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GEOTECHNICAL DATA REPORT

INTERSTATE 95 OVER SOUADABSCOOK STREAM CENTER
BRIDGES NOS. 5950 AND 1432
HAMPDEN, MAINE
MAINEDOT WIN 21728.00 AND WIN 21728.10

by Haley & Aldrich, Inc.
Portland, Maine

for Maine Department of Transportation
Augusta, Maine

File No. 129380-003
February 2019

HALEY & ALDRICH, INC.
75 Washington Avenue
Suite 1A
Portland, ME 04101
207.482.4600

22 February 2019
File No. 129380-003

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

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

Subject: Geotechnical Data Report
Interstate 95 over Souadabscook Stream Center, Bridge Nos. 5950 and 1432
Hampden, Maine
MaineDOT WIN 21728.00 and WIN 21728.10

Ladies and Gentlemen:

This geotechnical data report (GDR) presents the results of subsurface investigation and geotechnical laboratory testing programs. This work has been completed in accordance with our proposal dated 10 April 2017, and your subsequent authorization.

Project Understanding

The project consists of the replacement of two existing bridges that carry Route 95 traffic northbound and southbound over the Souadabscook Stream Center in Hampden, Maine. Historic drawings of the existing bridges were provided by MaineDOT and are included in this report in Appendix D. The location of the proposed pair of bridges is shown on Figure 1, Project Locus, and Figure 2, Boring Location Plan.

Horizontal Coordinate System and Elevation Datum

Plan locations of test borings are reported as northing and easting coordinates relative to the Maine State Plane Coordinate System, North American Datum of 1983 (NAD 83), Maine 2000 Central Zone (refer to Table I and boring logs in Appendix A). Elevations referenced herein are in feet and reference the North American Vertical Datum of 1988 (NAVD 88).

Geologic Setting

According to Maine Geological Survey's Hermon Quadrangle, Maine (2013), surficial geologic units mapped within the site vicinity consist largely of Wetland Deposits and Presumpscot Formation. The historic test borings drilled at the site encountered Wetland Deposits (i.e., peat, silt and sand) overlying the Presumpscot Formation (i.e., glaciomarine clays, silts and sands). The recent test borings drilled at the site encountered man-placed fill overlying the Presumpscot Formation. Deposition of the Presumpscot Formation occurred as a result of melting glacial ice in conjunction with sea level rise during deglaciation in Late Wisconsinan time. Below the Presumpscot Formation is a granular, glacial till deposit consisting of a heterogeneous mix of sand, silt, gravel, cobbles and boulders which directly overlies bedrock. Man-placed fill deposits were absent at boring locations drilled within the Souadabscook Stream limits. Thin near surface alluvial deposits were encountered at these locations consisting of fine to coarse gravel and sand overlying Presumpscot Formation, glacial till, and bedrock.

According to Maine Geological Survey's Bedrock Geology of the Bangor Quadrangle, Maine (1976), bedrock at the site is mapped as Silurian-Ordovician age rocks of the Vassalboro Formation. Bedrock core samples collected for this site investigation consisted of metamorphic rocks composed of phyllite.

Subsurface Explorations

PRELIMINARY DESIGN PHASE EXPLORATIONS BY HALEY & ALDRICH

Haley & Aldrich conducted a preliminary design phase geotechnical exploration program at the site of the two bridges. A total of six test borings (BB-HSS-107 through BB-HSS-112) were completed to identify subsurface conditions along the proposed bridge alignment. Test borings BB-HSS-107, BB-HSS-108, BB-HSS-111, and BB-HSS-112 were drilled through the bridge approach embankments behind the existing abutments. Test borings BB-HSS-109 and BB-HSS-110 were drilled through the bridge deck and casing was advanced from the bridge deck to the river mudline below.

Boring locations were laid out in the field by taping distances from existing site features. "As-drilled" locations and ground surface elevations at boring locations were determined by MaineDOT using GPS survey methods. As-drilled boring locations are shown on Figure 2. Coordinate location data and ground surface elevations at exploration locations are provided on individual test boring logs provided in Appendix A and are summarized in Table I.

All test borings were drilled by New England Boring Contractors of Hermon, Maine using either a truck-mounted Mobile B59 drill rig or track-mounted Mobile B53 drill rigs. Test borings were drilled to depths ranging from 33.7 ft to 66.0 ft below ground surface (BGS).

Test borings were advanced using cased-wash drilling methods by either driving or spinning casing. Casing consisted of 4.0-in. (HW-size) inside diameter (ID) steel casing and/or 3.0-in. (NW-size) ID steel casing. Casing blow count data is provided on the logs in Appendix A. Soil samples were generally collected continuously through the man-placed fill and then typically at 5-ft intervals once native soils

were encountered. The test borings were extended to bedrock and collected approximately 10 to 15 ft of rock core.

Soils samples were collected by driving a 1-3/8-in. ID split-spoon sampler with a 140-lb hammer dropped from a height of 30 in., as indicated on the test boring logs. Drilling and sampling were performed in accordance with MaineDOT specifications. The drill rigs were equipped with automatic hammers calibrated annually per MaineDOT requirements (Appendix A of MaineDOT Geotechnical Drilling Contract Specifications, revised June 2007). A calculated hammer efficiency of 0.75, 0.677 and 0.869 were used for the calibrated automatic hammer system for the steel track-mounted Mobile Drill B-53 rig, the rubber track-mounted Mobile Drill B-53 rig, and the truck-mounted Mobile Drill B-59 rig, respectively.

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. The energy-corrected SPT N-value (N60) is equal to the uncorrected N-value multiplied by the hammer efficiency factor divided by 0.6 (i.e., 60 percent calculated hammer efficiency). Both the raw blow count data and the corrected N-values are shown on the boring logs.

Samples of the in-situ fill soils collected during the explorations were screened in the field with a photoionization detector (PID) to assess the presence of volatile organic compounds (VOCs). No elevated PID readings were detected during the subsurface explorations. No visual or olfactory signs of contamination/environmentally impacted soils were observed during the subsurface explorations. Refer to individual boring logs provided in Appendix A for actual PID readings.

The test borings sampled 10.0 to 18.4 ft of bedrock using a 2.0-in. (NQ-size) ID diamond-tipped core barrel. Refer to rock core photographs provided in Appendix B for detailed information on bedrock core samples collected.

All soil and bedrock samples were classified in accordance with MaineDOT classification system and were preserved in glass sample jars and wooden core boxes. The samples that were not submitted for laboratory testing are available for review upon request. Soil and bedrock samples are being stored at the Haley & Aldrich laboratory facility in Portland, Maine.

Generalized Subsurface Conditions

The subsurface conditions encountered at the site consist of the following geologic units presented in order of increasing depth below ground surface: man-placed fill, alluvial deposits, marine deposits, glacial till and bedrock. Please note that historical borings indicate the presence of a thick deposit of peat, silt and sand, referred to as an organic deposit. This deposit was not encountered in the recent test borings, and may have been over-excavated from the site during construction of the original bridges.

SOIL UNIT AND BEDROCK DESCRIPTIONS

Soil

Refer to Table I for a summary of the soil units and encountered thicknesses at each test boring location. A description of each soil unit is provided separately, below. Detailed soil descriptions are provided on the test boring logs in Appendix A. Please note that the soil descriptions provided on the test boring logs and summarized below do not represent actual field conditions other than at the specific test boring locations. The actual conditions will vary from those described and shown herein.

Unit		Approximate Range in Encountered Thickness (ft)	Generalized Description
Fill		18.1 to 27.3	Loose to dense SAND, trace silt and trace to some gravel (SP-SM, SW, SW-SM); very loose to medium dense SAND, little silt to silty, trace to some gravel (SM); medium dense GRAVEL, some sand, trace silt (GW-GM) *(encountered behind each abutment in borings BB-HSS-107, BB-HSS-108, BB-HSS-111 and BB-HSS-112)*
Alluvial Deposit		3.0 to 4.0	Very loose to very dense GRAVEL, trace sand to sandy, trace to some silt (GW, GW-GM) *(encountered within the stream in borings BB-HSS-109 and BB-HSS-110)*
Marine Deposit	Clay and Silt	3.5 to 23.5	Very soft to medium stiff silty CLAY, trace to little sand, trace gravel (CL) contains occasional less than 1-in. thick partings of sand and gravel, occasional trace shells and occasional trace organics. (*encountered in all test borings*)
	Sand	4.1	Loose silty fine SAND (SM) (*encountered in test boring BB-HSS-112*)
Glacial Till		4.9 to 13.8	Loose to very dense SAND, little gravel, trace silt (SW, SW-SM); medium dense GRAVEL, some sand, trace silt (GW); dense SAND and GRAVEL, trace silt (SW-SM/GW-GM) The glacial till was weakly-bonded to moderately-bonded and contained occasional cobbles and boulders. *(encountered in all test borings except BB-HSS-108 and BB-HSS-111)*

Test borings performed behind the abutments encountered 0.5 to 1.0 ft of bituminous concrete with a 0.4 to 0.8-ft thick concrete approach slab underlying the bituminous concrete. Test borings performed at the midpoint of the bridge penetrated the concrete bridge deck, which had a thickness of 0.8 ft.

Bedrock

Bedrock was cored in each test boring. The top of the bedrock surface ranged from approximately 17.8 to 55.7 ft BGS (El. 79.3 to El. 96.2). Test borings BB-HSS-109 through BB-HSS-112 encountered 0.3 to 2.1 ft of weathered bedrock overlying the bedrock. Bedrock encountered at the site consisted of moderately hard to very hard PHYLLITE.

Rock quality designation (RQD) is a common parameter that is used to help assess the competency of sampled bedrock. RQD is defined as the sum of pieces of recovered bedrock greater than 4 in. in length divided by the total length of the core run. RQD values for bedrock encountered at the site ranged between 0 and 100 percent, this correlates to a Rock Mass Quality rating of very poor to excellent. Refer to rock core photographs provided in Appendix B for detailed information on bedrock core samples collected.

WATER ELEVATIONS

The water level of the Souadabscook Stream was measured while performing test borings BB-HSS-109 and BB-HSS-110 by measuring from the bridge deck to the stream. The water level of the Souadabscook Stream was approximately El. 121.8 on 30 May 2017 (BB-HSS-109) and El. 123.1 on 17 May 2017 (BB-HSS-110).

Observation wells were not installed in any of the completed boreholes. As a result, long term static water levels at test boring locations were not determined. Water levels were taken in the completed boreholes after the casing had been extracted from the borehole and are noted on the boring logs in Appendix A. Water depths ranged from 12 to 14 ft BGS (El. 120.7 to El. 123.2). Please note that the visual observations made during drilling and water levels measured in the completed boreholes may have been affected by drilling means/methods and may not be representative of actual static water levels at the site.

In general, groundwater levels can be expected to fluctuate, subject to seasonal variation, local soil conditions, topography and precipitation. Groundwater levels encountered during construction may differ from those observed in the test borings.

Flood levels in the Soudabscook Stream, as provided by McFarland Johnson, are summarized below.

Discharge	Headwater (ft, NAVD 88)
$Q_{1.1}$	El. 121.50
Q_{50}	El. 126.54
Q_{100}	El. 128.55 (FEMA)
Record Flood	El. 130.05 (FEMA)

Laboratory Testing Program

A preliminary design phase laboratory testing program was undertaken on soil samples collected during the field investigation to assist in soil classification/identification and scour evaluations. In general, laboratory testing was performed on disturbed soil samples collected during SPT sampling. All laboratory soil testing was performed by GeoTesting Express, Inc. of Acton, Massachusetts. Geotechnical laboratory testing was performed in accordance with applicable American Society for Testing Materials (ASTM) testing procedures.

The preliminary design phase testing program included six grain size analyses (sieve only, no hydrometer), five Atterberg Limits analyses, and four Compressive Strength/Elastic Moduli of Rock analyses. A summary of laboratory test results is provided below. Refer to the laboratory test results provided in Appendix C of this report.

Laboratory Test	ASTM Test Designation	Soil Unit	No. of Tests Completed	Range in Test Results
Grain Size	ASTM D 422 (Sieve Only)	Fill	4	AASHTO Classification: A-1-a(0), A-1-a(1), A-1-b(0) USCS Classification: SP-SM, SW-SM, SM
		Alluvial Deposit	2	AASHTO Classification: A-1-a(1) USCS Classification: GW-GM, GW
Atterberg Limits	ASTM D 4318	Marine Clay	5	USCS Classification: CL Moisture Content: 20% to 27% Liquid Limit: 24 to 36 Plastic Limit: 17 to 19 Plasticity Index: 7 to 18
Compressive Strength / Elastic Moduli of Rock	ASTM D 7012	Bedrock	4	Peak Compressive Stress: 5,093 psi to 12,435 psi Young's Modulus: 5,470,000 psi to 12,100,000 psi Poisson's Ratio: 0.08 to 0.30

Closure

We appreciate the opportunity to provide geotechnical services on this project. Please do not hesitate to call if you have any questions or comments.

Sincerely yours,
HALEY & ALDRICH, INC.

Erin A. Force, P.E.
Project Manager

Wayne A. Chadbourne, P.E.
Senior Associate

Enclosures:

- Table I – Summary of Subsurface Explorations
- Figure 1 – Project Locus
- Figure 2 – Boring Location Plan
- Appendix A – Test Boring Logs
- Appendix B – Rock Core Photographs
- Appendix C – Laboratory Test Results
- Appendix D – Historic Drawings

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References

1. Griffin, John R., *Bedrock Geology of the Bangor Quadrangle, Maine*, Maine Geological Survey, Department of Conservation, Augusta, Maine, Open File Report No. 76-23, 1976.

2. Weddle, Thomas K., *Surficial Geology Hermon Quadrangle, Maine*, Maine Geological Survey, Department of Conservation, Augusta, Maine, Open File Report No. 13-13, 2013.

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TABLES

TABLE I
Summary of Subsurface Explorations
Interstate 95 over Souadabscook Stream Center
Bridge Nos. 5950 and 1432
Hampden, Maine
MaineDOT WIN 21728.00 and WIN 21728.10

	Test Boring No.[1]	Coordinates[2] Easting	Northing
North bound	BB-HSS-108	1,696,357	460,313
	BB-HSS-110	1,696,426	460,316
	BB-HSS-112	1,696,500	460,324
South bound	BB-HSS-107	1,696,339	460,492
	BB-HSS-109	1,696,411	460,502
	BB-HSS-111	1,696,484	460,507

	Test Boring No.[1]	Ground Surface Elevation[3,4]	Approximate Strata Thickness[5] (ft) Bituminous Concrete	Fill	Alluvial Deposit	Marine Clay and Silt	Marine Sand	Glacial Till	Weathered Bedrock	Approximate Top of Bedrock Depth (ft)	Approximate Elevation of Top of Bedrock[3,4]	Approximate Bottom of Exploration Depth (ft)	Approximate Elevation of Bottom of Exploration[3,4]
North bound	BB-HSS-108	135.2	1.0	23.0	NE	22.3	NE	NE	NE	46.3	88.9	56.3	78.9
	BB-HSS-110	112.9	NE[6]	NE	4.0	17.0	NE	4.9	2.1	28.0	84.9	38.5	74.4
	BB-HSS-112	135.0	0.5	19.4	NE	16.7	4.1	13.8	1.2	55.7	79.3	66.0	69.0
South bound	BB-HSS-107	134.7	0.7	27.3	NE	3.5	NE	7.0	NE	38.5	96.2	48.9	85.8
	BB-HSS-109	112.1	NE[6]	NE	3.0	4.5	NE	10.0	0.3	17.8	94.3	33.7	78.4
	BB-HSS-111	134.5	0.9	18.1	NE	23.5	NE	NE	0.5	43.0	91.5	61.4	73.1

Notes:
[1] Test boring locations are shown on Figure 2, Boring Location Plan.
[2] As-drilled coordinates of test borings were determined by MaineDOT using GPS survey equipment and reference NAD 83, Maine 2000 Central Zone coordinate system.
[3] Ground surface elevations at as-drilled test boring locations were determined by MaineDOT using GPS survey equipment.
[4] Elevations are measured in feet and reference the National Geodetic Vertical Datum of 1988 (NAVD 88).
[5] "NE" indicates stratum was not encountered in test boring.
[6] Existing concrete bridge deck thickness encountered at both BB-HSS-109 and BB-HSS-110 was 0.8 ft.

	Individual	Date
Prepared By:	KAR	1/11/2019
Checked By:	EAF	2/18/2019
Reviewed By:	WAC	2/21/2019

FIGURES

MAP SOURCE: ESRI

SITE COORDINATES: 44°45'46"N, 68°54'34"W

HALEY ALDRICH

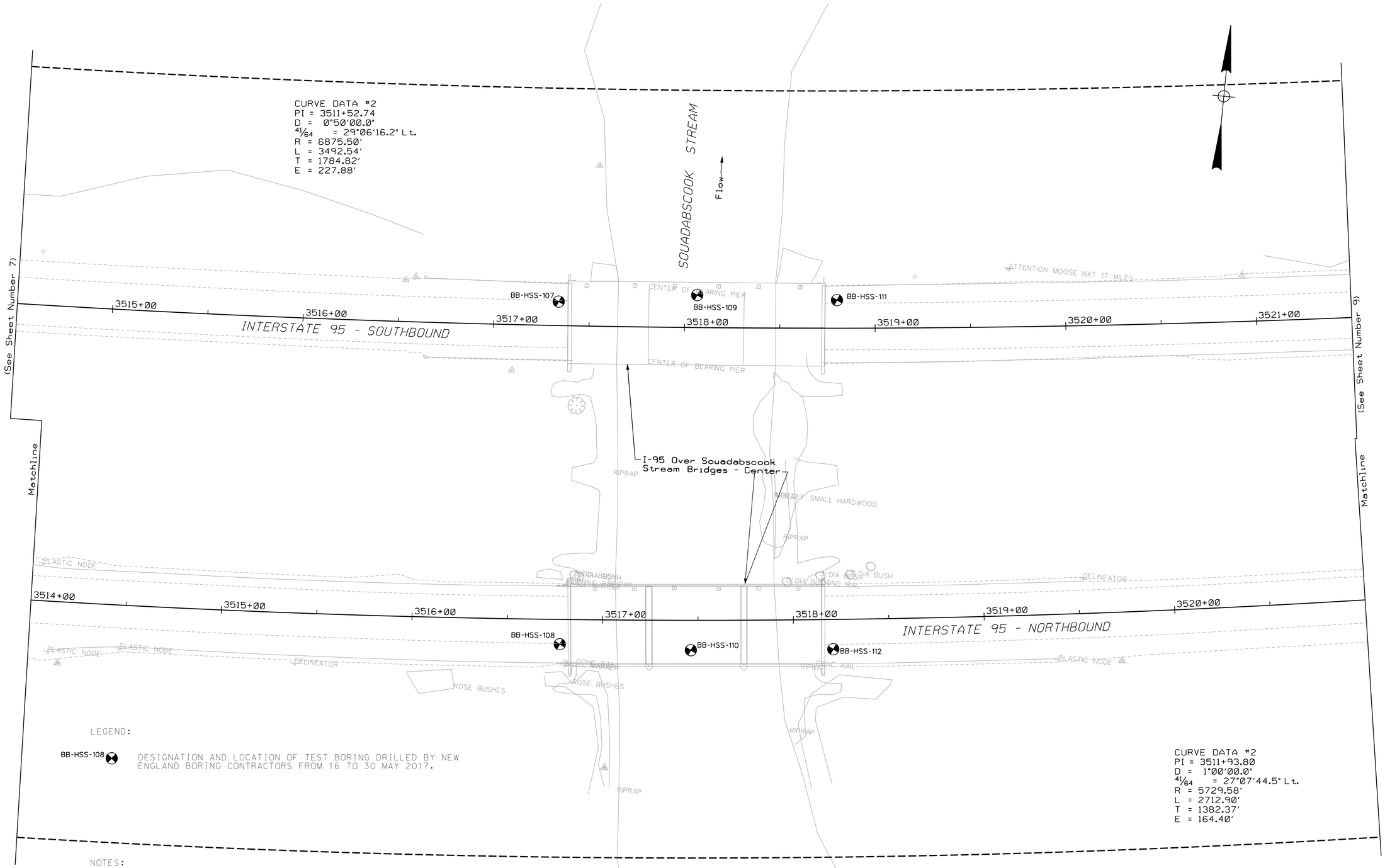
INTERSTATE 95 OVER SOUDABSCOOK STREAM
CENTER BRIDGES NOS. 5950 AND 1432
MAINEDOT WIN 21728.00 AND WIN 21728.10
HAMPDEN, MAINE

PROJECT LOCUS

APPROXIMATE SCALE: 1 IN = 2000 FT
FEBRUARY 2019

FIGURE 1

129380-003_1_LOCUS.PDF



LEGEND:

BB-HSS-108 — DESIGNATION AND LOCATION OF TEST BORING DRILLED BY NEW ENGLAND BORING CONTRACTORS FROM 16 TO 30 MAY 2017.

NOTES:

1. BASE PLAN TAKEN FROM ELECTRONIC MICROSTATION FILES PROVIDED BY MCFARLAND JOHNSON ON 15 FEBRUARY 2019.
2. AS-DRILLED LOCATIONS OF TEST BORINGS WERE DETERMINED IN THE FIELD BY MAINEDOT USING GPS SURVEY EQUIPMENT.
3. SUBSURFACE EXPLORATIONS SHOWN WERE MONITORED BY HALEY & ALDRICH, INC. PERSONNEL.

PLAN

25 0 25 50
Scale of Feet

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

BRIDGE NOS. 5950 & 1432 WIN 21728.00 - 21728.10 BRIDGE PLANS

PROJ. MANAGER	E. FORCE		
DESIGN-DETAILED	K. POST	K. POST	02-21-19
CHECKED-REVIEWED	E.FORCE	E.FORCE	02-21-19
DESIGN2-DETAILED2			
DESIGN3-DETAILED3			
REVISIONS 1			
REVISIONS 2			
REVISIONS 3			
REVISIONS 4			
FIELD CHANGES			

SIGNATURE

P.E. NUMBER

DATE

HAMPDEN BRIDGE BUNDLE
INTERSTATE 95
HAMPDEN, MAINE PENOBSCOT COUNTY

BORING LOCATION PLAN

SHEET NUMBER
2
OF 2

APPENDIX A

Test Boring Logs

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Souadabscook Stream Center Bridges
Location: Hampden, Maine

Boring No.: BB-HSS-107
WIN: 21728.10

Driller:	New England Boring Contractors	**Elevation (ft.)**	134.7	**Auger ID/OD:**	--
Operator:	M. Porter	**Datum:**	NAVD 88	**Sampler:**	Split Spoon-1.375 in. ID
Logged By:	M.Snow/K.Russ	**Rig Type:**	Mobile Drill B-53	**Hammer Wt./Fall:**	SS-140#/30;HW/NW-300#/18
Date Start/Finish:	5-25-17/5-30-17	**Drilling Method:**	HW/NW Drive	**Core Barrel:**	NQ-2.0 in. ID
Boring Location:	Bridge #1432: E1696339; N460492	**Casing ID/OD:**	HW-4.0 in. ID/NW-3.0 in. ID	**Water Level*:**	14 ft
Hammer Efficiency Factor: 0.750		**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 = Field Vane Shear Test, PP = Pocket Penetrometer
MV = Unsuccessful Field Vane Shear Test Attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = Weight of 140lb. Hammer
WOR/C = Weight of Rods or Casing
WO1P = Weight of One Person
S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane Shear Strength (psf)
WC = Water Content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

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.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0							HW Spun	134.0		-BITUMINOUS CONCRETE- 0.7	
	1D	8/8	1.0 - 1.7	14/50(2.0)				133.0		Brown, dry, dense, fine to medium SAND, little coarse sand, little fine gravel, trace coarse gravel, trace silt -FILL-(SW) PID=0.0 ppm	
	2D	24/14	2.5 - 4.5	8/9/9/7	18	23		132.2		-CONCRETE- 1.7	
										2.5	
	3D	24/13	4.5 - 6.5	6/9/9/10	18	23				Brown, dry, medium dense, fine to coase SAND, some gravel, trace silt -FILL-(SW) PID=0.0 ppm	
5							33			Brown, dry, medium dense, fine to medium SAND, little coarse sand, little fine gravel, trace coarse gravel, trace silt -FILL-(SW) PID=0.0 ppm	
	4D	24/12	6.5 - 8.5	8/11/8/10	19	24	38			Brown, dry, medium dense, fine to medium SAND, little coarse sand, little fine gravel, trace coarse gravel, trace silt -FILL-(SW) PID=0.0 ppm	
							40				
	5D	24/14	8.5 - 10.5	6/7/6/6	13	16	37			Brown, moist, medium dense, fine to medium SAND, little fine gravel, trace coarse sand, trace coarse gravel, trace silt -FILL-(SW-SM) PID=0.0 ppm	
							34				
10	6D	24/10	10.5 - 12.5	9/9/4/3	13	16	29			Brown, wet, medium dense, fine to medium SAND, lilttle coarse sand, little gravel, trace silt -FILL-(SW-SM) PID=0.0 ppm	
							14				
	7D	24/10	12.5 - 14.5	4/7/11/9	18	23	15			Brown, wet, medium dense, fine to coarse SAND, little fine gravel, trace silt, trace coarse gravel -FILL-(SW-SM) PID=0.0 ppm	
							44				
	8D	24/6	14.5 - 16.5	5/6/6/4	12	15	16			Brown, wet, medium dense, medium to coarse SAND, some fine gravel, trace coarse gravel, trace fine sand, trace silt -FILL-(SW) PID=0.0 ppm	
15							20				
	9D	24/5	16.5 - 18.5	10/6/6/6	12	15	24			Brown, wet, medium dense, GRAVEL, some medium to coarse sand, trace fine sand, trace silt, well graded -FILL-(GW-GM) PID=0.0 ppm	
							28				
	10D	24/9	18.5 - 20.5	5/5/4/4	9	11	29			Brown, wet, loose, medium to coarse SAND, some gravel, little silt, trace fine sand -FILL-(SP-SM) PID=0.0 ppm	G#426871 A-1-a (0) SP-SM
							30				
20	11D	24/6	20.5 - 22.5	7/5/9/6	14	18	30			Brown, wet, medium dense, medium to coarse SAND, some gravel, little silt, trace fine sand -FILL-(SM) PID=0.0 ppm	
							27				
	12D	24/5	22.5 - 24.5	4/8/8/5	16	20	15(6.0) 17(6.0)			Brown, wet, medium dense, medium to coarse SAND, some gravel, trace fine sand, trace silt -FILL-(SW-SM) PID=0.0 ppm	
							35				
25							35				

Remarks:

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

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

Boring No.: BB-HSS-107

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Souadabscook Stream Center Bridges
Location: Hampden, Maine

Boring No.: BB-HSS-107
WIN: 21728.10

Driller:	New England Boring Contractors	**Elevation (ft.)**	134.7	**Auger ID/OD:**	--
Operator:	M. Porter	**Datum:**	NAVD 88	**Sampler:**	Split Spoon-1.375 in. ID
Logged By:	M.Snow/K.Russ	**Rig Type:**	Mobile Drill B-53	**Hammer Wt./Fall:**	SS-140#/30;HW/NW-300#/18
Date Start/Finish:	5-25-17/5-30-17	**Drilling Method:**	HW/NW Drive	**Core Barrel:**	NQ-2.0 in. ID
Boring Location:	Bridge #1432: E1696339; N460492	**Casing ID/OD:**	HW-4.0 in. ID/NW-3.0 in. ID	**Water Level*:**	14 ft
Hammer Efficiency Factor:	0.750	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

Definitions:
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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.
25	13D	24/3	25.0 - 27.0	8/5/5/4	10	13	30		Brown, wet, loose, medium to coarse SAND, some fine gravel, trace fine sand, trace coarse gravel, trace silt -FILL-(SW) PID=0.0 ppm	
							60			
							49		Note: Drill wash water contents indicate strata change at 28.0 ft.	
							16	106.7	28.0	
	MV	0/0	30.0 - 30.0				16		Note: Attempt field vane shear test; refusal at 30.0 ft.	
30	14D	24/20	30.0 - 32.0	1/1/1/3	2	3	19		Olive-grey, wet, very soft, silty CLAY, little fine sand, trace fine and coarse gravel, occasional 1-in. partings of sand and gravel -MARINE DEPOSIT-(CL)	G#426865 A-6 CL WC=20% LL=25, PL=17 PI=8
							43	103.2	31.5	
							72		Note: Drill wash water contents indicate strata change at 31.5 ft.	
							57			
							62			
35	15D	24/4	35.0 - 37.0	9/5/5/5	10	13	48		Olive-grey, wet, loose, fine to coarse SAND, little gravel, trace silt, loosely bonded, well graded -GLACIAL TILL-(SW)	
							58			
							47			
	R1	60/56	38.9 - 43.9	RQD = 58%			59(6.0)	96.2	Note: Advance rollerbit to 38.9 ft, begin NQ rock core. 38.5 Top of Bedrock at El.96.2 R1: Grey, aphanitic, PHYLLITE, very hard, fresh to moderately weathered. Joints dipping at moderate to low angles, parallel to foliation, moderately close to very close, tight to open, planar, smooth to rough, highly oxidized joint surfaces. Occasional clay (0.125 in.) infilling, occasional 0.125-in. pits. Frequent 0.0625-in. to 0.125-in. quartz veins. Rock Mass Quality=Fair Recovery=93% R1 Core Times (min:sec): 38.9-39.9' (3:30); 39.9-40.9' (3:06); 40.9-41.9' (2:30); 41.9-42.9' (2:37); 42.9-43.9' (3:35)	
40										
	R2	41/32	43.9 - 47.3	RQD = 37%					R2: Grey to brownish-grey, aphanitic to fine grained, PHYLLITE, very hard to hard, fresh to moderately weathered. Primary joints moderately dipping, parallel to foliation, moderately close to very close, tight to open, planar, smooth to rough, highly oxidized joint surfaces, occasional 0.125-in. clay infilling. Secondary joints dipping vertically, wide, tight, planar, rough, highly oxidized joint surfaces. Single biotite-rich core from 44.9 to 45.4 ft. Single 2-in. quartz vein at 45.4 ft. Occasional 0.125-in. pits and 0.0625-in. quartz veins. Rock Mass Quality=Poor Recovery=78% R2 Core Times (min:sec): 43.9-44.9' (2:18); 44.9-45.9' (1:42); 45.9-46.9' (2:00); 46.9-47.3' (1:53)	
45										
	R3	19/19	47.3 - 48.9	RQD = 100%						
								85.8	R3: Grey, aphanitic, PHYLLITE, very hard, fresh. No visible joints.	
50										

Remarks:

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Souadabscook Stream Center Bridges
Location: Hampden, Maine

Boring No.: BB-HSS-107
WIN: 21728.10

Driller:	New England Boring Contractors	**Elevation (ft.)**	134.7	**Auger ID/OD:**	--
Operator:	M. Porter	**Datum:**	NAVD 88	**Sampler:**	Split Spoon-1.375 in. ID
Logged By:	M.Snow/K.Russ	**Rig Type:**	Mobile Drill B-53	**Hammer Wt./Fall:**	SS-140#/30;HW/NW-300#/18
Date Start/Finish:	5-25-17/5-30-17	**Drilling Method:**	HW/NW Drive	**Core Barrel:**	NQ-2.0 in. ID
Boring Location:	Bridge #1432: E1696339; N460492	**Casing ID/OD:**	HW-4.0 in. ID/NW-3.0 in. ID	**Water Level*:**	14 ft
Hammer Efficiency Factor:	0.750	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

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MV = Unsuccessful Field Vane Shear Test Attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = Weight of 140 lb. Hammer
WOR/C = Weight of Rods or Casing
WO1P = Weight of One Person
S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane Shear Strength (psf)
WC = Water Content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample 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.
50										Single 1.5-in. quartz vein at 47.5 ft, occasional 0.0625-in. quartz veins. Rock Mass Quality=Excellent Recovery=100% R3 Core Times (min:sec): 47.3-48.9' (2:20)	
										48.9	
										Bottom of Exploration at 48.9 feet below ground surface.	
55											
60											
65											
70											
75											

Remarks:

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Souadabscook Stream Center Bridges
Location: Hampden, Maine

Boring No.: BB-HSS-108
WIN: 21728.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	135.2	**Auger ID/OD:**	--
Operator:	B. Enos	**Datum:**	NAVD 88	**Sampler:**	Split Spoon-1.375 in. ID
Logged By:	T. Snow	**Rig Type:**	Mobile Drill B-53	**Hammer Wt./Fall:**	SS-140#/30;NW-300#/24
Date Start/Finish:	5-16-17/5-17-17	**Drilling Method:**	NW Drive	**Core Barrel:**	NQ-2.0 in. ID
Boring Location:	Bridge #5950: E1696357; N460313	**Casing ID/OD:**	NW-3.0 in. ID	**Water Level*:**	12 ft (approx.)
Hammer Efficiency Factor:	0.677	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

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SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = Weight of 140lb. Hammer
WOR/C = Weight of Rods or Casing
WO1P = Weight of One Person
S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane Shear Strength (psf)
WC = Water Content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
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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							NW Spun		-BITUMINOUS CONCRETE-	
								134.2	1.0	
	1D	14/10	1.0 - 2.2	25/45/30(2.0)	75	85			Grey to black, dry, very dense, fine to coarse SAND, some gravel, trace silt -FILL-(RECLAIM)	
								133.2 132.7	2.0	
	2D	24/14	3.0 - 5.0	6/12/9/12	21	24			Note: Drill action indicates crushed stone 2.0 to 2.5 ft.	
									2.5 Brown, dry, medium dense, fine to coarse SAND, little gravel, trace silt, well graded -FILL-(SW) PID=0.0 ppm	
5	3D	24/16	5.0 - 7.0	20/7/6/8	13	15	17		Brown, dry, medium dense, gravelly SAND, trace silt, well graded -FILL-(SW) PID=0.0 ppm	G#426872 A-1-a (1) SW
							22			
	4D	24/11	7.0 - 9.0	14/9/12/18	21	24	22		Brown, moist, medium dense, fine to coarse SAND, little coarse sand, little silt, trace gravel, well graded -FILL-(SW) PID=0.1 ppm	
							45 46	126.7	8.5	
	5D	24/20	9.0 - 11.0	17/14/12/22	26	29	56		Brown, moist, medium dense, fine to medium silty SAND, trace coarse sand, trace gravel -FILL-(SM) (Reworked Native Soil)	
10							62			
								124.2	11.0	
	6D	24/12	11.0 - 13.0	31/19/16/17	35	39	62		Brown, wet, dense, fine to coarse SAND, little gravel, little silt, well graded -FILL-(SM) PID=0.0 ppm	
							47			
							32			
							30			
15	7D	24/8	15.0 - 17.0	8/10/18/16	28	32			Brown, wet, medium dense, fine to medium SAND, some coarse sand, little gravel, trace silt, weakly bonded, poorly graded -FILL-(SP-SM) PID=0.0 ppm	
20	8D	24/4	20.0 - 22.0	8/7/5/5	12	14	23		Brown, wet, medium dense, fine to medium SAND, some coarse sand, little gravel, trace silt, weakly bonded -FILL-(SP-SM) PID=0.0 ppm	
							24			
							26			
							20			
							23	111.2	24.0 Note: Drill action indicates strata change at 24.0 ft.	
25										

Remarks:

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Boring No.: BB-HSS-108

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Souadabscook Stream Center Bridges
Location: Hampden, Maine

Boring No.: BB-HSS-108
WIN: 21728.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	135.2	**Auger ID/OD:**	--
Operator:	B. Enos	**Datum:**	NAVD 88	**Sampler:**	Split Spoon-1.375 in. ID
Logged By:	T. Snow	**Rig Type:**	Mobile Drill B-53	**Hammer Wt./Fall:**	SS-140#/30;NW-300#/24
Date Start/Finish:	5-16-17/5-17-17	**Drilling Method:**	NW Drive	**Core Barrel:**	NQ-2.0 in. ID
Boring Location:	Bridge #5950: E1696357; N460313	**Casing ID/OD:**	NW-3.0 in. ID	**Water Level*:**	12 ft (approx.)
Hammer Efficiency Factor:	0.677	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

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SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = Weight of 140 lb. Hammer
WOR/C = Weight of Rods or Casing
WO1P = Weight of One Person
S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane Shear Strength (psf)
WC = Water Content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample 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	1U	24/23	25.0 - 27.0				8			Grey, wet, silty CLAY -MARINE DEPOSIT-(CL)	
							7			Note: Attempt field vane shear test; refusal at 27.0 ft.	
	9D	24/24	27.0 - 29.0	3/2/2/3	4	5	12			Grey, wet, soft, silty CLAY -MARINE DEPOSIT-(CL)	
							13				
							15				
30	10D	24/24	30.0 - 32.0	WOH/WOH/WOH/ WOH			16			Grey, wet, medium stiff, silty CLAY -MARINE DEPOSIT-(CL)	G#426866 A-6 CL WC=23% LL=36, PL=18 PI=18
							18				
	V1		32.5 - 33.0	Su=545/80 psf			18			55x110 mm vane raw torque readings: V1: 140/20 in-lbs	
	V2		33.5 - 34.0	Su=600/80 psf			28			V2: 155/20 in-lbs	
							31				
35	2U	24/30	35.0 - 37.0				20			Grey, wet, medium stiff, silty CLAY -MARINE DEPOSIT-(CL)	
							22				
							24				
							22				
							21				
40	11D	24/24	40.0 - 42.0	WOH/WOH/WOH/ WOH			9			Grey, wet, medium stiff, silty CLAY -MARINE DEPOSIT-(CL)	
							17				
	V3		42.5 - 43.0	Su=505/155 psf			16			55x110 mm vane raw torque readings: V3: 130/40 in-lbs	
							15				
							16				
45	12D	16/12	45.0 - 46.3	WOR/WOR/50(3.0)						Grey, wet, medium stiff, silty CLAY -MARINE DEPOSIT-(CL)	
	R1	60/58	46.3 - 51.3	RQD = 80%				88.9		Note: Refusal on bedrock, begin NQ rock core at 46.3 ft. 46.3	qp=12,435 psi
										Top of Bedrock at El.88.9 R1: Grey, fine grained to aphanitic, PHYLLITE with quartz veins, hard, fresh. Primary joints dipping at moderate to high angles, moderately spaced, open to tight, smooth, slightly undulating. Secondary joints vertical, widely spaced, tight. Rock Mass Quality=Excellent Recovery=97%	
50											

Remarks:

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Souadabscook Stream Center Bridges
Location: Hampden, Maine

Boring No.: BB-HSS-108
WIN: 21728.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	135.2	**Auger ID/OD:**	--
Operator:	B. Enos	**Datum:**	NAVD 88	**Sampler:**	Split Spoon-1.375 in. ID
Logged By:	T. Snow	**Rig Type:**	Mobile Drill B-53	**Hammer Wt./Fall:**	SS-140#/30;NW-300#/24
Date Start/Finish:	5-16-17/5-17-17	**Drilling Method:**	NW Drive	**Core Barrel:**	NQ-2.0 in. ID
Boring Location:	Bridge #5950: E1696357; N460313	**Casing ID/OD:**	NW-3.0 in. ID	**Water Level*:**	12 ft (approx.)
Hammer Efficiency Factor:	0.677	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

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SSA = Solid Stem Auger
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RC = Roller Cone
WOH = Weight of 140 lb. Hammer
WOR/C = Weight of Rods or Casing
WO1P = Weight of One Person
S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane Shear Strength (psf)
WC = Water Content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample 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.
50										R1 Core Times (min:sec): 46.3-47.3' (2:30); 47.3-48.3' (2:30); 48.3-49.3' (2:00); 49.3-50.3' (2:00); 50.3-51.3' (2:30)	
	R2	60/60	51.3 - 56.3	RQD = 100%						R2: Grey, fine grained to aphanitic, PHYLLITE with quartz veins, hard, fresh. Primary joints dipping at moderate to high angles, moderately spaced, open to tight, smooth, slightly undulating. Secondary joints dipping at low angles to horizontal, widely spaced, tight. Rock Mass Quality=Excellent Recovery=100% R2 Core Times (min:sec): 51.3-52.3' (2:00); 52.3-53.3' (1:45); 53.3-54.3' (2:00); 54.3-55.3' (1:45); 55.3-56.3' (1:45)	
55								78.9		56.3 **Bottom of Exploration at 56.3 feet below ground surface.**	
60											
65											
70											
75											

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Souadabscook Stream Center Bridges
Location: Hampden, Maine

Boring No.: BB-HSS-109
WIN: 21728.10

Driller:	New England Boring Contractors	**Elevation (ft.)**	112.1	**Auger ID/OD:**	--
Operator:	B. Enos	**Datum:**	NAVD 88	**Sampler:**	Split Spoon-1.375 in. ID
Logged By:	T. Snow	**Rig Type:**	Mobile Drill B-59	**Hammer Wt./Fall:**	SS-140#/30;NW-300#/18
Date Start/Finish:	5-30-17/5-30-17	**Drilling Method:**	NW Drive	**Core Barrel:**	NQ-2.0 in. ID
Boring Location:	Bridge #1432: E1696411; N460502	**Casing ID/OD:**	NW-4.0 in. ID	**Water Level*:**	12.8 ft from bridge deck
Hammer Efficiency Factor:	0.869	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

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SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = Weight of 140lb. Hammer
WOR/C = Weight of Rods or Casing
WO1P = Weight of One Person
S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane Shear Strength (psf)
WC = Water Content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

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	18/7	0.0 - 1.5	5/100(12.0)					Note: Concrete bridge deck thickness 0.8 ft, bridge deck to mudline 22.5 ft. All samples are referenced to depth below mudline. Brown to grey, wet, very dense, fine to coarse GRAVEL, some fine to coarse sand, trace silt, well graded -ALLUVIAL DEPOSIT-(GW)	G#426873 A-1-a (1) GW
	MD	24/0	2.5 - 4.5	6/1/1/1	2	3		109.1	Note: Casing pushed down during sampling. Advance rollerbit to 2.5 ft. 3.0	
	V1		4.5 - 5.0	Su=235/60 psf					Note: No recovery, brown/gray clay on spoon tip. Advance roller bit to 4.5 ft. 55x110 mm vane raw torque readings: V1: 60/15 in-lbs	
5	2D	24/14	5.5 - 7.5	WOH/WOH/2/3	2	3		105.6	6.5	G#426867 A-6 CL WC=25% LL=24, PL=17 PI=7
	3D	24/5	7.5 - 9.5	20/10/8/9	18	26		104.6	Grey, wet, very soft, silty CLAY, trace fine sand and silt from 6.5 to 7.5 ft -MARINE DEPOSIT-(CL) 7.5	
10									Grey, wet, medium dense, GRAVEL, little coarse and medium sand, trace fine sand and silt -GLACIAL TILL-(GW)	
	4D	24/10	12.5 - 14.5	8/12/12/22	24	35	50		Grey, wet, medium dense, medium to coarse SAND, little fine sand, little gravel, trace silt, weakly bonded -GLACIAL TILL-(SW-SM)	
							143			
							102			
15							80		Note: Advance rollerbit ahead of casing to 17.5 ft.	
	5D	4/3	17.5 - 17.8	150(4.0)				94.6	17.5	
	R1	31/30	18.6 - 21.2	RQD = 16%				94.3	Grey, wet, very dense, sandy GRAVEL, little fine to coarse sand, trace silt -WEATHERED BEDROCK- Note: Advance rollerbit to 18.6 ft, begin NQ core run at 18.6 ft. 17.8	
20	R2	42/37	21.2 - 24.7	RQD = 47%					Top of Bedrock at El.94.3 R1: Grey, fine grained to aphanitic, chlorite PHYLLITE with few <0.25-in. quartz veins, hard, slight weathering on most joint surfaces (chlorite and oxidation discoloration). Primary joints moderately dipping to high angle, parallel to foliation, close to very close, open to tight, smooth to rough, planar. Secondary joints (1 at 4.2 ft) horizontal, moderate spacing, tight, rough, slightly undulating. <0.25-in. pits from 19.6 to 21.2 ft. Rock Mass Quality=Very Poor Recovery=97% R1 Core Times (min:sec): 18.6-19.6' (3:15); 19.6-20.6' (3:00)	qp=11,961 psi
25	R3	48/48	24.7 - 28.7	RQD = 37%						

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Boring No.: BB-HSS-109

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Souadabscook Stream Center Bridges
Location: Hampden, Maine

Boring No.: BB-HSS-109
WIN: 21728.10

Driller:	New England Boring Contractors	**Elevation (ft.)**	112.1	**Auger ID/OD:**	--
Operator:	B. Enos	**Datum:**	NAVD 88	**Sampler:**	Split Spoon-1.375 in. ID
Logged By:	T. Snow	**Rig Type:**	Mobile Drill B-59	**Hammer Wt./Fall:**	SS-140#/30;NW-300#/18
Date Start/Finish:	5-30-17/5-30-17	**Drilling Method:**	NW Drive	**Core Barrel:**	NQ-2.0 in. ID
Boring Location:	Bridge #1432: E1696411; N460502	**Casing ID/OD:**	NW-4.0 in. ID	**Water Level*:**	12.8 ft from bridge deck
Hammer Efficiency Factor:	0.869	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

Definitions:
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MD = Unsuccessful Split Spoon Sample Attempt
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MU = Unsuccessful Thin Wall Tube Sample Attempt
V = Field Vane Shear Test, PP = Pocket Penetrometer
MV = Unsuccessful Field Vane Shear Test Attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = Weight of 140 lb. Hammer
WOR/C = Weight of Rods or Casing
WO1P = Weight of One Person
S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane Shear Strength (psf)
WC = Water Content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample 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: Grey, fine grained to aphanitic, phyrite-chlorite PHYLLITE, <0.5-in. quartz veins, hard, very slight to slight weathering on joint surfaces (chlorite and oxidation discoloration). Primary joints high angle, parallel to foliation, close, open to tight, smooth to rough, planar to slightly undulating. Secondary joints horizontal to low angle, close to moderate, open, rough, planar to slightly undulating. Quartz intrusion from approximately 22.5 to 22.8 ft. Slight to moderately weathered zone from approximately 23 to 23.6 ft, <0.5-in. pits occasional.	
	R4	60/55	28.7 - 33.7	RQD = 55%						Rock Mass Quality=Fair Recovery=88% R2 Core Times (min:sec): 21.2-22.2' (3:00); 22.2-23.2' (3:00); 23.2-24.2' (3:15); 24.2-24.7' (3:00)	
30										R3: Grey, fine grained to aphanitic, phyrite-chlorite PHYLLITE, <0.5-in. quartz veins, hard, very slight to slight weathering on joint surfaces (some chlorite, but primarily oxidation discoloration). Primary joints moderately dipping to high angle, parallel to foliation, close to moderately close, open, smooth to rough, planar to slightly undulating. Secondary joints horzontal to low angle, very close to close, open, smooth to rough, planar to slightly undulating. Occasional <0.25-in. pits (frequent in weathered zone). Quartz intrusion from approximately 25.8 to 26.6 ft. Slightly to moderately weathered zone from approximately 26.9 to 28.7 ft.	
								78.4		Rock Mass Quality=Poor Recovery=100% R3 Core Times (min:sec): 24.7-25.7' (3:00); 25.7-26.7' (2:45); 26.7-27.7' (3:00); 27.7-28.7' (3:30)	
35										R4: Grey, fine grained to aphanitic, pyrite-chlorite PHYLLITE, <1-in. quartz veins, hard, slight weathering on joint surfaces (primarily oxidation discoloration). Primary joints moderately dipping to high angle, parallel to foliation, close, open to tight, healed, smooth to rough, planar to slightly undulating. Secondary joints horizontal to low angle, very close to moderately close, open to tight, smooth to rough, planar to slightly undulating. Few <0.25-in. pits (frequent in weathered zones). Slight to moderately weathered zone from approximately 28.7 to 29.7 ft.	
40										Rock Mass Quality=Fair Recovery=92% R4 Core Times (min:sec): 28.7-29.7' (3:30); 29.7-30.7' (3:00); 30.7-31.7' (3:00); 31.7-32.7' (3:00); 32.7-33.7' (3:00)	
										33.7	
										Bottom of Exploration at 33.7 feet below ground surface.	
45											
50											

Remarks:

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Souadabscook Stream Center Bridges
Location: Hampden, Maine

Boring No.: BB-HSS-110
WIN: 21728.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	112.9	**Auger ID/OD:**	--
Operator:	B. Enos	**Datum:**	NAVD 88	**Sampler:**	Split Spoon-1.375 in. ID
Logged By:	T. Snow	**Rig Type:**	Mobile Drill B-53	**Hammer Wt./Fall:**	SS-140#/30;NW-300#/18
Date Start/Finish:	5-17-17/5-17-17	**Drilling Method:**	NW Drive	**Core Barrel:**	NQ-2.0 in. ID
Boring Location:	Bridge #5950: E1696426; N460316	**Casing ID/OD:**	NW-4.0 in. ID	**Water Level*:**	12 ft(approx)from bridge deck
Hammer Efficiency Factor:	0.677	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

Definitions:
D = Split Spoon Sample
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SSA = Solid Stem Auger
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WOH = Weight of 140lb. Hammer
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S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane Shear Strength (psf)
WC = Water Content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

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	24/4	0.0 - 2.0	2/2/2/1	4	5			Note: Concrete bridge deck thickness 9 in. Bridge deck to mudline 22.2 ft. All samples are referenced to depth below mudline. Brown to grey, wet, very loose, sandy GRAVEL, trace silt, well graded -ALLUVIAL DEPOSIT-(GW)	G#426874 A-1-a (1) GW
							15			
								109.9	3.0	
	2D	24/10	3.0 - 5.0	9/3/3/4	6	7	23		Red-brown to grey, wet, very loose, coarse to fine GRAVEL -ALLUVIAL DEPOSIT-(GP)	
							16	108.9	4.0	
5							12		Grey, wet, medium stiff, CLAY -MARINE DEPOSIT-(CL)	
							5			
							4			
	MU	24/3	8.0 - 10.0				6		Note: Attempt tube sample from 8.0 to 10.0 ft. Recovered piece of 3-in. gravel in end of tube.	
10	V1		10.5 - 11.0	Su=505/115 psf			7		55x110 mm vane raw torque readings: V1: 120/30 in-lbs	
	V2		11.5 - 12.0	Su=445/115 psf			7		V2: 115/30 in-lbs	
							8			
	3D		13.0 - 15.0	WOR/WOR/WOR/ WOR			9		Grey, wet, soft to medium stiff, silty CLAY -MARINE DEPOSIT-(CL)	G#426868 A-6 CL WC=27% LL=33, PL=19 PI=14
							11			
15							11			
							10			
							13			
	4D	24/3	18.0 - 20.0	WOR/2/10/6	12	14	14		Grey, wet, soft, silty CLAY -MARINE DEPOSIT-(CL)	
							12		Note: Higher blows likely due to metal clip falling into hole.	
							10			
20										
								91.9	21.0	
							13			
							13			
	5D	24/3	23.0 - 25.0	12/13/18/16	31	35	44		Grey, wet, dense, coarse to fine SAND and GRAVEL, little fine sand, trace silt -GLACIAL TILL-(SW-SM/GW-GM)	
25										

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Boring No.: BB-HSS-110

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Souadabscook Stream Center Bridges
Location: Hampden, Maine

Boring No.: BB-HSS-110
WIN: 21728.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	112.9	**Auger ID/OD:**	--
Operator:	B. Enos	**Datum:**	NAVD 88	**Sampler:**	Split Spoon-1.375 in. ID
Logged By:	T. Snow	**Rig Type:**	Mobile Drill B-53	**Hammer Wt./Fall:**	SS-140#/30;NW-300#/18
Date Start/Finish:	5-17-17/5-17-17	**Drilling Method:**	NW Drive	**Core Barrel:**	NQ-2.0 in. ID
Boring Location:	Bridge #5950: E1696426; N460316	**Casing ID/OD:**	NW-4.0 in. ID	**Water Level*:**	12 ft(approx)from bridge deck
Hammer Efficiency Factor:	0.677	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

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WC = Water Content, percent
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Sample Information

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
25								87.0		25.9	
							86			Note: Casing refusal at 25.9 ft. Drill cuttings indicate weathered rock from approximately 25.9 to 28.0 ft. Begin NQ rock core at 28.0 ft.	
							79				
								84.9		28.0	
	R1	17/17	28.0 - 29.4	RQD = 0%						Top of Bedrock at El.84.9 R1: Grey, fine grained to aphanitic, PHYLLITE with quartz veins, hard, slightly weathered on joint surfaces. Primary joints dipping at high angles, very close to close, open to tight, smooth to rough, slightly undulating. Secondary joints horizontal, very close to close, open to tight, rough, slightly undulating. Rock Mass Quality=Very Poor Recovery=100% R1 Core Times (min:sec): 28.0-29.0' (3:00); 29.0-29.4' (3:00)	
	R2	48/47	29.4 - 33.4	RQD = 75%						R2: Grey, fine grained to aphanitic, PHYLITE with quartz veins, hard, slightly weathered joint surfaces. Primary joints dipping at high angles, closely spaced, open to tight smooth to rough, slightly undulating. Secondary joints horizontal, moderately close, open to tight, rough, slightly undulating. Rock Mass Quality=Fair Recovery=98% R2 Core Times (min:sec): 29.4-30.4' (2:30); 30.4-31.4' (3:00); 31.4-32.4' (3:00); 32.4-33.4' (3:00)	qp=5,093 psi
30											
	R3	26/27	33.4 - 35.6	RQD = 73%						R3: Grey, fine grained to aphanitic, PHYLLITE with quartz veins, hard, slightly weathered joint surfaces. Primary joints dipping at high angles, closely spaced, open to tight smooth to rough, slightly undulating. Rock Mass Quality=Fair Recovery=100% R3 Core Times (min:sec): 33.4-34.4' (3:00); 34.4-35.6' (3:00)	
35	R4	35/35	35.6 - 38.5	RQD = 40%				74.4		R4: Grey, fine grained to aphanitic, PHYLLITE with quartz veins, hard, slightly weathered. Primary joints high angle, very close, open to tight, smooth to rough. Note: Weathered zone from approximately 37.5 to 38.5 ft. Rock Mass Quality=Poor Recovery=100% R4 Core Times (min:sec): 35.6-36.6' (3:00); 36.6-37.6' (3:00); 37.6-38.5' (3:00)	
40										38.5	
45										**Bottom of Exploration at 38.5 feet below ground surface.**	
50											

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Souadabscook Stream Center Bridges
Location: Hampden, Maine

Boring No.: BB-HSS-111
WIN: 21728.10

Driller:	New England Boring Contractors	**Elevation (ft.)**	134.5	**Auger ID/OD:**	--
Operator:	B. Enos	**Datum:**	NAVD 88	**Sampler:**	Split Spoon-1.375 in. ID
Logged By:	T. Snow	**Rig Type:**	Mobile Drill B-59	**Hammer Wt./Fall:**	SS-140#/30;NW-300#/18
Date Start/Finish:	5-30-17/5-30-17	**Drilling Method:**	NW Drive	**Core Barrel:**	NQ-2.0 in. ID
Boring Location:	Bridge #1432: E1696484; N460507	**Casing ID/OD:**	NW-4.0 in. ID	**Water Level*:**	12.9 ft
Hammer Efficiency Factor:	0.869	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

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q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
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WC = Water Content, percent
LL = Liquid Limit
PL = Plastic Limit
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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									-BITUMINOUS CONCRETE-	
								133.6	0.9	
								132.9	Brown, dry, fine to coarse SAND, little gravel Note: Observed from drill cuttings.	
	1D	24/7	2.0 - 4.0	6/5/8/7	13	19		132.5	1.6	
									-CONCRETE-	
									2.0	
									Grey-brown, dry, medium dense, silty fine to medium SAND, trace coarse sand and gravel -FILL-(SM) PID=0.5 ppm	
	2D	24/8	4.0 - 6.0	10/9/9/8	18	26			Grey-brown, dry, medium dense, silty fine to coarse SAND, trace gravel -FILL-(SM) PID=0.6 ppm	
5								128.5	6.0	
	3D	24/10	6.0 - 8.0	9/11/7/7	18	26			Brown, moist, medium dense, fine to medium SAND, little coarse sand, trace silt and gravel, well graded -FILL-(SW) PID=0.0 ppm	
	4D	24/14	8.0 - 10.0	6/2/2/7	4	6			Brown, moist, very loose, fine SAND, some medium to coarse sand, little gravel, little silt, fining dowards -FILL-(SM) PID=0.0 ppm	G#426875 A-1-b (0) SM
10	5D	24/7	10.0 - 12.0	7/15/16/16	31	45	35		Brown, moist, dense, fine to medium SAND, little coarse sand, trace silt and gravel -FILL-(SW) PID=0.1 ppm	
							42			
	6D	24/11	12.0 - 14.0	10/11/8/5	19	28	42		Brown, moist, medium dense, fine to medium SAND, little coarse sand, trace silt and gravel -FILL-(SW) PID=0.1 ppm	
							42			
	7D	24/8	14.0 - 16.0	4/3/3/3	6	9	31		Brown, wet, loose, fine to medium SAND, little coarse sand, trace gravel, trace silt -FILL-(SW) PID=0.1 ppm	
15							20			
	8D	24/9	16.0 - 18.0	4/5/5/5	10	14	22		Brown, wet, loose, medium to coarse SAND, little fine sand, trace silt and gravel -FILL-(SW) PID=0.0 ppm	
							29			
	MD	24/0	18.0 - 20.0	4/3/1/1	4	6	45			
							12	115.5	19.0	
20	MV	6/0	20.0 - 20.5	Su>1,940 psf			14		55x110 mm vane raw torque readings: Refusal at 20.5 ft; >500 in-lbs	
	9D	18/18	20.5 - 22.0	WOH/WOH/WOH					Grey, wet, very soft, silty CLAY -MARINE DEPOSIT-(CL) Note: Rollerbit to 23.0 ft.	
							20			
							24			
	MU		23.0 - 25.0				NW Push		Grey, wet, silty CLAY -MARINE DEPOSIT-(CL)	
25										

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Boring No.: BB-HSS-111

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Souadabscook Stream Center Bridges
Location: Hampden, Maine

Boring No.: BB-HSS-111
WIN: 21728.10

Driller:	New England Boring Contractors	**Elevation (ft.)**	134.5	**Auger ID/OD:**	--
Operator:	B. Enos	**Datum:**	NAVD 88	**Sampler:**	Split Spoon-1.375 in. ID
Logged By:	T. Snow	**Rig Type:**	Mobile Drill B-59	**Hammer Wt./Fall:**	SS-140#/30;NW-300#/18
Date Start/Finish:	5-30-17/5-30-17	**Drilling Method:**	NW Drive	**Core Barrel:**	NQ-2.0 in. ID
Boring Location:	Bridge #1432: E1696484; N460507	**Casing ID/OD:**	NW-4.0 in. ID	**Water Level*:**	12.9 ft
Hammer Efficiency Factor:	0.869	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

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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.
25	U1	24/24	25.0 - 27.0				NW Push			
	V1		27.5 - 28.0	Su=1,145/155 psf					55x110 mm vane raw torque readings: V1: 295/40 in-lbs	
	V2		28.5 - 29.0	Su=1,050/155 psf					V2: 270/40 in-lbs	
30	10D	24/24	30.0 - 32.0	WOR/WOR/WOR/ WOR					Grey, wet, stiff, silty CLAY, black spots -MARINE DEPOSIT-(CL)	G#426869 A-6 CL WC=26% LL=34, PL=18 PI=16
	MU	24/0	32.0 - 34.0						Grey, wet, silty CLAY, black spots, trace shells -MARINE DEPOSIT-(CL)	
	2U	24/13	34.0 - 36.0						Grey, wet, silty CLAY, trace gravel -MARINE DEPOSIT-(CL)	
35	V3		36.5 - 37.0	Su=445/115 psf					55x110 mm vane raw torque readings: V3: 115/30 in-lbs	
	V4		37.5 - 38.0	Su=425/115 psf					V4: 110/30 in-lbs	
40	11D		40.0 - 42.0	WOR/WOR/4/1	4	6	16		Grey, wet, soft, silty CLAY, gravel at 41.2 ft -MARINE DEPOSIT-(CL)	
							35			
							46	92.0	42.5	
							132	91.5	Note: Possible weathered bedrock based on drill action. -WEATHERED BEDROCK- 43.0	
45	R1	36/33	44.4 - 47.4	RQD = 0%					Top of Bedrock at El.91.5 Note: Advanced rollerbit to 44.4 ft, begin NQ rock core. R1: Greenish-grey, aphanitic, quartz PHYLLITE, moderately hard to hard, slight to moderate weathering on joint surfaces (chlorite and oxidation discoloration). Primary joints high angle, close, open, smooth to rough, planar. Secondary joints horizonta, close, open, rough, planar. Moderately weathered zone from approximately 45.4 to 46.1 and approximately 46.7 to 47.4 ft. Rock Mass Quality=Very Poor Recovery=92% R1 Core Times (min:sec): 44.4-45.4' (2:30); 45.4-46.4' (2:45); 46.4-47.4' (2:45)	
	R2	54/54	47.4 - 51.9	RQD = 24%					R2: White, aphanitic, QUARTZ, moderately hard to hard, slight	
50										

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Boring No.: BB-HSS-111

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Souadabscook Stream Center Bridges
Location: Hampden, Maine

Boring No.: BB-HSS-111
WIN: 21728.10

Driller:	New England Boring Contractors	**Elevation (ft.)**	134.5	**Auger ID/OD:**	--
Operator:	B. Enos	**Datum:**	NAVD 88	**Sampler:**	Split Spoon-1.375 in. ID
Logged By:	T. Snow	**Rig Type:**	Mobile Drill B-59	**Hammer Wt./Fall:**	SS-140#/30;NW-300#/18
Date Start/Finish:	5-30-17/5-30-17	**Drilling Method:**	NW Drive	**Core Barrel:**	NQ-2.0 in. ID
Boring Location:	Bridge #1432: E1696484; N460507	**Casing ID/OD:**	NW-4.0 in. ID	**Water Level*:**	12.9 ft
Hammer Efficiency Factor:	0.869	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

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N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane Shear Strength (psf)
WC = Water Content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample 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.
50										weathering on joing surfaces (oxidation discoloration), slightly to moderately decomposed between joints. Primary joints horizontal to low angle, close to very close, open, smooth to rough, planar to stepped. Greenish-grey, aphanitic phyllite at 45.2 to 45.5 ft and 48.2 to 48.7 ft. Drill action indicated probable fracture at approximately 47.5 ft. Rock Mass Quality=Very Poor Recovery=100% R2 Core Times (min:sec): 47.4-48.4' (2:15); 48.4-49.4' (2:00); 49.4-50.4' (2:00); 50.4-51.4' (2.30)	
	R3	54/51	51.9 - 56.4	RQD = 70%							qp=8,245 psi
55										R3: Grey, fine grained to aphanitic, PHYLLITE, hard, slight weathering on joint surfaces (primarily chlorite discoloration). Primary joints (foliation) high angle, close to moderately close, open to tight, smooth to rough, planar to slightly undulating. Secondary joints horizontal to low angle, very close to wide, open, rough, planar to stepped. Weathered quartz intrusion with <0.25 -in. pits from approximately 42.4 to 53 ft. Frequent quartz veins <0.25 in. Rock Mass Quality=Fair Recovery=94% R3 Core Times (min:sec): 51.9-52.9' (2:15); 52.9-53.9' (2:30); 53.9-54.9' (2:15); 54.9-55.9' (2:00)	
	R4	60/59	56.4 - 61.4	RQD = 95%							
60										R4: Grey, fine grained to aphanitic, PHYLLITE, hard, slight weathering on joint surfaces (primarily chlorite discoloration). Primary joints high angle,close to moderately close, open to tight, smooth to rough, planar to slightly undulating. Secondary joints moderately dipping, wide, tight, rough, stepped. Frequent quartz veins <0.5 in., quartz intrusion approximately 1 to 2-in. thick from 59.2 to 60.7 ft. Rock Mass Quality=Excellent Recovery=98% R4 Core Times (min:sec): 56.4-57.4' (2:00); 57.4-58.4' (2:15); 58.4-59.4' (2:15); 59.4-60.4' (2:00); 60.4'-61.4' (2:00)	
								73.1			
65										**Bottom of Exploration at 61.4 feet below ground surface.**	
70											
75											

Remarks:

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

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

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Souadabscook Stream Center Bridges
Location: Hampden, Maine

Boring No.: BB-HSS-112
WIN: 21728.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	135.0	**Auger ID/OD:**	--
Operator:	M. Porter	**Datum:**	NAVD 88	**Sampler:**	Split Spoon-1.375 in. ID
Logged By:	K. Russ	**Rig Type:**	Mobile Drill B-53	**Hammer Wt./Fall:**	SS-140#/30;HW/NW-300#/18
Date Start/Finish:	5-17-17/5-18-17	**Drilling Method:**	HW/NW Drive	**Core Barrel:**	NQ-2.0 in. ID
Boring Location:	Bridge #5950: E1696500; N460324	**Casing ID/OD:**	HW-4.0 in. ID/NW-3.0 in. ID	**Water Level*:**	14 ft
Hammer Efficiency Factor:	0.750	**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 = Field Vane Shear Test, PP = Pocket Penetrometer
MV = Unsuccessful Field Vane Shear Test Attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = Weight of 140lb. Hammer
WOR/C = Weight of Rods or Casing
WO1P = Weight of One Person
S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane Shear Strength (psf)
WC = Water Content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

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	14/10	0.5 - 1.7	37/28/50(2.0)			Push	134.5	-BITUMINOUS CONCRETE- 0.5	
								133.3	Brown, dry, very dense, fine to coarse SAND, little gravel, well graded, contains trace asphalt -FILL-(SW) PID=0.0 ppm 1.7	
							9	132.5	-CONCRETE- 2.5	
	2D	24/13	3.5 - 5.5	5/7/5/3	12	15	16		Brown, dry, medium dense, fine to coarse SAND, little fine gravel, trace coarse gravel, well graded, trace asphalt -FILL-(SW) PID=0.0 ppm	
							33			
5	3D	24/14	5.5 - 7.5	6/6/7/7	13	16	35		Brown, moist, medium dense, fine to coarse SAND, little fine gravel, trace silt and coarse gravel, well graded -FILL-(SW) PID=0.0 ppm	
							26			
	4D	24/12	7.5 - 9.5	7/5/7/6	12	15	35		Brown, moist, medium dense, fine to coarse SAND, trace silt, trace gravel, well graded -FILL-(SW) PID=0.0 ppm	
							42			
	5D	24/13	9.5 - 11.5	11/11/15/10	26	33	57		Brown, moist, medium dense, fine to coarse SAND, little fine gravel, trace silt and coarse gravel, well graded -FILL-(SW) PID=0.0 ppm	
10							63			
	6D	24/13	11.5 - 13.5	14/17/16/19	33	41	45		Brown, wet, dense, fine to medium SAND, trace silt, coarse sand and gravel, well graded -FILL-(SW) PID=0.0 ppm	
							50			
	7D	24/14	13.5 - 15.5	20/19/14/10	33	41	59		Brown, wet, dense, fine to coarse SAND, trace silt and fine gravel, well graded -FILL-(SW) PID=0.0 ppm	
							43			
15	8D	24/5	15.5 - 17.5	5/5/3/11	8	10	7		Brown, wet, loose, medium to coarse SAND, little fine gravel, little silt, trace peat in spoon tip -FILL-(SM) PID=0.0 ppm	G#426876 A-1-b (0) SM
							9			
	9D	24/10	17.5 - 19.5	9/6/7/7	13	16	40		Brown, wet, medium dense, fine to coarse SAND, trace silt and fine gravel, well graded -FILL-(SW) PID=0.0 ppm	
							33			
	10D	24/9	19.5 - 21.5	7/5/4/3	9	11	29	115.1	Olive-brown, wet, loose, fine to coarse sand, little gravel, trace silt, well graded -FILL-(SW) PID=0.0 ppm 19.9	
20							25			
							24		Olive-grey, wet, loose, silty fine SAND -MARINE DEPOSIT-(SM)	
							30			
							40		Note: Drill wash water contents indicate strata change at 24.0 ft.	
							40	111.0	24.0	
25										

Remarks:

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

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

Boring No.: BB-HSS-112

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Souadabscook Stream Center Bridges
Location: Hampden, Maine

Boring No.: BB-HSS-112
WIN: 21728.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	135.0	**Auger ID/OD:**	--
Operator:	M. Porter	**Datum:**	NAVD 88	**Sampler:**	Split Spoon-1.375 in. ID
Logged By:	K. Russ	**Rig Type:**	Mobile Drill B-53	**Hammer Wt./Fall:**	SS-140#/30;HW/NW-300#/18
Date Start/Finish:	5-17-17/5-18-17	**Drilling Method:**	HW/NW Drive	**Core Barrel:**	NQ-2.0 in. ID
Boring Location:	Bridge #5950: E1696500; N460324	**Casing ID/OD:**	HW-4.0 in. ID/NW-3.0 in. ID	**Water Level*:**	14 ft
Hammer Efficiency Factor:	0.750	**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 = Field Vane Shear Test, PP = Pocket Penetrometer
MV = Unsuccessful Field Vane Shear Test Attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = Weight of 140 lb. Hammer
WOR/C = Weight of Rods or Casing
WO1P = Weight of One Person
S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane Shear Strength (psf)
WC = Water Content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample 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.
25	11D	24/7	25.0 - 27.0	WOH/1/2/1	3	4	41		Olive-grey, wet, soft, silty CLAY, trace fine to medium sand -MARINE DEPOSIT-(CL)	
							35			
							42		Note: Drill wash water from 25.0 to 27.0 ft contains clay.	
							43			
							44			
30	U1	24/24	30.0 - 32.0				43			
							37			
	12D V1	24/24	32.0 - 34.0 32.5 - 33.0	WOR/WOR/WOR/ WOR Su=680/115 psf			38		Olive-grey, wet, medium stiff, silty CLAY with black streaks -MARINE DEPOSIT-(CL) 65x130 mm vane raw torque readings: V1: 24/4 ft-lbs V2: 22/5 ft-lbs	G#426870 A-6 CL WC=23% LL=32, PL=18 PI=14
	V2		33.5 - 34.0	Su=625/140 psf			36			
							39			
35	13D V3	24/24	35.0 - 37.0 35.5 - 36.0	WOR/WOR/WOR/ WOR Su=455/115 psf			39		Olive-grey, wet, soft, silty CLAY with black streaks -MARINE DEPOSIT-(CL) 65x130 mm vane raw torque readings: V3: 16/4 ft-lbs V4: 15/4 ft-lbs	
	V4		36.5 - 37.0	Su=425/115 psf			40			
							35			
							35			
							37			
40	14D MV	24/4	40.0 - 42.0	WOR/16/11/22			43	94.3	Olive-grey, wet, medium dense, clayey GRAVEL -MARINE DEPOSIT-(CL) Note: Attempt field vane shear test; vane refusal at 40.7 ft.	
							6		40.7 -BOULDER/COBBLES-	
							10			
							21	91.7	43.3 Note: Drill action indicates strata change at 43.3 ft. -GLACIAL TILL-	
							66			
45	MD	7/0	45.0 - 45.6	121/50(1.0)			NW Spun	89.4	45.6 -BOULDER-	
	R1	60/21	46.0 - 51.0							
								86.8	48.2	
									Note: Spun NW-casing from 47.0 to 51.0 ft, drill action indicates boulder from 47.0 to 48.2 ft. Encountered zones of increasing and	
50										

Remarks:

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

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

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Souadabscook Stream Center Bridges
Location: Hampden, Maine

Boring No.: BB-HSS-112
WIN: 21728.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	135.0	**Auger ID/OD:**	--
Operator:	M. Porter	**Datum:**	NAVD 88	**Sampler:**	Split Spoon-1.375 in. ID
Logged By:	K. Russ	**Rig Type:**	Mobile Drill B-53	**Hammer Wt./Fall:**	SS-140#/30;HW/NW-300#/18
Date Start/Finish:	5-17-17/5-18-17	**Drilling Method:**	HW/NW Drive	**Core Barrel:**	NQ-2.0 in. ID
Boring Location:	Bridge #5950: E1696500; N460324	**Casing ID/OD:**	HW-4.0 in. ID/NW-3.0 in. ID	**Water Level*:**	14 ft
Hammer Efficiency Factor:	0.750	**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 = Field Vane Shear Test, PP = Pocket Penetrometer
MV = Unsuccessful Field Vane Shear Test Attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = Weight of 140 lb. Hammer
WOR/C = Weight of Rods or Casing
WO1P = Weight of One Person
S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane Shear Strength (psf)
WC = Water Content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample 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.
50									decreasing resistance from 48.2 to 51.0 ft.	
	15D	24/12	51.0 - 53.0	31/32/28/23	60	75			Olive-grey, wet, very dense, fine to coarse SAND, little gravel, trace silt -GLACIAL TILL-(SW)	
								80.5	54.5	
55	16D	3/3	55.0 - 55.3	50(2.0)				79.3	-WEATHERED BEDROCK- Note: Weathered bedrock in spoon tip. 55.7 Top of Bedrock at El.79.3	
	R2	60/54	56.0 - 61.0	RQD = 68%					R2: Grey, aphanitic, PHYLLITE, hard to moderately hard, fresh. Primary joints moderately dipping, parallel to foliation, moderately close, tight, planar and smooth to rough. Secondary joints dipping horizontally, moderately close, tight to open, rough. Joint surfaces oxidized and weathered. Single vertical joint from 56.3 to 58.7 ft, tight, smooth, planar, healed, oxidized. Several 0.125-in. pits at 57.0 ft. Rock Mass Quality=Fair Recovery=90% R2 Core Times (min:sec): 56.0-57.0' (1:55); 57.0-58.0' (2:01); 58.0-59.0' (1:50); 59.0-60.0' (1:59); 60.0-61.0' (2:28)	
60	R3	60/60	61.0 - 66.0	RQD = 95%					R3: Grey, aphanitic, PHYLLITE, hard to moderately hard, fresh to moderately severe (64.4 to 64.7 ft). Joints moderately dipping, wide, open, rough and undulating, silt infilling, highly oxidized and highly weathered. Single healed vertical fracture from 62.7 to 64.6 ft. Rock Mass Quality=Excellent Recovery=100% R3 Core Times (min:sec): 61.0-62.0' (1:51); 62.0-63.0' (1:35); 63.0-64.0' (1:54); 64.0-65.0' (1:39); 65.0-66.0' (1:56)	
65								69.0	66.0 **Bottom of Exploration at 66.0 feet below ground surface.**	
70										
75										

Remarks:

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

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

APPENDIX B

Rock Core Photographs

BORING ID	CORE ID	CORE RUN DEPTH (FT)	CORE RUN EL.[NOTE 1]	RECOVERY		RQD[NOTE 2]	
				IN.	%	IN.	%
~~BB-HSS-113~~	~~R1~~	~~16.0 to 21.0~~	~~118.8 to 113.8~~	~~60~~	~~100~~	~~28~~	~~47~~
~~BB-HSS-113~~	~~R2~~	~~21.0 to 26.0~~	~~113.8 to 108.8~~	~~60~~	~~100~~	~~32~~	~~53~~
BB-HSS-107	R1	38.9 to 43.9	95.8 to 90.8	56	93	35	58
BB-HSS-107	R2	43.9 to 47.3	90.8 to 87.4	32	78	15	37
BB-HSS-107	R3	47.3 to 48.9	87.4 to 85.8	19	100	19	100

NOTES:

1. ELEVATIONS ARE MEASURED IN FEET AND REFERENCE THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
2. "RQD" INDICATES ROCK QUALITY DESIGNATION (PERCENT OF ROCK PIECES RECOVERED EQUAL TO OR GREATER THAN 4 IN. IN LENGTH).

HALEY ALDRICH

UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS

INTERSTATE 95 OVER SOUDABSCOOK STREAM CENTER
BRIDGE NOS. 5950 AND 1432
HAMDEN, MAINE
MAINEDOT WIN 21728.0030.00 AND WIN 21728.10

PHOTOGRAPH OF BEDROCK CORE BORING: BB-HSS-107

FILE NO. 129380-003

February 2019

BORING ID	CORE ID	CORE RUN DEPTH (FT)	CORE RUN EL.[NOTE 1]	RECOVERY		RQD[NOTE 2]	
				IN.	%	IN.	%
~~BB-HSS-106~~	~~R1~~	~~45.0 to 47.2~~	~~89.8 to 87.6~~	~~16~~	~~62~~	~~0~~	~~0~~
~~BB-HSS-106~~	~~R2~~	~~47.2 to 48.6~~	~~87.6 to 86.2~~	~~14~~	~~85~~	~~4~~	~~28~~
~~BB-HSS-106~~	~~R3~~	~~48.6 to 51.2~~	~~86.2 to 83.6~~	~~32~~	~~100~~	~~8~~	~~25~~
~~BB-HSS-106~~	~~R4~~	~~51.2 to 54.5~~	~~83.6 to 80.3~~	~~39~~	~~97~~	~~22~~	~~56~~
BB-HSS-108	R1	46.3 to 51.3	88.9 to 83.9	58	97	48	80
BB-HSS-108	R2	51.3 to 56.3	83.9 to 78.9	60	100	60	100

NOTES:

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2. "RQD" INDICATES ROCK QUALITY DESIGNATION (PERCENT OF ROCK PIECES RECOVERED EQUAL TO OR GREATER THAN 4 IN. IN LENGTH).
3. RED LINES DRAWN THROUGH ROCK CORE PHOTOGRAPHS/TABLE TO INDICATE THAT ROCK CORE WAS COLLECTED FROM AN ADJACENT BRIDGE STRUCTURE. REFER TO OTHER BRIDGE REPORTS.

HALEY ALDRICH

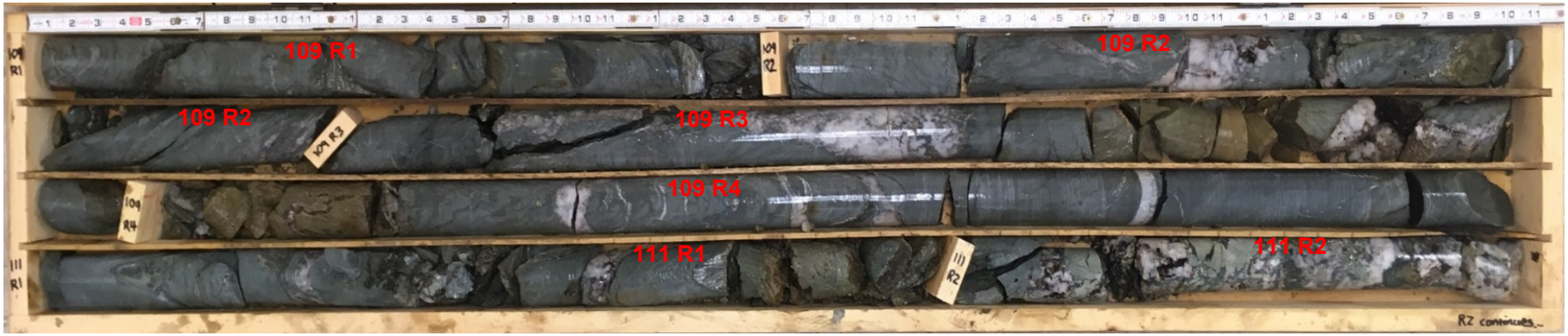
UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS

INTERSTATE 95 OVER SOUDABSCOOK STREAM CENTER
BRIDGE NOS. 5950 AND 1432
HAMDEN, MAINE
MAINEDOT WIN 21728.0030.00 AND WIN 21728.10

PHOTOGRAPH OF BEDROCK CORE BORING: BB-HSS-108

FILE NO. 129380-003

February 2019



BORING ID	CORE ID	CORE RUN DEPTH (FT)	CORE RUN EL.[NOTE 1]	RECOVERY		RQD[NOTE 2]	
				IN.	%	IN.	%
BB-HSS-109	R1	18.6 to 21.2	93.5 to 90.9	30	97	5	16
BB-HSS-109	R2	21.2 to 24.7	90.9 to 87.4	37	88	20	47
BB-HSS-109	R3	24.7 to 28.7	87.4 to 83.4	48	100	18	37
BB-HSS-109	R4	28.7 to 33.7	83.4 to 78.4	55	92	33	55
BB-HSS-111	R1	44.4 to 47.4	90.1 to 87.1	33	92	0	0
BB-HSS-111	R2	47.4 to 51.9	87.1 to 82.6	54	100	13	24

NOTES:

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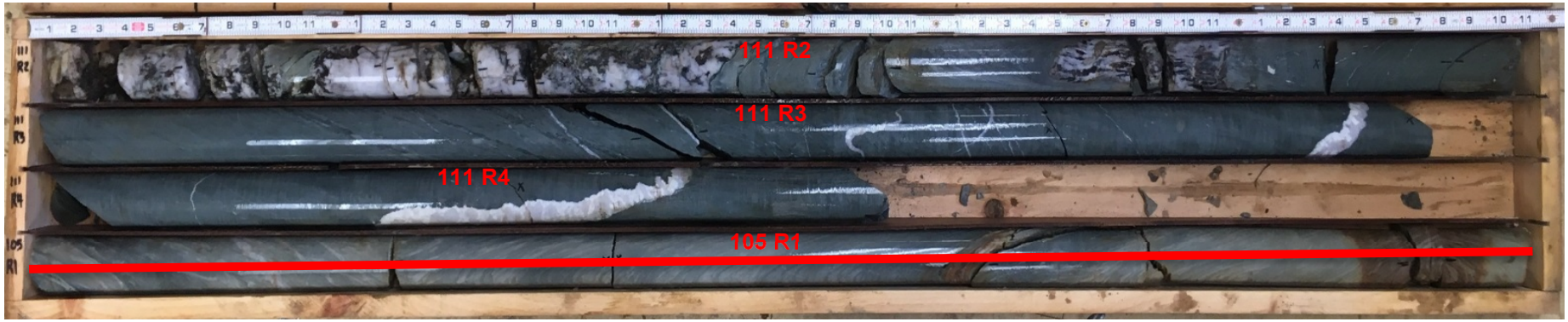
HALEY ALDRICH

UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS

INTERSTATE 95 OVER SOUDABSCOOK STREAM CENTER
BRIDGE NOS. 5950 AND 1432
HAMDEN, MAINE
MAINEDOT WIN 21728.0030.00 AND WIN 21728.10

PHOTOGRAPH OF BEDROCK CORE BORING: BB-HSS-109 AND BB-HSS-111

FILE NO. 129380-003 February 2019



BORING ID	CORE ID	CORE RUN DEPTH (FT)	CORE RUN EL.[NOTE 1]	RECOVERY		RQD[NOTE 2]	
				IN.	%	IN.	%
BB-HSS-111	R2 (cont.)	47.4 to 51.9	87.1 to 82.6	54	100	13	24
BB-HSS-111	R3	51.9 to 56.4	82.6 to 78.1	51	94	38	70
BB-HSS-111	R4	56.4 to 61.4	78.1 to 73.1	59	98	57	95
~~BB-HSS-105~~	~~R1~~	~~41.0 to 46.0~~	~~93.7 to 88.7~~	~~60~~	~~100~~	~~51~~	~~85~~

NOTES:

1. ELEVATIONS ARE MEASURED IN FEET AND REFERENCE THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
2. "RQD" INDICATES ROCK QUALITY DESIGNATION (PERCENT OF ROCK PIECES RECOVERED EQUAL TO OR GREATER THAN 4 IN. IN LENGTH).
3. RED LINES DRAWN THROUGH ROCK CORE PHOTOGRAPHS/TABLE TO INDICATE THAT ROCK CORE WAS COLLECTED FROM AN ADJACENT BRIDGE STRUCTURE. REFER TO OTHER BRIDGE REPORTS.

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UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS

INTERSTATE 95 OVER SOUDABSCOOK STREAM CENTER
BRIDGE NOS. 5950 AND 1432
HAMDEN, MAINE
MAINEDOT WIN 21728.0030.00 AND WIN 21728.10

PHOTOGRAPH OF BEDROCK CORE BORING: BB-HSS-111

FILE NO. 129380-003

February 2019

BORING ID	CORE ID	CORE RUN DEPTH (FT)	CORE RUN EL.[NOTE 1]	RECOVERY		RQD[NOTE 2]	
				IN.	%	IN.	%
BB-HSS-110	R1	28.0 to 29.4	84.9 to 83.5	17	100	0	0
BB-HSS-110	R2	29.4 to 33.4	83.5 to 79.5	47	98	36	75
BB-HSS-110	R3	33.4 to 35.6	79.5 to 77.3	27	100	19	73
BB-HSS-110	R4	35.6 to 38.5	77.3 to 74.4	35	100	14	40

NOTES:

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HALEY ALDRICH

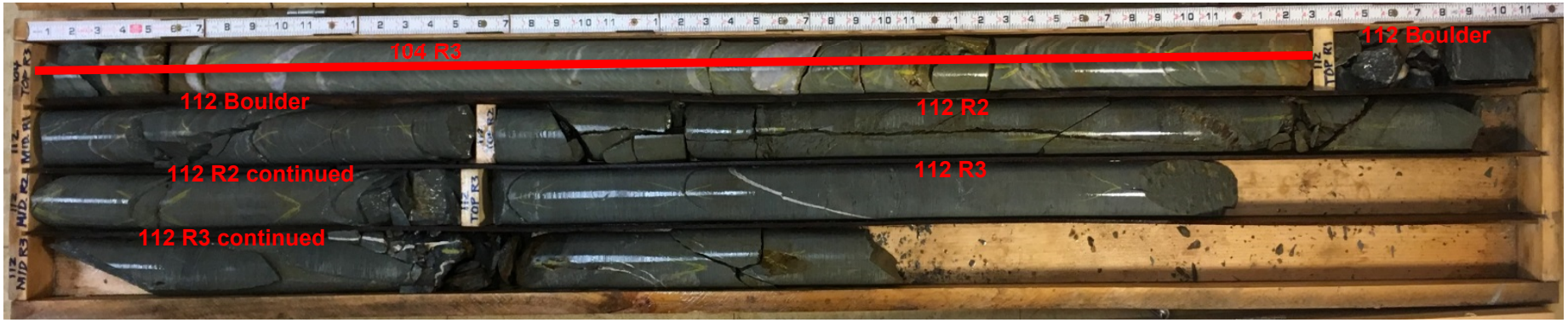
UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS

INTERSTATE 95 OVER SOUDABSCOOK STREAM CENTER
BRIDGE NOS. 5950 AND 1432
HAMDEN, MAINE
MAINEDOT WIN 21728.0030.00 AND WIN 21728.10

PHOTOGRAPH OF BEDROCK CORE BORING: BB-HSS-110

FILE NO. 129380-003

February 2019



BORING ID	CORE ID	CORE RUN DEPTH (FT)	CORE RUN EL.[NOTE 1]	RECOVERY		RQD[NOTE 2]	
				IN.	%	IN.	%
~~BB-HSS-104~~	~~R3~~	~~26.4 to 30.4~~	~~86.8 to 82.8~~	~~48~~	~~100~~	~~43~~	~~90~~
BB-HSS-112	Boulder	46.0 to 51.0	89.0 to 84.0	NA	NA	NA	NA
BB-HSS-112	R2	56.0 to 61.0	79.0 to 74.0	54	90	41	68
BB-HSS-112	R3	61.0 to 66.0	74.0 to 69.0	60	100	57	95

NOTES:

1. ELEVATIONS ARE MEASURED IN FEET AND REFERENCE THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
2. "RQD" INDICATES ROCK QUALITY DESIGNATION (PERCENT OF ROCK PIECES RECOVERED EQUAL TO OR GREATER THAN 4 IN. IN LENGTH).
3. RED LINES DRAWN THROUGH ROCK CORE PHOTOGRAPHS/TABLE TO INDICATE THAT ROCK CORE WAS COLLECTED FROM AN ADJACENT BRIDGE STRUCTURE. REFER TO OTHER BRIDGE REPORTS.

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BRIDGE NOS. 5950 AND 1432
HAMDEN, MAINE
MAINEDOT WIN 21728.0030.00 AND WIN 21728.10

PHOTOGRAPH OF BEDROCK CORE BORING: BB-HSS-112

FILE NO. 129380-003

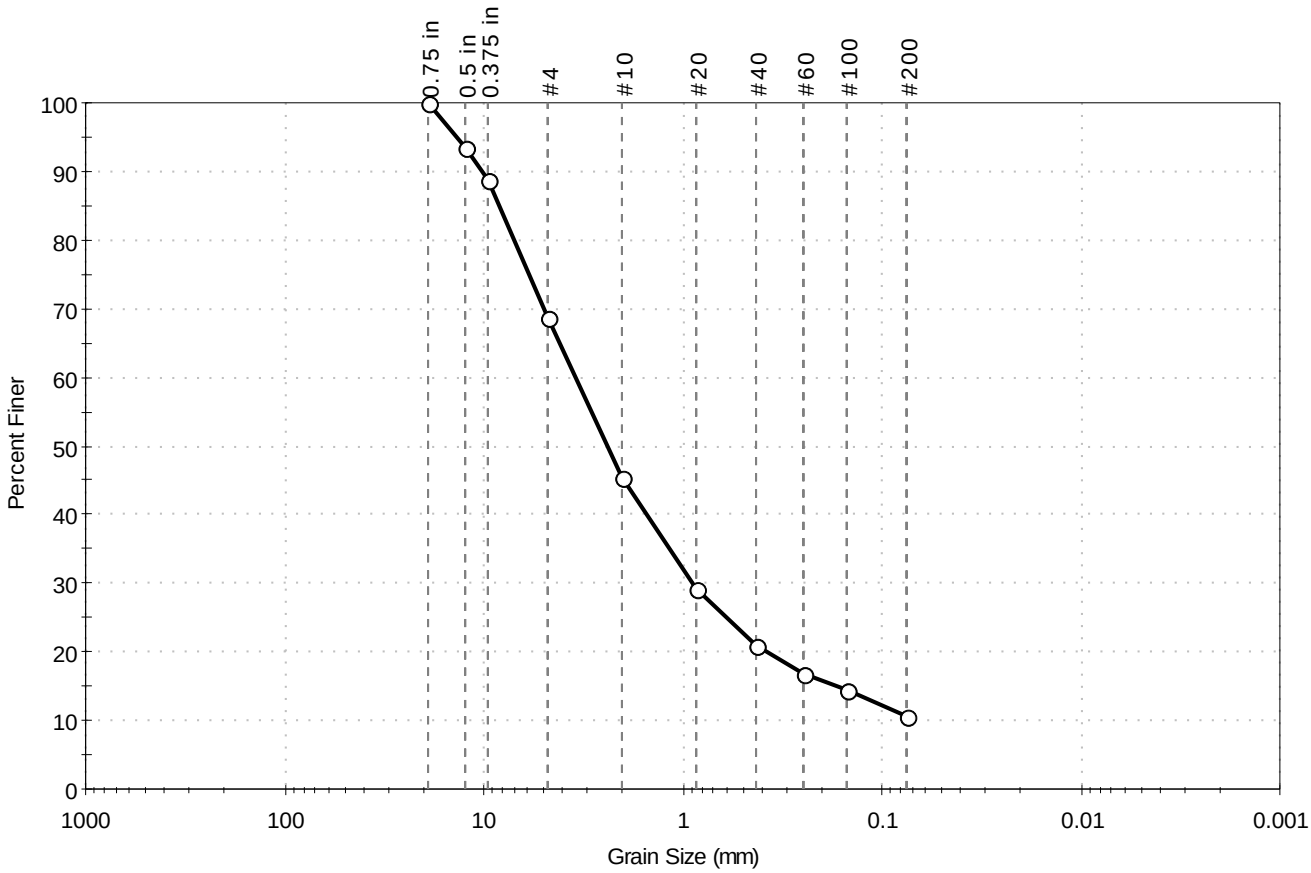
February 2019

APPENDIX C

Laboratory Test Results

Client:	Haley & Aldrich, Inc.				
Project:	Souadabscook Center # 1432 and 5950				
Location:	Hampden, ME			Project No:	GTX-307095
Boring ID:	BB-HSS-107	Sample Type:	jar	Tested By:	GA
Sample ID:	10D	Test Date:	10/06/17	Checked By:	emm
Depth :	18.5-20.5 ft	Test Id:	426871		
Test Comment:	---				
Visual Description:	Moist, brown sand with silt and gravel				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
---	31.1	58.1	10.8

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.75 in	19.00	100		
0.5 in	12.50	93		
0.375 in	9.50	89		
#4	4.75	69		
#10	2.00	45		
#20	0.85	29		
#40	0.42	21		
#60	0.25	17		
#100	0.15	14		
#200	0.075	11		

Coefficients

D_{85} = 8.3426 mm D_{30} = 0.8905 mm

D_{60} = 3.4298 mm D_{15} = 0.1667 mm

D_{50} = 2.3752 mm D_{10} = N/A

C_u = N/A C_c = N/A

Classification

ASTM N/A

AASHTO Stone Fragments, Gravel and Sand (A-1-a (0))

Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

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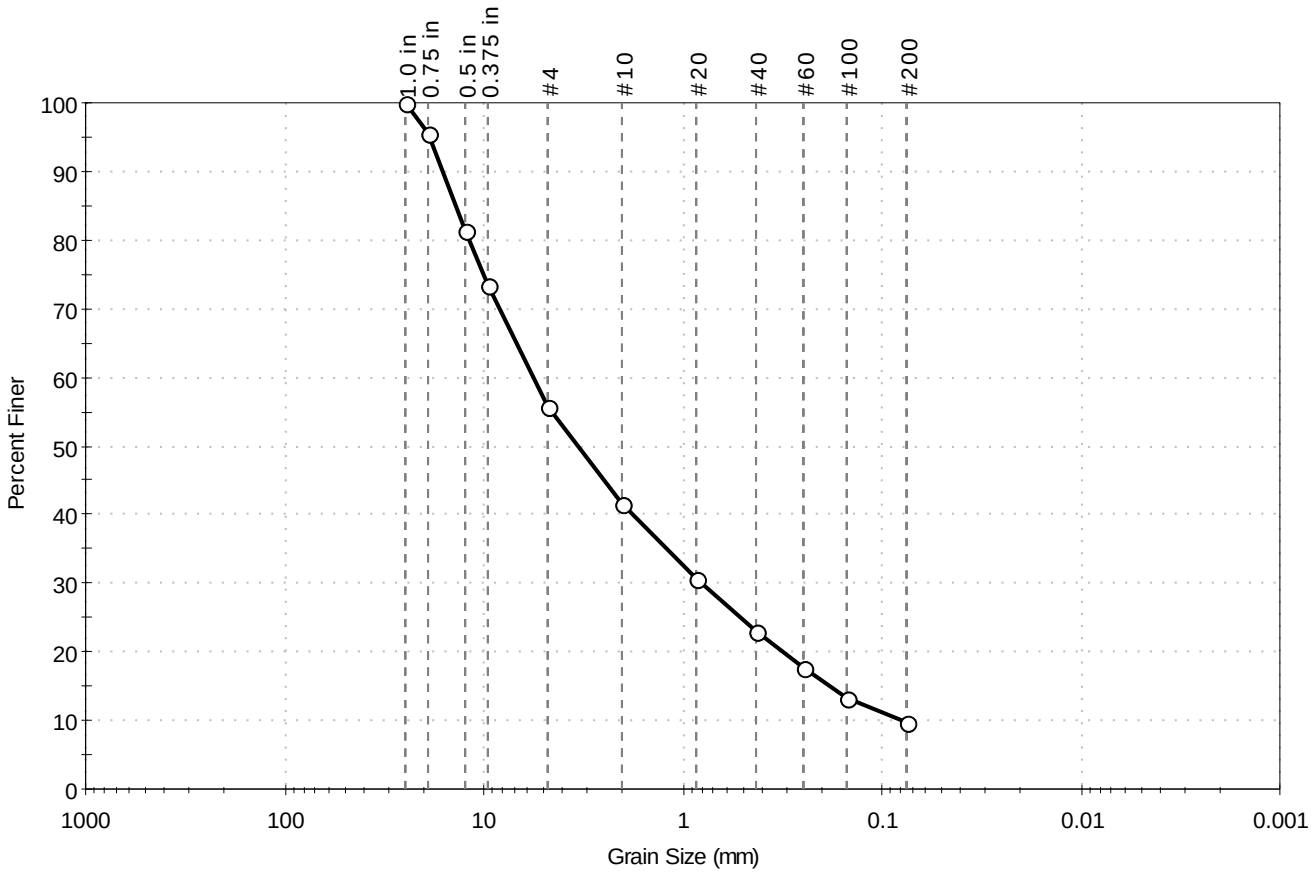
Client:	Haley & Aldrich, Inc.				
Project:	Souadabscook Center # 1432 and 5950				
Location:	Hampden, ME			Project No:	GTX-307095
Boring ID:	BB-HSS-108	Sample Type:	jar	Tested By:	GA
Sample ID:	3D	Test Date:	10/06/17	Checked By:	emm
Depth :	5.0-7.0 ft	Test Id:	426872		
Test Comment:	---				
Visual Description:	Moist, brown sand with silt and gravel				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
---	44.3	46.0	9.7

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1.0 in	25.00	100		
0.75 in	19.00	96		
0.5 in	12.50	81		
0.375 in	9.50	73		
#4	4.75	56		
#10	2.00	42		
#20	0.85	31		
#40	0.42	23		
#60	0.25	18		
#100	0.15	13		
#200	0.075	9.7		

Coefficients

D_{85} = 13.9141 mm D_{30} = 0.7920 mm

D_{60} = 5.6308 mm D_{15} = 0.1833 mm

D_{50} = 3.3617 mm D_{10} = 0.0801 mm

C_u = 70.297 C_c = 1.391

Classification

ASTM N/A

AASHTO Stone Fragments, Gravel and Sand (A-1-a (1))

Sample / Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

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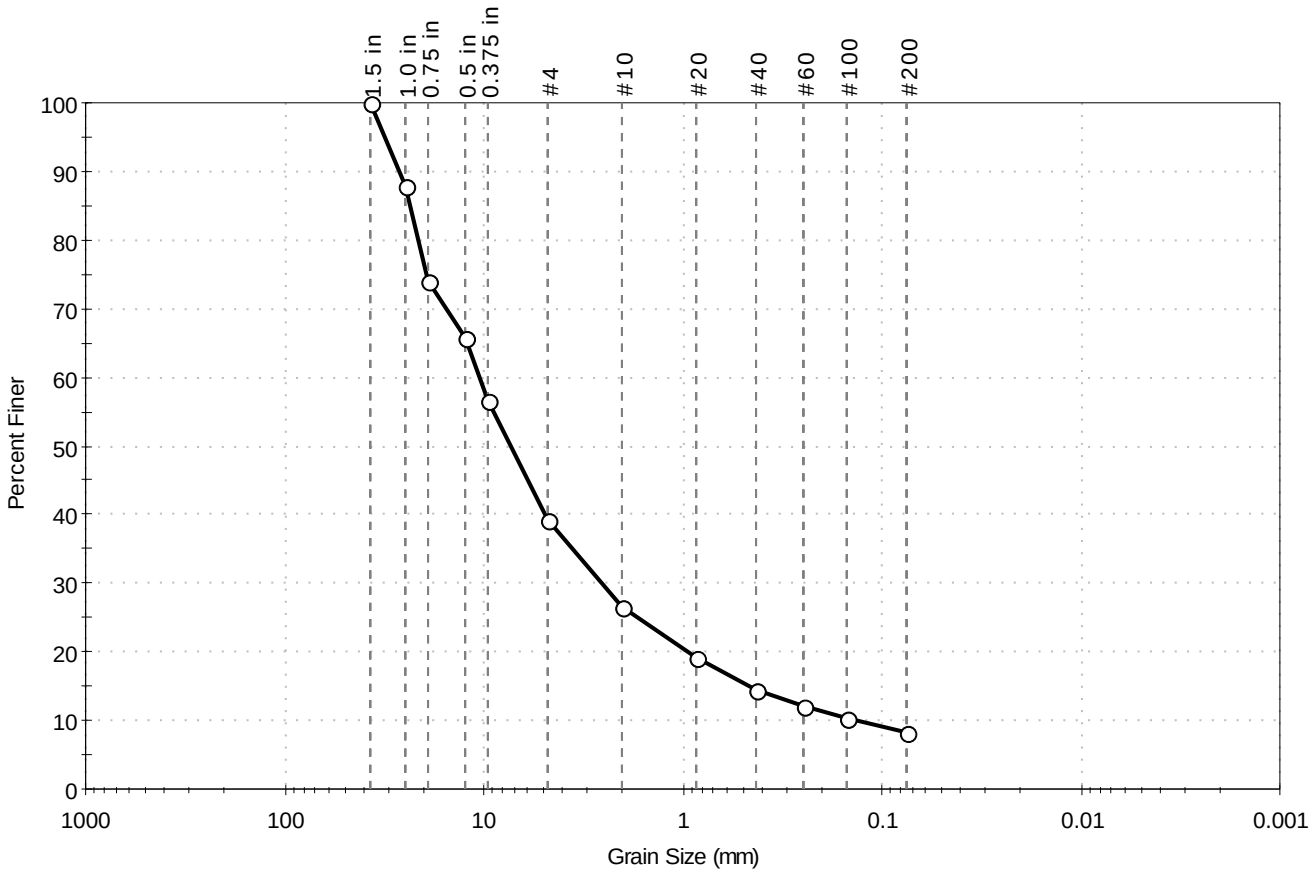
Client:	Haley & Aldrich, Inc.				
Project:	Souadabscook Center # 1432 and 5950				
Location:	Hampden, ME			Project No:	GTX-307095
Boring ID:	BB-HSS-109	Sample Type:	jar	Tested By:	GA
Sample ID:	1D	Test Date:	10/06/17	Checked By:	emm
Depth :	0.0-1.5 ft	Test Id:	426873		
Test Comment:	---				
Visual Description:	Moist, brown gravel with silt and sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
---	60.8	30.9	8.3

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1.5 in	37.50	100		
1.0 in	25.00	88		
0.75 in	19.00	74		
0.5 in	12.50	66		
0.375 in	9.50	57		
#4	4.75	39		
#10	2.00	27		
#20	0.85	19		
#40	0.42	15		
#60	0.25	12		
#100	0.15	10		
#200	0.075	8.3		

Coefficients

D_{85} = 23.5608 mm D_{30} = 2.5284 mm
D_{60} = 10.5230 mm D_{15} = 0.4568 mm
D_{50} = 7.3178 mm D_{10} = 0.1387 mm
C_u = 75.869 C_c = 4.380

Classification

ASTM N/A

AASHTO Stone Fragments, Gravel and Sand (A-1-a (1))

Sample / Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

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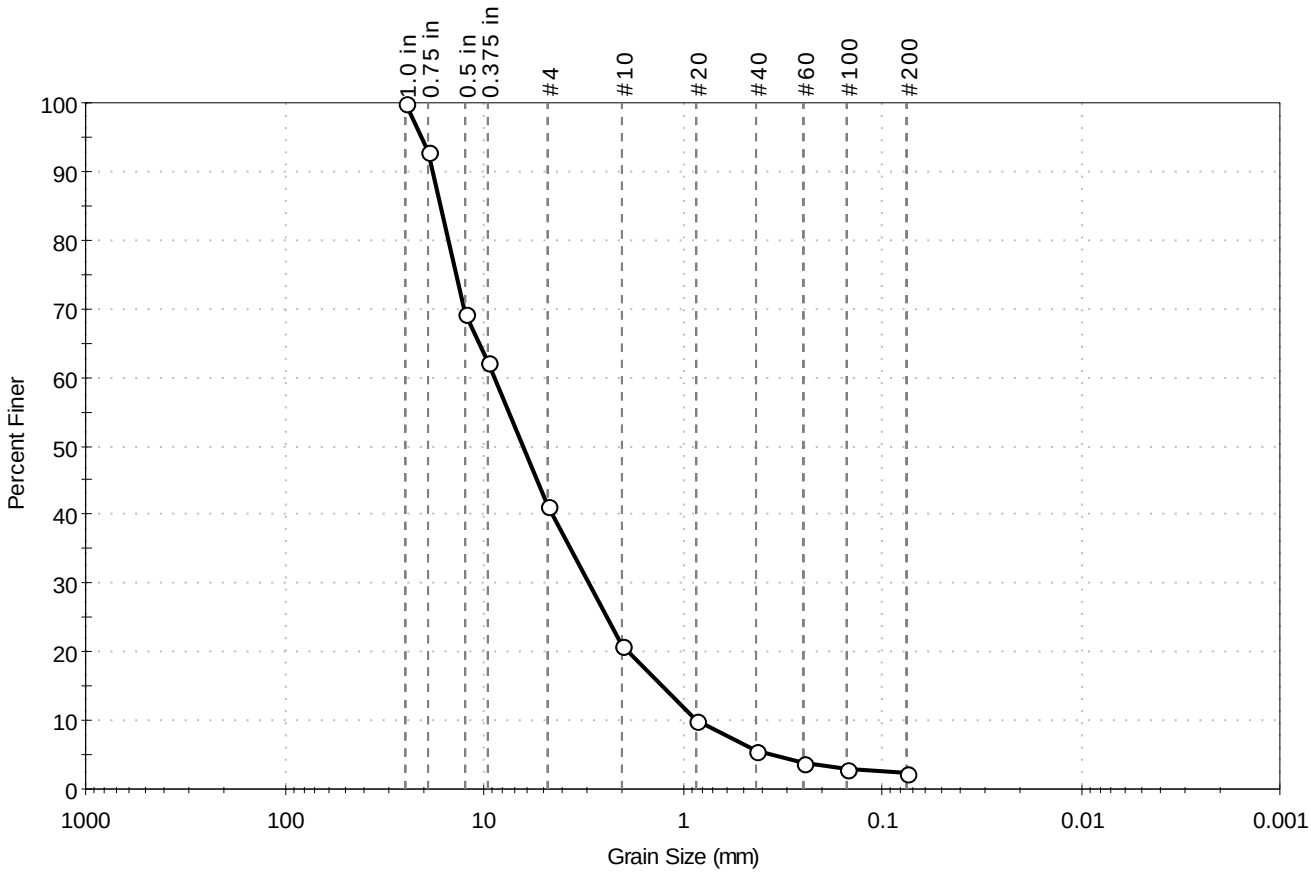
Client:	Haley & Aldrich, Inc.				
Project:	Souadabscook Center # 1432 and 5950				
Location:	Hampden, ME			Project No:	GTX-307095
Boring ID:	BB-HSS-110	Sample Type:	jar	Tested By:	GA
Sample ID:	1D	Test Date:	10/06/17	Checked By:	emm
Depth :	0.0-2.0 ft	Test Id:	426874		
Test Comment:	---				
Visual Description:	Moist, brown gravel with sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
---	58.7	39.0	2.3

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1.0 in	25.00	100		
0.75 in	19.00	93		
0.5 in	12.50	69		
0.375 in	9.50	62		
#4	4.75	41		
#10	2.00	21		
#20	0.85	10		
#40	0.42	6		
#60	0.25	4		
#100	0.15	3		
#200	0.075	2.3		

Coefficients

D_{85} = 16.5421 mm	D_{30} = 2.9368 mm
D_{60} = 8.7864 mm	D_{15} = 1.2580 mm
D_{50} = 6.3242 mm	D_{10} = 0.8535 mm
C_u = 10.295	C_c = 1.150

Classification

ASTM Well-graded gravel with sand (GW)

AASHTO Stone Fragments, Gravel and Sand (A-1-a (1))

Sample / Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

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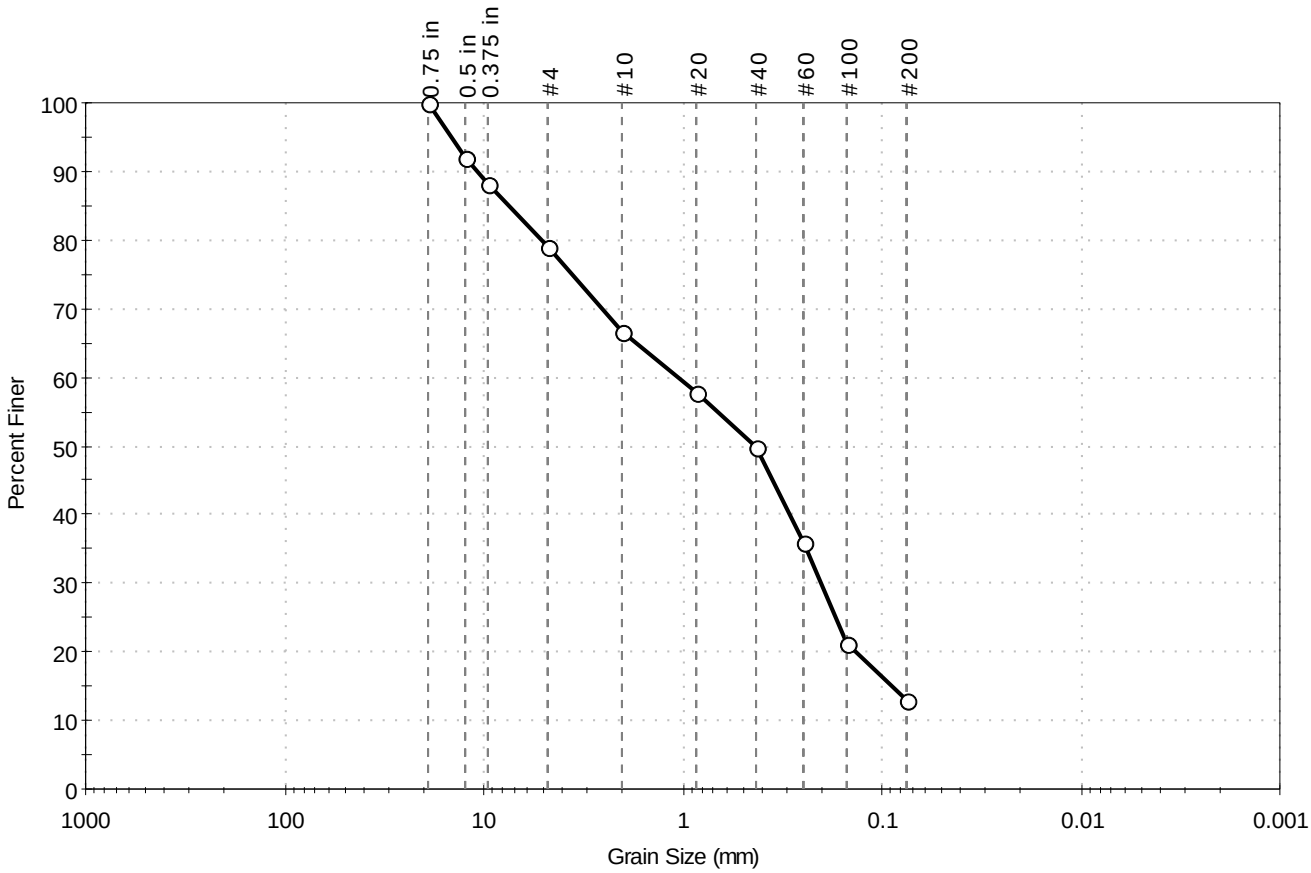
Client:	Haley & Aldrich, Inc.				
Project:	Souadabscook Center # 1432 and 5950				
Location:	Hampden, ME			Project No:	GTX-307095
Boring ID:	BB-HSS-111	Sample Type:	jar	Tested By:	GA
Sample ID:	4D	Test Date:	10/06/17	Checked By:	emm
Depth :	8.0-10.0 ft	Test Id:	426875		
Test Comment:	---				
Visual Description:	Moist, olive silty sand with gravel				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
---	21.0	66.1	12.9

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.75 in	19.00	100		
0.5 in	12.50	92		
0.375 in	9.50	88		
#4	4.75	79		
#10	2.00	67		
#20	0.85	58		
#40	0.42	50		
#60	0.25	36		
#100	0.15	21		
#200	0.075	13		

Coefficients

D_{85} = 7.5230 mm D_{30} = 0.2033 mm

D_{60} = 1.0558 mm D_{15} = 0.0895 mm

D_{50} = 0.4250 mm D_{10} = N/A

C_u = N/A C_c = N/A

Classification

ASTM N/A

AASHTO Stone Fragments, Gravel and Sand (A-1-b (0))

Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

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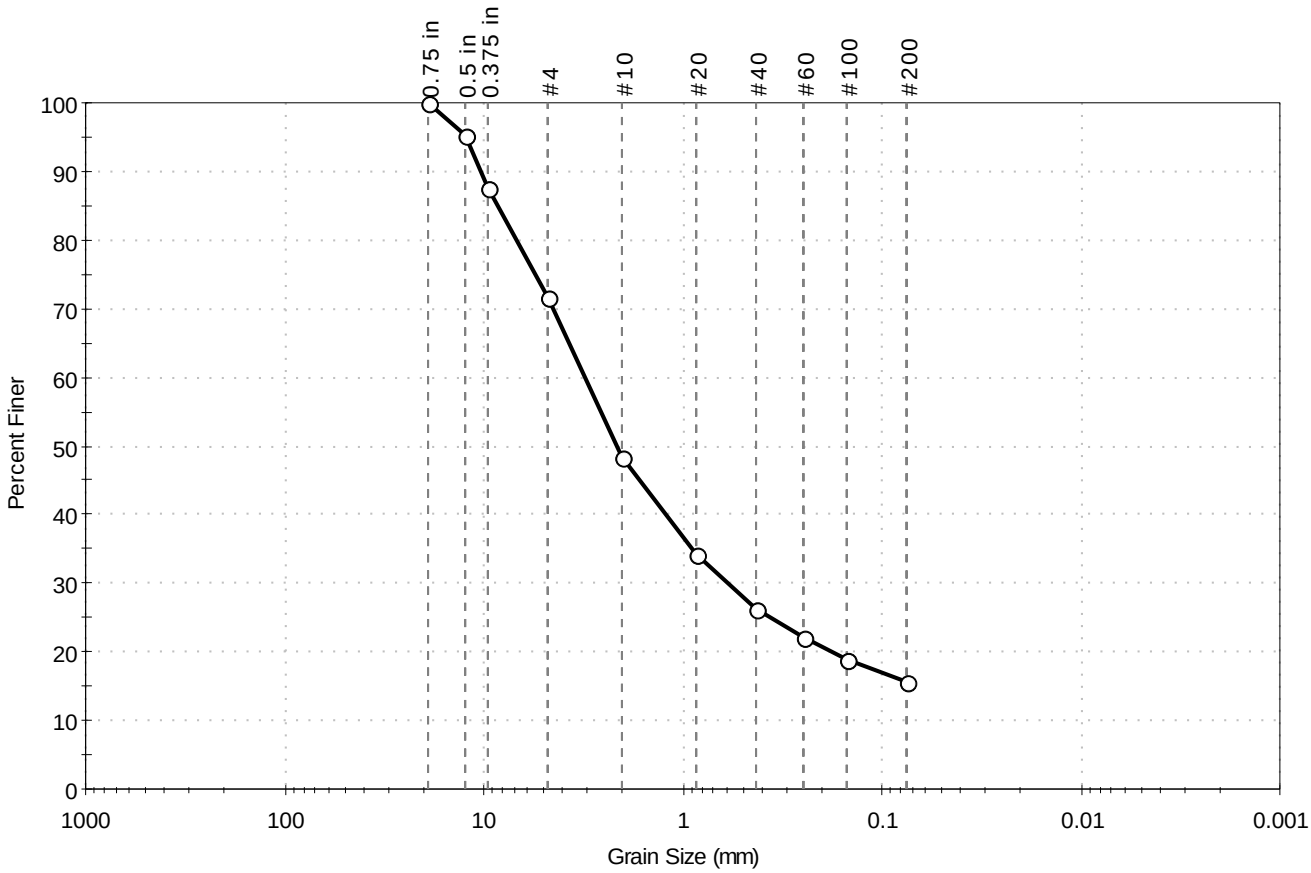
Client:	Haley & Aldrich, Inc.				
Project:	Souadabscook Center # 1432 and 5950				
Location:	Hampden, ME			Project No:	GTX-307095
Boring ID:	BB-HSS-112	Sample Type:	jar	Tested By:	GA
Sample ID:	8D	Test Date:	10/06/17	Checked By:	emm
Depth :	15.5-17.5 ft	Test Id:	426876		
Test Comment:	---				
Visual Description:	Moist, olive gray silty sand with gravel				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
---	28.4	56.0	15.6

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.75 in	19.00	100		
0.5 in	12.50	95		
0.375 in	9.50	88		
#4	4.75	72		
#10	2.00	48		
#20	0.85	34		
#40	0.42	26		
#60	0.25	22		
#100	0.15	19		
#200	0.075	16		

Coefficients

D_{85} = 8.4443 mm D_{30} = 0.5952 mm

D_{60} = 3.0798 mm D_{15} = N/A

D_{50} = 2.1187 mm D_{10} = N/A

C_u = N/A C_c = N/A

Classification

ASTM N/A

AASHTO Stone Fragments, Gravel and Sand (A-1-b (0))

Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

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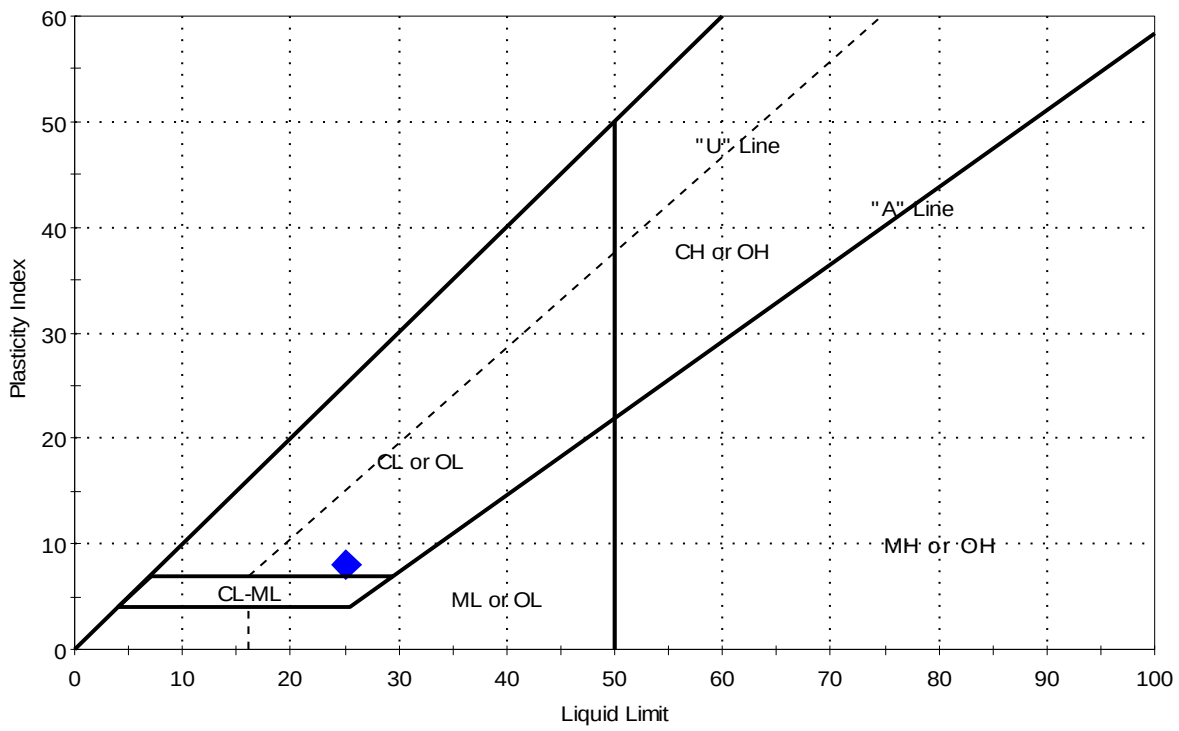
Client:	Haley & Aldrich, Inc.				
Project:	Souadabscook Center # 1432 and 5950				
Location:	Hampden, ME			Project No:	GTX-307095
Boring ID:	BB-HSS-107	Sample Type:	jar	Tested By:	GA
Sample ID:	14D	Test Date:	10/06/17	Checked By:	emm
Depth :	30.0-32.0 ft	Test Id:	426865		
Test Comment:	---				
Visual Description:	Moist, dark gray clay				
Sample Comment:	---				

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content, %	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	14D	B-HSS-10	30.0-32.0 ft	20	25	17	8	0.4	

Sample Prepared using the WET method

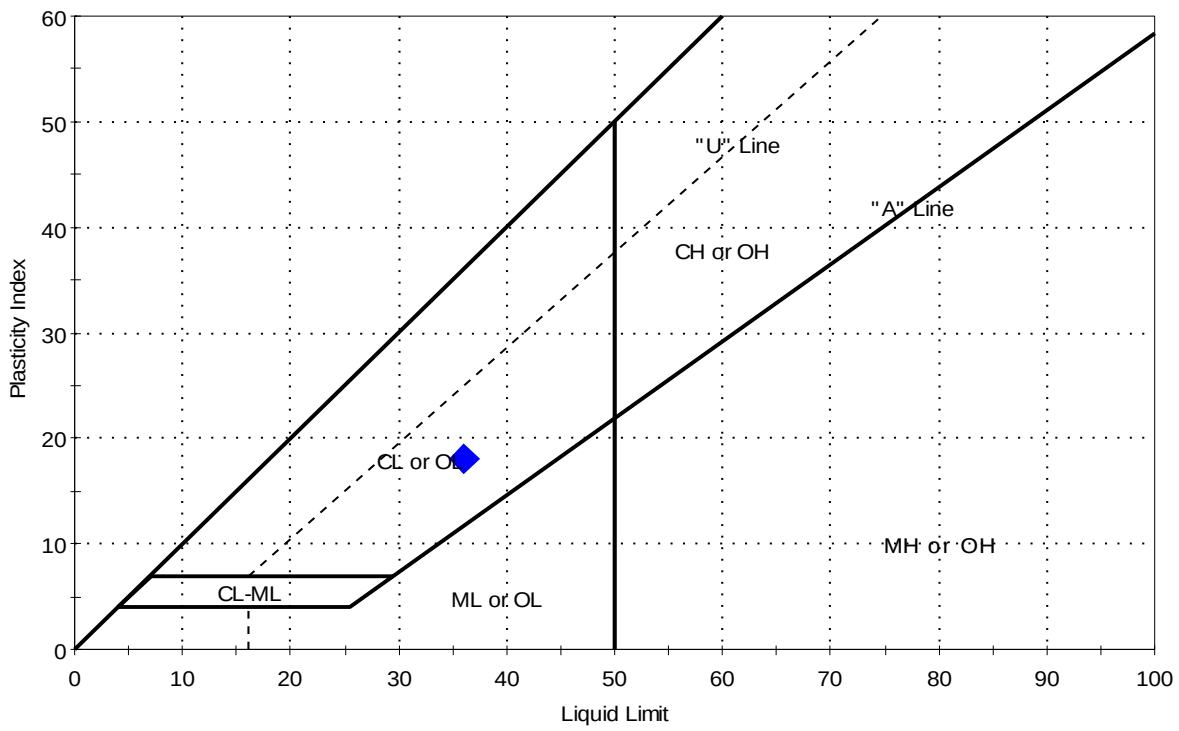
Dry Strength: HIGH

Dilatancy: SLOW

Toughness: MEDIUM

Client:	Haley & Aldrich, Inc.				
Project:	Souadabscook Center # 1432 and 5950				
Location:	Hampden, ME			Project No:	GTX-307095
Boring ID:	BB-HSS-108	Sample Type:	jar	Tested By:	GA
Sample ID:	10D	Test Date:	10/06/17	Checked By:	emm
Depth :	30.0-32.0 ft	Test Id:	426866		
Test Comment:	---				
Visual Description:	Moist, dark gray clay				
Sample Comment:	---				

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content, %	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	10D	B-HSS-10	30.0-32.0 ft	23	36	18	18	0.3	

Sample Prepared using the WET method

Dry Strength: HIGH

Dilatancy: SLOW

Toughness: MEDIUM

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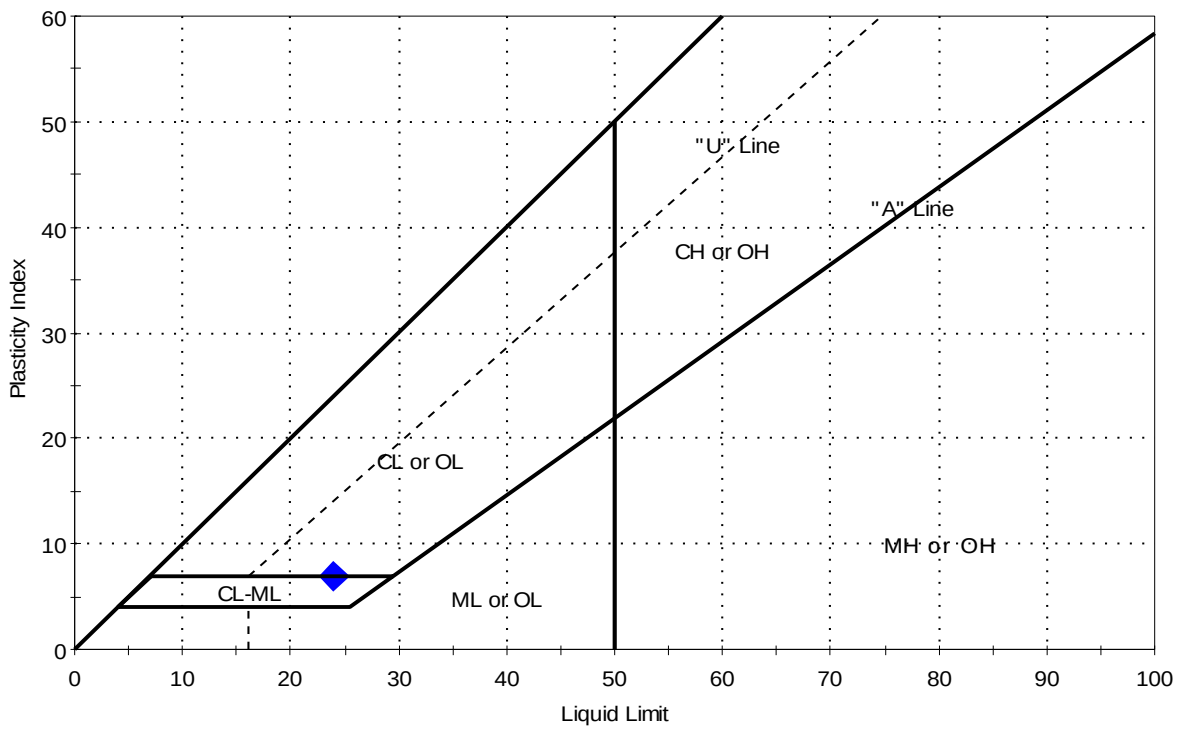
Client:	Haley & Aldrich, Inc.				
Project:	Souadabscook Center # 1432 and 5950				
Location:	Hampden, ME			Project No:	GTX-307095
Boring ID:	BB-HSS-109	Sample Type:	jar	Tested By:	GA
Sample ID:	2D	Test Date:	10/06/17	Checked By:	emm
Depth :	5.5-7.5 ft	Test Id:	426867		
Test Comment:	---				
Visual Description:	Moist, dark gray silty clay				
Sample Comment:	---				

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content, %	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	2D	B-HSS-10	5.5-7.5 ft	25	24	17	7	1.2	

Sample Prepared using the WET method

Dry Strength: HIGH

Dilatancy: SLOW

Toughness: MEDIUM

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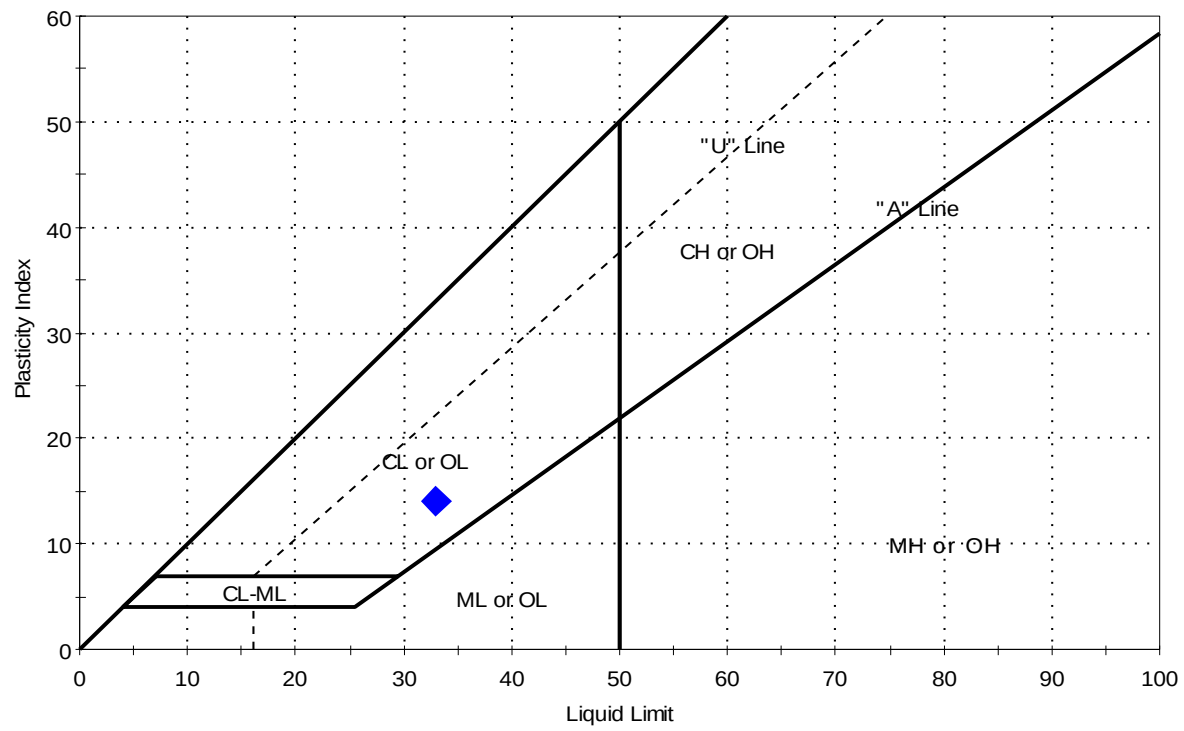
Client:	Haley & Aldrich, Inc.				
Project:	Souadabscook Center # 1432 and 5950				
Location:	Hampden, ME			Project No:	GTX-307095
Boring ID:	BB-HSS-110	Sample Type:	jar	Tested By:	GA
Sample ID:	3D	Test Date:	10/06/17	Checked By:	emm
Depth :	13.0-15.0 ft	Test Id:	426868		
Test Comment:	---				
Visual Description:	Moist, dark gray clay				
Sample Comment:	---				

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content, %	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	3D	B-HSS-11	13.0-15.0 ft	27	33	19	14	0.6	

Sample Prepared using the WET method

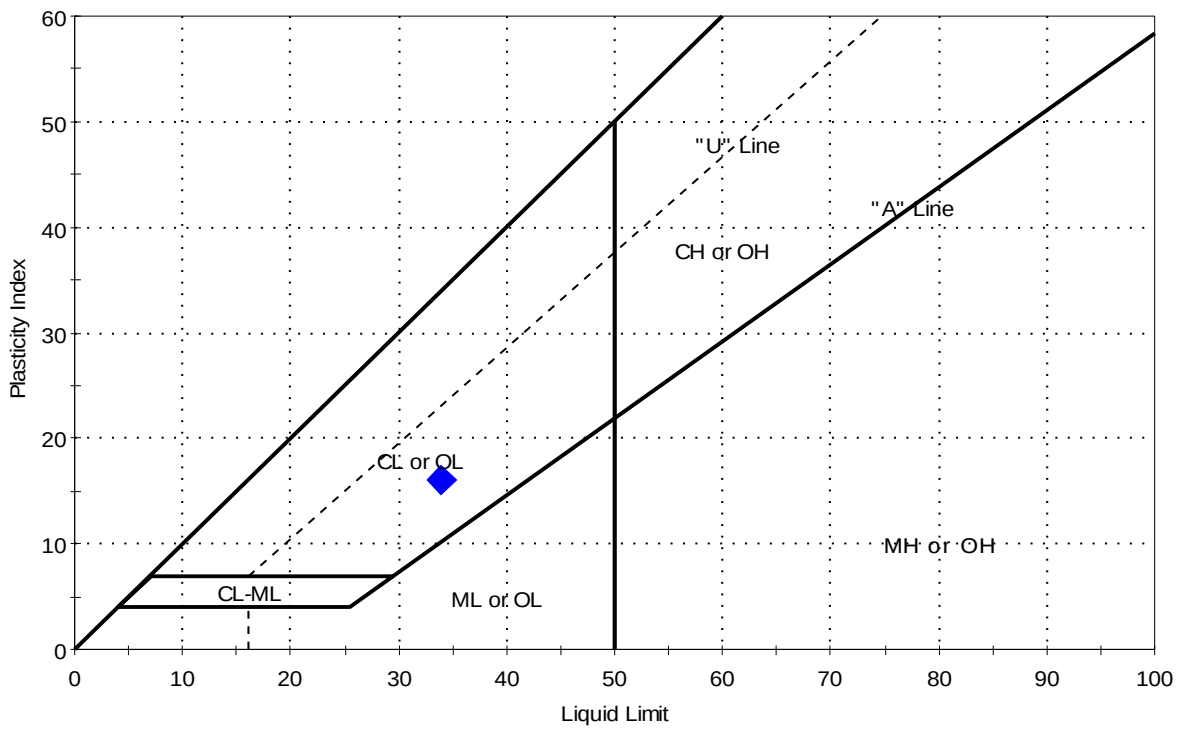
Dry Strength: HIGH

Dilatancy: SLOW

Toughness: MEDIUM

Client:	Haley & Aldrich, Inc.				
Project:	Souadabscook Center # 1432 and 5950				
Location:	Hampden, ME			Project No:	GTX-307095
Boring ID:	BB-HSS-111	Sample Type:	jar	Tested By:	GA
Sample ID:	10D	Test Date:	10/06/17	Checked By:	emm
Depth :	30.0-32.0 ft	Test Id:	426869		
Test Comment:	---				
Visual Description:	Moist, dark gray clay				
Sample Comment:	---				

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content, %	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	10D	B-HSS-11	30.0-32.0 ft	26	34	18	16	0.5	

Sample Prepared using the WET method

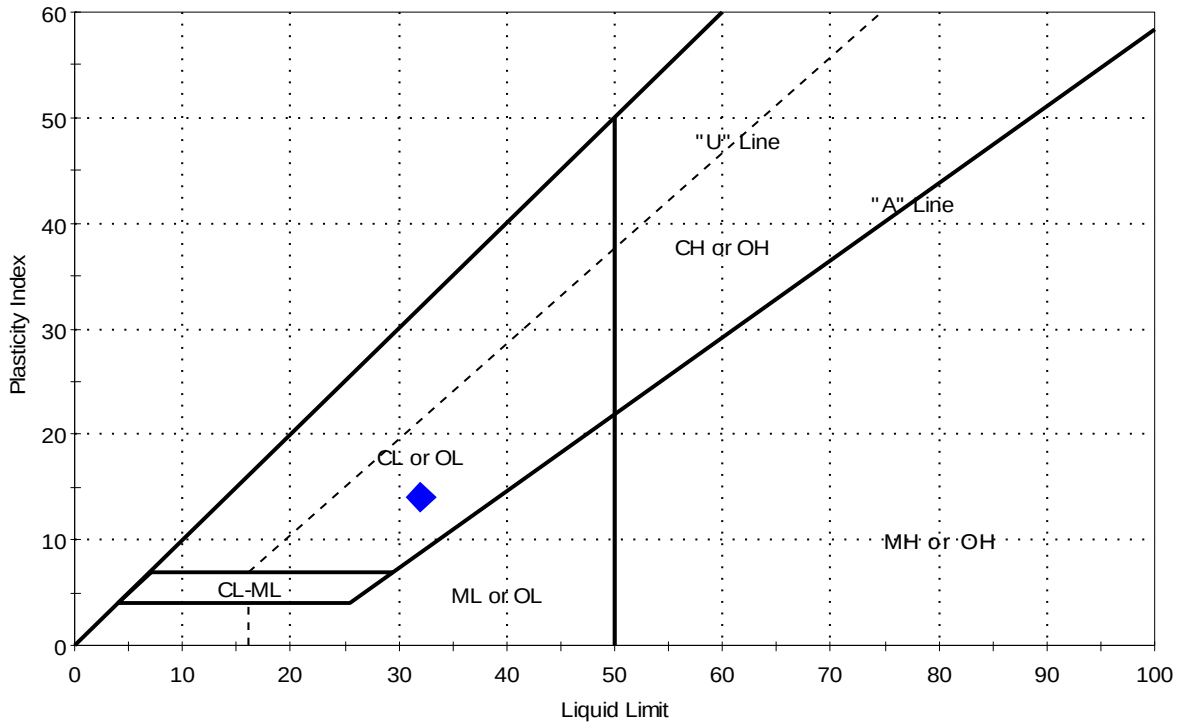
Dry Strength: HIGH

Dilatancy: SLOW

Toughness: MEDIUM

Client:	Haley & Aldrich, Inc.				
Project:	Souadabscook Center # 1432 and 5950				
Location:	Hampden, ME			Project No:	GTX-307095
Boring ID:	BB-HSS-112	Sample Type:	jar	Tested By:	GA
Sample ID:	12D	Test Date:	10/06/17	Checked By:	emm
Depth :	32.0-34.0 ft	Test Id:	426870		
Test Comment:	---				
Visual Description:	Moist, dark gray clay				
Sample Comment:	---				

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content, %	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	12D	B-HSS-11	32.0-34.0 ft	23	32	18	14	0.3	

Sample Prepared using the WET method

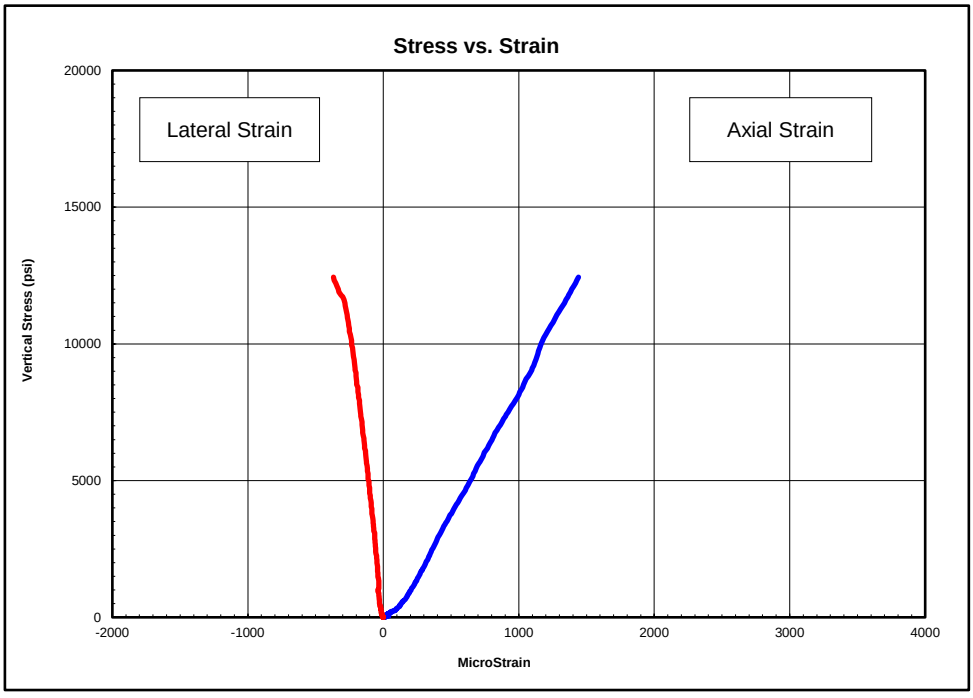
Dry Strength: HIGH

Dilatancy: SLOW

Toughness: MEDIUM

Client:	Haley & Aldrich, Inc.
Project Name:	Souadabscook Center # 1432 and 5950
Project Location:	Hampden, ME
GTX #:	307095
Test Date:	10/6/2017
Tested By:	rlc
Checked By:	jsc
Boring ID:	BB-HSS-108
Sample ID:	R1
Depth, ft:	46.32-46.67
Sample Type:	rock core
Sample Description:	See photographs Discontinuity failure

Compressive Strength and Elastic Moduli of Rock by ASTM D7012 - Method D



Peak Compressive Stress: 12,435 psi

Stress Range, psi	Young's Modulus, psi	Poisson's Ratio
1200-4600	9,460,000	0.19
4600-7900	9,000,000	0.22
7900-11200	10,600,000	0.30

Notes: Test specimen tested at the approximate as-received moisture content and at standard laboratory temperature.
The axial load was applied continuously at a stress rate that produced failure in a test time between 2 and 15 minutes.
Young's Modulus and Poisson's Ratio calculated using the tangent to the line in the stress range listed.
Calculations assume samples are isotropic, which is not necessarily the case.

Client:	Haley & Aldrich, Inc.	Test Date:	10/4/2017
Project Name:	Souadabscook Center # 1432 and 5950	Tested By:	rlc
Project Location:	Hampden, ME	Checked By:	jsc
GTX #:	307095		
Boring ID:	BB-HSS-108		
Sample ID:	R1		
Depth:	46.32-46.67 ft		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.31	4.30	4.31
Specimen Diameter, in:	1.99	1.99	1.99
Specimen Mass, g:	592.18		
Bulk Density, lb/ft^3	168	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:

Is the maximum gap ≤ 0.02 in.? YES

Maximum difference must be < 0.020 in.

Straightness Tolerance Met? YES

END FLATNESS AND PARALLELISM (Procedure FP1)

END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00030	-0.00020	-0.00010	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00010	0.00020	0.00030
Diameter 2, in (rotated 90°)	-0.00030	-0.00020	-0.00010	0.00000	-0.00010	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00010	0.00000	0.00000

Difference between max and min readings, in:

0° = 0.00060 90° = 0.00040

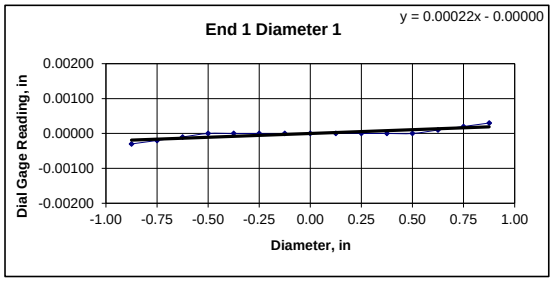
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00030	-0.00020	-0.00010	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00010	0.00010
Diameter 2, in (rotated 90°)	-0.00020	-0.00030	-0.00020	-0.00010	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	-0.00010	-0.00020	-0.00010

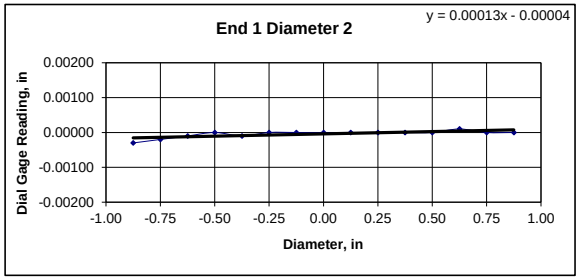
Difference between max and min readings, in:

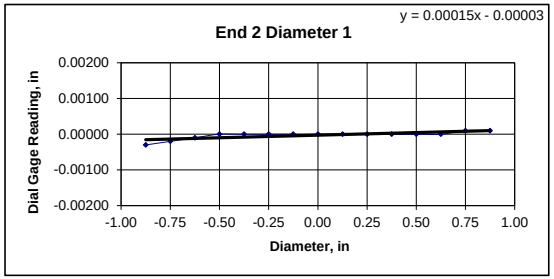
0° = 0.0004 90° = 0.0003

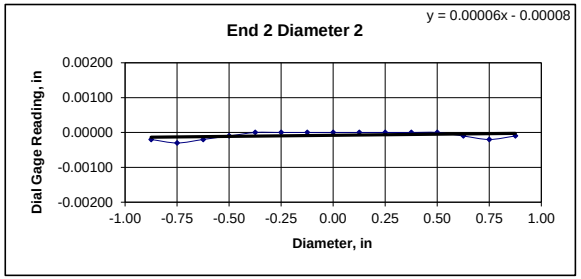
Maximum difference must be < 0.0020 in. Difference = ± 0.00030

Flatness Tolerance Met? YES









DIAMETER 1

End 1:

Slope of Best Fit Line	0.00022
Angle of Best Fit Line:	0.01261

End 2:

Slope of Best Fit Line	0.00015
Angle of Best Fit Line:	0.00859

Maximum Angular Difference: 0.00401

Parallelism Tolerance Met? YES

Spherically Seated

DIAMETER 2

End 1:

Slope of Best Fit Line	0.00013
Angle of Best Fit Line:	0.00745

End 2:

Slope of Best Fit Line	0.00006
Angle of Best Fit Line:	0.00344

Maximum Angular Difference: 0.00401

Parallelism Tolerance Met? YES

Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00060	1.990	0.00030	0.017	YES
Diameter 2, in (rotated 90°)	0.00040	1.990	0.00020	0.012	YES
END 2					
Diameter 1, in	0.00040	1.990	0.00020	0.012	YES
Diameter 2, in (rotated 90°)	0.00030	1.990	0.00015	0.009	YES

Maximum angle of departure must be ≤ 0.25°

Perpendicularity Tolerance Met? YES

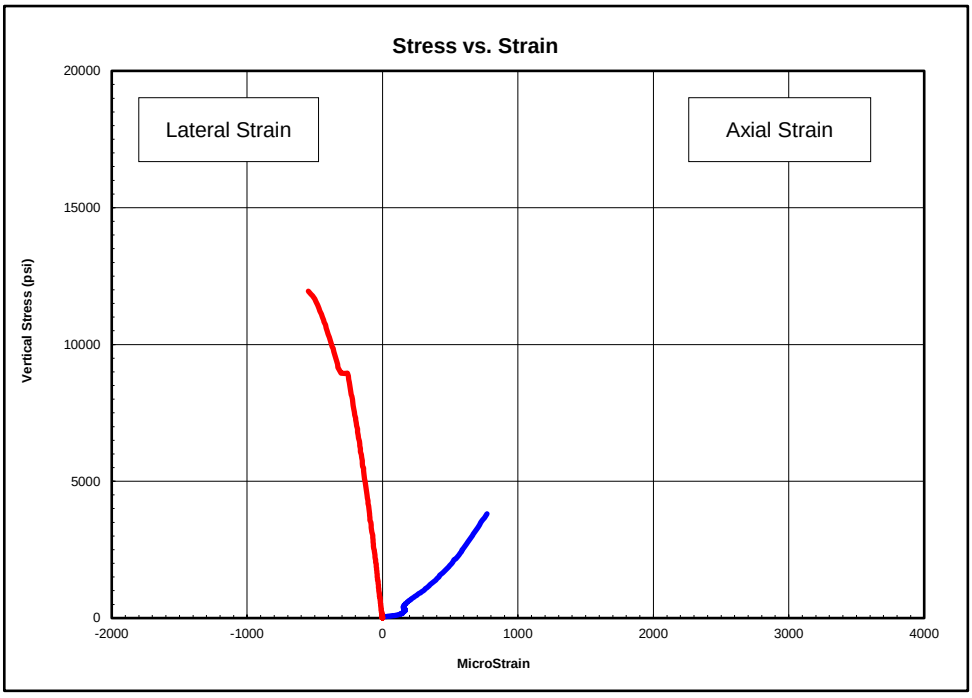
Client:	Haley & Aldrich, Inc.
Project Name:	Souadabscook Center # 1432 and 5950
Project Location:	Hampden, ME
GTX #:	307095
Test Date:	10/6/2017
Tested By:	rlc
Checked By:	jsc
Boring ID:	BB-HSS-108
Sample ID:	R1
Depth, ft:	46.32-46.67

After cutting and grinding

After break

Client:	Haley & Aldrich, Inc.
Project Name:	Souadabscook Center # 1432 and 5950
Project Location:	Hampden, ME
GTX #:	307095
Test Date:	10/6/2017
Tested By:	rlc
Checked By:	jsc
Boring ID:	BB-HSS-109
Sample ID:	R2
Depth, ft:	22.04-22.41
Sample Type:	rock core
Sample Description:	See photographs Intact material and Discontinuity failure

Compressive Strength and Elastic Moduli of Rock by ASTM D7012 - Method D



Peak Compressive Stress: 11,961 psi

The graph above does not include values up to the peak stress value. The axial strain gauges failed before the peak value was attained.

Stress Range, psi	Young's Modulus, psi	Poisson's Ratio
1200-3700	6,140,000	0.15
3700-7600	---	---
7600-10800	---	---

Notes: Test specimen tested at the approximate as-received moisture content and at standard laboratory temperature.
The axial load was applied continuously at a stress rate that produced failure in a test time between 2 and 15 minutes.
Young's Modulus and Poisson's Ratio calculated using the tangent to the line in the stress range listed.
Calculations assume samples are isotropic, which is not necessarily the case.

Client:	Haley & Aldrich, Inc.	Test Date:	10/4/2017
Project Name:	Souadabscook Center # 1432 and 5950	Tested By:	rlc
Project Location:	Hampden, ME	Checked By:	jsc
GTX #:	307095		
Boring ID:	BB-HSS-109		
Sample ID:	R2		
Depth:	22.04-22.41 ft		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.26	4.26	4.26
Specimen Diameter, in:	1.99	1.99	1.99
Specimen Mass, g:	586.09		
Bulk Density, lb/ft^3	168	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.1	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:

Is the maximum gap ≤ 0.02 in.? YES

Maximum difference must be < 0.020 in.

Straightness Tolerance Met? YES

END FLATNESS AND PARALLELISM (Procedure FP1)

END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00010	-0.00010	-0.00010	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	-0.00010	-0.00010	-0.00020
Diameter 2, in (rotated 90°)	-0.00020	-0.00010	-0.00010	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00010

Difference between max and min readings, in:

0° = 0.00020 90° = 0.00030

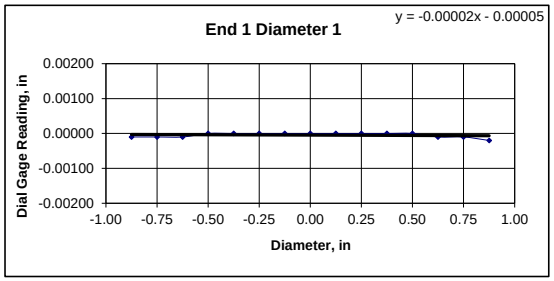
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00010	0.00010	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00010	0.00010	0.00010
Diameter 2, in (rotated 90°)	-0.00020	-0.00030	-0.00020	-0.00010	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

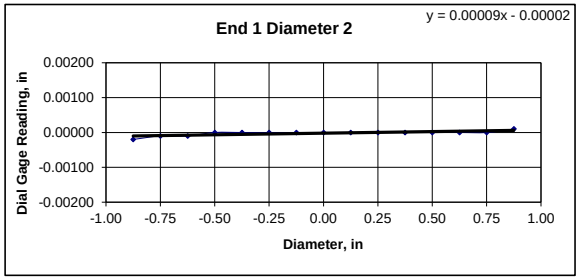
Difference between max and min readings, in:

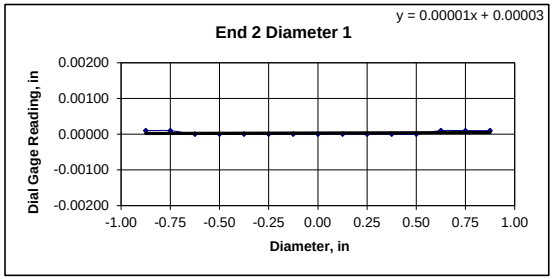
0° = 0.0001 90° = 0.0003

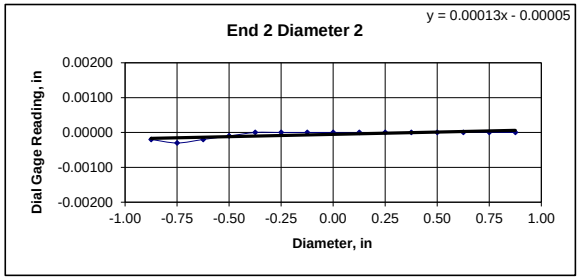
Maximum difference must be < 0.0020 in. Difference = ± 0.00015

Flatness Tolerance Met? YES









DIAMETER 1

End 1:

Slope of Best Fit Line	0.00002
Angle of Best Fit Line:	0.00115

End 2:

Slope of Best Fit Line	0.00001
Angle of Best Fit Line:	0.00057

Maximum Angular Difference: 0.00057

Parallelism Tolerance Met? YES

Spherically Seated

DIAMETER 2

End 1:

Slope of Best Fit Line	0.00009
Angle of Best Fit Line:	0.00516

End 2:

Slope of Best Fit Line	0.00013
Angle of Best Fit Line:	0.00745

Maximum Angular Difference: 0.00229

Parallelism Tolerance Met? YES

Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00020	1.990	0.00010	0.006	YES
Diameter 2, in (rotated 90°)	0.00030	1.990	0.00015	0.009	YES
END 2					
Diameter 1, in	0.00010	1.990	0.00005	0.003	YES
Diameter 2, in (rotated 90°)	0.00030	1.990	0.00015	0.009	YES

Maximum angle of departure must be ≤ 0.25°

Perpendicularity Tolerance Met? YES

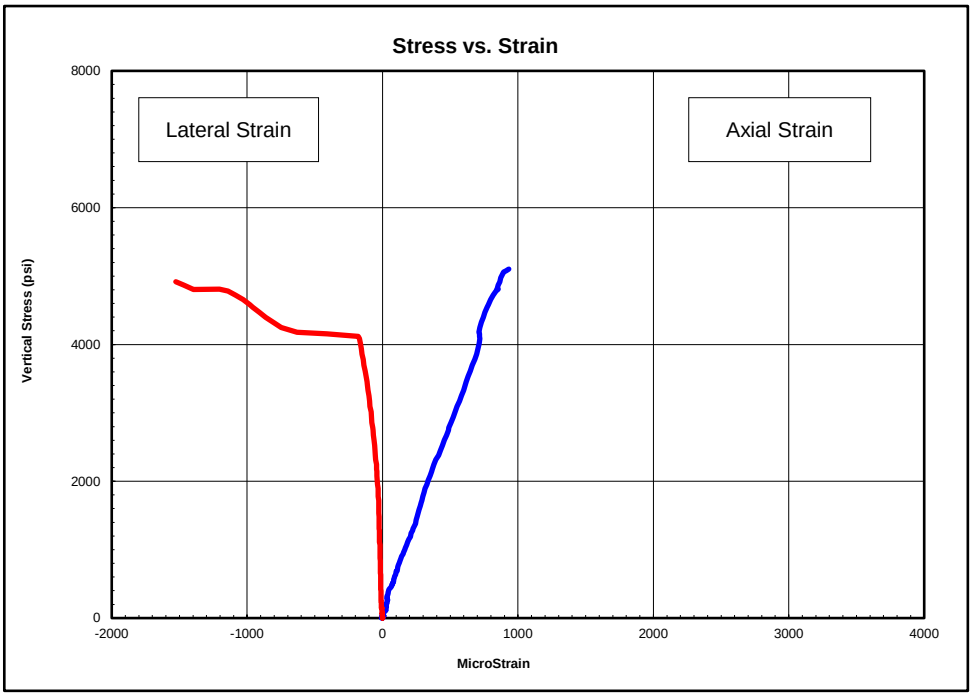
Client:	Haley & Aldrich, Inc.
Project Name:	Souadabscook Center # 1432 and 5950
Project Location:	Hampden, ME
GTX #:	307095
Test Date:	10/6/2017
Tested By:	rlc
Checked By:	jsc
Boring ID:	BB-HSS-109
Sample ID:	R2
Depth, ft:	22.04-22.41

After cutting and grinding

After break

Client:	Haley & Aldrich, Inc.
Project Name:	Souadabscook Center # 1432 and 5950
Project Location:	Hampden, ME
GTX #:	307095
Test Date:	10/6/2017
Tested By:	rlc
Checked By:	jsc
Boring ID:	BB-HSS-110
Sample ID:	R2
Depth, ft:	32.8-33.16
Sample Type:	rock core
Sample Description:	See photographs Discontinuity failure

Compressive Strength and Elastic Moduli of Rock by ASTM D7012 - Method D



Peak Compressive Stress: 5,093 psi

Stress Range, psi	Young's Modulus, psi	Poisson's Ratio
500-1900	5,470,000	0.08
1900-3200	5,010,000	0.25
3200-4600	7,080,000	---

Notes: Test specimen tested at the approximate as-received moisture content and at standard laboratory temperature.
The axial load was applied continuously at a stress rate that produced failure in a test time between 2 and 15 minutes.
Young's Modulus and Poisson's Ratio calculated using the tangent to the line in the stress range listed.
Calculations assume samples are isotropic, which is not necessarily the case.

Client:	Haley & Aldrich, Inc.	Test Date:	10/4/2017
Project Name:	Souadabscook Center # 1432 and 5950	Tested By:	rlc
Project Location:	Hampden, ME	Checked By:	jsc
GTX #:	307095		
Boring ID:	BB-HSS-110		
Sample ID:	R2		
Depth:	32.8-33.16 ft		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.15	4.16	4.16
Specimen Diameter, in:	1.99	1.99	1.99
Specimen Mass, g:	583.89		
Bulk Density, lb/ft^3	172	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.1	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:

Is the maximum gap ≤ 0.02 in.? YES

Maximum difference must be < 0.020 in.

Straightness Tolerance Met? YES

END FLATNESS AND PARALLELISM (Procedure FP1)

END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00020	-0.00010	-0.00010	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00010	0.00010	0.00010
Diameter 2, in (rotated 90°)	-0.00030	-0.00020	-0.00010	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

Difference between max and min readings, in:

0° = 0.00030 90° = 0.00030

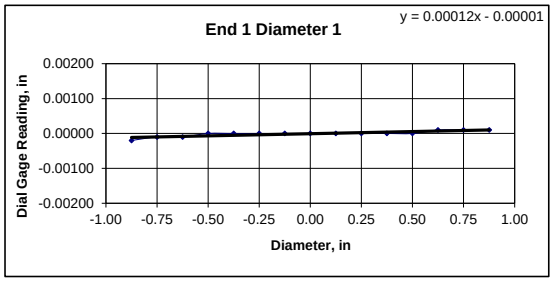
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00030	-0.00020	-0.00010	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00010	0.00010	0.00020
Diameter 2, in (rotated 90°)	-0.00010	-0.00010	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	-0.00010	-0.00020	-0.00020

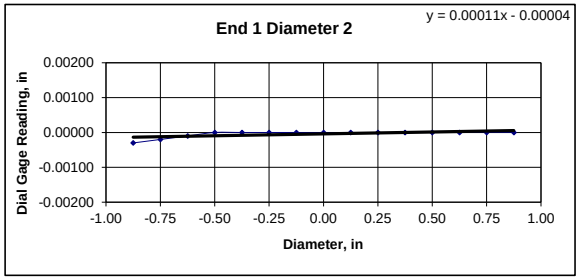
Difference between max and min readings, in:

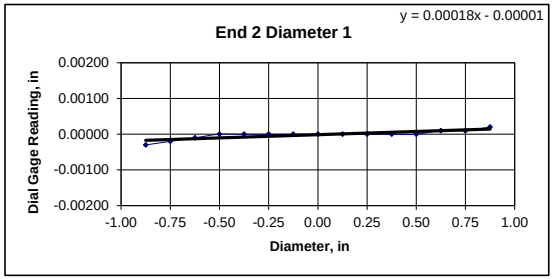
0° = 0.0005 90° = 0.0002

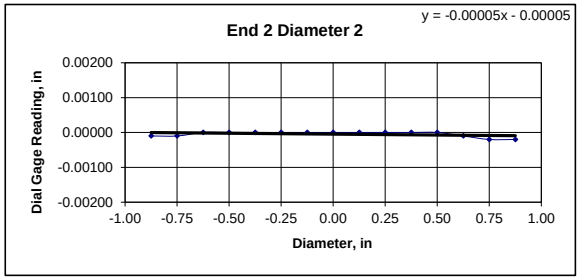
Maximum difference must be < 0.0020 in. Difference = ± 0.00025

Flatness Tolerance Met? YES









DIAMETER 1

End 1:

Slope of Best Fit Line	0.00012
Angle of Best Fit Line:	0.00688

End 2:

Slope of Best Fit Line	0.00018
Angle of Best Fit Line:	0.01031

Maximum Angular Difference: 0.00344

Parallelism Tolerance Met? YES

Spherically Seated

DIAMETER 2

End 1:

Slope of Best Fit Line	0.00011
Angle of Best Fit Line:	0.00630

End 2:

Slope of Best Fit Line	0.00005
Angle of Best Fit Line:	0.00286

Maximum Angular Difference: 0.00344

Parallelism Tolerance Met? YES

Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00030	1.990	0.00015	0.009	YES
Diameter 2, in (rotated 90°)	0.00030	1.990	0.00015	0.009	YES
END 2					
Diameter 1, in	0.00050	1.990	0.00025	0.014	YES
Diameter 2, in (rotated 90°)	0.00020	1.990	0.00010	0.006	YES

Maximum angle of departure must be ≤ 0.25°

Perpendicularity Tolerance Met? YES

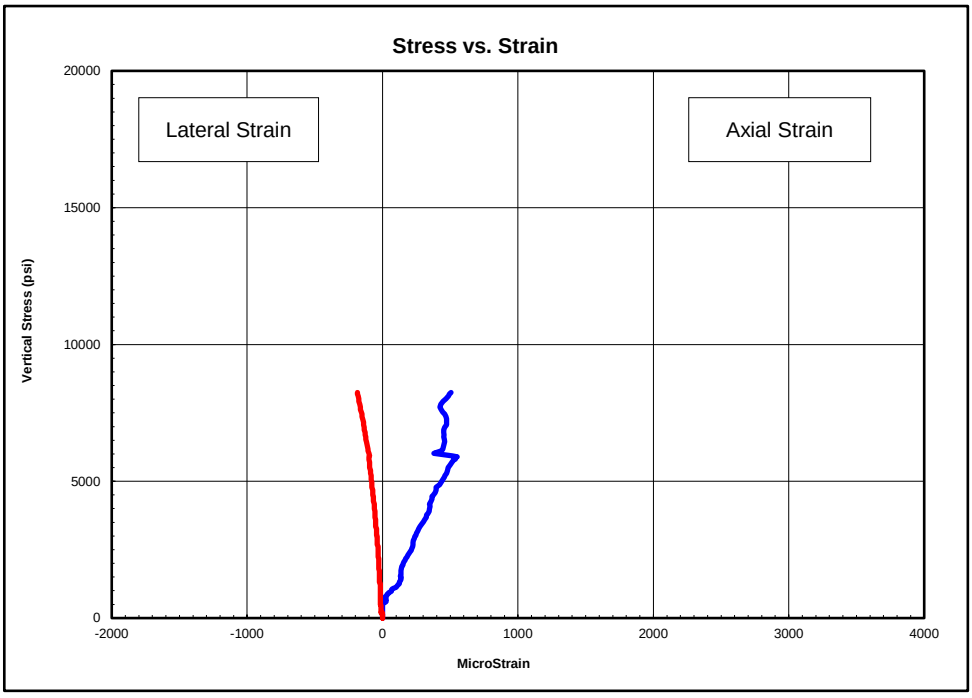
Client:	Haley & Aldrich, Inc.
Project Name:	Souadabscook Center # 1432 and 5950
Project Location:	Hampden, ME
GTX #:	307095
Test Date:	10/6/2017
Tested By:	rlc
Checked By:	jsc
Boring ID:	BB-HSS-110
Sample ID:	R2
Depth, ft:	32.8-33.16

After cutting and grinding

After break

Client:	Haley & Aldrich, Inc.
Project Name:	Souadabscook Center # 1432 and 5950
Project Location:	Hampden, ME
GTX #:	307095
Test Date:	10/6/2017
Tested By:	rlc
Checked By:	jsc
Boring ID:	BB-HSS-111
Sample ID:	R3
Depth, ft:	52.16-52.52
Sample Type:	rock core
Sample Description:	See photographs Discontinuity failure

Compressive Strength and Elastic Moduli of Rock by ASTM D7012 - Method D



Peak Compressive Stress: 8,245 psi

One lateral strain gauge failed to record meaningful data. Poisson's Ratio reported based on results of a single lateral strain gauge.

Stress Range, psi	Young's Modulus, psi	Poisson's Ratio
500-1900	8,200,000	0.09
1900-3200	12,100,000	0.21
3200-4600	11,000,000	---

Notes:
Test specimen tested at the approximate as-received moisture content and at standard laboratory temperature.
The axial load was applied continuously at a stress rate that produced failure in a test time between 2 and 15 minutes.
Young's Modulus and Poisson's Ratio calculated using the tangent to the line in the stress range listed.
Calculations assume samples are isotropic, which is not necessarily the case.

Client:	Haley & Aldrich, Inc.	Test Date:	10/4/2017
Project Name:	Souadabscook Center # 1432 and 5950	Tested By:	rlc
Project Location:	Hampden, ME	Checked By:	jsc
GTX #:	307095		
Boring ID:	BB-HSS-111		
Sample ID:	R3		
Depth:	52.16-52.52 ft		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.24	4.24	4.24
Specimen Diameter, in:	1.99	1.99	1.99
Specimen Mass, g:	592.46		
Bulk Density, lb/ft^3	171	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.1	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:

Is the maximum gap ≤ 0.02 in.? YES

Maximum difference must be < 0.020 in.

Straightness Tolerance Met? YES

END FLATNESS AND PARALLELISM (Procedure FP1)

END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00020	-0.00010	-0.00010	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	-0.00010	0.00000	0.00000
Diameter 2, in (rotated 90°)	-0.00010	-0.00020	-0.00010	-0.00010	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	-0.00010	-0.00010	-0.00010	-0.00010	-0.00010

Difference between max and min readings, in:

0° = 0.00020 90° = 0.00020

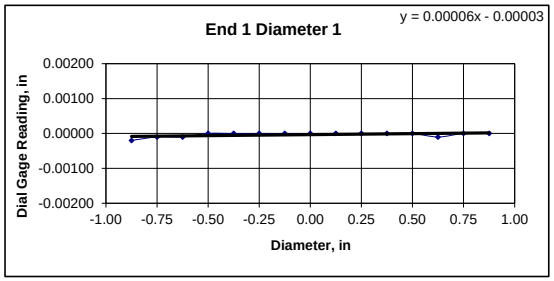
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00000	0.00010	0.00000	0.00000	0.00010	0.00000	0.00000	0.00000	0.00000	0.00000	-0.00010	-0.00010	0.00000	0.00000	-0.00010
Diameter 2, in (rotated 90°)	0.00010	0.00000	0.00000	0.00000	0.00010	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	-0.00010

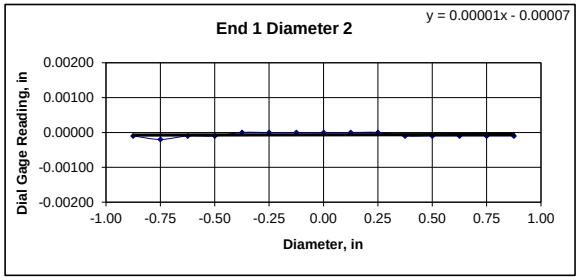
Difference between max and min readings, in:

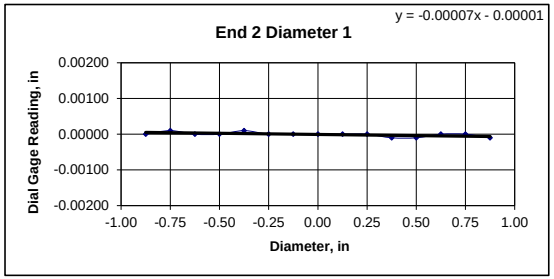
0° = 0.0002 90° = 0.0002

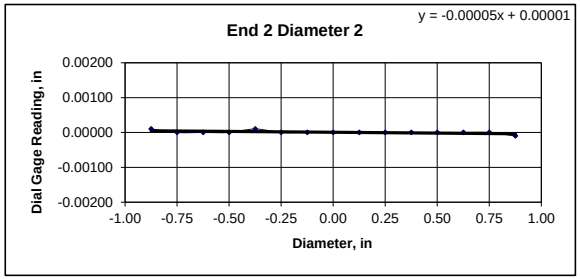
Maximum difference must be < 0.0020 in. Difference = ± 0.00010

Flatness Tolerance Met? YES









DIAMETER 1

End 1:

Slope of Best Fit Line	0.00006
Angle of Best Fit Line:	0.00344

End 2:

Slope of Best Fit Line	0.00007
Angle of Best Fit Line:	0.00401

Maximum Angular Difference: 0.00057

Parallelism Tolerance Met? YES

Spherically Seated

DIAMETER 2

End 1:

Slope of Best Fit Line	0.00001
Angle of Best Fit Line:	0.00057

End 2:

Slope of Best Fit Line	0.00005
Angle of Best Fit Line:	0.00286

Maximum Angular Difference: 0.00229

Parallelism Tolerance Met? YES

Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00020	1.990	0.00010	0.006	YES
Diameter 2, in (rotated 90°)	0.00020	1.990	0.00010	0.006	YES
END 2					
Diameter 1, in	0.00020	1.990	0.00010	0.006	YES
Diameter 2, in (rotated 90°)	0.00020	1.990	0.00010	0.006	YES

Maximum angle of departure must be ≤ 0.25°

Perpendicularity Tolerance Met? YES

Client:	Haley & Aldrich, Inc.
Project Name:	Souadabscook Center # 1432 and 5950
Project Location:	Hampden, ME
GTX #:	307095
Test Date:	10/6/2017
Tested By:	rlc
Checked By:	jsc
Boring ID:	BB-HSS-111
Sample ID:	R3
Depth, ft:	52.16-52.52

After cutting and grinding

After break

APPENDIX D

Historic Drawings

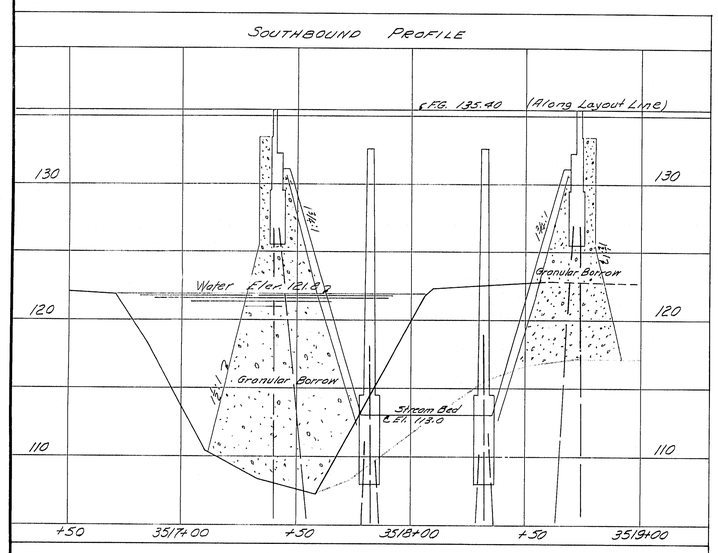
B. P. R. REG. NO.	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
1	MAINE	F.A.P. I-95-7(14)	22	145

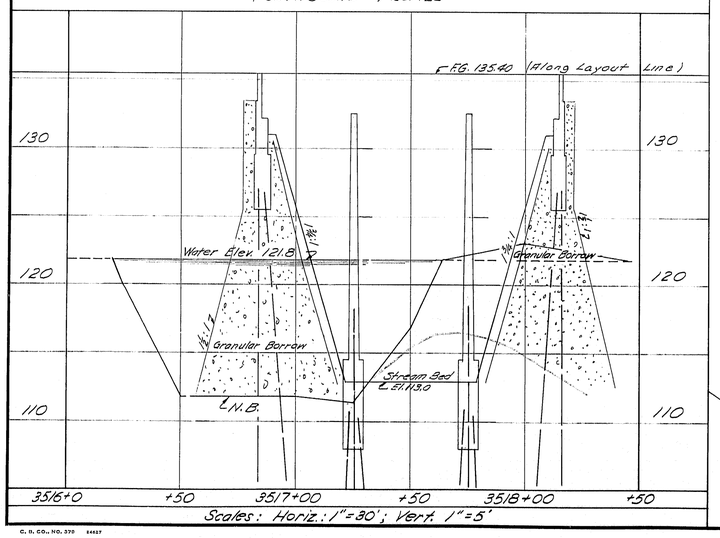
SOUTHBOUND CURVE DATA

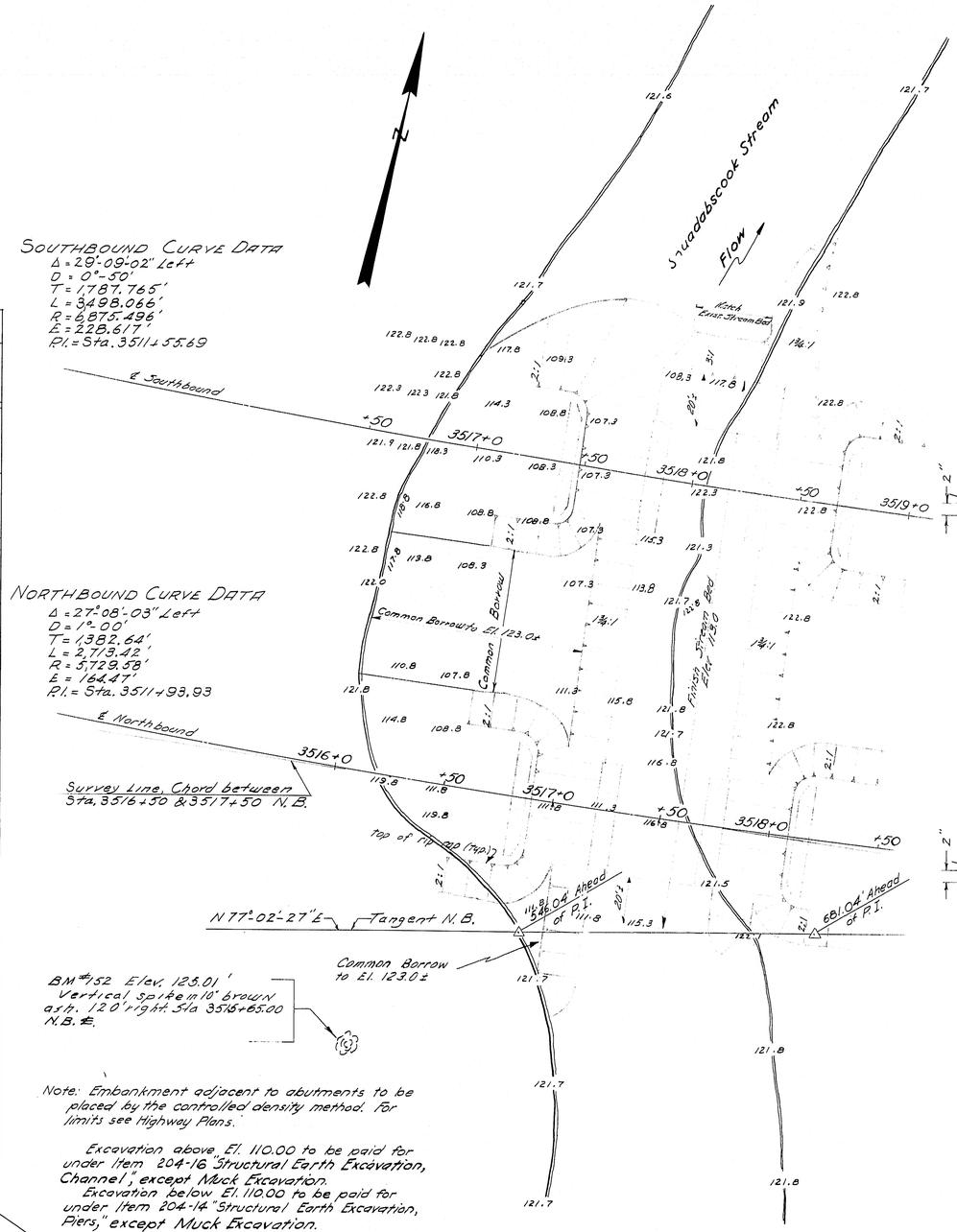
$\Delta = 29^\circ\text{-}09\text{'}\text{-}02''$ Left
$D = 0^\circ\text{-}30'$
$T = 1{,}787.765'$
$L = 3{,}498.066'$
$R = 6{,}875.496'$
$E = 228.617'$
P.I. = Sta. 3511+55.69

NORTHBOUND CURVE DATA

$\Delta = 27^\circ\text{-}08\text{'}\text{-}03''$ Left
$D = 1^\circ\text{-}00'$
$T = 1{,}382.64'$
$L = 2{,}713.42'$
$R = 5{,}729.58'$
$E = 164.47'$
P.I. = Sta. 3511+93.93

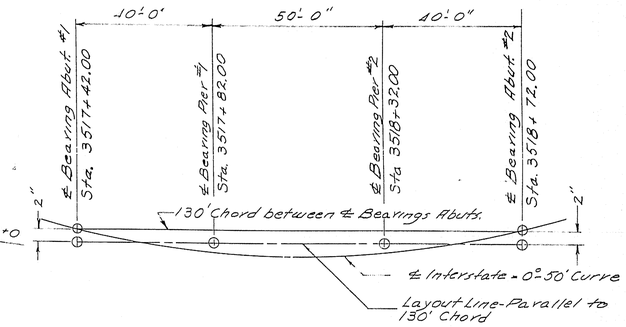




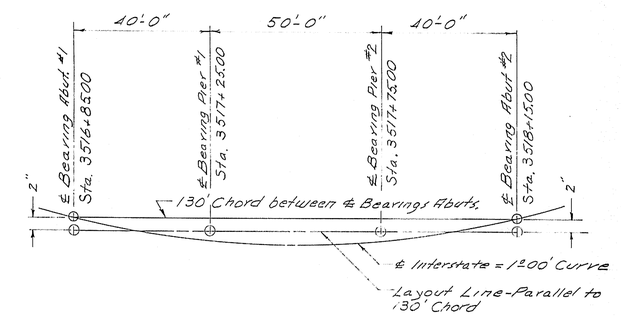


PLAN

Scale: 1" = 30'



LAYOUT PLAN ~ SOUTHBOUND



LAYOUT PLAN ~ NORTHBOUND

Note: Embankment adjacent to abutments to be placed by the controlled density method. For limits see Highway Plans.

Excavation above El. 110.00 to be paid for under Item 204-16 "Structural Earth Excavation, Channel," except Muck Excavation.

Excavation below El. 110.00 to be paid for under Item 204-14 "Structural Earth Excavation, Piers," except Muck Excavation.

Shaded areas indicate approximate location of peat. All this material within the limits of the new work shall be removed and paid for under Item 203-12, "Muck Excavation." Wherever these excavated areas lie within the final embankment they shall be backfilled with Granular Borrow.

See Sh. #5 for "ESTIMATED QUANTITIES"

Work this sheet with sheet "E"

DESIGN– Dority & P. Berrie	BRIDGE NO.
TRACE– Dority & P. Berrie	SURVEY– Blake
CHECK– Mallicoat	PLOT– Dority

STATE HIGHWAY COMMISSION
BRIDGE DIVISION

SOUADABSCOOK STREAM BRIDGE CENTER

IN THE TOWN OF

HAMPDEN
PENOBSCOT COUNTY

SURVEY

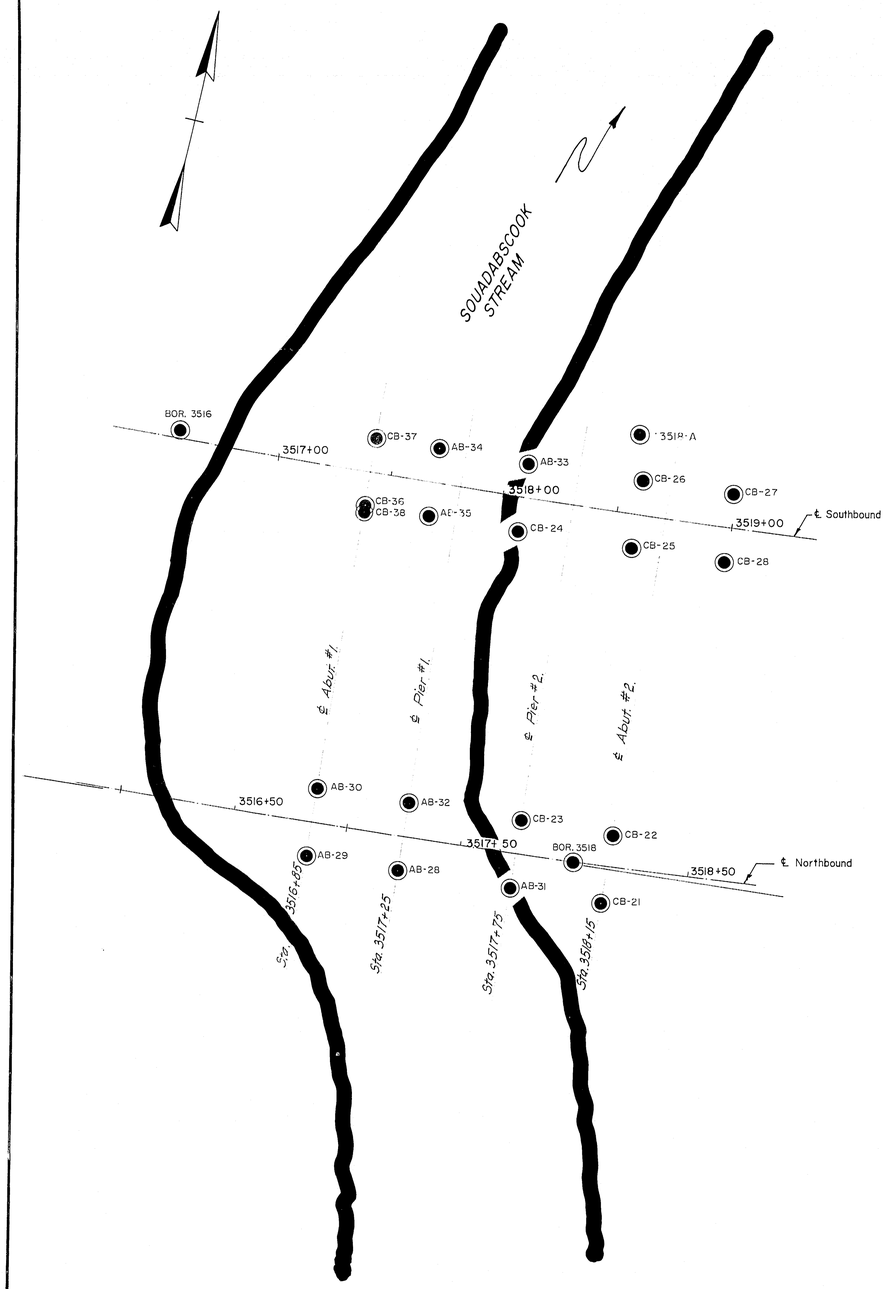
SHEET 1 OF 13 AUGUSTA, MAINE MARCH 1961

M-1514

C. H. CO., NO. 370 64627

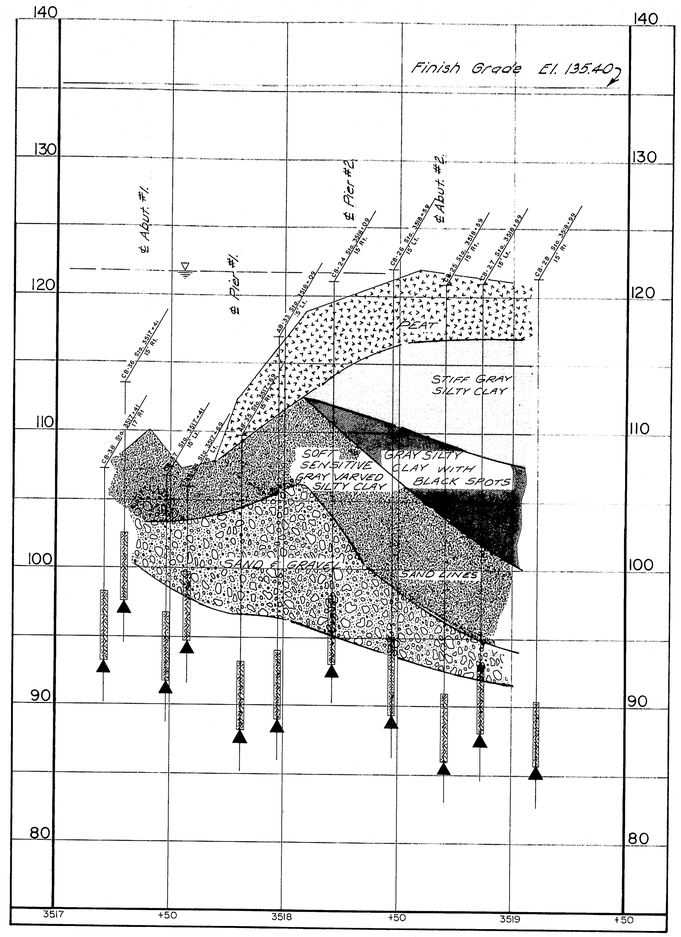
0 1 2 3 4 5 INCHES

B. P. R. REG. NO.	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
1	MAINE	F.A.P. I-95-T(4)	23	145

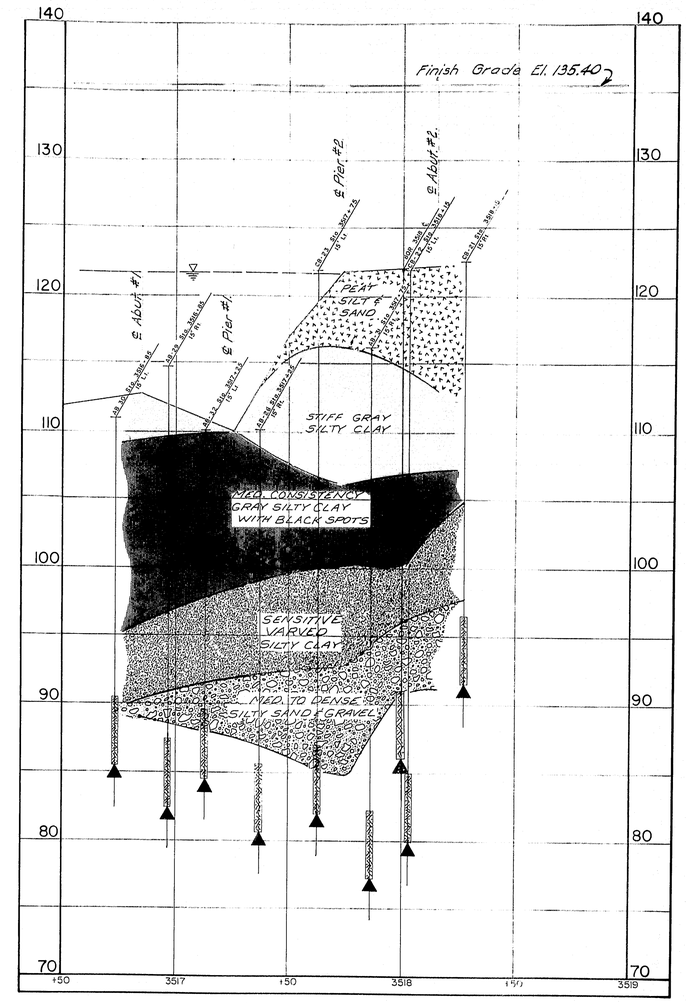


PLAN

SCALE 1" = 30'



℄ SOUTHBOUND PROFILE



℄ NORTHBOUND PROFILE

SCALE: HORIZ. 1" = 30'
VERTICAL 1" = 5'

DESIGN— TRACE— CHECK— } Soils Division

BRIDGE NO. SURVEY— PLOT— F. Boyce

STATE HIGHWAY COMMISSION
BRIDGE DIVISION

SOUADABSCOOK STREAM BRIDGE

CENTER

IN THE TOWN OF

HAMPDEN

PENOBSCOT COUNTY

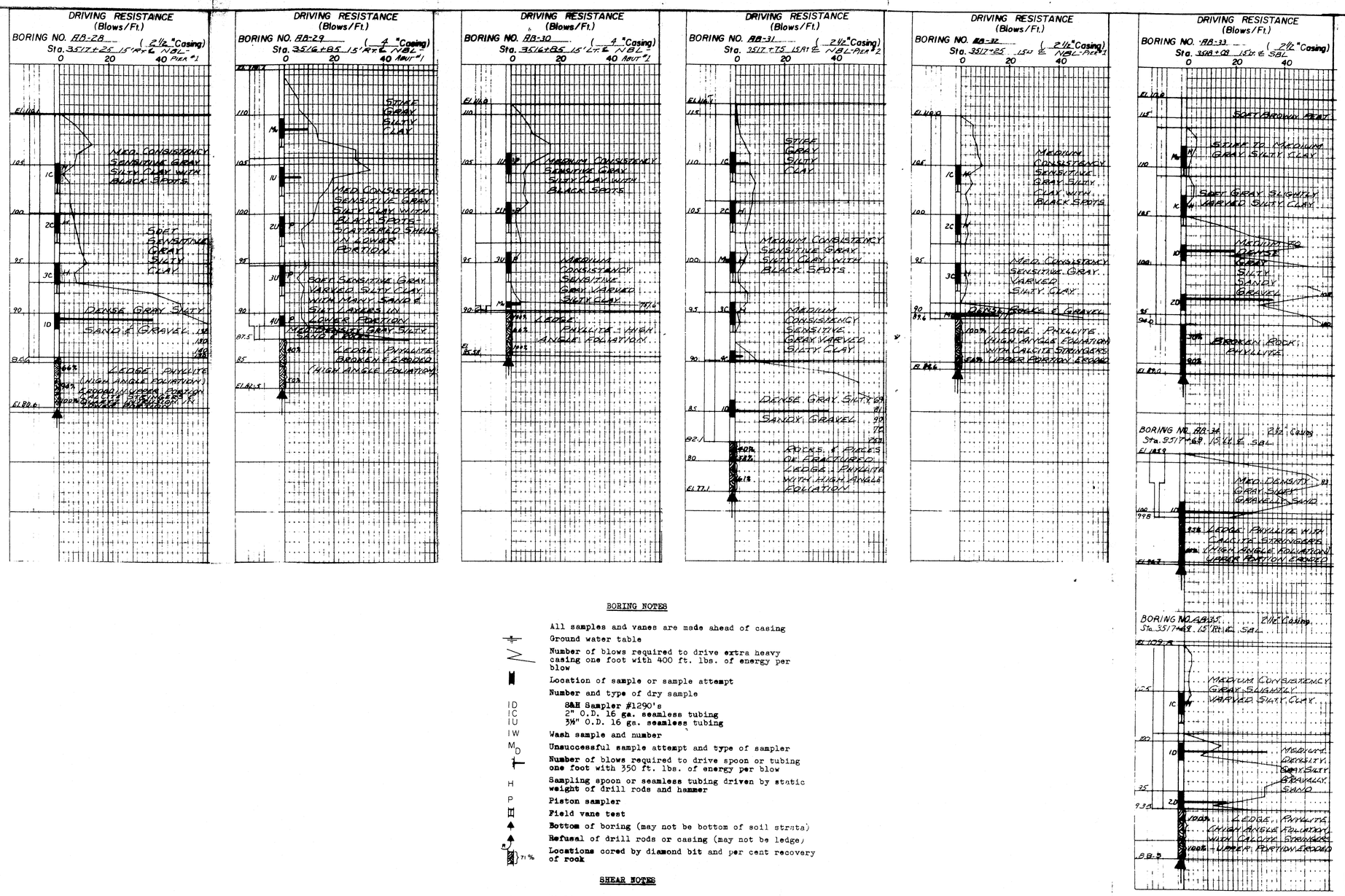
FOUNDATION SURVEY

SHEET 2 OF 13 AUGUSTA, MAINE August 1961

M-1515

K+E 166 IMPERIAL DRAWING CLOTH 7 X 4. D. L. M. INC. 67071

0 1 2 3 4 5 INCHES



P. R. REG. NO.	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
	MAINE	FA-P-[illegible]	24	145

BORING NOTES

All samples and vanes are made ahead of casing

Ground water table

Number of blows required to drive extra heavy casing one foot with 400 ft. lbs. of energy per blow

Location of sample or sample attempt

Number and type of dry sample

- 1D — S&H Sampler #1290's
- 1C — 2" O.D. 16 ga. seamless tubing
- 1U — 3¾" O.D. 16 ga. seamless tubing

1W — Wash sample and number

M_D — Unsuccessful sample attempt and type of sampler

Number of blows required to drive spoon or tubing one foot with 350 ft. lbs. of energy per blow

H — Sampling spoon or seamless tubing driven by static weight of drill rods and hammer

P — Piston sampler

Field vane test

Bottom of boring (may not be bottom of soil strata)

Refusal of drill rods or casing (may not be ledge)

3C 71% — Locations cored by diamond bit and per cent recovery of rock

SHEAR NOTES

● Field vane shear strengths

X Laboratory vane shear strengths

→ Shear strengths in excess of capacity of equipment

○ One half unconfined compressive strengths

WATER CONTENT NOTES

○ Natural water contents, given as per cent of dry weight

⊖---X Plastic and liquid limits

Ignition losses are given as per cent of dry weight

DESIGN TRAFFIC — STRUCTURE DESIGN — Soils Division

BRIDGE NO. SURVEY — PROJECT — F. Boyce

STATE HIGHWAY COMMISSION
BRIDGE DIVISION

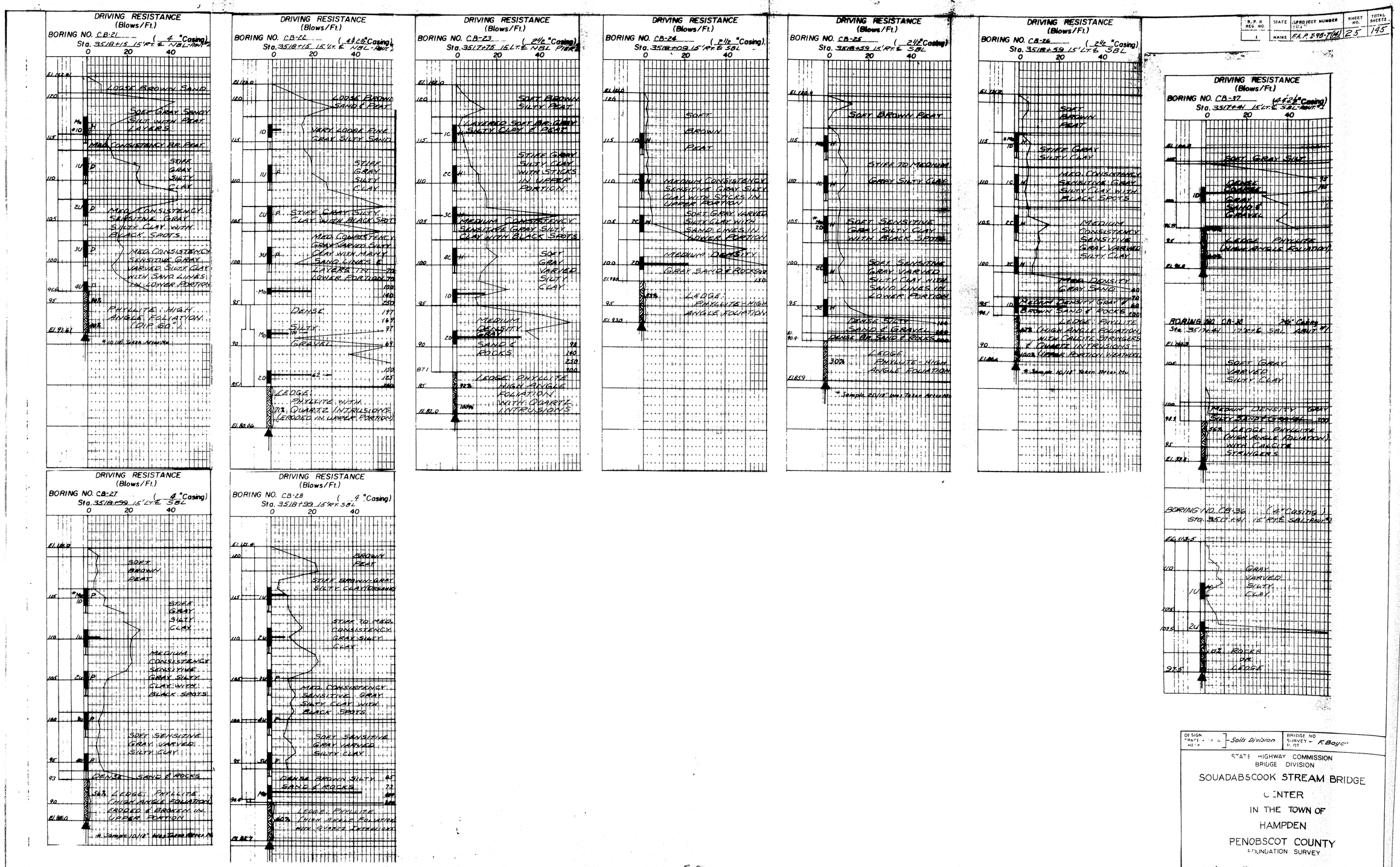
SOUADABSCOOK STREAM BRIDGE
CENTER
IN THE TOWN OF
HAMPDEN
PENOBSCOT COUNTY
BORING DETAILS

SHEET 3 OF 13 AUGUSTA, MAINE August 1961

M-1516

0 1 2 3 4 5 INCHES

B.P.R. REG. NO.	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
1	MAINE	F.A.P. I 95-7(14)	25	145



DESIGN — STATE — FED. AID PROJ. — HIGH. — Soils Division

BRIDGE NO. — SURVEY — F. Boyce — PLOT

STATE HIGHWAY COMMISSION
BRIDGE DIVISION

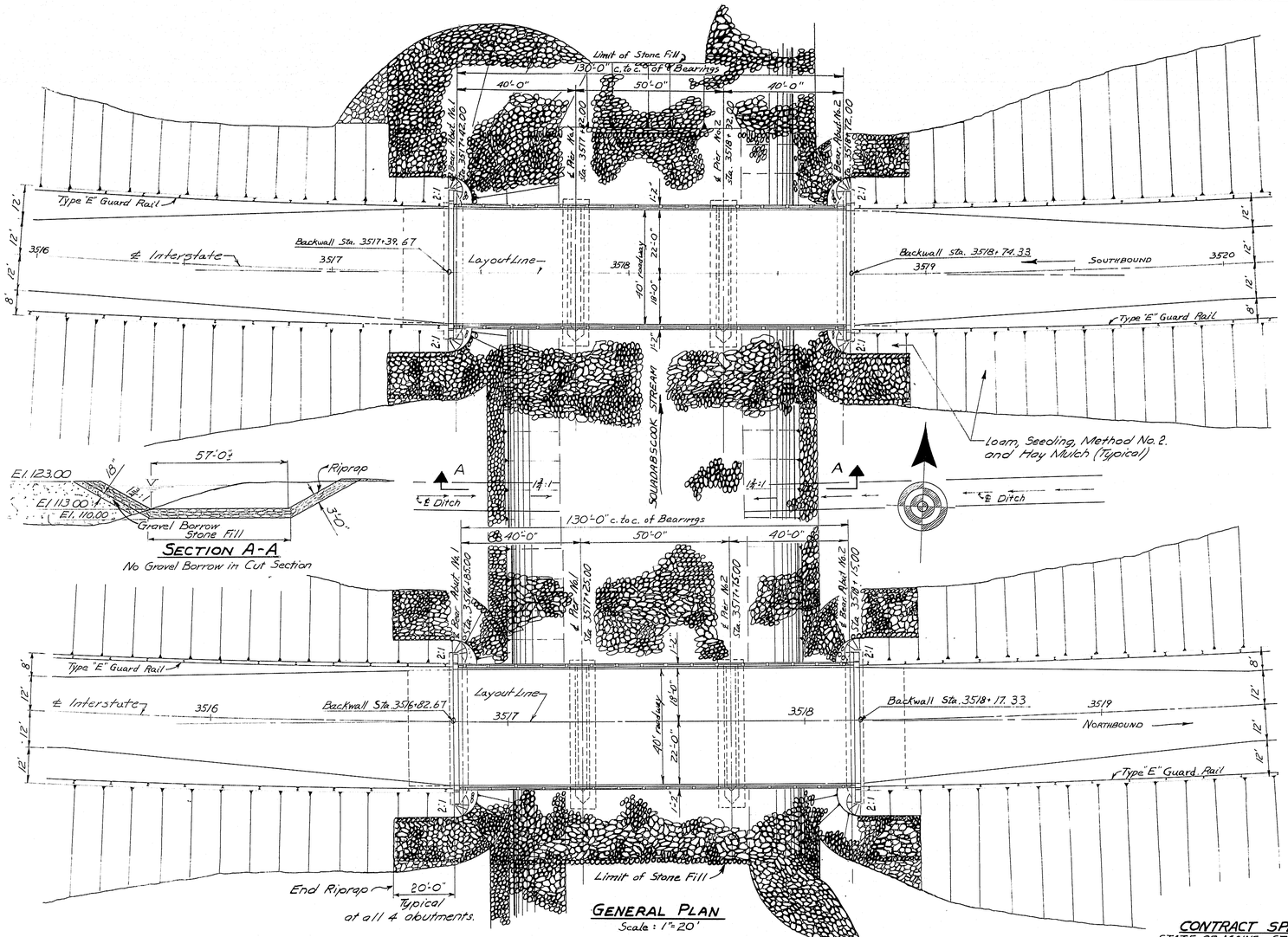
SOUADABSCOOK STREAM BRIDGE
CENTER
IN THE TOWN OF
HAMPDEN
PENOBSCOT COUNTY
FOUNDATION SURVEY

SHEET 4 OF 13 AUGUSTA, MAINE August 1961

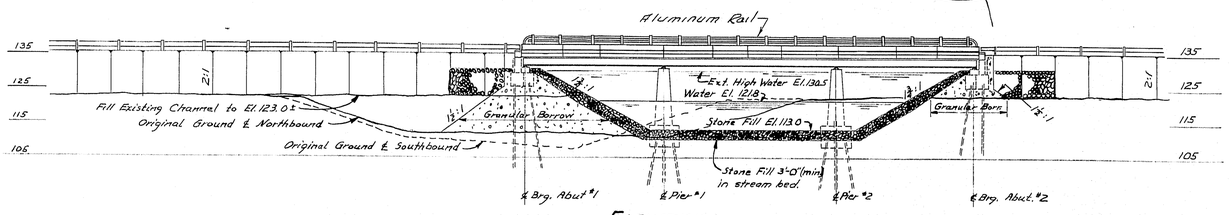
M-149

0 1 2 3 4 5 INCHES

B. P. R. REG. NO.	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
1	MAINE	F.A.P. I-95-7(14)	26	145



GENERAL PLAN
Scale: 1" = 20'



ELEVATION
Scale 1" = 20'

NOTE: Hand Laid Rip-rap above El. 122.00
Plain Rip-rap below El. 122.00

ESTIMATED QUANTITIES

Muck Excavation	6000	C.Y.
Structural Earth Excavation, Piers	180	C.Y.
Structural Earth Excavation, Channel	8000	C.Y.
Common Borrow	100	C.Y.
Granular Borrow	8000	C.Y.
Gravel Borrow	85	C.Y.
Gravel Base Course, In Place Measurement	45	C.Y.
► Bituminous Concrete Surface Course, Type "A"	130	Tons.
Portland Cement Concrete, Abutments and Retaining Walls.	270	C.Y.
Portland Cement Concrete, Piers.	425	C.Y.
Portland Cement Concrete, Piers (Placed under water)	409	C.Y.
Portland Cement Concrete, Roadway and Sidewalk Slabs on Steel Bridges	350	C.Y.
Portland Cement	2160	bbls.
Structural Steel, Fabricated and Delivered	229,500	lbs.
Structural Steel, Erection	229,500	lbs.
Structural Steel, Field Painting	229,500	lbs.
Bronze or Copper-Alloy Bearing and Expansion Plates, Delivered	400	lbs.
Bronze or Copper-Alloy Bearing and Expansion Plates, Placing	400	lbs.
Reinforcing Steel, Delivered	100,600	lbs.
Reinforcing Steel, Placing	100,600	lbs.
Steel H-Beam Piles, 42 lbs/ft.	4411	l.f.
Cofferdams for Piers, Souadabscook Stream Bridge, Center	Lump Sum	
Aluminum Rail	520	l.f.
► Membrane Waterproofing	1170	s.y.
Plain Riprap	1330	c.y.
Hand Laid Riprap	800	c.y.
Stone Fill	1490	c.y.

► Not part of this Contract.

CONTRACT SPECIFICATIONS
STATE OF MAINE, STATE HIGHWAY COMMISSION
STANDARD SPECIFICATIONS, REVISION OF JANUARY, 1956

DESIGN SPECIFICATIONS
A.A.S.H.O. STANDARD SPECIFICATIONS
FOR HIGHWAY BRIDGES 1957 and SUBSEQUENT REVISIONS

LOADING
H20-S16-44 AS MODIFIED FOR
INTERSTATE HIGHWAYS

TRAFFIC
A.D.T. 1960 7390
A.D.T. 1980 10310
D.H.V. 1235
D. 60
T. 11
V. 60

f_s = 18000 p.s.i. Str. Steel
f_s = 20000 p.s.i. Rein. Steel
f_c = 1200 p.s.i.
n = 10

CONCRETE CLASSIFICATION
CLASS "A" ABUTMENTS, SUPERSTRUCTURE & APPROACH SLABS
CLASS "B" PIER SHAFTS
CLASS "S" PIER FOOTINGS

(Note: Approach Slabs not part of this contract)

DESIGN– G. Barnes
TRACE– [illegible]
CHECK– Mollicone

BRIDGE NO.
SURVEY–
PLOT–

STATE HIGHWAY COMMISSION
BRIDGE DIVISION

SOUADABSCOOK STREAM BRIDGE CENTER

IN THE TOWN OF

HAMPDEN
PENOBSCOT COUNTY

GENERAL PLAN

SHEET 5 OF 13 AUGUSTA, MAINE JULY 1961

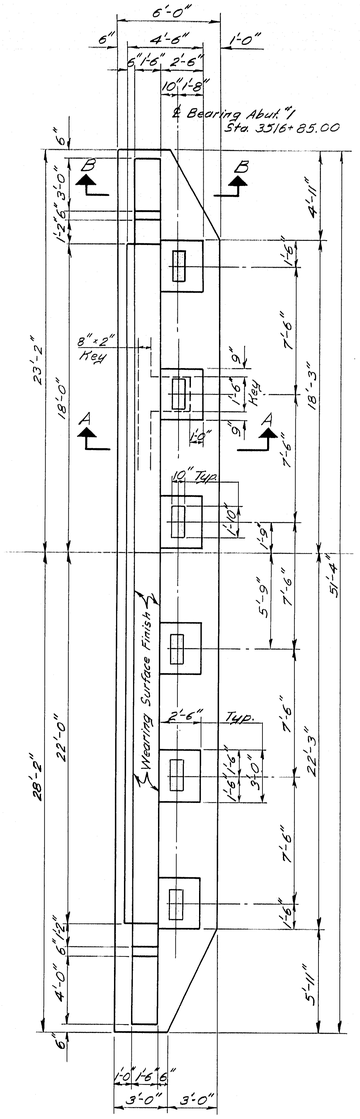
M-1518

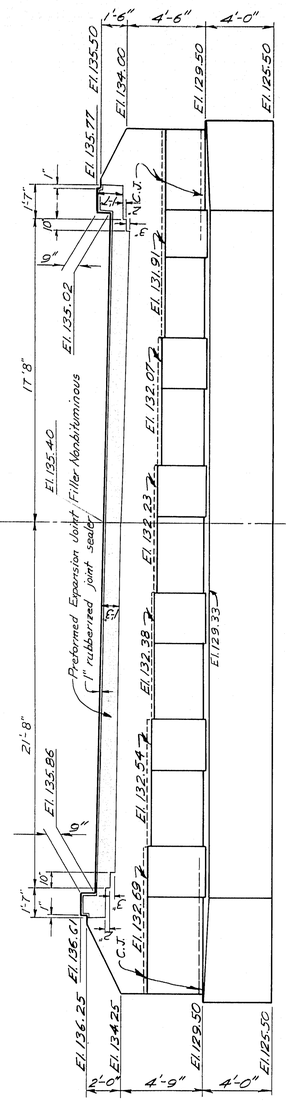
C. H. CO., NO. 379 84487

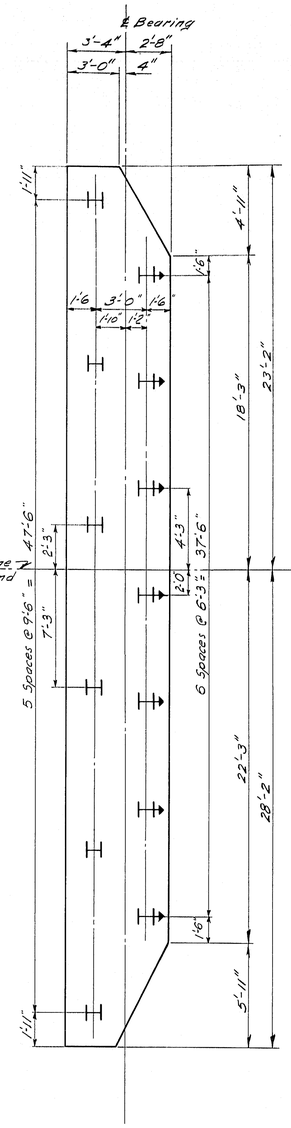
0 1 2 3 4 5 INCHES

B. P. R. REG. NO.	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
1	MAINE	F.A.P. I-95-7(14)	2-7	145

NORTHBOUND ABUTMENT NO. 1

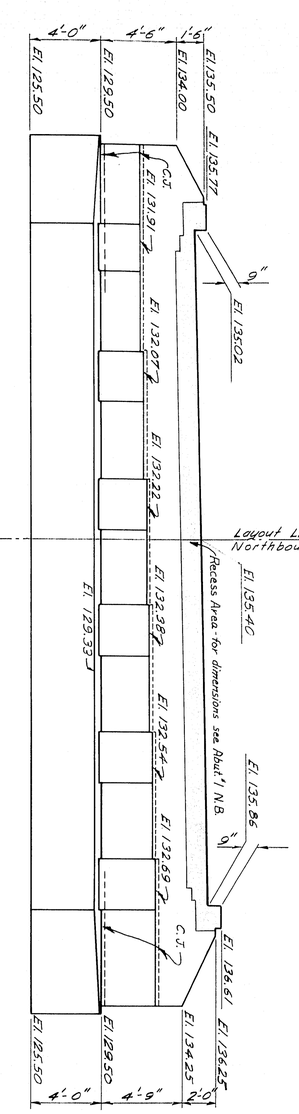


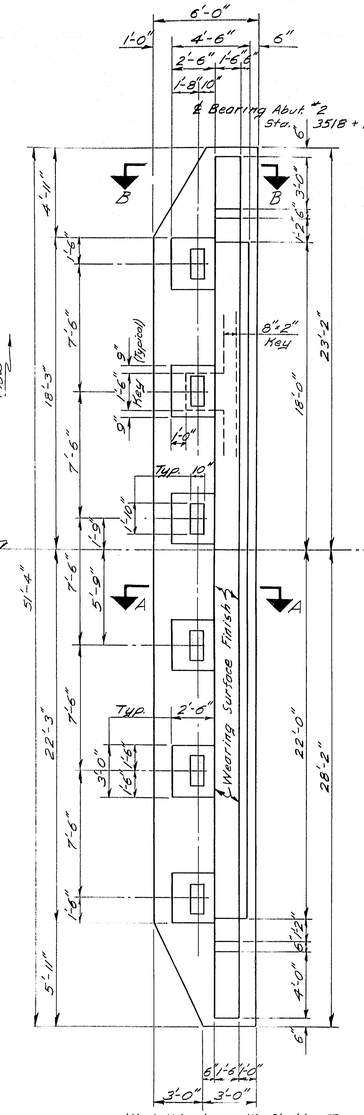




NOTES: 10x10x42# Steel H Bearing Piles driven to ledge or practical refusal.
13 Required Abut. No. 1 - Est. Length 45'
13 Required Abut. No. 2 - Est. Length - 7 @ 45' and 6 @ 40'
Allowable load 37 tons per pile.
Piles shown thus: ⊢⊣ to be battered 2" per foot in the direction of the arrow.
For Pile Cap Details See Sh. # 7.

NORTHBOUND ABUTMENT NO. 2





For footing plan, showing piles, see Abutment #1 Northbound.

Work this sheet with Sh. No. 7.

NOTES:

For Sections A-A & B-B, Reinforcing Steel, & General Notes see sheet # 7 Abutment #1 Southbound.

DESIGN– T.H.K.
TRACE– R.L.J.
CHECK– Coffin

BRIDGE NO.
SURVEY–
PLOT–

STATE HIGHWAY COMMISSION
BRIDGE DIVISION

SOUADABSCOOK STREAM BRIDGE CENTER

IN THE TOWN OF

HAMPDEN

PENOBSCOT COUNTY

ABUT. 1 & 2 N.B.

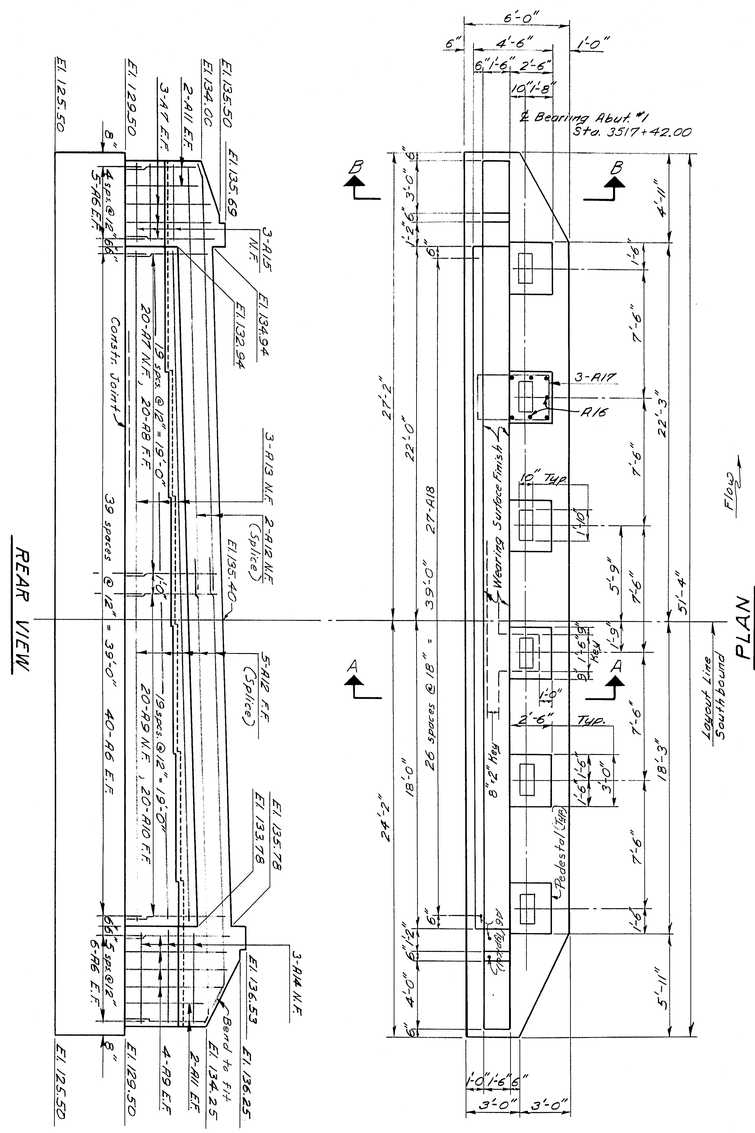
SHEET 6 OF 13 AUGUSTA, MAINE JULY 1961

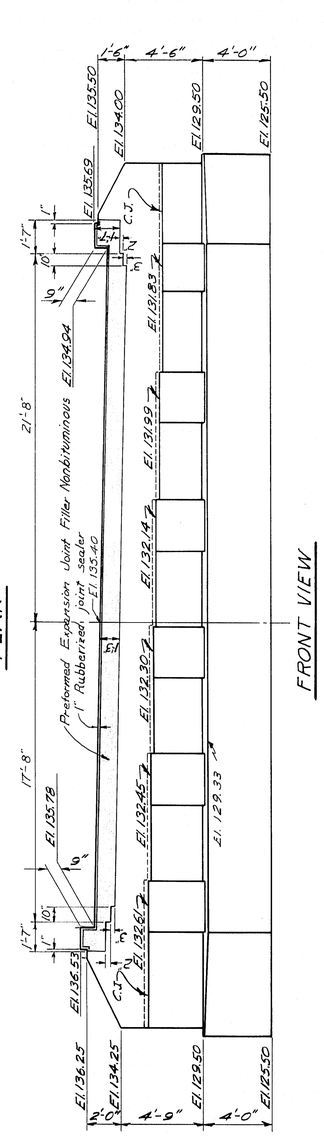
M-1519

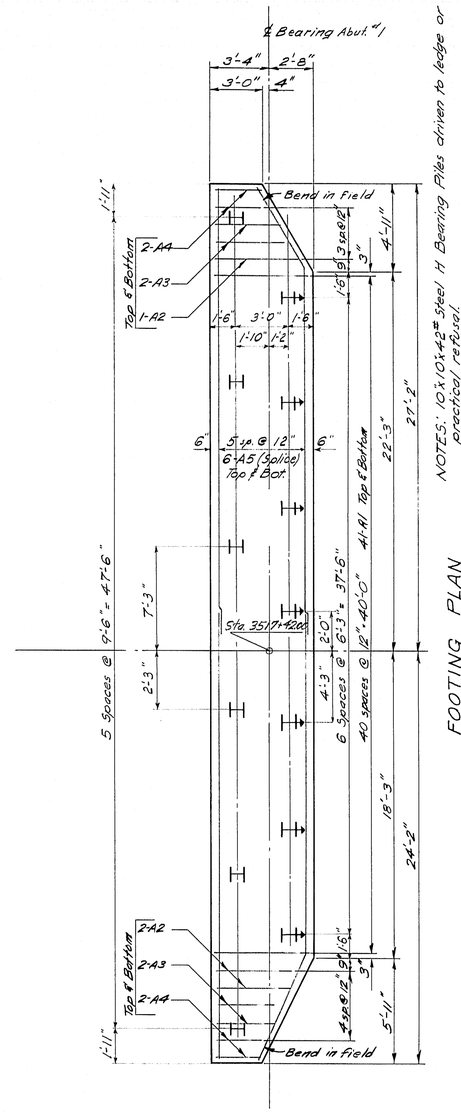
C. B. CO., NO. 378 34657

0 1 2 3 4 5 INCHES

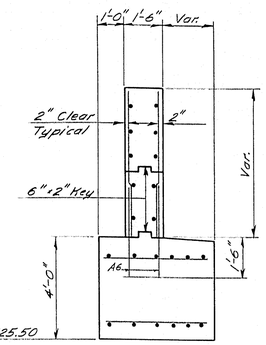
B. P. R. REG. NO.	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
1	MAINE	F.A.P.I-95-7(14)	28	195



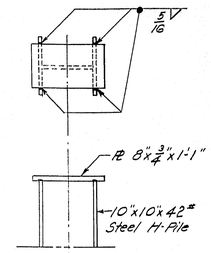




NOTES: 10"x10"x42# Steel H Bearing Piles driven to ledge or practical refusal.
13 Required Abut. No. 1. - Est. Length 35'.
13 Required Abut. No. 2. - Est. Length 40'.
Allowable load 37 tons per pile.
Piles shown thus: H to be battered 2" per foot in the direction of the arrow.

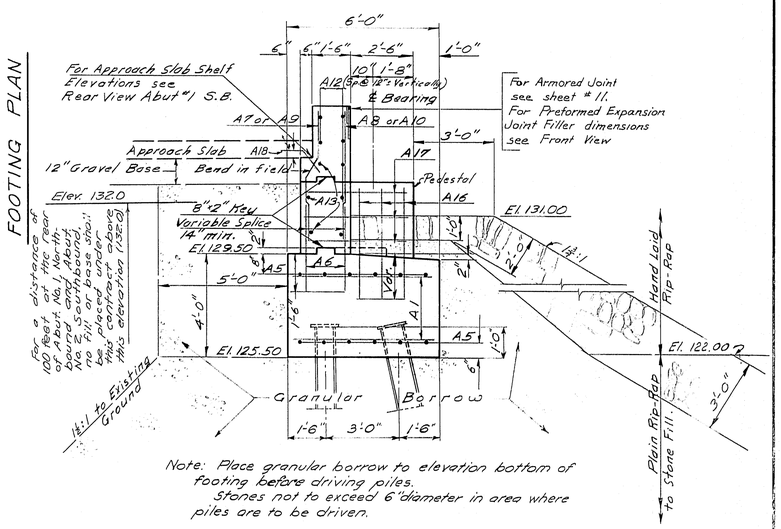


SECTION B-B



PILE CAP DETAIL

13 - Required Abut. No. 1. N.B.
13 - " Abut. No. 2. N.B.
13 - " Abut. No. 1. S.B.
13 - " Abut. No. 2. S.B.



Note: Place granular borrow to elevation bottom of footing before driving piles.
Stones not to exceed 6" diameter in area where piles are to be driven.

SECTION A-A

N.B. = Northbound
S.B. = Southbound

N.F. = Near Face
F.F. = Far Face
E.F. = Each Face

GENERAL NOTES

Concrete in backwall and bridge seat pedestals to be placed integrally.

Dress shaded bearing areas to dimensions & exact elevations shown.

All reinforcing steel to be 2" clear uless otherwise shown.

REINFORCING STEEL & SECTIONS A-A & B-B ARE TYPICAL FOR ALL FOUR ABUTMENTS.

Work this sheet with Sh. No. 6.

DESIGN– T.H.K.
TRACE– K.Cole
CHECK– Coffin
BRIDGE NO.
SURVEY–
PLOT–

STATE HIGHWAY COMMISSION
BRIDGE DIVISION

SOUADABSCOOK STREAM BRIDGE CENTER

IN THE TOWN OF

HAMPDEN
PENOBSCOT COUNTY

ABUT. 1 S.B.

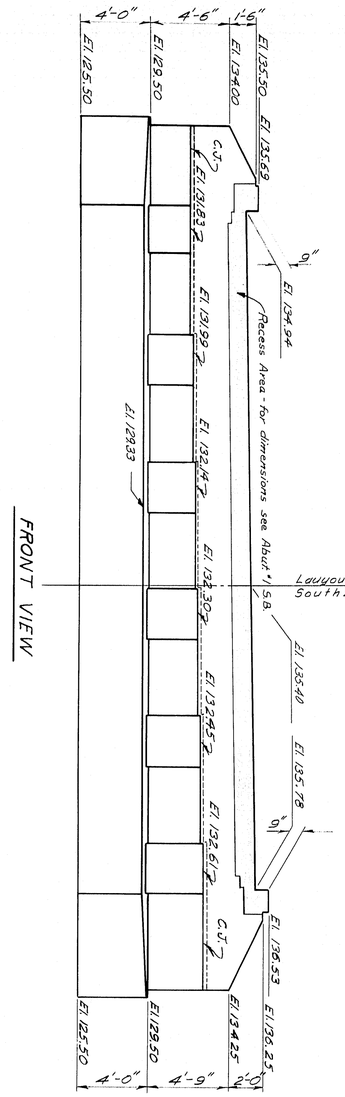
SHEET 7 OF 13 AUGUSTA, MAINE JULY 1961

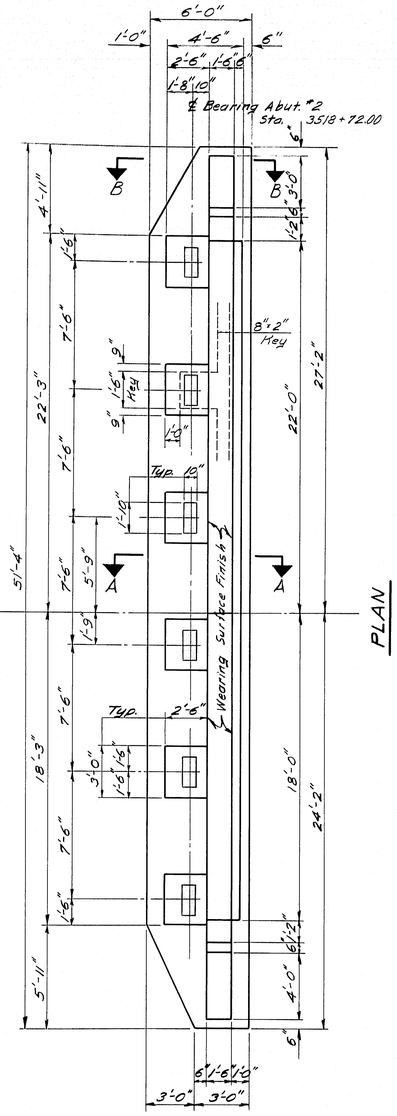
M-[redacted] 1520

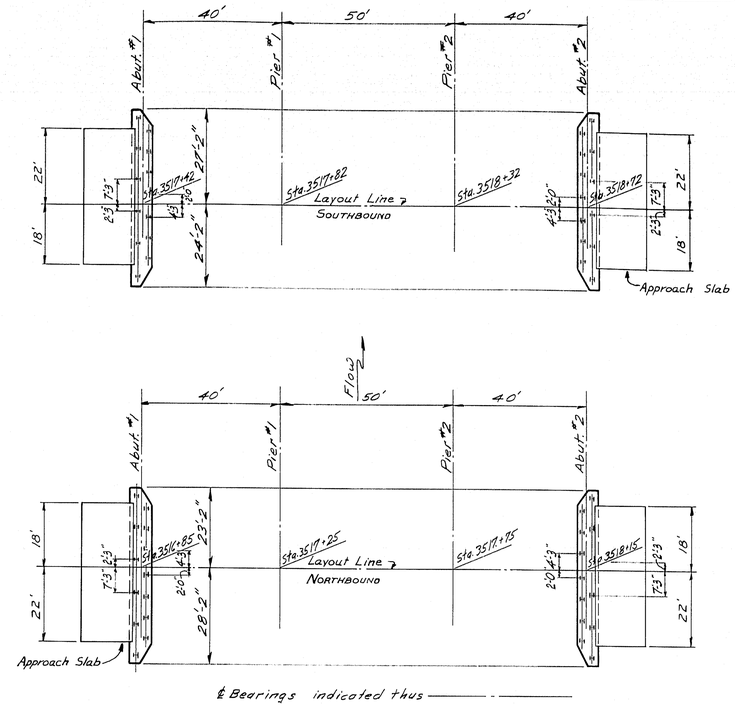
C. D. CO., NO. 379 84687

0 1 2 3 4 5 INCHES

B. P. R. REG. NO.	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
1	MAINE	F.A.P. I-95-7(14)	29	145







GENERAL LAYOUT

For: Sections A-A & B-B,
Reinforcing Steel,
Footing Plan, showing Piles
& General Notes
See Sheet #7 Abutment #1 S.B.

Work this Sheet with Sh. No. 6 & 7

DESIGN– T.H.K.	BRIDGE NO.
TRACE– R.W.P.	SURVEY–
CHECK–	PLOT–

STATE HIGHWAY COMMISSION
BRIDGE DIVISION

SOUADABSCOOK STREAM BRIDGE CENTER

IN THE TOWN OF

HAMPDEN

PENOBSCOT COUNTY

ABUT. 2 S.B.

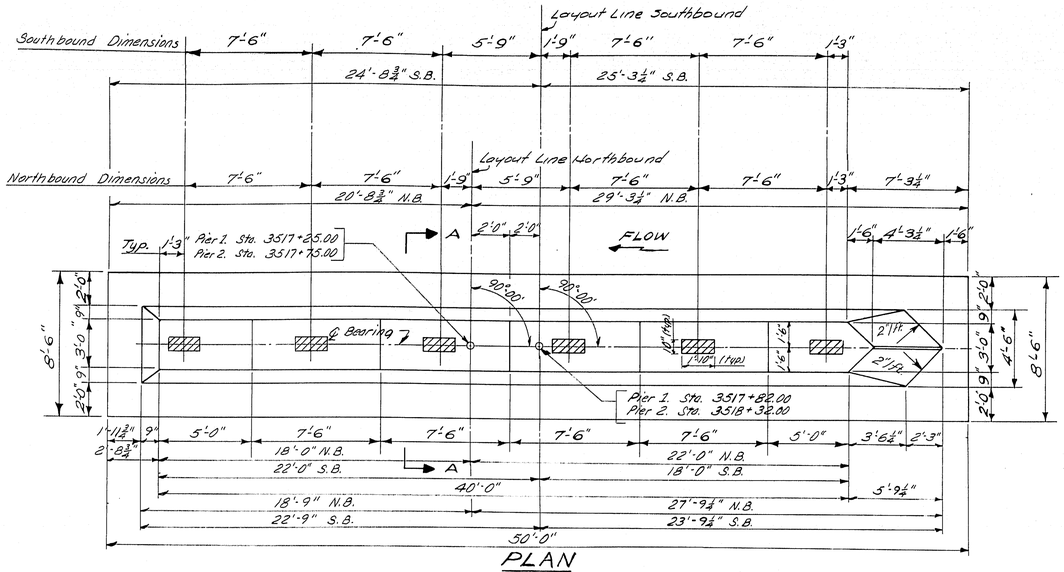
SHEET 8 OF 13 AUGUSTA, MAINE JULY 1961

M-1521

C. B. CO., NO. 379 FABST

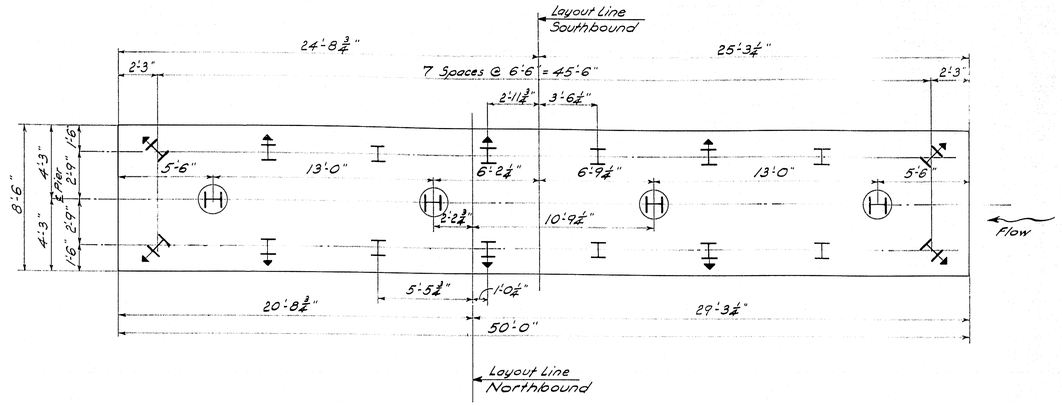
0 1 2 3 4 5 INCHES

B. P. R. REG. NO.	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
1	MAINE	F.A.P. I-95-7(14)	30	195



PLAN

NOTE: Dimensions in "PLAN" are to control elevation shown in SECTION A-A. Dress shaded bearing areas to exact dimensions and elevations shown.



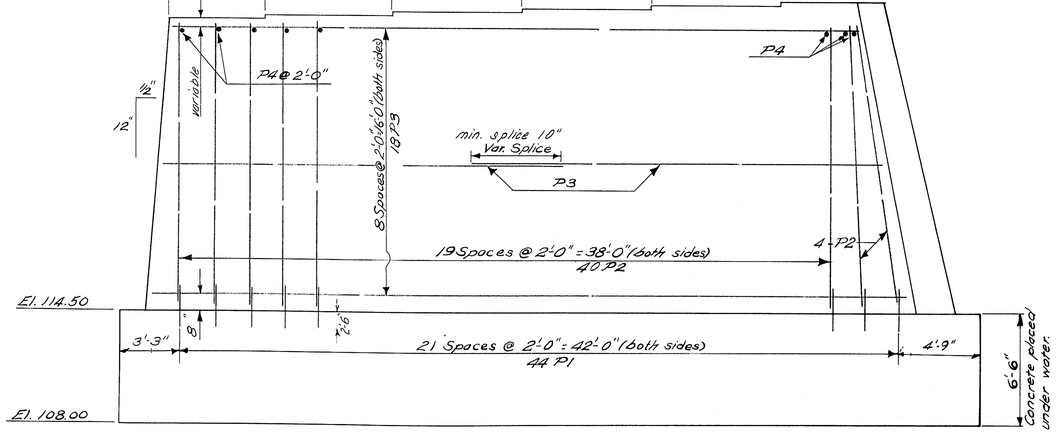
FOOTING PLAN

NOTES: 10"x10"x42# Steel Bearing Piles driven to ledge or practical refusal.
PILES REQUIRED –
N.B. Pier #1 - 4 piles 35' long, 8 piles 30' long and 8 piles 25' long.
" Pier #2 - 4 piles 40' long, 8 piles 30' long and 8 piles 25' long.
S.B. Pier #1 - 4 piles 30' long, 8 piles 25' long and 8 piles 15' long.
" Pier #2 - 4 piles 30' long and 16 piles 25' long.

Allowable load - 37 tons per pile.
Piles shown thus ⊢⊣ to be battered 2" per foot in the direction shown by the arrow.
Piles shown thus Ⓗ to extend into pier shaft as shown in SECTION A-A.

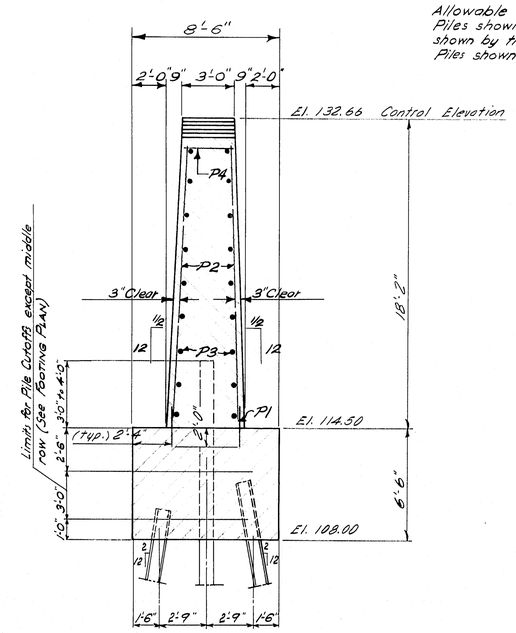
South bound Structure	Pier No 1	Elev. 131.63	Elev. 131.79	Elev. 131.94	Elev. 132.10	Elev. 132.25	Elev. 132.41
	Pier No. 2	Elev. 131.80	Elev. 131.96	Elev. 132.11	Elev. 132.27	Elev. 132.42	Elev. 132.58
North bound Structure	Pier No. 2	Elev. 131.88	Elev. 132.04	Elev. 132.19	Elev. 132.35	Elev. 132.51	Elev. 132.66
	Pier No. 1	Elev. 131.71	Elev. 131.87	Elev. 132.02	Elev. 132.18	Elev. 132.34	Elev. 132.49

Elevation Bearing Areas

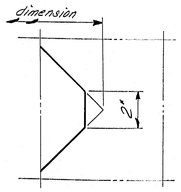


ELEVATION

Note: N. B. = North bound
S. B. = South bound



SECTION A-A



PIER NOSE DETAIL

DESIGN– T.H.K. Detail W.J.M.
TRACE– W.J.M.
CHECK–

BRIDGE NO.
SURVEY–
PLOT–

STATE HIGHWAY COMMISSION
BRIDGE DIVISION

SOUADABSCOOK STREAM BRIDGE CENTER

IN THE TOWN OF

HAMPDEN

PENOBSCOT COUNTY

PIERS 1 & 2 - N.B. & S.B.

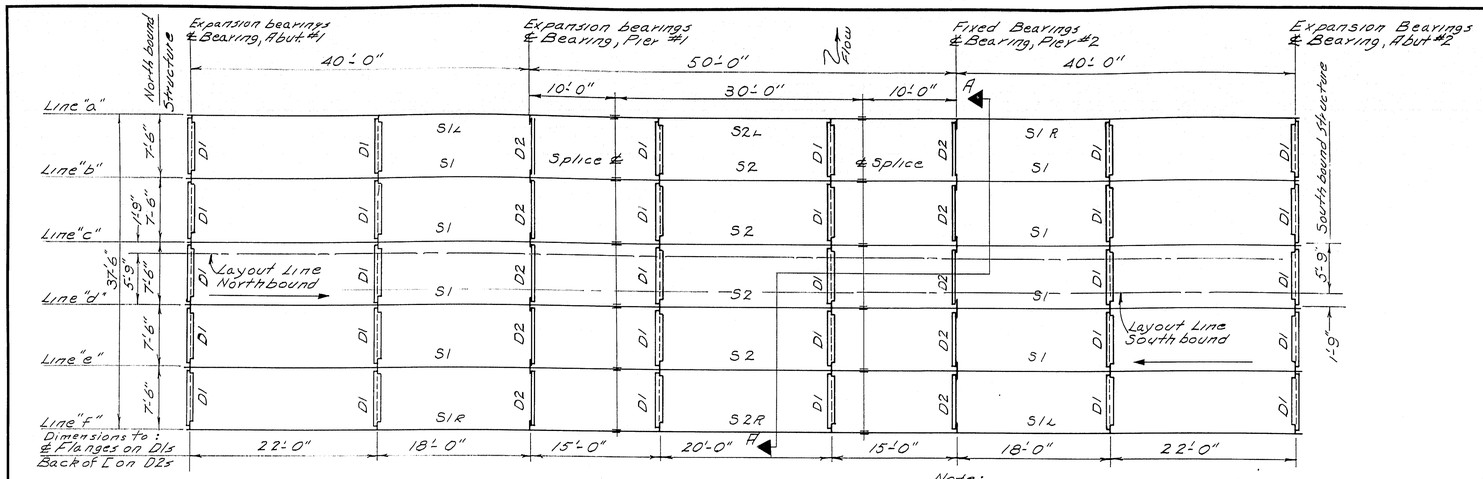
SHEET 9 OF 13 AUGUSTA, MAINE JULY 1961

M-1522

C. B. CO., NO. 370 84687

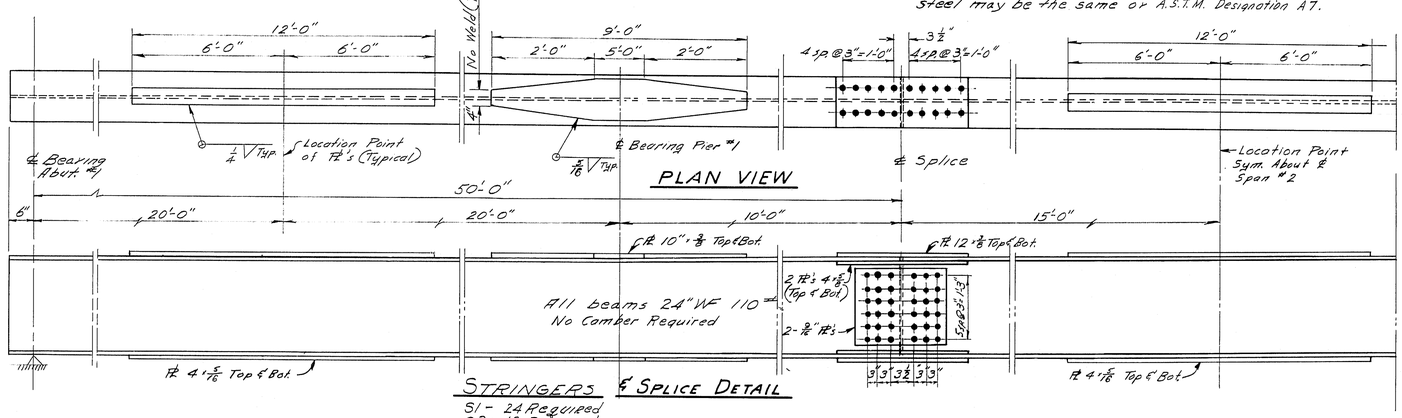
0 1 2 3 4 5 INCHES

B. P. R. REG. NO.	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
1	MAINE	F.A.P. I-95-7(14)	31	145



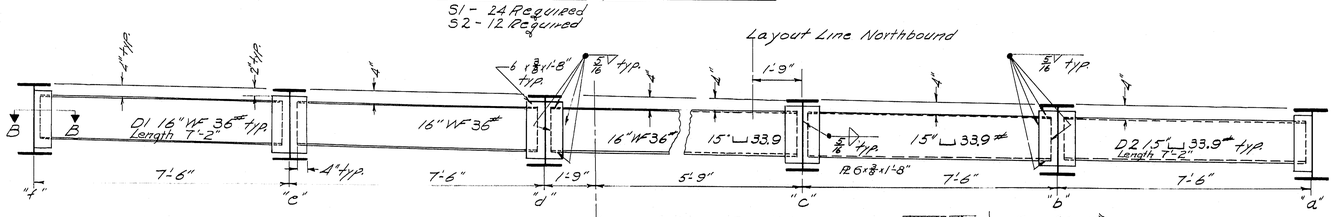
ERECTION DIAGRAM

Note: Steel for beams & cover plates shall be structural weldable steel ASTM Designation A373. All other steel may be the same or A.S.T.M. Designation A7.



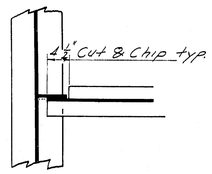
STRINGERS ℄ SPLICE DETAIL

S1 - 24 Required
S2 - 12 Required

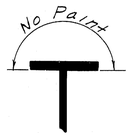


SECTION A-A

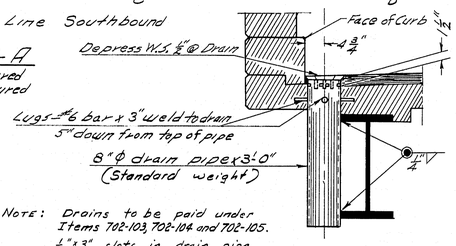
D1 - 60 Required
D2 - 20 Required



SECTION B-B



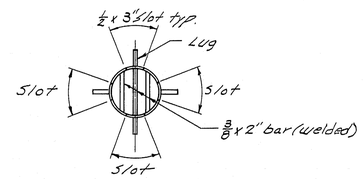
TYPICAL FOR 24" WF & 16" WF



Note: Drains to be paid under Items 702-103, 702-104 and 702-105. ½" × 3" slots in drain pipe must be cleared of concrete and membrane waterproofing.

DRAIN DETAIL

12 Required



PLAN VIEW OF DRAIN

Note: See sheet No. 12 for location of drains

NORTHBOUND STRUCTURE

ELEV. — BOTTOM OF ROADWAY SLAB

POINT = DISTANCE FROM ℄ BEARING ABUTS.

Point	Line "a"	Line "b"	Line "c"	Line "d"	Line "e"	Line "f"	
℄ brg.	134.34	134.50	134.65	134.81	134.97	135.12	℄ Bearing Abuts.
+10	134.35	134.51	134.66	134.82	134.98	135.13	
+20	134.36	134.52	134.67	134.83	134.99	135.14	
+30	134.35	134.51	134.66	134.82	134.97	135.13	
+40	134.34	134.50	134.65	134.81	134.97	135.12	℄ Bearing Piers
+50	134.35	134.51	134.66	134.82	134.98	135.13	
+60	134.36	134.52	134.68	134.83	134.99	135.14	
+65	134.37	134.52	134.68	134.84	134.99	135.15	℄ Span #2

Note: The line designated by the letter "a" is the down stream line of stringers on both North & Southbound Structures (See "Erection Diagram")

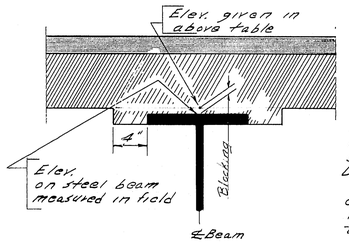
SOUTHBOUND STRUCTURE

ELEV. — BOTTOM OF ROADWAY SLAB

POINT = DISTANCE FROM ℄ BEARING ABUTS.

Point	Line "a"	Line "b"	Line "c"	Line "d"	Line "e"	Line "f"	
℄ brg.	134.26	134.42	134.57	134.73	134.88	135.04	℄ Bearing Abuts.
+10	134.27	134.43	134.58	134.74	134.89	135.05	
+20	134.28	134.44	134.59	134.75	134.90	135.06	
+30	134.27	134.42	134.58	134.74	134.89	135.05	
+40	134.26	134.42	134.57	134.73	134.88	135.04	℄ Bearing Piers
+50	134.27	134.43	134.58	134.74	134.89	135.05	
+60	134.28	134.44	134.59	134.75	134.91	135.06	
+65	134.28	134.44	134.59	134.75	134.91	135.06	℄ Span #2

Note: In order to compensate for the dead load deflection and any irregularities in the rolling of the steel, elevations will be taken at the above points after the erection of the steel, but before any forms have been constructed. These elevations will be subtracted from elevations given in the tables and the results will be the blocking. See blocking detail.



BLOCKING DETAIL

Blocking over ℄ Bearings for all beams is 1" to top of WF beam.

Note: Steel for beams and cover plates shall conform to A.S.T.M. Designation A-373. Other steel members shall conform to A.S.T.M. Designation A-373 or A7.

No paint required where steel is in contact with concrete.

Field connections to be ⅞" ϕ rivets or ⅞" ϕ high tensile strength bolts.

DESIGN- [illegible]
TRACE- [illegible]
CHECK- [illegible]

BRIDGE NO.
SURVEY-
PLOT-

STATE HIGHWAY COMMISSION
BRIDGE DIVISION

SOUADABSCOOK STREAM BRIDGE CENTER

IN THE TOWN OF

HAMPDEN

PENOBSCOT COUNTY

STRUCTURAL STEEL

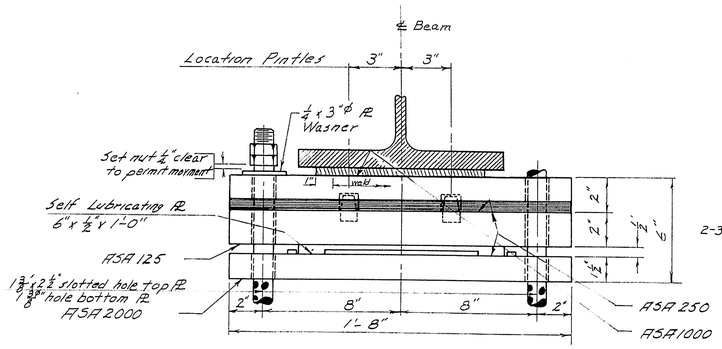
SHEET 10 OF 13 AUGUSTA, MAINE JULY 1961

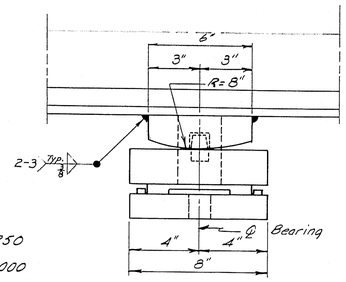
M-1523

G. H. CO., NO. 370 24637

0 1 2 3 4 5 INCHES

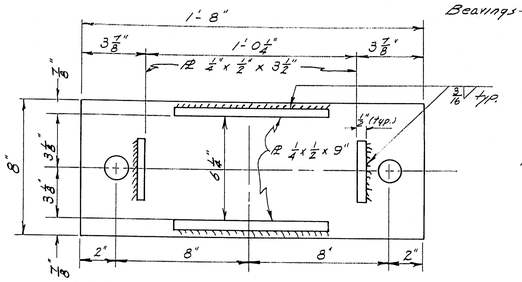
B. P. R. REG. NO.	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
1	MAINE	F.A.P. I-95-7(14)	32	195



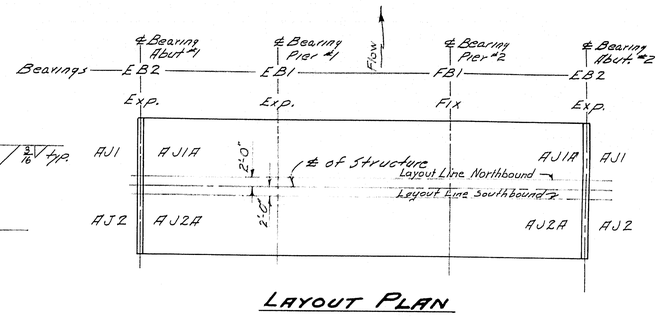


EXPANSION BEARING EB1

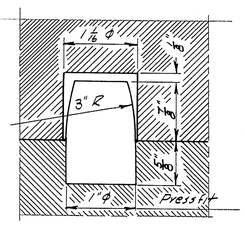
12 - Required



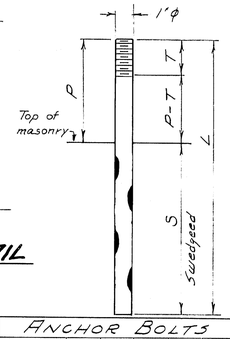
MASONRY PLATE FOR EB1 & EB2



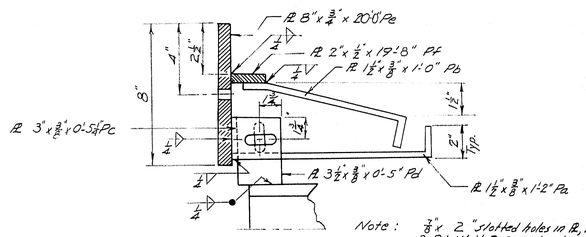
LAYOUT PLAN



PINTLE DETAIL

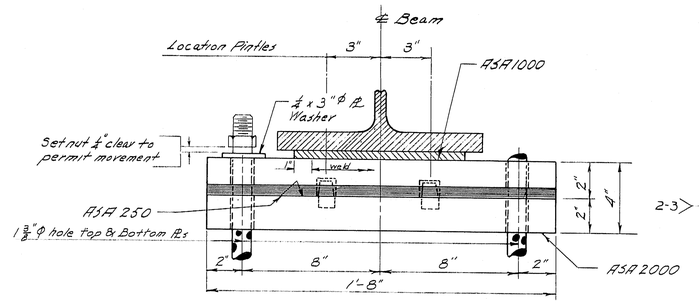


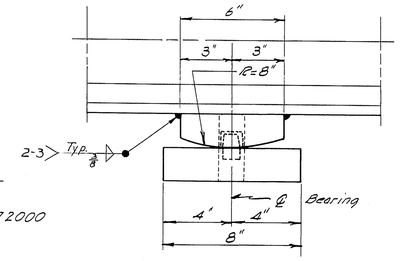
ANCHOR BOLTS						
Bearing	P	T	P-T	S	L	Reqd
EB1	8⅜"	2⅞"	6"	10"	1'-6⅞"	24
EB2	6⅞"	2⅞"	4"	10"	1'-4⅞"	48
FB1	6"	2"	4"	10"	1'-4"	24



Note: ⅜" x 2" slotted holes in PL Pc, Pd & Pd. Weld Pc & Pd together when joint is positioned. Omit PL's Pc & Pd from AJ1A & AJ2

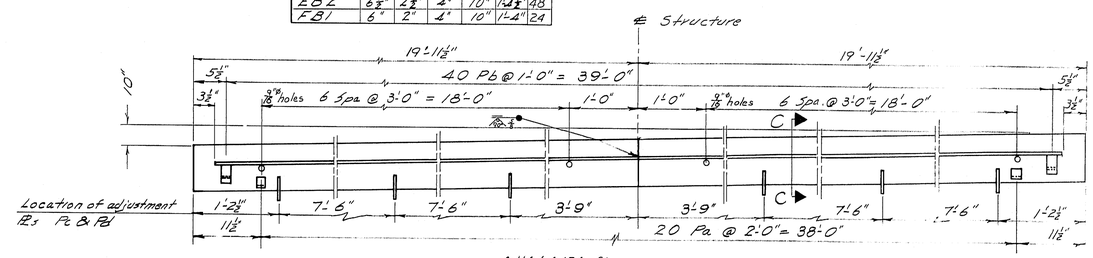
SECTION C-C





FIXED BEARING FB1

12-Required

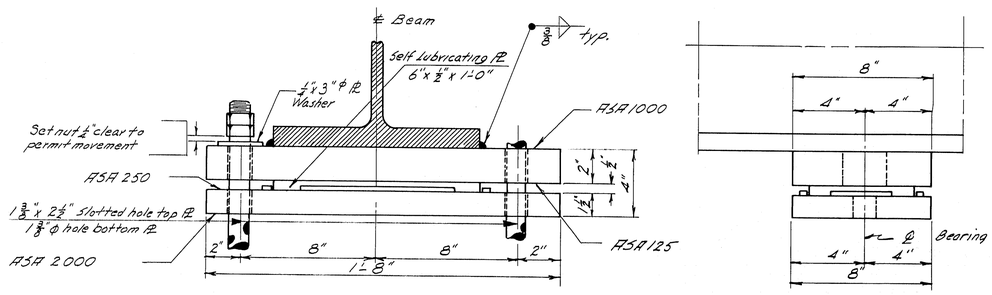


AJ1A & AJ2A Shown

ARMORED JOINT

AJ1 - 4 Required
AJ1A - 4 Required
AJ2 - 4 Required
AJ2A - 4 Required

Note: No paint where steel is in contact with concrete.



EXPANSION BEARING EB2

24 - Required

DESIGN- Area Des. Div.	BRIDGE NO.
TRACE-	SURVEY-
CHECK-	PLOT-

STATE HIGHWAY COMMISSION
BRIDGE DIVISION

SOUADABSCOOK STREAM BRIDGE CENTER

IN THE TOWN OF

HAMPDEN

PENOBSCOT COUNTY

STRUCTURAL STEEL

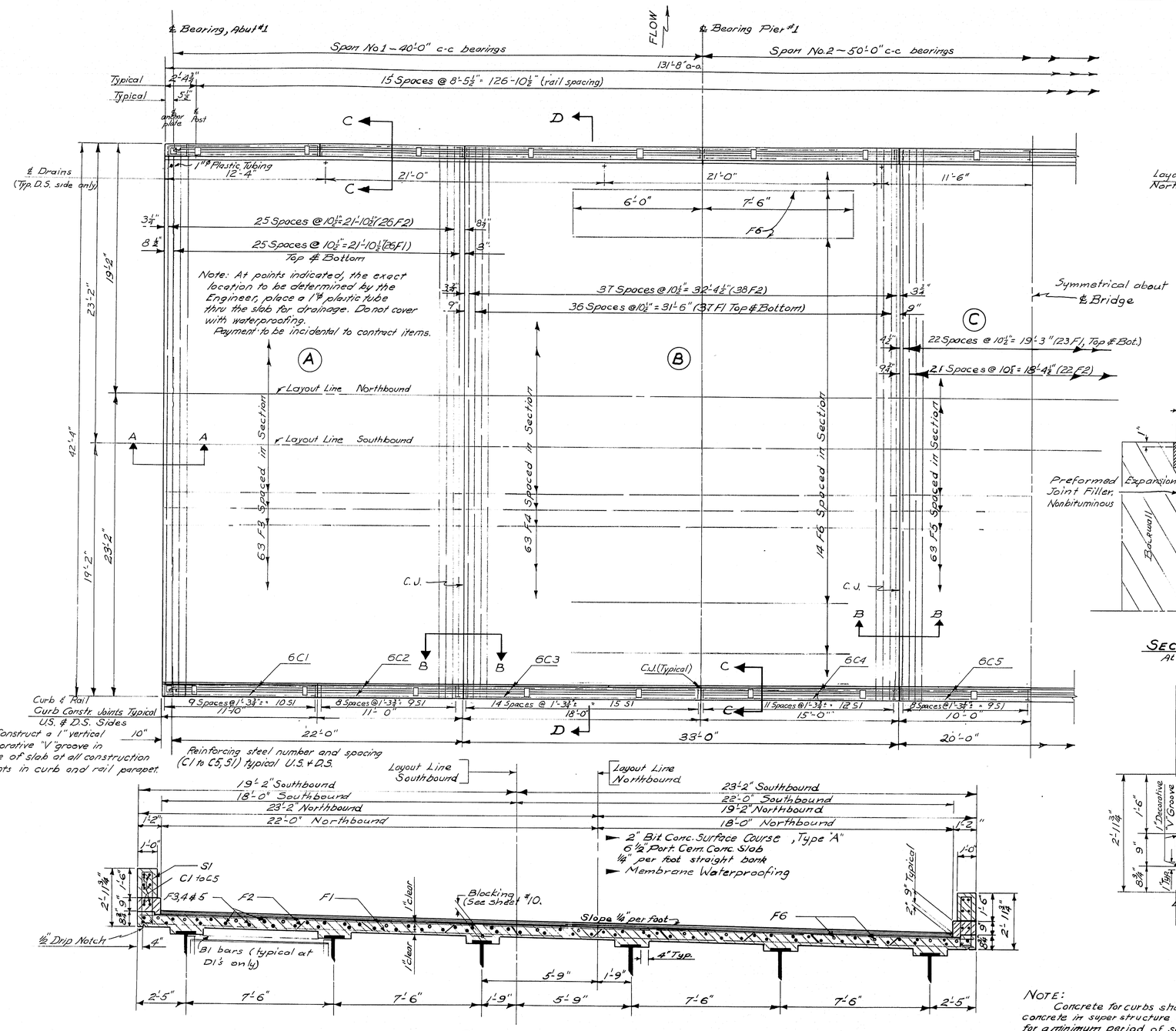
SHEET 11 OF 13 AUGUSTA, MAINE JULY 1961

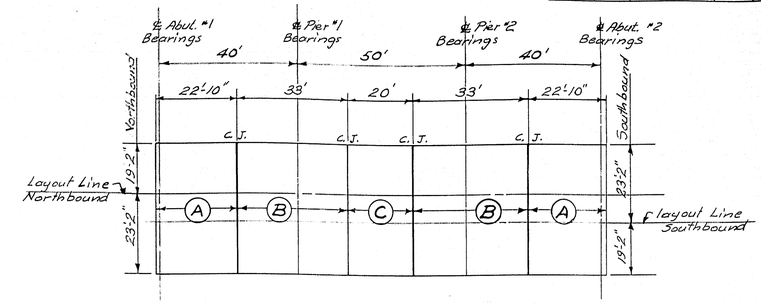
M-1524

C. H. CO., NO. 370 24687

0 1 2 3 4 5 INCHES

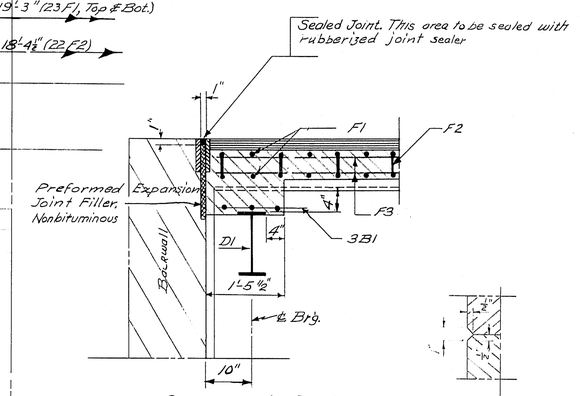
B. P. R. REG. NO.	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
1	MAINE	F.A.P. I-95-7(14)	33	145





CONCRETE PLACING SEQUENCE IN SUPERSTRUCTURE SLAB

In each structure, Panels A & C to be placed before Panels B.

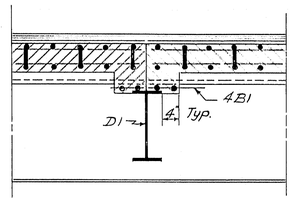


SECTION A-A

At Abutments

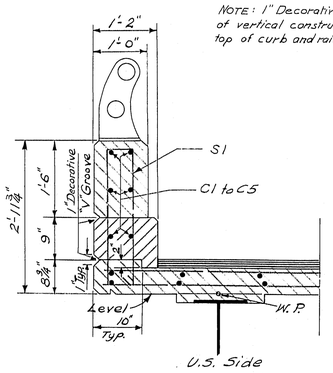
1" "V" GROOVE DETAIL

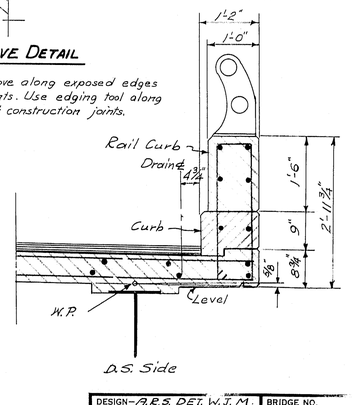
NOTE: 1" Decorative "V" Groove along exposed edges of vertical construction joints. Use edging tool along top of curb and rail curb at construction joints.



SECTION B-B

At Constr. Joints





SECTIONS C-C

SECTION D-D

► Not part of this Contract.

NOTE:

Concrete for curbs shall not be placed until concrete in superstructure slab has been in place for a minimum period of seven days. During the seven day period formwork may be placed but hand equipment only shall be allowed on the slab.

All curb and rail curb steel to be in place before any concrete is placed.

Break bond at vertical construction joints in curb and rail curb only with a suitable grade of asphaltic paint.

DESIGN– A.B.S. DET. W. J. M.
TRACE– W. J. M.
CHECK– Wallace

BRIDGE NO.
SURVEY–
PLOT–

STATE HIGHWAY COMMISSION
BRIDGE DIVISION

SOUADABSCOOK STREAM BRIDGE CENTER

IN THE TOWN OF

HAMPDEN

PENOBSCOT COUNTY

SUPERSTRUCTURE

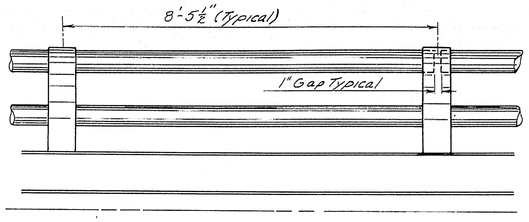
SHEET 12 OF 13 AUGUSTA, MAINE JULY 1961

M-1525

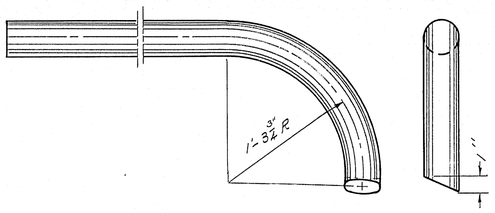
C. B. CO., NO. 370 24427

0 1 2 3 4 5 INCHES

B. P. R. REG. NO.	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
1	MAINE	BRP.I-95-7(14)	34	145

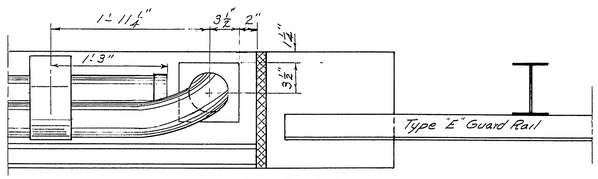


SIDE VIEW

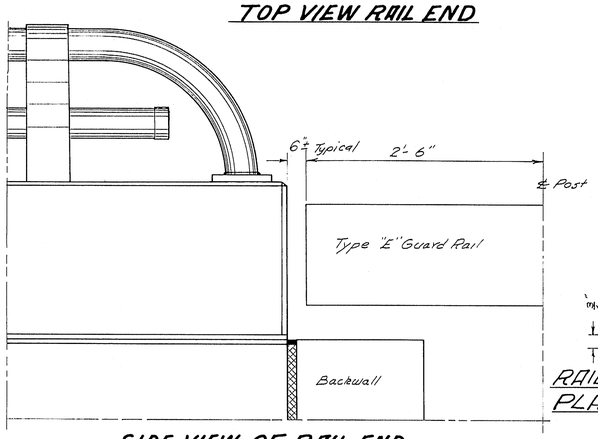


DETAIL END TUBE

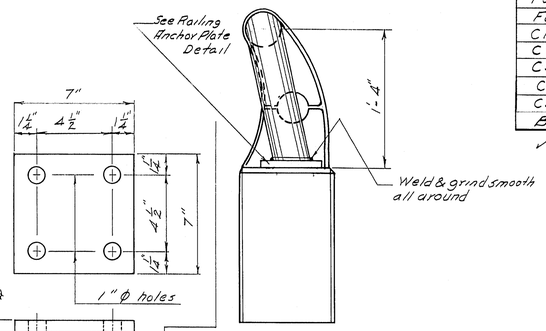
Note: Bent portion of Aluminum tube to be paid as Item 806-7 "Aluminum Rail"



TOP VIEW RAIL END

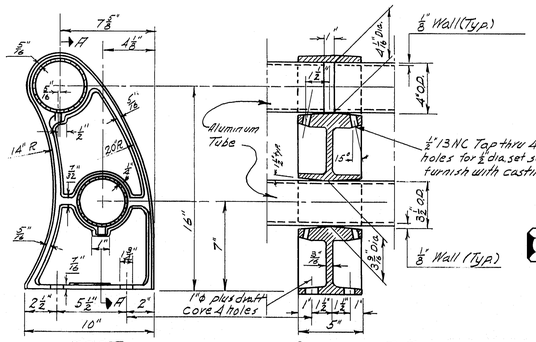


SIDE VIEW OF RAIL END

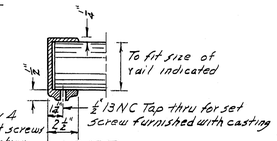


RAILING ANCHOR PLATE (ALUMINUM)

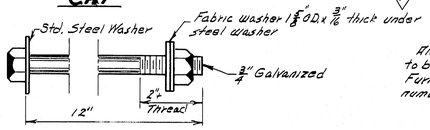
END VIEW RAIL END



POST **SECTION A-A**

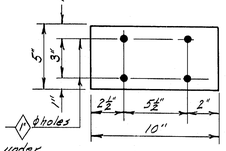


CAP



ANCHOR BOLTS

Structural Steel Galvanized
Set bolts with 2" projecting out of concrete
Req'd 4 each rail post.
4 each Anchor Plate



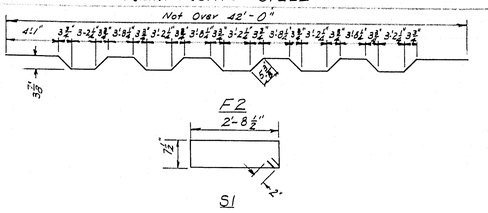
SHIM

Aluminum Alloy Shims 5" x 1/16" x 0'-10" to be used and cut as necessary. Furnish in the amount of 50% of number of rail posts.

Note: To the extent possible aluminum pipe to be continuous for two panels with joints staggered. One set screw to be tight, all others to bear, for each length of pipe.
Rail details shall be submitted to the Engineer for approval.

SUPERSTRUCTURE

REINFORCING STEEL



BENT BARS

Mark	Size	No	Length	Location
F2	#5	300	43'-4"	Superstructure Slab
S1	#4	440	7'-0"	Curbs

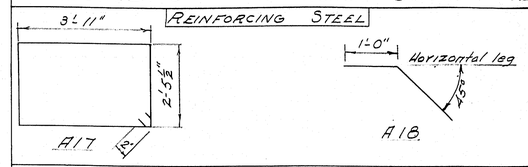
STRAIGHT BARS

F1	#5	596	42'-0"	Superstructure Slab
F3	#5	252	21'-8"	Superstr. Slab, Panels A
F4	#5	252	32'-8"	" , Panels B
F5	#5	126	19'-8"	" , Panels C
F6	#5	56	13'-6"	Supstr. Slab over Piers
C1	#4	48	11'-6"	Curbs
C2	#4	48	10'-8"	"
C3	#4	48	17'-8"	"
C4	#4	48	14'-8"	"
C5	#4	48	9'-8"	"
B1	#5	220	7'-2"	Supstr. Slab @ diaphragms

✓ Mallicone

ABUTMENTS — APPROACH SLABS — PIERS

REINFORCING STEEL



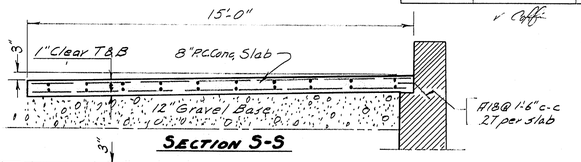
Bent Bars

Mark	Size	No	length	Location
A17	#5	72	13'-1"	Bridge seat Pedestals
A18	#5	108	2'-6"	Abutments

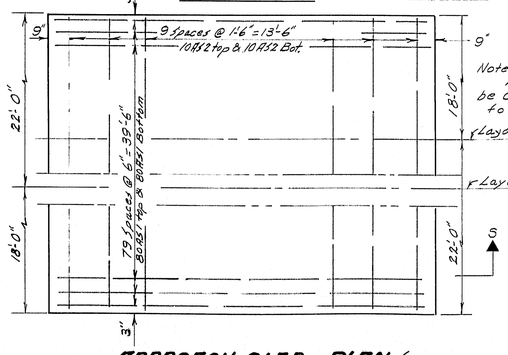
Straight Bars

A1	#6	328	5'-6"	Footing , Abutments
A2		24	4'-7"	" "
A3		32	3'-7"	" "
A4		32	2'-7"	" "
A5		96	26'-3"	" "
A6	#5	408	3'-6"	Footing - Backwall
A7		104	5'-4"	Backwall & Wings
A8		80	5'-2"	Backwall
A9		112	5'-8"	Backwall & Wings
A10		80	5'-6"	Backwall
A11		32	4'-3"	Backwall & Wings
A12	#4	56	25'-9"	" " "
A13		12	39'-6"	Backwall
A14		12	7'-0"	Wings
A15		12	6'-0"	"
A16	#6	168	4'-6"	Footing - Bridge seat
► A51	#6	640	14'-8"	Approach Slabs
► A52	#4	80	39'-8"	" "
P1	#6	176	5'-0"	Piers
P2	#6	176	16'-6"	"
P3	#4	72	21'-8"	"
P4	#6	88	2'-7"	"

✓ Cuff ► Not part of this Contract



SECTION S-S



APPROACH SLAB PLAN (Not part of this Contract.)

About "1" Shown (North bound & South bound)
About "2" Similar (" " " ")

Note: Approach slab concrete to be Class "A" and will be paid for as Item No. 701-40

Note: All reinforcing steel to be intermediate grade. Dimensions to ℄ of bars.

DESIGN - R.R.S.
TRACE - HNF
CHECK - as noted

BRIDGE NO.
SURVEY -
PLOT -

STATE HIGHWAY COMMISSION
BRIDGE DIVISION

SOUADABSCOOK STREAM BRIDGE CENTER

IN THE TOWN OF

HAMPDEN

PENOBSCOT COUNTY

REINFORCED STEEL & RAIL DETAIL

SHEET 13 OF 13 AUGUSTA, MAINE JULY 1961

M-1526

C. R. CO., NO. 378 24427

0 1 2 3 4 5 INCHES