Maine Department of Transportation

Geotechnical Group

Report of

SUBSURFACE INVESTIGATION FOR RECONSTRUCTION OF ROUTE 4/117 IN THE TOWNS OF LIVERMORE FALLS IN ANDROSCOGGIN COUNTY AND JAY IN FRANKLIN COUNTY

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Androscoggin and Franklin Counties

PIN 10018.00
Federal NH-1001(800)E

Soils Report 2010-22

September 1, 2010

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1.0 INTRODUCTION

1.1 General

The Maine Department of Transportation (MDOT) is planning highway improvements to a 1.75 km (1.1 mile) section of Route 4/17 in the Towns of Livermore Falls in Androscoggin County and Jay in Franklin County, Maine. This portion of the highway is on the National Highway System. The project begins at the intersection of Bridge Street in Livermore Falls and extends north to Pineau Street in Jay. The project is needed to improve the horizontal and vertical alignment, add and improve sidewalks and drainage, and pave shoulders. The original subbase has been damaged by underground utility construction over the years since this highway was built. The scope includes reconstruction for the full length of the project. The land slopes steeply up to the east, and many of the abutting properties have existing retaining walls to create a flat area for buildings and lawns above the roadway. This report summarizes the site subsurface conditions and discusses our recommendations for the proposed reconstruction.

1.2 Summary of Recommendations

These recommendations are discussed in detail in Section 3.0, Evaluation and Recommendations.

- All existing Portland Cement Concrete Pavement should be removed.

- Sections of this project will require solid pipes in the drainage system to prevent migration of petroleum contamination from prior spills.

- We recommend that a wet-cast small-block concrete block retaining wall system be used to replace the deteriorated existing walls. Any temporary shoring of structures above the existing walls must be arranged between the Contractor and abutting property owners.

- Extreme caution will be required in excavation for construction of retaining walls supporting houses close to the highway.

2.0 SITE AND SUBSURFACE CONDITIONS

2.1 General Site Conditions

Route 4/17 runs north and south along the east side of the Androscoggin River through the Towns of Livermore Falls and Jay. The portion of this highway project in the Town of Jay was originally built in 1926 as State Highway "F"; as-built plans do not exist for this section of highway in Livermore Falls. The highway is well above flood stage in the river, and the surrounding land is fully developed with industrial, commercial and residential uses. Most of the commercial uses along this project are in Livermore Falls, with a paper mill and residential use predominant in Jay. Abutting land is owned by Maine Central Railroad in some areas of this project, and drainage will outlet to pipes under the tracks.

On-street parking is presently allowed along much of this highway The existing pavement is at least 8.5 meters wide and is 11 meters wide or more in some areas to allow adequate width to park large trucks. Some of the on-street parking will be eliminated at the request of the Town.

Ledge outcrops are visible along the east side of the roadway in the northern part of the project. There are several areas where existing subbase and native subgrade soils have been contaminated by petroleum spills at existing or former gas stations. Contamination and required remediation is discussed in "Phase I & Phase II Environmental Study, State Route 4 (Main Street) – Livermore Falls and Jay, Maine, MDOT – Project # NH-1001(800)E." by Hillier & Associates, Inc, December 2003.

Municipal water and sewer serve all abutting properties. Underground water and sewer pipes will be replaced at the same time this project is built. Underground utility construction and repair has taken place since the original highway was built, and trenching activities have disturbed the subbase and subgrade soils.

2.2 Mapped Information

Surficial soils mapping in the Livermore Falls area shows the native soils to be glacial Till, with Till over shallow ledge in the northern part of the project. NRCS mapping shows disturbed "urban land" soils north of Gagnon Street and Hollis and Adams sandy loams for the southern part of the project. No wetlands are indicated on the National Wetlands Inventory map in the area of this project. Portions of the NRCS and Surficial Geology maps are included in Appendix A.

2.3 Existing Retaining Walls

The land rises steeply on the east side of the highway, and many buildings on the right are set behind retaining walls of different heights. Most of these walls are in poor condition and some are extremely close to the structures they support. Replacement of some of these walls may require temporary shoring of structures above the walls. Many buildings on the left are very close to the roadway. Most retaining walls along this project will need to be rebuilt or replaced, although there are cast-in-place concrete walls at Stations 40+ 885, 41+120 and 41+380 that can be patched as needed and left in place. Fences will be required above the taller walls. Photographs of existing retaining walls along this project are included in Appendix E.

2.4 Subsurface Investigation

Our subsurface investigation included 22 solid stem auger borings and a Falling Weight Deflectometer (FWD) analysis in June, 2003, to support design of the pavement structure. An additional 14 power auger borings were done to profile the top of ledge in an area where shallow bedrock is known to exist. A separate subsurface investigation was done to explore areas of potential environmental contamination, and some subsurface information was obtained from those explorations. It was not possible to drill in many places due to overhead or underground utilities, seismic refraction surveys were not feasible in this urban environment and GPR proved impractical to profile the bedrock surface as a result of past utility work. All highway borings were done in or near the existing roadway. Boring locations are shown on the Geoplans, Appendix B. Boring logs are in Appendix C and lab test data is included in Appendix D.

2.5 Existing Soils

Native soils encountered in our investigation included sand and silt of varying densities. A boring at Station 41+630 encountered peat soils at a depth of 1.22 meters but no other organic soils were encountered. A summary of native soils and pavement materials found in our borings is shown in the following table.

Table 1. Soils and Pavement

Station	Offset	HMA, mm	PCC, mm	Gravel, mm	native soils
40+130	3.0 RT	120		340	Medium dense SAND over SILT
40+160	5.5 RT	120	180		medium dense fine SAND
40+280	3.5 RT	240		220	medium to very dense SAND
40+380	3.5 RT	120		340	medium dense SAND
40+440	7.0 LT	120		270	medium dense SAND
40+520	5.5 RT	60		240	SILT
40+580	3.1 RT	180			SAND over SILT
40+610	5.0 RT	120			SAND over SILT
40+630	5.2 RT	60			SILT
40+680	CL	21			SAND
40+740	7.6 LT				SAND
40+810	8.0 RT	30	210	160	SAND over SILT
40+880	6.0 RT	60	120	800	SAND
40+930	1.5 RT	150			Black SAND over SAND
41+020	1.8 LT	240		520	SAND over CLAY-SILT
41+130	1.4 LT				silty SAND
41+131	1.0 LT	460		390	
41+231	5.0 RT	180		430	silty SAND to SAND, little SILT
41+320	2.3 LT	240		670	SAND, trace silt
41+340	1.0 R	180			
41+390	2.0 RT	150			
41+430	2.0 RT	180			
41+470	2.5 RT	180			
41+580	4.5 RT				SAND over SILT
41+630	1.7 RT	210			SAND, PEAT layer, silty SAND
41+730	2.5 RT	180			
41+801	2.5 LT	270		640	SILT over loose SAND

2.6 Existing Pavement

The existing pavement is in fair to poor condition. Original 1926 plans for the highway in Jay show both an 200 mm gravel section and a section with 150 mm gravel over stone base. Our drill crew found existing pavement thickness to vary between 125 mm and 240 mm. This range of variation may be a result of past utility repair work, or the variation may be partly due to the difficulty of measuring the thickness of pavement in this condition. The existing pavement was overlaid by MDOT Maintenance in the summer of 2003; it had been 7 or 8 years since the last Maintenance overlay prior to 2003. Concrete pavement was encountered under the sidewalk in several borings, but it was not possible to determine the extent of this concrete due to conflicts with utilities.

2.7 Subsurface Bedrock

Bedrock outcrops are visible in the northern part of the project. Shallow bedrock refusals were encountered in several borings, and an irregular surface is indicated. We anticipate that bedrock excavation will be required for both subbase and underdrain construction. The following table shows the locations and depths of explorations to bedrock.

Table 2. Depth to Bedrock

Station	Offset	Depth m	
40+122	6.7 RT	2.3	
40+132	6.1 RT	3.6	
40+270	2.7 RT	3.3	
40+282	2.7 RT	3.3	
40+288	2.7 RT	4.0	
40+630	1.0 RT	2.56	
41+130	1.5 RT	0.8	
41+230	3.8 RT	4.6	No Refusal
41+280	4.2 LT	4.1	
41+340	2.0 RT	3.81	
41+350	2.0 RT	4.18	
41+360	2.0 RT	4.57	No Refusal
41+370	2.0 RT	4.36	
41+380	2.0 RT	0.64	
41+390	2.0 RT	1.22	
41+400	2.0 RT	4.21	
41+410	2.0 RT	1.89	
41+420	2.5 RT	6.1	No Refusal
41+430	2.0 RT	2.26	
41+440	2.5 RT	2.53	
41+450	2.5 RT	3.96	
41+460	2.5 RT	3.87	
41+460	4.6 LT	4.6	No Refusal
41+468	4.5 LT	3.0	
41+470	2.5 RT	2.26	
41+730	2.5 RT	0.52	

3.0 EVALUATION AND RECOMMENDATIONS

3.1 Pavement Design

The resilient modulus (M_r) determined by FWD testing is variable along this project, with some very low deflections indicating areas of bedrock or shallow boulders within the soil matrix. Some high deflections may indicate areas with subsurface drainage problems or damaged pipes and catchbasins. These exceptional deflection values do not relate to the properties of the soil, and were not considered in calculating the M_r. The occasional low M_r values generally result from drainage problems or tests over the disturbed soils in utility trenches; these values will be improved by the construction of this project. An M_r of 34,000 kPa is appropriate for this project where the subgrade soils are generally sand or sand with some gravel of varying densities.

The bearing capacity of the shoulder pavement is a concern on this project. A substantial pavement should be used on the shoulders to support turning traffic and the heavy trucks that are likely to park there. We recommend that a single pavement structural section be used across the full width of this roadway.

Portland cement concrete pavement was encountered under the sidewalk in borings at the following Stations:

Station	**Offset**
40+160	5.5 RT
40+810	8.0 RT
40+880	6.0 RT

The extent of these areas could not be determined in the subsurface investigation due to conflicts with existing utilities, but this PCC should be removed before construction of the new sidewalks. Final quantities will need to be determined in the field.

3.2 Retaining Walls

Retaining walls will be needed to support land above the sidewalks and shoulders along this project. For some of these walls, shoring of the adjacent buildings may be required during construction. Any access beyond MDOT Right-of-Way must be arranged between the Contractor and each property owner.

The cast-in-place (CIP) retaining wall alongside church property on Jewell Street will remain in place, but existing spalled concrete will be patched to improve the structural integrity of this wall.

A new wall will be built extending from Elm Street, Station 41+006, 23m Right to Station 41+ 038, 10.5 m Right. Excavation to build this wall is expected to extend under the front porches of the houses above the wall. Based on standard loadings for residential houses (Total loading of 976 to 1952 kg/m2 – Foundation Behavior and Repair, Residential and Light Commercial, pg 83, Brown1992.) it does not appear that the necessary excavation will undermine the existing foundations, but these foundations are built of stone below the existing ground surface and their stability is not known. The contractor will need to use extreme caution in this area.

A new wall will be built from a driveway along Main Street at Station 41+058, 12.4m Right to Maple Street, Station 41+074, 10.5 m Right. The front entry steps to the building above this wall are directly on the existing stone wall. The contractor will need to ensure that all residents of the building have access at all times during construction.

The stone wall in the area of Station 41+090 will remain in place, but the corner will be altered to match changes in vertical alignment and radius at Maple Street. This wall will be rebuilt by a mason experienced in mortared stone construction using new stones to match the existing wall.

The CIP retaining wall from Station 41+103 to Otis Street will remain in place but the corner at Otis Street will be cut and replaced with a short section of small precast block wall to allow for changes in the radius and vertical alignment of the intersection. No plans exist for this wall, but it is not tipped, cracked or spalled, and appears to be in good condition. It appears to be a gravity or cantilever wall with adequate embedment. A clean cut of this concrete will be required, and if it appears that support of the cut end is required, geosynthetic reinforcement can be added to the back of the wall during construction.

The CIP wall at Station 41+380 will not be altered in any way.

We recommend the use of a small block retaining wall system with blocks made of wet-cast concrete for the other walls on this project. This type of wall can be built quickly and would enhance the appearance of the streetscape as compared to existing retaining wall structures. The soils along this project are variable, and retaining walls should be designed for ϕ=30 and γ_t=125. This will be conservative for many of the walls, but since most walls are low, there will be very little difference in reinforcement length between this and a stronger soil.

Steps will be required on many retaining walls, and should be built to match the walls and copings. Any free-standing wall elements will need a finished face on all exposed sides, and any copings and stairs should be attached with adhesive to ensure that they cannot be picked up and moved.

3.3 Bedrock Excavation

Bedrock excavation is anticipated for construction of the drainage system for this project. It was not possible to do an adequate drilling program due to the presence of above and below ground utilities, but the available borings indicate that bedrock excavation at subgrade may be required in the areas of Station 40+130, Station 41+380, and Station 41+730. FWD data does not provide an indication of depth to bedrock, however shallow bedrock typically appears as low deflection in FWD data. This data indicates that shallow bedrock may be encountered in the area of Station 40+630, between Stations 41+380 and 41+440, and at Station 41+730 under the existing outer wheel path on the Right. Bedrock at subgrade should be fracture blasted to ensure that pockets of water are not trapped between the bedrock surface and the pavement structure.

3.4 Subgrade Soils

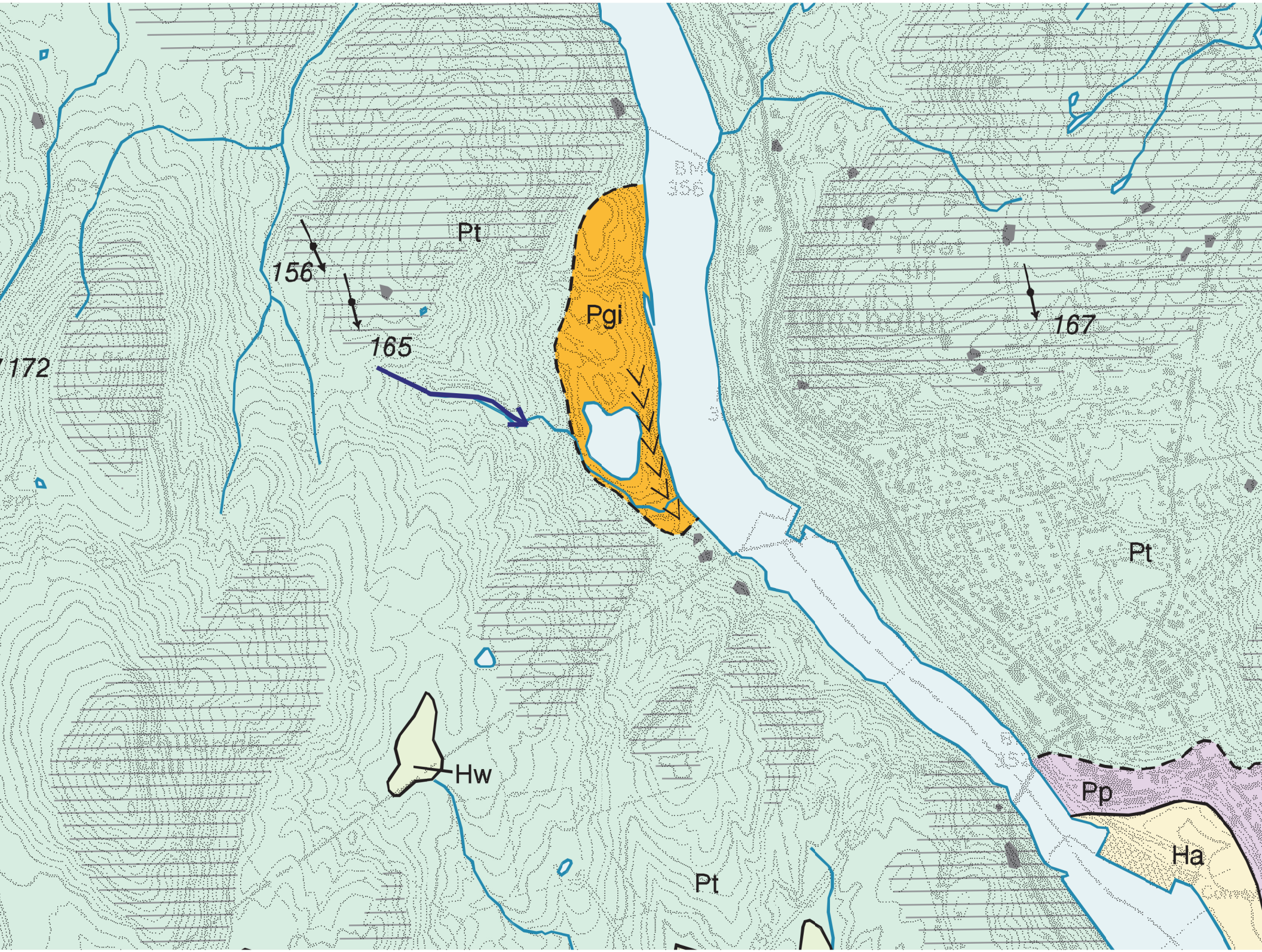
Subgrade soils were generally sand, however areas of damp and wet silty soils were encountered at Stations 40+520, 41+020 and 41+800. A non-woven

stabilization/reinforcement geotextile may be needed to support these soils during construction.

3.5 Frost Action

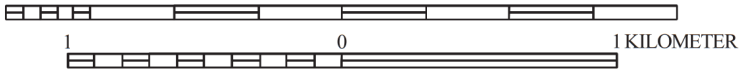
Frost penetration into granular subgrade is estimated as 1150 mm, with a design frost penetration of 1450 mm.

Appendix A
Resource Maps
Surficial Geology
NRCS Soils Survey


Pt
156
165
172
Pgi
167
Pt
Hw
Pt
Pp
Ha

Androscoggin Co. and by W. B. Thompson (2007) in Franklin and Kennebec Co.

Quadrangle Location



CONTOUR INTERVAL 10 FEET

Ha — **Stream alluvium** - Sand, silt, gravel, and organic sediment. Deposited on the flood plain of the Androscoggin River and other modern streams. Unit includes some wetland areas.

Hw — **Wetland deposits** - Peat, muck, silt, and clay. Deposited by accumulation of organic-rich sediments in poorly drained areas on valley floors. Unit may grade into or include areas of stream alluvium.

Qst — **Stream terraces** - Sand and gravel terraces in the Androscoggin River valley. Formed by postglacial erosion and deposition along the river.

Qe — **Eolian deposits** - Windblown sand derived from sediments in the Androscoggin River basin. Includes longitudinal dunes oriented parallel to the prevailing wind direction when the dunes formed. Unmapped areas of eolian sand occur extensively in the quadrangle, especially east of the Androscoggin River. These deposits typically are very irregular in thickness and extent.

Pl — **Glaciolacustrine deposit** - Sand and gravel deposited in a small glacial lake.

Plc2 — **Glacial Lake Canton deposits** - Sand, gravel, silt, and clay deposited in a lake that occupied part of the Androscoggin River valley and its tributaries. Includes sand and gravel deposited as deltas and subaqueous fans, and finer-grained lake-bottom sediments (sand, silt, and clay). An earlier and higher stage of Lake Canton ($\mathbf{Plc_1}$) drained southward through a spillway at an elevation of ~ 480 ft, on the divide between Bog Brook and Leavitt Brook in the Canton quadrangle. $\mathbf{Plc_1}$ deposits are not present in the Livermore Falls quad. The lower lake stage ($\mathbf{Plc_2}$) drained eastward through a spillway at an elevation of ~ 410 ft. This spillway may have been located along the drainage channel that is followed by Route 140 in the northeast corner of the Canton quad. The $\mathbf{Plc_2}$ stage of Lake Canton was dammed by glacial sediments that temporarily blocked a narrow stretch of the Androscoggin Valley between Canton and Jay. Lake Canton may have persisted into postglacial time.

Pm — **Glaciomarine sediments, undifferentiated** - Sand, gravel, and clay-silt deposited in the late-glacial sea. May include deposits formed in a variety of marine environments and locally modified by postglacial erosion.

Pp — **Presumpscot Formation** - Glaciomarine silt, clay, and sand deposited on the late-glacial sea floor.

Pgi — **Ice-contact deposits** - Miscellaneous sand and gravel deposits formed in contact with remants of glacial ice. May include glacial-stream and glacial-lake sediments, and probably some glacial-marine deltaic deposits (the latter in SW corner of quadrangle).

Pge — **Esker deposits** - Ridges of sand and gravel deposited by glacial meltwater streams in subglacial tunnels.

Pt — **Till** - Loose to very compact, poorly sorted, massive to weakly stratified mixture of sand, silt, and gravel-size rock debris deposited by glacial ice. Locally includes lenses of waterlaid sand and gravel.

Bedrock outcrops / thin-drift areas - Ruled pattern indicates areas where outcrops are common and/or surficial sediments are generally less than 10 ft thick (mapped partly from air photos). Dots show individual outcrops.

af — **Artificial fill** - Earth, rock, and/or man-made fill along roads and railroads.

Contact - Boundary between map units. Dashed where approximately located.

135 — **Glacial striation locality** - Arrow shows ice-flow direction inferred from striations on bedrock. Dot marks point of observation. Number is azimuth (in degrees) of flow direction.

k — **Kettle** - Depression created by melting of buried glacial ice and collapse of overlying sediments.

Grooved till surface - Narrow ridges and grooves in till sculpted by flow of glacial ice.

Glacially streamlined hill - Symbol shows trend of long axis of hill, which is parallel to former glacial ice-flow direction.

Meltwater channel - Channel eroded by glacial meltwater stream. Arrow shows inferred direction of water flow.

>>>>> — **Crest of esker** - Chevrons show trend of esker ridge and point in direction of glacial meltwater flow.

70° 12' 20"
70° 11' 15"
44° 29' 18"
44° 29' 19"

44° 28' 16"
44° 28' 17"
70° 12' 18"
70° 11' 14"

Map Scale: 1:9,180 if printed on A size (8.5" x 11") sheet.

N

Meters
0 50 100 200 300

Feet
0 350 700 1,400 2,100

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Units

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other

Special Line Features
- Gully
- Short Steep Slope
- Other

Political Features
- Cities

Water Features
- Oceans
- Streams and Canals

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

MAP INFORMATION

Map Scale: 1:9,180 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at scales ranging from 1:15,840 to 1:20,000.

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

Soil Survey Area: Franklin County Area and Part of Somerset County, Maine
Survey Area Data: Version 14, Sep 23, 2009

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Date(s) aerial images were photographed: 5/1/1998

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.

Map Unit Legend

Androscoggin and Sagadahoc Counties, Maine (ME606)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
AaB	Adams loamy sand, 0 to 8 percent slopes	2.4	0.6%
AaC	Adams loamy sand, 8 to 15 percent slopes	15.4	3.9%
HrC	Hollis fine sandy loam, 8 to 15 percent slopes	37.1	9.5%
HrD	Hollis fine sandy loam, 15 to 45 percent slopes	18.5	4.7%
HsC	Hollis very rocky fine sandy loam, 8 to 15 percent slop es	4.4	1.1%
HsD	Hollis very rocky fine sandy loam, 15 to 45 percent slo pes	25.5	6.5%
Md	Made land, loamy materials	6.5	1.7%
Mf	Made land, sanitary fill	23.0	5.9%
W	Water	28.6	7.3%
Subtotals for Soil Survey Area		**161.5**	**41.3%**
Totals for Area of Interest		**390.8**	**100.0%**

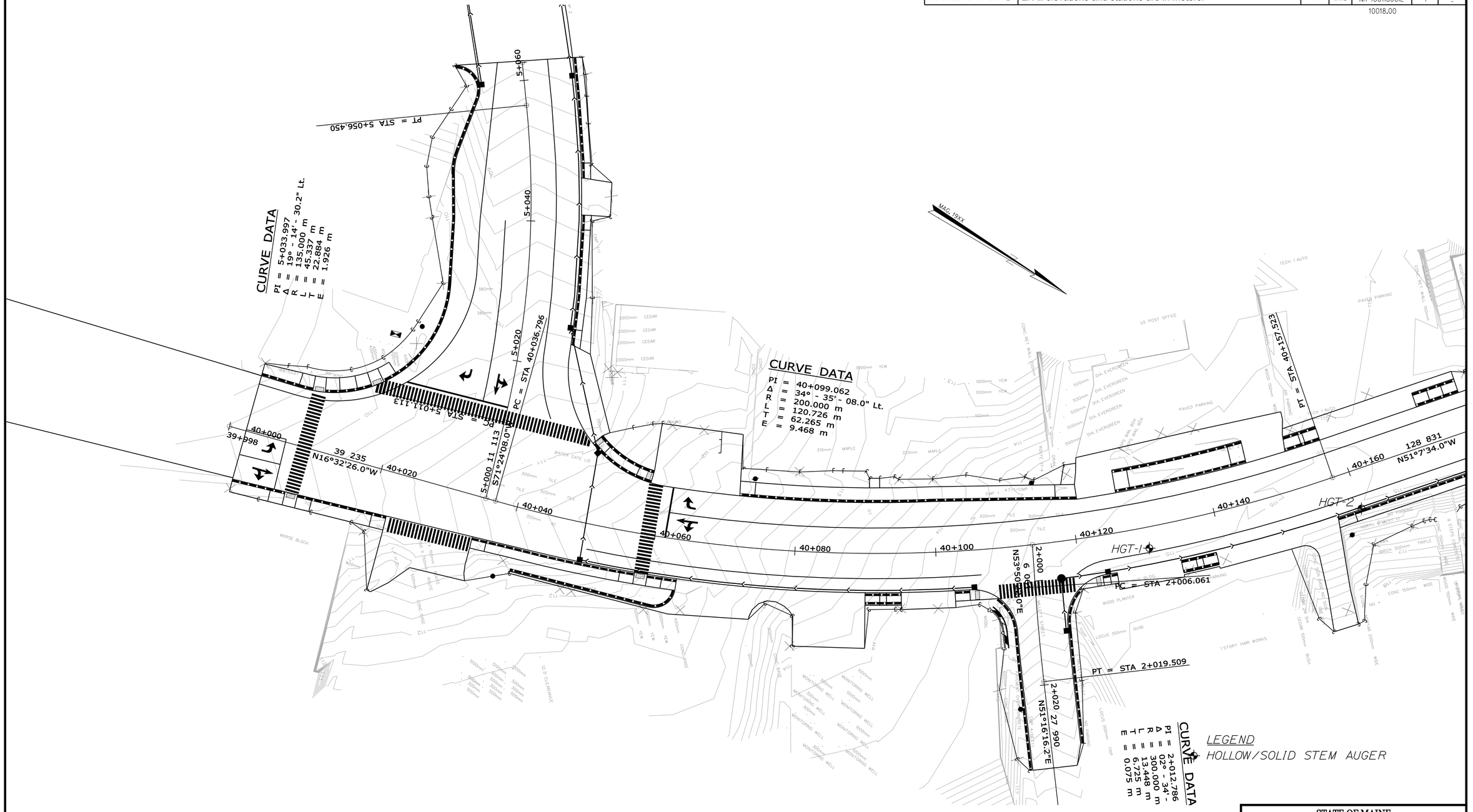
Franklin County Area and Part of Somerset County, Maine (ME610)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
BrB	Brayton fine sandy loam, 0 to 8 percent slopes, very stony	6.9	1.8%
CPC	Colonel-Dixfield association, strongly sloping, very stony	9.4	2.4%
DfC	Dixfield fine sandy loam, 8 to 15 percent slopes	10.6	2.7%
LmE	Lyman-Rock outcrop-Tunbridge complex, 15 to 45 percent slopes, very stony	40.6	10.4%
LyC	Lyman-Tunbridge-Rock outcrop complex, 3 to 15 percent slopes, very stony	39.9	10.2%
TuB	Tunbridge-Lyman complex, 3 to 8 percent slopes	18.7	4.8%
Ud	Udorthents-Urban land complex	86.9	22.2%
W	Water	16.4	4.2%
Subtotals for Soil Survey Area		**229.3**	**58.7%**
Totals for Area of Interest		**390.8**	**100.0%**

Appendix B
Geoplans

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

F.H.W.A. REG. NO.	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
1	MAINE	NH-1001(800)E	1	_

10018.00



PROJECT DESIGN ENGINEER	BY	DATE
DESIGN-DETAILED	K. BRESKIN	DEC 2003
CHECKED	T. WHITE	
REVISIONS	------	------
FIELD CHANGES	------	------

PLANS

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

GEOPLANS

LIVERMORE FALLS

ROUTE 4/17

5 0 5 10
SCALE
(in meters)

SHEET OF

AUGUSTA, MAINE

Filename: ...\GEOTECH\MSTA\001_GEOPlans1.dgn Username: kitty.breskin Date:9/1/2010 Division: GEOTECH

Filename: ...\geotech\msta\002_GEOPlans2.dgn   Division: GEOTECH   Username: kitty.breskin   Date:9/1/2010

PROJECT DESIGN ENGINEER	BY	DATE
PLANS — DESIGN-DETAILED	K. BRESKIN	T. WHITE	DEC 2003
CHECKED	-----	-----
REVISIONS	-----	-----
FIELD CHANGES		

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

F.H.W.A. REG. NO.	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
1	MAINE	NH-1001(800)E	2	-

10018.00

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

GEOPLANS

LIVERMORE FALLS

ROUTE 4/17

SCALE (in meters) 5 0 5 10

SHEET OF

AUGUSTA, MAINE

METRIC	1. All dimensions are in millimeters unless otherwise noted. 2. All elevations and stations are in meters.	F.H.W.A. REG. NO.	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
		1	MAINE	NH-1001(800)E	3	_
				10018.00		

CURVE DATA
PI = 17+007.464
Δ = 04° - 32' - 14.4" Rt.
R = 100.000 m
L = 7.919 m
T = 3.962 m
E = 0.078 m

PT = STA 17+011.422

PC = STA 17+003.503

N42°50'50.4"E
00 054

S41°28'06.5"W
3 503

S46°0'20.9"W
3 709

17+015

17+000

CURVE DATA
PI = 40+489.551.000
Δ = 06° - 01' - 18.7" Lt.
R = 300.000 m
L = 31.530 m
T = 15.780 m
E = 0.415 m

PC = STA 40+473.772

PT = STA 40+505.302

40+340 | 40+360 | 40+380 | 40+400 | 40+420 | 40+440 | 40+460 | 40+480 | 40+500 | 40+520 | 40+540

118 490
N49°9'5.3"W

118 490
N49°9'5.3"W

52 630
N55°10'24.0"W

PC = STA 6+000.054

PT = STA 6+013.709

HGT-4

HGT-5

HGT-6

7+000

7+020

22 241
N49°58'51.9"E

13 974
N45°49'46.3"E

PC = STA 40+540

PT = STA 8

CURVE DATA
PI = 8+015.707
Δ = 05° - 46' - 52.9" Rt.
R = 300.000 m
L = 30.271 m
T = 15.148 m
E = 0.382 m

PT = STA 40+355.2

6+020

N40°14'24.2"E
22 444

6+036

CURVE DATA
PI = 6+006.883
Δ = 03° - 36' - 28.3" Lt.
R = 300.000 m
L = 13.655 m
T = 6.829 m
E = 0.078 m

7" Rt.

MAG. VRXX

PROJECT DESIGN ENGINEER	BY	DATE
DESIGN-DETAILED	K. BRESKIN	T. WHITE	DEC 2003
CHECKED	-----	-----	-----
REVISIONS	-----	-----	-----
FIELD CHANGES			

PLANS

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

GEOPLANS

LIVERMORE FALLS

ROUTE 4/17

5 0 5 10
SCALE
(in meters)

SHEET OF

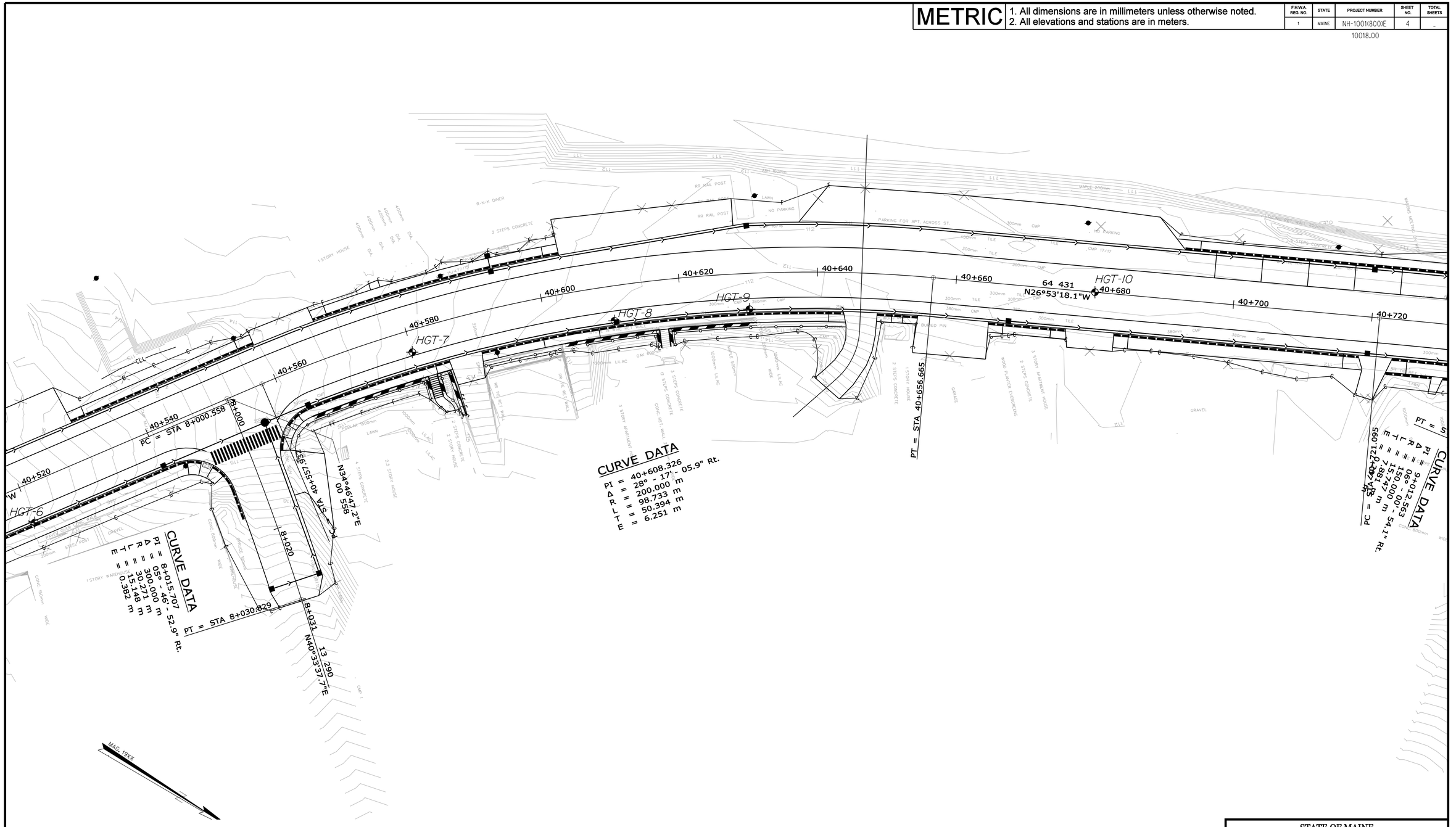
AUGUSTA, MAINE

Filename: ...\geotech\msta\003_GEOPlans3.dgn Division: GEOTECH Username: kitty.breskin Date:9/1/2010

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

F.H.W.A. REG. NO.	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
1	MAINE	NH-1001(800)E	4	_

10018.00



PROJECT DESIGN ENGINEER	BY	DATE
DESIGN-DETAILED	K. BRESKIN	DEC 2003
CHECKED	T. WHITE	-----
REVISIONS	-----	-----
FIELD CHANGES	-----	-----

PLANS

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

GEOPLANS

LIVERMORE FALLS

ROUTE 4/17

5 0 5 10
SCALE
(in meters)

SHEET OF AUGUSTA, MAINE

Filename: ...\geotech\msto\004_GEOPlans4.dgn Division: GEOTECH Username: kitty.breskin Date:9/1/2010

METRIC

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

F.H.W.A. REG. NO.	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
1	MAINE	NH-1001(800)E	5	_

10018.00

Filename: ...\geotech\rmsta\005_GEOPlans5.dgn Username: kitty.breskin Date:9/1/2010

Division: GEOTECH

PROJECT DESIGN ENGINEER		BY	DATE
PLANS	DESIGN-DETAILED	K. BRESKIN	DEC 2003
	CHECKED	T. WHITE	------
	REVISIONS	------	------
	FIELD CHANGES	------	------

CURVE DATA
PI = 1+020.391
Δ = 02° - 06' - 41.1" Lt.
R = 30.000 m
L = 1.106 m
T = 0.553 m
E = 0.005 m
PT = STA 1+020.944
PC = STA 1+019.839

CURVE DATA
PI = 40+918.518
Δ = 33°57'33.4"
R = 80.000 m
L = 47.416 m
T = 24.427 m
E = 3.646 m
PRC = STA 40+894.090

CURVE DATA
PI = 40+807.852
Δ = 10° - 50' - 40.20" Rt.
R = 914.000 m
L = 172.995 m
T = 86.757 m
E = 4.108 m

CURVE DATA
PI = 10+023.464
Δ = 07° - 20' - 42.9" Rt.
R = 300.000 m
L = 38.460 m
T = 19.256 m
E = 0.617 m

CURVE DATA
PI = 9+012.563
Δ = 06° - 00' - 54.1" Rt.
R = 150.000 m
L = 15.747 m
T = 7.881 m
E = 0.207 m
PC = STA 9+004.682

CURVE DATA
PI = 11+004.505
Δ = 02° - 57' - 34.1" Rt.
R = 300.000 m
L = 15.496 m
T = 7.750 m
E = 0.100 m

PT = STA 9+020.429
PT = STA 10+042.667
PC = STA 10+004.207
PC = STA 11+004.505

N74°17'34.3"E 4 682
N80°18'28.4"E 9+020 14 497
N73°16'18.3"E 4 207
N80°37'01.7"E 15 024
N66°40'10.6"E 4 505

MAG. 19XX

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

GEOPLANS

LIVERMORE FALLS

ROUTE 4/17

SCALE (in meters) 5 0 5 10

SHEET OF AUGUSTA, MAINE

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

F.H.W.A. REG. NO.	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
1	MAINE	NH-1001(800)E	6	_

10018.00

MAG. 19XX

PT = STA 40+941.506

111.4
111.6
111.8
112.0
112.2
112.4

40+920
40+940
40+960
40+980
41+000
41+020
41+040
41+060
41+080
41+100

HGT-14
HGT-15

244 796
N50°0'11.3"W

PC = STA
12+003.549

PT=STA 12+010.986

12+000
12+020

N34°00'51.9"E
549

28 839
N38°16'32.2"E

PC = STA
13+004.058

PT = STA 13+008.459

13+000
13+020
13+030

N40°59'21.3"E
25 571

N37°50'15.0"E
4 058

CURVE DATA

PI = 12+007.269
Δ = 04° - 15' - 40.3" Rt.
R = 100.000 m
L = 7.437 m
T = 3.720 m
E = 0.069 m

CURVE DATA

PI = 13+006.259
Δ = 03° - 09' - 06.4" Rt.
R = 80.000 m
L = 4.401 m
T = 2.201 m
E = 0.030 m

PROJECT DESIGN ENGINEER	BY	DATE
DESIGN-DETAILED	K. BRESKIN	T. WHITE	DEC 2003
CHECKED	-----	-----	
REVISIONS	------	------	------
FIELD CHANGES			

PLANS

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

GEOPLANS

LIVERMORE FALLS

ROUTE 4/17

5 0 5 10
SCALE
(in meters)

SHEET OF

AUGUSTA, MAINE

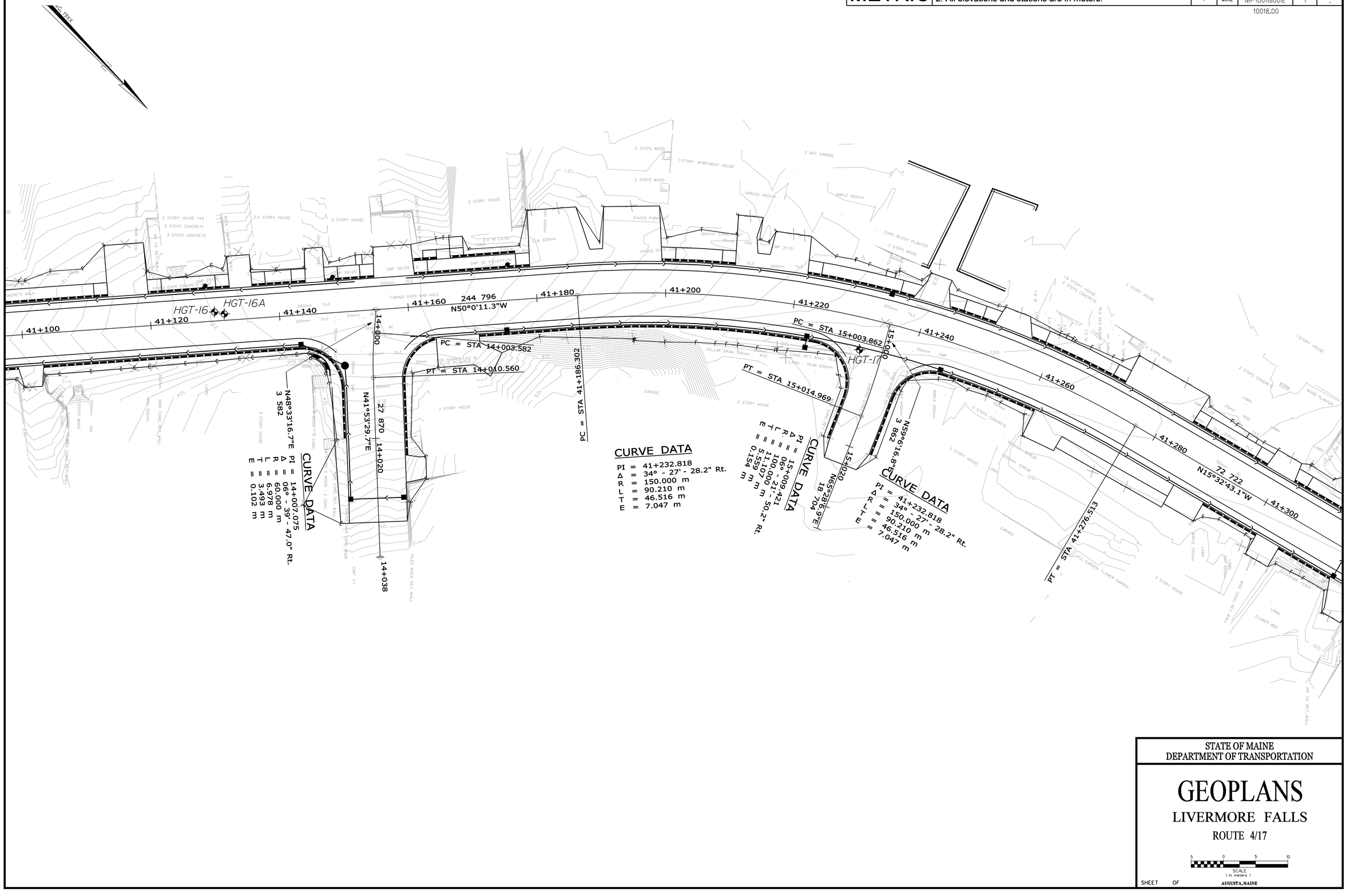
Filename: ...\geotech\msta\006_GEOPlans6.dgn Username: kitty.breskin Date:9/1/2010 Division: GEOTECH

METRIC

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

F.H.W.A. REG. NO.	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
1	MAINE	NH-1001(800)E	7	_

10018.00



PROJECT DESIGN ENGINEER	BY	DATE
DESIGN-DETAILED	K. BRESKIN	DEC 2003
CHECKED	-----	
REVISIONS	-----	-----
FIELD CHANGES		

PLANS

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

GEOPLANS

LIVERMORE FALLS

ROUTE 4/17

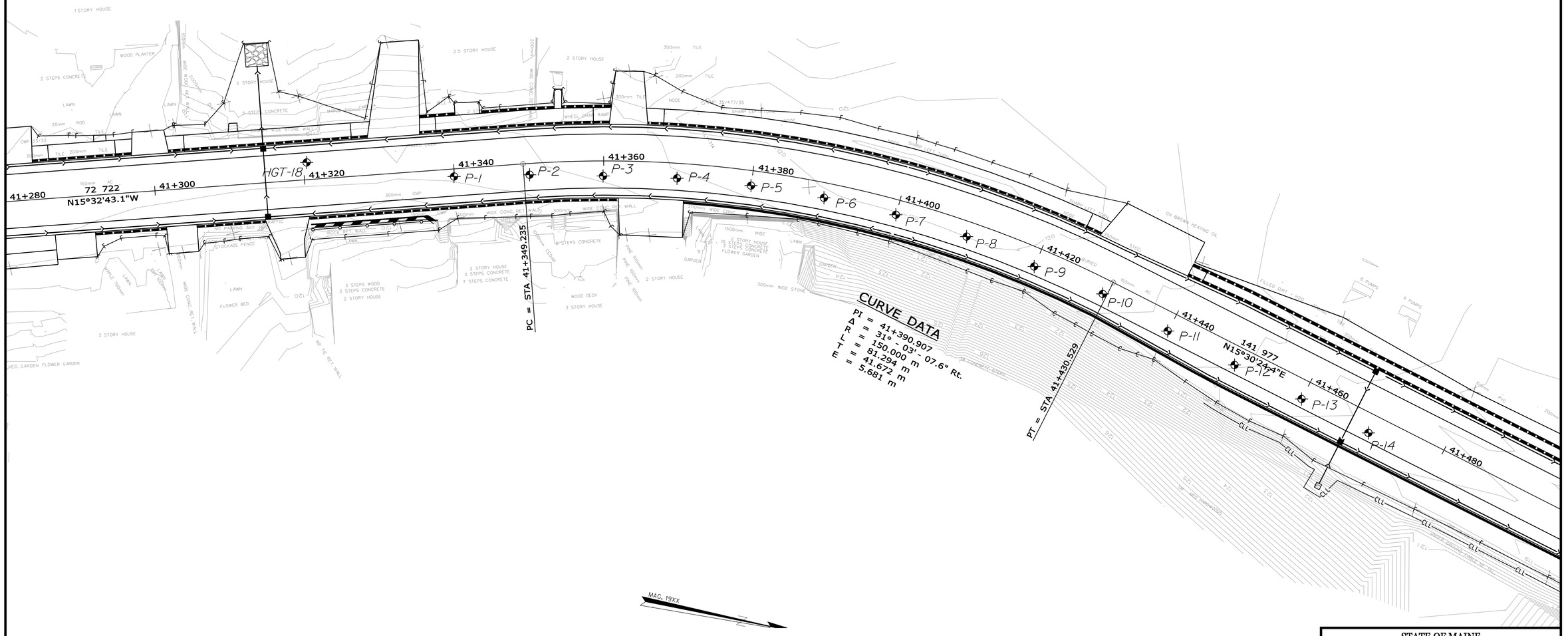
5 0 5 10
SCALE
(in meters)

SHEET OF

AUGUSTA, MAINE

Filename: ...\geotech\msta\007_GEOPlans7.dgn Division: GEOTECH Username: kitty.breskin Date:9/1/2010

METRIC	1. All dimensions are in millimeters unless otherwise noted. 2. All elevations and stations are in meters.	F.H.W.A. REG. NO.	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
		1	MAINE	NH-1001(800)E	8	_
				10018.00		



PROJECT DESIGN ENGINEER		BY	DATE
PLANS	DESIGN-DETAILED	K. BRESKIN	DEC 2003
	CHECKED	T. WHITE	
	REVISIONS	-----	-----
	FIELD CHANGES	-----	-----

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

GEOPLANS

LIVERMORE FALLS

ROUTE 4/17

5 0 5 10
SCALE
(in meters)

SHEET OF

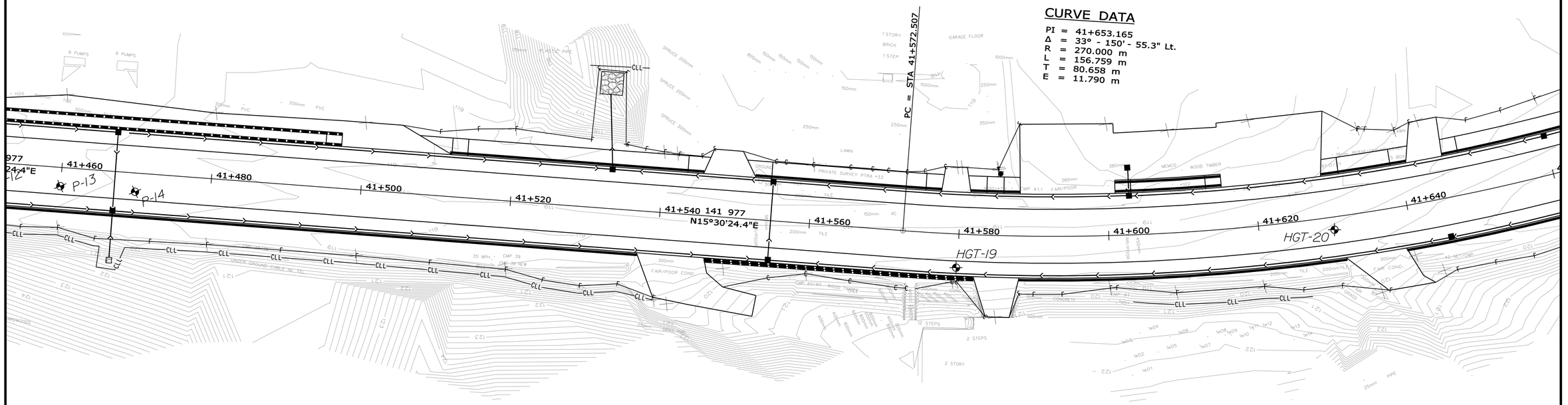
AUGUSTA, MAINE

Filename: ...\geotech\msto\008_GEOPlans8.dgn Division: GEOTECH Username: kitty.breskin Date:9/1/2010

METRIC	1. All dimensions are in millimeters unless otherwise noted. 2. All elevations and stations are in meters.	F.H.W.A. REG. NO.	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
		1	MAINE	NH-1001(800)E	9	_
				10018.00		

CURVE DATA

PI = 41+653.165
Δ = 33° - 150' - 55.3" Lt.
R = 270.000 m
L = 156.759 m
T = 80.658 m
E = 11.790 m



PROJECT DESIGN ENGINEER	BY	DATE
DESIGN-DETAILED	K. BRESKIN	DEC 2003
CHECKED	T. WHITE	
REVISIONS	-----	-----
FIELD CHANGES	-----	-----

PLANS

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

GEOPLANS

LIVERMORE FALLS

ROUTE 4/17

5 0 5 10
SCALE
(in meters)

SHEET OF AUGUSTA, MAINE

Filename: ...\geotech\mslo\009_GEOPlans9.dgn Division: GEOTECH Username: kitty.breskin Date:9/1/2010

METRIC

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

F.H.W.A. REG. NO.	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
1	MAINE	NH-1001(800)E	10	_

10018.00

MAG. 19XX

CURVE DATA

PI = 41+653.165
Δ = 33° - 150' - 55.3" Lt.
R = 270.000 m
L = 156.759 m
T = 80.658 m
E = 11.790 m

PT = STA 41+729.266

41+660 | 41+680 | 41+700 | 41+720 | 41+740 | 41+760 | 41+780 | 41+800 | 41+820 | 41+840

66 456
N17°45'30.9"W

12 463
N9°14'41.2"W

41+853

HGT-21 HGT-21A HGT-22

PC = STA 16+005.605

16+017.265

PT = STA 41+795.722

16+020

N30°06'53.6"E
3 442

16+040

16+047
12 569
N69°14'15.7"E

N63°25'6.8"E
5 605

PC = STA 41+606.964

CURVE DATA

PI = 41+818.075
Δ = 30° - 49.7" Rt.
R = 300.000 m
L = 41.578 m
T = 21.330 m
E = 1.730 m

CURVE DATA

PI = 16+044.667
Δ = 33° - 22.
R = 35.000 m
L = 23.960 m
T = 12.471 m
E = 2.155 m

PC = STA 16+020.707

CLL

SIZE UNKNOWN BURIED

FIRETRUCK PICTURED

HOUSE BEYOND THIS POINT

LEACH FIELD VENT-QUESTION

3 STEPS
BASEMENT WINDOW
+85/1 STORY

1 STORY 9 STEPS

PROJECT DESIGN ENGINEER		BY	DATE
	DESIGN-DETAILED	K. BRESKIN	DEC 2003
PLANS	CHECKED	-----	-----
	REVISIONS	-----	-----
	FIELD CHANGES	-----	-----

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

GEOPLANS

LIVERMORE FALLS

ROUTE 4/17

SCALE
(in meters)
5 0 5 10

SHEET OF AUGUSTA, MAINE

Filename: ...\ms1o\010_GEOPlans10.dgn Username: kitty.breskin Date:9/1/2010 Division: GEOTECH

Appendix C
Field Exploration Data
Soils Descriptions
Boring Logs
FWD Analysis

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			GROUP SYMBOLS	TYPICAL NAMES
COARSE-GRAINED SOILS (more than half of material is larger than No. 200 sieve size)	GRAVELS (more than half of coarse fraction is larger than No. 4 sieve size)	CLEAN GRAVELS (little or no fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines
			GP	Poorly-graded gravels, gravel sand mixtures, little or no fines
		GRAVEL WITH FINES (Appreciable amount of fines)	GM	Silty gravels, gravel-sand-silt mixtures.
			GC	Clayey gravels, gravel-sand-clay mixtures.
	SANDS (more than half of coarse fraction is smaller than No. 4 sieve size)	CLEAN SANDS (little or no fines)	SW	Well-graded sands, gravelly sands, little or no fines
			SP	Poorly-graded sands, gravelly sand, little or no fines.
		SANDS WITH FINES (Appreciable amount of fines)	SM	Silty sands, sand-silt mixtures
			SC	Clayey sands, sand-clay mixtures.
FINE-GRAINED SOILS (more than half of material is smaller than No. 200 sieve size)	SILTS AND CLAYS (liquid limit less than 50)		ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands, or clayey silts with slight plasticity.
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
			OL	Organic silts and organic silty clays of low plasticity.
	SILTS AND CLAYS (liquid limit greater than 50)		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.
			CH	Inorganic clays of high plasticity, fat clays.
			OH	Organic clays of medium to high plasticity, organic silts
	HIGHLY ORGANIC SOILS		Pt	Peat and other highly organic soils.

Desired Soil Observations: (in this order)

Color (Munsell color chart)
Moisture (dry, damp, moist, wet, saturated)
Density/Consistency (from above right hand side)
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., if applicable)
Cementation (weak, moderate, or strong, if applicable, ASTM D 2488)
Geologic Origin (till, marine clay, alluvium, etc.)
Unified Soil Classification Designation
Groundwater level

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

TERMS DESCRIBING DENSITY/CONSISTENCY

Coarse-grained soils (more than half of material is larger than No. 200 sieve): Includes (1) clean gravels; (2) silty or clayey gravels; and (3) silty, clayey or gravelly sands. Consistency is rated according to standard penetration resistance.

Modified Burmister System

Descriptive Term	Portion of Total
trace	0% - 10%
little	11% - 20%
some	21% - 35%
adjective (e.g. sandy, clayey)	36% - 50%

Density of Cohesionless Soils	Standard Penetration Resistance N-Value (blows per foot)
Very loose	0 - 4
Loose	5 - 10
Medium Dense	11 - 30
Dense	31 - 50
Very Dense	> 50

Fine-grained soils (more than half of material is smaller than No. 200 sieve): Includes (1) inorganic and organic silts and clays; (2) gravelly, sandy or silty clays; and (3) clayey silts. Consistency is rated according to shear strength as indicated.

Consistency of Cohesive soils	SPT N-Value blows per foot	Approximate Undrained Shear Strength (psf)	Field Guidelines
Very Soft	WOH, WOR, WOP, <2	0 - 250	Fist easily Penetrates
Soft	2 - 4	250 - 500	Thumb easily penetrates
Medium Stiff	5 - 8	500 - 1000	Thumb penetrates with moderate effort
Stiff	9 - 15	1000 - 2000	Indented by thumb with great effort
Very Stiff	16 - 30	2000 - 4000	Indented by thumbnai
Hard	>30	over 4000	Indented by thumbnail with difficulty

Rock Quality Designation (RQD):

$$RQD = \frac{\text{sum of the lengths of intact pieces of core* > 100 mm}}{\text{length of core advance}}$$

*Minimum NQ rock core (1.88 in. OD of core)

Correlation of RQD to Rock Mass Quality

Rock Mass Quality	RQD
Very Poor	<25%
Poor	26% - 50%
Fair	51% - 75%
Good	76% - 90%
Excellent	91% - 100%

Desired Rock Observations: (in this order)

Color (Munsell color chart)
Texture (aphanitic, fine-grained, etc.)
Lithology (igneous, sedimentary, metamorphic, 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, low angle - 5-35, mod. dipping - 35-55, steep - 55-85, vertical - 85-90)
- -spacing (very close - <5 cm, close - 5-30 cm, mod. close 30-100 cm, wide - 1-3 m, very wide >3 m)
- -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: AASHTO Standard Specification for Highway Bridges 17th Ed. Table 4.4.8.1.2A
Recovery

Sample Container Labeling Requirements:

PIN
Bridge Name / Town
Boring Number
Sample Number
Sample Depth
Blow Counts
Sample Recovery
Date
Personnel Initials

Maine Department of Transportation

Soil/Rock Exploration Log
METRIC UNITS

Project: Route 4/17, Main Street
Location: Livermore Falls/Jay, Maine

Boring No.: HGT-1
PIN: 10018.00

Driller:	Maine Test Boring	**Elevation (m):**	114.90	**Auger ID/OD:**	106/156 mm
Operator:	Mel Coffin	**Datum:**	NGVD	**Sampler:**	Standard Split Spoon
Logged By:	Brad Tirone/HAI	**Rig Type:**	Mobile Drill	**Hammer Wt./Fall:**	63.5 kg/760 mm
Date Start/Finish:	6/10/03-6/10/03	**Drilling Method:**	Hollow Stem Auger	**Core Barrel:**	N/A
Boring Location:	40+130, 3.0 Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	Boring dry

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						HSA	114.78		ASPHALT. 0.12	
	1D	61.0/45.7	0.46 - 1.07	8/7/6/6	13		114.44		Brown SAND and GRAVEL. 0.46	G#176760 A-1-b, SM WC=3.8%
1.2									Brown-tan, dry to damp, medium dense, fine to medium SAND, little silt, trace gravel.	
	2D	61.0/55.9	1.52 - 2.13	7/8/8/11	16		113.38		1.52 Tan, dry to damp, medium dense, SILT, little sand, trace gravel.	G#176761 A-4, ML WC=18.5%
2.4										
							112.31		2.59 Brown SAND and GRAVEL.	
							111.85		3.05 **Bottom of Exploration at 3.05 m below ground surface.** No Refusal	
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.: HGT-1

Maine Department of Transportation

Soil/Rock Exploration Log
METRIC UNITS

Project: Route 4/17, Main Street
Location: Livermore Falls/Jay, Maine

Boring No.: HGT-2
PIN: 10018.00

Driller:	Maine Test Boring	**Elevation (m):**	115.20	**Auger ID/OD:**	106/156 mm
Operator:	Mel Coffin	**Datum:**	NGVD	**Sampler:**	Standard Split Spoon
Logged By:	Brad Tirone/HAI	**Rig Type:**	Mobile Drill	**Hammer Wt./Fall:**	63.5 kg/760 mm
Date Start/Finish:	6/10/03-6/10/03	**Drilling Method:**	Hollow Stem Auger	**Core Barrel:**	N/A
Boring Location:	40+160, 5.5 Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	Boring dry

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						HSA	115.08		ASPHALT. Two layers asphalt each 61 mm thick. 0.12	
							114.90		CONCRETE. 0.30	
	1D	61.0/40.6	0.46 - 1.07	6/5/5/8	10				Tan, dry to damp, medium dense, very fine SAND, some silt, trace gravel.	G#176762 A-2-4, SM WC=7.2%
1.2										
	2D	61.0/61.0	1.52 - 2.13	10/9/8/10	17		113.68		1.52 Brown, damp, medium dense, fine SAND, trace silt.	
2.4							113.07		2.13 **Bottom of Exploration at 2.13 m below ground surface.** No Refusal	
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.: HGT-2

Maine Department of Transportation

Soil/Rock Exploration Log
METRIC UNITS

Project: Route 4/17, Main Street
Location: Livermore Falls/Jay, Maine

Boring No.: HGT-3
PIN: 10018.00

Driller:	Maine Test Boring	**Elevation (m):**	116.20	**Auger ID/OD:**	106/156 mm
Operator:	Mel Coffin	**Datum:**	NGVD	**Sampler:**	Standard Split Spoon
Logged By:	Brad Tirone/HAI	**Rig Type:**	Mobile Drill	**Hammer Wt./Fall:**	63.5 kg/760 mm
Date Start/Finish:	6/12/03-6/12/03	**Drilling Method:**	Hollow Stem Auger	**Core Barrel:**	N/A
Boring Location:	40+280, 3.5 Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	Boring dry

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						HSA				
	1D	21.6/17.8	0.24 - 0.46	36/13(61)	---		115.96		ASPHALT PAVEMENT. 0.24	
	2D	61.0/40.6	0.46 - 1.07	25/21/21/13	42		115.74		Dense, dry, coarse to fine gravelly SAND. 0.46	
							115.44		Light brown, dry, dense, gravelly coarse to fine SAND, trace silt, trace brick. 0.76	
1.2									Brown, damp, medium dense, medium to fine SAND, little silt, trace gravel.	
	3D	61.0/53.3	1.52 - 2.13	21/55/42/35	97		114.61		1.58	
							114.52		Brown, dry, SILT, little fine sand. 1.68	
							114.07		Brown, dry, very dense, gravelly coarse to fine SAND. 2.13	
2.4									Brown, dry, medium to fine SAND, trace gravel.	
							113.15		3.05	
3.6									**Bottom of Exploration at 3.05 m below ground surface.** No Refusal	
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.

Maine Department of Transportation

Soil/Rock Exploration Log
METRIC UNITS

Project: Route 4/17, Main Street
Location: Livermore Falls/Jay, Maine

Boring No.: HGT-4
PIN: 10018.00

Driller:	Maine Test Boring	**Elevation (m):**	118.20	**Auger ID/OD:**	106/156 mm
Operator:	Mel Coffin	**Datum:**	NGVD	**Sampler:**	Standard Split Spoon
Logged By:	Brad Tirone/HAI	**Rig Type:**	Mobile Drill	**Hammer Wt./Fall:**	63.5 kg/760 mm
Date Start/Finish:	6/12/03-6/12/03	**Drilling Method:**	Hollow Stem Auger	**Core Barrel:**	N/A
Boring Location:	40+380, 3.5 Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	Boring dry

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 Information: 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						HSA	118.08		ASPHALT PAVEMENT. 0.12	
	1D	30.5/27.9	0.15 - 0.46	18/17	---		117.74		Light brown, dry, dense, coarse to fine SAND, little gravel. 0.46	G#176763 A-2-4, SM WC=5.1%
	2D	61.0/33.0	0.46 - 1.07	17/9/10/7	19				Brown, dry, medium dense, coarse to fine SAND, little silt, trace gravel.	
1.2							117.14		1.07	
							116.83		Brown, damp, coarse to fine SAND. 1.37	
2.4									**Bottom of Exploration at 1.37 m below ground surface.** Refusal, material unknown.	
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.

Maine Department of Transportation

Soil/Rock Exploration Log
METRIC UNITS

Project: Route 4/17, Main Street
Location: Livermore Falls/Jay, Maine

Boring No.: HGT-5
PIN: 10018.00

Driller:	Maine Test Boring	**Elevation (m):**	119.20	**Auger ID/OD:**	106/156 mm
Operator:	Mel Coffin	**Datum:**	NGVD	**Sampler:**	Standard Split Spoon
Logged By:	Brad Tirone/HAI	**Rig Type:**	Mobile Drill	**Hammer Wt./Fall:**	63.5 kg/760 mm
Date Start/Finish:	6/12/03-6/12/03	**Drilling Method:**	Hollow Stem Auger	**Core Barrel:**	N/A
Boring Location:	40+440, 7.0 Lt.	**Casing ID/OD:**	N/A	**Water Level*:**	Boring dry

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						HSA	119.08		ASPHALT PAVEMENT.	
	1D	61.0/45.7	0.15 - 0.76	13/14/13/13	27		118.93		0.12	
									Brown, dry, medium dense, fine to medium SAND, little gravel, trace silt.	
									0.27	
1.2									Brown, dry, medium dense, coarse to fine SAND.	
	2D	61.0/40.6	1.52 - 2.13	4/6/9/9	15		117.68		1.52	
									Brown, moist, medium dense, coarse to fine SAND.	
2.4							117.07		2.13	
									Bottom of Exploration at 2.13 m below ground surface.	
									No Refusal	
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.

Maine Department of Transportation

Soil/Rock Exploration Log
METRIC UNITS

Project: Route 4/17, Main Street
Location: Livermore Falls/Jay, Maine

Boring No.: HGT-6
PIN: 10018.00

Driller:	Maine Test Boring	**Elevation (m):**	116.40	**Auger ID/OD:**	106/156 mm
Operator:	Mel Coffin	**Datum:**	NGVD	**Sampler:**	Standard Split Spoon
Logged By:	Brad Tirone/HAI	**Rig Type:**	Mobile Drill	**Hammer Wt./Fall:**	63.5 kg/760 mm
Date Start/Finish:	6/13/03-6/13/03	**Drilling Method:**	Hollow Stem Auger	**Core Barrel:**	N/A
Boring Location:	40+520, 5.5 Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	Boring dry

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						HSA	116.34		ASPHALT PAVEMENT. 0.06	
	1D	61.0/43.2	0.30 - 0.91	7/8/8/8	16		116.10		Brown, dry, fine to coarse SAND, some gravel, little silt, trace gravel. 0.30	G#176764 A-1-b, SM WC=10.8%
									Brown, damp, medium dense, fine to coarse SAND, some silt, trace gravel.	
1.2							115.49		0.91	
									Brown, damp, SILT, trace fine sand.	
	2D	39.4/22.9	1.52 - 1.92	13/45/50(75)	---		114.88		1.52	
							114.72		Brown, dense, wet, SILT, some gravel. 1.68	
							114.48		Brown, moist SILT. 1.92	
2.4									same as above but, with trace clay.	
3.6							113.35		3.05	
									Bottom of Exploration at 3.05 m below ground surface. No Refusal	
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.: HGT-6

Maine Department of Transportation

Soil/Rock Exploration Log
METRIC UNITS

Project: Route 4/17, Main Street
Location: Livermore Falls/Jay, Maine

Boring No.: HGT-7
PIN: 10018.00

Driller:	Maine Test Boring	**Elevation (m):**	113.00	**Auger ID/OD:**	106/156 mm
Operator:	Mel Coffin	**Datum:**	NGVD	**Sampler:**	Standard Split Spoon
Logged By:	Brad Tirone/HAI	**Rig Type:**	Mobile Drill	**Hammer Wt./Fall:**	63.5 kg/760 mm
Date Start/Finish:	6/23/03-6/23/03	**Drilling Method:**	Hollow Stem Auger	**Core Barrel:**	N/A
Boring Location:	40+580, 3.1 Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	Boring dry

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						HSA	112.82		ASPHALT PAVEMENT. 0.18	
	1D	61.0/45.7	0.46 - 1.07	27/22/17/28	39				Grey brown, dry, dense, coarse to fine SAND, some gravel.	
1.2							111.93		1.07 Brown, dry, coarse to fine SAND, little gravel.	
	MD	61.0/0.0	1.52 - 2.13	2/2/7/17	9				No Recovery	
2.4							110.87		2.13 Brown, moist, SILT, trace fine sand.	
							109.95		3.05 **Bottom of Exploration at 3.05 m below ground surface.** No Refusal	
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.: HGT-7

Maine Department of Transportation

Soil/Rock Exploration Log
METRIC UNITS

Project: Route 4/17, Main Street
Location: Livermore Falls/Jay, Maine

Boring No.: HGT-8
PIN: 10018.00

Driller:	Maine Test Boring	**Elevation (m):**	112.20	**Auger ID/OD:**	106/156 mm
Operator:	Mel Coffin	**Datum:**	NGVD	**Sampler:**	Standard Split Spoon
Logged By:	Brad Tirone/HAI	**Rig Type:**	Mobile Drill	**Hammer Wt./Fall:**	63.5 kg/760 mm
Date Start/Finish:	6/23/03-6/23/03	**Drilling Method:**	Hollow Stem Auger	**Core Barrel:**	N/A
Boring Location:	40+610, 5.0 Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	Boring dry

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						HSA	112.08		ASPHALT PAVEMENT. 0.12	
	1D	61.0/35.6	0.15 - 0.76	10/10/8/10	18				Brown, dry, medium dense, coarse to fine SAND, some gravel, trace silt.	G#176765 A-1-b, SW-SM WC=3.4%
1.2										
	2D	49.0/45.7	1.37 - 1.86	21/40/39/30(25)	79		110.83		1.37 REFUSAL, moved to Sta. 40+609, augered to 1.37 m bgs. Brown, damp, SILT, some sand, little gravel.	G#176766 A-4, ML WC=14.2%
2.4							110.34		1.86 **Bottom of Exploration at 1.86 m below ground surface.** Refusal Note: Concrete pieces in tip of spoon, could be storm drain.	
3.6										
4.8										
6										
7.2										
8.4										
9.6										

Remarks:

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

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Boring No.: HGT-8

Maine Department of Transportation

Soil/Rock Exploration Log
METRIC UNITS

Project: Route 4/17, Main Street
Location: Livermore Falls/Jay, Maine

Boring No.: HGT-9
PIN: 10018.00

Driller:	Maine Test Boring	**Elevation (m):**	112.00	**Auger ID/OD:**	106/156 mm
Operator:	Mel Coffin	**Datum:**	NGVD	**Sampler:**	Standard Split Spoon
Logged By:	Brad Tirone/HAI	**Rig Type:**	Mobile Drill	**Hammer Wt./Fall:**	63.5 kg/760 mm
Date Start/Finish:	6/24/03-6/24/03	**Drilling Method:**	Hollow Stem Auger	**Core Barrel:**	N/A
Boring Location:	40+630, 5.2 Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	Boring dry

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						HSA	111.94		ASPHALT PAVEMENT. 0.06	
	1D	61.0/33.0	0.15 - 0.76	7/9/10/19	19				Brown, damp, medium dense, coarse to fine SAND, some gravel.	
1.2										
	2D	61.0/50.8	1.52 - 2.13	13/26/62/58	88		110.48		1.52 Brown, damp, very dense, coarse to fine SAND, some gravel, some silt.	G#176767 A-1-b, SM WC=4.7%
2.4							109.87		2.13 Brown, dry, SILT, trace fine sand, trace gravel.	
							109.44		2.56 **Bottom of Exploration at 2.56 m below ground surface.** Refusal	
3.6										
4.8										
6										
7.2										
8.4										
9.6										

Remarks:

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

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Boring No.: HGT-9

Maine Department of Transportation

Soil/Rock Exploration Log
METRIC UNITS

Project: Route 4/17, Main Street
Location: Livermore Falls/Jay, Maine

Boring No.: HGT-10
PIN: 10018.00

Driller:	Maine Test Boring	**Elevation (m):**	112.20	**Auger ID/OD:**	106/156 mm
Operator:	Mel Coffin	**Datum:**	NGVD	**Sampler:**	Standard Split Spoon
Logged By:	Brad Tirone/HAI	**Rig Type:**	Mobile Drill	**Hammer Wt./Fall:**	63.5 kg/760 mm
Date Start/Finish:	6/24/03-6/24/03	**Drilling Method:**	Hollow Stem Auger	**Core Barrel:**	N/A
Boring Location:	40+680, CL	**Casing ID/OD:**	N/A	**Water Level*:**	Boring dry

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						HSA	111.99		ASPHALT PAVEMENT. 0.21	
	1D	61.0/48.3	0.46 - 1.07	36/42/61/35	103		111.74		Grey brown, dry, coarse to fine SAND, some silt, trace gravel. 0.46	G#176768 A-1-b, SM WC=7.8%
1.2							111.13		Light brown, damp, very dense, coarse to fine SAND, little silt, trace gravel. 1.07	
	2D	61.0/40.6	1.52 - 2.13	2/1/2/2	3		110.68		Black, damp, silty coarse to fine SAND, some gravel. 1.52	G#176769 A-1-b, SM WC=3.3%
2.4							110.07		Brown, damp, very loose, coarse to fine SAND, little silt, trace gravel. 2.13	
									Bottom of Exploration at 2.13 m below ground surface. No Refusal	
3.6										
4.8										
6										
7.2										
8.4										
9.6										

Remarks:

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

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Boring No.: HGT-10

Maine Department of Transportation

Soil/Rock Exploration Log
METRIC UNITS

Project: Route 4/17, Main Street
Location: Livermore Falls/Jay, Maine

Boring No.: HGT-11
PIN: 10018.00

Driller:	Maine Test Boring	**Elevation (m):**	111.80	**Auger ID/OD:**	106/156 mm
Operator:	Mel Coffin	**Datum:**	NGVD	**Sampler:**	Standard Split Spoon
Logged By:	Brad Tirone/HAI	**Rig Type:**	Mobile Drill	**Hammer Wt./Fall:**	63.5 kg/760 mm
Date Start/Finish:	6/24/03-6/24/03	**Drilling Method:**	Hollow Stem Auger	**Core Barrel:**	N/A
Boring Location:	40+740, 7.6 Lt.	**Casing ID/OD:**	N/A	**Water Level*:**	Boring dry

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	1D	61.0/35.6	0.00 - 0.61	1/2/2/2	4	HSA	111.19		Brown, dry, very loose, coarse to fine SAND.	
									0.61	
1.2									No description given.	
	2D	61.0/53.3	1.52 - 2.13	2/2/3/5	5		110.28		1.52	G#176770 A-1-b, SP-SM WC=9.5%
									Reddish brown, damp, loose, coarse to fine SAND, trace silt, trace gravel.	
2.4							109.67		2.13	
									Bottom of Exploration at 2.13 m below ground surface. No Refusal	
3.6										
4.8										
6										
7.2										
8.4										
9.6										

Remarks:

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

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Boring No.: HGT-11

Maine Department of Transportation

Soil/Rock Exploration Log
METRIC UNITS

Project: Route 4/17, Main Street
Location: Livermore Falls/Jay, Maine

Boring No.: HGT-12
PIN: 10018.00

Driller:	Maine Test Boring	**Elevation (m):**	112.20	**Auger ID/OD:**	106/156 mm
Operator:	Mel Coffin	**Datum:**	NGVD	**Sampler:**	Standard Split Spoon
Logged By:	Brad Tirone/HAI	**Rig Type:**	Mobile Drill	**Hammer Wt./Fall:**	63.5 kg/760 mm
Date Start/Finish:	6/24/03-6/24/03	**Drilling Method:**	Hollow Stem Auger	**Core Barrel:**	N/A
Boring Location:	40+810, 8.0 Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	Boring dry

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 Information: 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						HSA	112.17		ASPHALT PAVEMENT.	
							111.96		0.03	
	1D	61.0/45.7	0.30 - 0.91	14/9/5/6	14		111.80		CONCRETE PAVEMENT.	
									0.24	
									Dark brown, dry, medium dense, coarse to fine SAND, some gravel.	
									0.40	
							111.29		Brown, dry, medium dense, coarse to fine SAND, trace silt.	
1.2									0.91	
									Brown, damp, coarse to fine SAND.	
							110.68		1.52	
	2D		1.52 - 2.13	5/39/30/40	69				Brown, damp, dense, coarse to fine SAND, some gravel.	
							110.43		1.77	
									Light brown, damp, stiff, SILT, trace fine to medium gravel, iron staining and inclusions.	
							110.07		2.13	
2.4									**Bottom of Exploration at 2.13 m below ground surface.**	
									No Refusal	
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.

Maine Department of Transportation

Soil/Rock Exploration Log
METRIC UNITS

Project: Route 4/17, Main Street
Location: Livermore Falls/Jay, Maine

Boring No.: HGT-13
PIN: 10018.00

Driller:	Maine Test Boring	**Elevation (m):**	112.20	**Auger ID/OD:**	106/156 mm
Operator:	Mel Coffin	**Datum:**	NGVD	**Sampler:**	Standard Split Spoon
Logged By:	Brad Tirone/HAI	**Rig Type:**	Mobile Drill	**Hammer Wt./Fall:**	63.5 kg/760 mm
Date Start/Finish:	6/25/03-6/25/03	**Drilling Method:**	Hollow Stem Auger	**Core Barrel:**	N/A
Boring Location:	40+880, 6.0 Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	Boring dry

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						HSA	112.14		ASPHALT PAVEMENT.	
							112.02		0.06	
	1D	61.0/40.6	0.37 - 0.98	6/7/7/8	14				CONCRETE PAVEMENT.	G#176771 A-1-b, SP-SM WC=4.7%
									0.18	
1.2									Brown, damp, medium dense, coarse to fine SAND, trace silt, trace gravel.	
							111.23		0.98	
									Brown, damp, coarse to fine SAND.	
	2D	61.0/48.3	1.52 - 2.13	11/13/15/19	28		110.68		1.52	
2.4									Same as above but, Light brown.	
							110.07		2.13	
									Bottom of Exploration at 2.13 m below ground surface. No Refusal	
3.6										
4.8										
6										
7.2										
8.4										
9.6										

Remarks:

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

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Maine Department of Transportation

Soil/Rock Exploration Log
METRIC UNITS

Project: Route 4/17, Main Street
Location: Livermore Falls/Jay, Maine

Boring No.: HGT-14
PIN: 10018.00

Driller:	Maine Test Boring	**Elevation (m):**	112.60	**Auger ID/OD:**	106/156 mm
Operator:	Mel Coffin	**Datum:**	NGVD	**Sampler:**	Standard Split Spoon
Logged By:	Brad Tirone/HAI	**Rig Type:**	Mobile Drill	**Hammer Wt./Fall:**	63.5 kg/760 mm
Date Start/Finish:	6/25/03-6/25/03	**Drilling Method:**	Hollow Stem Auger	**Core Barrel:**	N/A
Boring Location:	40+930, 1.5 Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	Boring dry

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						HSA	112.45		ASPHALT PAVEMENT. 0.15	
	1D	61.0/48.3	0.46 - 1.07	25/43/38/36	81				Grey-brown, dry, very dense, fine to medium SAND, some silt, trace gravel.	G#176772 A-2-4, SM WC=8.3%
1.2							111.53		1.07 Black, coarse to fine SAND, trace ash.	
	2D	61.0/53.3	1.52 - 2.13	7/11/12/12	23		110.98		1.62	
							110.89		Red-brown, damp, medium dense, coarse to fine SAND.	
							110.71		1.71	
2.4							110.47		Light brown, damp, silty, fine SAND, some gravel. 1.89 Tan, damp, medium dense, silty fine SAND, (Native Soils). 2.13	
3.6									**Bottom of Exploration at 2.13 m below ground surface.** No Refusal	
4.8										
6										
7.2										
8.4										
9.6										

Remarks:

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

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Boring No.: HGT-14

Maine Department of Transportation

Soil/Rock Exploration Log
METRIC UNITS

Project: Route 4/17, Main Street
Location: Livermore Falls/Jay, Maine

Boring No.: HGT-15
PIN: 10018.00

Driller:	Maine Test Boring	**Elevation (m):**	117.00	**Auger ID/OD:**	106/156 mm
Operator:	Mel Coffin	**Datum:**	NGVD	**Sampler:**	Standard Split Spoon
Logged By:	Brad Tirone/HAI	**Rig Type:**	Mobile Drill	**Hammer Wt./Fall:**	63.5 kg/760 mm
Date Start/Finish:	6/25/03-6/25/03	**Drilling Method:**	Hollow Stem Auger	**Core Barrel:**	N/A
Boring Location:	41+020, 1.8 Lt.	**Casing ID/OD:**	N/A	**Water Level*:**	Boring dry

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						HSA				
	1D	61.0/30.5	0.15 - 0.76	76/19/19/16	38		116.76		ASPHALT PAVEMENT. 0.24	
									Brown, dry, dense, coarse to fine gravelly SAND.	
							116.24		0.76	
1.2									Brown, moist, silt coarse to fine SAND.	
							115.48		1.52	
	2D	61.0/61.0	1.52 - 2.13	6/7/13/7	20				Light brown, damp, stiff, CLAY SILT, trace sand, trace gravel.	G#176773 A-4, CL-ML WC=26.9%
							114.87		2.13	
2.4									**Bottom of Exploration at 2.13 m below ground surface.** No Refusal	
3.6										
4.8										
6										
7.2										
8.4										
9.6										

Remarks:

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

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Maine Department of Transportation

Soil/Rock Exploration Log
METRIC UNITS

Project: Route 4/17, Main Street
Location: Livermore Falls/Jay, Maine

Boring No.: HGT-16
PIN: 10018.00

Driller:	Maine Test Boring	**Elevation (m):**	122.00	**Auger ID/OD:**	106/156 mm
Operator:	Mel Coffin	**Datum:**	NGVD	**Sampler:**	Standard Split Spoon
Logged By:	Brad Tirone/HAI	**Rig Type:**	Mobile Drill	**Hammer Wt./Fall:**	63.5 kg/760 mm
Date Start/Finish:	6/25/03-6/25/03	**Drilling Method:**	Hollow Stem Auger	**Core Barrel:**	N/A
Boring Location:	41+130, 1.4 Lt.	**Casing ID/OD:**	N/A	**Water Level*:**	Boring dry

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 Information: 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						HSA			No description given.	
	1D	15.2/15.2	0.46 - 0.61	69	---		121.54		0.46	
							121.39		Grey brown, dry, dense, silty , coarse to fine SAND.	
							121.21		0.61	
1.2									ROCK.	
									0.79	
									Bottom of Exploration at 0.79 m below ground surface. 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.: HGT-16

Maine Department of Transportation

Soil/Rock Exploration Log
METRIC UNITS

Project: Route 4/17, Main Street
Location: Livermore Falls/Jay, Maine

Boring No.: HGT-16A
PIN: 10018.00

Driller:	Maine Test Boring	**Elevation (m):**	122.10	**Auger ID/OD:**	106/156 mm
Operator:	Mel Coffin	**Datum:**	NGVD	**Sampler:**	Standard Split Spoon
Logged By:	Brad Tirone/HAI	**Rig Type:**	Mobile Drill	**Hammer Wt./Fall:**	63.5 kg/760 mm
Date Start/Finish:	6/25/03-6/25/03	**Drilling Method:**	Hollow Stem Auger	**Core Barrel:**	N/A
Boring Location:	41+131.5, 1.0 Lt.	**Casing ID/OD:**	N/A	**Water Level*:**	Boring dry

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 Information: 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						HSA			ASPHALT PAVEMENT.	
	1D	61.0/38.1	0.46 - 1.07	28/40/61(91)	---		121.64		0.46 Grey-brown, dry, dense, very sandy GRAVEL, little silt.	G#176774 A-1-b, GM WC=4.2%
							121.25		0.85	
1.2							121.12		ROCK.	
									0.98 **Bottom of Exploration at 0.98 m below ground surface.** 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.

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Boring No.: HGT-16A

Maine Department of Transportation

Soil/Rock Exploration Log
METRIC UNITS

Project: Route 4/17, Main Street
Location: Livermore Falls/Jay, Maine

Boring No.: HGT-17
PIN: 10018.00

Driller:	Maine Test Boring	**Elevation (m):**	119.90	**Auger ID/OD:**	106/156 mm
Operator:	Mel Coffin	**Datum:**	NGVD	**Sampler:**	Standard Split Spoon
Logged By:	Brad Tirone/HAI	**Rig Type:**	Mobile Drill	**Hammer Wt./Fall:**	63.5 kg/760 mm
Date Start/Finish:	6/26/03-6/26/03	**Drilling Method:**	Hollow Stem Auger	**Core Barrel:**	N/A
Boring Location:	41+231.5, 5.0 Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	Boring dry

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						HSA	119.72		ASPHALT PAVEMENT. 0.18	
	1D	61.0/48.3	0.46 - 1.07	12/12/13/8	25		119.29		Brown, damp, medium dense, silty, medium to fine SAND, little gravel. 0.61	
1.2							118.83		Brown, damp, medium to fine silty SAND. 1.07	
	2D	61.0/61.0	1.52 - 2.13	7/10/13/15	23		118.38		Brown, damp, fine to medium SAND, little silt. 1.52	G#176775 A-2-4, SM WC=15.9%
2.4							117.77		Light brown, damp, medium dense, fine to medium SAND, little silt, trace gravel. 2.13	
3.6									**Bottom of Exploration at 2.13 m below ground surface.** No Refusal	
4.8										
6										
7.2										
8.4										
9.6										

Remarks:

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

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Boring No.: HGT-17

Maine Department of Transportation

Soil/Rock Exploration Log
METRIC UNITS

Project: Route 4/17, Main Street
Location: Livermore Falls/Jay, Maine

Boring No.: HGT-18
PIN: 10018.00

Driller:	Maine Test Boring	**Elevation (m):**	119.50	**Auger ID/OD:**	106/156 mm
Operator:	Mel Coffin	**Datum:**	NGVD	**Sampler:**	Standard Split Spoon
Logged By:	Brad Tirone/HAI	**Rig Type:**	Mobile Drill	**Hammer Wt./Fall:**	63.5 kg/760 mm
Date Start/Finish:	6/26/03-6/26/03	**Drilling Method:**	Hollow Stem Auger	**Core Barrel:**	N/A
Boring Location:	41+320.5, 2.3 Lt.	**Casing ID/OD:**	N/A	**Water Level*:**	Boring dry

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						HSA			ASPHALT PAVEMENT.	
							119.26		0.24	
	1D	61.0/30.5	0.30 - 0.91	8/14/5/4	19				Brown, damp, medium dense, coarse to fine SAND, little silt, trace gravel.	G#176776 A-1-b, SM WC=5.2%
							118.59		0.91	
	2D	61.0/30.5	0.91 - 1.52	2/3/3/6	6				Brown, moist, loose, coarse to fine SAND, some silt, trace gravel.	
1.2										
	3D	61.0/61.0	1.52 - 2.13	9/3/5/8	8					G#176777 A-2-4, SM WC=16.8%
							117.67		1.83	
									Reddish orange, damp, loose, medium to fine SAND, trace silt.	
							117.37		2.13	
2.4									**Bottom of Exploration at 2.13 m below ground surface.** No Refusal	
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.: HGT-18

Maine Department of Transportation

Soil/Rock Exploration Log
METRIC UNITS

Project: Route 4/17, Main Street
Location: Livermore Falls/Jay, Maine

Boring No.: HGT-19
PIN: 10018.00

Driller:	Maine Test Boring	**Elevation (m):**	119.50	**Auger ID/OD:**	106/156 mm
Operator:	Mel Coffin	**Datum:**	NGVD	**Sampler:**	Standard Split Spoon
Logged By:	Brad Tirone/HAI	**Rig Type:**	Mobile Drill	**Hammer Wt./Fall:**	63.5 kg/760 mm
Date Start/Finish:	6/26/03-6/26/03	**Drilling Method:**	Hollow Stem Auger	**Core Barrel:**	N/A
Boring Location:	41+580, 4.5 Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	Boring dry

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 Information: 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	1D	61.0/43.2	0.00 - 0.61	10/8/10/15	18	HSA	119.17		Black, dry, medium dense, coarse to fine SAND, ash? — 0.34	
									Brown, moist, coarse to fine SAND.	
	2D	61.0/53.3	0.91 - 1.52	8/8/10/47	18		118.59		— 0.91	G#176778 A-2-4, SM WC=20.6%
1.2							118.25		Black, moist, medium dense, medium to fine SAND, some silt, little gravel. — 1.25	
							117.98		Grey, damp, hard, gravelly SILT. — 1.52	
									Bottom of Exploration at 1.52 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.

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Boring No.: HGT-19

Maine Department of Transportation

Soil/Rock Exploration Log
METRIC UNITS

Project: Route 4/17, Main Street
Location: Livermore Falls/Jay, Maine

Boring No.: HGT-20
PIN: 10018.00

Driller:	Maine Test Boring	**Elevation (m):**	119.40	**Auger ID/OD:**	106/156 mm
Operator:	Mel Coffin	**Datum:**	NGVD	**Sampler:**	Standard Split Spoon
Logged By:	Brad Tirone/HAI	**Rig Type:**	Mobile Drill	**Hammer Wt./Fall:**	63.5 kg/760 mm
Date Start/Finish:	6/26/03-6/26/03	**Drilling Method:**	Hollow Stem Auger	**Core Barrel:**	N/A
Boring Location:	41+630, 1.7 Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	1.55 m bgs.

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						HSA	119.19		ASPHALT PAVEMENT. 0.21	
	1D	61.0/50.8	0.46 - 1.07	18/21/10/6	31				Dark brown, damp, dense, coarse to fine gravelly SAND, some ash?	
1.2							118.18		1.22	
	2D	61.0/50.8	1.52 - 2.13	13/28/32/35	60		117.88		Dark brown, PEAT. 1.52	
							117.27		Brown, moist, very dense, silty, very fine SAND, little gravel. 2.13	G#176779 A-4, SM WC=13.3%
2.4									**Bottom of Exploration at 2.13 m below ground surface.** No Refusal	
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.: HGT-20

Maine Department of Transportation

Soil/Rock Exploration Log
METRIC UNITS

Project: Route 4/17, Main Street
Location: Livermore Falls/Jay, Maine

Boring No.: HGT-21
PIN: 10018.00

Driller:	Maine Test Boring	**Elevation (m):**	121.10	**Auger ID/OD:**	106/156 mm
Operator:	Mel Coffin	**Datum:**	NGVD	**Sampler:**	Standard Split Spoon
Logged By:	Brad Tirone/HAI	**Rig Type:**	Mobile Drill	**Hammer Wt./Fall:**	63.5 kg/760 mm
Date Start/Finish:	6/26/03-6/26/03	**Drilling Method:**	Hollow Stem Auger	**Core Barrel:**	N/A
Boring Location:	41+730, 2.5 Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	Boring dry

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 Information: 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						HSA	120.92		ASPHALT PAVEMENT. 0.18	
	MD	6.1/6.1	0.46 - 0.52	40(61)			120.58		Brown, dry, medium to fine SAND, trace silt, trace gravel. 0.52	
							120.49		ROCK. 0.61	
1.2									**Bottom of Exploration at 0.61 m below ground surface.** 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.: HGT-21

Maine Department of Transportation

Soil/Rock Exploration Log
METRIC UNITS

Project: Route 4/17, Main Street
Location: Livermore Falls/Jay, Maine

Boring No.: HGT-21A
PIN: 10018.00

Driller:	Maine Test Boring	**Elevation (m):**	121.10	**Auger ID/OD:**	106/156 mm
Operator:	Mel Coffin	**Datum:**	NGVD	**Sampler:**	Standard Split Spoon
Logged By:	Brad Tirone/HAI	**Rig Type:**	Mobile Drill	**Hammer Wt./Fall:**	63.5 kg/760 mm
Date Start/Finish:	6/26/03-6/26/03	**Drilling Method:**	Hollow Stem Auger	**Core Barrel:**	N/A
Boring Location:	41+731, 2.5 Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	Boring dry

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 Information: 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						HSA	120.92		ASPHALT PAVEMENT. 0.18	
	MD	15.2/12.7	0.46 - 0.61	60(152)			120.49		No descriptin given. 0.61	
1.2									**Bottom of Exploration at 0.61 m below ground surface.** 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.: HGT-21A

Maine Department of Transportation

Soil/Rock Exploration Log
METRIC UNITS

Project: Route 4/17, Main Street
Location: Livermore Falls/Jay, Maine

Boring No.: HGT-22
PIN: 10018.00

Driller:	Maine Test Boring	**Elevation (m):**	119.40	**Auger ID/OD:**	106/156 mm
Operator:	Mel Coffin	**Datum:**	NGVD	**Sampler:**	Standard Split Spoon
Logged By:	Brad Tirone/HAI	**Rig Type:**	Mobile Drill	**Hammer Wt./Fall:**	63.5 kg/760 mm
Date Start/Finish:	6/27/03-6/27/03	**Drilling Method:**	Hollow Stem Auger	**Core Barrel:**	N/A
Boring Location:	41+801, 2.5 Lt.	**Casing ID/OD:**	N/A	**Water Level*:**	Boring dry

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						HSA			ASPHALT PAVEMENT.	
							119.13		0.27	
	1D	61.0/48.3	0.30 - 0.91	10/11/16/11	27				Dark brown, damp, medium dense, SAND, some gravel, little silt.	G#176780 A-2-4, SM WC=10.1%
							118.49		0.91	
1.2									Dark brown, wet, sandy SILT.	
	2D	61.0/61.0	1.52 - 2.13	1/3/2/3	5		117.88		1.52	G#176781 A-2-4, SM WC=46.5%
									Dark brown, moist, loose SAND, some silt, trace gravel, trace organics, (Bark) .	
2.4							117.27		2.13	
									Bottom of Exploration at 2.13 m below ground surface. No Refusal	
3.6										
4.8										
6										
7.2										
8.4										
9.6										

Remarks:

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

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Boring No.: HGT-22

Maine Department of Transportation

Soil/Rock Exploration Log
METRIC UNITS

Project: Route 4/17, Main Street
Location: Livermore Falls/Jay, Maine

Boring No.: P-1
PIN: 10018.00

Driller:	Maine Test Boring	**Elevation (m):**	119.40	**Auger ID/OD:**	106 mm
Operator:	Mel Coffin	**Datum:**	NGVD	**Sampler:**	N/A
Logged By:	Brad Tirone/HAI	**Rig Type:**	Mobile Drill	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	7/1/03-7/1/03	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	41+340, 1.0 Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	Boring dry

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 Information: 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						SSA	119.22		ASPHALT PAVEMENT. 0.18	
									Light brown, dry, gravelly SAND.	
1.2										
2.4							116.66		2.74 Reddish brown, medium to fine SAND, trace gravel, trace silt.	
3.6							115.59		3.81 **Bottom of Exploration at 3.81 m below ground surface.** Refusal	
4.8										
6										
7.2										
8.4										
9.6										

Remarks:

Revised By K. Breskin/MDOT.

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Boring No.: P-1

Maine Department of Transportation

Soil/Rock Exploration Log
METRIC UNITS

Project: Route 4/17, Main Street
Location: Livermore Falls/Jay, Maine

Boring No.: P-2
PIN: 10018.00

Driller:	Maine Test Boring	**Elevation (m):**	119.40	**Auger ID/OD:**	106 mm
Operator:	Mel Coffin	**Datum:**	NGVD	**Sampler:**	N/A
Logged By:	Brad Tirone/HAI	**Rig Type:**	Mobile Drill	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	7/1/03-7/1/03	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	41+350, 1.5 Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	Boring dry

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						SSA	119.22		ASPHALT PAVEMENT. 0.18 Light brown, dry, medium to fine SAND, some gravel, trace silt.	
1.2							117.88		1.52 Dark brown, medium to fine, silty SAND.	
2.4									Cobble at 2.59 m bgs.	
3.6							116.35		3.05 Light brown, damp, medium to fine SAND, trace silt.	
4.8							115.22		4.18 **Bottom of Exploration at 4.18 m below ground surface.** Bedrock Refusal	
6										
7.2										
8.4										
9.6										

Remarks:

Revised By K. Breskin/MDOT.

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Boring No.: P-2

Maine Department of Transportation

Soil/Rock Exploration Log
METRIC UNITS

Project: Route 4/17, Main Street
Location: Livermore Falls/Jay, Maine

Boring No.: P-3
PIN: 10018.00

Driller:	Maine Test Boring	**Elevation (m):**	119.70	**Auger ID/OD:**	106 mm
Operator:	Mel Coffin	**Datum:**	NGVD	**Sampler:**	N/A
Logged By:	Brad Tirone/HAI	**Rig Type:**	Mobile Drill	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	7/1/03-7/1/03	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	41+360, 2.0 Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	Boring dry

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						SSA	119.52		ASPHALT PAVEMENT. 0.18	
									Brown, dry, silty SAND, some gravel.	
1.2							118.18		1.52	
									Brown, silty SAND.	
2.4							117.11		2.59	
									Light brown, medium to fine SAND, trace silt.	
3.6							116.65		3.05	
									Brown, damp, medium to fine SAND, little silt.	
4.8							115.13		4.57	
									Bottom of Exploration at 4.57 m below ground surface. No Refusal	
6										
7.2										
8.4										
9.6										

Remarks:

Revised By K. Breskin/MDOT.

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Boring No.: P-3

Maine Department of Transportation

Soil/Rock Exploration Log
METRIC UNITS

Project: Route 4/17, Main Street
Location: Livermore Falls/Jay, Maine

Boring No.: P-4
PIN: 10018.00

Driller:	Maine Test Boring	**Elevation (m):**	119.80	**Auger ID/OD:**	106 mm
Operator:	Mel Coffin	**Datum:**	NGVD	**Sampler:**	N/A
Logged By:	Brad Tirone/HAI	**Rig Type:**	Mobile Drill	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	7/1/03-7/1/03	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	41+370, 2.0 Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	Boring dry

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 Information: 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						SSA	119.62		ASPHALT PAVEMENT. 0.18	
									Light brown, gravelly, coarse to fine SAND.	
1.2							118.28		1.52	
									Brown, damp, medium to fine SAND, trace silt.	
2.4										
3.6										
							115.44		4.36	
4.8									**Bottom of Exploration at 4.36 m below ground surface.** Bedrock Refusal	
6										
7.2										
8.4										
9.6										

Remarks:

Revised By K. Breskin/MDOT.

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Boring No.: P-4

Maine Department of Transportation

Soil/Rock Exploration Log
METRIC UNITS

Project: Route 4/17, Main Street
Location: Livermore Falls/Jay, Maine

Boring No.: P-5
PIN: 10018.00

Driller:	Maine Test Boring	**Elevation (m):**	119.90	**Auger ID/OD:**	106 mm
Operator:	Mel Coffin	**Datum:**	NGVD	**Sampler:**	N/A
Logged By:	Brad Tirone/HAI	**Rig Type:**	Mobile Drill	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	6/30/03-6/30/03	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	41+380, 2.0 Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	Boring dry

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 Information: 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						SSA	119.72		ASPHALT PAVEMENT. 0.18	
									Brown, dry, SILT, some gravel.	
							119.26		0.64	
									Bottom of Exploration at 0.64 m below ground surface. Bedrock Refusal	
1.2										
2.4										
3.6										
4.8										
6										
7.2										
8.4										
9.6										

Remarks:

Revised By K. Breskin/MDOT.

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Boring No.: P-5

Maine Department of Transportation

Soil/Rock Exploration Log
METRIC UNITS

Project: Route 4/17, Main Street
Location: Livermore Falls/Jay, Maine

Boring No.: P-6
PIN: 10018.00

Driller:	Maine Test Boring	**Elevation (m):**	119.90	**Auger ID/OD:**	106 mm
Operator:	Mel Coffin	**Datum:**	NGVD	**Sampler:**	N/A
Logged By:	Brad Tirone/HAI	**Rig Type:**	Mobile Drill	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	6/30/03-6/30/03	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	41+390, 2.0 Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	Boring dry

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						SSA	119.75		ASPHALT PAVEMENT. 0.15	
									Light reddish brown, gravelly SILT, some cobbles.	
1.2							118.68		1.22	
							118.38		Weathered ROCK. 1.52	
									Bottom of Exploration at 1.52 m below ground surface. Bedrock Refusal	
2.4										
3.6										
4.8										
6										
7.2										
8.4										
9.6										

Remarks:

Revised By K. Breskin/MDOT.

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

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Boring No.: P-6

Maine Department of Transportation

Soil/Rock Exploration Log
METRIC UNITS

Project: Route 4/17, Main Street
Location: Livermore Falls/Jay, Maine

Boring No.: P-7
PIN: 10018.00

Driller:	Maine Test Boring	**Elevation (m):**	120.00	**Auger ID/OD:**	106 mm
Operator:	Mel Coffin	**Datum:**	NGVD	**Sampler:**	N/A
Logged By:	Brad Tirone/HAI	**Rig Type:**	Mobile Drill	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	6/30/03-6/30/03	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	41+400, 2.0 Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	Boring dry

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 Information: 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						SSA	119.82		ASPHALT PAVEMENT. 0.18	
									Light brown, dry, silty SAND, some gravel.	
1.2										
							118.02		1.98	
									Same as above but, Brown.	
2.4										
3.6										
									Cobble at 3.96 m bgs.	
							115.79		4.21	
									Bottom of Exploration at 4.21 m below ground surface. Bedrock Refusal.	
4.8										
6										
7.2										
8.4										
9.6										

Remarks:

Revised By K. Breskin/MDOT.

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Boring No.: P-7

Maine Department of Transportation

Soil/Rock Exploration Log
METRIC UNITS

Project: Route 4/17, Main Street
Location: Livermore Falls/Jay, Maine

Boring No.: P-8
PIN: 10018.00

Driller:	Maine Test Boring	**Elevation (m):**	120.00	**Auger ID/OD:**	106 mm
Operator:	Mel Coffin	**Datum:**	NGVD	**Sampler:**	N/A
Logged By:	Brad Tirone/HAI	**Rig Type:**	Mobile Drill	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	6/30/03-6/30/03	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	41+410, 2.0 Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	Boring dry

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 Information: 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						SSA	119.82		ASPHALT PAVEMENT. 0.18	
									Light brown, silty SAND, some gravel.	
1.2										
							118.11		1.89	
									Bottom of Exploration at 1.89 m below ground surface. Bedrock Refusal.	
2.4										
3.6										
4.8										
6										
7.2										
8.4										
9.6										

Remarks:

Revised By K. Breskin/MDOT.

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.: P-8

Maine Department of Transportation

Soil/Rock Exploration Log
METRIC UNITS

Project: Route 4/17, Main Street
Location: Livermore Falls/Jay, Maine

Boring No.: P-9
PIN: 10018.00

Driller:	Maine Test Boring	**Elevation (m):**	119.90	**Auger ID/OD:**	106 mm
Operator:	Mel Coffin	**Datum:**	NGVD	**Sampler:**	N/A
Logged By:	Brad Tirone/HAI	**Rig Type:**	Mobile Drill	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	6/30/03-6/30/03	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	41+420, 2.5 Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	4.94 m bgs.

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 Information: 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						SSA	119.72		ASPHALT PAVEMENT. 0.18	
									Brown, silty SAND, some gravel.	
1.2										
2.4										
3.6										
4.8							114.96		4.94	
									Same as above but, wet.	
6							113.80		6.10	
									Bottom of Exploration at 6.10 m below ground surface. No Refusal.	
7.2										
8.4										
9.6										

Remarks:

Revised By K. Breskin/MDOT.

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.: P-9

Maine Department of Transportation

Soil/Rock Exploration Log
METRIC UNITS

Project: Route 4/17, Main Street
Location: Livermore Falls/Jay, Maine

Boring No.: P-10
PIN: 10018.00

Driller:	Maine Test Boring	**Elevation (m):**	119.90	**Auger ID/OD:**	106 mm
Operator:	Mel Coffin	**Datum:**	NGVD	**Sampler:**	N/A
Logged By:	Brad Tirone/HAI	**Rig Type:**	Mobile Drill	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	6/30/03-6/30/03	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	41+430, 2.0 Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	Boring dry

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 Information: 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						SSA	119.72		ASPHALT PAVEMENT. 0.18	
									Light brown, silty SAND, some gravel.	
1.2										
2.4							117.64		2.26 **Bottom of Exploration at 2.26 m below ground surface.** Bedrock Refusal	
3.6										
4.8										
6										
7.2										
8.4										
9.6										

Remarks:

Revised By K. Breskin/MDOT.

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.: P-10

Maine Department of Transportation

Soil/Rock Exploration Log
METRIC UNITS

Project: Route 4/17, Main Street
Location: Livermore Falls/Jay, Maine

Boring No.: P-11
PIN: 10018.00

Driller:	Maine Test Boring	**Elevation (m):**	119.70	**Auger ID/OD:**	106 mm
Operator:	Mel Coffin	**Datum:**	NGVD	**Sampler:**	N/A
Logged By:	Brad Tirone/HAI	**Rig Type:**	Mobile Drill	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	7/1/03-7/1/03	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	41+440, 2.5 Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	Boring dry

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 Information: 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						SSA	119.52		ASPHALT PAVEMENT. 0.18 Light brown, dry, coarse to fine SAND, little silt, trace gravel.	
1.2							118.18		Cobble at 0.91 m bgs. 1.52 Same as above but, with cobbles.	
2.4							117.17		2.53 **Bottom of Exploration at 2.53 m below ground surface.** Bedrock Refusal	
3.6										
4.8										
6										
7.2										
8.4										
9.6										

Remarks:

Revised By K. Breskin/MDOT.

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.: P-11

Maine Department of Transportation

Soil/Rock Exploration Log
METRIC UNITS

Project: Route 4/17, Main Street
Location: Livermore Falls/Jay, Maine

Boring No.: P-12
PIN: 10018.00

Driller:	Maine Test Boring	**Elevation (m):**	119.60	**Auger ID/OD:**	106 mm
Operator:	Mel Coffin	**Datum:**	NGVD	**Sampler:**	N/A
Logged By:	Brad Tirone/HAI	**Rig Type:**	Mobile Drill	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	7/1/03-7/1/03	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	41+450, 2.5 Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	11.3' bgs.

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						SSA	119.42		ASPHALT PAVEMENT. 0.18	
									Light reddish brown, gravelly, coarse to fine SAND, trace silt.	
1.2							118.08		1.52	
									Brown, sandy SILT, some gravel.	
2.4										
3.6							115.64		3.96	
									Bottom of Exploration at 3.96 m below ground surface. Bedrock Refusal	
4.8										
6										
7.2										
8.4										
9.6										

Remarks:

Revised By K. Breskin/MDOT.

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.: P-12

Maine Department of Transportation

Soil/Rock Exploration Log
METRIC UNITS

Project: Route 4/17, Main Street
Location: Livermore Falls/Jay, Maine

Boring No.: P-13
PIN: 10018.00

Driller:	Maine Test Boring	**Elevation (m):**	119.50	**Auger ID/OD:**	106 mm
Operator:	Mel Coffin	**Datum:**	NGVD	**Sampler:**	N/A
Logged By:	Brad Tirone/HAI	**Rig Type:**	Mobile Drill	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	7/1/03-7/1/03	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	41+460, 2.5 Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	9.6' bgs.

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						SSA	119.32		ASPHALT PAVEMENT. 0.18	
									Light brown, silty, coarse to fine SAND, little gravel.	
1.2										
2.4										
							116.45		3.05	
									Brown, sandy SILT, little gravel.	
3.6										
							115.63		3.87	
									Bottom of Exploration at 3.87 m below ground surface. Bedrock Refusal	
4.8										
6										
7.2										
8.4										
9.6										

Remarks:

Revised By K. Breskin/MDOT.

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.: P-13

Maine Department of Transportation

Soil/Rock Exploration Log
METRIC UNITS

Project: Route 4/17, Main Street
Location: Livermore Falls/Jay, Maine

Boring No.: P-14
PIN: 10018.00

Driller:	Maine Test Boring	**Elevation (m):**	119.30	**Auger ID/OD:**	106 mm
Operator:	Mel Coffin	**Datum:**	NGVD	**Sampler:**	N/A
Logged By:	Brad Tirone/HAI	**Rig Type:**	Mobile Drill	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	7/1/03-7/1/03	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	41+470, 2.5 Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	Boring dry

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 Information: 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						SSA	119.12		ASPHALT PAVEMENT. 0.18	
									Brown, damp, silty, coarse to fine SAND.	
1.2							117.78		1.52	
									Brown, damp, silty, coarse SAND, trace gravel.	
2.4							117.04		2.26	
									Bottom of Exploration at 2.26 m below ground surface. Bedrock Refusal	
3.6										
4.8										
6										
7.2										
8.4										
9.6										

Remarks:

Revised By K. Breskin/MDOT.

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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.

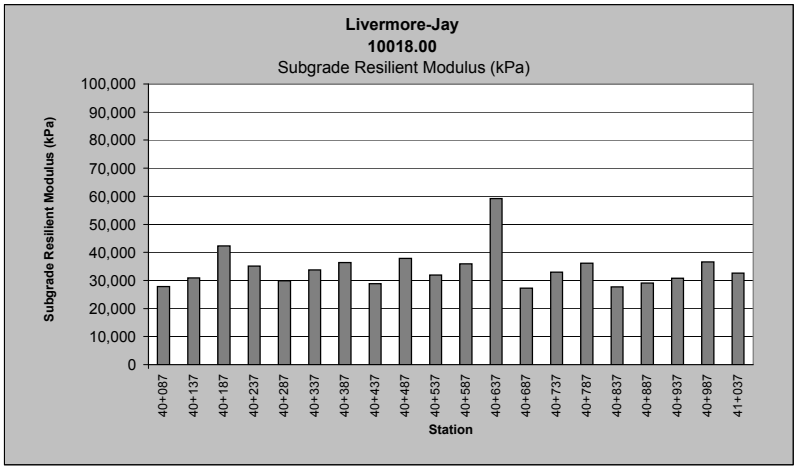
Boring No.: P-14

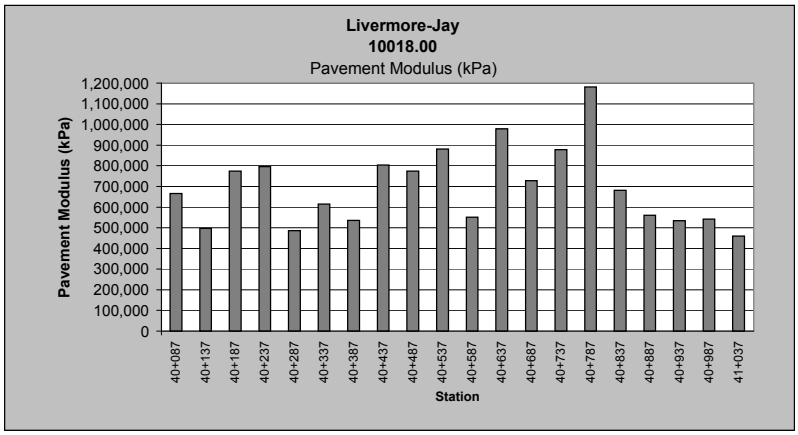
August 27, 2003

Livermore-Jay
10018.00
Route #4-17

Station (Meters)	Existing Pavement Modulus (kPa)	Subgrade Resilient Modulus (kPa)	Pavement Depth (mm)	* Combined Pavement/Gravel Depth Used for Calculation (mm)
40+087	665,228	27,807	125	460
40+137	497,390	30,948	125	460
40+187	774,869	42,281	125	460
40+237	796,270	35,095	240	460
40+287	486,263	29,881	240	460
40+337	614,238	33,743	125	460
40+387	535,312	36,371	125	460
40+437	803,360	28,870	125	460
40+487	773,475	37,859	125	460
40+537	881,497	31,946	125	460
40+587	551,878	35,965	180	460
40+637	978,736	59,147	180	460
40+687	727,432	27,198	210	460
40+737	877,294	32,966	210	460
40+787	1,181,207	36,170	210	460
40+837	680,833	27,704	210	460
40+887	561,116	29,032	150	460
40+937	533,651	30,730	150	460
40+987	542,691	36,589	240	760
41+037	460,533	32,608	240	760

*** For actual Gravel Depths, see attached logdraft forms**



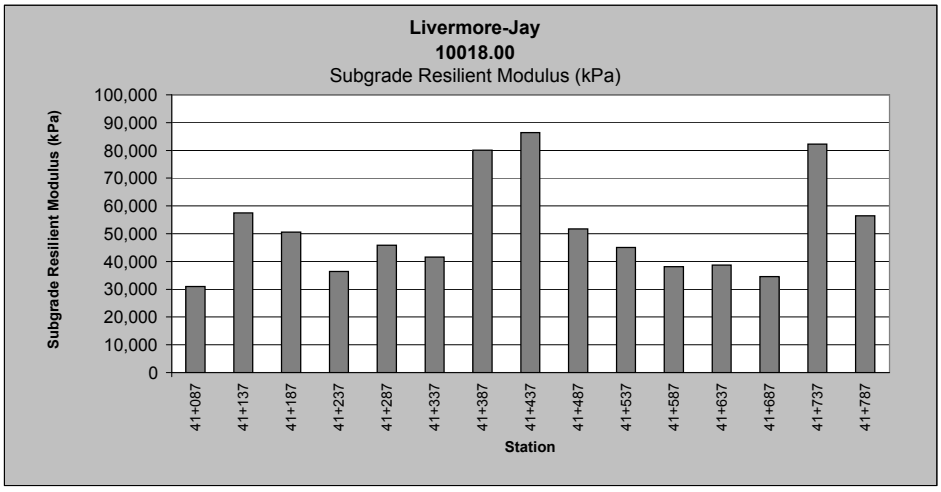


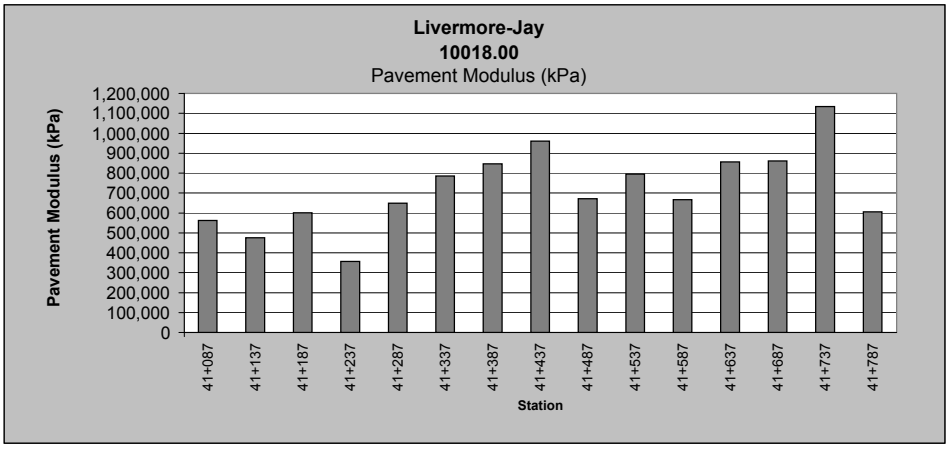
August 27, 2003

Livermore-Jay
10018.00
Route #4-17

Station (Meters)	Existing Pavement Modulus (kPa)	Subgrade Resilient Modulus (kPa)	Pavement Depth (mm)	* Combined Pavement/Gravel Depth Used for Calculation (mm)
41+087	562,813	30,984	240	760
41+137	475,804	57,446	240	760
41+187	600,740	50,606	180	610
41+237	357,290	36,419	180	610
41+287	648,739	45,840	240	760
41+337	784,844	41,566	240	760
41+387	846,320	80,099	240	760
41+437	960,175	86,395	240	760
41+487	671,033	51,684	240	760
41+537	795,645	45,023	210	460
41+587	666,238	38,082	210	460
41+637	856,045	38,695	210	460
41+687	860,880	34,603	210	460
41+737	1,133,974	82,213	180	460
41+787	606,184	56,445	180	460

*** For actual Gravel Depths, see attached logdraft forms**





Appendix D
Lab Test Data
Lab Testing Summary Sheet
Grain Size Curves

State of Maine - Department of Transportation

Laboratory Testing Summary Sheet

Town(s): Livermore Falls-Jay Project Number: 10018.00

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
HGT-1, 1D	40+130	3.0 Rt.	0.46-1.07	176760	1	3.8			SM	A-1-b	II
HGT-1, 2D	40+130	3.0 Rt.	1.52-2.13	176761	3	18.5			ML	A-4	IV
HGT-2, 1D	40+160	5.5 Rt.	0.46-1.07	176762	1	7.2			SM	A-2-4	II
HGT-4, 2D	40+380	3.5 Rt.	0.46-1.07	176763	1	5.1			SM	A-2-4	II
HGT-6, 1D	40+520	5.5 Rt.	0.30-0.91	176764	1	10.8			SM	A-1-b	II
HGT-8, 1D	40+610	5.0 Rt.	0.15-0.76	176765	1	3.4			SW-SM	A-1-b	0
HGT-8, 2D	40+610	5.0 Rt.	1.37-1.86	176766	3	14.2			ML	A-4	IV
HGT-9, 2D	40+630	5.2 Rt.	1.52-2.13	176767	3	4.7			SM	A-1-b	II
HGT-10, 1D	40+680	CL	0.46-1.07	176768	1	7.8			SM	A-1-b	II
HGT-10, 2D	40+680	CL	1.52-2.13	176769	3	3.3			SM	A-1-b	II
HGT-11, 2D	40+740	7.6 Lt.	1.52-2.13	176770	3	9.5			SP-SM	A-1-b	0
HGT-13, 1D	40+880	6.0 Rt.	0.37-0.98	176771	2	4.7			SP-SM	A-1-b	0
HGT-14, 1D	40+930	1.5 Rt.	0.46-1.07	176772	2	8.3			SM	A-2-4	II
HGT-15, 2D	41+020	1.8 Lt.	1.52-2.13	176773	3	26.9			CL-ML	A-4	IV
HGT-16A, 1D	41+131.5	1.0 Lt.	0.46-1.07	176774	2	4.2			GM	A-1-b	I
HGT-17, 2D	41+231.5	5.0 Rt.	1.52-2.13	176775	4	15.9			SM	A-2-4	II
HGT-18, 1D	41+320.5	2.3 Lt.	0.30-0.91	176776	2	5.2			SM	A-1-b	II
HGT-18, 3D	41+320.5	2.3 Lt.	1.52-2.13	176777	4	16.8			SM	A-2-4	II
HGT-19, 2D	41+580	4.5 Rt.	0.91-1.52	176778	4	20.6			SM	A-2-4	II
HGT-20, 2D	41+630	1.7 Rt.	1.52-2.13	176779	4	13.3			SM	A-4	III
HGT-22, 1D	41+801	2.5 Lt.	0.30-0.91	176780	2	10.1			SM	A-2-4	II
HGT-22, 2D	41+801	2.5 Lt.	1.52-2.13	176781	4	46.5			SM	A-2-4	II

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

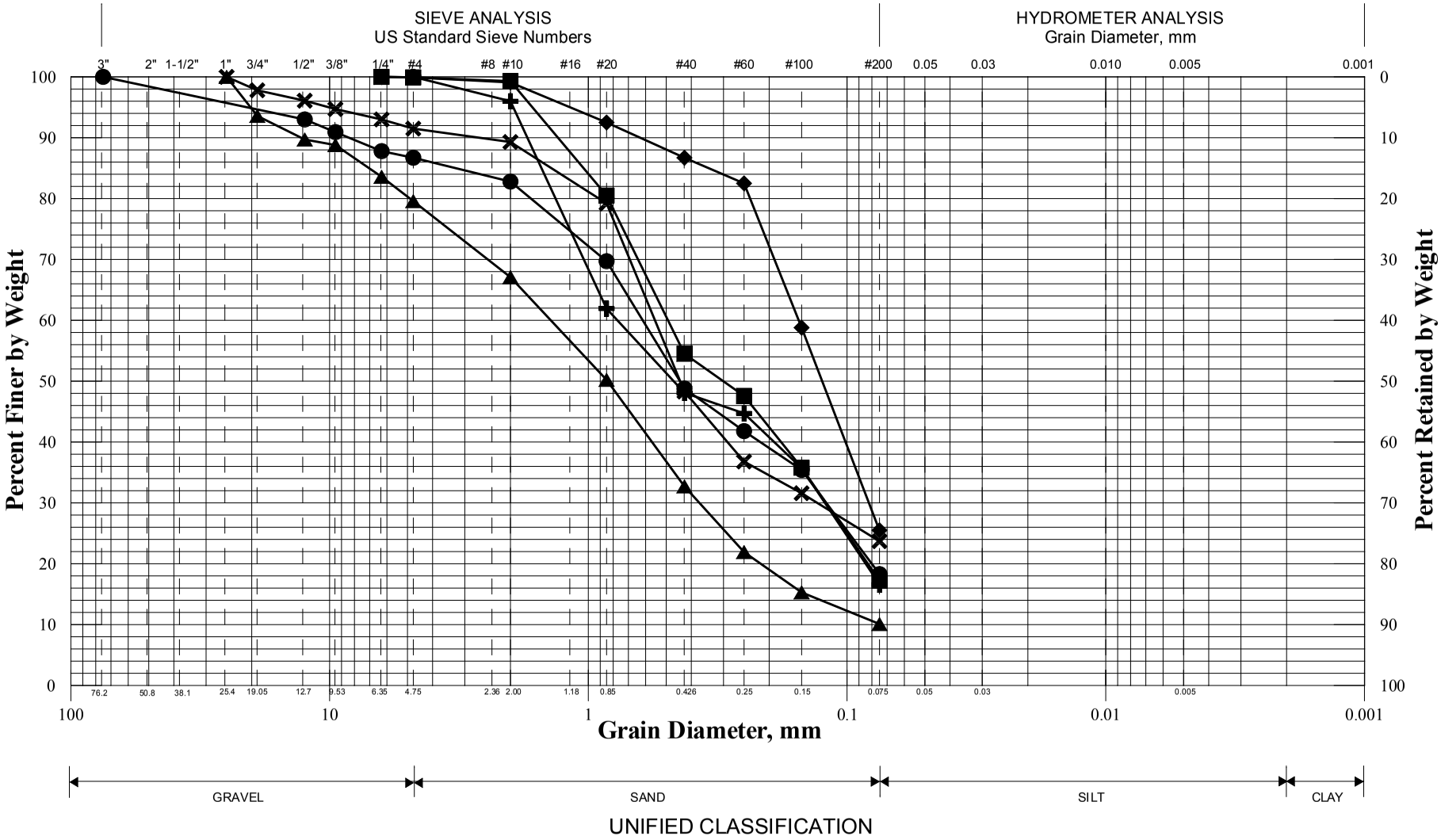
WC = water content as determined by AASHTO T 265-93 and/or ASTM D 2216-98

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



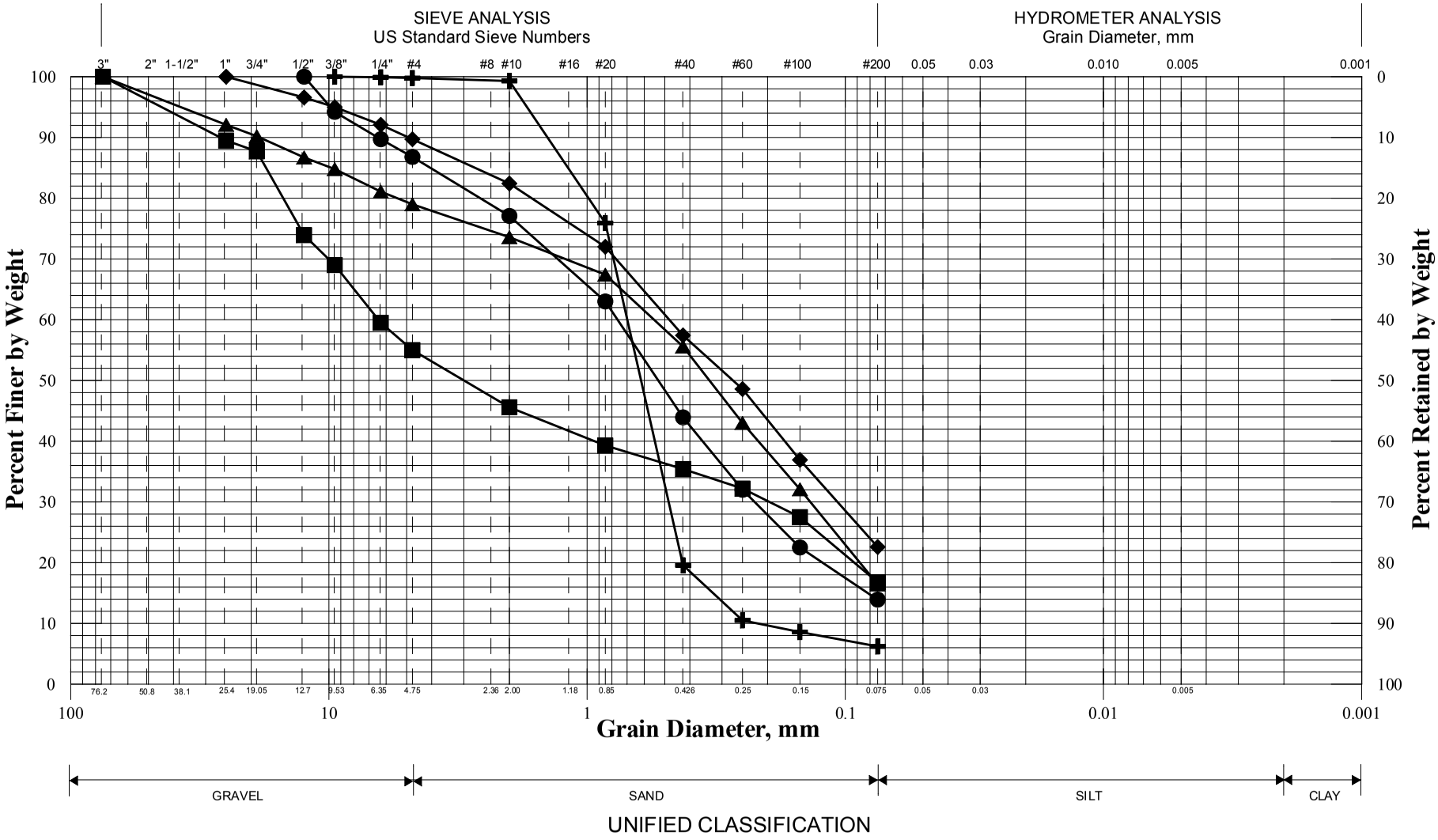
	Boring No.	Sample No.	Depth (m)	Description	w%	LL	PL	PI
+	HGT-1	1D	0.46-1.07	SAND, little silt, trace gravel.	3.8			
◆	HGT-2	1D	0.46-1.07	SAND, some silt, trace gravel.	7.2			
■	HGT-4	2D	0.46-1.07	SAND, little silt, trace gravel.	5.1			
●	HGT-6	1D	0.30-0.91	SAND, little silt, little gravel.	10.8			
▲	HGT-8	1D	0.15-0.76	SAND, some gravel, trace silt.	3.4			
×	HGT-10	1D	0.46-1.07	SAND, some silt, trace gravel.	7.8			

PIN: 10018.00
Town: Livermore Falls - Jay
Reported by: T. White
Date: 12/12/03

SHEET NO. 1

State of Maine Department of Transportation

GRAIN SIZE DISTRIBUTION CURVE



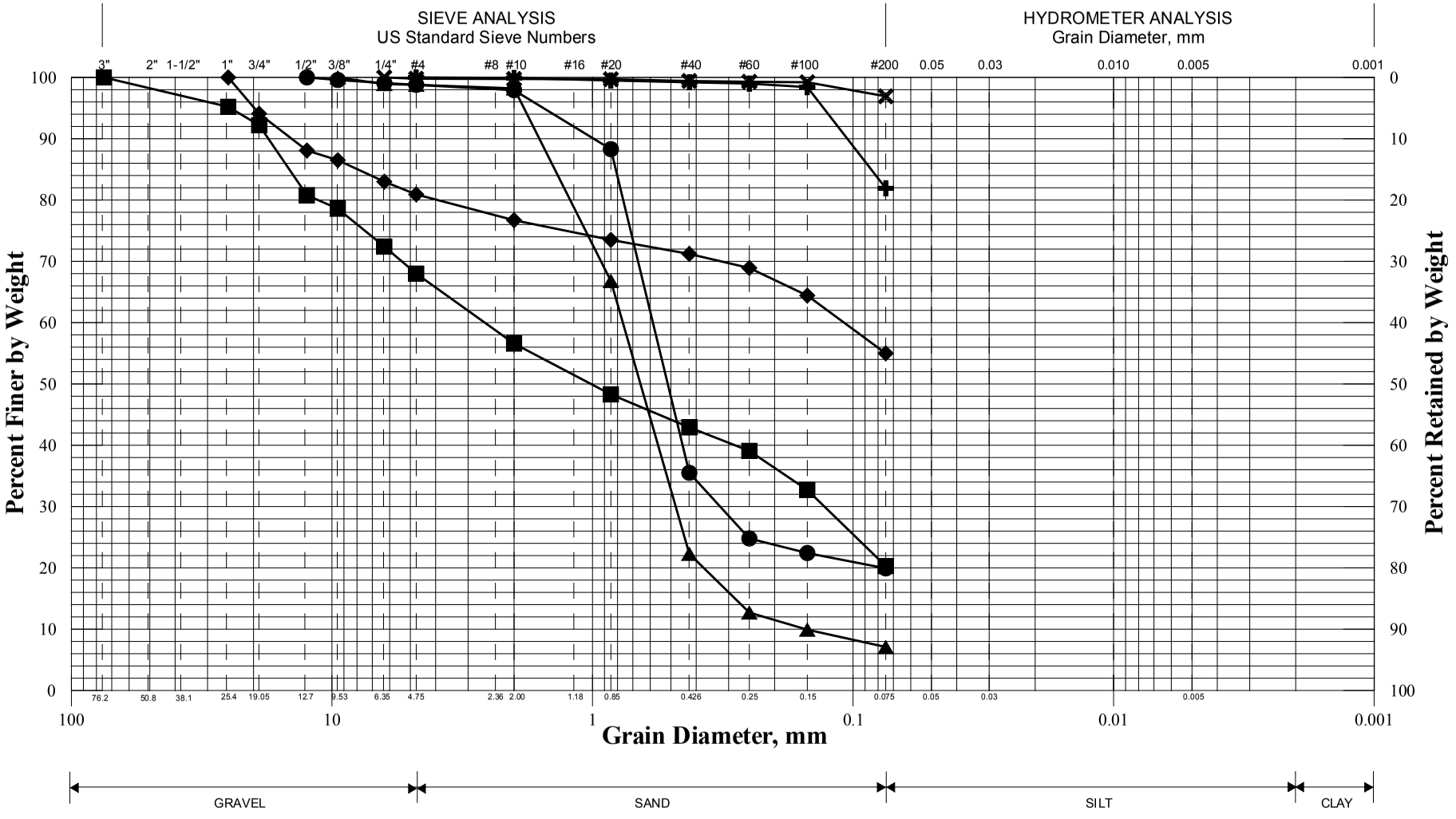
	Boring No.	Sample No.	Depth (m)	Description	w%	LL	PL	PI
+	HGT-13	1D	0.37-0.98	SAND, trace silt, trace gravel.	4.7			
◆	HGT-14	1D	0.46-1.07	SAND, some silt, trace gravel.	8.3			
■	HGT-16A	1D	0.46-1.07	Sandy GRAVEL, little silt.	4.2			
●	HGT-18	1D	0.30-0.91	SAND, little silt, trace gravel.	5.2			
▲	HGT-22	1D	0.30-0.91	SAND, some gravel, little silt.	10.1			
×	---							

PIN: 10018.00
Town: Livermore Falls - Jay
Reported by: T. White
Date: 12/12/03

SHEET NO. 2

State of Maine Department of Transportation

GRAIN SIZE DISTRIBUTION CURVE



UNIFIED CLASSIFICATION

	Boring No.	Sample No.	Depth (m)	Description	w%	LL	PL	PI
+	HGT-1	2D	1.52-2.13	SILT, little sand, trace gravel.	18.5			
◆	HGT-8	2D	1.37-1.86	SILT, some sand, little gravel.	14.2			
■	HGT-9	2D	1.52-2.13	SAND, some gravel, some silt.	4.7			
●	HGT-10	2D	1.52-2.13	SAND, little silt, trace gravel.	3.3			
▲	HGT-11	2D	1.52-2.13	SAND, trace silt, trace gravel.	9.5			
×	HGT-15	2D	1.52-2.13	SILT, trace sand, trace gravel.	26.9			

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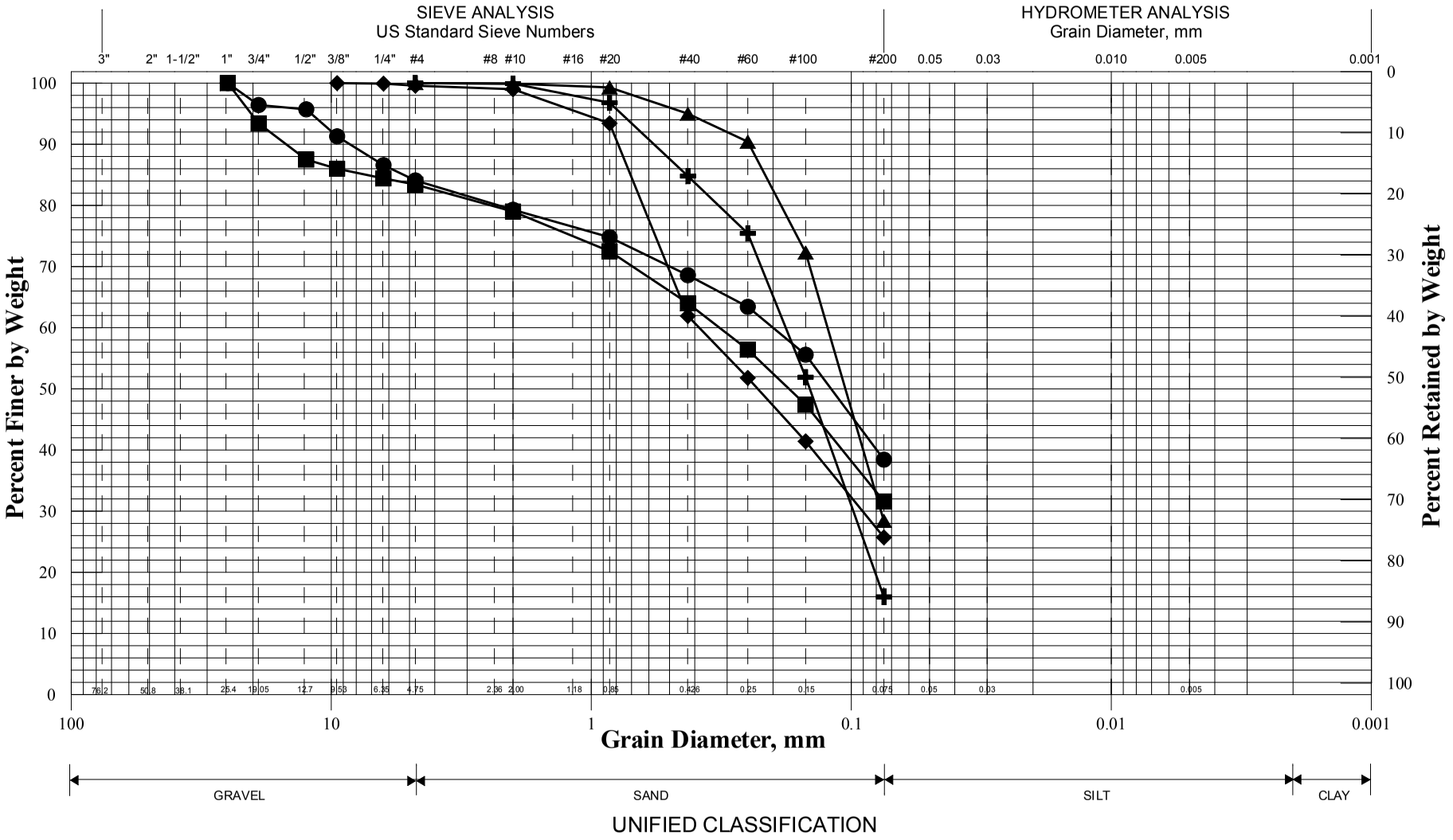
State of Maine Department of Transportation
GRAIN SIZE DISTRIBUTION CURVE



	Boring No.	Sample No.	Depth (m)	Description	w%	LL	PL	PI
+	HGT-17	2D	1.52-2.13	SAND, little silt, trace gravel.	15.9			
◆	HGT-18	3D	1.52-2.13	SAND, some silt, trace gravel.	16.8			
■	HGT-19	2D	0.91-1.52	SAND, some silt, little gravel.	20.6			
●	HGT-20	2D	1.52-2.13	Silty SAND, little gravel.	13.3			
▲	HGT-22	2D	1.52-2.13	SAND, some silt, trace gravel.	46.5			
×	---							

PIN: 10018.00
Town: Livermore Falls - Jay
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Date: 12/12/03

SHEET NO. 4

Appendix E
Existing Retaining Wall Photographs

Station 40+108

Station 40+560

Station 40+585

Station 40+610

Station 40+890

Station 41+020

Station 41+040

Station 41+060

Station 41+085

Station 41+145

Station 41+320

Station 41+340

Station 41+360