

### REPORT

## Preliminary Geotechnical Data Report REV01

Interstate 95 Bridges 1427 and 5800 over Stillwater Avenue, Bangor, Maine (WIN 027176.00)

Submitted to:

**Maine Department of Transportation** 

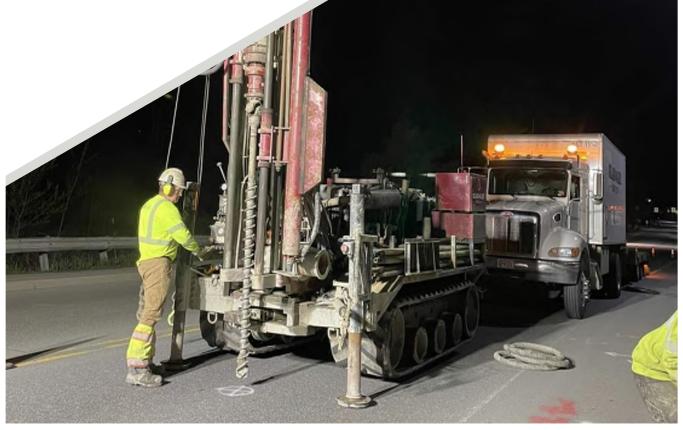
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WIN 027176.00 / WSP US0025840.3905

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## **1.0 INTRODUCTION**

This Preliminary Geotechnical Data Report (PGDR) summarizes the results of the geotechnical subsurface investigation and laboratory testing program of site soils and rock that WSP USA Inc. (WSP) performed to support the replacement of Bridge No. 1427 & No. 5800 that carries Interstate 95 (I-95) over Stillwater Avenue in Bangor, Maine. Figure 1 shows the site location.

## 2.0 PROJECT UNDERSTANDING

WSP reviewed the historical drawings<sup>1</sup> for the two existing I-95 bridges over Stillwater Avenue including historical boring logs provided by MaineDOT. The existing structures were constructed in 1960 and consist of two (2) three-span bridges with two (2) piers and two (2) abutments each.

## 3.0 GEOLOGIC SETTING

Available site geology information, consisting of surficial<sup>2</sup> geologic maps of the area indicate subsurface conditions consist of road embankment fills overlying Pleistocene Presumpscot Formation glaciomarine deposits generally consisting predominantly of silt and fine sand.

Available site geology information, consisting of bedrock<sup>3</sup> geologic maps of the area indicate bedrock in the region is mapped as the Medium bedded facies of the Penobscot River Member of the Silurian-aged Bangor Formation of the Vassalboro Group, consisting of medium to dark gray, fine-grained to very fine-grained, metawacke; a metamorphosed impure, poorly sorted sandstone with appreciable clay minerals. The 1958 historical Kenduskeag Avenue boring logs<sup>1</sup> characterize bedrock as phyllite (a general term for metamorphosed clay-rich rocks).

## 4.0 SUBSURFACE INVESTIGATIONS

## 4.1 Geotechnical Borings

WSP completed six (6) borings (BB-BSA-102, BB-BSA-103, BB-BSA-108, BB-BSA-109, BB-BSA-109A, and BB-BSA-110) within the paved roadway of Stillwater Avenue beyond the extents of the existing bridges in May 2024 and seven (7) borings (BB-BSA-101, BB-BSA-104, BB-BSA-104A, BB-BSA-105, BB-BSA-106, BB-BSA-107, and BB-BSA-111) within the paved roadway of I-95 beyond the existing bridge abutments in July 2024. The as-drilled boring locations and elevations are summarized in Table 1 and boring locations with respect to existing site features are illustrated in the Boring Location Plan in Figure 2.

The field program included Standard Penetration Testing (SPT) of predominantly coarse-grained soils and recovery of rock core from the bedrock. A WSP geotechnical engineer monitored drilling activities, selected sampling intervals, logged subsurface conditions encountered, and obtained soil samples for use in visual descriptions and subsequent laboratory testing and classification.

WSP subcontracted Seaboard Drilling, LLC (Seaboard) of Bangor, Maine, who completed the borings using a Diedrich D-50 drill rig for all borings. Borings were advanced using solid stem augers (SSA) followed by 4-inch or

<sup>&</sup>lt;sup>1</sup> Maine State Highway Commission, 1960 Final As Built Plans, Project No. I-95-8(6)180, Interstate #95 over Stillwater Ave. in the City of Bangor, Penobscot County, Plans and Profiles, 41 sheets, Received from HNTB, Filename: 1427 & 5800 Bangor 1958 As-Built.pdf.

<sup>&</sup>lt;sup>2</sup> Syverson, K.M., Thompson, A.M., and Johnston, R.A., (2011). Surficial Geology, Bangor Quadrangle, Maine. Open-File No. 11-6, Maine Geological Survey, 1 sheet, scale 1:24,000.

<sup>&</sup>lt;sup>3</sup> Pollock, S.G., Johnston, R.A., (2011). Bedrock Geology of the Bangor Quadrangle, Maine, Open-File No. 11-57, Maine Geological Survey, 1 sheet, scale 1:240,000.

3-inch casing and drive and wash methods to refusal; rock coring was performed in either 4-inch or 3-inch casing seated in rock, depending on the drilling conditions.

SPT was performed using a calibrated automatic hammer system and standard 2-inch split spoon sampler in general accordance with American Society for Testing and Materials (ASTM) D1586. Sampling was conducted at approximately 5-foot intervals, where split spoons were advanced 24 inches with a 140-pound hammer dropped 30 inches. WSP recorded the number of hammer blows required to advance the sampler through each 6-inch increment. Measured, uncorrected N-values, calculated as the sum of the hammer blows to advance the sampler during the 6-inch to 18-inch intervals. Seaboard provided WSP with a copy of the automatic hammer calibration report from November 2023<sup>4</sup> for both drill rigs used. WSP used a calibrated hammer energy transfer ratio of 106.6% for the May borings and 108.7% for the July borings provided by in the report convert the measured N-values to N<sub>60</sub> values. Uncorrected N-values and N<sub>60</sub> are shown on the boring logs (Appendix A). WSP collected and stored soil samples in sealed glass jars for later evaluation and laboratory testing.

Up to 10 feet of rock core was collected in each boring using NX size (1-7/8-inch diameter) diamond tipped core barrels following either refusal of casing or failure to advance the split spoon sampler or roller bit. Rock core samples were placed in wooden boxes and transported to the WSP office. WSP recorded the lithology, Total Core Recovery (TCR), Rock Quality Designation (RQD), and coring rates for each core run which are provided in the boring logs in Appendix A. Photographs of all collected rock core are presented in Appendix B.

The boring logs provided in Appendix A present details of the sampling methods used, field data obtained, and soil and rock conditions encountered during the investigation. A description of the boring log symbols and terms used for the soil and rock descriptions precedes the boring logs. A WSP geotechnical engineer monitored drilling activities, selected sampling intervals, logged subsurface conditions encountered, and obtained soil samples for use in visual descriptions and subsequent laboratory testing and classification WSP field characterized the soils in accordance with ASTM D2488. WSP field characterized the bedrock lithology.

## 4.2 Geologic Evaluation of Exposed Rock Cuts

On April 23, 2024, WSP visited the Stillwater Avenue site to collect geological data from the exposed rock cuts along Stillwater Avenue beneath the I-95 existing bridge foundations. The general locations of the exposed rock cuts are shown in plan view in Appendix D. During the site visit, WSP measured 37 geologic discontinuities and photographed existing rock cut conditions. Photographs of the existing rock cut conditions and discontinuities evaluated are presented in Appendix E. Our discontinuity measurements and observations are summarized in Table 2 (attached) and include discontinuity type, orientation, persistence, aperture, infilling materials, estimated strength, surface roughness, shape, spacing, and groundwater conditions. Our measured discontinuity orientations are plotted in Appendix D.1.

## 5.0 LABORATORY TESTING PROGRAM

After reviewing the collected samples in the office, WSP transferred select samples to GeoTesting Express (GTX) of Acton, Massachusetts for geotechnical laboratory testing in accordance with applicable AASHTO and ASTM testing procedures. The types and numbers of each of the laboratory tests conducted on soil samples and rock

<sup>&</sup>lt;sup>4</sup> GRL Engineers, Inc., SPT Energy Calibration on November 2, 2023, Submitted to Eric Baron of S.W. Cole Explorations, LLC (now known as Seaboard Drilling LLC) on November 10, 2023.

core are presented in Table 5-1. Soil testing results are included on the boring logs in Appendix A. Complete soil and rock laboratory testing results are provided in Appendix C.

 Table 5-1: Number and Type of Laboratory Tests Performed

Laboratory Test	Test Standard	No. Tests Completed
Moisture content	AASHTO T267, ASTM D2216	18
Grain size analysis (coarse)	AASHTO T88, ASTM D6913	37
Grain size (fine)	AASHTO T88, ASTM D7928	12
Atterberg limits	AASHTO T89 / T90, ASTM D4318	11
Chlorides	AASHTO T291, ASTM D512	2
рН	AASHTO T289, ASTM D4972	2
Sulfates	AASHTO T290	2
Electric Resistivity	ASTM G57	1
Elastic Moduli of Rock in Uniaxial Compression - Rock	ASTM D7012 Method D	6

## 6.0 SUBSURFACE CONDITIONS

The boring logs in Appendix A provide detailed descriptions of the soil, bedrock, and measured groundwater conditions encountered in the borings.

**Soils**: The soils encountered in the borings generally consist of fill materials placed during construction of the bridge and roadway and naturally occurring sand deposits, clay deposits, sand and gravel interpreted as glacial till. Table 6-1 summarizes the major stratigraphic units, the range of thicknesses, and generalized material descriptions for soils encountered.

Stratigraphic Unit	Approximate Range in Encountered Thickness (feet)	Generalized Description
Asphalt	0.5 to 0.8	Asphalt pavement approximately 5-inch to 10-inch thick ( <i>Encountered in all borings</i> )
Fill	2.6 to 20	The fill consists of olive brown to brown or grey to brown, dry to moist, medium dense to very dense, hard, fine to coarse Sand or SILT, with trace to little fine to coarse gravel, and non-plastic to slightly plastic. USCS: SM, ML, GM. AASHTO: A-1-b (0), A-4 (0), A-2-4 (0) <i>(Encountered in all borings)</i>
Sand, Silt, Gravel	1.3 to 22	Olive to brown to grey, moist to wet, medium dense to very dense, very stiff to hard, fine to coarse SAND or SILT with varying amounts of fine to coarse GRAVEL, and non-plastic to slightly

#### Table 6-1: Summary of Subsurface Fill and Soil Encountered

Stratigraphic Unit	Approximate Range in Encountered Thickness (feet)	Generalized Description
		plastic. USCS: SM, ML, GM, SC. AASHTO: A-2-4 (0), A-4 (0) (Encountered in BB-BSA-101, -102, -105, -106, -107, -108, and - 109)
Clay	3 to 14.5	Grey with brown and olive, wet, very soft to hard, CLAY, trace to little fine sand, trace gravel, medium plasticity with interbedded silt or sand lenses. USCS: CL. AASHTO: A–6 (9, 10, 11, 15, 18, 19, 37) <i>(Encountered in BB-BSA-104, -106, -107, and -111))</i>
Glacial Till	3 to 10.3	Grey with brown to olive, wet, very dense to hard, fine to coarse SAND and fine to coarse GRAVEL, with varying amounts of silt and gravel, non-plastic, and weathered rock fragments. USCS: SM, GM, ML. AASHTO: A-1-b (0), A-4 (0) <i>(Encountered in BB-BSA-104, -106, -107, and -111)</i>

Notes: USCS classification from laboratory testing in accordance with ASTM D2487. AASHTO classification from laboratory testing and includes Group Classification and Group Index in parentheses in accordance with AASHTO M145.

**Bedrock:** Bedrock was cored for each boring location. Bedrock cores for BB-BSA-104 and BB-BSA-109 were taken at the offset borings BB-BSA-104A and BB-BSA-109A respectively. For the borings performed from Stillwater Avenue, top of bedrock surface ranged from 3.5 feet bgs (EL. 123.5 feet NAVD88) to 12.2 feet bgs (EL. 121.3 feet NAVD88). For the borings performed from I-95, top of bedrock ranged from 17.8 feet bgs (130.5 feet NAVD88) to 63.8 feet bgs (EL. 79.8 feet NAVD88). The bedrock was described as grey, very fine to fine grained, very thinly to thinly bedded, Metawacke [metasandstone] with calcite veins, medium strong to very strong, slightly to moderately weathered.

Rock quality designation (RQD) is a common parameter that is used to help assess the competency of sampled bedrock. RQD is defined as the sum of pieces of recovered bedrock greater than 4 inches in length divided by the total length of the core run. RQD values for bedrock encountered at the site ranges between 0 and 88 percent, which generally correlates to Rock Mass Quality ratings of very poor to good.

**Groundwater:** Groundwater levels were measured in all borings except BB-BSA-104, BB-BSA-104A, and BB-BSA-109. Groundwater was measured before the casing was withdrawn and at the end of the drilling day. Groundwater elevations vary from approximately EL. 123.1 feet to EL. 135.1 feet (NAVD88), ground water levels encountered at the time of drilling may have been influenced by the drilling methods used. Groundwater levels will fluctuate due to soil conditions and topography and seasonal variations in precipitation. Groundwater levels encountered during construction may differ from those recorded from the borings.

## 7.0 CONDITIONS OF EXPOSED ROCK CUTS

Rock Mass Rating (RMR) and Geological Strength Index (GSI) values were calculated for the existing rock cut exposures along Stillwater Avenue and for the rock core collected in each boring for comparison. The RMR system<sup>5</sup> assigns numerical ratings to six parameters, including strength of the intact rock, RQD, discontinuity spacing, discontinuity surface conditions, groundwater conditions, and orientation of discontinuities. These ratings are summed to provide the RMR value. The GSI system<sup>6</sup> assigns a numerical rating to qualitative estimates of the lithology, discontinuity structure, and discontinuity surface conditions in a rock mass.

To determine the RMR, WSP used the discontinuities described in each rock cut exposure or core run and the RQD measured in each core run to assign ratings. We used the discontinuity orientations measured in the rock cuts to assign rating adjustments for the discontinuity sets that we identified as having unfavorable orientations relative to the existing foundation orientation (i.e., kinematically susceptible to sliding or toppling failure). The proposed foundation orientation may allow for a different rating adjustment for discontinuity orientation, and thus a modification to the RMR value. Our calculated RMR values are summarized in Table 2 (attached) for the measured rock cut exposures and Table 3 (attached) for the boring rock core runs. Full RMR calculations including the individual parameter ratings are provided in Appendix D.2. Photographs of the rock cuts evaluated are presented in Appendix E. Based on our field observations and measurements at the Stillwater Avenue bridge site, we estimate that:

- RMR values range from 40 to 79 and average 63 for the exposed rock cuts from 37 discontinuities evaluated.
- RMR values range from 26 to 72 and average 44 for the rock core runs from 30 runs.

To determine the GSI, WSP used the discontinuity structure observed in the existing rock cuts and the discontinuity surface conditions described in the rock cuts and core runs to assign a rating. We selected the GSI value from the range established by Marinos and Hoek<sup>6</sup> for typical sandstone lithologies. The GSI chart is presented in Appendix D.3. Based on our field observations and measurements, we estimate a GSI value of 55 for the exposed rock cuts at the Stillwater Avenue bridge site.

## 8.0 REPORT AND EXPLORATION LIMITATIONS

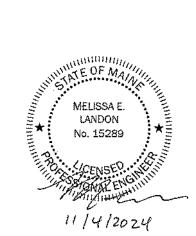
This Preliminary Geotechnical Data Report (PGDR) was prepared for the replacement of I-95 Bridge No. 1427 & Bridge No. 5800 over Stillwater Ave in Bangor, Maine. The professional services provided by WSP for this project include only the geotechnical aspects of the subsurface conditions at this site. The presence or implications of possible surface and/or subsurface contamination resulting from previous activities or uses of the site and/or resulting from the introduction onto the site of materials from off-site sources are outside the terms of reference for this report and have not been investigated or addressed.

<sup>&</sup>lt;sup>5</sup> Bieniawski, Z.T. 1989. Engineering Rock Mass Classifications: A Complete Manual for Engineers and Geologists in Mining, Civil, and Petroleum Engineering. John Wiley & Sons.

<sup>&</sup>lt;sup>6</sup> Marinos, Paul and Hoek, Evert. November 2000. GSI: a geologically friendly tool for rock mass strength estimation. ISRM International Symposium, Melbourne, Australia, paper number ISRM-IS-2000-035,

## Signature Page

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https://wsponlinenam.sharepoint.com/sites/us-win02609500/shared documents/06 deliverables/stillwater geotech data report/hntb stillwater ave bangor win 027176.00 wsp pgdr rev01.docx

## TABLES

## Table 1: Summary of Subsurface Explorations Geotechnical Data Report MaineDOT I-95 Bridge Over Stillwater Avenue, Bangor, Maine MaineDOT WIN 027176.00

			As-Drilled	Locations <sup>4</sup>			Appro	ximate Stra	ta Thick	ness (feet)		Approximate		Approximate	Approximate
					Ground Suface			Cond				Top of Bedrock	Approximate Elevation of	Bottom of Exploration	Elevation of Bottom of
		Test Boring			Elevation <sup>4</sup>			Sand, Silt,			Weathered	Donth	Top of Bedrock	Depth (ft)	Exploration
		No. <sup>1,2,3</sup>	Northing	Easting	(feet NAVD88)	Asphalt	Fill	Gravel <sup>6</sup>	Clay	Glacial Till	Bedrock	(feet bgs <sup>5</sup> )	(feet NAVD88)	(feet bgs <sup>5</sup> )	(feet NAVD88)
Φ		BB-BSA-101	482856.27	1735264.27	150.5	0.6	12.9	15.0	NE⁵	3.0	NE <sup>5</sup>	31.5	119.0	41.5	109.0
Bridge		BB-BSA-102	482969.08	1735451.57	133.5	0.6	4.4	7.2	NE⁵	NE <sup>5</sup>	NE <sup>5</sup>	12.2	121.3	22.2	111.3
nd E	12/	BB-BSA-103	482888.01	1735425.94	132.1	0.6	2.5	NE <sup>5</sup>	NE⁵	NE <sup>5</sup>	4.1	7.2	124.9	17.2	114.9
noq	7L#	BB-BSA-104	483018.96	1735602.84	151.9	0.8	14.7	NE <sup>5</sup>	3.0	4.5	NE <sup>5</sup>	23.0	128.9	23.5	128.4
South bound E		BB-BSA-104A	483017.59	1735600.99	152.0	0.7	$NE^5$	NE <sup>5</sup>	NE⁵	NE <sup>5</sup>	NE <sup>5</sup>	20.4	131.6	31.0	121.0
ŭ		BB-BSA-105	482984.90	1735593.56	152.1	0.8	12.3	11.9	NE⁵	NE <sup>5</sup>	1.4	26.4	125.7	36.2	115.9
00		BB-BSA-106	482611.20	1735095.82	143.6	0.8	18.2	22.0	12.5	10.3	NE <sup>5</sup>	63.8	79.8	74.1	69.5
#5800		BB-BSA-107	482578.95	1735092.78	143.1	0.5	20.0	18.5	14.5	9.9	NE <sup>5</sup>	63.4	79.7	77.2	65.9
idge	)	BB-BSA-108	482749.52	1735322.13	129.5	0.6	2.6	3.5	NE⁵	NE <sup>5</sup>	NE <sup>5</sup>	6.7	122.8	16.7	112.8
d Br		BB-BSA-109	482636.37	1735255.48	127.0	0.7	8	1.3	NE⁵	NE <sup>5</sup>	0.1	NE <sup>5</sup>	NE <sup>5</sup>	10.1	116.9
uno		BB-BSA-109A	482637.93	1735257.73	127.0	NE <sup>5</sup>	NE <sup>5</sup>	NE <sup>5</sup>	NE <sup>5</sup>	NE <sup>5</sup>	NE <sup>5</sup>	3.5	123.5	14.0	113.0
North bound Bridge		BB-BSA-110	482660.73	1735292.34	127.5	0.6	4.7	NE <sup>5</sup>	NE⁵	NE <sup>5</sup>	NE <sup>5</sup>	5.3	122.2	15.3	112.2
No		BB-BSA-111	482728.68	1735418.07	148.3	0.6	8.9	NE⁵	4.0	4.3	NE <sup>6</sup>	17.8	130.5	29.0	119.3

Notes:

1. Boring locations are shown in Figure 2 - Boring Location Plan of the Preliminary Geotechnical Data Report.

2. Borings BB-BSA-102, BB-BSA-103, BB-BSA-108, BB-BSA-109, BB-BSA-109A, and BB-BSA-110 were performed by Seaboard Drilling, LLC in May, 2024. Borings BB-BSA-101, BB-BSA-104, BB-BSA-105, BB-BSA-106, BB-BSA-107, and BB-BSA-111 were performed by Seaboard Drilling, LLC in July, 2024.

3. Boring logs are presented in Appendix A of the Preliminary Geotechnical Data Report.

4. As drilled Boring Locations Derived from the Electronic file "Ground.dgn" Provided to WSP by HNTB on August 12, 2024.	Prepared By: RJN
5. bgs = below ground surface, NE = not encountered	Checked By: LMP
6. This layer mainly consists of silty Sand or sandy Silt, but includes Gravel with some sand in borings BB-BSA-102 and BB-BSA-108 strata layers.	Reviewed By: MEL

Table 2:Summary of Rock Cut DiscontinuitiesPreliminary Geotechnical Design ReportBridge #1427 & #5800, I-95 over Stillwater Ave, Bangor, MaineMaineDOT WIN 027176.00

Outcrop	Discontinuity			Uncorrected Corrected Dip Direction Dip Direction State Plane State Plane		tion				Infilling Shear	Surface	Discontinuity		Discontinuity		
Area	Disc	ontinuity	Dip	Grid North		Set <sup>(2)</sup>	Persistence	Aperture	Infilling	Strength <sup>(3)</sup>	Roughness	Shape	Water	Spacing	Notes/Comments <sup>(4)</sup>	RMR
	ID	Туре	[degrees]		[degrees]		[ft]	[in]	,	5	<b>)</b>			[ft]		
	1	bedding	32	348	333	5	10	0.13	none	-	rough	undulating to stepped	dry	0.2		40
	2	joint	84	229	214	3	15	0.25	lichen	low	slightly rough	planar	dry	1.5		64
	3	joint	88	245	230	3	3	0.50	none	-	slightly rough	planar	dry	2.8		78
	4	joint	85	265	250	2	8	0.25	lichen	low	smooth	planar	dry	0.9		46
	5	joint	11	243	228	1	5	0.13	none	-	smooth	undulating	dry	5.9		78
	6	joint	83	186	171	4	10	0.06	none	-	slightly rough	planar	dry	1.6		72
	7	bedding	25	335	320	5	10	tight	none	-	rough	stepped	dry	0.3		49
	8	joint	8	100	85	1	3	0.50	sandy soil	medium	smooth	planar	dry	5.9		73
	9	joint	75	50	35	3	15	0.06	none	-	slightly rough	planar	dry	1.1	Quartz veins 0.25" thick in vicinity	58
	10	joint	10	58	43	1	20	0.75	quartz	high	slightly rough	planar	dry	1.0		52
	11	joint	64	4	349	-	4	0.75	quartz	high	rough	irregular	dry	3.7		64
	12	joint	83	41	26	3	12	0.06	none	-	slightly rough	planar	dry	4.5		66
	13	joint	65	278	263	2	6	0.13	none	-	slightly rough	stepped	dry	5.4		54
	14	joint	4	48	33	1	10	0.50	quartz	high	slightly rough	undulating	dry	0.9		63
Stillwater	15	joint	83	133	118	2	5	tight	none	-	smooth	planar	dry	5.1		68
Ave	16	joint	8	124	109	1	10	0.38	broken rock	high	rough	undulating	dry	1.3		67
Northbound	17	joint	89	357	342	4	15	0.06	roots	low	slightly rough	undulating	dry	2.5		71
	18	joint	67	213	198	-	15	tight	none	-	smooth	undulating	dry	2.5		78
	19	joint	87	20	5	4	15	0.06	none	-	rough	stepped	dry	1.8		71
	20	joint	88	124	109	2	15	0.25	topsoil	low	slightly rough	planar	dry	1.7		47
	21	bedding	21	26	11	5	6	0.06	none	-	smooth	stepped	dry	0.4		42
	22	joint	80	278	263	2	10	0.13	none	-	slightly rough	planar	dry	1.8	Shotcrete and dowel repair 2 ft north	54
	23	joint	10	111	96	1	22.5	0.25	quartz	high	smooth	planar	dry	2.0		64
	24	joint	18	65	50	1	20	tight	none	-	slightly rough	undulating	dry	1.4		72
	25	joint	85	190	175	4	15	tight	none	-	slightly rough	planar	dry	2.3		79
	26	joint	59	212	197	-	15	1.50	quartz	high	smooth	planar	dry	2.2	Blast fragmentation to south	67
	27	joint	31	106	91	1	10	0.50	roots, topsoil	low	smooth	planar	dry	4.0		68
	28	joint	25	5	350	5	10	0.50	quartz, broken rock	high	rough	undulating	dry	1.8		69
	29	joint	81	10	355	4	10	0.13	broken rock	high	rough	planar	dry	2.2		74
	30	joint	10	220	205	1	24.8	0.50	broken rock	high	slightly rough	planar	dry	1.6		67
	31	joint	84	55	40	3	4.5	0.50	roots, sandy soil	low	slightly rough	planar	dry	2.3		69

Table 2:Summary of Rock Cut DiscontinuitiesPreliminary Geotechnical Design ReportBridge #1427 & #5800, I-95 over Stillwater Ave, Bangor, MaineMaineDOT WIN 027176.00

Outcrop Area	Disc ID	ontinuity Type		Dip Direction State Plane Grid North	Corrected Dip Direction State Plane Grid North <sup>(1)</sup> [degrees]		Persistence [ft]	Aperture [in]	Infilling	Infilling Shear Strength <sup>(3)</sup>	Surface Roughness	Discontinuity Shape	Water	Discontinuity Spacing [ft]	Notes/Comments <sup>(4)</sup>	RMR
	32	joint	76	329	314	-	3.9	0.25	sandy soil	medium	very rough	undulating	dry	0.9		66
	33	joint	72	183	168	4	3.5	0.13	sandy soil	medium	rough	planar to stepped	dry	0.2		53
Stillwater	34	joint	66	278	263	2	-	0.13	sandy soil	medium	very rough	planar	dry	0.3		40
Ave Southbound	35	joint	17	62	47	1	9.7	0.50	none	-	rough	undulating	dry	2.0		74
Cound	36	joint	88	219	204	3	2.9	0.13	sandy soil	medium	smooth	planar	dry	0.6		60
	37	joint	89	262	247	2	3.4	0.25	none	-	smooth	stepped	dry	0.4		41

(1) Dip direction data corrected for magnetic declination (15 degrees west).

(2) See Appendix E for stereonets.

(3) Shear strength of infilling materials as follows:

Low = friction angle < 20 degrees

Medium = 20 degrees < friction angle < 30 degrees

High = 30 degrees < friction angle

(4) Discontinuity measurements were collected on April 23, 2024.

Prepared by: KAR Checked by: BK Reviewed by: JDL

				R	un			TC	R <sup>1</sup>	RQD <sup>2</sup>			Physical	Rock Parame			
Test Boring Designation	Core Size	No.	Midpoint Depth Below Bedrock Surface		Surface		Length			Length		Designation	Weathering <sup>3</sup>	Estimated Field Strength <sup>3</sup>	Rock Mass Rating [RMR] <sup>4</sup>	Lithologic,	
	(in)		(ft)	Start	End	Midpoint	(ft)	(ft)	%	(ft)	%					Grey, very fine grained, thi	
		R1	0.4	31.5	32.4	32.0	0.9	0.8	89%	0.00	0%	Very Poor	Slightly Weathered (W2)	Very Strong (R5)	31	with calcite veins, very stro dipping, very close to close fractured, clay infilling at b RIVER MEMBER, BANGO	
BB-BSA-101	NX	R2	1.2	32.4	32.9	32.7	0.5	0.5	100%	0.00	0%	Very Poor	Slightly Weathered (W2)	Strong (R4) to Very Strong (R5)	30	Grey, very fine grained, thi clay and sand infilling at th discontinuities low angle to fractured [MEDIUM BEDD FORMATION].	
DD-D3A-101	(1.88)	(1.88)	R3	3.2	32.9	36.5	34.7	3.6	3.6	100%	0.50	14%	Very Poor	Slightly Weathered (W2) to Fresh (W1)	Strong (R4) to Very Strong (R5)	39	Grey, very fine grained, thi with frequent calcite veins, discontinuities low angle to rough, tight to open, avera PENOBSCOT RIVER ME
		R4	7.5	36.5	41.5	39.0	5.0	5.0	100%	3.00	60%	Fair	Fresh (W1)	Strong (R4)	56	Grey, very fine grained, thi with frequent calcite veins, close spacing, rough to ve BEDDED FACIES, PENC	
BB-BSA-102	NX (1.88)	R1	2.5	12.2	17.2	14.7	5.0	4.5	90%	2.58	52%	Fair	Slightly Weathered (W2)	Strong (R4) to Extremely Strong (R6)	40	Grey, very fine to fine grain [metasandstone], frequent weathered; discontinuities spacing, irregular to planan [MEDIUM BEDDED FACI FORMATION].	
	(1.00)	R2	7.5	17.2	22.2	19.7	5.0	4.9	98%	4.38	88%	Good	Fresh (W1)	Extremely Strong (R6)	72	Grey, very fine to fine grain frequent calcite veins, extra to wide spacing, irregular t per foot [MEDIUM BEDDE FORMATION].	

### c, Rock Mass and Discontinuity Description<sup>5,6</sup>

chinly to very thinly bedded, METAWACKE [metasandstone] rong, slightly weathered; discontinuities low angle to steep se spacing, smooth to very rough, tight to open, highly bottom of run [MEDIUM BEDDED FACIES, PENOBSCOT GOR FORMATION].

thinly to very thinly bedded, METAWACKE [metasandstone], the top of run, strong to very strong, slightly weathered; to steep dipping, very close spacing, rough, open, highly DED FACIES, PENOBSCOT RIVER MEMBER, BANGOR

chinly to very thinly bedded, METAWACKE [metasandstone] is, strong to very strong, slightly weathered to fresh; to steep dipping, very close to close spacing, rough to very rage 3.5 fractures per foot [MEDIUM BEDDED FACIES, IEMBER, BANGOR FORMATION].

thinly to very thinly bedded, METAWACKE [metasandstone] is, strong, fresh; discontinuities low angle to steep dipping, very very rough, tight, average 1.6 fractures per foot [MEDIUM IOBSCOT RIVER MEMBER, BANGOR FORMATION].

ained, thinly to thickly laminated, METAWACKE int thin to thick calcite veins, strong to extremely strong, slightly as moderately to steeply dipping, close to moderately close har, smooth to very rough, open; average 3.2 fractures per foot CIES, PENOBSCOT RIVER MEMBER, BANGOR

ained, thinly laminated, METAWACKE [metasandstone], tremely strong, fresh; discontinuities horizontal dipping, close r to planar, smooth to very rough, open; average 0.2 fractures DED FACIES, PENOBSCOT RIVER MEMBER, BANGOR

				R	Run				R <sup>1</sup>		RQI	) <sup>2</sup>	Physical	Rock Param					
Test Boring Designation	Core Size (in)	No.	Midpoint Depth Below Bedrock Surface (ft)		h Below Surface End	r Ground (ft) Midpoint	Length (ft)	Length (ft)	%	Length (ft)	%	Designation	Weathering <sup>3</sup>	Estimated Field Strength <sup>3</sup>	Rock Mass Rating [RMR] <sup>4</sup>	Lithologic,			
	NX	R1	2.5	7.2	12.2	9.7	5.0	5.0	100%	1.54	31%	Poor	Slightly Weathered (W2)	Extremely Strong (R6)	44	Grey, very fine to fine grain and thick quartz veins, extr discontinuities low angle to irregular, very rough to sm BEDDED FACIES, PENO			
BB-BSA-103	(1.88)	R2	7.5	12.2	17.2	14.7	5.0	5.0	100%	3.50	70%	Fair	Fresh (W1)	Extremely Strong (R6)	62	Grey, very fine to fine grain quartz veins, extremely str dipping, close to moderate 0.8 fractures per foot [MEI BANGOR FORMATION].			
		R1	3.1	21.0	26.0	23.5	5.0	4.8	95%	2.80	56%	Fair	Slightly Weathered (W2) to Fresh (W1)	Strong (R4) to Very Strong (R5)	41	Grey, very fine grained, thi with frequent calcite veins, sand infilling 22.5 ft to 23 f close spacing, rough to ver [MEDIUM BEDDED FACII FORMATION].			
BB-BSA-104A	NX (1.88)				R2	7.0	26.0	28.8	27.4	2.8	2.1	75%	1.70	61%	Fair	Fresh (W1)	Strong (R4) to Very Strong (R5)	58	Grey, very fine grained, thi with calcite veins, strong to dipping, very close spacing [MEDIUM BEDDED FACI FORMATION].
		R3	9.5	28.8	31.0	29.9	2.2	2.0	91%	0.50	23%	Very Poor	Fresh (W1)	Strong (R4) to Very Strong (R5)	41	Grey, very fine grained, thi strong to very strong, fresh spacing, rough, tight to ope FACIES, PENOBSCOT R			
BB-BSA-105	NX	R1	2.5	26.4	31.4	28.9	5.0	5.0	100%	1.50	30%	Poor	Slightly Weathered (W2) to Fresh (W1)	Strong (R4)	41	Grey, very fine grained, thi with calcite veins, strong, s dipping, very close to close fractures per foot [MEDIUI BANGOR FORMATION].			
BB-BSA-105	(1.88)	R2	7.4	31.4	36.2	33.8	4.8	4.8	100%	3.60	75%	Fair	Fresh (W1)	Very Strong (R5)	58	Grey, very fine grained, thi with calcite veins, very stro close spacing, smooth to r BEDDED FACIES, PENO			

### c, Rock Mass and Discontinuity Description<sup>5,6</sup>

ained, METAWACKE [metasandstone] with thin calcite veins extremely strong, thinly laminated, slightly weathered; to steep dipping, very close to close spacing, stepped to smooth, open; average 4.0 fractures per foot [MEDIUM NOBSCOT RIVER MEMBER, BANGOR FORMATION].

ained, METAWACKE [metasandstone] with thin calcite and strong, thinly laminated, fresh; discontinuities moderately ately close spacing, stepped to irregular, rough, open; average IEDIUM BEDDED FACIES, PENOBSCOT RIVER MEMBER, II.

thinly to very thinly bedded, METAWACKE [metasandstone] ns, strong to very strong, slightly weathered to fresh, clay and 3 ft; discontinuities low angle to steep dipping, very close to very rough, tight to open, average 1.6 fractures per foot CIES, PENOBSCOT RIVER MEMBER, BANGOR

thinly to very thinly bedded, METAWACKE [metasandstone] to very strong, fresh; discontinuities low angle to moderate ing, rough to very rough, tight, average 0.5 fractures per foot CIES, PENOBSCOT RIVER MEMBER, BANGOR

thinly to very thinly bedded, METAWACKE [metasandstone], sh; discontinuities low angle to steep dipping, very close open, average 3.5 fractures per foot [MEDIUM BEDDED RIVER MEMBER, BANGOR FORMATION].

hinly to very thinly bedded, METAWACKE [metasandstone], slightly weathered to fresh; discontinuities low angle to steep se spacing, rough to very rough, tight to open, average 3.2 UM BEDDED FACIES, PENOBSCOT RIVER MEMBER, 1.

thinly to very thinly bedded, METAWACKE [metasandstone] trong, fresh; discontinuities low angle to steep dipping, very o rough, tight, average 1.6 fractures per foot [MEDIUM IOBSCOT RIVER MEMBER, BANGOR FORMATION].

				R	lun			тс	R <sup>1</sup>	RQD <sup>2</sup>			Physical	Rock Param					
Test Boring Designation	Core Size (in)	No.	Midpoint Depth Below Bedrock Surface (ft)		Surface	Ground (ft) Midpoint	Length (ft)	Length (ft)	%	Length (ft)	%	Designation	Weathering <sup>3</sup>	Estimated Field Strength <sup>3</sup>	Rock Mass Rating [RMR] <sup>4</sup>	Lithologic,			
		R1	0.5	63.8	64.8	64.3	1.0	0.3	30%	0.00	0%	Very Poor	Slightly Weathered (W2) to Fresh (W1)	Strong (R4) to Very Strong (R5)	36	Grey, very fine grained, thi with calcite veins, strong to angle dipping, very close to BEDDED FACIES, PENO			
BB-BSA-106	NX (1.88)	R2	3.1	64.8	69.1	67.0	4.3	4.3	100%	2.00	47%	Poor	Fresh (W1)	Strong (R4) to Very Strong (R5)	35	Grey, very fine grained, thi with frequent calcite veins, to 68.3 ft, sand infilling 67. very close to close spacing foot [MEDIUM BEDDED F FORMATION].			
		R3	7.8	69.1	74.1	71.6	5.0	5.0	100%	3.10	62%	Fair	Fresh (W1)	Weak (R2)		Grey, very fine grained, thi with frequent calcite veins, close to close spacing, rou foot [MEDIUM BEDDED F FORMATION].			
		R1	2.3	63.4	67.2	65.3	3.8	0.6	16%	0.00	0%	Very Poor	Highly Weathered (W4)	Strong (R4)		Grey, very fine grained, thi strong, highly weathered w low angle to steep dipping [MEDIUM BEDDED FACI FORMATION].			
	NX (1.88)			-	R2	4.7	67.2	68.2	67.7	1.0	0.2	17%	0.00	0%	Very Poor	Highly Weathered (W4)	Strong (R4)	27	Grey, very fine grained, thi strong, highly weathered w close spacing, very rough, PENOBSCOT RIVER ME
BB-BSA-107				R3	7.2	68.2	72.2	70.2	4.0	3.8	95%	1.41	35%	Poor	Slightly Weathered (W2)	Strong (R4) to Very Strong (R5)	36	Grey, very fine grained, thi with calcite veins, strong to severe chemical weatherin dipping, very close to close fractures per foot [MEDIUI BANGOR FORMATION].	
		R4	11.7	72.2	77.2	74.7	5.0	5.0	100%	1.96	39%	Poor	Slightly Weathered (W2)	Strong (R4) to Very Strong (R5)	36	Grey, very fine grained, thi with calcite veins, strong to severe chemical weatherin steep dipping, very close to 3.2 fractures per foot [MEI BANGOR FORMATION].			

### c, Rock Mass and Discontinuity Description<sup>5,6</sup>

thinly to very thinly bedded, METAWACKE [metasandstone] to very strong, slightly weathered to fresh; discontinuities low to close spacing, rough to very rough, tight to open [MEDIUM NOBSCOT RIVER MEMBER, BANGOR FORMATION].

thinly to very thinly bedded, METAWACKE [metasandstone] ns, strong to very strong, fresh with chemical weathering 67.4 ft 7.9 ft to 68.3 ft; discontinuities low angle to vertical dipping, ing, smooth to rough, tight to open, average 3.3 fractures per D FACIES, PENOBSCOT RIVER MEMBER, BANGOR

thinly to very thinly bedded, METAWACKE [metasandstone] ns, weak, fresh; discontinuities low angle to steep dipping, very ough to very rough, tight to open, average 1.4 fractures per D FACIES, PENOBSCOT RIVER MEMBER, BANGOR

thinly to very thinly bedded, METAWACKE [metasandstone], d with clay and sand infilling from 64.2 ft to 67.2; discontinuities ng, close spacing, rough to very rough, open, highly fractured CIES, PENOBSCOT RIVER MEMBER, BANGOR

thinly to very thinly bedded, METAWACKE [metasandstone], with clay and sand infilling; discontinuities low angle dipping, h, open, highly fractured [MEDIUM BEDDED FACIES, IEMBER, BANGOR FORMATION].

thinly to very thinly bedded, METAWACKE [metasandstone] to very strong, slightly weathered, occasional moderate to ring with sand infilling; discontinuities low angle to steep use spacing, rough to very rough, tight to open, average 3.5 UM BEDDED FACIES, PENOBSCOT RIVER MEMBER, 1.

thinly to very thinly bedded, METAWACKE [metasandstone] to very strong, slightly weathered, occasional moderate to ring with sand and clay infilling; discontinuities low angle to to close spacing, rough to very rough, tight to open, average EDIUM BEDDED FACIES, PENOBSCOT RIVER MEMBER, 1.

				R	un			TC	R <sup>1</sup>		RQI	D <sup>2</sup>	Physical	Rock Paramo	eters						
Test Boring Designation	Core Size	No.	Midpoint Depth Below Bedrock Surface		h Below Surface End	Ground (ft) Midpoint		Length	%	Length	%	Designation	Weathering <sup>3</sup>	Estimated Field Strength <sup>3</sup>	Rock Mass Rating [RMR] <sup>4</sup>	Lithologic,					
	(in)	R1	(ft) 2.5	6.7	11.7	9.2	(ft) 5.0	(ft) 4.9	98%	(ft) 2.92	58%	Fair	Slightly Weathered (W2)	Very Strong (R5) to Extremely Strong (R6)	51	Grey, very fine to fine grai veins, very to extremely st moderate to steep dipping average 2.6 fractures per MEMBER, BANGOR FOR					
BB-BSA-108	NX	R2	5.5	11.7	12.7	12.2	1.0	0.9	92%	0.42	42%	Poor	Slightly Weathered (W2) to Fresh (W1)	Extremely Strong (R6)	51	Grey, very fine to fine grai veins, extremely strong, th angle to steep dipping, ver open; average 1.0 fracture RIVER MEMBER, BANG					
DD-DSA-106	(1.88)	R3	7.0	12.7	14.7	13.7	2.0	1.8	88%	0.33	17%	Very Poor	Slightly Weathered (W2) to Fresh (W1)	Extremely Strong (R6)	45	Grey, very fine to fine grai veins, extremely strong, th angle to steep dipping, ver open; average 2.5 fracture RIVER MEMBER, BANG					
		R4	9.0	14.7	16.7	15.7	2.0	1.9	96%	0.71	35%	Poor	Slightly Weathered (W2) to Fresh (W1)	Extremely Strong (R6)	48	Grey, very fine to fine grai veins, extremely strong, th angle to steep dipping, ver open; average 2.0 fracture RIVER MEMBER, BANG					
BB-BSA-100A	NX	R1	2.9	4.0	8.8	6.4	4.8	4.6	95%	1.42	30%	Poor	Slightly Weathered (W2) to Fresh (W1)	Very Strong (R5) to Extremely Strong (R6)	43	Grey, very fine grained, M very to extremely strong, t steep dipping, close spaci fractures per foot [MEDIU BANGOR FORMATION].					
BB-BSA-109A	9A NX (1.88)			ωΔ			R2	7.9	8.8	14.0	11.4	5.2	5.1	99%	2.54	49%	Poor	Fresh (W1)	Very Strong (R5) to Extremely Strong (R6)	49	Grey, very fine grained, M (0.1 to 0.7 in thick), very to angle to steep dipping, ver rough to smooth, open; av PENOBSCOT RIVER ME
BB-BSA-110	NX	R1	2.5	5.3	10.3	7.8	5.0	4.8	95%	2.46	49%	Poor	Fresh (W1)	Medium Strong (R3)	43	Grey, very fine grained, M calcite veins, medium stro dipping, close to moderate average 1.0 fractures per MEMBER, BANGOR FOR					
	(1.88)	R2	7.5	10.3	15.3	12.8	5.0	5.0	100%	3.54	71%	Fair	Fresh (W1)	Very Strong (R5) to Extremely Strong (R6)	54	Grey, very fine grained, M calcite veins, very to extre dipping, close to wide spa [MEDIUM BEDDED FACI FORMATION].					

### c, Rock Mass and Discontinuity Description<sup>5,6</sup>

rained, METAWACKE [metasandstone] with frequent calcite strong, thinly laminated, slightly weathered; discontinuities ng, close to moderately close spacing, rough to polished, open; er foot [MEDIUM BEDDED FACIES, PENOBSCOT RIVER ORMATION].

rained, METAWACKE [metasandstone] with some calcite thinly laminated, fresh to slightly weathered; discontinuities low very close to close spacing, planar to stepped, rough to smooth, ures per foot [MEDIUM BEDDED FACIES, PENOBSCOT GOR FORMATION].

rained, METAWACKE [metasandstone] with some calcite thinly laminated, fresh to slightly weathered; discontinuities low very close to close spacing, planar to stepped, rough to smooth, ures per foot [MEDIUM BEDDED FACIES, PENOBSCOT GOR FORMATION].

rained, METAWACKE [metasandstone] with some calcite thinly laminated, fresh to slightly weathered; discontinuities low very close to close spacing, planar to stepped, rough to smooth, ures per foot [MEDIUM BEDDED FACIES, PENOBSCOT GOR FORMATION].

METAWACKE [metasandstone] with frequent calcite veins, , thinly laminated, fresh to slightly weathered; discontinuities icing, planar to stepped, rough to smooth, open; average 2.1 IUM BEDDED FACIES, PENOBSCOT RIVER MEMBER,

METAWACKE [metasandstone] with frequent calcite veins to extremely strong, thinly laminated, fresh; discontinuities low very close to moderately close spacing, planar to stepped, average 1.8 fractures per foot [MEDIUM BEDDED FACIES, //EMBER, BANGOR FORMATION].

METAWACKE [metasandstone] with frequent thick and thin rong, thinly laminated, fresh; discontinuities horizontal to steep ately close spacing, stepped, smooth to polished, open; er foot [MEDIUM BEDDEDFACIES, PENOBSCOT RIVER ORMATION].

METAWACKE [metasandstone] with frequent thick and thin remely strong, thinly laminated, fresh; discontinuities steep bacing, stepped, smooth, open; average 0.8 fractures per foot CIES, PENOBSCOT RIVER MEMBER, BANGOR

				R	un			тс	R <sup>1</sup>		RQI	) <sup>2</sup>	Physical	Rock Parame	eters	
Test Boring Designation	Core Size	No.	Midpoint Depth Below Bedrock Surface		h Below Surface	y Ground e (ft)	Length	Length		Length		Designation	Weathering <sup>3</sup>	Estimated Field Strength <sup>3</sup>	Rock Mass Rating [RMR] <sup>4</sup>	Lithologic,
	(in)		(ft)	Start	End	Midpoint	(ft)	(ft)	%	(ft)	%					
BB-BSA-111	NX (1.88)	R1	3.7	19.0	24.0	21.5	5.0	3.4	68%	0.75	15%	Very Poor	Slightly Weathered (W2)	Strong (R4) to Very Strong (R5)	37	Grey, very fine grained, thi with frequent calcite veins, chemical weathering; disco spacing, rough to very rough ft [MEDIUM BEDDED FAC FORMATION].
	(1.00)	R2	8.7	24.0	29.0	26.5	5.0	5.0	100%	3.00	60%	Fair	Fresh (W1)	Strong (R4) to Very Strong (R5)	54	Grey, very fine grained, thi with frequent calcite veins, dipping, very close spacing BEDDED FACIES, PENO

Notes:

1. TCR = total core recovery. Total core recovery is the length of core recovered divided by the length of the run.

2. RQD = rock quality designation. RQD is the total length of intact, full diameter core pieces recovered with a length greater than or equal to 4 inches measured along the core axis. The percent RQD is the total length of RQD measured divided by the run length. Note that vertical discontinuities are not included in determination of RQD.

3. Weathering and Estimated Field Strength based on Tables II.4 and II.3 (respectively) in Wyllie and Mah, 2004, Rock Slope Engineering: Civil and Mining, 4th Edition (based on ISRM, 1981).

4. Rock Mass Rating (RMR) System (Bieniawski, 1989) assigns numerical ratings to six parameters, including the strength of the intact rock, the RQD, the discontinuity spacing, groundwater conditions, and orientation of discontinuities. These ratings are summed to provide the RMR value. The rating adjustment for joint orientation was assigned a value of -4, which is the average of the orientation adjustments obtained from geologic field mapping of the exposed rock outcrops and which is based on the existing rock cut orientation. The proposed foundation orientation may allow for a different rating adjustment for joint orientation, and thus a modification to the RMR value shown on this table.

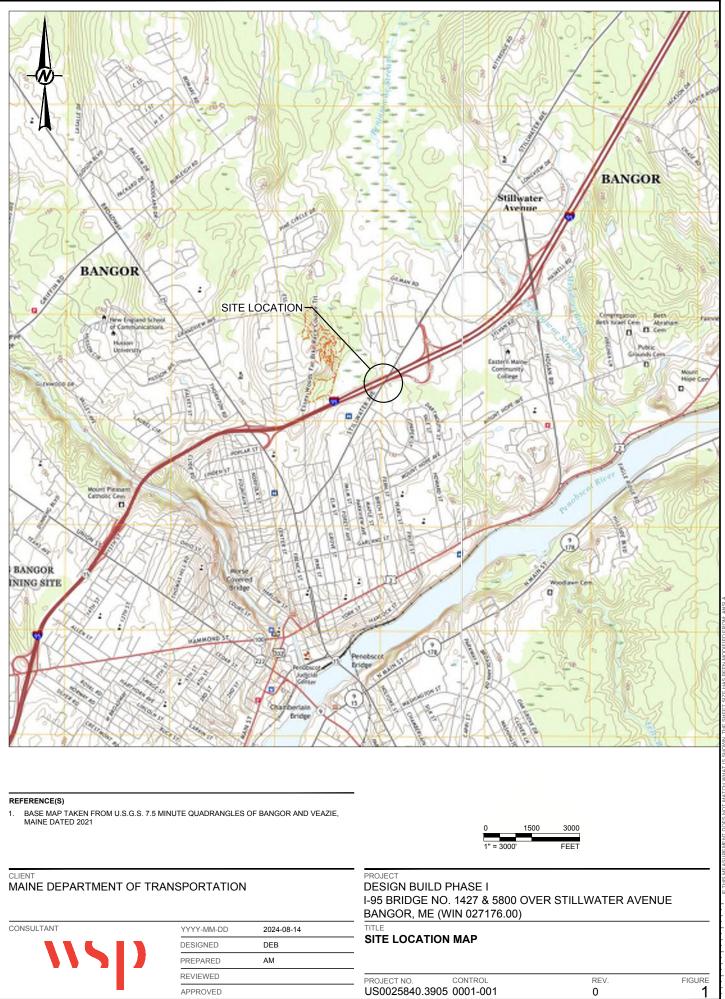
5. Bedrock formation name from: Pollock, Stephen G. 2011. Bedrock geology of the Bangor Quadrangle, Maine. Maine Geological Survey Open-File No. 11-57. Map scale 1:24,000. 6. ft = feet, in = inches c, Rock Mass and Discontinuity Description<sup>5,6</sup>

thinly to very thinly bedded, METAWACKE [metasandstone] ns, strong to very strong, slightly weathered with signs of scontinuities low angle to steep dipping, close to very close bugh, open to tight, highly fractured average from 19 ft to 21.3 FACIES, PENOBSCOT RIVER MEMBER, BANGOR

thinly to very thinly bedded, METAWACKE [metasandstone] ns, strong to very strong, fresh; discontinuities low angle ing, rough, tight, average 1.6 fractures per foot [MEDIUM IOBSCOT RIVER MEMBER, BANGOR FORMATION].

> Prepared by: KAR Checked by: BK Reviewed by: JDL

## FIGURES

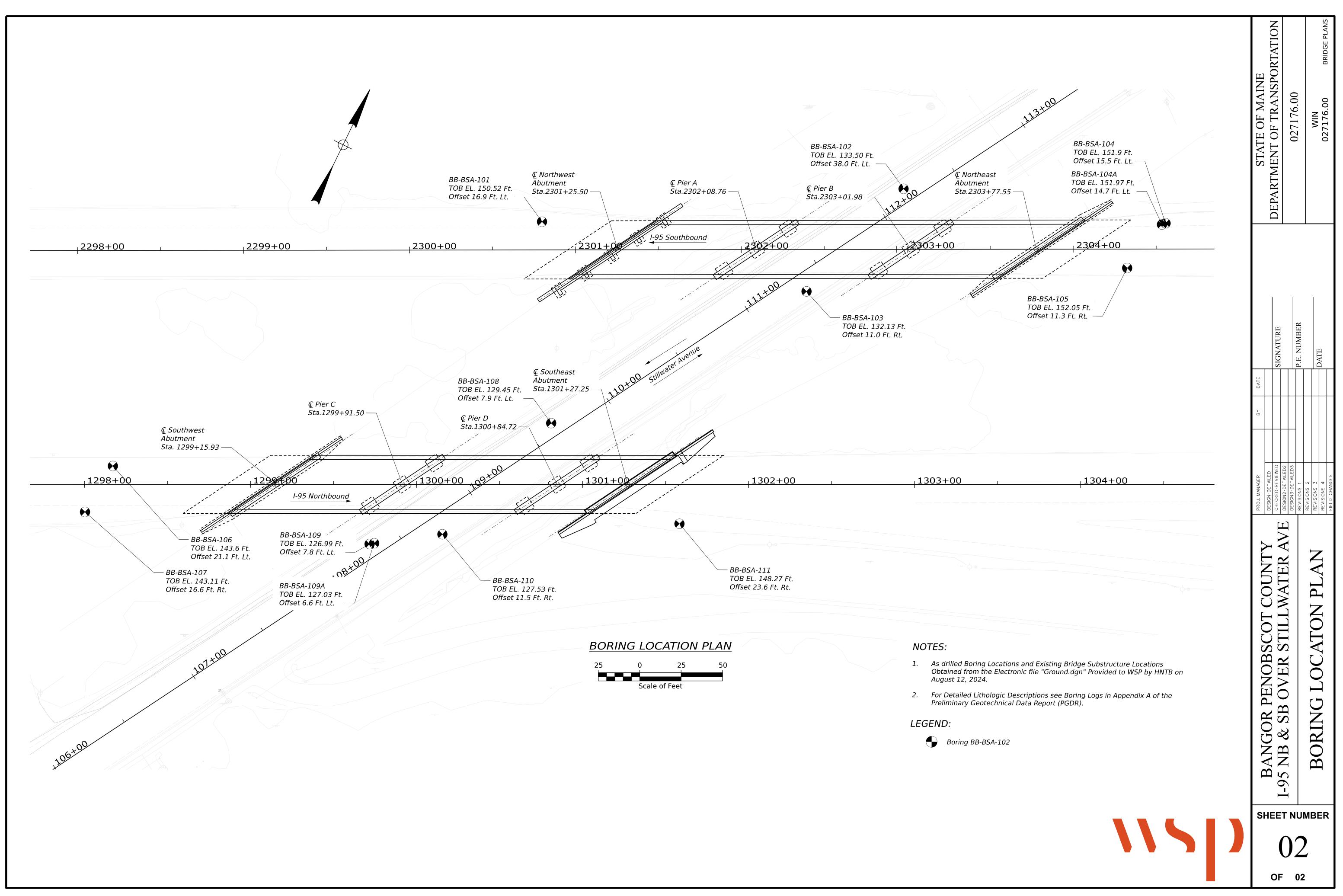


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Date: 9/13/2024

APPENDIX A

## **Boring Logs**

	UNIFIE	ED SOIL C	LASSIFIC	ATION SYSTEM		MODIFIED B	URMISTER S	YSTEM
			GROUP					
MAJ COARSE- GRAINED SOILS	GRAVELS	ONS CLEAN GRAVELS (little or no	GW GP	TYPICAL NAMES Well-graded gravels, gravel- sand mixtures, little or no fines. Poorly-graded gravels, gravel	tr li	<u>tive Term</u> race ittle ome . Sandy, Clayey)	<u>Porti</u>	<u>on of Total (%)</u> 0 - 10 11 - 20 21 - 35 36 - 50
	alf of coan er than No size)	fines)		sand mixtures, little or no fines.	(0.g.	TERMS		3
is larger ize)	(more than half of coarse fraction is larger than No. 4 sieve size)	GRAVEL WITH FINES (Appreciable amount of	GM GC	Silty gravels, gravel-sand-silt mixtures. Clayey gravels, gravel-sand-clay mixtures.	sieve): Includes (´ Clayey or Gravelly penetration resista	<u>soils</u> (more than half o 1) clean gravels; (2) S y sands. Density is ra ance (N-value).	ilty or Clayey gravels ated according to star	nan No. 200 s; and (3) Silty, ndard
(more than half of material is larger than No. 200 sleve size)		fines) CLEAN	SW	Well-graded sands, Gravelly	<u>Cohesion</u> Very	<u>isity of</u> <u>nless Soils</u> / loose pose		enetration Resistance ue (blows per foot) 0 - 4 5 - 10
e than hal than No.	SANDS	SANDS (little or no	SP	sands, little or no fines Poorly-graded sands, Gravelly	De	m Dense ense Dense		11 - 30 31 - 50 > 50
(mor	(more than half of coarse fraction is smaller than No. 4 sieve size)	fines)		sand, little or no fines.	Fine-grained soil	<b>ls</b> (more than half of n 1) inorganic and orgar		an No. 200
	ire than h∉ on is small sieve s	SANDS WITH FINES	SM	Silty sands, sand-silt mixtures	or Silty clays; and strength as indica	., ,,	<u>Approximate</u>	ording to undrained shear
	(mo fracti	(Appreciable amount of fines)	SC	Clayey sands, sand-clay mixtures.	Consistency of Cohesive soils	SPT N <sub>60</sub> -Value	<u>Undrained</u> <u>Shear</u> Strength (psf)	<u>Field</u> <u>Guidelines</u>
			ML	Inorganic silts and very fine sands, rock flour, Silty or Clayey fine sands, or Clayey silts with	Very Soft Soft Medium Stiff	WOH, WOR, WOP, <2 2 - 4 5 - 8	0 - 250 250 - 500 500 - 1000	Fist easily penetrates Thumb easily penetrates Thumb penetrates with
FINE- GRAINED	SILTS AN	ID CLAYS	CL	slight plasticity. Inorganic clays of low to medium plasticity, Gravelly clays, Sandy	Stiff Very Stiff	9 - 15 16 - 30	1000 - 2000 2000 - 4000	moderate effort Indented by thumb with great effort Indented by thumbnail
SOILS	(liquid limit l	ess than 50)	OL	clays, Silty clays, lean clays. Organic silts and organic Silty	Hard Rock Quality Des	>30 signation (RQD):	over 4000	Indented by thumbnail with difficulty
ial is e size)				clays of low plasticity.	RQD (%) =	sum of the lengths *Minimu	of intact pieces of length of core ad im NQ rock core (*	lvance
(more than half of material is smaller than No. 200 sieve size)	SILTS AN	ID CLAYS	СН	Inorganic silts, micaceous or diatomaceous fine Sandy or Silty soils, elastic silts. Inorganic clays of high		<b>Rock Quality Ba</b> <u>Rock Quality</u> Very Poor Poor	<u>RQD (%)</u> ≤25 26 - 50	
(more the smaller tha	(liquid limit gr	eater than 50)	ОН	plasticity, fat clays. Organic clays of medium to high plasticity, organic silts.	Desired Rock C	Fair Good Excellent <b>Dbservations (in th</b>	51 - 75 76 - 90 91 - 100 nis order, if appli	cable):
		ORGANIC	Pt	Peat and other highly organic soils.	Color (Munsell Texture (aphan Rock Type (gra		tc.) one, etc.)	
Desired Se	il Observet	tions (in thi	s order if	annlicable):			ht, moderate, mod	l. severe, severe, etc.)
Color (Muns Moisture (dr Density/Cor Texture (find Name (Sand Gradation (	sell color ch ry, damp, m nsistency (fr e, medium, d, Silty San well-graded on-plastic, s ayering, frac ell, moderat n (weak, mo rigin (till, ma	art) oist, wet) om above ri coarse, etc. d, Clay, etc. , poorly-grad slightly plast ctures, crack ely, loosely, oderate, or s	ght hand s ) , including ded, unifor ic, modera (s, etc.) etc., ) strong)	portions - trace, little, etc.) m, etc.) tely plastic, highly plastic)	Formation (Wat RQD and correl ref: ASTM D6 Site Characte Recovery (inch/ Rock Core Rate	35-55 deg., stee -spacing (very clos close - 1-3 feet, -tightness (tight, op -infilling (grain size terville, Ellsworth, C lation to rock quality 032 and FHWA NH erization, Table 4-12 /inch and percentag e (X.X ft - Y.Y ft (mi	ep - 55-85 deg., ve ee - <2 inch, close wide - 3-10 feet, v pen, or healed) , color, etc.) Cape Elizabeth, etc y (very poor, poor, 1I-16-072 GEC 5 - 2 ge) n:sec))	very wide >10 feet) c.) etc.) Geotechnical
Key	y to Soil a	Geotechi	<i>nical</i> Sec Descrip	tions and Terms	Sample Cont WIN Bridge Name Boring Numbe Sample Numb Sample Depth	er ber	Requirements: Blow Counts Sample Recove Date Personnel Initia	ery

## **Classification of Rock Material Strengths**<sup>1</sup>

Grade	Description	Field Identification	Compress	nge of Uniaxial vive Strength
			MPa	psi
S1	Very soft clay	Easily penetrated several inches by fist	<0.025	<4
S2	Soft clay	Easily penetrated several inches by thumb	0.025-0.05	4-7
S3	Firm clay	Can be penetrated several inches by thumb with moderate effort	0.05-0.10	7-15
S4	Stiff clay	Readily indented by thumb but penetrated only with great effort	0.10-0.25	15-35
S5	Very stiff clay	Readily indented by thumbnail	0.25-0.50	35-70
S6	Hard clay	Indented with difficulty by thumbnail	>0.50	>70
R0	Extremely weak rock	Indented by thumbnail	0.25-1.0	35-150
R1	Very weak rock	Crumbles under firm blows with point of geological hammer; can be peeled by a pocket knife	1-5	150-725
R2	Weak rock	Can be peeled by a pocket knife with difficulty; shallow indentations made by firm blow with point of geological hammer	5-25	725-3,500
R3	Medium strong rock	Cannot be scraped or peeled with a pocket knife; specimen can be fractured with single firm blow of geological hammer	25-50	3,500-7,000
R4	Strong rock	Specimen requires more than one blow of geological hammer to fracture it	50-100	7,000-15,000
R5	Very strong rock	Specimen requires many blows of geological hammer to fracture it	100-250	15,000-36,000
R6	Extremely strong rock	Specimen can only be chipped with geological hammer	>250	>36,000

*Note:* Grades S1 to S6 apply to cohesive soils, for example clays, silty clays, and combinations of silts and clays with sand, generally slow draining. Discontinuity wall strength will generally be characterized by grades R0-R6 (rock) while S1-S6 (clay) will generally apply to filled discontinuities.

<sup>&</sup>lt;sup>1</sup> International Society for Rock Mechanics (ISRM), Commission on standardization of laboratory and field tests (1978): Suggested methods for the quantitative description of discontinuities in rock masses. Int. J. Rock Mech. Min. Sci. & Geomech. Abstr., Vol. 15, No. 6, pp. 319-368.

Ι	Main	e Dep	artment	of Transport	tatio	n	Project	Main	DOT I-	95 Bridges Over Stillwater	Boring No.:	BB-BS	SA-101
		-	Soil/Rock Expl	-			Locatio	Aven		ine			
			US CUSTOM/	ARY UNITS			Localio	n. Dai	g01, I <b>v</b> 1a	ine	WIN:	0271	76.00
Drille	ar.		Seaboard		FIG	vatior	(f+ )	150	52		Auger ID/OD:		
	ator:		Ryan H.		_	tum:	(i)		ne East	Zone	Sampler:	Standard Split	Spoon
- ·	ged By:		D. Burgess			g Type			drich D-		Hammer Wt./Fall:	140lb/30in	Spool
	Start/Fi	inish:	-	); 7/30/24 (3:15)	_		lethod:			& Wash	Core Barrel:	NQ/NX	
	ng Loca			E: 1735264.27	_	sing II		4" (		ce trash	Water Level*:	24.8' at 1:47 7/	30/24
	-		actor: 1.087	2. 175520	_	mmer		Auton	,	Hydraulic 🗆	Rope & Cathead	2110 41 1117 //	00/21
Definit	ions:		401011 1.007	R = Rock	Core San	nple	.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	S <sub>u</sub> =	Peak/Re	molded Field Vane Undrained She	ear Strength (psf) T <sub>v</sub> =	Pocket Torvane She	
MD = U = Th MU = V = Fi	nin Wall Tu Unsuccess eld Vane S	sful Split Sp ibe Sample sful Thin Wa Shear Test,	oon Sample Atterr all Tube Sample At PP = Pocket Per ane Shear Test Att	RC = Roll ttempt WOH = W netrometer WOR/C =	er Cone /eight of 1 Weight o	40lb. Ha f Rods o	r Casing	q <sub>p</sub> = N-u Han N <sub>60</sub>	Unconfin corrected mer Effici = SPT N-	Vane Undrained Shear Strength ( ed Compressive Strength (ksf) d = Raw Field SPT N-value iency Factor = Rig Specific Annual uncorrected Corrected for Hamme re Efficiency Factor/60%)*N-uncor	LL = PL = Calibration Value PI = er Efficiency G = 0	= Water Content, per Liquid Limit Plastic Limit Plasticity Index Grain Size Analysis Consolidation Test	cent
			5	Sample Information		01101 01							I also and any
Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N <sub>60</sub>	Casing Blows	Elevation (ft.)	Graphic Log	Visual De	scription and Remarks		Laboratory Testing Results/ AASHTO and Unified Class.
0	1D	24/15	0.70 - 2.70	12-12-12-11	24	43	SSA	149.9	×××××	7" Asphlat Pavement			Fines = 16.8%
										Light Olive Brown, dry, des \little silt (FILL).	nse, fine to coarse SAND		A-1-b (0),SM
	2D	24/22	2.70 - 4.70	10-21-21-21	42	76				Olive with brown, dry, hard fine to coarse sand, non-pla		rse gravel, little	
- 5 -	3D	24/22	5.00 - 7.00	15-28-43-42	71	129				Olive with brown, dry, hard fine to coarse sand, non-pla		arse gravel, little	
	4D	24/22	7.00 - 9.00	24-16-26-39	42	76				Olive with brown, dry to m SILT, some fine to coarse s (FILL).			WC = 11.1% Fines = 52.2% A-4 (0), ML
							$\mathbb{N}$	1					
- 10 -	5D	24/22	10.00 - 12.00	11-13-16-17	29	53	182			Olive with brown, moist, ha		oarse sand, little	
	-						171			fine to coarse gravel, non-p	lastic (FILL).		
							142						
							85	137.0				— — — —13.5-	
- 15 -	6D	22/6	15.00 - 16.83	16-16-10-22	26	47	53 OPEN			Olive brown, moist, dense, gravel, some silt (SILTY S		me fine to coarse	WC = 10.7% Fines = 28.8% A-2-4 (0), SM- GM
													UM
- 20 -	7D	24/9	20.00 - 22.00	13-22-30-30	52	94				Olive brown, moist, dense, gravel, some silt (SILTY SA		me fine to coarse	
										Brown, wet, very dense, fin some silt (SILTY SAND W		e fine gravel,	
										Increased roller bit resistant	ce		
- 25 -	8D	24/6	25.00 - 27.00	29-33-34-23	67	121				Dark grayish brown, wet, v GRAVEL, little silt (SAND		SANDY	WC = 9.6% Fines = 17.5%
													A-1-b (0), GM- SM
										<u> </u>			
30 Rem	arks:								\$255				
1. H 2. A	lammer H s-drilled	boring loo	cations and grou	by S.W. Cole and take and surface elevations 4 at 1:47 am was made	were pro	ovided b	y HNTB.		le - SPT	Report" by GRL Engineers In	nc., dated 11/10/2023.		
Stratif	cation line	s represent	approximate bour	ndaries between soil types	; transitio	ns mav H	e gradual				Page 1 of 3		
* Wate	er level rea	dings have		es and under conditions st				ns may	occur due	to conditions other	Boring No.	: BB-BSA-	101

I	Main	e Depa	artment	of Transport	ation	Project	: Maine	eDOT I	95 Bridges Over Stillwater	Boring No.:	BB-BS	SA-101
		-	Soil/Rock Exp			Locatio	Aven n: Ban		iine		0.051	
		Ī	US CUSTOM	<u>ARY UNITS</u>				-		WIN:	0271	76.00
Drill	er:		Seaboard		Elevati	on (ft.)	150	.52		Auger ID/OD:		
Ope	rator:		Ryan H.		Datum:		Mai	ne East	Zone	Sampler:	Standard Split	Spoon
Log	ged By:		D. Burgess		Rig Typ	e:	Die	drich D	-50	Hammer Wt./Fall:	140lb/30in	
Date	Start/Fi	inish:	7/29/24 (21:00	)); 7/30/24 (3:15)	Drilling	Method:	SSA	A, Drive	& Wash	Core Barrel:	NQ/NX	
Bori	ng Loca	tion:	N: 482856.27,	E: 1735264.27	Casing	ID/OD:	4" (	ID)		Water Level*:	24.8' at 1:47 7/	30/24
		iciency F	actor: 1.087		Hamme	r Type:	Autom		Hydraulic 🗆	Rope & Cathead □		
MD = U = T MU = V = Fi	plit Spoon Unsuccess hin Wall Tu Unsuccess eld Vane S	sful Split Spo ube Sample sful Thin Wa Shear Test,	oon Sample Atten III Tube Sample A PP = Pocket Pe <u>ne Shear Test Att</u>	SSA = Soli npt HSA = Holl RC = Rolle ttempt WOH = We netrometer WOR/C = V	tore Sample d Stem Auger ow Stem Auger r Cone light of 140 lb. Veight of Rods leight of One F	Hammer or Casing	S <sub>u(la</sub> q <sub>p</sub> = N-ur Ham N <sub>60</sub>	ab) = Lab Unconfin ncorrecte mer Effic = SPT N	emolded Field Vane Undrained Sh Vane Undrained Shear Strength (ksf) ed Compressive Strength (ksf) d = Raw Field SPT N-value iency Factor = Rig Specific Annua -uncorrected Corrected for Hamm re Efficiency Factor/60%)*N-unco	(psf) WC = LL = I PL = I Il Calibration Value PI = F er Efficiency G = G	Pocket Torvane Shea Water Content, pero Liquid Limit Plastic Limit Plasticity Index Irain Size Analysis onsolidation Test	
Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (pst) or RQD (%)	N-uncorrected	Casing Blows	Elevation (ft.)	Graphic Log	Visual De	escription and Remarks		Laboratory Testing Results/ AASHTO and Unified Class.
30	9D	8/3	30.00 - 30.67	50/3"	R	-			Grey, wet, hard, SILT, som gravel, trace clay, fractured	· · · · · · · · · · · · · · · · · · ·	L TILL)	
	R-1 R-2	10.8/9.6 6/6	32.40 - 32.90	RQD = 0% $RQD = 0%$		NQ/NX	119.0		Bedrock encountered at 31 Top of Bedrock Elev. 119.	0 ft	31.5-	
	R-3	43.2/43.2	32.90 - 36.50	RQD = 14%					R1 (31.5' - 32.4'): Grey, ve bedded, METAWACKE [r	netasandstone] with calcite	veins, very	
- 35 -							-		strong, slightly weathered; very close to close spacing froatured, close in filling at h	, smooth to very rough, tig	ht to open, highly	
	R-4	60/60	36.50 - 41.50	RQD = 60%			-		fractured, clay infilling at t FACIES, PENOBSCOT R FORMATION].			
							1		Rock Mass Quality = very 89% recovery	poor		
									0% RQD Rock Core Rate (min:sec)			
- 40 -									31.5 - 32.4 ft (3:01) R2 (32.4' - 32.9'): Grey, ve	ry fine grained thinly to ye	erv thinly	
- 40 -							109.0	)	bedded, METAWACKE [r top of run, strong to very si to steep dipping, very close [MEDIUM BEDDED FAC BANGOR FORMATION] Rock Mass Quality = poor 100% recovery 0% ROD	netasandstone] clay and sa trong, weathered; discontin e spacing, rough, open, hig CIES, PENOBSCOT RIVE	nd infilling at the uities low angle hly fractured	
- 45 -							-		Rock Core Rate (min:sec) 32.4 - 32.9 ft (1:03) R3 (32.9' - 36.5'): Grey, ve bedded, METAWACKE [r strong to very strong, sligh angle to steep dipping, very rough, tight to open, averag BEDDED FACIES, PENO FORMATION].	netasandstone] with freque tly weathered to fresh; disc y close to close spacing, ro ge 3.5 fractures per foot [M BSCOT RIVER MEMBEI	nt calcite veins, continuities low ugh to very IEDIUM	
- 50 -							-		Rock Mass Quality = very 100% recovery 14% RQD Rock Core Rate (min:sec) 32.9 - 33.5 ft (2:24) 33.5 - 34.5 ft (3:07) 34.5 - 35.5 ft (3:25) 35.5 - 36.5 ft (3:23)			
- 55 -							-		R4 (36.5' - 41.5'): Grey, ve bedded, METAWACKE [r strong, fresh; discontinuitic spacing, rough to very roug [MEDIUM BEDDED FAC BANGOR FORMATION] Rock Mass Quality = fair 100% recovery 60% RQD Rock Core Rate (min:sec)	netasandstone] with freque es low angle to steep dippin gh, tight, average 1.6 fractu CIES, PENOBSCOT RIVE	nt calcite veins, ng, very close res per foot	
1. H 2. A 3. V Stratif	As-drilled Vater leve	boring loc el reading t s represent	cations and groutaken on 7/30/2	by S.W. Cole and taker and surface elevations w 4 at 1:47 am was made ndaries between soil types; es and under conditions sta	rere provided after the roc transitions ma	l by HNTB c coring. y be gradual.			II Report" by GRL Engineers I	Page 2 of 3		
			me measuremen				, `			Boring No.	BB-BSA-	101

Boring	No.:	BB-BSA	-101
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l	Main	e Dep	artment	of Transport	ation	Pro	oject:			95 Bridges Over Stillwater	Boring No.:	BB-BS	SA-101
			Soil/Rock Exp US CUSTOM	oloration Log IARY UNITS		Lo	ocatio	Avenu n: Bang		ine	WIN:	0271	76.00
Drill	er:		Seaboard		Elevat	ion (ft	.)	150.:	52		Auger ID/OD:		
	rator:		Ryan H.		Datum	,	.,		e East	Zone	Sampler:	Standard Split	Spoon
· ·	ged By:		D. Burgess		Rig Ty				rich D-		Hammer Wt./Fall:	140lb/30in	Броон
	Start/Fi	inich:	-	(0), 7/20/24 (2.15)		-	had			& Wash	Core Barrel:	NQ/NX	
				00); 7/30/24 (3:15)	Drillin	-				& wash			20/24
	ng Loca			7, E: 1735264.27	Casin	<u> </u>		4" (I	,		Water Level*:	24.8' at 1:47 7/	30/24
Ham Defini		iciency F	actor: 1.087		Hamm Core Sample	er Typ	pe:	Automa		Hydraulic emolded Field Vane Undrained Sh	Rope & Cathead	Pocket Torvane She	or Strongth (nof)
D = S MD = U = T MU = V = F	plit Spoon Unsuccess hin Wall Tu Unsuccess jeld Vane S	sful Split Sp ibe Sample sful Thin Wa Shear Test,	oon Sample Atte III Tube Sample A PP = Pocket Pe <u>ne Shear Test A</u>	SSA = Soli mpt HSA = Hol RC = Rolle Attempt WOH = We enetrometer WOR/C = V	d Stem Auge low Stem Aug	ger 5. Hamm ds or Ca:	sing	S <sub>u(lal</sub> q <sub>p</sub> = I N-uno Hamr N <sub>60</sub> =	o) = Lab Jnconfir correcter ner Effic sPT N	Vane Undrained Shear Strength ted Compressive Strength (ksf) d = Raw Field SPT N-value iency Factor = Rig Specific Annua -uncorrected Corrected for Hamm ter Efficiency Factor/60%)*N-unco	(psf) WC LL = PL = al Calibration Value PI = er Efficiency G =	= Water Content, per Liquid Limit Plastic Limit Plasticity Index Grain Size Analysis Consolidation Test	
				Sample Information									Laboratory
Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N60	Casing Blows	Elevation (ft.)	Graphic Log	Visual De	escription and Remarks		Testing Results/ AASHTO and Unified Class.
60										36.5 - 37.5 ft (3:04) 37.5 - 38.5 ft (3:24) 38.5 - 39.5 ft (3:32) 39.5 - 40.5 ft (4:40) 40.5 - 41.5 ft (4:44)		41.5	
										Bottom of Exploratio Boring backfilled with ben cuttings and gravel to botto		re socket, drill	
- 65 -										asphalt.			
- 70 -													
- 75 -													
- 80 -													
- 85 -													
						-+							
1. H 2. A 3. V	As-drilled Vater leve	boring loo el reading	cations and gro taken on 7/30/	ound surface elevations w 24 at 1:47 am was made	vere provid after the ro	ed by H ck corii	INTB. ng.	SW Col	e - SPT	Report" by GRL Engineers I			
* Wat	er level rea	dings have		undaries between soil types; nes and under conditions sta nts were made.				ns may o	cur due	to conditions other	Page 3 of 3 Boring No	: BB-BSA-	101

Ι	Main	e Depa	artment	of Transport	atioi	n	Project:	MaineDO	T I-95 Bridges Over Stillwater	Boring No.:	BB-BS	SA-102
			Soil/Rock Exp				Locatio	Avenue n: Bangor,	Maine			
		<u>l</u>	JS CUSTOM	ARY UNITS				. 8. ,		WIN:	0271	76.00
Drille	er:		Seaboard		Ele	vatior	n (ft.)	133.5		Auger ID/OD:		
	rator:		Kevin Hansco	m	_	um:		Maine E	ast Zone		Standard Split	Spoon
Logg	ged By:		Lina-Maria Pu	ia	Rig	Туре	:	Diedrich	D-50	Hammer Wt./Fall:	140 lbs/30 in	-
Date	Start/F	inish:	05/07/24 (23:5	53); 05/08/24 (02:12)	Dril	lling N	lethod:	SSA, Ca	sed Wash	Core Barrel:	NX	
Bori	ng Loca	tion:	N: 482969.08,	E: 1735451.57	Cas	sing II	D/OD:	3 in/3.25	i in	Water Level*:	9.3 ft on 05/08	/24 at 01:59
		iciency F	actor: 1.066				Туре:	Automatic I		Rope & Cathead □		
MD = U = Th MU = V = Fi	plit Spoon Unsucces hin Wall Tu Unsucces eld Vane S	sful Split Spo ube Sample sful Thin Wa Shear Test,	oon Sample Atten II Tube Sample A PP = Pocket Per ne Shear Test Att	RC = Rolle ttempt WOH = We metrometer WOR/C = W wonpt WO1P = W	d Stem A ow Stem r Cone eight of 14 Neight of	Auger Auger 40lb. Ha Rods o	r Casing	S <sub>u(lab)</sub> = q <sub>p</sub> = Unco N-uncorre Hammer I N <sub>60</sub> = SP	v/Remolded Field Vane Undrained S Lab Vane Undrained Shear Strengt nnfined Compressive Strength (ksf) cted = Raw Field SPT N-value Efficiency Factor = Rig Specific Ann T N-uncorrected Corrected for Ham ammer Efficiency Factor/60%)*N-undrained N-undrained Strength Streng	n (psf) WC = Wa LL = Liqu Jal Calibration Value PI = Plas mer Efficiency G = Grai		
			1 1	Sample Information	77							Laboratory
Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N <sub>60</sub>	Casing Blows	Elevation (ft.)	D Visual [	Description and Remarks		Testing Results/ AASHTO and Unified Class.
0							SSA	132.9	7.5" Asphalt Pavement		0.6	
	1D	24/11.5	1.00 - 3.00	14-13-20-38	33	59			Brown, moist, very dense little silt (FILL).	, fine to medium SAND, some	fine gravel,	WC = 3.7% Fines = 14.0% A-1-b(0), SM
	2D	24/12	3.00 - 5.00	15-24-12-43	36	64			Brown, dry to moist, very fine gravel, non-plastic (1 $q_p > 0.9$ ksf	v dense, medium to fine SILTY FILL).	SAND, some	WC = 8.6% Fines = 38.0% A-4 (0), SM
- 5 -	3D	24/11	5.00 - 7.00	47-22-10-12	32	57	40	128.5	××	o wet, hard, SILT, some sand, t ty (SANDY SILT).	5.0	
							48		Brown to vellow, wet, ha	rd, SANDY SILT, trace fine gr	avel. non-	Fines = 50.2%
	4D	24/12	7.00 - 9.00	15-14-9-39	23	41	45 92		plastic to low plasticity ( $q_p = 0.8 \text{ksf}, 0.9 \text{ksf}$		,	A-4 (0), ML
	5D	24/5	9.00 - 11.00	69-34-27-13	61	108	36	124.5	Brown to vellow, wet, ye	ry dense, fine to coarse GRAV	9.0- EL, some fine	WC = 15.5%
- 10 -	50	24/3	5.00 11.00	07 54 27 15	01	100	63			low to medium plasticity (GRA		Fines = 25.6% A-2-4 (0), GM
							+					(-// -
							100	121.3				
	R1	60/54	12.20 - 17.20	RQD = 73%			135	12110	Bedrock encountered at 1		12.2	
							NX			ry fine to fine grained, thinly to		
- 15 -										E [metasandstone], frequent th tremely strong, slightly weathe		
									discontinuities moderatel close spacing, irregular to	y to steeply dipping, close to m planar, smooth to very rough,	oderately open; average	
	R2	60/59	17.20 - 22.20	RQD = 98%					BEDDED FACIES, PEN	mical weathering in joints [ME OBSCOT RIVER MEMBER, ]		
				-					FORMATION]. Rock Mass Quality = Fai	r		
									90% Recovery Rock Core Rate (min:sec	)		
- 20 -									12.2-13.2 ft (2:24)			
							++/		13.2-14.2 ft (3:05) 14.2-15.2 ft (3:17)			
								111.3	15.2-16.2 ft (3:03) 16.2-17.2 ft (3:19)			
									R2 (17.2'-22.2'): Grey, v	ery fine to fine grained, thinly l		
									strong, fresh; discontinu	ndstone], frequent calcite veins, ties horizontal dipping, close t	to wide	
- 25 -										ar, smooth to very rough, open UM BEDDED FACIES, PENC		
									RIVER MEMBER, BAN	GOR FORMATION].	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
									Rock Mass Quality = Fai 98% Recovery	r		
									Rock Core Rate (min:sec	)		
									17.2-18.2 ft (2:54) 18.2-19.2 ft (3:07)			
30									19.2-20.2 ft (2:48) 20.2-21.2 ft (3:15)			
<b>Rem</b> 1. H 2. A	s-drilled	boring loc	ations and grou	and surface elevations w	ere prov	vided t	y HNTB.		SPT Report" by GRL Engineers			
Stratif	ication line	s represent	approximate bour	ndaries between soil types;	transition	ns may b	e gradual.			Page 1 of 2		
* Wate	er level rea	idings have l	been made at tim	es and under conditions sta	ited. Gro	oundwat	er fluctuatio	ns may occur	due to conditions other	D		100

than those present at the time measurements were mad	2

]	Main	e Dep	artment	of Transport	ation	Project			-95 Bridges Over Stillwater	Boring No.:	BB-BS	SA-102
			Soil/Rock Exp			Locatio	Avenu n: Ban		aine		0.0.5.1	
			US CUSTOM	IARY UNITS						WIN:	0271	76.00
Drill	er:		Seaboard		Elevatio	on (ft.)	133.	5		Auger ID/OD:		
Оре	rator:		Kevin Hansco	om	Datum:		Maiı	ne East	Zone	Sampler:	Standard Split	Spoon
Log	ged By:		Lina-Maria P	'ua	Rig Typ	e:	Died	lrich D	-50	Hammer Wt./Fall:	140 lbs/30 in	
	e Start/F		05/07/24 (23:	:53); 05/08/24 (02:12)		Method:			l Wash	Core Barrel:	NX	
	ng Loca			3, E: 1735451.57	Casing		3 in/	3.25 in	1	Water Level*:	9.3 ft on 05/08	/24 at 01:59
Han Defin		ficiency F	actor: 1.066		Hamme ore Sample	r Type:	Automa Su =		Hydraulic emolded Field Vane Undrained Sh	Rope & Cathead $\Box$	Pocket Torvane She	ar Strength (psf)
MD =		sful Split Sp	oon Sample Atte	mpt SSA = Solic HSA = Hole	d Stem Auger ow Stem Auge	r	S <sub>u(la</sub> q <sub>p</sub> =	b) = Lab Unconfi	Vane Undrained Shear Strength ned Compressive Strength (ksf)	(psf) WC = LL =	<ul> <li>Water Content, per Liquid Limit</li> </ul>	
MU =	Unsucces	ube Sample sful Thin Wa	all Tube Sample /	Attempt RC = Roller WOH = We	ight of 140 lb.		Hami	mer Effic	d = Raw Field SPT N-value ciency Factor = Rig Specific Annua	I Calibration Value PI = I	Plastic Limit Plasticity Index	
			PP = Pocket Pe ine Shear Test A		Veight of Rods eight of One P				I-uncorrected Corrected for Hamme ner Efficiency Factor/60%)*N-unco		Grain Size Analysis Consolidation Test	
				Sample Information	_		1	-				Laboratory
_	ö	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected			Бc				Testing Results/
Depth (ft.)	Sample No.	Rec.	e D	gth ((6	orre	0	Elevation (ft.)	Graphic Log	Visual De	scription and Remarks		AASHTO
epth	amp	en./F	amp	lows hear tren( sf) · RQ	N-unc N <sub>60</sub>	Casing Blows	evat	raph				and Unified Class.
30	ů	ď	ů ť.	ଞ୍ଚନ୍ଦ୍ର	z z		ΞĒ	U	21.2-22.2 ft (3:31)			
	L					_	-		. ,	n at 22.2 feet below grou		
						_	4		Boring backfilled with ben	tonite chips in the rock co	re socket, gravel	
									to bottom of pavement and	patened with cold paten a	spilait.	
- 35												
35												
							1					
							1					
- 40						-	-					
						_	-					
						-	-					
							-					
						_	-					
- 45							-					
						_	-					
						_	-					
						_						
- 50												
50												
	ĺ						]					
							1					
							1					
- 55							1					
	<u> </u>	+					1					
	<u> </u>						1					
						-	1					
							1					
60 Ren	arks:						I					
		Efficiency	factor provide	d by S.W. Cole and taken	from "2023	PA00074	SW Col	e - SPI	Report" by GRL Engineers I	nc dated 11/10/2023		
2. /	As-drilled	l boring lo	cations and gro	ound surface elevations w	ere provided	by HNTB						
3.	water lev	ei reading	taken on 5/8/2	4 at 01:59 was made 15 r	ninutes after	completion	1 OI drill	ing wit	h bottom of casing at 12.2 ft b	gs.		
Strati	fication line	es represent	approximate bou	undaries between soil types;	transitions may	/ be gradual.				Page 2 of 2		
		-	been made at tin ime measuremer	nes and under conditions sta	ted. Groundwa	ater fluctuatio	ons may o	ccur due	e to conditions other	Boring No.	• BB-BSA-	102

]	Main	e Dep	artment	of Transport	ation	L	Project:			95 Bridges Over Stillwater	Boring No.:	BB-BS	SA-103
		-	Soil/Rock Exp				Locatio	Avenu n: Ban		uine		0071	76.00
		<u>!</u>	US CUSTOM	ARY UNITS							WIN:	0271	76.00
Drill	er:		Seaboard		Elev	ation	(ft.)	132.	13		Auger ID/OD:		
Оре	rator:		Kevin Hansco	m	Datu	um:		Maiı	ne East	Zone	Sampler:	Standard Split	Spoon
Log	ged By:		Lina-Maria Pu	ıa	Rig	Туре	:	Died	lrich D-	-50	Hammer Wt./Fall:	140 lbs/30 in	
Date	e Start/F	inish:	05/08/24 (21:3	32); 05/08/24 (23:30)	Drill	ing N	lethod:	SSA	, Cased	Wash	Core Barrel:	NX	
Bori	ng Loca	ation:	N: 482888.01,	E: 1735425.94	Cas	ing IC	)/OD:	3 in/	3.25 in		Water Level*:	5.2 ft on 05/08	/24 at 23:14
		iciency F	actor: 1.066	R = Rock 0			Туре:	Automa		Hydraulic emolded Field Vane Undrained Sho	Rope & Cathead	Dockot Toniana Sha	or Strongth (pof)
MD = U = T MU = V = F	plit Spoon Unsucces hin Wall To Unsucces ield Vane S	sful Split Spo ube Sample sful Thin Wa Shear Test,	oon Sample Atten II Tube Sample A PP = Pocket Pe ne Shear Test Att	SSA = Soli           npt         HSA = Holi           RC = Rolle           ttempt         WOH = We           netrometer         WOR/C = Work           empt         WO1P = We	d Stem Au low Stem A er Cone eight of 140 Weight of F	uger Auger Olb. Ha Rods o	r Casing	S <sub>u(la</sub> q <sub>p</sub> = N-un Hami N <sub>60</sub> :	b) = Lab Unconfir correcte mer Effic = SPT N	Vane Undrained Shei Strength ( Vane Undrained Shear Strength ( ed Compressive Strength (ksf) d = Raw Field SPT N-value isiency Factor = Rig Specific Annua - uncorrected Corrected for Hammer er Efficiency Factor/60%)*N-unco	(psf) WC = LL = L PL = I I Calibration Value PI = F er Efficiency G = G	Pocket Torvane She Water Content, per iquid Limit Plastic Limit lasticity Index rain Size Analysis onsolidation Test	
		· ·		Sample Information	σ				1				Laboratory
Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N <sub>60</sub>	Casing Blows	Elevation (ft.)	Graphic Log	Visual De	escription and Remarks		Testing Results/ AASHTO and Unified Class.
0							SSA	131.5	××××	Asphalt Pavement			
	1D	24/16	1.00 - 3.00	21-24-21-21	45	80				Brown, dry, dense, SILTY (FILL).	GRAVEL, some sand, poo		
										(FILL).			
	2D	24/12	3.00 - 5.00	7-10-6-48	16	28		129.0		2DA, Top 1 in: Brown, dry		RAVEL, some	
										sand, poorly-graded (FILL)			
- 5 -	3D	26.4/15.5	5.00 - 7.20	45-34-45-50/4"	79	140				2DB, Bottom 11 in: Grey, o some weathered rock fragn	nents (WEATHERED BEI	ROCK).	
		20.1/10.0	5.00 7.20	15 51 15 50/1		140				Grey, moist to wet, very de little sand (WEATHERED		ROCK, some silt,	
		60/60	7 20 12 20	DOD 214/				124.9				7.2	
	R1	60/60	7.20 - 12.20	RQD = 31%			NX			Bedrock encountered at 7.2 Top of Bedrock at Elev. 12	0		
										R1 (7.2'-12.2'): Grey, very	fine to fine grained, META		
- 10 -										[metasandstone] with thin a extremely strong, thinly lar	•		
10										low angle to steep dipping,	very close to close spacing	g, stepped to	
										irregular, very rough to sm [MEDIUM BEDDEED FA			
	R2	60/60	12.20 - 17.20	RQD = 71%						BANGOR FORMATION]. Rock Mass Quality = very			
										100% Recovery	poor		
										Rock Core Rate (min:sec) 7.2-8.2 ft (4:32)			
- 15 -										8.2-9.2 ft (4:43) 9.2-10.2 ft (5:32)			
							$  \rangle / /$			10.2-11.2 ft (5:50)			
							+V	114.9		11.2-12.2 ft (6:37) R2 (12.2'-17.2'): Grey, very	y fine to fine grained, MET	AWACKE	
										[metasandstone] with thin a thinly laminated, fresh; dis			
										moderately close spacing, s	stepped to irregular, rough,	open, average	
- 20 -										0.8 fractures per foot [MEI RIVER MEMBER, BANG		, PENOBSCOT	
										Rock Mass Quality = Exce			
										100% Recovery			
										Bottom of Exploration Boring backfilled with ben	n at 17.2 feet below groun tonite chips in the rock cor		
	[									to bottom of pavement and	patched with cold patch as	sphalt.	
								1					
- 25 ·													
30 Rem	arks:				[								
			6 · • •	h- CW C 1		00005	100074	cuv c ·			- 1.4.11/10/2022		
2. A	As-drilled	boring loc	ations and grou	and surface elevations v	vere prov	ided b	y MaineE	DOT.		'Report" by GRL Engineers I	nc., dated 11/10/2023.		
3. \	Water lev	el reading	taken on 5/8/24	at 23:14 was made after	er comple	etion o	f drilling	with bot	tom of	casing at 7.2 ft bgs.			
				ndaries between soil types;			-				Page 1 of 1		
* Wat	er level rea	adings have	been made at tim	es and under conditions sta	ated. Grou	Indwate	er fluctuation	ns may o	ccur due	e to conditions other			

-	
than those present at the time measurements were made.	

Maine Department of Transportation							Project:	BB-BS	SA-104				
			Soil/Rock Expl				Locatio	Avenu Ban		ine			
			US CUSTOM/	ARY UNITS							WIN:	0271	76.00
Drill	er:		Seaboard		Ele	vation	(ft.)	151.	9		Auger ID/OD:		
<u> </u>	rator:		Ryan H.		_	tum:	()	Maine East Zone Sampler: Standard					
Log	ged By:		D. Burgess		Rig	ј Туре		Died	rich D-	50	Hammer Wt./Fall:	140lb/30in	1
Date Start/Finish: 7/30/24 (20:36); 7/30/24 (23:38) Drilling						lling N	lethod:	SSA	, Drive	& Wash	Core Barrel:	NA	
Bori	ng Loca	tion:	N: 483018.96,	E: 1735602.84	Cas	sing IC	D/OD:	4" (I	D)		Water Level*:	Not measured	
Ham	mer Effi	iciency F	actor: 1.087		Har	mmer	Туре:	Automa	tic ⊠	Hydraulic 🗆	Rope & Cathead □		
MD = U = T MU = V = F	plit Spoon Unsuccess hin Wall Tu Unsuccess ield Vane S	sful Split Sp be Sample sful Thin Wa Shear Test,	oon Sample Atterr III Tube Sample At PP = Pocket Per <u>ne Shear Test Att</u>	ttempt WOH = Wo work work = WOR/C = W	d Stem A low Stem er Cone eight of 14 Weight of	Auger 1 Auger 40lb. Ha f Rods o	r Casing	S <sub>u(la</sub> q <sub>p</sub> = N-un Hami N <sub>60</sub> :	b) = Lab Unconfir corrected mer Effic = SPT N	molded Field Vane Undrained She Vane Undrained Shear Strength (ksf) e Compressive Strength(ksf) i = Raw Field SPT N-value iency Factor = Rig Specific Annual uncorrected Corrected for Hamme er Efficiency Factor/60%)*N-uncor	psf) WC = LL = PL = Calibration Value PI = F er Efficiency G = C	Pocket Torvane She Water Content, per Liquid Limit Plastic Limit Plasticity Index Brain Size Analysis Consolidation Test	
Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (pst) or RQD (%)	N-uncorrected	N <sub>60</sub>	Casing Blows	Elevation (ft.)	Graphic Log	Visual De	scription and Remarks		Laboratory Testing Results/ AASHTO and Unified Class.
0	1D	24/16	0.80 - 2.80	15-14-14-12	28	51	SSA	151.1		8" Asphalt Pavement		0.8	
								151.1		Brown, dry, very dense, fin gravel, trace silt (FILL).	e to coarse SAND, some f		
	2D	24/20	2.80 - 4.80	13-14-9-14	23	42				Brown, dry, very dense, fin gravel, trace silt (FILL).	e to coarse SAND, some f	ine to coarse	
										Dark grayish brown, dry, ha fine to coarse gravel, non-p		edium sand, little	Fines = 55.3% A-4 (0), ML
- 5 -	3D	24/19	5.00 - 7.00	7-11-10-10	21	38				Dark grayish brown, dry, ha fine to coarse gravel, non-p	ard, SILT, some fine to me	edium sand, little	11 4 (0), ML
	4D	24/13	7.00 - 9.00	22-21-19-16	40	72				Dark grayish brown, dry, ha fine to coarse gravel, non-p		edium sand, little	
10							$\mathbb{H}$			Dark grayish brown, dry to some fine to coarse gravel,		coarse SAND,	WC = 6.5% Fines = 20.4% A-1-b (0), SM-
- 10 ·	5D	24/24	10.00 - 12.00	9-7-18-24	25	45	99			Grayish brown, moist, hard		um sand, little	GM
							128			fine to coarse gravel, slight	ly plasue (FILL).		
							92						
							196						
- 15 -							82			Wood fragments in wash w	ater.		
10	6D	24/13	15.00 - 17.00	3-3-4-8	7	13	38	136.4		Grayish brown, wet, stiff, C	LAV little sand trace or		WC = 25%
							57 104			plasticity (CLAY)	LAT, fuite sand, trace gr	ivel, inculuin	Fines = 87.8% $LL = 30$ $PL = 17$
								100.4				10.5	PI = 13
							118	133.4					LI = 0.6 A-6 (10), CL
- 20 -	7D	24/6	20.00 - 22.00	24-33-24-35	57	103	62 OPEN			Greenish grey, wet, hard, S trace clay, slightly plastic (		and, little gravel,	WC =16.4% Fines = 59.5% A-4 (0), ML
								128.9 128.4		Possible bedrock		23.0-	
								120.4			n at 23.5 feet below grou	23.5-	
- 25 ·										Boring terminated due to sh 104A to rock core.			
										Boring backfilled with grav cold patch asphalt.	rel to bottom of pavement	and patched with	
30													
	arks:					1							
				by S.W. Cole and take and surface elevations v				SW Col	e - SPT	Report" by GRL Engineers In	nc., dated 11/10/2023.		
Stratit	ication line	s represent	approximate bour	ndaries between soil types;	transitior	ns may b	e gradual.				Page 1 of 1		
		-	been made at tim ime measurement	es and under conditions sta s were made.	ated. Gro	oundwate	er fluctuation	ns may o	ccur due	to conditions other	Boring No.	: BB-BSA-	104

Maine Department of Transportation							Projec				95 Bridges Over Stillwater	Boring No.:	BB-BS	A-104A
			Soil/Rock Expl			Avenue Location: Bangor, Maine					ine			
		<u> </u>	JS CUSTOM/	ARY UNITS					5.			WIN:	0271	76.00
Drill	er:		Seaboard		Eleva	tior	n (ft.)	15	51.97	7		Auger ID/OD:		
	rator:		Ryan H.		Datu		. ()			e East	Zone			
· ·	ged By:		D. Burgess		Rig T		:			rich D		Hammer Wt./Fall:	140lb/30in	Spoon
	Start/F	inish:		); 7/31/24 (2:33)	_		Iethod:				& Wash	Core Barrel:	NX	
	ng Loca			E: 1735600.99	_	-	D/OD:		' (ID			Water Level*:	Not measured	
	-		actor: NA	2. 1700000000	_	-	Type:	Auto			Hydraulic 🗌	Rope & Cathead	Ttot measured	
Defini	tions:			R = Rock C	ore Sample	)	71	S	, = P	eak/Re	molded Field Vane Undrained She	ear Strength (psf) T <sub>v</sub> =	Pocket Torvane She	
	olit Spoon Unsucces		oon Sample Atterr	ssa = Solio hpt HSA = Hollo				Տլ Չո	lab) = Ur	) = Lab nconfir	Vane Undrained Shear Strength ( ned Compressive Strength (ksf)		Water Content, per Liquid Limit	cent
		ube Sample sful Thin Wa	II Tube Sample A	RC = Roller WOH = We		h Ha	mmer	Ń-	unco	orrected	d = Raw Field SPT N-value iency Factor = Rig Specific Annual		Plastic Limit Plasticity Index	
V = Fi	eld Vane S	Shear Test,	PP = Pocket Per ne Shear Test Att	netrometer WOR/C = V	Veight of R	ods o	r Casing	Ne	so = \$	SPT N	-uncorrected Corrected for Hamme ner Efficiency Factor/60%)*N-uncor	er Efficiency G = 0	Grain Size Analysis Consolidation Test	
1010 -	011000003			Sample Information			5011		1	Indinin				
		(in.)			eq									Laboratory Testing
£	°. No	i) i)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected			6		Log	Visual De	scription and Remarks		Results/
h (f	ple	/Re	ble	ar AD AD	cori		bu s	atio		hic				AASHTO and
Depth (ft.)	Sample No.	Pen./Rec.	ft.)	Blow Strer psf) r R(	un-	N60	Casing Blows	Elevation	Ê	Graphic I				Unified Class.
0	0)	<u> </u>	0, 0		~	2	SSA			0	8" Asphalt pavement			
							SSA	151	.3				0.7-	
							$\parallel$	_						
						-								
		1						1						
- 5 -								-						
								-						
								_						
								_						
							TV							
- 10 -							152							
							-	-						
							115	-						
							49	_						
							121							
							212							
- 15 -							49				Wood coming up in wash v	vater		
							44							
							+	-						
							53	-						
							54	_						
- 20 -							47							
20							NX	131	.6				— — — — 20.4-	
	R-1	60/57	21.00 - 26.00	RQD = 56%				1			Bedrock encountered at 20.			
		1						1			Top of Bedrock at Elev. 13 R1 (21.0' - 26.0'): Grey, ve		very thinly	
							++	-			bedded, METAWACKE [1	netasandstone] with frequ	ent calcite veins,	
							+ +	-			strong to very strong, sligh infilling 22.5 ft to 23 ft; dis			
- 25 -								4			very close to close spacing,	rough to very rough, tig	ht to open,	
											average 1.6 fractures per fo PENOBSCOT RIVER ME			
	R-2	33.6/25.2	26.00 - 28.80	RQD = 61%	T						Rock Mass Quality = fair	MIDER, DAINOUK FUR	MATION].	
								1			95% recovery 56% RQD			
	R-3	26 4/24	28.80 - 31.00	RQD = 23%			++	-			Rock Core Rate (min:sec)			
	N-3	20.7/24	20.00 - 51.00	NQD - 2370			+ +	-			21.0 - 22.0 ft (3:06) 22.0 - 23.0 ft (2:42)			
<u>30</u>	arka										22.0 - 23.0 ft (2:42)			
	arks:						_							
1. A	s-drilled	boring loc	ations and grou	ind surface elevations w	ere provi	ied t	y HNTE	3.						
Stratif	ication line	es represent	approximate bour	ndaries between soil types; t	ransitions	nay I	oe gradua					Page 1 of 2		
				es and under conditions stat		-	-			cur due	to conditions other			
		-	me measurement		27001				,			Boring No.	: BB-BSA-	104A

Maine Department of Transportation						Project:			-95 Bridges Over Stillwater	Boring No.:	BB-BS	A-104A	
			Soil/Rock Exp				Locatio	Avenu n: Bang		aine	WIN:	0271	76.00
Dril	ler:		Seaboard		Eleva	ation	(ft.)	151.	97		Auger ID/OD:		
Ope	erator:		Ryan H.		Datu	m:		Mair	ne East	Zone	Sampler:	Standard Split	Spoon
Log	ged By:		D. Burgess		Rig	Гуре		DieI	Drich D	-50	Hammer Wt./Fall:	140lb/30in	
Dat	e Start/F	inish:	7/30/24 (23:4	0); 7/31/24 (2:33)	Drilli	ng N	lethod:	SSA	, Drive	& Wash	Core Barrel:	NX	
Bor	ing Loca	ation:	N: 483017.59	, E: 1735600.99	Casi	ng IC	D/OD:	4" (I	D)		Water Level*:	Not measured	
		iciency l	Factor: NA				Туре:	Automa		Hydraulic 🗆	Rope & Cathead □		
Definitions:         R = Rock Core Sample           D = Split Spoon Sample         SSA = Solid Stem Auger           MD = Unsuccessful Split Spoon Sample Attempt         HSA = Hollow Stem Auger           U = Thin Wall Tube Sample         RC = Roller Cone           MU = Unsuccessful Thin Wall Tube Sample Attempt         WOH = Weight of 140 lb. H           V = Field Vane Shear Test, PP = Pocket Penetrometer         WOR/C = Weight of Rods           MV = Unsuccessful Field Vane Shear Test Attempt         WO1P = Weight of One Period								S <sub>u(la</sub> q <sub>p</sub> = N-uno Hamr N <sub>60</sub> =	b) = Lab Unconfir correcte ner Effic = SPT N	emolded Field Vane Undrained Sh Vane Undrained Shear Strength hed Compressive Strength (ksf) d = Raw Field SPT N-value ciency Factor = Rig Specific Annua -uncorrected Corrected for Hamm ner Efficiency Factor/60%)*N-uncc	(psf) WC LL = PL : Il Calibration Value PI = er Efficiency G =	Pocket Torvane Shea     Water Content, perce     Liquid Limit     Plastic Limit     Plasticity Index     Grain Size Analysis     Consolidation Test	
Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N <sub>60</sub>	Casing Blows	Elevation (ft.)	Graphic Log		escription and Remarks		Laboratory Testing Results/ AASHTO and Unified Class.
							V           Image: Second seco	121.0		23.0 - 24.0 ft (2:08) 24.0 - 25.0 ft (2:14) 25.0 - 26.0 ft (2:50) R2 (26.0' - 28.8): Grey, ve bedded, METAWACKE [r very strong, fresh; disconti close spacing, rough to ver [MEDIUM BEDDED FAC BANGOR FORMATION] Rock Mass Quality = fair 75% recovery 61% RQD Rock Core Rate (min:sec) 26.0 - 27.0 ft (2:19) 27.0 - 28.0 ft (2:28) 28.0 - 28.8 ft (0:15) R3 (28.8' - 31.0'): Grey, ve bedded, METAWACKE [r discontinuities low angle tt tight to open, average 3.5 f FACIES, PENOBSCOT R FORMATION]. Rock Mass Quality = very 91% recovery 23% RQD Rock Core Rate (min:sec) 28.8 - 29.0 ft (0:08) 29.0 - 30.0 ft (2:56) 30.0 - 31.0 ft (3:18) <b>Bottom of Exploratio</b> Boring backfilled with ben cuttings and gravel to botto asphalt.	netasandstone] with calci nuities low angle to mode y rough, tight, average 0. ZIES, PENOBSCOT RIV ry fine grained, thinly to netasandstone] strong to o steep dipping, very clos ractures per foot [MEDII IVER MEMBER, BANG poor n at 31.0 feet below grou tonite chips in the rock of	te veins, strong to rate dipping, very 5 fractures per foot ER MEMBER, very thinly very strong, fresh; e spacing, rough, JM BEDDED OR 31.0- md surface. pre socket, drill	
Ctrot	ification lin-		t approvimete h	Inderine botwoon coll to-	e: transition-	movi	a aradval				Page 2 of 2		
				Indaries between soil type		-	-			te en litter di	Faye 2 01 2		
		-	e been made at tin time measuremen	nes and under conditions nts were made.	stated. Groui	iawate	er nuctuatio	ns may o	cur due	ε ιο conditions other	Boring No	: BB-BSA-	104A

Ι	Aaine	-		of Transport	atio	n	Proje		MaineD Avenue		5 Bridges Over Stillwater	Boring No.:	BB-BS	SA-105
		-	Soil/Rock Expl JS CUSTOM				Location: Bangor, Maine					WIN:	0271	76.00
Driller: Seaboard Eleva							(ft.)		152.05	5		Auger ID/OD:		
Operator: Ryan H.									Maine	East 2	Zone	Sampler:	Standard Split	Spoon
_ogg	jed By:		D. Burgess		Rig	Туре	:		Diedrie	ich D-5	i0	Hammer Wt./Fall:	140lb/30in	
Date	Start/Fi	inish:	7/31/24 (20:07	); 8/1/24 (0:30)	Dri	lling N	lethod	:	SSA, C	Cased	Wash	Core Barrel:	NX	
Borii	ng Loca	tion:	N: 482984.9, I	E: 1735593.56	Cas	sing ID	D/OD:					Water Level*:	17.0' BGS 11:5	6 7/31/24
		iciency F	actor: 1.087			nmer	Туре:	Au	utomatio			Rope & Cathead □		
ИD = J = Th ИU = / = Fie	blit Spoon S Unsuccess hin Wall Tu Unsuccess eld Vane S	sful Split Spo be Sample sful Thin Wa Shear Test,	oon Sample Atterr Il Tube Sample A PP = Pocket Per ne Shear Test Att	RC = Rolle tempt WOH = W work work = W WOR/C = work work = W	id Stem A low Stem er Cone eight of 14 Weight of	Auger Auger 40lb. Ha	r Casing		$S_{u(lab)}$ $q_p = Un$ N-uncor Hamme $N_{60} = S$	= Lab nconfine rrected er Efficie SPT N-u	nolded Field Vane Undrained She /ane Undrained Shear Strength ( d Compressive Strength (ksf) = Raw Field SPT N-value ency Factor = Rig Specific Annual nucorrected Corrected for Hamme r Efficiency Factor/60%)*N-unco	psf) WC = LL = Li PL = P I Calibration Value PI = PI er Efficiency G = Gr	ocket Torvane She Nater Content, per quid Limit lastic Limit asticity Index ain Size Analysis onsolidation Test	
		<u> </u>		Sample Information	σ									Laboratory
Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N <sub>60</sub>	Casing	Elevation	Elevation (ft.)	Graphic Log	Visual De	scription and Remarks		Testing Results/ AASHTO and Unified Clas
0	1D	24/18	0.90 - 2.90	14-14-15-14	29	53	SSA	\   <sub>1</sub>	151.2		10" Asphalt pavement.			
								٦ '		***	Olive brown, dry, very den		ome fine to	Fines = $16.2$ A-1-b (0), S
	2D	24/19	2.90 - 4.90	9-11-13-12	24	43			X	***	coarse gravel, little silt (FII	LL).		
						-			X	***				
							+	-	X	***	Olive with brown, dry, hard fine to coarse gravel, non-		e sand, some	
5 -								_	×	***	Dark grayish brown, dry, hard, SANDY SILT, trace gravel (FILL).		avel (FILL)	Fines = 46.4
	3D	8/8	5.00 - 5.67	11-50/2"	R				Ŕ	***	Dan grayish orown, aly, h			A-4 (0), MI
									Ŕ	***				SM
	4D	24/10	7.00 - 9.00	13-23-20-16	43	78			Ŕ	***	Dark grayish brown, dry, h	ard, SANDY SILT, trace gi	avel (FILL).	
								,	X	***				
							$\uparrow$	4	X	***				
10 -	5D	13.5/7	10.00 - 11.13	11-31-50/1.5"	R		35		X	***	Dark grayish brown, dry, h	ard, SANDY SILT, trace g	avel (FILL).	
	3D	15.5/7	10.00 - 11.13	11-51-50/1.5	к		-	_	Ř	***				
							67	_	Ř	***				
							40	1	139.0	***			13.1-	
							57		137.0				15.1	
15							45							
15 -	6D	24/13	15.00 - 17.00	3-4-8-11	12	22	38				Grayish brown, wet, mediu little fine to coarse subroun			WC = 20.59 Fines = 55.7
							33				SAND).		IO SILT I	A-4 (0), M
							35							
							+	_						
							39	_						
20 -							40	_			Increased drilling resistance			WC = 11.79
-	7D	24/11	20.00 - 22.00	14-11-20-18	31	56	60				Olive brown, wet, very den gravel (SANDY SILT to SI		e to coarse	Fines = $40.3$
							92				6			A-4 (0), MI SM
							57							
							165							
							58							
25 -	8D	14/6	25.00 - 26.17	20-28-30/2"			OPE	- 1	127.1	F	Grey, wet, very dense, fract	tured rock with fine to coor	- — — —25.0-	
	-						+	_	125.7		(WEATHERED ROCK)	and fock with fille to coal		
	R-1	60/60	26.40 - 31.40	RQD = 30%			ŇX		123.1		Bedrock encountered at 26.		26.4-	
			+ +				+	-			Top of Bedrock Elev. 125.7 R1 (26.4' - 31.4'): Grey, ver		ry thinly	
							+	_			bedded, METAWACKE [n	netasandstone] with calcite	veins, strong,	
30											slightly weathered to fresh;	uscontinuities fow angle t	o steep uipping,	
1. H 2. A	s-drilled	boring loc	ations and grou	by S.W. Cole and take ind surface elevations v 4 at 23:58 was made af	vere pro	vided b	y HNT		V Cole -	- SPT	Report" by GRL Engineers In	nc., dated 11/10/2023.		
Stratifi	cation line	s represent	approximate bour	daries between soil types;	transitior	ns may b	e gradu	al.				Page 1 of 2		
		UNUS NAVE	been made at time	es and under conditions sta	ateu. Gro	unawate		auons i	may occl	ur aue l				

I	<b>Main</b>	e Depa	artment	of Transport	ation	1	Project: MaineDOT I-95 Bridges Over Stillwater				Boring No.:	BB-BS	SA-105
			oil/Rock Exp				Avenue Location: Bangor, Maine					0.051	
		<u>[</u>	JS CUSTOM	<u>ARY UNITS</u>							WIN:	0271	76.00
Drille	er:		Seaboard		Elev	/ation	(ft.)	152.	05		Auger ID/OD:		
Oper	ator:		Ryan H.		Datu	um:		Mai	ne East	Zone	Sampler:	Standard Split	Spoon
Logg	jed By:		D. Burgess		Rig	Туре	:	Diec	lrich D	-50	Hammer Wt./Fall:	140lb/30in	
Date	Start/F	inish:	7/31/24 (20:0)	7); 8/1/24 (0:30)	Drill	ling N	lethod:	SSA	, Cased	l Wash	Core Barrel:	NX	
Borii	ng Loca	tion:	N: 482984.9,	E: 1735593.56	Cas	ing IC	D/OD:				Water Level*:	17.0' BGS 11:5	56 7/31/24
		iciency Fa	actor: 1.087	P. Book C			Туре:	Autom		Hydraulic	Rope & Cathead	Doolaat Tonyono Sha	or Strongth (nof)
MD = 1 U = Th MU = 1 V = Fie	olit Spoon Unsuccess hin Wall Tu Unsuccess old Vane S	on Sample Atter I Tube Sample A PP = Pocket Pe te Shear Test At	RC = Roller WOH = We metrometer WOR/C = W tempt WO1P = W	Stem Au ow Stem A Cone ight of 14 Veight of 1	uger Auger 0 lb. Ha Rods o	r Casing	S <sub>u(la</sub> q <sub>p</sub> = N-un Ham N <sub>60</sub>	b) = Lab Unconfir correcte mer Effic = SPT N	emolded Field Vane Undrained She Vane Undrained Shear Strength ( hed Compressive Strength (ksf) d = Raw Field SPT N-value ciency Factor = Rig Specific Annua -uncorrected Corrected for Hammen er Efficiency Factor/60%)*N-unco	psf) WC = LL = PL = Calibration Value PI = F er Efficiency G = C	Pocket Torvane She Water Content, per Liquid Limit Plastic Limit Plasticity Index Grain Size Analysis Consolidation Test		
				Sample Information	σ				1				Laboratory
Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (pst) or RQD (%)	N-uncorrected	N <sub>60</sub>	Casing Blows	Elevation (ft.)	Graphic Log		scription and Remarks		Testing Results/ AASHTO and Unified Class.
30										very close to close spacing, 3.2 fractures per foot [MEI			
	R-2	57.6/57.6	31.40 - 36.20	RQD = 75%						RIVER MEMBER, BANG Rock Mass Quality = poor			
										100% recovery			
								1		30% RQD Rock Core Rate (min:sec)			
										26.4 - 27.4 ft (2:33)			
- 35 -										27.4 - 28.4 ft (3:10) 28.4 - 29.4 ft (2:54)			
							+V	115.9		29.4 - 30.4 ft (4:01) 30.4 - 31.4 ft (10:40)			
										R2 (31.4' - 36.2'): Grey, ver			
										bedded, METAWACKE [n strong, fresh; discontinuitie			
										spacing, smooth to rough, t			
- 40 -										[MEDIUM BEDDED FAC BANGOR FORMATION].	IES, PENODSCOT KIVE	K MEMDEK,	
40										Rock Mass Quality = fair 100% recovery			
								1		75% RQD			
										Rock Core Rate (min:sec) 31.4 - 32.4 ft (2:36)			
										32.4 - 33.4 (2:53)			
										33.4 - 34.4 (2:51) 34.4 - 35.4 (2:41)			
- 45 -										35.4 - 36.2 (4:20)			
										Bottom of Exploration Boring backfilled with bent	n at 36.2 feet below grou	nd surface.	
										cuttings and gravel to botto			
										asphalt.			
50													
- 50 -													
								1					
								1					
- 55 -													
60													
	arks:								-				-
2. A	s-drilled	boring loc	ations and gro	l by S.W. Cole and taken und surface elevations w 24 at 23:58 was made aft	ere prov	ided b	y HNTB.	SW Col	e - SPT	"Report" by GRL Engineers I	nc., dated 11/10/2023.		
Stratifi	cation line	s represent a	approximate bou	ndaries between soil types;	ransitions	s may b	e gradual.				Page 2 of 2		
* Wate	er level rea	idings have b		ies and under conditions sta			-	ns may c	ccur due	e to conditions other	Boring No.	: BB-BSA-	105

Maine Department of Transportation Soil/Rock Exploration Log				n	-	Aven		95 Bridges Over Stillwater	Boring No.:	<u></u> ,	SA-106		
			US CUSTOM	ARY UNITS	_		Locati	ы: ва	igor, Ma	ine	WIN:	0271	76.00
Driller: Seaboard Eleva							(ft.)	143	.6		Auger ID/OD:		
Operator: Ryan H.				Da	tum:		Ma	ne East	Zone	Sampler: Standard Split Spoon			
ogę	ed By:		D. Burgess		Rig	ј Туре		Die	drich D-	50	Hammer Wt./Fall: 140lb/30in		
	Start/Fi		7/25/24 (20:19	9); 7/29/24 (1:56)	_		lethod		A, Cased	Wash	Core Barrel:	NX	
	ng Loca		N: 482611.2, I	E: 1735095.82	_	sing IC		4" (	ID)		Water Level*:	Refer to remar	ks note 3
lam Definit		ciency F	actor: 1.087	R = Rock C		mmer	Туре:	Auton		Hydraulic  molded Field Vane Undrained She	Rope & Cathead	Pocket Torvane She	or Strongth (n
0 = Sp 1D = 1 1 = Th 1U = 1 1 = Fie	lit Spoon S Jnsuccess in Wall Tu Jnsuccess old Vane S	ful Split Sp be Sample ful Thin Wa hear Test,	oon Sample Atten all Tube Sample A PP = Pocket Per ine Shear Test Att	SSA = Soliv npt HSA = Holl RC = Rolle ttempt WOH = We netrometer WOR/C = W	d Stem A ow Sterr r Cone light of 1 Veight o	Auger Auger 40lb. Ha f Rods o	r Casing	S <sub>u(l</sub> q <sub>p</sub> = N-u Han N <sub>60</sub>	ab) = Lab Unconfin ncorrected mer Effici = SPT N-	Vane Undrained Shear Strength (p ed Compressive Strength (ksf) J = Raw Field SPT N-value iency Factor = Rig Specific Annual uncorrected Corrected for Hamme er Efficiency Factor/60%)*N-uncorr	osf) WC LL = PL = Calibration Value PI = r Efficiency G =	= Water Content, per = Liquid Limit = Plastic Limit Plasticity Index Grain Size Analysis Consolidation Test	
				Sample Information		1	1						Laborator
Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N <sub>60</sub>	Casing Blows	Elevation (ft.)	Graphic Log	Visual Des	scription and Remarks		Testing Results/ AASHTO and Unified Cla
0							SSA			10" Asphalt Pavement		0.0	
	1D	24/13	1.00 - 3.00	14-9-7-5	16	29		142.3		Brown, dry, medium dense, trace silt (FILL).	fine to coarse SAND, so	0.8- ome fine gravel,	
-	2D	24/19	3.00 - 5.00	11-13-18-20	31	56				Olive with brown, moist, ha fine to coarse gravel, non-pl	· · ·	nedium sand, some	
5 -	3D	24/15	5.00 - 7.00	13-16-37-30	53	96				Olive with brown, moist, ha fine to coarse gravel, non-pl		nedium sand, some	
	4D	24/0	7.00 - 9.00	25-27-22-23	49	89		-		No recovery.			
10 -	5D	24/13	10.00 - 12.00	8-9-11-27	20	36	64				Olive with brown, moist, hard, SILT, some fine to medium sand, some fine to coarse gravel, non-plastic (FILL)		
							148 133	-					
							166						
							82						
15 -	6D	24/9	15.00 - 17.00	12-31-20-15	51	92	87 124			Grey, wet, very dense, fine t fragments (FILL).	to coarse SAND, flakey	fractured rock	
							OPEN	r		Possible boulder or cobbles	12 to 15" thick.		
							OFE						
								124.					
20 -							$ \downarrow\rangle$						
	7D	24/22	20.00 - 22.00	5-6-3-4	9	16	24			Olive with grey and orange medium plasticity (CLAY).		CLAY, trace sand,	WC = 269 Fines = 98.
							26	1		Pp = 4.0 to 6.0 ksf.			LL = 37
							22	1					PL = 19 PI = 18
							34	-					LI = 0.4
								-					A-6 (19), 0
5 -							31	4	$\langle / / \rangle$	Olive with gray and orange	mottling wat your stiff	CLAV trace	WC = 28
	8D	24/24	25.00 - 27.00	4-7-8-9	15	27	42			Olive with grey and orange sand, medium plasticity (CL		, CLAI, HACE	Fines = 99.
							55		$\mathbb{V}/\mathbb{A}$	Pp = 6.0 to 8.0 ksf.			LL = 36 PL = 19
							61	1					PI = 17
							54	1					LI = 0.5 A-6 (18), 0
		1						-					71-0 (10), (
		1	1			1	35	1	Y///				1

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.	Page 1 of 4
* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.	Boring No.: BB-BSA-106

Ι	Maine Department of Transportat						Project:			-95 Bridges Over Stillwater	Boring No.:	BB-B	SA-106
		_	Soil/Rock Expl				Locatio	Avenu n: Bang		aine			
		<u>.</u>	US CUSTOMA	ARY UNITS				-			WIN:	0271	76.00
Drill	er:		Seaboard		Elev	vatior	n (ft.)	143.	5		Auger ID/OD:		
Ope	rator:		Ryan H.		Date	um:		Mair	e East	Zone	Sampler:	Standard Split	Spoon
Log	ged By:		D. Burgess		Rig	Туре	:	Died	rich D	-50	Hammer Wt./Fall:	140lb/30in	
Date	Start/Fi	nish:	7/25/24 (20:19	); 7/29/24 (1:56)	_	-	lethod:	SSA	Case	l Wash	Core Barrel:	NX	
Bori	ng Loca	tion:	N: 482611.2, E	E: 1735095.82	_	sing II		4" (I	D)		Water Level*:	Refer to remar	ks note 3
Ham Defini		ciency F	actor: 1.087	R = Rock C			Туре:	Automa		Hydraulic emolded Field Vane Undrained Sho	Rope & Cathead	Pocket Torvane She	ar Strength (nef)
D = S	plit Spoon		oon Sample Atterr	SSA = Soli	d Stem Ai	uger		S <sub>u(la</sub>	) = Lal	o Vane Undrained Shear Strength ( ned Compressive Strength (ksf)	psf) WC =	Water Content, per Liquid Limit	
U = TI	hin Wall Tu	be Sample	III Tube Sample Atten	RC = Rolle	r Cone	-		N-uno	orrecte	d = Raw Field SPT N-value ciency Factor = Rig Specific Annua	PL =	Plastic Limit Plasticity Index	
V = Fi	eld Vane S	Shear Test,	PP = Pocket Per ne Shear Test Atte	netrometer WOR/C = V	Neight of	Rods o	r Casing	N <sub>60</sub> =	SPT N	I-uncorrected Corrected for Hamma ner Efficiency Factor/60%)*N-unco	er Efficiency G = C	Grain Size Analysis	
	Unsuccess	<u>au rieu va</u>		Sample Information			5011	1160 -	(i iaini			Solisolidation rest	
		(in.)	pth	(;	ted				5				Laboratory Testing
(;	Sample No.		Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected			E	: Log	Visual De	scription and Remarks		Results/ AASHTO
Depth (ft.)	nple	Pen./Rec.	- nple	ws ( ear engt f) ROD	nco	0	Casing Blows	Elevation (ft.)	Graphic				and
	Sar	Per	(ft.)	Blo Str Str (ps or I	ź	N <sub>60</sub>	Blog	Ele (ft.)	0 10				Unified Class.
30	9D	24/24	30.00 - 32.00	WOH/18"-8			49			Grey, wet, very soft, CLAY $Pp < 1.0$ tsf.	, trace sand medium plas	ticity (CLAY).	WC = 29% Fines = 98.7%
							42	112.1		Grey, wet, fine to medium		31.5	LL = 26 PL = 15
							56			SILT).	SANDT SILT, some time	giaver (SAND I	PI = 11
							100						LI = 1.3 A-6 (9), CL
							57						
- 35 -	10D	24/12	35.00 - 37.00	4-2-6-7	8	14	43			Grey, wet, stiff, SANDY S		ubrounded to	
							40			round gravel (SANDY SIL	1).		
							42						
							51						
- 40 -		24/10	40.00 40.00		10	10	42			Grey, wet, very stiff, SANI	DY SILT, trace fine to coa	rse subrounded to	WC = 11%
	11D	24/10	40.00 - 42.00	5-3-7-7	10	18	59			round gravel (SANDY SIL			Fines = 57.6% LL = 17
							48						PL = 14
							50						PI = 3 LI = -0.8
							52						A-4 (0), ML
- 45 -							40					1 1 1 /	
	12D	24/18	45.00 - 47.00	3-4-4-6	8	14	53			Grey, wet, stiff, SANDY S round gravel (SANDY SIL		ibrounded to	
							49						
							53						
							61						
							43						
- 50 -	13D	24/12	50.00 - 52.00	10-8-6-11	14	25	54			Grey, wet, very stiff, SANI round gravel (SANDY SIL		rse subrounded to	
							42			Tound graver (SAIVD 1 SIL	1).		
							96						
							173	90.1				— — — —53.5·	
							248	2011				0010	
- 55 -	14D	24/15	55.00 - 57.00	14-13-16-19	29	53	61			Olive, wet, hard, SANDY S	SILT, little fine to coarse s	ubrounded to	WC = 46.5%
	14D	24/13	55.00 - 57.00	14-13-10-19	29	33				rounded gravel, non-plastic	(GLACIAL TILL)		Fines = 48.9% A-4 (0), ML/
							45						SM
							62		湖				
							108						
60							112						
	arks:								_				
				by S.W. Cole and taker and surface elevations w				SW Col	e - SP	F Report" by GRL Engineers I	nc., dated 11/10/2023.		
3. V	Vater leve	el measure	d during drilling	g at 20.55'bgs on 7/26/2	4 at 3:23	3, 20.5	5'bgs on 7	//28/24 a	t 20:1	9. Water level measured at 24.	9'bgs on 7/29/24 at 1:08	was made after th	e rock coring.
Stratif	ication line	s represent	approximate bour	daries between soil types;	transitions	s may t	oe gradual.				Page 2 of 4		
* Wate	er level rea	dings have	been made at time	es and under conditions sta	ited. Grou	undwat	er fluctuatio	ns may o	cur du	e to conditions other			

than those present at the time measurements were made.

Maine Department of Transportation					tion							SA-106	
			Soil/Rock Exp				ocatio	Avenu n: Bang		ine			
		<u> </u>	JS CUSTOM	ARY UNITS					,,		WIN:	0271	76.00
Drill	er:		Seaboard		Elevat	ion (	(ft.)	143.6	5		Auger ID/OD:		
Ope	ator:		Ryan H.		Datum	1:		Main	e East	Zone	Sampler:	Standard Split	Spoon
Log	ged By:		D. Burgess		Rig Ty	pe:		Died	rich D-	50	Hammer Wt./Fall:	140lb/30in	
Date	Start/F	inish:	7/25/24 (20:19	9); 7/29/24 (1:56)	Drilling	g Me	ethod:	SSA,	Cased	Wash	Core Barrel:	NX	
Bori	n <mark>g Lo</mark> ca	tion:	N: 482611.2, I	E: 1735095.82	Casing	g ID/	OD:	4" (II	D)		Water Level*:	Refer to remarl	ks note 3
		iciency Fa	actor: 1.087		Hamm	er T	ype:	Automa			Rope & Cathead □		
MD = U = TI MU = V = Fi	olit Spoon Unsuccess hin Wall Tu Unsuccess eld Vane S	sful Split Spo ube Sample sful Thin Wa Shear Test,	oon Sample Atten II Tube Sample A PP = Pocket Per ne Shear Test Att	RC = Roller ttempt WOH = Weig netrometer WOR/C = W tempt WO1P = Weig	Stem Auger w Stem Aug Cone ght of 140 lb eight of Roc	ger 5. Han ds or (	Casing	S <sub>u(lat</sub> q <sub>p</sub> = l N-unc Hamn N <sub>60</sub> =	o) = Lab Jnconfir corrected ner Effic SPT N	molded Field Vane Undrained She Vane Undrained Shear Strength ( de Compressive Strength (ksf) = Raw Field SPT N-value ency Factor = Rig Specific Annual uncorrected Corrected for Hamme er Efficiency Factor/60%)*N-uncor	psf) WC = LL = PL = Calibration Value PI = F er Efficiency G = C	Pocket Torvane Shea Water Content, pero Liquid Limit Plastic Limit Plasticity Index Grain Size Analysis Consolidation Test	
Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N60	Casing Blows	Elevation (ft.)	Graphic Log	Visual De	scription and Remarks		Laboratory Testing Results/ AASHTO and Unified Class.
60	15D	24/16	60.00 - 62.00	31-35-62-50/3"		76	36			Olive with brown, wet, very		ND, some fine to	
						+	226			course gravel, little silt (GL	ACIAL TILL).		
						-+	367						
	R-1	12/3.6	63.80 - 64.80	RQD = 0%			NX	79.8		Bedrock encountered at 63.	9 faat has	63.8-	
- 65 -	R-2	51.6/51.6	64.80 - 69.10	RQD = 47%						Top of Bedrock Elev. 79.8	ft		
										R1 (63.8' - 64.8'): Grey, ver bedded, METAWACKE [m			
										very strong, slightly weather	ered to fresh; discontinuiti	es low angle	
										dipping, very close to close [MEDIUM BEDDED FAC			
										BANGOR FORMATION].		,	
	R-3	60/60	69.10 - 74.10	RQD = 62%						Rock Mass Quality = very p 30% recovery	poor		
- 70 -	R 5	00/00	09.10 74.10	RQD = 0270		-				0% RQD			
						_				Rock Core Rate (min:sec) 63.8 - 64.8 ft (2:31)			
										R2 (64.8' - 69.1'): Grey, ver bedded, METAWACKE [n			
								-		very strong to strong, fresh	with chemical weathering	; 67.4 ft to 68.3 ft,	
							-V	69.5		sand infilling 67.9 ft to 68.3 dipping, very close to close			
75 -								09.5		average 3.3 fractures per fo			
- 75 -										PENOBSCOT RIVER MEI Rock Mass Quality = poor	MDER, DANGOR FORM	IATION].	
										100% recovery 47% ROD			
										Rock Core Rate (min:sec)			
						-				64.8 - 65.8 ft (3:14) 65.8 - 66.8 ft (2:05)			
						-+				66.8 - 67.8 ft (2:22)			
- 80 -						-				67.8- 68.8 ft (2:20) 68.8 - 69.1 ft (0:57)			
										R3 (69.1' - 74.1'): Grey, ver			
										bedded, METAWACKE [n weak, fresh; discontinuities	s low angle to steep dippin	ng, very close to	
										close spacing, rough to ver fractures per foot [MEDIU]			
								1		RIVER MEMBER, BANG			
										Rock Mass Quality = fair 100% recovery			
- 85 -						-				62% RQD			
						_				Rock Core Rate (min:sec) 69.1 - 70.1 ft (2:43)			
										70.1 - 71.1 ft (2:54)			
										71.1 - 72.1 ft (3:31) 72.1 - 73.1 ft (3:12)			
										73.1 - 74.1 ft (3:13)		74.1-	
90 _						T				Bottom of Exploration	n at 74.1 feet below grou		
	arks:		. 1										
									e - SPT	Report" by GRL Engineers In	nc., dated 11/10/2023.		
2. A 3. V	s-drilled ater leve	boring loc el measure	ations and grou d during drillin	and surface elevations we g at 20.55'bgs on 7/26/24	re provide at 3:23, 2	ed by 20.55	HNTB. bgs on 7	7/28/24 a	t 20:19	. Water level measured at 24.	9'bgs on 7/29/24 at 1:08	was made after the	e rock coring.

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.	Page 3 of 4
* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.	Boring No.: BB-BSA-106

	Maine Department of Transport					Project			-95 Bridges Over Stillwater	Boring No.:	BB-BS	SA-106
			Soil/Rock Exp			Locatio	Avenu n: Ban		aine	14/151-	0271	76.00
			<u>US CUSTOM</u>	IARY UNITS						WIN:	0271	76.00
Drill	ler:		Seaboard		Elevatio	on (ft.)	143.	6		Auger ID/OD:		
<u> </u>	rator:		Ryan H.		Datum:			ne East		Sampler:	Standard Split	Spoon
	ged By:		D. Burgess		Rig Typ			lrich D		Hammer Wt./Fall:	140lb/30in	
	e Start/F			9); 7/29/24 (1:56)		Method:			1 Wash	Core Barrel: Water Level*:	NX Defende	
	ing Loca		N: 482611.2,	E: 1735095.82	Casing Hamme		4" (I		Hydraulic 🗆	Rope & Cathead	Refer to remar	ks note 3
Defin	itions:		actor. 1.087	R = Rock C	ore Sample	Type.	Automa S <sub>u</sub> =	Peak/R	emolded Field Vane Undrained Sh	ear Strength (psf) T <sub>v</sub> =	Pocket Torvane She	
MD =		sful Split Sp	oon Sample Atter	mpt HSA = Holl	d Stem Auger ow Stem Auge	r	q <sub>p</sub> =	Unconfi	Vane Undrained Shear Strength ned Compressive Strength (ksf)	LL =	= Water Content, per Liquid Limit	cent
MU =	Unsucces	ube Sample sful Thin W	all Tube Sample A	Attempt RC = Rolle	ight of 140 lb.		Hami	mer Effic	d = Raw Field SPT N-value ciency Factor = Rig Specific Annua	I Calibration Value PI =	Plastic Limit Plasticity Index	
			PP = Pocket Pe ane Shear Test At		Veight of Rods eight of One P				l-uncorrected Corrected for Hammer Efficiency Factor/60%)*N-unco		Grain Size Analysis Consolidation Test	
				Sample Information			1	-				Laboratory
	ö	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected			og				Testing Results/
Ę,	e N	Rec.		gth D (9	orre	0.	tion	ic L	Visual De	scription and Remarks		AASHTO
Depth (ft.)	Sample No.	en./	amp t.)	lows hear tren ssf) r RG	N-und Neo	Casing Blows	Elevation (ft.)	Graphic Log				and Unified Class.
90	ν ν		S f)		z z		Ш£	U U	Boring backfilled with ben	tonite chips in the rock co	ore socket, drill	
							-		cuttings and gravel to botto asphalt.			
							-		asphart.			
						_	4					
							4					
- 95 -												
10												
							1					
							1					
- 100 -							1					
							1					
							1					
							-					
							-					
- 105 -							-					
							-					
							-					
						_	-					
							4					
- 110 -							-					
							4					
							4					
- 115 -												
115												
							1					
							1					
120		1					1					
<u>120</u> <u>Ren</u>	harks:	1	1	1			1	I	I			
								e - SPT	Report" by GRL Engineers I	nc., dated 11/10/2023.		
				ound surface elevations w ng at 20.55'bgs on 7/26/2				at 20:19	9. Water level measured at 24.	9'bgs on 7/29/24 at 1:08	was made after the	e rock coring.
			<i></i>		, 20					Ū.		
				undaries between soil types;		-				Page 4 of 4		
		-	been made at tim time measuremen	nes and under conditions sta nts were made.	ted. Groundw	ater fluctuatio	ons may o	ccur due	e to conditions other	Boring No	.: BB-BSA-	106

1	Maine Department of Transportation										Boring No.:	BB-BS	SA-107
			Soil/Rock Exp				Locatio	Avenu n: Ban		ine			
			US CUSTOM/	ARY UNITS				Dui	501, 1114		WIN:	0271	76.00
Drill	er:		Seaboard		Ele	vatior	(ft.)	143.	11		Auger ID/OD:		
Ope	rator:		Ryan H.		Dat	um:	. ,	Mai	ne East	Zone	Sampler:	Standard Split	Spoon
Log	ged By:		D. Burgess		Rig	Туре	:	Died	lrich D-	50	Hammer Wt./Fall:	140lb/30in	
Date	Start/Fi	nish:	7/22/24 (21:09	9); 7/24/24 (0:25)	Dril	lling N	lethod:	SSA	, Drive	& Wash	Core Barrel:	NX	
Bori	ng Loca	tion:	N: 482578.95,	E: 1735092.78	Cas	sing ID	D/OD:	4"(I	D)		Water Level*:	Refer to remar	ks note 3
Ham	mer Effi	iciency F	actor: 1.087		Har	nmer	Туре:	Autom	atic 🛛	Hydraulic 🗆	Rope & Cathead □		
MD = U = T MU = V = Fi	plit Spoon Unsuccess hin Wall Tu Unsuccess ield Vane S	sful Split Sp be Sample sful Thin Wa Shear Test,	oon Sample Atten III Tube Sample A PP = Pocket Pei <u>ne Shear Test Att</u>	RC = Roller ttempt WOH = Wei netrometer WOR/C = W	Stem A ow Stem Cone ght of 14 /eight of	uger Auger 40lb. Ha Rods o	r Casing	S <sub>u(la</sub> q <sub>p</sub> = N-un Ham N <sub>60</sub>	b) = Lab Unconfin correctec mer Effici = SPT N-	molded Field Vane Undrained She Vane Undrained Shear Strength (ksf) ed Compressive Strength (ksf) = Raw Field SPT N-value ency Factor = Rig Specific Annual uncorrected Corrected for Hamme er Efficiency Factor/60%)*N-uncor	psf) WC LL PL Calibration Value PI = er Efficiency G =	<ul> <li>Pocket Torvane She</li> <li>Water Content, per</li> <li>Liquid Limit</li> <li>Plastic Limit</li> <li>Plasticity Index</li> <li>Grain Size Analysis</li> <li>Consolidation Test</li> </ul>	
		(;			ð								Laboratory
Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N <sub>60</sub>	Casing Blows	Elevation (ft.)	Graphic Log	Visual De	scription and Remarks	5	Testing Results/ AASHTO and Unified Class.
0	1D	24/14	0.70 - 2.70	8-10-8-6	18	33	SSA	142.6		6" Asphalt Pavement		0.5-	
	2D	24/16	2.70 - 4.70	6-8-8-17	16	29				Brown, dry, medium dense, gravel, trace silt (FILL).		ome fine to coarse	
	3D	24/19	4.70 - 6.70	12-19-18-18	37	67				Grayish brown, dry, medium non-plastic (FILL).	m dense, SANDY SILT,	trace fine gravel,	
- 5 -	30	24/19	4.70 - 0.70	12-17-10-10	57	07				Grayish brown, dry, hard, S plastic (FILL).	SANDY SILT, trace fine	e gravel, non-	Fines = 55.2% A-4 (0), ML
	4D	24/10	6.70 - 8.70	14-7-18-10	25	45				Grayish brown, dry, hard, S plastic (FILL).	SANDY SILT, trace fine	e gravel, non-	
	5D	24/6	8.70 - 10.70	4-3-4-4	7	13				Grayish brown, dry, stiff, S plastic (FILL).	ANDY SILT, trace fine	gravel, slightly	
- 10 -	6D	24/9	10.70 - 12.70	6-8-41-50/2"	49	89	23						
					-		64			Olive brown, wet, hard, SII gravel, slightly plastic, frac Pp = 7.0 ksf			WC = 14.7% Fines = 62.3% A-4 (0), ML
							77 94						
- 15 -							77				C	6 . I I	
15	7D	24/5	15.00 - 17.00	12-19-20-8	39	71	59			Olive brown, wet, very den rock fragments (FILL).	se, fine to coarse SAND	, fractured scalty	
							135 180						
							91						
- 20 -							86						
20	8D	24/14	20.00 - 22.00	17-4-7-6	11	20	65 53	122.6		Grey with orange, mottled, plasticity (CLAY).	wet, very stiff, CLAY, t	20.5- race sand, medium	WC = 24% Fines = 98.3%
							65		<i>[]]</i>	Pp = 6.0  ksf			LL = 33 PL = 17
							82		V///				PI = 16 LI = -0.4
							87						A-6 (15), CL
- 25 -	9D	24/24	25.00 - 27.00	4-3-6-6	9	16	65		////	Grey to brown, mottled, we	et, very stiff, CLAY, trac	e sand (CLAY)	Fines $= 99.3\%$
							93			Pp = 4.5 to 5.0 ksf			A-6 (37), CL
							88						
							97						
									<i>[///</i>				
30 Rom	arks:						79		<i>V///</i>				
1. H 2. A 3. V	Hammer E As-drilled Vater leve	boring loc	cations and grou d during drillin	and surface elevations w	ere prov	vided b	y HNTB.			Report" by GRL Engineers In .3'bgs on 7/24/24 at 20:09. W		3.9'bgs on 7/24/24 a	at 23:51 was

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.	Page 1 of 4
* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.	Boring No.: BB-BSA-107

ľ	Maine Department of Transportat					n	Project:			I-95 Bridges Over Stillwater	Boring No.:	BB-BS	SA-107
		_	Soil/Rock Expl				Location	Avenu n: Bang		aine		0071	
		Ī	US CUSTOMA	<u>ARY UNITS</u>							WIN:	02/1	76.00
Drille	er:		Seaboard		Ele	evation	n (ft.)	143.1	11		Auger ID/OD:		
Oper	rator:		Ryan H.			tum:		Mair	ie Eas	t Zone	Sampler:	Standard Split	Spoon
	ged By:		D. Burgess			д Туре			lrich D		Hammer Wt./Fall:	140lb/30in	
	Start/Fi			9); 7/24/24 (0:25)	_	-	Method:			e & Wash	Core Barrel:	NX	
	ng Locat		,	, E: 1735092.78	_	sing IC	_	4"(II			Water Level*:	Refer to remark	ks note 3
Ham Definit		ciency F	actor: 1.087	R = Rock C			Туре:	Automa S <sub>11</sub> = I		Hydraulic emolded Field Vane Undrained She	Rope & Cathead ear Strength (psf) T <sub>u</sub>	= Pocket Torvane She	ar Strength (psf)
D = Sp	olit Spoon S		oon Sample Attem	SSA = Soli	id Stem A	Auger		Sullat	b) = La	b Vane Undrained Shear Strength ( ined Compressive Strength (ksf)	psf) W	C = Water Content, per	
U = Th	nin Wall Tul	be Sample		RC = Rolle	er Cone	-	lammer	N-unc	correcte	ed = Raw Field SPT N-value iciency Factor = Rig Specific Annual	PL	= Plastic Limit = Plasticity Index	
V = Fie	eld Vane S	Shear Test,	PP = Pocket Per ane Shear Test Atte	netrometer WOR/C = V	Weight of	f Rods o	or Casing	N <sub>60</sub> =	= SPT N	N-uncorrected Corrected for Hamme mer Efficiency Factor/60%)*N-uncor	er Efficiency G	= Grain Size Analysis = Consolidation Test	
10. 4		1	S	Sample Information	<u> </u>								Laboratory
		(in.)	Sample Depth (ft.)		sted	Ĺ		[ '	D				Laboratory Testing
( <del>,</del>	Sample No	ec.	e De	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	1		ē	c Log	Visual De	scription and Remark	S	Results/ AASHTO
Depth (ft.)	npk m	Pen./Rec.	mple	ws ear eng sf) RQI	nncc		Casing Blows	Elevation (ft.)	Graphic I				and
	Sa	Ре	(t. Sa	Shi Str (ps or	ž	N <sub>60</sub>	Ба В	Ele Ele	Ö				Unified Class.
30	10D	24/17	30.00 - 32.00	3-3-3-3	6	11	70	'	V///	Greyish brown, moist, medi plasticity, interbedded silt s		sand, medium	WC = 28% Fines = 99.1%
		I				Γ	63	1 '	V///	Pp < 2.0  ksf	, , , , , , , , , , , , , , , , , , ,		LL = 28
					·		56	1 '	V///	FV-1: 442psf / 118psf (55m	mx110mm Vane)		PL = 16 PI = 12
					1		390	1 '	V///	FV-2: 813psf / 415psf (55m			LI = 1 A-6 (11), CL
			1				63	'	V///				n-0 (11), er
- 35 -	11D	24/0	35.00 - 37.00	12-11-15-10	26	47	104	108.1		No recovery - washed water		- — — — — 35.0- vel and clav	
						<u> </u>	96	1 '		fragments.		voi una entry	
		<u> </u>	++			<u> </u>		1 '					
		<u> </u>				├──	87	1 '					
		<u> </u>				<u> </u>	78	'					
- 40 -		<b> </b>			<b> </b>	<b> </b>	63	'		Brownish grey, wet, dense,	STI TV SAND little co	arse aravel slightly	WC = 10%
	12D	24/6	40.00 - 42.00	5-7-12-12	19	34	73	. '		plastic (SILTY SAND)	SILT I SAILD, nuce	Jaise graver, sugner	Fines = 42.1%
		L				L	76	1 '					LL = 17 PL = 13
		L					103	<u> </u> '					PI = 4 LI = -0.8
		Ī				Ī	111	'					A-4 (0), SC/
		<u> </u>			,		81	1 '					SM
- 45 -	13D	24/4	45.00 - 47.00	9-9-6-9	15	27	105	'		Brownish grey, wet, mediun gravel, slightly plastic (SIL		, little coarse	
					, 1	[	103	'		glaver, singlicity prastic (SEE	11 <i>State)</i> .		
			1 1				111	'					
		<u> </u>	+			$\vdash$	118	'					
		<u> </u>	+			<u> </u>	90	1 '					
- 50 -	14D	24/8	50.00 - 52.00	6-8-15-8	23	42	81	'		Greyish brown, wet, dense,		e gravel, low	WC = 10%
	14D	24/0	50.00 - 52.00	0-8-13-0	25	42		{ '		plasticity (CLAYEY SAND	<b>D</b> ).	-	Fines = 39.6% LL = 20
		<u> </u>				──	89	'					PL = 12
		<b> </b>			<b> </b>	<b> </b>	105	4 '					PI = 8 LI = -0.3
		L	<u> </u>			Ļ	113	89.6	<b>M</b> T	<u> </u>		53.5-	A-4 (0), SC
- 55 -							89	1 '	<b>静</b> 静		·		
55	15D	24/14	55.00 - 57.00	26-41-51-50/4"	92	167	60	j '		Olive with brown mottled, v gravel, non-plastic (GLACI		SAND, little	WC = 10.6% Fines = 38.3%
		Ē				Ē	198	'	翻				A-4 (0), SM
							171	'					
					, 1	[	212	'					
			1 1				196	'	躢				
60 <b>Rem</b>	arks:	·	<u> </u>	<u>L</u>		L		<u>ل</u>	(Holen)				
		fficiency	factor provided	by S.W. Cole and take	n from "	"2023P	A00074 -	SW Col	e - SP	T Report" by GRL Engineers Ir	nc., dated 11/10/2023.		
2. A	s-drilled	boring loc	cations and grou	und surface elevations w	were prov	ovided b	by HNTB.			9.3'bgs on 7/24/24 at 20:09. W		2 01haa an 7/24/24 a	+ 22.51 was
		el measure		g at 0.45 bgs on 1/25/24	+ at 3:20,	, 1δ./ι	3gs on 112-	4/24 at 5	:22, 1	9.3 bgs on 1/24/24 at 20:09. w	ater level measured at 2	23.9'bgs on 7/24/24 a	it 23:51 was
Stratifi	cation lines	s represent	approximate bour	ndaries between soil types;	transition	ns may t	be gradual.				Page 2 of 4		
* Wate	er level rea	dings have	been made at tim	nes and under conditions sta	ated. Grc	oundwat	er fluctuatio	ns may o	ccur du	e to conditions other			

than those present at the time measurements were made.

Boring No.: BB-BSA-107

Maine Department of Transportation						Project			I-95 Bridges Over Stillwater Boring No.: BB-BSA	A-107	
			Soil/Rock Exp JS CUSTOM/				Locatio	Aven on: Ban		Maine WIN:027176	6.00
Drill	ər.		Seaboard		Flev	atio	l 1 (ft.)	143	11	Auger ID/OD:	
	ator:		Ryan H.		Datu		1 (10.)			st Zone Sampler: Standard Split Sp	0001
· ·	ged By:		D. Burgess		Rig				drich		
	Start/Fi	inish		9); 7/24/24 (0:25)			/lethod:			ve & Wash Core Barrel: NX	
	ng Loca			E: 1735092.78	-	-	D/OD:	4"(I		Water Level*: Refer to remarks to	note 3
	-		actor: 1.087				Type:	Autom	,		note 5
Defini	tions:		actor. 1.087	R = Rock C	ore Samp	le	.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	S <sub>u</sub> =	Peak	Remolded Field Vane Undrained Shear Strength (psf) T <sub>v</sub> = Pocket Torvane Shear S	Strength (psf)
MD = U = T MU = V = Fi	nin Wall Tu Unsuccess eld Vane S	sful Split Spo ibe Sample sful Thin Wa Shear Test,	oon Sample Atten II Tube Sample A PP = Pocket Pe ne Shear Test Att	RC = Roller ttempt WOH = Wei netrometer WOR/C = W tempt WO1P = Wei	ow Stem A Cone ght of 140 /eight of F	Auger ) Ib. H Rods c	or Casing	q <sub>p</sub> = N-ur Ham N <sub>60</sub>	Unco ncorrect imer E = SP1	ab Vane Undrained Shear Strength (psf)       WC = Water Content, percent         fifned Compressive Strength (ksf)       LL = Liquid Limit         ted = Raw Field SPT N-value       PL = Plastic Limit         ficiency Factor = Rig Specific Annual Calibration Value       PI = Plasticity Index         N-uncorrected Corrected for Hammer Efficiency       G = Grain Size Analysis         Immer Efficiency Factor/60%)*N-uncorrected       C = Consolidation Test	nt
			1	Sample Information	σ				-		Laboratory
Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N <sub>60</sub>	Casing Blows	Elevation (ft.)	Graphic Lod	, Visual Description and Remarks	Testing Results/ AASHTO and nified Class.
60	16D	8/8	60.00 - 60.67	53-50/2"	R		OPEN	-		Olive with brown mottled, wet, very dense, SILT, some fine round to subround gravel, trace fine to medium sand, weathered coarse gravel (GLACIAL TILL).	
	R-1	15 6/7 2	63.40 - 67.20	ROD = 0%			R	79.7		63.4	
	K-1	43.0/1.2	05.40 - 07.20	RQD = 0%				- '`'		Bedrock encountered at 63.4 feet bgs	
- 65 -							NX			Top of Bedrock Elev. 80.1 ft R1 (63.4' - 67.2): Grey, very fine grained, thinly to very thinly bedded, METAWACKE [metasandstone], strong, highly weathered with clay and sand infilling from 64.2 ft to 67.2; discontinuities low angle to steep dipping, close spacing, rough to very rough, open, highly	
	R-2	12/2.04	67.20 - 68.20	RQD = 0%						fractured [MEDIUM BEDDED FACIES, PENOBSCOT RIVER MEMBER, BANGOR FORMATION].	
	R-3	48/45.6	68.20 - 72.20	RQD = 35%				1		Rock Mass Quality = very poor	
				-				1		16% recovery 0% ROD	
- 70 -								-		Rock Core Rate (min:sec)	
								_		63.4 - 64.2 ft (1:09)	
										64.2 - 65.0 ft (1:29) 65.0 - 65.3 ft (0:41)	
	R-4	60/60	72.20 - 77.20	RQD = 39%						65.3 - 66.3 ft (1:51)	
								1		66.3 - 67.2 ft (1:13) R2 (67.2' - 68.2'): Grey, very fine grained, thinly to very thinly	
								1		bedded, METAWACKE [metasandstone] strong, highly weathered	
- 75 -								-		with clay and sand infilling; discontinuities low angle dipping, close spacing, very rough, open, highly fractured [MEDIUM BEDDED	
							++/	-		FACIES, PENOBSCOT RIVER MEMBER, BANGOR FORMATION].	
							$\perp V$			Rock Mass Quality = very poor	
								65.9	, 	17% recovery 0% ROD	
										Rock Core Rate (min:sec)	
- 80 -								-		67.2 - 68.2 ft (0:29) R3 (68.2' - 72.2): Grey, very fine grained, thinly to very thinly bedded, METAWACKE [metasandstone] with calcite veins, strong to very strong, slightly weathered, occasional moderate to severe chemical weathering with sand infilling: discontinuities low angle to steep	
										dipping, very close to close spacing, rough to very rough, tight to open, average 3.5 fractures per foot [MEDIUM BEDDED FACIES, PENOBSCOT RIVER MEMBER, BANGOR FORMATION].	
										Rock Mass Quality = poor	
										95% recovery 35% RQD	
- 85 -								1		Rock Core Rate (min:sec)	
								1		68.2 - 69.2 ft (1:42) 69.2 - 70.2 ft (1:59)	
							-	-		70.2 - 71.2 ft (2:32)	
								4		71.2 - 72.2 ft (1:28) R4 (72.2' - 77.2): Grey, very fine grained, thinly to very thinly bedded,	
										METAWACKE [metasandstone] with calcite veins, strong to very	
90					T					strong, slightly weathered, occasional moderate to severe chemical weathering with sand and clay infilling; discontinuities low angle to	
Rem	arks:		· · · · ·			0.007-					
2. A 3. V	s-drilled Vater leve	boring loc	ations and grou d during drillin	and surface elevations w	ere prov	ided l	by HNTB			PT Report" by GRL Engineers Inc., dated 11/10/2023. 19.3'bgs on 7/24/24 at 20:09. Water level measured at 23.9'bgs on 7/24/24 at 2	23:51 was
Stratif	ication line	s represent	approximate bour	ndaries between soil types; t	ransitions	may	be gradual			Page 3 of 4	
				es and under conditions stat	ed. Grou	ndwat	er fluctuati	ons may o	occur o	ue to conditions other	דר
than	those pres	sent at the ti	me measurement	ts were made.						Boring No.: BB-BSA-10	)

]	Main	e Dep	artment	of Transport	ation	Project			-95 Bridges Over Stillwater	Boring No.:	BB-BS	A-107
			Soil/Rock Exp			Locatio	Avenu n: Bang		aine	\A/INI.	02717	76.00
		-	US CUSTOM	ART UNITS						WIN:	02717	/6.00
Drill	er:		Seaboard		Elevatio	on (ft.)	143.	11		Auger ID/OD:		
<u> </u>	rator:		Ryan H.		Datum:			ne East		Sampler:	Standard Split S	poon
	ged By:		D. Burgess		Rig Typ			lrich D-		Hammer Wt./Fall:	140lb/30in	
L	e Start/F			9); 7/24/24 (0:25)		Method:			& Wash	Core Barrel:	NX	
	ng Loca			, E: 1735092.78	Casing		4"(II	,		Water Level*:	Refer to remark	s note 3
Han Defini		iciency F	actor: 1.087	R = Rock C	Hamme ore Sample	r Type:	Automa Su =		Hydraulic emolded Field Vane Undrained Sh	Rope & Cathead $\Box$	Pocket Torvane Shea	r Strength (psf)
D = S MD = U = T MU = V = F	plit Spoon Unsuccess hin Wall Tu Unsuccess ield Vane S	sful Split Spo ube Sample sful Thin Wa Shear Test,	oon Sample Atter II Tube Sample A PP = Pocket Pe ne Shear Test At	SSA = Solid mpt HSA = Holl RC = Rolle Attempt WOH = We enetrometer WOR/C = V	d Stem Auger ow Stem Auge	Hammer or Casing	S <sub>u(la</sub> q <sub>p</sub> = N-un Hami N <sub>60</sub> :	b) = Lab Unconfir correcte mer Effic = SPT N	Vane Undrained Shear Strength i ned Compressive Strength (ksf) d = Raw Field SPT N-value ciency Factor = Rig Specific Annua I-uncorrected Corrected for Hamm ner Efficiency Factor/60%)*N-unco	psf) WC = LL = PL = I Calibration Value PI = F er Efficiency G = C	- Water Content, perc Liquid Limit Plastic Limit Plasticity Index Grain Size Analysis Consolidation Test	
				Sample Information		-	1					Laboratory
Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	Casing Blows	Elevation (ft.)	Graphic Log		scription and Remarks		Testing Results/ AASHTO and Unified Class.
- 95 -								0	steep dipping, very close to open, average 3.2 fractures PENOBSCOT RIVER ME Rock Mass Quality = poor 100% recovery 39% RQD Rock Core Rate (min:sec) 72.2 - 73.2 ft (2:07) 73.2 - 74.2 ft (1:35) 74.2 - 75.2 ft (1:53) 75.2 - 76.2 ft (1:32) 76.2 - 77.2 ft (1:30) Bottom of Exploratio Boring backfilled with ben cuttings and gravel to botto asphalt.	per foot [MEDIUM BED MBER, BANGOR FORM n at <b>77.2 feet below grou</b> tonite chips in the rock con	DED FÀCIES, [ATION]. 	
- 105 -												
- 110 -							-					
_ 120	arks:						-					
1. H 2. A 3. V ma	Hammer H As-drilled Water leve de after th	boring loc el measure ne rock cor	ations and gro d during drillir ing.	und surface elevations w ng at 6.45'bgs on 7/23/24	ere providec at 3:28, 18.	l by HNTB 7'bgs on 7/2	24/24 at 3		" Report" by GRL Engineers I 9.3'bgs on 7/24/24 at 20:09. W	ater level measured at 23.	9'bgs on 7/24/24 at	t 23:51 was
Strati	fication line	s represent	approximate bou	indaries between soil types;	transitions may	/ be gradual.				Page 4 of 4		
		-	been made at tim me measuremen	nes and under conditions sta nts were made.	ted. Groundw	ater fluctuatio	ons may o	ccur due	e to conditions other	Boring No.	: BB-BSA-1	07

-		_		of Transport		- I		Aven		95 Bridges Over Stillwater <b>B</b>	-		SA-108
			Soil/Rock Exp				Locatio			ne W	IN:	0271	76.00
rille	er:		Seaboard		Ele	vation	(ft.)	129	.45	Au	iger ID/OD:		
per	ator:		Kevin Hansco	m	Dat	um:		Mai	ne East	Zone Sa	mpler:	Standard Split	Spoon
.ogg	ed By:		Lina-Maria Pu	a	Rig	Туре	:	Die	drich D-	50 <b>Ha</b>	mmer Wt./Fall:	140 lbs/30 in	
Date	Start/Fi	nish:	05/07/24 (21:5	55); 05/07/24 (23:30)	Dril	lling N	lethod:	SSA	, Cased	Wash Cc	ore Barrel:	NX	
Borir	ng Loca	tion:	N: 482749.52,	E: 1735322.13	Cas	sing ID	)/OD:	3 in	/3.25 in	Wa	ater Level*:	4.8 ft on 05/07	/24 at 22:20
lam	mer Effi	ciency I	actor: 1.066		Har	nmer	Туре:	Autom	atic 🖂	Hydraulic 🗆 Rop	e & Cathead □		
1D = 1 J = Th 1U = 1 ' = Fie	lit Spoon S Jnsuccess in Wall Tu Jnsuccess old Vane S	sful Split Sp be Sample sful Thin W Shear Test,	ooon Sample Atten all Tube Sample A PP = Pocket Pe ane Shear Test Att	RC = Rolle ttempt WOH = W netrometer WOR/C =	id Stem A llow Stem er Cone eight of 14 Weight of	Juger Auger 40lb. Ha Rods o	r Casing	S <sub>u</sub> (li q <sub>p</sub> = N-ur Harr N <sub>60</sub>	ab) = Lab Unconfin corrected mer Effic = SPT N-	nolded Field Vane Undrained Shear St Vane Undrained Shear Strength (psf) ad Compressive Strength (ksf) = Raw Field SPT N-value ancy Factor = Rig Specific Annual Caliti uncorrected Corrected for Hammer Effi ar Efficiency Factor/60%)*N-uncorrected	WC =           LL = L           PL = F           pration Value           PI = P           ciency         G = G	Pocket Torvane She Water Content, per iquid Limit Plastic Limit Ilasticity Index rain Size Analysis onsolidation Test	
				Sample Information				-	-				Laboratory
Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N <sub>60</sub>	Casing Blows	Elevation (ft.)	Graphic Log	Visual Descrip	otion and Remarks		Testing Results/ AASHTO and Unified Clas
0							SSA	128.9	****	7.5" Asphalt Pavement		0.6	
	1D	24/16	1.00 - 3.00	22-18-16-20	34	60		-		Brown to yellow, dry, very dens little fine gravel (FILL).	se, fine to coarse SAN		MC = 8.0% Fines = 28.5 A-2-4 (0), SI
	2D	24/9	3.00 - 5.00	15-14-24-16	38	68		126.3		2DA To 2 in: Brown to yellow, some silt, little fine gravel (FILI	L).		
5 -	3D	24/12	5.00 - 7.00	12-12-50/2"	24	43		1		2DB Bottom 7 in: Grey, dry, ver silt (GRAVEL)	ry dense, GRAVEL, s	ome sand, little	
			+ +		24	43		-		Brown, wet, dense, GRAVEL, s			
	R1	60/59	6.70 - 11.70	RQD = 59%				122.8		angular GRAVEL with some sa \spoon.	nd and little silt in the	tip of the split	
							NX			Bedrock encountered at 6.7 feet	bgs	6.7-	
										Top of Bedrock at Elev. 122.8 f	t		
								1		R1 (6.7'-11.1'): Grey, very fine t [metasandstone] with frequent c			
10										thinly laminated, slightly weather	ered; discontinuities m	noderate to steep	
	R2	12/11	11.70 - 12.70	RQD = 40%				1		dipping, close to moderately clo average 2.6 fractures per foot [N			
				-				-		PENOBSCOT RIVER MEMBE	ER, BANGOR FORM	ATION].	
	R3	24/21	12.70 - 14.70	RQD = 19%						Rock Mass Quality = fair 98% Recovery Rock Core Rate (min:sec)			
	R4	24/23	14.70 - 16.70	RQD = 37%						6.7-7.7 ft (2:33) 7.7-8.7 ft (2:46)			
15 -								1		8.7-9.7 ft (3:19)			
							$\uparrow \forall$	110		9.7-10.7 ft (2:51) 10.7-11.7 ft (3:17)			
								112.8		R2 (11.1'-12.7'): Grey, very fine [metasandstone] with some calc laminated, fresh to slightly weat	ite veins, extremely st hered; discontinuities	rong, thinly low angle to	
20 -								-		steep dipping, very close to clos smooth, open. average 1.0 fractu FACIES, PENOBSCOT RIVER FORMATION].	ares per foot [MEDIU	M BEDDEED	
										Rock Mass Quality = poor 92% Recovery Rock Core Rate (min:sec)			
										11.7-12.7 ft (3:07) R3 (12.7'-14.7'): Grey, very fine	to fine grained MFT	AWACKE	
								]		[metasandstone] with some calc	ite veins, extremely st	rong, thinly	
										laminated, fresh to slightly weat steep dipping, very close to clos			
25 -										smooth, open. average 2.5 fractu FACIES, PENOBSCOT RIVER FORMATION].	ares per foot [MEDIU	M BEDDEED	
										Rock Mass Quality = very poor 88% Recovery			
										Rock Core Rate (min:sec) 12.7-13.7 ft (2:04)			
,								]		13.7-14.7 ft (3:25)	to fine emined MET	AWACVE	
	arks:	1					1		1	K4 (14./-10./): Grey, very fine	to fine grained, MET	AWACKE	1
1. H 2. A	ammer E s-drilled	boring lo	cations and grou	by S.W. Cole and take and surface elevations v at 22:20 was made bef	vere prov	vided b	y MaineI	DOT.		Rock Core Rate (min:sec) 12.7-13.7 ft (2:04) 13.7-14.7 ft (3:25) R4 (14.7'-16.7'): Grey, very fine Report" by GRL Engineers Inc.,		AWACKE	

* 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-BSA-108

]	Main	e Dep	artment	of Transport	ation	Projec			-95 Bridges Over Stillwater	Boring No.:	BB-BS	SA-108
			Soil/Rock Exp			Locati	Avenu ion: Ban		aine	WIN:	0271	76.00
												10.00
Drill	-		Seaboard Kevin Hansco		Elevati	. ,	129. Mai	.45 ne East	7.000	Auger ID/OD:	Stondard Sulit	Succe
<u> </u>	rator: ged By:		Lina-Maria P		Rig Ty			frich D		Sampler: Hammer Wt./Fall:	Standard Split 140 lbs/30 in	Spoon
-	Start/Fi	inish:		55); 05/07/24 (23:30)		Method		, Cased		Core Barrel:	NX	
	ng Loca			, E: 1735322.13	_	ID/OD:		/3.25 in		Water Level*:	4.8 ft on 05/07	/24 at 22:20
Ham	mer Effi	iciency l	actor: 1.066		Hamm	er Type:	Autom	atic 🛛	Hydraulic 🗆	Rope & Cathead □		
MD = U = T MU = V = F	plit Spoon Unsuccess hin Wall Tu Unsuccess ield Vane S	sful Split Sp ube Sample sful Thin W Shear Test,	all Tube Sample A PP = Pocket Pe ane Shear Test At	SSA = Soli mpt HSA = Hol RC = Rolle Attempt WOH = We enetrometer WOR/C = V	Core Sample d Stem Auger ow Stem Aug r Cone eight of 140 lb Weight of Rod feight of One	er Hammer s or Casing	S <sub>u(la</sub> qp = N-un Ham N <sub>60</sub>	ab) = Lab Unconfin correcte mer Effic = SPT N	emolded Field Vane Undrained Sh Vane Undrained Shear Strength ed Compressive Strength (ksf) d = Raw Field SPT N-value iency Factor = Rig Specific Annue -uncorrected Corrected for Hamm ner Efficiency Factor/60%)'N-uncc	(psf) WC LL = PL = al Calibration Value PI = er Efficiency G =	Pocket Torvane She = Water Content, per Liquid Limit • Plastic Limit Plasticity Index Grain Size Analysis Consolidation Test	cent
Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	Casing Blows	Elevation (ft.)	Graphic Log		escription and Remarks		Laboratory Testing Results/ AASHTO and Unified Class.
30 - 35 - 40 - 45 - 50 - 55 - 55							[metasandstone] with som laminated, fresh to slightly steep dipping, very close to smooth, open, average 2.0 FACIES, PENOBSCOT R FORMATION]. Rock Mass Quality = poor 96% Recovery Rock Core Rate (min:sec) 14.7-15.7 ft (2:30) 15.7-16.7 ft (2:48) Bottom of Exploratio Boring caved in after rock the cave-in was backfilled patched with cold patch.	weathered; discontinuitie o close spacing, planar to o fractures per foot [MEDII IVER MEMBER, BANG n at 16.7 feet below grou coring was completed. Th	s low angle to stepped, rough to JM BEDDEED OR 16.7- Ind surface. Ie boring above			
2. /	As-drilled	boring lo	cations and gro	d by S.W. Cole and taken ound surface elevations w 4 at 22:20 was made before	ere provide	d by Main	eDOT.		" Report" by GRL Engineers I of casing at 6.7 ft bgs.	inc., dated 11/10/2023.		
Strati	tratification lines represent approximate boundaries between soil types; transitions may be gradual. Page 2 of 2											
		-	been made at tim time measuremen	nes and under conditions stants were made.	ited. Groundv	vater fluctua	tions may o	occur due	e to conditions other	Boring No	.: BB-BSA-	108

Ι	Maine Department of Transporta						Proje	ect:	Maine	DOT I	-95 Bridges Over Stillwater	Boring No.:	BB-BS	SA-109
		-	Soil/Rock Exp US CUSTOM	bloration Log			Loca	tior	Avenu 1: Bang		aine	WIN:	0271	76.00
Drill			Seaboard		_	ation	(ft.)		126.			Auger ID/OD:	4.0 in/4.5 in	
Ope	rator:		Kevin Hansco	om	Datu	ım:			Maiı	ne East	Zone	Sampler:	Standard Split	Spoon
	ged By:		Lina-Maria Pu			Туре				lrich D		Hammer Wt./Fall:	140 lbs/30 in	
Date	Start/F	inish:	05/07/24 (1:2	0); 05/07/24 (2:30)	_	-	letho		Holl	ow Ste	m Augers	Core Barrel:	NX	
	ng Loca			, E: 1735255.48	_	-	)/OD:					Water Level*:	Not Measured	
Ham Defini		iciency F	actor: 1.066	R = Rock 0			Туре		Automa		Hydraulic emolded Field Vane Undrained Sh	Rope & Cathead	= Pocket Torvane She	ar Strength (osf)
D = S MD = U = TI MU = V = Fi	olit Spoon Unsuccess nin Wall Tu Unsuccess eld Vane S	sful Split Spo be Sample sful Thin Wa Shear Test,	oon Sample Atter II Tube Sample A PP = Pocket Pe ne Shear Test At	SSA = Soli mpt HSA = Hol RC = Rolle Attempt WOH = WO enetrometer WOR/C = 1	d Stem Au low Stem A r Cone eight of 140 Weight of F	iger Auger Olb. Ha Rods o	r Casin	g	S <sub>u(la</sub> q <sub>p</sub> = N-un Hami N <sub>60</sub> :	b) = Lat Unconfi correcte mer Effie = SPT N	Vane Undrained Sheat Strength I ned Compressive Strength (ksf) d = Raw Field SPT N-value icincy Factor = Rig Specific Annua I-uncorrected Corrected for Hamm ner Efficiency Factor/60%)*N-unco	(psf) WC LL PL Il Calibration Value PI er Efficiency G =	<ul> <li>Plotter Torvane She</li> <li>Water Content, per</li> <li>Liquid Limit</li> <li>Plastic Limit</li> <li>Plasticity Index</li> <li>Grain Size Analysis</li> <li>Consolidation Test</li> </ul>	
		(in.)			à					1				Laboratory Testing
Depth (ft.)	Sample No.	Pen./Rec. (ir	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N <sub>60</sub>	Casing	Blows	Elevation (ft.)	Graphic Log	Visual De	escription and Remark	3	AASHTO and Unified Class.
0							SS		126.3		Asphalt Pavement		0.7	
	1D	24/12	1.00 - 3.00	19-16-17-18	33	59			120.3		Brown to yellow, dry, very little silt (FILL).	dense, fine to coarse SA	0.7- ND, some gravel,	
	2D	24/15.5	3.00 - 5.00	27-22-63-54	85	151					Brown to yellow, dry to mo silt (FILL).	oist, very dense, SANDY	GRAVEL, little	MC = 5.7% Fines = 15.9% A-1-b (0), GM
- 5 -	3D	24/13.5	5.00 - 7.00	19-23-16-17	39	69					Brown to yellow, wet, very some silt, poorly-graded (l		AND, some gravel,	11-1-0 (0), GM
	4D	24/23	7.00 - 9.00	41-41-67-103	108	192					4DA Top 19 in: Brown, we SAND, some gravel, little		ine to coarse	MC = 11.7% Fines = 20.3%
10	5D	12/10	9.00 - 10.00	28-63	R			/	118.3		4DB Bottom 4 in: Brown, p gravel (SANDY SILT).	moist, hard, SILT, some	fine sand, little	A-1-b (0), SM
- 10 -	6D	1/1	10.00 - 10.08	50/1"	R				117.0 116.9		Brown, moist, SILT, some Grey, very dense, PROBA	BLE BEDROCK FRAG	10.0-	
											(WEATHERED BEDROC Bottom of Exploratio Boring backfilled with dril	n at 10.1 feet below gro		
- 15 -											patched with cold patch.			
- 20 -														
- 25 -														
30														
<u>Rem</u> 1. F				l by S.W. Cole and takes und surface elevations v						e - SPI	" Report" by GRL Engineers I	inc., dated 11/10/2023.		
Stratif	ication line	s represent	approximate bou	indaries between soil types;	transitions	may b	e grad	ual.				Page 1 of 1		
		-	been made at tim me measuremen	nes and under conditions sta nts were made.	ated. Grou	ndwate	er fluctu	uatior	ns may o	ccur du	e to conditions other	Boring No	<b>.:</b> BB-BSA-	109

Ι	Maine	e Depa	artment	of Transporta	atior	1	Project			-95 Bridges Over Stillwater	Boring No.:	BB-BS	A-109A
			Soil/Rock Exp				Locatio	Avenu n: Ban		aine			
		<u>l</u>	JS CUSTOM	<u>ARY UNITS</u>					0. ,		WIN:	0271	76.00
Drill	er:		Seaboard		Elev	vatior	(ft.)	127.	03		Auger ID/OD:	4 in/4.5in	
Ope	rator:		Kevin Hansco	m	Dat	um:		Mai	ne East	t Zone	Sampler:	Standard Split	Spoon
Log	ged By:		Lina-Maria Pu	ıa	Rig	Туре	:	Diec	lrich D	-50	Hammer Wt./Fall:	140 lbs/30 in	
Date	Start/Fi	inish:	05/07/24 (20:1	18); 05/07/24 (21:44)	Dril	lling N	lethod:	SSA	, Case	d Wash	Core Barrel:	NX	
Bori	ng Loca	tion:	N: 482637.93,	E: 1735257.73	Cas	sing ID	D/OD:	4.0 i	n/4.25	in	Water Level*:	2.8 ft on 05/07/	/24 at 21:35
		iciency F	actor: 1.066			nmer	Туре:	Autom		Hydraulic 🗆	Rope & Cathead □		
MD = U = TI MU = V = Fi	plit Spoon S Unsuccess hin Wall Tu Unsuccess eld Vane S	sful Split Spo ibe Sample sful Thin Wa Shear Test,	oon Sample Atten Il Tube Sample A PP = Pocket Pe ne Shear Test Att	RC = Roller ttempt WOH = Wei netrometer WOR/C = W tempt WO1P = Wei	Stem A ow Stem Cone ight of 14 /eight of	Juger Auger 40lb. Ha Rods o	r Casing	S <sub>u(la</sub> q <sub>p</sub> = N-un Ham N <sub>60</sub>	ab) = Lal Unconfi correcte mer Effi = SPT N	emolded Field Vane Undrained She b Vane Undrained Shear Strength ( hed Compressive Strength (ksf) ad = Raw Field SPT N-value ciency Factor = Rig Specific Annua I-uncorrected Corrected for Hammer mer Efficiency Factor/60%)*N-unco	psf)         WC =           LL =         PL =           PL =         PI = F           I Calibration Value         PI = F           er Efficiency         G = C	Pocket Torvane Shea Water Content, pero Liquid Limit Plastic Limit Plasticity Index Grain Size Analysis consolidation Test	
		· ·		Sample Information	σ		1	<u> </u>	-				Laboratory
Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N <sub>60</sub>	Casing Blows	Elevation (ft.)	Graphic Log	Visual De	scription and Remarks		Testing Results/ AASHTO and Unified Class.
0							SSA			Offset 2.6 feet from BB-BS	SA-109A towards the bridg	ge	
							NX	123.5				3.5-	
	R-1	57.6/52	4.00 - 8.80	RQD = 33%						Driller noted encountering augers.	probable bedrock at 3.5 fe	et bgs with the	
- 5 -										Bedrock encountered at 3.5 Top of Bedrock at Elev. 12			
										Advanced with augers to 4.	.0 feet bgs	[]	
										R1 (4'-8.8'): Grey, very fine with frequent calcite veins,			
	R-2	66/61.5	8.80 - 14.30	RQD = 49%						fresh to slightly weathered; spacing, planar to stepped,			
	K-2	00/01.5	8.80 - 14.50	RQD = 4970						fractures per foot [MEDIU]	M BEDDEED FACIES, P		
- 10 -								-		RIVER MEMBER, BANG Rock Mass Quality = fair	OR FORMATION].		
								-		90% Recovery			
										Rock Core Rate (min:sec) 4.0-5.0 ft (1:19)			
							$  \rangle   /$			5.0-6.0 ft (2:24) 6.0-7.0 ft (2:56)			
							V V	113.0		7.0-8.0 ft (3:20)			
15								115.0		8.0-8.8 ft (4:28) R2 (8.8'-14.0'): Grey, very	fine grained, METAWAC	KE	
- 15 -										[metasandstone] with frequ to extremely strong, thinly to steep dipping, very close stepped, rough to smooth, or [MEDIUM BEDDEED FA BANGOR FORMATION]. Rock Mass Quality = poor 93% Recovery	laminated, fresh; discontir to moderately close spaci open. average 1.8 fractures CIES, PENOBSCOT RIV	nuities low angle ng, planar to to per foot	
- 20 -								1		Rock Core Rate (min:sec) 8.8-9.8 ft (2:10)			
								1		9.8-10.8 ft (3:07) 10.8-11.8 ft (2:59)			
							+	1		11.8-12.8 ft (3:30)			
								-		12.8-14.0 ft (4:19)			
							-	-		Boring backfilled with bent		e socket, gravel	
- 25 -								-		to bottom of pavement and	patched with cold patch a	sphalt.	
								-					
30								]					
	arks:		. 1										
2. A	s-drilled	boring loc	ations and grou	and surface elevations we	ere prov	vided b	y MaineI	DOT.		F Report" by GRL Engineers I om of casing at 3.5 ft bgs.	nc., dated 11/10/2023.		
Stratif	ication line	s represent	approximate bou	ndaries between soil types; t	ransition	is may b	e gradual.				Page 1 of 1		
* Wate	er level rea	idings have l	been made at tim	es and under conditions stat	ed. Gro	undwate	er fluctuatio	ns may c	ccur du	e to conditions other			

I	Main	-		of Transport	tation	Pro	oject:	Maine Avenu		95 Bridges Over Stillwater	Boring No.:	BB-B	SA-110
			Soil/Rock Exp US CUSTOM/			Loc	catio	n: Ban		line	WIN:	0271	76.00
Drill	er:		Seaboard		Elevatio	on (ft.)	)	127.	53		Auger ID/OD:		
)pe	rator:		Kevin Hansco	m	Datum:			Mair	ne East	Zone	Sampler:	Standard Split	Spoon
oa	ged By:		Lina-Maria Pu	18	Rig Typ	oe:		Died	lrich D-	-50	Hammer Wt./Fall:	140 lbs/30 in	1
	Start/Fi	inish		09); 05/08/24 (21:22)	Drilling		od.		, Cased		Core Barrel:	NX	
	ng Loca			, E: 1735292.34	Casing				n/3.25 i		Water Level*:	3.1 ft on 05/08	2/24 at 20.34
	-			, E: 1755292.54								5.1 It 011 05/08	/24 at 20:54
efini = S ID = = T IU = = Fi	tions: blit Spoon Unsuccess hin Wall Tu Unsuccess eld Vane S	Sample sful Split Sp ube Sample sful Thin W Shear Test,	all Tube Sample A PP = Pocket Pe ane Shear Test At	SSA = So npt HSA = Ho RC = Roll ttempt WOH = W netrometer WOR/C =	eight of 140lb. Weight of Rods Neight of One F	er Hamme s or Cas	er	S <sub>u(la</sub> q <sub>p</sub> = N-un Ham N <sub>60</sub> :	Peak/Re b) = Lab Unconfir corrected mer Effic = SPT N	Hydraulic □ amolded Field Vane Undrained Shu Vane Undrained Shear Strength ( ed Compressive Strength (ksf) d = Raw Field SPT N-value iency Factor = Rig Specific Annua -uncorrected Corrected for Hamme re Efficiency Factor/60%)*N-unco	psf) WC LL = PL = I Calibration Value PI = er Efficiency G =	Pocket Torvane She = Water Content, per Liquid Limit Plastic Limit Plasticity Index Grain Size Analysis Consolidation Test	
Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	Casind	Blows	Elevation (ft.)	Graphic Log		scription and Remarks		Laboratory Testing Results/ AASHTO and Unified Class
0						s	SA	126.9		Asphalt Pavement		0.6	
	1D	24/11	1.00 - 3.00	16-21-16-20	37 60	6				Brown, dry, dense, Silty Gl	RAVEL, little sand (FILL		
	2D	24/6			17 30	0				Grey, wet, medium dense, s	Silty angular GRAVEL, t	race sand (FILL).	
5 -	3D R1	3/3 60/57	5.00 - 5.25 5.30 - 10.30	50/3" RQD = 52%	R	1	NX	122.2		Grey, wet, very dense, angu poorly-graded (FILL).	ular GRAVEL, some silt,		4
10 - 15 - 20 -	R1 R2	60/57	5.30 - 10.30	RQD = 52%			112.2		Bedrock encountered at 5.3 Top of Bedrock at Elev. 12 R1 (5.3'-10.3'): Grey, very [metasandstone] with frequ strong, thinly laminated, ff dipping, close to moderatel polished, open. average 1.0 FACIES, PENOBSCOT R FORMATION]. Rock Mass Quality = fair 95% Recovery Rock Core Rate (min:sec) 5.3-6.3 ft (2:20) 6.3-7.3 ft (2:21) 8.3-9.3 ft (2:21) RIVER MEMBER, BANG Rock Mass Quality = fair 100% Recovery Rock Core Rate (min:sec) 10.3-11.3 ft (3:15) 11.3-12.3 ft (3:15) 11.3-12.3 ft (3:28) 14.3-15.3 ft (3:40) Bottom of Exploration Boring backfilled with ben	2.2 ft fine grained, METAWAG ent thick and thin calcite resh; discontinuities horiz esh; discontinuities horiz y close spacing, stepped, fractures per foot [MED IVER MEMBER, BANC Ver MEMBER, BANC y fine grained, METAWA ent thick and thin calcite ninated, fresh; discontinu ing, stepped, smooth, ope M BEDDEED FACIES, OR FORMATION].	veins, medium ontal to steep smooth to IUM BEDDEED OR ACKE veins, very to ities steep n. average 0.8 PENOBSCOT 15.3 md surface. re socket, gravel		
1. H 2. A	s-drilled	boring lo	cations and grou	by S.W. Cole and take und surface elevations v at 20:34 was made be	were provided	d by M	laineD	DOT.		' Report" by GRL Engineers I of casing at 5.3 ft bgs.	· · ·	asphalt.	
tratif	ication line	s represen	t approximate bou	ndaries between soil types	; transitions ma	y be gra	adual.				Page 1 of 1		
		-	been made at tim time measuremen	es and under conditions st ts were made.	ated. Groundw	vater fluc	ctuation	ns may o	ccur due	to conditions other	Boring No	.: BB-BSA-	110

n those present at the time measurements were mad	e.
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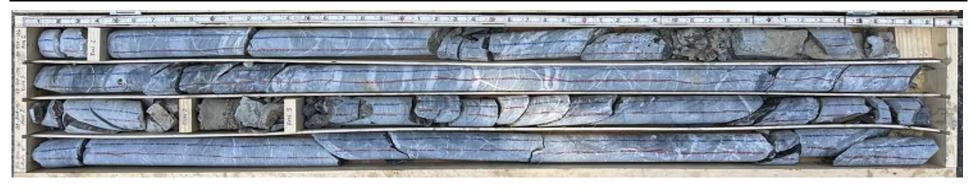
1	Main	e Dep	artment	of Transport	ation		Project:	Maine	DOT	-95 Bridges Over Stillwater	Boring No.:	BB-B	SA-111	
		-	Soil/Rock Expl	-			Locatio	Avenu	e					
		ļ	JS CUSTOMA	ARY UNITS			LUCALIO	n. Danş	gor, w	ame	WIN:	0271	76.00	
Drill			Seaboard		Flor	otion	(44)	148.2	77					
	rator:		Ryan H.		Dati	atior	i (itt.)			t Zone	Auger ID/OD: Sampler:	Stondord Sulit	Sacca	
	ged By:					Type			rich E		Hammer Wt./Fall:	Standard Split 140lb/30in	Spooli	
	Start/Fi	inich	D. Burgess	; 7/25/24 (4:25)			Nethod:			d Wash	Core Barrel:	NX		
	ng Loca			E: 1735418.07	_		D/OD:	4" (I		u wash	Water Level*:	14.75' 4:07 7/2	15/24	
	-			E: 1755418.07	_	-			,	The description 🗖		14.75 4:07 7/2	.3/24	
Defini		ICIENCY F	actor: 1.087	R = Rock (			Туре:	Automa S <sub>11</sub> =		Hydraulic emolded Field Vane Undrained She	Rope & Cathead $\Box$ ear Strength (psf) $T_{y} =$	Pocket Torvane She	ar Strength (psf)	
MD = U = T	hin Wall Tu	sful Split Spo ube Sample	oon Sample Attem	RC = Rolle	low Stem a r Cone	Auger	ımmer	q <sub>p</sub> = 1 N-uno	Únconf correct	b Vane Undrained Shear Strength (j ined Compressive Strength (ksf) ed = Raw Field SPT N-value ciency Factor = Rig Specific Annual	LL = PL =	= Water Content, per Liquid Limit Plastic Limit Plasticity Index	cent	
			PP = Pocket Per ne Shear Test Atte							N-uncorrected Corrected for Hamme mer Efficiency Factor/60%)*N-uncor		Grain Size Analysis Consolidation Test		
				Sample Information									Laboratory	
Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N60	Casing Blows	Elevation (ft.)	Graphic Log	Visual De	scription and Remarks		Testing Results/ AASHTO and Unified Class.	
					Z 36	SSA SSA	ш€	G	7" Ashpalt pavement					
	1D	24/9	0.60 - 2.60	9-11-9-11	20	Olive brown, moist, dense, GRAVEL, little silt (FILL).			Fines = 13.5% A-1-a (0), GM- SM					
	2D	24/19	3.00 - 5.00	11-20-22-16	42	76				Olive with brown, moist, ha little fine to medium sand, v				
- 5 -	3D	13.5/12	5.00 - 6.13	13-21-50/1.5"	R		165			(FILL). Light olive brown, moist, he plastic (FILL).	-	Fines = 61.6% A-4 (0), ML		
							64			Fractured rock fragments, ti	I)			
	4D	24/12	7.00 - 9.00	12-26-20-13	46	83	47			Tractured Toek Tragments, u	ace organies (10013) (1 IL	L).		
							88			Olive with dark grey, moist	hard, SANDY SILT, tra	ce gravel, non-		
- 10 -							47	138.8		plastic (FILL).		9.5	WC = 21%	
	5D	24/22	10.00 - 12.00	7-9-11-15	20	36	59			Olive with orange mottled, plasticity (CLAY).	moist, hard, CLAY, trace	sand, medium	Fines = $99.4\%$ LL = $32$	
							73			Pp 3.0 to 3.5 tsf			PL = 17	
							146						PI = 15 $LI = 0.3$	
							210	134.8		(		— — — —13.5 <sup>.</sup>	A-6 (15), CL	
- 15 -	6D	24/13	15.00 - 17.00	19-24-16-45	40	72	71			Grayish brown, wet, very d		L, little silt, and		
							95			fractured rock fragments (G	ILACIAL HEL).		Fines = 20.0% A-1-b (0), SM/ GM	
							208	130.5				17.8 <sup>-</sup>	GWI	
							NX	150.5		Bedrock encountered at 17. Top of Bedrock at Elev. 13		17.0		
	R-1	60/40.8	19.00 - 24.00	RQD = 15%						R1 (19.0' - 24.0'): Grey, ver	y fine grained, thinly to v			
- 20 -										bedded, METAWACKE [m strong to very strong, slight				
										weathering; discontinuities				
										close spacing, rough to very average from 19 ft to 21.3 ft				
										PENOBSCOT RIVER MEI Rock Mass Quality = very		IATION].		
										68% recovery	2001			
- 25 -	R-2	60/60	24.00 - 29.00	RQD = 60%						15% RQD Rock Core Rate (min:sec)				
										19.0 - 20.0 ft (2:11) 20.0 - 21.0 ft (1:11)				
										21.0 - 22.0 ft (1:55)				
										22.0 - 23.0 ft (1:49) 23.0 - 24.0 ft (1:56)				
_ 30	119.3       R2 (24.0' - 29.0'): Grey, very fine grained, thinly to very thinly bedded, METAWACKE [metasandstone] with frequent calcite veins, very strong to strong, fresh: discontinuities low angle dipping, very													
Rem	arks:													
									e - SP	T Report" by GRL Engineers In	nc., dated 11/10/2023.			
				nd surface elevations v 4 at 4:07 am was made										
	3. Water level reading taken on 7/25/24 at 4:07 am was made after the rock coring.													
Stratif	ication line	s represent	approximate bour	daries between soil types;	transitions	s may b	oe gradual.				Page 1 of 2			
* Wat	er level rea	idings have	been made at time	es and under conditions sta	ated. Grou	undwat	er fluctuatio	ns may o	ccur du	e to conditions other		<b>-</b>		
than	those pre	sent at the ti	me measurement	s were made.							Boring No.	: BB-BSA-	111	

]	Main	e Dep	artment	of Transport	ation	Project			-95 Bridges Over Stillwater	Boring No.:	BB-B	SA-111			
			Soil/Rock Exp			Locatio	Avenu n: Ban		aine		0071	<b>R</b> < 00			
			US CUSTOM	IARY UNITS						WIN:	0271	76.00			
Drill	ler:		Seaboard		Elevatio	n (ft.)	148.	27		Auger ID/OD:					
Оре	rator:		Ryan H.		Datum:		Maiı	ne East	Zone	Sampler:	Standard Split	Spoon			
Log	ged By:		D. Burgess		Rig Typ	e:	Died	rich D	-50	Hammer Wt./Fall:	140lb/30in				
Date	e Start/F	inish:	7/25/24 (0:44	); 7/25/24 (4:25)	Drilling	Method:	SSA	, Cased	l Wash	Core Barrel:	NX				
	ing Loca			8, E: 1735418.07	Casing		4" (I	,		Water Level*:	14.75' 4:07 7/2	25/24			
	nmer Eff	ficiency l	Factor: 1.087	R = Rock (	Hamme Core Sample	r Type:	Automa Su =		Hydraulic emolded Field Vane Undrained Sh	Rope & Cathead $\Box$ ear Strength (psf) $T_{y} =$	Pocket Torvane She	ar Strength (psf)			
D = S MD = U = T MU = V = F	Split Spoon Unsucces Thin Wall T Unsucces Tield Vane	ssful Split Sp ube Sample ssful Thin W Shear Test,	all Tube Sample / PP = Pocket Pe ane Shear Test A	SSA = Soli           mpt         HSA = Holi           RC = Rolle           Attempt         WOH = We           enetrometer         WOR/C = W           ttempt         WO1P = W	d Stem Auger ow Stem Auger	Hammer or Casing	S <sub>u(la</sub> q <sub>p</sub> = N-un Hami N <sub>60</sub> :	b) = Lab Unconfii correcte ner Effic = SPT N	Vane Undrained Shear Strength ned Compressive Strength (ksf) d = Raw Field SPT N-value iency Factor = Rig Specific Annue -uncorrected Corrected for Hamm ner Efficiency Factor/60%)'N-unco	(psf) WC = LL = PL = al Calibration Value PI = I er Efficiency G = 0	e Water Content, per Liquid Limit Plastic Limit Plasticity Index Grain Size Analysis Consolidation Test				
		<u> </u>		Sample Information	σ							Laboratory			
Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	Casing Blows	Elevation (ft.)	Graphic Log	Visual De	escription and Remarks		Testing Results/ AASHTO and Unified Class.			
<u>a</u> 30 - 35 - 40 - 45								0	close spacing, rough, tight,         BEDDED FACIES, PENC         FORMATION].         Rock Mass Quality = fair         100% recovery         60% RQD         Rock Core Rate (min:sec)         24.0 - 25.0 ft (3:39)         25.0 - 26.0 ft (5:35)         26.0 - 27.0 ft (5:39)         27.0 - 28.0 ft (5:10)         28.0 - 29.0 ft (3:51)         Bottom of Exploratio         Boring backfilled with ben to bottom of pavement and	DBSCOT RIVER MEMBE					
- 50							-								
							1								
		+				+	1								
60 Ren	harks:														
1. I 2. 2 3. V Strati	Hammer As-drillec Water lev	l boring lo rel reading	t approximate bou	d by S.W. Cole and taken und surface elevations w 24 at 4:07 am was made undaries between soil types; nes and under conditions sta	vere provided after the rock transitions may	by HNTB			" Report" by GRL Engineers I	Inc., dated 11/10/2023.					
		-	time measuremer		Groundwa	ແລະ ແດຍເປັນເປັນ	na mety 0	JUUI UUE		Boring No.	: BB-BSA-	111			

**APPENDIX B** 

## **Rock Core Photographs**

Boring	Run	Depth Below Surface	Recovery		RQD	Rock Type	Box Row	Date
Boning	Kuli	Feet	Feet	%	Feet	%	BUX KOW	Cored
	R1	31.5 - 32.4	0.8 / 0.9	89	0.0 / 0.9	0 Metawacke	3	7/29/2024
BB-BSA-101	R2	32.4 - 32.9	0.5 / 0.5	100	0.0 / 0.5	0 Metawacke	3	7/29/2024
DD-D3A-101	R3	32.9 - 36.5	3.6 / 3.6	100	0.5 / 3.6	14 Metawacke	3	7/29/2024
	R4	36.5 - 41.5	5.0 / 5.0	100	3.0 / 5.0	60 Metawacke	4	7/29/2024
	R1	63.8 - 64.8	0.3 / 1.0	30	0 / 0.3	0 Metawacke	1	7/28/2024
BB-BSA-106	R2	64.8 - 69.1	4.3 / 4.3	100	2 / 4.3	47 Metawacke	1	7/28/2024
	R3	69.1 - 74.1	5.0 / 5.0	100	3.6 / 5.0	62 Metawacke	2	7/28/2024



Notes:

"Box row" indicates the section of the box where the core is contained: 1 = top, 4 = bottom.
 Top of each core run is on the left and increases with depth to the right.

Boring	Run	Depth B	elow	Surface		Re	ecovery				RQD		Rock Type	Box Row	Date
Boning	Kuli		Feet			Feet		%		Fee	t	%	Косктуре	BOX NOW	Cored
BB-BSA-102	R1	12.2	-	17.2	4.50	/	5.0	90	3.7	/	5.0	73	Metawacke	3	5/8/2024
BB-B3A-102	R2	17.2	-	22.2	4.9	/	5.0	98	4.9	/	5.0	98	Metawacke	4	5/8/2024
	R1	6.7	-	11.7	4.9	/	5.0	98	3.0	/	5.0	59	Metawacke	1	5/7/2024
BB-BSA-108	R2	11.7	-	12.7	0.9	/	1.0	92	0.4	/	1.0	40	Metawacke	2	5/7/2024
BB-B3A-100	R3	12.7	-	14.7	1.76	/	2.0	88	0.38	/	2.0	19	Metawacke	2	5/7/2024
	R4	14.7	-	16.7	1.92	/	2.0	96	0.74	/	2.0	37	Metawacke	2	5/7/2024
1.101															
1 8 8 7	4 36 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	\$ 15 DE D	0.26	56 . 6. 9	Sal Salit é	2.8 2	2. 25. 24	1.59 2.6 2.7	4. 141.11	0 1	22.28.2	A 9 %	10 10 10 10 10 10 10 10 10 10 10 10 10 1	1	A 1 2
	and with a	the second	and the	STATE OF		P		See St		311		40.5-	No. 33)-1	C So Th	
a france		Na Asia	-	ALL PROPERTY.	Fra A.	E.	- former	The second second	E	9					
			(South			Eà	1	//		6.3	n	11 1	12 L 21/2	1 miles	3.6 2
Pr A	State and	1 1000		TIER MORE		UN I	1	10015-1/60		- 10	-	1	No. 1 March	1 100	5
A CARLE		K	1 10	14 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			l	(	SH-	21	1		1 1 2 2 2 1 1		
1 1100-5-5	1 to the second second	C.	52	1. 11 -	L C YNY	4	Ser In	North State	-	al	200 100	the state	and the second second		
122 Antoney	Call March	2 8		CAN INCOM	1	1000		and the set	Section in	21	ALC: NO	the set			

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Notes:

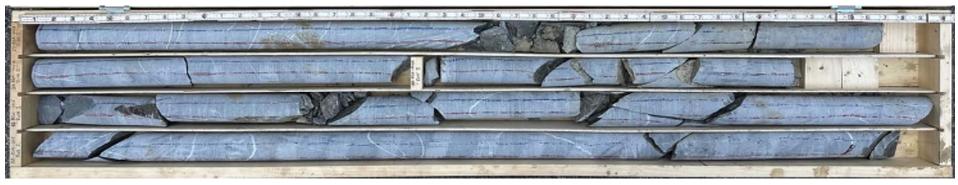
"Box row" indicates the section of the box where the core is contained: 1 = top, 4 = bottom.
 Top of each core run is on the left and increases with depth to the right.

Boring	Run	Depth Belo	ow Surface		Recovery			RQD		Rock Type	Box Row	Date
воппу	Kull	Fe	et	F	eet	%	F	eet	%	коск туре	DOX NOW	Cored
BB-BSA-103	R1	7.2	- 12.2	5.0	/ 5.0	100	1.6 /	5.0	31	Metawacke	3	5/8/2024
BB-B3A-103	R2	12.2	- 17.2	5.0	/ 5.0	100	3.6 /	5.0	71	Metawacke	4	5/8/2024
BB-BSA-110	R1	5.3	- 10.3	4.8	/ 5.0	95	2.6 /	5.0	52	Metawacke	1	5/8/2024
DD-D3A-110	R2	10.3	- 15.3	5.0	/ 5.0	100	3.6 /	5.0	72	Metawacke	2	5/8/2024

Notes:

- 1. "Box row" indicates the section of the box where the core is contained: 1 = top, 4 = bottom.
- 2. Top of each core run is on the left and increases with depth to the right.

Poring	Bun	Depth Below Surface	Recovery		RQD		Pook Turo	Box Row	Date
Boring	Run	Feet	Feet	%	Feet	%	Rock Type	DOX KOW	Cored
	R1	21.0 - 26.0	4.8 / 5.0	95	2.8 / 5.0	56	Metawacke	1	7/30/2024
BB-BSA-104A	R2	26.0 - 28.8	2.1 / 2.8	75	1.7 / 2.8	61	Metawacke	2	7/30/2024
	R3	28.8 - 31.0	2.0 / 2.2	91	0.5 / 2.2	23	Metawacke	2	7/30/2024
BB-BSA-105	R1	26.4 - 31.4	5.0 / 5.0	100	1.5 / 5.0	30	Metawacke	3	7/31/2024
BB-B3A-105	R2	31.4 - 36.2	4.8 / 4.8	100	3.6 / 4.8	75	Metawacke	4	7/31/2024



Notes:

"Box row" indicates the section of the box where the core is contained: 1 = top, 4 = bottom.
 Top of each core run is on the left and increases with depth to the right.

Dun	Depth Be	low Surface		Reco	overy				RQD		Pock Typo	Box Dow	Date
Kull	F	eet	F	Feet		%		Feet	t	%	коск туре	BOX KOW	Cored
R1	63.4	- 67.2	0.6	/ :	3.8	23	0.0	/	3.8	0	Metawacke	1	7/23/2024
R2	67.2	- 68.2	0.2	/ '	1.0	17	0.0	/	1.0	0	Metawacke	1	7/24/2024
R3	68.2	- 72.2	3.8	/ 4	4.0	95	1.4	/	4.0	35	Metawacke	1	7/24/2024
R4	72.2	- 77.2	5.0	/ !	5.0	100	2.0	/	5.0	39	Metawacke	2	7/24/2024
R1	19.0	- 24.0	3.4	/ !	5.0	68	0.8	/	5.0	15	Metawacke	3	7/24/2024
R2	24.0	- 29.0	5.0	/ !	5.0	100	3.0	/	5.0	60	Metawacke	4	7/24/2024
6 7 8 9 6	1 8 S.	4 - 10 - 6 - 7	28 28 4	51 52	23.24	259.26.23	11.24	0 11	2 . 2	41.9	A 10 10 10 10 10 10 10	4 .0 .0 .7	2 10 10 10
Call .	1 3.90	ALL NEW SI		1.1	1		1	A de	Can Bark		and the second states of the second		130
		Ser la		17.		N	11	326	1	5 4 1	and the second sec	and the second	
the and the fit	6-1	The	1		150.77	6	20	15	1.100	k		1	
1 - B - B				THE SOL	Constant of		25:	1	1 14	1-			
- Commenter	EXY	Sal	-	1	5	Desk La Te		5-1	1	1	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	-	20 -11-
	Run R1 R2 R3 R4 R1	Run         F           R1         63.4           R2         67.2           R3         68.2           R4         72.2           R1         19.0	Run         Feet           R1         63.4         -         67.2           R2         67.2         -         68.2           R3         68.2         -         72.2           R4         72.2         -         77.2           R1         19.0         -         24.0	Run         Feet         F           R1         63.4         -         67.2         0.6           R2         67.2         -         68.2         0.2           R3         68.2         -         72.2         3.8           R4         72.2         -         77.2         5.0           R1         19.0         -         24.0         3.4	Run         Feet         Feet           R1         63.4         -         67.2         0.6         /           R2         67.2         -         68.2         0.2         /           R3         68.2         -         72.2         3.8         /           R4         72.2         -         77.2         5.0         /           R1         19.0         -         24.0         3.4         /	Run         Feet         Feet           R1         63.4         -         67.2         0.6         /         3.8           R2         67.2         -         68.2         0.2         /         1.0           R3         68.2         -         72.2         3.8         /         4.0           R4         72.2         -         77.2         5.0         /         5.0           R1         19.0         -         24.0         3.4         /         5.0	Run         Feet         Feet         %           R1         63.4         -         67.2         0.6         /         3.8         23           R2         67.2         -         68.2         0.2         /         1.0         17           R3         68.2         -         72.2         3.8         /         4.0         95           R4         72.2         -         77.2         5.0         /         5.0         100           R1         19.0         -         24.0         3.4         /         5.0         68           R2         24.0         -         29.0         5.0         /         5.0         100	Run         Feet         Feet         %           R1         63.4         -         67.2         0.6         /         3.8         23         0.0           R2         67.2         -         68.2         0.2         /         1.0         17         0.0           R3         68.2         -         72.2         3.8         /         4.0         95         1.4           R4         72.2         -         77.2         5.0         /         5.0         100         2.0           R1         19.0         -         24.0         3.4         /         5.0         688         0.8	Run         Feet         Feet         %         Fee           R1         63.4         -         67.2         0.6         /         3.8         23         0.0         /           R2         67.2         -         68.2         0.2         /         1.0         17         0.0         /           R3         68.2         -         72.2         3.8         /         4.0         95         1.4         /           R4         72.2         -         77.2         5.0         /         5.0         100         2.0         /           R1         19.0         -         24.0         3.4         /         5.0         688         0.8         /           R2         24.0         -         29.0         5.0         /         5.0         100         3.0         /	Run         Feet         Feet         %         Feet           R1         63.4         -         67.2         0.6         /         3.8         23         0.0         /         3.8           R2         67.2         -         68.2         0.2         /         1.0         17         0.0         /         1.0           R3         68.2         -         72.2         3.8         /         4.0         95         1.4         /         4.0           R4         72.2         -         77.2         5.0         /         5.0         100         2.0         /         5.0           R1         19.0         -         24.0         3.4         /         5.0         688         0.8         /         5.0           R2         24.0         -         29.0         5.0         /         5.0         100         3.0         /         5.0	Run         Feet         %         Feet         %           R1         63.4         -         67.2         0.6         /         3.8         23         0.0         /         3.8         0           R2         67.2         -         68.2         0.2         /         1.0         17         0.0         /         1.0         0           R3         68.2         -         72.2         3.8         /         4.0         95         1.4         /         4.0         35           R4         72.2         -         77.2         5.0         /         5.0         100         2.0         /         5.0         39           R1         19.0         -         24.0         3.4         /         5.0         100         2.0         /         5.0         15           R2         24.0         -         29.0         5.0         /         5.0         100         3.0         /         5.0         60	Run         Feet         %         Feet         %         Rock Type           R1         63.4         -         67.2         0.6         /         3.8         23         0.0         /         3.8         0         Metawacke           R2         67.2         -         68.2         0.2         /         1.0         17         0.0         /         1.0         0         Metawacke           R3         68.2         -         72.2         3.8         /         4.0         95         1.4         /         4.0         35         Metawacke           R4         72.2         -         77.2         5.0         /         5.0         100         2.0         /         5.0         39         Metawacke           R1         19.0         -         24.0         3.4         /         5.0         100         3.0         /         5.0         60         Metawacke           R2         24.0         -         29.0         5.0         /         5.0         100         3.0         /         5.0         60         Metawacke	Run         Feet         %         Feet         %         Rock Type         Box Row           R1         63.4         -         67.2         0.6         /         3.8         23         0.0         /         3.8         0         Metawacke         1           R2         67.2         -         68.2         0.2         /         1.0         17         0.0         /         1.0         0         Metawacke         1           R3         68.2         -         72.2         3.8         /         4.0         95         1.4         /         4.0         35         Metawacke         1           R4         72.2         -         77.2         5.0         /         5.0         100         2.0         /         5.0         39         Metawacke         2           R1         19.0         -         24.0         3.4         /         5.0         100         3.0         /         5.0         10         Metawacke         3           R2         24.0         -         29.0         5.0         100         3.0         /         5.0         60         Metawacke         4

N	otes:	

6

"Box row" indicates the section of the box where the core is contained: 1 = top, 4 = bottom.
 Top of each core run is on the left and increases with depth to the right.

Boring	Run	Depth Bel	ow Surface		Red	covery			R	QD		Rock Type	Box Row Date	Date
воппу	Kuli	Fe	et		Feet		%		Feet		%	Коск туре	DUX KUW	Cored
BB-BSA109A	R1	4.0	- 8.8	4.3	/	4.8	90	1.6	/	4.8	33	Metawacke	2	5/7/2024
DD-DOAT09A	R2	8.8	- 13.9	4.8	/	5.1	93	2.5	/	5.1	49	Metawacke	2,3	5/7/2024
	3 6 2 6 5 1		1. 1. I.	-		100	. Ka	1. 1.	5:	14	121-1-12	in to sale to	1.1	
E C		11 . 12 . 12	KO4 16 11	10.10.	a 21.2	A T	259 26 22	28 29 1	A DA	1. 1.	4 9 6	72 78 78 4 71 72 13 74	1 28 28 27 28	- 21 10 10
the care and	The second second		las		1 1	120	R. WY	Start 1	111	- subject	251110		-	
ALL ALLER	1000 ST	100-1		-	1000		12		2.				F	E I
		10	-4	ALL L	0	式名	Ka C		X	- 7-	4.20	A ANY A	10-13	
	1.1.1	6 1		Carl			CAR.	11	-FI	18/	2	the second	Re	41.38
		1 A ju						-64	-	9		a la la	15	
	and the second second	1000 200	110 Sec.	1200	100	1.14- 5	The and	10.26	1.40	- (E)	and the second	9	11-11-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-	A CONTRACTOR OF THE

Notes:

"Box row" indicates the section of the box where the core is contained: 1 = top, 4 = bottom.
 Top of each core run is on the left and increases with depth to the right.

APPENDIX C

# Laboratory Test Results



### Moisture Content of Soil and Rock - ASTM D2216

Boring ID	Sample ID	Depth	Description	Moisture Content,%
BB-BSA-101	4D	7-9 ft	Moist, olive brown sandy silt with gravel	11.1
BB-BSA-101	6D	15-17 ft	Moist, olive brown silty sand with gravel	10.7
BB-BSA-101	8D	25-27 ft	Moist, dark grayish brown silty gravel with sand	9.6
BB-BSA-104	4D	7-9 ft	Moist, dark grayish brown silty sand with gravel	6.5
BB-BSA-104	5D	10-12 ft	Moist, grayish brown sandy silt	11.1
BB-BSA-104	7D	20-22 ft	Moist, greenish gray silt with sand	16.4
BB-BSA-105	6D	15-17 ft	Moist, grayish brown sandy silt	20.5
BB-BSA-105	7D	20-22ft	Moist, olive brown silty sand with gravel	11.7
BB-BSA-106	14D	55-57 ft	Moist, gray silty sand	46.5
BB-BSA-107	6D	10.7-12.7 ft	Moist, olive brown silt with sand	14.7

Notes: Temperature of Drying : 110° Celsius



Client:	WSP USA, Inc.				
Project:	MaineDOT I-95 Bridge o	ver Stillwater			
Location:	Merrimack, NH			Project No:	GTX-319180
Boring ID:		Sample Type:		Tested By:	ajl
Sample ID	:	Test Date:	08/14/24	Checked By:	ank
Depth :		Test Id:	780423		

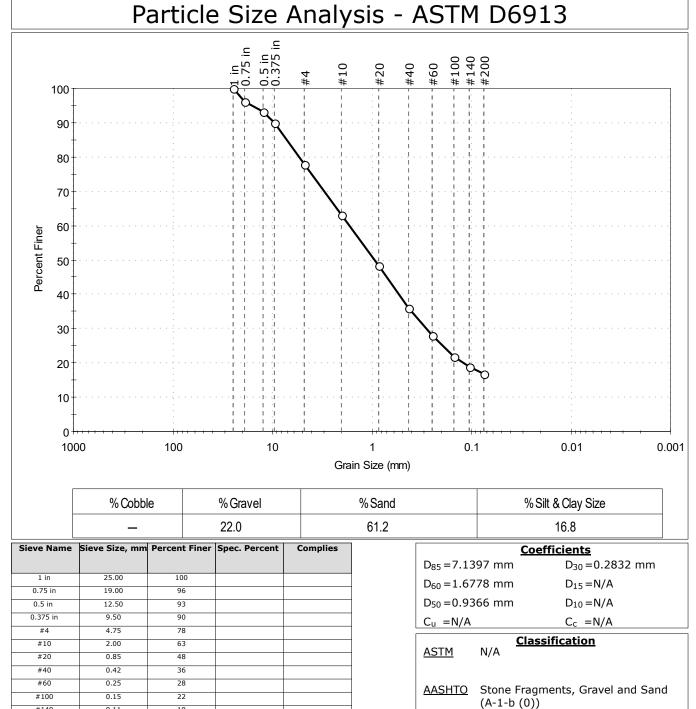
### Moisture Content of Soil and Rock - ASTM D2216

Boring ID	Sample ID	Depth	Description	Moisture Content,%
BB-BSA-107	15D	55-57 ft	Moist, grayish brown silty sand with gravel	10.6
BB-BSA-111	6D	15-17 ft	Moist, grayish brown silty sand with gravel	13.4

Notes: Temperature of Drying : 110° Celsius



Client:	WSP USA,	Inc.				
Project:	MaineDOT	laineDOT I-95 Bridge over Stillwater				
Location:	Merrimack	, NH			Project No:	GTX-319180
Boring ID:	BB-BSA-10	01	Sample Type:	Jar	Tested By:	ajl
Sample ID:	: 1D		Test Date:	08/19/24	Checked By:	ank
Depth :	0.7-2.7 ft		Test Id:	780401		
Test Comm	ent:					
Visual Desc	cription:	Moist, light ol	ive brown silty	sand with g	ravel	
Sample Co	mment:					



0.11

0.075

19

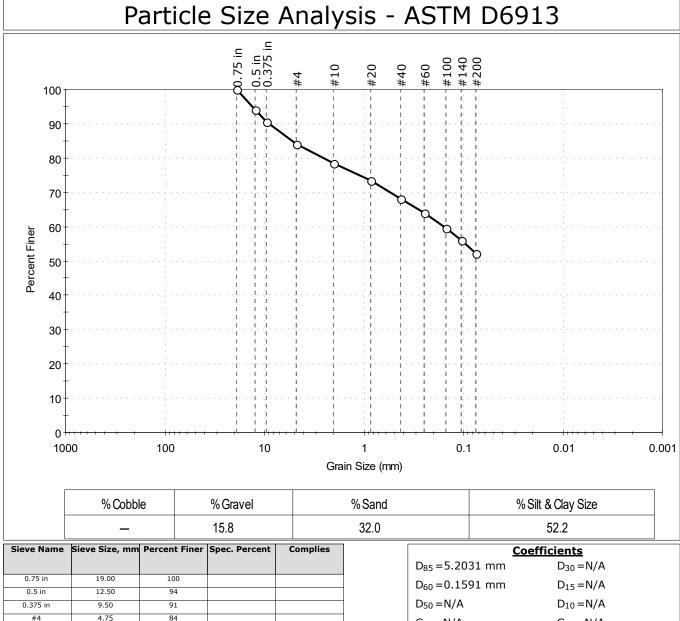
17

#140

#200



Client:	WSP USA,	Inc.				
Project:	MaineDOT	I-95 Bridge ov	ver Stillwater			
Location:	Merrimack	, NH			Project No:	GTX-319180
Boring ID:	BB-BSA-1	01	Sample Type:	Jar	Tested By:	ajl
Sample ID:	: 4D		Test Date:	08/19/24	Checked By:	ank
Depth :	7-9 ft		Test Id:	780402		
Test Comm	ent:					
Visual Desc	cription:	Moist, olive b	rown sandy silt	with gravel		
Sample Cor	mment:					



0.375 in	9.50	91	
#4	4.75	84	
#10	2.00	79	
#20	0.85	73	
#40	0.42	68	
#60	0.25	64	
#100	0.15	59	
#140	0.11	56	
#200	0.075	52	

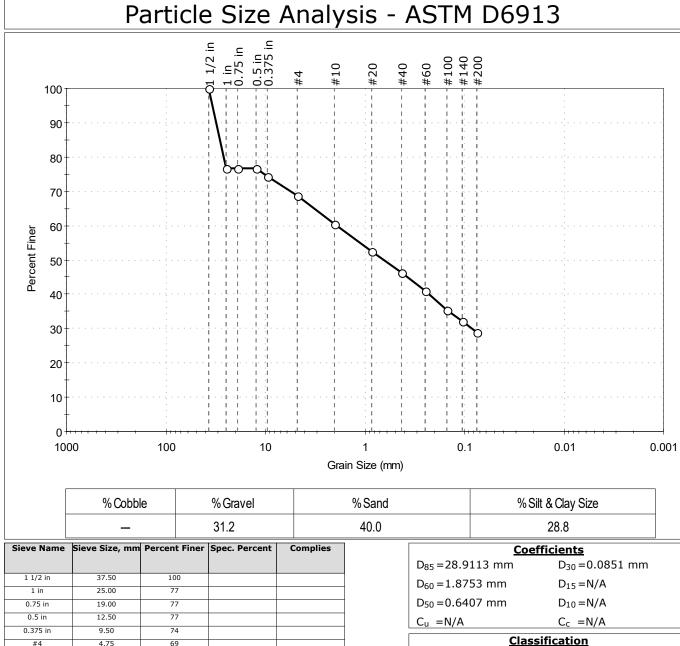
	<u>Coefficients</u>
D <sub>85</sub> =5.2031 mm	$D_{30} = N/A$
D <sub>60</sub> =0.1591 mm	$D_{15} = N/A$
D <sub>50</sub> = N/A	$D_{10} = N/A$
C <sub>u</sub> =N/A	C <sub>c</sub> =N/A
	<u>Classification</u>

<u>ASTM</u>	N/A
<u>AASHTO</u>	Silty Soils (A-4 (0))

Sand/Gravel Particle Shape : ANGULAR Sand/Gravel Hardness : HARD



Client:	WSP USA,	, Inc.				
Project:	MaineDOT	I-95 Bridge ov	ver Stillwater			
Location:	Merrimack	<, NH			Project No:	GTX-319180
Boring ID:	BB-BSA-1	01	Sample Type:	Jar	Tested By:	ajl
Sample ID	: 6D		Test Date:	08/16/24	Checked By:	ank
Depth :	15-17 ft		Test Id:	780403		
Test Comm	nent:					
Visual Deso	cription:	Moist, olive b	rown silty sand	with gravel		
Sample Co	mment:					



0.375 in	9.50	74	
#4	4.75	69	
#10	2.00	61	
#20	0.85	53	
#40	0.42	46	
#60	0.25	41	
#100	0.15	35	
#140	0.11	32	
#200	0.075	29	

<u>AASHTO</u>	Silty Gravel and Sand (A-2-4 (0))
---------------	-----------------------------------

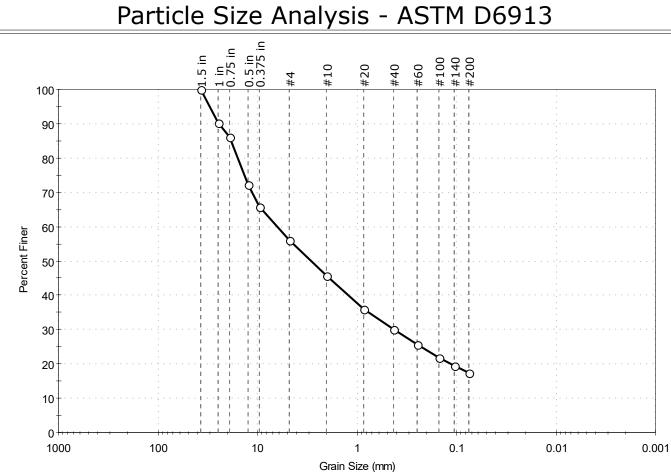
Sample/Test Description Sand/Gravel Particle Shape : ANGULAR Sand/Gravel Hardness : HARD

<u>ASTM</u>

N/A



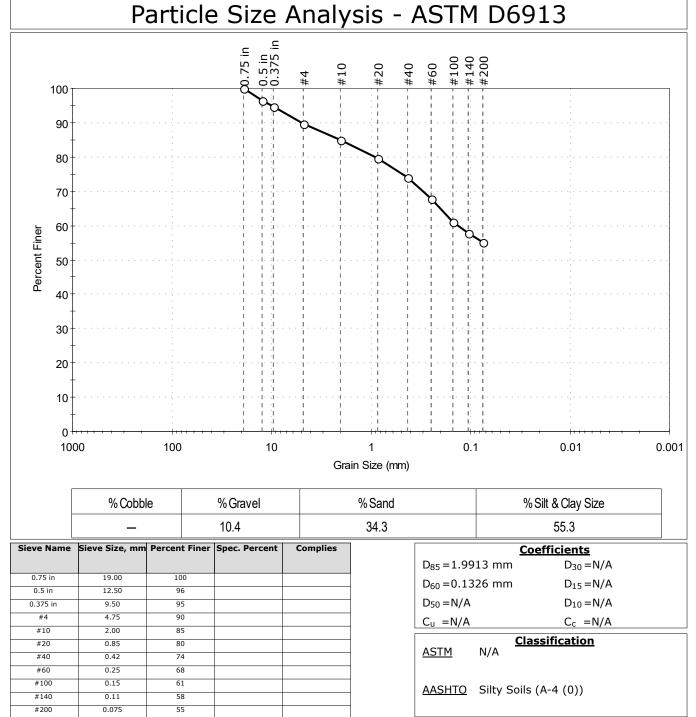
Client:	WSP USA,	Inc.				
Project:	MaineDOT	I-95 Bridge ov	er Stillwater			
Location:	Merrimack	, NH			Project No:	GTX-319180
Boring ID:	BB-BSA-10	)1	Sample Type:	Jar	Tested By:	ajl
Sample ID:	8D		Test Date:	08/19/24	Checked By:	ank
Depth :	25-27 ft		Test Id:	780404		
Test Comm	ent:					
Visual Desc	ription:	Moist, dark gr	ayish brown sil	ty gravel wi	th sand	
Sample Cor	mment:					
	<u> </u>				<u> </u>	



	% Cobbl	e	% Gravel		% Sand		%S	ilt & Clay Size	
	-		43.8		38.7			17.5	
Sieve Name	Sieve Size, mm	Percent Fine	Spec. Percent	Complies			<u>Coe</u>	fficients	
						D <sub>85</sub> =18.3	264 mm	D <sub>30</sub> =0.4200 mm	
1.5 in	37.50	100				$D_{60} = 6.26$	48 mm	$D_{15} = N/A$	
1 in	25.00	90							
0.75 in	19.00	86				$D_{50} = 2.86$	44 mm	$D_{10} = N/A$	
0.5 in	12.50	72				$C_u = N/A$		C <sub>c</sub> =N/A	
0.375 in	9.50	66							
#4	4.75	56				ASTM	N/A	<u>sification</u>	
#10	2.00	46				<u>A3111</u>	N/A		
#20	0.85	36							
#40	0.42	30				AASHTO	Stone Frage	nents, Gravel and Sand	
#60	0.25	26				<u></u>	(A-1-b (0))		
#100	0.15	22					() = = (0))		
#140	0.11	19			7		Sample/Te	est Description	
#200	0.075	18				Sand/Grav	vel Particle S	hape : ANGULAR	
					-	Sand/Grav	vel Hardness	: HARD	



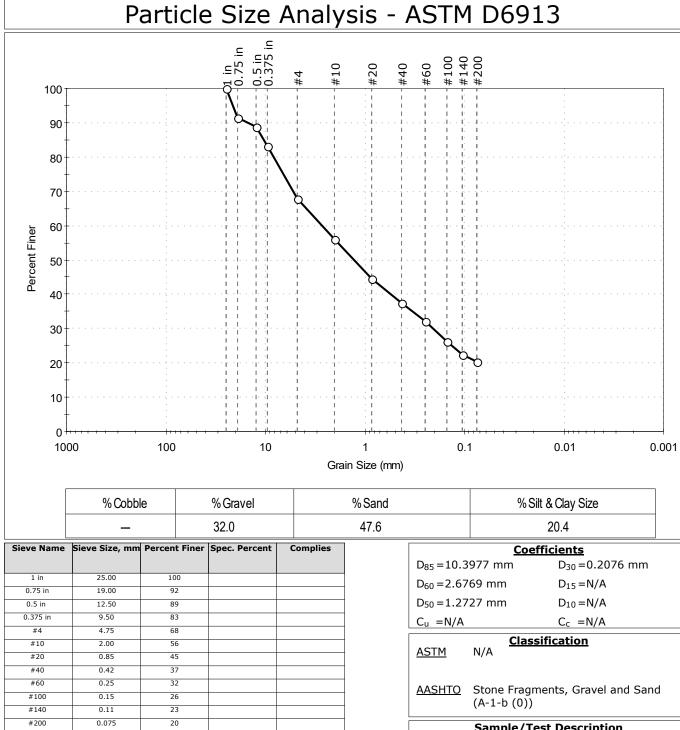
Client:	WSP USA,	Inc.				
Project:	MaineDOT	I-95 Bridge o	ver Stillwater			
Location:	Merrimack	, NH			Project No:	GTX-319180
Boring ID:	BB-BSA-1	04	Sample Type:	Jar	Tested By:	ajl
Sample ID:	: 2D		Test Date:	08/19/24	Checked By:	ank
Depth :	2.8-4.8 ft		Test Id:	780405		
Test Comm	ent:					
Visual Desc	cription:	Moist, dark g	rayish brown sa	ndy silt		
Sample Co	mment:					



Sample/Test Description Sand/Gravel Particle Shape : ANGULAR Sand/Gravel Hardness : HARD

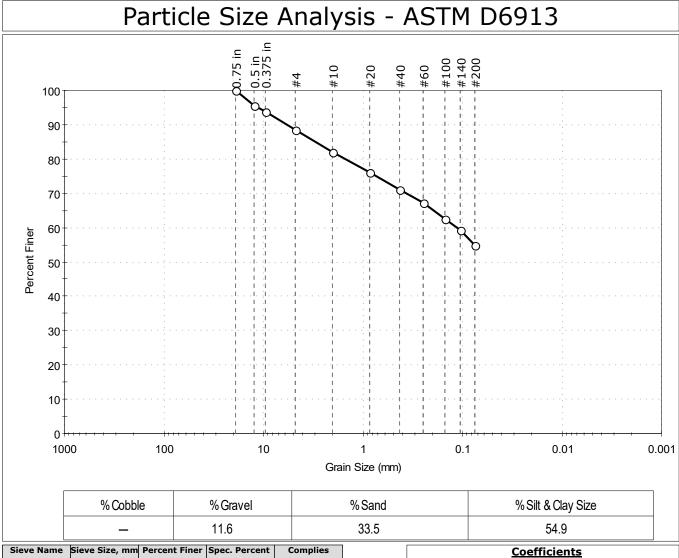


Client:	WSP USA,	Inc.				
Project:	MaineDOT	I-95 Bridge ov	ver Stillwater			
Location:	Merrimack	, NH			Project No:	GTX-319180
Boring ID:	BB-BSA-1	04	Sample Type:	Jar	Tested By:	ajl
Sample ID:	: 4D		Test Date:	08/19/24	Checked By:	ank
Depth :	7-9 ft		Test Id:	780406		
Test Comm	ent:					
Visual Desc	cription:	Moist, dark g	rayish brown si	ty sand witl	h gravel	
Sample Cor	mment:					





Client:	WSP USA,	Inc.				
Project:	MaineDOT	I-95 Bridge ov	er Stillwater			
Location:	Merrimack	, NH			Project No:	GTX-319180
Boring ID:	BB-BSA-1	04	Sample Type:	Jar	Tested By:	ajl
Sample ID	: 5D		Test Date:	08/19/24	Checked By:	ank
Depth :	10-12 ft		Test Id:	780407		
Test Comm	ent:					
Visual Description: Moist, grayisl		Moist, grayish	brown sandy s	ilt		
Sample Co	mment:					



Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.75 in	19.00	100		
0.5 in	12.50	96		
0.375 in	9.50	94		
#4	4.75	88		
#10	2.00	82		
#20	0.85	76		
#40	0.42	71		
#60	0.25	67		
#100	0.15	63		
#140	0.11	59		
#200	0.075	55		

<u>(</u>	Coefficients	
D <sub>85</sub> =3.0173 mm	$D_{30} = N/A$	
D <sub>60</sub> =0.1137 mm	D <sub>15</sub> =N/A	
D <sub>50</sub> =N/A	D <sub>10</sub> =N/A	
C <sub>u</sub> =N/A	C <sub>c</sub> =N/A	

<u>ASTM</u>	N/A	<u>Classification</u>

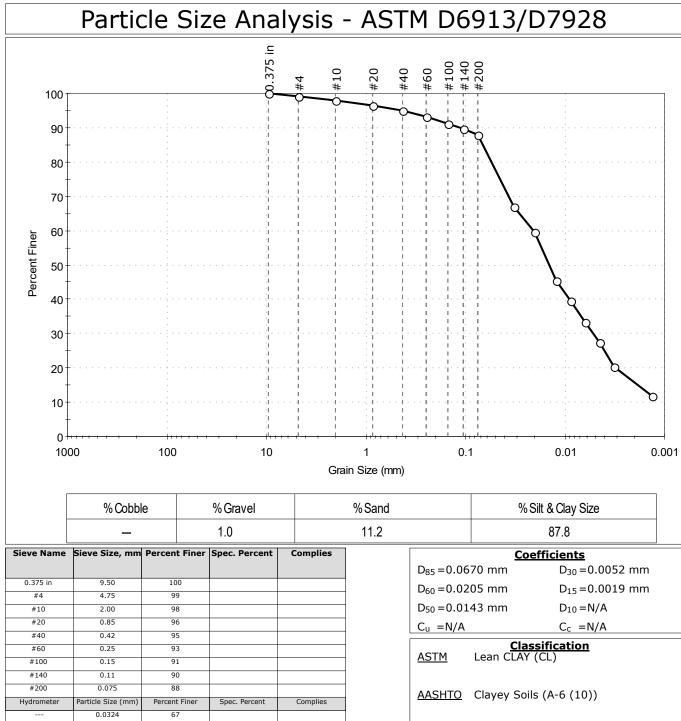
AASHTO Silty Soils (A-4 (0))

# Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD



Client:	WSP USA,	Inc.				
Project:	MaineDOT	I-95 Bridge ov	ver Stillwater			
Location:	Merrimack	, NH			Project No:	GTX-319180
Boring ID:	BB-BSA-10	04	Sample Type:	Jar	Tested By:	ajl
Sample ID:	6D		Test Date:	08/15/24	Checked By:	ank
Depth :	15-17 ft		Test Id:	780410		
Test Comm	ent:					
Visual Desc	ription:	Moist, grayish	ı brown clay			
Sample Cor	mment:					
	•				- / <del>-</del>	



Sample/Test Description Sand/Gravel Particle Shape : ---Sand/Gravel Hardness : ---Dispersion Device : Apparatus A - Mech Mixer Dispersion Period : 1 minute Est. Specific Gravity : 2.65 Separation of Sample: #200 Sieve

0.0201

0.0122

0.0063

0.0045

0.0032

0.0013

60

45

39

33

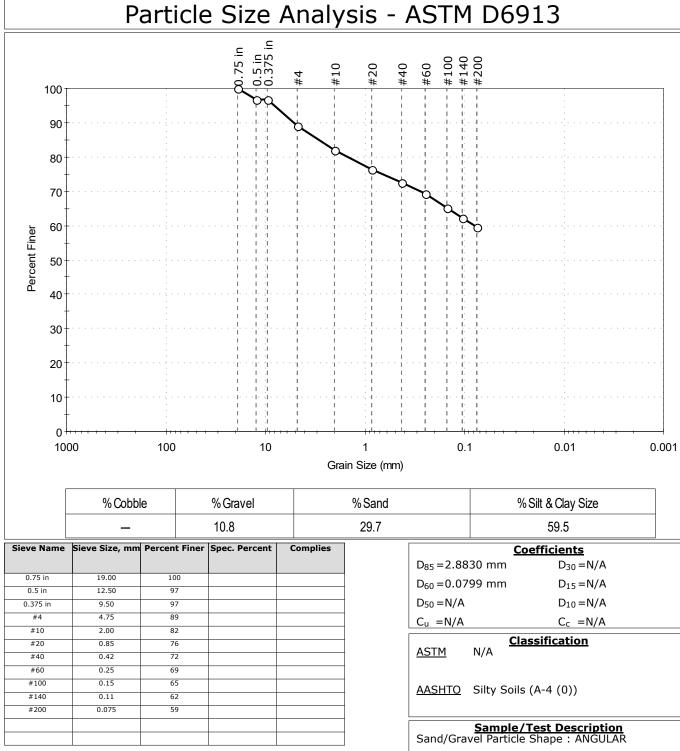
27

20

12

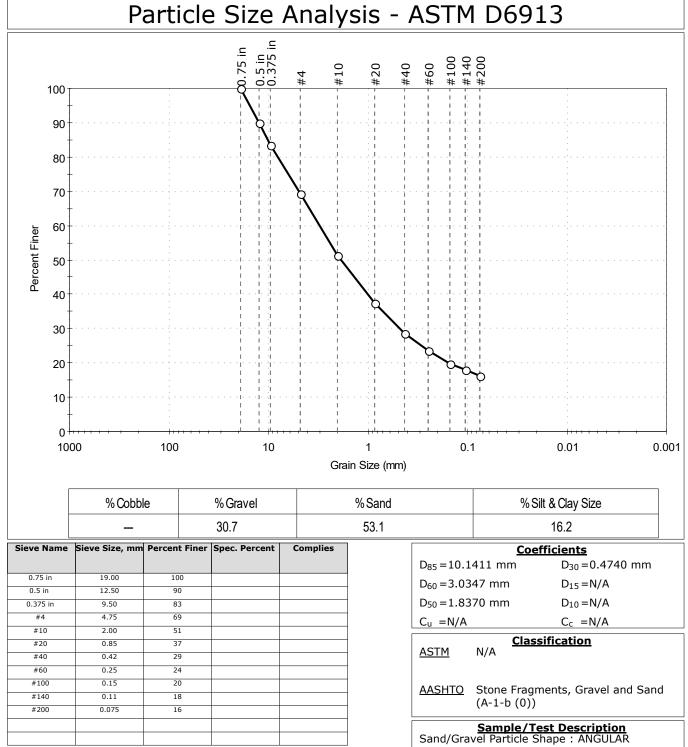


Client:	WSP USA,	, Inc.				
Project:	MaineDOT	I-95 Bridge ov	/er Stillwater			
Location:	Merrimack	<, NH			Project No:	GTX-319180
Boring ID:	BB-BSA-1	04	Sample Type:	Jar	Tested By:	ajl
Sample ID	: 7D		Test Date:	08/19/24	Checked By:	ank
Depth :	20-22 ft		Test Id:	780408		
Test Comm	nent:					
Visual Dese	cription:	Moist, greenis	sh gray silt with	sand		
Sample Co	mment:					



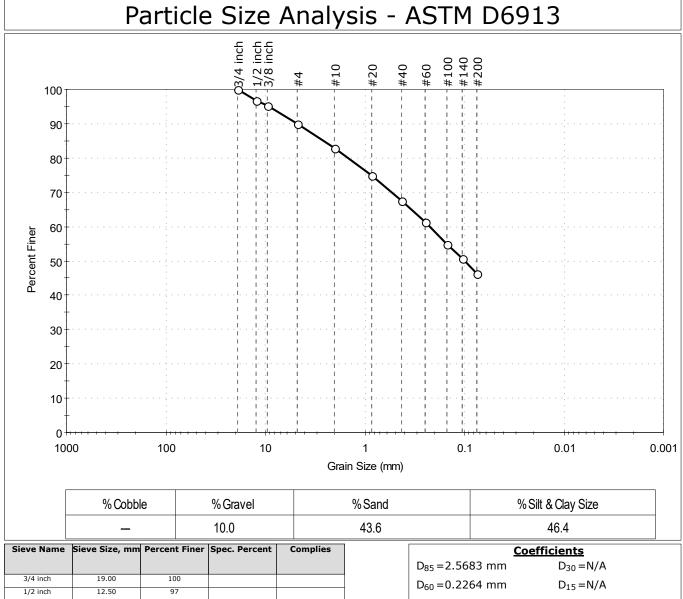


Client:	WSP USA,	Inc.				
Project:	MaineDOT	I-95 Bridge ov	er Stillwater			
Location:	Merrimack	, NH			Project No:	GTX-319180
Boring ID:	BB-BSA-10	)5	Sample Type:	Jar	Tested By:	ajl
Sample ID:	: 1D		Test Date:	08/19/24	Checked By:	ank
Depth :	0.9-2.9 ft		Test Id:	780366		
Test Comm	ent:					
Visual Desc	Visual Description: Moist, olive brown silty sand with gravel					
Sample Co	mment:					





Client:	WSP USA,	Inc.						
Project:	MaineDOT	MaineDOT I-95 Bridge over Stillwater						
Location:	Merrimack	, NH					Project No:	GTX-319180
Boring ID:	BB-BSA-1	05		Sample	e Type:	Jar	Tested By:	ajl
Sample ID:	: 3D			Test Da	ate:	08/19/24	Checked By:	ank
Depth :	5-5.6 ft			Test Id	:	780367		
Test Comm	ent:							
Visual Desc	cription:	Moist,	dark g	rayish br	own sil	ty sand		
Sample Co	mment:							
 	<u><u></u></u>	•		•			6010	



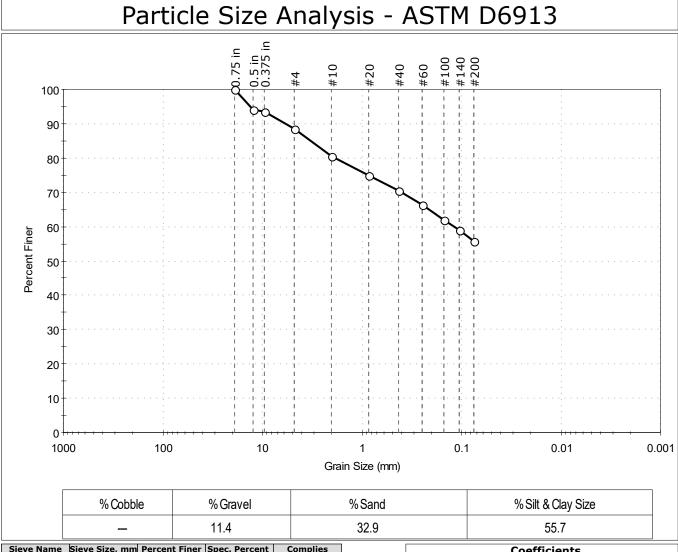
1/2 inch	12.50	97	
3/8 inch	9.50	95	
#4	4.75	90	
#10	2.00	83	
#20	0.85	75	
#40	0.42	67	
#60	0.25	61	
#100	0.15	55	
#140	0.11	51	
#200	0.075	46	

	4	6.4	
	<u>Coeffic</u>	<u>cients</u>	
D <sub>85</sub> = 2.56	83 mm	$D_{30} = N/A$	
D <sub>60</sub> = 0.22	64 mm	$D_{15} = N/A$	
$D_{50} = 0.10$	02 mm	$D_{10} = N/A$	
$C_u = N/A$		C <sub>c</sub> =N/A	
<u>ASTM</u>	<u>Classifi</u> N/A	<u>cation</u>	
<u>AASHTO</u>	Silty Soils (A-4	(0))	

Sample/Test Description Sand/Gravel Particle Shape : ANGULAR Sand/Gravel Hardness : HARD



Client:	WSP USA,	Inc.				
Project:	MaineDOT I-95 Bridge over Stillwater					
Location:	Merrimack	k, NH			Project No:	GTX-319180
Boring ID:	BB-BSA-1	05	Sample Type:	Jar	Tested By:	ajl
Sample ID:	: 6D		Test Date:	08/19/24	Checked By:	ank
Depth :	15-17 ft		Test Id:	780368		
Test Comm	ent:					
Visual Desc	cription:	Moist, grayish	n brown sandy s	silt		
Sample Co	mment:					



Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.75 in	19.00	100		
0.5 in	12.50	94		
0.375 in	9.50	93		
#4	4.75	89		
#10	2.00	81		
#20	0.85	75		
#40	0.42	70		
#60	0.25	67		
#100	0.15	62		
#140	0.11	59		
#200	0.075	56		

	<u>Coefficients</u>	
D <sub>85</sub> =3.2112 mm	$D_{30} = N/A$	
D <sub>60</sub> =0.1201 mm	$D_{15} = N/A$	
$D_{50} = N/A$	$D_{10} = N/A$	
C <sub>u</sub> =N/A	C <sub>c</sub> =N/A	

<u>ASTM</u>	N/A	<u>Classification</u>

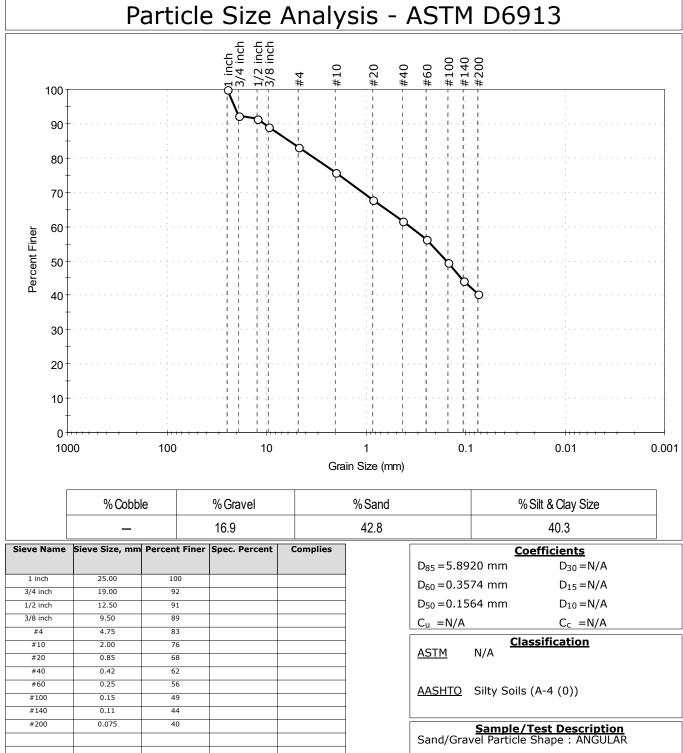
AASHTO Silty Soils (A-4 (0))

#### Sample/Test Description Sand/Gravel Particle Shape : ANGULAR Sand/Gravel Hardness : HARD

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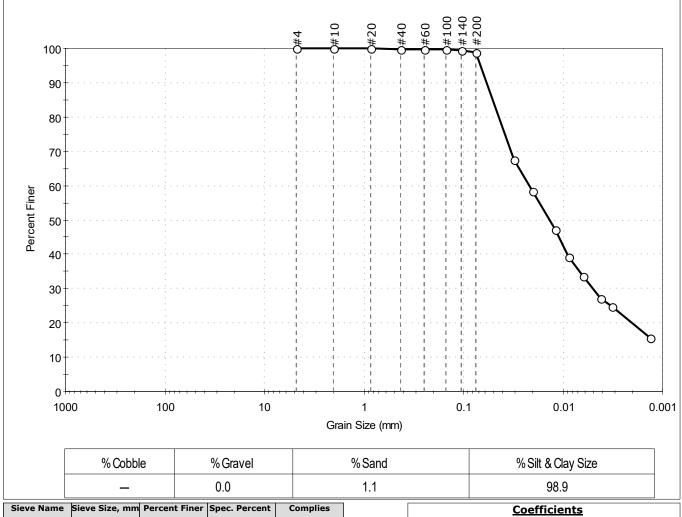
Client:	WSP USA,	Inc.				
Project: I	MaineDOT	I-95 Bridge ov	er Stillwater			
Location: I	Merrimack	, NH			Project No:	GTX-319180
Boring ID: I	BB-BSA-10	)5	Sample Type:	Jar	Tested By:	ajl
Sample ID: 7	7D		Test Date:	08/19/24	Checked By:	ank
Depth : 2	20-22ft		Test Id:	780369		
Test Comme	nt:					
Visual Descr	iption:	Moist, olive br	own silty sand	with gravel		
Sample Com	iment:					





Client:	WSP USA,	Inc.				
Project:	MaineDOT	I-95 Bridge ov	/er Stillwater			
Location:	Merrimack	, NH			Project No:	GTX-319180
Boring ID:	BB-BSA-1	06	Sample Type:	Jar	Tested By:	ajl
Sample ID:	: 7D		Test Date:	08/15/24	Checked By:	ank
Depth :	20-22 ft		Test Id:	780382		
Test Comm	ent:					
Visual Desc	cription:	Moist, light ol	ive brown clay			
Sample Co	mment:					

## Particle Size Analysis - ASTM D6913/D7928



Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies	
#4	4.75	100			
#10	2.00	100			
#20	0.85	100			
#40	0.42	100			
#60	0.25	100			
#100	0.15	100			
#140	0.11	99			
#200	0.075	99			
Hydrometer	Particle Size (mm)	Percent Finer	Spec. Percent	Complies	
	0.0314	67			
	0.0203	58			
	0.0121	47			
	0.0087	39			
	0.0062	34			
	0.0042	27			
	0.0032	25			
	0.0013	16			

	<u> </u>	Coefficients	-
D <sub>85</sub> =0.05	10 mm	D <sub>30</sub> =0.0050 mm	
$D_{60} = 0.02$	19 mm	$D_{15} = N/A$	
D <sub>50</sub> = 0.01	37 mm	$D_{10} = N/A$	
C <sub>u</sub> =N/A		C <sub>c</sub> =N/A	

ASTMClassificationAASHTOClayey Soils (A-6 (19))

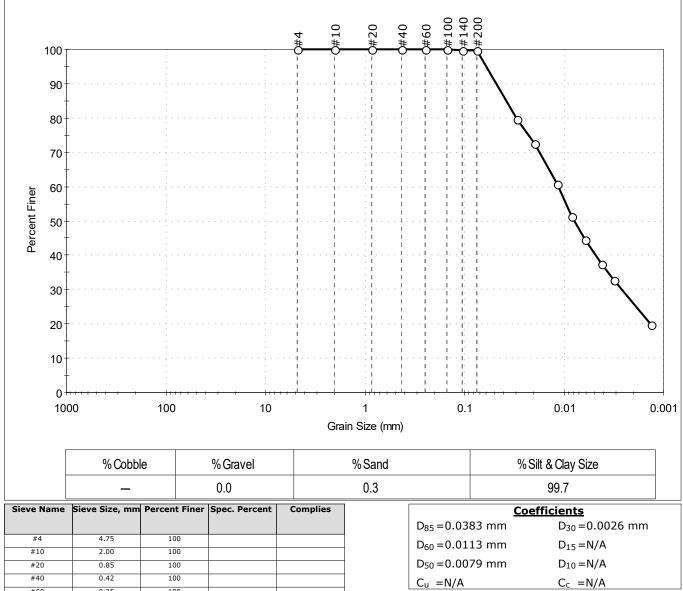
#### Sample/Test Description Sand/Gravel Particle Shape : ---Sand/Gravel Hardness : ---Disparsion Davisa : Apparatus A Mach Mi

Dispersion Device : Apparatus A - Mech Mixer Dispersion Period : 1 minute Est. Specific Gravity : 2.65 Separation of Sample: #200 Sieve



Client:	WSP USA,	Inc.				
Project:	MaineDOT	I-95 Bridge ov	ver Stillwater			
Location:	Merrimack	k, NH			Project No:	GTX-319180
Boring ID:	BB-BSA-1	06	Sample Type:	Jar	Tested By:	ajl
Sample ID:	: 8D		Test Date:	08/15/24	Checked By:	ank
Depth :	25-27 ft		Test Id:	780383		
Test Comm	ent:					
Visual Desc	cription:	Moist, grayisł	n brown clay			
Sample Co	mment:					

#### Particle Size Analysis - ASTM D6913/D7928



#40	0.42	100		
#60	0.25	100		
#100	0.15	100		
#140	0.11	100		
#200	0.075	100		
Hydrometer	Particle Size (mm)	Percent Finer	Spec. Percent	Complies
	0.0298	80		
	0.0196	73		
	0.0117	61		
	0.0084	51		
	0.0061	44		
	0.0042	37		
	0.0031	33		
	0.0013	20		

$C_{\rm u} = N/A$	$C_{c} = N/A$
<u>ASTM</u>	Classification Lean CLAY (CL)
<u>AASHTO</u>	Clayey Soils (A-6 (18))

#### Sample/Test Description Sand/Gravel Particle Shape : ---Sand/Gravel Hardness : ---Dispersion Device : Apparatus A - Mech Mixer

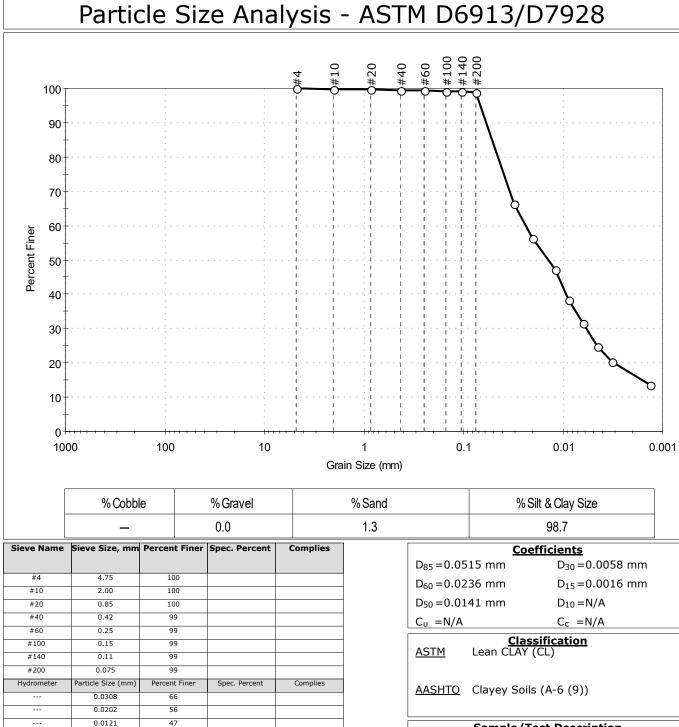
Dispersion Period : 1 minute

Est. Specific Gravity : 2.65

Separation of Sample: #200 Sieve



Client:	WSP USA,	Inc.				
Project:	MaineDOT	I-95 Bridge o	ver Stillwater			
Location:	Merrimack	, NH			Project No:	GTX-319180
Boring ID:	BB-BSA-10	06	Sample Type:	Jar	Tested By:	ajl
Sample ID:	9D		Test Date:	08/15/24	Checked By:	ank
Depth :	30-32 ft		Test Id:	780384		
Test Comm	ent:					
Visual Desc	ription:	Moist, gray c	lay			
Sample Cor	mment:					
	_					~ ~



#### Sample/Test Description Sand/Gravel Particle Shape : ---Sand/Gravel Hardness : ---Dispersion Device : Apparatus A - Mech Mixer

Dispersion Period : 1 minute

Est. Specific Gravity : 2.65

Separation of Sample: #200 Sieve

0.0087

0.0063

0.0045

0.0032

0.0013

38

32

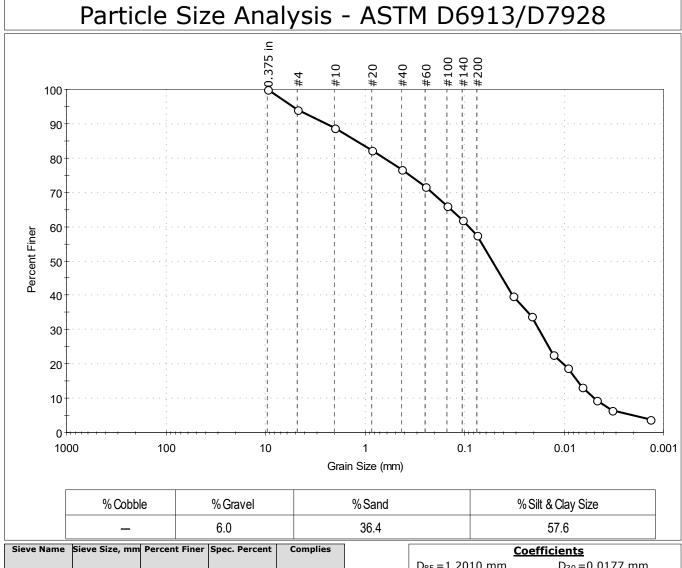
25

20

14



Client:	WSP USA,	Inc.				
Project:	MaineDOT	I-95 Bridge ov	er Stillwater			
Location:	Merrimack	, NH			Project No:	GTX-319180
Boring ID:	BB-BSA-10	)6	Sample Type:	Jar	Tested By:	ajl
Sample ID:	11D		Test Date:	08/15/24	Checked By:	ank
Depth :	40-42 ft		Test Id:	780385		
Test Comm	ent:					
Visual Desc	Visual Description: Moist, gray sa		ndy silt			
Sample Cor	nment:					



Sieve Maille	Sieve Size, IIIII	Percent Filler	Spec. Percent	complies
0.375 in	9.50	100		
#4	4.75	94		
#10	2.00	89		
#20	0.85	82		
#40	0.42	77		
#60	0.25	72		
#100	0.15	66		
#140	0.11	62		
#200	0.075	58		
Hydrometer	Particle Size (mm)	Percent Finer	Spec. Percent	Complies
	0.0327	40		
	0.0212	34		
	0.0128	23		
	0.0091	19		
	0.0065	13		
	0.0047	9		
	0.0033	7		
	0.0014	4		

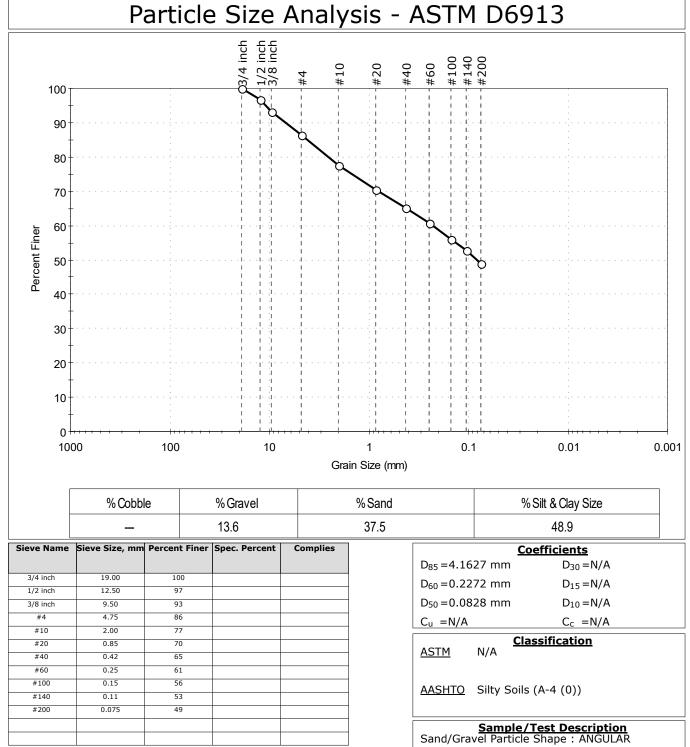
<b>Coefficients</b>					
D <sub>85</sub> =1.2010 mm	D <sub>30</sub> =0.0177 mm				
D <sub>60</sub> =0.0912 mm	D <sub>15</sub> =0.0073 mm				
D <sub>50</sub> =0.0526 mm	D <sub>10</sub> =0.0049 mm				
C <sub>u</sub> =18.612	C <sub>c</sub> =0.701				

ASTMClassificationASTMSandy SILT (ML)AASHTOSilty Soils (A-4 (0))

#### Sample/Test Description Sand/Gravel Particle Shape : ANGULAR Sand/Gravel Hardness : HARD Dispersion Device : Apparatus A - Mech Mixer Dispersion Period : 1 minute Est. Specific Gravity : 2.65 Separation of Sample: #200 Sieve



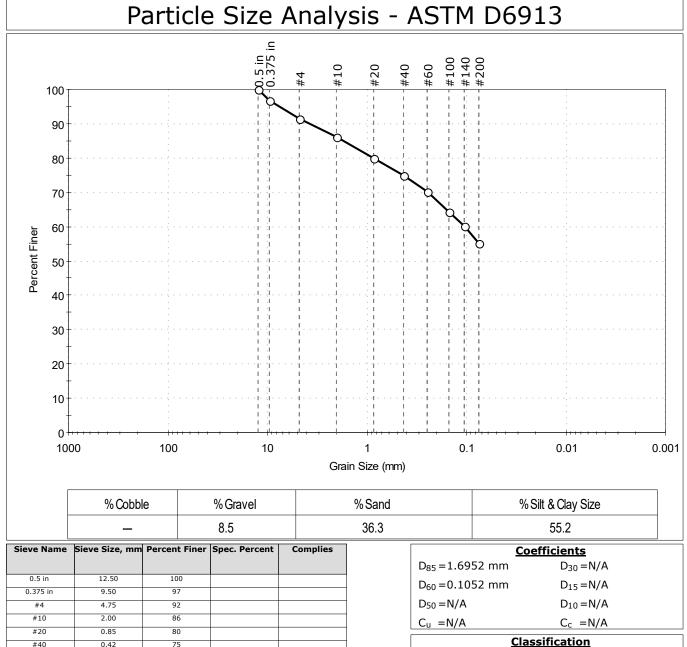
	Client:	WSP USA,	Inc.					
	Project:	MaineDOT	MaineDOT I-95 Bridge over Stillwater					
9	Location:	Merrimack	k, NH			Project No:	GTX-319180	
	Boring ID:	BB-BSA-1	06	Sample Type:	Jar	Tested By:	ajl	
	Sample ID:	: 14D		Test Date:	08/16/24	Checked By:	ank	
	Depth :	55-57 ft		Test Id:	780380			
	Test Comm	ent:						
	Visual Desc	cription:	Moist, gray si	lty sand				
	Sample Co	mment:						



Sand/Gravel Hardness : HARD



Client:	WSP USA,	Inc.					
Project:	MaineDOT	laineDOT I-95 Bridge over Stillwater					
Location:	Merrimack	Merrimack, NH				GTX-319180	
Boring ID:	BB-BSA-10	07	Sample Type:	Jar	Tested By:	ajl	
Sample ID:	: 3D		Test Date:	08/19/24	Checked By:	ank	
Depth :	4.7-6.7 ft		Test Id:	780391			
Test Comm	ent:						
Visual Desc	cription:	Moist, grayish	n brown sandy s	silt			
Sample Comment:							



	AASHTO	Silty Soils (A-4 (0))
	10101110	

<u>ASTM</u>

# Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

N/A

#40

#60

#100

#140

#200

0.42

0.25

0.15

0.11

0.075

75

70

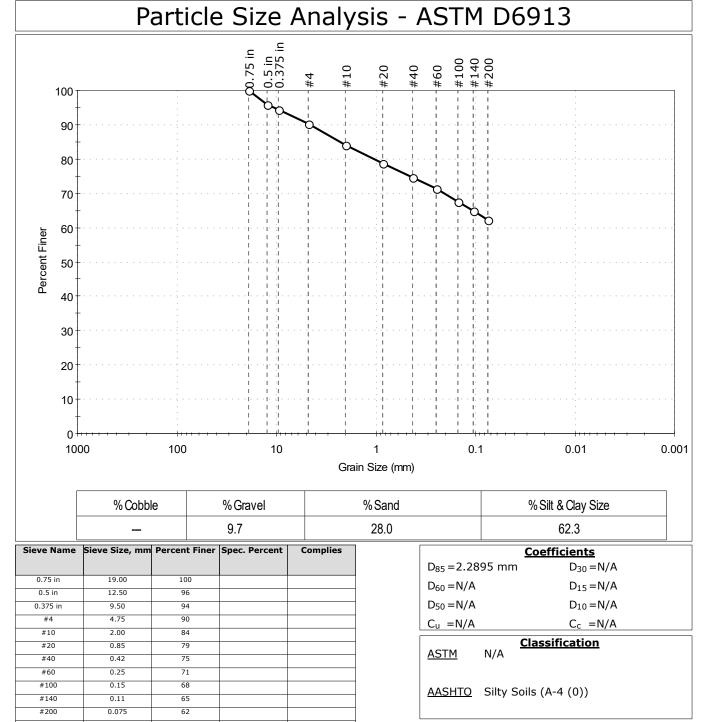
64

60

55



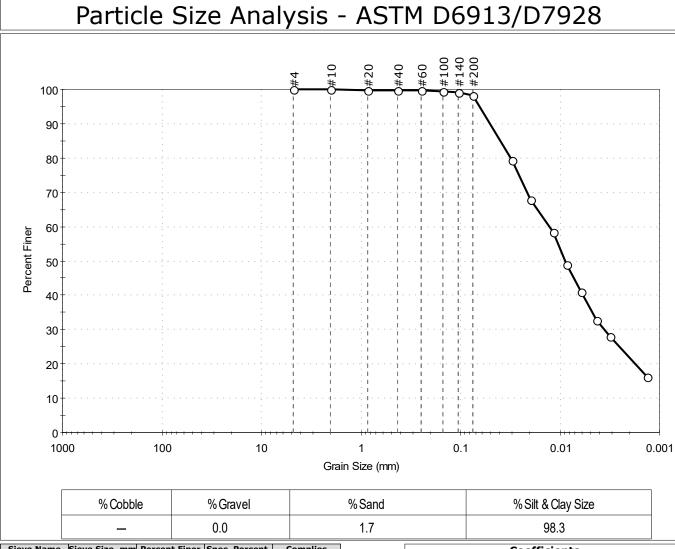
Client:	WSP USA,	Inc.				
Project:	MaineDOT	MaineDOT I-95 Bridge over Stillwater				
Location:	Merrimack	Merrimack, NH			Project No:	GTX-319180
Boring ID:	BB-BSA-1	07	Sample Type:	Jar	Tested By:	ajl
Sample ID: 6D		Test Date:	08/19/24	Checked By:	ank	
Depth :	10.7-12.7	ft	Test Id:	780392		
Test Comm	ent:					
Visual Description: Moist, olive bi		rown silt with s	and			
Sample Comment:						



Sample/Test Description Sand/Gravel Particle Shape : ANGULAR Sand/Gravel Hardness : HARD



Client:	WSP USA,	WSP USA, Inc.						
Project:	MaineDOT	MaineDOT I-95 Bridge over Stillwater						
Location:	Merrimack	Merrimack, NH Project No: GTX-319180						
Boring ID:	BB-BSA-10	)7	Sample Type:	Jar	Tested By:	ajl		
Sample ID:	8D		Test Date:	08/15/24	Checked By:	ank		
Depth :	20-22 ft		Test Id:	780395				
Test Comm	ent:							
Visual Desc	ription:	Moist, grayish	brown clay					
Sample Cor	mment:							



Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	100		
#20	0.85	100		
#40	0.42	100		
#60	0.25	100		
#100	0.15	99		
#140	0.11	99		
#200	0.075	98		
Hydrometer	Particle Size (mm)	Percent Finer	Spec. Percent	Complies
	0.0303	79		
	0.0196	68		
	0.0117	58		
	0.0085	49		
	0.0061	41		
	0.0043	33		
	0.0032	28		
	0.0013	16		

_		
		<u>Coefficients</u>
	D <sub>85</sub> =0.0395 mm	D <sub>30</sub> =0.0036 mm
	D <sub>60</sub> =0.0127 mm	$D_{15} = N/A$
	D <sub>50</sub> =0.0088 mm	$D_{10} = N/A$
	Cu =N/A	$C_c = N/A$

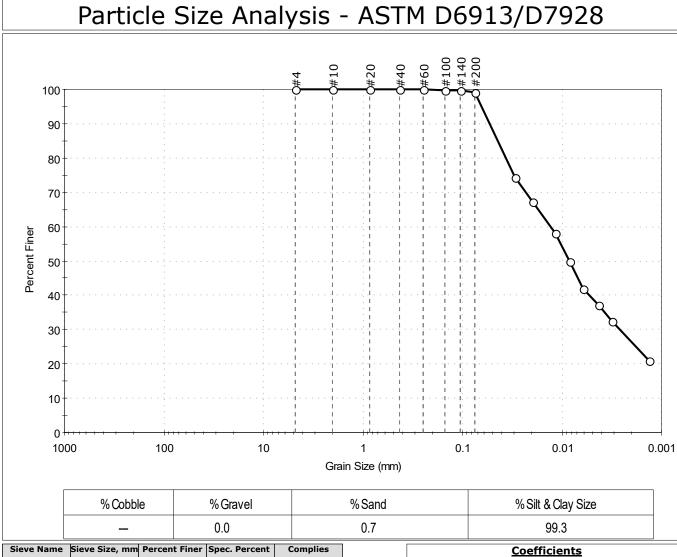
<u>ASTM</u>	Classification Lean CLAY (CL)
<u>AASHTO</u>	Clayey Soils (A-6 (15))

#### Sample/Test Description Sand/Gravel Particle Shape : ---Sand/Gravel Hardness : ---

Dispersion Device : Apparatus A - Mech Mixer Dispersion Period : 1 minute Est. Specific Gravity : 2.65 Separation of Sample: #200 Sieve



Client:	WSP USA,	Inc.					
Project:	MaineDOT	laineDOT I-95 Bridge over Stillwater					
Location:	Merrimack	Merrimack, NH				GTX-319180	
Boring ID:	BB-BSA-1	07	Sample Type:	Jar	Tested By:	ajl	
Sample ID	: 9D		Test Date:	08/15/24	Checked By:	ank	
Depth :	25-27 ft		Test Id:	780396			
Test Comm	ent:						
Visual Desc	cription:	Moist, olive b	rown clay				
Sample Co	mment:						
Sample Co	ininent:	 					



Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	100		
#20	0.85	100		
#40	0.42	100		
#60	0.25	100		
#100	0.15	100		
#140	0.11	100		
#200	0.075	99		
Hydrometer	Particle Size (mm)	Percent Finer	Spec. Percent	Complies
	0.0295	74		
	0.0198	67		
	0.0117	58		
	0.0083	50		
	0.0061	42		
	0.0043	37		
	0.0031	33		
	0.0013	21		

<b>Coefficients</b>					
D <sub>85</sub> =0.0440 mm	D <sub>30</sub> =0.0026 mm				
D <sub>60</sub> =0.0131 mm	$D_{15} = N/A$				
D <sub>50</sub> =0.0084 mm	$D_{10} = N/A$				
C <sub>u</sub> =N/A	C <sub>c</sub> =N/A				

<u>ASTM</u>	<u>Classification</u> Lean CLAY (CL)
<u>AASHTO</u>	Clayey Soils (A-6 (37))

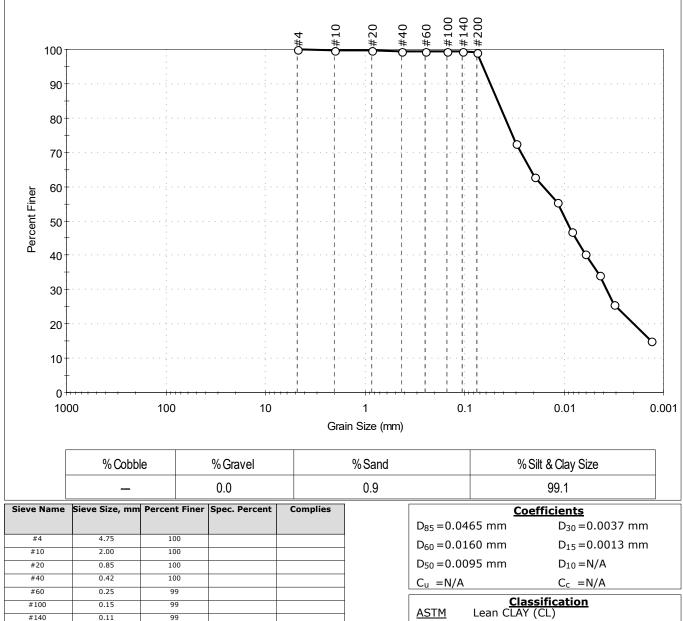
#### Sample/Test Description Sand/Gravel Particle Shape : ---Sand/Gravel Hardness : ---

Dispersion Device : Apparatus A - Mech Mixer Dispersion Period : 1 minute Est. Specific Gravity : 2.65 Separation of Sample: #200 Sieve



Client:	WSP USA,	WSP USA, Inc.						
Project:	MaineDOT	1aineDOT I-95 Bridge over Stillwater						
Location:	Merrimack	Merrimack, NH Project No: GTX-319180						
Boring ID:	BB-BSA-1	)7	Sample Type:	Jar	Tested By:	ajl		
Sample ID:	10D		Test Date:	08/15/24	Checked By:	ank		
Depth :	30-32 ft		Test Id:	780397				
Test Comm	ent:							
Visual Desc	ription:	Moist, grayish	n brown clay					
Sample Cor	nment:							

#### Particle Size Analysis - ASTM D6913/D7928



#40	0.42	100		
#60	0.25	99		
#100	0.15	99		
#140	0.11	99		
#200	0.075	99		
Hydrometer	Particle Size (mm)	Percent Finer	Spec. Percent	Complies
	0.0305	73		
	0.0196	63		
	0.0117	55		
	0.0085	47		
	0.0061	41		
	0.0044	34		
	0.0032	26		
	0.0013	15		
				1

Sample/Test Description
Sand/Gravel Particle Shape :
Sand/Gravel Hardness :
Dispersion Device : Apparatus A - Mech Mixer

Dispersion Period : 1 minute Est. Specific Gravity : 2.65

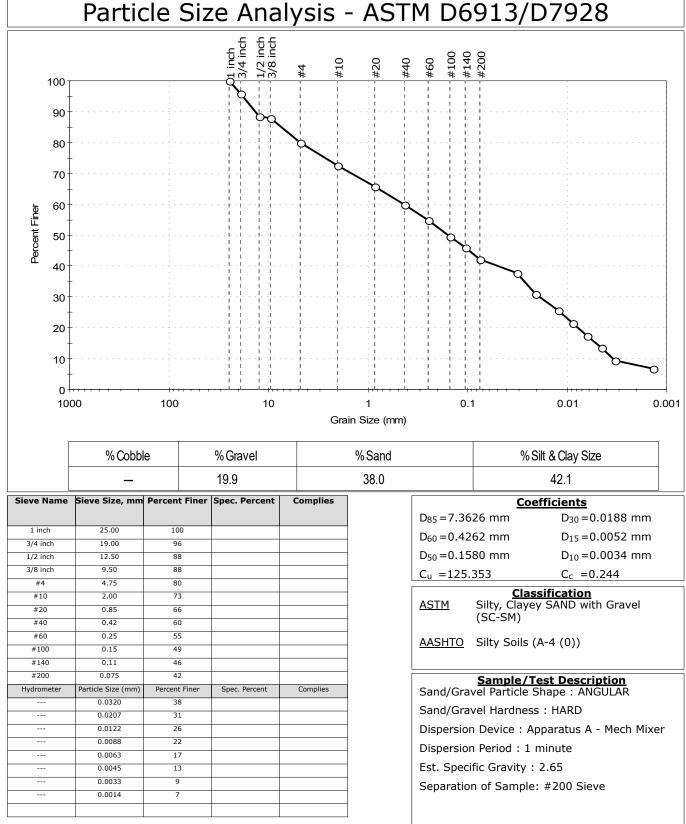
Separation of Sample: #200 Sieve

AASHTO Clayey Soils (A-6 (11))

<u>ASTM</u>

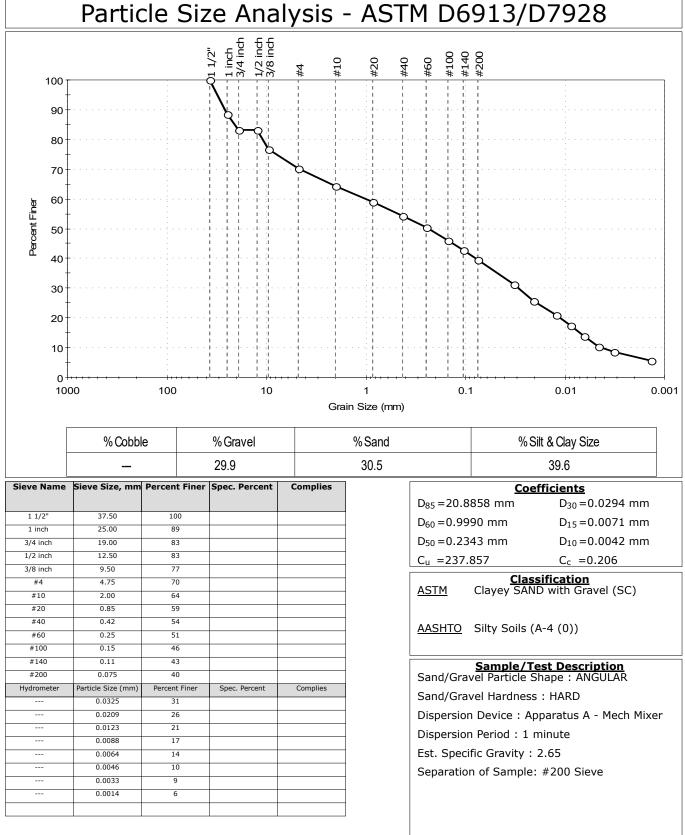


[	Client:	WSP USA,	Inc.					
6	Project: MaineDOT I-95 Bridge over Stillwater							
g	Location:	Merrimack	, NH			Project No:	GTX-319180	
- I	Boring ID:	BB-BSA-10	)7	Sample Type:	Jar	Tested By:	ajl	
	Sample ID:	12D		Test Date:	08/15/24	Checked By:	ank	
	Depth :	40-42 ft		Test Id:	781642			
	Test Comm	ent:						
	Visual Desc	ription:	Moist, brownis	sh gray silty cla	yey sand w	ith gravel		
	Sample Cor	nment:						
icl	o Ciza	n ∧n⊃	lycic -	<b>ACTM</b>		2/070	7 Q	



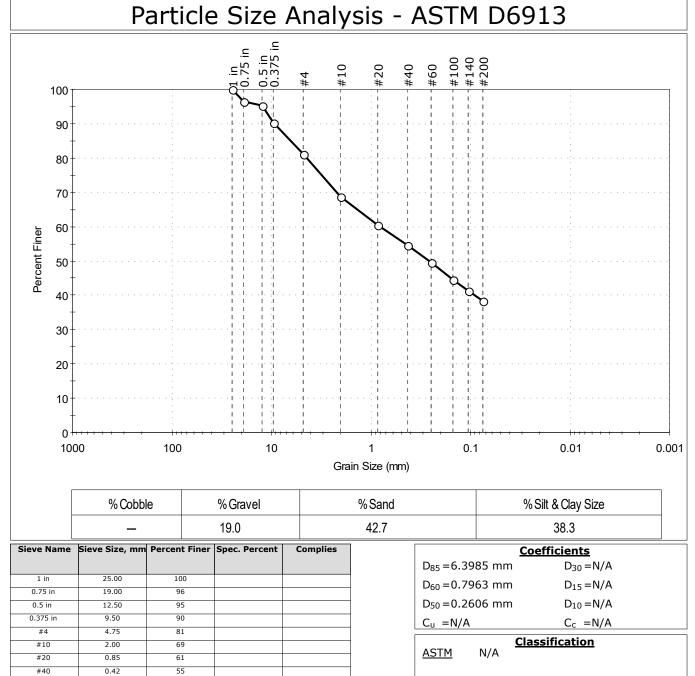


	Client:	WSP USA,	Inc.							
1	Project:	MaineDOT	1aineDOT I-95 Bridge over Stillwater							
	Location:	Merrimack	, NH			Project No:	GTX-319180			
	Boring ID:	BB-BSA-1	)7	Sample Type:	Jar	Tested By:	ajl			
	Sample ID:	14D		Test Date:	08/15/24	Checked By:	ank			
	Depth :	50-52 ft		Test Id:	780394					
	Test Comm	ent:								
	Visual Desc	ription:	Moist, grayish	brown clayey	sand with g	ravel				
	Sample Cor	nment:								
ial	o Ciza	h And	lycic -	ΛСТΜ	D601	2/070	<u> </u>			





Client:	WSP USA,	Inc.							
Project:	MaineDOT	MaineDOT I-95 Bridge over Stillwater							
Location:	Merrimack	, NH			Project No:	GTX-319180			
Boring ID:	BB-BSA-10	)7	Sample Type:	Jar	Tested By:	ajl			
Sample ID:	15D		Test Date:	08/16/24	Checked By:	ank			
Depth :	55-57 ft		Test Id:	780393					
Test Comm	ent:								
Visual Desc	ription:	Moist, grayish	brown silty sa	nd with grav	/el				
Sample Cor	mment:								



AASHTO Silty Soils (A-4 (0))

0.25

0.15

0.11

0.075

50

45

41

38

#60

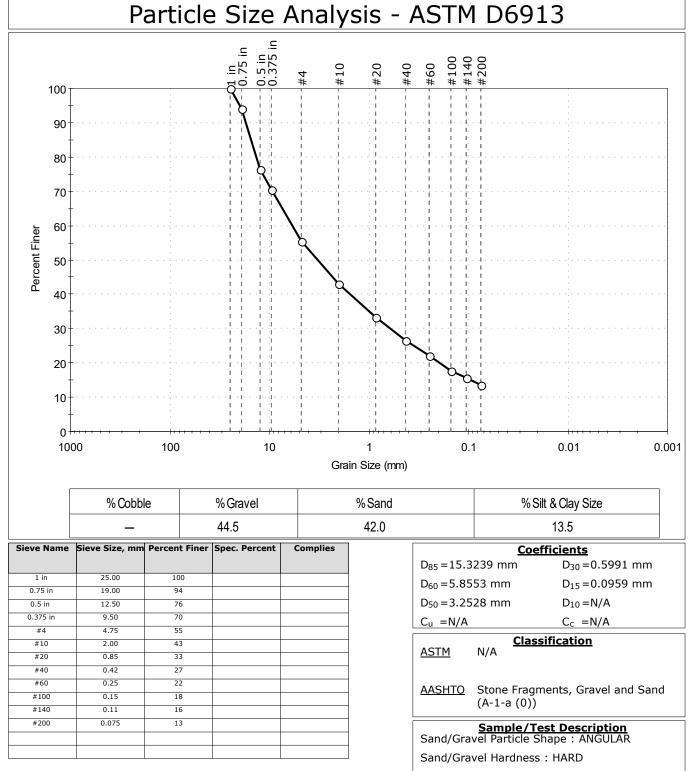
#100

#140

#200

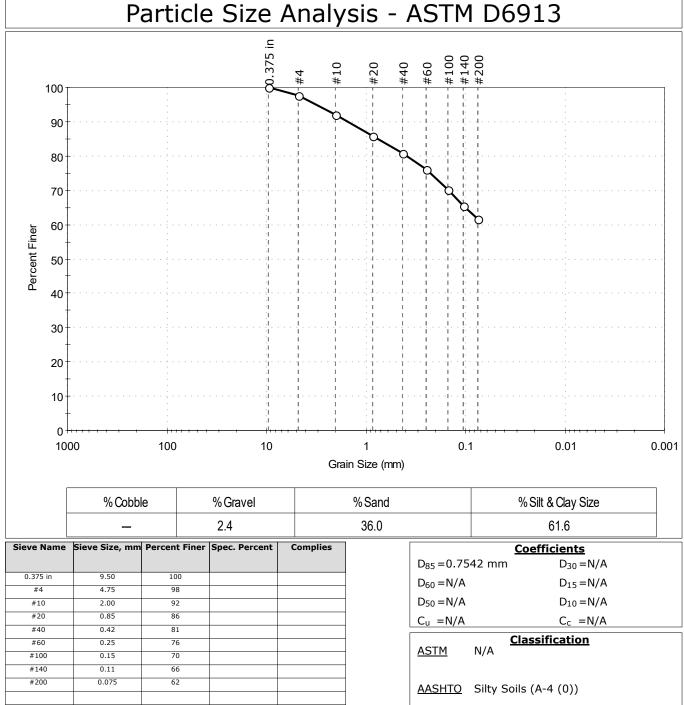


Client:	WSP USA,	Inc.							
Project:	MaineDOT	MaineDOT I-95 Bridge over Stillwater							
Location:	Merrimack	, NH			Project No:	GTX-319180			
Boring ID:	BB-BSA-1	11	Sample Type:	Jar	Tested By:	ajl			
Sample ID:	1D		Test Date:	08/16/24	Checked By:	ank			
Depth :	1-3 ft		Test Id:	780418					
Test Comm	ent:								
Visual Desc	ription:	Moist, olive b	rown silty grave	el with sand					
Sample Cor	mment:								
-									





Client:	WSP USA,	Inc.							
Project:	MaineDOT	MaineDOT I-95 Bridge over Stillwater							
Location:	Merrimack	k, NH			Project No:	GTX-319180			
Boring ID:	BB-BSA-1	11	Sample Type:	Jar	Tested By:	ajl			
Sample ID:	3D		Test Date:	08/19/24	Checked By:	ank			
Depth :	5-7 ft		Test Id:	780420					
Test Comm	ent:								
Visual Desc	ription:	Moist, light o	live brown sand	y silt					
Sample Co	mment:								
	<u> </u>								



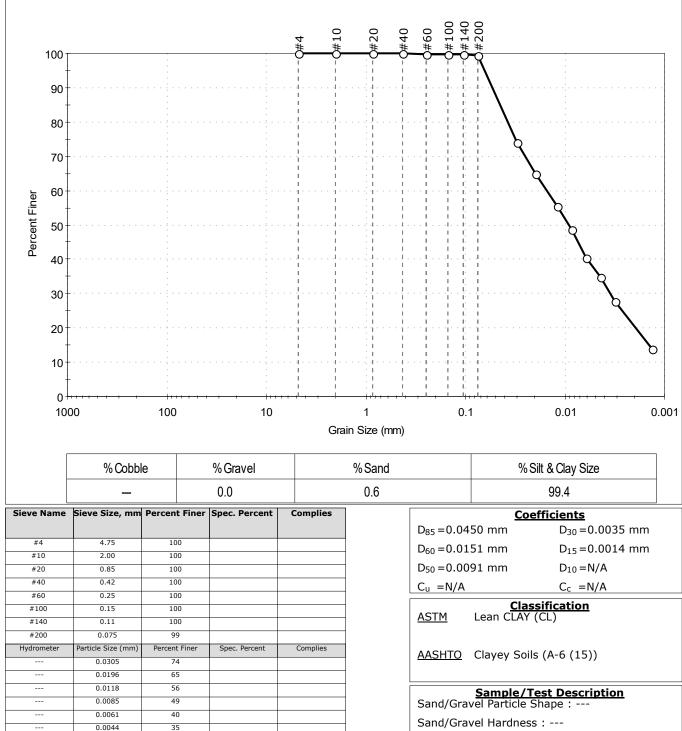
Sample/Test Description Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD



Γ	Client:	WSP USA,	Inc.				
	Project:	MaineDOT	I-95 Bridge ov	ver Stillwater			
	Location:	Merrimack	c, NH			Project No:	GTX-319180
	Boring ID:	BB-BSA-1	11	Sample Type:	Jar	Tested By:	ajl
	Sample ID:	: 5D		Test Date:	08/15/24	Checked By:	ank
	Depth :	10-12 ft		Test Id:	780422		
	Test Comm	ent:					
	Visual Description: Moist, olive b		rown clay				
	Sample Co	mment:					
L							

#### Particle Size Analysis - ASTM D6913/D7928



0.0032

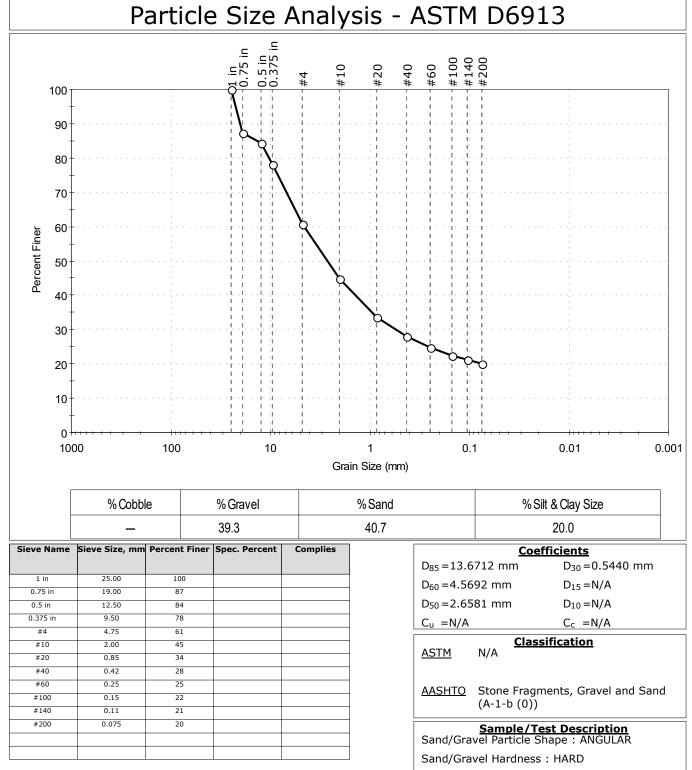
0.0013

28

14

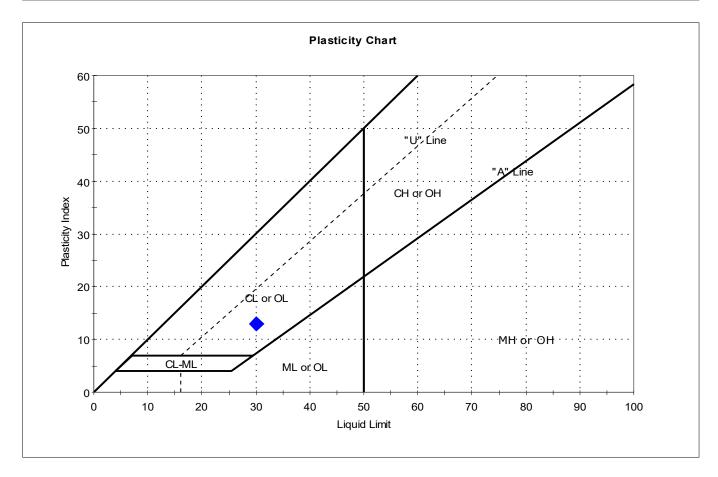


Client:	WSP USA,	Inc.							
Project:	MaineDOT	MaineDOT I-95 Bridge over Stillwater							
Location:	Merrimack	, NH			Project No:	GTX-319180			
Boring ID:	BB-BSA-1	11	Sample Type:	Jar	Tested By:	ajl			
Sample ID:	6D		Test Date:	08/16/24	Checked By:	ank			
Depth :	15-17 ft		Test Id:	780421					
Test Comm	ent:								
Visual Description: Moist, grayis		Moist, grayish	brown silty sa	nd with grav	vel				
Sample Co	mment:								





Client:	WSP USA,	Inc.							
Project:	MaineDOT	MaineDOT I-95 Bridge over Stillwater							
Location:	Merrimack	, NH			Project No:	GTX-319180			
Boring ID:	BB-BSA-10	04	Sample Type:	Jar	Tested By:	cam			
Sample ID:	6D		Test Date:	08/16/24	Checked By:	ank			
Depth :	15-17 ft		Test Id:	780409					
Test Comm	ent:								
Visual Description: Moist, grayish		brown clay							
Sample Co	mment:								

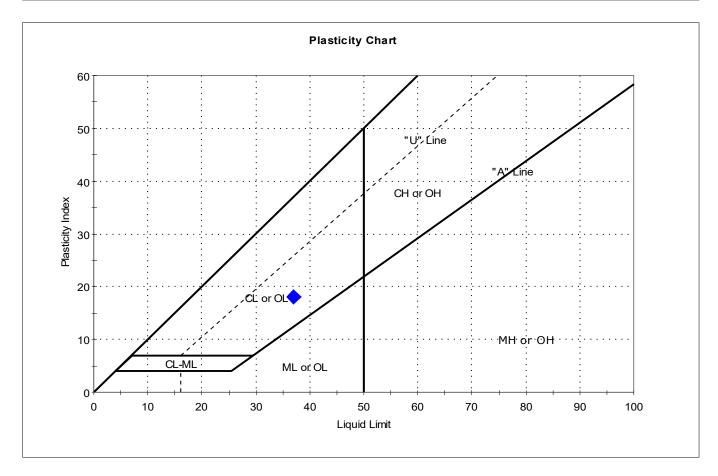


Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
•	6D	B-BSA-10	15-17 ft	25	30	17	13	0.6	Lean CLAY (CL)

Sample Prepared using the WET method 5% Retained on #40 Sieve Dry Strength: VERY HIGH Dilatancy: SLOW Toughness: LOW



Client:	WSP USA,	Inc.							
Project:	MaineDOT	MaineDOT I-95 Bridge over Stillwater							
Location:	Merrimack	, NH			Project No:	GTX-319180			
Boring ID:	BB-BSA-10	06	Sample Type:	Jar	Tested By:	cam			
Sample ID:	: 7D		Test Date:	08/19/24	Checked By:	ank			
Depth :	20-22 ft		Test Id:	780372					
Test Comm	ent:								
Visual Description: Moist, light oli		ive brown clay							
Sample Co	mment:								

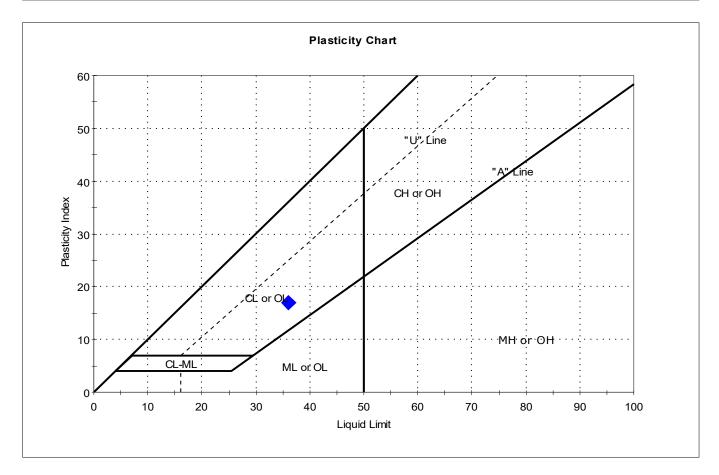


Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
•	7D	B-BSA-10	20-22 ft	26	37	19	18	0.4	Lean CLAY (CL)

Sample Prepared using the WET method 0% Retained on #40 Sieve Dry Strength: VERY HIGH Dilatancy: SLOW Toughness: LOW



Client:	WSP USA,	Inc.								
Project:	MaineDOT	I-95 Bridge ov	er Stillwater							
Location:	Merrimack	lerrimack, NH Project No: GTX-319180								
Boring ID:	BB-BSA-10	06	Sample Type:	Jar	Tested By:	cam				
Sample ID:	: 8D		Test Date:	08/19/24	Checked By:	ank				
Depth :	25-27 ft		Test Id:	780373						
Test Comm	ent:									
Visual Desc	cription:	Moist, grayish	brown clay							
Sample Co	mment:									

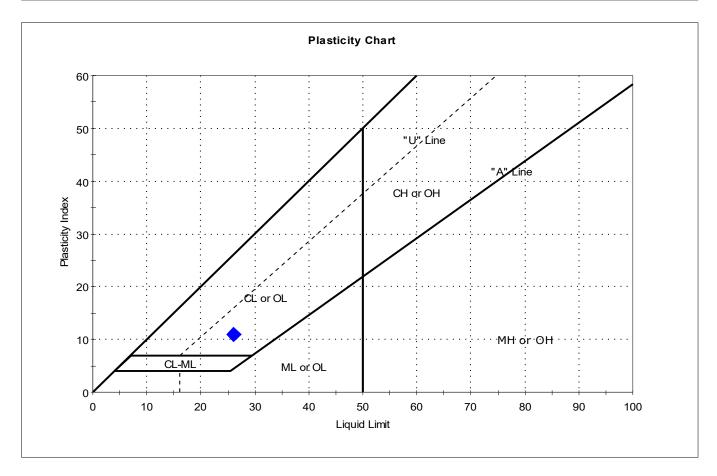


Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
•	8D	B-BSA-10	25-27 ft	28	36	19	17	0.5	Lean CLAY (CL)

Sample Prepared using the WET method 0% Retained on #40 Sieve Dry Strength: VERY HIGH Dilatancy: SLOW Toughness: LOW



Client:	WSP USA,	Inc.								
Project:	MaineDOT	I-95 Bridge ov	er Stillwater							
Location:	Merrimack	Merrimack, NH Project No: GTX-319180								
Boring ID:	BB-BSA-1	06	Sample Type:	Jar	Tested By:	cam				
Sample ID	: 9D		Test Date:	08/16/24	Checked By:	ank				
Depth :	30-32 ft		Test Id:	780374						
Test Comm	ent:									
Visual Deso	cription:	Moist, gray cla	ау							
Sample Co	mment:									

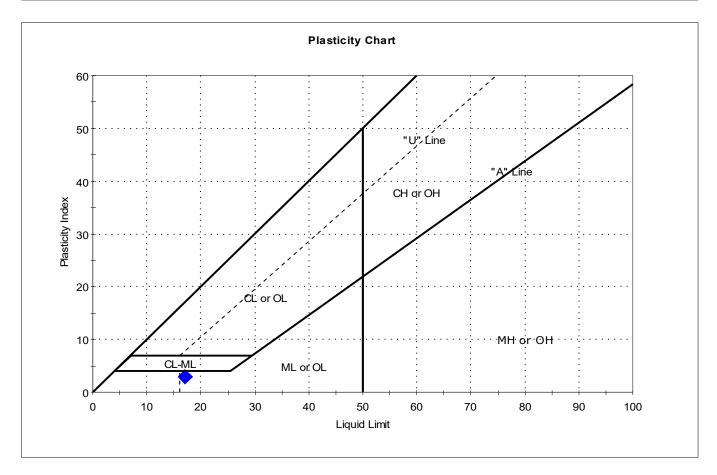


Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
•	9D	B-BSA-10	30-32 ft	29	26	15	11	1.3	Lean CLAY (CL)

Sample Prepared using the WET method 1% Retained on #40 Sieve Dry Strength: VERY HIGH Dilatancy: SLOW Toughness: LOW



Client:	WSP USA,	Inc.									
Project:	MaineDOT	1aineDOT I-95 Bridge over Stillwater									
Location:	Merrimack	1errimack, NH Project No: GTX-319180									
Boring ID:	BB-BSA-10	06	Sample Type:	Jar	Tested By:	cam					
Sample ID:	11D		Test Date:	08/16/24	Checked By:	ank					
Depth :	40-42 ft		Test Id:	780375							
Test Comm	ent:										
Visual Desc	ription:	Moist, gray sa	ndy silt								
Sample Co	mment:										

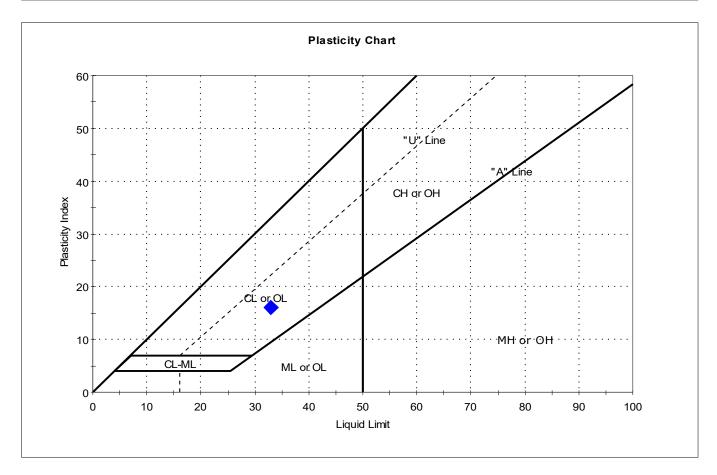


Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
•	11D	B-BSA-10	40-42 ft	11	17	14	3	-0.8	Sandy SILT (ML)

Sample Prepared using the WET method 23% Retained on #40 Sieve Dry Strength: n/a Dilatancy: n/a Toughness: n/a



Client:	WSP USA,	Inc.				
Project:	MaineDOT	I-95 Bridge ov	er Stillwater			
Location:	Merrimack	:, NH			Project No:	GTX-319180
Boring ID:	BB-BSA-10	07	Sample Type:	Jar	Tested By:	cam
Sample ID:	: 8D		Test Date:	08/19/24	Checked By:	ank
Depth :	20-22 ft		Test Id:	780386		
Test Comm	ent:					
Visual Desc	cription:	Moist, grayish	brown clay			
Sample Co	mment:					

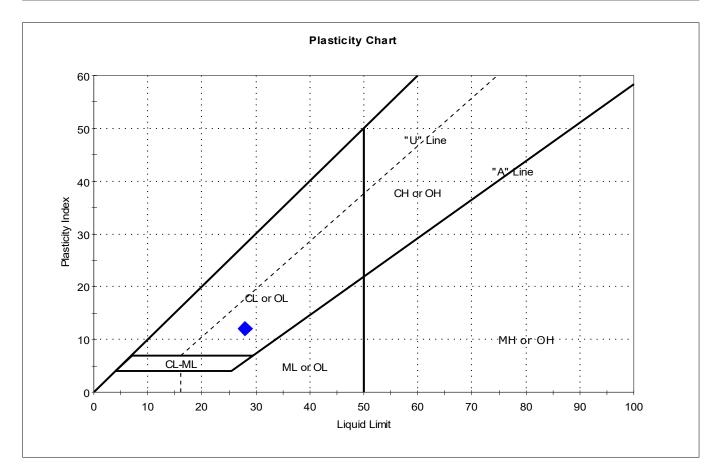


Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
•	8D	B-BSA-10	20-22 ft	24	33	17	16	0.4	Lean CLAY (CL)

Sample Prepared using the WET method 0% Retained on #40 Sieve Dry Strength: VERY HIGH Dilatancy: SLOW Toughness: LOW



Client:	WSP USA,	Inc.									
Project:	MaineDOT	1aineDOT I-95 Bridge over Stillwater									
Location:	Merrimack	Ierrimack, NHProject No:GTX-319180									
Boring ID:	BB-BSA-10	07	Sample Type:	Jar	Tested By:	cam					
Sample ID	:10D		Test Date:	08/19/24	Checked By:	ank					
Depth :	30-32 ft		Test Id:	780388							
Test Comm	ent:										
Visual Desc	cription:	Moist, grayish	ı brown clay								
Sample Co	mment:										

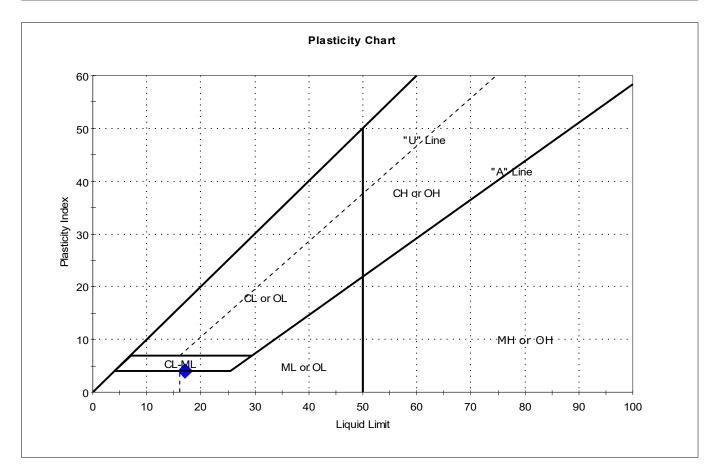


Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
•	10D	B-BSA-10	30-32 ft	28	28	16	12	1	Lean CLAY (CL)

Sample Prepared using the WET method 0% Retained on #40 Sieve Dry Strength: VERY HIGH Dilatancy: SLOW Toughness: LOW



Client: V	NSP USA, 1	Inc.				
Project: N	MaineDOT 1	I-95 Bridge ov	er Stillwater			
Location: N	4errimack,	NH			Project No:	GTX-319180
Boring ID: E	3B-BSA-10	7	Sample Type:	Jar	Tested By:	cam
Sample ID: 1	L2D		Test Date:	08/16/24	Checked By:	ank
Depth : 4	10-42 ft		Test Id:	780389		
Test Comme	nt:					
Visual Descri	ption:	Moist, brownis	sh gray silty cla	yey sand w	ith gravel	
Sample Com	ment:					

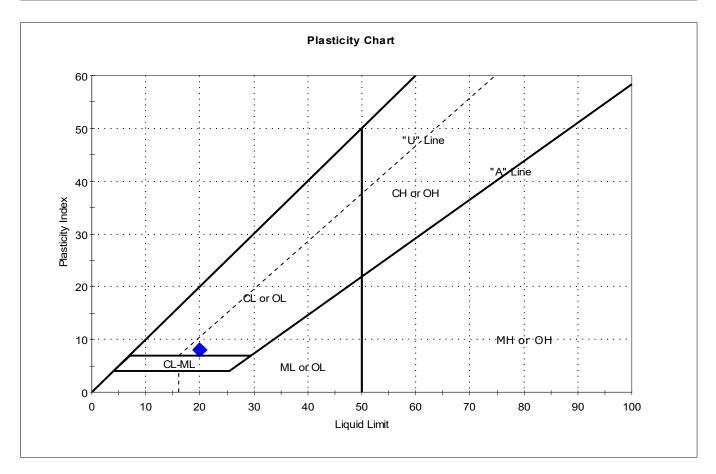


Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
•	12D	B-BSA-10	40-42 ft	10	17	13	4	-0.8	Silty, Clayey SAND with Gravel (SC-SM)

Sample Prepared using the WET method 40% Retained on #40 Sieve Dry Strength: VERY HIGH Dilatancy: SLOW Toughness: LOW



Client: V	NSP USA, I	Inc.							
Project: N	MaineDOT I-95 Bridge over Stillwater								
Location: N	4errimack,	NH			Project No:	GTX-319180			
Boring ID: E	3B-BSA-10	7	Sample Type:	Jar	Tested By:	cam			
Sample ID: 1	L4D		Test Date:	08/15/24	Checked By:	ank			
Depth : 5	50-52 ft		Test Id:	780390					
Test Commer	nt:								
Visual Descri	ption:	Moist, grayish	brown clayey s	and with g	ravel				
Sample Com	ment:								

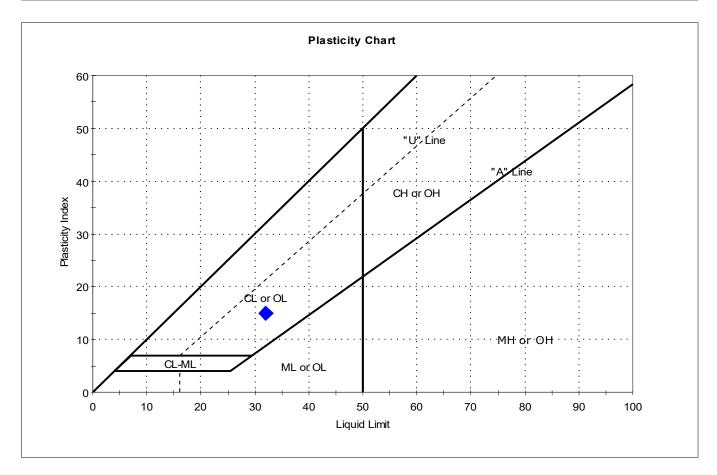


Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
•	14D	B-BSA-10	50-52 ft	10	20	12	8	-0.3	Clayey SAND with Gravel (SC)

Sample Prepared using the WET method 46% Retained on #40 Sieve Dry Strength: VERY HIGH Dilatancy: SLOW Toughness: LOW



Client:	WSP USA,	Inc.							
Project:	MaineDOT	MaineDOT I-95 Bridge over Stillwater							
Location:	Merrimack	Merrimack, NH Project No: GTX-3191							
Boring ID:	BB-BSA-11	11	Sample Type:	Jar	Tested By:	cam			
Sample ID:	: 5D		Test Date:	08/16/24	Checked By:	ank			
Depth :	10-12 ft		Test Id:	780417					
Test Comm	ent:								
Visual Desc	cription:	Moist, olive br	rown clay						
Sample Co	mment:								



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
•	5D	B-BSA-11	10-12 ft	21	32	17	15	0.3	Lean CLAY (CL)

Sample Prepared using the WET method 0% Retained on #40 Sieve Dry Strength: VERY HIGH Dilatancy: SLOW Toughness: LOW



#### Moisture Content of Soil and Rock - ASTM D2216

Boring ID	Sample ID	Depth	Description	Moisture Content,%
BB-BSA-102	1D	1-3ft	Moist, brown silty sand with gravel	3.7
BB-BSA-102	2D	3-5ft	Moist, brown silty sand with gravel	8.6
BB-BSA-102	5D	9-11ft	Moist, light brown silty gravel with sand	15.5
BB-BSA-108	1D	0-2ft	Moist, yellowish brown silty sand with gravel	8.0
BB-BSA-109	2D	3-5ft	Moist, grayish brown silty gravel with sand	5.7
BB-BSA-109	4D	7-9ft	Moist, brown silty sand with gravel	11.7

Notes: Temperature of Drying : 110° Celsius



Client:	WSP USA, Inc.				
Project:	MaineDOT I-95 Bridge o	ver Stillwater			
Location:	Merrimack, NH			Project No:	GTX-319180
Boring ID:		Sample Type:		Tested By:	ajl
Sample ID	:	Test Date:	06/07/24	Checked By:	ank
Depth :		Test Id:	771713		

# pH of Soil by ASTM D4972

Boring ID	Sample ID	Depth	Visual Description	pH of Soil in Distilled Water	pH of Soil in Calcium Chloride
BB-BSA-102	1D	1-3ft	Moist, brown silty sand with gravel	7.9	7.2
BB-BSA-109	2D	3-5ft	Moist, grayish brown silty gravel with sand	8.2	7.3

Notes: Sample Preparation: screened through #10 sieve Method A, pH meter used



Client:	WSP USA, Inc.
Project:	MaineDOT I-95 Bridge Over Stillwater
Location:	Merrimack, NH
GTX#:	319180
Test Date:	06/10/24
Due Date:	06/13/24
Tested By:	NMK
Checked By:	ank

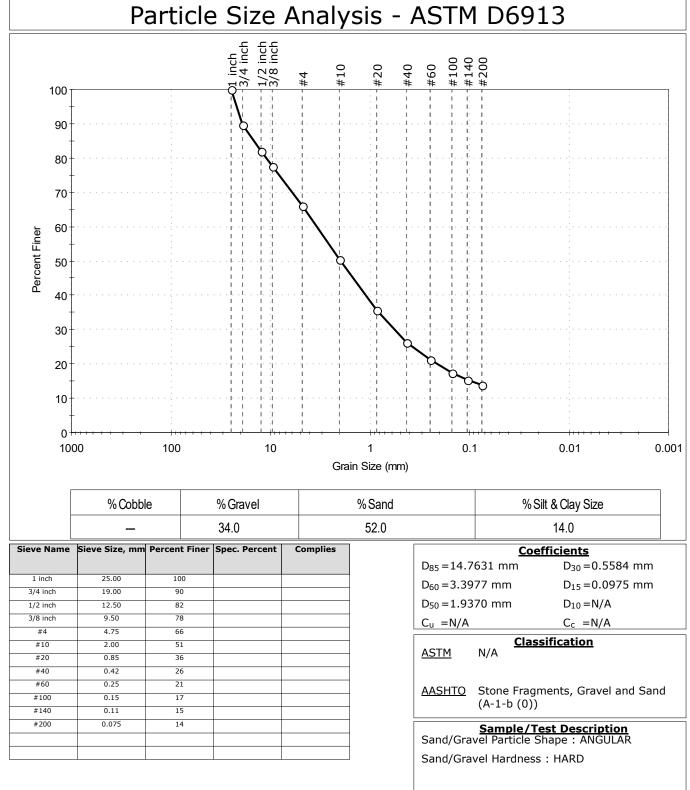
#### Laboratory Measurement of Soil Resistivity Using the Wenner Four-Electrode Method by ASTM G57 (Laboratory Measurement)

Boring ID	Sample ID	Depth, ft.	Sample Description	Electrical Resistivity, ohm-cm	Electrical Conductivity, (ohm-cm) <sup>-1</sup>
BB-BSA-102	1D	1-3 ft	Moist, brown silty gravel	1,202	8.32E-04

Notes: Test Equipment: Nilsson Model 400 Soil Resistance Meter, MC Miller Soil Box Water added to sample to create a thick slurry prior to testing (saturated condition). Electrical Conductivity is calculated as inverse of Electrical Resistivity (per ASTM G57) Test conducted in standard laboratory atmosphere: 68-73 F

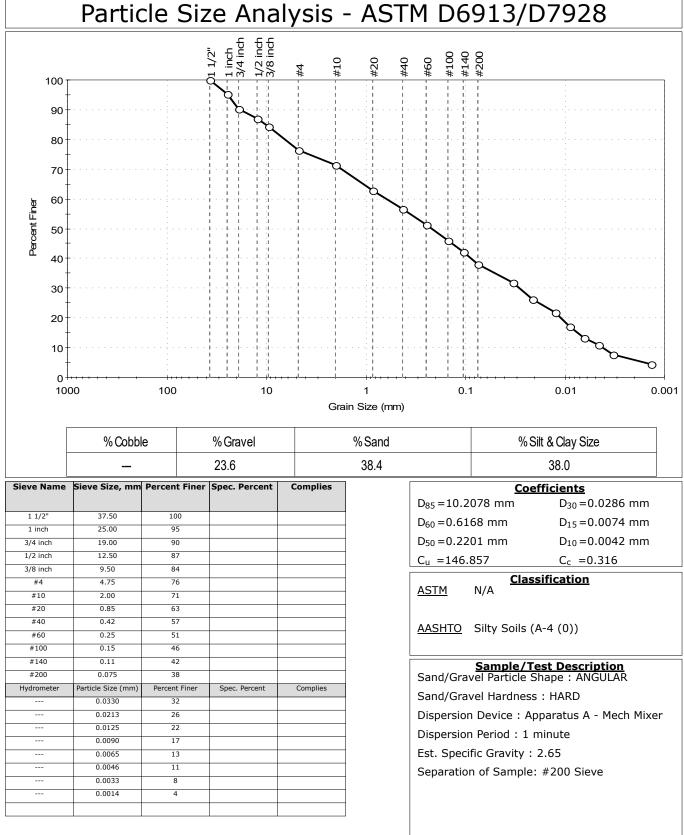


Client:	WSP USA,	Inc.						
Project:	MaineDOT I-95 Bridge over Stillwater							
Location:	Merrimack	, NH			Project No:	GTX-319180		
Boring ID:	BB-BSA-10	)2	Sample Type:	Jar	Tested By:	ajl		
Sample ID:	1D		Test Date:	06/10/24	Checked By:	ank		
Depth :	1-3ft		Test Id:	771699				
Test Comme	ent:							
Visual Desc	ription:	Moist, brown	silty sand with gravel					
Sample Cor	nment:							



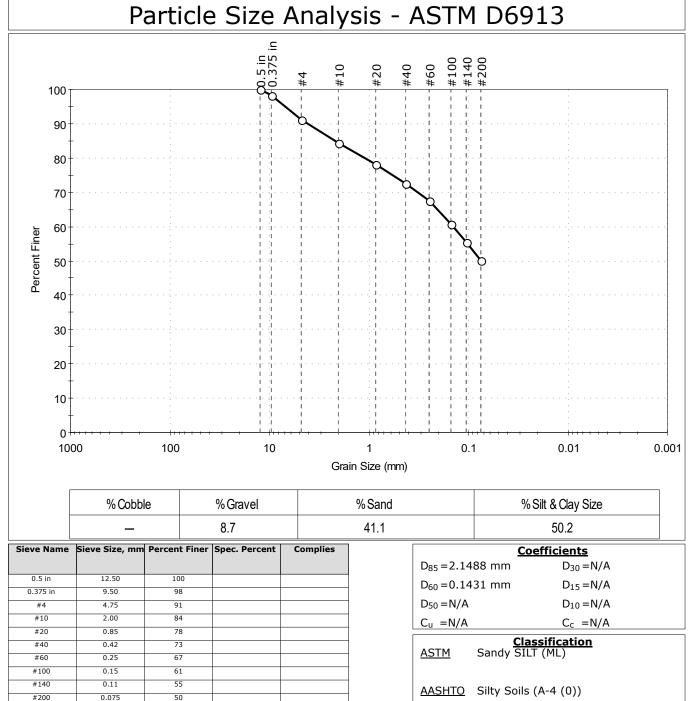


	Client:	WSP USA,	WSP USA, Inc.								
	Project:	MaineDOT	I-95 Bridge ov	er Stillwater							
	Location:	Merrimack	:, NH			Project No:	GTX-319180				
1	Boring ID: BB-BSA-102			Sample Type:	Jar	Tested By:	ajl				
	Sample ID:	2D		Test Date:	06/11/24	Checked By:	ank				
	Depth :	3-5ft		Test Id:	771725						
	Test Comm	ent:									
	Visual Desc	cription:	Moist, brown	silty sand with	gravel						
	Sample Co	mment:									
		_									
$\sim$	$\triangle$ Ciza	ב An ב	lycic -	Λςτμ	D601	2/070	70				





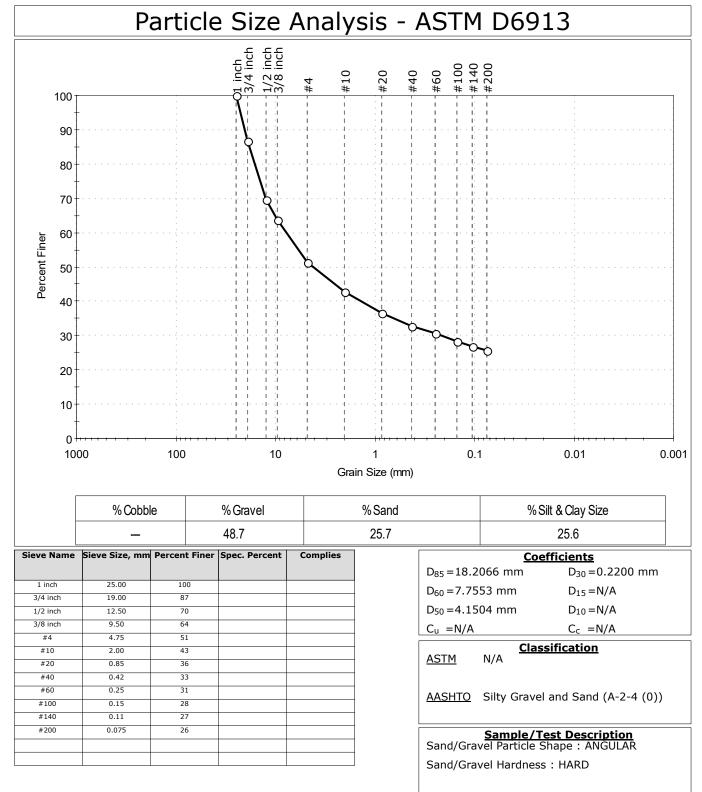
Client:	WSP USA,	Inc.					
Project:	MaineDOT I-95 Bridge over Stillwater						
Location:	Merrimack, NH				Project No:	GTX-319180	
Boring ID:	BB-BSA-1	02	Sample Type:	Jar	Tested By:	ajl	
Sample ID:	: 4D		Test Date:	06/11/24	Checked By:	ank	
Depth :	7-9ft		Test Id:	771701			
Test Comment:							
Visual Description: Moist, brown		sandy silt					
Sample Comment:							



Sample/Test Description Sand/Gravel Particle Shape : ANGULAR Sand/Gravel Hardness : HARD

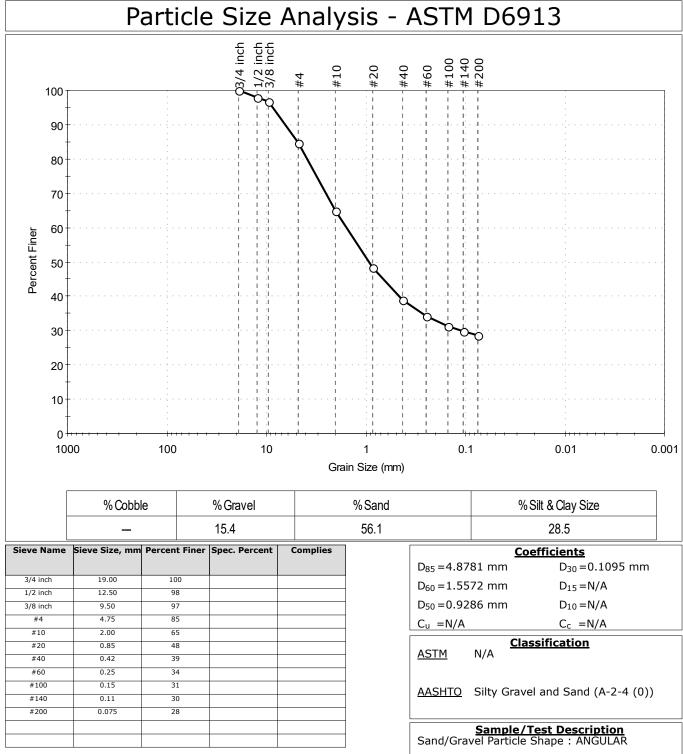


Client:	WSP USA,	Inc.					
Project:	MaineDOT I-95 Bridge over Stillwater						
Location:	Merrimack, NH Project No: GTX-3191					GTX-319180	
Boring ID:	BB-BSA-1	02	Sample Type:	Jar	Tested By:	ajl	
Sample ID	: 5D		Test Date:	06/10/24	Checked By:	ank	
Depth :	9-11ft		Test Id:	771702			
Test Comm	ent:						
Visual Desc	cription:	Moist, light brown silty gravel with sand					
Sample Co	mment:						



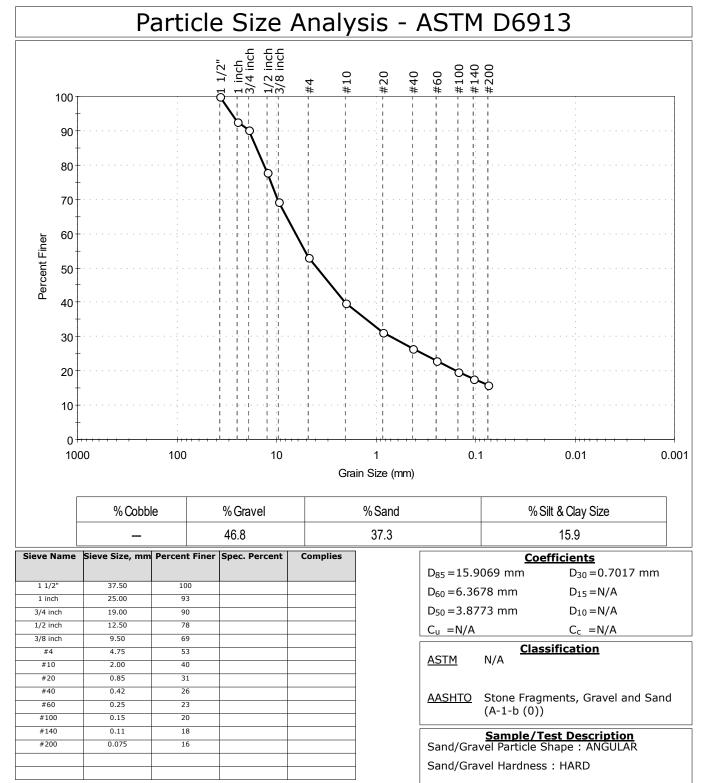


Client:	WSP USA,	Inc.					
Project:	MaineDOT I-95 Bridge over Stillwater						
Location:	Merrimack, NH Project No: GTX-31918					GTX-319180	
Boring ID:	BB-BSA-10	08	Sample Type:	Jar	Tested By:	ajl	
Sample ID:	: 1D		Test Date:	06/10/24	Checked By:	ank	
Depth :	0-2ft		Test Id:	771703			
Test Comm	ent:						
Visual Description: Moist, yellowish brown silty sand with gravel							
Sample Co	mment:						



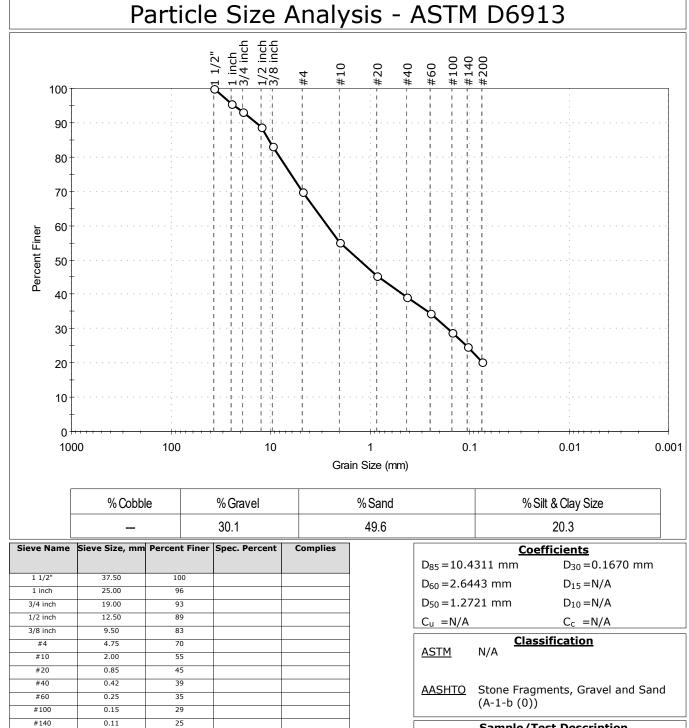


Client:	WSP USA,	Inc.						
Project:	MaineDOT	aineDOT I-95 Bridge over Stillwater						
Location:	Merrimack	k, NH			Project No:	GTX-319180		
Boring ID:	BB-BSA-1	09	Sample Type:	Jar	Tested By:	ajl		
Sample ID	: 2D		Test Date:	06/11/24	Checked By:	ank		
Depth :	3-5ft		Test Id:	771704				
Test Comm	nent:							
Visual Dese	cription:	Moist, grayish	ı brown silty gra	avel with sa	nd			
Sample Co	mment:							





Client:	WSP USA,	Inc.						
Project:	MaineDOT	1aineDOT I-95 Bridge over Stillwater						
Location:	Merrimack	, NH			Project No:	GTX-319180		
Boring ID:	BB-BSA-10	)9	Sample Type:	Jar	Tested By:	ajl		
Sample ID:	4D		Test Date:	06/10/24	Checked By:	ank		
Depth :	7-9ft		Test Id:	771705				
Test Comm	ent:							
Visual Desc	ription:	Moist, brown	silty sand with	gravel				
Sample Cor	mment:							



0.075

20

#200



Client:	WSP USA,	Inc.					
Project:	MaineDOT	laineDOT I-95 Bridge over Stillwater					
Location:	Merrimack	k, NH			Project No:	GTX-319180	
Boring ID:	BB-BSA-1	02	Sample Type:	Jar	Tested By:	cam	
Sample ID:	: 4D		Test Date:	06/10/24	Checked By:	ank	
Depth :	7-9ft		Test Id:	771698			
Test Comm	ent:						
Visual Desc	cription:	Moist, brown	sandy silt				
Sample Co	mment:						

# Atterberg Limits - ASTM D4318

Sample Determined to be non-plastic	

Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
•	4D	B-BSA-10	7-9ft	13	n/a	n/a	n/a	n/a	Sandy SILT (ML)

27% Retained on #40 Sieve Dry Strength: n/a Dilatancy: n/a Toughness: n/a The sample was determined to be Non-Plastic

# Etesting m services

PO Box 572455 / Salt Lake City UT 84157-2455 / USA TEL +1 801 262 2448 · FAX +1 801 262 9870 · www.TEi-TS.com

Analysis No.	TS-A2411955
Report Date	14 June 2024
Date Sampled	12 June 2024
Date Received	13 June 2024
Where Sampled	Acton, MA USA
Sampled By	Client

This is to attest that we have examined: Soil: Project: MaineDOT I-95 Bridge over Stillwater; Site Location: - - -; Job Number: GTX-319180

When examined to the applicable requirements of:

AASHTO T 291-18

AASHTO T 290-20

"Standard Method of Test for Determining Water-Soluble Chloride Ion Content in Soil" Method B "Standard Method of Test for Determining Water-Soluble Sulfate Ion Content in Soil"

#### Results:

AASHTO T 291 – Chloride (Method B)

Sor	nnlo	Res	Minimum	
Sai	nple	ppm (mg/kg)	% <sup>1</sup>	Detection Limit
BB-BSA-102		215.	0.0215	
1D	1 – 3'	215.	0.0215	10
BB-BSA-109		- 59.	0.0059	10.
2D	3 – 5'	59.	0.0059	

NOTE: <sup>1</sup>Percent by weight after drying and prepared as per the Standard.

#### AASHTO T 290 – Sulfates (Soluble)

	,	Res	sults	Minimum
Sa	mple	ppm (mg/kg)	% <sup>1</sup>	Detection Limit
BB-BS	SA-102	. 10	. 0.0010	
1D	1 – 3'	< 10.	< 0.0010	10
BB-BSA-109		- 10	10.0010	10.
2D	3 – 5'	< 10.	< 0.0010	

NOTE: <sup>1</sup>Percent by weight after drying and prepared as per the Standard.

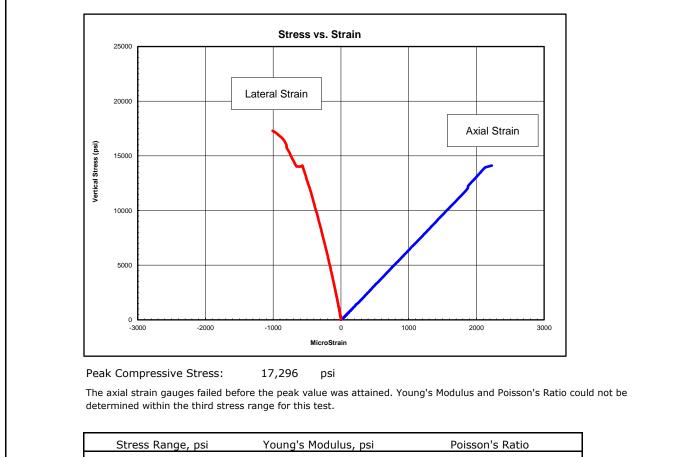
END OF ANALYSIS

Merrill Gee P.E. – Engineer in Charge

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Client:	WSP USA, Inc.
Project Name:	MaineDOT I-95 Bridge over Stillwater
Project Location:	Merrimack, NH
GTX #:	319180
Test Date:	6/13/2024
Tested By:	gp
Checked By:	jsc
Boring ID:	BB-BSA-102
Sample ID:	R1
Depth, ft:	14.87-15.25
Sample Type:	rock core
Sample Description:	See photographs
	Intact material failure
	Best Effort end preparation performed

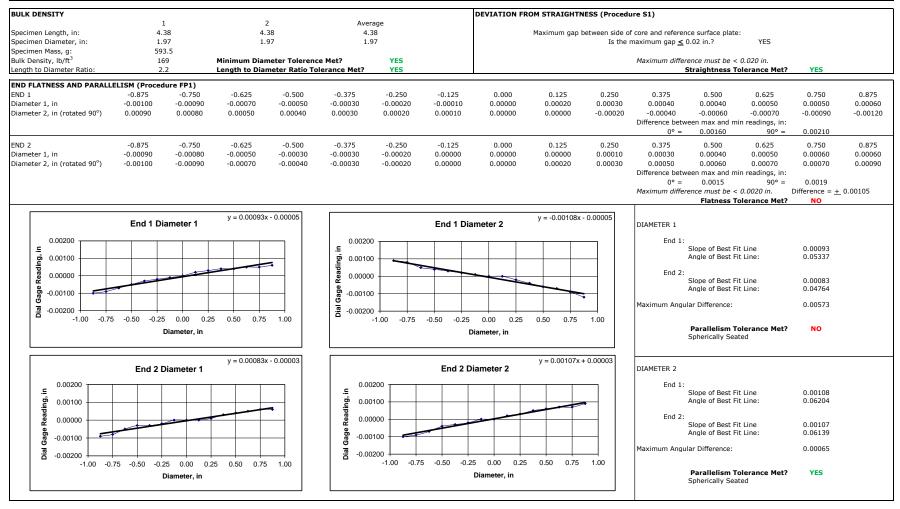


Stress Range, ps	Young's Modulus, psi	Poisson's Ratio	
1700-6300	6,470,000	0.23	
6300-11000	6,460,000	0.27	
11000-15600			
Notes: Test spec	nen tested at the approximate as-received r	moisture content and at standard laboratory tempe	erature.
	,	e that produced failure in a test time between 2 an	d 15 minutes
Young's M	odulus 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:	WSP USA, Inc.	Test Date:	6/12/2024
Project Name:	MaineDOT I-95 Bridge over Stillwater	Tested By:	gp
Project Location:	Merrimack, NH	Checked By:	smd
GTX #:	319180		
Boring ID:	BB-BSA-102		
Sample ID:	R1		
Depth (ft):	14.87-15.25		
Visual Description:	See photographs		



PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)							
ND 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?	Maximum angle of departure must be $\leq 0.25^{\circ}$	
Diameter 1, in	0.00160	1.970	0.00081	0.047	YES		
Diameter 2, in (rotated 90°)	0.00210	1.970	0.00107	0.061	YES	Perpendicularity Tolerance Met? YES	
ND 2							
Diameter 1, in	0.00150	1.970	0.00076	0.044	YES		
Diameter 2, in (rotated 90°)	0.00190	1.970	0.00096	0.055	YES		

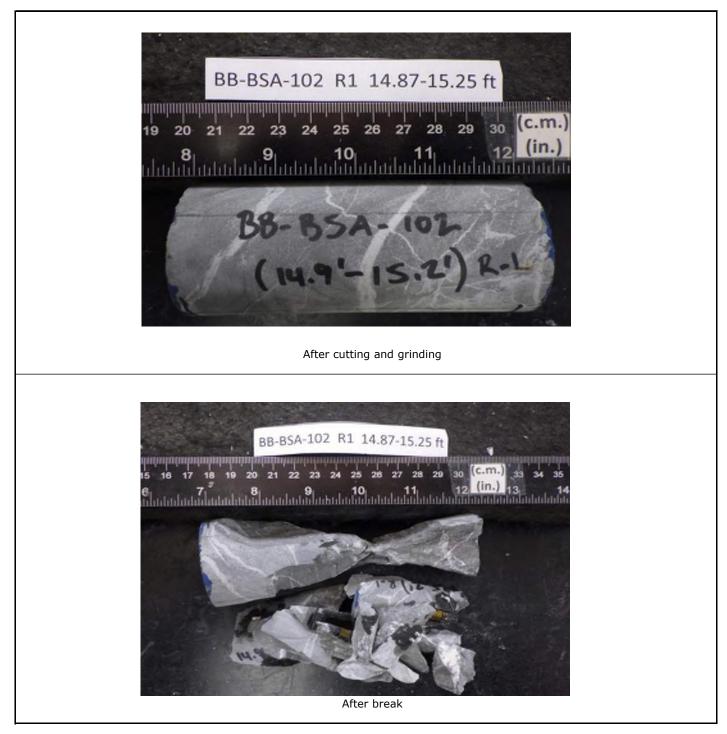


Client:	WSP USA, Inc.	Test Date:	6/12/2024	
Project Name:	MaineDOT I-95 Bridge over Stillwater	Tested By:	gp	
Project Location:	Merrimack, NH	Checked By:	smd	
GTX #: 319180				
Boring ID:		Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a		
Sample ID:	R1			
Depth (ft):	14 07 15 25		aightedge and feeler gauges to	
Visual Description:	See photographs	ASTM specifications.		

END FLATNESS					
END 1					
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES			
Diameter 2 (rotated $90^{\circ}$ )	Is the maximum gap $\leq \pm 0.001$ in.?	YES			
END 2					
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES			
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES			
End Flatness Tolerance Met? YES					

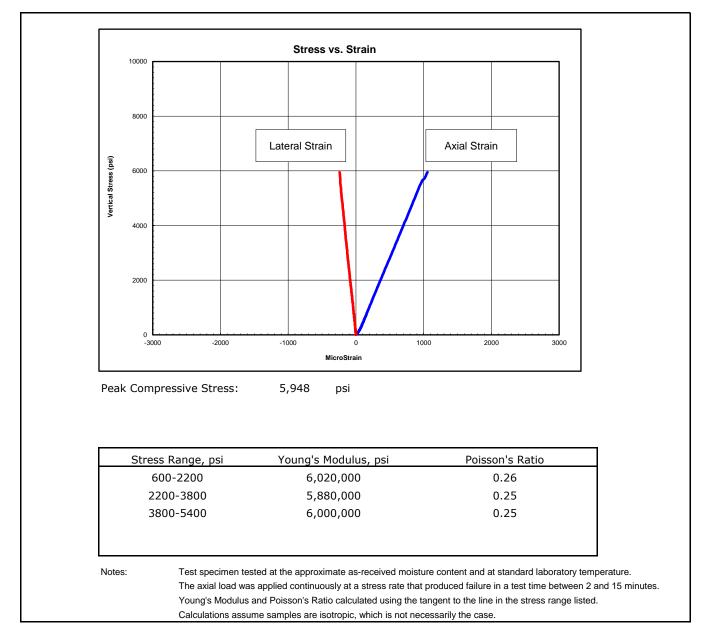


Client:	WSP USA, Inc.			
Project Name:	MaineDOT I-95 Bridge over Stillwater			
Project Location:	Merrimack, NH			
GTX #:	319180			
Test Date:	6/13/2024			
Tested By:	smd			
Checked By:	jsc			
Boring ID:	BB-BSA-102			
Sample ID:	R1			
Depth, ft:	14.87-15.25			



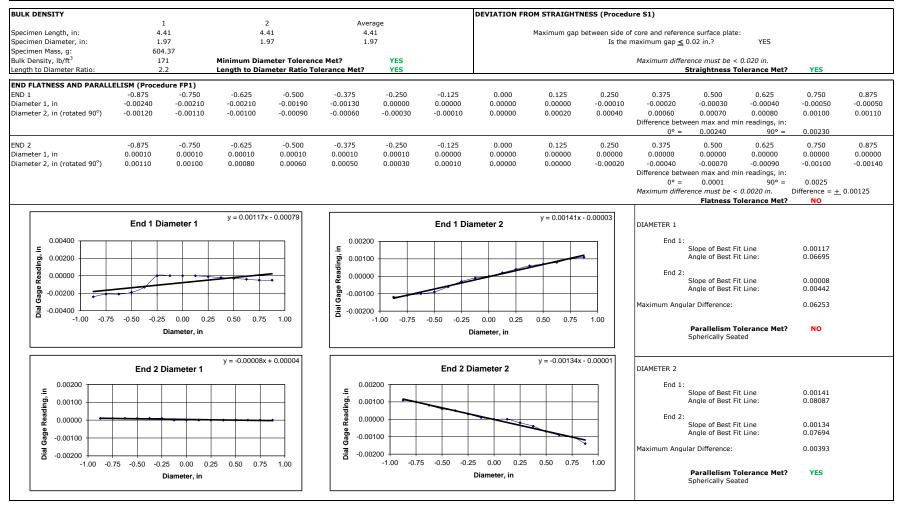


Client:	WSP USA, Inc.		
Project Name:	MaineDOT I-95 Bridge over Stillwater		
Project Location:	Merrimack, NH		
GTX #:	319180		
Test Date:	6/13/2024		
Tested By:	gp		
Checked By:	jsc		
Boring ID:	BB-BSA-110		
Sample ID:	R1		
Depth, ft:	5.93-6.31		
Sample Type:	rock core		
Sample Description:	See photographs		
	Intact material and discontinuity failure		
	Best Effort end preparation performed		





Client:	WSP USA, Inc.	Test Date:	6/12/2024
Project Name:	MaineDOT I-95 Bridge over Stillwater	Tested By:	9P
Project Location:	Merrimack, NH	Checked By:	smd
GTX #:	319180		
Boring ID:	BB-BSA-110		
Sample ID:	R1		
Depth (ft):	5.93-6.31		
Visual Description:	See photographs		



RPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)						
END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle <sup>o</sup>	Perpendicularity Tolerance Met?	Maximum angle of departure must be $\leq 0.25^{\circ}$
Diameter 1, in	0.00240	1.970	0.00122	0.070	YES	
Diameter 2, in (rotated 90°)	0.00230	1.970	0.00117	0.067	YES	Perpendicularity Tolerance Met? YES
END 2						
Diameter 1, in	0.00010	1.970	0.00005	0.003	YES	
Diameter 2, in (rotated 90°)	0.00250	1.970	0.00127	0.073	YES	

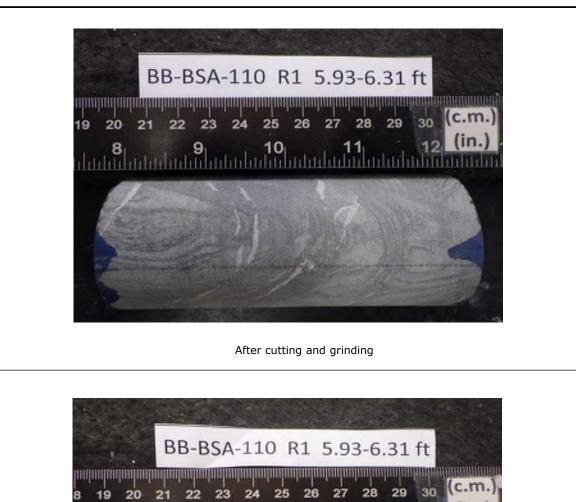


Client:	WSP USA, Inc.	Test Date:	6/12/2024	
Project Name:	MaineDOT I-95 Bridge over Stillwater	Tested By:	gp	
Project Location:	Merrimack, NH	Checked By:	smd	
GTX #:	319180			
Boring ID:		Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a		
Sample ID:	R1			
Depth (ft):	5.93-6.31		aightedge and feeler gauges to	
Visual Description:	See photographs	ASTM specifications.		

END FLATNESS					
END 1					
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES			
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES			
END 2					
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES			
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES			
End Flatness Tolerance Met? YES					



Client:	WSP USA, Inc.			
Project Name:	MaineDOT I-95 Bridge over Stillwater			
Project Location:	Merrimack, NH			
GTX #:	319180			
Test Date:	6/13/2024			
Tested By:	gp			
Checked By:	smd			
Boring ID:	BB-BSA-110			
Sample ID:	R1			
Depth, ft:	5.93-6.31			



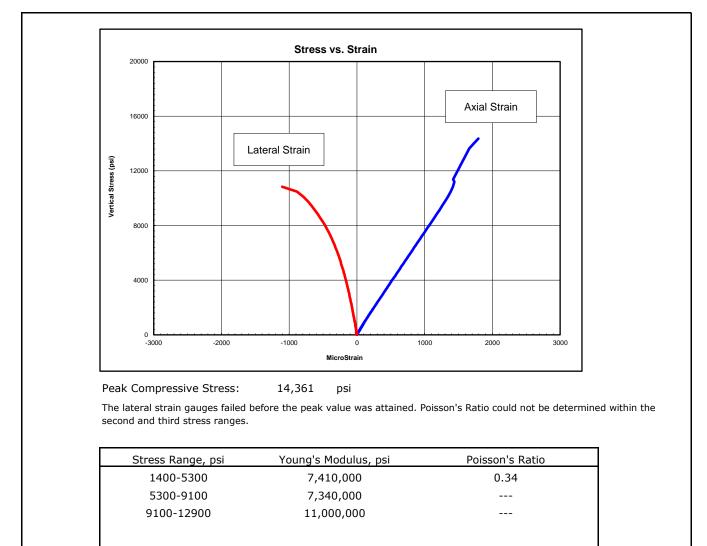
8 9 10 11 12 (in.)



After break



Client:	WSP USA, Inc.		
Project Name:	MaineDOT I-95 Bridge over Stillwater		
Project Location:	Merrimack, NH		
GTX #:	319180		
Test Date:	8/29/2024		
Tested By:	gp		
Checked By:	jsc		
Boring ID:	BB-BSA-101		
Sample ID:	R-4		
Depth, ft:	37-37.3		
Sample Type:	rock core		
Sample Description:	See photographs Intact material failure		
	Best Effort end preparation performed		

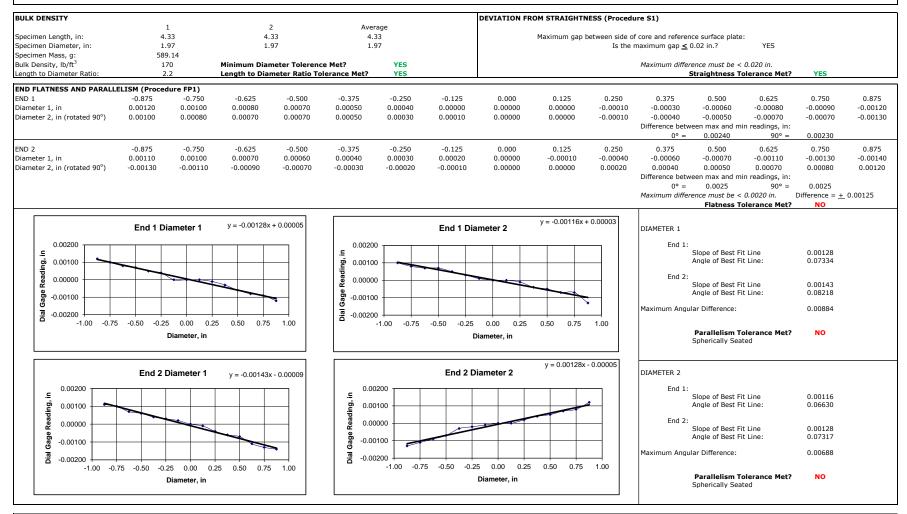


Notes:

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:	WSP USA, Inc.	Test Date:	8/28/2024
Project Name:	MaineDOT I-95 Bridge over Stillwater	Tested By:	9P
Project Location:	Merrimack, NH	Checked By:	smd
GTX #:	319180		
Boring ID:	BB-BSA-101		
Sample ID:	R-4		
Depth (ft):	37-37.3		
Visual Description:	See photographs		



PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measur				ibove)		
END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?	Maximum angle of departure must be $\leq 0.25^{\circ}$
Diameter 1, in	0.00240	1.970	0.00122	0.070	YES	
Diameter 2, in (rotated 90°)	0.00230	1.970	0.00117	0.067	YES	Perpendicularity Tolerance Met? YES
END 2						
Diameter 1, in	0.00250	1.970	0.00127	0.073	YES	
Diameter 2, in (rotated 90°)	0.00250	1.970	0.00127	0.073	YES	



	Client:	WSP USA, Inc.	Test Date:	8/28/2024	
D	Project Name:	MaineDOT I-95 Bridge over Stillwater	Tested By:	gp	
y	Project Location:	Merrimack, NH	Checked By:	smd	
S	GTX #:	319180			
	Boring ID:		-	gauge measurements could not be	
	Sample ID:	N-4	performed on this rock type. Tolerance measurements were performed using a		
	Depth (ft):			raightedge and feeler gauges to	
	Visual Description:	See photographs	ASTM specifications.		

END FLATNESS					
END 1					
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES			
Diameter 2 (rotated $90^{\circ}$ )	Is the maximum gap $\leq \pm 0.001$ in.?	YES			
END 2					
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES			
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES			
End Flatness Tolerance Met? YES					



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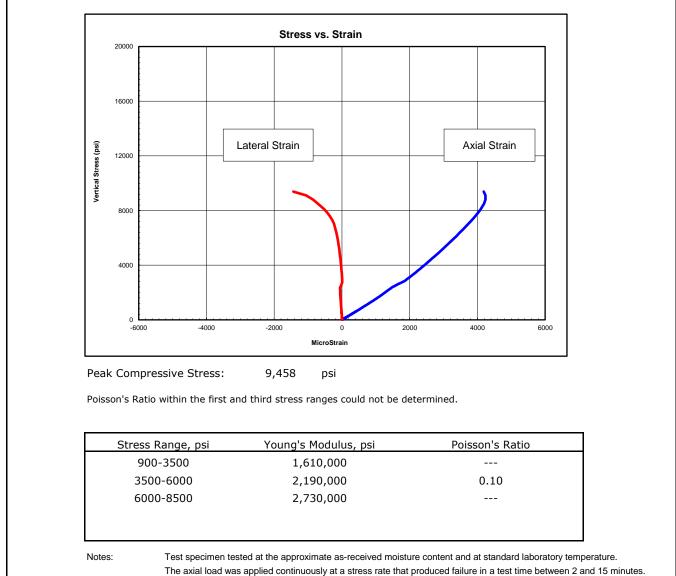


After cutting and grinding





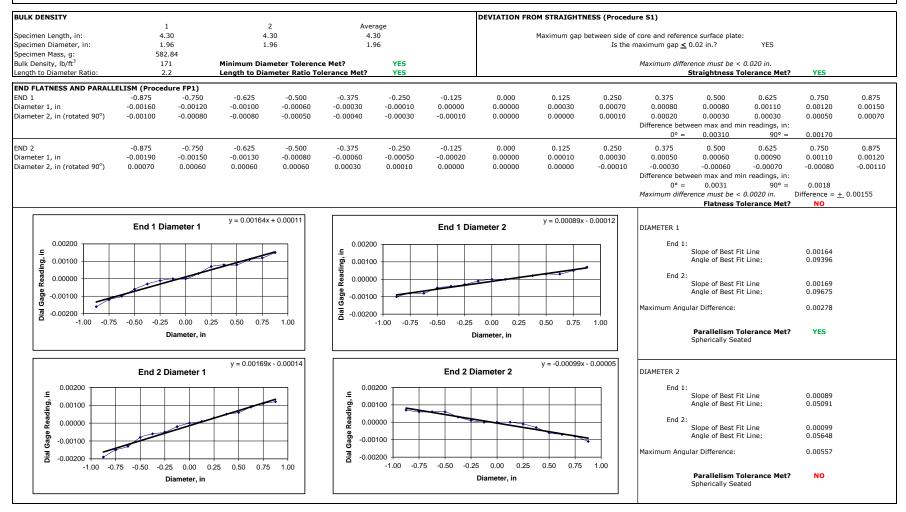
Client:	WSP USA, Inc.				
Project Name:	MaineDOT I-95 Bridge over Stillwater				
Project Location:	Merrimack, NH				
GTX #:	319180				
Test Date:	8/29/2024				
Tested By:	gp				
Checked By:	jsc				
Boring ID:	BB-BSA-105				
Sample ID:	R-1				
Depth, ft:	28.8-29.1				
Sample Type:	rock core				
Sample Description:	See photographs				
	Intact material failure				
	Best Effort end preparation performed				



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:	WSP USA, Inc.	Test Date:	8/28/2024
Project Name:	MaineDOT I-95 Bridge over Stillwater	Tested By:	9P
Project Location:	Merrimack, NH	Checked By:	smd
GTX #:	319180		
Boring ID:	BB-BSA-105		
Sample ID:	R-1		
Depth (ft):	28.8-29.1		
Visual Description:	See photographs		



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?	Maximum angle of departure must be $\leq 0.25^{\circ}$
Diameter 1, in	0.00310	1.960	0.00158	0.091	YES	
Diameter 2, in (rotated 90°)	0.00170	1.960	0.00087	0.050	YES	Perpendicularity Tolerance Met? YES
END 2						
Diameter 1, in	0.00310	1.960	0.00158	0.091	YES	
Diameter 2, in (rotated 90°)	0.00180	1.960	0.00092	0.053	YES	

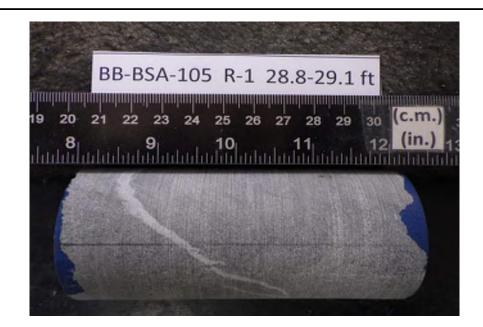


	Client:	WSP USA, Inc.	Test Date:	8/28/2024	
g	Project Name:	MaineDOT I-95 Bridge over Stillwater	Tested By:	gp	
	Project Location:	Merrimack, NH	Checked By:	smd	
S	GTX #: 319180				
	Boring ID:		Reliable dial gauge measurements could not be performed on this rock type. Tolerance measurements were performed using a		
	Sample ID:	K-1			
	Depth (ft):			aightedge and feeler gauges to	
	Visual Description:	See photographs	ASTM specifications.		

END FLATNESS					
END 1					
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES			
Diameter 2 (rotated $90^{\circ}$ )	Is the maximum gap $\leq \pm 0.001$ in.?	YES			
END 2					
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES			
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES			
End Flatness Tolerance Met? YES					



WSP USA, Inc.				
MaineDOT I-95 Bridge over Stillwater				
Merrimack, NH				
319180				
8/29/2024				
gp				
smd				
BB-BSA-105				
R-1				
28.8-29.1				



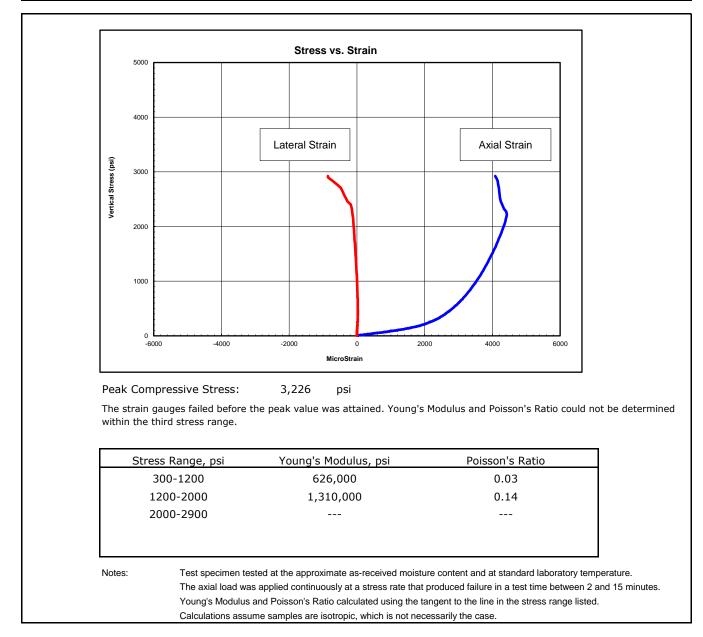
After cutting and grinding



After break

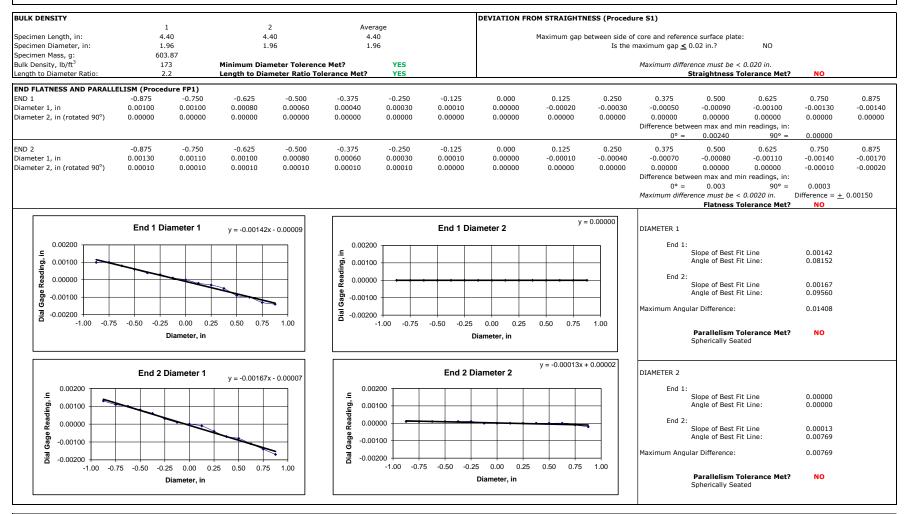


Client:	WCD LICA Inc				
Client:	WSP USA, Inc.				
Project Name:	MaineDOT I-95 Bridge over Stillwater				
Project Location:	Merrimack, NH				
GTX #:	319180				
Test Date:	8/29/2024				
Tested By:	gp				
Checked By:	jsc				
Boring ID:	BB-BSA-106				
Sample ID:	R-3				
Depth, ft:	69.3-69.6				
Sample Type:	rock core				
Sample Description:	See photographs				
	Intact material failure				
	Best Effort end preparation performed				





Client:	WSP USA, Inc.	Test Date:	8/28/2024
Project Name:	MaineDOT I-95 Bridge over Stillwater	Tested By:	9P
Project Location:	Merrimack, NH	Checked By:	smd
GTX #:	319180		
Boring ID:	BB-BSA-106		
Sample ID:	R-3		
Depth (ft):	69.3-69.6		
Visual Description:	See photographs		



PERPENDICULARITY (Procedure	e P1) (Calculated from End Flatness	and Parallelism me	easurements a	bove)		
END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?	Maximum angle of departure must be $\leq 0.25^{\circ}$
Diameter 1, in	0.00240	1.960	0.00122	0.070	YES	
Diameter 2, in (rotated 90°)	0.00000	1.960	0.00000	0.000	YES	Perpendicularity Tolerance Met? YES
END 2						
Diameter 1, in	0.00300	1.960	0.00153	0.088	YES	
Diameter 2, in (rotated 90°)	0.00030	1.960	0.00015	0.009	YES	

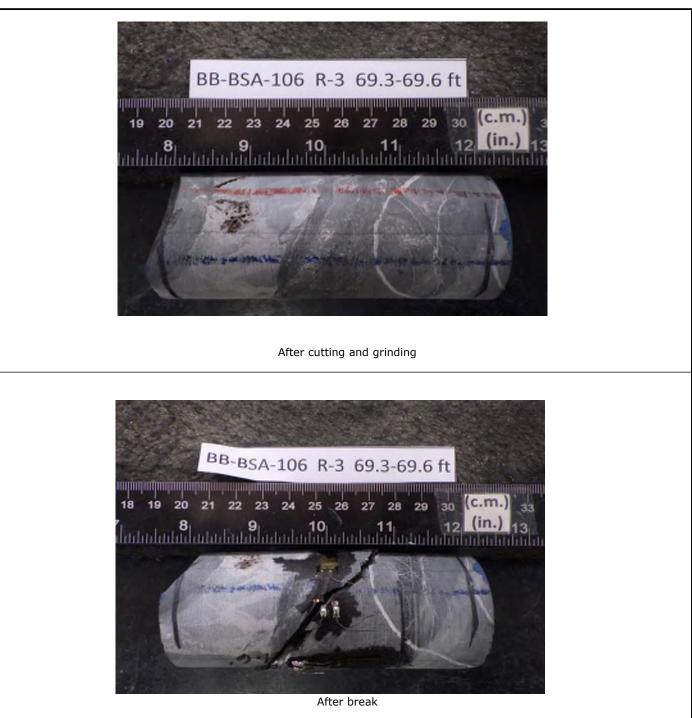


	Client:	WSP USA, Inc.	Test Date:	8/28/2024				
g	Project Name:	MaineDOT I-95 Bridge over Stillwater	Tested By:	gp				
	Project Location:	Merrimack, NH	Checked By:	smd				
S	GTX #:	319180						
	Boring ID:			gauge measurements could not be				
	Sample ID:	K-J	•	this rock type. Tolerance ts were performed using a				
	Sample ID: Depth (ft):			aightedge and feeler gauges to				
	Visual Description:	See photographs	ASTM specifications.					

END FLATNESS			
END 1			
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES	
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES	
END 2			
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES	
Diameter 2 (rotated $90^{\circ}$ )	Is the maximum gap $\leq \pm 0.001$ in.?	YES	
	End Flatness Toler	ance Met?	YES

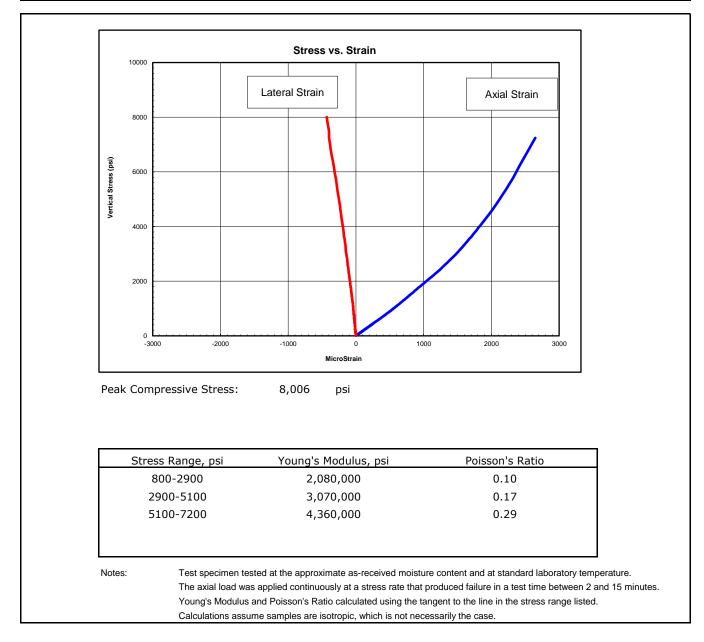


WSP USA, Inc.
MaineDOT I-95 Bridge over Stillwater
Merrimack, NH
319180
8/29/2024
gp
smd
BB-BSA-106
R-3
69.3-69.6



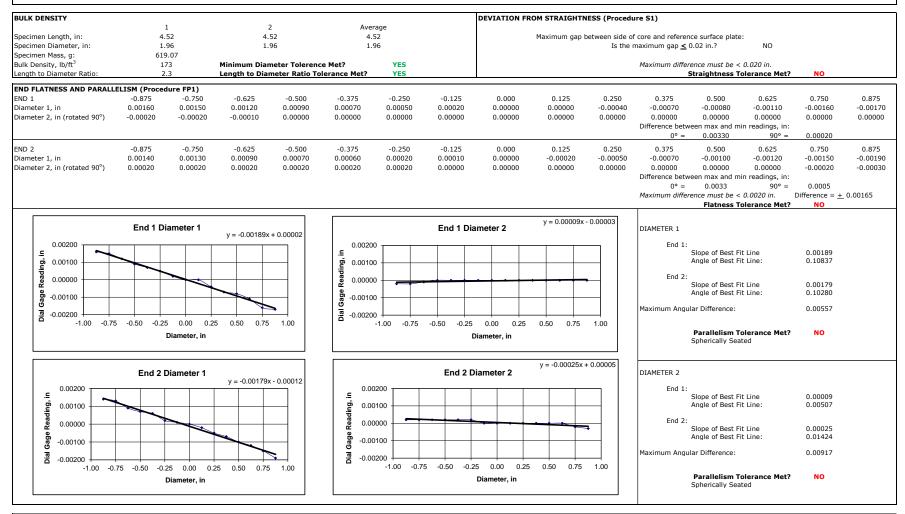


Client:	WSP USA, Inc.
Project Name:	MaineDOT I-95 Bridge over Stillwater
Project Location:	Merrimack, NH
GTX #:	319180
Test Date:	8/29/2024
Tested By:	gp
Checked By:	jsc
Boring ID:	BB-BSA-111
Sample ID:	R-1
Depth, ft:	21.4-21.7
Sample Type:	rock core
Sample Description:	See photographs Intact material and discontinuity failure Best Effort end preparation performed





Client:	WSP USA, Inc.	Test Date:	8/28/2024
Project Name:	MaineDOT I-95 Bridge over Stillwater	Tested By:	<u>gp</u>
Project Location:	Merrimack, NH	Checked By:	smd
GTX #:	319180		
Boring ID:	BB-BSA-111		
Sample ID:	R-1		
Depth (ft):	21.4-21.7		
Visual Description:	See photographs		



PERPENDICULARITY (Procedure	e P1) (Calculated from End Flatness	and Parallelism me	easurements a			
END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?	Maximum angle of departure must be $\leq 0.25^{\circ}$
Diameter 1, in	0.00330	1.960	0.00168	0.096	YES	
Diameter 2, in (rotated 90°)	0.00020	1.960	0.00010	0.006	YES	Perpendicularity Tolerance Met? YES
END 2						
Diameter 1, in	0.00330	1.960	0.00168	0.096	YES	
Diameter 2, in (rotated 90°)	0.00050	1.960	0.00026	0.015	YES	



	Client:	WSP USA, Inc.	Test Date:	8/28/2024				
g	Project Name:	MaineDOT I-95 Bridge over Stillwater	Tested By:	gp				
	Project Location:	Merrimack, NH	Checked By:	smd				
S	GTX #:	319180						
	Boring ID:			gauge measurements could not be				
B S	Sample ID:	K-1		this rock type. Tolerance s were performed using a				
	Depth (ft):			aightedge and feeler gauges to				
	Visual Description:	See photographs	ASTM specifications.					

END FLATNESS			
END 1			
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES	
Diameter 2 (rotated $90^{\circ}$ )	Is the maximum gap $\leq \pm 0.001$ in.?	YES	
END 2			
Diameter 1	Is the maximum gap $\leq \pm 0.001$ in.?	YES	
Diameter 2 (rotated 90°)	Is the maximum gap $\leq \pm 0.001$ in.?	YES	
	End Flatness Toler	ance Met?	YES



Client:	WSP USA, Inc.
Project Name:	MaineDOT I-95 Bridge over Stillwater
Project Location:	Merrimack, NH
GTX #:	319180
Test Date:	8/29/2024
Tested By:	gp
Checked By:	smd
Boring ID:	BB-BSA-111
Sample ID:	R-1
Depth, ft:	21.4-21.7



After cutting and grinding



APPENDIX D

# **Rock Discontinuity Calculations**

# **Rock Cut Locations**

Bridge #1427 & #5800, I-95 over Stillwater Ave, Bangor ME

Legend

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16 55

Stillwater Northbound Cut Stillwater Southbound Cut

Google Earth

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	A set 3	Noint Set 4	Set 2	Image: Second constraint of the second constraint of	13.44%       Fisher       1.0%       bip Direction     Label       Planes       80     Joint Set 1       268     Joint Set 2       35     Joint Set 3       173     Joint Set 4       342     Bedding       Pole Vectors     37 (37 Entries)
NSD	Project Analysis Description		#5800 over Stillwater Ave, B		1 027176.00
	Drawn By KAR	Checked By BK	rops along Stillwater Ave Northb Reviewed By JDL Scal		
DIPS 8.025	Date 5/21/2024		Stillwater-outcrop-data.dips8		Appendix D.1

September 2024

Appendix D.2: Calculation of Rock Mass Rating Preliminary Geotechnical Design Report Bridge #1427 & #5800, I-95 over Stillwater Ave, Bangor, Maine MaineDOT WIN 027176.00

#### References:

1. Bieniawski, Z.T. 1989. Engineering Rock Mass Classifications: A Complete Manual for Engineers and Geologists in Mining, Civil, and Petroleum Engineering. John Wiley & Sons.

2. Wyllie, Duncan C. 1999. Foundations on Rock, 2nd Edition. E&FN Spon.

3. Hoek, Evert. 2006. Practical Rock Engineering. Rocscience Inc.

### Notes:

1. The RMR ratings for parameter 1 (intact rock strength), parameter 2 (drill core quality RQD), and parameter 3 (discontinuity spacing) are selected using Charts A, B, and C, respectively, from Bieniawski 1989 (Ref. 1). For core runs on which UCS lab testing was not performed, the intact strength rating is selected based on field strength estimates using Table 3.5 from Wyllie 1999 (Ref. 2).

2. The RMR ratings for parameter 4 (discontinuity condition) are selected using Section E of Table 4 from Hoek 2006 (Ref. 3).

3. The RMR ratings for parameter 5 (groundwater) are selected using Table 3.5 from Wyllie 1999 (Ref. 2).

4. For the outcrop discontinuities, the RQD is correlated from discontinuity spacing based on Chart D from Bieniawski 1989 (Ref. 1).

5. For the boring core runs, the persistence rating is based on an average of the persistence measurements at the outcrops.

6. The rating adjustment for joint orientation (parameter B) is selected from Bieniawski 1989 (Ref. 1), using an orientation adjustment of -15 ("unfavorable" for foundations) for the bedding set based on the kinematic possibility of planar sliding and for joint set 2 based on the kinematic possibility of toppling. Since the boring rock core was collected unoriented, an average of all outcrop orientation adjustments is used for the boring core runs.

Prepared by: KAR

Checked by: BK

Reviewed by: JDL

	Run Number			Intact Strength		Fracture Spacing						А.	Classificati	on Paramete	rs				B. Rating	
Boring or Outcrop	or Discontinuity	UCS	UCS	Field Strength Estimate	RQD (%)	Average fractures	Average spacing		1 Strength	2	3 Spacing			4 Condition o	f Joints			5 Ground	adjustment	RMR
	ID	(psi)	(MPa)	3		per foot	(ft)	(mm)	of rock	RQD	of joints		Aperture	Roughness	Infilling	Weathering	Total	water		
	R1	-	-	Very Strong (R5)	0	broken	-	-	12	3	5	2	0	1	0	5	8	7	-4	31
BB-BSA-101	R2	-	-	Strong (R4) to Very Strong (R5)	0	broken	-	-	7	3	5	2	0	5	0	5	12	7	-4	30
DD-D3A-101	R3	-	-	Strong (R4) to Very Strong (R5)	14	3.5	0.3	87	7	5	6	2	0	5	6	5	18	7	-4	39
	R4	-	-	Strong (R4)	60	1.6	0.6	191	9	12	8	2	5	5	6	6	24	7	-4	56
BB-BSA-102	R1	17,296	119	Strong (R4) to Extremely Strong (R6)	52	3.2	0.3	95	11	10	6	2	0	1	2	5	10	7	-4	40
DD-D3A-102	R2	-	-	Extremely Strong (R6)	88	0.2	5.0	1524	15	18	16	2	0	6	6	6	20	7	-4	72
BB-BSA-103	R1	-	-	Extremely Strong (R6)	31	4.0	0.3	76	15	7	6	2	1	1	4	5	13	7	-4	44
BB-BSA-103	R2	-	-	Extremely Strong (R6)	70	2.0	0.5	152	15	14	7	2	4	5	6	6	23	7	-4	62
	R1	-	-	Strong (R4) to Very Strong (R5)	56	1.6	0.6	191	7	11	8	2	0	5	0	5	12	7	-4	41
BB-BSA-104A	R2	-	-	Strong (R4) to Very Strong (R5)	61	0.5	2.0	610	7	12	12	2	5	5	6	6	24	7	-4	58
	R3	-	-	Strong (R4) to Very Strong (R5)	23	3.5	0.3	87	7	6	6	2	0	5	6	6	19	7	-4	41
BB-BSA-105	R1	-	-	Strong (R4)	30	3.2	0.3	95	7	7	6	2	0	5	6	5	18	7	-4	41
BB-B3A-105	R2	-	-	Very Strong (R5)	75	1.6	0.6	191	12	15	8	2	5	1	6	6	20	7	-4	58
	R1	-	-	Strong (R4) to Very Strong (R5)	0	broken	-	-	7	3	5	2	0	5	6	5	18	7	-4	36
BB-BSA-106	R2	-	-	Strong (R4) to Very Strong (R5)	47	3.3	0.3	92	7	10	6	2	0	1	0	6	9	7	-4	35
	R3	-	-	Weak (R2)	62	1.4	0.7	218	3	12	8	2	0	5	6	6	19	7	-4	45
	R1	-	-	Strong (R4)	0	broken	-	-	7	3	5	2	0	5	0	1	8	7	-4	26
BB-BSA-107	R2	-	-	Strong (R4)	0	broken	-	-	7	3	5	2	0	6	0	1	9	7	-4	27
00-03A-107	R3	-	-	Strong (R4) to Very Strong (R5)	35	3.5	0.3	87	7	8	6	2	0	5	0	5	12	7	-4	36
	R4	-	-	Strong (R4) to Very Strong (R5)	39	3.2	0.3	95	7	8	6	2	0	5	0	5	12	7	-4	36

Overall average RMR =

54

Page 1 of 3

	Run Number			Intact Strength		Frac	cture Spa	cing				A.	Classificat	ion Paramete	ers				B. Rating	
Boring or	or				RQD	Average	e Average A	Average	1	2	3			4				5	adjustment	DUD
Outcrop	Discontinuity	UCS	UCS	Field Strength Estimate	(%)	fractures	spacing	-	Strength		Spacing	Condition of Joints						Ground	for joint	RMR
	ID	(psi)	(MPa)	3		per foot	(ft)	(mm)	of rock	RQD	of joints		Aperture	1	1	Weathering	Total	water	orientation	
	R1	_	_	Very Strong (R5) to Extremely Strong (R6)	58	2.6	0.4	117	12	11	7	2		5	6	5	18	7	-4	51
	R1 R2		_	Extremely Strong (R6)	42	1.0	1.0	305	12	9	9	2	1	1	6	5	15	7	-4	51
BB-BSA-108	R3	-	_	Extremely Strong (R6)	17	2.5	0.4	122	15	5	7	2	1	1	6	5	15	7	-4	45
	R4		_	Extremely Strong (R6)	35	2.0	0.4	152	15	8	7	2	1	1	6	5	15	7	-4	48
	R1		_	Very Strong (R5) to Extremely Strong (R6)	30	1.8	0.6	169	13	7	7	2	0	1	6	5	14	7	-4	43
BB-BSA-109A	R2	_	_	Very Strong (R5) to Extremely Strong (R6)	49	1.6	0.6	100	12	10	8	2	1	1	6	6	16	7	-4	40
	R1	5,948	41	Medium Strong (R3)	49	1.0	1.0	305	5	10	9	2	1	1	6	6	16	7	-4	43
BB-BSA-110	R2	-	-	Very Strong (R5) to Extremely Strong (R6)	71	0.8	1.3	381	12	14	10	2	0	1	6	6	15	7	-4	54
	R1	_	_	Strong (R4) to Very Strong (R5)	15	broken	-	-	6	5	5	2	0	5	6	5	18	7	-4	37
BB-BSA-111	R2	-	-	Strong (R4) to Very Strong (R5)	60	1.6	0.6	191	7	12	8	2	5	5	6	6	24	7	-4	54
	Disc. 1	-	-	-	20	-	0.2	61	15	5	6	2	1	5	6	5	19	10	-15	40
	Disc. 2	-	-	-	93	-	1.5	457	15	19	10	2	0	3	0	5	10	10	0	64
	Disc. 3	-	-	-	99	-	2.8	853	15	20	13	6	0	3	6	5	20	10	0	78
	Disc. 4	-	-	-	85	-	0.9	274	15	17	9	4	0	1	0	5	10	10	-15	46
	Disc. 5	-	-	-	100	-	5.9	1798	15	20	16	4	1	1	6	5	17	10	0	78
	Disc. 6	-	-	-	95	-	1.6	488	15	19	11	2	1	3	6	5	17	10	0	72
	Disc. 7	-	-	R6	41	-	0.3	91	15	9	6	2	6	5	6	5	24	10	-15	49
	Disc. 8	-	-	-	100	-	5.9	1798	15	20	16	6	0	1	0	5	12	10	0	73
	Disc. 9	-	-	-	88	-	1.1	335	4	18	9	2	1	3	6	5	17	10	0	58
	Disc. 10	-	-	-	86	-	1.0	305	4	17	9	2	0	3	2	5	12	10	0	52
	Disc. 11	-	-	R3	100	-	3.7	1128	4	20	14	4	0	5	2	5	16	10	0	64
	Disc. 12	-	-	-	100	-	4.5	1372	4	20	15	2	1	3	6	5	17	10	0	66
	Disc. 13	-	-	-	100	-	5.4	1646	4	20	16	4	1	3	6	5	19	10	-15	54
	Disc. 14	-	-	-	85	-	0.9	274	15	17	9	2	0	3	2	5	12	10	0	63
Outcrop along	Disc. 15	-	-	R6	100	-	5.1	1554	15	20	16	4	6	1	6	5	22	10	-15	68
Stillwater Ave	Disc. 16	-	-	-	91	-	1.3	396	15	18	10	2	0	5	2	5	14	10	0	67
Northbound	Disc. 17	-	-	-	99	-	2.5	762	15	20	13	2	1	3	2	5	13	10	0	71
	Disc. 18	-	-	-	99	-	2.5	762	15	20	13	2	6	1	6	5	20	10	0	78
	Disc. 19	-	-	-	96	-	1.8	549	12	19	11	2	1	5	6	5	19	10	0	71
	Disc. 20	-	-	-	96	-	1.7	518	12	19	11	2	0	3	0	5	10	10	-15	47
	Disc. 21	-	-	-	56	-	0.4	122	12	11	7	4	1	1	6	5	17	10	-15	42
	Disc. 22	-	-	-	96	-	1.8	549	12	19	11	2	1	3	6	5	17	10	-15	54
	Disc. 23	-	-	R5	98	-	2.0	610	12	20	12	2	0	1	2	5	10	10	0	64
	Disc. 24	-	-	-	92	-	1.4	427	12	18	10	2	6	3	6	5	22	10	0	72
	Disc. 25	-	-	R6	99	-	2.3	701	15	20	12	2	6	3	6	5	22	10	0	79
	Disc. 26	-	-	-	99	-	2.2	671	15	20	12	2	0	1	2	5	10	10	0	67
	Disc. 27	-	-	-	100	-	4.0	1219	15	20	15	2	0	1	0	5	8	10	0	68
	Disc. 28	-	-	-	96	-	1.8	549	15	19	11	2	0	5	2	5	14	10	0	69
	Disc. 29	-	-	R6	99	-	2.2	671	15	20	12	2	1	5	4	5	17	10	0	74
	Disc. 30	-	-	R6	95	-	1.6	488	15	19	11	2	0	3	2	5	12	10	0	67
	Disc. 31	-	-	R6	99	-	2.3	701	15	20	12	4	0	3	0	5	12	10	0	69

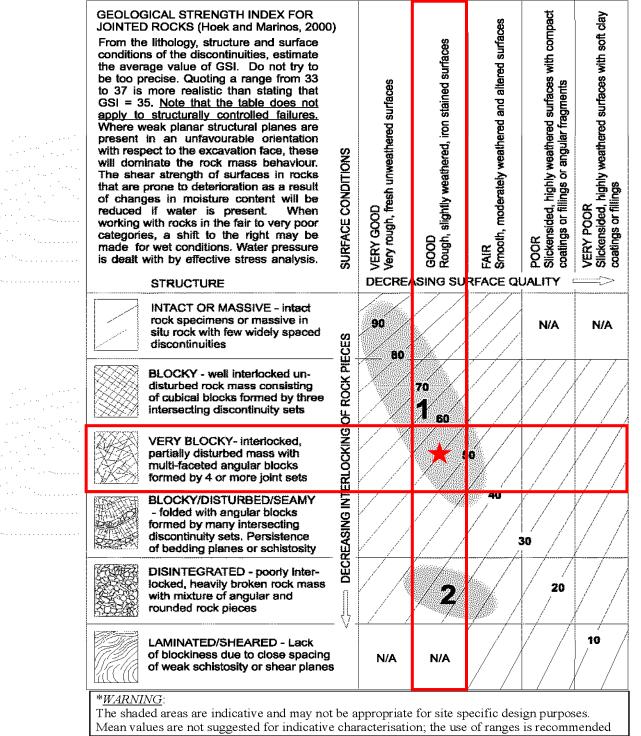
Boring or	Run Number or Discontinuity ID	Intact Strength				Fracture Spacing		A. Classification Parameters							B. Rating					
			UCS (MPa)	Field Strength Estimate	RQD (%)	Average Ave fractures spa per foot (	Average A	Average	verage 1	2	3	4						5	adjustment for joint	RMR
							spacing	acing spacing	Strength of rock	RQD	Spacing of joints	Condition of Joints						Ground		
							(ft)	(mm)				Persistence	Aperture	Roughness	Infilling	Weathering	Total	water	orientation	
Outcrop along Stillwater Ave Southbound	Disc. 32	-	-	-	85	-	0.9	274	15	17	9	4	0	6	0	5	15	10	0	66
	Disc. 33	-	-	-	20	-	0.2	61	15	5	6	4	1	5	2	5	17	10	0	53
	Disc. 34	-	-	-	41	-	0.3	91	12	9	6	4	1	6	2	5	18	10	-15	40
	Disc. 35	-	-	-	98	-	2.0	610	12	20	12	4	0	5	6	5	20	10	0	74
	Disc. 36	-	-	R5	76	-	0.6	183	12	15	8	6	1	1	2	5	15	10	0	60
	Disc. 37	-	-	-	56	-	0.4	122	12	11	7	4	0	1	6	5	16	10	-15	41

### Appendix D.3: Calculation of Geological Strength Index Preliminary Geotechnical Design Report Bridge #1427 & #5800, I-95 over Stillwater Ave, Bangor, Maine MaineDOT WIN 027176.00

Prepared by:	KAR	
Checked by:	BK	
Reviewed by:	JDL	



### Table 5: Most common GSI ranges for typical sandstones.\*



<sup>1.</sup> Massive or bedded (no clayey cement present)

2. Brecciated (no clayey cement present)

GSI chart from: Marinos, Paul, and Hoek, Evert. November 2000. GSI: a geologically friendly tool for rock mass strength estimation. ISRM International Symposium, Melbourne, Australia, paper number ISRM-IS-2000-035.

APPENDIX E

# Rock Cut Discontinuity Photographs

CUT DISCONTINUITY ID LOCATIONS

ROCK

**\\S**D

STILLWATER AVENUE NORTHBOUND



Date: 11/4/2024 Prepared: KAR Checked: LMP Reviewed: MEL

> BANGOR, MAINE 7176.00 #5800 02 ∞ STILLWATER AVE MAINEDOT WIN 02 #1427 BRIDGE I-95 OVER

SHEET NUMBER 01 OF 54

LOCATIONS

<u>0</u>

**CUT DISCONTINUITY** 

ROCK

**\\S**[]

STILLWATER AVENUE

NORTHBOUND



Date: 11/4/2024 Prepared: KAR Checked: LMP Reviewed: MEL

> BANGOR, MAINE 7176.00 #5800 02 Щ ∞ R STILLWATER AV MAINEDOT WIN #1427 MIN BRIDGE I-95 OVER

SHEET NUMBER **02** OF 54

vsp

### **CUT DISCONTINUITY ID LOCATIONS** STILLWATER AVENUE NORTHBOUND ROCK

WIN 027176.00 *Project No.* US0025840.3905



Date: 11/4/2024 Prepared: KAR Checked: LMP Reviewed: MEL

> BANGOR, MAINE 7176.00 #5800 02 ∞ Ч R STILLWATER AV MAINEDOT WIN #1427 MIN BRIDGE I-95 OVER

SHEET NUMBER 03 OF 54



# CUT DISCONTINUITY ID LOCATIONS ROCK



Date: 11/4/2024 Prepared: KAR Checked: LMP Reviewed: MEL

> BANGOR, MAINE 7176.00 #5800 02 Щ ∞ R STILLWATER AV MAINEDOT WIN #1427 MIN BRIDGE I-95 OVER

SHEET NUMBER 04 OF 54



### LOCATIONS STILLWATER AVENUE NORTHBOUND ₽ **CUT DISCONTINUITY** ROCK

WIN 027176.00 *Project No.* US0025840.3905



Date: 11/4/2024 Prepared: KAR Checked: LMP Reviewed: MEL

> BANGOR, MAINE 7176.00 #5800 02 Щ ∞ R STILLWATER AV MAINEDOT WIN #1427 NIN BRIDGE I-95 OVER

SHEET NUMBER 05 OF 54

wsp

### LOCATIONS STILLWATER AVENUE NORTHBOUND <u>0</u> **CUT DISCONTINUITY** ROCK

WIN 027176.00 *Project No.* US0025840.3905



Date: 11/4/2024 Prepared: KAR Checked: LMP Reviewed: MEL

> ER AVE, BANGOR, MAINE WIN 027176.00 #5800 ∞ STILLWATER AVE MAINEDOT WIN 02 #1427 BRIDGE I-95 OVER

SHEET NUMBER 06 OF 54

LOCATIONS

<u>0</u>

**ROCK CUT DISCONTINUITY** 

**\\S|)** 

STILLWATER AVENUE NORTHBOUND



Date: 11/4/2024 Prepared: KAR Checked: LMP Reviewed: MEL

> ER AVE, BANGOR, MAINE WIN 027176.00 #5800 ∞ STILLWATER AVE MAINEDOT WIN 02 #1427 BRIDGE I-95 OVER

SHEET NUMBER 07 OF 54

LOCATIONS

STILLWATER AVENUE NORTHBOUND

**ROCK CUT DISCONTINUITY ID** 

**\\S**D



Date: 11/4/2024 Prepared: KAR Checked: LMP Reviewed: MEL

> ER AVE, BANGOR, MAINE WIN 027176.00 #5800 ∞ STILLWATER AVE MAINEDOT WIN 02 #1427 BRIDGE I-95 OVER

SHEET NUMBER 08 OF 54



### LOCATIONS STILLWATER AVENUE NORTHBOUND <u>0</u> **CUT DISCONTINUITY** ROCK

WIN 027176.00 *Project No.* US0025840.3905



Date: 11/4/2024 Prepared: KAR Checked: LMP Reviewed: MEL

BANGOR, MAINE 7176.00

02

STILLWATER AVE MAINEDOT WIN 02

#5800

∞

#1427

BRIDGE

SHEET NUMBER 09 OF 54

I-95 OVER

LOCATIONS

STILLWATER AVENUE NORTHBOUND

**CUT DISCONTINUITY ID** 

ROCK

**\\S|)** 



Date: 11/4/2024 Prepared: KAR Checked: LMP Reviewed: MEL

> /E, BANGOR, MAINE 027176.00 #5800 ∞ STILLWATER AVE MAINEDOT WIN 02 #1427 BRIDGE I-95 OVER

SHEET NUMBER **10** OF 54

\\\\)

# **ROCK CUT DISCONTINUITY ID LOCATIONS** STILLWATER AVENUE NORTHBOUND

WIN 027176.00 Project No. US0025840.3905



STILLWATER AVE, BANGOR, MAINE MAINEDOT WIN 027176.00

#5800

∞

#1427

BRIDGE

I-95 OVER

11

OF 54

*Project No.* US0025840.3905 **ROCK CUT DISCONTINUITY ID LOCATIONS** 

STILLWATER AVENUE NORTHBOUND

**\\S**D

WIN 027176.00



Date: 11/4/2024 Prepared: KAR Checked: LMP Reviewed: MEL

> STILLWATER AVE, BANGOR, MAINE MAINEDOT WIN 027176.00 #5800 ∞ BRIDGE #1427 I-95 OVER

SHEET NUMBER 12 OF 54

**ROCK CUT DISCONTINUITY ID LOCATIONS** 

STILLWATER AVENUE NORTHBOUND

**\\\D** 



Date: 11/4/2024 Prepared: KAR Checked: LMP Reviewed: MEL

1427 & #5800 ER AVE, BANGOR, MAINE WIN 027176.00

R STILLWATER AVE, MAINEDOT WIN 027

#1427

BRIDGE

SHEET NUMBER 13 OF 54

I-95 OVER

**ROCK CUT DISCONTINUITY ID LOCATIONS** 

STILLWATER AVENUE NORTHBOUND

**\\\\** 



SOUTH

Date: 11/4/2024 Prepared: KAR Checked: LMP Reviewed: MEL

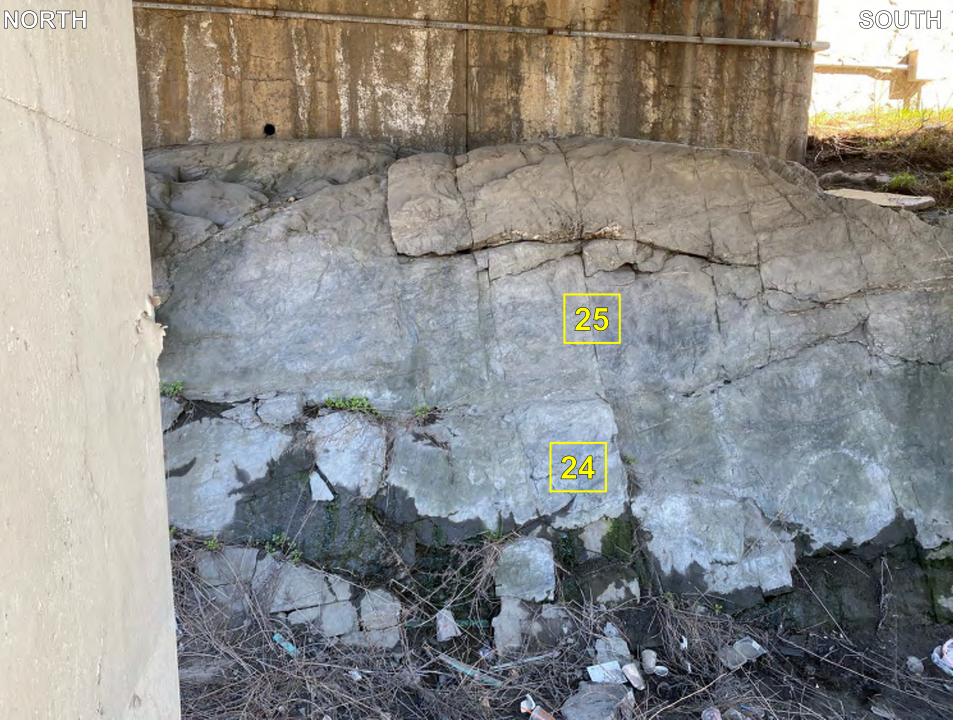
> STILLWATER AVE, BANGOR, MAINE MAINEDOT WIN 027176.00 #5800 ∞ #1427 BRIDGE I-95 OVER

SHEET NUMBER **14** OF 54

**ROCK CUT DISCONTINUITY ID LOCATIONS** 

STILLWATER AVENUE NORTHBOUND

**\\S**])



Date: 11/4/2024 Prepared: KAR Checked: LMP Reviewed: MEL

> ER AVE, BANGOR, MAINE WIN 027176.00 #5800 ∞ STILLWATER AVE MAINEDOT WIN 02 #1427 BRIDGE I-95 OVER

SHEET NUMBER 15 OF 54

**ROCK CUT DISCONTINUITY ID LOCATIONS** 

STILLWATER AVENUE NORTHBOUND

**\\\**|)



Date: 11/4/2024 Prepared: KAR Checked: LMP Reviewed: MEL

> STILLWATER AVE, BANGOR, MAINE MAINEDOT WIN 027176.00 #5800 ∞ BRIDGE #1427 I-95 OVER

SHEET NUMBER **16** OF 54



WIN 027176.00

*Project No.* US0025840.3905



Date: 11/4/2024 Prepared: KAR Checked: LMP Reviewed: MEL

> ER AVE, BANGOR, MAINE WIN 027176.00

R STILLWATER AVE, MAINEDOT WIN 027

#5800

∞

#1427

BRIDGE

ано 26-SHEET NUMBER **17** OF 54

**ROCK CUT DISCONTINUITY ID LOCATIONS** 

STILLWATER AVENUE NORTHBOUND

**\\S**])



Date: 11/4/2024 Prepared: KAR Checked: LMP Reviewed: MEL

> ER AVE, BANGOR, MAINE WIN 027176.00 #5800 R STILLWATER AVE, MAINEDOT WIN 027 ∞ #1427 BRIDGE I-95 OVER

SHEET NUMBER **18** OF 54

NORTH



Date: 11/4/2024 Prepared: KAR Checked: LMP Reviewed: MEL

> ER AVE, BANGOR, MAINE WIN 027176.00 #5800 ∞ STILLWATER AVE MAINEDOT WIN 02 #1427 BRIDGE I-95 OVER

SHEET NUMBER **19** OF 54

**ROCK CUT DISCONTINUITY ID LOCATIONS** STILLWATER AVENUE NORTHBOUND

**\\S[]** 

**ROCK CUT DISCONTINUITY ID LOCATIONS** 

STILLWATER AVENUE NORTHBOUND

**\\S|)** 



Date: 11/4/2024 Prepared: KAR Checked: LMP Reviewed: MEL

> ER AVE, BANGOR, MAINE WIN 027176.00 #5800 ∞ STILLWATER AVE MAINEDOT WIN 02 #1427 BRIDGE I-95 OVER

SHEET NUMBER **20** OF 54

**ROCK CUT DISCONTINUITY ID LOCATIONS** 

STILLWATER AVENUE NORTHBOUND

**\\S**]]



Date: 11/4/2024 Prepared: KAR Checked: LMP Reviewed: MEL

> ER AVE, BANGOR, MAINE WIN 027176.00 #5800 ∞ STILLWATER AVE MAINEDOT WIN 02 #1427 BRIDGE I-95 OVER

SHEET NUMBER
21
OF 54

**ROCK CUT DISCONTINUITY ID LOCATIONS** 

STILLWATER AVENUE NORTHBOUND



Date: 11/4/2024 Prepared: KAR Checked: LMP Reviewed: MEL

> ER AVE, BANGOR, MAINE WIN 027176.00 #5800 STILLWATER AVE MAINEDOT WIN 02 ∞ #1427 BRIDGE I-95 OVER

SHEET NUMBER 22 OF 54

CUT DISCONTINUITY ID LOCATIONS

ROCK

**\\S|**)

STILLWATER AVENUE NORTHBOUND



Date: 11/4/2024 Prepared: KAR Checked: LMP Reviewed: MEL

> /E, BANGOR, MAINE 027176.00 #5800 ∞ STILLWATER AVE MAINEDOT WIN 02 #1427 BRIDGE I-95 OVER

SHEET NUMBER **23** OF 54

CUT DISCONTINUITY ID LOCATIONS

ROCK

**\** \ | )

STILLWATER AVENUE NORTHBOUND



Date: 11/4/2024 Prepared: KAR Checked: LMP Reviewed: MEL

> BANGOR, MAINE 7176.00 #5800 02 ∞ STILLWATER AVE MAINEDOT WIN 02 #1427 BRIDGE I-95 OVER

SHEET NUMBER
24
OF 54

LOCATIONS

<u>0</u>

**CUT DISCONTINUITY** 

ROCK

**\\S|)** 

STILLWATER AVENUE NORTHBOUND



Date: 11/4/2024 Prepared: KAR Checked: LMP Reviewed: MEL

> BANGOR, MAINE 7176.00 #5800 02 ∞ STILLWATER AVE MAINEDOT WIN 02 #1427 BRIDGE I-95 OVER

SHEET NUMBER 25 OF 54



#### LOCATIONS NORTHBOUND <u>0</u> **CUT DISCONTINUITY** STILLWATER AVENUE ROCK

WIN 027176.00



Date: 11/4/2024 Prepared: KAR Checked: LMP Reviewed: MEL

> BANGOR, MAINE 7176.00 #5800 02 ш ∞ R STILLWATER AV MAINEDOT WIN #1427 MIN BRIDGE I-95 OVER

SHEET NUMBER 26 OF 54

*Project No.* US0025840.3905

LOCATIONS

**CUT DISCONTINUITY ID** 

ROCK

**\\S**])

STILLWATER AVENUE

NORTHBOUND

WIN 027176.00



Date: 11/4/2024 Prepared: KAR Checked: LMP Reviewed: MEL

> BANGOR, MAINE 7176.00 #5800 02 ∞ STILLWATER AVE MAINEDOT WIN 02 #1427 BRIDGE I-95 OVER

SHEET NUMBER 27 OF 54



### CUT DISCONTINUITY ID LOCATIONS STILLWATER AVENUE NORTHBOUND ROCK

WIN 027176.00 Project No. US0025840.3905



Date: 11/4/2024 Prepared: KAR Checked: LMP Reviewed: MEL

> ER AVE, BANGOR, MAINE WIN 027176.00

STILLWATER AVE MAINEDOT WIN 02

#5800

∞

#1427

BRIDGE

SHEET NUMBER **28**OF 54

I-95 OVER

CUT DISCONTINUITY ID LOCATIONS

ROCK

**\\\**|)

STILLWATER AVENUE NORTHBOUND



Date: 11/4/2024 Prepared: KAR Checked: LMP Reviewed: MEL

> ER AVE, BANGOR, MAINE WIN 027176.00 #5800 ∞ STILLWATER AVE MAINEDOT WIN 02 #1427 BRIDGE I-95 OVER

SHEET NUMBER **29** OF 54

**\\**\\]]

### LOCATIONS STILLWATER AVENUE NORTHBOUND CUT DISCONTINUITY ID ROCK



Date: 11/4/2024 Prepared: KAR Checked: LMP Reviewed: MEL

> BANGOR, MAINE 7176.00 #5800 02 ∞ STILLWATER AVE MAINEDOT WIN 02 #1427 BRIDGE I-95 OVER

SHEET NUMBER 30 OF 54

**ROCK CUT DISCONTINUITY ID LOCATIONS** 

STILLWATER AVENUE NORTHBOUND

\\\\)



Date: 11/4/2024 Prepared: KAR Checked: LMP Reviewed: MEL

> ER AVE, BANGOR, MAINE WIN 027176.00

STILLWATER AVE MAINEDOT WIN 02

#5800

∞

BRIDGE #1427

SHEET NUMBER **31** OF 54

I-95 OVER

**ROCK CUT DISCONTINUITY ID LOCATIONS** 

STILLWATER AVENUE NORTHBOUND

**\\S**])



Date: 11/4/2024 Prepared: KAR Checked: LMP Reviewed: MEL

> BRIDGE #1427 & #5800 STILLWATER AVE, BANGOR, MAINE MAINEDOT WIN 027176.00 I-95 OVER

> > 32

OF 54

**ROCK CUT DISCONTINUITY ID LOCATIONS** 

STILLWATER AVENUE NORTHBOUND

**\\S**D



Date: 11/4/2024 Prepared: KAR Checked: LMP Reviewed: MEL

> STILLWATER AVE, BANGOR, MAINE MAINEDOT WIN 027176.00 #5800 ∞ BRIDGE #1427 I-95 OVER

SHEET NUMBER **33** OF 54

wsp

# **ROCK CUT DISCONTINUITY ID LOCATIONS** STILLWATER AVENUE NORTHBOUND





Date: 11/4/2024 Prepared: KAR Checked: LMP Reviewed: MEL

> BRIDGE #1427 & #5800 STILLWATER AVE, BANGOR, MAINE MAINEDOT WIN 027176.00 I-95 OVER

SHEET NUMBER **34** OF 54 **ROCK CUT DISCONTINUITY ID LOCATIONS** STILLWATER AVENUE NORTHBOUND

**\\\**])





Date: 11/4/2024 Prepared: KAR Checked: LMP Reviewed: MEL

> BRIDGE #1427 & #5800 STILLWATER AVE, BANGOR, MAINE MAINEDOT WIN 027176.00

35 OF 54



**\\**\|)

WIN 027176.00 Project No. US0025840.3905



Date: 11/4/2024 Prepared: KAR Checked: LMP Reviewed: MEL

> BRIDGE #1427 & #5800 STILLWATER AVE, BANGOR, MAINE MAINEDOT WIN 027176.00

SHEET NUMBER **36** OF 54

I-95 OVER





Date: 11/4/2024 Prepared: KAR Checked: LMP Reviewed: MEL

> 1427 & #5800 ER AVE, BANGOR, MAINE WIN 027176.00 STILLWATER AVE, MAINEDOT WIN 027 BRIDGE #1427 I-95 OVER

SHEET NUMBER **37** OF 54





Date: 11/4/2024 Prepared: KAR Checked: LMP Reviewed: MEL

> ER AVE, BANGOR, MAINE WIN 027176.00 #5800 ∞ STILLWATER AVE MAINEDOT WIN 02 BRIDGE #1427 I-95 OVER

SHEET NUMBER 38 OF 54





Date: 11/4/2024 Prepared: KAR Checked: LMP Reviewed: MEL

> ER AVE, BANGOR, MAINE WIN 027176.00 #5800 ∞ STILLWATER AVE MAINEDOT WIN 02 #1427 BRIDGE I-95 OVER

SHEET NUMBER 39 OF 54



WIN 027176.00

*Project No.* US0025840.3905



Date: 11/4/2024 Prepared: KAR Checked: LMP Reviewed: MEL

> ER AVE, BANGOR, MAINE WIN 027176.00

STILLWATER AVE MAINEDOT WIN 02

#5800

∞

#1427

BRIDGE

SHEET NUMBER **40**OF 54

I-95 OVER

**ROCK CUT DISCONTINUITY ID LOCATIONS** 

STILLWATER AVENUE SOUTHBOUND

**\\SI)** 



Date: 11/4/2024 Prepared: KAR Checked: LMP Reviewed: MEL

> ER AVE, BANGOR, MAINE WIN 027176.00 #5800 STILLWATER AVE, MAINEDOT WIN 02 ∞ #1427 BRIDGE I-95 OVER

SHEET NUMBER
41
OF 54

**ROCK CUT DISCONTINUITY ID LOCATIONS** 

STILLWATER AVENUE SOUTHBOUND



Date: 11/4/2024 Prepared: KAR Checked: LMP Reviewed: MEL

> STILLWATER AVE, BANGOR, MAINE MAINEDOT WIN 027176.00 #5800 ∞ BRIDGE #1427 I-95 OVER

SHEET NUMBER 42 OF 54

**ROCK CUT DISCONTINUITY ID LOCATIONS** 

STILLWATER AVENUE SOUTHBOUND

**\\S**])



Date: 11/4/2024 Prepared: KAR Checked: LMP Reviewed: MEL

> BRIDGE #1427 & #5800 STILLWATER AVE, BANGOR, MAINE MAINEDOT WIN 027176.00 I-95 OVER

SHEET NUMBER **43** OF 54





#### **ROCK CUT DISCONTINUITY ID LOCATIONS** SOUTHBOUND STILLWATER AVENUE





Date: 11/4/2024 Prepared: KAR Checked: LMP Reviewed: MEL

> ER AVE, BANGOR, MAINE WIN 027176.00 #5800 ∞ STILLWATER AVE MAINEDOT WIN 02 #1427 BRIDGE I-95 OVER

SHEET NUMBER 45 OF 54



WIN 027176.00 Project No. US0025840.3905



Date: 11/4/2024 Prepared: KAR Checked: LMP Reviewed: MEL

BRIDGE #1427 & #5800 STILLWATER AVE, BANGOR, MAINE MAINEDOT WIN 027176.00 I-95 OVER SHEET NUMBER **46** OF 54



#### **ROCK CUT DISCONTINUITY ID LOCATIONS** SOUTHBOUND STILLWATER AVENUE

WIN 027176.00

*Project No.* US0025840.3905



Date: 11/4/2024 Prepared: KAR Checked: LMP Reviewed: MEL

> ER AVE, BANGOR, MAINE WIN 027176.00 #5800 ∞ STILLWATER AVE MAINEDOT WIN 02 #1427 BRIDGE I-95 OVER

SHEET NUMBER
47
OF 54



#### LOCATIONS SOUTHBOUND CUT DISCONTINUITY ID STILLWATER AVENUE ROCK

WIN 027176.00

*Project No.* US0025840.3905



Date: 11/4/2024 Prepared: KAR Checked: LMP Reviewed: MEL

> ER AVE, BANGOR, MAINE WIN 027176.00 #5800 ∞ STILLWATER AVE MAINEDOT WIN 02 #1427 BRIDGE I-95 OVER

SHEET NUMBER **48** OF 54



Prepared: KAR Checked: LMP Reviewed: MEL

STILLWATER AVE MAINEDOT WIN 02

LOCATIONS

CUT DISCONTINUITY ID

ROCK

**\\**\|)

STILLWATER AVENUE

SOUTHBOUND



Date: 11/4/2024 Prepared: KAR Checked: LMP Reviewed: MEL

> BANGOR, MAINE 027176.00 #5800 ∞ STILLWATER AVE MAINEDOT WIN 02 #1427 BRIDGE I-95 OVER

SHEET NUMBER 50 OF 54



**\\**\|)

#### LOCATIONS SOUTHBOUND **ROCK CUT DISCONTINUITY ID** STILLWATER AVENUE

WIN 027176.00



Date: 11/4/2024 Prepared: KAR . Checked: LMP Reviewed: MEL

ER AVE, BANGOR, MAINE WIN 027176.00

STILLWATER AVE MAINEDOT WIN 02

#5800

∞

#1427

BRIDGE

SHEET NUMBER 51 OF 54

I-95 OVER

LOCATIONS

<u>0</u>

**CUT DISCONTINUITY** 

ROCK

**\\**\|)

STILLWATER AVENUE

SOUTHBOUND



Date: 11/4/2024 Prepared: KAR Checked: LMP Reviewed: MEL

> ER AVE, BANGOR, MAINE WIN 027176.00 #5800 ∞ STILLWATER AVE MAINEDOT WIN 02 #1427 BRIDGE I-95 OVER

SHEET NUMBER **52** OF 54 Project No. US0025840.3905

LOCATIONS

CUT DISCONTINUITY ID

ROCK

**\\S|)** 

STILLWATER AVENUE

SOUTHBOUND

WIN 027176.00



Date: 11/4/2024 Prepared: KAR Checked: LMP Reviewed: MEL

> ER AVE, BANGOR, MAINE WIN 027176.00 #5800 ∞ STILLWATER AVE MAINEDOT WIN 02 #1427 BRIDGE I-95 OVER

SHEET NUMBER 53 OF 54



#### LOCATIONS SOUTHBOUND CUT DISCONTINUITY ID STILLWATER AVENUE ROCK



Date: 11/4/2024 Prepared: KAR . Checked: LMP Reviewed: MEL

> /E, BANGOR, MAINE 027176.00 #5800 ∞ STILLWATER AVE MAINEDOT WIN 02 #1427 BRIDGE I-95 OVER

SHEET NUMBER 54 OF 54

