Maine Department of Transportation

Urban & Arterial Program
Geotechnical Group

Report of

SUBSURFACE INVESTIGATION FOR WIDENING AND OVERLAY Of JOLINE DRIVE IN THE CITY OF AUBURN, ANDROSCOGGIN COUNTY

Prepared by:

Kitty Breskin, P.E.
Geotechnical Design Engineer

Androscoggin County PIN 12737.00 & 13059.00 Soils Report 2009-109
Federal Numbers AC-STP-1273(700)X
AC-STP-1305(900)X

April 2, 2009

Maine DOT proposes to rebuild Joline Drive in the City of Auburn, including the intersections with Turner Street and Stetson Road. The project includes full reconstruction of the roadway, drainage, and construction of a retaining wall.

This compilation includes the following data:

- Geoplans
- Surficial Geology Map of project area
- NRCS Soils map of project area
- Boring logs
- Lab Testing Summary Sheet
- Grain Size Curves
- FWD test report

Filename: ...\GEOTECH\MSTA\001_Geoplan1.dgn Division: GEOTECH Username: kitty.breskin Date:3/31/2009

STA 7+00.00
LIMIT OF WORK
MATCH EXIST. PAVEMENT

IF PIPE CONTINUES OFF PROJECT, PIPE MAY BE CUT AND PLUGGED, AS DIRECTED BY THE RESIDENT.

N23°54'44.3"E

CURVE DATA #1
PI = 5+80.57
D = 57°17'44.8"
Δ = 44°19'15.9" Rt.
R = 100.00'
L = 77.35'
T = 40.73'
E = 7.98'

PT = STA. 6+17.19

Sta. 25+26.56 on Joline Drive
= Sta. 5+00.00 on Turner Street

N20°24'31.6"W

CURVE DATA #1
PI = 25+51.31
D = 28°38'52.4"
Δ = 84°04'15.2" Rt.
R = 200.00'
L = 293.46'
T = 180.30'
E = 69.28'

PT = STA. 26+64.47

PC = STA. 23+71.01

N25°01'47.0"E

PC = STA. 30+12.00

CURVE DATA #2
PI = 30+89.93
D = 1°08'45.3"
Δ = 1°47'09.1" Rt.
R = 5000.00'
L = 155.84'
T = 77.93'
E = 0.61'

S70°53'57.8"E

STA 22+75.00
BEGIN PROJECT
MATCH EXIST. PAVEMENT

REMOVE

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

STP-1273(700)X & STP-1305(900)X

PIN
12737.00 & 13059.00 HIGHWAY PLANS

	BY	DATE	SIGNATURE
PROJ. MANAGER	J. Ferguson		
DESIGN-DETAILED	K. BRESKIN	JAN 2009	
CHECKED-REVIEWED	-----	-----	-----
DESIGN2-DETAILED2	-----	-----	-----
DESIGN3-DETAILED3	-----	-----	-----
REVISIONS 1	-----	-----	-----
REVISIONS 2	-----	-----	-----
REVISIONS 3	-----	-----	-----
REVISIONS 4	-----	-----	-----
FIELD CHANGES	-----	-----	-----

P.E. NUMBER

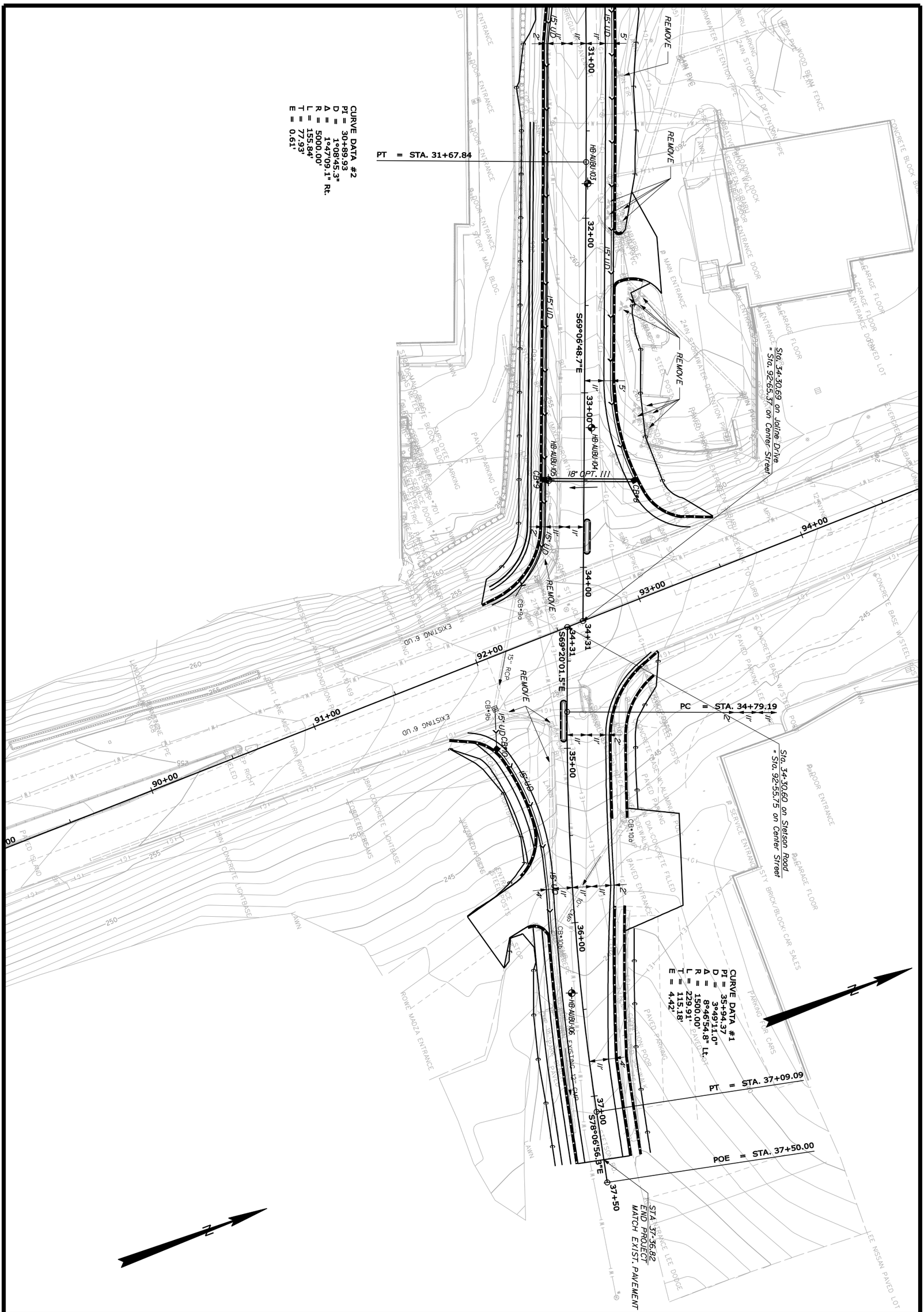
DATE

AUBURN
JOLINE DRIVE

GEOPLANS

SHEET NUMBER
1
OF 2

Filename: ...\geotech\msta\002_Geoplan2.dgn Division: GEOTECH Username: kitty.breskin Date:3/31/2009



SHEET NUMBER 2 OF 2

AUBURN
JOLINE DRIVE

GEOPLANS

PROJ. MANAGER	J. Ferguson	BY	DATE
DESIGN-DETAILED	K. BRESKIN	T. WHITE	JAN 2009
CHECKED-REVIEWED	_____	_____	_____
DESIGN2-DETAILED2	_____	_____	_____
DESIGN3-DETAILED3	_____	_____	_____
REVISIONS 1	_____		_____
REVISIONS 2	_____		_____
REVISIONS 3	_____		_____
REVISIONS 4	_____		_____
FIELD CHANGES	_____		_____

SIGNATURE

P.E. NUMBER

DATE

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

STP-1273(700)X & STP-1305(900)X

PIN
12737.00 & 13059.00 HIGHWAY PLANS

Lake Auburn East Quadrangle, Maine

Surficial geologic mapping by
Carol T. Hildreth

Digital cartography by:
Susan S. Tolman

Robert G. Marvinney
State Geologist

Cartographic design and editing by:
Robert D. Tucker

Funding for the preparation of this map was provided in part by the U.S. Geological Survey
STATEMAP Program, Cooperative Agreement No. 01HQAG0090.

A thin, discontinuous layer of windblown sand and silt, generally mixed with underlying glacial deposits by frost action and bioturbation, is present near the ground surface over much of the map area but is not shown.

af **Artificial fill** - Man-made. Material varies from natural sand and gravel to quarry waste to sanitary landfill; may include highway and railroad embankments and dredge spoil areas. This material is mapped only where it can be identified using the topographic contour lines or where actually observed. Minor artificial fill is present in virtually all developed areas of the quadrangle. Thickness of fill varies.

Ha **Stream alluvium** (Holocene) - Sand, silt, gravel, and muck in flood plains along present rivers and streams. As much as 3 m (10 ft) thick. Extent of alluvium indicates most areas flooded in the past that may be subject to future flooding. In places the unit is indistinguishable from, grades into, or is interbedded with freshwater wetlands deposits (Hw).

Hw **Freshwater wetland deposit** (Holocene) - Muck, peat, silt, and sand deposited in poorly drained areas. Generally 0.5 to 3 m (1 to 10 ft) thick, but may be much thicker in large bogs. In places, this unit is indistinguishable from, grades into, or is interbedded with stream alluvium (Ha).

Hls **Modern lakeshore deposit** (Holocene) - Sand and/or silt with gravel in places. Developed along the present and prehistoric shorelines of lakes and ponds. Most extensive and thickest on larger lakes, 0.5 to 2 m (1 to 6 ft) thick. Includes spit deposits and may include dune deposits.

Qst **Stream terrace deposit** (Holocene and Late Pleistocene) - Sand, silt, gravel and occasional muck on terraces cut into glacial deposits in Androscoggin River valley. These terraces formed in part during late-glacial time as sea level regressed. From 0.5 to 5 m (1 to 15 ft) thick.

Qe **Eolian deposit** (Holocene and Late Pleistocene) - Fine- to medium-grained, well-sorted sand. Found as small dunes on a variety of older glacial deposits. Deposited after late-glacial sea level regressed from the area and left fine-grained marine sediments exposed to wind erosion and transport before vegetation established itself and anchored the deposits. Many more thin dunes are present in the area than are delineated on the map. Thickness usually varies from 0.5 to 2 m (1 to 6 ft), but is greater in places.

Pmrs **Marine regressive deposits** (Pleistocene) - Sand, silt, and minor gravel. Consists of reworked marine delta and other glacial sediments redistributed by marine currents and wave action as sea level fell during late-glacial time. As much as 3 m (10 ft) thick.

Pgi **Undifferentiated ice-contact deposits** (Pleistocene) - Sand, gravel and silt. Consists of ice-contact esker, delta, or glaciomarine fan deposits. Thickness varies from 0 to 15 m (0 to 50 ft).

Phb **Glaciofluvial and glaciomarine deposits of Hooper Brook valley** (Pleistocene) - Sand, silt, gravel, and mud. Consists of fluvial, subaqueous fan, and outwash deposits graded to the contemporary sea. In places, overlain by unmapped thin dune deposits. Thickness varies from 0.5 to 6 m (1 to 20 ft).

Pm **Glaciomarine sediments, undifferentiated** (Pleistocene) - Sand, gravel, and clay-silt deposited in the late-glacial sea as delta, fan, sea floor, and/or nearshore sediments. Locally overlain by unmapped thin dune deposits. Thickness varies from 0.5 to 9 m (1 to 30 ft).

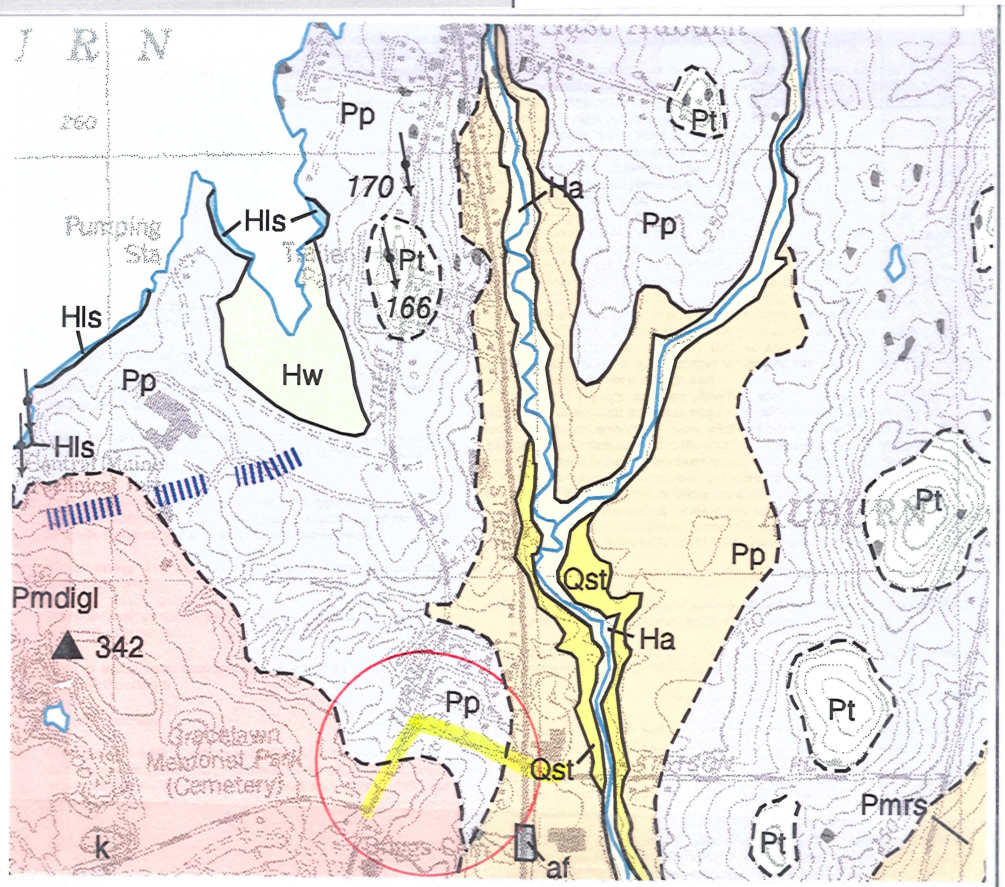
Pmdi **Glaciomarine ice-contact delta deposits** (Pleistocene) - Composed primarily of sorted and stratified sand and gravel graded to the contemporary sea. Distinguished by flat, sometimes kettled top, and topset-foreset beds. Thickness varies from 0.5 to 21 m (1 to 70 ft). Four deltas have been assigned the unique geographic names listed below:

- Pmdigl - Gracelawn delta; topset-foreset contact at elevation 342 ft (104 m) (Thompson and others, 1989)
- Pmdiap - Auburn Plains delta; topset-foreset contact at elevation 351 ft (107 m) (Thompson, unpub. data)
- Pmdita - Twitchell Airport delta
- Pmdispm - Saint Peter Cemetery-Merrill Road delta

Pp **Presumpscot Formation: glaciomarine sea-floor deposits** (Pleistocene) - Silt and clay with local sandy beds and intercalations. Consists of late-glacial submarine fine-grained (marine mud) bottom deposits. Commonly lies beneath surface deposits of units Pmdi, Pm, and Pmrs; in places may be overlain by unmapped thin dune deposits. As much as 50 m (150 ft) thick.

Pge **Esker deposits** (Pleistocene) - Sand and gravel deposited by glacial meltwater flowing in tunnels within or beneath the ice. As much as 21 m (70 ft) thick.

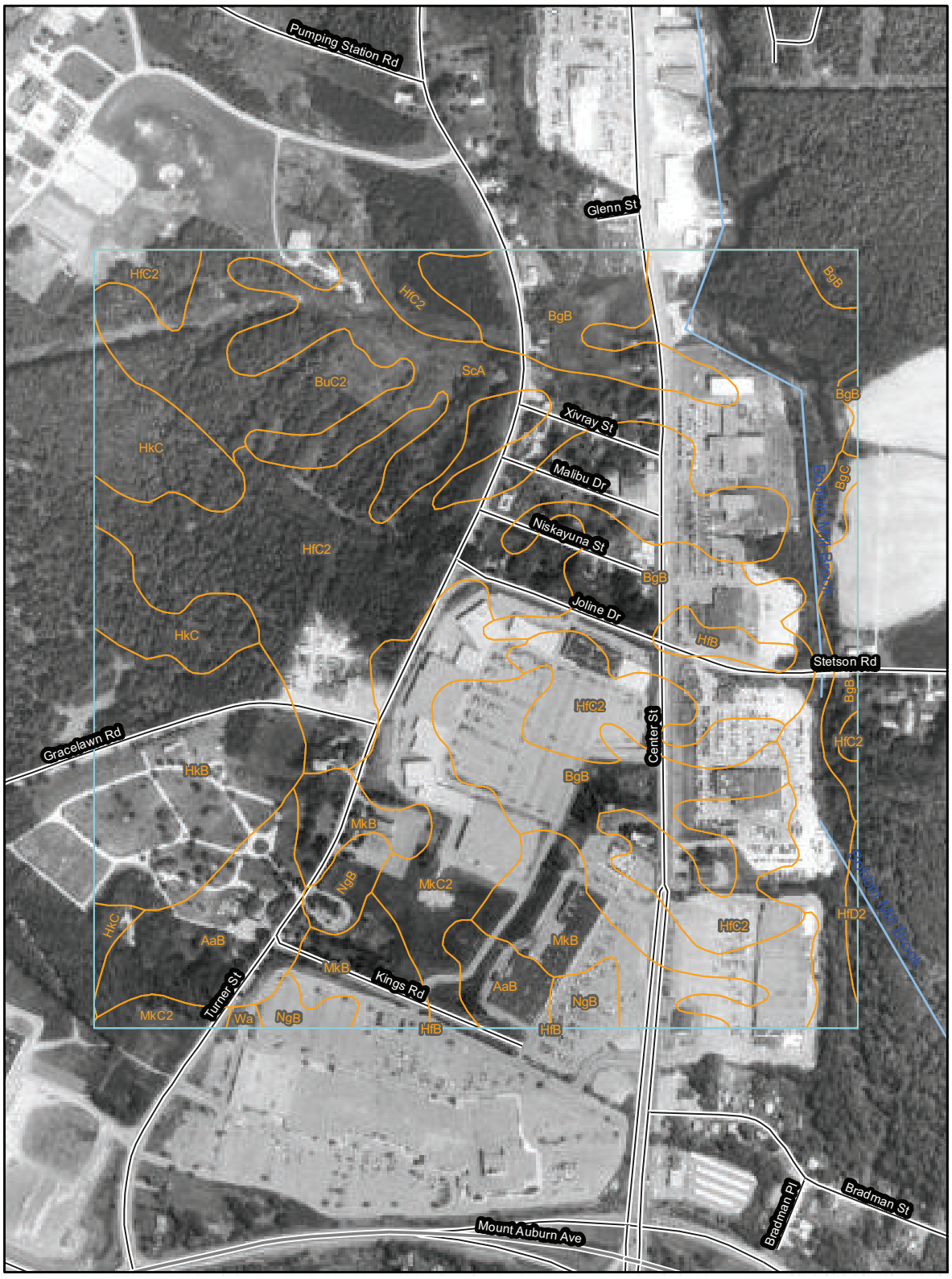
Pt **Till** (Pleistocene) - Light- to dark-gray, nonsorted to poorly sorted mixture of clay, silt, sand, pebbles, cobbles, and boulders; a predominantly sandy diamicton containing some gravel. Generally underlies most other deposits. Thickness varies and generally is less than 6 m (20 ft), but is probably more than 30 m (100 ft) in many drumlins and streamlined hills. Many streamlined hills in this area are bedrock-cored.



Surficial Geology

Soil Map—Androscoggin and Sagadahoc Counties, Maine
(Jolin Drive, Auburn)

70° 14' 8"
70° 13' 14"
44° 8' 5"
44° 8' 6"



44° 7' 13"
44° 7' 13"

70° 14' 7"
70° 13' 12"

Map Scale: 1:7,730 if printed on A size (8.5" x 11") sheet.

N

Meters
0 50 100 200 300

Feet
0 250 500 1,000 1,500

MAP LEGEND

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

Soils
- Soil Map Units

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: 1:7,730 if printed on A size (8.5" × 11") sheet.

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

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 12, Jan 9, 2009

Date(s) aerial images were photographed: 4/29/1998; 6/7/1997; 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	13.1	5.4%
BgB	Belgrade very fine sandy loam, 2 to 8 percent slopes	46.0	19.2%
BgC	Belgrade very fine sandy loam, 8 to 15 percent slopes	1.1	0.4%
BuC2	Buxton silt loam, 8 to 15 percent slopes, eroded	12.5	5.2%
HfB	Hartland very fine sandy loam, 2 to 8 percent slopes	1.8	0.8%
HfC2	Hartland very fine sandy loam, 8 to 15 percent slopes, eroded	57.5	24.0%
HfD2	Hartland very fine sandy loam, 15 to 25 percent slopes, eroded	0.6	0.3%
HkB	Hinckley gravelly sandy loam, 0 to 8 percent slopes	17.7	7.4%
HkC	Hinckley gravelly sandy loam, 8 to 15 percent slopes	11.1	4.6%
MkB	Merrimac fine sandy loam, 0 to 8 percent slopes	15.9	6.6%
MkC2	Merrimac fine sandy loam, 8 to 15 percent slopes, eroded	15.8	6.6%
NgB	Ninigret fine sandy loam, 0 to 8 percent slopes	5.0	2.1%
ScA	Scantic silt loam, 0 to 3 percent slopes	41.8	17.4%
Wa	Walpole fine sandy loam	0.3	0.1%
Totals for Area of Interest		**240.3**	**100.0%**

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Turner Street & Joline Drive
Location: Auburn, Maine

Boring No.: HB-AUBU-101
PIN: 12737.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	E. Giguere/C. Giles	**Datum:**	NAVD 88	**Sampler:**	Standard Split Spoon
Logged By:	B. Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	5/14/08; 08:30-09:00	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	24+00, 6.5' Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed
Hammer Efficiency Factor:	0.77	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test, PP = Pocket Penetrometer
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR/C = weight of rods or casing
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0							SSA	-0.40		PAVEMENT.	
										0.40	
	1D	24/22	1.00 - 3.00	7/9/13/21	22	28				Brown, damp, medium dense, fine to coarse SAND, little gravel.	G#208711 A-1-b, SW-SM WC=3.5%
								-3.50		3.50	
5	2D	24/20	5.00 - 7.00	5/4/5/5	9	12				Olive, wet, loose, fine SAND, some silt.	G#208715 A-4, ML WC=23.4%
								-7.00		7.00	
										Bottom of Exploration at 7.00 feet below ground surface. NO REFUSAL	
10											
15											
20											
25											

Remarks:

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

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

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Turner Street & Joline Drive
Location: Auburn, Maine

Boring No.: HB-AUBU-102
PIN: 12737.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	E. Giguere/C. Giles	**Datum:**	NAVD 88	**Sampler:**	Standard Split Spoon
Logged By:	B. Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	5/14/08; 09:30-10:00	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	28+00, 8.8' Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed
Hammer Efficiency Factor:	0.77	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test, PP = Pocket Penetrometer
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR/C = weight of rods or casing
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0							SSA	-0.45		PAVEMENT.	
										0.45	
	1D	24/18	1.00 - 3.00	5/8/6/6	14	18				Brown, damp, medium dense, fine to coarse SAND, little gravel.	G#208712 A-2-4, SM WC=8.4%
								-2.50		2.50	
										Olive, wet, loose, fine SAND, some silt.	
5	2D	24/20	5.00 - 7.00	1/1/2/2	3	4					
								-7.00		7.00	
										Bottom of Exploration at 7.00 feet below ground surface. NO REFUSAL	
10											
15											
20											
25											

Remarks:

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

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

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Turner Street & Joline Drive
Location: Auburn, Maine

Boring No.: HB-AUBU-103
PIN: 12737.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	E. Giguere/C. Giles	**Datum:**	NAVD 88	**Sampler:**	Standard Split Spoon
Logged By:	B. Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	5/14/08; 10:00-10:30	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	31+80, 1.0' Lt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed
Hammer Efficiency Factor:	0.77	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

Definitions:
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MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR/C = weight of rods or casing
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0							SSA	-0.40		PAVEMENT.	
										0.40	
	1D	24/16	1.00 - 3.00	7/11/8/6	19	24				Brown, damp, medium dense, gravelly fine to coarse SAND.	G#208713 A-1-b, SW-SM WC=4.7%
								-3.50		3.50	
5	2D	24/9	5.00 - 7.00	10/6/6/9	12	15				Light brown, moist, medium dense, fine SAND, little silt.	G#208716 A-4, SM WC=14.4%
10	3D	24/20	10.00 - 12.00	3/7/6/6	13	17				Similar to above.	
								-12.00		12.00	
										Bottom of Exploration at 12.00 feet below ground surface. NO REFUSAL	
15											
20											
25											

Remarks:

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Turner Street & Joline Drive
Location: Auburn, Maine

Boring No.: HB-AUBU-104
PIN: 12737.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	E. Giguere/C. Giles	**Datum:**	NAVD 88	**Sampler:**	Standard Split Spoon
Logged By:	B. Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	5/14/08; 10:30-11:00	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	33+20, 4.0' Lt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed
Hammer Efficiency Factor:	0.77	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

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V = Insitu Vane Shear Test, PP = Pocket Penetrometer
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SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR/C = weight of rods or casing
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
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PI = Plasticity Index
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C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0							SSA	-0.40		PAVEMENT.	
	1D	24/19	1.00 - 3.00	4/2/2/3	4	5				0.40 Brown, damp, very dense, fine to coarse SAND, little gravel.	
								-2.00		2.00	
5	2D	24/24	5.00 - 7.00	6/3/5/8	8	10				Light brown, wet, loose, fine SAND, little silt.	
10	3D	24/22	10.00 - 12.00	5/3/2/4	5	6		-11.00		11.00 Light brown, wet, loose, fine SAND, some silt, trace clay.	
								-12.00		12.00 **Bottom of Exploration at 12.00 feet below ground surface.** NO REFUSAL	
15											
20											
25											

Remarks:

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

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

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Turner Street & Joline Drive
Location: Auburn, Maine

Boring No.: HB-AUBU-105
PIN: 12737.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	E. Giguere/C. Giles	**Datum:**	NAVD 88	**Sampler:**	Standard Split Spoon
Logged By:	B. Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	5/14/08; 11:00-11:30	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	33+50, 20.3' Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	5.5' bgs.
Hammer Efficiency Factor:	0.77	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test, PP = Pocket Penetrometer
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR/C = weight of rods or casing
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	1D	24/18	0.00 - 2.00	WOH/2/2/2	4	5	SSA	-0.20		TOPSOIL, (Sod). 0.20	G#208718 A-2-4, SM WC=14.8%
										Brown, damp, very loose, fine to medium SAND, little silt.	
								-3.00		3.00	
5	2D	24/24	5.00 - 7.00	3/5/6/7	11	14				Light brown, wet, medium dense, fine SAND, trace silt.	G#208719 A-2-4, SM WC=21.3%
10	3D	24/24	10.00 - 12.00	1/2/1/4	3	4				Light brown, saturated, very loose, fine SAND, little silt.	G#208720 A-4, ML WC=31.6%
								-12.00		12.00	
										Bottom of Exploration at 12.00 feet below ground surface. NO REFUSAL	
15											
20											
25											

Remarks:

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

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

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Turner Street & Joline Drive
Location: Auburn, Maine

Boring No.: HB-AUBU-106
PIN: 12737.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	E. Giguere/C. Giles	**Datum:**	NAVD 88	**Sampler:**	Standard Split Spoon
Logged By:	B. Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	5/14/08; 12:15-12:45	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	36+40, 5.5' Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed
Hammer Efficiency Factor:	0.77	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test, PP = Pocket Penetrometer
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR/C = weight of rods or casing
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0							SSA	-0.30		PAVEMENT.	
										0.30	
	1D	24/16	1.00 - 3.00	8/13/10/9	23	30				Brown, damp, medium dense, gravelly fine to coarse SAND.	G#208714 A-1-b, SW-SM WC=4.1%
								-3.50		3.50	
5	2D	24/20	5.00 - 7.00	2/4/5/5	9	12				Olive-brown, wet, loose, silty fine SAND.	G#208717 A-4, ML WC=20.3%
								-7.00		7.00	
										Bottom of Exploration at 7.00 feet below ground surface. NO REFUSAL	
10											
15											
20											
25											

Remarks:

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

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

State of Maine - Department of Transportation

Laboratory Testing Summary Sheet

Town(s): Auburn Project Number: 12737.00

Boring & Sample Identification Number	Station (Feet)	Offset (Feet)	Depth (Feet)	Reference Number	G.S.D.C. Sheet	W.C. %	L.L.	P.I.	Classification		
									Unified	AASHTO	Frost
HB-AUBU-101, 1D	24+00	6.5 Rt.	1.0-3.0	208711	1	3.5			SW-SM	A-1-b	0
HB-AUBU-101, 2D	24+00	6.5 Rt.	5.0-7.0	208715	2	23.4			ML	A-4	IV
HB-AUBU-102, 1D	28+00	8.8 Rt.	1.0-3.0	208712	1	8.4			SM	A-2-4	II
HB-AUBU-103, 1D	31+80	1.0 Lt.	1.0-3.0	208713	1	4.7			SW-SM	A-1-b	0
HB-AUBU-103, 2D	31+80	1.0 Lt.	5.0-7.0	208716	2	14.4			SM	A-4	III
HB-AUBU-105, 1D	33+50	20.3 Rt.	0.0-2.0	208718	3	14.8			SM	A-2-4	II
HB-AUBU-105, 2D	33+50	20.3 Rt.	5.0-7.0	208719	3	21.3			SM	A-2-4	II
HB-AUBU-105, 3D	33+50	20.3 Rt.	10.0-12.0	208720	3	31.6			ML	A-4	IV
HB-AUBU-106, 1D	36+40	5.5 Rt.	1.0-3.0	208714	1	4.1			SW-SM	A-1-b	0
HB-AUBU-106, 2D	36+40	5.5 Rt.	5.0-7.0	208717	2	20.3			ML	A-4	IV

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

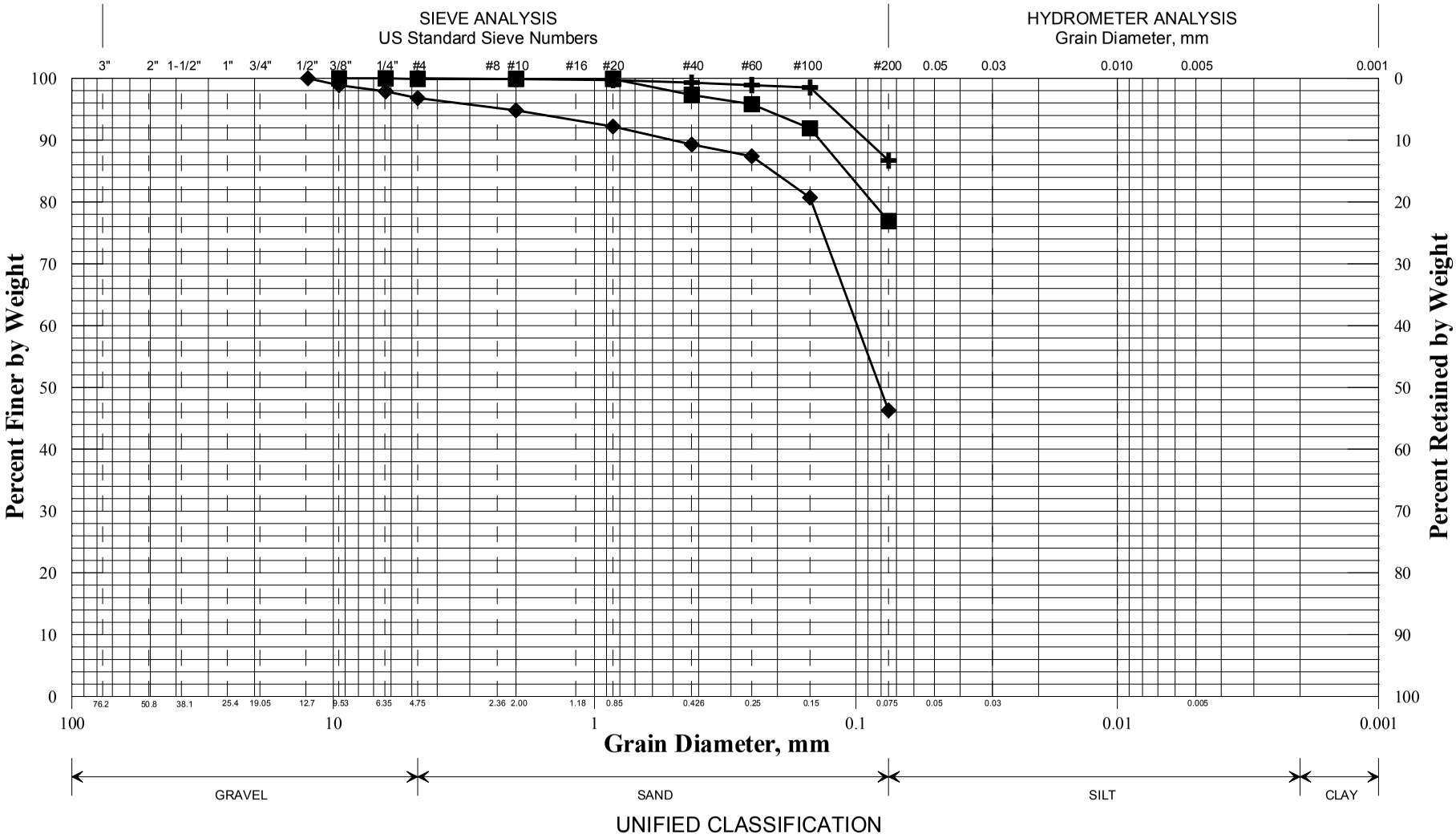
GSDC = Grain Size Distribution Curve as determined by AASHTO T 88-93 (1996) and/or ASTM D 422-63 (Reapproved 1998)

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

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

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

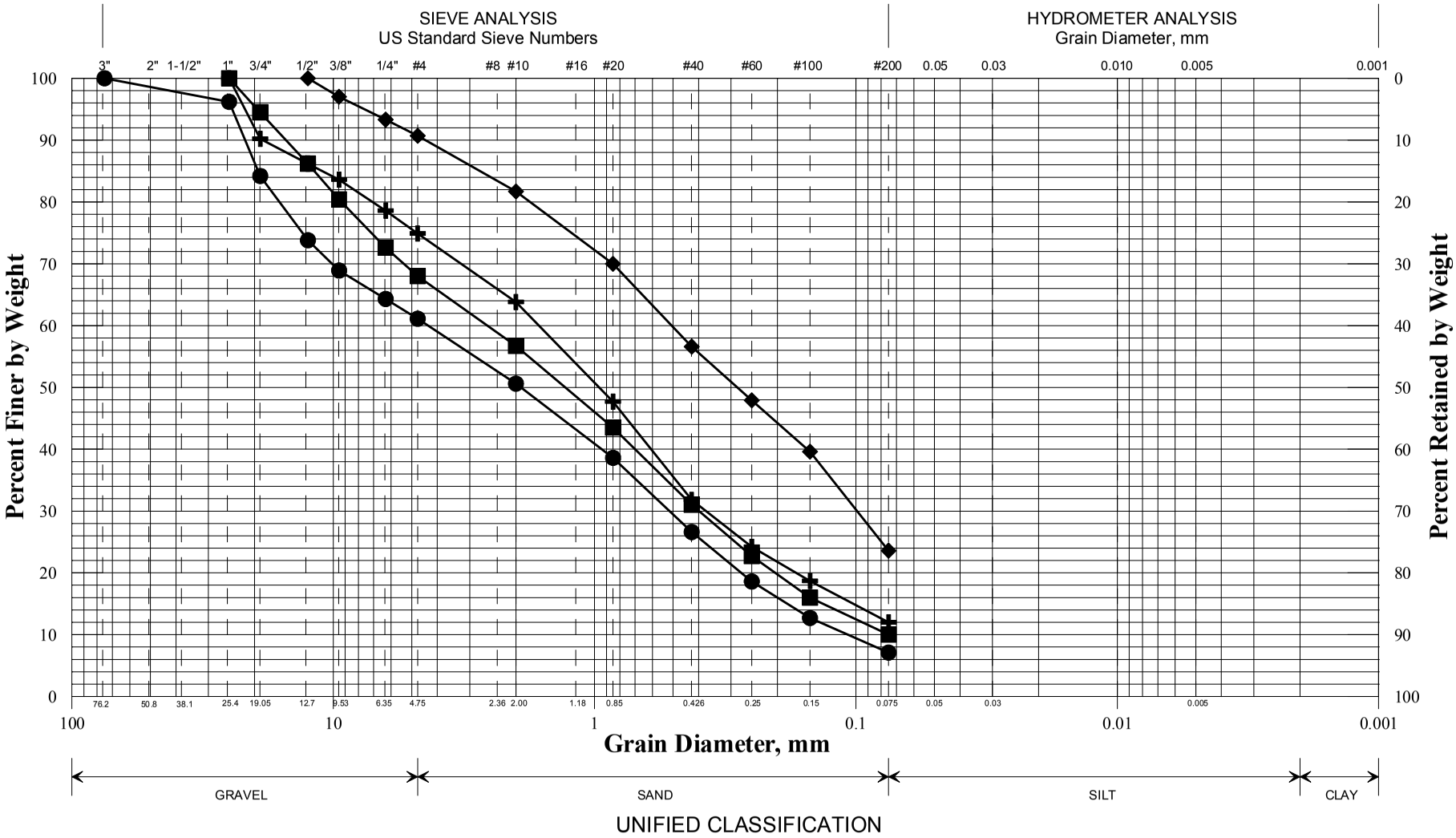
State of Maine Department of Transportation
GRAIN SIZE DISTRIBUTION CURVE



	Boring/Sample No.	Station	Offset, ft	Depth, ft	Description	W, %	LL	PL	PI
✚	BB-AUBU-101/2D	24+00	6.5 RT	5.0-7.0	SILT, little sand.	23.4			
◆	BB-AUBU-103/2D	31+80	5.5 LT	5.0-7.0	Silty SAND, trace gravel.	14.4			
■	BB-AUBU-106/2D	36+40	8.5 RT	5.0-7.0	SILT, some sand, trace gravel.	20.3			
●									
▲									
✕									

PIN
012737.00
Town
Auburn
Reported by/Date
WHITE, TERRY A 10/2/2008

State of Maine Department of Transportation
GRAIN SIZE DISTRIBUTION CURVE



	Boring/Sample No.	Station	Offset, ft	Depth, ft	Description	W, %	LL	PL	PI
✚	BB-AUBU-101/1D	24+00	6.5 LT	1.0-3.0	SAND, some gravel, little silt.	3.5			
◆	BB-AUBU-102/1D	28+00	7.5 RT	1.0-3.0	SAND, some silt, trace gravel.	8.4			
■	BB-AUBU-103/1D	31+80	5.5 LT	1.0-3.0	SAND, some gravel, trace silt.	4.7			
●	BB-AUBU-106/1D	36+40	8.5 RT	1.0-3.0	Gravelly SAND, trace silt.	4.1			
▲									
✕									

PIN
012737.00
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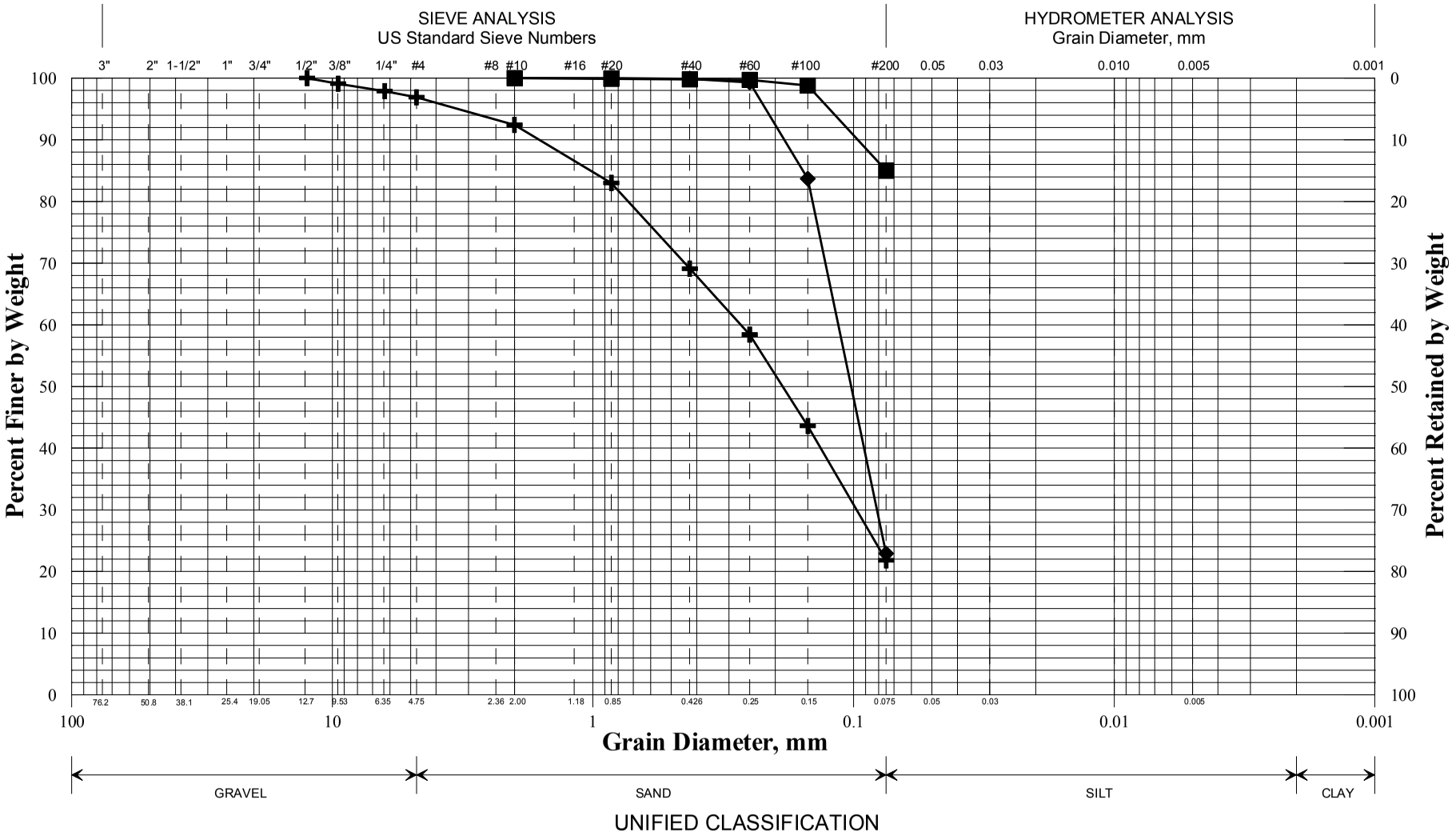
State of Maine Department of Transportation
GRAIN SIZE DISTRIBUTION CURVE



	Boring/Sample No.	Station	Offset, ft	Depth, ft	Description	W, %	LL	PL	PI
✚	BB-AUBU-105/1D	33+50	21.5 RT	0-2.0	SAND, some silt, trace gravel.	14.8			
◆	BB-AUBU-105/2D	33+50	21.5 RT	5.0-7.0	SAND, some silt.	21.3			
■	BB-AUBU-105/3D	33+50	21.5 RT	10.0-12.0	SILT, little sand.	31.6			
●									
▲									
✕									

PIN
012737.00
Town
Auburn
Reported by/Date
WHITE, TERRY A 10/2/2008

Auburn - Turner/Joline Dr.
12737.00

July 9, 2008

Station (Feet)	Subgrade Resilient Modulus (psi)	Pavement Depth (in)	* Combined Pavement/Gravel Depth Used for Calculation (in)
21+50	6,160	4.8	30
23+00	4,272	4.8	30
24+50	2,404	4.8	30
26+00	2,391	4.8	30
27+50	2,701	6	30
29+00	2,938	6	30
30+50	3,579	6	30
32+00	4,879	6	30
33+36	3,825	3.6	30
35+00	4,345	3.6	30
36+50	3,802	3.6	30

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