MAINE DEPARTMENT OF TRANSPORTATION HIGHWAY PROGRAM GEOTECHNICAL SECTION AUGUSTA, MAINE

GEOTECHNICAL DESIGN REPORT

For the Rehabilitation of

US ROUTE 1 Van Buren, Maine

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Aroostook County WIN 22658.00 Soils Report 2024-13 Federal Project No. NHPP-2265(800)

April 18, 2024

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1.0 INTRODUCTION

The purpose of this Geotechnical Design Report is to present subsurface information and make geotechnical design and construction recommendations for the rehabilitation of an approximately 1.94-mile portion of US Route 1 in Van Buren, as shown on Sheet 1 – Location Map. The project is needed to improve drainage and the roadway structure. The scope includes rehabilitation of the existing travel lanes, reconstruction of the shoulders, approximately 1300 feet of full depth reconstruction, drainage improvements, and one (1) large culvert replacement. US Route 1 is a Highway Corridor Priority 1 road.

2.0 GEOLOGIC SETTING

According to the Reconnaissance Surficial Geology Map of the Stockholm Quadrangle, Maine, Open File No. 78-8 (1978) published by the Maine Geological Survey (MGS), the surficial soils along the project length consist of Stream Alluvium and Till. Stream Alluvium consists of sand, gravel, and silt. Till consists of a mixture of sand, silt, clay, and stones.

According to the MGS map titled Bedrock Geologic Map of Maine (1985) the bedrock along the project consists of interbedded pelite and sandstone of the Madawaska Lake Formation.

3.0 SUBSURFACE INVESTIGATION

Subsurface conditions at the site were explored by drilling a total of thirteen (13) borings and one (1) probe.

Borings HB-VB-101 through HB-VB-112 were drilled on June 16, 2015. Boring HB-VB-201 and probe HB-VB-202 were drilled on August 2, 2022. All explorations were drilled by the MaineDOT drill crew. The borings were drilled to depths ranging from approximately 4.5 to 22.0 feet below ground surface (bgs) using solid stem auger and cased wash boring techniques. The probe was drilled to a depth of approximately 20.5 feet bgs using solid stem auger drilling techniques. Boring and probe locations are shown on Sheets 2 through 17 Boring Location Plans. The boring logs are presented in Appendix A.

Soil samples were obtained off the auger flights in eight (8) 100-series borings. Soil descriptions were recorded but no soil sampling was done in four (4) 100-series borings. Soil samples were obtained in boring HB-VB-201 at standard 5-foot intervals using Standard Penetration Testing (SPT). No soil sampling was done in probe HB-VB-202 and no soil descriptions were recorded.

The MaineDOT calibrated automatic hammer delivers approximately 62 percent more energy during driving than the standard rope and cathead system. All N-values discussed in this report are corrected values (N_{60}) computed by applying an average energy transfer factor of 0.974 to the raw field N-values.

Details and sampling methods used, field data obtained, and soil and groundwater conditions encountered are shown in the Boring Logs in Appendix A. The MaineDOT Geotechnical Team member selected the boring locations, drilling methods, designated type and depth of sampling, reviewed field logs for accuracy and identified field and laboratory testing requirements. A North East Transportation Training and Certification Program (NETTCP) certified subsurface inspector logged the subsurface conditions encountered. The boring and probes were located in the field by taping to site features after completion of the drilling program.

4.0 LABORATORY TESTING

A laboratory testing program was conducted on select soil samples obtained in the test borings to assist in soil classification, evaluation of engineering properties of the soils and geologic assessment of the project site. Laboratory testing consisted of fifteen (15) standard grain size analyses and natural water content, three (3) grain size analyses with hydrometer and natural water content, and two (2) Atterberg Limits tests. The results of the laboratory tests are in Appendix B – Laboratory Test Results. Laboratory test results are also summarized on the boring logs in Appendix A.

5.0 SUBSURFACE CONDITIONS

Subsurface conditions encountered at the test borings and probe generally consisted of pavement and fill soils consisting of gravelly sand, sandy gravel, sand, and silt underlain by layers of native sand, silt, and sandy silt. The boring locations are shown on Sheets 2 through 17 - Boring Location Plans. The boring logs are presented in Appendix A – Boring Logs.

5.1 **Pavement and Fill Soils**

The subsurface investigations found areas of pavement and roadway fill soils along the project. Where present, the pavement thickness ranged from approximately 4.5 to 8.0 inches. The fill soils consisted of:

- Light brown to brown, dry to moist, gravelly fine to coarse sand, trace to some silt, occasional cobble.
- Brown, dry to damp, fine to coarse sand, some gravel, some silt, occasional cobble.
- Brown, moist, fine to coarse sandy gravel, little silt, occasional cobble.
- Grey, moist, silt, little fine to coarse sand, trace gravel.

The thickness of the fill ranged from approximately 1.0 to 7.6 feet. One (1) SPT N_{60} -value obtained the in the sand fill was 39 blows per foot (bpf) indicating that the sand fill is dense in consistency. One (1) SPT N_{60} -value obtained the in the silt fill was 16 blows per foot (bpf) indicating that the silt fill is very stiff in consistency.

Water contents from eight (8) samples obtained within the fill range from approximately 1.4% to 21.2%. Grain size analyses conducted on eight (8) samples of the fill resulted in the soil being

classified as an A-1-a, A-1-b, or A-4 under the AASHTO Soil Classification System and an SM, SW-SM, GM, or CL under the Unified Classification System.

5.2 Native Soils

The fill soils are underlain by layers of native soils consisting of sand and silt.

5.2.1 Native Silt

The native silt encountered in the borings consisted of:

- Grey, dark grey. and light brown, moist to wet, silt, trace to some fine to coarse sand, trace to some clay, trace to some gravel.
- Grey and light brown, wet, fine to coarse sandy silt, trace gravel.

The thickness of the native silt layers ranged from approximately 2.1 to 11.0 feet. The full depth of the native silt was not penetrated in all of the explorations. Two (2) SPT N-values obtained in the native silt were 5 bpf indicating that the silt is medium stiff in consistency.

Water contents from eight (8) samples obtained within the native silt range from approximately 17.0% to 99.6%. Grain size analyses conducted on eight (8) samples of the native silt resulted in the soil being classified as an A-4 or A-7-6 under the AASHTO Soil Classification System and an ML, CL, or SM under the Unified Classification System.

Two (2) soil samples of silt were submitted to the lab for Atterberg Limits testing. One (1) sample was determined to be non-plastic. The following table summarizes the results of one (1) sample's Atterberg Limits tests:

Boring No. and	Water	Liquid	Plastic	Plasticity	Liquidity
Sample No.	Content (%)	Limit	Limit	Index	Index
HB-VB-202 3D	43.1	43	31	12	1.01

Interpretation of these results indicates that the silt is moderately plastic. The silt is on the verge of being a viscous liquid if disturbed. Overburden pressure and interparticle cementation is providing stability to keep the soil in its current state, but the slightest disturbance causing remolding could convert the soil into a viscous fluid.

5.2.2 Native Sand

The native sand encountered in the borings consisted of:

• Grey-brown and grey, moist to wet, fine to coarse sand, some gravel, little to some silt.

The thickness of the native sand ranged from approximately 2.4 to 3.0 feet. The full depth of the native sand was not encountered or fully penetrated in all of the explorations. One (1) SPT N-

value obtained in the native sand ranged was 45 bpf indicating that the native sand is dense in consistency.

Water contents from two (2) samples obtained within the native sand range from approximately 10.7% to 12.4%. Grain size analyses conducted on two (2) samples of the native sand resulted in the soil being classified as an A-1-b or A-2-4 under the AASHTO Soil Classification System and an SM under the Unified Classification System.

5.3 Groundwater

Groundwater level was observed in boring HB-VB-201 at a depth of approximately 17.0 feet bgs. The water levels observed are indicated on the boring logs in Appendix A. Groundwater levels can be expected to fluctuate subject to seasonal variations, local soil conditions, topography, precipitation, and construction activity.

6.0 GEOTECHNICAL RECOMMENDATIONS

The following sections discuss the geotechnical-related design features of this project. An area of geotechnical concern is the Large Culvert at approximate Station 192+14.

6.1 Large Culvert at approximate Station 192+14

6.1.1 General Information

The existing structure at approximate Station 191+96 is a 28-inch diameter, approximately 61-foot long corrugated metal pipe (CMP) culvert. The proposed replacement structure is a 96-inch diameter, 104-foot long reinforced concrete pipe (RCP) culvert on an approximately 20-degree skew to the roadway centerline with an inlet elevation of approximately 446.83 feet and an outlet elevation of approximately 444.67 feet.

One (1) boring (HB-VB-201) and (1) probe (HB-VB-202) were drilled along the alignment of the proposed structure. The boring locations and the interpretive subsurface profile are shown on Sheet 18 – Boring Location Plan & Interpretive Subsurface Profile with Boring Logs. The boring logs are also provided in Appendix A – Boring Logs.

Boring HB-VB-201 was drilled to a depth of approximately 22.0 feet bgs without encountering a refusal surface. The subsurface conditions encountered in the boring consisted of fill consisting of sand and silt underlain by silt underlain by sand. Two (2) SPT N₆₀-values obtained in the fill ranged from 16 bpf to 39 bpf indicating that the fill is medium dense to dense in consistency. Two (2) SPT N₆₀-values obtained in the sandy silt were both 5 bpf indicating that the silt is medium stiff in consistency. One (1) SPT N₆₀-value obtained in the sand was 45 bpf indicating that the sand is dense in consistency. Probe HB-VB-202 was drilled to a depth of approximately 20.5 feet bgs without encountering a refusal surface.

6.2.2 Design and Construction – The proposed RCP culvert shall be constructed in accordance with MaineDOT Standard Specification Section 603 and the Contract Plans. To facilitate fish passage, Habitat Connectivity Design elements will be used inside the proposed RCP culvert as shown on the Special Details sheet in the Contract Plans.

The proposed RCP culvert can be bedded on a 1-foot thick layer of Granular Borrow, Material for Underwater Backfill (MaineDOT Item 203.25, Granular Borrow). The bedding material should be placed in lifts of 6 to 8 inches loose measure and compacted to at least 95 percent of the AASHTO T-180 maximum dry density. The exposed subgrade shall be free of ponded water so that bedding material placement and compaction can be completed in the dry. The soils at the bedding elevation shall be excavated using a smooth-edged backhoe bucket to limit disturbance. Any disturbed soils at the bedding elevation resulting from excavation activities shall be removed by hand prior to placement of the bedding material. All subgrade surfaces should be protected from construction traffic in order to limit disturbance. Groundwater and surface water levels shall be depressed sufficiently to allow work in the dry.

The full nature of the culvert bearing surface will not become evident until the culvert excavation is made. The bottom elevation of the excavation shall take into account the wall thickness of the RCP culvert and the required 1-foot layer of bedding material. Any loose or soft soils in the excavations shall be removed and replaced with Granular Borrow Material for Underwater Backfill (MaineDOT 703.19) or Crushed Stone ³/₄-Inch (MaineDOT 703.13). Any cobbles or boulders encountered in excess of 6 inches shall be removed and replaced with compacted Granular Borrow Material for Underwater Backfill or Crushed Stone ³/₄-Inch.

The soil envelope and backfill shall consist of Granular Borrow (703.19) with a maximum particle size of 4 inches. The granular borrow backfill material shall be placed in lifts of 6 to 8 inches loose measure and compacted to the manufacturer's specifications or, in the absence of manufacturer's specifications, the bedding and backfill soil shall be compacted to at least 92 percent of the AASHTO T-180 maximum dry density.

6.2 Settlement

No settlement issues are anticipated for either the roadway or the proposed RCP culvert. The installation of the proposed RCP culvert west of the existing culvert will result in a net unloading of the site soils at the proposed structure location. Placement of fill soils at the location of the existing structure to be removed and in areas where the proposed roadway grade is higher than existing grades are not anticipated to exceed the past loading condition of the site soils.

6.3 Scour and Riprap

Both the inlet and outlet of the proposed RCP culvert shall be armored with riprap conforming to MaineDOT Standard Specification Section 703.26 Plain and Hand Laid Riprap. Riprap slopes shall not be steeper than 2H:1V. The riprap on the slopes shall be underlain by a 1-foot layer of protective aggregate cushion conforming to MaineDOT Standard Specification 703.19 Granular

Borrow Material for Underwater Backfill that is underlain by a non-woven Class 1 erosion control geotextile that meets the requirements for MaineDOT Standard Specification 722.03.

6.4 Seismic Design Considerations

In conformance with LRFD Article 3.10.1, seismic analysis is not required for buried structures, except where they cross active faults. There are no known active faults in Maine; therefore, seismic analysis is not required.

6.5 Additional Construction Considerations

Construction of the RCP culvert will require soil excavation. Earth support systems will be required if laying back slopes is not feasible. Regardless of the method of excavation, all excavations and earth support systems shall meet all applicable OSHA regulations.

The Contractor shall control groundwater and surface water infiltration using temporary ditches, sumps, granular drainage blankets, stone ditch protection or hand-laid riprap with geotextile underlayment to divert groundwater and surface water to allow construction in the dry.

7.0 CLOSURE

This report has been prepared for the use of the MaineDOT Highway Program for specific application to the proposed rehabilitation of U.S. Route 1 in Van Buren, Maine in accordance with generally accepted geotechnical and foundation engineering practices. No other intended use or warranty is expressed or implied.

In the event that any changes in the nature, design, or location of the proposed project are planned, this report should be reviewed by a geotechnical engineer to assess the appropriateness of the conclusions and recommendations and to modify the recommendations as appropriate to reflect the changes in design. These analyses and recommendations are based in part upon a limited subsurface investigation at discrete exploratory locations completed at the site. If variations from the conditions encountered during the investigation appear evident during construction, it may also become necessary to re-evaluate the recommendations made in this report.

It is recommended that a geotechnical engineer be provided the opportunity for a review of the design and specifications in order that the earthwork and foundation recommendations and construction considerations presented in this report are properly interpreted and implemented in the design and specifications.

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_	Cort	loo l	Merrido.	NZA	to stell koyer	Koter Level®	None Obser	here
	aful T	hin We	UTUD:	n/A	empt #DIP = Weight of 1 Person	MOLAL FAAA143	None upser	Wed
	Sompton tem Au Stem A one of 140	e ger uger Ib. Ha	mer		S _U = Peck/Renolded Fletd Vone t S _U (tob) = Lob Vone Undrolmed St op = Unconfined Corpressive Str N=volue = Row Fletd SPT N=volut T _V = Pocket Torvone Shor Stret	indrolmed Sheor Strengtl Neor Strength (psf) rength (ksf) Ngth (psf)	1 (psf) LL = Liquid PL = Plastic Pl = Plastic 6 = Orain Si	Limit Limit Ity Index Ze Analysis
	eight o	of Rod	s or Cosing		WC = Water Content, percent		C = Consol id	lation Test
	4-volue	Casing	levation (++.)	Craphic Log	Visuol Descr	iption and Remarks		Laboratory Testing Results/ AASHTO and Unified Clas
t	~			Ŭ	Probe, similar soils as HB-	VAN-201.		1
			436.8		Bortom of Exploration of a	20.5 feet below gr	ound aur foce.	×.
50	I type	161 Tro	insitions m	oy be g	roduci.	Page 1 of 1		
*14	ns ste	nted.	Groundwote	r fluch	uctions may occur due to conditions o	Boring No	o.: HB−VB−2	02

STATE OF MAINE		DEPARTMENT OF TRANSPORTATION					MIN	022658 00 HIGHWAY PLANS	
		SIGNATURE			P.E. NUMBER			DALE	
DATE			APR 2024						
PROJ. MANAGERBY	DESIGN-DETAILED	CHECKED-REVIEWED	DESIGN2-DETAILED2 C.RUSSELL T.WHITE	DESIGN3-DETAILED3	REVISIONS 1	REVISIONS 2	REVISIONS 3	REVISIONS 4	FIELD CHANGES
						BURING LUCATION FLAN &	INTERPRETIVE SURSURFACE PROFILE		MILH BURING LUGS
s	н	EE	ΞT	N	U	ME	ЗE	R	
			1		E	}			
		(DF		18				

<u>Appendix A</u>

Boring Logs

	UNIFIE	ED SOIL C	LASSIFI	CATION SYSTEM		MODIFIED E	BURMISTER S	YSTEM
MA	JOR DIVISI	ONS	GROUP SYMBOLS	S TYPICAL NAMES				
COARSE- GRAINED	GRAVELS	CLEAN GRAVELS	GW	Well-graded gravels, gravel- sand mixtures, little or no fines.	Descrip tr	<u>tive Term</u> race ittle	Port	<u>ion of Total (%)</u> 0 - 10 11 - 20 21 - 25
30123	of coarse han No. 4 e)	(little or no fines)	GP	Poorly-graded gravels, gravel sand mixtures, little or no fines.	adjective (e.g.	. Sandy, Clayey)		36 - 50
	half o ger tl e size						S DESCRIBIN Y/CONSISTEN	G
	than is laı siev	GRAVEL	GM	Silty gravels, gravel-sand-silt	Coarse-grained	soils (more than half	of material is larger t	han No. 200
L	nore	WITH		mixtures.	sieve): Includes (1 Clavey or Gravelly	1) clean gravels; (2) S v sands Density is ra	ilty or Clayey gravels	s; and (3) Silty, ndard
is large ce)	(r fra	(Appreciable amount of	GC	Clayey gravels, gravel-sand-clay mixtures.	penetration resista	ance (N-value).		
iaterial		fines)			Den Cohesion	<u>isity of</u> nless Soils	<u>Standard Po</u> <u>N-Value</u>	enetration Resistance e (blows per foot)
f of m 200 s		CLEAN	SW	Well-graded sands, Gravelly	Very	/ loose oose		0 - 4 5 - 10
No. 3	SANDS	SANDS		sands, little or no fines	Mediur	m Dense		11 - 30
e thai than	9. 6 . 4	(little or no	SP	Poorly-graded sands, Gravelly	Very	Dense		> 50
(mor	coars an No	fines)		sand, little or no fines.	Eine greined eel	le (more then helf of r	matarial is smaller th	an No. 200
	alf of ller th size)				sieve): Includes (1	1) inorganic and organ	nic silts and clays; (2) Gravelly, Sandy
	an ha smal	SANDS WITH	SM	Silty sands, sand-silt mixtures	or Silty clays; and strength as indica	(3) Clayey silts. Con ted.	isistency is rated acc	ording to undrained shear
	ore th ion is	FINES			5		Approximate	
	(m fract	(Appreciable amount of	30	mixtures.	Consistency of	SPT N-Value	Shear	Field
		fines)			Cohesive soils	(blows per foot) WOH WOR	Strength (psf)	Guidelines
			ML	Inorganic silts and very fine	Very Soft	WOP, <2	0 - 250	Fist easily penetrates
	Sands, rock flour, Sitty or Clayey fine sands, or Clayey silts with SILTS AND CLAYS slight plasticity.		sands, rock flour, Silty or Clayey fine sands, or Clayey silts with	Soft Medium Stiff	2 - 4 5 - 8	250 - 500 500 - 1000	Thumb easily penetrates Thumb penetrates with	
	SILTS AN	ID CLAYS		slight plasticity.	Stiff	9 - 15	1000 - 2000	moderate effort Indented by thumb with
FINE-			CL	Inorganic clays of low to medium		10 00	0000 4000	great effort
SOILS				plasticity, Gravelly clays, Sandy clays, Silty clays, lean clays.	Very Stiπ Hard	16 - 30 >30	2000 - 4000 over 4000	Indented by thumbnail Indented by thumbnail
	(liquid limit l	ess than 50)						with difficulty
			OL	Organic silts and organic Silty clays of low plasticity.	RQD (%) =	signation (RQD): sum of the lengths	of intact pieces of	f core* > 4 inches
lis size)					_	*Minimu	length of core a um NQ rock core (dvance (1.88 in. OD of core)
ateria			МН	Inorganic silts, micaceous or		Deals Quality B		· · ·
of m 200 s	SILTS AN	ID CLAYS		Silty soils, elastic silts.		Rock Quality	RQD (%)	
n half No.			СН	Inorganic clavs of high		Very Poor Poor	≤25 26 - 50	
e thai r thar				plasticity, fat clays.		Fair	51 - 75	
(mon malle	(liquid limit gr	eater than 50)	ОН	Organic clays of medium to		Excellent	76 - 90 91 - 100	
2				high plasticity, organic silts.	Desired Rock C Color (Munsell	Dbservations (in tl color chart)	his order, if appli	cable):
			D+	Dept and other birth to an 1	Texture (aphan	itic, fine-grained, et	tc.)	
	SC	ORGANIC	Pt	Peat and other highly organic soils.	Hardness (very	hard, hard, mod. h	nard, etc.)	
Decircul C		Hone /in 41	o orden ''	familiantia):	Weathering (fre	esh, very slight, slig	ht, moderate, mod	l. severe, severe, etc.)
Color (Mun	sell color ch	art)	s order, l'	rappilcable):	Geologic discor	-dip (horiz - 0-5 de	g., low angle - 5-3	5 deg., mod. dipping -
Moisture (d	ry, damp, m	oist, wet)	abthard	sido)		35-55 deg., ste	ep - 55-85 deg., ve	ertical - 85-90 deg.)
Texture (fin	e, medium,	coarse, etc.	yni nand :)	SIUC)		-spacing (very clos close - 1-3 feet,	se - <∠ incn, ciose , wide - 3-10 feet, ⁻	- ∠-1∠ mcn, moa. very wide >10 feet)
Name (San Gradation /	d, Silty San	d, Clay, etc.	, including	portions - trace, little, etc.)		-tightness (tight, op	pen, or healed)	<i>.</i>
Plasticity (n	on-plastic, s	slightly plast	ic, modera	ately plastic, highly plastic)	Formation (Wat	terville, Ellsworth, C	, color, etc.) Cape Elizabeth, etc	c.)
Structure (la	ayering, frac	tures, crack	s, etc.)	,	RQD and correl	lation to rock qualit	y (very poor, poor	, etc.)
Cementatio	en, moderat n (weak, mo	eiy, iooseiy, oderate, or s	eic.,) strong)		Site Characte	erization, Table 4-12	וו-10-072 GEC 5 - 2	Geotecnnical
Geologic O	rigin (till, ma	rine clay, al	luvium, et	c.)	Recovery (inch/	/inch and percenta	ge)	
Groundwate	ei ievel				Sample Cort		n:sec))	
	Maine L	Departme	nt of Tra	ansportation	WIN	amer Labeling I	Blow Counts	-
Kei	to Call	Geotechi	nical Se	ction stions and Tarms	Bridge Name	/ Town	Sample Recov	ery
rvey	y נט 1001 8 Fiel	d Identific	ation Inf	formation	Boring Number	er oer	Date Personnel Initia	als
					Sample Depth	า		
<u> </u>								

N	laine	Depa	rtment	of Transporta	Ortation Project: A 1.94 mile portion of US Route 1					Boring No.:	HB-VE	3-101
		<u>s</u> U	oil/Rock Expl	loration Log ARY UNITS		L	ocatio	n: Van	Buren, Maine	WIN:	226	58.00
Drillir	a Contr	actor	MaineDOT		Elovati		÷)	455	1	Auger ID/OD:	12" Dia	
Opera	ator:	actor.	Giles/Daggett/	Giles	Datum	511 (1)	NAV	- /D88	Sampler:	Off Flights	
	ed By:	1	B Wilder	Glies	Rig Ty	<u>е.</u>		CM	F 45C	Hammer Wt /Fall	N/A	
Date	Start/Fir	nish:	6/16/2015-6/1	6/2015	Drilling	Mot	hod	Soli	d Stem Auger	Core Barrel:	N/A	
Borin	a Locat	ion:	104+34 5 8 4	ft I t	Casing		ווטמ. חוי.	N/A	a Stelli Muger	Water Level*	None Observer	1
Definitio	ons: D =	Spilt Spoon	Sample	MU = Unsucce	essful Thin W	all Tu	ibe Sam	ole Atterr	pt WO1P = Weight of 1 Person			
S = SarB = BuoMD = UU = ThiMV = UV = Fie	mple off Au cket Sampl Insuccessfi n Wall Tub Insuccessfi Id Vane Sh	iger Flights e off Auger ul Split Spoo e Sample ul Field Van iear Test,	Flights on Sample Atterr e Shear Test Att <u>PP= Pocket Pen</u>	R = Rock Core SSA = Solid S hpt HSA = Hollow RC = Roller C wOR/C = Wei tetrometer WOR/C = Wei	e Sample tem Auger Stem Auger one t of 140lb. H <u>ght of Rods</u>	amme or Cas	er sing		$\begin{array}{l} S_u = \text{Peak/Remolded Field Vane U}\\ S_{U(lab)} = \text{Lab Vane Undrained Sheit}\\ q_p = \text{Unconfined Compressive Strent}\\ N_value = \text{Raw Field SPT N-value}\\ T_v = \text{Pocket Torvane Shear Strengt}\\ WC = Water Content, percent \ge Strengt \\ \end{array}$	ndrained Shear Strength (psf) ar Strength (psf) ngth (ksf) h (psf) <u>Similar or Equal too</u>	LL = Liquid Lim PL = Plastic Lir PI = Plasticity Iı G = Grain Size C = Consolidati	it nit ndex Analysis on Test
				sample information								Laboratory
Depth (ft.)	Sample No.	Pen./Rec. (in.	Sample Depti (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value Casind	Blows	Elevation (ft.)	Graphic Log	Visual Descr	iption and Remarks		Testing Results/ AASHTO and Unified Class.
0	B1		0.67 - 2.10		s	SA SA	454.7		8" PAVEMENT.		0.7	
							454.7		Brown, moist, Gravelly fine to coa (Fill).	rse SAND, trace silt, occa	sional cobble,	G#271022 A-1-a, SW-SM WC=1.4%
	S1		2.10 - 4.50				455.5		Grey, moist, SILT, some fine to cc	barse sand, trace gravel.	2.1	G#264726 A-4, ML WC=17.0%
							450.9				4.5	
- 5 -									NO REFUSAL	t 4.5 feet below ground st	irface.	
10												
10												
- 15 -												
- 20 -												
25 Rema	irks:											
Stratific	ation lines	represent		ndaries between soil types: tr	ansitione mo	v he a	Iradual			Page 1 of 1		
* Water	level read	ings have b	een made at time	es and under conditions state	ed. Groundv	ater fl	uctuation	ns may c	ccur due to conditions other	Boring No	HR-VR-1	01
man t	nose prese	ni at the tin	ie measurement	s were made.							- 11D- V D-1	V 1

N	laine	Depa	rtment	of Tra	nspor	tatior	1	Project	: A 1.9	4 mile portion of US Route 1	Boring No.:	HB-VE	3-102
		<u>s</u> L	oil/Rock Expl	loration Lo	g <u>S</u>			Locatio	on: Va	Buren, Maine	WIN:	2265	58.00
Drillin	na Contr	actor:	MaineDOT			FIA	vation	(ft)	455	1	Auger ID/OD:	5" Dia	
Opera	ator:	uctor.	Giles/Daggett/	Giles		Dat	um:	(10.)	NA	VD88	Sampler:	Off Flights	
Loga	ed Bv:		B. Wilder			Ria	Type:		CM	E 45C	Hammer Wt./Fall:	N/A	
Date	Start/Fir	nish:	6/16/2015-6/10	6/2015		Dril	lina M	ethod:	Sol	d Stem Auger	Core Barrel:	N/A	
Borin	a Locat	ion:	104+34.5, 14.5	5 ft Lt. Sho	ulder	Cas	sina ID	OD:	N/A		Water Level*:	None Observe	1
Definitio	ons: D =	Spilt Spoon	Sample		MU = Uns	uccessful T	hin Wall	Tube San	nple Attei	WO1P = Weight of 1 Person			
S = Sar B = Buo	cket Sampl	e off Auger	Flights		SSA = Sol	id Stem Aug	e ger			$S_u = Peak/Remoled Field Vale Of Su(lab) = Lab Vane Undrained Shea$	ar Strength (psf)	LL = Liquid Lim	it
MD = U U = Thi	Insuccessf n Wall Tub	ul Split Spo e Sample	on Sample Attern	npt	HSA = Hol RC = Rolle	low Stem A er Cone	uger			q _p = Unconfined Compressive Strer N-value = Raw Field SPT N-value	ngth (ksf)	PL = Plastic Lin PI = Plasticity I	nit ndex
MV = U V = Fie	Insuccessfi Id Vane Sh	ul Field Van Iear Test,	e Shear Test Atte PP= Pocket Pen	empt ietrometer	WOH = W WOR/C =	eight of 140 Weight of R	lb. Hamr tods or C	mer Casing		T_V = Pocket Torvane Shear Strengt WC = Water Content, percent \cong = S	h (psf) Similar or Equal too	G = Grain Size C = Consolidati	Analysis on Test
			5	Sample In	formatio	n							Laboratory
		in.)	oth	()	-								Testing
(;	Ň).	Del	/6 in	[%]			5	Ľ	Visual Descr	iption and Remarks		Results/
th (Jple	./Re	Jple	vs (ar	() ()	alue	sing vs	/atic	phic				and
Dep	San	Pen	San (ft.)	Blov	Stre (psf or F	Z-Z	Cas	Ele/	Gra				Unified Class.
0							SSA			Brown, moist, Gravelly fine to coa (Fill).	rse SAND, trace silt, occa	sional cobble,	
	S2		1.30 - 5.00					453.		Light brown, wet, fine to coarse Sa	andy SILT, trace gravel.		G#264727 A-4, ML
								-					wC=20.5%
								,	0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1				
- 5 -								450.	1 11921198	Bottom of Exploration a NO REFUSAL	t 5.0 feet below ground s	5.0- urface.	
								4					
								-					
								-					
- 10 -								1					
								-					
								-					
- 15 -													
								-					
				<u> </u>				-					
- 20 -													
								_					
								-					
								-					
Rema	irks:		1				I			1			
0,						- 4 ***					Dogo 4 -54		
Stratific	ation lines	represent a	approximate bour een made at time	ndaries betwe	een soil type	s; transition stated. Gro	is may be undwate	e gradual. er fluctuati	ons may	occur due to conditions other	Page 1 of 1		0.2
than t	hose prese	ent at the tir	ne measurement	s were made							Boring No.	нв-ув-г	02

N	Iaine	Depa	rtment	of Tran	sporta	tion	F	Project	A 1.9	4 mile portion of US Route 1	Boring No.:	HB-VE	3-103
		<u>s</u> U	oil/Rock Expl	loration Log ARY UNITS			ŀ	ocatio	n: Var	Buren, Maine	WIN:	2265	58.00
Deillie	a Cant		Main DOT			Floyet		(#4.)	150	4		5" D:-	
Onor	ig Conti	ractor:	Cilas/Decentt/	/C:lag		Elevat	ion (π.)	456	4	Auger ID/OD:	5" Dia.	
Opera			D Wilder	Glies		Datum			NA CM	F 450	Sampler.	N/A	
Logg	ea By:		B. Wilder	(2015		RIGTY	pe:	4	CM	E 45C	Hammer Wt./Fall:	N/A	
Date	Start/Fir	nisn:	6/16/2015-6/1	6/2015		Drilling	g ivie	ethod:	Soli	d Stem Auger	Core Barrel:	N/A	,
Definition	g Locat	Spilt Spoon	117+03.2, 9.7	ft Rt.		Casing	J ID/	OD:	N/A	wort WO1P = Weight of 1 Person	Water Level":	None Observe	1
S = Sar B = Buo MD = U U = Thi MV = U V = Fie	mple off Au cket Sampl Insuccessf n Wall Tub Insuccessf Id Vane Sh	iger Flights le off Auger ul Split Spoo le Sample ul Field Van hear Test,	Flights on Sample Atten e Shear Test Att <u>PP= Pocket Pen</u>	npt F F tempt V tetrometer V	t = Rock Core SA = Solid St ISA = Hollow S C = Roller Co VOH = Weight <u>VOR/C = Weight</u>	Sample em Auger Stem Auge one t of 140lb. H ght of Rods	r Iamm <u>or Ca</u>	ier asing		S_{U} = Peak/Remolded Field Vane Un $S_{U}(lab)$ = Lab Vane Undrained Sher q_{p} = Unconfined Compressive Strer N_{v} alue = Raw Field SPT N-value T_{V} = Pocket Torvane Shear Strengt WC = Water Content, percent \ge = S	ndrained Shear Strength (psf) ar Strength (psf) ngth (ksf) h (psf) Similar or Equal too	LL = Liquid Lim PL = Plastic Lin Pl = Plasticity I G = Grain Size C = Consolidati	it nit ndex Analysis on Test
		<u> </u>	,		mation				T				Laboratory
Depth (ft.)	Sample No.	Pen./Rec. (in.	Sample Deptl (ft.)	Blows (/6 in.) Shear Strength	(psf) or RQD (%)	N-value	Blows	Elevation (ft.)	Graphic Log	Visual Descr	iption and Remarks		Testing Results/ AASHTO and Unified Class.
0	S3		0.50 - 2.50			5	SA	455.9		6" PAVEMENT.		0 5	G#264728
										Brown, dry, fine to coarse SAND, (Fill).	some gravel, some silt, oo	ccasional cobble,	A-1-b, SM WC=3.1%
	S4		2.50 - 5.00					453.9		Grey, moist, SILT, some fine to co	parse sand, trace gravel.	2.5-	G#264729 A-4, ML WC=17.0%
- 5 -						<u> </u>	\bigvee	451.4				5.0-	
- 10 -										Bottom of Exploration a NO REFUSAL	t 5.0 feet below ground s	urface.	
25								-					
25 Remarks:													
* Wotor	level road	ings have h	een made at tim	es and under of	nditione state	d Ground	Nator	fluctuatio	ns mour	ocur due to conditions other			
than t	hose prese	ent at the tin	ne measurement	ts were made.	nanons state	a. Ground	Maler	กนอเมสมใด	nə mety (and to conditions ound	Boring No.	: HB-VB-1	03

N	laine	of Trans	porta	Ation Project: A 1.94 mile portion of US Route 1						Boring No.:	HB-VB	-104		
		<u>s</u> U	oil/Rock Expl	oration Log				Locat	ion:	Van	Buren, Maine	WIN:	2265	58.00
Drillin	na Contr	actor:	MaineDOT			Eleva	ation	(ft.)		457.	1	Auger ID/OD:	5" Dia.	
Opera	ator:		Giles/Daggett/	Giles		Datu	m:	()		NAV	/D88	Sampler:	Off Flights	
Loga	ed Bv:	-	B. Wilder			Ria 1	Type:			CMI	E 45C	Hammer Wt./Fall:	N/A	
Date	Start/Fir	nish:	6/16/2015-6/10	6/2015		Drilli	ina M	ethod	:	Solie	Stem Auger	Core Barrel:	N/A	
Borin	a Locat	ion:	127+03.9.8.8	ft Lt.		Casi	na ID	/OD:		N/A	, stem muger	Water Level*:	None Observed	1
Definitio	ons: D =	Spilt Spoon	Sample	MU	I = Unsucces	ssful Thi	n Wall	Tube Sa	ample	e Attem	pt WO1P = Weight of 1 Person			
S = Sar B = Buo MD = U U = Thi MV = U V = Fie	mple off Au cket Sampl Insuccessfi n Wall Tub Insuccessfi Id Vane Sh	iger Flights e off Auger ul Split Spoo e Sample ul Field Van <u>iear Test,</u>	Flights on Sample Atterr e Shear Test Att <u>PP= Pocket Pen</u>	R = SS. Ppt HS RC empt WC Letrometer WC Sample Inforr	Rock Core A = Solid Ste A = Hollow S = Roller Cor DH = Weight DR/C = Weight mation	Sample em Auge Stem Aug ne of 140lb <u>ht of Ro</u>	er ger o. Hamr <u>ds or C</u>	ner asing			S _u = Peak/Remolded Field Vane U) Su(Iab) = Lab Vane Undrained She: q _p = Unconfined Compressive Stret N-value = Raw Field SPT N-value T _v = Pocket Torvane Shear Strengt <u>WC</u> = Water Content, percent ≅ = 5	ndrained Shear Strength (psf) ar Strength (psf) ngth (ksf) h (psf) <u>Similar or Equal too</u>	LL = Liquid Lim PL = Plastic Lin PI = Plasticity Ir G = Grain Size C = Consolidati	t nit dex Analysis on Test
		<u></u>	- <u>-</u>	<u> </u>										Laboratory
Depth (ft.)	Sample No.	Pen./Rec. (ir	Sample Dept (ft.)	Blows (/6 in.) Shear Strength	or RQD (%)	N-value	Casing Blows	Elevation	(ft.)	Graphic Log	Visual Descr	iption and Remarks		Results/ AASHTO and Unified Class.
0	S5		0.50 - 2.50				SSA	45	6.6 ×	****	6" PAVEMENT.		0.5-	G#264730
									XXXXXX		Light brown, damp, Gravelly fine	to coarse SAND, some silt	, (Fill).	A-1-b, SM WC=3.8%
	<u>S6</u>		2.50 - 5.00					45	4.6	~~~~	Grey, wet, SILT, trace fine to coar	se sand.	2.5-	
- 5 -							\bigvee	45	2.1				5.0-	
						_		-			NO REFUSAL	t 5.0 feet below ground s	urtace.	
								-						
- 10 -														
						_								
- 15 -						-+		_						
								-						
- 20 -														
						-+		-						
25								-						
Rema	irks:							•						
Stratific * Water	ation lines	represent a ings have b	pproximate bour een made at time	ndaries between s es and under con	oil types; tra ditions stated	nsitions d. Grour	may be ndwate	e gradu r fluctua	al. ations	may o	ccur due to conditions other	Page 1 of 1		
than t	hose prese	ent at the tin	ne measurement	s were made.								Boring No.	: HB-VB-1	04

N	laine	nsporta	Project: A 1.94 mile portion of US Route 1						Boring No.:	HB-VB	-105			
		<u>s</u> L	oil/Rock Expl	loration Log				Locati	on: \	Van	Buren, Maine	WIN:	2265	58.00
Deillie	on Cont		MainaDOT			Flow		(54.)		450 1		Auger ID/OD:	10" D.	
Opera	ator:	actor.	Giles/Daggett/	Giles		Dati	im.	(11.)	4	+38.1		Sampler:	Off Elights	
	ed By:		B Wilder	Olles		Rig	Type		1	CME	45C	Hammer Wt /Fall	N/A	
Date	Start/Fir	nish:	6/16/2015-6/10	6/2015		Drill	ina M	ethod:	: 5	Solid	Stem Auger	Core Barrel:	N/A	
Borin	g Locat	ion:	136+98.4, 8.6	ft Rt.		Casi	ing ID	/OD:	١	N/A	6	Water Level*:	None Observed	1
Definitio	ons: D =	Spilt Spoon	Sample		MU = Unsucci	essful Thi	in Wall .	Tube Sa	mple A	ttemp	ot WO1P = Weight of 1 Person	I		
B = Buo	cket Sampl	e off Auger	Flights		SSA = Solid S	tem Aug	er				$S_u(lab) = Lab Vane Undrained Shea$	ar Strength (psf)	LL = Liquid Lim	it .
U = Thi	in Wall Tub	e Sample	on Sample Atterr	ipt	RC = Roller C	one	iger				q _p = Oncontined Compressive Stren N-value = Raw Field SPT N-value	igin (ksi)	PL = Plastic Lin PI = Plasticity Ir	ndex
V = Fie	Insuccessi Id Vane Sh	ul Fleid Van lear Test,	PP= Pocket Pen	empt netrometer	WOH = Weigr WOR/C = Wei	ight of 1400	b. Hamr ods or C	mer Casing			T _V = Pocket Torvane Shear Strengtr WC = Water Content, percent ≅ = S	n (pst) Similar or Equal too	C = Consolidati	Analysis on Test
			:	Sample Info	ormation									Laboratory
	ö	(in.	epth		(9)					g				Testing Results/
(ft.)	e N	Rec.	e D	oth	e) Q	e	0	tion	-	2 2	Visual Descri	ption and Remarks		AASHTO
epth	amp	en./ł	amp t.)	lows hear trend	sf) - RQ	-valt	asin lows	leva		raph				and Unified Class.
	S	۵.	S F)	<u> </u>	9	z		Шч	5 (5	6" PAVEMENT			
	B2		0.50 - 2.90				SSA	457	.6	\otimes	Brown moist fine to coarse Sandy	GRAVEL little silt occ	0.5-	G3271023
										*	(Fill).	5111 · 22, inte sin, eee	abioinal 000010,	WC=4.5%
	S7		2.90 - 5.00						×	*				
								455	.2	M	Grey, wet, SILT, trace fine to coars	se sand.	2.9	G#264731
								_						A-4, CL WC=28.1%
Ę							\mathbf{V}	452						
5								455			Bottom of Exploration at	t 5.0 feet below ground s	urface.	
											NO REFUSAL			
								-						
								_						
- 10 -								-						
								_						
								-						
- 15 -														
								-						
								-						
20														
								-						
25 Rema	arks:													
Stratific	ation lines	represent a	pproximate bour	ndaries betwee	n soil types; tr	ansitions	s may be	e gradua	ıl.			Page 1 of 1		
* Water	r level read	ings have b	een made at tim	es and under c	onditions state	ed. Grou	Indwate	r fluctuat	tions m	iay oc	cur due to conditions other	Danim m M-		0.5
than t	those prese	ent at the tin	ne measurement	ts were made.								Boring No.	: нв-vв-1	05

N	laine	Depa	rtment	of Trar	isporta	tion	I F	roject:	A 1.9	a mile portion of US Route 1	Boring No.:	HB-VB	-106
		<u>s</u> L	oil/Rock Expl	loration Log ARY UNITS			L	ocatio.	n: Van	Buren, Maine	WIN:	2265	58.00
Drillir	na Contr	actor:	MaineDOT			Elev	vation (ft.)	457	5	Auger ID/OD:	5" Dia	
Opera	ator:		Giles/Daggett/	Giles		Datu	um:	,	NA	/D88	Sampler:	Off Flights	
Loga	ed By:		B. Wilder			Ria	Type:		CM	E 45C	Hammer Wt./Fall:	N/A	
Date	Start/Fin	ish:	6/16/2015-6/10	6/2015		Drill	lina Me	thod:	Soli	d Stem Auger	Core Barrel:	N/A	
Borin	a Locati	ion:	136+98.4. 14.1	1 ft Rt. Shoul	der	Cas	ing ID/	OD:	N/A	a bioini i ragoi	Water Level*:	None Observed	1
Definitio	ons: D =	Spilt Spoon	Sample		MU = Unsucce	essful Th	in Wall T	ube Samp	ole Atterr	pt WO1P = Weight of 1 Person			
S = Sar B = Buo MD = U U = Thi MV = U V = Fie	nple off Au cket Sample Insuccessfu n Wall Tub nsuccessfu Id Vane Sh	ger Flights e off Auger ul Split Spo e Sample ul Field Van <u>ear Test,</u>	Flights on Sample Atterr le Shear Test Att <u>PP= Pocket Pen</u>	empt empt setrometer Sample Info	R = Rock Core SSA = Solid Si HSA = Hollow RC = Roller Co WOH = Weigh WOR/C = Weigh	e Sample tem Aug Stem Au one t of 140l ght of Ro	e ler uger b. Hamm <u>ods or Ca</u>	er asing		$\begin{array}{l} S_u = \text{PearKemoled - rield vane U}\\ S_u(lab) = \text{Lab Vane Undrained She}\\ q_p = \text{Unconfined Compressive Stre}\\ N-value = \text{Raw Field SPT N-value}\\ T_v = \text{Pocket Torvane Shear Streng}\\ WC = Water Content, percent \underline{\approx} = 1 \end{array}$	ndrained Shear Strength (psf) angth (psf) ht (psf) <u>Similar or Equal too</u>	LL = Liquid Lim PL = Plastic Lin PI = Plasticity Ir G = Grain Size C = Consolidati	it hit Idex Analysis on Test
		(·u	ţ	<u> </u>									Laboratory Testing
Depth (ft.)	Sample No.	Pen./Rec. (i	Sample Dep (ft.)	Blows (/6 in. Shear Strenath	(psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Descr	iption and Remarks		Results/ AASHTO and Unified Class.
0							SSA	456.5		Brown, moist, fine to coarse Sand (Fill).	y GRAVEL, little silt, occa	isional cobble,	0//264722
	S8		1.00 - 5.00					- 100.0		Light brown, wet, SILT, some fine	e to coarse sand, little grave		G#264732 A-4, SM WC=21.3%
							<u> </u>						
- 5 -								452.5	11211339	Bottom of Exploration a	t 5.0 feet below ground su	5.0- 5.0-	
										NOREFUSAL			
								-					
- 10 -								-					
								1					
- 15 -								-					
								-					
- 20 -													
								-					
								-					
								1					
25								1					
Rema	rks:				I					<u>.</u>			
Stratific	ation lines	represent a	approximate bour	ndaries betwee	n soil types; tra	ansitions	s may be	gradual.			Page 1 of 1		
* Water than t	level readi	ings have b ent at the tin	een made at tim	es and under c ts were made	onditions state	ed. Grou	undwater	fluctuatio	ns may c	ccur due to conditions other	Borina No.	: HB-VB-1	06
			acaromoni										

N	Maine Department of Transporta Soil/Rock Exploration Log							Project	A 1.9	4 mile portion of US Route 1	Boring No.:	HB-VB	-107
		<u>s</u> L	oil/Rock Expl	loration Log ARY UNITS			I	Locatio	n: Var	Buren, Maine	WIN:	2265	58.00
Drillin	a Cont	actor	MainaDOT			Elova	tion	(#)	460	4		5" Die	
Oper	ig contr	actor.	Giles/Daggett/	Giles		Datur	n.	(11.)	400 NA	4	Sampler:	Off Elights	
	ad By:		B Wilder	Glics		Rig T	vne:		CM	F 45C	Hammer Wt /Fall	N/A	
Date	Start/Fir	nish:	6/16/2015-6/1	6/2015		Drillin	<u>γρο.</u> τα Μα	athod:	Soli	d Stem Auger	Core Barrel:	N/A	
Borin	a Locat	ion:	155+40.8 10 4	5 ft Rt		Casir	na ID/	OD:	N/A	a stelli / tager	Water Level*:	None Observed	1
Definitio	ons: D =	Spilt Spoon	Sample		MU = Unsucce	essful Thin	Wall 1	Tube Sam	ple Atten	wo1P = Weight of 1 Person			
S = Sar B = Buo	nple oπ Au cket Sampl	e off Auger	Flights		R = ROCK COR SSA = Solid S	e Sample tem Auger				S _u = Peak/Remoided Field Vane Ur S _{u(lab)} = Lab Vane Undrained Shea	ndrained Snear Strength (pst) ar Strength (psf)	LL = Liquid Lim	t
MD = U U = Thi	Insuccessf n Wall Tub	ul Split Spo e Sample	on Sample Atterr	npt	HSA = Hollow RC = Roller C	Stem Aug one	er			qp = Unconfined Compressive Strer N-value = Raw Field SPT N-value	ngth (ksf)	PL = Plastic Lin PI = Plasticity Ir	nit Idex
MV = U V = Fie	Insuccessfi Id Vane Sh	ul Field Van iear Test.	e Shear Test Att PP= Pocket Per	tempt netrometer	WOH = Weigh WOR/C = Wei	t of 140lb. aht of Rod	Hamn s or Ca	ner asing		T _V = Pocket Torvane Shear Strengt WC = Water Content, percent ≈ = S	h (psf) Similar or Equal too	G = Grain Size C = Consolidati	Analysis on Test
				Sample Info	ormation						ł	· · ·	Laboratory
		in.)	oth										Testing
(;	Ň	°C. (Del	/0 in	(%)			5	Ľ	Visual Descr	iption and Remarks		Results/
oth (nple	i./Re	nple	ws (ear	() SQD	alue	sing vs	vatic	phic				and
Dep	Sar	Per	Sar (ft.)	She She	(pst or F	~ Z	Cas Bloy	(ft.)	Gra				Unified Class.
0	S9		0.50 - 2.60				SSA	459.9		6" PAVEMENT.			G#264733
								-		Brown, damp, SAND, some grave	l, some silt, occasional co	bble, (Fill).	A-1-b, SM
							_	_					WC=3.8%
	S10		2.60 - 5.00					457.8	3	Crew wat SUT trace fine to see	hanna an	2.6-	
										Grey, wei, SILT, trace file to coar	se sand.		
								1					
- 5 -							\mathbf{V}	455.4	+	Dettern of Freedom the	4.5.0.f	5.0-	
								4		NO REFUSAL	t 5.0 feet below ground s	surface.	
								1					
								-					
								-					
10													
10													
								1					
								-					
								4					
- 15 -								1					
								-					
								4					
								1					
- 20 -								-					
								_					
								1					
								-					
								-					
25													
Rema	irks:												
Stratific	ation lines	represent	ipproximate bour	ndaries betwee	n soil types: tr	ansitions	nav he	aradual			Page 1 of 1		
* Water	level read	ings have h	een made at tim	es and under o	conditions state	ed. Groun	dwater	fluctuatio	ons mav o	occur due to conditions other			
than t	hose prese	ent at the tin	ne measurement	ts were made.					, -		Boring No	: HB-VB-1	07

N	laine	Depa	rtment	of Transpor	tation	P	Project:	A 1.9	4 mile portion of US Route 1	Boring No.:	HB-VB	-108
		<u>S</u> U	oil/Rock Exp IS CUSTOM/	loration Log ARY UNITS		L	ocatio	n: Var	Buren, Maine	WIN:	2265	58.00
Drillin	a Contr	actor	MaineDOT		Elovat	ion ((ff)	458	6	Auger ID/OD:	5" Dia	
Opera	ator:	401011	Giles/Daggett	/Giles	Datum	:	10.)	NA	VD88	Sampler:	Off Flights	
Loga	ed Bv:		B. Wilder		Ria Tv	pe:		CM	E 45C	Hammer Wt./Fall:	N/A	
Date	Start/Fir	ish:	6/16/2015-6/1	6/2015	Drillin	n Me	thod:	Soli	d Stem Auger	Core Barrel:	N/A	
Borin	a Locat	ion:	166+40.2. 8.4	ft Lt.	Casino	1 ID/	OD:	N/A	a bioint rager	Water Level*:	None Observed	1
Definitio	ons: D =	Spilt Spoon	Sample	MU = Unsu	ccessful Thin V	, Vall T	ube Sam	ple Atten	pt WO1P = Weight of 1 Person			
S = Sar B = Buo MD = U U = Thi MV = U V = Fiel	nple off Au sket Sampl nsuccessfi n Wall Tub nsuccessfi <u>d Vane Sh</u>	ger Flights e off Auger ul Split Spor e Sample ul Field Van <u>ear Test,</u>	Flights on Sample Atten e Shear Test Att <u>PP= Pocket Per</u>	R = Rock C SSA = Soli Npt HSA = Holl RC = Rolle tempt WOH = We netrometer WOR/C = V	ore Sample I Stem Auger ow Stem Auge Cone ight of 140lb. F Veight of Rods	lamm or Ca	er asing		$\begin{array}{l} S_{u} = \text{PearKemolede} - \text{rield vane U}\\ S_{u}(ab) = \text{Lab Vane Undrained She}\\ q_{p} = \text{Unconfined Compressive Stree}\\ N-value = \text{Raw Field SPT N-value}\\ T_{v} = \text{Pocket Torvane Shear Strengt}\\ WC = Water Content, percent \equiv s \end{array}$	narained Snear Strength (pst) ar Strength (psf) ngth (ksf) h (psf) <u>Similar or Equal too</u>	LL = Liquid Lim PL = Plastic Lin PI = Plasticity Ir G = Grain Size C = Consolidati	it nit idex Analysis on Test
			:	Sample Informatior			1	T				Laboratory
Depth (ft.)	Sample No.	Pen./Rec. (in.	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Blows	Elevation (ft.)	Graphic Log	Visual Descr	iption and Remarks		Testing Results/ AASHTO and Unified Class.
0					s	SA	458.1		6" PAVEMENT.			
					+ +	-	1		Brown, damp, fine to coarse SAN	D, some gravel, some silt,	occasional	
						-	456.9	Ĩ	coddle, (Fill).		1.7-	
									Grey, wet, fine to coarse Sandy SI	LT.		
						1	1					
- 5 -					<u> </u>	V	453.6	, 1111111			5.0-	
							4		NO REFUSAL	t 5.0 feet below ground s	urtace.	
							1					
							-					
							4					
10												
							1					
							1					
							4					
							1					
- 15 -							-					
							1					
							1					
					+		1					
					+		-					
20												
20						_	1					
							1					
					+		-					
							1					
25 Rema	rks:						1	1				
Stratific	ation lines	represent a	pproximate bour	ndaries between soil types	; transitions m	ay be	gradual.			Page 1 of 1		
* Water	level read	ings have b	een made at tim	es and under conditions s	tated. Ground	water	fluctuatio	ns may c	occur due to conditions other	Dente M	. 110 120 (
than t	hose prese	ent at the tin	ne measurement	ts were made.						Boring No.	: HB-VB-1	08

N	laine	Depa	rtment	of Transp	ortatio	n	Р	roject:	A 1.9	mile portion of US Route 1	Boring No.:	HB-VB	-109
		<u>s</u> U	oil/Rock Exp	loration Log ARY UNITS			L	ocatio	n: Van	Buren, Maine	WIN:	2265	58.00
Drillin	a Contr	actor:	MaineDOT		E	levat	ion (1	it.)	457	5	Auger ID/OD:	5" Dia.	
Opera	ator:		Giles/Daggett	/Giles		atum	:	,	NA	/D88	Sampler:	Off Flights	
Loga	ed Bv:	-	B. Wilder		R	ia Tv	pe:		CM	E 45C	Hammer Wt./Fall:	N/A	
Date	Start/Fir	nish [.]	6/16/2015-6/1	6/2015		rillin	n Mei	hod.	Soli	1 Stem Auger	Core Barrel:	N/A	
Borin	a Locat	ion:	169+82.8. 8.8	ft Rt.		asino	1 ID/0	DD:	N/A	, Stelli Muger	Water Level*:	None Observed	1
Definitio	ons: D =	Spilt Spoon	Sample	MU = U	Insuccessful	Thin V	Vall Tu	ibe Samp	ole Atten	pt WO1P = Weight of 1 Person			-
S = Sar B = Buo MD = U U = Thi MV = U V = Fiel	nple off Au ket Sampl nsuccessf n Wall Tub nsuccessf d Vane Sh	iger Flights e off Auger ul Split Spoo e Sample ul Field Van iear Test,	Flights on Sample Atten e Shear Test Att <u>PP= Pocket Per</u>	R = Rc SSA = npt HSA = RC = F tempt WOH netrometer WOR/(Samplo Informa	ck Core San Solid Stem / Hollow Stem coller Cone Weight of 1 C = Weight o	nple Auger Auge 40lb. H <u>f Rods</u>	lamme or Ca	er sing		$\begin{array}{l} S_u = \text{Peak/Remolded Field Vane Ur}\\ S_{U(lab)} = \text{Lab Vane Undrained Shei}\\ q_p = Unconfined Compressive Stretq_p = Unconfined Compressive StretN-value = Raw Field SPT N-valueT_v = Pocket Torvane Shear StrengtWC = Water Content, percent \equiv = S$	ndrained Shear Strength (psf) ar Strength (psf) ngth (ksf) h (psf) Similar or Equal too	LL = Liquid Lim PL = Plastic Lin PI = Plasticity Ir G = Grain Size C = Consolidati	it nit ndex Analysis on Test
		<u> </u>											Laboratory
Depth (ft.)	Sample No.	Pen./Rec. (in	Sample Dept (ft.)	Blows (/6 in.) Shear Strength (psf)	N-value	ocioc.	Blows	Elevation (ft.)	Graphic Log	Visual Descr	iption and Remarks		Results/ AASHTO and Unified Class.
0						s	SA	457.0	*****	6" PAVEMENT.			
						+	+			Brown, damp, fine to coarse SANI	D, some gravel, some silt,	occasional	
						+		455.3		Light brown, wet, SILT, some fine	e to coarse sand, little grav	2.2-	
- 5 -							\bigvee	452.5		Detter of Frankristian	4 5 0 foot halans and a	5.0-	
						╀				NO REFUSAL	t 5.0 leet below ground s	urtace.	
						╀							
						╞							
- 10 -													
						+							
						╀							
						+							
1.5						T							
						+							
						+							
- 20 -													
						+							
						+							
25 Rema	rks:		1	1	I			L	1				
Stratific	ation lines	represent a	pproximate bou	ndaries between soil t	ypes; transiti	ons m	ay be g	gradual.			Page 1 of 1		
* Water than t	level read	ings have b ent at the tin	een made at tim ne measurement	es and under conditions to were made.	ns stated. G	iround	water f	luctuation	ns may o	ccur due to conditions other	Boring No.	: HB-VB-1	09

N	laine	Depa	rtment	of Tran	sporta	tion	F	Project	: A 1.9	4 mile portion of US Route 1	Boring No.:	HB-VE	B-110
		<u>s</u> L	oil/Rock Expl	loration Log ARY UNITS			ľ	Locatio	on: Va	Buren, Maine	WIN:	226	58.00
Drillin	a Cont	rootori	MainaDOT			Eloy	otion	(#+)	450	5		12" Die	
Opera	ator:	actor.	Giles/Daggett/	/Giles		Datu	m·	(11.)	435 NA	5 VD88	Sampler:	Off Flights	
Loga	ed Bv:		B Wilder	Giles		Rig 1	Type:		CM	E 45C	Hammer Wt./Fall:	N/A	
Date	Start/Fir	nish:	6/16/2015-6/10	6/2015		Drilli	na Me	ethod:	Sol	d Stem Auger	Core Barrel:	N/A	
Borin	g Locat	ion:	177+39.8, 9.0	ft Lt.		Casi	ng ID/	OD:	N/A		Water Level*:	None Observe	d
Definitio	ons: D =	Spilt Spoon	Sample	M	U = Unsucce	ssful Thir	n Wall T	lube San	nple Atter	wolP = Weight of 1 Person	adrained Cheer Strength (nef)		
B = Bud	cket Sampl	le off Auger	Flights	S	SA = Solid St	tem Auge	r			$S_u(lab)$ = Lab Vane Undrained She	ar Strength (psf)	LL = Liquid Lim	it
U = Thi	in Wall Tub	ul Split Spo e Sample	on Sample Atterr	npt H R	C = Roller Co	Stem Aug one	ger			q _p = Uncontined Compressive Strer N-value = Raw Field SPT N-value	ngth (KST)	PL = Plastic Lir PI = Plasticity I	nit ndex
MV = U V = Fie	Insuccessf Id Vane Sh	ul Field Van near Test,	e Shear Test Att PP= Pocket Pen	tempt N netrometer N	/OH = Weight /OR/C = Weig	t of 140lb ght of Roe	. Hamm ds or Ca	ner asing		T_V = Pocket Torvane Shear Strengt WC = Water Content, percent \cong = S	h (psf) Similar or Equal too	G = Grain Size C = Consolidat	Analysis on Test
			5	Sample Info	rmation			-	_				Laboratory
	ċ	(in.)	epth	Û.					b				Testing
(ft.)	e No	ec.	e De	(/6 i th	%) (a	-	ы	c Lo	Visual Descr	iption and Remarks		AASHTO
epth	Idma	n./F	ld m	ows lear reng	sf) RQI	valu	asing	evat	aphi				and Unified Class
ă	Š	Pe	S E	<u>ى بە </u>	ë b	ż	üă	± ≣	Ū				onnied oldss.
Ū	B3		0.67 - 2.60				SSA	458.	8	8 PAVEMENT.		0.7	G#271024
										Brown, damp, Gravelly fine to coa (Fill).	irse SAND, trace silt, occa	sional cobble,	A-1-a, SW-SM
	C11		260 500			-+	+	-				-	₩C=3.3%
	511		2.00 - 5.00				_	456.		Grey-brown, moist, fine to coarse	SAND, some silt, some gr	2.6	G#264734
													WC=10.7%
							$\langle \rangle$						
- 5 -								454.	5 494033	Bottom of Exploration a	t 5.0 feet below ground s	5.0	
								-		NO REFUSAL	toto feet below ground s	ur nucc.	
								-					
								-					
10													
10													
								-					
								-					
								-					
- 15 -								-					
								-					
						-+		-					
- 20 -								1					
								-					
								1					
			7										
								1					
								-					
25													
Rema	arks:												
Stratif -	ation line-	reprocest	upprovimate harm	ndarias hotuss-	soil tunce: to	aneitiene	maybe	aradual			Page 1 of 1		
* Water		iepresent a	een made at tim	es and under co	nditions state	answork	ndy De	fluctuot	ons mov	ccur due to conditions other	lagerori		
than t	hose prese	ent at the tin	ne measurement	ts were made.	namons state	.a. Grour	awaler		una may		Boring No.	: HB-VB-1	10

N	laine	Depa	rtment	of Transp	ortati	ion	Р	roject:	A 1.9	a mile portion of US Route 1	Boring No.:	HB-VE	-111
		<u>s</u> L	oil/Rock Exp IS CUSTOM	loration Log ARY UNITS			L	ocatior	n: Van	Buren, Maine	WIN:	226	58.00
Drillir	na Conti	ractor:	MaineDOT			Elevat	ion (f	ft.)	459	2	Auger ID/OD:	5" Dia	
Opera	ator:		Giles/Daggett/	/Giles		Datum	:	,	NA	- /D88	Sampler:	Off Flights	
Loga	ed Bv:		B. Wilder			Ria Tv	pe:		CM	E 45C	Hammer Wt./Fall:	N/A	
Date	Start/Fir	nish:	6/16/2015-6/1	6/2015		Drillin	a Me	thod:	Soli	d Stem Auger	Core Barrel:	N/A	
Borin	a Locat	ion:	177+39.8. 14.	2 ft Lt. Shoulder		Casin	3 ID/0	DD:	N/A	a bioint ruger	Water Level*:	None Observe	1
Definitio	ons: D =	Spilt Spoon	Sample	MU =	Unsuccessi	ful Thin \	Vall Tu	ube Samp	le Atterr	pt WO1P = Weight of 1 Person			
S = Sar B = Buc MD = U U = Thi MV = U V = Fiel	nple off Au oket Sampl Insuccessf n Wall Tub nsuccessf Id Vane Sh	iger Flights le off Auger ul Split Spo le Sample ul Field Van lear Test,	Flights on Sample Atten e Shear Test Att <u>PP= Pocket Per</u>	R = R SSA : npt HSA RC = tempt WOH tetrometer WOR Sample Informa	ock Core Sa = Solid Sterr = Hollow Ster Roller Cone = Weight of / <u>C = Weight</u>	ample n Auger em Auge f 140lb. I cof Rods	r Hamme or Ca	er sing		$\begin{array}{l} S_{u} = \text{Peak/Remolded Field Vane U}\\ Su(lab) = Lab Vane Undrained She, \\ q_{p} = Unconfined Compressive Streit N-value = Raw Field SPT N-value \\ T_{v} = Pocket Torvane Shear Strengt \\ WC = Water Content, percent a s Strengt \\ \end{array}$	ndrained Shear Strength (psf) ar Strength (psf) ngth (ksf) h (psf) <u>Similar or Equal too</u>	LL = Liquid Lim PL = Plastic Lir PI = Plasticity I G = Grain Size C = Consolidat	it nit Analysis on Test
Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf)	or KUU (%)	N-value	Blows	Elevation (ft.)	Graphic Log	Visual Descr	iption and Remarks		Testing Results/ AASHTO and Unified Class.
0						5	SSA	157 0		Brown, damp, Gravelly, fine to co (Fill).	arse SAND, trace silt, occa	asional cobble,	
						+		437.0		Grey-brown, moist, fine to coarse	SAND, some silt, some gr	avel.	
- 5 -							\bigvee	454.2		Bottom of Exploration a	t 5.0 feet below ground s	urface.	
								-		NO REFUSAL			
								-					
- 10 -								-					
								-					
								-					
								-					
- 15 -								-					
						+		-					
- 20 -								-					
						-		-					
25								-					
<u>Rema</u>	rks:												
Stratific	ation lines	represent a	approximate bou	ndaries between soil	types; trans	sitions m	ay be g	gradual.			Page 1 of 1		
* Water than t	level read	ings have b ent at the tin	een made at tim ne measuremen	es and under condit ts were made.	ons stated.	Ground	water f	fluctuatior	ns may c	ccur due to conditions other	Boring No.	: HB-VB-1	11

N	laine	Depa	rtment	of Transport	ation	Р	roject:	A 1.94	mile portion of US Route 1	Boring No.:	HB-VB	3-112
		<u>s</u> U	oil/Rock Expl	loration Log ARY UNITS		L	ocatior	n: Van	Buren, Maine	WIN:	2265	58.00
Drillin	a Contr	ractor:	MaineDOT		Elevat	on (1	ft.)	459	0	Auger ID/OD:	5" Dia.	
Opera	ator:		Giles/Daggett/	Giles	Datum	:	,	NAV	/D88	Sampler:	Off Flights	
Loga	ed By:		B Wilder		Rig Ty	ne:		CM	E 45C	Hammer Wt./Fall:	N/A	
Date	Start/Fir	nish [.]	6/16/2015-6/1	6/2015	Drilling	1 Met	thod:	Soli	1 Stem Auger	Core Barrel:	N/A	
Borin	a Locat	ion:	189+67 7 6 9	ft Rt	Casino		DD:	N/A	, Stelli Muger	Water Level*:	None Observed	1
Definitio	ons: D =	Spilt Spoon	Sample	MU = Unsuc	cessful Thin V	Vall Tu	ibe Samp	le Atterr	pt WO1P = Weight of 1 Person			
S = Sar B = Buo MD = U U = Thi MV = U V = Fiel	nple off Au cket Sampl Insuccessfi n Wall Tub nsuccessfi Id Vane Sh	iger Flights le off Auger ul Split Spoo le Sample ul Field Van lear Test,	Flights on Sample Attern e Shear Test Att <u>PP= Pocket Per</u>	R = Rock Cc SSA = Solid npt HSA = Hollo RC = Roller empt WOH = Weig ietrometer WOR/C = W Scamplo Information	re Sample Stem Auger v Stem Auger Cone ht of 140lb. H eight of Rods	lamme or Cas	er sing		$\begin{array}{l} S_{u} = \text{Peak/Remolded Field Vane Ur}\\ S_{U(lab)} = \text{Lab Vane Undrained Shea}\\ q_{p} = \text{Unconfined Compressive Stret}\\ \text{N-value} = \text{Raw Field SPT N-value}\\ T_{v} = \text{Pocket Torvane Shear Strengt}\\ \hline WC = Water Content, percent \equiv = S$	ndrained Shear Strength (psf) ar Strength (psf) ngth (ksf) h (psf) Similar or Equal too	LL = Liquid Lim PL = Plastic Lin Pl = Plasticity Ir G = Grain Size C = Consolidati	it nit ndex Analysis on Test
		÷										Laboratory
Depth (ft.)	Sample No.	Pen./Rec. (in	Sample Dept (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Blows	Elevation (ft.)	Graphic Log	Visual Descr	iption and Remarks		Results/ AASHTO and Unified Class.
0					s	SA	458.5		6" PAVEMENT.			
							456.9		Brown, damp, Gravelly, fine to co (Fill).	arse SAND, trace silt, occa	asional cobble,	
									Grey-brown, moist, fine to coarse	SAND, some silt, some gr	avel.	
							454.0				5.0	
							454.0		Bottom of Exploration a NO REFUSAL	t 5.0 feet below ground s	urface.	
- 10 -												
- 15 -												
- 20 -												
25 Roma	rke											
Itema	<u> nə.</u>											
Stratific	ation lines	represent a	pproximate bour	ndaries between soil types;	transitions ma	ay be g	gradual.			Page 1 of 1		
* Water than t	level read	ings have b ent at the tin	een made at tim ne measurement	es and under conditions sta ts were made.	ted. Ground	vater f	luctuatior	ns may c	ccur due to conditions other	Boring No.	: HB-VB-1	12

Ι	Main	e Depa	artment	of Transporta	ation	F	rojec	t: Rou	te 1	Large	Culvert	Boring No.:	HB-V	'B-201	
		9	Soil/Rock Expl	loration Log			.ocati	on: Va	ın B	uren.	Maine				
		<u>l</u>	US CUSTOMA	ARY UNITS						,		WIN:	226:	58.00	
Drille	er:		MaineDOT		Elevati	on (ft.)	45	7.8			Auger ID/OD:	5" Dia.		
Oper	ator:		Daggett		Datum	:		N	AVD	88		Sampler:	Standard Split	Spoon	
Logo	ed By:		B.Wilder		Rig Ty	pe:		Cl	AE 4	ISC		Hammer Wt./Fall:	140#/30"		
Date	Start/Fi	nish:	8/2/2022; 07:3	0-10:30	Drilling	ı Me	thod:	Sc	lid S	Stem /	Auger	Core Barrel:	N/A		
Bori	ng Loca	tion:	192+10.2, 13.0	0 ft Lt.	Casing	, D/	OD:	N/	A		0	Water Level*:	17.0 ft bgs.		
Ham	mer Effi	ciency F	actor: 0.974		Hamme	er T	ype:	Auto	natio	c 🛛	Hydraulic 🗆	Rope & Cathead □			
Definit	ions:	Comple		R = Rock C	ore Sample			Su	= Pe	ak/Re	molded Field Vane Undrained She	ear Strength (psf) $T_v = F$	Pocket Torvane She	ar Strength (psf)	
MD =	Unsuccess	sful Split Spo	oon Sample Atten	npt HSA = Hollo	w Stem Auge	er		q _p	(lab) = Un	confin	ed Compressive Strength (ksf)	LL = L	iquid Limit	cent	
U = 11 MU =	un Wall Tu Unsuccess	ibe Sample sful Thin Wa	II Tube Sample A	ttempt WOH = Wei	Cone ght of 140lb.	Ham	mer	N-i Ha	incor mme	rected r Effici	= Raw Field SPT N-value ency Factor = Rig Specific Annual	Calibration Value PL = F	Plastic Limit Iasticity Index		
V = Fi MV =	eld Vane S Unsuccess	Shear Test, sful Field Va	PP = Pocket Per ne Shear Test Att	netrometer WOR/C = W empt WO1P = We	eight of Rod	s or (Perso	Casing n	N ₆ N ₆	0 = S 0 = (I	SPT N- Hamm	uncorrected Corrected for Hamme er Efficiency Factor/60%)*N-uncor	er Efficiency G = G rected C = C	rain Size Analysis onsolidation Test		
				Sample Information										Laboratory	
			gt		fed					_				Testing	
f.	No		Del	6 in (%)	rect					Ľ	Visual De	scription and Remarks		Results/	
th (j	Jple	./Re	Jple	ws (ar (COD	ucol		vs vs	/atic		phic				and	
Dep	San	Pen	San (ft.)	Stre Stre or R			Cas Blov	Elev		Gra				Unified Class.	
0							SSA	457	4 😒	~~~	_4½" HMA.		0.4		
						-		-		***	Brown dry dense fine to c	coarse SAND some grave	0.4 1 little silt (Fill)	G#379773	
	1D	24/19	1.00 - 3.00	21/11/13/16	24 3	9				***	Die mit, ary, aenze, mie te e	ourse sin is, some grave	i, intre 5111, (i iii)	A-1-b, SM	
								1	×	***				WC=5.4%	
						-	-	-		***					
								454	.3 🕅				— — — —3.5		

- 5 -	20	24/20	5.00 7.00	E E E D	10 1			1		***	Grey, moist, very stiff, SILT	T, little fine to coarse sand	, trace gravel,	G#379774	
	2D	24/20	5.00 - 7.00	3/3/3/3	10 10	0	_	_		***	(Fill).			A-4, CL WC=21.2%	
									×	***				WC-21.270	
								1		***					
						_	_	449	.8 🕅	***					
								1							
- 10 -						-	_	-			Dark grev, wet, medium stit	ff, SILT, little clay, trace f	ine to medium	G#379775	
	3D	24/24	10.00 - 12.00	1/1/2/3	3 5	5					sand.	, , ,,		A-7-6, ML	
														WC=43.1% LL=43	
	Image: Construction of the second s														
								_						PI=12	
								1							
- 15 -						_	_	-			4D (15 0-16 5 ft bos) Dark	grev wet medium stiff S	ILT some clay	G#379776	
	4D/A	24/20	15.00 - 17.00	1/1/2/3	3 5	5					trace fine to medium sand.	grey, wet, meatain binn, 2	121, some eng,	A-4, CL	
								441	.3					WC=64.8% Non-Plastic	
						_		-			4D/A (16.5-17.0 ft bgs.) Gr	ey, wet, medium stiff, SIL	T, some fine to	G#379777	
							\downarrow /				medium sand, trace clay.			A-4, CL WC=99.6%	
							$\langle /$								
							-\//-	438	.8 ^Щ				19.0		
20 -							V	-			Grev wet dance fina to an	aree SAND come ground	little silt	G#370779	
	5D	24/16	20.00 - 22.00	5/14/14/11	28 4	5					Grey, wet, dense, fille to co.	aise SAND, some graver,	intre sint.	A-1-b, SM	
								1						WC=12.4%	
								435	.8				22.0		
											Bottom of Exploration NO REFUSAL	1 at 22.0 feet below grour	id surface.		
						-		-							
_ 25															
Rem	arks:														
I															
I															
I															
Ctratif	cation lin-	e roprocost	approvimate how	ndarias hatwoon sail turs - 4	raneitiona	w ha	aradus					Page 1 of 1			
strauf	cauon line	s represent	approximate bour	iuaries between soll types; t	ansidons ma	ay De	yradual					Fage 1 011			
Wate	those pres	dings have	been made at tim	es and under conditions stat ts were made	ed. Groundw	vater	fluctuati	ons may	OCCL	ur due	to conditions other	Boring No	HB-VB-?	01 I	
uiali	aloge higs	son at the li		a there made.										~ 1	

N	laine	Dep	artment	of Tran	sporta	tion	F	Project:	Route	1 Large Culvert	Boring No.:	HB-VE	-202
		<u>:</u> !	Soil/Rock Exp US CUSTOM	loration Log ARY UNITS			l	_ocation	: Van	Buren, Maine	WIN:	226	58.00
Drillin	na Conti	actor:	MaineDOT			Eleva	tion ((ft.)	457	3	Auger ID/OD:	5" Dia.	
Opera	ator:		Daggett			Datun	n:	(***)	NAV	/D88	Sampler:	N/A	
Loga	ed Bv:		B.Wilder			Ria Ty	vpe:		CM	E 45C	Hammer Wt./Fall:	N/A	
Date	Start/Fir	nish:	8/2/2022-8/2/	2022		Drillin	a Me	thod:	Soli	1 Stem Auger	Core Barrel:	N/A	
Borin	a Locat	ion:	192+18.3. 13.	0 ft Rt.		Casin	a ID/	OD:	N/A	, Stolli Truger	Water Level*:	None Observe	1
Definiti	ons: D =	Spilt Spoo	n Sample	N	/U = Unsucces	ssful Thin	Wall T	ube Samp	le Atterr	pt WO1P = Weight of 1 Person			
S = Sai B = Bui MD = U U = Thi MV = U V = Fie	mple off Au cket Sampl Jnsuccessf in Wall Tub Jnsuccessf Id Vane Sh	iger Flights le off Auge ul Split Sp le Sample ul Field Va hear Test,	s r Flights oon Sample Atter ne Shear Test At PP= Pocket Per	F Smpt F tempt V netrometer V	R = Rock Core SA = Solid Sta ISA = Hollow S C = Roller Co VOH = Weight VOR/C = Weight	Sample em Auger Stem Auge ne of 140lb. <u>ht of Rode</u>	er Hamm <u>s or Ca</u>	ner asing		$\begin{array}{l} S_u = \text{Peak/Remolded Field Vane U}\\ S_{U(lab)} = \text{Lab Vane Undrained She}\\ q_D = \text{Unconfined Compressive Strei}\\ \text{N-value} = \text{Raw Field SPT N-value}\\ T_v = \text{Pocket Torvane Shear Strengt}\\ WC = Water Content, percent \\ \equiv = S \end{array}$	ndrained Shear Strength (psf) ar Strength (psf) ngth (ksf) h (psf) <u>Similar or Equal too</u>	LL = Liquid Lim PL = Plastic Lir PI = Plasticity I G = Grain Size C = Consolidati	it nit ndex Analysis on Test
Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength	(psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Descr	iption and Remarks		Laboratory Testing Results/ AASHTO and Unified Class.
0							SSA			Probe, similar soils as HB-VAN-2	01.		
- 5 -								-					
								-					
- 10 -								-					
- 15 -								-					
- 20 -								436.8				20.5	
								-		Bottom of Exploration at NO REFUSAL	20.5 leet below ground s	SULLACE.	
25													
Rema	arks:												
Stratific * Water than t	ation lines r level read	represent ings have	approximate bou been made at tim	ndaries betweer nes and under co its were made.	n soil types; tra	unsitions m d. Ground	nay be Iwater	gradual. fluctuation	s may c	ccur due to conditions other	Page 1 of 1 Boring No.	: HB-VB-2	02

Appendix **B**

Laboratory Test Results

State of Maine - Department of Transportation Laboratory Testing Summary Sheet

Town(s):	Van B	uren			Work	ς Νι	ımk	ber	: 226	58.00				
Boring & Sample	Station	Offset	Depth	Reference	G.S.D.C.	W.C.	L.L.	P.I.	Cla	ssification				
Identification Number	(Feet)	(Feet)	(Feet)	Number	Sheet	%			Unified	AASHTO	Frost			
HB-VB-101, B1	104+34.5	8.4 Lt.	0.67-2.1	271022	1	1.4			SW-SM	A-1-a	0			
HB-VB-101, S1	104+34.5	8.4 Lt.	2.1-4.5	264726	1	17.0			ML	A-4	IV			
HB-VB-102, S2	104+34.5	14.5 Lt.	1.3-5.0	264727	1	20.5			ML	A-4	IV			
HB-VB-103, S3	117+03.2	9.7 Rt.	0.5-2.5	264728	1	3.1			SM	A-1-b				
HB-VB-103, S4	117+03.2	9.7 Rt.	2.5-5.0	264729	1	17.0			ML	A-4	IV			
HB-VB-104, S5	127+03.9	8.8 Lt.	0.5-2.5	264730	2	3.8			SM	A-1-b				
HB-VB-105, B2	136+98.4	8.6 Rt.	0.5-2.9	271023	2	4.5			GM	A-1-a				
HB-VB-105, S7	136+98.4	8.6 Rt.	2.9-5.0	264731	2	28.1			CL	A-4	IV			
HB-VB-106, S8	136+98.4	14.1 Rt.	1.0-5.0	264732	3	21.3			SM	A-4				
HB-VB-107, S9	155+40.8	10.5 Rt.	0.5-2.6	264733	3	3.8			SM	A-1-b				
HB-VB-110, B3	177+39.8	9.0 Lt.	0.67-2.6	271024	3	3.3			SW-SM	A-1-a	0			
HB-VB-110, S11	177+39.8	9.0 Lt.	2.6-5.0	264734	3	10.7			SM	A-2-4				
HB-VB-201, 1D	192+10.2	13.0 Lt.	1.0-3.0	379773	4	5.4			SM	A-1-b				
HB-VB-201, 2D	192+10.2	13.0 Lt.	5.0-7.0	379774	4	21.2			CL	A-4	IV			
HB-VB-201, 3D 192+10.2 13.0 Lt. 10.0-12.0 379775 4 43.1 43 12 ML A-7-6 IV HB-VB-201, 4D 192+10.2 13.0 Lt. 15.0-16.5 379776 4 64.8 -N P- CL A-4 IV														
HB-VB-201, 4D 192+10.2 13.0 Lt. 15.0-16.5 379776 4 64.8 -N P- CL A-4 IV HB-VB-201, 4D/A 192+10.2 13.0 Lt. 15.0-16.5 379777 4 99.6 CI A-4 IV														
HB-VB-201, 4D/A 192+10.2 13.0 Lt. 16.5-17.0 379777 4 99.6 CL A-4 IV HB-VB-201, 5D 192+10.2 13.0 Lt. 20.0-22.0 379778 4 12.4 SM A-1-b II														
HB-VB-201, 5D 192+10.2 13.0 Lt. 20.0-22.0 379778 4 12.4 SM A-1-b II														
HB-VB-201, 5D 192+10.2 13.0 Lt. 20.0-22.0 379778 4 12.4 SM A-1-b II														
Classification of th	ese soil samp	les is in ac	cordance with	h AASHTO C	lassificatio	on Syst	tem M-	145-4	0. This cla	ssification				
is followed by the	"Frost Suscep	tibility Rat	ing" from zero	o (non-frost s	usceptible	e) to Cl	ass IV	(high	ly frost su	sceptible).				
The "Frost Sus	ceptibility Rat	ing" is bas	ed upon the M	laineDOT an	d Corps of	f Engin	eers C	lassif	ication Sy	stems.				
GSDC = Grain Size Distribu	ution Curve as	determined	by AASHTO T	88-93 (1996)	and/or AS	TM D 4	22-63	(Reap	proved 199	98)				

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

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

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



State of Maine Department of Transportation GRAIN SIZE DISTRIBUTION CURVE

UNIFIED CLASSIFICATION

	Boring/Sample No.	Station	Offset, ft	Depth, ft	Description	W, %	LL	PL	PI	WIN
+	HB-VB-101/B1	104+34.5	8.4 LT	0.67-2.1	Gravelly SAND, trace silt.	1.4				022658.00
	HB-VB-101/S1	104+34.5	8.4 LT	2.1-4.5	SILT, some sand, trace gravel.	17.0				Town
	HB-VB-102/S2	104+34.5	14.5 LT	1.3-5.0	Sandy SILT, trace gravel.	20.5				Van Buren, Grand Isle
	HB-VB-103/S3	117+03.2	9.7 RT	0.5-2.5	SAND, some gravel, some silt.	3.1				
	HB-VB-103/S4	117+03.2	9.7 RT	2.5-5.0	SILT, some sand, trace gravel.	17.0				Reported by/Date
×										WHITE, TERRY A 7/16/2015



State of Maine Department of Transportation GRAIN SIZE DISTRIBUTION CURVE

UNIFIED CLASSIFICATION

	Boring/Sample No.	Station	Offset, ft	Depth, ft	Description	W, %	LL	PL	ΡI	WIN
+	HB-VB-104/S5	127+03.9	8.8 LT	0.5-2.5	Gravelly SAND, some silt.	3.8				022658.00
	HB-VB-105/B2	136+98.4	8.6 RT	0.5-2.9	Sandy GRAVEL, little silt.	4.5				Town
	HB-VB-105/S7	136+98.4	8.6 RT	2.9-5.0	SILT, trace sand.	28.1				Van Buren, Grand Isle
										Benerted by/Dete
										Reported by/Date
×										WHITE, TERRY A 7/16/2015



State of Maine Department of Transportation GRAIN SIZE DISTRIBUTION CURVE

	Boring/Sample No.	Station	Offset, ft	Depth, ft	Description	W, %	LL	PL	PI	WIN
+	HB-VB-106/S8	136+98.4	14.1 RT	1.0-5.0	SILT, some sand, little gravel.	21.3				022658.00
	HB-VB-107/S9	155+40.8	10.5 RT	0.5-2.6	SAND, some gravel, some silt.	3.8				Town
	HB-VB-110/B3	177+39.8	9.0 LT	0.67-2.6	Gravelly SAND, trace silt.	3.3				Van Buren, Grand Isle
	HB-VB-110/S11	177+39.8	9.0 LT	2.6-5.0	SAND, some silt, some gravel.	10.7				Demanted by/Dete
										Reported by/Date
X										WHITE, TERRY A 7/16/2015



UNIFIED CLASSIFICATION

	Boring/Sample No.	Station	Offset, ft	Depth, ft	Description	WC, %	LL	PL	PI
0	HB-VB-201/1D	192+10.2	13.0 LT	1.0-3.0	SAND, some gravel, little silt.	5.4			
	HB-VB-201/2D	192+10.2	13.0 LT	5.0-7.0	SILT, little sand, trace gravel.	21.2			
	HB-VB-201/3D	192+10.2	13.0 LT	10.0-12.0	SILT, little clay, trace sand.	43.1	43	31	12
	HB-VB-201/4D	192+10.2	13.0 LT	15.0-16.5	SILT, some clay, trace sand.	64.8			NP
	HB-VB-201/4DA	192+10.2	13.0 LT	16.5-17.0	SILT, some sand, trace clay.	99.6			
X	HB-VB-201/5D	192+10.2	13.0 LT	20.0-22.0	SAND, some gravel, little silt.	12.4			

WI	N	
022658.00		
Town		
Van Buren		
Reported by/Date		
WHITE, TERRY A	9/27/2022	

TOWN	Van Buren	Reference No.	379775
WIN	022658.00	Water Content, %	43.1
Sampled	8/2/2022	Liquid Limit @ 25 blows (T 89), %	43
Boring No./Sample No.	HB-VB-201/3D	Plastic Limit (T 90), %	31
Station	192+10.2	Plasticity Index (T 90), %	12
Depth	10.0-12.0	Tested By	BBURR

