PRELIMINARY GEOTECHNICAL DESIGN REPORT
INTERSTATE 395 OVER WEBSTER AVENUE
MAINEDOT WIN 19311.00
BANGOR, MAINE

by

Haley & Aldrich, Inc.
Portland, Maine

for

Maine Department of Transportation
Augusta, Maine

File No. 38751-010
20 December 2012

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20 December 2012
File No. 38751-010

Maine Department of Transportation
16 State House Station
Augusta, Maine 04333-0016

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

Subject: Preliminary Geotechnical Design Report
Interstate 395 over Webster Avenue
MaineDOT WIN 19311.00
Bangor, Maine

Ladies and Gentlemen:

This preliminary geotechnical design report (PGDR) presents the results of subsurface investigation and geotechnical laboratory testing programs, and also provides preliminary geotechnical design recommendations and geotechnical factors that will likely affect the bridge reconstruction/replacement. This PGDR has been prepared in support of Becker Structural Engineers, Inc. (Becker) Preliminary Design Report (PDR) submission to the Maine Department of Transportation (MaineDOT).

This work has been completed based on our mutually agreed upon work scope and in accordance with the provisions of our GCA Agreement with MaineDOT, No. CT20110614000000006492, and with our project-specific assignment letter dated 4 May 2012.

ELEVATION DATUM

Elevations referenced herein are in feet and reference the North American Vertical Datum of 1988 (NAVD 88).

PROJECT UNDERSTANDING

The existing bridge carries Interstate 395 (I-395) over Webster Avenue in Bangor, Maine as shown on Figure 1, Project Locus.

Based on our review of historic bridge plans provided by the Maine Department of Transportation (MaineDOT), it is our understanding that the existing bridge was originally constructed in 1957 and consists of an approximate 115-ft long, 123-ft wide, three-span structure supported on two abutments and two piers. The abutments and piers are supported on 35-ton design capacity, cast-in-place (CIP) concrete piles. Approximately 15 to 20 ft of soil was excavated during construction to allow Webster Avenue to pass beneath the bridge as shown on Figure 3. An existing 8-in. diameter PVC gravity sanitary sewer line was installed in 2006 and runs parallel to Webster Avenue. Based on review of sewer line construction drawings provided by you, we understand that the invert elevation of the sewer

line, within the limits of the existing overpass bridge, varies from approximately El. 120 to El. 123 (datum unknown).

Based on discussions with you, it is our understanding that Becker Structural Engineers, Inc. (Becker) has been retained by MaineDOT to evaluate bridge rehabilitation and replacement alternatives and to prepare a preliminary design report (PDR) summarizing the results of their study and the recommended bridge rehabilitation/replacement alternative. Based on our discussions with Becker and MaineDOT, it is our understanding that the rehabilitation/replacement alternatives currently consist of the following:

- Rehabilitation of the existing overpass bridge.
- Removal of the existing overpass bridge and replacement with earthfill. Pedestrian/bicycle access along Webster Avenue would be maintained by a "tunnel", which could consist of one of the following alternatives:
    - Galvanized and corrugated multi-plate steel culvert (multi-plate alternative)
    - Precast concrete box culvert (box culvert alternative)
    - Precast concrete arch (arch alternative)

Based on conversations with Becker, it is our understanding that, if selected, the preferred foundation system for the multi-plate and arch alternatives would be shallow foundations and the preferred foundation system for the box culvert alternative would be deep foundations. We also understand that each alternative will be approximately 12-ft wide and 14-ft tall.

Regardless of the alternative selected, the existing horizontal and vertical alignments of I-395 and Webster Avenue will not be altered. The proposed location of the "tunnel" is shown on Figure 2. Depending on the preferred alternative, we understand that staged construction and maintenance of I-395 traffic may be necessary during construction.

SUBSURFACE EXPLORATION PROGRAMS

Historic Explorations

Previous explorations were conducted at the site in association with the original construction of the bridge. Explorations were completed by the Maine State Highway Commission in February, 1957. A total of 12 explorations, consisting of "wash borings" and "punchings", were drilled/driven in the vicinity of each substructure (abutment, pier).

Seven "wash borings" (W-1 through W-3, W-5, W-8, W-10 and W-12) were drilled to depths ranging from approximately 27 to 45 ft below ground surface (BGS) using 2.5-in. steel casing. In-situ vane shear testing was conducted in each test boring. In addition, each test boring, with the exception of W-3, was advanced between 3 and 5 ft into bedrock.

Five "punchings" (PW-4, PW-6, PW-7, PW-9 and PW-11) were driven to depths ranging from approximately 28 to 34 ft BGS. The "punchings" were advanced by driving an "A" rod outfitted with a "probe point" using a 300 lb hammer dropped from a height of 14 in. The number of blows per foot

of advancement was recorded and is provided on the test boring logs in Appendix D. Each "punching", with the exception of PW-4 was driven to refusal. No information was provided on the historic drawings that define what refusal criterion was used to terminate the "punchings".

The locations of the explorations as well as logs providing information on subsurface conditions encountered in the "wash borings" and "punchings" are provided on historic drawings included in Appendix D.

Recent Explorations

Haley & Aldrich conducted a subsurface investigation at the site to provide general subsurface information in the vicinity of the existing overpass bridge. Three test borings, designated BB-BWA-101 through BB-BWA-102A, were drilled on the northerly and southerly sides of the existing bridge piers A and B. Test boring BB-BWA-102A was drilled to obtain additional in-situ vane shear strength data and undisturbed Shelby tube samples of marine clay. The as-drilled location of the test borings was determined in the field by taping/pacing distances from existing site features. Ground surface elevations at test boring locations were determined upon completion of drilling by MaineDOT using GPS and/or optical survey equipment. The as-drilled test boring locations are shown on Figure 2.

Test borings were drilled by MaineDOT and monitored by a Haley & Aldrich geologist on 16 and 17 July 2012 using a truck-mounted CME 45 drill rig. Test borings were drilled to depths ranging from approximately 17 to 34 ft BGS using 3.0-in. (NW-size) and 4.0-in. (HW-size) inside diameter (ID) steel casing. Soil samples were collected continuously and/or at standard 5-ft increments by driving a 1-3/8-in. ID split-spoon sampler with a 140-lb hammer dropped from a height of 30 in., using a calibrated automatic hammer.

The number of hammer blows required to advance the sampler through each 6 in. interval was recorded and is provided on the test boring logs. The uncorrected SPT N-value is defined as the total number of blows required to advance the sampler through the middle 12 in. of the 24-in. sampling interval (blows per foot, bpf). The energy-corrected SPT N-value (N_{60}) is equal to the uncorrected N-value multiplied by the hammer efficiency factor divided by 0.84 (i.e., 84 percent theoretical hammer efficiency).

A total of three, relatively undisturbed samples of cohesive soil (marine clay) were obtained in the test borings (one from each test boring). The samples were collected at various depths/elevations and were obtained by advancing a 3-in. outside diameter (OD) thin-wall Shelby Tube into the soil using a piston sampler.

In-situ vane shear tests were conducted in each of the test borings. In-situ vane shear tests were conducted with either a 55 mm by 110 mm or 65 mm by 130 mm Geonor rectangular vane (per MaineDOT requirements) attached to a 2-ft long, 12-mm diameter rod extension, attached to a string of 5/8-in. outside diameter (OD) hollow chrome-moly rods. At each in-situ vane shear test location, the vane was pushed (by hand) until the bottom of the vane was approximately 1 to 2 ft below the bottom of the borehole. The vane was then rotated at a rate of about 90 degrees per minute using a calibrated

torque wrench. Results of the vane shear testing, including raw torque values and calculated shear strengths, are provided on the test boring logs in Appendix A.

Test borings BB-BWA-101 and BB-BWA-102 were advanced approximately 10 ft into bedrock using a 2.0-in. (NQ-size) ID diamond-tipped core barrel.

One groundwater observation well was installed in test boring BB-BWA-101 upon the completion of drilling. The observation well consisted of a combination of 2-in. diameter screened and solid sections of PVC pipe extending from the bottom of the test boring to approximately 3 ft above the existing ground surface. The portion of the PVC pipe extending above ground surface was outfitted with a 4-in. diameter steel guardpipe.

GENERALIZED SUBSURFACE CONDITIONS

Soil and Bedrock Conditions

A. Portland Cement Concrete/Man-Placed Fill

An approximate 6-in.thick layer of Portland cement concrete was encountered at the ground surface in test boring BB-BWA-102.

A 4 to 6-ft thick layer of man-placed fill was encountered in each test boring at the ground surface or directly beneath the surficial layer of Portland cement concrete (BB-BWA-102). The thickness of fill generally increases from north to south, along Webster Avenue.

In general, the man-placed fill material consisted of the following:

- Brown medium to coarse SAND with varying percentages of silt, fine sand and gravel.
- Brown fine to coarse GRAVEL with varying percentages of silt and sand.

The fill was loose to medium dense with SPT N_{60} values ranging from 4 to 42 blows per foot (bpf, average of 25 bpf).

B. Marine Clay

Marine clay was encountered directly beneath the man-placed fill in each test boring. The deposit ranged in thickness from approximately 7 ft (BB-BWA-101) to 12 ft (BB-BWA-102) and generally increased from north to south. In general, the deposit consisted of dark olive gray silty CLAY.

The marine clay was typically medium stiff to stiff with measured in-situ undrained shear strengths ranging from approximately 600 to 1,100 pounds per square foot (psf). A summary of measured in-situ undrained shear strengths are summarized in Table I and Table II.

C. Glacial Till

Glacial till was encountered in each test boring. The deposit ranged in thickness from approximately 1 to 6 ft, increasing in thickness from north to south. The composition of the soil varied and generally consisted of the following:

- Silty CLAY with varying percentages of silt, sand and gravel.
- SILT with varying percentages of clay, sand and gravel.
- Fine to coarse GRAVEL with varying percentages of clay, silt and sand.

Due to the limited thickness of glacial till encountered and pre-determined sampling intervals, limited SPT data was obtained. Therefore, an accurate assessment of the density/consistency of the soil layer could not be determined.

D. Bedrock

As described above, bedrock was encountered and sampled in test borings BB-BWA-101 and BB-BWA-102. The top of bedrock surface varied from approximately 12 ft (BB-BWA-101) to 24 ft (BB-BWA-102) BGS, corresponding to El. 91 to El. 105. Bedrock encountered at the site consists of hard, very slightly to moderately weathered METAWACKE of the Bangor Formation. Primary joints were oriented at steep angles and joint surfaces were discolored and slightly to moderately weathered.

Rock quality designation (RQD) is a common parameter that is used to help assess the competency of sampled bedrock. RQD is defined as the sum of pieces of recovered bedrock greater than 4 in. in length divided by the total length of recovered bedrock. RQD values for bedrock encountered at the site ranged from 11 to 57 percent (average of approximately 56 percent in BB-BWA-101 and 13 percent in BB-BWA-102). Please note that the RQD values estimated from recovered bedrock core were likely influenced by joint orientation.

Groundwater Conditions

Water levels were measured in the observation well installed in completed test boring BB-BWA-101 as noted on the test boring log. The measured water level immediately after drilling was 5.2 ft BGS (El. 111.5; 1 ft below the top of marine clay). Please note that no long-term water levels were measured in the observation well. The water depth measured in test boring BB-BWA-101 may not be representative of groundwater and could have been influenced by drilling means/methods. In general, groundwater levels can be expected to fluctuate, subject to seasonal variation, local soil conditions, topography and precipitation. Water levels encountered during construction may differ from those summarized above.

LABORATORY TESTING PROGRAM

A preliminary phase laboratory testing program was undertaken to assist in soil classification/identification and to determine engineering properties of representative soil samples (cohesionless and cohesive) collected during the field investigation. In general, laboratory testing was performed on disturbed and undisturbed soil samples collected during SPT and Shelby Tube sampling,

respectively. All laboratory soil testing was performed by the MaineDOT Materials Testing and Exploration Central Laboratory in Bangor, Maine in accordance with applicable American Society for Testing Material (ASTM) testing procedures. A summary of laboratory testing conducted for the different soil types encountered at this site are is provided below.

The testing program on samples of man-placed fill included four natural water content tests and four grain size analyses (with hydrometer). A summary of laboratory test results on these samples is provided below.

- Classification: GW-GC, GC-GM, SC-SM
- Natural Water Content: 2% to 13%

The testing program on samples of marine clay included eight natural water content tests, eight Atterberg Limits tests, four grain size analyses (with hydrometer) and three incremental consolidation tests (used to determine compressibility and stress history characteristics of marine clay). A summary of laboratory test results completed on collected samples of marine clay is provided below.

- Classification: CL
- Natural Water Content: 27% to 33%
- Atterberg Limits:
  - Liquid Limit (LL): 25% to 31%
  - Plastic Limit (PL): 17% to 20%
  - Plasticity Index (PI): 5% to 12%
- Total Unit Weight: 117 pcf to 126 pcf

STRENGTH AND COMPRESSIBILITY CHARACTERISTICS OF MARINE CLAY

The stress-strain or compressibility characteristics of clay deposits are highly dependent upon their stress history. Overconsolidation is a condition that results from the clay deposit having been exposed, at some time in the geologic past, to stresses greater than the present in-place stresses. If the clay deposit is stressed within the limits of the maximum previous stress (i.e., maximum past pressure), the magnitude of consolidation settlement will be a function of the recompression ratio (RR) of the clay. If the applied stress exceeds the maximum previous stress, the magnitude of consolidation settlement will be a function of the virgin compression ratio (CR). Measured values of CR are typically 10 to 25 times greater than RR, and consolidation settlement is directly correlated with the value of CR or RR. Therefore, the estimated consolidation settlement for normally consolidated clay would be 10 to 25 times greater than that of overconsolidated clay for the same stress increase. A summary of the stress history and compressibility characteristics determined from incremental consolidation tests is provided below and is shown on Figure 4.

Test Boring No.[1]	Sample No.	Sample Elevation (ft, NAVD88)	Stress History[2]			Compressibility[2]	
			Existing Vertical Effective Stress (psf)	Maximum Previous Stress (psf)	OCR	CR	RR
BB-BWA-101[3]	1U	107.7	884	2,640	3.0	0.12	0.020
BB-BWA-102	1U	98.7	1,204	3,840	3.2	0.21	0.016
BB-BWA-102A	1U	105.7	773	4,000	5.2	0.23	0.022

Notes:
[1] – Refer to Figure 2 for approximate test boring locations.
[2] – Values shown are considered approximate and are based on interpretation of laboratory test results.
[3] – Laboratory test results indicative of moderately to highly disturbed sample and are likely not representative of actual conditions. The results were not used to develop the design OCR profile shown in Figure 4.

The design overconsolidation profile is shown in comparison to the laboratory consolidation data and the existing effective overburden pressure in Figure 4. The data indicates that the marine clay is heavily overconsolidated in the upper portion of the deposit and becomes moderately overconsolidated with depth (near the bottom of the deposit). The overconsolidation is partially a function of the approximately 15 to 20 ft of soil that was present within the limits of the existing overpass bridge and removed (excavated) during original bridge (I-395)/roadway (Webster Avenue) construction as shown in Figure 3. As a result, it is our opinion that settlement resulting from the proposed overpass bridge removal and fill placement, will be minimal. Settlement analysis and results are presented in subsequent sections of this memorandum.

The undrained shear strength profile of the marine clay stratum was determined using in-situ vane shear tests conducted during drilling of the historic and recent test borings, as well as an empirical approach known as Stress History and Normalized Engineering Properties (SHANSEP). The design undrained shear strength profile used in our global stability and settlement evaluations is shown in Figure 4.

PRELIMINARY GEOTECHNICAL EVALUATIONS

Global Stability

Removal of the existing overpass bridge and replacement with earthfill (up to approximately 20 ft) could cause excessive vertical and lateral strains eventually resulting in a shear failure of the foundation soil (marine clay) and subsequent failure of the roadway (I-395). A series of computer-assisted, two-dimensional global stability evaluations were performed using the computer program Slide 5.0 to evaluate the likelihood of global stability failures at the site.

Stability evaluations were conducted transverse to the I-395 baseline (parallel to Webster Avenue) where, based on our review of existing topography and proposed grading information provided by Becker, maximum raises in grade are anticipated. A typical soil profile was developed based on the subsurface conditions encountered in the recently completed explorations (BB-BWA-101 and BB-BWA-102). The marine clay layer was modeled with an undrained shear strength equal to 900 psf (see Figure 4) based on in-situ and laboratory test results. In addition, a 250 psf live load surcharge within the limits of I-395 was included in our model.

The calculated factor of safety for the condition summarized above is 1.8. The minimum required factor of safety as specified by both AASHTO LRFD and the MaineDOT Bridge Design Guide (BDG) for "embankments" under static conditions, which do not support structures are 1.3 and 1.25, respectively.

We also conducted a "sensitivity" analysis where we varied the undrained shear strength of the marine clay until the calculated factor of safety was equal to the minimum acceptable factor of safety (i.e., 1.25). The undrained shear strength of the marine clay layer which resulted in a calculated factor of safety equal to 1.25 was found to be 550 psf, well below the 900 psf design shear strength determined from field measurements. Therefore, it is our opinion; based on the results of our evaluations, that backfilling the area beneath the existing bridge overpass with earthfill will not cause a global stability failure.

Consolidation Settlement

The subsurface soil conditions along Webster Avenue and within the limits of the existing I-395 overpass bridge will affect the planning and design of the proposed construction. Maximum raises in site grades of approximately 20 ft are anticipated within the limits of the existing I-395 overpass bridge.

Placement of normal weight earthfill will cause consolidation settlement of the underlying marine clay. As a result, we conducted settlement evaluations to assess the feasibility of constructing the "infill" with normal weight earthfill and to determine the foundation support requirements for the various "tunnel" alternatives.

As described above, the stress-strain or compressibility characteristics of marine clay deposits are highly dependent upon their stress history. Based on the laboratory test results, the maximum previous stress (i.e., maximum past pressure) within the marine clay deposit exceeds the existing vertical effective stress ($3.0 < OCR < 5.2$). The magnitude of stress increase within the marine clay deposit, as a result of the proposed fill placement, was estimated by assuming a maximum fill height equal to 20 ft with normal weight earthfill weighing 125 pounds per cubic foot (pcf). Since the combination of existing vertical effective stress and the stress increase caused by fill placement will be less than the maximum past pressure, the magnitude of consolidation settlement will be a function of the recompression ratio ($0.016 < RR < 0.022$) of the clay. Please recall that if the stress increase exceeds the maximum previous stress, the magnitude of consolidation settlement would be a function of the virgin compression ratio, which were measured to be between 6 and 13 times greater than RR.

Detailed settlement evaluations were conducted using the computer program Settle 3D and the design maximum past pressure profile discussed above and shown on Figure 4. Estimates of settlement were computed along the proposed "tunnel" alignment, the existing sanitary sewer alignment and along the centerline and edges of I-395. Estimates of the magnitude of ground surface settlement using normal weight earthfill are summarized below and on Figure 2.

Range of Estimated Consolidation Settlement (in.)	Location
0.50 to 1.25	Northerly Edge of I-395
0.25 to 1.50	Centerline of I-395
0.50 to 1.50	Southerly Edge of I-395
0.25 to 1.50	Proposed Tunnel
0.25 to 1.50	Existing Sewer Line

As discussed above, the estimated magnitude of settlement will occur as recompression since the combination of existing vertical effective stress and estimated stress increase within the marine clay layer is less than the maximum past pressure. As a result, we anticipate that the majority of settlement will occur during construction, as earthfill is placed and compacted.

We recommend that the estimated magnitude of consolidation settlement summarized above and on Figure 2 be forwarded to Becker and other members of the design team for use in evaluating potential alternatives (rehabilitation versus removal and replacement with earthfill) as well as impacts on the existing sewer line. Based on the magnitude of anticipated settlement, it is our opinion that the new tunnel could be supported on spread/continuous footings bearing on undisturbed, naturally-deposited marine clay. We recommend that Becker review the anticipated magnitudes of settlement to confirm that they are acceptable for the selected tunnel alternative.

In addition, based on conversations with Becker, it is our understanding that if the existing overpass bridge is removed the bridge substructures (pile supported abutments and piers) will remain in place. Although the majority of settlement is anticipated to occur during construction, it is our opinion that there is some potential for “hard spots” to develop at the existing overpass bridge substructure locations after construction has been completed, particularly between the two bridge pier locations where maximum raises in grade are anticipated.

CLOSURE

We trust this information meets your present needs. Please do not hesitate to contact us if you have any questions, comments or concerns related to information summarized in this report.

Sincerely yours,
HALEY & ALDRICH, INC.

Bryan C. Steinert, P.E.
Senior Geotechnical Engineer

Wayne A. Chadbourne, P.E.
Lead Geotechnical Engineer/Vice President

STATE OF MAINE
WAYNE A. CHADBOURNE
No. 10620
LICENSED
PROFESSIONAL ENGINEER

Enclosures:

Table I -	Preliminary Design In-Situ Vane Shear Test Results
Table II -	Historic In-Situ Vane Shear Test Results
Figure 1 -	Project Locus
Figure 2 -	Settlement Evaluation
Figure 3 –	Interpretive Geologic Profile
Figure 4 –	Compressibility and Shear Strength Data for Marine Silt/Clay
Appendix A -	Test Boring Logs
Appendix B -	Observation Well Installation & Groundwater Monitoring Reports
Appendix C -	Laboratory Test Results
Appendix D -	Historic Bridge Plans

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TABLE I
Preliminary Design In-Situ Vane Shear Test Results
Interstate 395 over Webster Avenue
MaineDOT WIN 19311.00
Bangor, Maine

Haley & Aldrich File No.: 38751-010

Test Boring No.[1]	Ground Surface Elevation[2] (ft, NAVD 88)	Test No.	Depth Below Ground Surface (ft)	Approximate Elevation[2] (ft, NAVD 88)	Undrained Shear Strength[3]	
					tons/sq. ft	lbs/sq. ft
BB-BWA-101	116.7	V1A	10.8	105.9	1,870	935
BB-BWA-102	114.7	V1A	13.8	100.9	1,760	880
		V1B	14.8	99.9	1,870	935
		V2A	17.6	97.1	2,240	1,120
BB-BWA-102A	113.7	V1A	9.8	103.9	1,680	840
		V1B	10.8	102.9	1,490	745
		V2A	11.8	101.9	1,210	605
		V2B	12.8	100.9	1,490	745
		V3A	13.8	99.9	1,210	605
		V3B	14.8	99.0	1,490	745
		V4A	15.8	97.9	1,770	885

Notes:
[1] - See Figure 2 for plan location of test borings.
[2] - Ground surface elevations at test boring locations were determined by MaineDOT using optical survey equipment upon the completion of drilling.
[3] - Vane shear measurements are shown on the test boring logs presented in Appendix A.

Completed By:	BCS	7/18/2012
Checked By:	EFW	7/18/2012
Reviewed By:	WAC	12/7/2012

TABLE II
Historic In-Situ Vane Shear Test Results
Interstate 395 over Webster Avenue
MaineDOT WIN 19311.00
Bangor, Maine

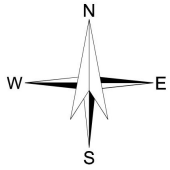
Haley & Aldrich File No.: 38751-010

Test Boring No.[1]	Ground Surface Elevation[2] (ft, NAVD 88)	Test No.	Depth Below Ground Surface (ft)	Approximate Elevation[2] (ft, NAVD 88)	Undrained Shear Strength[3]	
					tons/sq. ft	lbs/sq. ft
W-1	128.1	FV1	8.0	120.1	1.590	3,180
		FV2	13.0	115.1	1.360	2,720
		FV3	18.0	110.1	0.383	766
		FV4	22.0	106.1	0.443	886
W-2	126.8	FV1	8.0	118.8	1.640	3,280
		FV2	13.0	113.8	1.120	2,240
		FV3	18.0	108.8	0.483	966
		FV4	23.0	103.8	0.483	966
W-3	125.8	FV1	8.0	117.8	1.360	2,720
		FV2	13.0	112.8	1.040	2,080
		FV3	18.0	107.8	0.403	806
		FV4	23.0	102.8	0.403	806
		FV5	27.0	98.8	0.423	846
W-5	128.6	FV1	8.0	120.6	1.680	3,360
		FV2	13.0	115.6	1.500	3,000
		FV3	18.0	110.6	0.383	766
		FV4	23.0	105.6	0.423	846
W-8	129.6	FV1	8.0	121.6	1.550	3,100
		FV2	13.0	116.6	1.500	3,000
		FV3	18.0	111.6	0.544	1,088
		FV4	23.0	106.6	0.463	926
W-10	132.0	FV1	8.0	124.0	1.960	3,920
		FV2	13.0	119.0	1.220	2,440
		FV3	18.0	114.0	0.423	846
		FV4	23.0	109.0	0.403	806
W-12	128.1	FV1	8.0	120.1	1.780	3,560
		FV2	13.0	115.1	1.080	2,160
		FV3	18.0	110.1	0.564	1,128
		FV4	23.0	105.1	0.604	1,208

Notes:
[1] - See historic bridge plans included in Appendix D for the plan location of test borings.
[2] - Ground surface elevations at test boring locations were provided on the test boring logs in Appendix D and were assumed to reference the NAVD 88 datum.
[3] - Vane shear measurements are shown on the test boring logs presented in Appendix D.

Completed By:	BCS	5/4/2012
Checked By:	EFW	5/4/2012
Reviewed By:	WAC	12/7/2012

SITE COORDINATES:44°47'11"N 68°48'10"W



U.S.G.S. QUADRANGLE: BANGOR, ME

HALEY & ALDRICH

INTERSTATE 395 OVER WEBSTER AVENUE
MAINEDOT WIN 19311.00
BANGOR, MAINE

PROJECT LOCUS

SCALE: 1:24,000
OCTOBER 2012

FIGURE 1

38751-010 1.PDF

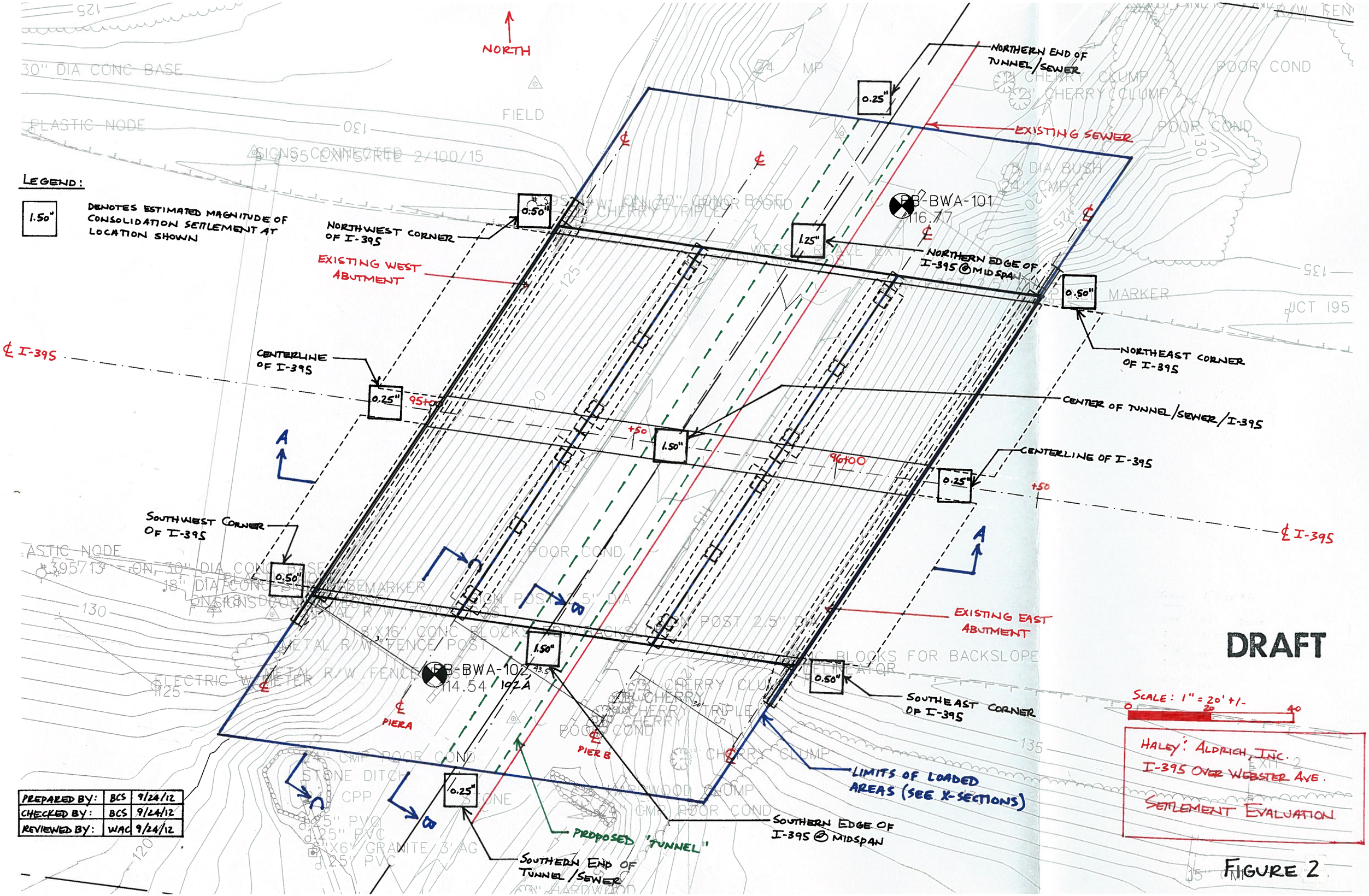
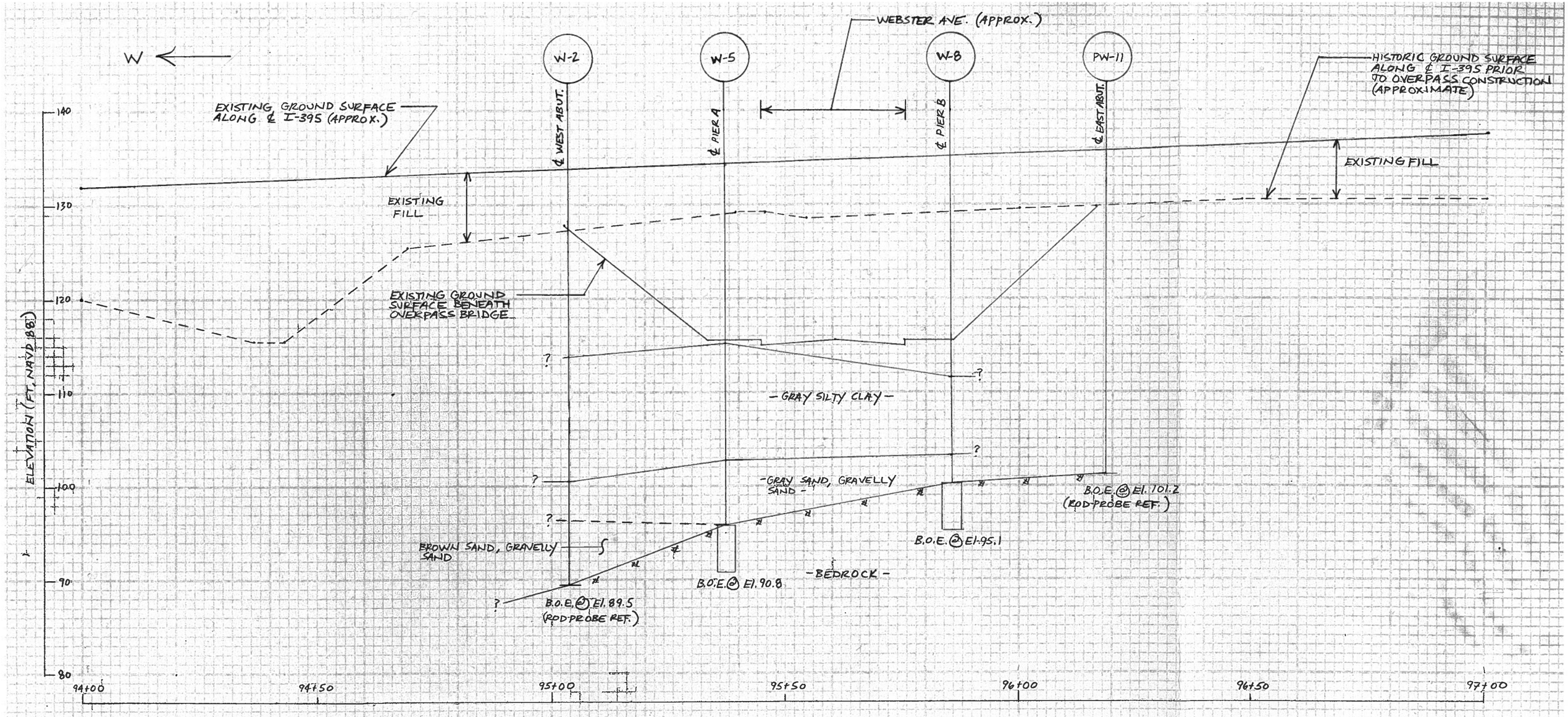

NORTH
LEGEND:
1.50" DENOTES ESTIMATED MAGNITUDE OF CONSOLIDATION SETTLEMENT AT LOCATION SHOWN
NORTHERN END OF TUNNEL/SEWER
EXISTING SEWER
0.25"
0.50"
1.25"
1.50"
PB-BWA-101
116.77
NORTHWEST CORNER OF I-395
EXISTING WEST ABUTMENT
NORTHERN EDGE OF I-395 @ MIDSPAN
NORTHEAST CORNER OF I-395
CENTERLINE OF I-395
℄ I-395
95+00
96+00
+50
CENTER OF TUNNEL/SEWER/I-395
CENTERLINE OF I-395
SOUTHWEST CORNER OF I-395
EXISTING EAST ABUTMENT
PB-BWA-102
114.54
107A
℄ PIER A
℄ PIER B
SOUTHEAST CORNER OF I-395
LIMITS OF LOADED AREAS (SEE X-SECTIONS)
SOUTHERN EDGE OF I-395 @ MIDSPAN
PROPOSED "TUNNEL"
SOUTHERN END OF TUNNEL/SEWER
A
B
C
D
DRAFT
SCALE: 1" = 20' +/-
0
20
40
HALEY & ALDRICH, INC.
I-395 OVER WEBSTER AVE.
SETTLEMENT EVALUATION
PREPARED BY: BCS 9/24/12
CHECKED BY: BCS 9/24/12
REVIEWED BY: WAC 9/24/12

FIGURE 2



SCALE: H: 1" = 20'
V: 1" = 10'

NOTES:

1. SEE FIGURE 2 FOR THE LOCATION AND ORIENTATION OF THE SUBSURFACE PROFILE (EXISTING I-395 CENTERLINE).
2. HISTORIC GROUND SURFACE ELEVATIONS WERE DETERMINED BY SCALING FROM HISTORIC BRIDGE DRAWINGS INCLUDED IN APPENDIX D AND SHOULD BE CONSIDERED APPROXIMATE.
3. EXISTING GROUND SURFACE ELEVATIONS ALONG AND BENEATH I-395 WERE TAKEN FROM SITE TOPOGRAPHIC INFORMATION PROVIDED BY BECKER.
4. LINES REPRESENTING CHANGES IN STRATA SHOWN ON THE PROFILE ARE BASED ON LINEAR INTERPOLATION BETWEEN SUBSURFACE EXPLORATIONS AND DEPICT ANTICIPATED SUBSURFACE CONDITIONS ALONG I-395. THE ACTUAL CONDITIONS WILL DIFFER FROM THOSE SHOWN.
5. REFER TO TEST BORING LOGS IN APPENDIX D FOR SPECIFIC SUBSURFACE INFORMATION. DATA NOT SHOWN FOR CLARITY. THE INTENT OF THIS PROFILE IS TO SHOW CHANGES IN GROUND SURFACE ELEVATION.

LEGEND:

W-2 — DESIGNATION AND APPROXIMATE LOCATION OF TEST BORING/PUNCHING DRILLED/DRIVEN BY THE MAINE STATE HIGHWAY COMMISION IN 1957.

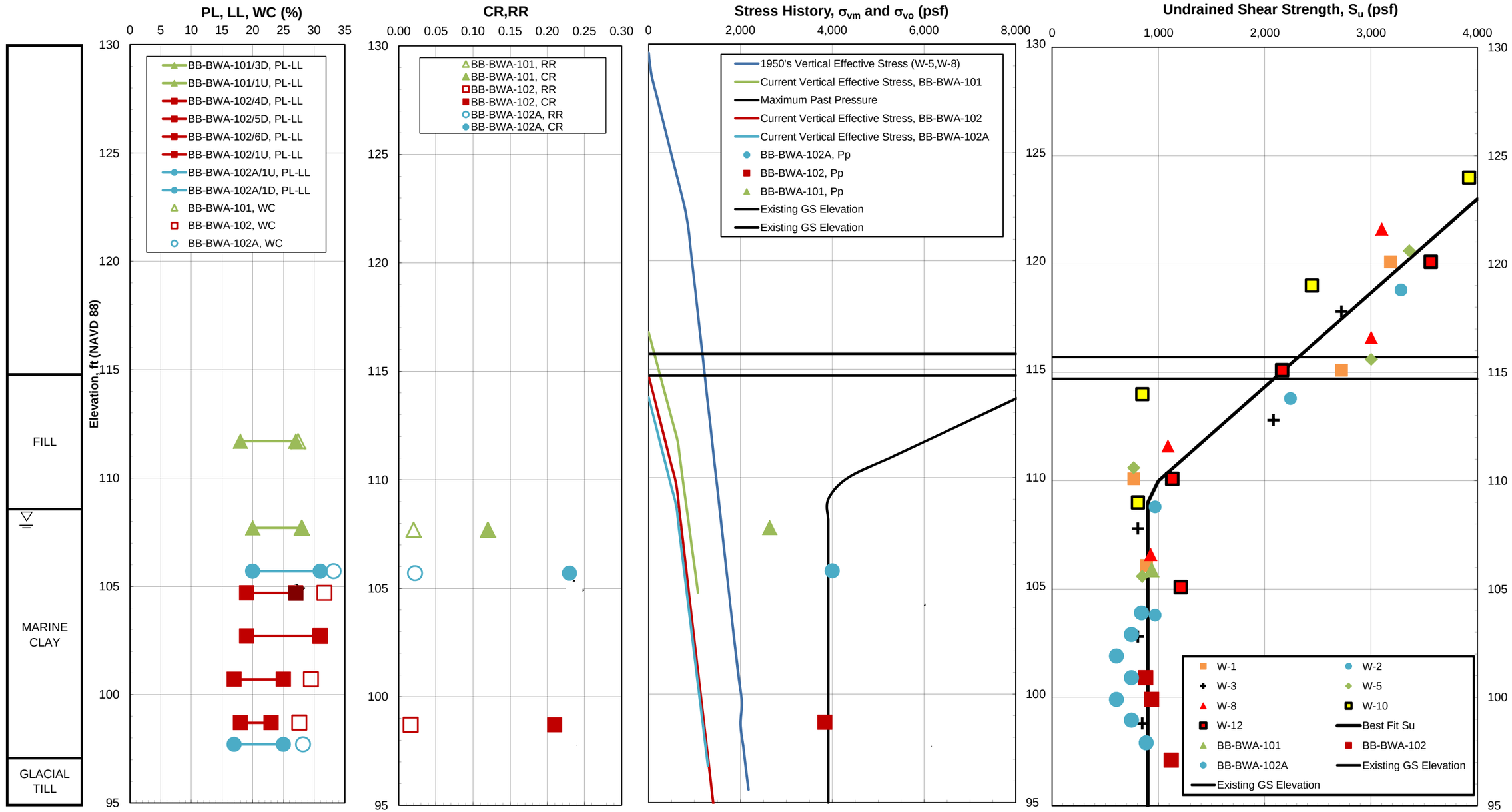
B.O.E. — APPROXIMATE BOTTOM OF EXPLORATION AT DEPTH/ELEVATION SHOWN.

INTERSTATE 395 OVER WEBSTER AVE.
MAINEDOT WIN 19311.00
BANGOR, MAINE

INTERPRETIVE GEOLOGIC PROFILE A-A

JUNE 2012

FIGURE 3



NOTES:

1. Typical soil profile and in-situ vane test results from historic and preliminary design phase test borings; see Tables I and II for tabulated results.
2. Compressibility data from laboratory incremental consolidation tests performed on specimens of marine clay trimmed from Shelby tube samples obtained from test borings BB-BWA-101, -102 and -102A.
3. Design undrained shear strength profile developed by establishing a best-fit curve through in-situ vane shear test data shown.
4. Design preconsolidation pressure profile established using a ratio of undrained shear strength (Su) over preconsolidation pressure (Pp) equal to 0.23.
5. Design Su/Pp ratio was determined by comparison of the design undrained shear strength to the corresponding preconsolidation pressure at similar depths.
6. RR = Recompression Ratio; CR = Virgin Compression Ratio; Po' = Existing Effective Overburden Pressure
7. Compressibility data from test boring BB-BWA-101 indicative of moderately to highly disturbed sample. Results were not used to develop the design preconsolidation pressure profile shown.

COMPLETED BY:	BCS
CHECKED BY:	EFW
REVIEWED BY:	WAC

HALEY & ALDRICH

INTERSTATE 395 OVER WEBSTER AVENUE
MAINEDOT WIN 19311.00
BANGOR, MAINE

COMPRESSIBILITY AND SHEAR STRENGTH DATA FOR MARINE SILT/CLAY

NOT TO SCALE
DECEMBER 2012

FIGURE 4

G:\PROJECTS\38751 - MaineDOT Multi-PIN Support\010 - I395 Webster Ave Overpass\[2012_0606_HAI_Compressibility Data_rev2.xlsx]Compressibility Figure

APPENDIX A

Test Boring Logs

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 395 over Webster Avenue
Location: Bangor, Maine

Boring No.: BB-BWA-101
PIN: 19311.00

Driller:	MaineDOT	**Elevation (ft.)**	116.7	**Auger ID/OD:**	--
Operator:	E. Giguere	**Datum:**	NAVD 88	**Sampler:**	Split Spoon-1.375 in. ID
Logged By:	B. Babcock	**Rig Type:**	CME 45 Skid on Truck	**Hammer Wt./Fall:**	HW-NW-S 140#/30 in.
Date Start/Finish:	07-16-2012/07-16-2012	**Drilling Method:**	HW/NW	**Core Barrel:**	NQ-2.0 in.
Boring Location:	See Plan	**Casing ID/OD:**	HW-4.0 in. ID/NW-3.0 in. ID	**Water Level*:**	5.2
Hammer Efficiency Factor:	0.84	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Sample Information

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	1D	24/12	0.0 - 2.0	5/10/11/8	21	29	PUSH		Brown, dry, medium dense, gravelly medium to coarse SAND, trace fine sand, little silt -FILL-(GC/GM)	G#244201 A-1-b, GC/GM WC=2.3%
	2D	24/18	2.0 - 4.0	3/10/9/5	19	27			Brown with gray-brown, dry to moist, medium dense, gravelly medium to coarse SAND, trace fine sand, little silt -FILL-(SC-SM)	G#244202 A-1-b, SC-SM WC=4.8%
								112.7	4.0	
	3D	24/14	4.0 - 6.0	3/1/1/1	2	3			Olive-gray, wet, very soft, silty CLAY, pocket penetrometer <0.1 tsf -MARINE DEPOSIT-(CL)	G#244203 A-4, CL WC=27.4%, LL=27 PL=18, PI=9
5										
	MU	24/0	6.0 - 8.0						Pushed thinwall tube 24 in. with no recovery. Pushed spoon through sample zone, recovered 2 in. clay similar to above	
	1U	24/23	8.0 - 10.0				4		Pushed thinwall tube 24 in., 23 in. recovery	G#244204 A-4, CL WC=28.0%, LL=28 PL=20, PI=8 C#244204
							6			
10	V1A		10.6 - 11.0	Su=935/285 psf			6		65x110 mm vane raw torque readings: V1A: 33.0/10.0 ft-lbs Note: Vane refusal at 11.0 ft.	
								105.7	11.0	
	4D	11/5	11.0 - 11.9	8/100(5.0")			24	104.8	Gray, wet, very dense, fine to coarse GRAVEL, some clay, little fine to coarse sand, trace silt -GLACIAL TILL-(GC)	
	R1	60/60	12.4 - 17.4	RQD = 55%					11.9	
									Top of Bedrock at El. 104.8 ft Light green-gray, aphanitic to fine grained METAWACKE. Hard, very slight to moderately weathered between 16.9 and 17.4 ft. Primary joints dipping at steep angles, close, smooth, undulating, discolored, open. Secondary joints dipping at vertical angles, very close, rough, stepped, discolored to moderately weathered with silt infilling, open. Quartzose veins throughout. Total water loss between 16.4 and 17.4 ft. Rock Mass Quality=Fair -BANGOR FORMATION- R1 Core Times (min:sec): 12.4-13.4' (3:59); 13.4-14.4' (2:46); 14.4-15.4' (3:09); 15.4-16.4' (2:10); 16.4-17.4' (2:15)	
15										
	R2	60/60	17.4 - 22.4	RQD = 57%					Light green-gray, aphanitic to fine grained METAWACKE. Hard, moderately to very slightly weathered. Primary joints dipping at steep angles, close, smooth, planar, discolored to slightly weathered, open. Secondary joints dipping at vertical angles, close to moderately close, rough, stepped, discolored to moderately weathered with occasional brown clay infilling, open to healed. Quartzose veins throughout. Total water loss during core run from 17.4 to 22.4 ft. Rock Mass Quality=Fair -BANGOR FORMATION- R2 Core Times (min:sec): 17.4-18.4' (2:35); 18.4-19.4' (3:05); 19.4-20.4' (2:35); 20.4-21.4' (1:31); 21.4-22.4' (1:48)	
20								94.3		
									22.4	
25									**Bottom of Exploration at 22.4 feet below ground surface.**	

Remarks:

1. Ground surface elevations at test boring locations were determined by MaineDOT upon the completion of drilling.

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

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

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 395 over Webster Avenue
Location: Bangor, Maine

Boring No.: BB-BWA-102
PIN: 19311.00

Driller:	MaineDOT	**Elevation (ft.)**	114.7	**Auger ID/OD:**	--
Operator:	E. Giguere	**Datum:**	NAVD 88	**Sampler:**	Split Spoon-1.375 in. ID
Logged By:	B. Babcock	**Rig Type:**	CME 45 Skid on Truck	**Hammer Wt./Fall:**	HW-NW-S 140#/30 in.
Date Start/Finish:	07-16-2012/07-17-2012	**Drilling Method:**	HW/NW	**Core Barrel:**	NQ-2.0 in.
Boring Location:	See Plan	**Casing ID/OD:**	HW-4.0 in. ID/NW-3.0 in. ID	**Water Level*:**	Not Measured
Hammer Efficiency Factor:	0.84	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Sample Information

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0							Push	114.2	-PORTLAND CEMENT CONCRETE- 0.5	
	1D	24/4	1.0 - 3.0	2/11/17/15	28	39			Brown, dry, medium dense, gravelly medium to coarse SAND, trace fine sand, little silt -FILL-(GW-GC)	G#244205 A-1-a, GW-GC W=8.2%
	2D	24/18	3.0 - 5.0	5/19/11/13	30	42			Brown with gray-brown, dry to moist, medium dense, sandy fine to coarse GRAVEL, little silt -FILL-(GC-GM)	G#244206 A-1-a, GC-GM WC=5.2%
5	3D	24/15	5.0 - 7.0	5/7/2/2	9	13	10		Brown, wet, loose, gravelly fine to coarse SAND, little silt -FILL-(GC-GM)	G#244207 A-1-b, GC-GM WC=12.5%
							12	108.7	6.0 Dark olive-gray, wet, soft, silty CLAY, pocket penetrometer<0.1 tsf -MARINE DEPOSIT-(CL) Note: Gravel caught between casing and roller bit while washing ahead to 7.0 ft. Forced to wash ahead to 9.0 ft.	
							20			
							Open			
10	MU 4D	24/24	9.0 - 11.0						Push thinwall tube 24 in. from 9 to 11 ft, no recovery. Dark olive-gray, wet, medium stiff, silty CLAY, pocket penetrometer <0.1 tsf -MARINE DEPOSIT-(CL)	WC=31.7%, LL=27 PL-19, PI=8
	MV 5D	24/16	11.0 - 13.0						Push thinwall tube 24 in. from 11.0 to 13.0 ft, no recovery Dark olive-gray, wet, medium stiff, silty CLAY, pocket penetrometer <0.1 tsf -MARINE DEPOSIT-(CL)	WC=31.0%, LL=31 PL=19, PI=12
	6D V1A	24/24	13.0 - 15.0 13.6 - 14.0	- Su=880/170 psf					Dark olive-gray, wet, soft, silty CLAY, pocket penetrometer <0.1 tsf -MARINE DEPOSIT-(CL) 65x110 mm vane raw torque readings: V1A: 31.0/6.0 ft-lbs V2A: 33.0/7.5 ft-lbs	WC=29.5%, LL=25 PL=17, PI=8
	V1B		14.6 - 15.0	Su=935/225 psf						
15	1U	24/18	15.0 - 17.0						Pushed thinwall tube 24 in. from 15.0 to 17.0 ft, recovered 18 in.	G#244208 A-4, CL WC=27.6%, LL=23 PL=18, PI=5
	7D V2A	24/10	17.0 - 19.0 17.4 - 17.8	WOH(12.0")/3/8 Su=1,120/95 psf				96.9	55x130 mm vane raw torque readings: V2A: 24.0/2.0 ft-lbs Note: Vane refusal at 17.8 ft. 17.8	
	8D	24/10	19.0 - 21.0	9/11/4/17	15	21	8	95.7	Gray, wet, stiff, silty CLAY, little gravel, little silt, little fine sand, trace medium to coarse sand -GLACIAL TILL-(CL) 19.0	
20							23		Gray, wet, stiff, SILT, some clay, little gravel, little fine to coarse sand -GLACIAL TILL-(ML)	
							21			
							22		Note: Casing and drill action indicate probable bedrock at 23.7 ft.	
	R1	24/22	23.7 - 25.7	RQD = 75%			42(7.0")	91.0	23.7 Top of Bedrock at El. 91.0 ft Gray, aphanitic to fine grained METAWACKE. Hard, very slight to	
25										

Remarks:

1. Ground surface elevations at test boring locations were determined by MaineDOT upon the completion of drilling.

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

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

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 395 over Webster Avenue
Location: Bangor, Maine

Boring No.: BB-BWA-102
PIN: 19311.00

Driller:	MaineDOT	**Elevation (ft.)**	114.7	**Auger ID/OD:**	--
Operator:	E. Giguere	**Datum:**	NAVD 88	**Sampler:**	Split Spoon-1.375 in. ID
Logged By:	B. Babcock	**Rig Type:**	CME 45 Skid on Truck	**Hammer Wt./Fall:**	HW-NW-S 140#/30 in.
Date Start/Finish:	07-16-2012/07-17-2012	**Drilling Method:**	HW/NW	**Core Barrel:**	NQ-2.0 in.
Boring Location:	See Plan	**Casing ID/OD:**	HW-4.0 in. ID/NW-3.0 in. ID	**Water Level*:**	Not Measured
Hammer Efficiency Factor:	0.84	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
25	R2	54/54	25.7 - 30.2	RQD = 14%						moderately weathered. Primary joints dipping at steep angles, close to very close, smooth, planar, discolored, moderately weathered, open. Single horizontal joint at 24.3 ft, smooth, undulating, slightly weathered with minimal brown silt infilling, open. Note: Barrel jammed at 25.7 ft. Rock Mass Quality=Fair -BANGOR FORMATION- R1 Core Times (min:sec): 23.7-24.7' (2:05); 24.7-25.7' (2:15)	
30	R3	42/36	30.2 - 33.7	RQD = 11%						Gray, aphanitic to fine grained METAWACKE. Hard, very slight to moderately weathered. Primary joints dipping at steep angles, close, smooth to rough, stepped, discolored to slightly weathered with minimal silt infilling, open. Secondary joints dipping at vertical angles, close, smooth to rough, planar to stepped, discolored to slightly weathered, open. Horizontal joints close to moderately close, smooth, undulating, slightly weathered with minimal silt infilling, open. Rock Mass Quality=Very Poor -BANGOR FORMATION- R2 Core Times (min:sec): 25.7-26.7' (3:34); 26.7-27.7' (2:49); 27.7-28.7' (2:20); 28.7-29.7' (2:06); 29.7-30.2' (2:14)	
								81.0		Gray, aphanitic to fine grained METAWACKE. Hard, very slight to moderately weathered. Primary joints dipping at steep angles, close; smooth to rough, stepped to planar, discolored to slightly weathered, open, moderately weathered zone from 31.9 to 32.2 ft. Rock Mass Quality=Very Poor -BANGOR FORMATION- R3 Core Times (min:sec): 30.2-31.2' (1:48); 31.2-32.2' (3:04); 32.2-33.3' (3:12); 33.3-33.7' (1:50)	
35											
40											
45											
50											

33.7

Bottom of Exploration at 33.7 feet below ground surface.

Remarks:

1. Ground surface elevations at test boring locations were determined by MaineDOT upon the completion of drilling.

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

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

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 395 over Webster Avenue
Location: Bangor, Maine

Boring No.: BB-BWA-102A
PIN: 19311.00

Driller:	MaineDOT	**Elevation (ft.)**	113.7	**Auger ID/OD:**	--
Operator:	E. Giguere	**Datum:**	NAVD 88	**Sampler:**	Split Spoon-1.375 in. ID
Logged By:	B. Babcock	**Rig Type:**	CME 45 Skid on Truck	**Hammer Wt./Fall:**	HW-S 140#/30 in.
Date Start/Finish:	07-17-2012/07-17-2012	**Drilling Method:**	HW/NW	**Core Barrel:**	NQ-2.0 in.
Boring Location:	See Plan	**Casing ID/OD:**	HW-4.0 in. ID	**Water Level*:**	Not Measured
Hammer Efficiency Factor:	0.6	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Sample Information

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0							HSA		Note: Advanced borehole to 7.0 ft, unsampled. See BB-BWA-102 log for overburden details. -FILL-	
5							10			
							12	107.7	6.0	
	1U	24/22	7.0 - 9.0				Open		Push thinwall tube 24 in., recovered 22 in.	G#244212 A-6, CL WC=33.2%, LL=31 PL=20, PI=11 C#244212
10	V1A		9.6 - 10.0	Su=840/235 psf					55x130 mm vane raw torque readings: V1A: 18.0/5.0 ft-lbs V1B: 16.0/4.0 ft-lbs	
	V1B		10.6 - 11.0	Su=745/185 psf						
	V2A		11.6 - 12.0	Su=605/140 psf					55x130 mm vane raw torque readings: V2A: 13.0/3.0 ft-lbs V2B: 14.5/4.0 ft-lbs	
	V2B		12.6 - 13.0	Su=745/185 psf						
	V3A		13.6 - 14.0	Su=605/140 psf					55x130 mm vane raw torque readings: V3A: 13.0/3.0 ft-lbs V3B: 16.0/4.0 ft-lbs	
	V3B		14.6 - 14.9	Su=745/185 psf						
15	1D	24/24	15.0 - 17.0	Push(12.0")/12/19					Dark olive-gray, wet, medium stiff to stiff, silty CLAY, little silt, pocket penetrometer <1 tsf, few pieces gravel in tip of spoon -MARINE DEPOSIT-(CL)	WC=28.2%, LL=25 PL=17, PI=8
	V4A		15.6 - 16.0	Su=885/185 psf				96.9	55x130 mm vane raw torque readings: V4A: 19.0/4.0 ft-lbs Note: Vane refual at 16.7 ft.	
								96.7	16.8	
									-PROBABLE GLACIAL TILL- 17.0	
20									**Bottom of Exploration at 17.0 feet below ground surface.**	
25										

Remarks:

1. Ground surface elevations at test boring locations were determined by MaineDOT upon the completion of drilling.

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

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

APPENDIX B

Observation Well Installation & Groundwater Monitoring Reports

OBSERVATION WELL INSTALLATION REPORT

HALEY & ALDRICH

Well No.
BB-BWA-101
Boring No.
BB-BWA-101

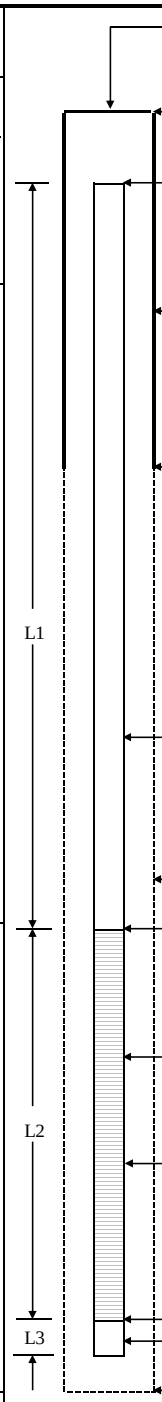
PROJECT	MaineDOT Bridge Program 19311.00	**H&A FILE NO.**	38751-010
LOCATION	I395/Webster Avenue, Bangor, Maine	**PROJECT MGR.**	W. Chadbourne
CLIENT	Maine Department of Transportation	**FIELD REP.**	B. Babcock
CONTRACTOR	Maine Department of Transportation	**DATE INSTALLED**	7/16/2012
DRILLER	E. Giguere	**WATER LEVEL**	3.48 ft

Ground El.	116.7 ft	**Location**	See Plan	☑ **Guard Pipe**
El. Datum	NAVD 88			☐ **Roadway Box**

SOIL/ROCK CONDITIONS	BOREHOLE BACKFILL
	Concrete
	0.5
-FILL-	Bentonite
	3.0
4.0	
-MARINE DEPOSIT- (Clay)	Filter Sand
11.0	
-GLACIAL TILL-	
11.9	11.9
-BEDROCK-	Cave-In
22.4	**22.4**

(Bottom of Exploration)

(Numbers refer to depth from ground surface in feet)



(Not to Scale)

Type of protective cover/lock	None	
Height/Depth of top of guard pipe/roadway box above/below ground surface	3.1	ft
Height/Depth of top of riser pipe above/below ground surface	2.9	ft
Type of protective casing:	Stainless Guardpipe	
Length	5.0	ft
Inside Diameter	4.0	in
Depth of bottom of guard pipe/roadway box	1.9	ft

Type of Seals	Top of Seal (ft)	Thickness (ft)
Concrete	0.0	0.5
Bentonite Seal	0.5	2.5

Type of riser pipe:	Schedule 40 PVC	
Inside diameter of riser pipe	2.0	in
Type of backfill around riser	Filter Sand	
Diameter of borehole	4.0	in
Depth to top of well screen	2.0	ft
Type of screen	Slotted Schedule 40 PVC	
Screen gauge or size of openings	0.010	in
Diameter of screen	1.9	in
Type of backfill around screen	Filter Sand	
Depth of bottom of well screen	11.9	ft
Bottom of Silt trap	--	ft
Depth of bottom of borehole	22.4	ft

Riser Pay Length (L1)	+	Length of screen (L2)	+	Length of silt trap (L3)	=	Pay length
4.8 ft	+	10.0 ft	+	-- ft	=	14.8 ft

COMMENTS: Attempted to set well into bedrock but borehole caved to 11.9 ft.

Form 2007

APPENDIX C

Laboratory Test Results

State of Maine - Department of Transportation

Laboratory Testing Summary Sheet

Town(s): Bangor Work Number: 19311.00

Boring & Sample Identification Number	Station (Feet)	Offset (Feet)	Depth (Feet)	Reference Number	G.S.D.C. Sheet	W.C. %	L.L.	P.I.	Classification		
									Unified	AASHTO	Frost
BB-BWA-101, 1D			0.0-2.0	244201	1	2.3			GC-GM	A-1-b	I
BB-BWA-101, 2D			2.0-4.0	244202	1	4.8			SC-SM	A-1-b	II
BB-BWA-101, 3D			4.0-6.0	244203	1	27.4	27	9	CL	A-4	IV
BB-BWA-101, 1U			8.0-10.0	244204	1	28.0	28	8	CL	A-4	IV
BB-BWA-102, 1D			1.0-3.0	244205	2	8.2			GW-GC	A-1-a	I
BB-BWA-102, 2D			3.0-5.0	244206	2	5.2			GC-GM	A-1-a	I
BB-BWA-102, 3D/A			6.0-7.0	244207	2	12.5			GC-GM	A-1-b	II
BB-BWA-102, 4D			9.0-11.0	244209	---	31.7	27	8	CL	A-4	IV
BB-BWA-102, 5D			11.0-13.0	244210	---	31.0	31	12	CL	A-6	III
BB-BWA-102, 6D			13.0-15.0	244211	---	29.5	25	8	CL	A-4	IV
BB-BWA-102, 1U			15.0-17.0	244208	2	27.6	23	5	CL-ML	A-4	IV
BB-BWA-102A, 1U			7.0-9.0	244212	3	33.2	31	11	CL	A-6	IV
BB-BWA-102A, 1D			15.0-17.0	244213	---	28.2	25	8	CL	A-4	IV

Classification of these soil samples is in accordance with AASHTO Classification System M-145-40. This classification is followed by the "Frost Susceptibility Rating" from zero (non-frost susceptible) to Class IV (highly frost susceptible). The "Frost Susceptibility Rating" is based upon the MaineDOT and Corps of Engineers Classification Systems.

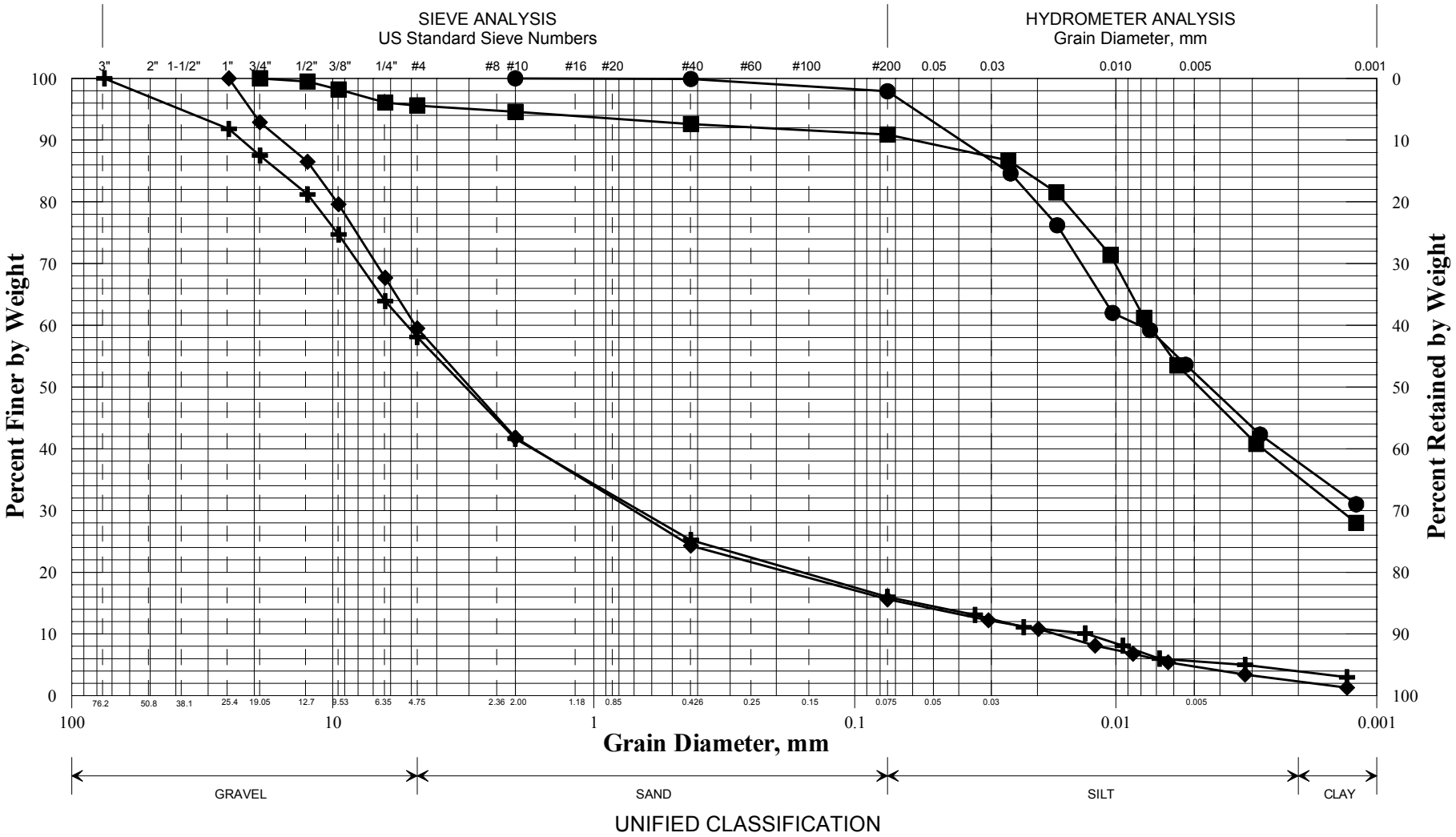
GSDC = Grain Size Distribution Curve as determined by AASHTO T 88-93 (1996) and/or ASTM D 422-63 (Reapproved 1998)

WC = water content as determined by AASHTO T 265-93 and/or ASTM D 2216-98

LL = Liquid limit as determined by AASHTO T 89-96 and/or ASTM D 4318-98 NP = Non Plastic

PI = Plasticity Index as determined by AASHTO 90-96 and/or ASTM D4318-98

State of Maine Department of Transportation
GRAIN SIZE DISTRIBUTION CURVE



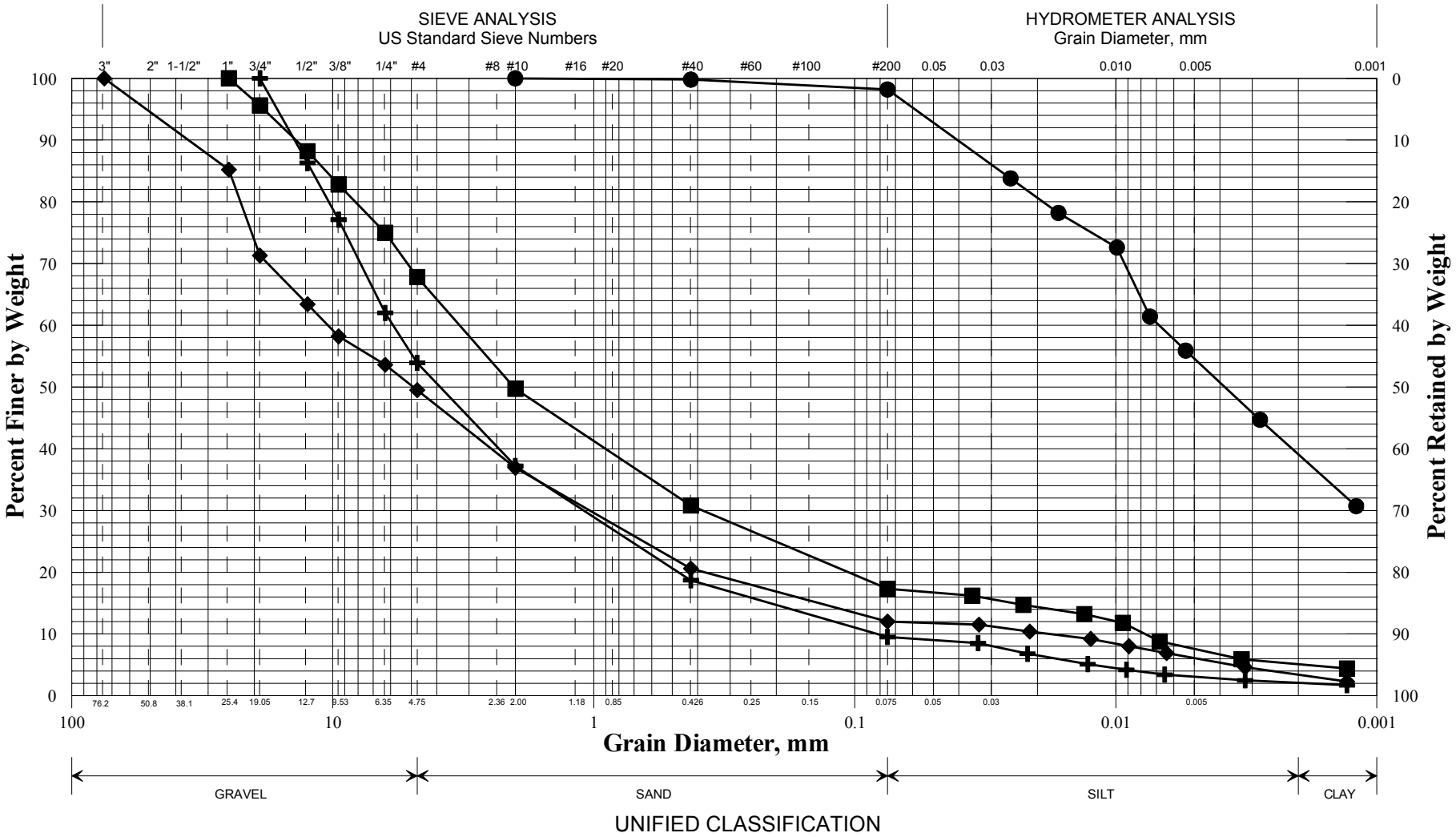
UNIFIED CLASSIFICATION

	Boring/Sample No.	Station	Offset, ft	Depth, ft	Description	W, %	LL	PL	PI
✚	BB-BWA-101/1D	TBD		0.0-2.0	Sandy GRAVEL, little silt, trace clay.	2.3			
◆	BB-BWA-101/2D	TBD		2.0-4.0	Gravelly SAND, little silt, trace clay.	4.8			
■	BB-BWA-101/3D	TBD		4.0-6.0	SILT, some clay, trace sand, trace gravel.	27.4	27	18	9
●	BB-BWA-101/1U	TBD		8.0-10.0	Clayey SILT, trace sand.	28.0	28	20	8
▲									
✖									

WIN
019311.00
Town
Bangor
Reported by/Date
WHITE, TERRY A 8/16/2012

SHEET 1

State of Maine Department of Transportation
GRAIN SIZE DISTRIBUTION CURVE

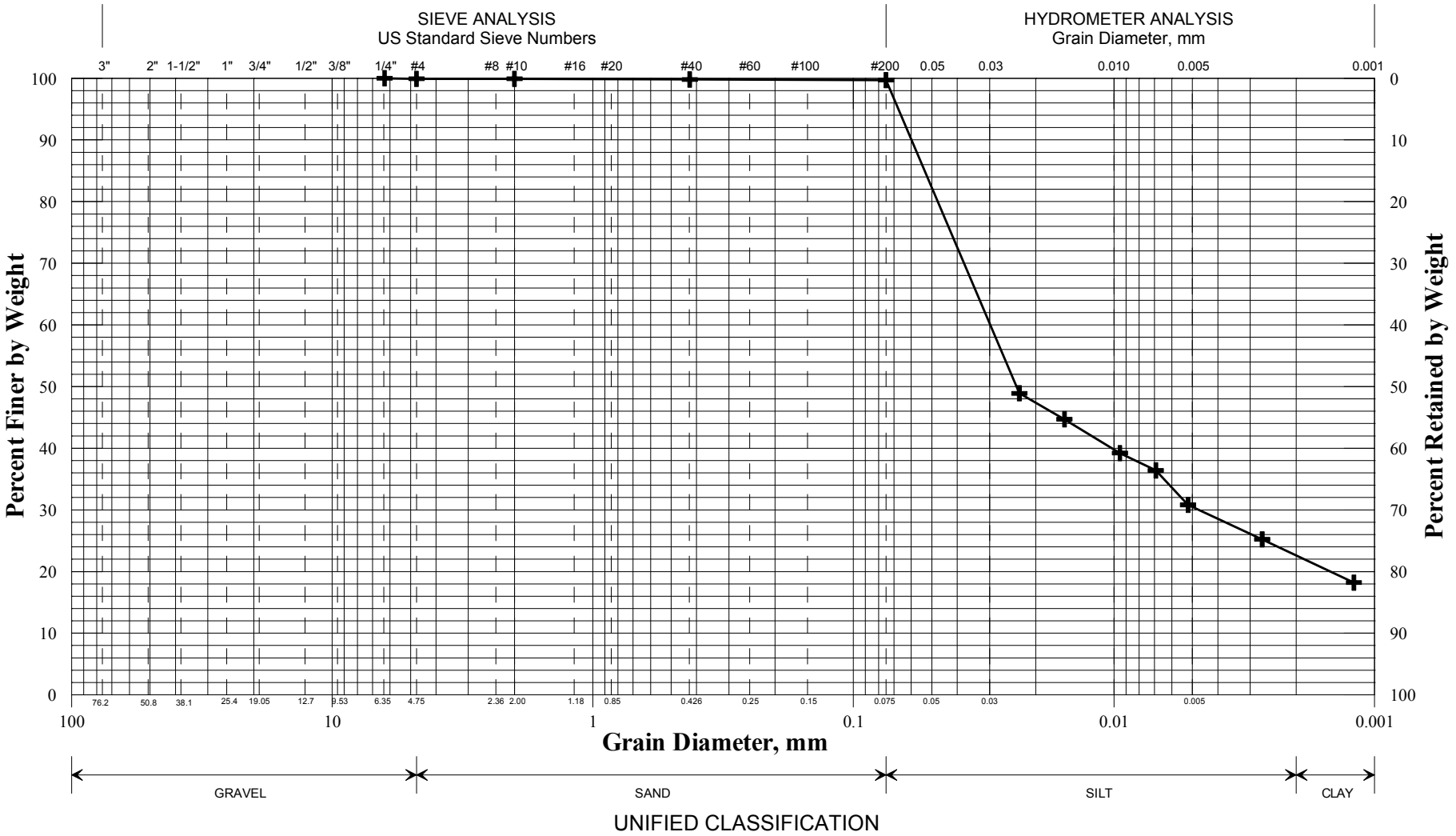


UNIFIED CLASSIFICATION

	Boring/Sample No.	Station	Offset, ft	Depth, ft	Description	W, %	LL	PL	PI
✚	BB-BWA-102/1D	TBD		1.0-3.0	GRAVEL, some sand, trace silt, trace clay.	8.2			
◆	BB-BWA-102/2D	TBD		3.0-5.0	GRAVEL, some sand, trace silt, trace clay.	5.2			
■	BB-BWA-102/3DA	TBD		6.0-7.0	GRAVEL, some sand, little silt, trace clay.	12.5			
●	BB-BWA-102/1U	TBD		15.0-17.0	Clayey SILT, trace sand.	27.6	23	18	5
▲									
✖									

WIN
019311.00
Town
Bangor
Reported by/Date
WHITE, TERRY A 8/16/2012

State of Maine Department of Transportation
GRAIN SIZE DISTRIBUTION CURVE



UNIFIED CLASSIFICATION

	Boring/Sample No.	Station	Offset, ft	Depth, ft	Description	W, %	LL	PL	PI
✚	BB-BWA-102A/1U	TBD		7.0-9.0	SILT, some clay, trace sand, trace gravel.	33.2	31	20	11
◆									
■									
●									
▲									
✖									

WIN
019311.00
Town
Bangor
Reported by/Date
WHITE, TERRY A 8/16/2012

Maine DOT, Materials Testing & Exploration, 219 Hogan Road, Bangor, Maine 04401

GEOTECHNICAL TEST REPORT
Central Laboratory

SAMPLE INFORMATION

Reference No.	Boring No./Sample No.	Sample Description	Sampled	Received
244201	**BB-BWA-101/1D**	**GEOTECHNICAL (DISTURBED)**	**7/16/2012**	**7/25/2012**

Sample Type: **GEOTECHNICAL** Location: **OTHER** Station: **TBD** Offset, ft: Dbfg, ft: **0.0-2.0**

WIN/Town **019311.00 - BANGOR** Sampler: **GIGUERE, ERVIN M**

TEST RESULTS

Sieve Analysis (T 88)

Wash Method

SIEVE SIZE U.S. [SI]	% Passing
3 in. [75.0 mm]	**100.0**
1 in. [25.0 mm]	**91.8**
¾ in. [19.0 mm]	**87.5**
½ in. [12.5 mm]	**81.2**
⅜ in. [9.5 mm]	**74.7**
¼ in. [6.3 mm]	**63.9**
No. 4 [4.75 mm]	**58.1**
No. 10 [2.00 mm]	**41.6**
No. 20 [0.850 mm]	
No. 40 [0.425 mm]	**25.2**
No. 60 [0.250 mm]	
No. 100 [0.150 mm]	
No. 200 [0.075 mm]	**16.0**
[0.0347 mm]	**13.1**
[0.0225 mm]	**11.1**
[0.0131 mm]	**10.1**
[0.0094 mm]	**8.1**
[0.0068 mm]	**6.0**
[0.0032 mm]	**5.0**
[0.0013 mm]	**3.0**

Direct Shear (T 236)

Shear Angle, °			
Initial Water Content, %			
Normal Stress, psi			
Wet Density, lbs/ft³			
Dry Density, lbs/ft³			
Specimen Thickness, in			

Consolidation (T 216)

Trimmings, Water Content, %

	Initial	Final		Void Ratio	% Strain
Water Content, %			Pmin		
Dry Density, lbs/ft³			Pp		
Void Ratio			Pmax		
Saturation, %			Cc/C'c		

Miscellaneous Tests

Liquid Limit @ 25 blows (T 89), %

Plastic Limit (T 90), %

Plasticity Index (T 90), %

Specific Gravity, Corrected to 20°C (T 100): **2.70**

Loss on Ignition (T 267)

Loss, %	H2O, %

Water Content (T 265), %: **2.3**

Vane Shear Test on Shelby Tubes (Maine DOT)

Depth taken in tube, ft	3 In.		6 In.		Water Content, %	Description of Material Sampled at the Various Tube Depths
	U. Shear tons/ft²	Remold tons/ft²	U. Shear tons/ft²	Remold tons/ft²		

Comments:

AUTHORIZATION AND DISTRIBUTION

Reported by: **FOGG, BRIAN** Date Reported: **8/6/2012**

Paper Copy: Lab File; Project File; Geotech File

Maine DOT, Materials Testing & Exploration, 219 Hogan Road, Bangor, Maine 04401

GEOTECHNICAL TEST REPORT
Central Laboratory

SAMPLE INFORMATION

Reference No.	Boring No./Sample No.	Sample Description	Sampled	Received
244204	**BB-BWA-101/1U**	**GEOTECHNICAL (UNDISTURBED)**	**7/17/2012**	**7/25/2012**

Sample Type: **GEOTECHNICAL** Location: **OTHER** Station: **TBD** Offset, ft: Dbfg, ft: **8.0-10.0**

WIN/Town **019311.00 - BANGOR** Sampler: **GIGUERE, ERVIN M**

TEST RESULTS

Sieve Analysis (T 88)

Wash Method

SIEVE SIZE U.S. [SI]	% Passing
3 in. [75.0 mm]	
1 in. [25.0 mm]	
¾ in. [19.0 mm]	
½ in. [12.5 mm]	
⅜ in. [9.5 mm]	
¼ in. [6.3 mm]	
No. 4 [4.75 mm]	
No. 10 [2.00 mm]	**100.0**
No. 20 [0.850 mm]	
No. 40 [0.425 mm]	**99.9**
No. 60 [0.250 mm]	
No. 100 [0.150 mm]	
No. 200 [0.075 mm]	**97.9**
[0.0253 mm]	**84.6**
[0.0168 mm]	**76.2**
[0.0103 mm]	**62.0**
[0.0074 mm]	**59.2**
[0.0054 mm]	**53.6**
[0.0028 mm]	**42.3**
[0.0012 mm]	**31.0**

Direct Shear (T 236)

Shear Angle, °			
Initial Water Content, %			
Normal Stress, psi			
Wet Density, lbs/ft³			
Dry Density, lbs/ft³			
Specimen Thickness, in			

Consolidation (T 216)

Trimmings, Water Content, %	**24.6**

	Initial	Final		Void Ratio	% Strain
Water Content, %	**26.7**	**19.5**	Pmin		
Dry Density, lbs/ft³	**99.1**	**119.5**	Pp		
Void Ratio	**0.93**	**0.6**	Pmax		
Saturation, %	**88.2**	**100**	Cc/C'c		

Miscellaneous Tests

Liquid Limit @ 25 blows (T 89), %
28
Plastic Limit (T 90), %
20
Plasticity Index (T 90), %
8
Specific Gravity, Corrected to 20°C (T 100)
2.75

Loss on Ignition (T 267)

Loss, %	H2O, %

Water Content (T 265), %
28.0

Vane Shear Test on Shelby Tubes (Maine DOT)

Depth taken in tube, ft	3 In. U. Shear tons/ft²	3 In. Remold tons/ft²	6 In. U. Shear tons/ft²	6 In. Remold tons/ft²	Water Content, %	Description of Material Sampled at the Various Tube Depths
0-0.5	0.32	0.03	0.31	0.04	24.6	alternating layers of light to dark gray clay with traces of silt and silt line at 3.25"
0.75-1.25	0.26	0.02	0.25	0.03	28.6	alt. layers of light to dark gray clay with traces of silt 0.25" layer fine silty sand at 9.75" and 0.125" layer at 11", fine silt line at 13.75"
1.25-1.75	0.2	0.02	0.22	0.03	31.1	alt. layers of light to dark gray clay with traces of silt and fine silt line at 16.5"
1.75-2	0.19	0.01	0.15	0.02	28.8	alt. layers of light to dark gray clay with traces of silt and 0.25" layer fine silty sand at 21.25"

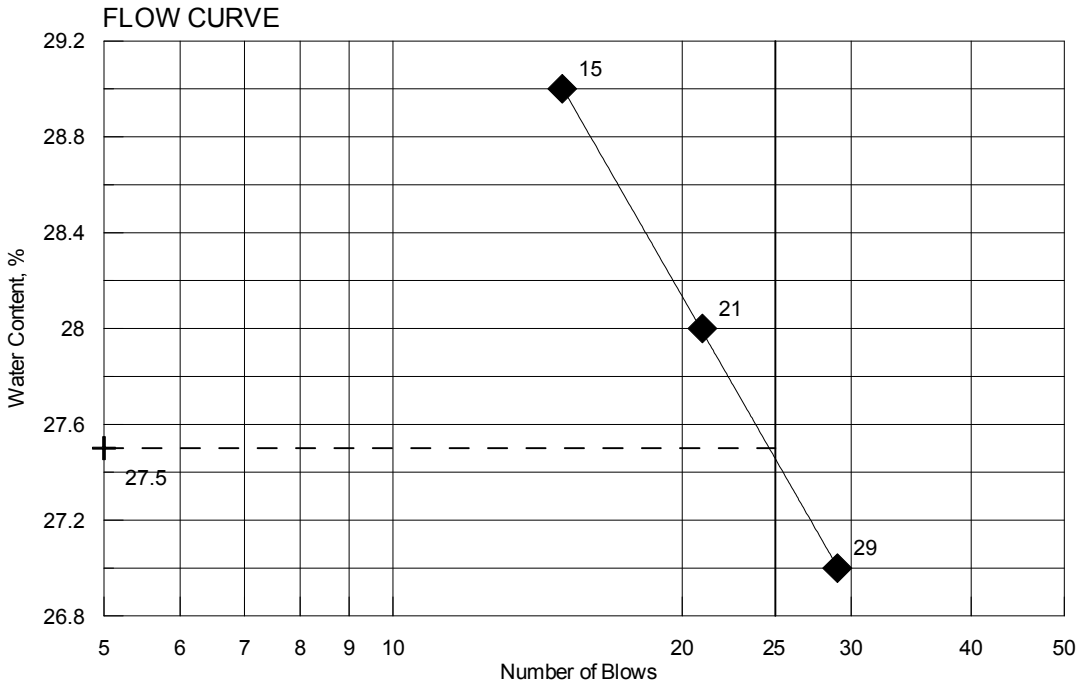
Comments:

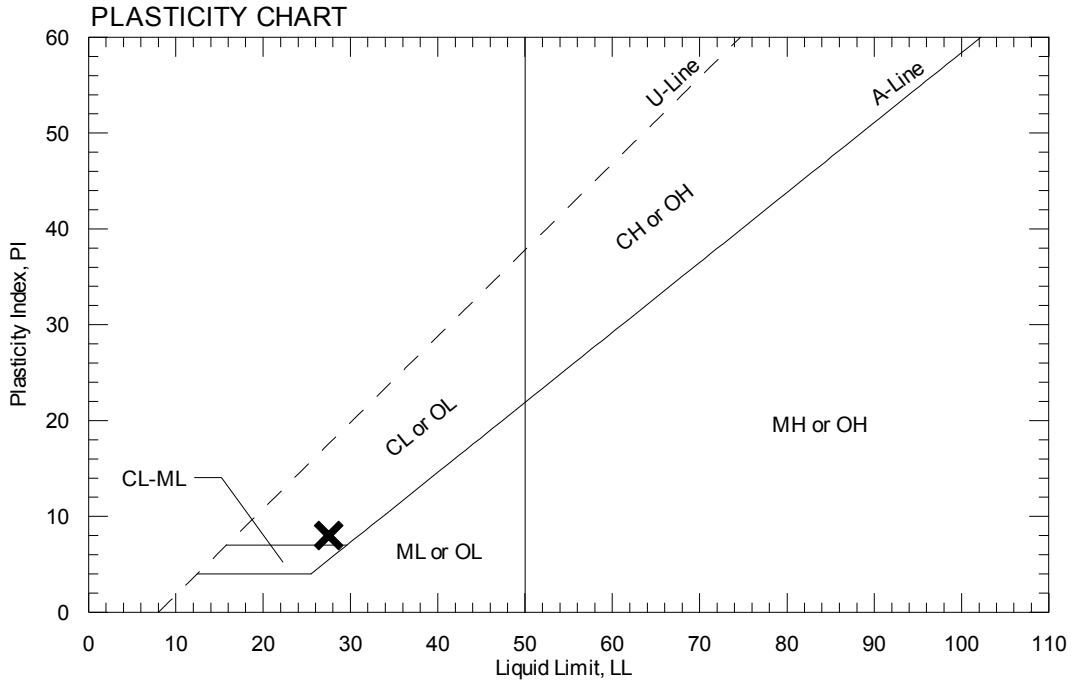
AUTHORIZATION AND DISTRIBUTION

Reported by: **FOGG, BRIAN** Date Reported: **8/16/2012**

Paper Copy: Lab File; Project File; Geotech File

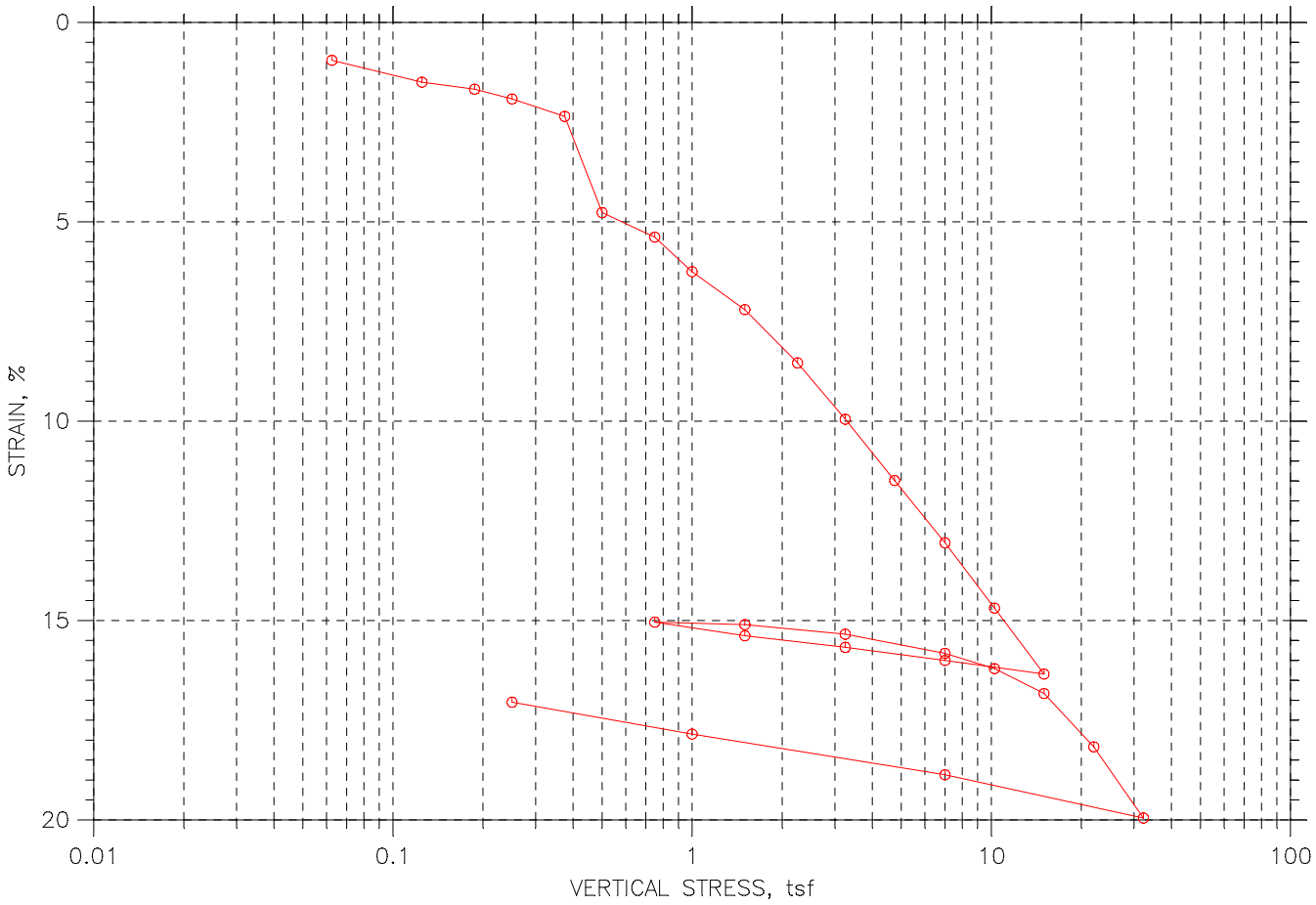
TOWN	Bangor	Reference No.	244204
WIN	019311.00	Water Content, %	28
Sampled	7/17/2012	Liquid Limit @ 25 blows (T 89), %	28
Boring No./Sample No.	BB-BWA-101/1U	Plastic Limit (T 90), %	20
Station	TBD	Plasticity Index (T 90), %	8
Depth	8.0-10.0	Tested By	BBURR

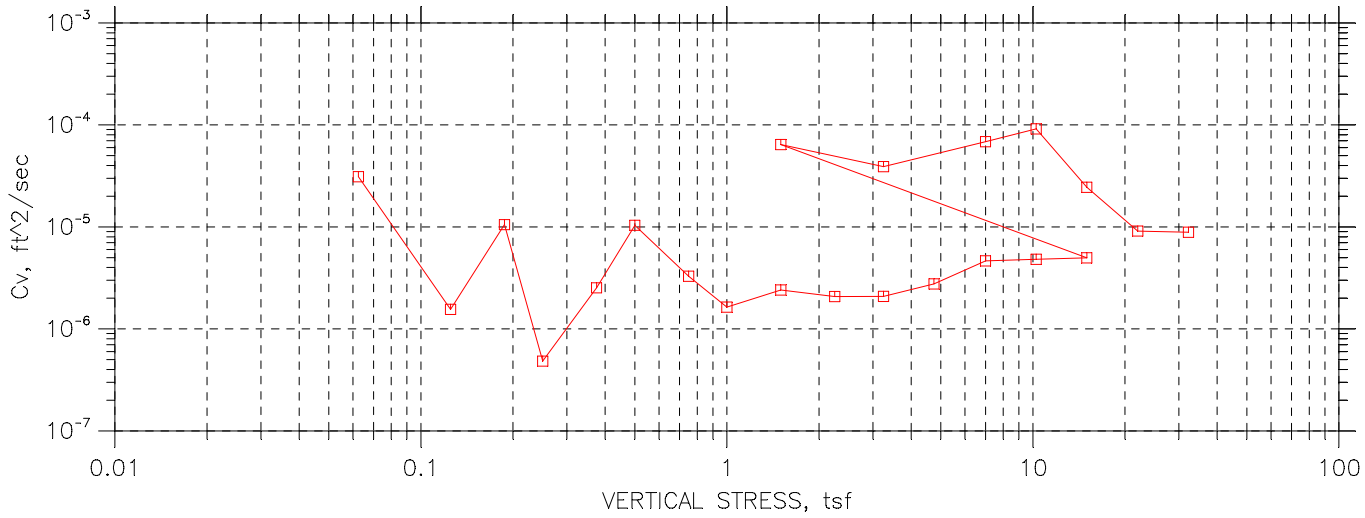




CONSOLIDATION TEST DATA

SUMMARY REPORT



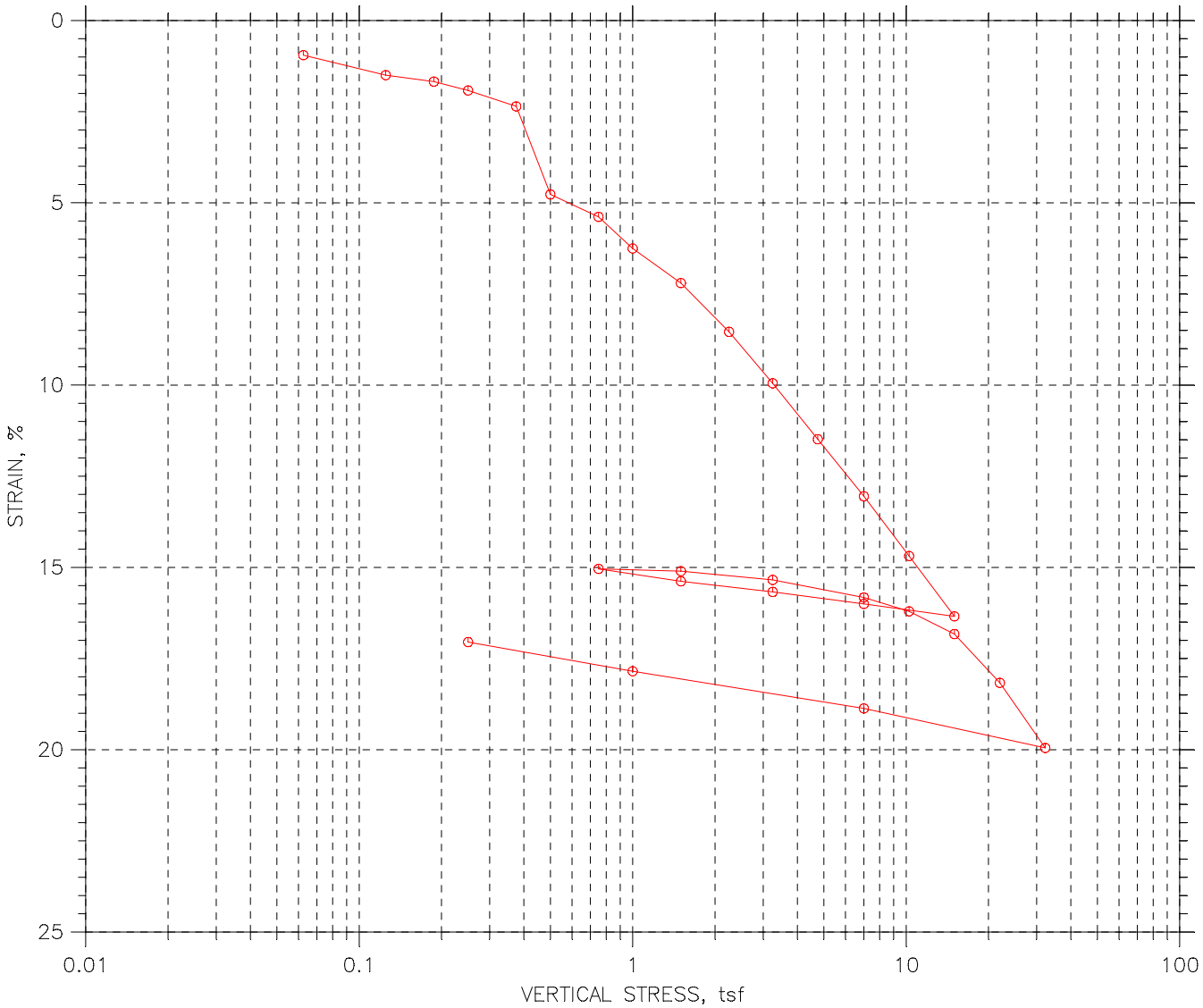


Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-101	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/1/12	Depth: 8.0-10.0 FT
Test No.: 244204	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

Fri, 10-AUG-2012 16:05:54

CONSOLIDATION TEST DATA

SUMMARY REPORT



					Before Test	After Test
Overburden Pressure, tsf:				Water Content, %	26.71	19.54
Preconsolidation Pressure, tsf:				Dry Unit Weight, pcf	99.102	119.47
Compression Index:				Saturation, %	88.22	100.00
Diameter: 2.485 in		Height: 0.998 in		Void Ratio	0.93	0.60
LL: 0	PL: 0	PI: 0	GS: 3.06			

Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-101	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/1/12	Depth: 8.0-10.0 FT
Test No.: 244204	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

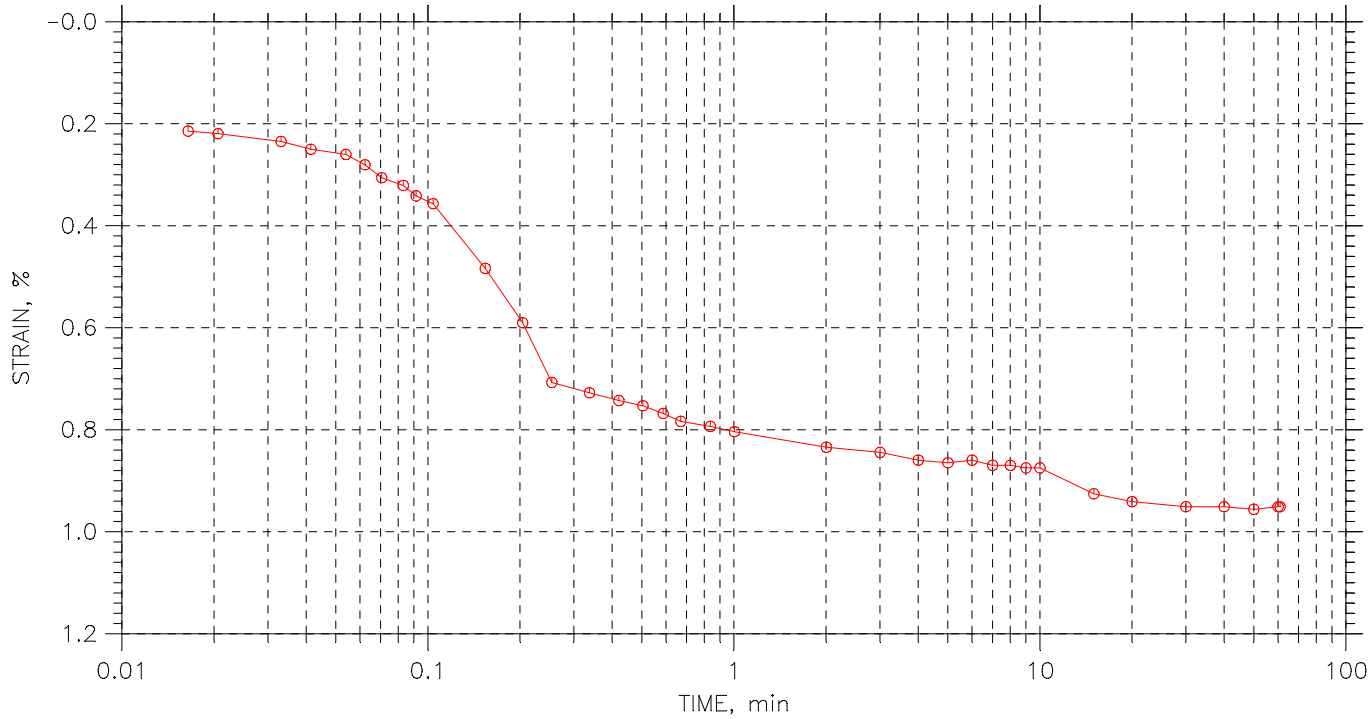
Fri, 10-AUG-2012 16:05:55

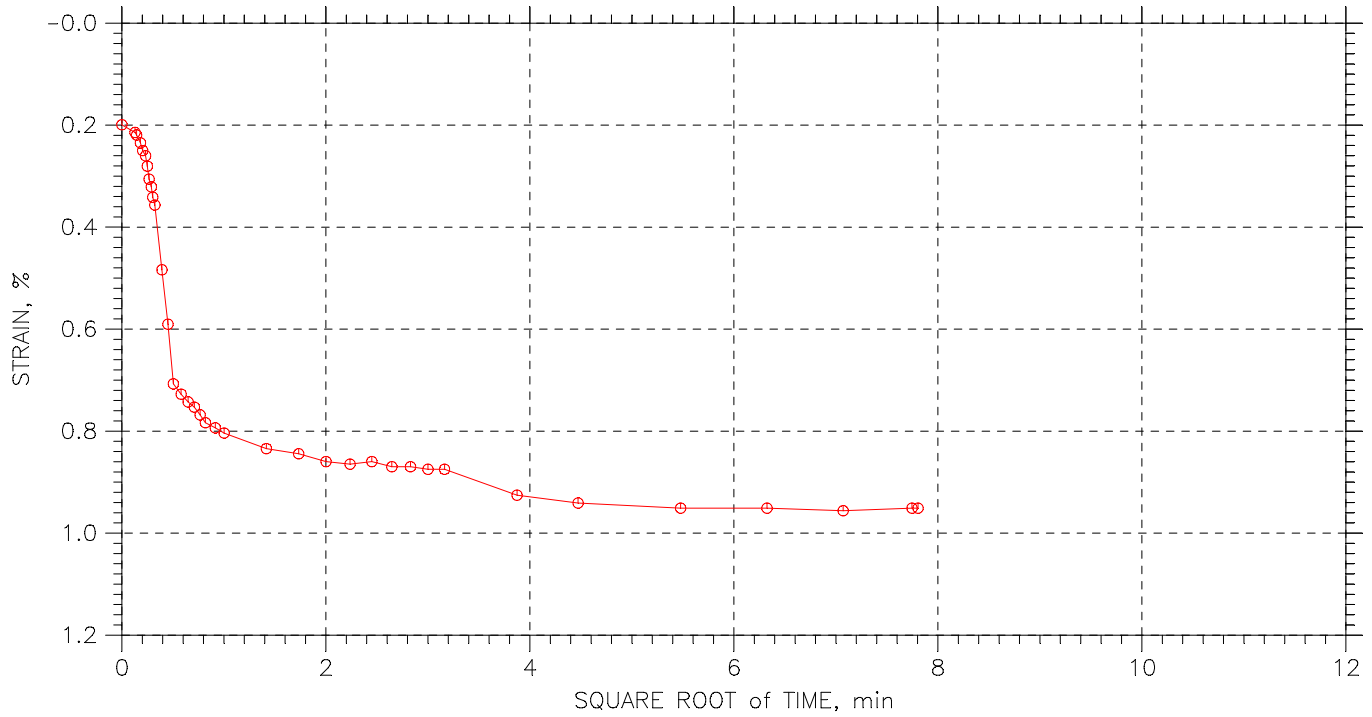
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 1 of 29

Stress: 6.25e-002 tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-101	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/1/12	Depth: 8.0-10.0 FT
Test No.: 244204	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

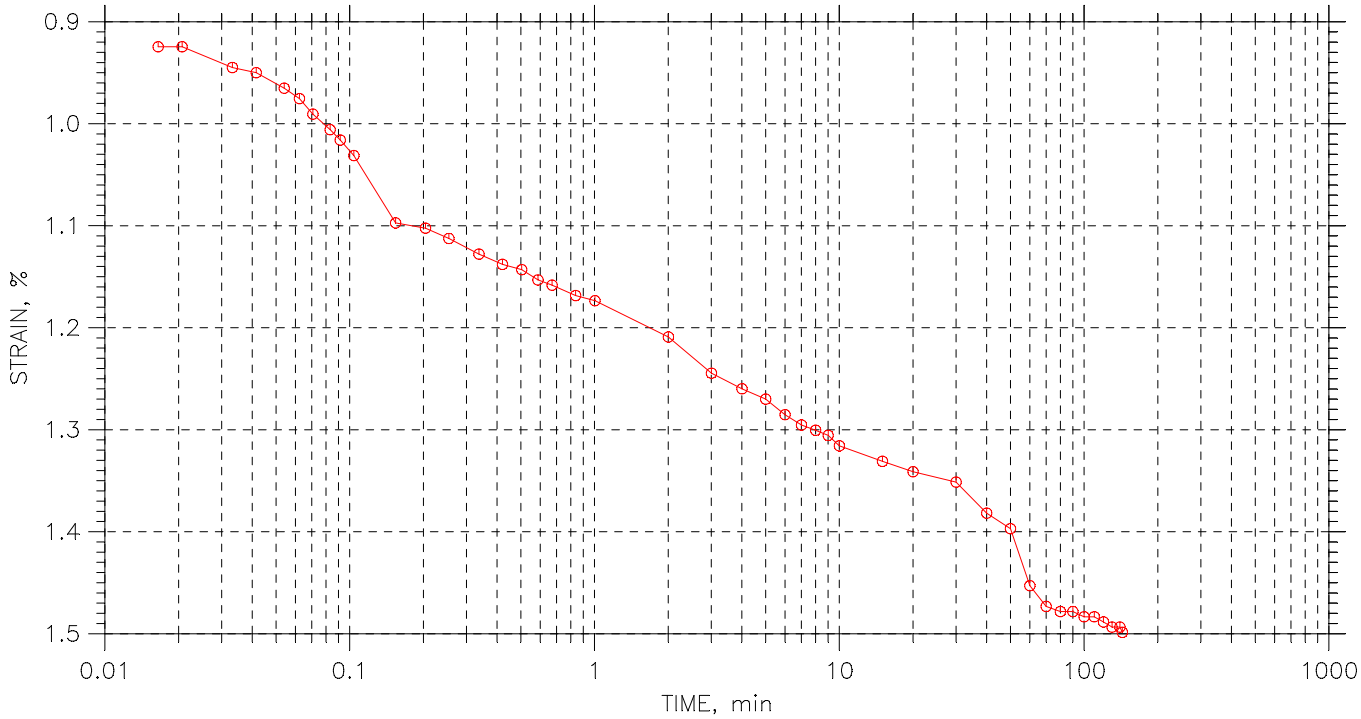
Fri, 10-AUG-2012 16:05:56

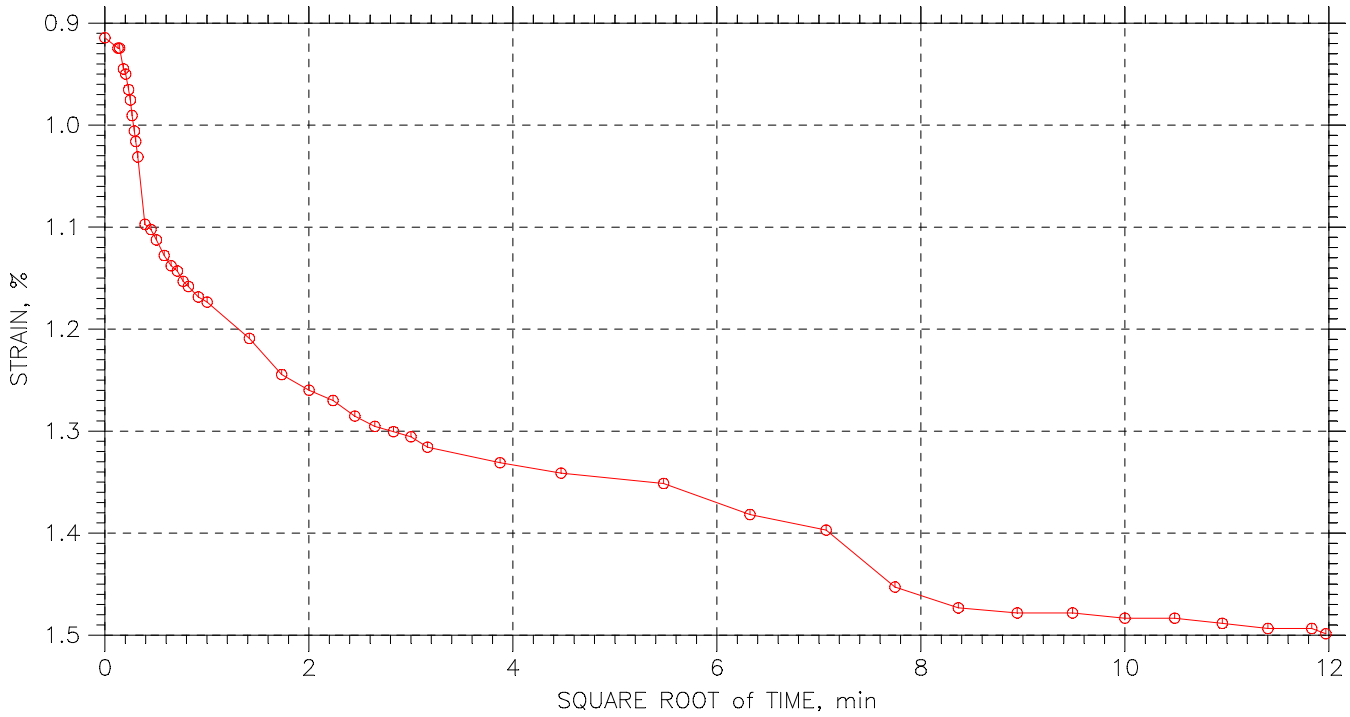
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 2 of 29

Stress: 0.125 tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-101	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/1/12	Depth: 8.0-10.0 FT
Test No.: 244204	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

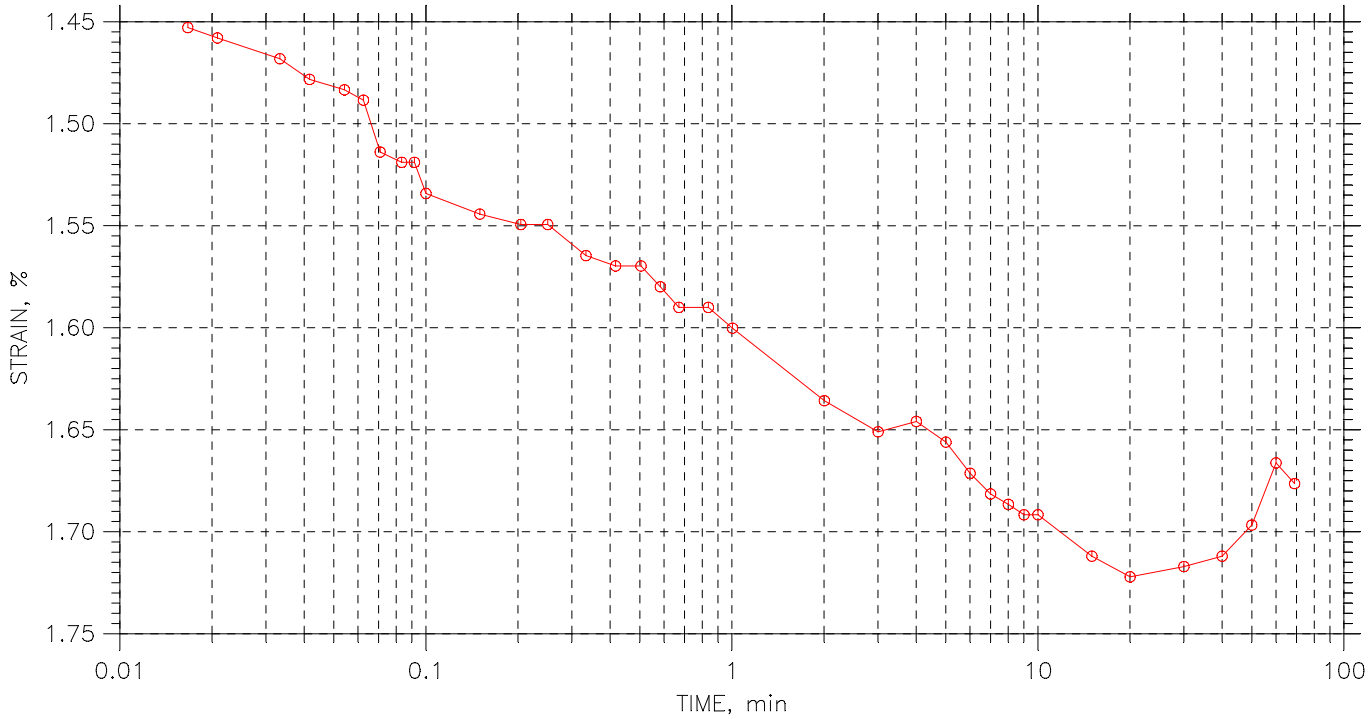
Fri, 10-AUG-2012 16:05:56

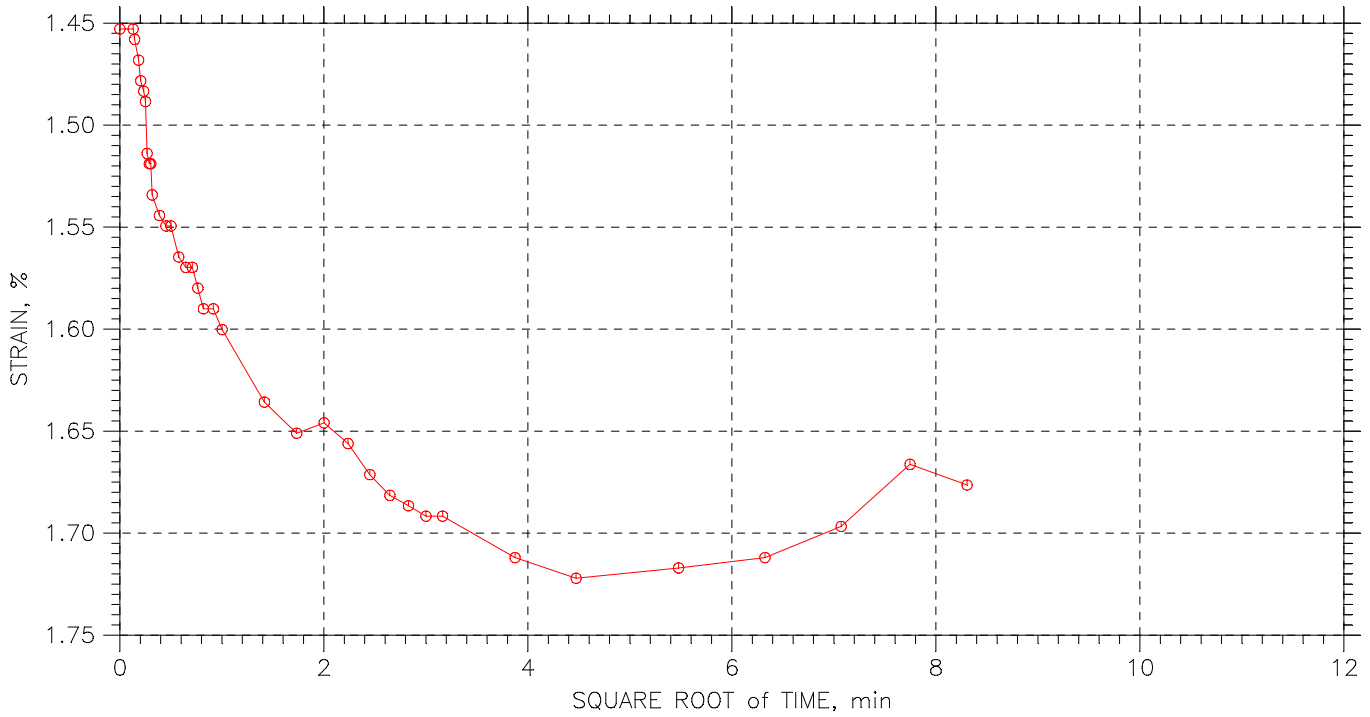
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 3 of 29

Stress: 0.1875 tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-101	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/1/12	Depth: 8.0-10.0 FT
Test No.: 244204	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

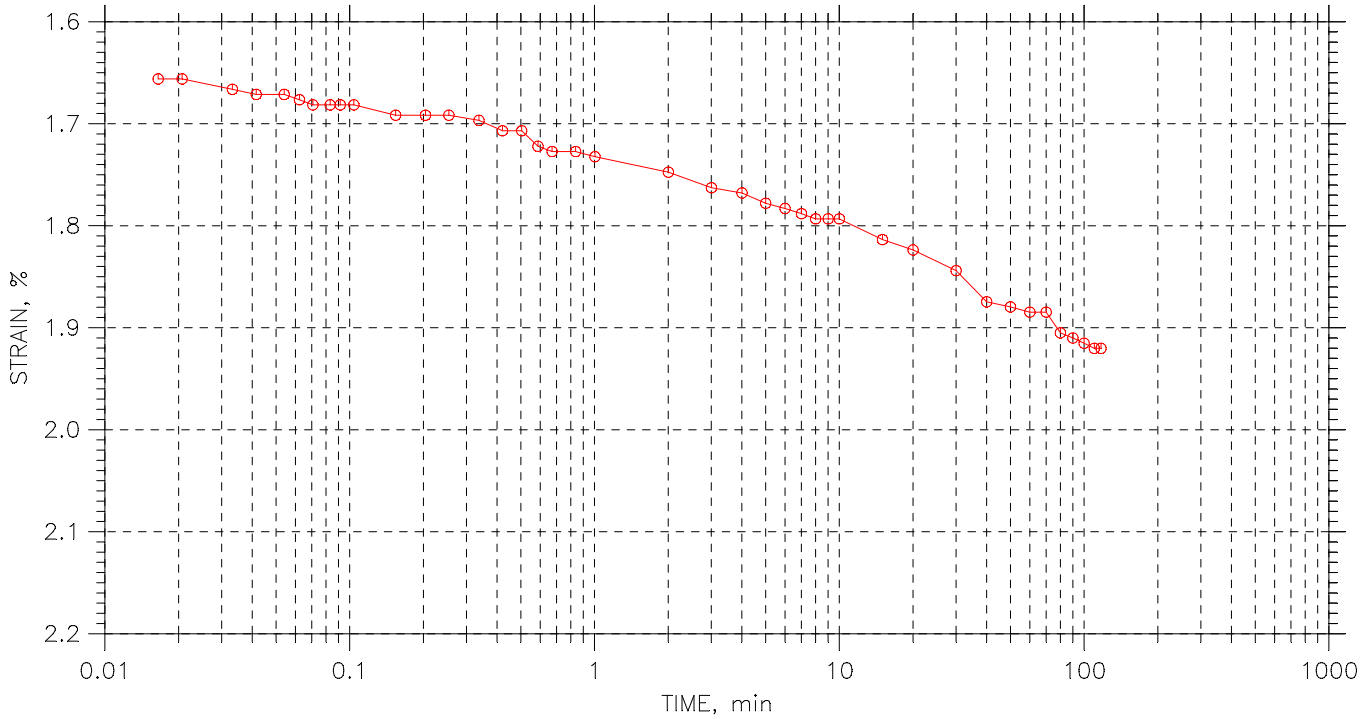
Fri, 10-AUG-2012 16:05:57

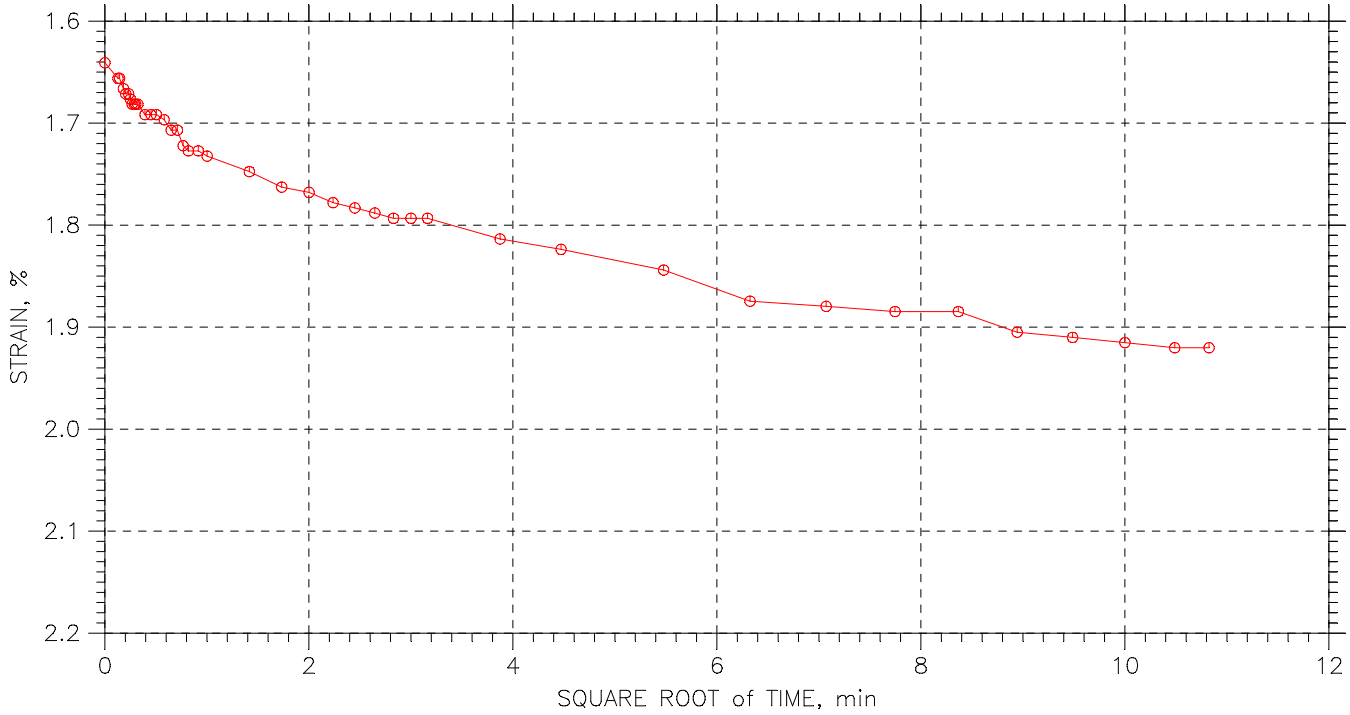
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 4 of 29

Stress: 0.25 tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-101	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/1/12	Depth: 8.0-10.0 FT
Test No.: 244204	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

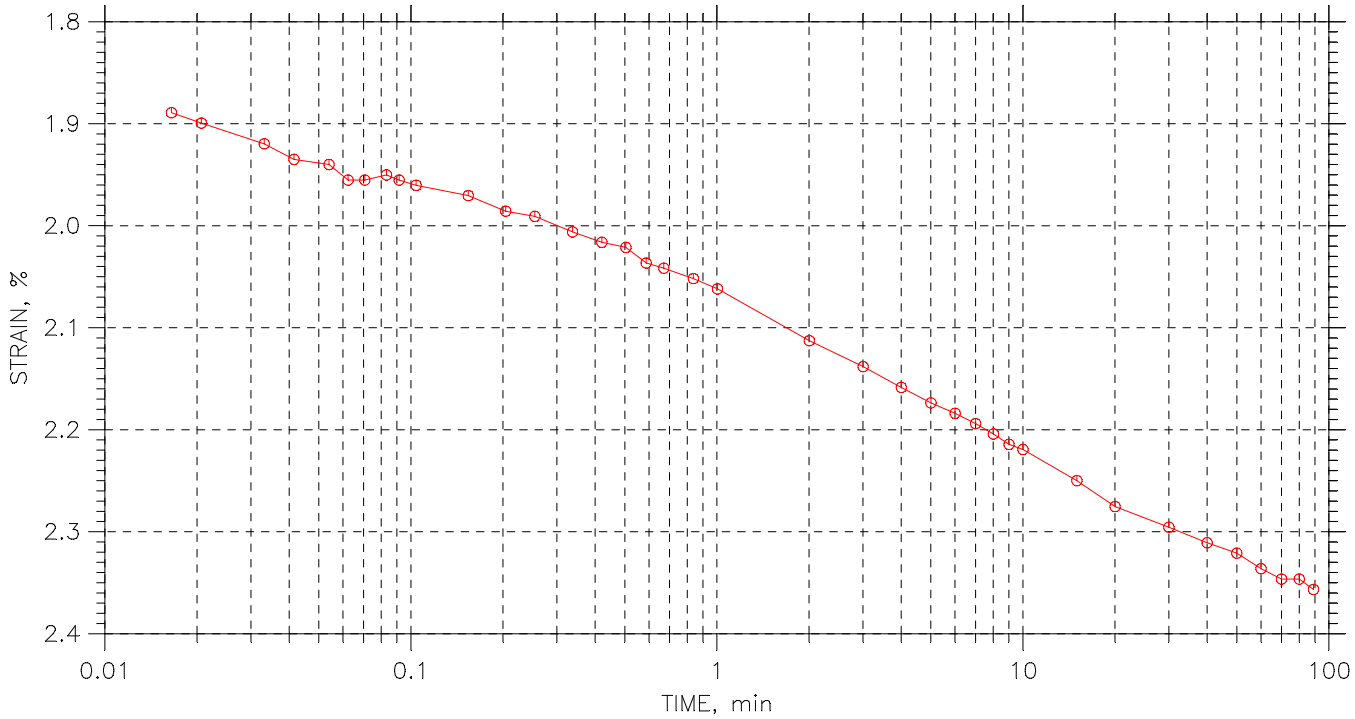
Fri, 10-AUG-2012 16:05:58

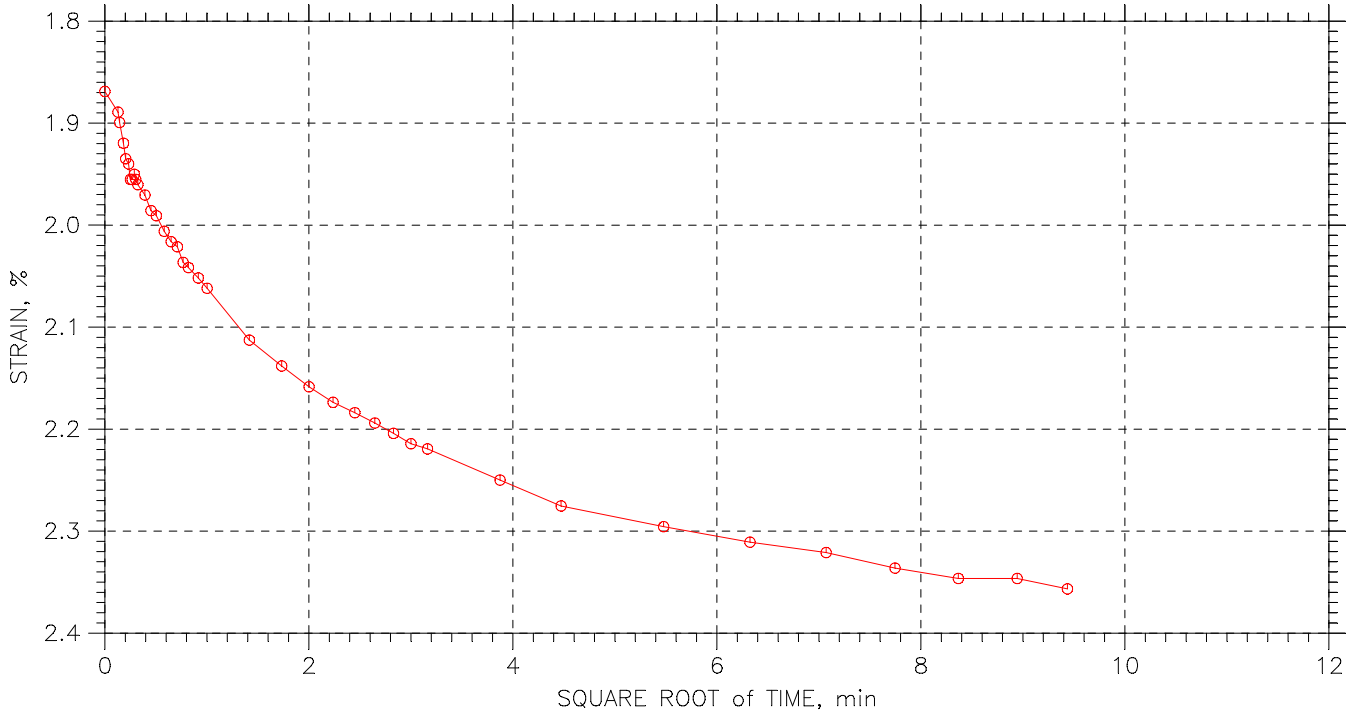
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 5 of 29

Stress: 0.375 tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-101	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/1/12	Depth: 8.0-10.0 FT
Test No.: 244204	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

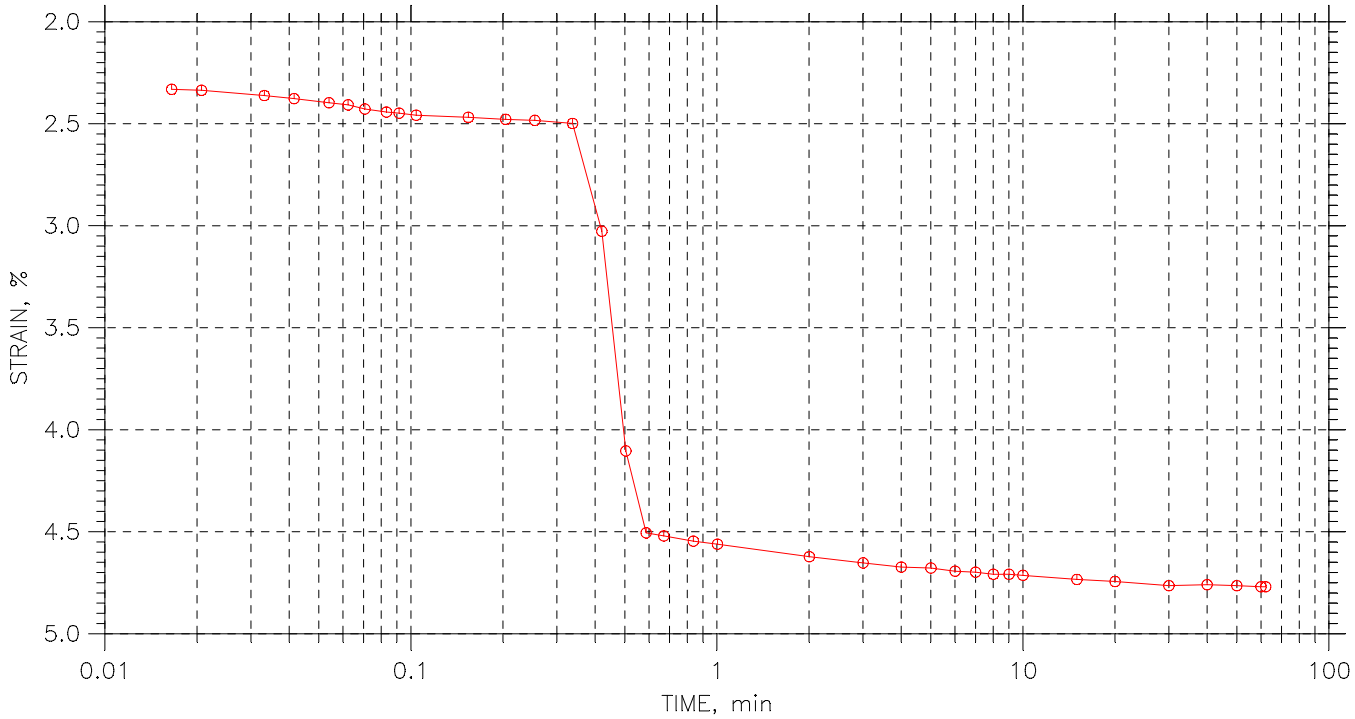
Fri, 10-AUG-2012 16:05:58

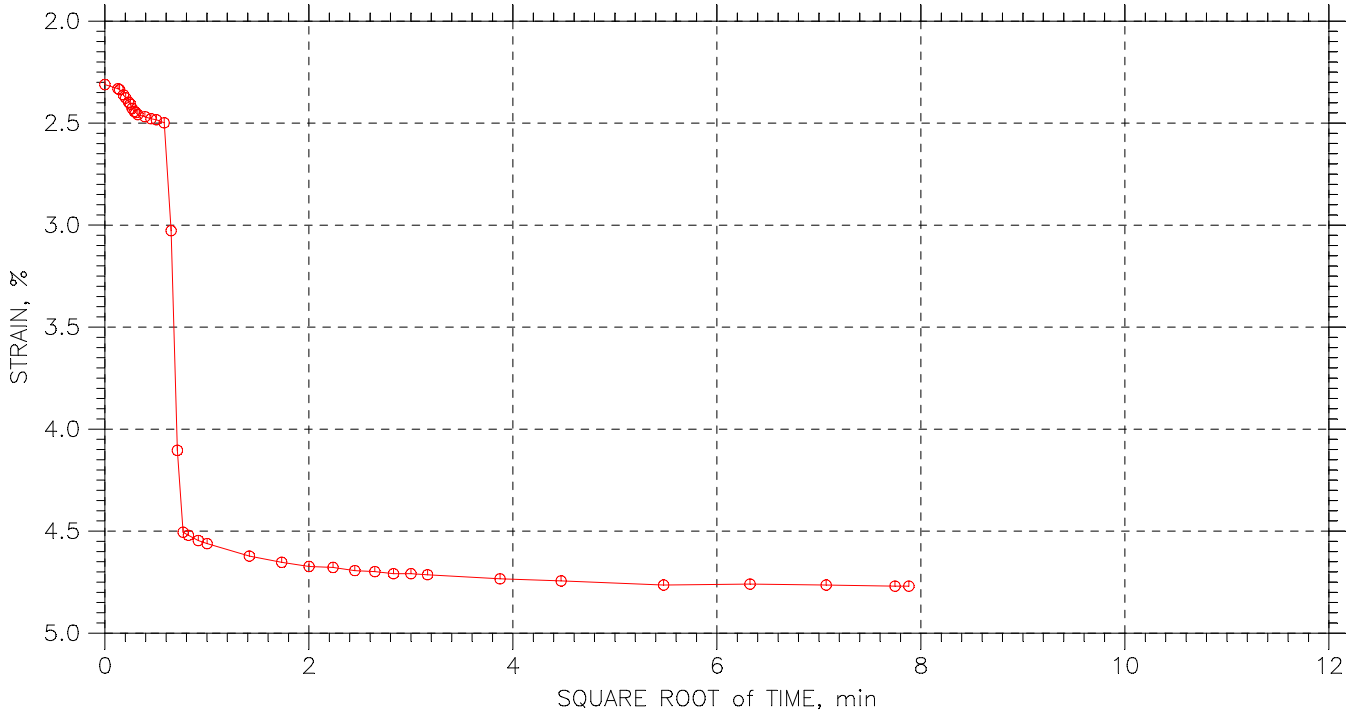
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 6 of 29

Stress: 0.5 tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-101	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/1/12	Depth: 8.0-10.0 FT
Test No.: 244204	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

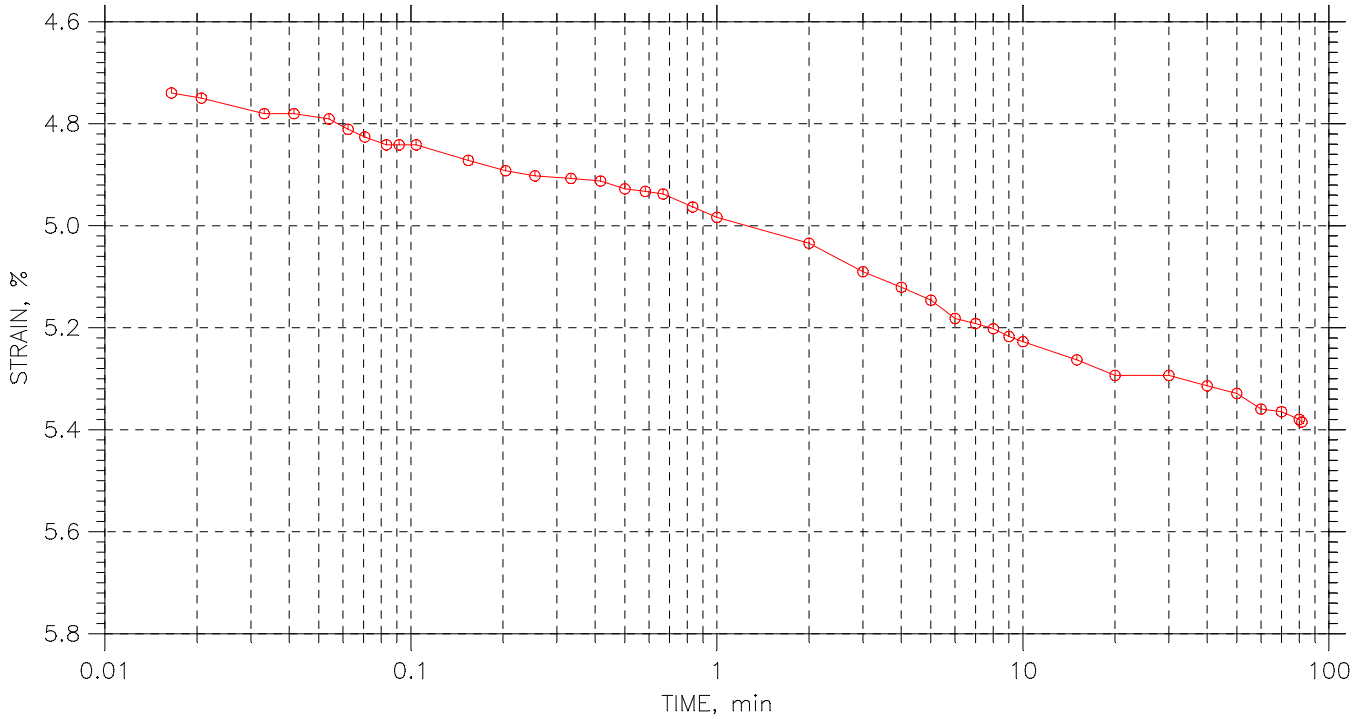
Fri, 10-AUG-2012 16:05:59

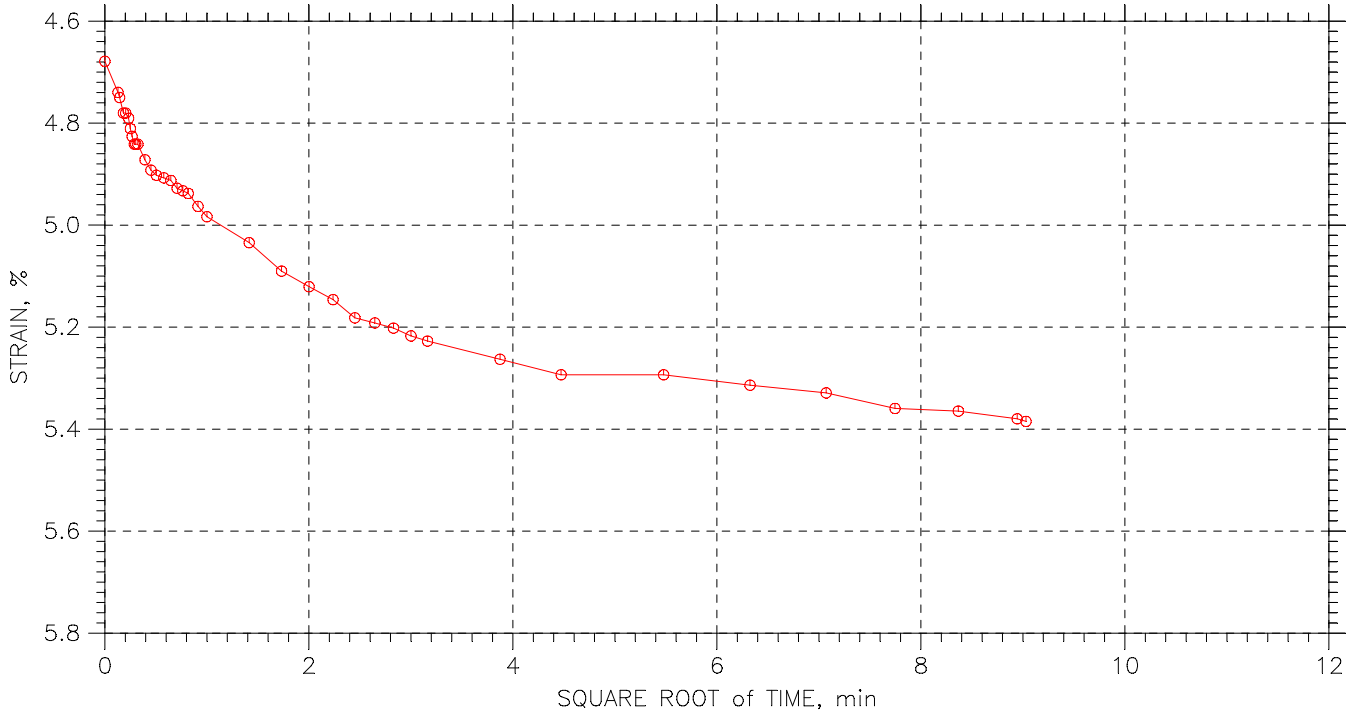
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 7 of 29

Stress: 0.75 tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-101	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/1/12	Depth: 8.0-10.0 FT
Test No.: 244204	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

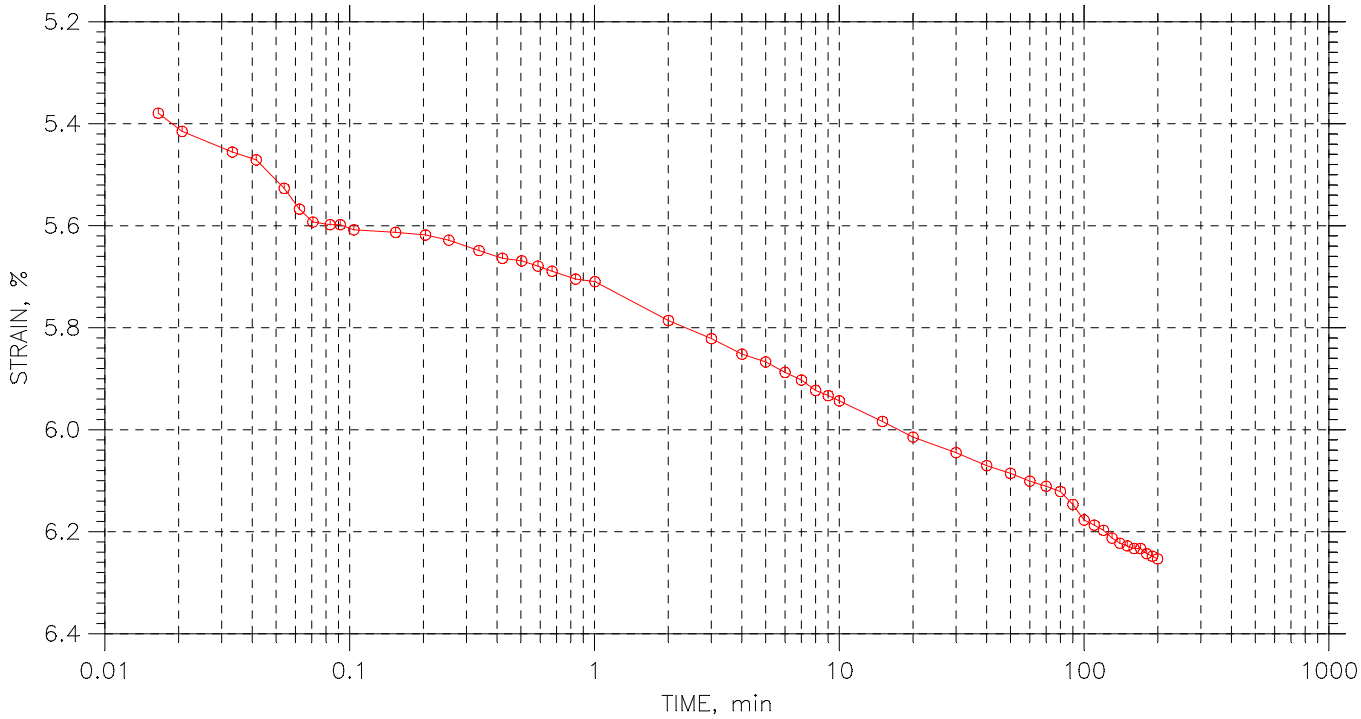
Fri, 10-AUG-2012 16:06:00

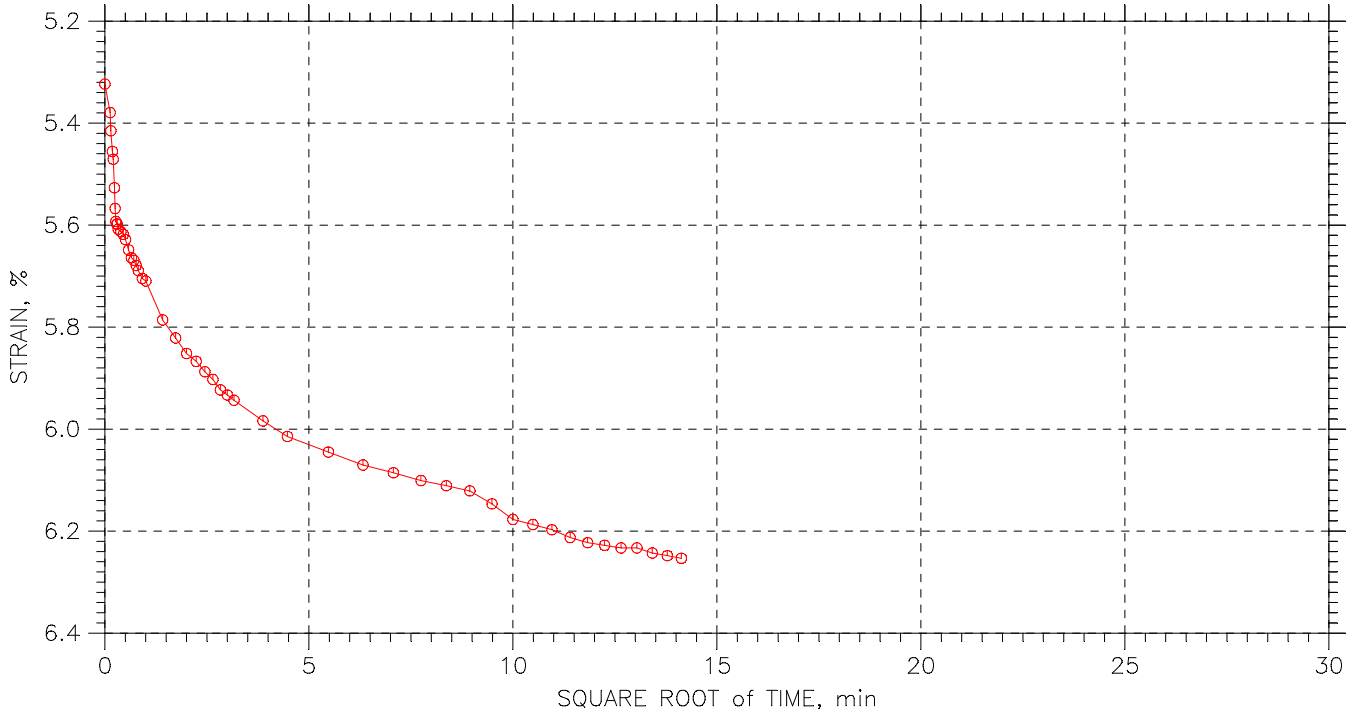
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 8 of 29

Stress: 1. tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-101	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/1/12	Depth: 8.0-10.0 FT
Test No.: 244204	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

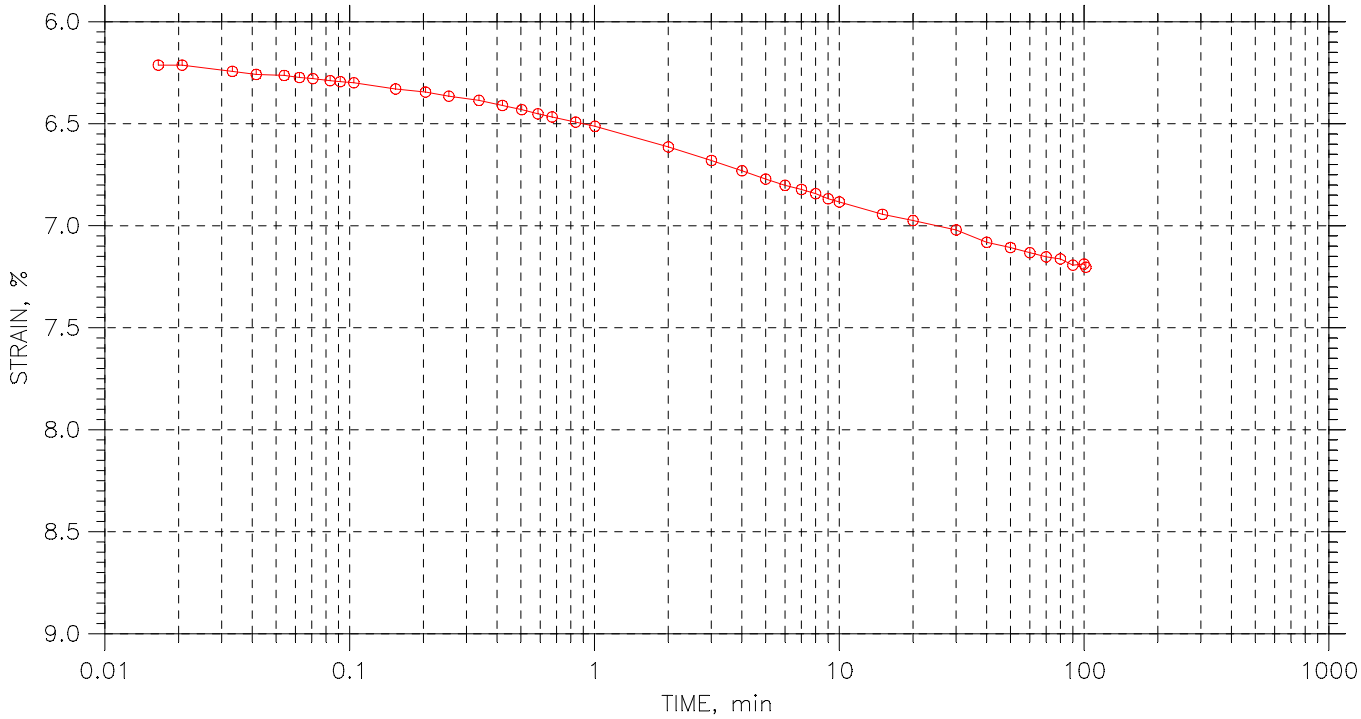
Fri, 10-AUG-2012 16:06:00

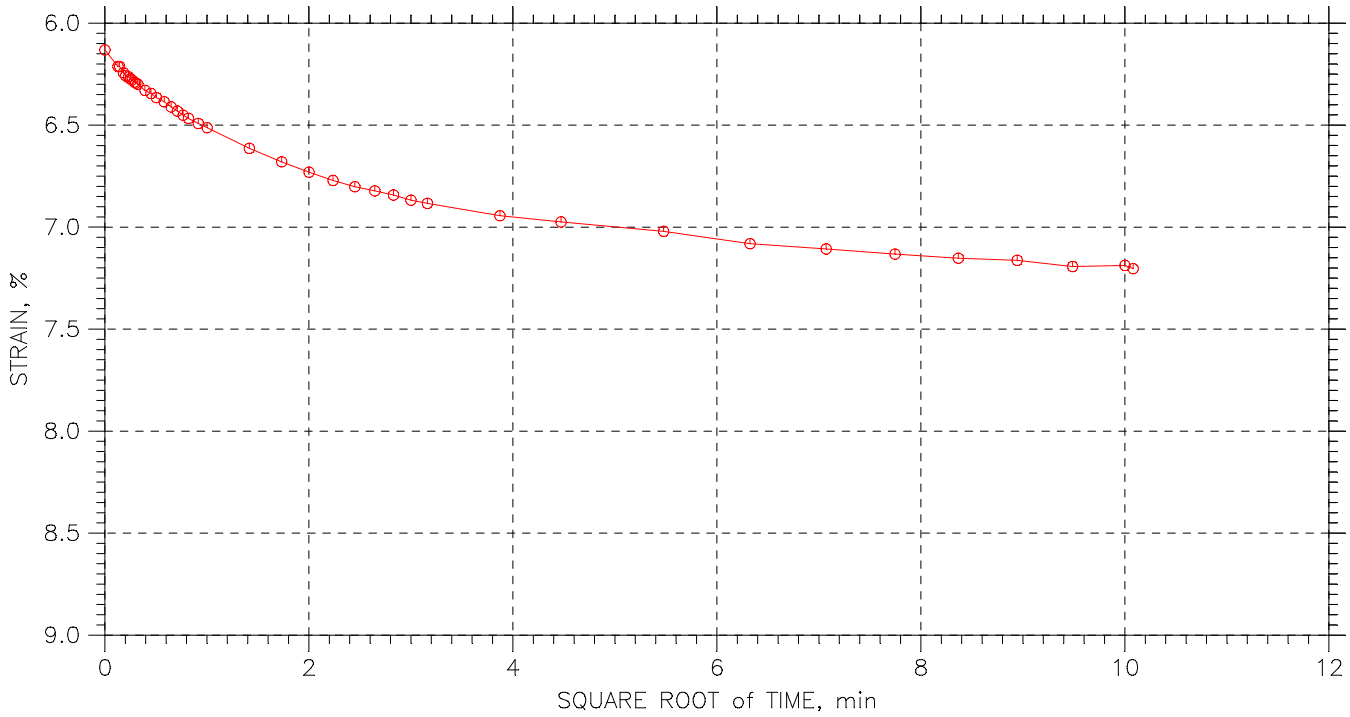
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 9 of 29

Stress: 1.5 tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-101	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/1/12	Depth: 8.0-10.0 FT
Test No.: 244204	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

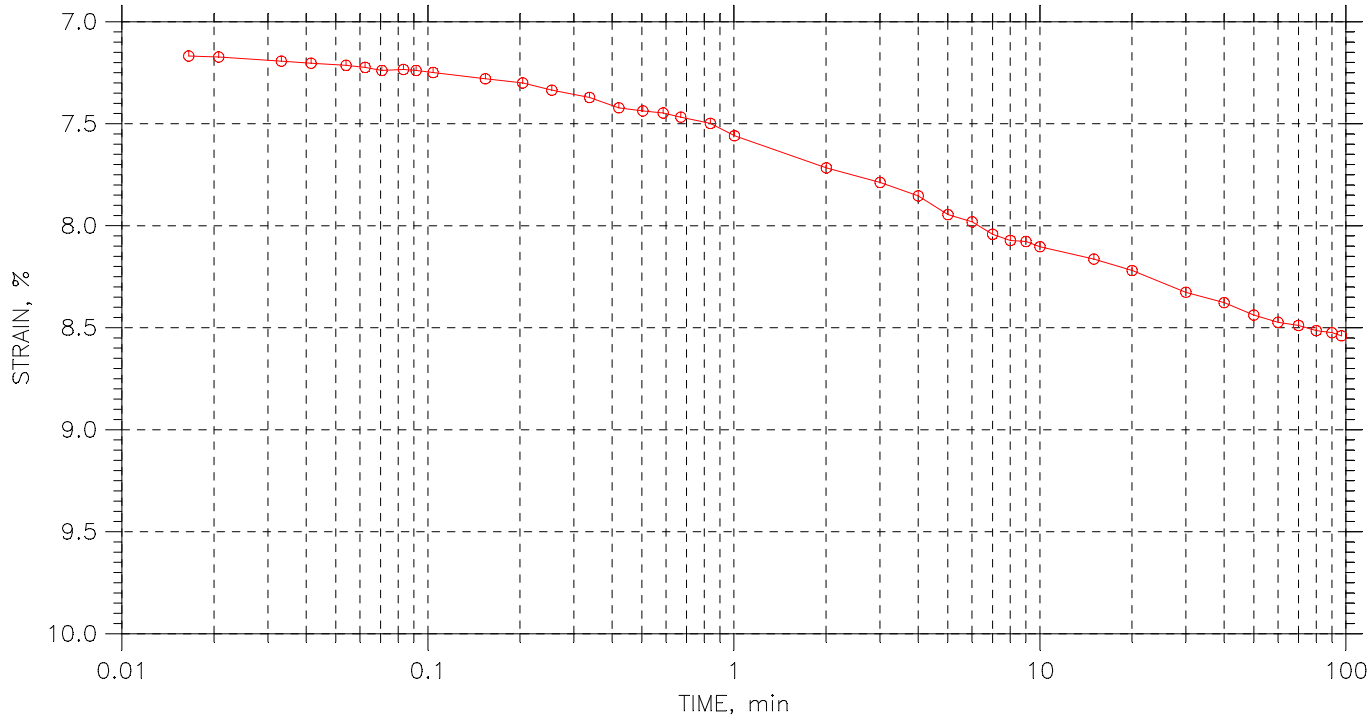
Fri, 10-AUG-2012 16:06:01

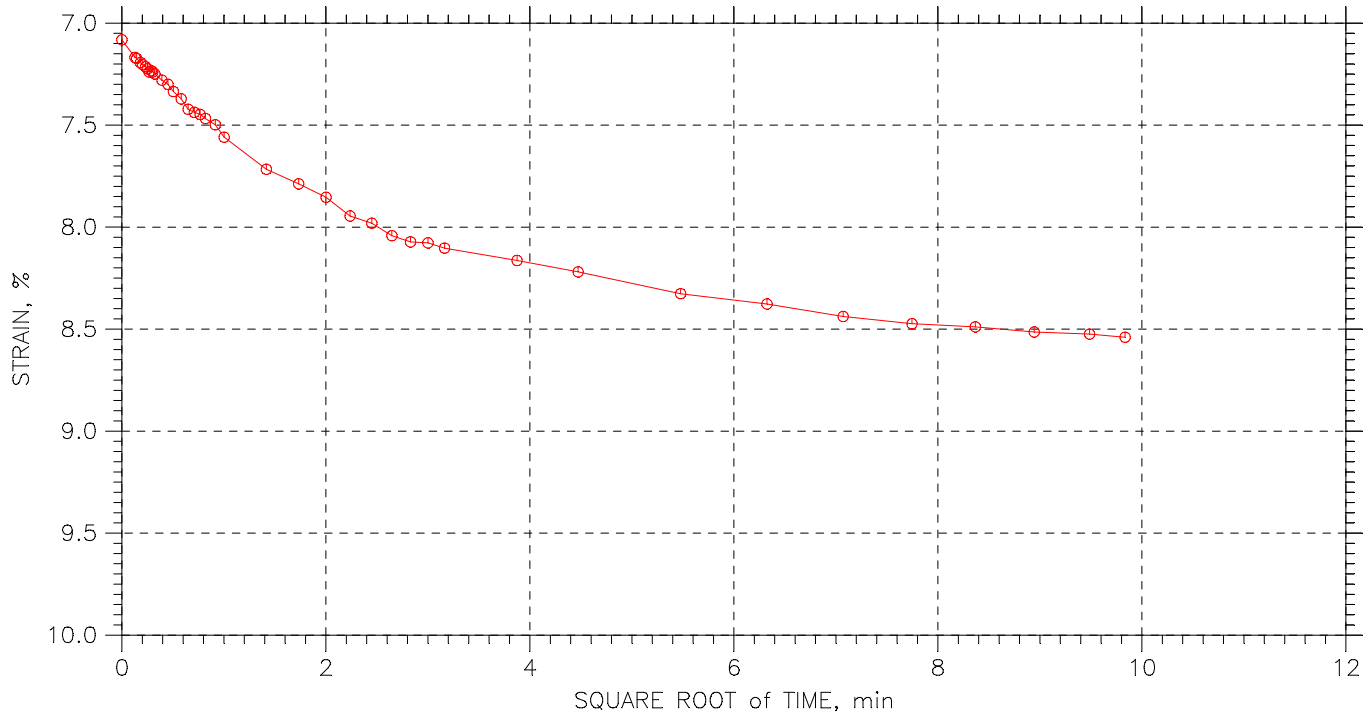
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 10 of 29

Stress: 2.25 tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-101	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/1/12	Depth: 8.0-10.0 FT
Test No.: 244204	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

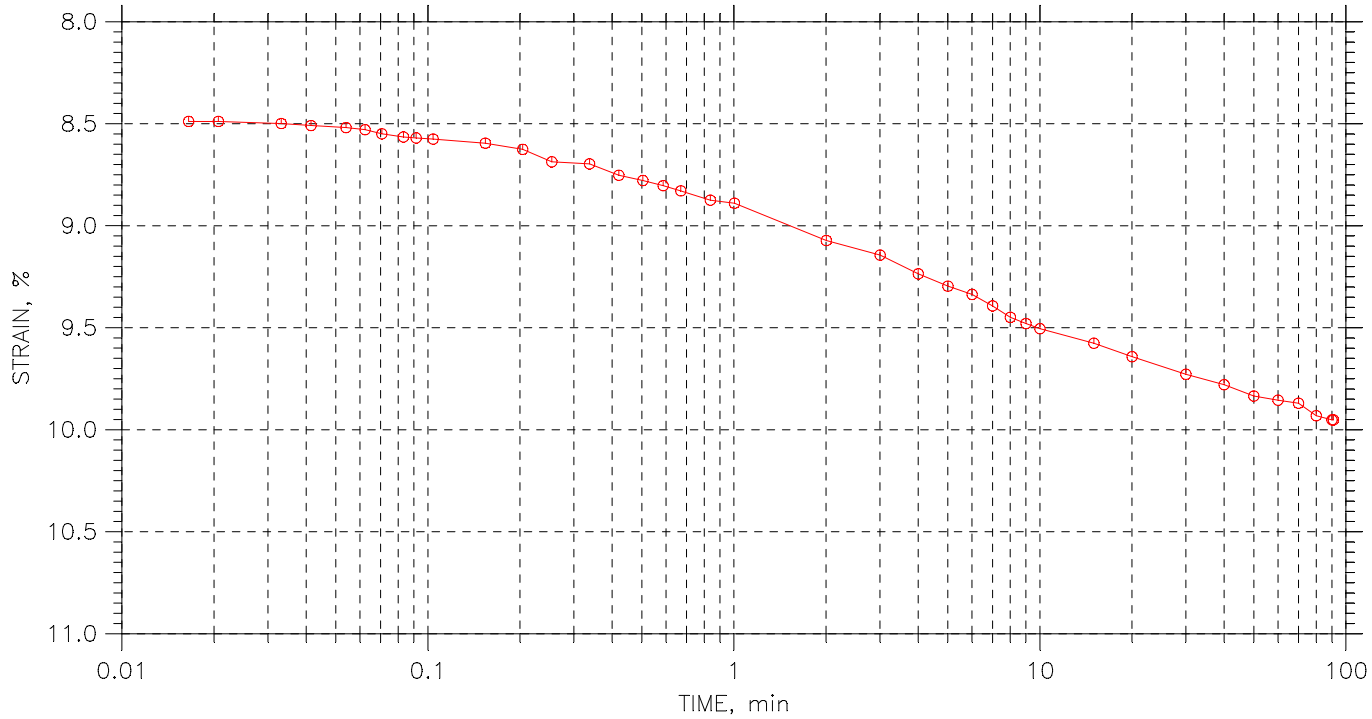
Fri, 10-AUG-2012 16:06:02

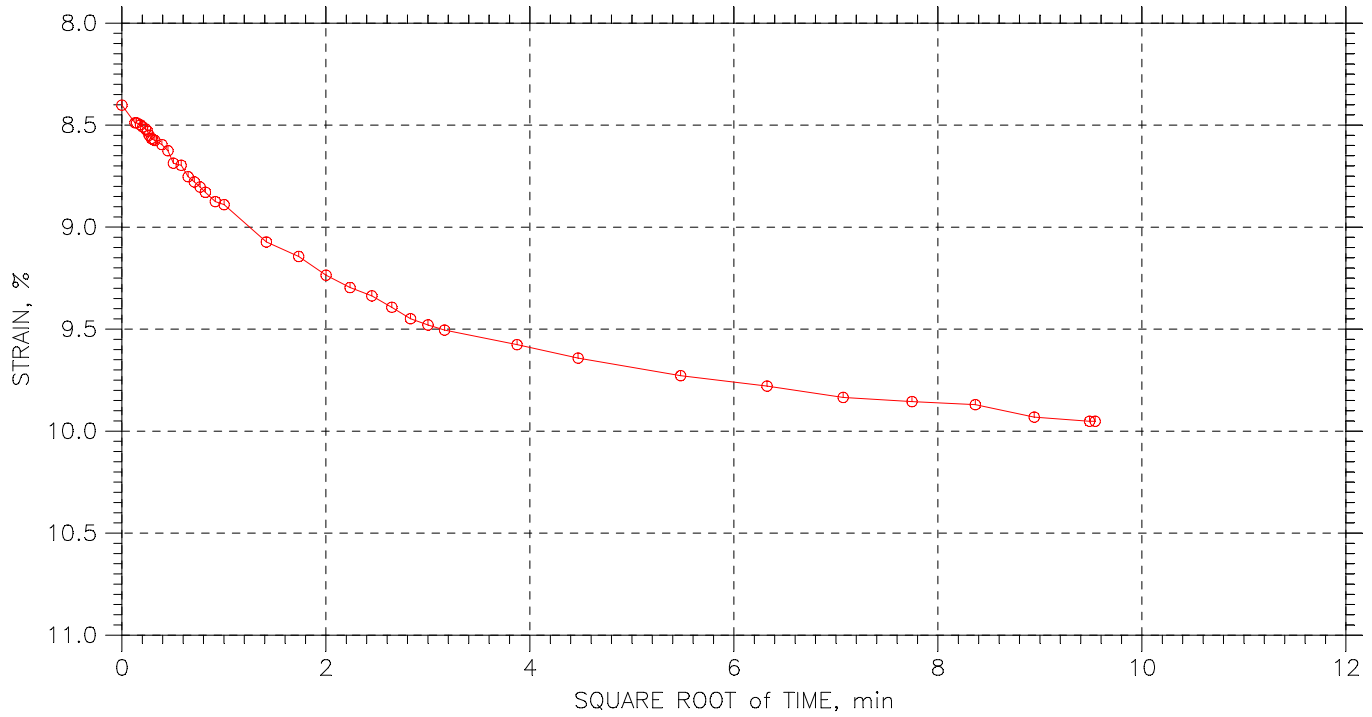
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 11 of 29

Stress: 3.25 tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-101	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/1/12	Depth: 8.0-10.0 FT
Test No.: 244204	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

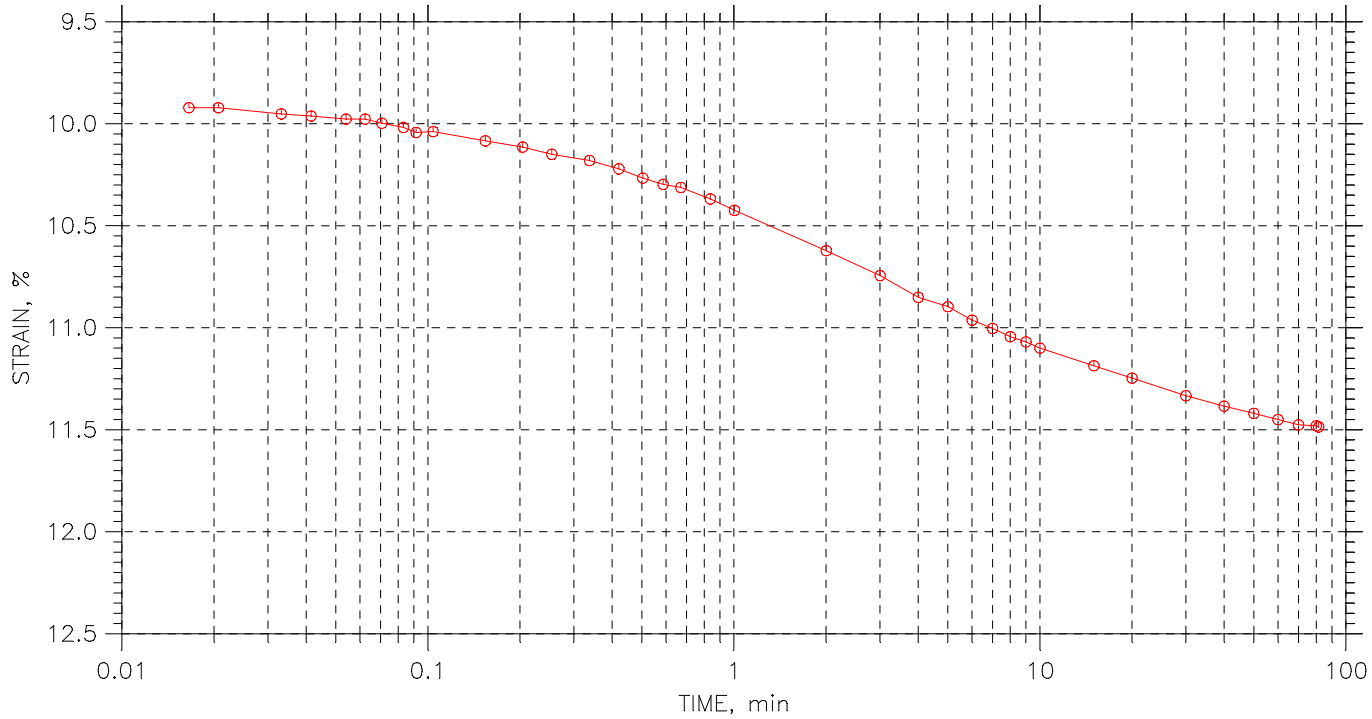
Fri, 10-AUG-2012 16:06:02

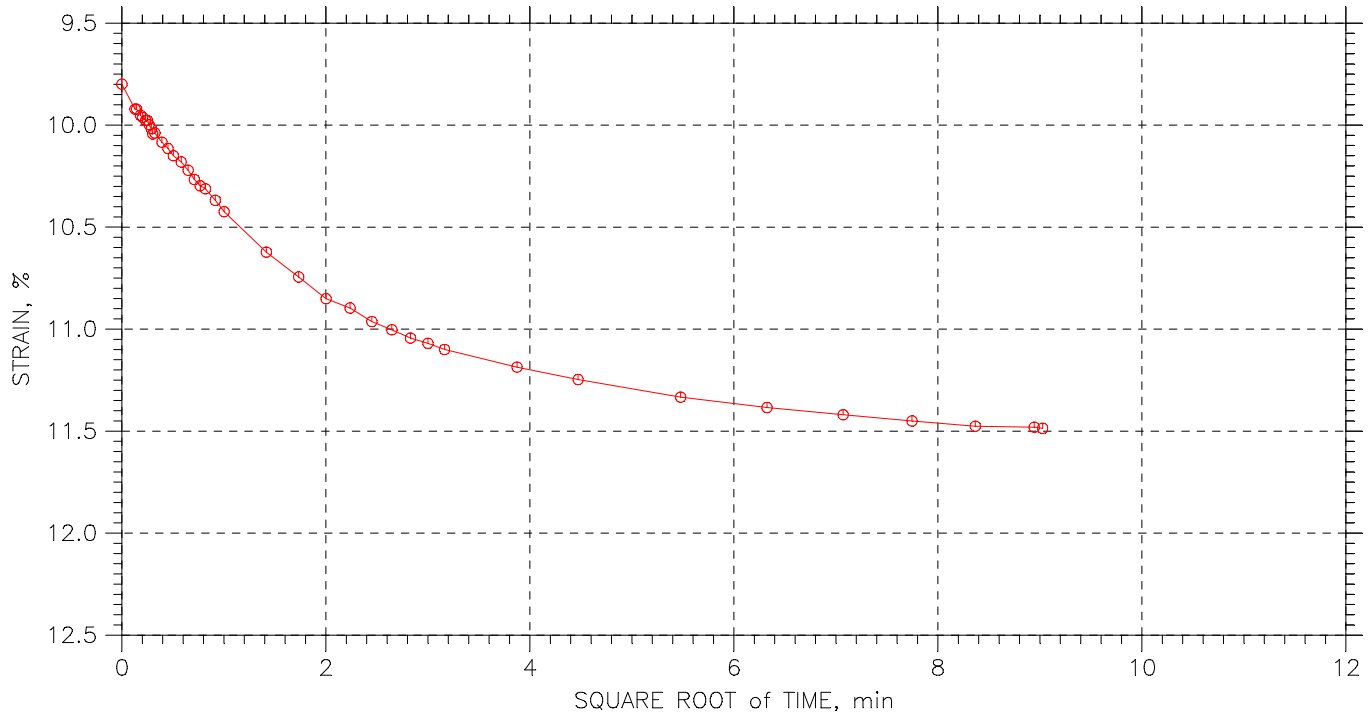
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 12 of 29

Stress: 4.75 tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-101	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/1/12	Depth: 8.0-10.0 FT
Test No.: 244204	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

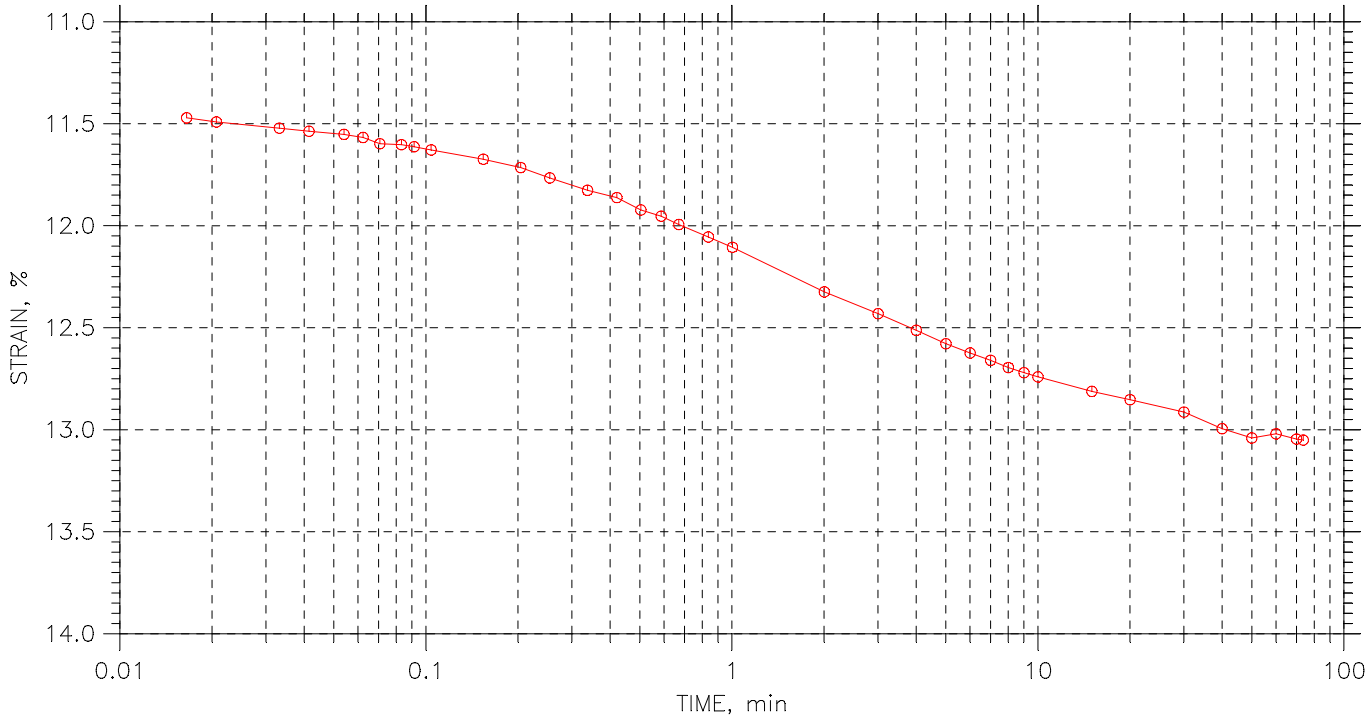
Fri, 10-AUG-2012 16:06:03

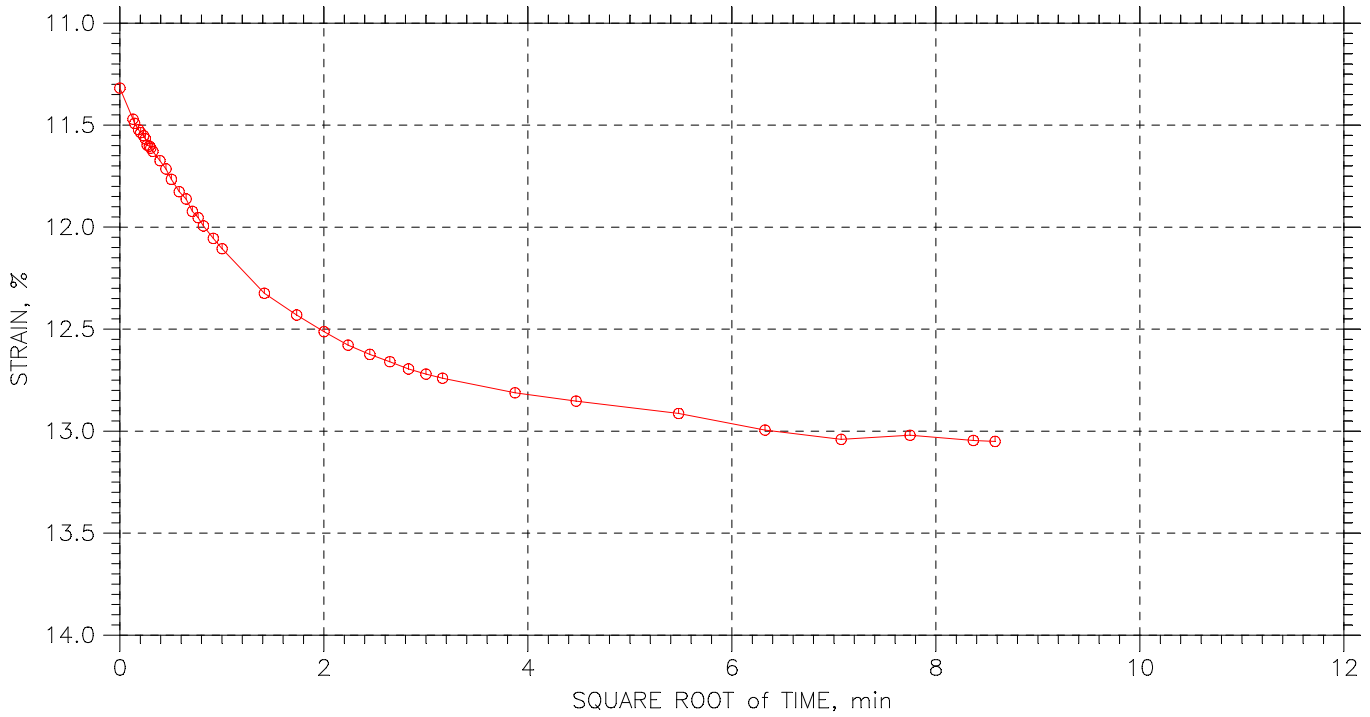
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 13 of 29

Stress: 7. tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-101	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/1/12	Depth: 8.0-10.0 FT
Test No.: 244204	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

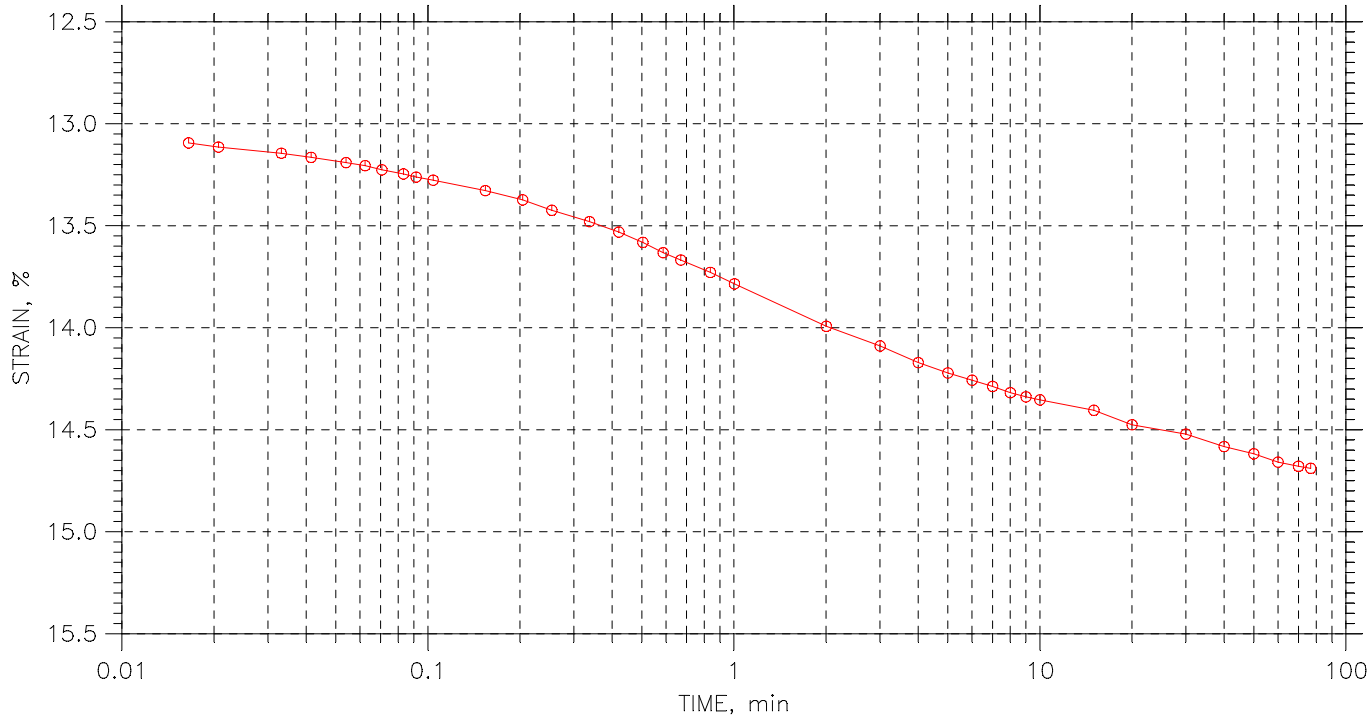
Fri, 10-AUG-2012 16:06:04

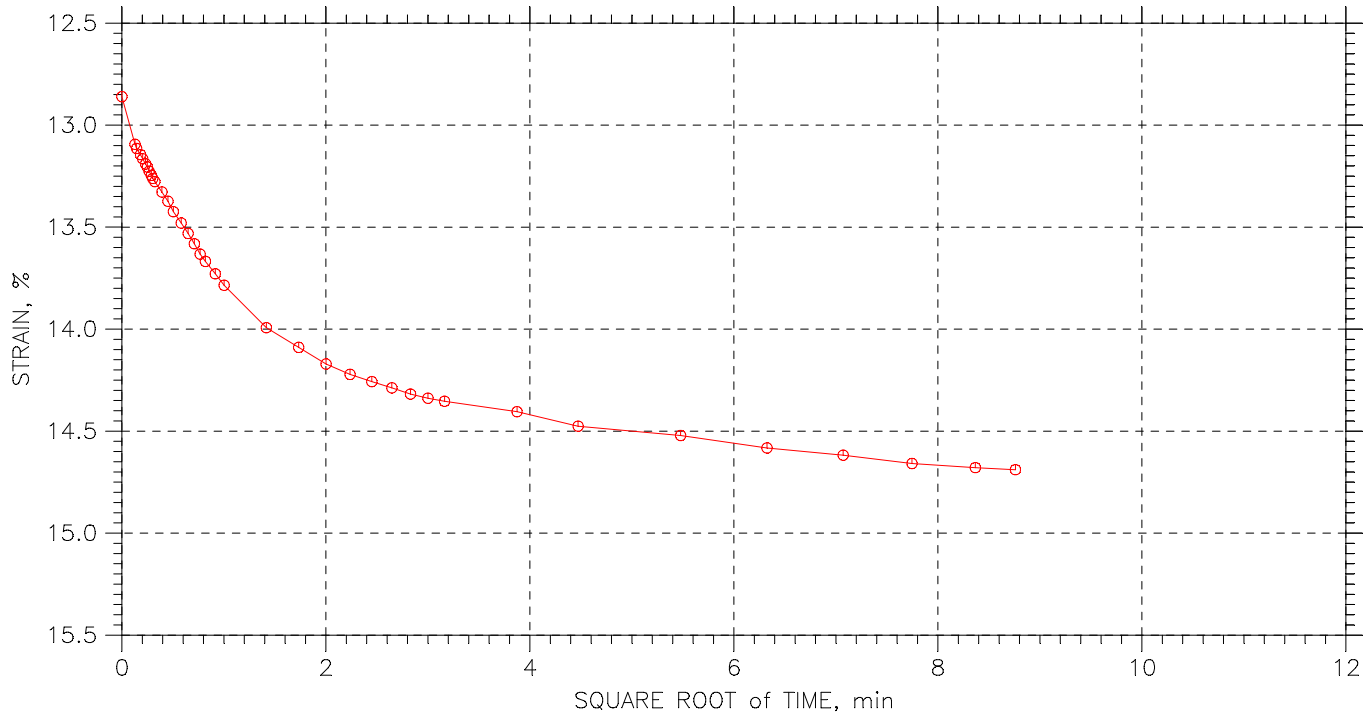
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 14 of 29

Stress: 10.25 tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-101	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/1/12	Depth: 8.0-10.0 FT
Test No.: 244204	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

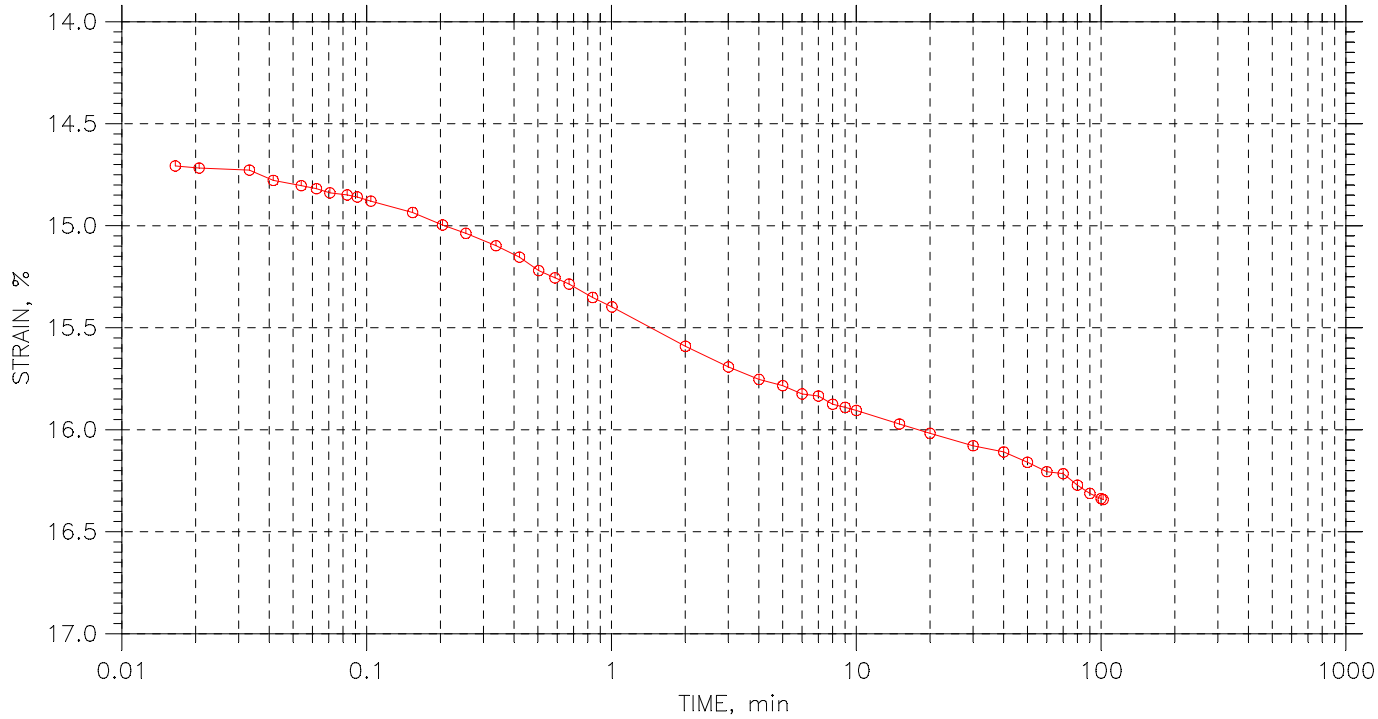
Fri, 10-AUG-2012 16:06:04

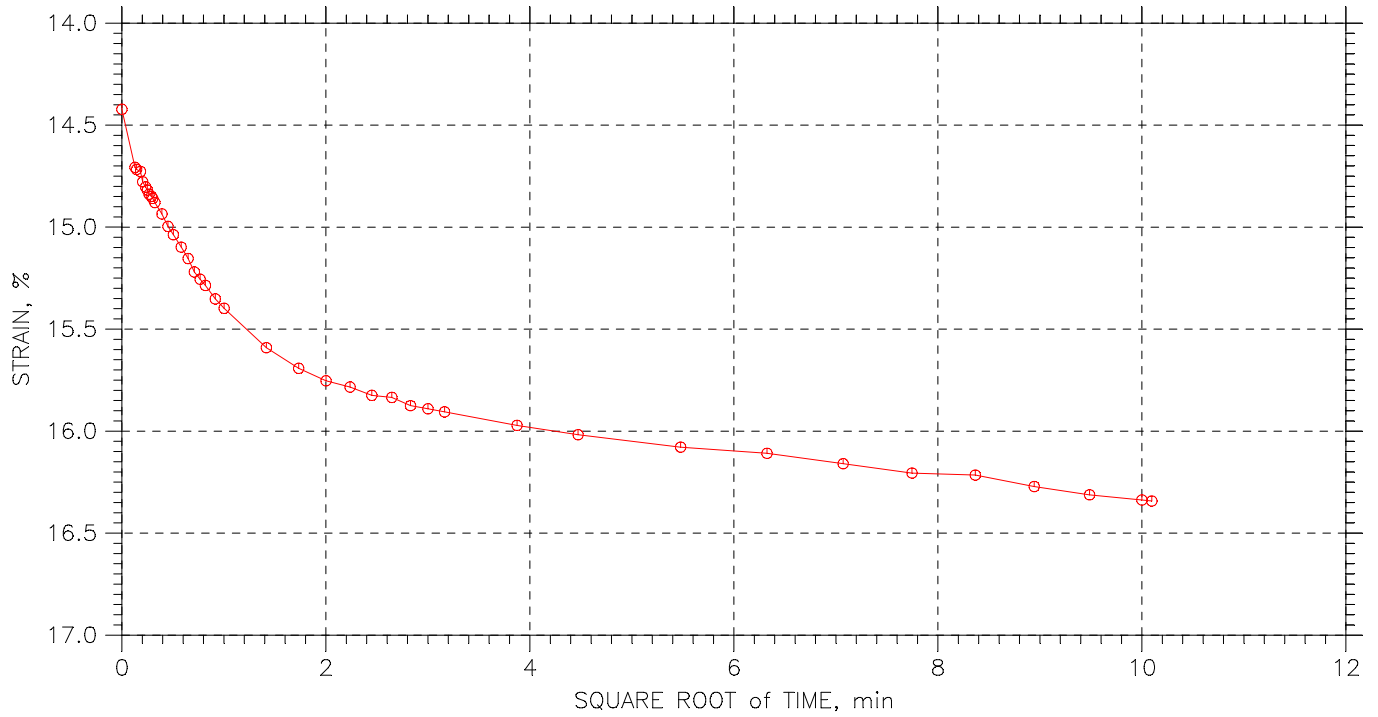
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 15 of 29

Stress: 15. tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-101	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/1/12	Depth: 8.0-10.0 FT
Test No.: 244204	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

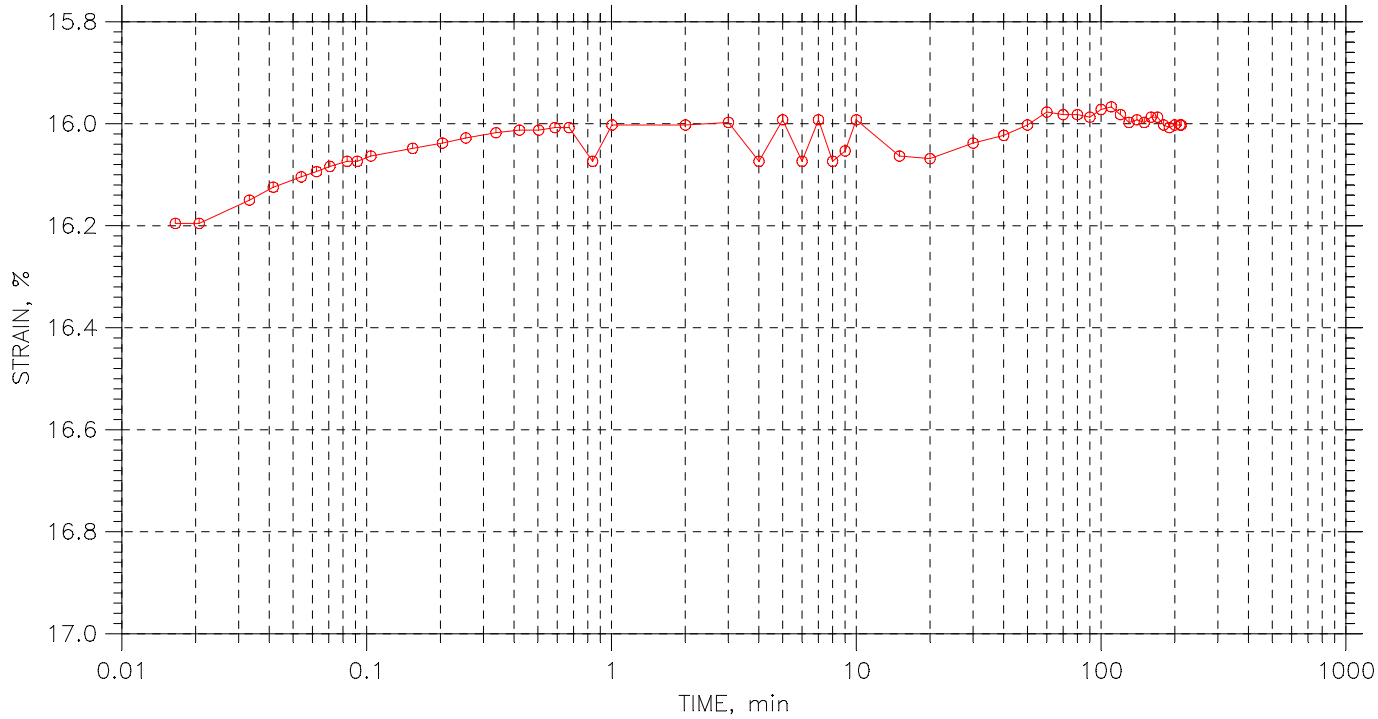
Fri, 10-AUG-2012 16:06:05

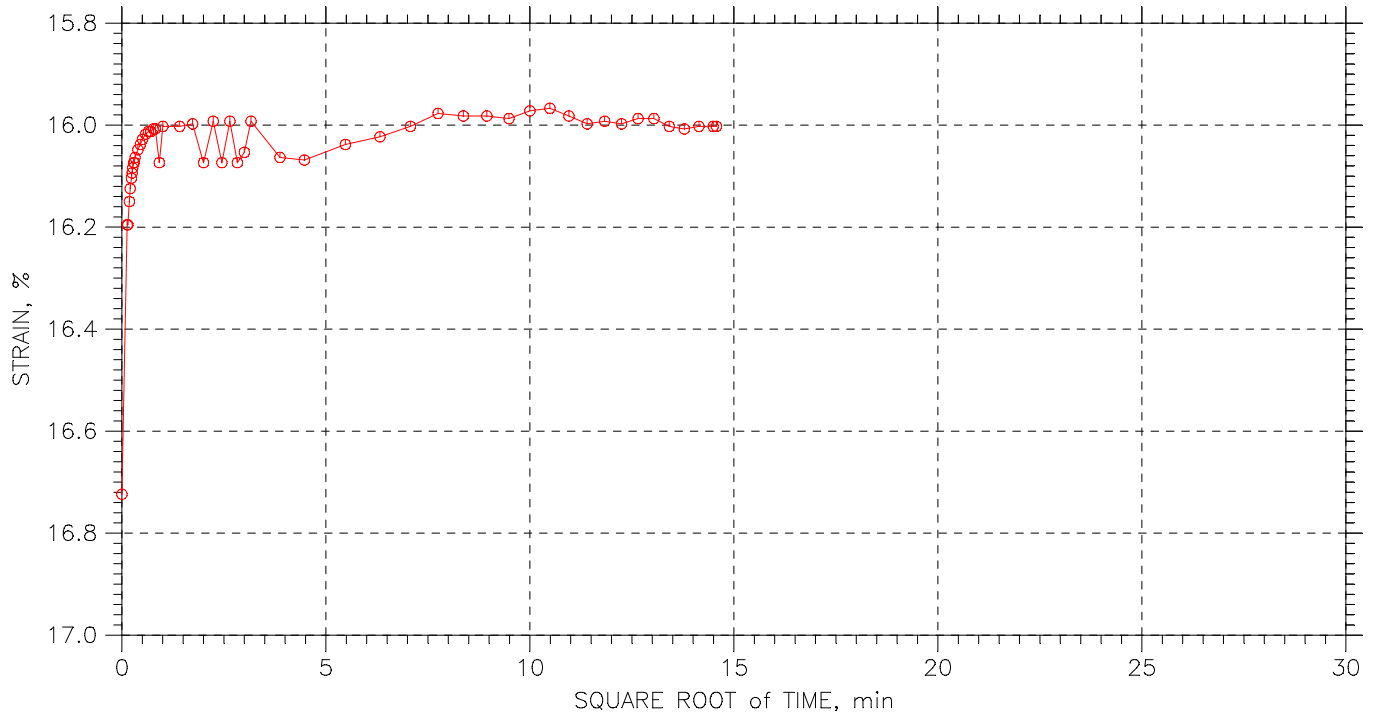
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 16 of 29

Stress: 7. tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-101	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/1/12	Depth: 8.0-10.0 FT
Test No.: 244204	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

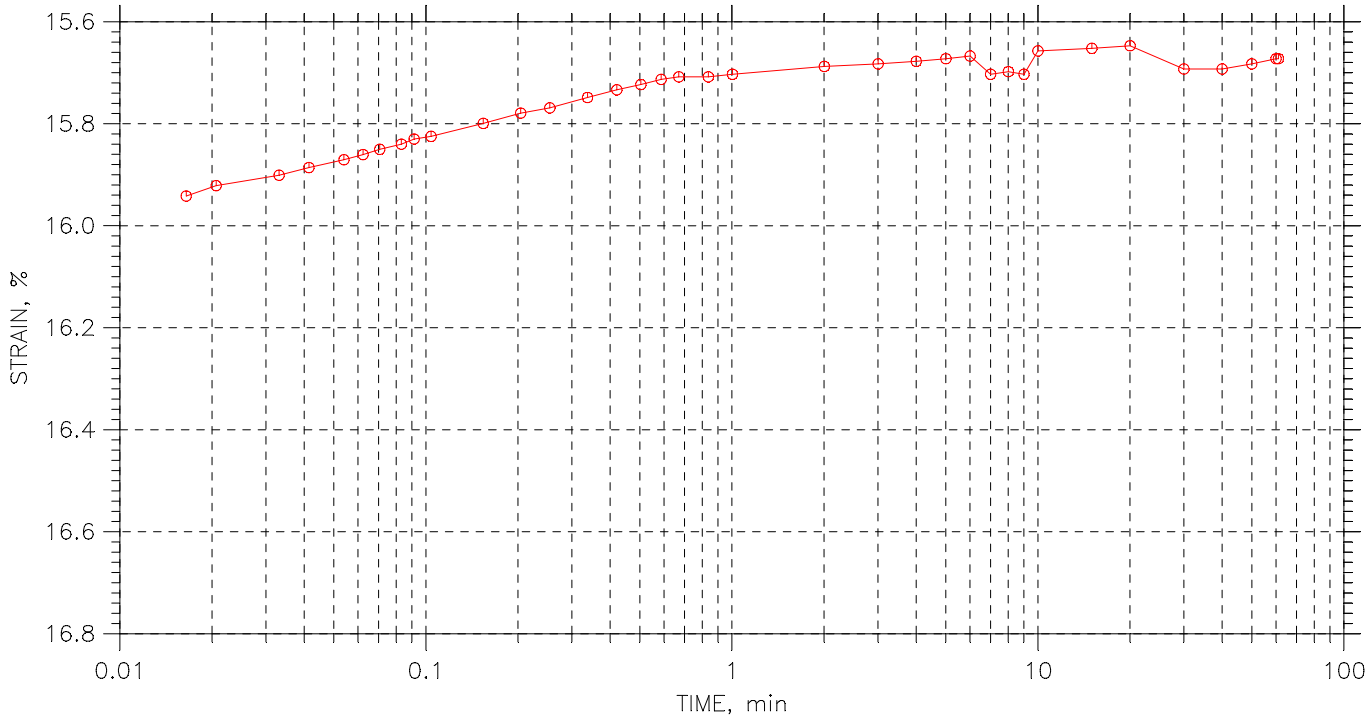
Fri, 10-AUG-2012 16:06:05

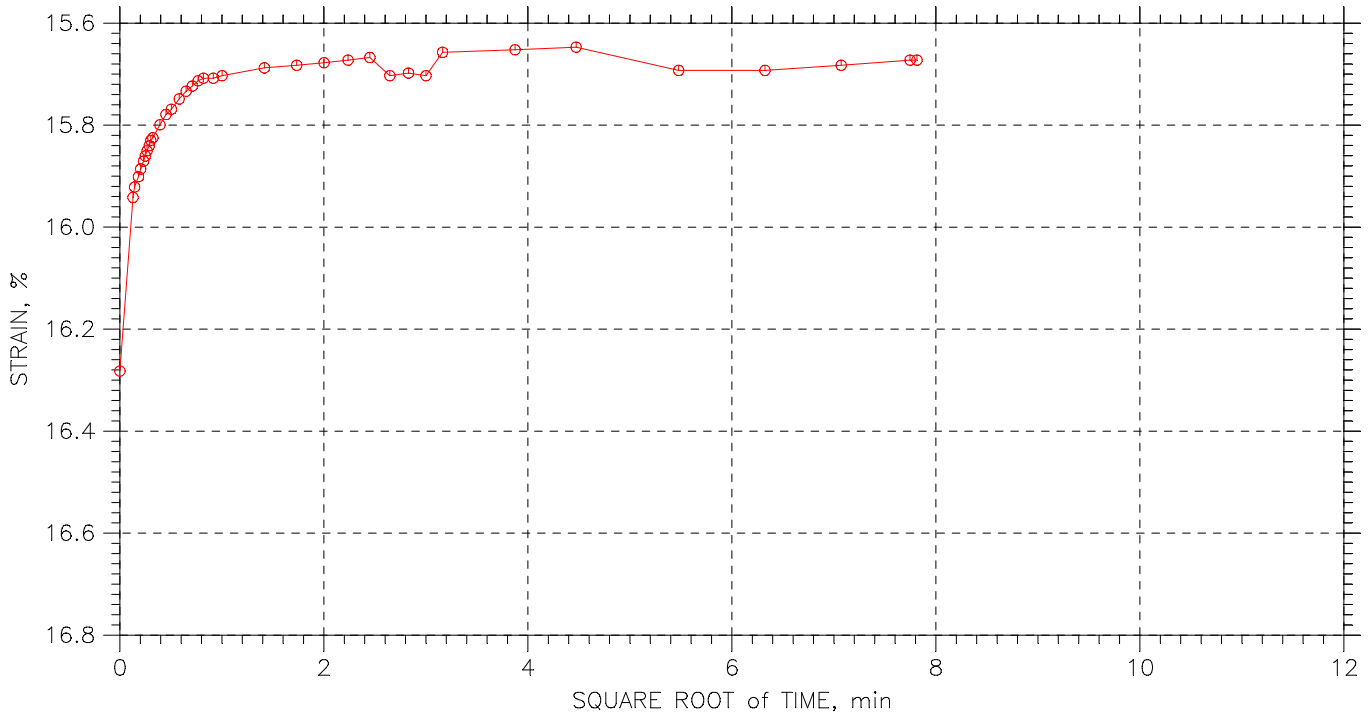
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 17 of 29

Stress: 3.25 tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-101	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/1/12	Depth: 8.0-10.0 FT
Test No.: 244204	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

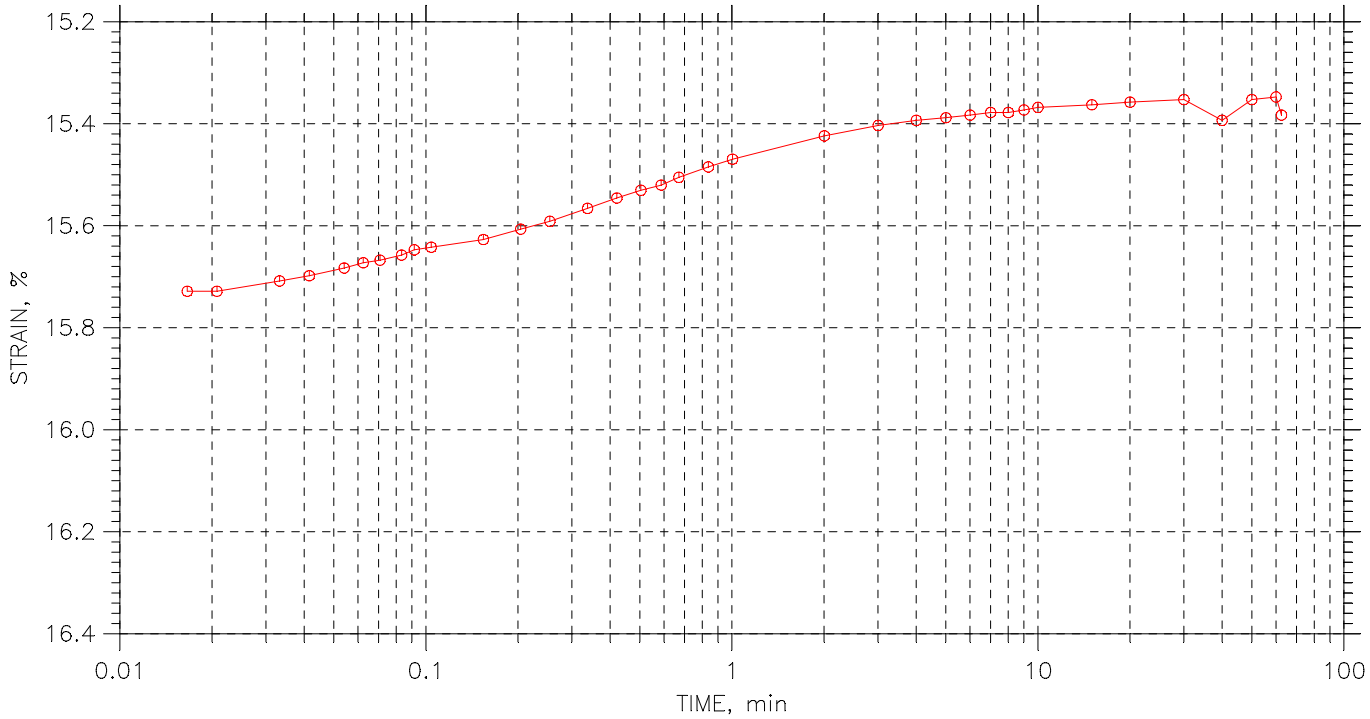
Fri, 10-AUG-2012 16:06:06

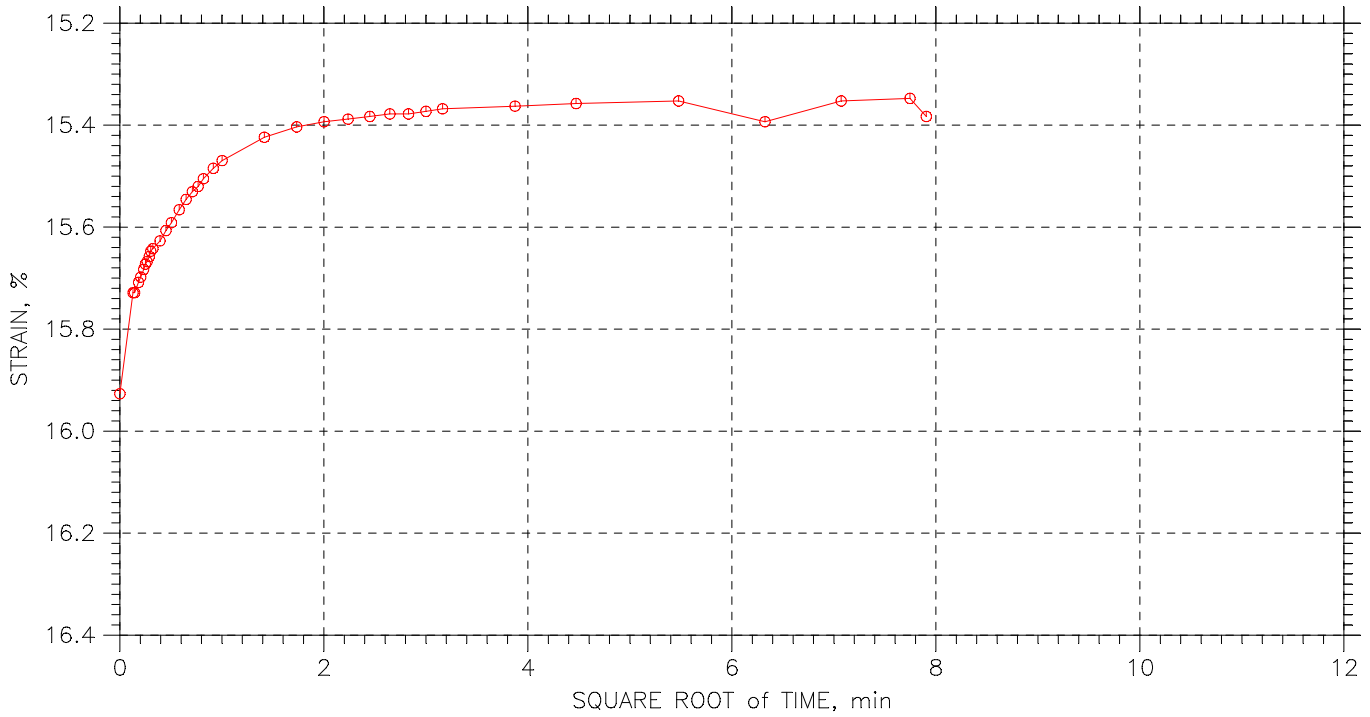
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 18 of 29

Stress: 1.5 tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-101	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/1/12	Depth: 8.0-10.0 FT
Test No.: 244204	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

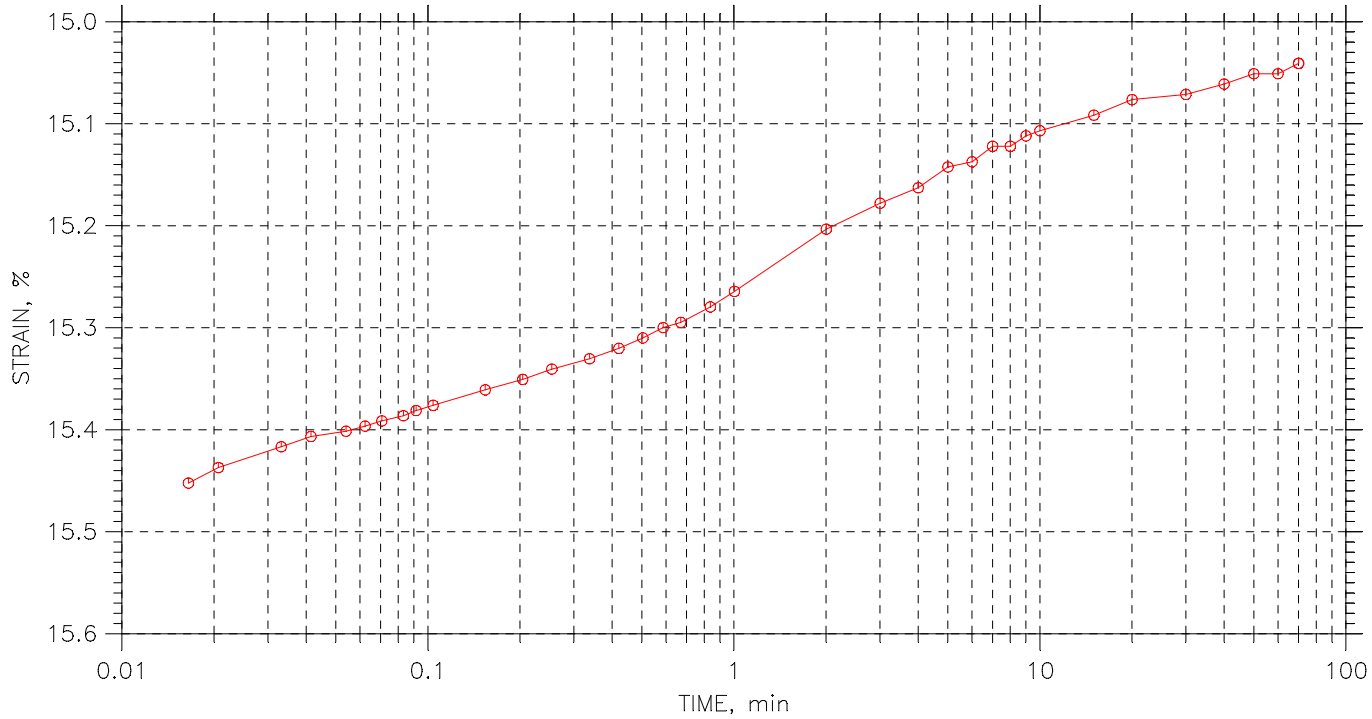
Fri, 10-AUG-2012 16:06:07

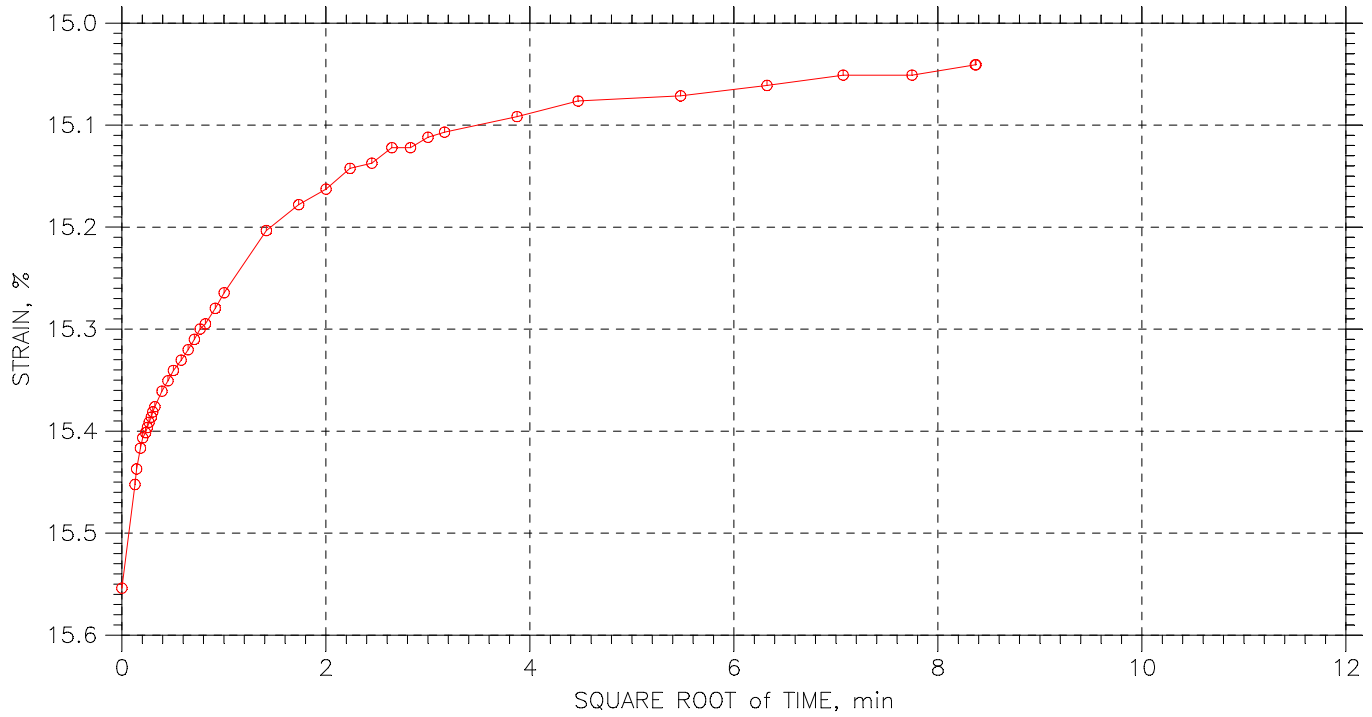
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 19 of 29

Stress: 0.75 tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-101	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/1/12	Depth: 8.0-10.0 FT
Test No.: 244204	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

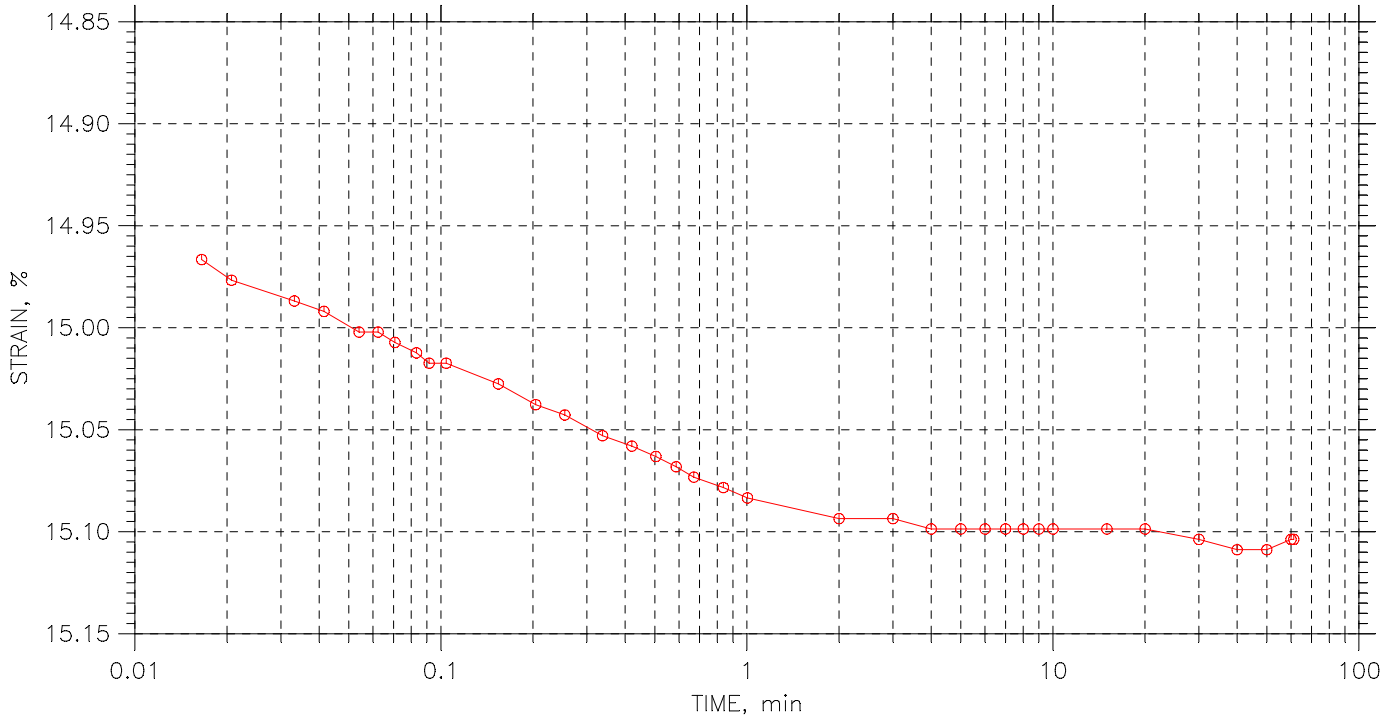
Fri, 10-AUG-2012 16:06:07

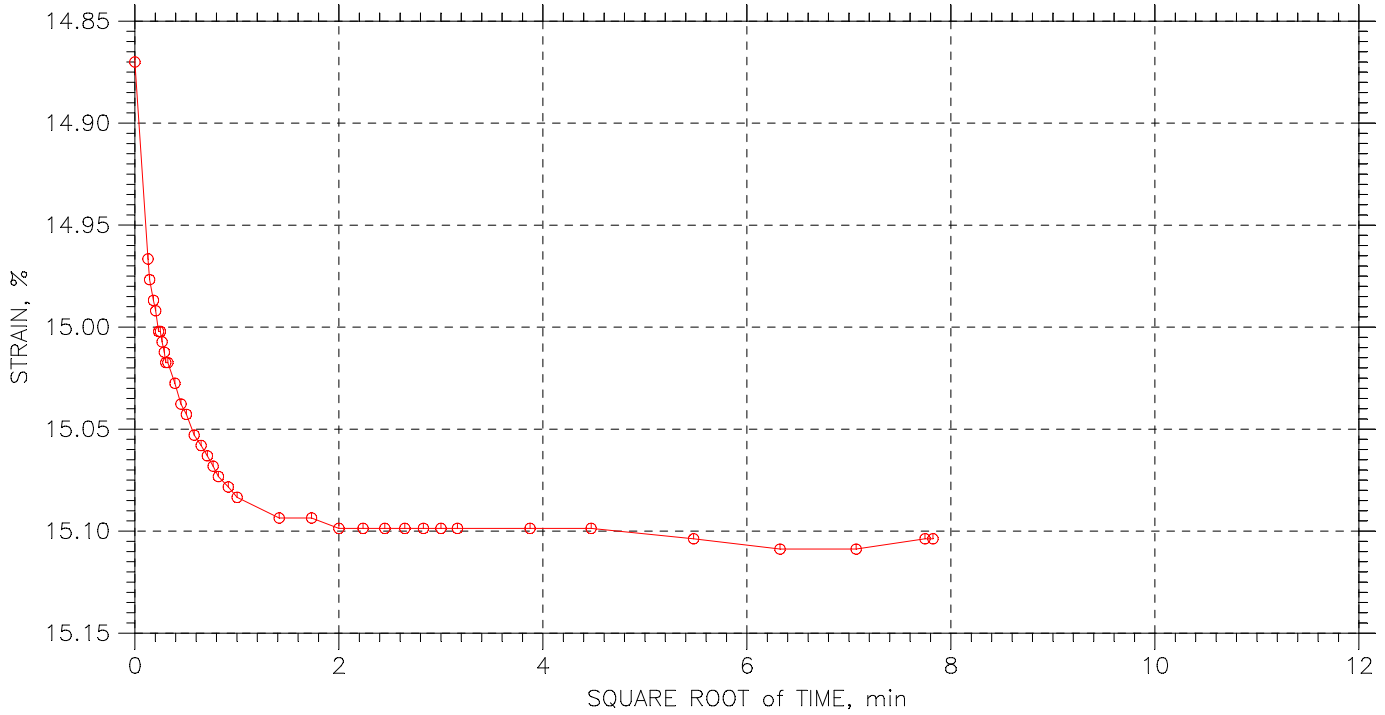
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 20 of 29

Stress: 1.5 tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-101	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/1/12	Depth: 8.0-10.0 FT
Test No.: 244204	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

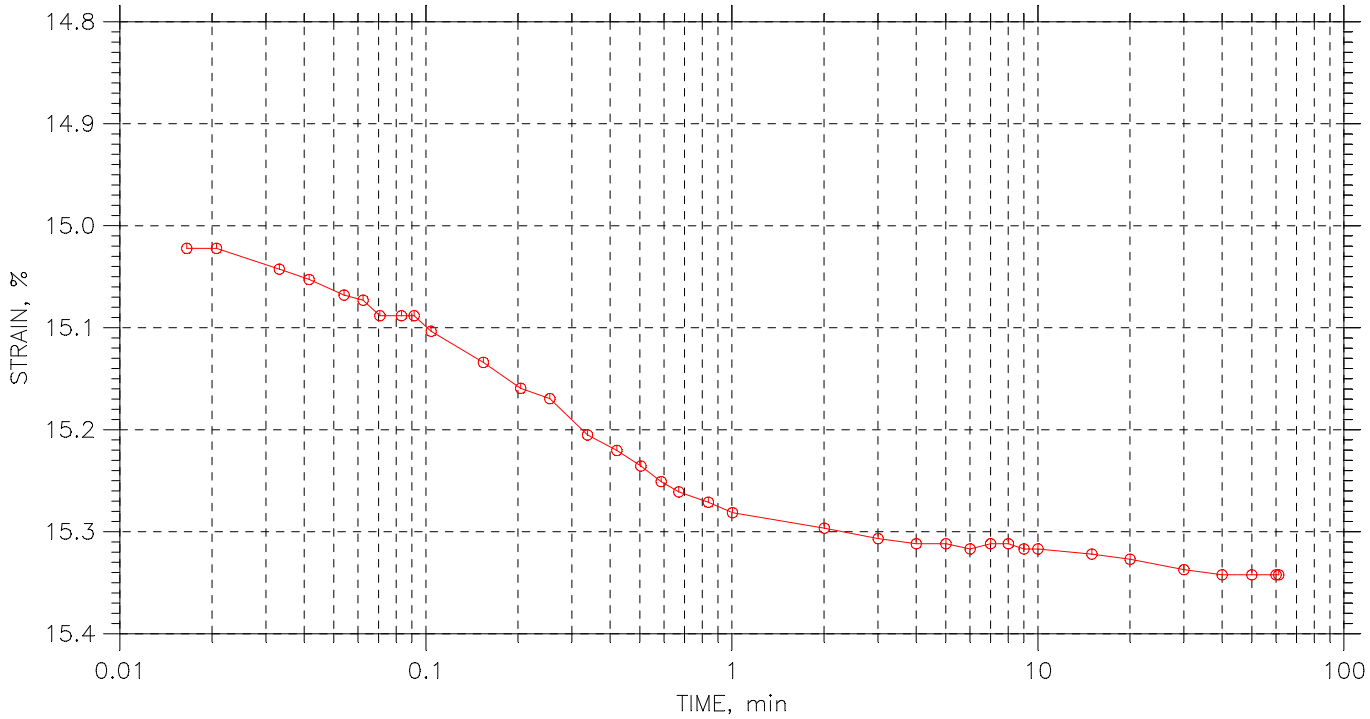
Fri, 10-AUG-2012 16:06:08

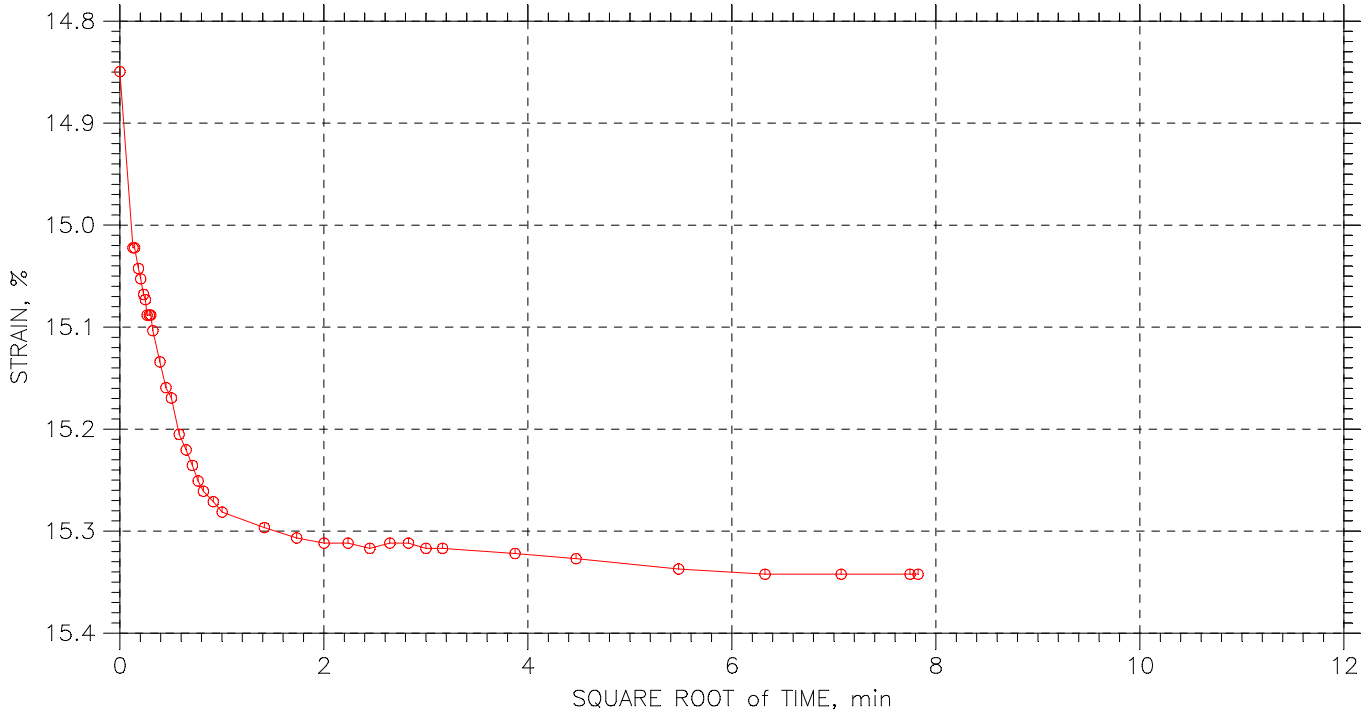
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 21 of 29

Stress: 3.25 tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-101	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/1/12	Depth: 8.0-10.0 FT
Test No.: 244204	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

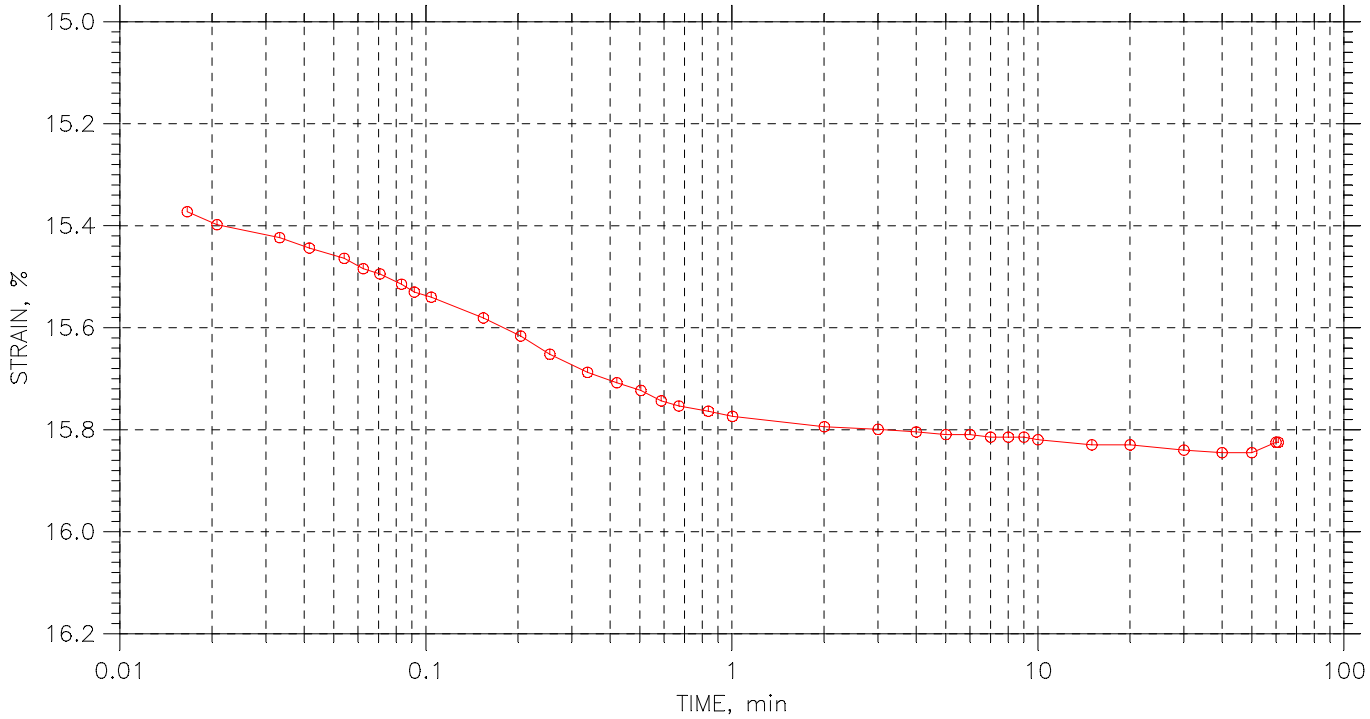
Fri, 10-AUG-2012 16:06:09

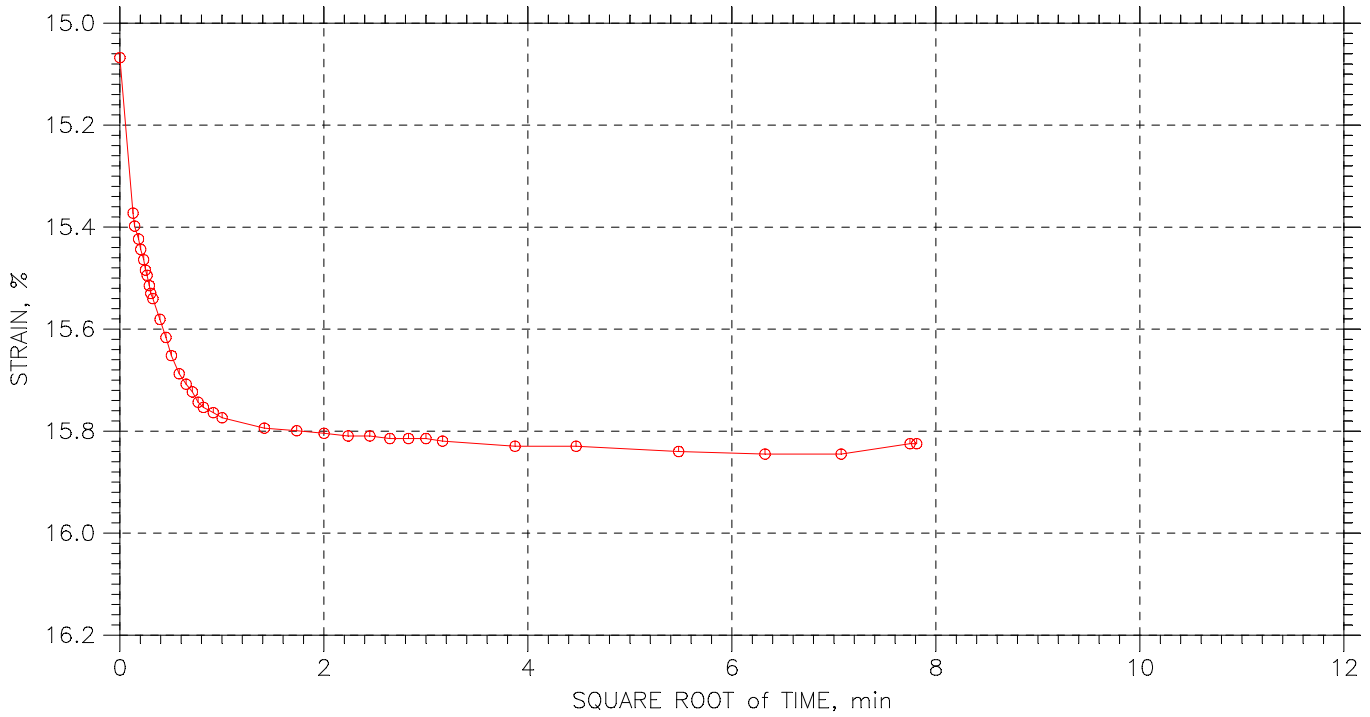
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 22 of 29

Stress: 7. tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-101	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/1/12	Depth: 8.0-10.0 FT
Test No.: 244204	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

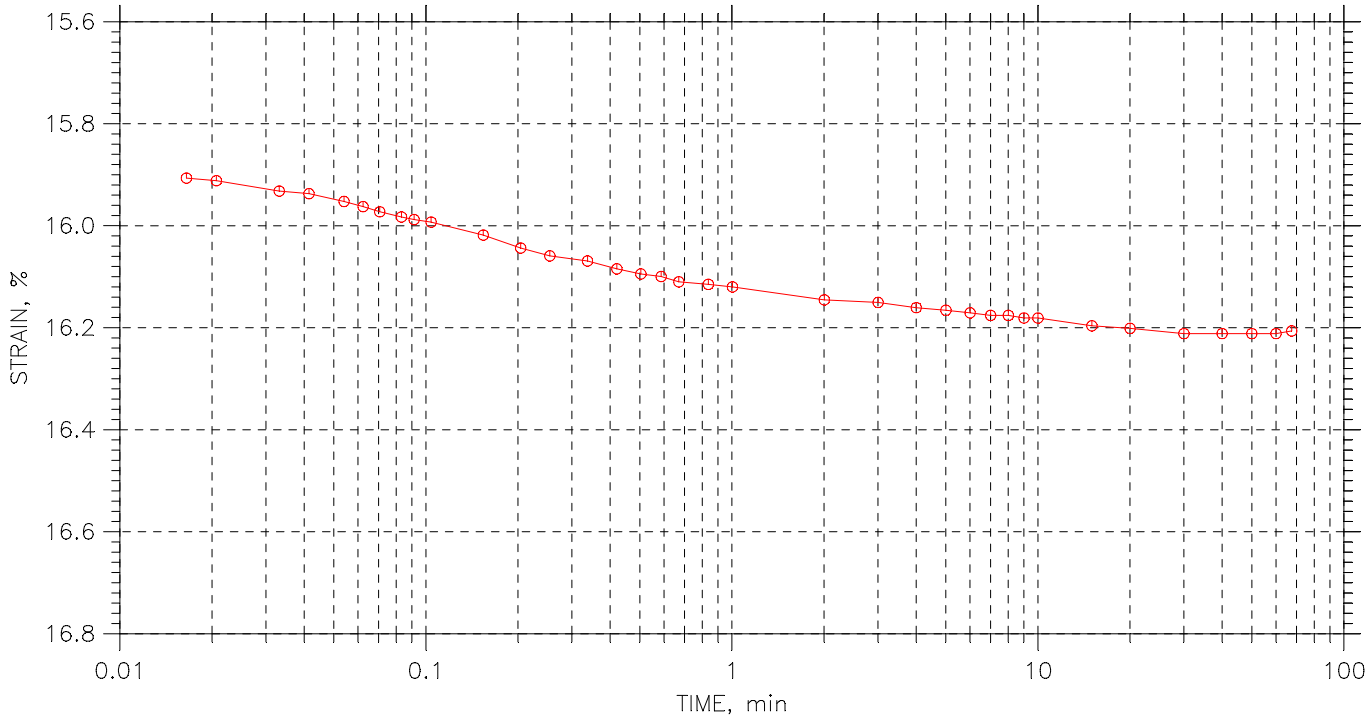
Fri, 10-AUG-2012 16:06:09

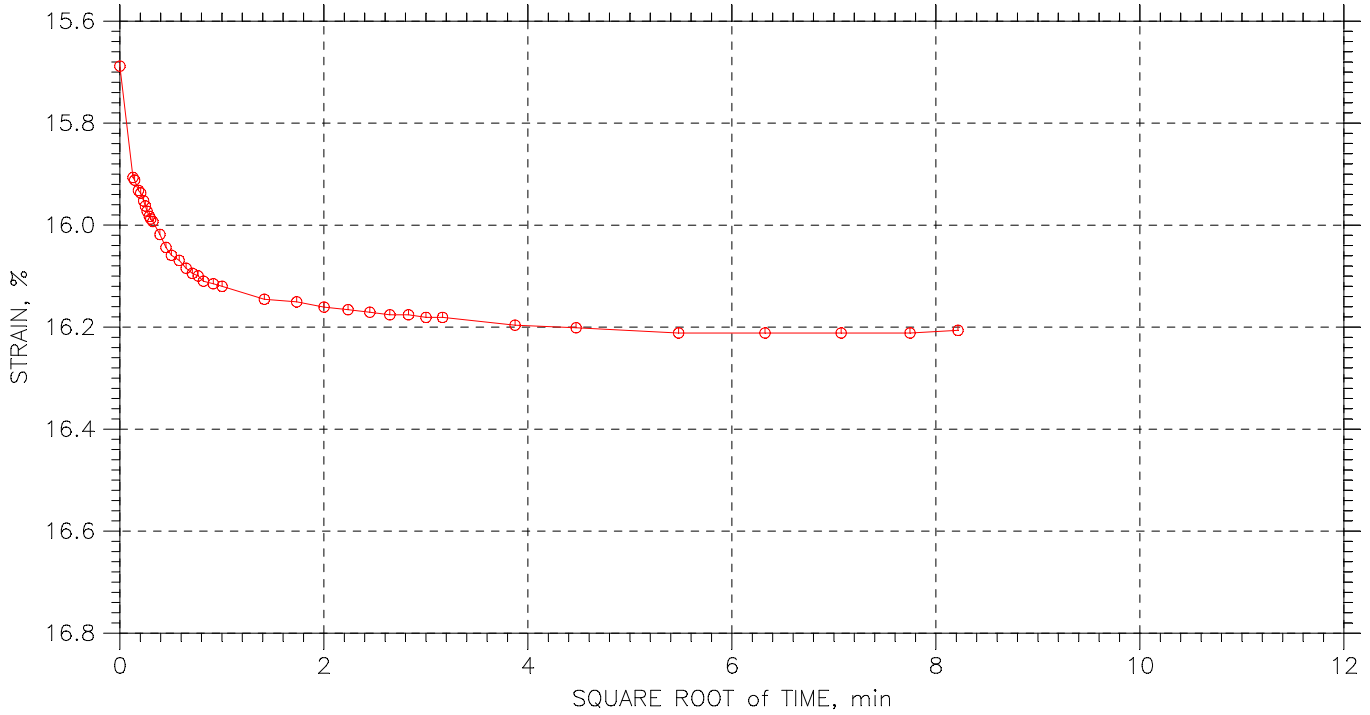
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 23 of 29

Stress: 10.25 tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-101	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/1/12	Depth: 8.0-10.0 FT
Test No.: 244204	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

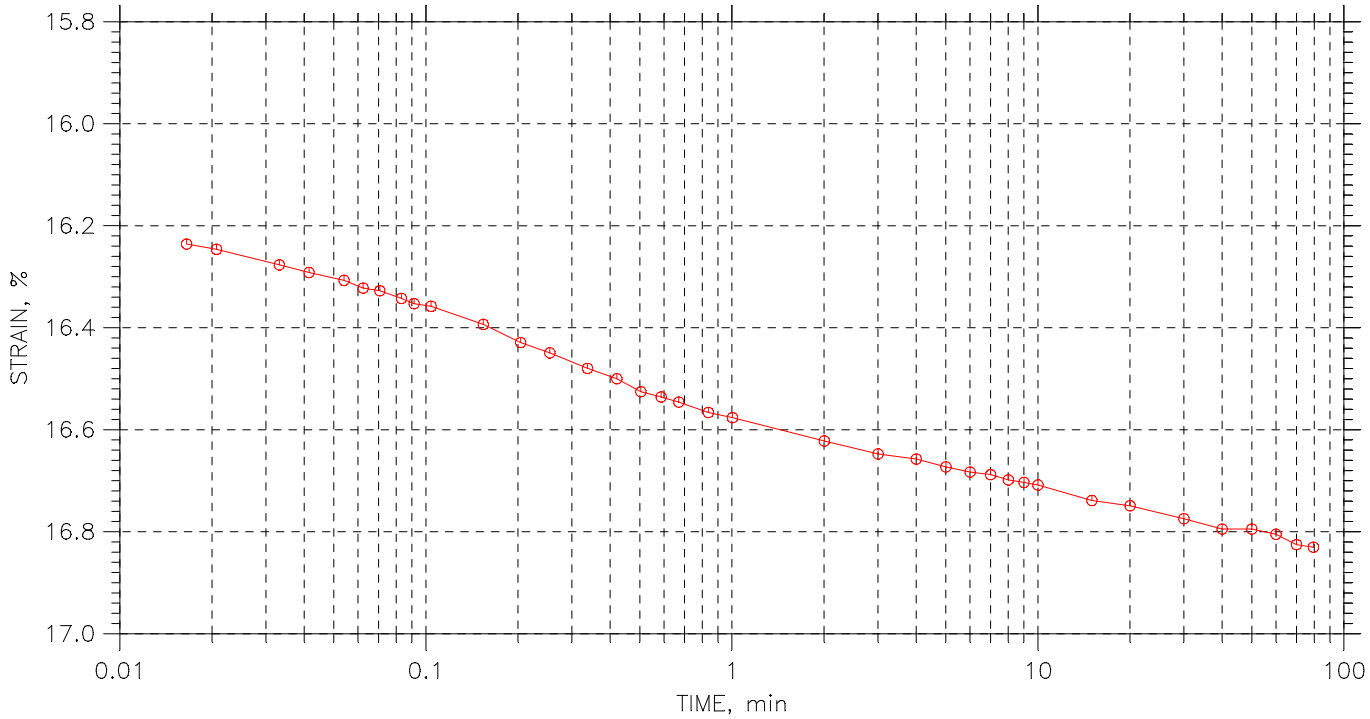
Fri, 10-AUG-2012 16:06:10

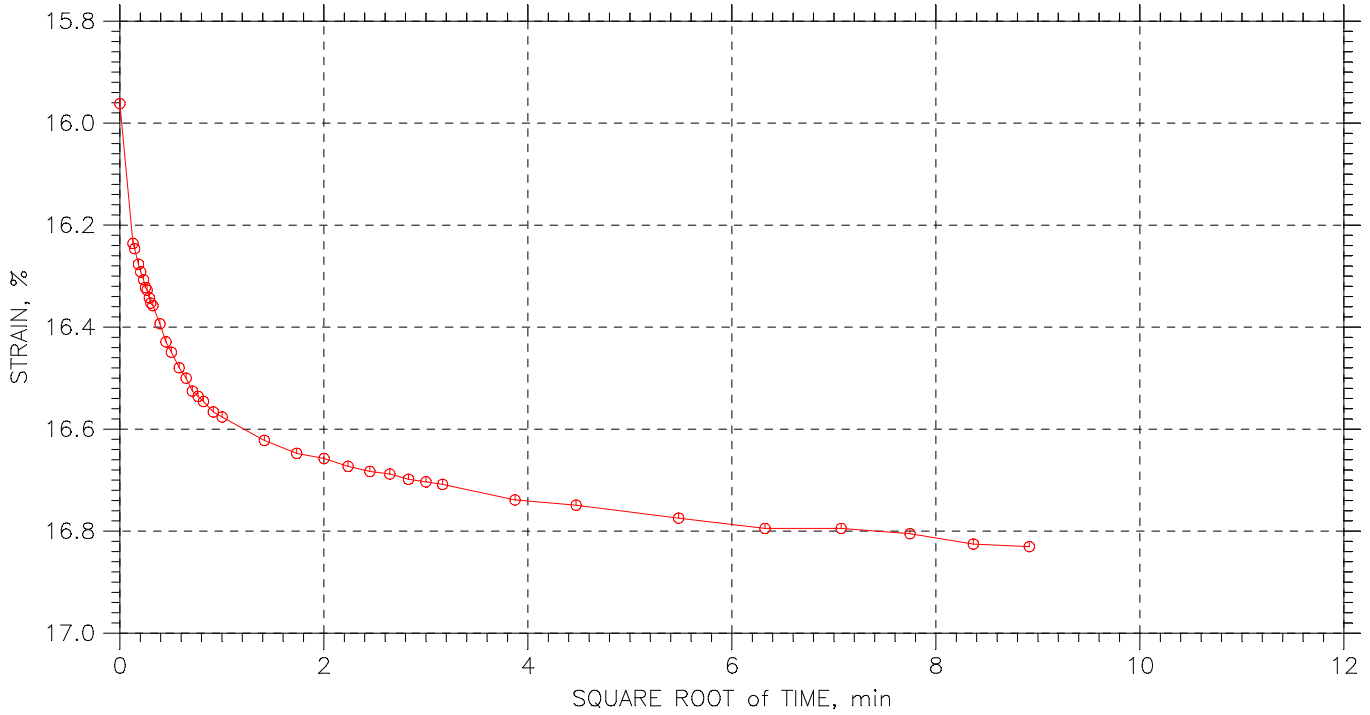
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 24 of 29

Stress: 15. tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-101	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/1/12	Depth: 8.0-10.0 FT
Test No.: 244204	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

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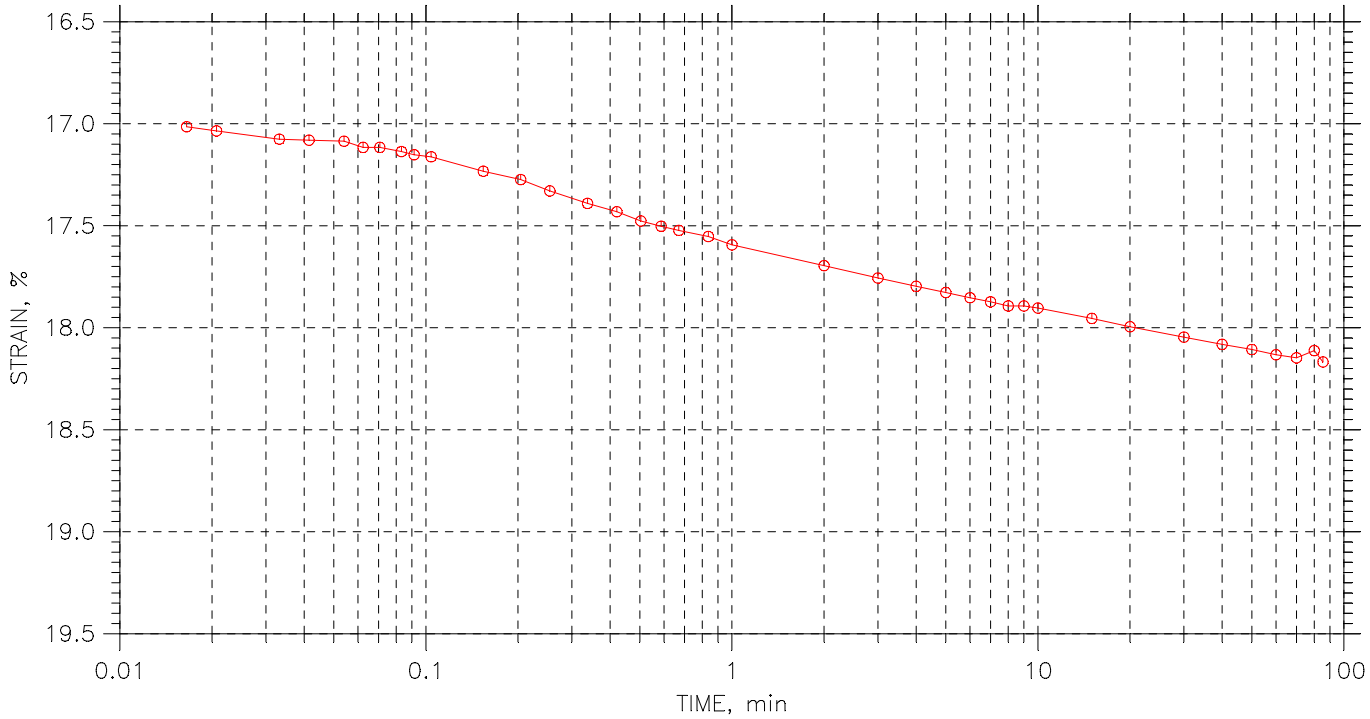
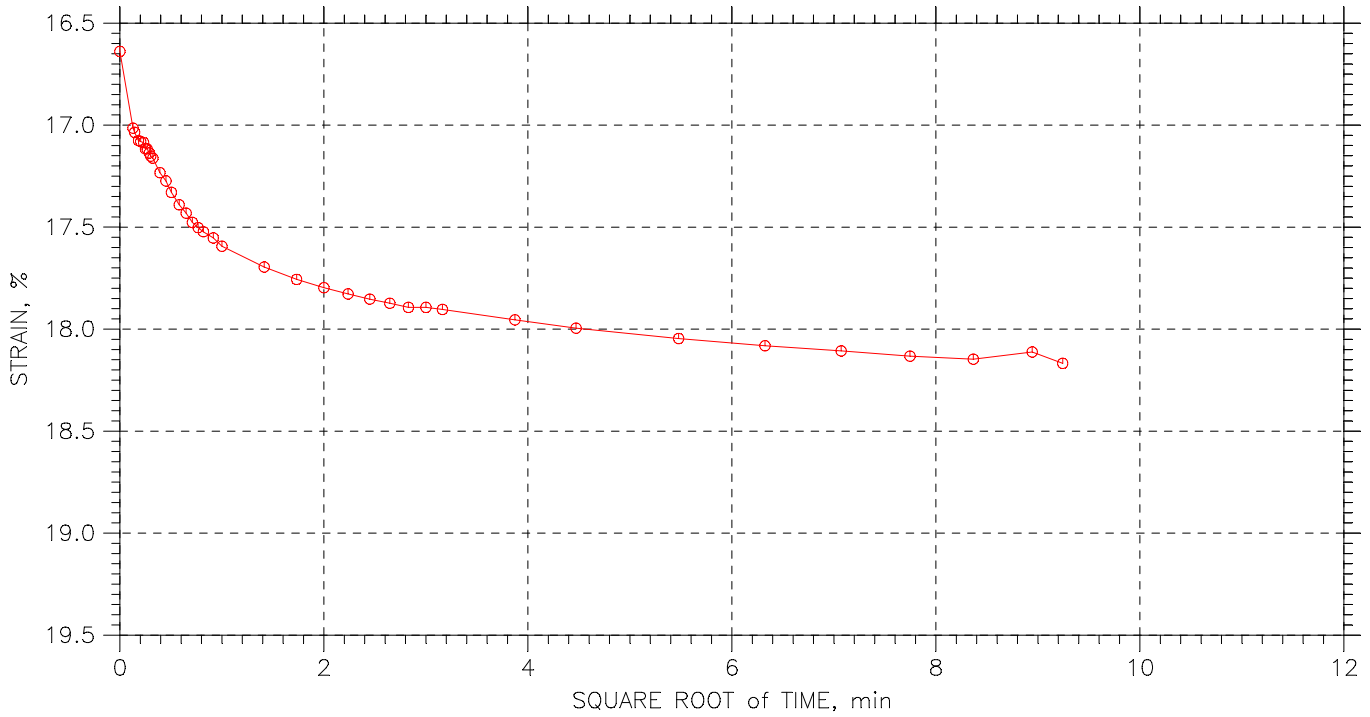
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 25 of 29

Stress: 22. tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-101	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/1/12	Depth: 8.0-10.0 FT
Test No.: 244204	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

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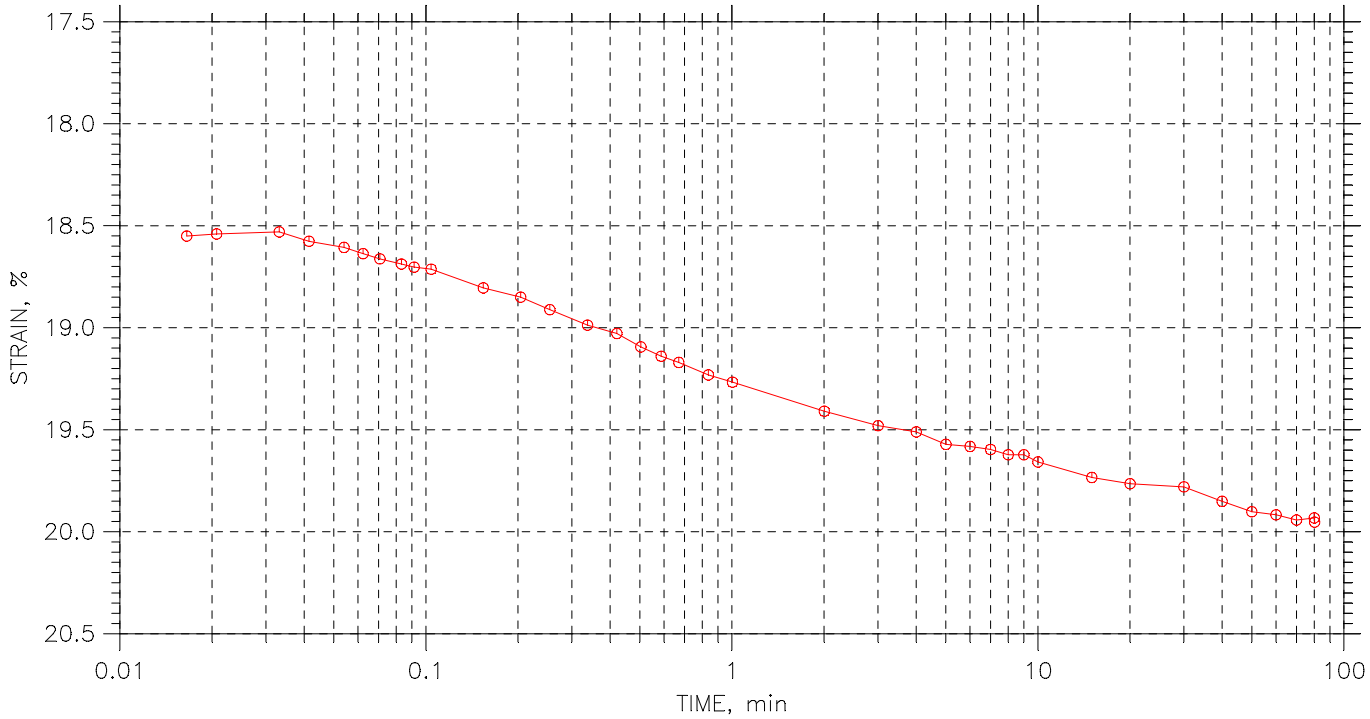
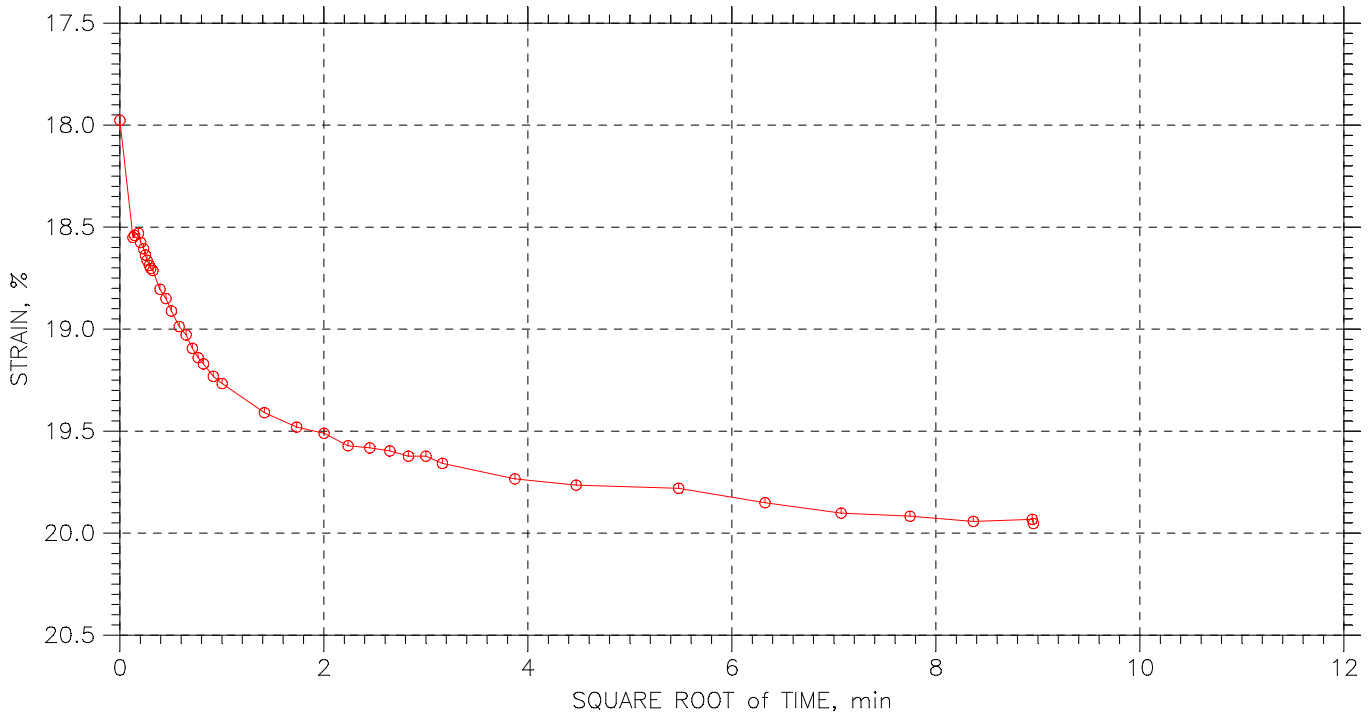
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 26 of 29

Stress: 32.25 tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-101	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/1/12	Depth: 8.0-10.0 FT
Test No.: 244204	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

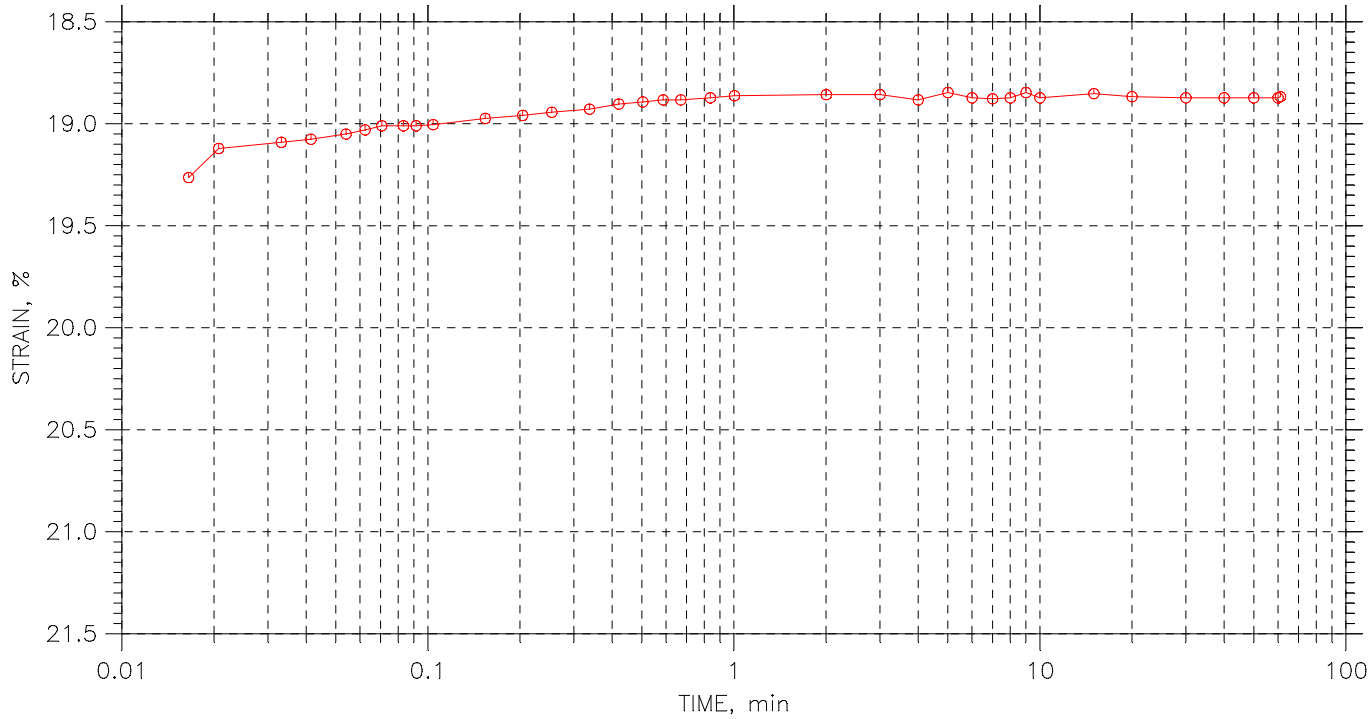
Fri, 10-AUG-2012 16:06:12

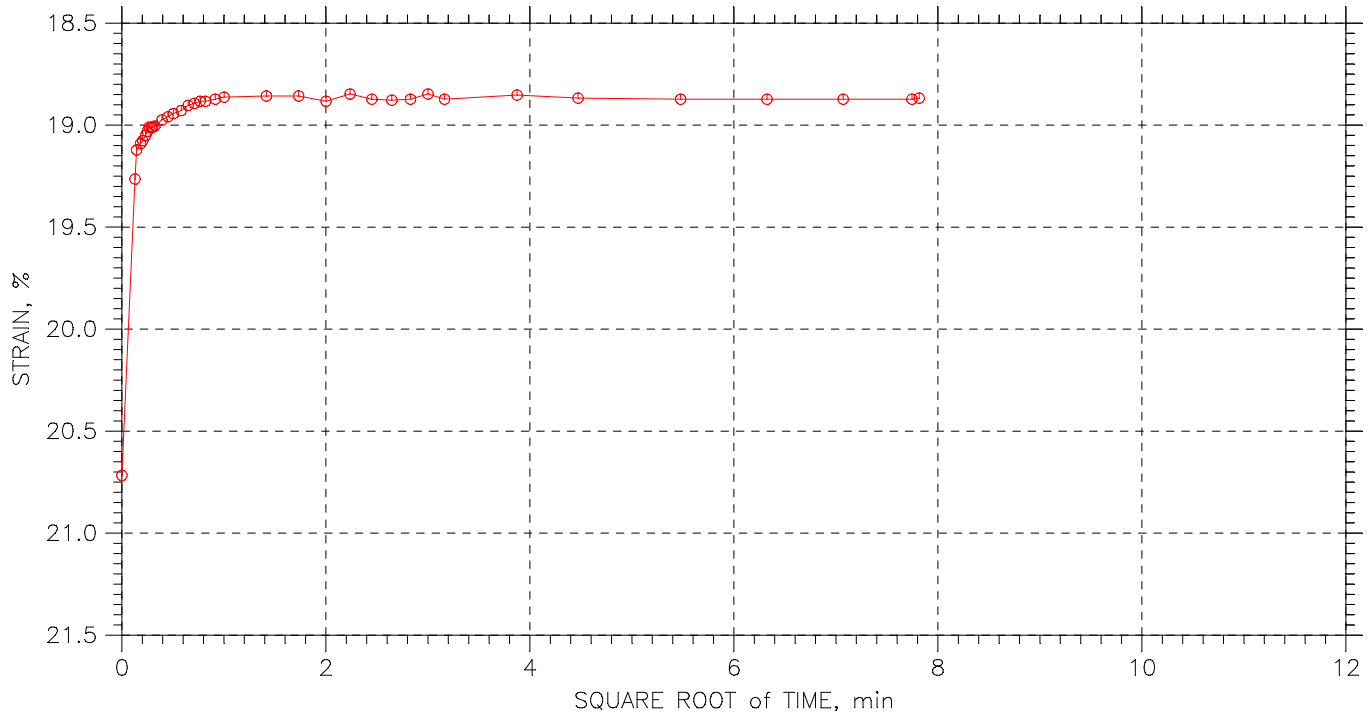
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 27 of 29

Stress: 7. tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-101	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/1/12	Depth: 8.0-10.0 FT
Test No.: 244204	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

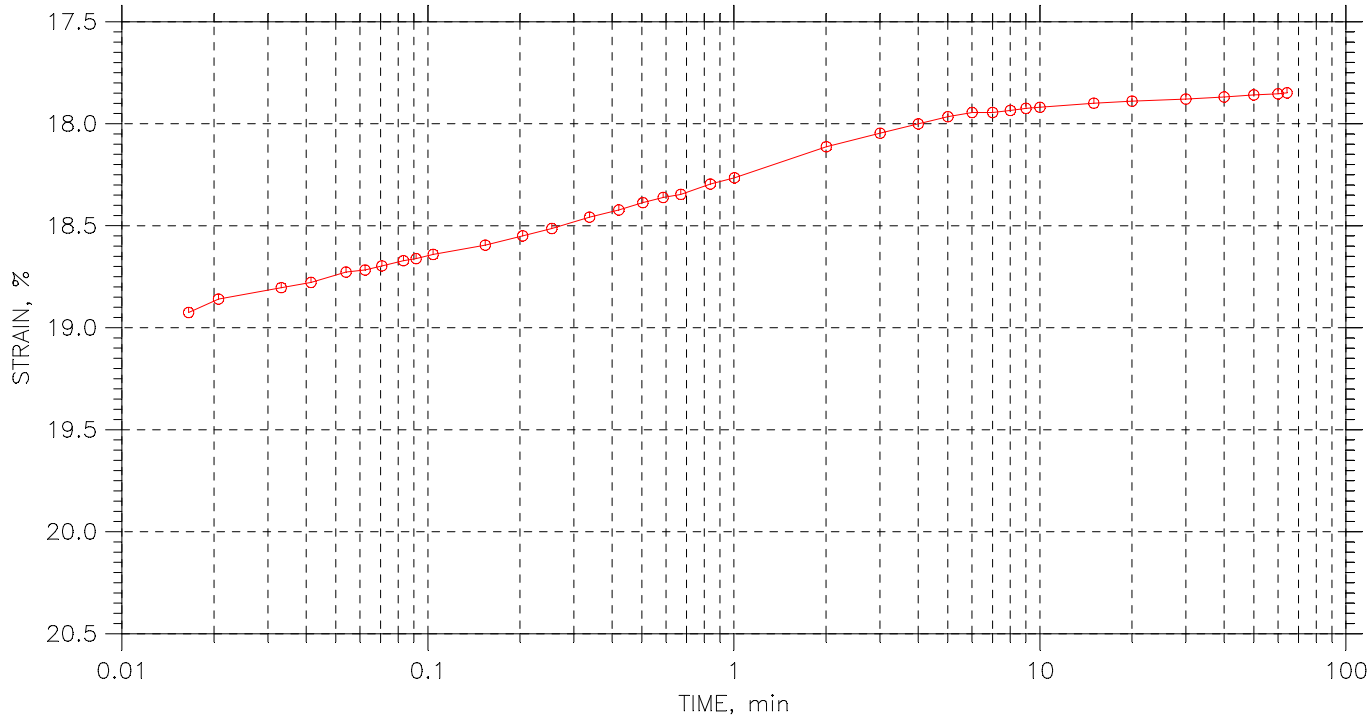
Fri, 10-AUG-2012 16:06:13

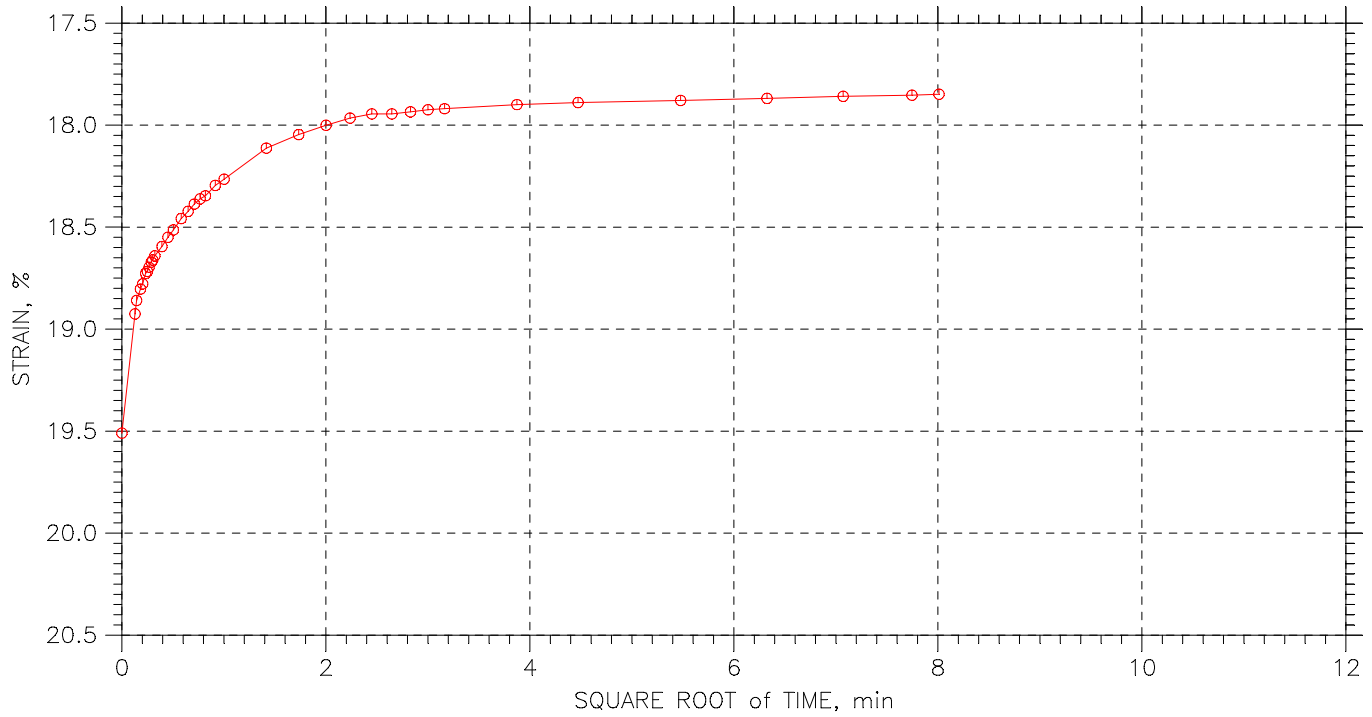
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 28 of 29

Stress: 1. tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-101	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/1/12	Depth: 8.0-10.0 FT
Test No.: 244204	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

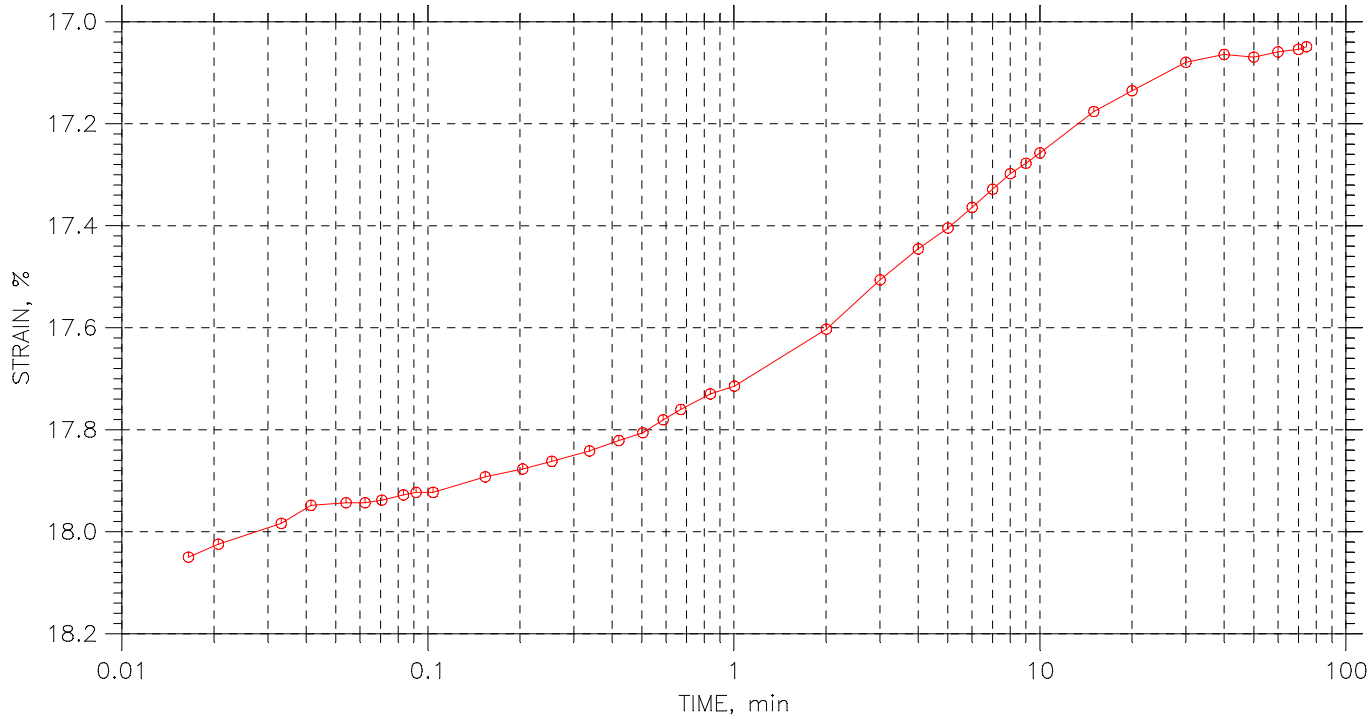
Fri, 10-AUG-2012 16:06:13

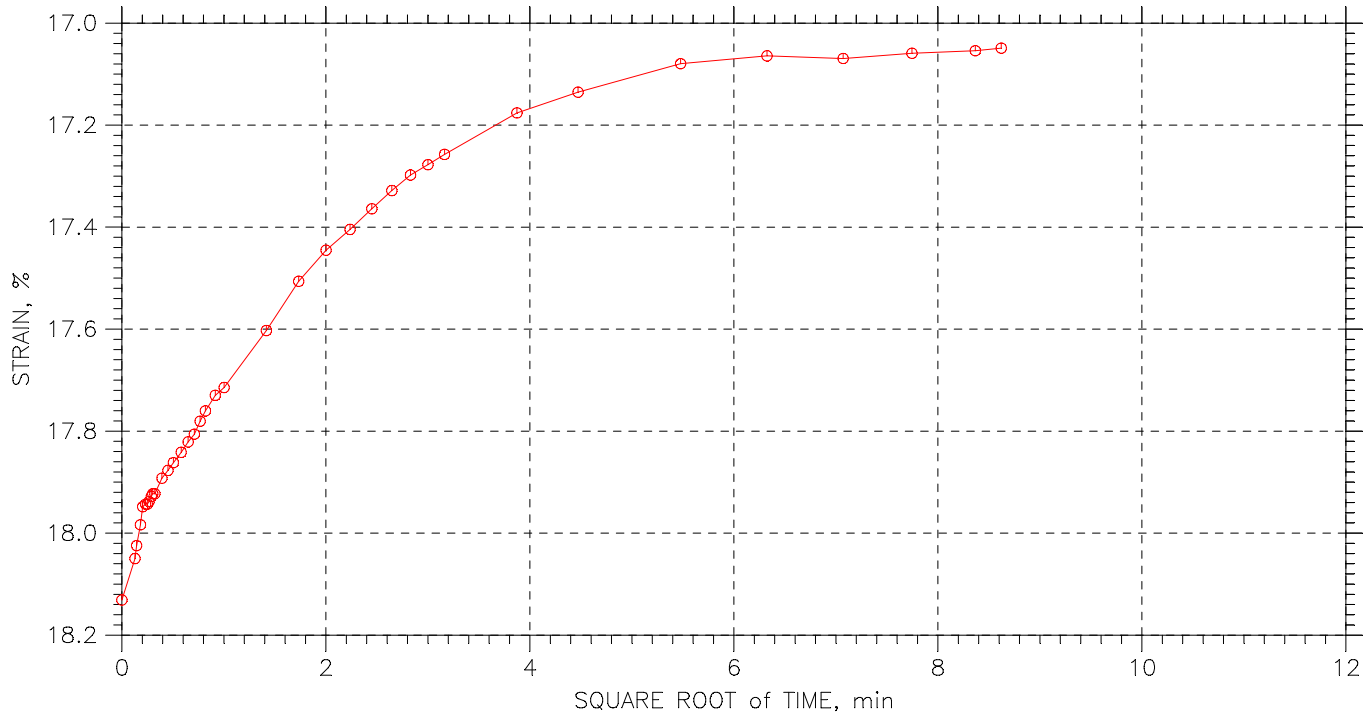
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 29 of 29

Stress: 0.25 tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-101	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/1/12	Depth: 8.0-10.0 FT
Test No.: 244204	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

Fri, 10-AUG-2012 16:06:14

Maine DOT, Materials Testing & Exploration, 219 Hogan Road, Bangor, Maine 04401

GEOTECHNICAL TEST REPORT
Central Laboratory

SAMPLE INFORMATION

Reference No.	Boring No./Sample No.	Sample Description	Sampled	Received
244202	**BB-BWA-101/2D**	**GEOTECHNICAL (DISTURBED)**	**7/16/2012**	**7/25/2012**

Sample Type: **GEOTECHNICAL** Location: **OTHER** Station: **TBD** Offset, ft: Dbfg, ft: **2.0-4.0**

WIN/Town **019311.00 - BANGOR** Sampler: **GIGUERE, ERVIN M**

TEST RESULTS

Sieve Analysis (T 88)

Wash Method

SIEVE SIZE U.S. [SI]	% Passing
3 in. [75.0 mm]	
1 in. [25.0 mm]	**100.0**
¾ in. [19.0 mm]	**92.9**
½ in. [12.5 mm]	**86.5**
⅜ in. [9.5 mm]	**79.6**
¼ in. [6.3 mm]	**67.7**
No. 4 [4.75 mm]	**59.5**
No. 10 [2.00 mm]	**41.8**
No. 20 [0.850 mm]	
No. 40 [0.425 mm]	**24.3**
No. 60 [0.250 mm]	
No. 100 [0.150 mm]	
No. 200 [0.075 mm]	**15.6**
[0.0307 mm]	**12.2**
[0.0198 mm]	**10.8**
[0.0120 mm]	**8.1**
[0.0086 mm]	**6.8**
[0.0063 mm]	**5.4**
[0.0032 mm]	**3.4**
[0.0013 mm]	**1.3**

Direct Shear (T 236)

Shear Angle, °			
Initial Water Content, %			
Normal Stress, psi			
Wet Density, lbs/ft³			
Dry Density, lbs/ft³			
Specimen Thickness, in			

Consolidation (T 216)

Trimmings, Water Content, %

	Initial	Final		Void Ratio	% Strain
Water Content, %			Pmin		
Dry Density, lbs/ft³			Pp		
Void Ratio			Pmax		
Saturation, %			Cc/C'c		

Miscellaneous Tests

Liquid Limit @ 25 blows (T 89), %

Plastic Limit (T 90), %

Plasticity Index (T 90), %

Specific Gravity, Corrected to 20°C (T 100): **2.74**

Loss on Ignition (T 267)

Loss, %	H2O, %

Water Content (T 265), %: **4.8**

Vane Shear Test on Shelby Tubes (Maine DOT)

Depth taken in tube, ft	3 In.		6 In.		Water Content, %	Description of Material Sampled at the Various Tube Depths
	U. Shear tons/ft²	Remold tons/ft²	U. Shear tons/ft²	Remold tons/ft²		

Comments:

AUTHORIZATION AND DISTRIBUTION

Reported by: **FOGG, BRIAN** Date Reported: **8/2/2012**

Paper Copy: Lab File; Project File; Geotech File

Maine DOT, Materials Testing & Exploration, 219 Hogan Road, Bangor, Maine 04401

GEOTECHNICAL TEST REPORT
Central Laboratory

SAMPLE INFORMATION

Reference No.	Boring No./Sample No.	Sample Description	Sampled	Received
244203	**BB-BWA-101/3D**	**GEOTECHNICAL (DISTURBED)**	**7/16/2012**	**7/25/2012**

Sample Type: **GEOTECHNICAL** Location: **OTHER** Station: **TBD** Offset, ft: Dbfg, ft: **4.0-6.0**

WIN/Town **019311.00 - BANGOR** Sampler: **GIGUERE, ERVIN M**

TEST RESULTS

Sieve Analysis (T 88)

Wash Method

SIEVE SIZE U.S. [SI]	% Passing
3 in. [75.0 mm]	
1 in. [25.0 mm]	
¾ in. [19.0 mm]	**100.0**
½ in. [12.5 mm]	**99.5**
⅜ in. [9.5 mm]	**98.2**
¼ in. [6.3 mm]	**96.1**
No. 4 [4.75 mm]	**95.6**
No. 10 [2.00 mm]	**94.6**
No. 20 [0.850 mm]	
No. 40 [0.425 mm]	**92.6**
No. 60 [0.250 mm]	
No. 100 [0.150 mm]	
No. 200 [0.075 mm]	**90.9**
[0.0258 mm]	**86.7**
[0.0169 mm]	**81.5**
[0.0105 mm]	**71.4**
[0.0078 mm]	**61.2**
[0.0058 mm]	**53.5**
[0.0029 mm]	**40.8**
[0.0012 mm]	**28.0**

Direct Shear (T 236)

Shear Angle, °			
Initial Water Content, %			
Normal Stress, psi			
Wet Density, lbs/ft³			
Dry Density, lbs/ft³			
Specimen Thickness, in			

Consolidation (T 216)

Trimmings, Water Content, %

	Initial	Final		Void Ratio	% Strain
Water Content, %			Pmin		
Dry Density, lbs/ft³			Pp		
Void Ratio			Pmax		
Saturation, %			Cc/C'c		

Miscellaneous Tests

Liquid Limit @ 25 blows (T 89), %
27
Plastic Limit (T 90), %
18
Plasticity Index (T 90), %
9
Specific Gravity, Corrected to 20°C (T 100)
2.72
Loss on Ignition (T 267)

Loss, %	H2O, %

Water Content (T 265), %
27.4

Vane Shear Test on Shelby Tubes (Maine DOT)

Depth taken in tube, ft	3 In.		6 In.		Water Content, %	Description of Material Sampled at the Various Tube Depths
	U. Shear tons/ft²	Remold tons/ft²	U. Shear tons/ft²	Remold tons/ft²		

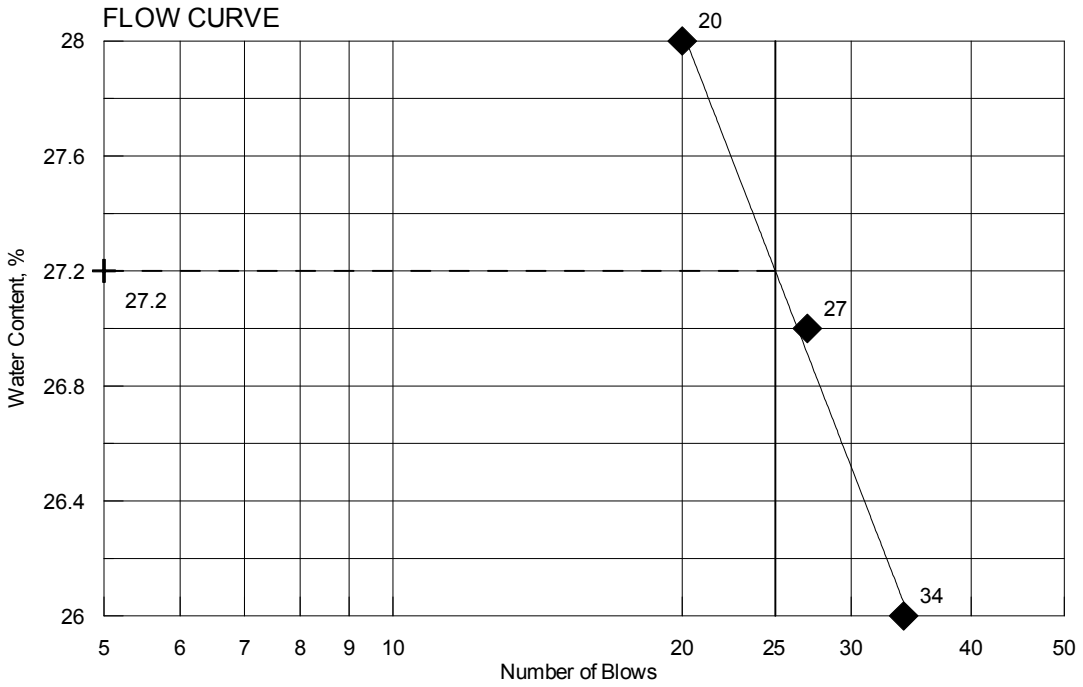
Comments:

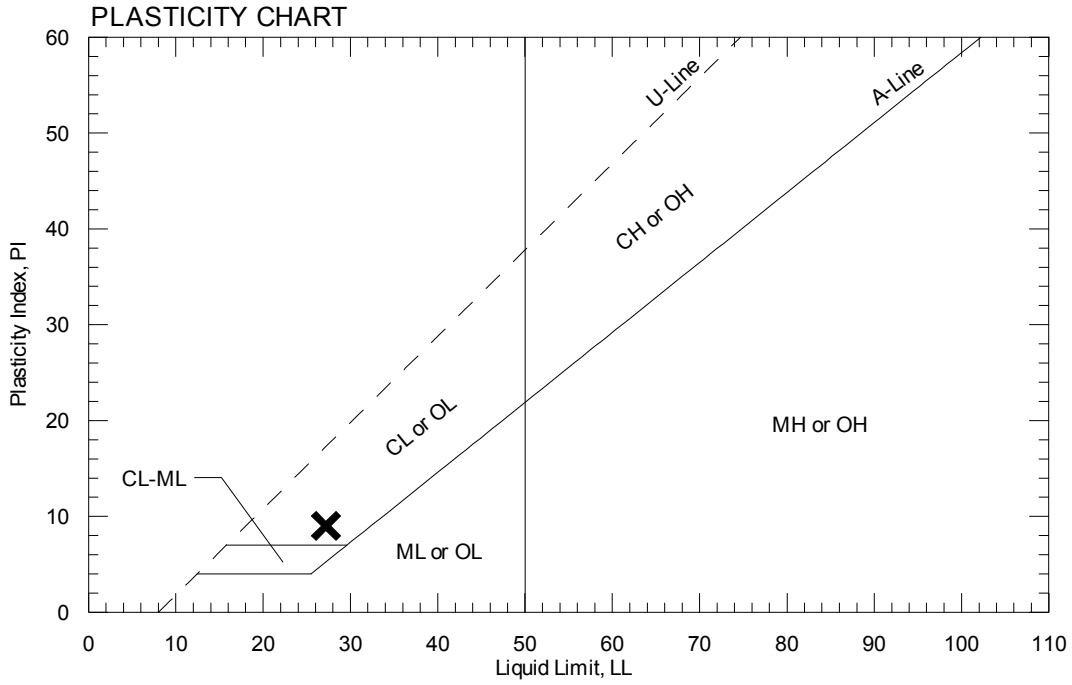
AUTHORIZATION AND DISTRIBUTION

Reported by: **FOGG, BRIAN** Date Reported: **8/6/2012**

Paper Copy: Lab File; Project File; Geotech File

TOWN	Bangor	Reference No.	244203
WIN	019311.00	Water Content, %	27.4
Sampled	7/16/2012	Liquid Limit @ 25 blows (T 89), %	27
Boring No./Sample No.	BB-BWA-101/3D	Plastic Limit (T 90), %	18
Station	TBD	Plasticity Index (T 90), %	9
Depth	4.0-6.0	Tested By	BBURR





Maine DOT, Materials Testing & Exploration, 219 Hogan Road, Bangor, Maine 04401

GEOTECHNICAL TEST REPORT
Central Laboratory

SAMPLE INFORMATION

Reference No.	Boring No./Sample No.	Sample Description	Sampled	Received
244205	**BB-BWA-102/1D**	**GEOTECHNICAL (DISTURBED)**	**7/17/2012**	**7/25/2012**

Sample Type: **GEOTECHNICAL** Location: **OTHER** Station: **TBD** Offset, ft: Dbfg, ft: **1.0-3.0**

WIN/Town **019311.00 - BANGOR** Sampler: **GIGUERE, ERVIN M**

TEST RESULTS

Sieve Analysis (T 88)

Wash Method

SIEVE SIZE U.S. [SI]	% Passing
3 in. [75.0 mm]	
1 in. [25.0 mm]	
¾ in. [19.0 mm]	**100.0**
½ in. [12.5 mm]	**86.3**
⅜ in. [9.5 mm]	**77.1**
¼ in. [6.3 mm]	**62.0**
No. 4 [4.75 mm]	**53.9**
No. 10 [2.00 mm]	**37.2**
No. 20 [0.850 mm]	
No. 40 [0.425 mm]	**18.7**
No. 60 [0.250 mm]	
No. 100 [0.150 mm]	
No. 200 [0.075 mm]	**9.5**
[0.0337 mm]	**8.5**
[0.0218 mm]	**6.8**
[0.0128 mm]	**5.1**
[0.0091 mm]	**4.2**
[0.0065 mm]	**3.4**
[0.0032 mm]	**2.5**
[0.0013 mm]	**1.7**
[mm]	

Direct Shear (T 236)

Shear Angle, °			
Initial Water Content, %			
Normal Stress, psi			
Wet Density, lbs/ft³			
Dry Density, lbs/ft³			
Specimen Thickness, in			

Consolidation (T 216)

Trimmings, Water Content, %

	Initial	Final		Void Ratio	% Strain
Water Content, %			Pmin		
Dry Density, lbs/ft³			Pp		
Void Ratio			Pmax		
Saturation, %			Cc/C'c		

Miscellaneous Tests

Liquid Limit @ 25 blows (T 89), %

Plastic Limit (T 90), %

Plasticity Index (T 90), %

Specific Gravity, Corrected to 20°C (T 100)

Loss on Ignition (T 267)

Loss, %	H2O, %

Water Content (T 265), %

8.2

Vane Shear Test on Shelby Tubes (Maine DOT)

Depth taken in tube, ft	3 In.		6 In.		Water Content, %	Description of Material Sampled at the Various Tube Depths
	U. Shear tons/ft²	Remold tons/ft²	U. Shear tons/ft²	Remold tons/ft²		

Comments:

Due to lack of material, assumed specific gravity of 2.70 based on simular material in same group of geologies.

AUTHORIZATION AND DISTRIBUTION

Reported by: **FOGG, BRIAN** Date Reported: **8/6/2012**

Paper Copy: Lab File; Project File; Geotech File

Maine DOT, Materials Testing & Exploration, 219 Hogan Road, Bangor, Maine 04401

GEOTECHNICAL TEST REPORT
Central Laboratory

SAMPLE INFORMATION

Reference No.	Boring No./Sample No.	Sample Description	Sampled	Received
244208	**BB-BWA-102/1U**	**GEOTECHNICAL (UNDISTURBED)**	**7/17/2012**	**7/25/2012**

Sample Type: **GEOTECHNICAL** Location: **OTHER** Station: **TBD** Offset, ft: Dbfg, ft: **15.0-17.0**

WIN/Town **019311.00 - BANGOR** Sampler: **GIGUERE, ERVIN M**

TEST RESULTS

Sieve Analysis (T 88)

Wash Method

SIEVE SIZE U.S. [SI]	% Passing
3 in. [75.0 mm]	
1 in. [25.0 mm]	
¾ in. [19.0 mm]	
½ in. [12.5 mm]	
⅜ in. [9.5 mm]	
¼ in. [6.3 mm]	
No. 4 [4.75 mm]	
No. 10 [2.00 mm]	**100.0**
No. 20 [0.850 mm]	
No. 40 [0.425 mm]	**99.8**
No. 60 [0.250 mm]	
No. 100 [0.150 mm]	
No. 200 [0.075 mm]	**98.2**
[0.0253 mm]	**83.8**
[0.0166 mm]	**78.2**
[0.0099 mm]	**72.6**
[0.0074 mm]	**61.4**
[0.0054 mm]	**55.9**
[0.0028 mm]	**44.7**
[0.0012 mm]	**30.7**

Direct Shear (T 236)

Shear Angle, °			
Initial Water Content, %			
Normal Stress, psi			
Wet Density, lbs/ft³			
Dry Density, lbs/ft³			
Specimen Thickness, in			

Consolidation (T 216)

Trimmings, Water Content, %	**29.6**

	Initial	Final		Void Ratio	% Strain
Water Content, %	**38**	**25.4**	Pmin		
Dry Density, lbs/ft³	**85**	**105.8**	Pp		
Void Ratio	**1.19**	**0.76**	Pmax		
Saturation, %	**95.5**	**100**	Cc/C'c		

Miscellaneous Tests

Liquid Limit @ 25 blows (T 89), %
23
Plastic Limit (T 90), %
18
Plasticity Index (T 90), %
5
Specific Gravity, Corrected to 20°C (T 100)
2.75

Loss on Ignition (T 267)

Loss, %	H2O, %

Water Content (T 265), %
27.6

Vane Shear Test on Shelby Tubes (Maine DOT)

Depth taken in tube, ft	3 In. U. Shear tons/ft²	3 In. Remold tons/ft²	6 In. U. Shear tons/ft²	6 In. Remold tons/ft²	Water Content, %	Description of Material Sampled at the Various Tube Depths
0-0.5	0.23	0.01	0.28	0.03	28.2	Alternating layers of light to dark gray silty clay,fine sand lines at 1.25" and 4", silt layer 4" to 4.5".
0.625-1	0.24	0.01	0.28	0.03	27.5	Alternating layers of light to dark gray silty clay, frequent silt lines, fine sand lines at 8.5" and 11.25".
1-1.5	0.21	0.02	0.22	0.02	25.3	Alternating layers of light to dark gray silty clay, frequent silt lines, fine sand lines at 13.5", 13.75", 14.25", 15.75", 16.5", 1.75" stone at

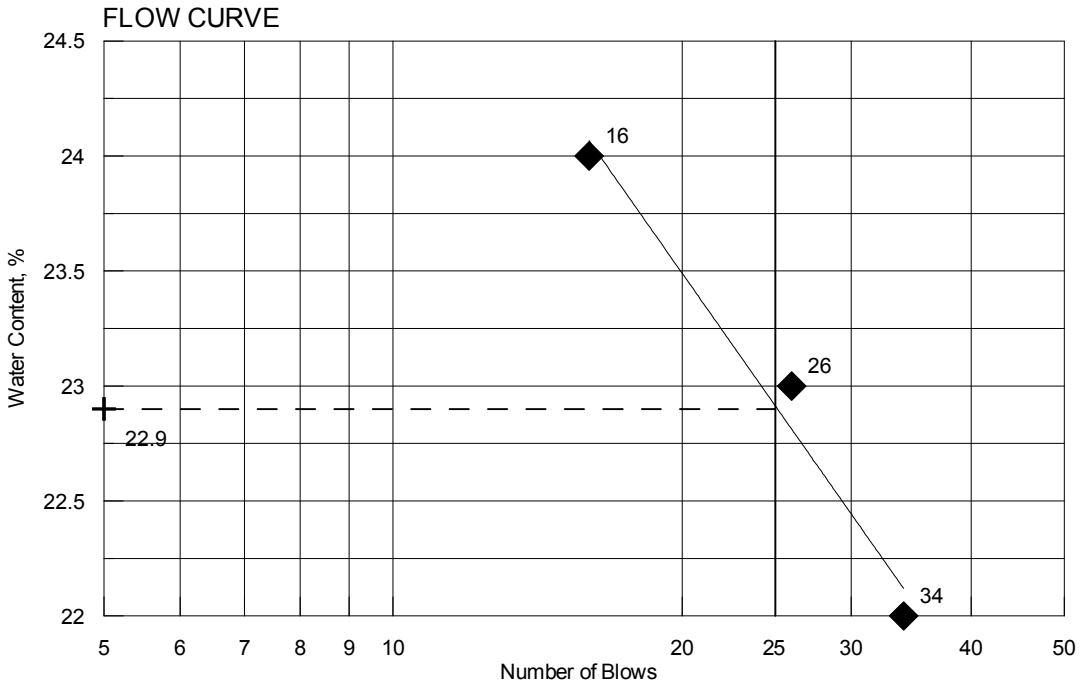
Comments:

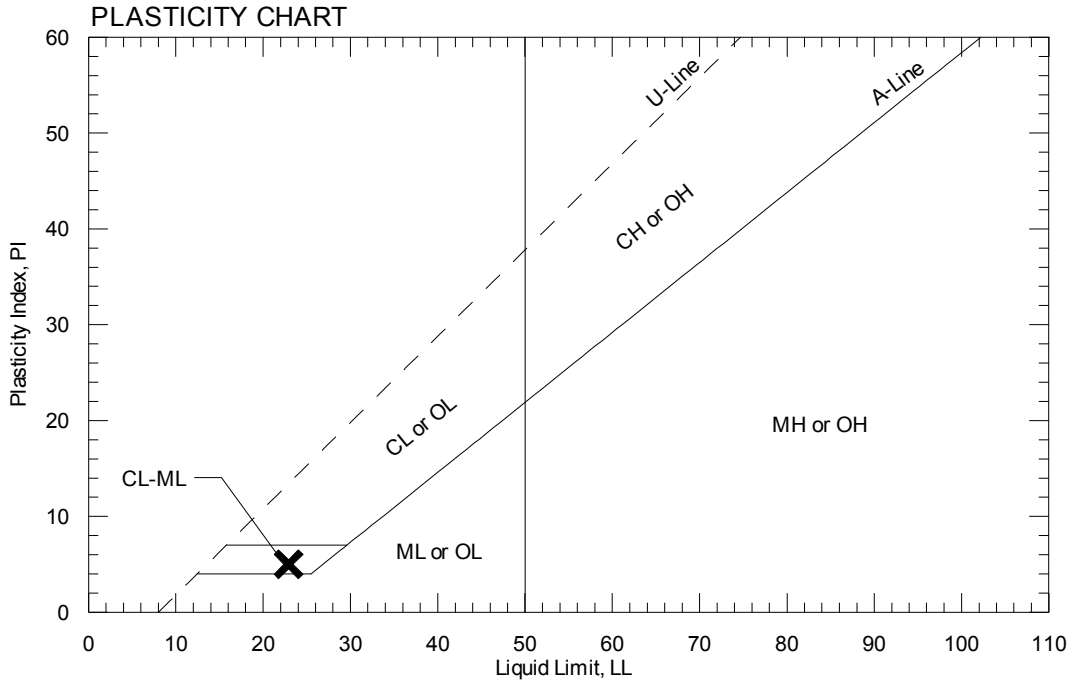
AUTHORIZATION AND DISTRIBUTION

Reported by: **FOGG, BRIAN** Date Reported: **8/16/2012**

Paper Copy: Lab File; Project File; Geotech File

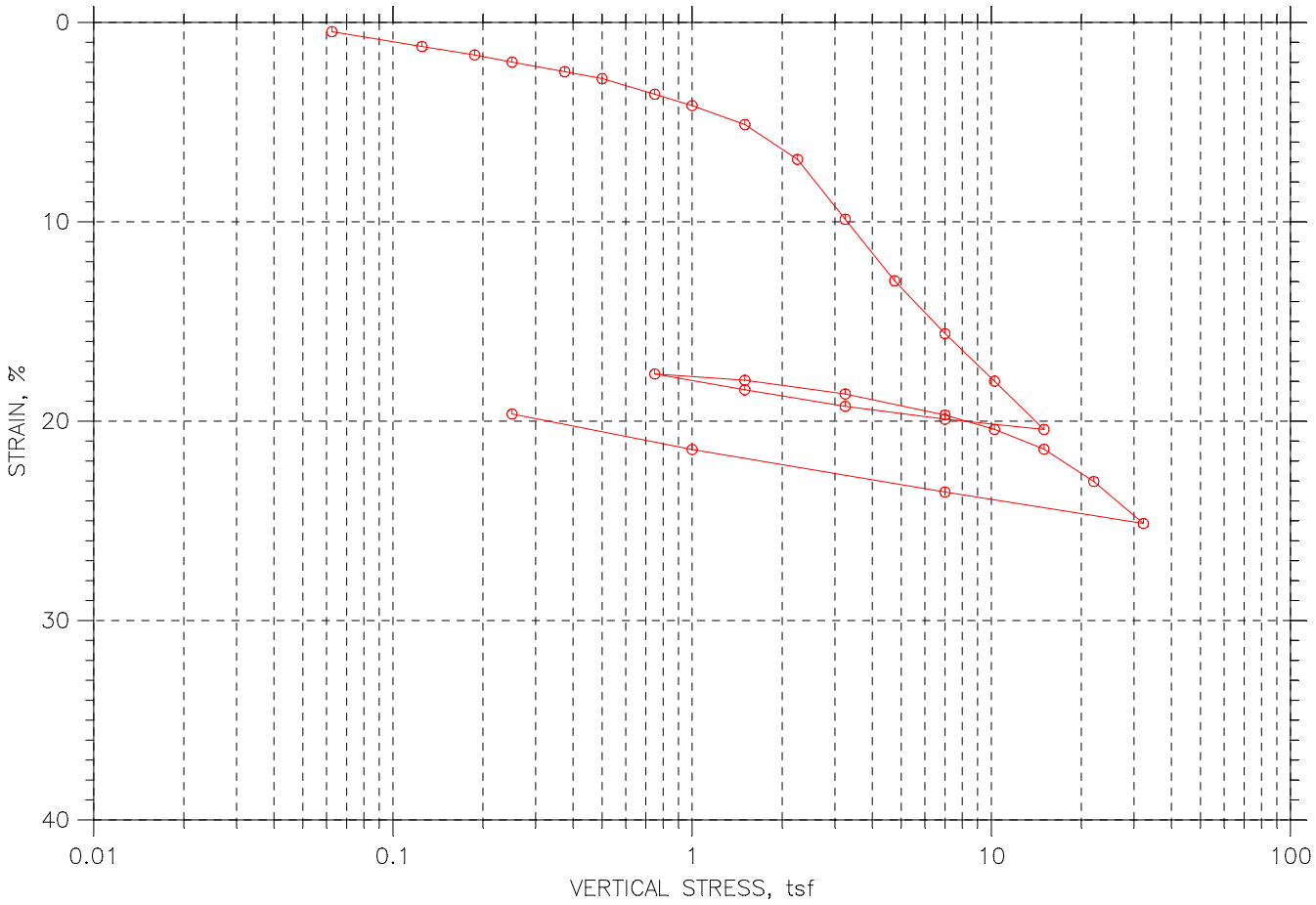
TOWN	Bangor	Reference No.	244208
WIN	019311.00	Water Content, %	27.6
Sampled	7/17/2012	Liquid Limit @ 25 blows (T 89), %	23
Boring No./Sample No.	BB-BWA-102/1U	Plastic Limit (T 90), %	18
Station	TBD	Plasticity Index (T 90), %	5
Depth	15.0-17.0	Tested By	BBURR

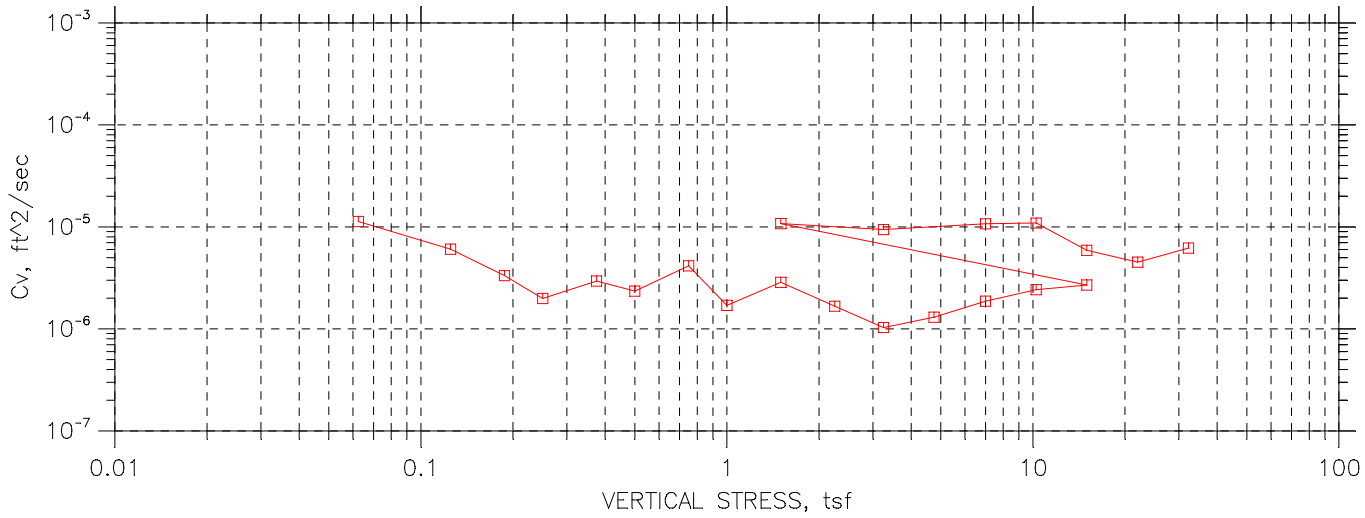




CONSOLIDATION TEST DATA

SUMMARY REPORT



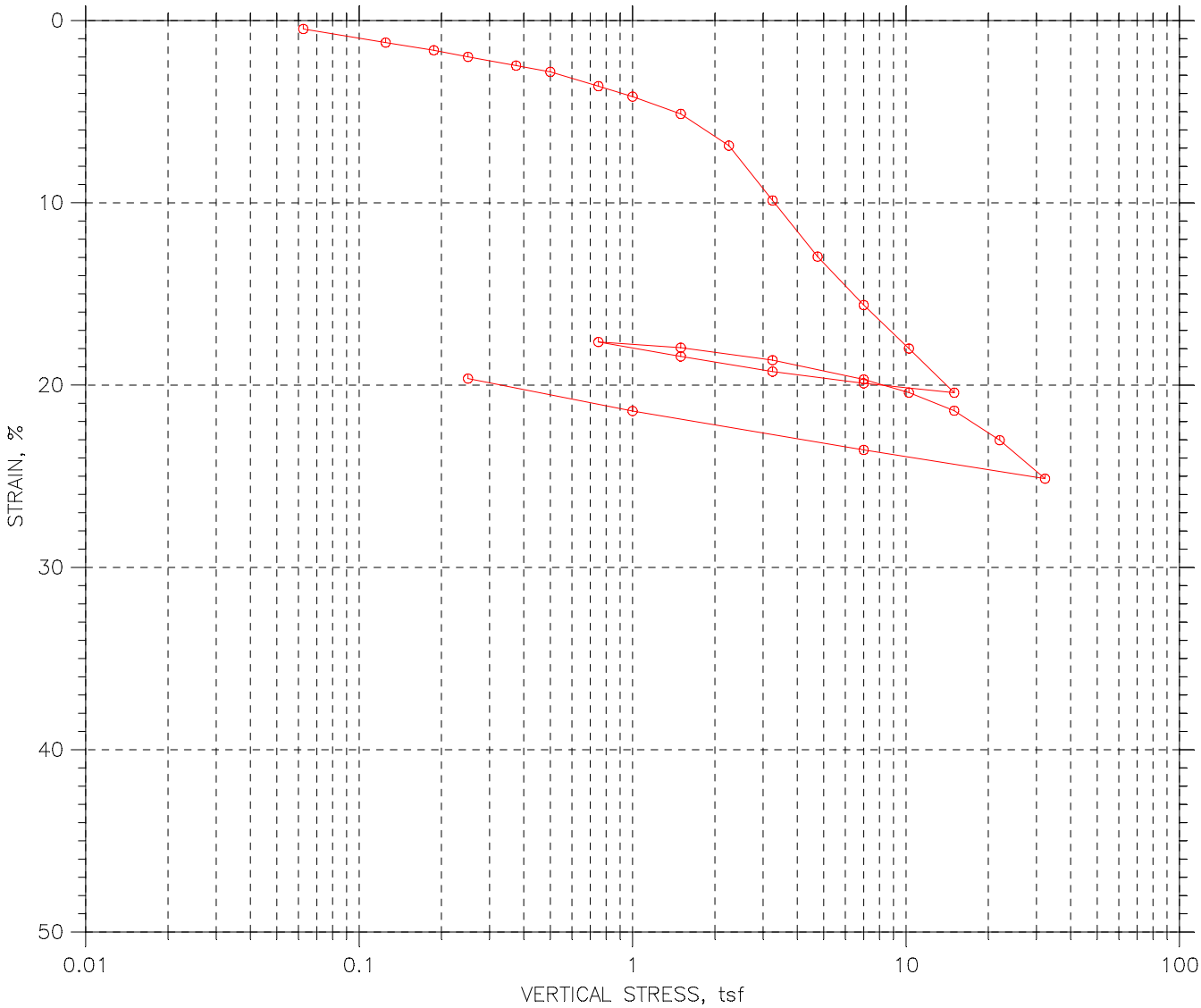


Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-102	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/6/12	Depth: 15.0-17.0
Test No.: 244208	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

Thu, 16-AUG-2012 11:38:56

CONSOLIDATION TEST DATA

SUMMARY REPORT



					Before Test	After Test
Overburden Pressure, tsf:				Water Content, %	38.02	25.40
Preconsolidation Pressure, tsf:				Dry Unit Weight, pcf	85.035	105.82
Compression Index:				Saturation, %	95.47	100.00
Diameter: 2.485 in		Height: 0.992 in		Void Ratio	1.19	0.76
LL: 0	PL: 0	PI: 0	GS: 2.98			

Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-102	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/6/12	Depth: 15.0-17.0
Test No.: 244208	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

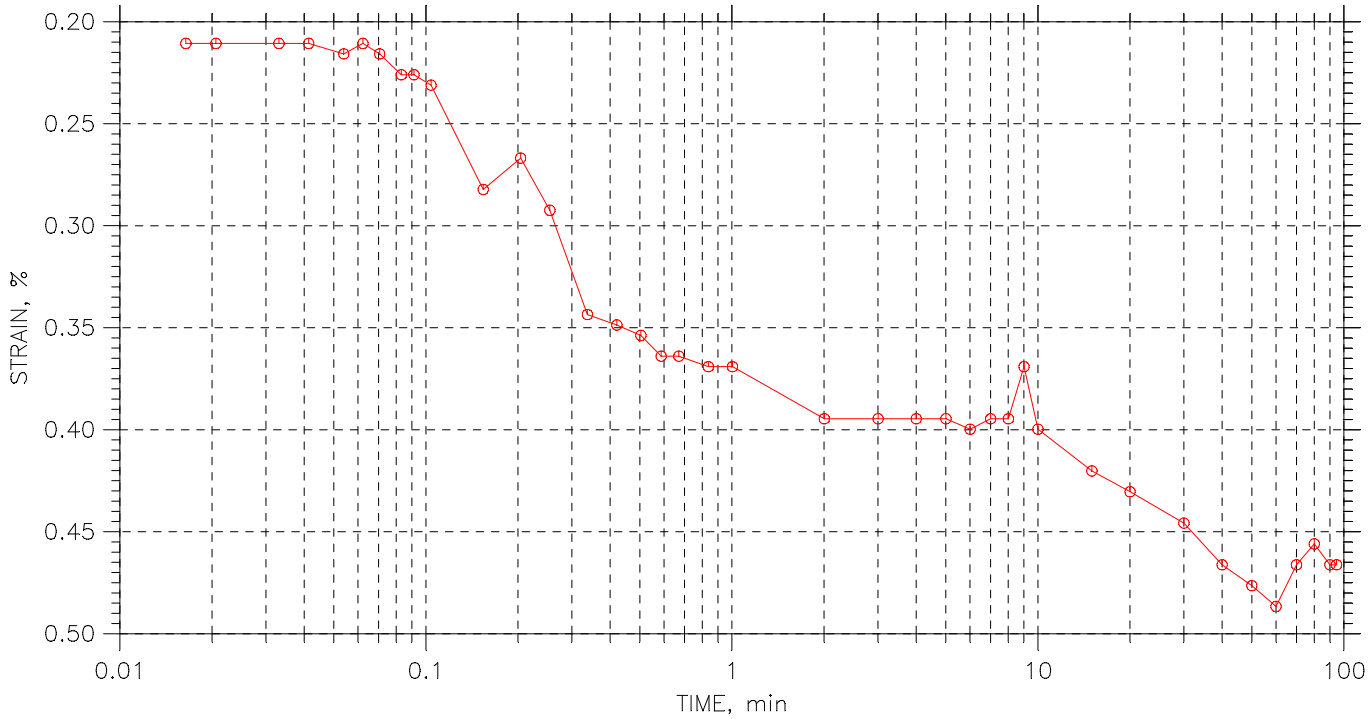
Thu, 16-AUG-2012 11:38:57

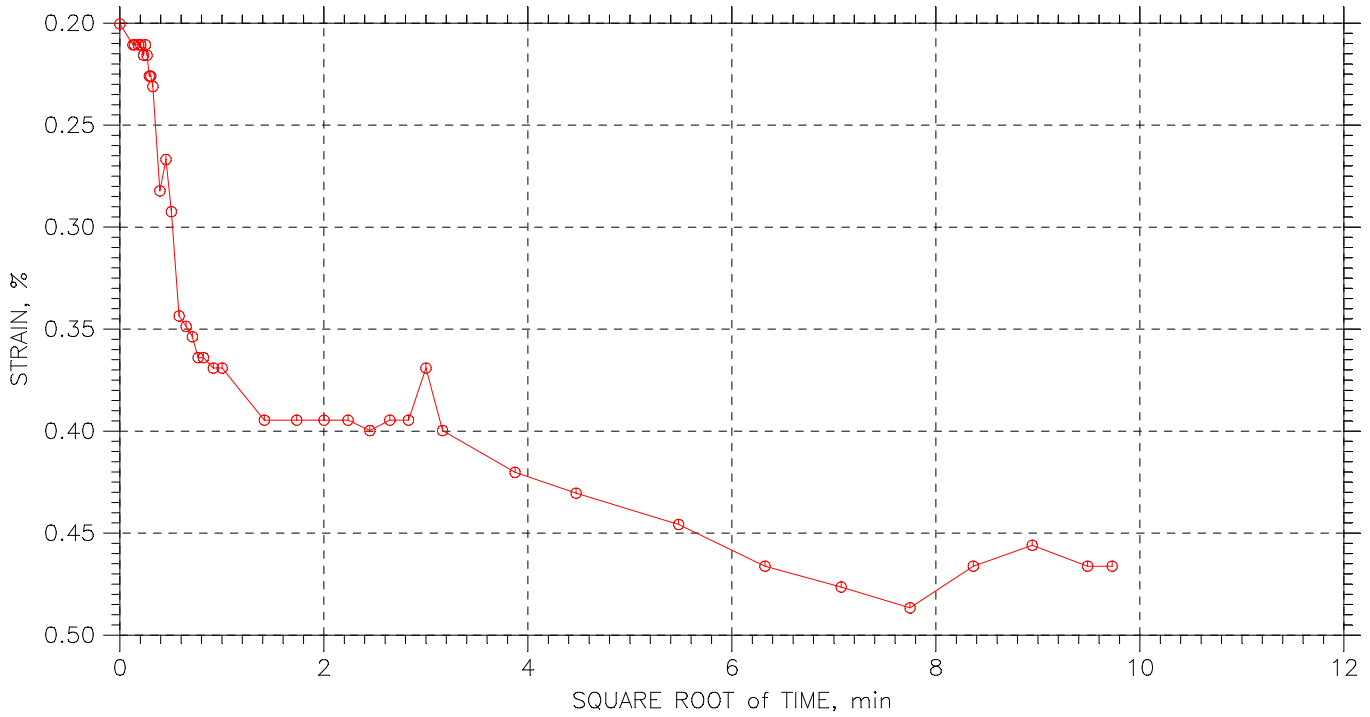
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 1 of 29

Stress: 6.25e-002 tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-102	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/6/12	Depth: 15.0-17.0
Test No.: 244208	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

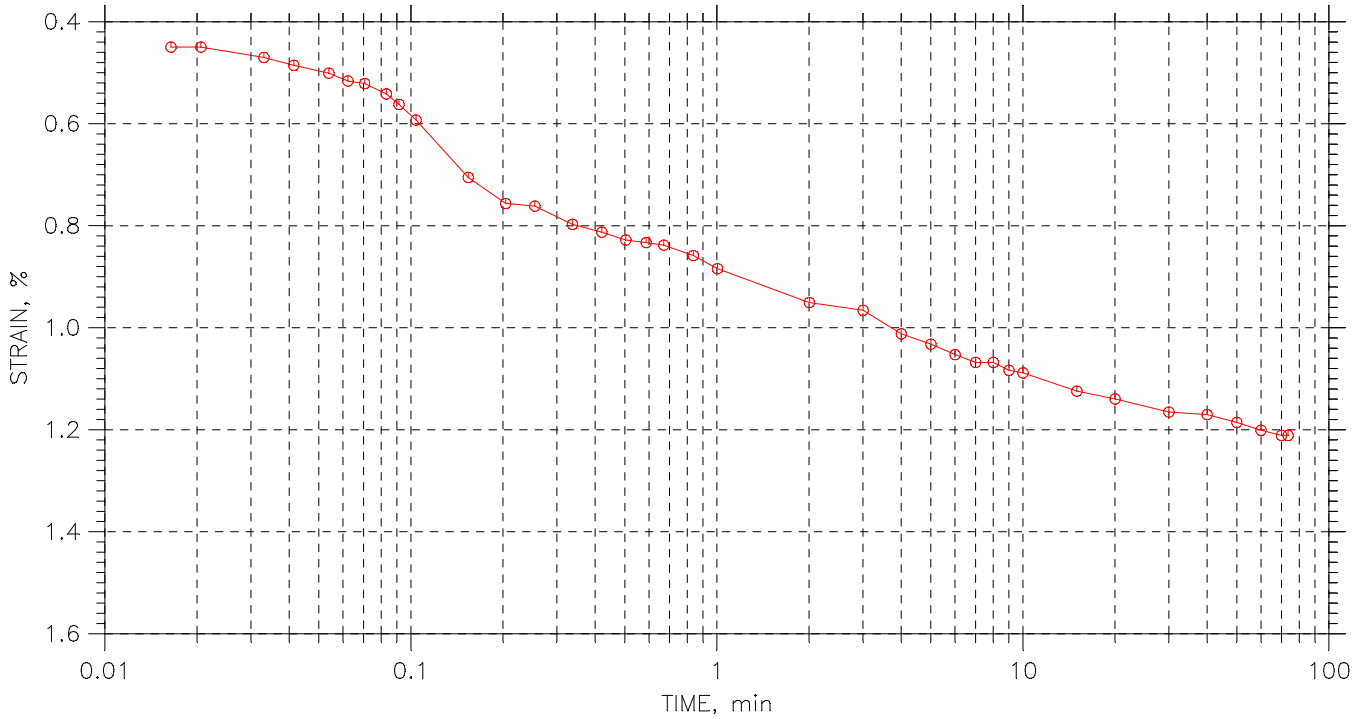
Thu, 16-AUG-2012 11:38:58

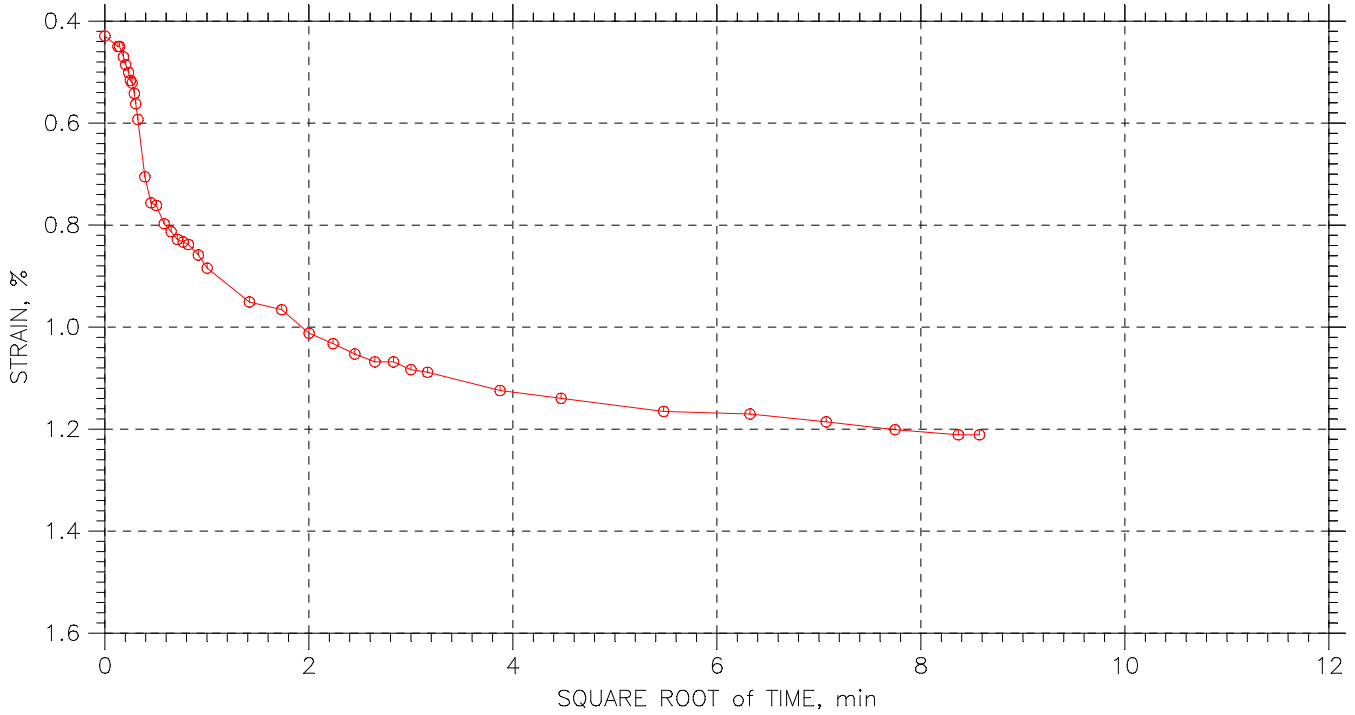
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 2 of 29

Stress: 0.125 tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-102	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/6/12	Depth: 15.0-17.0
Test No.: 244208	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

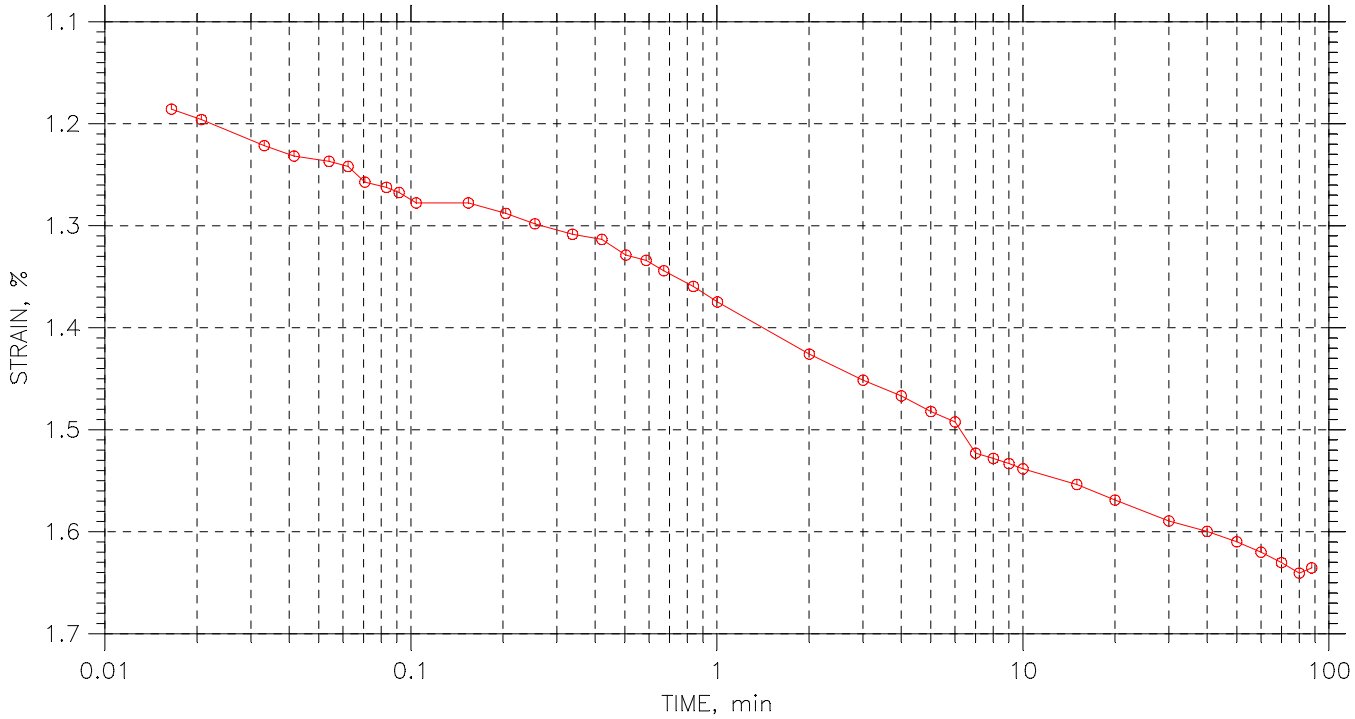
Thu, 16-AUG-2012 11:38:58

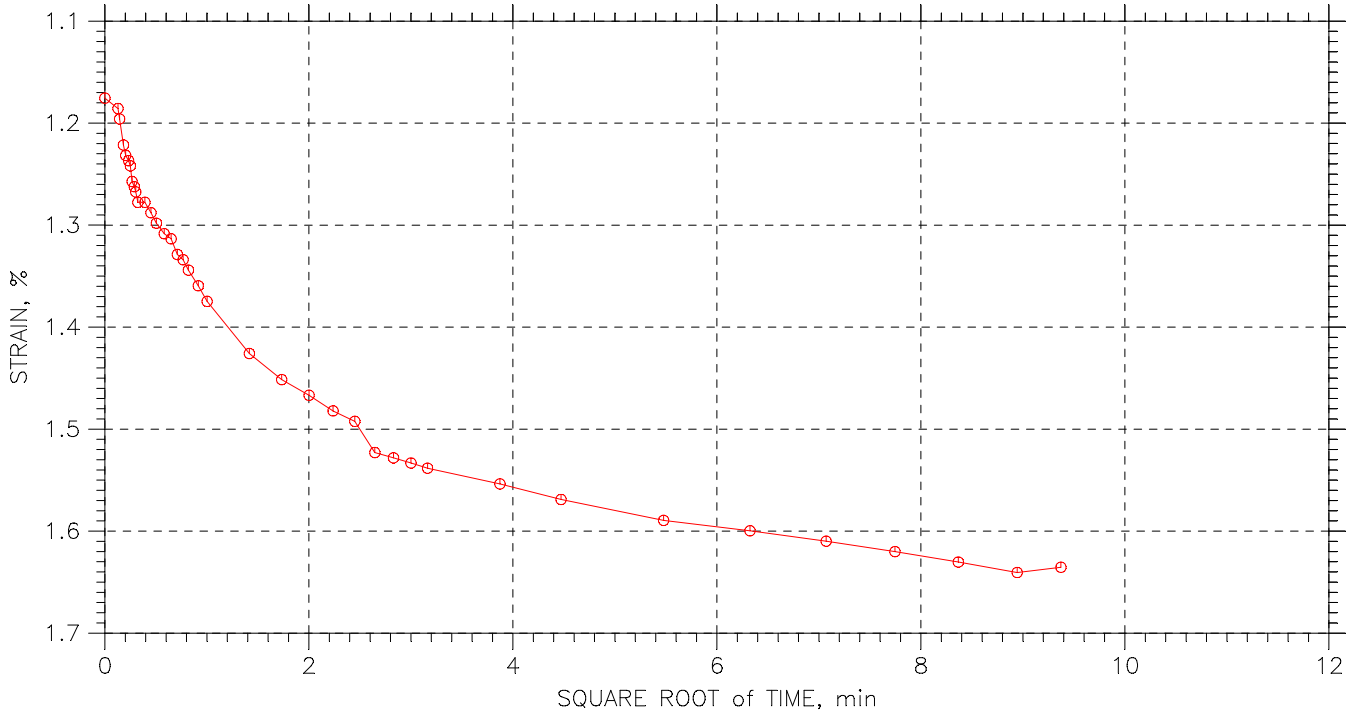
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 3 of 29

Stress: 0.1875 tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-102	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/6/12	Depth: 15.0-17.0
Test No.: 244208	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

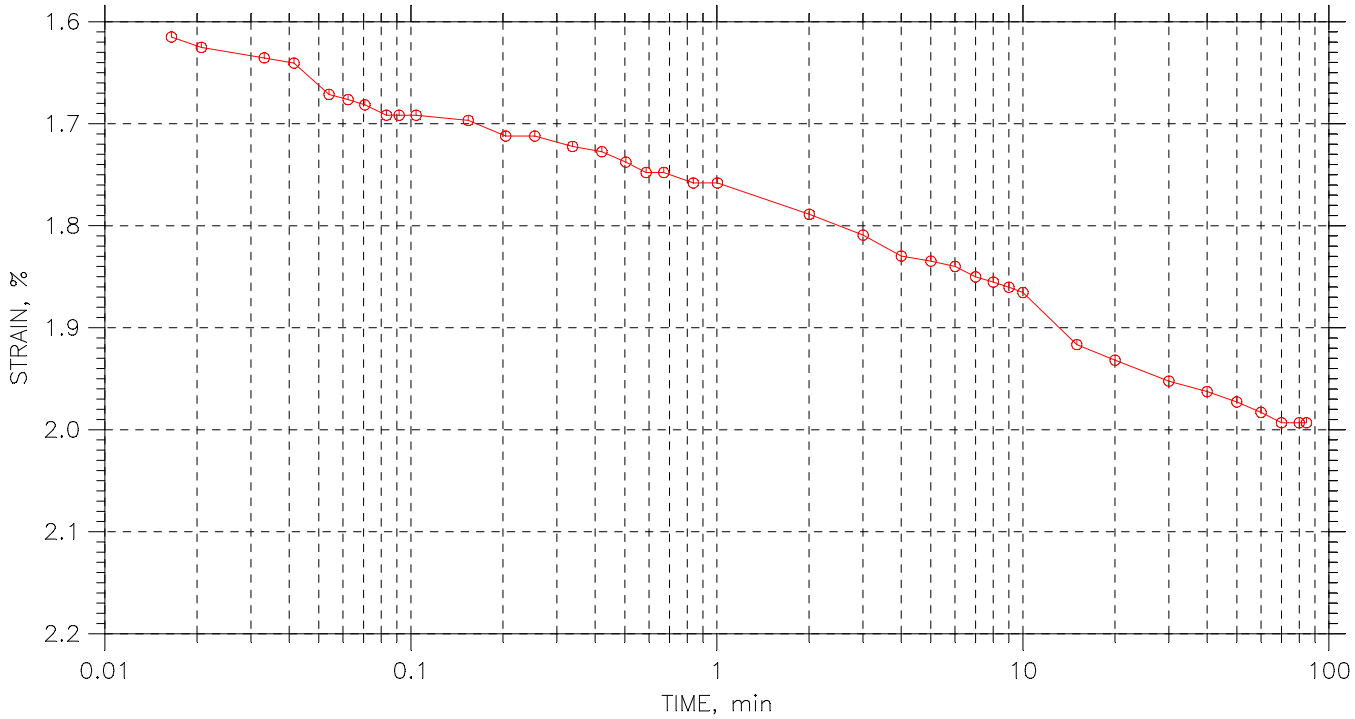
Thu, 16-AUG-2012 11:38:59

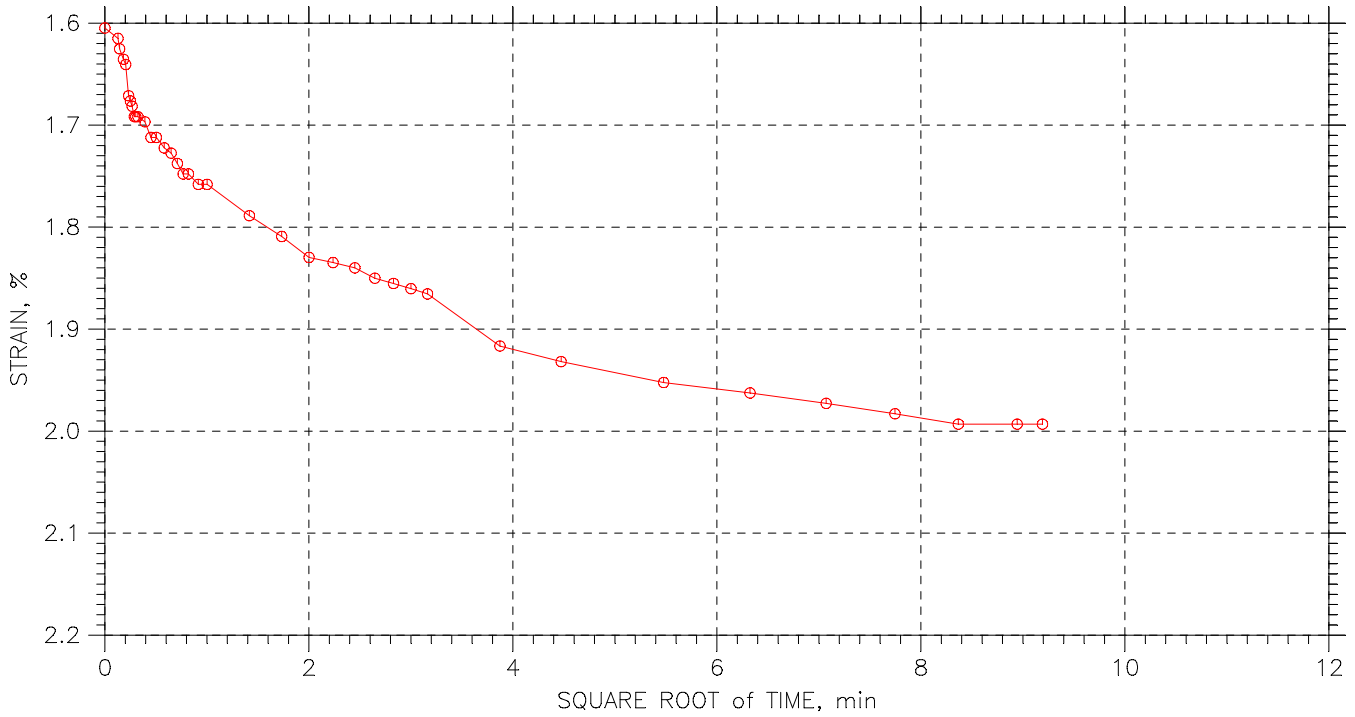
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 4 of 29

Stress: 0.25 tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-102	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/6/12	Depth: 15.0-17.0
Test No.: 244208	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

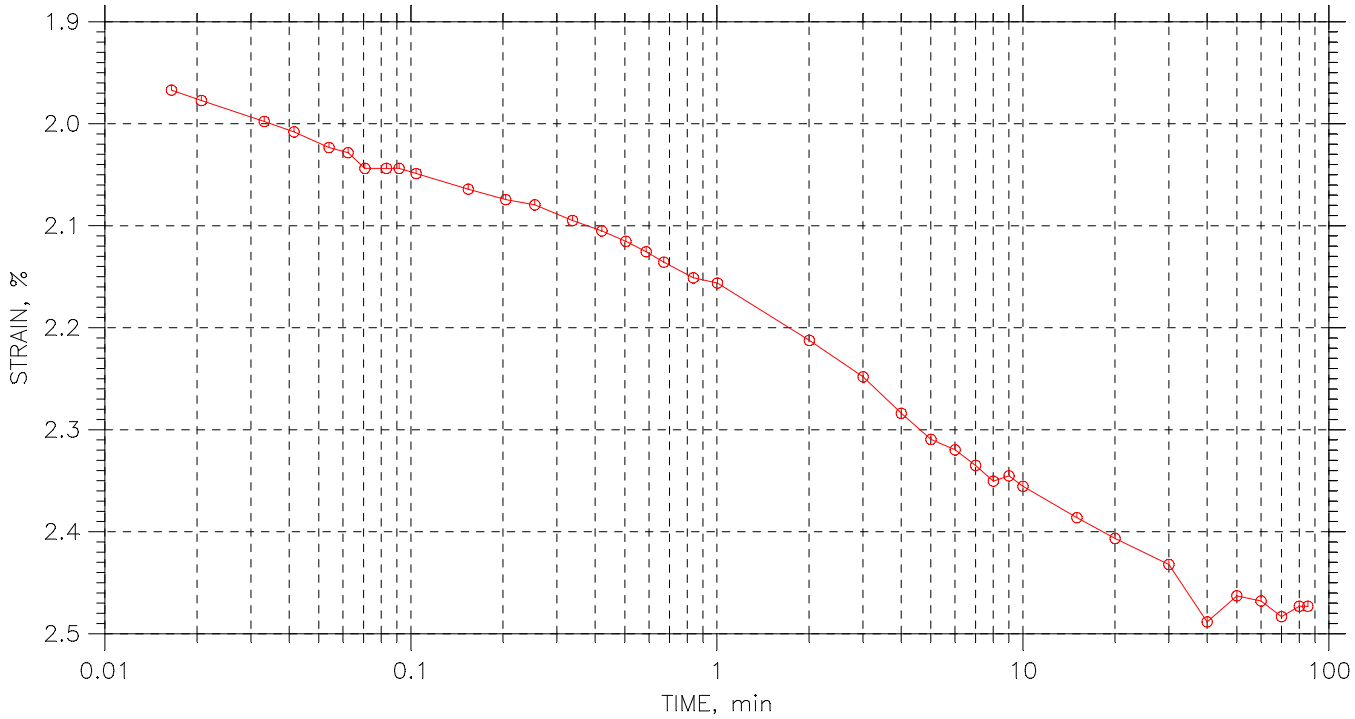
Thu, 16-AUG-2012 11:38:59

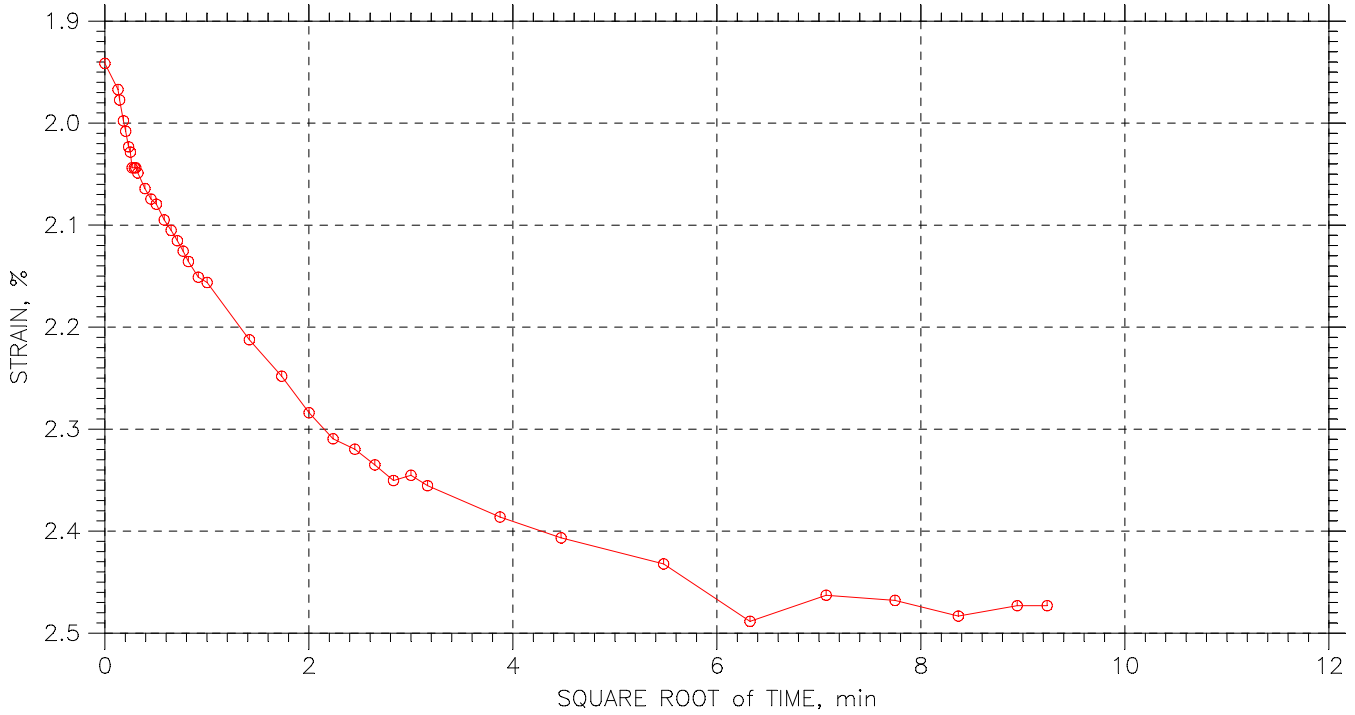
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 5 of 29

Stress: 0.375 tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-102	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/6/12	Depth: 15.0-17.0
Test No.: 244208	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

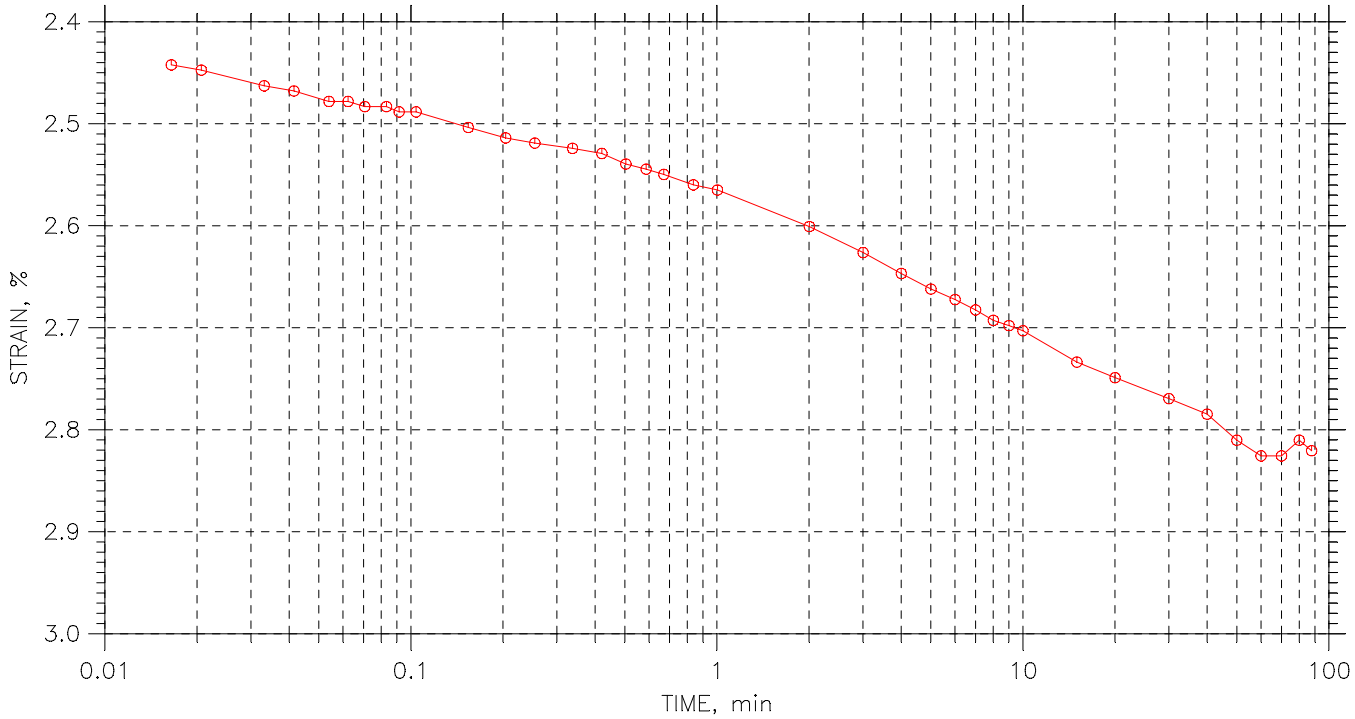
Thu, 16-AUG-2012 11:39:00

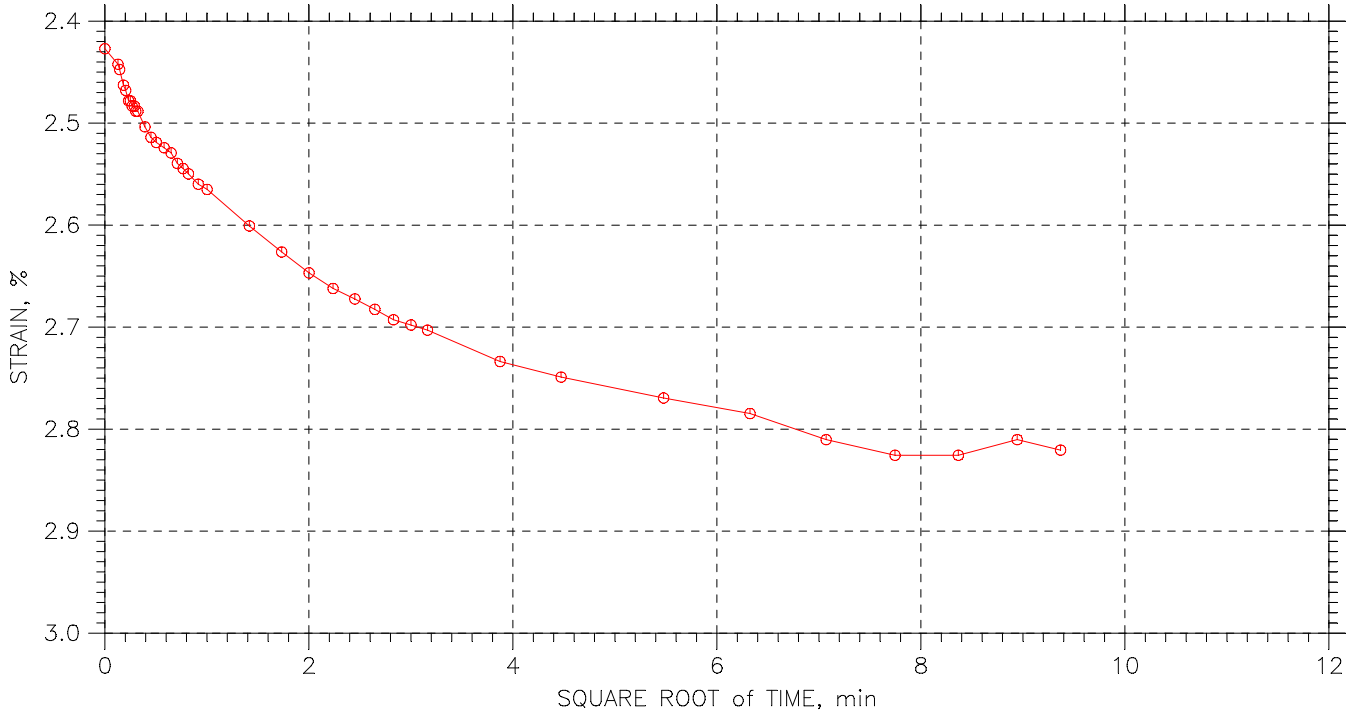
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 6 of 29

Stress: 0.5 tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-102	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/6/12	Depth: 15.0-17.0
Test No.: 244208	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

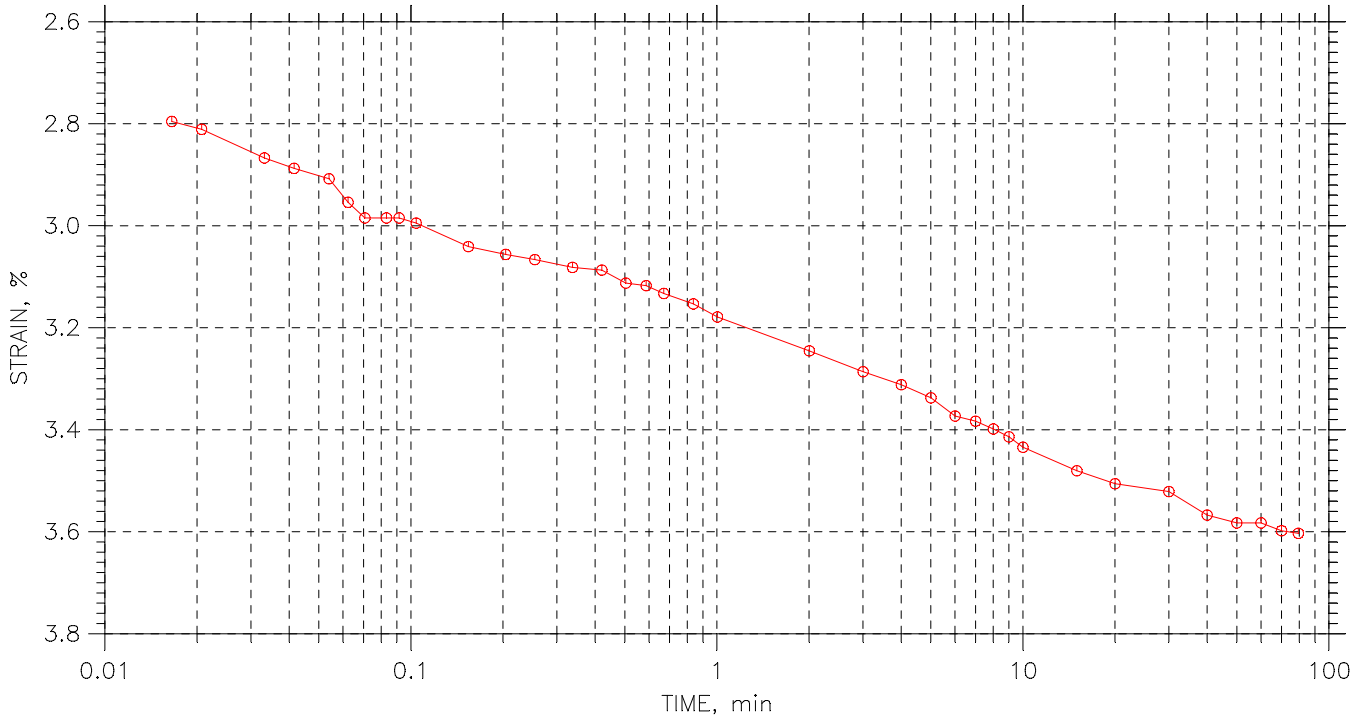
Thu, 16-AUG-2012 11:39:01

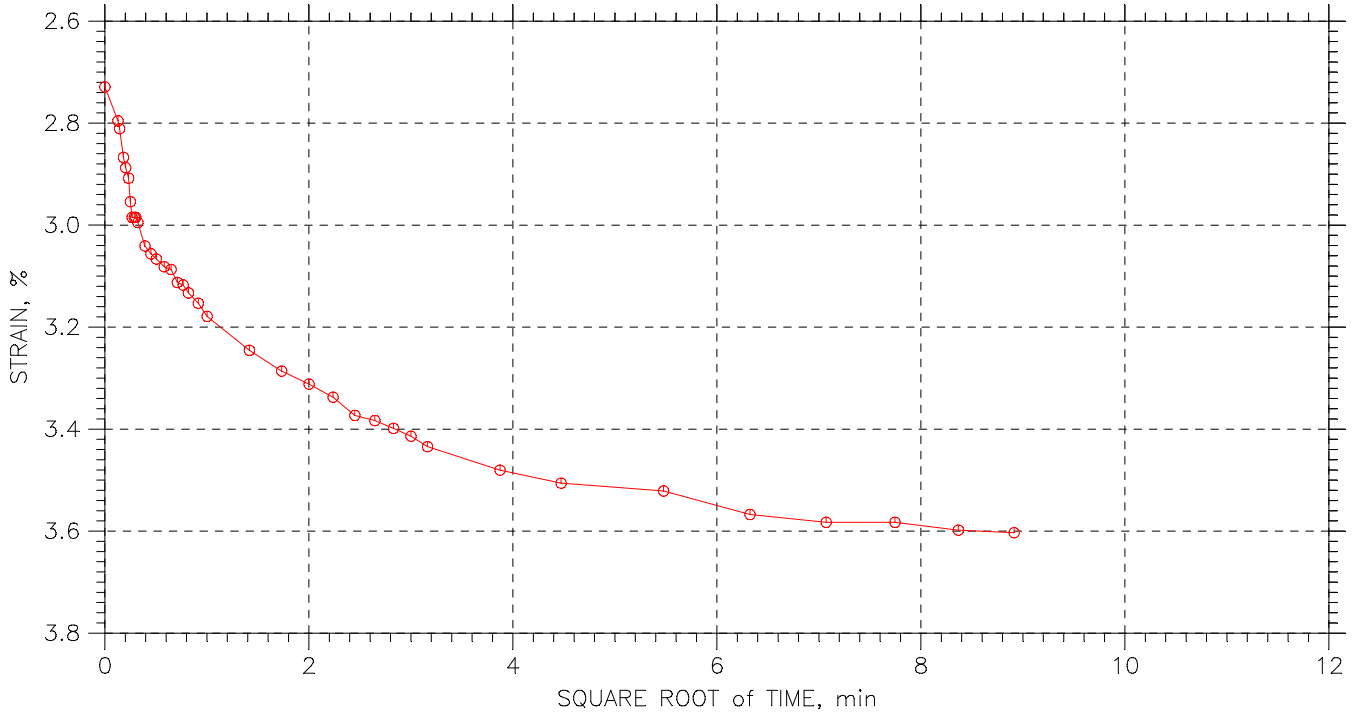
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 7 of 29

Stress: 0.75 tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-102	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/6/12	Depth: 15.0-17.0
Test No.: 244208	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

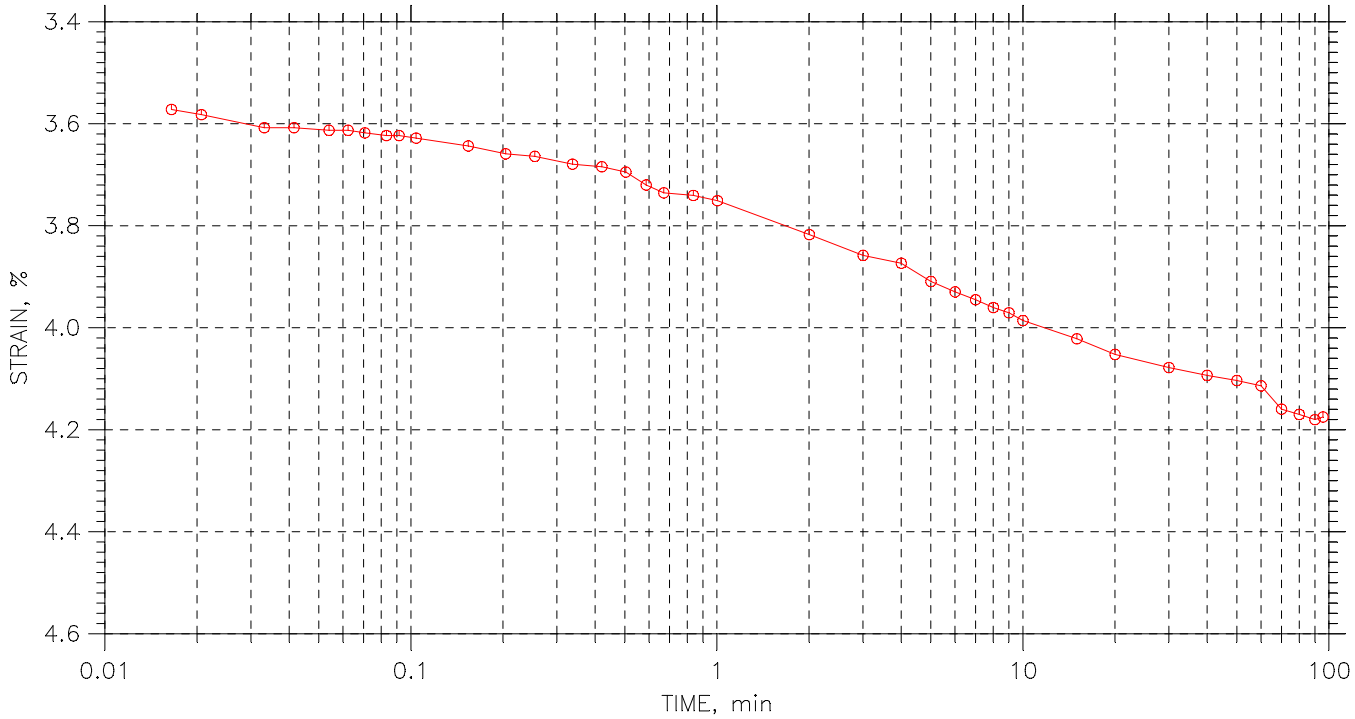
Thu, 16-AUG-2012 11:39:01

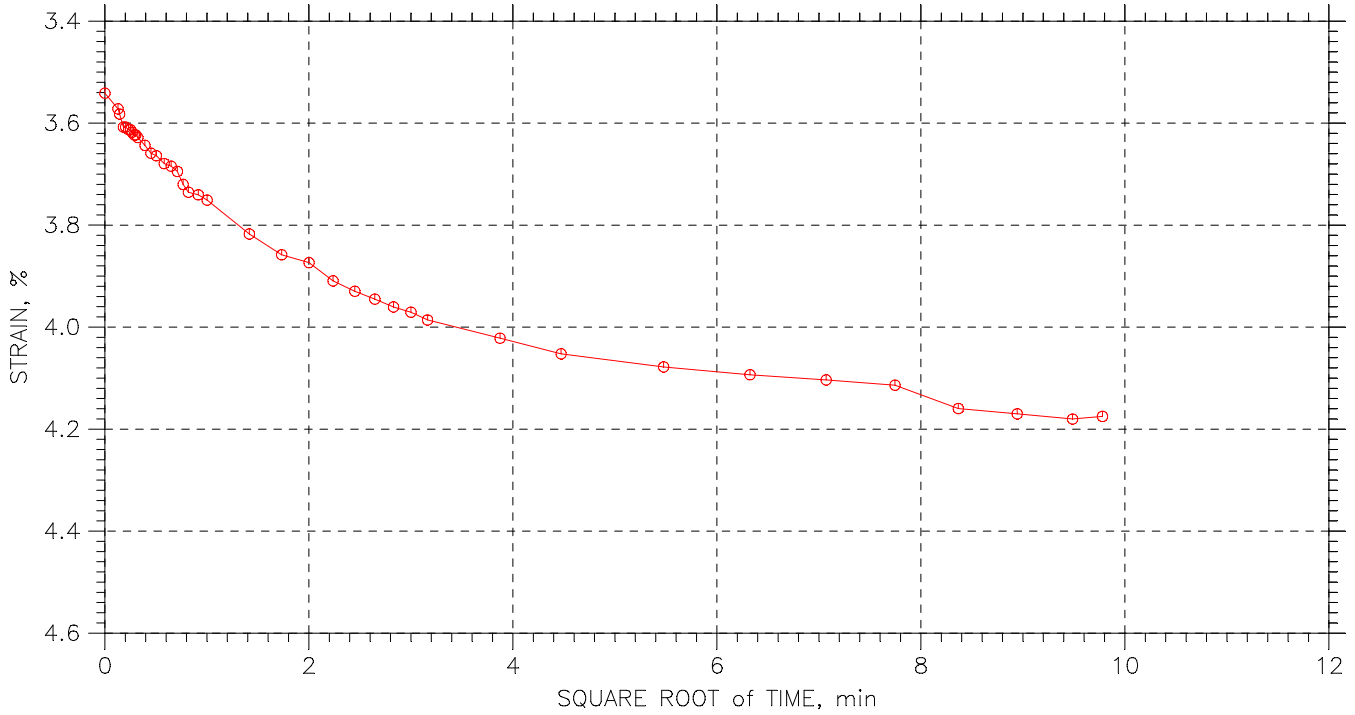
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 8 of 29

Stress: 1. tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-102	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/6/12	Depth: 15.0-17.0
Test No.: 244208	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

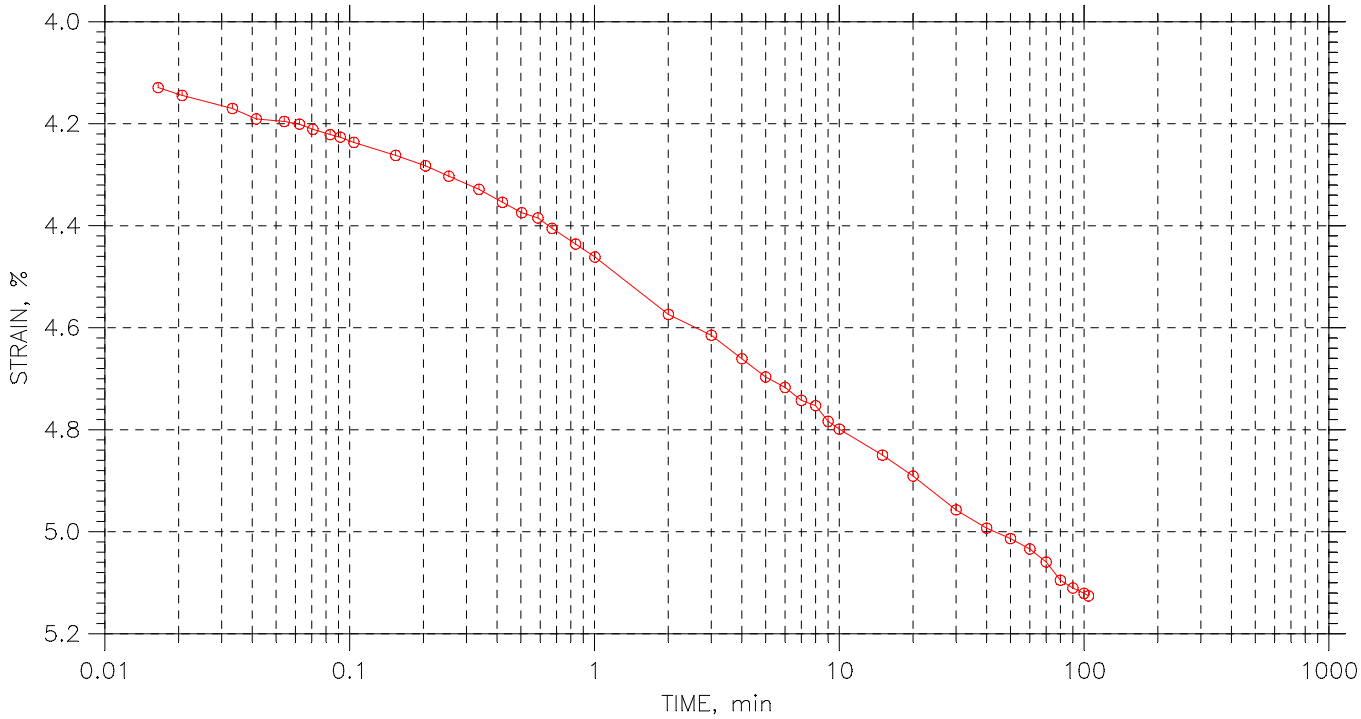
Thu, 16-AUG-2012 11:39:02

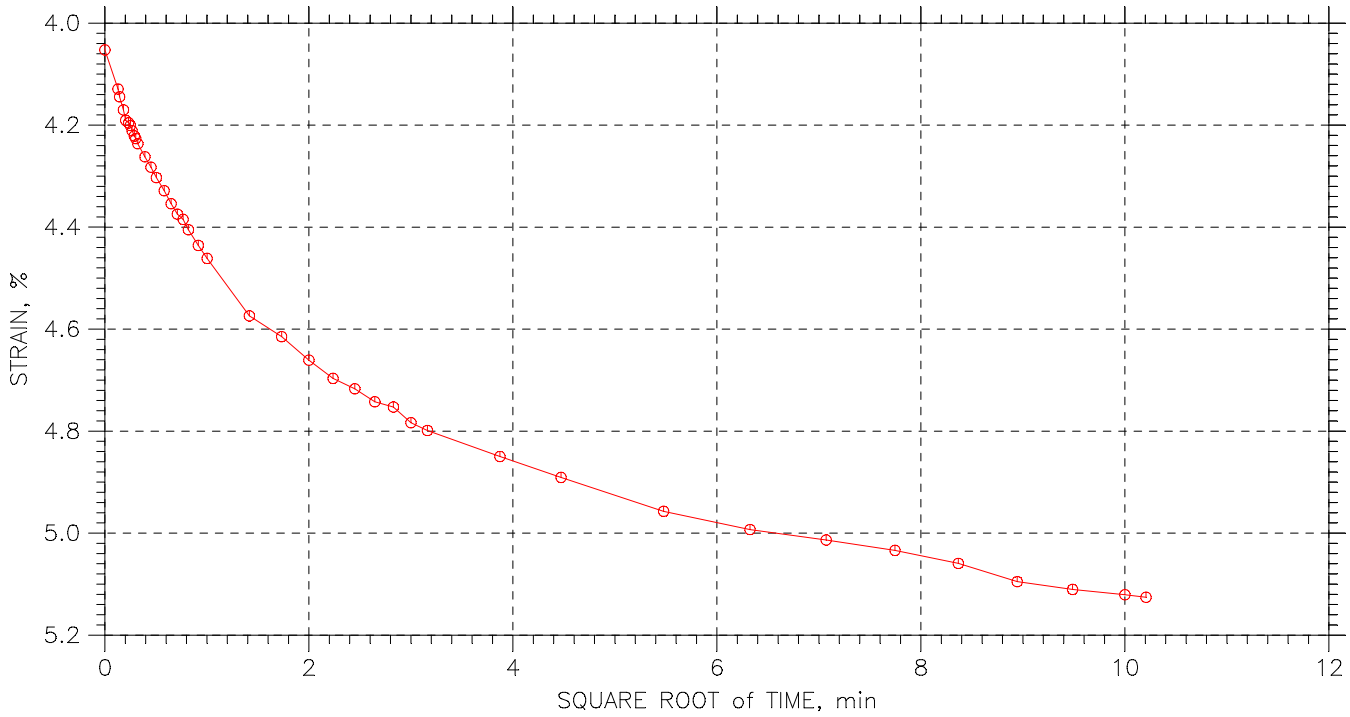
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 9 of 29

Stress: 1.5 tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-102	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/6/12	Depth: 15.0-17.0
Test No.: 244208	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

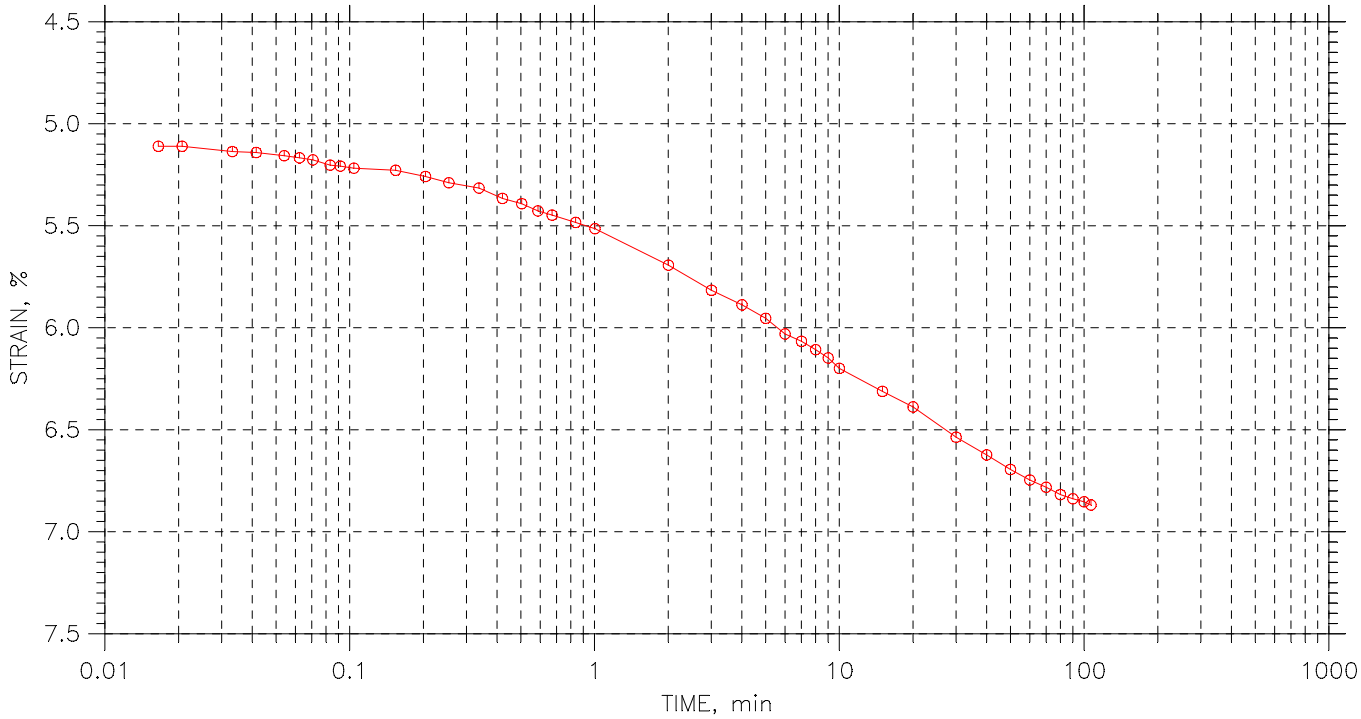
Thu, 16-AUG-2012 11:39:03

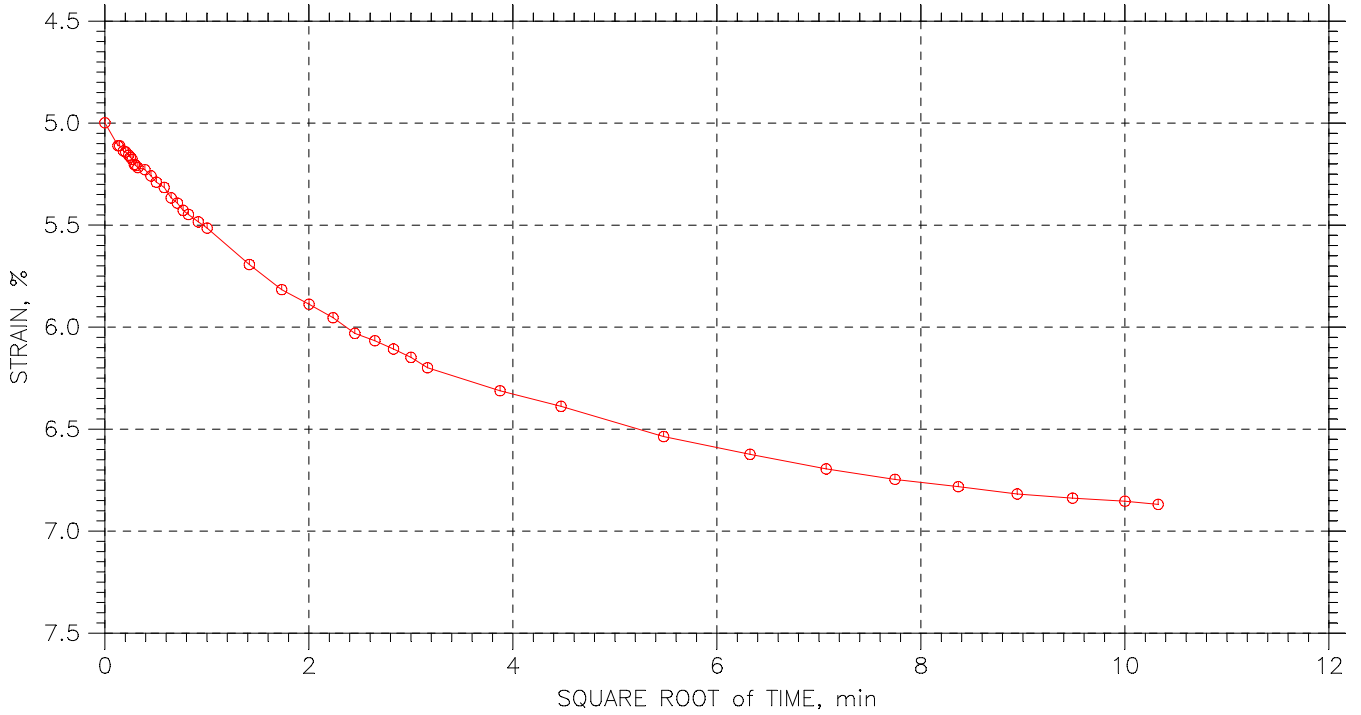
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 10 of 29

Stress: 2.25 tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-102	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/6/12	Depth: 15.0-17.0
Test No.: 244208	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

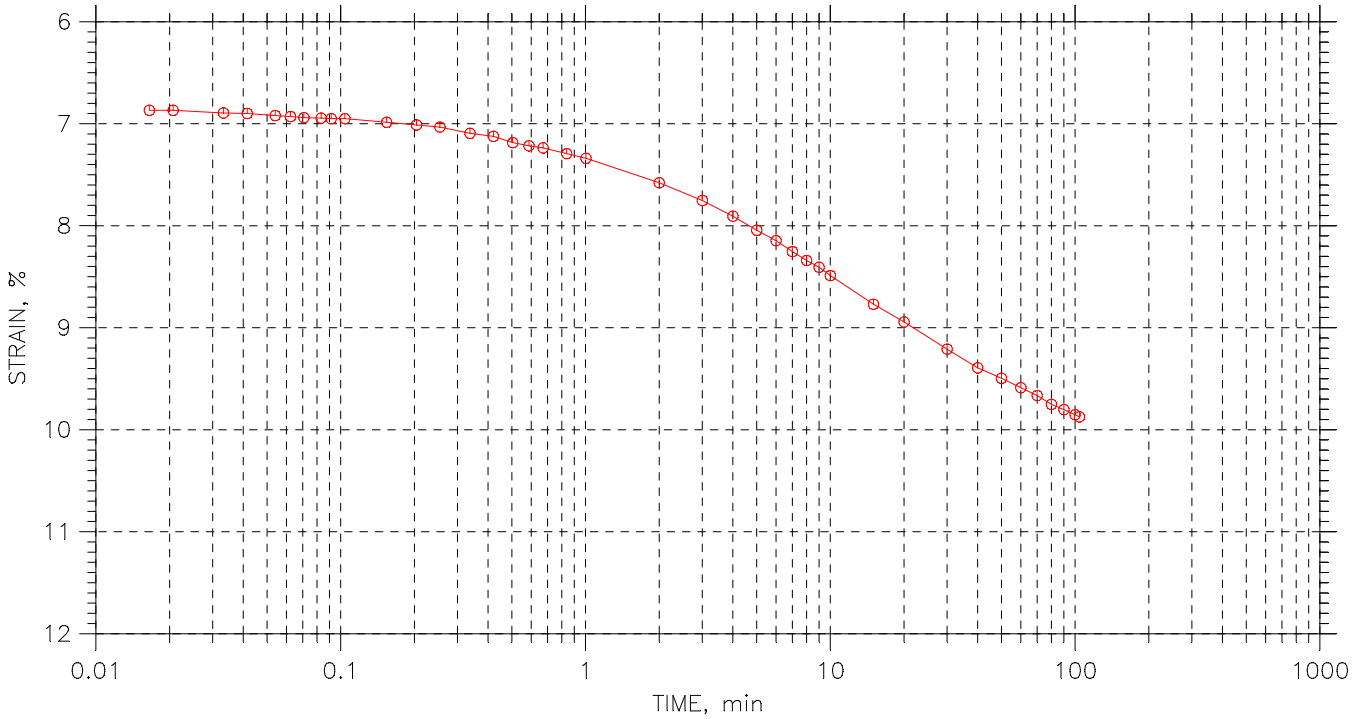
Thu, 16-AUG-2012 11:39:03

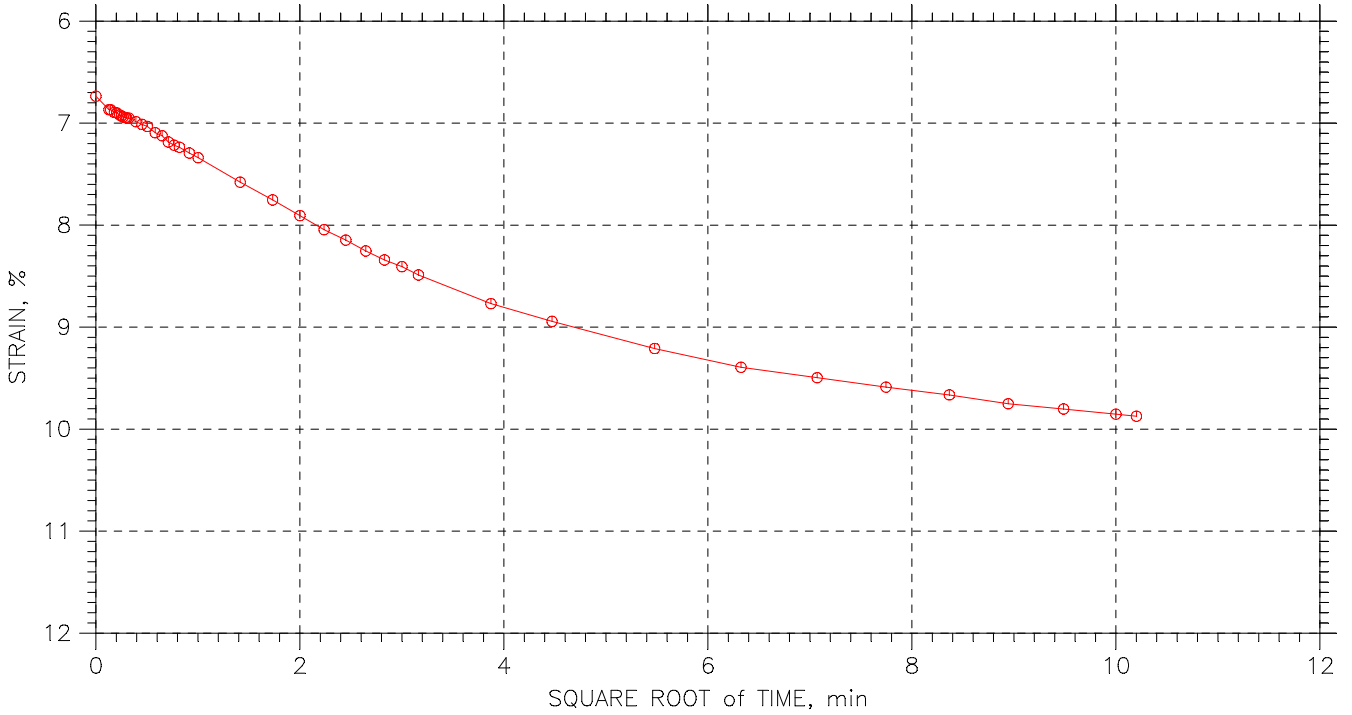
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 11 of 29

Stress: 3.25 tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-102	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/6/12	Depth: 15.0-17.0
Test No.: 244208	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

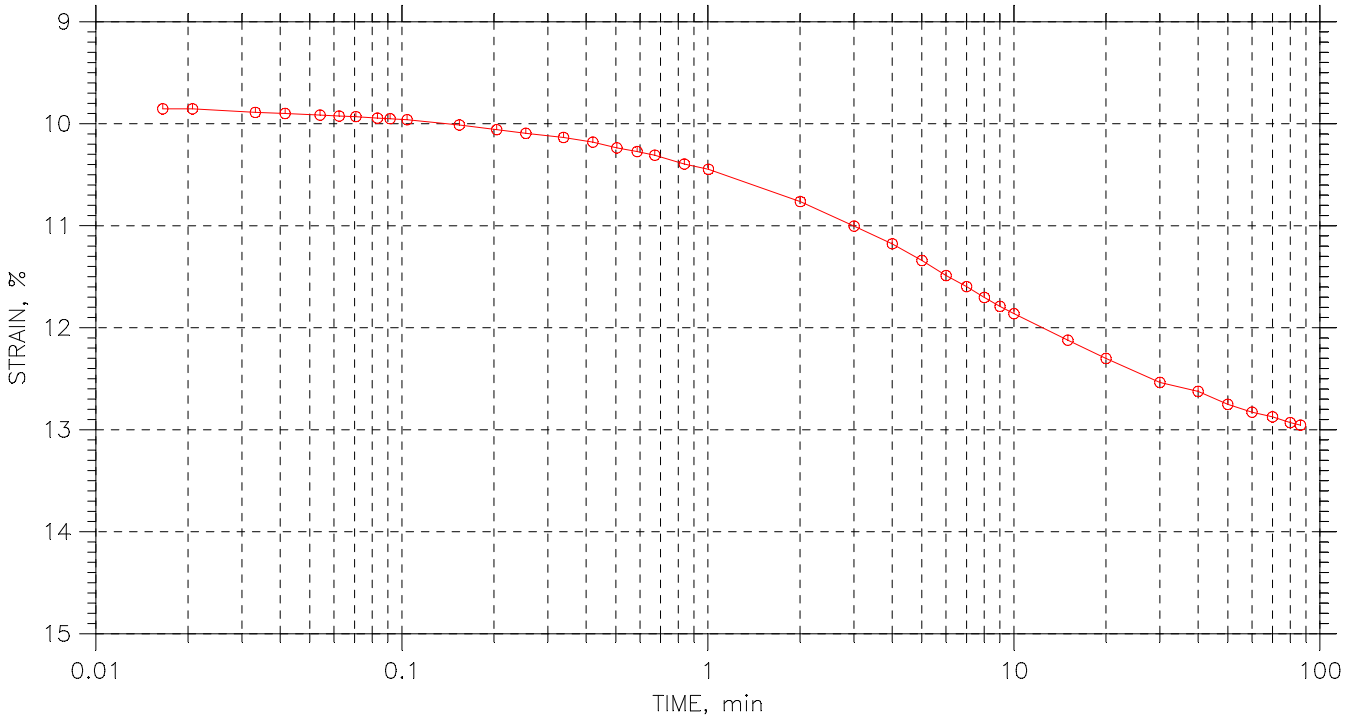
Thu, 16-AUG-2012 11:39:04

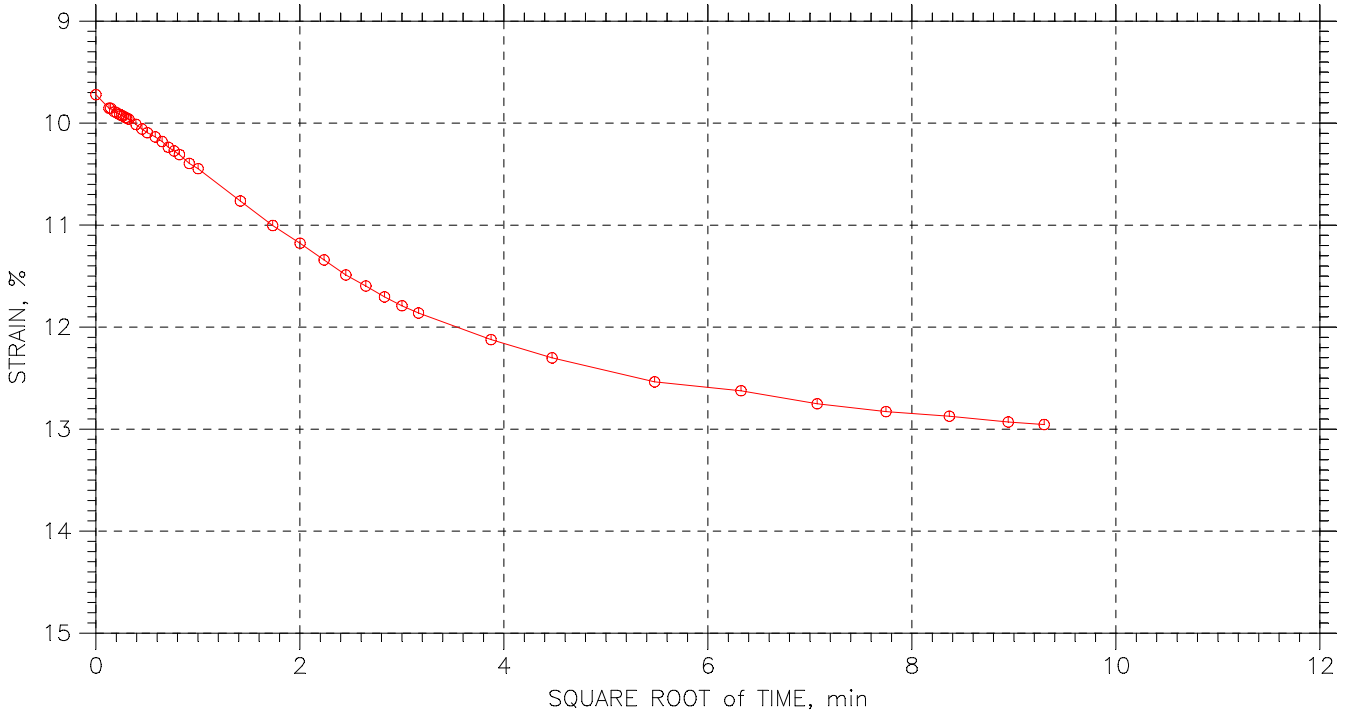
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 12 of 29

Stress: 4.75 tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-102	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/6/12	Depth: 15.0-17.0
Test No.: 244208	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

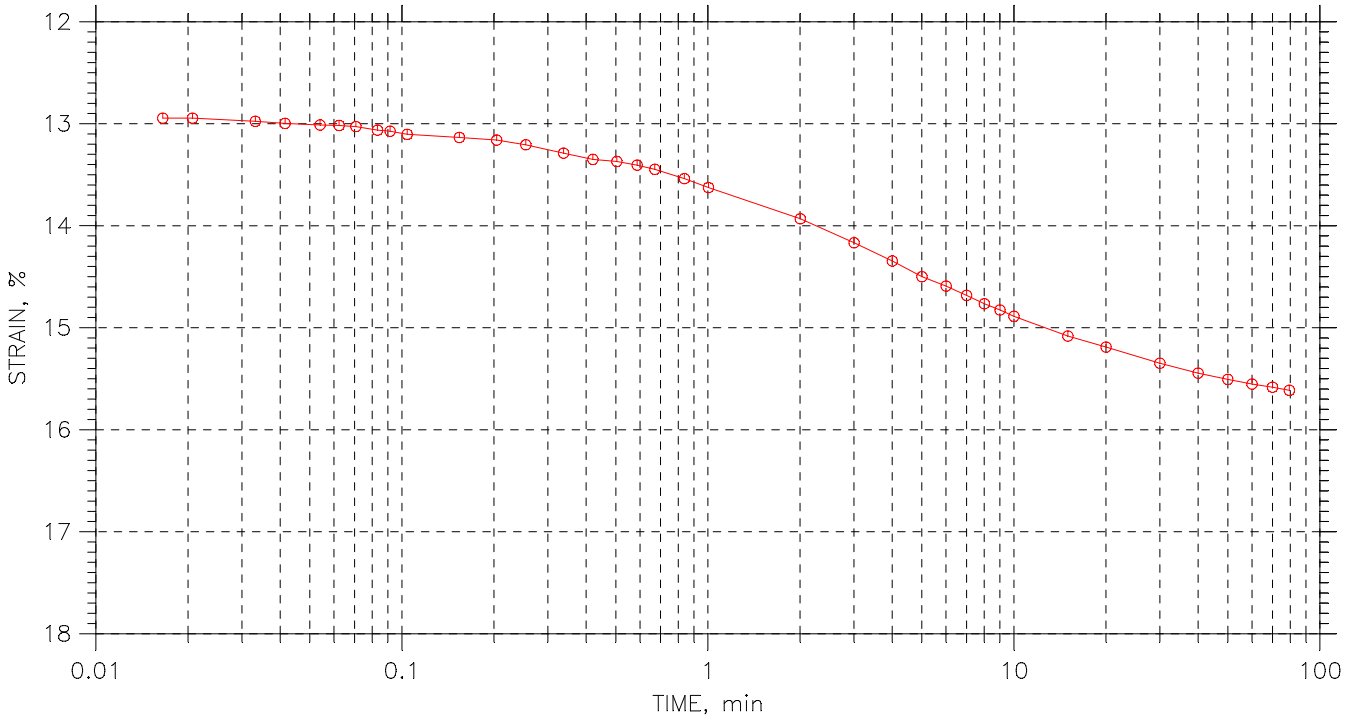
Thu, 16-AUG-2012 11:39:04

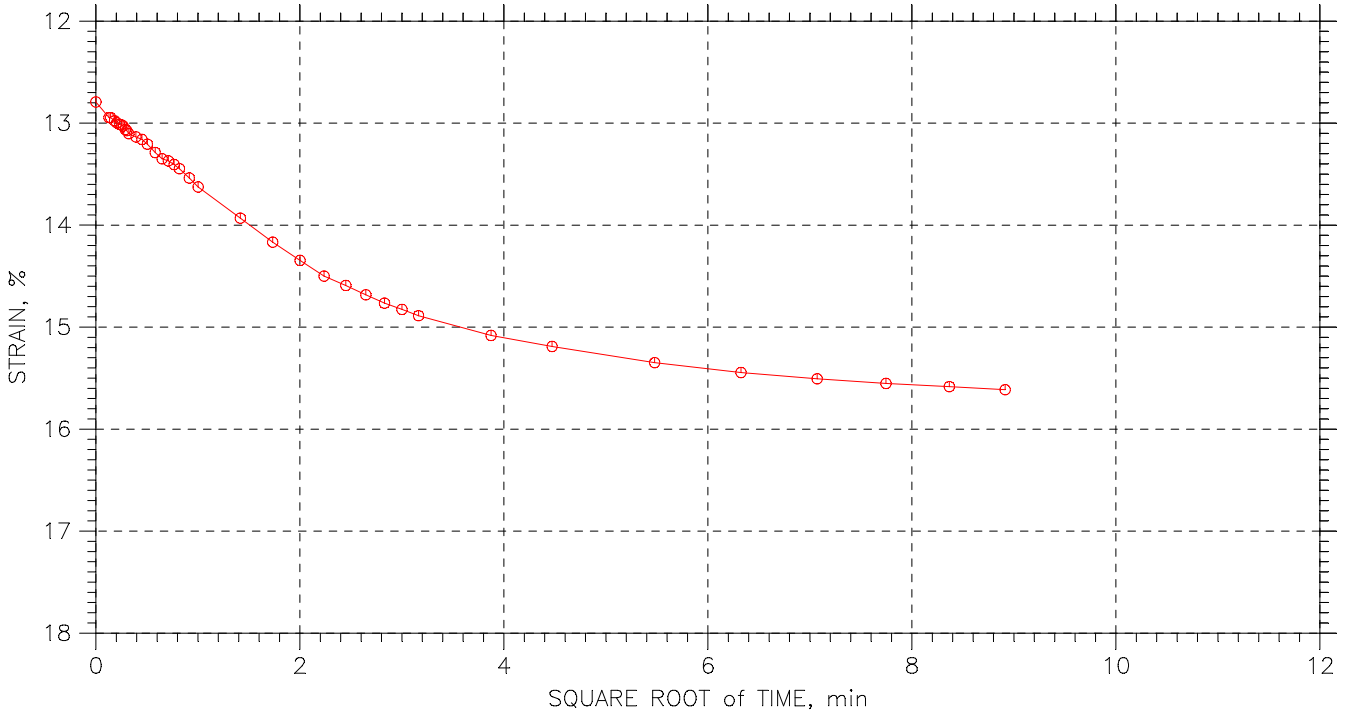
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 13 of 29

Stress: 7. tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-102	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/6/12	Depth: 15.0-17.0
Test No.: 244208	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

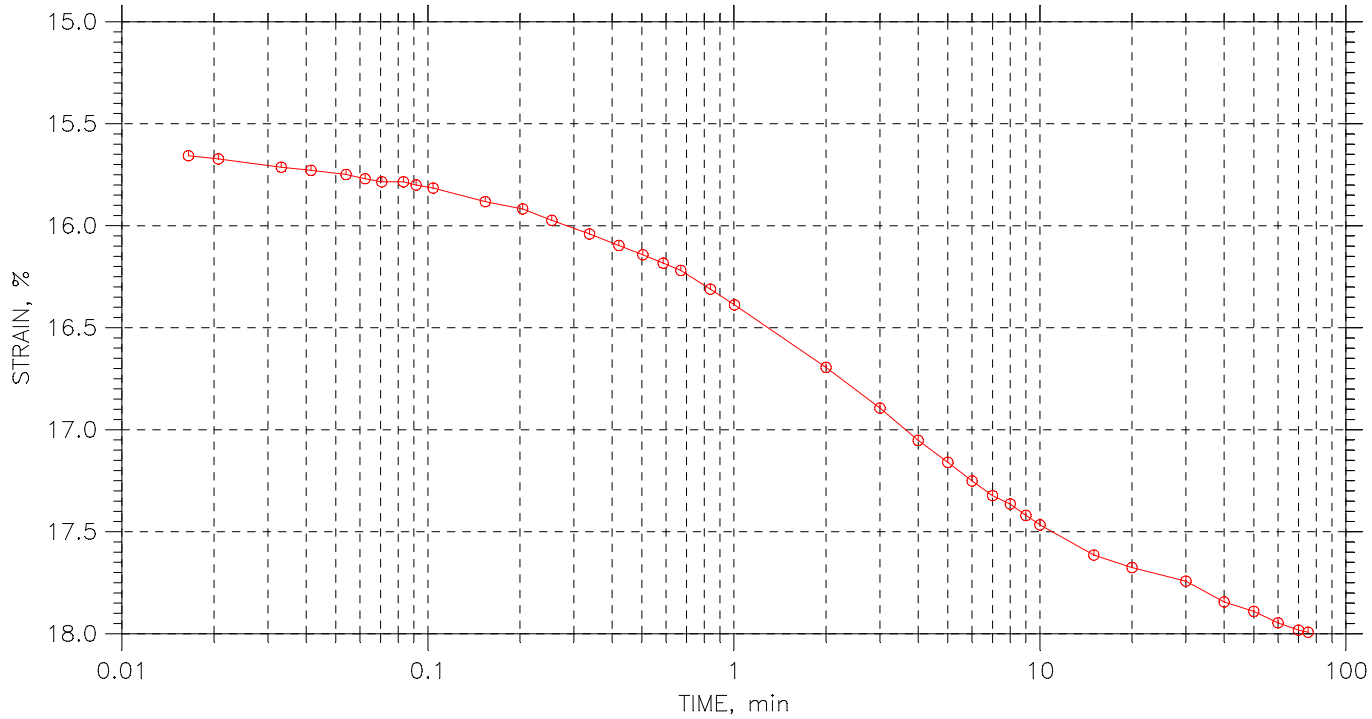
Thu, 16-AUG-2012 11:39:05

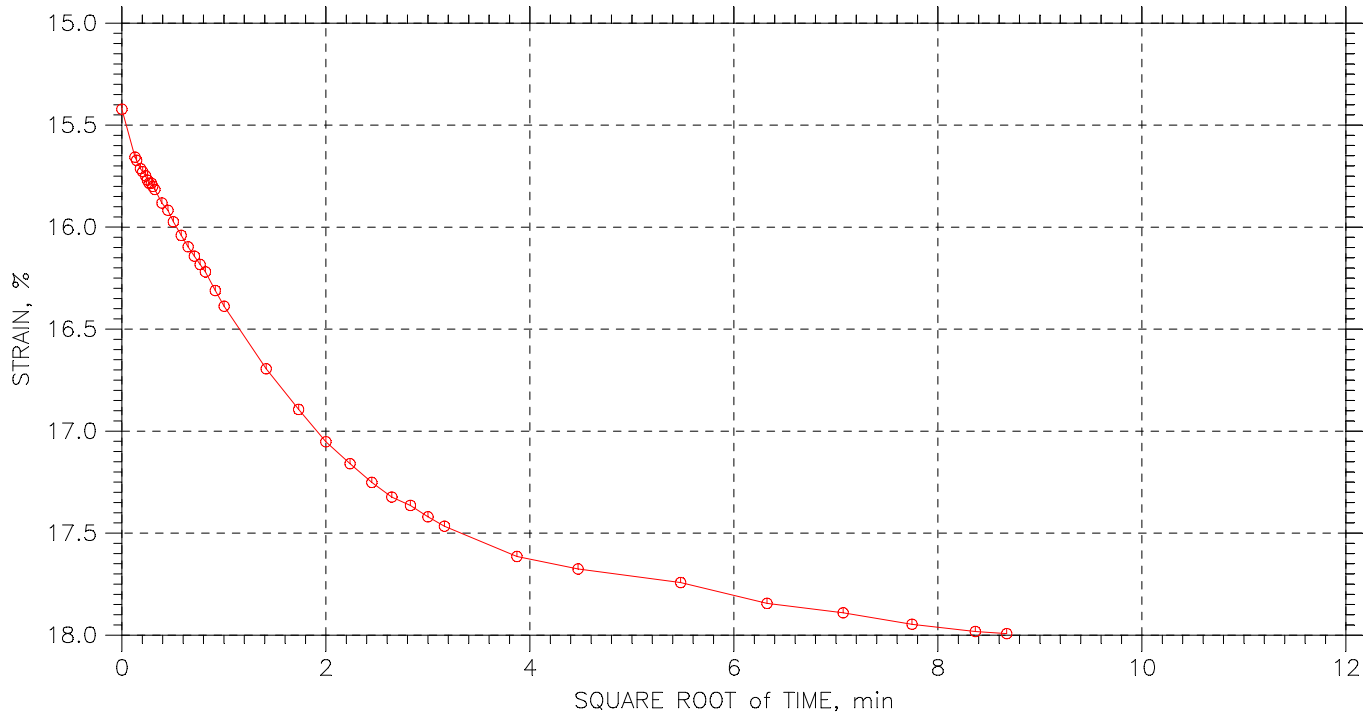
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 14 of 29

Stress: 10.25 tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-102	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/6/12	Depth: 15.0-17.0
Test No.: 244208	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

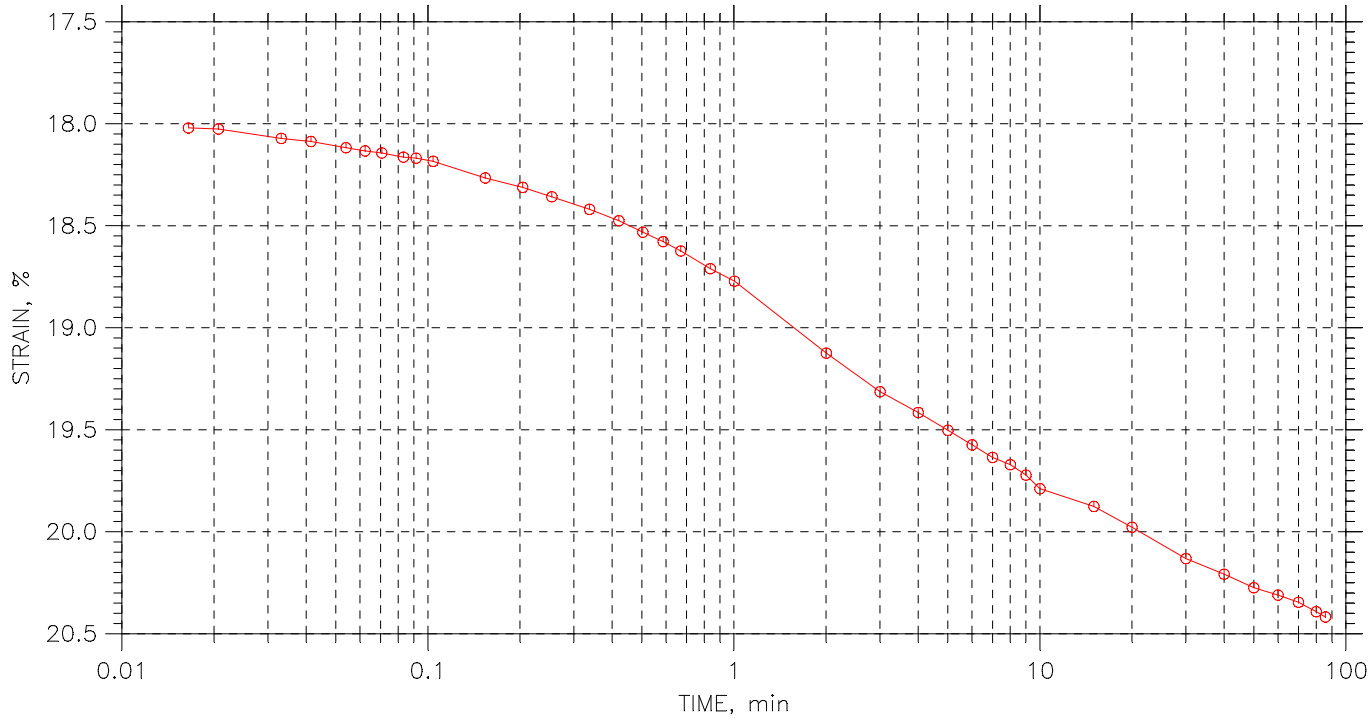
Thu, 16-AUG-2012 11:39:06

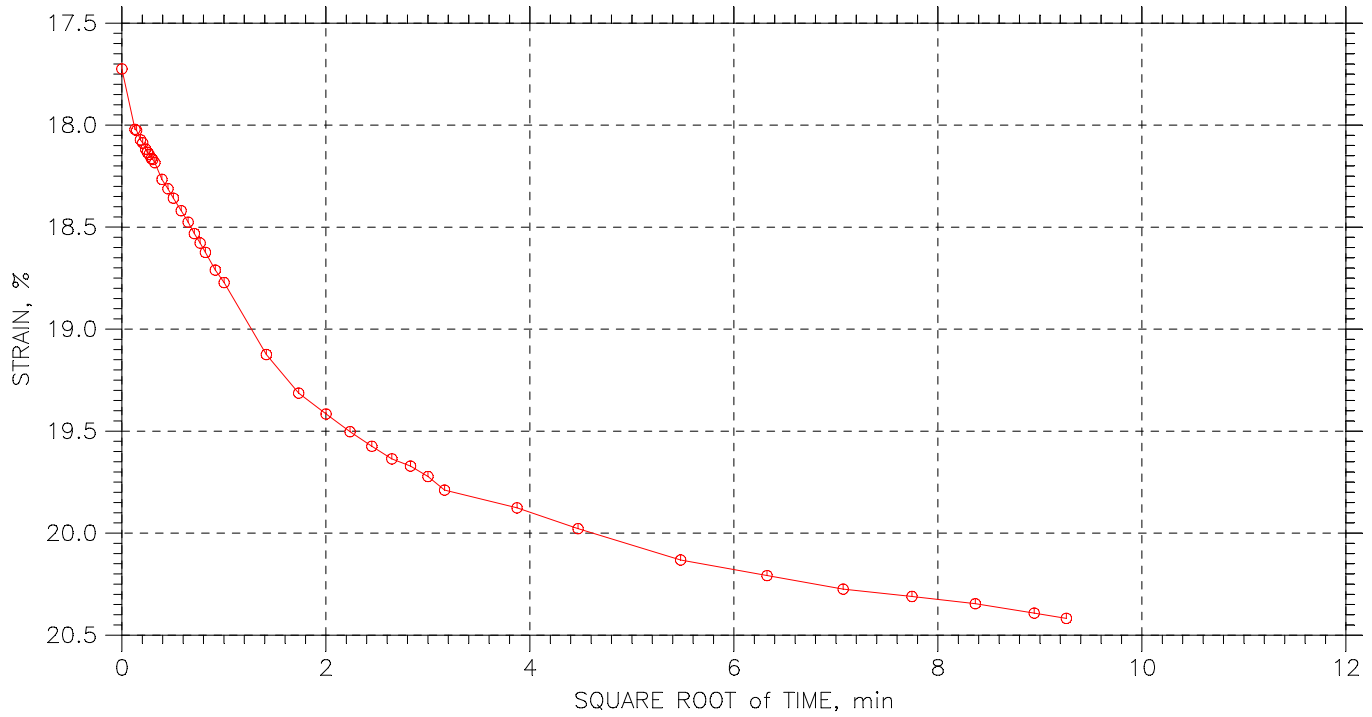
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 15 of 29

Stress: 15. tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-102	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/6/12	Depth: 15.0-17.0
Test No.: 244208	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

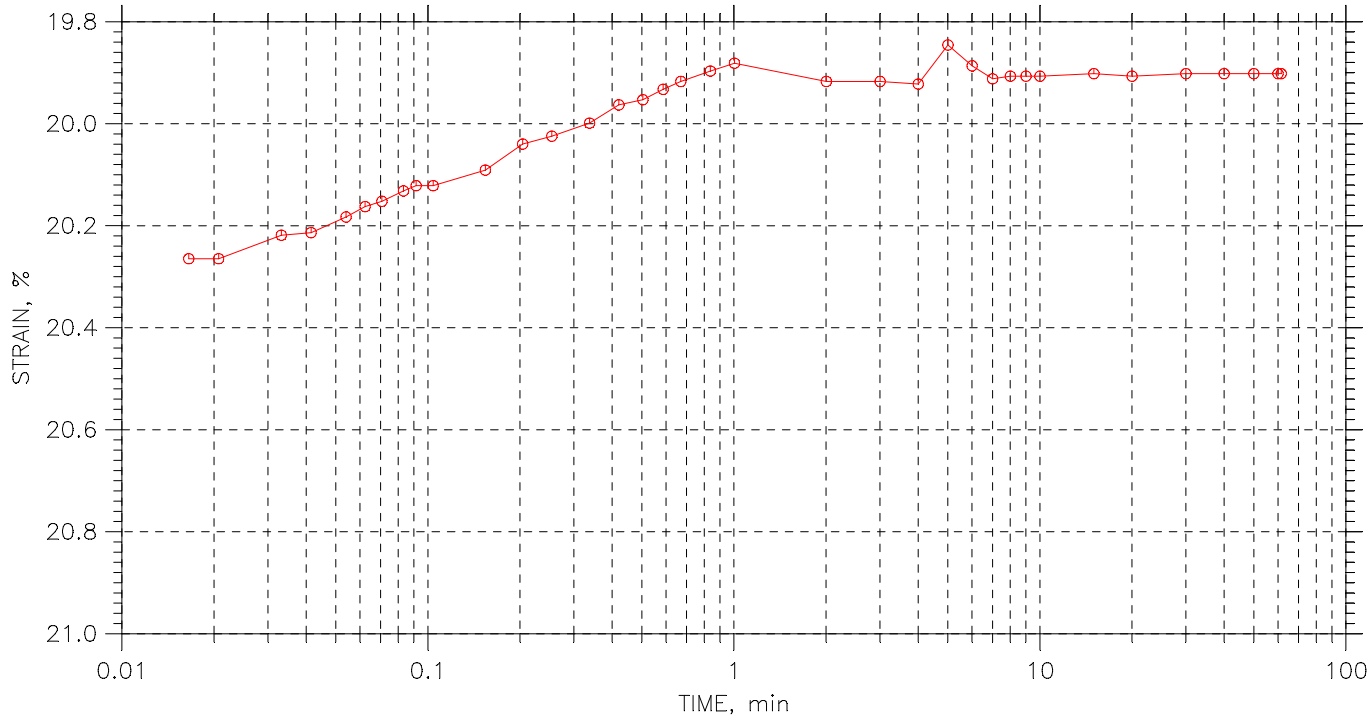
Thu, 16-AUG-2012 11:39:06

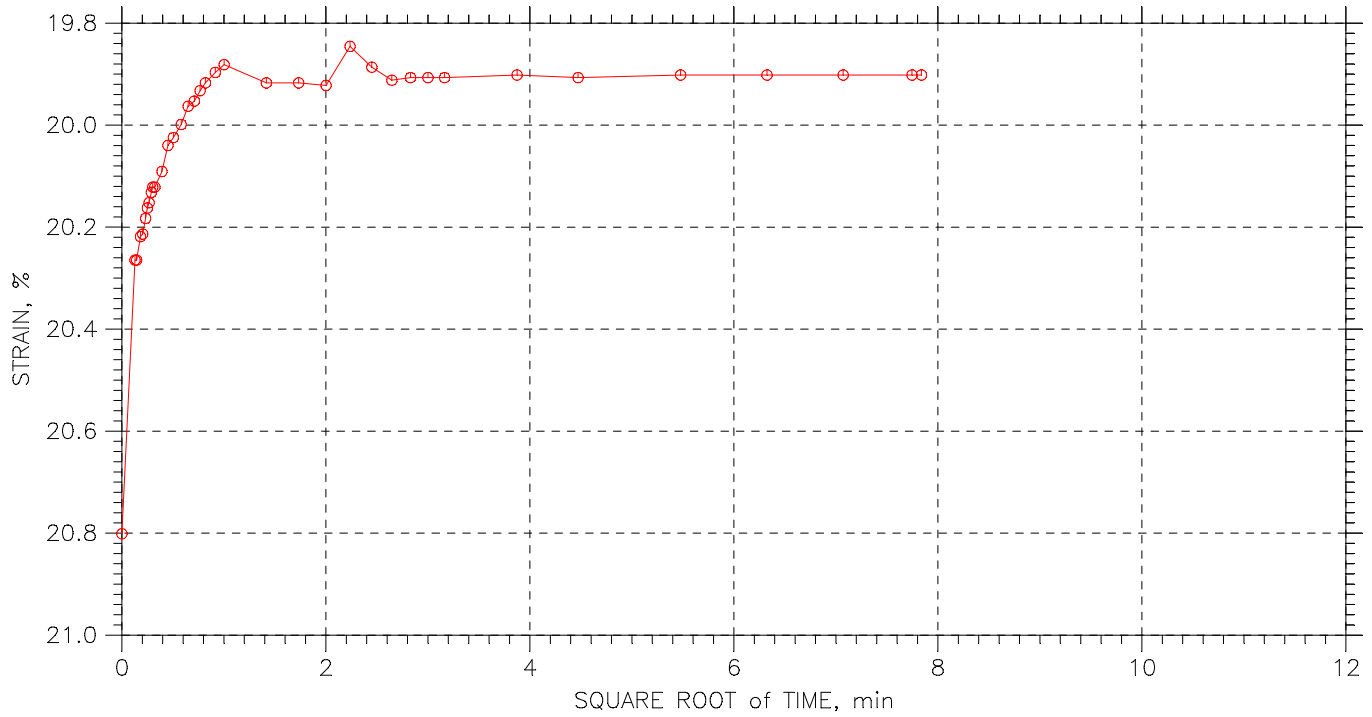
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 16 of 29

Stress: 7. tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-102	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/6/12	Depth: 15.0-17.0
Test No.: 244208	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

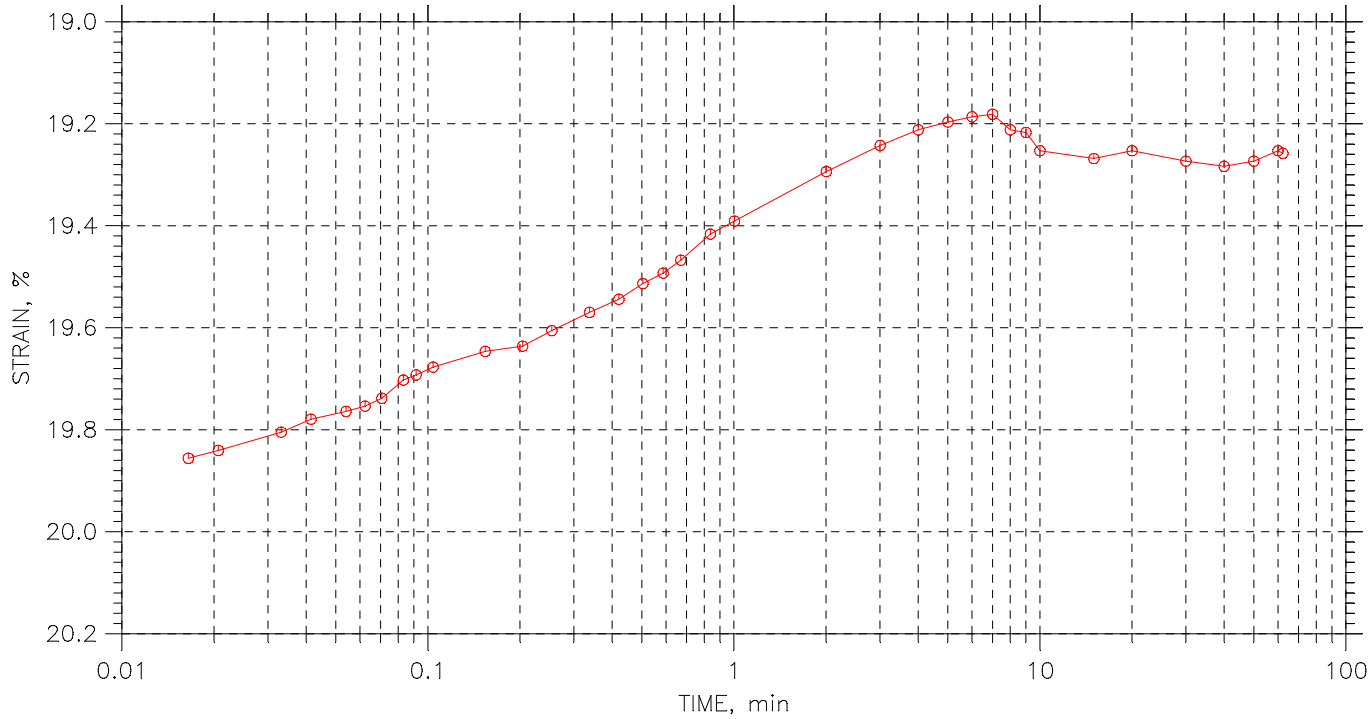
Thu, 16-AUG-2012 11:39:07

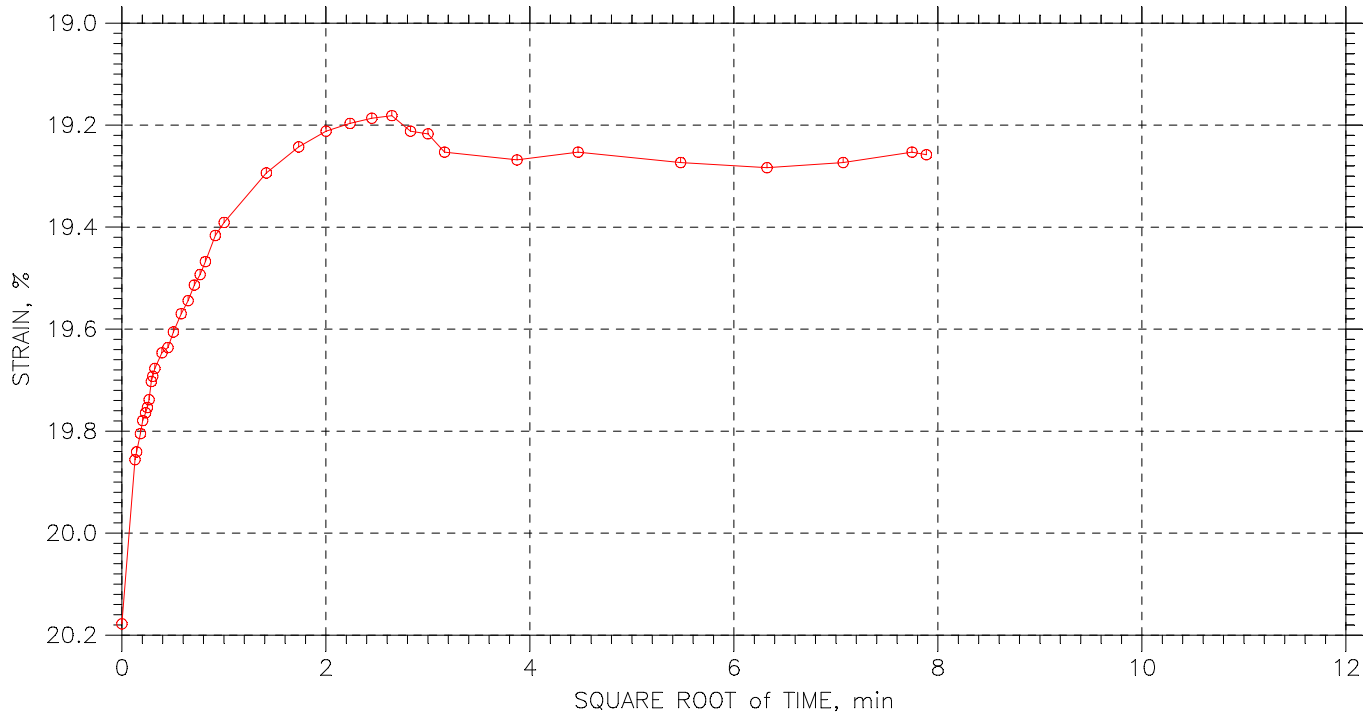
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 17 of 29

Stress: 3.25 tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-102	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/6/12	Depth: 15.0-17.0
Test No.: 244208	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

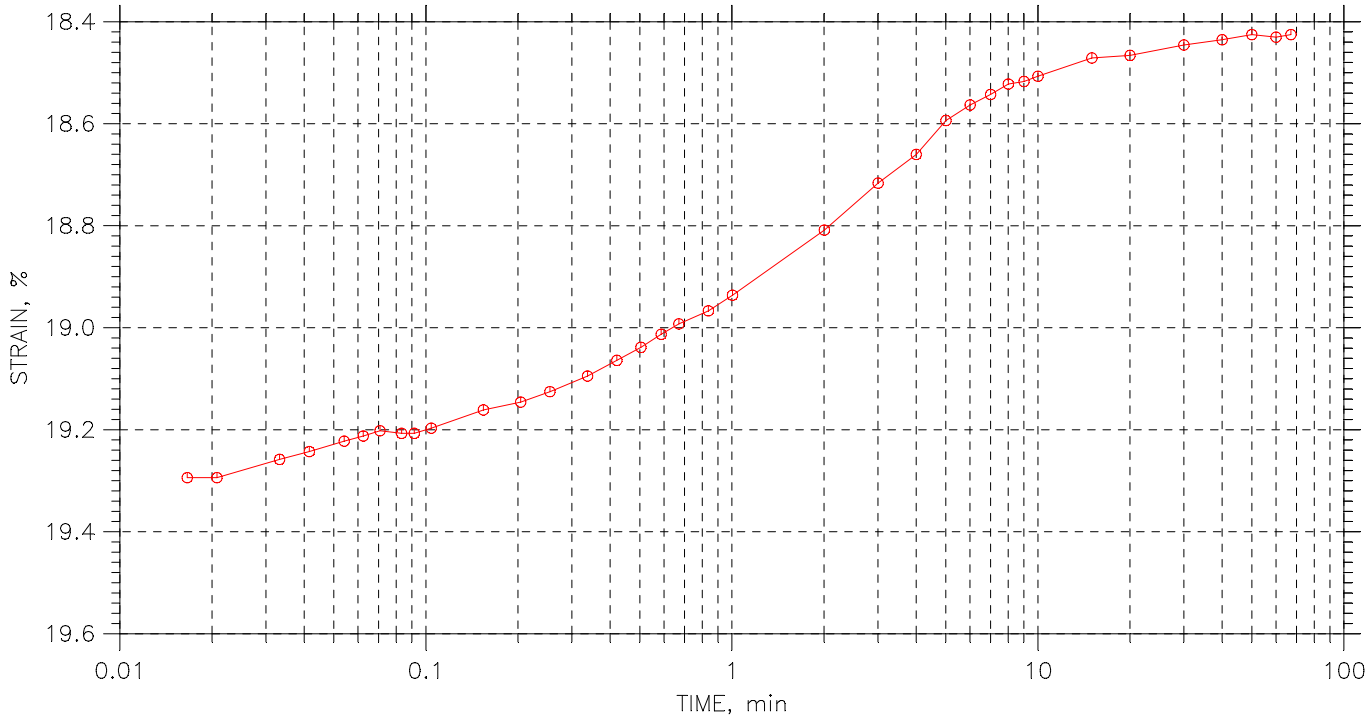
Thu, 16-AUG-2012 11:39:08

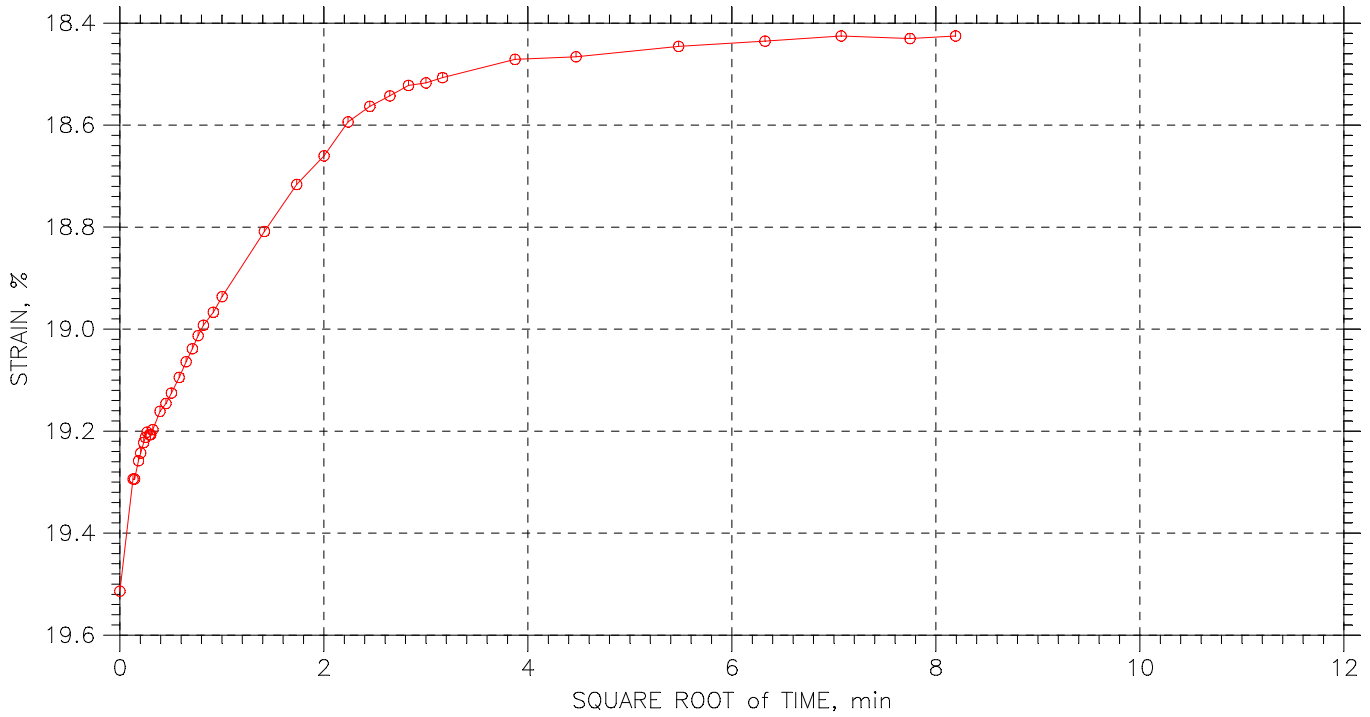
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 18 of 29

Stress: 1.5 tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-102	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/6/12	Depth: 15.0-17.0
Test No.: 244208	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

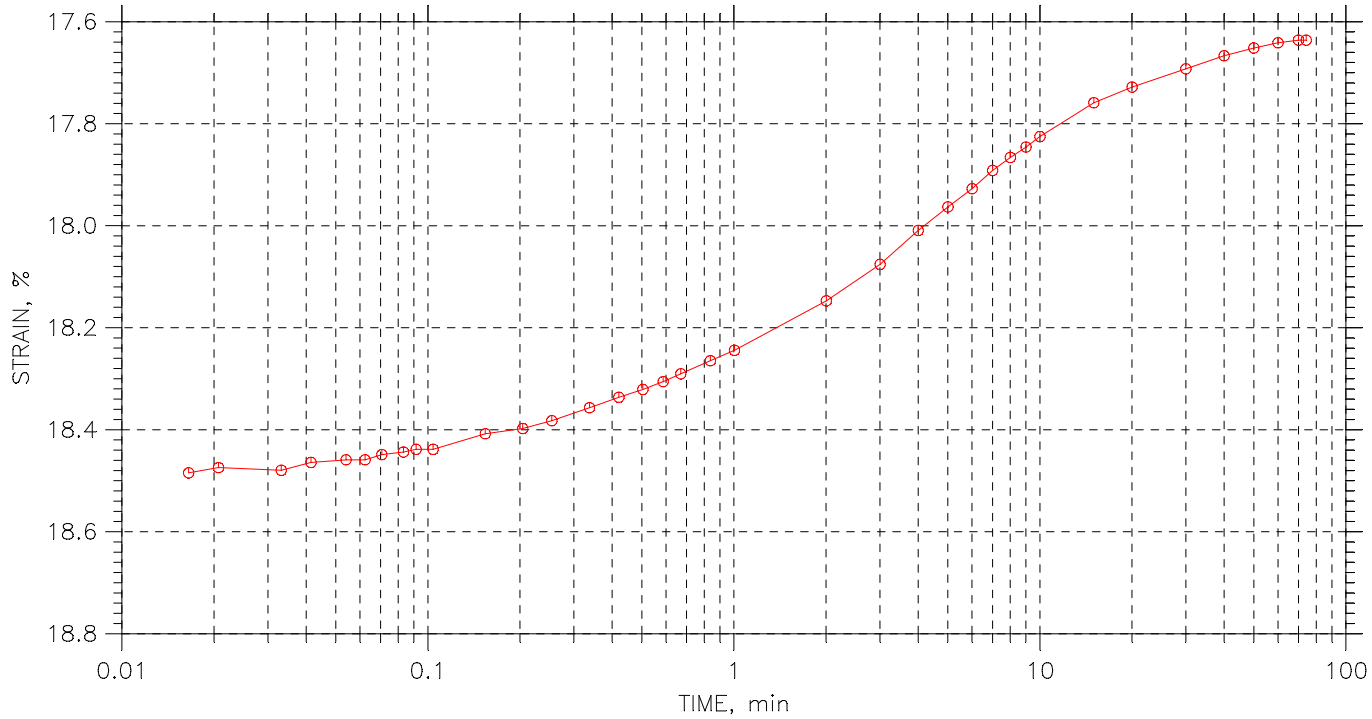
Thu, 16-AUG-2012 11:39:08

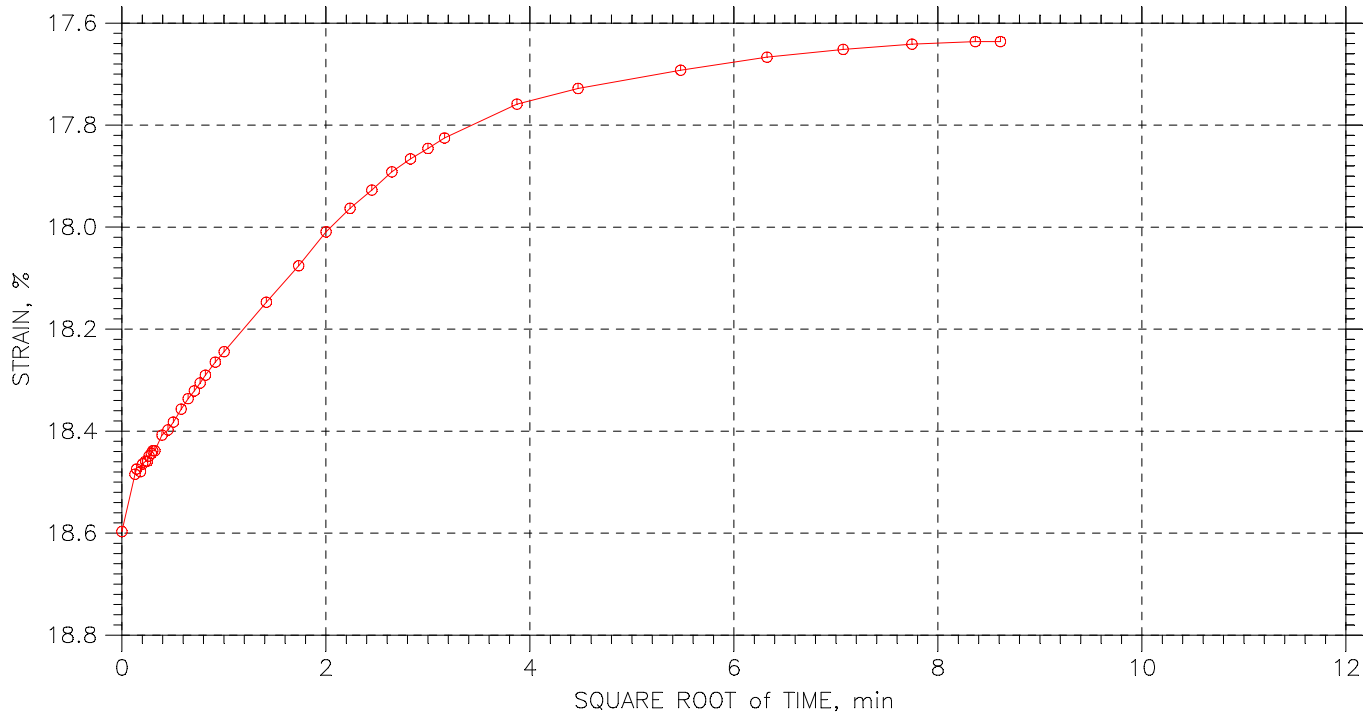
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 19 of 29

Stress: 0.75 tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-102	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/6/12	Depth: 15.0-17.0
Test No.: 244208	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

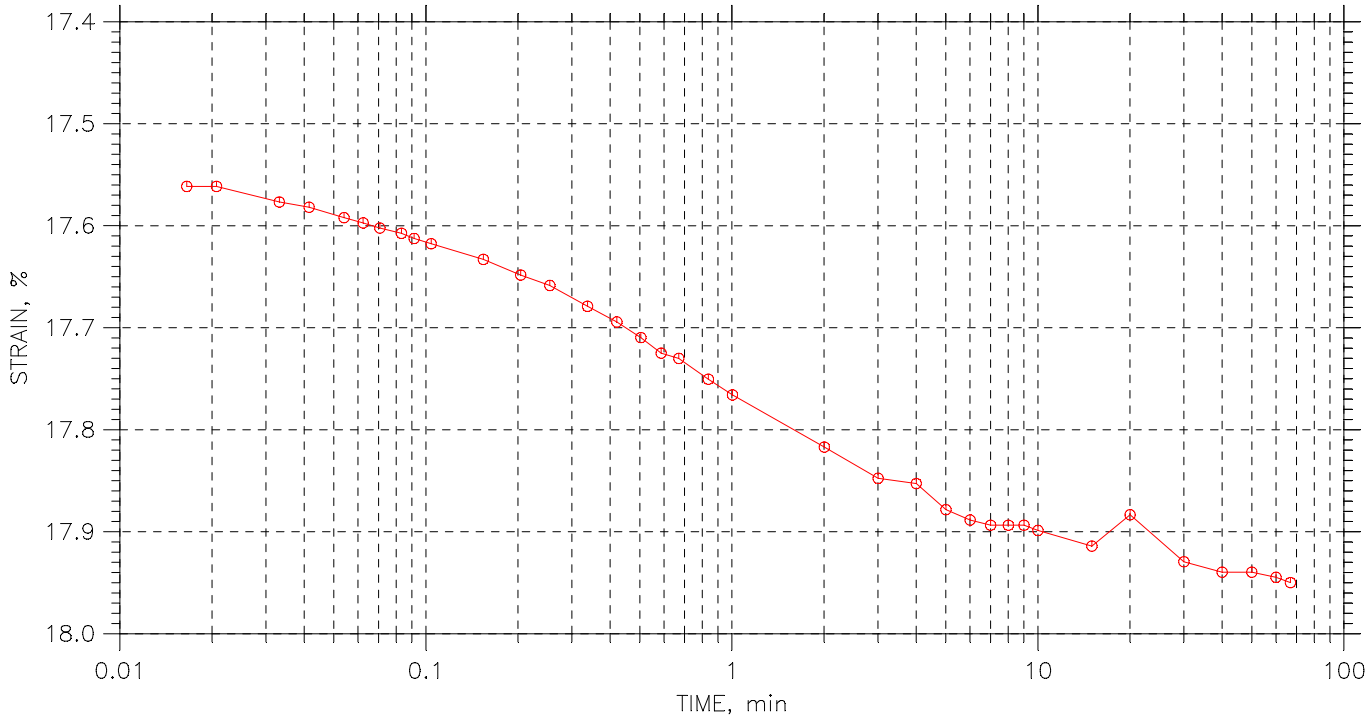
Thu, 16-AUG-2012 11:39:09

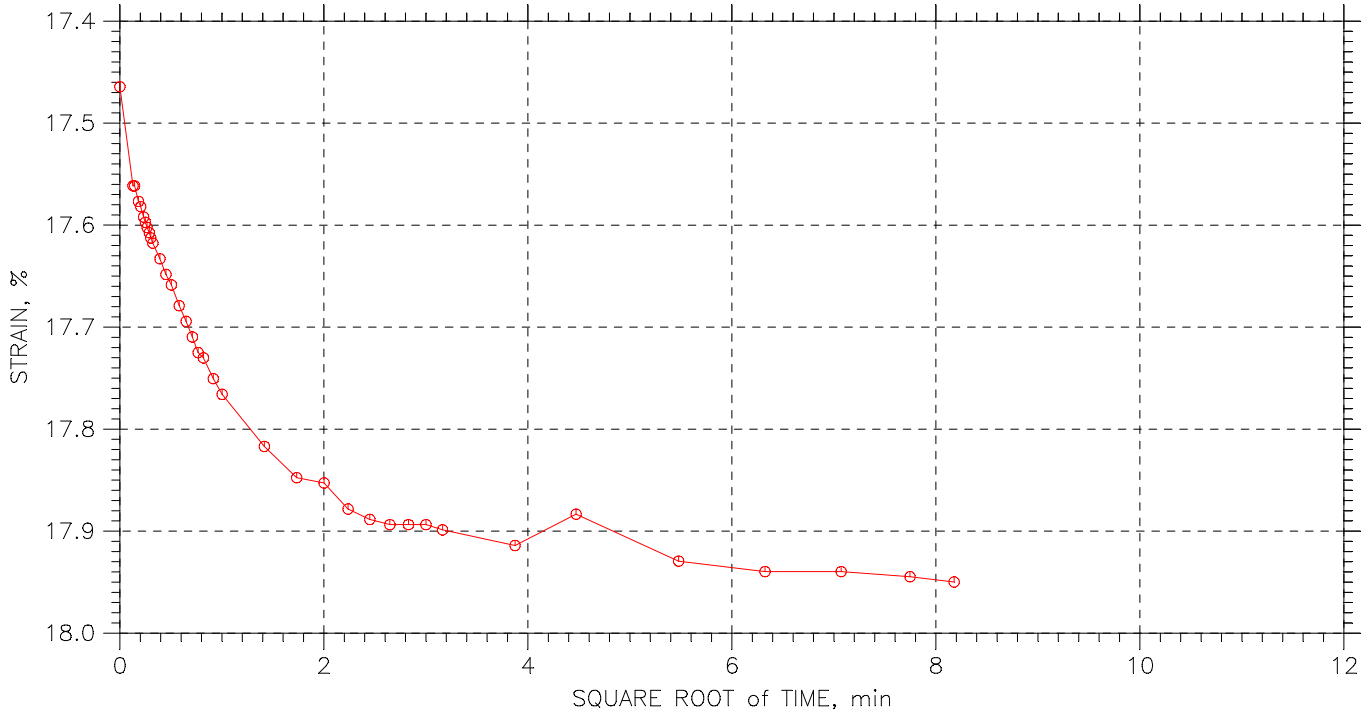
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 20 of 29

Stress: 1.5 tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-102	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/6/12	Depth: 15.0-17.0
Test No.: 244208	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

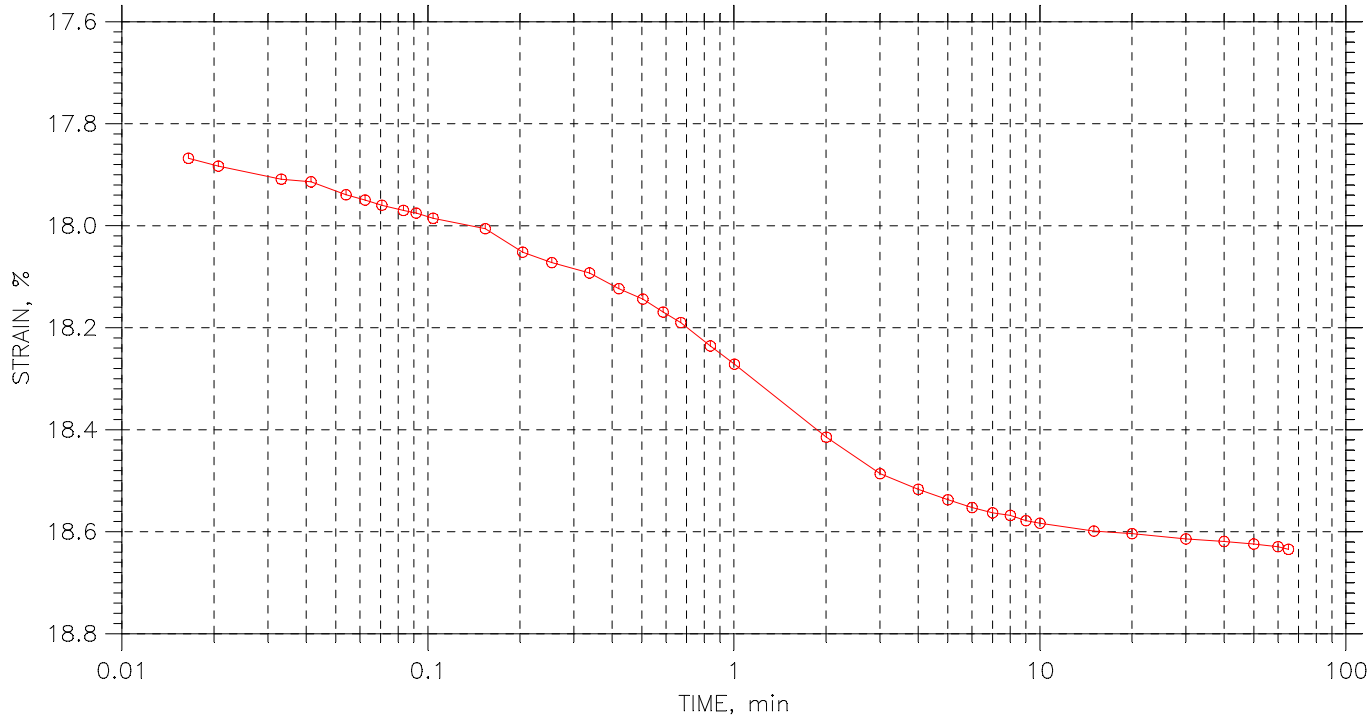
Thu, 16-AUG-2012 11:39:10

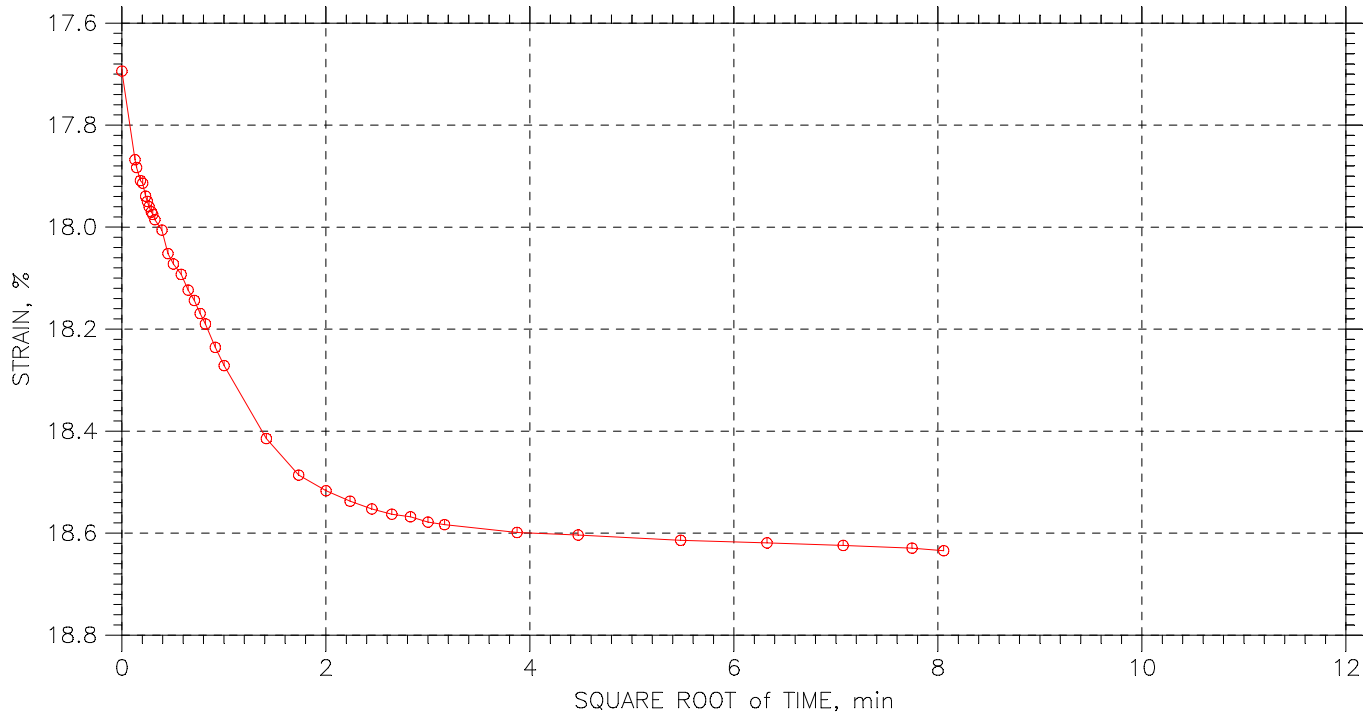
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 21 of 29

Stress: 3.25 tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-102	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/6/12	Depth: 15.0-17.0
Test No.: 244208	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

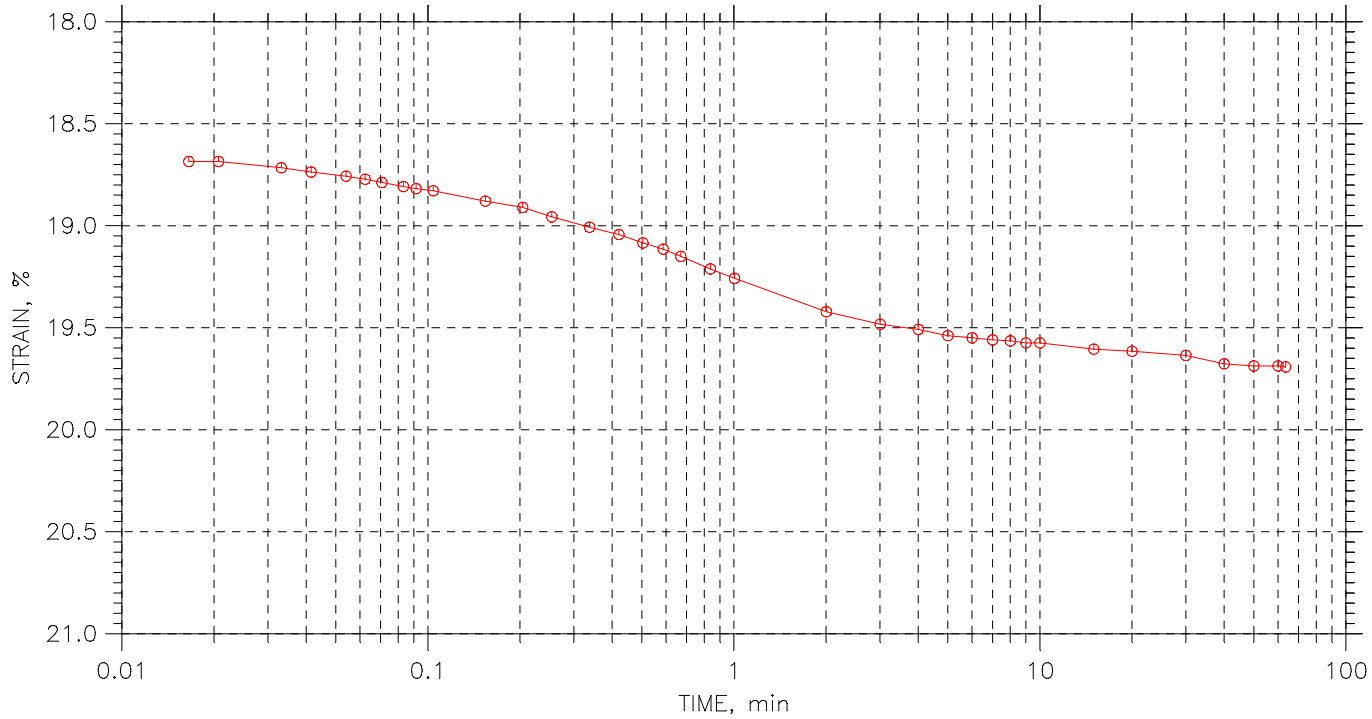
Thu, 16-AUG-2012 11:39:10

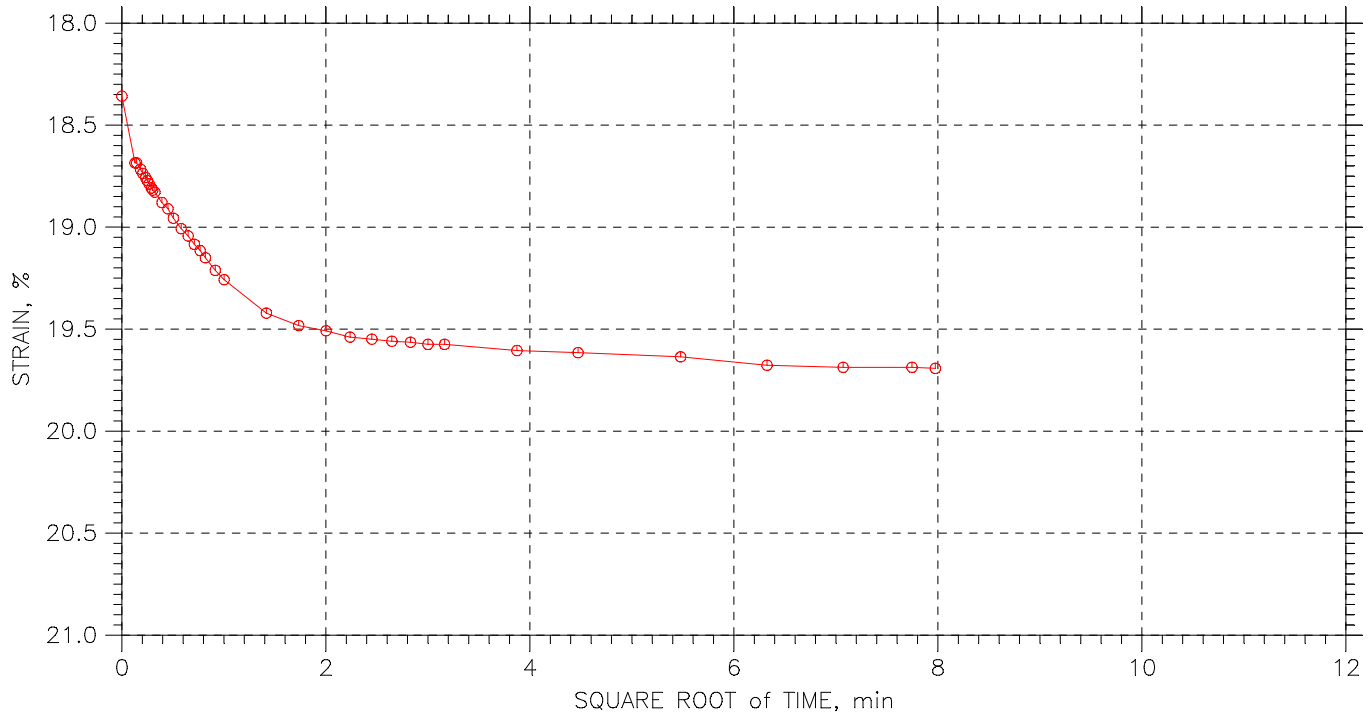
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 22 of 29

Stress: 7. tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-102	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/6/12	Depth: 15.0-17.0
Test No.: 244208	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

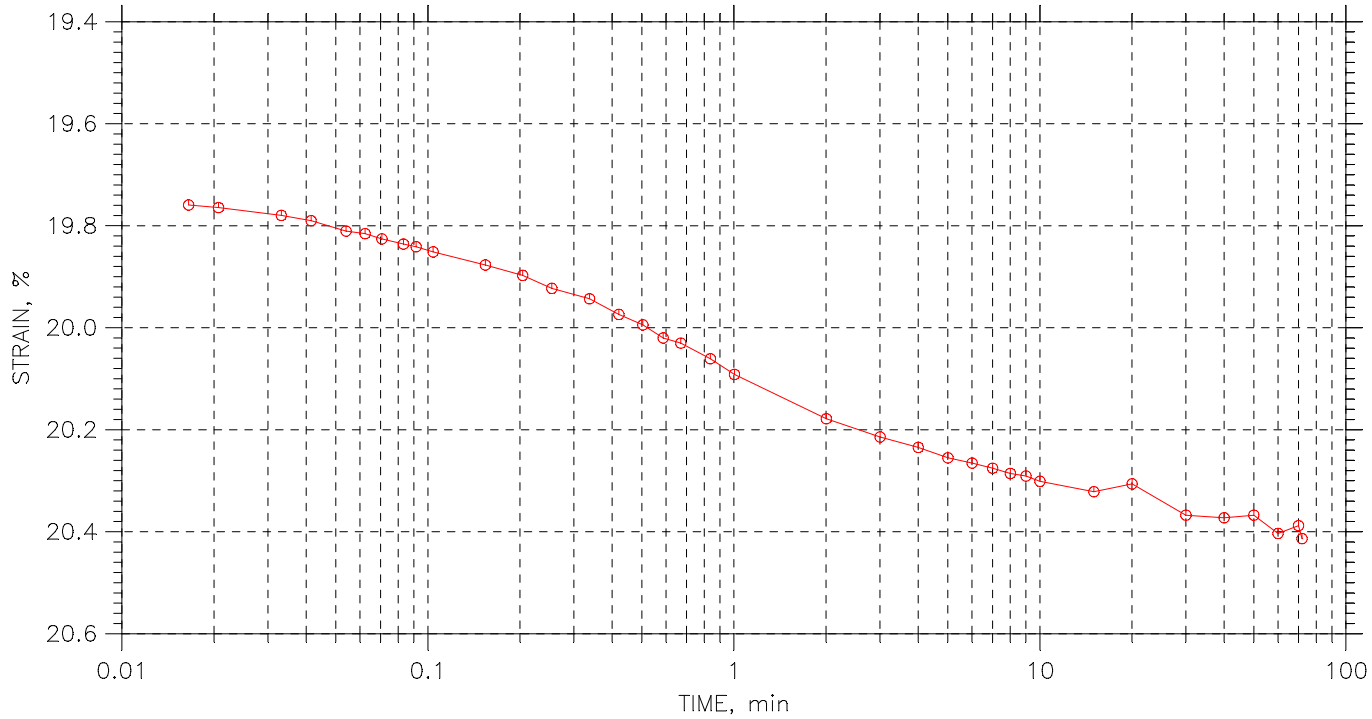
Thu, 16-AUG-2012 11:39:11

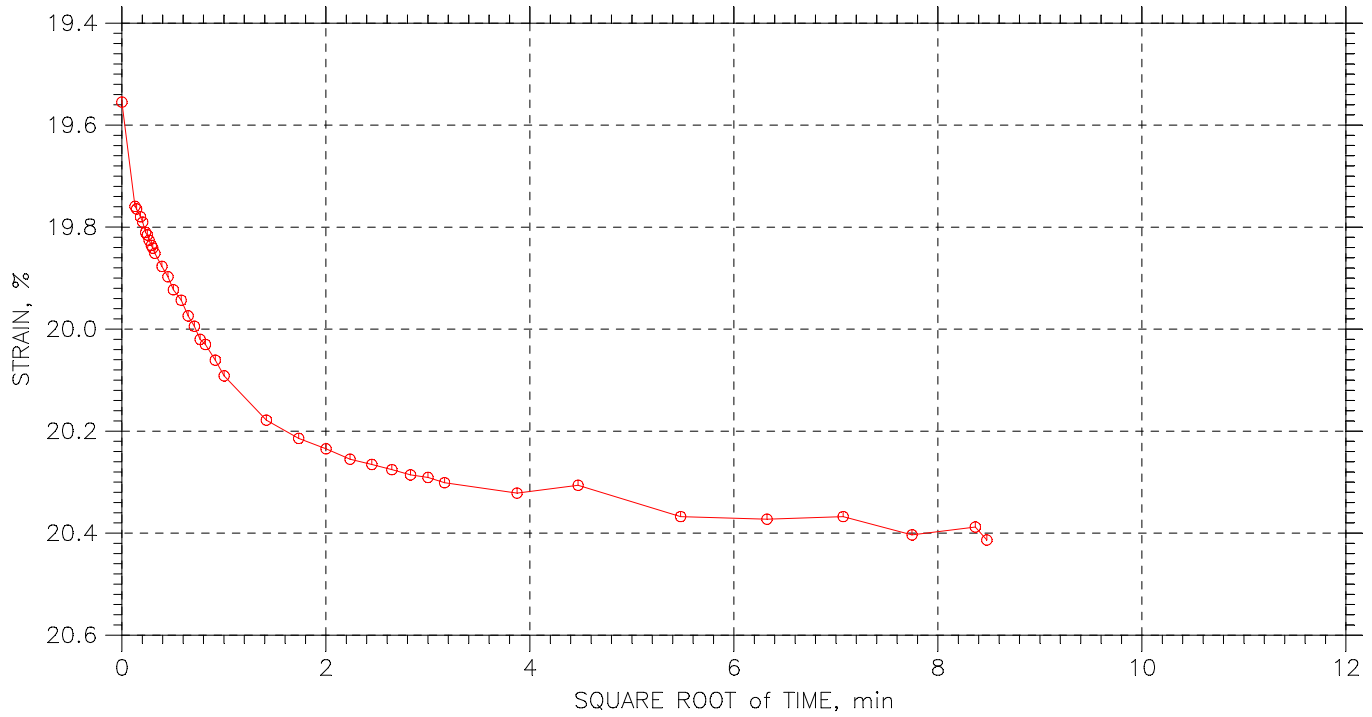
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 23 of 29

Stress: 10.25 tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-102	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/6/12	Depth: 15.0-17.0
Test No.: 244208	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

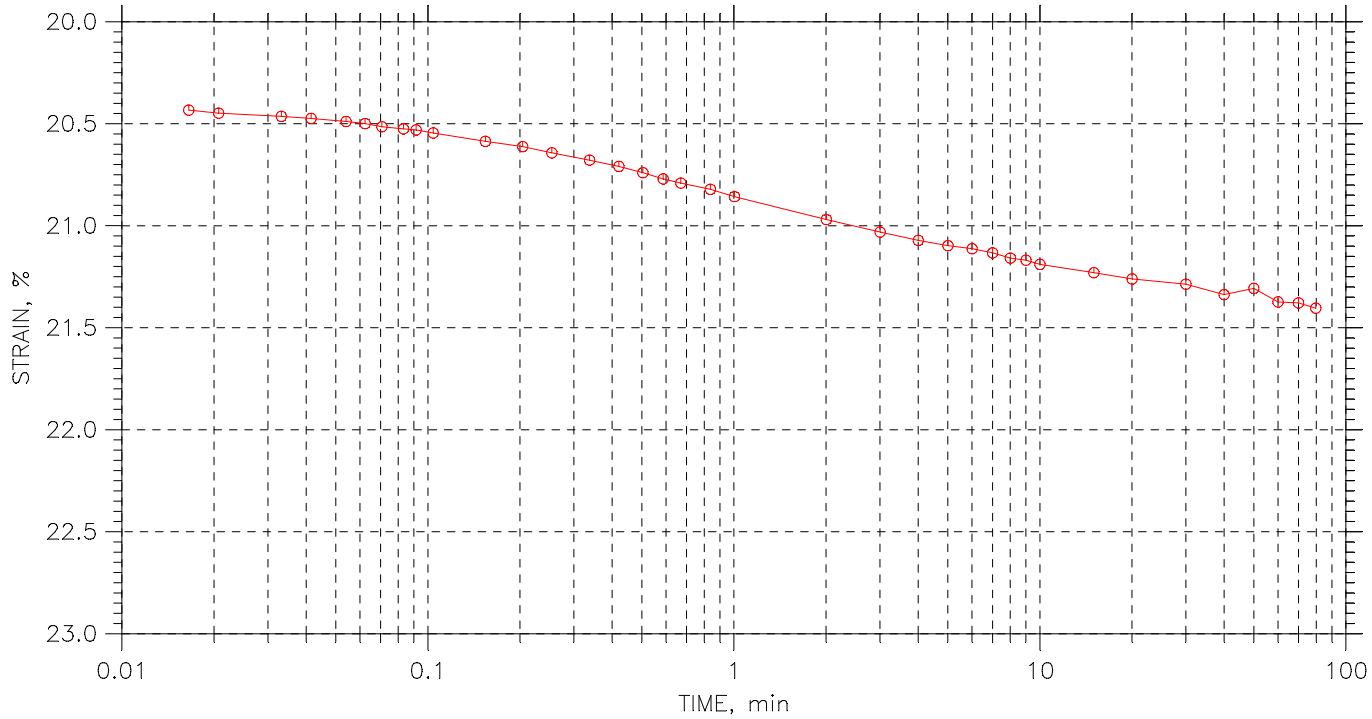
Thu, 16-AUG-2012 11:39:11

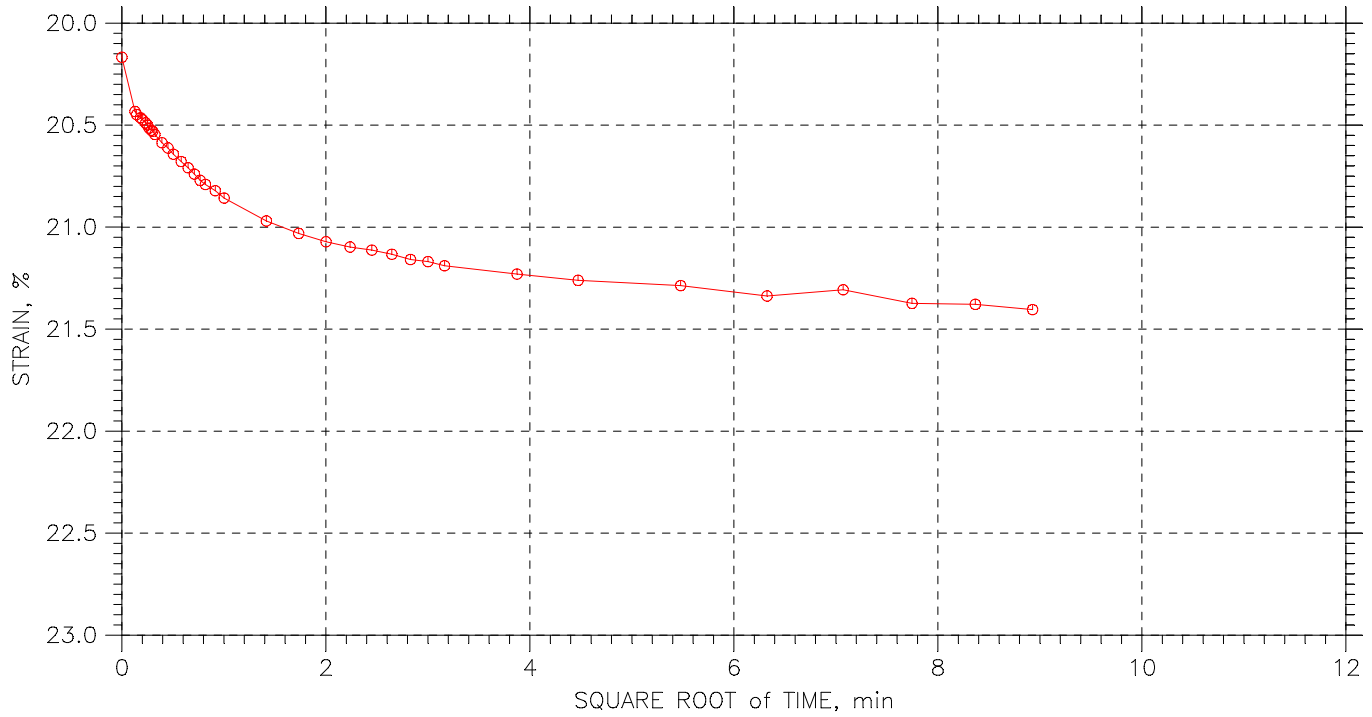
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 24 of 29

Stress: 15. tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-102	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/6/12	Depth: 15.0-17.0
Test No.: 244208	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

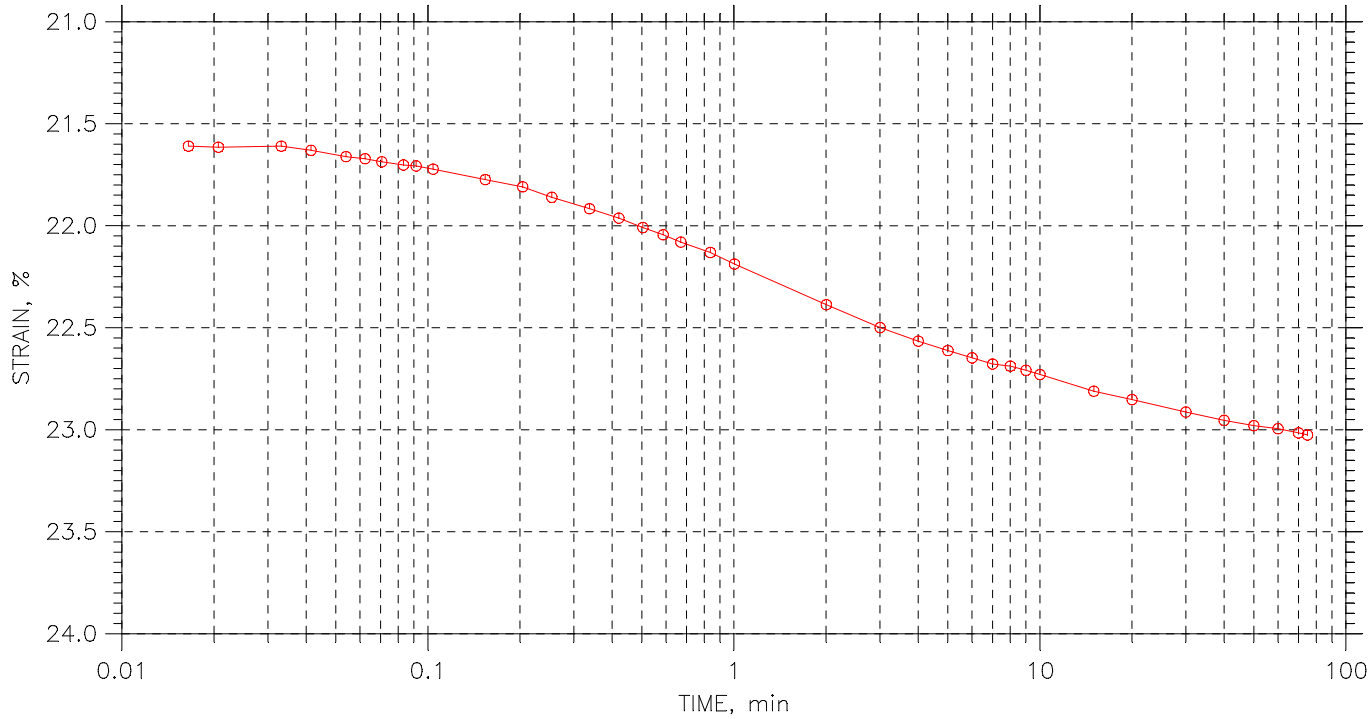
Thu, 16-AUG-2012 11:39:12

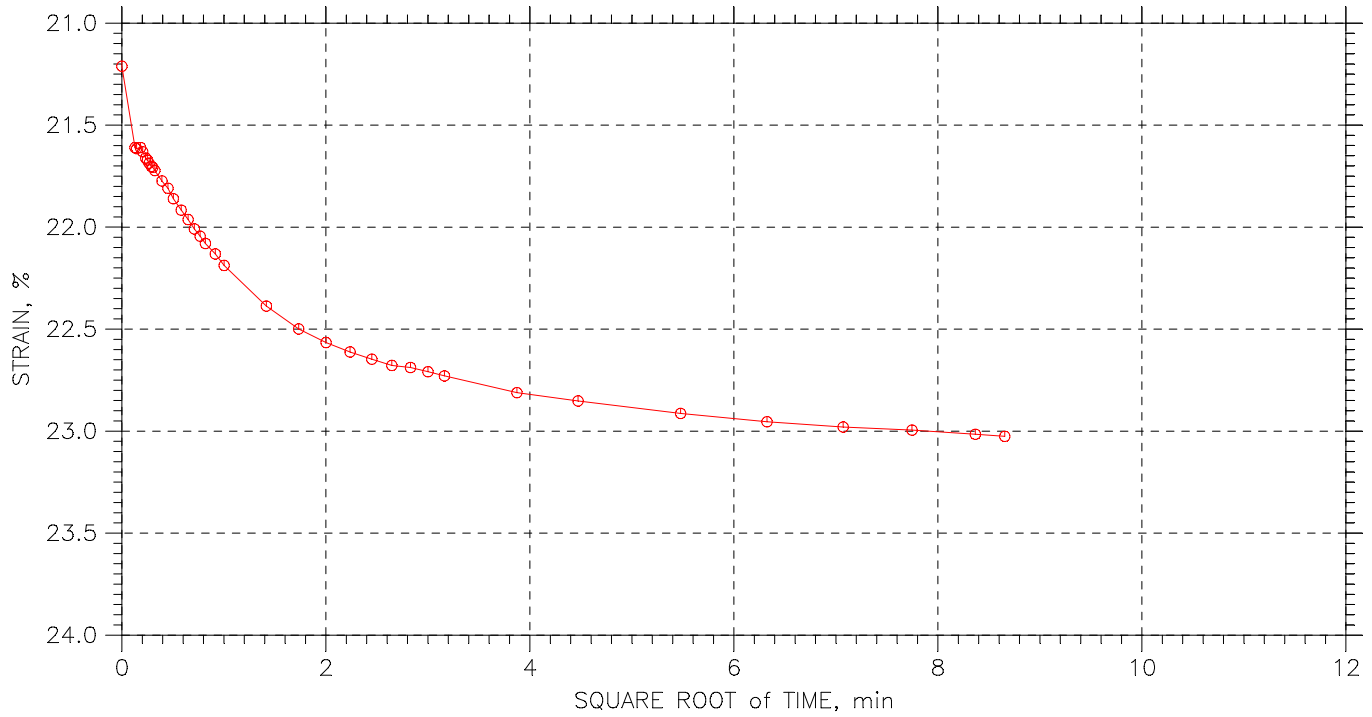
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 25 of 29

Stress: 22. tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-102	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/6/12	Depth: 15.0-17.0
Test No.: 244208	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

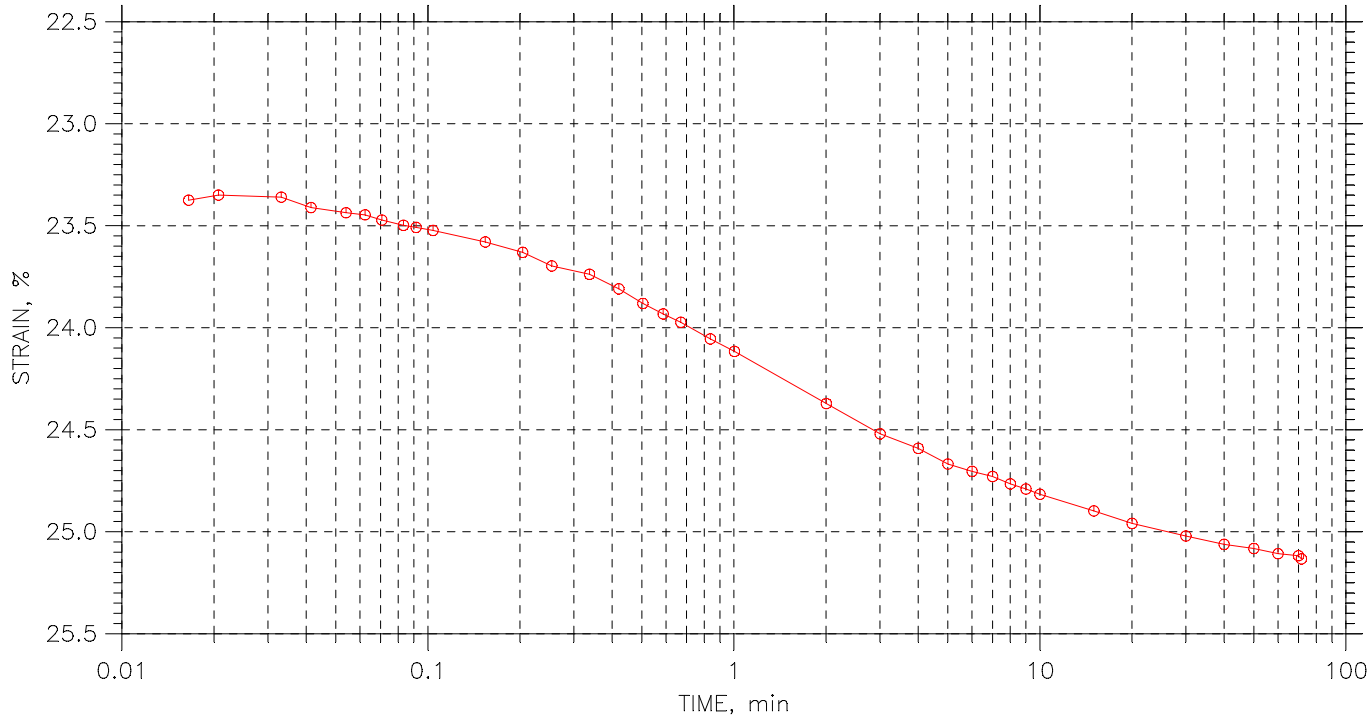
Thu, 16-AUG-2012 11:39:13

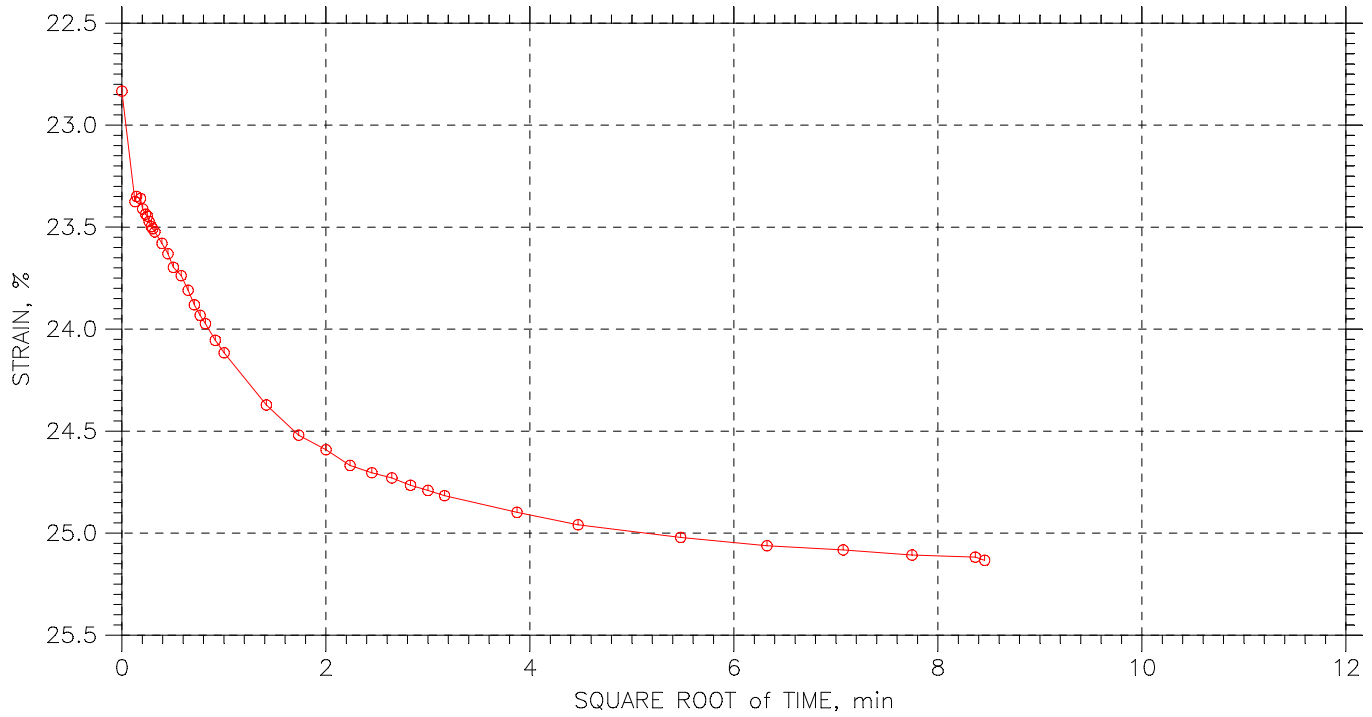
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 26 of 29

Stress: 32.25 tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-102	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/6/12	Depth: 15.0-17.0
Test No.: 244208	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

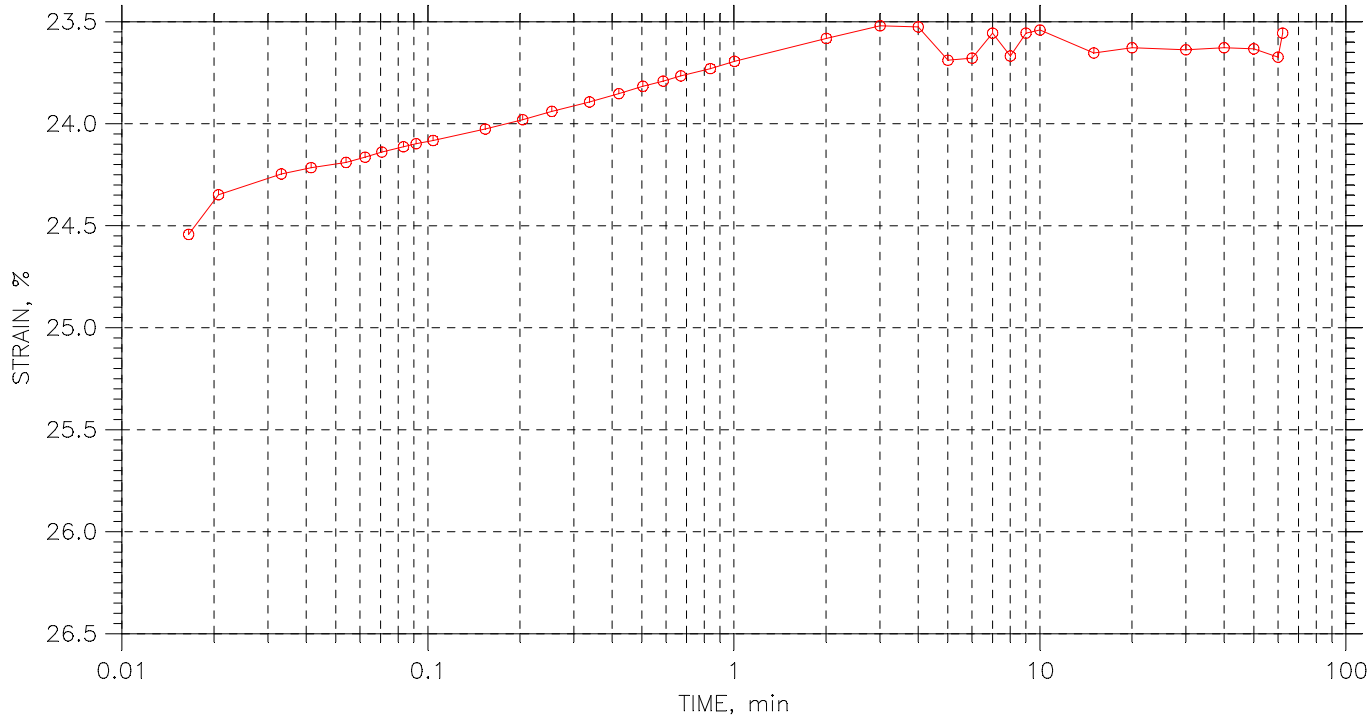
Thu, 16-AUG-2012 11:39:13

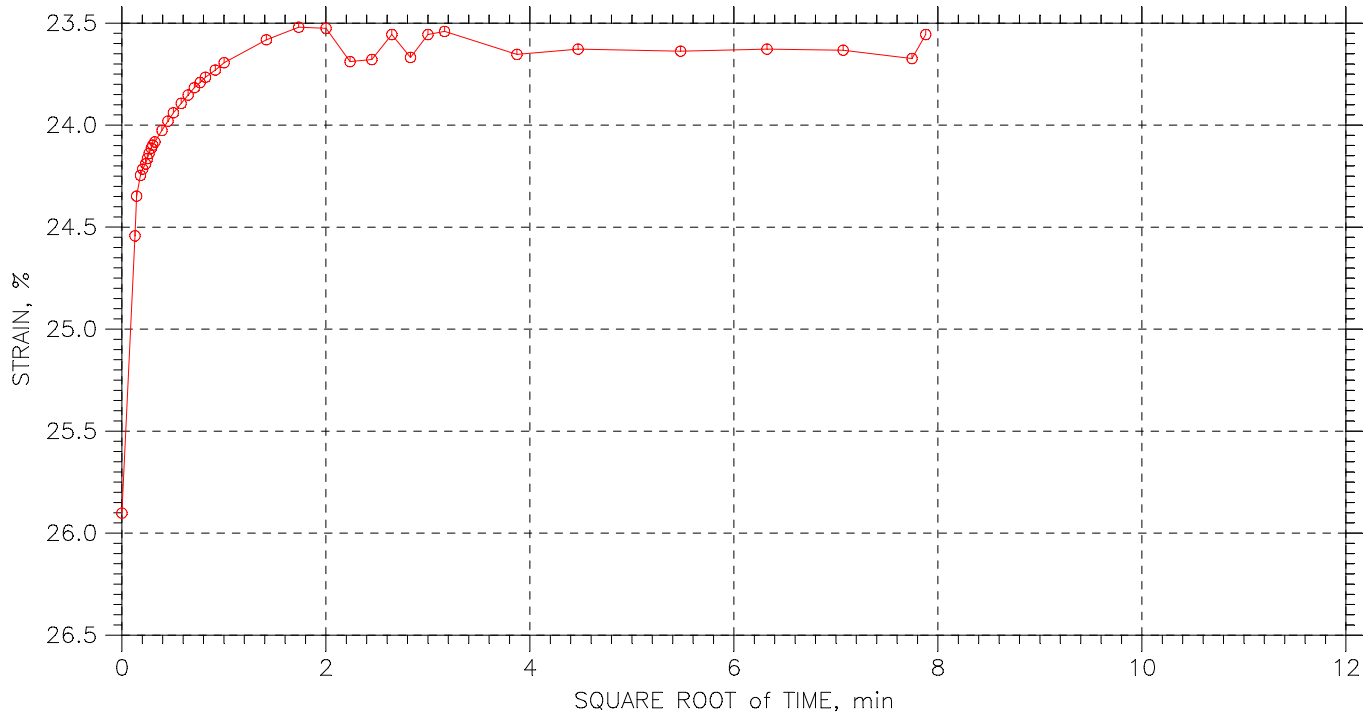
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 27 of 29

Stress: 7. tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-102	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/6/12	Depth: 15.0-17.0
Test No.: 244208	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

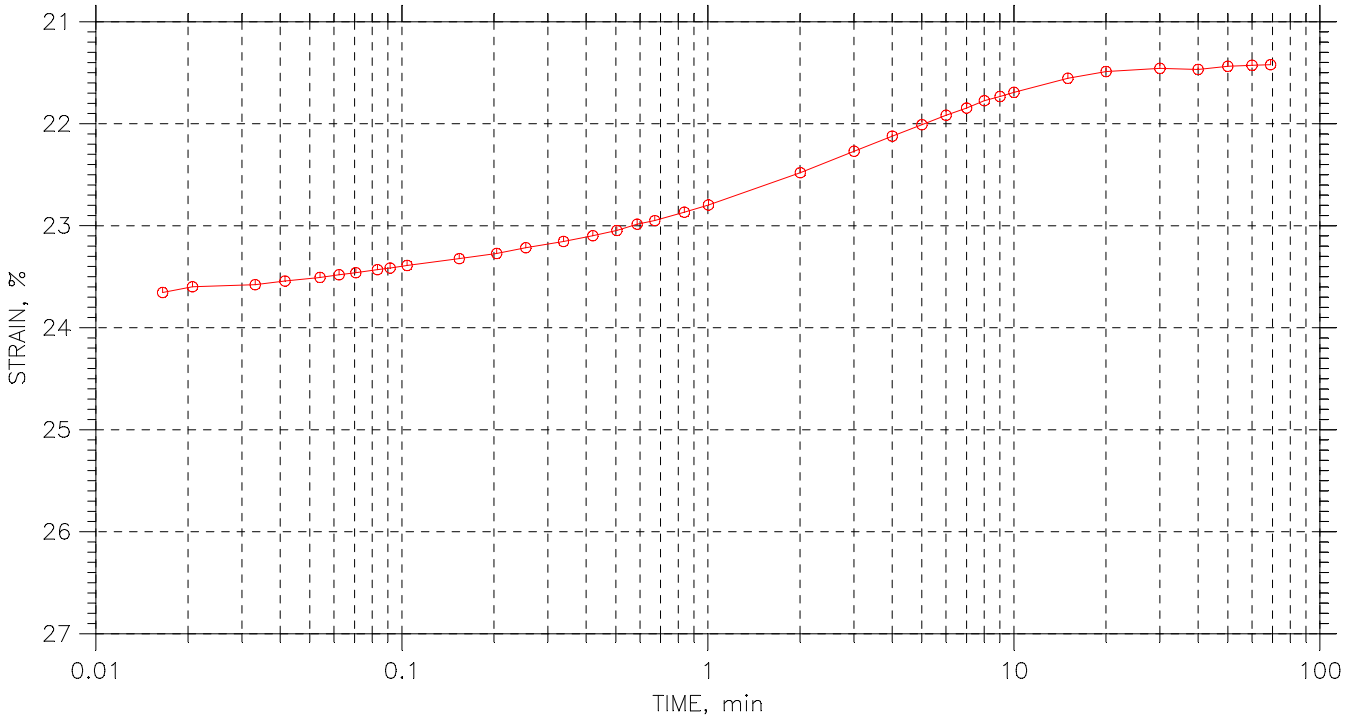
Thu, 16-AUG-2012 11:39:14

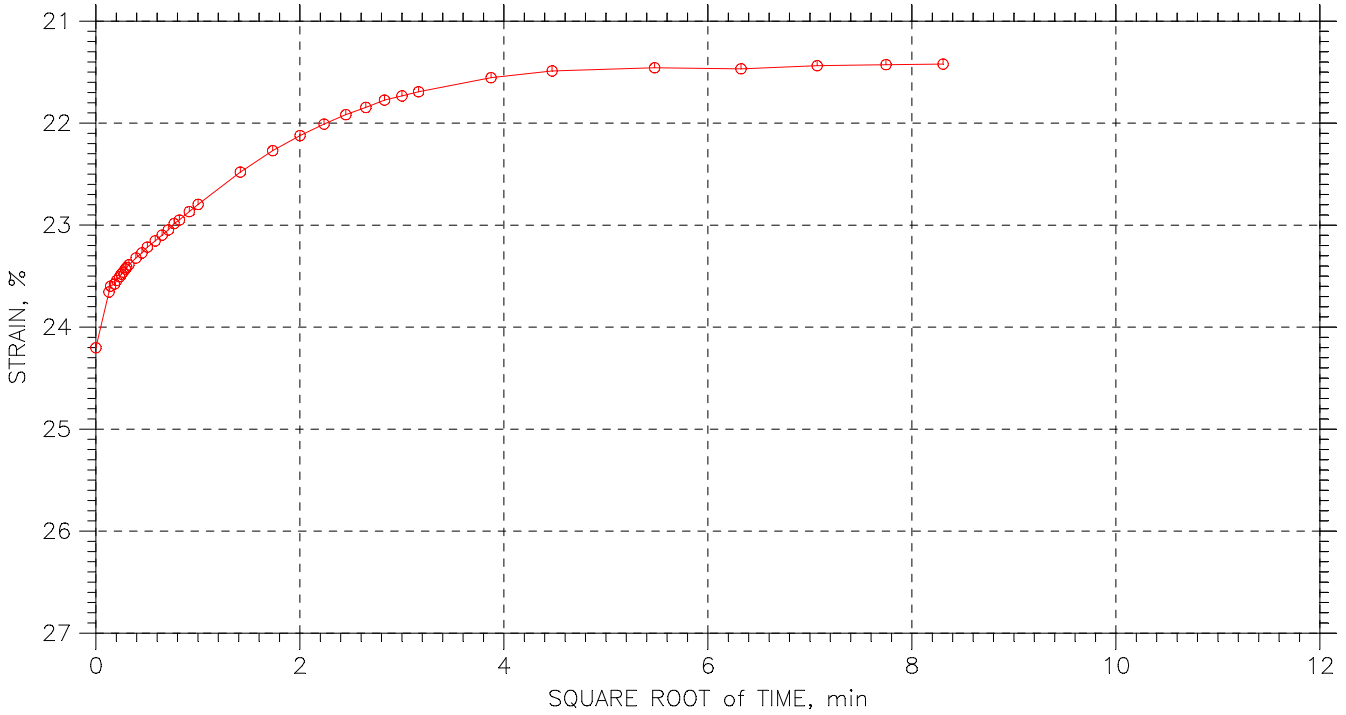
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 28 of 29

Stress: 1. tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-102	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/6/12	Depth: 15.0-17.0
Test No.: 244208	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

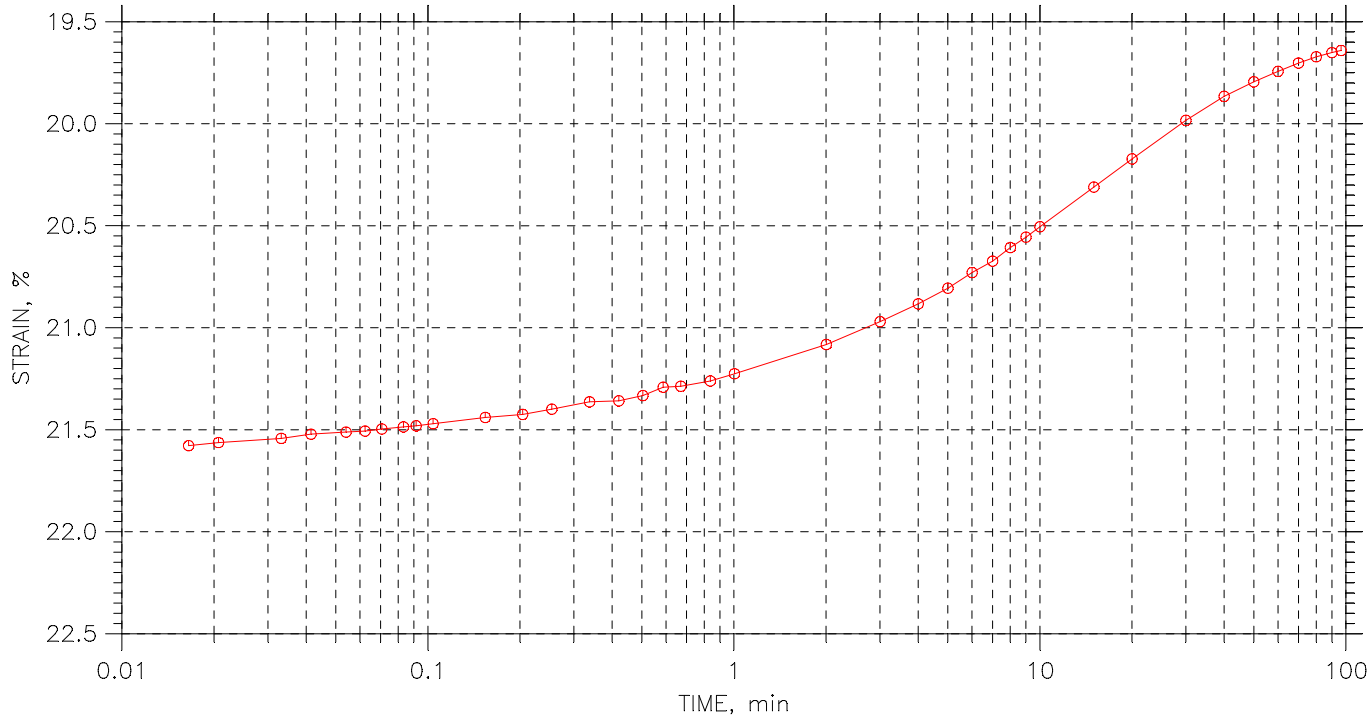
Thu, 16-AUG-2012 11:39:15

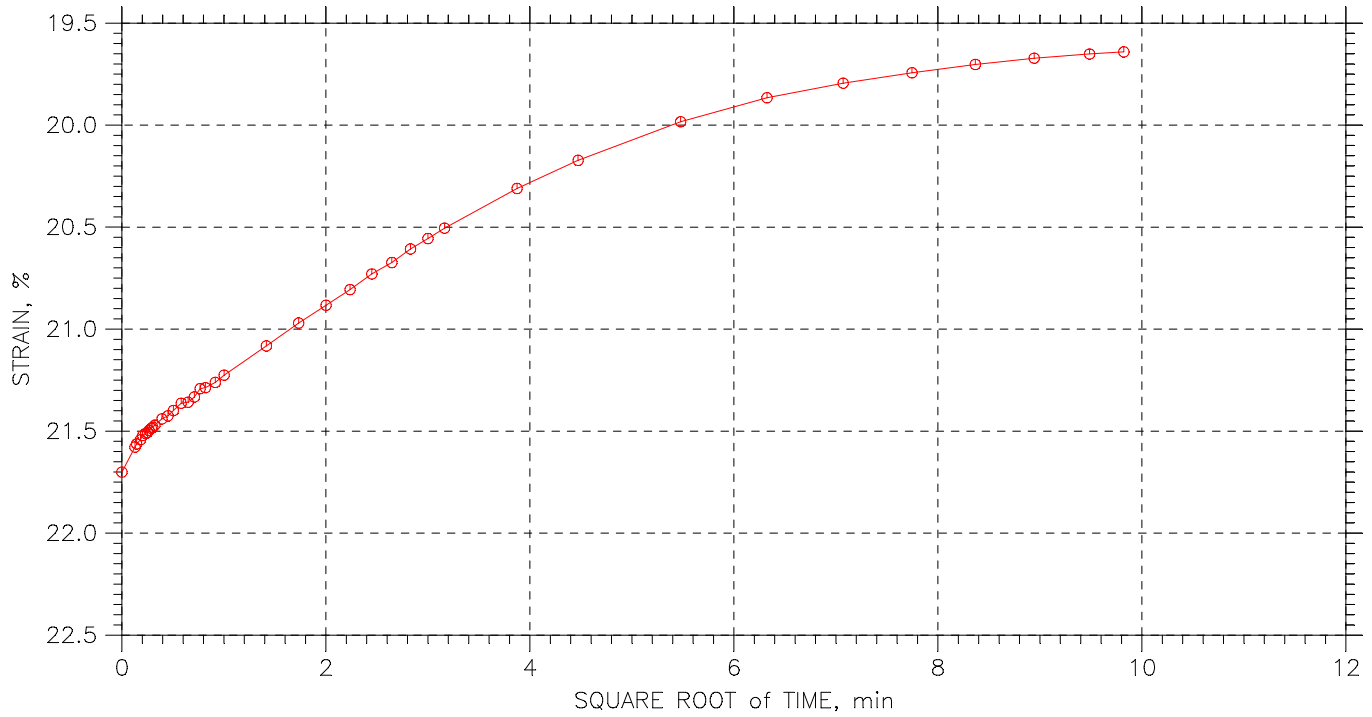
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 29 of 29

Stress: 0.25 tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-102	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/6/12	Depth: 15.0-17.0
Test No.: 244208	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

Thu, 16-AUG-2012 11:39:15

Maine DOT, Materials Testing & Exploration, 219 Hogan Road, Bangor, Maine 04401

GEOTECHNICAL TEST REPORT
Central Laboratory

SAMPLE INFORMATION

Reference No.	Boring No./Sample No.	Sample Description	Sampled	Received
244206	**BB-BWA-102/2D**	**GEOTECHNICAL (DISTURBED)**	**7/17/2012**	**7/25/2012**

Sample Type: **GEOTECHNICAL** Location: **OTHER** Station: **TBD** Offset, ft: Dbfg, ft: **3.0-5.0**

WIN/Town **019311.00 - BANGOR** Sampler: **GIGUERE, ERVIN M**

TEST RESULTS

Sieve Analysis (T 88)

Wash Method

SIEVE SIZE U.S. [SI]	% Passing
3 in. [75.0 mm]	**100.0**
1 in. [25.0 mm]	**85.2**
¾ in. [19.0 mm]	**71.3**
½ in. [12.5 mm]	**63.4**
⅜ in. [9.5 mm]	**58.2**
¼ in. [6.3 mm]	**53.6**
No. 4 [4.75 mm]	**49.5**
No. 10 [2.00 mm]	**36.9**
No. 20 [0.850 mm]	
No. 40 [0.425 mm]	**20.6**
No. 60 [0.250 mm]	
No. 100 [0.150 mm]	
No. 200 [0.075 mm]	**12.0**
[0.0335 mm]	**11.5**
[0.0214 mm]	**10.4**
[0.0125 mm]	**9.2**
[0.0089 mm]	**8.0**
[0.0064 mm]	**6.9**
[0.0032 mm]	**4.6**
[0.0013 mm]	**2.3**

Direct Shear (T 236)

Shear Angle, °			
Initial Water Content, %			
Normal Stress, psi			
Wet Density, lbs/ft³			
Dry Density, lbs/ft³			
Specimen Thickness, in			

Consolidation (T 216)

Trimmings, Water Content, %

	Initial	Final		Void Ratio	% Strain
Water Content, %			Pmin		
Dry Density, lbs/ft³			Pp		
Void Ratio			Pmax		
Saturation, %			Cc/C'c		

Miscellaneous Tests

Liquid Limit @ 25 blows (T 89), %

Plastic Limit (T 90), %

Plasticity Index (T 90), %

Specific Gravity, Corrected to 20°C (T 100): **2.77**

Loss on Ignition (T 267)

Loss, %	H2O, %

Water Content (T 265), %: **5.2**

Vane Shear Test on Shelby Tubes (Maine DOT)

Depth taken in tube, ft	3 In.		6 In.		Water Content, %	Description of Material Sampled at the Various Tube Depths
	U. Shear tons/ft²	Remold tons/ft²	U. Shear tons/ft²	Remold tons/ft²		

Comments:

AUTHORIZATION AND DISTRIBUTION

Reported by: **FOGG, BRIAN** Date Reported: **8/2/2012**

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Maine DOT, Materials Testing & Exploration, 219 Hogan Road, Bangor, Maine 04401

GEOTECHNICAL TEST REPORT
Central Laboratory

SAMPLE INFORMATION

Reference No.	Boring No./Sample No.	Sample Description	Sampled	Received
244207	**BB-BWA-102/3DA**	**GEOTECHNICAL (DISTURBED)**	**7/17/2012**	**7/25/2012**

Sample Type: **GEOTECHNICAL** Location: **OTHER** Station: **TBD** Offset, ft: Dbfg, ft: **6.0-7.0**

WIN/Town **019311.00 - BANGOR** Sampler: **GIGUERE, ERVIN M**

TEST RESULTS

Sieve Analysis (T 88)

Wash Method

SIEVE SIZE U.S. [SI]	% Passing
3 in. [75.0 mm]	
1 in. [25.0 mm]	**100.0**
¾ in. [19.0 mm]	**95.6**
½ in. [12.5 mm]	**88.2**
⅜ in. [9.5 mm]	**82.8**
¼ in. [6.3 mm]	**75.0**
No. 4 [4.75 mm]	**67.8**
No. 10 [2.00 mm]	**49.7**
No. 20 [0.850 mm]	
No. 40 [0.425 mm]	**30.8**
No. 60 [0.250 mm]	
No. 100 [0.150 mm]	
No. 200 [0.075 mm]	**17.3**
[0.0355 mm]	**16.2**
[0.0226 mm]	**14.7**
[0.0132 mm]	**13.2**
[0.0094 mm]	**11.8**
[0.0068 mm]	**8.8**
[0.0033 mm]	**5.9**
[0.0013 mm]	**4.4**

Direct Shear (T 236)

Shear Angle, °			
Initial Water Content, %			
Normal Stress, psi			
Wet Density, lbs/ft³			
Dry Density, lbs/ft³			
Specimen Thickness, in			

Consolidation (T 216)

Trimmings, Water Content, %

	Initial	Final		Void Ratio	% Strain
Water Content, %			Pmin		
Dry Density, lbs/ft³			Pp		
Void Ratio			Pmax		
Saturation, %			Cc/C'c		

Miscellaneous Tests

Liquid Limit @ 25 blows (T 89), %

Plastic Limit (T 90), %

Plasticity Index (T 90), %

Specific Gravity, Corrected to 20°C (T 100): **2.68**

Loss on Ignition (T 267)

Loss, %	H2O, %

Water Content (T 265), %: **12.5**

Vane Shear Test on Shelby Tubes (Maine DOT)

Depth taken in tube, ft	3 In.		6 In.		Water Content, %	Description of Material Sampled at the Various Tube Depths
	U. Shear tons/ft²	Remold tons/ft²	U. Shear tons/ft²	Remold tons/ft²		

Comments:

AUTHORIZATION AND DISTRIBUTION

Reported by: **FOGG, BRIAN** Date Reported: **8/2/2012**

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Maine DOT, Materials Testing & Exploration, 219 Hogan Road, Bangor, Maine 04401

GEOTECHNICAL TEST REPORT
Central Laboratory

SAMPLE INFORMATION

Reference No.	Boring No./Sample No.	Sample Description	Sampled	Received
244209	**BB-BWA-102/4D**	**GEOTECHNICAL (DISTURBED)**	**7/17/2012**	**7/25/2012**

Sample Type: **GEOTECHNICAL** Location: **OTHER** Station: **TBD** Offset, ft: Dbfg, ft: **9.0-11.0**

WIN/Town **019311.00 - BANGOR** Sampler: **GIGUERE, ERVIN M**

TEST RESULTS

Sieve Analysis (T 27)

Wash Method

SIEVE SIZE U.S. [SI]	% Passing
3 in. [75.0 mm]	
1 in. [25.0 mm]	
¾ in. [19.0 mm]	
½ in. [12.5 mm]	
⅜ in. [9.5 mm]	
¼ in. [6.3 mm]	
No. 4 [4.75 mm]	
No. 10 [2.00 mm]	
No. 20 [0.850 mm]	
No. 40 [0.425 mm]	
No. 60 [0.250 mm]	
No. 100 [0.150 mm]	
No. 200 [0.075 mm]	

Direct Shear (T 236)

Shear Angle, °			
Initial Water Content, %			
Normal Stress, psi			
Wet Density, lbs/ft³			
Dry Density, lbs/ft³			
Specimen Thickness, in			

Consolidation (T 216)

Trimmings, Water Content, %

	Initial	Final		Void Ratio	% Strain
Water Content, %			Pmin		
Dry Density, lbs/ft³			Pp		
Void Ratio			Pmax		
Saturation, %			Cc/C'c		

Miscellaneous Tests

Liquid Limit @ 25 blows (T 89), %: **27**

Plastic Limit (T 90), %: **19**

Plasticity Index (T 90), %: **8**

Specific Gravity, Corrected to 20°C (T 100):

Loss on Ignition (T 267)

Loss, %	H2O, %

Water Content (T 265), %: **31.7**

Vane Shear Test on Shelby Tubes (Maine DOT)

Depth taken in tube, ft	3 In.		6 In.		Water Content, %	Description of Material Sampled at the Various Tube Depths
	U. Shear tons/ft²	Remold tons/ft²	U. Shear tons/ft²	Remold tons/ft²		

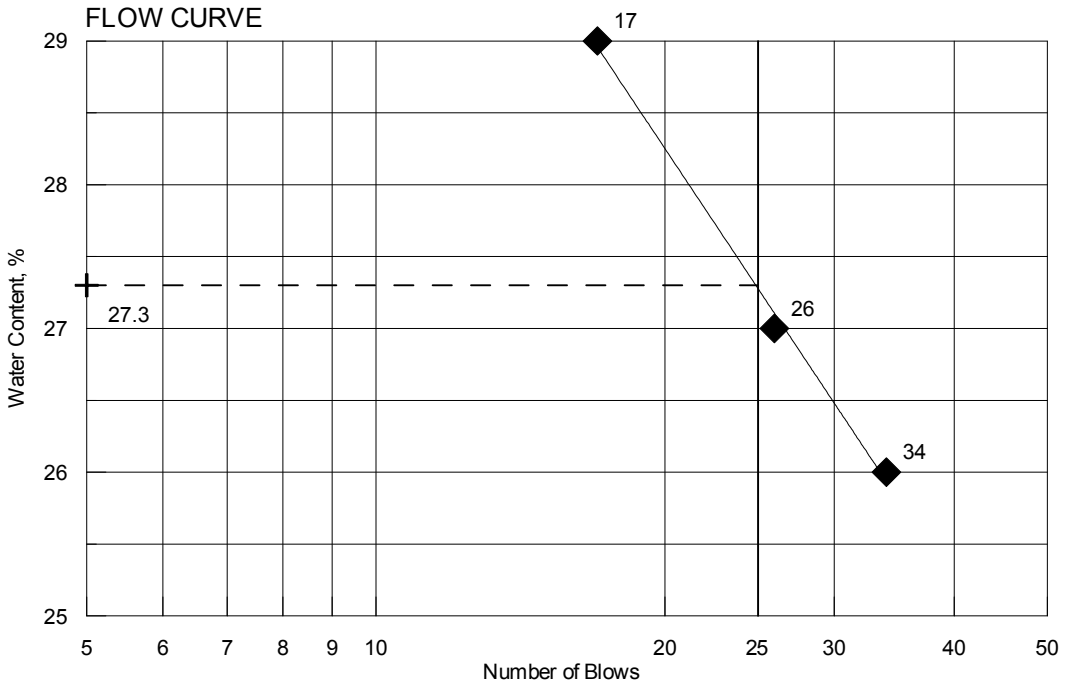
Comments:

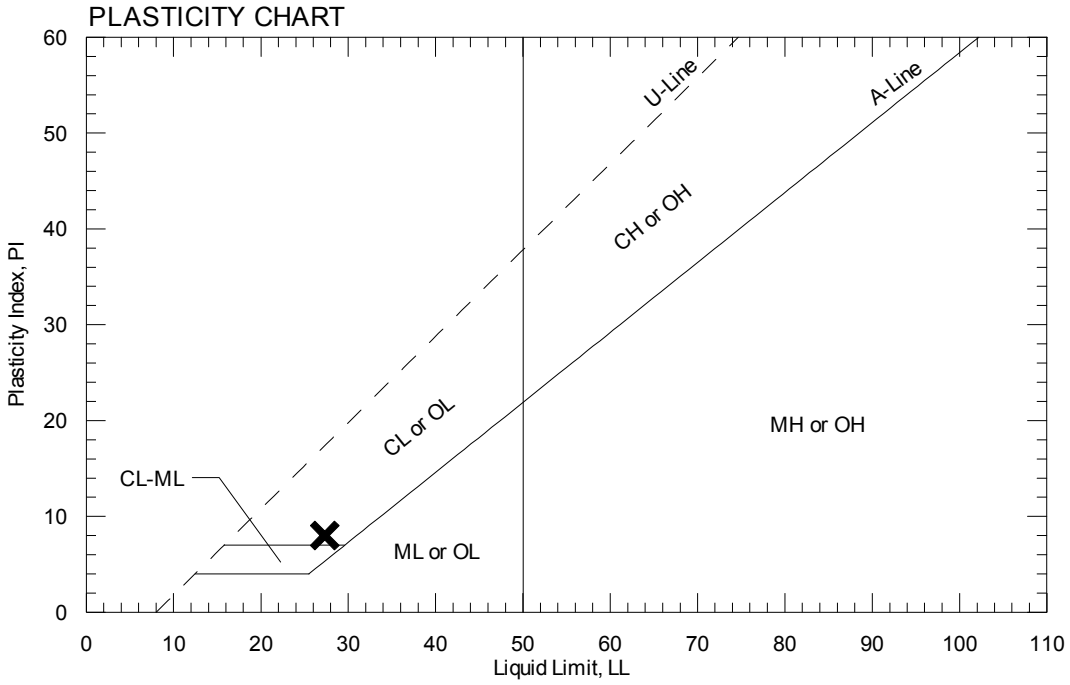
AUTHORIZATION AND DISTRIBUTION

Reported by: **FOGG, BRIAN** Date Reported: **8/6/2012**

Paper Copy: Lab File; Project File; Geotech File

TOWN	Bangor	Reference No.	244209
WIN	019311.00	Water Content, %	31.7
Sampled	7/17/2012	Liquid Limit @ 25 blows (T 89), %	27
Boring No./Sample No.	BB-BWA-102/4D	Plastic Limit (T 90), %	19
Station	TBD	Plasticity Index (T 90), %	8
Depth	9.0-11.0	Tested By	BBURR





Maine DOT, Materials Testing & Exploration, 219 Hogan Road, Bangor, Maine 04401

GEOTECHNICAL TEST REPORT
Central Laboratory

SAMPLE INFORMATION

Reference No.	Boring No./Sample No.	Sample Description	Sampled	Received
244210	**BB-BWA-102/5D**	**GEOTECHNICAL (DISTURBED)**	**7/17/2012**	**7/25/2012**

Sample Type: **GEOTECHNICAL** Location: **OTHER** Station: **TBD** Offset, ft: Dbfg, ft: **11.0-13.0**

WIN/Town **019311.00 - BANGOR** Sampler: **GIGUERE, ERVIN M**

TEST RESULTS

Sieve Analysis (T 27)

Wash Method

SIEVE SIZE U.S. [SI]	% Passing
3 in. [75.0 mm]	
1 in. [25.0 mm]	
¾ in. [19.0 mm]	
½ in. [12.5 mm]	
⅜ in. [9.5 mm]	
¼ in. [6.3 mm]	
No. 4 [4.75 mm]	
No. 10 [2.00 mm]	
No. 20 [0.850 mm]	
No. 40 [0.425 mm]	
No. 60 [0.250 mm]	
No. 100 [0.150 mm]	
No. 200 [0.075 mm]	
[mm]	
[mm]	
[mm]	
[mm]	
[mm]	
[mm]	
[mm]	

Direct Shear (T 236)

Shear Angle, °			
Initial Water Content, %			
Normal Stress, psi			
Wet Density, lbs/ft³			
Dry Density, lbs/ft³			
Specimen Thickness, in			

Consolidation (T 216)

Trimmings, Water Content, %

	Initial	Final		Void Ratio	% Strain
Water Content, %			Pmin		
Dry Density, lbs/ft³			Pp		
Void Ratio			Pmax		
Saturation, %			Cc/C'c		

Miscellaneous Tests

Liquid Limit @ 25 blows (T 89), %: **31**

Plastic Limit (T 90), %: **19**

Plasticity Index (T 90), %: **12**

Specific Gravity, Corrected to 20°C (T 100):

Loss on Ignition (T 267)

Loss, %	H2O, %

Water Content (T 265), %: **31.0**

Vane Shear Test on Shelby Tubes (Maine DOT)

Depth taken in tube, ft	3 In.		6 In.		Water Content, %	Description of Material Sampled at the Various Tube Depths
	U. Shear tons/ft²	Remold tons/ft²	U. Shear tons/ft²	Remold tons/ft²		

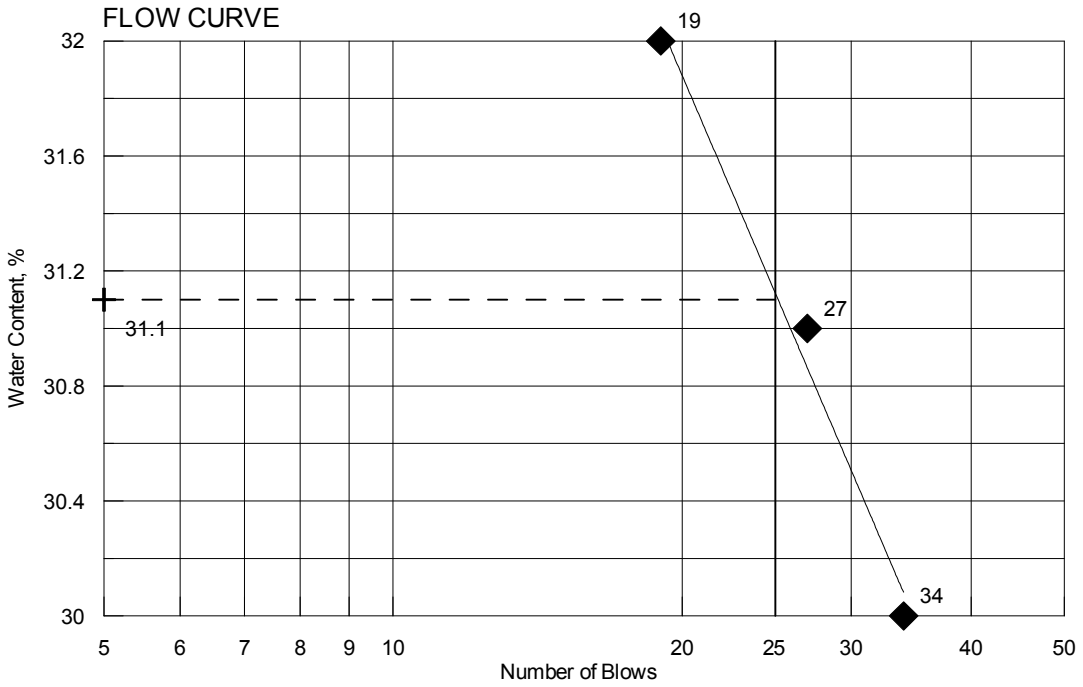
Comments:

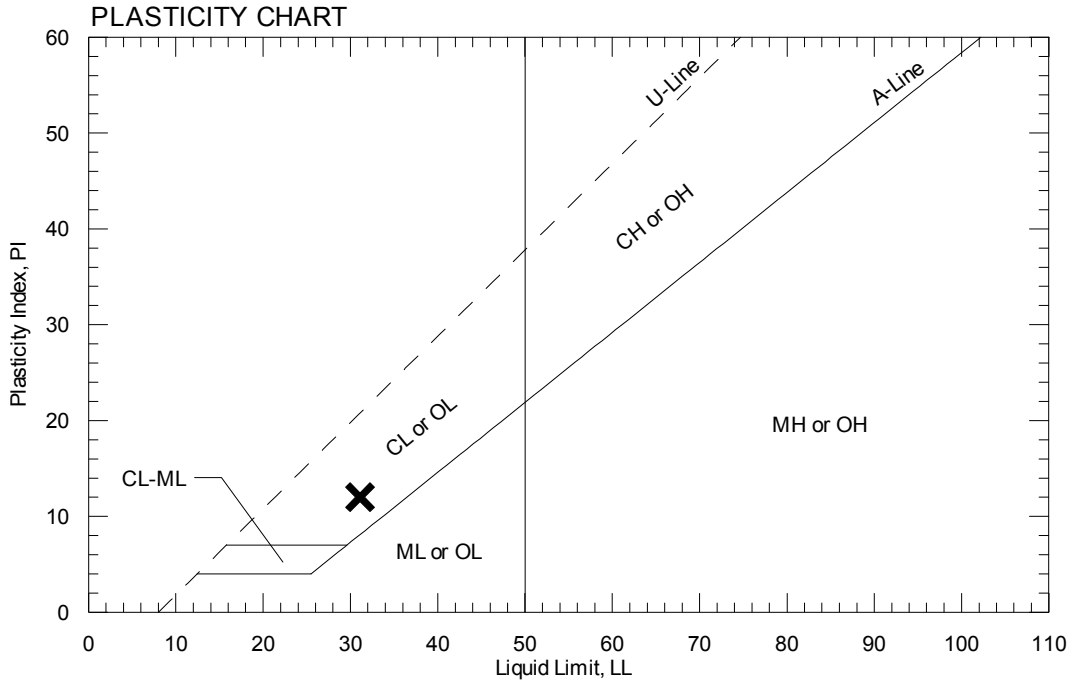
AUTHORIZATION AND DISTRIBUTION

Reported by: **FOGG, BRIAN** Date Reported: **8/6/2012**

Paper Copy: Lab File; Project File; Geotech File

TOWN	Bangor	Reference No.	244210
WIN	019311.00	Water Content, %	31
Sampled	7/17/2012	Liquid Limit @ 25 blows (T 89), %	31
Boring No./Sample No.	BB-BWA-102/5D	Plastic Limit (T 90), %	19
Station	TBD	Plasticity Index (T 90), %	12
Depth	11.0-13.0	Tested By	BBURR





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GEOTECHNICAL TEST REPORT
Central Laboratory

SAMPLE INFORMATION

Reference No.	Boring No./Sample No.	Sample Description	Sampled	Received
244211	**BB-BWA-102/6D**	**GEOTECHNICAL (DISTURBED)**	**7/17/2012**	**7/25/2012**

Sample Type: **GEOTECHNICAL** Location: **OTHER** Station: **TBD** Offset, ft: Dbfg, ft: **13.0-15.0**

WIN/Town **019311.00 - BANGOR** Sampler: **GIGUERE, ERVIN M**

TEST RESULTS

Sieve Analysis (T 27)

Wash Method

SIEVE SIZE U.S. [SI]	% Passing
3 in. [75.0 mm]	
1 in. [25.0 mm]	
¾ in. [19.0 mm]	
½ in. [12.5 mm]	
⅜ in. [9.5 mm]	
¼ in. [6.3 mm]	
No. 4 [4.75 mm]	
No. 10 [2.00 mm]	
No. 20 [0.850 mm]	
No. 40 [0.425 mm]	
No. 60 [0.250 mm]	
No. 100 [0.150 mm]	
No. 200 [0.075 mm]	

Direct Shear (T 236)

Shear Angle, °			
Initial Water Content, %			
Normal Stress, psi			
Wet Density, lbs/ft³			
Dry Density, lbs/ft³			
Specimen Thickness, in			

Consolidation (T 216)

Trimmings, Water Content, %

	Initial	Final		Void Ratio	% Strain
Water Content, %			Pmin		
Dry Density, lbs/ft³			Pp		
Void Ratio			Pmax		
Saturation, %			Cc/C'c		

Miscellaneous Tests

Liquid Limit @ 25 blows (T 89), %: **25**

Plastic Limit (T 90), %: **17**

Plasticity Index (T 90), %: **8**

Specific Gravity, Corrected to 20°C (T 100):

Loss on Ignition (T 267)

Loss, %	H2O, %

Water Content (T 265), %: **29.5**

Vane Shear Test on Shelby Tubes (Maine DOT)

Depth taken in tube, ft	3 In.		6 In.		Water Content, %	Description of Material Sampled at the Various Tube Depths
	U. Shear tons/ft²	Remold tons/ft²	U. Shear tons/ft²	Remold tons/ft²		

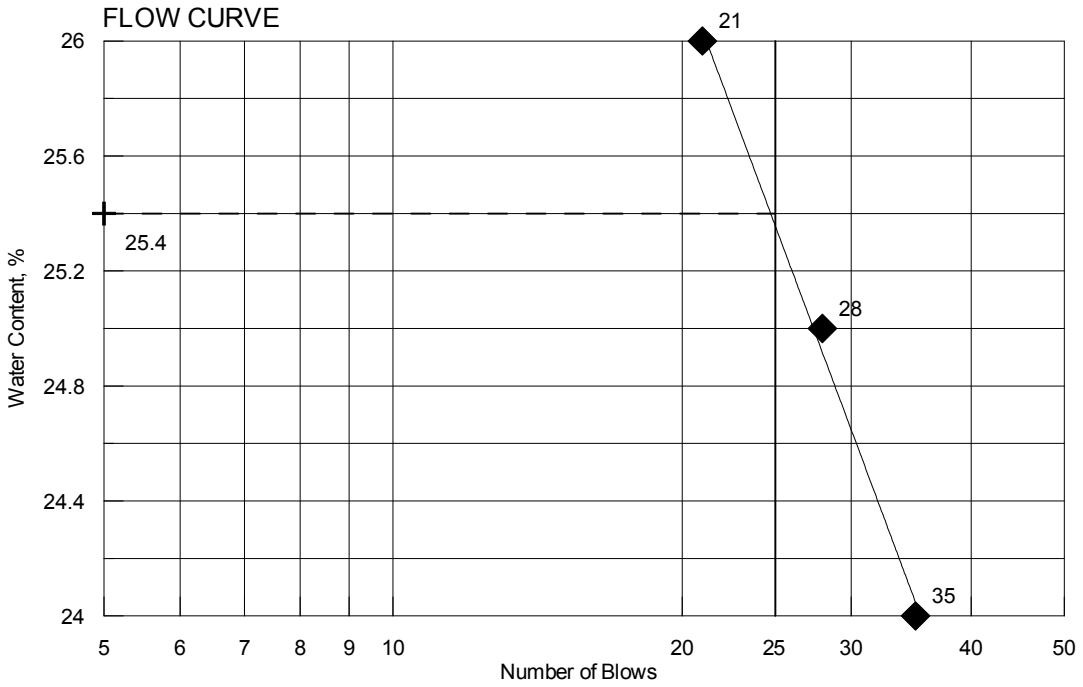
Comments:

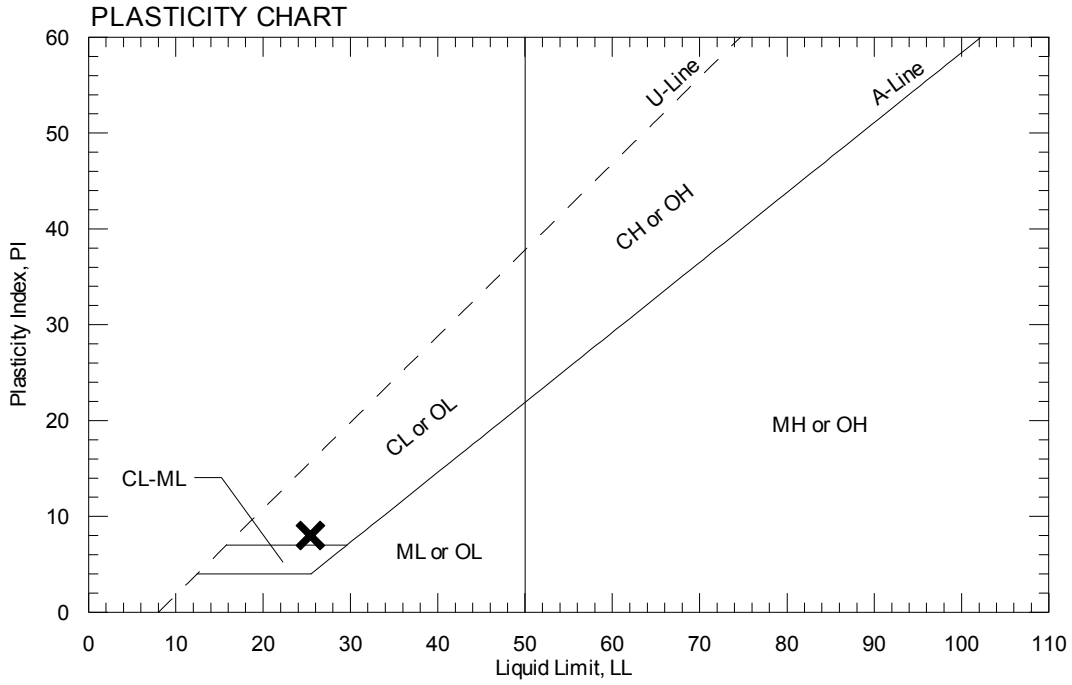
AUTHORIZATION AND DISTRIBUTION

Reported by: **FOGG, BRIAN** Date Reported: **8/6/2012**

Paper Copy: Lab File; Project File; Geotech File

TOWN	Bangor	Reference No.	244211
WIN	019311.00	Water Content, %	29.5
Sampled	7/17/2012	Liquid Limit @ 25 blows (T 89), %	25
Boring No./Sample No.	BB-BWA-102/6D	Plastic Limit (T 90), %	17
Station	TBD	Plasticity Index (T 90), %	8
Depth	13.0-15.0	Tested By	BBURR





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GEOTECHNICAL TEST REPORT
Central Laboratory

SAMPLE INFORMATION

Reference No.	Boring No./Sample No.	Sample Description	Sampled	Received
244213	**BB-BWA-102A/1**	**GEOTECHNICAL (DISTURBED)**	**7/17/2012**	**7/25/2012**

Sample Type: **GEOTECHNICAL** Location: **OTHER** Station: **TBD** Offset, ft: Dbfg, ft: **15.0-17.0**

WIN/Town **019311.00 - BANGOR** Sampler: **GIGUERE, ERVIN M**

TEST RESULTS

Sieve Analysis (T 27)

Wash Method

SIEVE SIZE U.S. [SI]	% Passing
3 in. [75.0 mm]	
1 in. [25.0 mm]	
¾ in. [19.0 mm]	
½ in. [12.5 mm]	
⅜ in. [9.5 mm]	
¼ in. [6.3 mm]	
No. 4 [4.75 mm]	
No. 10 [2.00 mm]	
No. 20 [0.850 mm]	
No. 40 [0.425 mm]	
No. 60 [0.250 mm]	
No. 100 [0.150 mm]	
No. 200 [0.075 mm]	

Direct Shear (T 236)

Shear Angle, °			
Initial Water Content, %			
Normal Stress, psi			
Wet Density, lbs/ft³			
Dry Density, lbs/ft³			
Specimen Thickness, in			

Consolidation (T 216)

Trimmings, Water Content, %

	Initial	Final		Void Ratio	% Strain
Water Content, %			Pmin		
Dry Density, lbs/ft³			Pp		
Void Ratio			Pmax		
Saturation, %			Cc/C'c		

Miscellaneous Tests

Liquid Limit @ 25 blows (T 89), %: **25**

Plastic Limit (T 90), %: **17**

Plasticity Index (T 90), %: **8**

Specific Gravity, Corrected to 20°C (T 100):

Loss on Ignition (T 267)

Loss, %	H2O, %

Water Content (T 265), %: **28.2**

Vane Shear Test on Shelby Tubes (Maine DOT)

Depth taken in tube, ft	3 In.		6 In.		Water Content, %	Description of Material Sampled at the Various Tube Depths
	U. Shear tons/ft²	Remold tons/ft²	U. Shear tons/ft²	Remold tons/ft²		

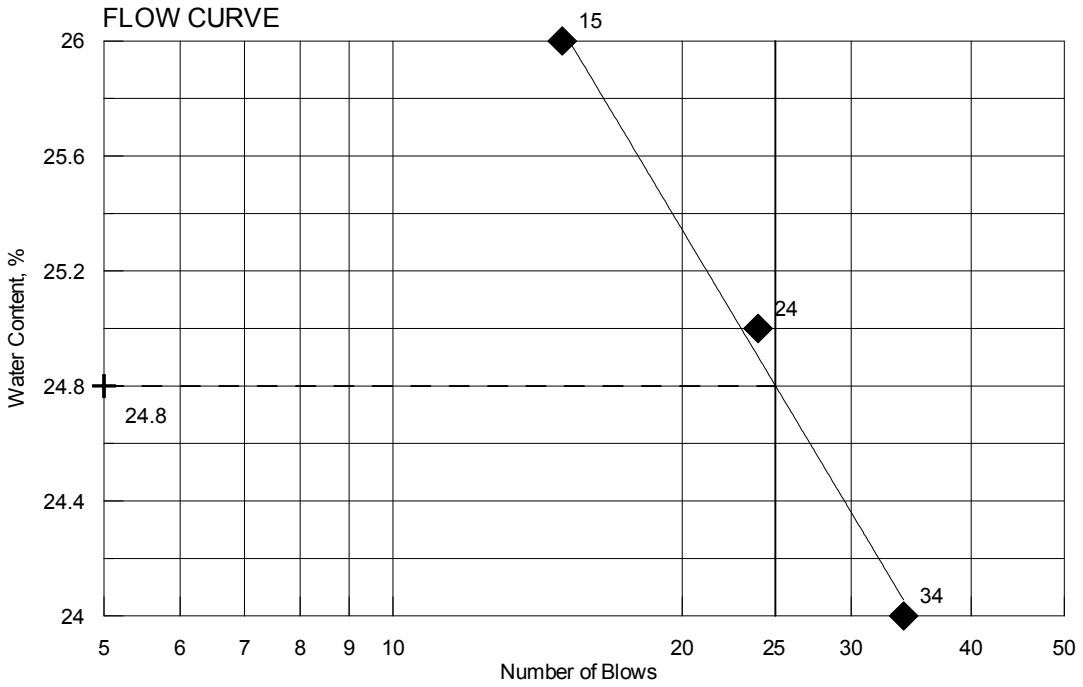
Comments:

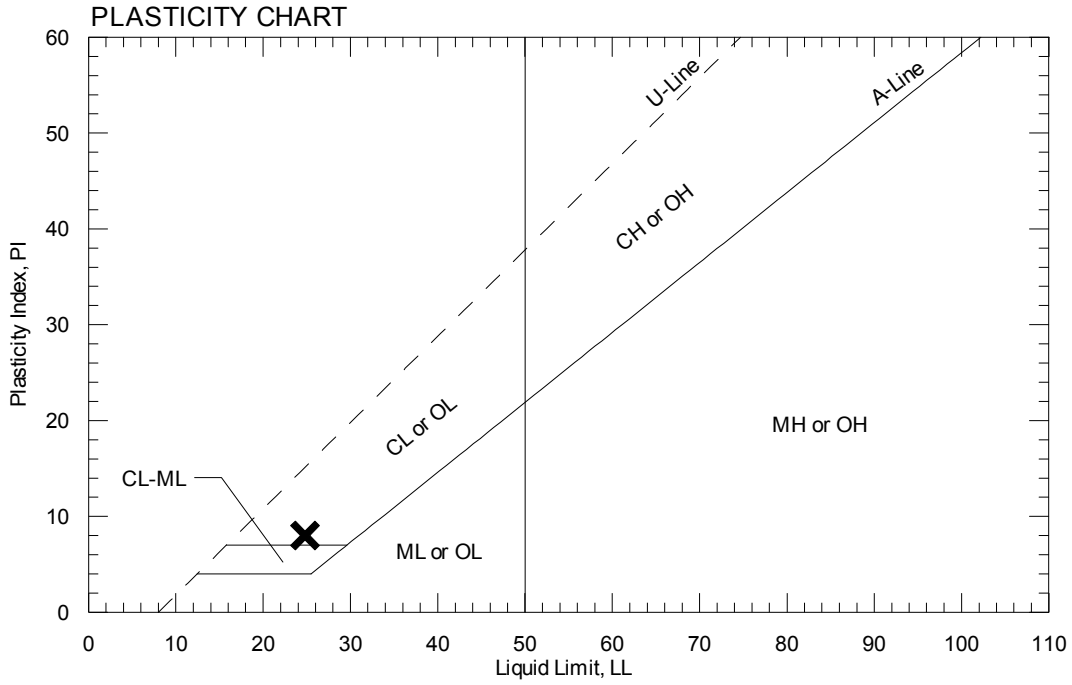
AUTHORIZATION AND DISTRIBUTION

Reported by: **FOGG, BRIAN** Date Reported: **8/6/2012**

Paper Copy: Lab File; Project File; Geotech File

TOWN	Bangor	Reference No.	244213
WIN	019311.00	Water Content, %	28.2
Sampled	7/17/2012	Liquid Limit @ 25 blows (T 89), %	25
Boring No./Sample No.	BB-BWA-102A/1	Plastic Limit (T 90), %	17
Station	TBD	Plasticity Index (T 90), %	8
Depth	15.0-17.0	Tested By	BBURR





Maine DOT, Materials Testing & Exploration, 219 Hogan Road, Bangor, Maine 04401

GEOTECHNICAL TEST REPORT
Central Laboratory

SAMPLE INFORMATION

Reference No.	Boring No./Sample No.	Sample Description	Sampled	Received
244212	**BB-BWA-102A/1U**	**GEOTECHNICAL (UNDISTURBED)**	**7/17/2012**	**7/25/2012**

Sample Type: **GEOTECHNICAL** Location: **OTHER** Station: **TBD** Offset, ft: Dbfg, ft: **7.0-9.0**

WIN/Town **019311.00 - BANGOR** Sampler: **GIGUERE, ERVIN M**

TEST RESULTS

Sieve Analysis (T 88)

Wash Method

SIEVE SIZE U.S. [SI]	% Passing
3 in. [75.0 mm]	
1 in. [25.0 mm]	
¾ in. [19.0 mm]	
½ in. [12.5 mm]	
⅜ in. [9.5 mm]	
¼ in. [6.3 mm]	**100.0**
No. 4 [4.75 mm]	**99.9**
No. 10 [2.00 mm]	**99.9**
No. 20 [0.850 mm]	
No. 40 [0.425 mm]	**99.8**
No. 60 [0.250 mm]	
No. 100 [0.150 mm]	
No. 200 [0.075 mm]	**99.7**
[0.0231 mm]	**48.9**
[0.0155 mm]	**44.7**
[0.0095 mm]	**39.2**
[0.0069 mm]	**36.4**
[0.0052 mm]	**30.8**
[0.0027 mm]	**25.2**
[0.0012 mm]	**18.2**

Direct Shear (T 236)

Shear Angle, °			
Initial Water Content, %			
Normal Stress, psi			
Wet Density, lbs/ft³			
Dry Density, lbs/ft³			
Specimen Thickness, in			

Consolidation (T 216)

Trimmings, Water Content, %	**31.9**

	Initial	Final		Void Ratio	% Strain
Water Content, %	**35.04**	**25**	Pmin		
Dry Density, lbs/ft³	**88.6**	**105.2**	Pp		
Void Ratio	**1.05**	**0.73**	Pmax		
Saturation, %	**96.9**	**100**	Cc/C'c		

Miscellaneous Tests

Liquid Limit @ 25 blows (T 89), %
31
Plastic Limit (T 90), %
20
Plasticity Index (T 90), %
11
Specific Gravity, Corrected to 20°C (T 100)
2.77

Loss on Ignition (T 267)

Loss, %	H2O, %

Water Content (T 265), %
33.2

Vane Shear Test on Shelby Tubes (Maine DOT)

Depth taken in tube, ft	3 In. U. Shear tons/ft²	3 In. Remold tons/ft²	6 In. U. Shear tons/ft²	6 In. Remold tons/ft²	Water Content, %	Description of Material Sampled at the Various Tube Depths
0-0.5	0.21	0.01	0.28	0.02	33.3	Alternating layers of light to dark gray silty clay, silt lines at 2.75" and 5.5".
0.63-1	0.28	0.01	0.27	0.02	35.1	Alternating layers of light to dark gray silty clay, silt line at 11.5".
1-1.5	0.3	0.02	0.24	0.03	33.3	Alternating layers of light to dark gray silty clay, slit line at 15.5".
1.5-1.8					32.0	Alternating layers of light to dark gray silty clay with (2) 2" stones.

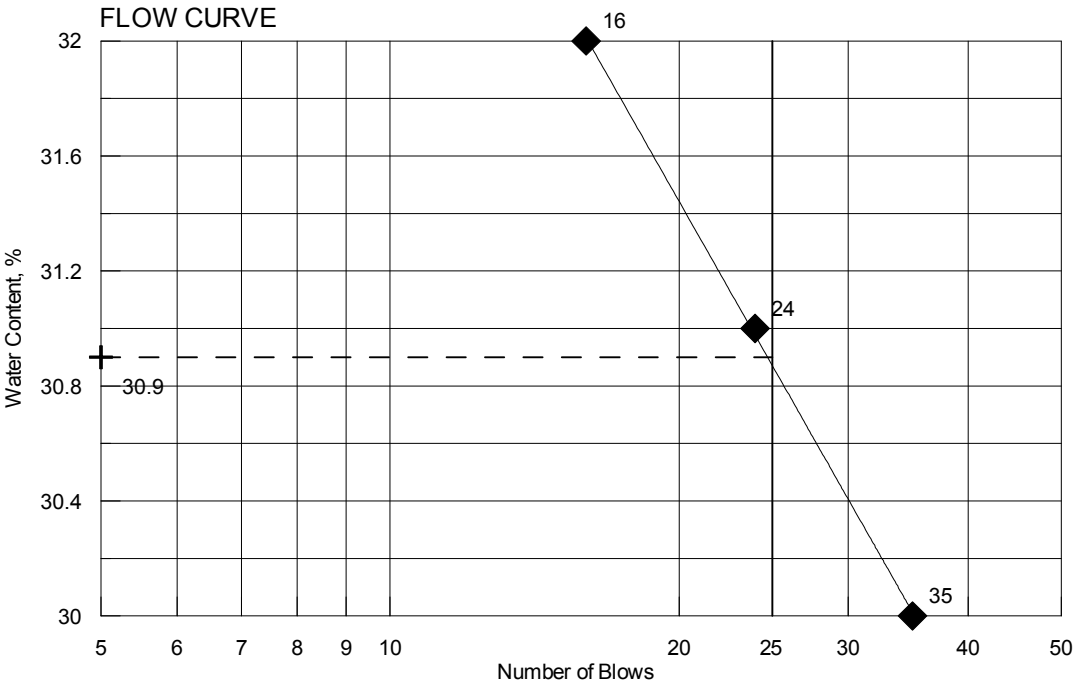
Comments:

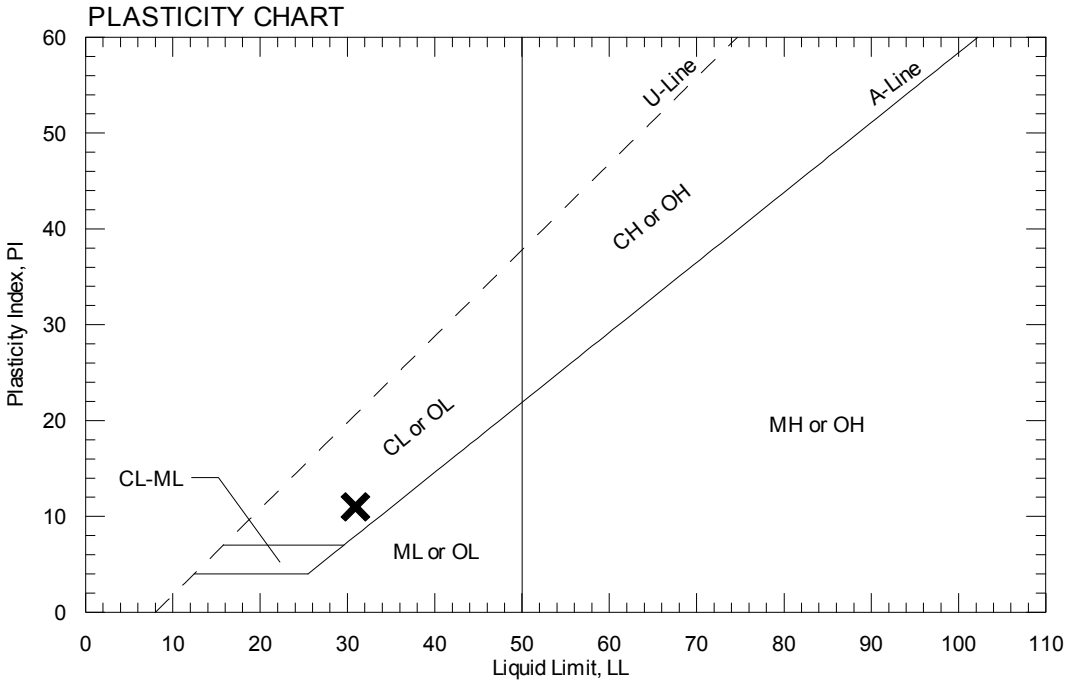
AUTHORIZATION AND DISTRIBUTION

Reported by: **FOGG, BRIAN** Date Reported: **8/16/2012**

Paper Copy: Lab File; Project File; Geotech File

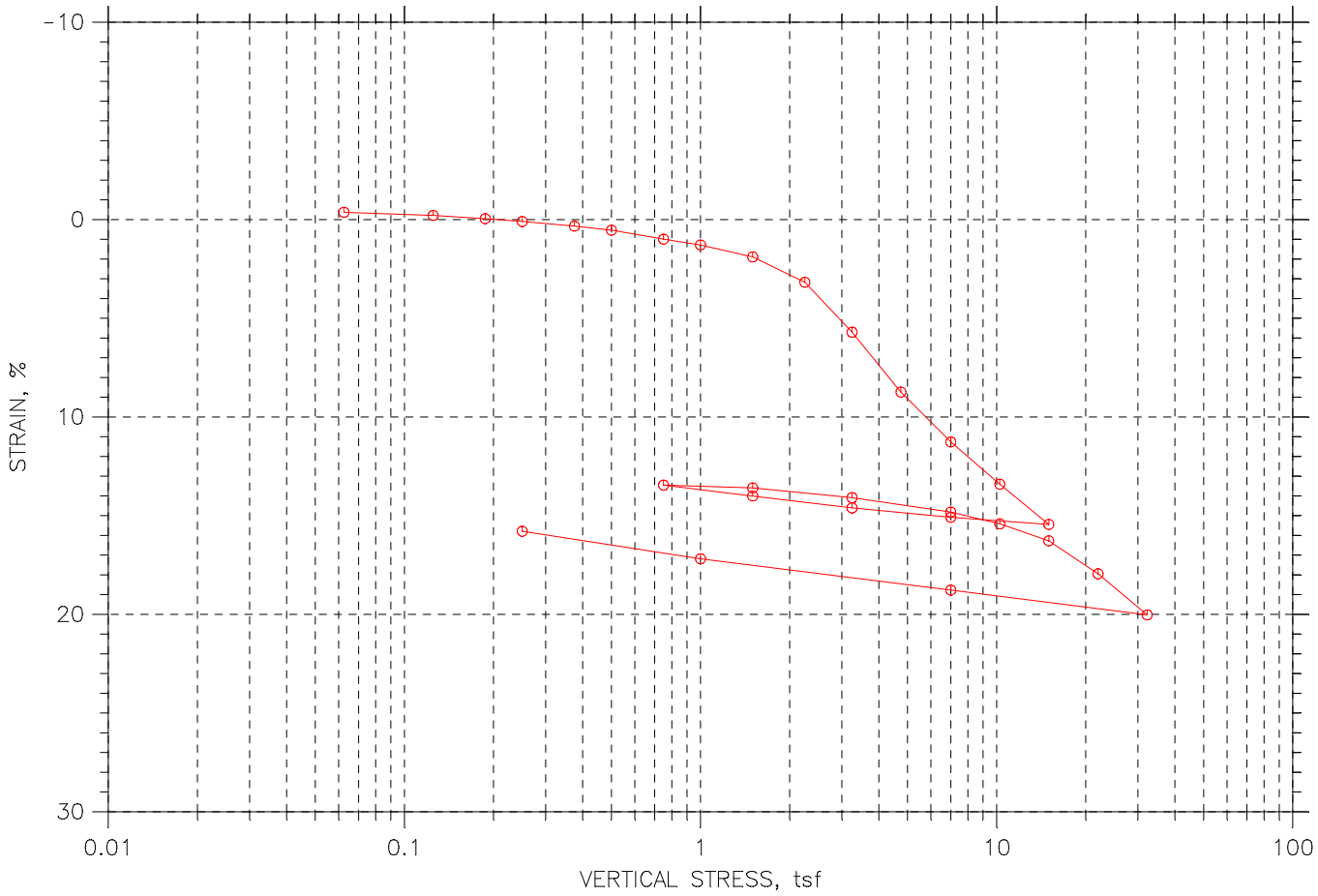
TOWN	Bangor	Reference No.	244212
WIN	019311.00	Water Content, %	33.2
Sampled	7/17/2012	Liquid Limit @ 25 blows (T 89), %	31
Boring No./Sample No.	BB-BWA-102A/1U	Plastic Limit (T 90), %	20
Station	TBD	Plasticity Index (T 90), %	11
Depth	7.0-9.0	Tested By	BBURR

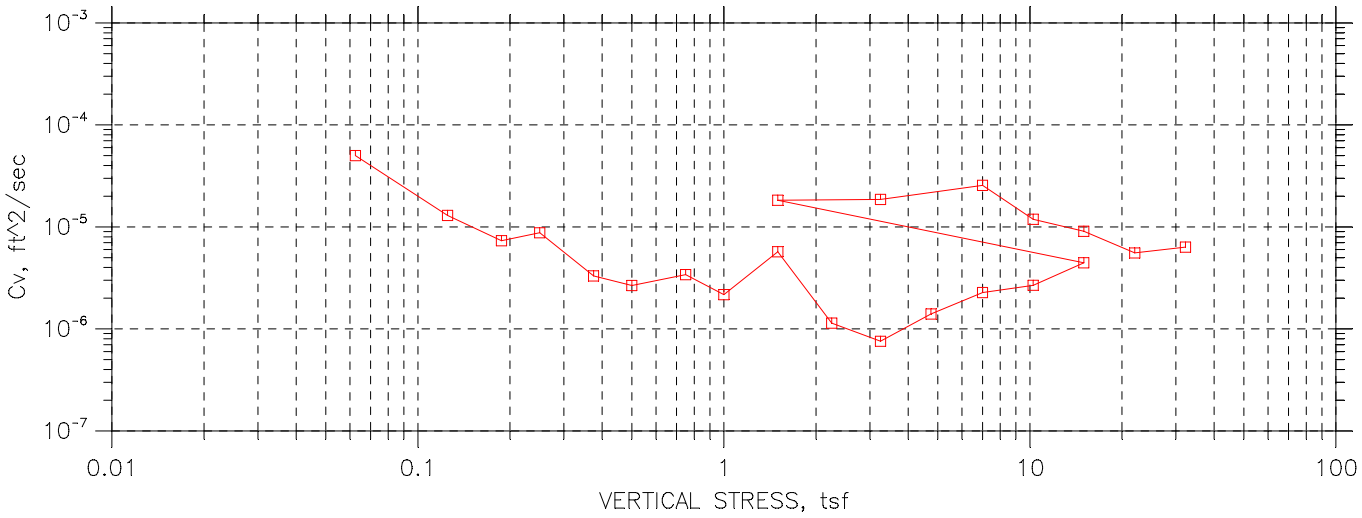




CONSOLIDATION TEST DATA

SUMMARY REPORT



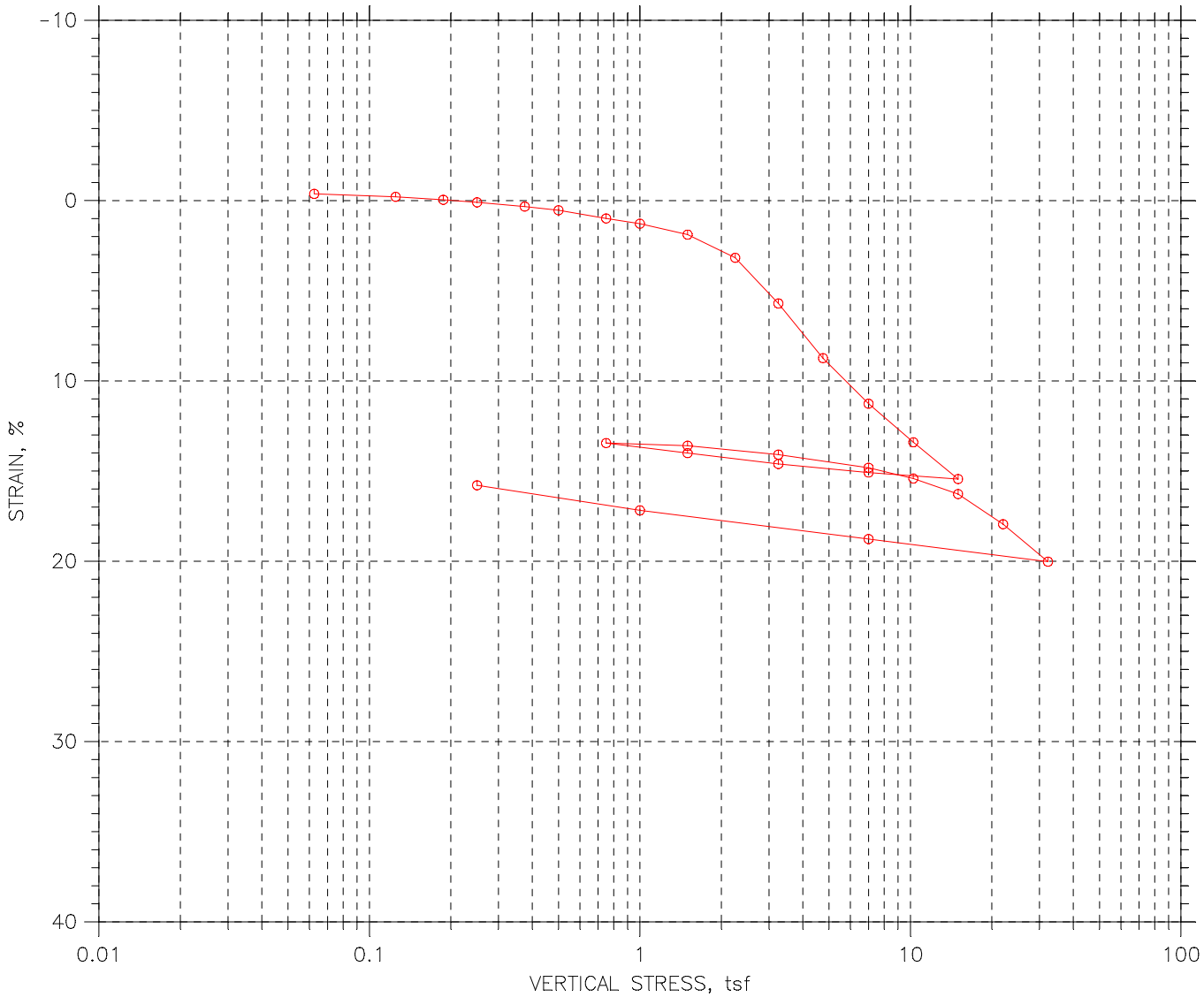


Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-102A	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/8/2012	Depth: 7.0-9.0 FT
Test No.: 244212	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

Thu, 16-AUG-2012 11:54:46

CONSOLIDATION TEST DATA

SUMMARY REPORT



					Before Test	After Test
Overburden Pressure, tsf:				Water Content, %	35.04	25.03
Preconsolidation Pressure, tsf:				Dry Unit Weight, pcf	88.596	105.21
Compression Index:				Saturation, %	96.92	100.00
Diameter: 2.485 in		Height: 0.998 in		Void Ratio	1.05	0.73
LL: 0	PL: 0	PI: 0	GS: 2.91			

Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-102A	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/8/2012	Depth: 7.0-9.0 FT
Test No.: 244212	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

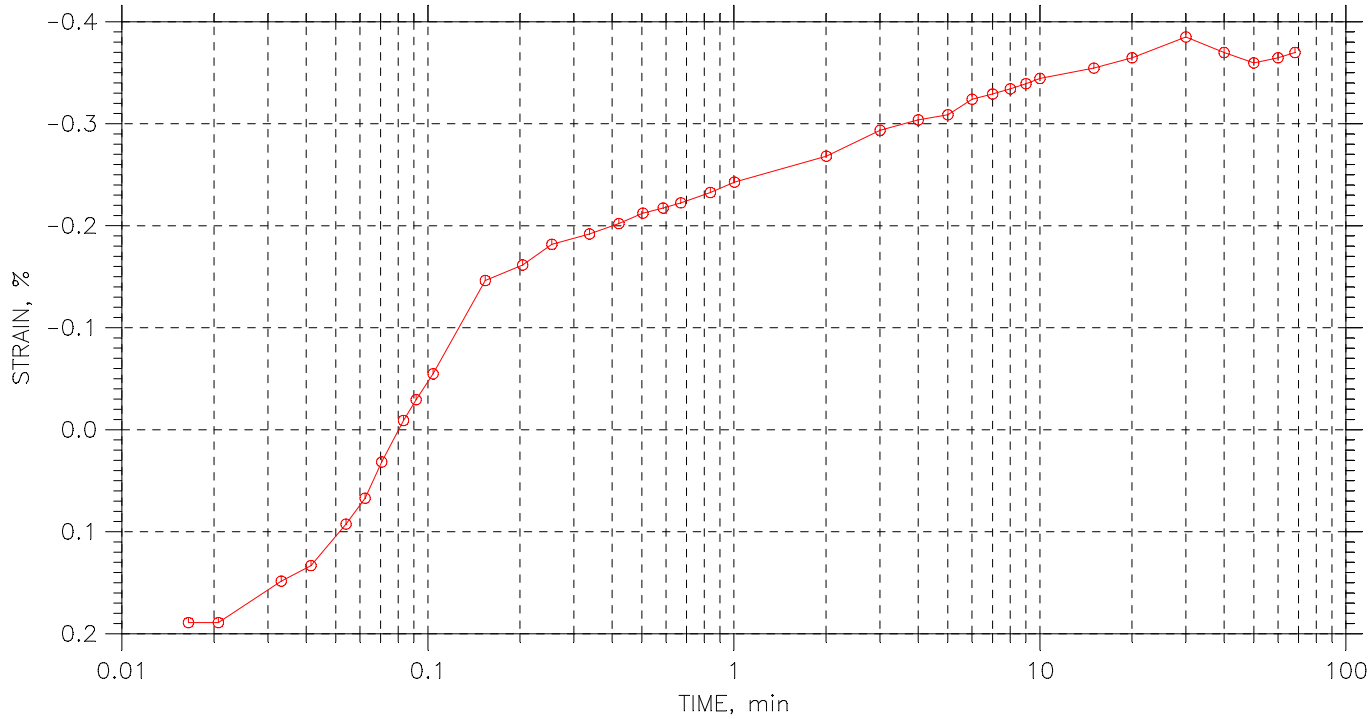
Thu, 16-AUG-2012 11:54:47

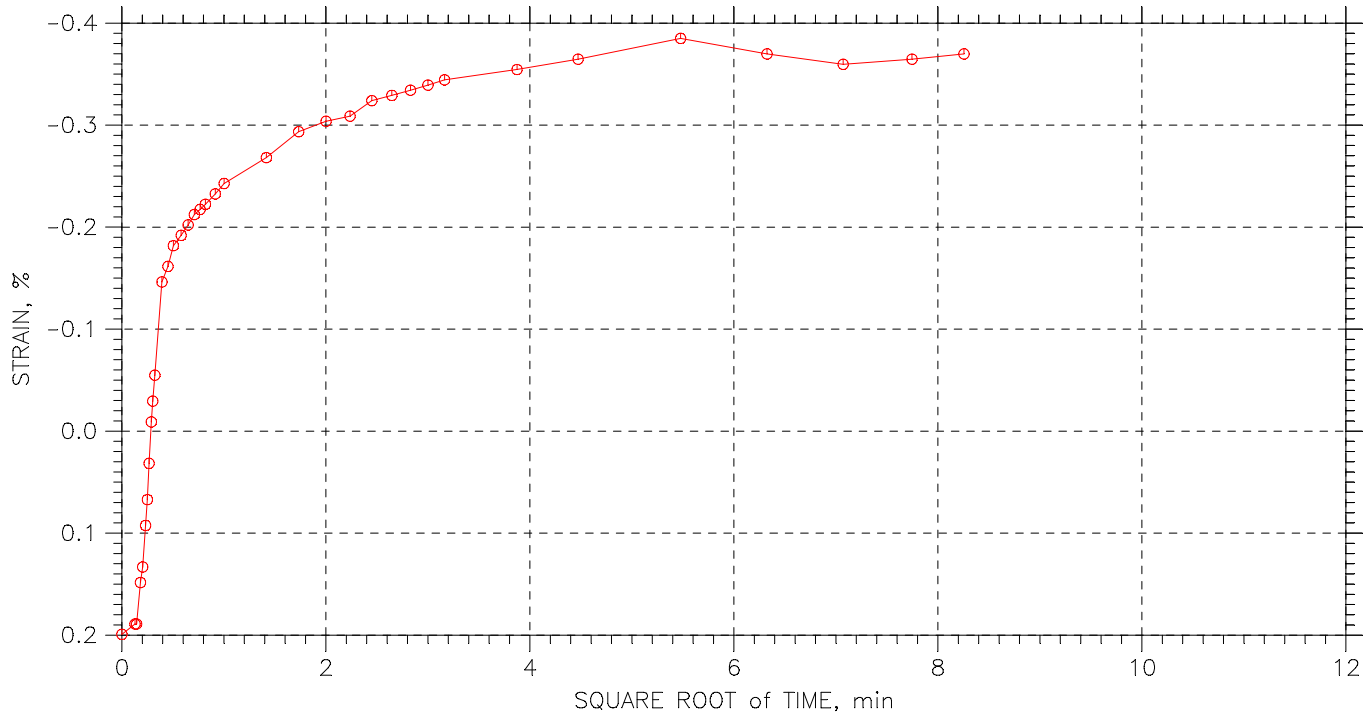
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 1 of 29

Stress: 6.25e-002 tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-102A	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/8/2012	Depth: 7.0-9.0 FT
Test No.: 244212	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

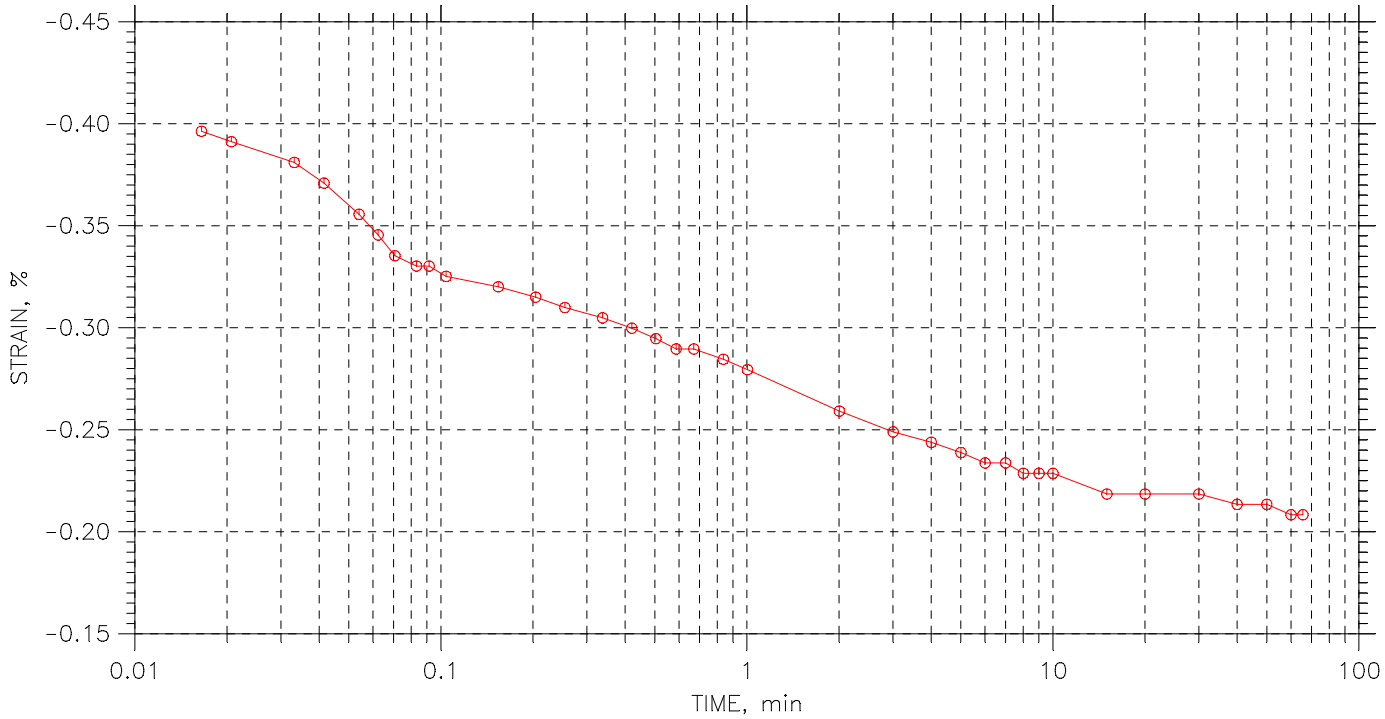
Thu, 16-AUG-2012 11:54:48

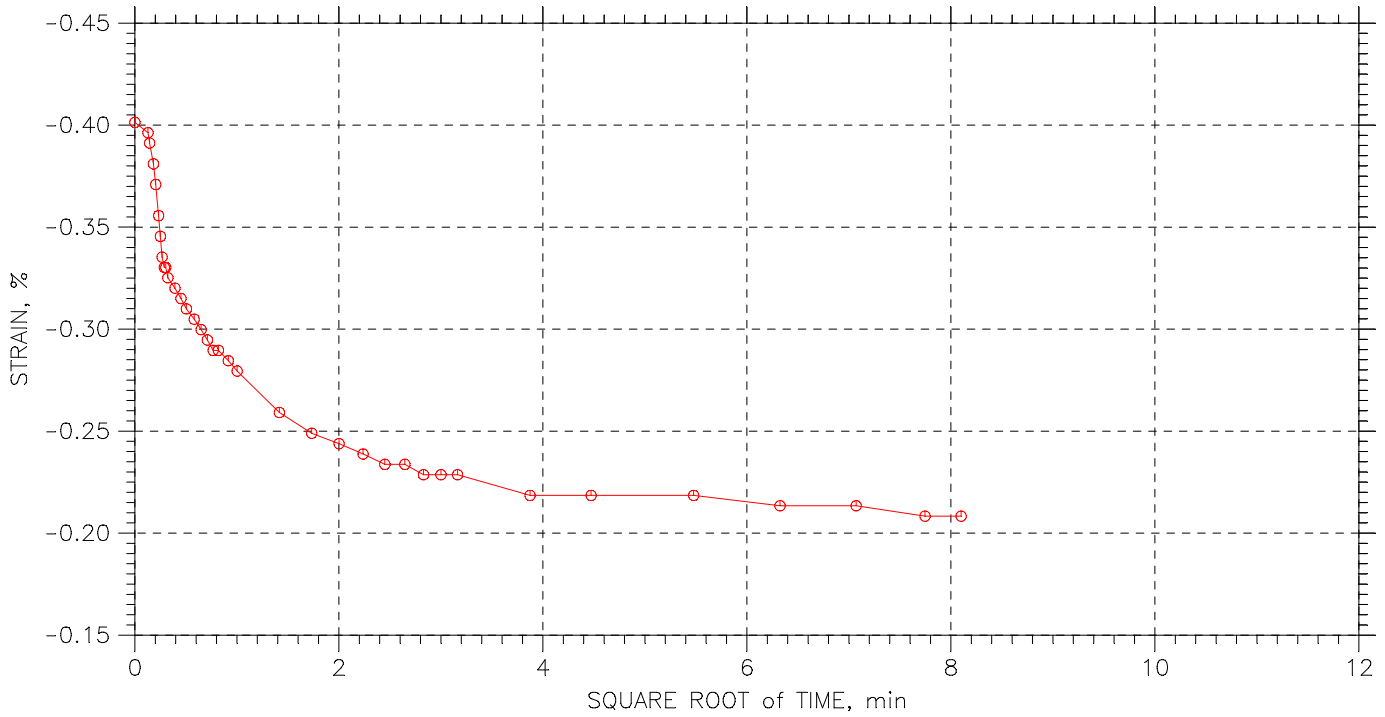
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 2 of 29

Stress: 0.125 tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-102A	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/8/2012	Depth: 7.0-9.0 FT
Test No.: 244212	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

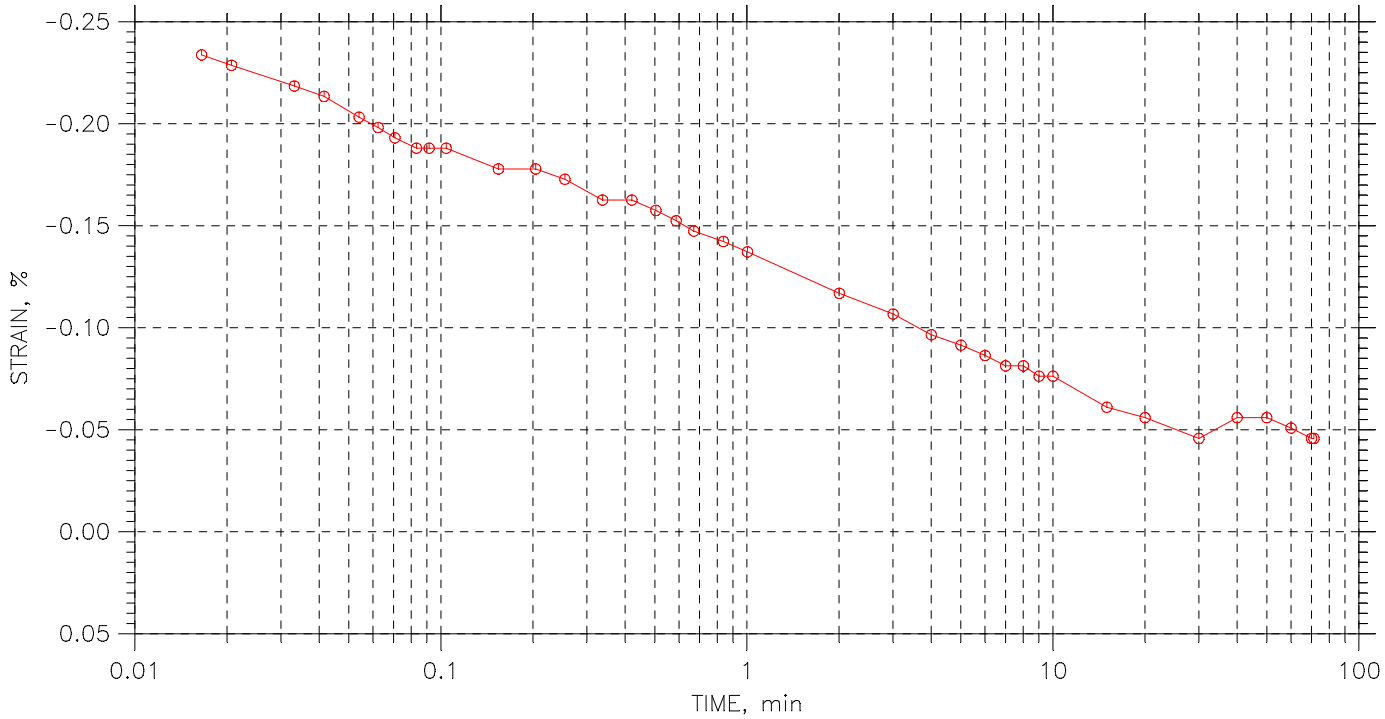
Thu, 16-AUG-2012 11:54:49

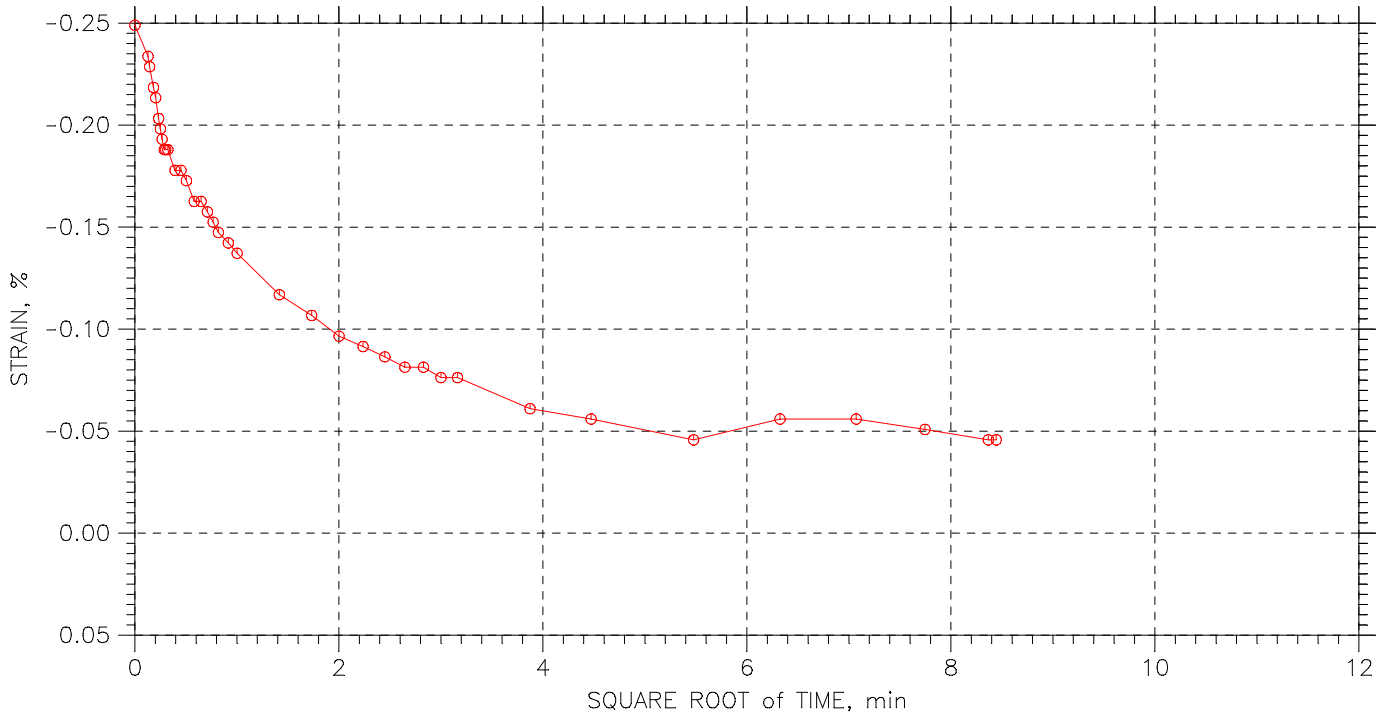
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 3 of 29

Stress: 0.1875 tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-102A	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/8/2012	Depth: 7.0-9.0 FT
Test No.: 244212	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

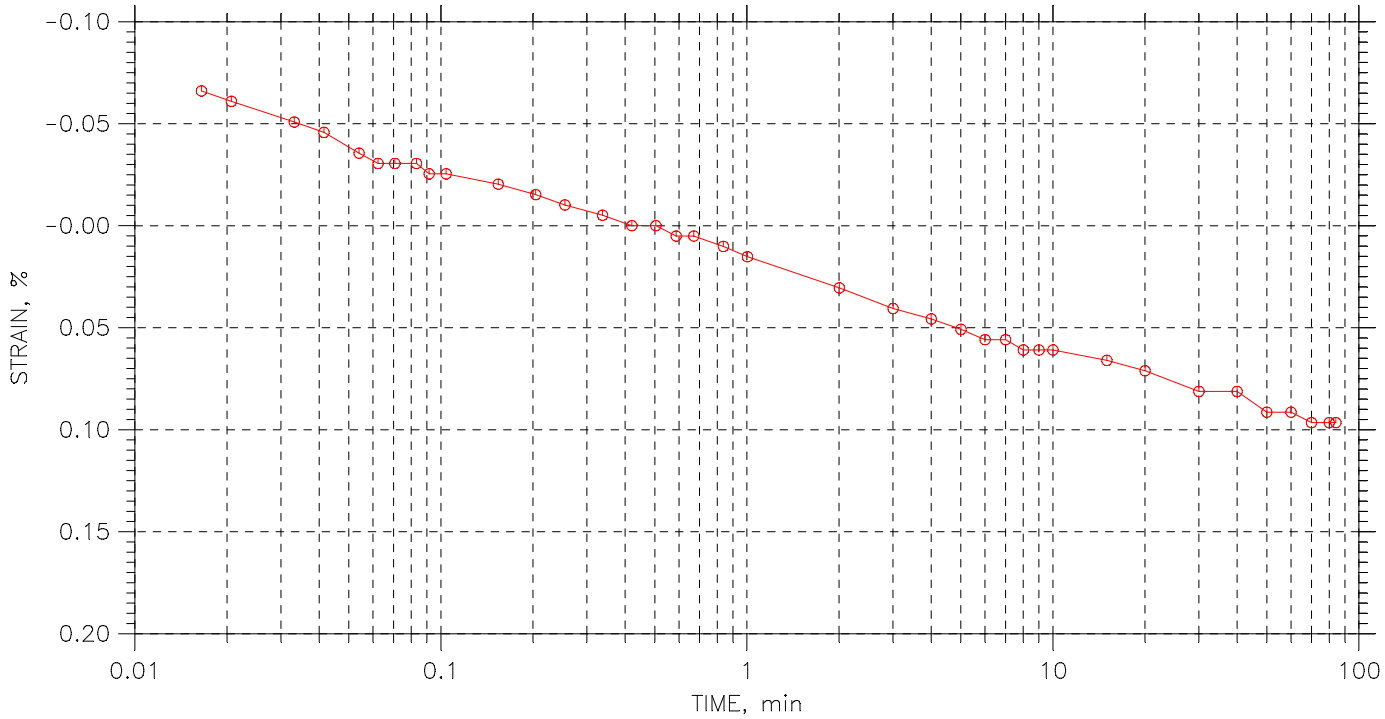
Thu, 16-AUG-2012 11:54:49

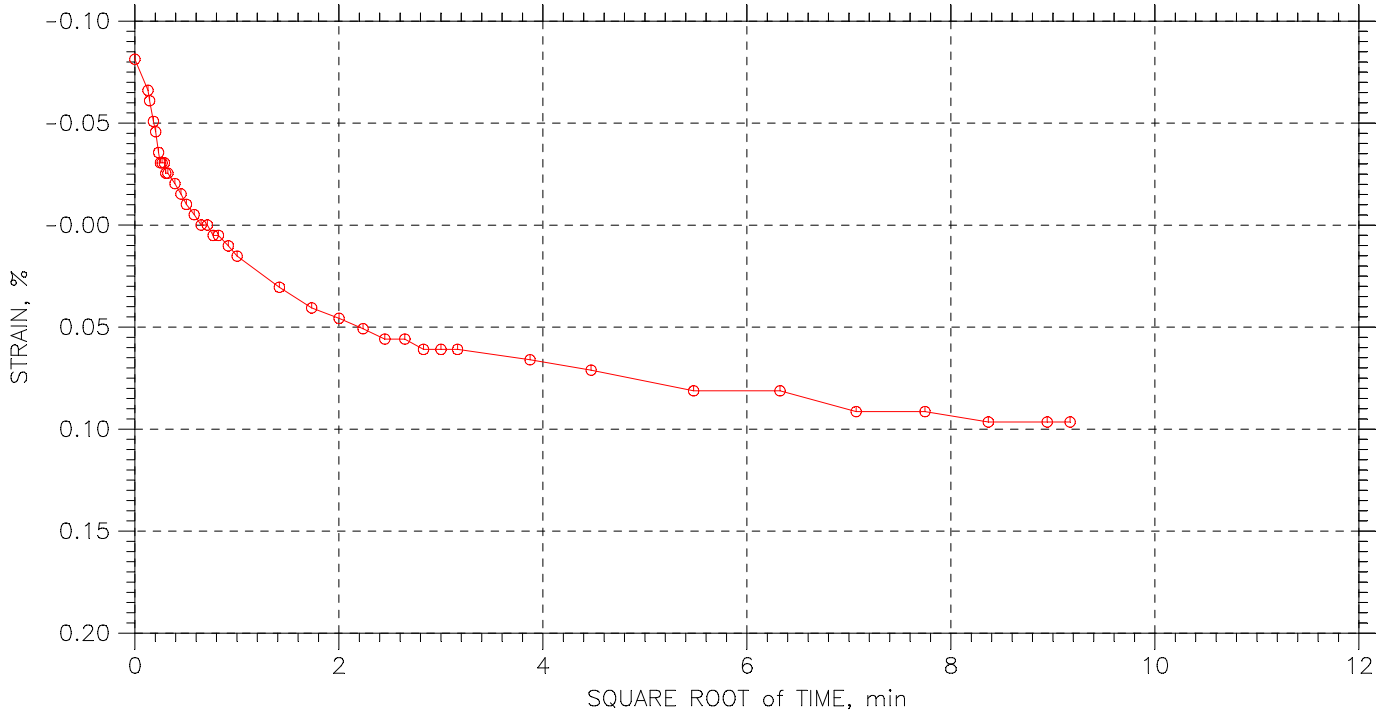
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 4 of 29

Stress: 0.25 tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-102A	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/8/2012	Depth: 7.0-9.0 FT
Test No.: 244212	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

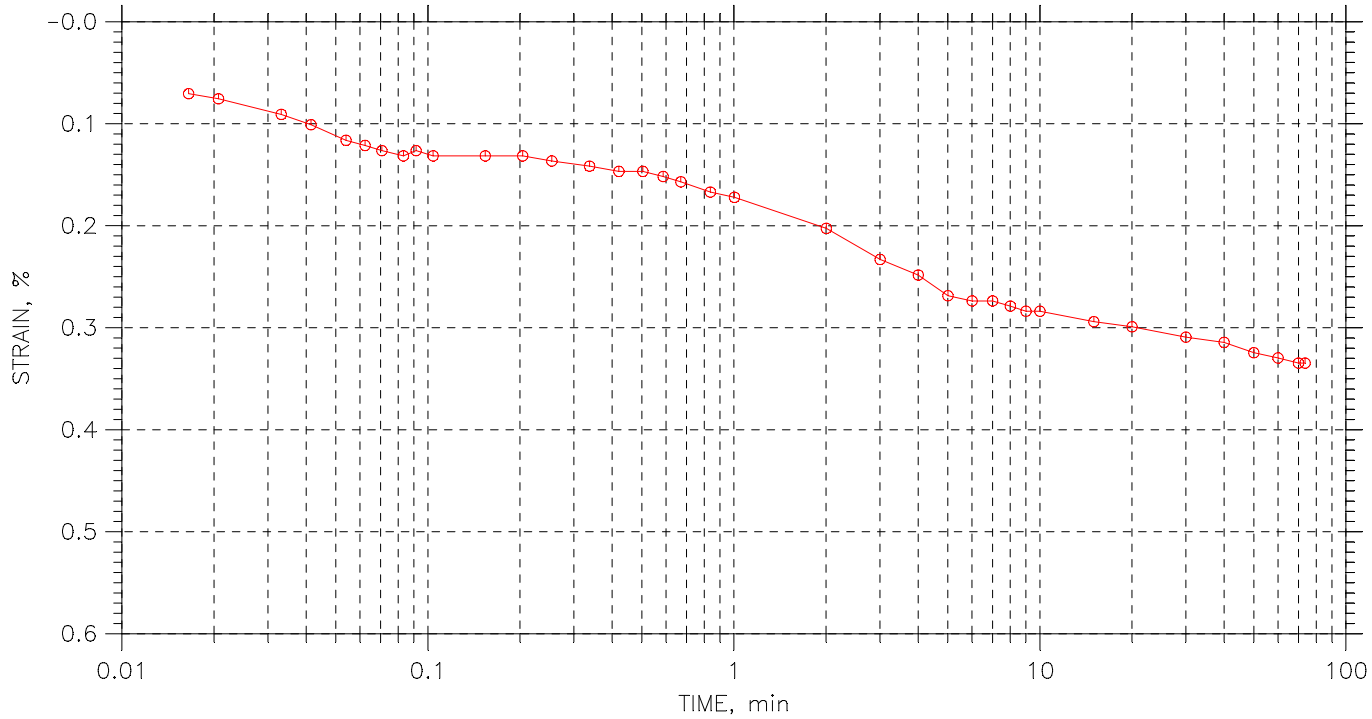
Thu, 16-AUG-2012 11:54:50

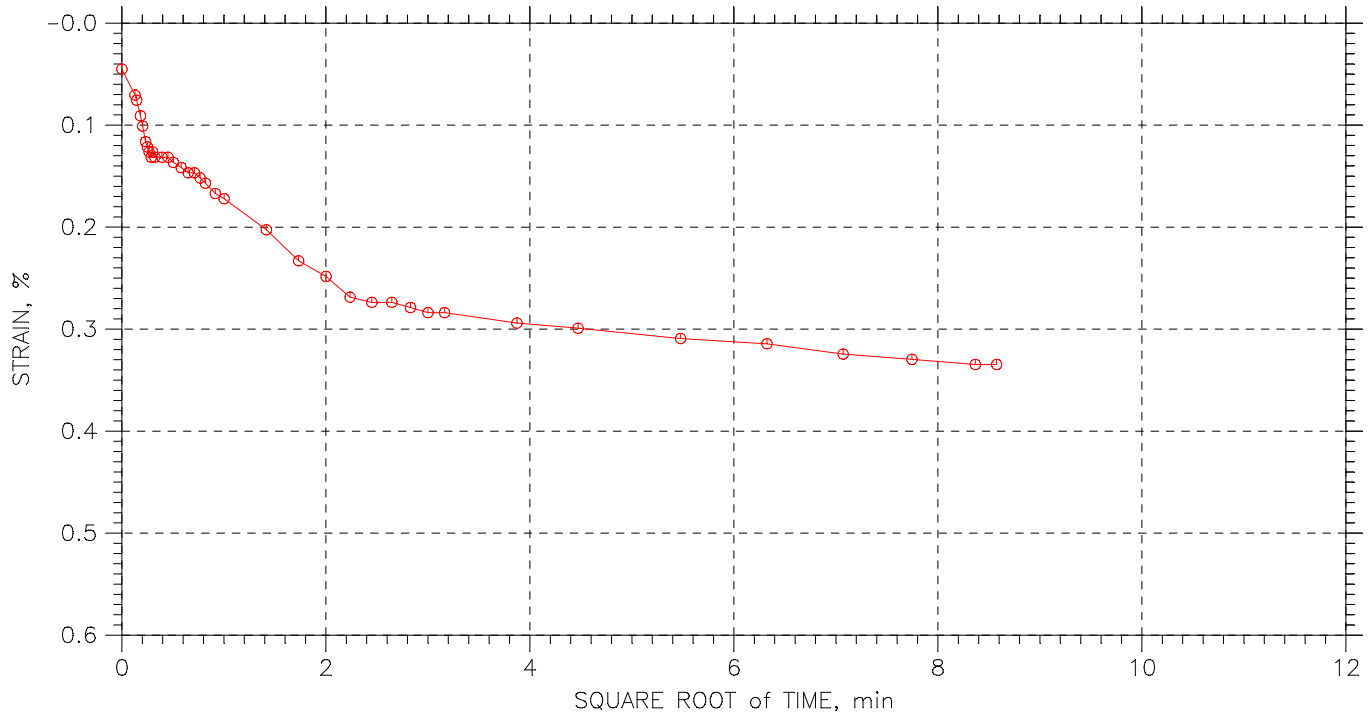
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 5 of 29

Stress: 0.375 tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-102A	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/8/2012	Depth: 7.0-9.0 FT
Test No.: 244212	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

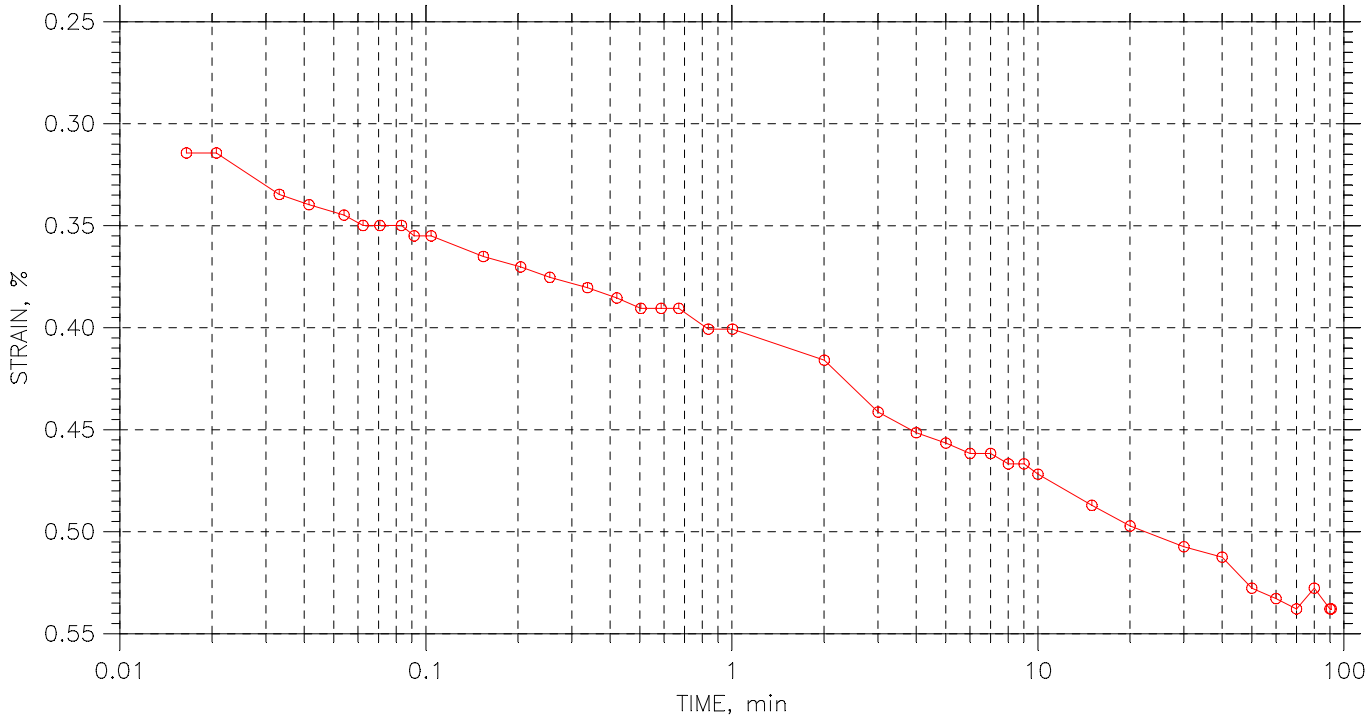
Thu, 16-AUG-2012 11:54:50

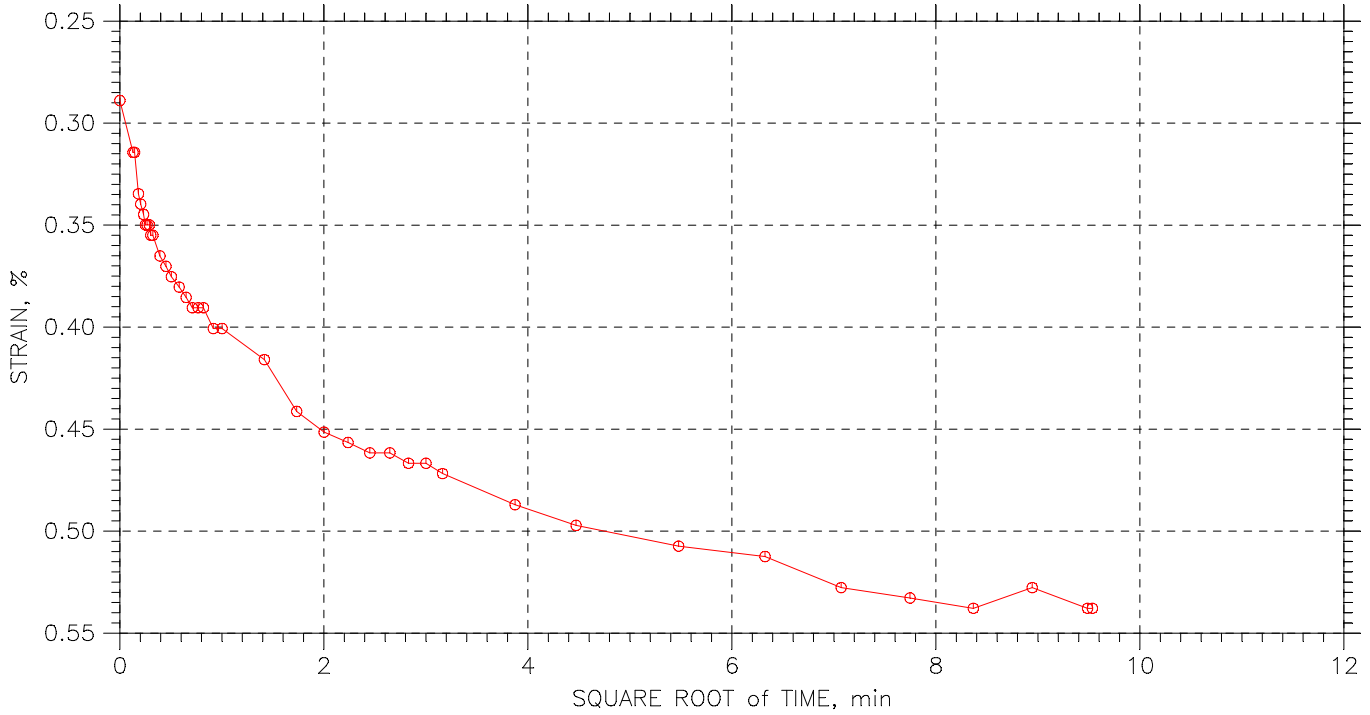
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 6 of 29

Stress: 0.5 tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-102A	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/8/2012	Depth: 7.0-9.0 FT
Test No.: 244212	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

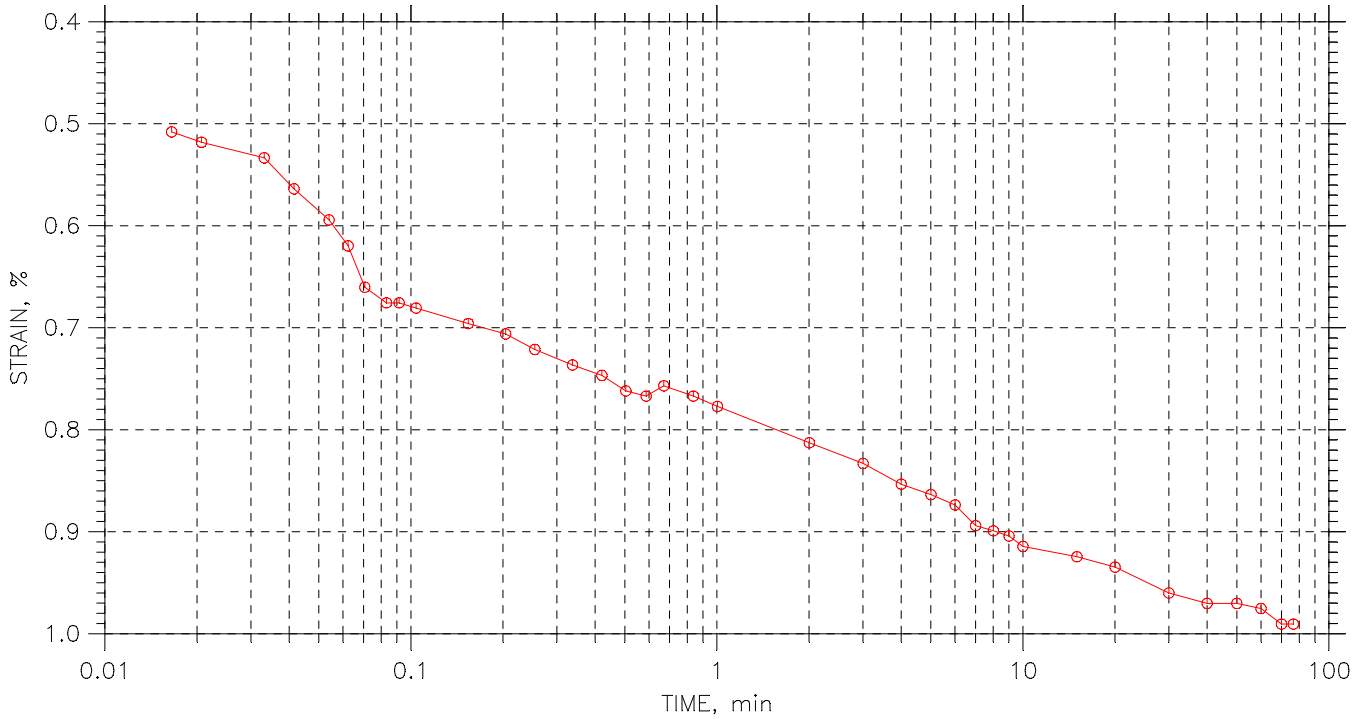
Thu, 16-AUG-2012 11:54:51

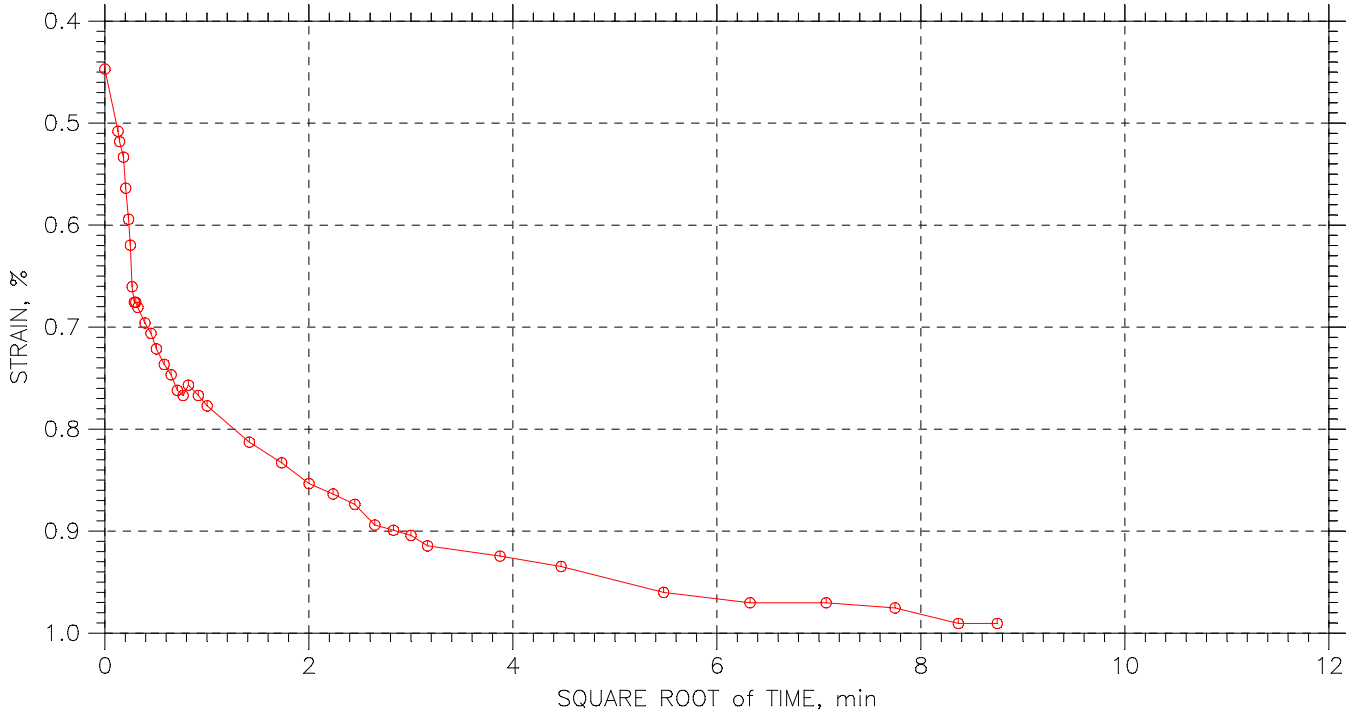
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 7 of 29

Stress: 0.75 tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-102A	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/8/2012	Depth: 7.0-9.0 FT
Test No.: 244212	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

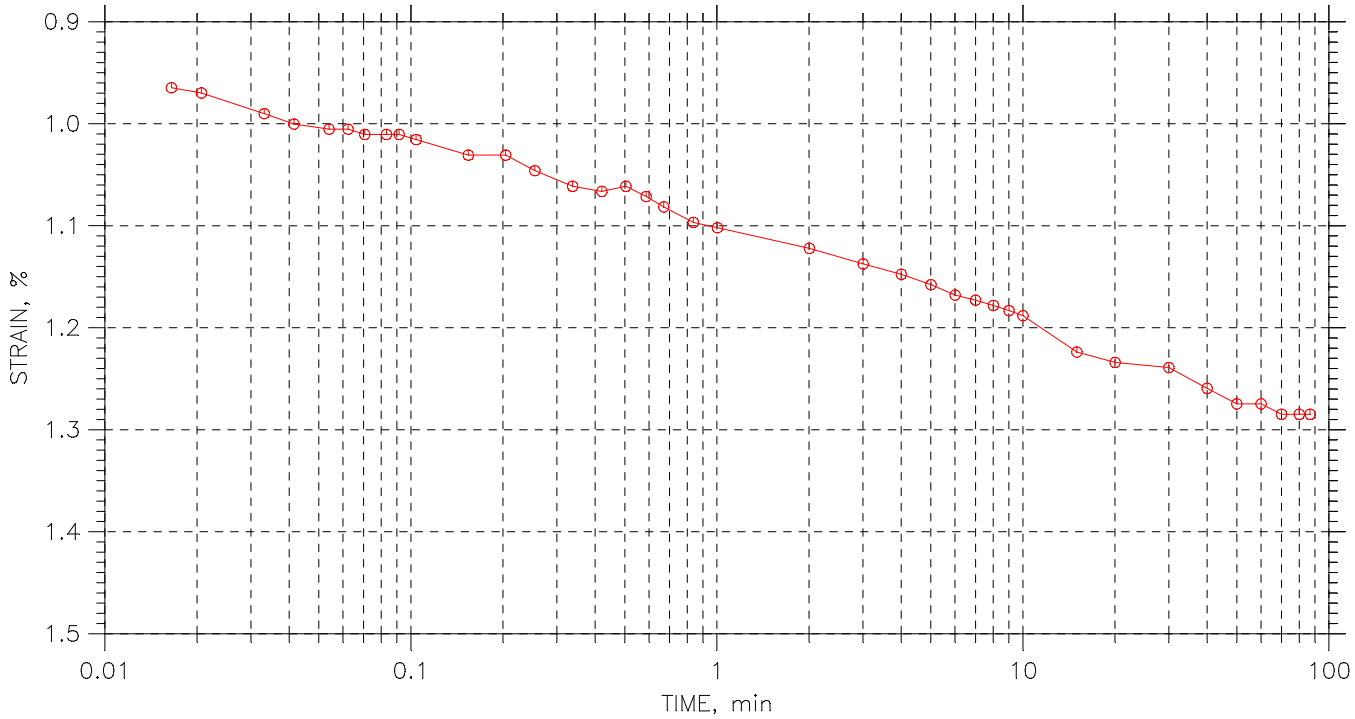
Thu, 16-AUG-2012 11:54:52

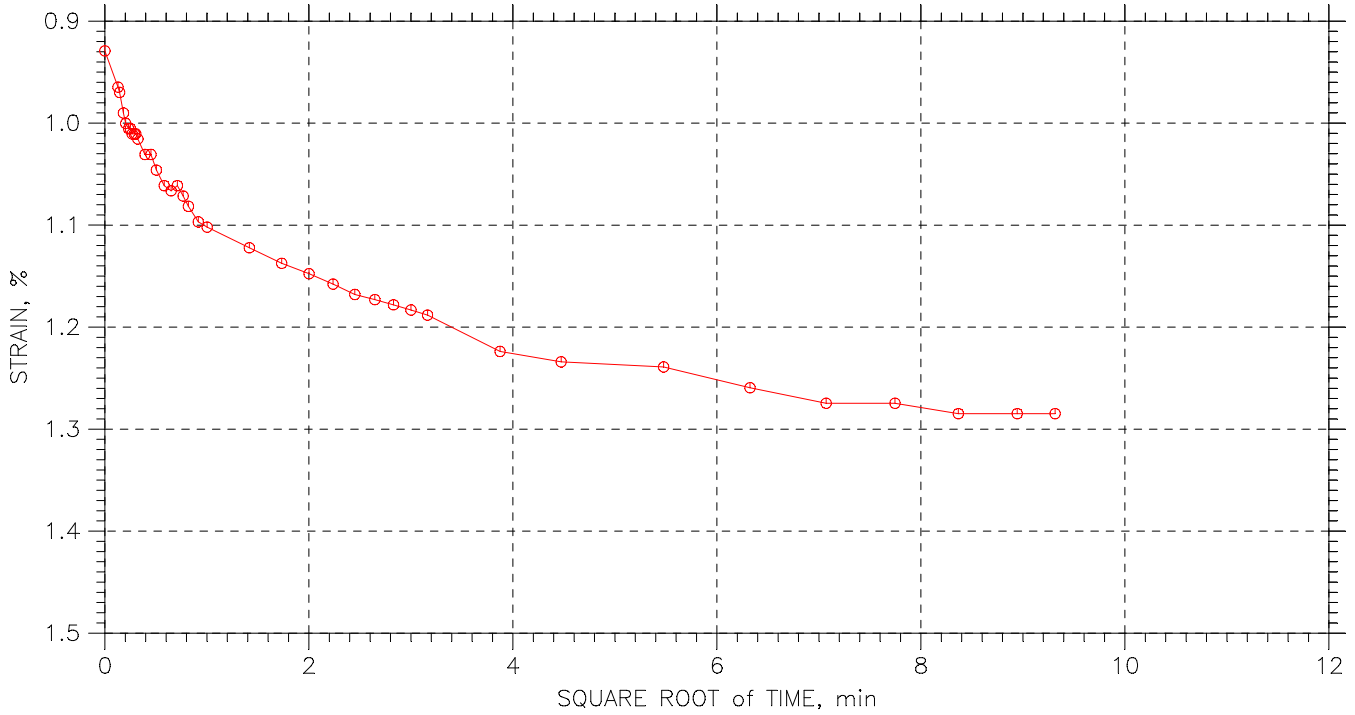
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 8 of 29

Stress: 1. tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-102A	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/8/2012	Depth: 7.0-9.0 FT
Test No.: 244212	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

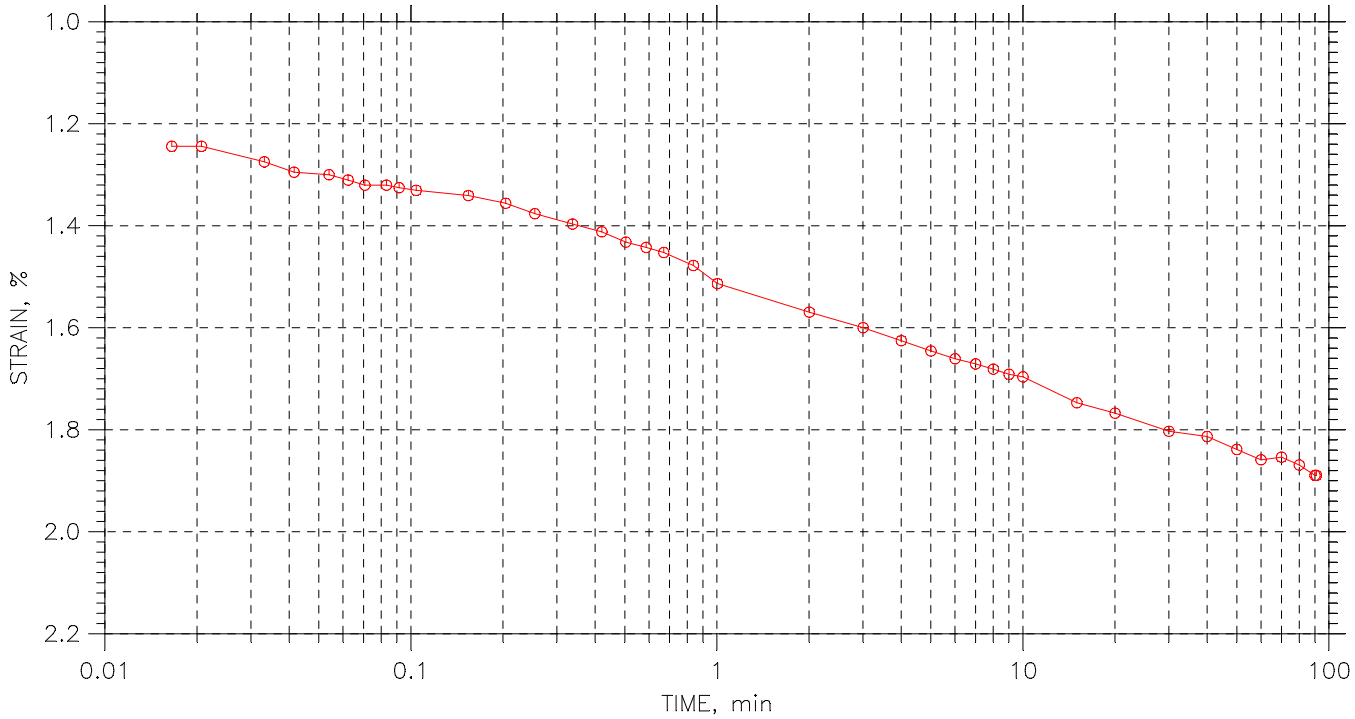
Thu, 16-AUG-2012 11:54:52

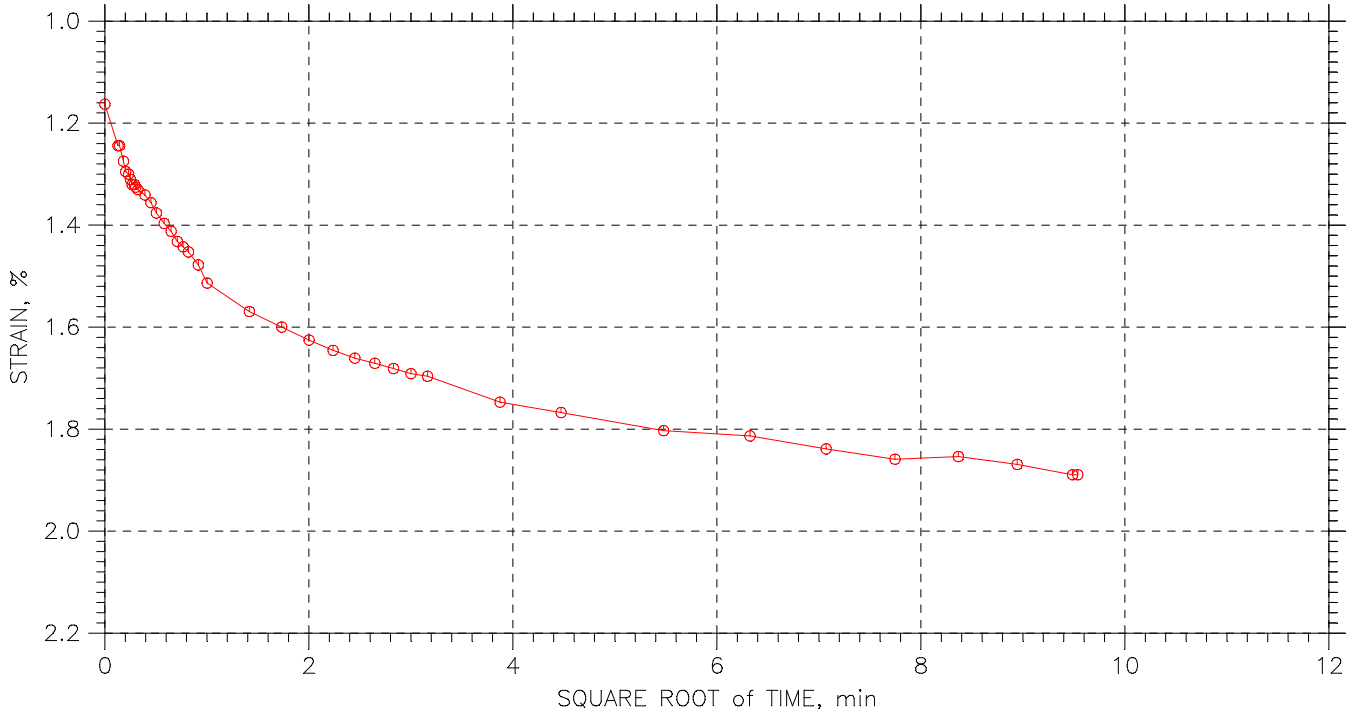
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 9 of 29

Stress: 1.5 tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-102A	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/8/2012	Depth: 7.0-9.0 FT
Test No.: 244212	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

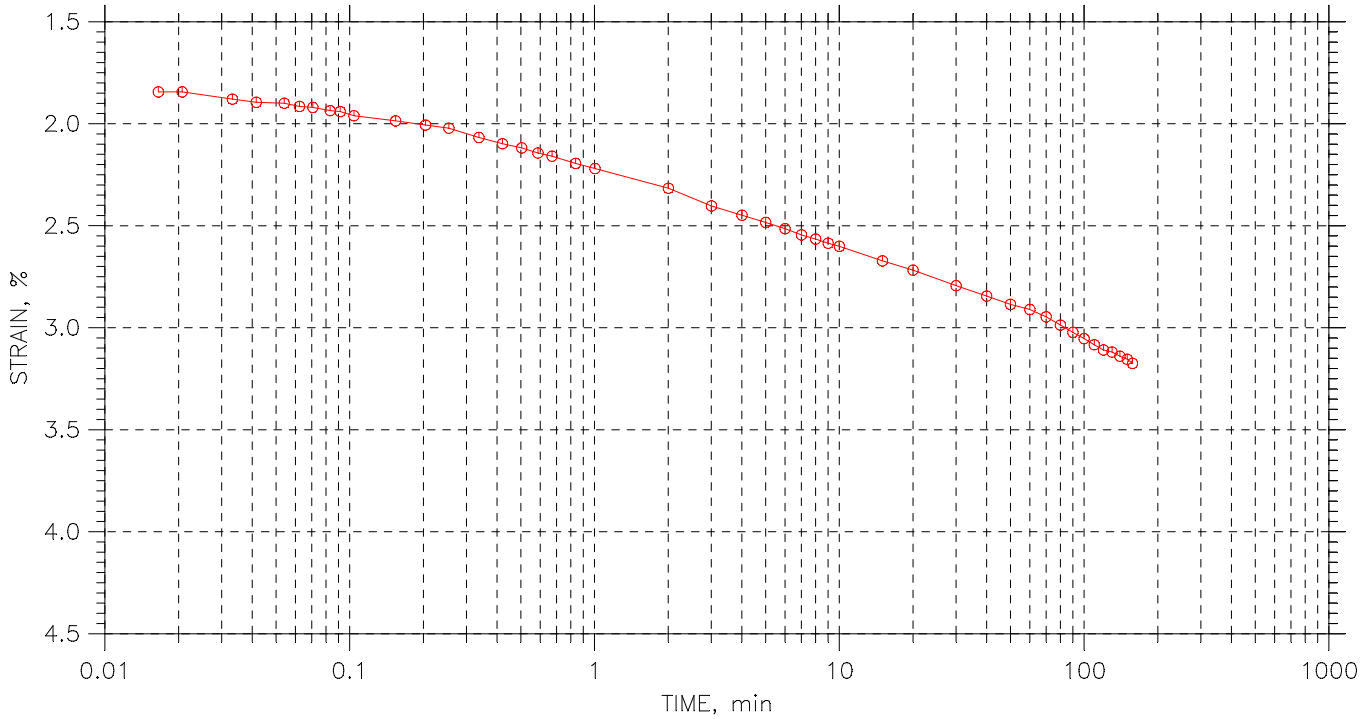
Thu, 16-AUG-2012 11:54:53

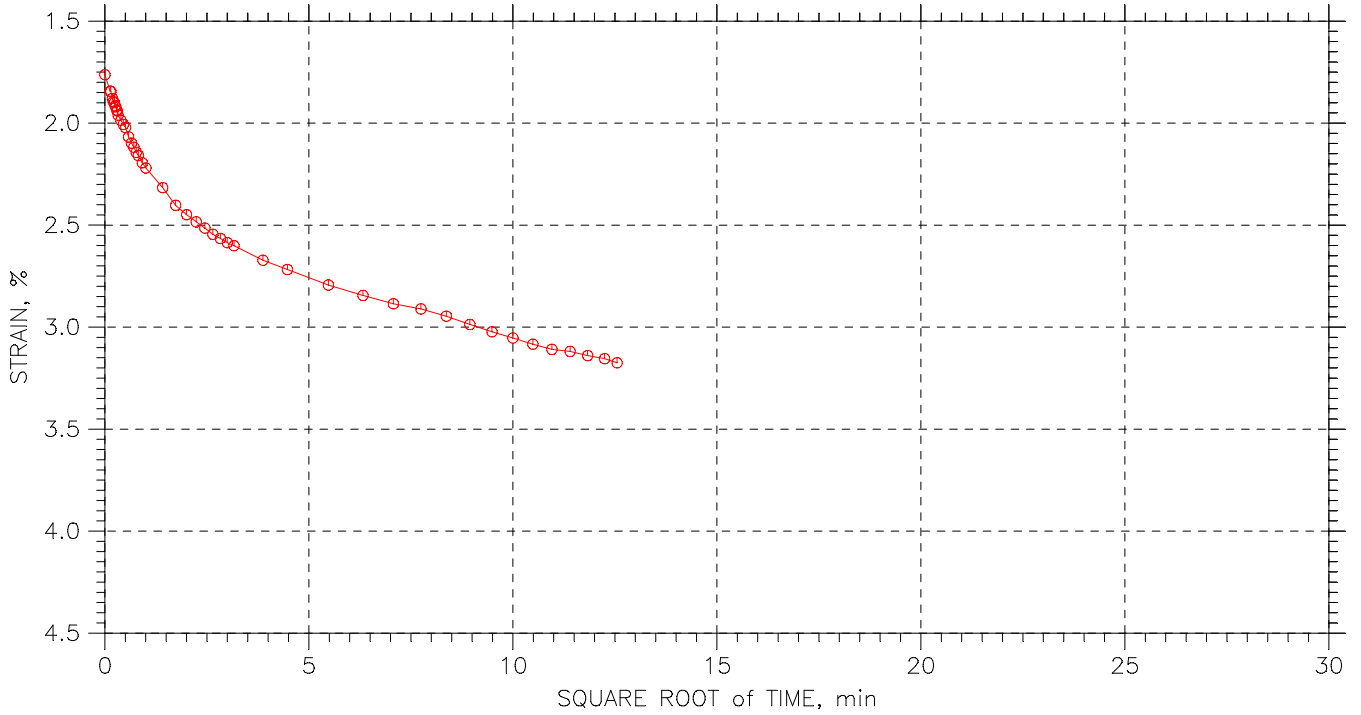
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 10 of 29

Stress: 2.25 tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-102A	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/8/2012	Depth: 7.0-9.0 FT
Test No.: 244212	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

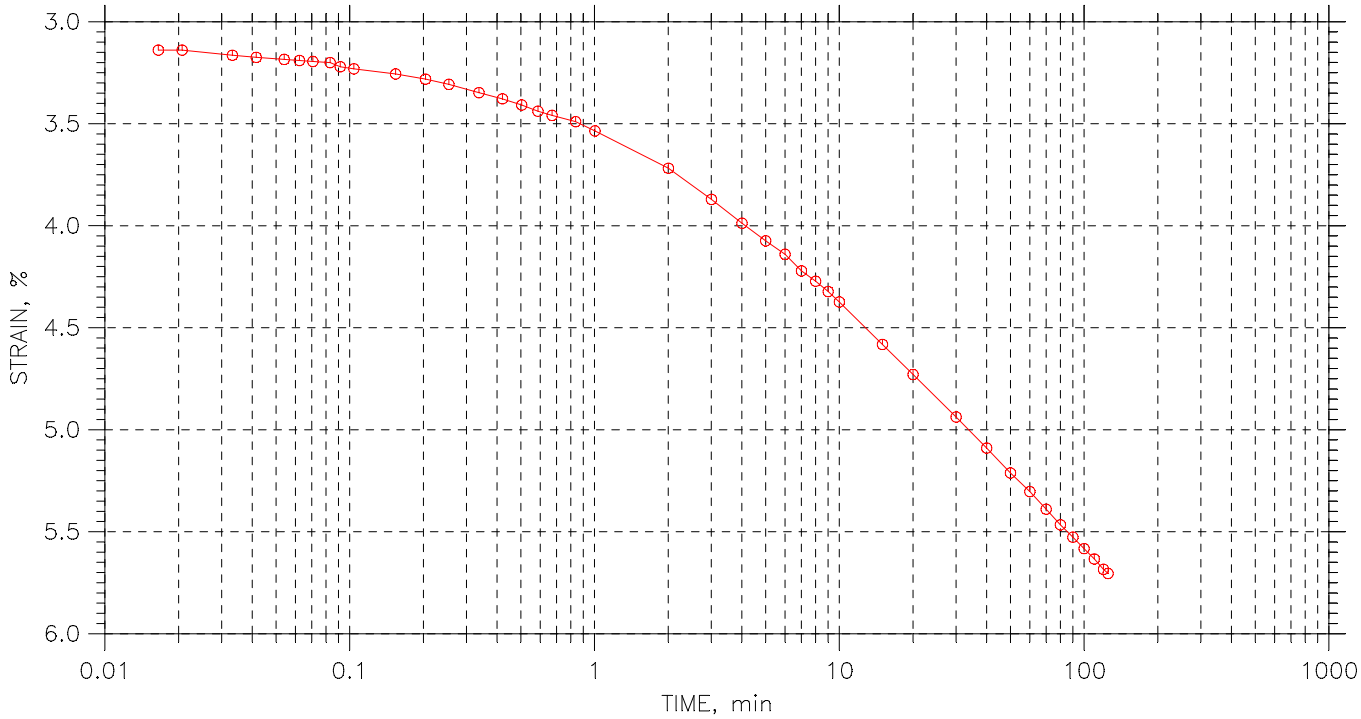
Thu, 16-AUG-2012 11:54:54

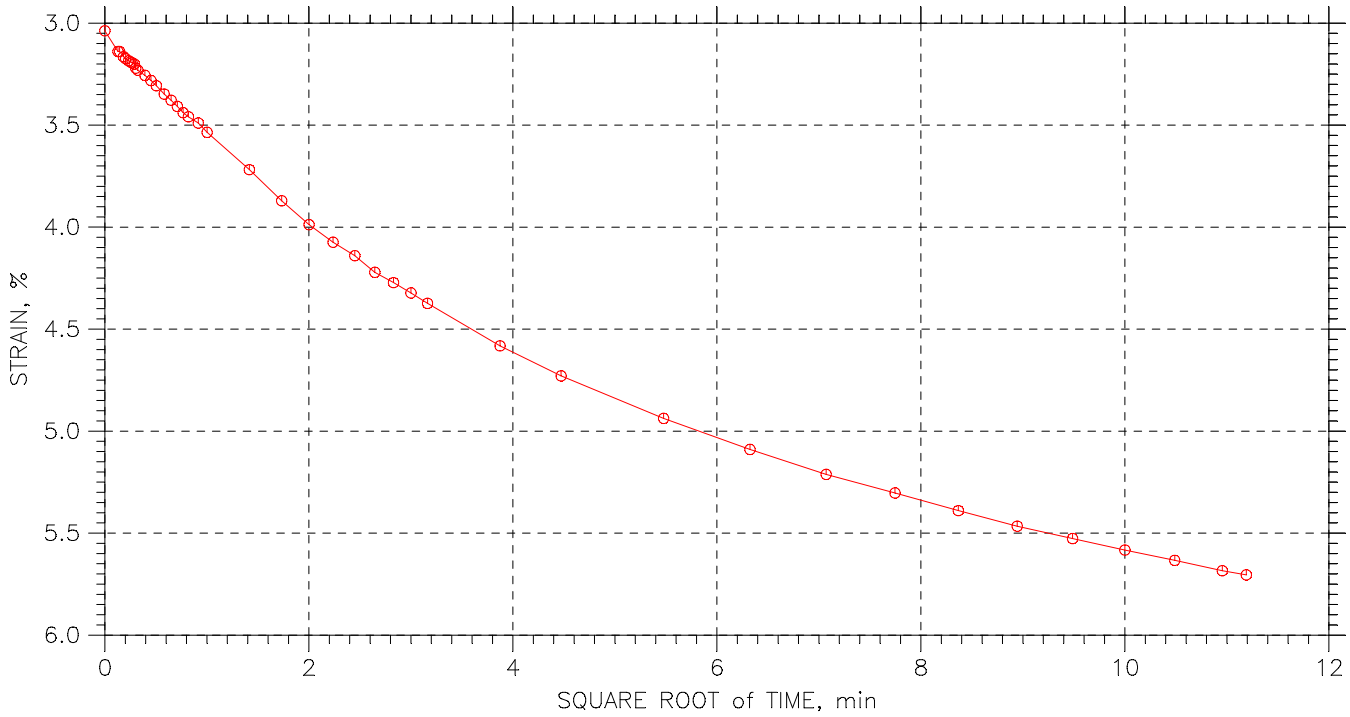
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 11 of 29

Stress: 3.25 tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-102A	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/8/2012	Depth: 7.0-9.0 FT
Test No.: 244212	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

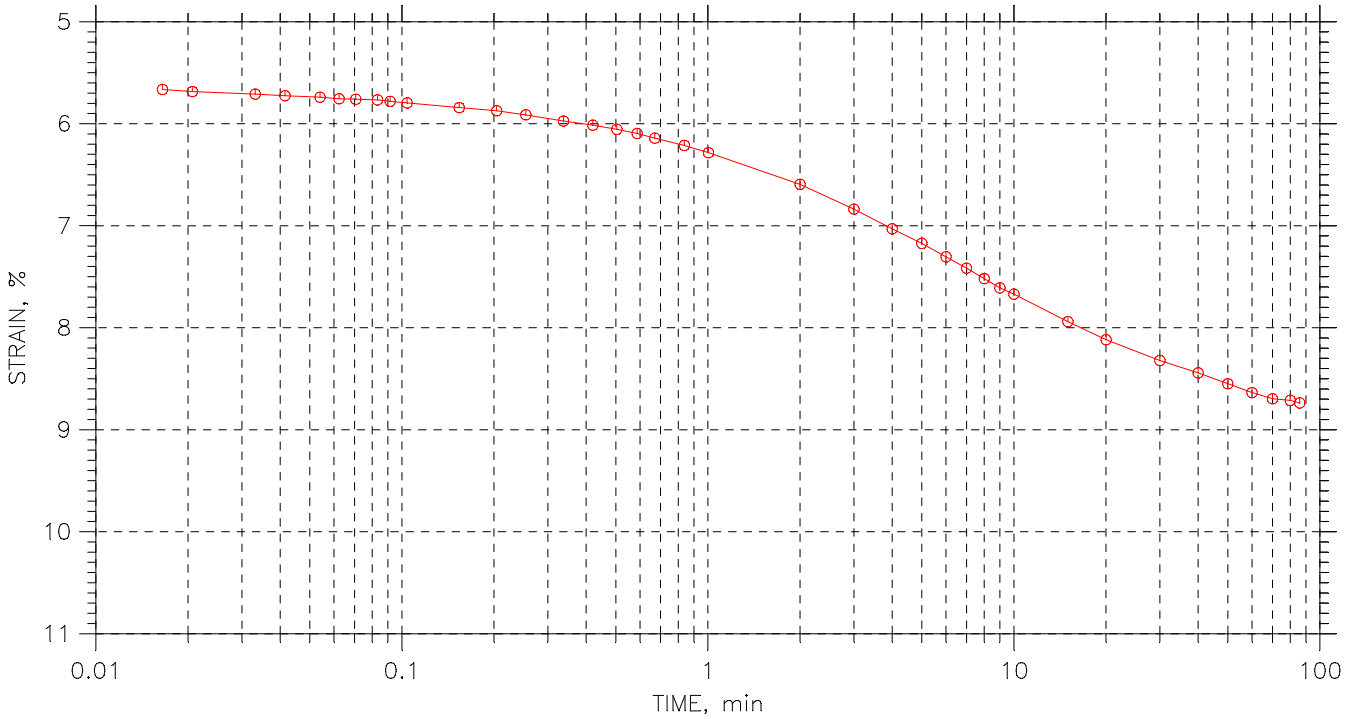
Thu, 16-AUG-2012 11:54:54

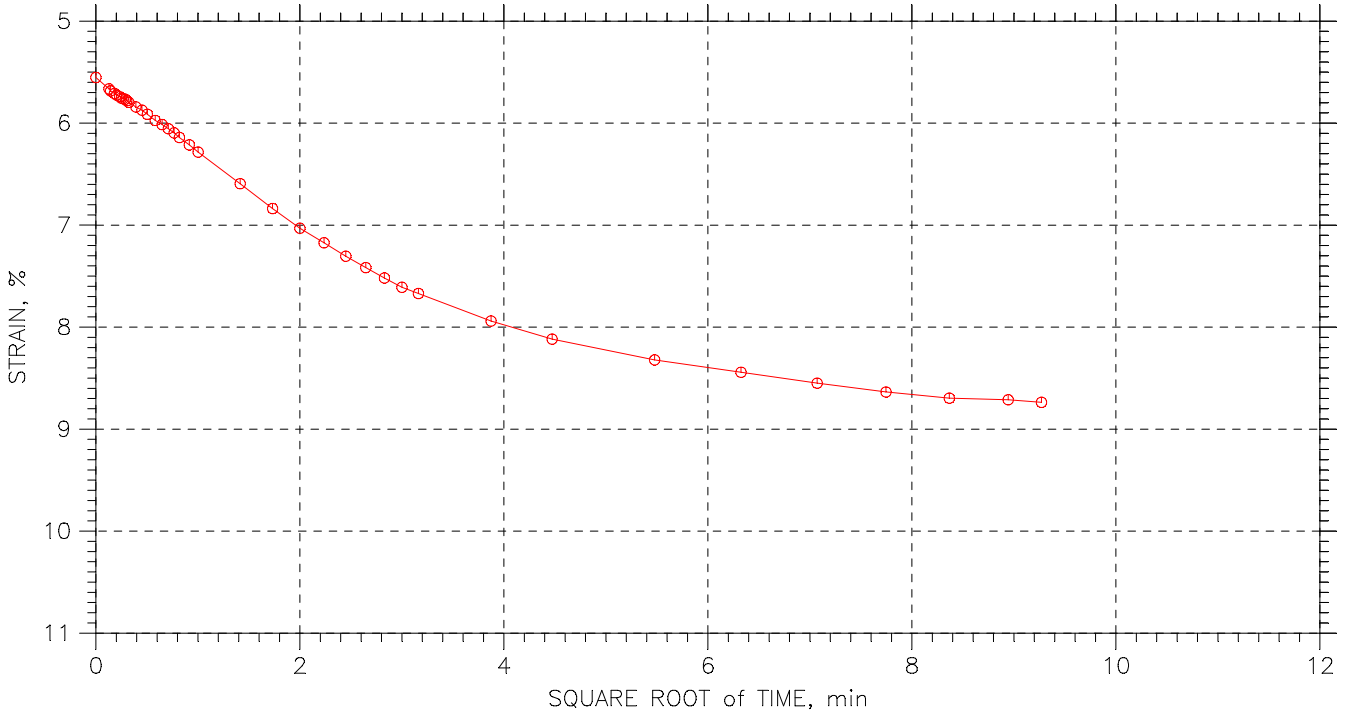
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 12 of 29

Stress: 4.75 tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-102A	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/8/2012	Depth: 7.0-9.0 FT
Test No.: 244212	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

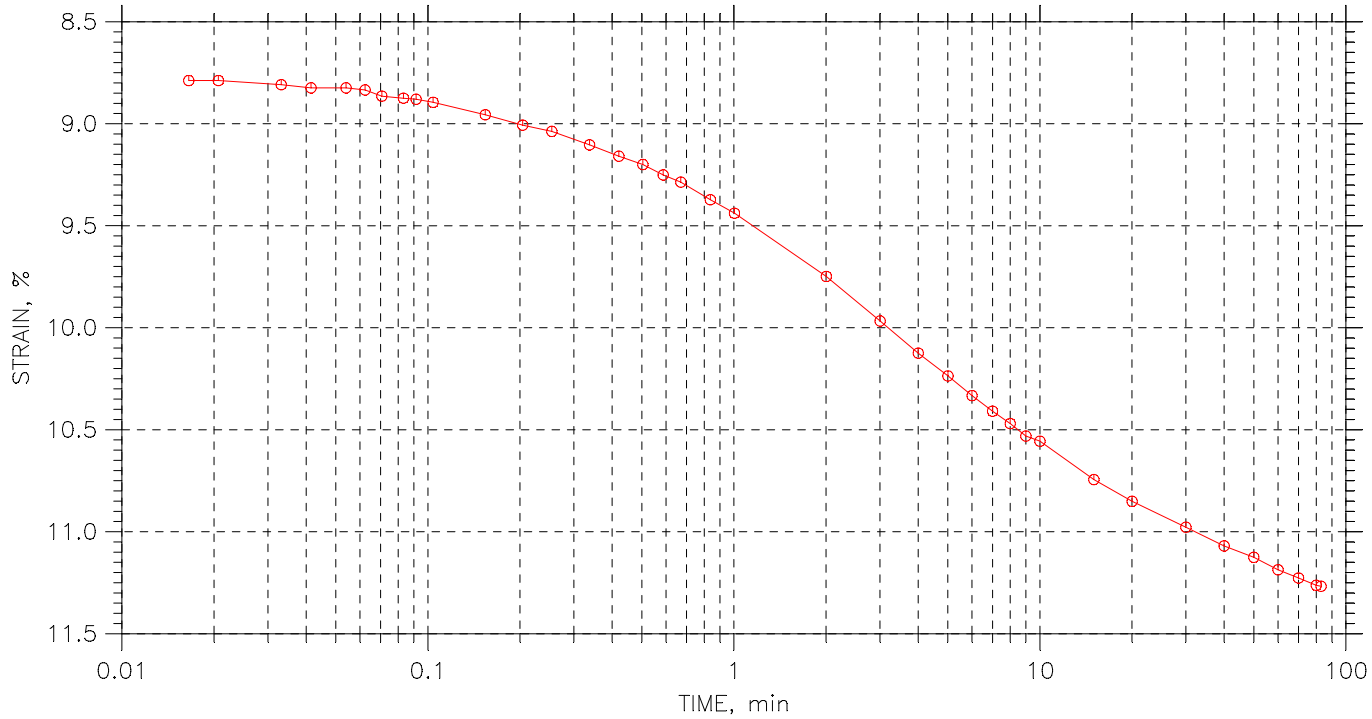
Thu, 16-AUG-2012 11:54:55

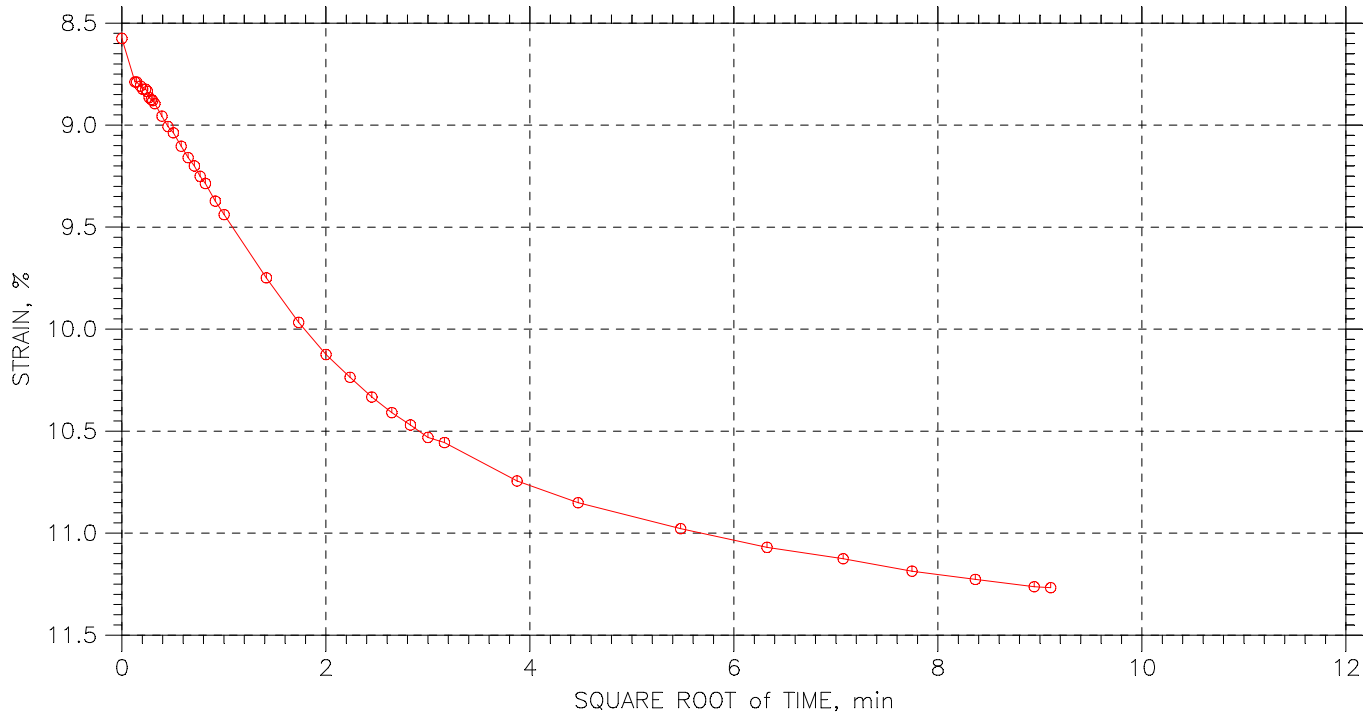
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 13 of 29

Stress: 7. tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-102A	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/8/2012	Depth: 7.0-9.0 FT
Test No.: 244212	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

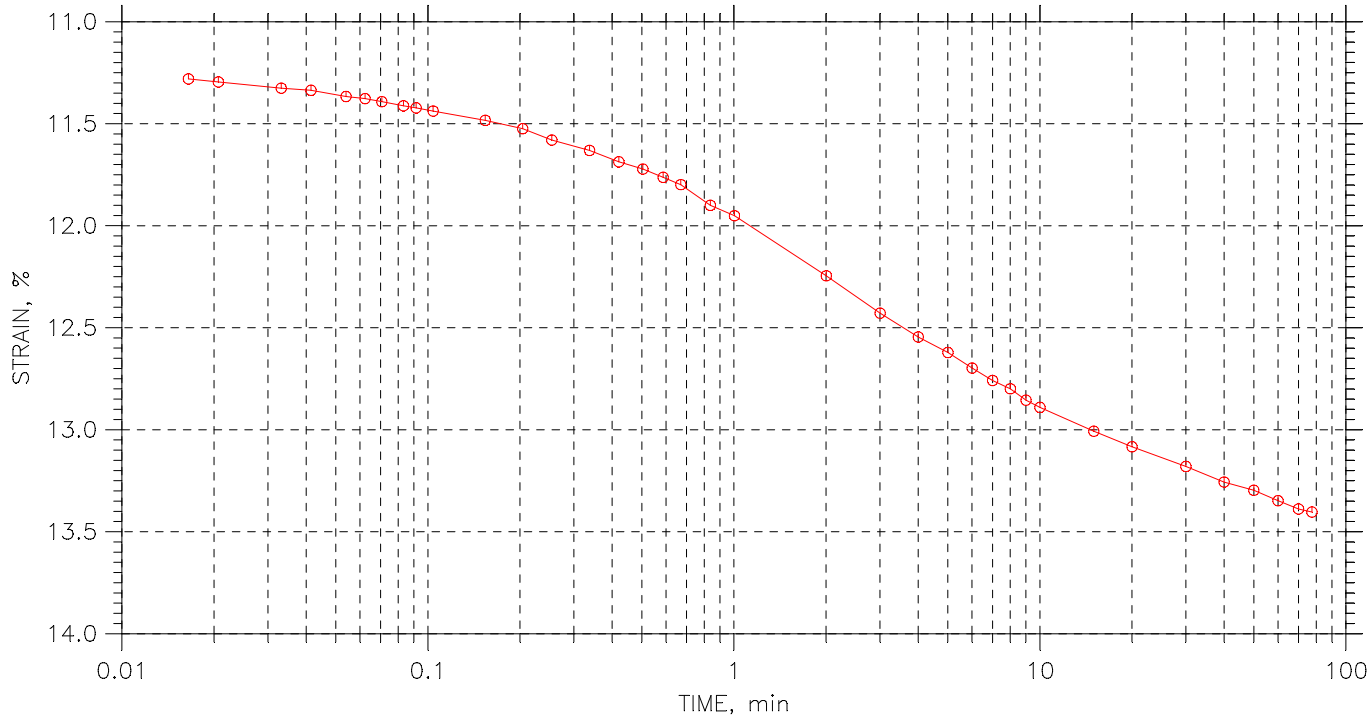
Thu, 16-AUG-2012 11:54:56

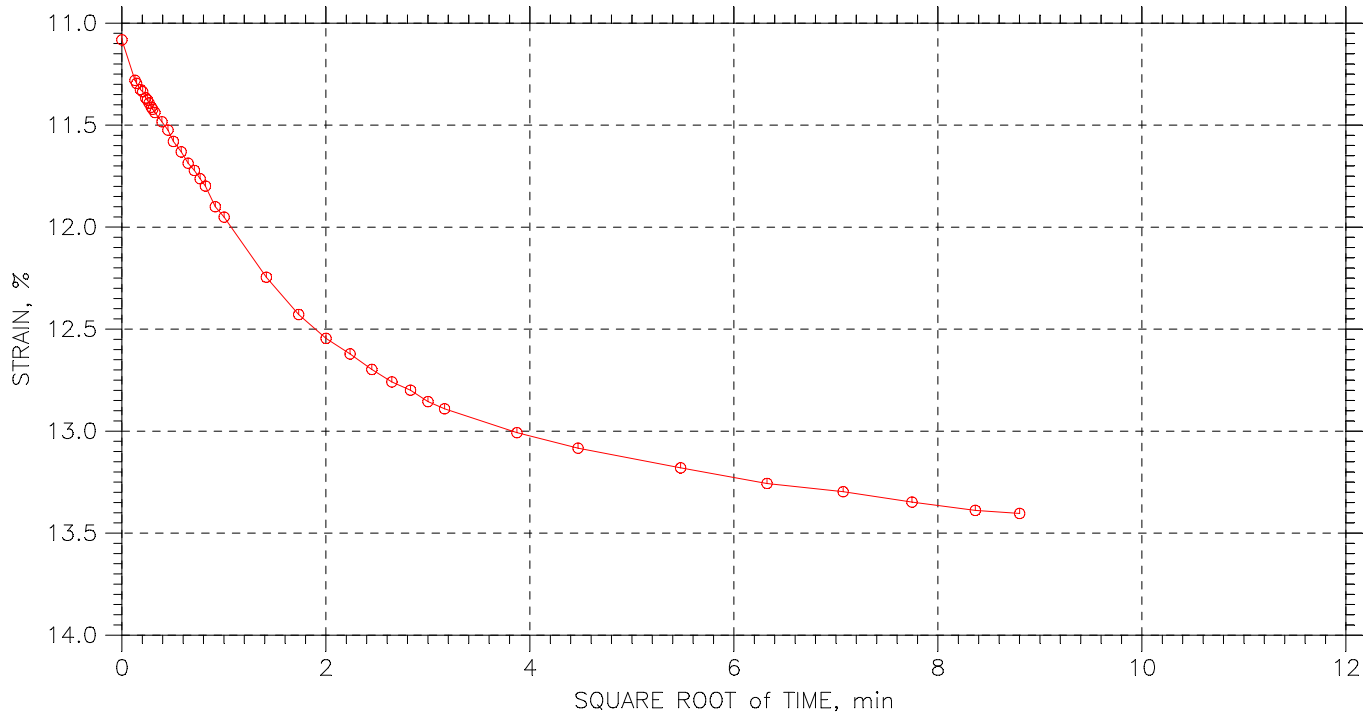
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 14 of 29

Stress: 10.25 tsf





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Boring No.: BB-BWA-102A	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/8/2012	Depth: 7.0-9.0 FT
Test No.: 244212	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

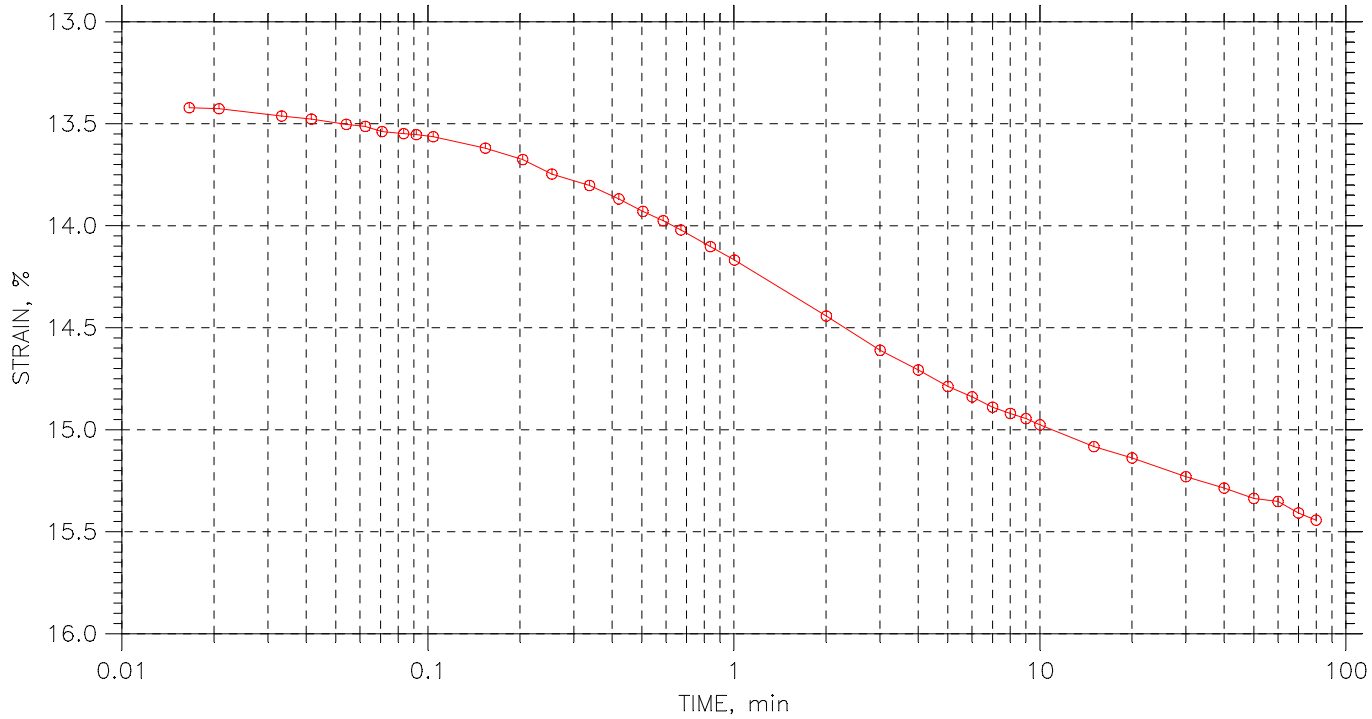
Thu, 16-AUG-2012 11:54:56

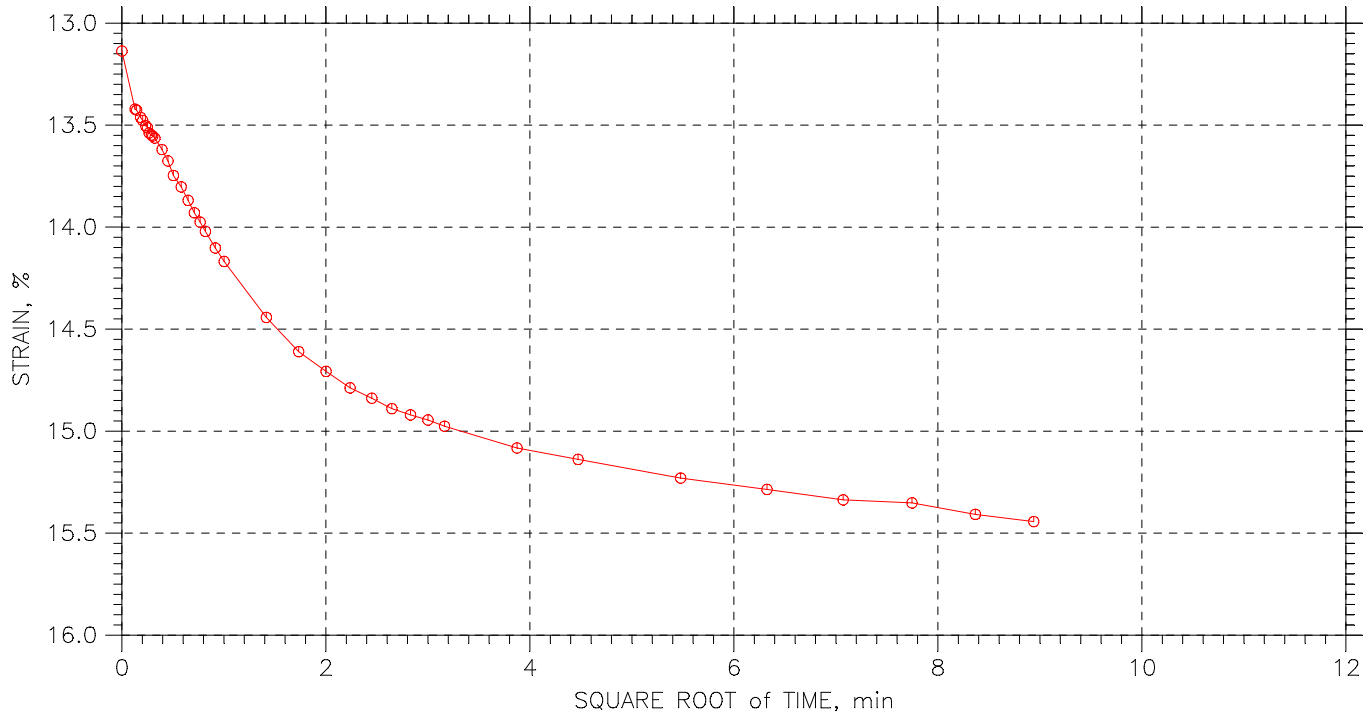
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 15 of 29

Stress: 15. tsf





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Boring No.: BB-BWA-102A	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/8/2012	Depth: 7.0-9.0 FT
Test No.: 244212	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

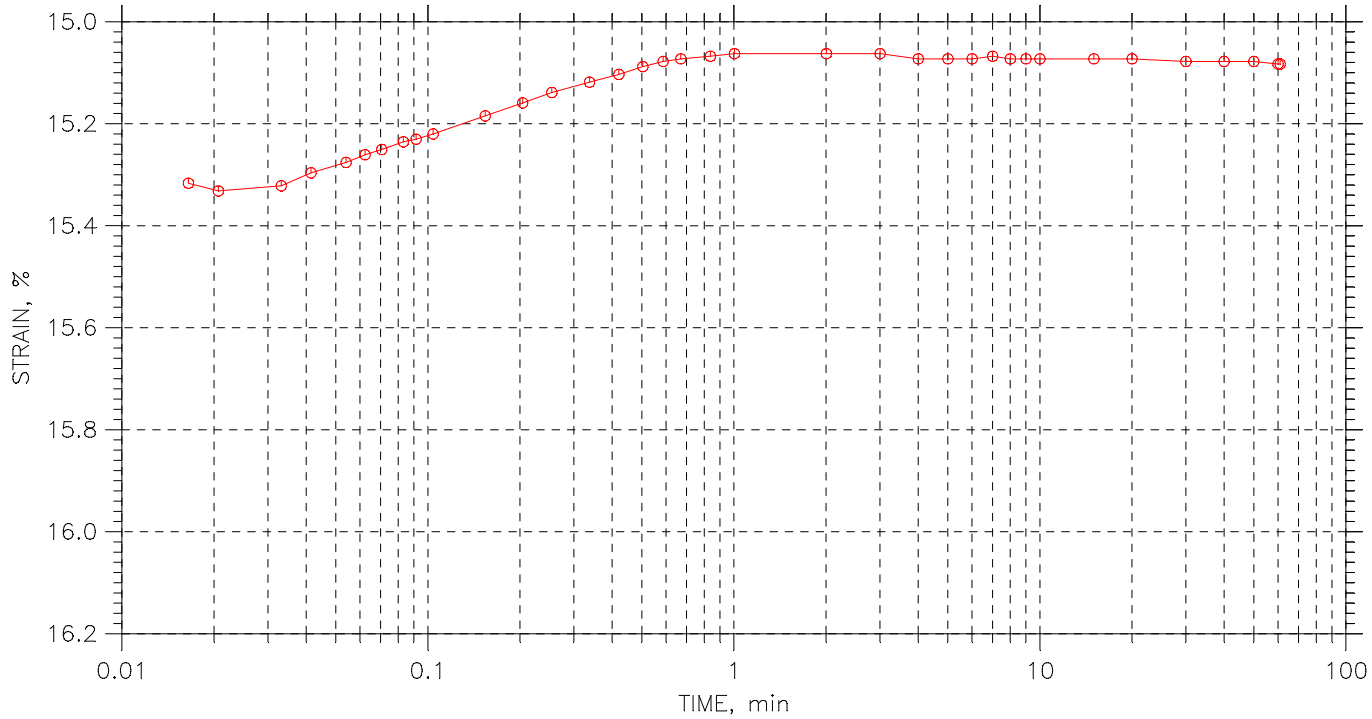
Thu, 16-AUG-2012 11:54:57

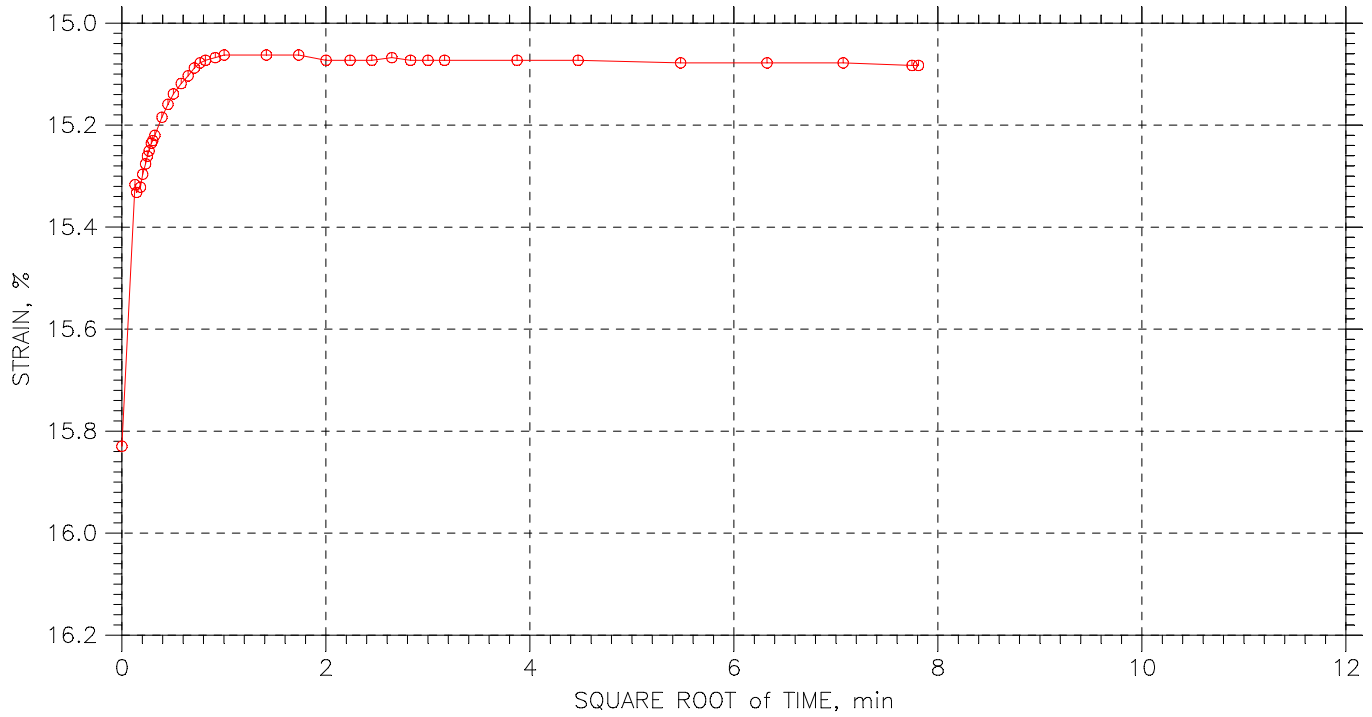
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 16 of 29

Stress: 7. tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-102A	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/8/2012	Depth: 7.0-9.0 FT
Test No.: 244212	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

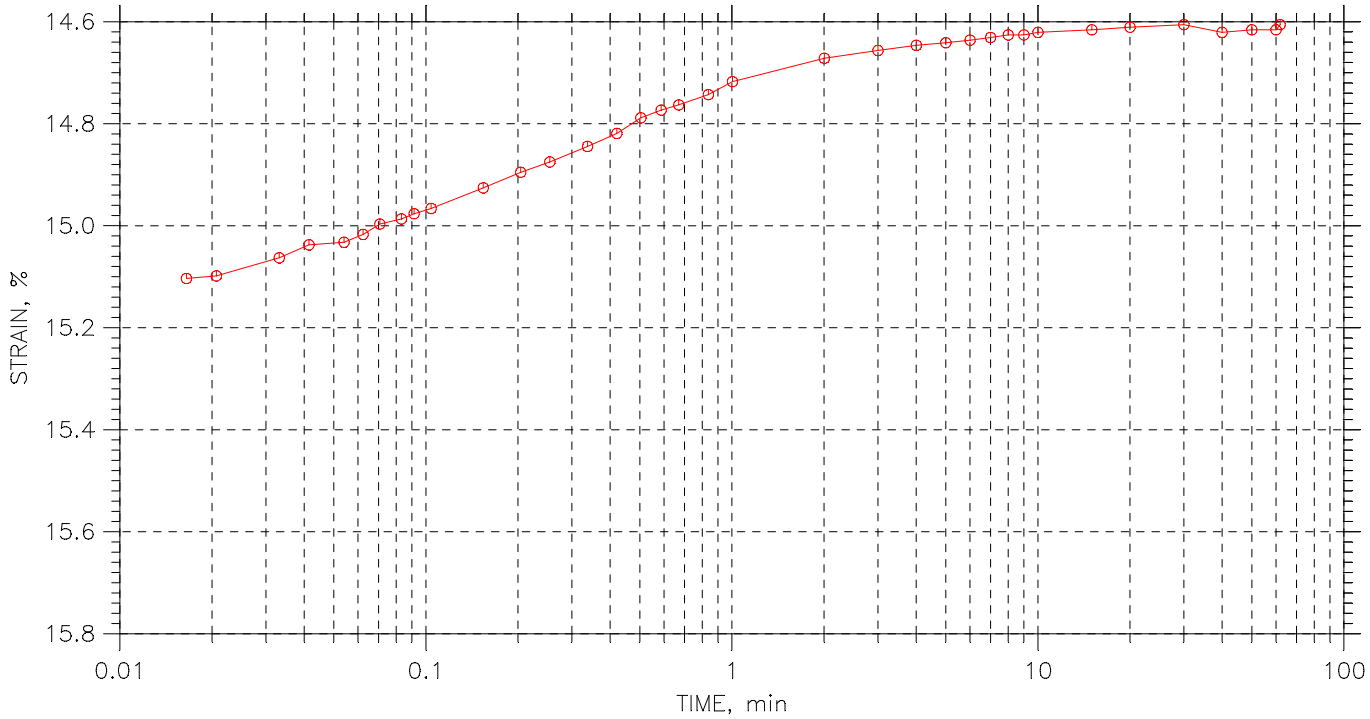
Thu, 16-AUG-2012 11:54:58

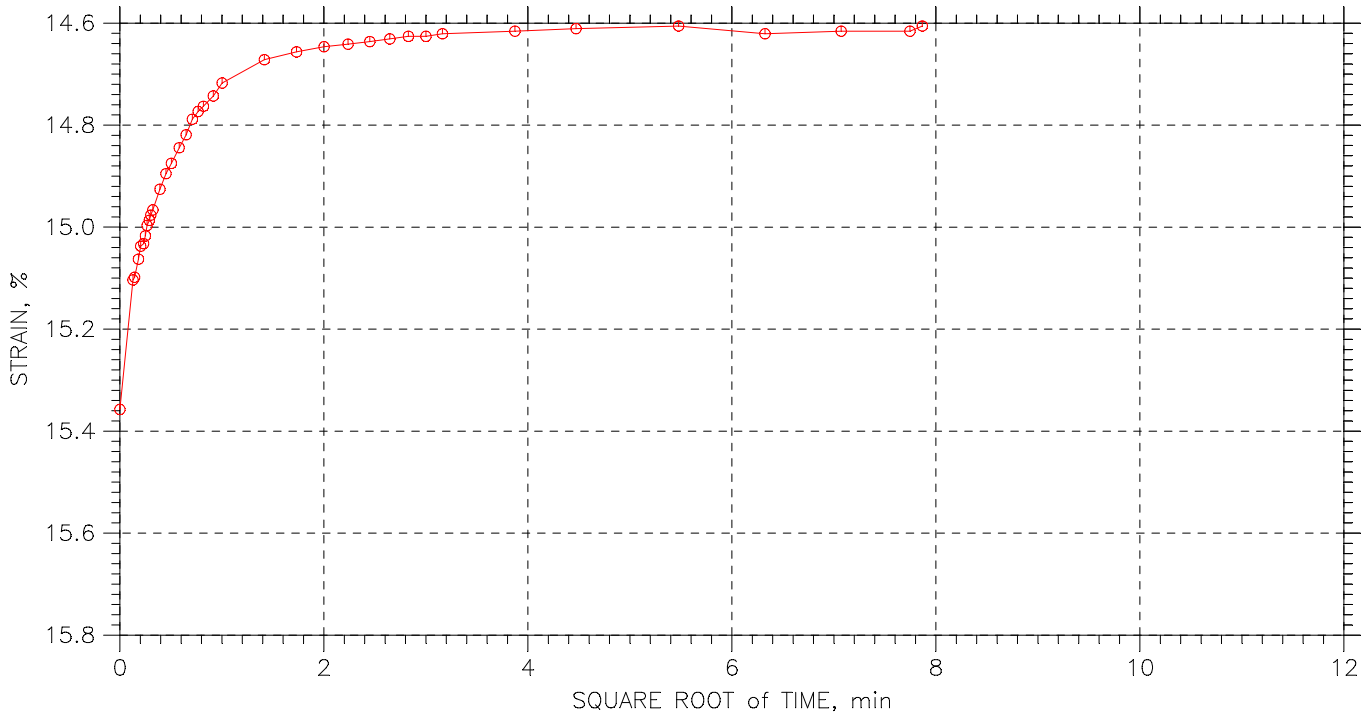
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 17 of 29

Stress: 3.25 tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-102A	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/8/2012	Depth: 7.0-9.0 FT
Test No.: 244212	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

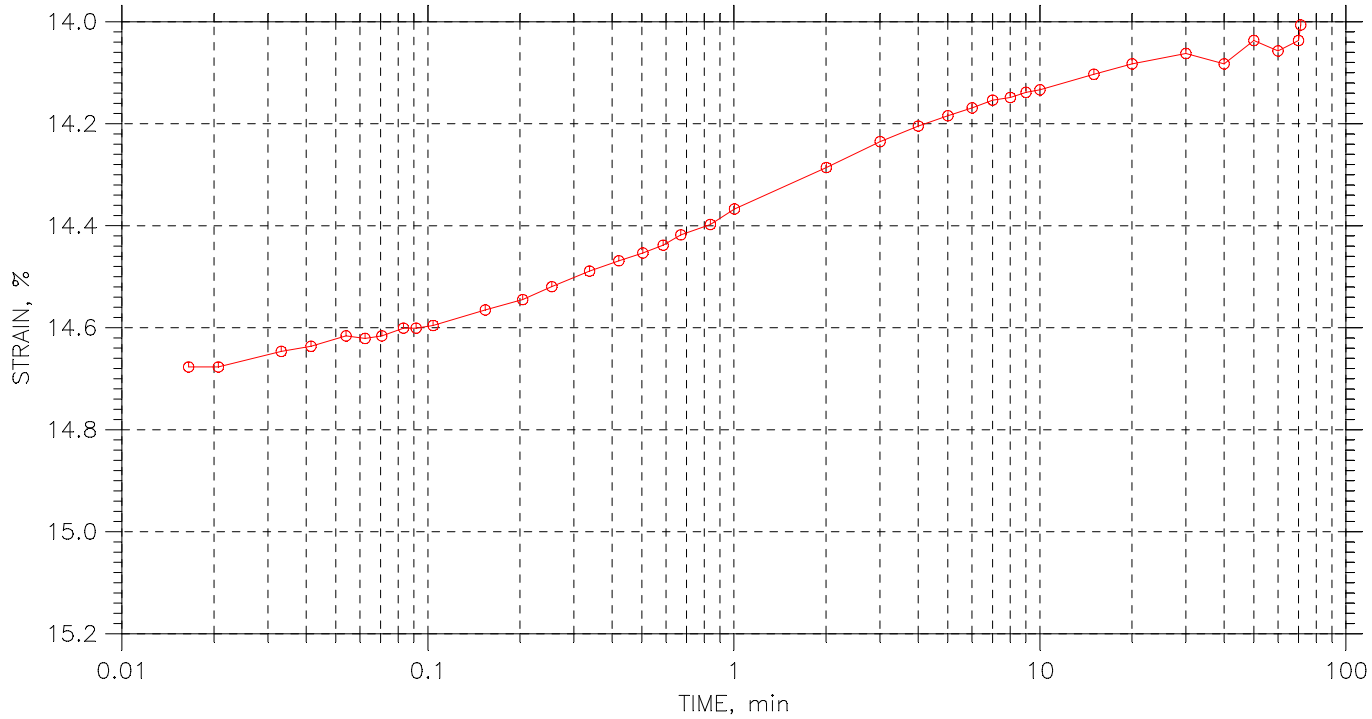
Thu, 16-AUG-2012 11:54:58

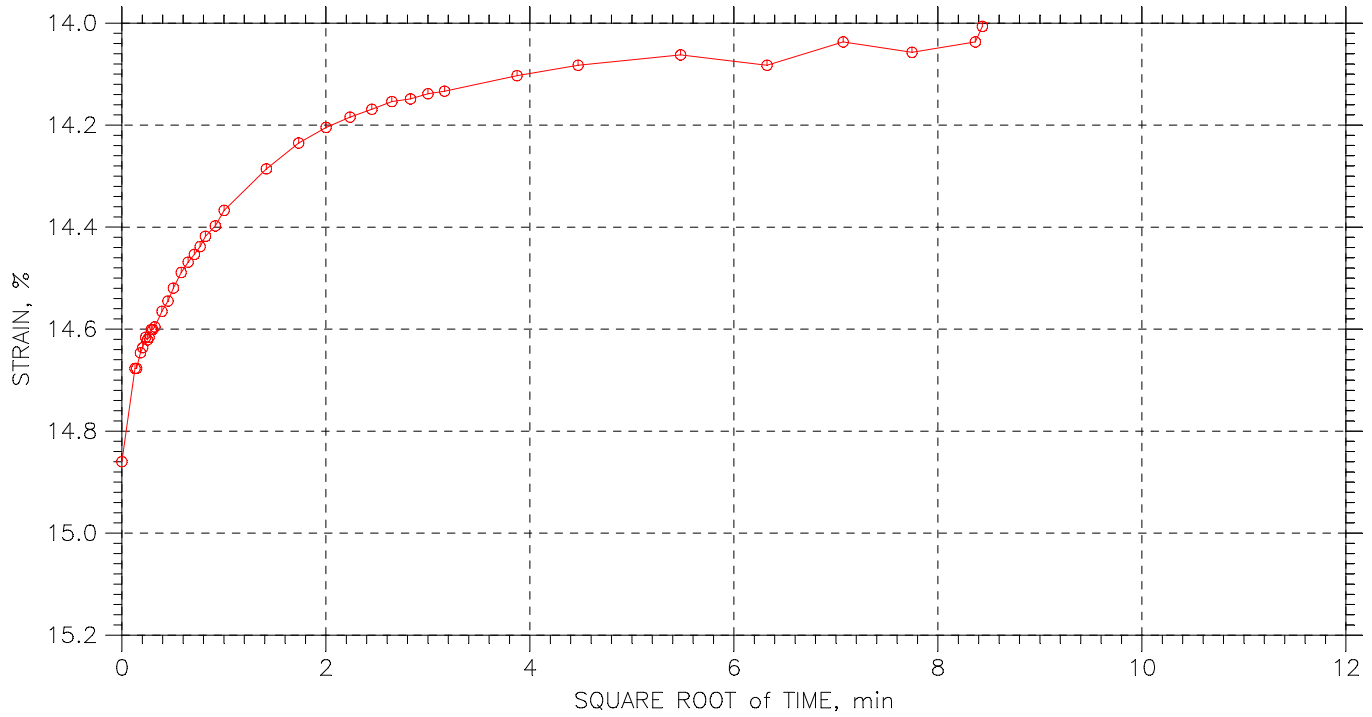
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 18 of 29

Stress: 1.5 tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-102A	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/8/2012	Depth: 7.0-9.0 FT
Test No.: 244212	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

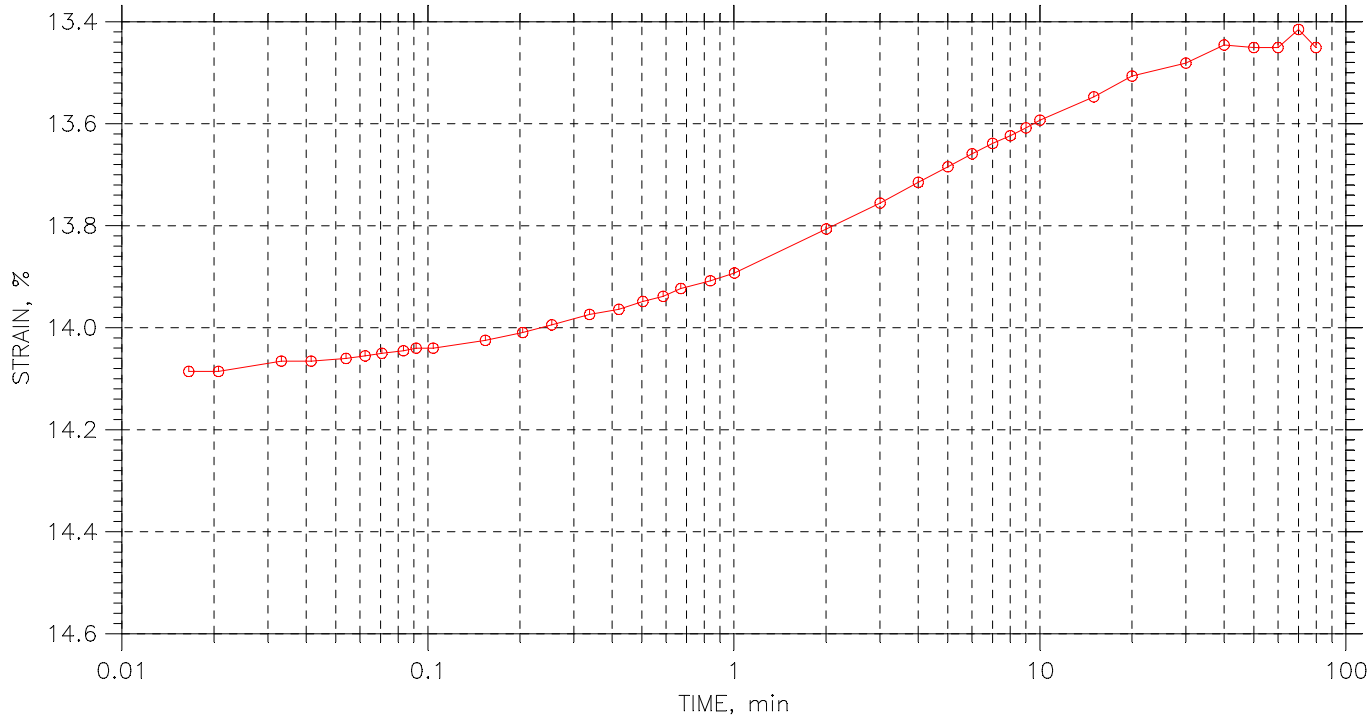
Thu, 16-AUG-2012 11:54:59

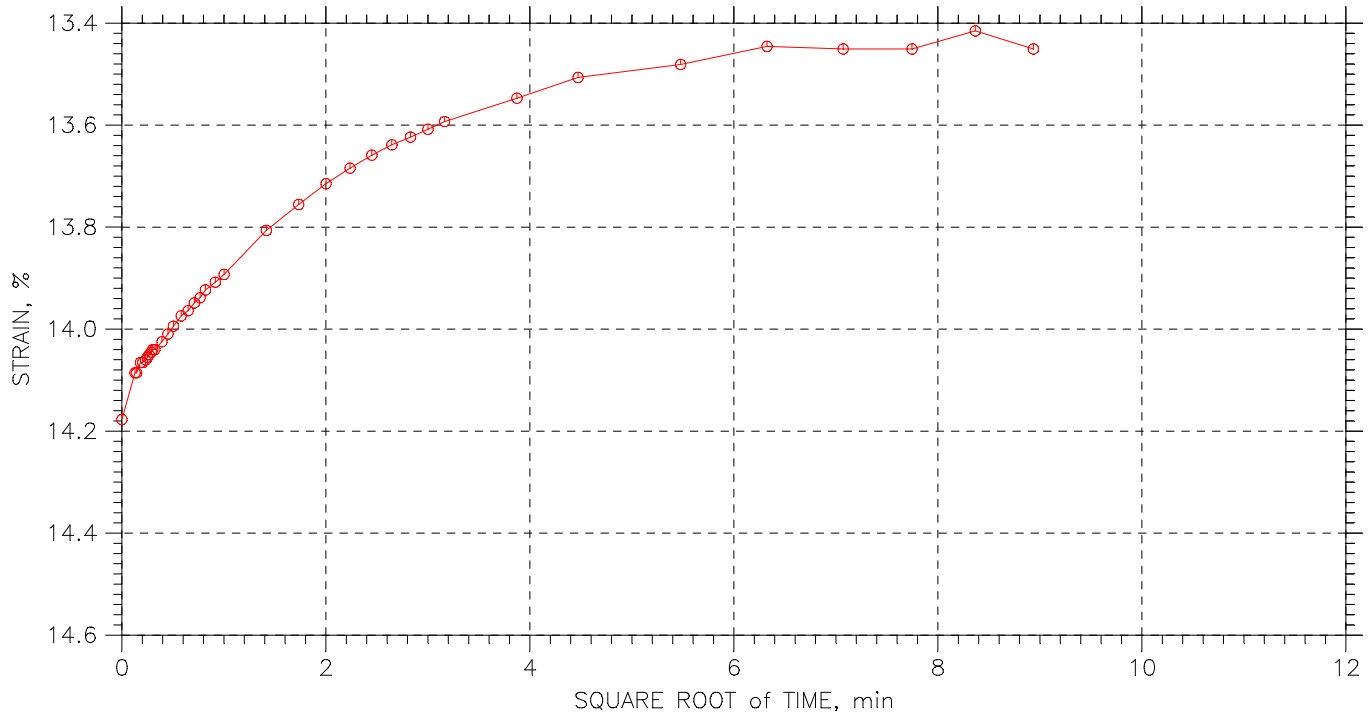
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 19 of 29

Stress: 0.75 tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-102A	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/8/2012	Depth: 7.0-9.0 FT
Test No.: 244212	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

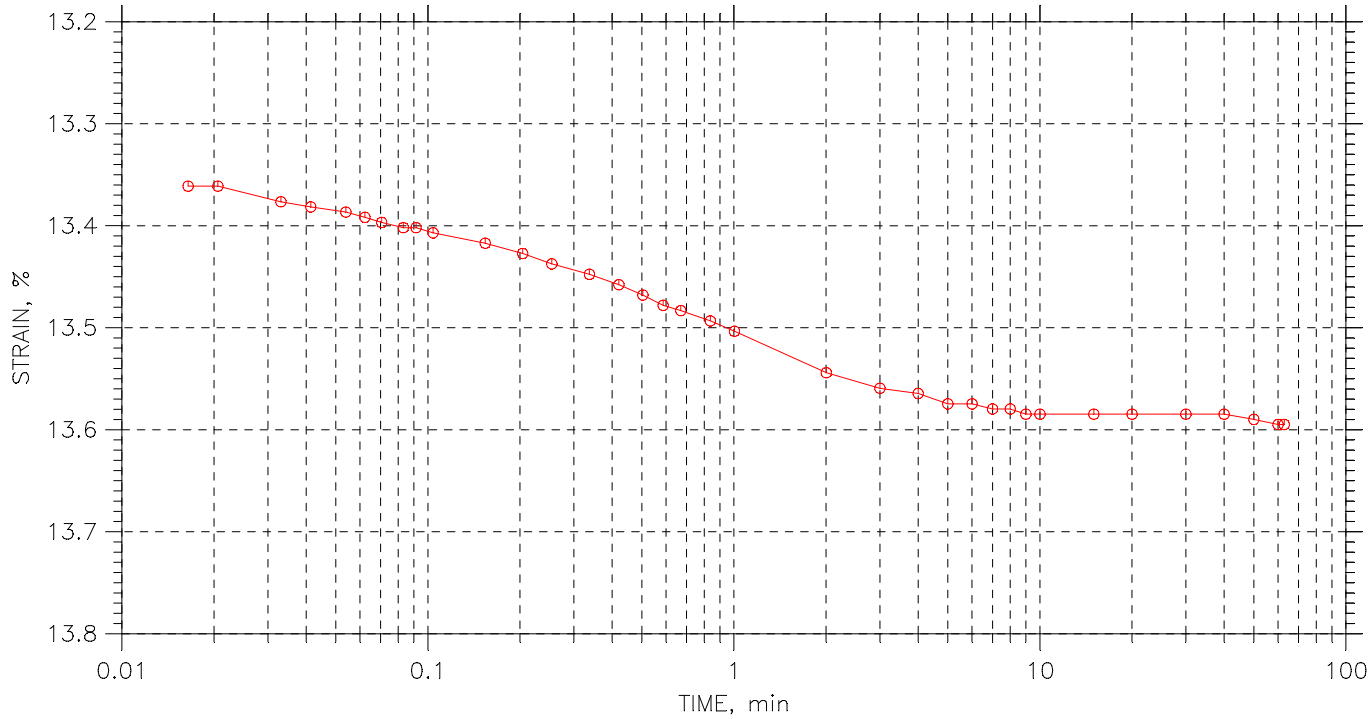
Thu, 16-AUG-2012 11:55:00

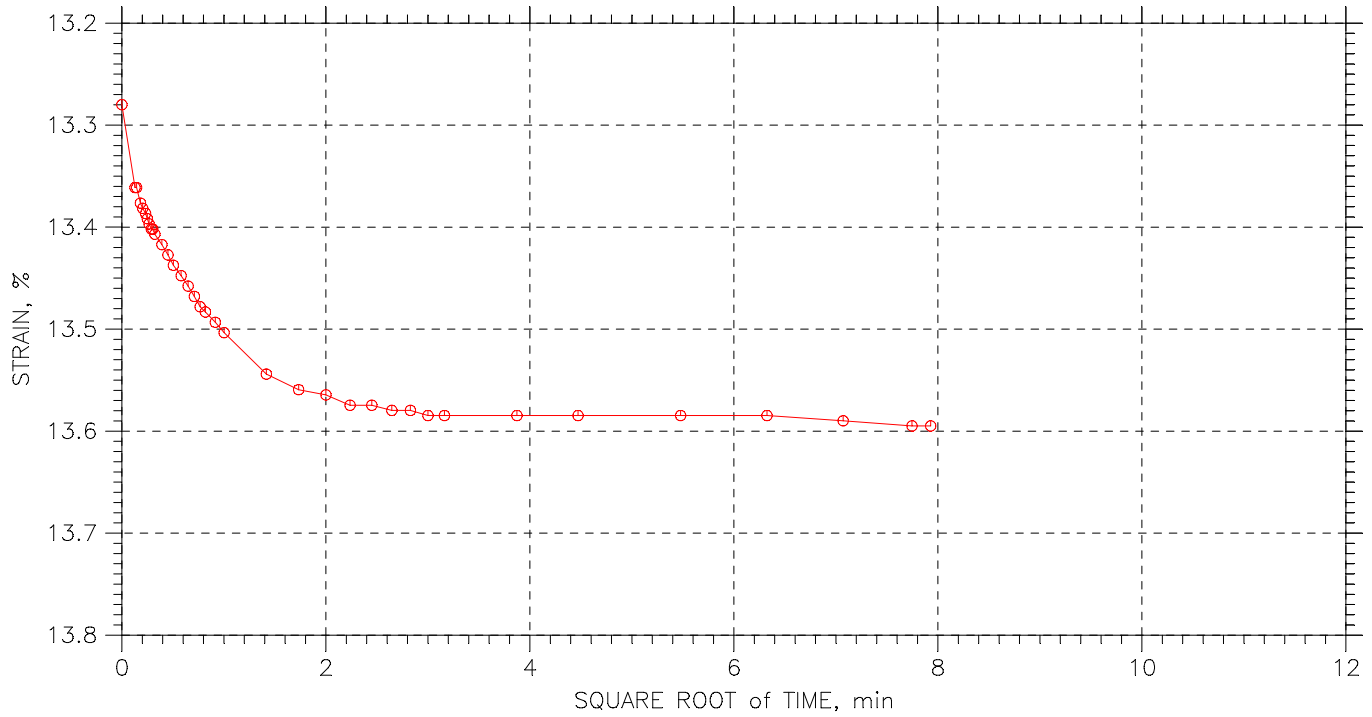
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 20 of 29

Stress: 1.5 tsf





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Boring No.: BB-BWA-102A	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/8/2012	Depth: 7.0-9.0 FT
Test No.: 244212	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

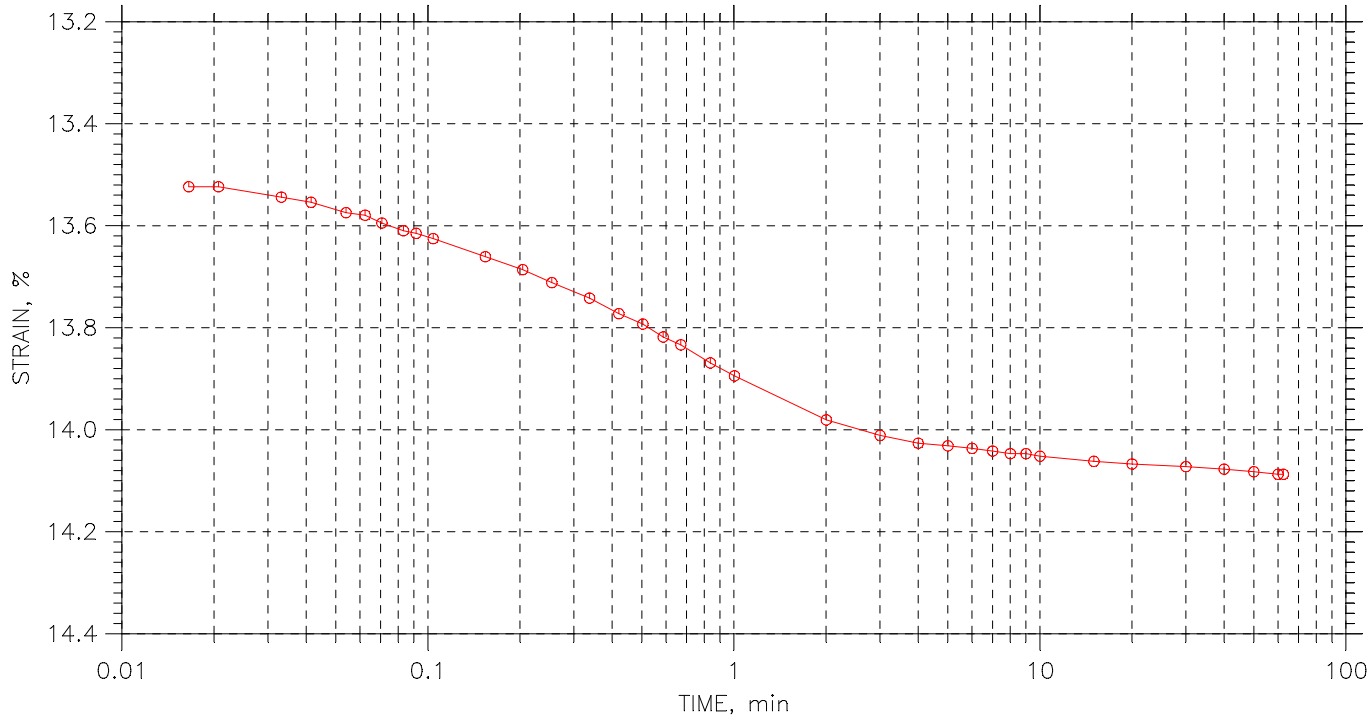
Thu, 16-AUG-2012 11:55:00

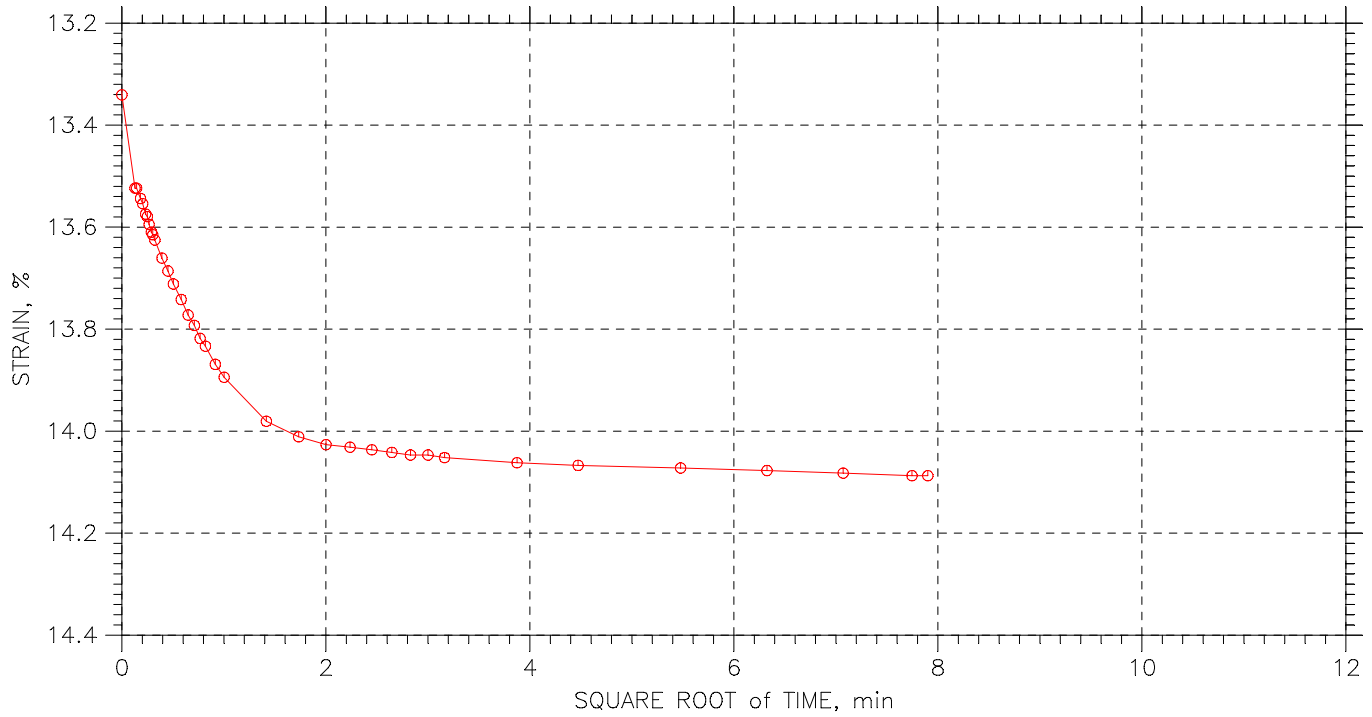
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 21 of 29

Stress: 3.25 tsf





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Test No.: 244212	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

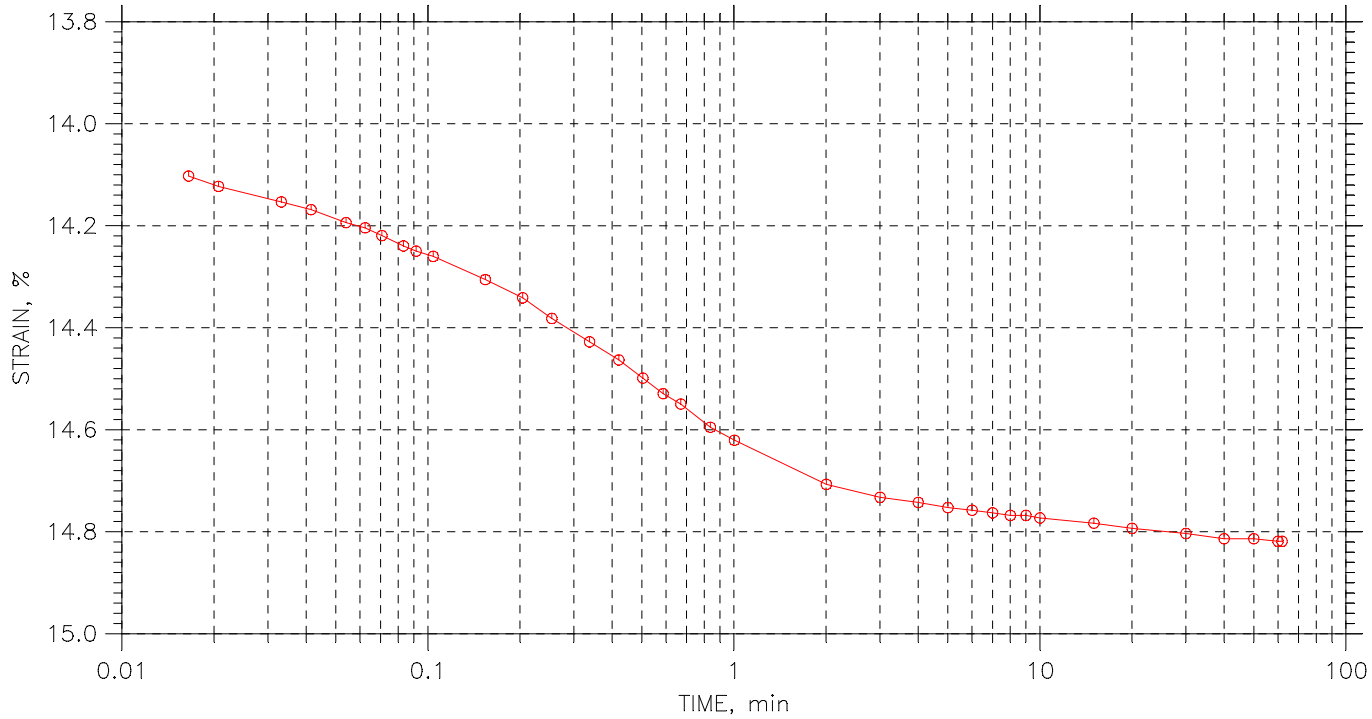
Thu, 16-AUG-2012 11:55:01

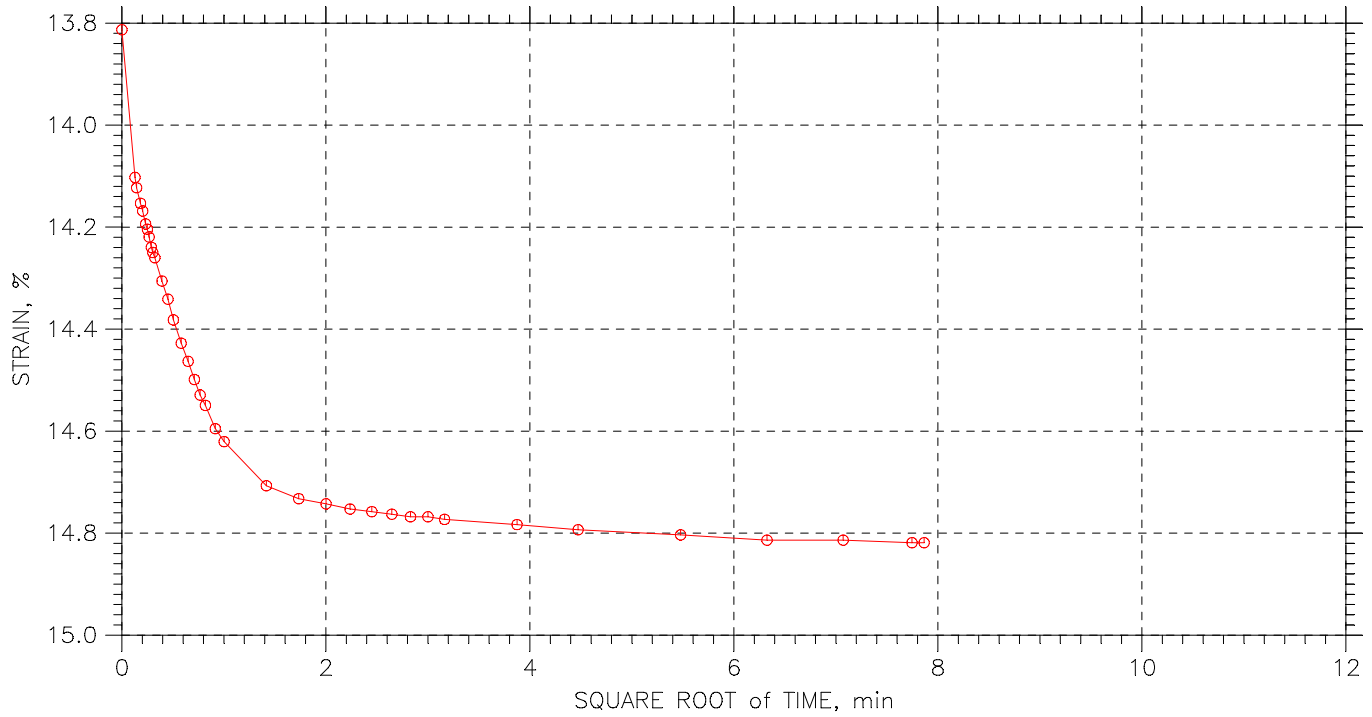
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 22 of 29

Stress: 7. tsf





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Boring No.: BB-BWA-102A	Tested By: G LIDSTONE	Checked By:
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Test No.: 244212	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

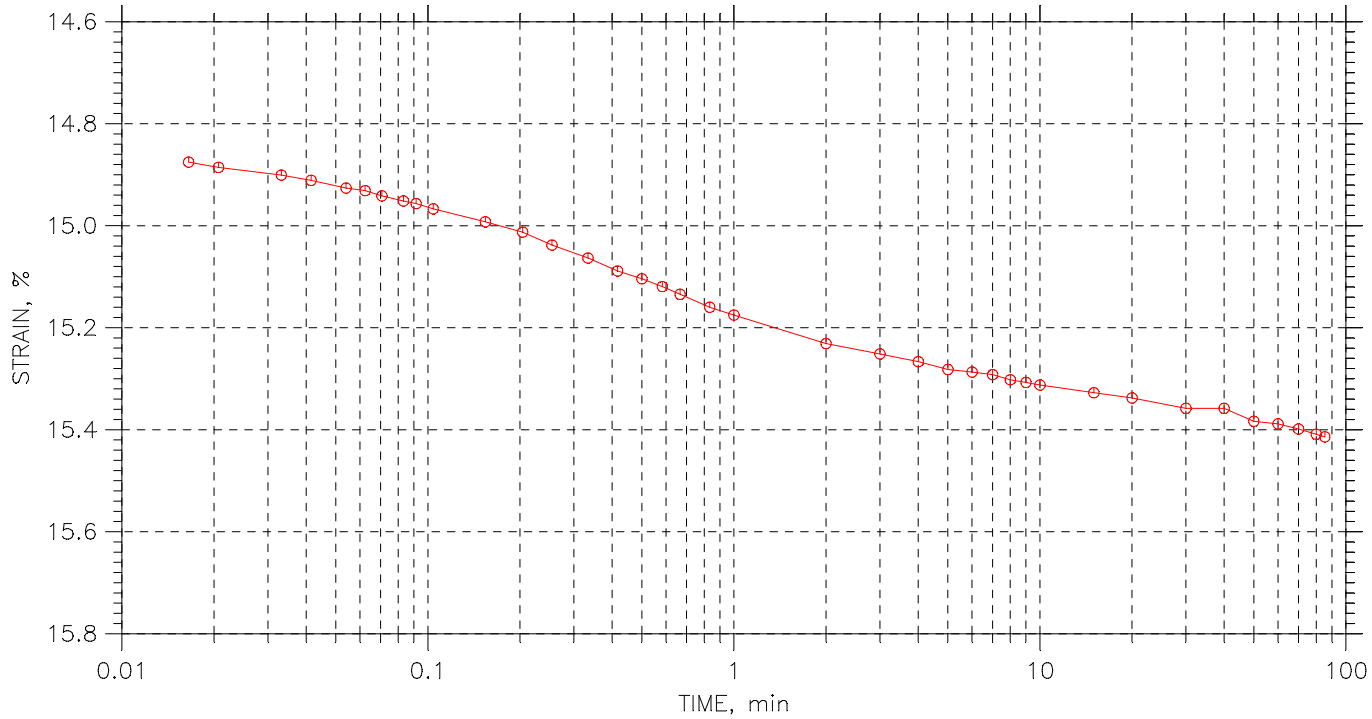
Thu, 16-AUG-2012 11:55:01

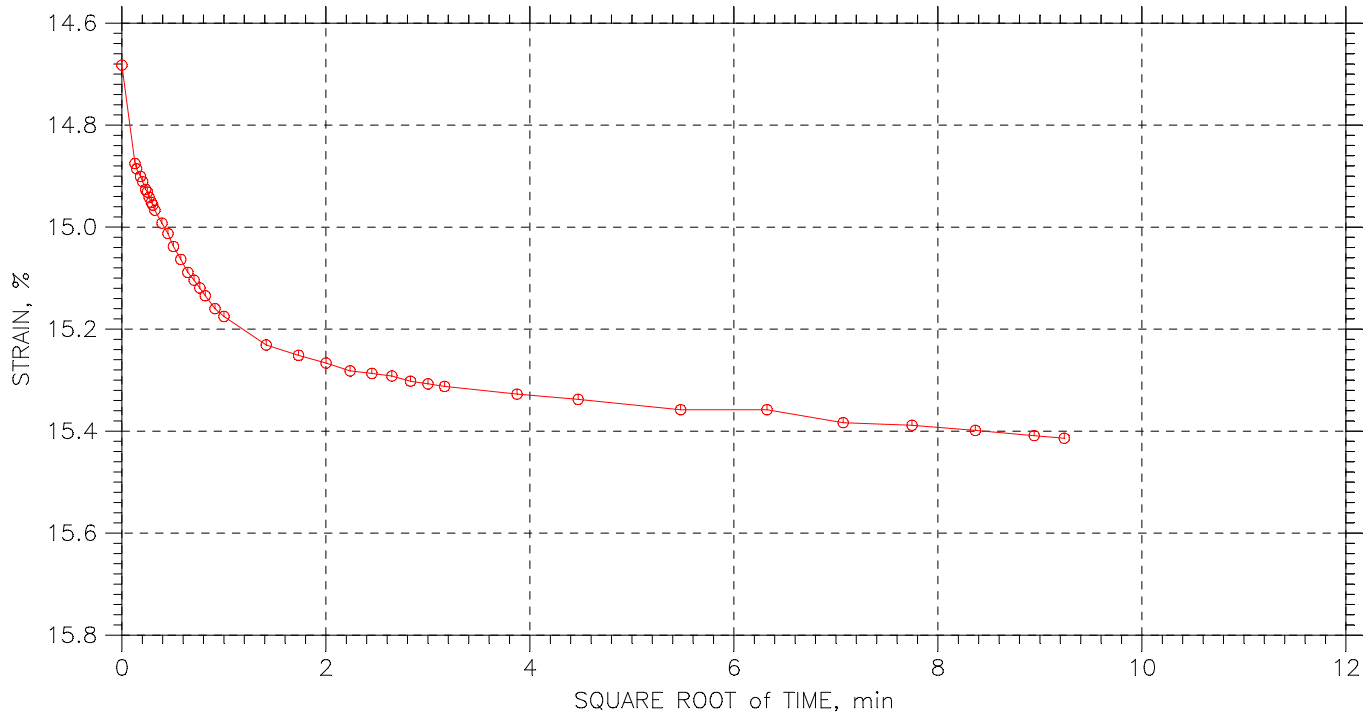
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 23 of 29

Stress: 10.25 tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-102A	Tested By: G LIDSTONE	Checked By:
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Test No.: 244212	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

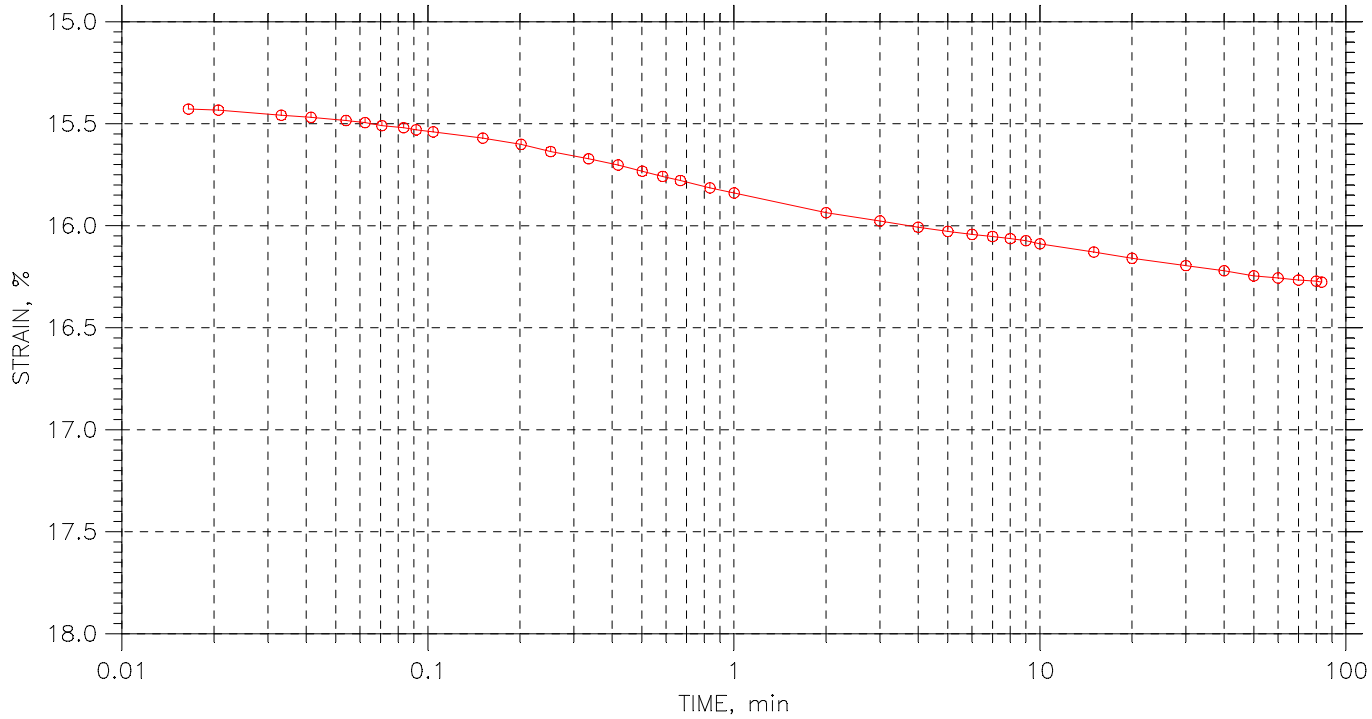
Thu, 16-AUG-2012 11:55:02

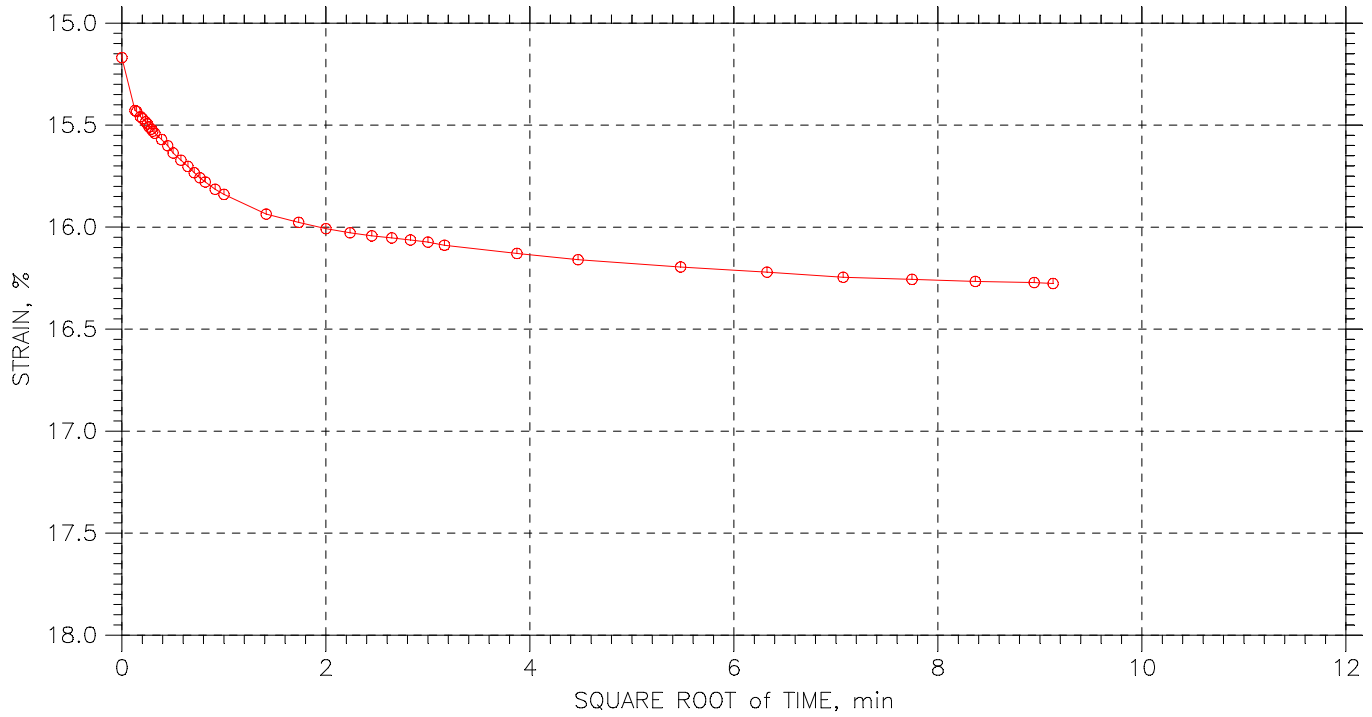
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 24 of 29

Stress: 15. tsf





Project:	Location: BANGOR	Project No.: 019311.00
Boring No.: BB-BWA-102A	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/8/2012	Depth: 7.0-9.0 FT
Test No.: 244212	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

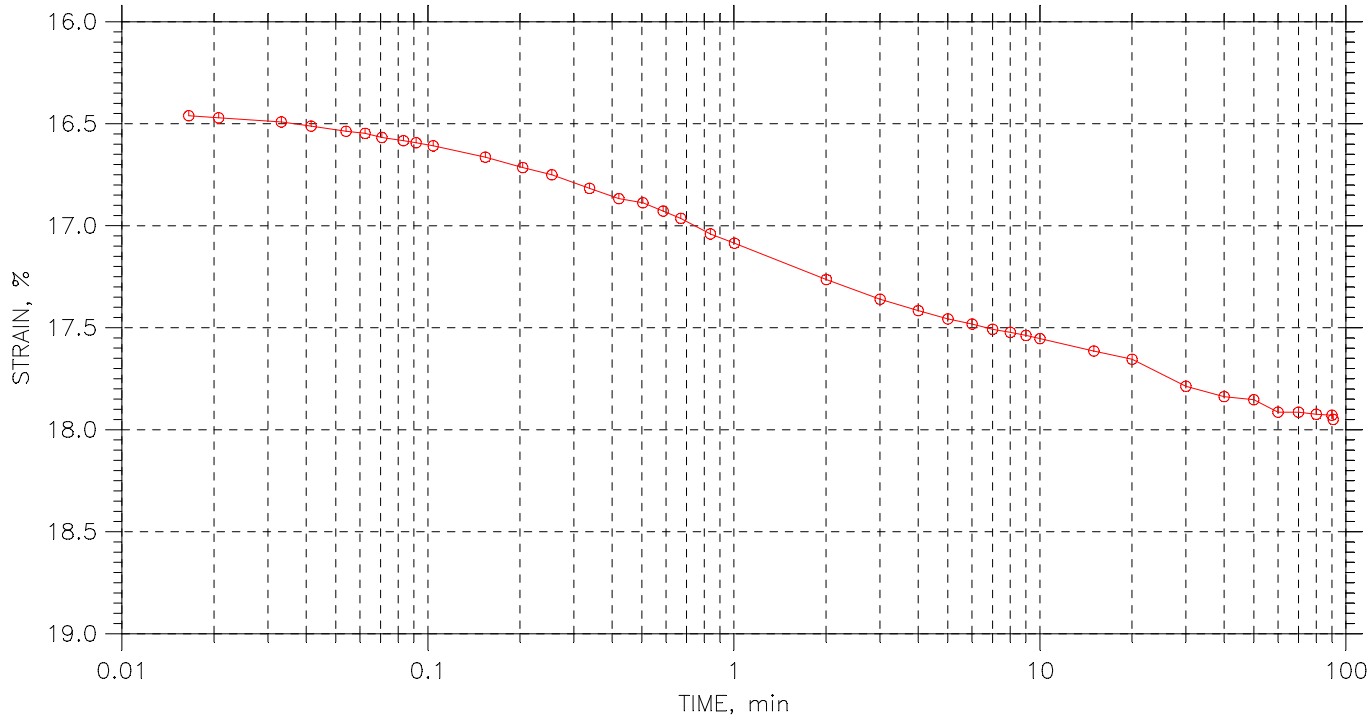
Thu, 16-AUG-2012 11:55:03

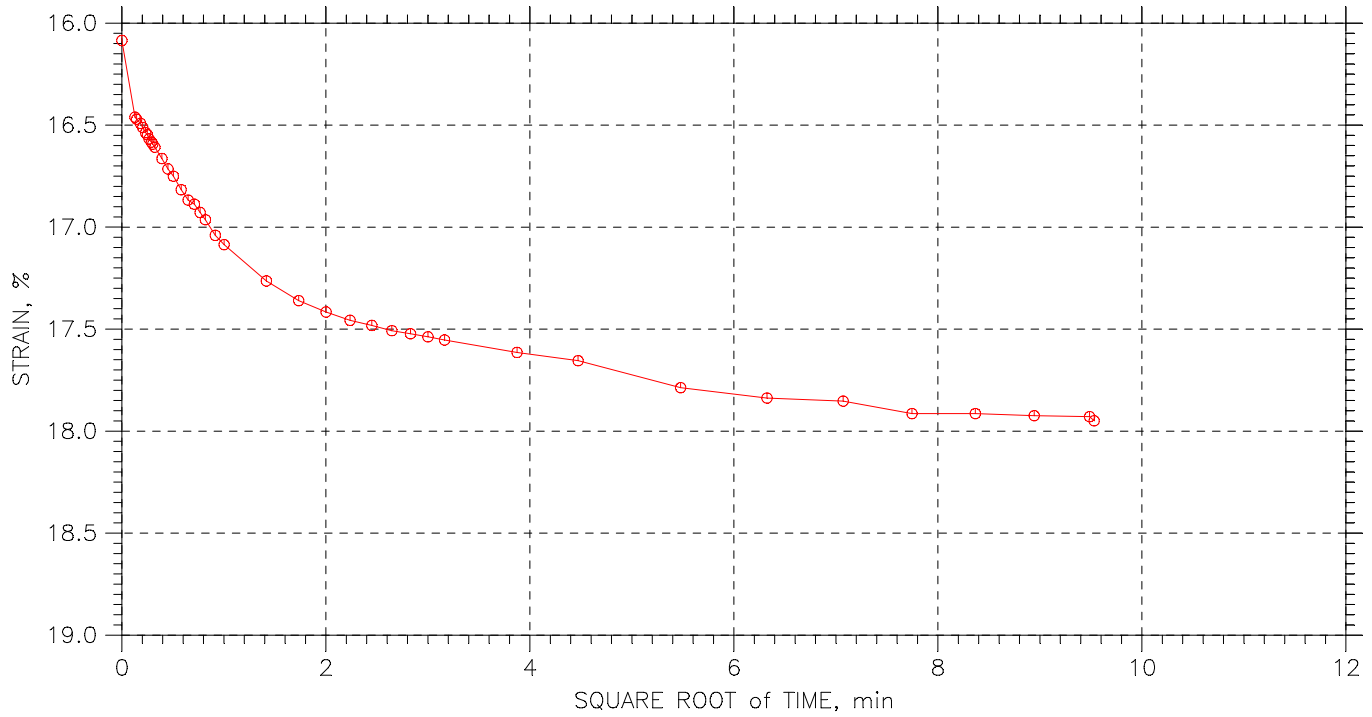
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 25 of 29

Stress: 22. tsf





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Boring No.: BB-BWA-102A	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/8/2012	Depth: 7.0-9.0 FT
Test No.: 244212	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

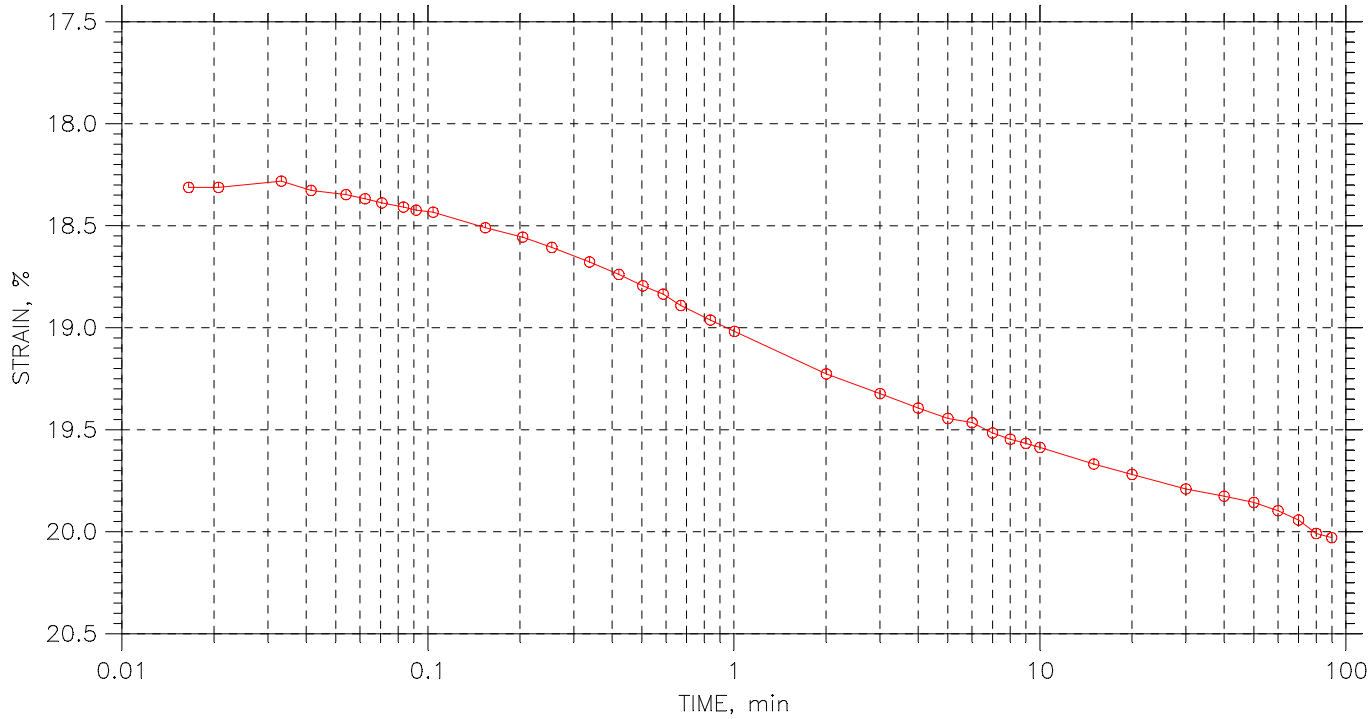
Thu, 16-AUG-2012 11:55:03

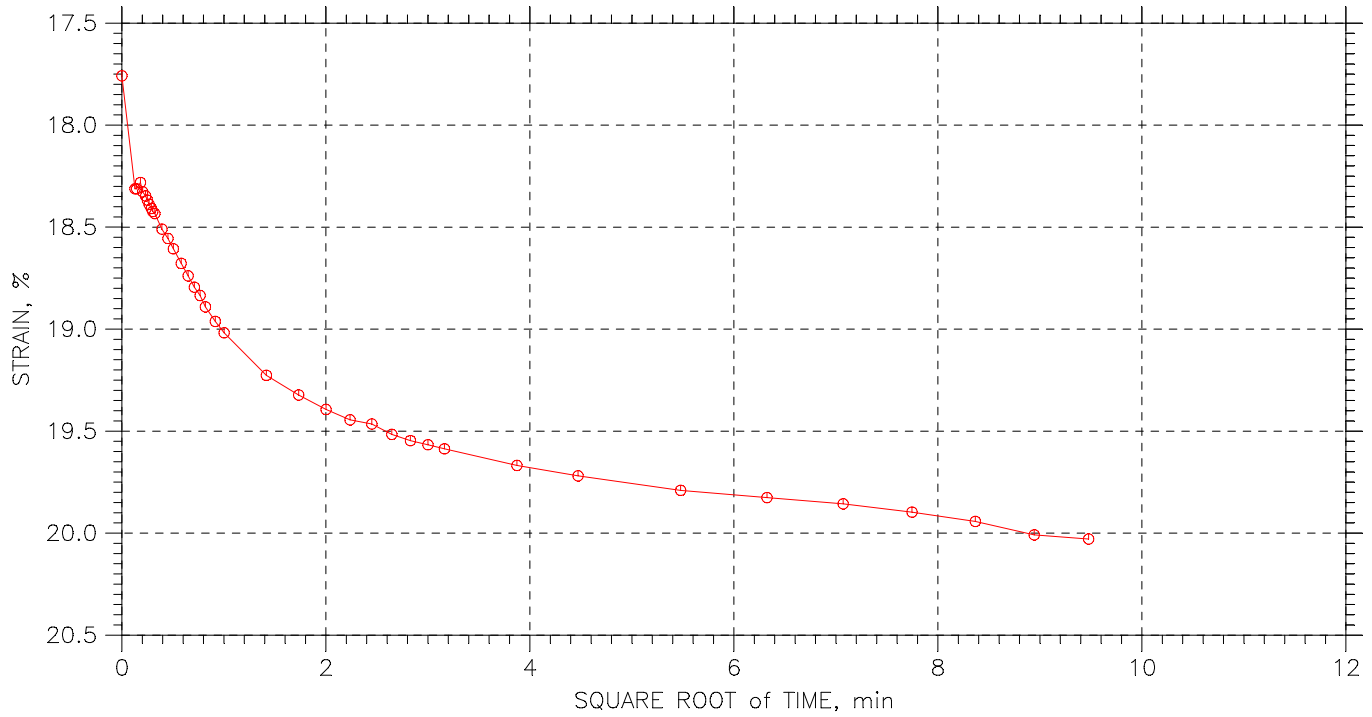
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 26 of 29

Stress: 32.25 tsf





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Boring No.: BB-BWA-102A	Tested By: G LIDSTONE	Checked By:
Sample No.: 1U	Test Date: 8/8/2012	Depth: 7.0-9.0 FT
Test No.: 244212	Sample Type: TUBE	Elevation:
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Remarks:		

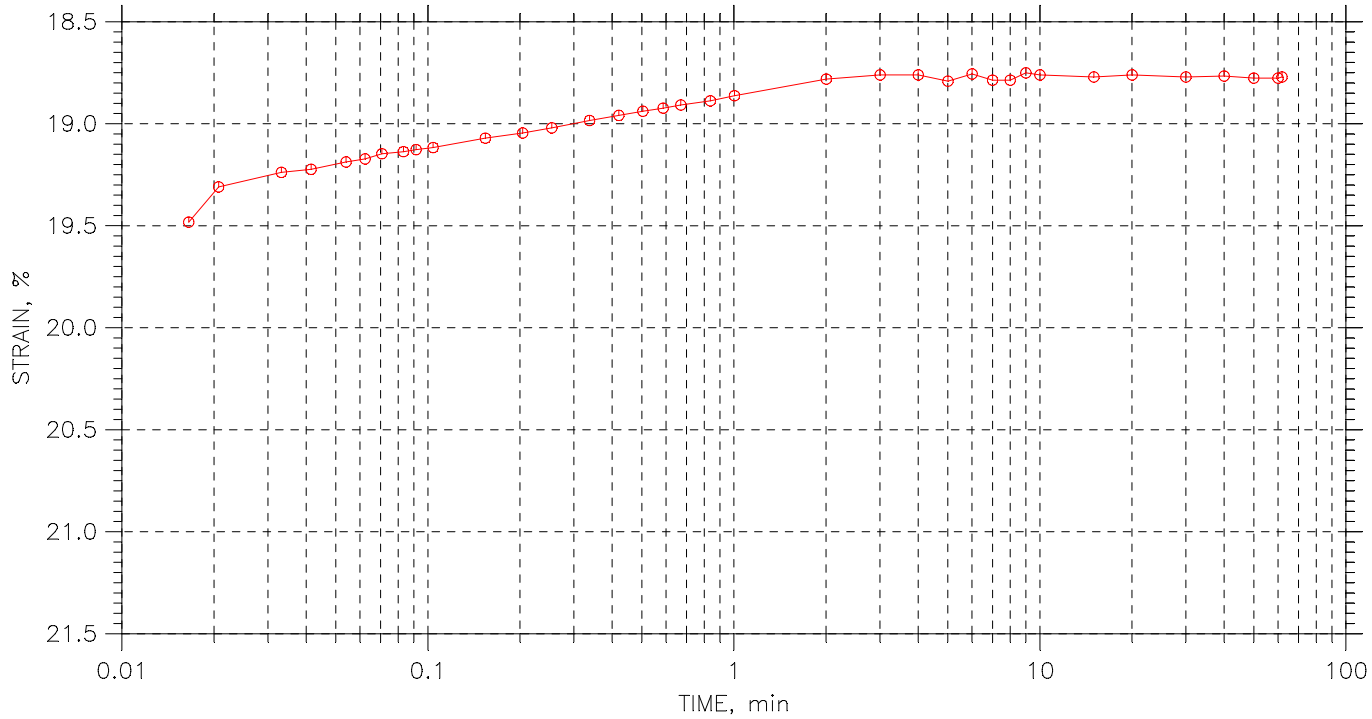
Thu, 16-AUG-2012 11:55:04

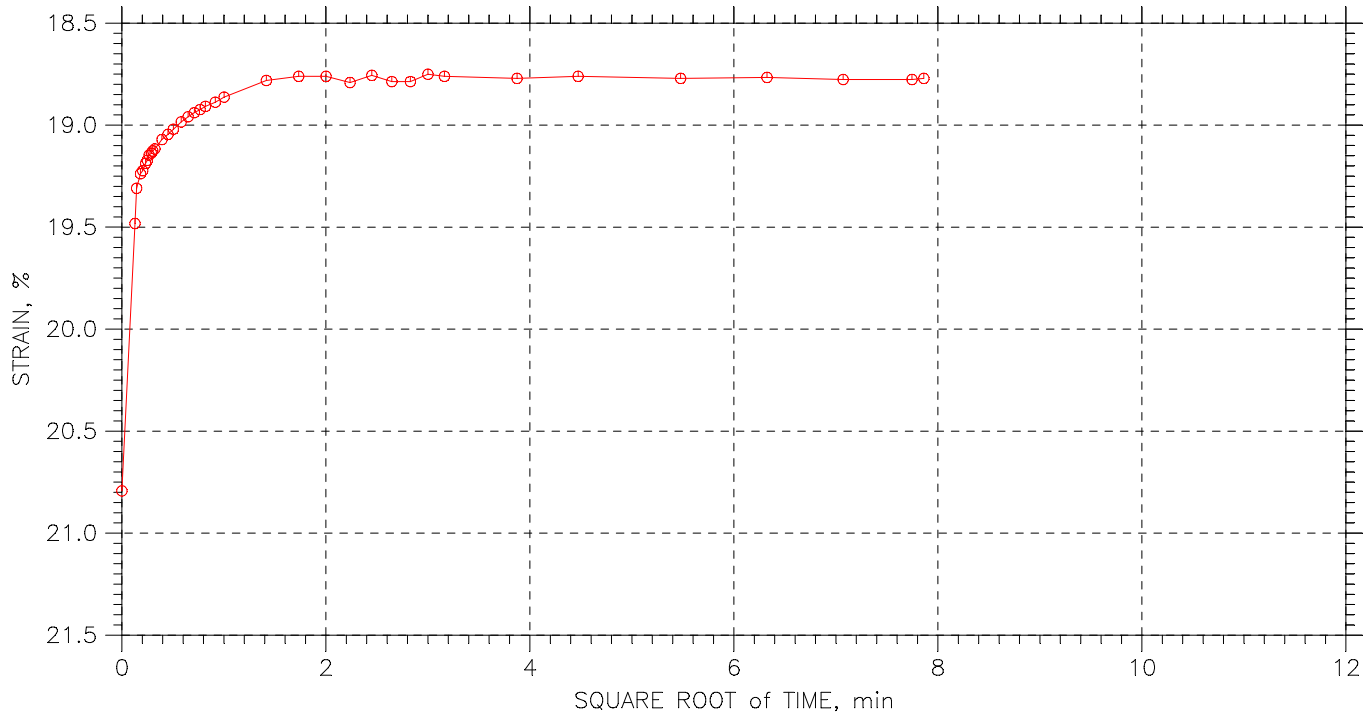
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 27 of 29

Stress: 7. tsf





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Test No.: 244212	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

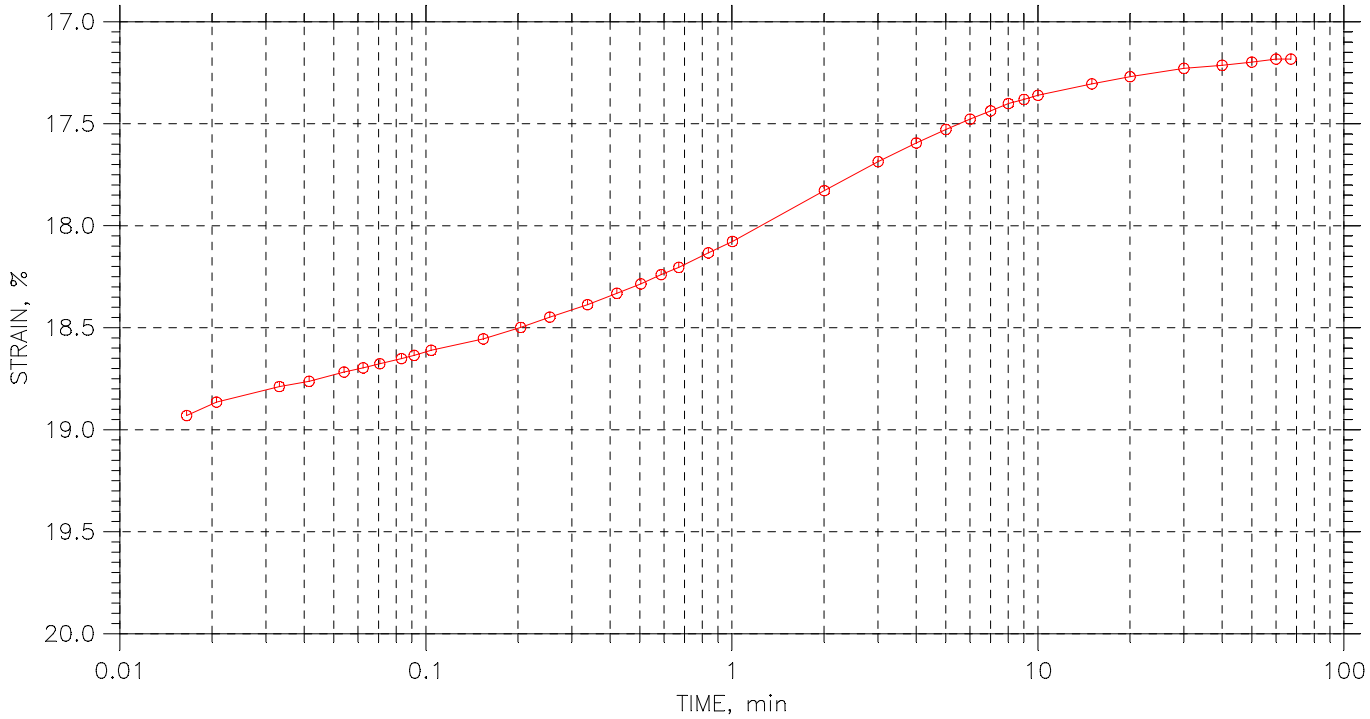
Thu, 16-AUG-2012 11:55:05

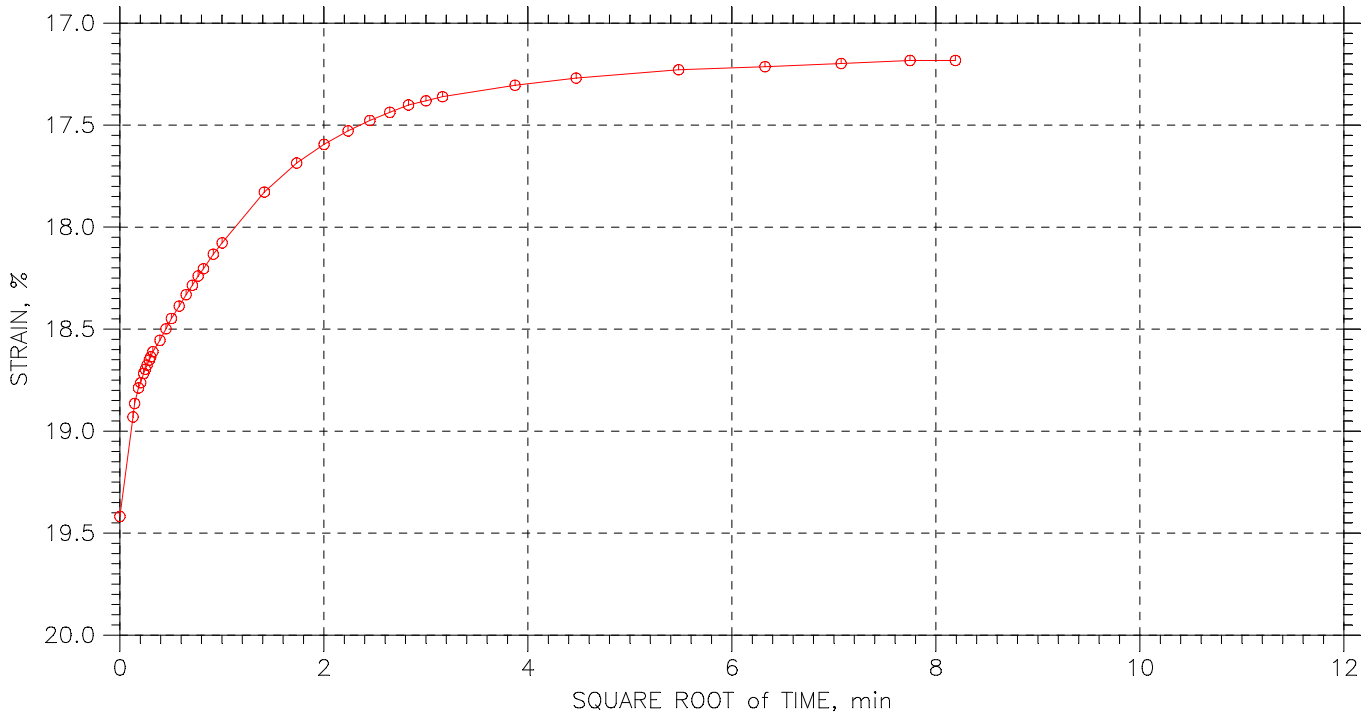
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 28 of 29

Stress: 1. tsf





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Boring No.: BB-BWA-102A	Tested By: G LIDSTONE	Checked By:
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Test No.: 244212	Sample Type: TUBE	Elevation:
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Remarks:		

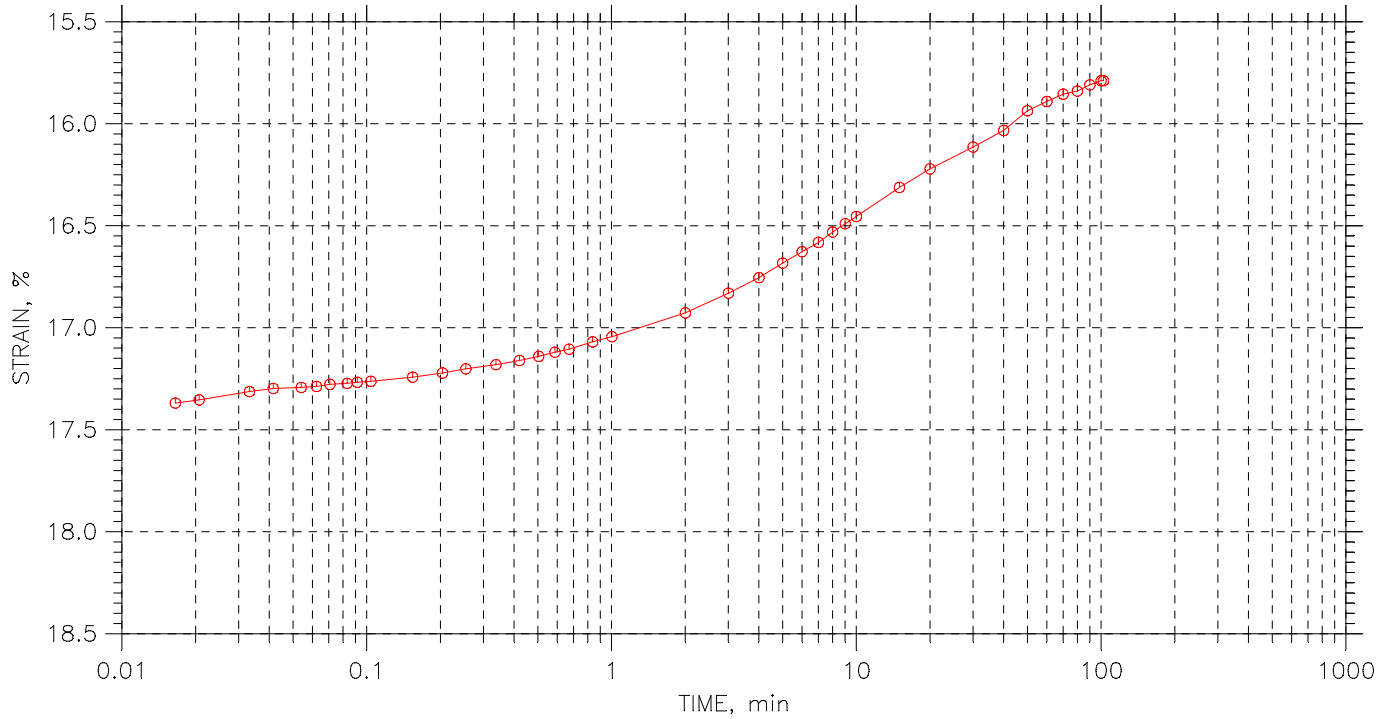
Thu, 16-AUG-2012 11:55:05

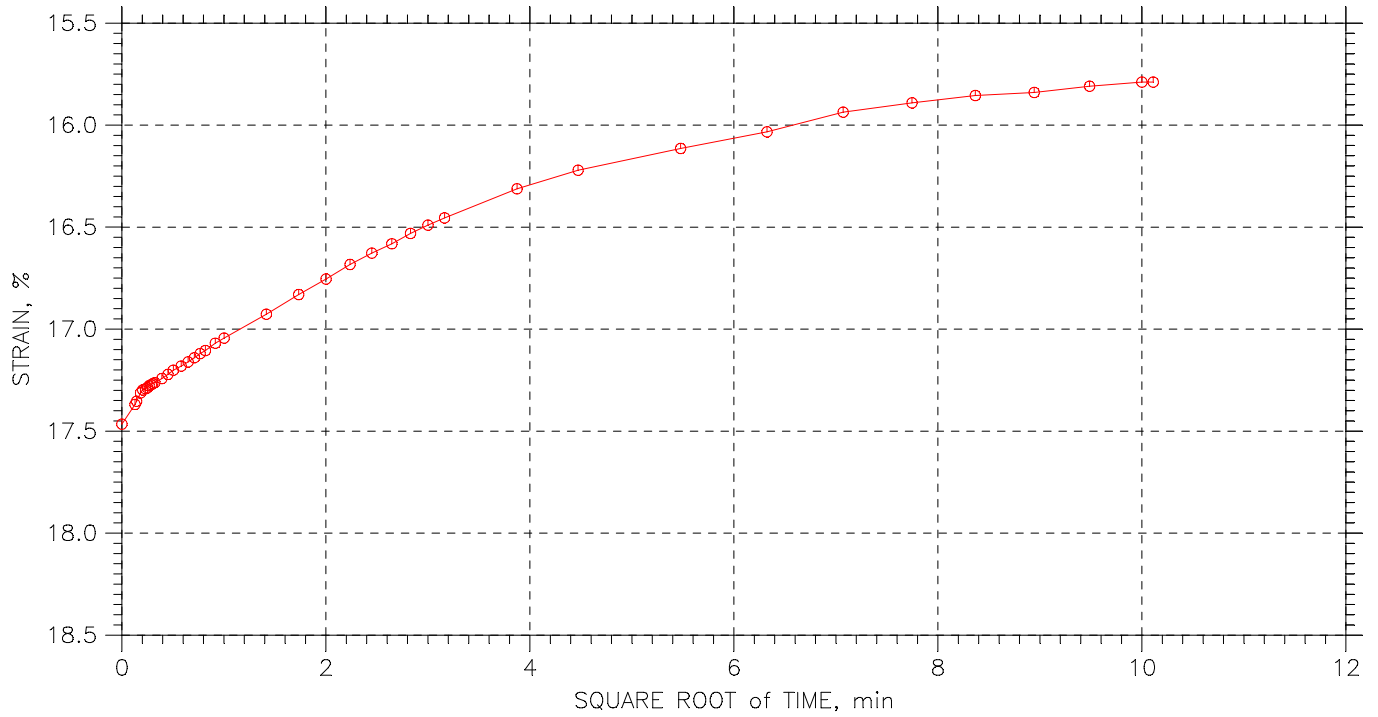
CONSOLIDATION TEST DATA

TIME CURVES

Constant Load Step: 29 of 29

Stress: 0.25 tsf





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Sample No.: 1U	Test Date: 8/8/2012	Depth: 7.0-9.0 FT
Test No.: 244212	Sample Type: TUBE	Elevation:
Description:		
Remarks:		

Thu, 16-AUG-2012 11:55:06

APPENDIX D

Historic Drawings

2006 Sewer Extension Drawings

CITY OF BANGOR
PARKS AND RECREATION
WEBSTER AVENUE WATER/SEWER EXTENSION

GOLF MAINTENANCE BUILDING
BANGOR, MAINE

OWNER

CITY OF BANGOR
73 HARLOW STREET
BANGOR, MAINE

ENGINEER

CARPENTER ASSOCIATES
687 STILLWATER AVENUE
OLD TOWN, MAINE 04468
PHONE (207) 827-8001 FAX (207) 827-8234

MAY 1, 2006

INDEX

	COVER
C1	OVERALL SITE PLAN
C2	SITE PLAN
C3	SITE DETAILS
C4	SITE DETAILS
U1	SEWER PROFILES
U2	SEWER PROFILES

CARPENTER ASSOCIATES
CONSULTING ENGINEERS
687 STILLWATER AVENUE OLD TOWN, MAINE 04468

FOR BID
05-01-06

STATE OF MAINE
RANDY BRAGG
No. 7278
REGISTERED PROFESSIONAL ENGINEER

GENERAL NOTES:

1. EXISTING CONDITIONS INFORMATION TAKEN FROM BANGOR CITY DIGITAL MAPS.

2. CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE EXACT LOCATION OF EXISTING UTILITIES WITH ALL UTILITY COMPANIES BEFORE BEGINNING CONSTRUCTION.

3. EROSION CONTROL MEASURES SHALL BE INSTALLED PRIOR TO BEGINNING OF CONSTRUCTION. CONTRACTOR TO FOLLOW BMP RULES.

4. EROSION CONTROL MESH SHALL BE INSTALLED ON ALL SLOPES GREATER THAN 3:1.

5. HAY BALE BARRIERS SHALL BE INSTALLED AROUND EXISTING CATCH BASINS, AND PIPE INLETS / OUTLETS DURING CONSTRUCTION.

6. CONTRACTOR SHALL CONTACT DIGSAFE PRIOR TO ANY EXCAVATION WORK.

7. CONSTRUCTION ACTIVITIES OCCURRING AFTER NOVEMBER 15TH SHALL INCORPORATE A WINTER CONSTRUCTION PLAN WHICH SHALL BE APPROVED BY THE CITY OF BANGOR.

8. ALL DISTURBED AREAS SHALL BE REVEGETATED AND RECEIVE PROPER EROSION CONTROL MANAGEMENT.

9. COMPACT TRENCHES MATCHING GRAVEL DEPTH AND PAVEMENT THICKNESS.

10. WORK LIMITS ARE WITHIN THE WEBSTER AVENUE R.O.W. BUILDING AND ASSOCIATED SITE WORK NOT IN THIS CONTRACT.

LOCATION MAP

FOR BID
05-01-06

May 03, 2006 - 2:07pm user
H:\PROJECTS\2004-100's\204103 P&R Golf Building\CA DWGS\OFFSITE UTILITIES\204103-SITEPLAN-SEWER.dwg

CARPENTER ASSOCIATES
CONSULTING ENGINEERS
687 STILLWATER AVENUE • OLD TOWN • MAINE 04468

REVISIONS

NO.	DATE	BY	DESCRIPTION

STATE OF MAINE
J. RYAN BRAGG
No. 12278
REGISTERED PROFESSIONAL ENGINEER

CITY OF BANGOR
WEBSTER AVENUE WATER/SEWER EXTENSION
BANGOR, MAINE

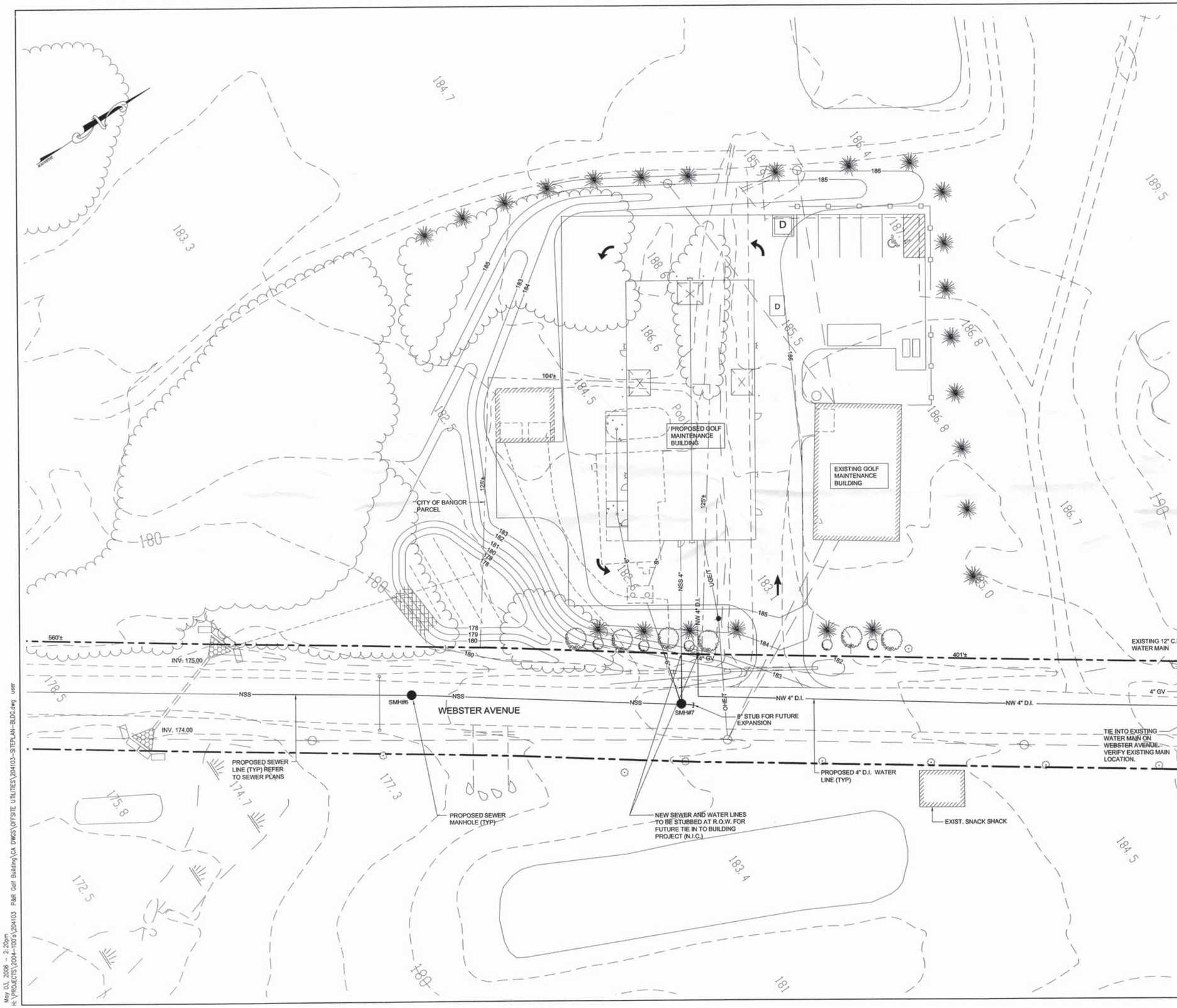
OVERALL SITE PLAN

Drawn: BB
Checked: RB
Scale: 1"=100'
Date: 03/02/06

Project No: 204103

Sheet Number:

C1



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5. HAY BALE BARRIERS SHALL BE INSTALLED AROUND EXISTING CATCH BASINS, AND PIPE INLETS / OUTLETS DURING CONSTRUCTION.

6. CONTRACTOR SHALL CONTACT DIGSAFE PRIOR TO ANY EXCAVATION WORK.

7. CONTRACTOR SHALL REFER TO ARCHITECTURAL PLANS FOR EXACT DIMENSIONS OF THE BUILDINGS, ITS ENTRANCES / EXITS AND OTHER APPURTENANCES.

8. CONSTRUCTION ACTIVITIES OCCURRING AFTER NOVEMBER 15TH SHALL INCORPORATE A WINTER CONSTRUCTION PLAN WHICH SHALL BE APPROVED BY THE CITY OF BANGOR.

9. BOLLARDS SHALL BE INSTALLED IN FRONT OF OVERHEAD DOOR LOCATIONS FOR PROTECTION.

10. SEE SITE PLAN FOR PARKING REQUIREMENTS. ALL PARKING STRIPES SHALL BE 4" WIDE, TRAFFIC WHITE.

11. ALL DISTURBED AREAS SHALL BE REVEGETATED AND RECEIVE PROPER EROSION CONTROL MANAGEMENT.

12. REFER TO SEWER PROFILE PLANS FOR INVERT ELEVATIONS.

13. PROPOSED BUILDING HEIGHT IS 18'±. REFER TO ARCHITECTURAL PLANS FOR ADDITIONAL INFORMATION.

14. EXISTING FIRE HYDRANT IS 350'± AWAY, LOCATED ON THE NORTHWEST SIDE OF WEBSTER AVENUE.

LEGEND

EXISTING		PROPOSED
	IRON ROD	
	UTILITY POLE	
	HYDRANT	
	MANHOLE	
	TREE LINE	
UD	UNDER DRAIN	
	PROPERTY LINE	
S	SEWER LINE	NSS
W	WATER LINE	NW
	ELECTRICAL/COMM LINE	UGE/T
	TREES / SHRUBS	
	CULVERT	
160	CONTOUR	160
	BOLLARD	
	STONE CHECK DAM	SCD
	DOOR LOCATION	
	LIGHTS	200W METAL HALIDE WALL MOUNT CUT-OFF FIXTURES
	PAVEMENT	
	FENCE	

THIS PLAN IS FOR REFERENCE ONLY. WORK LIMITS ARE WITHIN THE WEBSTER AVENUE R.O.W. BUILDING AND RELATED SITE WORK NOT IN THIS CONTRACT.

FOR BID
05-01-06

CARPENTER ASSOCIATES
CONSULTING ENGINEERS
687 STILLWATER AVENUE • OLD TOWN • MAINE 04468

REVISIONS

NO.	DATE	BY	DESCRIPTION
1	5/1/06	RB/BB	PER PLANNING COMMENTS

STATE OF MAINE
BANDY BRADY BRADY
No. 7278
REGISTERED PROFESSIONAL ENGINEER

CITY OF BANGOR
WEBSTER AVENUE WATER/SEWER EXTENSION
BANGOR, MAINE

SITE PLAN

Drawn: BB
Checked: RB
Scale: 1"=20'
Date: 03/02/06

Project No: 204103

Sheet Number:

C2

May 03, 2006 – 2:20pm
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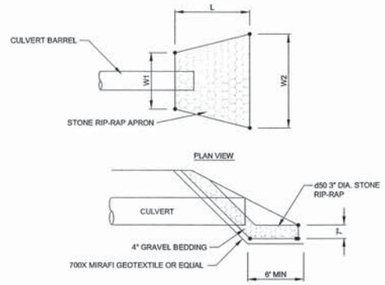
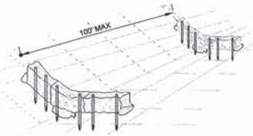


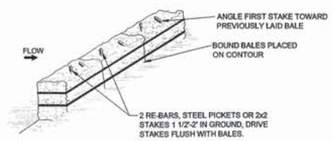
RIP-RAP APRON DETAIL

NOT TO SCALE



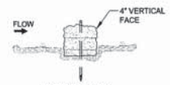
EROSION CHECK TO BE BALES OF HAY SECURED TO THE GROUND WITH 2-4' LONG GRADE STAKES FOR EACH BALE. SAND BAG AS REQUIRED.

EROSION CHECK FOR DITCH



ANCHORING DETAIL

STRAW OR HAY BALE BARRIER

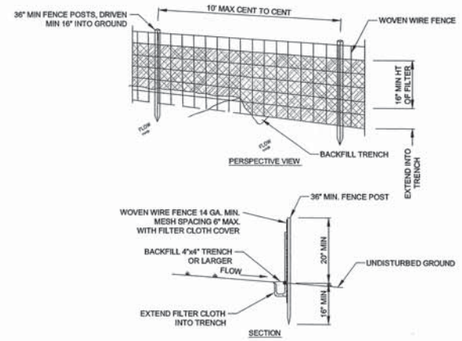


EMBEDDING DETAIL

CONSTRUCTION SPECIFICATIONS:
1. BALES SHALL BE PLACED AT THE TOE OF A SLOPE OR ON THE CONTOUR AND IN A ROW WITH ENDS TIGHTLY ABUTTING THE ADJACENT BALES.
2. EACH BALE SHALL BE EMBEDDED IN THE SOIL A MINIMUM OF FOUR INCHES AND PLACED SO THE BINDINGS ARE HORIZONTAL.
3. BALES SHALL BE SECURELY ANCHORED IN PLACE BY EITHER TWO STAKES OR RE-BARS DRIVEN THROUGH THE BALE. THE FIRST STAKE IN EACH BALE SHALL BE DRIVEN TOWARD THE PREVIOUSLY LAID BALE AT AN ANGLE TO FORCE THE BALES TOGETHER. STAKES SHALL BE DRIVEN FLUSH WITH THE BALE.
4. INSPECTION SHALL BE FREQUENT AND REPAIR REPLACEMENT SHALL BE MAKE PROMPTLY AS NEEDED.
5. BALES SHALL BE REMOVED WHEN THEY HAVE SERVED THEIR USEFULNESS SO AS NOT TO BLOCK OR IMPEDE STORM FLOW OR DRAINAGE.

HAYBALE DETAIL

NOT TO SCALE



CONSTRUCTION SPECIFICATIONS:
THE CONTRACTOR HAS THE OPTION TO NOT USE WOVEN WIRE MESH IF STAKE SPACERS ARE REDUCED TO 6' o.c.
1. WOVEN WIRE FENCE TO BE FASTENED SECURELY TO FENCE POSTS WITH WORE TIES OR STAPLES.
2. FILTER CLOTH TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 24" AT TOP OF MID SECTION.
3. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVER LAPPED BY SIX INCHES AND FOLDED.
4. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN BULGES DEVELOP IN THE SILT FENCE.
5. POSTS: STEEL EITHER T OR U TYPE OR 2" HARDWOOD. FENCE: WOVEN WIRE, 14 GA. 6" MAX. MESH OPENING. FILTER CLOTH: FILTER X, MARAFI 100X, STABI-LINKA T140N OR APPROVED EQUAL. PREFABRICATED UNIT: GEOFAB, ENVIROFENCE, OR APPROVED EQUAL.

SILT FENCE DETAIL

NOT TO SCALE

PERMANENT SEEDING NOTES FOR ALL DISTURBED AREAS:

1. DURING PERIOD FROM APRIL 15 TO OCTOBER 15, AREAS DISTURBED SHALL BE LIMED, FERTILIZED, SEEDED AND MULCHED AS FOLLOWS:
   A. APPLY AGRICULTURAL GRADE LIMESTONE OF NOT LESS THAN 85 PERCENT CALCIUM AND MAGNESIUM CARBONATES AT A RATE OF 130 LBS/1,000 SQUARE FEET (SF).
   B. FERTILIZE WITH COMMERCIAL GRADE 10-10-10 FERTILIZER AT A RATE OF 14 LBS/1,000 SF.
   C. SEED WITH LAST YEARS CROP MIXTURE AT A RATE OF 2 LBS/1,000 SF. MIXTURE SHALL BE: RED FESCUE 57 PERCENT, KENTUCKY BLUEGRASS 28 PERCENT, REDTOP 9 PERCENT AND WHITE DUTCH CLOVER 6 PERCENT. MIXTURE SHALL HAVE A GERMINATION RATE OF NOT LESS THAN 80 PERCENT AND A PURITY OF NOT LESS THAN 85 PERCENT.
2. AFTER SEEDING, AREAS DISTURBED SHALL BE HAY MULCHED AT A RATE OF 2.5 BALES/1,000 SF.
3. NO SEEDING SHALL TAKE PLACE BETWEEN JUNE 15 AND JULY 15. AS A CONTINGENCY PLAN, AREAS DISTURBED DURING THESE DATES SHALL BE HAY MULCHED AT A RATE OF 2 BALES/1,000 SF AND SECURED WITH PEG AND TWINE OF 4-6 PEGS/SY OR WITH TERRA TACK II AT A RATE OF 60 GALLONS/ACRE.
4. WEEKLY, OR AFTER PRECIPITATION PRODUCING THE EQUIVALENT OF ONE HALF INCH OF RAINFALL OR SNOW MELT, ALL MULCHED AREAS SHALL BE INSPECTED FOR SUITABILITY FOR EROSION CONTROL AND SLOPE PROTECTION. WEAKENED AREAS SHALL BE RE-MULCHED AS 2. ABOVE.
5. WITHIN 30-45 DAYS OF SEED APPLICATION, ALL AREAS SHALL BE INSPECTED FOR SATISFACTORY GROWTH. AREAS OF LESS THAN 75 PERCENT GROWTH SHALL BE RESEEDED AT ORIGINAL APPLICATION RATES, MULCHED AND MAINTAINED ACCORDINGLY AS SPECIFIED ABOVE.
6. PERMANENT SEEDING SHALL BE INSTALLED IMMEDIATELY UPON REACHING FINAL GRADE.

EROSION CONTROL CONSTRUCTION SEQUENCE:

1. INSTALL ALL SILT FENCING AND TEMPORARY CONSTRUCTION ENTRANCES.
2. CONSTRUCT DETENTION POND WITH RIP-RAP INLET CHANNEL AND OUTLET STRUCTURE (INCLUDING RIP-RAP APRON AT OUTLET). INSTALL TEMPORARY PIPE SEDIMENT TRAP ON OUTLET PIPE. TEMPORARILY SEED AND MULCH DETENTION POND AREA AND INSTALL EROSION CONTROL BLANKET WHERE SHOWN.
3. GRADE PROJECT TO SUBGRADE LEVEL IN LOGICAL MANNER TO MINIMIZE EARTH MOVING AND TO PRESERVE LAND NOT TO BE DISTURBED.
4. INSTALL DETENTION POND INLET PIPE WITH RIP-RAP OUTLET.
5. COMPLETE DRAINAGE AND UTILITY CONSTRUCTION.
6. INSTALL GRAVEL BASE. REMOVE TEMPORARY CONSTRUCTION ENTRANCE IMMEDIATELY PRIOR TO PLACING ROAD BASE.
7. COMPLETE FINISH GRADING. LOAM, SEED AND MULCH (WITH EROSION CONTROL BLANKET WHERE SHOWN) ALL DISTURBED AREAS NOT TO BE PAVED OR RIP-RAPPED. REMOVE EXCESS ACCUMULATED SEDIMENTS FROM DETENTION POND BOTTOM.
8. COMPLETE UNFINISHED CONSTRUCTION AND FINISH PAVING.
9. REMOVE TEMPORARY DIVERSION DITCHES, LEVEL SPREADERS, HAY BALES AND STONE CHECK DAM WHEN 75 PERCENT OF GRASS GROWTH HAS BEEN ESTABLISHED.

ALL EARTHWORK OR CONSTRUCTION ACTIVITIES SHALL OCCUR AFTER APRIL 15 AND BEFORE NOVEMBER 15 UNLESS PRIOR PERMISSION FROM DEP IS OBTAINED. THE CONTRACTOR SHALL INSTALL ALL EROSION CONTROL DEVICES PRIOR TO THE DISTURBANCE OF ANY WORK AREA.

TEMPORARY SEEDING NOTES:

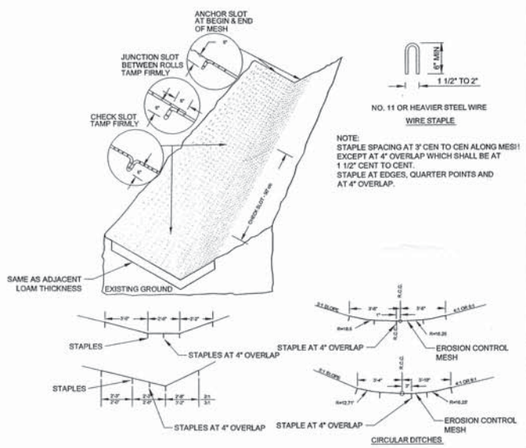
1. ANY DISTURBED AREAS TO BE LEFT IN ROUGH GRADED FORM FOR MORE THAN 30 DAYS BUT LESS THAN ONE GROWING SEASON SHALL BE LIMED, FERTILIZED, TEMPORARILY SEEDED AND MULCHED.
2. APPLICATION RATES AND MATERIALS USED SHALL BE THE SAME AS FOR PERMANENT SEEDING EXCEPT SEED MIXTURE SHALL BE ANNUAL RYE GRASS.

DORMANT SEEDING NOTES:

1. DURING PERIODS FROM OCTOBER 1 TO NOVEMBER 15, AREAS DISTURBED SHALL BE DORMANT SEEDED WITH WINTER RYE, 1.5 LBS/1,000 SF. DURING PERIODS BETWEEN NOVEMBER 15 AND APRIL 15, DISTURBED AREAS SHALL BE MULCHED AND IF NECESSARY, STABILIZED WITH EROSION CONTROL MESH.

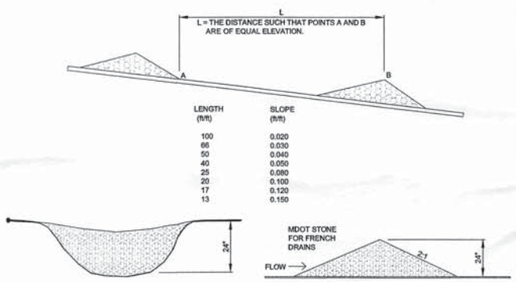
GENERAL NOTES:

1. ON SITE STABILIZATION WILL BE DONE WITHIN 15 DAYS OF FINAL GRADING OR WITHIN 30 DAYS OF INITIAL SOIL DISTURBANCE.
2. EVERY WEEK AND AFTER PRECIPITATION PRODUCING THE EQUIVALENT OF ONE HALF INCH OF RAINFALL, THE CONTRACTOR SHALL INSPECT AND MAINTAIN ALL EROSION CONTROL MEASURES. MAINTENANCE SHALL INCLUDE, BUT NOT BE LIMITED TO REMOVAL OF SEDIMENT FROM SILT FENCE IF SOIL ACCUMULATES TO A DEPTH OF ONE-HALF THE FABRIC HEIGHT; REPAIR OF HAY BALE BARRIERS IF RUNOFF CHANNELIZES UNDER OR AROUND THE BALES; REMOVAL OF EXCESS ACCUMULATED SEDIMENT FROM DETENTION POND; AND WASHING OF TEMPORARY CONSTRUCTION ENTRANCES PRIOR TO OCCURRENCES OF SIGNIFICANT TRACKING.
3. ALL EROSION CONTROL MEASURES SHALL BE CONSTRUCTED AND MAINTAINED IN ACCORDANCE WITH "MAINE EROSION AND SEDIMENT CONTROL HANDBOOK FOR CONSTRUCTION: BEST MANAGEMENT PRACTICES, BY CUMBERLAND COUNTY SWCD, DEPARTMENT OF ENVIRONMENTAL PROTECTION, MARCH, 1991.
4. REFER TO "DETENTION POND DETAILS" FOR ALL RIP-RAP APRON AND CHANNEL DETAILS.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL EROSION CONTROL MEASURES, INCLUDING MATERIALS, CONSTRUCTION, MAINTENANCE AND REMOVAL.
6. JUTE MESH SHALL BE INSTALLED ON ALL LOAM AND SEEDED AREAS WHICH HAVE A SLOPE GREATER THAN 3:1.
7. EROSION CONTROL MEASURES SHALL BE INSPECTED ON A MONTHLY BASIS ONCE FINAL STABILIZATION IS COMPLETE, BY THE INSPECTING ENGINEER. THIS INSPECTION IN NO WAY REDUCES OR ELIMINATES THE CONTRACTOR'S RESPONSIBILITY TO ADHERE WITH VERBAL OR WRITTEN REQUIREMENTS OF DEP, ARMY CORPS, EPA OR OTHER JURISDICTIONAL AGENCIES. CONTRACTOR MUST FURTHER ADHERE TO ALL REQUIREMENTS SET FORTH IN THE DEP ORDER OF CONDITIONS.
8. AFTER EACH INSPECTION OF EROSION CONTROL MEASURES, AND INSPECTION REPORT DETAILING THE SCOPE OF THE INSPECTION, NAME(S) OF PERSONNEL CONDUCTING THE INSPECTION, DATE, MAJOR OBSERVATION AND ACTIONS TAKEN, SHALL BE MADE AND KEPT ON FILE FOR THREE YEARS AFTER THE INSPECTION.



EROSION CONTROL MESH

NOT TO SCALE



LENGTH (ft/ft)	SLOPE (ft/ft)
100	0.020
66	0.030
50	0.040
40	0.050
25	0.080
20	0.100
17	0.120
13	0.150

STONE CHECK DAM DETAILS

NOT TO SCALE

FOR BID
05-01-06

CARPENTER ASSOCIATES
CONSULTING ENGINEERS
687 STILLWATER AVENUE • OLD TOWN • MAINE 04468

STATE OF MAINE
RANDY BRAGG
No. 7278
REGISTERED PROFESSIONAL ENGINEER

REVISIONS

NO.	DATE	BY	DESCRIPTION

CITY OF BANGOR
WEBSTER AVENUE WATER/SEWER EXTENSION
BANGOR, MAINE

SITE DETAILS

Drawn: BB
Checked: RB
Scale: NO SCALE
Date: 03/03/06

Project No: 204103

Sheet Number:

C3

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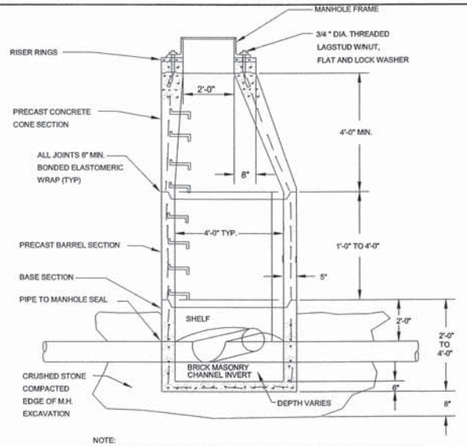
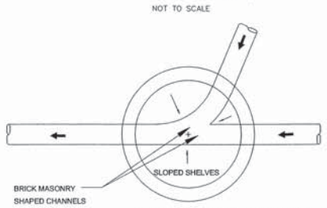


NOTE:
GROUT INLET AND OUTLET PIPES TO PROVIDE SMOOTH TRANSITION FROM PIPE TO INVERT.

TYPICAL MANHOLE (PER CITY OF BANGOR)

NOT TO SCALE



MANHOLE BASE (PER CITY OF BANGOR)

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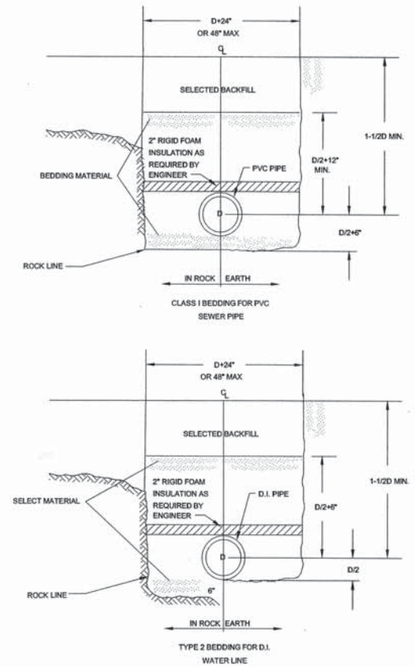

TRENCH AND BEDDING DETAILS

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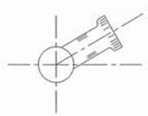
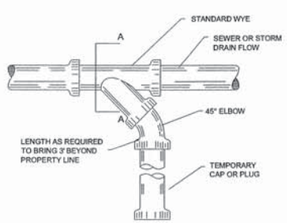


SECTION A-A



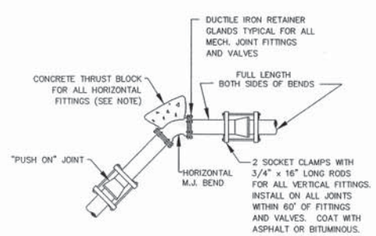
SEWER/FOUNDATION DRAIN SERVICE CONNECTION

NOT TO SCALE

THE AREA OF THRUST BLOCKING AGAINST UNDISTURBED EARTH MUST BE AS FOLLOWS:

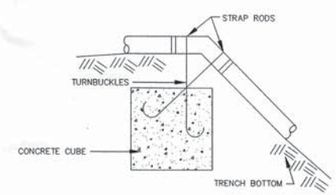
FITTING TYPE	6" FITTING MIN. SQ. FT.	8" FITTING MIN. SQ. FT.	12" FITTING MIN. SQ. FT.
PLUG OR TEE	2.7	3.6	5.4
90° ELBOW	3.3	4.3	6.4
45° BEND	2.4	3.2	4.7
22.5° BEND	1.7	2.3	3.3
11.25° BEND	1.2	1.6	2.4

NOTE:
ALLUVIAL SOIL BEARING PRESSURE = 1000 psi
MAXIMUM OPERATING PSI = 145



WATER MAIN/SERVICE RESTRAINT FITTINGS DETAIL (PER BWD)

NOT TO SCALE



THRUST ANCHORS – 6" FITTINGS

BEND	11-1/4°	22-1/2°	45°
CONCRETE VOLUME, ft3	11	25	68
SITE OF CUBE, ft	2.2	2.9	4.1
DIAMETER OF SHACKLE RODS, in*	3/4 "	3/4 "	3/4 "
DEPTH OF RODS IN CONCRETE, ft	2.0	2.0	2.0

THRUST ANCHORS – 8" FITTINGS

BEND	11-1/4°	22-1/2°	45°
CONCRETE VOLUME, ft3	16	47	123
SITE OF CUBE, ft	2.5	6.0	5.0
DIAMETER OF SHACKLE RODS, in*	3/4 "	3/4 "	3/4 "
DEPTH OF RODS IN CONCRETE, ft	2.0	2.0	2.0

THRUST ANCHORS – 12" FITTINGS

BEND	11-1/4°	22-1/2°	45°
CONCRETE VOLUME, ft3	32	88	232
SITE OF CUBE, ft	3.2	4.5	6.1
DIAMETER OF SHACKLE RODS, in*	3/4 "	7/8 "	3/4 "
DEPTH OF RODS IN CONCRETE, ft	2.0	3.0	2.5

* 2 RODS EXCEPT 4 RODS FOR 45° BENDS

THRUST ANCHOR (PER BWD)

NOT TO SCALE

FOR BID
05-01-06

CARPENTER ASSOCIATES
CONSULTING ENGINEERS
687 STILLWATER AVENUE · OLD TOWN · MAINE 04468

REVISIONS

NO.	DATE	BY	DESCRIPTION

STATE OF MAINE
RANDY BRAGG
6801278
REGISTERED PROFESSIONAL ENGINEER

CITY OF BANGOR
WEBSTER AVENUE WATER/SEWER EXTENSION
BANGOR, MAINE

SITE DETAILS

Drawn: BB
Checked: RB
Scale: NO SCALE
Date: 03/03/06

Project No: 204103

Sheet Number:

C4

May 03, 2006 – 12:40pm user
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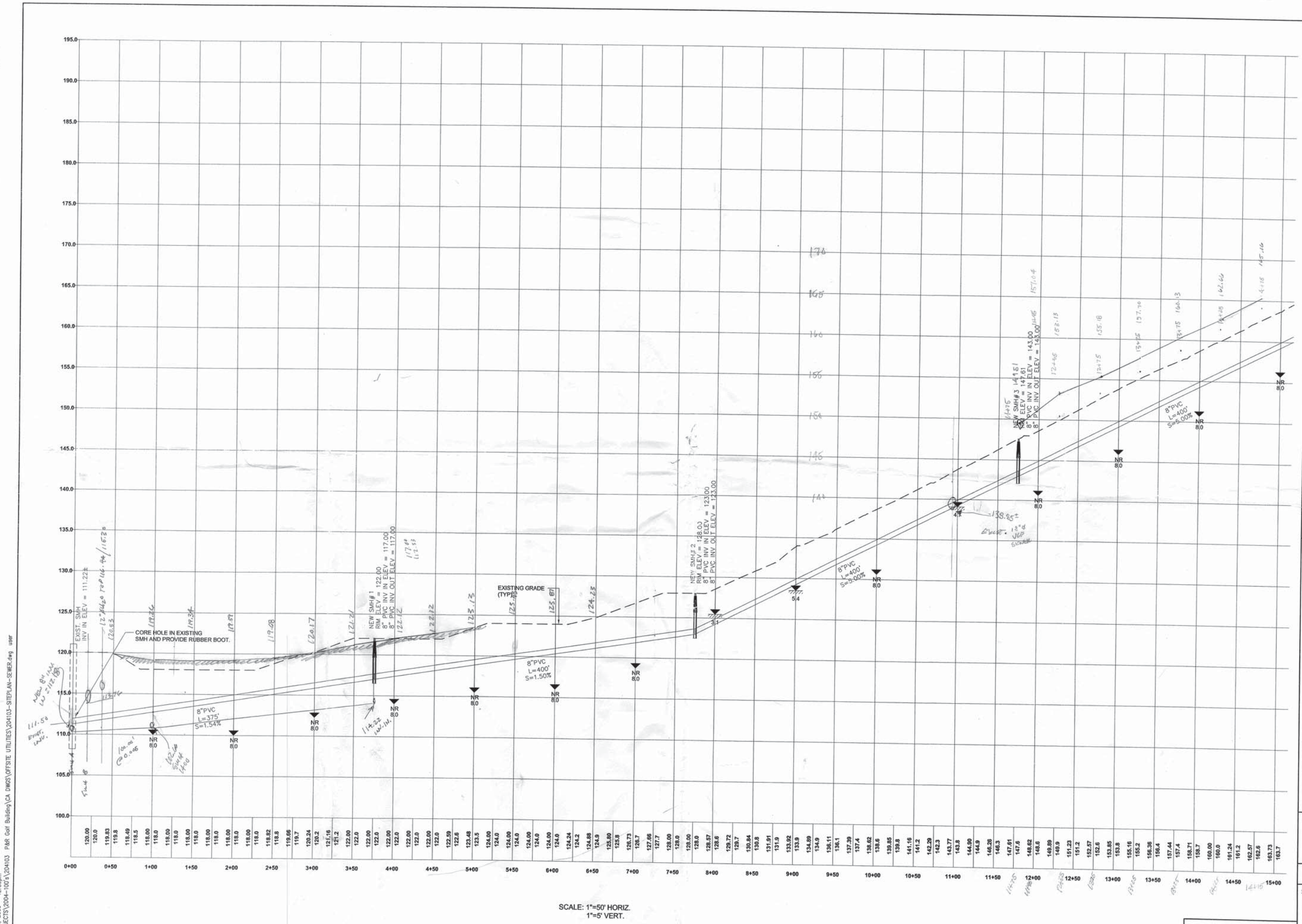

FOR BID
05-01-06

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CARPENTER ASSOCIATES
CONSULTING ENGINEERS
687 STILLWATER AVENUE • OLD TOWN • MAINE 04468

REVISIONS

NO.	DATE	BY	DESCRIPTION

STATE OF MAINE
RANDY BRACH
No. 7278
REGISTERED PROFESSIONAL ENGINEER

CITY OF BANGOR
WEBSTER AVENUE WATER/SEWER EXTENSION
BANGOR, MAINE

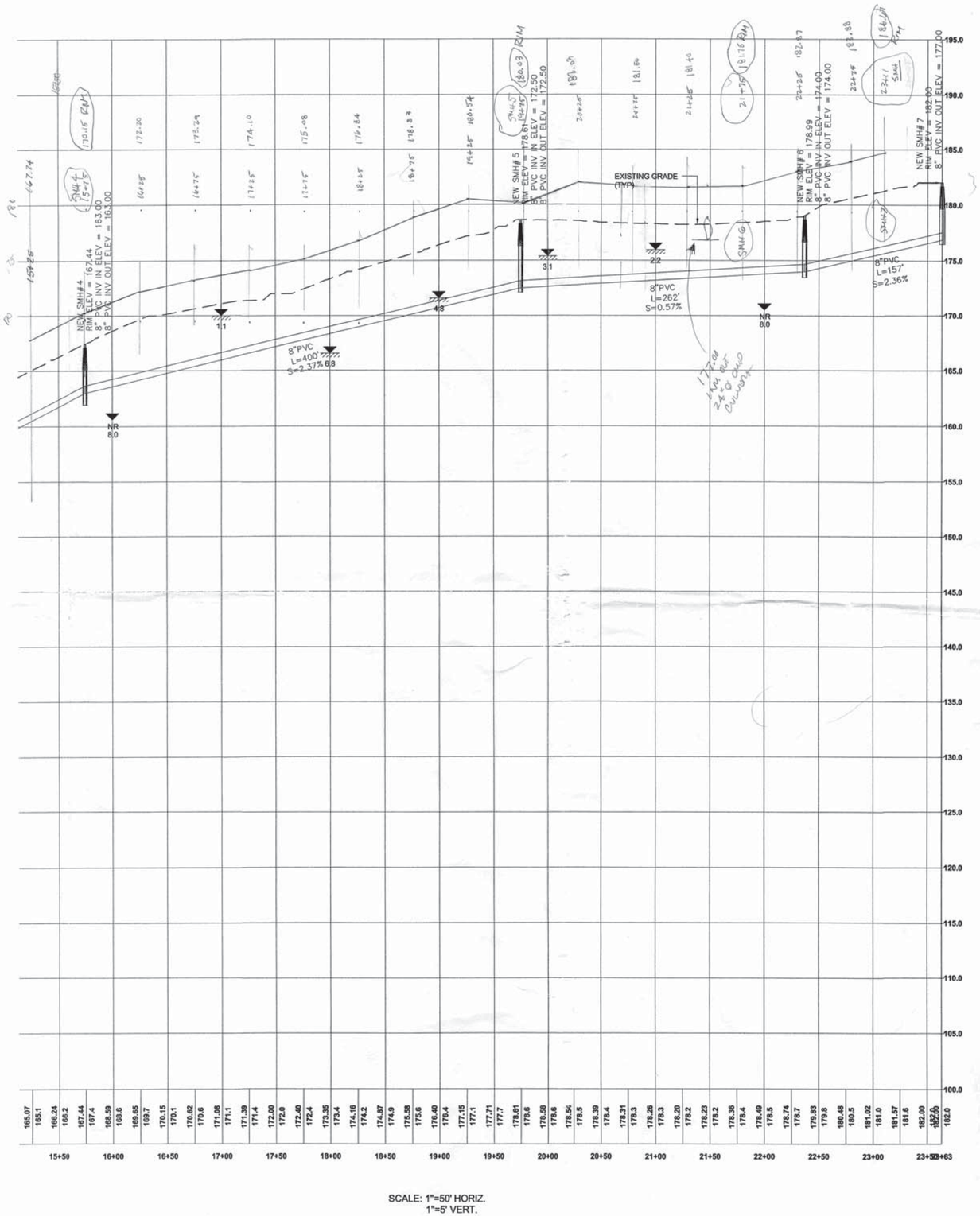
SEWER PROFILE
STA: 0+00 TO 15+00

Drawn: BB
Checked: RB
Scale: AS NOTED
Date: 03/02/06

Project No: 204103

Sheet Number:

U1



SCALE: 1"=50' HORIZ.
1"=5' VERT.

2.2 LEDGE REFUSAL DEPTH

NR NO REFUSAL

FOR BID
05-01-06

CARPENTER ASSOCIATES
CONSULTING ENGINEERS
687 STILLWATER AVENUE • OLD TOWN • MAINE 04468

REVISIONS

NO.	DATE	BY	DESCRIPTION

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RANDY BRAGG
No. 7278
REGISTERED PROFESSIONAL ENGINEER

CITY OF BANGOR
WEBSTER AVENUE WATER/SEWER EXTENSION
BANGOR, MAINE

SEWER PROFILE
STA: 15+50 TO 23+63

Drawn: BB
Checked: RB
Scale: AS NOTED
Date: 03/02/06

Project No: 204103

Sheet Number: U2

May 03, 2006 – 12:56pm
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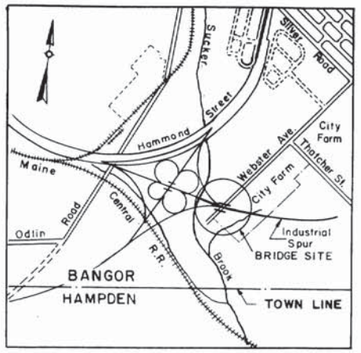
1957 Bridge Drawings

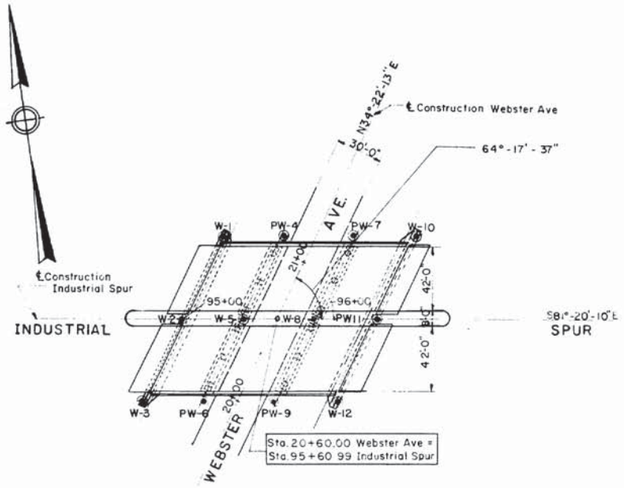
B.P.R. DIV. NO.	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
1	MAINE	I-083-1(1)	84	230

BANGOR INDUSTRIAL SPUR



LOCATION MAP

NO SCALE



KEY PLAN

SCALE: 1"=50'-0"

GENERAL NOTES

FOUNDATIONS:

Foundations may be altered, if necessary, to suit conditions encountered in construction.

DESIGN:

In accordance with the Specifications of the American Association of State Highway Officials for H20-S16-44 loading (1953 edition), modified for military requirements.

Design Stresses Structural Steel 18,000 psi
Reinforcing Steel 18,000 psi
Concrete (n=10) 1,200 psi

CONSTRUCTION:

State of Maine Standard Specification to be followed except as noted in Special Provisions.

REINFORCEMENT:

All bars shall have deformations conforming to A.S.T.M. Designation A 305

Unless otherwise shown on plans, reinforcing bars shall be lapped 20 diameters to make a splice, except that main reinforcing bars near the top of slabs and beams having more than 12 inches of concrete under the bars shall be lapped 35 diameters to make a splice

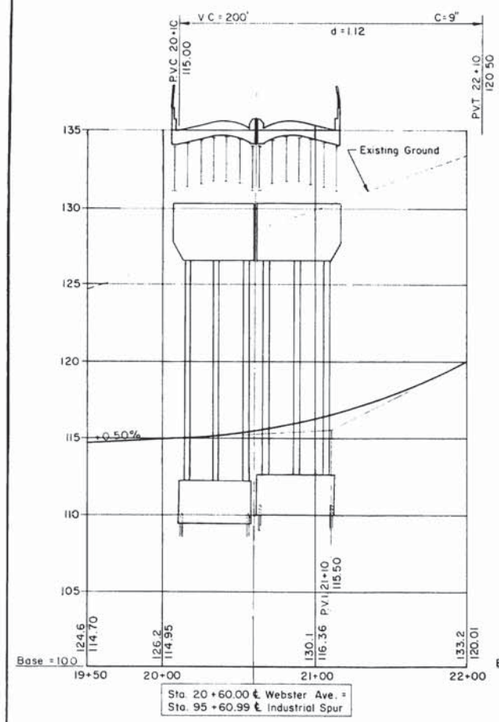
BENCH MARK:

TBM #8 R.R. Spike in root of Northside of forked 24" Pine Sta 96+10±, 390'± Rt. Elev. 117.69

ESTIMATED QUANTITIES

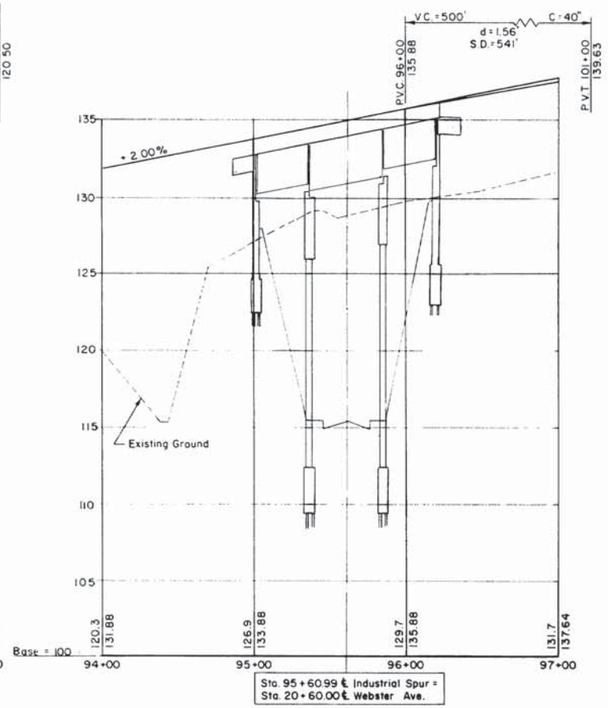
(NOT GUARANTEED)

STRUCTURAL EARTH EXCAVATION (ABUTMENTS AND RETAINING WALLS)	640 CU. YDS
STRUCTURAL EARTH EXCAVATION, (PIERS)	400 CU. YDS
BITUMINOUS CONCRETE SURFACE COURSE (TYPE "A")	170 TONS
MEMBRANE WATERPROOFING (3 PLY)	1,140 SQ. YDS
PORTLAND CEMENT CONCRETE (ABUTMENTS AND RETAINING WALLS)	365 CU YDS
PORTLAND CEMENT CONCRETE, (PIERS)	360 CU YDS
PORTLAND CEMENT CONCRETE (ROADWAY AND SIDEWALK SLABS ON STEEL BRIDGES)	420 CU YDS
PORTLAND CEMENT	1,710 BBLS.
BRIDGE DRAINAGE	1 LUMP SUM
STRUCTURAL STEEL, FABRICATED AND DELIVERED	328,000 LBS.
STRUCTURAL STEEL ERECTION	328,000 LBS
REINFORCING STEEL DELIVERED	153,200 LBS
REINFORCING STEEL PLACED.	153,200 LBS
CAST IN PLACE CONCRETE PILES	2,500 LIN. FT.
FRENCH DRAINS.	150 CU. YDS.
ALUMINUM RAILING	240 LIN FT
SLOPED GRANITE CURB (6"x7")	240 LIN FT
SLOPE PAVING FOR BRIDGE	800 SQ. YDS.
GRAVEL BASE COURSE-IN PLACE MEASUREMENT	400 CU. YDS
PILE LOADING TEST	1 LUMP SUM
2" GALVANIZED CONDUIT	120 LIN. FT



PROFILE ALONG WEBSTER AVE.

SCALES Horiz. 1"=50'-0" Vert. 1"=5'-0"



PROFILE ALONG INDUSTRIAL SPUR

SCALES Horiz 1"= 50'-0" Vert. 1"= 5'-0"

FINAL AS BUILT PLANS

DESIGN	CHECK H.P.	BRIDGE NO.
DRAWN D.A.T.	APPROVED: WAH BCJM	SURVEY PLOT

STATE HIGHWAY COMMISSION

INDUSTRIAL SPUR

OVER

WEBSTER AVE.

IN THE CITY OF

BANGOR

PENOBSCOT COUNTY

KEY PLAN & PROFILES

APPROVED BY [signature] DATE 9/4/57

THE CLARKESON ENGINEERING CO., INC.
CONSULTING ENGINEERS
BOSTON MASSACHUSETTS

SHEET 1 OF 7 AUGUSTA, MAINE

M-1155

B.P.R. DIV. NO.	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
1	MAINE	I-083-1(1)	88	230

BANGOR INDUSTRIAL SPUR

W-1

Elevations	Description of Materials	Casing Blows per Foot	Spoon Blows per Foot	Percent Recovery	Vane Shear Strength (Tons per Sq. Ft.)
128.1	Brown fine sandy silt or silty sand	34 25 20			
125.1	Mottled fine sandy silt	18 16 11 14 15	3 3		
121.0 (Water 122.50)					1.59
120.1	Brown silty fine sand	13 14 12 11 10	0 3		1.36
114.6	Blue gray silty clay	9 9 8 4 7			.383
	Sand layer at 108.6	7 9 9 11	0		.443
103.3	Gray silty sand	12 24 25 24 124 50 90	13 13		
95.6	Compact gray gravel	134 195 230 59 58 450 250 770	90		
88.1	Phyllite with weathered calcite and quartz seams Bedded 50°				
63.1					

Base = 100

Bottom of Proposed Westerly Abutment Foundation

W-2

Elevations	Description of Materials	Casing Blows per Foot	Spoon Blows per Foot	Percent Recovery	Vane Shear Strength (Tons per Sq. Ft.)
126.8	Brown sandy silt or silty sand	50 24 16 15			
122.50 (Water 119.8)	Gradually turning to gray	14 7 9 14 15 15 8 9	1 3		1.64
113.8	Gray black silty clay (black spots)	11 11 10 8 10 12			1.12
107.8	Gray silty clay	12 10 10 13 15 17			1.04 .483
100.6	Gray sand or gravelly sand	18 45 65 75 80	2		
96.3	Brown sand or gravelly sand	1	19		
95.8		25* 57 22 65 78 85 30 Refusal			
89.5					

*Blows per foot are on "A" rod taken from 95.8 to refusal.

W-3

Elevations	Description of Materials	Casing Blows per Foot	Spoon Blows per Foot	Percent Recovery	Vane Shear Strength (Tons per Sq. Ft.)
125.8	Brown fine sandy silt or silty sand	74 30 31			
122.50 (Water 118.6)	Mottled silty sand or sandy silt	22 21 13 15 19 22 25 17 12 18 16	6 10		1.68 1.36
111.3	Dark gray sandy silt or silty sand	15 13 9 8 10			1.04 .403
106.8	Gray silty clay	12 10 10 10 11 11 9 12 13 13			.403 423
96.8	Gray gravel or sandy gravel	50 85 35 70	135		
92.8	Brown compact stony sand	145 135 175	40		
89.8	Phyllite with weathered calcite and quartz seams Bedded 50°			72 100 90	
84.8					

W-5

Elevations	Description of Materials	Casing Blows per Foot	Spoon Blows per Foot	Percent Recovery	Vane Shear Strength (Tons per Sq. Ft.)
128.6	Gravel mixed (Fill) with brown silty sand	8 12 25			
125.1	Brown fine sandy silt or silty sand	30 14 14 15 16 20 22 15 13 14	3 6		1.68 1.50
122.5 (Water)					
115.1	Gray silty clay or clayey silt	14 9 8 11 12 11 10 10 10 12 16			.383 .423
110.0 / 109.0					
102.7	Gray gravelly sand	27 36 73 63 40 29 75	15 24 0		
95.8	Phyllite-bedded 50°-with weathered calcite seams to 4' depth			67 87 100 50 147	
90.8					

Bottom of Proposed Pier A Foundation

W-8

Elevations	Description of Materials	Casing Blows per Foot	Spoon Blows per Foot	Percent Recovery	Vane Shear Strength (Tons per Sq. Ft.)
129.6	Brown silty fine sand or sandy silt	10 10 10 10 12 20 10 9 9	0 5		
121.5 (Water)					1.55
121.1	Gray silty fine sand or sandy silt	11 16 8 7 7 10			1.50
115.1	Bluish gray silty fine sand or sandy silt	10 8 8			544
111.6					
110.0 / 109.0	Gray silty clay or clayey silt	11 12 5 7 10 11 12 6	0		.463
103.1	Gray silty sand	20 45 150	5		
100.1	Rock			90 67	
95.1					

Bottom of Proposed Pier B Foundation

W-10

Elevations	Description of Materials	Casing Blows per Foot	Spoon Blows per Foot	Percent Recovery	Vane Shear Strength (Tons per Sq. Ft.)
132.0	Brown fine sandy silt or silty sand	31 19 18 17 20 10 17 15	3 3		
123.00 / 123.7					1.96
119.0	Mottled fine sandy silt or silty sand	20 19 19 13 14	0 3		1.22
108.4	Gray clayey silt or silty clay	29 23 20 20 10 16 9 9			423
105.4	Rock* - 75% quartz seam in phyllite			87 67	403
		75			

*3" of rotten rock on top of ledge

W-12

Elevations	Description of Materials	Casing Blows per Foot	Spoon Blows per Foot	Percent Recovery	Vane Shear Strength (Tons per Sq. Ft.)
128.1	Brown silty fine sand or sandy silt	12 14 15 15 24 10 13 14 19 11 8 13 13 18	4 10		1.78 1.08
123.00					
113.1	Gray sandy silt or sandy silty clay	10 8 10			564
109.6	Gray silty clay	12 15 7 15			604
103.6	Gravelly silty sand	23 170	55		
102.4	Rock - Phyllite bedded 70° with thin calcite and quartz seams			93 93	
97.4					

Bottom of Proposed Easterly Abutment Foundation

Bottom of Proposed Pier A Foundation

Bottom of Proposed Pier B Foundation

BORING LOG

Scale 1/8" = 1'-0"

NOTES:

1. Location of borings are shown on Key Plan thus ● W-1; punchings are shown on Key Plan thus ● PW-4; borings and punchings are taken for purpose of design and show condition at boring and punching points only, but do not necessarily show nature of materials to be encountered during construction.
2. Figures in boring columns indicate blows per foot on 2½" casing or 1" spoon produced by a 308# hammer with a fall of 16" and 14" respectively.
3. Figures in punching columns indicate blows per foot on "A" rods with a probe point produced by a 308# hammer with a fall of 14".
4. Borings and punchings were taken by the Maine State Highway Commission during the month of February, 1957.
5. The contractor in to form his own opinion of the character of the material, and to make his own interpretation of the borings.
6. The Engineer does not warrant the findings as being accurate or complete.

PW-4

Elev.	Depth in Feet	No. of Blows
130.4	0-1	10
	1-2	5
	2-3	10
	3-4	11
	4-5	13
	5-6	13
	6-7	12
	7-8	12
	8-9	14
120.0	9-10	15
	10-11	15
	11-12	15
	12-13	15
	13-14	16
	14-15	16
	15-16	17
	16-17	18
	17-18	17
	18-19	16
110.0	19-20	16
	20-21	16
	21-22	18
	22-23	16
	23-24	17
	24-25	18
	25-26	19
100.0	26-27	18
	27-28	19
	28-29	27
	29-30	36
	30-31	41
	31-32	38
	32-33	34
	33-34	105 Not Refusal

PW-6

Elev.	Depth in Feet	No. of Blows
126.0	0-1	10
	1-2	3
	2-3	6
	3-4	11
	4-5	12
120.0	5-6	14
	6-7	15
	7-8	15
	8-9	15
	9-10	17
	10-11	17
	11-12	17
	12-13	18
	13-14	19
	14-15	18
110.0	15-16	18
	16-17	22
	17-18	21
	18-19	22
	19-20	22
	20-21	23
	21-22	23
	22-23	23
	23-24	24
	24-25	21
	25-26	23
100.0	26-27	22
	27-28	23
	28-29	24
	29-30	110
	30-31	50
	31-32	40
	32-33	48
	33-34	95
	34-34'-2"	40 Refusal

PW-7

Elev.	Depth in Feet	No. of Blows
131.4	0-1	12
	1-2	3
	2-3	6
	3-4	14
	4-5	12
	5-6	19
	6-7	14
	7-8	13
	8-9	15
	9-10	17
120.0	10-11	18
	11-12	19
	12-13	22
	13-14	17
	14-15	17
	15-16	15
	16-17	14
	17-18	13
	18-19	15
	19-20	15
110.0	20-21	14
	21-22	14
	22-23	13
	23-24	13
	24-25	17
	25-26	18
	26-27	21
	27-27'-11"	55 Refusal

PW-9

Elev.	Depth in Feet	No. of Blows
127.5	0-1	26
	1-2	6
	2-3	7
	3-4	11
	4-5	12
	5-6	16
	6-7	16
	7-8	15
	8-9	15
120.0	9-10	15
	10-11	15
	11-12	15
	12-13	15
	13-14	16
	14-15	17
	15-16	16
110.0	16-17	16
	17-18	17
	18-19	17
	19-20	19
	20-21	21
	21-22	21
	22-23	21
	23-24	19
	24-25	20
	25-26	19
100.0	26-27	18
	27-28	19
	28-29	21
	29-30	32
	30-31	27
	31-31'-2"	25 Refusal

PW-11

Elev.	Depth in Feet	No. of Blows
130.3	0-1	15
	1-2	6
	2-3	9
	3-4	10
	4-5	12
	5-6	16
	6-7	15
	7-8	13
	8-9	14
120.0	9-10	14
	10-11	15
	11-12	16
	12-13	17
	13-14	17
	14-15	16
	15-16	16
	16-17	15
	17-18	15
	18-19	15
110.0	19-20	15
	20-21	16
	21-22	18
	22-23	16
	23-24	19
	24-25	15
	25-26	25
	26-27	30
	27-28	38
	28-28'-10"	70 Refusal

Bottom of Proposed Pier B Foundation

Bottom of Proposed Easterly Abutment Foundation

PUNCHING LOG

No Scale

FINAL AS BUILT PLANS

THE CLARKESON ENGINEERING CO., INC.

DESIGN	CHECK G.B.	BRIDGE NO.
DRAWN A.L.	APPROVED W.A.H. C.J.M.	SURVEY PLOT

STATE HIGHWAY COMMISSION

INDUSTRIAL SPUR

OVER

WEBSTER AVE.

IN THE CITY OF

BANGOR

PENOBSCOT COUNTY

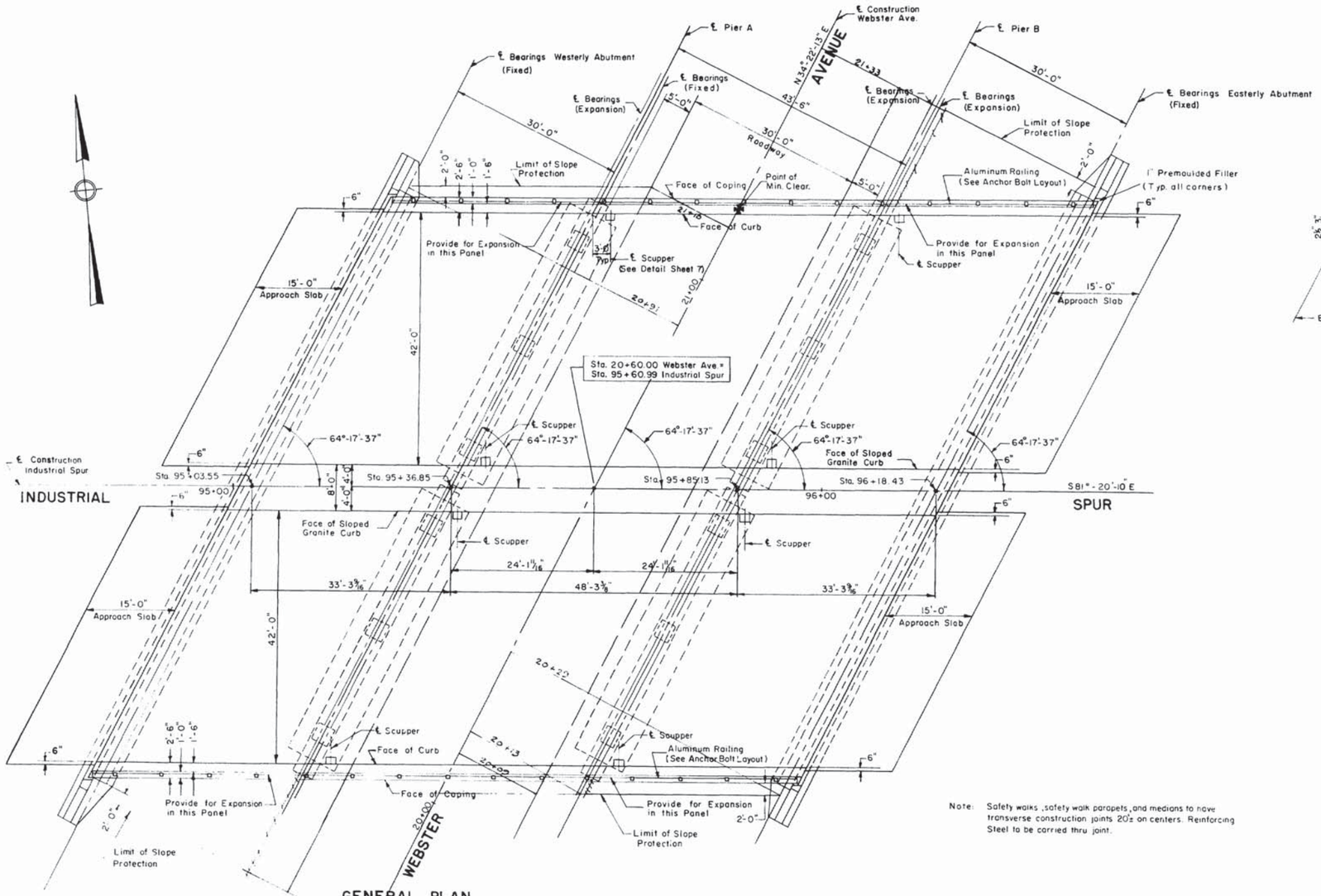
BORING DATA

SHEET 2 OF 7 AUGUSTA, MAINE

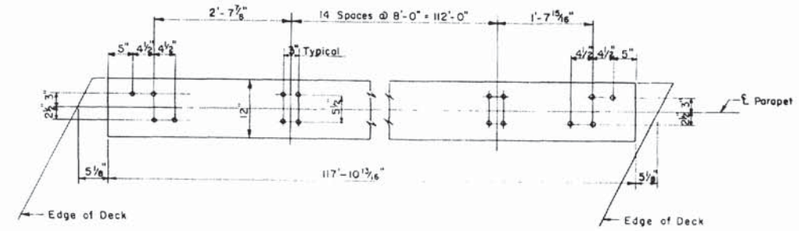
M-1156

B.P.R. DIV. NO.	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
1	MAINE	I-083-1(1)	88	230

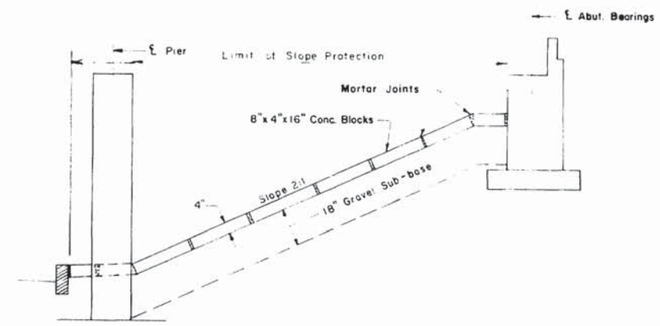
BANGOR INDUSTRIAL SPUR



GENERAL PLAN
SCALE: 3/32" = 1'-0"

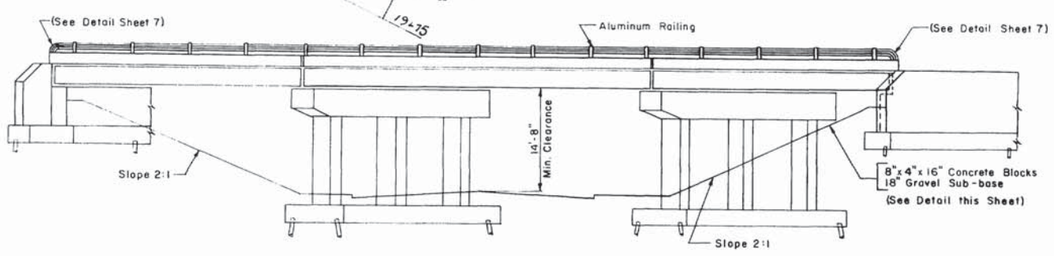


NORTHERLY RAILING ANCHOR BOLT LAYOUT
SOUTHERLY RAILING ANCHOR BOLT LAYOUT (OPP. HAND)
SCALE: 3/4" = 1'-0"



SLOPE DETAIL
NO SCALE

Note: Safety walks, safety walk parapets, and medians to have transverse construction joints 20'± on centers. Reinforcing Steel to be carried thru joint.



GENERAL ELEVATION
SCALE: 3/32" = 1'-0"

FINAL AS BUILT PLANS

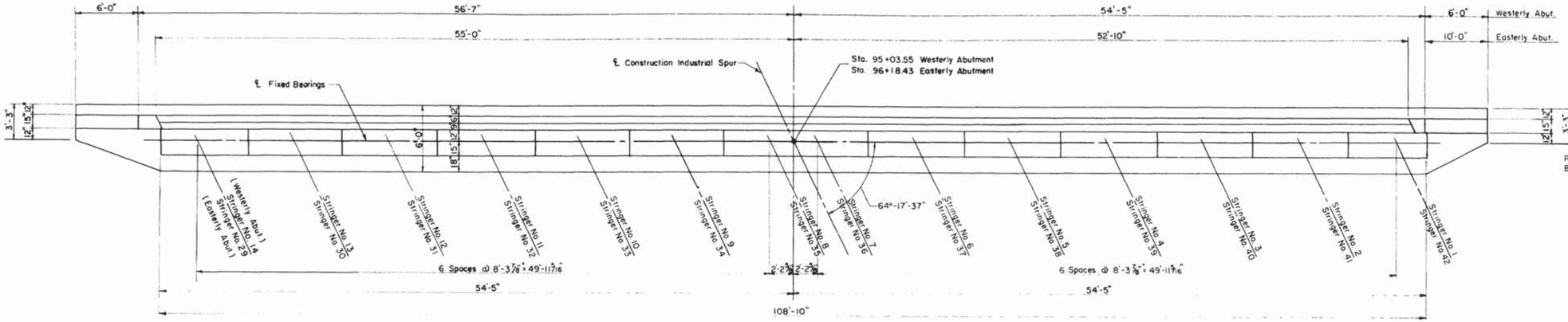
THE CLARKESON ENGINEERING CO., INC.		
DESIGN: H.P. DRAWN: D.A.T.	CHECK: Y.E. & H.P. APPROVED: W.A.H., C.J.M.	BRIDGE NO. SURVEY PLOT

STATE HIGHWAY COMMISSION
INDUSTRIAL SPUR
OVER
WEBSTER AVENUE
IN THE CITY OF
BANGOR
PENOBSCOT COUNTY
GENERAL PLAN AND ELEVATION
SHEET 3 OF 7 AUGUSTA, MAINE

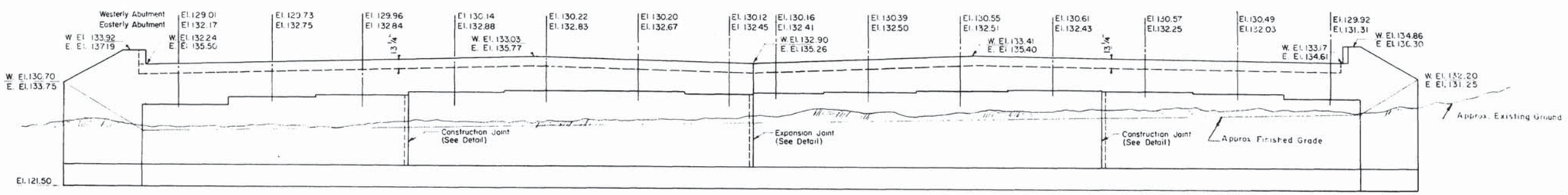
M-1157

B.P.R. DIV. NO.	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
1	MAINE	I-083-1(1)	67	230

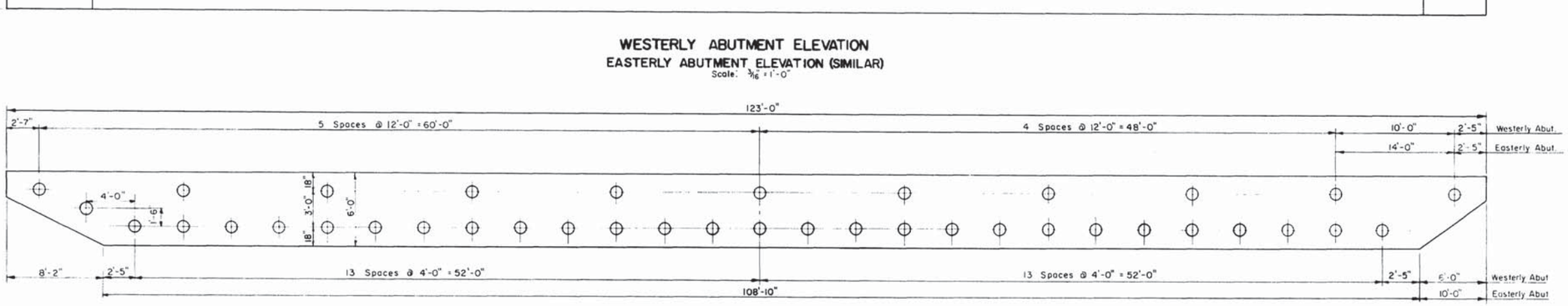
BANGOR INDUSTRIAL SPUR



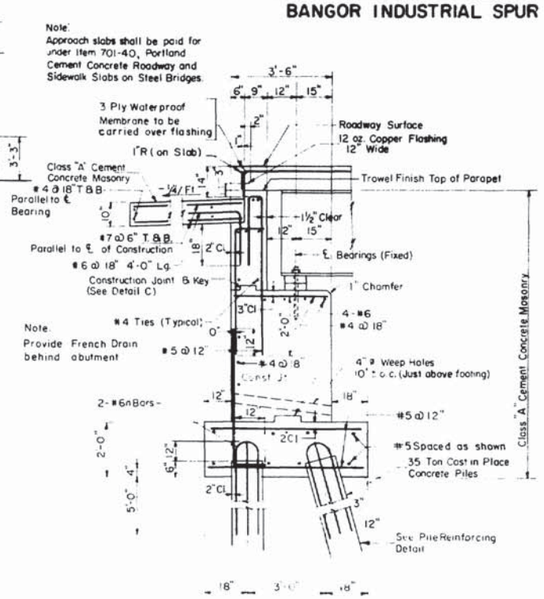
WESTERLY ABUTMENT PLAN
EASTERLY ABUTMENT PLAN (SIMILAR)
Scale: 3/16" = 1'-0"



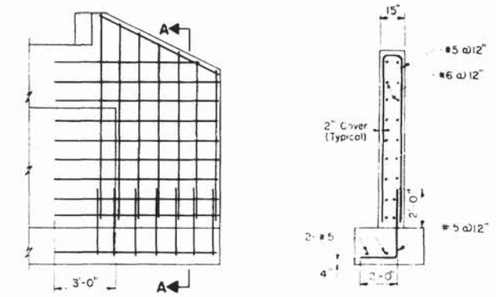
WESTERLY ABUTMENT ELEVATION
EASTERLY ABUTMENT ELEVATION (SIMILAR)
Scale: 3/16" = 1'-0"



WESTERLY ABUTMENT PILE PLAN
EASTERLY ABUTMENT PILE PLAN (SAME)
Scale: 3/16" = 1'-0"

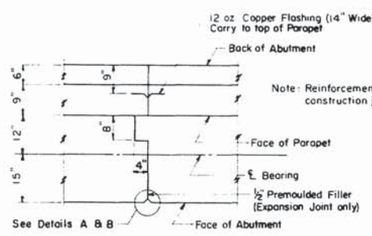


TYPICAL ABUTMENT SECTION
Scale: 3/8" = 1'-0"

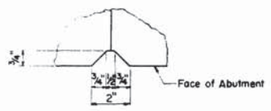


WING REINFORCING LAYOUT
Scale: 1/4" = 1'-0"

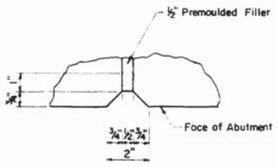
SECTION A-A
Scale: 1/4" = 1'-0"



ABUTMENT CONSTRUCTION & EXPANSION JOINT
Scale: 1/2" = 1'-0"

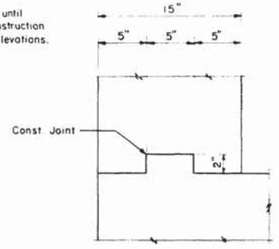


DETAIL A (CONSTRUCTION JOINT)
Scale: 3" = 1'-0"

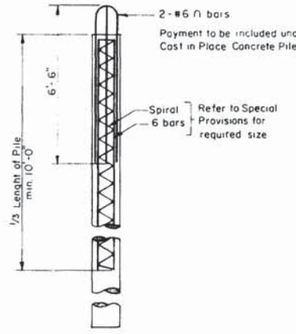


DETAIL B (EXPANSION JOINT)
Scale: 3" = 1'-0"

Note: Concrete in backwall not to be placed until Structural Steel has been erected. Construction Joint to be at or above Bridge Seat Elevations.



DETAIL C
Scale: 1½" = 1'-0"



PILE REINFORCING DETAIL
Scale: 3/8" = 1'-0"

FINAL AS BUILT PLANS

THE CLARKESON ENGINEERING CO., INC.

DESIGN	H.P.	CHECK	Y.E. & H.P.	BRIDGE NO.
	D.A.T.		W.A.H.	SURVEY
DRAWN	S.A.L.	APPROVED	C.J.M.	PLOT

STATE HIGHWAY COMMISSION

INDUSTRIAL SPUR

OVER

WEBSTER AVE.

IN THE CITY OF

BANGOR

PENOBSCOT COUNTY

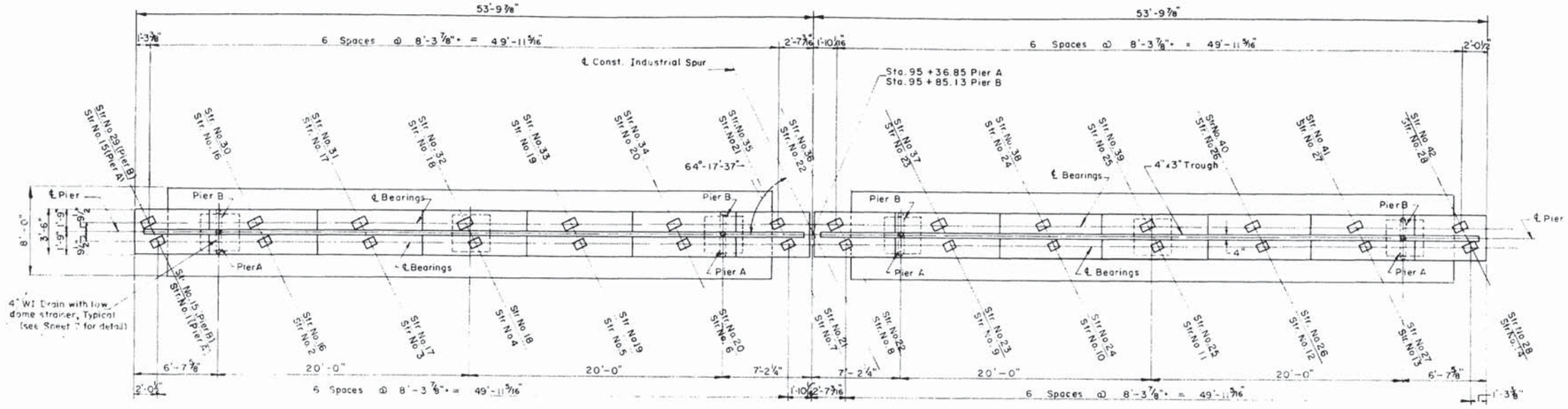
ABUTMENTS

SHEET 4 OF 7 AUGUSTA, MAINE

M-1158

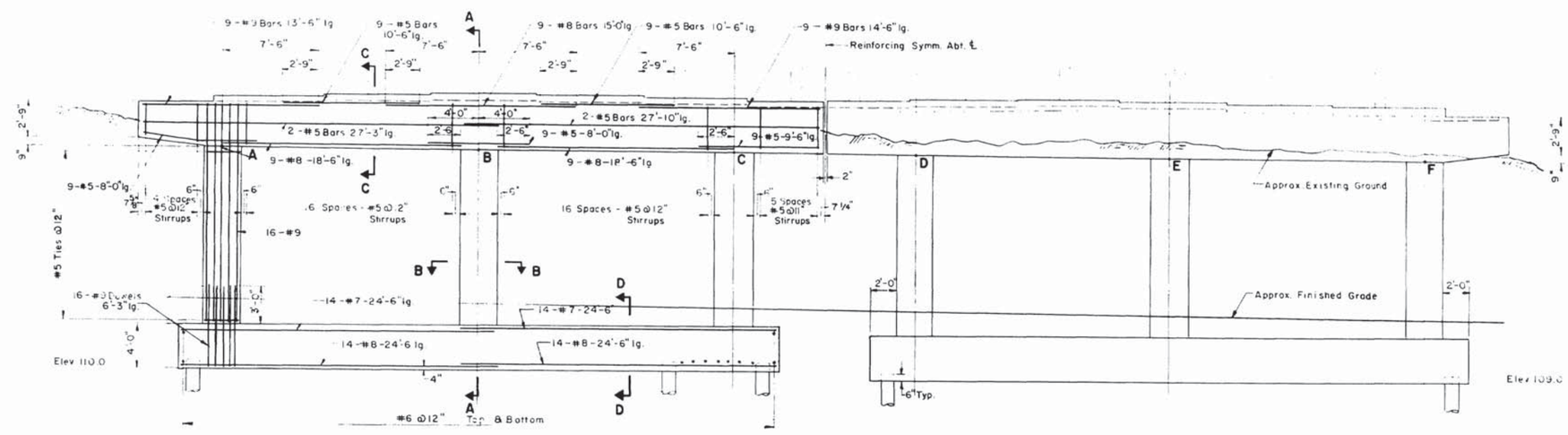
B.P.R. DIV. NO.	STATE	PRODJECT NO.	SHEET NO.	TOTAL SHEETS
1	MAINE	I-083-1(1)	88	230

BANGOR INDUSTRIAL SPUR



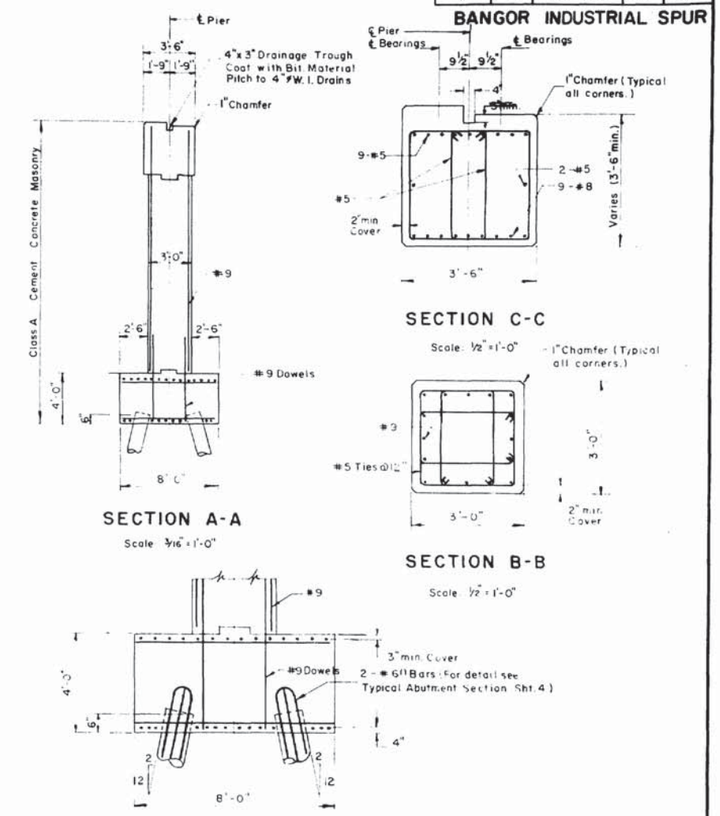
PLAN PIER A
PLAN PIER B (SIMILAR)

Scale: 3/16" = 1'-0"

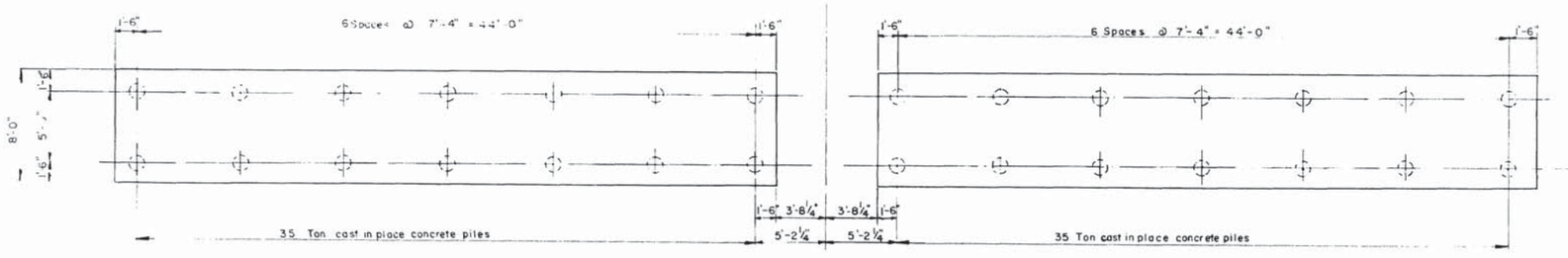


ELEVATION PIER A
ELEVATION PIER B (SIMILAR)

Scale: 3/16" = 1'-0"



Schedule of Beam Seat Elevations						
Beam No.	Pier A		Beam No.	Pier B		Beam No.
1	130.57	130.57	15	131.50	131.57	29
2	131.14	130.64	16	131.57	132.14	30
3	131.22	130.72	17	131.65	132.22	31
4	131.26	130.75	18	131.64	132.26	32
5	131.19	130.69	19	131.62	132.20	33
6	131.03	130.51	20	131.46	132.04	34
7	130.81	130.29	21	131.22	131.81	35
8	130.77	130.25	22	131.18	131.77	36
9	130.85	130.35	23	131.28	131.85	37
10	130.87	130.37	24	131.30	131.87	38
11	130.79	130.28	25	131.21	131.79	39
12	130.61	130.10	26	131.03	131.61	40
13	130.38	129.88	27	130.81	131.38	41
14	129.66	129.67	28	130.60	130.66	42



PILE PLAN PIER A
PILE PLAN PIER B (SIMILAR)

Scale: 3/16" = 1'-0"

Elevations at Tops of Pier Columns						
Pier \ Col.	A	B	C	D	E	F
A	127.07	126.88	126.68	126.55	126.35	126.16
B	128.01	127.83	127.64	127.50	127.30	127.11

FINAL AS BUILT PLANS

THE CLARKESON ENGINEERING CO., INC.

DESIGN - O.C.O.	CHECK - YE. & H.P.	BRIDGE NO.
DRAWN - D.A.T.	APPROVED - W.A.H. C.J.M.	SURVEY PLOT

STATE HIGHWAY COMMISSION

INDUSTRIAL SPUR

OVER

WEBSTER AVE.

IN THE CITY OF

BANGOR

PENOBSCOT COUNTY

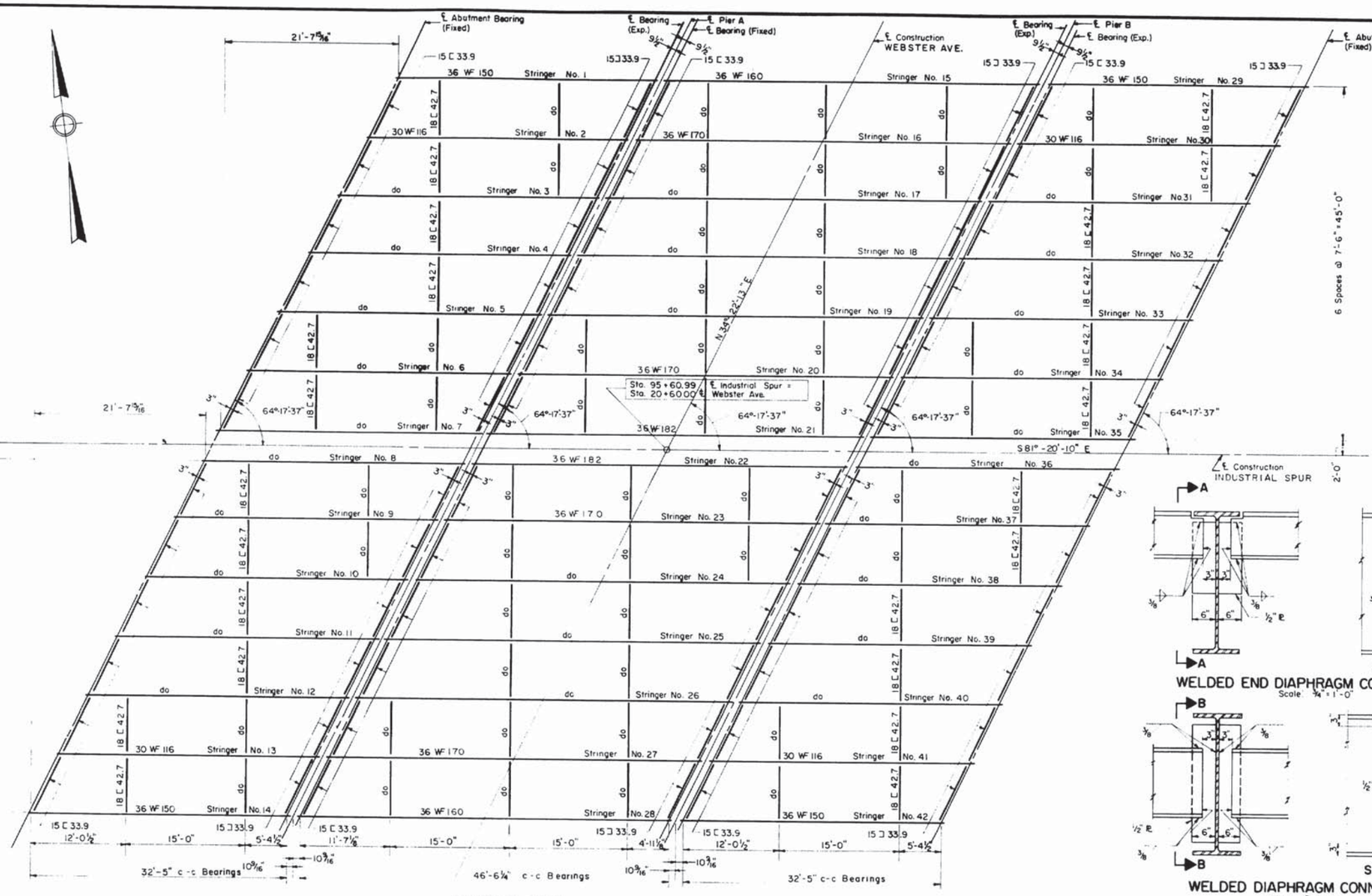
PIERS

SHEET 5 OF 7 AUGUSTA, MAINE

M-1159

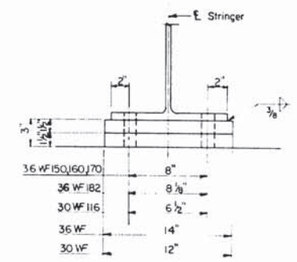
B.P.R. DIV. NO.	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
1	MAINE	I-083-1(1)	89	230

BANGOR INDUSTRIAL SPUR



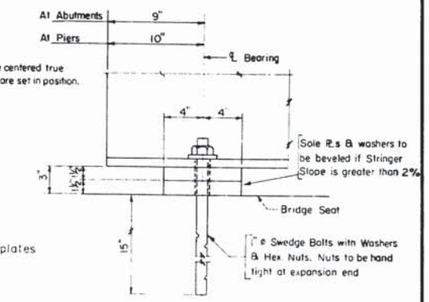
FRAMING PLAN
Scale: 1/8" = 1'-0"

Camber Note: All beams to be cambered to the extent that the bridge deck under full dead load will follow as nearly as practicable the design profile, and in no case with less camber than is likely to remain permanent. The proposed camber diagram shall be submitted to the Engineer for approval.

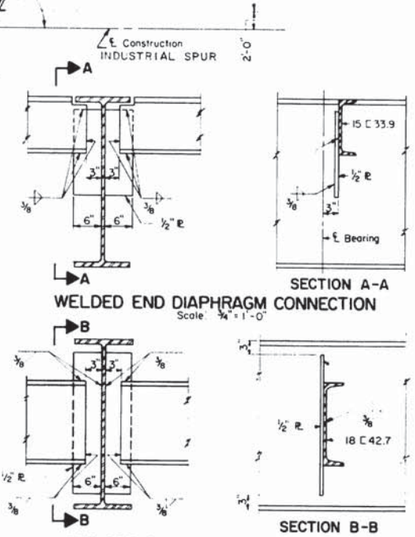


Note
All anchor bolts to be centered true before bearing plates are set in position.

Note
Holes in masonry plates to be 1 3/8" dia.



FIXED AND EXPANSION BEARING DETAILS
Scale: 1½" = 1'-0"



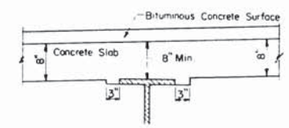
WELDED END DIAPHRAGM CONNECTION
Scale: ¾" = 1'-0"

SECTION A-A

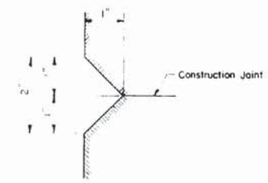
WELDED DIAPHRAGM CONNECTION
Scale: ¾" = 1'-0"

SECTION B-B

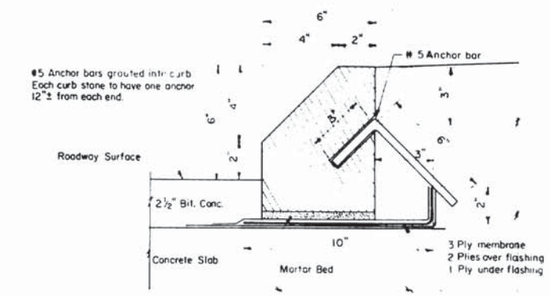
Note: All welds may be shop or field welds



DETAIL OF HAUNCH
Scale: ¾" = 1'-0"

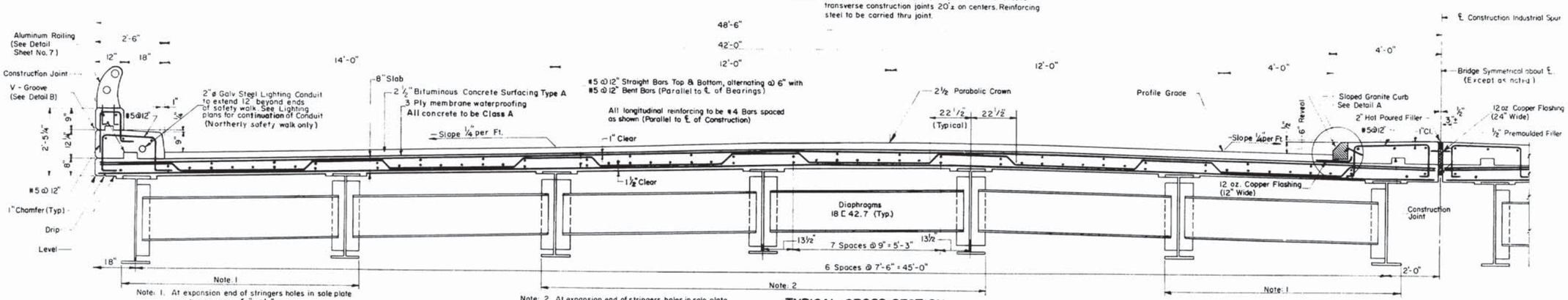


DETAIL B
Scale: ½ Size



DETAIL A
Scale: 3" = 1'-0"

Note Safety walks, safety walk parapets, and medians to have transverse construction joints 20'± on centers. Reinforcing steel to be carried thru joint.



Note: 1. At expansion end of stringers holes in sole plate and flange to be 1⅜" x 2½" slots. At fixed end of these stringers holes to be 1⅜" ø

Note: 2. At expansion end of stringers holes in sole plate and flange to be 1⅜" x 2½" slots. At fixed end of these stringers holes to be 1⅜" ø

TYPICAL CROSS SECTION
Scale: ½" = 1'-0"

FINAL AS BUILT PLANS

THE CLARKESON ENGINEERING CO., INC.

DESIGN H.P.	CHECK Y.E. & H.P.		BRIDGE NO.
DRAWN S.A.L.	APPROVED W.A.H. C.J.M.		SURVEY PLOT

STATE HIGHWAY COMMISSION

INDUSTRIAL SPUR

OVER

WEBSTER AVE.

IN THE CITY OF

BANGOR

PENOBSCOT COUNTY

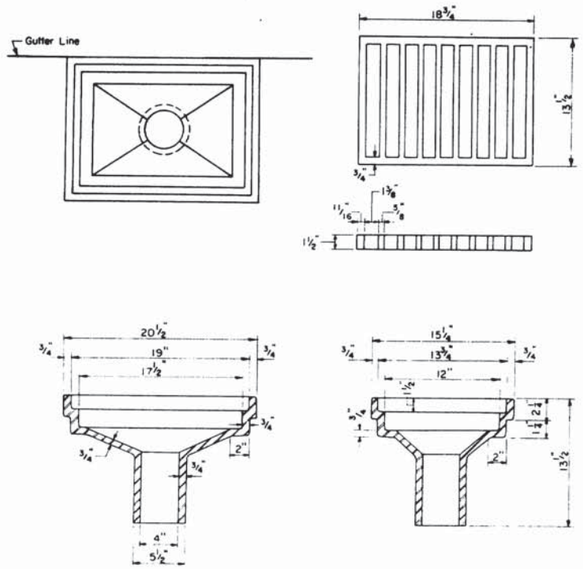
FRAMING PLAN & TYPICAL CROSS SECTION

SHEET 6 OF 7 AUGUSTA, MAINE

M-1160

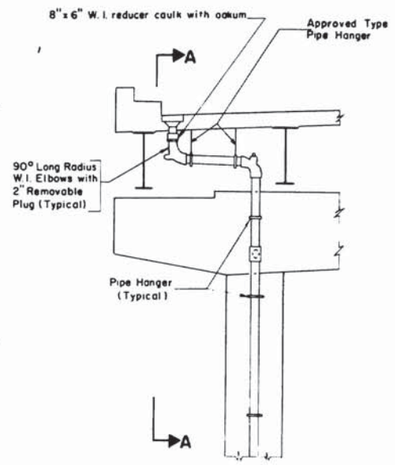
B.P.R. DIV. NO.	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
1	MAINE	I-083-1(1)	90	230

BANGOR INDUSTRIAL SPUR



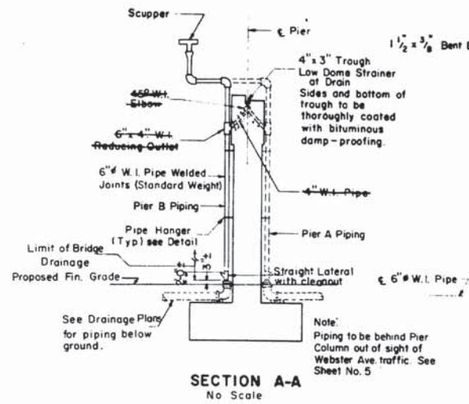
SCUPPER DETAILS

Scale: 1½" = 1'-0"



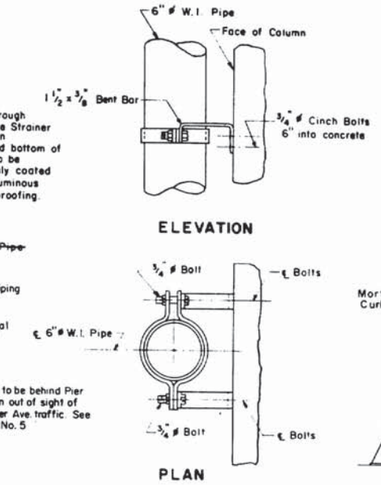
PIPE DETAILS AT SCUPPERS

Scale ¼" = 1'-0"



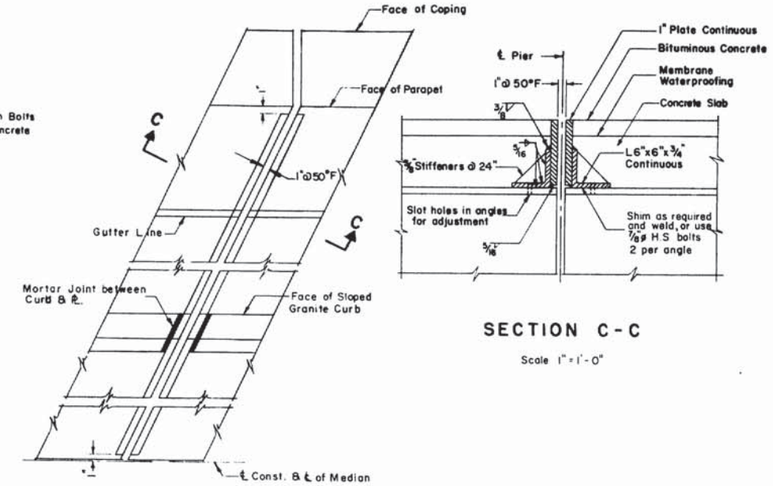
SECTION A-A

No Scale



PIPE HANGER DETAIL

Scale 1½" = 1'-0"



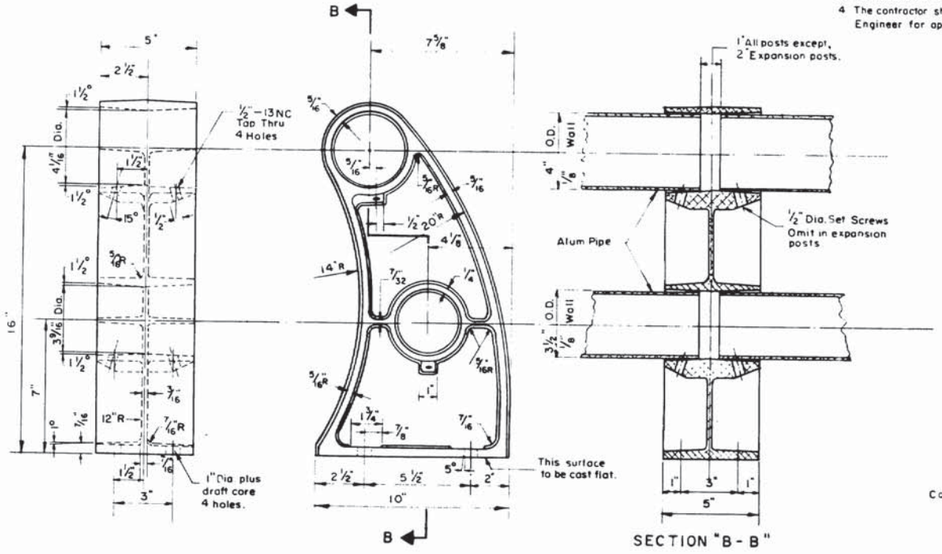
PLAN OF FIXED & EXPANSION JOINTS

Scale 1" = 1'-0"

SECTION C-C

Scale 1" = 1'-0"

Note: 1. All pipes and fittings to be W.I. standard weight with horizontal runs on 2% grade
2. All joints to be welded except as shown
3. For location of scuppers see Sheet No. 3
4. The contractor shall submit complete drawings of the piping system to the Engineer for approval.

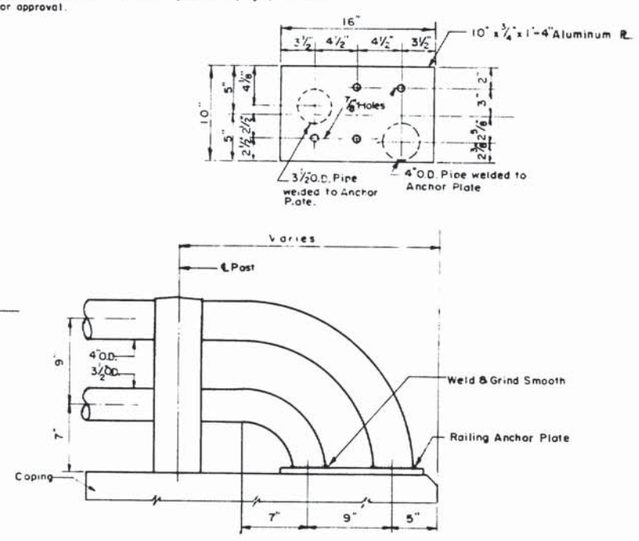


ALUMINUM RAIL DETAILS

Scale: 3" = 1'-0"

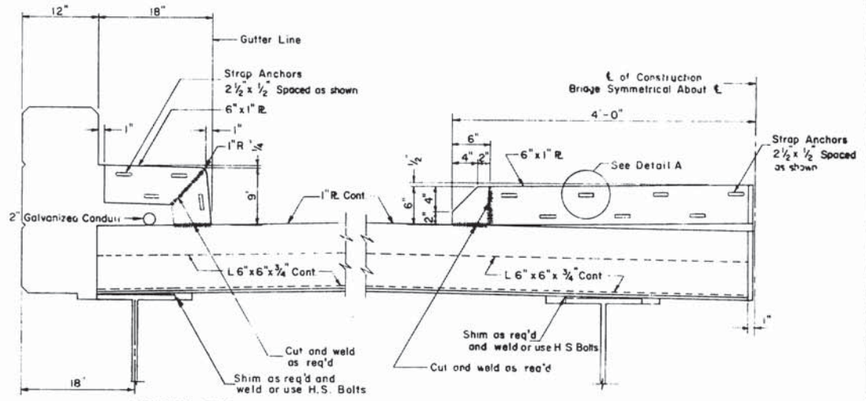
Notes: 1. Any variation in railing dimensions shall be submitted for approval.
2. Aluminum Alloy Anchor Bolts, Nuts & Washers
3. All anchor bolts to be ¾"ø L bolts (set 8" min. into conc.)

Note See sheet 3 for anchor bolt layout



END RAILING DETAIL

Scale: 1½" = 1'-0"

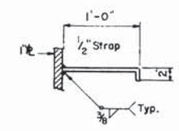


SAFETY WALK

MEDIAN

FIXED & EXPANSION JOINT DETAILS

Scale 1" = 1'-0"



DETAIL A

FINAL AS BUILT PLANS

THE CLARKESON ENGINEERING CO., INC.

DESIGN	CHECK H.P.	BRIDGE NO
DRAWN A.I.	APPROVED W.A.H. C.J.M.	SURVEY PLOT

STATE HIGHWAY COMMISSION

INDUSTRIAL SPUR

OVER

WEBSTER AVE.

IN THE CITY OF

BANGOR

PENOBSCOT COUNTY

DETAIL SHEET

SHEET 7 OF 7 AUGUSTA, MAINE

M-1161