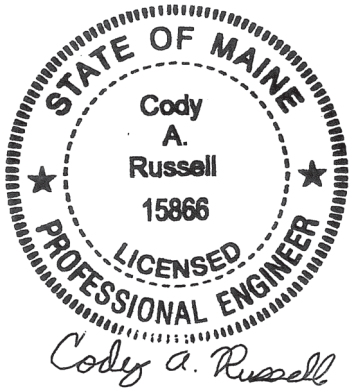
MAINE DEPARTMENT OF TRANSPORTATION
HIGHWAY PROGRAM
GEOTECHNICAL SECTION
AUGUSTA, MAINE

GEOTECHNICAL DESIGN REPORT

For the Rehabilitation of

US ROUTE 1
VAN BUREN, MAINE

Prepared by:
Cody Russell, P.E.
Geotechnical Engineer



Reviewed by:
Kathleen Maguire, P.E.
Senior Geotechnical Engineer

Aroostook County
WIN 22658.00

Soils Report 2024-13
Federal Project No. NHPP-2265(800)

April 18, 2024

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Appendices

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 Sample No.	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity 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 N_{60}-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 N_{60}-values obtained in the sandy silt were both 5 bpf indicating that the silt is medium stiff in consistency. One (1) SPT N_{60}-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 ¾-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 ¾-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.

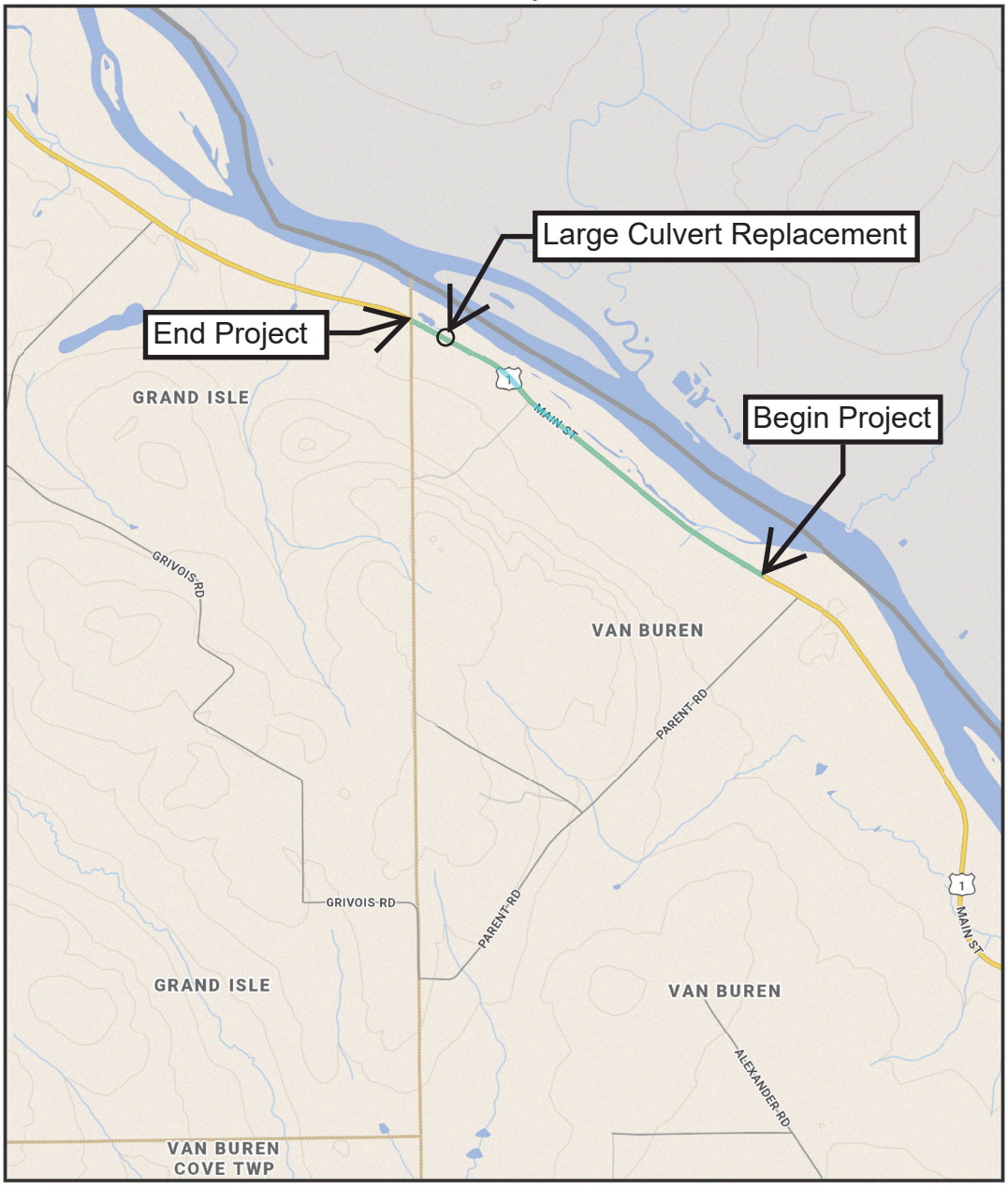
In the event that any changes in the nature, design, or location of the proposed project are planned, this report should be reviewed by a geotechnical engineer to assess the appropriateness of the conclusions and recommendations and to modify the recommendations as appropriate to reflect the changes 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.

Sheets

Date:4/18/2024
Division: GEOTECH
Username: Terry.White

VAN BUREN, MAINE



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0.75 Miles
1 inch = 0.8 miles

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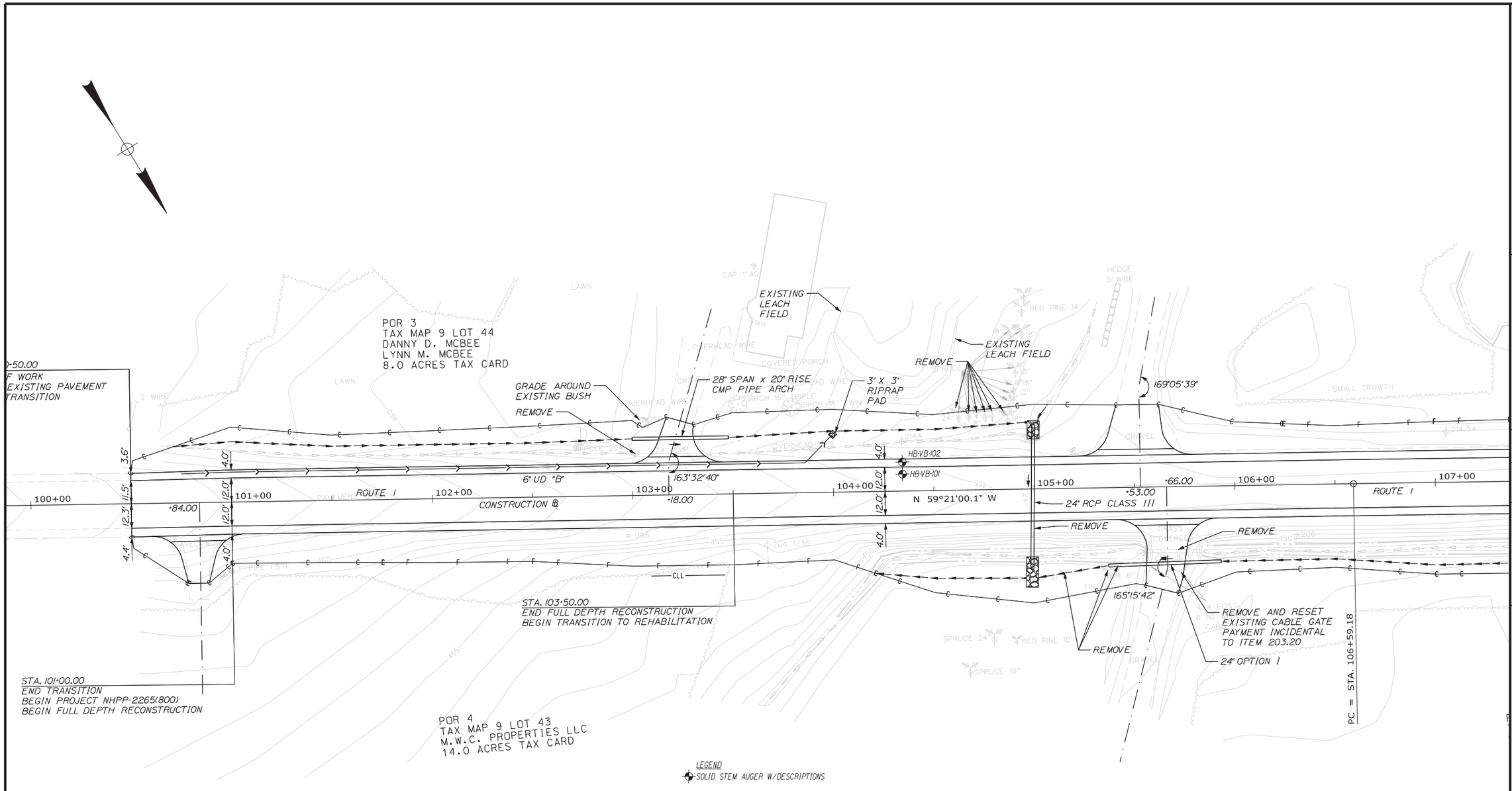
SHEET NUMBER 1 OF 18	VAN BUREN US ROUTE 1 LOCATION MAP	STATE OF MAINE DEPARTMENT OF TRANSPORTATION NHPP-2265(800) WIN 022658.00 HIGHWAY PLANS



STATE OF MAINE
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HIGHWAY PLANS

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VAN BUREN
US ROUTE 1

BORING LOCATION PLAN

SHEET NUMBER

2

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POR 3
TAX MAP 9 LOT 44
DANNY D. MCBEE
LYNN M. MCBEE
8.0 ACRES TAX CARD

POR 6
TAX MAP 11 LOT 18
G.R. TIMBER HOLDINGS, LLC
138.0 ACRES TAX CARD

GROUND LEVEL
WATER LEVEL
TWO 4" PVC PIPES
3'D SCREEN CAGE
WATER LEVEL
PIPE DISCONNECTED
SMALL GROWTH
26" SPRUCE
214.5A
424/215A
215.5A
CLL
REMOVE
24" RCP CLASS III
17.00
107+00
108+00
109+00
110+00
111+00
112+00
113+00
114+00
ROUTE 1
CONSTRUCTION
4.0'
12.0'
12.0'
4.0'
450
455
460
207
209
REMOVE
COVERED
CMP 12"
REMOVE
15" OPTION 1
8" SPRUCE
MEDIUM GROWTH
8" ASH
8" SPRUCE
8" SPRUCE

CURVE DATA #1
PI = 109+22.41
D = 0°17'11.3"
Δ = 1°30'29.1" Rt.
R = 20000.00'
L = 526.42'
T = 263.22'
E = 1.73'

CURVE DATA #1
PI = 109+22.41
D = 0°17'11.3"
Δ = 1°30'29.1" Rt.
R = 20000.00'
L = 526.42'
T = 263.22'
E = 1.73'

PT = STA. 111+85.60

POR 4
TAX MAP 9 LOT 43
LARRY S. BUTT
JANE V. BUTT
14.0 ACRES TAX CARD

POR 5
TAX MAP 11 LOT 19A
PAUL N. BORGERINK
KARIN B. BORGERINK
10.0 ACRES TAX CARD

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VAN BUREN
US ROUTE 1

BORING LOCATION PLAN

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POR 6
TAX MAP 11 LOT 18
G.R. TIMBER HOLDINGS, LLC
138.0 ACRES TAX CARD

POR 7
TAX MAP 11 LOT 17
G. R. TIMBER HOLDINGS, LLC
3.0 ACRES TAX CARD

POR 7
TAX MAP 11 LOT 17
G. R. TIMBER HOLDINGS, LLC
3.0 ACRES TAX CARD

18" OPTION I

REMOVE

CLL

18" SPRUCE

MEDIUM GROWTH

WASHOUT

114+00 115+00 116+00 117+00 118+00 119+00 120+00

CONSTRUCTION ℄

ROUTE 1

N 57°50'31.1" W

HB-VB-103

*56.00

4.0' 12.0' 12.0' 4.0' 4.0' 7.9' 6.0' 4.0' 3.0'

REMOVE

W-BEAM GUARDRAIL - MID-WAY SPLICE

MID-WAY SPLICE - FLARED TERMINAL

PC = STA. 117+82.01

POR 5
TAX MAP 11 LOT 19A
PAUL N. BORGERINK
10.0 ACRES TAX CARD

POR 8
MAP 11 LOT 6
PATRICK MICHAUD
117.0 ACRES TAX CARD

CURVE DATA #2
PI = 121+59.29
D = 0°55'26.9"
Δ = 6°57'52.7" Rt.
R = 6200.00'
L = 753.65'
T = 377.29'
E = 11.47'

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HIGHWAY PLANS

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VAN BUREN
US ROUTE 1

BORING LOCATION PLAN

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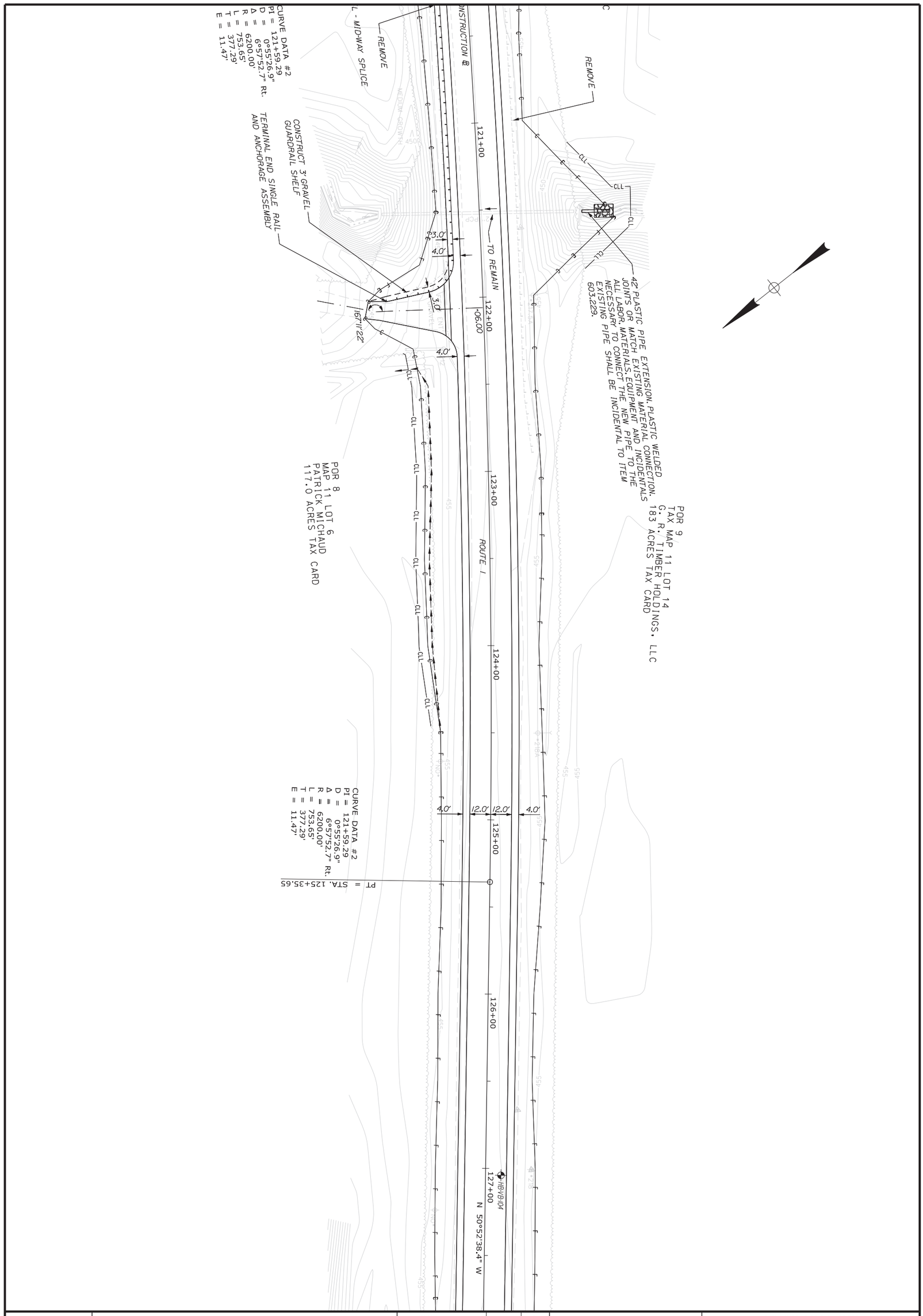

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VAN BUREN
US ROUTE 1

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POR 9
TAX MAP 11 LOT 14
G. R. TIMBER HOLDINGS, LLC
183 ACRES TAX CARD

POR 10
TAX MAP 11 LOT
LAKEVILLE SHORES
649 ACRES TAX CA

. PROPERTY LINE FLAG

HB-VB-104
127+00
N 50°52'38.4" W
128+00
129+00
130+00
131+00
132+00
133+00
134+00
CONSTRUCTION
ROUTE 1
4.0'
12.0'
12.0'
4.0'

POR 8
MAP 11 LOT 6
PATRICK MICHAUD
117.0 ACRES TAX CARD

POR 11
TAX MAP 11
KELLY LAPO
11.5 ACRES

STATE OF MAINE
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NHPP-2265(800)

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HIGHWAY PLANS

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VAN BUREN
US ROUTE 1

BORING LOCATION PLAN

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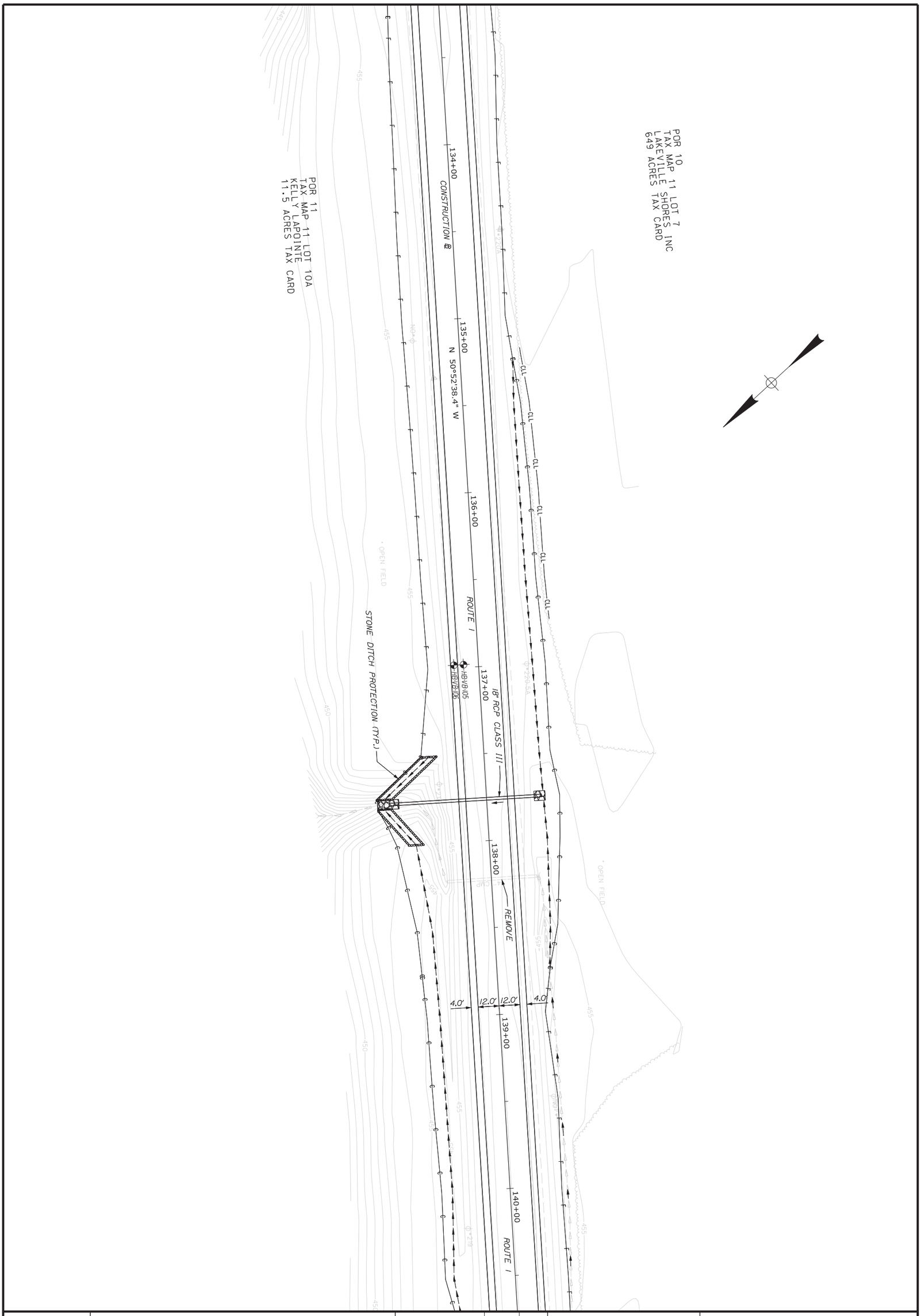

VAN BUREN
US ROUTE 1

BORING LOCATION PLAN

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022658.00 HIGHWAY PLANS

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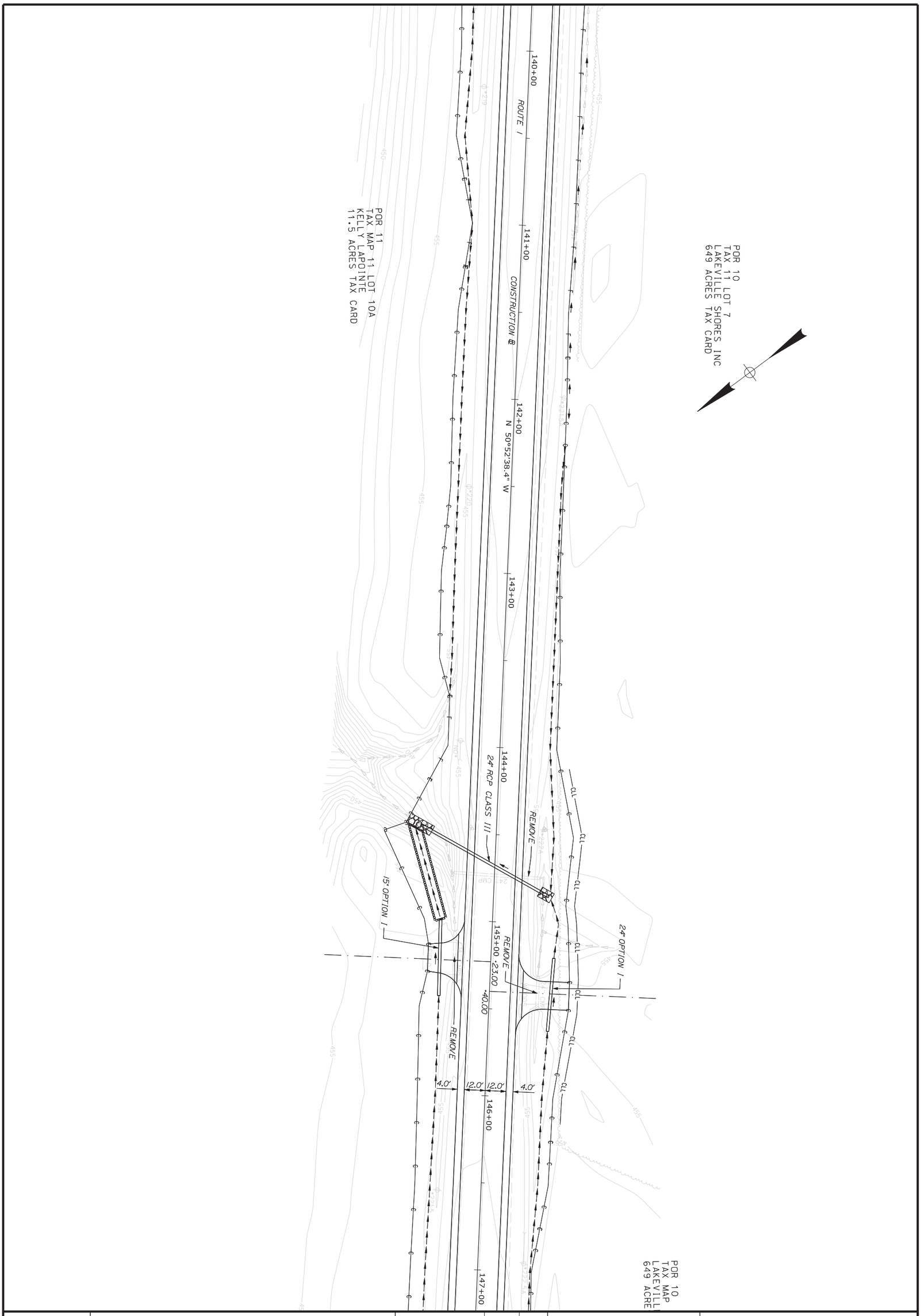

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VAN BUREN
US ROUTE 1

BORING LOCATION PLAN

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DEPARTMENT OF TRANSPORTATION

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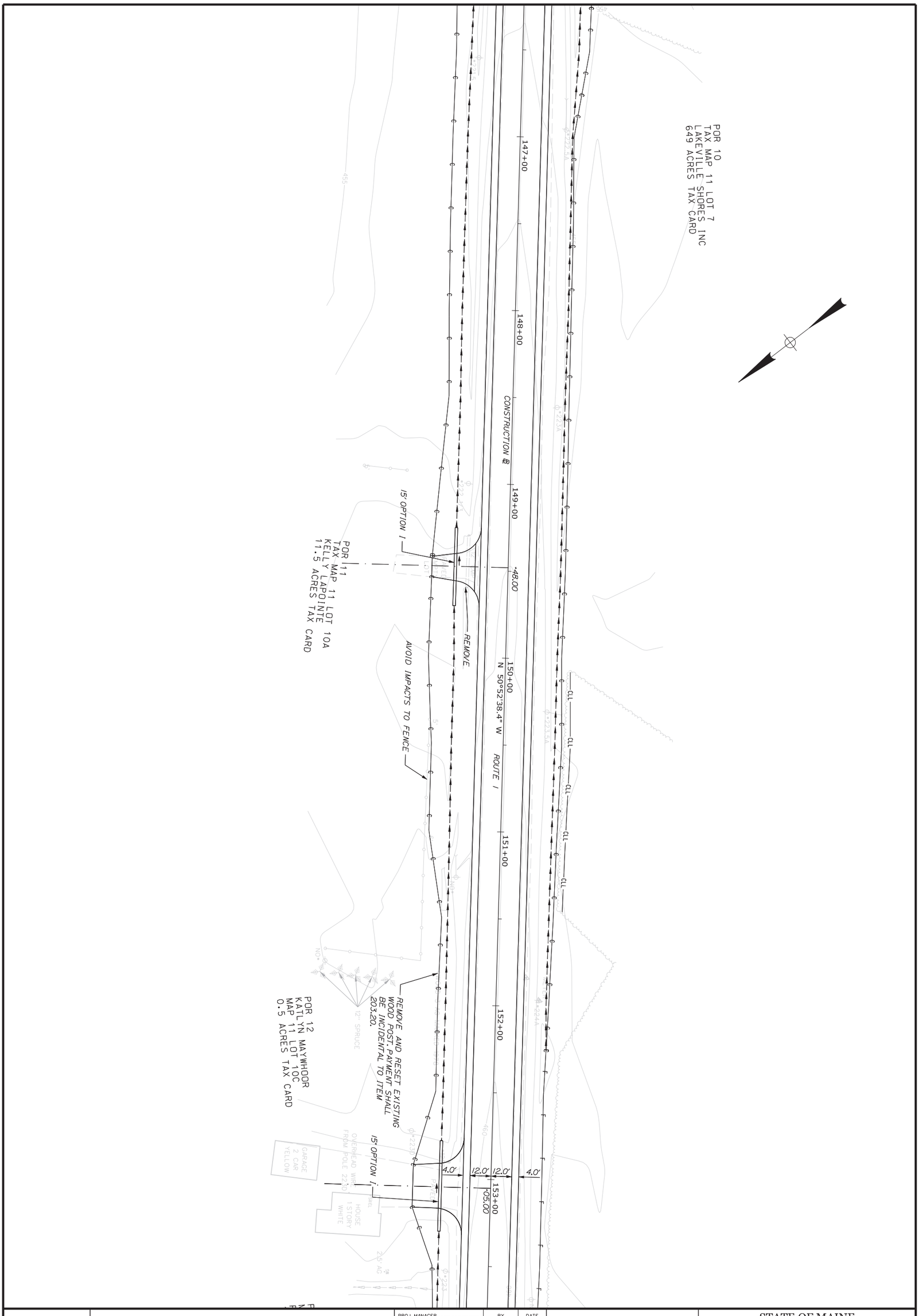
HIGHWAY PLANS



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VAN BUREN
US ROUTE 1

BORING LOCATION PLAN

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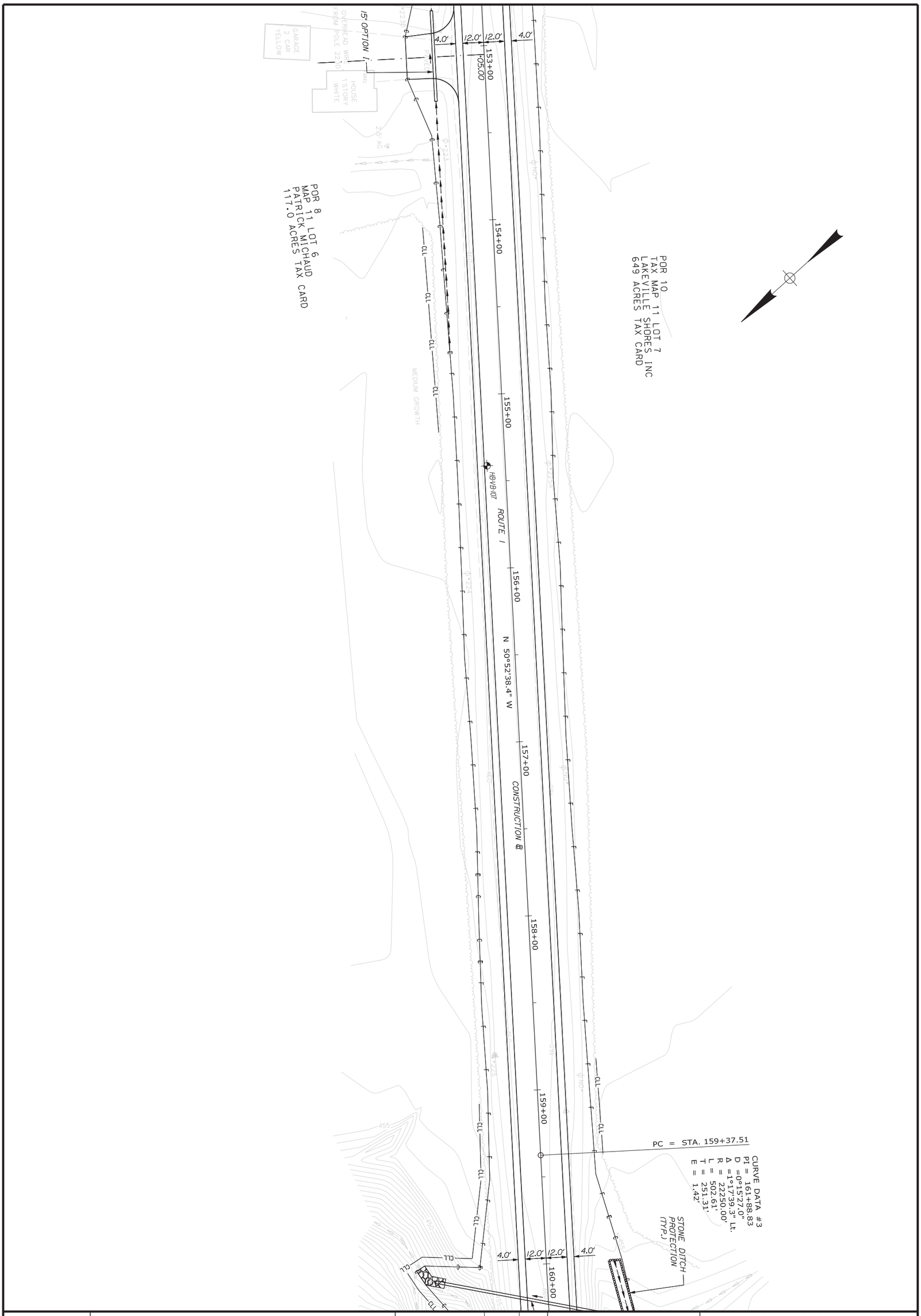

VAN BUREN
US ROUTE 1

BORING LOCATION PLAN

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DESIGN3-DETAILED3			
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DATE

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

NHPP-2265(800)

WIN 022658.00 HIGHWAY PLANS

SHEET NUMBER 10 OF 18

RVE DATA #3
= 161+88.83
=0°15'27.0"
=1°17'39.3" Lt.
= 22250.00'
= 502.61'
= 251.31'
= 1.42'

CURVE DATA #3
PI = 161+88.83
D =0°15'27.0"
Δ =1°17'39.3" Lt.
R = 22250.00'
L = 502.61'
T = 251.31'
E = 1.42'

POR 10
TAX MAP 11 LOT 7
LAKEVILLE SHORES INC
649 ACRES TAX CARD

PT = STA. 164+40.12

POR 20
TAX MAP 11 LOT 7A
PHILLIP C. ELLIS
JESSE J. BARROSO
12.95 ACRES DEED

POR 8
MAP 11 LOT 6
PATRICK MICHAUD
117.0 ACRES TAX CARD

STONE DITCH PROTECTION (TYP.)

REMOVE

24" RCP CLASS III

18" RCP CLASS IV

95.00'

166°42'46"

151°48'27"

166°47'18"

15" OPTION 1

CONSTRUCTION ℄

ROUTE 1

N 52°10'17.7" W

HB-VB-108

160+00 161+00 162+00 163+00 164+00 165+00 166+00

4.0' 12.0' 12.0' 4.0'

CLL

TTD

SMALL TREE GROWTH

FIELD

WOODS

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

NHPP-2265(800)

WIN 022658.00

HIGHWAY PLANS

	BY	DATE
PROJ. MANAGER		
DESIGN-DETAILED		
CHECKED-REVIEWED	C.RUSSELL	APR 2024
DESIGN2-DETAILED2		
DESIGN3-DETAILED3		
REVISIONS 1		
REVISIONS 2		
REVISIONS 3		
REVISIONS 4		
FIELD CHANGES		

SIGNATURE

P.E. NUMBER

DATE

VAN BUREN
US ROUTE 1

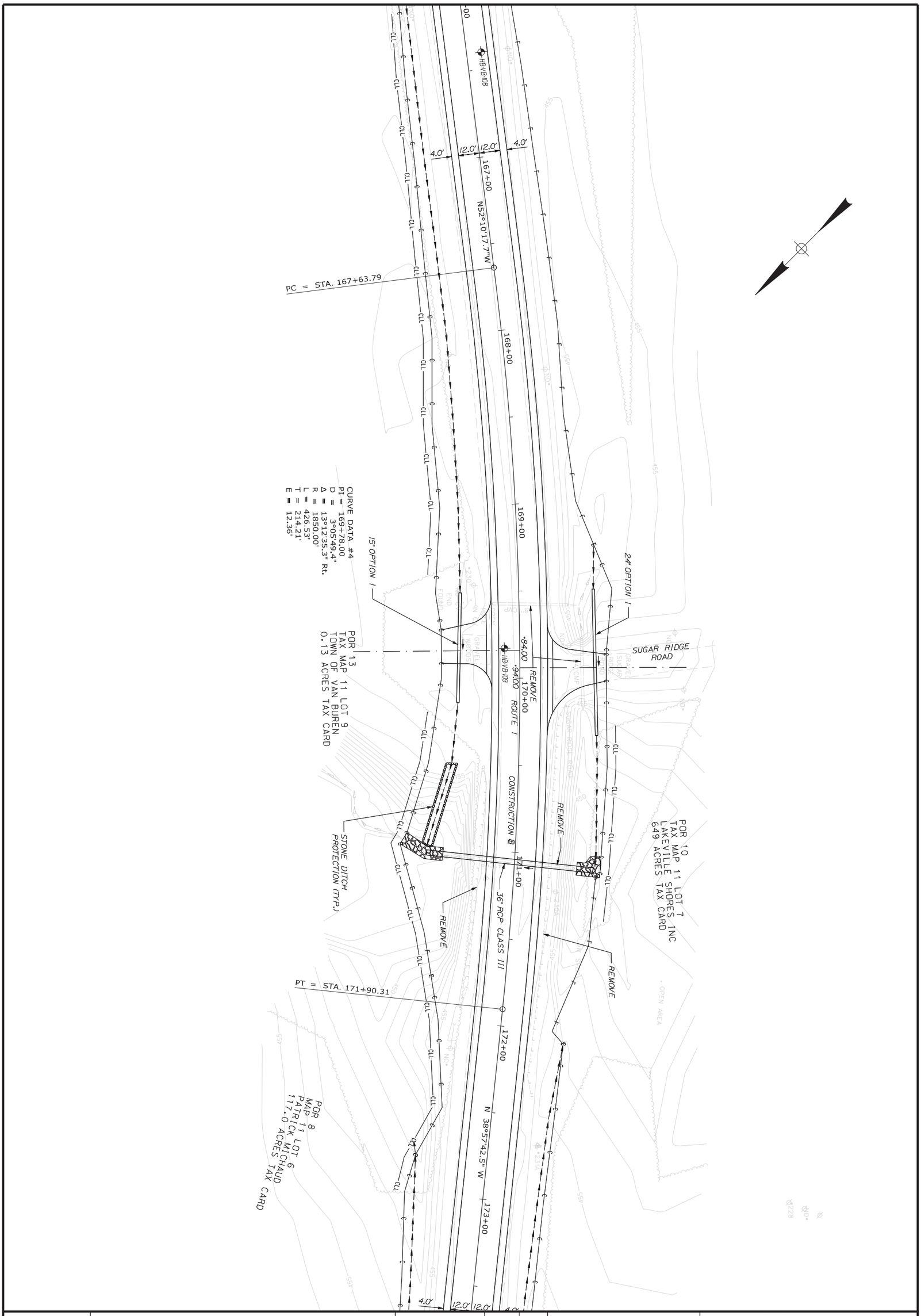
BORING LOCATION PLAN

SHEET NUMBER

11

OF 18

Filename: ...\00\GEOTECH\MSTA\011_BLP10.dgn Username: Cody.A.Russell Date:4/18/2024 Division: GEOTECH



SHEET NUMBER 12 OF 18

VAN BUREN
US ROUTE 1

BORING LOCATION PLAN

		BY	DATE
PROJ. MANAGER			
DESIGN-DETAILED			
CHECKED-REVIEWED			
DESIGN2-DETAILED2	C.RUSSELL	T.WHITE	APR 2024
DESIGN3-DETAILED3			
REVISIONS 1			
REVISIONS 2			
REVISIONS 3			
REVISIONS 4			
FIELD CHANGES			

SIGNATURE

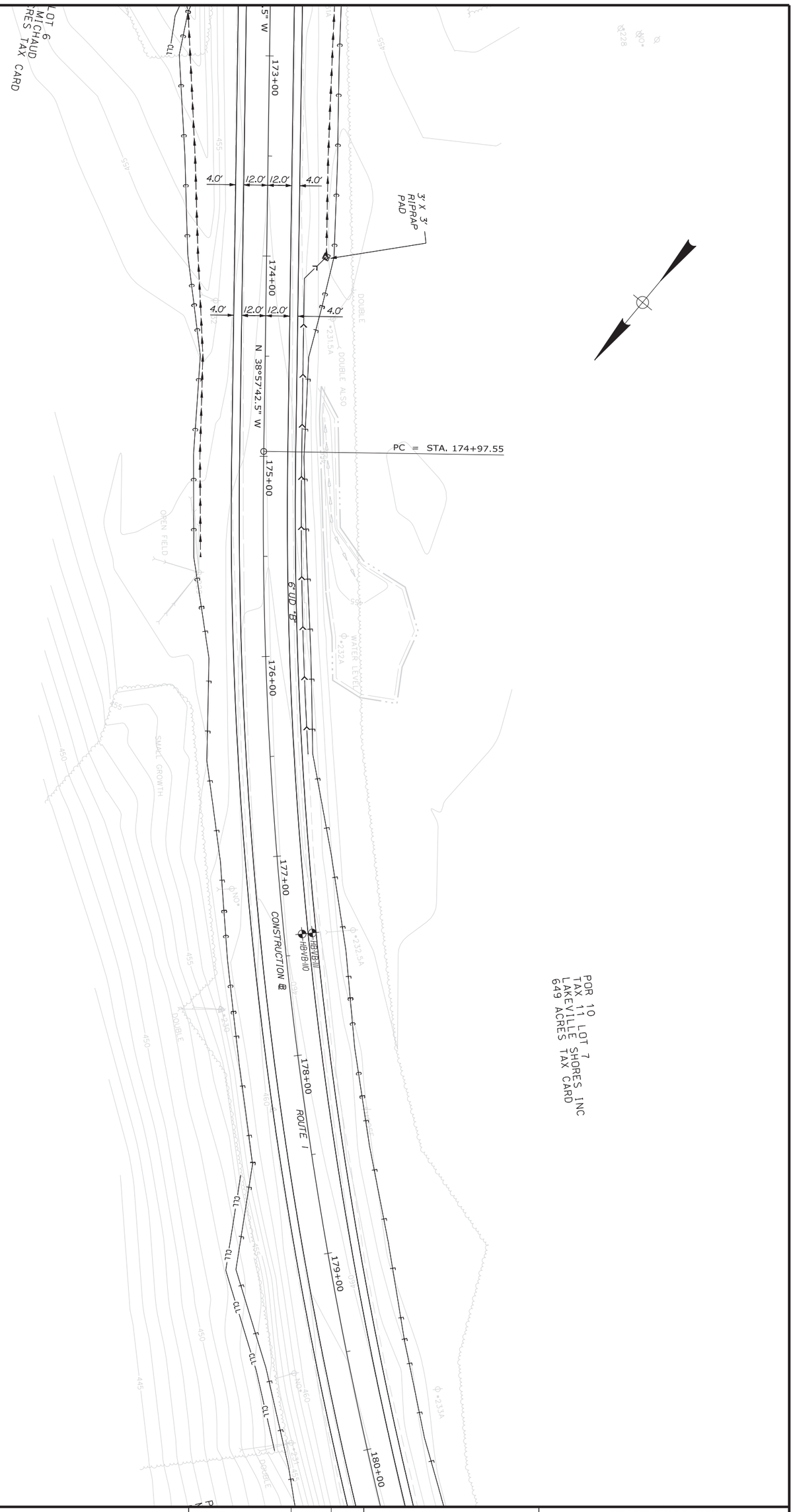
P.E. NUMBER

DATE

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

NHPP-2265(800)

WIN 022658.00 HIGHWAY PLANS



VAN BUREN
US ROUTE 1

BORING LOCATION PLAN

PROJ. MANAGER		BY	DATE
DESIGN-DETAILED			
CHECKED-REVIEWED			
DESIGN2-DETAILED2	C.RUSSELL	T.WHITE	APR 2024
DESIGN3-DETAILED3			
REVISIONS 1			
REVISIONS 2			
REVISIONS 3			
REVISIONS 4			
FIELD CHANGES			

SIGNATURE

P.E. NUMBER

DATE

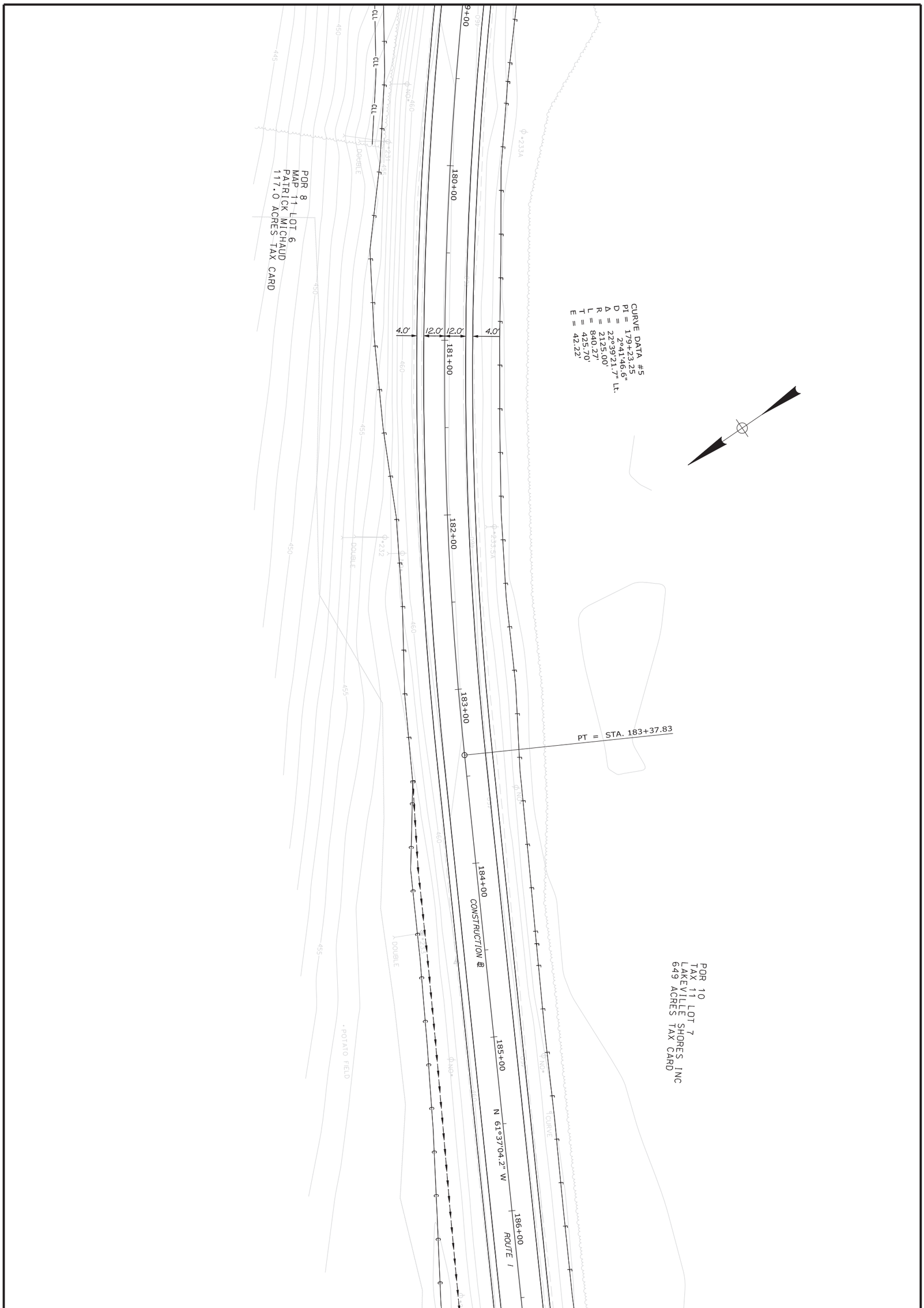
STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

NHPP-2265(800)

WIN
022658.00

HIGHWAY PLANS

SHEET NUMBER 13 OF 18



SHEET NUMBER 14 OF 18

VAN BUREN
US ROUTE 1

BORING LOCATION PLAN

		BY	DATE
PROJ. MANAGER			
DESIGN-DETAILED			
CHECKED-REVIEWED			
DESIGN2-DETAILED2	C.RUSSELL	T.WHITE	APR 2024
DESIGN3-DETAILED3			
REVISIONS 1			
REVISIONS 2			
REVISIONS 3			
REVISIONS 4			
FIELD CHANGES			

SIGNATURE

P.E. NUMBER

DATE

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

NHPP-2265(800)

WIN 022658.00 HIGHWAY PLANS

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

NHPP-2265(800)

WIN
022658.00

HIGHWAY PLANS

POR 10
TAX MAP11 LOT 7
LAKEVILLE SHORES INC
649 ACRES TAX CARD

STA. 190+00.00
END REHABILITATION
BEGIN TRANSITION TO FULL DEPTH
RECONSTRUCTION

STA. 190+50.00
END TRANSITION TO FULL DEPTH RECONSTRUCTION
BEGIN FULL DEPTH RECONSTRUCTION

WATER LEVEL

7'04.2" W
186+00
ROUTE 1
187+00
188+00
N 61°37'04.2" W
189+00
190+00
CONSTRUCTION ℄
191+00
27.00
REMOVE
ROUTE 1
192+00
19

4.0'
12.0'
12.0'
4.0'

HB-VB-112
HB-VB-201
HB-VB-202

REMOVE

96" RCP CLASS III
WITH SPECIAL FILL

15" OPTION 1

STONE DITCH
PROTECTION (TYP.)

8 FT HIGH

PLAN

25 0 25 50
Scale of Feet

POR 8
MAP 11 LOT 6
PATRICK MICHAUD
117.0 ACRES TAX CARD

	BY	DATE
PROJ. MANAGER		
DESIGN-DETAILED		
CHECKED-REVIEWED	C.RUSSELL	APR 2024
DESIGN2-DETAILED		
DESIGN3-DETAILED		
REVISIONS 1		
REVISIONS 2		
REVISIONS 3		
REVISIONS 4		
FIELD CHANGES		

SIGNATURE

P.E. NUMBER

DATE

VAN BUREN
US ROUTE 1

BORING LOCATION PLAN

SHEET NUMBER

15

OF 18

Filename: ...\00\GEOTECH\MSTA\015_BLP14.dgn Division: GEOTECH Username: Cody.A.Russell Date:4/18/2024

POR 4
TAX MAP 11 LOT 4
JEAN PAUL RIOUX
HUGUETTE RIOUX
5.0 ACRES TAX CARD

POR 4
TAX MAP 11 LOT 4
JEAN PAUL RIOUX
HUGUETTE RIOUX
5.0 ACRES TAX CARD

TO REM

15" OPTION I

HB-VB-201

HB-VB-202

96" RCP CLASS III
WITH SPECIAL FILL

4.0'
12.0'
12.0'
4.0'

192+00 193+00 194+00 195+00 196+00 197+00 198+00 199+00

CONSTRUCTION ℄

·40.00 ·95.00

154°43'05"

EXISTING MAILBOX
TO BE RESET.
INCIDENTAL TO
ITEM 631.12

GRADE AROUND WALLS, REMOVE
AND RESET LANDSCAPING.
PAID WITH EQUIPMENT RENTAL
ITEMS.

CURVE DATA #6
PI = 196+50.42
D = 0°08'59.3"
Δ = 0°47'55.8" Rt.
R = 38250.00'
L = 533.29'
T = 266.65'
E = 0.93'

PC = STA. 193+83.77

PRC = STA. 199+17.06

POR 5
TAX MAP 11 LOT 5
JEAN PAUL RIOUX
HUGUETTE RIOUX
19.79 ACRES TAX CARD

PLAN

25 50
Scale of Feet

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

NHPP-2265(800)

WIN
022658.00

HIGHWAY PLANS

	DATE	BY	SIGNATURE
PROJ. MANAGER	------	-----	-----
DESIGN-DETAILED	------	-----	-----
CHECKED-REVIEWED	------	-----	-----
DESIGN2-DETAILED2	APR 2024	C.RUSSELL	T.WHITE
DESIGN3-DETAILED3	------	-----	-----
REVISIONS 1	------	-----	P.E. NUMBER
REVISIONS 2	------	-----	-----
REVISIONS 3	------	-----	DATE
REVISIONS 4	------	-----	-----
FIELD CHANGES	------	-----	-----

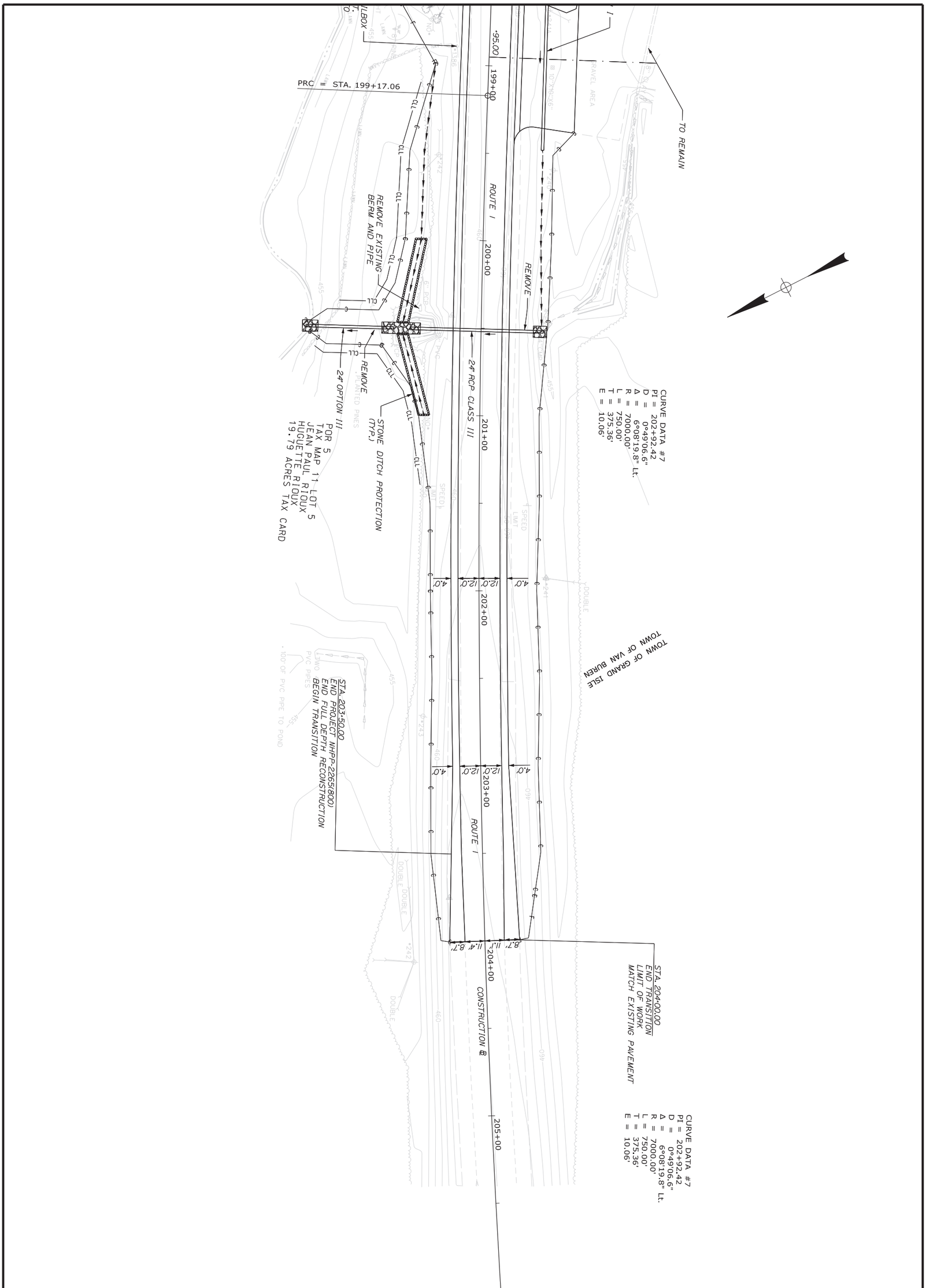
VAN BUREN
US ROUTE 1

BORING LOCATION PLAN

SHEET NUMBER

16

OF 18



SHEET NUMBER 17 OF 18

VAN BUREN
US ROUTE 1

BORING LOCATION PLAN

		BY	DATE
PROJ. MANAGER			
DESIGN-DETAILED			
CHECKED-REVIEWED			
DESIGN2-DETAILED2	C.RUSSELL	T.WHITE	APR 2024
DESIGN3-DETAILED3			
REVISIONS 1			
REVISIONS 2			
REVISIONS 3			
REVISIONS 4			
FIELD CHANGES			

SIGNATURE

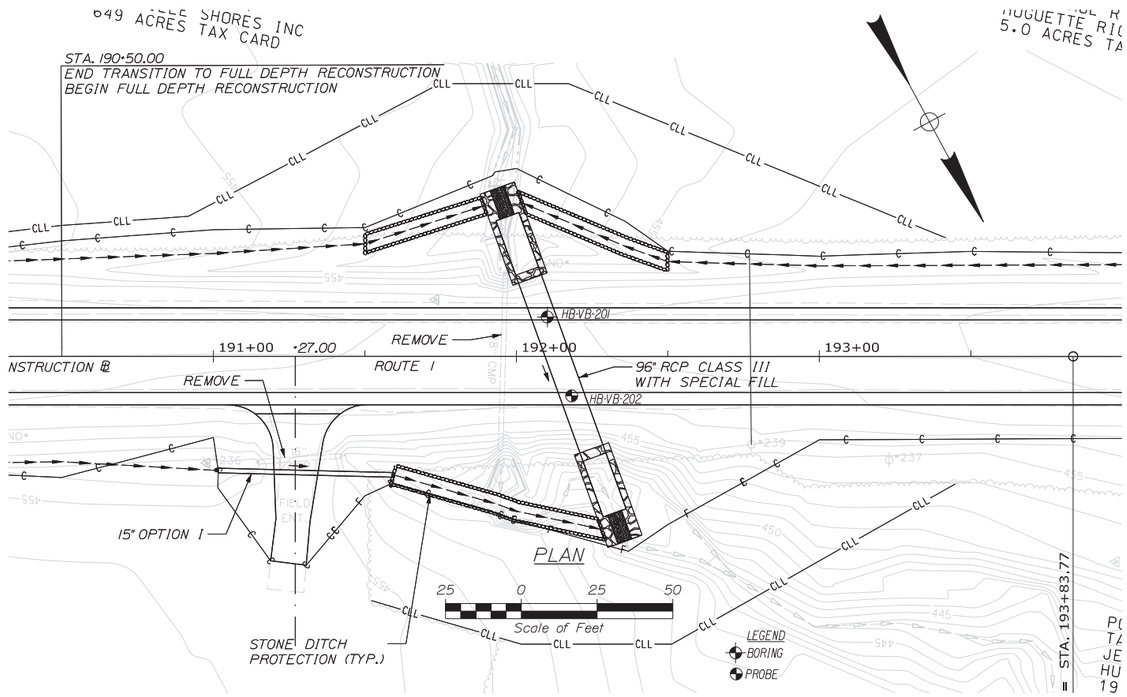
P.E. NUMBER

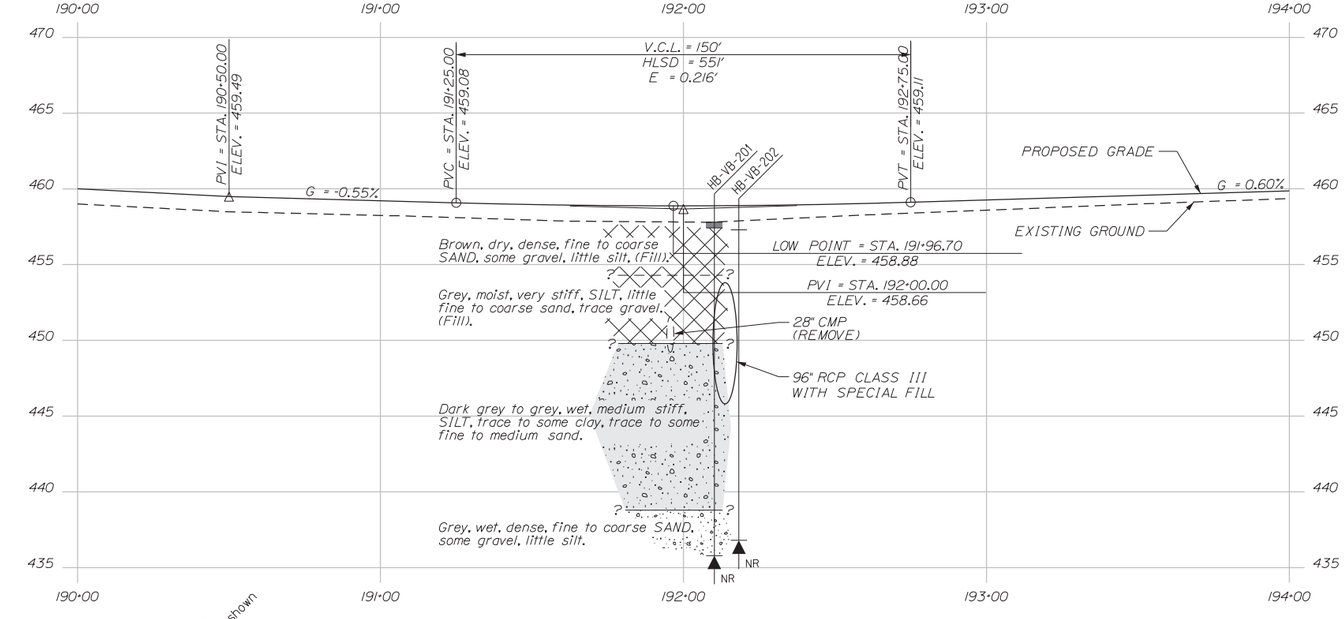
DATE

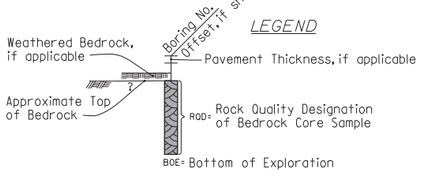
STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

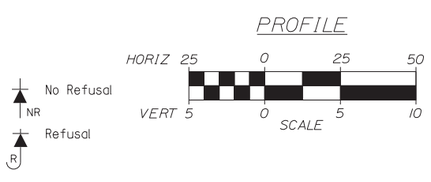
NHPP-2265(800)

WIN 022658.00 HIGHWAY PLANS









Note: This generalized interpretive soil profile is intended to convey trends in subsurface conditions. The boundaries between strata are approximate and idealized, and have been developed by interpretations of widely spaced explorations and samples. Actual soil and bedrock transitions may vary and are probably more erratic. For more specific information refer to the exploration logs.

Maine Department of Transportation
Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Route 1 Large Culvert
Location: Van Buren, Maine

Boring No.: HB-VB-201
WIN: 22658.00

Driller:	MaineDOT	Elevation (ft.): 457.8	Auger ID/OD: 5" Dia.
Operator:	Doggett	Datum: NAVD88	Sampler: Standard Split Spoon
Logged By:	B.Wilder	Rig Type: CME 45C	Hammer Wt./Fall: 140#/30"
Date Start/Finish:	8/2/2021 07:30-10:30	Drilling Method: Solid Stem Auger	Core Barrel: N/A
Boring Location:	192+10.2, 13.0 ft Lt.	Casing ID/OD: N/A	Water Level*: 17.0 ft bgs.
Hammer Efficiency Factor: 0.974		Hammer Type: Automatic ☒ Hydraulic ☐	Rope & Cathead ☐

Definitions:
S = Split Spoon Sample
U = Unsuccessful Split Spoon Sample Attempt
D = Thin Wall Tube Sample
WU = Unsuccessful Thin Wall Tube Sample Attempt
V = Field Vane Shear Test. PP = Pocket Penetrometer
W = 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 = Weight of Rods or Casing
WOP = Weight of the Person
S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(qu)}$ = Lab Vane Undrained Shear Strength (psf)
q_u = Unconfined Compressive Strength (tsf)
N-value = Raw Field SPT N-value
T_v = Pocket Torvane Shear Strength (tsf)
MC = Water Content, percent
LL = Liquid Limit
PL = Plasticity Limit
PI = Plasticity Index
GS = Grain Size Analysis
C = Consolidation Test
*Groundwater Readings = Raw Field SPT Data
**Hammer Efficiency Factor = Automatic Hammer Calibration Value
N_{60} = SPT N-value Corrected for Hammer Efficiency
N_{60} = Hammer Efficiency Factor(%)*Uncorrected

Depth (ft.)	Sample No.	Rec./Max. (in.)	Sample Depth (ft.)	Blows (/6 in. Sheer 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
							SSA	457.4		4.5" HMA.	
											0.4
	10	24/19	1.00 - 3.00	21/11/13/16	24	39				Brown, dry, dense, fine to coarse SAND, some gravel, little silt, (Fill).	GM379773 A-1-b, SM MC=5.4%
								454.3			
											3.5
5	20	24/20	5.00 - 7.00	5/5/5/3	10	16				Grey, moist, very stiff, SILT, little fine to coarse sand, trace gravel. (Fill).	GM379774 A-4, CL MC=21.2%
								449.8			
											8.0
	30	24/24	10.00 - 12.00	1/1/2/3	3	5				Dark grey, wet, medium stiff, SILT, little clay, trace fine to medium sand.	GM379775 A-7-6, MH MC=43.1% LL=43 PL=31 PI=12
10											
	40/4	24/20	15.00 - 17.00	1/1/2/3	3	5				4D (15.0-16.5 ft bgs.): Dark grey, wet, medium stiff, SILT, some clay, trace fine to medium sand.	GM379776 A-4, CL MC=64.8%
										Non-Plastic	
								441.3		4D/4 (16.5-17.0 ft bgs.): Grey, wet, medium stiff, SILT, some fine to medium sand, trace clay.	GM379777 A-4, CL MC=99.6%
											19.0
15											
								438.8			
	50	24/16	20.00 - 22.00	5/14/14/11	28	45				Grey, wet, dense, fine to coarse SAND, some gravel, little silt.	GM379778 A-1-b, SM MC=12.4%
								435.8			
										Bottom of Exploration at 22.0 feet below ground surface. NO REFUSAL	22.0
20											
25											

Remarks:

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

Page 1 of 1
Boring No.: HB-VB-201

Maine Department of Transportation
Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Route 1 Large Culvert
Location: Van Buren, Maine

Boring No.: HB-VB-202
WIN: 22658.00

Drilling Contractor:	MaineDOT	Elevation (ft.): 457.3	Auger ID/OD: 5" Dia.
Operator:	Doggett	Datum: NAVD88	Sampler: N/A
Logged By:	B.Wilder	Rig Type: CME 45C	Hammer Wt./Fall: N/A
Date Start/Finish:	8/2/2022-8/2/2022	Drilling Method: Solid Stem Auger	Core Barrel: N/A
Boring Location:	192+18.3, 13.0 Rt.	Casing ID/OD: N/A	Water Level*: None Observed

Definitions:
S = Sample off Auger Flights
B = Bucket Sample off Auger Flights
SU = Unsuccessful Split Spoon Sample Attempt
U = Thin Wall Tube Sample
WU = Unsuccessful Thin Wall Tube Sample Attempt
V = Field Vane Shear Test. PP= Pocket Penetrometer
WOH = Weight of 140lb. Hammer
WOR = Weight of Rods or Casing
WOP = Weight of 1 Person
S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(qu)}$ = Lab Vane Undrained Shear Strength (psf)
q_u = Unconfined Compressive Strength (tsf)
N-value = Raw Field SPT N-value
T_v = Pocket Torvane Shear Strength (tsf)
MC = Water Content, percent
LL = Liquid Limit
PL = Plasticity Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Rec./Max. (in.)	Sample Depth (ft.)	Blows (/6 in. Sheer Strength (psf) or RQD (%))	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class
						SSA			Probe, similar soils as HB-VAN-201.	
5										
10										
15										
20							436.8		Bottom of Exploration at 20.5 feet below ground surface. NO REFUSAL	20.5
25										

Remarks:

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

Page 1 of 1
Boring No.: HB-VB-202

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

NHPP-2265(800)

WIN 022658.00

HIGHWAY PLANS

	BY	DATE
PROJ. MANAGER	-----	-----
DESIGN-DETAILED	-----	-----
CHECKED-REVIEWED	-----	-----
DESIGN2-DETAILED2	C.RUSSELL	APR 2024
DESIGN3-DETAILED3	T.WHITE	-----
REVISIONS 1	-----	-----
REVISIONS 2	-----	-----
REVISIONS 3	-----	-----
REVISIONS 4	-----	-----
FIELD CHANGES	-----	-----

SIGNATURE

P.E. NUMBER

DATE

VAN BUREN
US ROUTE 1

BORING LOCATION PLAN &
INTERPRETIVE SUBSURFACE PROFILE
WITH BORING LOGS

SHEET NUMBER

18

OF 18

Username: Cody.A.Russell Date:4/18/2024
Division: GEOTECH
Filename: ...\MSTA\018_BLP&SP wBL1.dgn

Appendix A

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

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-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-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):

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

*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))

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

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: A 1.94 mile portion of US Route 1
Location: Van Buren, Maine

Boring No.: HB-VB-101
WIN: 22658.00

Drilling Contractor:	MaineDOT	**Elevation (ft.)**	455.4	**Auger ID/OD:**	12" Dia.
Operator:	Giles/Daggett/Giles	**Datum:**	NAVD88	**Sampler:**	Off Flights
Logged By:	B. Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	6/16/2015-6/16/2015	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	104+34.5, 8.4 ft Lt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

Definitions:
D = Spilt Spoon Sample; S = Sample off Auger Flights; B = Bucket Sample off Auger Flights; MD = Unsuccessful Split Spoon Sample Attempt; U = Thin Wall Tube Sample; MV = Unsuccessful Field Vane Shear Test Attempt; V = Field Vane Shear Test, PP= Pocket Penetrometer
MU = Unsuccessful Thin Wall Tube Sample 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 1 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-value = Raw Field SPT N-value; T_v = Pocket Torvane Shear Strength (psf); WC = Water Content, percent ≅ = Similar or Equal too
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-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	B1		0.67 - 2.10			SSA	454.7		8" PAVEMENT. 0.7	
									Brown, moist, Gravelly fine to coarse SAND, trace silt, occasional cobble, (Fill).	G#271022 A-1-a, SW-SM WC=1.4%
	S1		2.10 - 4.50				453.3		2.1 Grey, moist, SILT, some fine to coarse sand, trace gravel.	G#264726 A-4, ML WC=17.0%
							450.9		4.5 **Bottom of Exploration at 4.5 feet below ground surface.** NO REFUSAL	
5										
10										
15										
20										
25										

Remarks:

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

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

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: A 1.94 mile portion of US Route 1
Location: Van Buren, Maine

Boring No.: HB-VB-102
WIN: 22658.00

Drilling Contractor:	MaineDOT	**Elevation (ft.)**	455.1	**Auger ID/OD:**	5" Dia.
Operator:	Giles/Daggett/Giles	**Datum:**	NAVD88	**Sampler:**	Off Flights
Logged By:	B. Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	6/16/2015-6/16/2015	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	104+34.5, 14.5 ft Lt. Shoulder	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

Definitions:
D = Spilt Spoon Sample; S = Sample off Auger Flights; B = Bucket Sample off Auger Flights; MD = Unsuccessful Split Spoon Sample Attempt; U = Thin Wall Tube Sample; MV = Unsuccessful Field Vane Shear Test Attempt; V = Field Vane Shear Test, PP= Pocket Penetrometer
MU = Unsuccessful Thin Wall Tube Sample 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 1 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-value = Raw Field SPT N-value; T_v = Pocket Torvane Shear Strength (psf); WC = Water Content, percent ≅ = Similar or Equal too
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-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0						SSA			Brown, moist, Gravelly fine to coarse SAND, trace silt, occasional cobble, (Fill).	
	S2		1.30 - 5.00				453.8		1.3	G#264727 A-4, ML WC=20.5%
									Light brown, wet, fine to coarse Sandy SILT, trace gravel.	
5							450.1		5.0	
									Bottom of Exploration at 5.0 feet below ground surface. NO REFUSAL	
10										
15										
20										
25										

Remarks:

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

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

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: A 1.94 mile portion of US Route 1
Location: Van Buren, Maine

Boring No.: HB-VB-103
WIN: 22658.00

Drilling Contractor:	MaineDOT	**Elevation (ft.)**	456.4	**Auger ID/OD:**	5" Dia.
Operator:	Giles/Daggett/Giles	**Datum:**	NAVD88	**Sampler:**	Off Flights
Logged By:	B. Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	6/16/2015-6/16/2015	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	117+03.2, 9.7 ft Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

Definitions: D = Spilt Spoon Sample; S = Sample off Auger Flights; B = Bucket Sample off Auger Flights; MD = Unsuccessful Split Spoon Sample Attempt; U = Thin Wall Tube Sample; MV = Unsuccessful Field Vane Shear Test Attempt; V = Field Vane Shear Test, PP= Pocket Penetrometer; MU = Unsuccessful Thin Wall Tube Sample 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 1 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-value = Raw Field SPT N-value; T_v = Pocket Torvane Shear Strength (psf); WC = Water Content, percent ≅ = Similar or Equal too; 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-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	S3		0.50 - 2.50			SSA	455.9		6" PAVEMENT. 0.5 Brown, dry, fine to coarse SAND, some gravel, some silt, occasional cobble, (Fill).	G#264728 A-1-b, SM WC=3.1%
	S4		2.50 - 5.00				453.9		2.5 Grey, moist, SILT, some fine to coarse sand, trace gravel.	G#264729 A-4, ML WC=17.0%
5							451.4		5.0 **Bottom of Exploration at 5.0 feet below ground surface.** NO REFUSAL	
10										
15										
20										
25										

Remarks:

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

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

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: A 1.94 mile portion of US Route 1

Location: Van Buren, Maine

Boring No.: HB-VB-104

WIN: 22658.00

Drilling Contractor:	MaineDOT	**Elevation (ft.)**	457.1	**Auger ID/OD:**	5" Dia.
Operator:	Giles/Daggett/Giles	**Datum:**	NAVD88	**Sampler:**	Off Flights
Logged By:	B. Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	6/16/2015-6/16/2015	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	127+03.9, 8.8 ft Lt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

Definitions: D = Spilt Spoon Sample; S = Sample off Auger Flights; B = Bucket Sample off Auger Flights; MD = Unsuccessful Split Spoon Sample Attempt; U = Thin Wall Tube Sample; MV = Unsuccessful Field Vane Shear Test Attempt; V = Field Vane Shear Test, PP= Pocket Penetrometer; MU = Unsuccessful Thin Wall Tube Sample 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 1 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-value = Raw Field SPT N-value; T_v = Pocket Torvane Shear Strength (psf); WC = Water Content, percent ≅ = Similar or Equal too; 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-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	S5		0.50 - 2.50			SSA	456.6		6" PAVEMENT.	G#264730 A-1-b, SM WC=3.8%
									0.5 Light brown, damp, Gravelly fine to coarse SAND, some silt, (Fill).	
	S6		2.50 - 5.00				454.6		2.5 Grey, wet, SILT, trace fine to coarse sand.	
5							452.1		5.0 **Bottom of Exploration at 5.0 feet below ground surface.** NO REFUSAL	
10										
15										
20										
25										

Remarks:

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

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

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: A 1.94 mile portion of US Route 1
Location: Van Buren, Maine

Boring No.: HB-VB-105
WIN: 22658.00

Drilling Contractor:	MaineDOT	**Elevation (ft.)**	458.1	**Auger ID/OD:**	12" Dia.
Operator:	Giles/Daggett/Giles	**Datum:**	NAVD88	**Sampler:**	Off Flights
Logged By:	B. Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	6/16/2015-6/16/2015	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	136+98.4, 8.6 ft Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

Definitions:
D = Spilt Spoon Sample; S = Sample off Auger Flights; B = Bucket Sample off Auger Flights; MD = Unsuccessful Split Spoon Sample Attempt; U = Thin Wall Tube Sample; MV = Unsuccessful Field Vane Shear Test Attempt; V = Field Vane Shear Test, PP= Pocket Penetrometer
MU = Unsuccessful Thin Wall Tube Sample 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 1 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-value = Raw Field SPT N-value; T_v = Pocket Torvane Shear Strength (psf); WC = Water Content, percent ≅ = Similar or Equal too
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-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	B2		0.50 - 2.90			SSA	457.6		6" PAVEMENT. 0.5 Brown, moist, fine to coarse Sandy GRAVEL, little silt, occasional cobble, (Fill).	G3271023 A-1-a, GM WC=4.5%
	S7		2.90 - 5.00				455.2		2.9 Grey, wet, SILT, trace fine to coarse sand.	G#264731 A-4, CL WC=28.1%
5							453.1		5.0 **Bottom of Exploration at 5.0 feet below ground surface.** NO REFUSAL	
10										
15										
20										
25										

Remarks:

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: A 1.94 mile portion of US Route 1
Location: Van Buren, Maine

Boring No.: HB-VB-106
WIN: 22658.00

Drilling Contractor:	MaineDOT	**Elevation (ft.)**	457.5	**Auger ID/OD:**	5" Dia.
Operator:	Giles/Daggett/Giles	**Datum:**	NAVD88	**Sampler:**	Off Flights
Logged By:	B. Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	6/16/2015-6/16/2015	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	136+98.4, 14.1 ft Rt. Shoulder	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

Definitions: D = Spilt Spoon Sample; S = Sample off Auger Flights; B = Bucket Sample off Auger Flights; MD = Unsuccessful Split Spoon Sample Attempt; U = Thin Wall Tube Sample; MV = Unsuccessful Field Vane Shear Test Attempt; V = Field Vane Shear Test, PP= Pocket Penetrometer; MU = Unsuccessful Thin Wall Tube Sample 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 1 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-value = Raw Field SPT N-value; T_v = Pocket Torvane Shear Strength (psf); WC = Water Content, percent ≅ = Similar or Equal too; 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-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0						SSA	456.5		Brown, moist, fine to coarse Sandy GRAVEL, little silt, occasional cobble, (Fill).	
	S8		1.00 - 5.00						1.0 Light brown, wet, SILT, some fine to coarse sand, little gravel.	G#264732 A-4, SM WC=21.3%
5							452.5		5.0 **Bottom of Exploration at 5.0 feet below ground surface.** NO REFUSAL	
10										
15										
20										
25										

Remarks:

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: A 1.94 mile portion of US Route 1

Location: Van Buren, Maine

Boring No.: HB-VB-107

WIN: 22658.00

Drilling Contractor:	MaineDOT	**Elevation (ft.)**	460.4	**Auger ID/OD:**	5" Dia.
Operator:	Giles/Daggett/Giles	**Datum:**	NAVD88	**Sampler:**	Off Flights
Logged By:	B. Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	6/16/2015-6/16/2015	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	155+40.8, 10.5 ft Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

Definitions:
D = Spilt Spoon Sample; S = Sample off Auger Flights; B = Bucket Sample off Auger Flights; MD = Unsuccessful Split Spoon Sample Attempt; U = Thin Wall Tube Sample; MV = Unsuccessful Field Vane Shear Test Attempt; V = Field Vane Shear Test, PP= Pocket Penetrometer
MU = Unsuccessful Thin Wall Tube Sample 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 1 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-value = Raw Field SPT N-value; T_v = Pocket Torvane Shear Strength (psf); WC = Water Content, percent ≅ = Similar or Equal too
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-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	S9		0.50 - 2.60			SSA	459.9		6" PAVEMENT. 0.5	G#264733 A-1-b, SM WC=3.8%
									Brown, damp, SAND, some gravel, some silt, occasional cobble, (Fill).	
	S10		2.60 - 5.00				457.8		2.6 Grey, wet, SILT, trace fine to coarse sand.	
5							455.4		5.0 **Bottom of Exploration at 5.0 feet below ground surface.** NO REFUSAL	
10										
15										
20										
25										

Remarks:

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

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: A 1.94 mile portion of US Route 1

Location: Van Buren, Maine

Boring No.: HB-VB-108

WIN: 22658.00

Drilling Contractor:	MaineDOT	**Elevation (ft.)**	458.6	**Auger ID/OD:**	5" Dia.
Operator:	Giles/Daggett/Giles	**Datum:**	NAVD88	**Sampler:**	Off Flights
Logged By:	B. Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	6/16/2015-6/16/2015	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	166+40.2, 8.4 ft Lt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

Definitions:
D = Spilt Spoon Sample; S = Sample off Auger Flights; B = Bucket Sample off Auger Flights; MD = Unsuccessful Split Spoon Sample Attempt; U = Thin Wall Tube Sample; MV = Unsuccessful Field Vane Shear Test Attempt; V = Field Vane Shear Test, PP= Pocket Penetrometer
MU = Unsuccessful Thin Wall Tube Sample 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 1 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-value = Raw Field SPT N-value; T_v = Pocket Torvane Shear Strength (psf); WC = Water Content, percent ≅ = Similar or Equal too
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-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0						SSA	458.1		6" PAVEMENT. 0.5	
							456.9		Brown, damp, fine to coarse SAND, some gravel, some silt, occasional cobble, (Fill). 1.7	
									Grey, wet, fine to coarse Sandy SILT.	
5							453.6		5.0	
									Bottom of Exploration at 5.0 feet below ground surface. NO REFUSAL	
10										
15										
20										
25										

Remarks:

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

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

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: A 1.94 mile portion of US Route 1
Location: Van Buren, Maine

Boring No.: HB-VB-109
WIN: 22658.00

Drilling Contractor:	MaineDOT	**Elevation (ft.)**	457.5	**Auger ID/OD:**	5" Dia.
Operator:	Giles/Daggett/Giles	**Datum:**	NAVD88	**Sampler:**	Off Flights
Logged By:	B. Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	6/16/2015-6/16/2015	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	169+82.8, 8.8 ft Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

Definitions:
D = Spilt Spoon Sample; S = Sample off Auger Flights; B = Bucket Sample off Auger Flights; MD = Unsuccessful Split Spoon Sample Attempt; U = Thin Wall Tube Sample; MV = Unsuccessful Field Vane Shear Test Attempt; V = Field Vane Shear Test, PP= Pocket Penetrometer
MU = Unsuccessful Thin Wall Tube Sample 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 1 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-value = Raw Field SPT N-value; T_v = Pocket Torvane Shear Strength (psf); WC = Water Content, percent ≅ = Similar or Equal too
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-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0						SSA	457.0		6" PAVEMENT. 0.5	
									Brown, damp, fine to coarse SAND, some gravel, some silt, occasional cobble, (Fill).	
							455.3		2.2	
									Light brown, wet, SILT, some fine to coarse sand, little gravel.	
5							452.5		5.0	
									Bottom of Exploration at 5.0 feet below ground surface. NO REFUSAL	
10										
15										
20										
25										

Remarks:

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

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

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: A 1.94 mile portion of US Route 1
Location: Van Buren, Maine

Boring No.: HB-VB-110
WIN: 22658.00

Drilling Contractor:	MaineDOT	**Elevation (ft.)**	459.5	**Auger ID/OD:**	12" Dia.
Operator:	Giles/Daggett/Giles	**Datum:**	NAVD88	**Sampler:**	Off Flights
Logged By:	B. Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	6/16/2015-6/16/2015	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	177+39.8, 9.0 ft Lt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

Definitions:
D = Spilt Spoon Sample; S = Sample off Auger Flights; B = Bucket Sample off Auger Flights; MD = Unsuccessful Split Spoon Sample Attempt; U = Thin Wall Tube Sample; MV = Unsuccessful Field Vane Shear Test Attempt; V = Field Vane Shear Test, PP= Pocket Penetrometer
MU = Unsuccessful Thin Wall Tube Sample 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 1 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-value = Raw Field SPT N-value; T_v = Pocket Torvane Shear Strength (psf); WC = Water Content, percent ≅ = Similar or Equal too
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-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	B3		0.67 - 2.60			SSA	458.8		8" PAVEMENT. 0.7 Brown, damp, Gravelly fine to coarse SAND, trace silt, occasional cobble, (Fill).	G#271024 A-1-a, SW-SM WC=3.3%
	S11		2.60 - 5.00				456.9		2.6 Grey-brown, moist, fine to coarse SAND, some silt, some gravel.	G#264734 A-2-4, SM WC=10.7%
5							454.5		5.0 **Bottom of Exploration at 5.0 feet below ground surface.** NO REFUSAL	
10										
15										
20										
25										

Remarks:

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

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

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: A 1.94 mile portion of US Route 1
Location: Van Buren, Maine

Boring No.: HB-VB-111
WIN: 22658.00

Drilling Contractor:	MaineDOT	**Elevation (ft.)**	459.2	**Auger ID/OD:**	5" Dia.
Operator:	Giles/Daggett/Giles	**Datum:**	NAVD88	**Sampler:**	Off Flights
Logged By:	B. Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	6/16/2015-6/16/2015	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	177+39.8, 14.2 ft Lt. Shoulder	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

Definitions: D = Spilt Spoon Sample; S = Sample off Auger Flights; B = Bucket Sample off Auger Flights; MD = Unsuccessful Split Spoon Sample Attempt; U = Thin Wall Tube Sample; MV = Unsuccessful Field Vane Shear Test Attempt; V = Field Vane Shear Test, PP= Pocket Penetrometer; MU = Unsuccessful Thin Wall Tube Sample 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 1 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-value = Raw Field SPT N-value; T_v = Pocket Torvane Shear Strength (psf); WC = Water Content, percent ≅ = Similar or Equal too; 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-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0						SSA			Brown, damp, Gravelly, fine to coarse SAND, trace silt, occasional cobble, (Fill).	
							457.8		1.4	
									Grey-brown, moist, fine to coarse SAND, some silt, some gravel.	
5							454.2		5.0	
									Bottom of Exploration at 5.0 feet below ground surface. NO REFUSAL	
10										
15										
20										
25										

Remarks:

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

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

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: A 1.94 mile portion of US Route 1
Location: Van Buren, Maine

Boring No.: HB-VB-112
WIN: 22658.00

Drilling Contractor:	MaineDOT	**Elevation (ft.)**	459.0	**Auger ID/OD:**	5" Dia.
Operator:	Giles/Daggett/Giles	**Datum:**	NAVD88	**Sampler:**	Off Flights
Logged By:	B. Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	6/16/2015-6/16/2015	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	189+67.7, 6.9 ft Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

Definitions:
D = Spilt Spoon Sample; S = Sample off Auger Flights; B = Bucket Sample off Auger Flights; MD = Unsuccessful Split Spoon Sample Attempt; U = Thin Wall Tube Sample; MV = Unsuccessful Field Vane Shear Test Attempt; V = Field Vane Shear Test, PP= Pocket Penetrometer
MU = Unsuccessful Thin Wall Tube Sample 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 1 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-value = Raw Field SPT N-value; T_v = Pocket Torvane Shear Strength (psf); WC = Water Content, percent ≅ = Similar or Equal too
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-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0						SSA	458.5		6" PAVEMENT. 0.5	
									Brown, damp, Gravelly, fine to coarse SAND, trace silt, occasional cobble, (Fill).	
							456.9		2.1	
									Grey-brown, moist, fine to coarse SAND, some silt, some gravel.	
5							454.0		5.0	
									Bottom of Exploration at 5.0 feet below ground surface. NO REFUSAL	
10										
15										
20										
25										

Remarks:

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

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

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Route 1 Large Culvert
Location: Van Buren, Maine

Boring No.: HB-VB-201
WIN: 22658.00

Driller:	MaineDOT	**Elevation (ft.)**	457.8	**Auger ID/OD:**	5" Dia.
Operator:	Daggett	**Datum:**	NAVD88	**Sampler:**	Standard Split Spoon
Logged By:	B.Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	8/2/2022; 07:30-10:30	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	192+10.2, 13.0 ft Lt.	**Casing ID/OD:**	N/A	**Water Level*:**	17.0 ft bgs.
Hammer Efficiency Factor: 0.974		**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	457.4		4½" HMA.	
										0.4	
	1D	24/19	1.00 - 3.00	21/11/13/16	24	39				Brown, dry, dense, fine to coarse SAND, some gravel, little silt, (Fill).	G#379773 A-1-b, SM WC=5.4%
								454.3		3.5	
5	2D	24/20	5.00 - 7.00	5/5/5/3	10	16				Grey, moist, very stiff, SILT, little fine to coarse sand, trace gravel, (Fill).	G#379774 A-4, CL WC=21.2%
								449.8		8.0	
10	3D	24/24	10.00 - 12.00	1/1/2/3	3	5				Dark grey, wet, medium stiff, SILT, little clay, trace fine to medium sand.	G#379775 A-7-6, ML WC=43.1% LL=43 PL=31 PI=12
15	4D/A	24/20	15.00 - 17.00	1/1/2/3	3	5				4D (15.0-16.5 ft bgs.) Dark grey, wet, medium stiff, SILT, some clay, trace fine to medium sand.	G#379776 A-4, CL WC=64.8% Non-Plastic
								441.3		16.5	
										4D/A (16.5-17.0 ft bgs.) Grey, wet, medium stiff, SILT, some fine to medium sand, trace clay.	G#379777 A-4, CL WC=99.6%
								438.8		19.0	
20	5D	24/16	20.00 - 22.00	5/14/14/11	28	45				Grey, wet, dense, fine to coarse SAND, some gravel, little silt.	G#379778 A-1-b, SM WC=12.4%
								435.8		22.0	
25										**Bottom of Exploration at 22.0 feet below ground surface.** NO REFUSAL	

Remarks:

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

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

Boring No.: HB-VB-201

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Route 1 Large Culvert
Location: Van Buren, Maine

Boring No.: HB-VB-202
WIN: 22658.00

Drilling Contractor:	MaineDOT	**Elevation (ft.)**	457.3	**Auger ID/OD:**	5" Dia.
Operator:	Daggett	**Datum:**	NAVD88	**Sampler:**	N/A
Logged By:	B.Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	8/2/2022-8/2/2022	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	192+18.3, 13.0 ft Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

Definitions:
D = Spilt Spoon Sample
S = Sample off Auger Flights
B = Bucket Sample off Auger Flights
MD = Unsuccessful Split Spoon Sample Attempt
U = Thin Wall Tube Sample
MV = Unsuccessful Field Vane Shear Test Attempt
V = Field Vane Shear Test, PP= Pocket Penetrometer
MU = Unsuccessful Thin Wall Tube Sample 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 1 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-value = Raw Field SPT N-value
T_v = Pocket Torvane Shear Strength (psf)
WC = Water Content, percent ≅ = Similar or Equal too
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-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0						SSA			Probe, similar soils as HB-VAN-201.	
5										
10										
15										
20							436.8		20.5 **Bottom of Exploration at 20.5 feet below ground surface.** NO REFUSAL	
25										

Remarks:

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

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

Appendix B

Laboratory Test Results

State of Maine - Department of Transportation

Laboratory Testing Summary Sheet

Town(s): Van Buren Work Number: 22658.00

Boring & Sample Identification Number	Station (Feet)	Offset (Feet)	Depth (Feet)	Reference Number	G.S.D.C. Sheet	W.C. %	L.L.	P.I.	Classification		
									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	II
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	II
HB-VB-105, B2	136+98.4	8.6 Rt.	0.5-2.9	271023	2	4.5			GM	A-1-a	I
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	III
HB-VB-107, S9	155+40.8	10.5 Rt.	0.5-2.6	264733	3	3.8			SM	A-1-b	II
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	II
HB-VB-201, 1D	192+10.2	13.0 Lt.	1.0-3.0	379773	4	5.4			SM	A-1-b	II
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/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

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

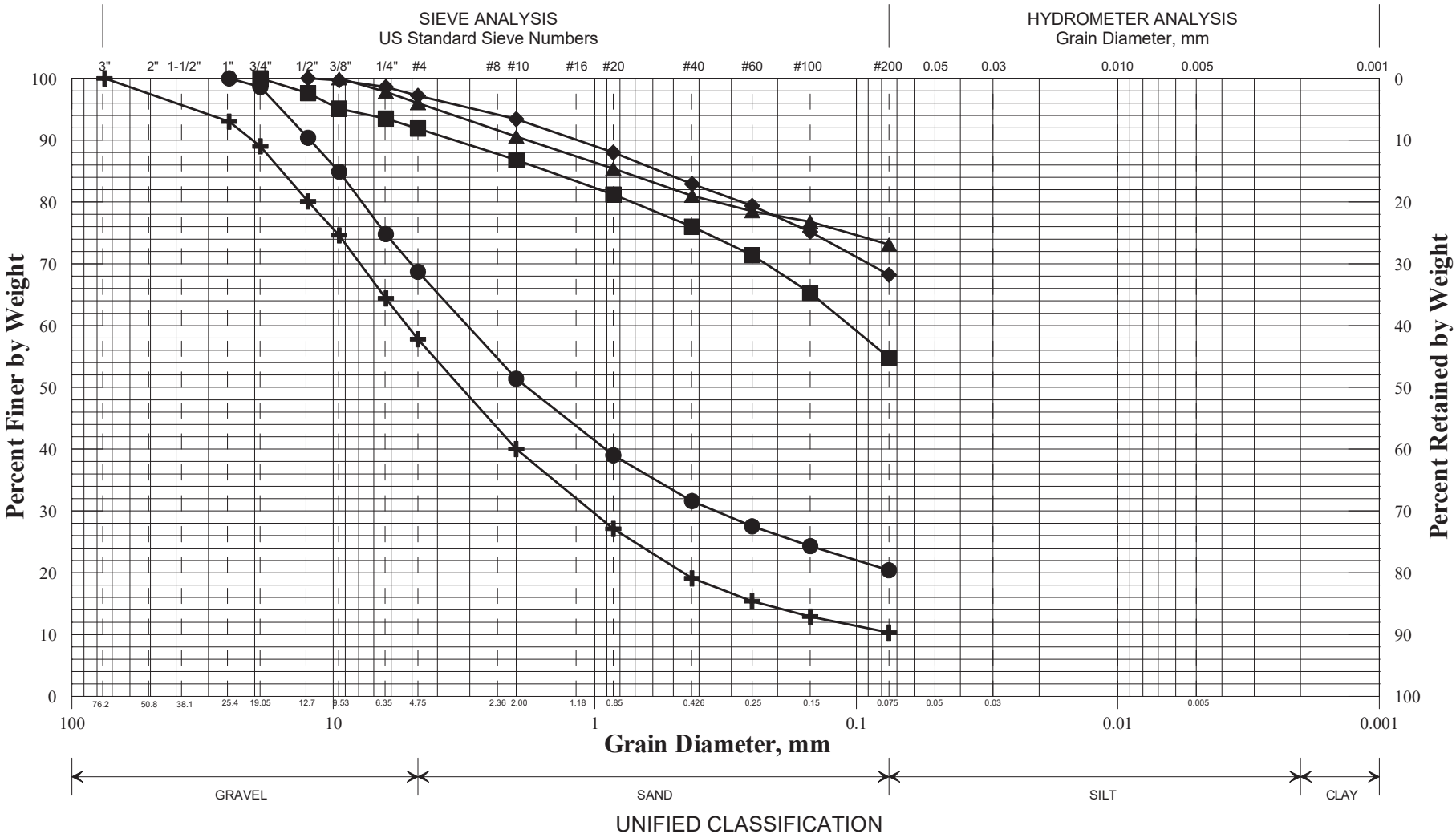
GSDC = Grain Size Distribution Curve as determined by AASHTO T 88-93 (1996) and/or ASTM D 422-63 (Reapproved 1998)

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

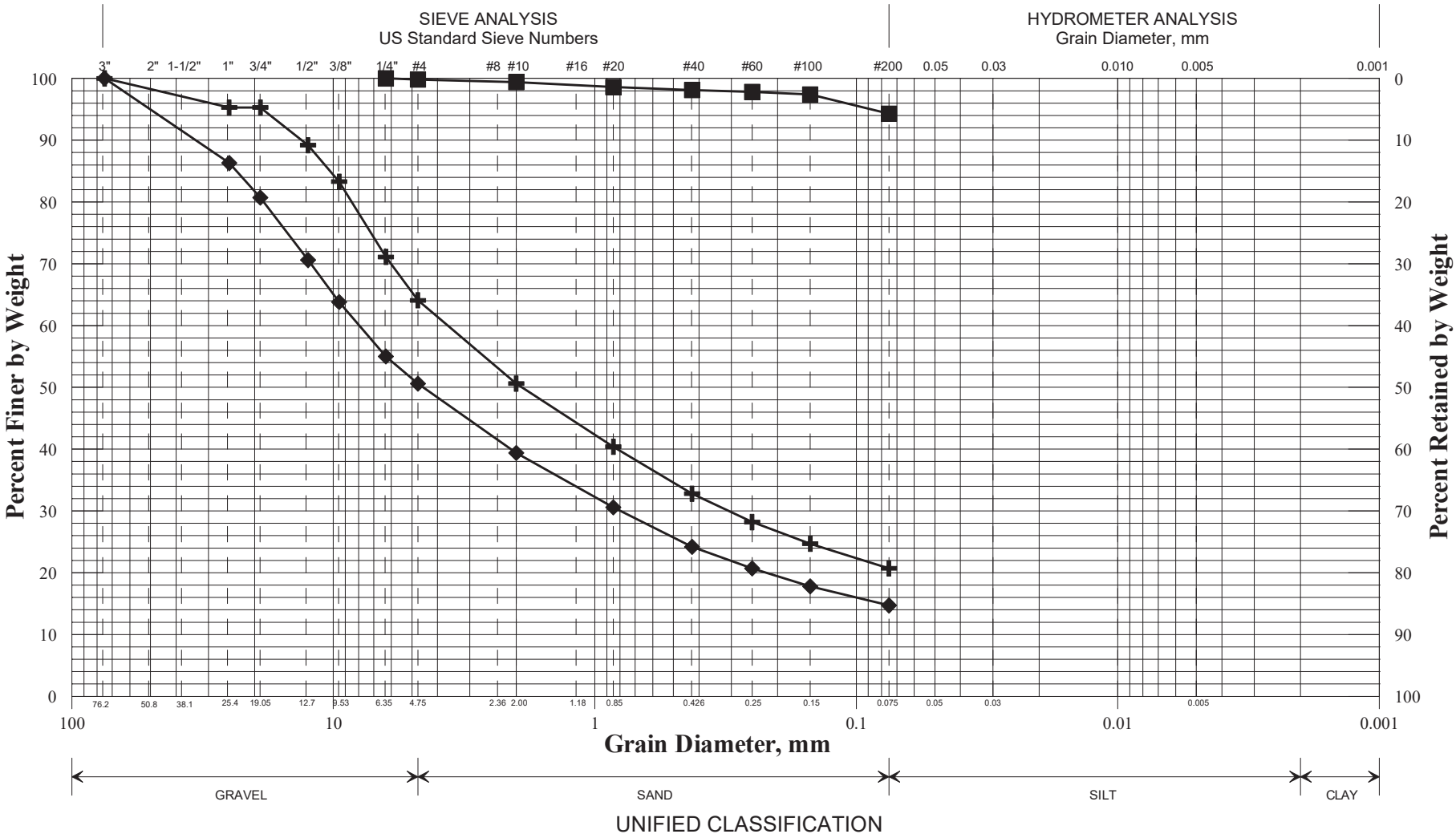
State of Maine Department of Transportation
GRAIN SIZE DISTRIBUTION CURVE



	Boring/Sample No.	Station	Offset, ft	Depth, ft	Description	W, %	LL	PL	PI
✚	HB-VB-101/B1	104+34.5	8.4 LT	0.67-2.1	Gravelly SAND, trace silt.	1.4			
◆	HB-VB-101/S1	104+34.5	8.4 LT	2.1-4.5	SILT, some sand, trace gravel.	17.0			
■	HB-VB-102/S2	104+34.5	14.5 LT	1.3-5.0	Sandy SILT, trace gravel.	20.5			
●	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			
✖									

WIN
022658.00
Town
Van Buren, Grand Isle
Reported by/Date
WHITE, TERRY A 7/16/2015

State of Maine Department of Transportation
GRAIN SIZE DISTRIBUTION CURVE

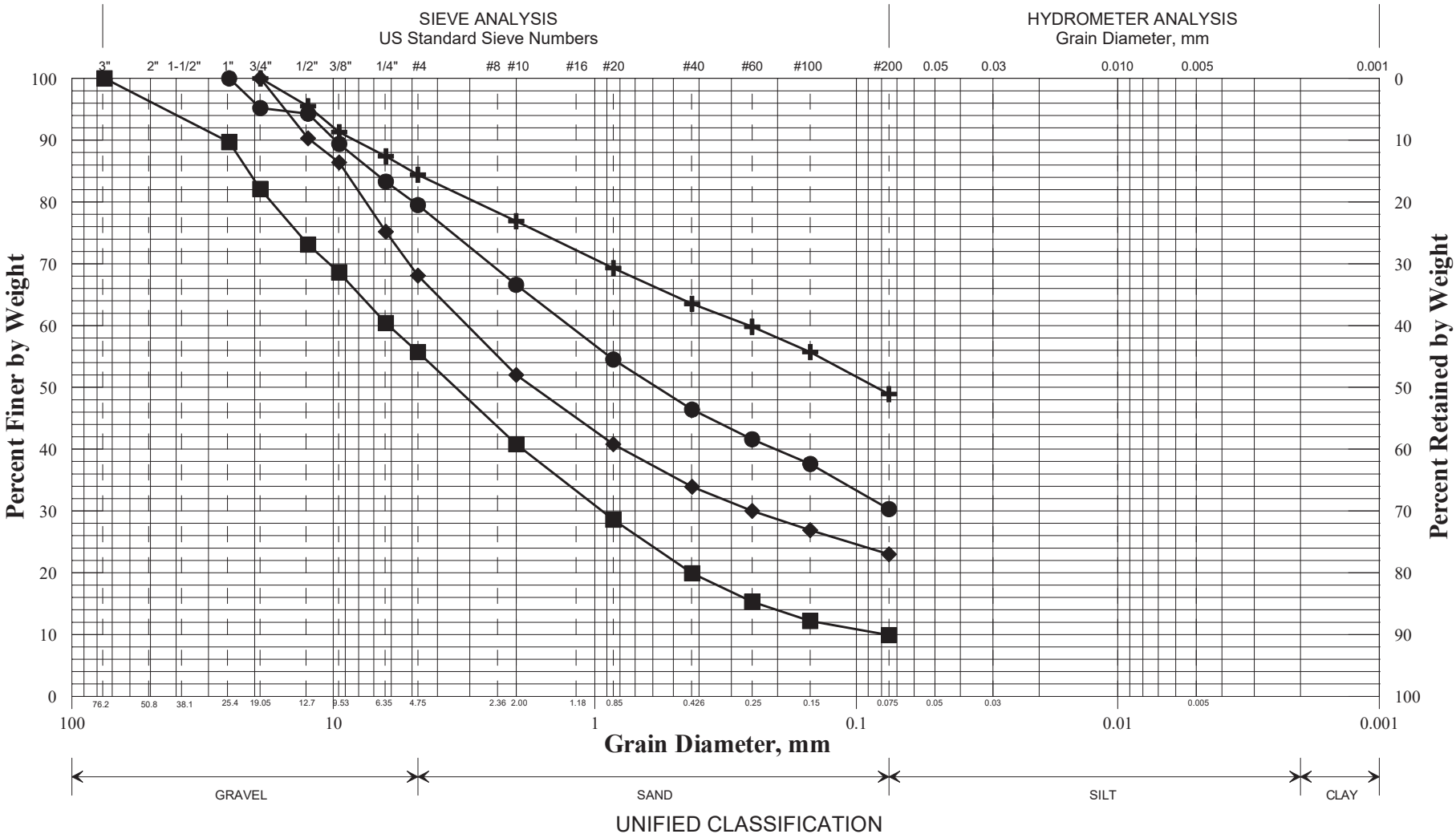


	Boring/Sample No.	Station	Offset, ft	Depth, ft	Description	W, %	LL	PL	PI
✚	HB-VB-104/S5	127+03.9	8.8 LT	0.5-2.5	Gravelly SAND, some silt.	3.8			
◆	HB-VB-105/B2	136+98.4	8.6 RT	0.5-2.9	Sandy GRAVEL, little silt.	4.5			
■	HB-VB-105/S7	136+98.4	8.6 RT	2.9-5.0	SILT, trace sand.	28.1			
●									
▲									
✖									

WIN
022658.00
Town
Van Buren, Grand Isle
Reported by/Date
WHITE, TERRY A 7/16/2015

State of Maine Department of Transportation

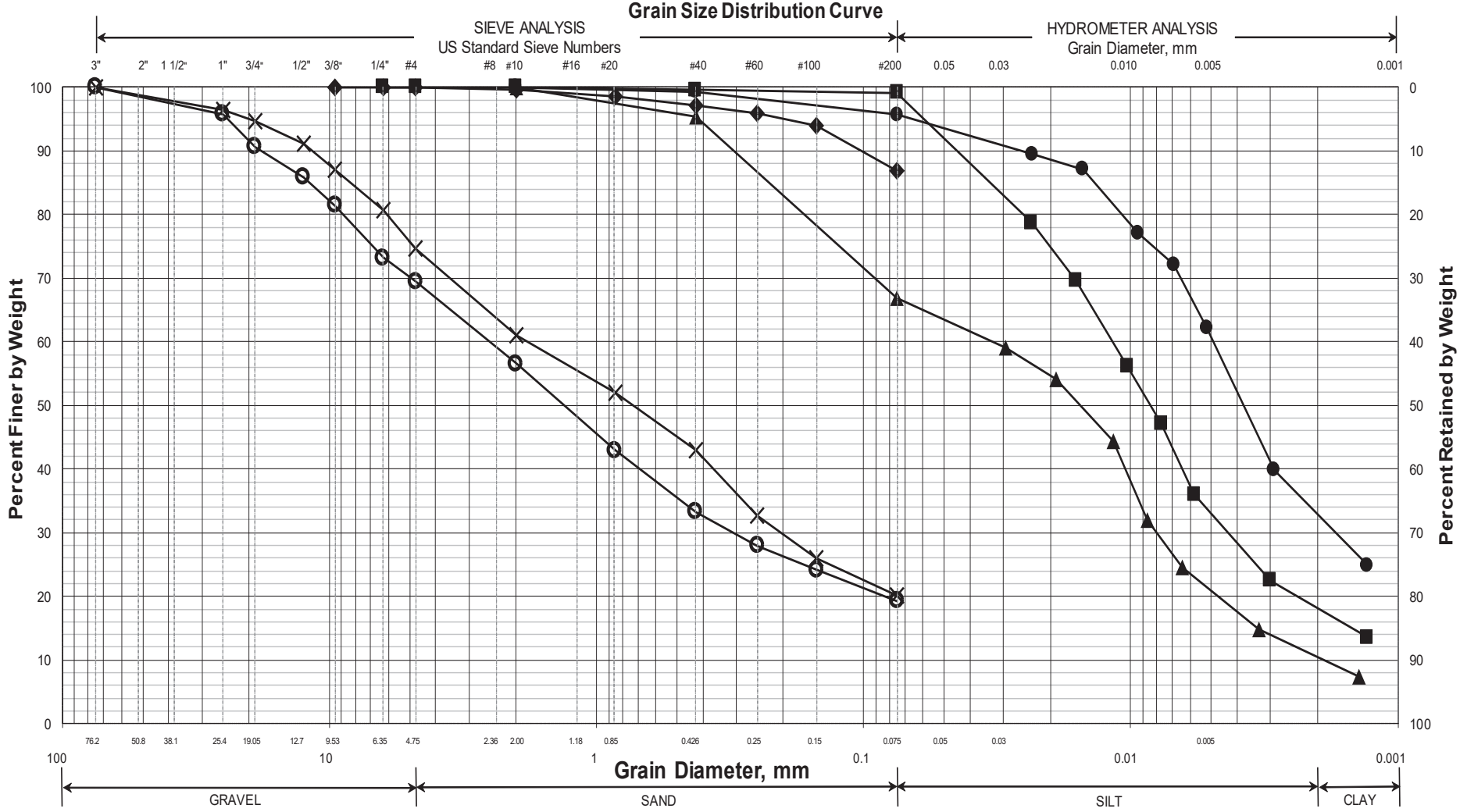
GRAIN SIZE DISTRIBUTION CURVE



	Boring/Sample No.	Station	Offset, ft	Depth, ft	Description	W, %	LL	PL	PI
✚	HB-VB-106/S8	136+98.4	14.1 RT	1.0-5.0	SILT, some sand, little gravel.	21.3			
◆	HB-VB-107/S9	155+40.8	10.5 RT	0.5-2.6	SAND, some gravel, some silt.	3.8			
■	HB-VB-110/B3	177+39.8	9.0 LT	0.67-2.6	Gravelly SAND, trace silt.	3.3			
●	HB-VB-110/S11	177+39.8	9.0 LT	2.6-5.0	SAND, some silt, some gravel.	10.7			
▲									
✖									

WIN
022658.00
Town
Van Buren, Grand Isle
Reported by/Date
WHITE, TERRY A 7/16/2015

Maine Department of Transportation
Grain Size Distribution Curve



UNIFIED CLASSIFICATION

	Boring/Sample No.	Station	Offset, ft	Depth, ft	Description	WC, %	LL	PL	PI
○	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			
×	HB-VB-201/5D	192+10.2	13.0 LT	20.0-22.0	SAND, some gravel, little silt.	12.4			

WIN
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