

**MAINE DEPARTMENT OF TRANSPORTATION
HIGHWAY PROGRAM
GEOTECHNICAL SECTION
AUGUSTA, MAINE**

GEOTECHNICAL DATA REPORT

For the Reconstruction of:
**U.S. ROUTE 1A / STATE ROUTE 9
HAMPDEN, MAINE**

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Penobscot County
WIN 11577.00

Soils Report 2019-01
Federal No. STP-1157(700)X

January 11, 2019

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1.0 INTRODUCTION

The purpose of this data report is to document subsurface information collected and make geotechnical design and construction recommendations for the reconstruction of an approximately 1.73-mile portion of U.S. Route 1A / State Route 9 in Hampden. The project is needed to remove the existing concrete core of the roadway to improve drainage, safety, and pedestrian mobility. This report presents the results of a limited geotechnical investigation performed along the project alignment and the results of a limited laboratory testing program conducted on soils recovered during the geotechnical investigation. U.S. Route 1A / State Route 9 is a Highway Corridor Priority 2 road.

2.0 GEOLOGIC SETTING

The project begins at Western Avenue (State Route 9) and extends northerly approximately 1.73 miles to Carriage Lane as shown on Sheet 1 – Location Map.

According to the Maine Geologic Survey (MGS) maps titled Surficial Geology, Bangor Quadrangle, Maine, Open-File No. 11-6 (2011) and Surficial Geology, Hampden Quadrangle, Maine, Open Files No. 13-12 (2013) the surficial soils along the project consist of Presumpscot Formation silt, clay, and sand; Presumpscot Formation overlying submarine fan sediment sand and gravel; and sand, silt, and gravel Till.

According to the map titled Bedrock Geologic Map of Maine (1985) published by the MGS, the bedrock in the vicinity of the site consists of calcareous sandstone and interbedded sandstone and impure limestone of the Vassalboro Formation.

3.0 SUBSURFACE INVESTIGATION

Subsurface conditions along the project were explored by drilling a total of twenty-seven (27) test borings on June 19, 2012 and June 20, 2012. All of the borings were drilled by the MaineDOT drill crew using a trailer mounted drill rig and solid stem auger and cased wash boring drilling techniques. The boring depths ranged from approximately 2.5 to 21.0 feet below ground surface (bgs). Ten (10) of the borings encountered a shallow refusal surface. The exact nature of the refusal surface was not determined in the explorations. Boring locations are shown on Sheets 2 through 16 – Boring Location Plans.

Soil samples were obtained in fourteen (14) of the borings using Standard Penetration Testing (SPT) methods. The MaineDOT drill rig is equipped with an automatic hammer to drive the split spoon. The MaineDOT calibrated hammer delivers approximately 40 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 0.84 to the raw field N-values. Details and sampling methods used, field data obtained, and soil conditions encountered are presented in the boring logs provided in Appendix A – Boring Logs.

A Northeast Transportation Training and Certification Program (NETTCP) Certified Subsurface Inspector logged the subsurface conditions encountered in the borings. The MaineDOT

Geotechnical Team member selected the boring locations, drilling methods, designated type and depth of sampling, reviewed field logs for accuracy and identified laboratory testing requirements. The borings 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 borings to assist in soil classification. Laboratory testing consisted of twenty (20) standard grain size analyses with natural water content and two (2) grain size analyses with hydrometer and natural water content. The results of the laboratory tests are in Appendix B – Laboratory Test Results. Laboratory test results for the samples obtained in the borings are also summarized on the boring logs in Appendix A.

5.0 SUBSURFACE CONDITIONS

Subsurface conditions encountered at the borings and test pits were generally fill underlain by glacial till or Presumpscot Formation. The boring locations are shown on Sheets 2 through 16 – Boring Location Plans. The boring logs are in Appendix A – Boring Logs.

5.1 Fill

The subsurface investigation found layers of fill consisting of sand, gravelly sand, and sandy gravel under the roadway pavement (thickness ranging from 5 to 9 inches) and concrete layer (thickness ranging from 0 to 10 inches). The sand fill consisted of brown, dry to damp, fine to coarse sand, some gravel, little to some silt. The gravelly sand fill consisted of brown, dry to moist, gravelly, fine to coarse sand, trace to little silt. The sandy gravel fill consisted of brown, moist, fine to coarse sandy gravel, little silt. Corrected N-values (N_{60}) obtained in the fill ranged from 8 to 56, indicating that the fill is loose to very dense in consistency. The thickness of the fill layers ranged from approximately 0.9 feet to greater than approximately 21.0 feet. Grain size analyses conducted on eleven (11) samples of the fill resulted in the soil being classified as an A-1-a or A-1-b under the AASHTO Soil Classification System and an SM or GM under the Unified Classification System. The measured natural water contents of the fill samples tested ranged from approximately 3 to 8 percent.

5.2 Glacial Till

In some areas, the fill is underlain by layers of glacial till consisting of sand, silty sand, and sandy silt. The sand consisted of brown, damp to wet, fine to coarse sand, some silt, little to some gravel. The silty sand consisted of brown and grey, damp to wet, silty, fine to coarse sand, trace to some gravel. The sandy silt consisted of olive brown and brown, moist to wet, fine to coarse sandy silt, trace to little gravel. Corrected N-values (N_{60}) obtained in the till ranged from 7 to 92, indicating that the till is loose to very dense in consistency. The full thickness of the till was not penetrated in all of the borings. Grain size analyses conducted on four (4) samples of the till resulted in the soil being classified as an A-1-b, A-2-4, or A-4 under the AASHTO Soil Classification System.

and an SM under the Unified Classification System. The measured natural water contents of the samples tested ranged from approximately 7 to 23 percent.

5.3 Presumpscot Formation

In some areas, the fill is underlain by layers of Presumpscot Formation consisting of silt, clayey silt, and sandy silt. The silt consisted of olive brown and brown, moist to wet, silt, trace to some clay, trace to little fine to coarse sand, trace to little gravel. The clayey silt consisted of brown, moist to wet, clayey silt, trace fine sand. The sandy silt consisted of olive-brown, brown, and grey, wet, fine to medium sandy silt, trace clay, trace to little gravel. The full thickness of the Presumpscot Formation was not penetrated in the borings. Corrected N-values (N_{60}) obtained in the Presumpscot Formation ranged from 7 to 31, indicating that the Presumpscot Formation is medium stiff to hard in consistency. Grain size analyses conducted on seven (7) samples of Presumpscot Formation resulted in the soil being classified as an A-4 under the AASHTO Soil Classification System and an CL-ML under the Unified Classification System. The measured natural water contents of the samples tested ranged from approximately 19 to 24 percent.

6.0 GEOTECHNICAL RECOMMENDATIONS

Shallow refusals are an area of geotechnical concern on this project.

6.1 Shallow Refusals

Based on the results of the borings and probes, rock removal will be necessary near the following stations where a shallow refusal surface was encountered:

Stations	Range of Approximate Depths to Refusal (feet bgs)
63+00 to 69+50	3.2 to 9.4
76+00 to 86+50	2.5 to 8.8
92+00 to 95+50	6.2 to 9.4

Rock excavation for the proposed drainage system will be necessary near these stations. Additional shallow rock may be encountered during construction of the drainage system at other locations. No rock cores were taken along the project and the actual nature of the refusal surface was not determined. The nature, slope and degree of fracturing in the rock surface will not be evident until the excavations are made and rock is exposed.

It should be anticipated that if shallow rock is encountered during excavation work, removal will be necessary. Machinery capable of removing intact rock, such as heavy duty backhoes with rock ripping teeth, hydraulic thumbs or pneumatic rock breaking equipment, should be anticipated for this work. There is also a possibility that rock excavation will require blasting. Construction

activities should not be permitted to disturb the rock mass or to create any rock falls or any open fissures.

Blasting should be conducted in accordance with MaineDOT Standard Specification Sections 105.2.7 and 203. The Contractor is required to conduct pre-blast surveys as well as blast vibration monitoring at any nearby structures in accordance with industry standards at the time of the blast. Pre-blast surveys shall be provided to the Resident prior to blasting at the site. Strict measures should be implemented to control flyrock. The method of flyrock control shall be subject to approval by the Department. Such approval will not relieve the Contractor from adequately protecting adjacent property and work areas.

7.0 CLOSURE

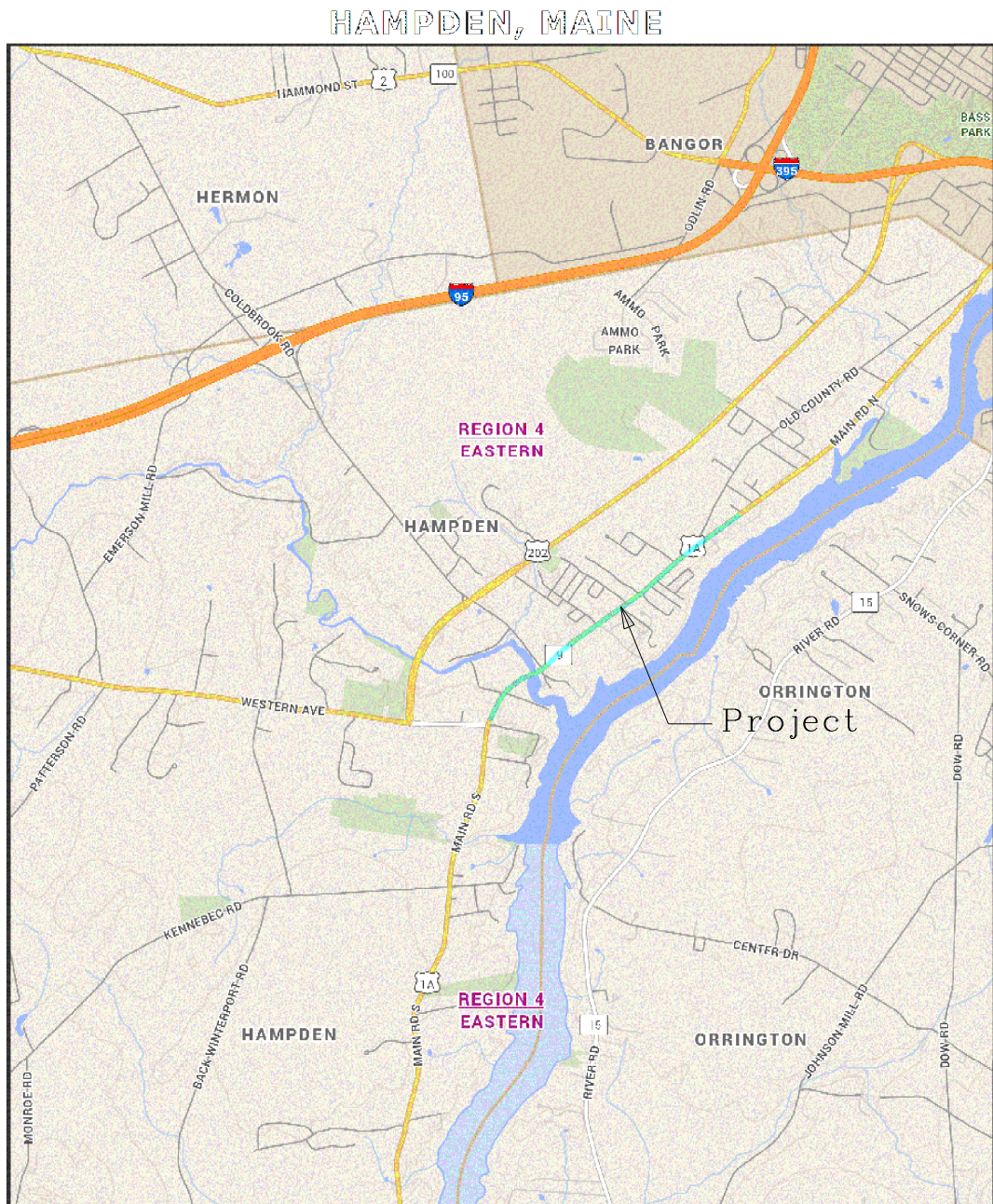
This Geotechnical Data Report has been prepared for the use of the MaineDOT Highway Program for specific application to the proposed reconstruction of U.S. Route 1A / State Route 9 in Hampden, Maine in accordance with generally accepted geotechnical and foundation engineering practices. No other intended use or warranty is expressed or implied.

MaineDOT conducted a limited number of soil explorations at discrete locations along the project and a limited number of laboratory tests. MaineDOT shall not be responsible for the Bidder's or Contractor's interpretations, estimates, or conclusions derived from the geotechnical information. Data provided may not be representative of the subsurface conditions between boring locations.

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

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

Sheets



The Maine Department of Transportation provides this publication for information only. Reliance upon this information is at user risk. It is subject to revision and may be incomplete depending upon changing conditions. The Department assumes no liability if injuries or damages result from this information. This map is not intended to support emergency dispatch.

0.85 Miles
1 inch = 0.91 miles

Date: 11/27/2018
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SHEET NUMBER

1

OF 16

HAMPDEN
ROUTE 1A

LOCATION MAP

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

STP-1157(700)X

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11577.00

HIGHWAY PLANS



STATE OF MAINE

DEPARTMENT OF TRANSPORTATION

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HAMPDEN ROUTE 1A

BORING LOCATION PLAN

SHEET NUMBER

2

OF 16

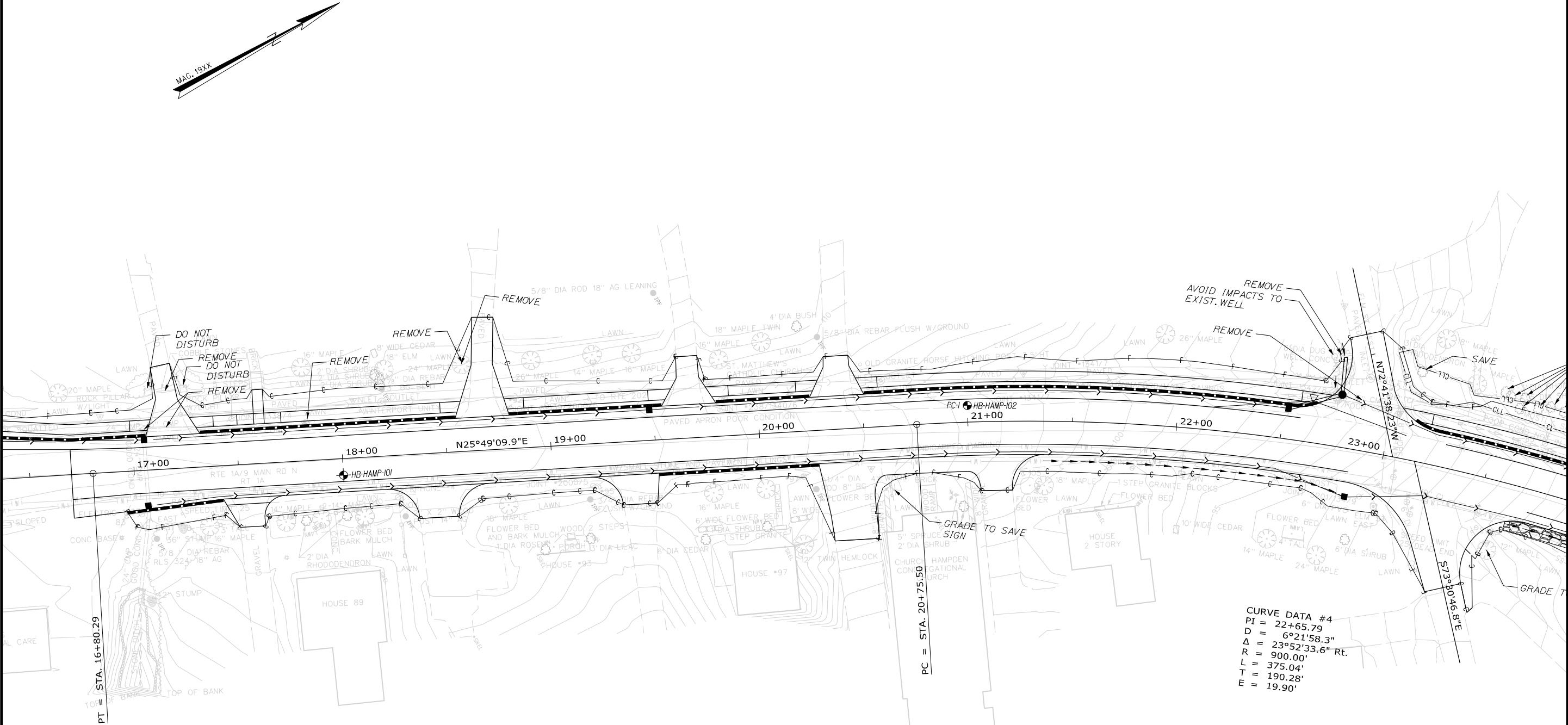
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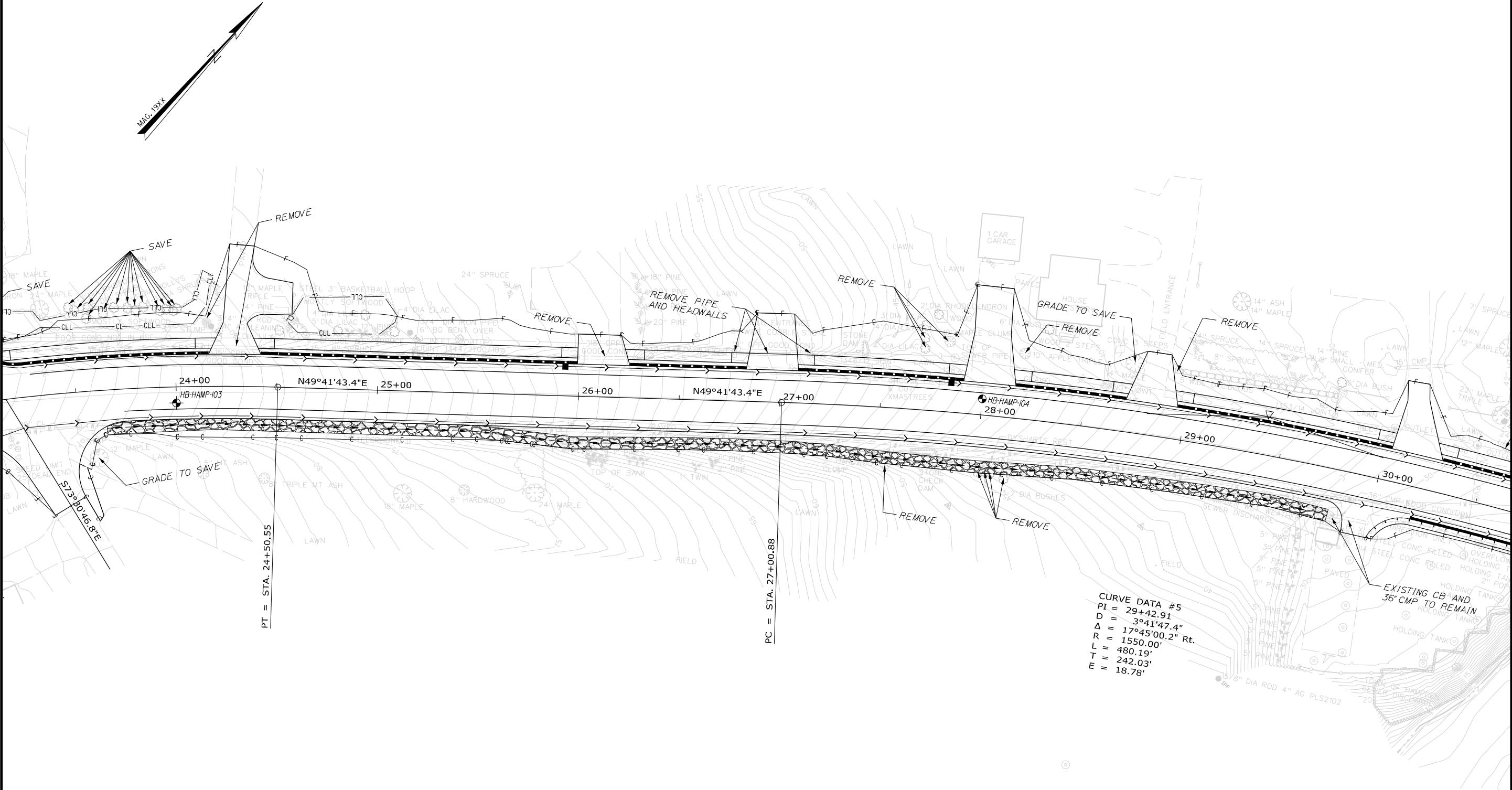
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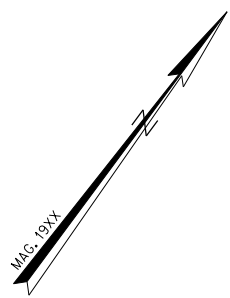


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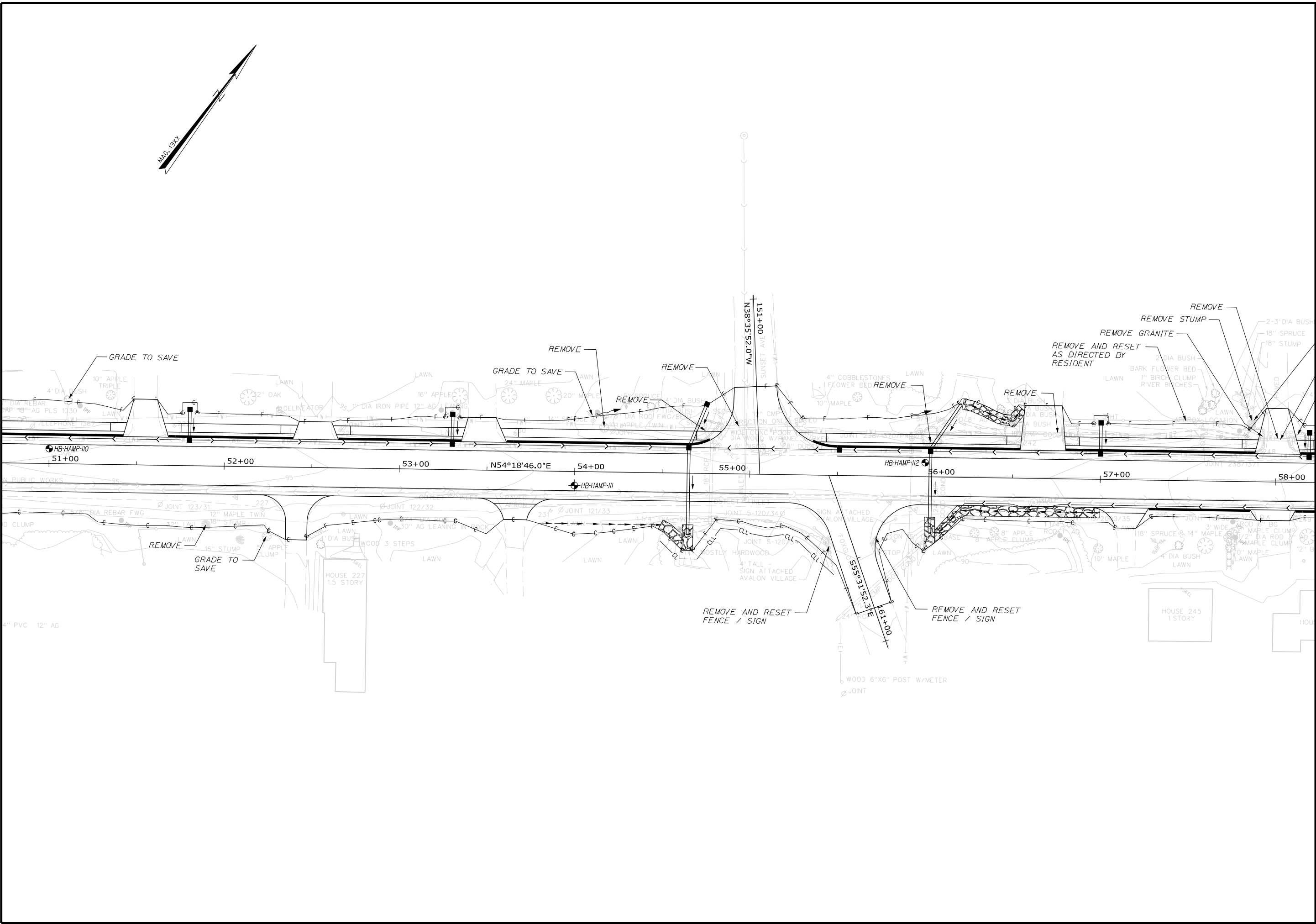
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ROUTE 1A

BORING LOCATION PLAN

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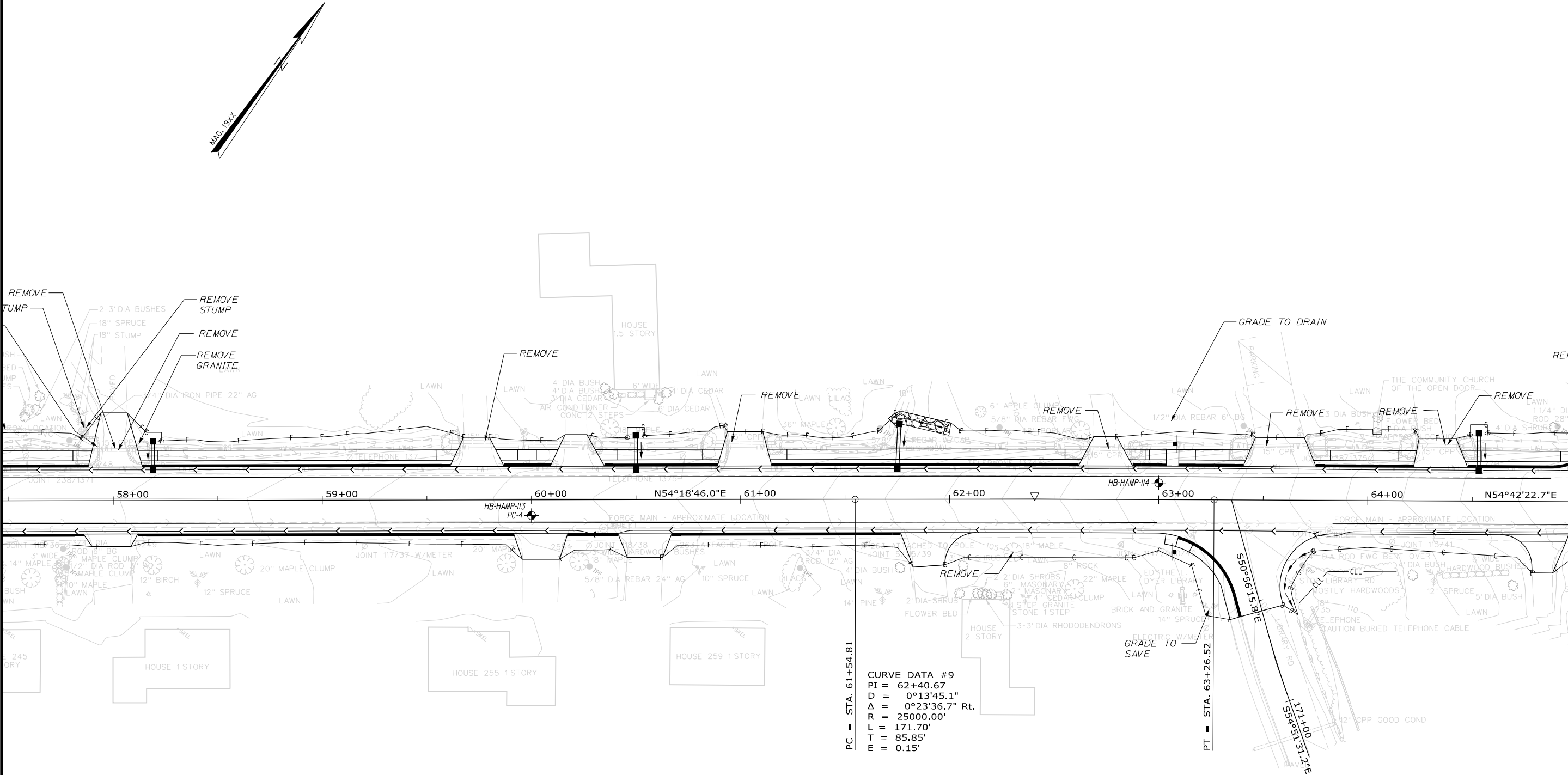
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BORING LOCATION PLAN

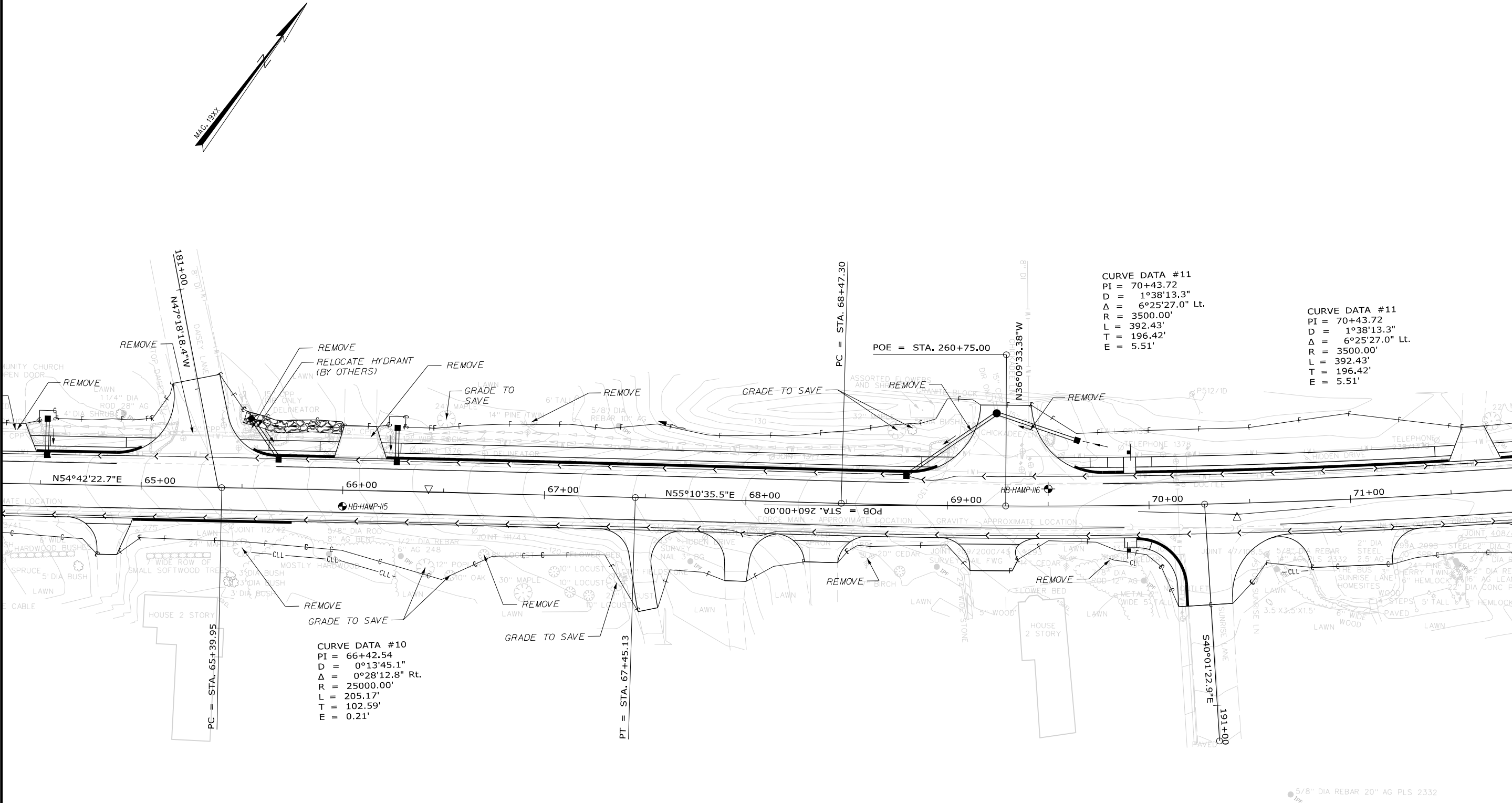
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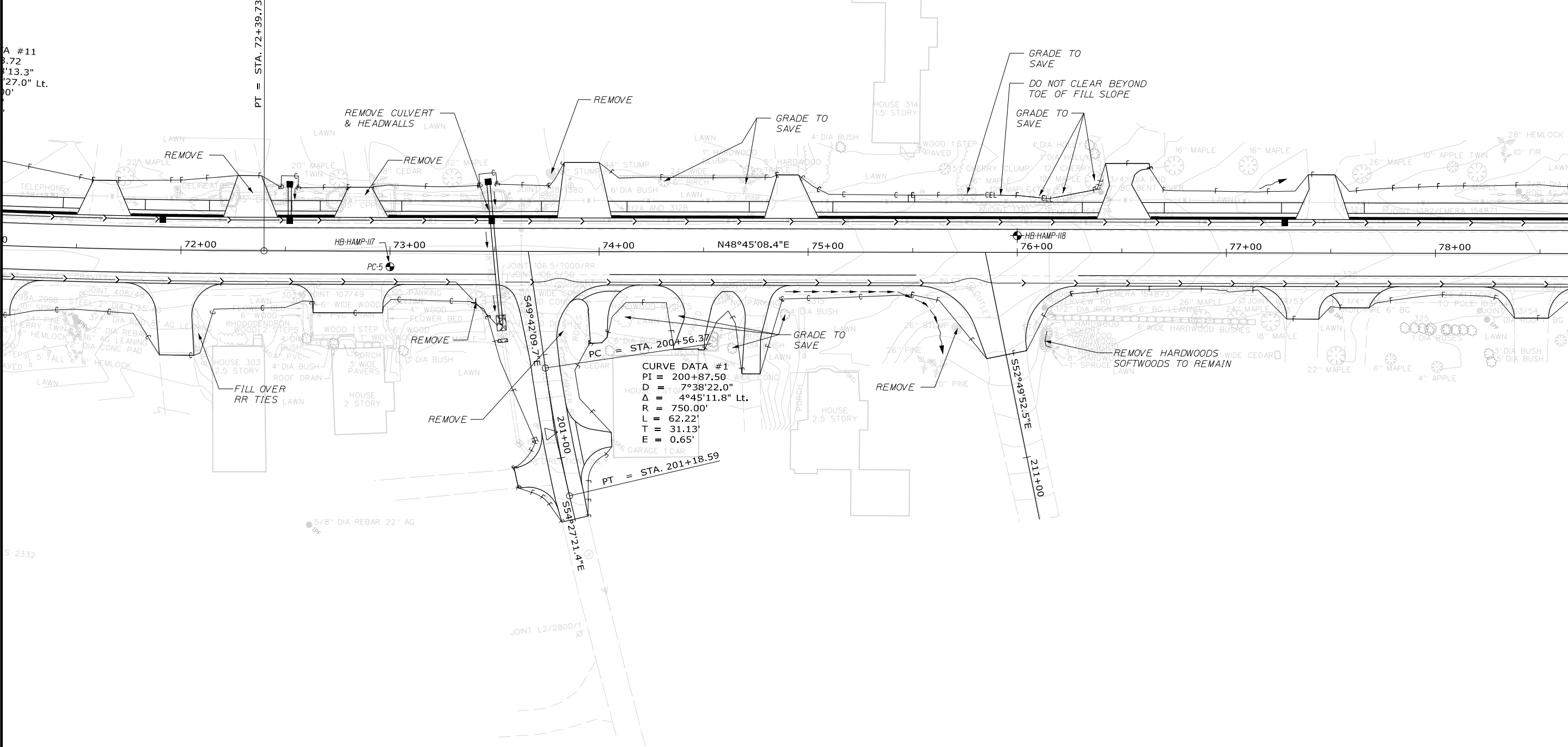
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ROUTE 1A

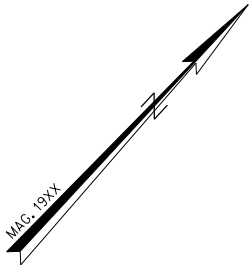
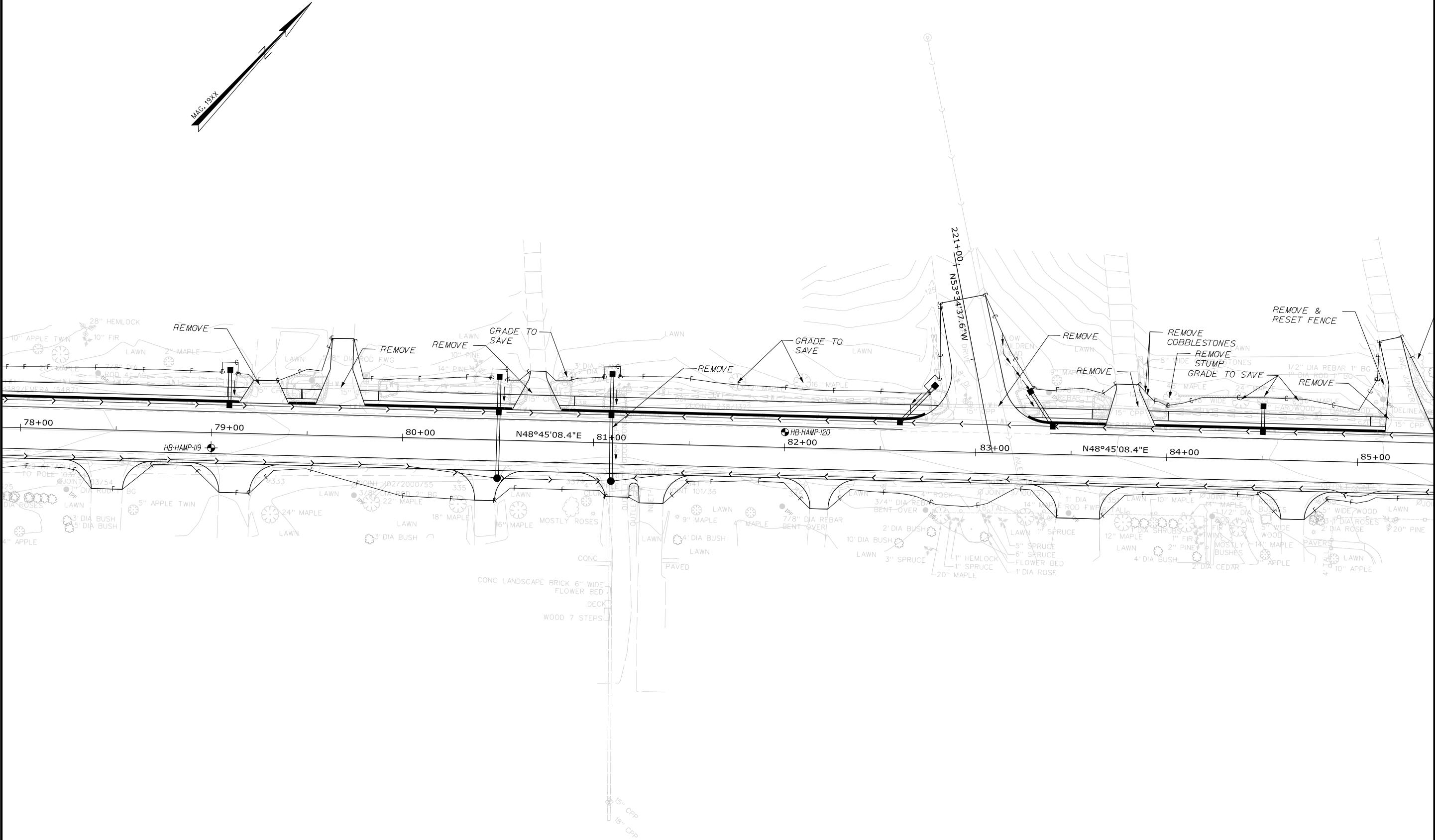
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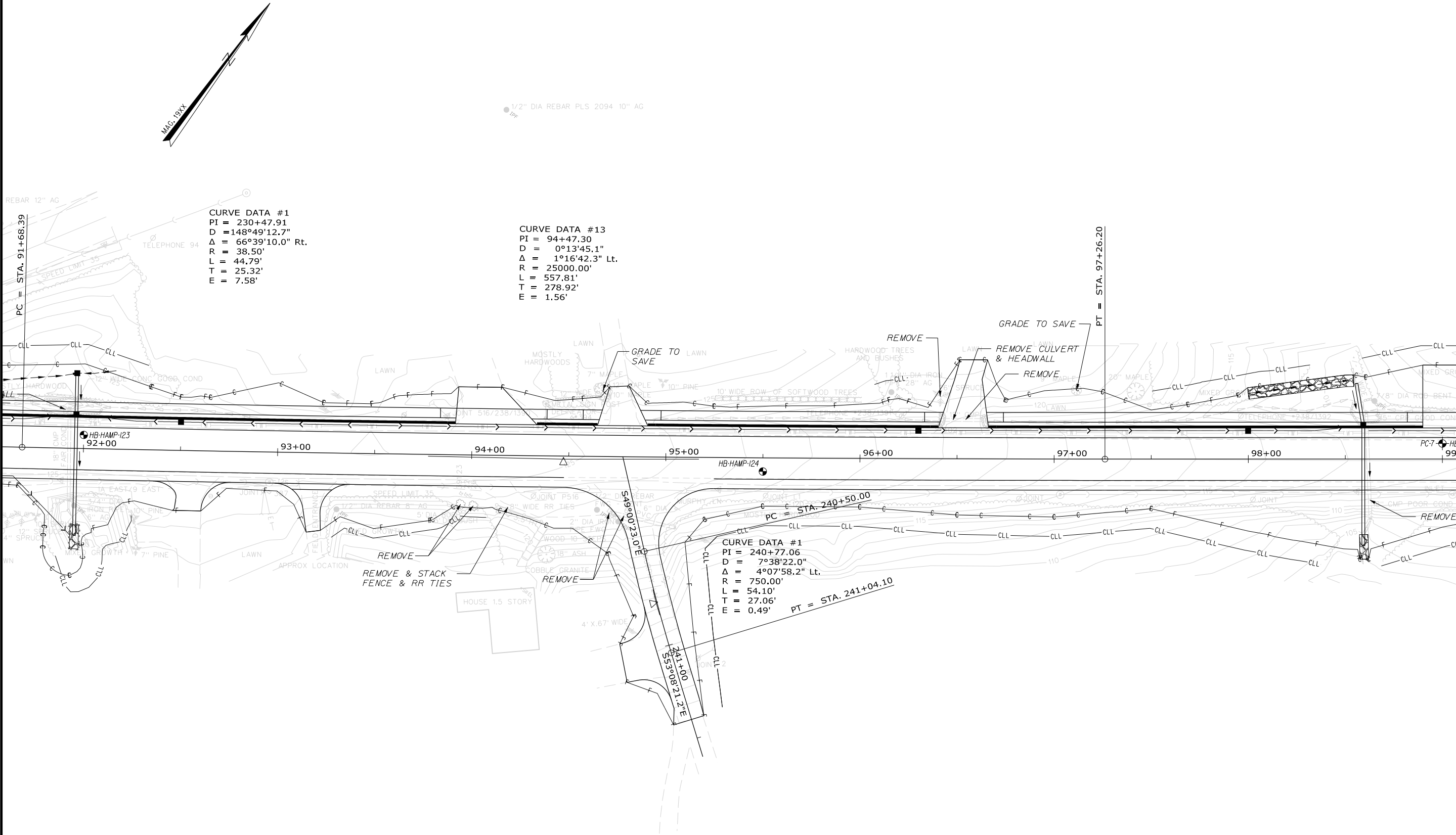
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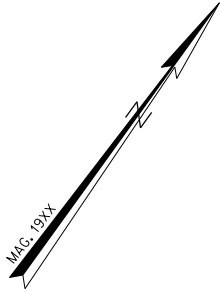
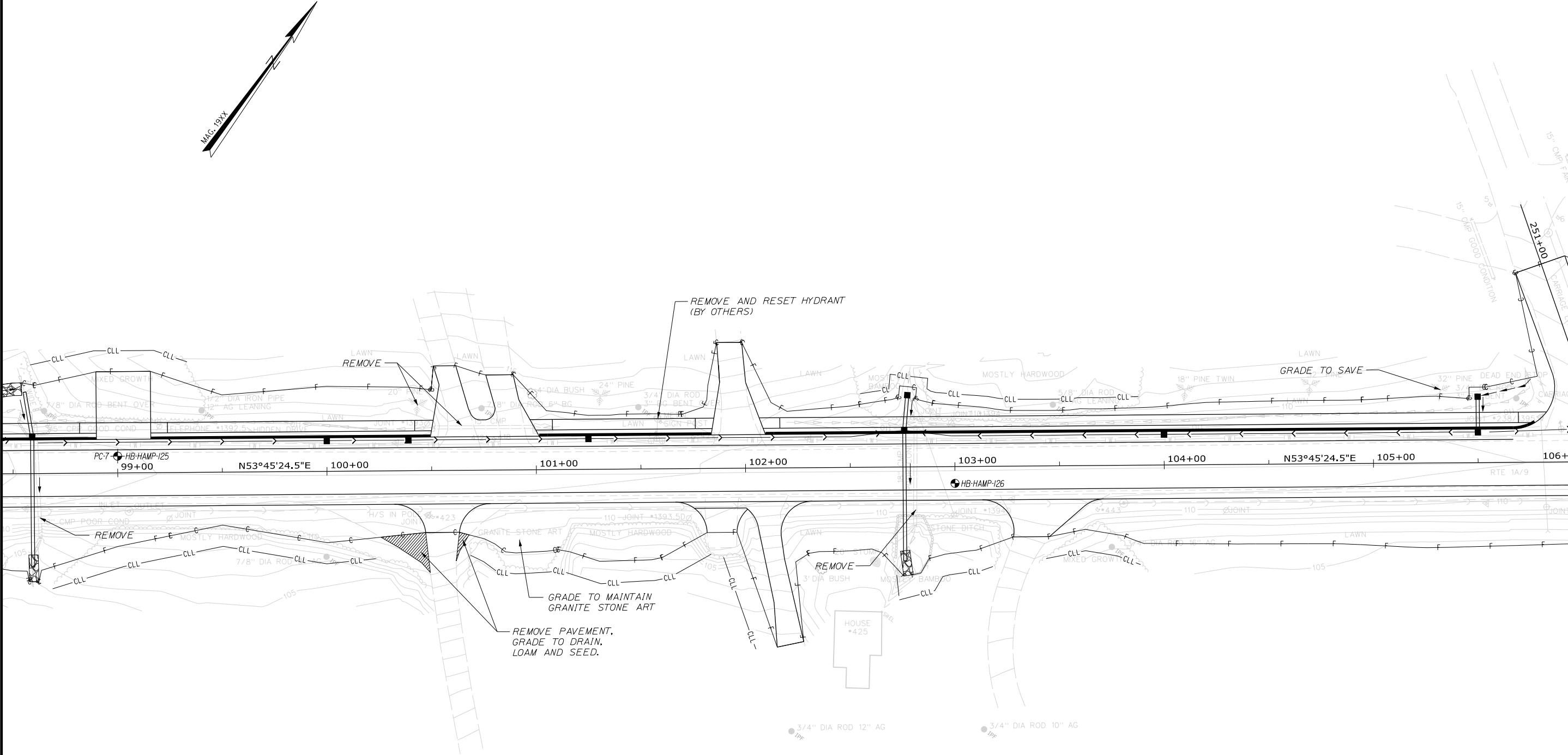
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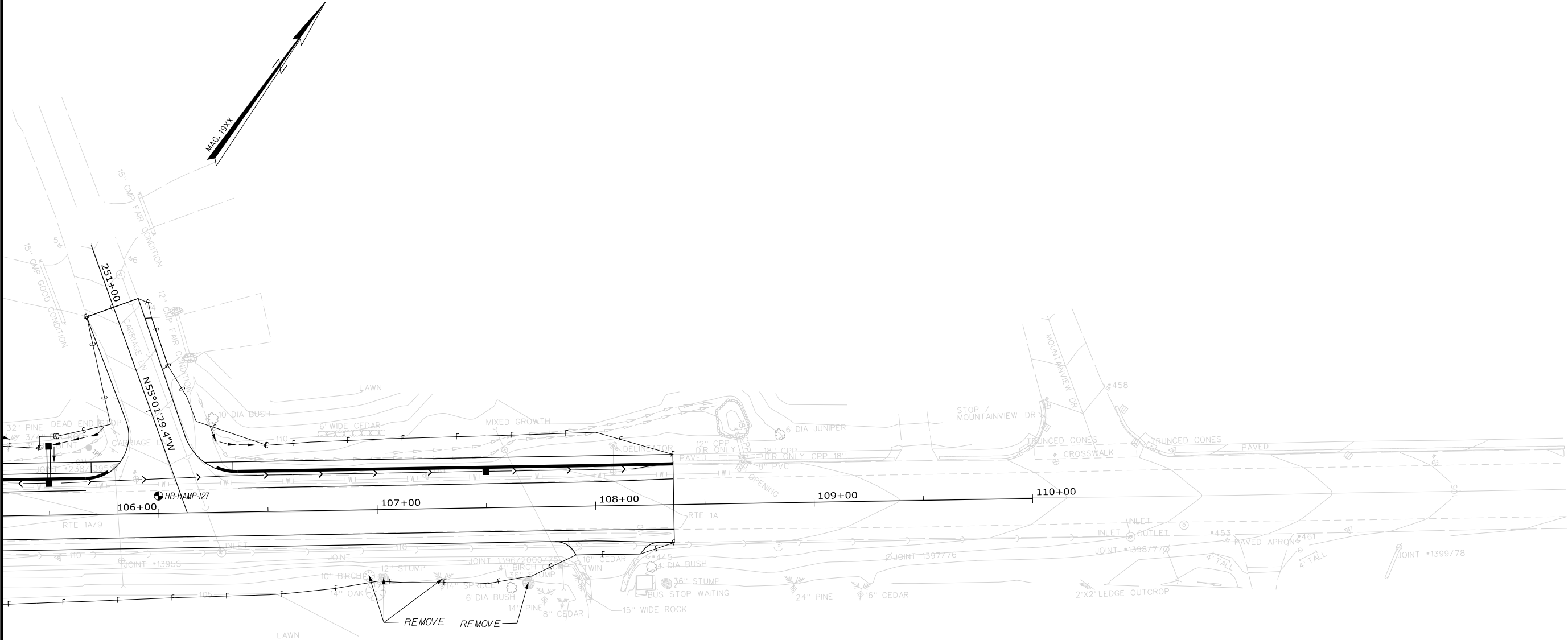
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HAMPDEN
ROUTE 1A
BORING LOCATION PLAN



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Appendix A

Boring Logs

UNIFIED SOIL CLASSIFICATION SYSTEM					MODIFIED BURMISTER SYSTEM															
MAJOR DIVISIONS			GROUP SYMBOLS	TYPICAL NAMES																
COARSE-GRAINED SOILS (more than half of material is larger than No. 200 sieve size)	GRAVELS (more than half of coarse fraction is larger than No. 4 sieve size)	CLEAN GRAVELS	GW	Well-graded gravels, gravel-sand mixtures, little or no fines.	Descriptive Term		Portion of Total (%)													
		(little or no fines)	GP	Poorly-graded gravels, gravel sand mixtures, little or no fines.	trace	0 - 10														
					little	11 - 20														
					some	21 - 35														
				adjective (e.g. sandy, clayey)	36 - 50															
	SANDS (more than half of coarse fraction is smaller than No. 4 sieve size)	GRAVEL WITH FINES (Appreciable amount of fines)	GM	Silty gravels, gravel-sand-silt mixtures.	TERMS DESCRIBING DENSITY/CONSISTENCY															
		GC	Clayey gravels, gravel-sand-clay mixtures.																	
		CLEAN SANDS	SW	Well-graded sands, gravelly sands, little or no fines	<u>Coarse-grained soils</u> (more than half of material is larger than No. 200 sieve): Includes (1) clean gravels; (2) silty or clayey gravels; and (3) silty, clayey or gravelly sands. Density is rated according to standard penetration resistance (N-value).															
(little or no fines)			SP	Poorly-graded sands, gravelly sand, little or no fines.																
FINE-GRAINED SOILS (more than half of material is smaller than No. 200 sieve size)	SILTS AND CLAYS (liquid limit less than 50)	SANDS WITH FINES (Appreciable amount of fines)	SM	Silty sands, sand-silt mixtures	Density of Cohesionless Soils		Standard Penetration Resistance													
		SC	Clayey sands, sand-clay mixtures.	N-Value (blows per foot)																
					Very loose	0 - 4														
					Loose	5 - 10														
	SILTS AND CLAYS (liquid limit greater than 50)				Medium Dense	11 - 30														
					Dense	31 - 50														
					Very Dense	> 50														
						<u>Fine-grained soils</u> (more than half of material is smaller than No. 200 sieve): Includes (1) inorganic and organic silts and clays; (2) gravelly, sandy or silty clays; and (3) clayey silts. Consistency is rated according to undrained shear strength as indicated.														
HIGHLY ORGANIC SOILS	Pt				Approximate Undrained Shear		Field													
					Strength (psf)		Guidelines													
					Consistency of Cohesive soils	SPT N-Value (blows per foot)														
					WOH, WOR, WOP, <2	0 - 250	Fist easily penetrates													
					Soft	250 - 500	Thumb easily penetrates													
					Medium Stiff	500 - 1000	Thumb penetrates with moderate effort													
					Stiff	1000 - 2000	Indented by thumb with great effort													
					Very Stiff	2000 - 4000	Indented by thumbnail													
			Hard	over 4000	Indented by thumbnail with difficulty															
<u>Desired Soil Observations (in this order, if applicable):</u> Color (Munsell color chart) Moisture (dry, damp, moist, wet) Density/Consistency (from above right hand side) Texture (fine, medium, coarse, etc.) Name (sand, silty sand, clay, etc., including portions - trace, little, etc.) Gradation (well-graded, poorly-graded, uniform, etc.) Plasticity (non-plastic, slightly plastic, moderately plastic, highly plastic) Structure (layering, fractures, cracks, etc.) Bonding (well, moderately, loosely, etc.,) Cementation (weak, moderate, or strong) Geologic Origin (till, marine clay, alluvium, etc.) Groundwater level					<u>Rock Quality Designation (RQD):</u> RQD (%) = $\frac{\text{sum of the lengths of intact pieces of core}^* > 4 \text{ inches}}{\text{length of core advance}}$ *Minimum NQ rock core (1.88 in. OD of core) Correlation of RQD to Rock Mass Quality <table><tr><th>Rock Mass Quality</th><th>RQD (%)</th></tr><tr><td>Very Poor</td><td>≤25</td></tr><tr><td>Poor</td><td>26 - 50</td></tr><tr><td>Fair</td><td>51 - 75</td></tr><tr><td>Good</td><td>76 - 90</td></tr><tr><td>Excellent</td><td>91 - 100</td></tr></table> <u>Desired Rock Observations (in this order, if applicable):</u> Color (Munsell color chart) Texture (aphanitic, fine-grained, etc.) Rock Type (granite, schist, sandstone, etc.) Hardness (very hard, hard, mod. hard, etc.) Weathering (fresh, very slight, slight, moderate, mod. severe, severe, etc.) Geologic discontinuities/jointing: -dip (horiz - 0-5 deg., low angle - 5-35 deg., mod. dipping - 35-55 deg., steep - 55-85 deg., vertical - 85-90 deg.) -spacing (very close - <2 inch, close - 2-12 inch, mod. close - 1-3 feet, wide - 3-10 feet, very wide >10 feet) -tightness (tight, open, or healed) -infilling (grain size, color, etc.) Formation (Waterville, Ellsworth, Cape Elizabeth, etc.) RQD and correlation to rock mass quality (very poor, poor, etc.) ref: ASTM D6032 and AASHTO Standard Specification for Highway Bridges, 17th Ed. Table 4.4.8.1.2A Recovery (inch/inch and percentage) Rock Core Rate (X.X ft - Y.Y ft (min:sec))				Rock Mass Quality	RQD (%)	Very Poor	≤25	Poor	26 - 50	Fair	51 - 75	Good	76 - 90	Excellent	91 - 100
Rock Mass Quality	RQD (%)																			
Very Poor	≤25																			
Poor	26 - 50																			
Fair	51 - 75																			
Good	76 - 90																			
Excellent	91 - 100																			
Maine Department of Transportation Geotechnical Section Key to Soil and Rock Descriptions and Terms Field Identification Information					<u>Sample Container Labeling Requirements:</u> WIN Blow Counts Bridge Name / Town Sample Recovery Boring Number Date Sample Number Personnel Initials Sample Depth															

Maine Department of Transportation Soil/Rock Exploration Log US CUSTOMARY UNITS				Project: A 1.73 mile portion of Routes 1A/9. Location: Hampden, Maine				Boring No.: HB-HAMP-101 WIN: 11577.00			
Driller: MaineDOT				Elevation (ft.) 110.6				Auger ID/OD: 5" Dia.			
Operator: Giguere/Giles/Daggett				Datum: NAVD88				Sampler: Standard Split Spoon			
Logged By: B. Wilder				Rig Type: CME 45C				Hammer Wt./Fall: 140#/30"			
Date Start/Finish: 6/19/12-6/19/12				Drilling Method: Solid Stem Auger				Core Barrel: N/A			
Boring Location: 18+00, 8.0 ft Rt.				Casing ID/OD: N/A				Water Level*: None Observed			
Hammer Efficiency Factor: 0.84				Hammer Type: Automatic ☒ Hydraulic ☐ Rope & Cathead ☐							
Definitions: D = Split Spoon Sample MD = Unsuccessful Split Spoon Sample Attempt U = Thin Wall Tube Sample MU = Unsuccessful Thin Wall Tube Sample Attempt V = Field Vane Shear Test, PP = Pocket Penetrometer MV = Unsuccessful Field Vane Shear Test Attempt R = Rock Core Sample SSA = Solid Stem Auger HSA = Hollow Stem Auger RC = Roller Cone WOH = Weight of 140lb. Hammer WOR/C = Weight of Rods or Casing WO1P = Weight of One Person S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf) S_{u(lab)} = Lab Vane Undrained Shear Strength (psf) q_p = Unconfined Compressive Strength (ksf) N-uncorrected = Raw Field SPT N-value Hammer Efficiency Factor = Rig Specific Annual Calibration Value N₆₀ = SPT N-uncorrected Corrected for Hammer Efficiency N₆₀ = (Hammer Efficiency Factor/60%)*N-uncorrected T_v = Pocket Torvane Shear Strength (psf) WC = Water Content, percent LL = Liquid Limit PL = Plastic Limit PI = Plasticity Index G = Grain Size Analysis C = Consolidation Test											
Depth (ft.)	Sample Information							Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N ₆₀	Casing Blows				
0								110.2		5" PAVEMENT.	
	1D/A	24/18	1.50 - 3.50	8/18/20/19	38	53		109.5		8" CONCRETE.	
								108.1		1D (1.5-2.5 ft) Brown, dry, very dense, Gravelly, fine to coarse SAND, little silt, (Fill).	
										1D/A (1.5-3.5 ft) Brown, moist, very dense, fine to coarse SAND, some silt, little gravel.	
								106.1			
5	2D	24/17	5.00 - 7.00	9/38/23/17	61	85				Brown, moist, very dense, Silty, fine to coarse SAND, some gravel, (Till).	
								103.6		Bottom of Exploration at 7.0 feet below ground surface. NO REFUSAL	
25											
Remarks:											
Stratification lines represent approximate boundaries between soil types; transitions may be gradual.										Page 1 of 1	
* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.										Boring No.: HB-HAMP-101	

Maine Department of Transportation Soil/Rock Exploration Log US CUSTOMARY UNITS				Project: A 1.73 mile portion of Routes 1A/9. Location: Hampden, Maine				Boring No.: HB-HAMP-102 WIN: 11577.00																																																																																																																															
Drilling Contractor: MaineDOT				Elevation (ft.): 103.6				Auger ID/OD: 5" Dia.																																																																																																																															
Operator: Giguere/Giles/Daggett				Datum: NAVD88				Sampler: N/A																																																																																																																															
Logged By: B. Wilder				Rig Type: CME 45C				Hammer Wt./Fall: N/A																																																																																																																															
Date Start/Finish: 6/19/12-6/19/12				Drilling Method: Solid Stem Auger				Core Barrel: N/A																																																																																																																															
Boring Location: 21+00, 8.0 ft Lt.				Casing ID/OD: N/A				Water Level*: None Observed																																																																																																																															
Definitions: D = Split Spoon Sample S = Sample off Auger Flights B = Bucket Sample off Auger Flights MD = Unsuccessful Split Spoon Sample Attempt U = Thin Wall Tube Sample MV = Unsuccessful Field Vane Shear Test Attempt V = Field Vane Shear Test, PP= Pocket Penetrometer MU = Unsuccessful Thin Wall Tube Sample Attempt R = Rock Core Sample SSA = Solid Stem Auger HSA = Hollow Stem Auger RC = Roller Cone WOH = Weight of 140lb. Hammer WOR/C = Weight of Rods or Casing WO1P = Weight of 1 Person S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf) S_u(lab) = Lab Vane Undrained Shear Strength (psf) q_p = Unconfined Compressive Strength (ksf) N-value = Raw Field SPT N-value T_v = Pocket Torvane Shear Strength (psf) WC = Water Content, percent ≈ = Similar or Equal too LL = Liquid Limit PL = Plastic Limit PI = Plasticity Index G = Grain Size Analysis C = Consolidation Test																																																																																																																																							
<table><tr><th rowspan="2">Depth (ft.)</th><th colspan="8">Sample Information</th><th rowspan="2">Visual Description and Remarks</th><th rowspan="2">Laboratory Testing Results/ AASHTO and Unified Class.</th></tr><tr><th>Sample No.</th><th>Pen./Rec. (in.)</th><th>Sample Depth (ft.)</th><th>Blows (6 in.) Shear Strength (psf) or RQD (%)</th><th>N-value</th><th>Casing</th><th>Blows</th><th>Elevation (ft.)</th><th>Graphic Log</th></tr><tr><td>0</td><td>PC-1</td><td></td><td>0.00 - 0.46</td><td></td><td></td><td></td><td>SSA</td><td>103.1</td><td></td><td>5 1/2" PAVEMENT.</td><td rowspan="5">-0.5 -1.1 -2.5 -5.0</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>102.5</td><td></td><td>8" CONCRETE.</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>101.1</td><td></td><td>Brown, damp, Gravelly, fine to coarse SAND, little silt, (Fill).</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>Brown, moist, fine to coarse SAND, some silt, little gravel.</td></tr><tr><td>5</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>98.6</td><td></td><td>Bottom of Exploration at 5.0 feet below ground surface. NO REFUSAL</td></tr><tr><td>10</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>15</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>20</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>25</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>												Depth (ft.)	Sample Information								Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing	Blows	Elevation (ft.)	Graphic Log	0	PC-1		0.00 - 0.46				SSA	103.1		5 1/2" PAVEMENT.	-0.5 -1.1 -2.5 -5.0									102.5		8" CONCRETE.									101.1		Brown, damp, Gravelly, fine to coarse SAND, little silt, (Fill).											Brown, moist, fine to coarse SAND, some silt, little gravel.	5								98.6		Bottom of Exploration at 5.0 feet below ground surface. NO REFUSAL	10												15												20												25											
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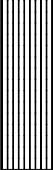
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Maine Department of Transportation Soil/Rock Exploration Log US CUSTOMARY UNITS				Project: A 1.73 mile portion of Routes 1A/9. Location: Hampden, Maine				Boring No.: HB-HAMP-105 WIN: 11577.00																																																																																																																																																																																																																																																																																							
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Set in NW Casing at 10.0 ft bgs.</td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>7</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>8</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>14</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td rowspan="4">15</td><td>3D</td><td>24/14</td><td>14.00 - 16.00</td><td>3/3/3/3</td><td>6</td><td>8</td><td>7</td><td></td><td></td><td></td><td>Brown, wet, loose, fine to coarse SAND, some gravel, some silt, (Fill).</td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>17</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>28</td><td></td><td>8.9</td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>28</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td rowspan="4">20</td><td></td><td></td><td></td><td></td><td></td><td></td><td>42</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>4D</td><td>24/13</td><td>19.00 - 21.00</td><td>4/9/4/5</td><td>13</td><td>18</td><td></td><td></td><td></td><td></td><td>Brown, wet, medium dense, fine to coarse SAND, some gravel, some silt, (Fill).</td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td rowspan="4">25</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>4.4</td><td></td><td>Bottom of Exploration at 21.0 feet below ground surface. 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G#264031 A-1-b, SM WC=8.2%																									10	MD	24/0	10.00 - 12.00	5/6/5/3	11	15	4		16.4		Failed sample attempt. Set in NW Casing at 10.0 ft bgs.								7												8												14						15	3D	24/14	14.00 - 16.00	3/3/3/3	6	8	7				Brown, wet, loose, fine to coarse SAND, some gravel, some silt, (Fill).								17												28		8.9										28						20							42						4D	24/13	19.00 - 21.00	4/9/4/5	13	18					Brown, wet, medium dense, fine to coarse SAND, some gravel, some silt, (Fill).																										25									4.4		Bottom of Exploration at 21.0 feet below ground surface. NO REFUSAL																																					
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Maine Department of Transportation Soil/Rock Exploration Log US CUSTOMARY UNITS				Project: A 1.73 mile portion of Routes 1A/9. Location: Hampden, Maine		Boring No.: HB-HAMP-106 WIN: 11577.00					
Driller: MaineDOT		Elevation (ft.) 44.4		Auger ID/OD: 5" Dia.							
Operator: Giguere/Giles/Daggett		Datum: NAVD88		Sampler: Standard Split Spoon							
Logged By: B. Wilder		Rig Type: CME 45C		Hammer Wt./Fall: 140#/30"							
Date Start/Finish: 6/19/12-6/19/12		Drilling Method: Solid Stem Auger		Core Barrel: N/A							
Boring Location: 36+00, 14.0 ft Lt.		Casing ID/OD: N/A		Water Level*: None Observed							
Hammer Efficiency Factor: 0.84		Hammer Type: Automatic ☒ Hydraulic ☐ Rope & Cathead ☐									
Definitions: D = Split Spoon Sample MD = Unsuccessful Split Spoon Sample Attempt U = Thin Wall Tube Sample MU = Unsuccessful Thin Wall Tube Sample Attempt V = Field Vane Shear Test, PP = Pocket Penetrometer MV = Unsuccessful Field Vane Shear Test Attempt R = Rock Core Sample SSA = Solid Stem Auger HSA = Hollow Stem Auger RC = Roller Cone WOH = Weight of 140lb. Hammer WOR/C = Weight of Rods or Casing WO1P = Weight of One Person S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf) S_u(lab) = Lab Vane Undrained Shear Strength (psf) q_p = Unconfined Compressive Strength (ksf) N-uncorrected = Raw Field SPT N-value Hammer Efficiency Factor = Rig Specific Annual Calibration Value N₆₀ = SPT N-uncorrected Corrected for Hammer Efficiency N₆₀ = (Hammer Efficiency Factor/60%)*N-uncorrected T_v = Pocket Torvane Shear Strength (psf) WC = Water Content, percent LL = Liquid Limit PL = Plastic Limit PI = Plasticity Index G = Grain Size Analysis C = Consolidation Test											
Depth (ft.)	Sample Information							Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N ₆₀	Casing Blows				
0	PC-2		0.00 - 0.58				SSA	43.8		7" PAVEMENT.	
	1D	24/12	1.50 - 3.50	6/9/3/4	12	17		41.4		Brown, damp, medium dense, fine to coarse Sandy GRAVEL, little silt, (Fill).	G#264034 A-1-a, GM WC=2.6%
5	2D	24/20	5.00 - 7.00	4/4/5/6	9	13		37.4		Olive-brown, wet, stiff, SILT, some clay, little fine to coarse sand, trace gravel.	G#264035 A-4, CL-ML WC=23.9%
										Bottom of Exploration at 7.0 feet below ground surface. NO REFUSAL	
10											
15											
20											
25											
Remarks:											
Stratification lines represent approximate boundaries between soil types; transitions may be gradual.										Page 1 of 1	
* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.										Boring No.: HB-HAMP-106	

[illegible]

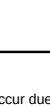
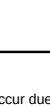
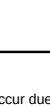
Maine Department of Transportation Soil/Rock Exploration Log US CUSTOMARY UNITS				Project: A 1.73 mile portion of Routes 1A/9. Location: Hampden, Maine				Boring No.: HB-HAMP-108 WIN: 11577.00			
Driller: MaineDOT				Elevation (ft.) 85.2				Auger ID/OD: 5" Dia.			
Operator: Giguere/Giles/Daggett				Datum: NAVD88				Sampler: Standard Split Spoon			
Logged By: B. Wilder				Rig Type: CME 45C				Hammer Wt./Fall: 140#/30"			
Date Start/Finish: 6/19/12-6/19/12				Drilling Method: Solid Stem Auger				Core Barrel: N/A			
Boring Location: 42+50, 18.0 ft Lt.				Casing ID/OD: N/A				Water Level*: None Observed			
Hammer Efficiency Factor: 0.84				Hammer Type: Automatic ☒ Hydraulic ☐ Rope & Cathead ☐							
Definitions: D = Split Spoon Sample MD = Unsuccessful Split Spoon Sample Attempt U = Thin Wall Tube Sample MU = Unsuccessful Thin Wall Tube Sample Attempt V = Field Vane Shear Test, PP = Pocket Penetrometer MV = Unsuccessful Field Vane Shear Test Attempt R = Rock Core Sample SSA = Solid Stem Auger HSA = Hollow Stem Auger RC = Roller Cone WOH = Weight of 140lb. Hammer WOR/C = Weight of Rods or Casing WO1P = Weight of One Person S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf) S_u(lab) = Lab Vane Undrained Shear Strength (psf) q_p = Unconfined Compressive Strength (ksf) N-uncorrected = Raw Field SPT N-value Hammer Efficiency Factor = Rig Specific Annual Calibration Value N₆₀ = SPT N-uncorrected Corrected for Hammer Efficiency N₆₀ = (Hammer Efficiency Factor/60%)*N-uncorrected T_v = Pocket Torvane Shear Strength (psf) WC = Water Content, percent LL = Liquid Limit PL = Plastic Limit PI = Plasticity Index G = Grain Size Analysis C = Consolidation Test											
Depth (ft.)	Sample Information							Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N ₆₀	Casing Blows				
0							SSA	84.7		6" PAVEMENT.	G#264032 A-1-b, SM WC=5.3%
	1D	24/14	1.50 - 3.50	8/10/10/6	20	28		84.1		7" CONCRETE.	
										Brown, damp, medium dense, fine to coarse SAND, some gravel, little silt, (Fill).	
								82.2			
5										Brown, wet, medium stiff, SILT, some fine to coarse sand, trace gravel.	G#264033 A-4, CL-ML WC=21.4%
	2D	24/19	5.00 - 7.00	2/2/3/3	5	7					
								78.2		Bottom of Exploration at 7.0 feet below ground surface. NO REFUSAL	
10											
25											
Remarks:											
Stratification lines represent approximate boundaries between soil types; transitions may be gradual.										Page 1 of 1	
* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.										Boring No.: HB-HAMP-108	

Maine Department of Transportation <u>Soil/Rock Exploration Log</u> <u>US CUSTOMARY UNITS</u>				Project: A 1.73 mile portion of Routes 1A/9. Location: Hampden, Maine				Boring No.: HB-HAMP-109 WIN: 11577.00																																																																																																																																							
Driller: MaineDOT				Elevation (ft.): 88.8				Auger ID/OD: 5" Dia.																																																																																																																																							
Operator: Giguere/Giles/Daggett				Datum: NAVD88				Sampler: Standard Split Spoon																																																																																																																																							
Logged By: B. Wilder				Rig Type: CME 45C				Hammer Wt./Fall: 140#/30"																																																																																																																																							
Date Start/Finish: 6/19/12-6/19/12				Drilling Method: Solid Stem Auger				Core Barrel: N/A																																																																																																																																							
Boring Location: 45+00, 7.5 ft Rt.				Casing ID/OD: N/A				Water Level*: None Observed																																																																																																																																							
Hammer Efficiency Factor: 0.84				Hammer Type: Automatic ☒ Hydraulic ☐ Rope & Cathead ☐																																																																																																																																											
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Maine Department of Transportation Soil/Rock Exploration Log US CUSTOMARY UNITS						Project: A 1.73 mile portion of Routes 1A/9. Location: Hampden, Maine			Boring No.: HB-HAMP-111 WIN: 11577.00																																																																																																																																																																																																																																																												
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Operator: Giguere/Giles/Daggett		Datum: NAVD88		Sampler: Standard Split Spoon																																																																																																																																																																																																																																																																	
Logged By: B. Wilder		Rig Type: CME 45C		Hammer Wt./Fall: 140#/30"																																																																																																																																																																																																																																																																	
Date Start/Finish: 6/19/12-6/19/12		Drilling Method: Solid Stem Auger		Core Barrel: N/A																																																																																																																																																																																																																																																																	
Boring Location: 54+00, 8.0 ft Rt.		Casing ID/OD: N/A		Water Level*: None Observed																																																																																																																																																																																																																																																																	
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Maine Department of Transportation Soil/Rock Exploration Log US CUSTOMARY UNITS				Project: A 1.73 mile portion of Routes 1A/9. Location: Hampden, Maine				Boring No.: HB-HAMP-113 WIN: 11577.00																																																																																																																																																																																																																																																																																																																												
Driller: MaineDOT				Elevation (ft.) 99.3				Auger ID/OD: 5" Dia.																																																																																																																																																																																																																																																																																																																												
Operator: Giguere/Giles/Daggett				Datum: NAVD88				Sampler: Standard Split Spoon																																																																																																																																																																																																																																																																																																																												
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Date Start/Finish: 6/19/12-6/19/12				Drilling Method: Solid Stem Auger				Core Barrel: N/A																																																																																																																																																																																																																																																																																																																												
Boring Location: 60+00, 7.5 ft Rt.				Casing ID/OD: N/A				Water Level*: None Observed																																																																																																																																																																																																																																																																																																																												
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Shear Strength (psf) or RQD (%)</th><th>N-uncorrected</th><th>N₆₀</th><th>Casing Blows</th></tr></thead><tbody><tr><td>0</td><td>PC-4</td><td></td><td>0.00 - 0.67</td><td></td><td></td><td></td><td>SSA</td><td>98.6</td><td rowspan="3"></td><td>8" PAVEMENT.</td><td rowspan="3">G#264039 A-1-b, SM WC=7.0%</td></tr><tr><td></td><td>1D</td><td>24/18</td><td>1.50 - 3.50</td><td>10/9/7/6</td><td>16</td><td>22</td><td></td><td>98.1</td><td>6" CONCRETE.</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>Brown, moist, medium dense, fine to coarse SAND, some silt, little gravel, (Fill).</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>95.6</td><td></td><td></td><td></td></tr><tr><td>5</td><td>2D</td><td>24/20</td><td>5.00 - 7.00</td><td>3/3/4/5</td><td>7</td><td>10</td><td></td><td></td><td rowspan="4"></td><td>Grey-brown, wet, stiff, SILT, some clay, trace fine sand.</td><td rowspan="4">G#264040 A-4, CL-ML WC=22.5%</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>10</td><td>3D</td><td>24/24</td><td>10.00 - 12.00</td><td>2/3/2/3</td><td>5</td><td>7</td><td></td><td></td><td rowspan="4"></td><td>Grey-brown, wet, medium stiff, SILT, some clay, trace fine sand, with fine sand layers.</td><td rowspan="4">Bottom of Exploration at 12.0 feet below ground surface. NO REFUSAL</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>15</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td rowspan="8"></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>20</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td rowspan="4"></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>25</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td rowspan="4"></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></tbody></table>												Depth (ft.)	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Maine Department of Transportation Soil/Rock Exploration Log US CUSTOMARY UNITS							Project: A 1.73 mile portion of Routes 1A/9.						Boring No.: HB-HAMP-114																																																																																																																																																																																																																																																																																																								
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Maine Department of Transportation						Project: A 1.73 mile portion of Routes 1A/9.							Boring No.: HB-HAMP-115							
Soil/Rock Exploration Log US CUSTOMARY UNITS						Location: Hampden, Maine							WIN: 11577.00							
Drilling Contractor: MaineDOT						Elevation (ft.) 119.5							Auger ID/OD: 5" Dia.							
Operator: Giguere/Giles/Daggett						Datum: NAVD88							Sampler: N/A							
Logged By: B. Wilder						Rig Type: CME 45C							Hammer Wt./Fall: N/A							
Date Start/Finish: 6/19/12-6/19/12						Drilling Method: Solid Stem Auger							Core Barrel: N/A							
Boring Location: 66+00, 8.0 ft Rt.						Casing ID/OD: N/A							Water Level*: None Observed							
Definitions: D = Spilt Spoon Sample S = Sample off Auger Flights B = Bucket Sample off Auger Flights MD = Unsuccessful Split Spoon Sample Attempt U = Thin Wall Tube Sample MV = Unsuccessful Field Vane Shear Test Attempt V = Field Vane Shear Test, PP= Pocket Penetrometer MU = Unsuccessful Thin Wall Tube Sample Attempt R = Rock Core Sample SSA = Solid Stem Auger HSA = Hollow Stem Auger RC = Roller Cone WOH = Weight of 140lb. Hammer WOR/C = Weight of Rods or Casing WO1P = Weight of 1 Person S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf) S_{u(lab)} = Lab Vane Undrained Shear Strength (psf) q_p = Unconfined Compressive Strength (ksf) N-value = Raw Field SPT N-value T_v = Pocket Torvane Shear Strength (psf) WC = Water Content, percent ≡ Similar or Equal too LL = Liquid Limit PL = Plastic Limit PI = Plasticity Index G = Grain Size Analysis C = Consolidation Test																				
Sample Information																				
Depth (ft.)		Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks										Laboratory Testing Results/ AASHTO Unified Class.
0							SSA	118.9		7" PAVEMENT. Brown, damp, Gravelly, fine to coarse SAND, little silt, (Fill).										
								116.5		Brown, damp, fine to coarse SAND, some silt, some gravel.										
5																				
10								110.1		Bottom of Exploration at 9.4 feet below ground surface. REFUSAL										
25																				
Remarks:																				
Stratification lines represent approximate boundaries between soil types; transitions may be gradual.																				
Page 1 of 1																				
Boring No.: HB-HAMP-115																				

Maine Department of Transportation Soil/Rock Exploration Log US CUSTOMARY UNITS				Project: A 1.73 mile portion of Routes 1A/9. Location: Hampden, Maine				Boring No.: HB-HAMP-116 WIN: 11577.00			
Driller: MaineDOT		Elevation (ft.) 131.4		Auger ID/OD: 5" Dia.							
Operator: Giguere/Giles/Daggett		Datum: NAVD88		Sampler: Standard Split Spoon							
Logged By: B. Wilder		Rig Type: CME 45C		Hammer Wt./Fall: 140#/30"							
Date Start/Finish: 6/20/12-6/20/12		Drilling Method: Solid Stem Auger		Core Barrel: N/A							
Boring Location: 69+50, 8.5 ft Lt.		Casing ID/OD: N/A		Water Level*: None Observed							
Hammer Efficiency Factor: 0.84		Hammer Type: Automatic ☒ Hydraulic ☐ Rope & Cathead ☐									
Definitions: D = Split Spoon Sample MD = Unsuccessful Split Spoon Sample Attempt U = Thin Wall Tube Sample MU = Unsuccessful Thin Wall Tube Sample Attempt V = Field Vane Shear Test, PP = Pocket Penetrometer MV = Unsuccessful Field Vane Shear Test Attempt		R = Rock Core Sample SSA = Solid Stem Auger HSA = Hollow Stem Auger RC = Roller Cone WOH = Weight of 140lb. Hammer WOR/C = Weight of Rods or Casing WO1P = Weight of One Person		S _u = Peak/Remolded Field Vane Undrained Shear Strength (psf) S _u (lab) = Lab Vane Undrained Shear Strength (psf) q _p = Unconfined Compressive Strength (ksf) N-uncorrected = Raw Field SPT N-value Hammer Efficiency Factor = Rig Specific Annual Calibration Value N ₆₀ = SPT N-uncorrected Corrected for Hammer Efficiency N ₆₀ = (Hammer Efficiency Factor/60%)*N-uncorrected		T _v = Pocket Torvane Shear Strength (psf) WC = Water Content, percent LL = Liquid Limit PL = Plastic Limit PI = Plasticity Index G = Grain Size Analysis C = Consolidation Test					
Depth (ft.)	Sample Information								Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N ₆₀	Casing Blows	Elevation (ft.)			
0							SSA	130.7		9" PAVEMENT. 8" CONCRETE. Brown, damp, Gravelly, fine to coarse SAND, (Fill). Bottom of Exploration at 3.2 feet below ground surface. REFUSAL, Rock fragments in tip of spoon.	
								130.0			
	1D	12/10	2.00 - 3.00	8/18/50(2.2")	---						
								128.2			
5											
10											
15											
20											
25											
Remarks:											
Stratification lines represent approximate boundaries between soil types; transitions may be gradual.										Page 1 of 1	
* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.										Boring No.: HB-HAMP-116	

Maine Department of Transportation Soil/Rock Exploration Log US CUSTOMARY UNITS						Project: A 1.73 mile portion of Routes 1A/9.				Boring No.: HB-HAMP-117																																																																																																																																																																																																																																																																																																										
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Drilling Contractor: MaineDOT						Elevation (ft.) 132.7				Auger ID/OD: 5" Dia.																																																																																																																																																																																																																																																																																																										
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Boring No.: HB-HAMP-117																																																																																																																																																																																																																																																																																																																				

Maine Department of Transportation Soil/Rock Exploration Log US CUSTOMARY UNITS				Project: A 1.73 mile portion of Routes 1A/9. Location: Hampden, Maine				Boring No.: HB-HAMP-118 WIN: 11577.00			
Driller: MaineDOT				Elevation (ft.) 130.1				Auger ID/OD: 5" Dia.			
Operator: Giguere/Giles/Daggett				Datum: NAVD88				Sampler: Standard Split Spoon			
Logged By: B. Wilder				Rig Type: CME 45C				Hammer Wt./Fall: 140#/30"			
Date Start/Finish: 6/20/12-6/20/12				Drilling Method: Solid Stem Auger				Core Barrel: N/A			
Boring Location: 76+00, 8.0 ft Lt.				Casing ID/OD: N/A				Water Level*: None Observed			
Hammer Efficiency Factor: 0.84				Hammer Type: Automatic ☒ Hydraulic ☐ Rope & Cathead ☐							
Definitions: D = Split Spoon Sample MD = Unsuccessful Split Spoon Sample Attempt U = Thin Wall Tube Sample MU = Unsuccessful Thin Wall Tube Sample Attempt V = Field Vane Shear Test, PP = Pocket Penetrometer MV = Unsuccessful Field Vane Shear Test Attempt R = Rock Core Sample SSA = Solid Stem Auger HSA = Hollow Stem Auger RC = Roller Cone WOH = Weight of 140lb. Hammer WOR/C = Weight of Rods or Casing WO1P = Weight of One Person S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf) S_u(lab) = Lab Vane Undrained Shear Strength (psf) q_p = Unconfined Compressive Strength (ksf) N-uncorrected = Raw Field SPT N-value Hammer Efficiency Factor = Rig Specific Annual Calibration Value N₆₀ = SPT N-uncorrected Corrected for Hammer Efficiency N₆₀ = (Hammer Efficiency Factor/60%)*N-uncorrected T_v = Pocket Torvane Shear Strength (psf) WC = Water Content, percent LL = Liquid Limit PL = Plastic Limit PI = Plasticity Index G = Grain Size Analysis C = Consolidation Test											
Depth (ft.)	Sample Information							Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N ₆₀	Casing Blows				
0							SSA	129.6		6" PAVEMENT.	G#264043 A-1-b, SM WC=3.5%
	1D	24/19	1.50 - 3.50	14/22/18/11	40	56		129.0		7" CONCRETE.	
								127.1		Brown, damp, very dense, fine to coarse SAND, some gravel, little silt, (Fill).	
5										Brown, damp, very dense, fine to coarse SAND, some silt, some gravel, (Till).	G#264044 A-1-b, SM WC=7.3%
	2D	24/17	5.00 - 7.00	12/24/42/53	66	92					
10								121.3	Bottom of Exploration at 8.8 feet below ground surface. REFUSAL, Weathered Rock in tip of spoon.		
15											
20											
25											
Remarks:											
Stratification lines represent approximate boundaries between soil types; transitions may be gradual.										Page 1 of 1	
* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.										Boring No.: HB-HAMP-118	

Maine Department of Transportation Soil/Rock Exploration Log US CUSTOMARY UNITS				Project: A 1.73 mile portion of Routes 1A/9. Location: Hampden, Maine				Boring No.: HB-HAMP-119 WIN: 11577.00																																																																																																																																																																																																																									
Driller: MaineDOT				Elevation (ft.) 123.1				Auger ID/OD: 5" Dia.																																																																																																																																																																																																																									
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Boring Location: 79+00, 8.0 ft Rt.				Casing ID/OD: N/A				Water Level*: None Observed																																																																																																																																																																																																																									
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Maine Department of Transportation <u>Soil/Rock Exploration Log</u> <u>US CUSTOMARY UNITS</u>				Project: A 1.73 mile portion of Routes 1A/9. Location: Hampden, Maine				Boring No.: HB-HAMP-121 WIN: 11577.00																																																																																																																																																																																																																																																																																																																																		
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* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.										Boring No.: HB-HAMP-122																																																																																																																																																																																																																																																																																							

Maine Department of Transportation Soil/Rock Exploration Log US CUSTOMARY UNITS									Project: A 1.73 mile portion of Routes 1A/9.						Boring No.: HB-HAMP-123												
									Location: Hampden, Maine						WIN: 11577.00												
Drilling Contractor: MaineDOT									Elevation (ft.) 125.3						Auger ID/OD: 5" Dia.												
Operator: Giguere/Giles/Daggett									Datum: NAVD88						Sampler: N/A												
Logged By: B. Wilder									Rig Type: CME 45C						Hammer Wt./Fall: N/A												
Date Start/Finish: 6/20/12-6/20/12									Drilling Method: Solid Stem Auger						Core Barrel: N/A												
Boring Location: 92+00, 7.0 ft Lt.									Casing ID/OD: N/A						Water Level*: None Observed												
Definitions: D = Spilt Spoon Sample S = Sample off Auger Flights B = Bucket Sample off Auger Flights MD = Unsuccessful Split Spoon Sample Attempt U = Thin Wall Tube Sample MV = Unsuccessful Field Vane Shear Test Attempt V = Field Vane Shear Test. PP= Pocket Penetrometer MU = Unsuccessful Thin Wall Tube Sample Attempt R = Rock Core Sample SSA = Solid Stem Auger HSA = Hollow Stem Auger RC = Roller Cone WOH = Weight of 140lb. Hammer WOR/C = Weight of Rods or Casing WO1P = Weight of 1 Person Su = Peak/Remolded Field Vane Undrained Shear Strength (psf) Su(lab) = Lab Vane Undrained Shear Strength (psf) qp = Unconfined Compressive Strength (ksf) N-value = Raw Field SPT N-value Tv = Pocket Torvane Shear Strength (psf) WC = Water Content, percent ≈ = Similar or Equal too LL = Liquid Limit PL = Plastic Limit PI = Plasticity Index G = Grain Size Analysis C = Consolidation Test																											
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0												SSA		124.8				6" PAVEMENT.									
														124.3				6" CONCRETE.								-0.5	
																		Brown, damp, Gravelly, fine to coarse SAND, little silt, (Fill).								-1.0	
														122.3				Brown, damp, fine to coarse SAND, some silt, little gravel.								-3.0	
5																											
														119.1				Bottom of Exploration at 6.2 feet below ground surface. REFUSAL								-6.2	
10																											
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Maine Department of Transportation				Project: A 1.73 mile portion of Routes 1A/9.				Boring No.: HB-HAMP-124																																																																																																																																																																																																																																																																																																																									
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Maine Department of Transportation Soil/Rock Exploration Log US CUSTOMARY UNITS				Project: A 1.73 mile portion of Routes 1A/9. Location: Hampden, Maine				Boring No.: HB-HAMP-125 WIN: 11577.00																																																																																																																																																																																		
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Operator: Giguere/Giles/Daggett				Datum: NAVD88				Sampler: Standard Split Spoon																																																																																																																																																																																		
Logged By: B. Wilder				Rig Type: CME 45C				Hammer Wt./Fall: 140#/30"																																																																																																																																																																																		
Date Start/Finish: 6/20/12-6/20/12				Drilling Method: Solid Stem Auger				Core Barrel: N/A																																																																																																																																																																																		
Boring Location: 99+00, 8.0 ft Lt.				Casing ID/OD: N/A				Water Level*: None Observed																																																																																																																																																																																		
Hammer Efficiency Factor: 0.84				Hammer Type: Automatic ☒ Hydraulic ☐ Rope & Cathead ☐																																																																																																																																																																																						
Definitions: D = Split Spoon Sample MD = Unsuccessful Split Spoon Sample Attempt U = Thin Wall Tube Sample MU = Unsuccessful Thin Wall Tube Sample Attempt V = Field Vane Shear Test, PP = Pocket Penetrometer MV = Unsuccessful Field Vane Shear Test Attempt R = Rock Core Sample SSA = Solid Stem Auger HSA = Hollow Stem Auger RC = Roller Cone WOH = Weight of 140lb. Hammer WOR/C = Weight of Rods or Casing WO1P = Weight of One Person S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf) S_u(lab) = Lab Vane Undrained Shear Strength (psf) q_p = Unconfined Compressive Strength (ksf) N-uncorrected = Raw Field SPT N-value Hammer Efficiency Factor = Rig Specific Annual Calibration Value N₆₀ = SPT N-uncorrected Corrected for Hammer Efficiency N₆₀ = (Hammer Efficiency Factor/60%)*N-uncorrected T_v = Pocket Torvane Shear Strength (psf) WC = Water Content, percent LL = Liquid Limit PL = Plastic Limit PI = Plasticity Index G = Grain Size Analysis C = Consolidation Test																																																																																																																																																																																										
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Maine Department of Transportation Soil/Rock Exploration Log US CUSTOMARY UNITS				Project: A 1.73 mile portion of Routes 1A/9. Location: Hampden, Maine				Boring No.: HB-HAMP-126 WIN: 11577.00																																																																																																																																																																																																																																																																																																																																																																							
Drilling Contractor: MaineDOT				Elevation (ft.): 111.5				Auger ID/OD: 5" Dia.																																																																																																																																																																																																																																																																																																																																																																							
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Maine Department of Transportation Soil/Rock Exploration Log US CUSTOMARY UNITS						Project: A 1.73 mile portion of Routes 1A/9. Location: Hampden, Maine								Boring No.: HB-HAMP-127 WIN: 11577.00					
Drilling Contractor: MaineDOT						Elevation (ft.) 110.8						Auger ID/OD: 5" Dia.							
Operator: Giguere/Giles/Daggett						Datum: NAVD88						Sampler: N/A							
Logged By: B. Wilder						Rig Type: CME 45C						Hammer Wt./Fall: N/A							
Date Start/Finish: 6/20/12-6/20/12						Drilling Method: Solid Stem Auger						Core Barrel: N/A							
Boring Location: 106+00, 8.0 ft Lt.						Casing ID/OD: N/A						Water Level*: None Observed							
Definitions: D = Spilt Spoon Sample MU = Unsuccessful Thin Wall Tube Sample Attempt WOIP = Weight of 1 Person S = Sample off Auger Flights R = Rock Core Sample S _U = Peak/Remolded Field Vane Undrained Shear Strength (psf) B = Bucket Sample off Auger Flights SSA = Solid Stem Auger S _{U(lab)} = Lab Vane Undrained Shear Strength (psf) LL = Liquid Limit MD = Unsuccessful Split Spoon Sample Attempt HSA = Hollow Stem Auger q _p = Unconfined Compressive Strength (ksf) PL = Plastic Limit U = Thin Wall Tube Sample RC = Roller Cone N-value = Raw Field SPT N-value PI = Plasticity Index MV = Unsuccessful Field Vane Shear Test Attempt WOH = Weight of 140lb. Hammer T _v = Pocket Torvane Shear Strength (psf) G = Grain Size Analysis V = Field Vane Shear Test PP= Pocket Penetrometer WOR/C = Weight of Rods or Casing WC = Water Content, percent ≈ = Similar or Equal too C = Consolidation Test																			
Sample Information										Visual Description and Remarks						Laboratory Testing Results/ AASHTO and Unified Class.			
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											
0						SSA	110.2	[Pattern]	7" PAVEMENT.—0.6'										
							109.6	[Pattern]	8" CONCRETE.—1.3'										
									Brown, damp, Gravelly, fine to coarse SAND, little silt, (Fill).—3.0'										
							107.8	[Pattern]	Brown, moist, Clayey SILT, trace fine sand.—3.0'										
5																			
10							100.8		Bottom of Exploration at 10.0 feet below ground surface. NO REFUSAL.—10.0'										
25																			
Remarks:																			
Stratification lines represent approximate boundaries between soil types; transitions may be gradual.																			
* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.																			
Page 1 of 1												Boring No.: HB-HAMP-127							

Appendix B

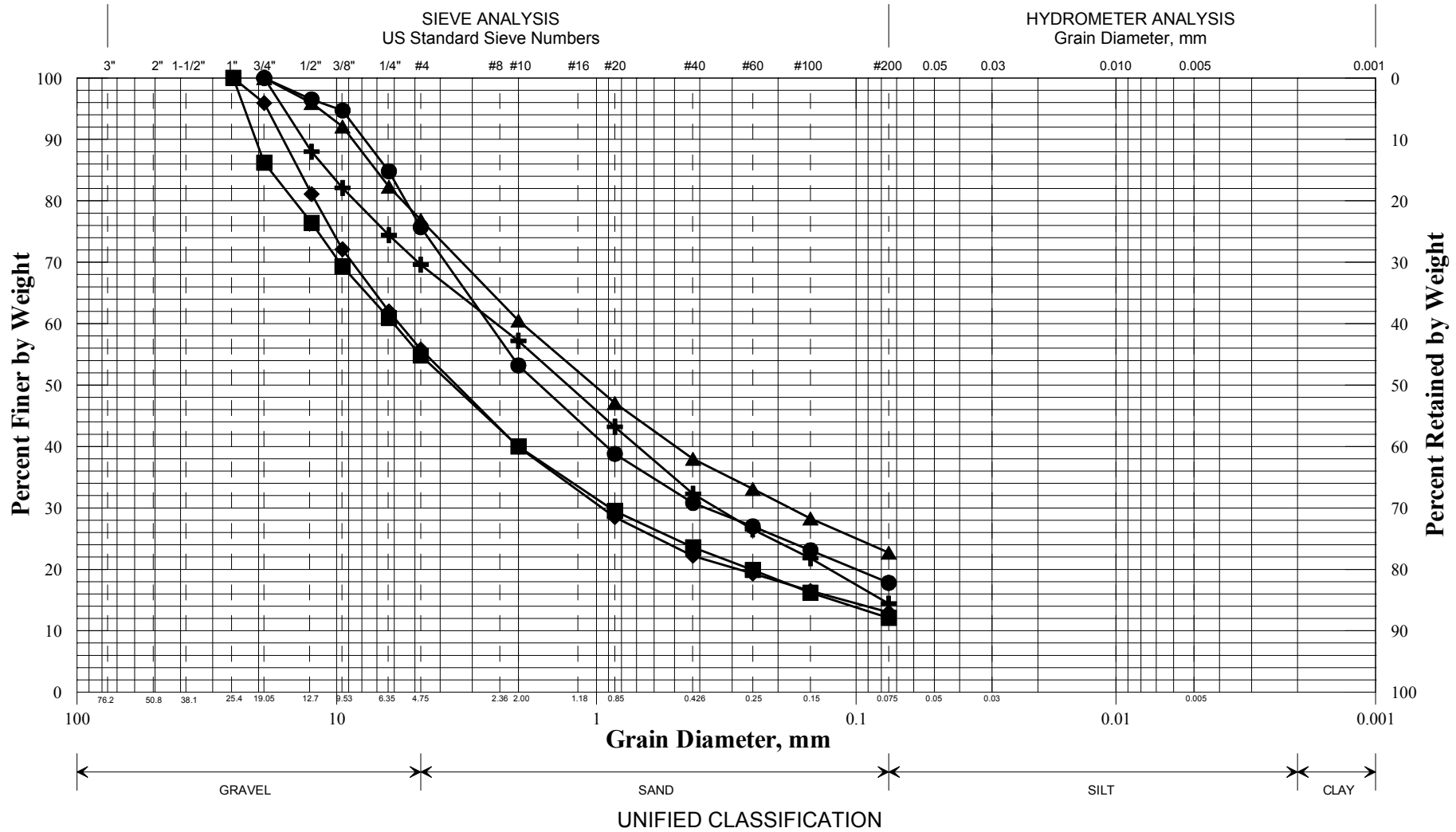
Laboratory Test Results

Work Number: 11577.00

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

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

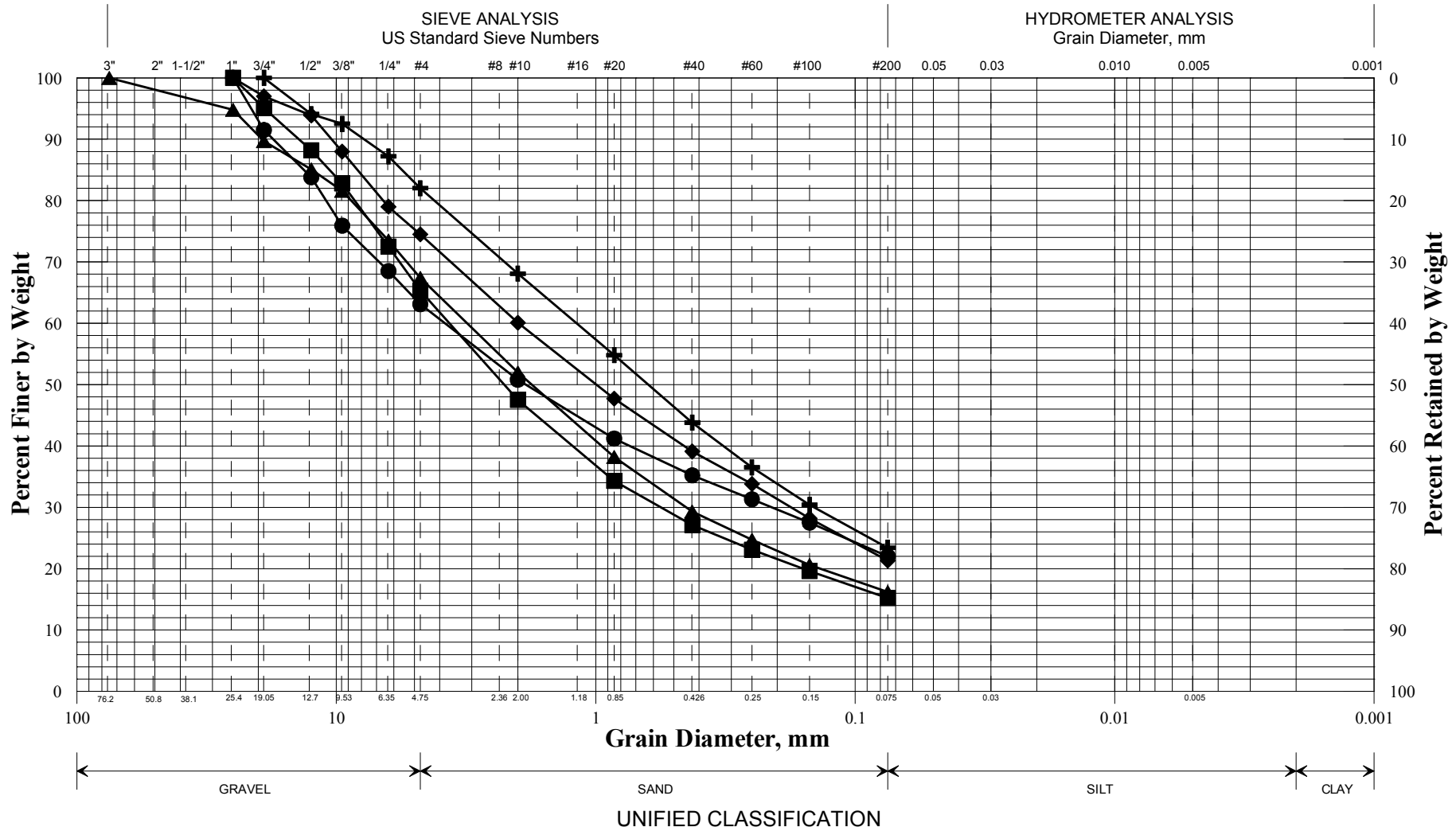
State of Maine Department of Transportation
GRAIN SIZE DISTRIBUTION CURVE



	Boring/Sample No.	Station	Offset, ft	Depth, ft	Description	W, %	LL	PL	PI
+	HB-HAMP-103/1D	24+00	8.0 RT	1.5-3.5	SAND, some gravel, little silt.	4.9			
◆	HB-HAMP-105/1D	32+00	8.0 RT	1.5-3.5	Sandy GRAVEL, little silt.	2.6			
■	HB-HAMP-106/1D	36+00	14.0 LT	1.5-3.5	Sandy GRAVEL, little silt.	2.6			
●	HB-HAMP-108/1D	42+50	18.0 LT	1.58-3.58	SAND, some gravel, little silt.	5.3			
▲	HB-HAMP-111/1D	54+00	8.0 RT	1.58-3.58	SAND, some gravel, some silt.	4.9			
×									

WIN	
011577.00	
Town	
Hampden	
Reported by/Date	
WHITE, TERRY A	8/23/2012

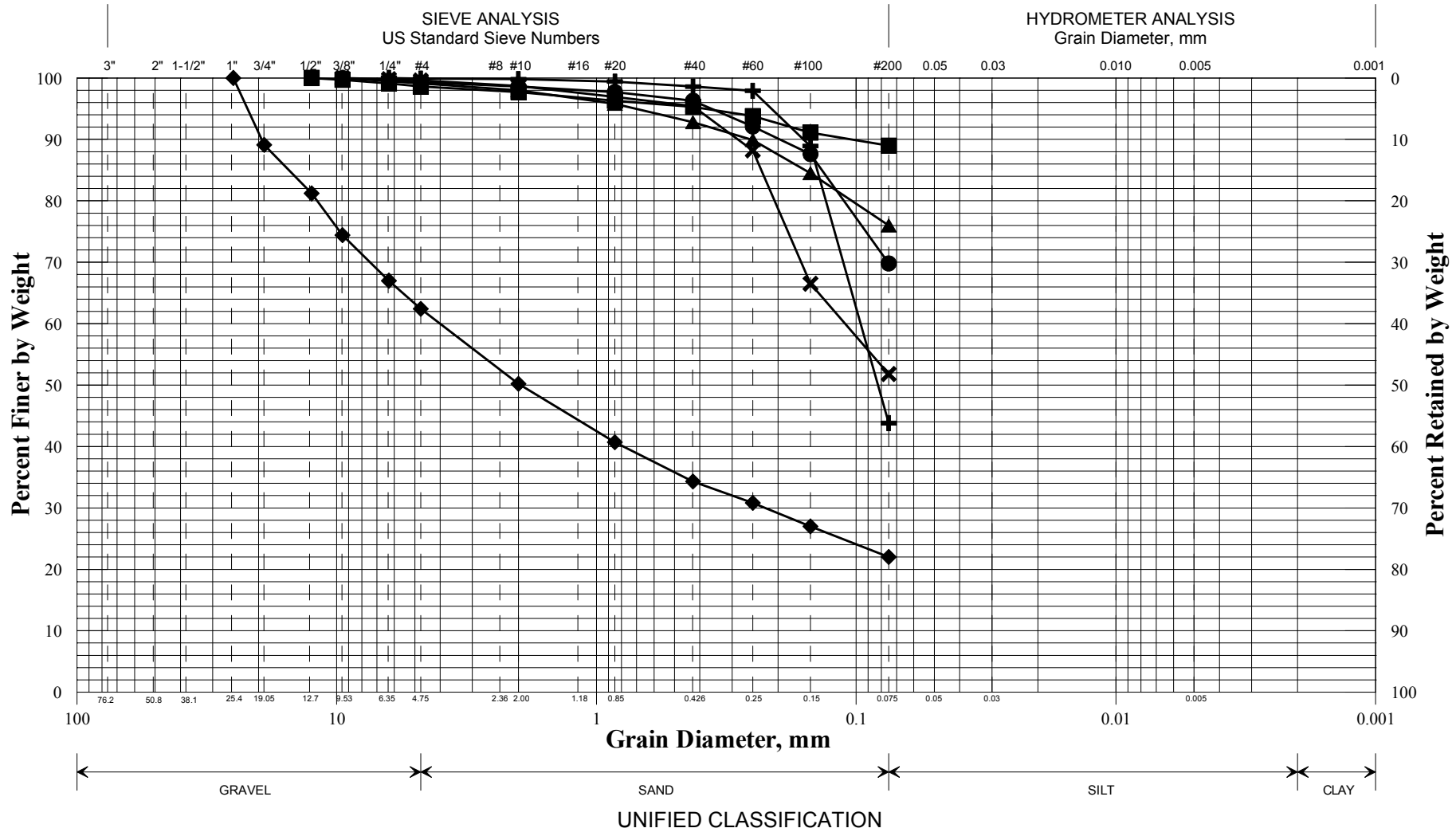
State of Maine Department of Transportation
GRAIN SIZE DISTRIBUTION CURVE



	Boring/Sample No.	Station	Offset, ft	Depth, ft	Description	W, %	LL	PL	PI
+	HB-HAMP-113/1D	60+00	7.5 RT	1.83-3.83	SAND, some silt, little gravel.	7.0			
◆	HB-HAMP-114/1D	63+00	8.0 LT	1.5-3.5	SAND, some gravel, some silt.	5.9			
■	HB-HAMP-118/1D	76+00	8.0 LT	1.58-3.58	SAND, some gravel, little silt.	3.5			
●	HB-HAMP-119/1D	79+00	8.0 RT	1.58-3.58	Gravelly SAND, some silt.	5.7			
▲	HB-HAMP-125/1D	99+00	8.0 LT	1.83-3.83	SAND, some gravel, little silt.	4.3			
×									

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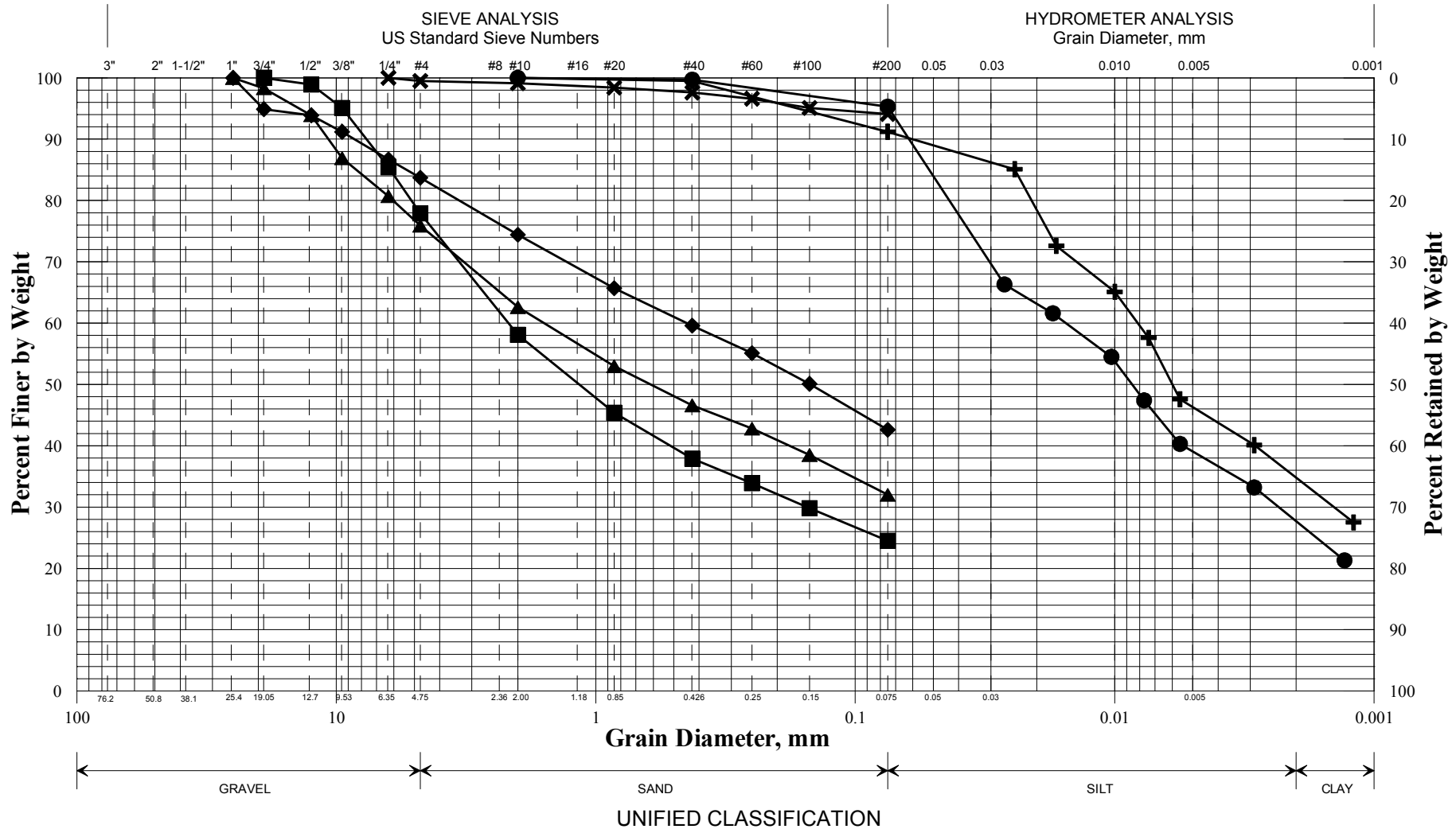
State of Maine Department of Transportation
GRAIN SIZE DISTRIBUTION CURVE



	Boring/Sample No.	Station	Offset, ft	Depth, ft	Description	W, %	LL	PL	PI
+	HB-HAMP-103/2D	24+00	8.0 RT	5.0-7.0	Silty SAND, trace gravel.	22.7			
◆	HB-HAMP-105/2D	32+00	8.0 RT	5.0-7.0	Gravelly SAND, some silt.	8.2			
■	HB-HAMP-106/2D	36+00	14.0 LT	5.0-7.0	SILT, little sand, trace gravel.	23.9			
●	HB-HAMP-108/2D	42+50	18.0 LT	5.0-7.0	SILT, some sand, trace gravel.	21.4			
▲	HB-HAMP-109/2D	45+00	7.5 RT	5.0-7.0	SILT, some sand, trace gravel.	22.3			
×	HB-HAMP-111/2D	54+00	8.0 RT	5.0-7.0	Sandy SILT, trace gravel.	18.8			

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	Boring/Sample No.	Station	Offset, ft	Depth, ft	Description	W, %	LL	PL	PI
+	HB-HAMP-113/2D	60+00	7.5 RT	5.0-7.0	SILT, some clay, trace sand.	22.5			
◆	HB-HAMP-114/2D	63+00	8.0 LT	5.0-5.9	Sandy SILT, little gravel.	10.0			
■	HB-HAMP-118/2D	76+00	8.0 LT	5.0-7.0	SAND, some silt, some gravel.	7.3			
●	HB-HAMP-119/2D	79+00	8.0 RT	5.0-7.0	SILT, some clay, trace sand.	22.5			
▲	HB-HAMP-122/2D	88+50	7.0 RT	5.0-7.0	SAND, some silt, some gravel.	8.9			
×	HB-HAMP-125/2D	99+00	8.0 LT	5.0-7.0	SILT, trace sand, trace gravel.	19.4			

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