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GEOTECHNICAL DATA REPORT
DRUMMOND ROAD BRIDGE NO. 5784 OVER INTERSTATE 95
MAINE DOT WIN 29486.00 (LEGACY WIN 25469.00)
SIDNEY, MAINE

June 2025
09.0026242.00

Prepared for:
Maine Department of Transportation
Augusta, Maine

Prepared by:
GZA GeoEnvironmental, Inc.
707 Sable Oaks Drive | Suite 150 | South Portland, Maine 04106
207.879.9190

31 Offices Nationwide
www.gza.com

TABLE OF CONTENTS

TABLES

FIGURES

APPENDICES

1.0 INTRODUCTION

We are pleased to provide this Geotechnical Data Report, which includes geotechnical data related to the replacement of Maine Department of Transportation (MaineDOT) Drummond Road Bridges No. 5784 in Sidney, Maine. Our work was completed in accordance with GZA GeoEnvironmental, Inc.'s Project Contract for the above referenced project dated July 22, 2024, and our Proposal No. 09.P000130.24d, dated December 18, 2023, and the Limitations included in **Appendix A** of this report.

1.1 BACKGROUND

The existing Drummond Road Bridge No. 5784 was constructed circa 1958 and spans west to east carrying Drummond Road over Interstate 95 (I-95), as shown in **Figure 1**. Bridge No. 5784 is a 245-foot-long, four-span, continuous bridge with steel beams and a reinforced concrete deck. The bridge is 29 feet wide and supported by concrete piers and concrete stub abutments.

The 1958 as-built plans indicate that the two stub abutments are supported by HP 10x42 piles that are either plumb or battered at 2.5:12. Abutments 1 and 2 are each supported by 10 piles. The plans indicate an allowable pile design capacity of 30 tons. The piles supporting the abutments were estimated to be between 20 and 42 feet long. The three pier stems are shown to be supported by spread footings bearing on bedrock. A design bearing capacity is not shown on the plans. The existing approach embankments are approximately 17 to 20 feet above original grades. The available historic foundation drawings are attached in **Appendix B**.

Elevations referenced in this report are in feet and refer to the North American Vertical Datum of 1988 (NAVD88) unless noted otherwise. Elevations shown on the 1958 drawings are in feet and refer to the National Geodetic Vertical Datum of 1929 (NGVD29). Stantec indicated that a datum shift of approximately - 0.7 feet can be used to convert from NGVD29 to NAVD88.

It is GZA's understanding that a full bridge replacement is planned for this project. The bridge will be designed and constructed as part of a Design-Build bundle. Requirements for on- or off-alignment bridge replacement alternatives will be specified in the MaineDOT Design-Build Request for Proposals (RFP).

1.2 OBJECTIVES AND SCOPE OF SERVICES

The objectives of our work were to collect data on the subsurface conditions as the Owner's Geotechnical Consultant to be provided to prospective Design-Build teams in the MaineDOT Design-Build Request for Proposals (RFP). To meet these objectives, GZA completed the following Scope of Services:

- Conducted a site visit to observe surficial conditions and reviewed existing bridge plans, historical topography, historical geotechnical reports, and mapped surficial and bedrock geology of the site;
- Coordinated and observed a subsurface exploration program, consisting of three test borings, to evaluate subsurface conditions for the bridge;

- Conducted a laboratory testing program to evaluate engineering and index properties of the site soils and bedrock; and
- Prepared this report summarizing our findings.

2.0 SUBSURFACE EXPLORATIONS

Details of the previous and current subsurface explorations are provided in the following sections.

2.1 PREVIOUS (1958) BORING

In 1958, MaineDOT conducted seven test borings, designated Boring #1 through #7 and three soundings designated as #1 through #3, to explore subsurface conditions for bridge construction. All borings drilled for the design of the existing bridges were drilled prior to construction of I-95. At the time, the grades were approximately 17 to 20 feet lower than Drummond Road is today. All of the borings were drilled through the overburden and to bedrock, and approximately 5 feet of core was collected.

The boring log sheets from the 1958 geotechnical report are included in **Appendix B**.

2.2 RECENT BORINGS

GZA completed a preliminary subsurface exploration program consisting of three (3) test borings designated as BB-SDRR-101 through BB-SDRR-103, the locations and designations of which are shown on the attached **Boring Location Plan, Figure 2**. Borings BB-SDRR-101 and -103 were drilled through the approach, about 15 feet behind the face of each abutment, and boring BB-SDRR-102 was drilled through the bridge deck between Pier 3 and Abutment 2. The as-drilled boring locations and elevations were surveyed by MaineDOT, provided to GZA, and are shown on the logs, and on **Figure 2**.

The borings were drilled to depths of approximately 25 to 63 feet below ground surface (bgs) and terminated approximately 10 to 11 feet into bedrock. Seaboard Drilling of Bangor, Maine provided drilling services and coordinated utility clearance. The drilling was completed between July 8 and July 10, 2024. GZA personnel monitored the drilling work and prepared logs of each boring that are included in **Appendix C**.

The borings were drilled using solid stem augers followed by 3-inch or 4-inch casing and drive-and-wash techniques through the overburden and coring equipment in the bedrock. Standard Penetration Testing (SPT) and split-spoon sampling were performed at 5-foot typical intervals in overburden soils. SPTs were conducted according to MaineDOT requirements using an automatic hammer system calibrated in accordance with ASTM D4633-05 and MaineDOT procedures. SPTs were conducted using automatic hammer Seaboard SN367, which had a rated hammer energy transfer ratio of 1.066 at the time of drilling. The drilling subcontractor backfilled the approach boreholes with cuttings or sand and topped them with asphalt cold patch upon completion. The bridge deck was patched with quick-set concrete. Rock core was taken from each boring using NQ2 (2.0-inch diameter) coring equipment.

3.0 LABORATORY TESTING

GZA retained Thielsch Engineering's Geotechnical Laboratory in Cranston, Rhode Island to complete a laboratory testing program to assess the gradation and index properties of the soil and the strength and elastic modulus of bedrock. The testing program is summarized in the table below:

COMPLETED LABORATORY TESTS		
Laboratory Test	**ASTM Standard**	**Number of Tests**
Grain Size Analysis	D6913	9
Hydrometer	D7928	5
Atterberg Limits	D4318	3
Moisture Content	D2216	12
Unconfined Compressive Strength (with axial and lateral strain)	D7012 Method D	2

Results of the testing are included in **Appendix D**.

4.0 SUBSURFACE CONDITIONS

4.1 SURFICIAL AND BEDROCK GEOLOGY

Based on available surficial geologic mapping[1], the surficial soil unit at the site is Presumpscot Formation, which consists of a marine silt, clay, and local sand beds deposited on the late-glacial sea floor. Glacial Till is mapped to the east and west of the site and consists of a poorly sorted mixture of clay, silt, and sand and can include cobbles and boulders. Bedrock outcroppings are mapped to the south of the site.

Bedrock in the vicinity of the site is mapped[2] as the Waterville Formation. The Waterville formation is characterized as fine to medium grained siltstone and claystone pelite and fine grained to very fine grained, non-foliated, quartz-plagioclase, metasandstone.

4.2 SUBSURFACE PROFILE

Three soil units, Fill, Marine Clay, and Glacial Till, were encountered in the test borings underlying approximately 7 to 8 inches of asphalt pavement (in Drummond Road approaches) or 3 inches of topsoil, and overlying bedrock. The thicknesses and generalized descriptions of the soil units are presented in the following table, in descending order from existing ground surface. Detailed descriptions of the materials encountered at specific locations are provided in the boring logs in **Appendix C.**

[1] Hildreth, Carol T., 2005, Surficial geology of the Vassalboro quadrangle, Maine: Maine Geological Survey, Open-File Map 05-8, Map, scale 1:24,000. *Maine Geological Survey Maps*. 1505. http://digitalmaine.com/mgs_maps/1505

[2] Osberg, Philip H., 1968, Stratigraphy, structural geology, and metamorphism of the Waterville-Vassalboro area, Maine: Maine Geological Survey (Department of Economic Development), Bulletin 20, 64 p. report, color map, cross section, scale 1:62,500. Maine Geological Survey Maps. 80. http://digitalmaine.com/mgs_maps/80

INTERPRETED SUBSURFACE CONDITIONS		
Soil Unit	**Approximate Encountered Thickness (ft)**	**Generalized Description**
Fill	17 to 20	Varies from: Brown, loose to very dense, fine to coarse SAND, trace to some gravel, Silty to trace silt to: very dense, GRAVEL, some sand, trace silt road base only. A 10-inch layer of concrete (apparent approach slab) was encountered in boring BB-SDRR-103 at 2.5 to 3.4 feet bgs. Typical MaineDOT Frost Classification Range= I to III Results of 4 Grain Size, 1 Hydrometer, and 4 Moisture Content Analyses: • AASHTO Classifications: A-1-b, A-1-a • USCS Classifications: SM, GW-GM, GM • Moisture Content: 2.0 to 12.6% *Encountered in borings BB-SDRR-101 and BB-SDRR-103*
Marine Clay	5 to 19	Brown to grey, very soft to very stiff, Clayey SILT to Silty CLAY, trace to some sand, trace gravel. Typical MaineDOT Frost Classification Range = III to IV Results of 3 Grain Size, 3 Hydrometer, 3 Atterberg Limits, and 6 Moisture Content Analyses: • AASHTO Classification: A-4(0) • USCS Classifications: CL, ML • Liquid Limit: 32 to 34 • Plastic Limit: 18 to 20 • Plasticity Index: 14 to 16 • Moisture Content: 20.9 to 30.3% *Encountered in all borings*
Glacial Till	< 1 to 9	Brown to grey, dense to very dense, Silty fine to coarse SAND, some gravel. Typical MaineDOT Frost Classification Range= III to IV Results of 2 Grain Size, 1 Hydrometer, and 2 Moisture Content Analyses: • AASHTO Classification: A-4(0) • USCS Classification: SM • Moisture Content: 8.2 to 13.3% *Encountered in all borings*
Estimated Top of Bedrock*	Approx. El. 150 to 133 (32 to 52 feet bgs)	
*Note: Estimated top of bedrock is based on recent borings. Depths to bedrock refer to ground surface at either Drummond Road (approach/abutment borings) or I-95 (pier borings).		

4.2.1 Bedrock

Bedrock was encountered beneath the glacial till stratum in each boring and was described as Pelite of the Waterville Formation. Pelite was generally described as medium hard to hard, slightly weathered, medium grained, and grey. Joints in the Pelite were characterized as very close to moderately spaced, horizontal to moderately dipping, rough, undulating, discolored, and tight to partially open, with occasional Quartzite laminae and intrusions up to approximately 1.5 feet thick. The RQD ranged from 53 to 97 percent, indicating a Rock Quality of Fair to Excellent. The bedrock core data are summarized in **Table 2**. Wet and dry photographs of the collected rock core are included in **Appendix E**.

Unconfined compressive strength and elastic modulus tests were conducted on two rock specimens, the results of which are summarized in the following table.

SUMMARY OF BEDROCK STRENGTH TEST RESULTS						
Boring	**Depth below Existing Ground (ft)**	**Depth below Top of Rock (ft)**	**Unconfined Compressive Strength (psi)**	**Secant Modulus @ 50% of Failure Stress (ksi)**	**Unit Weight (pcf)**	**Rock Type**
BB-SDRR-102	18.8	3.0	5,548	2,030	174.0	Pelite
BB-SDRR-103	56.4	4.3	5,442	5,130	175.9	Pelite

4.2.3 Groundwater

Groundwater depth was measured in all borings. Groundwater depths ranged from approximately 0 to 23.5 feet, corresponding to approximately El. 166.1 to El. 169.9. Groundwater levels in the borings were measured during or immediately after drilling and were likely affected by cased drilling procedures, which included introduction of water for drilling purposes.

The groundwater observations were made at the times and under the conditions stated in the boring logs. Fluctuations in groundwater level occur due to variations in season, precipitation, and construction activities in the area. Consequently, water levels during construction are likely to vary from those encountered at the time the observations were made.

BMC/ARB/CLS:cc

SIGNATURE PAGE

This report has been prepared and reviewed by:

GZA GEOENVIRONMENTAL, INC.

Blaine Cardali
Senior Project Manager

Christopher L. Snow, P.E.
Consultant/Reviewer

Andrew R. Blaisdell, P.E.
Associate Principal

TABLES

TABLE 1
Summary of Subsurface Explorations
Drummond Road Bridge #5784 over I-95
Sidney, ME
WIN 25469.00

Boring ID	Northing	Easting	Ground Surface El. (ft)	Top of Stratum Elevation						Stratum Thickness					Depth to Bedrock (ft)	Bottom of Boring Depth (ft)	Bottom of Boring El. (ft)	Groundwater	
				Asphalt	Topsoil	Fill	Marine Clay	Glacial Till	Bedrock	Asphalt	Topsoil	Fill	Marine Clay	Glacial Till				El. (ft)	Depth (ft)
BB-SDRR-101	600945.8	1158464.5	187.9	187.9	NE	187.3	169.4	164.4	155.4	0.6	NE	17.9	5.0	9.0	32.5	42.8	145.1	169.9	18.0
BB-SDRR-102	600904.6	1158678.7	166.1	NE	166.1	NE	165.8	150.6	150.3	NE	0.3	NE	15.2	0.3	15.8	25.5	140.6	166.1	0.0
BB-SDRR-103	600892.7	1158738.1	187.8	187.8	NE	187.1	167.5	148.8	135.7	0.7	NE	19.6	18.7	13.1	52.1	63.0	124.8	164.3	23.5

Notes:
1. Refer to the boring logs in Appendix C for additional information.
2. Project elevation datum is North American Vertical Datum (NAVD88), unless noted otherwise.
3. Project coordinates are in survey feet and reference the North American Datum of 1983 (NAD83) Maine Coordinate System 2000 West, unless noted otherwise.
4. As-drilled locations were surveyed by MaineDOT and provided to GZA.
5. Stratum depths, thickness and elevations are rounded to the nearest 0.1 foot as interpreted on the boring logs, but this does not represent the precision of the data.

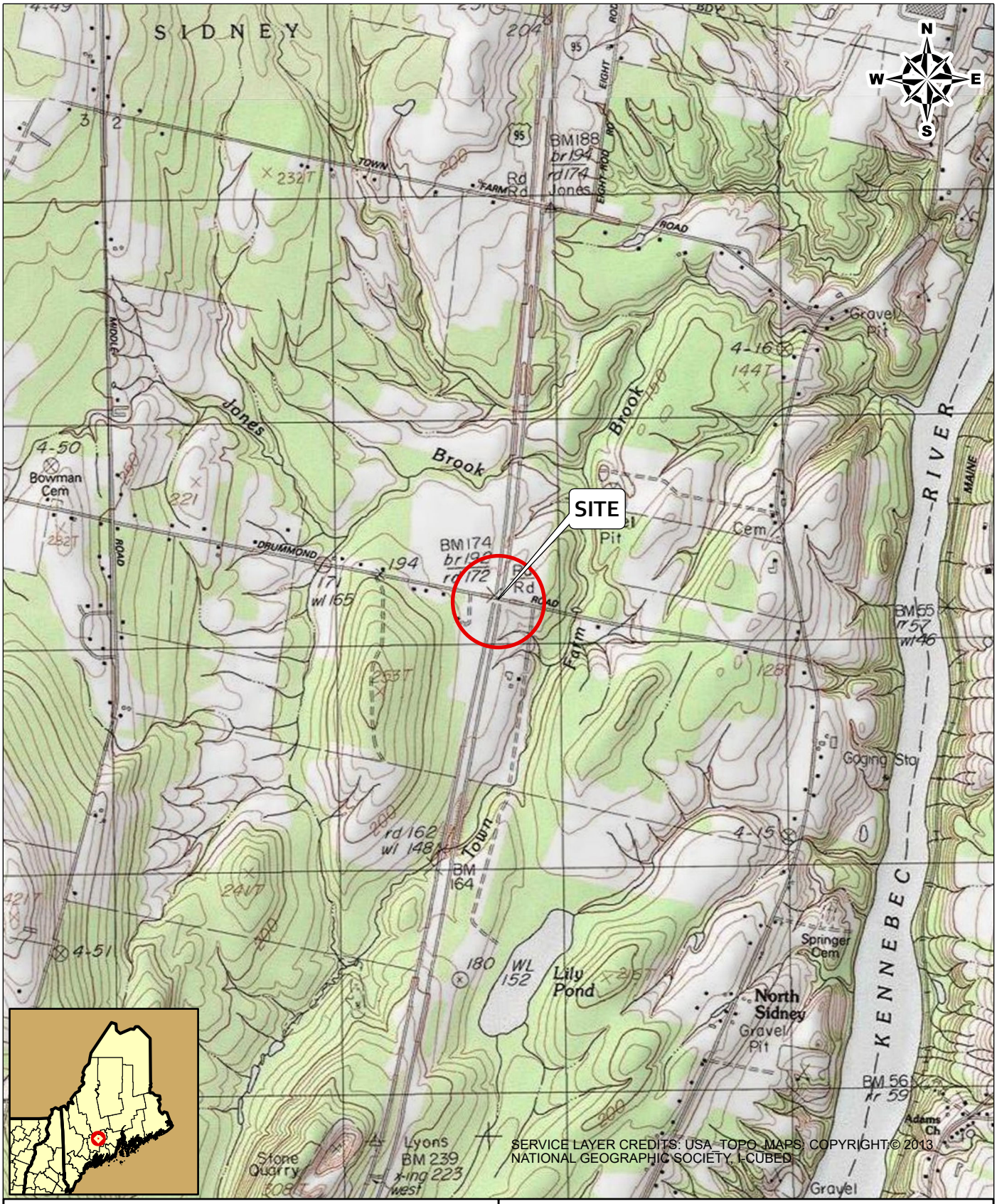
TABLE 2
Summary of Bedrock Data
Drummond Road Bridge #5784 Over I-95
Sidney, ME
WIN 25469.00

Boring ID	Core Run	Ground Surface El. (ft)	Depth of Core Run below GS (ft)			Depth to Rock (ft)	Depth Below Top of Rock (ft)			Length of Core Run (in)	Rec (in)	Rec (%)	RQD (in)	RQD %	Joint Spacing (in)	Joint Aperture (in)	Elev. (ft)		LAB							Rock Type
			Top		Bottom		Top		Bottom								Top	Bottom	Depth of Sample (ft)	Depth of Sample into Rock (ft)	Elev Top of Sample (ft)	UCS (psi)	Poissons Ratio	Modulus (ksi)	Unit Wt (pcf)	
BB-SDRR-101	R1	187.9	32.8	-	37.8	32.5	0.3	-	5.3	60.0	60	100%	58	97%	0.75-2.5	0.004-0.02	155.1	150.1								
BB-SDRR-101	R2	187.9	37.8	-	42.8	32.5	5.3	-	10.3	60.0	60	100%	54	90%	2.5-8	0.004-0.02	150.1	145.1								
BB-SDRR-102	R1	166.1	15.8	-	20.8	15.8	0.0	-	5.0	60.0	60	100%	42	70%	2.5-2.5	0.01-0.02	150.3	145.3	18.8	3.0	147.3	5,548	0.14	2,030	174.0	Pelite
BB-SDRR-102	R2	166.1	20.8	-	25.5	15.8	5.0	-	9.7	56.0	48	86%	30	53%	2.5-2.5	0.01-0.02	145.3	140.6								
BB-SDRR-103	R1	187.8	53.0	-	58.0	52.1	0.9	-	5.9	60.0	58	97%	33	55%	2.5-2.5	0.004-0.02	134.8	129.8	56.4	4.3	131.4	5,442	0.31	5,130	175.9	Pelite
BB-SDRR-103	R2	187.8	58.0	-	63.0	52.1	5.9	-	10.9	60.0	57	95%	44	73%	2.5-8	0.004-0.02	129.8	124.8								

Notes:

1. Refer to the boring logs in Appendix C for additional information.
2. Project elevation datum is North American Vertical Datum (NAVD88), unless noted otherwise.
3. As-drilled locations were surveyed by MaineDOT and provided to GZA.

FIGURES



0 1,000 2,000 4,000

SCALE IN FEET

DRUMMOND ROAD BRIDGE #5784 OVER I-95

SIDNEY, ME

LOCUS PLAN

PREPARED BY:
GZA GeoEnvironmental, Inc.
www.gza.com

PREPARED FOR:
STANTEC

PROJ MGR: BMC	REVIEWED BY: CLS	CHECKED BY: ARB	FIGURE 1
DESIGNED BY: EAF	DRAWN BY: EAF	SCALE: 1 in = 2,000 ft	
DATE: APRIL 2025	PROJECT NO: 09.0026242.00	REVISION NO:	

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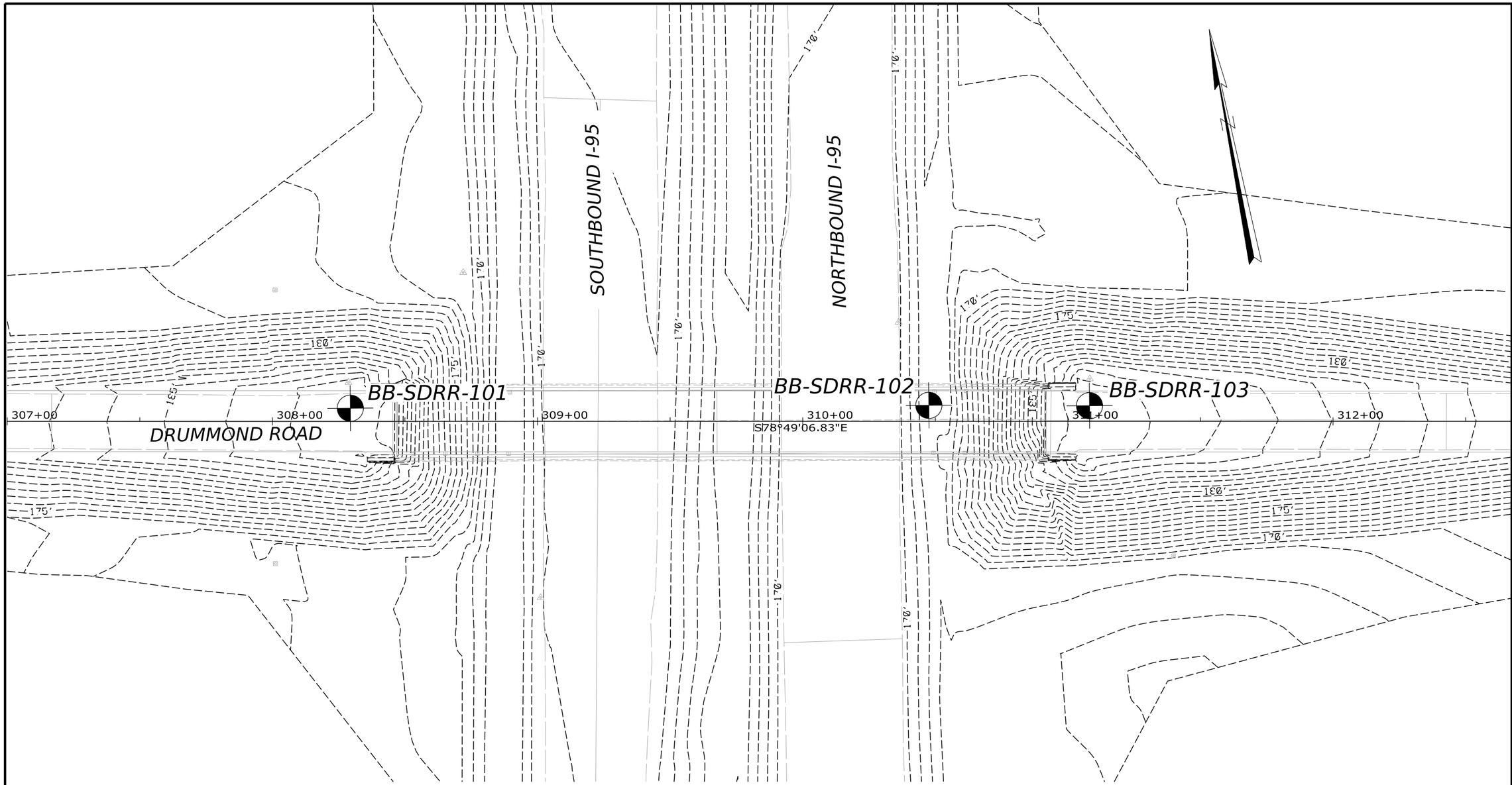


NOTES

1) Base map developed from the Work Set electronic files provided by Stantec on April 7, 2025.

2) The as-drilled locations of the test borings were surveyed by Maine DOT and provided by Stantec in an electronic file (Topo.dgn) on April 7, 2025.

BORING LOCATION PLAN LEGEND

BB-SDRR-103

PLAN

25 0 25 50
Scale of Feet

Location and designation of BB-SDRR-100 series borings performed by Seaboard Drilling, LLC of Bangor, Maine and observed by GZA personnel between July 8 and 10, 2024.

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

25469.00

WIN 25469.00 HIGHWAY PLANS
BRIDGE NO. 5784

SIGNATURE

P.E. NUMBER

DATE

	BY	DATE
PROJ. MANAGER	J. BRASK	
DESIGN-DETAILED	NVW	5/15/2025
CHECKED-REVIEWED	ARB	CLS 5/16/2025
DESIGN2-DETAILED2		
DESIGN3-DETAILED3		
REVISIONS 1		
REVISIONS 2		
REVISIONS 3		
REVISIONS 4		
FIELD CHANGES		

DRUMMOND ROAD BRIDGE
SIDNEY, MAINE

BORING LOCATION PLAN

SHEET NUMBER
2
OF 2

Username: nicholas.williams Date: 5/15/2025

Filename: P:\09 Jobs\MEDOT_ORD\WIN\25469_00\GEOTECH\Boring_Location_Plan.dgn

APPENDIX A – LIMITATIONS

GEOTECHNICAL LIMITATIONS

Use of Report

1. GZA GeoEnvironmental, Inc. (GZA) prepared this report on behalf of, and for the exclusive use of our Client for the stated purpose(s) and location(s) identified in the Proposal for Services and/or Report. Use of this report, in whole or in part, at other locations, or for other purposes, may lead to inappropriate conclusions; and we do not accept any responsibility for the consequences of such use(s). Further, reliance by any party not expressly identified in the contract documents, for any use, without our prior written permission, shall be at that party's sole risk, and without any liability to GZA.

Standard of Care

2. GZA's findings and conclusions are based on the work conducted as part of the Scope of Services set forth in Proposal for Services and/or Report, and reflect our professional judgment. These findings and conclusions must be considered not as scientific or engineering certainties, but rather as our professional opinions concerning the limited data gathered during the course of our work. If conditions other than those described in this report are found at the subject location(s), or the design has been altered in any way, GZA shall be so notified and afforded the opportunity to revise the report, as appropriate, to reflect the unanticipated changed conditions .

3. GZA's services were performed using the degree of skill and care ordinarily exercised by qualified professionals performing the same type of services, at the same time, under similar conditions, at the same or a similar property. No warranty, expressed or implied, is made.

4. In conducting our work, GZA relied upon certain information made available by public agencies, Client and/or others. GZA did not attempt to independently verify the accuracy or completeness of that information. Inconsistencies in this information which we have noted, if any, are discussed in the Report.

Subsurface Conditions

5. The generalized soil profile(s) provided in our Report are based on widely-spaced subsurface explorations and are intended only to convey trends in subsurface conditions. The boundaries between strata are approximate and idealized and were based on our assessment of subsurface conditions. The composition of strata, and the transitions between strata, may be more variable and more complex than indicated. For more specific information on soil conditions at a specific location refer to the exploration logs. The nature and extent of variations between these explorations may not become evident until further exploration or construction. If variations or other latent conditions then become evident, it will be necessary to reevaluate the conclusions and recommendations of this report.

6. In preparing this report, GZA relied on certain information provided by the Client, state and local officials, and other parties referenced therein which were made available to GZA at the time of our

evaluation. GZA did not attempt to independently verify the accuracy or completeness of all information reviewed or received during the course of this evaluation.

7. Water level readings have been made in test holes (as described in this Report) and monitoring wells at the specified times and under the stated conditions. These data have been reviewed and interpretations have been made in this Report. Fluctuations in the level of the groundwater however occur due to temporal or spatial variations in areal recharge rates, soil heterogeneities, the presence of subsurface utilities, and/or natural or artificially induced perturbations. The water table encountered in the course of the work may differ from that indicated in the Report.

8. GZA's services did not include an assessment of the presence of oil or hazardous materials at the property. Consequently, we did not consider the potential impacts (if any) that contaminants in soil or groundwater may have on construction activities, or the use of structures on the property.

9. Recommendations for foundation drainage, waterproofing, and moisture control address the conventional geotechnical engineering aspects of seepage control. These recommendations may not preclude an environment that allows the infestation of mold or other biological pollutants.

Compliance with Codes and Regulations

10. We used reasonable care in identifying and interpreting applicable codes and regulations. These codes and regulations are subject to various, and possibly contradictory, interpretations. Compliance with codes and regulations by other parties is beyond our control.

Cost Estimates

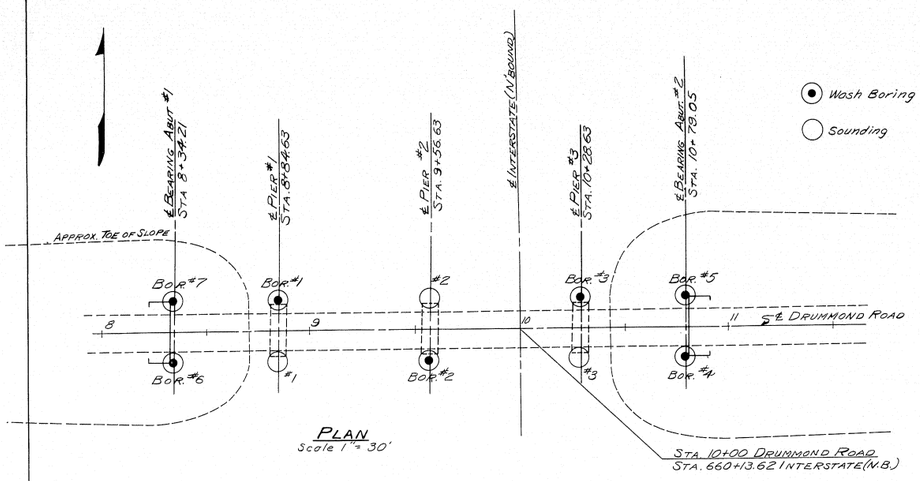
11. Unless otherwise stated, our cost estimates are only for comparative and general planning purposes. These estimates may involve approximate quantity evaluations. Note that these quantity estimates are not intended to be sufficiently accurate to develop construction bids, or to predict the actual cost of work addressed in this Report. Further, since we have no control over either when the work will take place or the labor and material costs required to plan and execute the anticipated work, our cost estimates were made by relying on our experience, the experience of others, and other sources of readily available information. Actual costs may vary over time and could be significantly more, or less, than stated in the Report.

Additional Services

12. GZA recommends that we be retained to provide services during any future: site observations, design, implementation activities, construction and/or property development/redevelopment. This will allow us the opportunity to: i) observe conditions and compliance with our design concepts and opinions; ii) allow for changes in the event that conditions are other than anticipated; iii) provide modifications to our design; and iv) assess the consequences of changes in technologies and/or regulations.

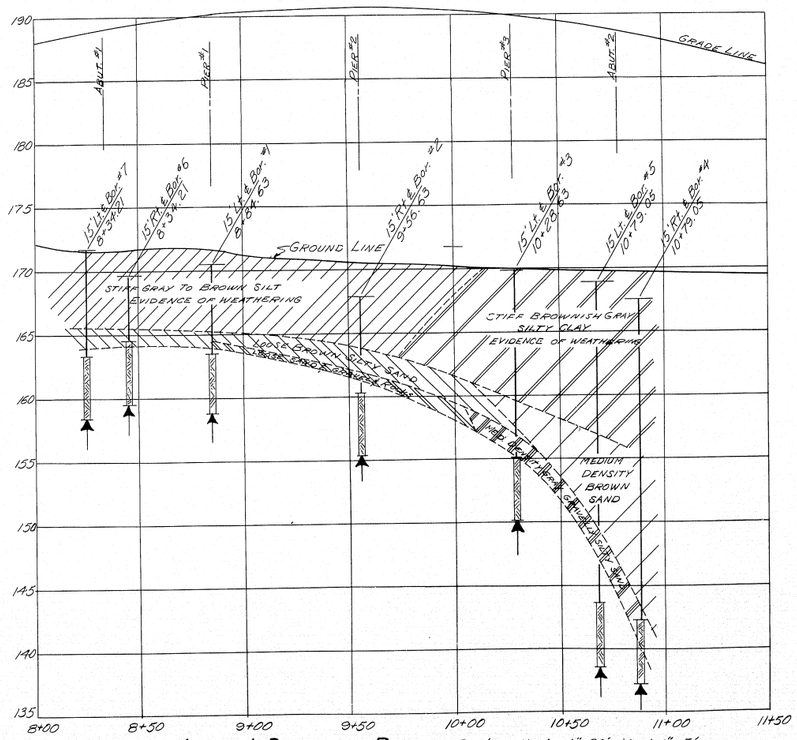
APPENDIX B – HISTORIC GEOTECHNICAL DATA AND FOUNDATION DRAWINGS

B. P. R. W&NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
1	MAINE	I-95-6(04)116	5	18

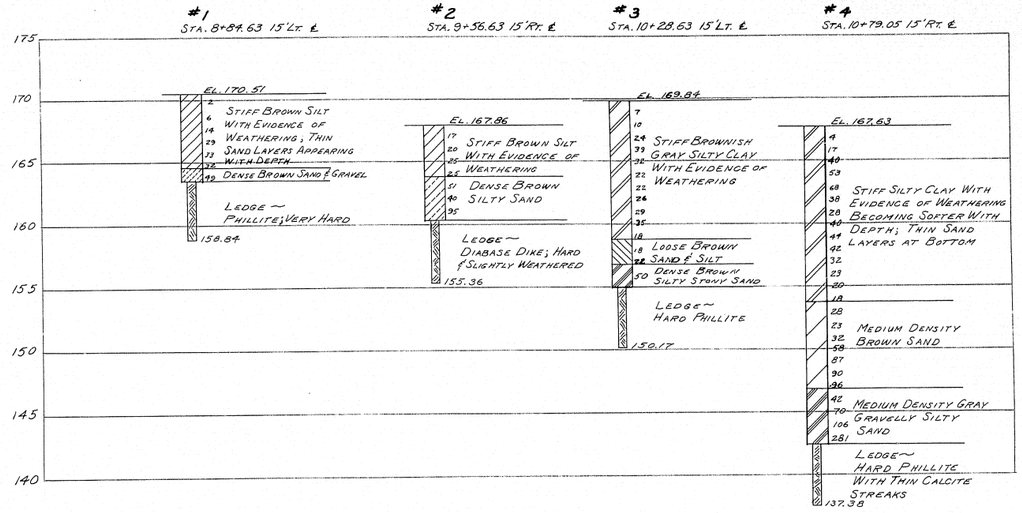


PLAN
Scale 1" = 30'

STA. 10+00 DRUMMOND ROAD
STA. 660+13.62 INTERSTATE (N.B.)



PROFILE ALONG ℄ DRUMMOND ROAD - Scales: Horiz. 1"=30' Vert. 1"=5'



BORING LOGS
Scale 1" = 5'

NOTE: Numerals Refer To Driving Resistance (Blows/Ft.)

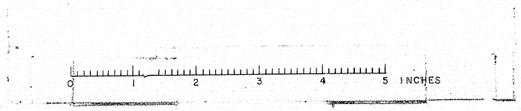
DESIGN - TRACE - HICKS CHECK - Gad.	SURVEY - SOILS LAB

STATE HIGHWAY COMMISSION
BRIDGE DIVISION

DRUMMOND ROAD BRIDGE
OVER
INTERSTATE HIGHWAY
IN THE TOWN OF
SIDNEY
KENNEBEC COUNTY
FOUNDATION SURVEY

SHEET 5 OF 18 AUGUSTA, MAINE APRIL 1958

74-191



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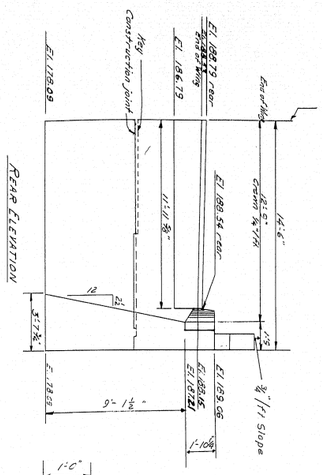
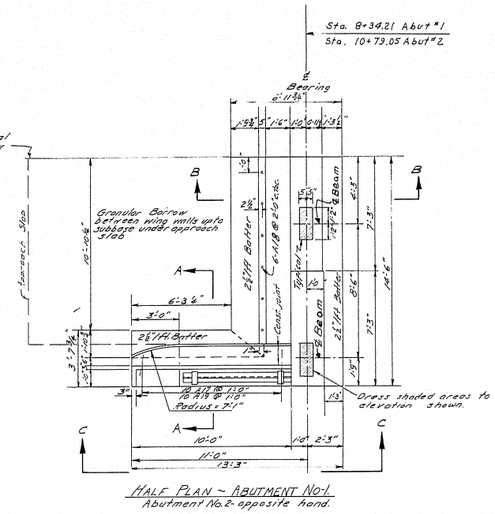
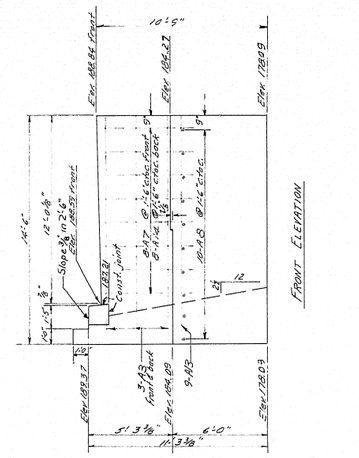
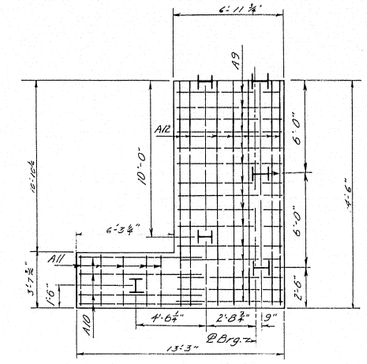


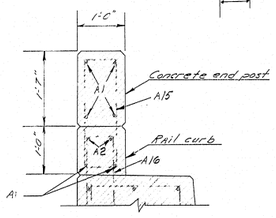




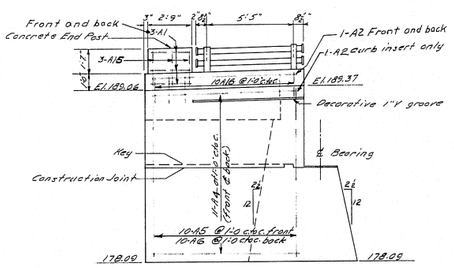


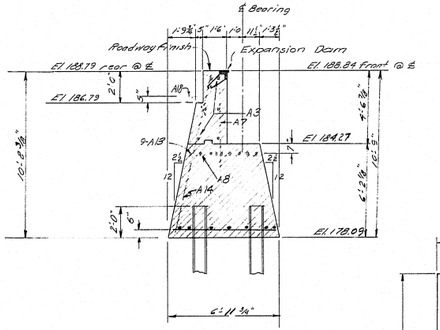
HALF PILE PLAN & STEEL LAYOUT - ABUTMENT NO.1
Abutment No2 - opposite hand

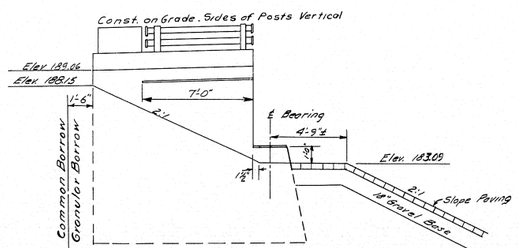
10"x10"x42# Steel H Piles. All piles driven to refusal.
Maximum Pile Load = 30 Ton.
Piles marked thus: H+ batter 2½"/I in direction of arrow.
Abutment #1 10 piles Estimated Length = 20'
Abutment #2 10 piles Estimated Length = 42'
Pile Cut Off Elevation = 180.09

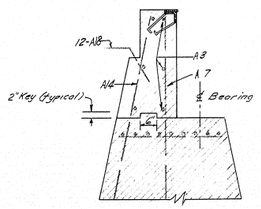


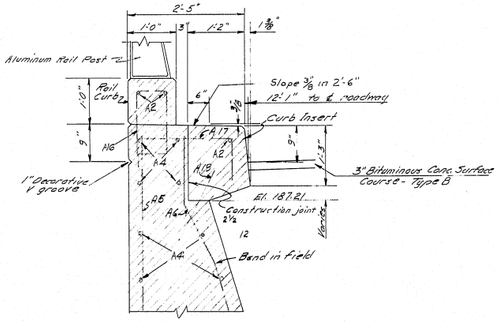
SECTION
Through concrete end post.



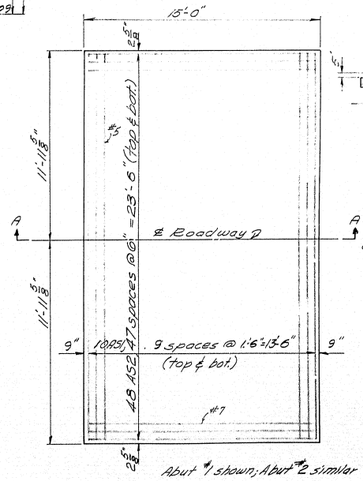






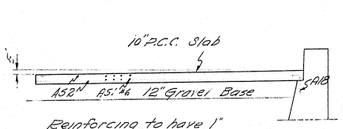


SECTION A-A



Abut #1 shown; Abut #2 similar

APPROACH SLABS



SECTION A-A

A Conc. in App. Slab to be paid for under Item 701.40, P.C.C. in Pdwy. & Sidewalk Slabs on Steel Bridges.

General Notes:
Concrete end posts, rail curbs, and curb inserts to be Class A Conc. to be paid for under Item 701.83, Portland Cement Concrete, Abutments and retaining walls.
All chamfers to be ¾" unless otherwise noted. ¥ grooves to be 1".
Place reinforcing steel in bridge seats to clear anchor bolts.
Backwall to be placed after structural steel is erected.
Wing steel to have 3" cover.
See Sheet 18 for detail of expansion dams.

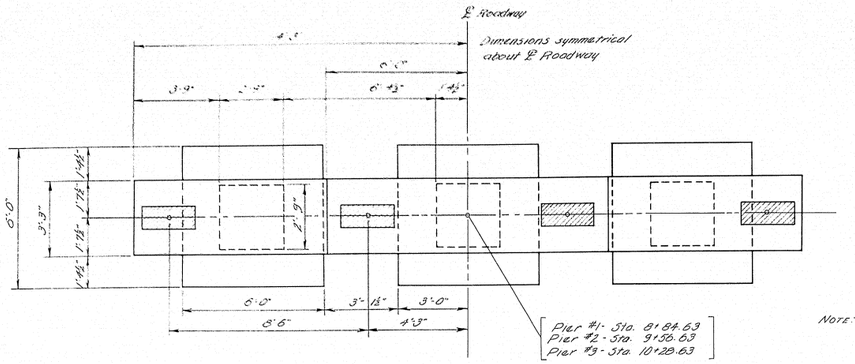
DES. Bridge	BRIDGE NO.
TRACE Barnes	
CHECK G.L.J. V.P.L. R.A.P.	

STATE HIGHWAY COMMISSION
BRIDGE DIVISION
DRUMMOND ROAD BRIDGE
OVER
INTERSTATE HIGHWAY
IN THE TOWN OF
SIDNEY
KENNEBEC COUNTY
ABUTMENTS
AND APPROACH SLABS
SHEET 10 OF 18 AUGUSTA MAINE April 58

74-196

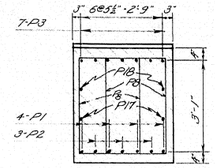
0 1 2 3 4 5 INCHES

APPR.	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
	I-95-6(103)116	11	18

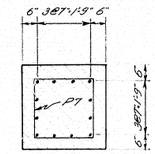


PLAN

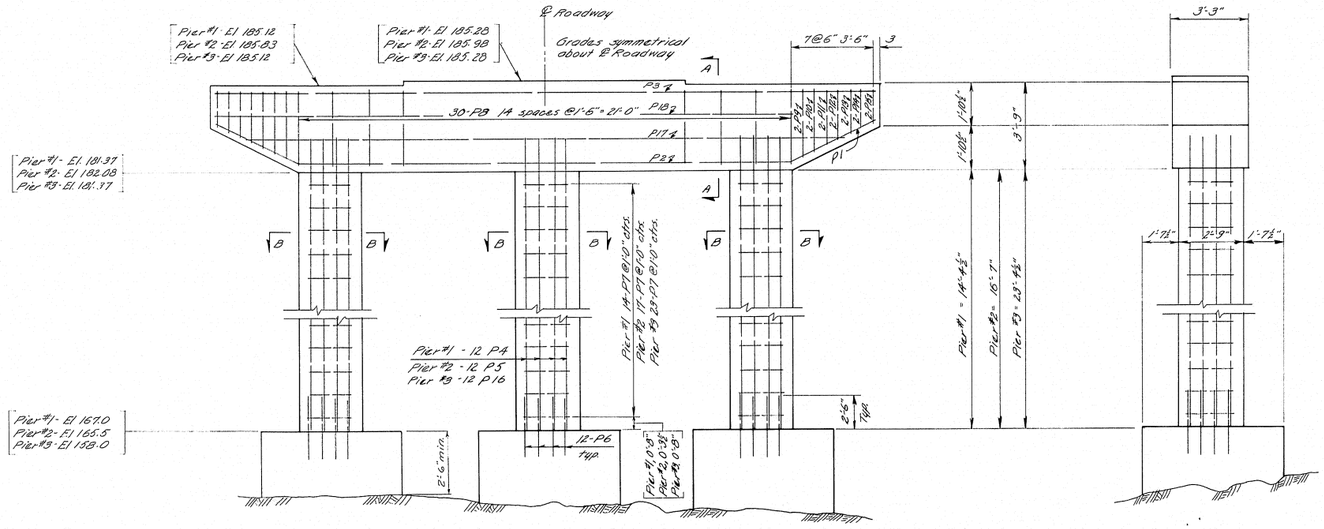
Note: Dress bearing areas 1" larger all around than size of bearing plate and to exact elevation shown. Place reinforcing steel in cap beam to clear anchor bolts.



SECT. A-A



SECT. B-B



ELEVATION

Note: Any necessary unwatering to be considered incidental to Item 204-14, Struct. Earth Excav. Piers.

END ELEVATION

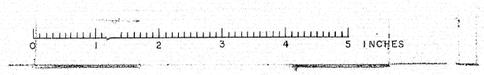
PLAN - SHAILER
CHECK - A.B.P.

STATE HIGHWAY COMMISSION
BRIDGE DIVISION

DRUMMOND ROAD BRIDGE
OVER
INTERSTATE HIGHWAY
IN THE TOWN OF
SIDNEY
KENNEBEC COUNTY
PIERS

SHEET 11 OF 18 AUGUSTA, MAINE April 1958

74-197



APPENDIX C – TEST BORING LOGS

UNIFIED SOIL CLASSIFICATION SYSTEM

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 (little or no fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines.
			GP	Poorly-graded gravels, gravel sand mixtures, little or no fines.
		GRAVEL WITH FINES (Appreciable amount of fines)	GM	Silty gravels, gravel-sand-silt mixtures.
			GC	Clayey gravels, gravel-sand-clay mixtures.
	SANDS (more than half of coarse fraction is smaller than No. 4 sieve size)	CLEAN SANDS (little or no fines)	SW	Well-graded sands, Gravelly sands, little or no fines
			SP	Poorly-graded sands, Gravelly sand, little or no fines.
		SANDS WITH FINES (Appreciable amount of fines)	SM	Silty sands, sand-silt mixtures
			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, if applicable):

Color (Munsell color chart)
Moisture (dry, damp, moist, wet)
Density/Consistency (from above right hand side)
Texture (fine, medium, coarse, etc.)
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.,)
Cementation (weak, moderate, or strong)
Geologic Origin (till, marine clay, alluvium, etc.)
Groundwater level

Maine Department of Transportation
Geotechnical Section
Key to Soil and Rock Descriptions and Terms
Field Identification Information

MODIFIED BURMISTER SYSTEM

Descriptive Term	Portion of Total (%)
trace	0 - 10
little	11 - 20
some	21 - 35
adjective (e.g. Sandy, Clayey)	36 - 50

TERMS DESCRIBING DENSITY/CONSISTENCY

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. Density is rated according to standard penetration resistance (N-value).

Density of Cohesionless Soils	Standard Penetration Resistance N_{60}-Value (blows per foot)
Very loose	0 - 4
Loose	5 - 10
Medium Dense	11 - 30
Dense	31 - 50
Very Dense	> 50

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 undrained shear strength as indicated.

Consistency of Cohesive soils	SPT N_{60}-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 Quality Designation (RQD):

$$RQD\ (\%) = \frac{\text{sum of the lengths of intact pieces of core* > 4 inches}}{\text{length of core advance}}$$

*Minimum NQ rock core (1.88 in. OD of core)

Rock Quality Based on RQD

Rock Quality	RQD (%)
Very Poor	≤25
Poor	26 - 50
Fair	51 - 75
Good	76 - 90
Excellent	91 - 100

Desired Rock Observations (in this order, if applicable):

Color (Munsell color chart)
Texture (aphanitic, fine-grained, etc.)
Rock Type (granite, schist, sandstone, 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 deg., low angle - 5-35 deg., mod. dipping - 35-55 deg., steep - 55-85 deg., vertical - 85-90 deg.)
-spacing (very close - <2 inch, close - 2-12 inch, mod. close - 1-3 feet, wide - 3-10 feet, very wide >10 feet)
-tightness (tight, open, or healed)
-infilling (grain size, color, etc.)
Formation (Waterville, Ellsworth, Cape Elizabeth, etc.)
RQD and correlation to rock quality (very poor, poor, etc.)
ref: ASTM D6032 and FHWA NHI-16-072 GEC 5 - Geotechnical Site Characterization, Table 4-12
Recovery (inch/inch and percentage)
Rock Core Rate (X.X ft - Y.Y ft (min:sec))

Sample Container Labeling Requirements:

WIN
Bridge Name / Town
Boring Number
Sample Number
Sample Depth
Blow Counts
Sample Recovery
Date
Personnel Initials

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Drummond Road Bridge No. 5784
Location: Sidney, Maine

Boring No.: BB-SDRR-101
WIN: 025469.00

Driller:	Seaboard Drilling	**Elevation (ft.)**	187.9	**Auger ID/OD:**	4.25" OD
Operator:	K. Hanscom	**Datum:**	NAVD88	**Sampler:**	Standard Splitspoon
Logged By:	L. Hailey	**Rig Type:**	ATV	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	7-10-24/7-10-24	**Drilling Method:**	Solid Stem Auger/Drive & Wash	**Core Barrel:**	NQ2
Boring Location:	N: 600945.8 E: 1158464.5	**Casing ID/OD:**	4.0/4.5", 3.0/3.5"	**Water Level*:**	18.0
Hammer Efficiency Factor:	1.066	**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: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	1D	10/4	0.6 - 1.4	9-17/1"			SSA	187.3		Top 7": Asphalt	
										0.6	
										Brown, dry, fine to medium SAND, some gravel, (Fill). Casing refusal at 1.8' on cobbles. Advanced casing from 1.8'-5.0'.	
5	2D	24/11	5.0 - 7.0	6-2-1-2	3	5				Brown, moist, loose, fine to coarse SAND, some silt, trace gravel, (Fill).	G#24-S-3362 A-1-b, SM WC = 8.8%
10	3D	24/14	10.0 - 12.0	5-8-22-25	30	53	55			(Top 6"): Brown, moist, fine to medium SAND, some gravel, (Fill). (Bottom 8"): Brown, wet, very dense, Silty SAND, some gravel, (Fill).	
							107				
							85				
							104				
							57				
15	4D	24/12	15.0 - 17.0	7-7-11-17	18	32	28			Brown, wet, dense, fine to coarse SAND, some gravel, some silt, (Fill).	G#24-S-3363 A-1-b, SM WC = 11.2%
							54				
							123				
							79	169.4		18.5	
							48				
20	5D	24/21	20.0 - 22.0	5-5-6-6	11	20	36			Brown, wet, very stiff, Clayey SILT, (Marine Clay).	G#24-S-3364 CL LL = 34 PL = 18 PI = 16 WC = 26.8%
							58				
							64				
							73	164.4		23.5	
25							59				

Remarks:

1. Fine Grained Soil Descriptions on this log are based on plasticity estimated using visual manual classification techniques of laboratory Atterberg Limit Tests if available, rather than the MaineDot Standard based percentages passing specific grain sizes.
2. Automatic hammer Seaboard Drilling #D50, Energy Transfer Ratio = 1.066
3. Water level measured before removal of 4" casing on 7/10/24.

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.
* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Drummond Road Bridge No. 5784
Location: Sidney, Maine

Boring No.: BB-SDRR-101
WIN: 025469.00

Driller:	Seaboard Drilling	**Elevation (ft.)**	187.9	**Auger ID/OD:**	4.25" OD
Operator:	K. Hanscom	**Datum:**	NAVD88	**Sampler:**	Standard Splitspoon
Logged By:	L. Hailey	**Rig Type:**	ATV	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	7-10-24/7-10-24	**Drilling Method:**	Solid Stem Auger/Drive & Wash	**Core Barrel:**	NQ2
Boring Location:	N: 600945.8 E: 1158464.5	**Casing ID/OD:**	4.0/4.5", 3.0/3.5"	**Water Level*:**	18.0
Hammer Efficiency Factor:	1.066	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

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

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
25	6D	24/18	25.0 - 27.0	14-29-37-78	66	117	RC	162.9		25.0 Brown, wet, very dense, Silty fine to coarse SAND, some gravel, (Glacial Till).	G#24-S-3365 A-4(0), SM WC = 13.3%
30	7D	24/14	30.0 - 32.0	26-30-41-98	71	126				Brown, wet, very dense, Silty fine to medium SAND, some gravel, (Glacial Till).	
	R1	60/60	32.8 - 37.8	RQD = 97%			NQ2	155.4		32.5 Roller cone resistance increased at 32.5', rock chips in wash return; probable top of rock at 32.5'. Advanced roller cone to 32.8' and set up to core. R1: Medium hard, slightly weathered, medium grained, grey, PELITE. Joints are very close to closely spaced, low angle, undulating, rough, discolored, tight. Recovery = 100% Rock Quality = Very Poor Rock Core Times (min:sec): 32.8-33.8' (2:38), 33.8-34.8' (2:39), 34.8-35.8' (2:15), 35.8-36.8' (2:27), 36.8-37.8' (2:15)	
35	R2	60/60	37.8 - 42.8	RQD = 90%						R2: Medium hard, slightly weathered, medium grained, grey, PELITE. Joints are close to moderately spaced, low angle, undulating, rough, discolored, tight. Recovery = 100% Rock Quality = Good Rock Core Times (min:sec): 37.8-38.8' (4:41), 38.8-39.8' (2:45), 39.8-40.8' (2:20), 40.8-41.8' (2:33), 41.8-42.8' (2:24)	
40								145.1		42.8 **Bottom of Exploration at 42.8 feet below ground surface.**	
45											
50											

Remarks:

1. Fine Grained Soil Descriptions on this log are based on plasticity estimated using visual manual classification techniques of laboratory Atterberg Limit Tests if available, rather than the MaineDot Standard based percentages passing specific grain sizes.
2. Automatic hammer Seaboard Drilling #D50, Energy Transfer Ratio = 1.066
3. Water level measured before removal of 4" casing on 7/10/24.

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.
* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Drummond Road Bridge No. 5784
Location: Sidney, Maine

Boring No.: BB-SDRR-102
WIN: 025469.00

Driller:	Seaboard Drilling	**Elevation (ft.)**	166.1	**Auger ID/OD:**	4.25" OD
Operator:	K. Hanscom	**Datum:**	NAVD88	**Sampler:**	Standard Splitspoon
Logged By:	L. Hailey	**Rig Type:**	ATV	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	7-10-24/7-10-24	**Drilling Method:**	Drive & Wash	**Core Barrel:**	NQ
Boring Location:	N: 600904.6 E: 1158678.7	**Casing ID/OD:**	4.0/4.5", 3.0/3.5"	**Water Level*:**	0.0
Hammer Efficiency Factor:	1.066	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

Definitions:
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T_v = Pocket Torvane Shear Strength (psf)
WC = Water Content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
				Sample Information							
0	1D	24/10	0.0 - 2.0	6-5-3-4	8	14	8	165.8		(Top 4"): Brown, wet, Silty fine to medium SAND, some organic material (Topsoil)	
							17	165.5		0.3 (Bottom 6"): Tan, wet, stiff, Silty CLAY, trace gravel, trace organic material (Marine Clay)	
							9				
							5				
							12				
5	2D	24/14	5.0 - 7.0	1-1-WOH-1	1	2	13			Tan, wet, soft, Silty CLAY, trace gravel (Marine Clay)	G#24-S-3366 CL LL = 33 PL = 18 PI = 15 WC = 25.9%
							13				
							18				
							14				
							13				
10	3D	24/6	10.0 - 12.0	1-WOH-WOH-1			16			Tan, wet, very soft to soft, Clayey SILT, little fine sand, trace gravel (Marine Clay)	G#24-S-3367 A-4(0), ML WC = 22.5%
							14				
							R/C				
15	4D	10/9	15.0 - 15.8	3-34/4"	0	0	NQ2	150.6		(Top 6"): Grey, wet, Clayey SILT, some sand (Marine Clay)	G#24-S-3368 A-4(0), ML WC = 20.9%
	R1	60/60	15.8 - 20.8	RQD = 70%				150.3		15.5 (Bottom 3"): Tan, wet, dense, Silty fine to medium SAND, some gravel (Glacial Till)	
										15.8 Roller cone refusal at 15.8' on probable top of rock. Set up to core at 15.8'. R1: Hard, slightly weathered, medium grained, grey, PELITE, with occasional quartzite laminae or intrusions. Joints are closely spaced, low angle, undulating, rough, discolored, partially open. Recovery = 100% Rock Quality = Fair Rock Core Times (min:sec): 15.8-16.8' (3:28), 16.8-17.8' (3:35), 17.8-18.8' (3:14), 18.8-19.8' (5:06), 19.8-20.8' (5:21)	q_p=799 ksf
20	R2	56/48	20.8 - 25.5	RQD = 53%						R2: Hard, slightly weathered, medium grained, grey, PELITE, with occasional quartzite laminae or intrusions. Joints are closely spaced, low angle, undulating, rough, discolored, partially open. Core broke into hole at 56". Recovery = 86% Rock Quality = Fair Rock Core Times (min:sec): 20.8-21.8' (5:14), 21.8-22.8' (7:02), 22.8-23.8' (4:37), 23.8-24.8' (3:50), 24.8-25.8' (3:42)	
25											

Remarks:

1. Fine Grained Soil Descriptions on this log are based on plasticity estimated using visual manual classification techniques of laboratory Atterberg Limit Tests if available, rather than the MaineDot Standard based percentages passing specific grain sizes.
2. Automatic hammer Seaboard Drilling #D50, Energy Transfer Ratio = 1.066.
3. Measured 23.2' from bridge deck to ground surface.
4. Water level taken after removal of casing.

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.
* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Drummond Road Bridge No. 5784

Location: Sidney, Maine

Boring No.: BB-SDRR-102

WIN: 025469.00

Driller:	Seaboard Drilling	**Elevation (ft.)**	166.1	**Auger ID/OD:**	4.25" OD
Operator:	K. Hanscom	**Datum:**	NAVD88	**Sampler:**	Standard Splitspoon
Logged By:	L. Hailey	**Rig Type:**	ATV	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	7-10-24/7-10-24	**Drilling Method:**	Drive & Wash	**Core Barrel:**	NQ
Boring Location:	N: 600904.6 E: 1158678.7	**Casing ID/OD:**	4.0/4.5", 3.0/3.5"	**Water Level*:**	0.0
Hammer Efficiency Factor:	1.066	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

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

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
25								140.6		25.5	
										Bottom of Exploration at 25.5 feet below ground surface.	
30											
35											
40											
45											
50											

Remarks:

1. Fine Grained Soil Descriptions on this log are based on plasticity estimated using visual manual classification techniques of laboratory Atterberg Limit Tests if available, rather than the MaineDot Standard based percentages passing specific grain sizes.
2. Automatic hammer Seaboard Drilling #D50, Energy Transfer Ratio = 1.066.
3. Measured 23.2' from bridge deck to ground surface.
4. Water level taken after removal of casing.

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.
* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Drummond Road Bridge No. 5784
Location: Sidney, Maine

Boring No.: BB-SDRR-103
WIN: 025469.00

Driller:	Seaboard Drilling	**Elevation (ft.)**	187.8	**Auger ID/OD:**	4.25" OD
Operator:	K. Hanscom	**Datum:**	NAVD88	**Sampler:**	Standard Splitspoon
Logged By:	L. Hailey	**Rig Type:**	ATV	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	7-8-24/7-9-24	**Drilling Method:**	Solid Stem Auger/Drive & Wash	**Core Barrel:**	NQ
Boring Location:	N: 600892.7 E: 1158738.1	**Casing ID/OD:**	4.0/4.5", 3.0/3.5"	**Water Level*:**	23.5'
Hammer Efficiency Factor:	1.066	**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 No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0							SSA	187.1		Top 8": Asphalt (0.7)	
	1D	7/4	1.0 - 1.6	20-39/1"	R					Brown, dry, very dense, GRAVEL, some fine to coarse Sand, trace silt, (Fill). Spoon refusal at 1.7'.	G#24-S-3369 A-1-a, GW-GM WC = 2.0%
								185.3		(2.5) Encountered concrete at 2.5'. (Approach Slab)	
	2D	24/18	3.5 - 5.5	5-6-5-3	11	20		184.3		(3.5) Brown, dry, medium dense, fine to medium SAND, some gravel, trace silt, (Fill).	
5	3D	24/13	5.5 - 7.5	2-2-2-2	4	7				Brown, dry, loose, fine to medium SAND, some gravel, trace silt, (Fill).	
							22				
							53				
							73				
10	4D	24/13	10.0 - 12.0	10-8-8-10	16	28				Brown, wet, medium dense, fine to coarse SAND, some gravel, some silt, (Fill).	G#24-S-3370 A-1-b, SM WC = 12.6%
15	5D	24/10	15.0 - 17.0	9-11-12-15	23	41	52			Brown, wet, dense, Silty SAND, some gravel, (Fill).	
							48				
							66				
							78				
							84				
20	6D	24/15	20.0 - 22.0	8-4-5-6	9	16	55	167.5		(Top 3"): Brown, wet, Silty SAND, some gravel, (Fill). (20.3) (Bottom 12"): Grey, wet, stiff, Clayey SILT, some sand, (Marine Clay).	G#24-S-3371 A-4(0), ML WC = 30.1%
							57				
							65				
							104				
25							79				

Remarks:

1. Fine Grained Soil Descriptions on this log are based on plasticity estimated using visual manual classification techniques of laboratory Atterberg Limit Tests if available, rather than the MaineDot Standard based percentages passing specific grain sizes.
2. Automatic hammer Seaboard Drilling #D50, Energy Transfer Ratio = 1.066.
3. Water level measured at the beginning of drilling on 7/9/24.

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.
* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Drummond Road Bridge No. 5784
Location: Sidney, Maine

Boring No.: BB-SDRR-103
WIN: 025469.00

Driller:	Seaboard Drilling	**Elevation (ft.)**	187.8	**Auger ID/OD:**	4.25" OD
Operator:	K. Hanscom	**Datum:**	NAVD88	**Sampler:**	Standard Splitspoon
Logged By:	L. Hailey	**Rig Type:**	ATV	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	7-8-24/7-9-24	**Drilling Method:**	Solid Stem Auger/Drive & Wash	**Core Barrel:**	NQ
Boring Location:	N: 600892.7 E: 1158738.1	**Casing ID/OD:**	4.0/4.5", 3.0/3.5"	**Water Level*:**	23.5'
Hammer Efficiency Factor:	1.066	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

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

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
25	7D	24/24	25.0 - 27.0	5-6-6-6	12	21	25/6"			Grey, moist, very stiff, Silty CLAY, trace fine sand, (Marine Clay).	
							85				
							75				
							85				
							79				
30	8D	24/24	30.0 - 32.0	2-3-2-3	5	9	31/6"			Grey, wet, stiff, Silty CLAY, trace fine sand, (Marine Clay).	G#24-S-3372 CL LL = 32 PL = 18 PI = 14 WC = 30.3%
							64				
							57				
							54				
							48				
35	1U	24/22	35.0 - 37.0	PUSH			RC			1U: Grey, wet, Silty CLAY (Marine Clay)	
	MV1		37.6 - 38.0							55 x 110 mm vane raw torque reading: MV1: Vane refusal, Could not advance vane.	
								148.8		39.0	
40	9D	24/8	40.0 - 42.0	14-16-20-13	36	64				Grey, wet, very dense, Silty medium to coarse SAND, some gravel, (Glacial Till).	
45	10D	24/13	45.0 - 47.0	19-20-42-52	62	110				Grey, wet, very dense, Silty fine to coarse SAND, some gravel (Glacial Till)	G#24-S-3373 A-4(0), SM WC = 8.2%
50											

Remarks:

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2. Automatic hammer Seaboard Drilling #D50, Energy Transfer Ratio = 1.066.
3. Water level measured at the beginning of drilling on 7/9/24.

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.
* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Drummond Road Bridge No. 5784
Location: Sidney, Maine

Boring No.: BB-SDRR-103
WIN: 025469.00

Driller:	Seaboard Drilling	**Elevation (ft.)**	187.8	**Auger ID/OD:**	4.25" OD
Operator:	K. Hanscom	**Datum:**	NAVD88	**Sampler:**	Standard Splitspoon
Logged By:	L. Hailey	**Rig Type:**	ATV	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	7-8-24/7-9-24	**Drilling Method:**	Solid Stem Auger/Drive & Wash	**Core Barrel:**	NQ
Boring Location:	N: 600892.7 E: 1158738.1	**Casing ID/OD:**	4.0/4.5", 3.0/3.5"	**Water Level*:**	23.5'
Hammer Efficiency Factor:	1.066	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

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

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
50	11D	22/14	50.0 - 51.8	26-65-74-55	139	247				Grey, wet, very dense, Silty fine to coarse SAND, some gravel, (Glacial Till).	
								135.7		52.1	
	R1	60/58	53.0 - 58.0	RQD = 55%			NQ2			Roller cone resistance at 52.1', flakes in wash; probable top of rock at 52.1'. Advanced roller cone to 53.0' and set up to core. R1: (53.0'-58.0'): Medium hard, slightly weathered, medium grained, grey, PELITE, with occasional quartzite laminae and quartzite intrusion 54.5 to 56.1'. Joints are very close to close, low angle, rough, undulating, discolored, tight to moderately wide.	
55										R1: (53.6'-55.6'): Hard, slightly weathered, aphanitic, white, QUARTZITE. Joints are very close, horizontal, rough, undulating, discolored, moderately wide. Recovery = 97% Rock Quality = Fair Rock Core Times (min:sec): 53.0-54.0' (2:17), 54.0-55.0' (4:42), 55.0-56.0' (4:01), 56.0-57.0' (2:34), 57.0-58.0' (2:11)	
	R2	60/57	58.0 - 63.0	RQD = 73%						R2: Hard, slightly weathered, medium grained, grey, PELITE, with occasional quartzite laminae. Joints are close to moderately spaced, horizontal to moderately dipping, undulating, rough, discolored, tight to partially open. Recovery = 95% Rock Quality = Fair Rock Core Times (min:sec): 58.0-59.0' (3:07), 59.0-60.0' (3:58), 60.0-61.0' (3:41), 61.0-62.0' (3:12), 62.0-63.0' (3:25)	qp=784 ksf
60								124.8		63.0	
										Bottom of Exploration at 63.0 feet below ground surface.	
65											
70											
75											

Remarks:

1. Fine Grained Soil Descriptions on this log are based on plasticity estimated using visual manual classification techniques of laboratory Atterberg Limit Tests if available, rather than the MaineDot Standard based percentages passing specific grain sizes.
2. Automatic hammer Seaboard Drilling #D50, Energy Transfer Ratio = 1.066.
3. Water level measured at the beginning of drilling on 7/9/24.

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APPENDIX D – LABORATORY TESTING RESULTS

Thielsch
DIVISION OF THE RISE GROUP

195 Frances Avenue
Cranston RI, 02910
Phone: (401)-467-6454
Fax: (401)-467-2398
cts.thielsch.com
Let's Build a Solid Foundation

Client Information:	
GZA GeoEnvironmental, Inc.	
South Portland, ME	
Project Manager:	Blaine Cardali
Assigned By:	Blaine Cardali
Collected By:	GZA

Project Information:	
Drummond Road Bridge #5784	
Sidney, Maine	
Project Number:	09.0026242.00 Task 3
Summary Page:	1 of 1
Report Date:	9/9/2024

LABORATORY TESTING DATA SHEET, Report No.: 7424-H-256

Boring No.	Sample ID	Depth (ft)	Laboratory No.	Identification Tests									Proctor / CBR / Permeability Tests								Laboratory Log and Soil Description
				As Rcvd Moisture Content %	LL %	PL %	OD LL	Gravel %	Sand %	Fines %	Org. %	pH	g_d MAX (pcf) W_{opt} (%)	g_d MAX (pcf) W_{opt} (%) (Corr.)	Dry unit wt. (pcf)	Test Moisture Content %	Target Test Setup as % of Proctor	CBR @ 0.1"	CBR @ 0.2"	Permeability cm/sec	
				D2216	D4318			D6913			D2974	D4792	D1557								
BB-SDRR-101	2D	5-7	24-S-3362	8.8				1.4	77.7	20.9											Dark Brown f-c SAND, some Silt, trace fine Gravel
BB-SDRR-101	4D	15-17	24-S-3363	11.2				31.0	45.0	24.0											Brown f-c SAND, some fine Gravel, some Silt
BB-SDRR-101	5D	20-22	24-S-3364	26.8	34	18															Brown CLAY & SILT
BB-SDRR-101	6D	25-27	24-S-3365	13.3				22.7	37.8	39.5											Brown SILTY f-c SAND, some f-c Gravel
BB-SDRR-102	2D	5-7	24-S-3366	25.9	33	18															Brown CLAY & SILT
BB-SDRR-102	3D	10-12	24-S-3367	22.5				7.0	12.8	80.2											Olive SILT & CLAY, little f-c Sand, trace fine Gravel
BB-SDRR-102	4D	15-17	24-S-3368	20.9				25.8	23.0	51.2											Olive SILT & CLAY, some f-c Gravel, some f-c Sand
BB-SDRR-103	1D	0-2	24-S-3369	2.0				62.2	29.3	8.5											Dark Brown f-c GRAVEL, some f-c Sand, trace Silt
BB-SDRR-103	4D	10-12	24-S-3370	12.6				27.1	47.8	25.1											Dark Brown f-c SAND, some f-c Gravel, some Silt
BB-SDRR-103	6D	20-22	24-S-3371	30.1				7.8	5.4	86.8											Brown SILT & CLAY, trace fine Gravel, trace f-c Sand
BB-SDRR-103	8D	30-32	24-S-3372	30.3	32	18															Brown CLAY & SILT
BB-SDRR-103	10D	45-47	24-S-3373	8.2				21.8	35.8	42.4											Grey CLAYEY SILT, some f-c Sand, some fine Gravel

Date Received: **8/23/2024** Reviewed By: Date Reviewed: **9/9/2024**

Thielsch
DIVISION OF THE R SE GROUP

CTS Laboratory
195 Frances Ave, Cranston RI 02910
401.467.6454 | cts.thielsch.com

State of Maine - Department of Transportation
Laboratory Testing Summary Sheet

Project ID: Drummond Road Bridge #5784 **MDOT Project Number:**

Town(s): Sidney, ME **GZA Project Number:** 09.0026242.00 Task 03

Boring & Sample	Station	Sample	Depth	Lab	Organic	WC	LL	PI	Classification		
ID Number	(Feet)	No.	(Feet)	Number	%	%			Unified	AASHTO	Frost
BB-SDRR-101		2D	5-7	S-3362		8.8	NV	NP	SM	A-1-b	II
BB-SDRR-101		4D	15-17	S-3363		11.2	NV	NP	SM	A-1-b	II
BB-SDRR-101		5D	20-22	S-3364		26.8	34	16	CL		III
BB-SDRR-101		6D	25-27	S-3365		13.3	NV	NP	SM	A-4(0)	III
BB-SDRR-102		2D	5-7	S-3366		25.9	33	15	CL	A-4(0)	III
BB-SDRR-102		3D	10-12	S-3367		22.5			ML	A-4(0)	IV
BB-SDRR-102		4D	15-17	S-3368		20.9			ML	A-4(0)	IV
BB-SDRR-103		1D	0-2	S-3369		2.0	NV	NP	GW-GM	A-1-a	I
BB-SDRR-103		4D	10-12	S-3370		12.6	NV	NP	SM	A-1-b	III
BB-SDRR-103		6D	20-22	S-3371		30.1			ML	A-4(0)	IV
BB-SDRR-103		8D	30-32	S-3372		30.3	32	14	CL		III
BB-SDRR-103		10D	45-47	S-3373		8.2			SM	A-4(0)	IV

Classification of these soil samples is in accordance with AASHTO Classification System M-145-95. 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 MDOT and Corps of Engineers Classification Systems.

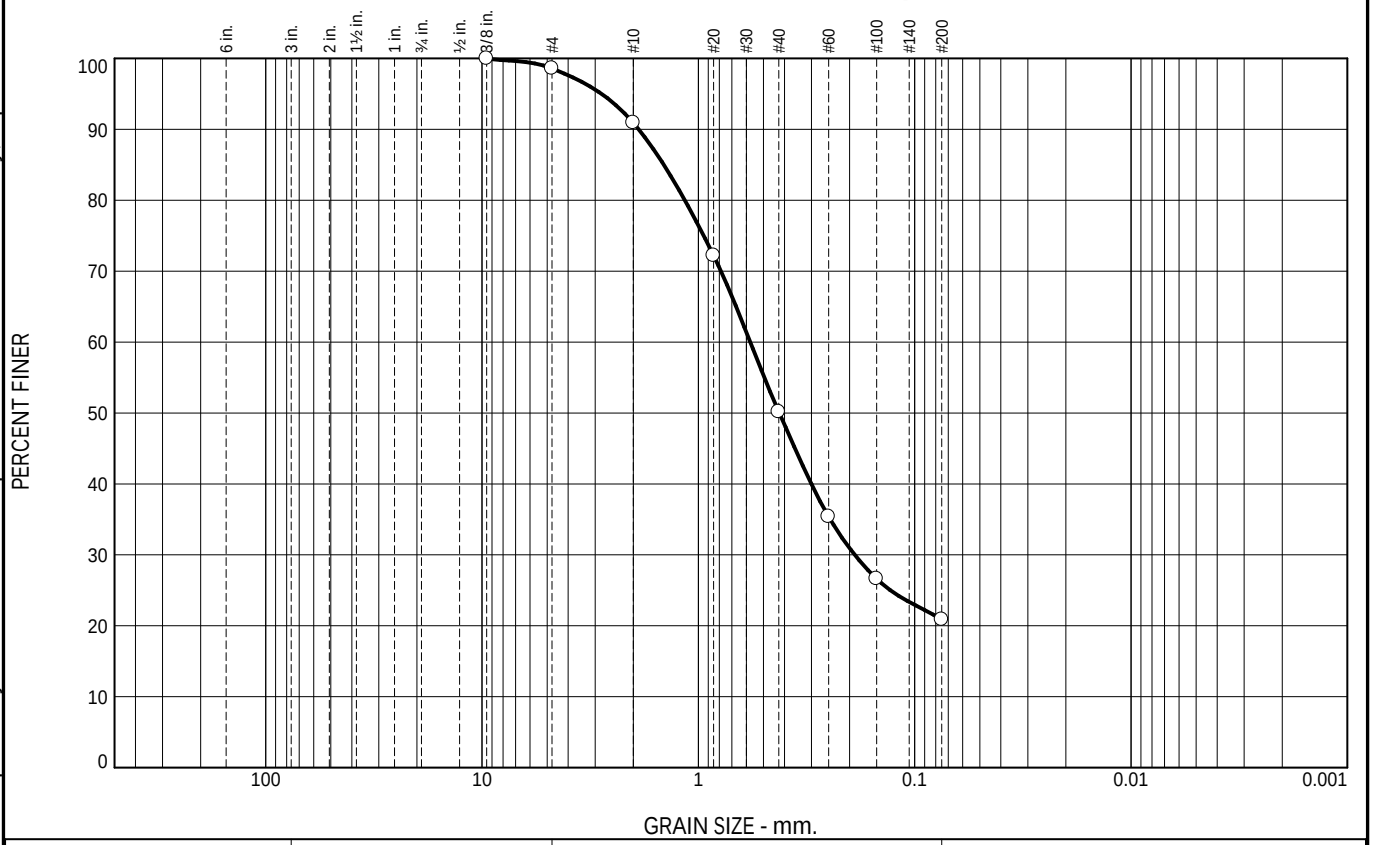
GSDC = Grain Size Distribution Curve as determined by AASHTO T 88-19 and/or ASTM D 7928-21e1 (Last Updated June 2021)

WC = water content as determined by AASHTO T 265-19 and/or ASTM D 2216-19

LL = Liquid limit as determined by AASHTO T 89-17 and/or ASTM D 4318-17E01

PI = Plasticity Index as determined by AASHTO 90-16 and/or ASTM D4318-17E01

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.4	7.7	40.7	29.3	20.9	

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8"	100.0		
#4	98.6		
#10	90.9		
#20	72.2		
#40	50.2		
#60	35.4		
#100	26.6		
#200	20.9		

* (no specification provided)

Source of Sample: BB-SDRR-101 Depth: 5-7'
Sample Number: 2D

Soil Description
Dark Brown f-c SAND, some Silt, trace fine Gravel

Atterberg Limits
PL= NP LL= NV PI= NP

Coefficients
D_{90}= 1.8872 D_{85}= 1.4447 D_{60}= 0.5757
D_{50}= 0.4226 D_{30}= 0.1893 D_{15}=
D_{10}= C_u= C_c=

Classification
USCS= SM AASHTO= A-1-b

Remarks

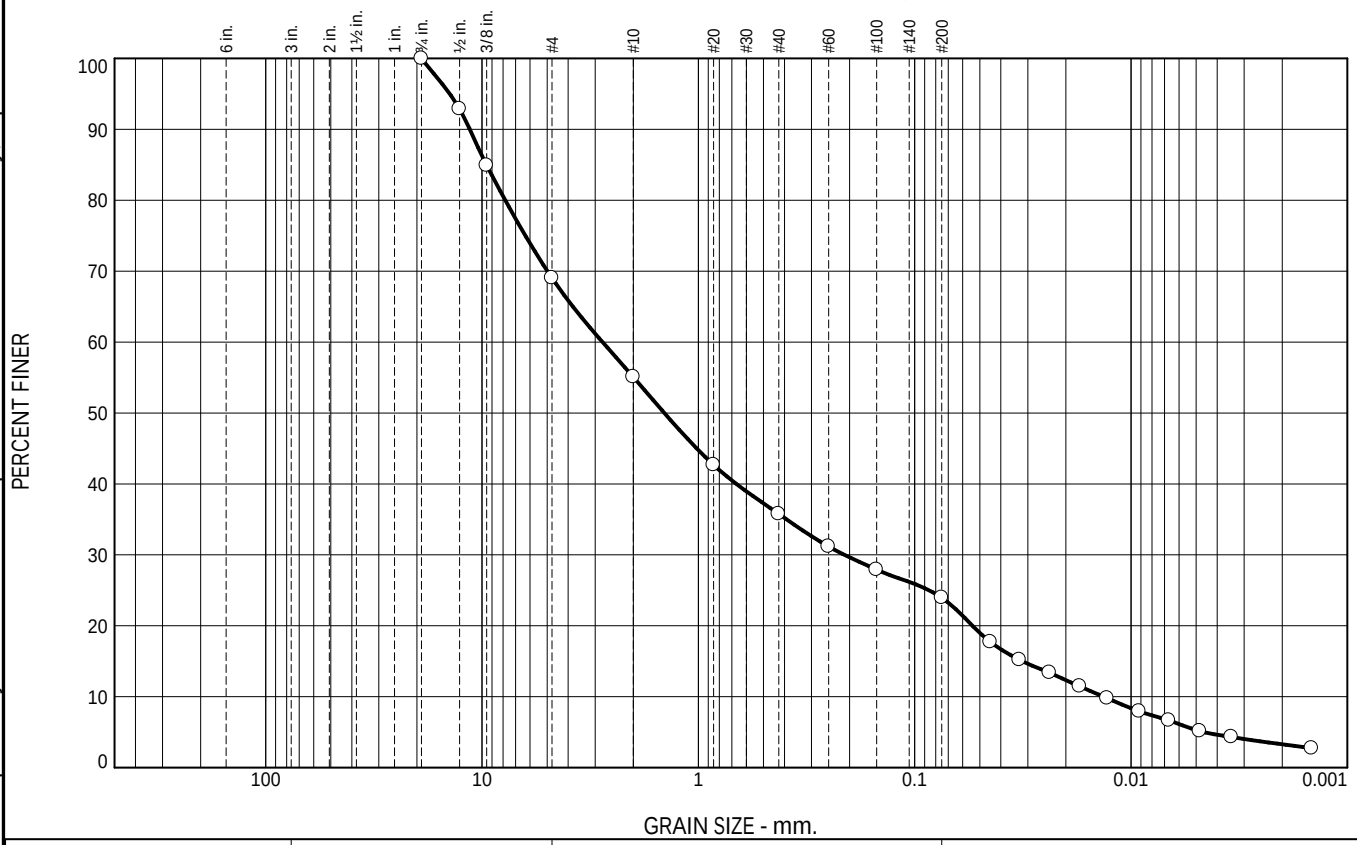
Date: 8.30.24

Thielsch Engineering Inc.
Cranston, RI

Client: GZA GeoEnvironmental
Project: Drummond Road Bridge #5784
Sidney, Maine
Project No: 09.0026242.00 Task 3 Fig. 24-S-3362

Tested By: MCS Checked By: Kris Roland

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	31.0	13.9	19.3	11.8	20.7	3.3

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4"	100.0		
1/2"	92.9		
3/8"	84.9		
#4	69.0		
#10	55.1		
#20	42.7		
#40	35.8		
#60	31.2		
#100	27.9		
#200	24.0		
0.0447 mm.	17.7		
0.0328 mm.	15.2		
0.0238 mm.	13.4		
0.0173 mm.	11.4		
0.0129 mm.	9.8		
0.0092 mm.	7.9		
0.0067 mm.	6.7		
0.0048 mm.	5.1		
0.0034 mm.	4.3		
0.0015 mm.	2.7		

* (no specification provided)

Source of Sample: BB-SDRR-101 Depth: 15-17'
Sample Number: 4D

Soil Description

Brown f-c SAND, some fine Gravel, some Silt

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 11.3792 D_{85}= 9.5550 D_{60}= 2.7739
D_{50}= 1.4363 D_{30}= 0.2114 D_{15}= 0.0318
D_{10}= 0.0134 C_u= 207.02 C_c= 1.20

Classification

USCS= SM AASHTO= A-1-b

Remarks

Date: 8.30.24

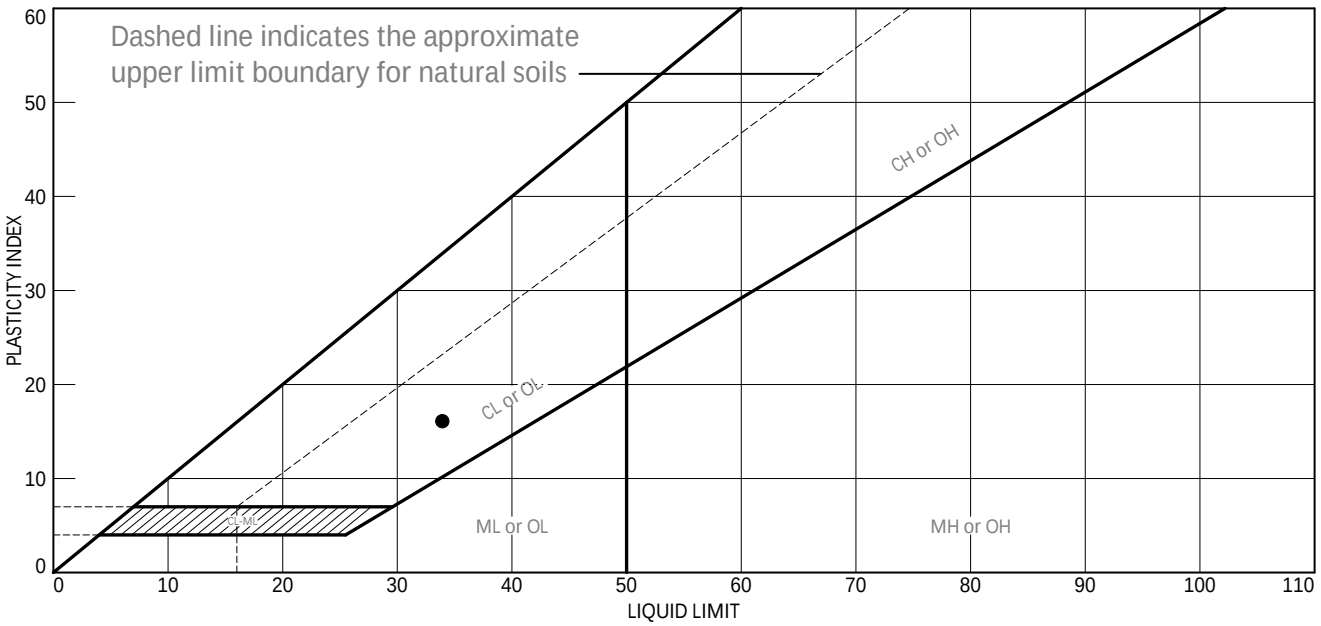
Thielsch Engineering Inc.

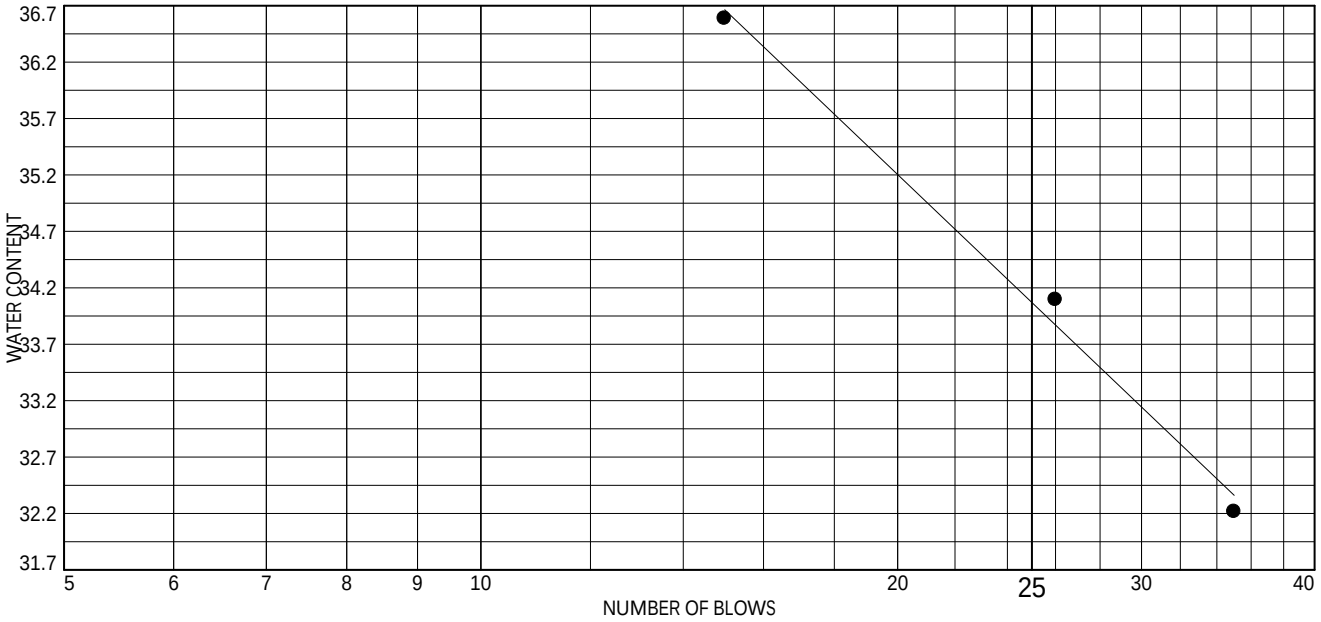
Cranston, RI

Client: GZA GeoEnvironmental
Project: Drummond Road Bridge #5784
Sidney, Maine
Project No: 09.0026242.00 Task 3 Fig. 24-S-3363

Tested By: RB/MCS Checked By: Kris Roland

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Brown CLAY & SILT	34	18	16			

Project No. 09.0026242.00 Task 3 Client: GZA GeoEnvironmental

Project: Drummond Road Bridge #5784

Sidney, Maine

Source of Sample: BB-SDRR-101 Depth: 20-22'

Sample Number: 5D

Thielsch Engineering Inc.

Cranston, RI

Remarks:

Fig. 24-L-3364

Tested By: RB Checked By: Kris Roland

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	9.1	13.6	7.4	12.7	17.7	34.9	4.6

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1"	100.0		
3/4"	90.9		
1/2"	85.7		
3/8"	83.4		
#4	77.3		
#10	69.9		
#20	63.7		
#40	57.2		
#60	51.1		
#100	44.5		
#200	39.5		
0.0449 mm.	29.5		
0.0331 mm.	24.9		
0.0240 mm.	21.7		
0.0174 mm.	18.8		
0.0130 mm.	16.0		
0.0094 mm.	12.9		
0.0068 mm.	9.5		
0.0048 mm.	8.1		
0.0035 mm.	6.4		
0.0015 mm.	3.6		

* (no specification provided)

Soil Description

Brown SILTY f-c SAND, some f-c Gravel

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 18.1954 D_{85}= 11.7981 D_{60}= 0.5629
D_{50}= 0.2295 D_{30}= 0.0463 D_{15}= 0.0117
D_{10}= 0.0072 C_u= 78.37 C_c= 0.53

Classification

USCS= SM AASHTO= A-4(0)

Remarks

Sample visually classified as non-plastic. Sample could not be rolled to 1/4".

Source of Sample: BB-SDRR-101 Depth: 25-27'
Sample Number: 6D

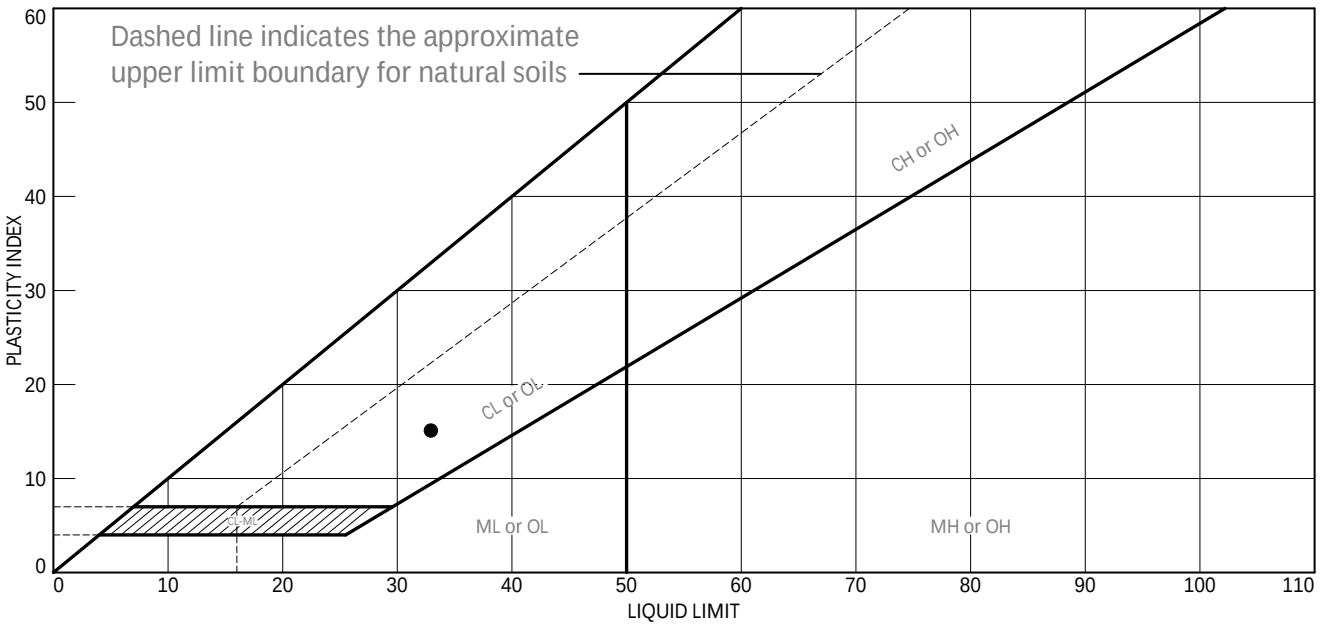
Date: 8.30.24

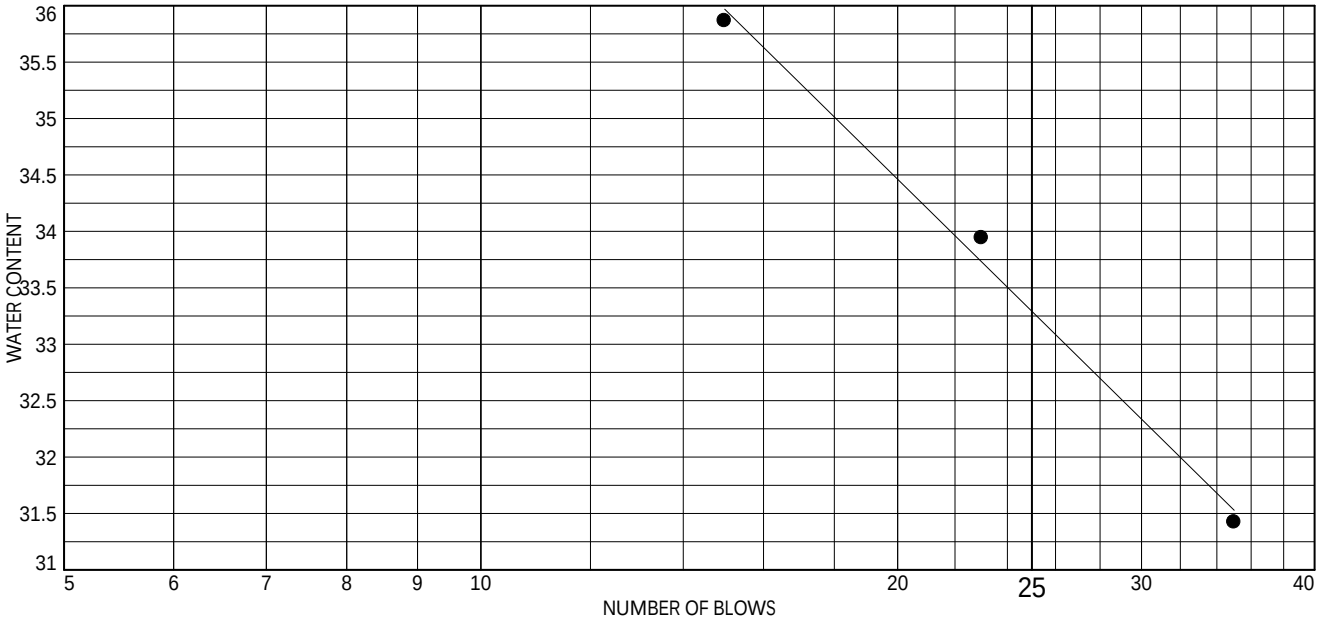
Thielsch Engineering Inc.
Cranston, RI

Client: GZA GeoEnvironmental
Project: Drummond Road Bridge #5784
Sidney, Maine
Project No: 09.0026242.00 Task 3 Fig. 24-S-3365

Tested By: RB/MCS Checked By: Kris Roland

LIQUID AND PLASTIC LIMITS TEST REPORT





MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
● Brown CLAY & SILT	33	18	15			

Project No. 09.0026242.00 Task 3 Client: GZA GeoEnvironmental

Project: Drummond Road Bridge #5784

Sidney, Maine

Source of Sample: BB-SDRR-102 Depth: 5-7'

Sample Number: 2D

Thielsch Engineering Inc.

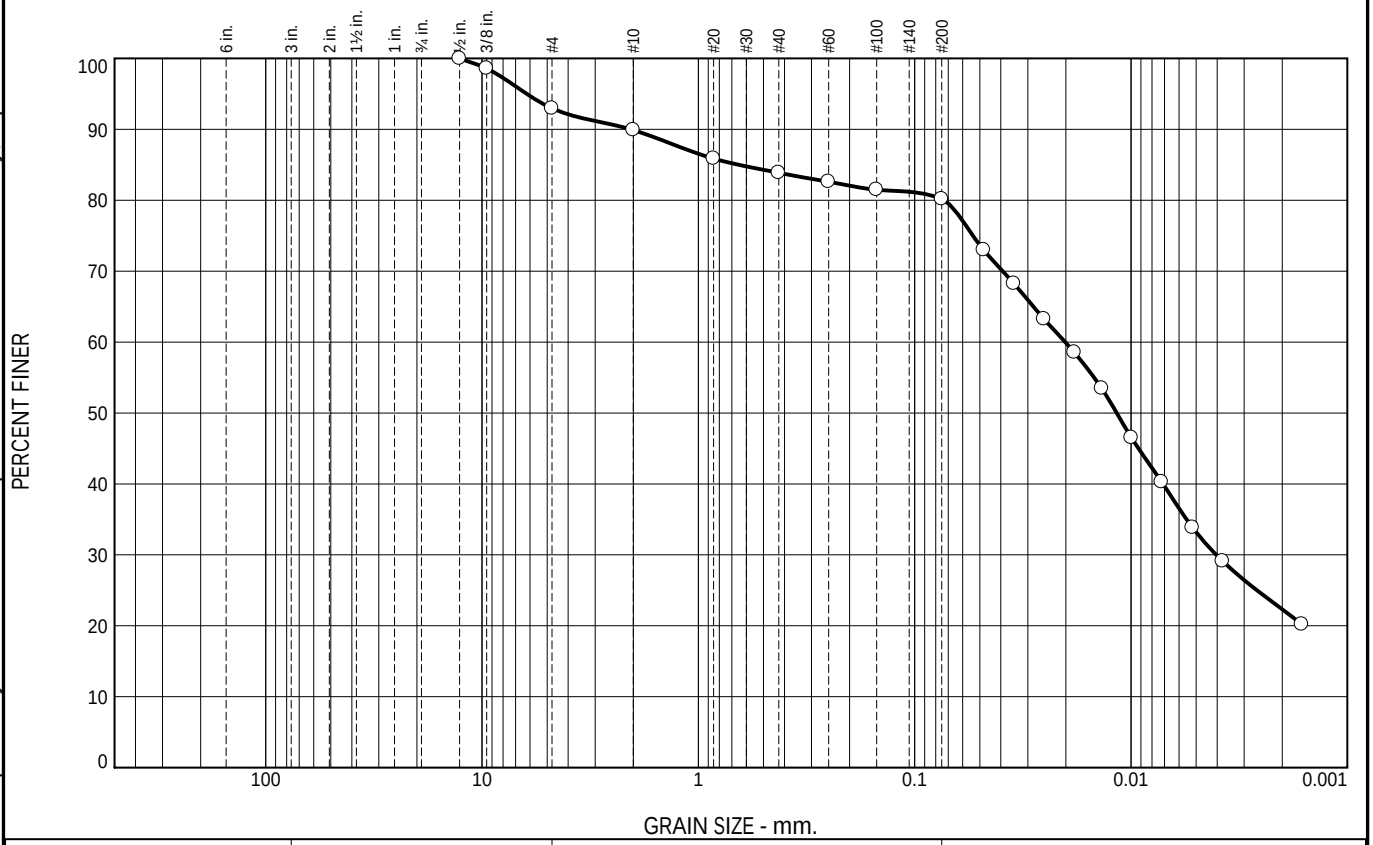
Cranston, RI

Remarks:

Fig. 24-L-3366

Tested By: RB Checked By: Kris Roland

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	7.0	3.1	6.0	3.7	57.9	22.3

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1/2"	100.0		
3/8"	98.6		
#4	93.0		
#10	89.9		
#20	85.9		
#40	83.9		
#60	82.6		
#100	81.5		
#200	80.2		
0.0480 mm.	73.0		
0.0348 mm.	68.3		
0.0253 mm.	63.3		
0.0183 mm.	58.6		
0.0137 mm.	53.5		
0.0100 mm.	46.5		
0.0072 mm.	40.3		
0.0052 mm.	33.8		
0.0038 mm.	29.1		
0.0016 mm.	20.2		

* (no specification provided)

Soil Description

Olive SILT & CLAY, little f-c Sand, trace fine Gravel

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 2.0450 D_{85}= 0.6507 D_{60}= 0.0201
D_{50}= 0.0116 D_{30}= 0.0040 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= ML AASHTO= A-4(0)

Remarks

Sample visually classified as plastic. Sample rolled to 1/8".

Source of Sample: BB-SDRR-102 Depth: 10-12'
Sample Number: 3D

Date: 8.30.24

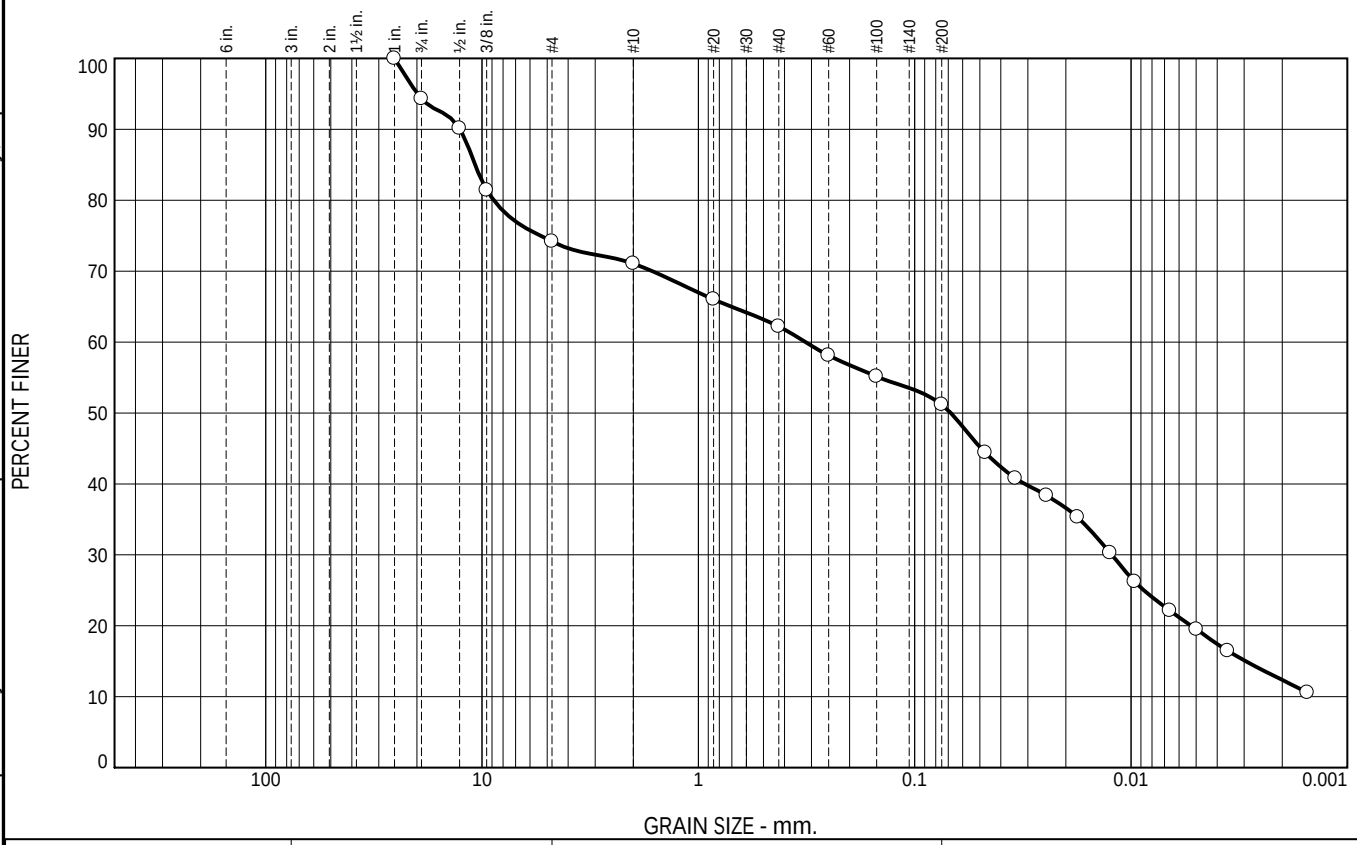
Thielsch Engineering Inc.

Cranston, RI

Client: GZA GeoEnvironmental
Project: Drummond Road Bridge #5784
Sidney, Maine
Project No: 09.0026242.00 Task 3 Fig. 24-S-3367

Tested By: RB/MCS Checked By: Kris Roland

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	5.7	20.1	3.1	8.9	11.0	38.8	12.4

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1"	100.0		
3/4"	94.3		
1/2"	90.1		
3/8"	81.4		
#4	74.2		
#10	71.1		
#20	66.0		
#40	62.2		
#60	58.1		
#100	55.1		
#200	51.2		
0.0472 mm.	44.4		
0.0342 mm.	40.8		
0.0245 mm.	38.4		
0.0177 mm.	35.3		
0.0125 mm.	30.3		
0.0096 mm.	26.2		
0.0066 mm.	22.1		
0.0050 mm.	19.5		
0.0036 mm.	16.4		
0.0015 mm.	10.6		

* (no specification provided)

Soil Description

Olive SILT & CLAY, some f-c Gravel, some f-c Sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 12.6101 D_{85}= 10.7560 D_{60}= 0.3195
D_{50}= 0.0681 D_{30}= 0.0123 D_{15}= 0.0030
D_{10}= C_u= C_c=

Classification

USCS= ML AASHTO= A-4(0)

Remarks

Sample visually classified as plastic. Sample rolled to 1/8".

Source of Sample: BB-SDRR-102 Depth: 15-17'
Sample Number: 4D

Date: 8.30.24

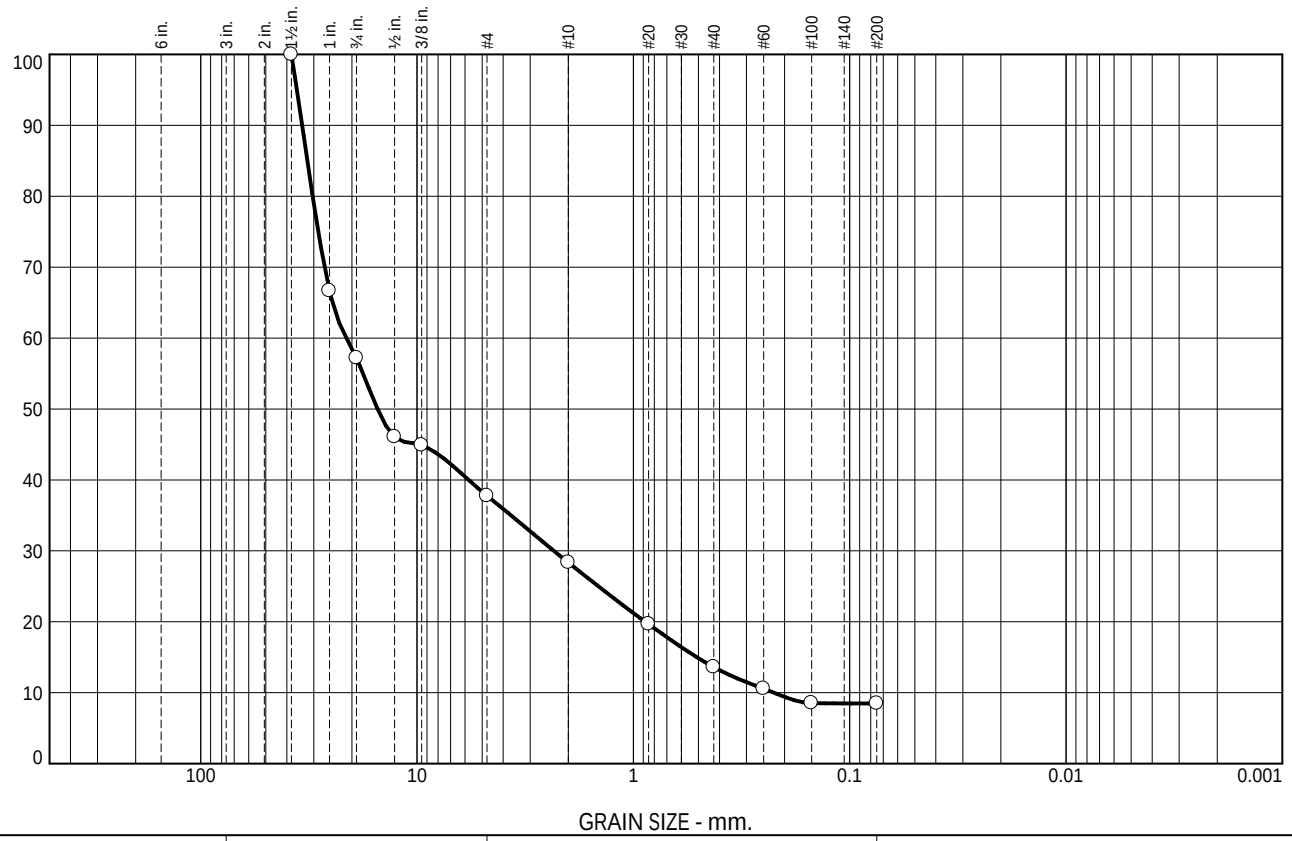
Thielsch Engineering Inc.

Cranston, RI

Client: GZA GeoEnvironmental
Project: Drummond Road Bridge #5784
Sidney, Maine
Project No: 09.0026242.00 Task 3 Fig. 24-S-3368

Tested By: RB/MCS Checked By: Kris Roland

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	42.8	19.4	9.4	14.8	5.1	8.5	

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 1/2"	100.0		
1"	66.7		
3/4"	57.2		
1/2"	46.1		
3/8"	44.9		
#4	37.8		
#10	28.4		
#20	19.7		
#40	13.6		
#60	10.6		
#100	8.5		
#200	8.5		

* (no specification provided)

Soil Description

Dark Brown f-c GRAVEL, some f-c Sand, trace Silt

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 33.9710 D_{85}= 32.1401 D_{60}= 21.2185
D_{50}= 15.2167 D_{30}= 2.3322 D_{15}= 0.5089
D_{10}= 0.2242 C_u= 94.65 C_c= 1.14

Classification

USCS= GW-GM AASHTO= A-1-a

Remarks

Source of Sample: BB-SDRR-103 Depth: 0-2'
Sample Number: 1D

Date: 8.30.24

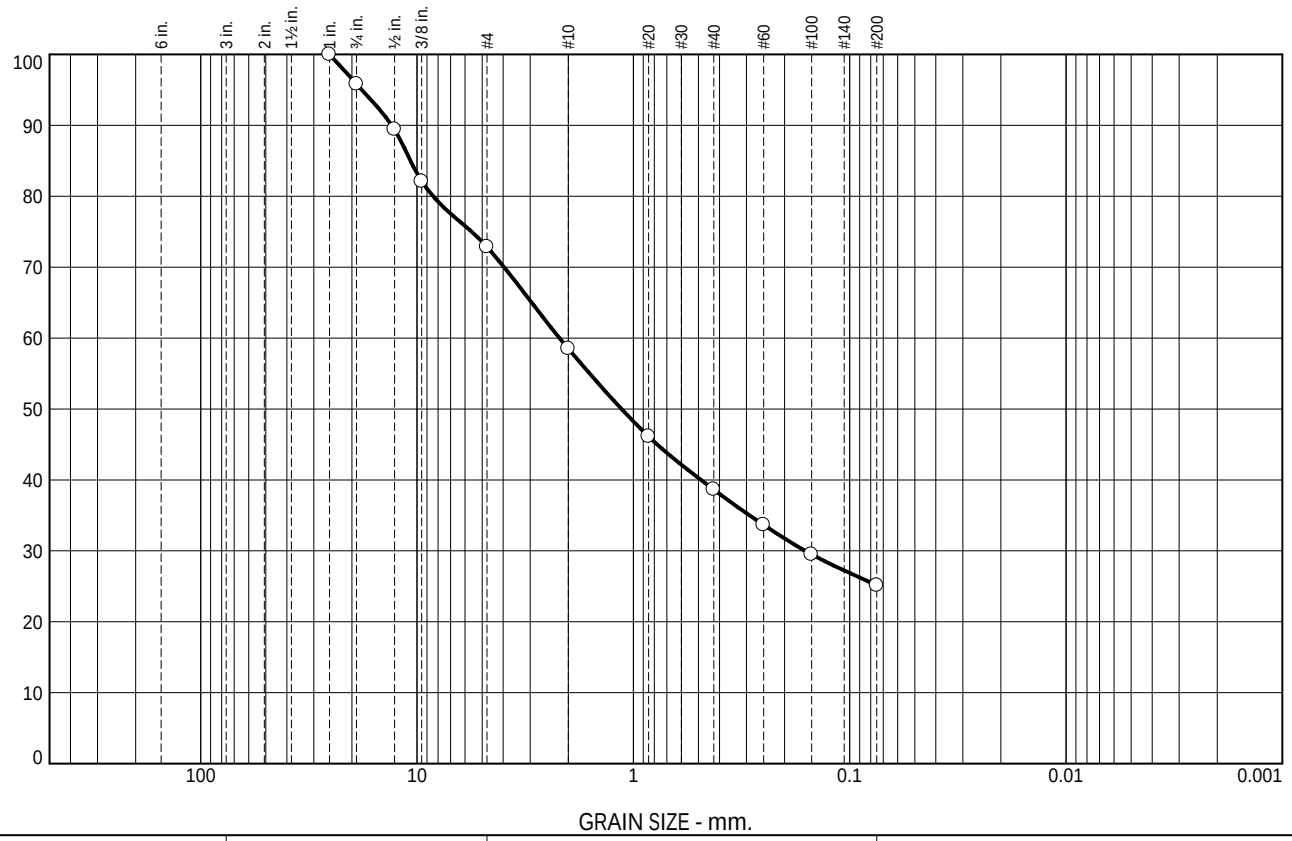
Thielsch Engineering Inc.

Cranston, RI

Client: GZA GeoEnvironmental
Project: Drummond Road Bridge #5784
Sidney, Maine
Project No: 09.0026242.00 Task 3 Fig. 24-S-3369

Tested By: MCS Checked By: Kris Roland

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	4.2	22.9	14.4	19.9	13.5	25.1	

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1"	100.0		
3/4"	95.8		
1/2"	89.4		
3/8"	82.1		
#4	72.9		
#10	58.5		
#20	46.1		
#40	38.6		
#60	33.7		
#100	29.5		
#200	25.1		

* (no specification provided)

Soil Description

Dark Brown f-c SAND, some f-c Gravel, some Silt

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 13.0778 D_{85}= 10.7218 D_{60}= 2.1952
D_{50}= 1.1343 D_{30}= 0.1606 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO= A-1-b

Remarks

Source of Sample: BB-SDRR-103 Depth: 10-12'
Sample Number: 4D

Date: 8.30.24

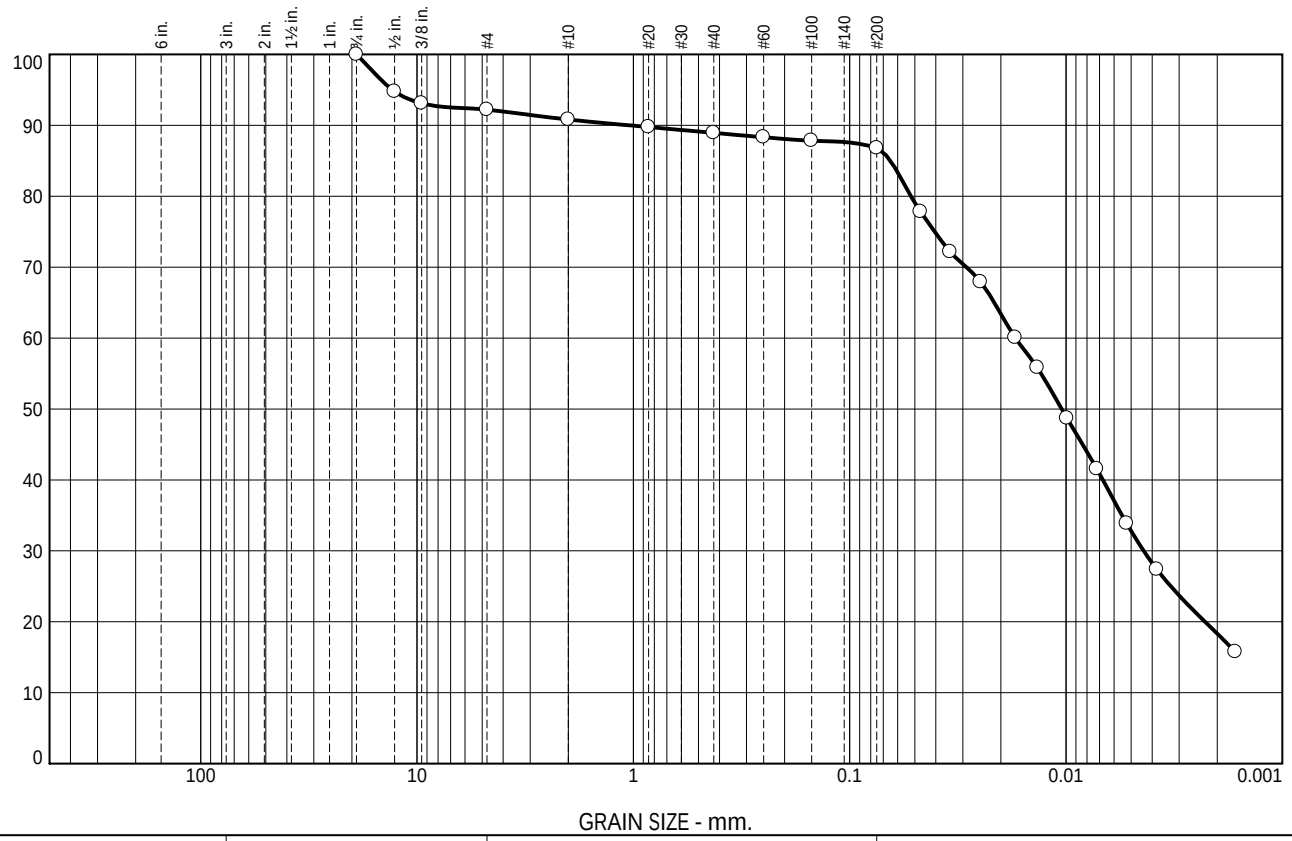
Thielsch Engineering Inc.

Cranston, RI

Client: GZA GeoEnvironmental
Project: Drummond Road Bridge #5784
Sidney, Maine
Project No: 09.0026242.00 Task 3 Fig. 24-S-3370

Tested By: MCS Checked By: Kris Roland

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	7.8	1.4	1.9	2.1	68.5	18.3

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4"	100.0		
1/2"	94.8		
3/8"	93.1		
#4	92.2		
#10	90.8		
#20	89.8		
#40	88.9		
#60	88.3		
#100	87.8		
#200	86.8		
0.0471 mm.	77.8		
0.0343 mm.	72.2		
0.0248 mm.	67.9		
0.0172 mm.	60.1		
0.0136 mm.	55.8		
0.0099 mm.	48.7		
0.0072 mm.	41.6		
0.0052 mm.	33.9		
0.0038 mm.	27.4		
0.0016 mm.	15.7		

* (no specification provided)

Soil Description

Brown SILT & CLAY, trace fine Gravel, trace f-c Sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 1.0379 D_{85}= 0.0649 D_{60}= 0.0171
D_{50}= 0.0105 D_{30}= 0.0044 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= ML AASHTO= A-4(0)

Remarks

Sample visually classified as plastic. Sample rolled to 1/8".

Source of Sample: BB-SDRR-103 Depth: 20-22'
Sample Number: 6D

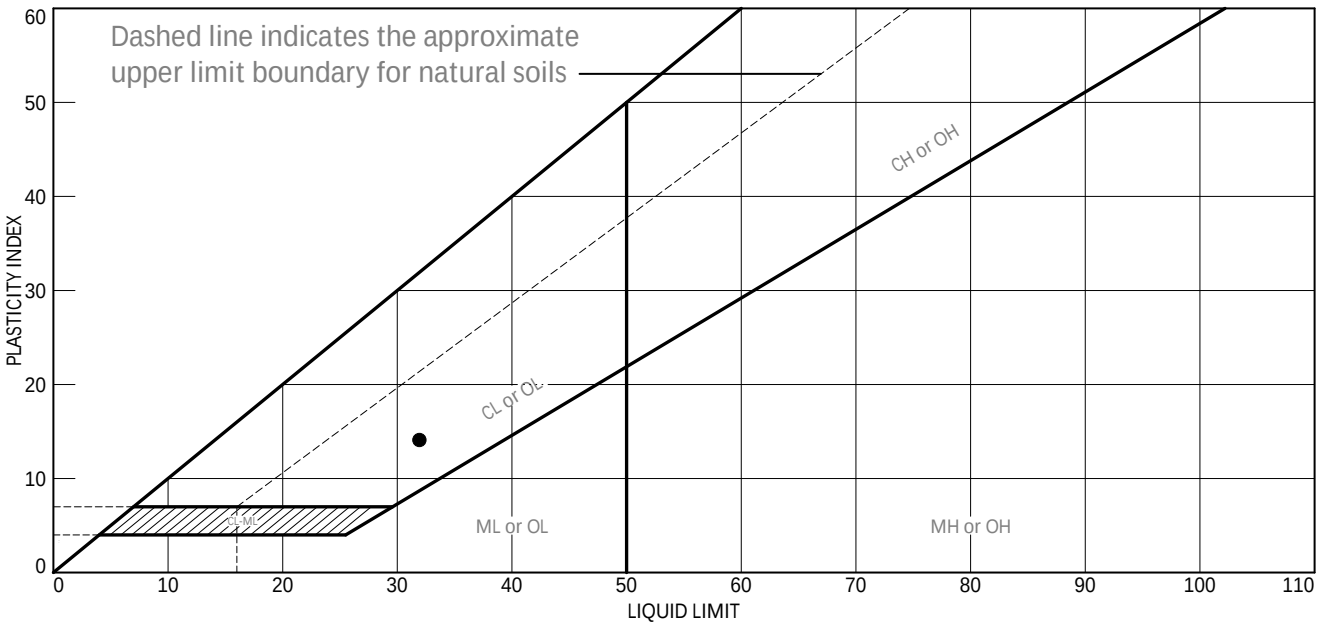
Date: 8.30.24

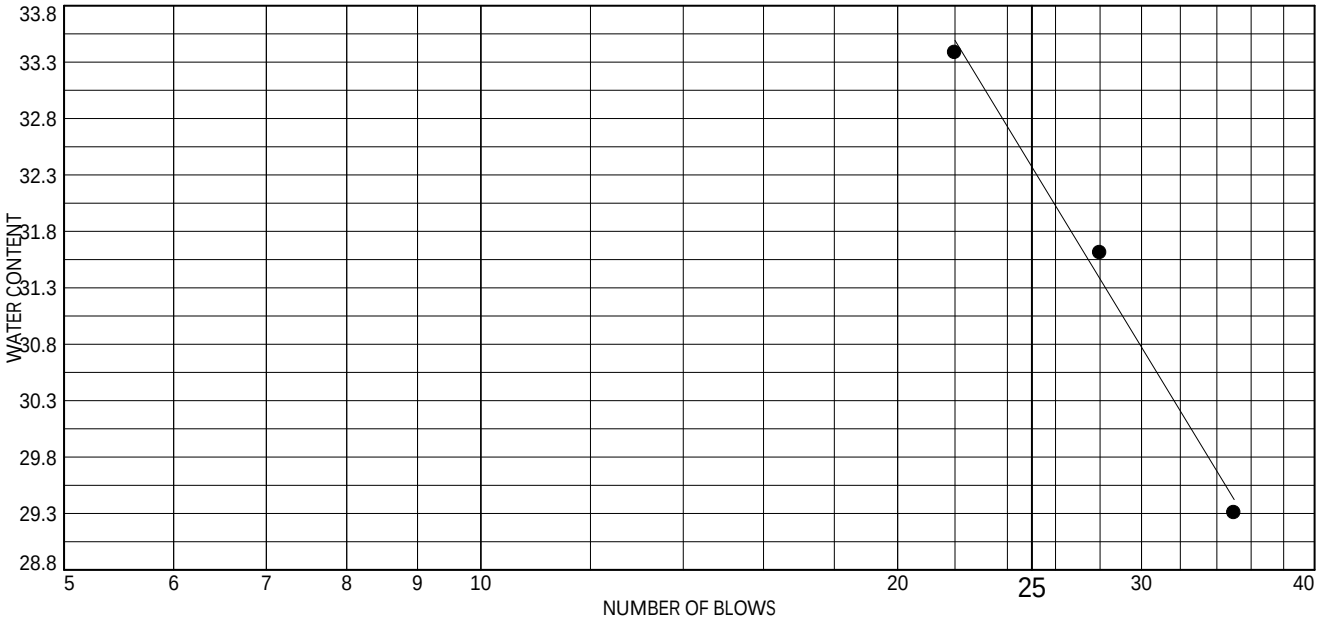
Thielsch Engineering Inc.
Cranston, RI

Client: GZA GeoEnvironmental
Project: Drummond Road Bridge #5784
Sidney, Maine
Project No: 09.0026242.00 Task 3 Fig. 24-S-3371

Tested By: RB/MCS Checked By: Kris Roland

LIQUID AND PLASTIC LIMITS TEST REPORT





MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
● Brown CLAY & SILT	32	18	14			

Project No. 09.0026242.00 Task 3 Client: GZA GeoEnvironmental

Project: Drummond Road Bridge #5784

Sidney, Maine

Source of Sample: BB-SDRR-103 Depth: 30-32'

Sample Number: 8D

Remarks:

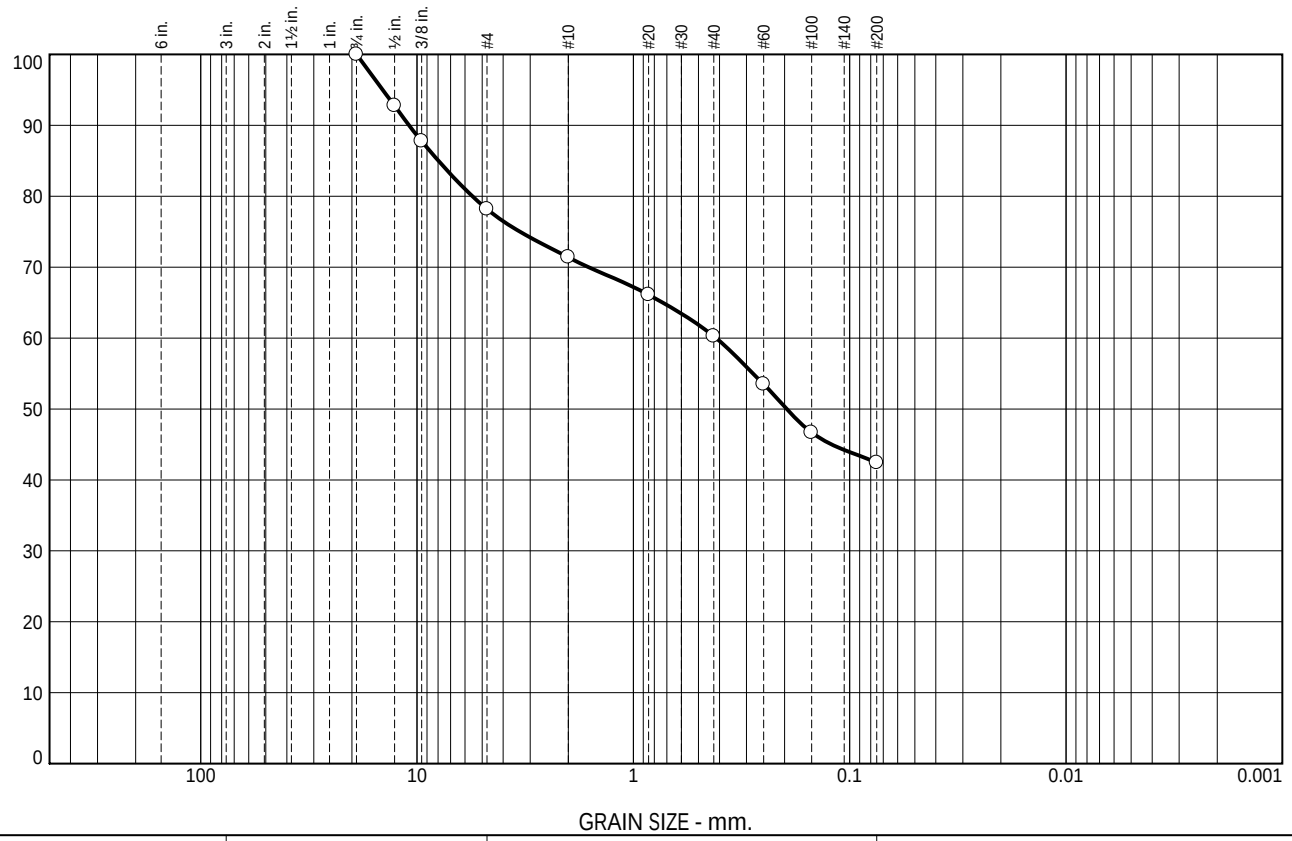
Thielsch Engineering Inc.

Cranston, RI

Fig. 24-L-3372

Tested By: RB Checked By: Kris Roland

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	21.8	6.8	11.1	17.9	42.4	

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4"	100.0		
1/2"	92.8		
3/8"	87.8		
#4	78.2		
#10	71.4		
#20	66.1		
#40	60.3		
#60	53.5		
#100	46.7		
#200	42.4		

* (no specification provided)

Soil Description

Grey CLAYEY SILT, some f-c Sand, some fine Gravel

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 10.8825 D_{85}= 7.9556 D_{60}= 0.4148
D_{50}= 0.1954 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO= A-4(0)

Remarks

Sample visually classified as plastic. Sample rolled to 1/4"

Source of Sample: BB-SDRR-103 Depth: 45-47'
Sample Number: 10D

Date: 8.30.24

Thielsch Engineering Inc.

Cranston, RI

Client: GZA GeoEnvironmental
Project: Drummond Road Bridge #5784
Sidney, Maine
Project No: 09.0026242.00 Task 3 Fig. 24-S-3373

Tested By: MCS Checked By: Kris Roland

Thielsch
DIVISION OF THE RISE GROUP

195 Frances Avenue
Cranston RI, 02910
Phone: (401)-467-6454
Fax: (401)-467-2398
thielsch.com
Let's Build a Solid Foundation

Client Information:	
GZA GeoEnvironmental	
South Portland, ME	
Project Manager:	Blaine Cardali
Assigned By:	Blaine Cardali
Collected By:	Luis Navarrete

Project Information:	
Sidney Bridges	
Sidney, ME	
Project Number:	09.0026242.00 T3
Summary Page:	1 of 1
Report Date:	09.06.24

LABORATORY TESTING DATA SHEET, Report No.: 7424-H-253

Boring No.	Sample No.	Depth (ft)	Laboratory No.	Specimen Data						Compressive Strength Tests								Rock Formation or Description or Remarks
				Mohs Hard-ness	Diameter (in)	Length (in)	(1) Unit Weight (PCF)	(2) Wet Density (PCF)	Bulk G_s	(3) Other Tests	(4) Strength PSI	(5) Strain %	(6) E sec PSI EE+06	(7) Poisson's Ratio	st PSI	Is_{50} PSI	(8) s_c PSI	
BB-SDRR-101		32.8-33.8	24-S-3345															No Data
Sample broke along foliation when setting it in the trimmer																		
BB-SDRR-102		18.8-19.4	24-S-3346		1.988	4.600	174.0			U	5548	0.314	2.03	0.14				Grey Slate
Fresh Break along foliation																		
BB-SDRR-103		56.4-57.0	24-S-3347		1.964	4.431	175.9			U	5442	0.426	5.13	0.31				Grey Slate
Fresh Break along foliation																		

(1) Volume Determined By Measuring Dimensions

(2) Determined by Measuring Dimensions and Weight of Saturated Sample

Notes

(3) PLD=Point Load (diametrical), PLA= Point Load (Axial) ST= Splitting Tensile U= Unconfined Compressive Strength

(4) Taken at Peak Deviator Stress

Notes

(5) Strain at Peak Deviator Stress

(6) Represents Secant Modulus at 50% of Total Failure Stress

(7) Represents Secant Poisson's Ratio at 50% of Total Failure Stress

(8) Estimated UCS from Table 1 of ASTM D5731 for NX cores (Is x 24)

Date Received: **08.22.24** Reviewed By: Date Review **09.06.24**

Thielsch
DIVISION OF THE RISE GROUP

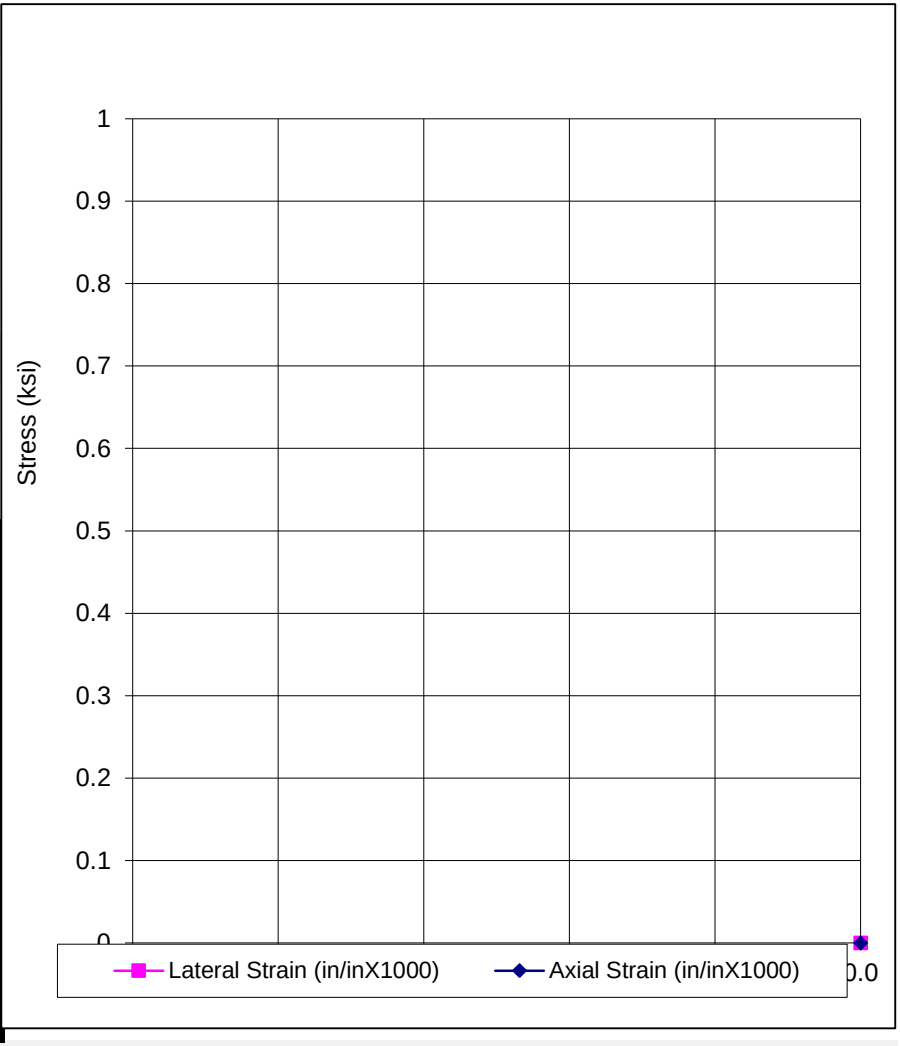
195 Frances Avenue
Cranston, Rhode Island 02910
Phone: (401) 467-6454
Fax: (401) 467-2398
www.thielsch.com
Let's Build a Solid Foundation

Client Information:	
GZA GeoEnvironmental	
South Portland, ME	
Project Manager:	Blaine Cardali
Assigned by:	Blaine Cardali
Collected by:	L. Navarrete

Project Information:	
Sidney Bridges	
Sidney, ME	
Project Number:	09.0026242.00 T3
Technician:	AV
Report Date:	09.06.24

ASTM D7012 Compressive Strength and Elastic Moduli of Intact Rock Core Specimens

Sample Information		**Compressive Test Information**	
Boring ID:	BB-SDRR-101	**Unit Weight (pcf):**	
Sample #:		**Failure Stress (psi):**	
Depth (ft):	32.8-33.8	**Failure Mode:**	Fresh
Tested Depth (ft):		**Time to Failure (min)**	
Rock Type:	Grey Slate		
Features:	Fresh Break		
Test Specimen Information		**Elastic Moduli Test Information**	
Diameter, D (in):		**Poisson's Ratio @ 50%:**	
Length, L (in):		**Strain %:**	
L:D Ratio:		**E sec PSI @ 50%:**	



Testing Notes: **Sample broke along foliation when setting it into trimmer**

Thielsch
DIVISION OF THE RISE GROUP

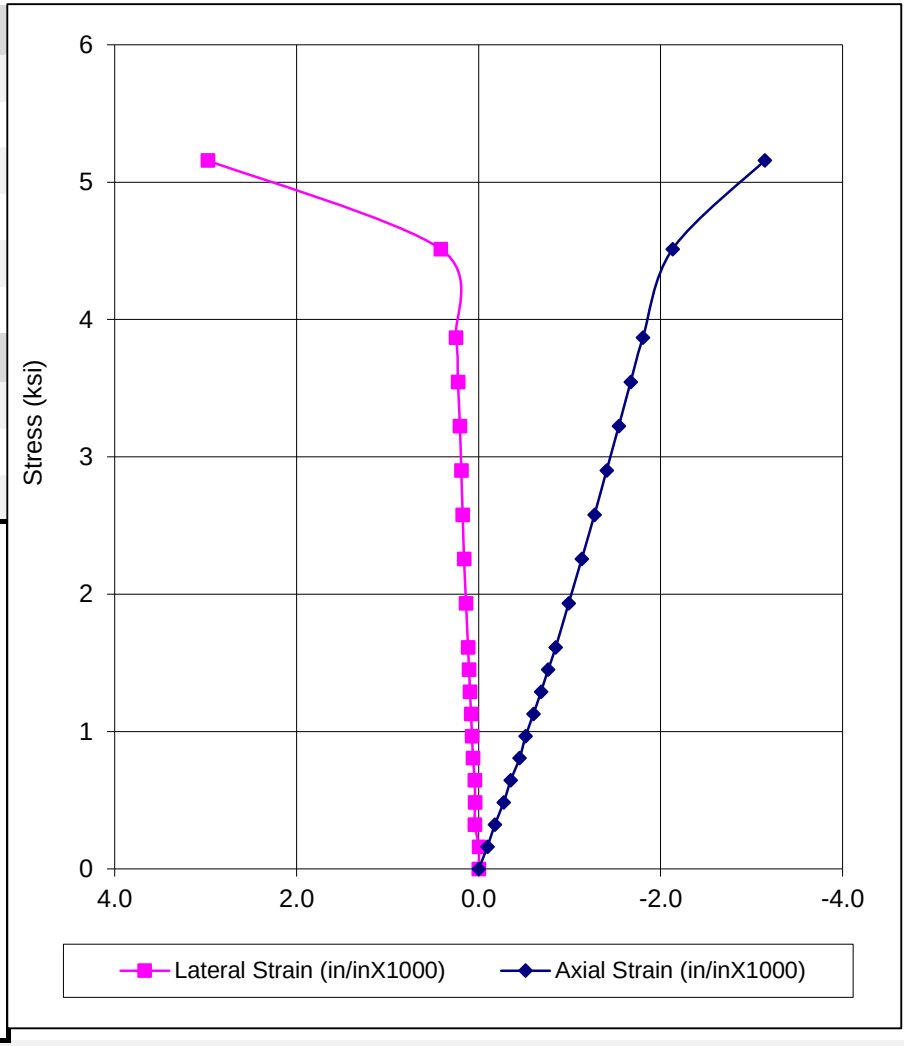
195 Frances Avenue
Cranston, Rhode Island 02910
Phone: (401) 467-6454
Fax: (401) 467-2398
www.thielsch.com
Let's Build a Solid Foundation

Client Information:	
GZA GeoEnvironmental	
South Portland, ME	
Project Manager:	Blaine Cardali
Assigned by:	Blaine Cardali
Collected by:	L. Navarrete

Project Information:	
Sidney Bridges	
Sidney, ME	
Project Number:	09.0026242.00 T3
Technician:	AV
Report Date:	09.06.24

ASTM D7012 Compressive Strength and Elastic Moduli of Intact Rock Core Specimens

Sample Information		**Compressive Test Information**	
Boring ID:	BB-SDRR-102	**Unit Weight (pcf):**	174.0
Sample #:		**Failure Stress (psi):**	5,548
Depth (ft):	18.8-19.4	**Failure Mode:**	Fresh
Tested Depth (ft):	18.9-19.1	**Time to Failure (min)**	6.27
Rock Type:	Grey Slate		
Features:	Broke along foliation		
Test Specimen Information		**Elastic Moduli Test Information**	
Diameter, D (in):	1.988	**Poisson's Ratio @ 50%:**	0.14
Length, L (in):	4.600	**Strain %:**	0.314
L:D Ratio:	2.31	**E sec PSI @ 50%:**	2.03E+06



Testing Notes:

Thielsch
DIVISION OF THE RISE GROUP

195 Frances Avenue
Cranston, Rhode Island 02910
Phone: (401) 467-6454
Fax: (401) 467-2398
www.thielsch.com
Let's Build a Solid Foundation

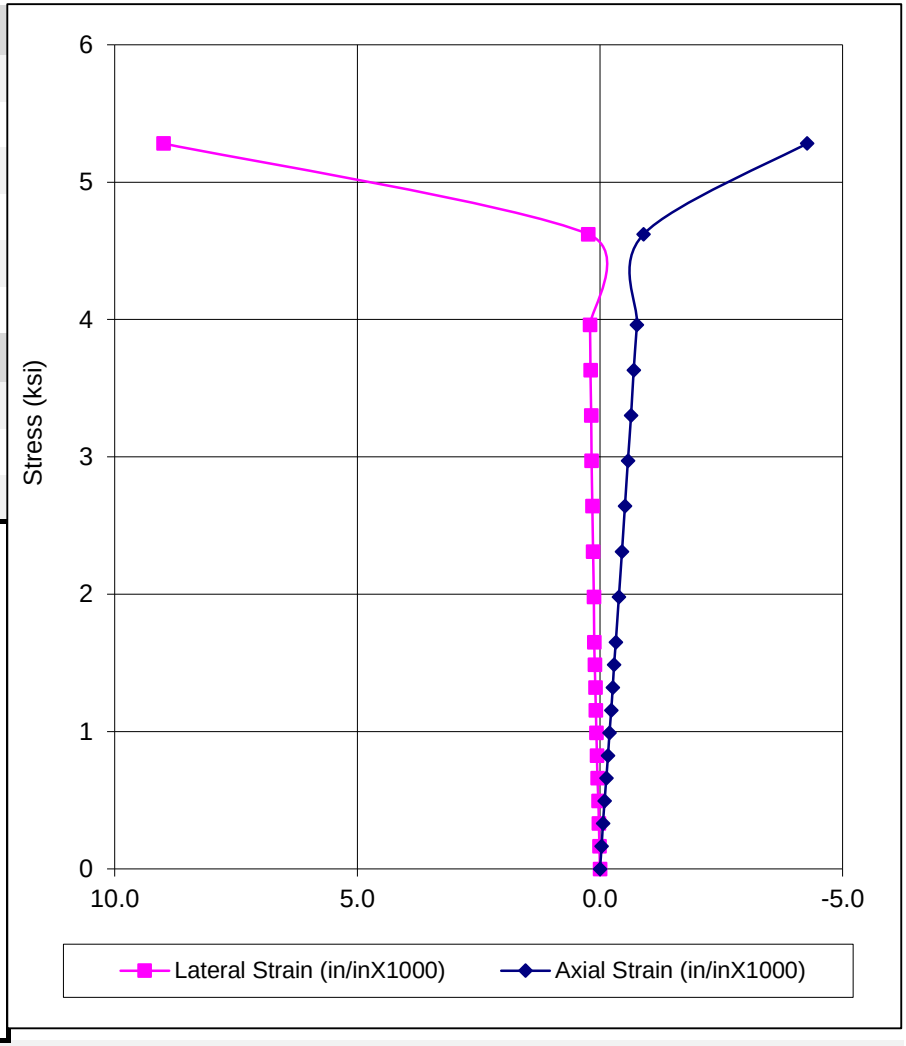
Client Information:	
GZA GeoEnvironmental	
South Portland, ME	
Project Manager:	Blaine Cardali
Assigned by:	Blaine Cardali
Collected by:	L. Navarrete

Project Information:	
Sidney Bridges	
Sidney, ME	
Project Number:	09.0026242.00 T3
Technician:	AV
Report Date:	09.06.24

ASTM D7012 Compressive Strength and Elastic Moduli of Intact Rock Core Specimens

Sample Information		**Compressive Test Information**	
Boring ID:	BB-SDRR-103	**Unit Weight (pcf):**	175.9
Sample #:		**Failure Stress (psi):**	5,442
Depth (ft):	56.4-57.0	**Failure Mode:**	Fresh
Tested Depth (ft):	56.58-56.93	**Time to Failure (min)**	6.27
Rock Type:	Grey Slate		
Features:	Broke along foliation		

Test Specimen Information		**Elastic Moduli Test Information**	
Diameter, D (in):	1.964	**Poisson's Ratio @ 50%:**	0.31
Length, L (in):	4.431	**Strain %:**	0.426
L:D Ratio:	2.26	**E sec PSI @ 50%:**	5.13E+06



Testing Notes:

APPENDIX E – ROCK CORE PHOTOGRAPHS

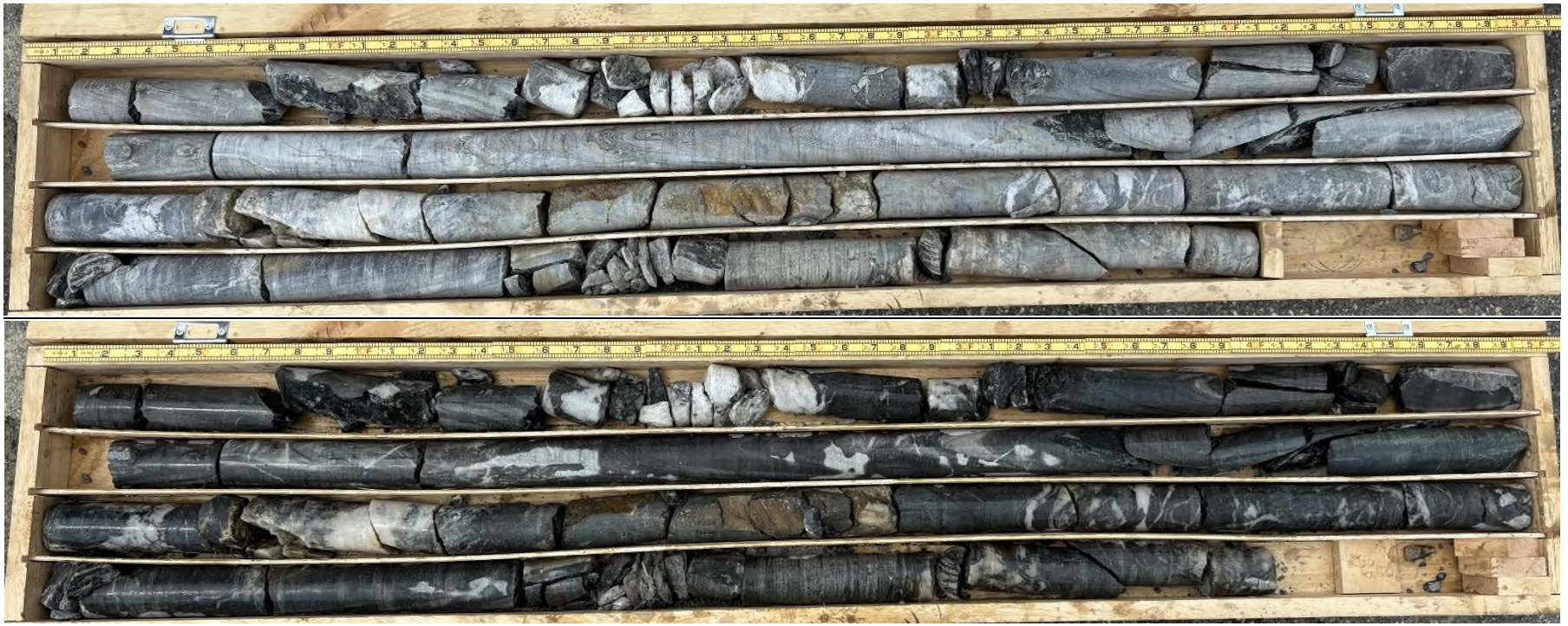
MaineDOT Bridge No. 5784
Drummond Rd over I-95
Sidney, ME
WIN 25469.00
Rock Core Photographs

Boring No.	Run	Depth (ft)	Recovery (in)	Recovery (%)	RQD (in)	RQD (%)	Rock Type	Box Row
BB-SDRR-101	R1	32.8 - 37.8	60	100%	58	97%	PELITE	1
BB-SDRR-101	R2	37.8 - 42.8	60	100%	54	90%	PELITE	2

Notes: 1. Box row corresponds to the core box section in which the rock core sample is contained; Row 1=Top, Row 4=Bottom.
2. Top photo is dry, bottom photo is wet.

MaineDOT Bridge No. 5784
Drummond Rd over I-95
Sidney, ME
WIN 25469.00
Rock Core Photographs

Boring No.	Run	Depth (ft)	Recovery (in)	Recovery (%)	RQD (in)	RQD (%)	Rock Type	Box Row
BB-SDRR-103	R1	53.0 - 58.0	58	97%	33	55%	PELITE/QUARTZITE	1
BB-SDRR-103	R2	58.0 - 63.0	57	95%	44	73%	PELITE	2
BB-SDRR-102	R1	15.8 - 20.8	60	100%	42	70%	PELITE	3
BB-SDRR-102	R2	20.8 - 25.5	48	86%	30	53%	PELITE	4



Notes: 1. Box row corresponds to the core box section in which the rock core sample is contained; Row 1=Top, Row 4=Bottom.
2. Top photo is dry, bottom photo is wet.