

April 26, 2016

Project No.: 1648201

Ms. Kate Maguire, P.E.
Maine Department of Transportation
Highway Program
16 State House Station
Augusta, Maine 04333-0016

**RE: GEOTECHNICAL INVESTIGATION AND DATA REPORT
ROUTE 111 PASSING LANE
ARUNDEL, MAINE
WIN 019107.00**

Dear Ms. Maguire:

This data report presents the findings of a geotechnical investigation performed by Golder Associates Inc. (Golder) for the Maine Department of Transportation's (MaineDOT's) proposed addition of a half-mile long westbound passing lane to Route 111 in Arundel, Maine located between Old Alfred Road and Drew's Mill Road. TMSI Engineers, the roadway designer, requested 20 borings be performed along the proposed alignment of the road widening. Golder completed the geotechnical field exploration program February 18 and 19, 2016. This report presents the soils information obtained during the subsurface investigation, the results of geotechnical laboratory tests, a summary of bedrock surface elevations at the boring locations, and a discussion of the subsurface conditions encountered.

Our work was conducted in accordance with the scope described in our proposal dated January 22, 2016 and associated Assignment Letter #2 dated January 26, 2016 with MaineDOT. The terms and conditions governing the work are stated in our MaineDOT Stand-Alone Multi-PIN Project Contract Number 2015060800000000788 with the Highway Program dated July 17, 2015.

SUBSURFACE EXPLORATION PROGRAM

The drilling program was conducted on February 18 and 19, 2016 by Northern Test Boring Inc. (NTB) of Gorham, Maine using a Diedrich D-50 drill rig. A Golder representative was on site during the field program to monitor drilling activities, select sampling intervals, log the conditions encountered, and obtain soil and rock samples for visual description and laboratory testing.

The as-drilled boring location stations, offsets and ground surface elevations are summarized on Table 1 and were provided by MaineDOT based on Golder's as-drilled location taped field measurements. The boring location taped field measurements are shown on the Boring Location Plan, Figure 1.

NTB advanced the 20 borings with a 4½" inside diameter hollow stem auger (HSA). Standard Penetration Test (SPT) sampling was conducted continuously to at least approximately four feet (two samples below the pavement) and at five-foot intervals or less thereafter using a 1-3/8 inch ID split spoon sampler with an automatic hammer in accordance with ASTM D1586. An energy correction factor of 1.63 was used to correct SPT N-values to N₆₀ values based on NTB's hammer calibration dated November 17, 2015.

Boring depths ranged between 4.5 and 11.2 feet below ground surface (bgs). Nine (9) borings were terminated with refusal on top of suspected bedrock. Five (5) borings were terminated within the bedrock layer after completing one rock core run. Six (6) borings were terminated at 10 feet below ground surface (bgs) within suspected native soils.

Five locations B-3, B-5, B-12, B-16, and B-19 were selected for rock core sampling where a 5-foot run of bedrock core was extracted for sampling using a NQ-size (2.0 inch ID) core barrel. Recorded coring rate times per core interval are shown on the boring logs. Core recovery and calculated Rock Quality Designation (RQD) are also shown on the logs for each bedrock core interval.

Soil and rock core samples were collected and in jars and wooden boxes, respectively. Details of the sampling methods used, field data obtained, and soil and rock conditions encountered are presented on the boring logs included in Appendix A. A description of the boring log symbols and terms used for the soil and rock descriptions precedes the logs in Appendix A. Photographs of rock core samples obtained are presented in Appendix B.

LABORATORY TESTING

Geotechnical laboratory tests were performed on representative soil samples collected during the subsurface investigation to assist in soil classification. Samples suitable for testing were selected by Golder. The testing was conducted by MaineDOT's materials testing laboratory in Bangor, Maine and was performed in accordance with applicable AASHTO and American Society for Testing Materials (ASTM) testing procedures. The testing performed for the investigation is summarized below.

Soil Laboratory Test	Testing Procedure	Number of Tests Completed
Grain Size Analysis, sieve only	AASHTO T88, ASTM D422	26
Grain Size Analysis including Hydrometer	AASHTO T88, ASTM D422	3
Natural Moisture Content	AASHTO T265, ASTM D2216	33
Atterberg Limits	AASHTO T89 & T90, ASTM D4318	4
Specific Gravity	AASHTO T100, ASTM D854	3

Selected soil testing results are included on the boring logs in Appendix A and summarized on Table 2. Complete laboratory testing results are provided in Appendix C.

REGIONAL GEOLOGY

Regional surficial geologic mapping indicates the native surficial soils in the site area are Pleistocene-aged glacial till, consisting of loose to very dense, poorly sorted, massive to weakly stratified mixtures of sand, silt and gravel-size rock debris deposited directly from glacial ice. The till can locally contain lenses of variably wasted and stratified sediments^{1,2}.

Regional bedrock geologic mapping indicates the bedrock west of approximate Sta 1675+00 consists of generally thin bedded, fine grained, gray, calcareous and ankeritic quartz-biotite-chlorite phyllite and metasiltstone, and dark gray biotite-chlorite-muscovite phyllite of the Silurian- to Ordovician-aged Elliot Formation, previously mapped as the Silurian- to Precambrian- aged Berwick Formation^{3,4,5}. The bedrock

¹ Thompson, W.B., 1987. Surficial Geology of the Portland 1° X 2° Quadrangle, Maine. Maine Geological Survey Open-File Report No. 87-4, scale 1:250,000.

² Tolman, S.S., 2007. Surficial Geology of the Kittery 1:100,000 Quadrangle, Maine. Maine Geological Survey, Open-File Report No. 07-52, scale 1:100,000.

³ Osberg, P.H., Hussey, A.M., and Boone, G.M., 1985. Bedrock Geologic Map of Maine: Maine Geological Survey, Department of Conservation, scale 1:500,000.

⁴ Hussey, A.M., II, Bothner, W.A. and Thompson, P.J., 2008. Bedrock Geology of the Kittery 1:100,000 Quadrangle, Maine and New Hampshire: Maine Geological Survey, Geologic Map 08-78, scale 1:100,000.

east of approximate Sta 1675+00 consists of a light gray, medium grained, biotite-muscovite granite of the Carboniferous- to Devonian-aged Biddeford Pluton, previously mapped as a Carboniferous undivided biotite granite.

SITE SUBSURFACE CONDITIONS

Subsurface conditions encountered at the test borings generally consisted of asphalt overlying a granular subbase fill, overlying a general fill, overlying suspected native soils consisting of either sand or clay/till, overlying bedrock. Groundwater was encountered in ten (10) of the borings. Groundwater levels observed at the time of drilling varied between 1.5 and 5.3 feet bgs with an average depth of 3.8 feet bgs. The following paragraphs describe the materials and strata encountered at the explorations.

Asphalt

Asphalt was encountered at every boring, excluding boring B-7 (where the surface material was observed to be a dense subbase soil). The asphalt thickness at the boring locations varied between 3 and 6 inches with an average of 4.7 inches.

Subbase

A subbase layer was identified directly below the asphalt in all the borings. This layer generally consisted of a brown, dry to moist, fine to coarse sand, with gravel contents ranging from some to gravelly, and silt contents ranging from trace to little. The laboratory testing data indicated this material has a fines content ranging from about 4 to 18% (average 10%). The subbase layer was observed to be approximately 0.5 to 2.5 feet thick with an average thickness of 2 feet. SPT N_{60} -values ranged from 29 to 146, with an average value of 45, indicating medium dense to very dense consistency. As noted on the boring logs included in Appendix A, a few of the samples were frozen or slightly frozen at the time of sampling. N -values and accompanying relative densities obtained in frozen soils are likely higher than actual.

Fill

An unclassified fill layer was encountered in all of the borings directly below the subbase layer excluding borings B-11 and B-13. The fill layer was observed to generally consist of a brown to black, damp to wet, fine to medium sand, with little to trace gravel and varying amounts of silt from trace to silty. The top of the fill layer was encountered between 0.8 to 2.8 feet bgs and was approximately 0.5 to 5.5 feet thick with an average thickness of 3.4 feet. Borings B-6, B-8, and B-9, encountered a layer of brown, wet, silt fill. SPT N_{60} -values of the silt fill ranged from 15 to 24 with an average of 20, indicating a stiff consistency. SPT N_{60} -values within the granular fill material averaged 36, and ranged from 10 to >50, indicating loose to very dense consistency.

Native Sand

A native sand layer was encountered in 9 borings: B-1, B-6 through B-9, B-11, B-14, B-15, and B-18. The Native Sand is comprised of tan, wet to saturated, fine to medium sand with trace gravel and trace to some silt. The top of this layer was encountered at an average depth of 4.4 feet bgs (range of 2.5 to 8 feet bgs) and had an average thickness of 3.5 feet (range of 0.8 to 5.2 feet thick). SPT N_{60} -values within this layer averaged 16, with a range of 8 to 28, indicating loose to medium dense consistency.

Glacial Till

Glacial till was encountered below the native sand layer in 10 borings (B-2, B-3, B-4, B-5, B-6, B-8, B-10, B-13, B-14, and B-20) and included a variety of materials including: gray fine to medium sand, clay, and silt, with some to trace gravel. The top of the glacial till was observed between 2.5 to 8 feet bgs (average 5.4 feet bgs) with an average thickness of 1.9 feet (range 0.9 to 3.4 feet) within the drilled depth of the

⁵ Hussey, A.M., II, 1989. Geology of Southwestern Coastal Maine, in: Anderson, W.A. and Borns, H.W. Jr., (eds.), Neotectonics of Maine: Studies in Seismicity, Crustal Warping, and Sea-Level Change. Maine Geological Survey, Bulletin 40, p. 25-42.

borings. SPT N_{60} -values within this layer were observed to have an average of 64, with a range from 10 to >50, indicating a consistency of loose to very dense for granular soils and medium stiff to hard for fine grained soils.

Bedrock

Bedrock was encountered in five borings as determined from rock core (B-3, B-5, B-12, B-16 and B-19), and suspected from drill rig auger refusal in nine (9) other borings (B-2, B-4, B-6, B-7, B-10, B-11, B-13, B-17 and B-18). Bedrock surface depths are interpreted to range between 3.4 and 7.7 ft bgs where bedrock was encountered. Top of bedrock depths and elevations at the boring locations are summarized in Table 1. Based on regional geologic mapping and the rock core, two lithologies are present beneath the site:

Metasiltstone and Phyllite

West of approximate Sta 1675+00, and within borings B-3 and B-5, the bedrock consists of medium to light gray and greenish gray, fine to very fine grained, weakly foliated, slightly weathered, strong (R4) metasiltstone and phyllite. The discontinuities within this rock are stained with iron oxide/hydroxides, are smooth to rough, planar to irregular, and are extremely close to moderately spaced. RQDs range from 0% to 93% (arithmetic mean of 40%), indicating very poor to excellent rock quality; however, the closeness of the discontinuities caused jamming in the core barrel runs, limiting them to 1 foot or less in recovered core. The relatively low RQDs, moderate estimated intact rock strength, and closeness of the discontinuities suggest that this bedrock lithology may be rippable with conventional excavation equipment with ripping teeth, and/or with hydraulic hammers.

Granite

East of approximate Sta 1675+00, and within borings B-12, B-16 and B-19, the bedrock consists of pinkish gray, very light gray and light bluish gray, very coarse grained, equigranular, slightly weathered to fresh, strong to very strong (R4 to R5), biotite-granite. The discontinuities within this rock are rough to very rough, planar to irregular, extremely close to widely spaced. RQDs range from 58% to 85% (arithmetic mean of 70%), indicating fair to good rock quality. The relatively high RQDs, higher estimated intact rock strength, and long widths between discontinuities suggest that this bedrock lithology may be marginally rippable or non-rippable with conventional excavation equipment with ripping teeth; as such, mechanical excavation (e.g., with a hydraulic hammer) or controlled blasting may be needed for excavation.

The nature of the contact between these lithologies is unknown at this time, but the metasiltstone/phyllite has been mapped to contain hornfels or granofels (fine-, and medium- to coarse-grained rocks) that formed from contact thermal metamorphism from the adjacent younger granite⁴. Such contact metamorphism can cause the original rock to become harder and thus more difficult to excavate.

CLOSING

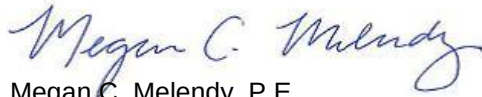
This report was prepared for the exclusive use of MaineDOT for specific application to the proposed Route 111 passing lane addition in Arundel, Maine in accordance with generally accepted soil and foundation engineering practices. Golder makes no other warranty, either express or implied. The data presented herein are based, in part, on information obtained from the referenced subsurface explorations completed at the discrete locations described in the report. Variations in the nature and extent of subsurface conditions between explorations should be expected.

The professional services provided by Golder 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.

It has been a pleasure working with MaineDOT on this project. Please contact us if you have any questions concerning our report or require additional information.

Sincerely,

GOLDER ASSOCIATES INC.



Megan C. Melendy, P.E.
Senior Engineer



Mark S. Peterson, P.E.
Principal

Attachments:

Tables

Table 1 – Subsurface Exploration Locations and Depths to Bedrock

Table 2 – Summary of Laboratory Soil Testing

Figures

Figure 1 – Boring Location Plan

Appendices

Appendix A – Boring Logs

Appendix B – Rock Core Photographs

Appendix C – Laboratory Test Results

TABLES

**Table 1: Subsurface Exploration Locations and Depth to Bedrock
Geotechnical Data Report
MaineDOT Arundel
Arundel, Maine**

Test Boring Designation ^{1,2}	APPROXIMATE						Comment
	Station, Offset ³ (feet)	Ground Surface Elevation ⁴ (feet)	Depth to Water Level (feet)	Boring Depth (feet)	Depth to Bedrock (feet)	Top of Bedrock Elevation (feet)	
B-1	1656+54.7, 21.2	147.1	3.9	10.0	NE	NE	--
B-2	1657+27.7, 13.2	149.9	NE	6.3	6.3	143.6	Refusal encountered. Suspected Top of Bedrock.
B-3	1658+84.4, 10.8	154.3	4.3	11.1	6.1	148.2	Bedrock cored.
B-4	1659+58.4, 13.0	156.2	NE	6.1	6.1	150.1	Refusal encountered. Suspected Top of Bedrock.
B-5	1660+49.1, 12.0	158.8	4.2	10.2	5.3	153.5	Bedrock cored.
B-6	1661+17.8, 12.1	160.7	NE	8.0	6.8 ⁶	153.9 ⁶	Augered through 1.2 ft of Weathered Bedrock.
B-7	1661+63.2, 98.3	169.0	NE	5.6	5.6	163.4	Refusal encountered. Suspected Top of Bedrock.
B-8	1664+09.9, 9.6	168.8	NE	10.0	NE	NE	--
B-9	1665+08.9, 12.1	171.8	NE	10.0	NE	NE	--
B-10	1666+13.1, 10.2	175.6	NE	6.5	6.5	169.1	Refusal encountered. Suspected Top of Bedrock.
B-11	1675+57.7, 16.5	200.5	NE	7.7	7.7	192.8	Refusal encountered. Suspected Top of Bedrock.
B-12	1676+55.1, 16.4	200.3	1.5	10.5	5.5	194.8	Bedrock cored.
B-13	1677+57.2, 11.3	199.5	3.7	4.5	4.5	195.0	Refusal encountered. Suspected Top of Bedrock.
B-14	1678+44, 10.3	198.4	5.3	10.0	NE	NE	--
B-15	1679+41.1, 11.8	196.1	5.4	10.0	NE	NE	--
B-16	1680+71.1, 10.1	193.5	3.9	8.4	3.4	190.1	Bedrock cored.
B-17	1681+71.2, 11.2	191.2	NE	6.7	6.7	184.5	Refusal encountered. Suspected Top of Bedrock.
B-18	1682+54.7, 9.0	189.4	NE	7.4	7.4	182.0	Refusal encountered. Suspected Top of Weathered Bedrock.
B-19	1684+00, 10.7	186.1	1.5	11.2	5.2	180.9	Bedrock cored.
B-20	1685+64.8, 14.6	182.0	3.9	10.0	NE	NE	--

Notes:

1. Test borings were drilled by Northern Test Boring, Inc. on February 18 through 19, 2016.
2. Test boring locations are shown on Figure 1, Arundel RTE 111 Plans.
3. Stations and offsets were received from MaineDOT and are based on as-drilled field measurements using measuring tape.
4. Ground Surface Elevation provided by MaineDOT via email from Terry White on March 24, 2016.
5. NE= Not Encountered
6. Depth to bedrock for Boring B-6 represents the depth to weathered rock.

Prepared By: SMP
Checked By: CJS
Reviewed By: MCM



Table 2: Summary of Laboratory Soil Index and Classification Testing Results
Geotechnical Data Report
MaineDOT Arundel
Arundel, Maine

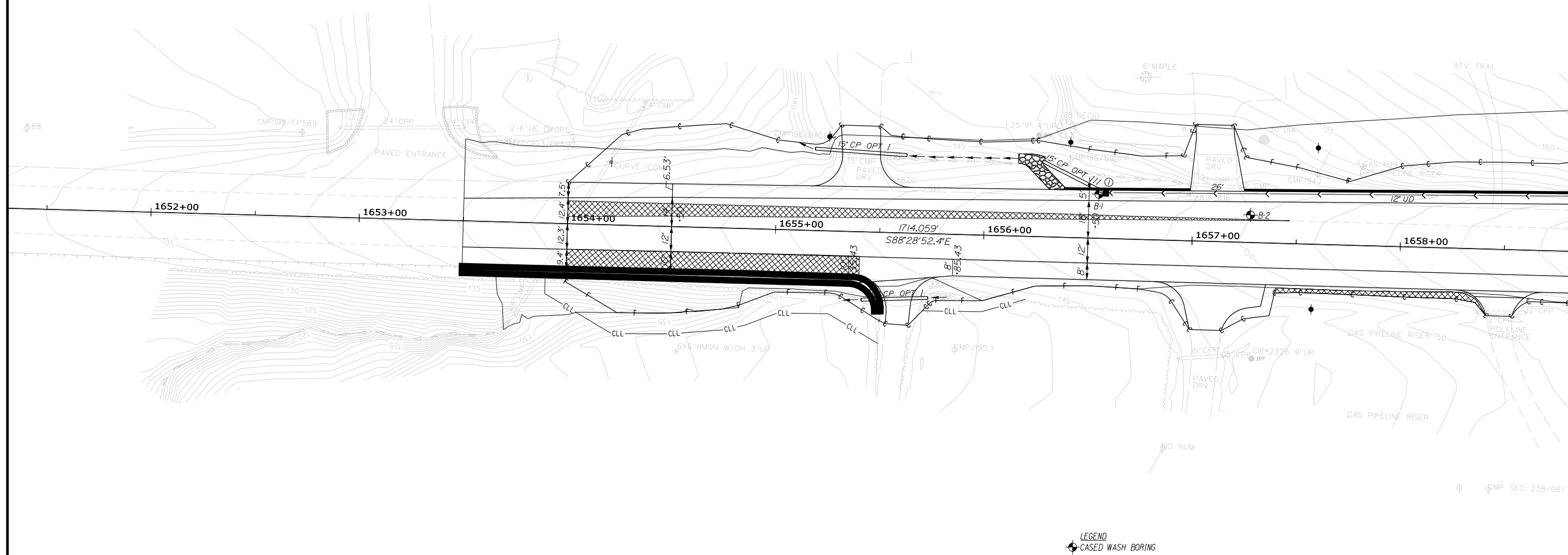
Test Boring Designation ^{1,2}	Sample Number	Sample Depth Below Ground Surface (ft)	Sieve Minus No. 200 (%):	Natural Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index	Liquidity Index	AASHTO Soil Classification ³	USCS Soil Classification ³
B-1	S-4	8.0 - 10.0	--	29.7	35	23	12	0.56	A-6	CL
B-2	S-1	0.5 - 2.5	10.3	7.4	--	--	--	--	A-1-b	SW-SM
	S-2	2.5 - 4.5	21.2	11.9	--	--	--	--	A-2-4	SM
	S-3	5.0 - 7.0	67.0	18.4	--	--	--	--	A-4	CL
B-3	S-3	5.0 - 7.0	28.5	14.2	--	--	--	--	A-2-4	SM
B-4	S-1	0.5 - 2.5	7.1	8.0	--	--	--	--	A-1-b	SW-SM
B-5	S-1	0.5 - 2.5	11.3	7.2	--	--	--	--	A-1-b	SW-SM
B-6	S-2	2.5 - 4.5	21.2	13.5	--	--	--	--	A-2-4	SM
B-7	S-1A	0.0 - 1.0	11.4	6.9	--	--	--	--	A-1-b	SW-SM
	S-1B	1.0 - 2.0	17.1	10.3	--	--	--	--	A-1-b	SM
	S-2A	2.0 - 3.0	6.6	7.5	--	--	--	--	A-3	SP-SM
	S-2B	3.0 - 4.0	89.6	23.4	--	--	--	--	A-4	CL
B-8	S-1	0.5 - 2.5	8.7	3.7	--	--	--	--	A-1-b	SW-SM
	S-4	8.0 - 10.0	--	28.9	35	23	12	0.49	A-6	CL
B-9	S-2	2.5 - 4.5	9.3	6.1	--	--	--	--	A-1-b	SW-SM
	S-3A	5.0 - 6.0	24.6	12.0	--	--	--	--	A-2-4	SC-SM
	S-3B	6.0 - 7.0	--	24.0	NP	--	--	--	--	--
B-10	S-1	0.5 - 2.5	12.1	5.1	--	--	--	--	A-2-4	SM
B-11	S-1	0.5 - 2.5	5.2	9.9	--	--	--	--	A-3	SP-SM
B-11	S-2	2.5 - 4.5	3.6	21.3	--	--	--	--	A-3	SP
B-13	S-2	2.5 - 4.5	19.8	11.5	--	--	--	--	A-1-b	SM
B-14	S-1	0.5 - 2.5	13.2	3.6	--	--	--	--	A-1-b	SM
	S-2	2.5 - 4.5	23.5	22.1	--	--	--	--	A-2-4	SM
B-15	S-1	0.5 - 2.5	13.0	5.7	--	--	--	--	A-1-b	SM
	S-2	2.5 - 4.5	30.7	18.1	--	--	--	--	A-2-4	SC-SM
B-17	S-1	0.5 - 2.5	17.7	10.5	--	--	--	--	A-1-b	SM
	S-2	2.5 - 4.5	8.5	15.4	--	--	--	--	A-1-a	SW-SM
B-18	S-2	2.5 - 4.5	31.2	24.8	--	--	--	--	A-2-4	SM
B-19	S-1	0.5 - 2.5	11.7	8.2	--	--	--	--	A-1-a	SW-SM
B-20	S-1	0.5 - 2.5	15.6	10.6	--	--	--	--	A-1-b	SM
	S-2	2.5 - 4.5	4.7	11.7	--	--	--	--	A-1-b	SW
	S-3A	8.0 - 9.0	4.8	24.5	--	--	--	--	A-3	SP
	S-3B	9.0 - 10.0	--	26.7	27	18	9	0.97	A-4	CL

Notes:

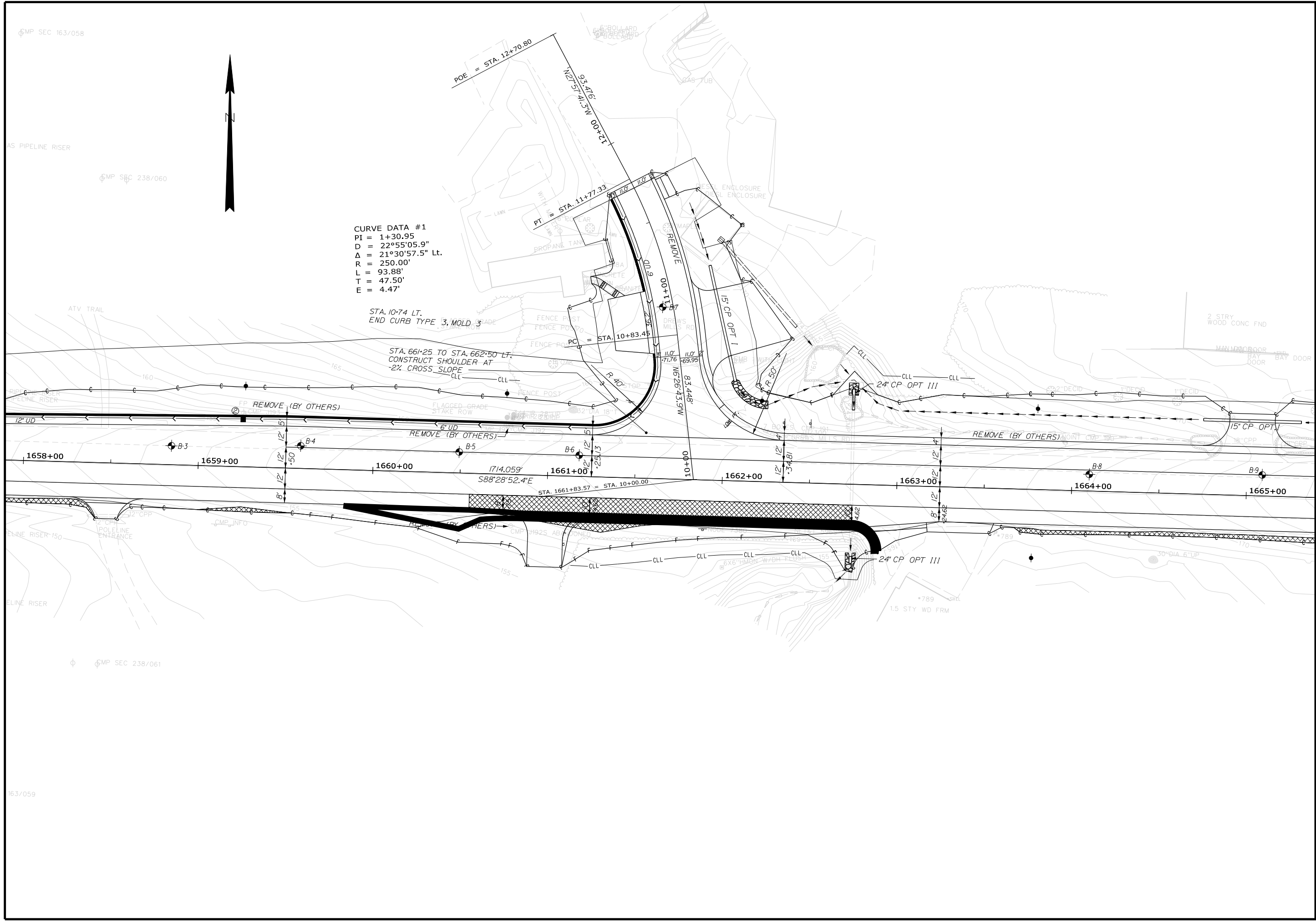
1. Test borings were drilled by Northern Test Boring, Inc. on February 18 through 19, 2016.
2. Test boring locations are shown on Figure 1, Arundel RTE 111 Plans.
3. AASHTO and USCS symbols assigned based on field identification and interpretation of laboratory test results.
5. Complete laboratory test results for soil testing are provided in Appendix C.
6. Laboratory testing was performed by MaineDOT.

Prepared By: SMP
 Checked By: CJS
 Reviewed By: MCM

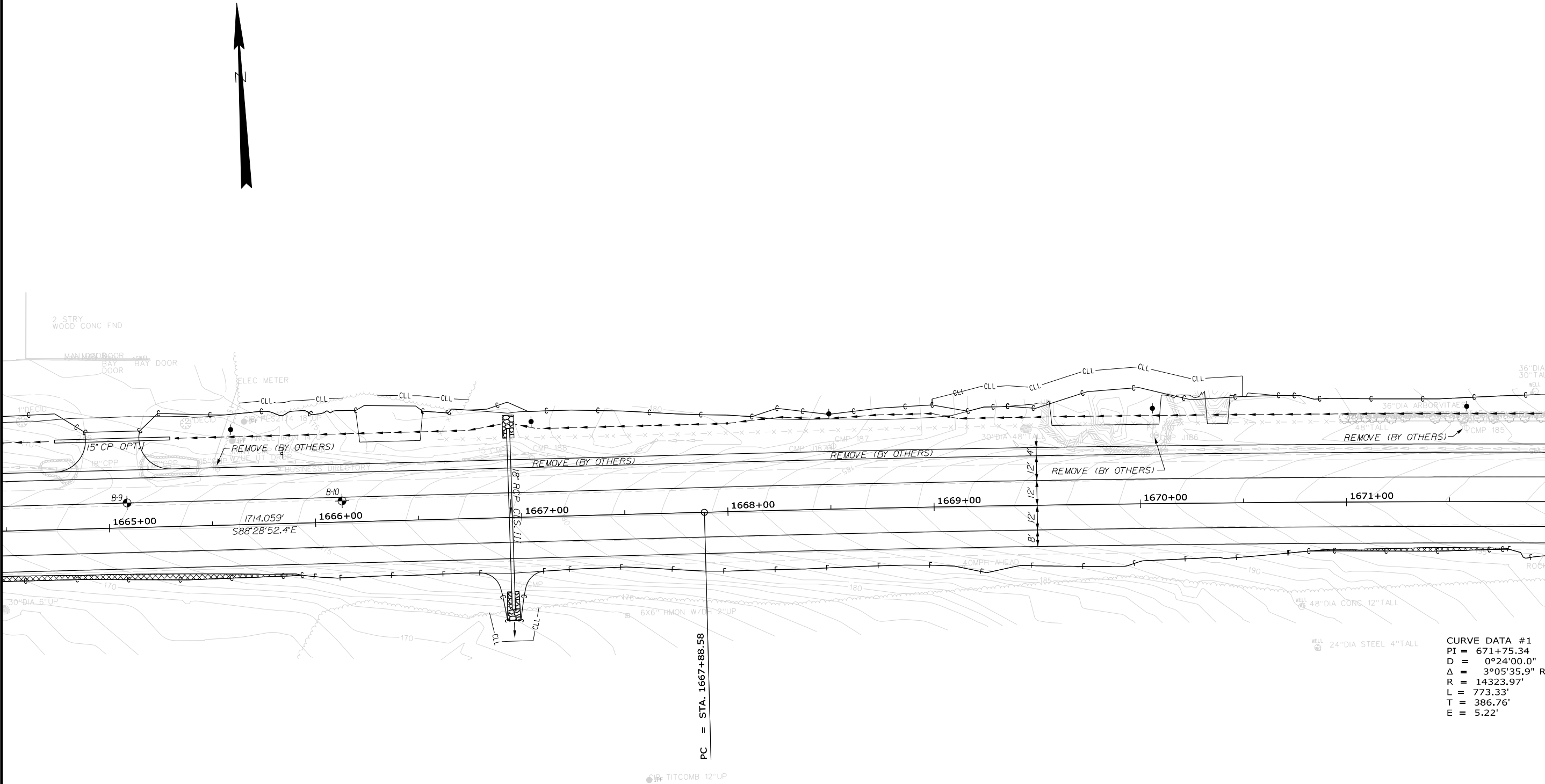
FIGURES



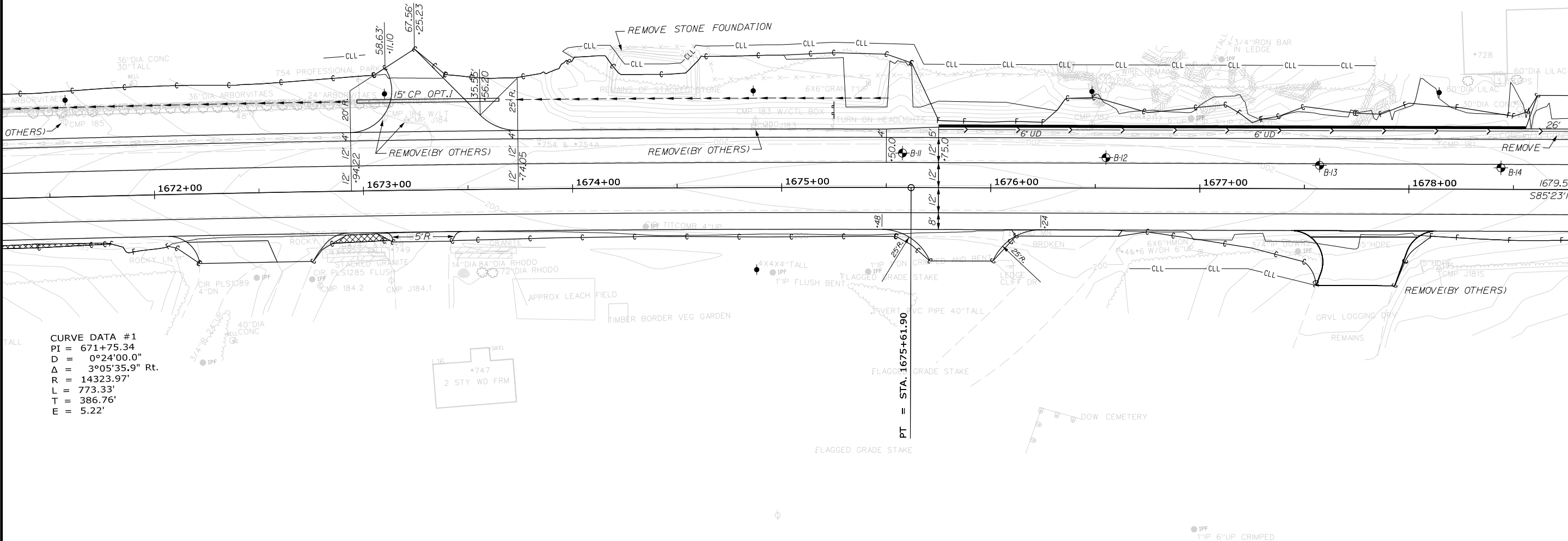
OF 6	SHEET NUMBER	ARUNDEL		PROJ. MANAGER		BY	DATE	STATE OF MAINE
		ROUTE 111 PASSING LANE		CHECKED-REVIEWED				
				DESIGN2-DETAILED2	K.MAGUIRE	SIGNATURE		
				DESIGN3-DETAILED3	T.WHITE	MAR 2018		
	BORING LOCATION PLANS			REVISIONS 1		P.E. NUMBER		019107.00
				REVISIONS 2				
				REVISIONS 3				
				REVISIONS 4				
	FIELD CHANGES					DATE		WIN
								19107.00
								HIGHWAY PLANS



OF 6	SHEET NUMBER 2	ARUNDEL ROUTE 111 PASSING LANE		PROJ. MANAGER	BY	DATE	STATE OF MAINE DEPARTMENT OF TRANSPORTATION 019107.00
				CHECKED-DETAILED			
				CHECKED-REVISED		SIGNATURE	
				DESIGN2-DETAILED2	K.MAGUIRE	MAR. 2016	
				DESIGN3-DETAILED3	T.WHITE		
				REVISIONS 1		P.E. NUMBER	
		BORING LOCATION PLANS	REVISIONS 2				WIN 19107.00 HIGHWAY PLANS
			REVISIONS 3				
			REVISIONS 4		DATE		
			FIELD CHANGES				



ARUNDEL ROUTE 111 PASSING LANE		PROJ. MANAGER		BY	DATE	STATE OF MAINE DEPARTMENT OF TRANSPORTATION	
		DESIGN-DETAILED	CHECKED-REVIEWED				
BORING LOCATION PLANS		DESIGN2-DETAILED2		K. MAGUIRE	MAR 2016	SIGNATURE	
		DESIGN3-DETAILED3					
		REVISIONS 1					P.E. NUMBER
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		REVISIONS 3					
REVISIONS 4							
FIELD CHANGES						DATE	
						WIN 19107.00	
						HIGHWAY PLANS	

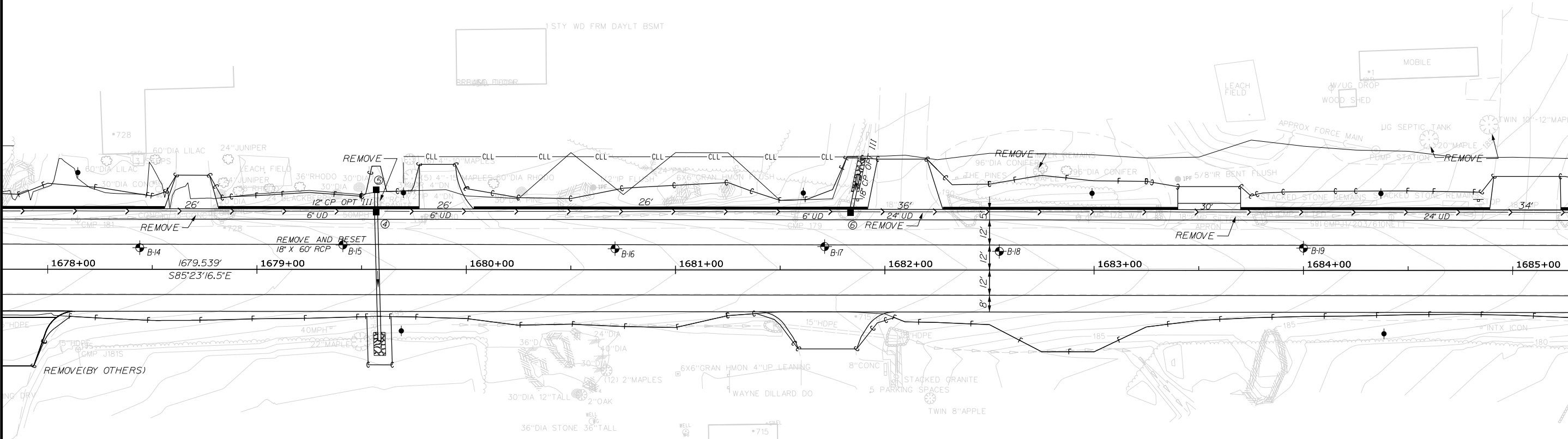


STATE OF MAINE
DEPARTMENT OF TRANSPORTATION
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WIN
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HIGHWAY PLANS

PROJ. MANAGER	BY	DATE
DESIGN-DETAILED		
CHECKED-REVIEWED		
DESIGN-DETAILED	T. WHITE	MAR 2016
DESIGN-DETAILED		
REVISIONS 1		
REVISIONS 2		
REVISIONS 3		
REVISIONS 4		
FIELD CHANGES		

ARUNDEL
ROUTE 111 PASSING LANE
BORING LOCATION PLANS

SHEET NUMBER
4
OF 6



STATE OF MAINE	
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PROJ. MANAGER	BY	DATE
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DESIGN-DETAILED		
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REVISIONS 2		
REVISIONS 3		
REVISIONS 4		
FIELD CHANGES		

ARUNDEL	
ROUTE 111 PASSING LANE	
BORING LOCATION PLANS	

SHEET NUMBER
5
OF 6

APPENDIX A
BORING LOGS

Table A-1

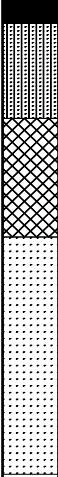
UNIFIED SOIL CLASSIFICATION SYSTEM				TERMS DESCRIBING DENSITY/CONSISTENCY																																																																	
MAJOR DIVISIONS			GROUP SYMBOLS	TYPICAL NAMES																																																																	
COARSE-GRAINED SOILS (more than half of material is larger than No. 200 sieve size)	GRAVELS (more than half of coarse fraction is larger than No. 4 sieve size)	CLEAN GRAVELS	GW	Well-graded gravels, gravel-sand mixtures, little or no fines.																																																																	
		(little or no fines)	GP	Poorly-graded gravels, gravel sand mixtures, little or no fines.																																																																	
		GRAVEL WITH FINES	GM	Silty gravels, gravel-sand-silt mixtures.																																																																	
		(Appreciable amount of fines)	GC	Clayey gravels, gravel-sand-clay mixtures.																																																																	
	SANDS (more than half of coarse fraction is smaller than No. 4 sieve size)	CLEAN SANDS	SW	Well-graded sands, gravelly sands, little or no fines																																																																	
		(little or no fines)	SP	Poorly-graded sands, gravelly sand, little or no fines.																																																																	
		SANDS WITH FINES	SM	Silty sands, sand-silt mixtures																																																																	
		(Appreciable amount of fines)	SC	Clayey sands, sand-clay mixtures.																																																																	
FINE-GRAINED SOILS (more than half of material is smaller than No. 200 sieve size)	SILTS AND CLAYS (liquid limit less than 50)	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands, or clayey silts with slight plasticity.																																																																		
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.																																																																		
		OL	Organic silts and organic silty clays of low plasticity.																																																																		
		SILTS AND CLAYS (liquid limit greater than 50)	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.																																																																	
	CH		Inorganic clays of high plasticity, fat clays.																																																																		
	OH		Organic clays of medium to high plasticity, organic silts.																																																																		
	HIGHLY ORGANIC SOILS		Pt	Peat and other highly organic soils.																																																																	
	Desired Soil Observations: (in this order) Color (Munsell color chart) Moisture (dry, damp, moist, wet, saturated) Density/Consistency (from above right hand side) Name (sand, silty sand, clay, etc., including portions - trace, little, etc.) Gradation (well-graded, poorly-graded, uniform, etc.) Plasticity (non-plastic, slightly plastic, moderately plastic, highly plastic) Structure (layering, fractures, cracks, etc.) Bonding (well, moderately, loosely, etc., if applicable) Cementation (weak, moderate, or strong, if applicable, ASTM D 2488) Geologic Origin (till, marine clay, alluvium, etc.) Unified Soil Classification Designation Groundwater level				Coarse-grained soils (more than half of material is larger than No. 200 sieve): Includes (1) clean gravels; (2) silty or clayey gravels; and (3) silty, clayey or gravelly sands. Consistency is rated according to standard penetration resistance. Modified Burmister System <table><tr><th>Descriptive Term</th><th>Portion of Total</th></tr><tr><td>trace</td><td>0% - 10%</td></tr><tr><td>little</td><td>11% - 20%</td></tr><tr><td>some</td><td>21% - 35%</td></tr><tr><td>adjective (e.g. sandy, clayey)</td><td>36% - 50%</td></tr></table> <table><tr><th>Density of Cohesionless Soils</th><th>Standard Penetration Resistance N-Value (blows per foot)</th></tr><tr><td>Very loose</td><td>0 - 4</td></tr><tr><td>Loose</td><td>5 - 10</td></tr><tr><td>Medium Dense</td><td>11 - 30</td></tr><tr><td>Dense</td><td>31 - 50</td></tr><tr><td>Very Dense</td><td>> 50</td></tr></table> Fine-grained soils (more than half of material is smaller than No. 200 sieve): Includes (1) inorganic and organic silts and clays; (2) gravelly, sandy or silty clays; and (3) clayey silts. Consistency is rated according to shear strength as indicated. <table><tr><th>Consistency of Cohesive soils</th><th>SPT N-Value blows per foot</th><th>Approximate Undrained Shear Strength (psf)</th><th>Field Guidelines</th></tr><tr><td>Very Soft</td><td>WOH, WOR, WOP, <2</td><td>0 - 250</td><td>Fist easily Penetrates</td></tr><tr><td>Soft</td><td>2 - 4</td><td>250 - 500</td><td>Thumb easily penetrates</td></tr><tr><td>Medium Stiff</td><td>5 - 8</td><td>500 - 1000</td><td>Thumb penetrates with moderate effort</td></tr><tr><td>Stiff</td><td>9 - 15</td><td>1000 - 2000</td><td>Indented by thumb with great effort</td></tr><tr><td>Very Stiff</td><td>16 - 30</td><td>2000 - 4000</td><td>Indented by thumbnail</td></tr><tr><td>Hard</td><td>>30</td><td>over 4000</td><td>Indented by thumbnail with difficulty</td></tr></table> Rock Quality Designation (RQD): RQD = $\frac{\text{sum of the lengths of intact pieces of core}^* > 100 \text{ mm}}{\text{length of core advance}}$ *Minimum NQ rock core (1.88 in. OD of core) Correlation of RQD to Rock Mass Quality <table><tr><th>Rock Mass Quality</th><th>RQD</th></tr><tr><td>Very Poor</td><td><25%</td></tr><tr><td>Poor</td><td>26% - 50%</td></tr><tr><td>Fair</td><td>51% - 75%</td></tr><tr><td>Good</td><td>76% - 90%</td></tr><tr><td>Excellent</td><td>91% - 100%</td></tr></table> Desired Rock Observations: (in this order) Color (Geological Society of America Rock Color Chart) Texture (aphanitic, fine-grained, etc.) Strength (ISRM Classification per Table A-2) Lithology (igneous, sedimentary, metamorphic, etc.) Hardness (very hard, hard, mod. hard, etc.) Weathering (fresh, very slight, slight, moderate, mod. severe, severe, etc.) Geologic discontinuities/jointing: -dip (horiz - 0-5, low angle - 5-35, mod. dipping - 35-55, steep - 55-85, vertical - 85-90) -spacing (very close - <5 cm, close - 5-30 cm, mod. close 30-100 cm, wide - 1-3 m, very wide >3 m) -tightness (tight, open or healed) -infilling (grain size, color, etc.) Formation (Waterville, Ellsworth, Cape Elizabeth, etc.) RQD and correlation to rock mass quality (very poor, poor, etc.) ref: AASHTO Standard Specification for Highway Bridges 17th Ed. Table 4.4.8.1.2A Recovery				Descriptive Term	Portion of Total	trace	0% - 10%	little	11% - 20%	some	21% - 35%	adjective (e.g. sandy, clayey)	36% - 50%	Density of Cohesionless Soils	Standard Penetration Resistance N-Value (blows per foot)	Very loose	0 - 4	Loose	5 - 10	Medium Dense	11 - 30	Dense	31 - 50	Very Dense	> 50	Consistency of Cohesive soils	SPT N-Value blows per foot	Approximate Undrained Shear Strength (psf)	Field Guidelines	Very Soft	WOH, WOR, WOP, <2	0 - 250	Fist easily Penetrates	Soft	2 - 4	250 - 500	Thumb easily penetrates	Medium Stiff	5 - 8	500 - 1000	Thumb penetrates with moderate effort	Stiff	9 - 15	1000 - 2000	Indented by thumb with great effort	Very Stiff	16 - 30	2000 - 4000	Indented by thumbnail	Hard	>30	over 4000	Indented by thumbnail with difficulty	Rock Mass Quality	RQD	Very Poor	<25%	Poor	26% - 50%	Fair	51% - 75%	Good	76% - 90%	Excellent
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Table A-2**Classification of Rock Material Strengths¹**

Grade	Description	Field Identification	Approx. Range of Uniaxial Compressive 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.

¹ 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.

Maine Department of Transportation Soil/Rock Exploration Log US CUSTOMARY UNITS					Project: MaineDOT Arundel Location: Route 111 Westbound Lane Arundel, Maine			Boring No.: B-1 WIN: 019107.00				
Driller: Northern Test Boring				Elevation (ft.) 147.1			Auger ID/OD: 4 1/2"					
Operator: M. Nadeau				Datum:			Sampler: Standard Split Spoon Sampler					
Logged By: J. Fontaine				Rig Type: John Deere 125 HP			Hammer Wt./Fall: 140#/30"					
Date Start/Finish: 2/19/2015; 14:40-15:20				Drilling Method: Hollow Stem Auger			Core Barrel: N/A					
Boring Location: 1656+54.7, 21.2 ft Lt.				Casing ID/OD: N/A			Water Level*: 3.9					
Hammer Efficiency Factor: 0.976				Hammer Type: Automatic ☒ Hydraulic ☐ Rope & Cathead ☐								
Definitions: D = Split Spoon Sample MD = Unsuccessful Split Spoon Sample Attempt U = Thin Wall Tube Sample MU = Unsuccessful Thin Wall Tube Sample Attempt V = Field Vane Shear Test, PP = Pocket Penetrometer MV = Unsuccessful Field Vane Shear Test Attempt R = Rock Core Sample SSA = Solid Stem Auger HSA = Hollow Stem Auger RC = Roller Cone WOH = Weight of 140lb. Hammer WOR/C = Weight of Rods or Casing WO1P = Weight of One Person S_U = Peak/Remolded Field Vane Undrained Shear Strength (psf) S_U(lab) = Lab Vane Undrained Shear Strength (psf) q_p = Unconfined Compressive Strength (ksf) N-uncorrected = Raw Field SPT N-value Hammer Efficiency Factor = Rig Specific Annual Calibration Value N₆₀ = SPT N-uncorrected Corrected for Hammer Efficiency N₆₀ = (Hammer Efficiency Factor/60%)*N-uncorrected T_V = Pocket Torvane Shear Strength (psf) WC = Water Content, percent LL = Liquid Limit PL = Plastic Limit PI = Plasticity Index G = Grain Size Analysis C = Consolidation Test												
Depth (ft.)	Sample Information								Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.	
	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N ₆₀	Casing Blows	Elevation (ft.)				
0	S-1	24/16	0.50 - 2.50	49/37/26/19	63	102	HSA	146.60		TOP 4.5" of BORING: ASPHALT	G#302015 A-6, CL LL=35, PL=23 PI=12 W/C=29.7%	
								144.60		Top 10": Brown, damp, very dense, silty fine to medium SAND, trace gravel, (SM), SUBBASE. Bottom 9": Brown, damp, very dense, fine to medium SAND, some gravel, some fines, (SM), SUBBASE.		
	S-2	24/13	2.50 - 4.50	12/12/6/5	18	29				142.10		Top 2": Black, damp, medium dense, silty fine to medium SAND, trace gravel, (SM), FILL. Middle 4": Brown, damp, medium dense, silty fine to medium SAND and GRAVEL, (SM/GM). Bottom 7": Brown, damp, medium dense, silty fine to medium SAND, (SM).
5	S-3	24/24	5.00 - 7.00	4/4/4/3	8	13				137.10		Top 10": Tan, saturated, loose, fine to medium SAND, trace fines, (SP), NATIVE SAND. Bottom 8": Gray, dry, medium stiff, dry, clayey SILT, (ML).
												Top 10": Brown, moist, loose, fine to medium SAND, trace fines, (SP). Bottom 14": Gray, dry, medium stiff, silty CLAY, (CL).
	S-4	24/24	8.00 - 10.00	2/3/3/3	6	10						
10												
15												
20												
25												
Remarks:												
Stratification lines represent approximate boundaries between soil types; transitions may be gradual.										Page 1 of 1		
* 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.: B-1		

Maine Department of Transportation Soil/Rock Exploration Log US CUSTOMARY UNITS				Project: MaineDOT Arundel Location: Route 111 Westbound Lane Arundel, Maine		Boring No.: B-2 WIN: 019107.00																																																																																																																																																																																																																																																																																																																																																				
Driller: Northern Test Boring			Elevation (ft.) 149.9		Auger ID/OD: 4 1/2"																																																																																																																																																																																																																																																																																																																																																					
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Boring Location: 1657+27.7, 13.2 ft Lt.			Casing ID/OD: N/A		Water Level*: None Observed																																																																																																																																																																																																																																																																																																																																																					
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Shear Strength (psf) or RQD (%)</th><th>N-uncorrected</th><th>N₆₀</th><th>Casing</th><th>Blows</th><th>Elevation (ft.)</th></tr><tr><td rowspan="3">0</td><td>S-1</td><td>24/11</td><td>0.50 - 2.50</td><td>25/19/19/9</td><td>38</td><td>62</td><td>HSA</td><td></td><td>149.40</td><td rowspan="3"></td><td>TOP 4.5" of BORING: ASPHALT</td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>Brown, damp, dense, fine to medium SAND , some gravel, trace asphalt, trace silt, (SW-SM), SUBBASE.</td><td>G#302016 A-1-b, SW-SM W/C=7.4%</td></tr><tr><td>S-2</td><td>24/11</td><td>2.50 - 4.50</td><td>10/11/8/6</td><td>19</td><td>31</td><td></td><td></td><td>147.40</td><td>Brown, moist, medium dense, fine to medium SAND, some silt, trace gravel, (SM), FILL.</td><td>G#271237 A-2-4, SM W/C=11.9%</td></tr><tr><td rowspan="2">5</td><td>S-3</td><td>14/9</td><td>5.00 - 6.17</td><td>5/7/50(2")</td><td>>50</td><td></td><td></td><td></td><td>144.90</td><td></td><td>Brown, dry, hard, silty CLAY, some fine sand, trace gravel, (CL), TILL.</td><td>G#302017 A-4, CL W/C=18.4%</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>143.60</td><td></td><td>Bottom of Exploration at 6.30 feet below ground surface. AUGER REFUSAL.</td><td></td></tr><tr><td>10</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td rowspan="8">15</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td rowspan="8">20</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td rowspan="4">25</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>										Depth (ft.)	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											Brown, damp, dense, fine to medium SAND , some gravel, trace asphalt, trace silt, (SW-SM), SUBBASE.	G#302016 A-1-b, SW-SM W/C=7.4%																																																																																																																																																																																																																																																																																																																																														
	S-2	24/11	2.50 - 4.50	10/11/8/6	19	31			147.40		Brown, moist, medium dense, fine to medium SAND, some silt, trace gravel, (SM), FILL.	G#271237 A-2-4, SM W/C=11.9%																																																																																																																																																																																																																																																																																																																																														
5	S-3	14/9	5.00 - 6.17	5/7/50(2")	>50				144.90		Brown, dry, hard, silty CLAY, some fine sand, trace gravel, (CL), TILL.	G#302017 A-4, CL W/C=18.4%																																																																																																																																																																																																																																																																																																																																														
									143.60		Bottom of Exploration at 6.30 feet below ground surface. AUGER REFUSAL.																																																																																																																																																																																																																																																																																																																																															
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Maine Department of Transportation Soil/Rock Exploration Log US CUSTOMARY UNITS					Project: MaineDOT Arundel Location: Route 111 Westbound Lane Arundel, Maine			Boring No.: B-3 WIN: 019107.00																																																																																																																																																																																																															
Driller: Northern Test Boring			Elevation (ft.) 154.3			Auger ID/OD: 4 1/2"																																																																																																																																																																																																																	
Operator: M. Nadeau			Datum:			Sampler: Standard Split Spoon Sampler																																																																																																																																																																																																																	
Logged By: J. Fontaine			Rig Type: John Deere 125 HP			Hammer Wt./Fall: 140#/30"																																																																																																																																																																																																																	
Date Start/Finish: 2/19/2015; 13:00-14:05			Drilling Method: Hollow Stem Auger			Core Barrel: NQ																																																																																																																																																																																																																	
Boring Location: 1658+84.4, 10.8 ft Lt.			Casing ID/OD: N/A			Water Level*: 4.3																																																																																																																																																																																																																	
Hammer Efficiency Factor: 0.976			Hammer Type: Automatic ☒ Hydraulic ☐ Rope & Cathead ☐																																																																																																																																																																																																																				
Definitions: D = Split Spoon Sample MD = Unsuccessful Split Spoon Sample Attempt U = Thin Wall Tube Sample MU = Unsuccessful Thin Wall Tube Sample Attempt V = Field Vane Shear Test, PP = Pocket Penetrometer MV = Unsuccessful Field Vane Shear Test Attempt R = Rock Core Sample SSA = Solid Stem Auger HSA = Hollow Stem Auger RC = Roller Cone WOH = Weight of 140lb. Hammer WOR/C = Weight of Rods or Casing WO1P = Weight of One Person S_U = Peak/Remolded Field Vane Undrained Shear Strength (psf) S_{U(lab)} = Lab Vane Undrained Shear Strength (psf) q_p = Unconfined Compressive Strength (ksf) N-uncorrected = Raw Field SPT N-value Hammer Efficiency Factor = Rig Specific Annual Calibration Value N₆₀ = SPT N-uncorrected Corrected for Hammer Efficiency N₆₀ = (Hammer Efficiency Factor/60%)*N-uncorrected T_V = Pocket Torvane Shear Strength (psf) WC = Water Content, percent LL = Liquid Limit PL = Plastic Limit PI = Plasticity Index G = Grain Size Analysis C = Consolidation Test																																																																																																																																																																																																																							
<table><tr><th rowspan="2">Depth (ft.)</th><th colspan="8">Sample Information</th><th rowspan="2">Graphic Log</th><th rowspan="2">Visual Description and Remarks</th><th rowspan="2">Laboratory Testing Results/ AASHTO and Unified Class.</th></tr><tr><th>Sample No.</th><th>Pen./Rec. (in.)</th><th>Sample Depth (ft.)</th><th>Blows (6 in.) Shear Strength (psf) or RQD (%)</th><th>N-uncorrected</th><th>N₆₀</th><th>Casing</th><th>Blows</th><th>Elevation (ft.)</th></tr><tr><td rowspan="2">0</td><td>S-1</td><td>24/9</td><td>0.50 - 2.50</td><td>27/19/18/16</td><td>37</td><td>60</td><td>HSA</td><td></td><td>153.80</td><td rowspan="2"></td><td>TOP 4.5" of BORING: ASPHALT</td><td rowspan="10">G#302018 A-2-4, SM W/C=14.2%</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>153.30</td><td>Top 6": Brown, damp, dense, silty fine to medium SAND, some gravel, trace asphalt, (SM), SUBBASE.</td></tr><tr><td></td><td>S-2</td><td>24/13</td><td>2.50 - 4.50</td><td>4/6/7/10</td><td>13</td><td>21</td><td></td><td></td><td></td><td></td><td>Bottom 3": ASPHALT Orangish brown, damp, loose, silty fine to medium SAND, some gravel, (SM), FILL.</td></tr><tr><td rowspan="2">5</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>149.30</td><td></td><td>Brown, damp, very dense, fine to medium SAND, some silt, trace gravel, (SM), TILL.</td></tr><tr><td>S-3</td><td>13/9.5</td><td>5.00 - 6.08</td><td>15/17/50(1")</td><td>>50</td><td></td><td></td><td></td><td>148.20</td><td></td><td>AUGER REFUSAL. Top of Bedrock at Elev: -6.1 ft.</td></tr><tr><td></td><td>R1</td><td>24/0</td><td>6.10 - 8.10</td><td>RQD = 0%</td><td></td><td></td><td></td><td></td><td></td><td></td><td>R1-R4: Medium gray (N5) to greenish gray (5 GY 6/1), fine grained, weakly foliated, slightly weathered, strong (R4) METALSTONE; discontinuities, stained with FeOx/OH, smooth to rough, 0 - 85 deg, planar to irregular; partially dissolutioned calcite/ quartz vein, 1/4" thick at 9.0', irregular, 0 10 deg; white, very fine grained calcite vein, 1/4" thick at 9.7 - 9.9', 50 deg, discontinuities extremely close to moderately spaced (0.5 - 6") (Berwick Formation)</td></tr><tr><td rowspan="2">10</td><td>R2</td><td>10/9</td><td>8.10 - 8.93</td><td>RQD = 51%</td><td></td><td></td><td></td><td></td><td></td><td></td><td>R1 Rock Mass Quality = Very Poor</td></tr><tr><td>R3</td><td>14/14</td><td>8.90 - 10.07</td><td>RQD = 93%</td><td></td><td></td><td></td><td></td><td></td><td></td><td>R1 Core Times (min:sec) 6.1-7.1': (2:00)</td></tr><tr><td></td><td>R4</td><td>14/11</td><td>9.90 - 11.07</td><td>RQD = 67%</td><td></td><td></td><td></td><td></td><td></td><td></td><td>7.1-8.1': (1:30) Recovery = 23%</td></tr><tr><td rowspan="2">15</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>R2 Rock Mass Quality = Fair</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>R2 Core Times (min:sec) 8.1-8.9': (2:00) Recovery = 90%</td></tr><tr><td rowspan="2">20</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>R3 Rock Mass Quality = Excellent</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>R3 Core Times (min:sec) 8.9-9.9': (5:00) Recovery = 100%</td></tr><tr><td rowspan="2">25</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>R4 Rock Mass Quality = Fair</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>R4 Core Times (min:sec) 9.9-11.1': (5:00) Recovery = 92%</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>Bottom of Exploration at 11.10 feet below ground surface.</td></tr></table>									Depth (ft.)	Sample Information								Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N ₆₀	Casing	Blows	Elevation (ft.)	0	S-1	24/9	0.50 - 2.50	27/19/18/16	37	60	HSA		153.80		TOP 4.5" of BORING: ASPHALT	G#302018 A-2-4, SM W/C=14.2%									153.30	Top 6": Brown, damp, dense, silty fine to medium SAND, some gravel, trace asphalt, (SM), SUBBASE.		S-2	24/13	2.50 - 4.50	4/6/7/10	13	21					Bottom 3": ASPHALT Orangish brown, damp, loose, silty fine to medium SAND, some gravel, (SM), FILL.	5									149.30		Brown, damp, very dense, fine to medium SAND, some silt, trace gravel, (SM), TILL.	S-3	13/9.5	5.00 - 6.08	15/17/50(1")	>50				148.20		AUGER REFUSAL. Top of Bedrock at Elev: -6.1 ft.		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Page 1 of 1

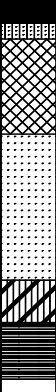
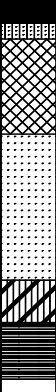
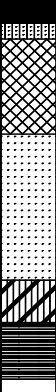
Boring No.: B-3

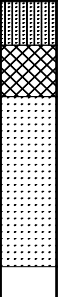
Maine Department of Transportation Soil/Rock Exploration Log US CUSTOMARY UNITS				Project: MaineDOT Arundel Location: Route 111 Westbound Lane Arundel, Maine		Boring No.: B-4 WIN: 019107.00																																																																																																																																																																																																																																													
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* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.											Boring No.: B-4																																																																																																																																																																																																																																								

Maine Department of Transportation Soil/Rock Exploration Log US CUSTOMARY UNITS					Project: MaineDOT Arundel Location: Route 111 Westbound Lane Arundel, Maine			Boring No.: B-5 WIN: 019107.00																																																																																																																																																																																																																																																																																																																																																																																																																									
Driller: Northern Test Boring				Elevation (ft.) 158.8		Auger ID/OD: 4 1/2"																																																																																																																																																																																																																																																																																																																																																																																																																											
Operator: M. Nadeau				Datum:		Sampler: Standard Split Spoon Sampler																																																																																																																																																																																																																																																																																																																																																																																																																											
Logged By: J. Fontaine				Rig Type: John Deere 125 HP		Hammer Wt./Fall: 140#/30"																																																																																																																																																																																																																																																																																																																																																																																																																											
Date Start/Finish: 2/19/2015; 10:50-12:30				Drilling Method: Hollow Stem Auger		Core Barrel: NQ																																																																																																																																																																																																																																																																																																																																																																																																																											
Boring Location: 1660+49.1, 12.0 ft Lt.				Casing ID/OD: N/A		Water Level*: 4.2																																																																																																																																																																																																																																																																																																																																																																																																																											
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	S-3	4/4	5.00 - 5.33	50(4")	>50			153.50		Top of Bedrock at Elev: -5.3 ft.																																																																																																																																																																																																																																																																																																																																																																																																																							
	R1	12/3	5.30 - 6.30	RQD = 0%						R1 - R4: Medium gray (N5) to medium light gray (N6), fine to very fine grained, weakly foliated, slightly weathered, strong (R4) METASILTSTONE and PHYLLITE; discontinuities stained with FeOx/ OH, smooth to rough, planar to irregular, 0 - 90 deg (highly variable), extremely close to closely spaced (0.25 - 4") (Berwick Formation).																																																																																																																																																																																																																																																																																																																																																																																																																							
	R2	11/9	6.30 - 7.22	RQD = 46%						Rock Mass Quality = Very Poor																																																																																																																																																																																																																																																																																																																																																																																																																							
	R3	12/11.5	7.20 - 8.20	RQD = 0%						R1 Core Times (min:sec)																																																																																																																																																																																																																																																																																																																																																																																																																							
	R4	11/6	8.20 - 9.12	RQD = 58%						5.3-6.3': (2:00) Recovery = 23%																																																																																																																																																																																																																																																																																																																																																																																																																							
10	R5	13/6	9.10 - 10.18	RQD = 46%						R2 Rock Mass Quality = Poor																																																																																																																																																																																																																																																																																																																																																																																																																							
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										7.2-8.2': (5:00) Recovery = 50%																																																																																																																																																																																																																																																																																																																																																																																																																							
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Page 1 of 1

Boring No.: B-5

Maine Department of Transportation Soil/Rock Exploration Log US CUSTOMARY UNITS					Project: MaineDOT Arundel Location: Route 111 Westbound Lane Arundel, Maine			Boring No.: B-6 WIN: 019107.00																																																																																																																																																																																																																																																																																																																																																																																																									
Driller: Northern Test Boring				Elevation (ft.) 160.7			Auger ID/OD: 4 1/2"																																																																																																																																																																																																																																																																																																																																																																																																										
Operator: M. Nadeau				Datum:			Sampler: Standard Split Spoon Sampler																																																																																																																																																																																																																																																																																																																																																																																																										
Logged By: J. Fontaine				Rig Type: John Deere 125 HP			Hammer Wt./Fall: 140#/30"																																																																																																																																																																																																																																																																																																																																																																																																										
Date Start/Finish: 2/19/2015; 09:50-10:20				Drilling Method: Hollow Stem Auger			Core Barrel: N/A																																																																																																																																																																																																																																																																																																																																																																																																										
Boring Location: 1661+17.8, 12.1 ft Lt.				Casing ID/OD: N/A			Water Level*: None Observed																																																																																																																																																																																																																																																																																																																																																																																																										
Hammer Efficiency Factor: 0.976				Hammer Type: Automatic ☒ Hydraulic ☐ Rope & Cathead ☐																																																																																																																																																																																																																																																																																																																																																																																																													
Definitions: D = Split Spoon Sample MD = Unsuccessful Split Spoon Sample Attempt U = Thin Wall Tube Sample MU = Unsuccessful Thin Wall Tube Sample Attempt V = Field Vane Shear Test, PP = Pocket Penetrometer MV = Unsuccessful Field Vane Shear Test Attempt R = Rock Core Sample SSA = Solid Stem Auger HSA = Hollow Stem Auger RC = Roller Cone WOH = Weight of 140lb. Hammer WOR/C = Weight of Rods or Casing WO1P = Weight of One Person S_U = Peak/Remolded Field Vane Undrained Shear Strength (psf) S_U(lab) = Lab Vane Undrained Shear Strength (psf) q_p = Unconfined Compressive Strength (ksf) N-uncorrected = Raw Field SPT N-value Hammer Efficiency Factor = Rig Specific Annual Calibration Value N₆₀ = SPT N-uncorrected Corrected for Hammer Efficiency N₆₀ = (Hammer Efficiency Factor/60%)*N-uncorrected T_V = Pocket Torvane Shear Strength (psf) WC = Water Content, percent LL = Liquid Limit PL = Plastic Limit PI = Plasticity Index G = Grain Size Analysis C = Consolidation Test																																																																																																																																																																																																																																																																																																																																																																																																																	
<table><tr><th rowspan="2">Depth (ft.)</th><th colspan="8">Sample Information</th><th rowspan="2">Graphic Log</th><th rowspan="2">Visual Description and Remarks</th><th rowspan="2">Laboratory Testing Results/ AASHTO and Unified Class.</th></tr><tr><th>Sample No.</th><th>Pen./Rec. (in.)</th><th>Sample Depth (ft.)</th><th>Blows (6 in.) Shear Strength (psf) or RQD (%)</th><th>N-uncorrected</th><th>N₆₀</th><th>Casing</th><th>Blows</th><th>Elevation (ft.)</th></tr><tr><td rowspan="3">0</td><td>S-1</td><td>24/12</td><td>0.50 - 2.50</td><td>11/12/6/3</td><td>18</td><td>29</td><td>HSA</td><td></td><td>160.20</td><td rowspan="11"></td><td>TOP 4" of BORING: ASPHALT</td><td rowspan="11">G#302021 A-2-4, SM W/C=13.5%</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>159.87</td><td>Top 4": Brown, frozen, medium dense, fine to medium SAND, some gravel, trace silt, (SP), SUBBASE.</td></tr><tr><td>S-2</td><td>24/10</td><td>2.50 - 4.50</td><td>2/3/7/8</td><td>10</td><td>16</td><td></td><td></td><td>157.87</td><td>Middle 4": Black, damp, very stiff, sandy SILT, trace gravel, (ML), FILL. Bottom 4": Brown, damp, very stiff, SILT, trace sand, (ML), FILL. Top 4": Brown, damp, stiff, clayey SILT, trace fine sand, (ML).</td></tr><tr><td rowspan="3">5</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>Bottom 6": Tan, damp, loose, fine to medium SAND, some silt, trace clay, (SM) , NATIVE SAND.</td></tr><tr><td>S-3</td><td>24/20</td><td>5.00 - 7.00</td><td>8/20/27/50(3")</td><td>47</td><td>76</td><td></td><td></td><td>154.79</td><td>Top 9": Brownish gray, damp, dense, silty fine SAND, (SM).</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>153.90</td><td>Bottom 11": Brown, dry, dense, fine to medium SAND, some gravel, (SM), TILL.</td></tr><tr><td rowspan="10">10</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>152.70</td><td>AUGERED TO 8 ft bgs. 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Sample Information								Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N ₆₀	Casing	Blows	Elevation (ft.)	0	S-1	24/12	0.50 - 2.50	11/12/6/3	18	29	HSA		160.20		TOP 4" of BORING: ASPHALT	G#302021 A-2-4, SM W/C=13.5%									159.87	Top 4": Brown, frozen, medium dense, fine to medium SAND, some gravel, trace silt, (SP), SUBBASE.	S-2	24/10	2.50 - 4.50	2/3/7/8	10	16			157.87	Middle 4": Black, damp, very stiff, sandy SILT, trace gravel, (ML), FILL. Bottom 4": Brown, damp, very stiff, SILT, trace sand, (ML), FILL. Top 4": Brown, damp, stiff, clayey SILT, trace fine sand, (ML).	5										Bottom 6": Tan, damp, loose, fine to medium SAND, some silt, trace clay, (SM) , NATIVE SAND.	S-3	24/20	5.00 - 7.00	8/20/27/50(3")	47	76			154.79	Top 9": Brownish gray, damp, dense, silty fine SAND, (SM).									153.90	Bottom 11": Brown, dry, dense, fine to medium SAND, some gravel, (SM), TILL.	10									152.70	AUGERED TO 8 ft bgs. WEATHERED ROCK 6.8-8.0 ft bgs.										Bottom of Exploration at 8.00 feet below ground surface.																																																																																	15																																																																																					20																																																																																					25																																				
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Maine Department of Transportation Soil/Rock Exploration Log US CUSTOMARY UNITS				Project: MaineDOT Arundel Location: Route 111 Westbound Lane Arundel, Maine		Boring No.: B-7 WIN: 019107.00					
Driller: Northern Test Boring			Elevation (ft.) 169.0		Auger ID/OD: 4 1/2"						
Operator: M. Nadeau			Datum:		Sampler: Standard Split Spoon Sampler						
Logged By: J. Fontaine			Rig Type: John Deere 125 HP		Hammer Wt./Fall: 140#/30"						
Date Start/Finish: 2/19/2015; 10:25-10:45			Drilling Method: Hollow Stem Auger		Core Barrel: N/A						
Boring Location: 1661+63.2, 98.3 ft Lt.			Casing ID/OD: N/A		Water Level*: None Observed						
Hammer Efficiency Factor: 0.976			Hammer Type: Automatic ☒ Hydraulic ☐ Rope & Cathead ☐								
Definitions: D = Split Spoon Sample MD = Unsuccessful Split Spoon Sample Attempt U = Thin Wall Tube Sample MU = Unsuccessful Thin Wall Tube Sample Attempt V = Field Vane Shear Test, PP = Pocket Penetrometer MV = Unsuccessful Field Vane Shear Test Attempt			R = Rock Core Sample SSA = Solid Stem Auger HSA = Hollow Stem Auger RC = Roller Cone WOH = Weight of 140lb. Hammer WOR/C = Weight of Rods or Casing WO1P = Weight of One Person		S _U = Peak/Remolded Field Vane Undrained Shear Strength (psf) S _U (lab) = Lab Vane Undrained Shear Strength (psf) q _p = Unconfined Compressive Strength (ksf) N-uncorrected = Raw Field SPT N-value Hammer Efficiency Factor = Rig Specific Annual Calibration Value N ₆₀ = SPT N-uncorrected Corrected for Hammer Efficiency N ₆₀ = (Hammer Efficiency Factor/60%)*N-uncorrected		T _V = Pocket Torvane Shear Strength (psf) WC = Water Content, percent LL = Liquid Limit PL = Plastic Limit PI = Plasticity Index G = Grain Size Analysis C = Consolidation Test				
Depth (ft.)	Sample Information								Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N ₆₀	Casing Blows	Elevation (ft.)			
0	S-1	24/20	0.00 - 2.00	25/17/14/8	31	50	HSA	168.08		Top 11": Dark brown, frozen, dense, gravelly fine to medium SAND, little silt, (SW-SM), SUBBASE. Bottom 9": Gray, damp, dense, fine to coarse SAND, some gravel, little silt, (SM), FILL. Top 13": Tan, moist, medium dense, fine to medium SAND, trace gravel, trace silt, (SP-SM), NATIVE SAND. Bottom 4": Gray, moist, stiff, CLAY, some silt, trace fine to medium sand, mottled, (CL). Top 3": Gray, moist, hard, silty CLAY, (CL). Bottom 1": ROCK Bottom of Exploration at 5.58 feet below ground surface. REFUSAL, TOP of ROCK.	G#302022 A-1-b, SW-SM W/C=6.9% G#271238 A-1-b, SM W/C=10.3% G#302023 A-3, SP-SM W/C=7.5% G#302024 A-4, CL W/C=23.4%
								167.00			
	S-2	24/17	2.00 - 4.00	8/8/6/4	14	23					
5	S-3	8/4	5.00 - 5.67	12/50(2")	>50			163.42			
10											
15											
20											
25											
Remarks:											
Stratification lines represent approximate boundaries between soil types; transitions may be gradual.										Page 1 of 1	
* 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.: B-7	

Maine Department of Transportation Soil/Rock Exploration Log US CUSTOMARY UNITS					Project: MaineDOT Arundel Location: Route 111 Westbound Lane Arundel, Maine			Boring No.: B-8 WIN: 019107.00																																																																																																																																																																														
Driller: Northern Test Boring				Elevation (ft.) 168.8		Auger ID/OD: 4 1/2"																																																																																																																																																																																
Operator: M. Nadeau				Datum:		Sampler: Standard Split Spoon Sampler																																																																																																																																																																																
Logged By: J. Fontaine				Rig Type: John Deere 125 HP		Hammer Wt./Fall: 140#/30"																																																																																																																																																																																
Date Start/Finish: 2/19/2015; 09:10-09:45				Drilling Method: Hollow Stem Auger		Core Barrel: N/A																																																																																																																																																																																
Boring Location: 1664+09.9, 9.6 ft Lt.				Casing ID/OD: N/A		Water Level*: None Observed																																																																																																																																																																																
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Maine Department of Transportation Soil/Rock Exploration Log US CUSTOMARY UNITS					Project: MaineDOT Arundel Location: Route 111 Westbound Lane Arundel, Maine			Boring No.: B-9 WIN: 019107.00																																																																																																																																																																																																																																																																																																																																									
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Maine Department of Transportation Soil/Rock Exploration Log US CUSTOMARY UNITS				Project: MaineDOT Arundel Location: Route 111 Westbound Lane Arundel, Maine		Boring No.: B-10 WIN: 019107.00																																																																																																																																																																																																																
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Operator: M. Nadeau			Datum:		Sampler: Standard Split Spoon Sampler																																																																																																																																																																																																																	
Logged By: J. Fontaine			Rig Type: John Deere 125 HP		Hammer Wt./Fall: 140#/30"																																																																																																																																																																																																																	
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Boring Location: 1666+13.1, 10.2 ft Lt.			Casing ID/OD: N/A		Water Level*: None Observed																																																																																																																																																																																																																	
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Maine Department of Transportation Soil/Rock Exploration Log US CUSTOMARY UNITS					Project: MaineDOT Arundel Location: Route 111 Westbound Lane Arundel, Maine			Boring No.: B-11 WIN: 019107.00																																																																																																																																																																																																																																																																																																																																																																																																																																														
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Sample Information								Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N ₆₀	Casing Blows	Elevation (ft.)	0	S-1	24/15	0.50 - 2.50	16/14/9/10	23	37	HSA	200.00		TOP 4" of BORING: ASPHALT	G#271244 A-3, SP-SM W/C=9.9%								198.00	Brown, damp, medium dense, fine to medium SAND, trace gravel, trace silt, (SP-SM), SUBBASE.	S-2	24/14	2.50 - 4.50	6/7/8/9	15	24			2.50	Tan, wet, medium dense, fine to medium SAND, trace silt, (SP), NATIVE SAND.	G#271245 A-3, SP W/C=21.3%	5											S-3	14/13	5.00 - 6.17	9/12/50(2")	>50						Tan, moist, very dense, fine to medium SAND, trace gravel, (SP), NATIVE SAND.												10								192.80																																																																																																							15																																																																																																															20																																																																																																															25											
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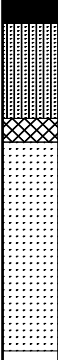
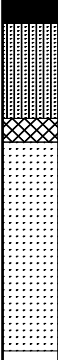
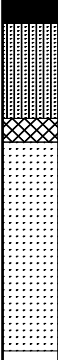
Maine Department of Transportation Soil/Rock Exploration Log US CUSTOMARY UNITS					Project: MaineDOT Arundel Location: Route 111 Westbound Lane Arundel, Maine			Boring No.: B-13 WIN: 019107.00																																																																																																																										
Driller: Northern Test Boring			Elevation (ft.) 199.5			Auger ID/OD: 4 1/2"																																																																																																																												
Operator: M. Nadeau			Datum:			Sampler: Standard Split Spoon Sampler																																																																																																																												
Logged By: J. Fontaine			Rig Type: John Deere 125 HP			Hammer Wt./Fall: 140#/30"																																																																																																																												
Date Start/Finish: 2/18/2015; 13:15-13:30			Drilling Method: Hollow Stem Auger			Core Barrel: N/A																																																																																																																												
Boring Location: 1677+57.2, 11.3 ft Lt.			Casing ID/OD: N/A			Water Level*: 3.7																																																																																																																												
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Maine Department of Transportation Soil/Rock Exploration Log US CUSTOMARY UNITS				Project: MaineDOT Arundel Location: Route 111 Westbound Lane Arundel, Maine		Boring No.: B-15 WIN: 019107.00					
Driller: Northern Test Boring			Elevation (ft.) 196.1		Auger ID/OD: 4 1/2"						
Operator: M. Nadeau			Datum:		Sampler: Standard Split Spoon Sampler						
Logged By: J. Fontaine			Rig Type: John Deere 125 HP		Hammer Wt./Fall: 140#/30"						
Date Start/Finish: 2/18/2015; 12:35-12:47			Drilling Method: Hollow Stem Auger		Core Barrel: N/A						
Boring Location: 1679+41.1, 11.8 ft Lt.			Casing ID/OD: N/A		Water Level*: 5.4						
Hammer Efficiency Factor: 0.976			Hammer Type: Automatic ☒ Hydraulic ☐ Rope & Cathead ☐								
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Depth (ft.)	Sample Information								Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N ₆₀	Casing Blows	Elevation (ft.)			
0	S-1	24/10	0.50 - 2.50	19/24/15/8	39	63	HSA	195.60		TOP 5" of BORING: ASPHALT Brown, damp, dense, gravelly fine to medium SAND, little silt, (SM), SUBBASE. Grayish brown, moist, loose, fine to medium SAND, some clay, trace gravel, trace silt, (SC-SM), FILL. At 3" from bottom of the sampler: 1" thick black band of silty organic. Tan, wet, medium dense, fine to medium SAND, trace gravel, (SP), NATIVE SAND. Bottom of Exploration at 10.00 feet below ground surface. NO REFUSAL.	G#271249 A-1-b, SM W/C=5.7% G#271250 A-1-a, SC-SM W/C=18.1%
								193.60			
	S-2	24/12	2.50 - 4.50	5/4/3/2	7	11					
5											
	S-3	24/18	8.00 - 10.00	3/8/9/5	17	28		188.10			
10								186.10			
15											
20											
25											
Remarks:											
Stratification lines represent approximate boundaries between soil types; transitions may be gradual.										Page 1 of 1	
* 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.: B-15	

Maine Department of Transportation						Project: MaineDOT Arundel				Boring No.: B-16																																																																																																																																																																																																																																																																																																																																																																					
Soil/Rock Exploration Log US CUSTOMARY UNITS						Location: Route 111 Westbound Lane Arundel, Maine				WIN: 019107.00																																																																																																																																																																																																																																																																																																																																																																					
Driller: Northern Test Boring			Elevation (ft.): 193.5			Auger ID/OD: 4 1/2"																																																																																																																																																																																																																																																																																																																																																																									
Operator: M. Nadeau			Datum:			Sampler: Standard Split Spoon Sampler																																																																																																																																																																																																																																																																																																																																																																									
Logged By: J. Fontaine			Rig Type: John Deere 125 HP			Hammer Wt./Fall: 140#/30"																																																																																																																																																																																																																																																																																																																																																																									
Date Start/Finish: 2/18/2015; 11:40-12:30			Drilling Method: Hollow Stem Auger			Core Barrel: NQ																																																																																																																																																																																																																																																																																																																																																																									
Boring Location: 1680+71.1, 10.1 ft Lt.			Casing ID/OD: N/A			Water Level*: 3.9																																																																																																																																																																																																																																																																																																																																																																									
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Maine Department of Transportation Soil/Rock Exploration Log US CUSTOMARY UNITS				Project: MaineDOT Arundel Location: Route 111 Westbound Lane Arundel, Maine		Boring No.: B-17 WIN: 019107.00																																																																																																																																																																																																				
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Maine Department of Transportation Soil/Rock Exploration Log US CUSTOMARY UNITS					Project: MaineDOT Arundel Location: Route 111 Westbound Lane Arundel, Maine			Boring No.: B-18 WIN: 019107.00																																																																																																																																																																																																																																																																																																																																											
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Operator: M. Nadeau			Datum:			Sampler: Standard Split Spoon Sampler																																																																																																																																																																																																																																																																																																																																													
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0	S-1	24/14	0.50 - 2.50	27/34/7/5	41	67	HSA		185.60		TOP 5.5" of BORING: ASPHALT	G#242687 A-1-a, SW-SM W/C=8.2%																																																																																																																																																																																																																																																																																																																																																																													
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	S-2	24/7	2.50 - 4.50	3/3/18/27	21	34			183.60		Brown, wet, medium dense, silty SAND, some rock at 3" from bottom of spoon some gravel, (SM), FILL.																																																																																																																																																																																																																																																																																																																																																																														
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	R1	48/48	5.20 - 9.20	RQD = 73%					180.90		Top of Bedrock at Elev: -5.2 ft. R1: Pinkish gray (5 YR 8/1) to very light gray (N8), very coarse grained, equigranular, slightly weathered to fresh, strong, to very strong (R4 - R5), biotite GRANITE; discontinuities, very rough, irregular, slight FeOx/OH staining 5.2 - 6.5'; 5 - 25 deg, closely to moderately spaced (3 - 22") (Carboniferous Granite - undivided) Rock Mass Quality = Fair R1 Core Times (min:sec) 5.2-6.2': (2:00) 6.2-7.2': (4:00) 7.2-8.2': (4:00) 8.2-9.2': (4:00) Recovery = 63% R2 Rock Mass Quality = Fair R2 Core Times (min:sec) 9.2-10.2': (2:00) Recovery = 100%																																																																																																																																																																																																																																																																																																																																																																														
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	R2	12/12	10.20 - 11.20	RQD = 63%					174.90																																																																																																																																																																																																																																																																																																																																																																																
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Maine Department of Transportation Soil/Rock Exploration Log US CUSTOMARY UNITS				Project: MaineDOT Arundel Location: Route 111 Westbound Lane Arundel, Maine				Boring No.: B-20 WIN: 019107.00																																																																																																																																																																																																																																																																					
Driller: Northern Test Boring				Elevation (ft.): 182.0				Auger ID/OD: 4 1/2"																																																																																																																																																																																																																																																																					
Operator: M. Nadeau				Datum:				Sampler: Standard Split Spoon Sampler																																																																																																																																																																																																																																																																					
Logged By: J. Fontaine				Rig Type: John Deere 125 HP				Hammer Wt./Fall: 140#/30"																																																																																																																																																																																																																																																																					
Date Start/Finish: 2/18/2015; 09:00-09:25				Drilling Method: Hollow Stem Auger				Core Barrel: N/A																																																																																																																																																																																																																																																																					
Boring Location: 1685+64.8, 14.6 ft Lt.				Casing ID/OD: N/A				Water Level*: 3.9																																																																																																																																																																																																																																																																					
Hammer Efficiency Factor: 0.976				Hammer Type: Automatic ☒ Hydraulic ☐ Rope & Cathead ☐																																																																																																																																																																																																																																																																									
Definitions: D = Split Spoon Sample MD = Unsuccessful Split Spoon Sample Attempt U = Thin Wall Tube Sample MU = Unsuccessful Thin Wall Tube Sample Attempt V = Field Vane Shear Test, PP = Pocket Penetrometer MV = Unsuccessful Field Vane Shear Test Attempt R = Rock Core Sample SSA = Solid Stem Auger HSA = Hollow Stem Auger RC = Roller Cone WOH = Weight of 140lb. Hammer WOR/C = Weight of Rods or Casing WO1P = Weight of One Person S_U = Peak/Remolded Field Vane Undrained Shear Strength (psf) S_U(lab) = Lab Vane Undrained Shear Strength (psf) q_p = Unconfined Compressive Strength (ksf) N-uncorrected = Raw Field SPT N-value Hammer Efficiency Factor = Rig Specific Annual Calibration Value N₆₀ = SPT N-uncorrected Corrected for Hammer Efficiency N₆₀ = (Hammer Efficiency Factor/60%)*N-uncorrected T_v = Pocket Torvane Shear Strength (psf) WC = Water Content, percent LL = Liquid Limit PL = Plastic Limit PI = Plasticity Index G = Grain Size Analysis C = Consolidation Test																																																																																																																																																																																																																																																																													
<table><tr><th rowspan="2">Depth (ft.)</th><th colspan="8">Sample Information</th><th rowspan="2">Graphic Log</th><th rowspan="2">Visual Description and Remarks</th><th rowspan="2">Laboratory Testing Results/ AASHTO and Unified Class.</th></tr><tr><th>Sample No.</th><th>Pen./Rec. (in.)</th><th>Sample Depth (ft.)</th><th>Blows (6 in.) Shear Strength (psf) or RQD (%)</th><th>N-uncorrected</th><th>N₆₀</th><th>Casing</th><th>Blows</th><th>Elevation (ft.)</th></tr><tr><td rowspan="3">0</td><td>S-1</td><td>24/17</td><td>0.50 - 2.50</td><td>41/52/23/10</td><td>75</td><td>122</td><td>HSA</td><td></td><td>181.50</td><td rowspan="3"></td><td>TOP 6" of BORING: ASPHALT</td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>0.50</td><td>Brown, frozen, very dense, fine to coarse SAND, little gravel, little silt, (SM), SUBBASE.</td><td>G#242688 A-1-b, SM W/C=10.6%</td></tr><tr><td>S-2</td><td>24/7</td><td>2.50 - 4.50</td><td>7/7/7/10</td><td>14</td><td>23</td><td></td><td></td><td>179.50</td><td>2.50</td><td>Brown, wet, medium dense, fine to coarse SAND, little gravel, trace silt, (SW), FILL.</td><td>G#242689 A-1-b, SW W/C=11.7%</td></tr><tr><td rowspan="3">5</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td rowspan="3">10</td><td>S-3</td><td>24/18</td><td>8.00 - 10.00</td><td>5/7/5/7</td><td>12</td><td>20</td><td></td><td></td><td>174.00</td><td></td><td>8.00</td><td>Top 9": Tan, wet, medium dense, fine SAND, trace silt, (SP), NATIVE SAND.</td><td>G#242690 A-3, SP W/C=24.5%</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>173.25</td><td></td><td>8.75</td><td>Bottom 9": Gray, damp, stiff, silty CLAY, (CL), TILL. Tv= 2500, 2250, 2500 psf. PP qp= 1375, 1125, 750, 875 psf.</td><td>G#242691 A-4, CL LL=27, PL=18</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>172.00</td><td></td><td>10.00</td><td>Bottom of Exploration at 10.00 feet below ground surface. NO REFUSAL.</td><td>PI=9 W/C=26.7%</td></tr><tr><td rowspan="3">15</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td rowspan="3">20</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td rowspan="3">25</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>												Depth (ft.)	Sample Information								Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N ₆₀	Casing	Blows	Elevation (ft.)	0	S-1	24/17	0.50 - 2.50	41/52/23/10	75	122	HSA		181.50		TOP 6" of BORING: ASPHALT											0.50	Brown, frozen, very dense, fine to coarse SAND, little gravel, little silt, (SM), SUBBASE.	G#242688 A-1-b, SM W/C=10.6%	S-2	24/7	2.50 - 4.50	7/7/7/10	14	23			179.50	2.50	Brown, wet, medium dense, fine to coarse SAND, little gravel, trace silt, (SW), FILL.	G#242689 A-1-b, SW W/C=11.7%	5																																								10	S-3	24/18	8.00 - 10.00	5/7/5/7	12	20			174.00		8.00	Top 9": Tan, wet, medium dense, fine SAND, trace silt, (SP), NATIVE SAND.	G#242690 A-3, SP W/C=24.5%									173.25		8.75	Bottom 9": Gray, damp, stiff, silty CLAY, (CL), TILL. Tv= 2500, 2250, 2500 psf. PP qp= 1375, 1125, 750, 875 psf.	G#242691 A-4, CL LL=27, PL=18									172.00		10.00	Bottom of Exploration at 10.00 feet below ground surface. NO REFUSAL.	PI=9 W/C=26.7%	15																																								20																																								25																																							
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APPENDIX B
ROCK CORE PHOTOGRAPHS

APPENDIX B
MaineDOT Rt. 111 Westbound Passing Lane
Arundel, Maine
Geotechnical Data Report

Photo No. 1



Row 1 = B-5, Run 1: 5.2-6.3 ft Below Ground Surface (BGS); Run 2: 6.3-7.2 ft BGS;
 Run 3: 7.2-8.2 ft BGS; Run 4: 8.2-9.1 ft BGS; Run 5: 9.1-10.2 ft BGS
 Row 2 = B-3, Run 1: 6.1-8.1 ft BGS; Run 2: 8.1-8.9 ft BGS; Run 3: 8.9-9.1 ft BGS; Run 4: 9.1-10.1 ft BGS

APPENDIX B
MaineDOT Rt. 111 Westbound Passing Lane
Arundel, Maine
Geotechnical Data Report

Photo No. 2



Row 1 = B-19, Run 1: 5.2-9.2 ft BGS; Run 2: 9.2-10.2 ft BGS
 Row 2 = B-16, Run 1: 3.4-8.4 ft BGS
 Row 3 = B-12, Run 1: 5.5-8.9 ft BGS
 Row 4 = B-12, Run 2: 8.9-10.9 ft BGS

APPENDIX C
LABORATORY TEST RESULTS

Town(s): Arundel **Work Number:** 19107.00

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

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



GEOTECHNICAL TEST REPORT

Central Laboratory

SAMPLE INFORMATION

Reference No.

Boring No./Sample No.

Sample Description

Sampled

Received

302015

B-1/S-4

GEOTECHNICAL (DISTURBED)

2/19/2016

3/3/2016

Sample Type: **GEOTECHNICAL** Location:

Station: **1656+54.7** Offset, ft: **21.2** LT Dbfg, ft: **8.0-10.0**

WIN/Town 019107.00 - ARUNDEL

Sampler: **CONSULTANT PERSONNEL**

TEST RESULTS

Sieve Analysis (T 27)

Wash Method

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

Miscellaneous Tests

Liquid Limit @ 25 blows (T 89), %	35
Plastic Limit (T 90), %	23
Plasticity Index (T 90), %	12
Specific Gravity, Corrected to 20°C (T 100)	
Loss on Ignition, % (T 267)	
Water Content (T 265), %	29.7

Consolidation (T 216)

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

Vane Shear Test on Shelby Tubes (Maine DOT)

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

Comments:

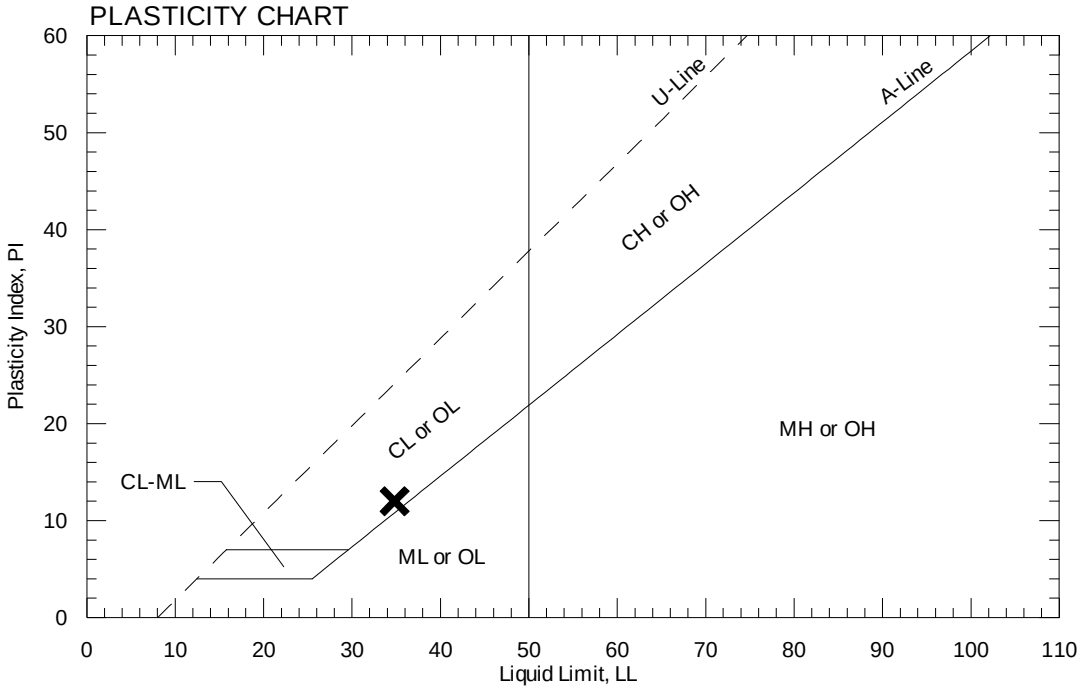
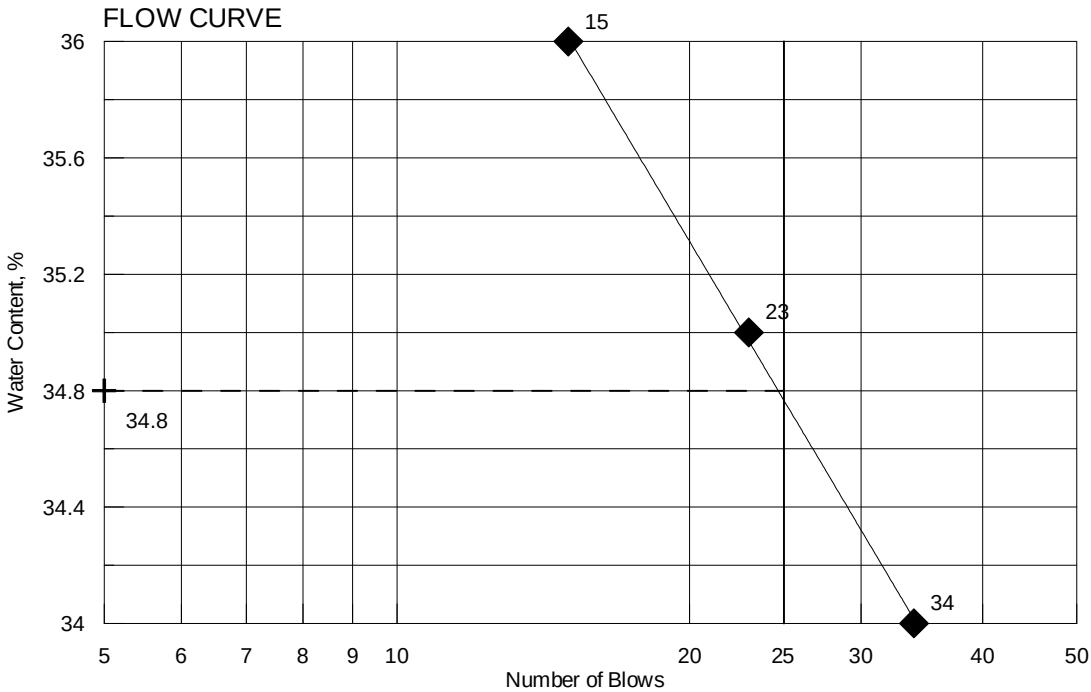
AUTHORIZATION AND DISTRIBUTION

Reported by: **GREGORY LIDSTONE**

Date Reported: 3/24/2016

Paper Copy: Lab File; Project File; Geotech File

TOWN	Arundel	Reference No.	302015
WIN	019107.00	Water Content, %	29.7
Sampled	2/19/2016	Liquid Limit @ 25 blows (T 89), %	35
Boring No./Sample No.	B-1/S-4	Plastic Limit (T 90), %	23
Station	1656+54.7	Plasticity Index (T 90), %	12
Depth	8.0-10.0	Tested By	BBURR





GEOTECHNICAL TEST REPORT

Central Laboratory

SAMPLE INFORMATION

Reference No. **302016** Boring No./Sample No. **B-2/S-1** Sample Description **GEOTECHNICAL (DISTURBED)** Sampled **2/19/2016** Received **3/3/2016**

Sample Type: **GEOTECHNICAL** Location: Station: **1657+27.7** Offset, ft: **13.2** LT Dbfg, ft: **0.5-2.5**

WIN/Town **019107.00 - ARUNDEL** Sampler: **CONSULTANT PERSONNEL**

TEST RESULTS

Sieve Analysis (T 27, T 11)

Wash Method

Procedure A

SIEVE SIZE U.S. [SI]	% Passing
3 in. [75.0 mm]	
1 in. [25.0 mm]	100.0
¾ in. [19.0 mm]	94.8
½ in. [12.5 mm]	83.2
⅜ in. [9.5 mm]	79.1
¼ in. [6.3 mm]	71.6
No. 4 [4.75 mm]	67.1
No. 10 [2.00 mm]	56.7
No. 20 [0.850 mm]	45.2
No. 40 [0.425 mm]	34.3
No. 60 [0.250 mm]	26.5
No. 100 [0.150 mm]	18.0
No. 200 [0.075 mm]	10.3

Miscellaneous Tests

Liquid Limit @ 25 blows (T 89), %	
Plastic Limit (T 90), %	
Plasticity Index (T 90), %	
Specific Gravity, Corrected to 20°C (T 100)	
Loss on Ignition, % (T 267)	
Water Content (T 265), %	7.4

Consolidation (T 216)

Trimming, Water Content, %

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

Vane Shear Test on Shelby Tubes (Maine DOT)

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

Comments:

AUTHORIZATION AND DISTRIBUTION

Reported by: **GREGORY LIDSTONE**Date Reported: **3/18/2016**

Paper Copy: Lab File; Project File; Geotech File



GEOTECHNICAL TEST REPORT

Central Laboratory

SAMPLE INFORMATION

Reference No. **271237** Boring No./Sample No. **B-2/S-2** Sample Description **GEOTECHNICAL (DISTURBED)** Sampled **2/19/2016** Received **3/3/2016**

Sample Type: **GEOTECHNICAL** Location: Station: **1657+27.7** Offset, ft: **13.2** LT Dbfg, ft: **2.5-4.5**

WIN/Town **019107.00 - ARUNDEL** Sampler: **CONSULTANT PERSONNEL**

TEST RESULTS

Sieve Analysis (T 27, T 11)

Wash Method

Procedure A

SIEVE SIZE U.S. [SI]	% Passing
3 in. [75.0 mm]	
1 in. [25.0 mm]	
¾ in. [19.0 mm]	100.0
½ in. [12.5 mm]	96.2
⅜ in. [9.5 mm]	95.3
¼ in. [6.3 mm]	92.4
No. 4 [4.75 mm]	91.1
No. 10 [2.00 mm]	87.4
No. 20 [0.850 mm]	81.9
No. 40 [0.425 mm]	68.3
No. 60 [0.250 mm]	50.2
No. 100 [0.150 mm]	34.7
No. 200 [0.075 mm]	21.2

Miscellaneous Tests

Liquid Limit @ 25 blows (T 89), %	
Plastic Limit (T 90), %	
Plasticity Index (T 90), %	
Specific Gravity, Corrected to 20°C (T 100)	
Loss on Ignition, % (T 267)	
Water Content (T 265), %	11.9

Consolidation (T 216)

Trimming, Water Content, %

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

Vane Shear Test on Shelby Tubes (Maine DOT)

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

Comments:

AUTHORIZATION AND DISTRIBUTION

Reported by: **GREGORY LIDSTONE**Date Reported: **3/18/2016**

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GEOTECHNICAL TEST REPORT

Central Laboratory

SAMPLE INFORMATION

Reference No.

Boring No./Sample No.

Sample Description

Sampled

Received

302017

B-2/S-3

GEOTECHNICAL (DISTURBED)

2/19/2016

3/3/2016

Sample Type: **GEOTECHNICAL** Location:

Station: **1657+27.7** Offset, ft: **13.2** LT Dbfg, ft: **5.0-7.0**

WIN/Town 019107.00 - ARUNDEL

Sampler: CONSULTANT PERSONNEL

TEST RESULTS

Sieve Analysis (T 27, T 11)

Wash Method

Procedure A

SIEVE SIZE U.S. [SI]	% Passing
3 in. [75.0 mm]	
1 in. [25.0 mm]	
¾ in. [19.0 mm]	
½ in. [12.5 mm]	100.0
⅜ in. [9.5 mm]	98.5
¼ in. [6.3 mm]	96.5
No. 4 [4.75 mm]	96.2
No. 10 [2.00 mm]	93.6
No. 20 [0.850 mm]	90.7
No. 40 [0.425 mm]	87.0
No. 60 [0.250 mm]	81.9
No. 100 [0.150 mm]	76.6
No. 200 [0.075 mm]	67.0

Miscellaneous Tests

Liquid Limit @ 25 blows (T 89), %	
Plastic Limit (T 90), %	
Plasticity Index (T 90), %	
Specific Gravity, Corrected to 20°C (T 100)	
Loss on Ignition, % (T 267)	
Water Content (T 265), %	18.4

Consolidation (T 216)

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

Vane Shear Test on Shelby Tubes (Maine DOT)

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

Comments:

AUTHORIZATION AND DISTRIBUTION

Reported by: **GREGORY LIDSTONE**

Date Reported: **3/18/2016**

Paper Copy: Lab File; Project File; Geotech File



GEOTECHNICAL TEST REPORT

Central Laboratory

SAMPLE INFORMATION

Reference No. **302018** Boring No./Sample No. **B-3/S-3** Sample Description **GEOTECHNICAL (DISTURBED)** Sampled **2/19/2016** Received **3/3/2016**

Sample Type: **GEOTECHNICAL** Location: Station: **1658+84.4** Offset, ft: **10.8** LT Dbfg, ft: **5.0-7.0**

WIN/Town **019107.00 - ARUNDEL** Sampler: **CONSULTANT PERSONNEL**

TEST RESULTS

Sieve Analysis (T 27, T 11)

Wash Method

Procedure A

SIEVE SIZE U.S. [SI]	% Passing
3 in. [75.0 mm]	
1 in. [25.0 mm]	
¾ in. [19.0 mm]	100.0
½ in. [12.5 mm]	98.0
⅜ in. [9.5 mm]	96.1
¼ in. [6.3 mm]	93.1
No. 4 [4.75 mm]	90.9
No. 10 [2.00 mm]	84.1
No. 20 [0.850 mm]	74.4
No. 40 [0.425 mm]	63.1
No. 60 [0.250 mm]	52.7
No. 100 [0.150 mm]	40.9
No. 200 [0.075 mm]	28.5

Miscellaneous Tests

Liquid Limit @ 25 blows (T 89), %	
Plastic Limit (T 90), %	
Plasticity Index (T 90), %	
Specific Gravity, Corrected to 20°C (T 100)	
Loss on Ignition, % (T 267)	
Water Content (T 265), %	14.2

Consolidation (T 216)

Trimming, Water Content, %

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

Vane Shear Test on Shelby Tubes (Maine DOT)

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

Comments:

AUTHORIZATION AND DISTRIBUTION

Reported by: **GREGORY LIDSTONE**Date Reported: **3/22/2016**

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GEOTECHNICAL TEST REPORT

Central Laboratory

SAMPLE INFORMATION

Reference No. **302019** Boring No./Sample No. **B-4/S-1** Sample Description **GEOTECHNICAL (DISTURBED)** Sampled **2/19/2016** Received **3/3/2016**

Sample Type: **GEOTECHNICAL** Location: Station: **1659+58.4** Offset, ft: **13.0** LT Dbfg, ft: **0.5-2.5**

WIN/Town **019107.00 - ARUNDEL** Sampler: **CONSULTANT PERSONNEL**

TEST RESULTS

Sieve Analysis (T 27, T 11)

Wash Method

Procedure A

SIEVE SIZE U.S. [SI]	% Passing
3 in. [75.0 mm]	
1 in. [25.0 mm]	100.0
¾ in. [19.0 mm]	95.3
½ in. [12.5 mm]	86.2
⅜ in. [9.5 mm]	79.7
¼ in. [6.3 mm]	71.2
No. 4 [4.75 mm]	66.4
No. 10 [2.00 mm]	55.7
No. 20 [0.850 mm]	42.1
No. 40 [0.425 mm]	26.1
No. 60 [0.250 mm]	15.4
No. 100 [0.150 mm]	11.1
No. 200 [0.075 mm]	7.1

Miscellaneous Tests

Liquid Limit @ 25 blows (T 89), %	
Plastic Limit (T 90), %	
Plasticity Index (T 90), %	
Specific Gravity, Corrected to 20°C (T 100)	
Loss on Ignition, % (T 267)	
Water Content (T 265), %	8.0

Consolidation (T 216)

Trimming, Water Content, %

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

Vane Shear Test on Shelby Tubes (Maine DOT)

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

Comments:

AUTHORIZATION AND DISTRIBUTION

Reported by: **GREGORY LIDSTONE**Date Reported: **3/18/2016**

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GEOTECHNICAL TEST REPORT

Central Laboratory

SAMPLE INFORMATION

Reference No. **302020** Boring No./Sample No. **B-5/S-1** Sample Description **GEOTECHNICAL (DISTURBED)** Sampled **2/19/2016** Received **3/3/2016**

Sample Type: **GEOTECHNICAL** Location: Station: **1660+49.1** Offset, ft: **12.0** LT Dbfg, ft: **0.5-2.5**

WIN/Town **019107.00 - ARUNDEL** Sampler: **CONSULTANT PERSONNEL**

TEST RESULTS

Sieve Analysis (T 27, T 11)

Wash Method

Procedure A

SIEVE SIZE U.S. [SI]	% Passing
3 in. [75.0 mm]	100.0
1 in. [25.0 mm]	95.8
¾ in. [19.0 mm]	93.6
½ in. [12.5 mm]	84.3
⅜ in. [9.5 mm]	80.0
¼ in. [6.3 mm]	72.2
No. 4 [4.75 mm]	67.6
No. 10 [2.00 mm]	56.1
No. 20 [0.850 mm]	44.0
No. 40 [0.425 mm]	29.9
No. 60 [0.250 mm]	20.5
No. 100 [0.150 mm]	16.1
No. 200 [0.075 mm]	11.3

Miscellaneous Tests

Liquid Limit @ 25 blows (T 89), %	
Plastic Limit (T 90), %	
Plasticity Index (T 90), %	
Specific Gravity, Corrected to 20°C (T 100)	
Loss on Ignition, % (T 267)	
Water Content (T 265), %	7.2

Consolidation (T 216)

Trimming, Water Content, %

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

Vane Shear Test on Shelby Tubes (Maine DOT)

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

Comments:

AUTHORIZATION AND DISTRIBUTION

Reported by: **GREGORY LIDSTONE**Date Reported: **3/22/2016**

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GEOTECHNICAL TEST REPORT

Central Laboratory

SAMPLE INFORMATION

Reference No. **302021** Boring No./Sample No. **B-6/S-2** Sample Description **GEOTECHNICAL (DISTURBED)** Sampled **2/19/2016** Received **3/3/2016**

Sample Type: **GEOTECHNICAL** Location: Station: **1661+17.8** Offset, ft: **12.1** LT Dbfg, ft: **2.5-4.5**

WIN/Town **019107.00 - ARUNDEL** Sampler: **CONSULTANT PERSONNEL**

TEST RESULTS

Sieve Analysis (T 27, T 11)

Wash Method

Procedure A

SIEVE SIZE U.S. [SI]	% Passing
3 in. [75.0 mm]	
1 in. [25.0 mm]	
¾ in. [19.0 mm]	
½ in. [12.5 mm]	
⅜ in. [9.5 mm]	
¼ in. [6.3 mm]	100.0
No. 4 [4.75 mm]	99.5
No. 10 [2.00 mm]	98.5
No. 20 [0.850 mm]	93.0
No. 40 [0.425 mm]	75.9
No. 60 [0.250 mm]	52.7
No. 100 [0.150 mm]	35.9
No. 200 [0.075 mm]	21.2

Miscellaneous Tests

Liquid Limit @ 25 blows (T 89), %	
Plastic Limit (T 90), %	
Plasticity Index (T 90), %	
Specific Gravity, Corrected to 20°C (T 100)	
Loss on Ignition, % (T 267)	
Water Content (T 265), %	13.5

Consolidation (T 216)

Trimming, Water Content, %

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

Vane Shear Test on Shelby Tubes (Maine DOT)

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

Comments:

AUTHORIZATION AND DISTRIBUTION

Reported by: **GREGORY LIDSTONE**Date Reported: **3/22/2016**

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GEOTECHNICAL TEST REPORT

Central Laboratory

SAMPLE INFORMATION

Reference No. **302022** Boring No./Sample No. **B-7/S-1A** Sample Description **GEOTECHNICAL (DISTURBED)** Sampled **2/19/2016** Received **3/3/2016**

Sample Type: **GEOTECHNICAL** Location: Station: **1661+63.2** Offset, ft: **98.3** LT Dbfg, ft: **0.0-2.0**

WIN/Town **019107.00 - ARUNDEL** Sampler: **CONSULTANT PERSONNEL**

TEST RESULTS

Sieve Analysis (T 27, T 11)

Wash Method

Procedure A

SIEVE SIZE U.S. [SI]	% Passing
3 in. [75.0 mm]	
1 in. [25.0 mm]	100.0
¾ in. [19.0 mm]	90.2
½ in. [12.5 mm]	79.4
⅜ in. [9.5 mm]	75.8
¼ in. [6.3 mm]	67.0
No. 4 [4.75 mm]	63.0
No. 10 [2.00 mm]	53.9
No. 20 [0.850 mm]	43.7
No. 40 [0.425 mm]	32.1
No. 60 [0.250 mm]	22.0
No. 100 [0.150 mm]	16.4
No. 200 [0.075 mm]	11.4

Miscellaneous Tests

Liquid Limit @ 25 blows (T 89), %	
Plastic Limit (T 90), %	
Plasticity Index (T 90), %	
Specific Gravity, Corrected to 20°C (T 100)	
Loss on Ignition, % (T 267)	
Water Content (T 265), %	6.9

Consolidation (T 216)

Trimming, Water Content, %

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

Vane Shear Test on Shelby Tubes (Maine DOT)

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

Comments:

AUTHORIZATION AND DISTRIBUTION

Reported by: **GREGORY LIDSTONE**Date Reported: **3/18/2016**

Paper Copy: Lab File; Project File; Geotech File



GEOTECHNICAL TEST REPORT

Central Laboratory

SAMPLE INFORMATION

Reference No. **271238** Boring No./Sample No. **B-7/S-1B** Sample Description **GEOTECHNICAL (DISTURBED)** Sampled **2/19/2016** Received **3/3/2016**

Sample Type: **GEOTECHNICAL** Location: Station: **1661+63.2** Offset, ft: **98.3** LT Dbfg, ft: **0.0-1.0**

WIN/Town **019107.00 - ARUNDEL** Sampler: **CONSULTANT PERSONNEL**

TEST RESULTS

Sieve Analysis (T 27, T 11)

Wash Method

Procedure A

SIEVE SIZE U.S. [SI]	% Passing
3 in. [75.0 mm]	
1 in. [25.0 mm]	
¾ in. [19.0 mm]	100.0
½ in. [12.5 mm]	92.4
⅜ in. [9.5 mm]	86.4
¼ in. [6.3 mm]	81.9
No. 4 [4.75 mm]	78.8
No. 10 [2.00 mm]	73.7
No. 20 [0.850 mm]	65.7
No. 40 [0.425 mm]	47.8
No. 60 [0.250 mm]	30.7
No. 100 [0.150 mm]	22.5
No. 200 [0.075 mm]	17.1

Miscellaneous Tests

Liquid Limit @ 25 blows (T 89), %	
Plastic Limit (T 90), %	
Plasticity Index (T 90), %	
Specific Gravity, Corrected to 20°C (T 100)	
Loss on Ignition, % (T 267)	
Water Content (T 265), %	10.3

Consolidation (T 216)

Trimming, Water Content, %

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

Vane Shear Test on Shelby Tubes (Maine DOT)

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

Comments:

AUTHORIZATION AND DISTRIBUTION

Reported by: **GREGORY LIDSTONE**Date Reported: **3/18/2016**

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GEOTECHNICAL TEST REPORT

Central Laboratory

SAMPLE INFORMATION

Reference No. **302023** Boring No./Sample No. **B-7/S-2A** Sample Description **GEOTECHNICAL (DISTURBED)** Sampled **2/19/2016** Received **3/3/2016**

Sample Type: **GEOTECHNICAL** Location: Station: **1661+63.2** Offset, ft: **98.3** LT Dbfg, ft: **1.0-2.0**

WIN/Town **019107.00 - ARUNDEL** Sampler: **CONSULTANT PERSONNEL**

TEST RESULTS

Sieve Analysis (T 27, T 11)

Wash Method

Procedure A

SIEVE SIZE U.S. [SI]	% Passing
3 in. [75.0 mm]	
1 in. [25.0 mm]	
¾ in. [19.0 mm]	
½ in. [12.5 mm]	100.0
⅜ in. [9.5 mm]	99.0
¼ in. [6.3 mm]	97.3
No. 4 [4.75 mm]	96.5
No. 10 [2.00 mm]	92.4
No. 20 [0.850 mm]	82.4
No. 40 [0.425 mm]	52.7
No. 60 [0.250 mm]	24.8
No. 100 [0.150 mm]	9.8
No. 200 [0.075 mm]	6.6

Miscellaneous Tests

Liquid Limit @ 25 blows (T 89), %	
Plastic Limit (T 90), %	
Plasticity Index (T 90), %	
Specific Gravity, Corrected to 20°C (T 100)	
Loss on Ignition, % (T 267)	
Water Content (T 265), %	7.5

Consolidation (T 216)

Trimming, Water Content, %

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

Vane Shear Test on Shelby Tubes (Maine DOT)

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

Comments:

AUTHORIZATION AND DISTRIBUTION

Reported by: **GREGORY LIDSTONE**Date Reported: **3/18/2016**

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GEOTECHNICAL TEST REPORT

Central Laboratory

SAMPLE INFORMATION

Reference No. **302024** Boring No./Sample No. **B-7/S-2B** Sample Description **GEOTECHNICAL (DISTURBED)** Sampled **2/19/2016** Received **3/3/2016**

Sample Type: **GEOTECHNICAL** Location: Station: **1661+63.2** Offset, ft: **98.3** LT Dbfg, ft: **3.0-4.0**

WIN/Town **019107.00 - ARUNDEL** Sampler: **CONSULTANT PERSONNEL**

TEST RESULTS

Sieve Analysis (T 88)

Wash Method

SIEVE SIZE U.S. [SI]	% Passing
3 in. [75.0 mm]	
1 in. [25.0 mm]	
¾ in. [19.0 mm]	
½ in. [12.5 mm]	
⅜ in. [9.5 mm]	
¼ in. [6.3 mm]	
No. 4 [4.75 mm]	
No. 10 [2.00 mm]	100.0
No. 20 [0.850 mm]	
No. 40 [0.425 mm]	96.9
No. 60 [0.250 mm]	
No. 100 [0.150 mm]	
No. 200 [0.075 mm]	89.6
[0.0273 mm]	88.4
[0.0184 mm]	76.6
[0.0109 mm]	70.7
[0.0082 mm]	58.9
[0.0059 mm]	53.0
[0.0030 mm]	44.2
[0.0013 mm]	32.4

Miscellaneous Tests

Liquid Limit @ 25 blows (T 89), %	
Plastic Limit (T 90), %	
Plasticity Index (T 90), %	
Specific Gravity, Corrected to 20°C (T 100)	2.64
Loss on Ignition, % (T 267)	
Water Content (T 265), %	23.4

Consolidation (T 216)

Trimmings, Water Content, %

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

Vane Shear Test on Shelby Tubes (Maine DOT)

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

Comments:

AUTHORIZATION AND DISTRIBUTION

Reported by: **MAURA FOLEY**

Date Reported: **3/24/2016**

Paper Copy: Lab File; Project File; Geotech File



GEOTECHNICAL TEST REPORT

Central Laboratory

SAMPLE INFORMATION

Reference No. **302025** Boring No./Sample No. **B-8/S-1** Sample Description **GEOTECHNICAL (DISTURBED)** Sampled **2/19/2016** Received **3/3/2016**

Sample Type: **GEOTECHNICAL** Location: Station: **1664+09.9** Offset, ft: **9.6** LT Dbfg, ft: **0.5-2.5**

WIN/Town **019107.00 - ARUNDEL** Sampler: **CONSULTANT PERSONNEL**

TEST RESULTS

Sieve Analysis (T 27, T 11)

Wash Method

Procedure A

SIEVE SIZE U.S. [SI]	% Passing
3 in. [75.0 mm]	100.0
1 in. [25.0 mm]	94.9
¾ in. [19.0 mm]	87.2
½ in. [12.5 mm]	77.2
⅜ in. [9.5 mm]	73.4
¼ in. [6.3 mm]	68.9
No. 4 [4.75 mm]	65.3
No. 10 [2.00 mm]	57.1
No. 20 [0.850 mm]	44.6
No. 40 [0.425 mm]	29.1
No. 60 [0.250 mm]	18.4
No. 100 [0.150 mm]	13.4
No. 200 [0.075 mm]	8.7

Miscellaneous Tests

Liquid Limit @ 25 blows (T 89), %	
Plastic Limit (T 90), %	
Plasticity Index (T 90), %	
Specific Gravity, Corrected to 20°C (T 100)	
Loss on Ignition, % (T 267)	
Water Content (T 265), %	3.7

Consolidation (T 216)

Trimming, Water Content, %

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

Vane Shear Test on Shelby Tubes (Maine DOT)

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

Comments:

AUTHORIZATION AND DISTRIBUTION

Reported by: **GREGORY LIDSTONE**Date Reported: **3/18/2016**

Paper Copy: Lab File; Project File; Geotech File



GEOTECHNICAL TEST REPORT

Central Laboratory

SAMPLE INFORMATION

Reference No. **271239** Boring No./Sample No. **B-8/S-4** Sample Description **GEOTECHNICAL (DISTURBED)** Sampled **2/19/2016** Received **3/3/2016**

Sample Type: **GEOTECHNICAL** Location: Station: **1664+09.9** Offset, ft: **9.6** LT Dbfg, ft: **8.0-10.0**

WIN/Town **019107.00 - ARUNDEL** Sampler: **CONSULTANT PERSONNEL**

TEST RESULTS

Sieve Analysis (T 27)

Wash Method

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

Miscellaneous Tests

Liquid Limit @ 25 blows (T 89), %	35
Plastic Limit (T 90), %	23
Plasticity Index (T 90), %	12
Specific Gravity, Corrected to 20°C (T 100)	
Loss on Ignition, % (T 267)	
Water Content (T 265), %	28.9

Consolidation (T 216)

Trimming, Water Content, %

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

Vane Shear Test on Shelby Tubes (Maine DOT)

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

Comments:

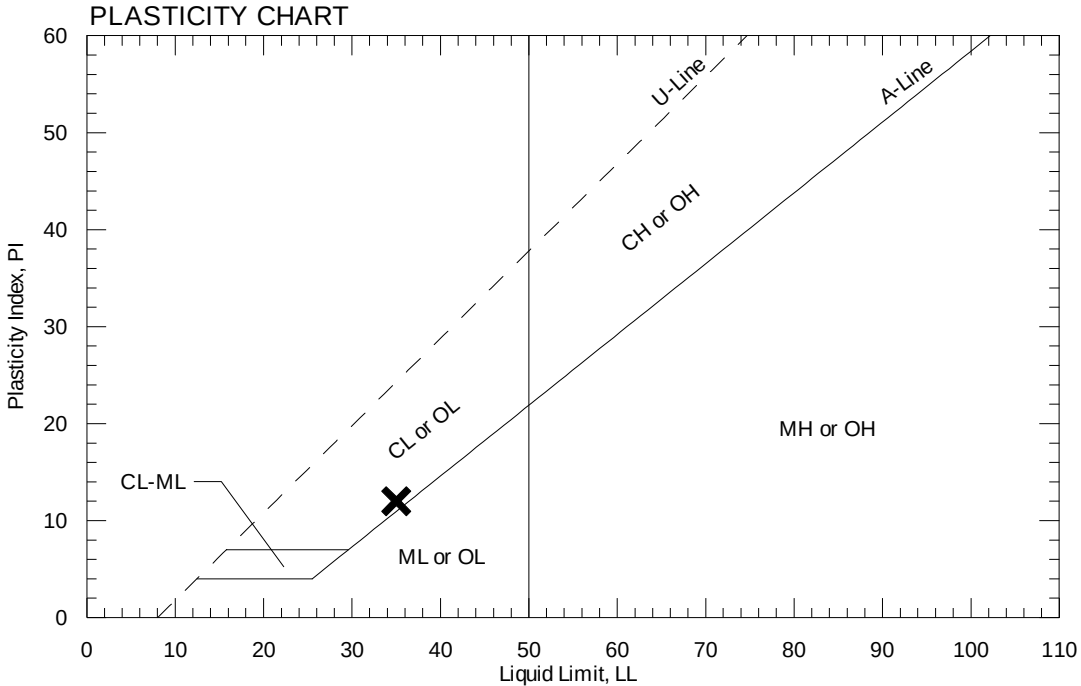
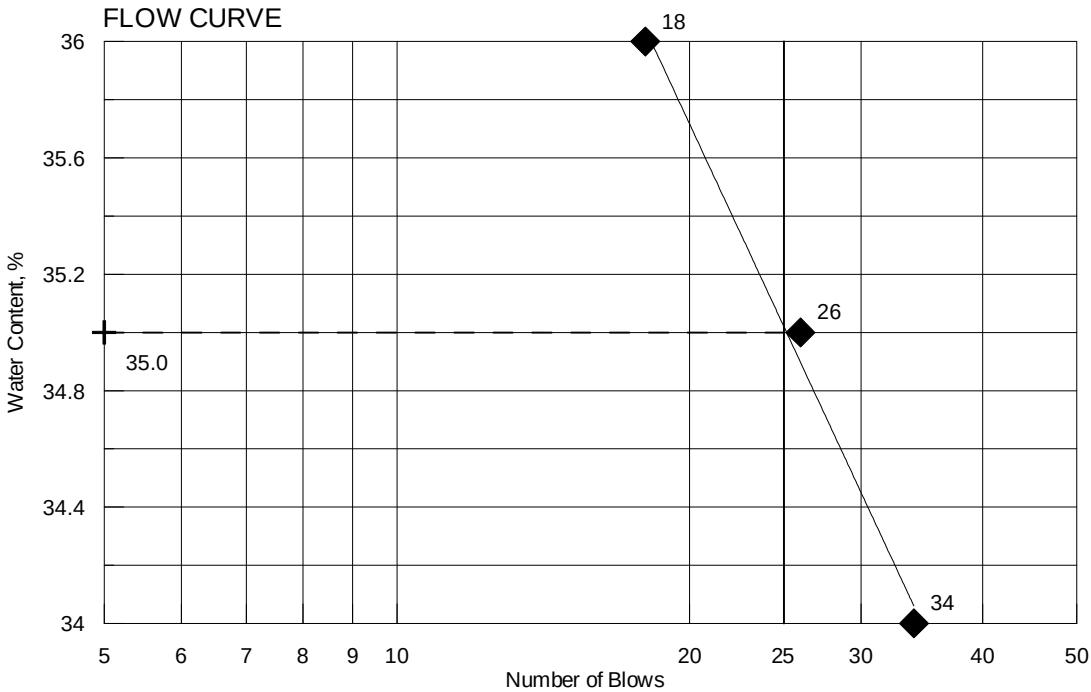
AUTHORIZATION AND DISTRIBUTION

Reported by: **GREGORY LIDSTONE**

Date Reported: **3/24/2016**

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TOWN	Arundel	Reference No.	271239
WIN	019107.00	Water Content, %	28.9
Sampled	2/19/2016	Liquid Limit @ 25 blows (T 89), %	35
Boring No./Sample No.	B-8/S-4	Plastic Limit (T 90), %	23
Station	1664+09.9	Plasticity Index (T 90), %	12
Depth	8.0-10.0	Tested By	BBURR





GEOTECHNICAL TEST REPORT

Central Laboratory

SAMPLE INFORMATION

Reference No.

Boring No./Sample No.

Sample Description

Sampled

Received

271240

B-9/S-2

GEOTECHNICAL (DISTURBED)

2/19/2016

3/3/2016

Sample Type: **GEOTECHNICAL** Location:

Station: **1665+08.9** Offset, ft: **12.1** LT Dbfg, ft: **2.5-4.5**

WIN/Town 019107.00 - ARUNDEL

Sampler: **CONSULTANT PERSONNEL**

TEST RESULTS

Sieve Analysis (T 27, T 11)

Wash Method

Procedure A

SIEVE SIZE U.S. [SI]	% Passing
3 in. [75.0 mm]	
1 in. [25.0 mm]	
¾ in. [19.0 mm]	100.0
½ in. [12.5 mm]	93.1
⅜ in. [9.5 mm]	89.3
¼ in. [6.3 mm]	84.2
No. 4 [4.75 mm]	79.1
No. 10 [2.00 mm]	65.2
No. 20 [0.850 mm]	47.2
No. 40 [0.425 mm]	32.5
No. 60 [0.250 mm]	22.0
No. 100 [0.150 mm]	14.5
No. 200 [0.075 mm]	9.3

Miscellaneous Tests

Liquid Limit @ 25 blows (T 89), %	
Plastic Limit (T 90), %	
Plasticity Index (T 90), %	
Specific Gravity, Corrected to 20°C (T 100)	
Loss on Ignition, % (T 267)	
Water Content (T 265), %	6.1

Consolidation (T 216)

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

Vane Shear Test on Shelby Tubes (Maine DOT)

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

Comments:

AUTHORIZATION AND DISTRIBUTION

Reported by: **GREGORY LIDSTONE**

Date Reported: **3/18/2016**

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GEOTECHNICAL TEST REPORT

Central Laboratory

SAMPLE INFORMATION

Reference No. **271241** Boring No./Sample No. **B-9/S-3A** Sample Description **GEOTECHNICAL (DISTURBED)** Sampled **2/19/2016** Received **3/3/2016**

Sample Type: **GEOTECHNICAL** Location: Station: **1665+08.9** Offset, ft: **12.1** LT Dbfg, ft: **5.0-6.0**

WIN/Town **019107.00 - ARUNDEL** Sampler: **CONSULTANT PERSONNEL**

TEST RESULTS

Sieve Analysis (T 88)

Wash Method

SIEVE SIZE U.S. [SI]	% Passing
3 in. [75.0 mm]	
1 in. [25.0 mm]	
¾ in. [19.0 mm]	
½ in. [12.5 mm]	
⅜ in. [9.5 mm]	100.0
¼ in. [6.3 mm]	99.4
No. 4 [4.75 mm]	99.3
No. 10 [2.00 mm]	98.2
No. 20 [0.850 mm]	
No. 40 [0.425 mm]	83.2
No. 60 [0.250 mm]	
No. 100 [0.150 mm]	
No. 200 [0.075 mm]	24.6
[0.0363 mm]	21.3
[0.0232 mm]	16.7
[0.0135 mm]	14.6
[0.0098 mm]	10.5
[0.0070 mm]	8.3
[0.0034 mm]	6.3
[0.0015 mm]	4.2

Miscellaneous Tests

Liquid Limit @ 25 blows (T 89), %	
Plastic Limit (T 90), %	
Plasticity Index (T 90), %	
Specific Gravity, Corrected to 20°C (T 100)	2.61
Loss on Ignition, % (T 267)	
Water Content (T 265), %	12.0

Consolidation (T 216)

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

Vane Shear Test on Shelby Tubes (Maine DOT)

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

Comments:

AUTHORIZATION AND DISTRIBUTION

Reported by: **GREGORY LIDSTONE**

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GEOTECHNICAL TEST REPORT

Central Laboratory

SAMPLE INFORMATION

Reference No. **271242** Boring No./Sample No. **B-9/S-3B** Sample Description **GEOTECHNICAL (DISTURBED)** Sampled **2/19/2016** Received **3/3/2016**

Sample Type: **GEOTECHNICAL** Location: Station: **1665+08.9** Offset, ft: **12.1** LT Dbfg, ft: **6.0-7.0**

WIN/Town **019107.00 - ARUNDEL** Sampler: **CONSULTANT PERSONNEL**

TEST RESULTS

Sieve Analysis (T 27)

Wash Method

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

Miscellaneous Tests

Liquid Limit @ 25 blows (T 89), %	
Plastic Limit (T 90), %	
Plasticity Index (T 90), %	NP
Specific Gravity, Corrected to 20°C (T 100)	
Loss on Ignition, % (T 267)	
Water Content (T 265), %	24.3

Consolidation (T 216)

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

Vane Shear Test on Shelby Tubes (Maine DOT)

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

Comments:

AUTHORIZATION AND DISTRIBUTION

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GEOTECHNICAL TEST REPORT

Central Laboratory

SAMPLE INFORMATION

Reference No. **271243** Boring No./Sample No. **B-10/S-1** Sample Description **GEOTECHNICAL (DISTURBED)** Sampled **2/18/2016** Received **3/3/2016**

Sample Type: **GEOTECHNICAL** Location: Station: **1666+13.1** Offset, ft: **10.2** LT Dbfg, ft: **0.5-2.5**

WIN/Town **019107.00 - ARUNDEL** Sampler: **CONSULTANT PERSONNEL**

TEST RESULTS

Sieve Analysis (T 27, T 11)

Wash Method

Procedure A

SIEVE SIZE U.S. [SI]	% Passing
3 in. [75.0 mm]	
1 in. [25.0 mm]	100.0
¾ in. [19.0 mm]	97.0
½ in. [12.5 mm]	89.3
⅜ in. [9.5 mm]	83.9
¼ in. [6.3 mm]	77.9
No. 4 [4.75 mm]	74.4
No. 10 [2.00 mm]	65.4
No. 20 [0.850 mm]	53.0
No. 40 [0.425 mm]	35.8
No. 60 [0.250 mm]	25.6
No. 100 [0.150 mm]	19.0
No. 200 [0.075 mm]	12.1

Miscellaneous Tests

Liquid Limit @ 25 blows (T 89), %	
Plastic Limit (T 90), %	
Plasticity Index (T 90), %	
Specific Gravity, Corrected to 20°C (T 100)	
Loss on Ignition, % (T 267)	
Water Content (T 265), %	5.1

Consolidation (T 216)

Trimming, Water Content, %

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

Vane Shear Test on Shelby Tubes (Maine DOT)

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

Comments:

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GEOTECHNICAL TEST REPORT

Central Laboratory

SAMPLE INFORMATION

Reference No. **271244** Boring No./Sample No. **B-11/S-1** Sample Description **GEOTECHNICAL (DISTURBED)** Sampled **2/18/2016** Received **3/3/2016**

Sample Type: **GEOTECHNICAL** Location: Station: **1675+57.7** Offset, ft: **16.5** LT Dbfg, ft: **0.5-2.5**

WIN/Town **019107.00 - ARUNDEL** Sampler: **CONSULTANT PERSONNEL**

TEST RESULTS

Sieve Analysis (T 27, T 11)

Wash Method

Procedure A

SIEVE SIZE U.S. [SI]	% Passing
3 in. [75.0 mm]	
1 in. [25.0 mm]	
¾ in. [19.0 mm]	
½ in. [12.5 mm]	100.0
⅜ in. [9.5 mm]	99.4
¼ in. [6.3 mm]	99.2
No. 4 [4.75 mm]	98.7
No. 10 [2.00 mm]	98.0
No. 20 [0.850 mm]	95.8
No. 40 [0.425 mm]	76.4
No. 60 [0.250 mm]	24.2
No. 100 [0.150 mm]	8.6
No. 200 [0.075 mm]	5.2

Miscellaneous Tests

Liquid Limit @ 25 blows (T 89), %	
Plastic Limit (T 90), %	
Plasticity Index (T 90), %	
Specific Gravity, Corrected to 20°C (T 100)	
Loss on Ignition, % (T 267)	
Water Content (T 265), %	9.9

Consolidation (T 216)

Trimming, Water Content, %

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

Vane Shear Test on Shelby Tubes (Maine DOT)

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

Comments:

AUTHORIZATION AND DISTRIBUTION

Reported by: **GREGORY LIDSTONE**

Date Reported: **3/18/2016**

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GEOTECHNICAL TEST REPORT

Central Laboratory

SAMPLE INFORMATION

Reference No.

Boring No./Sample No.

Sample Description

Sampled

Received

271245

B-11/S-2

GEOTECHNICAL (DISTURBED)

2/18/2016

3/3/2016

Sample Type: **GEOTECHNICAL** Location:

Station: **1675+57.7** Offset, ft: **16.5** LT Dbfg, ft: **2.5-4.5**

WIN/Town **019107.00 - ARUNDEL**

Sampler: **CONSULTANT PERSONNEL**

TEST RESULTS

Sieve Analysis (T 27, T 11)

Wash Method

Procedure A

SIEVE SIZE U.S. [SI]	% Passing
3 in. [75.0 mm]	
1 in. [25.0 mm]	
¾ in. [19.0 mm]	
½ in. [12.5 mm]	
⅜ in. [9.5 mm]	
¼ in. [6.3 mm]	100.0
No. 4 [4.75 mm]	99.9
No. 10 [2.00 mm]	99.5
No. 20 [0.850 mm]	97.8
No. 40 [0.425 mm]	83.1
No. 60 [0.250 mm]	38.7
No. 100 [0.150 mm]	7.2
No. 200 [0.075 mm]	3.6

Miscellaneous Tests

Liquid Limit @ 25 blows (T 89), %	
Plastic Limit (T 90), %	
Plasticity Index (T 90), %	
Specific Gravity, Corrected to 20°C (T 100)	
Loss on Ignition, % (T 267)	
Water Content (T 265), %	21.3

Consolidation (T 216)

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

Vane Shear Test on Shelby Tubes (Maine DOT)

Depth taken in tube, ft	3 In.		6 In.		Water Content, %	Description of Material Sampled at the Various Tube Depths
	U. Shear	Remold	U. Shear	Remold		
	tons/ft²	tons/ft²	tons/ft²	tons/ft²		
0						
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
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Comments:

AUTHORIZATION AND DISTRIBUTION

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Date Reported: **3/18/2016**

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GEOTECHNICAL TEST REPORT

Central Laboratory

SAMPLE INFORMATION

Reference No. **271246** Boring No./Sample No. **B-13/S-2** Sample Description **GEOTECHNICAL (DISTURBED)** Sampled **2/18/2016** Received **3/3/2016**

Sample Type: **GEOTECHNICAL** Location: Station: **1677+57.2** Offset, ft: **11.3** LT Dbfg, ft: **2.5-4.5**

WIN/Town **019107.00 - ARUNDEL** Sampler: **CONSULTANT PERSONNEL**

TEST RESULTS

Sieve Analysis (T 27, T 11)

Wash Method

Procedure A

SIEVE SIZE U.S. [SI]	% Passing
3 in. [75.0 mm]	100.0
1 in. [25.0 mm]	95.3
¾ in. [19.0 mm]	85.0
½ in. [12.5 mm]	83.9
⅜ in. [9.5 mm]	81.9
¼ in. [6.3 mm]	78.4
No. 4 [4.75 mm]	74.3
No. 10 [2.00 mm]	62.4
No. 20 [0.850 mm]	50.9
No. 40 [0.425 mm]	41.2
No. 60 [0.250 mm]	33.0
No. 100 [0.150 mm]	27.4
No. 200 [0.075 mm]	19.8

Miscellaneous Tests

Liquid Limit @ 25 blows (T 89), %	
Plastic Limit (T 90), %	
Plasticity Index (T 90), %	
Specific Gravity, Corrected to 20°C (T 100)	
Loss on Ignition, % (T 267)	
Water Content (T 265), %	11.5

Consolidation (T 216)

Trimming, Water Content, %

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

Vane Shear Test on Shelby Tubes (Maine DOT)

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

Comments:

AUTHORIZATION AND DISTRIBUTION

Reported by: **GREGORY LIDSTONE**Date Reported: **3/22/2016**

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GEOTECHNICAL TEST REPORT

Central Laboratory

SAMPLE INFORMATION

Reference No. **271247** Boring No./Sample No. **B-14/S-1** Sample Description **GEOTECHNICAL (DISTURBED)** Sampled **2/18/2016** Received **3/3/2016**

Sample Type: **GEOTECHNICAL** Location: Station: **1678+44** Offset, ft: **10.3** LT Dbfg, ft: **0.5-2.5**

WIN/Town **019107.00 - ARUNDEL** Sampler: **CONSULTANT PERSONNEL**

TEST RESULTS

Sieve Analysis (T 27, T 11)

Wash Method

Procedure A

SIEVE SIZE U.S. [SI]	% Passing
3 in. [75.0 mm]	100.0
1 in. [25.0 mm]	90.7
¾ in. [19.0 mm]	90.7
½ in. [12.5 mm]	81.1
⅜ in. [9.5 mm]	78.0
¼ in. [6.3 mm]	70.5
No. 4 [4.75 mm]	66.0
No. 10 [2.00 mm]	55.3
No. 20 [0.850 mm]	43.4
No. 40 [0.425 mm]	32.5
No. 60 [0.250 mm]	25.4
No. 100 [0.150 mm]	19.4
No. 200 [0.075 mm]	13.2

Miscellaneous Tests

Liquid Limit @ 25 blows (T 89), %	
Plastic Limit (T 90), %	
Plasticity Index (T 90), %	
Specific Gravity, Corrected to 20°C (T 100)	
Loss on Ignition, % (T 267)	
Water Content (T 265), %	3.6

Consolidation (T 216)

Trimming, Water Content, %

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

Vane Shear Test on Shelby Tubes (Maine DOT)

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

Comments:

AUTHORIZATION AND DISTRIBUTION

Reported by: **GREGORY LIDSTONE**

Date Reported: **3/22/2016**

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GEOTECHNICAL TEST REPORT

Central Laboratory

SAMPLE INFORMATION

Reference No. **271248** Boring No./Sample No. **B-14/S-2** Sample Description **GEOTECHNICAL (DISTURBED)** Sampled **2/18/2016** Received **3/3/2016**

Sample Type: **GEOTECHNICAL** Location: Station: **1678+44** Offset, ft: **10.3** LT Dbfg, ft: **2.5-4.5**

WIN/Town **019107.00 - ARUNDEL** Sampler: **CONSULTANT PERSONNEL**

TEST RESULTS

Sieve Analysis (T 27, T 11)

Wash Method

Procedure A

SIEVE SIZE U.S. [SI]	% Passing
3 in. [75.0 mm]	
1 in. [25.0 mm]	
¾ in. [19.0 mm]	
½ in. [12.5 mm]	
⅜ in. [9.5 mm]	100.0
¼ in. [6.3 mm]	97.9
No. 4 [4.75 mm]	97.4
No. 10 [2.00 mm]	93.6
No. 20 [0.850 mm]	88.0
No. 40 [0.425 mm]	72.9
No. 60 [0.250 mm]	52.7
No. 100 [0.150 mm]	35.4
No. 200 [0.075 mm]	23.5

Miscellaneous Tests

Liquid Limit @ 25 blows (T 89), %	
Plastic Limit (T 90), %	
Plasticity Index (T 90), %	
Specific Gravity, Corrected to 20°C (T 100)	
Loss on Ignition, % (T 267)	
Water Content (T 265), %	22.1

Consolidation (T 216)

Trimming, Water Content, %

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

Vane Shear Test on Shelby Tubes (Maine DOT)

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

Comments:

AUTHORIZATION AND DISTRIBUTION

Reported by: **GREGORY LIDSTONE**Date Reported: **3/18/2016**

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GEOTECHNICAL TEST REPORT

Central Laboratory

SAMPLE INFORMATION

Reference No. **271249** Boring No./Sample No. **B-15/S-1** Sample Description **GEOTECHNICAL (DISTURBED)** Sampled **2/18/2016** Received **3/3/2016**

Sample Type: **GEOTECHNICAL** Location: Station: **1679+41.1** Offset, ft: **11.8** LT Dbfg, ft: **0.5-2.5**

WIN/Town **019107.00 - ARUNDEL** Sampler: **CONSULTANT PERSONNEL**

TEST RESULTS

Sieve Analysis (T 27, T 11)

Wash Method

Procedure A

SIEVE SIZE U.S. [SI]	% Passing
3 in. [75.0 mm]	100.0
1 in. [25.0 mm]	96.1
¾ in. [19.0 mm]	91.5
½ in. [12.5 mm]	80.2
⅜ in. [9.5 mm]	75.8
¼ in. [6.3 mm]	69.3
No. 4 [4.75 mm]	64.3
No. 10 [2.00 mm]	53.8
No. 20 [0.850 mm]	43.2
No. 40 [0.425 mm]	32.5
No. 60 [0.250 mm]	26.5
No. 100 [0.150 mm]	20.8
No. 200 [0.075 mm]	13.0

Miscellaneous Tests

Liquid Limit @ 25 blows (T 89), %	
Plastic Limit (T 90), %	
Plasticity Index (T 90), %	
Specific Gravity, Corrected to 20°C (T 100)	
Loss on Ignition, % (T 267)	
Water Content (T 265), %	5.7

Consolidation (T 216)

Trimming, Water Content, %

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

Vane Shear Test on Shelby Tubes (Maine DOT)

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

Comments:

AUTHORIZATION AND DISTRIBUTION

Reported by: **GREGORY LIDSTONE**Date Reported: **3/22/2016**

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GEOTECHNICAL TEST REPORT

Central Laboratory

SAMPLE INFORMATION

Reference No. **271250** Boring No./Sample No. **B-15/S-2** Sample Description **GEOTECHNICAL (DISTURBED)** Sampled **2/19/2016** Received **3/3/2016**

Sample Type: **GEOTECHNICAL** Location: Station: **1679+41.1** Offset, ft: **11.8** LT Dbfg, ft: **2.5-4.5**

WIN/Town **019107.00 - ARUNDEL** Sampler: **CONSULTANT PERSONNEL**

TEST RESULTS

Sieve Analysis (T 88)

Wash Method

SIEVE SIZE U.S. [SI]	% Passing
3 in. [75.0 mm]	
1 in. [25.0 mm]	100.0
¾ in. [19.0 mm]	95.9
½ in. [12.5 mm]	93.1
⅜ in. [9.5 mm]	93.1
¼ in. [6.3 mm]	91.6
No. 4 [4.75 mm]	90.1
No. 10 [2.00 mm]	85.0
No. 20 [0.850 mm]	
No. 40 [0.425 mm]	66.1
No. 60 [0.250 mm]	
No. 100 [0.150 mm]	
No. 200 [0.075 mm]	30.7
[0.0352 mm]	28.2
[0.0227 mm]	23.5
[0.0134 mm]	18.8
[0.0096 mm]	16.5
[0.0069 mm]	11.7
[0.0034 mm]	9.4
[0.0014 mm]	7.1

Miscellaneous Tests

Liquid Limit @ 25 blows (T 89), %	
Plastic Limit (T 90), %	
Plasticity Index (T 90), %	
Specific Gravity, Corrected to 20°C (T 100)	2.60
Loss on Ignition, % (T 267)	
Water Content (T 265), %	18.1

Consolidation (T 216)

Trimming, Water Content, %

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

Vane Shear Test on Shelby Tubes (Maine DOT)

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

Comments:

AUTHORIZATION AND DISTRIBUTION

Reported by: **GREGORY LIDSTONE**

Date Reported: **3/24/2016**

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GEOTECHNICAL TEST REPORT

Central Laboratory

SAMPLE INFORMATION

Reference No. **242684** Boring No./Sample No. **B-17/S-1** Sample Description **GEOTECHNICAL (DISTURBED)** Sampled **2/18/2016** Received **3/3/2016**

Sample Type: **GEOTECHNICAL** Location: Station: **1681+71.2** Offset, ft: **11.2** LT Dbfg, ft: **0.5-2.5**

WIN/Town **019107.00 - ARUNDEL** Sampler: **CONSULTANT PERSONNEL**

TEST RESULTS

Sieve Analysis (T 27, T 11)

Wash Method

Procedure A

SIEVE SIZE U.S. [SI]	% Passing
3 in. [75.0 mm]	
1 in. [25.0 mm]	100.0
¾ in. [19.0 mm]	98.1
½ in. [12.5 mm]	89.7
⅜ in. [9.5 mm]	86.0
¼ in. [6.3 mm]	80.0
No. 4 [4.75 mm]	76.0
No. 10 [2.00 mm]	64.8
No. 20 [0.850 mm]	52.0
No. 40 [0.425 mm]	40.4
No. 60 [0.250 mm]	31.8
No. 100 [0.150 mm]	26.4
No. 200 [0.075 mm]	17.7

Miscellaneous Tests

Liquid Limit @ 25 blows (T 89), %	
Plastic Limit (T 90), %	
Plasticity Index (T 90), %	
Specific Gravity, Corrected to 20°C (T 100)	
Loss on Ignition, % (T 267)	
Water Content (T 265), %	10.5

Consolidation (T 216)

Trimming, Water Content, %

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

Vane Shear Test on Shelby Tubes (Maine DOT)

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

Comments:

AUTHORIZATION AND DISTRIBUTION

Reported by: **GREGORY LIDSTONE**Date Reported: **3/18/2016**

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GEOTECHNICAL TEST REPORT

Central Laboratory

SAMPLE INFORMATION

Reference No. **242685** Boring No./Sample No. **B-17/S-2** Sample Description **GEOTECHNICAL (DISTURBED)** Sampled **2/18/2016** Received **3/3/2016**

Sample Type: **GEOTECHNICAL** Location: Station: **1681+71.2** Offset, ft: **11.2** LT Dbfg, ft: **2.5-4.5**

WIN/Town **019107.00 - ARUNDEL** Sampler: **CONSULTANT PERSONNEL**

TEST RESULTS

Sieve Analysis (T 27, T 11)

Wash Method

Procedure A

SIEVE SIZE U.S. [SI]	% Passing
3 in. [75.0 mm]	
1 in. [25.0 mm]	
¾ in. [19.0 mm]	
½ in. [12.5 mm]	100.0
⅜ in. [9.5 mm]	94.2
¼ in. [6.3 mm]	78.8
No. 4 [4.75 mm]	69.4
No. 10 [2.00 mm]	45.9
No. 20 [0.850 mm]	30.3
No. 40 [0.425 mm]	21.9
No. 60 [0.250 mm]	16.2
No. 100 [0.150 mm]	12.9
No. 200 [0.075 mm]	8.5

Miscellaneous Tests

Liquid Limit @ 25 blows (T 89), %	
Plastic Limit (T 90), %	
Plasticity Index (T 90), %	
Specific Gravity, Corrected to 20°C (T 100)	
Loss on Ignition, % (T 267)	
Water Content (T 265), %	15.4

Consolidation (T 216)

Trimming, Water Content, %

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

Vane Shear Test on Shelby Tubes (Maine DOT)

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

Comments:

AUTHORIZATION AND DISTRIBUTION

Reported by: **GREGORY LIDSTONE**Date Reported: **3/22/2016**

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GEOTECHNICAL TEST REPORT

Central Laboratory

SAMPLE INFORMATION

Reference No.

Boring No./Sample No.

Sample Description

Sampled

Received

242686

B-18/S-2

GEOTECHNICAL (DISTURBED)

2/18/2016

3/3/2016

Sample Type: **GEOTECHNICAL** Location:

Station: **1682+54.7** Offset, ft: **9.0** LT Dbfg, ft: **2.5-4.5**

WIN/Town 019107.00 - ARUNDEL

Sampler: **CONSULTANT PERSONNEL**

TEST RESULTS

Sieve Analysis (T 27, T 11)

Wash Method

Procedure A

SIEVE SIZE U.S. [SI]	% Passing
3 in. [75.0 mm]	
1 in. [25.0 mm]	
¾ in. [19.0 mm]	
½ in. [12.5 mm]	100.0
⅜ in. [9.5 mm]	99.4
¼ in. [6.3 mm]	98.4
No. 4 [4.75 mm]	97.3
No. 10 [2.00 mm]	94.2
No. 20 [0.850 mm]	89.7
No. 40 [0.425 mm]	77.5
No. 60 [0.250 mm]	62.0
No. 100 [0.150 mm]	44.8
No. 200 [0.075 mm]	31.2

Miscellaneous Tests

Liquid Limit @ 25 blows (T 89), %	
Plastic Limit (T 90), %	
Plasticity Index (T 90), %	
Specific Gravity, Corrected to 20°C (T 100)	
Loss on Ignition, % (T 267)	
Water Content (T 265), %	24.8

Consolidation (T 216)

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

Vane Shear Test on Shelby Tubes (Maine DOT)

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

Comments:

AUTHORIZATION AND DISTRIBUTION

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Date Reported: **3/22/2016**

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GEOTECHNICAL TEST REPORT

Central Laboratory

SAMPLE INFORMATION

Reference No. **242687** Boring No./Sample No. **B-19/S-1** Sample Description **GEOTECHNICAL (DISTURBED)** Sampled **2/18/2016** Received **3/3/2016**

Sample Type: **GEOTECHNICAL** Location: Station: **1684+00** Offset, ft: **10.7 LT** Dbfg, ft: **0.5-2.5**

WIN/Town **019107.00 - ARUNDEL** Sampler: **CONSULTANT PERSONNEL**

TEST RESULTS

Sieve Analysis (T 27, T 11)

Wash Method

Procedure A

SIEVE SIZE U.S. [SI]	% Passing
3 in. [75.0 mm]	
1 in. [25.0 mm]	100.0
¾ in. [19.0 mm]	93.8
½ in. [12.5 mm]	80.1
⅜ in. [9.5 mm]	77.0
¼ in. [6.3 mm]	65.8
No. 4 [4.75 mm]	60.2
No. 10 [2.00 mm]	48.6
No. 20 [0.850 mm]	38.9
No. 40 [0.425 mm]	29.9
No. 60 [0.250 mm]	23.2
No. 100 [0.150 mm]	18.4
No. 200 [0.075 mm]	11.7

Miscellaneous Tests

Liquid Limit @ 25 blows (T 89), %	
Plastic Limit (T 90), %	
Plasticity Index (T 90), %	
Specific Gravity, Corrected to 20°C (T 100)	
Loss on Ignition, % (T 267)	
Water Content (T 265), %	8.2

Consolidation (T 216)

Trimming, Water Content, %

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

Vane Shear Test on Shelby Tubes (Maine DOT)

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

Comments:

AUTHORIZATION AND DISTRIBUTION

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GEOTECHNICAL TEST REPORT

Central Laboratory

SAMPLE INFORMATION

Reference No. **242688** Boring No./Sample No. **B-20/S1** Sample Description **GEOTECHNICAL (DISTURBED)** Sampled **2/18/2016** Received **3/3/2016**

Sample Type: **GEOTECHNICAL** Location: Station: **1685+64.8** Offset, ft: **14.6** LT Dbfg, ft: **0.5-2.5**

WIN/Town **019107.00 - ARUNDEL** Sampler: **CONSULTANT PERSONNEL**

TEST RESULTS

Sieve Analysis (T 27, T 11)

Wash Method

Procedure A

SIEVE SIZE U.S. [SI]	% Passing
3 in. [75.0 mm]	
1 in. [25.0 mm]	
¾ in. [19.0 mm]	100.0
½ in. [12.5 mm]	98.6
⅜ in. [9.5 mm]	94.6
¼ in. [6.3 mm]	86.3
No. 4 [4.75 mm]	82.0
No. 10 [2.00 mm]	70.6
No. 20 [0.850 mm]	55.2
No. 40 [0.425 mm]	39.6
No. 60 [0.250 mm]	30.5
No. 100 [0.150 mm]	22.9
No. 200 [0.075 mm]	15.6

Miscellaneous Tests

Liquid Limit @ 25 blows (T 89), %	
Plastic Limit (T 90), %	
Plasticity Index (T 90), %	
Specific Gravity, Corrected to 20°C (T 100)	
Loss on Ignition, % (T 267)	
Water Content (T 265), %	10.6

Consolidation (T 216)

Trimming, Water Content, %

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

Vane Shear Test on Shelby Tubes (Maine DOT)

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

Comments:

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GEOTECHNICAL TEST REPORT

Central Laboratory

SAMPLE INFORMATION

Reference No. **242689** Boring No./Sample No. **B-20/S-2** Sample Description **GEOTECHNICAL (DISTURBED)** Sampled **2/18/2016** Received **3/3/2016**

Sample Type: **GEOTECHNICAL** Location: Station: **1685+64.8** Offset, ft: **14.6** LT Dbfg, ft: **2.5-4.5**

WIN/Town **019107.00 - ARUNDEL** Sampler: **CONSULTANT PERSONNEL**

TEST RESULTS

Sieve Analysis (T 27, T 11)

Wash Method

Procedure A

SIEVE SIZE U.S. [SI]	% Passing
3 in. [75.0 mm]	
1 in. [25.0 mm]	
¾ in. [19.0 mm]	100.0
½ in. [12.5 mm]	95.8
⅜ in. [9.5 mm]	90.4
¼ in. [6.3 mm]	85.2
No. 4 [4.75 mm]	80.1
No. 10 [2.00 mm]	64.9
No. 20 [0.850 mm]	41.5
No. 40 [0.425 mm]	22.6
No. 60 [0.250 mm]	13.0
No. 100 [0.150 mm]	8.1
No. 200 [0.075 mm]	4.7

Miscellaneous Tests

Liquid Limit @ 25 blows (T 89), %	
Plastic Limit (T 90), %	
Plasticity Index (T 90), %	
Specific Gravity, Corrected to 20°C (T 100)	
Loss on Ignition, % (T 267)	
Water Content (T 265), %	11.7

Consolidation (T 216)

Trimming, Water Content, %

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

Vane Shear Test on Shelby Tubes (Maine DOT)

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

Comments:

AUTHORIZATION AND DISTRIBUTION

Reported by: **GREGORY LIDSTONE**Date Reported: **3/18/2016**

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GEOTECHNICAL TEST REPORT

Central Laboratory

SAMPLE INFORMATION

Reference No. **242690** Boring No./Sample No. **B-20/S-3A** Sample Description **GEOTECHNICAL (DISTURBED)** Sampled **2/18/2016** Received **3/3/2016**

Sample Type: **GEOTECHNICAL** Location: Station: **1685+64.8** Offset, ft: **14.6** LT Dbfg, ft: **8.0-9.0**

WIN/Town **019107.00 - ARUNDEL** Sampler: **CONSULTANT PERSONNEL**

TEST RESULTS

Sieve Analysis (T 27, T 11)

Wash Method

Procedure A

SIEVE SIZE U.S. [SI]	% Passing
3 in. [75.0 mm]	
1 in. [25.0 mm]	
¾ in. [19.0 mm]	
½ in. [12.5 mm]	
⅜ in. [9.5 mm]	
¼ in. [6.3 mm]	100.0
No. 4 [4.75 mm]	99.8
No. 10 [2.00 mm]	99.3
No. 20 [0.850 mm]	97.9
No. 40 [0.425 mm]	94.4
No. 60 [0.250 mm]	77.7
No. 100 [0.150 mm]	35.4
No. 200 [0.075 mm]	4.8

Miscellaneous Tests

Liquid Limit @ 25 blows (T 89), %	
Plastic Limit (T 90), %	
Plasticity Index (T 90), %	
Specific Gravity, Corrected to 20°C (T 100)	
Loss on Ignition, % (T 267)	
Water Content (T 265), %	24.5

Consolidation (T 216)

Trimming, Water Content, %

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

Vane Shear Test on Shelby Tubes (Maine DOT)

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

Comments:

AUTHORIZATION AND DISTRIBUTION

Reported by: **GREGORY LIDSTONE**

Date Reported: **3/17/2016**

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GEOTECHNICAL TEST REPORT

Central Laboratory

SAMPLE INFORMATION

Reference No. **242691** Boring No./Sample No. **B-20/S-3B** Sample Description **GEOTECHNICAL (DISTURBED)** Sampled **2/18/2016** Received **3/3/2016**

Sample Type: **GEOTECHNICAL** Location: Station: **1685+64.8** Offset, ft: **14.6** LT Dbfg, ft: **9.0-10.0**

WIN/Town **019107.00 - ARUNDEL** Sampler: **CONSULTANT PERSONNEL**

TEST RESULTS

Sieve Analysis (T 27)

Wash Method

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

Miscellaneous Tests

Liquid Limit @ 25 blows (T 89), %	27
Plastic Limit (T 90), %	18
Plasticity Index (T 90), %	9
Specific Gravity, Corrected to 20°C (T 100)	
Loss on Ignition, % (T 267)	
Water Content (T 265), %	26.7

Consolidation (T 216)

Trimming, Water Content, %

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

Vane Shear Test on Shelby Tubes (Maine DOT)

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

Comments:

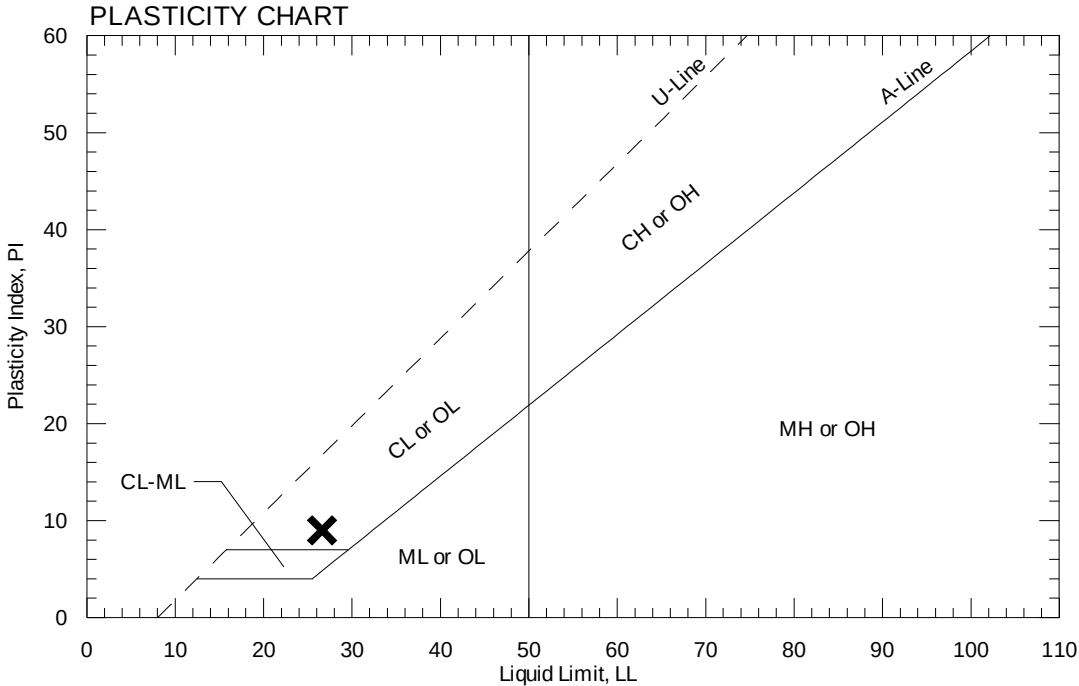
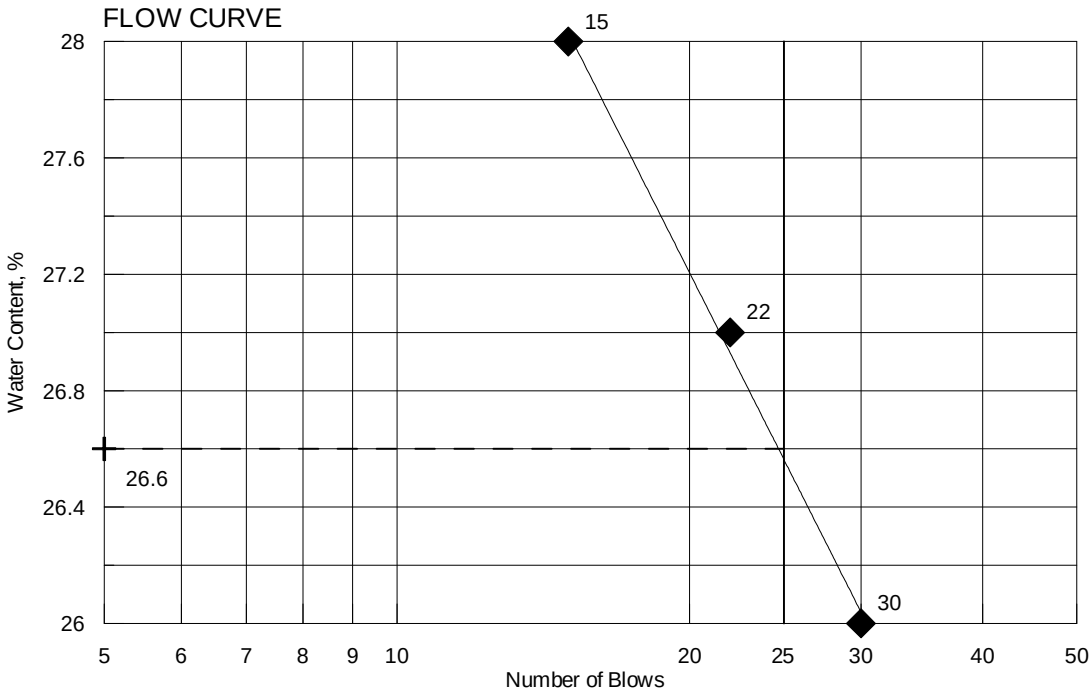
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Reported by: **GREGORY LIDSTONE**

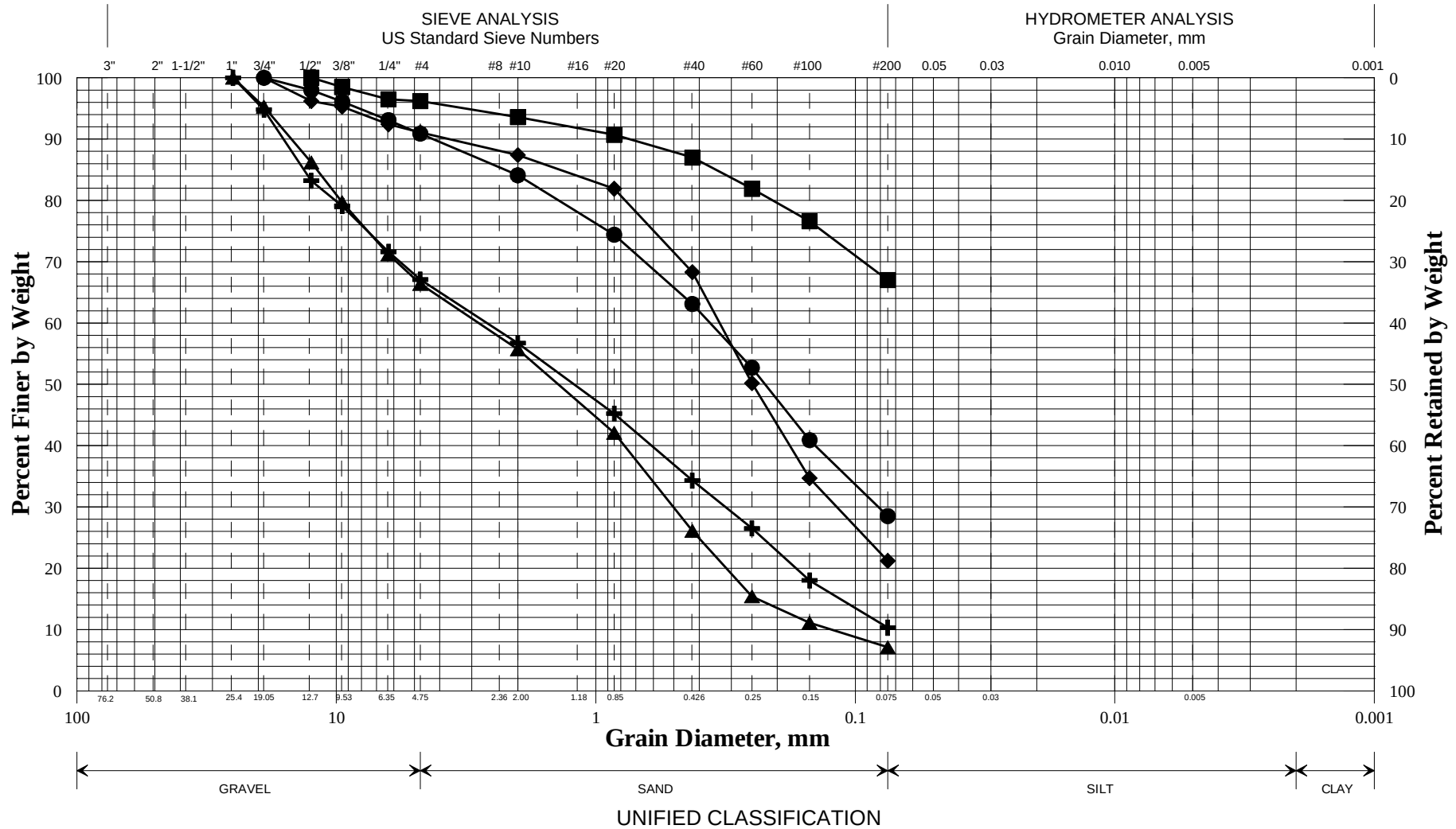
Date Reported: **3/24/2016**

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TOWN	Arundel	Reference No.	242691
WIN	019107.00	Water Content, %	26.7
Sampled	2/18/2016	Liquid Limit @ 25 blows (T 89), %	27
Boring No./Sample No.	B-20/S-3B	Plastic Limit (T 90), %	18
Station	1685+64.8	Plasticity Index (T 90), %	9
Depth	9.0-10.0	Tested By	BBURR



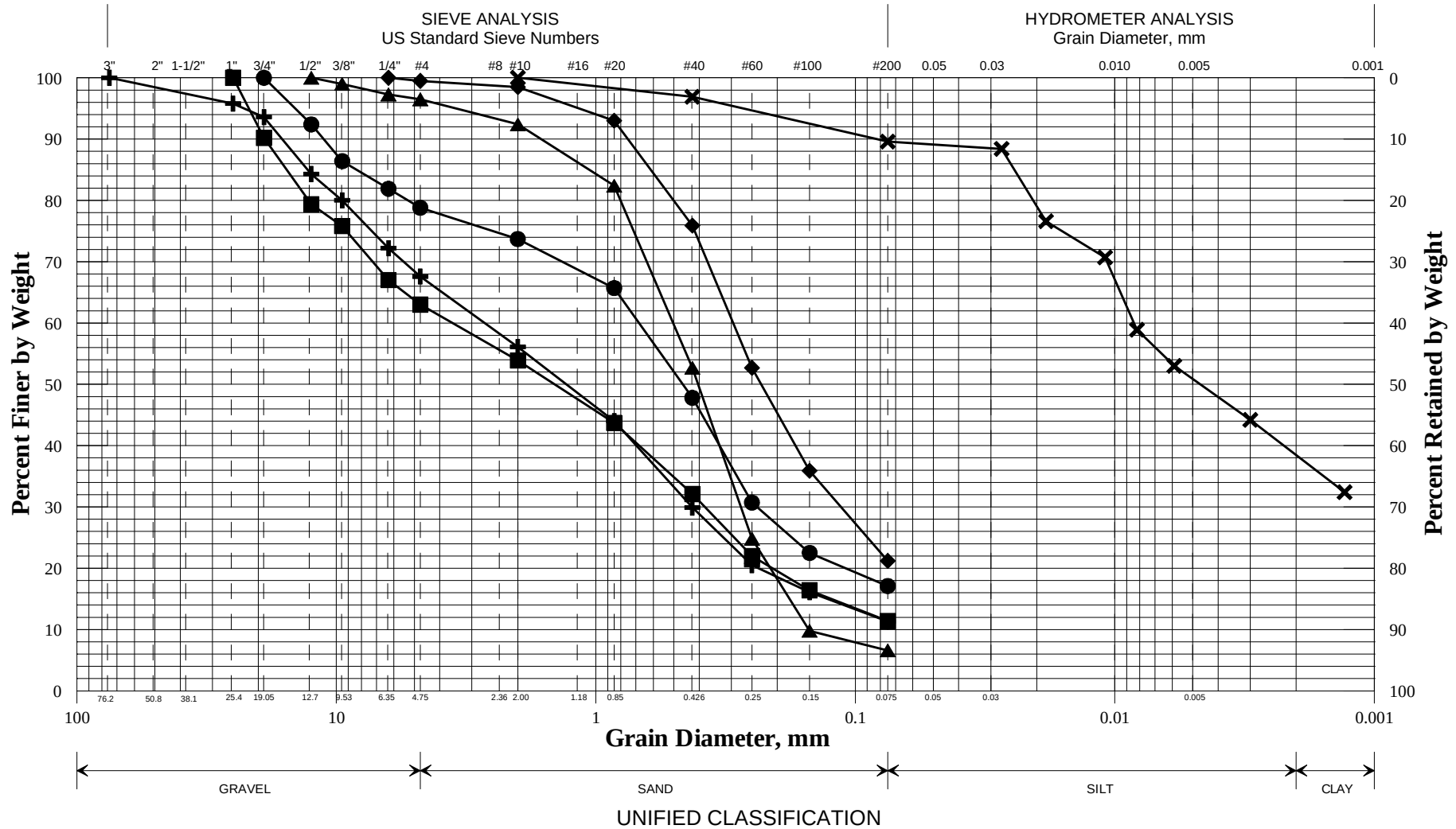
State of Maine Department of Transportation
GRAIN SIZE DISTRIBUTION CURVE



	Boring/Sample No.	Station	Offset, ft	Depth, ft	Description	W, %	LL	PL	PI
+	B-2/S-1	1657+27.7	13.2 LT	0.5-2.5	SAND, some gravel, little silt.	7.4			
◆	B-2/S-2	1657+27.7	13.2 LT	2.5-4.5	SAND, some silt, trace gravel.	11.9			
■	B-2/S-3	1657+27.7	13.2 LT	5.0-7.0	SILT, some sand, trace gravel.	18.4			
●	B-3/S-3	1658+84.4	10.8 LT	5.0-7.0	SAND, some silt, trace gravel.	14.2			
▲	B-4/S-1	1659+58.4	13.0 LT	0.5-2.5	SAND, some gravel, trace silt.	8.0			
×									

WIN
019107.00
Town
Arundel
Reported by/Date
WHITE, TERRY A 3/28/2016

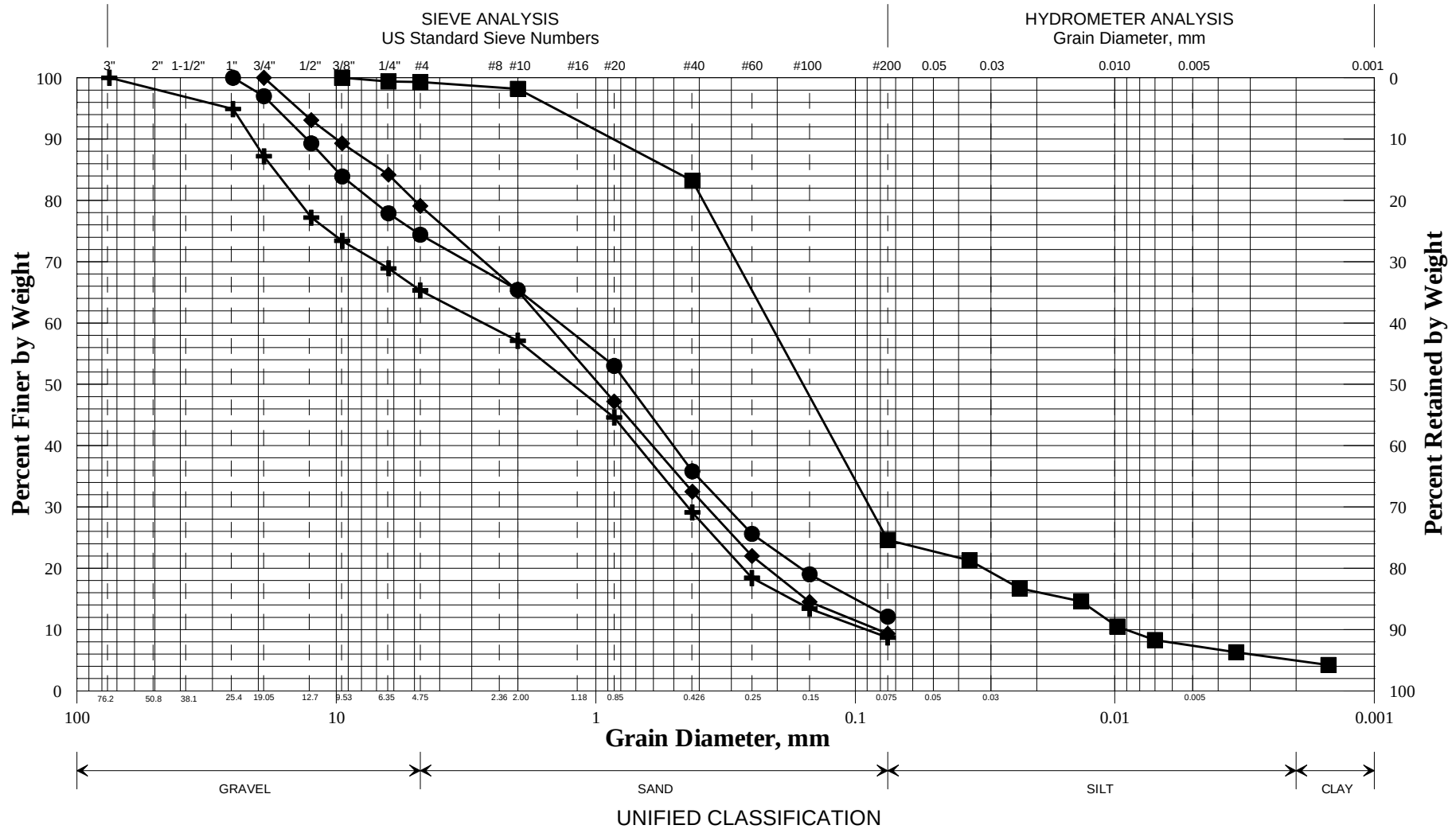
State of Maine Department of Transportation
GRAIN SIZE DISTRIBUTION CURVE



	Boring/Sample No.	Station	Offset, ft	Depth, ft	Description	W, %	LL	PL	PI
+	B-5/S-1	1660+49.1	12.0 LT	0.5-2.5	SAND, some gravel, little silt.	7.2			
◆	B-6/S-2	1661+17.8	12.1 LT	2.5-4.5	SAND, some silt, trace gravel.	13.5			
■	B-7/S-1A	1661+63.2	98.3 LT	0.0-2.0	Gravelly SAND, little silt.	6.9			
●	B-7/S-1B	1661+63.2	98.3 LT	0.0-1.0	SAND, some gravel, little silt.	10.3			
▲	B-7/S-2A	1661+63.2	98.3 LT	1.0-2.0	SAND, trace silt, trace gravel.	7.5			
×	B-7/S-2B	1661+63.2	98.3 LT	3.0-4.0	Clayey SILT, trace sand.	23.4			

WIN	
019107.00	
Town	
Arundel	
Reported by/Date	
WHITE, TERRY A	3/28/2016

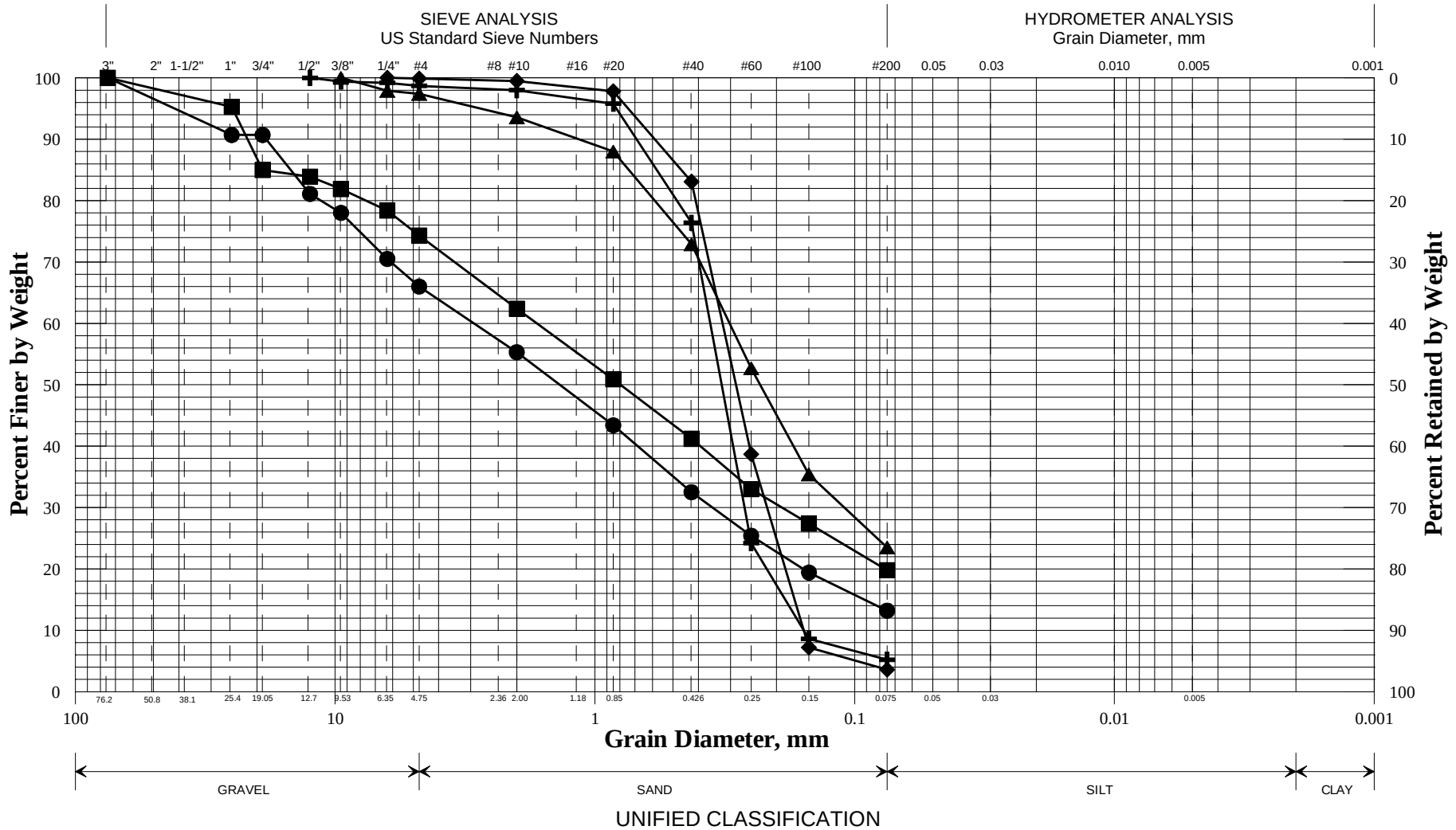
State of Maine Department of Transportation
GRAIN SIZE DISTRIBUTION CURVE



	Boring/Sample No.	Station	Offset, ft	Depth, ft	Description	W, %	LL	PL	PI
+	B-8/S-1	1664+09.9	9.6 LT	0.5-2.5	SAND, some gravel, trace silt.	3.7			
◆	B-9/S-2	1665+08.9	12.1 LT	2.5-4.5	SAND, some garvel, trace silt.	6.1			
■	B-9/S-3A	1665+08.9	12.1 LT	5.0-6.0	SAND, little silt, trace clay, trace gravel.	12.0			
●	B-10/S-1	1666+13.1	10.2 LT	0.5-2.5	SAND, some gravel, little silt.	5.1			
▲									
×									

WIN
019107.00
Town
Arundel
Reported by/Date
WHITE, TERRY A 3/28/2016

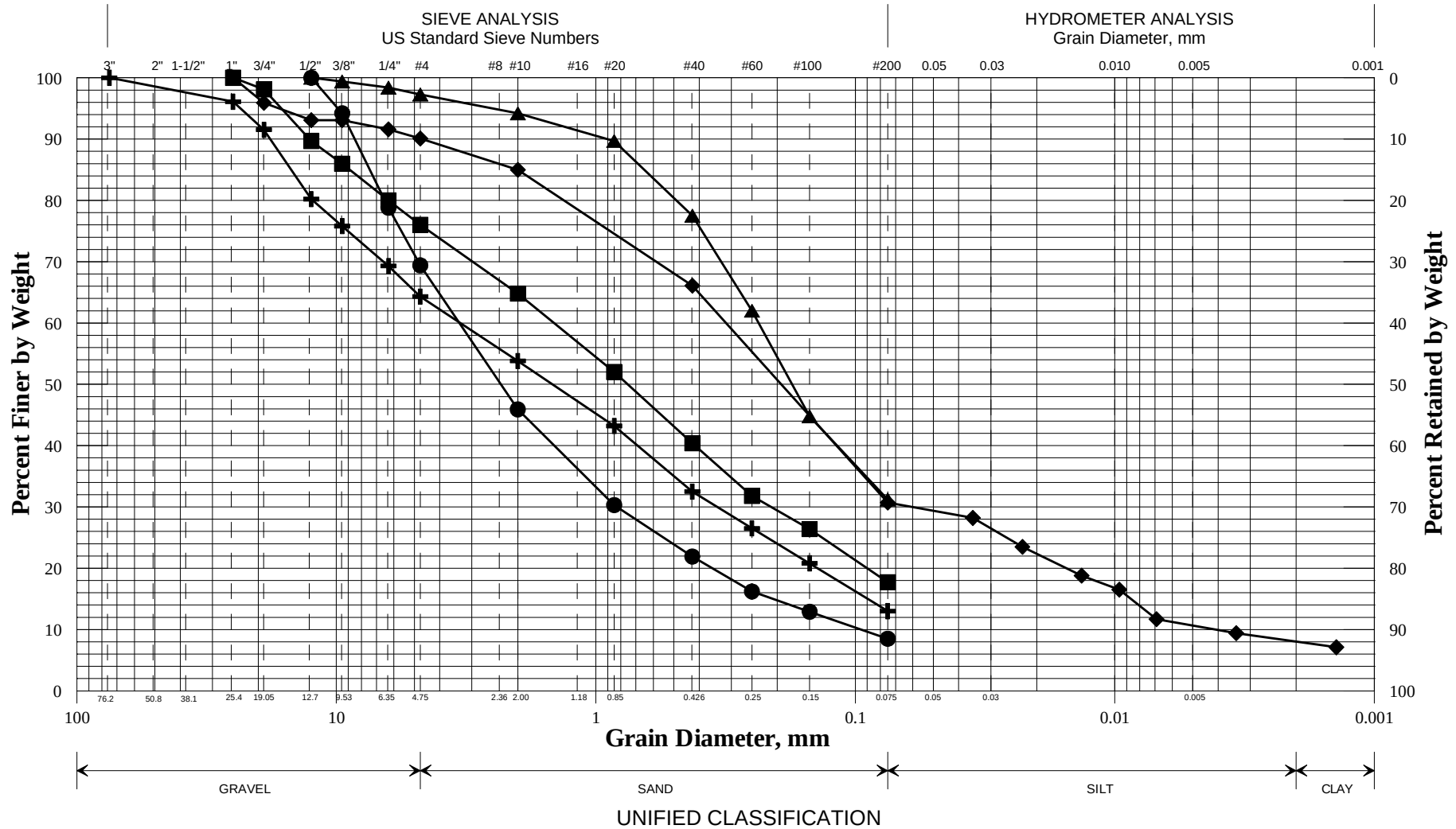
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GRAIN SIZE DISTRIBUTION CURVE



	Boring/Sample No.	Station	Offset, ft	Depth, ft	Description	W, %	LL	PL	PI
+	B-11/S-1	1675+57.7	16.5 LT	0.5-2.5	SAND, trace silt, trace gravel.	9.9			
◆	B-11/S-2	1675+57.7	16.5 LT	2.5-4.5	SAND, trace silt, trace gravel.	21.3			
■	B-13/S-2	1677+57.2	11.3 LT	2.5-4.5	SAND, some gravel, little silt.	11.5			
●	B-14/S-1	1678+44	10.3 LT	0.5-2.5	SAND, some gravel, little silt.	3.6			
▲	B-14/S-2	1678+44	10.3 LT	2.5-4.5	SAND, some silt, trace gravel.	22.1			
×									

WIN
019107.00
Town
Arundel
Reported by/Date
WHITE, TERRY A 3/28/2016

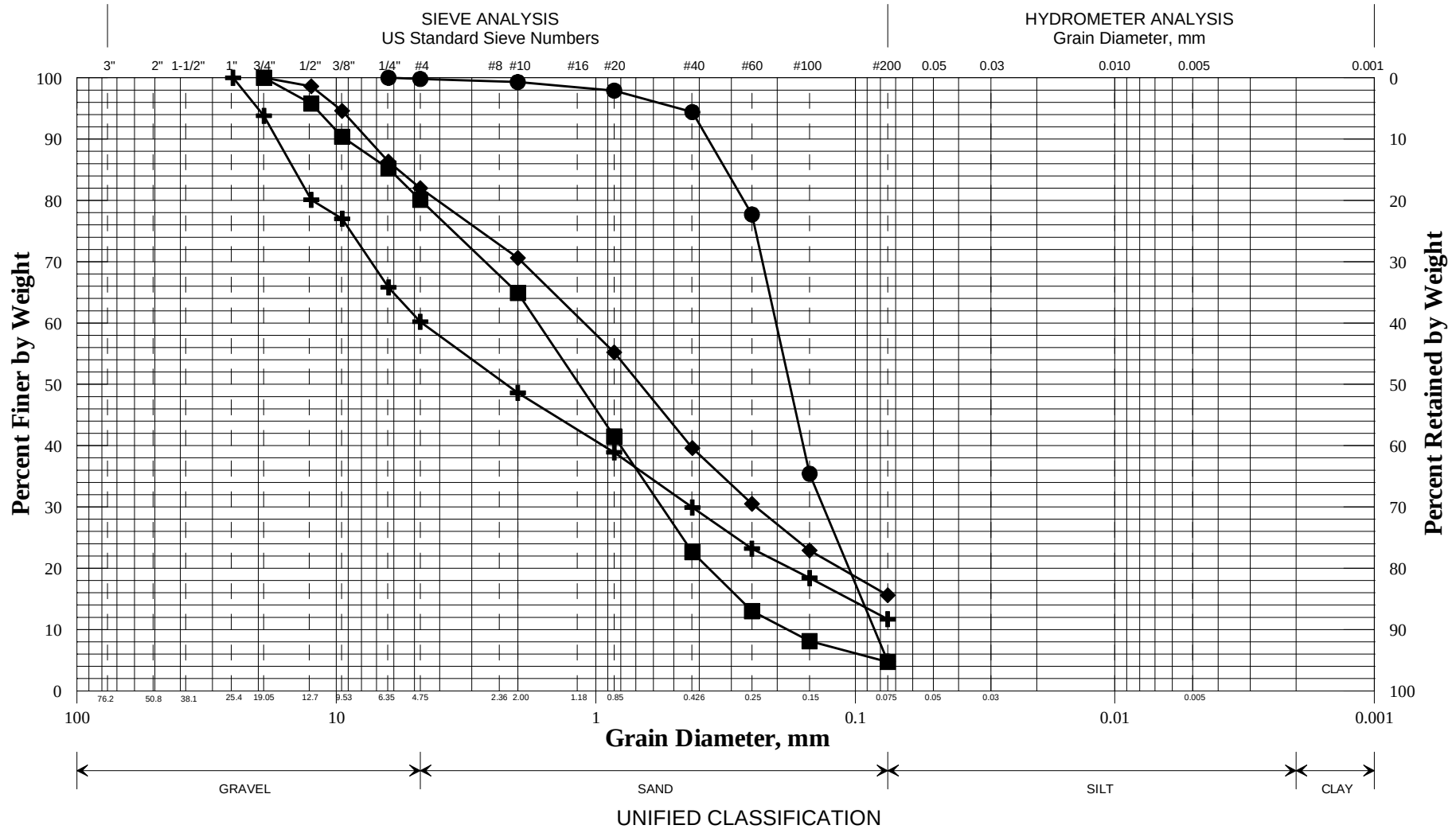
State of Maine Department of Transportation
GRAIN SIZE DISTRIBUTION CURVE



	Boring/Sample No.	Station	Offset, ft	Depth, ft	Description	W, %	LL	PL	PI
+	B-15/S-1	1679+41.1	11.8 LT	0.5-2.5	Gravelly SAND, little silt.	5.7			
◆	B-15/S-2	1679+41.1	11.8 LT	2.5-4.5	SAND, some silt, trace gravel, trace clay.	18.1			
■	B-17/S-1	1681+71.2	11.2 LT	0.5-2.5	SAND, some gravel, little silt.	10.5			
●	B-17/S-2	1681+71.2	11.2 LT	2.5-4.5	SAND, some gravel, trace silt.	15.4			
▲	B-18/S-2	1682+54.7	9.0 LT	2.5-4.5	SAND, some silt, trace gravel.	24.8			
×									

WIN
019107.00
Town
Arundel
Reported by/Date
WHITE, TERRY A 3/28/2016

State of Maine Department of Transportation
GRAIN SIZE DISTRIBUTION CURVE



	Boring/Sample No.	Station	Offset, ft	Depth, ft	Description	W, %	LL	PL	PI
+	B-19/S-1	1684+00	10.7 LT	0.5-2.5	Gravelly SAND, little silt.	8.2			
◆	B-20/S1	1685+64.8	14.6 LT	0.5-2.5	SAND, little gravel, little silt.	10.6			
■	B-20/S-2	1685+64.8	14.6 LT	2.5-4.5	SAND, little gravel, trace silt.	11.7			
●	B-20/S-3A	1685+64.8	14.6 LT	8.0-9.0	SAND, trace silt, trace gravel.	24.5			
▲									
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WIN	
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