Highway Program

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Memorandum

To: Brian Keezer, P.E.
From: Karen Gross
Date: 11/09/12
Subject: Geotechnical/Pavement Information and Assessment
Pleasant Hill Road, Sabattus
WIN 19081.00

The geotechnical investigations and lab testing for the Pleasant Hill Road project has been completed. The following is a summary of those investigations and an assessment of existing conditions in relation to the options for the new pavement structure. The information reviewed for this assessment includes a field reconnaissance and subsurface investigations. No as-built plans were located for this project. There is no design stationing available at this stage of design, so roadways, buildings and utility poles are used to reference locations.

Project Overview

The project begins at the intersection of Route 9 and extends 0.75 miles northeasterly to the intersection of Route 129/9/132. This roadway is classified as a major urban collector (Federal Functional Classification), an inventory road (#0140034) by MaineDOT classifications, and is considered a Highway Corridor Priority (HCP) 4 roadway. The scope of work will include milling and overlaying sections as well as realigning a curve section to the east side of the existing roadway (northbound lane) between Upper Stage Road and Route 126.

Existing Conditions

This section of Pleasant Hill Road is straddled by sand and gravels pits. There are primarily houses on the west side of the roadway, and a cemetery, athletic fields, a recycling/solid waster transfer station, and the Sabattus Public Works facility on the east side. The topography consists of an upgrade from Route 9 to the cemetery, a flat section from the cemetery to Upper Stage Road, and a downgrade from Upper Stage Road to Route 126. Visible surficial soils appear to be sands and gravels. A curved section between Upper Stage Road and the Transfer Station has long, steep slopes on the west side of the roadway. There are minimal drainage ditches to remove stormwater and those that do exist are very shallow.

The existing pavement consists of two 10.5’ to 11’ travel lanes and variable width gravel shoulders. The exception is a short guardrail section that has a shoulder paved to the face of rail. There is evidence of some surface erosion of the gravel shoulders from stormwater, but in general, the natural sand and gravel soils appear to have good drainage properties.

Current pavement management data (2011) indicates that the International Roughness Index (IRI) is 171 inches/mile, the Pavement Condition Rating (PCR) is 2.74, and the right rut depth is 0.3”.

The IRI is a measure of ride quality and the lower the number, the better the feel of the ride. A new pavement typically has IRI values of 40 to 50 inches/mile. The current values indicate that the road has a comfortable ride at 45 mph, but there will be noticeable swaying and movements felt that are induced by the existing distresses.

The PCR is a numerical measure of all the distresses (cracking and rutting) including extent and severity. The PCR scale ranges from 0 (poor) to 5 (excellent). PCR values between 2 and 3 indicate that the roadway is in fair condition and rehabilitation is warranted. The distresses on this project are considered moderate in severity for most of the project. These distresses include transverse cracking, block cracking, longitudinal cracking in the wheel paths, alligator cracking, and right wheel path rutting. The longitudinal wheel path cracks, alligator cracking, and rutting are of most concern because they indicate structural deficiencies.
Transverse and block cracks form due to temperature differences and are considered functional cracks (produce ride quality issues).

The method that the rut depths are measured and recorded are not always valid for roads with gravel shoulders and where there is evidence of rutting due to lack of travel lane edge confinement. The reported value of 0.3" is less that what I physically measured on the east side of the roadway. I measured 0.5" to 1.25". These were just spot checks and stations were not recorded (none available at the time). I would expect these rut depths or even greater depths with gravel shoulders and poor stormwater removal at the edge of the travel lanes.

Existing Subsurface/Pavement Structure Conditions and Assessment
Borings were drilled at nine locations to a depth of 6' to 7' feet below the ground surface. All borings were drilled in the roadway due to the presence of a sewer line that runs the entire length of the east side of the roadway, and a water line that runs on the north end and the south end of the roadway. Boring locations were selected based on avoiding underground utilities (sewer and water) that exist on most of the project and the anticipated scope of work.

Eight representative samples collected in the borings were tested in the MaineDOT Lab Testing facility to determine the gradation and water contents of the pavement structure aggregate and underlying subgrade. The following table summarizes the boring and testing information.

Boring No.	HMA (in)	Aggregate (in)	%Passing #200 (Aggregate)	Water Content % (Aggregate)	Subgrade Soil Type
HB-SABA-101	5	21	16.2	3	SAND
HB-SABA-102	5	67	13.9	3.1	SAND
HB-SABA-103	5	67	13.9	3.1	SAND
HB-SABA-104	4 ½	21	15.7	6.9	SAND
HB-SABA-105	5	73	11.3	4	SAND
HB-SABA-106	5	73	11.3	4	SAND
HB-SABA-107	4 ½	??	??	??	SAND
HB-SABA-108	5	??	??	??	SAND
HB-SABA-109	5	18	11.3	4	SILT

Surface Course
The existing roadway surface is Hot Mix Asphalt (HMA) and is 21' to 22' in total width. Borings indicate that the HMA ranges from 4½" to 5" in thickness. There is a coarser mix in the bottom layer and finer mixes as you move towards the surface.

Base/Subbase
The existing base/subbase aggregate ranges from 0" to 73" in thickness. Lab testing indicates that the existing aggregate does not meet MaineDOT gradation specifications for subbase aggregate (#304.10) and exceeds the requirements for the percent passing the #200 sieve (7% maximum). It should be noted that we collect very small sample sizes from borings. The MaineDOT Standard Specifications requirements are based on bag samples that are collected during construction or from stockpiles. Because of this small sample size, the results can be skewed toward the finer particle sizes since larger stones are not included like with bag samples. Based on the lab test results for the % passing the #200 sieve, the existing pavement structure aggregate will be slightly frost susceptible and have fair drainage properties.

Please note the lack of information for boring HB-SABA-107 and HB-SABA-108. The lab test results for Sample #7 indicate that the pavement structure aggregate has 59.4% passing the #200 sieve. This high silt content contradicts the field visual description as well as the sample notes I made prior to submitting the samples for testing. My notes state that all samples appeared to be the same except for a subgrade sample (Sample #8) which was collected at the north end of the project in boring HB-SABA-109. Therefore, I am assuming the information from the field descriptions and my notes is correct and that an error occurred during testing. I am assuming that the pavement structure aggregate in boring #107 and #108 is similar to the aggregate properties in boring #106 and is in an excess of 60" in thickness.

Water contents of the pavement structure aggregates ranges from 3% to 7%. These values indicate that the existing material is not holding water and probably has good drainage properties.

Subgrade

Borings indicate that the subgrade consists predominately of sand with varying amounts of silt and gravel with the exception of the very north end of the project where the subgrade consists of silt. This layer of silt is thin and is underlain by the same sands and gravels as found elsewhere on the project. The Maine Geologic Survey surficial geology map for this area indicates the natural surficial soils are Marine Delta Deposits from the beginning of the project to the Public Works location, and Presumpscot Formation (marine clays and silts) from Public Works to Route 126. The borings confirm the existence of these deposits. Geology maps also indicate that the entire project is located within a significant Sand and Gravel Aquifer. Based on the field and map information, the subgrade soils will have good drainage properties and be slightly frost susceptible from the start of the project to the Public Works facility, and poor drainage properties and highly frost susceptible from the Public Works facility to Route 126 due to the clay-silt layer.

Shoulders

Although it was not possible to drill in the northbound shoulder, I am assuming that the underlying soils are the same as what was found in the roadway borings.

Bedrock

No shallow refusal was encountered at any of the boring locations.

Groundwater

No groundwater or wet soils were encountered in any borings.

Pavement Structure Options

The lab testing information shows that the pavement structure aggregate and the subgrade soils are very similar from the project start to Public Works. Without as-built information, I can't tell if the pavement structure aggregate was placed or if the HMA was simply paved on the natural soils. Either way, and considering the aggregate has a higher fine material content that specifications allow, the pavement seems to be performing satisfactorily from the start of the project to the Public Works facility. This would be expected because of the weaker underlying clay-silt soils located between Public Works and Route 126. Most or the structural distress is caused by the lack of paved shoulders which function to prevent shearing of the underlying aggregate at the edge of the travel lane (from applied loads) and prevent water from entering under the edge of the travel lanes. In my opinion and based on the Priority 4 classification and the existing distresses, milling and overlaying the travel lanes plus paving the shoulders will greatly improve this roadway.

Ditching should also be considered to remove stormwater and to prevent erosion. The ditch can be shallower than the MaineDOT typical depth from the start of the project to Public Works since it will not function to remove groundwater with the existing soils in this section. Deeper ditching or underdrain is recommended from Public Works to Route 126.

Realigning the curves between Upper Stage Road and the Transfer Station will probably require areas of full reconstruction. The appropriate Subgrade Resilient Modulus value to use for the pavement design in this section is 5000 psi. Based on a 12-year design life, the following designs meet the structural needs:

Option 1	
HMA	4
Subbase (Item #30410)	25
total	29

Option 2	
HMA	5
Subbase (Item #30410)	21
total	26

Option 3	
HMA	6
Subbase (Item #30410)	17
total	23

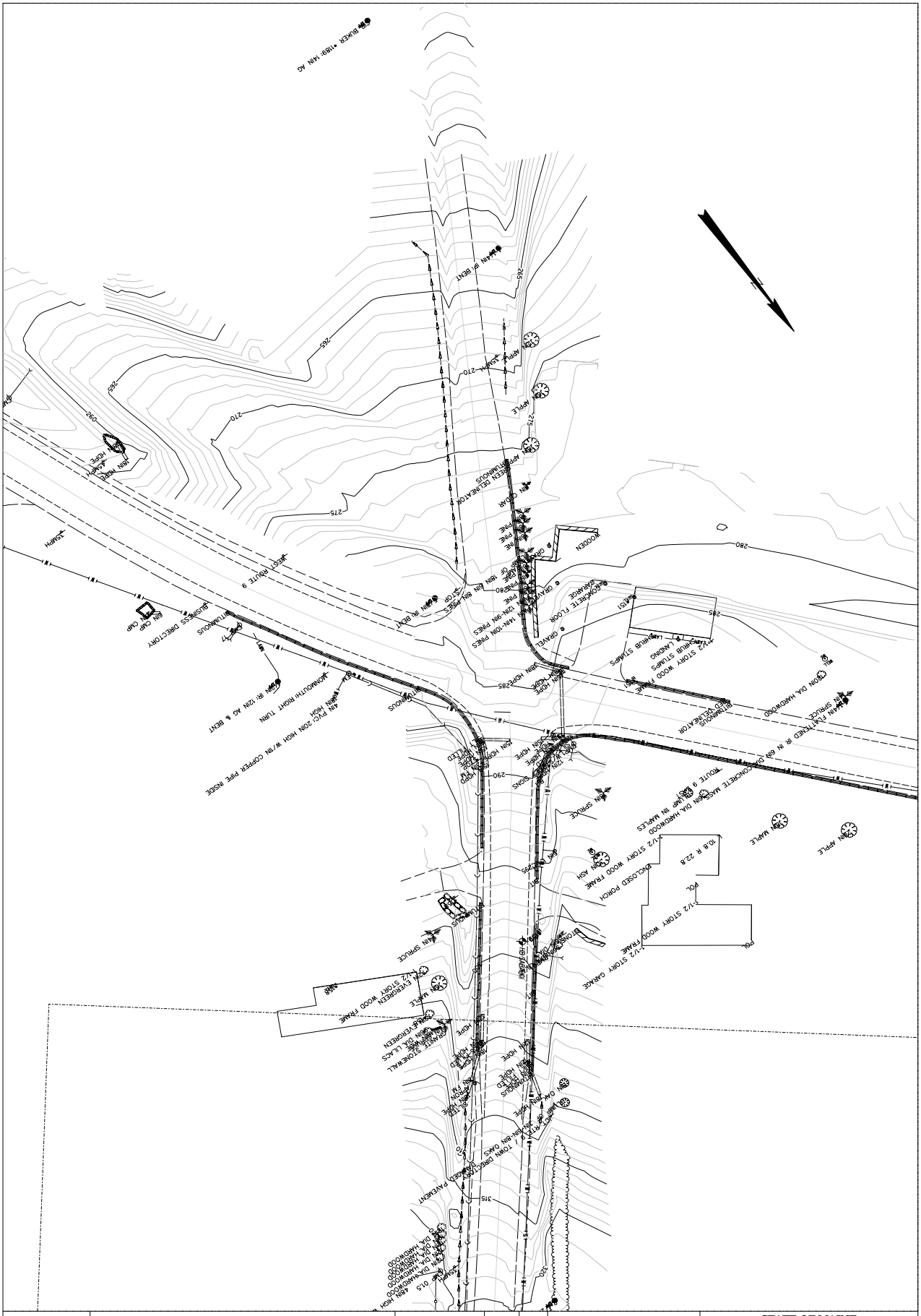
There are advantages and disadvantages to each option, primarily cost and right-of-way related, but all are considered acceptable designs for this roadway classification. Since frost is not a concern except at the north end of the project, a thinner overall pavement section is appropriate for this roadway.

Conclusion

All supporting documentation used in this assessment is attached for your reference. I have also included the plans and geotechnical information for the intersection of Pleasant Hill Road and Route 126 for your reference and for matching purposes. Please let me know if I can provide you with any additional information or clarify anything in this memo.

ATTACHMENTS:
Location Map
Geoplans
Boring Logs
Lab Testing Data
Geology Maps and Keys
DARWin Pavement Design
Traffic Data Sheet
Soil Support/ Resilient Modulus Selection Guidelines
Plans – WIN #10764.00

Sabattus, Pleasant Hill Road
WIN 19081.00



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REVISIONS 3			DATE
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SABATTUS
ROUTE 9/PLEASANT HILL RD.

GEOPLANS

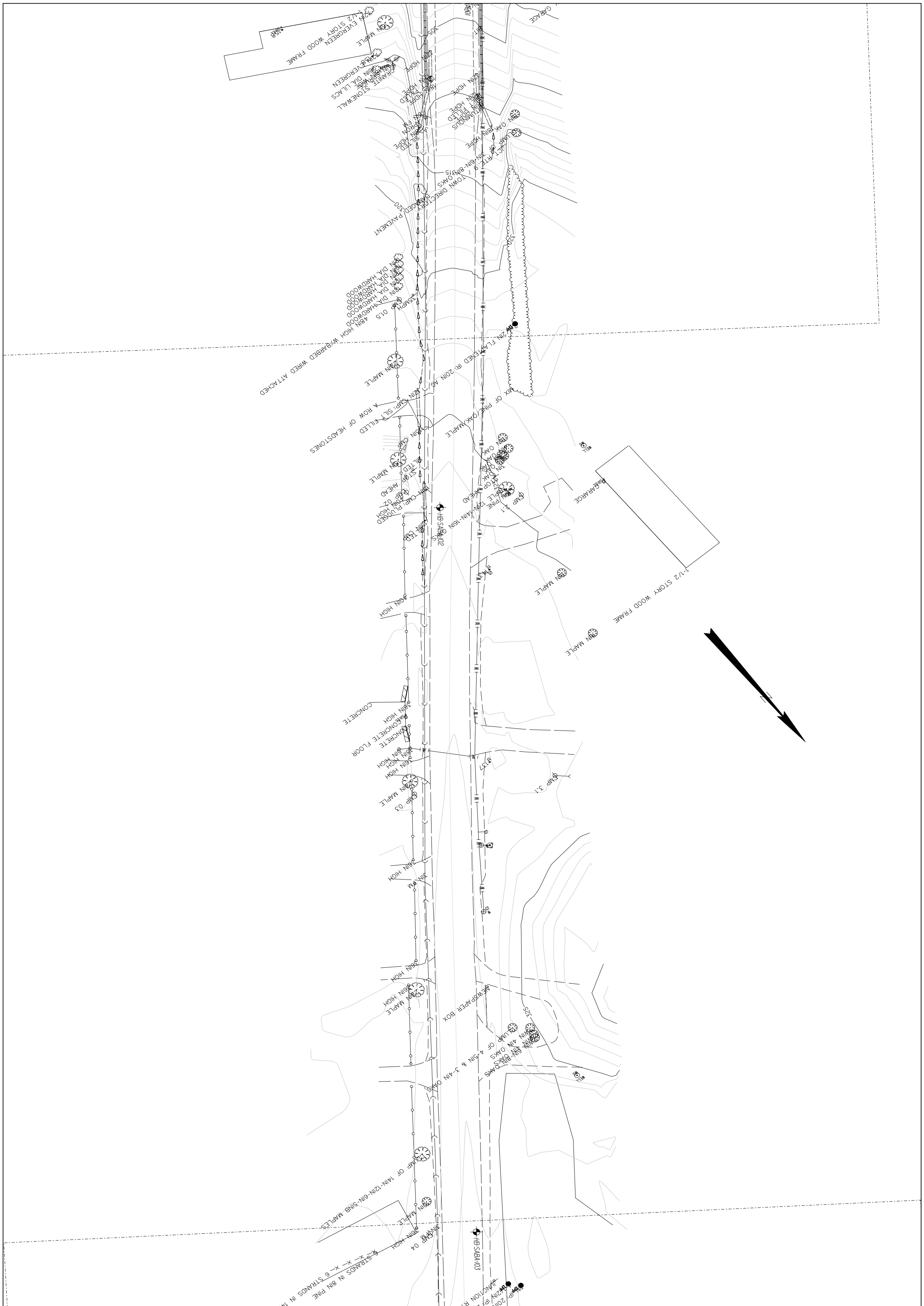
SHEET NUMBER 1 OF 7

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

AC-STP-1908(100)X

WIN 19081.00

HIGHWAY PLANS



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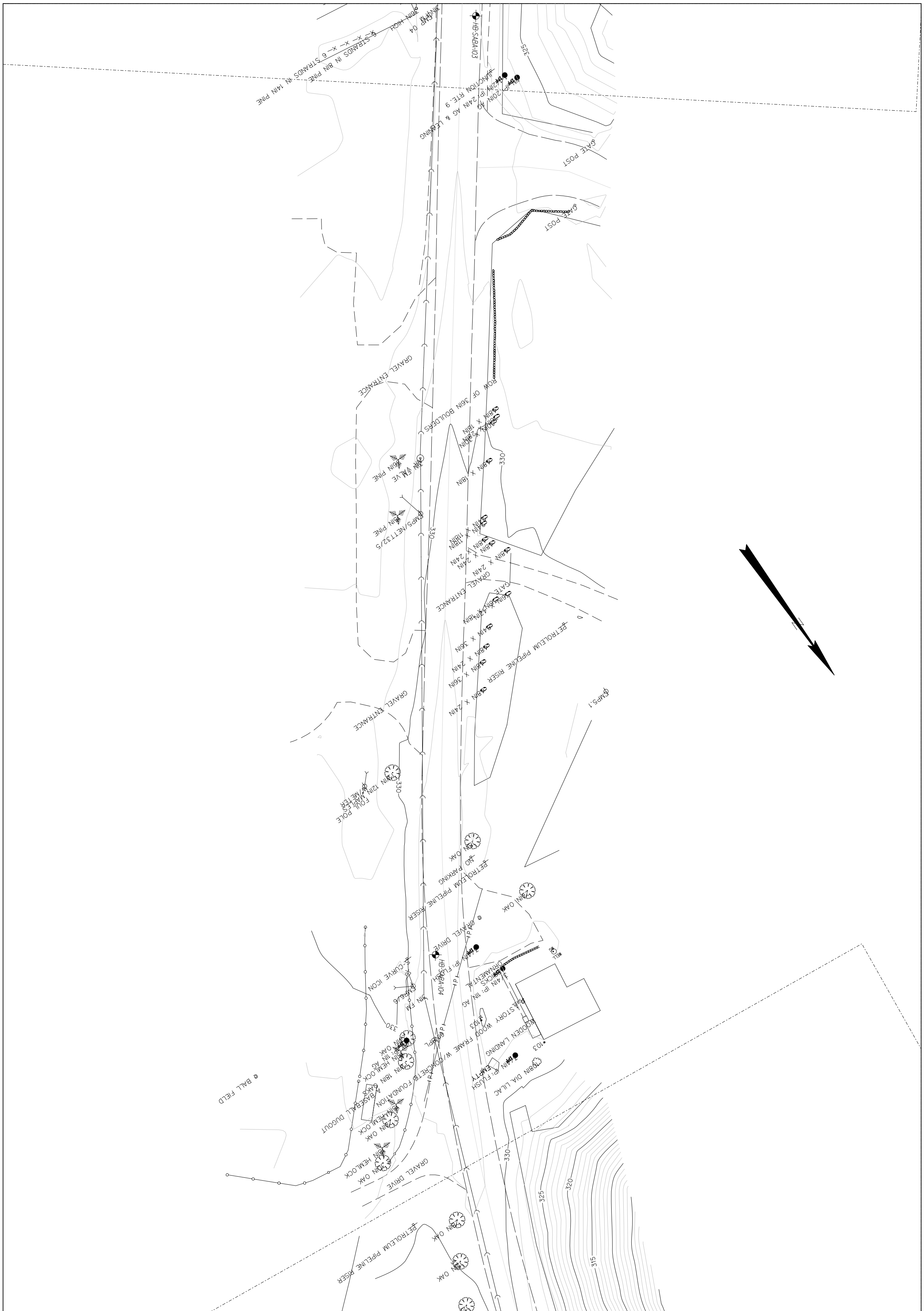

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SIGNATURE

P.E. NUMBER

DATE

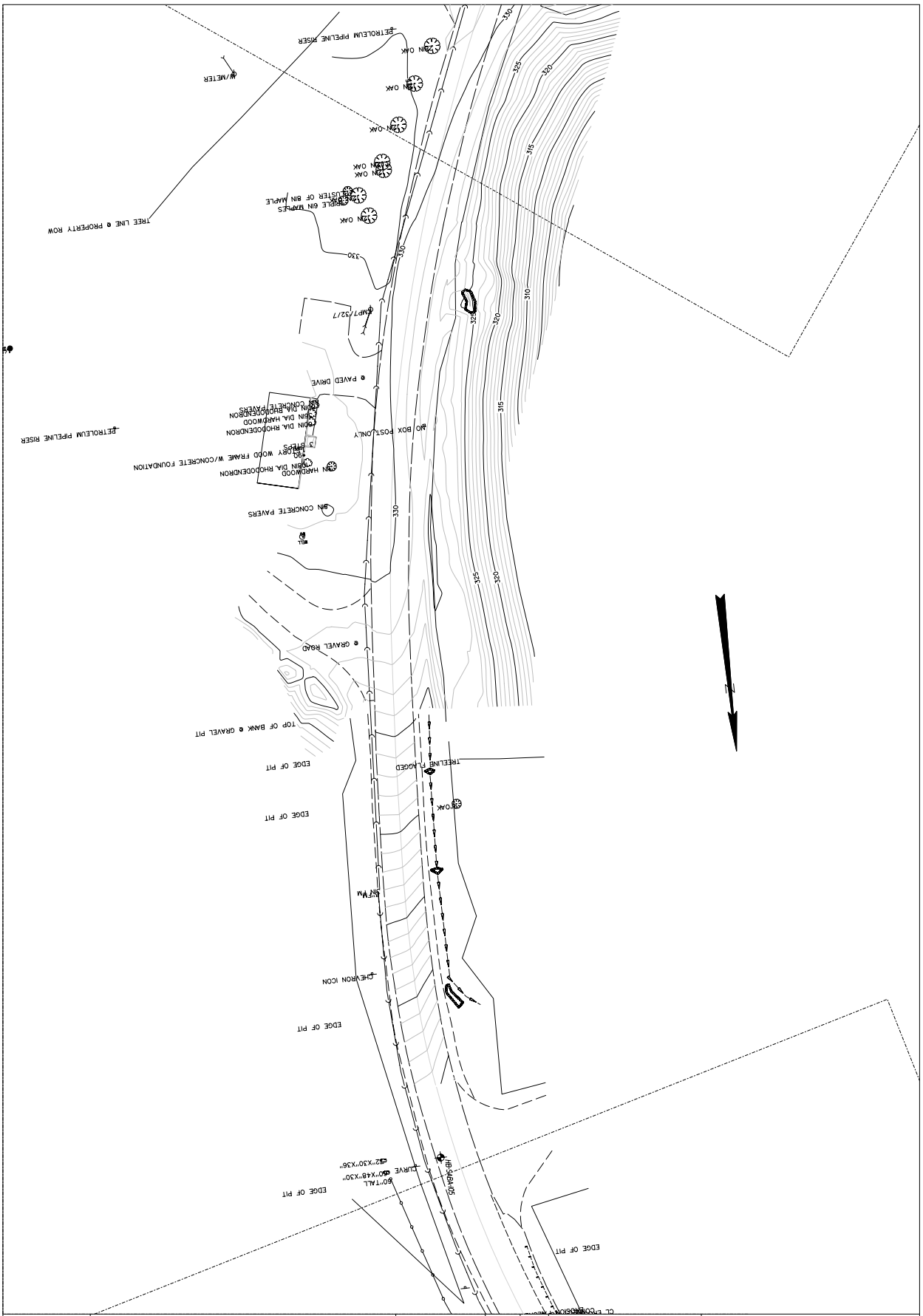
SHEET NUMBER 3 OF 7

SABATTUS
ROUTE 9/PLEASANT HILL RD.
GEOPLANS

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

AC-STP-1908(100)X

WIN 19081.00 HIGHWAY PLANS



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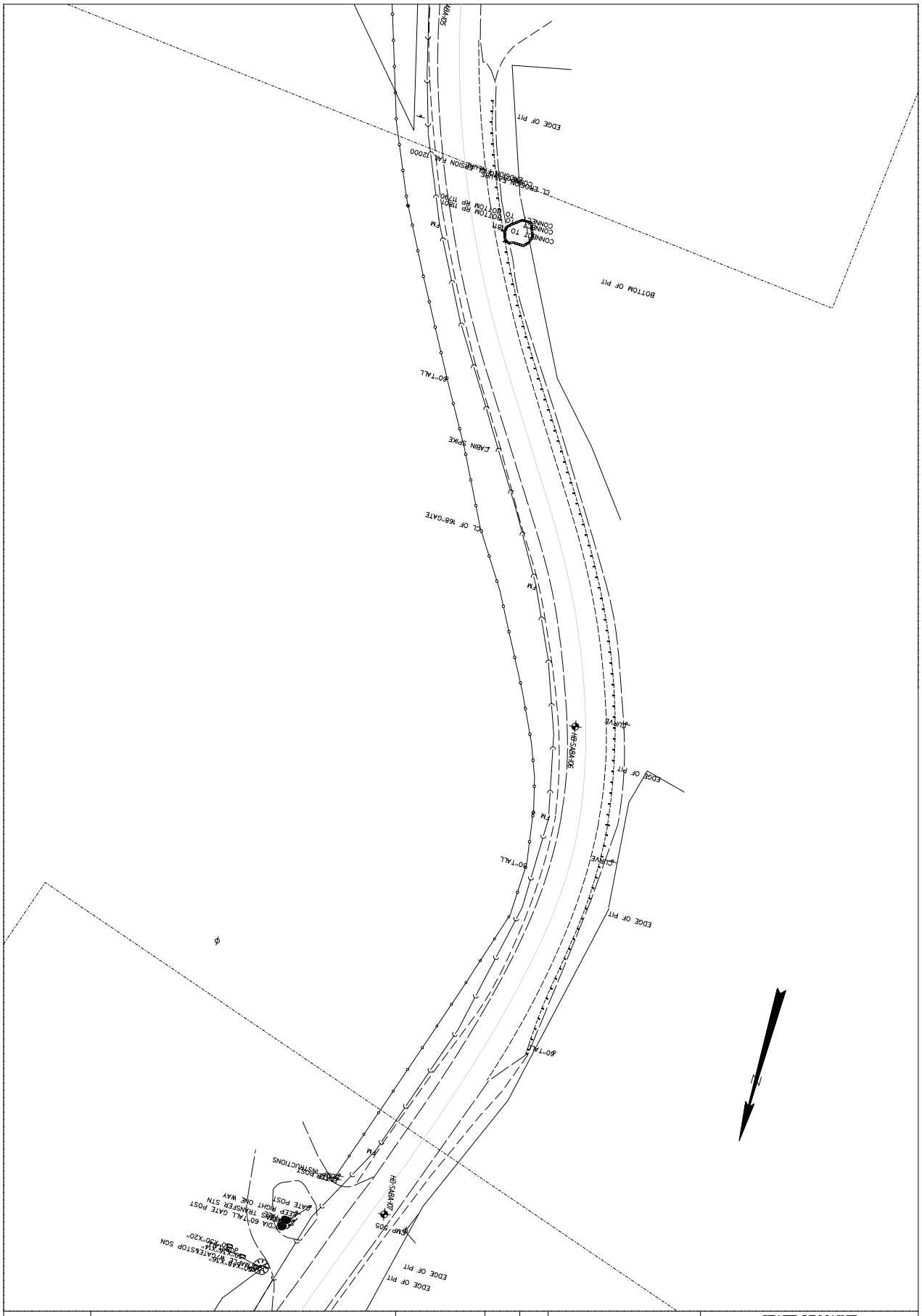
STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

AC-STP-1908(100)X

WIN 19081.00

HIGHWAY PLANS



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DEPARTMENT OF TRANSPORTATION

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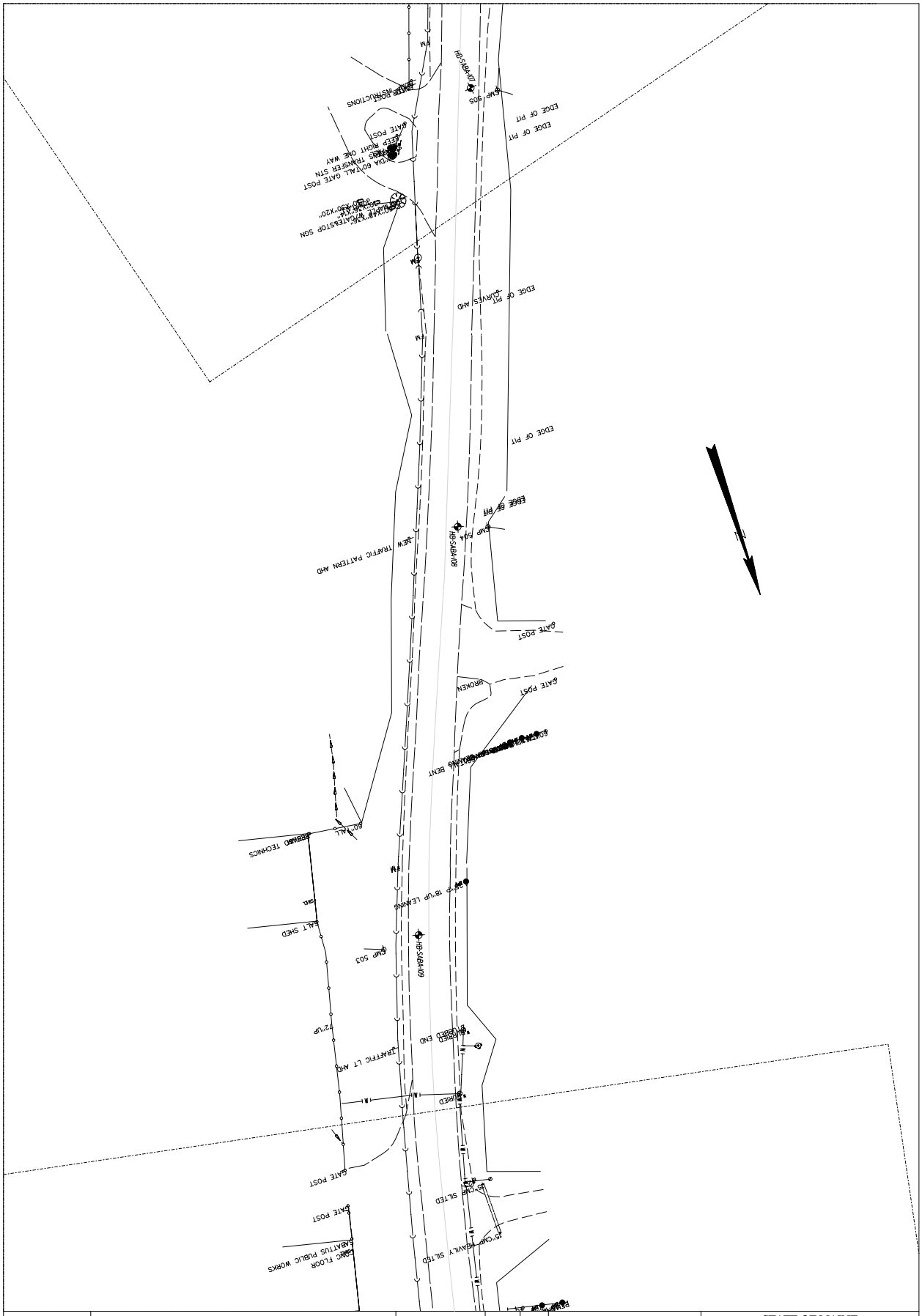

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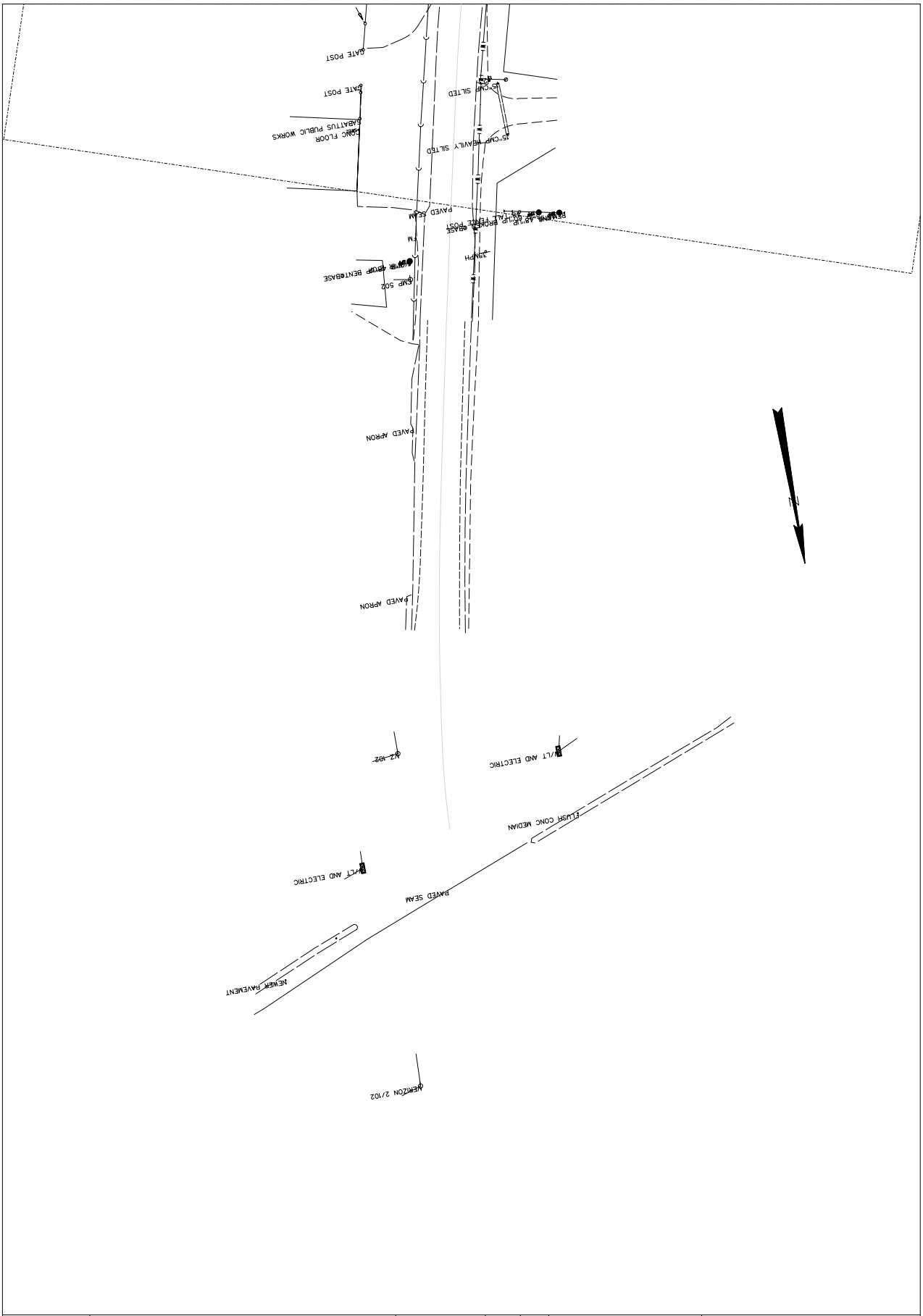

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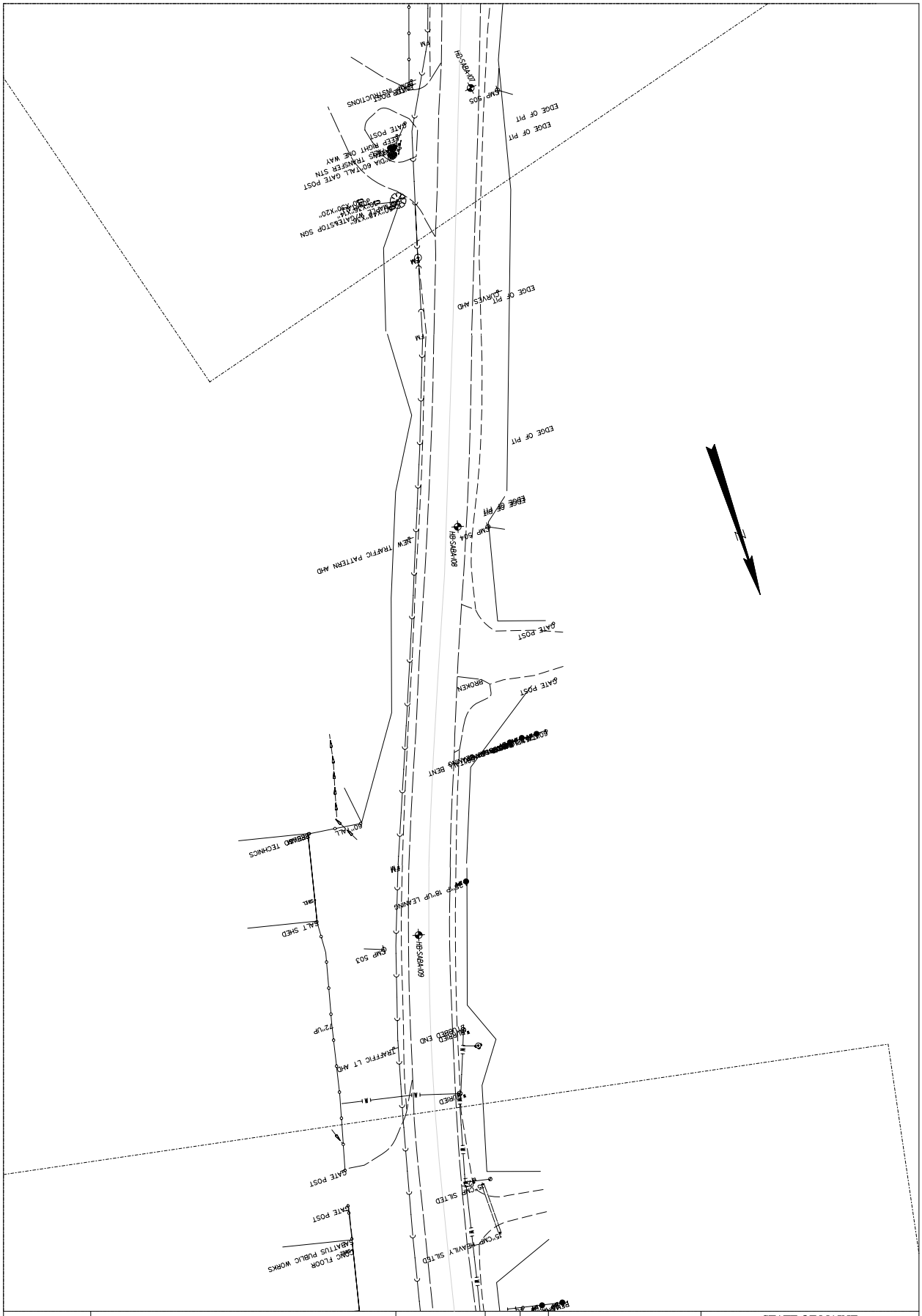

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DEPARTMENT OF TRANSPORTATION

AC-STP-1908(100)X

WIN 19081.00 HIGHWAY PLANS

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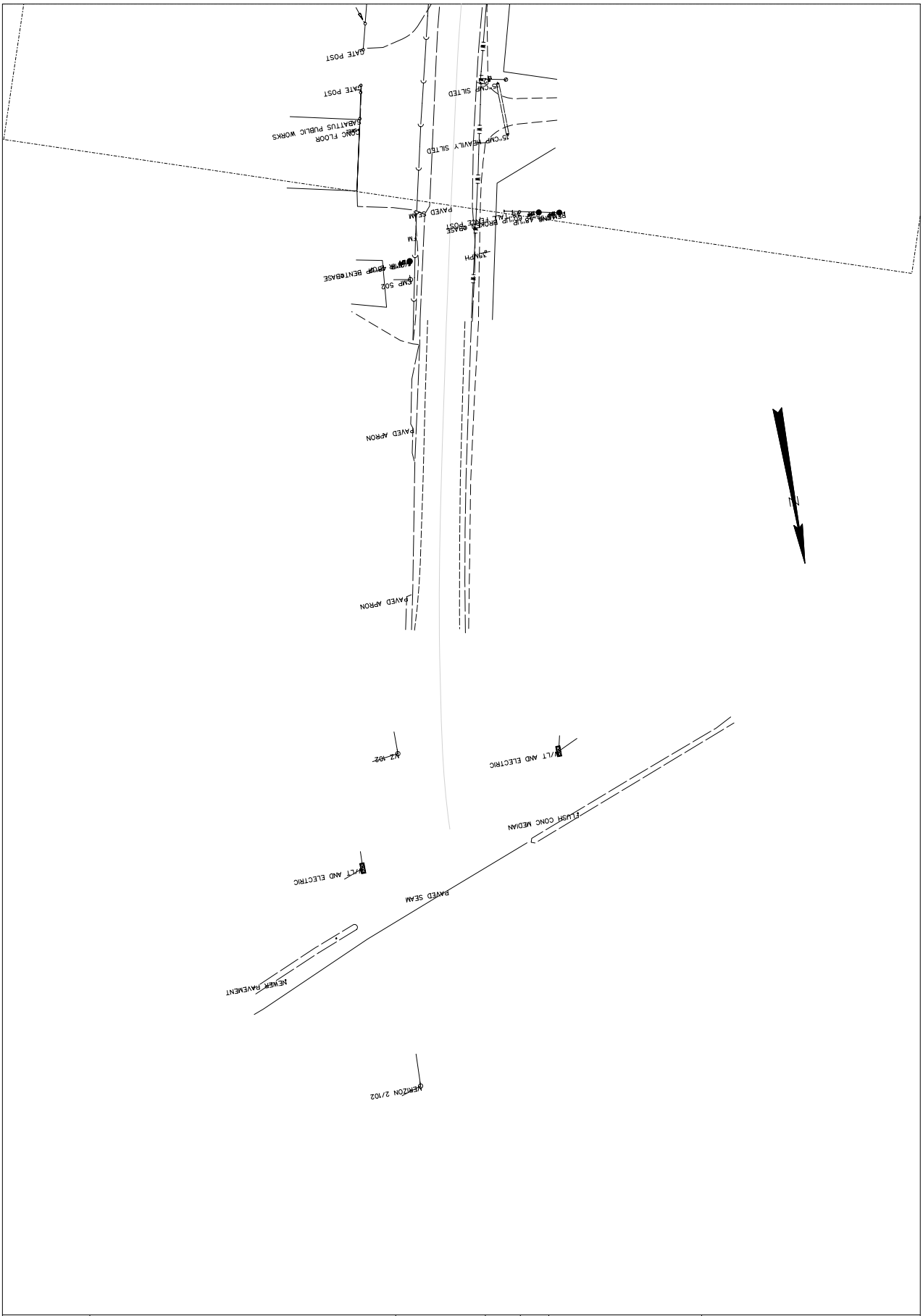

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STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

AC-STP-1908(100)X

WIN 19081.00 HIGHWAY PLANS

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Route 9/132 (Pleasant Hill Rd)
Location: Sabattus, Maine

Boring No.: HB-SABA-101
WIN: 19081.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	Enos/Giles	**Datum:**	NAVD 88	**Sampler:**	Off Flights
Logged By:	B. Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	10/10/12-10/10/12	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:		**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
R = Rock Core Sample
V = Insitu Vane Shear Test
SSA = Solid Stem Auger

Definitions:
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WOH = weight of 140lb. hammer
WOR = weight of rods WOC = weight of casing

Definitions:
WC = water content, percent
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 and Unified Class.
0	S1		0.42 - 2.20			SSA	-0.42		5" PAVEMENT.	
									0.42 Brown, damp, fine to coarse SAND, little silt, trace gravel.	G#264088 A-2-4, SM WC=3.0%
	S2		2.20 - 7.00				-2.20		2.20 Light brown, moist, fine to medium SAND, little silt, trace gravel.	G#264089 A-2-4, SM WC=4.3%
5										
							-7.00		7.00 **Bottom of Exploration at 7.00 feet below ground surface.** NO REFUSAL	
10										
15										
20										
25										

Remarks:

140' N of Rt. 9 intersection, 8' L of existing CL. 8' S of Pole #1.

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

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

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Route 9/132 (Pleasant Hill Rd)
Location: Sabattus, Maine

Boring No.: HB-SABA-102
WIN: 19081.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	Enos/Giles	**Datum:**	NAVD 88	**Sampler:**	Off Flights
Logged By:	B. Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	10/10/12-10/10/12	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:		**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
R = Rock Core Sample
V = Insitu Vane Shear Test
SSA = Solid Stem Auger

Definitions:
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WOH = weight of 140lb. hammer
WOR = weight of rods WOC = weight of casing

Definitions:
WC = water content, percent
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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 and Unified Class.
0	S3		0.42 - 6.00			SSA	-0.42		5" PAVEMENT.	
									0.42 Brown, damp, fine to coarse SAND, little gravel, little silt.	G#264090 A-1-b, SM WC=3.1%
5							-6.00		6.00 **Bottom of Exploration at 6.00 feet below ground surface.** NO REFUSAL	
10										
15										
20										
25										

Remarks:

470' N of Rt. 9 inersection, 7' R of existing CL. 10' N of Pole #2.

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

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

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Route 9/132 (Pleasant Hill Rd)
Location: Sabattus, Maine

Boring No.: HB-SABA-103
WIN: 19081.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	Enos/Giles	**Datum:**	NAVD 88	**Sampler:**	Off Flights
Logged By:	B. Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	10/10/12-10/10/12	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:		**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
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Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0						SSA	-0.42		5" PAVEMENT. 0.42	
									Brown, damp, fine to coarse SAND, little gravel, little silt. ≅S3	
5							-6.00		6.00	
									Bottom of Exploration at 6.00 feet below ground surface. NO REFUSAL	
10										
15										
20										
25										

Remarks:

950' N of Rt. 9 intersection, 8' L of existing CL. At Pole #4.

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

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

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Route 9/132 (Pleasant Hill Rd)
Location: Sabattus, Maine

Boring No.: HB-SABA-104
WIN: 19081.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	Enos/Giles	**Datum:**	NAVD 88	**Sampler:**	Off Flights
Logged By:	B. Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	10/10/12-10/10/12	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:		**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
R = Rock Core Sample
V = Insitu Vane Shear Test
SSA = Solid Stem Auger

Definitions:
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WOH = weight of 140lb. hammer
WOR = weight of rods WOC = weight of casing

Definitions:
WC = water content, percent
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.)	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	S4		0.38 - 2.10			SSA	-0.38	4½" PAVEMENT.	
								0.38 Brown, damp, fine to coarse SAND, little gravel, little silt.	G#264091 A-1-b, SM WC=6.9%
	S5		2.10 - 6.00				-2.10	2.10 Brown, moist, fine to coarse SAND, some gravel, little silt, occasional cobbles.	G#264092 A-1-b, SM WC=3.2%
5							-6.00	6.00 **Bottom of Exploration at 6.00 feet below ground surface.** NO REFUSAL	
10									
15									
20									
25									

Remarks:

1500' N of Rt. 9 intersection, 7' R of existing CL. 16' S of Pole #6.

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

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

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Route 9/132 (Pleasant Hill Rd)
Location: Sabattus, Maine

Boring No.: HB-SABA-105
WIN: 19081.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	Enos/Giles	**Datum:**	NAVD 88	**Sampler:**	Off Flights
Logged By:	B. Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	10/10/12-10/10/12	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:		**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
R = Rock Core Sample
V = Insitu Vane Shear Test
SSA = Solid Stem Auger

Definitions:
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WOH = weight of 140lb. hammer
WOR = weight of rods WOC = weight of casing

Definitions:
WC = water content, percent
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 and Unified Class.
0	S6		0.42 - 6.50			SSA	-0.42		5" PAVEMENT. 0.42	
									Brown, moist, fine to coarse SAND, some gravel, little silt.	G#264093 A-1-b, SW-SM WC=4.0%
5							-6.50		6.50	
									Bottom of Exploration at 6.50 feet below ground surface. NO REFUSAL	
10										
15										
20										
25										

Remarks:

2300' N of Rt. 9 intersection, 9' R of existing CL. At Curve sign.

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

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

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Route 9/132 (Pleasant Hill Rd)
Location: Sabattus, Maine

Boring No.: HB-SABA-106
WIN: 19081.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	Enos/Giles	**Datum:**	NAVD 88	**Sampler:**	Off Flights
Logged By:	B. Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	10/10/12-10/10/12	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:		**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
R = Rock Core Sample
V = Insitu Vane Shear Test
SSA = Solid Stem Auger

Definitions:
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WOH = weight of 140lb. hammer
WOR = weight of rods WOC = weight of casing

Definitions:
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0						SSA	-0.42		5" PAVEMENT. 0.42	
									Brown, moist, fine to coarse SAND, some gravel, little silt. ≅S6	
5							-6.50		6.50	
									Bottom of Exploration at 6.50 feet below ground surface. NO REFUSAL	
10										
15										
20										
25										

Remarks:

2700' N of Rt. 9 intersection, 6' R of existing CL. At curve sign.

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

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

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Route 9/132 (Pleasant Hill Rd)
Location: Sabattus, Maine

Boring No.: HB-SABA-107
WIN: 19081.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	Enos/Giles	**Datum:**	NAVD 88	**Sampler:**	Off Flights
Logged By:	B. Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	10/10/12-10/10/12	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:		**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
R = Rock Core Sample
V = Insitu Vane Shear Test
SSA = Solid Stem Auger

Definitions:
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WOH = weight of 140lb. hammer
WOR = weight of rods WOC = weight of casing

Definitions:
WC = water content, percent
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 and Unified Class.
0	S7		0.38 - 6.50			SSA	-0.38		4½" PAVEMENT. 0.38	
									Light brown, moist, fine to medium SAND, little silt.	G#264094 A-4, ML WC=8.4%
5							-6.50		6.50	
									Bottom of Exploration at 6.50 feet below ground surface. NO REFUSAL	
10										
15										
20										
25										

Remarks:

3040' N of Rt. 9 inersection, 7' L of existing CL. At Pole #505.

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

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

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Route 9/132 (Pleasant Hill Rd)
Location: Sabattus, Maine

Boring No.: HB-SABA-108
WIN: 19081.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	Enos/Giles	**Datum:**	NAVD 88	**Sampler:**	Off Flights
Logged By:	B. Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	10/10/12-10/10/12	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:		**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
R = Rock Core Sample
V = Insitu Vane Shear Test
SSA = Solid Stem Auger

Definitions:
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WOH = weight of 140lb. hammer
WOR = weight of rods WOC = weight of casing

Definitions:
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0						SSA	-0.42		5" PAVEMENT. 0.42	
									Light brown, moist, fine to medium SAND, little silt, occasional cobbles. ≅S7	
5										
							-6.50		6.50	
									Bottom of Exploration at 6.50 feet below ground surface. NO REFUSAL	
10										
15										
20										
25										

Remarks:

3300' N of Rt. 9 intersection, 6' R of existing CL. At Pole #504.

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

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

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Route 9/132 (Pleasant Hill Rd)
Location: Sabattus, Maine

Boring No.: HB-SABA-109
WIN: 19081.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	Enos/Giles	**Datum:**	NAVD 88	**Sampler:**	Off Flights
Logged By:	B. Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	10/10/12-10/10/12	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:		**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
R = Rock Core Sample
V = Insitu Vane Shear Test
SSA = Solid Stem Auger

Definitions:
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WOH = weight of 140lb. hammer
WOR = weight of rods WOC = weight of casing

Definitions:
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0						SSA	-0.42	5" PAVEMENT. 0.42	
	S8		1.90 - 3.50					Brown, moist, fine to coarse SAND, soem gravel, little silt. ≅S6	
							-1.90	1.90	
								Brown, moist, SILT, little sand, trace gravel .	G#264095 A-4, CL-ML WC=24.9%
							-3.50	3.50	
								Light brown, moist, fine to medium SAND, little silt. ≅S7	
5									
							-6.50	6.50	
								Bottom of Exploration at 6.50 feet below ground surface. NO REFUSAL	
10									
15									
20									
25									

Remarks:

3570' N of Rt. 9 intersection, 6' R of existing CL. 8' S of Pole #503.

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.

KEY TO SYMBOLS

Symbol	Description
Strata symbols	
	Paving
	Variable sand and silt mix
	Poorly graded silty fine sand
	Description not given for: "0YB"
	Description not given for: "03"
	Description not given for: "Z:B"
	Poorly graded clayey silty sand
Misc. Symbols	
↓	Description not given for: "DOWNAROW"

Notes:

1. Exploratory borings were drilled on 10/10/12-10/10/12 using a 4-inch diameter continuous flight power auger.

2. No free water was encountered at the time of drilling or when re-checked the following day.

3. Boring locations were taped from existing features and elevations extrapolated from the final design schematic plan.

4. These logs are subject to the limitations, conclusions, and recommendations in this report.

5. Results of tests conducted on samples recovered are reported on the logs.

State of Maine - Department of Transportation

Laboratory Testing Summary Sheet

Town(s): Sabattus Work Number: 19081.00

Boring & Sample Identification Number	Station (Feet)	Offset (Feet)	Depth (Feet)	Reference Number	G.S.D.C. Sheet	W.C. %	L.L.	P.I.	Classification		
									Unified	AASHTO	Frost
HB-SABA-101, S1	140	8.0 Lt.	0.42-2.2	264088	1	3.0			SM	A-2-4	II
HB-SABA-101, S2	140	8.0 Lt.	2.2-7.0	264089	1	4.3			SM	A-2-4	II
HB-SABA-102, S3	470	7.0 Rt.	0.42-6.0	264090	1	3.1			SM	A-1-b	II
HB-SABA-104, S4	1500	7.0 Rt.	0.38-2.1	264091	1	6.9			SM	A-1-b	II
HB-SABA-104, S5	1500	7.0 Rt.	2.1-6.0	264092	1	3.2			SM	A-1-b	II
HB-SABA-105, S6	2300	9.0 Rt.	0.42-6.5	264093	2	4.0			SW-SM	A-1-b	0
HB-SABA-107, S7	3040	7.0 Lt.	0.38-6.5	264094	2	8.4			ML	A-4	IV
HB-SABA-109, S8	3520	6.0 Rt.	1.9-3.5	264095	2	24.9			CL-ML	A-4	IV

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

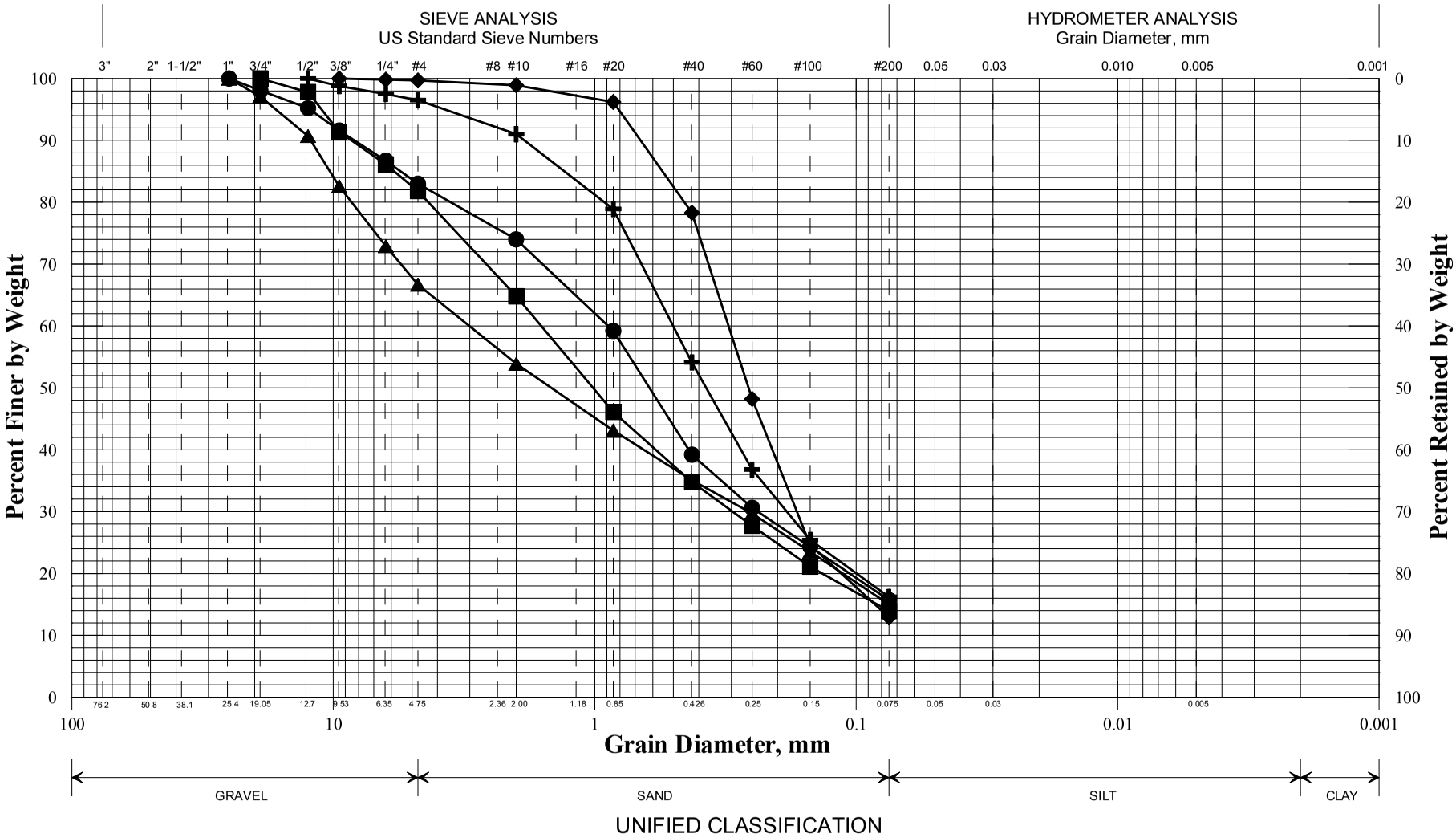
GSDC = Grain Size Distribution Curve as determined by AASHTO T 88-93 (1996) and/or ASTM D 422-63 (Reapproved 1998)

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

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

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

State of Maine Department of Transportation
GRAIN SIZE DISTRIBUTION CURVE

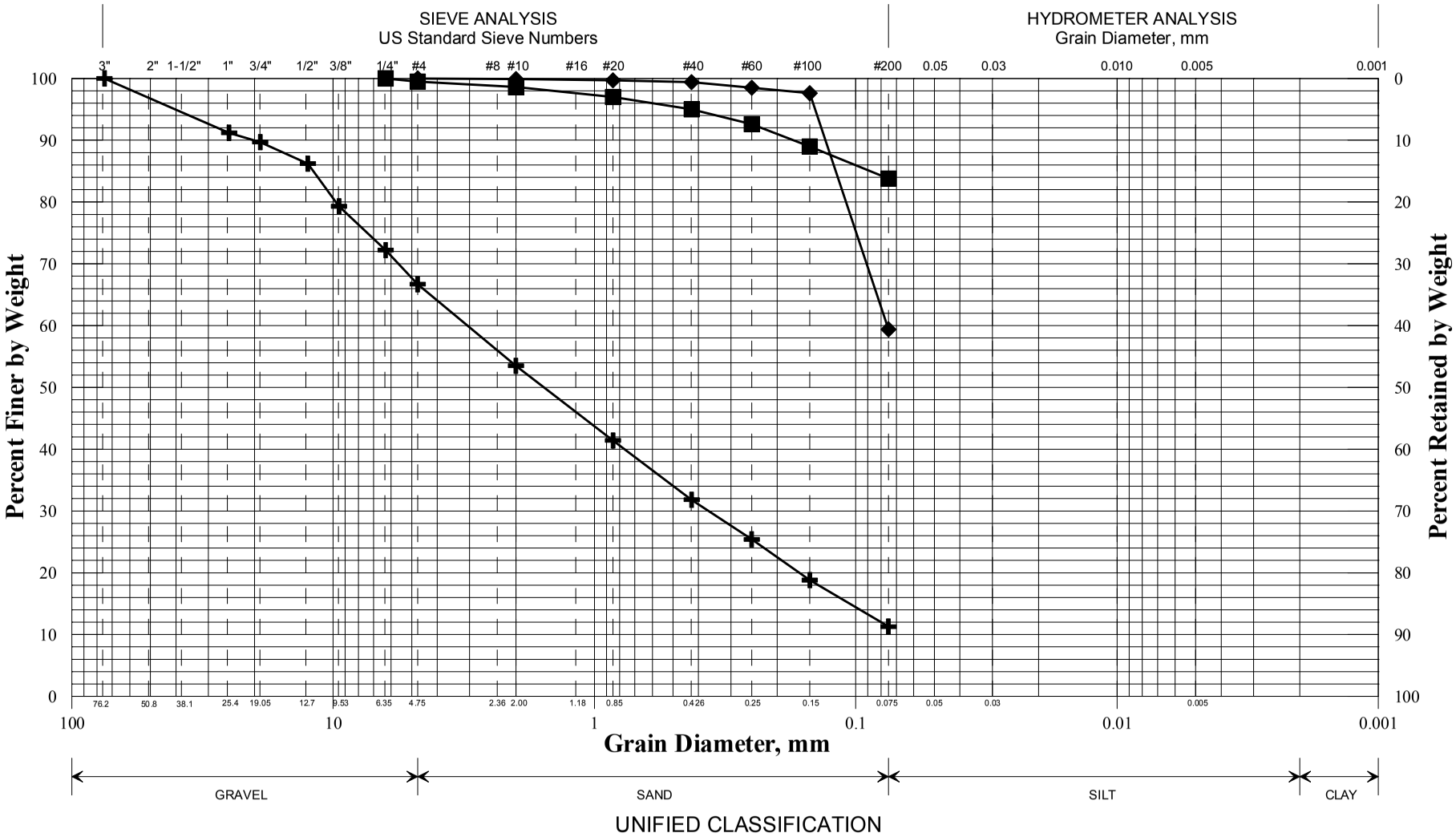


	Boring/Sample No.	Station	Offset, ft	Depth, ft	Description	W, %	LL	PL	PI
✚	HB-SABA-101 S1	140	8.0 LT	0.42-2.2	SAND, little silt, trace gravel.	3.0			
◆	HB-SABA-101 S2	140	8.0 LT	2.2-7.0	SAND, little silt, trace gravel.	4.3			
■	HB-SABA-102 S3	470	7.0 RT	0.42-6.0	SAND, little gravel, little silt.	3.1			
●	HB-SABA-104 S4	1500	7.0 RT	0.38-2.1	SAND, little gravel, little silt.	6.9			
▲	HB-SABA-104 S5	1500	7.0 RT	2.1-6.0	SAND, some gravel, little silt.	3.2			
✕									

WIN
019081.00
Town
Sabattus
Reported by/Date
WHITE, TERRY A 11/7/2012

SHEET 1

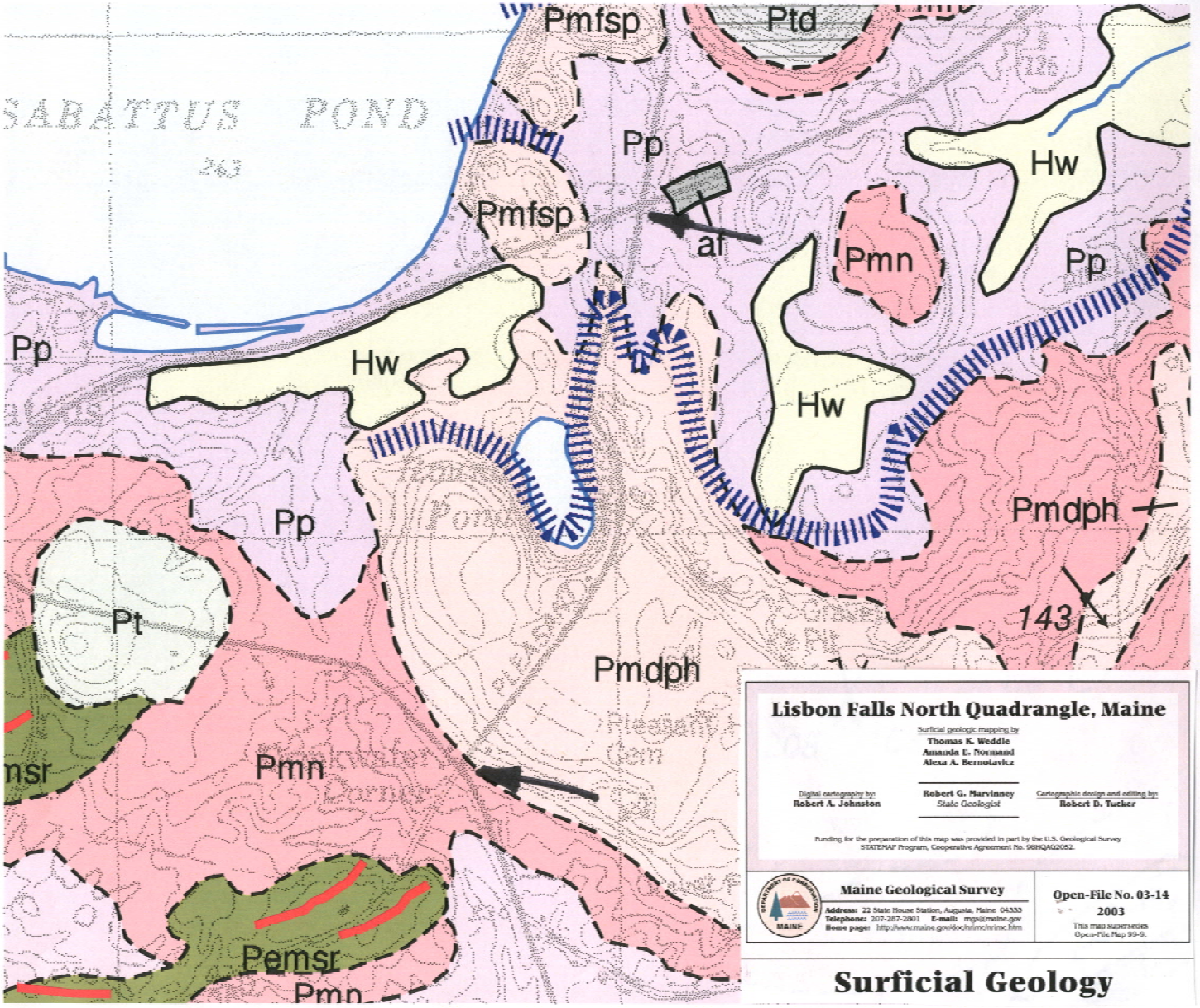
State of Maine Department of Transportation
GRAIN SIZE DISTRIBUTION CURVE



UNIFIED CLASSIFICATION

	Boring/Sample No.	Station	Offset, ft	Depth, ft	Description	W, %	LL	PL	PI
✚	HB-SABA-105 S6	2300	9.0 RT	0.42-6.5	SAND, some gravel, little silt.	4.0			
◆	HB-SABA-107 S7	3040	7.0 LT	0.38-6.5	Sandy SILT.	8.4			
■	HB-SABA-109 S8	3520	6.0 RT	1.9-3.5	SILT, little sand, trace gravel.	24.9			
●									
▲									
✕									

WIN
019081.00
Town
Sabattus
Reported by/Date
WHITE, TERRY A 11/7/2012


SABATTUS POND
243
Pmfsp
Ptd
Pp
Hw
Pmfsp
af
Pmn
Pp
Pp
Hw
Hw
Pp
Pmdph
Pt
143
Pmdph
msr
Pmn
Pemsr
Pmn
Lisbon Falls North Quadrangle, Maine
Surficial geologic mapping by
Thomas K. Weddle
Amanda E. Normand
Alexa A. Bernotavicz
Digital cartography by:
Robert A. Johnston
Robert G. Marvinney
State Geologist
Cartographic design and editing by:
Robert D. Tucker
Funding for the preparation of this map was provided in part by the U.S. Geological Survey STATEMAP Program, Cooperative Agreement No. 98HQAG2052.
Maine Geological Survey
Address: 22 State House Station, Augusta, Maine 04333
Telephone: 207-287-2801 E-mail: mgs@maine.gov
Home page: http://www.maine.gov/doc/nrimc/mgs/mgs.htm
Open-File No. 03-14
2003
This map supersedes Open-File Map 99-9.
Surficial Geology

af

Artificial fill - Includes landfills, highway and railroad embankments, and dredge spoil areas. These units are mapped only where they are resolvable using the contour lines on the map, or where they define the limits of wetland units. Minor artificial fill is present in virtually all developed areas of the quadrangle.

Ha

Stream alluvium - Gray to brown fine sand and silt with some gravel. Comprises flood plains along present streams and rivers. Extent of alluvium approximates areas of potential flooding.

Hw

Freshwater wetlands - Muck, peat, silt, and sand. Poorly drained areas, often with standing water.

Pa

Braided-stream alluvium - Pleistocene alluvium consisting of fluvially deposited sand and gravel; trough-crossbeds with rare mud drapes and intraclasts are found in exposures or excavations in this unit.

Pmn

Marine nearshore deposits - Pleistocene gravel, sand, and mud deposited as a result of wave activity in nearshore or shallow-marine environments; not associated with beach morphology.

Pp

Presumpscot Formation - Massive to laminated silty clay with rare dropstones and occasional shelly horizons, which overlie rock and till, and are interbedded with and overlie end moraines and marine fan deposits; includes sand deposited as a distal unit of submarine fans.

Pem

End moraines - Linear ridges consisting of bedded sand and gravel interbedded with Presumpscot Formation silty clay and overlain by till on the ice-proximal faces of the moraines. Some moraines, or groups of moraines, have been assigned a unique geographic name listed below:

Pemsr - Sabattus River moraines
Pemwc - Webster Corner moraines
Pemr - Ridge Road moraine
Pemfb - Fisher Brook moraines
Pemlf - Little Falls moraines
Pemh - Hudon Road moraines

Pmd

Marine delta - Glacial-marine delta composed primarily of sorted and stratified sand and gravel. Deposit was graded to surface of late-glacial sea and is distinguished by flat top and foreset and topset beds. Deltas have been assigned a unique geographic name listed below:

Pmdph - Pleasant Hill delta; topset-foreset contact at elevation 323 feet (Thompson and others, 1989).
Pmdpb - Purington Brook delta; topset-foreset contact at elevation 298 feet (Kettlebottom Road delta of Thompson and others, 1989).

Pmf

Submarine outwash fans - Thick sand and gravel accumulations formed at the mouth of subglacial tunnels along the receding late Pleistocene ice margin. The sand and gravel is interbedded with and overlain by Presumpscot Formation clay at the distal edges of the fans, and interlayered with and overlain by till at their ice-contact faces. Some fans, or groups of fans have been assigned a unique geographic name listed below:

Pmfsp - Sabattus Pond fans
Pmfmb - Maxwell Brook fan
Pmfsr - Sabattus River fans
Pmfk - Kettle bottom fan
Pmfwb - West Bowdoin fan
Pmfhc - Higgins Corner fan
Pmfwh - Whites Hill fan

Pgi

Ice-contact deposits - Sand and gravel deposited against remnant masses of glacial ice; massive to well stratified; commonly has collapse features and irregular topography.

Pt

Till - Gravelly to bouldery, sandy, or silty matrix diamicton.

Ptd

Thin-drift areas - Areas with generally less than ten feet of drift covering bedrock. Till overlies bedrock on hillslopes and ridge crests; Presumpscot Formation silty clay is present in depressions; and nearshore deposits overlie till, Presumpscot Formation, and bedrock on hillslopes and at the base of these slopes. Small rock outcrops, and areas of numerous small outcrops are shown as gray areas.

Contact between units; dashed where inferred.

135

Glacial striations or grooves - observations made at dot. Number indicates azimuth (in degrees) of ice-flow direction. Where two directions are observed in the same outcrop, flags indicate older trends where discerned.

End moraine - Ridge of till, sand, and gravel deposited and/or deformed by glacial ice, often mantled by Presumpscot Formation.

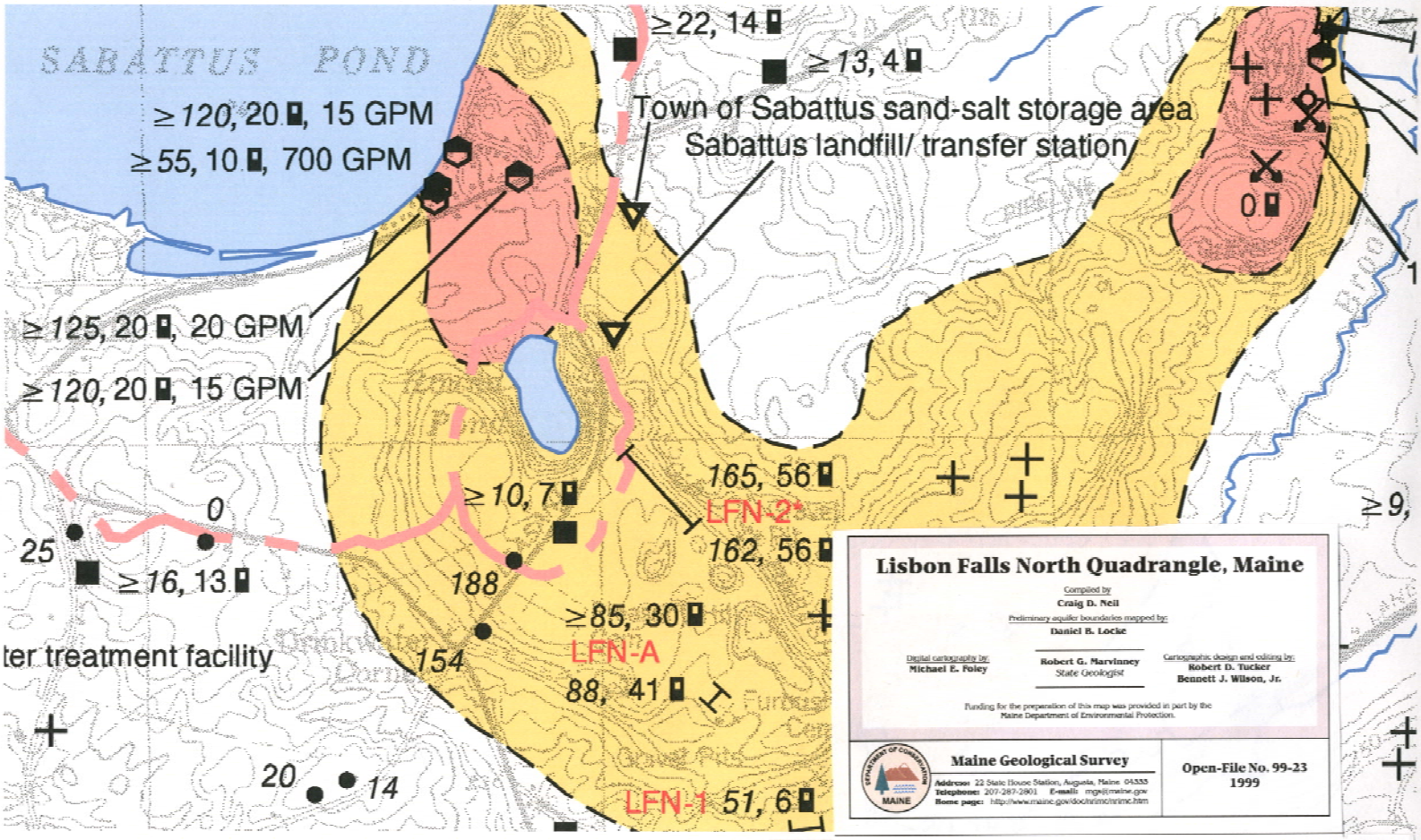
Meltwater channel - Channel eroded by meltwater or later meteoric runoff.

Ice margin position - Line shows approximate position of ice margin during glacial retreat for major ice-margin positions.

Drumlin or glacially streamlined hill.

135

Chattermarks - Friction cracks that are zones of crescentic fractures on the bedrock surface and are formed by ice or debris in the ice exerting force on the bedrock sufficient to cause it to fracture.



Significant Sand and Gravel Aquifers

SIGNIFICANT SAND AND GRAVEL AQUIFERS
(yields greater than 10 gallons per minute)

Approximate boundary of surficial deposits with significant saturated thickness where potential ground-water yield is moderate to excellent.

Surficial deposits with good to excellent potential ground-water yield; yields generally greater than 50 gallons per minute to a properly constructed well. Deposits consist primarily of glacial sand and gravel, but can include areas of sandy till and alluvium; yield zones are based on subsurface data where available, and may vary from mapped extent in areas where data are unavailable.

Surficial deposits with moderate to good potential ground-water yield; yields generally greater than 10 gallons per minute to a properly constructed well. Deposits consist primarily of glacial sand and gravel, but can include areas of sandy till and alluvium; yields may exceed 50 gallons per minute in deposits hydraulically connected with surface-water bodies, or in extensive deposits where subsurface data are available.

SURFICIAL DEPOSITS WITH LESS FAVORABLE AQUIFER CHARACTERISTICS
(yields less than 10 gallons per minute)

Areas with moderate to low or no potential ground-water yield (includes areas underlain by till, marine deposits, eolian deposits, alluvium, swamps, thin glacial sand and gravel deposits, or bedrock); yields in surficial deposits generally less than 10 gallons per minute to a properly constructed well.

SEISMIC-LINE INFORMATION

Profiles for 12-channel seismic lines are shown in Figure 8 of Open-File Report 85-82a (Tepper and others, 1985), or may be viewed at the Maine Geological Survey. Length of 12-channel seismic lines as shown on the map is to scale. All single-channel lines ranged from 80 to 300 feet long and are not shown to scale.

53 — Depth to bedrock, in feet below land surface.

>53 — Depth to bedrock exceeds depth shown (based on calculations).

12 — Depth to water level, in feet below land surface.

MAP-7 *131, 23* — Twelve-channel seismic line, with depth to bedrock and depth to water shown at the midpoint of the line, in feet below land surface.

69, 12 MAP-E *72, 12* — Single-channel seismic line, with depth to bedrock and depth to water shown at each end of the line, in feet below land surface. Unless otherwise indicated, data shown above the line-identifier box refers to the northern end of the seismic line.

The 3-letter identifier for a line is an abbreviation for the topographic quadrangle. If the 3-letter identifier for the line is followed by a number (ex: MAP - 7, MAP - 4), the line is a 12-channel line. If the identifier is followed by a letter (ex: MAP - E, MAP- P), the line is a single-channel line. Single-channel seismic interpretations by D. H. Tepper. Twelve-channel seismic interpretations by D. H. Tepper and C. D. Neil.

GEOLOGIC AND WELL INFORMATION

50 — Depth to bedrock, in feet below land surface

≥13 — Penetration depth of boring; ≥ symbol refers to minimum depth to bedrock based on boring depth or refusal

6 — Depth to water level in feet below land surface (observed in well, spring, test boring, pit, or seismic line)

Gravel pit (overburden thickness noted in feet, e.g. 5-12')

Quarry

4 GPM — Yield (flow) of well or spring in gallons per minute (GPM)

Spring, with general direction of flow

Drilled overburden well

Dug well

Observation well (project well if labeled; nonproject well if unlabeled)

Test boring (project boring if labeled; nonproject boring if unlabeled)

Driven point

Test pit

Drilled bedrock well

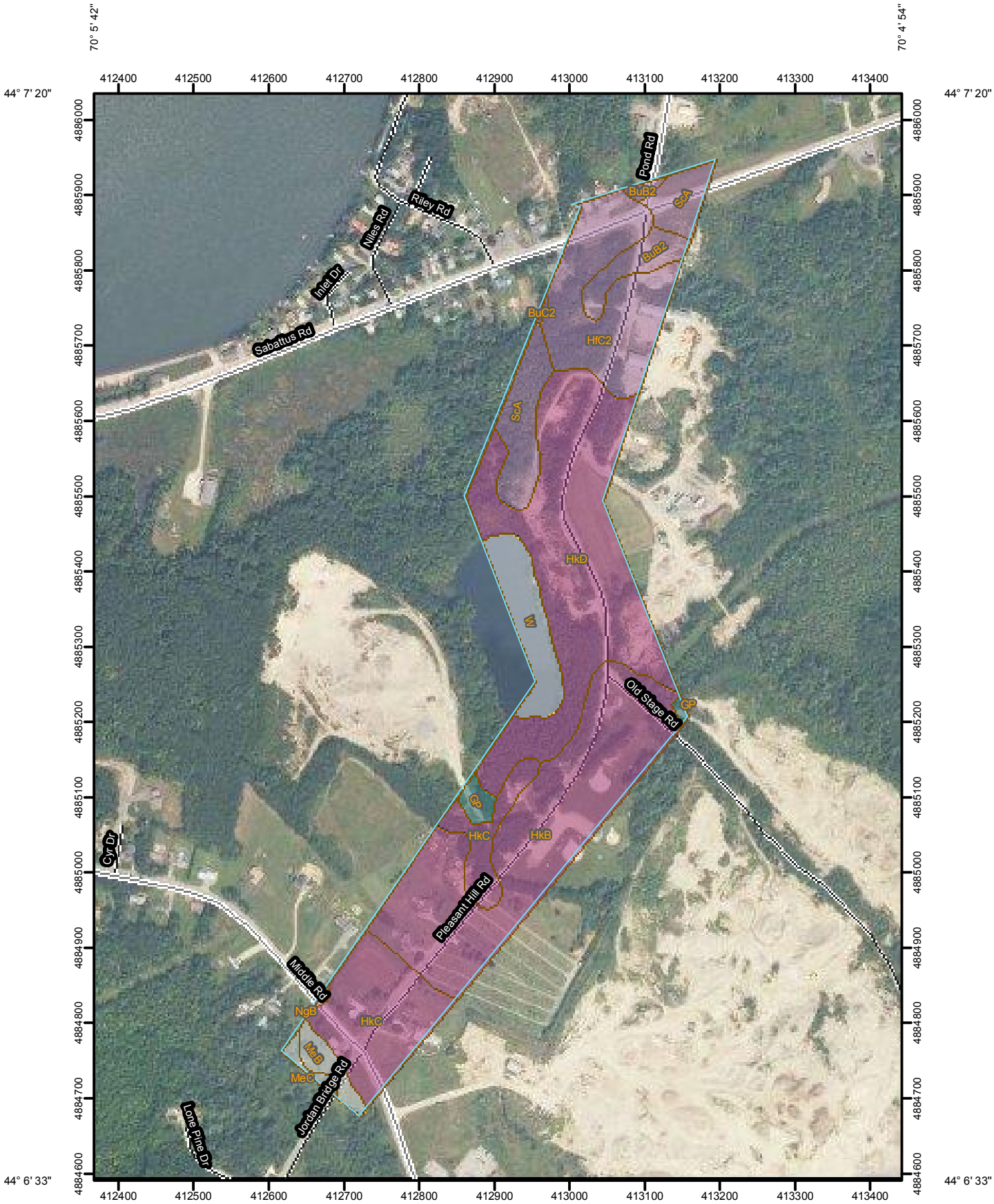
Potential point source of ground-water contamination

Bedrock outcrop

Surface-water drainage-basin boundary; surface-water divides generally correspond to ground-water divides. Horizontal direction of ground-water flow generally is away from divides and toward surface-water bodies.

OTHER SOURCES OF INFORMATION

1. Tepper, D. H., Williams, J. S., Tolman, A. L., and Prescott, G.C., Jr., 1985, Hydrogeology and water quality of significant sand and gravel aquifers in parts of Androscoggin, Cumberland, Franklin, Kennebec, Lincoln, Oxford, Sagadahoc, and Somerset Counties, Maine: Maine Geological Survey, Open-File Report 85-82a, 106 p.
2. Weddle, T. K., Normand, A. E., Bernotavicz, A., and Neil, C. D., 1999, Surficial materials of the Lisbon Falls North quadrangle, Maine: Maine Geological Survey Open-File Map 99-10.
3. Weddle, T. K., 1999, Surficial geology of the Lisbon Falls North quadrangle, Maine: Maine Geological Survey, Open-File Map 99-9.
4. Caswell, W. B., 1987, Ground water handbook for the state of Maine, Second Edition: Maine Geological Survey, Bulletin 39, 135 p.
5. Thompson, W. B., 1979, Surficial geology handbook for coastal Maine: Maine Geological Survey, 68 p. (out of print)
6. Kendall, D. L., 1987, Glaciers and granite: A guide to Maine's landscape and geology: Down East Books, Camden, Maine, 240 p.
7. Thompson, W. B., and Borns, H. W., Jr., 1985, Surficial geologic map of Maine: Maine Geological Survey, scale 1:500,000.



Map Scale: 1:6,890 if printed on A size (8.5" x 11") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 250 500 1,000 1,500

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Units

Soil Ratings

- CH
- CL
- CL-A (proposed)
- CL-K (proposed)
- CL-ML
- CL-O (proposed)
- CL-T (proposed)
- GC
- GC-GM
- GM
- GP
- GP-GC
- GP-GM
- GW
- GW-GC
- GW-GM
- MH
- MH-A (proposed)
- MH-K (proposed)
- MH-O (proposed)
- MH-T (proposed)
- ML
- ML-A (proposed)
- ML-K (proposed)
- ML-O (proposed)
- ML-T (proposed)
- OH
- OH-T (proposed)
- OL
- PT
- SC
- SC-SM
- SM
- SP
- SP-SC
- SP-SM
- SW
- SW-SC
- SW-SM
- Not rated or not available

Political Features

- Cities

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

MAP INFORMATION

Map Scale: 1:6,890 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:15,840.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 19N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

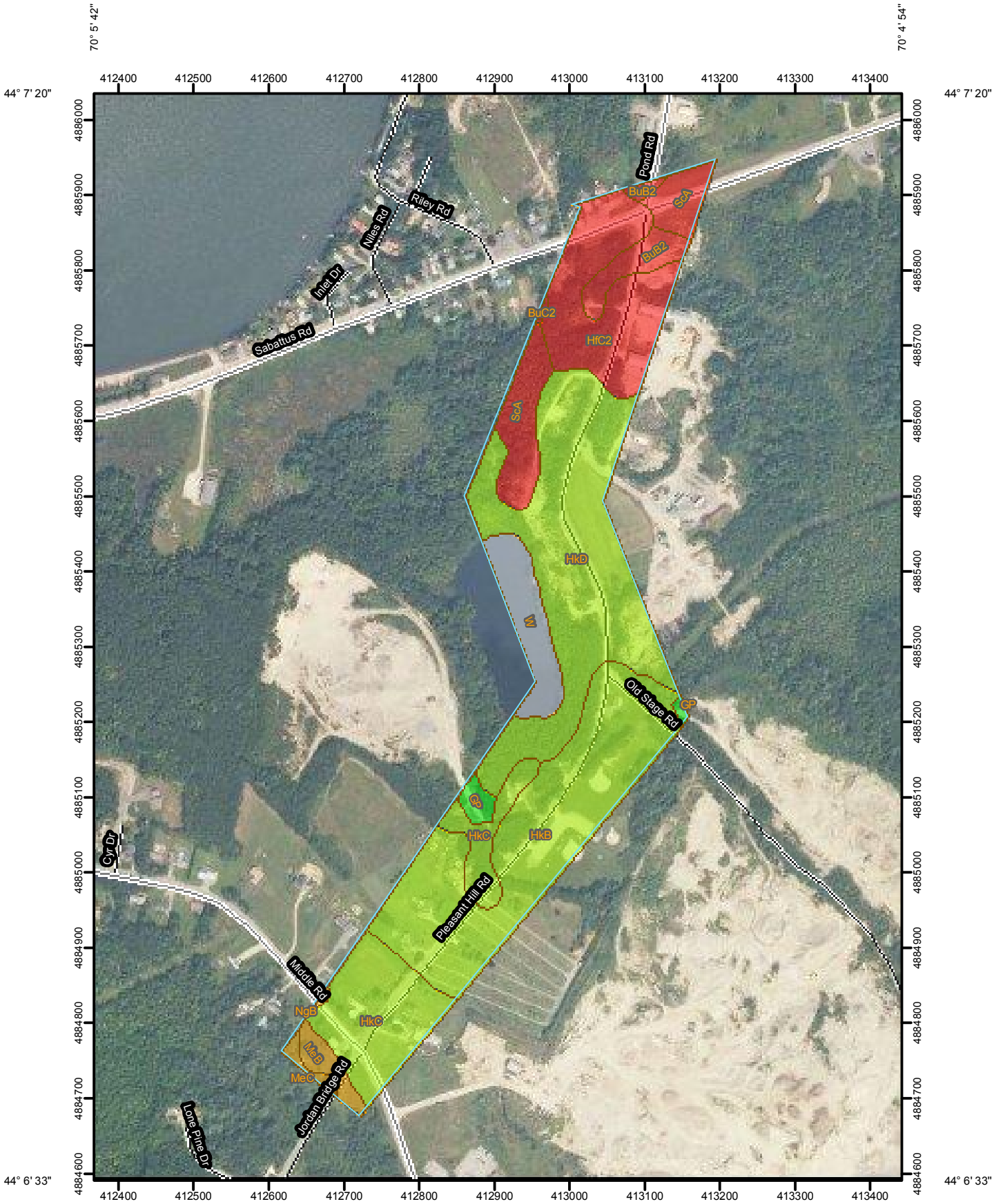
Soil Survey Area: Androscoggin and Sagadahoc Counties, Maine
Survey Area Data: Version 13, Jul 27, 2009

Date(s) aerial images were photographed: Data not available.

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Unified Soil Classification (Surface)

Unified Soil Classification (Surface)— Summary by Map Unit — Androscoggin and Sagadahoc Counties, Maine (ME606)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
BuB2	Buxton silt loam, 0 to 8 percent slopes, eroded	ML	1.7	3.0%
BuC2	Buxton silt loam, 8 to 15 percent slopes, eroded	ML	0.1	0.1%
GP	Sand and gravel pits	GP	0.6	1.2%
HfC2	Hartland very fine sandy loam, 8 to 15 percent slopes, eroded	ML	7.2	13.0%
HkB	Hinckley gravelly sandy loam, 0 to 8 percent slopes	GM	14.9	26.8%
HkC	Hinckley gravelly sandy loam, 8 to 15 percent slopes	GM	7.5	13.5%
HkD	Hinckley gravelly sandy loam, 15 to 25 percent slopes	GM	15.5	27.9%
MeB	Melrose fine sandy loam, 0 to 8 percent slopes		0.9	1.7%
MeC	Melrose fine sandy loam, 8 to 20 percent slopes		0.3	0.5%
NgB	Ninigret fine sandy loam, 0 to 8 percent slopes	ML	0.1	0.1%
ScA	Scantic silt loam, 0 to 3 percent slopes	ML	3.9	7.1%
W	Water		2.9	5.1%
Totals for Area of Interest			**55.7**	**100.0%**



Map Scale: 1:6,890 if printed on A size (8.5" x 11") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 250 500 1,000 1,500

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Map Units

Soil Ratings

High

Moderate

Low

None

Not rated or not available

Political Features

Cities

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

MAP INFORMATION

Map Scale: 1:6,890 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:15,840.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 19N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Androscoggin and Sagadahoc Counties, Maine
Survey Area Data: Version 13, Jul 27, 2009

Date(s) aerial images were photographed: Data not available.

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Frost Action

Frost Action— Summary by Map Unit — Androscoggin and Sagadahoc Counties, Maine (ME606)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
BuB2	Buxton silt loam, 0 to 8 percent slopes, eroded	High	1.7	3.0%
BuC2	Buxton silt loam, 8 to 15 percent slopes, eroded	High	0.1	0.1%
GP	Sand and gravel pits	None	0.6	1.2%
HfC2	Hartland very fine sandy loam, 8 to 15 percent slopes, eroded	High	7.2	13.0%
HkB	Hinckley gravelly sandy loam, 0 to 8 percent slopes	Low	14.9	26.8%
HkC	Hinckley gravelly sandy loam, 8 to 15 percent slopes	Low	7.5	13.5%
HkD	Hinckley gravelly sandy loam, 15 to 25 percent slopes	Low	15.5	27.9%
MeB	Melrose fine sandy loam, 0 to 8 percent slopes	Moderate	0.9	1.7%
MeC	Melrose fine sandy loam, 8 to 20 percent slopes	Moderate	0.3	0.5%
NgB	Ninigret fine sandy loam, 0 to 8 percent slopes	Moderate	0.1	0.1%
ScA	Scantic silt loam, 0 to 3 percent slopes	High	3.9	7.1%
W	Water		2.9	5.1%
Totals for Area of Interest			**55.7**	**100.0%**

Description

Potential for frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, saturated hydraulic conductivity (Ksat), content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured, clayey soils that have a high water table in winter are the most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage to pavements and other rigid structures.

Rating Options

Aggregation Method: Dominant Condition

Engineering Properties

This table gives the engineering classifications and the range of engineering properties for the layers of each soil in the survey area.

Depth to the upper and lower boundaries of each layer is indicated.

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is 15 percent or more, an appropriate modifier is added, for example, "gravelly."

Classification of the soils is determined according to the Unified soil classification system (ASTM, 2005) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO, 2004).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to particle-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of particle-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Rock fragments larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

Engineering Properties– Androscoggin and Sagadahoc Counties, Maine												
Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
GP—Sand and gravel pits												
Sand and gravel pits	0-6	*Extremely gravelly sand	GW, GP	A-1	0	0-25	10-25	5-25	0-15	0-5	0-14	NP
	6-60	*Extremely gravelly sand, Extremely gravelly coarse sand, very gravelly coarse sand	SW, GP, GW, SP	A-1	0	0-25	10-55	5-50	0-15	0-5	0-14	NP
HfC2—Hartland very fine sandy loam, 8 to 15 percent slopes, eroded												
Hartland	0-10	*Very fine sandy loam	CL-ML, ML	A-4, A-6	0	0	100	85-100	80-100	70-95	20-40	2-12
	10-19	*Very fine sandy loam, Silt loam	ML, CL-ML	A-4	0	0	100	85-100	80-100	70-95	15-25	NP-5
	19-28	*Very fine sandy loam, Silt loam	CL-ML, ML	A-4	0	0	100	85-100	80-100	70-95	15-25	NP-5
	28-65	*Very fine sandy loam, Silt loam, sandy loam	SM, CL-ML, ML, SC-SM	A-4, A-2	0	0	100	85-100	80-100	25-95	15-25	NP-5

Engineering Properties– Androscoggin and Sagadahoc Counties, Maine												
Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
HkB—Hinckley gravelly sandy loam, 0 to 8 percent slopes												
Hinckley	0-4	*Gravelly sandy loam	SW-SM, GM, GW-GM, SM	A-4, A-1, A-2	0	5-25	35-80	30-75	20-65	10-40	0-10	NP-2
	4-20	*Gravelly loamy sand, Gravelly loamy fine sand, cobbly coarse sand	SM, SP, GM, GP	A-1	0-1	5-20	30-80	25-75	20-50	2-20	0-14	NP
	20-44	*Very cobbly sand, Very gravelly loamy sand, extremely gravelly coarse sand	SW, GP, GW, SP	A-1	0-1	10-45	20-55	15-50	10-30	0-5	0-14	NP
	44-65	*Stratified very gravelly coarse sand	GW, SW	A-1-a	0-1	10-45	20-55	15-50	10-30	0-5	0-14	NP

Engineering Properties– Androscoggin and Sagadahoc Counties, Maine												
Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
HkC—Hinckley gravelly sandy loam, 8 to 15 percent slopes												
Hinckley	0-4	*Gravelly sandy loam	GW-GM, SM, SW-SM, GM	A-4, A-1, A-2	0	10-25	35-80	30-75	20-65	10-40	0-10	NP-2
	4-20	*Gravelly loamy sand, Gravelly loamy fine sand, cobbly coarse sand	SP, GM, GP, SM	A-1	0-1	5-20	30-80	25-75	20-50	2-20	0-14	NP
	20-44	*Very cobbly sand, Very gravelly loamy sand, extremely gravelly coarse sand	SW, GP, GW, SP	A-1	0-1	10-45	20-55	15-50	10-30	0-5	0-14	NP
	44-65	*Stratified very gravelly coarse sand	GW, SW	A-1-a	0-1	10-45	20-55	15-50	10-30	0-5	0-14	NP

Engineering Properties– Androscoggin and Sagadahoc Counties, Maine												
Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
HkD—Hinckley gravelly sandy loam, 15 to 25 percent slopes												
Hinckley	0-4	*Gravelly sandy loam	SM, SW-SM, GM, GW-GM	A-4, A-1, A-2	0	10-25	35-80	30-75	20-65	10-40	0-10	NP-2
	4-20	*Gravelly loamy sand, Gravelly loamy fine sand, cobbly coarse sand	SM, SP, GM, GP	A-1	0-1	5-20	30-80	25-75	20-50	2-20	0-14	NP
	20-44	*Very cobbly sand, Very gravelly loamy sand, extremely gravelly coarse sand	SP, SW, GP, GW	A-1	0-1	10-45	20-55	15-50	10-30	0-5	0-14	NP
	44-65	*Stratified very gravelly coarse sand	SW, GW	A-1-a	0-1	10-45	20-55	15-50	10-30	0-5	0-14	NP
MeB—Melrose fine sandy loam, 0 to 8 percent slopes												
Melrose	0-9	*Fine sandy loam	SC, SM, CL, ML	A-4, A-2	0	0	100	95-100	55-85	30-55	15-30	NP-9
	9-24	*Fine sandy loam, Sandy loam, coarse sandy loam	SC, SC-SM, SM	A-2, A-4	0	0	100	95-100	55-85	25-50	15-30	NP-9
	24-65	*Silty clay loam, Clay loam, clay	CH, CL	A-7, A-6	0	0	100	100	95-100	90-100	30-55	11-30

1993 AASHTO Pavement Design

DARWin Pavement Design and Analysis System

A Proprietary AASHTOWare
Computer Software Product
State of Maine

Flexible Structural Design Module

Sabattus, Pleasant Hill Road
WIN19081.00
12 year design life

Flexible Structural Design

18-kip ESALs Over Initial Performance Period	1,103,760
Initial Serviceability	4.5
Terminal Serviceability	2.5
Reliability Level	90 %
Overall Standard Deviation	0.45
Roadbed Soil Resilient Modulus	5,000 psi
Stage Construction	1
Calculated Design Structural Number	3.95 in

Specified Layer Design

Layer	Material Description	Struct Coef. (Ai)	Drain Coef. (Mi)	Thickness (Di)(in)	Width (ft)	Calculated SN (in)
1	HMA	0.44	1	4	-	1.76
2	HMA	0.34	1	0	-	0.00
3	subbase aggregate	0.09	1	25	-	2.25
Total	-	-	-	29.00	-	4.01

1993 AASHTO Pavement Design

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Calculated Design Structural Number	3.95 in

Specified Layer Design

Layer	Material Description	Struct Coef. (Ai)	Drain Coef. (Mi)	Thickness (Di)(in)	Width (ft)	Calculated SN (in)
1	HMA	0.44	1	4	-	1.76
2	HMA	0.34	1	1	-	0.34
3	subbase aggregate	0.09	1	21	-	1.89
Total	-	-	-	26.00	-	3.99

STATE OF MAINE

FILE: RTE 9

INTERDEPARTMENTAL MEMORANDUM

Date of Request: 2/7/2012 Return: 2/14/2012

Latest Date Needed By 2/29/2012

To: **Ed Hanscom** Dept.: MDOT, Bureau of Planning

From: **Brian Keezer** Dept.: MaineDOT Traffic

Subject: **Request for Traffic Information** Project Manager: **Brian Keezer**

TOWN(S): Sabattus P.I.N. **19008.00** Consultant Proj [X]

COUNTY: Androscoggin ROUTE: 9 (Middle Rd.)

LOCATION/ DESCRIPTION: Intersection of Rte 9 (Middle Rd.) and Pleasant Hill Rd/Jordan Bridge Rd. Reduce grade on Pleasant Hill Road approach as grade/cemetery allows. Widen the approach/install turn lanes to allow for heavy truck turning movements. Drainage work to correct issues. Install traffic shelf at the Jordan Bridge Road.

	Roadway Changes or Relocation (Attach Sketch)	Turning Movement needed (Provide Locations under Comments)	Other Please Describe Under Comments
Please Check Box if Applicable:	X		

Prep By: MAM

Description of Sections	Sec. 1	Sec. 2	Sec. 3	Sec. 4	Sec. 5
	Sabattus - Pleasant Hill Rd. S/O SR 9/126	Sabattus - SR 9 (Center Rd.) SE/O Pleasant Hill Rd.	Sabattus - Jordan Bridge Rd. SE/O SR (Center Rd.)	Sabattus - SR 9 (Center Rd.) NW/O Jordan Bridge Rd.	
1 Latest AADT (Year)	3570 (2011)	6770 (2011)	860 (2011)		
2 Current **2012** AADT	3570	6770	860	4500	
3 Future **2022** AADT	3930	7450	950	4950	
4 Future **2032** AADT	4280	8120	1030	5400	
5 DHV - % of AADT	11%	11%	11%	11%	%
6 Design Hourly Volume	471	893	113	594	
7 % Heavy Trucks (AADT)	11%	8%	8%	8%	%
8 % Heavy Trucks (DHV)	9%	6%	6%	6%	%
9 Direct.Dist. (DHV)	69%	67%	67%	67%	%
10 18-KIP Equivalent P 2.0	265	369	47	240	
11 18-KIP Equivalent P 2.5	252	352	45	229	

Notes or Remarks: 18-Kip ESALS is based on 20 year life

PLEASE PROVIDE: (1) PIN NUMBER, (2) THE CURRENT & FUTURE YEARS FOR WHICH YOU WANT AADT CALCULATED, AND SEND TO MIKE MORGAN. (A LOCATION MAP IS NO LONGER NEEDED.)
RAFFIC REQUESTS WILL BE FILLED ON A FIRST COME / SERVE BASIS. PLEASE SEND WHEN PROJECT KICKS OFF!!

Need Only Data Items Numbered All

Comments: Intersection improvements

No turning movement data available at this intersection.

ESAL'S - (252)(365)(20) = 1,839,600
- (252)(365)(12) = 1,103,760 * use for design

1993 AASHTO Pavement Design

DARWin Pavement Design and Analysis System

A Proprietary AASHTOWare
Computer Software Product
State of Maine

Flexible Structural Design Module

Sabattus, Pleasant Hill Road
WIN19081.00
12 year design life

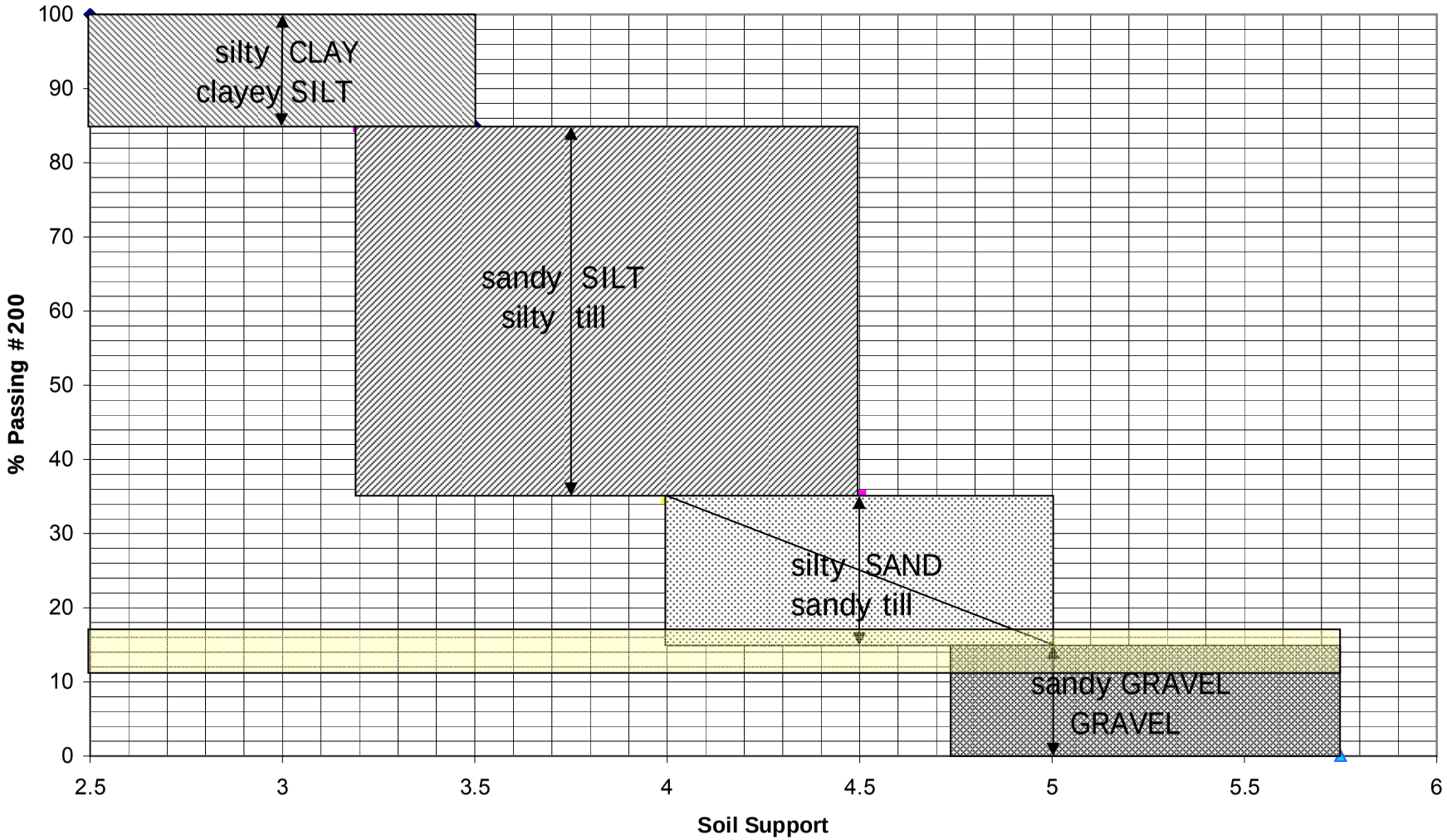
Flexible Structural Design

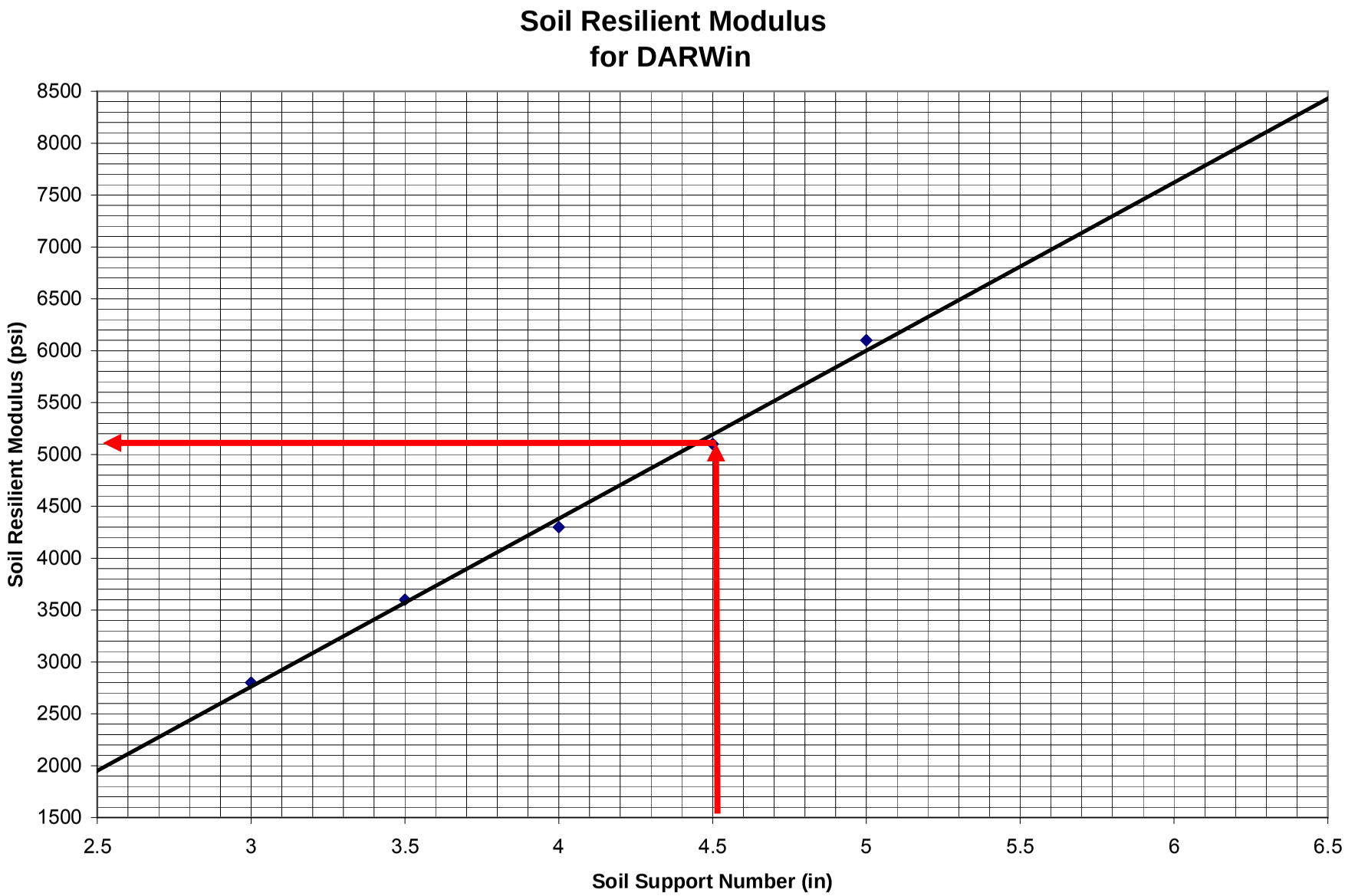
18-kip ESALs Over Initial Performance Period	1,103,760
Initial Serviceability	4.5
Terminal Serviceability	2.5
Reliability Level	90 %
Overall Standard Deviation	0.45
Roadbed Soil Resilient Modulus	5,000 psi
Stage Construction	1
Calculated Design Structural Number	3.95 in

Specified Layer Design

Layer	Material Description	Struct Coef. (Ai)	Drain Coef. (Mi)	Thickness (Di)(in)	Width (ft)	Calculated SN (in)
1	HMA	0.44	1	4	-	1.76
2	HMA	0.34	1	2	-	0.68
3	subbase aggregate	0.09	1	17	-	1.53
Total	-	-	-	23.00	-	3.97

Guidelines for Selection of Soil Support Values for Pavement Design




Soil Resilient Modulus
for DARWin
Soil Resilient Modulus (psi)
8500
8000
7500
7000
6500
6000
5500
5000
4500
4000
3500
3000
2500
2000
1500
2.5
3
3.5
4
4.5
5
5.5
6
6.5
Soil Support Number (in)

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

SABATTUS

ANDROSCOGGIN COUNTY
PROJECT NO. STP-1076(400)X

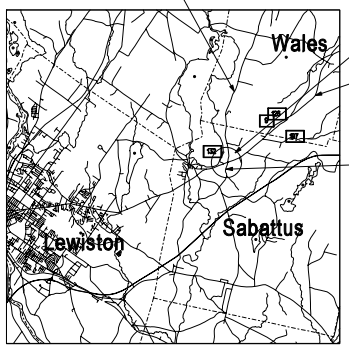
RTE. 9\126 @ RTE. 132

PROJECT LENGTH : 0.5 km

GRADING, DRAINAGE, BASE, PAVEMENT, INTERSECTION IMPROVEMENT

INDEX OF SHEETS

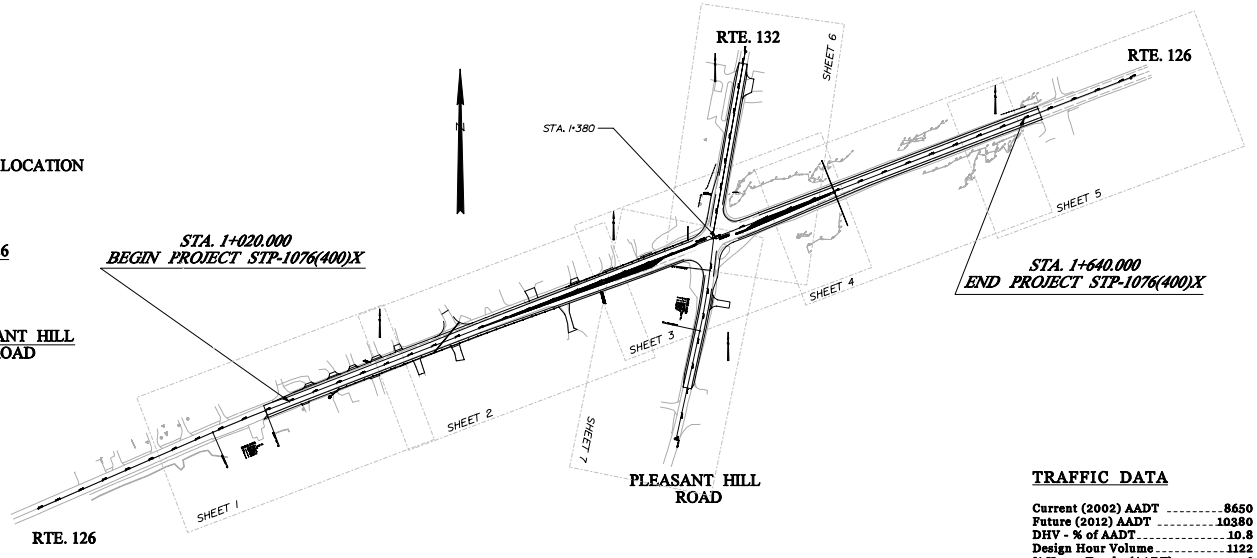
Description	Sheet No.
Title Sheet	1
Typical Sections	2-4
Estimated Quantities & Earthwork Summary	5
Drainage Sheet	6
Construction Notes	7
Geometric Island Layout	8
Traffic Plan	9
Geotechnical Information	10-11
Plan/Profile	12-18
Cross - Sections	19-55
Right of Way Maps	56-61



LOCATION MAP

2 0 2 4

Scale In Kilometers



LAYOUT SCALE

35 0 35 70

Scale In Meters

TRAFFIC DATA

Current (2002) AADT	8650
Future (2012) AADT	10380
DHV - % of AADT	10.8
Design Hour Volume	1122
% Heavy Trucks (AADT)	6
% Heavy Trucks (DHV)	3
Directional Distribution (DHV)	62
80 kN Equivalent P 2.0	173
80 kN Equivalent P 2.5	170
Design Speed (km/h)	80.4

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

APPROVED | DATE

COMMISSIONER:

CHIEF ENGINEER:

PIN 10764.00

PROJECT INFORMATION		SIGNATURE
PROGRAM	U & A HIGHWAY	
PROJECT MANAGER	H. COWAN	
DESIGNER	R. MOULTON	P.E. NUMBER
CONSULTANT		
PROJECT RESIDENT		
CONTRACTOR		DATE
PROJECT COMPLETION DATE		

STP-1076(400)X

SABATTUS
RTE. 9\126 @ RTE. 132

TITLE SHEET

SHEET NUMBER

1

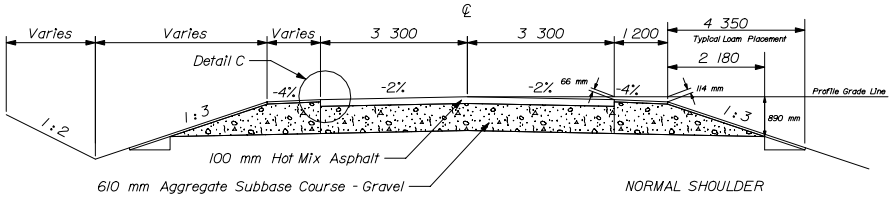
OF 59

Filename: ...\00\HIGHWAY\MSTA\001_Title.dgn Division: HIGHWAY Username: karen.gross Date:11/15/2012

METRIC	1. All dimensions are in millimeters unless otherwise noted. 2. All elevations and stations are in meters.	FUNCL. REG. NO.	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
		1	MAINE	STP-1076(400)X	4	61
				10764.00		

100 mm Hot Mix Asphalt

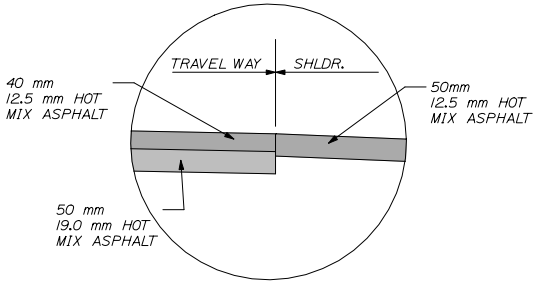
Side Road Typicals



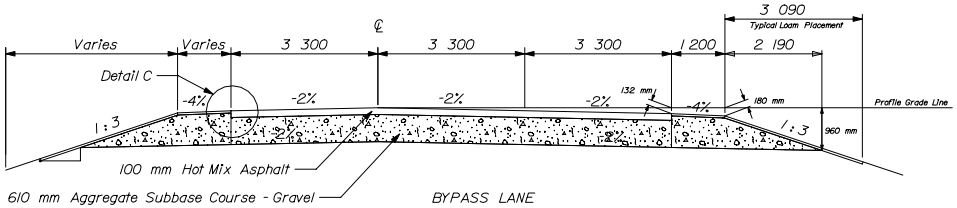
VARIABLE SHOULDER WITH DITCH
Rte. 132
Sta. 2+030.0 to 2+060.0 Lt.

NORMAL SECTION
Rte. 132
Sta. 2+010.0 to 2+028.7
4.026 m²/m

NORMAL SHOULDER
Rte. 132
Sta. 2+025.4 to 2+028.7 Rt.
Pleasant Hill Road
Sta. 3+010.0 to 3+046.3 Rt.
Sta. 3+040.0 to 3+046.3 Lt.
1.583 m²/m

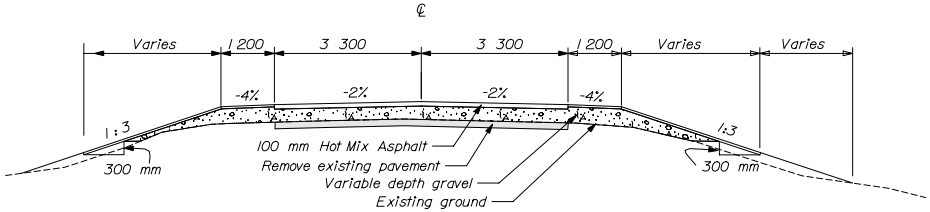


DETAIL C
TYPICAL FOR SIDE ROADS



VARIABLE SHOULDER
Pleasant Hill Road
Sta.. 3+030.0 to 3+040.0 Lt.

BYPASS LANE
Rte. 132
Sta. 2+010.0 to 2+030.0 Lt.
Pleasant Hill Road
Sta. 3+014.4 to 3+030.0 Lt.
6.038 m²/m



VARIABLE DEPTH GRAVEL
Side Roads
Sta. 2+041.9 to 2+130.0
Sta. 3+060.0 to 3+110.0

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

TYPICAL SECTIONS

SABATTUS

RTE. 9\126 @ RTE. 132

NOT TO SCALE

SHEET 3 OF 3 AUGUSTA, MAINE

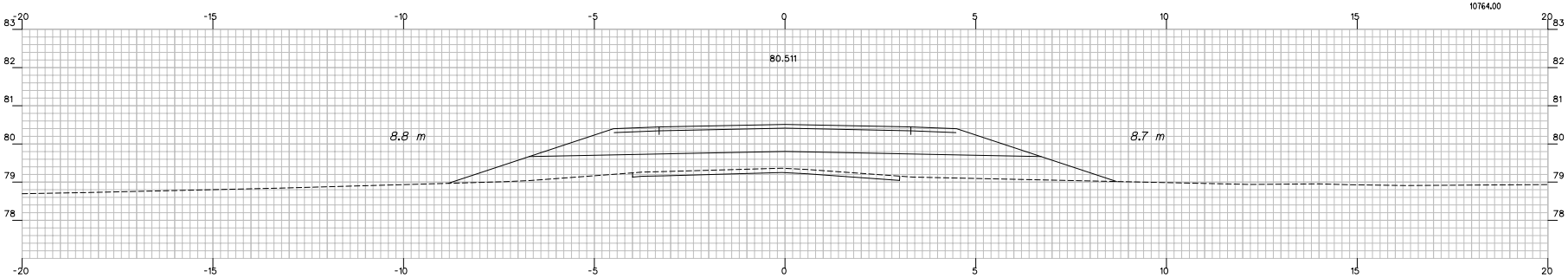
PROJECT DESIGN ENGINEER		BY	DATE
PLANS	DESIGNED	R.MOULTON	R.MOULTON	MAY 2005
	CHECKED	----------	----------	----------
	REVISIONS	----------	----------	----------
	FIELD CHANGES	----------	----------	----------

Filename: ...\HIGHWAY\MSTA\004_Typical3.dgn Division: HIGHWAY Username: karen.gross Date:11/15/2012

METRIC	1. All dimensions are in millimeters unless otherwise noted. 2. All elevations and stations are in meters.

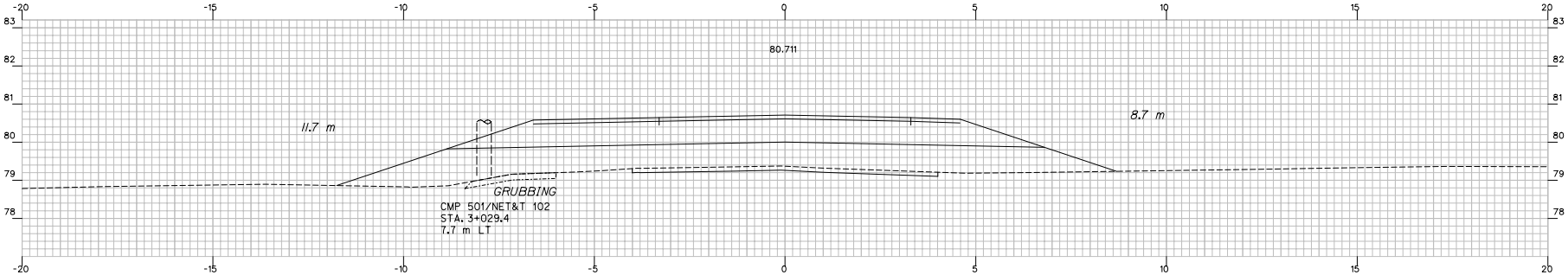
F.A.H.A. RGN. NO.	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
1	MAINE	STP-1076(400)X	49	61

10764.00



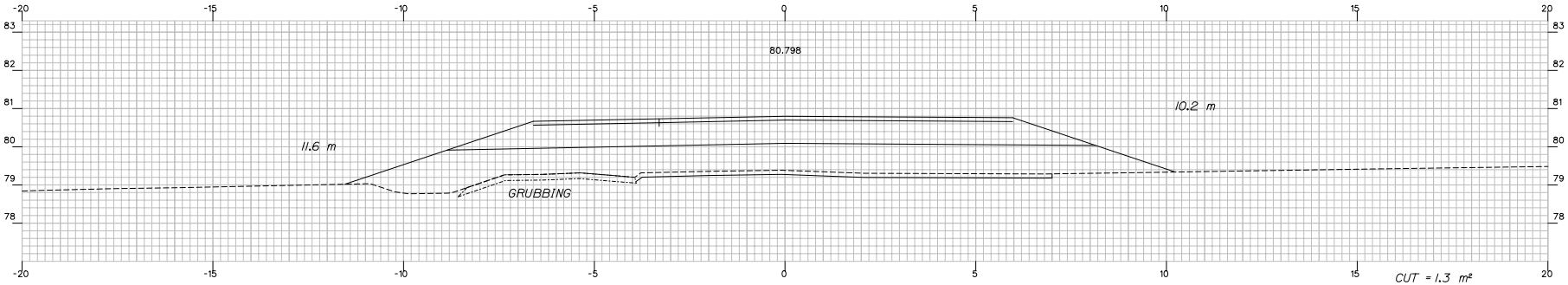
3+040.000

CUT = 0.8 m²
FILL = 8.3 m²



3+030.000

CUT = 0.8 m²
FILL = 12.7 m²
GRUBBING = 0.4 m²



3+025.650

CUT = 1.3 m²
FILL = 15.1 m²
GRUBBING = 0.7 m²

PROJECT DESIGN ENGINEER	BY	DATE
DESIGN-DETAILED	R.MOULTON	MAY 2005
CHECKED		
REVISIONS		
FIELD CHANGES		

PLANS

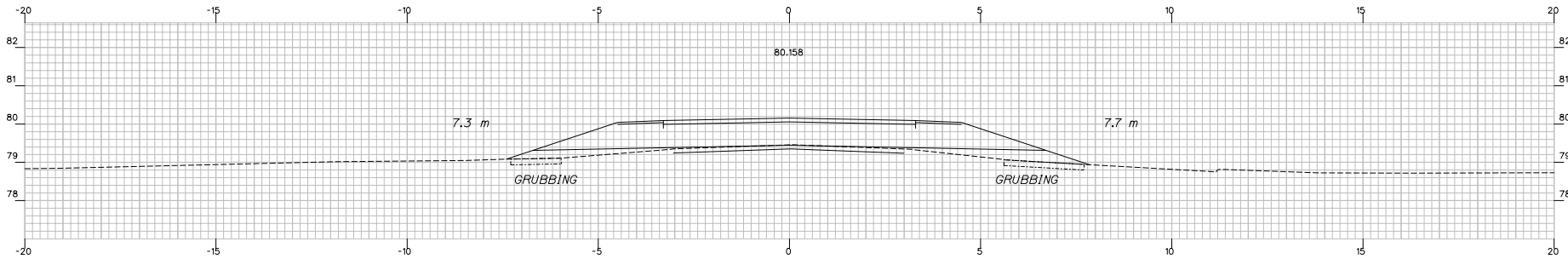
Filename: ...\MSTA\049_XSMCA2_dr_002.dgn Division: HIGHWAY Username: karen.gross Date:11/15/2012

SABATTUS RTE. 9\126 @ RTE. 132

STA. 3+025.65 TO STA. 3+040

METRIC	1. All dimensions are in millimeters unless otherwise noted. 2. All elevations and stations are in meters.	F.A./W.A. PROJ. NO.	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
		1	MAINE	STP-1076(400)X	50	61

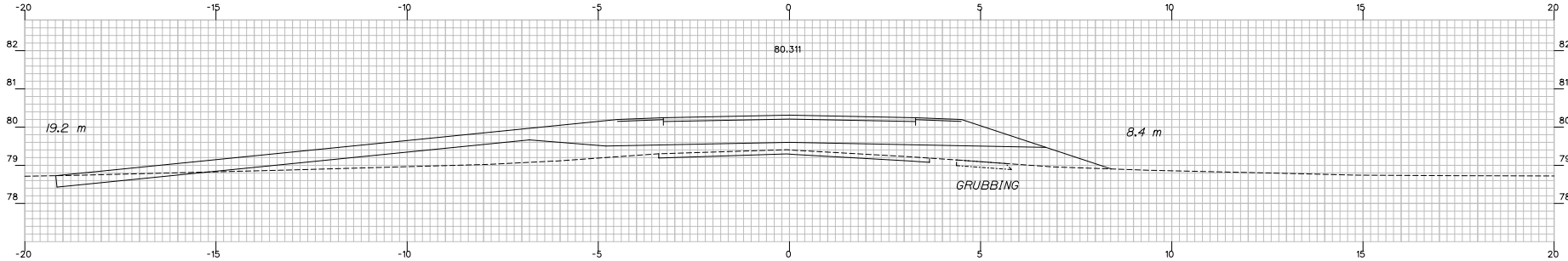
10764.00



3+060.000

BEGIN VARIABLE DEPTH GRAVEL
STA. 3+060.0

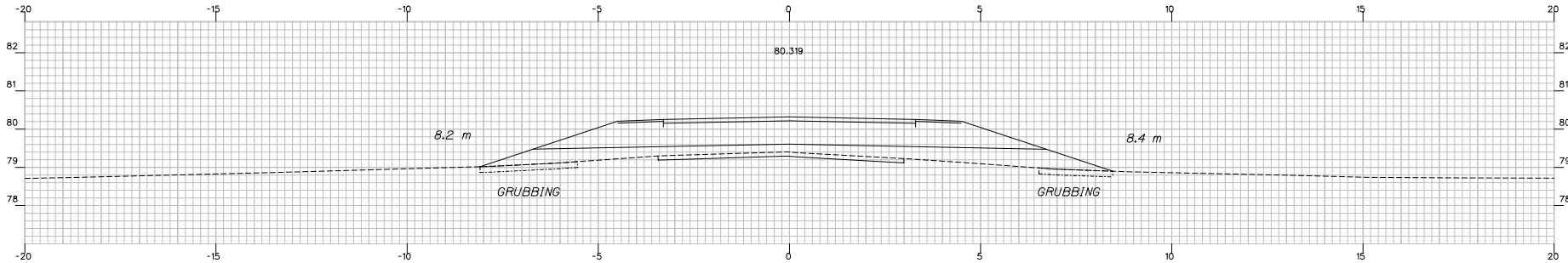
CUT = 0.6 m²
FILL = 1.2 m²
GRUBBING = 0.5 m²



3+050.000

STA. 3+050 LT.
CONSTRUCT 5 m
FIELD ENTRANCE

CUT = 0.8 m²
FILL = 4.8 m²
GRUBBING = 0.6 m²



3+049.639

PROJECT DESIGN ENGINEER		BY	DATE
PLANS	DESIGNED	R.MOULTON	MAY 2005
	DRAWN BY FIELD	R.MOULTON	------
	CHECKED	------	------
	REVISIONS	------	------
	FIELD CHANGES		

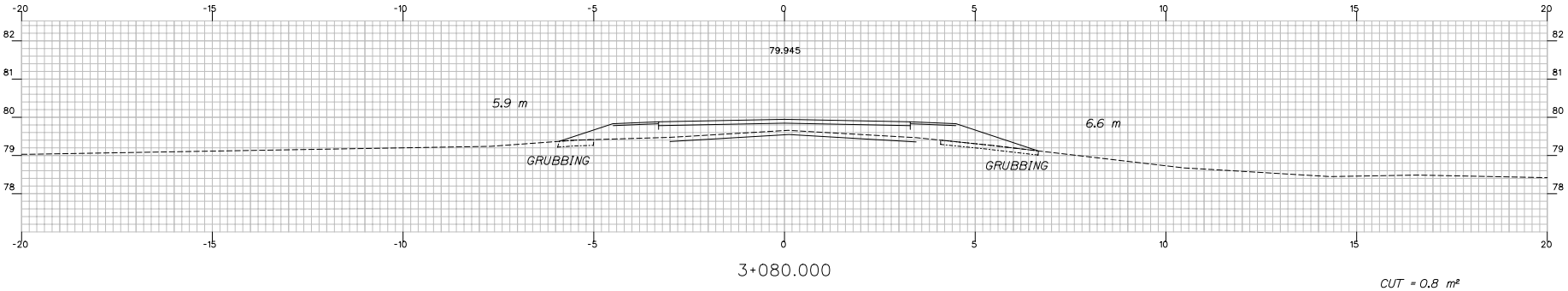
Filename: ...\MSTA\050_XSMCA2_dr_003.dgn Division: HIGHWAY Username: karen.gross Date:11/15/2012

SABATTUS RTE. 9\126 @ RTE. 132

STA. 3+049.639 TO STA. 3+060

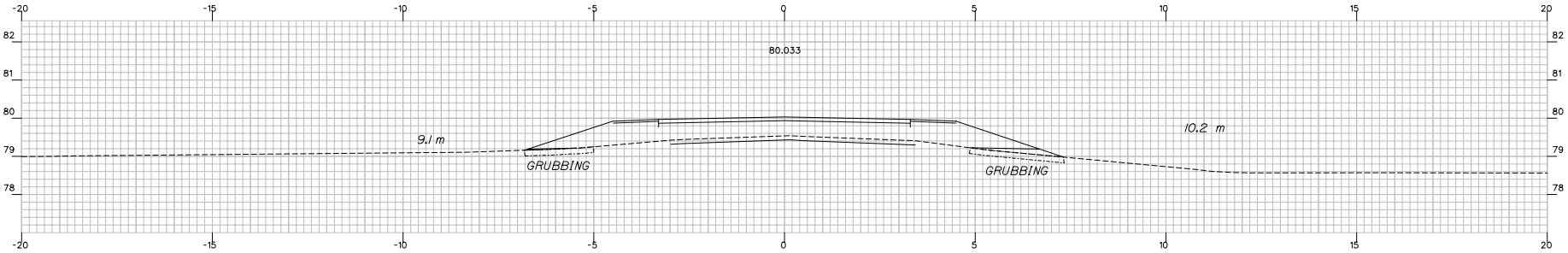
METRIC	1. All dimensions are in millimeters unless otherwise noted. 2. All elevations and stations are in meters.	F.A./W.A. ROAD, NO.	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
		1	MAINE	STP-1076(400)X	51	61

10764.00



3+080.000

CUT = 0.8 m²
GRUBBING = 0.5 m²



3+070.000

CUT = 0.6 m²
FILL = 0.2 m²
GRUBBING = 0.6 m²

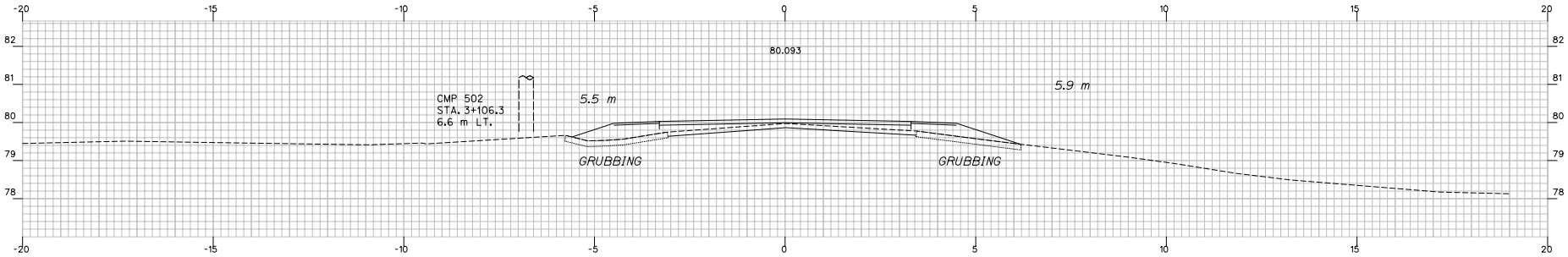
PROJECT DESIGN ENGINEER		By	DATE
PLANS	PREPARED	R.MOULTON	MAY 2005
	CHECKED	R.MOULTON	
	REVISIONS		
	FIELD CHANGES		

Filename: ...\MSTA\051_XSMCA2_dr_004.dgn Division: HIGHWAY Username: karen.gross Date:11/15/2012

SABATTUS RTE. 9\126 @ RTE. 132

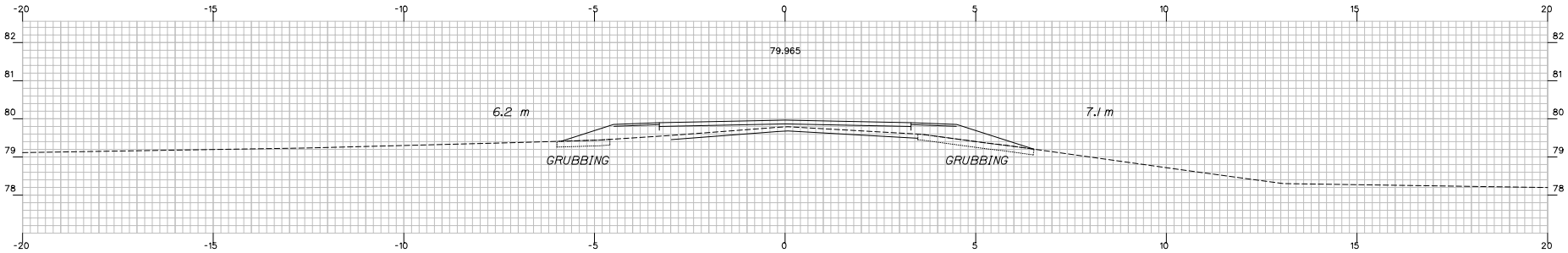
STA. 3.070 TO STA. 3+073.957

METRIC	1. All dimensions are in millimeters unless otherwise noted. 2. All elevations and stations are in meters.	F.A./W.A. ROAD NO.	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
		1	MAINE	STP-1076(400)X	52	61
				10764.00		



3+100.000

CUT = 0.8 m²
GRUBBING = 0.9 m²



3+090.000

CUT = 0.8 m²
GRUBBING = 0.7 m²

PROJECT DESIGN ENGINEER		BY	DATE
PLANS	DESIGN-DETAILED	R.MOULTON	MAY 2005
	CHECKED		
	REVISIONS		
	FIELD CHANGES		

Filename: ...\MSTA\052_XSMCA2_dr_005.dgn Division: HIGHWAY Username: karen.gross Date:11/15/2012

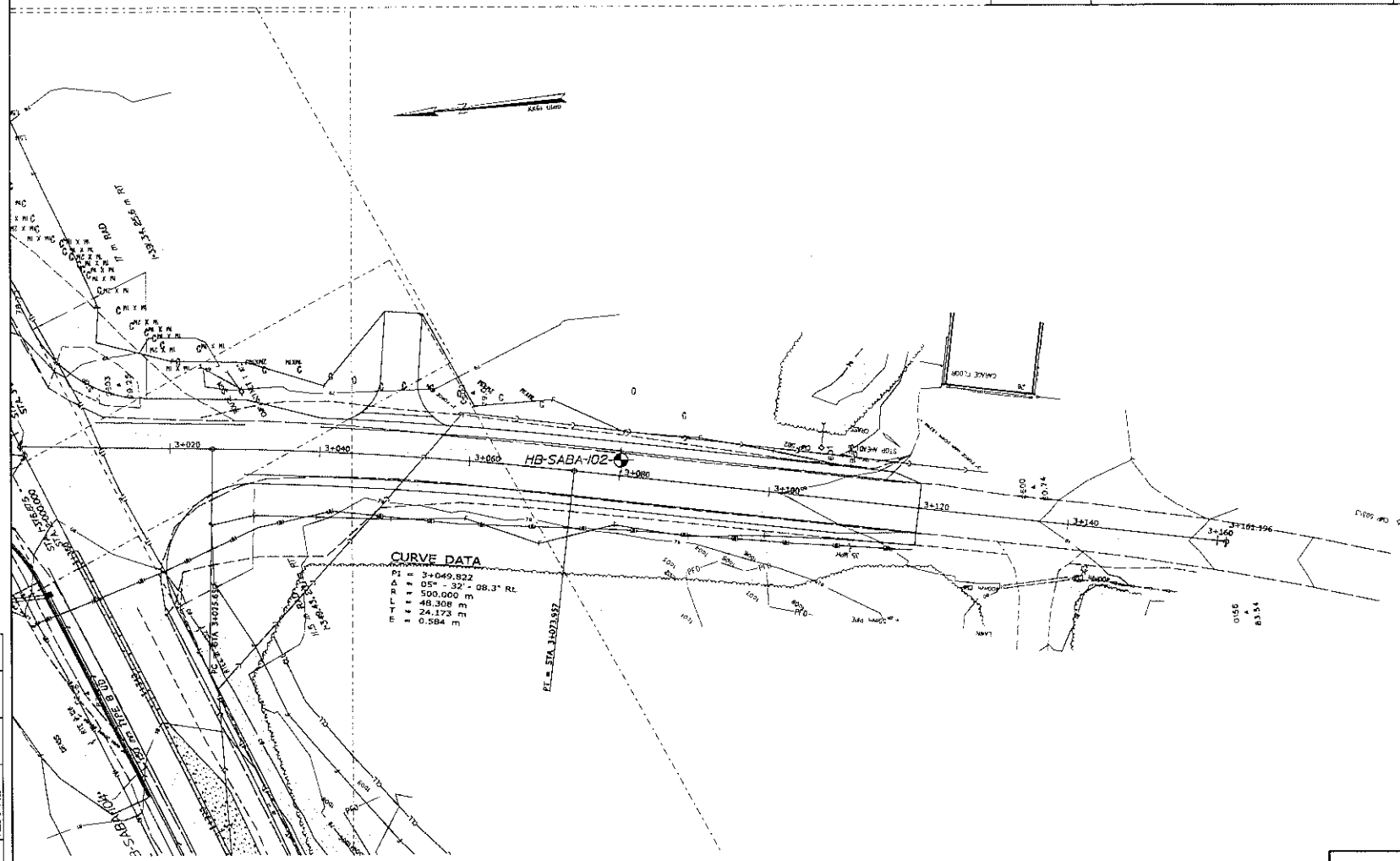
STA. 3+080 TO STA. 3+090

SABATTUS RTE. 9\126 @ RTE. 132

METRIC	1. All dimensions are in millimeters unless otherwise noted. 2. All elevations and stations are in meters.

FEDERAL AID NO.	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
1	MAINE	STP-1076(400)X	7	9

13764.00



PROJECT DESIGN ENGINEER		BY	DATE
DESIGN DETAILED	K. BERSON	R. WHITE	2/12
CHECKED	-----	-----	WR 7/05
REVISED	-----	-----	-----
FIELD CHANGES	-----	-----	-----

PLANS

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

GEOPLANS

SABATTUS

RTE. 9\126 @ RTE. 132

SCALE
(IN METERS)

SHEET OF AUGUSTA, MAINE

Filename: $file$ Division: $wkgroup$ Username: $user$ Date: $date$

Maine Department of Transportation

Soil/Rock Exploration Log
METRIC UNITS

Project: ROUTES 126/9 @ ROUTE 132
Location: SABATTUS, MAINE

Boring No.: HB-SABA-102
PIN: 10764.00

Driller:	MaineDOT	**Elevation (m):**	79.50	**Auger ID/OD:**	156 mm
Operator:	C. Mann	**Datum:**	NGVD	**Sampler:**	Standard Split Spoon
Logged By:	B. Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	63.5 kg/760 mm
Date Start/Finish:	9/24/02-9/24/02	**Drilling Method:**	Hollow Stem Auger	**Core Barrel:**	N/A
Boring Location:	3+080, 2.1 LT.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
R = Rock Core Sample
V = Insitu Vane Shear Test
SSA = Solid Stem Auger

Definitions:
S_u = Insitu Field Vane Shear Strength (kPa)
T_v = Pocket Torvane Shear Strength (kPa)
q_p = Unconfined Compressive Strength (Pa)
$S_{u(lab)}$ = Lab Vane Shear Strength (kPa)
WOH = weight of 64 kg hammer
WOR = weight of rods WOC = weight of casing

Definitions:
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (m)	Sample No.	Pen/Rec (cm)	Sample Depth (m)	Blows (150 mm) Shear Strength (kPa) or RQD (%)	N-value	Casing Blows	Elevation (m)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	PC					HSA	79.39		PAVEMENT, Core taken. 0.11	
									Brown, dry, sandy GRAVEL, trace silt. 0.61	
	1D	61.0/50.8	0.61 - 1.22	10/7/5/5	12		78.89		Brown, moist, medium dense, ~~fine SAND, little silt~~ Silty SAND, trace gravel 1.22	G#100539 A-4, SM WC=12.6%
1.2							78.28		**Bottom of Exploration at 1.22 m below ground surface.** NO REFUSAL	
2.4										
3.6										
4.8										
6										
7.2										
8.4										
9.6										

Remarks:

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

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

Boring No.: HB-SABA-102

State of Maine - Department of Transportation

Laboratory Testing Summary Sheet

Town(s): Sabattus Project Number: 10764.00

Boring & Sample Identification Number	Station (Meter)	Offset (Meter)	Depth (Meter)	Reference Number	G.S.D.C. Sheet	W.C.	L.L.	P.I.	Classification		
									Unified	AASHTO	Frost
HB-SABA-108, 1D	1+100	2.9 RT.	0.61-1.22	100535	1	24.5	38	17	CL	A-6	III
HB-SABA-107, 2D	1+140	7.0 RT.	1.52-2.13	100536	1	18.7			ML	A-4	IV
HB-SABA-106, 1D	1+180	7.0 RT.	0.91-1.52	100537	1	24.4			SM	A-2-4	II
HB-SABA-105, 2D	1+230	6.7 RT.	1.22-1.83	100538	1	4.4			SP	A-1-b	0
HB-SABA-103, 1D	1+440	2.5 LT.	0.61-1.22	100540	1	2.4			SW-SM	A-1-b	0
HB-SABA-201, 2D	1+460	5.6 Rt.	4.57-5.18	183559	2	28.9	25	5	CL-ML	A-4	IV
HB-SABA-201, 3D	1+460	5.6 Rt.	9.14-9.4	183514	2	24.6			CL-ML	A-4	IV
HB-SABA-201, 3D/A	1+460	5.6 Rt.	9.4-9.75	Combined with HB-SABA-201, 3D							
HB-SABA-202, 1U	1+520	5.5 Rt.	5.18-5.79	183560	2	30.8	24	5	CL-ML	A-4	IV
HB-SABA-202, 2U	1+520	5.5 Rt.	7.62-8.23	183563	---	Did not use					
HB-SABA-202, 3D	1+520	5.5 Rt.	12.19-12.8	183515	2	19.9			SM	A-4	III
X HB-SABA-102, 1D	3+080	2.1 LT.	0.61-1.22	100539	1	12.6			SM	A-4	IV

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 MDOT and Corps of Engineers Classification Systems.

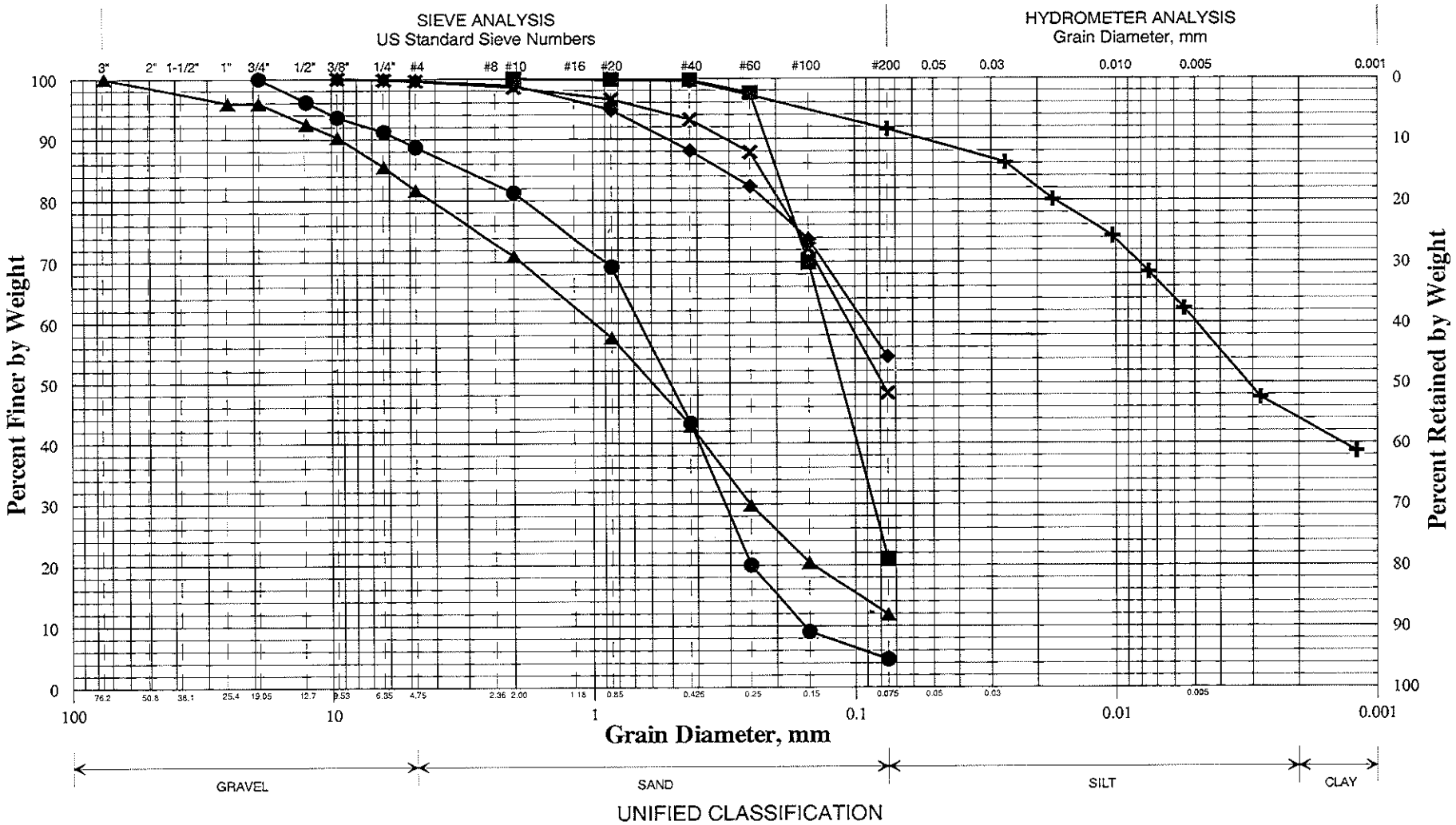
GSDC = Grain Size Distribution Curve as determined by AASHTO T 88-93 (1996) and/or ASTM D 422-63 (Reapproved 1998)

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

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

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.	Depth, m	Description	W, %	LL	PL	PI
✚	HB-SABA-108-1D	0.61-1.22	Clayey SILT, trace sand.	24.5	38	21	17
◆	HB-SABA-107-2D	1.52-2.13	Sandy SILT, trace sand, trace gravel.	18.7			
■	HB-SABA-106-1D	0.91-1.52	SAND, some silt.	24.4			
●	HB-SABA-105-2D	1.22-1.83	SAND, little gravel, trace silt.	4.4			
▲	HB-SABA-103-1D	0.61-1.22	SAND, little gravel, little sand.	2.4			
✕	HB-SABA-102-1D	0.61-1.22	Silty SAND, trace gravel.	12.6			

PIN:	010764.00
Town:	SABATTUS
Reported by:	WHITE, TERRY A
Date:	3/16/2005

SHEET NO. 1

Sieve s-100539	% passing p-100539
75	
25	
19	
12.5	
9.5	100
6.3	99.8
4.75	99.6
2	98.5
0.85	96.5
0.425	93.2
0.25	87.8
0.15	72.2
0.075	48.3

	Boring/Sample No.	Depth, m	Description	W, %
+	HB-SABA-108-1D	0.61-1.22	Clayey SILT, trace sand.	24.5
◆	HB-SABA-107-2D	1.52-2.13	Sandy SILT, trace sand, trace gravel.	18.7
■	HB-SABA-106-1D	0.91-1.52	SAND, some silt.	24.4
●	HB-SABA-105-2D	1.22-1.83	SAND, little gravel, trace silt.	4.4
▲	HB-SABA-103-1D	0.61-1.22	SAND, little gravel, little sand.	2.4
×	HB-SABA-102-1D	0.61-1.22	Silty SAND, trace gravel.	12.6

Ref No.	0.002mm, %
+	44
◆	
■	
●	
▲	
×	

PIN: 010764.00
Town: SABATTUS
Reported By: WHITE, TERRY A
Date: 3/16/2005
Sheet No.: 1
Units, E/M: M