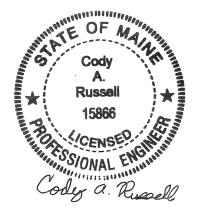
MAINE DEPARTMENT OF TRANSPORTATION HIGHWAY PROGRAM GEOTECHNICAL SECTION AUGUSTA, MAINE

GEOTECHNICAL DESIGN REPORT

For the Rehabilitation of

ROUTE 109 ACTON, MAINE

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York County WIN 20267.00 Soils Report 2024-16 Federal Project No. STP-2026(700)

July 24, 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 2.21-mile portion of Route 109 in Acton, as shown on Sheet 1 - Location Map. The project is needed to improve drainage and safety. The scope includes grading, base, pavement, drainage improvements, realignment in some areas, one (1) large culvert replacement, and a small retaining wall replacement. Route 109 is a Highway Corridor Priority 2 road.

2.0 GEOLOGIC SETTING

According to the Surficial Geology Great East Lake Quadrangle, Maine, Open File No. 97-46 (1997) published by the Maine Geological Survey (MGS), the surficial soils along the project length consist of:

- Glacial fluvial sand and gravel of the Horn Pond area.
- Glacial lacustrine deposits of the Delta of the Wilson Lake area consisting of sand and gravel.
- Glacial Till consisting of silt, sand, and gravel with cobbles and boulders.

According to the MGS map titled Bedrock Geologic Map of Maine (1985) the bedrock along the project consists of interbedded pelite and limestone and/or dolostone of the Rindgemere Formation lower member.

3.0 SUBSURFACE INVESTIGATION

Subsurface conditions at the site were explored by drilling a total of twenty (20) borings and seventy (70) probes.

Borings HB-ACT-101 through HB-ACT-110 and sixty-nine (69) unnamed probes were drilled on July 15 and 16, 2015. Borings HB-ACT-201 through HB-ACT-207, HB-ACT-209 through HB-ACT-211 and probe HB-ACT-208 were drilled on June 12, 2019 and June 17, 2019. All explorations were drilled by the MaineDOT drill crew. The borings were drilled to depths ranging from approximately 2.4 to 28.0 feet below ground surface (bgs) using solid stem auger, open hole, cased wash boring, and rock core drilling techniques. The probes were drilled to depths ranging from approximately 1.6 to 25.5 feet bgs using solid stem auger drilling techniques. Boring and probe locations are shown on Sheets 2 through 19 Boring Location Plans. The boring logs are presented in Appendix A.

Soil samples were obtained off the auger flights in nine (9) 100-series borings. Soil descriptions were recorded but no soil sampling was done in one (1) 100-series borings. Soil samples were obtained in the 200-series borings at standard 5-foot intervals using Standard Penetration Testing (SPT). No soil sampling was done in the probes and no soil descriptions were recorded.

The MaineDOT calibrated automatic hammer delivers approximately 55 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 0.928 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 twenty-seven (27) standard grain size analyses and natural water content, and one (1) loss on ignition test. 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 sand and gravel underlain by layers of native sand, silt, and sandy silt. Layers of peat and organic silt were encountered near the end of the project limits. The boring locations are shown on Sheets 2 through 19 - 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 5.0 to 12.0 inches. The fill soils consisted of:

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

The thickness of the fill encountered in the borings ranged from approximately 0.4 to 10.0 feet. The full thickness of the fill was not fully penetrated in all of the explorations. Eleven (11) SPT N_{60} -values obtained in the fill ranged from 5 to 34 blows per foot (bpf) indicating that the fill is loose to dense in consistency.

Water contents from samples obtained within the fill range from approximately 3.0% to 12.8%. Grain size analyses conducted on samples of the fill resulted in the soil being classified as an A-1-a. A-1-b, or A-2-4 under the AASHTO Soil Classification System and a GW-GM, SW-SM, or SM under the Unified Classification System.

5.2 Native Soils

The fill soils are underlain by layers of native soils consisting of sand, gravelly sand, silty sand, and sandy silt and three (3) areas where peat and organic silt were encountered.

5.2.1 Native Sand, Gravelly Sand, Silty Sand, and Sandy Silt

The native sand, gravelly sand, silty sand, and sandy silt encountered in the borings consisted of:

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

The thickness of the native sand and gravelly sand ranged from approximately 2.6 to 17.0 feet. The full depth of the native sand and gravelly sand was not encountered or fully penetrated in all of the explorations. Sixteen (16) SPT N₆₀-values obtained in the native sand and gravelly sand ranged from 5 to 79 bpf indicating that the native sand and gravelly sand are loose to very dense in consistency. The thickness of the silty sand ranged from approximately 2.5 to 6.0 feet where encountered. One (1) SPT N₆₀ value obtained in the silty sand layer was >50 bpf but was likely influenced by the presence of cobbles. The thickness of the sandy silt was approximately 3.0 feet where encountered. One (1) SPT N₆₀-value obtained in the sandy silt was 6 bpf, indicating that the sandy silt is medium stiff in consistency.

Water contents from samples obtained within the native sand and gravelly sand range from approximately 7.2% to 37.8%. Grain size analyses conducted on samples of the native sand and gravelly 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 or SW under the Unified Classification System. Water contents from samples obtained within the silty sand range from approximately 11.1% to 20.1%. Grain size analysis conducted on two (2) samples of silty sand resulted in the soil being classified as an A-4 under the AASHTO Soil Classification System and a SM under the Unified Classification System One (1) water content from a sample obtained within the sandy silt was approximately 41.4% Grain size analysis conducted on one (1) sample of sandy silt resulted in the soil being classified as an A-4 under the AASHTO Soil Classification System and a CL under the Unified Classification System

5.3 Organic Silt and Peat

Layers of organic silt and peat were encountered in three (3) of the borings. The layers identified in the field consisted of:

- Black or dark brown organic silt, trace to some fine sand.
- Dark brown peat.

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The following table summarizes the locations and elevations were the organic silt and peat were encountered:

| Boring Number / Approximate Station Location | Approximate thickness of Organic Silt and/or Peat Layer (feet) | Approximate Elevation of Top of Layer (feet) |
|--|--|---|
| HB-ACT-207 / 156+10 | 1.0 | 577.0 |
| HB-ACT-209 / 169+50 | 1.0 | 575.3 |
| HB-ACT-210 / 171+00 | 1.3 | 571.3 |

No SPT N₆₀-values were obtained in the organic silt or peat layers.

A loss on ignition test was conducted on one (1) sample of peat resulting in a 4.7% loss on ignition.

Water contents from two (2) samples obtained within the organic silt and peat were approximately 45.3% and 172.4%. Grain size analyses conducted on one (1) sample of organic silt resulted in the soil being described as sand, some gravel, little silt and classified as an A-1-b under the AASHTO Soil Classification System and an SM under the Unified Classification System.

5.4 Bedrock and Refusal Surfaces

Refusal surfaces were encountered at varying depths along the project. Refusal of the drilling tools varied from a depth of approximately 1.6 feet to 9.9 feet bgs. The table below summarizes the refusal surfaces encountered.

| Approximate Station/Offset | Approximate Elevation of Top of Refusal Surface (feet) |
|-------------------------------|--|
| 98+75/12.0 ft RT | 712.8 (bedrock cored) |
| 99+40/9.5 ft LT | 714.4 (bedrock cored |
| 105+50/9.0 ft RT | 738.4 |
| 109+00/8.0 ft RT | 730.6 |
| 109+00/7.0 ft LT | 735.5 |
| 110+00/9.0 ft RT | 734.4 |
| 110+00/8.0 ft LT | 734.6 |
| 111+00/9.0 ft RT | 733.2 |
| 112+00/7.0 ft RT | 733.0 |
| 112+00/12.0 ft LT | 732.5 |
| 113+00/7.0 ft RT | 725.7 |
| 113+00/12.5 ft LT | 725.6 |
| 113+75/15.0 ft LT | 716.1 (bedrock cored) |
| 118+00/10.5 ft RT | 703.7 |
| 118+00/9.0 ft RT | 702.5 |
| 119+00/10.0 ft RT | 702.2 |
| 119+00/9.0 ft LT | 701.0 |
| 120+00/7.0 ft RT | 702.1 |
| 120+00/8.0 ft LT | 702.4 |
| 121+00/12.0 ft RT | 691.4 |
| 121+00/9.0 ft LT | 687.8 |
| 122+00/8.5 ft RT | 683.4 |
| 145+00/8.0 ft RT | 621.4 |
| 146+00/11.0 ft LT | 619.5 |
| 148+00/9.0 ft LT | 616.8 |
| 152+00/9.4 ft RT | 603.4 |
| 184+15/4.9 ft RT | 579.5 |
| 184+15/15.0 ft LT | 579.9 |
| 185+15/5.0 ft RT | 585.4 |
| 185+15/15.2 ft LT | 584.2 |
| 186+15/9.0 ft RT | 586.9 |
| 186+15/10.5 ft LT | 585.7 |
| 187+15/10.1 ft RT | 588.9 |
| 187+15/10.9 ft LT | 585.1 |
| 188+15/10.1 ft RT | 583.3 |
| 189+15/8.9 ft LT | 575.7 |
| 194+15/10.5 ft RT | 559.4 |

Bedrock was cored in three (3) of the borings where refusal was encountered. The exact nature of the refusal surface was not determined in the remaining explorations.

The bedrock consists of interbedded pelite and limestone and/or dolostone of the Sangerville Formation. The Rock Quality Designation (RQD) of the bedrock was determined to range from 58% to 67%, correlating to a Rock Quality of Fair. The approximate elevations of the top of bedrock or the refusal surface encountered at the boring locations are presented on the Boring Logs in Appendix A.

5.5 Groundwater

Groundwater level was observed in eight (8) borings at depths ranging from approximately 1.9 to 12.0 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. Areas of geotechnical concern include the Wilson Lake Bridge box culvert, the proposed oversteepened slope from approximate stations 166+50 to 168+50, and a proposed retaining wall in the vicinity of Station 190+50.

6.1 Wilson Lake Bridge (Bridge #6700) at approximate Station 156+30

6.1.1 General Information

The existing structure at approximate Station 156+25 is a 28-inch diameter, approximately 61-foot long corrugated metal pipe (CMP) culvert. The proposed replacement structure is a 12-foot span, 8-foot rise, 94-foot long precast concrete box culvert on an approximately 17-degree skew to the roadway centerline with an inlet elevation of approximately 573.70 feet and an outlet elevation of approximately 572.66 feet.

One (1) boring (HB-ACT-207) and (1) probe (HB-ACT-208) were drilled in the roadway on each side of the proposed structure. The boring locations and the interpretive subsurface profile are shown on Sheet 20 - Boring Location Plan & Interpretive Subsurface Profile with Boring Logs. The boring logs are also provided in Appendix A – Boring Logs.

Boring HB-ACT-207 was drilled to a depth of approximately 28.0 feet bgs without encountering a refusal surface. The subsurface conditions encountered in the boring consisted of fill consisting of sand underlain by a 1-foot layer of peat, underlain by native sand. One SPT N₆₀-value obtained in the peat was 12 bpf indicating that the peat is mixed with sand and is medium dense in consistency. Two (2) SPT N₆₀-values obtained in the fill were 5 bpf and 22 bpf indicating that the fill is loose to medium dense in consistency. Two (2) SPT N₆₀-values obtained in the native sand were 62 bpf and 73 bpf indicating that the native sand is very dense in consistency. Probe HB-

ACT-208 was drilled to a depth of approximately 25.5 feet bgs without encountering a refusal surface.

6.1.2 Design and Construction – The proposed precast concrete box culvert shall be constructed in accordance with MaineDOT Standard Specification Section 534 and the Contract Plans. To facilitate fish passage, Habitat Connectivity Design elements will be used inside the proposed precast concrete box culvert as shown on the Special Details sheet in the Contract Plans.

The proposed precast concrete box 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 precast concrete box culvert and the required 1-foot layer of bedding material. Any loose or soft soils (peat or organic materials) 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.

6.1.3 Bearing Resistance

The factored bearing resistances for the precast concrete box culvert bearing on compacted granular bedding material placed on native soils at the service and strength limit states are presented in the table below. Supporting calculations in accordance with AASHTO LRFD Bridge Design Specifications 9th Edition 2020 (LRFD) are provided in Appendix C – Calculations.

| Limit State | Resistance Factor | AASHTO LRFD | Factored Bearing |
|-------------|-------------------|--------------------|------------------|
| | Фb | Reference | Resistance (ksf) |
| Service | 1.0 | Article 10.5.5.1 | 6.0 |
| Strength | 0.45 | Table 10.5.5.2.2-1 | 9.0 |

6.1.4 Modulus of Subgrade Reaction

A modulus of subgrade reaction (ks) equal to 140 pounds per cubic inch shall be used for the structural design of the box culvert's base slab. Calculations are included in Appendix C – Calculations.

6.1.5 Scour and Riprap

Both the inlet and outlet of the proposed precast concrete box 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.

6.1.3 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.

6.2 Oversteepened Slopes from Stations 166+50 to 168+50

A 1.5H:1V cut slope is proposed from Stations 166+50 to 168+50. In accordance with AASHTO LRFD Bridge Design Specifications 9th Edition 2020 (LRFD) Article 11.6.3.7 evaluation of earth slopes that do not support or contain a structural element should achieve a factor of safety of 1.3 (equivalent to a resistance factor of 0.75). Analysis of the proposed 1.5H:1V slopes using Geostudio Slope/W software determined that riprap armor was necessary for the slopes to achieve a factor of safety of 1.3 or greater. The critical slope was analyzed assuming 3-feet of plain riprap will armor the full height of the slope. The analysis of the proposed slope resulted in an acceptable factor of safety of 1.315. Appendix D – Slope Stability Analyses presents the stability results from this analysis. The stability analyses based on subsurface conditions encountered in borings drilled in the vicinity of the slopes.

The slope shall be armored with 3 feet of riprap conforming to MaineDOT Standard Specification Section 703.26 Plain Riprap and Hand Laid Riprap 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.

6.3 Wet Cast Small Landscape Block Wall in the Vicinity of Station 190+50

The proposed replacement retaining wall shall be constructed as shown on the Contract Plans and shall meet the requirements of Standard Specification 673 Wet Cast Small Landscape Block Wall.

The proposed wall shall be supplier designed in accordance with AASHTO LRFD Bridge Design Specifications (LRFD) 9th Edition 2020 and Design and Construction of Mechanically Stabilized Earth Walls and Reinforced Slopes (FHWA-NHI-10-024 and FHWA-NHI-10-025, March 2012).

The proposed retaining wall shall be designed to withstand lateral earth pressures. Earth loads may be calculated using an active earth pressure coefficient, K_a, calculated using Rankine or Coulomb Theory. Refer to LRFD Article 3.11.5.3 and Equations 3.11.5.3-1 and -2 for calculating Coulomb active earth pressure coefficient. Lateral earth pressure distributions for design of MSE walls are provided in LRFD Figures 3.11.5.8.1-1, -2 and -3. Passive earth pressure in front of the wall shall be neglected in the design.

The factored bearing resistances for the retaining wall bearing on a concrete leveling pad on native soils at the service and strength limit states are presented in the table below. No borings were drilled in the vicinity of the proposed retaining walls. Bearing resistance calculation assume medium dense sand as the foundation material. In no instance shall the bearing stress exceed the nominal resistance of the structural concrete which may be taken as 0.3f'c.

| Limit State | Resistance Factor | AASHTO LRFD | Factored Bearing |
|-------------|--------------------------|--------------------|------------------|
| | Фb | Reference | Resistance (ksf) |
| Service | 1.0 | Article 10.5.5.1 | 5.0 |
| Strength | 0.45 | Table 10.5.5.2.2-1 | 3.5 |

The following additional considerations should be addressed in the wall design:

- Traffic will be required in the design of the wall.
- Piped drainage shall be included in the design of the wall.
- A minimum embedment of 2.0 feet below finished grade is required for the wall design.
- The retaining wall design shall include a drainage system (swale) at the top of the wall to carry surface water runoff away from the face of the wall.

6.4 Settlement

No settlement issues are anticipated for either the roadway or the proposed precast concrete culvert. The installation of the proposed precast concrete box 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.

6.5 Bedrock Removal

Refusal of the drilling tools was encountered in multiple borings and probes along the project (see Section 5.4). Bedrock removal is anticipated for drainage and subgrade installation near these locations. Additional shallow bedrock should be expected during construction at other locations.

Blasting, if required, shall be conducted in accordance with MaineDOT Standard Specifications Sections 105.2.7 and 203. The Contractor is required to conduct pre- and post-blast surveys, as

well as blast vibrations monitoring at nearby structures in accordance with industry standards at the time of the blast.

6.6 Additional Construction Considerations

Construction of the precast concrete box 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.

If organic silt or peat is encountered in the project excavations, the materials should be over excavated to be completely removed and replaced with Granular Borrow, Material for Underwater Backfill or Crushed Stone, ³/₄-Inch.

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.

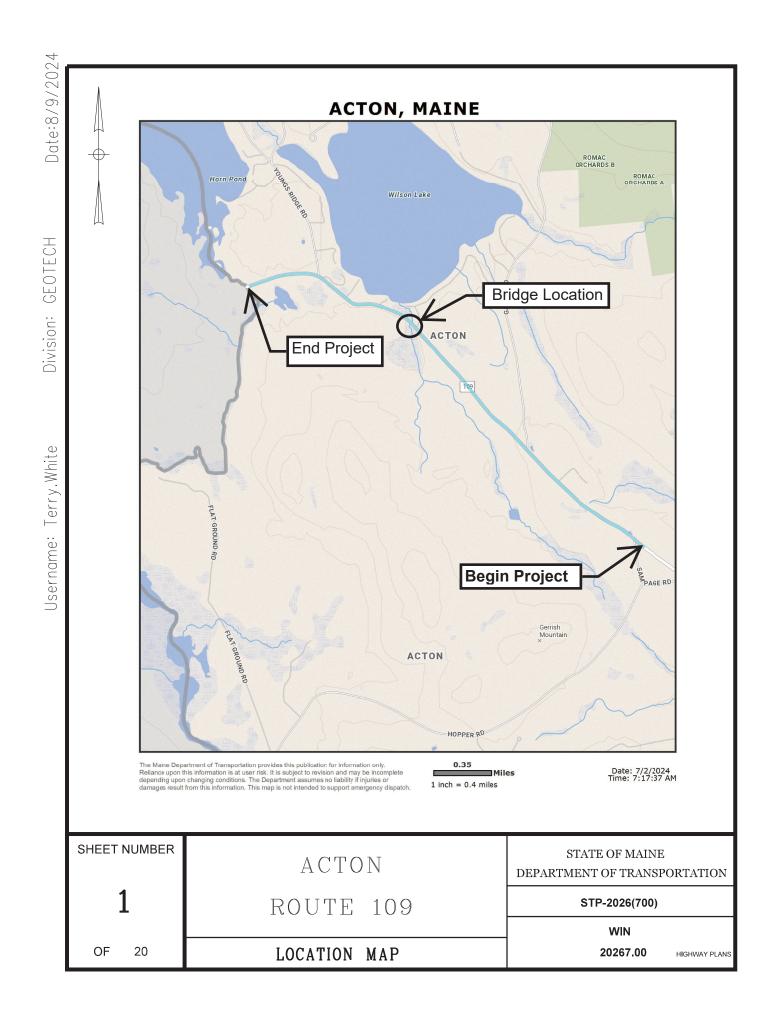
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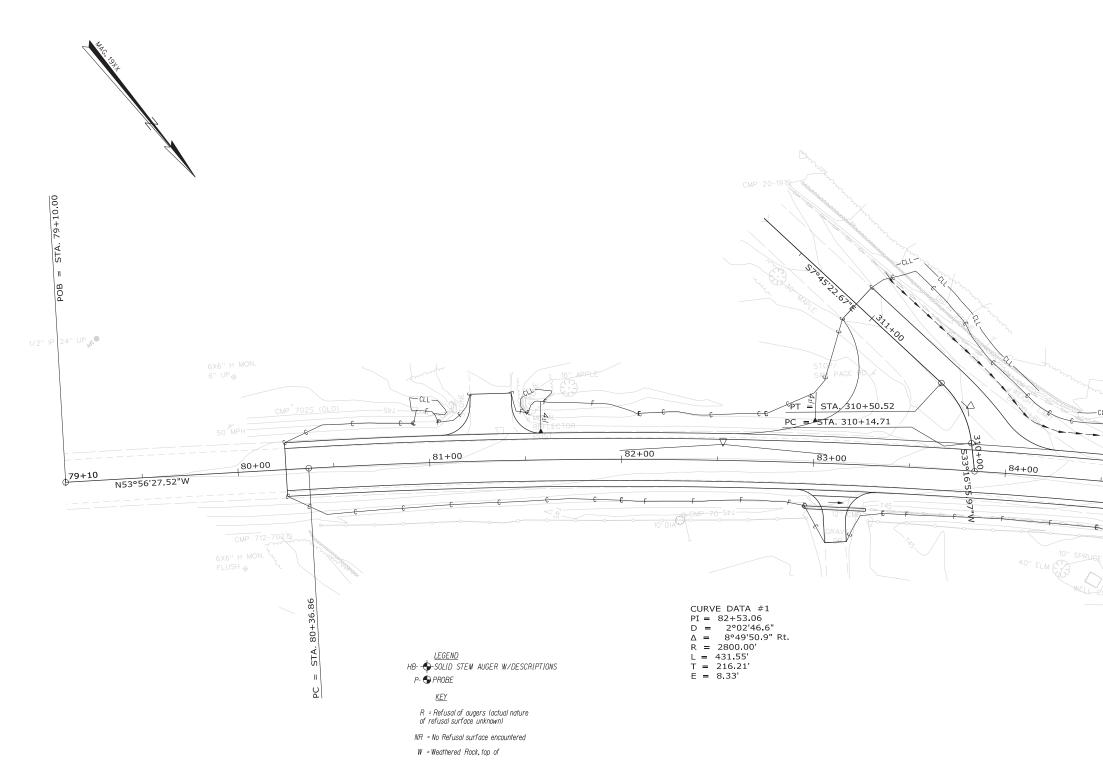
This report has been prepared for the use of the MaineDOT Highway Program for specific application to the proposed rehabilitation of Route 109 in Acton, Maine in accordance with generally accepted geotechnical and foundation engineering practices. No other intended use or warranty is expressed or implied.

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.

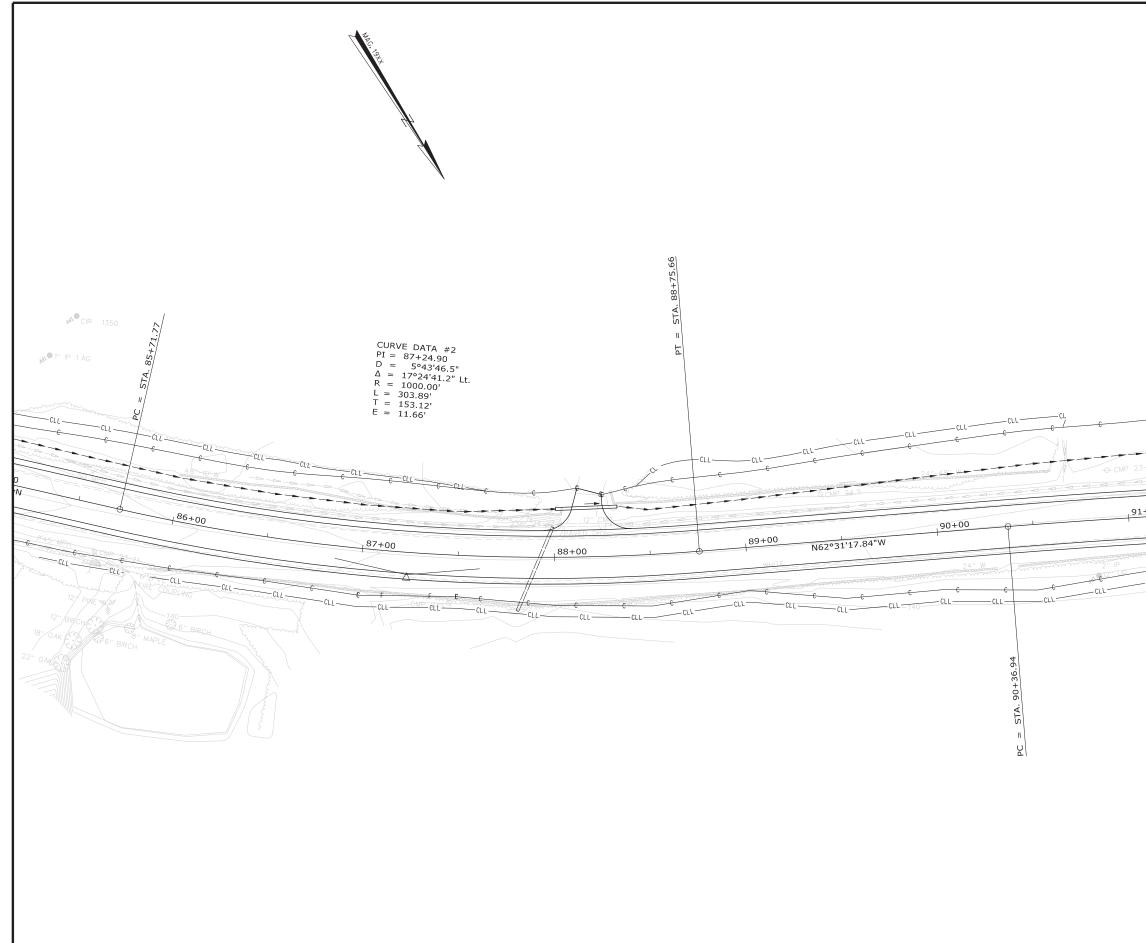
It is recommended that a geotechnical engineer be provided the opportunity for a review of the design and specifications in order that the earthwork and foundation recommendations and construction considerations presented in this report are properly interpreted and implemented in the design and specifications.

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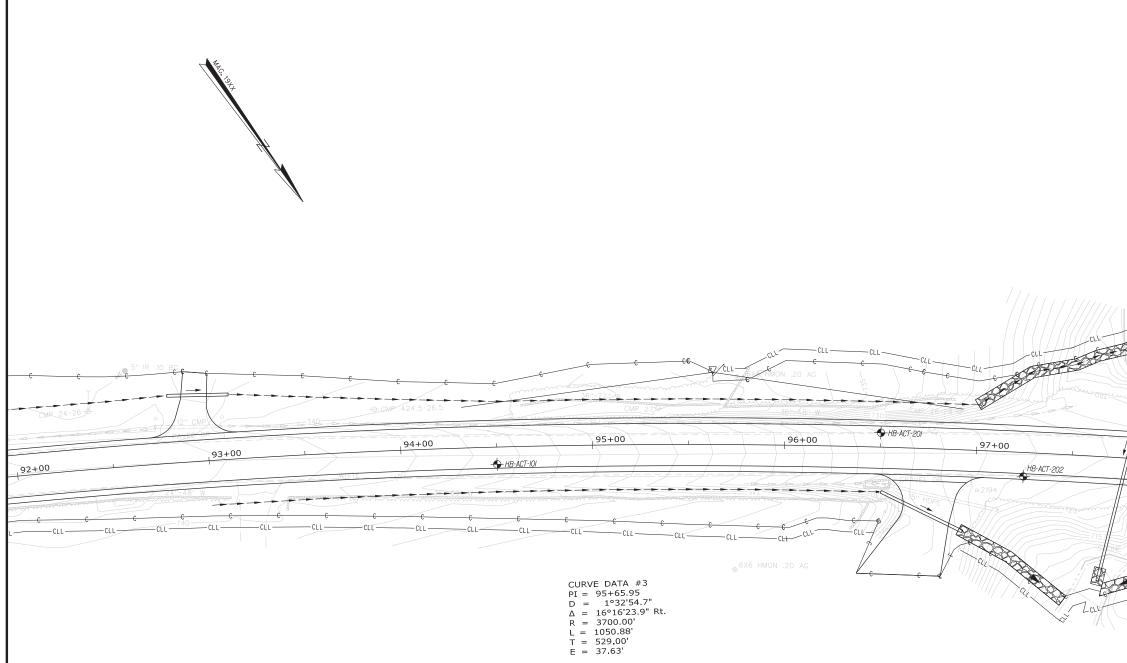
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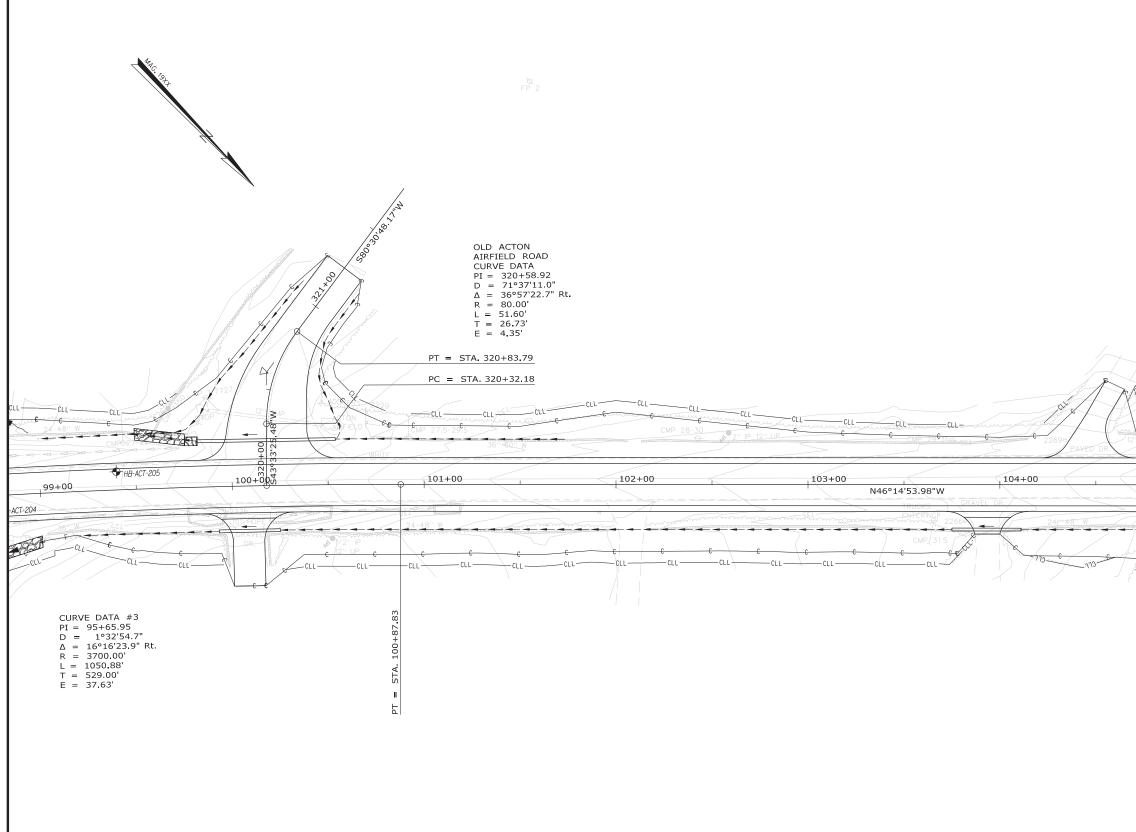
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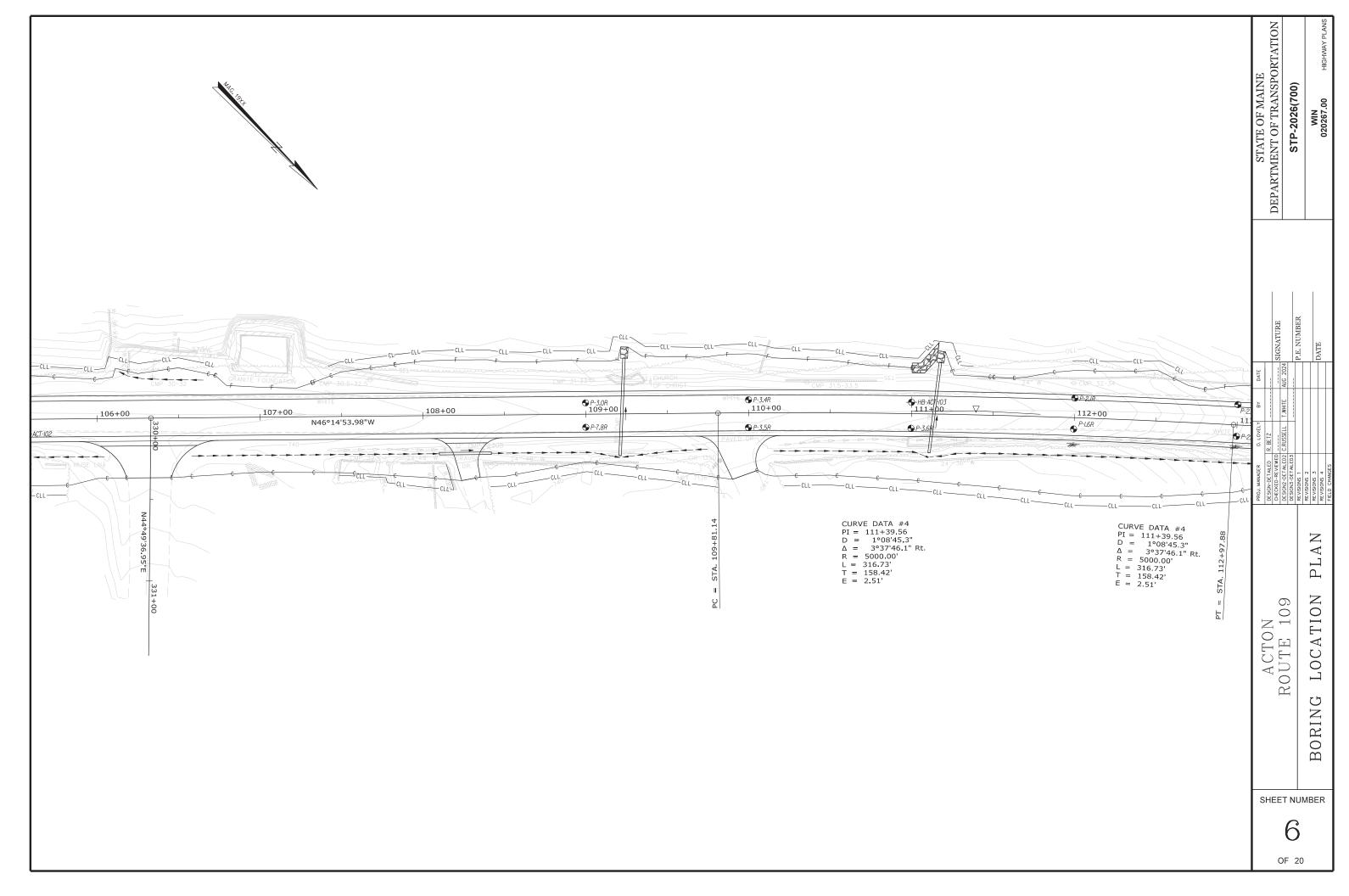
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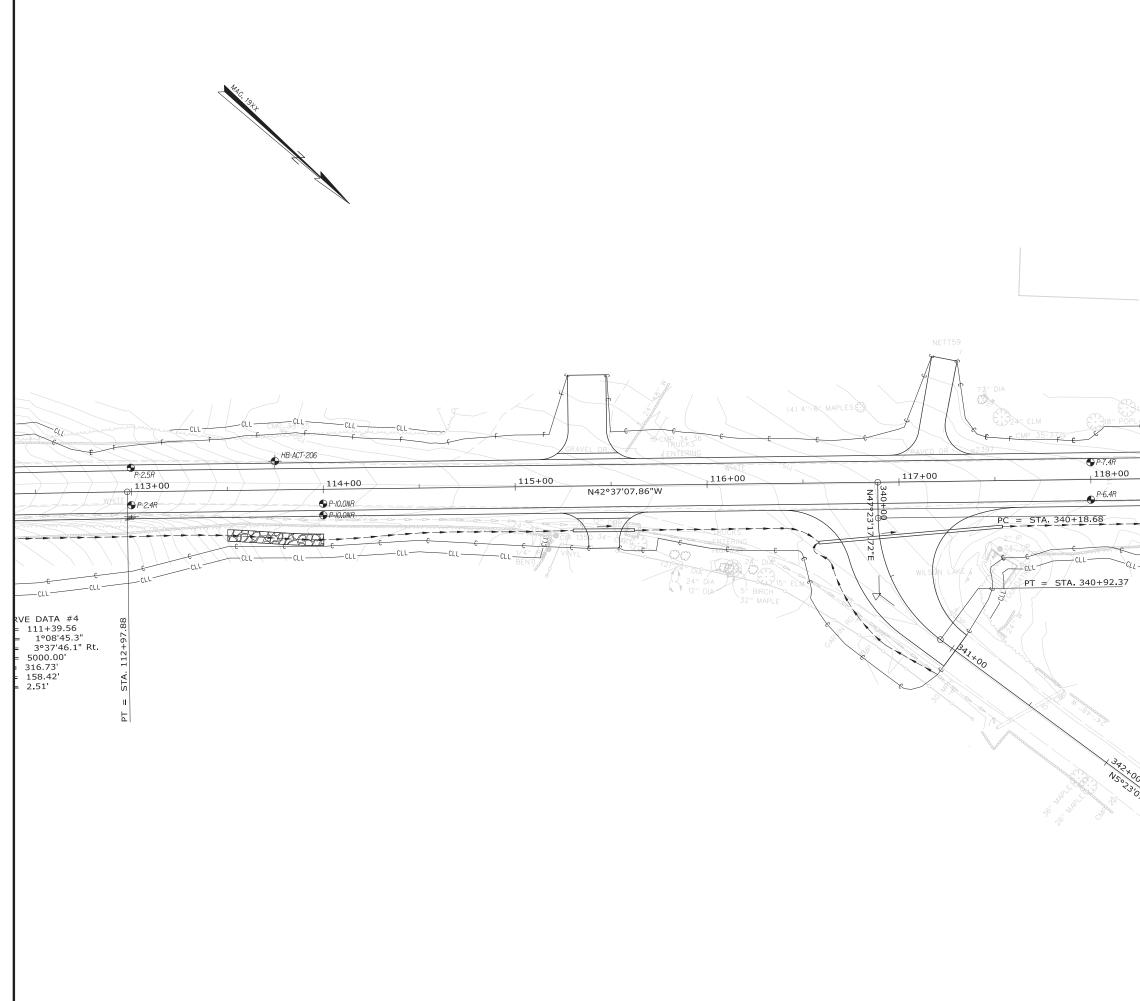


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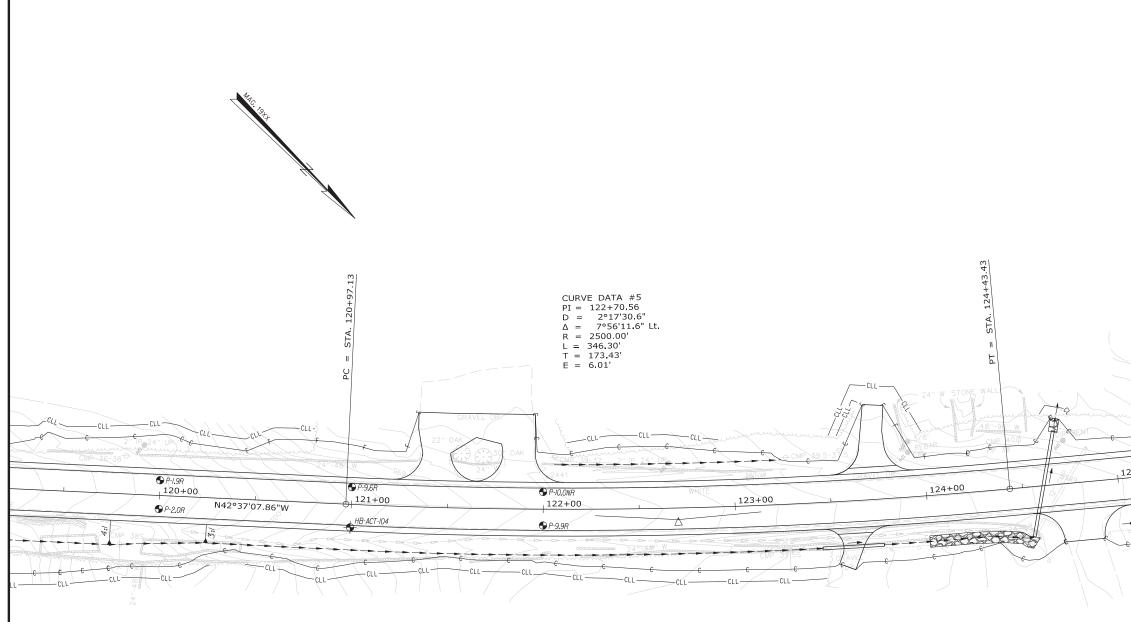
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| GARVIN ROAD CURVE DATA PI = $340+58.37$ D = $71^{0}37'11.0''$ $\Delta = 52^{0}46'25.7''$ Lt. R = $80.00'$ L = $73.69'$ T = $39.69'$ E = $9.30'$ | | | | BORING LOCATION PLAN REVISIONS OF REVISIONS |
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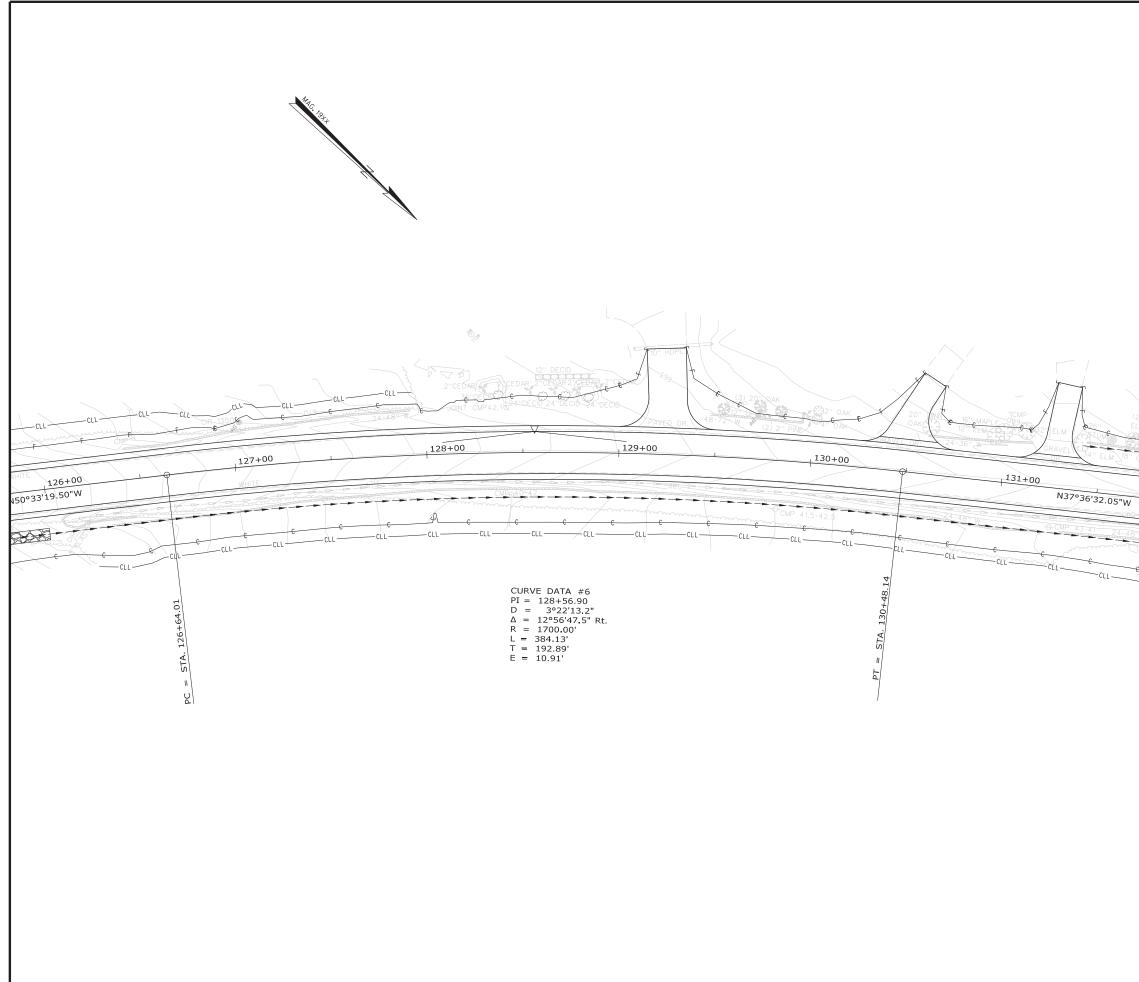


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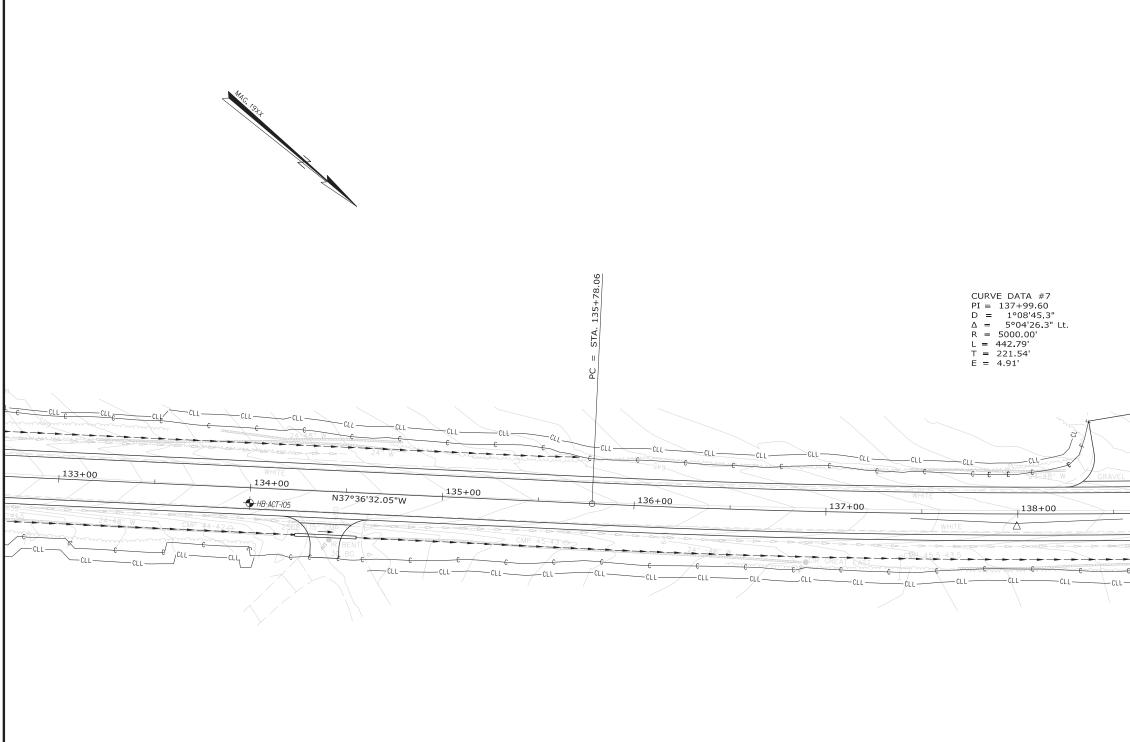
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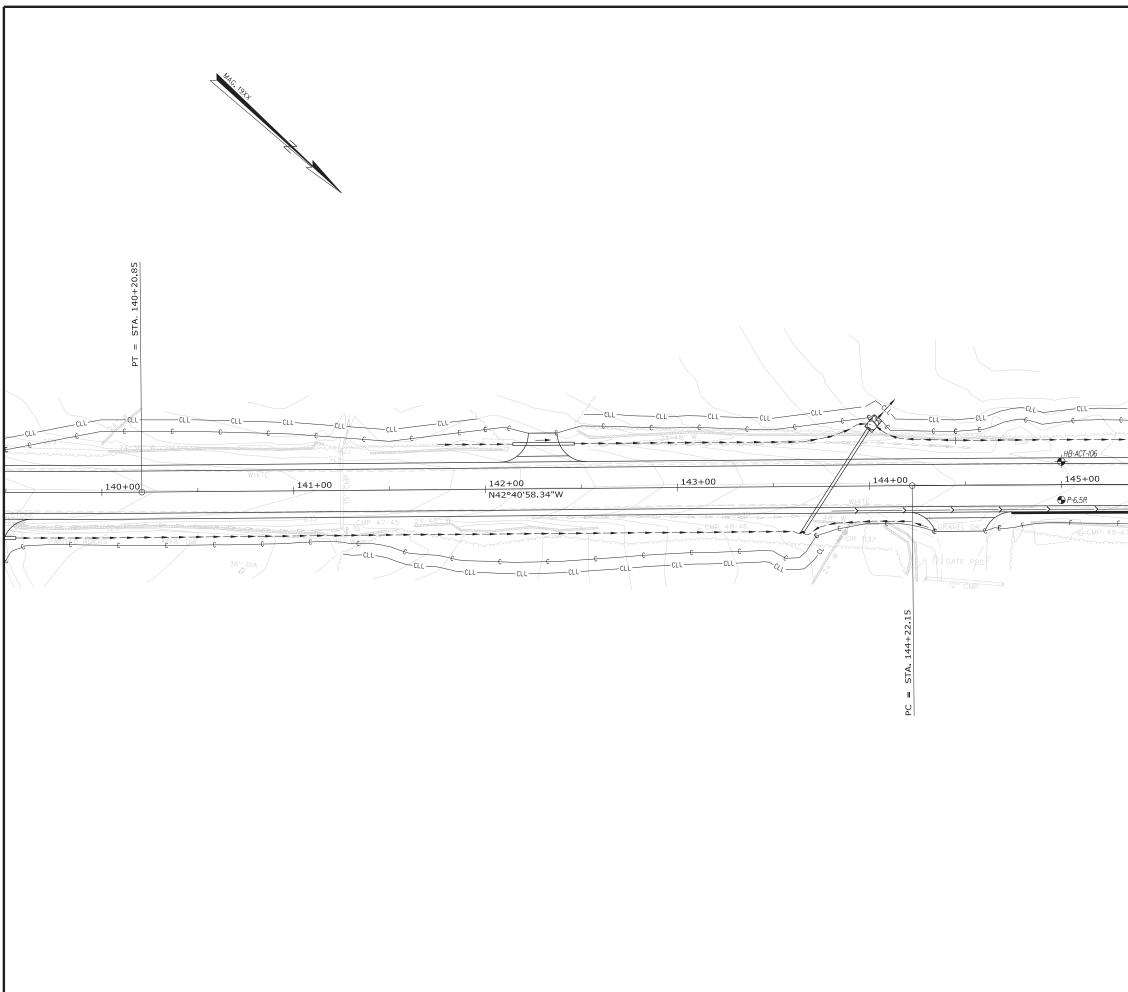
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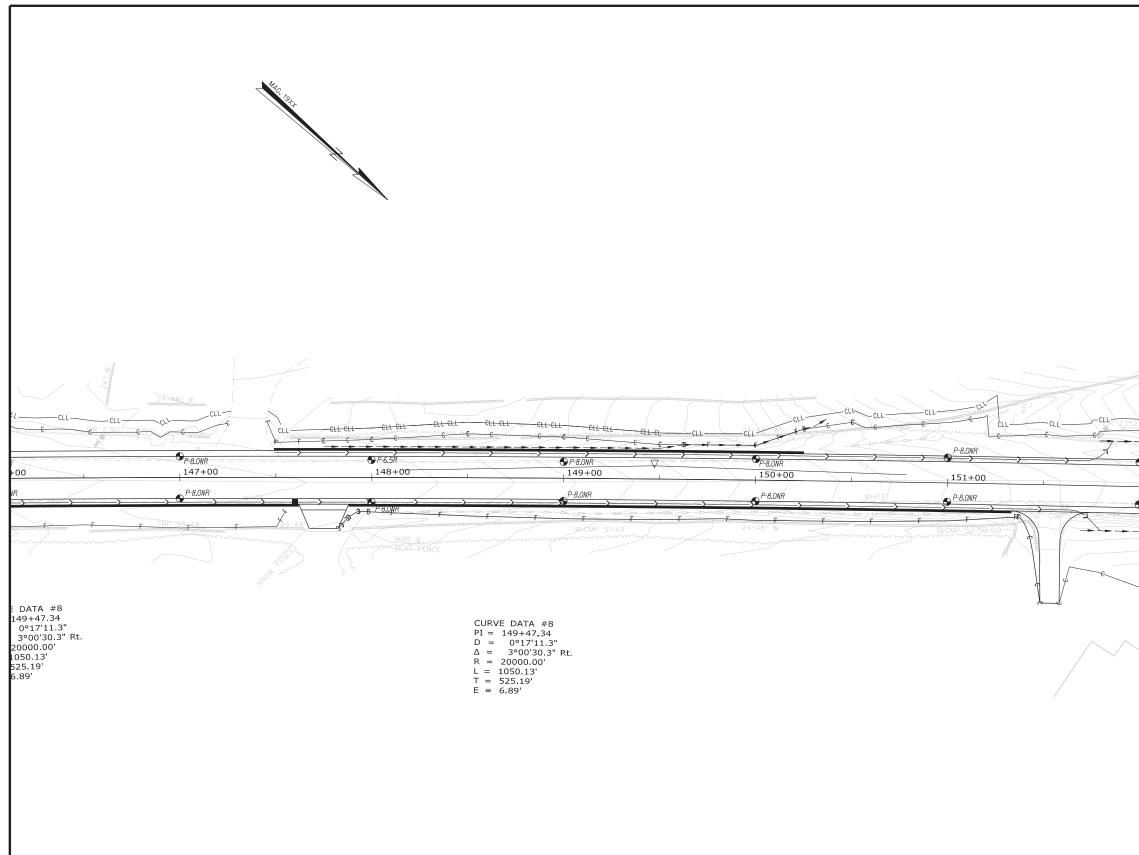
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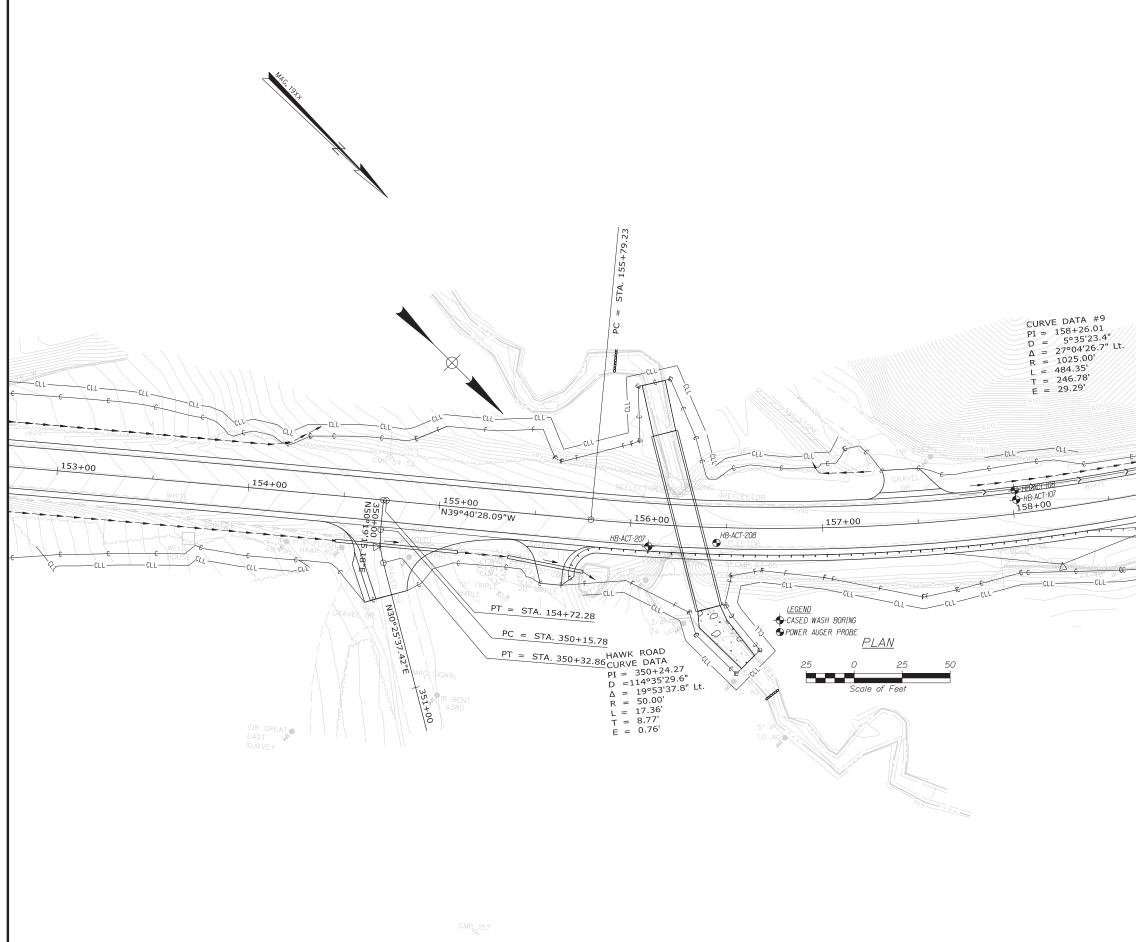
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| CURVE DATA #8 P1 = 19947.34 D = 017/11.37 R. = 20000.000 R = 2050.130 T = 1050.137 T = 525.19 E = 6.89' | | STATE OF MAINE DEPARTMENT OF TRANSPORTATION | STP-2026(700) | VIN 020267.00 HIGHWAY PLANS |
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| CURVE DATA #8 PI = 149+47.34 D = 0°17'11.3" A = 3°00'30.3" Rt. R = 20000.00' L = 1050.13' T = 525.19' E = 6.89' BORTO PICA ROUTE 100 ROUTE 100 | -CLL - CLL | D.LOVELY BY DATE R.BETZ | C.RUSSELL 1.WHIE AUG 2024 | 52 |
| | $PI = 149+47.34$ $D = 0°17'11.3"$ $\Delta = 3°00'30.3" \text{ Rt.}$ $R = 20000.00'$ $L = 1050.13'$ $T = 525.19'$ | ACTON Dollare 100 | KUUIE 103 | BORING LOCATION PLAN |
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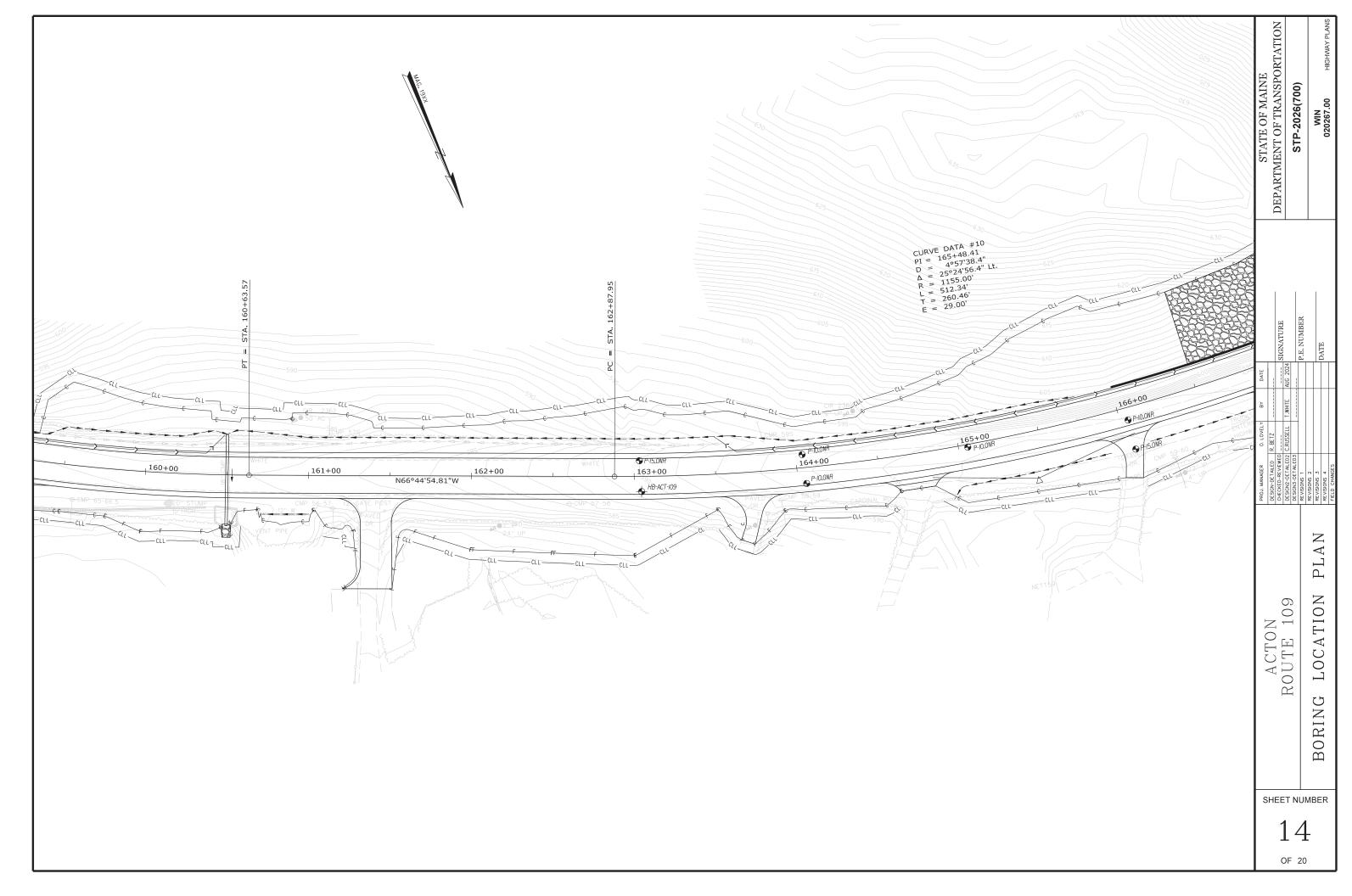
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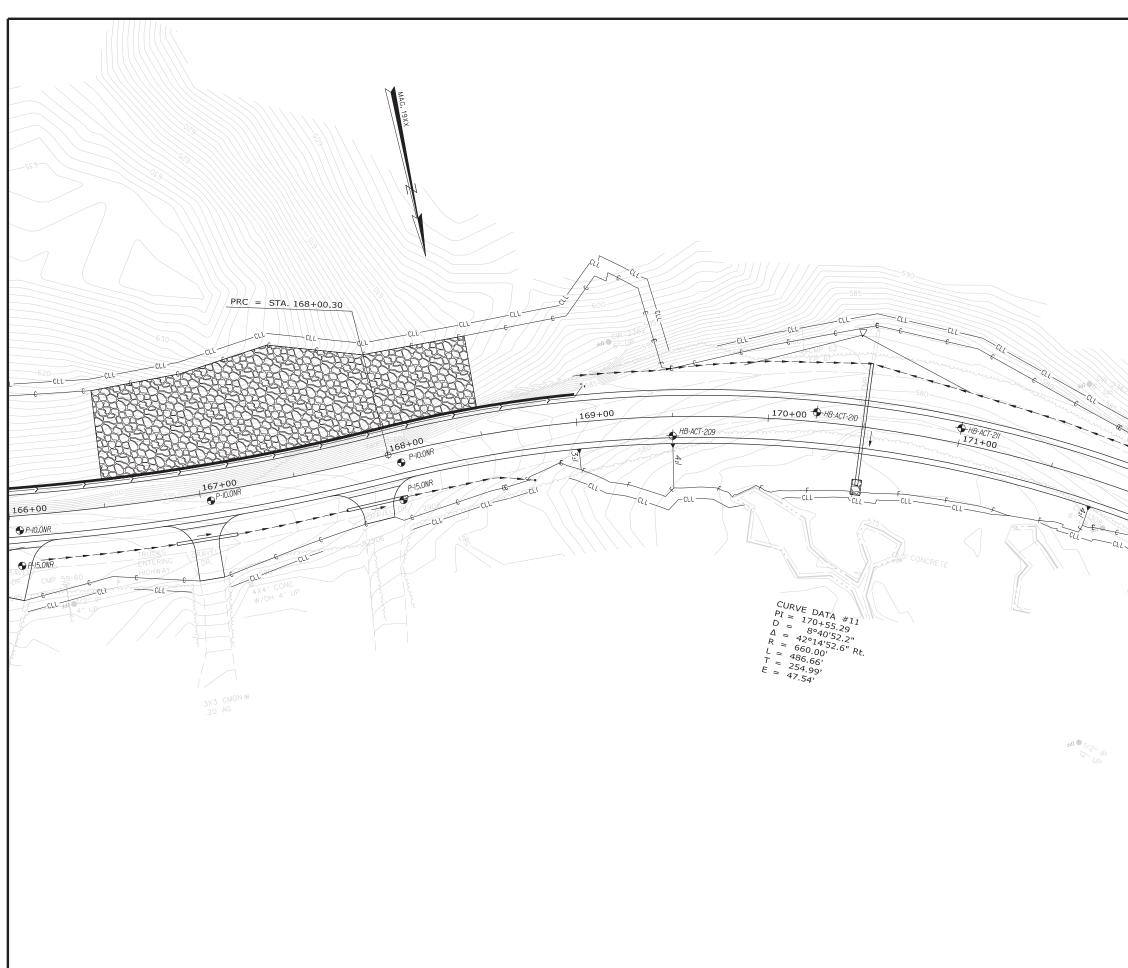
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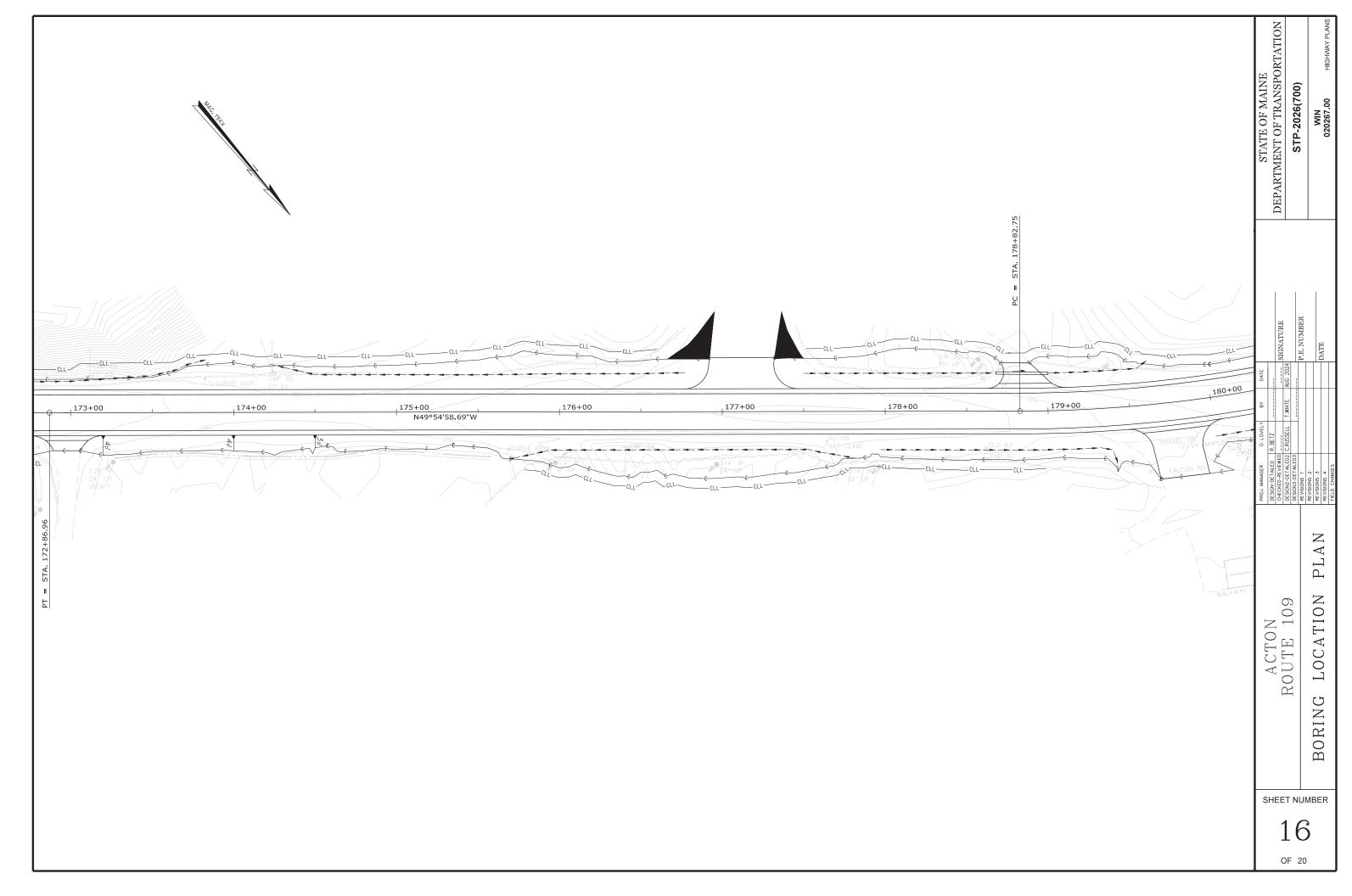
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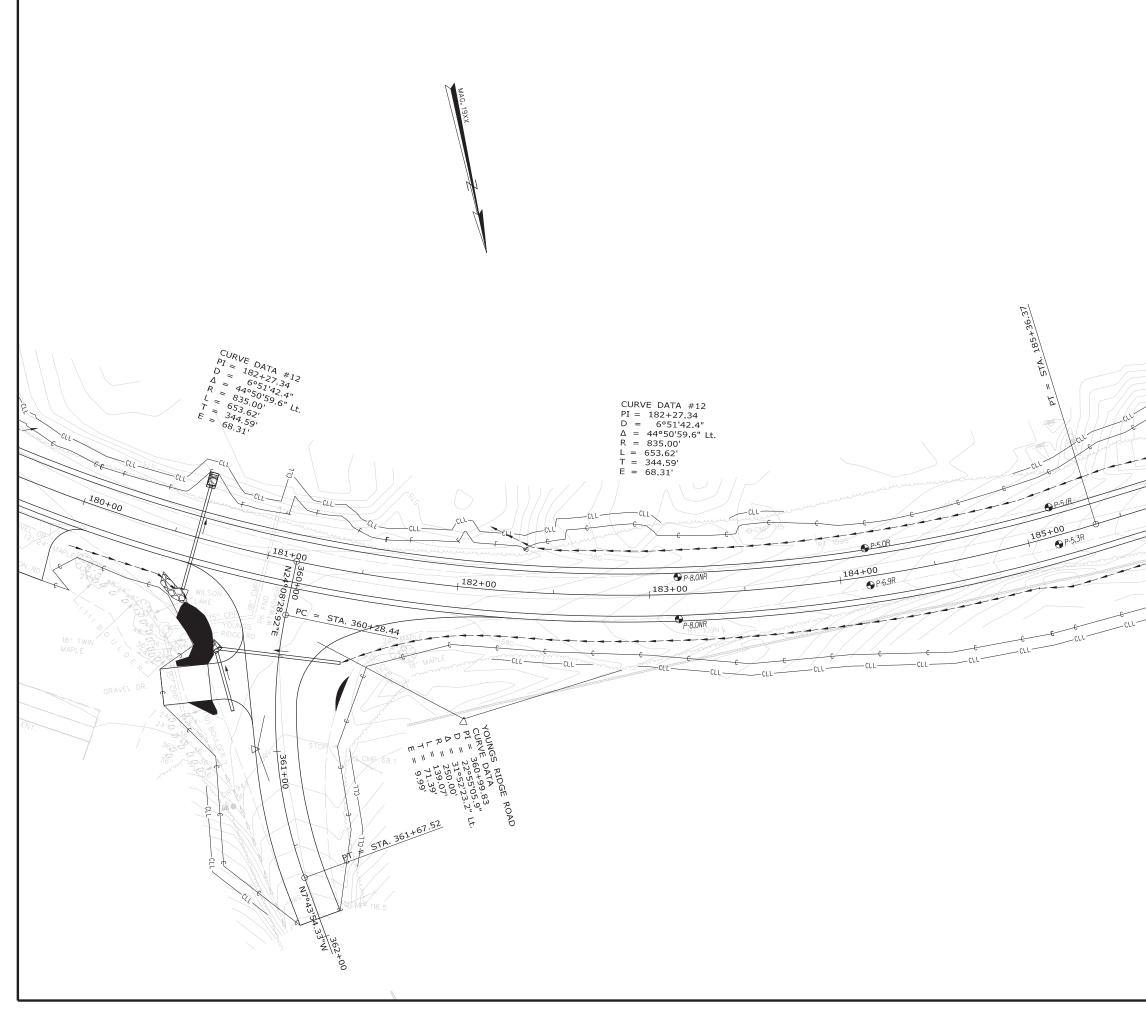
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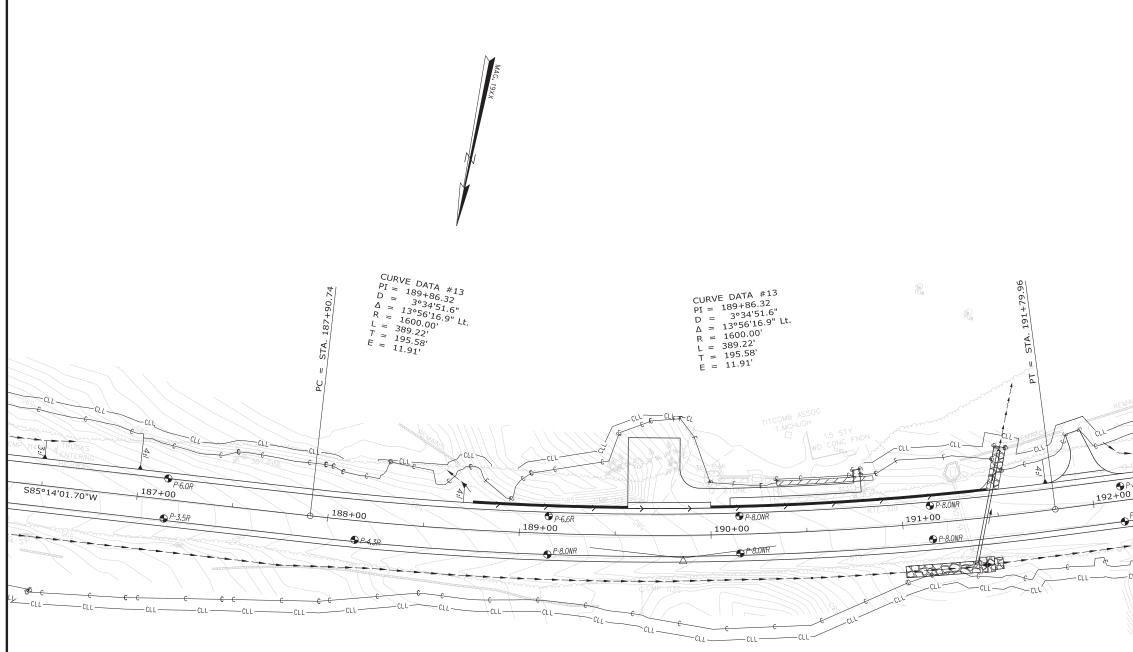
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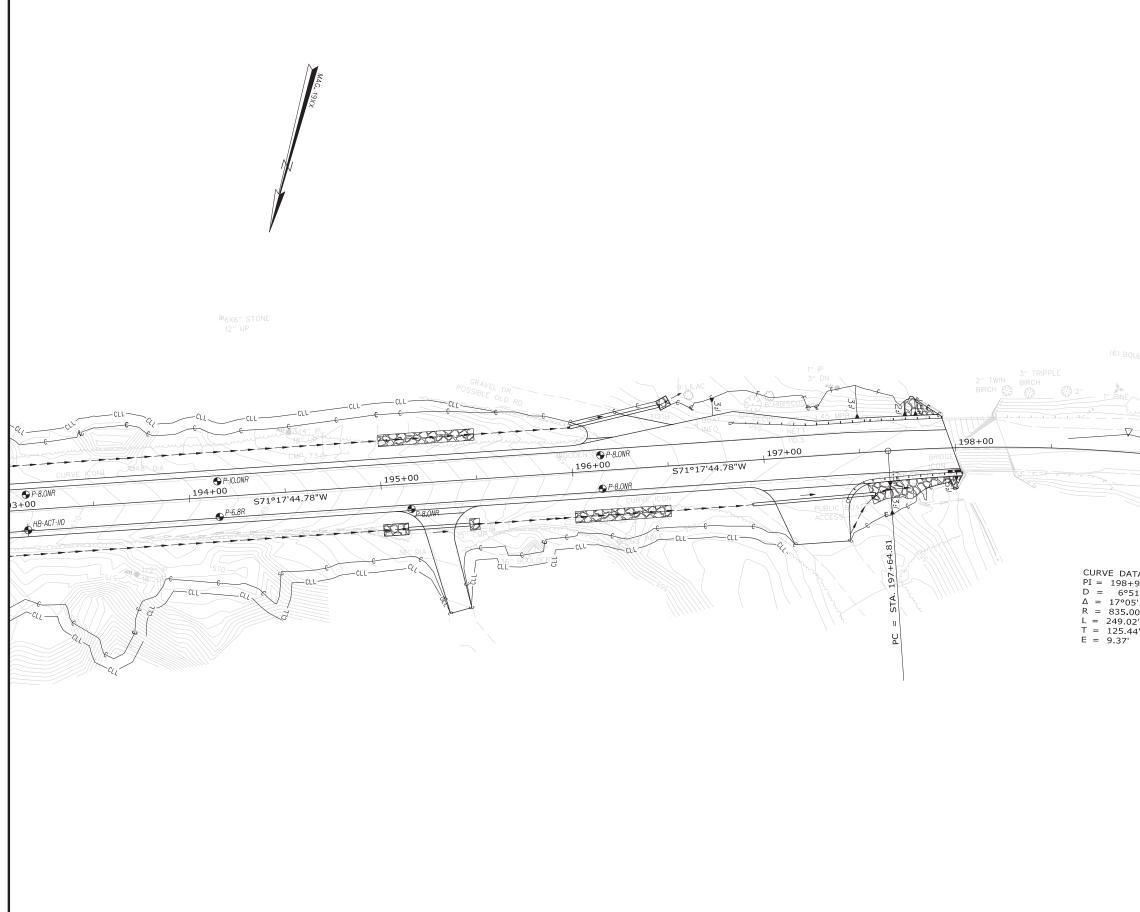


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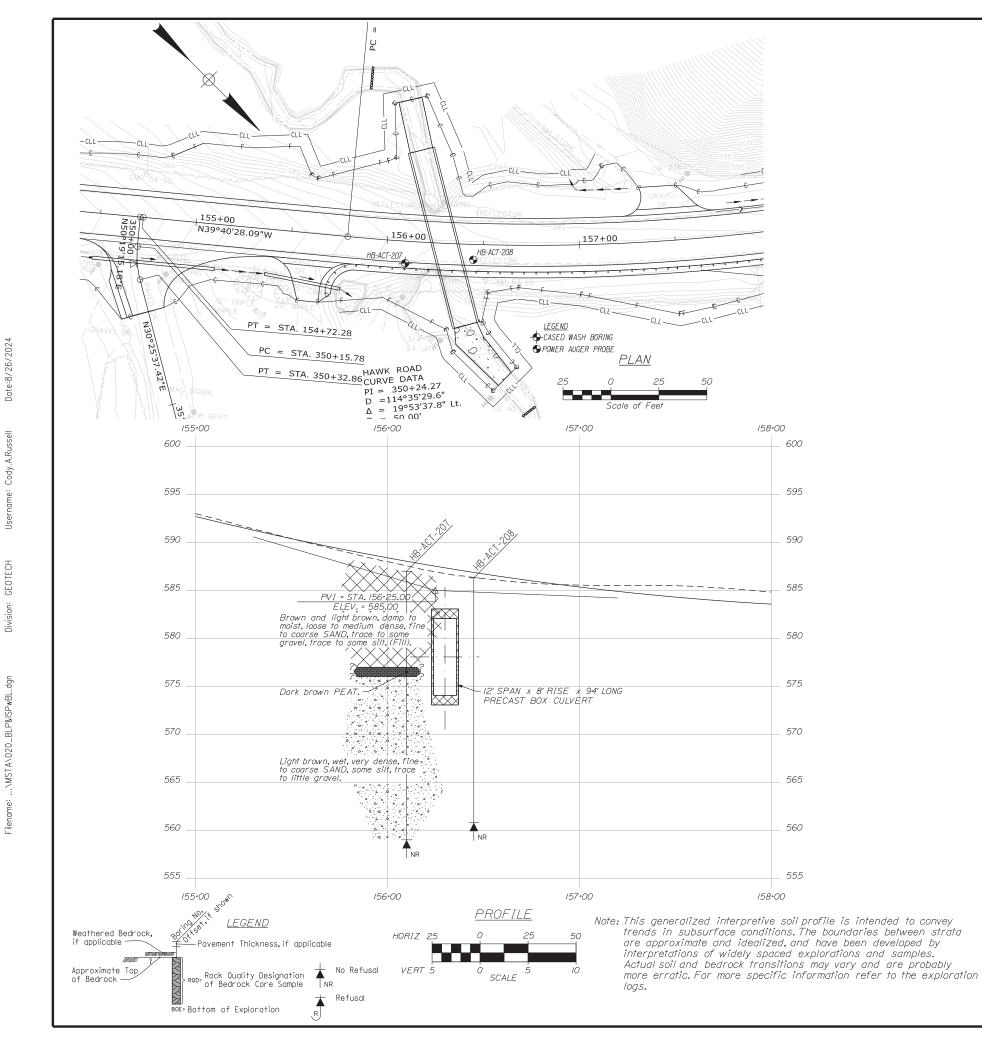
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| 7.27 | STATE OF MAINE DEPARTMENT OF TRANSPORTATION STP-2026(700) | WIN 020267.00 HIGHWAY PLANS |
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| OULDER (2) 2' STOP 03' 199+00 199+00 MM SEAT BELTT LAW PSNH 140 MM SEAT BELTT LAW PSNH 1405 ATA #14 | ER D. LOVELY BY DATE ALED R. BETZ | PLAN NUMBER REVISIONS 3 PLAN NUMBER REVISIONS 3 DATE FELD CHARGES DATE |
| AlA #14 +90.25 51'42.4" 5'15.0" Rt. 00' 02' 44' | ACTON ROUTE 109 | BORING LOCATION PLAN |
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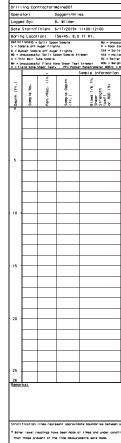


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| | ta†i | | | | | portion of Route 109 | Boring No.: | HB-A | CT-207 |
| | | | Locotic | | | ine | WIN: | | 67.00 |
| | Ele | | (ft.) | 587 NAV | | | Auger ID/OD: Sompler: | 5" Solid St Standard Sp | |
| | | Type: Iling | Method: | | 45C ed Wasl | n Boring | Hammer Wt./Fall Core Barrel: | 1: 140#/30* N/A | |
| | Cos | ing ID mer Ty | /00: | N#- | 3″ | | Noter Level®: | 12.0 ft bgs | |
| | Core Song Id Stem J Iow Stem | Auger Auger | | Su : Su : Qu : | Peck/Re (db) = Lc Unconfi | molded Fleid Vone Undralined S b Vone Undralined Shear Streng ned Compressive Strength (kaf | hear Strength (psf) 1 th (psf)) | BC = Boter Content, p LL = Liquid Limit PL = Blockst | or Strength (psf ercent |
| | ar Cone pht of 1 Meight o loht of (| 4016. Ho of Rods | or Cosin son | N+ur Horm N60 | eorrecte er Effic = SPT N- = (Home | Hydroulic L molded Fleid Vone Undrolned S b Vone Undrolned Smerr Streng ned Compressive Strength Kast d = Rem Fleid SPT N-volue lency foctor = Rig Specific J uncornected Cornected for Hon r Efficiency Foctor/6031Hf-un | nnual Calibration Va mer Efficiency corrected | iue PI = Plasticity II G = Orain Size Analys C = Consolidation Tes | ndex Is F |
| n | uncorrected | NGO | Cosing Bloes | levation ft.) | Log | | scription and Rem | | Laboratory Testing Results/ AASHTD and Unified Class |
| | ż 14 | 22 | SSA | ű: | | Brown, moist, medium gravel, trace silt, (| dense. fine to c Fill). | oorse SAND, some | G#337347 1-1-D. SW-SN MC=4.8% |
| | 3 | 5 | | • | | Light brown, domp, io silt, trace gravel, (| ose, fine to com Fill). | rse SAMD+ some | ₩C=4.8% G#337348 A-2-4. SM ₩C=12.8% |
| | | | łV | | | | | | |
| | 8 | 12 | 2 | 577.0 576.0 | BROOM | Dark brown PEAT. | | | 8-1-b. SW-SA |
| | _ | | 11 82 | | | Brown, wet, medium de gravel, trace silt. | nse, fine to coo | rse SAND+ troce | Loss on Ignition (4.7%) |
| | 47 | 73 | 86 107 9 26 | | | Light brown, wet, ver silt, little grovel, Roller Coned cheod to | y dense. fine to 20.0 ft bgs. | coorse SAND, som | |
| | 40 | 62 | 27 38 77 39 63 | | | Light brown, wet, ver silt, trace gravel, | y dense. fine to | coarse SAND. som | e G#337301 A-2-4- SM ₩C=12.6% |
| | | | 64 0100 0PEN HOLE | | | G100 blows for 0.8 ft Cobble from 23.8-24.2 Cobble from 24.6-24.9 Light brown, wet, ver Silt, trace gravel. Cobble from 25.7-26.0 Roller Coned cheod to | ft bgs. | coorse SAND, som | e G#337302 A-2-4. SM ₩C=9.2% |
| | | | | er fluct | productions | moy occur due to conditions o | Poge 1 of Boring | 1 No.: HB-ACT-: | 207 |
| r | tati | | | : A 2. | iuotions | portion of Route 109 | ther | No.: HB-ACT-; : <u>HB-AC</u> | |
| r | | vation | Project | : A 2 | 17 mile | portion of Route 109 | Boring No.: WIN: Auger ID/00: Sampler: | No.: HB-ACT-: HB-AC 2021 5" Dio. | -208 |
| r · | Ele Dati | vation um: Type: | Project Locatio | : A 2, - m: Act 586 NAV CME | 117 mile ron, Mo .3 088 450 | portion of Route 109 Ine | Boring No.: WIN: Auger 10/00: | No.: HB-ACT-: HB-AC 2021 5" Dio. | -208 |
| | Eler Date Rig Dr1 | vation um: Type: IIIng | Project Locatic (ft.) Method: | 586 NAV CME SOI | 10012016 17 milie 10 milie 10 milie 10 milie 10 milie 10 milie 10 milie | portion of Route 109 ine | Boring No.: WIN: Auger (D/OD): Sampler: Harmer Wt./Fall Core Barrel: Mater Level*: | No.: HB-ACT-; HB-AC 2024 5" Dio. N/A 1: N/A N/A N/A N/A | 7-208 57.00 |
| ucc Ce | Eler Dati Rig Dri Cas | vation un: Type: Iling ID hin Kal | Project Locatio (ft.) Method: 1700: | : A 2. 586 NAV CME : Sol N/A mple At | 17 mile on Mo 088 450 1d Ster | portion of Route 109 Ine In Auger In Auger | Boring No.: WIN: Auger ID/00: Sampler: Harmer Wt./Fall Core Borrel: Boter Level*: | No.: HB-ACT-; HB-AC 2024 5" Dio. N/A 1: N/A N/A N/A N/A | 1-208 57.00 |
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| | Eler Dati Rig Dr1 Cas sasful Sten Au Cas t of 140 hight of | vation un: Type: Iling ID hin Nol e uger Ho. Hom f Rods c | Projecti Locatic ((ft.)) Methods //OD: // Tube Si mer // Costing S | 5 A 2, 5 Set 1 5 Set 2 5 Set 1 5 Se | 17 mile 17 mile 10 mile 10 Ster 10 | portion of Route 109 ine h Auger In + Region of Person + Region of Pe | mer Boring No. 2 Boring No. 2 WIN: Auger 10/00: Someter I Hommer V./fail Roter (Internet) Someter I ster (Internet) Someter I ster (Internet) Someter I Someter I Some | NO. : HB-ACT : <u>HB-ACT</u> 2021 5° Dio. <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> <i>N/A</i> | A Construction of the second s |
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| | Electronic State S | | Project Locatic | 5866 NAV COLE COLE N/A | 17 m1 m 17 m1 m 10 m | portion of Route 109 ine h Auger In + Region of Person + Region of Pe | mer Boring No. 2 Boring No. 2 WIN: Auger 10/00: Someter I Hommer V./fail Roter (Internet) Someter I ster (Internet) Someter I ster (Internet) Someter I Someter I Some | NO. 2 HB-ACT | A Constraint of the second sec |

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| ACTON UTE 109 | ACTON ROUTE 109 BORING LOCATION PLAN & INTERPRETIVE SUBSURFACE PROFILE WITH BORING LOGS |
| | SHEET NUMBER |
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Appendix A

Boring Logs & Probe Summary Sheets

| | UNIFIE | ED SOIL C | LASSIFIC | ATION SYSTEM | | MODIFIED B | URMISTER S | YSTEM | | | | |
|---|---|--|--|---|---|---|--|--|----------------|--|---|--|
| | | | GROUP | | | | | | | | | |
| COARSE- GRAINED | GRAVELS | CLEAN GRAVELS | SYMBOLS GW | TYPICAL NAMES Well-graded gravels, gravel- sand mixtures, little or no fines. | tra | ive Term_ ace tle | Port | ion of Total (%) 0 - 10 11 - 20 | | | | |
| SOILS | (more than half of coarse fraction is larger than No. 4 sieve size) | (little or no fines) | GP | Poorly-graded gravels, gravel sand mixtures, little or no fines. | so adjective (e.g. | | S DESCRIBIN | 21 - 35 36 - 50 | | | | |
| | n half arger ve siz | | | | | | Y/CONSISTEN | - | | | | |
| al is larger size) | (more tha fraction is l sie | GRAVEL WITH FINES (Appreciable amount of fines) | GM GC | Silty gravels, gravel-sand-silt mixtures. Clayey gravels, gravel-sand-clay mixtures. | sieve): Includes (1) Clayey or Gravelly penetration resistan | <u>bils</u> (more than half of) clean gravels; (2) S sands. Density is ra nce (N-value). sity of | ilty or Clayey gravels ted according to star | ; and (3) Silty, | | | | |
| ateria ieve s | | lilles) | | | Cohesion | less Soils | | e (blows per foot) | | | | |
| (more than half of material is larger than No. 200 sieve size) | SANDS | CLEAN SANDS | SW | Well-graded sands, Gravelly sands, little or no fines | Very Loo Medium Dei | ose 1 Dense | | 0 - 4 5 - 10 11 - 30 31 - 50 | | | | |
| (more tha than | if coarse than No. 4 () | (little or no fines) | SP | Poorly-graded sands, Gravelly sand, little or no fines. | Very [| Dense <u>s</u> (more than half of n | naterial is smaller tha | > 50 | | | | |
| | (more than half of coarse fraction is smaller than No. sieve size) | SANDS WITH FINES | SM | Silty sands, sand-silt mixtures | , | | |) Gravelly, Sandy ording to undrained shear | | | | |
| | (more fraction | (Appreciable amount of fines) | SC | Clayey sands, sand-clay mixtures. | Consistency of Cohesive soils | <u>SPT N-Value</u> (blows per foot) | <u>Undrained</u> <u>Shear</u> Strength (psf) | <u>Field</u> Guidelines | | | | |
| | | | ML | Inorganic silts and very fine sands, rock flour, Silty or Clayey fine sands, or Clayey silts with | Very Soft Soft Medium Stiff | WOH, WOR, WOP, <2 2 - 4 5 - 8 | 0 - 250 250 - 500 500 - 1000 | Fist easily penetrates Thumb easily penetrates Thumb penetrates with | | | | |
| | | | | slight plasticity. | Stiff | 9 - 15 | 1000 - 2000 | moderate effort | | | | |
| FINE- GRAINED SOILS | | | ED S | | plastici clays, S | | Inorganic clays of low to medium plasticity, Gravelly clays, Sandy clays, Silty clays, lean clays. | Very Stiff Hard | 16 - 30 >30 | 2000 - 4000 over 4000 | Indented by thumb with great effort Indented by thumbnail Indented by thumbnail with difficulty | |
| | (inquid infint i | | | Organic silts and organic Silty clays of low plasticity. | RQD (%) = s | ignation (RQD): sum of the lengths | of intact pieces of length of core ad | core* > 4 inches | | | | |
| ial is e size | | | | | - | *Minimu | im NQ rock core (| | | | | |
| half of material is No. 200 sieve size) | SILTS AND CLAYS | | SILTS AND CLAYS | | SILTS AND CLAYS | | MH | Inorganic silts, micaceous or diatomaceous fine Sandy or Silty soils, elastic silts. | | Rock Quality Ba <u>Rock Quality</u> Very Poor | ased on RQD <u>RQD (%)</u> ≤25 | |
| (more than h smaller than N | | | СН | Inorganic clays of high plasticity, fat clays. | | Poor Fair Good | 26 - 50 51 - 75 76 - 90 | | | | | |
| sma sma | (liquid limit greater than 50) C | | | Organic clays of medium to high plasticity, organic silts. | Excellent 91 - 100 Desired Rock Observations (in this order, if applicable): Color (Munsell color chart) | | | | | | | |
| | | ORGANIC | Pt | Peat and other highly organic soils. | 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.) | | | | | | | |
| | | | s order, if | applicable): | Geologic discont | tinuities/jointing: | | | | | | |
| Color (Muns Moisture (dr Density/Cor Texture (find Name (Sand Gradation (N | sell color ch. ry, damp, m isistency (fr e, medium, d, Silty Sand well-graded, on-plastic, s ayering, frac all, moderat n (weak, mo rigin (till, ma | art) oist, wet) om above ri coarse, etc. d, Clay, etc. , poorly-grad slightly plast :tures, crack ely, loosely, oderate, or s | ght hand s) , including led, uniforr ic, moderat s, etc.) etc.,) trong) | ide) portions - trace, little, etc.) n, etc.) tely plastic, highly plastic) | -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)) | | | | | | | |
| Key | / to Soil a | Geotechi | <i>nical</i> Sec Descrip | tions and Terms | Sample Conta WIN Bridge Name / Boring Numbe Sample Numb Sample Depth | r | Requirements: Blow Counts Sample Recov Date Personnel Initia | ery | | | | |

| N | laine | | | of Transpo | rtatio | on | Pi | roject: | A 2.1 | 7 mile portion of Route 109 | Boring No.: | HB-AC | Г-101 |
|---------------------------------------|--|--------------------------|--|--|---|-------------------------------|----------|--------------------|-------------|--|--|--|--|
| | | | oil/Rock Expl | | | | Lo | ocatior | n: Act | on, Maine | WIN: | 2020 | 67.00 |
| Drillin | a Contr | actor: | MaineDOT | | F | levatio | n (f | ÷) | 738 | 4 | Auger ID/OD: | 12" Dia. | |
| Opera | - | | Giles/Daggett/ | Giles | | atum: | /I (I |) | | - /D88 | Sampler: | Off Flights | |
| <u> </u> | ed By: | | B. Wilder | Glies | | ig Typ | <u>.</u> | | | E 45C | Hammer Wt./Fall: | N/A | |
| | Start/Fir | | 7/15/2015-7/1: | 5/2015 | | rilling | | hod | | d Stem Auger | Core Barrel: | N/A | |
| | g Locat | | 94+50, 9.0 ft F | | | asing | | | N/A | - | Water Level*: | None Observed | 4 |
| | - | Spilt Spoon | | | successfu | | | | | | Water Lever . | None Observed | |
| B = Bu MD = U U = Thi MV = U | cket Sampl Insuccessf n Wall Tub Insuccessf | e Sample ul Field Van | on Sample Atterr le Shear Test Att <u>PP= Pocket Pen</u> | ssA = 5 hpt HSA = H RC = Ro empt WOH = | Core Sar olid Stem J ollow Sten ller Cone Weight of 1 = Weight o on | Auger n Auger 140lb. Ha | | | | $S_u = Peak/Remolded Field Vane Ur S_{U(ab)} = Lab Vane Undrained Shee q_p = Unconfined Compressive Stret N-value = Raw Field SPT N-value T_v = Pocket Torvane Shear Strengt WC = Water Content, percent = 5$ | ar Strength (psf) ngth (ksf) h (psf) | LL = Liquid Lim PL = Plastic Lin PI = Plasticity Ir G = Grain Size C = Consolidati | nit ndex Analysis |
| 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 | | Testing Results/ AASHTO and Unified Class. |
| 0 | B1 | | 0.79 - 1.50 | | | SS | | 737.6 | | 9½" PAVEMENT | | | G#302216 |
| | S1 | | 1.50 - 5.00 | | | | | 736.9 | Î | Brown, damp, fine to coarse Sandy (Fill). | | | A-1-a, GW- GM |
| | | | | | | | | | | Light brown, moist, fine to coarse | SAND, some silt, little gr | avel. | WC=5.3% G#302217 A-2-4, SM WC=7.9% |
| - 5 - | | | | | | | | 733.4 | | | | 5.0- | |
| - 10 - | | | | | | | | | | Bottom of Exploration a NO REFUSAL | t 5.0 feet below ground s | urface. | |
| - 20 - | | | | | | | | | | | | | |
| 25 Rema | urke: | | | | | | | | | | | | |
| Stratific * Water | ation lines | ings have b | | | | | | | ns may d | ccur due to conditions other | Page 1 of 1 Boring No. | : HB-ACT- | 101 |

| N | laine | | rtment | | | tion | Pi | roject: | A 2.17 | 7 mile portion of Route 109 | Boring No.: | HB-AC | Г-102 |
|--|--|--------------------------|---|-------------------------------------|---|---|-------|--------------------|-------------|--|--|--|--|
| | | | oil/Rock Expl | | | | Lo | ocatior | n: Acto | on, Maine | WIN: | 2026 | 57.00 |
| Drillin | a Contr | actor | MaineDOT | | | Elevati | | ÷) | 740. | 0 | Auger ID/OD: | 5" Dia. | |
| Opera | - | | Giles/Daggett/ | Giles | | Datum | |) | | ° /D88 | Sampler: | Off Flights | |
| <u> </u> | ed By: | | B. Wilder | Glies | | Rig Ty | | | | E 45C | Hammer Wt./Fall: | N/A | |
| | Start/Fir | | 7/15/2015-7/1: | 5/2015 | | Drilling | | hod | | d Stem Auger | Core Barrel: | N/A N/A | |
| | g Locat | | 105+50, 9.0 ft | | | Casing | | | N/A | - | Water Level*: | None Observed | |
| Definiti | ons: D = | Spilt Spoon | - | ICt. | MU = Unsucce | ssful Thin W | | | | pt WO1P = Weight of 1 Person | | Tone Observed | |
| B = Buo MD = U U = Thi MV = U | cket Sampl Insuccessf n Wall Tub Insuccessf | e Sample ul Field Van | on Sample Attem e Shear Test Atte <u>PP= Pocket Pen</u> | npt empt netrometer | R = Rock Core SSA = Solid Si HSA = Hollow RC = Roller Co WOH = Weigh WOR/C = Wei | tem Auger Stem Auger one t of 140lb. H | amme | | | $\begin{array}{l} S_{u} = \text{Peak/Remolded Field Vane Ur}\\ S_{U(lab)} = Lab Vane Undrained Sheiq_p = Unconfined Compressive StreiN-value = Raw Field SPT N-valueT_v = Pocket Torvane Shear StrengtWC = Water Content, percent \cong = S$ | ar Strength (psf) ngth (ksf) h (psf) | LL = Liquid Lim PL = Plastic Lin PI = Plasticity Ir G = Grain Size C = Consolidati | iit idex Analysis |
| | | | | Sample Inf | ormation | | | | | | | | Laboratory |
| Depth (ft.) | Sample No. | Pen./Rec. (in.) | Sample Depth (ft.) | Blows (/6 in.) Shear Strondth | or RQD (%) | N-value Casind | Blows | Elevation (ft.) | Graphic Log | Visual Descr | ption and Remarks | | Testing Results/ AASHTO and Unified Class. |
| 0 | S2 | | 0.75 - 2.40 | | | s | SA | 740.1 | | 9" PAVEMENT | | | |
| | | | | | | | | 740.1 738.4 | | Brown, moist, fine to coarse SANI | | 2.4- | G#302218 A-1-b, SM WC=6.5% |
| | | | | | | | | | | Bottom of Exploration a AUGER REFU | JSAL | urrace. | |
| - 5 - | | | | | | | | | | | | | |
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| - 10 - | | | | | | | | | | | | | |
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| - 15 - | | | | | | | | | | | | | |
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| 25 | | | | | | | | | | | | | |
| Rema | | | , | | | 1 | | | | | Done 4 - 64 | | |
| * Water | level read | ings have b | pproximate bour een made at time ne measurement | es and under | | | | | ns may c | ccur due to conditions other | Page 1 of 1 Boring No. | : HR-ACT- | 102 |
| unan t | nose prese | ni at the tin | ne measurement | is were made. | | | | | | | | · 110-AC1- | 102 |

| N | Iaine | | | of Transport | ation | F | Project: | A 2.1 | 7 mile portion of Route 109 | Boring No.: | HB-AC | Г-103 |
|--------------------------------------|---|--------------------------|---|--|---|-------|--------------------|-------------|--|--|--|--|
| | | | oil/Rock Expl | | | L | ocatio | n: Act | on, Maine | WIN: | 2026 | 57.00 |
| Drilli | a Cont | actor: | MaineDOT | | Elevat | | ft) | 737 | 2 | Auger ID/OD: | 12" Dia. | |
| Opera | - | | Giles/Daggett/ | Giles | Datum | | 11.) | | 2 VD88 | Sampler: | Off Flights | |
| <u> </u> | ed By: | | B. Wilder | Giles | Rig Ty | | | | E 45C | Hammer Wt./Fall: | N/A | |
| | Start/Fir | | 7/15/2015-7/1: | 5/2015 | Drilling | | thod: | | d Stem Auger | Core Barrel: | N/A | |
| | g Locat | | 111+00, 7.0 ft | | Casing | | | N/A | | Water Level*: | None Observed | 1 |
| Definiti | ons: D = | Spilt Spoon | | MU = Unsuce | cessful Thin V | · | | | wo1P = Weight of 1 Person | | | |
| B = Bu MD = U U = Th MV = U | cket Sampl Jnsuccessf in Wall Tub Jnsuccessf | e Sample ul Field Van | on Sample Atterr e Shear Test Att <u>PP= Pocket Pen</u> | empt RC = Roller (| Stem Auger v Stem Auge Cone ht of 140lb. H | lamm | | | $\begin{array}{l} S_u = \text{Peak/Remolded Field Vane U}\\ S_{u(lab)} = \text{Lab Vane Undrained She}\\ q_p = Unconfined Compressive StreitN-value = Raw Field SPT N-value\\ T_v = \text{Pocket Torvane Shear Strengt}\\ WC = Water Content, percent \underline{z} = 5 \end{array}$ | ar Strength (psf) ngth (ksf) h (psf) | LL = Liquid Lim PL = Plastic Lin PI = Plasticity Ir G = Grain Size C = Consolidati | 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 | Blows | Elevation (ft.) | Graphic Log | Visual Descr | iption and Remarks | | Laboratory Testing Results/ AASHTO and Unified Class. |
| 0 | | <u>ц</u> | | | | SA | - 736.2 | | 12" PAVEMENT | | 1 0- | |
| | B2 | | 1.00 - 2.10 | | | | 735.1 | | Brown, moist, fine to coarse SAN | | 2.1- | G#302219 A-1-b, SW-SM WC=6.2% |
| | S3 | | 2.10 - 5.00 | | | | - | | Light brown, moist, Silty fine to co | oarse SAND, trace gravel. | | G#302220 A-4, SM WC=20.1% |
| - 5 - | | | | | | | 732.2 | | | | | |
| - 10 - | | | | | | | - | | Bottom of Exploration a NO REFUSAL | t 5.0 feet below ground s | | |
| - 15 - | | | | | | | - | | | | | |
| | | | | | | | - | | | | | |
| - 20 - | | | | | | | - | | | | | |
| * Wate | cation lines | ings have b | | | | | | ns may c | ccur due to conditions other | Page 1 of 1 Boring No. | : HB-ACT- | 103 |

| N | laine | | rtment | | sporta | tion | | Project | : A 2.1 | 7 mile portion of Route 109 | Boring No.: | HB-AC | Г-104 |
|--|---|--|--|-------------------------------------|--|---|-----------------------------|--------------------|-------------|--|--|--|---|
| | | | oil/Rock Expl | | | | | Locatio | on: Act | on, Maine | WIN: | 2020 | 57.00 |
| Drilli | a Contr | actor | MaineDOT | | | Elov | ation | (#+) | 697 | 2 | Auger ID/OD: | 12" Dia. | |
| Opera | - | | Giles/Daggett/ | Gilas | | Datu | | (11.) | | 5 VD88 | Sampler: | Off Flights | |
| <u> </u> | | | | Ulles | | | | | | | <u> </u> | | |
| | ed By: | | B. Wilder | 5/2015 | | | Гуре: | . 4le e el . | | E 45C | Hammer Wt./Fall: | N/A | |
| | Start/Fir | | 7/15/2015-7/1 | | | | - | ethod: | | d Stem Auger | Core Barrel: | N/A | , |
| | g Locat | Spilt Spoon | 121+00, 12.0 f | | U = Unsucce | | n g ID / n Wall 1 | | N/A | | Water Level*: | None Observed | 1 |
| S = Sa B = Bu MD = U U = Th MV = U | mple off Au cket Sampl Insuccessf in Wall Tub Insuccessfi | iger Flights e off Auger ul Split Spoo e Sample ul Field Van | Flights on Sample Attem e Shear Test Atte <u>PP= Pocket Pen</u> | R S npt H R empt W | = Rock Core SA = Solid St SA = Hollow S C = Roller Co /OH = Weight /OR/C = Weight | Sample em Auge Stem Aug ne : of 140lb | er ger o. Hamn | ner | | $\begin{array}{l} S_{U} = \text{Peak/Remolded Field Vane U}\\ S_{U(lab)} = \text{Lab Vane Undrained She}\\ q_{p} = \text{Unconfined Compressive Stre}\\ N-value = \text{Raw Field SPT N-value}\\ T_{v} = \text{Pocket Torvane Shear Streng}\\ WC = Water Content, percent \cong \Xi \end{array}$ | ar Strength (psf) ngth (ksf) h (psf) | LL = Liquid Lim PL = Plastic Lin PI = Plasticity II G = Grain Size C = Consolidati | nit ndex Analysis |
| | | , Li | pth | (; | | | | | | | | | Testing |
| 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 | | Results/ AASHTO and Unified Class. |
| 0 | В3 | | 0.00 - 1.10 | | | | SSA | | | Brown, damp, fine to coarse SAN | D, some gravel, trace silt, (| (Fill). | G#302221 |
| | S4 | | 1.10 - 5.90 | | | | | - 696. - | 2 | Light brown, moist, fine to coarse | SAND, little gravel, little | 1.1- | A-1-b, SW-SM WC=3.0% G#302222 A-1-b, SM WC=7.2% |
| - 5 - | | | | | | | 17 | 1 | | | | | |
| | | | | | | | | _ 691.· _ | 4 | Bottom of Exploration a AUGER REF | t 5.9 feet below ground s USAL | urface. | |
| - 10 - | | | | | | | | - | | | | | |
| - 15 - | | | | | | | | - | | | | | |
| - 20 - | | | | | | | | - | | | | | |
| Rema | arks: | | | | I | | | | | | | | |
| * Wate | level read | ings have b | pproximate bour een made at time ne measurement | es and under co | | | | | | ccur due to conditions other | Page 1 of 1 Boring No. | : HB-ACT- | 104 |

| N | laine | | | of Transport | ation | F | Project | : A 2.1 | 7 mile portion of Route 109 | Boring No.: | HB-AC | T-105 |
|--|---|--------------------------|---|--|---------------------------|-----------------|--------------------|-------------|--|--|--|--|
| | | | oil/Rock Expl | | | l | ocatio | n: Act | on, Maine | WIN: | 202 | 67.00 |
| | | | | | 1 | | | | | | | |
| L | - | | MaineDOT | | Eleva | | (ft.) | 651 | | Auger ID/OD: | 12" Dia. | |
| Opera | | | Giles/Daggett/ | Giles | Datun | | | | VD88 | Sampler: | Off Flights | |
| | ed By: | | B. Wilder | 5/2015 | Rig Ty | | the di | | E 45C | Hammer Wt./Fall: | N/A | |
| L | Start/Fir | | 7/15/2015-7/1 134+00, 8.0 ft | | Drillin Casin | - | | N/A | d Stem Auger | Core Barrel: Water Level*: | N/A None Observe | 4 |
| Definitio | ons: D = | Spilt Spoon | | MU = Unsuc | cessful Thin | | | | pt WO1P = Weight of 1 Person | | | |
| B = Buo MD = U U = Thi MV = U | cket Sampl Insuccessf in Wall Tub Insuccessf | e Sample ul Field Van | on Sample Atterr e Shear Test Att <u>PP= Pocket Pen</u> | RC = Roller empt WOH = Wei etrometer WOR/C = W | Stem Auger w Stem Auge | Hamm | | | $\begin{array}{l} S_u = \text{Peak/Remolded Field Vane Ur}\\ S_{U(ab)} = Lab Vane Undrained Sherq_p = Unconfined Compressive StretN-value = Raw Field SPT N-valueT_v = Pocket Torvane Shear StrengtWC = Water Content, percent \cong = S$ | ar Strength (psf) ngth (ksf) h (psf) | LL = Liquid Lim PL = Plastic Lir Pl = Plasticity I G = Grain Size C = Consolidat | nit ndex Analysis |
| | | | | Sample Information | | | | | | | | Laboratory |
| 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 | | Testing Results/ AASHTO and Unified Class. |
| 0 | B4 | | 0.92 - 2.40 | | | SSA | (50) | | 11" PAVEMENT | | 0.0 | |
| | | | | | | | 650. | | Brown, damp, Gravelly, fine to co (Fill). | arse SAND, trace silt, occ | | G#302223 A-1-a, SW-SM WC=4.4% |
| | S5 | | 2.40 - 5.00 | | | | 649. | 1 | Light brown, moist, fine to coarse | SAND, some silt, trace gr | avel. | G#302224 A-2-4, SM WC=8.3% |
| - 5 - | | | | | \ \ | \bigvee | 646.: | _ | | | 5.0 | |
| | | | | | | | 040 | 5 | Bottom of Exploration a NO REFUSAL | t 5.0 feet below ground s | urface. | |
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| 1.0 | | | | | | | | | | | | |
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| <u>Rema</u> | arks: | | | | | | | | | | | |
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| Stratific | ation lines | represent a | pproximate bour | ndaries between soil types; | transitions n | ay be | gradual. | | | Page 1 of 1 | | |
| | | | | | | | | | ccur due to conditions other | | | |
| | | | ne measurement | | | | | | | Boring No. | : HB-ACT | 105 |

| N | Aaine | | | of Transpo | rtatio | 1 | Projec | t: A | 2.17 | mile portion of Route 109 | Boring No.: | HB-AC | Г-106 |
|----------------------------|--|-----------------|---|--|---|-----------------|-------------|--------|-------------|---|---------------------------------|---|--|
| | | | oil/Rock Expl | | | | Locati | on: | Acto | n, Maine | WIN: | 2026 | 57.00 |
| Drilli | na Cont | ractor: | MaineDOT | | Fle | vation | (ft) | | 627.9 |) | Auger ID/OD: | 12" Dia. | |
| Oper | - | | Giles/Daggett/ | Giles | | um: | (10) | | | D88 | Sampler: | Off Flights | |
| <u> </u> | ed By: | | B. Wilder | | | Type: | | | | 2.45C | Hammer Wt./Fall: | N/A | |
| | Start/Fi | | 7/15/2015-7/1: | 5/2015 | | | lethod: | | | Stem Auger | Core Barrel: | N/A | |
| | ng Locat | | 145+00, 12.0 f | | | sing ID | | | N/A | Stelli Muger | Water Level*: | None Observed | 1 |
| Definiti | ions: D = | Spilt Spoon | , | MU = Ur | successful T | hin Wall | | | | | | | |
| B = Bu MD = U U = Th | icket Samp Jnsuccess in Wall Tul | be Sample | Flights on Sample Atterr e Shear Test Att | npt SSA = S HSA = H RC = Rc | Core Sampl olid Stem Aug ollow Stem A ller Cone Veight of 140 | ger luger | mer | | | $\begin{array}{l} S_{u} = \text{Peak/Remolded Field Vane Un}\\ S_{u}(ab) = Lab Vane Undrained Sheiq_{p} = Unconfined Compressive StreiN-value = Raw Field SPT N-valueT_{v} = Pocket Torvane Shear Strengt$ | ar Strength (psf) ngth (ksf) | LL = Liquid Lim PL = Plastic Lin PI = Plasticity Ir G = Grain Size | nit ndex |
| | | | PP= Pocket Pen | etrometer WOR/C | = Weight of R | | | | | WC = Water Content, percent ≅ = 5 | | C = Consolidati | |
| | | | | Sample Informati | on | | | | _ | | | | Laboratory |
| Depth (ft.) | Sample No. | Pen./Rec. (in.) | Sample Depth (ft.) | Blows (/6 in.) Shear Strength (psf) or RQD (%) | N-value | Casing Blows | Elevation | (III.) | Graphic Log | Visual Descr | iption and Remarks | | Testing Results/ AASHTO and Unified Class. |
| 0 | В5 | | 0.00 - 1.60 | | | SSA | | | | Brown, damp, fine to coarse SANI | D, some gravel, trace silt, (| (Fill). | G#302225 A-1-b, SW-SM WC=3.5% |
| | S6 | | 1.60 - 8.00 | | | | 626 | .3 🇙 | | Light brown, damp, fine to coarse | SAND, some silt, little gra | 1.6- avel. | G#302151 A-2-4, SM WC=11.2% |
| | | | | | | | _ | | | | | | |
| - 5 - | | | | | | | | | | | | | |
| | | | | | | | / | | | | | | |
| | | | | | | | 619 | .9 | | Bottom of Exploration a NO REFUSAL | t 8.0 feet below ground s | urface. | |
| - 10 - | | | | | | | - | | | | | | |
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| _ 25 | | | | | | | | | | | | | |
| <u>Rem</u> a | <u>arks:</u> | | | | | | | | | | | | |
| Stratifi | cation lines | s represent a | approximate bour | ndaries between soil ty | es; transition | is may b | e gradua | I. | | | Page 1 of 1 | | |
| | | | een made at time ne measurement | | stated. Gro | undwate | er fluctuat | ions m | nay oc | ccur due to conditions other | Boring No. | : HB-ACT- | 106 |

| N | laine | | | of Transport | ation | Ī | Project | A 2.1 | 7 mile portion of Route 109 | Boring No.: | HB-AC | Г-107 |
|---|--|---|--|--|--|-----------------|--------------------|-------------|---|--|--|--|
| | | | oil/Rock Expl | | | | Locatio | n: Act | on, Maine | WIN: | 2026 | 57.00 |
| Drillin | na Conti | ractor: | MaineDOT | | Elevat | ion | (ft) | 584 | 1 | Auger ID/OD: | 5" Dia. | |
| Opera | - | | Giles/Daggett/ | Giles | Datun | | (10.) | | VD88 | Sampler: | Off Flights | |
| <u> </u> | | | B. Wilder | Glies | Rig Ty | | | | E 45C | Hammer Wt./Fall: | N/A | |
| | ed By: | | | (/2015 | | - | . 4le e el . | | | | | |
| | Start/Fir | | 7/16/2015-7/1 | | Drillin | - | | | d Stem Auger | Core Barrel: | N/A | |
| | g Locat | Spilt Spoon | 158+00, 6.0 ft | Rt. MU = Unsuce | | | | N/A | | Water Level*: | None Observed | 1 |
| S = Sar B = Buo MD = U U = Thi MV = U | mple off Au cket Sampl Insuccessf in Wall Tub Insuccessf | uger Flights le off Auger ul Split Spo be Sample ul Field Van | Flights on Sample Atten le Shear Test Att <u>PP= Pocket Per</u> | R = Rock Co SSA = Solid HSA = Hollov RC = Roller WOH = Weig ietrometer WOR/C = Wo | re Sample Stem Auger v Stem Auge Cone ht of 140lb. | er Hamn | ner | | $ \begin{array}{l} \begin{array}{l} \text{S}_{\text{U}} = \text{Peak/Remoided Field Vane Un}\\ \text{S}_{\text{U}}(\text{lab}) = \text{Lab Vane Undrained She}\\ \text{q}_{\text{p}} = \text{Unconfined Compressive Street}\\ \text{N-value} = \text{Raw Field SPT N-value}\\ \text{T}_{\text{V}} = \text{Pocket Torvane Shear Strengt}\\ \text{WC} = \text{Water Content, percent} \equiv \text{S} \end{array} $ | ar Strength (psf) ngth (ksf) h (psf) | LL = Liquid Lim PL = Plastic Lin PI = Plasticity Ir G = Grain Size C = Consolidati | nit ndex Analysis |
| | | | | Sample Information | | | - | | - | | | Laboratory |
| 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 | | iption and Remarks | | Testing Results/ AASHTO and Unified Class. |
| 0 | S7 | | 0.83 - 1.30 | | : | SSA | 583.3 | | 10" PAVEMENT | | | |
| | S8 | | 1.30 - 5.00 | | | | 582.8 | | Brown, damp, fine to coarse Sandy | y GRAVEL, trace silt, (Fill |)1.3- | G#302152 A-1-a, GW- |
| | | | | | | +- | - | | Light brown, moist, fine to coarse | SAND, some silt, trace gra | | GM |
| | | | | | | | - | | | | | WC=4.45% G#302153 A-2-4, SM WC=20.3% |
| - 5 - | | | | | | V. | 579.1 | | Pottom of Evaluation a | t 5.0 feet below ground si | | |
| - 10 - | | | | | | | | | NO REFUSAL | | | |
| 25 | | | | | | | _ | | | | | |
| * Water | cation lines | lings have b | | | | | | ns may | occur due to conditions other | Page 1 of 1 Boring No. | : HB-ACT- | 107 |

| N | laine | | | of Tran | sporta | tion | Р | roject: | A 2.1 | 7 mile portion of Route 109 | Boring No.: | HB-AC | Г-108 |
|--|--|--------------------------|---|---|--|--|-----------------|--------------------|-------------|--|--|--|--|
| | | | oil/Rock Expl | | | | L | ocatio | n: Act | on, Maine | WIN: | 2020 | 57.00 |
| Drillir | a Cont | actor: | MaineDOT | | | Eleva | tion (| ft) | 583 | 6 | Auger ID/OD: | 5" Dia. | |
| Opera | - | | Giles/Daggett/ | /Giles | | Datur | | | | /D88 | Sampler: | Off Flights | |
| <u> </u> | ed By: | | B. Wilder | Glies | | Rig T | | | | E 45C | Hammer Wt./Fall: | N/A | |
| | Start/Fin | | 7/16/2015-7/1 | 6/2015 | | Drillir | | thod: | | d Stem Auger | Core Barrel: | N/A N/A | |
| | g Locat | | 158+00, 1.0 ft | | | Casin | - | | N/A | - | Water Level*: | None Observed | 1 |
| Definitio | ons: D = | Spilt Spoon | | М | U = Unsucce | ssful Thin | - | | | pt WO1P = Weight of 1 Person | | | · |
| B = Buo MD = U U = Thi MV = U | cket Samp Insuccessf in Wall Tub Insuccessf | e Sample ul Field Van | on Sample Atterr e Shear Test Att <u>PP= Pocket Pen</u> | Sanpt H R tempt W tetrometer W | = Rock Core SA = Solid Sta SA = Hollow S C = Roller Co OH = Weight | em Auger Stem Aug one t of 140lb. | er Hamm | | | $\begin{array}{l} S_{u} = \text{Peak/Remolded Field Vane Ur}\\ S_{u}(\text{[ab)} = \text{Lab Vane Undrained Shee}\\ q_{p} = \text{Unconfined Compressive Strer}\\ N-value = \text{Raw Field SPT N-value}\\ T_{v} = \text{Pocket Torvane Shear Strengt}\\ WC = Water Content, percent \equiv S \end{array}$ | ar Strength (psf) ngth (ksf) n (psf) | LL = Liquid Lim PL = Plastic Lin PI = Plasticity Ir G = Grain Size C = Consolidati | nit ndex Analysis |
| | | | | Sample Info | | | | | | | | | Laboratory |
| Depth (ft.) | Sample No. | Pen./Rec. (in.) | Sample Depth (ft.) | Blows (/6 in.) Shear Strength | (pst) or RQD (%) | N-value | Casing Blows | Elevation (ft.) | Graphic Log | Visual Descri | ption and Remarks | | Testing Results/ AASHTO and Unified Class. |
| 0 | | | | | | | SSA | 583.2 | | Brown, damp, fine to coarse Sandy | GRAVEL, trace silt, (Fil | | |
| | | | | | | | | - | | Light brown, moist, fine to coarse | SAND, some silt, trace gr. | | |
| - 5 - | | | | | | | | 578.6 | | Bottom of Exploration a NO REFUSAL | t 5.0 feet below ground s | urface. | |
| - 10 - | | | | | | | | - | | | | | |
| - 20 - | | | | | | | | - | | | | | |
| | | | | | | | | 1 | | | | | |
| | | | | | | | | - | | | | | |
| 25 | | | | | | | | | | | | | |
| * Water | ation lines | ings have b | een made at tim | | | | | | ns may d | ccur due to conditions other | Page 1 of 1 Boring No. | • HR ACT | 108 |
| than t | nose prese | ent at the tin | ne measurement | ts were made. | | | | | | | | . пр-АСІ- | 100 |

| N | laine | | rtment | | isporta | tion | P | roject: | A 2.1 | 7 mile portion of Route 109 | Boring No.: | HB-AC | T-109 |
|---|--|--|--|-------------------------------------|---|---|-----------------------|--------------------|-------------|--|---|--|--|
| | | | oil/Rock Expl | | | | L | ocatio | n: Act | on, Maine | WIN: | 2020 | 67.00 |
| Drillin | a Cont | actor | MaineDOT | | | Eleva | tion (| F4) | 589. | 4 | Auger ID/OD: | 12" Dia. | |
| Opera | - | | Giles/Daggett/ | Giles | | Datur | | n.) | | 4 VD88 | Sampler: | Off Flights | |
| <u> </u> | ed By: | | B. Wilder | Glies | | Rig T | | | | E 45C | Hammer Wt./Fall: | N/A | |
| | Start/Fir | | 7/15/2015-7/1: | 5/2015 | | - | | thod: | | d Stem Auger | Core Barrel: | N/A | |
| | g Locat | | 163+00, 11.1 f | | | Casir | - | | N/A | | Water Level*: | None Observe | 4 |
| Definition S = Sant B = Buon MD = U U = Thi MV = U | ons: D = mple off Au cket Sampl Insuccessf in Wall Tub Insuccessf | Spilt Spoon Iger Flights le off Auger ul Split Spo le Sample ul Field Van | Sample | rpt F empt N | MU = Unsucce R = Rock Core SSA = Solid St HSA = Hollow S RC = Roller Co NOH = Weight NOR/C = Weight | ssful Thin Sample tem Auger Stem Aug one t of 140lb. | Wall Ti er Hamm | ube Samj er | ole Atten | pt WO1P = Weight of 1 Person $S_u = Peak/Remolded Field Vane UI S_{U(lab)} = Lab Vane Undrained Shet q_p = Unconfined Compressive Stret N-value = Raw Field SPT N-value T_v = Pocket Torvane Shear Strengt WC = Water Content, percent z = 5$ | ndrained Shear Strength (psf) ar Strength (psf) ngth (ksf) h (psf) | LL = Liquid Lim PL = Plastic Lir PI = Plasticity I G = Grain Size C = Consolidat | it nit Analysis |
| | | | | Sample Info | | | | | | | | | |
| Depth (ft.) | Sample No. | Pen./Rec. (in.) | Sample Depth (ft.) | Blows (/6 in.) Shear Strendth | (psf) or RQD (%) | N-value | Casing Blows | Elevation (ft.) | Graphic Log | Visual Descr | iption and Remarks | | Laboratory Testing Results/ AASHTO and Unified Class. |
| 0 | B6 | | 0.75 - 5.00 | | | | SSA | | | 9" PAVEMENT | | | |
| | | | 0.75 - 5.00 | | | | | 588.7 | | Brown, damp, Gravelly, fine to co (Fill). | arse SAND, trace silt, occ | | G#302154 A-1-a, SW-SM WC=3.0% |
| - 5 - | | | | | | | | - 584.4 | ××××× | Bottom of Exploration a NO REFUSAL | t 5.0 feet below ground s | urface. 5.0 | |
| - 10 - | | | | | | | | - | | | | | |
| - 15 - | | | | | | | | | | | | | |
| - 20 - | | | | | | | | - | | | | | |
| Rema Stratific * Water | ation lines | ings have b | pproximate bour een made at tim ne measurement | es and under c | | | | | ns may c | ccur due to conditions other | Page 1 of 1 Boring No. | : HB-ACT- | 109 |

| N | Iaine | | rtment | | | atior | ı | Proj | ject: | A 2.1 | mile portion of Route 109 | Boring No.: | HB-AC | Г-110 |
|-------------------|---------------------------|-----------------------------|------------------------------------|--------------------|---------------------------------|------------|----------|----------|---------|-----------------|---|----------------------------|--|-----------------------|
| | | | oil/Rock Expl | | | | | Loc | atior | n: Act | n, Maine | WIN: | 2026 | 57.00 |
| Drillin | a Contr | actor | MaineDOT | | | Elo | vatior | (ft) | | 571 | 0 | Auger ID/OD: | 12" Dia. | |
| Opera | - | | Giles/Daggett/ | Giles | | _ | um: | i (ii.) | | | 7D88 | Sampler: | Off Flights | |
| <u> </u> | ed By: | | B. Wilder | Giles | | _ | Туре | | | | E 45C | Hammer Wt./Fall: | N/A | |
| | Start/Fir | | 7/15/2015-7/1: | 5/2015 | | - | ling N | _ | od. | | l Stem Auger | Core Barrel: | N/A | |
| | g Locat | | 193+00, 10.5 f | | | _ | ing I | | | N/A | r Stelli / Yuger | Water Level*: | None Observed | 1 |
| Definiti | ons: D = | Spilt Spoon | | | MU = Unsuc | cessful Th | nin Wall | | | | | | | |
| B = Bu | cket Sampl | iger Flights e off Auger | | | R = Rock Co SSA = Solid | Stem Aug | ger | | | | S _u = Peak/Remolded Field Vane Ur S _{u(lab)} = Lab Vane Undrained Shea | | LL = Liquid Lim | t |
| | Insuccessf in Wall Tub | | on Sample Atterr | npt | HSA = Hollo RC = Roller | | uger | | | | q _p `= Unconfined Compressive Strer N-value = Raw Field SPT N-value | ngth (ksf) | PL = Plastic Lin PI = Plasticity Ir | |
| MV = L V = Fie | Insuccessfi Id Vane Sh | ul Field Van lear Test. | e Shear Test Att PP= Pocket Pen | empt ietrometer | WOH = Weig WOR/C = W | | | | 1 | | T_V = Pocket Torvane Shear Strengt WC = Water Content, percent \cong = S | | G = Grain Size C = Consolidati | |
| | | | | | formation | | | | , | | | • | | |
| | | in.) | oth | | - | | | | | _ | | | | Laboratory Testing |
| ft.) | No |). | Det | /6 in | (%) | | | 9 | Ξ | Lo ⁰ | Visual Descr | iption and Remarks | | Results/ AASHTO |
| Depth (ft.) | Sample No. | Pen./Rec. (in.) | Jple | vs (ar | () () | N-value | ing | | /allc | Graphic Log | | | | and |
| Dep | San | Pen | Sample Depth (ft.) | She | Strength (psf) or RQD (%) | N-N | Casing | | (ft.) | Gra | | | | Unified Class. |
| 0 | B7 | | 0.42 - 5.00 | | | | SSA | | 570.6 | | 5" PAVEMENT | | | G#302155 |
| | | | | | | | | - | | | Brown, damp, fine to coarse Sandy | GRAVEL, trace silt, (Fill | | A-1-a, GW- |
| | | | | | | | | | | | | | | GM WC=3.7% |
| | | | | | | | | | | | | | | |
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| - 5 - | | | | | | | | 5 | 566.0 | ×××× | | | 5.0- | |
| | | | | | | | | | | | Bottom of Exploration a NO REFUSAL | t 5.0 feet below ground su | rface. | |
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| Rema | arks: | | | | | | | | | | | | | |
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| | | | pproximate bour | | | | | | | | | Page 1 of 1 | | |
| | | | een made at time ne measurement | | | ited. Gro | undwat | er fluct | tuatior | ns may c | ccur due to conditions other | Boring No.: | HB-ACT- | 110 I |
| a.diri | | | acaromoni | | | | | | | | | | | |

| I | Main | e Depa | artment | of Transport | ation | | Projec | t: A | 2.17 | mile | oortion of Route 109 | Boring No.: | HB-A | CT-201 |
|---|--|---|--|--|--|--------------------------------|-----------------|------------------|--|--|---|--|---|--|
| | | _ | Soil/Rock Exp | | | | Locati | on: | Acto | n, Ma | ne | | | - |
| | | <u>[</u> | JS CUSTOM | <u>ARY UNITS</u> | | | | | | | | WIN: | 2026 | 57.00 |
| Drill | er: | | MaineDOT | | Eleva | ation | (ft.) | 2 | 726.9 |) | | Auger ID/OD: | 5" Solid Stem | |
| Ope | rator: | | Daggett/Niles | | Datu | m: | | l | NAV | D88 | | Sampler: | Standard Split | Spoon |
| Log | ged By: | | B. Wilder | | Rig T | уре | : | (| CME | 45C | | Hammer Wt./Fall: | 140#/30" | |
| Date | Start/Fi | inish: | 6/12/2019;06 | :30-08:15 | | - | lethod: | (| Case | d Was | n Boring | Core Barrel: | N/A | |
| | ng Loca | | 96+50, 7.5 ft | Lt. | Casir | - | | 1 | NW- | 3" | | Water Level*: | 1.9 ft bgs. | |
| Ham Defini | | iciency F | actor: 0.928 | R = Rock C | | | Туре: | | | tic⊠ Peak/R | Hydraulic emolded Field Vane Undrained She | Rope & Cathead | Pocket Torvane She | ar Strength (psf) |
| D = S MD = U = TI MU = V = Fi | plit Spoon S Unsuccess hin Wall Tu Unsuccess ield Vane S | sful Split Spo Ibe Sample sful Thin Wa Shear Test, | oon Sample Atter Il Tube Sample A PP = Pocket Pe ne Shear Test At | SSA = Solid mpt HSA = Holly RC = Roller Attempt WOH = We enetrometer WOR/C = V | d Stem Aug ow Stem Au Cone ight of 140I Veight of Re | ger uger Ib. Ha ods o | r Casing | 2 0 1 1 | Su(lal 1p = l N-unc Hamn N60 = | o) = Lal Jnconfi correcte ner Effi SPT N | Vane Undrained Shear Strength (hed Compressive Strength (ksf) d = Raw Field SPT N-value siency Factor = Rig Specific Annual -uncorrected Corrected for Hamme her Efficiency Factor/60%)*N-uncor | psf) WC LL = PL = PL = PC Calibration Value PI = er Efficiency G = | Water Content, peri- Liquid Limit Plastic Limit Plastic Limit Plasticity Index Grain Size Analysis <u>Consolidation Test</u> | cent |
| Depth (ft.) | Sample No. | Pen./Rec. (in.) | Sample Depth (ft.) | Blows (/6 in.) Shear Strength (psf) or RQD (%) | N-uncorrected | N60 | Casing Blows | Elevation | (ft.) | Graphic Log | Visual De | scription and Remarks | | Laboratory Testing Results/ AASHTO and Unified Class. |
| 0 | | | | | | | SSA | | | | 11" HMA. | | | |
| | 1D | 24/12 | 1.00 - 3.00 | 12/13/9/8 | 22 | 34 | | _ | 26.0 | | Brown, moist, medium den old pavement, (Fill). | se, Silty fine to coarse Sz | - | |
| | | | | | | | | 72 | 2.9 | ĬĬĬ | | | 4.0- | |
| - 5 - | 2D | 9.6/9.6 | 5.00 - 5.80 | 13/50(3.6") | | | a100 | _ | | | ^a 100 blows for 0.8 ft. Brown, moist, dense, Silty | fine to coarse SAND, tra | ce gravel. | G#337341 A-4, SM |
| | | | | | | | OPEN HOLE | | | | Cobble from 5.8-6.3 ft bgs. Roller Coned ahead to 10.0 | | | WC=11.1% |
| | | | | | | | | - | | | Cobble from 6.9-7.5 ft bgs. | it ogs. | | |
| | | | | | | | | _ | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| - 10 - | 3D | 12/12 | 10.00 - 11.00 | 16/66 | | | | 71 | 6.9 | | Brown, wet, very dense, Gr occasional cobble. | ravelly fine to coarse SAl | ND, little silt, | |
| | | | | | | | | _ | | | Roller Coned ahead to 13.0 Cobble from 11.0-11.4 ft b | ft bgs. gs. | | |
| | | | | | | | $\downarrow V$ | - 71 | 3.9 | | Bottom of Exploratio | n at 13.0 feet below grou | 13.0- | |
| | | | | | | | | 1 | | | NO REFUSAL | | | |
| - 15 - | | | | | | | | | | | | | | |
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| 25 Rem | arks: | | | | | | | | | | | | | |
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| Stratif | ication line | s represent | approximate bou | ndaries between soil types; | transitions i | may b | e gradua | I. | | | | Page 1 of 1 | | |
| | | | been made at tim me measuremen | nes and under conditions sta ts were made. | ted. Groun | ndwate | er fluctuat | ions m | ay oo | cur du | to conditions other | Boring No | HB-ACT- | 201 |

| [] | Main | e Dep | artment | of Transport | ation | Р | roject: | A 2.1 | 7 mile j | portion of Route 109 | Boring No.: | HB-A | CT-202 |
|---|--|--|---|---|------------------------------|------------------------|-----------------|---|--|--|--|--|--|
| | | | Soil/Rock Exp | - | | L | ocatio | n: Act | on, Ma | ine | | | |
| | | <u> </u> | US CUSTOM | <u>ARY UNITS</u> | | | | | | | WIN: | 2020 | 67.00 |
| Drill | er: | | MaineDOT | | Elevat | ion (| ft.) | 722 | 9 | | Auger ID/OD: | 5" Dia. | |
| Ope | rator: | | Daggett/Niles | | Datum | : | | NA | /D88 | | Sampler: | Standard Split | Spoon |
| Log | ged By: | | B. Wilder | | Rig Ty | pe: | | CM | E 45C | | Hammer Wt./Fall: | 140#/30" | |
| Date | e Start/Fi | nish: | 6/12/2019; 13 | :30-14:45 | Drilling | - | | Soli | d Stem | Auger | Core Barrel: | N/A | |
| Bori | ng Loca | tion: | 97+25, 12.5 f | t Rt. | Casing | | | N/A | | | Water Level*: | None Observe | d |
| Ham Defini | | ciency F | actor: 0.928 | R = Rock | Hamm Core Sample | er Ty | /pe: | Autom | | Hydraulic emolded Field Vane Undrained She | Rope & Cathead | Pocket Torvane She | ar Strength (psf) |
| D = S MD = U = T MU = V = F | plit Spoon Unsuccess hin Wall Tu Unsuccess ield Vane S | sful Split Spo be Sample sful Thin Wa Shear Test, | oon Sample Atter Il Tube Sample A PP = Pocket Pe <u>ne Shear Test At</u> | SSA = Sol mpt HSA = Hol RC = Rolle kttempt WOH = W enetrometer WOR/C = tempt WO1P = V | d Stem Auger low Stem Aug | ler Hamr Is or C | asing | S _{u(la} q _p = N-ur Ham N ₆₀ | _{ib)} = Lal Unconfi correcte mer Effi = SPT N | Vane Undrained Shear Strength (ned Compressive Strength (ksf) d = Raw Field SPT N-value ciency Factor = Rig Specific Annua I-uncorrected Corrected for Hamme ner Efficiency Factor/60%)*N-unco | psf) WC LL = PL = I Calibration Value PI = er Efficiency G = | = Water Content, per Liquid Limit : Plastic Limit Plasticity Index Grain Size Analysis Consolidation Test | |
| Depth (ft.) | Sample No. | Pen./Rec. (in.) | Sample Depth (ft.) | Blows (/6 in.) Shear Strength (psf) or RQD (%) | N-uncorrected | 09v1 | Casing Blows | Elevation (ft.) | Graphic Log | Visual De | scription and Remarks | | Laboratory Testing Results/ AASHTO and Unified Class. |
| 0 | 1D | 24/14 | 0.00 - 2.00 | 4/5/5/7 | | 5 | SSA | | | Brown, moist, medium den | se, fine to coarse SAND, | some gravel, trace | |
| | | | | | | | | 718.9 | | silt, (Fill). | | 4.0 | A-1-b, SW-SM WC=7.1% |
| - 5 - | 2D | 24/20 | 5.00 - 7.00 | 4/18/14/20 | 32 4 | 9 | | | | Brown, moist, dense, fine t | o coarse SAND, little gra | vel, little silt. | |
| | | 24/20 | 5.00 - 7.00 | 4/10/14/20 | J2 7 | | | | | | | | |
| | | | | | | | | 1 | | Cobble from 7.2-7.6 ft bgs. | | | |
| | | | | | | | | | | Cobble from 8.1-8.5 ft bgs. | | | |
| | | | | | | | +/ | 713.9 | | | | 9.0 | |
| - 10 - | 3D | 24/18 | 10.00 - 12.00 | 19/30/21/36 | 51 7 | '9 | | | | Brown, moist, very dense, | Gravelly fine to coarse SA | AND, little silt. | |
| | | | | | | | | 710.9 | | - | | | |
| | | | | | | _ | | | | Bottom of Exploration NO REFUSAL | n at 12.0 feet below grou | ind surface. | |
| - 15 - | | | | | | | | | | | | | |
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| Rem | arks: | | | | I | | | | | | | | · |
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| Stratit | fication line | s represent | approximate bou | ndaries between soil types; | transitions ma | ay be | gradual. | | | | Page 1 of 1 | | |
| | | | been made at tim me measuremen | nes and under conditions sta ts were made. | ated. Ground | water 1 | fluctuatio | ns may o | ccur du | e to conditions other | Boring No | .: HB-ACT- | 202 |

| | Main | e Dep | artment | of Transport | ation | | Project: | A 2.1 | 7 mil | e portion of Route 109 | Boring No.: | HB-A | CT-203 |
|--|--|--|--|--|---------------------------|------------------------------|-----------------|---|---|--|--|--|--|
| | | | Soil/Rock Exp | - | | | Locatio | n: Act | on, N | aine | | 202 | (7.00 |
| | | <u>!</u> | US CUSTOM | ARY UNITS | | | | | | | WIN: | 2020 | 67.00 |
| Drill | er: | | MaineDOT | | Eleva | tion | (ft.) | 721 | .4 | | Auger ID/OD: | 5" Dia. | |
| Ope | rator: | | Daggett/Niles | | Datun | n: | | NA | VD8 | | Sampler: | Standard Split | Spoon |
| | ged By: | | B. Wilder | | Rig Ty | ype | | | E 45 | | Hammer Wt./Fall: | 140#/30" | |
| ⊢ | e Start/Fi | | 6/12/2019; 08 | | _ | - | lethod: | | | n Auger | Core Barrel: | N/A | |
| L | ng Loca | | 98+00, 12.0 ft | Lt. | Casin | - | | N/A | | | Water Level*: | 9.0 ft bgs. | |
| Ham Defini | | ciency F | actor: 0.928 | R = Rock C | Hamn ore Sample | | Туре: | Auton S = | | I Hydraulic □ Remolded Field Vane Undrained She | Rope & Cathead \Box | Pocket Torvane She | ar Strength (psf) |
| D = S MD = U = T MU = V = Fi | plit Spoon Unsuccess hin Wall Tu Unsuccess ield Vane S | sful Split Spo be Sample sful Thin Wa Shear Test, | con Sample Atten Il Tube Sample A PP = Pocket Pe <u>ne Shear Test Att</u> | SSA = Solie npt HSA = Holl RC = Rolle ttempt WOH = We netrometer WOR/C = W | d Stem Auge ow Stem Au | er ger o. Ha ids oi | r Casing | S _{u(I} q _p = N-u Han N ₆₀ | ab) = : Unco ncorre nmer E = SP | ab Vane Undrained Shear Strength (fifned Compressive Strength (ksf) ted = Raw Field SPT N-value ficiency Factor = Rig Specific Annual N-uncorrected Corrected for Hamme <u>mmer Efficiency Factor/60%)*N-uncor</u> | psf) WC LL = PL = Calibration Value PI = er Efficiency G = | = Water Content, per Liquid Limit Plastic Limit Plasticity Index Grain Size Analysis Consolidation Test | cent |
| Depth (ft.) | Sample No. | Pen./Rec. (in.) | Sample Depth (ft.) | Blows (/6 in.) Shear Strength (pst) or RQD (%) | N-uncorrected | N60 | Casing Blows | Elevation (ft.) | Cranhic Lod | Visual De | scription and Remarks | | Laboratory Testing Results/ AASHTO and Unified Class. |
| 0 | 1D | 24/18 | 0.00 - 2.00 | 2/4/5/7 | 9 | 14 | SSA | | \otimes | Brown, damp, medium den silt, occasional cobble, (Fill | | some gravel, trace | |
| - 5 - | 2D | 24/20 | 5.00 - 7.00 | 5/5/7/9 | 12 | 19 | | 716.4 | | Brown, moist, medium den | | 5.0- some silt, trace | |
| | | | | | | | | 712.4 | 4 | gravel. | | 9.0- | |
| - 10 - | 3D | 24/18 | 10.00 - 12.00 | 1/2/2/4 | 4 | 6 | | 709.4 | 1 | Grey, wet, medium stiff, fir | - · · | | G#337343 A-4, CL WC=41.4% |
| | | | | | | | | | | Bottom of Exploration NO REFUSAL | 1 at 12.0 feet below grou | ind surface. | |
| - 15 - | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| - 20 - | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
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| 25 | | | | | | | | | | | | | |
| Rem | <u>narks:</u> | | | | | | | | | | | | |
| Stratif | fication line | s represent | approximate bou | ndaries between soil types; | transitions n | nay b | e gradual. | | | | Page 1 of 1 | | |
| | | | been made at tim me measuremen | es and under conditions sta ts were made. | ted. Ground | dwate | er fluctuatio | ns may | occur | ue to conditions other | Boring No | .: HB-ACT- | -203 |

| Ι | Main | e Depa | artment | of Transport | ation | | Project: | A 2.1 | 7 mile | portion of Route 109 | Boring No.: | HB-A | CT-204 |
|----------------------------------|---|---|---|--|--|------------------------------|-----------------|--|---|---|--|--|--|
| | | _ | Soil/Rock Exp | | | | Locatio | n: Act | on, M | ine | | | |
| | | <u>[</u> | JS CUSTOM | <u>ARY UNITS</u> | | | | | | | WIN: | 2020 | 67.00 |
| Drill | er: | | MaineDOT | | Eleva | tion | (ft.) | 720 | .8 | | Auger ID/OD: | 5" Solid Stem | |
| Ope | rator: | | Daggett/Niles | | Datur | n: | . , | NA | VD88 | | Sampler: | Standard Split | Spoon |
| Log | ged By: | | B. Wilder | | Rig T | ype | : | CM | E 450 | | Hammer Wt./Fall: | 140#/30" | |
| Date | Start/Fi | inish: | 6/12/2019; 10 | :30-12:00 | Drillin | ng N | lethod: | Cas | ed Wa | sh Boring | Core Barrel: | NQ-2" | |
| Bori | ng Loca | tion: | 98+75, 12.0 ft | t Rt. | Casir | ng IE |)/OD: | NW | -3" | | Water Level*: | 1.9 ft bgs. | |
| | | iciency Fa | actor: 0.928 | | Hamr | | Туре: | Autom | | | Rope & Cathead □ | | |
| MD = U = TI MU = V = Fi | plit Spoon Unsuccess hin Wall Tu Unsuccess eld Vane S | sful Split Spo Ibe Sample sful Thin Wa Shear Test, | oon Sample Atten II Tube Sample A PP = Pocket Pe ne Shear Test Att | RC = Roller WOH = We enetrometer WOR/C = V | Stem Aug w Stem Au Cone ght of 140I /eight of Ro | er uger b. Ha ods o | r Casing | S _{u(li} q _p = N-ur Harr N ₆₀ | ab) = L Uncor Icorrec mer E = SPT | temolded Field Vane Undrained She b Vane Undrained Shear Strength (ined Compressive Strength (ksf) ed = Raw Field SPT N-value ciciency Factor = Rig Specific Annual N-uncorrected Corrected for Hamme mer Efficiency Factor/60%)*N-uncor | wc LL = PL = Calibration Value PI = r Efficiency G = | Pocket Torvane She = Water Content, per Liquid Limit Plastic Limit Plasticity Index Grain Size Analysis Consolidation Test | cent |
| Depth (ft.) | Sample No. | Pen./Rec. (in.) | Sample Depth (ft.) | Blows (/6 in.) Shear Strength (pst) or RQD (%) | N-uncorrected | N ₆₀ | Casing Blows | Elevation (ft.) | Graphic Log | Visual De | scription and Remarks | | Laboratory Testing Results/ AASHTO and Unified Class. |
| 0 | 1D | 24/15 | 0.00 - 2.00 | 3/5/7/7 | 12 | 19 | SSA | | | Brown, moist, medium den silt, (Fill). | se, fine to coarse SAND, | some gravel, trace | |
| | | | | | | | | 717.3 | | | | 3.5- | |
| - 5 - | | | | | | | $\downarrow V$ | - | 5 | ^a 20 blows for 0.5 ft. | | | |
| | 2D | 3.6/3.6 | 5.00 - 5.30 | 50(3.6") | | | a20 OPEN | | 2 | Very dense, COBBLES. | | | |
| | | | | | | | HOLE | | | Roller Coned ahead to 8.0 f | t bgs. | | |
| | | | | | | | | | • | | | | |
| | | | | | | | | 712.8 | | | | | |
| | R1 | 60/60 | 8.00 - 13.00 | RQD = 68% | | | NQ-2 | | | Top of Bedrock at Elev. 71: R1: Bedrock: Interbedded F | | E and/or | |
| | | | | | | | | 1 | | DOLOSTONE [Rindgemer | | E and/or | |
| - 10 - | | | | | | | | | | Rock Quality = Fair R1: Core Times (min:sec) | | | |
| | | | | | | | | | | 8.0-9.0 ft (2:34) | | | |
| | | | | | | | | | | 9.0-10.0 ft (1:59) 10.0-11.0 ft (2:03) | | | |
| | | | | | | | 1.7 | 1 | | 11.0-12.0 ft (2:18) | | | |
| | | | | | | | $+ \vee$ | 707.8 | | 12.0-13.0 ft (2:16) 100% Recovery | | | |
| | | | | | | | | | | Bottom of Exploration | at 13.0 feet below grou | 13.0- | |
| | | | | | | | | | | | | | |
| - 15 - | | | | | | | | | | | | | |
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| | | | | | | | | 1 | | | | | |
| 25 Rem | arks: | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| Stratif | ication line | s represent : | approximate hou | ndaries between soil types; t | ransitions r | nav ^k | e gradual | | | | Page 1 of 1 | | |
| | | | | ies and under conditions stat | | | | ns may | | e to conditions other | | | |
| | | | me measuremen | | Su. Groun | awall | | | ui U | | Boring No | .: HB-ACT- | 204 |

| | Main | e Depa | artment | of Transport | ation | | Project | A 2.17 | mile p | portion of Route 109 | Boring No.: | HB-A | CT-205 |
|---------------------------------|--|---|---|--|--|--------------------------------|----------------------|---|--|--|--|--|--|
| | | | Soil/Rock Exp | | | | Locatio | n: Acto | n, Mai | ne | | | |
| | | <u>l</u> | JS CUSTOM | ARY UNITS | | | | | , | | WIN: | 2026 | 57.00 |
| Drill | er: | | MaineDOT | | Eleva | ation | (ft.) | 723. | 9 | | Auger ID/OD: | 5" Solid Stem | |
| ⊢ | rator: | | Daggett/Niles | | Datu | | () | | /D88 | | Sampler: | Standard Split | Spoon |
| Log | ged By: | | B. Wilder | | Rig T | уре | | CMI | E 45C | | Hammer Wt./Fall: | 140#/30" | |
| | Start/Fi | nish: | 6/12/2019; 09 | :30-10:30 | Drilli | ng N | lethod: | Case | d Was | h Boring | Core Barrel: | NQ-2" | |
| Bori | ng Loca | tion: | 99+40, 9.5 ft I | Lt. | Casir | ng IE |)/OD: | NW | 3" | | Water Level*: | None Observed | ł |
| Ham | mer Effi | ciency F | actor: 0.928 | | Hamr | mer | Туре: | Automa | | | Rope & Cathead □ | | |
| MD = U = T MU = V = Fi | plit Spoon S Unsuccess hin Wall Tu Unsuccess ield Vane S | ful Split Spo be Sample ful Thin Wa hear Test, | oon Sample Atten II Tube Sample A PP = Pocket Pe ne Shear Test Att | . RC = Roller ttempt WOH = We netrometer WOR/C = V | d Stem Aug ow Stem Au Cone ight of 140I Veight of Re | jer uger Ib. Ha ods o | r Casing | S _{u(la} q _p = N-uno Hamr N ₆₀ = | b) = Lab Unconfii correcte ner Effic = SPT N | emolded Field Vane Undrained She Vane Undrained Shear Strength (ed Compressive Strength (ksf) d = Raw Field SPT N-value ency Factor = Rig Specific Annual -uncorrected Corrected for Hamme nec Efficiency Factor/60%)*N-uncor | psf) WC = LL = PL = I Calibration Value PI = F er Efficiency G = C | Pocket Torvane She: Water Content, pero Liquid Limit Plastic Limit Plasticity Index Grain Size Analysis Consolidation Test | cent |
| Depth (ft.) | Sample No. | Pen./Rec. (in.) | Sample Depth (ft.) | Blows (/6 in.) Shear Strength (psf) or RQD (%) | N-uncorrected | N ₆₀ | Casing Blows | Elevation (ft.) | Graphic Log | Visual De | scription and Remarks | | Laboratory Testing Results/ AASHTO and Unified Class. |
| 0 | | | | | | | SSA | 702.0 | | 9" HMA. | | | |
| | 1D | 24/10 | 1.00 - 3.00 | 8/7/7/8 | 14 | 22 | | 723.2 | | Brown, moist, medium den silt, (Fill). | se, fine to coarse SAND, s | 0.8- some gravel, trace | |
| - 5 - | | | | | | | | 719.9 | **** | Brown, moist, very dense, 1 | fine to coarse SAND_little | | |
| | 2D | 24/8 | 5.00 - 7.00 | 8/16/22/40 | 38 | 59 | | | | brown, moist, very dense, i | line to coarse 57(17), nuc | graver, intre sint. | |
| | | | | | | | | | | | | | |
| | R1 | 60/60 | 9.50 - 14.50 | RQD = 57% | | | a50 | 714.4 | | a50 blows for 0.5 ft. | | 9.5- | |
| - 10 - | | | | | | | NQ-2 | | | Top of Bedrock at Elev. 71 R1: Bedrock: Interbedded I DOLOSTONE [Rindgemer Rock Quality = Fair | PELITE and LIMESTONE | E and/or | |
| | | | | | | | | | | R1: Core Times (min:sec) 9.5-10.5 ft (2:04) 10.5-11.5 ft (2:01) | | | |
| | | | | | | | | | | 11.5-12.5 ft (2:29) | | | |
| | | | | | | | $\uparrow \forall /$ | 700.4 | | 12.5-13.5 ft (2:08) 13.5-14.5 ft (2:27) | | | |
| - 15 - | | | | | | | <u> </u> | 709.4 | | 100% Recovery | | 14.5- | |
| | | | | | | | | | | Bottom of Exploration | n at 14.5 feet below grou | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| - 20 - | | | | | | | | | | | | | |
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| _25 | arks: | | | | | | | | | | | | |
| Kem | <u>iai 115.</u> | | | | | | | | | | | | |
| Stratif | fication line | s represent | approximate bour | ndaries between soil types; | transitions i | may b | e gradual. | | | | Page 1 of 1 | | |
| | | | | es and under conditions sta | | | | ns may o | ccur due | e to conditions other | | | |
| than | those pres | ent at the ti | me measurement | ts were made. | | | | | | | Boring No. | : HB-ACT- | 205 |

| | Main | e Depa | artment | of Transport | atior | 1 | Project | A 2.1 | 7 mile p | portion of Route 109 | Boring No.: | HB-A | CT-206 |
|---|---|---|--|--|--|-------------------------------------|------------------|---|--|---|--|--|--|
| | | | Soil/Rock Exp JS CUSTOM | | | | Locatio | n: Act | on, Mai | ne | WIN: | 2024 | 7.00 |
| | | <u>_</u> | <u>55 C05 T0IVI</u> | AIT UNITS | | | | | | | VVIIN. | 2020 | 57.00 |
| Drill | | | MaineDOT | | - | vation | (ft.) | 722 | | | Auger ID/OD: | 5" Solid Stem | |
| <u> </u> | rator: | | Daggett/Niles | | - | um: | | | VD88 | | Sampler: | Standard Split | Spoon |
| <u> </u> | ged By: e Start/Fi | inich: | B. Wilder 6/17/2019; 06 | | _ | Type | : lethod: | | E 45C | h Boring | Hammer Wt./Fall: Core Barrel: | 140#/30" NQ-2" | |
| <u> </u> | ng Loca | | 113+75, 15.0 | | _ | sing ID | | NW | | n bornig | Water Level*: | 5.0 ft bgs. | |
| | | | actor: 0.928 | | _ | nmer | | Autom | | Hydraulic 🗆 | Rope & Cathead □ | | |
| Defini D = S MD = U = T MU = V = F | itions: plit Spoon Unsuccess hin Wall Tu Unsuccess ield Vane S | Sample sful Split Spo ube Sample sful Thin Wa Shear Test, <u>sful Field Va</u> | oon Sample Atter II Tube Sample A PP = Pocket Pe ne Shear Test At | RC = Rolle Attempt WOH = W enetrometer WOR/C = | d Stem A low Stem r Cone eight of 14 Weight of | uger Auger 40lb. Ha Rods o | r Casing | S _{u(la} q _p = N-ur Ham N ₆₀ | ab) = Lat Unconfi correcte mer Effic = SPT N | emolded Field Vane Undrained Shi Vane Undrained Shear Strength (hed Compressive Strength (ksf) d = Raw Field SPT N-value itency Factor = Rig Specific Annua -uncorrected Corrected for Hamme ner Efficiency Factor/60%)*N-unco | ear Strength (psf) T, (psf) W Pi I Calibration Value P er Efficiency G | Pocket Torvane Shei Water Content, perc Liquid Limit Plastic Limit Plasticity Index Grain Size Analysis Consolidation Test | |
| Depth (ft.) | Sample No. | Pen./Rec. (in.) | Sample Depth (ft.) | Blows (/6 in.) Shear Strength (psf) or RQD (%) | N-uncorrected | N ₆₀ | Casing Blows | Elevation (ft.) | Graphic Log | | scription and Remark | | Testing Results/ AASHTO and Unified Class. |
| 0 | 1D | 24/14 | 0.00 - 2.00 | 4/3/2/2 | 5 | 8 | SSA | | | Brown, moist, loose, fine to (Fill). | o coarse SAND, some g | gravel, little silt, | |
| | | | | | | | | 1 | | | | | |
| | | | | | | | | 1 | | | | | |
| | | | | | | | | 719.9 | | | | 3.0- | |
| | | | | | | | $\left \right $ | - | | | | | |
| - 5 - | | | | | | | $ \vee $ | | | Deserve and deserve Correctly | - CAND | 11441 | |
| | 2D | 21.6/18 | 5.00 - 6.80 | 5/8/23/40(3.6") | 31 | 48 | 15 | | | Brown, wet, dense, Gravell weathered rock in tip of spo | | , little silt, | |
| | R1 | 60/60 | 6.80 - 11.80 | RQD = 65% | | | NQ-2 | 716.1 | ×// × | | | 6.8- | |
| | | | | | | | | | | Top of Bedrock at Elev. 71 R1: Bedrock: Interbedded I | | | |
| | | | | | | | | 1 | | DOLOSTONE [Rindgemen | | | |
| | | | | | | | | - | | Rock Quality = Fair R1: Core Times (min:sec) | | | |
| - 10 - | | | | | | | | - | | 6.8-7.8 ft (2:02) 7.8-8.8 ft (1:58) | | | |
| | | | | | | | | | | 8.8-9.8 ft (1:56) 9.8-10.8 ft (1:58) | | | |
| | | | | | | | $ \vee $ | 711.1 | | 10.8-11.8 ft (2:00) 100% Recovery | | | |
| | | | | | | | | 1 | | Bottom of Exploration | n at 11 8 faat balow gr | | |
| | | | | | | | | 1 | | Dottoin of Exploration | ii at 11.0 ieet below gi | ound surface. | |
| | | | | | | | | 1 | | | | | |
| - 15 - | | | | | | | | - | | | | | |
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| | | | | | | | | 1 | | | | | |
| 25 Rem | harks: | | | | | | 1 | 1 | 1 | 1 | | | |
| | | | | | | | | | | | | | |
| Strati | fication line | s represent | approximate bou | ndaries between soil types | transition | is may b | e gradual. | | | | Page 1 of 1 | | |
| | | | | nes and under conditions st | ated. Gro | undwate | er fluctuatio | ons may o | occur due | e to conditions other | Boring N | | 206 |
| thar | those pre | sent at the ti | me measuremen | ts were made. | | | | | | | Boring N | o.: HB-ACT- | 200 |

| Ι | Main | e Dep | artment | of Transporta | atio | n | Project: | A 2.1 | 7 mile p | oortion of Route 109 | Boring No.: | HB-A | CT-207 |
|------------------|----------------------|---------------|--------------------------------------|--|---------------|----------|-----------------|------------------------|-----------|--|--------------------------------|--------------------------------------|--------------------------|
| | | - | Soil/Rock Exp | 0 | | | Locatio | n: Acto | on, Mai | ne | | • • • | |
| | | <u> </u> | US CUSTOMA | ARY UNITS | | | | | | | WIN: | 2020 | 57.00 |
| Drille | er: | | MaineDOT | | Ele | vation | ı (ft.) | 587. | 0 | | Auger ID/OD: | 5" Solid Stem | |
| Oper | rator: | | Daggett/Niles | | Dat | tum: | . , | NA | /D88 | | | Standard Split | Spoon |
| Log | ged By: | | B. Wilder | | Rig | ј Туре | : | CM | E 45C | | Hammer Wt./Fall: | 140#/30" | |
| Date | Start/Fi | inish: | 6/17/2019; 08: | 45-10:45 | Dri | lling N | lethod: | Case | ed Wasl | n Boring | Core Barrel: | N/A | |
| Bori | ng Loca | tion: | 156+10, 11.5 | ì Rt. | Ca | sing IC | D/OD: | NW | -3" | | Water Level*: | 12.0 ft bgs. | |
| Ham | mer Effi | ciency F | actor: 0.928 | | Hai | mmer | Туре: | Autom | atic 🛛 | Hydraulic 🗆 | Rope & Cathead □ | | |
| Definit | tions: plit Spoon | Sample | | R = Rock C SSA = Solid | | | | | | emolded Field Vane Undrained She Vane Undrained Shear Strength (| | ket Torvane She ater Content, per | |
| MD = | Unsuccess | | oon Sample Atten | | w Stem | | | qp`= | Unconfir | ned Compressive Strength (ksf) d = Raw Field SPT N-value | LL = Liqu PL = Plas | id Limit | |
| MU = | Unsuccess | sful Thin Wa | II Tube Sample A | ttempt WOH = We | ght of 1 | | | Ham | mer Effic | iency Factor = Rig Specific Annual | Calibration Value PI = Plas | ticity Index | |
| | | | PP = Pocket Per ne Shear Test Att | | | | | №60 N ₆₀ | = (Hamn | -uncorrected Corrected for Hamme ner Efficiency Factor/60%)*N-uncor | rected C = Cons | n Size Analysis solidation Test | |
| | | | T T | Sample Information | | | | | { | | | | Laboratory |
| | ö | (in.) | Sample Depth (ft.) | Blows (/6 in.) Shear Strength (psf) or RQD (%) | N-uncorrected | | | | Log | | | | Testing Results/ |
| Depth (ft.) | Sample No. | Pen./Rec. | e D | gth D (9 | orre | | 0 | Elevation (ft.) | ic L | Visual De | scription and Remarks | | AASHTO |
| epth | dme | en./F | dme 🤆 | ows near rren(RQ | -nnc | N60 | Casing Blows | .) eva | Graphic | | | | and Unified Class. |
| | ů | ď | й ŧ, | ଅନ୍ଦ୍ର ନ | ż | ž | U III | ⊟€ | Ū | Duran and the diam day | Sector CAND | | - |
| | 1D | 24/17 | 0.00 - 2.00 | 4/4/10/9 | 14 | 22 | SSA | | | silt, (Fill). | se, fine to coarse SAND, som | ie gravel, trace | G#337347 A-1-b, SW-SM |
| | | | | | | | |] | | | | | WC=4.8% |
| | | | | | | | | 1 | ×× | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | 1 | | | | | |
| - 5 - | | | | | | | | | | Light brown damn loose f | ine to coarse SAND, some si | It trace | G#337348 |
| | 2D | 24/15 | 5.00 - 7.00 | 1/1/2/3 | 3 | 5 | | | | gravel, (Fill). | the to course shirts, some s | it, titee | A-2-4, SM |
| | | | | | | | |] | | | | | WC=12.8% |
| | | | | | | | | | | | | | |
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| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| - 10 - | | | | | | | <u> </u> | 577.0 | ***** | | | | G#337349 |
| | 3D | 24/16 | 10.00 - 12.00 | 2/2/6/15 | 8 | 12 | 2 | 576.0 | | Dark brown PEAT. | | 11.0 | A-1-b, SW-SM |
| | | | | | | | 11 | 570.0 | | | , fine to coarse SAND, trace | | WC=45.3% Loss on |
| | | | | | | | 82 | | | silt. | | | Ignition,(4.7%) |
| | | | | | | | | | | | | | |
| | | | | | | | 86 | | | | | | |
| | | | | | | | 107 | | | | | | |
| - 15 - | 4D | 24/19 | 15.00 - 17.00 | 12/17/30/27 | 47 | 73 | 9 | 572.0 | | Light brown, wet, very dens | se, fine to coarse SAND, som | | G#337350 A-2-4, SM |
| | | | | | | | | | | gravel. Beller Canad should to 20.0 | fthee | | WC=12.5% |
| | | | | | | | 26 | | | Roller Coned ahead to 20.0 | 11 025. | | |
| | | | | | | | 27 | | | | | | |
| | | | | | | | 38 | 1 | | | | | |
| | | | | | | | | • | | | | | |
| - 20 - | | | | | | | 77 | | | Light brown wat yang dan | se, fine to coarse SAND, som | a cilt traca | G#337301 |
| | 5D | 24/18 | 20.00 - 22.00 | 15/21/19/22 | 40 | 62 | 39 | | | gravel. | se, fine to coarse SAIND, SOIT | ie sin, uace | A-2-4, SM |
| | | | | | | | 63 | 1 | | | | | WC=12.6% |
| | | | | | | | (1 | | | | | | |
| | | | | | | | 64 | | | a100 blows for 0.8 ft. | | | |
| | | | | | | | a100 OPEN | | | | | | |
| | | | | | | | HOLE | | | Cobble from 23.8-24.2 ft by | - | | |
| 25 Rem | arks: | | | | | | | I | | Cobble from 24.6-24.9 ft bg | 30. | | |
| | - | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | ndaries between soil types; t | | | - | | | | Page 1 of 2 | | |
| | | - | been made at tim me measurement | es and under conditions stat s were made | ed. Gro | oundwate | er fluctuatio | ns may c | ccur due | to conditions other | Boring No.: | HB-ACT- | 207 |
| uian | alose pres | sont at the t | me measurement | S were made. | | | | | | | | | 201 |

| | Main | e Dep | artment | of Transport | ation | Project | A 2.17 | 7 mile p | ortion of Route 109 | Boring No.: | HB-A | CT-207 |
|--------------------------------|--|--|--|--|--|---------------------|--|--|---|--|--|--|
| | | | Soil/Rock Exp US CUSTOM | | | Locatio | n: Acto | on, Mai | ne | WIN: | 2020 | 67.00 |
| Drill | er: | | MaineDOT | | Elevatio | n (ft.) | 587. | 0 | | Auger ID/OD: | 5" Solid Stem | |
| L | rator: | | Daggett/Niles | | Datum: | | | /D88 | | Sampler: | Standard Split | Spoon |
| ⊢÷- | ged By: | | B. Wilder | | Rig Type | e: | | E 45C | | Hammer Wt./Fall: | 140#/30" | 1 |
| <u> </u> | Start/Fi | inish: | 6/17/2019;08 | :45-10:45 | Drilling | | | | 1 Boring | Core Barrel: | N/A | |
| <u> </u> | ing Loca | | 156+10, 11.5 | | Casing I | | NW | | 6 | Water Level*: | 12.0 ft bgs. | |
| Ham | nmer Effi | iciency F | actor: 0.928 | | Hammer | r Type: | Automa | atic 🛛 | Hydraulic 🗆 | Rope & Cathead □ | | |
| MD = U = T MU = V = F | plit Spoon Unsuccess hin Wall Tu Unsuccess ield Vane S | sful Split Sp ibe Sample sful Thin Wa Shear Test, | II Tube Sample A PP = Pocket Pe ne Shear Test At | SSA = Sol mpt HSA = Hol RC = Rolle Attempt WOH = Wo workrometer WOR/C = tempt WO1P = V | d Stem Auger d Stem Auger low Stem Auger r Cone eight of 140 lb. H Weight of Rods /eight of One Pe | lammer or Casing | S _{u(la} q _p = N-un Hami N ₆₀ : | b) = Lab Unconfir correcte mer Effic = SPT N | molded Field Vane Undrained Sh Vane Undrained Shear Strength (led Compressive Strength (ksf) = Raw Field SPT N-value iency Factor = Rig Specific Annua -uncorrected Corrected for Hamm her Efficiency Factor/60%)*N-unco | ear Strength (psf) T _v = (psf) WC = LL = PL = I Calibration Value PI = F er Efficiency G = C | Pocket Torvane She Water Content, per Liquid Limit Plastic Limit Plasticity Index Grain Size Analysis consolidation Test | |
| | <u> </u> | | | Sample Information | 7 | | | 1 | | | | Laboratory |
| 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 | | escription and Remarks | | Testing Results/ AASHTO and Unified Class. |
| 25 | 6D | 8.4/6 | 25.00 - 25.70 | 46/50(2.4") | | | - | | Light brown, wet, very den gravel. Cobble from 25.7-26.0 ft b Roller Coned ahead to 28.0 | gs. | ome silt, trace | G#337302 A-2-4, SM WC=9.2% |
| | | | | | | | 559.0 | | Bottom of Exploration NO REFUSAL | n at 28.0 feet below grou | nd surface. | |
| - 30 · | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | - | | | | | |
| - 35 - | | | | | | | - | | | | | |
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| | | | | | | | | | | | | |
| - 40 · | | | | | | | - | | | | | |
| | | | | | | | - | | | | | |
| | | | | | | | | | | | | |
| - 45 · | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | 1 | | | | | |
| <u>50</u> <u>Rem</u> | larks: | | | | | | 1 | I | | | | |
| | | | | | | | | | | | | |
| | | | | ndaries between soil types; nes and under conditions sta | | | ins may o | cour due | to conditions other | Page 2 of 2 | | |
| | | | ime measuremen | | | ter nuctuatio | ma may 0 | | | Boring No. | : HB-ACT- | 207 |

| N | Iaine | | | of Trans | sporta | tion | Pr | roject: | A 2.17 | 7 mile portion of Route 109 | Boring No.: | HB-AC | Г-208 |
|---|--|--|--|--|--|---|---------|--------------------|-------------|------------------------------|---|--|--|
| | | | Soil/Rock Expl | | | | Lo | ocation | : Acto | on, Maine | WIN: | 2020 | 67.00 |
| Drillin | na Conti | actor: | MaineDOT | | | Elevatio | n (f | +) | 586. | 3 | Auger ID/OD: | 5" Dia. | |
| Opera | - | | Daggett/Niles | | | Datum: | | | | /D88 | Sampler: | N/A | |
| <u> </u> | ed By: | | B. Wilder | | | Rig Typ | ٥. | | | E 45C | Hammer Wt./Fall: | N/A | |
| | Start/Fir | | 6/17/2019; 11: | ·00-12·00 | | Drilling | | hod. | | d Stem Auger | Core Barrel: | N/A | |
| | g Locat | | 156+45, 8.0 ft | | | Casing | | | N/A | - | Water Level*: | None Observed | 1 |
| Definition S = Sart B = Buon MD = U U = Thi MV = U | ons: D = mple off Au cket Sampl Jnsuccessf in Wall Tub Jnsuccessf | Spilt Spoor Iger Flights e off Auger ul Split Spo e Sample ul Field Var | n Sample Flights ion Sample Attern ne Shear Test Att <u>PP= Pocket Per</u> | MI R SS npt HS RC tempt W | J = Unsucces = Rock Core & = Solid Sta & = Hollow & C = Roller Co OH = Weight <u>OR/C = Weig</u> | ssful Thin Wa Sample em Auger Stem Auger ne of 140lb. Ha | all Tul | be Sampl | | | ndrained Shear Strength (psf) ar Strength (psf) ngth (ksf) h (psf) | LL = Liquid Lim PL = Plastic Lin PI = Plasticity Ir G = Grain Size C = Consolidati | it nit Analysis |
| | | <u> </u> | | | | | | | | | | | Laboratory |
| o Depth (ft.) | Sample No. | Pen./Rec. (in.) | Sample Depth (ft.) | Blows (/6 in.) Shear Strength | (psi) or RQD (%) | N-value Casing | Blows | Elevation (ft.) | Graphic Log | | iption and Remarks | | Testing Results/ AASHTO and Unified Class. |
| 0 | | | | | | SS | A | | | Probe, no samples taken. | | | |
| - 5 - - 10 - - 20 - | | | | | | | | | | Soils Similar to HB-ACT-207. | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| Ot | ation P | ' | annewi | nderies 5-1 | noil trans t | maiti | / ha = | una d ' | | | Dogo 1 of 0 | | |
| | | | | ndaries between | | | | | | | Page 1 of 2 | | |
| | | | been made at tim me measurement | | ditions stated | d. Groundwa | ater fl | uctuation | s may o | ccur due to conditions other | Boring No. | : HB-ACT- | 208 |

| N | Iaine | e Depa | rtment | of Tra | nsporta | tion | F | Project: | A 2.1 | 7 mile portion of Route 109 | Boring No.: | HB-AC | Г-208 |
|--------------------------------------|---|--|--|-------------------------------------|--|--|-------|--------------------|-------------|---|---------------------------------|--|--|
| | | | oil/Rock Exp | | | | L | .ocation | : Acto | on, Maine | | 202 | |
| | | <u>L</u> | S CUSTOM | <u>ARY UNITS</u> | <u>.</u> | | | | | | WIN: | 2020 | 57.00 |
| Drilliı | ng Cont | ractor: | MaineDOT | | | Elevat | on (| (ft.) | 586. | 3 | Auger ID/OD: | 5" Dia. | |
| Oper | ator: | | Daggett/Niles | | | Datum | : | | NAV | /D88 | Sampler: | N/A | |
| Logg | ed By: | | B. Wilder | | | Rig Ty | pe: | | CM | E 45C | Hammer Wt./Fall: | N/A | |
| | Start/Fi | | 6/17/2019; 11 | | | Drilling | | | | d Stem Auger | Core Barrel: | N/A | |
| | g Locat | tion: Spilt Spoon | 156+45, 8.0 ft | | MU = Unsucce | Casing | · | | N/A | | Water Level*: | None Observe | 1 |
| S = Sa B = Bu MD = U U = Th | mple off Au cket Samp Jnsuccessi in Wall Tub | uger Flights le off Auger ful Split Spo pe Sample | | npt | R = Rock Core SSA = Solid Si HSA = Hollow RC = Roller Co WOH = Weigh | e Sample tem Auger Stem Auger one | | | | $ \begin{array}{l} S_{u} = \text{Peak/Remolded Field Vane U} \\ S_{u}(lab) = \text{Lab Vane Undrained She} \\ q_{p} = \text{Unconfined Compressive Stree} \\ \text{N-value} = \text{Raw Field SPT N-value} \\ T_{v} = \text{Pocket Torvane Shear Strengt} \end{array} $ | ar Strength (psf) ngth (ksf) | LL = Liquid Lim PL = Plastic Lir Pl = Plasticity I G = Grain Size | nit ndex |
| V = Fie | ld Vane Sl | hear Test, | PP= Pocket Per | netrometer | WOR/C = Wei | | | | | WC = Water Content, percent ≅ = S | | C = Consolidat | on Test |
| | | <u> </u> | | Sample Inf | | | | | | | | | Laboratory |
| Depth (ft.) | Sample No. | Pen./Rec. (in.) | Sample Depth (ft.) | Blows (/6 in.) Shear Strendth | (psf) or RQD (%) | N-value | Blows | Elevation (ft.) | Graphic Log | Visual Descr | iption and Remarks | | Testing Results/ AASHTO and Unified Class. |
| 25 | | | | | | | V | 560.8 | | | | 25.5 | |
| | | | | | | | | _ | | Bottom of Exploration at NO REFUSAL | 25.5 feet below ground s | | |
| - 30 - | | | | | | | | - | | | | | |
| - 35 - | | | | | | | | - | | | | | |
| - 40 - | | | | | | | | - | | | | | |
| - 45 - | | | | | | | | - | | | | | |
| Rema Stratific * Water | cation lines | lings have b | pproximate bour een made at tim re measuremeni | ies and under | | | | | s may c | ccur due to conditions other | Page 2 of 2 Boring No. | : HB-ACT- | 208 |

| | Main | e Depa | artment | of Transport | ation | Τ | Project: | A 2.1 | 7 mile j | portion of Route 109 | Boring No.: | HB-A | CT-209 |
|--------------------------------|--|---|--|---|---|-----------------------|-----------------|---|--|--|--|---|--|
| | | | Soil/Rock Exp JS CUSTOM | | | | Locatio | n: Act | on, Ma | ne | WIN: | 2026 | 57.00 |
| | | | MaineDOT | | Elevet | | (64.) | 590 | 2 | | | 5" Die | |
| Drill | er: rator: | | Daggett/Niles | | Elevat Datum | | (π.) | 580 | 5 /D88 | | Auger ID/OD: Sampler: | 5" Dia. Standard Split | Spoon |
| ⊢÷– | ged By: | | B. Wilder | | Rig Ty | | | | E 45C | | Hammer Wt./Fall: | 140#/30" | вроон |
| | Start/Fi | nish: | 6/17/2019; 13 | :00-13:30 | Drilling | · · | | | | Auger | Core Barrel: | N/A | |
| L | ng Loca | | 169+50, 10.0 | | Casing | - | | N/A | | 0 | Water Level*: | 3.5 ft bgs. | |
| Ham | mer Effi | ciency F | actor: 0.928 | | Hamm | er 1 | Гуре: | Autom | atic 🖂 | Hydraulic 🗆 | Rope & Cathead □ | | |
| MD = U = T MU = V = F | plit Spoon S Unsuccess hin Wall Tu Unsuccess ield Vane S | ful Split Spo be Sample ful Thin Wa hear Test, | oon Sample Atter II Tube Sample A PP = Pocket Pe ne Shear Test At | SSA = Soli npt HSA = Holl RC = Rolle MOH = We enetrometer WOR/C = N | Core Sample d Stem Auger ow Stem Aug r Cone eight of 140lb. Veight of Roc leight of One | ger . Har ds or | Casing | S _{u(la} q _p = N-ur Ham N ₆₀ | _{ib)} = Lat Unconfi correcte mer Effi = SPT N | emolded Field Vane Undrained Shea Vane Undrained Shear Strength (ned Compressive Strength (ksf) d = Raw Field SPT N-value ciency Factor = Rig Specific Annual -uncorrected Corrected for Hamme ner Efficiency Factor/60%)*N-uncor | psf) WC = LL = L PL = I Calibration Value PI = F er Efficiency G = G | Pocket Torvane She Water Content, per iquid Limit Plastic Limit Plasticity Index rain Size Analysis onsolidation Test | cent |
| Depth (ft.) | Sample No. | Pen./Rec. (in.) | Sample Depth (ft.) | Blows (/6 in.) Shear Strength (psf) or RQD (%) | N-uncorrected | N60 | Casing Blows | Elevation (ft.) | Graphic Log | Visual De | scription and Remarks | | Laboratory Testing Results/ AASHTO and Unified Class. |
| 0 | 1D | 24/13 | 0.00 - 2.00 | 3/4/5/5 | 9 1 | 14 | SSA | | | Brown, wet, medium dense silt, (Fill). | , fine to coarse SAND, so | ne gravel, little | |
| - 5 - | | | | | | | | 575.3 | | он, (тн). | | 5.0 | 0//2272.14 |
| | 2D/A | 24/18 | 5.00 - 7.00 | 3/2/9/16 | 11 1 | 17 | | 070.0 | | 2D (5.0-6.0 ft bgs.) Black O | Organic SILT, fine sand. | 5.0 | G#337344 A-1-b, SM |
| | | | | | | | | | | 2D/A (6.0-7.0 ft bgs.) Brow SAND, some gravel, little s | | e to coarse | WC=172.4% |
| | | | | | | | | 571.8 | | | | | |
| | | | | | | | | | | | | | |
| - 10 - | 3D | 24/19 | 10.00 - 12.00 | 2/5/14/17 | 19 2 | 29 | | | | Light brown, wet, medium | dense, fine to medium SA | ND, trace silt. | |
| | | | | | | | | 568.3 | | Bottom of Exploration NO REFUSAL | n at 12.0 feet below groun | 12.0- ad surface. | |
| - 15 - | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| - 20 - | | | | | | | | | | | | | |
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| | | | | | | | | | | | | | |
| 25 Rem | arks: | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | ndaries between soil types; | | | | | | | Page 1 of 1 | | |
| | | | been made at tim me measuremen | es and under conditions sta ts were made. | ted. Ground | wate | r fluctuatio | ns may o | ccur due | e to conditions other | Boring No. | HB-ACT- | 209 |

| [] | Main | e Depa | artment | of Transport | ation | | Project: | A 2.1′ | mile j | portion of Route 109 | Boring No.: | HB-A | CT-210 |
|---|--|--|--|--|--------------------------|--------------------------------|-----------------|---|---|---|---|---|--|
| | | | Soil/Rock Exp | | | | Locatio | n: Acto | on, Ma | ine | | | |
| | | <u> </u> | JS CUSTOM | <u>ARY UNITS</u> | | | | | | | WIN: | 2026 | 67.00 |
| Drill | er: | | MaineDOT | | Eleva | ation | (ft.) | 578. | 7 | | Auger ID/OD: | 5" Dia. | |
| Ope | rator: | | Daggett/Niles | 5 | Datu | m: | | NAV | /D88 | | Sampler: | Standard Split | Spoon |
| Log | ged By: | | B. Wilder | | Rig T | уре | | CM | E 45C | | Hammer Wt./Fall: | 140#/30" | |
| Date | Start/Fi | nish: | 6/17/2019; 11 | :30-14:00 | _ | - | lethod: | Soli | l Stem | Auger | Core Barrel: | N/A | |
| ⊢ | ng Loca | | 170+25, 5.0 f | t Lt. | Casir | - | | N/A | | | Water Level*: | 2.5 ft bgs. | |
| Ham Defini | | ciency F | actor: 0.928 | R = Rock (| Hamr Core Sample | | Туре: | Automa S., = | | Hydraulic emolded Field Vane Undrained Sho | Rope & Cathead ear Strength (psf) T= | Pocket Torvane She | ar Strength (psf) |
| D = S MD = U = T MU = V = F | plit Spoon Unsuccess hin Wall Tu Unsuccess ield Vane S | sful Split Spo be Sample sful Thin Wa Shear Test, | oon Sample Atter Il Tube Sample A PP = Pocket Pe ne Shear Test At | SSA = Soli mpt HSA = Hol RC = Rolle Attempt WOH = We enetrometer WOR/C = V | d Stem Aug ow Stem Au | jer uger Ib. Ha ods o | r Casing | S _{u(la} q _p = N-un Ham N ₆₀ | b) = La Unconfi correcte ner Effi = SPT N | b Vane Undrained Shear Strength (ined Compressive Strength (ksf) id = Raw Field SPT N-value ciency Factor = Rig Specific Annua I-uncorrected Corrected for Hammin mer Efficiency Factor/60%)*N-unco | (psf) WC = LL = PL = I Calibration Value PI = er Efficiency G = 0 | Evater Content, per Liquid Limit Plastic Limit Plasticity Index Grain Size Analysis Consolidation Test | cent |
| Depth (ft.) | Sample No. | Pen./Rec. (in.) | Sample Depth (ft.) | Blows (/6 in.) Shear Strength (psf) or RQD (%) | N-uncorrected | N60 | Casing Blows | Elevation (ft.) | Graphic Log | Visual De | escription and Remarks | | Laboratory Testing Results/ AASHTO and Unified Class. |
| 0 | 1D | 24/16 | 0.00 - 2.00 | 4/6/4/4 | 10 | 15 | SSA | | | Brown, wet, medium dense | e, fine to coarse SAND, so | me gravel, trace | G#337345 |
| - 5 - | | | | | | | | 574.0 | | silt, (Fill). | | | A-1-b, SW-SM WC=9.6% |
| - 5 - | 2D | 24/17 | 5.00 - 7.00 | 4/7/9/12 | 16 | 25 | | 573.7 | 0.020 0.020 0.020 | Layer of Black Organics. | | | |
| | | | | | | | | | | Brown, wet, medium dense silt. | e, fine to coarse SAND, so | me gravel, trace | |
| - 10 - | | | | | | | $\downarrow V$ | | 0,000 | Brown, wet, dense, fine to | coarse SAND some grav | el trace silt | |
| | 3D | 24/6 | 10.00 - 12.00 | 8/13/10/12 | 23 | 36 | | | 0.00 0.00 0.00 | brown, wet, dense, mie to | coarse strives, some grav | ei, trace siit. | |
| | | | | | | | |] | 000 | | | | |
| - 15 - | | | | | | | | 566.7 | 001142 | Bottom of Exploration NO REFUSAL | n at 12.0 feet below grou | nd surface. | |
| | | | | | | | | | | | | | |
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| - 20 - | | | | | | | | 1 | | | | | |
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| | | | | | | | | 1 | | | | | |
| 25 Rem | arks: | | | | | | | | | I | | | |
| | | | | | | | | | | | | | |
| Strati | fication line | s represent | approximate bou | indaries between soil types; | transitions i | may b | e gradual. | | | | Page 1 of 1 | | |
| | | | been made at tim me measuremen | nes and under conditions sta nts were made. | ited. Groun | dwate | er fluctuatio | ns may c | ccur du | e to conditions other | Boring No. | : HB-ACT- | 210 |
| | . alose pres | | insasuremen | | | | | | | | | | |

| | Main | e Depa | artment | of Transport | ation | | Project: | A 2.1 | 7 mile | portion of Route 109 | Boring No.: | HB-A | CT-211 |
|---|---|---|---|--|--|---------------------|------------------|---|---|--|--|--|--|
| | | | Soil/Rock Exp JS CUSTOM | - | | | Locatio | n: Act | on, Ma | ine | WIN: | 2020 | 57.00 |
| | | | | | | | | | | | | | |
| Drill | - | | MaineDOT | | Eleva | | ı (ft.) | 578 | | | Auger ID/OD: | 5" Dia. | |
| ⊢÷– | rator: | | Daggett/Niles | | Datur | | | | VD88 | | Sampler: | Standard Split | Spoon |
| | ged By: e Start/Fi | nich | B. Wilder 6/17/2019; 14 | -20 15-20 | Rig T | | | | E 45C | Auger | Hammer Wt./Fall: Core Barrel: | 140#/30" N/A | |
| L | ing Loca | | 171+00, 8.0 ft | | Casin | - | lethod: | N/A | | Auger | Water Level*: | 4.0 ft bgs. | |
| ⊢ | - | | actor: 0.928 | | _ | - | Type: | Autom | | Hydraulic 🗆 | Rope & Cathead | 1.0 11 0 g 5. | |
| Defini D = S MD = U = T MU = V = F | itions: plit Spoon & Unsuccess hin Wall Tu Unsuccess ield Vane S | Sample ful Split Spo be Sample ful Thin Wa hear Test, | oon Sample Atten II Tube Sample A PP = Pocket Pe ne Shear Test Att | Attempt RC = Rolle WOH = We netrometer WOR/C = V | core Sample d Stem Aug ow Stem Au r Cone ight of 140ll Veight of Ro | er uger b. Ha | mmer r Casing | S _u = S _{u(li} q _p = N-ur Ham N ₆₀ | Peak/F ab) = La Uncon ncorrect mer Eff = SPT | temolded Field Vane Undrained She b Vane Undrained Shear Strength (ined Compressive Strength (ksf) de = Raw Field SPT N-value iciency Factor = Rig Specific Annua N-uncorrected Corrected for Hamme mer Efficiency Factor/60%)*N-unco | Strength (psf) T _V = psf) WC LL = PL = I Calibration Value PI = or Efficiency G = | Pocket Torvane She = Water Content, per Liquid Limit = Plastic Limit Plasticity Index Grain Size Analysis Consolidation Test | cent |
| Depth (ft.) | Sample No. | Pen./Rec. (in.) | Sample Depth (ft.) | Blows (/6 in.) Shear Strength (psf) or RQD (%) | N-uncorrected | N60 | Casing Blows | Elevation (ft.) | Graphic Log | Visual De | scription and Remarks | | Laboratory Testing Results/ AASHTO and Unified Class. |
| 0 | 1D | 24/14 | 0.00 - 2.00 | 4/5/6/5 | 11 | 17 | SSA | | | Brown, moist, medium den silt, (Fill). | se, fine to coarse SAND, | some gravel, trace | |
| | | | | | | | | 573.8 | | | | 4.5 | |
| - 5 - | 2D | 24/4 | 5.00 - 7.00 | 2/2/5/5 | 7 | 11 | | - | | Brown, wet, medium dense silt. | , fine to coarse SAND, li | - | |
| | | | | | | | | 571.3 | | Dark brown Organic SILT | on auger flight. | | |
| - 10 · | | | | | | | | - | | Brown, wet, loose, fine to c | coarse SAND trace grav. | el trace silt trace | G#337346 |
| | 3D | 24/6 | 10.00 - 12.00 | 1/1/2/3 | 3 | 5 | | 566.3 | | organics. | | | A-1-b, SW WC=37.8% |
| | | | | | | | | | | Bottom of Exploration NO REFUSAL | n at 12.0 feet below grou | | |
| - 15 - | | | | | | | | - | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | - | | | | | |
| - 20 · | | | | | | | | | | | | | |
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| 25 Rem | narks: | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| Stratit | fication line | s represent | approximate bou | ndaries between soil types; | transitions r | nay b | e gradual. | | | | Page 1 of 1 | | |
| | | | been made at tim me measuremen | es and under conditions sta ts were made. | ted. Groun | dwate | er fluctuatio | ns may o | occur du | e to conditions other | Boring No | .: HB-ACT- | 211 |

State of Maine - Department of Transportation <u>Probe Summary Sheet</u>

| Town(s): | Acton | Ì | | Proje | ct Numbe | r: 20267.00 |
|----------|----------|---------------|---------|------------|------------------|-----------------|
| Station | Offset | Top of Boring | Refusal | No Refusal | Bottom of Boring | Comments / Date |
| (Feet) | (Feet) | Elev. (Feet) | (Feet) | (Feet) | Elev. (Feet) | 7/15-16/2015 |
| 109+00 | 8.0 Rt. | 738.4 | 7.8 | | 730.6 | Probe |
| 109+00 | 7.0 Lt. | 738.5 | 3.0 | | 735.5 | Probe |
| 110+00 | 9.0 Rt. | 737.9 | 3.5 | | 734.4 | Probe |
| 110+00 | 8.0 Lt. | 738.0 | 3.4 | | 734.6 | Probe |
| 111+00 | 9.0 Rt. | 736.8 | 3.6 | | 733.2 | Probe |
| 112+00 | 7.0 Rt. | 734.6 | 1.6 | | 733.0 | Probe |
| 112+00 | 16.0 Rt. | 736.5 | | | | Bedrock Outcrop |
| 112+00 | 12.0 Lt. | 734.6 | 2.1 | | 732.5 | Probe |
| 113+00 | 7.0 Rt. | 728.1 | 2.4 | | 725.7 | Probe |
| 113+00 | 13.0 Rt. | 728.1 | | | | Bedrock Outcrop |
| 113+00 | 12.5 Lt. | 728.1 | 2.5 | | 725.6 | Probe |
| 114+00 | 7.5 Rt. | 721.6 | | 10.0 | 711.6 | Probe |
| 114+00 | 13.5 Rt. | 720.9 | | 10.0 | 710.9 | Probe |
| 118+00 | 10.5 Rt. | 710.1 | 6.4 | | 703.7 | Probe |
| 118+00 | 9.0 Lt. | 709.9 | 7.4 | | 702.5 | Probe |
| 119+00 | 10.0 Rt. | 707.7 | 5.5 | | 702.2 | Probe |
| 119+00 | 9.0 Lt. | 708.0 | 7.0 | | 701.0 | Probe |
| 120+00 | 7.0 Rt. | 704.1 | 2.0 | | 702.1 | Probe |
| 120+00 | 8.0 Lt. | 704.3 | 1.9 | | 702.4 | Probe |
| 121+00 | 9.0 Lt. | 697.4 | 9.6 | | 687.8 | Probe |
| 122+00 | 8.5 Rt. | 693.3 | 9.9 | | 683.4 | Probe |
| 122+00 | 9.0 Lt. | 693.1 | | 10.0 | 683.1 | Probe |
| 145+00 | 8.0 Rt. | 627.9 | 6.5 | | 621.4 | Probe |
| 146+00 | 10.0 Rt. | 625.6 | | 8.0 | 617.6 | Probe |
| 146+00 | 11.0 Lt. | 625.1 | 5.6 | | 619.5 | Probe |
| 147+00 | 11.0 Rt. | 624.3 | | 8.0 | 616.3 | Probe |
| 147+00 | 11.0 Lt. | 623.7 | | 8.0 | 615.7 | Probe |
| 148+00 | 13.0 Rt. | 623.4 | | 8.0 | 615.4 | Probe |
| 148+00 | 9.0 Lt. | 623.3 | 6.5 | | 616.8 | Probe |
| 149+00 | 12.0 Rt. | 620.9 | | 8.0 | 612.9 | Probe |
| 149+00 | 8.5 Lt. | 620.6 | | 8.0 | 612.6 | Probe |
| 150+00 | 11.0 Rt. | 617.4 | | 8.0 | 609.4 | Probe |
| 150+00 | 11.0 Lt. | 617.1 | | 8.0 | 609.1 | Probe |
| 151+00 | 10.0 Rt. | 613.9 | | 8.0 | 605.9 | Probe |
| 151+00 | 13.3 Lt. | 613.2 | | 8.0 | 605.2 | Probe |
| 152+00 | 9.4 Rt. | 609.9 | 6.5 | | 603.4 | Probe |
| 152+00 | 12.8 Lt. | 609.5 | | 9.5 | 600.0 | Probe |
| 163+03 | 9.7 Lt. | 590.0 | 1 | 15.0 | 575.0 | Probe |
| 164+05 | 9.8 Rt. | 593.5 | | 10.0 | 583.5 | Probe |
| 164+04 | 8.1 Lt. | 593.6 | | 10.0 | 583.6 | Probe |
| 165+05 | 1.8 Rt. | 595.6 | | 10.0 | 585.6 | Probe |
| 166+05 | 7.8 Rt. | 595.1 | 1 | 10.0 | 585.1 | Probe |
| 166+05 | 26.1 Rt. | 596.3 | 1 | 15.0 | 581.3 | Probe |
| 167+05 | 4.5 Rt. | 592.9 | 1 | 10.0 | 582.9 | Probe |
| 168+03 | 24.5 Rt. | 590.3 | 1 | 15.0 | 575.3 | Probe |
| 168+06 | 5.4 Rt. | 589.5 | 1 | 10.0 | 579.5 | Probe |

State of Maine - Department of Transportation <u>Probe Summary Sheet</u>

| Town(s): | Acton | • | | Proje | ct Numbe | er: 20267.00 |
|----------|----------|---------------|---------|------------|------------------|-----------------|
| Station | Offset | Top of Boring | Refusal | No Refusal | Bottom of Boring | Comments / Date |
| (Feet) | (Feet) | Elev. (Feet) | (Feet) | (Feet) | Elev. (Feet) | 7/15-16/2015 |
| 183+15 | 13.1 Rt. | 583.3 | | 8.0 | 575.3 | Probe |
| 183+15 | 9.1 Lt. | 581.9 | | 8.0 | 573.9 | Probe |
| 184+15 | 4.9 Rt. | 586.4 | 6.9 | | 579.5 | Probe |
| 184+15 | 15.0 Lt. | 584.9 | 5.0 | | 579.9 | Probe |
| 185+15 | 5.0 Rt. | 590.7 | 5.3 | | 585.4 | Probe |
| 185+15 | 15.2 Lt. | 589.3 | 5.1 | | 584.2 | Probe |
| 186+15 | 9.0 Rt. | 594.8 | 7.9 | | 586.9 | Probe |
| 186+15 | 10.5 Lt. | 594.1 | 8.4 | | 585.7 | Probe |
| 187+15 | 10.1 Rt. | 592.4 | 3.5 | | 588.9 | Probe |
| 187+15 | 10.9 Lt. | 591.1 | 6.0 | | 585.1 | Probe |
| 188+15 | 10.1 Rt. | 587.6 | 4.3 | | 583.3 | Probe |
| 189+15 | 11.2 Rt. | 583.2 | | 8.0 | 575.2 | Probe |
| 189+15 | 8.9 Lt. | 582.3 | 6.6 | | 575.7 | Probe |
| 190+15 | 10.1 Rt. | 578.0 | | 8.0 | 570.0 | Probe |
| 190+15 | 9.5 Lt. | 577.2 | | 8.0 | 569.2 | Probe |
| 191+15 | 8.6 Rt. | 574.2 | | 8.0 | 566.2 | Probe |
| 191+15 | 9.0 Lt. | 573.8 | | 8.0 | 565.8 | Probe |
| 192+15 | 11.1 Rt. | 572.8 | | 8.0 | 564.8 | Probe |
| 192+15 | 7.7 Lt. | 572.6 | | 8.0 | 564.6 | Probe |
| 193+15 | 8.0 Lt. | 570.8 | | 8.0 | 562.8 | Probe |
| 194+15 | 10.5 Rt. | 566.2 | 6.8 | | 559.4 | Probe |
| 194+15 | 7.9 Lt. | 566.2 | | 10.0 | 556.2 | Probe |
| 195+15 | 13.2 Rt. | 560.4 | | 8.0 | 552.4 | Probe |
| 196+15 | 9.7 Rt. | 553.8 | | 8.0 | 545.8 | Probe |
| 196+15 | 8.0 Lt. | 553.8 | | 8.0 | 545.8 | Probe |
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Appendix **B**

Laboratory Test Results

State of Maine - Department of Transportation Laboratory Testing Summary Sheet

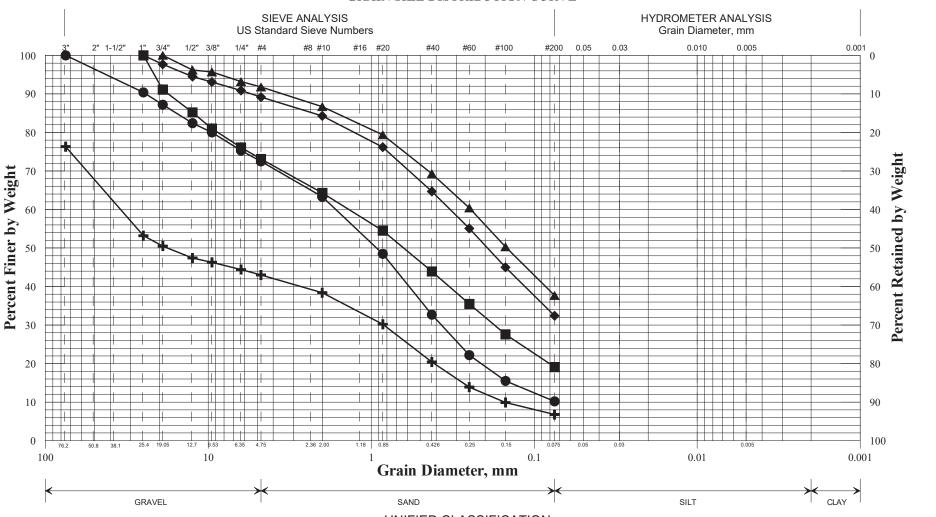
| Town(s): | Actor | 1 | | | Worl | ς Nι | umber | : 2026 | 67.00 | | | |
|-----------------------|-----------------|--------------|---------------|------------|-------------|--------|-------------|------------------|------------|-------|--|--|
| Boring & Sample | Station | Offset | Depth | Reference | G.S.D.C. | W.C. | % Passing | g Classification | | | | |
| Identification Number | (Feet) | (Feet) | (Feet) | Number | Sheet | | 200 Sieve | Unified | AASHTO | Frost | | |
| HB-ACT-101, B1 | 94+50 | 9.0 Rt. | 0.79-1.5 | 302216 | 1 | 5.3 | 6.8 | GW-GM | A-1-a | 0 | | |
| HB-ACT-101, S1 | 94+50 | 9.0 Rt. | 1.5-5.0 | 302217 | 1 | 7.9 | 32.4 | SM | A-2-4 | 11 | | |
| HB-ACT-102, S2 | 105+50 | 9.0 Rt. | 0.75-2.4 | 302218 | 1 | 6.5 | 19.1 | SM | A-1-b | 11 | | |
| HB-ACT-103, B2 | 111+00 | 7.0 Lt. | 1.0-2.1 | 302219 | 1 | 6.2 | 10.2 | SW-SM | A-1-b | 0 | | |
| HB-ACT-103, S3 | 111+00 | 7.0 Lt. | 2.1-5.0 | 302220 | 1 | 20.1 | 37.7 | SM | A-4 | | | |
| HB-ACT-104, B3 | 121+00 | 12.0 Rt. | 0.0-1.1 | 302221 | 2 | 3.0 | 8.2 | SW-SM | A-1-b | 0 | | |
| HB-ACT-104, S4 | 121+00 | 12.0 Rt. | 1.1-5.9 | 302222 | 2 | 7.2 | 13.2 | SM | A-1-b | Ш | | |
| HB-ACT-105, B4 | 134+00 | 8.0 Rt. | 0.92-2.4 | 302223 | 2 | 4.4 | 6.7 | SW-SM | A-1-a | 0 | | |
| HB-ACT-105, S5 | 134+00 | 8.0 Rt. | 2.4-5.0 | 302224 | 2 | 8.3 | 32.5 | SM | A-2-4 | Ш | | |
| HB-ACT-106, B5 | 145+00 | 12.0 Lt. | 0.0-1.6 | 302225 | 2 | 3.5 | 9.6 | SW-SM | A-1-b | 0 | | |
| HB-ACT-106, S6 | 145+00 | 12.0 Lt. | 1.6-8.0 | 302151 | 2 | 11.2 | 29.9 | SM | A-2-4 | 11 | | |
| HB-ACT-107, S7 | 158+00 | 6.0 Rt. | 0.83-1.3 | 302152 | 3 | 4.4 | 8.9 | GW-GM | A-1-a | 0 | | |
| HB-ACT-107, S8 | 158+00 | 6.0 Rt. | 1.3-5.0 | 302153 | 3 | 20.3 | 31.4 | SM | A-2-4 | Ш | | |
| HB-ACT-109, B6 | 163+00 | 11.1 Rt. | 0.75-5.0 | 302154 | 3 | 3.0 | 7.7 | SW-SM | A-1-a | 0 | | |
| HB-ACT-110, B7 | 193+00 | 10.5 Rt. | 0.42-5.0 | 302155 | 3 | 3.7 | 7.1 | GW-GM | A-1-a | 0 | | |
| HB-ACT-201, 2D | 96+50 | 7.5 Lt. | 5.0-5.8 | 337341 | 4 | 11.1 | 36.8 | SM | A-4 | | | |
| HB-ACT-202, 1D | 97+25 | 12.5 Rt. | 0.0-2.0 | 337342 | 4 | 7.1 | 8.8 | SW-SM | A-1-b | 0 | | |
| HB-ACT-203, 3D | 98+00 | 12.0 Lt. | 10.0-12.0 | 337343 | 4 | 41.4 | 53.1 | CL | A-4 | IV | | |
| HB-ACT-207, 1D | 156+10 | 11.5 Rt. | 0.0-2.0 | 337347 | 5 | 4.8 | 8.2 | SW-SM | A-1-b | 0 | | |
| HB-ACT-207, 2D | 156+10 | 11.5 Rt. | 5.0-7.0 | 337348 | 5 | 12.8 | 25.4 | SM | A-2-4 | | | |
| HB-ACT-207, 3D | 156+10 | 11.5 Rt. | 10.0-12.0 | 337349 | 5 | 45.3 | 8.4 | SW-SM | A-1-b | 0 | | |
| HB-ACT-207, 4D | 156+10 | 11.5 Rt. | 15.0-17.0 | 337350 | 5 | 12.5 | 29.5 | SM | A-2-4 | 11 | | |
| HB-ACT-207, 5D | 156+10 | 11.5 Rt. | 20.0-22.0 | 337301 | 5 | 12.6 | 28.0 | SM | A-2-4 | | | |
| HB-ACT-207, 6D | 156+10 | 11.5 Rt. | 25.0-25.7 | 337302 | 5 | 9.2 | 23.1 | SM | A-2-4 | | | |
| HB-ACT-209, 2D | 169+50 | 10.0 Rt. | 5.0-6.0 | 337344 | 6 | 172 | 12.3 | SM | A-1-b | | | |
| HB-ACT-210, 1D | 170+25 | 5.0 Lt. | 0.0-2.0 | 337345 | 6 | 9.6 | 6.9 | SW-SM | A-1-b | 0 | | |
| HB-ACT-211, 3D | 171+00 | 8.0 Lt. | 10.0-12.0 | 337346 | 6 | 37.8 | 4.1 | SW | A-1-b | 0 | | |
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| | | | | | | | Loss on l | gnition, % | % (T 267 | ') | | |
| HB-ACT-207, 3D | 156+10 | 11.5 Rt. | 10.0-12.0 | 337349 | 5 | | | 4.7 | | | | |
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| | 1 | | | | 1 | | | | | | | |
| Classification of th | ese soil sam | oles is in a | ccordance wit | h AASHTO C | lassificati | on Sys | tem M-145-4 | 0. This cla | ssificatio | n | | |
| is followed by the | | | | | | | | | | | | |
| | usceptibility F | - | - | | | | | - | | | | |
| | | | | | | | | | | | | |

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

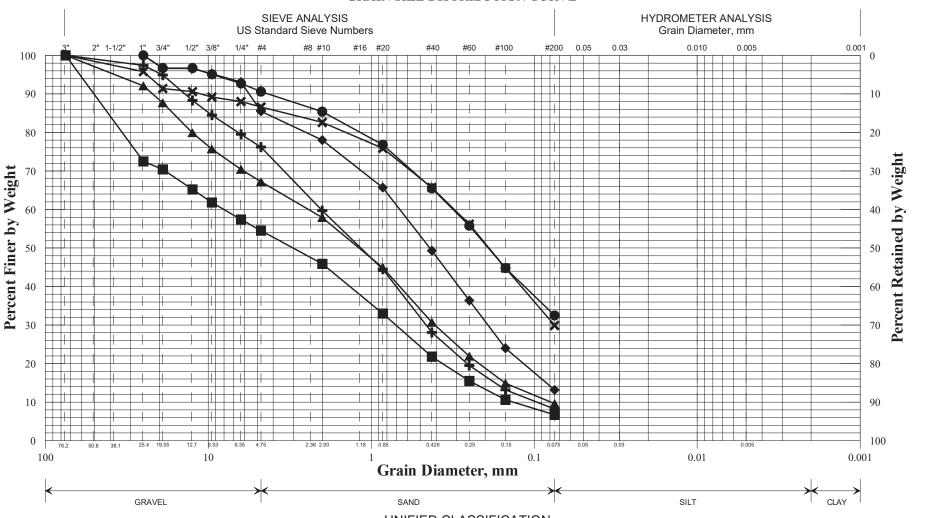
LL = Liquid limit as determined by AASHTO T 89-96 and/or ASTM D 4318-98

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



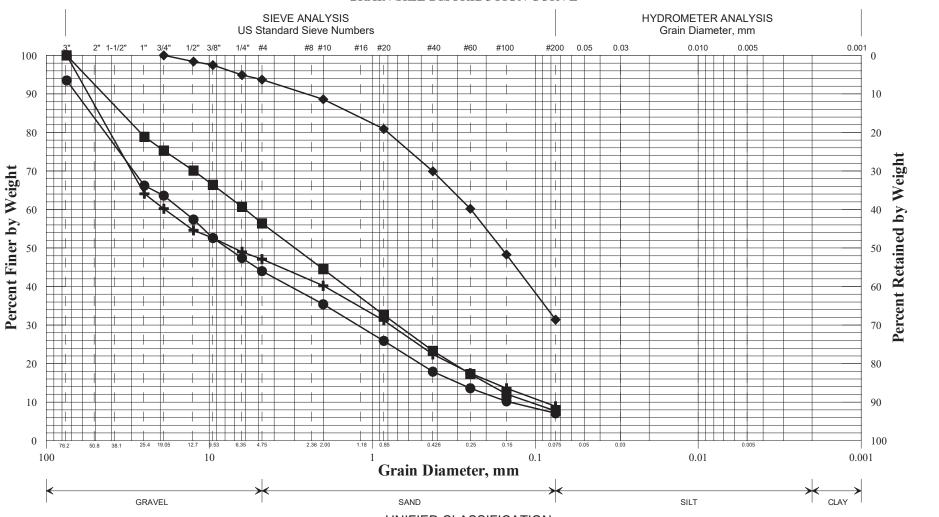
State of Maine Department of Transportation GRAIN SIZE DISTRIBUTION CURVE

| | Boring/Sample No. | Station | Offset, ft | Depth, ft | Description | W, % | W, % LL PL PI | | ΡI | WIN |
|---|-------------------|---------|------------|-----------|---------------------------------|------|---------------|--|----|--------------------------|
| + | HB-ACT-101/B1 | 94+50 | 9.0 RT | 0.79-1.5 | Sandy GRAVEL, trace silt. | 5.3 | | | | 020267.00 |
| • | HB-ACT-101/S1 | 94+50 | 9.0 RT | 1.5-5.0 | SAND, some silt, little gravel. | 7.9 | | | | Town |
| | HB-ACT-102/S2 | 105+50 | 9.0 RT | 0.75-2.4 | SAND, some gravel, little silt. | 6.5 | | | | Acton |
| | HB-ACT-103/B2 | 111+00 | 7.0 RT | 1.0-2.1 | SAND, some gravel, trace silt. | 6.2 | | | | |
| | HB-ACT-103/S3 | 111+00 | 7.0 LT | 2.1-5.0 | Silty SAND, trace gravel. | 20.1 | | | | Reported by/Date |
| × | | | | | | | | | | WHITE, TERRY A 8/27/2015 |



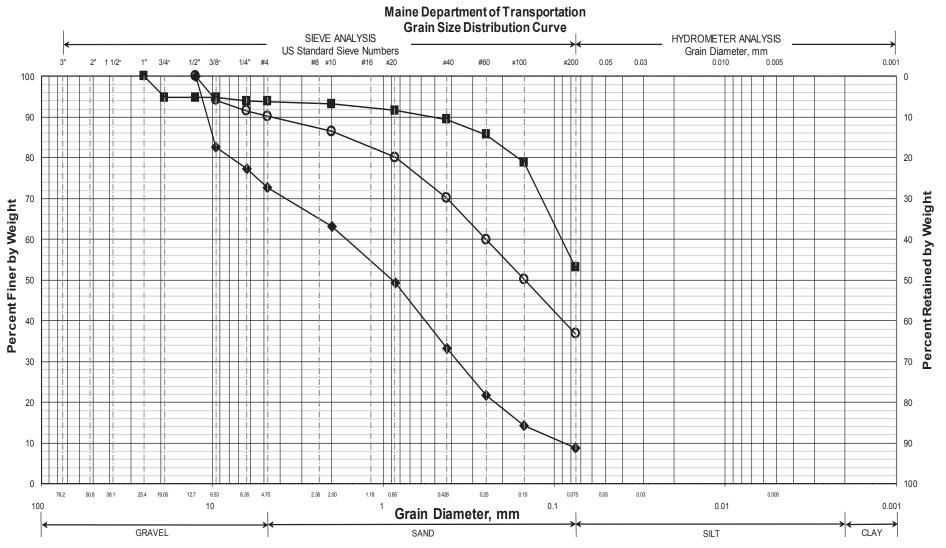
State of Maine Department of Transportation GRAIN SIZE DISTRIBUTION CURVE

| | Boring/Sample No. | Station | Offset, ft | Depth, ft | Description | W, % | 6 LL PL PI | | PI | WIN |
|---|-------------------|---------|------------|-----------|-----------------------------------|------|------------|--|--------------------------|------------------|
| + | HB-ACT-104/B3 | 121+00 | 12.0 RT | 0.0-1.1 | SAND, some gravel, trace silt. | 3.0 | | | 020267.00 | |
| | HB-ACT-104/S4 | 121+00 | 12.0 RT | 1.1-5.9 | SAND, little gravel, little silt. | 7.2 | | | Town | |
| | HB-ACT-105/B4 | 134+00 | 8.0 RT | 0.92-2.4 | Gravelly SAND, trace silt. | 4.4 | | | Acton | |
| | HB-ACT-105/S5 | 134+00 | 8.0 RT | 2.4-5.0 | SAND, some silt, trace gravel. | 8.3 | | | | |
| | HB-ACT-106/B5 | 145+00 | 12.0 LT | 0.0-1.6 | SAND, some gravel, trace silt. | 3.5 | | | | Reported by/Date |
| × | HB-ACT-106/S6 | 145+00 | 12.0 LT | 1.6-8.0 | SAND, some silt, little gravel. | 11.2 | | | WHITE, TERRY A 8/27/2015 | |



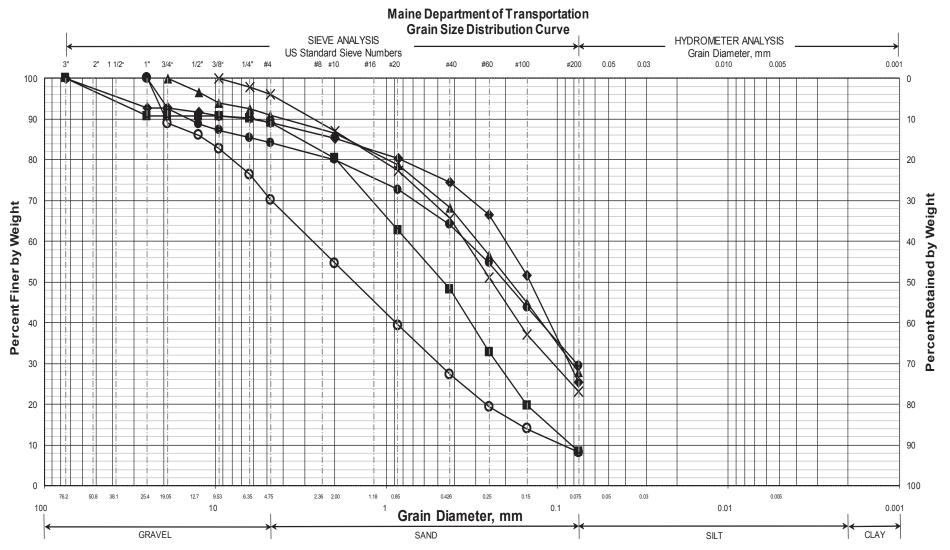
State of Maine Department of Transportation GRAIN SIZE DISTRIBUTION CURVE

| | Boring/Sample No. | Station | Offset, ft | Depth, ft | Description | W, % | LL | PL | ΡI | WIN |
|---|-------------------|---------|------------|-----------|--------------------------------|------|----|----|----|--------------------------|
| + | HB-ACT-107/S7 | 158+00 | 6.0 RT | 0.83-1.3 | Sandy GRAVEL, trace silt. | 4.4 | | | | 020267.00 |
| | HB-ACT-107/S8 | 158+00 | 6.0 RT | 1.3-5.0 | SAND, some silt, trace gravel. | 20.3 | | | | Town |
| | HB-ACT-109/B6 | 163+00 | 11.1 RT | 0.75-5.0 | Gravelly SAND, trace silt. | 3.0 | | | | Acton |
| | HB-ACT-110/B7 | 193+00 | 10.5 RT | 0.42-5.0 | Sandy GRAVEL, trace silt. | 3.7 | | | | |
| | | | | | | | | | | Reported by/Date |
| × | | | | | | | | | | WHITE, TERRY A 8/27/2015 |



| | Boring/Sample No. | Station | Offset, ft | Depth, ft | Description | WC, % | LL | PL | PI |
|---|-------------------|---------|------------|-----------|--------------------------------|-------|----|----|----|
| 0 | HB-ACT-201/2D | 96+50 | 7.5 LT | 5.0-5.8 | Silty SAND, trace gravel. | 11.1 | | | |
| • | HB-ACT-202/1D | 97+25 | 12.5 RT | 0.0-2.0 | SAND, some gravel, trace silt. | 7.1 | | | |
| | HB-ACT-203/3D | 98+00 | 12.0 LT | 10.0-12.0 | Sandy SILT, trace gravel. | 41.4 | | | |
| | | | | | | | | | |
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| X | | | | | | | | | |

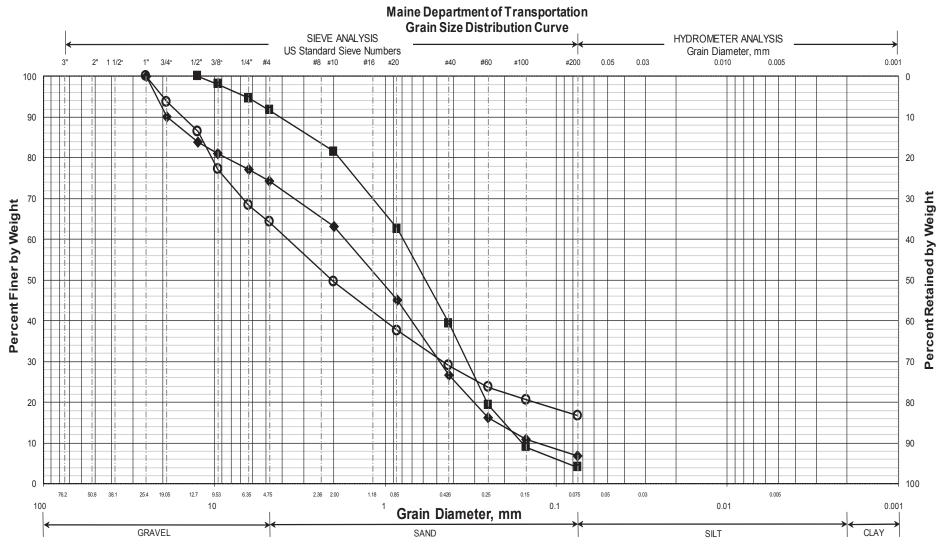
| WI | N | | | | | |
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| 020267.00 | | | | | | |
| Τον | vn | | | | | |
| Acton | | | | | | |
| Reported by/Date | | | | | | |
| WHITE, TERRY A | 9/6/2019 | | | | | |
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| | | Boring/Sample No. | Station | Offset, ft | Depth, ft | Description | WC, % | LL | PL | PI |
|---|----------|-------------------|---------|------------|-----------|---------------------------------|-------|----|----|----|
| C |) | HB-ACT-207/1D | 156+10 | 11.5 RT | 0.0-2.0 | SAND, some gravel, trace silt. | 4.8 | | | |
| | | HB-ACT-207/2D | 156+10 | 11.5 RT | 5.0-7.0 | SAND, some silt, trace gravel. | 12.8 | | | |
| | | HB-ACT-207/3D | 156+10 | 11.5 RT | 10.0-12.0 | SAND, trace gravel, trace silt. | 45.3 | | | |
| | | HB-ACT-207/4D | 156+10 | 11.5 RT | 15.0-17.0 | SAND, some silt, little gravel. | 12.5 | | | |
| | | HB-ACT-207/5D | 156+10 | 11.5 RT | 20.0-22.0 | SAND, some silt, trace gravel. | 12.6 | | | |
| × | (| HB-ACT-207/6D | 156+10 | 11.5 RT | 25.0-25.8 | SAND, some silt, trace gravel. | 9.2 | | | |

| WI | N | | | | | |
|------------------|----------|--|--|--|--|--|
| 020267.00 | | | | | | |
| Tov | vn | | | | | |
| Acton | | | | | | |
| Reported by/Date | | | | | | |
| WHITE, TERRY A | 9/6/2019 | | | | | |
| | | | | | | |

SHEET 5



UNIFIED CLASSIFICATION

| | Boring/Sample No. | Station | Offset, ft | Depth, ft | Description | WC, % | LL | PL | PI |
|---|-------------------|---------|------------|-----------|---------------------------------|-------|----|----|----|
| 0 | HB-ACT-209/2D | 169+50 | 10.0 RT | 5.0-6.0 | SAND, some gravel, little silt. | 172.4 | | | |
| • | HB-ACT-210/1D | 170+25 | 5.0 LT | 0.0-2.0 | SAND, some gravel, trace silt. | 9.6 | | | |
| | HB-ACT-211/3D | 171+00 | 8.0 LT | 10.0-12.0 | SAND, trace gravel, trace silt. | 37.8 | | | |
| | | | | | | | | | |
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| WI | N | | | | | |
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| 020267.00 | | | | | | |
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| Acton | | | | | | |
| Reported by/Date | | | | | | |
| WHITE, TERRY A | 9/6/2019 | | | | | |
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SHEET 6

Appendix C

Calculations

Bearing Resistance - Box Culvert on Native Soils:

Part 1 - Service Limit State

Nominal and factored Bearing Resistance - Box Culvert on Sand

Presumptive Bearing Resistance for Service Limit State ONLY

Reference: AASHTO LRFD Bridge Design Specifications 9th Edition 2020 Table C10.6.2.6.1-1 Presumptive Bearing Resistances for Spread Footings at the Service Limit State Modified after US Department of Navy (1982)

Type of Bearing Material: Sand (SM)

Based on N-values, soils are dense near the bearing elevation

Density In Place: very dense

Bearing Resistance: Ordinary Range (ksf) 6 to 10

Recommended Value of Use: $q_{nom} := 6 \cdot ksf$

| Resistance factor at the service limit state = 1.0 (LRFD Article 10.5.5.1) | $\phi_{\text{service bc}} \coloneqq 1.0$ |
|---|--|
|---|--|

 $q_{factored_service_bc} \coloneqq q_{nom} \cdot \phi_{service_bc}$

 $q_{factored_service_bc} = 6 \cdot ksf$

Note: This bearing resistance is settlement limited (1 inch) and applies only at the service limit state.

Part 2 - Strength Limit State

Nominal and factored Bearing Resistance - Box Culvert on Sand

Reference: AASHTO LRFD Bridge Design Specifications 9th Edition 2020 - Article 10.6.3.1

Assumptions:

1. The box will be founded at ~ Elev 243.3 feet

Bottom of Construction will be 2 feet below box invert $D_{footing} \coloneqq 2.0 \cdot ft$

2. Assumed parameters for fill soils:

| Saturated unit weight: | $\gamma_s := 125 \cdot pcf$ |
|---------------------------|---------------------------------------|
| Internal friction angle: | $\varphi_{ns} \coloneqq 32 \cdot deg$ |
| Undrained shear strength: | $c_{ns} := 0 \cdot psf$ |

3. Box Culvert parameters

| Width of box culvert, B | $B_{box} := 12 \cdot ft$ |
|--------------------------|--------------------------|
| Length of box culvert, L | $L_{box} := 94 \cdot ft$ |

Nominal Bearing Resistance per LRFD Equation 10.6.3.1.2a-1

 $q_n = cN_{cm} + \gamma D_f N_{qm} C_{wq} + 0.5\gamma BN_{\gamma m} C_{w\gamma}$

Bearing Capacity Factors - LRFD Table 10.6.3.1.2a-1

For
$$\phi$$
=32 deg N_c := 35.5 N_g := 23.2 N_y := 30.2

Shape Correction Factors LRFD Table 10.6.3.1.2a.-3

for ϕ =32 degrees

$$s_{c} \coloneqq 1 + \left(\frac{B_{box}}{L_{box}}\right) \left(\frac{N_{q}}{N_{c}}\right) \qquad s_{c} = 1.08$$
$$s_{\gamma} \coloneqq 1 - 0.4 \left(\frac{B_{box}}{L_{box}}\right) \qquad s_{\gamma} = 0.9489$$

$$s_q := 1 + \left(\frac{B_{box}}{L_{box}} \cdot tan(\phi_{ns})\right) \qquad s_q = 1.08$$

Load Inclination Factors: Assume all are 1.0 (LRFD Article C10.6.3.1.2a)

 $i_c \coloneqq 1.0 \qquad \qquad i_q \coloneqq 1.0 \qquad \qquad i_\gamma \coloneqq 1.0$

Depth Correction Factor $d_q := 1 + 2 \cdot tan(\phi_{ns}) \cdot (1 - sin(\phi_{ns}))^2 \cdot tan\left(\frac{D_{footing}}{B_{box}}\right)^{-1}$ $d_q = 2.6416$ LRFD Eq. 10.6.3.1.2a-10

| $N_{cm} := N_c \cdot s_c \cdot i_c$ | $N_{cm} = 38.4617$ | LRFD Eq. 10.6.3.1.2a-2 |
|---|------------------------|---------------------------|
| $N_{qm} \coloneqq N_q \cdot s_q \cdot d_q \cdot i_q$ | $N_{qm} = 66.17$ | LRFD Eq. 10.6.3.1.2a-3 |
| $N_{\gamma m} \coloneqq N_{\gamma} \cdot s_{\gamma} \cdot i_{\gamma}$ | $N_{\gamma m} = 28.66$ | LRFD Eq. 10.6.3.1.2a-4 |

Coefficients for Groundwater Depths LRFD Table 10.6.3.1.2a-2

 $q_{nominal} = 19 \cdot ksf$

Factored Bearing Resistance for Strength Limit State

Resistance Factor: $\phi_h := 0.45$ LRFD Table 10.5.5.2.2-1

 $q_{factored} \coloneqq q_{nominal} \cdot \varphi_b$

 $q_{factored} = 8.6 \cdot ksf$

Recommend a limiting factored bearing resistance of 9.0 ksf for the Strength Limit State.

Modulus of Subgrade Reaction - Box Culvert on Native Soil:

Reference: Foundation Analysis and Design 5th Edition JE Bowles Section 9-6

| Width of box culvert, B | $B_{box} = 12 ft$ |
|---------------------------|---|
| Length of box culvert, L | $L_{box} = 94 \text{ ft}$ |
| Thickness of box culve | t $t_{box} := 12 \cdot in$ assumed |
| Depth of box, D | $D_{box} := 14.2 \cdot ft$ |
| Bearing Resistance: | $q_{factored_service_bc} = 6 \cdot ksf$ Calculated above |
| Modulus of Elasticity: | Site soils at bearing elevation are Sand. Use values for Sand (dense) From Bowles Table 2-8 Modulus Es for Sand, dense ranges from 1000 - 1700 ksf |

Modulus of Elasticity, Es Use $E_s := 1200 \cdot ksf$

Poisson's Ratio:

Site conditions at bearing elevation are Sand Use values for Sand, gravely sand. From Bowles Table 2-7 Poisson's Ration μ for Sand, gravely sand ranges from 0.3 - 0.4

Analyze corner:

Take H as 5*B as recommended in Bowles Chapter 5

$$\begin{split} H_{inf} &\coloneqq \frac{5 \cdot B_{box}}{B_{box}} & H_{inf} = 5 \quad \text{N in Table 5-2} \\ \hline \\ \frac{L_{box}}{B_{box}} &= 7.8333 & \text{M in Table 5-2} \\ \end{split} \label{eq:Hinf} \begin{array}{c} \text{From Table 5-2 for N=5 and M=7.8333} \\ I_1 &\coloneqq 0.541 \\ I_2 &\coloneqq 0.132 \\ \end{array} \\ \begin{array}{c} \text{by interpolation} \\ \text{by interpolation} \\ \end{array} \end{split}$$

Determine Steinbrenner influence factor - Bowles Section 5-6:

$$I_s := I_1 + \left[\frac{1 - (2 \cdot \mu)}{1 - \mu}\right] \cdot I_2$$
 $I_s = 0.6019$

Determine Influence factor for footing depth - Bowles Figure 5-7

Depth ratio:
$$\frac{D_{box}}{B_{box}} = 1.1833$$
 $\frac{L_{box}}{B_{box}} = 7.8333$ $\mu = 0.35$ $I_F := 0.80$

Calculate modulus of subgrade reaction - Bowles Eq. 9-7

$$k_s \coloneqq \frac{1}{B_{box} \cdot E_{prime_s} \cdot I_s \cdot I_F} \qquad \qquad \begin{array}{l} \text{Bowles Eq.} \\ \textbf{9-7} \end{array}$$

 $k_s = 137 \cdot pci$

Recommend Modulus of Subgrade Reaction of 140 pci

Bearing Resistance - Retaining Wall on Native Soils:

Part 1 - Service Limit State

Nominal and factored Bearing Resistance - block wall on sand

Presumptive Bearing Resistance for Service Limit State ONLY

Reference: AASHTO LRFD Bridge Design Specifications 9th Edition 2020 Table C10.6.2.6.1-1 Presumptive Bearing Resistances for Spread Footings at the Service Limit State Modified after US Department of Navy (1982)

Type of Bearing Material: Sand (SM)

Assume soils are medium dense at bearing elevation

Consistency In Place: medium dense

Bearing Resistance: Ordinary Range (ksf) 4 to 8

Recommended Value of Use:

 $q_{nom} := 5 \cdot ksf$

 $q_{\text{factored service bc}} = 5 \cdot \text{ksf}$

 $\phi_{\text{service bc}} \coloneqq 1.0$

Resistance factor at the service limit state = 1.0 (LRFD Article 10.5.5.1)

 $q_{\text{factored_service_bc}} := q_{\text{nom}} \cdot \phi_{\text{service_bc}}$

Part 2 - Strength Limit State

Nominal and factored Bearing Resistance - block wall on sand

Reference: Foundation Engineering and Design by JE Bowles Fifth Edition

Assumptions:

- 1. The walls will be founded at ~ Elev 570 feet Bottom of Construction will be 2 feet below grade for. $D_{\text{footing}} \coloneqq 2.0 \cdot \text{ft}$
- 2. Assumed parameters for fill soils: (Ref: Bowles 5th Ed Table 3-4)
 - Saturated unit weight: $\gamma_s := 125 \cdot pcf$ Dry unit weight: $\gamma_d := 120 \cdot pcf$ Internal friction angle: $\phi_{ns} := 32 \cdot deg$ Undrained shear strength: $c_{ns} := 0 \cdot psf$
- 3. Use Terzaghi strip equations as L>B
- 4. Effective stress analysis footing on (-c soil (Bowles 5th Ed. Example 4-1 pg 231)

Depth to the water table: Assume $D_w := 8 \cdot ft$ Unit Weight of water: $\gamma_w := 62.4 \cdot pcf$

Effective stress at bearing level:

 $q_{eff} := (D_{footing}) \cdot (\gamma_s)$ $q_{eff} = 0.25 \cdot ksf$

Maximum block width is 18 inches

Terzaghi Shape factors from Table 4-1 For a strip footing: $s_c := 1.0$ $s_\gamma := 1.0$ Meyerhof Bearing Capacity Factors - Bowles 5th Ed. table 4-4 pg 223 For ϕ =32 deg $N_c := 35.47$ $N_q := 23.2$ $N_{\gamma} := 22$ Nominal Bearing Resistance per Terzaghi equation (Bowles 5th Ed. Table 4-1 pg 220) $q_{nominal} := c_{ns} \cdot N_c \cdot s_c + q_{eff} \cdot N_q + 0.5(\gamma_s) B \cdot N_\gamma \cdot s_\gamma$ $q_{nominal} = 7.9 \cdot ksf$ Factored Bearing Resistance for Strength Limit State Resistance Factor: AASHTO LRFD Table 10.5.5.2.2-1 $\phi_b := 0.45$ $q_{factored} := q_{nominal} \cdot \phi_b$

 $B := 18 \cdot in$

 $q_{\text{factored}} = 3.5 \cdot \text{ksf}$ $B = 18 \cdot \text{in}$

Recommend a limiting factored bearing resistance of 3.5 ksf for the Strength Limit State.

Appendix D

Slope Stability Analyses

