Highway Program

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Memorandum

To: Paul MacDonald
From: Karen Gross
Date: 03/10/11
Subject: Final Geotechnical Information
Old Town, Stillwater Ave/US Rte. 2A
PIN 14794.00, Report No. 2011-107

All subsurface investigations and lab testing have been completed for the Stillwater Avenue (U.S. Route 2A) project in Old Town. The primary focus of these investigations was to determine the general types of existing pavement materials and subsurface soils in order to select the appropriate pavement treatment for this project.

Project Description

The project begins at the intersection with College Avenue, and extends northerly 1.02 miles to the entrance of the elementary school. The proposed scope of work includes widening the existing roadway to accommodate four 11' travel lanes and 5' paved shoulders, and improvements to the drainage system.

Site Description

Site visits were done to evaluate the existing pavement structure condition, to identify the types of pavement distresses, to note geological features, and to establish the preliminary subsurface investigation program. This section of Route 2A/Stillwater Ave is adjacent to many businesses, a cemetery, houses, and open fields. The topography of the roadway is relatively flat.

The existing pavement geometry changes along the project: four lanes from the intersection with College Avenue to Tim Horton's, three lanes from Tim Horton's to V.I.P., two lanes from V.I.P. to Roy Brothers, and three lanes from Roy Brothers to the intersection with the University of Maine/elementary school road. The existing travel lanes are 12' wide, with variable width paved shoulders in curbed sections, and 8' wide paved shoulders in sections without curbing. The pavement is moderately distressed, with the primary forms of distress being longitudinal and transverse cracking and patching from utility cuts. Cracks are spaced a consistent distance in both the longitudinal and transverse direction along most of the project length which can indicate an underlying concrete pavement. A few areas in the northbound lane are rutted and alligator cracked in the right wheel path, indicating a structural failure due to lack of support for the applied traffic loadings.

Drainage ditches are non-existent or shallow along the uncurbed sections. Storm water in curbed sections is collected and removed via a catch basins and a closed drainage system.

Geology

The Surficial Geology map for the Old Town Quadrangle indicates that the surficial soils consist of Presumpscot Formation (Pp) and Till (Pt). Presumpscot Formation consists of fine-grained marine silts and clays typically with varying quantities of fine sand. Till consists of a mix of sand, gravel, silt, clay, cobbles, and boulders.

The Soil Conservation Survey (SCS) maps show five soil units at this location: Biddeford silt loam (BoA), Buxton silt loam (BuA, BuB), Howland very stony loam (HvB), Scantic silt loam (ScB), and Suffield silt loam (SuB, SuC). SCS maps were developed for agricultural purposes, but they contain a section with information on the engineering properties and classifications of the soils that are useful. Table 1 lists the SCS soils and related engineering properties.

Table 1: Soil Conservation Survey Engineering Properties Summary

Map Symbol	Soil	Brief Description	Classification		Permeability (in/hr)	Depth to High Water Table (ft)	Frost Susceptibility
			Unified	AASHTO			
BoA	Biddeford silt loam	marine silt & clay	ML-CL	A-4, A-6	0.20 to 0.63	at surface	high
BuA, BuB	Buxton silt loam	marine silt & clay	ML-CL	A-4, A-6	0.20 to 0.63	1.5 to 2	high
HvB	Howland very stony loam	glacial till	ML-CL	A-4	0.20 to 2.0	1 to 3	high
ScB	Scantic silt loam	silt & clay	ML-CL	A-4, A-6	0.20 to 0.63	at surface	high
SuB, SuC	Suffield silt loam	marine silt & clay	ML-CL	A-4, A-6	0.20 to 2.0	> 5	moderate

As-Built Plans

As-built plans were located for a HMA resurfacing and drainage improvements project constructed in 1991. The resurfacing consisted of a 1¼″ overlay over the existing asphalt surface. As-built's for the original construction were not located in the MaineDOT database.

Subsurface Investigations and Lab Testing

Twenty borings were drilled (May 2009) in the roadway and shoulders in order to determine the subsurface material types, and to collect representative samples of the existing base/subbase gravels and subgrade. Borings were drilled to a depth of approximately 5' or refusal, which ever came first. One asphalt core was collected to confirm HMA thicknesses as reported on the boring logs.

Laboratory testing was completed on eight samples to determine the grain size distribution, water content, the Unified and AASHTO classification, and the Frost Susceptibility Rating of the subbase and subgrade.

A boring summary sheet, boring logs, lab testing summary sheet, and grain size curves are attached for your reference.

Subsurface Conditions

Boring information indicates that the existing pavement structure in the travel lanes consists of 4.8″ to 7.2″ of HMA over a 6″ concrete pavement. A thin granular layer of aggregate (2.4″ to 3.6″) exists over the concrete pavement at all locations where concrete was encountered in the borings. An aggregate layer was placed over concrete pavements in some past projects to function as a crack arresting layer. These granular layers main function is to eliminate reflective cracking from the underlying concrete pavement joints up through the asphalt surface.

The HMA core consists of 1" of 12.5 mm mix (surface), 1 ¼ ″ of 12.5 mm mix, ¾ ″ of 9.5 mm mix, 1 ½ ″ of 12.5 mm mix, and a ½ ″ base layer of a coarse penetrated gravel (5" total).

The base/subbase gravel ranges from 12″ to 46.8″ in thickness. Lab test results indicate that the existing base/subbase does not meet any MaineDOT specifications for aggregate base/subbase materials and the percent passing the #200 sieve significantly exceeds all MaineDOT subbase/base course aggregate requirements. It is inconclusive if this layer is natural material or was placed under the concrete. No as-built plans were found for this section for the time the concrete pavement was placed, so the original construction details are unknown.

The gravel in the shoulders appears to be the same material that was placed under the concrete pavement. Because of the lack of drainage provisions, I am assuming that the original pavement was constructed as a bathtub section which is common with the older concrete pavements.

The subgrade soils consist of varying amounts of silt and sand. This confirms the natural soils as indicated on the geology and SCS maps. These soils are classified as A-4 (AASHTO), and SM and ML (Unified) and are moderately to highly frost susceptible.

Shallow refusals were encountered in borings at stations 104+00 (1.1' b.g.s.) and 107+50 (3.5' b.g.s.). It is unconfirmed if the refusal at station 104+00 was bedrock, a boulder, or concrete.

No groundwater was encountered in any borings, however saturated soils were encountered at the following locations and depths:

Boring #	Station	Offset (ft) from existing CL	Direction from CL	Depth to Water (ft –b.g.s.)
HB-OT-107	117+50	16	L	soil wet @ 0.1'
HB-OT-108	122+50	7	L	soil wet @ 2.2'
HB-OT-109	122+50	16	L	soil wet @ 1.0'
HB-OT-110	127+50	2	R	soil wet @ 2.1'
HB-OT-111	127+50	15	R	soil wet @ 3.0'
HB-OT-113	132+00	16	L	soil wet @ 2.6'
HB-OT-120	151+50	8	L	soil wet @ 2.9'

Saturated soils can indicate water trapped beneath the pavement, or that the zone of capillary action and the groundwater table is probably not far below the wet soils.

Final Recommendations

The following are recommendations for the pavement structure design, construction, and drainage provisions.

Pavement

- Removing the existing concrete pavement is recommended for long term performance and serviceability of the roadway. Concrete pavements with a gravel crack arresting layer placed between the concrete and asphalt layer have been observed to be moderately to severely distressed when exposed during construction. The condition of the existing concrete pavement is unknown.
- The existing granular material underlying the concrete pavement and in the shoulders does not meet any MaineDOT specifications for base or subbase gravel. Based on the gradation, it is considered moderately frost susceptible and has a low permeability. If the concrete pavement is removed, this material should not be used as subbase for the new pavement structure.
- In-place Rubblization of the concrete pavement is not feasible at this location due to the location of underground utilities and the closeness of buildings to the roadway. Vibrations from the rubblizing process can damage underground utilities and building foundations. Noise and dust would also be an issue for abutting homes and businesses.
- If the concrete pavement must remain in place, the old asphalt and granular layer should be removed and replaced with new HMA. Borings indicate that a total of 8.4″ of gravel and HMA consistently overlies the concrete pavement. A 2″ asphalt rich base with a minimum of 4″ of HMA over it is one option that could be used to mitigate future reflective cracking.
- If the concrete pavement must remain in place, a pavement design should be done for the widened sections. The HMA layer thickness for the widened area should be the same as what is used over the concrete. A pavement design can not be done for a composite pavement with MaineDOT current pavement design methods.
- An FWD analysis can't be done due to the underlying concrete pavement. If this pavement is removed, a resilient modulus of 4000 psi can be used for design providing drainage improvements are made.
- If the concrete pavement is removed, a total pavement structure depth of 30" is recommended to reduce the depth of frost penetration into the underlying frost susceptible soils.

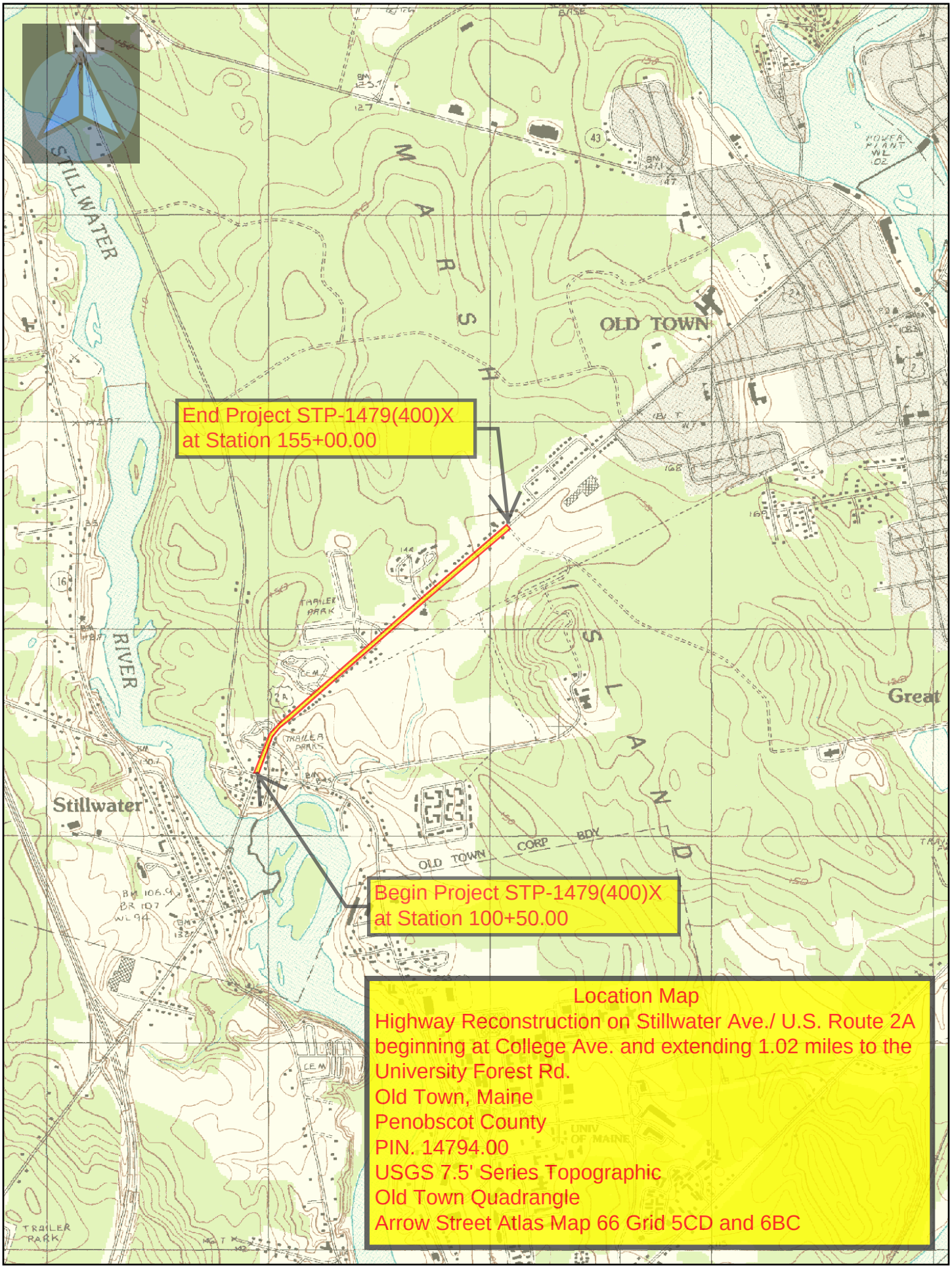
Drainage

- Drainage improvements to remove surface and subsurface water are recommended along the entire length of the project. This can be accomplished by daylighting the subbase aggregate into ditches or by using longitudinal underdrains if ditching is not feasible. The existing soils become significantly weaker when saturated, therefore drainage of the pavement structure will ensure a longer design life.

- The subgrade is moderately to highly frost susceptible. The anticipated depth of frost penetration beneath the pavement structure at this location is between 46” and 56". Since frost action is dependant on a water source, eliminating water will reduce or eliminate both frost heaving and thaw weakening. Thaw weakening is expected to be the most detrimental to the pavement at this location based on the existing subgrade soil types.
- Cross pipes located at or above the anticipated frost depth should include MaineDOT typical transitions to reduce differential heaving.

All supporting documentation from the investigations and the geology maps are attached for your reference. Please let me know if you have any questions regarding this report or if you need any additional information.

ATTACHMENTS:
Project Location Map
Boring Summary Sheet
Boring Logs
Laboratory Testing Summary Sheet
Grain Size Distribution Curves
Frost Charts
Surficial Geology
Soil Conservation Survey
Photographs
Plan Sheets



Map Scale 1:24000

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

BORING SUMMARY SHEET
OLD TOWN, STILLWATER AVE.
PIN 14794.00

Boring #	Station	Offset (ft) from existing CL	Direction from CL	HMA (in)	Concrete (in)	Subbase/ Base Aggregate (in)	% Passing #200	Agg Meet Spec??	Subgrade Type	Refusal (ft)	Water (ft)	Comments	
HB-OT-101	104+00	8	L	6		7.2		no		1.1		refusal - boulder or concrete???	
HB-OT-102	107+50	11	L	7.2		34.8	17.7	no		3.5			
HB-OT-103	107+50	25	L									shoulder	
HB-OT-104	112+50	1	R	4.8	6	14.4	19.9	no	silty SAND			3.6" of gravel over concrete	8.4" over concrete
HB-OT-105	112+50	15	R	3.6		56.4		no				shoulder	
HB-OT-106	117+50	7.5	L	6	6	31.2		no	silty SAND			2.4" of gravel over concrete	8.4" over concrete
HB-OT-107	117+50	16	L	1.2		40.8		no			soil wet @ 0.1'	shoulder	
HB-OT-108	122+50	7	L	4.8	4.8	13.2		no	SAND		soil wet @ 2.2'	3.6" of gravel over concrete	8.4" over concrete
HB-OT-109	122+50	16	L	1.2							soil wet @ 1.0'	shoulder	
HB-OT-110	127+50	2	R	4.8	4.8	12		no	SILT		soil wet @ 2.1'	3.6" of gravel over concrete	8.4" over concrete
HB-OT-111	127+50	15	R	2.4							soil wet @ 3.0'	shoulder	
HB-OT-112	132+00	7	L	4.8	4.8	19.2		no	SILT			3.6" of gravel over concrete	8.4" over concrete
HB-OT-113	132+00	16	L	1.2							soil wet @ 2.6'	shoulder	
HB-OT-114	137+50	2	R	4.8	6	19.2	22.7	no	SILT			3.6" of gravel over concrete	8.4" over concrete
HB-OT-115	137+50	16.5	R	3.6		36		no					
HB-OT-116	142+00	7	L	4.8	4.8	46.8		no	SAND			3.6" of gravel over concrete	8.4" over concrete
HB-OT-117	142+00	16	L	2.4		18		no				shoulder	
HB-OT-118	147+00	3	R	4.8	4.8	15.6		no	SILT			3.6" of gravel over concrete	8.4" over concrete
HB-OT-119	147+00	16	R	2.4		19.2		no					
HB-OT-120	151+50	8	L	4.8	4.8	21.6	28.7	no	SILT		soil wet @ 2.9'	3.6" of gravel over concrete	8.4" over concrete

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Stillwater Avenue/US Route 2A
Location: Old Town, Maine

Boring No.: HB-OT-101
PIN: 14794.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	E. Giguere/C. Giles	**Datum:**	NAVD 88	**Sampler:**	Off Flights
Logged By:	B. Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	5/11/09-5/11/09	**Drilling Method:**	Soild Stem Auger	**Core Barrel:**	N/A
Boring Location:	104+00, 8.0 Lt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed
Hammer Efficiency Factor:		**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							SSA	-0.50		PAVEMENT. (0.50)	
								-1.10		Brown, dry, gravelly fine to medium SAND, trace silt. (1.10)	
										Bottom of Exploration at 1.10 feet below ground surface. REFUSAL (Boulder ?)	
5											
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.

Boring No.: HB-OT-101

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Stillwater Avenue/US Route 2A
Location: Old Town, Maine

Boring No.: HB-OT-102
PIN: 14794.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	E. Giguere/C. Giles	**Datum:**	NAVD 88	**Sampler:**	Off Flights
Logged By:	B. Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	5/11/09-5/11/09	**Drilling Method:**	Soild Stem Auger	**Core Barrel:**	N/A
Boring Location:	107+50, 11.0 Lt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed
Hammer Efficiency Factor:		**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☐		

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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
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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	S1		0.60 - 3.50				SSA	-0.60		PAVEMENT. 0.60	
										Brown, damp, fine to coarse SAND, some gravel, trace silt.	G#207248 A-1-b, SM WC=3.3%
								-3.50		3.50	
										Bottom of Exploration at 3.50 feet below ground surface. REFUSAL	
5											
10											
15											
20											
25											

Remarks:

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Boring No.: HB-OT-102

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Stillwater Avenue/US Route 2A
Location: Old Town, Maine

Boring No.: HB-OT-103
PIN: 14794.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	E. Giguere/C. Giles	**Datum:**	NAVD 88	**Sampler:**	Off Flights
Logged By:	B. Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	5/11/09-5/11/09	**Drilling Method:**	Soild Stem Auger	**Core Barrel:**	N/A
Boring Location:	107+50, 25.0 Lt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed
Hammer Efficiency Factor:		**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☐		

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RC = Roller Cone
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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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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		Winter SAND. 0.40	
										Brown, damp, fine to coarse SAND, some gravel, trace silt .≅S1	
5								-5.00		5.00	
										Bottom of Exploration at 5.00 feet below ground surface. NO REFUSAL	
10											
15											
20											
25											

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Boring No.: HB-OT-103

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Stillwater Avenue/US Route 2A
Location: Old Town, Maine

Boring No.: HB-OT-104
PIN: 14794.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	E. Giguere/C. Giles	**Datum:**	NAVD 88	**Sampler:**	Off Flights
Logged By:	B. Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	5/11/09-5/11/09	**Drilling Method:**	Soild Stem Auger	**Core Barrel:**	N/A
Boring Location:	112+50, 1.0 Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed
Hammer Efficiency Factor:		**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☐		

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Sample Information

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	PC-1		0.00 - 0.40				SSA	-0.40	PAVEMENT, core taken. (0.40)	
	S2		1.20 - 2.40					-0.70	Layer of GRAVEL. (0.70)	G#207249 A-1-b, SM WC=7.4%
	S3		2.40 - 5.00					-1.20	CONCRETE. (1.20)	G#207250 A-4, SM WC=12.0%
								-2.40	Brown, moist, gravelly fine to coarse SAND, trace silt. (2.40)	
									Grey, damp, silty fine to coarse SAND, trace gravel.	
5								-5.00	(5.00)	
10										
15										
20										
25										

Bottom of Exploration at 5.00 feet below ground surface.
NO REFUSAL

Remarks:

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Stillwater Avenue/US Route 2A
Location: Old Town, Maine

Boring No.: HB-OT-105
PIN: 14794.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	E. Giguere/C. Giles	**Datum:**	NAVD 88	**Sampler:**	Off Flights
Logged By:	B. Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	5/11/09-5/11/09	**Drilling Method:**	Soild Stem Auger	**Core Barrel:**	N/A
Boring Location:	112+50, 15.0 Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed
Hammer Efficiency Factor:		**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☐		

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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	-0.30		PAVEMENT. 0.30	
										Brown, moist, gravelly fine to coarse SAND, trace silt. ≅S2	
5								-5.00		5.00	
										Bottom of Exploration at 5.00 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: Stillwater Avenue/US Route 2A
Location: Old Town, Maine

Boring No.: HB-OT-106
PIN: 14794.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	E. Giguere/C. Giles	**Datum:**	NAVD 88	**Sampler:**	Off Flights
Logged By:	B. Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	5/11/09-5/11/09	**Drilling Method:**	Soild Stem Auger	**Core Barrel:**	N/A
Boring Location:	117+50, 7.5 Lt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed
Hammer Efficiency Factor:		**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

Sample Information

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.)	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0							SSA	-0.50	PAVEMENT. (0.50)	
								-0.70	Layer of GRAVEL. (0.70)	
								-1.20	CONCRETE. (1.20)	
									Brown, moist, gravelly fine to coarse SAND, trace silt. ≅S2	
	S4		3.80 - 5.00					-3.80	(3.80)	
									Brown, moist, silty fine to medium SAND, trace fine gravel.	G#207196 A-4, ML WC=13.0%
5								-5.00	(5.00)	
									Bottom of Exploration at 5.00 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.

Boring No.: HB-OT-106

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Stillwater Avenue/US Route 2A
Location: Old Town, Maine

Boring No.: HB-OT-107
PIN: 14794.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	E. Giguere/C. Giles	**Datum:**	NAVD 88	**Sampler:**	Off Flights
Logged By:	B. Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	5/11/09-5/11/09	**Drilling Method:**	Soild Stem Auger	**Core Barrel:**	N/A
Boring Location:	117+50, 16.0 Lt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed
Hammer Efficiency Factor:		**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	S5		0.10 - 3.50				SSA	-0.10		PAVEMENT. 0.10	
										Brown, wet, gravelly fine to coarse SAND, little silt.	
								-3.50		3.50	
5								-5.00		5.00	
										Bottom of Exploration at 5.00 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.

Boring No.: HB-OT-107

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Stillwater Avenue/US Route 2A
Location: Old Town, Maine

Boring No.: HB-OT-108
PIN: 14794.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	E. Giguere/C. Giles	**Datum:**	NAVD 88	**Sampler:**	Off Flights
Logged By:	B. Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	5/11/09-5/11/09	**Drilling Method:**	Soild Stem Auger	**Core Barrel:**	N/A
Boring Location:	122+50, 7.0 Lt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed
Hammer Efficiency Factor:		**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							SSA	-0.40		PAVEMENT. (0.40)	
								-0.70		Layer of Brown GRAVEL. (0.70)	
								-1.10		CONCRETE. (1.10)	
								-2.20		Brown, moist, gravelly fine to coarse SAND, trace silt. ≅S2 (2.20)	
										Brown, wet, gravelly fine to coarse SAND, little silt. ≅S5	
5								-5.00		(5.00)	
10											
15											
20											
25											

Bottom of Exploration at 5.00 feet below ground surface.
NO REFUSAL

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: Stillwater Avenue/US Route 2A
Location: Old Town, Maine

Boring No.: HB-OT-109
PIN: 14794.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	E. Giguere/C. Giles	**Datum:**	NAVD 88	**Sampler:**	Off Flights
Logged By:	B. Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	5/11/09-5/11/09	**Drilling Method:**	Soild Stem Auger	**Core Barrel:**	N/A
Boring Location:	122+50, 16.0 Lt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed
Hammer Efficiency Factor:		**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							SSA	-0.10		PAVEMENT. 0.10	
								-1.00		Brown, moist, silty fine to medium SAND, trace fine gravel. ≅S4 1.00	
										Brown, wet, gravelly fine to coarse SAND, little silt. ≅S5	
5								-5.00		5.00	
										Bottom of Exploration at 5.00 feet below ground surface. NO REFUSAL	
10											
15											
20											
25											

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
US CUSTOMARY UNITS

Project: Stillwater Avenue/US Route 2A
Location: Old Town, Maine

Boring No.: HB-OT-110
PIN: 14794.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	E. Giguere/C. Giles	**Datum:**	NAVD 88	**Sampler:**	Off Flights
Logged By:	B. Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	5/11/09-5/11/09	**Drilling Method:**	Soild Stem Auger	**Core Barrel:**	N/A
Boring Location:	127+50, 2.0 Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed
Hammer Efficiency Factor:		**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

Sample Information

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.)	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0							SSA	-0.40	PAVEMENT. (0.40)	
								-0.70	Layer of Brown GRAVEL. (0.70)	
								-1.10	CONCRETE. (1.10)	
	S6		2.10 - 5.00					-2.10	Brown, moist, silty fine to medium SAND, trace fine gravel. ≈S4 (2.10)	G#207197 A-1-b, SM WC=39.5%
									Dark grey, wet, SILT, trace fine sand.	
5								-5.00	(5.00)	
10										
15										
20										
25										

Bottom of Exploration at 5.00 feet below ground surface.
NO REFUSAL

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: Stillwater Avenue/US Route 2A
Location: Old Town, Maine

Boring No.: HB-OT-111
PIN: 14794.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	E. Giguere/C. Giles	**Datum:**	NAVD 88	**Sampler:**	Off Flights
Logged By:	B. Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	5/11/09-5/11/09	**Drilling Method:**	Soild Stem Auger	**Core Barrel:**	N/A
Boring Location:	127+50, 15.0 Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed
Hammer Efficiency Factor:		**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							SSA	-0.20		PAVEMENT.	
										0.20 Brown, moist, silty fine to medium SAND, trace fine gravel. ≅S4	
								-3.00		3.00 Dark grey, wet, SILT, trace fine sand. ≅S6	
5								-5.00		5.00 **Bottom of Exploration at 5.00 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.

Boring No.: HB-OT-111

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Stillwater Avenue/US Route 2A
Location: Old Town, Maine

Boring No.: HB-OT-112
PIN: 14794.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	E. Giguere/C. Giles	**Datum:**	NAVD 88	**Sampler:**	Off Flights
Logged By:	B. Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	5/11/09-5/11/09	**Drilling Method:**	Soild Stem Auger	**Core Barrel:**	N/A
Boring Location:	132+00, 7.0 Lt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed
Hammer Efficiency Factor:		**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.)	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0							SSA	-0.40	PAVEMENT. 0.40	
								-0.70	Layer of GRAVEL. 0.70	
								-1.10	CONCRETE. 1.10	
	S7		2.70 - 5.00					-2.70	Brown, moist, silty fine to medium SAND, trace fine gravel. ≥S4 2.70	
									Olive-grey, moist, SILT, trace fine sand.	
5								-5.00	5.00	
									Bottom of Exploration at 5.00 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.

Boring No.: HB-OT-112

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Stillwater Avenue/US Route 2A
Location: Old Town, Maine

Boring No.: HB-OT-113
PIN: 14794.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	E. Giguere/C. Giles	**Datum:**	NAVD 88	**Sampler:**	Off Flights
Logged By:	B. Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	5/11/09-5/11/09	**Drilling Method:**	Soild Stem Auger	**Core Barrel:**	N/A
Boring Location:	132+00, 16.0 Lt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed
Hammer Efficiency Factor:		**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							SSA	-0.10		PAVEMENT. 0.10	
										Brown, moist, silty fine to medium SAND, trace fine gravel. ≅S4	
								-2.60		2.60	
										Dark grey, wet, SILT, trace fine sand. ≅S6	
5								-5.00		5.00	
										Bottom of Exploration at 5.00 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.

Boring No.: HB-OT-113

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Stillwater Avenue/US Route 2A
Location: Old Town, Maine

Boring No.: HB-OT-114
PIN: 14794.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	E. Giguere/C. Giles	**Datum:**	NAVD 88	**Sampler:**	Off Flights
Logged By:	B. Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	5/11/09-5/11/09	**Drilling Method:**	Soild Stem Auger	**Core Barrel:**	N/A
Boring Location:	137+50, 2.0 Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed
Hammer Efficiency Factor:		**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

Sample Information

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.)	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0							SSA	-0.40	PAVEMENT. 0.40	
								-0.70	Layer of GRAVEL. 0.70	
	S8		1.20 - 2.80					-1.20	CONCRETE. 1.20	G#207198 A-1-b, SM WC=6.5%
								-2.80	Brown, damp, fine to coarse SAND, some gravel, trace silt. 2.80	
									Olive-grey, moist, SILT, trace fine sand. ≥S7	
5								-5.00	5.00	
									Bottom of Exploration at 5.00 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: Stillwater Avenue/US Route 2A
Location: Old Town, Maine

Boring No.: HB-OT-115
PIN: 14794.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	E. Giguere/C. Giles	**Datum:**	NAVD 88	**Sampler:**	Off Flights
Logged By:	B. Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	5/11/09-5/11/09	**Drilling Method:**	Soild Stem Auger	**Core Barrel:**	N/A
Boring Location:	137+50, 16.5 Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed
Hammer Efficiency Factor:		**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							SSA	-0.30		PAVEMENT. 0.30	
										Brown, damp, fine to coarse SAND, some gravel, trace silt. ≅S8	
								-3.30		3.30	
										Olive-grey, moist, SILT, trace fine sand. ≅S7	
5								-5.00		5.00	
										Bottom of Exploration at 5.00 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.

Boring No.: HB-OT-115

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Stillwater Avenue/US Route 2A
Location: Old Town, Maine

Boring No.: HB-OT-116
PIN: 14794.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	E. Giguere/C. Giles	**Datum:**	NAVD 88	**Sampler:**	Off Flights
Logged By:	B. Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	5/11/09-5/11/09	**Drilling Method:**	Soild Stem Auger	**Core Barrel:**	N/A
Boring Location:	142+00, 7.0 Lt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed
Hammer Efficiency Factor:		**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							SSA	-0.40		PAVEMENT. 0.40	
								-0.70		Layer of GRAVEL. 0.70	
								-1.10		CONCRETE. 1.10	
										Brown, damp, fine to coarse SAND, some gravel, trace silt. ≅S8	
5								-5.00		5.00	
										Bottom of Exploration at 5.00 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.

Boring No.: HB-OT-116

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Stillwater Avenue/US Route 2A
Location: Old Town, Maine

Boring No.: HB-OT-117
PIN: 14794.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	E. Giguere/C. Giles	**Datum:**	NAVD 88	**Sampler:**	Off Flights
Logged By:	B. Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	5/11/09-5/11/09	**Drilling Method:**	Soild Stem Auger	**Core Barrel:**	N/A
Boring Location:	142+00, 16.0 Lt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed
Hammer Efficiency Factor:		**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							SSA	-0.20		PAVEMENT.	
										0.20 Brown, damp, fine to coarse SAND, some gravel, trace silt. ≅S8	
								-1.70		1.70 Olive-grey, moist, SILT, trace fine sand. ≅S7	
5								-5.00		5.00 **Bottom of Exploration at 5.00 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: Stillwater Avenue/US Route 2A
Location: Old Town, Maine

Boring No.: HB-OT-118
PIN: 14794.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	E. Giguere/C. Giles	**Datum:**	NAVD 88	**Sampler:**	Off Flights
Logged By:	B. Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	5/11/09-5/11/09	**Drilling Method:**	Soild Stem Auger	**Core Barrel:**	N/A
Boring Location:	147+00, 3.0 Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed
Hammer Efficiency Factor:		**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							SSA	-0.40		PAVEMENT. 0.40	
								-0.70		Layer of GRAVEL. 0.70	
								-1.10		CONCRETE. 1.10	
								-2.40		Brown, damp, fine to coarse SAND, some gravel, trace silt. ≅S8 2.40	
										Olive-grey, moist, SILT, trace fine sand. ≅S7	
5								-5.00		5.00	
10											
15											
20											
25											

Bottom of Exploration at 5.00 feet below ground surface.
NO REFUSAL

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
US CUSTOMARY UNITS

Project: Stillwater Avenue/US Route 2A
Location: Old Town, Maine

Boring No.: HB-OT-119
PIN: 14794.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	E. Giguere/C. Giles	**Datum:**	NAVD 88	**Sampler:**	Off Flights
Logged By:	B. Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	5/11/09-5/11/09	**Drilling Method:**	Soild Stem Auger	**Core Barrel:**	N/A
Boring Location:	147+00, 16.0 Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed
Hammer Efficiency Factor:		**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							SSA	-0.20		PAVEMENT.	
										0.20 — Brown, damp, fine to coarse SAND, some gravel, trace silt. ≅S8	
								-1.80		1.80 — Olive-grey, moist, SILT, trace fine sand. ≅S7	
5								-5.00		5.00 — **Bottom of Exploration at 5.00 feet below ground surface.** NO REFUSAL	
10											
15											
20											
25											

Remarks:

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Stillwater Avenue/US Route 2A
Location: Old Town, Maine

Boring No.: HB-OT-120
PIN: 14794.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	E. Giguere/C. Giles	**Datum:**	NAVD 88	**Sampler:**	Off Flights
Logged By:	B. Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	5/11/09-5/11/09	**Drilling Method:**	Soild Stem Auger	**Core Barrel:**	N/A
Boring Location:	151+50, 8.0 Lt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed
Hammer Efficiency Factor:		**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
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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

Sample Information

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.)	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0							SSA	-0.40	PAVEMENT. (0.40)	
								-0.70	Layer of GRAVEL. (0.70)	
	S9		1.10 - 2.90					-1.10	CONCRETE. (1.10)	G#207199 A-2-4, SM WC=7.4%
	S10		2.90 - 5.00						Brown, damp, fine to coarse SAND, some gravel, trace silt. (2.90)	
								-2.90	Grey, wet, SILT, trace fine sand.	G#207200 A-4, SM WC=20.3%
5								-5.00	(5.00)	
10										
15										
20										
25										

Bottom of Exploration at 5.00 feet below ground surface.
NO REFUSAL

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): Old Town Project Number: 14794.00

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-OT-102, S1	107+50	11.0 Lt.	0.60-3.5	207248	1	3.3			SM	A-1-b	II
HB-OT-104, S2	112+50	1.0 Rt.	1.2-2.4	207249	1	7.4			SM	A-1-b	II
HB-OT-104, S3	112+50	1.0 Rt.	2.4-5.0	207250	1	12.0			SM	A-4	III
HB-OT-106, S4	117+50	7.5 Lt.	3.8-5.0	207196	1	13.0			ML	A-4	IV
HB-OT-110, S6	127+50	2.0 Rt.	2.1-5.0	207197	2	39.5			SM	A-1-b	II
HB-OT-114, S8	137+50	2.0 Rt.	1.2-2.8	207198	2	6.5			SM	A-1-b	II
HB-OT-120, S9	151+50	8.0 Lt.	1.1-2.9	207199	2	7.4			SM	A-2-4	II
HB-OT-120, S10	151+50	8.0 Lt.	2.9-5.0	207200	2	20.3			SM	A-4	III

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.

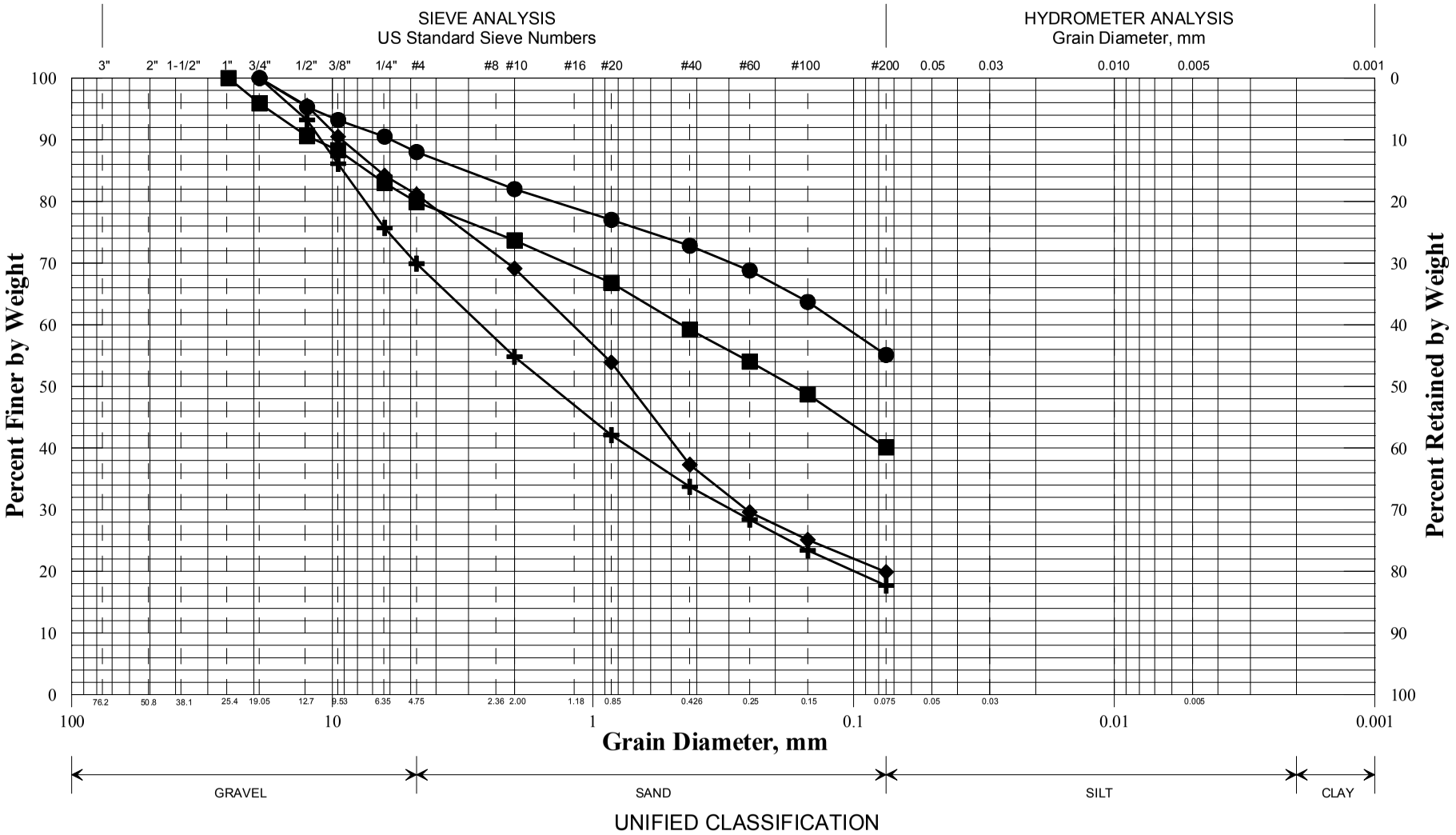
GSDC = Grain Size Distribution Curve as determined by AASHTO T 88-93 (1996) and/or ASTM D 422-63 (Reapproved 1998)

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



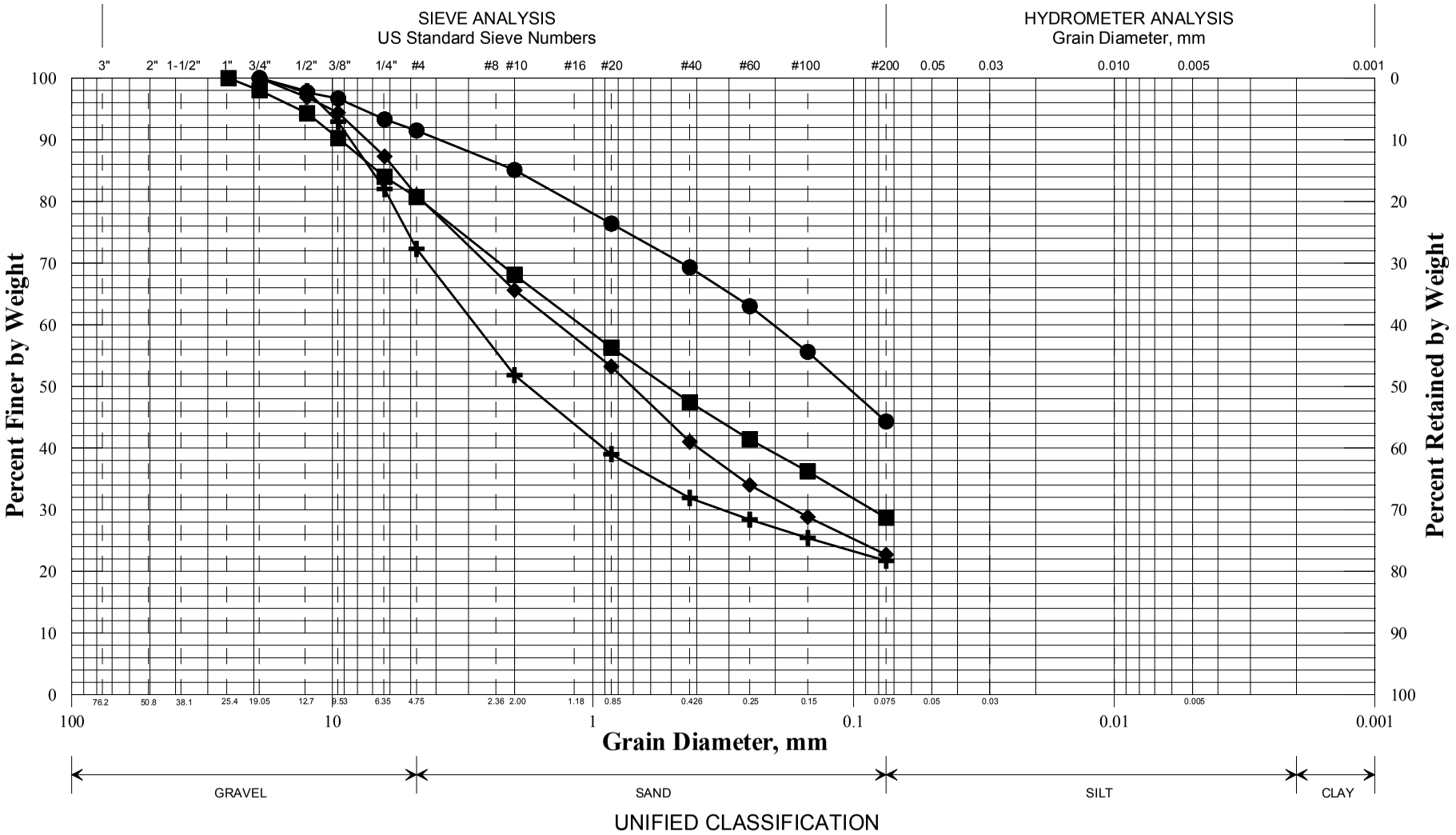
UNIFIED CLASSIFICATION

	Boring/Sample No.	Station	Offset, ft	Depth, ft	Description	W, %	LL	PL	PI
✚	HB-OT-102/S1	107+50	11.0 LT	0.6-3.5	SAND, some gravel, little silt.	3.3			
◆	HB-OT-104/S2	112+50	1.0 RT	1.2-2.4	SAND, little silt, little gravel.	7.4			
■	HB-OT-104/S3	112+50	1.0 RT	2.4-5.0	Sandy SILT, little gravel.	12.0			
●	HB-OT-106/S4	117+50	7.5 LT	3.8-5.0	SILT, some sand, little gravel.	13.0			
▲									
✕									

PIN
014794.00
Town
Old Town
Reported by/Date
WHITE, TERRY A 6/1/2009

SHEET 1

State of Maine Department of Transportation
GRAIN SIZE DISTRIBUTION CURVE

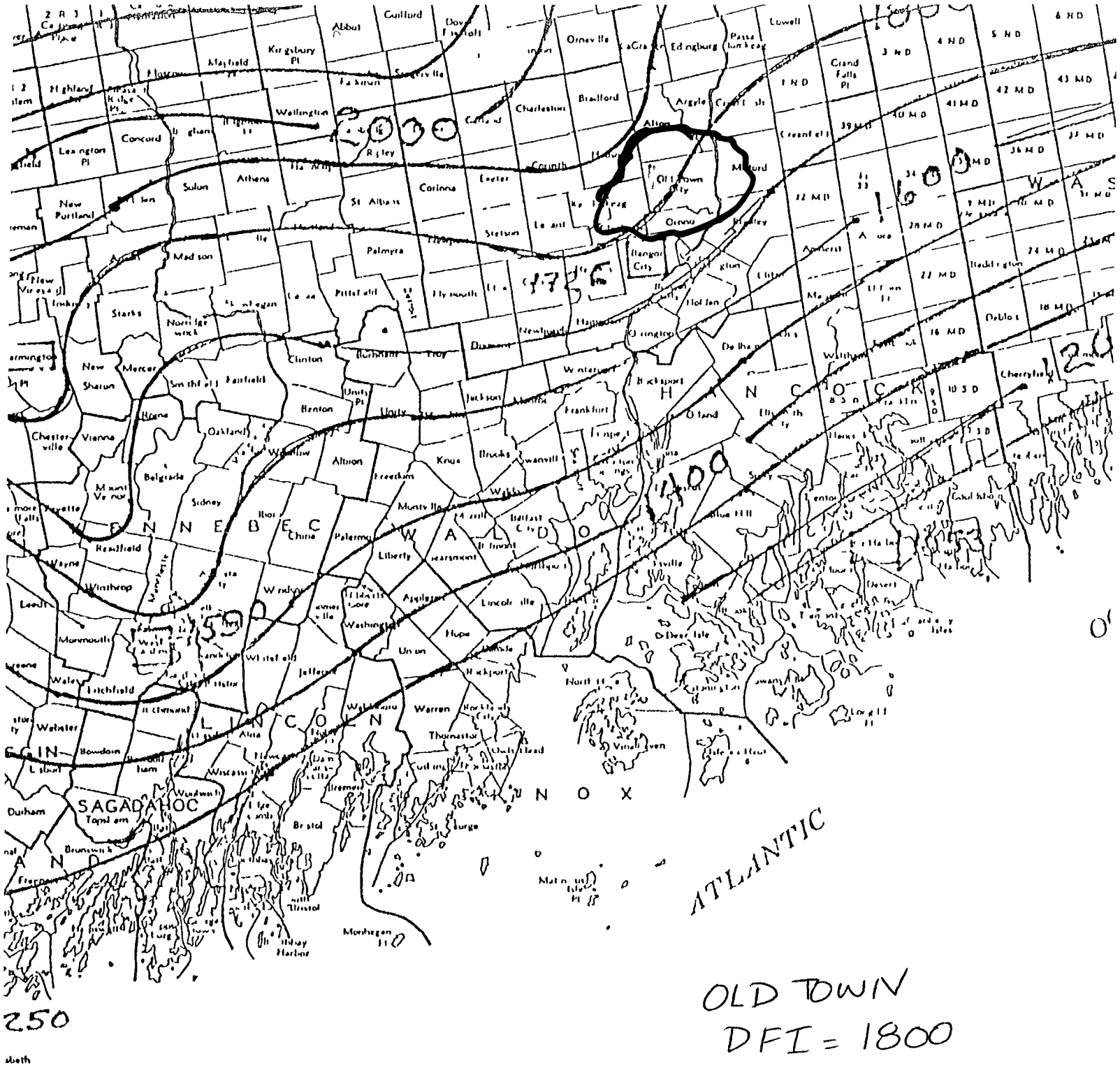


UNIFIED CLASSIFICATION

	Boring/Sample No.	Station	Offset, ft	Depth, ft	Description	W, %	LL	PL	PI
✚	HB-OT-110/S6	127+50	2.0 RT	2.1-5.0	SAND, some gravel, some silt.	39.5			
◆	HB-OT-114/S8	137+50	2.0 RT	1.2-2.8	SAND, some silt, little gravel.	6.5			
■	HB-OT-120/S9	151+50	8.0 LT	1.1-2.9	SAND, some silt, little garvel.	7.4			
●	HB-OT-120/S10	151+50	8.0 LT	2.9-5.0	Silty SAND, trace gravel.	20.3			
▲									
✕									

PIN
014794.00
Town
Old Town
Reported by/Date
WHITE, TERRY A 6/1/2009

SHEET 2



EXTRAPOLATIONS BASED ON

1. COLDEST YEAR IN 10, 1958-67 FIG 7
2. FORT KENT, DATA, COLDEST YEAR IN 21
3. PLANT HARDINESS ZONE MAP, USDA MISCELLANEOUS PUBLICATION NO 814

MAINE

DESIGN FREEZING INDEX

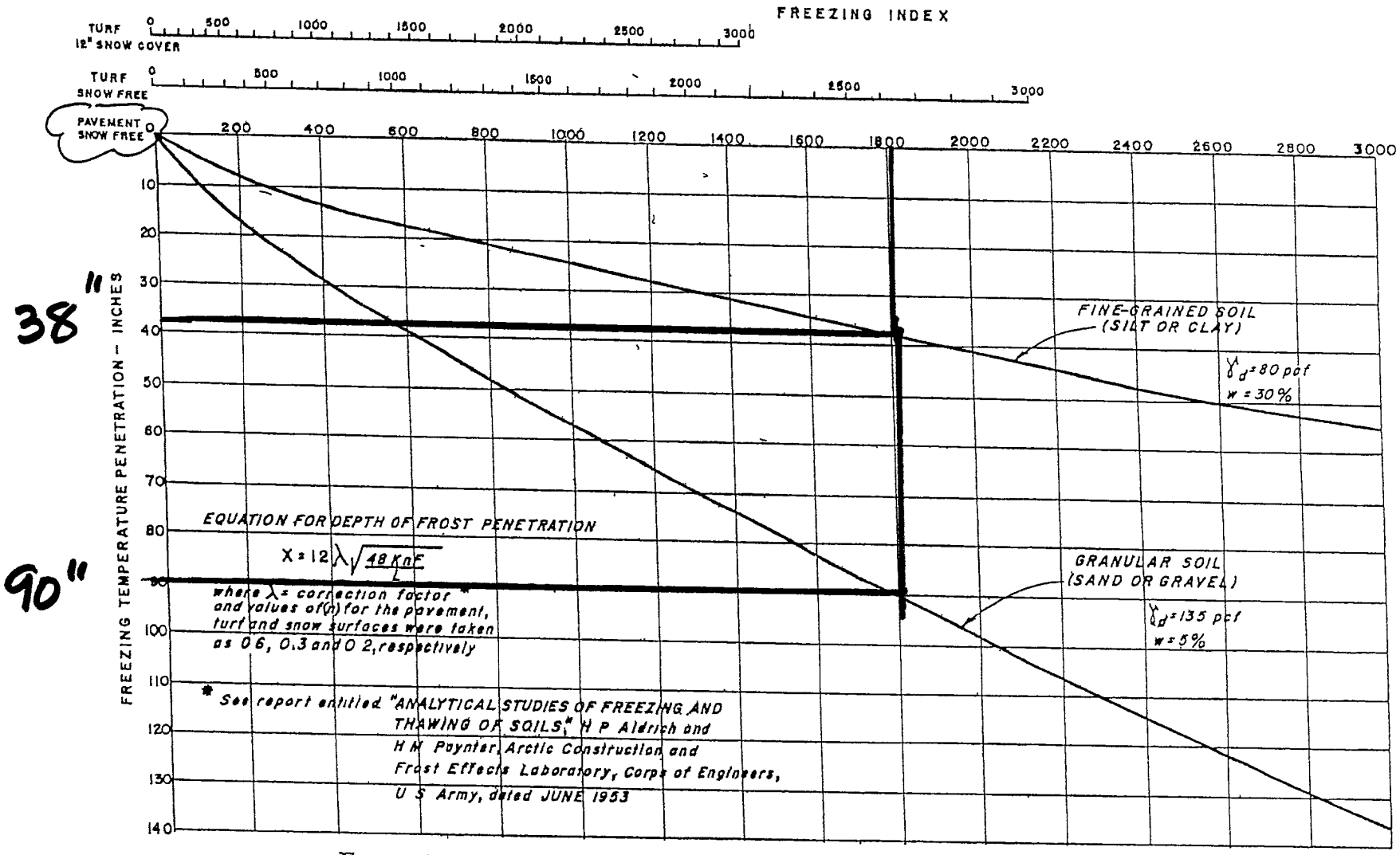
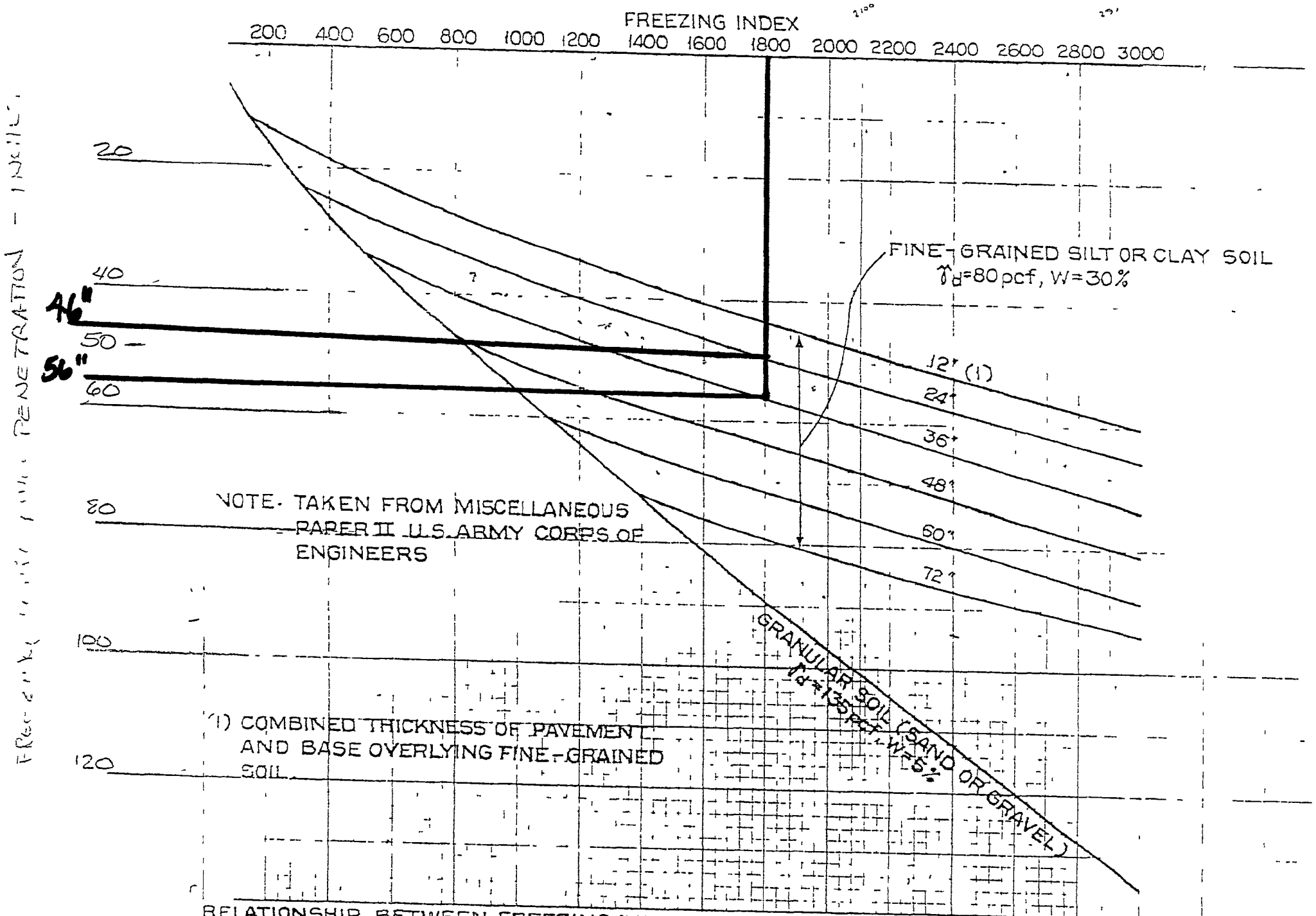
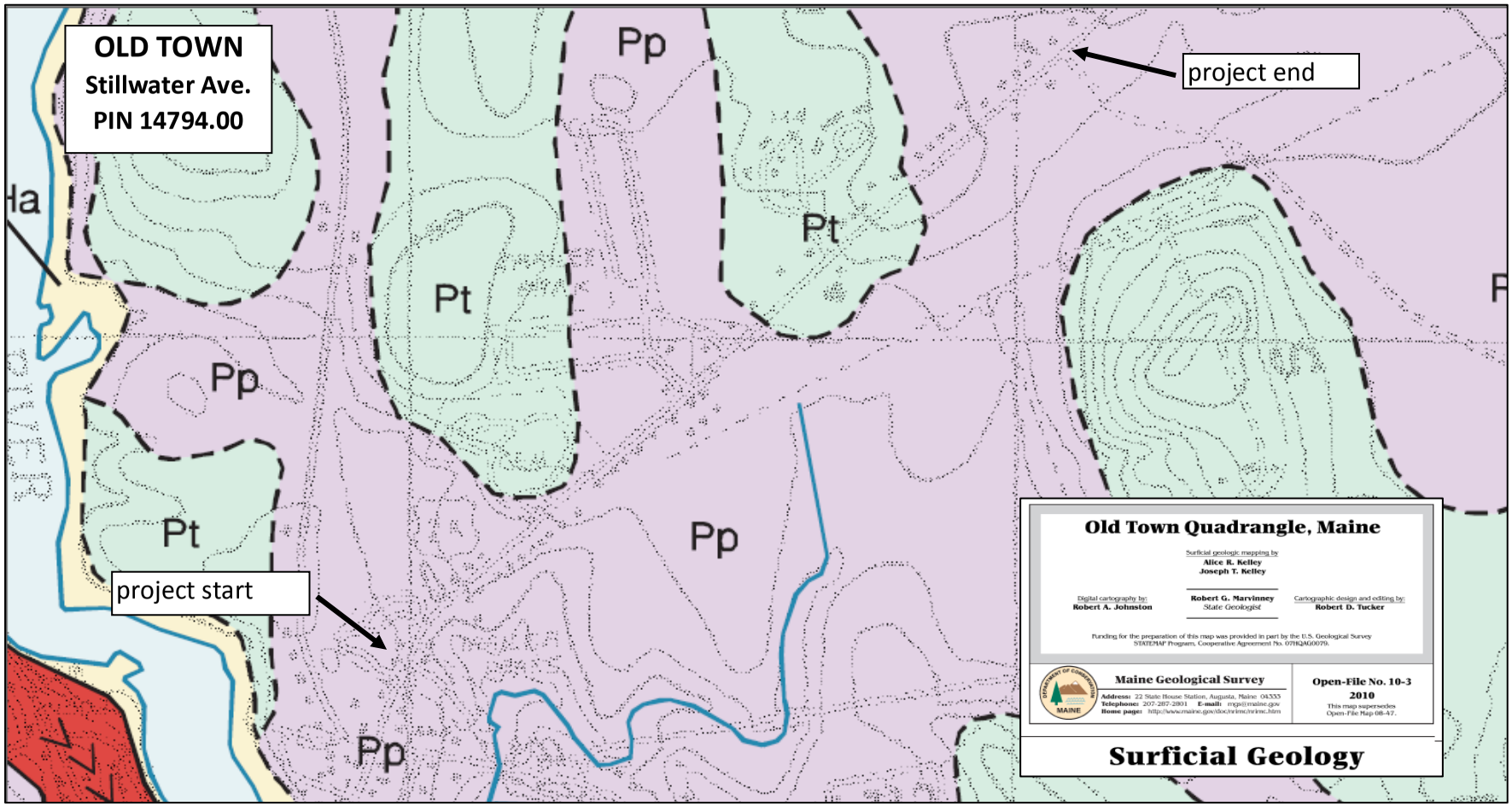


Figure 13-3 RELATIONSHIP BETWEEN FREEZING INDEX AND FREEZING TEMPERATURE PENETRATION FOR VARIOUS SURFACE CONDITIONS FOR GRANULAR AND FINE-GRAINED SOILS



RELATIONSHIP BETWEEN FREEZING INDEX AND FREEZING TEMPERATURE PENETRATION FOR GRANULAR SOIL UNDERLAIN BY FINE-GRAINED SOIL


OLD TOWN
Stillwater Ave.
PIN 14794.00
project end
project start
Pp
Pt
Pp
Pt
Pt
Pp
Pp
Ha
Old Town Quadrangle, Maine
Surficial geologic mapping by
Alice R. Kelley
Joseph T. Kelley
Digital cartography by:
Robert A. Johnston
Robert G. Marvinney
State Geologist
Cartographic design and editing by:
Robert D. Tucker
Funding for the preparation of this map was provided in part by the U.S. Geological Survey STATEMAP Program, Cooperative Agreement No. 07HQAG0079.
Maine Geological Survey
Address: 22 State House Station, Augusta, Maine 04333
Telephone: 207-287-2801 E-mail: mgs@maine.gov
Home page: http://www.maine.gov/doc/nrimc/mrimc.htm
Open-File No. 10-3
2010
This map supersedes Open-File Map 08-47.
Surficial Geology

Old Town Quadrangle Key

Ha — **Stream alluvium** - Sand, gravel, and silt deposited on banks of modern streams.

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

Qst — **Stream terrace** - Sand and gravel deposited by higher than present river/stream levels.

Qe — **Eolian deposits** - Windblown fine-grained sand and silt. Characterized by hummocky topography.

Pms — **Marine shoreline deposit** - Wave-worked, fine-very fine sand. Locally covered with eolian deposits with hummocky topography.

Pp — **Presumpscot Formation** - Fine-grained marine silts and clays. Locally fossiliferous.

Pmf — **Glaciomarine fans** - Sand and gravel deposited as submarine fans.

Pge — **Eskers** - Sand and gravel deposited in tunnels in ice. Chevrons show inferred direction of water flow. Esker deposits draped with fine-grained glaciomarine deposits. Regressive phase, reworked sand deposits commonly associated with esker crests and upper slopes of esker flanks.

Pt — **Till** - Loose to compact and poorly sorted to weakly stratified clay, silt, sand, and gravel. Boulders may be present on the surface. Upper portions of till deposits are brown and weakly to moderately stratified as a result of regressive marine phase. Lower portions of till seen in deep cuts or bore logs are stiff, gray, and compact.

Bedrock outcrops/thin-drift areas - Ruled pattern indicates areas where outcrops are common and/or surficial sediments are generally less than 10 ft thick. Thin drift more extensive than shown, particularly on topographic highs.

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

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

Glacial striation locality - Symbol shows trend of glacial ice-flow inferred from striations on bedrock. Dot marks point of observation. Number is azimuth (in degrees) of flow direction.

Area of large boulders - Area of glacial till where there are many large boulders, typically 3-5 ft or larger, scattered over the ground surface. These areas have been mapped only where observed, and they are likely to occur elsewhere in the till-covered uplands.

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

Stream channel - Higher than present stream channels associated with stream terraces. Hachured line represents channel edge.

W. F. Reid

Series 1959, No. 28

Issued October 1963

SOIL SURVEY

Penobscot County Maine

OUR SOIL ★ OUR STRENGTH

UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service
In cooperation with
UNIVERSITY OF MAINE AGRICULTURAL EXPERIMENT STATION

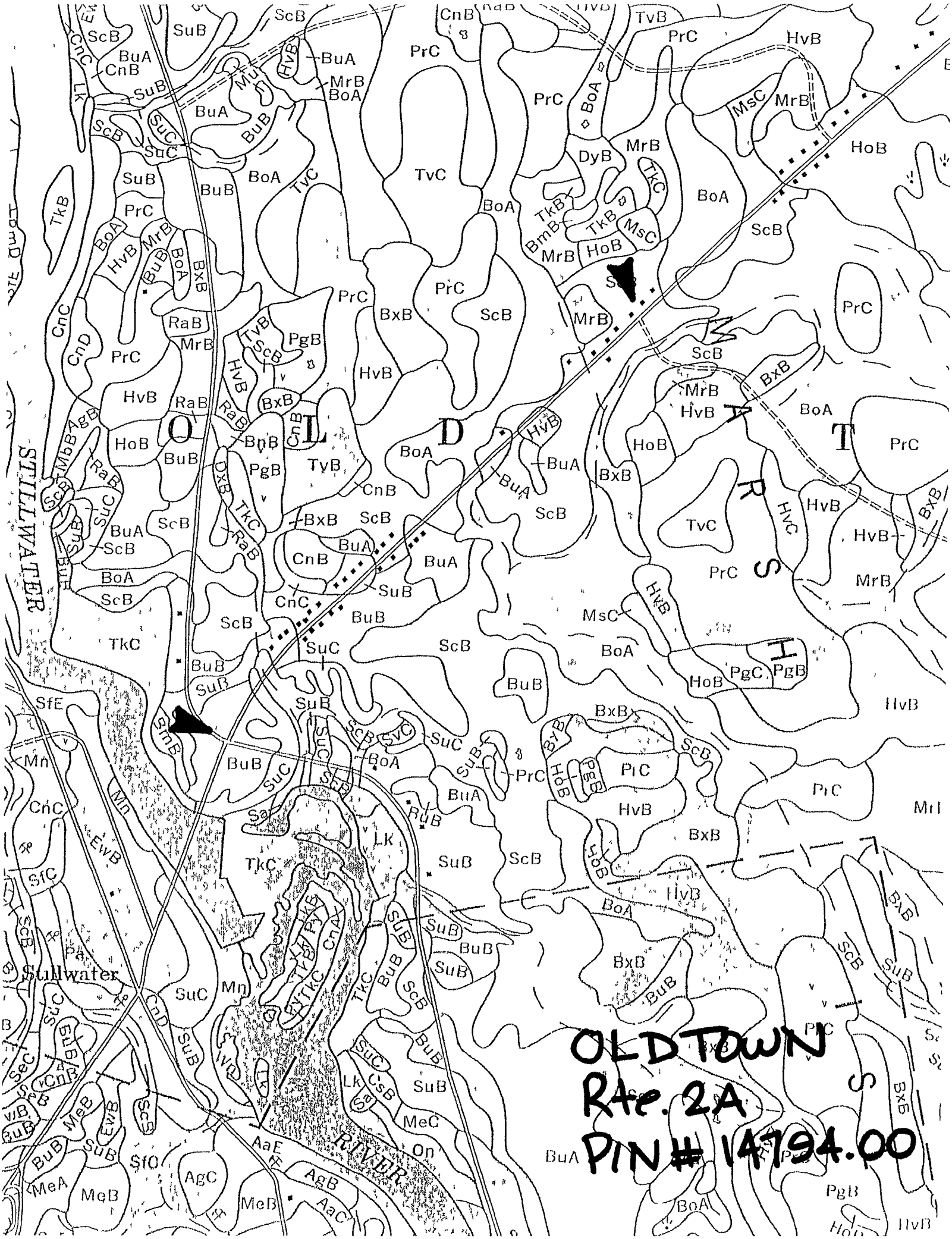

STILLWATER
RIVER
Sullwater
OLD TRUSTS
OLDTOWN
Rte. 2A
PIN # 14794.00

TABLE 4.—*Brief descriptions of soils and their estimated physical properties*—Continued

Map symbol	Soil	Depth to seasonal high water table	Brief site and soil description	Depth from surface	Classification: USDA texture	Classification: Unified	Classification: AASHO	Percent passing sieve—No 4 (4.76 mm.)	Percent passing sieve—No 10 (2.0 mm.)	Percent passing sieve—No 200 (0.074 mm.)	Permeability [1]	Available moisture capacity	Shrink-swell potential
		Feet		*Inches*								*Inches per inch of depth* [2]	
HdB HdC	Hermon sandy loam, moderately deep, 2 to 8 percent slopes Hermon sandy loam, moderately deep, 8 to 15 percent slopes	(None above bedrock)	1½ to 2 feet of well-drained sandy soil from coarse, granitic glacial till, granitic bedrock at 18 to 30 inches, scattered stones and boulders occur on rolling to hilly upland	0 to 30 (bedrock below 30 inches)	Sandy loam	SM	A-2-4	80–95	80–90	25–35	Rapid	0.11 to 0.13	Moderate
HoB HoC HvB HvC HvD	Howland gravelly loam, 0 to 8 percent slopes Howland gravelly loam, 8 to 15 percent slopes Howland very stony loam, 0 to 8 percent slopes Howland very stony loam, 8 to 15 percent slopes Howland very stony loam, 15 to 25 percent slopes	1 to 3	1½ to 2 feet of moderately well drained loamy soil over compact, loamy glacial till from mixed granitic, slaty, and shaly materials, boulders, stones, and fragments of shale and slate in profile. The stony type contains numerous large stones and boulders on the surface and throughout the profile	0 to 18 18 to 48	Gravelly or gritty loam Gravelly loam	ML-CL ML-CL	A-4 A-4	90–95 90–95	85–90 85–95	55–60 55–60	Moderate Slow	0.13 to 0.17 0.13 to 0.15	Low to moderate Low to moderate
Lk	Limerick silt loam	(Flooding common)	1 to 1½ feet of poorly drained silt loam over stratified and mixed flood-plain materials, includes sandy loam, gravelly loam, and streaks of sandy clay	0 to 16 16 to 30	Fine sandy loam Gravelly loam	ML-CL GM-SM	A-4 A-2-4	70–80 50–70	65–75 40–50	55–65 25–30	Moderate Rapid	0.13 to 0.17 0.13 to 0.17	Moderate Moderate
MaB	Machias fine sandy loam, 0 to 8 percent slopes	1 to 4	1½ to 2 feet of moderately well drained fine sandy soil over glacial outwash consisting of stratified fine sand and gravel	0 to 30 30 to 48	Fine sandy loam Gravelly sandy loam	GM-GC GM-GC	A-4 A-2-4	65–75 50–60	50–60 40–50	35–45 25–35	Moderate Very rapid	0.13 to 0.17 0.04	Low Low
MbB	Madawaska very fine sandy loam, 0 to 8 percent slopes	1 to 3	2 to 3 feet of moderately well drained to somewhat poorly drained very fine sandy or silty soil, overlies stratified sandy, fine sandy, and loamy river-terrace materials	0 to 36	Fine sandy loam or silt loam	ML-CL	A-4	70–80	65–75	60–65	Moderate	0.17 to 0.22	Moderate
MeA MeB MeC	Melrose fine sandy loam, 0 to 2 percent slopes Melrose fine sandy loam, 2 to 8 percent slopes Melrose fine sandy loam, 8 to 15 percent slopes	More than 5	3 to 4 feet of well-drained fine sandy soil over very deep marine and lacustrine silt and clay deposits	0 to 32 32 to 50	Fine sandy loam Silty clay loam or silty clay	SM CL	A-2-4 A-6	80–95 100	70–85 100	20–30 80–95	Rapid Slow	0.17 to 0.22 0.21 to 0.26	Moderate Moderate
Mn	Mixed alluvial land	(Water table at surface)	Moderately well drained to somewhat poorly drained sandy, gravelly, and silty flood-plain materials on narrow bottom land, boulders and stones are included	Variable—because of variability of soil materials, no estimates are made									
MoB	Monarda silt loam, 0 to 8 percent slopes [3]	(Water table at surface)	1 to 1½ feet of poorly drained silty soil, overlies 5 feet or more of compact, silty glacial till from slate and shale, or loamy glacial till from mixed granite, slate, and shale, stones, boulders, and slaty fragments throughout the profile, till generally medium to slightly acid but in places neutral to calcareous at 10 to 12 feet, usually on nearly level or depressed areas	0 to 18 18 to 72	Silt loam Heavy silt loam or gritty loam	ML ML-CL	A-4 A-4	85–90 85–90	80–90 80–90	55–60 55–60	Moderate Slow	0.15 to 0.18 0.15 to 0.21	Moderate Moderate
MrB MsC	Monarda and Burnham very stony silt loams, 0 to 8 percent slopes Monarda and Burnham extremely stony silt loams, 0 to 15 percent slopes	(Water table at surface)	Material is frequently shallow to bedrock and extremely bouldery and stony in places, also occurs in mountainous areas. (See separate descriptions of Monarda and Burnham soils.)	See separate descriptions of Monarda and Burnham soils									
Mu	Muck	(Water table at surface)	Wet, very deep, decomposed organic matter	Not suitable for engineering purposes									
On	Ondawa fine sandy loam	(Flooding usually in spring only)	2 to 3 feet of well-drained fine sandy or silty soil over flood-plain materials of fine sand and some gravel, usually occurs on narrow bands along larger rivers and streams	0 to 36	Fine sandy loam	SM	A-4	100	100	40–50	Moderate	0.13 to 0.17	Moderate
Pa Pc Pf Ps	Peat and muck Peat, coarsely fibrous Peat, moderately fibrous Peat, sphagnum	(Water table at surface)	Wet, very deep, highly organic materials that vary in depth. (On-site examinations are necessary.)	Not suitable for engineering purposes									

See footnotes at end of table

TABLE 4.—*Brief descriptions of soils and their estimated physical properties*—Continued

Map symbol	Soil	Depth to seasonal high water table	Brief site and soil description	Depth from surface	Classification: USDA texture	Classification: Unified	Classification: AASHO	Percent passing sieve—: No 4 (4 76 mm)	Percent passing sieve—: No 10 (2 0 mm)	Percent passing sieve—: No 200 (0 074 mm)	Permeability [1]	Available moisture capacity	Shrink-swell potential
		Feet		*Inches*								*Inches per inch of depth* [1]	
PhB PhC PmB PmC	Perham silt loam, 0 to 8 percent slopes Perham silt loam, 8 to 15 percent slopes Perham stony silt loam, 0 to 8 percent slopes Perham stony silt loam, 8 to 15 percent slopes	More than 5	1½ to 2 feet of silty soil over very deep, compact silty clay loam glacial till from slate, shale, and limestone that contains a high percentage of silt and clay in matrix, fragments of shale, slate, and limestone, as well as scattered stones and boulders, are throughout profile	0 to 24	Silt loam	ML-CL	A-4	80-90	75-85	50-55	Moderate	0 17 to 0 18	Moderate
				24 to 60	Silty clay	ML-CL	A-4	80-90	75-85	50-55	Slow	0 17 to 0 21	Moderate
PgB PgC PgD PgE PrC PrE PxC	Plaisted gravelly loam, 2 to 8 percent slopes Plaisted gravelly loam, 8 to 15 percent slopes Plaisted gravelly loam, 15 to 25 percent slopes Plaisted gravelly loam, 25 to 45 percent slopes Plaisted very stony loam, 5 to 15 percent slopes Plaisted very stony loam, 15 to 45 percent slopes Plaisted extremely stony loam, 5 to 15 percent slopes	More than 5	1 to 1½ feet of well-drained loamy soil over deep, compact, sandy loam glacial till from mixed granite, slate, and shale materials, boulders, stones, and fragments of shale and slate common in profile, mountainous and hilly areas are often very stony and extremely bouldery in places, till is generally acid The stony types contain numerous large stones and boulders on the surface and throughout the profile	0 to 18	Gravelly loam	GM	A-2	60-70	70-80	30-35	Moderate	0 17 to 0 18	Moderate
				18 to 48	Gravelly loam	GM	A-4	60-70	55-65	40-45	Slow	0 15 to 0 18	Moderate
Py	Podunk fine sandy loam	(Occasional flooding)	Moderately well drained to somewhat poorly drained, deep fine sandy loam or silt loam over flood-plain materials of fine sandy clay, fine sand, and some gravel, flooded mostly in spring	0 to 36	Fine sandy loam	ML-CL	A-4	75	60	60	Moderate	0 13 to 0 19	Moderate
RdB RaB	Red Hook and Atherton fine sandy loams, 0 to 8 percent slopes Red Hook and Atherton silt loams, 0 to 8 percent slopes	(Water table at surface)	The poorly drained Red Hook and very poorly drained Atherton are fine sandy or silty soils on stratified sand and silt, clay varves in places, gravel streaks may underlie the finer soil at 18 to 22 inches, occurs as glacial outwash and river terraces Atherton soils differ from Red Hook by having a black mucky surface	0 to 21	Fine sandy loam or silt loam	ML-CL	A-4	70-80	65-75	55-60	Moderate	0 13 to 0 17	Moderate to low
				21 to 32	Fine sandy loam or silt loam	ML-CL	A-4	70-80	65-75	55-60	Moderate	0 13 to 0 17	Moderate to low
				32 to 60	Fine sandy clay and gravel	GM-GC	A-2	55-65	40-50	25-30	Rapid	0 04	Moderate to low
Re	Riverwash	Often flooded	Variable materials—no estimates made										
RkC RkD	Rockland, Canaan material, sloping Rockland, Canaan material, strongly sloping	(None above bedrock)	Very dry, extremely shallow sandy soil, granitic bedrock at 5 or 6 inches, occurs on mountainous and extremely rocky areas	0 to 5 (bedrock below 5 inches)	Sandy loam	Because of the shallow soil material, these mapping units should be considered as bedrock for practical purposes							
RmC RmD	Rockland, Thorndike material, sloping Rockland, Thorndike material, strongly sloping	(None above bedrock)	Very dry, extremely shallow silty soil, lime-seamed bedrock at 7 or 8 inches, occurs on mountainous and extremely rocky areas	0 to 8 (bedrock below 8 inches)	Silt loam	Because of the shallow soil material, these mapping units should be considered as bedrock for practical purposes							
Ro	Rock outcrop	(None above bedrock)	Very little or no soil material, mountainous areas, quarries in places	(Bedrock exposed)	No estimates made—little or no soil material								
Sa	Saco silt loam	(Flooding common)	2 to 2½ feet of very poorly drained silty soil over flood-plain materials that are generally fine to medium textured	0 to 30	Silt loam	ML-CL	A-6	100	100	70-90	Slow	0 17 to 0 19	Moderate
ScB	Scantic silt loam, 0 to 8 percent slopes [3]	(Water table surface)	1 to 2 feet of poorly drained silty soil over 5 feet or more of massive and hard silt and clay deposits	0 to 14	Silt loam	ML-CL	A-4	100	100	95	Slow	0 17 to 0 19	Moderate
				14 to 72	Silty clay loam or silty clay	ML-CL	A-6	100	100	99	Slow	0 21 to 0 26	Moderate
SeA SeB SeC SeD	Stetson fine sandy loam, 0 to 2 percent slopes Stetson fine sandy loam, 2 to 8 percent slopes Stetson fine sandy loam, 8 to 15 percent slopes Stetson fine sandy loam, 15 to 25 percent slopes	Generally more than 10	2 to 2½ feet of fine sandy soil over well-drained, very deep stratified sand and gravel from glacial outwash, calcite coatings common on gravel in pits 12 to 20 feet deep	0 to 24	Fine sandy loam	SM	A-1-b	70-85	65-75	20-30	Moderate	0 17 to 0 19	Low
				24 to 120	Gravel	SW-SM	A-1-a	45-60	35-45	0-5	Very rapid	0 04	Low
SfC SfE	Stetson-Suffield complex, 0 to 15 percent slopes Stetson-Suffield complex, 15 to 45 percent slopes	More than 5	Well-drained, very deep mixtures of sandy and gravelly glacial outwash and silt and clay deposits	0 to 20	Fine sandy loam or silt loam	See separate descriptions of Stetson and Suffield soils					Moderate	0 17 to 0 24	Moderate
				20 to 60	Interstratified fine gravel, silt, and clay	See separate descriptions of Stetson and Suffield soils					Moderate	0 04 to 0 25	Moderate
ShD	Stony land, Hermon material, strongly sloping	Generally greater than 6	All on steep and mountainous slopes (See Hermon soils for description of soil material)										
SpD	Stony land, Plaisted material, strongly sloping	Generally greater than 4	All on steep and mountainous slopes (See Plaisted soils for description of soil material)										

See footnotes at end of table

TABLE 4 —*Brief descriptions of soils and their estimated physical properties*—Continued

Map symbol	Soil	Depth to seasonal high water table	Brief site and soil description	Depth from surface	Classification: USDA texture	Classification: Unified	Classification: AASHO	Percent passing sieve—: No 4 (4 76 mm)	Percent passing sieve—: No 10 (2 0 mm)	Percent passing sieve—: No 200 (0 074 mm)	Permeability [1]	Available moisture capacity	Shrink-swell potential
		Feet		*Inches*								*Inches per inch of depth* [2]	
SuA	Suffield silt loam, 0 to 2 percent slopes	More than 5	1 to 1½ feet of well-drained silty soil over very deep marine and lacustrine silt and clay deposits, relief usually undulating to sloping or steep, very erodible	0 to 10	Silt loam	ML-CL	A-4	100	100	90–95	Moderately slow	0 23 to 0 25	Moderate
SuB	Suffield silt loam, 2 to 8 percent slopes			10 to 48	Silty clay loam or silty clay	ML-CL	A-6	100	100	90–100	Slow	0 21 to 0 25	Moderate
SuC	Suffield silt loam, 8 to 15 percent slopes												
SuC2	Suffield silt loam, 8 to 15 percent slopes, eroded												
SuD	Suffield silt loam, 15 to 25 percent slopes												
SuD2	Suffield silt loam, 15 to 25 percent slopes, eroded												
SuE	Suffield silt loam, 25 to 45 percent slopes												
SvA	Suffield very fine sandy loam, 0 to 2 percent slopes	More than 5	½ to 1 foot of well-drained sandy soil over very deep marine and lacustrine silt and clay deposits	0 to 12	Very fine sandy loam	SM	A-2-4	85–95	70–90	20–30	Moderate	0 21 to 0 24	Moderate
SvB	Suffield very fine sandy loam, 2 to 8 percent slopes			12 to 48	Silt loam and silty clay loam	ML-CL	A-6	100	100	90–100	Slow	0 21 to 0 25	Moderate
SvC	Suffield very fine sandy loam, 8 to 15 percent slopes												
SvD	Suffield very fine sandy loam, 15 to 25 percent slopes												
ThB	Thorndike shaly silt loam, 2 to 8 percent slopes [3]	(None above bedrock)	1 to 1½ feet of well-drained shaly and silty soil that is primarily residuum from lime-seamed slate or shale, scattered boulders but usually few stones The stony type contains numerous large stones and boulders on the surface and throughout the profile	0 to 16 (bedrock below 16 inches)	Shaly silt loam—lime seamed	GM, SM	A-1	60–65	45–55	15–20	Moderate	0 10 to 0 14	Low
ThC	Thorndike shaly silt loam, 8 to 15 percent slopes												
ThD	Thorndike shaly silt loam, 15 to 25 percent slopes												
ThE	Thorndike shaly silt loam, 25 to 45 percent slopes												
TvB	Thorndike very stony silt loam, 2 to 8 percent slopes												
TvC	Thorndike very stony silt loam, 8 to 15 percent slopes												
TvD	Thorndike very stony silt loam, 15 to 35 percent slopes												
TkE	Thorndike very rocky silt loam, 2 to 8 percent slopes	(None above bedrock)	½ to 1 foot of dry shaly silt loam that is primarily residuum from lime-seamed slate, shale or phyllite	0 to 10 (bedrock below 10 inches)	Rocky silt loam—lime seamed	Because of the shallow soil material, this mapping unit should be considered as bedrock							
TkC	Thorndike very rocky silt loam, 8 to 15 percent slopes												
Wn	Winooski silt loam	(Occasional flooding)	Moderately well drained to somewhat poorly drained, deep fine sandy loam or silt loam over flood-plain materials of silt loam, fine sand, and some gravel, flooded mostly in spring	0 to 36	Silt loam	ML-CL	A-4	90–95	85–90	55–60	Moderate	0 13 to 0 19	Moderate

[1] Rate at which moisture percolates, in inches per hour Very slow—0 to 0 2, slow—0 20 to 0 63, moderate—0 63 to 2 0, rapid—2 0 to 6 3, very rapid—more than 6 3

[2] To convert to inches per foot of depth, multiply by 12

[3] Test data available for this soil, see table 2

[4] Occurs in mountainous and hilly areas, huge boulders and granitic stones are common

TABLE 4.—*Brief descriptions of soils and their estimated physical properties*

Map symbol	Soil	Depth to seasonal high water table	Brief site and soil description	Depth from surface	Classification: USDA texture	Classification: Unified	Classification: AASHO	Percent passing sieve—: No 4 (4.76 mm.)	Percent passing sieve—: No 10 (2.0 mm.)	Percent passing sieve—: No 200 (0.074 mm.)	Permeability [1]	Available moisture capacity	Shrink-swell potential
		Feet		*Inches*								*Inches per inch of depth* [2]	
AaB AaC AaE	Adams loamy sand, 0 to 8 percent slopes Adams loamy sand, 8 to 15 percent slopes Adams loamy sand, 15 to 45 percent slopes	More than 5	Glacial-outwash and wind deposits that are very dry and very deep and consist of particles that are generally uniform in size, mainly in the valley of the Penobscot River	0 to 60	Loamy sand	SM	A-2-4	100	100	15-30	Very rapid	0.06 to 0.08	Moderate
AgA AgB AgC AgD	Allagash fine sandy loam, 0 to 2 percent slopes Allagash fine sandy loam, 2 to 8 percent slopes Allagash fine sandy loam, 8 to 15 percent slopes Allagash fine sandy loam, 15 to 25 percent slopes	More than 5	Well-drained, very deep sandy soils over sand and gravel, occur as deposits of glacial outwash and on river terraces	0 to 36 36 to 60	Fine sandy loam Interstratified sand and gravel	SM GM-SM	A-2 A-2	100 55-60	100 45-50	15-25 15-25	Moderate Very rapid	0.10 to 0.18 0.04	Low Low
BaA BaB BaC BaD BnB BnC BnD	Bangor silt loam, 0 to 2 percent slopes [3] Bangor silt loam, 2 to 8 percent slopes Bangor silt loam, 8 to 15 percent slopes Bangor silt loam, 15 to 25 percent slopes Bangor very stony silt loam, 0 to 8 percent slopes Bangor very stony silt loam, 8 to 15 percent slopes Bangor very stony silt loam, 15 to 25 percent slopes	More than 5	1 to 1½ feet of well-drained silty soil over 5 feet or more of well-drained, compact, silty glacial till from slate and shale, stones, a few boulders, and slaty fragments occur throughout the profile, till generally acid but in places is neutral or slightly calcareous at a depth of 12 to 20 feet. The stony type contains numerous large stones and boulders on the surface and throughout the profile	0 to 18 18 to 72 72 to 131	Loam or silt loam Gravelly silt loam Gravelly silt loam	ML ML-CL ML-CL	A-5(7) A-4(5) A-4(5)	94 84 84	82 73 74	66 61 61	Moderate Moderately slow Moderately slow	0.15 to 0.22 0.15 to 0.22 0.15 to 0.22	Moderate Moderate Moderate
BmB BmC BmD	Bangor silt loam, moderately deep, 2 to 8 percent slopes Bangor silt loam, moderately deep, 8 to 15 percent slopes Bangor silt loam, moderately deep, 15 to 35 percent slopes	More than 5	1 to 2 feet of well-drained silty soil over thin, slaty glacial till and residuum from lime seamed bedrock, a few stones and boulders	0 to 18 18 to 31 (bedrock below 34 inches)	Silt loam Shaly silt loam—lime seamed	ML-CL ML-CL	A-4 A-4	90 80	85 75	65 55	Moderate Moderate	0.13 to 0.17 0.13 to 0.17	Moderate Moderate
BoA	Biddeford silt loam, 0 to 3 percent slopes	(Water table at surface)	Very poorly drained silty soil underlain by very deep lacustrine and marine deposits of silt and clay, (surface deposits or organic matter not considered), occurs on nearly level or depressed areas	10 to 40	Silty clay loam or silty clay	ML-CL	A-6	100	100	95-99	Slow	0.17 to 0.19	Moderate
BrA	Burnham silt loam, 0 to 3 percent slopes	(Water table at surface)	1 to 2 feet of very poorly drained silty soil over very deep, slaty and shaly or mixed granitic and slaty, compact glacial till, (7 to 10 inches of highly organic material in surface not considered), usually on nearly level or depressed areas	7 to 24 24 to 48	Silt loam Heavy silt loam or gritty loam	ML ML-CL	A-4 A-4	90-95 85-90	80-90 85-95	60-70 65-75	Moderate Moderately slow	0.17 to 0.19 0.15 to 0.22	Moderate Moderate
BuA BuB BuC	Buxton silt loam, 0 to 2 percent slopes Buxton silt loam, 2 to 8 percent slopes Buxton silt loam, 8 to 15 percent slopes	1½ to 2	Moderately well to somewhat poorly drained silty soil underlain by very deep silt and clay deposits, on gently sloping or undulating and sloping marine and lacustrine terraces	0 to 20 20 to 40	Silt loam Silty clay or silty clay loam	ML-CL ML-CL	A-4 A-6	100 100	100 100	90-95 95-99	Slow Slow	0.17 to 0.19 0.21 to 0.25	Moderate Moderate
BxB	Buxton, Scantic, and Biddeford stony silt loams, 0 to 8 percent slopes	½ to 2	See separate descriptions of Buxton, Scantic, and Biddeford soils										
CaC CaE	Canaan extremely rocky sandy loam, 5 to 15 percent slopes Canaan extremely rocky sandy loam, 15 to 45 percent slopes	(None above bedrock)	10 to 16 inches of dry sandy soil from coarse, granitic glacial till on granitic bedrock, many large boulders and stones, in hilly and mountainous areas	0 to 16	Sandy loam (bedrock)	SM	A-2-4	80-95	75-90	25-30	Rapid	0.11 to 0.13	Moderate
CcB CcC CcD CcE	Colton cobbly sandy loam, dark materials, 0 to 8 percent slopes Colton cobbly sandy loam, dark materials, 8 to 15 percent slopes Colton cobbly sandy loam, dark materials, 15 to 25 percent slopes Colton cobbly sandy loam, dark materials, 25 to 45 percent slopes	More than 5	Cobbly, sandy, and gravelly glacial-outwash deposits, usually very dry and very deep and unsorted, some pebbles may have calcite coatings at 10 to 12 feet	0 to 16 16 to 72	Cobbly sandy loam or loamy sand Cobblestones	GW-GM GP	A-1-a A-1	55 30	45 10	10 5	Rapid Rapid	0.04 0.04	Low Low

See footnotes at end of table

TABLE 5.—*Engi*

[Made land and Peat and muck are omitted from this table because they are too vari

Soil name and map symbol	Adaptability to winter grading	Susceptibility to frost action	Suitability of soil material for—		Suitability as source	
			Road subgrade	Road fill	Topsoil	San gr
Adams loamy sand AaB, AaC, AaE	Fair	Low	Fair	Fair	Poor	Not s
Allagash fine sandy loam AgA, AgB, AgC, AgD	Good	Low	Fair, good below 36 inches	Good	Fair	Good feet
Bangor silt loam BaA, BaB, BaC, BaD	Fair	Moderate	Fair	Good	Fair to good	Not s
Bangor silt loam, moderately deep BmB, BmC, BmD	Fair	Moderate	Fair	Fair	Good	Not s
Bangor very stony silt loam BnB, BnC, BnD	Fair	Moderate	Fair	Good, numerous boulders	Fair, some problems with surface stones	Not s
Biddeford silt loam BoA	Poor	High	Poor	Poor	Poor	Not s
Burnham silt loam BrA	Poor	High	Fair	Fair when dry	Poor	Not s
Buxton silt loam BuA, BuB, BuC	Poor	High	Poor	Poor	Fair	Not s
Buxton, Scantic, and Biddeford stony silt loams BxB	See Buxton, Scantic, and Biddeford soils in this table					
Canaan extremely rocky sandy loam CaC, CaE	Fair	Low	Good	Fair	Not suitable	Not s
Colton cobbly sandy loam, dark materials CcB, CcC, CcD, CcE	Good	Low	Good	Good	Not suitable	Good
Colton gravelly sandy loam, dark materials CnA, CnB, CnC, CnD, CnE	Good	Low	Good	Good	Not suitable	Good
Colton loamy fine sand, dark materials CsA, CsB, CsC, CsD	Good	Low	Good	Good	Not suitable	Good
Daigle silt loam DaA, DaB, DaC	Fair	Moderate	Fair	Fair	Fair to unsuitable	Not s
Daigle stony silt loam DgA, DgB, DgC	Fair	Moderate	Fair	Fair, numerous boulders	Fair to unsuitable	Not s

TABLE 5.—*Engineering*

Soil name and map symbol	Adaptability to winter grading	Susceptibility to frost action	Suitability of soil material for—		Suitability as source of—	
			Road subgrade	Road fill	Topsoil	Sand and gravel
Dixmont silt loam DxA, DxB, DxC	Fair	Moderate	Fair	Fair	Fair to good	Not suitable
Dixmont very stony silt loam DyA DyB, DyC	Fair	Moderate	Fair	Fair, numerous boulders	Fair, some problems with surface stones	Not suitable
Elmwood fine sandy loam EwB	Poor	High	Poor, below 2 to 3 feet	Fair	Fair	Not suitable
Hadley silt loam Ha	Poor	Moderate	Fair	Fair	Good	Not suitable
Hermon sandy loam HbB, HbC	Good	Low	Good	Good	Poor to unsuitable	Fair
Hermon sandy loam, moderately deep HdB, HdC	Fair	Low	Good	Fair	Fair	Not suitable
Hermon very stony sandy loam HeB, HeC, HeE	Good	Low	Good	Good, numerous boulders	Not suitable	Fair
Hermon extremely stony sandy loam HhC	Good	Low	Good	Good	Not suitable	Fair
Howland gravelly loam HoB, HoC	Fair	High	Fair	Fair	Fair	Not suitable
Howland very stony loam HvB, HvC, HvD	Fair	High	Fair	Fair, numerous boulders	Fair, some problems with surface stones	Not suitable
Limerick silt loam Lk	Poor	High	Fair	Fair	Poor	Not suitable
Machias fine sandy loam MaB	Poor	Moderate	Fair	Good	Fair	Fair, limited by water table
Madawaska very fine sandy loam MbB	Poor	High	Fair	Fair	Fair	Not suitable

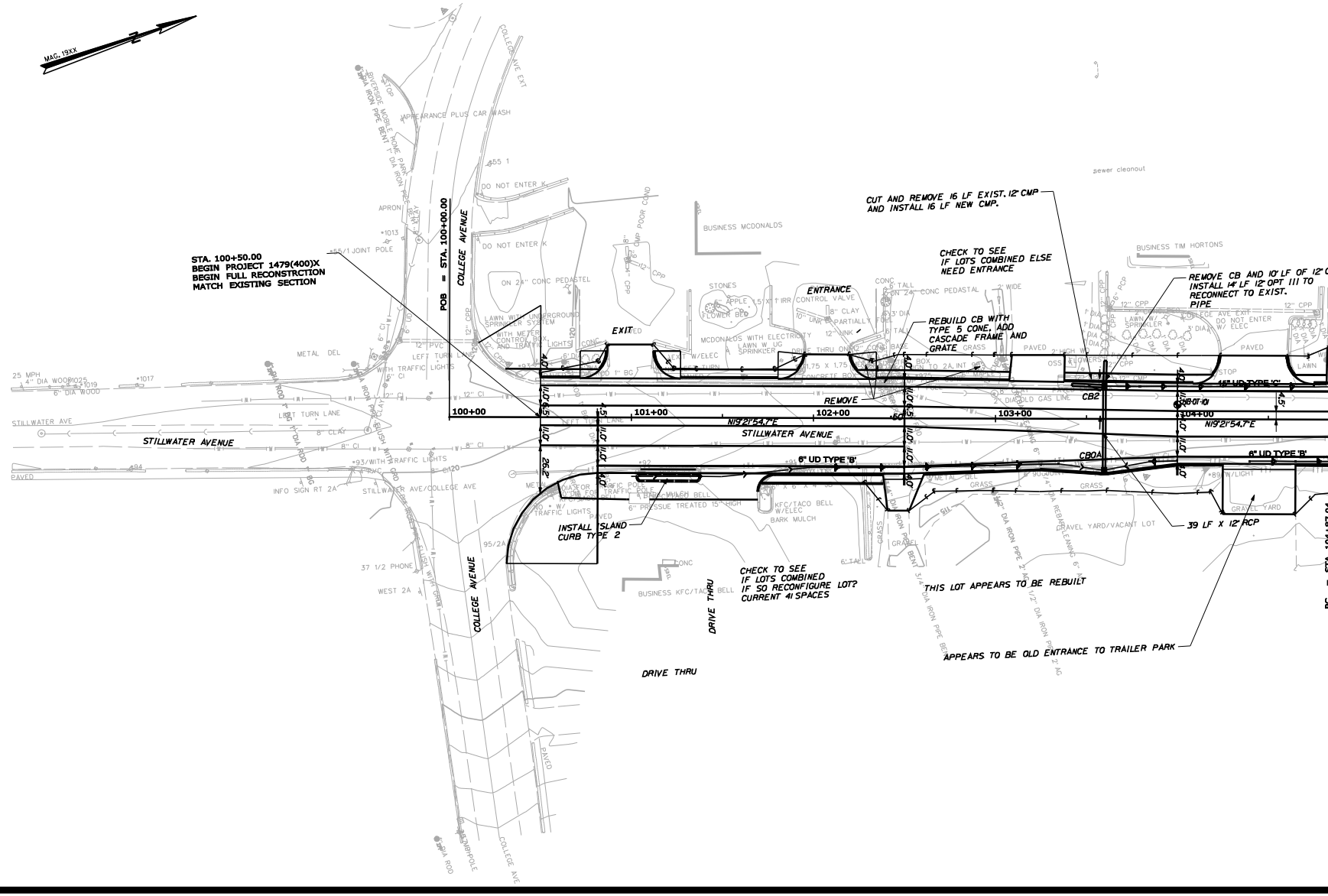
TABLE 5 —*Engine*

Soil name and map symbol	Adaptability to winter grading	Susceptibility to frost action	Suitability of soil material for—		Suitability as source of	
			Road subgrade	Road fill	Topsoil	Sand a grave
Red Hook and Atherton fine sandy loams RdB	Poor	High	Fair	Fair	Fair	Poor, lim by high water t
Red Hook and Atherton silt loams RaB	Poor	High	Fair	Fair	Fair	Poor, lim by high water t
Riverwash Re	Too variable to rate					
Rockland, Canaan material RkC, RkD	Because of the shallow soil material, this mapping unit should be considered as be					
Rockland, Thorndike material RmC, RmD	Same					
Saco silt loam Sa	Poor	High	Poor	Poor	Not suitable	Not suita
Scantic silt loam ScB	Poor	High	Poor	Poor	Poor	Not suital
Stetson fine sandy loam SeA, SeB, SeC, SeD	Good	Low	Good	Good	Fair	Good
Stetson-Suffield complex SfC, SfE	See Stetson soils and Suffield soils					
Stony land, Hermon material ShD	Good	Low	Good	Good	Not suitable	Fair
Stony land, Plaisted material SpD	Fair	Moderate	Fair	Fair	Not suitable	Not suital
Suffield silt loam SuA, SuB, SuC, SuC2, SuD, SuD2, SuE	Fair	Moderate	Poor	Poor	Good	Not suitab
Suffield very fine sandy loam SvA, SvB, SvC, SvD	Fair	Moderate	Poor	Poor	Good	Not suitab
Thorndike shaly silt loam ThB, ThC, ThD, ThE	Fair	Low	Fair	Fair	Not suitable	Not suitab
Thorndike very rocky silt loam TkB, TkC	Fair	Low	Fair	Fair between outcrops	Not suitable	Not suitab
Thorndike very stony silt loam TvB, TvC, TvD	Fair	Low	Fair	Fair, numerous boulders	Not suitable	Not suitab
Winooski silt loam Wn	Poor	High	Fair	Fair	Good	Not suitab

2.523 30.0 08/26/08

2.629 29.9 08/26/08

2.689
33.6
08/26/08



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STP-1479(400)X

PIN 14794.00

HIGHWAY PLANS

	BY	DATE
PROJ. MANAGER	----------	----------
DESIGN-DETAILED	T. WHITE	MAR. 2011
DESIGN-QUANTITIES	K.CROSS	------
DESIGN-DETAILED	------	------
DESIGN-DETAILED	------	------
REVISIONS 1	------	------
REVISIONS 2	------	------
REVISIONS 3	------	------
REVISIONS 4	------	------
FIELD CHANGES	------	------

SIGNATURE

P.E. NUMBER

DATE

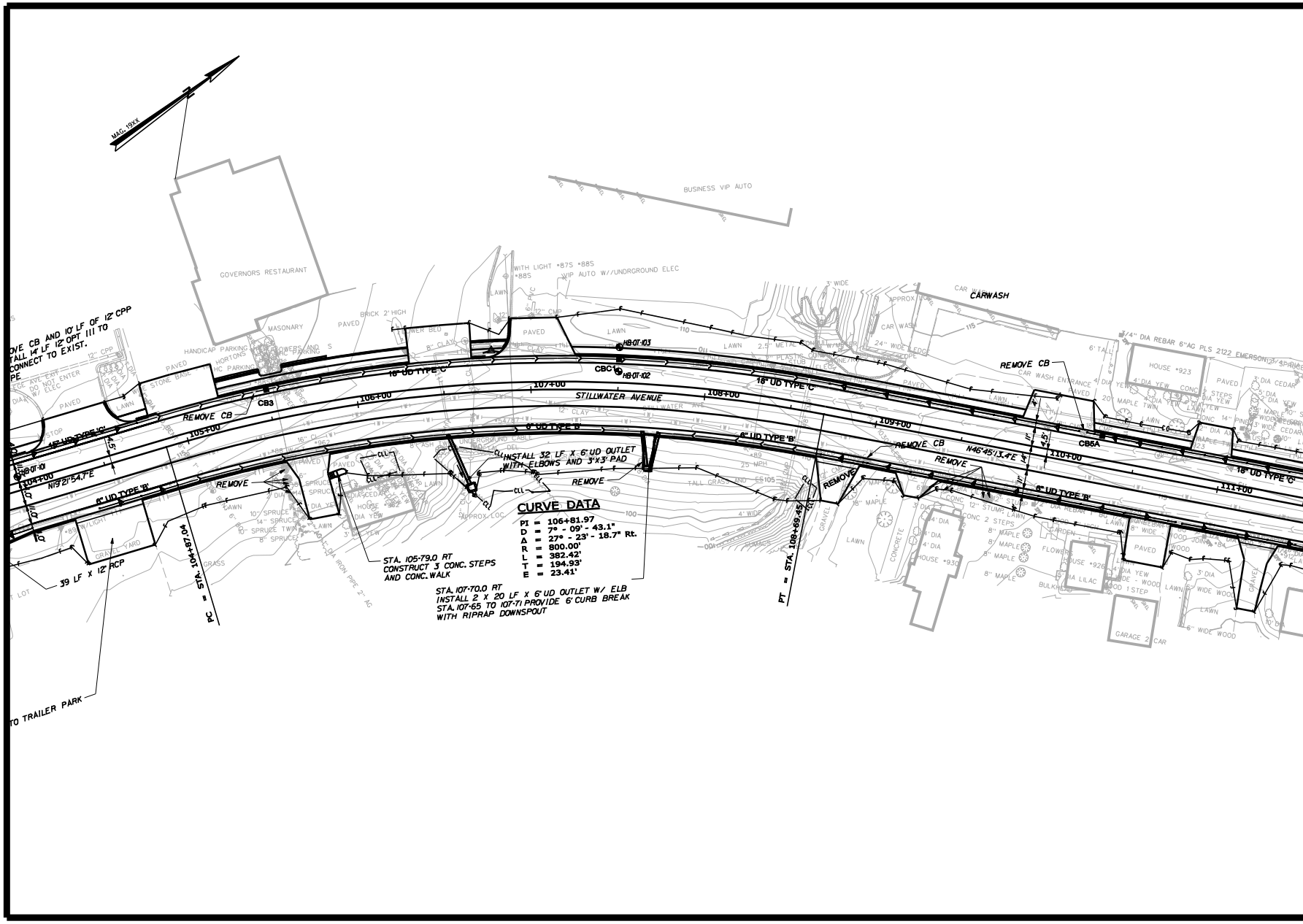
OLD TOWN
STILLWATER AVE./ROUTE 2A

GEOPLANS

SHEET NUMBER

1

OF 9



STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

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PIN 14794.00

HIGHWAY PLANS

PROJ. MANAGER	----------	BY	DATE
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DESIGN-DETAILED	------	------	------
DESIGN-REVIEWED	------	------	------
DESIGN-DETAILED	------	------	------
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OLD TOWN
STILLWATER AVE./ROUTE 2A

GEOPLANS

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2

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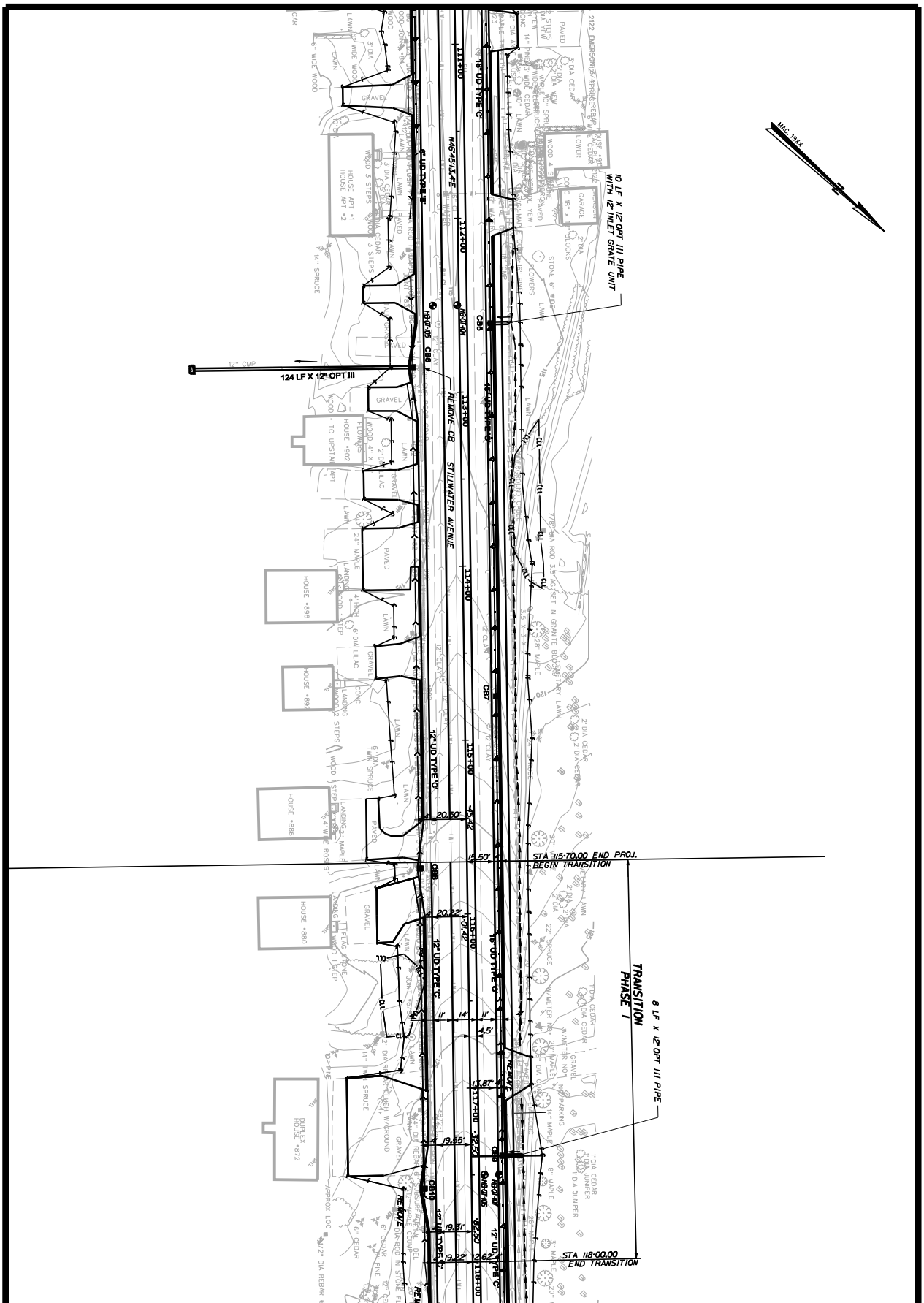

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DESIGN3-DETAILED3	------	------	------
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REVISIONS 2	------		------
REVISIONS 3	------		------
REVISIONS 4	------		------
FIELD CHANGES	------		------

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OLD TOWN
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GEOPLANS

STATE OF MAINE
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HIGHWAY PLANS

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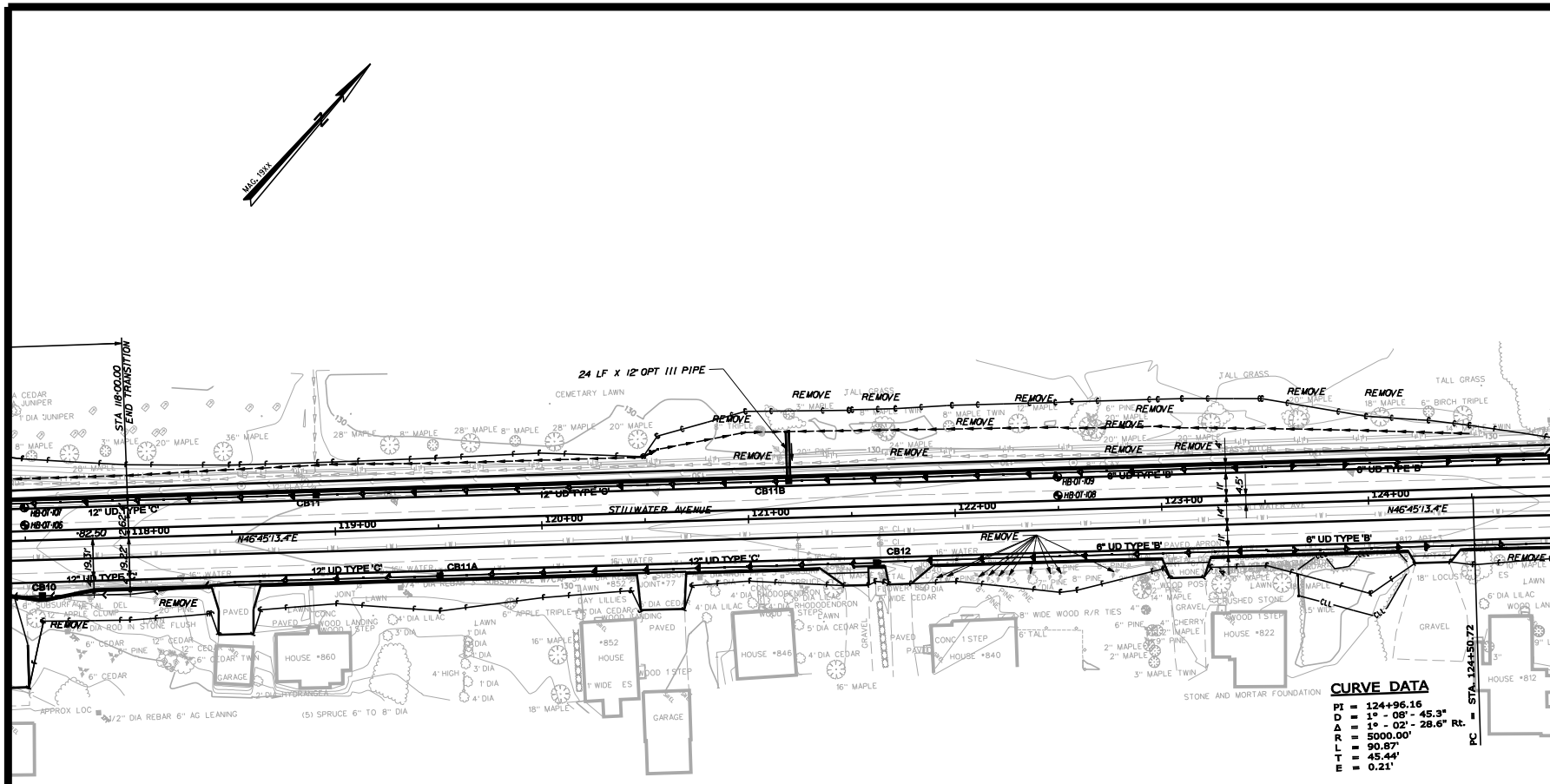

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STATE OF MAINE
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HIGHWAY PLANS

	BY	DATE
PROJ. MANAGER		
DESIGN-DETAILED	T. CROSS	MAR. 2011
DESIGN-STRUCTURE		
DESIGN-DETAILED		
REVISIONS 1		
REVISIONS 2		
REVISIONS 3		
REVISIONS 4		
FIELD CHANGES		

SIGNATURE

P.E. NUMBER

DATE

OLD TOWN
STILLWATER AVE./ROUTE 2A

GEOPLANS

SHEET NUMBER

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OF 9

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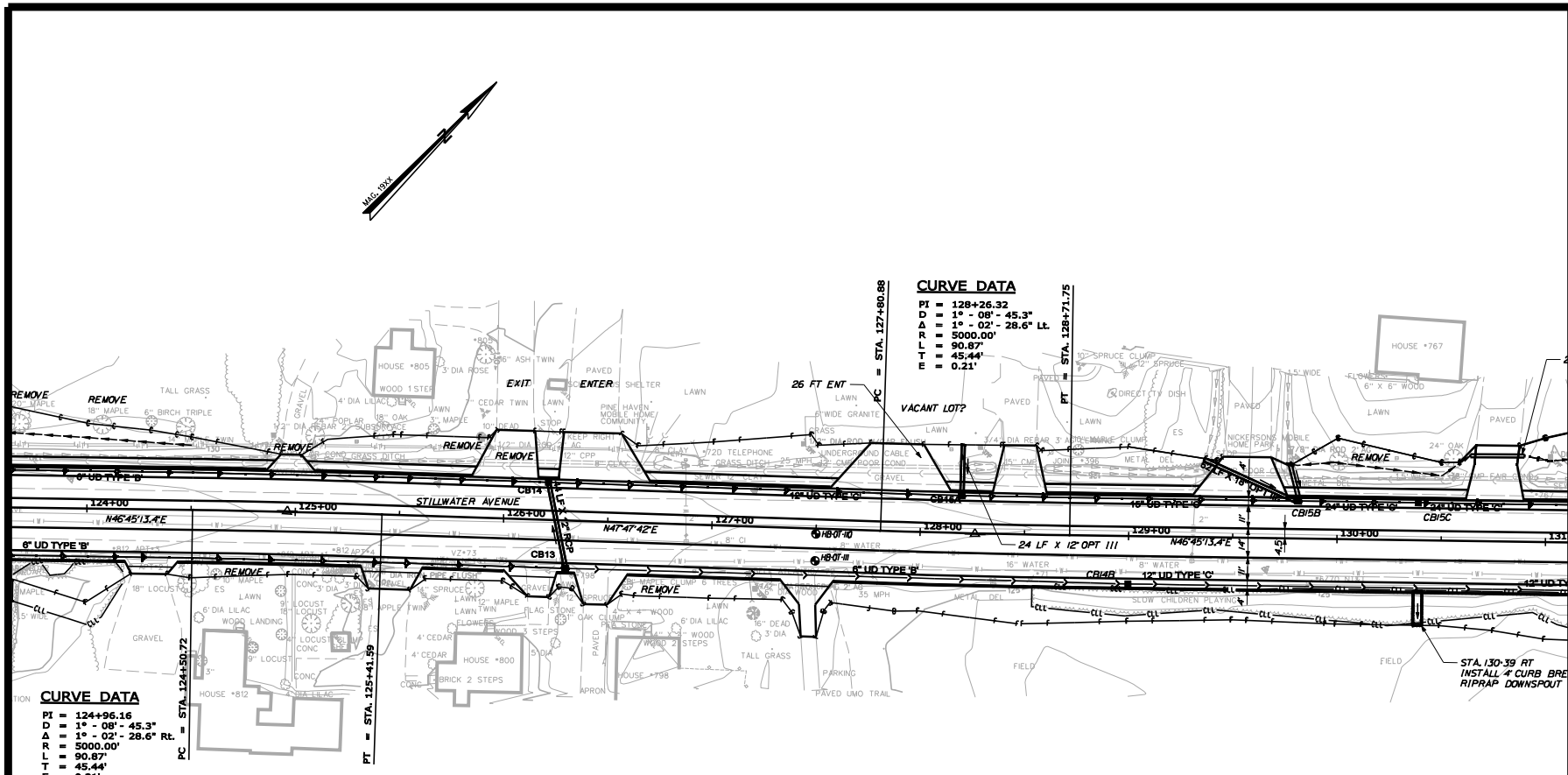

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T = 45.44'
E = 0.21'

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T = 45.44'
E = 0.21'

STATE OF MAINE
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HIGHWAY PLANS

	BY	DATE
PROJ. MANAGER		
DESIGN-DETAILED	K.CROSS	MAR. 2011
CHECKED-DETAILED	T.WHITE	
DESIGN-SR.TALLOS		
DESIGN-DETAILED		
REVISIONS 1		
REVISIONS 2		
REVISIONS 3		
REVISIONS 4		
FIELD CHANGES		

SIGNATURE

P.E. NUMBER

DATE

OLD TOWN
STILLWATER AVE./ROUTE 2A

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OF 9

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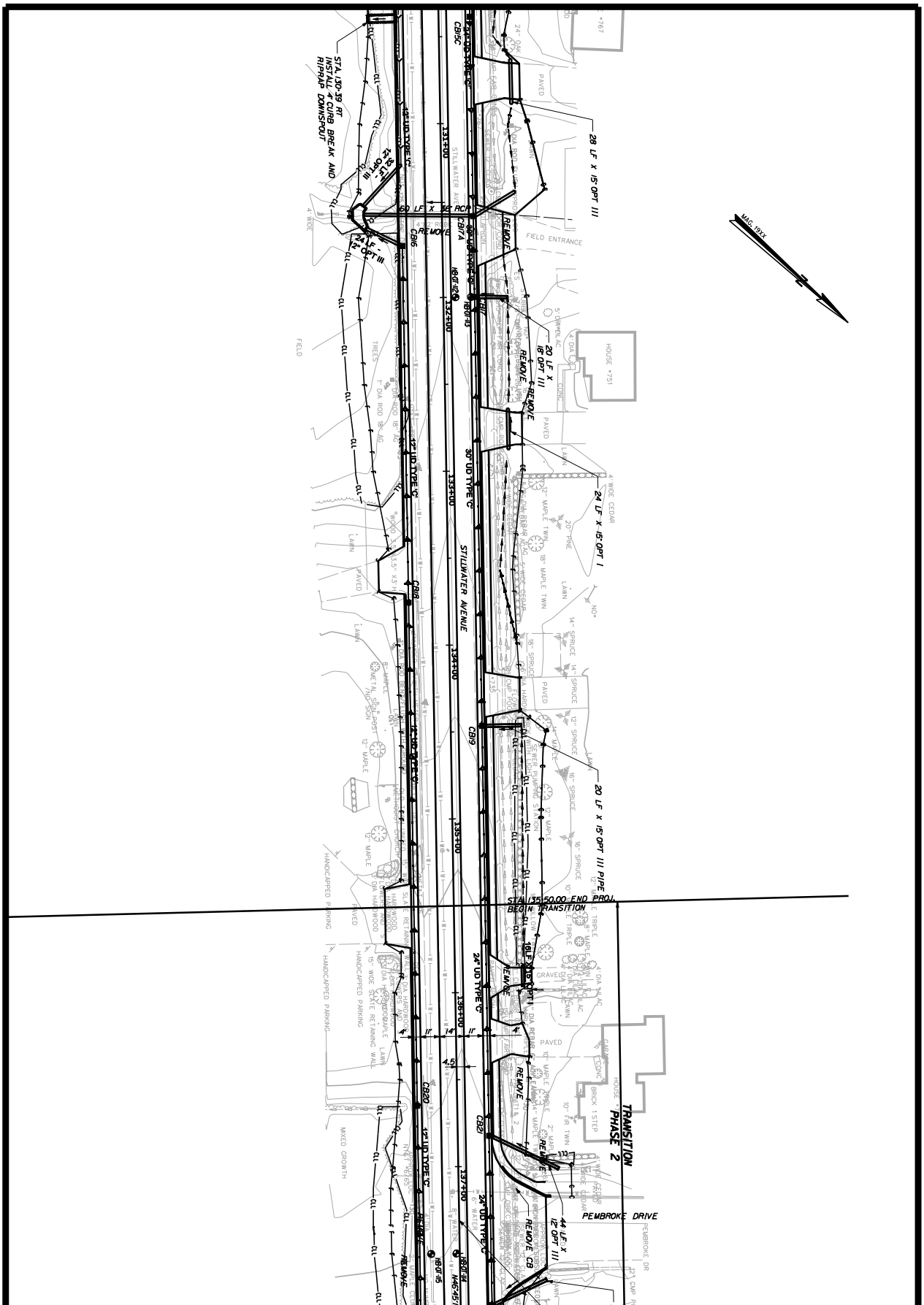

PROJ. MANAGER		BY	DATE
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DESIGN3-DETAILED3	------	------	------
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FIELD CHANGES	------		------

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OLD TOWN
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GEOPLANS

SHEET NUMBER 6 OF 9

STATE OF MAINE
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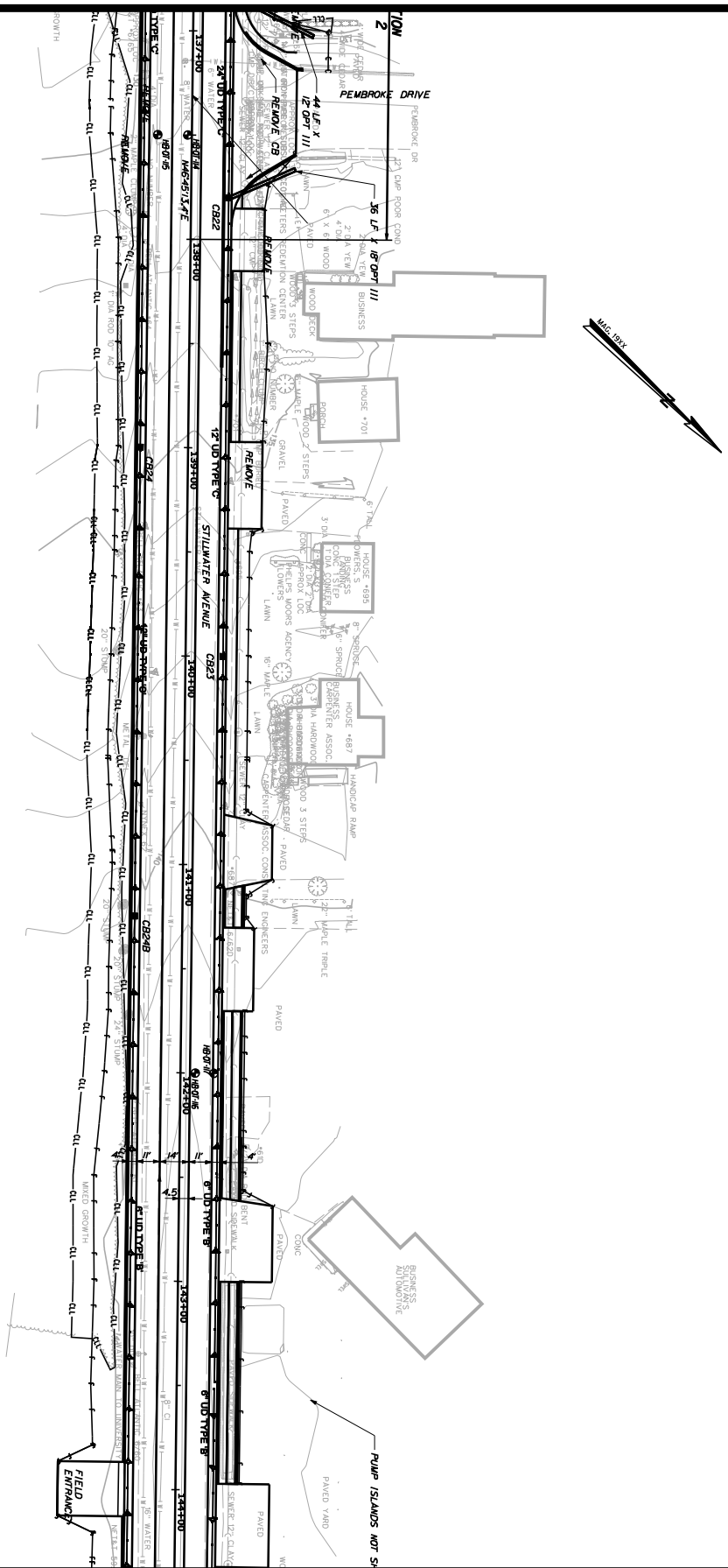
HIGHWAY PLANS



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	CHECKED-REVIEWED			
	DESIGN2-DETAILED2			
	DESIGN3-DETAILED3			
	REVISIONS 1			
	REVISIONS 2			
	REVISIONS 3			
	REVISIONS 4			
	FIELD CHANGES			

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HIGHWAY PLANS

GEOPLANS

SHEET NUMBER 7 OF 9

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

STP-1479(400)X

PIN 14794.00 HIGHWAY PLANS

PROJ. MANAGER		BY	DATE
DESIGN-DETAILED	K.GROSS	T.WHITE	MAR 2011
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REVISIONS 1			
REVISIONS 2			
REVISIONS 3			
REVISIONS 4			
FIELD CHANGES			

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DATE

OLD TOWN
STILLWATER AVE./ROUTE 2A

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SHEET NUMBER 8 OF 9

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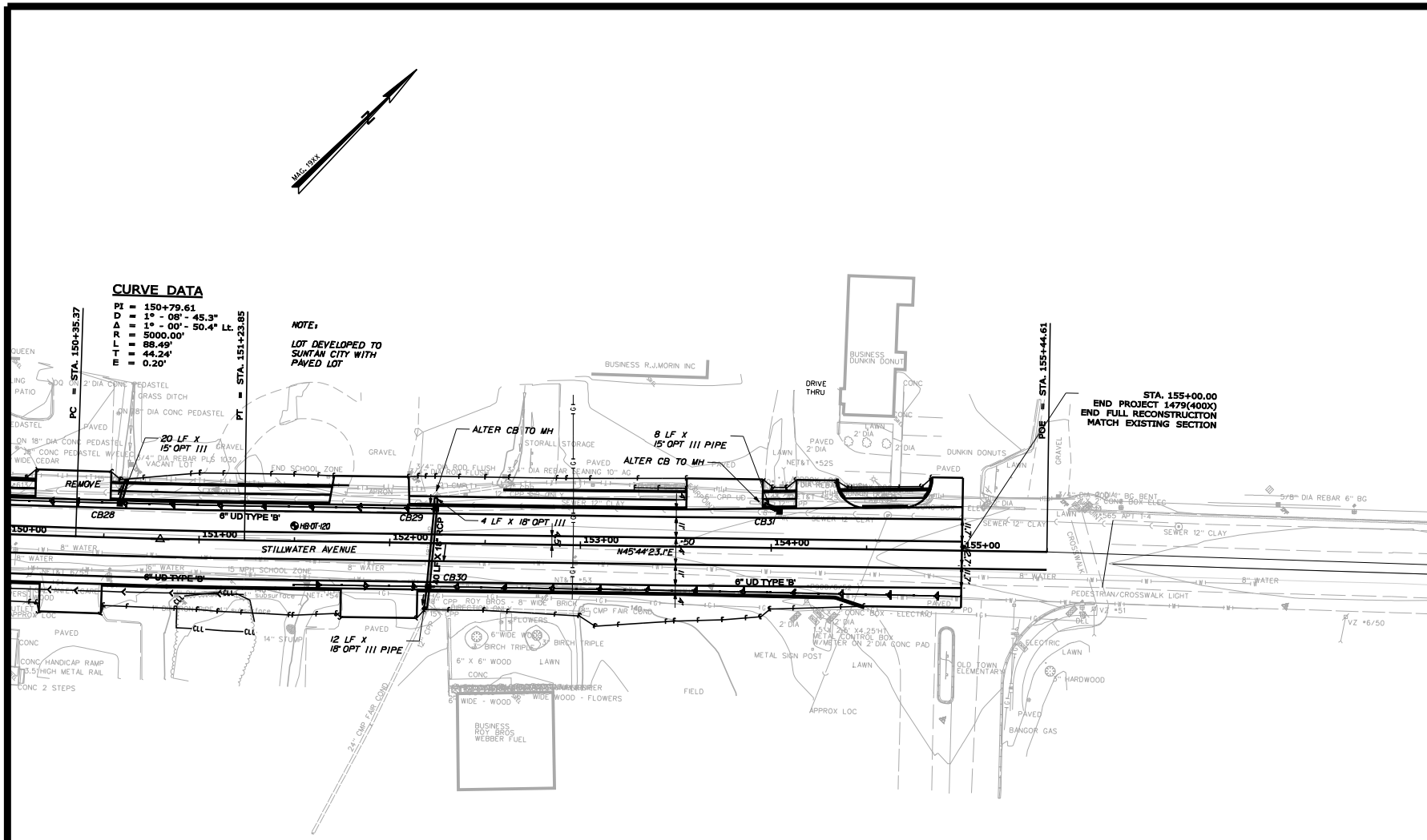

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HIGHWAY PLANS

PROJ. MANAGER		BY	DATE
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DESIGN-REVIEWED	------	------	------
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DESIGN-DETAILED3	------	------	------
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OLD TOWN
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