MaineDOT

Highway Program

Brad Foley, Program Manager
Scott Bickford & Steve Bodge, Assistant Program Managers
Phone: 624-3480 Fax: 624-3481

Memorandum

To: Ernie Martin
From: Karen Gross
Date: 03/09/15
Subject: Final Series 100 Soils Report 2015-112
PIN 19109.00
Bridgton-Fryeburg, Route 302

==========

PROJECT INFORMATION

Pavement and soils investigations have been completed for the U.S. Route 302 reconstruction project in the towns of Bridgton and Fryeburg. The scope of work for this project includes pavement structure reconstruction, paved shoulders, and subsurface and surface drainage improvements.

The project begins 0.11 mile west of Stanley Hill Road (Route Log Mile= 48.44) and extends easterly 5.14 miles to a point 0.04 miles east of Stack Em Inn Road (RLM= 43.30). This section of Route 302 is on the National Highway System (NHS) and is classified as a rural principal arterial. The following summarizes the existing subsurface conditions, the types of pavement structure materials and how it was constructed, subgrade types and strengths, existing surface and subsurface drainage conditions, and anticipated frost conditions.

EXISTING PAVEMENT ASSESSMENT

The existing roadway consists of two 12-foot travel lanes and variable width gravel shoulders. Pavement distress prior to an overlay in 2010 was observed and considered to be moderate in severity, however there are a few locations where pavement distress can be considered severe. The primary distresses included rutting of the outer 1/3 of the travel lanes (structural distress), alligator cracking (structural distress), longitudinal cracking (structural and functional distress), block cracking (functional distress), and transverse cracking (functional distress). The cause of pavement distress is predominately due to frost action (heaving), poor pavement structure drainage, lack of structure support for traffic/truck loadings, and asphalt aging.

Prior to the 2010 overlay, severe rutting could be seen in the outer 1/3 of the travel lane at many locations. This type of rutting typically indicates lack of support for the applied traffic loadings and occurs frequently on heavily traveled roadways without paved shoulders. The lack of support can be due an insufficient base gravel thickness, or from water entering into the subbase and subgrade soils via the unpaved shoulders. A thick layer of shim course was placed in these rutted areas to improve the roadway cross slope during the placement of the 2010 overlay. It is expected that the rutting will return since the shoulders remain unpaved and the underlying subbase and subgrade were not improved.

Ditching is non-existent or shallow along most of the project. There also appears to be severe erosion of the gravel shoulders in some locations. Stormwater drainage running in the gravel shoulders can cause undermining of the gravel beneath the asphalt surface course, as well as saturating and softening the subbase and subgrade soils.

AS-BUILT PLANS

As-built plans from the 1930's indicate that Route 302 was originally constructed with 10′ wide travel lanes and 3' wide gravel shoulders. A variable gravel base was used on all projects within the current project limits, with typical thickness of 12" to 18". The shoulders were constructed with 5" of gravel base, creating a pavement structure type known as a "bathtub". The surface of the gravel base in the travel lanes was treated with a liquid bituminous material, and a 3" macadam surface/wearing course was placed over it. Plans also show that some sections of the roadway were constructed with a base consisting of 6" of gravel base over 8" of stone base, but this was not encountered in the investigations. They also show that a ledge cut was made between design station 358+00 to 361+00, with excavated ledge used as fill from design station 348+00 to 356+50, and to build the shoulders in the ledge cut area. As-built plans, the as-built to design station conversions, and a summary of the as-constructed pavement structure construction in relation to the current design stationing are attached at the end of this report for your reference.

INVESTIGATIONS

Investigations included a Falling Weight Deflectometer (FWD) field analysis to determine pavement weaknesses and resilient modulus values for pavement design, Ground Penetrating Radar (GPR) to determine the existing asphalt thickness, and 17 power auger borings to determine pavement structure materials thicknesses and properties, 6 asphalt cores, and power auger probes and hand soundings to identify the depth to the top of bedrock.

Existing information including roadway as-built plans, surficial geology and agricultural maps, and pavement management data were also analyzed to determine how the roadway was constructed, what the pavement foundation soils consist of, and where possible surface and subsurface drainage problems may exist.

Boring and Lab Testing Information

Seventeen borings were drilled to a depth of 5 (+/-) feet for the preliminary investigations using solid stem augers, unless refusal was encountered shallower than that depth. Subbase and subgrade soil samples were taken directly off the auger flights, and representative samples were tested by the MaineDOT testing lab in Bangor to determine the gradation and water content. Auger probes and rod soundings were conducted following the finalization of the horizontal and vertical alignments to identify top of bedrock for bedrock removal quantities. Ten borings were also drilled in 2007 as part of the Enhanced Scoping process, so that information is included here also. The following sections summarize the materials properties and thicknesses as found in the borings and from the lab testing data. A boring summary sheet, boring logs, lab testing data and Geoplans showing boring and probe locations are attached at the end of this memo for your reference.

Existing HMA

The subsurface information indicates that the existing asphalt (HMA) ranges from 5.4" inches to 7.8" in thickness. No bituminous treated material or macadam as indicated on the as-built typical sections were encountered in the borings or asphalt cores, however drilling with power augers can destroy this layer so it is not always visible.

GPR data was collected in the right and left wheel path of each lane at ½ foot intervals to determine the HMA thicknesses for the entire project length versus a few point locations (borings and asphalt cores). The data collected was difficult to evaluate in the right wheel path in both directions due to the presence of multiple asphalt shim applications at the edge of the travel lane. HMA thicknesses as found in the borings and cores were used extensively to help with the analysis of the GPR data. The roadway was divided into 100' sections and the HMA thicknesses from each section were averaged. These average HMA thicknesses range from 4.3" to 8.9". The HMA thicknesses are variable throughout the entire project length, but most 100' sections have thicknesses between 6' and 7". The full GRP report is attached at the end of this memo for your reference.

Existing Base/Subbase

The subsurface information indicates that the existing granular base/subbase thickness ranges from 9" to 29" in thickness. Thinner subbase sections exist at stations 346+40 (11.4") and 420+06 (9"). All other boring locations have subbase thicknesses of 16" or more.
No stone base was encountered in the borings. Lab testing data indicates that the existing granular material meets the requirements of Aggregate Subbase Course Gravel – Type E. Soil sample sizes were small and therefore tend to be skewed to the finer particle sizes. The existing subbase may meet the gradation of ASCG-Type D if a larger sample size (bag sample) was tested.

Subgrade Soils

The subsurface information indicates that the existing subgrade soils are predominately glacial till that consists of a mix of variable amounts of sand, gravel, and silt. No boulders or cobbles were encountered in the subgrade during drilling. This soil type is considered moderately to highly frost susceptible, with the susceptibility increasing with increasing silt contents.

Bedrock

Exposed bedrock and boulders were observed between stations 364+35 and 385+50, with a ledge cut located on the southbound side of the roadway. Probes and rod soundings were completed between Station 357+50 and 364+50 on both sides of the roadway to determine the top of bedrock in a proposed cut area. Shallow refusals (5' below the ground surface or less) were also encountered in roadway borings at stations 363+82 and 559+18. Shallow bedrock is expected at station 363+82 because of the proximity to the ledge cut in this section, but it is unknown if the refusal are Station 559+18 is bedrock or a large boulder. As-built plans indicate that bedrock was removed during the construction of the original roadway approximately between design stations 357+00 to 363+00. The borings, probes and rod soundings confirmed this original construction. The following table is a summary of the refusal depths encountered in all subsurface investigations. See the Falling Weight Deflectometer Results section for

possible shallow bedrock locations as indicated by deflection data and resilient modulus calculations.

Design Station	Offset (ft)	Refusal (ft)	Offset (ft)	Refusal (ft)
361+50	26.0 Lt.	3.2	19.0 Rt.	0.8
362+00	30.0 Lt.	2.6	19.0 Rt.	1.6
362+50	21.0 Lt.	4.0 (weathered)	22.0 Rt.	2.1
363+00	21.0 Lt.	5.7	25.0 Rt.	1.8
363+50	30.0 Lt.	6.8	26.0 Rt.	3.7
363+82	9.0 Lt.	5.2		
363+82	14.0 Lt.	4		
364+00	27.0 Lt.	2.2	30.0 Rt.	3.4
364+50	20.0 Lt.	1.9	25.0 Rt.	outcrop
364+50	28.0 Rt.	outcrop	30.0 Rt.	0.2
357+50	30.0 Lt.	2.6	30.0 Rt.	2.9
358+00	30.0 Lt.	0.4	30.0 Rt.	3.9
358+50	30.0 Lt.	2.6	30.0 Rt.	0.2
359+00	30.0 Lt.	0.9	30.0 Rt.	outcrop
359+50	30.0 Lt.	1.1	30.0 Rt.	0.4
360+00	30.0 Lt.	2.0	30.0 Rt.	1.0
360+50	30.0 Lt.	2.0	30.0 Rt.	2.7
361+00	30.0 Lt.	3.5	30.0 Rt.	5.7
559+18	9.0 Lt.	3.4		

Groundwater

Shallow groundwater or wet subsurface soils were encountered beneath the pavement for the entire project length. The average depth to wet soils/groundwater was approximately 2’ below the pavement surface at the time of drilling. These water levels can be due to a high groundwater table as well as poor pavement structure drainage attributed to the “bathtub” pavement section. Groundwater levels will fluctuate seasonally and with precipitation, so the groundwater levels encountered during construction may be different than at the time of the subsurface investigations.

Design Station	Offset (ft)	Depth to water (ft)
334+26	9 L	wet soils @ 4.0'
386+53	9 L	wet soils @ 2.2'
409+23	9 L	wet soils @ 1.5'
429+82	9 L	2.1
503+74	9 L	wet soils @ 2'
503+74	17 L	wet soils @ 2.3'
521+12	11 L	9
521+58	13 R	9
521+70	9 L	wet soils @ 2'
541+23	9L	wet soils @ 3.2'
549+15	9L	wet soils @ 2.4'
573+97	9 L	wet soils @ 2'

Falling Weight Deflectometer (FWD) Results

FWD data was collected at 0.05 mile intervals in the right wheel path of the westbound travel lane (in the direction of the Route Log Mile nodes). The deflection data provides information on where the existing pavement may have high deflections (weakness within the pavement or subgrade) and areas of low deflection where bedrock may be close to the surface. Sections with high deflections can also help identify areas that may need to be reconstructed.

The FWD deflection data shows there are deflections in all of the pavement structure layers, with the highest deflections occurring in the top 12" to 18" of the pavement structure. This indicates that the pavement structure is probably not adequate to support traffic loadings either because of material deterioration or lack of structural support. The sections with the highest deflections in the top 12" to 18" are stations 322+00 to 345+00, 360+00 to 369+00, 420+00 to 422+00, 430+00 to 432+00, 448+00 to 454+00, 491+00 to 507+00, and 512+00 to 523+00, 531+00 to 532+00, and 547+00 to 552+00. The FWD deflection data can also show where there are areas with a weak subgrade. The sections with the highest deflections in the subgrade are stations 321+00 to 325+00, 346+40, 363+82, and 386+53.

The FWD deflection data can also show locations were bedrock or large stone/boulders are close to the surface. Low deflections were measured at stations 356+43, 359+07, 389+17, 474+18, 484+21, 519+06, 536+48, and 553+90.

The resilient moduli (Mr) values as calculated from the FWD data range from 2428 psi to 9620 psi. Typically, Mr values over 8000 psi indicate the presence of shallow bedrock or stone base sections. Mr values over 8000 psi were calculated at stations 359+07, 389+17, 474+18, 484+21, and 553+90. Mr values under 3000 psi can indicate weak or soft subgrade soils. Deflection testing over existing culverts can also produce very low modulus values. Mr values of 3000 psi or less were calculated at stations 321+58, 324+22, 346+40, and 386+53.

GEOLOGY

The Maine Surficial Geology maps for Pleasant Mountain and the Fryeburg Quadrangle indicate that the surficial soils at this location predominately consist of glacial till and glacial lake deposits. Till consists of a mixture of silt, sand, gravel, and boulders, and typically is an excellent foundation material for the pavement structure, however, it is typically moderately to highly frost susceptible due to the high silt content. Glacial lake deposits typically consist of a mixture of sand, gravel, and silt, and were deposited in a water environment. This deposit typically consists of finer material than the adjacent glacial till. This deposit should also be an excellent foundation for the pavement structure, however will also be moderately frost susceptible.

The National Cooperative Soil Survey of Cumberland County indicates that the surficial soils consist primarily off glacial till and glacial outwash deposits. The Soil Conservation Survey of Oxford County indicates that the surficial soils consist primarily of glacial till and glacio-lacustrine sediments. All these soil types are similar and consist of a mix of varying amounts of sand, gravel, and silt.

The Soil Survey also contains information on physical and engineering properties of the soils that are useful for design decisions. These include expected depth to the high groundwater table, depth to bedrock, erodibility and potential frost action. The following table summarizes the Soil Survey information that will pertain to this project. Erodibility is discussed in the Cut Slopes section. The design stations have been interpolated from the Soil Survey maps so they are considered very approximate.

Soil Survey Summary

Design Station	Groundwater Depth	Bedrock Depth	Frost Action
313+98 to 327+39	1’ to 2.5’	> 60”	high
327+39 to 343+23	0’ to 1.5’	> 60”	high
343+23 to 348+51	1.5’ to 2.5’	> 60”	high
348+51 to 353+79	0’ to 1.5’	> 60”	high
353+79 to 359+00	1’ to > 6’	> 60”	high
359+00 to 369+63	> 6’	10” to 20”	moderate
369+63 to 465+20	1’ – 2.5’	> 60”	high
465+20 to 475+23	> 5’	> 60”	low
475+23 to 563+41	3.0’ – 5.0’	> 60”	moderate
563+41 to 568+69	0’ - 1.0’	> 60”	moderate
568+69 to 589+79	3.0’ – 5.0’	> 60”	moderate

As can be seen in this table and the SCS data, a seasonally high groundwater table is expected on most of the project, and the depth to bedrock is expected to be greater than 5 feet except between station 359+00 to 369+63 where it is expected to be shallow or at the surface.

The geology and Soil Survey maps and information are attached for your reference.

FROST

Subgrade soils on this roadway will be moderately frost susceptible at all locations. The factors that must be present for frost action to occur are frost susceptible soils, an adequate water supply (infiltration, groundwater, capillary rise), and sustained temperatures below freezing for an extended period of time. All these factors are present on this project, therefore detrimental effects of frost are expected. Frost action will predominately produce frost heaves on this project, but since the soils may contain a significant quantity of finer sands and silts, thaw weakening during the melting period may also be an issue. The depth of frost penetration for this area is expected to be approximately 73”.

DRAINAGE

Some shallow ditching is located along the project, but it appears to be functioning to remove surface water only. As-built plans show that ditching was constructed as part of the original project, so it is assumed that they have filled with winter sand and vegetation over time. Since the groundwater table is seasonally high throughout the project, efforts to lower groundwater will greatly improve the performance and extend the functional life of the pavement. This can be accomplished by providing deep ditches (at least 1 foot below the bottom of the subbase), underdrain, or by raising the vertical profile. Since the roadway is most probably constructed as a bathtub section, boxing out a portion of the travel lane and shoulders and replacing the low

permeability, silty till material with good draining gravel is also important to provide long-term pavement performance. These drainage provisions will also help mitigate frost action.

CUT SLOPES

The existing natural soils are moderately erodible (K Factor 0.28 - 0.43) at many areas along the project. According to the SCS maps and information, these soils with the highest K Factors are located approximately from design Stations 325+00 to 350+00 and 485+00 to 586+00. Other locations may exist that were not identified on the SCS maps. Cut slope surfaces should be stabilized/protected as soon as possible to prevent loss of surface soils during rainstorms. Downspouts to channelize stormwater are recommended on slopes with a steeper grades, long slope lengths, and larger surface areas.

BOX CULVERTS

Large box culverts are located at station 321+50 and station 521+50. Design information is located in a memorandum from Kitty Breskin dated 9/15/14 and is attached at the end of this report.

CONSTRUCTION CONSIDERATIONS

1. Existing roadway aggregate excavated as part of this project may meet the requirements of Aggregate Subbase Course Gravel (ASCG) - Type D or E. Provisions in the contract are recommended allowing the contractor to reuse it to the fullest extent possible if testing during construction confirms it meets MaineDOT specifications.

2. Drainage provisions for the removal of surface water and subsurface (groundwater) is recommended for the entire project. A high groundwater table was encountered at many locations (see Groundwater section). Constructing drainage ditches and installing underdrain prior to pavement removal is recommended to give the subgrade time to drain. This will greatly improve the subgrade soil strength when the pavement is removed and construction traffic is applied.

3. Surface and subsurface drainage improvements are recommended to help reduce the effects of frost on the pavement structure.

4. The existing natural soils are moderately erodible at many areas along the project. Cut slope surfaces should be stabilized /protected as soon as possible to prevent loss of surface soils cut slopes.

5. Downspouts are recommended to channelize stormwater on cut slopes with highly erodible soils if the slope is steep, has a long length, and/or has a large surface area.

6. Shallow bedrock is expected between stations 364+35 and 385+50, and at 534+00 +/-. A ledge cut was observed between stations 364+50 and 385+50, and exposed bedrock was observed at station 534+00 +/-. If rock excavation is necessary in these locations, rock is considered hard and will require blasting for removal.

Attachments:

As-Built Typicals
As-Built Station Conversion
Boring Summary Sheet
Boring Logs
Laboratory Testing Summary Sheet
Grain Size Curves
FWD Data and Analysis
GPR Data and Analysis
Design Freezing Index/Frost Depth Chart
Maine Surficial Geology Map
National Cooperative Soil Survey of Cumberland and Oxford Counties – Maps and Data
Box Culvert Design Memorandum

As-Built Plans

As-Built Station Conversion

Fed. Road Dist. No.	State	Fed. Aid Proj. No.	Fiscal Year	Sheet No.	Total Sheets
9	Maine	130-A		1	21

STATE OF MAINE
STATE HIGHWAY COMMISSION

PLAN AND PROFILE
STATE HIGHWAY "B" Rt. 302
FRYEBURG
OXFORD COUNTY
FEDERAL AID PROJECT NO. 130-A

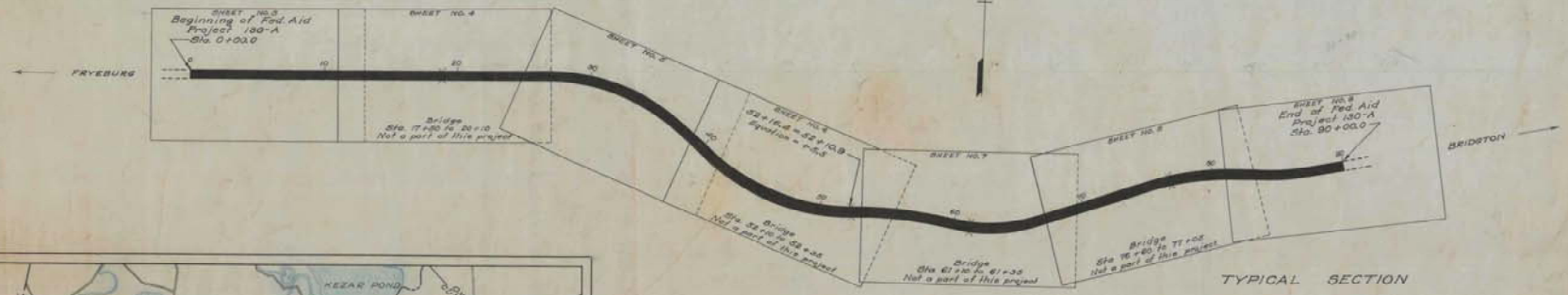
TOTAL LENGTH 1.638 MILES

SCALES: PLAN 1 IN. = 50 FT.
PROFILE HOR. 1 IN. = 50 FT. VER. 1 IN. = 5 FT.
CROSS SECTIONS 1 IN. = 5 FT.

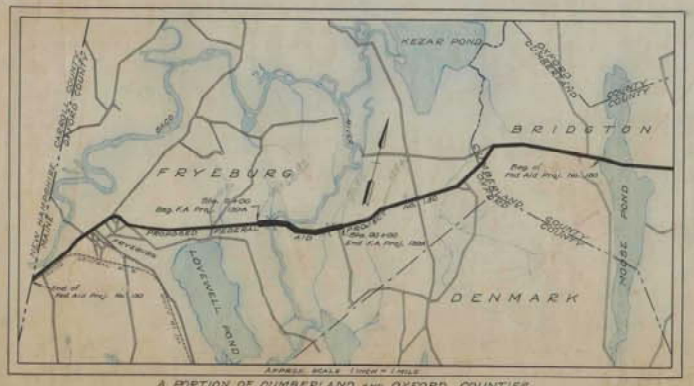
CONVENTIONAL SIGNS

State or National Line		Survey Line	
County Line		Culvert	
Town Line		Drop Inlet	
Unfenced Property		Trolley Pole	
Fence		Power Pole	
Right of Way Line		Tel. Pole	
Traveled Way		Marsh	
Railroad		Trees	
Retaining Wall		Stone Wall	

INDEX OF SHEETS



SCALE 1 INCH = 400 FEET



A PORTION OF CUMBERLAND AND OXFORD COUNTIES

TYPICAL SECTION

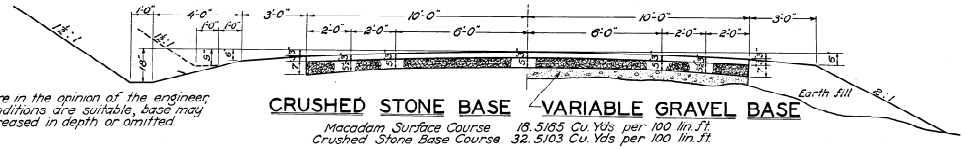
Note:—
All work contemplated under this contract to be covered by and in conformity with the specifications adopted May 27, 1930, except as modified on this plan.

Approved:
Maine State Highway Commission
Chairman
[redacted]
Chief Engineer

Approved:
U. S. Bureau of Public Roads
[redacted]
District Engineer
[redacted]
Chief Engineer
[redacted]
Director

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
9	MAINE	130-A		2	21

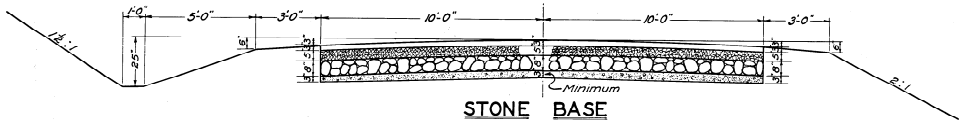
STANDARD SECTIONS BITUMINOUS MACADAM SURFACE



Where in the opinion of the engineer, soil conditions are suitable, base may be decreased in depth or omitted

CRUSHED STONE BASE VARIABLE GRAVEL BASE

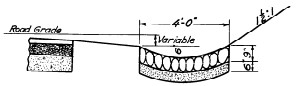
Macadam Surface Course 18.5185 Cu. Yds. per 100 lin. ft.
Crushed Stone Base Course 32.5103 Cu. Yds per 100 lin. ft.



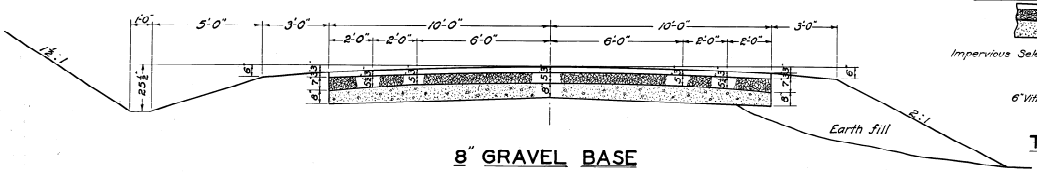
STONE BASE

Location and depth of ditch to be governed by local conditions

5" Crushed Stone Base 30.8642 Cu Yds per 100 lin. ft.
8" Stone Base 49.3827 Cu Yds per 100 lin. ft.
3" Gravel Sub-Base 21.6050 Cu. Yds per 100 lin. ft

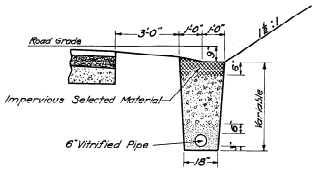


COBBLE GUTTER

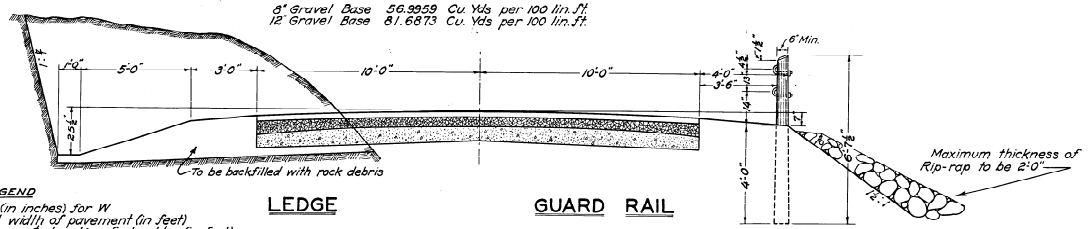


8" GRAVEL BASE

8" Gravel Base 56.9959 Cu Yds per 100 lin. ft.
12" Gravel Base 81.6873 Cu Yds per 100 lin. ft.



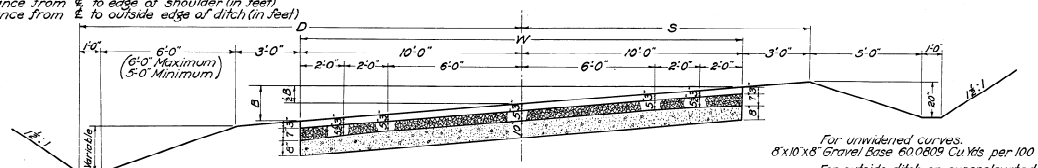
TILE UNDERDRAIN



LEDGE

GUARD RAIL

LEGEND
B= Full Bank (in inches) for W
W= Unwidened width of pavement (in feet)
S= Distance from ℄ to edge of shoulder (in feet)
D= Distance from ℄ to outside edge of ditch (in feet)



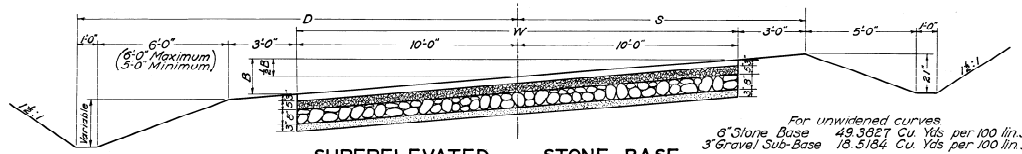
SUPERELEVATED GRAVEL BASE

For inside ditch on widened or unwidened superelevated curves. Depth of ditch below center grade equals thickness of section at ℄ plus $\frac{D}{W} \times B$.

Curves of 2° or more to be superelevated.
"B"= Degree of Curve x 2" with a minimum of a 6" superelevation. Maximum superelevation=1" per foot width of pavement.
All curves to have full superelevation at approximately 50' onto the curve from P.C. & P.T. with a 150' runoff.

For unwidened curves.
8"x10"x8" Gravel Base 60.0809 Cu Yds per 100 lin. ft.

For outside ditch on superelevated curves. Depth of ditch in inches below center grade equals thickness of section at ℄ plus 2", minus $\frac{S}{W} \times B$.



SUPERELEVATED STONE BASE

For unwidened curves.
6" Stone Base 49.3827 Cu. Yds per 100 lin. ft.
3" Gravel Sub-Base 18.5184 Cu. Yds per 100 lin. ft.

ESTIMATED QUANTITIES

ITEM	DESCRIPTION	QUANTITY	REMARKS
11	Clearing and Grubbing	46 Acres	
12A	Earth Excavation	15,000 Cu Yds	
12B	Rock Excavation	1,500 Cu Yds	Est ledge, Sta 30 to 34.
12C	Trees Removed	20 Each	
13	Excavation for Structures	700 Cu. Yds	
17A	Common Borrow	36,200 Cu. Yds	
20	Gravel Sub-Base	440 Cu. Yds	
23	Gravel Base Course	4200 Cu Yds	
24	Stone Base Course	1000 Cu Yds	
26	Crushed Stone Base Course	2780 Cu. Yds	
28	Gravel Surface Course	100 Cu. Yds	No Pavement to be placed before 1932
30A	Bituminous Macadam Surface Course	1600 Cu. Yds	
	Bituminous Material Applied Hot	48100 Gals.	
35B	Class "B" Concrete	30 Cu Yds	
36	Steel Reinf. for Conc. Structures	100 Lbs	
40A	Laying 12" Corr. Metal Pipe	120 Lin. Ft.	
42B	Laying 15" Concrete Pipe	220 Lin. ft	
42C	Laying 18" Concrete Pipe	156 Lin. ft	
42F	Laying 36 Concrete Pipe	40 Lin. Ft.	
46	Hand Laid Riprap	5000 Cu. Yds	
47	Tile Underdrain	1300 Lin. Ft.	
50A	Wire Cable Guard Rail	8700 Lin. Ft.	
50B	Anchorages for Wire Cable Gd. Rail	60 Each	
52	Gravel Overhaul	— Yd. Miles	
48	Cobble Stone Gutter	700 Sq. Yds.	

CULVERT DATA

STATION	KIND	SIZE	LENGTH	"B" CONC.	STEEL
12+10	Conc. Pipe	15"	46	3.00 c.y.	8 lb.
24+50	" "	15"	48	2.50 "	8 "
28+01	" "	15"	44'	2.50 "	8 "
38+49	" "	18"	52'	2.93 "	11 "
47+94	" "	15"	40'	2.50 "	8 "
66+50	" "	18"	48'	2.93 "	11 "
72+86	" "	16"	56'	2.93 "	11 "
82+46	" "	15"	40'	2.50 "	8 "
84+35	" "	36"	40'	7.00	22 "
DRIVEWAY CULVERTS -					
1+10 R	C.M.P.	12"	20		
7+15 R	"	12"	20'		
7+25 L	"	12"	20'		
10+60 L	"	12"	20'		
49+30 R	"	12"	20'		
97+75 R	"	12"	20'		

MARCH '31

Fed. Road Dist. No.	State	Fed. Aid Proj. No.	Fiscal Year	Sheet No.	Total Sheets
9	Maine	NRH 130-B		1	19

STATE OF MAINE
STATE HIGHWAY COMMISSION

PLAN AND PROFILE
STATE HIGHWAY "B"

Rt 302

FRYEBURG
OXFORD COUNTY
FEDERAL AID PROJECT NO. N.R.H. 130-B

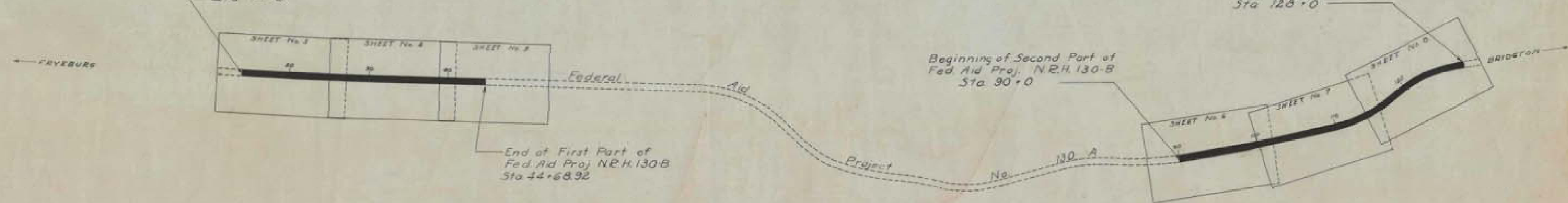
TOTAL LENGTH 1.300 MILES

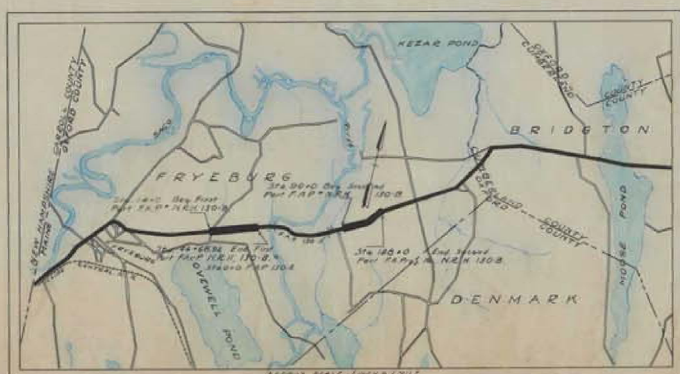
SCALES:
- PLAN 1 IN.= 50 FT.
- PROFILE: HOR. 1 IN.= 50 FT.; VER. 1 IN.= 5 FT.
- CROSS SECTIONS 1 IN.= 5 FT.

CONVENTIONAL SIGNS

STATE OR NATIONAL LINE	SURVEY LINE
COUNTY LINE	CULVERT
TOWN LINE	DROP INLET
UNFENCED PROPERTY	TROLLEY POLE
FENCE	POWER POLE
RIGHT OF WAY LINE	TEL. POLE
TRAVELED WAY	MARSH
RAILROAD	TREES
RETAINING WALL	STONE WALL

INDEX OF SHEETS





A PORTION OF CUMBERLAND AND OXFORD COUNTIES

Note:-
All work contemplated under this contract to be governed by, and in conformity with the specifications adopted March 21, 1932 with all subsequent approved revisions except as modified on these plans.
The above specifications where in not in conformity with the Federal Government's Rules and Regulations for work done under the National Recovery Act relative to the furnishing of all materials by the contractor, or otherwise not in conformity therewith, are hereby amended to meet said Rules and Regulations of the Federal Government.

The Commission reserves the right to increase or decrease the length of this project but in no event more than twenty five percent of the original contract.

APPROVED:
MAINE STATE HIGHWAY COMMISSION

Frank A. Peabody, Chairman
Edward E. Sommers
Paul C. Thurston
Llewellyn N. Barry, Chief Engineer

APPROVED:
U. S. BUREAU OF PUBLIC ROADS

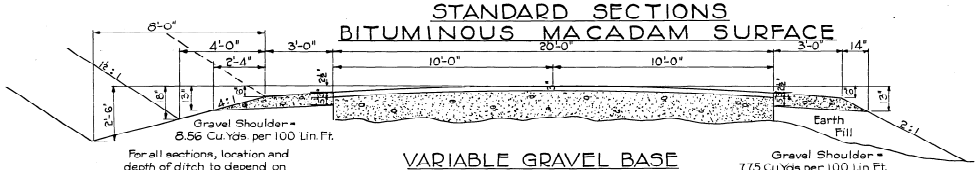
[redacted]
DISTRICT ENGINEER

[redacted]
CHIEF ENGINEER

[redacted]
DIRECTOR

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
3	MAINE	138-B		2	19

STANDARD SECTIONS
BITUMINOUS MACADAM SURFACE



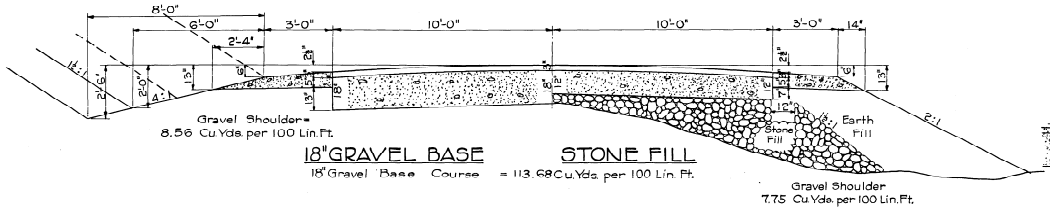
Gravel Shoulder = 8.56 Cu. Yds. per 100 Lin. Ft.

Gravel Shoulder = 7.75 Cu. Yds. per 100 Lin. Ft.

For all sections, location and depth of ditch to depend on local conditions.

VARIABLE GRAVEL BASE

3" Macadam Surface Course = 18.52 Cu. Yds. per 100 Lin. Ft.

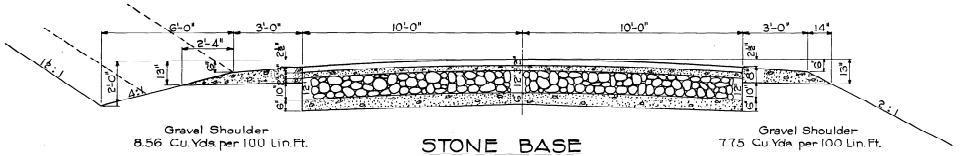


Gravel Shoulder = 8.56 Cu. Yds. per 100 Lin. Ft.

18" GRAVEL BASE — STONE FILL

18" Gravel Base Course = 113.68 Cu. Yds. per 100 Lin. Ft.

Gravel Shoulder 7.75 Cu. Yds. per 100 Lin. Ft.

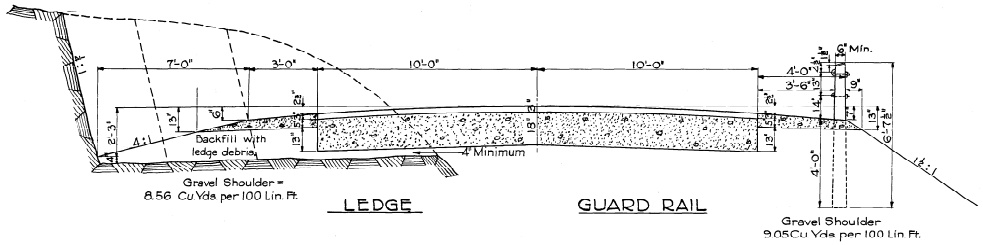


Gravel Shoulder 8.56 Cu. Yds. per 100 Lin. Ft.

Gravel Shoulder 7.75 Cu. Yds. per 100 Lin. Ft.

STONE BASE

3" Gravel Base Course	=	18.52 Cu. Yds. per 100 Lin. Ft.
12" Stone Base Course	=	74.07 Cu. Yds. per 100 Lin. Ft.
6" Gravel Sub-base	=	39.61 Cu. Yds. per 100 Lin. Ft.

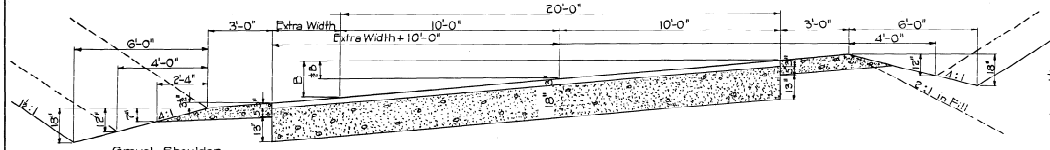


Gravel Shoulder = 8.56 Cu. Yds. per 100 Lin. Ft.

Gravel Shoulder 9.05 Cu. Yds. per 100 Lin. Ft.

LEDGE — GUARD RAIL

"B" = Full bank for 20 ft. width.



Gravel Shoulder 8.56 Cu. Yds. per 100 Lin. Ft.

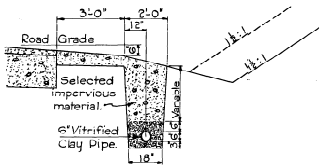
WIDENED & SUPERELEVATED GRAVEL BASE

NOTE: All dimensions for ditch on superelevated section are given from edge of shoulder.

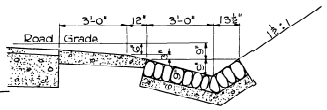
Curves of 2° or more to be superelevated.
"B" equals (Degree of curve × 2) with a minimum of 6'
Maximum superelevation equals 1" per foot width of pavement.
All curves to have full superelevation at approximately 50' onto the curve from P.C. and P.T., with runoff of 150' unless otherwise specified.
Curves of 8° or more to be widened according to the formula $\frac{B}{18} * D$, where "D" = Degree of Curve.

For Unwidened Superelevated Curves

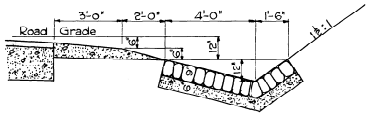
18" Gravel Base Course	=	111.11 Cu. Yds. per 1004. in. Ft.
4" Gravel Sub-base	=	24.69 " " " 100 " "



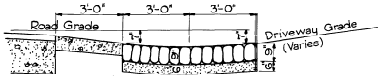
TILE UNDERDRAIN



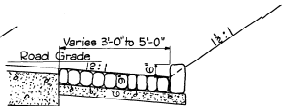
COBBLE STONE GUTTER
Area = 0.50 Sq. Yds. per Lin. Ft.



COBBLE STONE GUTTER
Area = 0.66 Sq. Yds. per Lin. Ft.



COBBLE STONE GUTTER
for Driveways & Side Roads.



COBBLE STONE GUTTER
and Curb

ESTIMATED QUANTITIES

ITEM	DESCRIPTION	QUANTITY
11	Clearing & Grubbing	0.60 Acres
12-A	Earth Excavation	4900 Cu. Yds.
12-B	Rock Excavation	3500 " "
12-C	Trees Removed	15 Each
13	Excavation for Structures	125 Cu. Yds.
17-A	Common Borrow	2700 " "
20	Gravel Sub-Base	210 " "
23	Gravel Base Course	8900 " "
24	Stone Base Course	890 " "
31-A	Bituminous Macadam Surface Course (Emulsified Asphalt Penetration Method)	1300 " "
31-B	Emulsified Asphalt Finished & Applied	40300 Gals
37-A	Class "A" Concrete	14.14 Cu. Yds.
37-B	Class "D" Concrete	26.26 " "
38	Steel Rein. for Concrete Structures	1720 Lbs.
40	Cement Rubble Masonry	2 Cu. Yds.
42-A	Laying 12" Corr. Metal Pipe	80 Lin. Ft.
42-B	Laying 15" Corr. Metal Pipe	40 " "
42-C	Laying 18" Corr. Metal Pipe	40 " "
44-C	Laying 18" Reinf. Concrete Pipe	42 " "
49	Tile Underdrain	550 " "
52-A	Wire Cable Guard Rail	1870 " "
52-B	Anchorages for Wire Cable Guard Rail	12 Each
54	Gravel Overhaul	14450 M. Miles

NOTE
GRAVEL SHOULDERS TO BE PAID FOR AS GRAVEL BASE.

PAVEMENT NOT TO BE LAID UNTIL 1934.

IN COMPUTING GRAVEL OVERHAUL EACH PART OF THIS CONTRACT WILL BE CONSIDERED AS A SEPARATE UNIT.

CULVERT DATA

FIRST PART

STA.	KIND	SIZE	LENGTH	STA.	KIND	SIZE	LENGTH
17+33	Conc Box	1'x 3'	12'	Undetermined	C.M.P.	12"	20'
				"	" " "	12"	20'
				"	" " "	15"	20'
				"	" " "	18"	20'

SECOND PART

109+96	R.C.P.	18"	12'	Undetermined	C.M.P.	15"	20'
				"	" " "	12"	20'
				"	" " "	15"	20'
				"	" " "	18"	20'

Fed. Road Dist. No.	State	Fed. Aid Proj. No.	Fiscal Year	Sheet No.	Total Sheets
9	Maine	130-C		1	45

STATE OF MAINE
STATE HIGHWAY COMMISSION

PLAN AND PROFILE
STATE HIGHWAY "B" RT 130-2
FRYEBURG - BRIDGTON
OXFORD & CUMBERLAND COUNTIES
FEDERAL AID PROJECT NO. 130-C

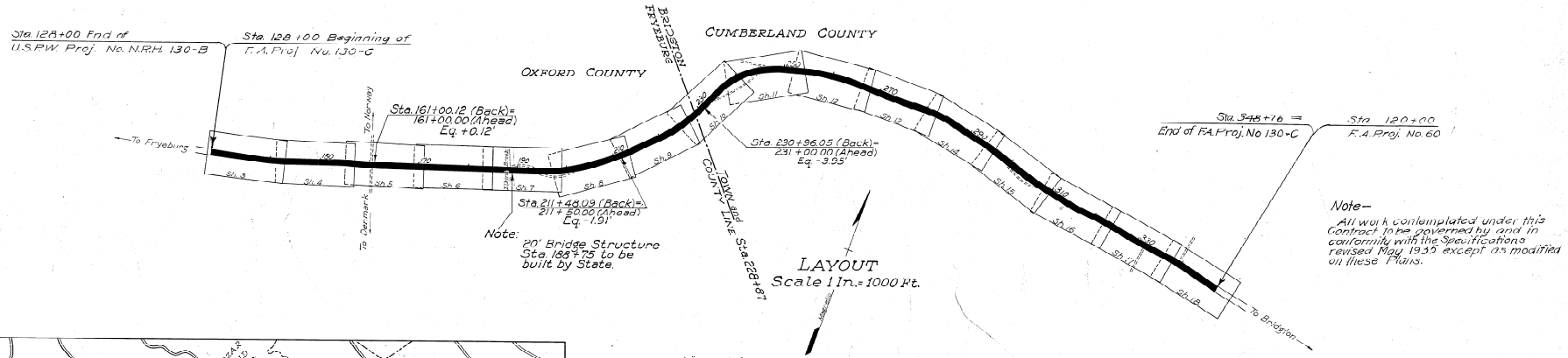
TOTAL LENGTH 4.179 MILES

SCALES { PLAN 1 IN. = 50 FT. ; PROFILE { HOR. 1 IN. = 50 FT. ; VER. 1 IN. = 5 FT. } ; CROSS SECTIONS 1 IN. = 5 FT. }

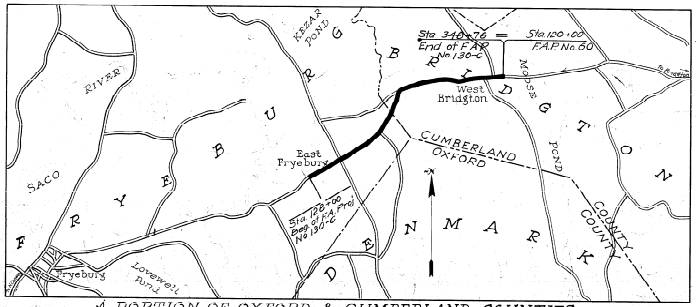
CONVENTIONAL SIGNS

State or National Line	Survey Line
County Line	Culvert
Town Line	Drop Inlet
Unfenced Property	Trolley Pole
Fence	Power Pole
Right of Way Line	Tel. Pole
Travelled Way	Marsh
Railroad	Trees
Retaining Wall	Stone Wall

INDEX OF SHEETS



Note—
All work contemplated under this Contract to be governed by and in conformity with the Specifications revised May 1935 except as modified on these Plans.



A PORTION OF OXFORD & CUMBERLAND COUNTIES
Approx. Scale - 1 In. - 1 Mile

TYPICAL SECTION

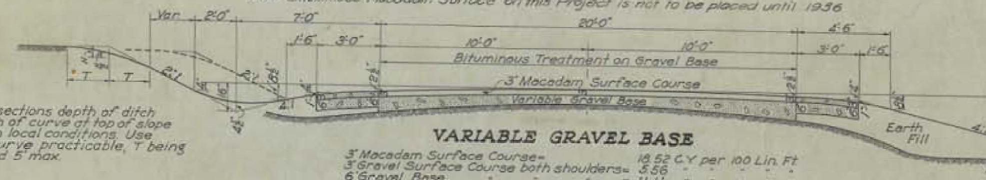
APPROVED:
MAINE STATE HIGHWAY COMMISSION
Paul C. Thurston CHAIRMAN
[redacted]
[redacted]
[redacted] CHIEF ENGINEER

APPROVED:
U. S. BUREAU OF PUBLIC ROADS
[redacted] DISTRICT ENGINEER
[redacted] CHIEF ENGINEER
[redacted] DIRECTOR

B-14

BITUMINOUS MACADAM SURFACE COURSE

Note - Bituminous Macadam Surface on this Project is not to be placed until 1936

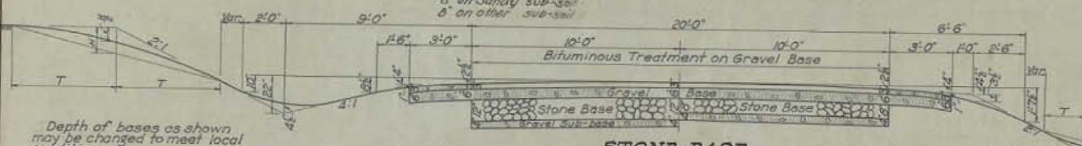


For all sections depth of ditch and length of curve at top of slope depend on local conditions. Use longest curve practicable, T being 2' min. and 5' max.

VARIABLE GRAVEL BASE

3" Macadam Surface Course = 18.52 C.Y. per 100 Lin. Ft.
3" Gravel Surface Course both shoulders = 5.56 " " " "
6" Gravel Base " " " = 11.11 " " " "

Minimum depth of Variable Gravel Base on 8" Gravel Road with Bituminous Treatment.
6" on Sandy sub-soil
8" on other sub-soil



Depth of bases as shown may be changed to meet local conditions.

STONE BASE

6" Gravel Base Course including shoulders = 48.15 C.Y. per 100 L.F.
4" Gravel Sub-base Course = 27.26 " " " "

8" Stone Base Course = 49.38 C.Y. per 100 L.F.
12" " " " = 74.07 " " " "

Round bottom of 2:1 slope, T being 2' min. and 4' max.

Where a 2:1 slope is not practicable, use a 1½:1 slope in cuts. Construct berm ditch where needed.

GRAVEL BASE & STONE FILL

12" Gravel Base Course including shoulders = 87.76 C.Y. per 100 L.F.
15" " " " " = 106.28 " " " "

18" Grav. Base Course inc. shoulders = 124.79 C.Y. per 100 L.F.
24" " " " " = 161.83 " " " "

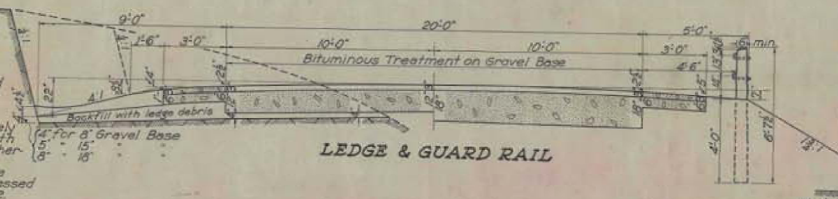
Round bottom of 2:1 slope, T being 2' min. and 4' max.

Curves of 2° or more shall be superelevated. 'B', the full bank for 20 ft. width, equals 2 times 'D', the degree of curve, with a minimum of 5" superelevation. Maximum bank shall not exceed 1 inch per foot width of pavement.

All curves shall have full superelevation at approximately the P.C. and P.T. of the curve with a transition of 150 ft. unless otherwise specified.

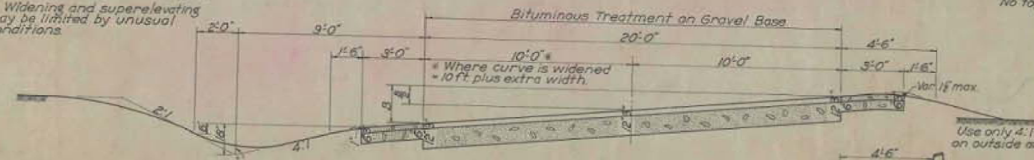
Curves of 6° or more shall be widened. The extra width expressed in feet is given by formula $\frac{D}{10}+2$.

Widening and superelevating may be limited by unusual conditions.

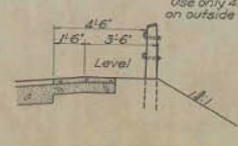


LEDGE & GUARD RAIL

No top nor bottom rounding with 1½:1 slope



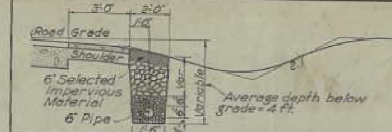
Use only 4:1 slope or guard rail on outside of superelevated curve



WIDENED & SUPERELEVATED

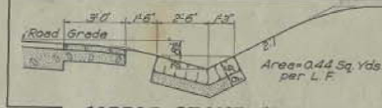
6" Gravel Base Course inc. shoulders = 48.15 C.Y. per 100 L.F.
12" " " " " " = 85.19 " " " "
15" " " " " " = 103.70 " " " "
18" " " " " " = 122.22 " " " "
24" " " " " " = 159.26 " " " "

12" Stone Base Course = 74.07 C.Y. per 100 L.F.
18" " " " = 111.11 " " " "
4" Grav. Sub-base " = 34.69 " " " "

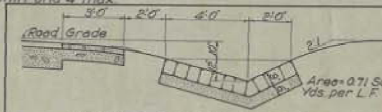


UNDERDRAIN

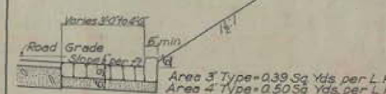
No bottom rounding with 4:1 slope



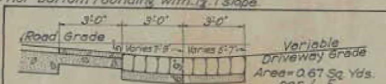
COBBLE STONE GUTTER



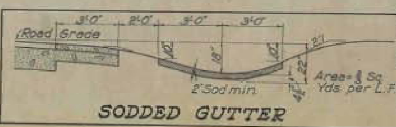
COBBLE STONE GUTTER



COBBLE STONE GUTTER



COBBLE STONE GUTTER



SODDED GUTTER

FINAL ~~ESTIMATED~~ QUANTITIES

ITEM	DESCRIPTION	QUANTITY
11	Clearing and Grubbing	3.3
12A	Earth Excavation	56725.4
12B	Rock Excavation	852.3
12C	Trees Removed	23
13	Excavation for Structures	1607.[illegible]
	Rock Excavation for Structures	32.3
17A	Common Borrow	None
20	Gravel Sub-base	415.6
23	Gravel Base Course	23719.7
24	Stone Base Course	1004.9[illegible]
27	Gravel Surface Course	1225.9
29A	Bit. Mac. Surface Course (Emul. Asp. Penet. Method)	4090.7[illegible]
29B	Emulsified Asphalt, Furnished and Applied	130,562
35A	Class "A" Concrete	53.76
35B	Class "B" Concrete	171.39
36	Steel Reinf. for Concrete Structures	6562
38	Cement Rubble Masonry	22.08
40A	12" Corrugated Metal Pipe	120
40B	15" Corrugated Metal Pipe	176
40C	18" Corrugated Metal Pipe	60
40D	Relaying 12" Corrugated Metal Pipe	62
40E	Relaying 24" Corrugated Metal Pipe	110
43B	15" Reinf. Concrete Pipe	336
43C	18" Reinf. Concrete Pipe	176
43D	24" Reinf. Concrete Pipe	360
43E	30" Reinf. Concrete Pipe	148
44A	8" Vitrified Clay Pipe	348
45A	Drop Inlets - Type A	3
45B	Drop Inlets - Type B	1
46B	Underdrain - Type B	833
49	Cobble Stone Gutter	772.1
51A	Wire Cable Guard Rail	5458
51B	Anchorages for W.C.G.R.	54
51C	Anchorages at Bridges	4
52	Loam	None
53B	Seeding-Roadside Mixture	44.2
54	Sodding	553.89
55	Bituminous Treatment	25384
57	Muck Excavation	12876.6

EXTRA WORK $ 120.24 LIQUIDATED DAMAGES $ 300.00

ROADWAY CULVERTS

STA	KIND	SIZE	LENGTH	CONCRETE A	CONCRETE B	STEEL	REMARKS
128+49	R.C.P.	15"	36'				
135+88	"	15"	40'				
149+17	"	24"	36'				
160+98	"	15"	68'				Skew
180+76	"	15"	36'				
232+75	"	15"	40'				
234+65	"	15"	60'				
242+10	"	30"	60'				
251+13	"	24"	36'				
255+97	"	24"	48'				
259+16	"	24"	40'				
264+11	"	30"	~~40'~~ 32				
265+55	"	24"	44'				
270+30	"	30"	44'				
278+02	"	18"	44'				
284+30	Con. Box	6'-8" x 7'	16'-10"				Extension
288+45	R.C.P.	15"	~~114'~~ [illegible]				Skew
294+95	"	15"	44'				
303+68	Con. Box	3' x 3'	58'				
309+49	R.C.P.	24"	64'				
315+92	"	24"	36'				
318+78	"	24"	56'				
328+44	"	18	~~80'~~ 85				

DRIVEWAY CULVERTS

STA.	SIDE	KIND	SIZE	LENGTH	REMARKS
~~162+00~~	~~Rt.~~	~~C.M.P.~~	~~12"~~	~~20'~~	
~~160+98~~	~~Lt.~~	~~"~~	~~12"~~	~~14'~~	~~Relay~~
162+50	Lt.	"	12"	~~16'~~ 18	" Relay
164+75	Rt.	"	15"	20'	
~~199+46~~	"	"	18"	~~30'~~ 40	[illegible]
~~230+80~~	"	"	~~12"~~	~~20'~~	
273+50	"	"	12"	20	
275+85	"	"	12"	20	
286+30	Lt.	"	12"	20	
~~288+30~~	~~Rt.~~	"	~~24"~~	~~20~~	~~Relay~~
331+78	"	"	24"	~~30~~ 28	Relay
~~333+36~~	"	"	24"	20'	" [illegible]
333+60	Lt.	"	24"	20'	"
345+00	Rt.	"	24"	~~20~~ 22	"
[illegible]	Lt.	"	[illegible]	22'	[illegible]
[illegible]	Rt.	"	[illegible]	[illegible]	[illegible]
[illegible]	Lt.	"	[illegible]	20'	
[illegible]	[illegible]	"	[illegible]	[illegible]	Relay
[illegible]	Rt.	"	[illegible]	20'	
[illegible]	Lt.	"	[illegible]	[illegible]	[illegible]
[illegible]	Rt.	"	[illegible]	[illegible]	[illegible]
[illegible]	Lt.	R.C.P.	[illegible]	[illegible]	[illegible]

Station Conversion - Route 302 , As-builts 1930's to present design station

Feature	design station	as-built station	Granular Pavement Matl's	Cut/Fill
Elkins Brook Bridge	314+00	77+00	8" stone base, 3" subbase	
	315+00	78+00		
	316+00	79+00		
	317+00	80+00		
	318+00	81+00		
	319+00	82+00		
Stanley Hill Rd	320+00	83+00		fill
	321+00	84+00		
	322+00	85+00		
	323+00	86+00		
	324+00	87+00		
	325+00	88+00		
	326+00	89+00		
	327+00	90+00		
	327+00	90+00	variable	
	328+00	91+00		
	329+00	92+00		
	330+00	93+00		
	331+00	94+00		
	332+00	95+00		
	333+00	96+00		
	334+00	97+00		
	335+00	98+00		
	336+00	99+00		
	337+00	100+00		
	338+00	101+00		
	339+00	102+00		
	340+00	103+00		
	341+00	104+00		
	342+00	105+00		
	343+00	106+00		
	344+00	107+00		
	345+00	108+00		
	346+00	109+00		
	347+00	110+00		
	348+00	111+00		
	348+00	111+00	12" gravel base	Ledge fill
	349+00	112+00		
	350+00	113+00		
	351+00	114+00		
	352+00	115+00		
	353+00	116+00		
	354+00	117+00		
	355+00	118+00		
	356+00	119+00		
	356+50	119+50		
	356+50	119+50	????	cut
	357+00	120+00		
	358+00	121+00		
	359+00	122+00		
	360+00	123+00		
	361+00	124+00		
	362+00	125+00		
	363+00	126+00		

	364+00	127+00		
	365+00	128+00		
	365+00	128+00	variable	
	366+00	129+00		
	367+00	130+00		
	368+00	131+00		
	369+00	132+00		
	369+00	132+00	18" gravel base	
	370+00	133+00		
	371+00	134+00		
	372+00	135+00		
	372+50	135+50		
	372+50	135+50	15" gravel base	
	373+00	136+00		
	374+00	137+00		
	374+00	137+00	variable	
	375+00	138+00		
	376+00	139+00		
	377+00	140+00		
	378+00	141+00		
	378+50	141+50		
	378+50	141+50	18" gravel base	
	379+00	142+00		
	380+00	143+00		
	380+50	143+50		
	380+50	143+50	variable	
	381+00	144+00		
	382+00	145+00		
	383+00	146+00		
	384+00	147+00		
	385+00	148+00		
	386+00	149+00		
	387+00	150+00		
	388+00	151+00		
	389+00	152+00		
	389+00	152+00	24" gravel base	
	390+00	153+00		
	390+00	153+00	18" gravel base	
	391+00	154+00		
	392+00	155+00		
	393+00	156+00		
	394+00	157+00		
	395+00	158+00		
	396+00	159+00		
	397+00	160+00		
Intersection Denmark/Hem Brdg Rd	397+50	160+50		
	398+00	161+00		
	398+00	161+00	variable	
	399+00	162+00		
	400+00	163+00		
	401+00	164+00		
	402+00	165+00		
	403+00	166+00		
	404+00	167+00		
	405+00	168+00		
	406+00	169+00		
	407+00	170+00		
	408+00	171+00		
	409+00	172+00		
	410+00	173+00		

	411+00	174+00		
	412+00	175+00		
	413+00	176+00		
	414+00	177+00		
	415+00	178+00		
	416+00	179+00		
	417+00	180+00		
	418+00	181+00		
	418+00	181+00	15' gravel base	
	419+00	182+00		
	420+00	183+00		
	421+00	184+00		
	422+00	185+00		fill
	423+00	186+00		
	423+00	186+00	12" gravel base	
	424+00	187+00		
Little Pond bridge (425+75/ 188+80) V	425+00	188+00		
	426+00	189+00		
	427+00	190+00		
	428+00	191+00		
	429+00	192+00		
	430+00	193+00		
	431+00	194+00		
	432+00	195+00		
	433+00	196+00		
	434+00	197+00		fill
	435+00	198+00		
	436+00	199+00		
	437+00	200+00		
	438+00	201+00		cut
	439+00	202+00		
	440+00	203+00		
	441+00	204+00		
	442+00	205+00		
	443+00	206+00		
	444+00	207+00		
	445+00	208+00		
	446+00	209+00		
	447+00	210+00		
	448+00	211+00		
	449+00	212+00		
	449+00	212+00	variable	
	450+00	213+00		
	451+00	214+00		
	452+00	215+00		
	453+00	216+00		
	454+00	217+00		
	455+00	218+00		
	455+50	218+50		
	455+50	218+50	12" gravel base	
	456+00	219+00		
	457+00	220+00		
	458+00	221+00		
	459+00	222+00		
	460+00	223+00		
	461+00	224+00		cut
	462+00	225+00		
	463+00	226+00		
	464+00	227+00		

	464+00	227+00	18" gravel base	
	465+00	228+00		
	466+00	229+00		cut
Bridgton/Fryeburg TL	467+00	230+00		
	468+00	231+00		
	469+00	232+00		fill
	469+50	232+50		
	469+50	232+50	15" gravel base	
	470+00	233+00		
	471+00	234+00		
	472+00	235+00		
	473+00	236+00		
	474+00	237+00		
	474+00	237+00	15" gravel base	
	475+00	238+00		
	475+00	238+00	15" gravel base	fill
	476+00	239+00		
	477+00	240+00		
	478+00	241+00		
	479+00	242+00		
	480+00	243+00		
	481+00	244+00		
	481+00	244+00	18" gravel base	
	482+00	245+00		
	483+00	246+00		
	484+00	247+00		cut
	485+00	248+00		
	486+00	249+00		
	487+00	250+00		
	488+00	251+00		
	489+00	252+00		
	490+00	253+00		
	491+00	254+00		
	492+00	255+00		
	492+00	255+00	15" gravel base	
	493+00	256+00		
	494+00	257+00		
	494+00	257+00	variable	
	495+00	258+00		
	496+00	259+00		
	497+00	260+00		
	498+00	261+00		
	499+00	262+00		
	500+00	263+00		
	501+00	264+00		
	502+00	265+00		
	503+00	266+00		
	504+00	267+00		
	505+00	268+00		
	506+00	269+00		
	507+00	270+00		
	508+00	271+00		
	508+50	271+50		
	508+50	271+50	18" gravel base	
	509+00	272+00		
	510+00	273+00		
	511+00	274+00		
	511+50	274+50		
	511+50	274+50		

	512+00	275+00	15" gravel base	
	513+00	276+00		
	514+00	277+00		
	515+00	278+00		
	515+50	278+50		
	515+50	278+50	24" gravel base	
	516+00	279+00		
	517+00	280+00		
	518+00	281+00		
	519+00	282+00		
	519+50	282+50		
	519+50	282+50	15" gravel base	
	520+00	283+00		
	521+00	284+00		
	522+00	285+00		
	523+00	286+00		
	523+50	286+50		
	523+50	286+50	18" gravel base	
	524+00	287+00		
	525+00	288+00		
	525+00	288+00	variable	
	526+00	289+00		
	527+00	290+00		
	528+00	291+00		
	529+00	292+00		
	530+00	293+00		
	531+00	294+00		
	531+00	294+00	15" gravel base	
	532+00	295+00		fill
	533+00	296+00		
	534+00	297+00		
	535+00	298+00		
	536+00	299+00		cut
	537+00	300+00		
	538+00	301+00		fill
	539+00	302+00		
	540+00	303+00		
	541+00	304+00		
	542+00	305+00		
	543+00	306+00		cut
	544+00	307+00		
	545+00	308+00		
	546+00	309+00		fill
	547+00	310+00		
	548+00	311+00		cut
	549+00	312+00		
	550+00	313+00		
	551+00	314+00		
	552+00	315+00		
	553+00	316+00		
	554+00	317+00		
	555+00	318+00		fill
	556+00	319+00		
	557+00	320+00		
	558+00	321+00		
	558+00	321+00	18" gravel base	
	559+00	322+00		
	560+00	323+00		
	561+00	324+00		

	562+00	325+00		
	562+00	325+00	15" gravel base	fill
	563+00	326+00		
	564+00	327+00		
	565+00	328+00		
	566+00	329+00		
	567+00	330+00		
Mountain Rd (568+70/331+80) V	568+00	331+00		
	568+00	331+00	6" gravel base, 15" stone base, 6" subbase	
	569+00	332+00		
	570+00	333+00		
	571+00	334+00		
	571+50	334+50		
	571+50	334+50	variable	
	572+00	335+00		
	573+00	336+00		
	574+00	337+00		
	575+00	338+00		
Knight's Hill Rd (576+25)	576+00	339+00		
	576+00	339+00	6" gravel base, 15" stone base, 6" subbase	
	577+00	340+00		
	578+00	341+00		
	579+00	342+00		
	580+00	343+00		
	581+00	344+00		
	582+00	345+00		
	583+00	346+00		
	583+00	346+00	18" gravel base	
	584+00	347+00		
	585+00	348+00		
	585+78	348+78		

Boring and Laboratory Testing Data

BORING SUMMARY

Bridgton-Fryeburg, PIN 19091.00

Boring No.	Design Station	Offset (ft)	Exploration Depth (ft)	Refusal Depth (ft)	Depth to water (ft)	Pavement Thickness			Subbase Classification (USCS & AASHTO)	Subgrade Type
						HMA (in)	Subbase (in)	Total (in)		
scoping	327+55	L				6				
HB-BRFR-115	334+26	9 L	5		wet soils @ 4.0'	6.6	21	27.6	SW-SM/A-1-b	SAND
HB-BRFR-114	346+40	9 L	5.5			7.8	11.4	19.2	SW-SM/A-1-b	SAND, some silt
scoping	347+61	L				6	29			silty SAND
HB-BRFR-112	363+82	9 L	5.2	5.2		6.6	23.4	30	SW-SM/A-1-b	SAND, little gravel
HB-BRFR-113	363+82	14 L	4	4						shoulder
scoping	372+54	L				6				
HB-BRFR-111	386+53	9 L	5.0		wet soils @ 2.2'	7.2	19.2	26.4	SP-SM/A-1-b	silty SAND
scoping	405+48	L				6.0				
HB-BRFR-110	409+23	9 L	5.0		wet soils @ 1.5'	7.2	22.8	30.0	SP-SM/A-1-b	SAND
scoping	420+06	L				6.0	9.6			SAND
HB-BRFR-109	429+82	9 L	5.0		2.1	6.6	19.8	26.4	SP-SM/A-1-b	SAND
scoping	445+19	L				6.0				
HB-BRFR-108	448+83	9 L	5.0			6.6	23.4	30.0	SP-SM/A-1-b	SAND
scoping	488+54	L				6.0	25.0			SAND, littlt gravel
HB-BRFR-106	503+74	9 L	5.0		wet soils @ 2'	7.2	16.8	24.0	SW-SM/A-1-b	SAND, little silt
HB-BRFR-107	503+74	17 L	5.0		wet soils @ 2.3'				SW-SM/A-1-b	SAND, little silt
scoping	518+79	L				6.0				
SB-BRFR-102	521+12	11 L	25		9					shoulder
SB-BRFR-101	521+58	13 R	25		9					shoulder
HB-BRFR-105	521+70	9 L	5.0		wet soils @ 2'	7.2	16.8	24.0	SW-SM/A-1-b	SAND, little silt
HB-BRFR-104	541+23	9L	5.0		wet soils @ 3.2'	7.2	22.8	30.0	SW-SM/A-1-b	SAND, little silt
scoping	548+57	L				5.4	26.0			SAND, littlt gravel
HB-BRFR-103	549+15	9L	5.0		wet soils @ 2.4'	6.6	22.2	28.8	SW-SM/A-1-b	SAND, little silt
HB-BRFR-102	559+18	9 L	3.4	3.4		6.6	23.4	30.0	SW-SM/A-1-b	SAND, littlt gravel
scoping	573+76	L				6.6				
HB-BRFR-101	573+97	9 L	5.0		wet soils @ 2'	6.0	18.0	24.0	SW-SM/A-1-b	silty SAND

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Route 302

Location: Bridgton-Fryeburg, Maine

Boring No.: HB-BRFR-101

PIN: 19109.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	Giguere/Giles	**Datum:**	NAVD88	**Sampler:**	Off Flights
Logged By:	B.Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	12/17/10-12/17/10	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	573+97, 9.0 ft. Lt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

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

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

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

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	S1		0.50 - 2.00			SSA	-0.50		PAVEMENT.	
									0.50 — Dark brown, damp, gravelly SAND, trace silt.	G#245494 A-1-b, SW-SM, WC=3.1%
	S2		2.00 - 5.00				-2.00		2.00 — Brown, wet, silty SAND, trace gravel.	G#245495 A-4, SM WC=22.7%
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: Route 302

Location: Bridgton-Fryeburg, Maine

Boring No.: HB-BRFR-102

PIN: 19109.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	Giguere/Giles	**Datum:**	NAVD88	**Sampler:**	Off Flights
Logged By:	B.Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	12/17/10-12/17/10	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	559+18, 9.0 ft. Lt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

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

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

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

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	S3		0.55 - 3.40			SSA	-0.55		PAVEMENT.	
									0.55 Brown, moist, fine to coarse SAND, some gravel, trace silt.	G#245496 A-1-b, SW-SM WC=5.9%
							-3.40		3.40 **Bottom of Exploration at 3.40 feet below ground surface.** REFUSAL	
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.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Route 302

Location: Bridgton-Fryeburg, Maine

Boring No.: HB-BRFR-103

PIN: 19109.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	Giguere/Giles	**Datum:**	NAVD88	**Sampler:**	Off Flights
Logged By:	B.Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	12/17/10-12/17/10	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	549+15, 9.0 ft. Lt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

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

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

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

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0						SSA	-0.55		PAVEMENT.	
									0.55	
									Brown, moist, fine to coarse SAND, little gravel, trace silt. ≡S3	
	S4		2.40 - 5.00				-2.40		2.40	G#245497 A-2-4, SM WC=9.4%
									Gray, wet, fine to medium SAND, some silt, trace gravel.	
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: Route 302

Location: Bridgton-Fryeburg, Maine

Boring No.: HB-BRFR-104

PIN: 19109.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	Giguere/Giles	**Datum:**	NAVD88	**Sampler:**	Off Flights
Logged By:	B.Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	12/17/10-12/17/10	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	541+23, 9.0 ft. Lt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

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

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

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

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0						SSA	-0.60		PAVEMENT. 0.60	
									Brown, moist, fine to coarse SAND, little gravel, trace silt. ≅S3	
							-3.20		3.20	
									Gray-brown, wet, fine to medium SAND, little silt. ≅S4	
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: Route 302

Location: Bridgton-Fryeburg, Maine

Boring No.: HB-BRFR-105

PIN: 19109.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	Giguere/Giles	**Datum:**	NAVD88	**Sampler:**	Off Flights
Logged By:	B.Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	12/17/10-12/17/10	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	521+70, 9.0 ft. Lt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

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

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

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

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0						SSA	-0.60		PAVEMENT. 0.60	
									Brown, moist, fine to coarse SAND, little gravel, trace silt. ≡S3	
							-2.00		2.00	
									Gray-brown, wet, fine to medium SAND, little silt, wetter with depth. ≡S4	
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: Route 302
Location: Bridgton-Fryeburg, Maine

Boring No.: HB-BRFR-106
PIN: 19109.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	Giguere/Giles	**Datum:**	NAVD88	**Sampler:**	Off Flights
Logged By:	B.Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	12/17/10-12/17/10	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	503+74, 9.0 ft. Lt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

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

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

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

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0						SSA	-0.60		PAVEMENT. 0.60	
									Brown, moist, fine to coarse SAND, little gravel, trace silt. ≅S3	
							-2.00		2.00	
									Gray-brown, wet, fine to medium SAND, little silt. ≅S4	
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: Route 302

Location: Bridgton-Fryeburg, Maine

Boring No.: HB-BRFR-107

PIN: 19109.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	Giguere/Giles	**Datum:**	NAVD88	**Sampler:**	Off Flights
Logged By:	B.Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	12/17/10-12/17/10	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	503+74, 17.0 ft. Lt. Shoulder	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

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

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

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

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0						SSA			Brown, moist, fine to coarse SAND, little gravel, trace silt. ≅S3	
							-2.20		2.20	
									Gray-brown, wet, fine to medium SAND, little silt. ≅S4	
5							-5.00		5.00	
									Bottom of Exploration at 5.00 feet below ground surface. NO REFUSAL	
10										
15										
20										
25										

Remarks:

Cable in shoulder at 14.0 ft Rt.

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

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

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Route 302
Location: Bridgton-Fryeburg, Maine

Boring No.: HB-BRFR-108
PIN: 19109.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	Giguere/Giles	**Datum:**	NAVD88	**Sampler:**	Off Flights
Logged By:	B.Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	12/17/10-12/17/10	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	448+83, 9.0 ft. Lt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

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

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

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

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	S5		0.55 - 1.60			SSA	-0.55		PAVEMENT. 0.55	G#245498 A-1-b, SP-SM WC=9.1%
	S6		1.60 - 5.00				-1.60		Brown, damp, fine to coarse SAND, trace silt, trace gravel. 1.60	G#245499 A-1-b, SP-SM WC=4.8%
									Light brown, damp, fine to medium SAND, trace silt, trace gravel.	
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: Route 302

Location: Bridgton-Fryeburg, Maine

Boring No.: HB-BRFR-109

PIN: 19109.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	Giguere/Giles	**Datum:**	NAVD88	**Sampler:**	Off Flights
Logged By:	B.Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	12/17/10-12/17/10	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	429+82, 9.0 ft. Lt.	**Casing ID/OD:**	N/A	**Water Level*:**	2.1 ft bgs.

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

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

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

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0						SSA	-0.55		PAVEMENT.	
									0.55	
									Brown, damp, fine to coarse SAND, little gravel, trace silt. ≅S5	
							-2.20		2.20	
									Light brown, saturated, fine to medium SAND, trace silt. ≅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.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Route 302

Location: Bridgton-Fryeburg, Maine

Boring No.: HB-BRFR-110

PIN: 19109.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	Giguere/Giles	**Datum:**	NAVD88	**Sampler:**	Off Flights
Logged By:	B.Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	12/17/10-12/17/10	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	409+23, 9.0 ft. Lt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

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

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

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

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0						SSA	-0.60		PAVEMENT.	
									0.60	
							-1.50		Brown, damp, fine to coarse SAND, little gravel, trace silt. ≅S5	
									1.50	
									Light brown, wet, fine to medium SAND, trace silt. ≅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.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Route 302
Location: Bridgton-Fryeburg, Maine

Boring No.: HB-BRFR-111
PIN: 19109.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	Giguere/Giles	**Datum:**	NAVD88	**Sampler:**	Off Flights
Logged By:	B.Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	12/17/10-12/17/10	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	386+53, 9.0 ft. Lt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

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

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

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

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0						SSA	-0.60		PAVEMENT.	
									0.60 Brown, damp, fine to coarse SAND, little gravel, trace silt. ≡S5	
							-2.20		2.20 Olive brown, wet, silty, fine to medium 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.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Route 302

Location: Bridgton-Fryeburg, Maine

Boring No.: HB-BRFR-112

PIN: 19109.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	Giguere/Giles	**Datum:**	NAVD88	**Sampler:**	Off Flights
Logged By:	B.Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	12/20/10-12/20/10	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	363+82, 9.0 ft. Lt.	**Casing ID/OD:**	N/A	**Water Level*:**	3.0 ft bgs.

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

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

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

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	S8		0.55 - 5.20			SSA	-0.55		PAVEMENT. 0.55	G#245500 A-1-b, SW-SM WC=4.0%
									Brown, damp, fine to coarse SAND, little gravel, trace silt, wetter with depth.	
5							-5.20		5.20 **Bottom of Exploration at 5.20 feet below ground surface.** 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: Route 302

Location: Bridgton-Fryeburg, Maine

Boring No.: HB-BRFR-113

PIN: 19109.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	Giguere/Giles	**Datum:**	NAVD88	**Sampler:**	Off Flights
Logged By:	B.Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	12/20/10-12/20/10	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	363+82, 14.0 ft. Lt. Shoulder	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

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

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

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

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0						SSA			Brown, damp, fine to coarse SAND, some gravel, trace silt, wetter with depth.	
							-4.00		4.00	
									Bottom of Exploration at 4.00 feet below ground surface. REFUSAL	
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.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Route 302
Location: Bridgton-Fryeburg, Maine

Boring No.: HB-BRFR-114
PIN: 19109.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	Giguere/Giles	**Datum:**	NAVD88	**Sampler:**	Off Flights
Logged By:	B.Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	12/20/10-12/20/10	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	346+40, 9.0 ft. Lt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

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

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

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

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0						SSA	-0.65		PAVEMENT.	
									0.65	
	S9		1.60 - 4.00				-1.60		Brown, damp, fine to coarse SAND, some gravel, trace silt, wetter with depth. ≈S8	
									1.60	G#182546 A-2-4, SM WC=9.1%
									Grey-brown, moist, fine to medium SAND, some silt, trace gravel.	
							-4.00		4.00	
	S10		4.00 - 4.80						Black, moist, silty, fine to medium SAND, trace organics.	
5	S11		4.80 - 5.50				-4.80		4.80	G#182547 A-4, ML WC=31.4%
							-5.50		Olive-brown, wet, sandy SILT, trace gravel.	
									5.50	
									Bottom of Exploration at 5.50 feet below ground surface. NO REFUSAL	
10										
15										
20										
25										

Sample Information

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: Route 302

Location: Bridgton-Fryeburg, Maine

Boring No.: HB-BRFR-115

PIN: 19109.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	Giguere/Giles	**Datum:**	NAVD88	**Sampler:**	Off Flights
Logged By:	B.Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	12/20/10-12/20/10	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	334+26, 9.0 ft. Lt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

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

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

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

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0						SSA	-0.55		PAVEMENT.	
									0.55	
									Brown, damp, fine to coarse SAND, some gravel, trace silt, wetter with depth. ≅S8	
							-2.30		2.30	
									Grey-brown, moist, fine to medium SAND, trace silt. ≅S9	
	S12		4.00 - 5.00				-4.00		4.00	
5							-5.00		Olive-grey, wet, SILT, trace fine sand, trace clay.	
									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: Route 302

Location: Bridgton-Fryeburg, Maine

Boring No.: SB-BRFR-101

PIN: 19109.00

Driller:	MaineDOT	**Elevation (ft.)**	437.5	**Auger ID/OD:**	5" Dia.
Operator:	Giguere/Giles	**Datum:**	NAVD88	**Sampler:**	Off Flights
Logged By:	B.Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	6/26/13-6/26/13	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	521+58, 13.0 ft Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	9.0 ft bgs.

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

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

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

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	S1		0.00 - 5.60			SSA			Brown, damp, fine to coarse SAND, little gravel, occasional cobbles.	
5	S2		5.60 - 17.50				431.90		5.60 Brown, wet, fine to coarse SAND, little silt, occasional cobbles.	
10										
15										
	S3		17.50 - 25.00				420.00		17.50 Grey, wet, fine to coarse SAND, little silt, little gravel, occasional cobbles, becoming more dense with depth.	
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: Route 302
Location: Bridgton-Fryeburg, Maine

Boring No.: SB-BRFR-101
PIN: 19109.00

Driller:	MaineDOT	**Elevation (ft.)**	437.5	**Auger ID/OD:**	5" Dia.
Operator:	Giguere/Giles	**Datum:**	NAVD88	**Sampler:**	Off Flights
Logged By:	B.Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	6/26/13-6/26/13	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	521+58, 13.0 ft Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	9.0 ft bgs.

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

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

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

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
25							412.50		25.00 **Bottom of Exploration at 25.00 feet below ground surface.**	
									Bottom of Exploration at 25.00 feet below ground surface. NO REFUSAL	
30										
35										
40										
45										
50										

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: Route 302

Location: Bridgton-Fryeburg, Maine

Boring No.: SB-BRFR-102

PIN: 19109.00

Driller:	MaineDOT	**Elevation (ft.)**	437.1	**Auger ID/OD:**	5" Dia.
Operator:	Giguere/Giles	**Datum:**	NAVD88	**Sampler:**	Off Flights
Logged By:	B.Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	6/26/13-6/26/13	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	521+12, 11.0 ft Lt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

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

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

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

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0						SSA			Very similar to SB-BRID-101.	
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.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Route 302
Location: Bridgton-Fryeburg, Maine

Boring No.: SB-BRFR-102
PIN: 19109.00

Driller:	MaineDOT	**Elevation (ft.)**	437.1	**Auger ID/OD:**	5" Dia.
Operator:	Giguere/Giles	**Datum:**	NAVD88	**Sampler:**	Off Flights
Logged By:	B.Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	6/26/13-6/26/13	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	521+12, 11.0 ft Lt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed

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

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

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

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
25							412.10		25.00 **Bottom of Exploration at 25.00 feet below ground surface.**	
									Bottom of Exploration at 25.00 feet below ground surface. NO REFUSAL	
30										
35										
40										
45										
50										

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.

Geol. BW
Crew BL
EG
KS

Town Brynbarb
Proj. No. 115700
Line C of Road
Rods 5/8" 1"

Date 12-19-07
Weather Cloudy
Page 1-1

Hammer 35# 55#

DEC 26 2007

STATION & G.W.T.	OFFSET & DEPTH LT.	℄	RT.	TEST & BLOWS OR SAMPLE #	REMARKS SOIL CONSISTENCY OR DENSITY, COLOR & TYPE
					RTE #302
					Sect. # 2
372+54 2509'			7.5"		Core
RLM	0	–	.5	6"	Pavement
47.345					
347+61 5002			9.5"		
RLM	0	–	.5	6"	Pavement
47.817					
	.5	–	2.9	29"	Brown Damp Gravelly F-C Sand
	2.9	–	5.0		Gray Wet Silty F-M Sand Trace Organics & Roots 5.0 No Ref
327+55 7007'			8.		Core
RLM	0	–	.5	6"	Pavement
48.197					

Geol. B.Wilder Town Fryeburg Date 12-19-07 Page 1-1
Crew G. Lindstrom Proj. No. 11870.10 Weather Overcast
E. Gilbert Line ⊄ of Road
K. Speed Rods 5/8" 1" Hammer 35# 55#

STATION & G.W.T.		OFFSET & DEPTH LT.	⊄	RT.	TEST & BLOWS OR SAMPLE #	REMARKS SOIL CONSISTENCY OR DENSITY, COLOR & TYPE
						RTE #302
						Sect. #1
445+19	2002'			6'		Core
	RLM	0	-	.5	6"	Pavement
	45.969					
420+06	4512'			8.5'		
	RLM	0	-	.5	6"	Pavement
	46.445					
		.5	-	1.3		Lt. Brown, Damp
	H2O 3.7					Gravelly F-C Sand
		1.3	-	5.0		Lt. Brown, Very Wet
						F-M Sand, Trace
						Silt 5.0
405+48	1001			7.5'		Core
	RLM	0	-	.5	6"	Pavement
	46.721					

Geol. BW Town Bradshaw Date 12-1907 Page 1-1
Crew CL Proj. No. 11870.00 Weather Overcast
EG Line ℄ of Row 1
KS Rods 5/8" 1" Hammer 35# 55#

STATION & G.W.T.	OFFSET & DEPTH LT.	℄	RT.	TEST & BLOWS OR SAMPLE #	REMARKS SOIL CONSISTENCY OR DENSITY, COLOR & TYPE
					RTE #302
573+76 2501			8'		CORE
RLM '43.534	0	–	+55	6.6"	Pavement
548+57 5021			8'		
RLM	0	–	+45	5.4'	PAVEMENT
44.011					
	+45	–	2.6	26"	Brown Damp
					Gravelly F-C
					SAND
	2.6	–	5.0		Gray-Brown
					Damp F-C Sand
					Little Gravel, Little
					Silt 5.0 to Ref
518+79 5001			8'		CORE
RLM	0	–	05	6"	PAVEMENT
44.575					
11025			8'		
RLM	0	–	05	6"	Pavement
488+54 45.148	+5	–	2.4	25"	Lt Brown, Damp
					Gravelly F-C SAND
	2.6	–	5.0		Gray Damp F-C
					Sand, Little Silt
					Trace Gravel

State of Maine - Department of Transportation

Power Auger Probe Summary Sheet

Town(s): Bridgeton-Fryeburg Work Number: 19109.00

Station (Feet)	Offset (Feet)	Weathered Rock (Feet)	Refusal (Feet)	No Refusal (Feet)	Water Depth (Ft.)	Comments / Date 6/20/2013
361+50	26.0 Lt.		3.2			
361+50	19.0 Rt.		0.8			
362+00	30.0 Lt.		2.6			
362+00	19.0 Rt.		1.6			
362+50	21.0 Lt.	4.0	6.7			
362+50	22.0 Rt.		2.1			
363+00	21.0 Lt.		5.7			
363+00	25.0 Rt.		1.8			
363+50	30.0 Lt.		6.8			
363+50	26.0 Rt.		3.7			
364+00	27.0 Lt.		2.2			
364+00	30.0 Rt.		3.4			
364+50	20.0 Lt.		1.9			
364+50	25.0 Rt.					outcrop
364+50	28.0 Rt.					outcrop
364+50	30.0 Rt.		0.2			

MaineDOT Drill Crew
Logged By: B. Wilder
Drill Rig: CME 45C

5" Solid Stem Auger

State of Maine - Department of Transportation

Rod Sounding Summary Sheet

Town(s): Bridgeton-Fryeburg Work Number: 19109.00

Boring	Station (Feet)	Offset (Feet)	Refusal (Feet)	No Refusal (Feet)	Water (X) = Yes	Comments 6/5/2013
	357+50	30.0 Lt.	2.6			
	357+50	30.0 Rt.	2.9			
	358+00	30.0 Lt.	0.4			
	358+00	30.0 Rt.	3.9			
	358+50	30.0 Lt.	2.6			
	358+50	30.0 Rt.	0.2			
	359+00	30.0 Lt.	0.9			
	359+00	30.0 Rt.				Ledge Outcrop
	359+50	30.0 Lt.	1.1			
	359+50	30.0 Rt.	0.4			
	360+00	30.0 Lt.	2.0			
	360+00	30.0 Rt.	1.0			
	360+50	30.0 Lt.	2.0			
	360+50	30.0 Rt.	2.7			
	361+00	30.0 Lt.	3.5			
	361+00	30.0 Rt.	5.7			

State of Maine - Department of Transportation

Laboratory Testing Summary Sheet

Town(s): Bridgton-Fryeburg Project Number: 19109.00

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-BRFR-101, S1	573+97	9.0 Lt.	0.5-2.0	245494	1	3.1			SW-SM	A-1-b	0
HB-BRFR-101, S2	573+97	9.0 Lt.	2.0-5.0	245495	1	22.7			SM	A-4	III
HB-BRFR-102, S3	559+18	9.0 Lt.	0.55-3.4	245496	1	5.9			SW-SM	A-1-b	0
HB-BRFR-103, S4	549+15	9.0 Lt.	2.4-5.0	245497	1	9.4			SM	A-2-4	II
HB-BRFR-108, S5	448+83	9.0 Lt.	0.55-1.6	245498	1	9.1			SP-SM	A-1-b	0
HB-BRFR-108, S6	448+83	9.0 Lt.	1.6-5.0	245499	1	4.8			SP-SM	A-1-b	0
HB-BRFR-112, S8	363+82	9.0 Lt.	0.55-5.2	245500	2	4.0			SW-SM	A-1-b	0
HB-BRFR-114, S9	346+40	9.0 Lt.	1.6-4.0	182546	2	9.1			SM	A-2-4	II
HB-BRFR-114, S11	346+40	9.0 Lt.	4.8-5.5	182547	2	31.4			ML	A-4	IV

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

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

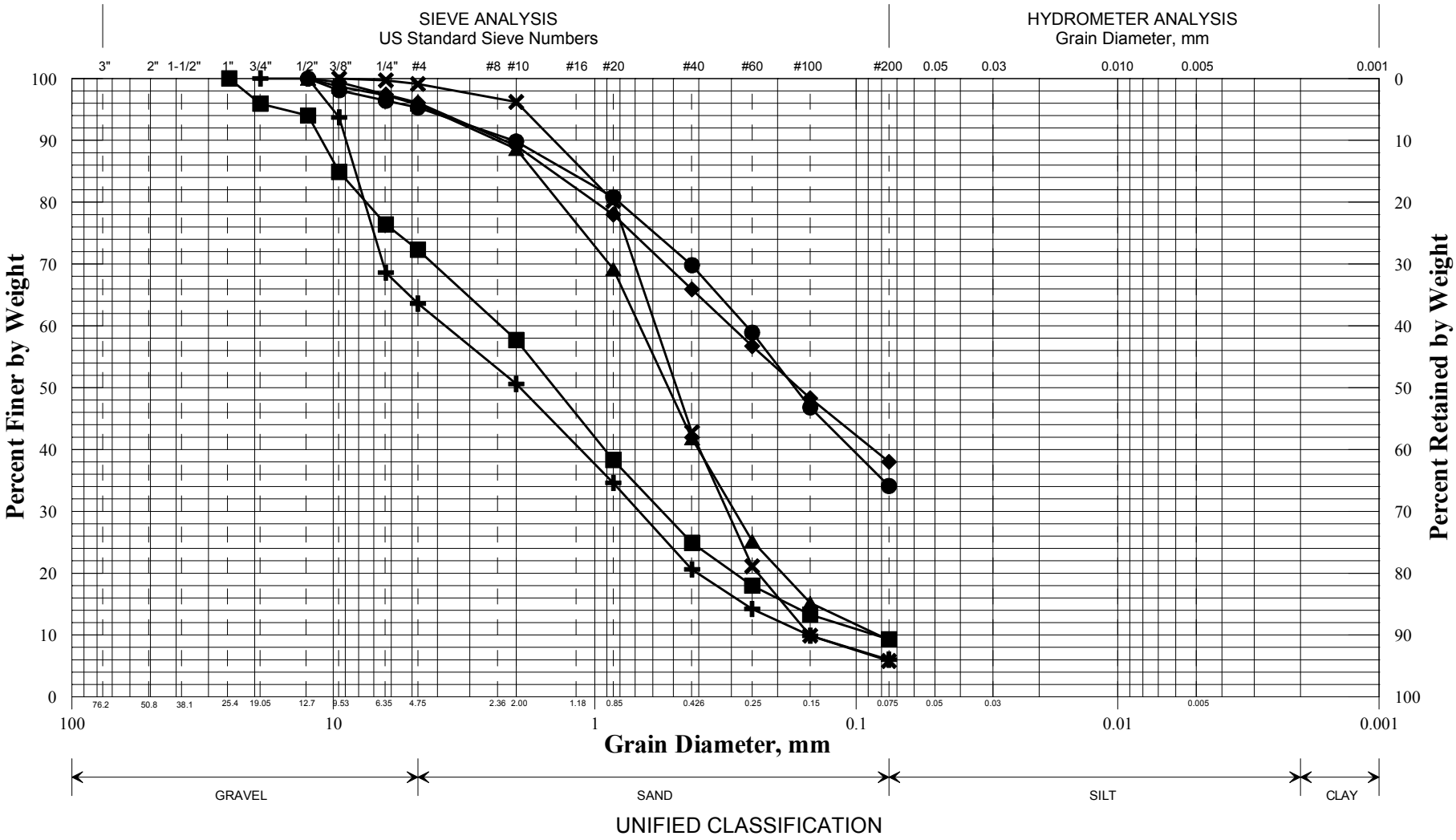
WC = water content as determined by AASHTO T 265-93 and/or ASTM D 2216-98

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

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

State of Maine Department of Transportation

GRAIN SIZE DISTRIBUTION CURVE

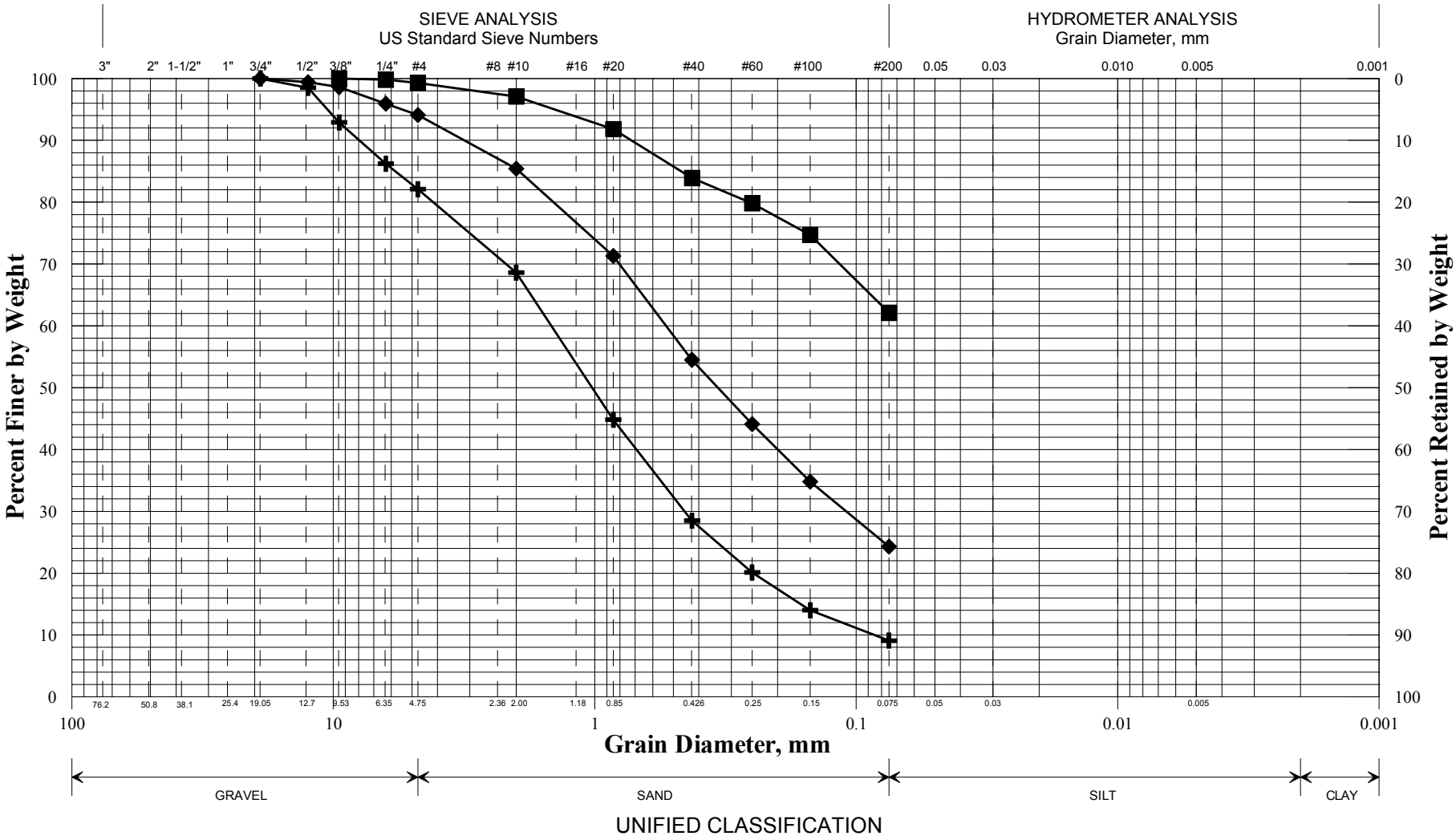


	Boring/Sample No.	Station	Offset, ft	Depth, ft	Description	W, %	LL	PL	PI
✚	HB-BRFR-101/S1	573+97	9.0 LT	0.5-2.0	Gravelly SAND, trace silt.	3.1			
◆	HB-BRFR-101/S2	573+97	9.0 LT	2.0-5.0	Silty SAND, trace gravel.	22.7			
■	HB-BRFR-102/S3	559+18	9.0 LT	0.55-3.4	SAND, some gravel, trace silt.	5.9			
●	HB-BRFR-103/S4	549+15	9.0 LT	2.4-5.0	SAND, some silt, trace gravel.	9.4			
▲	HB-BRFR-108/S5	448+83	9.0 LT	0.55-1.6	SAND, trace silt, trace gravel.	9.1			
✖	HB-BRFR-108/S6	448+83	9.0 LT	1.6-5.0	SAND, trace silt, trace gravel.	4.8			

WIN
019109.00
Town
Bridgton,Fryeburg
Reported by/Date
WHITE, TERRY A 8/15/2011

State of Maine Department of Transportation

GRAIN SIZE DISTRIBUTION CURVE



	Boring/Sample No.	Station	Offset, ft	Depth, ft	Description	W, %	LL	PL	PI
✚	HB-BRFR-112/S8	363+82	9.0 LT	0.55-5.2	SAND, little gravel, trace silt.	4.0			
◆	HB-BRFR-114/S9	346+40	9.0 LT	1.6-4.0	SAND, some silt, trace gravel.	9.1			
■	HB-BRFR-114/S11	346+40	9.0 LT	4.8-5.5	Sandy SILT, trace gravel.	31.4			
●									
▲									
✖									

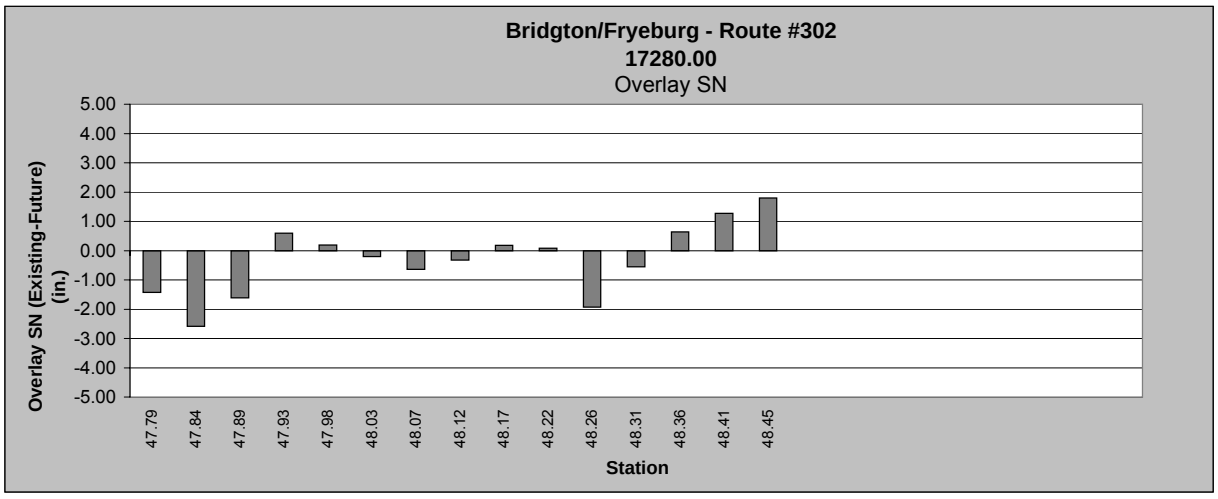
WIN
019109.00
Town
Bridgton,Fryeburg
Reported by/Date
WHITE, TERRY A 8/15/2011

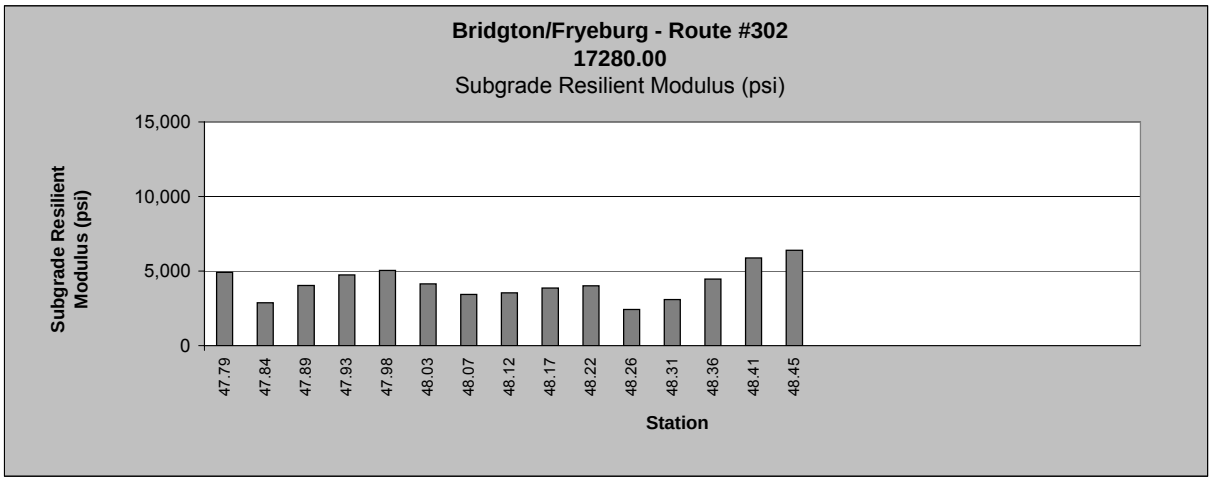
FWD and GPR Data and Analysis

Bridgton/Fryeburg - Route #302 (Section #1)
19109.00

Route Log Mile (RLM)	Design Station	Existing Structural Number (in.)	Future Traffic Structural Number (in.)	Overlay Structural Number (Existing - Future)	Recommended Pavement Thickness (in.)	Pavement Modulus (psi)	Subgrade Resilient Modulus (psi)	Pavement Depth (in)	Combined Pavement/Gravel Depth Used for Calculation (in)
47.79	349+04	3.44	4.87	**-1.43**	**3.25**	87,652	4,910	5.8	**17.2**
47.84	346+40	3.16	5.75	**-2.59**	**5.89**	48,745	**2,883**	7.8	**19.2**
47.89	343+76	3.57	5.18	**-1.61**	**3.66**	76,470	4,042	7.3	**18.7**
47.93	341+65	5.52	4.92	0.60	-	85,083	4,733	6.9	27.9
47.98	339+01	5.01	4.82	0.19	-	69,974	5,039	6.0	27.0
48.03	336+37	4.93	5.13	**-0.20**	**0.45**	63,363	4,151	6.5	27.5
48.07	334+26	4.80	5.44	**-0.64**	**1.45**	57,559	3,439	6.6	27.6
48.12	331+62	5.08	5.40	**-0.32**	**0.73**	68,609	3,536	6.6	27.6
48.17	328+98	5.43	5.25	0.18	-	79,000	3,857	7.1	28.1
48.22	326+34	5.27	5.19	0.08	-	76,310	4,009	6.6	27.6
48.26	324+22	4.12	6.05	**-1.93**	**4.39**	37,788	**2,428**	6.3	27.3
48.31	321+58	5.07	5.62	**-0.55**	**1.25**	69,661	3,098	6.4	27.4
48.36	318+94	5.66	5.02	0.64	-	73,871	4,464	6.6	30.0
48.41	316+30	5.86	4.59	1.27	-	81,593	5,871	6.1	30.0
48.45	314+19	6.26	4.46	1.80	-	99,518	6,399	5.1	30.0

Possible Weak Soils (<3000)
Possible Shallow Bedrock (>8000)
For actual Gravel Depths, see logdraft forms

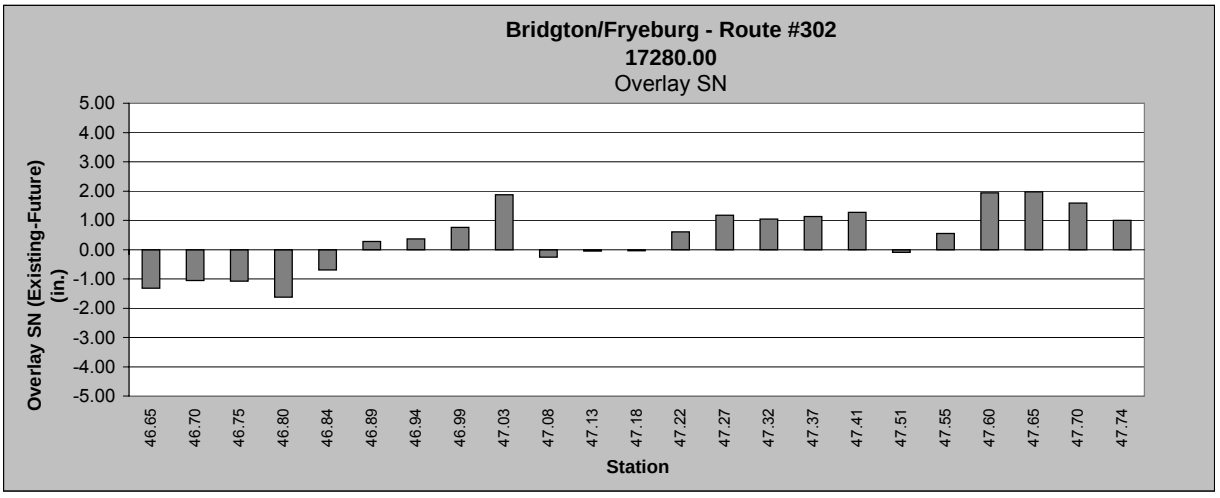


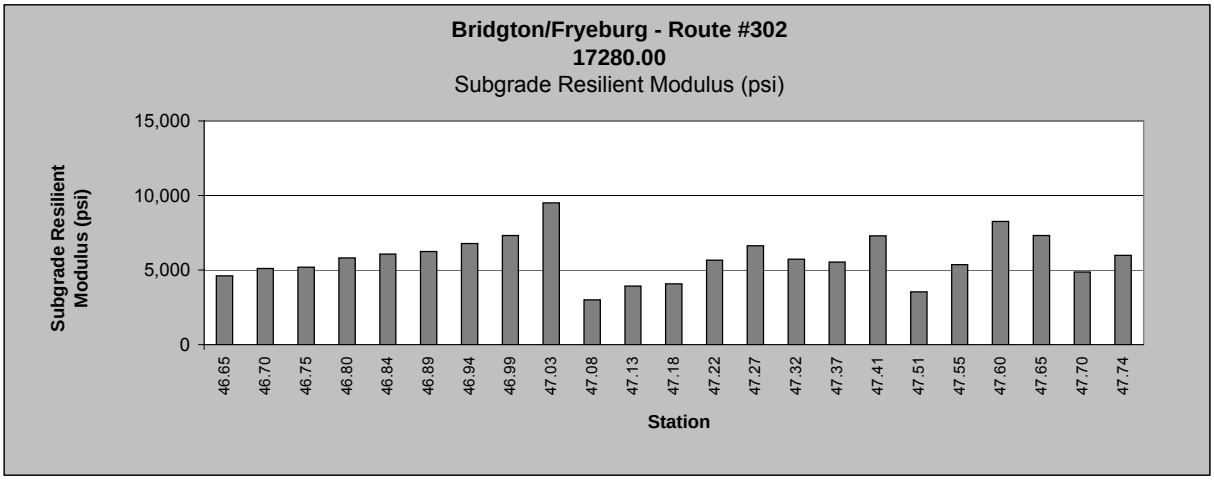


Bridgton/Fryeburg - Route #302 (Section #1)
19109.00

Route Log Mile (RLM)	Design Station	Existing Structural Number (in.)	Future Traffic Structural Number (in.)	Overlay Structural Number (Existing - Future)	Recommended Pavement Thickness (in.)	Pavement Modulus (psi)	Subgrade Resilient Modulus (psi)	Pavement Depth (in)	Combined Pavement/Gravel Depth Used for Calculation (in)
46.65	409+23	3.64	4.96	**-1.32**	**3.00**	90,712	4,618	7.2	**18.0**
46.70	406+59	3.74	4.80	**-1.06**	**2.41**	101,541	5,109	7.0	**17.8**
46.75	403+95	3.70	4.78	**-1.08**	**2.45**	96,864	5,196	7.1	**17.9**
46.80	401+31	2.99	4.61	**-1.62**	**3.68**	50,126	5,806	7.2	**18.0**
46.84	399+20	3.85	4.54	**-0.69**	**1.57**	109,503	6,079	7.1	**17.9**
46.89	396+56	4.78	4.50	0.28	-	73,308	6,241	6.2	25.4
46.94	393+92	4.75	4.38	0.37	-	69,356	6,772	6.5	25.7
46.99	391+28	5.03	4.27	0.76	-	86,262	7,315	6.1	25.3
47.03	389+17	5.77	3.90	1.87	-	128,689	9,513	6.2	25.4
47.08	386+53	5.41	5.67	**-0.26**	**0.59**	94,450	3,009	7.2	26.4
47.13	383+89	5.18	5.23	**-0.05**	**0.11**	90,855	3,921	6.4	25.6
47.18	381+25	5.13	5.17	**-0.04**	**0.09**	88,124	4,067	6.4	25.6
47.22	379+14	5.25	4.64	0.61	-	102,734	5,668	5.7	24.9
47.27	376+50	5.58	4.41	1.17	-	70,465	6,621	5.4	30.0
47.32	373+86	5.67	4.63	1.04	-	73,955	5,730	5.8	30.0
47.37	371+22	5.81	4.68	1.13	-	79,752	5,538	7.5	30.0
47.41	369+10	5.54	4.27	1.27	-	69,173	7,294	6.8	30.0
47.51	363+82	5.31	5.40	**-0.09**	**0.20**	60,809	3,536	6.6	30.0
47.55	361+71	5.28	4.73	0.55	-	59,732	5,363	6.6	30.0
47.60	359+07	6.04	4.10	1.94	-	89,357	8,252	5.0	30.0
47.65	356+43	6.24	4.27	1.97	-	98,870	7,314	5.9	30.0
47.70	353+79	6.47	4.88	1.59	-	109,953	4,871	6.0	30.0
47.74	351+68	5.56	4.56	1.00	-	69,860	5,994	5.6	30.0

Possible Weak Soils (<3000)
Possible Shallow Bedrock (>8000)
For actual Gravel Depths, see logdraft forms

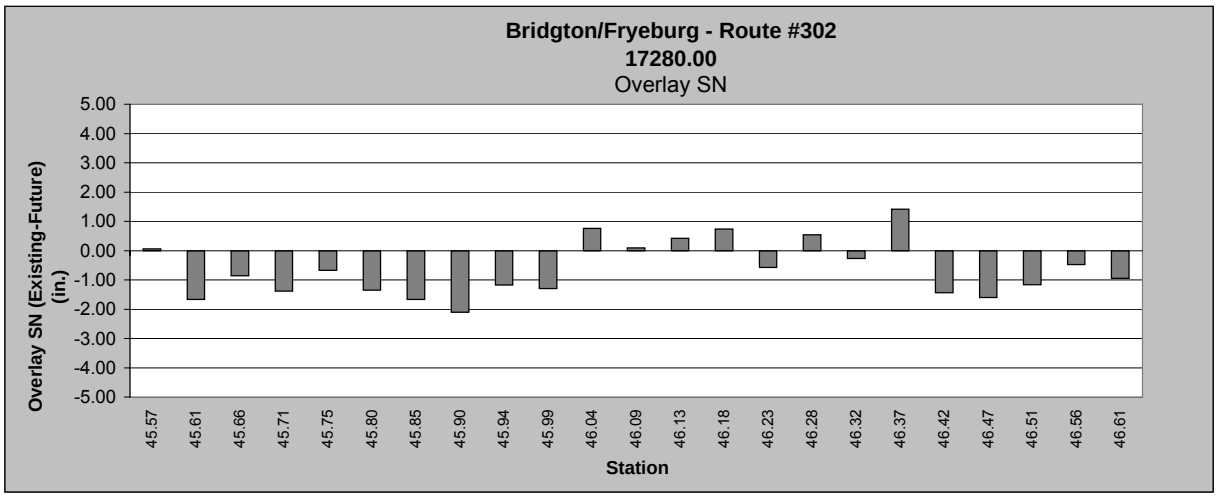


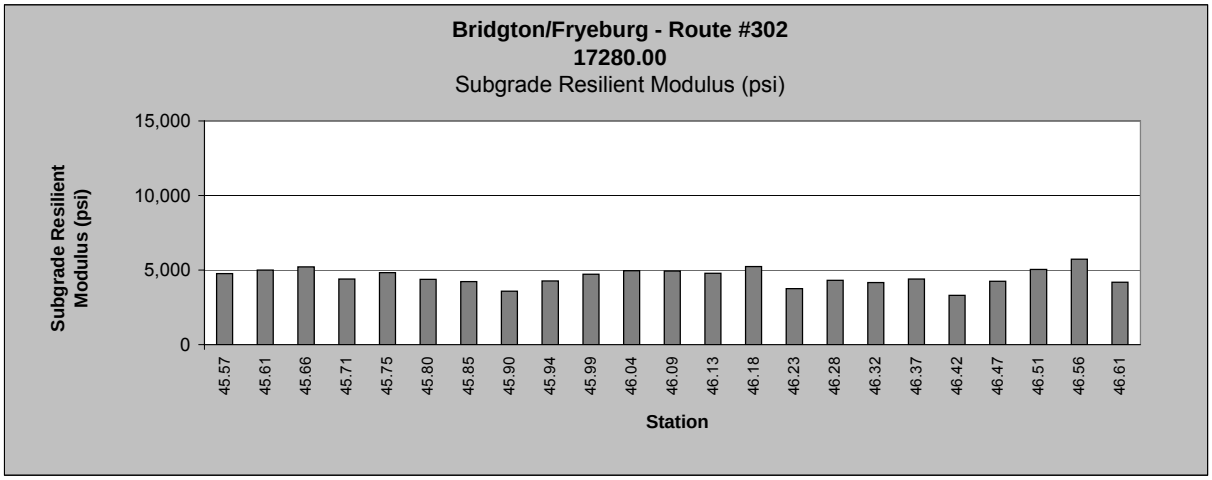


Bridgton/Fryeburg - Route #302 (Section #1)
19109.00

Route Log Mile (RLM)	Design Station	Existing Structural Number (in.)	Future Traffic Structural Number (in.)	Overlay Structural Number (Existing - Future)	Recommended Pavement Thickness (in.)	Pavement Modulus (psi)	Subgrade Resilient Modulus (psi)	Pavement Depth (in)	Combined Pavement/Gravel Depth Used for Calculation (in)
45.57	466+26	4.98	4.92	0.06	-	100,680	4,755	7.0	23.8
45.61	464+14	3.16	4.83	**-1.67**	**3.80**	46,645	5,010	6.9	**19.5**
45.66	461+50	3.91	4.77	**-0.86**	**1.95**	85,829	5,211	7.1	**19.7**
45.71	458+86	3.66	5.04	**-1.38**	**3.14**	72,284	4,404	6.9	**19.5**
45.75	456+75	4.22	4.89	**-0.67**	**1.52**	106,423	4,820	7.2	**19.8**
45.80	454+11	3.70	5.05	**-1.35**	**3.07**	80,897	4,371	6.4	**19.0**
45.85	451+47	3.43	5.10	**-1.67**	**3.80**	61,712	4,234	6.7	**19.3**
45.90	448+83	3.28	5.38	**-2.10**	**4.77**	54,495	3,578	6.6	**19.2**
45.94	446+72	3.91	5.08	**-1.17**	**2.66**	87,082	4,280	7.0	**19.6**
45.99	444+08	3.63	4.92	**-1.29**	**2.93**	75,124	4,729	6.5	**19.1**
46.04	441+44	5.61	4.85	0.76	-	104,249	4,951	6.7	26.5
46.09	438+80	4.94	4.85	0.09	-	77,228	4,944	6.0	25.8
46.13	436+69	5.33	4.91	0.42	-	96,491	4,778	6.0	25.8
46.18	434+05	5.50	4.76	0.74	-	100,445	5,245	6.5	26.3
46.23	431+41	4.73	5.30	**-0.57**	**1.30**	60,444	3,756	7.0	26.8
46.28	428+77	5.61	5.07	0.54	-	105,214	4,314	6.6	26.4
46.32	426+66	4.85	5.12	**-0.27**	**0.61**	65,653	4,169	6.9	26.7
46.37	424+02	6.45	5.04	1.41	-	142,926	4,405	7.6	27.4
46.42	421+38	4.07	5.51	**-1.44**	**3.27**	43,472	3,312	5.9	25.7
46.47	418+74	3.50	5.10	**-1.60**	**3.64**	108,552	4,244	5.5	**16.3**
46.51	416+62	3.66	4.82	**-1.16**	**2.64**	117,143	5,045	5.8	**16.6**
46.56	413+98	4.15	4.63	**-0.48**	**1.09**	161,927	5,729	6.1	**16.9**
46.61	411+34	4.17	5.12	**-0.95**	**2.16**	148,768	4,187	6.7	**17.5**

Possible Weak Soils (<3000)
Possible Shallow Bedrock (>8000)
For actual Gravel Depths, see logdraft forms

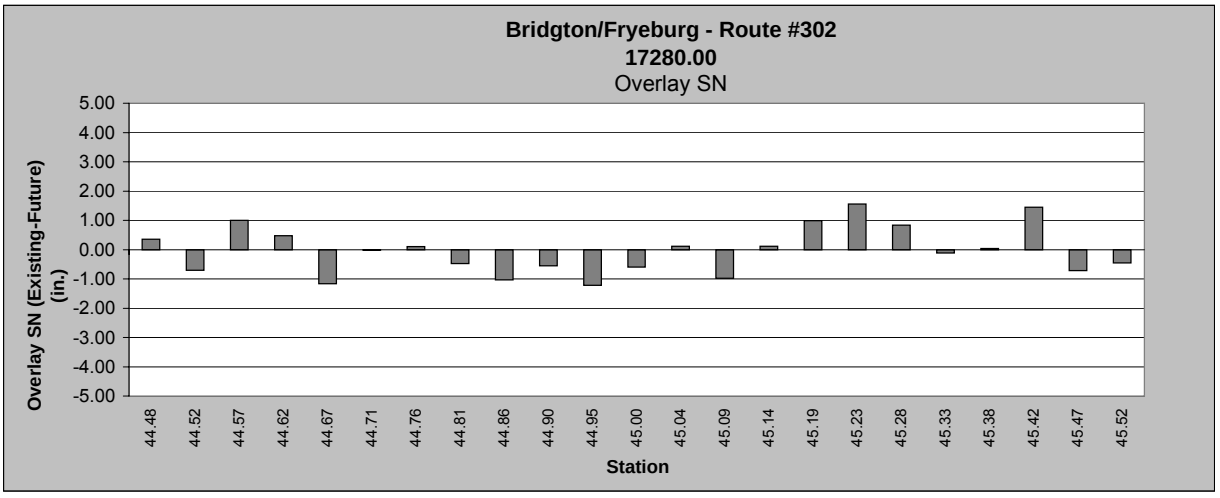


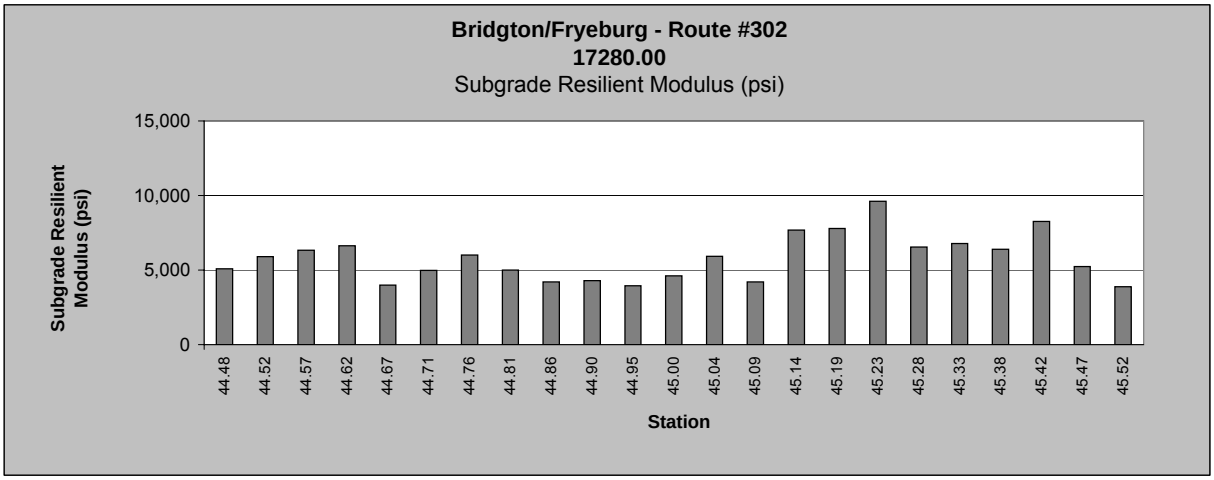


Bridgton/Fryeburg - Route #302 (Section #1)
19109.00

Route Log Mile (RLM)	Design Station	Existing Structural Number (in.)	Future Traffic Structural Number (in.)	Overlay Structural Number (Existing - Future)	Recommended Pavement Thickness (in.)	Pavement Modulus (psi)	Subgrade Resilient Modulus (psi)	Pavement Depth (in)	Combined Pavement/Gravel Depth Used for Calculation (in)
44.48	523+81	5.17	4.81	0.36	-	105,823	5,078	7.5	24.3
44.52	521+70	3.87	4.58	**-0.71**	**1.61**	45,950	5,905	7.2	24.0
44.57	519+06	5.48	4.48	1.00	-	118,428	6,337	8.0	24.8
44.62	516+42	4.89	4.41	0.48	-	90,518	6,634	7.4	24.2
44.67	513+78	4.04	5.20	**-1.16**	**2.64**	49,795	3,982	7.6	24.4
44.71	511+66	4.83	4.85	**-0.02**	**0.05**	87,087	4,968	7.4	24.2
44.76	509+02	4.66	4.56	0.10	-	83,408	6,007	6.9	23.7
44.81	506+38	4.37	4.84	**-0.47**	**1.07**	67,106	4,994	7.1	23.9
44.86	503+74	4.08	5.11	**-1.03**	**2.34**	54,033	4,209	7.2	24.0
44.90	501+63	4.53	5.08	**-0.55**	**1.25**	75,513	4,285	7.0	23.8
44.95	498+99	4.00	5.22	**-1.22**	**2.77**	45,548	3,943	8.1	24.9
45.00	496+35	4.36	4.96	**-0.60**	**1.36**	61,640	4,611	7.7	24.5
45.04	494+24	4.69	4.58	0.11	-	72,649	5,918	8.2	25.0
45.09	491+60	4.13	5.11	**-0.98**	**2.23**	54,424	4,198	7.4	24.2
45.14	488+96	4.32	4.20	0.12	-	56,592	7,681	8.2	25.0
45.19	486+32	5.17	4.18	0.99	-	97,226	7,796	8.2	25.0
45.23	484+21	5.45	3.89	1.56	-	119,532	9,620	7.8	24.6
45.28	481+57	5.27	4.43	0.84	-	122,291	6,535	6.8	23.6
45.33	478+93	4.26	4.38	**-0.12**	**0.27**	63,148	6,774	7.0	23.8
45.38	476+29	4.50	4.46	0.04	-	81,314	6,402	6.3	23.1
45.42	474+18	5.55	4.10	1.45	-	146,544	8,252	6.6	23.4
45.47	471+54	4.04	4.76	**-0.72**	**1.64**	59,479	5,243	6.2	23.0
45.52	468+90	4.79	5.24	**-0.45**	**1.02**	89,735	3,892	7.0	23.8

Possible Weak Soils (<3000)
Possible Shallow Bedrock (>8000)
For actual Gravel Depths, see logdraft forms

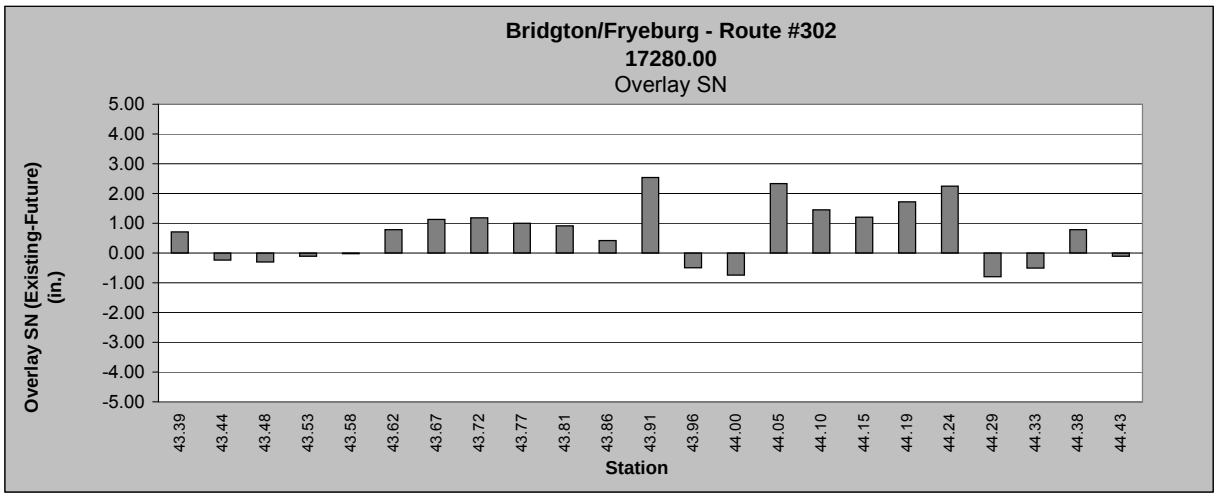


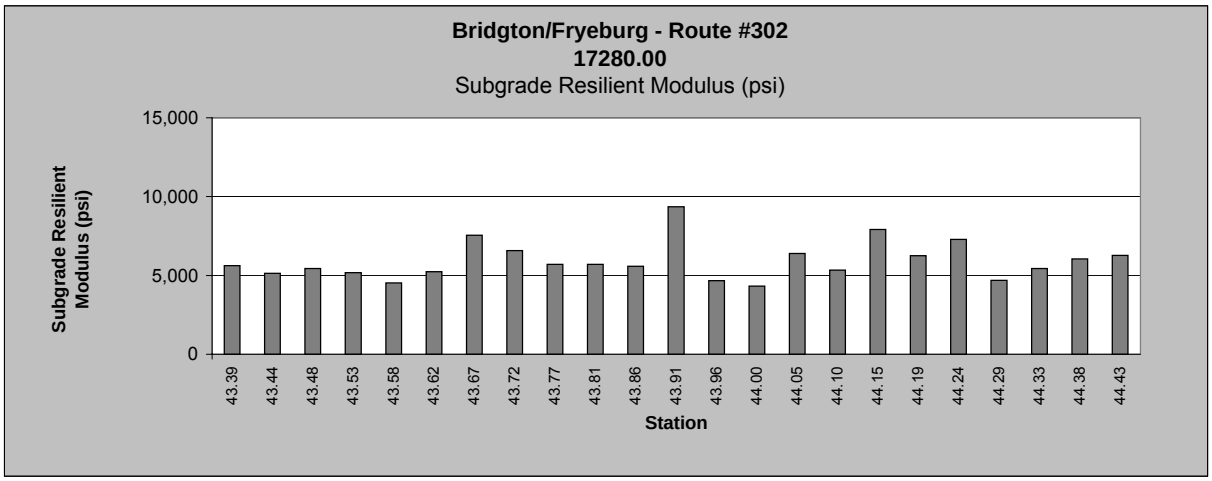


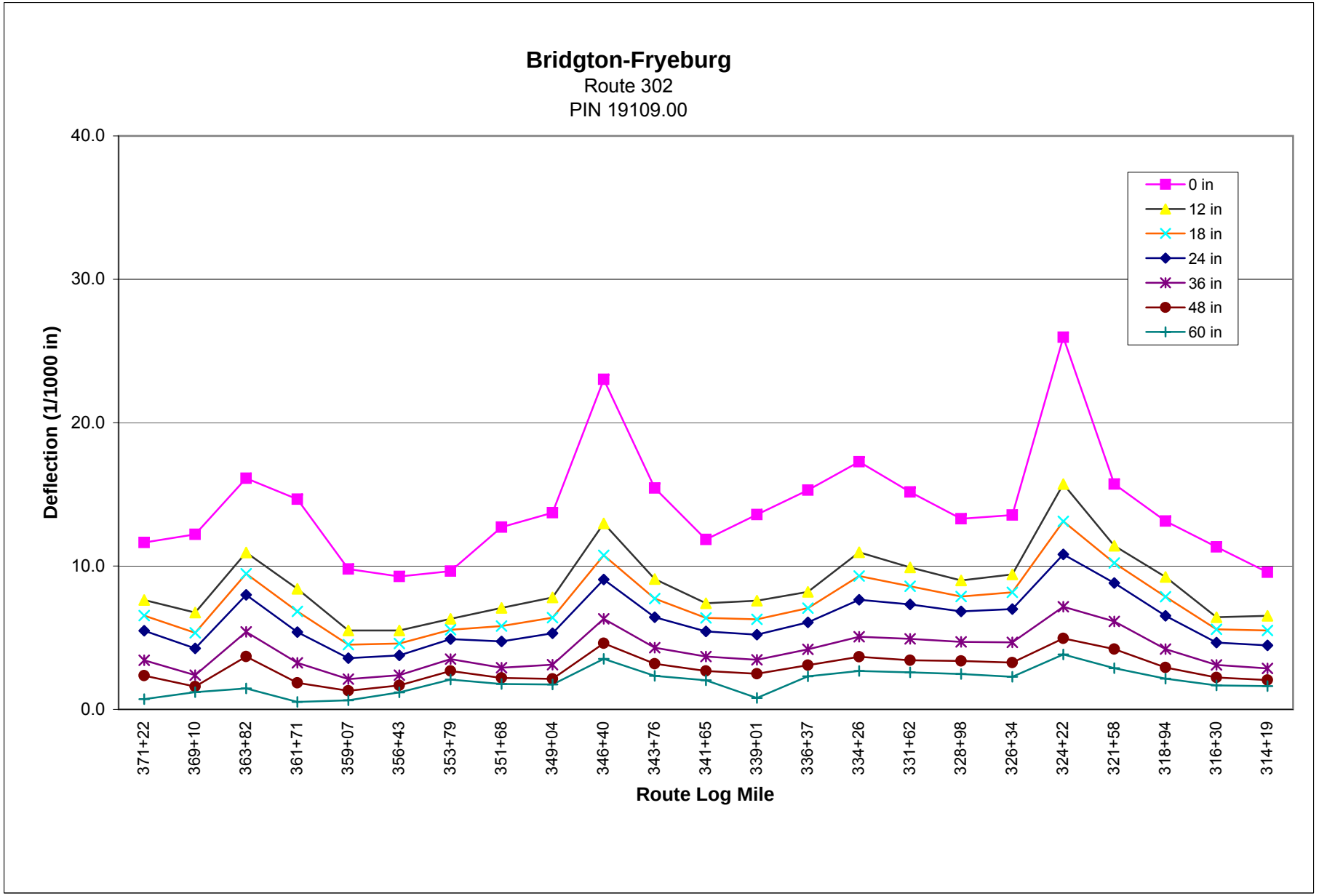
Bridgton/Fryeburg - Route #302 (Section #1)
19109.00

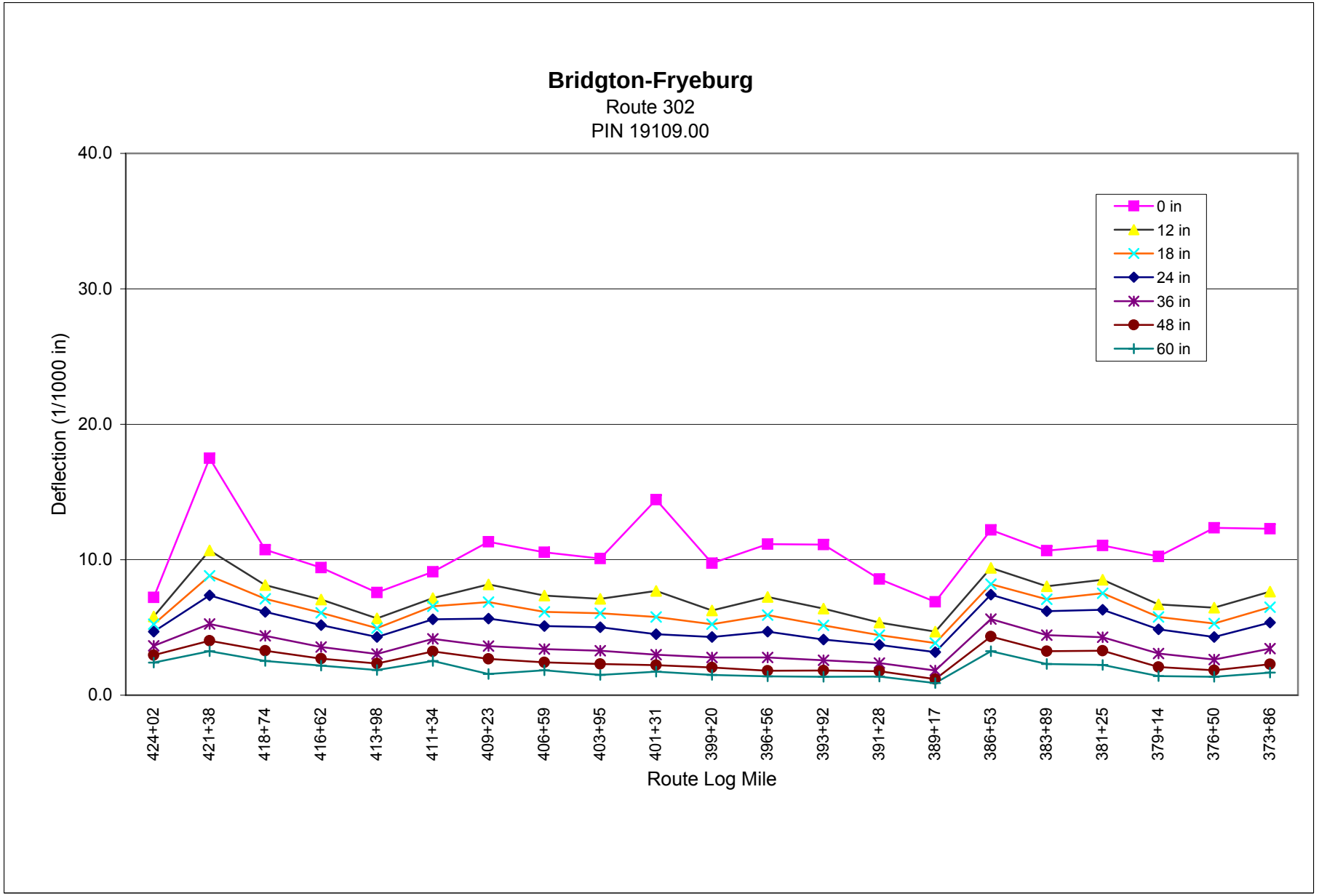
Route Log Mile (RLM)	Design Station	Existing Structural Number (in.)	Future Traffic Structural Number (in.)	Overlay Structural Number (Existing - Future)	Recommended Pavement Thickness (in.)	Pavement Modulus (psi)	Subgrade Resilient Modulus (psi)	Pavement Depth (in)	Combined Pavement/Gravel Depth Used for Calculation (in)
43.39	581+36	5.37	4.66	0.71	-	108,752	5,625	7.0	25.0
43.44	578+72	4.56	4.80	**-0.24**	**0.55**	65,156	5,130	7.2	25.2
43.48	576+61	4.41	4.71	**-0.30**	**0.68**	65,741	5,442	6.3	24.3
43.53	573+97	4.67	4.78	**-0.11**	**0.25**	80,671	5,176	6.0	24.0
43.58	571+33	4.97	4.99	**-0.02**	**0.05**	90,752	4,525	6.6	24.6
43.62	569+22	5.54	4.76	0.78	-	117,795	5,242	7.1	25.1
43.67	566+58	5.35	4.22	1.13	-	127,768	7,541	5.6	23.6
43.72	563+94	5.60	4.42	1.18	-	121,760	6,584	7.1	25.1
43.77	561+30	5.63	4.63	1.00	-	72,605	5,706	6.0	30.0
43.81	559+18	5.54	4.63	0.91	-	69,035	5,709	6.6	30.0
43.86	556+54	5.09	4.67	0.42	-	53,642	5,583	6.6	30.0
43.91	553+90	6.46	3.92	2.54	-	109,403	9,351	6.2	30.0
43.96	551+26	4.46	4.95	**-0.49**	**1.11**	41,239	4,660	6.5	28.7
44.00	549+15	4.32	5.06	**-0.74**	**1.68**	37,014	4,328	6.6	28.8
44.05	546+51	6.79	4.46	2.33	-	127,251	6,398	6.9	30.0
44.10	543+87	6.18	4.73	1.45	-	95,703	5,344	6.9	30.0
44.15	541+23	5.35	4.15	1.20	-	62,075	7,915	7.2	30.0
44.19	539+12	6.22	4.50	1.72	-	97,990	6,242	7.3	30.0
44.24	536+48	6.52	4.27	2.25	-	112,616	7,290	7.5	30.0
44.29	533+84	4.14	4.94	**-0.80**	**1.82**	53,434	4,681	7.6	24.4
44.33	531+73	4.20	4.71	**-0.51**	**1.16**	59,680	5,431	7.1	23.9
44.38	529+09	5.33	4.54	0.79	-	105,055	6,057	8.3	25.1
44.43	526+45	4.38	4.49	**-0.11**	**0.25**	61,057	6,264	7.9	24.7

Possible Weak Soils (<3000)
Possible Shallow Bedrock (>8000)
For actual Gravel Depths, see logdraft forms

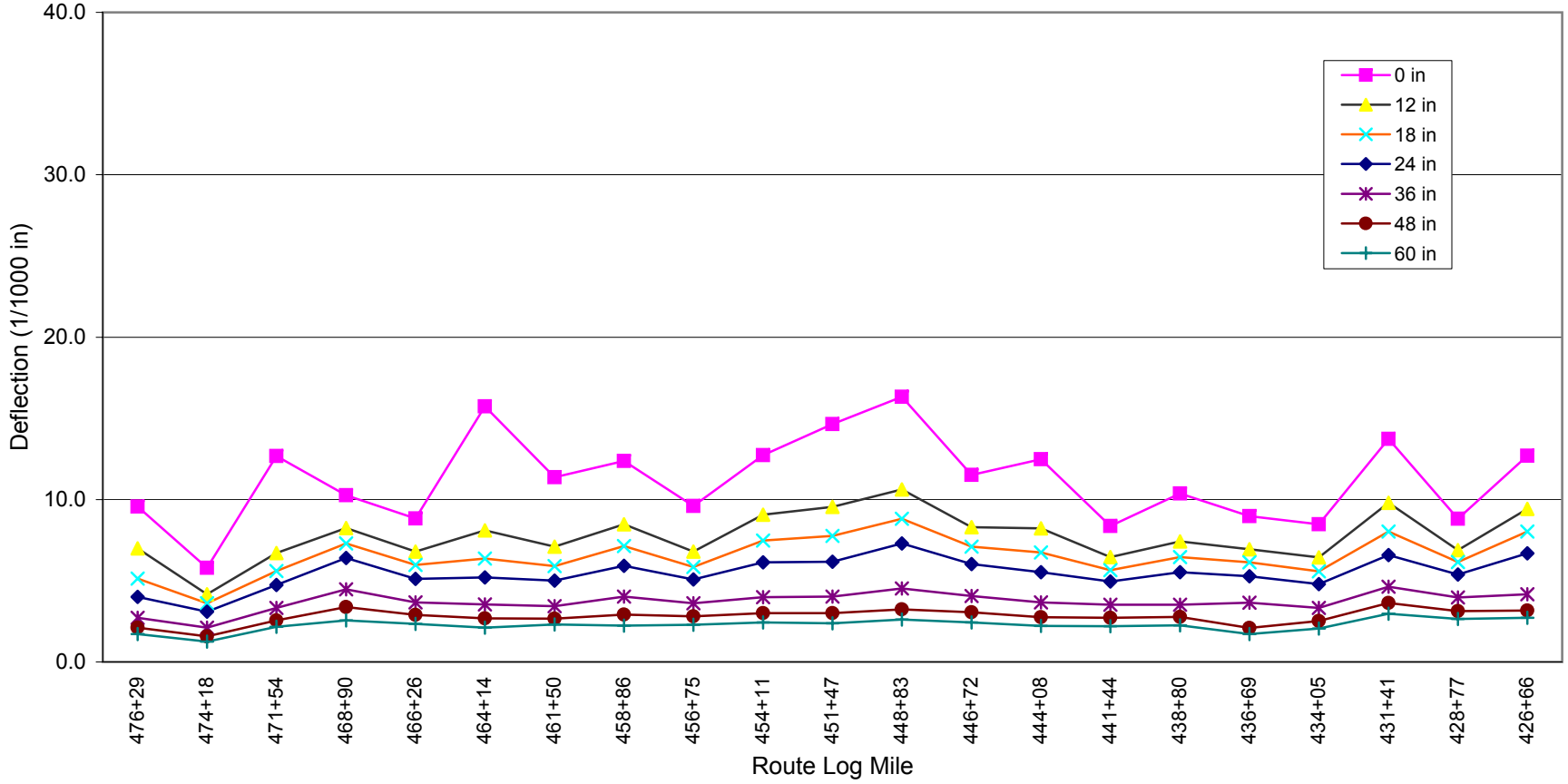


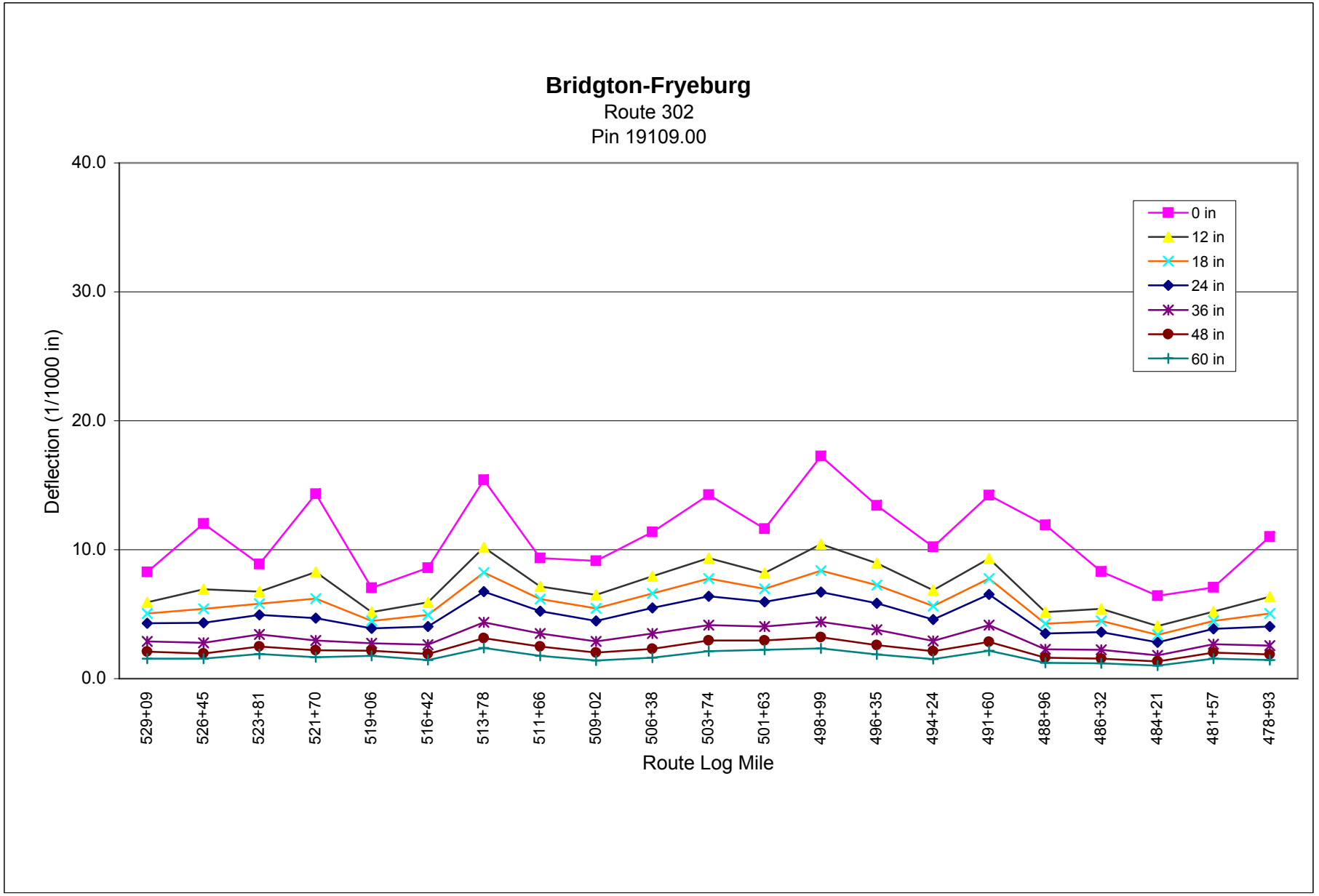


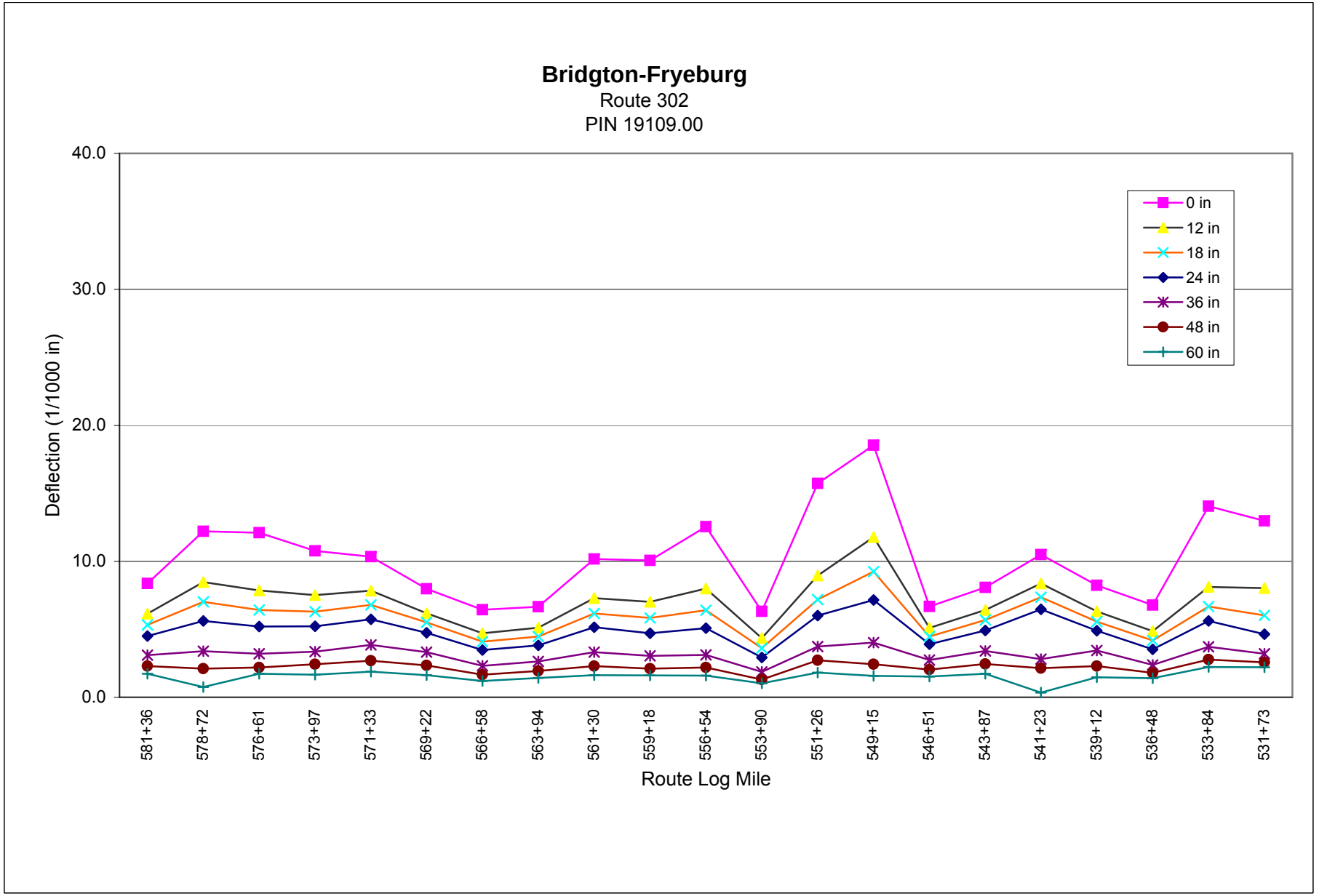

Bridgton-Fryeburg
Route 302
PIN 19109.00
Deflection (1/1000 in)
40.0
30.0
20.0
10.0
0.0
0 in
12 in
18 in
24 in
36 in
48 in
60 in
371+22
369+10
363+82
361+71
359+07
356+43
353+79
351+68
349+04
346+40
343+76
341+65
339+01
336+37
334+26
331+62
328+98
326+34
324+22
321+58
318+94
316+30
314+19
Route Log Mile

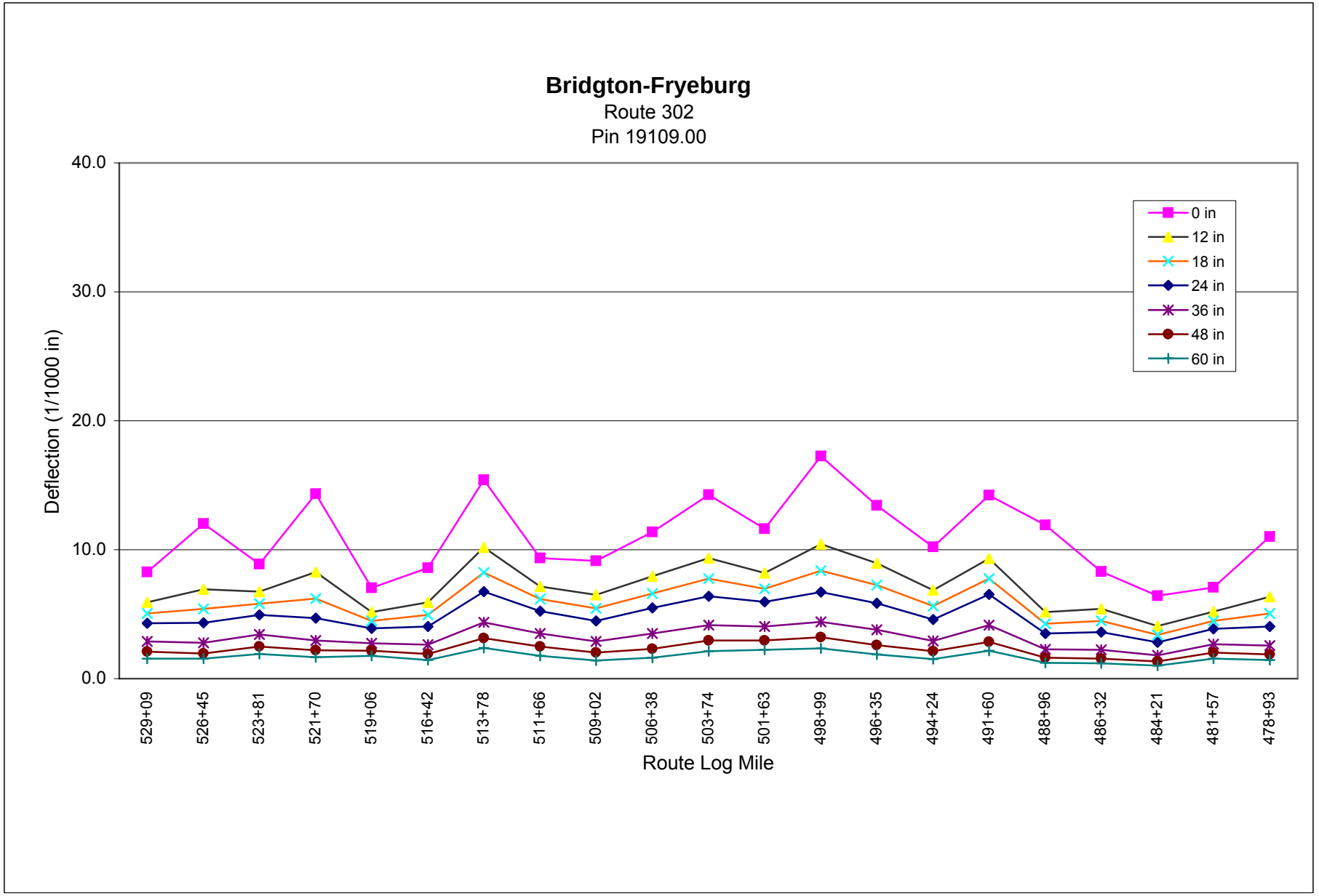

Bridgton-Fryeburg
Route 302
PIN 19109.00
Deflection (1/1000 in)
40.0
30.0
20.0
10.0
0.0
0 in
12 in
18 in
24 in
36 in
48 in
60 in
424+02
421+38
418+74
416+62
413+98
411+34
409+23
406+59
403+95
401+31
399+20
396+56
393+92
391+28
389+17
386+53
383+89
381+25
379+14
376+50
373+86
Route Log Mile

Bridgton-Fryeburg
Route 302
PIN 19109.00




Bridgton-Fryeburg
Route 302
Pin 19109.00
Deflection (1/1000 in)
40.0
30.0
20.0
10.0
0.0
0 in
12 in
18 in
24 in
36 in
48 in
60 in
529+09
526+45
523+81
521+70
519+06
516+42
513+78
511+66
509+02
506+38
503+74
501+63
498+99
496+35
494+24
491+60
488+96
486+32
484+21
481+57
478+93
Route Log Mile


Bridgton-Fryeburg
Route 302
PIN 19109.00
Deflection (1/1000 in)
40.0
30.0
20.0
10.0
0.0
0 in
12 in
18 in
24 in
36 in
48 in
60 in
581+36
578+72
576+61
573+97
571+33
569+22
566+58
563+94
561+30
559+18
556+54
553+90
551+26
549+15
546+51
543+87
541+23
539+12
536+48
533+84
531+73
Route Log Mile


Bridgton-Fryeburg
Route 302
Pin 19109.00
Deflection (1/1000 in)
40.0
30.0
20.0
10.0
0.0
0 in
12 in
18 in
24 in
36 in
48 in
60 in
529+09
526+45
523+81
521+70
519+06
516+42
513+78
511+66
509+02
506+38
503+74
501+63
498+99
496+35
494+24
491+60
488+96
486+32
484+21
481+57
478+93
Route Log Mile

Ground Penetrating Radar

~~17280.00~~ Bridgton/Fryeburg – Route #302

19109.00

Ground Penetrating Radar (GPR) data was collected on Tuesday October 19th, 2010, using the Departments two gigahertz air launched antenna. GPR data was collected at ½ foot intervals, at approximately 30 miles per hour in the left and right wheel paths of each lane. This project is separated into two sections and GPR data was collected for both sections.

Geotechnical Boring information, collected in December, 2010 by the Departments Drilling crew, was used extensively in identifying the layer which represents the bottom of the asphalt pavement. This information greatly enhanced the accuracy of the estimated GPR pavement depths.

Below is a brief summary of the GPR findings

Section #1 Route Log Mile (RLM) 43.34 – Intersection of Stack Em Inn Road Westerly to RLM ~~51.67~~ 48.44

Overall, GPR data was very difficult to evaluate in the right wheel path of both the east and west bound lanes. Many areas along the section indicated the presence of multiple pavement layers, making the bottom of the asphalt pavement difficult to identify (see Photo 1). This appearance is believed to be caused by cracked and deteriorated pavement and from multiple shimming efforts near the outside edge of the roadway.

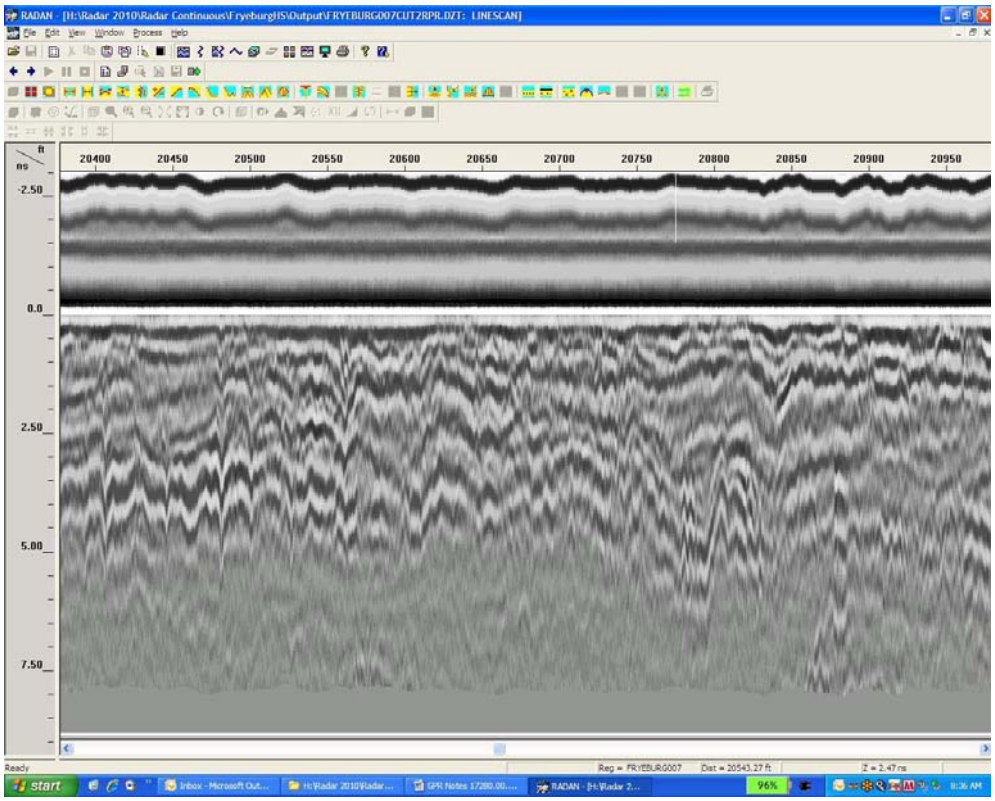


Photo 1: GPR Data Indicating Multiple Pavement Layers.

Two bridge crossing areas, located at approximately RLM 48.45 and 49.50 did provide strong, single pavement layer reflections. These areas coincide with the approach and leave sides of each bridge (see Photo 2). It is theorized that these areas show a clearer pavement layer because of newer, more uniformed construction.

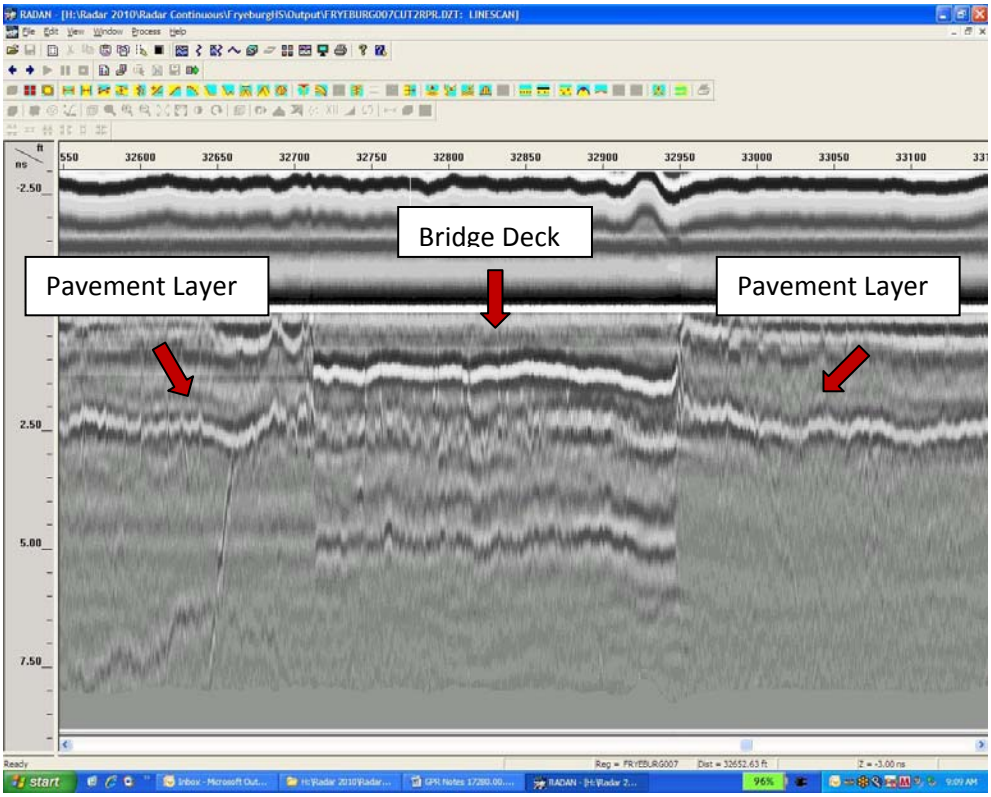


Photo 2: Bridge location at RLM 49.50. Pavement Layer at Either Side of Bridge Deck

The left or inside wheel paths in each direction were somewhat clearer in depicting the bottom of the asphalt pavement, with approximately 25 to 30 percent of each GPR data file showing a clearer, more defined pavement layer.

Section #2 - (RLM) 53.03 – Intersection of River Street Westerly to RLM 54.17 (New Hampshire State Line)

GPR data, collected in Section #2 was also difficult to analyze. As with Section #1, the inner wheel paths provided a clearer, more defined bottom of the asphalt pavement layer. Where available, boring information was again used to identify the bottom of the asphalt layer.

Summary

GPR data was collected and analyzed for both sections in the inner and outer wheel paths in both the east and west bound lanes. Pavement thickness information from geotechnical borings was used extensively to analyze GPR data files on both sections.

GPR data was summarized, averaged and reported every 100 feet along each section. The summaries for each section are attached.

Table I compares the average estimated GPR pavement thickness and the pavement thickness reported as part of the geotechnical boring. It is important to note; the estimated GPR pavement thickness is the average

for the 100 foot section in which the geotechnical boring was located. Borings were positioned in the outer wheel path of the west bound lane. GPR data is an average of the inner and outer wheel paths in both the east and west bound lanes. Overall, these values correlated quite well.

Table I

GPR Average Estimated Pavement Thickness		Geotechnical Boring Pavement Thickness	
Route Log Mile	Average Thickness (inches)	Route Log Mile	Reported Thickness (inches)
43.5290 to 43.5479	6.5	43.53	6.0
43.7936 to 43.8125	6.8	43.81	6.6
43.9826 to 43.0015	6.5	44.00	6.6
44.1338 to 44.1527	6.9	44.15	7.2
44.5118 to 44.5307	7.1	44.52	7.2
44.8520 to 44.8709	7.5	44.86	7.2
45.8915 to 45.9104	6.7	45.90	6.6
46.2506 to 46.2695	6.4	46.26	6.6
46.6475 to 46.6664	6.9	46.65	7.2
47.0633 to 47.0822	6.8	47.08	7.2
47.4980 to 47.5169	6.5	47.51	6.6
47.8382 to 47.8571	6.3	47.84	7.8
48.0650 to 48.0839	6.0	48.07	6.6
48.8210 to 48.8399	7.1	48.83	6.6
48.9722 to 48.9911	6.9	48.98	7.2
50.0117 to 50.0306	6.4	50.02	6.6
50.9945 to 51.0134	5.7	51.00	6.6
Section #2			
53.0678 to 53.0867	7.5	53.07	5.4
53.3135 to 53.3324	6.6	53.33	5.4

Prepared by Stephen Colson – MaineDOT

17280.00 Bridgton-Fryeburg - Route #302 (Section #1)

Estimated Pavement Thickness

Ground Penetrating Radar (GPR)

Explanation of Ground Penetrating Radar (GPR) Data Collection and Analysis:

For Project 17280.00 (Bridgton-Fryeburg), GPR data was collected in the left and right wheel paths in both the East and West bound lanes. Data was collected at ½ foot intervals along the entire section. Pavement thickness estimates were developed using Geophysical Survey Systems Inc. (GSSI) RADAN GPR Data Processing Software. Where available, pavement thicknesses from roadway borings collected by MaineDOT personnel were used in developing the estimated GPR pavement thicknesses. Please see the attached sheet for specific details regarding unique sections identified along the project.

GPR pavement thickness averages are to be considered for estimating purposes only.
Actual pavement thickness may vary.

Analysis Distance (ft) - 0.0189 **100 Feet**

RLM Limits		Average Depth (in)	RLM Limits		Average Depth (in)	RLM Limits		Average Depth (in)	RLM Limits		Average Depth (in)
43.3400	43.3589	6.9	43.6235	43.6424	6.3	43.9070	43.9259	6.2	44.1905	44.2094	7.3
43.3589	43.3778	6.6	43.6424	43.6613	6.9	43.9259	43.9448	6.7	44.2094	44.2283	8.0
43.3778	43.3967	7.0	43.6613	43.6802	5.6	43.9448	43.9637	6.5	44.2283	44.2472	7.5
43.3967	43.4156	7.0	43.6802	43.6991	5.8	43.9637	43.9826	6.8	44.2472	44.2661	7.2
43.4156	43.4345	7.2	43.6991	43.7180	6.4	43.9826	44.0015	6.5	44.2661	44.2850	7.2
43.4345	43.4534	7.2	43.7180	43.7369	7.1	44.0015	44.0204	6.2	44.2850	44.3039	7.6
43.4534	43.4723	6.7	43.7369	43.7558	6.4	44.0204	44.0393	6.8	44.3039	44.3228	6.7
43.4723	43.4912	6.3	43.7558	43.7747	6.0	44.0393	44.0582	6.9	44.3228	44.3417	7.1
43.4912	43.5101	6.2	43.7747	43.7936	6.6	44.0582	44.0771	6.8	44.3417	44.3606	7.2
43.5101	43.5290	6.3	43.7936	43.8125	6.8	44.0771	44.0960	6.8	44.3606	44.3795	7.5
43.5290	43.5479	6.5	43.8125	43.8314	6.8	44.0960	44.1149	6.9	44.3795	44.3984	8.3
43.5479	43.5668	6.6	43.8314	43.8503	7.0	44.1149	44.1338	7.1	44.3984	44.4173	8.1
43.5668	43.5857	6.6	43.8503	43.8692	6.6	44.1338	44.1527	6.9	44.4173	44.4362	7.9
43.5857	43.6046	7.2	43.8692	43.8881	6.4	44.1527	44.1716	7.3	44.4362	44.4551	7.3
43.6046	43.6235	7.1	43.8881	43.9070	6.3	44.1716	44.1905	7.3	44.4551	44.4740	7.9

RLM Limits		Average Depth (in)
44.4740	44.4929	7.5
44.4929	44.5118	7.5
44.5118	44.5307	7.1
44.5307	44.5496	7.3
44.5496	44.5685	7.8
44.5685	44.5874	8.0
44.5874	44.6063	7.6
44.6063	44.6252	7.4
44.6252	44.6441	7.1
44.6441	44.6630	7.4
44.6630	44.6819	7.6
44.6819	44.7008	7.4
44.7008	44.7197	7.4
44.7197	44.7386	7.2
44.7386	44.7575	7.2
44.7575	44.7764	6.9
44.7764	44.7953	7.2
44.7953	44.8142	7.1
44.8142	44.8331	7.9
44.8331	44.8520	8.0
44.8520	44.8709	7.5
44.8709	44.8898	6.8
44.8898	44.9087	7.0
44.9087	44.9276	7.5
44.9276	44.9465	8.0
44.9465	44.9654	8.1
44.9654	44.9843	7.5
44.9843	45.0032	7.7
45.0032	45.0221	8.1
45.0221	45.0410	8.2
45.0410	45.0599	7.5
45.0599	45.0788	7.2
45.0788	45.0977	7.4
45.0977	45.1166	7.6
45.1166	45.1355	7.5

RLM Limits		Average Depth (in)
45.1355	45.1544	8.2
45.1544	45.1733	8.9
45.1733	45.1922	8.2
45.1922	45.2111	7.5
45.2111	45.2300	7.2
45.2300	45.2489	7.8
45.2489	45.2678	7.3
45.2678	45.2867	6.8
45.2867	45.3056	7.1
45.3056	45.3245	7.3
45.3245	45.3434	7.0
45.3434	45.3623	6.7
45.3623	45.3812	6.3
45.3812	45.4001	5.9
45.4001	45.4190	6.3
45.4190	45.4379	6.6
45.4379	45.4568	6.7
45.4568	45.4757	6.2
45.4757	45.4946	6.8
45.4946	45.5135	7.0
45.5135	45.5324	7.0
45.5324	45.5513	7.1
45.5513	45.5702	6.7
45.5702	45.5891	7.0
45.5891	45.6080	7.1
45.6080	45.6269	6.9
45.6269	45.6458	7.0
45.6458	45.6647	7.1
45.6647	45.6836	6.9
45.6836	45.7025	7.2
45.7025	45.7214	6.9
45.7214	45.7403	7.2
45.7403	45.7592	7.2
45.7592	45.7781	7.0
45.7781	45.7970	6.7

RLM Limits		Average Depth (in)
45.7970	45.8159	6.4
45.8159	45.8348	6.2
45.8348	45.8537	6.7
45.8537	45.8726	6.8
45.8726	45.8915	6.5
45.8915	45.9104	6.7
45.9104	45.9293	6.8
45.9293	45.9482	7.0
45.9482	45.9671	7.1
45.9671	45.9860	6.5
45.9860	46.0049	6.5
46.0049	46.0238	6.9
46.0238	46.0427	6.7
46.0427	46.0616	6.7
46.0616	46.0805	6.5
46.0805	46.0994	6.0
46.0994	46.1183	5.8
46.1183	46.1372	6.0
46.1372	46.1561	6.7
46.1561	46.1750	6.9
46.1750	46.1939	6.5
46.1939	46.2128	6.4
46.2128	46.2317	7.0
46.2317	46.2506	6.4
46.2506	46.2695	6.4
46.2695	46.2884	6.1
46.2884	46.3073	5.9
46.3073	46.3262	6.9
46.3262	46.3451	7.7
46.3451	46.3640	7.5
46.3640	46.3829	7.6
46.3829	46.4018	6.8
46.4018	46.4207	5.9
46.4207	46.4396	5.2
46.4396	46.4585	5.4

RLM Limits		Average Depth (in)
46.4585	46.4774	5.5
46.4774	46.4963	5.9
46.4963	46.5152	5.8
46.5152	46.5341	5.6
46.5341	46.5530	5.8
46.5530	46.5719	6.1
46.5719	46.5908	6.6
46.5908	46.6097	6.6
46.6097	46.6286	6.7
46.6286	46.6475	6.7
46.6475	46.6664	6.9
46.6664	46.6853	6.8
46.6853	46.7042	7.0
46.7042	46.7231	6.9
46.7231	46.7420	7.2
46.7420	46.7609	7.1
46.7609	46.7798	7.4
46.7798	46.7987	7.1
46.7987	46.8176	7.2
46.8176	46.8365	7.2
46.8365	46.8554	7.1
46.8554	46.8743	7.2
46.8743	46.8932	6.2
46.8932	46.9121	6.2
46.9121	46.9310	6.8
46.9310	46.9499	6.5
46.9499	46.9688	6.1
46.9688	46.9877	6.2
46.9877	47.0066	6.1
47.0066	47.0255	6.3
47.0255	47.0444	6.2
47.0444	47.0633	6.3
47.0633	47.0822	6.8
47.0822	47.1011	6.8
47.1011	47.1200	6.6

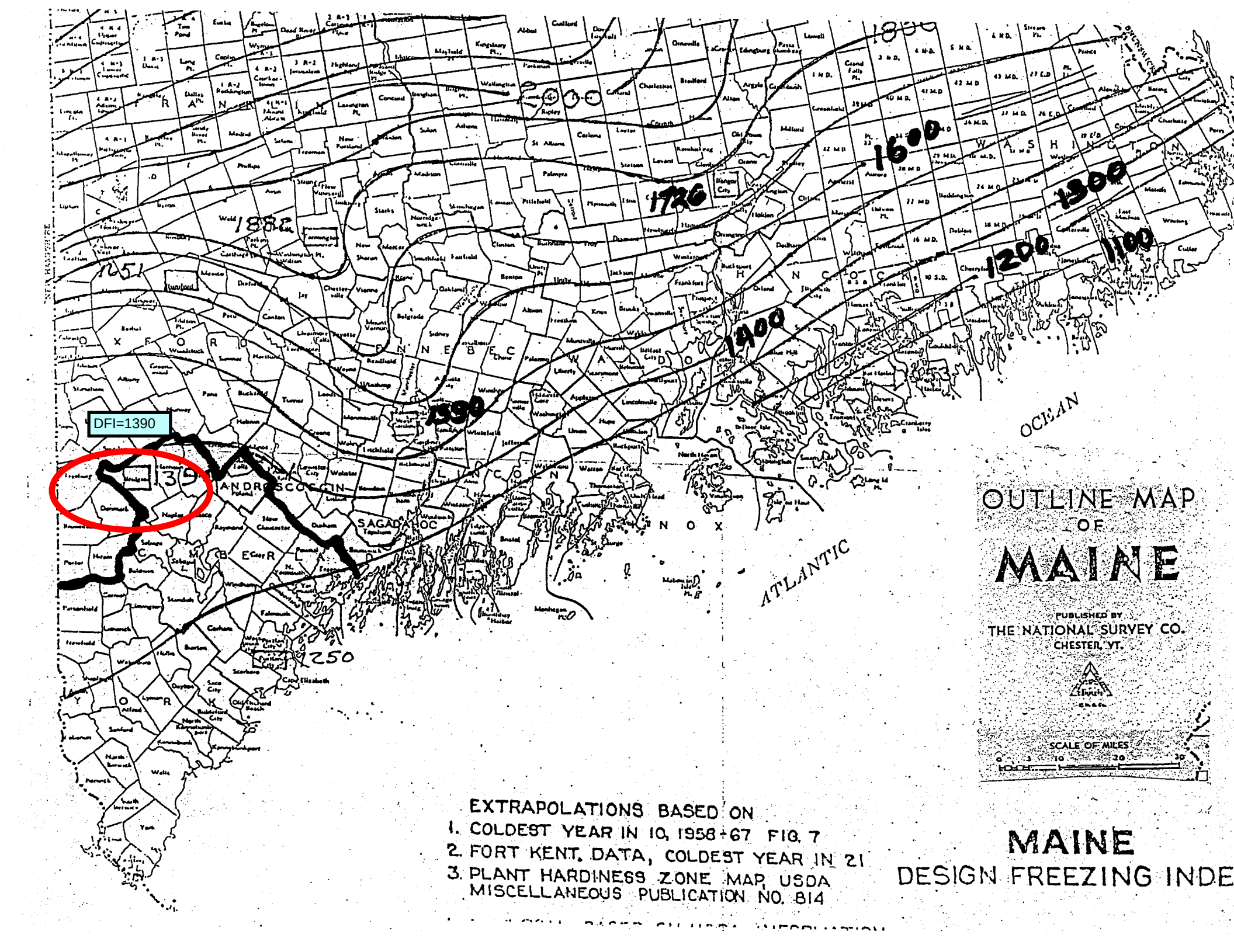
RLM Limits		Average Depth (in)
47.1200	47.1389	6.4
47.1389	47.1578	6.5
47.1578	47.1767	6.4
47.1767	47.1956	6.4
47.1956	47.2145	6.3
47.2145	47.2334	5.7
47.2334	47.2523	5.6
47.2523	47.2712	5.4
47.2712	47.2901	5.6
47.2901	47.3090	5.8
47.3090	47.3279	5.8
47.3279	47.3468	6.1
47.3468	47.3657	7.0
47.3657	47.3846	7.5
47.3846	47.4035	7.0
47.4035	47.4224	6.8
47.4224	47.4413	6.3
47.4413	47.4602	6.5
47.4602	47.4791	6.7
47.4791	47.4980	6.5
47.4980	47.5169	6.5
47.5169	47.5358	6.4
47.5358	47.5547	6.6
47.5547	47.5736	5.6
47.5736	47.5925	5.1
47.5925	47.6114	5.0
47.6114	47.6303	5.0
47.6303	47.6492	5.5
47.6492	47.6681	5.9
47.6681	47.6870	5.6
47.6870	47.7059	6.0
47.7059	47.7248	5.8
47.7248	47.7437	5.6
47.7437	47.7626	5.7
47.7626	47.7815	5.8

RLM Limits		Average Depth (in)
47.7815	47.8004	5.8
47.8004	47.8193	5.9
47.8193	47.8382	6.7
47.8382	47.8571	6.3
47.8571	47.8760	7.0
47.8760	47.8949	7.3
47.8949	47.9138	7.4
47.9138	47.9327	6.9
47.9327	47.9516	6.4
47.9516	47.9705	6.0
47.9705	47.9894	6.0
47.9894	48.0083	6.1
48.0083	48.0272	6.2
48.0272	48.0461	6.5
48.0461	48.0650	6.3
48.0650	48.0839	6.0
48.0839	48.1028	6.5
48.1028	48.1217	6.6
48.1217	48.1406	6.4
48.1406	48.1595	6.5
48.1595	48.1784	7.1
48.1784	48.1973	6.9
48.1973	48.2162	6.9
48.2162	48.2351	6.6
48.2351	48.2540	6.0
48.2540	48.2729	6.3
48.2729	48.2918	6.6
48.2918	48.3107	6.4
48.3107	48.3296	6.6
48.3296	48.3485	6.8
48.3485	48.3674	6.6
48.3674	48.3863	6.7
48.3863	48.4052	6.8
48.4052	48.4241	6.1
48.4241	48.4430	5.5

RLM Limits		Average Depth (in)
48.4430	48.4619	5.1
48.4619	48.4808	4.3
48.4808	48.4997	5.4
48.4997	48.5186	6.5
48.5186	48.5375	7.4
48.5375	48.5564	8.1
48.5564	48.5753	8.1
48.5753	48.5942	7.4
48.5942	48.6131	7.1
48.6131	48.6320	6.6
48.6320	48.6509	6.8
48.6509	48.6698	7.5
48.6698	48.6887	7.0
48.6887	48.7076	6.9
48.7076	48.7265	7.7
48.7265	48.7454	8.5
48.7454	48.7643	7.6
48.7643	48.7832	7.3
48.7832	48.8021	6.9
48.8021	48.8210	7.1
48.8210	48.8399	7.1
48.8399	48.8588	7.5
48.8588	48.8777	7.6
48.8777	48.8966	7.3
48.8966	48.9155	6.4
48.9155	48.9344	6.8
48.9344	48.9533	6.6
48.9533	48.9722	6.2
48.9722	48.9911	6.9
48.9911	49.0100	7.9
49.0100	49.0289	8.3
49.0289	49.0478	8.2
49.0478	49.0667	7.9
49.0667	49.0856	7.3
49.0856	49.1045	6.9

RLM Limits		Average Depth (in)
49.1045	49.1234	6.7
49.1234	49.1423	6.4
49.1423	49.1612	6.3
49.1612	49.1801	7.1
49.1801	49.1990	7.3
49.1990	49.2179	7.1
49.2179	49.2368	6.6
49.2368	49.2557	7.1
49.2557	49.2746	7.3
49.2746	49.2935	7.6
49.2935	49.3124	7.2
49.3124	49.3313	7.0
49.3313	49.3502	7.1
49.3502	49.3691	6.6
49.3691	49.3880	6.4
49.3880	49.4069	6.8
49.4069	49.4258	7.7
49.4258	49.4447	7.4
49.4447	49.4636	7.0
49.4636	49.4825	6.6
49.4825	49.5014	6.7
49.5014	49.5203	6.5
49.5203	49.5392	6.8
49.5392	49.5581	4.4
49.5581	49.5770	3.5
49.5770	49.5959	5.3
49.5959	49.6148	7.0
49.6148	49.6337	7.4
49.6337	49.6526	7.5
49.6526	49.6715	7.4
49.6715	49.6904	7.4
49.6904	49.7093	7.1
49.7093	49.7282	6.9
49.7282	49.7471	7.0
49.7471	49.7660	7.0

Geology, Soil Survey, Frost Depth Maps and Information


DFI=1390
1390
1400
1600
1300
1200
1100
1250
1851
1886
OCEAN
ATLANTIC
OUTLINE MAP
OF
MAINE
PUBLISHED BY
THE NATIONAL SURVEY CO.
CHESTER, VT.
SCALE OF MILES
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 INDE

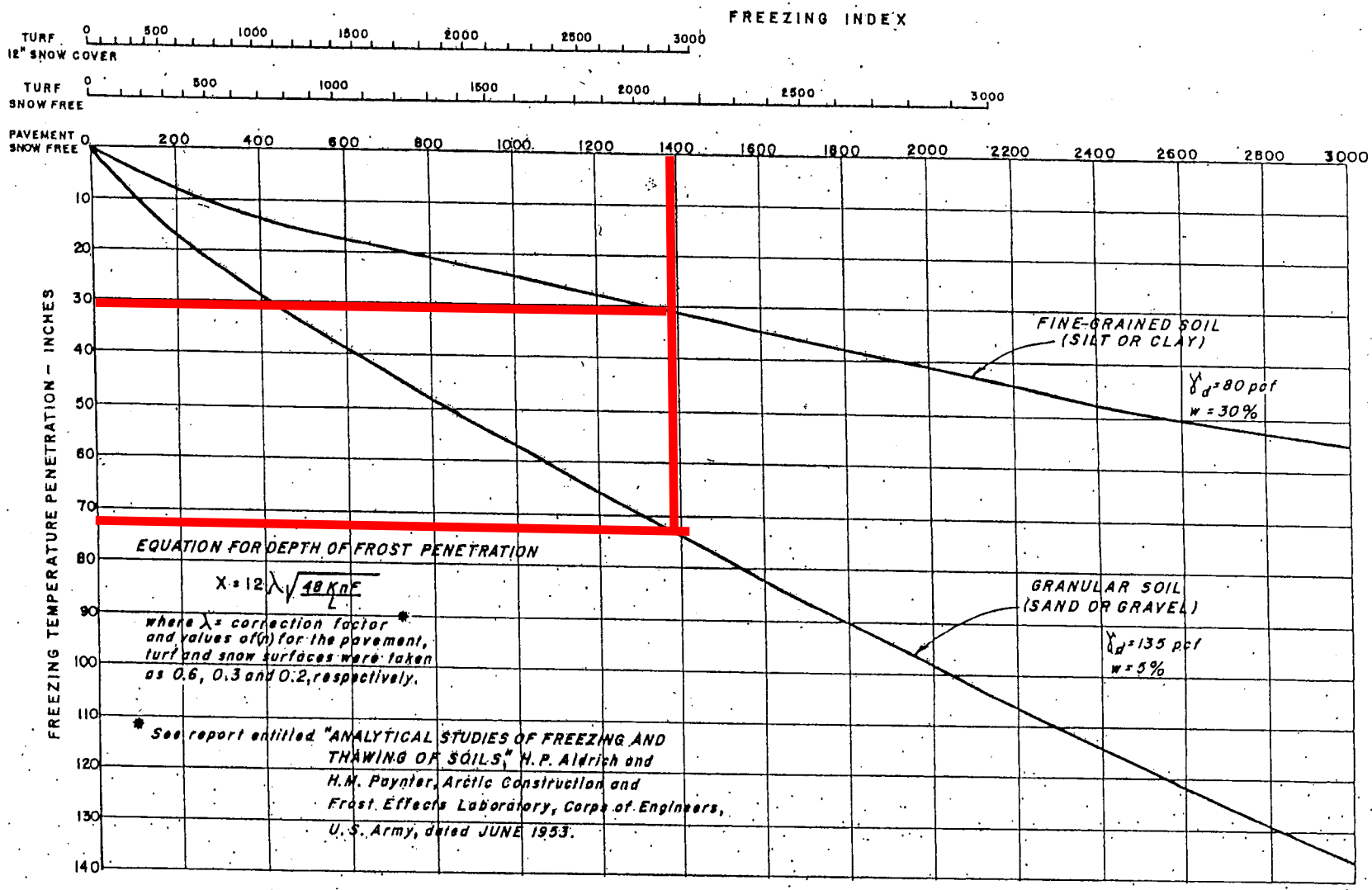
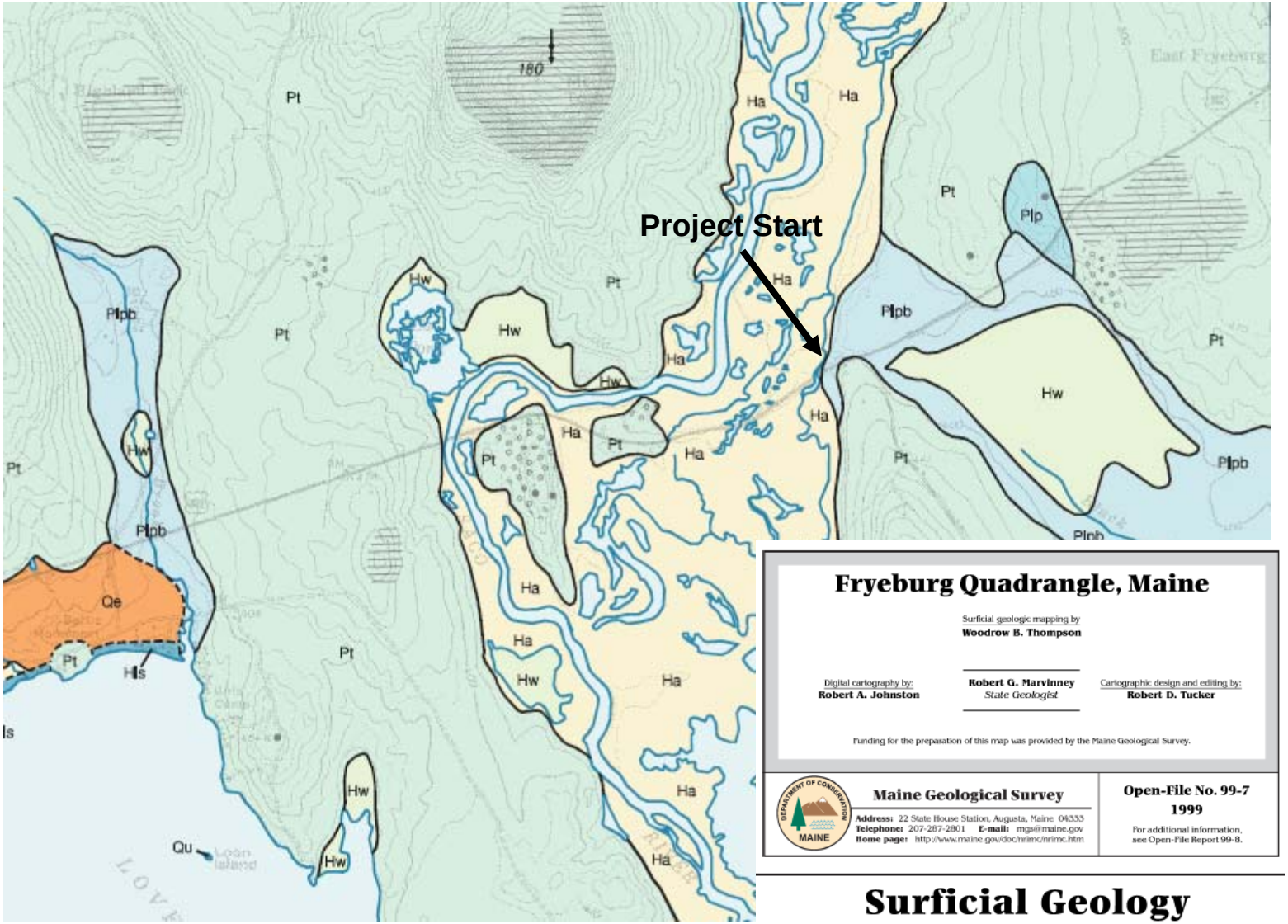


Figure 13-3 RELATIONSHIP BETWEEN FREEZING INDEX AND FREEZING TEMPERATURE PENETRATION FOR VARIOUS SURFACE CONDITIONS FOR GRANULAR AND FINE-GRAINED SOILS.

WIN 19109.00



Fryeburg Quadrangle, Maine

Surficial geologic mapping by
Woodrow B. Thompson

Digital cartography by:
Robert A. Johnston

Robert G. Marvinney
State Geologist

Cartographic design and editing by:
Robert D. Tucker

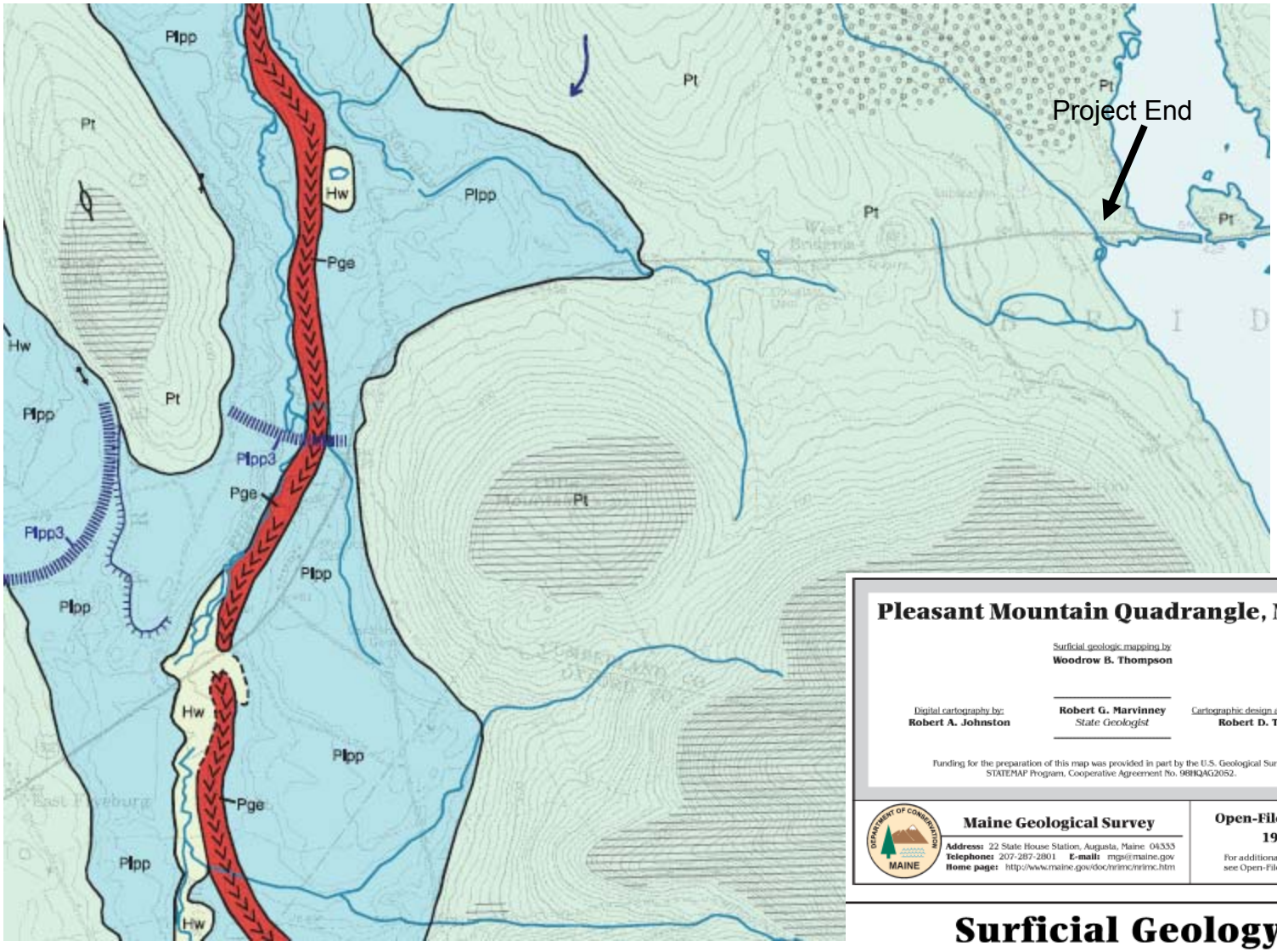
Funding for the preparation of this map was provided by the Maine Geological Survey.

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. 99-7
1999
For additional information, see Open-File Report 99-8.

Surficial Geology

WIN 19190.00



Pleasant Mountain Quadrangle, Maine

Surficial geologic mapping by
Woodrow B. Thompson

Digital cartography by:
Robert A. Johnston

Robert G. Marvinney
State Geologist

Cartographic design and editing by:
Robert D. Tucker

Funding for the preparation of this map was provided in part by the U.S. Geological Survey STATEMAP Program, Cooperative Agreement No. 98HQAG2052.

Maine Geological Survey
Address: 22 State House Station, Augusta, Maine 04333
Telephone: 207-287-2801 **E-mail:** mgs@maine.gov
Home page: http://www.maine.gov/doc/nrimc/mgsmc.htm

Open-File No. 99-5
1999
For additional information, see Open-File Report 99-6.

Surficial Geology

WIN 19109.00

Ha — **Alluvium** - Sand, gravel, silt, and organic sediment. Deposited on flood plains of modern streams.

Hw — **Wetland deposits** - Peat, muck, silt, and clay. Deposited in poorly drained areas.

Qe — **Eolian deposits** - Windblown sand. Forms dunes and irregular blanket deposits.

Plpk / Plpp / Plppf / Plpb — **Glacial Lake Pigwacket deposits** - Sand, gravel, and silt deposited in glacial Lake Pigwacket. Includes fan, delta, and lake-bottom sediments.

- **Plpk** - Kezar Valley stage deposits - Formed in an ice-dammed lake that extended up the Kezar River valley (north of the quadrangle).
- **Plpp** - Pleasant Mountain stage deposits - Formed in an ice-dammed lake flanking the esker in western part of the quadrangle.
- **Plppf** - Fan deposited into Pleasant Mountain stage of Lake Pigwacket at mouth of ice tunnel.
- **Plpb** - Lake-bottom deposits.

Pgo — **Outwash deposits** - Outwash sand deposited by glacial meltwater stream in valley between Stearns Pond and Highland Lake.

Pgk — **Kame deposit** - Mound of ice-contact gravel deposited by glacial meltwater on hillside east of Kezar Pond.

Pgim — **Moose Pond deposits** - Ice-contact sand and gravel deposited by glacial outwash streams in the Moose Pond valley.

Plwb — **Willett Brook deposits** - Ice-contact sand and gravel; probably deposited into a glacial lake in the Willett Brook valley.

Pge — **Esker deposits** - Sand and gravel deposited by meltwater streams in a subglacial tunnel system. Unit may also include tunnel-mouth lacustrine fan deposits.

Phm — **Hummocky moraine** - Glacial till with hummocky topography. Consists of poorly sorted rock debris deposited by glacial ice. May contain variable proportions of sand and gravel. Locally very bouldery.

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

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

Contact - Boundary between map units. Dashed where very approximate.

Scarp - Scarp (delta front?) separating higher and lower depositional levels of glacial Lake Pigwacket sediments.

Ice-margin position - Line shows approximate position of the glacier margin during ice retreat, based on head of outwash for related meltwater deposits. Numbers indicate relative ages; "1" is oldest.

Moraine ridge - Symbol shows trend of moraine ridge in area of hummocky moraine south of Pleasant Mountain. Origin of ridge is unknown.

>>>>> **Esker ridge** - Shows trend of sand and gravel ridge deposited in a meltwater tunnel within or beneath glacial ice. Chevrons indicate direction of meltwater flow.

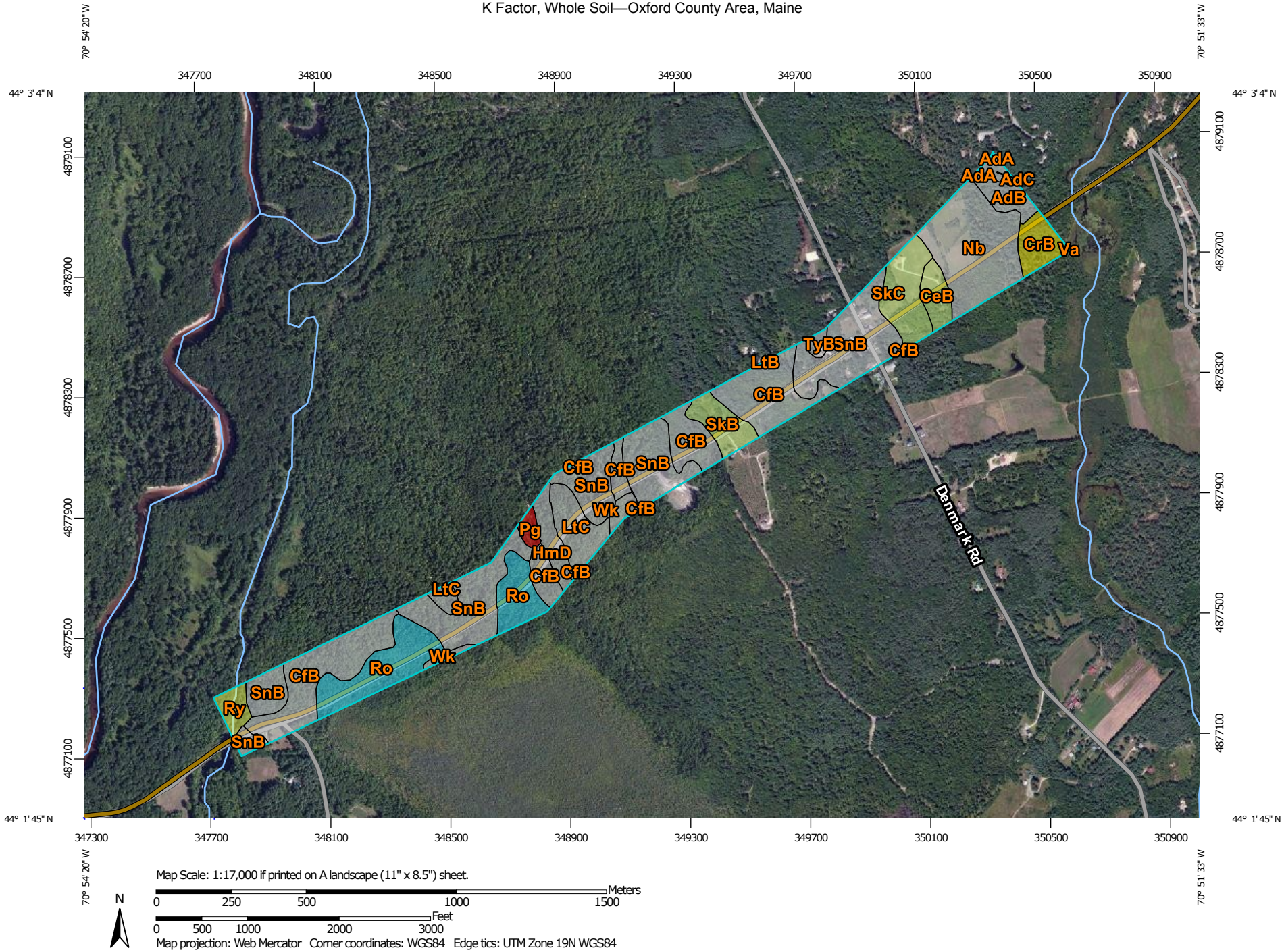
Glacially streamlined hill - Symbol shows trend of long axis, which is parallel to former glacial ice-flow direction.

135 **Glacial striation locality** - Arrow shows ice-flow direction inferred from striations on bedrock. Dot marks point of observation.

Dip of cross-bedding - Arrow shows average dip direction of cross-bedding in fluvial or deltaic deposits, which indicates direction of stream flow or delta progradation. Point of observation at dot.

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

Area of many large boulders



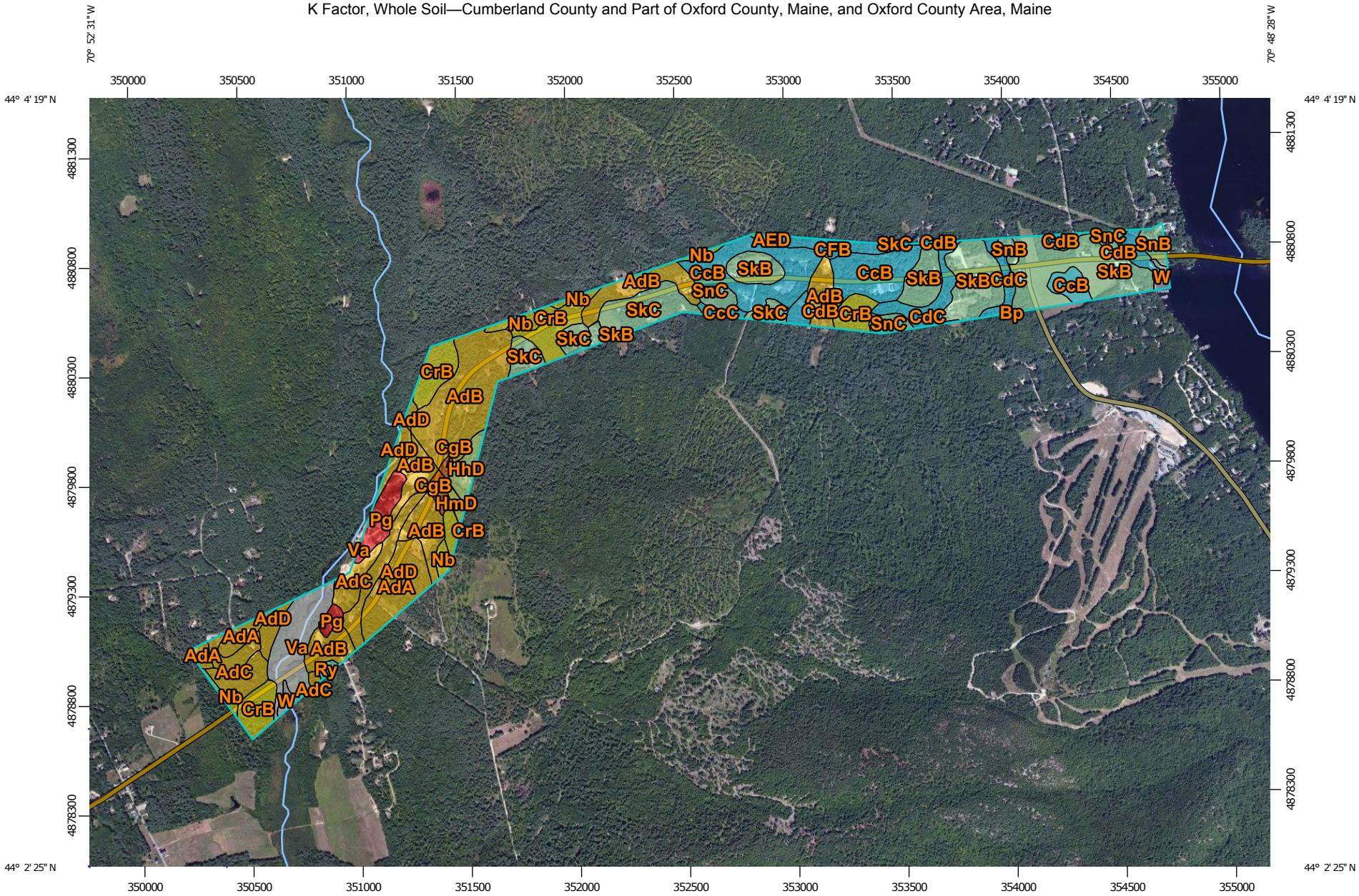
Map Scale: 1:17,000 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 250 500 1000 1500

Feet: 0 500 1000 2000 3000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84



Map Scale: 1:24,700 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 350 700 1400 2100

Feet: 0 1000 2000 4000 6000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

.02
.05
.10
.15
.17
.20
.24
.28
.32
.37
.43
.49
.55
.64
Not rated or not available

Soil Rating Lines

.02
.05
.10
.15
.17
.20
.24
.28
.32
.37
.43
.49
.55
.64
Not rated or not available

Soil Rating Points

.02
.05
.10
.15
.17
.20
.24
.28
.32
.37
.43
.49
.55
.64
Not rated or not available

Water Features

Streams and Canals

Transportation

Rails
Interstate Highways
US Routes
Major Roads
Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

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

Soil Survey Area: Oxford County Area, Maine
Survey Area Data: Version 15, Sep 13, 2014

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 20, 2010—Jul 16, 2011

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

K Factor, Whole Soil

K Factor, Whole Soil— Summary by Map Unit — Oxford County Area, Maine (ME613)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
AdA	Adams loamy sand, 0 to 3 percent slopes		0.4	0.2%
AdB	Adams loamy sand, 3 to 8 percent slopes		3.9	2.0%
AdC	Adams loamy sand, 8 to 15 percent slopes		1.4	0.7%
CeB	Colonel fine sandy loam, 3 to 8 percent slopes	.24	4.3	2.2%
CfB	Colonel fine sandy loam, 3 to 8 percent slopes, very stony		42.5	21.6%
CrB	Croghan loamy fine sand, 3 to 8 percent slopes	.17	5.4	2.8%
HmD	Hermon sandy loam, 15 to 35 percent slopes, very stony		4.7	2.4%
LtB	Lyman-Tunbridge complex, 0 to 8 percent slopes, very stony		0.2	0.1%
LtC	Lyman-Tunbridge complex, 8 to 15 percent slopes, very stony		9.2	4.7%
Nb	Naumburg loamy sand		23.5	11.9%
Pg	Pits, gravel	.02	1.6	0.8%
Ro	Roundabout silt loam	.37	20.5	10.4%
Ry	Rumney fine sandy loam, 0 to 3 percent slopes, frequently flooded	.20	3.1	1.6%
SkB	Skerry fine sandy loam, 3 to 8 percent slopes	.24	6.1	3.1%
SkC	Skerry fine sandy loam, 8 to 15 percent slopes	.24	10.4	5.3%
SnB	Skerry fine sandy loam, 3 to 8 percent slopes, very stony		55.9	28.4%
TyB	Tunbridge-Lyman complex, 3 to 8 percent slopes, rocky		1.2	0.6%
Va	Vassalboro mucky peat		0.0	0.0%

K Factor, Whole Soil

K Factor, Whole Soil— Summary by Map Unit — Cumberland County and Part of Oxford County, Maine (ME005)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
AdB	Adams loamy sand, 3 to 8 percent slopes	.15	59.2	13.3%
AdD	Adams loamy sand, 15 to 25 percent slopes	.15	1.0	0.2%
AED	Adams loamy sand, moderately steep	.15	1.4	0.3%
Bp	Brayton-Peacham complex, very stony	.43	0.2	0.0%
CcB	Colonel fine sandy loam, 3 to 8 percent slopes	.37	49.1	11.0%
CcC	Colonel fine sandy loam, 8 to 15 percent slopes	.37	2.0	0.4%
CdB	Colonel fine sandy loam, 3 to 8 percent slopes, very stony	.37	9.1	2.0%
CdC	Colonel fine sandy loam, 8 to 15 percent slopes,very stony	.37	15.2	3.4%
CFB	Colonel-Brayton assocation, gently sloping, very stony	.37	6.3	1.4%
CgB	Colton gravelly loamy sand, 3 to 8 percent slopes	.05	1.1	0.2%
CrB	Croghan loamy fine sand, 3 to 8 percent slopes	.17	25.8	5.8%
HhD	Hermon very stony sandy loam, 15 to 35 percent slopes	.24	6.1	1.4%
Nb	Naumburg loamy sand	.17	5.5	1.2%
SkB	Skerry fine sandy loam, 3 to 8 percent slopes	.28	72.8	16.3%
SkC	Skerry fine sandy loam, 8 to 15 percent slopes	.28	27.8	6.2%
SnB	Skerry fine sandy loam, 3 to 8 percent slopes, very stony	.28	5.8	1.3%
SnC	Skerry fine sandy loam, 8 to 15 percent slopes, very stony	.28	10.3	2.3%
W	Water		1.6	0.4%

Engineering Properties

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

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

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

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

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

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

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

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

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

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

Report—Engineering Properties

Absence of an entry indicates that the data were not estimated. The asterisk '*' denotes the representative texture; other possible textures follow the dash.

Engineering Properties– Cumberland County and Part of Oxford County, Maine												
Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
AdB—Adams loamy sand, 3 to 8 percent slopes												
Adams	0-1	*Highly decomposed plant material	PT	—	7-34	0-14	97-100	97-100	60-100	53-89	—	—
	1-2	*Loamy sand	SM, SP-SM	A-3, A-4, A-1, A-2	0	0	95-100	95-100	45-85	5-40	0-14	NP
	2-19	*Loamy sand, Sand, loamy fine sand	SM, SP-SM	A-2, A-3, A-4, A-1	0	0	95-100	95-100	35-95	5-40	0-14	NP
	19-65	*Sand, Fine sand, coarse sand	SP, SP-SM, SW-SM	A-1, A-2, A-3	0	0-1	80-100	70-100	20-90	0-10	0-14	NP

Engineering Properties– Cumberland County and Part of Oxford County, Maine												
Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
AdC—Adams loamy sand, 8 to 15 percent slopes												
Adams	0-1	*Highly decomposed plant material	PT	—	7-34	0-14	97-100	97-100	60-100	53-89	—	—
	1-2	*Loamy sand	SM, SP-SM	A-4, A-1, A-2, A-3	0	0	95-100	95-100	45-85	5-40	0-14	NP
	2-19	*Loamy sand, Sand, loamy fine sand	SP-SM, SM	A-4, A-1, A-2, A-3	0	0	95-100	95-100	35-95	5-40	0-14	NP
	19-65	*Sand, Fine sand, coarse sand	SP, SP-SM, SW-SM	A-3, A-1, A-2	0	0-1	80-100	70-100	20-90	0-10	0-14	NP
AdD—Adams loamy sand, 15 to 25 percent slopes												
Adams	0-1	*Highly decomposed plant material	PT	—	7-34	0-14	97-100	97-100	60-100	53-89	—	—
	1-2	*Loamy sand	SM, SP-SM	A-1, A-2, A-3, A-4	0	0	95-100	95-100	45-85	5-40	0-14	NP
	2-19	*Loamy sand, Sand, loamy fine sand	SM, SP-SM	A-3, A-4, A-1, A-2	0	0	95-100	95-100	35-95	5-40	0-14	NP
	19-65	*Sand, Fine sand, coarse sand	SW-SM, SP, SP-SM	A-3, A-1, A-2	0	0-1	80-100	70-100	20-90	0-10	0-14	NP

Engineering Properties– Cumberland County and Part of Oxford County, Maine												
Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
AED—Adams loamy sand, moderately steep												
Adams	0-1	*Highly decomposed plant material	PT	—	7-34	0-14	97-100	97-100	60-100	53-89	—	—
	1-2	*Loamy sand	SP-SM, SM	A-2, A-3, A-4, A-1	0	0	95-100	95-100	45-85	5-40	0-14	NP
	2-19	*Loamy sand, Sand, loamy fine sand	SM, SP-SM	A-2, A-3, A-4, A-1	0	0	95-100	95-100	35-95	5-40	0-14	NP
	19-65	*Sand, Fine sand, coarse sand	SP, SP-SM, SW-SM	A-3, A-1, A-2	0	0-1	80-100	70-100	20-90	0-10	0-14	NP
CcB—Colonel fine sandy loam, 3 to 8 percent slopes												
Colonel	0-7	*Fine sandy loam	ML, SC-SM, SM, CL-ML	A-2, A-4	0-1	0-5	85-95	80-90	50-85	25-70	15-25	NP-10
	7-17	*Fine sandy loam, Gravelly sandy loam, loam	SC-SM, SM, CL-ML, ML	A-1, A-2, A-4	0-5	0-10	75-95	60-90	35-85	20-70	15-25	NP-10
	17-65	*Gravelly fine sandy loam, Gravelly sandy loam, loam	CL-ML, ML, SC-SM, SM	A-1, A-2, A-4	0-10	0-10	75-95	60-90	35-85	20-70	15-25	NP-10

Engineering Properties– Cumberland County and Part of Oxford County, Maine												
Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
CcC—Colonel fine sandy loam, 8 to 15 percent slopes												
Colonel	0-7	*Fine sandy loam	SM, CL-ML, ML, SC-SM	A-4, A-2	0-1	0-5	85-95	80-90	50-85	25-70	15-25	NP-10
	7-17	*Fine sandy loam, Gravelly sandy loam, loam	ML, SC-SM, SM, CL-ML	A-4, A-1, A-2	0-5	0-10	75-95	60-90	35-85	20-70	15-25	NP-10
	17-65	*Gravelly fine sandy loam, Gravelly sandy loam, loam	SC-SM, SM, CL-ML, ML	A-4, A-1, A-2	0-10	0-10	75-95	60-90	35-85	20-70	15-25	NP-10
CdB—Colonel fine sandy loam,3 to 8 percent slopes, very stony												
Colonel	0-2	*Fine sandy loam	ML, SC-SM, SM, CL-ML	A-2, A-4, A-1	1-5	1-15	75-95	60-90	35-85	20-70	15-25	NP-10
	2-18	*Fine sandy loam, Gravelly sandy loam, loam	CL-ML, ML, SC-SM, SM	A-4, A-1, A-2	0-10	0-10	75-95	60-90	35-85	20-70	15-25	NP-10
	18-65	*Gravelly fine sandy loam, Gravelly sandy loam, loam	CL-ML, ML, SC-SM, SM	A-1, A-2, A-4	0-10	0-10	75-95	60-90	35-85	20-70	15-25	NP-10

Engineering Properties– Cumberland County and Part of Oxford County, Maine												
Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
CFB—Colonel-Brayton assocation, gently sloping, very stony												
Colonel	0-1	*Highly decomposed plant material	PT	—	0	0-14	99-100	98-100	60-100	53-89	—	—
	1-3	*Fine sandy loam	CL-ML, ML, SC-SM, SM	A-1, A-2, A-4	1-5	1-15	75-95	60-90	35-85	20-70	15-25	NP-10
	3-19	*Fine sandy loam, Gravelly sandy loam, loam	CL-ML, ML, SC-SM, SM	A-1, A-2, A-4	0-10	0-10	75-95	60-90	35-85	20-70	15-25	NP-10

Engineering Properties– Cumberland County and Part of Oxford County, Maine												
Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
	19-65	*Gravelly fine sandy loam, Gravelly sandy loam, loam	CL-ML, ML, SC-SM, SM	A-1, A-2, A-4	0-10	0-10	75-95	60-90	35-85	20-70	15-25	NP-10
Brayton	0-1	*Highly decomposed plant material	PT	—	—	—	—	—	—	—	—	—
	1-6	*Fine sandy loam	CL-ML, ML, SC-SM, SM	A-1, A-2, A-4	1-5	1-15	65-95	55-90	35-90	20-80	15-30	NP-10
	6-25	*Fine sandy loam, Gravelly sandy loam, silt loam	CL-ML, ML, SC-SM, SM	A-1, A-2, A-4	0-10	0-10	65-95	55-90	35-90	20-80	15-30	NP-10
	25-65	*Fine sandy loam, Gravelly sandy loam, loam	CL-ML, ML, SC-SM, SM	A-4, A-1, A-2	0-10	0-10	65-95	55-90	35-85	20-70	15-30	—
CgB—Colton gravelly loamy sand, 3 to 8 percent slopes												
Colton	0-3	*Highly decomposed plant material	PT	—	0	0-14	100	100	60-100	53-89	—	—
	3-5	*Gravelly loamy sand	GM, GW, SM, SP	A-1, A-2, A-3	0	15-25	30-80	25-75	25-60	2-25	0-10	NP-2
	5-23	*Very gravelly loamy sand	SP, GM, GP, SM	A-1	0-1	5-20	30-80	25-75	20-50	2-20	0-14	NP
	23-65	*Extremely gravelly sand	GP, GW, SP, SW	A-1	0-1	10-45	20-55	15-50	10-30	0-5	0-14	NP

Engineering Properties– Cumberland County and Part of Oxford County, Maine												
Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
CrB—Croghan loamy fine sand, 3 to 8 percent slopes												
Croghan	0-2	*Loamy fine sand	SM, SP-SM, SW-SM	A-1, A-2, A-3, A-4	0	0	95-100	95-100	45-80	5-40	0-14	NP
	2-35	*Loamy fine sand, Sand, loamy sand	SM, SP-SM, SW-SM	A-2, A-3, A-4, A-1	0	0	80-100	75-100	45-80	5-40	0-14	NP
	35-65	*Sand, Loamy sand, coarse sand	SM, SP-SM, SW-SM	A-2, A-3, A-1	0	0	80-100	75-100	45-75	5-30	0-14	NP

Engineering Properties– Cumberland County and Part of Oxford County, Maine												
Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
Nb—Naumburg loamy sand												
Naumburg	0-2	*Highly decomposed plant material	PT	—	0	0-14	100	100	60-100	53-89	—	—
	2-7	*Loamy sand	SM, SP-SM, SW-SM	A-3, A-4, A-2	0	0	95-100	90-100	50-85	5-45	0-14	NP
	7-38	*Sand, Loamy fine sand, loamy sand	SP-SM, SW-SM, SM	A-2, A-3, A-1	0	0	95-100	90-100	45-85	5-35	0-14	NP
	38-65	*Coarse sand, Sand, loamy fine sand	SM, SP-SM, SW-SM	A-2, A-3, A-1	0	0	95-100	90-100	45-80	5-35	0-14	NP
SkB—Skerry fine sandy loam, 3 to 8 percent slopes												
Skerry	0-6	*Fine sandy loam	SC-SM, SM, SC	A-2, A-4	0	0-10	80-95	75-90	60-85	30-50	15-30	NP-10
	6-22	*Sandy loam, Gravelly fine sandy loam, fine sandy loam	SC-SM, SM, SC	A-2, A-4	0-1	5-15	75-95	60-95	50-75	20-45	15-25	NP-10
	22-65	*Gravelly sandy loam, Loamy sand, gravelly fine sandy loam	SP-SM, GM, GP-GM, SM	A-1, A-2	0-1	5-25	60-85	45-75	30-70	10-35	0-14	NP

Engineering Properties– Cumberland County and Part of Oxford County, Maine												
Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
SkC—Skerry fine sandy loam, 8 to 15 percent slopes												
Skerry	0-6	*Fine sandy loam	SC, SC-SM, SM	A-2, A-4	0	0-10	80-95	75-90	60-85	30-50	15-30	NP-10
	6-22	*Sandy loam, Gravelly fine sandy loam, fine sandy loam	SM, SC, SC-SM	A-2, A-4	0-1	5-15	75-95	60-95	50-75	20-45	15-25	NP-10
	22-65	*Gravelly sandy loam, Loamy sand, gravelly fine sandy loam	GM, GP-GM, SM, SP-SM	A-1, A-2	0-1	5-25	60-85	45-75	30-70	10-35	0-14	NP
SnB—Skerry fine sandy loam, 3 to 8 percent slopes, very stony												
Skerry	0-3	*Highly decomposed plant material	PT	—	7-34	0-14	99-100	99-100	60-100	53-89	—	—
	3-5	*Fine sandy loam	SC, SC-SM, SM	A-1-b, A-2, A-4	0	0-10	80-95	75-90	60-85	30-50	15-30	NP-10
	5-25	*Sandy loam, Gravelly fine sandy loam, fine sandy loam	SC, SC-SM, SM	A-2, A-4	0-1	5-15	75-95	60-95	50-75	20-45	15-25	NP-10
	25-65	*Gravelly sandy loam, Loamy sand, gravelly fine sandy loam	GM, GP-GM, SM, SP-SM	A-1, A-2	0-1	5-25	60-85	45-75	30-70	10-35	0-14	NP

Engineering Properties–Oxford County Area, Maine														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			In				*Pct*	*Pct*					*Pct*	
LtC—Lyman-Tunbridge complex, 8 to 15 percent slopes, very stony														
Lyman, very stony	50	D	0-1	Moderately decomposed plant material, highly decomposed plant material, slightly decomposed plant material	PT	A-8	0	0	—	—	—	—	—	—
			1-3	Loam, fine sandy loam, sandy loam, very fine sandy loam	ML	A-4	0-28	0-18	55-100	53-100	38-90	22-62	0-65	NP-5
			3-5	Fine sandy loam, sandy loam, very fine sandy loam, loam	SM	A-4	0-22	0-14	64-98	63-98	46-89	23-57	0-33	NP-6
			5-7	Fine sandy loam, sandy loam, very fine sandy loam, loam	SM	A-4	0-28	0-18	77-99	53-97	38-88	22-60	0-76	NP-5
			7-11	Loam, fine sandy loam, sandy loam, very fine sandy loam	SM	A-4	0-27	0-18	77-99	53-97	38-88	22-60	0-61	NP-5
			11-18	Channery loam, fine sandy loam, sandy loam, very fine sandy loam	SM	A-4	0-25	0-30	52-99	50-99	36-89	21-61	0-36	NP-6

Engineering Properties–Oxford County Area, Maine														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			In				*Pct*	*Pct*					*Pct*	
Ro—Roundabout silt loam														
Roundabout	90	B/D	0-8	Very fine sandy loam	CL-ML, ML	A-4, A-6	0	0	90-100	85-100	70-100	60-90	20-40	2-12
			8-18	Silt loam, very fine sandy loam, loamy very fine sand	CL-ML, ML	A-4	0	0	90-100	85-100	75-100	60-90	15-25	NP-5
			18-65	Silt loam, very fine sand, sandy loam	CL-ML, ML, SC-SM, SM	A-2, A-4	0	0	90-100	85-100	50-100	25-90	15-25	NP-5
Ry—Rumney fine sandy loam, 0 to 3 percent slopes, frequently flooded														
Rumney	84	B/D	0-9	Silt loam, loam, very fine sandy loam, fine sandy loam	ML, SM	A-2, A-4	0	0	79-100	57-100	46-100	17-54	0-43	NP-5
			9-20	Very fine sandy loam, fine sandy loam, sandy loam, loam	ML, SM	A-2, A-4	0	0	79-100	58-100	45-100	19-57	0-27	NP-6
			20-30	Fine sandy loam, sandy loam, very fine sandy loam	ML, SM	A-2, A-4	0	0	79-100	58-100	38-87	16-51	0-27	NP-6
			30-65	Loamy sand, loamy fine sand, gravelly loamy sand, stratified loamy sand to loamy fine sand	SP, SP-SM, SM	A-2, A-3, A-2-4	0	0	80-100	42-100	29-87	9-35	0-14	NP

Engineering Properties–Oxford County Area, Maine														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			In				*Pct*	*Pct*					*Pct*	
			18-28	Bedrock	—	—	—	—	—	—	—	—	—	—
Tunbridge, very stony	30	C	0-3	Moderately decomposed plant material	PT	A-8	0	0	—	—	—	—	—	—
			3-5	Highly decomposed plant material	PT	A-8	0	0	—	—	—	—	—	—
			5-8	Fine sandy loam, sandy loam, very fine sandy loam, loam	SM	A-4	0	0-24	53-96	51-96	37-87	19-55	0-33	NP-6
			8-11	Very fine sandy loam, loam, sandy loam, fine sandy loam	SM	A-4	0	0-30	43-90	41-90	30-81	15-52	0-76	NP-5
			11-26	Very fine sandy loam, sandy loam, fine sandy loam, loam	SM	A-4	0	0-30	43-91	41-90	30-82	15-52	0-61	NP-5
			26-28	Fine sandy loam, sandy loam, very fine sandy loam, loam	SM	A-4	0	0-25	52-91	50-91	36-83	19-53	0-30	NP-6
			28-38	Bedrock	—	—	—	—	—	—	—	—	—	—
Pg—Pits, gravel														
Pits	92		0-6	Very gravelly sand	GP, GW	A-1	—	0-25	10-25	5-25	0-15	0-5	0-14	NP
			6-60	Very gravelly sand, extremely gravelly coarse sand, very gravelly coarse sand	GP, GW, SP, SW	A-1	—	0-25	10-55	5-50	0-15	0-5	0-14	NP

Physical Soil Properties

This table shows estimates of some physical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

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

Particle size is the effective diameter of a soil particle as measured by sedimentation, sieving, or micrometric methods. Particle sizes are expressed as classes with specific effective diameter class limits. The broad classes are sand, silt, and clay, ranging from the larger to the smaller.

Sand as a soil separate consists of mineral soil particles that are 0.05 millimeter to 2 millimeters in diameter. In this table, the estimated sand content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Silt as a soil separate consists of mineral soil particles that are 0.002 to 0.05 millimeter in diameter. In this table, the estimated silt content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of sand, silt, and clay affects the physical behavior of a soil. Particle size is important for engineering and agronomic interpretations, for determination of soil hydrologic qualities, and for soil classification.

The amount and kind of clay affect the fertility and physical condition of the soil and the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, saturated hydraulic conductivity (Ksat), plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3- or 1/10-bar (33kPa or 10kPa) moisture tension. Weight is determined after the soil is dried at 105 degrees C. In the table, the estimated moist bulk density of each soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute linear extensibility, shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. Depending on soil texture, a bulk density of more than 1.4 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Saturated hydraulic conductivity (Ksat) refers to the ease with which pores in a saturated soil transmit water. The estimates in the table are expressed in terms of micrometers per second. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Saturated hydraulic conductivity (Ksat) is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each soil layer. The capacity varies, depending on soil properties that affect retention of water. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Linear extensibility refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. It is an expression of the volume change between the water content of the clod at 1/3- or 1/10-bar tension (33kPa or 10kPa tension) and oven dryness. The volume change is reported in the table as percent change for the whole soil. The amount and type of clay minerals in the soil influence volume change.

Linear extensibility is used to determine the shrink-swell potential of soils. The shrink-swell potential is low if the soil has a linear extensibility of less than 3 percent; moderate if 3 to 6 percent; high if 6 to 9 percent; and very high if more than 9 percent. If the linear extensibility is more than 3, shrinking and swelling can cause damage to buildings, roads, and other structures and to plant roots. Special design commonly is needed.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In this table, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter. The content of organic matter in a soil can be maintained by returning crop residue to the soil.

Organic matter has a positive effect on available water capacity, water infiltration, soil organism activity, and tilth. It is a source of nitrogen and other nutrients for crops and soil organisms.

Erosion factors are shown in the table as the K factor (Kw and Kf) and the T factor. Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and Ksat. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor Kw indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

Erosion factor Kf indicates the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size.

Report—Physical Soil Properties

Physical Soil Properties–Oxford County Area, Maine														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
AdA—Adams loamy sand, 0 to 3 percent slopes														
Adams	0-1	20-26- 30	40-54- 65	0-20- 25	—	10.00-100.00	0.20-0.60	—	25.0-91.0			5	2	134
	1-2	70-81- 90	0-16- 30	0- 3- 5	1.00-1.30	42.34-141.14	0.06-0.12	0.0-2.9	2.0-5.0	.10	.10			
	2-19	70-81- 90	0-16- 30	0- 3- 5	1.10-1.45	42.34-141.14	0.05-0.07	0.0-2.9	0.0-2.7	.15	.15			
	19-65	85-97-10 0	0- 1- 10	0- 3- 5	1.20-1.50	141.14-705.00	0.02-0.04	0.0-2.9	0.0-0.5	.02	.02			
AdB—Adams loamy sand, 3 to 8 percent slopes														
Adams	0-1	20-26- 30	40-54- 65	0-20- 25	—	10.00-100.00	0.20-0.60	—	25.0-91.0			5	2	134
	1-2	70-81- 90	0-16- 30	0- 3- 5	1.00-1.30	42.34-141.14	0.06-0.12	0.0-2.9	2.0-5.0	.10	.10			
	2-19	70-81- 90	0-16- 30	0- 3- 5	1.10-1.45	42.34-141.14	0.05-0.07	0.0-2.9	0.0-2.7	.15	.15			
	19-65	85-97-10 0	0- 1- 10	0- 3- 5	1.20-1.50	141.14-705.00	0.02-0.04	0.0-2.9	0.0-0.5	.02	.02			

Report—Physical Soil Properties

Physical Soil Properties–Cumberland County and Part of Oxford County, Maine														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
AdB—Adams loamy sand, 3 to 8 percent slopes														
Adams	0-1	20-26- 30	40-54- 65	0-20- 25	—	10.00-100.00	0.20-0.60	—	25.0-91.0			5	2	134
	1-2	70-81- 90	0-16- 30	0- 3- 5	1.00-1.30	42.34-141.14	0.06-0.12	0.0-2.9	2.0-5.0	.10	.10			
	2-19	70-81- 90	0-16- 30	0- 3- 5	1.10-1.45	42.34-141.14	0.05-0.07	0.0-2.9	0.0-2.7	.15	.15			
	19-65	85-97-10 0	0- 1- 10	0- 3- 5	1.20-1.50	141.14-705.00	0.02-0.04	0.0-2.9	0.0-0.5	.02	.02			
AdD—Adams loamy sand, 15 to 25 percent slopes														
Adams	0-1	20-26- 30	40-54- 65	0-20- 25	—	10.00-100.00	0.20-0.60	—	25.0-91.0			5	2	134
	1-2	70-81- 90	0-16- 30	0- 3- 5	1.00-1.30	42.34-141.14	0.06-0.12	0.0-2.9	2.0-5.0	.10	.10			
	2-19	70-81- 90	0-16- 30	0- 3- 5	1.10-1.45	42.34-141.14	0.05-0.07	0.0-2.9	0.0-2.7	.15	.15			
	19-65	85-97-10 0	0- 1- 10	0- 3- 5	1.20-1.50	141.14-705.00	0.02-0.04	0.0-2.9	0.0-0.5	.02	.02			

Physical Soil Properties–Cumberland County and Part of Oxford County, Maine														
Map symbol and soil name	**Depth**	**Sand**	**Silt**	**Clay**	**Moist bulk density**	**Saturated hydraulic conductivity**	**Available water capacity**	**Linear extensibility**	**Organic matter**	**Erosion factors**			**Wind erodibility group**	**Wind erodibility index**
										Kw	**Kf**	**T**		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
AED—Adams loamy sand, moderately steep														
Adams	0-1	20-26- 30	40-54- 65	0-20- 25	—	10.00-100.00	0.20-0.60	—	25.0-91.0			5	2	134
	1-2	70-81- 90	0-16- 30	0- 3- 5	1.00-1.30	42.34-141.14	0.06-0.12	0.0-2.9	2.0-5.0	.10	.10			
	2-19	70-81- 90	0-16- 30	0- 3- 5	1.10-1.45	42.34-141.14	0.05-0.07	0.0-2.9	0.0-2.7	.15	.15			
	19-65	85-97-10 0	0- 1- 10	0- 3- 5	1.20-1.50	141.14-705.00	0.02-0.04	0.0-2.9	0.0-0.5	.02	.02			
Bp—Brayton-Peacham complex, very stony														
Brayton	0-1	20-26- 30	40-54- 65	0-20- 25	—	10.00-100.00	0.20-0.50	—	25.0-91.0			3	3	86
	1-5	45-66- 85	0-27- 50	4- 7- 10	1.00-1.30	4.23-14.11	0.21-0.32	0.0-2.9	0.6-8.0	.24	.24			
	5-24	45-66- 85	0-27- 50	4- 7- 10	1.40-1.65	4.23-14.11	0.14-0.22	0.0-2.9	0.1-1.8	.37	.37			
	24-65	45-66- 85	0-27- 50	4- 7- 10	1.70-2.00	0.42-4.23	0.12-0.17	0.0-2.9	0.0-0.2	.43	.43			
Peacham	0-8	20-26- 30	40-54- 65	0-20- 25	—	10.00-100.00	0.20-0.60	—	35.0-85.0			1	2	134
	8-13	45-61- 85	0-32- 50	3- 7- 10	1.20-1.40	4.23-14.11	0.11-0.22	0.0-2.9	0.2-4.4	.37	.37			
	13-65	45-60- 85	0-34- 50	3- 7- 10	1.80-2.00	0.00-1.41	0.02-0.06	0.0-2.9	0.1-0.5	.49	.49			
CcB—Colonel fine sandy loam, 3 to 8 percent slopes														
Colonel	0-7	45-66- 85	0-28- 50	3- 7- 10	0.90-1.20	4.23-14.11	0.20-0.30	0.0-2.9	4.0-8.0	.24	.24	2	3	86
	7-17	45-66- 85	0-28- 50	3- 7- 10	1.00-1.60	4.23-14.11	0.16-0.25	0.0-2.9	0.5-2.0	.37	.37			
	17-65	45-66- 85	0-28- 50	3- 7- 10	1.65-1.95	0.42-4.23	0.13-0.22	0.0-2.9	0.0-0.5	.24	.43			

Physical Soil Properties–Oxford County Area, Maine														
Map symbol and soil name	**Depth**	**Sand**	**Silt**	**Clay**	**Moist bulk density**	**Saturated hydraulic conductivity**	**Available water capacity**	**Linear extensibility**	**Organic matter**	**Erosion factors**			**Wind erodibility group**	**Wind erodibility index**
										Kw	**Kf**	**T**		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
CrB—Croghan loamy fine sand, 3 to 8 percent slopes														
Croghan	0-2	70-81- 90	0-17- 30	0- 3- 5	1.10-1.50	42.34-141.14	0.05-0.16	0.0-2.9	2.0-9.0	.17	.17	5	2	134
	2-35	70-84- 90	0-14- 30	0- 3- 5	1.20-1.50	141.14-705.00	0.03-0.07	0.0-2.9	0.5-4.9	.10	.10			
	35-65	85-97-10 0	0- 1- 10	0- 3- 5	1.20-1.50	141.14-705.00	0.05-0.10	0.0-2.9	0.1-0.3	.02	.02			
HmD—Hermon sandy loam, 15 to 35 percent slopes, very stony														
Hermon	0-2	20-26- 30	40-54- 65	0-20- 25	—	10.00-100.00	0.20-0.60	—	35.0-91.0			5	3	86
	2-3	45-65- 85	0-31- 50	2- 4- 6	0.85-1.20	14.11-141.14	0.07-0.15	0.0-2.9	3.0-4.7	.17	.17			
	3-9	45-61- 85	0-35- 50	2- 4- 6	0.85-1.20	14.11-141.14	0.07-0.20	0.0-2.9	2.1-4.7	.20	.20			
	9-32	70-84- 90	0-12- 50	2- 5- 7	0.85-1.30	14.11-141.14	0.05-0.10	0.0-2.9	0.3-2.0	.05	.15			
	32-65	-91-100	0- 7- 10	1- 3- 4	1.10-1.70	42.34-141.14	0.02-0.06	0.0-2.9	0.0-0.5	.02	.02			

Physical Soil Properties–Oxford County Area, Maine														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
LtC—Lyman-Tunbridge complex, 8 to 15 percent slopes, very stony														
Lyman, very stony	0-1	—	—	—	0.17-0.33	10.00-99.00	0.35-0.50	—	35.0-95.0			1	5	56
	1-3	40-52- 80	10-41- 50	1- 7- 10	0.70-1.31	1.00-99.00	0.19-0.23	0.2-1.4	4.0-20.0	.32	.32			
	3-5	40-59- 80	10-37- 50	1- 4- 10	1.48-1.54	1.00-99.00	0.12-0.16	0.1-1.2	1.4-5.7	.37	.37			
	5-7	40-52- 80	10-41- 50	1- 7- 10	0.57-1.44	1.00-99.00	0.16-0.21	0.2-1.5	3.1-25.0	.32	.32			
	7-11	40-52- 80	10-41- 50	1- 7- 10	0.58-1.45	1.00-99.00	0.17-0.21	0.1-1.4	2.2-18.0	.32	.32			
	11-18	40-52- 80	10-41- 50	1- 7- 10	0.89-1.45	1.00-99.00	0.14-0.18	0.1-1.2	2.2-7.0	.24	.32			
	18-28	—	—	—	—	0.01-100.00	—	—	—					
Tunbridge, very stony	0-3	—	—	—	0.17-0.33	10.00-99.00	0.35-0.50	—	35.0-95.0			2	3	86
	3-5	—	—	—	0.17-0.33	10.00-99.00	0.35-0.50	—	35.0-95.0					
	5-8	40-59- 80	10-37- 50	1- 4- 10	1.48-1.54	1.00-100.00	0.12-0.16	0.1-1.1	1.4-5.7	.37	.37			
	8-11	40-59- 80	10-34- 50	1- 7- 10	0.57-1.44	1.00-100.00	0.14-0.21	0.1-1.4	3.1-25.0	.32	.32			
	11-26	40-59- 80	10-37- 50	1- 4- 10	0.58-1.45	1.00-100.00	0.13-0.21	0.1-1.3	2.2-18.0	.37	.37			
	26-28	40-59- 80	10-37- 50	1- 4- 10	1.31-1.58	1.00-100.00	0.10-0.14	0.1-1.1	1.0-4.2	.43	.43			
	28-38	—	—	—	—	0.01-100.00	—	—	—					

Physical Soil Properties–Oxford County Area, Maine														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
Nb—Naumburg loamy sand														
Naumburg	0-2	20-26- 30	40-54- 65	0-20- 25	—	10.00-100.00	0.20-0.50	—	25.0-91.0			5	2	134
	2-7	70-81- 90	0-16- 30	1- 3- 5	1.20-1.50	14.11-42.34	0.05-0.09	0.0-2.9	1.5-3.1	.17	.17			
	7-38	85-88-10 0	0- 9- 10	1- 3- 5	1.20-1.50	42.34-141.14	0.06-0.08	0.0-2.9	0.4-3.3	.02	.02			
	38-65	85-91-10 0	0- 6- 10	1- 3- 5	1.45-1.65	42.34-141.14	0.04-0.06	0.0-2.9	0.2-0.5	.02	.02			
Pg—Pits, gravel														
Pits	0-6	85-98-10 0	0- 2- 10	0- 1- 1	—	42.34-141.14	0.01-0.02	0.0-2.9	0.0-0.1	.02	.05		2	134
	6-60	85-98-10 0	0- 2- 10	0- 1- 1	—	42.34-141.14	0.01-0.02	0.0-2.9	—					
Ro—Roundabout silt loam														
Roundabout	0-8	45-62- 85	0-28- 50	2-10- 18	1.20-1.50	4.23-14.11	0.16-0.22	0.0-2.9	2.0-6.0	.37	.37	5	3	86
	8-18	45-61- 85	0-29- 50	2-10- 18	1.20-1.50	4.23-14.11	0.15-0.20	0.0-2.9	0.2-4.9	.49	.49			
	18-65	0-21- 50	50-69- 80	2-10- 18	1.45-1.65	4.23-14.11	0.12-0.20	0.0-2.9	0.0-1.0	.64	.64			

Physical Soil Properties–Oxford County Area, Maine														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
Ry—Rumney fine sandy loam, 0 to 3 percent slopes, frequently flooded														
Rumney	0-9	45-71- 85	5-22- 50	1- 7- 10	0.90-1.40	1.00-100.00	0.15-0.19	0.0-1.1	2.0-8.0	.20	.20	3	3	86
	9-20	45-65- 85	5-31- 50	1- 4- 10	0.90-1.40	1.00-100.00	0.12-0.16	0.0-0.7	0.0-3.0	.32	.32			
	20-30	45-68- 85	5-30- 50	1- 2- 10	0.90-1.40	1.00-100.00	0.12-0.16	0.0-0.7	0.0-3.0	.28	.28			
	30-65	70-81- 90	7-18- 30	0- 1- 3	0.90-1.50	10.00-705.00	0.06-0.10	0.0-0.2	0.0-1.5	.15	.15			
SkB—Skerry fine sandy loam, 3 to 8 percent slopes														
Skerry	0-6	45-61- 85	0-35- 50	2- 4- 6	0.60-1.20	4.23-14.11	0.10-0.23	0.0-2.9	5.4-8.5	.24	.24	3	3	86
	6-22	45-61- 85	0-35- 50	2- 5- 7	1.30-1.60	4.23-14.11	0.06-0.16	0.0-2.9	0.7-5.8	.28	.28			
	22-65	45-61- 85	0-36- 50	1- 3- 5	1.60-1.75	0.42-4.23	0.03-0.09	0.0-2.9	0.1-0.6	.24	.43			
SkC—Skerry fine sandy loam, 8 to 15 percent slopes														
Skerry	0-6	45-61- 85	0-35- 50	2- 4- 6	0.60-1.20	4.23-14.11	0.10-0.23	0.0-2.9	5.4-8.5	.24	.24	3	3	86
	6-22	45-61- 85	0-35- 50	2- 5- 7	1.30-1.60	4.23-14.11	0.06-0.16	0.0-2.9	0.7-5.8	.28	.28			
	22-65	45-61- 85	0-36- 50	1- 3- 5	1.60-1.75	0.42-4.23	0.03-0.09	0.0-2.9	0.1-0.6	.24	.43			

Physical Soil Properties–Oxford County Area, Maine														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
SnB—Skerry fine sandy loam, 3 to 8 percent slopes, very stony														
Skerry	0-3	20-26- 30	40-54- 65	0-20- 25	—	10.00-100.00	0.20-0.60	—	35.0-91.0			3	3	86
	3-5	45-61- 85	0-35- 50	2- 4- 6	0.60-1.30	4.23-14.11	0.06-0.23	0.0-2.9	5.4-8.5	.24	.24			
	5-25	45-61- 85	0-35- 50	2- 5- 7	1.30-1.60	4.23-14.11	0.06-0.16	0.0-2.9	0.7-5.8	.28	.28			
	25-65	45-61- 85	0-36- 50	1- 3- 5	1.60-1.75	0.42-4.23	0.03-0.09	0.0-2.9	0.1-0.6	.24	.43			

Physical Soil Properties–Cumberland County and Part of Oxford County, Maine														
Map symbol and soil name	**Depth**	**Sand**	**Silt**	**Clay**	**Moist bulk density**	**Saturated hydraulic conductivity**	**Available water capacity**	**Linear extensibility**	**Organic matter**	**Erosion factors**			**Wind erodibility group**	**Wind erodibility index**
										Kw	**Kf**	**T**		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
CFB—Colonel-Brayton assocation, gently sloping, very stony														
Colonel	0-1	20-26- 30	40-54- 65	0-20- 25	—	10.00-100.00	—	—	35.0-91.0			2	3	86
	1-3	45-66- 85	0-28- 50	3- 7- 10	0.90-1.20	4.23-14.11	0.16-0.33	0.0-2.9	0.0-2.0	.32	.32			
	3-19	45-66- 85	0-28- 50	3- 7- 10	1.00-1.60	4.23-14.11	0.16-0.25	0.0-2.9	0.5-4.0	.37	.37			
	19-65	45-66- 85	0-28- 50	3- 7- 10	1.65-1.95	0.42-4.23	0.13-0.22	0.0-2.9	0.0-0.5	.24	.43			
Brayton	0-1	20-26- 30	40-54- 65	0-20- 25	—	10.00-100.00	—	—	25.0-91.0			2	3	86
	1-6	45-66- 85	0-27- 50	4- 7- 10	1.00-1.30	4.23-14.11	0.21-0.32	0.0-2.9	4.0-8.0	.24	.24			
	6-25	45-66- 85	0-27- 50	4- 7- 10	1.40-1.65	4.23-14.11	0.14-0.22	0.0-2.9	0.5-2.0	.37	.37			
	25-65	45-66- 85	0-27- 50	4- 7- 10	1.70-2.00	0.42-4.23	0.12-0.17	0.0-2.9	0.0-0.5	.43	.43			
CgB—Colton gravelly loamy sand, 3 to 8 percent slopes														
Colton	0-3	20-26- 30	40-54- 65	0-20- 25	—	10.00-100.00	0.20-0.60	—	35.0-91.0			3	2	134
	3-5	70-81- 90	0-16- 30	1- 3- 5	1.10-1.40	42.34-141.14	0.03-0.07	0.0-2.9	2.0-6.0	.05	.10			
	5-23	70-81- 90	0-17- 30	0- 3- 5	1.25-1.55	42.34-141.14	0.02-0.05	0.0-2.9	0.4-6.7	.05	.15			
	23-65	85-88-10 0	0-11- 12	0- 2- 3	1.45-1.65	141.14-705.00	0.01-0.02	0.0-2.9	0.1-0.4	.02	.05			

Soil Features

This table gives estimates of various soil features. The estimates are used in land use planning that involves engineering considerations.

A *restrictive layer* is a nearly continuous layer that has one or more physical, chemical, or thermal properties that significantly impede the movement of water and air through the soil or that restrict roots or otherwise provide an unfavorable root environment. Examples are bedrock, cemented layers, dense layers, and frozen layers. The table indicates the hardness and thickness of the restrictive layer, both of which significantly affect the ease of excavation. *Depth to top* is the vertical distance from the soil surface to the upper boundary of the restrictive layer.

Subsidence is the settlement of organic soils or of saturated mineral soils of very low density. Subsidence generally results from either desiccation and shrinkage, or oxidation of organic material, or both, following drainage. Subsidence takes place gradually, usually over a period of several years. The table shows the expected initial subsidence, which usually is a result of drainage, and total subsidence, which results from a combination of factors.

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

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that corrodes or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel or concrete in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than the steel or concrete in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion also is expressed as *low*, *moderate*, or *high.* It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Report—Soil Features

Soil Features–Oxford County Area, Maine									
Map symbol and soil name	Restrictive Layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		Low-RV-High	*Range*		*Low-High*	*Low-High*			
		In	*In*		*In*	*In*			
AdA—Adams loamy sand, 0 to 3 percent slopes									
Adams		—	—		0	—	Low	Moderate	High
AdB—Adams loamy sand, 3 to 8 percent slopes									
Adams		—	—		0	—	Low	Moderate	High
AdC—Adams loamy sand, 8 to 15 percent slopes									
Adams		—	—		0	—	Low	Moderate	High
CeB—Colonel fine sandy loam, 3 to 8 percent slopes									
Colonel	Densic material	10-18-24	—	Noncemented	0	—	High	High	High
CfB—Colonel fine sandy loam, 3 to 8 percent slopes, very stony									
Colonel	Densic material	10-18-24	—	Noncemented	0	—	High	High	High

Report—Soil Features

Soil Features–Cumberland County and Part of Oxford County, Maine									
Map symbol and soil name	**Restrictive Layer**				**Subsidence**		**Potential for frost action**	**Risk of corrosion**	
	Kind	**Depth to top**	**Thickness**	**Hardness**	**Initial**	**Total**		**Uncoated steel**	**Concrete**
		Low-RV-High	*Range*		*Low-High*	*Low-High*			
		In	*In*		*In*	*In*			
AdB—Adams loamy sand, 3 to 8 percent slopes									
Adams		—	—		0	—	Low	Moderate	High
AdD—Adams loamy sand, 15 to 25 percent slopes									
Adams		—	—		0	—	Low	Moderate	High
AED—Adams loamy sand, moderately steep									
Adams		—	—		0	—	Low	Moderate	High
Bp—Brayton-Peacham complex, very stony									
Brayton	Densic material	12-24-25	—	Noncemented	0	—	High	High	High
Peacham	Densic material	12-13-24	—	Noncemented	0	—	High	High	High
CcB—Colonel fine sandy loam, 3 to 8 percent slopes									
Colonel	Densic material	10-17-24	—	Noncemented	0	—	High	High	High

Soil Features–Cumberland County and Part of Oxford County, Maine									
Map symbol and soil name	Restrictive Layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		Low-RV-High	*Range*		*Low-High*	*Low-High*			
CcC—Colonel fine sandy loam, 8 to 15 percent slopes									
Colonel	Densic material	10-17-24	—	Noncemented	0	—	High	High	High
CdB—Colonel fine sandy loam,3 to 8 percent slopes, very stony									
Colonel	Densic material	10-18-24	—	Noncemented	0	—	High	High	High
CdC—Colonel fine sandy loam, 8 to 15 percent slopes,very stony									
Colonel	Densic material	10-18-24	—	Noncemented	0	—	High	High	High
CFB—Colonel-Brayton assocation, gently sloping, very stony									
Colonel	Densic material	10-19-24	—	Noncemented	0	—	High	High	High
Brayton	Densic material	12-18-24	—	Noncemented	0	—	High	High	High
CgB—Colton gravelly loamy sand, 3 to 8 percent slopes									
Colton		—	—		0	—	Low	Moderate	High

Soil Features–Oxford County Area, Maine									
Map symbol and soil name	Restrictive Layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		Low-RV-High	*Range*		*Low-High*	*Low-High*			
CrB—Croghan loamy fine sand, 3 to 8 percent slopes									
Croghan		—	—		0	—	Moderate	High	High
HmD—Hermon sandy loam, 15 to 35 percent slopes, very stony									
Hermon		—	—		0	—	Low	Moderate	High
LtB—Lyman-Tunbridge complex, 0 to 8 percent slopes, very stony									
Lyman, very stony	Lithic bedrock	11-18-24	10-10	Indurated	0	0	Moderate	High	High
Tunbridge, very stony	Lithic bedrock	20-28-40	10-10	Indurated	0	0	Moderate	High	High
LtC—Lyman-Tunbridge complex, 8 to 15 percent slopes, very stony									
Lyman, very stony	Lithic bedrock	11-18-24	10-10	Indurated	0	0	Moderate	High	High
Tunbridge, very stony	Lithic bedrock	20-28-40	10-10	Indurated	0	0	Moderate	High	High
Nb—Naumburg loamy sand									
Naumburg		—	—		0	—	Moderate	High	High

Soil Features–Oxford County Area, Maine									
Map symbol and soil name	Restrictive Layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		Low-RV-High	*Range*		*Low-High*	*Low-High*			
Pg—Pits, gravel									
Pits		—	—		0	—	None		
Ro—Roundabout silt loam									
Roundabout		—	—		0	—	High	High	High
Ry—Rumney fine sandy loam, 0 to 3 percent slopes, frequently flooded									
Rumney		—	—		0	0	High	High	High
SkB—Skerry fine sandy loam, 3 to 8 percent slopes									
Skerry	Densic material	17-22-31	—	Noncemented	0	—	High	High	Moderate
SkC—Skerry fine sandy loam, 8 to 15 percent slopes									
Skerry	Densic material	17-22-31	—	Noncemented	0	—	High	High	Moderate
SnB—Skerry fine sandy loam, 3 to 8 percent slopes, very stony									
Skerry	Densic material	17-25-31	—	Noncemented	0	—	High	High	Moderate

Box Culvert Design

MaineDOT Highway Program

Brad Foley, Program Manager
Scott Bickford & Heath Cowan, Assistant Program Managers
Phone: 624-3480 Fax: 624-3481

Memorandum

STATE OF MAINE Kalia Breskin 8581 LICENSED PROFESSIONAL ENGINEER

To: Bob Carrell
Cc: Karen Gross
From: Kitty Breskin
Date: September 15, 2014
Subject: Box culverts, Bridgton-Fryeburg 19109

The Bridgton-Fryeburg project includes Douglas Bridge over Sawyer Brook at Station 521+50 and a large box culvert at Station 321+50. The bridge will be a 12-foot span x 10-foot rise four sided box, and the culvert at Station 321+50 will have a 6-foot span and a 4-foot rise. Both box structures will be designed as specified in Special Provision 534, Precast Structural Concrete, and bearing capacity calculations will be according to the latest LRFD Bridge Design Specification.

Borings were drilled for these structures on July 16, 2014, by MaineDOT. The boring at Station 321+53 was drilled using a solid stem auger and Standard Penetration Tests (SPT) at 5-foot intervals to a depth of 20-feet. The boring at Station 521+44 was drilled using a combination of cased wash boring and open hole drilling with SPT to a depth of 22-feet. Boring logs and laboratory test reports are attached to this memo.

The culvert subgrade for Douglas Bridge will be at elevation 424, a depth of 14-feet below ground surface (bgs). The boring at Station 521+44, 10 Right encountered damp, medium dense sand to a depth of 8 feet, underlain by loose sand to a depth of 11 feet and loose, silty sand with trace organics to a depth of 13.5 feet. Grey, wet very dense sand (Till) was encountered at culvert subgrade, and undercut with a stone mattress is recommended to ensure that any loose silty sand the might remain under the culvert is replaced with crushed stone to provide uniform support.

Culvert subgrade at Station 321+50 will be at elevation 385, a depth of 8-feet bgs. The boring at Station 321+53, 8.5 Right encountered loose, wet sand to a depth of 5.5-feet bgs and grey, wet, loose sand to a depth of 9.5 feet bgs. These loose soils were underlain by grey, wet, medium dense sands. Undercut with a stone mattress is recommended to ensure that loose soils are replaced with crushed stone to provide uniform support to the structure.

Toe walls at inlet and outlet will be needed to prevent the flow of water through the bedding material under these structures.

Service and Strength limit state bearing resistance was calculated for each structure. The Factored Bearing Resistance for the Douglas Bridge should not exceed 6 ksf for the Service Limit State or 7.4 ksf for the Strength Limit State. For the box culvert at Station

321+50, the Factored Bearing Resistance should not exceed 5 ksf for the Service Limit State or 2.2 ksf for the Strength Limit State.

Attachments:
Boring Logs
Grain Size Curves
Laboratory Test Results
Calculations

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Route 302
Location: Bridgton-Fryeburg, Maine

Boring No.: SB-BRID-201
WIN: 19109.00

Driller:	MaineDOT	**Elevation (ft.)**	437.6	**Auger ID/OD:**	5" Soild Stem
Operator:	Giles/Daggett/Giles	**Datum:**	NAVD88	**Sampler:**	Standard Split Spoon
Logged By:	B. Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	7/10/2014; 07:30-10:30	**Drilling Method:**	Cased Wash Boring	**Core Barrel:**	N/A
Boring Location:	521+43.8, 9.8 ft Rt.	**Casing ID/OD:**	NW	**Water Level*:**	11.0 ft bgs.
Hammer Efficiency Factor:	0.867	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test, PP = Pocket Penetrometer
MV = Unsuccessful Insitu Vane Shear Test attempt

R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR/C = weight of rods or casing
WO1P = Weight of one person

S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected

$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0							SSA	437.02		7" PAVEMENT.	
										0.58	
5	1D	24/13	5.00 - 7.00	8/8/7/8	15	22				Brown, damp, medium dense, fine to coarse SAND, some gravel, trace silt.	G#262294 A-3, SP-SM WC=6.2%
								429.60		8.00	
10	2D/A	24/18	10.00 - 12.00	3/4/4/10	8	12	10			2D (10.0-11.0 ft) Brown, moist, loose, fine to coarse SAND, little gravel, little silt.	
							14	426.60		11.00	
							92			2D/A (11.0-12.0 ft) Dark brown, loose, silty, fine to medium SAND, trace organics.	
							101	424.10		13.50	
15	3D	18/18	15.00 - 16.50	29/41/60	101	146	167 OPEN HOLE			Grey, wet, very dense, fine to coarse silty SAND, trace gravel (Till).	G#262295 A-4, SM WC=11.9%
20	4D	24/19	20.00 - 22.00	38/70/70/71	140	202				Similar to above.	G#262296 A-4, SM WC=9.8%
								415.60		22.00	
25										**Bottom of Exploration at 22.00 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.

Boring No.: SB-BRID-201

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Route 302
Location: Bridgton-Fryeburg, Maine

Boring No.: SB-BRID-202
WIN: 19109.00

Driller:	MaineDOT	**Elevation (ft.)**	391.5	**Auger ID/OD:**	5" Dia.
Operator:	Giles/Daggett/Giles	**Datum:**	NAVD88	**Sampler:**	Standard Split Spoon
Logged By:	B. Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	7/16/2014; 08:00-11:00	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	321+52.8, 8.5 ft Lt.	**Casing ID/OD:**	NW	**Water Level*:**	None Observed
Hammer Efficiency Factor:	0.867	**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	391.08		5" PAVEMENT.	
										0.42	
5	1D/A	24/14	5.00 - 7.00	2/3/5/5	8	12		386.00		1D (5.0-5.5 ft) Brown, wet, loose, fine to coarse SAND, some gravel.	
										5.50	
										1D/A (5.5-7.0 ft) Grey, wet, loose, fine to coarse SAND, some silt, trace gravel.	G#262297 A-2-4, SM WC=11.5%
10	2D	24/20	10.00 - 12.00	13/9/9/11	18	26		382.00		9.50	
										Grey, wet, medium dense, fine to coarse SAND, little gravel, little silt.	G#262298 A-2-4, SM WC=11.6%
15	3D	18/18	15.00 - 16.50	35/44/55	99	143				Similar to above, except moist, very dense.	
20								371.50		20.00	
										Bottom of Exploration at 20.00 feet below ground surface. NO REFUSAL, very dense.	
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.: SB-BRID-202

State of Maine - Department of Transportation

Laboratory Testing Summary Sheet

Town(s): Bridgton-Fryeburg Work Number: 19109.00

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
SB-BRID-201/1D	521+43.8	9.8 Rt.	5.0-7.0	262294	1	6.2			SP-SM	A-3	0
SB-BRID-201/3D	521+43.8	9.8 Rt.	15.0-16.5	262295	1	11.9			SM	A-4	III
SB-BRID-201/4D	521+43.8	9.8 Rt.	20.0-22.0	262296	1	9.8			SM	A-4	III
SB-BRID-202/1D/A	321+52.8	8.5 Lt.	5.5-7.0	262297	1	11.5			SM	A-2-4	II
SB-BRID-202/2D	321+52.8	8.5 Lt.	10.0-12.0	262298	1	11.6			SM	A-2-4	II

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

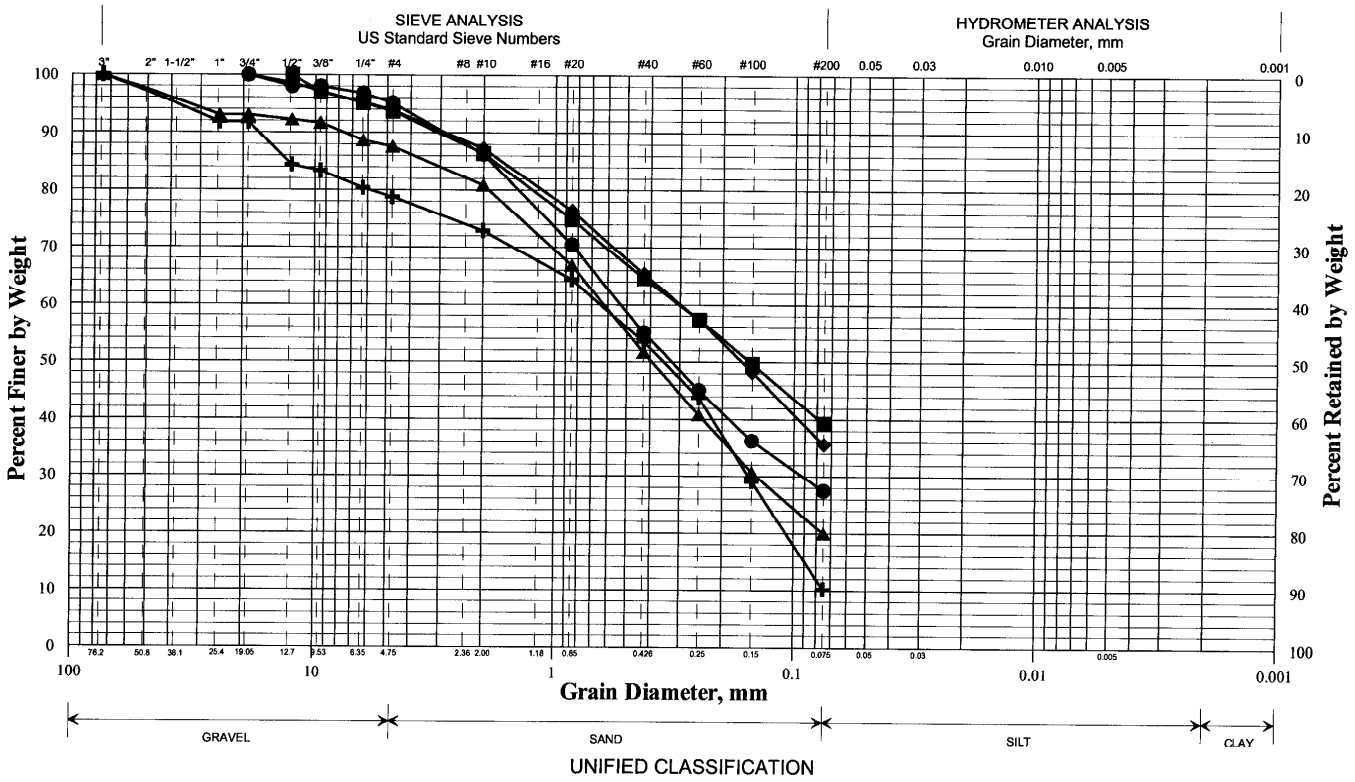
GSDC = Grain Size Distribution Curve as determined by AASHTO T 88-93 (1996) and/or ASTM D 422-63 (Reapproved 1998)

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

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

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

State of Maine Department of Transportation
GRAIN SIZE DISTRIBUTION CURVE



UNIFIED CLASSIFICATION

	Boring/Sample No.	Station	Offset, ft	Depth, ft	Description	W, %	LL	PL	PI
✚	SB-BRID-201/1D	521+43.8	9.8 RT	5.0-7.0	SAND, some gravel, trace silt.	6.2			
◆	SB-BRID-201/3D	521+43.8	9.8 RT	15.0-16.5	Silty SAND, trace gravel.	11.9			
■	SB-BRID-201/4D	521+43.8	9.5 RT	20.0-22.0	Silty SAND, trace gravel.	9.8			
●	SB-BRID-202/1D/A	321+52.8	8.5 LT	5.5-7.0	SAND, some silt, trace gravel.	11.5			
▲	SB-BRID-202/2D	321+52.8	8.5 LT	10.0-12.0	SAND, little silt, little gravel.	11.6			
✖									

WIN
019109.00
Town
Bridgton, Fryeburg
Reported by/Date
WHITE, TERRY A 7/25/2014

SHEET 1

12 Desert Rd, Freeport MaineDOT TESTING LABORATORIES 219 Hogan Rd, Bangor

MaineDOT

GEOTECHNICAL TEST REPORT
Central Laboratory

SAMPLE INFORMATION

Reference No.	Boring No./Sample No.	Sample Description	Sampled	Received
262294	SB-BRID-201/1D	GEOTECHNICAL (DISTURBED)	7/10/2014	7/23/2014

Sample Type: **GEOTECHNICAL** Location: **OTHER** Station: **521+43.8** Offset, ft: **9.8** **RT** Dbfg, ft: **5.0-7.0**

WIN/Town **019109.00 - BRIDGTON, FRYEBURG** Sampler: **WILDER, BRUCE H**

TEST RESULTS

Sieve Analysis (T 27, T 11)

Wash Method
Procedure A

SIEVE SIZE U.S. [SI]	% Passing
3 in. [75.0 mm]	100.0
1 in. [25.0 mm]	91.8
¾ in. [19.0 mm]	91.8
½ in. [12.5 mm]	84.4
⅜ in. [9.5 mm]	83.4
¼ in. [6.3 mm]	80.4
No. 4 [4.75 mm]	78.8
No. 10 [2.00 mm]	72.9
No. 20 [0.850 mm]	64.4
No. 40 [0.425 mm]	53.5
No. 60 [0.250 mm]	43.8
No. 100 [0.150 mm]	29.1
No. 200 [0.075 mm]	10.2

Miscellaneous Tests

Liquid Limit @ 25 blows (T 89), %	
Plastic Limit (T 90), %	
Plasticity Index (T 90), %	
Specific Gravity, Corrected to 20°C (T 100)	
Loss on Ignition (T 267)	
Loss, %	
H2O, %	
Water Content (T 265), %	6.2

Consolidation (T 216)

Trimmings, Water Content, %

	Initial	Final		Void Ratio	% Strain
Water Content, %			Pmin		
Dry Density, lbs/ft³			Pp		
Void Ratio			Pmax		
Saturation, %			Cc/C'c		

Vane Shear Test on Shelby Tubes (Maine DOT)

Depth taken in tube, ft	3 in. U. Shear tons/ft²	3 in. Remold tons/ft²	6 in. U. Shear tons/ft²	6 in. Remold tons/ft²	Water Content, %	Description of Material Sampled at the Various Tube Depths

Comments:

AUTHORIZATION AND DISTRIBUTION

Reported by: **FOGG, BRIAN** Date Reported: **7/24/2014**

Paper Copy: Lab File; Project File; Geotech File

12 Desert Rd, Freeport MaineDOT TESTING LABORATORIES 219 Hogan Rd, Bangor

MaineDOT

GEOTECHNICAL TEST REPORT
Central Laboratory

SAMPLE INFORMATION

Reference No.	Boring No./Sample No.	Sample Description	Sampled	Received
262295	SB-BRID-201/3D	GEOTECHNICAL (DISTURBED)	7/10/2014	7/23/2014

Sample Type: **GEOTECHNICAL** Location: **OTHER** Station: **521+43.8** Offset, ft: **9.8** **RT** Dbfg, ft: **15.0-16.5**

WIN/Town **019109.00 - BRIDGTON, FRYEBURG** Sampler: **WILDER, BRUCE H**

TEST RESULTS

Sieve Analysis (T 27, T 11)

Wash Method
Procedure A

SIEVE SIZE U.S. [SI]	% Passing
3 in. [75.0 mm]	
1 in. [25.0 mm]	
¾ in. [19.0 mm]	100.0
½ in. [12.5 mm]	98.6
⅜ in. [9.5 mm]	97.1
¼ in. [6.3 mm]	95.2
No. 4 [4.75 mm]	93.9
No. 10 [2.00 mm]	87.3
No. 20 [0.850 mm]	76.4
No. 40 [0.425 mm]	65.4
No. 60 [0.250 mm]	57.3
No. 100 [0.150 mm]	48.3
No. 200 [0.075 mm]	35.6

Miscellaneous Tests

Liquid Limit @ 25 blows (T 89), %	
Plastic Limit (T 90), %	
Plasticity Index (T 90), %	
Specific Gravity, Corrected to 20°C (T 100)	
Loss on Ignition (T 267)	
Loss, %	
H2O, %	
Water Content (T 265), %	11.9

Consolidation (T 216)

Trimmings, Water Content, %

	Initial	Final		Void Ratio	% Strain
Water Content, %			Pmin		
Dry Density, lbs/ft³			Pp		
Void Ratio			Pmax		
Saturation, %			Cc/C'c		

Vane Shear Test on Shelby Tubes (Maine DOT)

Depth taken in tube, ft	3 in. U. Shear tons/ft²	3 in. Remold tons/ft²	6 in. U. Shear tons/ft²	6 in. Remold tons/ft²	Water Content, %	Description of Material Sampled at the Various Tube Depths

Comments:

AUTHORIZATION AND DISTRIBUTION

Reported by: **FOGG, BRIAN** Date Reported: **7/24/2014**

Paper Copy: Lab File; Project File; Geotech File

12 Desert Rd, Freeport MaineDOT TESTING LABORATORIES 219 Hogan Rd, Bangor

MaineDOT

GEOTECHNICAL TEST REPORT
Central Laboratory

SAMPLE INFORMATION

Reference No.	Boring No./Sample No.	Sample Description	Sampled	Received
262296	SB-BRID-201/4D	GEOTECHNICAL (DISTURBED)	7/10/2014	7/23/2014

Sample Type: **GEOTECHNICAL** Location: **OTHER** Station: **521+43.8** Offset, ft: **9.5** **RT** Dbfg, ft: **20.0-22.0**

WIN/Town **019109.00 - BRIDGTON, FRYEBURG** Sampler: **WILDER, BRUCE H**

TEST RESULTS

Sieve Analysis (T 27, T 11)

Wash Method

Procedure A

SIEVE SIZE U.S. [SI]	% Passing
3 in. [75.0 mm]	
1 in. [25.0 mm]	
¾ in. [19.0 mm]	
½ in. [12.5 mm]	100.0
⅜ in. [9.5 mm]	97.0
¼ in. [6.3 mm]	95.1
No. 4 [4.75 mm]	93.7
No. 10 [2.00 mm]	86.4
No. 20 [0.850 mm]	74.9
No. 40 [0.425 mm]	64.6
No. 60 [0.250 mm]	57.4
No. 100 [0.150 mm]	49.7
No. 200 [0.075 mm]	39.3

Miscellaneous Tests

Liquid Limit @ 25 blows (T 89), %	
Plastic Limit (T 90), %	
Plasticity Index (T 90), %	
Specific Gravity, Corrected to 20°C (T 100)	
Loss on Ignition (T 267)	
Loss, %	
H2O, %	
Water Content (T 265), %	9.8

Consolidation (T 216)

Trimmings, Water Content, %

	Initial	Final		Void Ratio	% Strain
Water Content, %			Pmin		
Dry Density, lbs/ft³			Pp		
Void Ratio			Pmax		
Saturation, %			Cc/C'c		

Vane Shear Test on Shelby Tubes (Maine DOT)

Depth taken in tube, ft	3 In.		6 In.		Water Content, %	Description of Material Sampled at the Various Tube Depths
	U. Shear tons/ft²	Remold tons/ft²	U. Shear tons/ft²	Remold tons/ft²		

Comments:

AUTHORIZATION AND DISTRIBUTION

Reported by: **FOGG, BRIAN** Date Reported: **7/24/2014**

Paper Copy: Lab File; Project File; Geotech File

MaineDOT

GEOTECHNICAL TEST REPORT
Central Laboratory

SAMPLE INFORMATION

Reference No.	Boring No./Sample No.	Sample Description	Sampled	Received
262297	SB-BRID-202/1D/A	GEOTECHNICAL (DISTURBED)	7/10/2014	7/23/2014

Sample Type: **GEOTECHNICAL** Location: **OTHER** Station: **321+52.8** Offset, ft: **8.5** **LT** Dbfg, ft: **5.5-7.0**

WIN/Town **019109.00 - BRIDGTON, FRYEBURG** Sampler: **WILDER, BRUCE H**

TEST RESULTS

Sieve Analysis (T 27, T 11)

Wash Method

Procedure A

SIEVE SIZE U.S. [SI]	% Passing
3 in. [75.0 mm]	
1 in. [25.0 mm]	
¾ in. [19.0 mm]	100.0
½ in. [12.5 mm]	98.0
⅜ in. [9.5 mm]	98.0
¼ in. [6.3 mm]	96.8
No. 4 [4.75 mm]	95.1
No. 10 [2.00 mm]	86.3
No. 20 [0.850 mm]	70.5
No. 40 [0.425 mm]	55.1
No. 60 [0.250 mm]	45.1
No. 100 [0.150 mm]	36.2
No. 200 [0.075 mm]	27.5

Miscellaneous Tests

Liquid Limit @ 25 blows (T 89), %	
Plastic Limit (T 90), %	
Plasticity Index (T 90), %	
Specific Gravity, Corrected to 20°C (T 100)	
Loss on Ignition (T 267)	
Loss, %	
H2O, %	
Water Content (T 265), %	11.5

Consolidation (T 216)

Trimmings, Water Content, %

	Initial	Final		Void Ratio	% Strain
Water Content, %			Pmin		
Dry Density, lbs/ft³			Pp		
Void Ratio			Pmax		
Saturation, %			Cc/C'c		

Vane Shear Test on Shelby Tubes (Maine DOT)

Depth taken in tube, ft	3 In. U. Shear tons/ft²	3 In. Remold tons/ft²	6 In. U. Shear tons/ft²	6 In. Remold tons/ft²	Water Content, %	Description of Material Sampled at the Various Tube Depths

Comments:

AUTHORIZATION AND DISTRIBUTION

Reported by: **FOGG, BRIAN** Date Reported: **7/24/2014**

Paper Copy: Lab File; Project File; Geotech File

12 Desert Rd, Freeport MaineDOT TESTING LABORATORIES 219 Hogan Rd, Bangor

MaineDOT

GEOTECHNICAL TEST REPORT
Central Laboratory

SAMPLE INFORMATION

Reference No.	Boring No./Sample No.	Sample Description	Sampled	Received
262298	SB-BRID-202/2D	GEOTECHNICAL (DISTURBED)	7/10/2014	7/23/2014

Sample Type: **GEOTECHNICAL** Location: **OTHER** Station: **321+52.8** Offset, ft: **8.5** **LT** Dbfg, ft: **10.0-12.0**

WIN/Town **019109.00 - BRIDGTON, FRYEBURG** Sampler: **WILDER, BRUCE H**

TEST RESULTS

Sieve Analysis (T 27, T 11)

Wash Method
Procedure A

SIEVE SIZE U.S. [SI]	% Passing
3 in. [75.0 mm]	100.0
1 in. [25.0 mm]	93.0
¾ in. [19.0 mm]	93.0
½ in. [12.5 mm]	92.2
⅜ in. [9.5 mm]	91.7
¼ in. [6.3 mm]	88.7
No. 4 [4.75 mm]	87.6
No. 10 [2.00 mm]	80.9
No. 20 [0.850 mm]	66.9
No. 40 [0.425 mm]	51.6
No. 60 [0.250 mm]	40.8
No. 100 [0.150 mm]	30.7
No. 200 [0.075 mm]	20.0

Miscellaneous Tests

Liquid Limit @ 25 blows (T 89), %	
Plastic Limit (T 90), %	
Plasticity Index (T 90), %	
Specific Gravity, Corrected to 20°C (T 100)	
Loss on Ignition (T 267)	
Loss, %	
H2O, %	
Water Content (T 265), %	11.6

Consolidation (T 216)

Trimmings, Water Content, %

	Initial	Final		Void Ratio	% Strain
Water Content, %			Pmin		
Dry Density, lbs/ft³			Pp		
Void Ratio			Pmax		
Saturation, %			Cc/C'c		

Vane Shear Test on Shelby Tubes (Maine DOT)

Depth taken in tube, ft	3 In. U. Shear tons/ft²	3 In. Remold tons/ft²	6 In. U. Shear tons/ft²	6 In. Remold tons/ft²	Water Content, %	Description of Material Sampled at the Various Tube Depths

Comments:

AUTHORIZATION AND DISTRIBUTION

Reported by: **FOGG, BRIAN** Date Reported: **7/24/2014**

Paper Copy: Lab File; Project File; Geotech File

Headwall Active Earth Pressures - both structures, compacted fill:

Effective active earth pressure coefficient:

Rankine Theory - Active Earth Pressure from MaineDOT Bridge Design Guide Section 3.6.5.2, pg 3-7

$\beta := 0 \cdot deg$ slope angle of backfill soils from horizontal

$\phi_a := 30 \cdot deg$ assumed effective friction angle for medium dense gravelly sand

$$K_a := \tan\left(45 \cdot deg - \frac{\phi_a}{2}\right)^2 \qquad K_a = 0.33$$

$$K_p := \tan\left(45 \cdot deg + \frac{\phi_a}{2}\right)^2 \qquad K_p = 3$$

Station 521+50

Service Limit State Bearing Resistance - Very Dense Sand

Nominal and factored Bearing Resistance

Presumptive Bearing Resistance for Service Limit State ONLY

Reference: AASHTO LRFD Bridge Design Specifications 5th Edition
Table C10.6.2.6.1-1 Presumptive Bearing Resistances for Spread Footings at the Service Limit State Modified after US Department of Navy (1982)

Type of Bearing Material: Very dense silty sand at culvert subgrade - N >50

Bearing Resistance: Ordinary Range (ksf)
6 - 10 ksf for medium dense, coarse to medium sand

Recommended Value of Use: 6 ksf

Recommended Value: $6 \cdot ksf = 3 \cdot tsf$ $tsf := g \cdot \left(\frac{ton}{ft^2}\right)$

Note: This bearing resistance is settlement limited (1 inch) and applies only a the service limit state.

Characteristics of Native Soils at foundation level

Brown, very dense, gravelly f-c silty SAND, trace gravel.

$wc := 0.119$ water content

$e := 0.55$ estimated void ratio

$\gamma_w := 62.4pcf$ unit weight of water

$sp := 2.66$ estimated specific gravity

saturation $sat := \frac{(wc \cdot sp)}{e}$ $sat = 0.5755$

total unit weight

$$\gamma_t := \frac{(sp + sat \cdot e) \cdot \gamma_w}{(1 + e)} \qquad \gamma_t = 119.8 \cdot pcf$$

saturated unit weight

$$\gamma_{sat} := \frac{(sp + e) \cdot \gamma_w}{(1 + e)} \qquad \gamma_{sat} = 129 \cdot pcf$$

Strength Limit State Bearing Resistance - Native Granular Soils:

Nominal and factored Bearing Resistance for box culvert and wingwall base slab

Assumptions

1. Culvert will be embedded 2.0 feet below streambed

   $D_f := 2.0ft$

2. Assumed parameters based on granular fill

Moist unit weight	$\gamma_t = 119.8297 \cdot pcf$
Saturated unit weight	$\gamma_{sat} = 129.2284 \cdot pcf$
Angle of internal friction	$\phi_b := 34deg$
Undrained shear strength	$c := 0psf$
Depth to groundwater	$D_w := 0ft$

3. L > B, so use Terzaghi strip foundation equations

Terzaghi shape factors	$B := 12ft$
	$s_c := 1.0$
Meyerhof bearing capacity factors	$s_\gamma := 1.0$
	$N_c := 42.14$
	$N_q := 29.4$
	$N_\gamma := 31.1$

Effective stress at footing level

$$q_{eff} := D_w \cdot \gamma_t + (D_f - D_w) \cdot (\gamma_{sat} - \gamma_w)$$

$q_{eff} = 134 \cdot psf$

Nominal Bearing Resistance

$$q_{nom} := c \cdot N_c \cdot s_c + q_{eff} \cdot N_q + 0.5 \cdot (\gamma_{sat} - \gamma_w) \cdot B \cdot N_\gamma \cdot s_\gamma$$

$q_{nom} = 16.4 \cdot ksf$

Resistance Factor from LRFD Table 10.5.5.2.2-1, pg 10-32 $\Phi_b := 0.45$

$q_{factored} := q_{nom} \cdot \Phi_b$ $q_{factored} = 7.38 \cdot ksf$

Station 321+50

Service Limit State Bearing Resistance - Loose Sand, some silt

Nominal and factored Bearing Resistance

Presumptive Bearing Resistance for Service Limit State ONLY

Reference: AASHTO LRFD Bridge Design Specifications 5th Edition
Table C10.6.2.6.1-1 Presumptive Bearing Resistances for Spread Footings at the Service Limit State Modified after US Department of Navy (1982)

Type of Bearing Material: Medium Dense silty Sand at culvert subgrade

Bearing Resistance: Ordinary Range (ksf)
2-4 ksf for medium dense, coarse to medium sand

Recommended Value of Use: 4-8 ksf

Recommended Value: $5 \cdot ksf = 2.5 \cdot tsf$ $tsf := g \cdot \left(\frac{ton}{ft^2}\right)$

Note: This bearing resistance is settlement limited (1 inch) and applies only a the service limit state.

Characteristics of Native Soils at foundation level

Brown, very dense, gravelly f-c silty SAND, trace gravel.

$wc := 0.115$ water content

$e := 0.8$ estimated void ratio

$\gamma_w := 62.4pcf$ unit weight of water

$sp := 2.66$ estimated specific gravity

saturation $sat := \frac{(wc \cdot sp)}{e}$ $sat = 0.3824$

total unit weight $\gamma_t := \frac{(sp + sat \cdot e) \cdot \gamma_w}{(1 + e)}$ $\gamma_t = 102.8 \cdot pcf$

saturated unit weight $\gamma_{sat} := \frac{(sp + e) \cdot \gamma_w}{(1 + e)}$ $\gamma_{sat} = 120 \cdot pcf$

Strength Limit State Bearing Resistance - Native Granular Soils:

Nominal and factored Bearing Resistance for box culvert and wingwall base slab

Assumptions

1. Culvert will be embedded 2.0 feet below streambed

$D_f := 2.0ft$

2. Assumed parameters based on granular fill

Moist unit weight	$\gamma_t = 102.8179 \cdot pcf$
Saturated unit weight	$\gamma_{sat} = 119.9467 \cdot pcf$
Angle of internal friction	$\Phi_b := 30deg$
Undrained shear strength	$c := 0psf$
Depth to groundwater	$D_w := 0ft$

3. L > B, so use Terzaghi strip foundation equations

Terzaghi shape factors	$B := 6ft$
	$s_c := 1.0$
	$s_\gamma := 1.0$
Meyerhof bearing capacity factors	$N_c := 30.13$
	$N_q := 18.4$
	$N_\gamma := 15.7$

Effective stress at footing level

$$q_{eff} := D_w \cdot \gamma_t + (D_f - D_w) \cdot (\gamma_{sat} - \gamma_w)$$

$$q_{eff} = 115 \cdot psf$$

Nominal Bearing Resistance

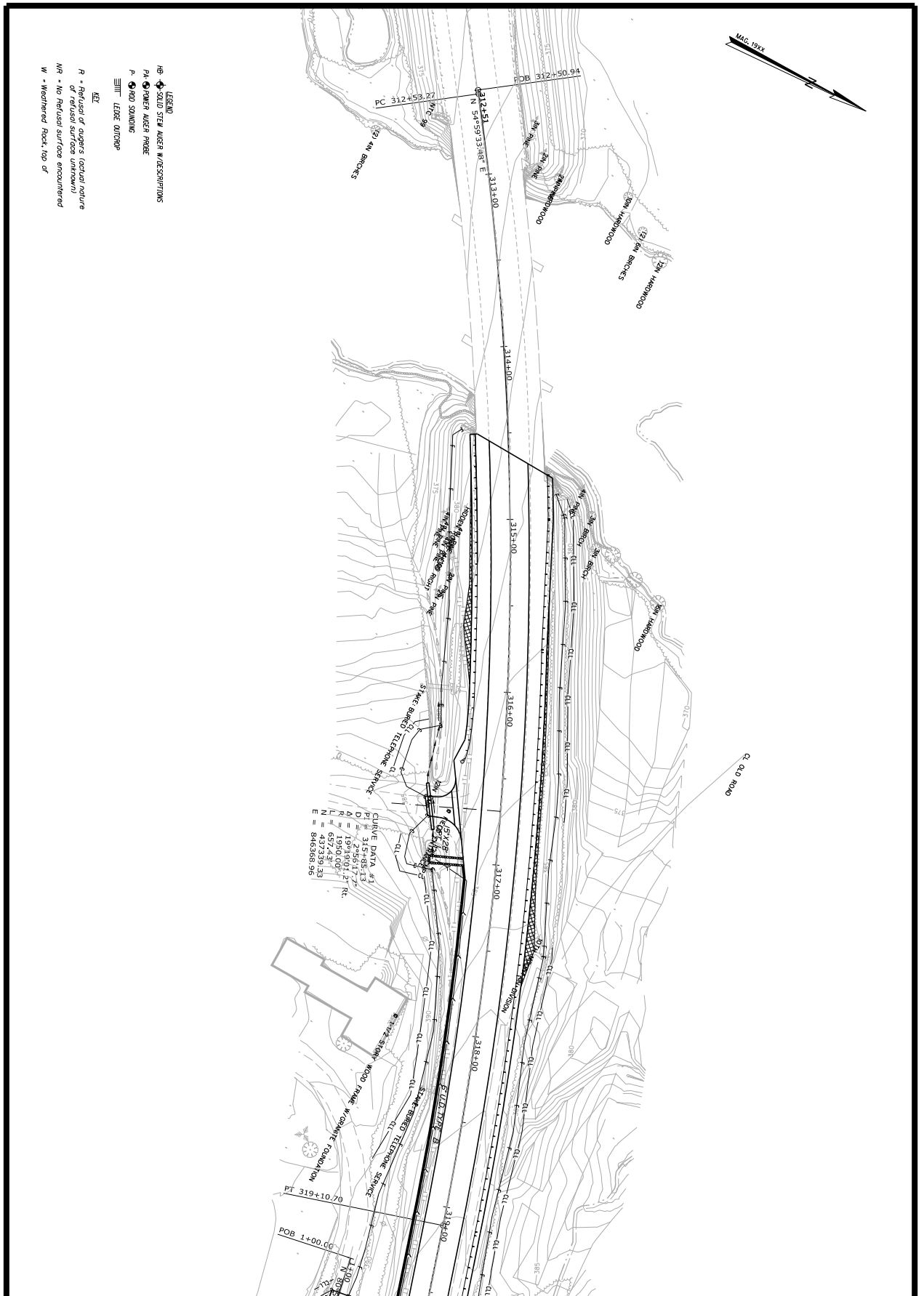
$$q_{nom} := c \cdot N_c \cdot s_c + q_{eff} \cdot N_q + 0.5 \cdot (\gamma_{sat} - \gamma_w) \cdot B \cdot N_\gamma \cdot s_\gamma$$

$$q_{nom} = 4.828 \cdot ksf$$

Resistance Factor from LRFD Table 10.5.5.2.2-1, pg 10-32 $\Phi_b := 0.45$

$q_{factored} := q_{nom} \cdot \Phi_b$ $q_{factored} = 2.173 \cdot ksf$

GEOPLANS



PROJ. MANAGER		BY	DATE
DESIGN-DETAILED	K.GROSS	T.WHITE	AUG 2011
CHECKED-REVIEWED	-----	-----	-----
DESIGN2-DETAILED2			
DESIGN3-DETAILED3			
REVISIONS 1			
REVISIONS 2			
REVISIONS 3			
REVISIONS 4			
FIELD CHANGES			

SIGNATURE

P.E. NUMBER

DATE

BRIDGTON - FRYEBURG
ROUTE 302

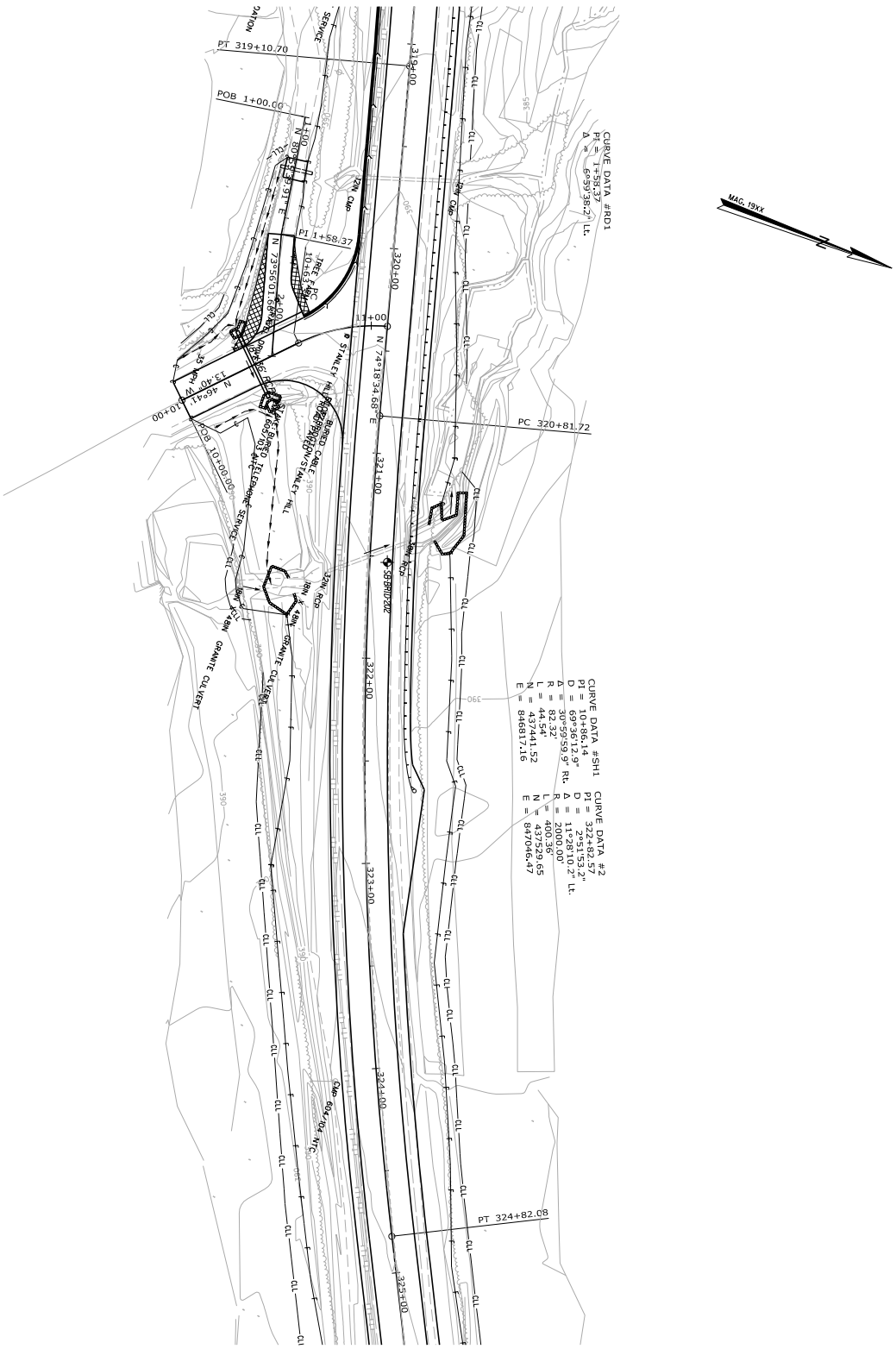
GEOPLANS

SHEET NUMBER 1 OF 43

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

NH-1910(900)E

PIN 19109.00 HIGHWAY PLANS



PROJ. MANAGER		BY	DATE
DESIGN-DETAILED	K.GROSS	T.WHITE	AUG 2011
CHECKED-REVIEWED	-----	-----	-----
DESIGN2-DETAILED2	------	------	------
DESIGN3-DETAILED3	------	------	------
REVISIONS 1	------		------
REVISIONS 2	------		------
REVISIONS 3	------		------
REVISIONS 4	------		------
FIELD CHANGES	------		------

SIGNATURE

P.E. NUMBER

DATE

BRIDGTON - FRYEBURG
ROUTE 302

GEOPLANS

SHEET NUMBER 2 OF 43

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

NH-1910(900)E

PIN
19109.00

HIGHWAY PLANS

SHEET NUMBER 3 OF 43	BRIDGTON - FRYEBURG ROUTE 302	PROJ. MANAGER _____	BY / DATE
		DESIGN-DETAILED	K.GROSS / T.WHITE / AUG 2011
		CHECKED-REVIEWED	_____ / _____ / _____
		DESIGN2-DETAILED2	_____ / _____ / _____
		DESIGN3-DETAILED3	_____ / _____ / _____
		REVISIONS 1	_____ / _____ / _____
		REVISIONS 2	_____ / _____ / _____
		REVISIONS 3	_____ / _____ / _____
		REVISIONS 4	_____ / _____ / _____
		FIELD CHANGES	_____ / _____ / _____
	GEOPLANS	SIGNATURE P.E. NUMBER DATE	STATE OF MAINE DEPARTMENT OF TRANSPORTATION **NH-1910(900)E** **PIN 19109.00** HIGHWAY PLANS

PROJ. MANAGER		BY	DATE
DESIGN-DETAILED	K.GROSS	T.WHITE	AUG 2011
CHECKED-REVIEWED			
DESIGN2-DETAILED2			
DESIGN3-DETAILED3			
REVISIONS 1			
REVISIONS 2			
REVISIONS 3			
REVISIONS 4			
FIELD CHANGES			

SIGNATURE

P.E. NUMBER

DATE

BRIDGTON - FRYEBURG
ROUTE 302

GEOPLANS

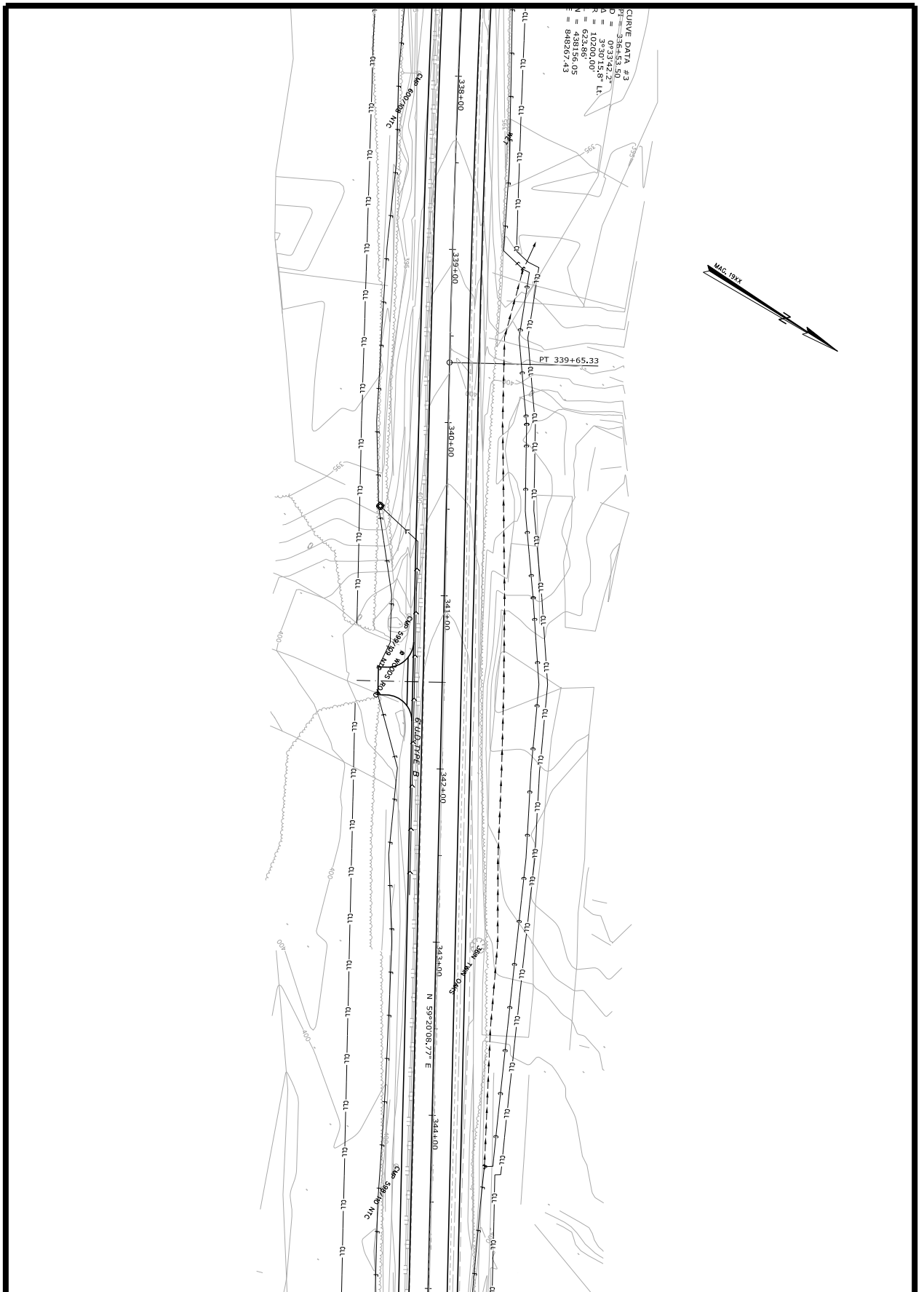
SHEET NUMBER 4 OF 43

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

NH-1910(900)E

PIN 19109.00

HIGHWAY PLANS



BRIDGTON - FRYEBURG
ROUTE 302

GEOPLANS

PROJ. MANAGER		BY	DATE
DESIGN-DETAILED	K.GROSS	T.WHITE	AUG 2011
CHECKED-REVIEWED	-----	-----	-----
DESIGN2-DETAILED2	-----	-----	-----
DESIGN3-DETAILED3	-----	-----	-----
REVISIONS 1	-----		-----
REVISIONS 2	-----		-----
REVISIONS 3	-----		-----
REVISIONS 4	-----		-----
FIELD CHANGES	-----		-----

SIGNATURE

P.E. NUMBER

DATE

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

NH-1910(900)E

PIN
19109.00 HIGHWAY PLANS

SHEET NUMBER **5** OF 43

Filename: ...\GEOTECH\MSTA\006_Geoplan6.dgn Division: HIGHWAY Username: karen.gross Date:2/27/2015

SHEET NUMBER 6 OF 43

BRIDGTON - FRYEBURG
ROUTE 302

GEOPLANS

PROJ. MANAGER		BY	DATE
DESIGN-DETAILED	K.GROSS	T.WHITE	AUG 2011
CHECKED-REVIEWED	-----	-----	-----
DESIGN2-DETAILED2	-----	-----	-----
DESIGN3-DETAILED3	-----	-----	-----
REVISIONS 1	-----		-----
REVISIONS 2	-----		-----
REVISIONS 3	-----		-----
REVISIONS 4	-----		-----
FIELD CHANGES	-----		-----

SIGNATURE

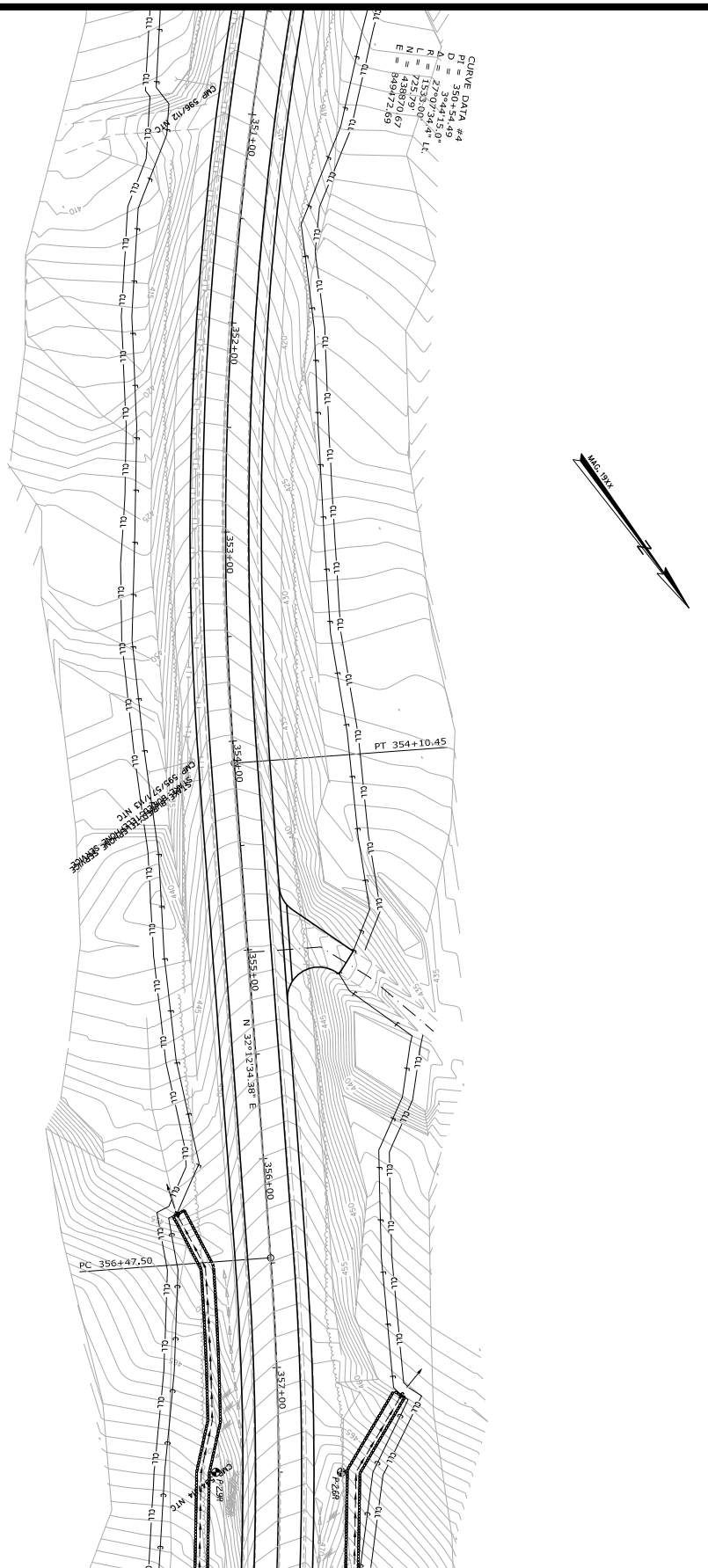
P.E. NUMBER

DATE

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

NH-1910(900)E

PIN
19109.00 HIGHWAY PLANS



PROJ. MANAGER		BY	DATE
DESIGN-DETAILED	K.GROSS	T.WHITE	AUG 2011
CHECKED-REVIEWED	-----	-----	-----
DESIGN2-DETAILED2	------	------	------
DESIGN3-DETAILED3	------	------	------
REVISIONS 1	------		------
REVISIONS 2	------		------
REVISIONS 3	------		------
REVISIONS 4	------		------
FIELD CHANGES	------		------

SIGNATURE

P.E. NUMBER

DATE

SHEET NUMBER 2 OF 43

BRIDGTON - FRYEBURG
ROUTE 302

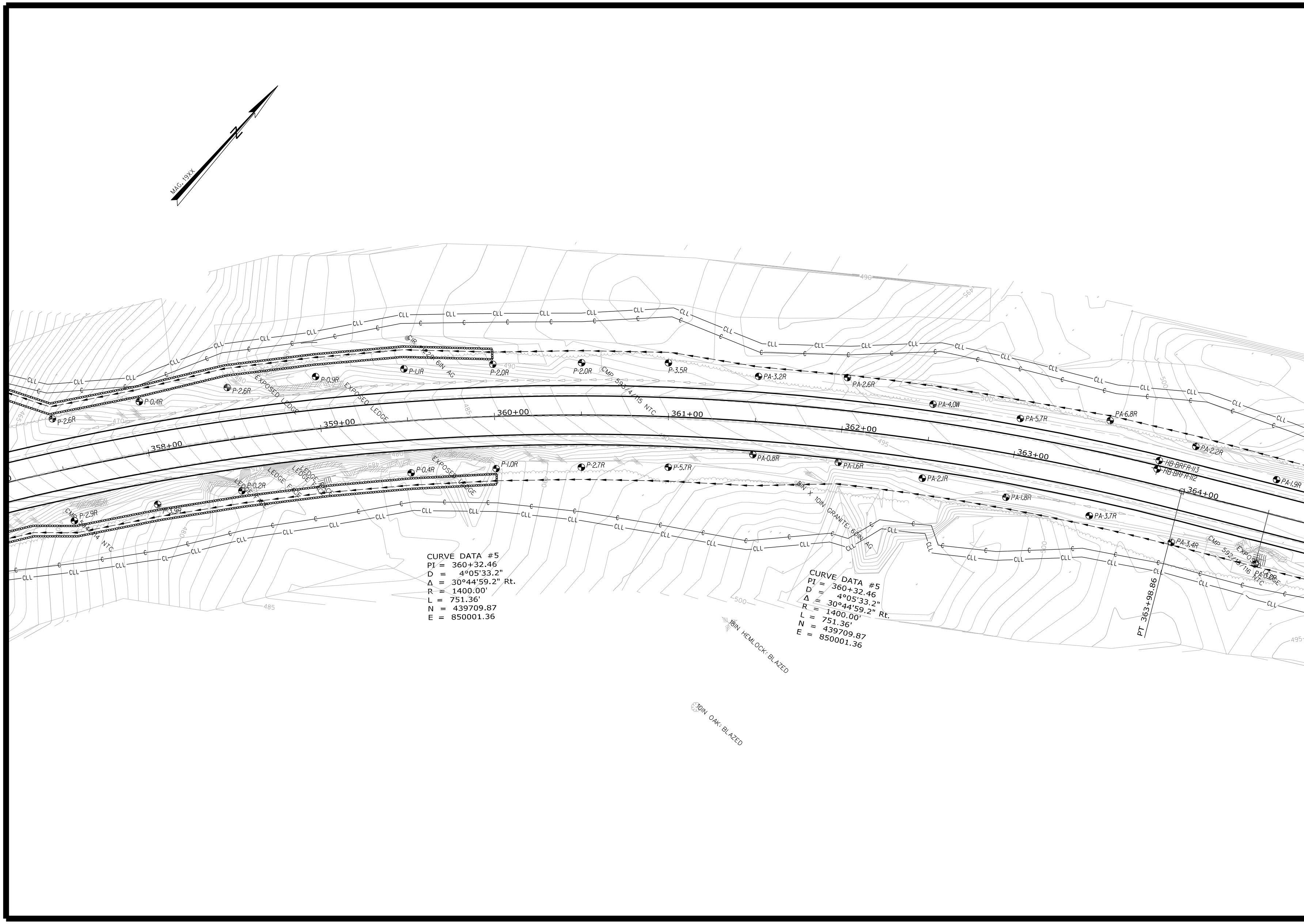
GEOPLANS

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

NH-1910(900)E

PIN
19109.00 HIGHWAY PLANS

Filename: ...\GEOTECH\MSTA\008_Geoplan8.dgn Division: HIGHWAY Username: karen.gross Date:2/27/2015



STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

NH-1910(900)E

PIN
19109.00

HIGHWAY PLANS

	BY	DATE
PROJ. MANAGER		
DESIGN-DETAILED	K.GROSS	AUG. 2011
CHECKED-REVIEWED	T.WHITE	
DESIGN2-DETAILED2		
DESIGN3-DETAILED3		
REVISIONS 1		
REVISIONS 2		
REVISIONS 3		
REVISIONS 4		
FIELD CHANGES		

SIGNATURE

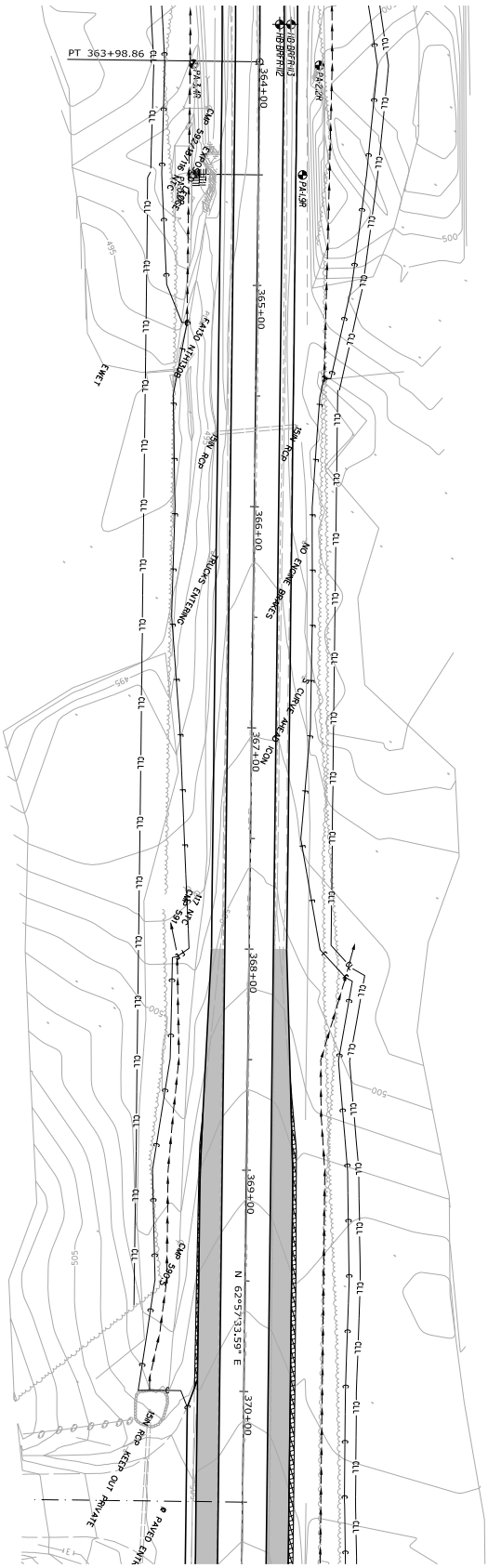
P.E. NUMBER

DATE

BRIDGTON - FRYEBURG
ROUTE 302

GEOPLANS

SHEET NUMBER
8
OF 43



PROJ. MANAGER		BY	DATE
DESIGN-DETAILED	K.GROSS	T.WHITE	AUG 2011
CHECKED-REVIEWED			
DESIGN2-DETAILED2			
DESIGN3-DETAILED3			
REVISIONS 1			
REVISIONS 2			
REVISIONS 3			
REVISIONS 4			
FIELD CHANGES			

SIGNATURE

P.E. NUMBER

DATE

BRIDGTON - FRYEBURG
ROUTE 302

GEOPLANS

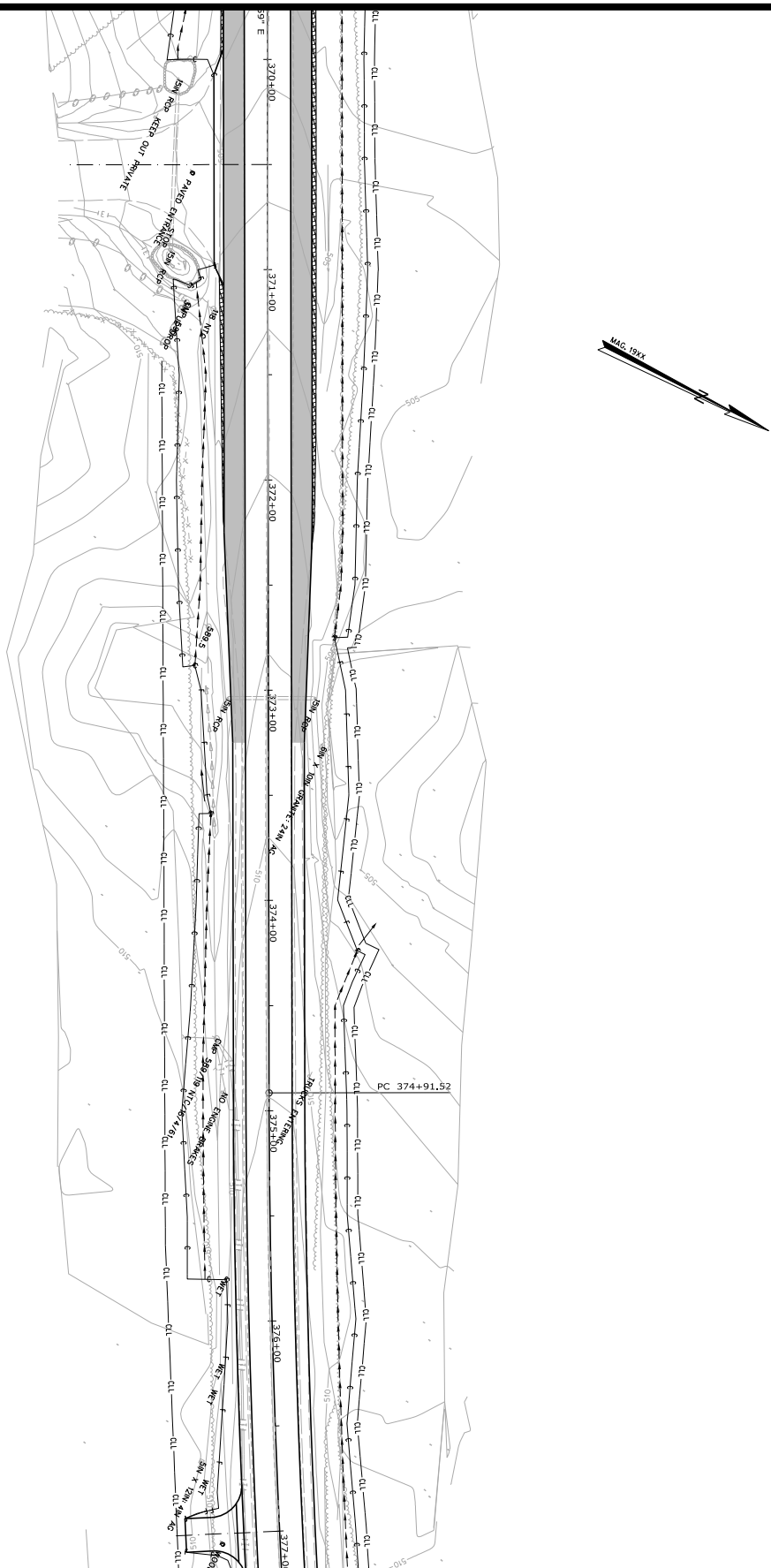
SHEET NUMBER 6 OF 43

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

NH-1910(900)E

PIN
19109.00 HIGHWAY PLANS

Filename: ...\GEOTECH\MSTA\010_Geoplan10.dgn Division: HIGHWAY Username: karen.gross Date:2/27/2015



BRIDGTON - FRYEBURG
ROUTE 302

GEOPLANS

PROJ. MANAGER		BY	DATE
DESIGN-DETAILED	K.GROSS	T.WHITE	AUG 2011
CHECKED-REVIEWED	-----	-----	-----
DESIGN2-DETAILED2	------	------	------
DESIGN3-DETAILED3	------	------	------
REVISIONS 1	------		------
REVISIONS 2	------		------
REVISIONS 3	------		------
REVISIONS 4	------		------
FIELD CHANGES			

SIGNATURE

P.E. NUMBER

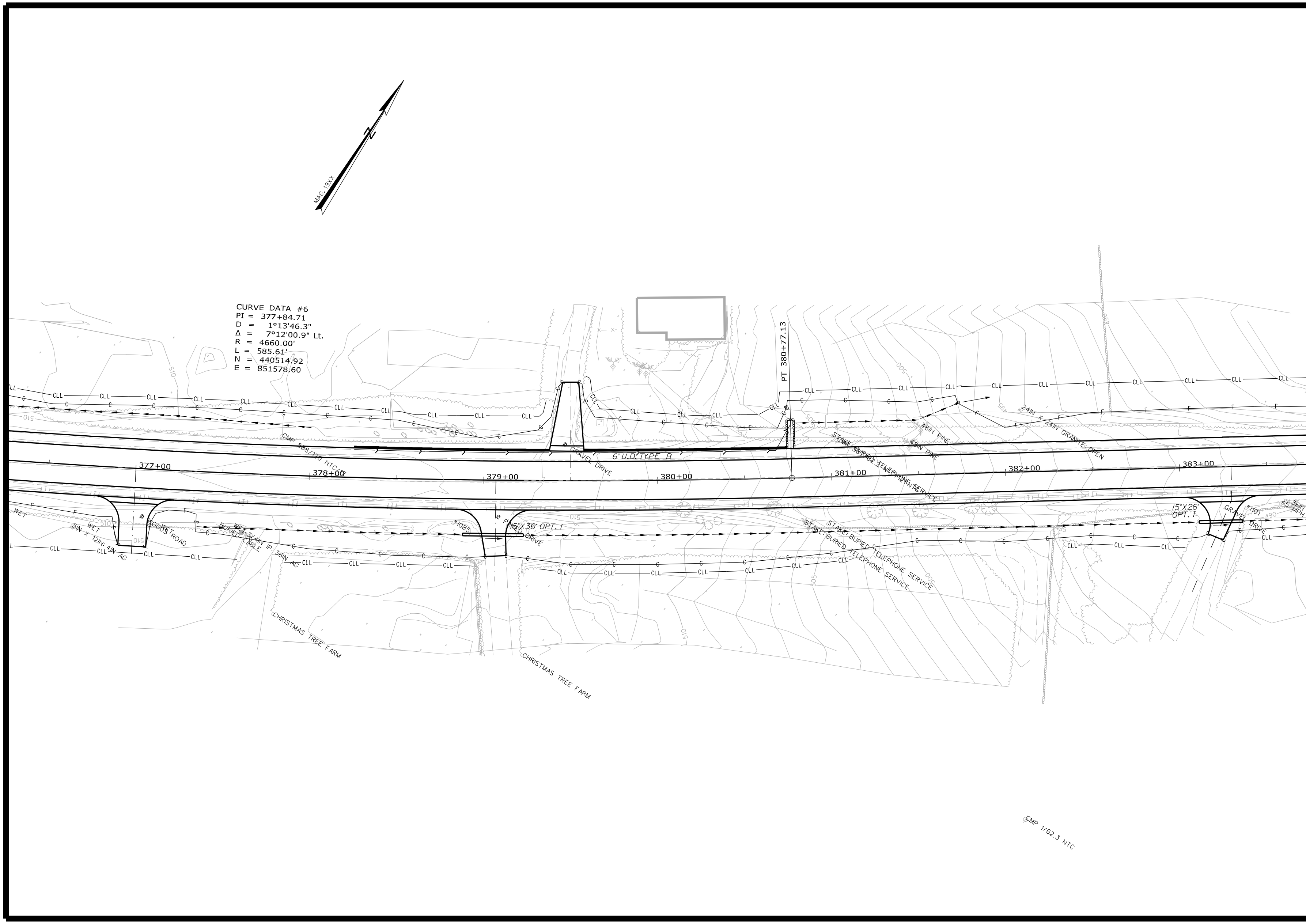
DATE

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

NH-1910(900)E

PIN
19109.00 HIGHWAY PLANS

SHEET NUMBER **10** OF 43



STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

NH-1910(900)E

PIN 19109.00

HIGHWAY PLANS

	BY	DATE
PROJ. MANAGER		
DESIGN-DETAILED	K.GROSS	
CHECKED-REVIEWED	T.WHITE	AUG 2011
DESIGN2-DETAILED2		
DESIGN3-DETAILED3		
REVISIONS 1		
REVISIONS 2		
REVISIONS 3		
REVISIONS 4		
FIELD CHANGES		

SIGNATURE

P.E. NUMBER

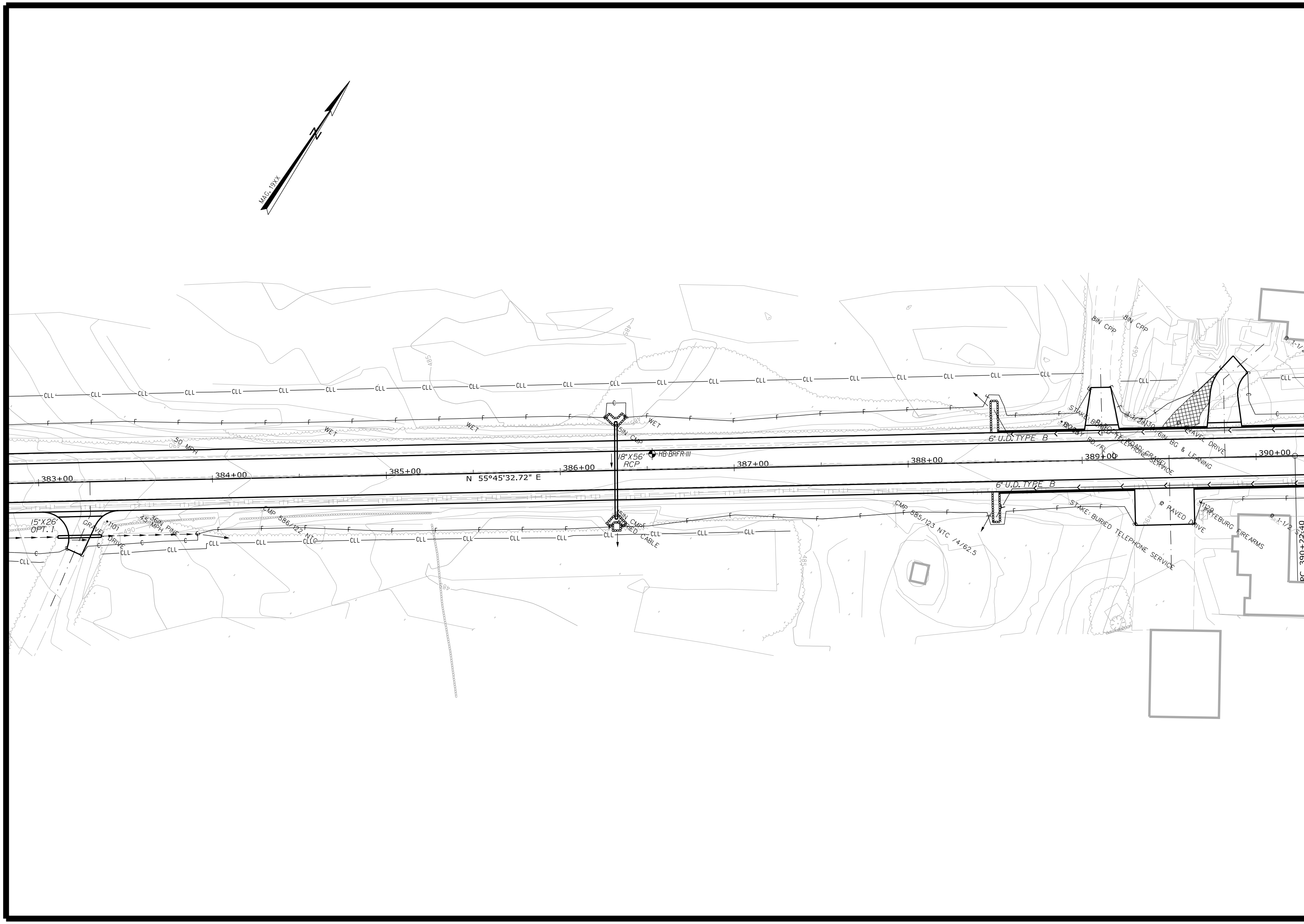
DATE

BRIDGTON - FRYEBURG
ROUTE 302

GEOPLANS

SHEET NUMBER
11
OF 43

Filename: ...\GEOTECH\MSTA\011_Geoplan11.dgn   Division: HIGHWAY   Username: karen.gross   Date:2/27/2015



STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

NH-1910(900)E

PIN
19109.00

HIGHWAY PLANS

	BY	DATE
PROJ. MANAGER		
DESIGN-DETAILED	K.GROSS	AUG 2011
CHECKED-REVIEWED	T.WHITE	
DESIGN2-DETAILED2		
DESIGN3-DETAILED3		
REVISIONS 1		
REVISIONS 2		
REVISIONS 3		
REVISIONS 4		
FIELD CHANGES		

SIGNATURE

P.E. NUMBER

DATE

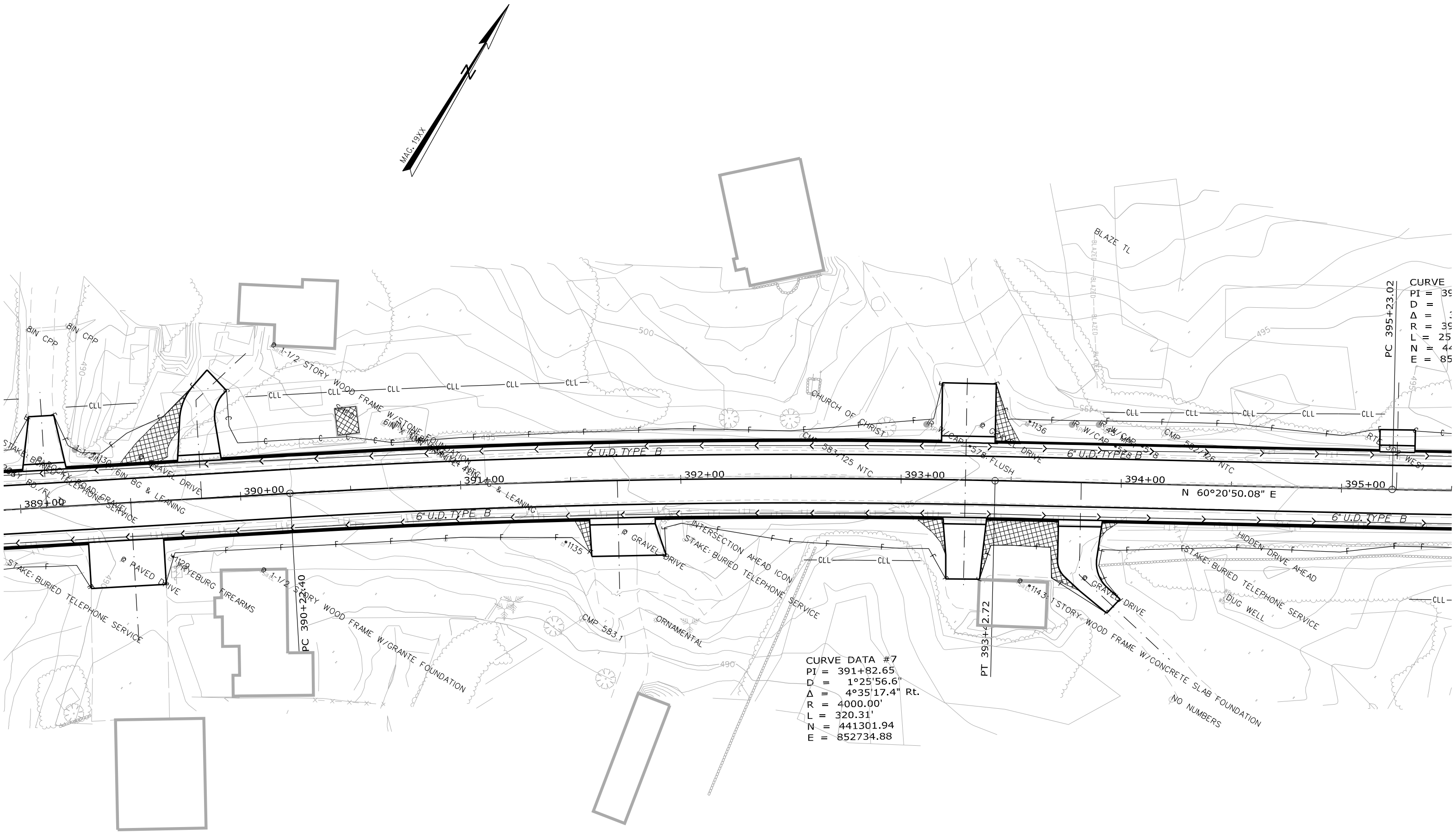
BRIDGTON - FRYEBURG
ROUTE 302

GEOPLANS

SHEET NUMBER
12
OF 43

Filename: ...\GEOTECH\MSTA\012_Geoplan12.dgn Division: HIGHWAY Username: karen.gross Date:2/27/2015

Filename: ...\GEOTECH\MSTA\013_Geoplan13.dgn   Division: HIGHWAY   Username: karen.gross   Date:2/27/2015



STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

NH-1910(900)E

PIN 19109.00

HIGHWAY PLANS

	BY	DATE
PROJ. MANAGER		
DESIGN-DETAILED	K.GROSS	AUG. 2011
CHECKED-REVIEWED	T.WHITE	
DESIGN2-DETAILED2		
DESIGN3-DETAILED3		
REVISIONS 1		
REVISIONS 2		
REVISIONS 3		
REVISIONS 4		
FIELD CHANGES		

SIGNATURE

P.E. NUMBER

DATE

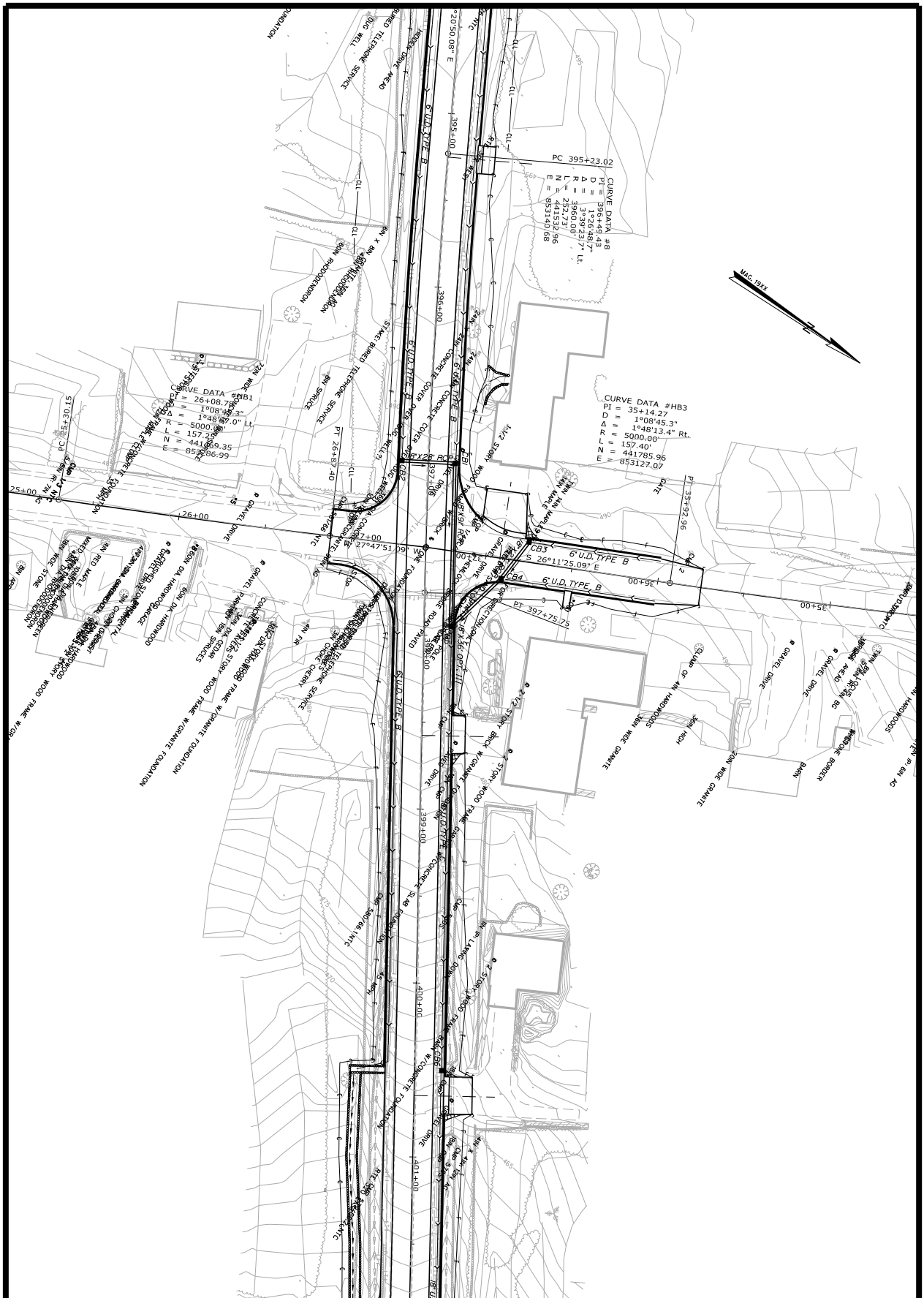
BRIDGTON - FRYEBURG
ROUTE 302

GEOPLANS

SHEET NUMBER

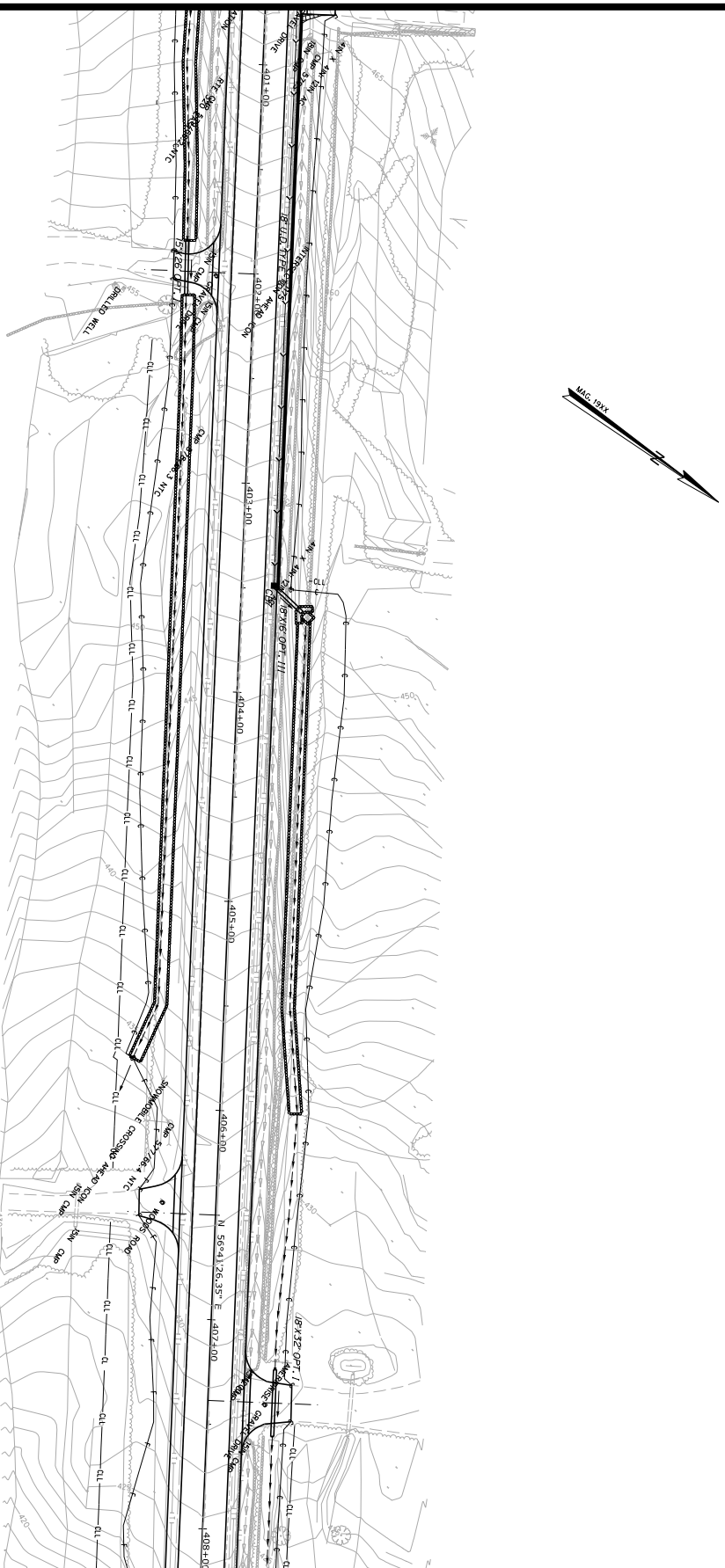
13

OF 43



SHEET NUMBER 14 OF 43	BRIDGTON - FRYEBURG ROUTE 302 **GEOPLANS**	PROJ. MANAGER _____	STATE OF MAINE DEPARTMENT OF TRANSPORTATION
		DESIGN-DETAILED K.GROSS T.WHITE AUG 2011	**NH-1910(900)E**
		CHECKED-REVIEWED _____ _____ _____ SIGNATURE	
		DESIGN2-DETAILED2 _____ _____ _____	
		DESIGN3-DETAILED3 _____ _____ _____ P.E. NUMBER	
		REVISIONS 1 _____ _____ DATE	**PIN 19109.00** HIGHWAY PLANS
		REVISIONS 2 _____ _____ _____	
		REVISIONS 3 _____ _____ _____	
		REVISIONS 4 _____ _____ _____	
		FIELD CHANGES _____ _____ _____	

Filename: ...\GEOTECH\MSTA\015_Geoplan15.dgn Division: HIGHWAY Username: karen.gross Date:2/27/2015



PROJ. MANAGER		BY	DATE
DESIGN-DETAILED	K.GROSS	T.WHITE	AUG 2011
CHECKED-REVIEWED			
DESIGN2-DETAILED2			
DESIGN3-DETAILED3			
REVISIONS 1			
REVISIONS 2			
REVISIONS 3			
REVISIONS 4			
FIELD CHANGES			

SIGNATURE

P.E. NUMBER

DATE

SHEET NUMBER 15 OF 43

BRIDGTON - FRYEBURG
ROUTE 302

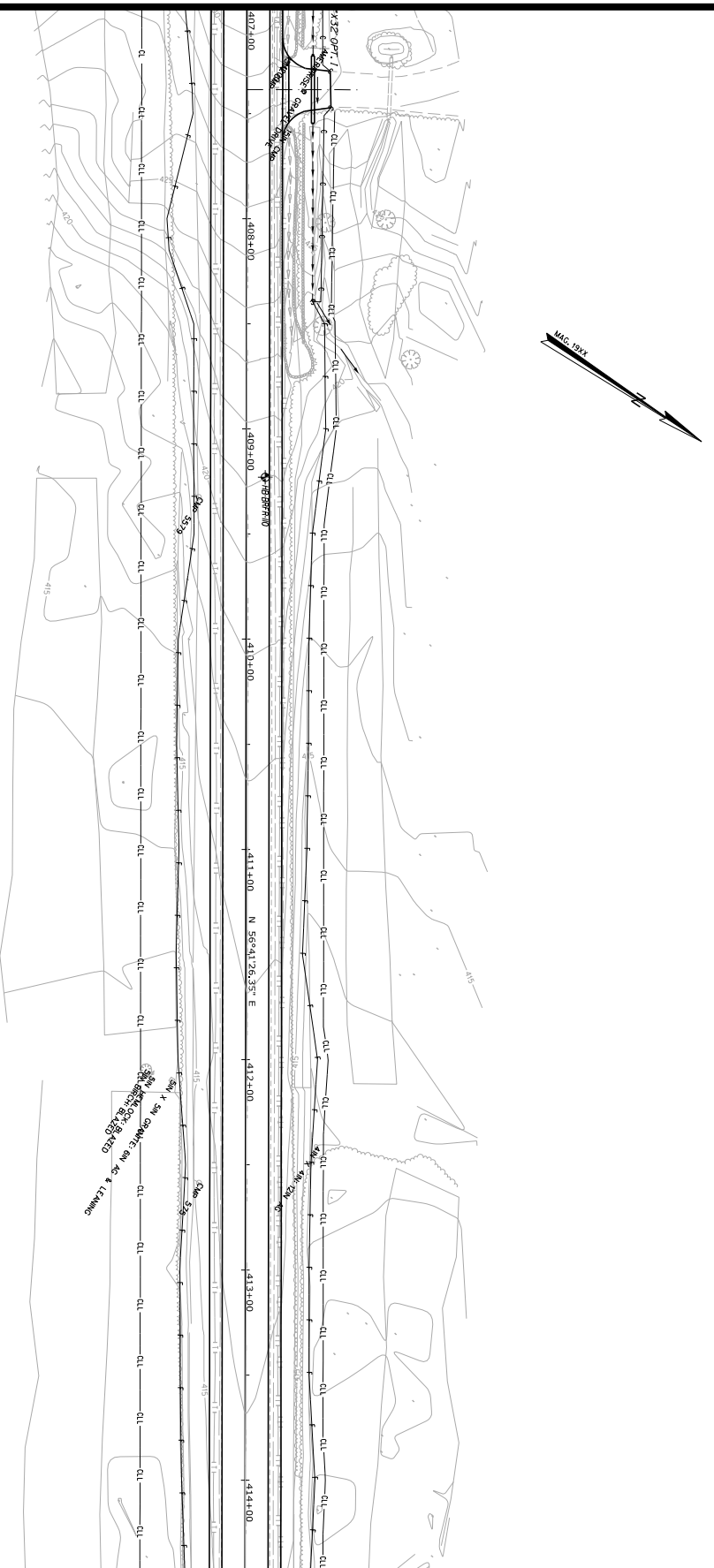
GEOPLANS

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

NH-1910(900)E

PIN
19109.00 HIGHWAY PLANS

Filename: ...\GEOTECH\MSTA\016_Geoplan16.dgn Division: HIGHWAY Username: karen.gross Date:2/27/2015



PROJ. MANAGER		BY	DATE
DESIGN-DETAILED	K.GROSS	T.WHITE	AUG 2011
CHECKED-REVIEWED			
DESIGN2-DETAILED2			
DESIGN3-DETAILED3			
REVISIONS 1			
REVISIONS 2			
REVISIONS 3			
REVISIONS 4			
FIELD CHANGES			

SIGNATURE

P.E. NUMBER

DATE

SHEET NUMBER 16 OF 43

BRIDGTON - FRYEBURG
ROUTE 302

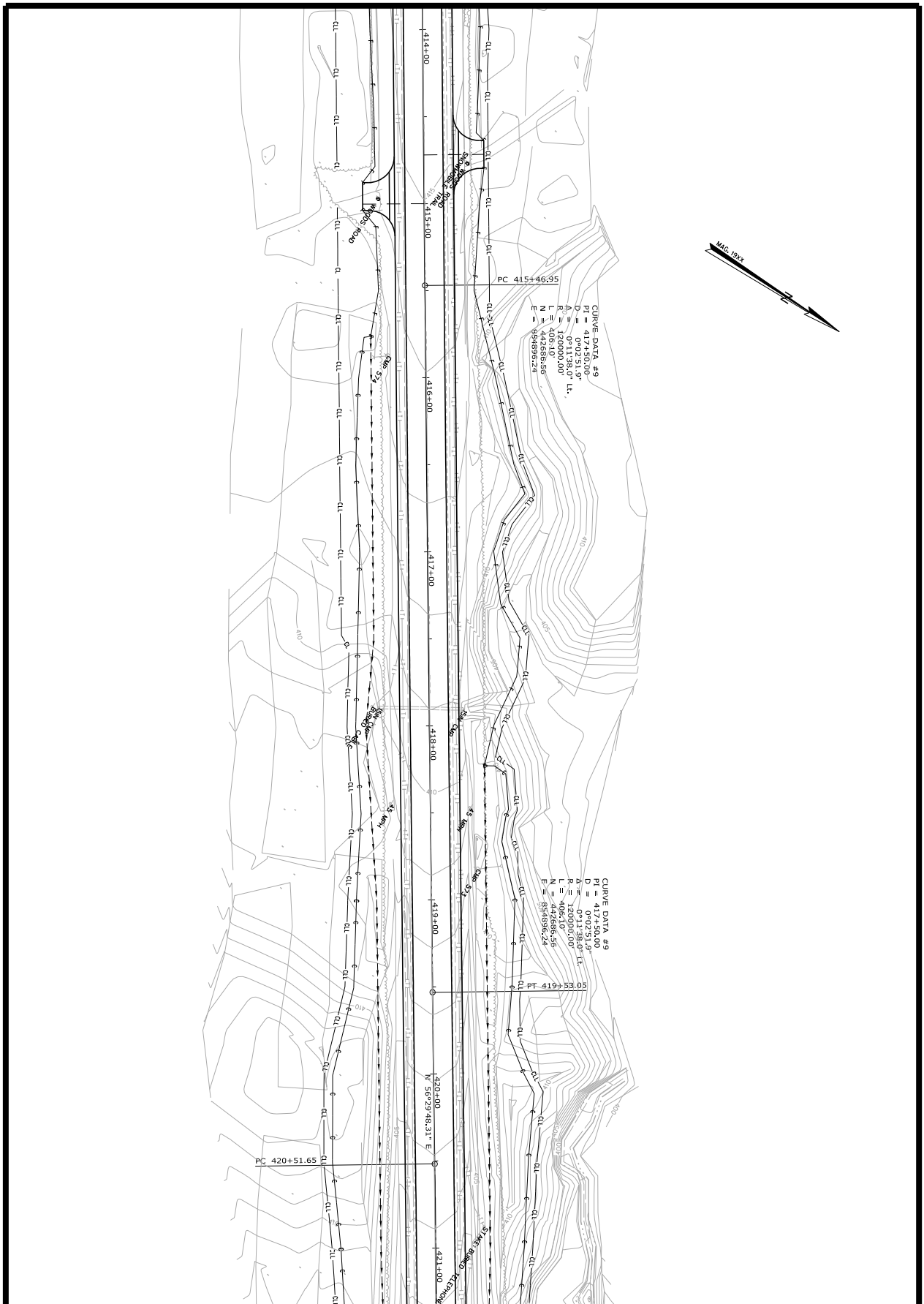
GEOPLANS

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

NH-1910(900)E

PIN
19109.00 HIGHWAY PLANS

Filename: ...\GEOTECH\MSTA\017_Geoplan17.dgn Division: HIGHWAY Username: karen.gross Date:2/27/2015



PROJ. MANAGER		BY	DATE
DESIGN-DETAILED	K.GROSS	T.WHITE	AUG 2011
CHECKED-REVIEWED	-----	-----	-----
DESIGN2-DETAILED2	------	------	------
DESIGN3-DETAILED3	------	------	------
REVISIONS 1	------		------
REVISIONS 2	------		------
REVISIONS 3	------		------
REVISIONS 4	------		------
FIELD CHANGES	------		------

SIGNATURE

P.E. NUMBER

DATE

BRIDGTON - FRYEBURG
ROUTE 302

GEOPLANS

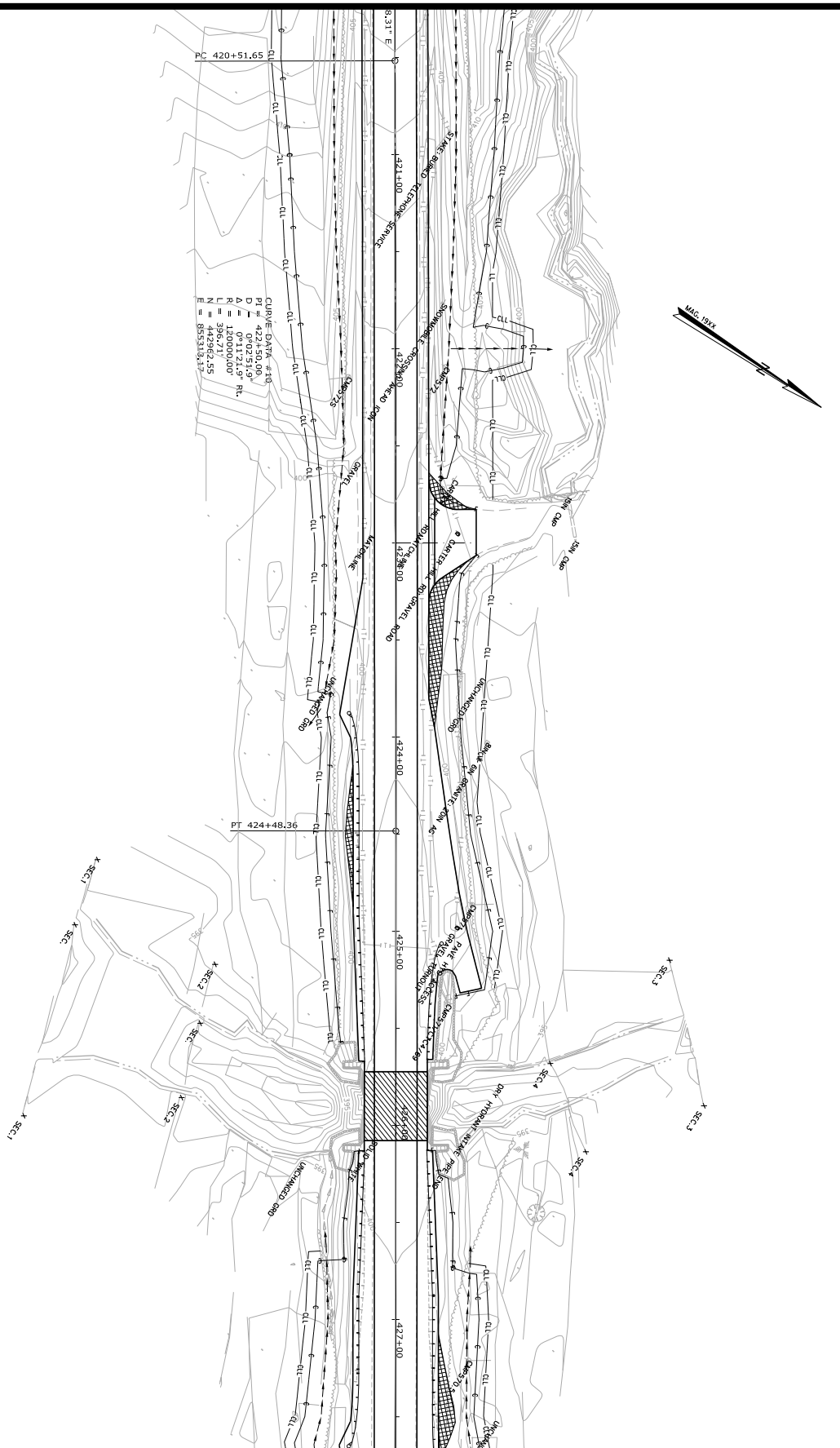
SHEET NUMBER 17 OF 43

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

NH-1910(900)E

PIN
19109.00

HIGHWAY PLANS



SHEET NUMBER 18 OF 43	BRIDGTON - FRYEBURG ROUTE 302 **GEOPLANS**	PROJ. MANAGER _____	BY / DATE
		DESIGN-DETAILED	K.GROSS / AUG 2011
		CHECKED-REVIEWED	_____ / _____
		DESIGN2-DETAILED2	_____ / _____
		DESIGN3-DETAILED3	_____ / _____
		REVISIONS 1	_____ / _____
		REVISIONS 2	_____ / _____
		REVISIONS 3	_____ / _____
		REVISIONS 4	_____ / _____
		FIELD CHANGES	_____ / _____

SIGNATURE

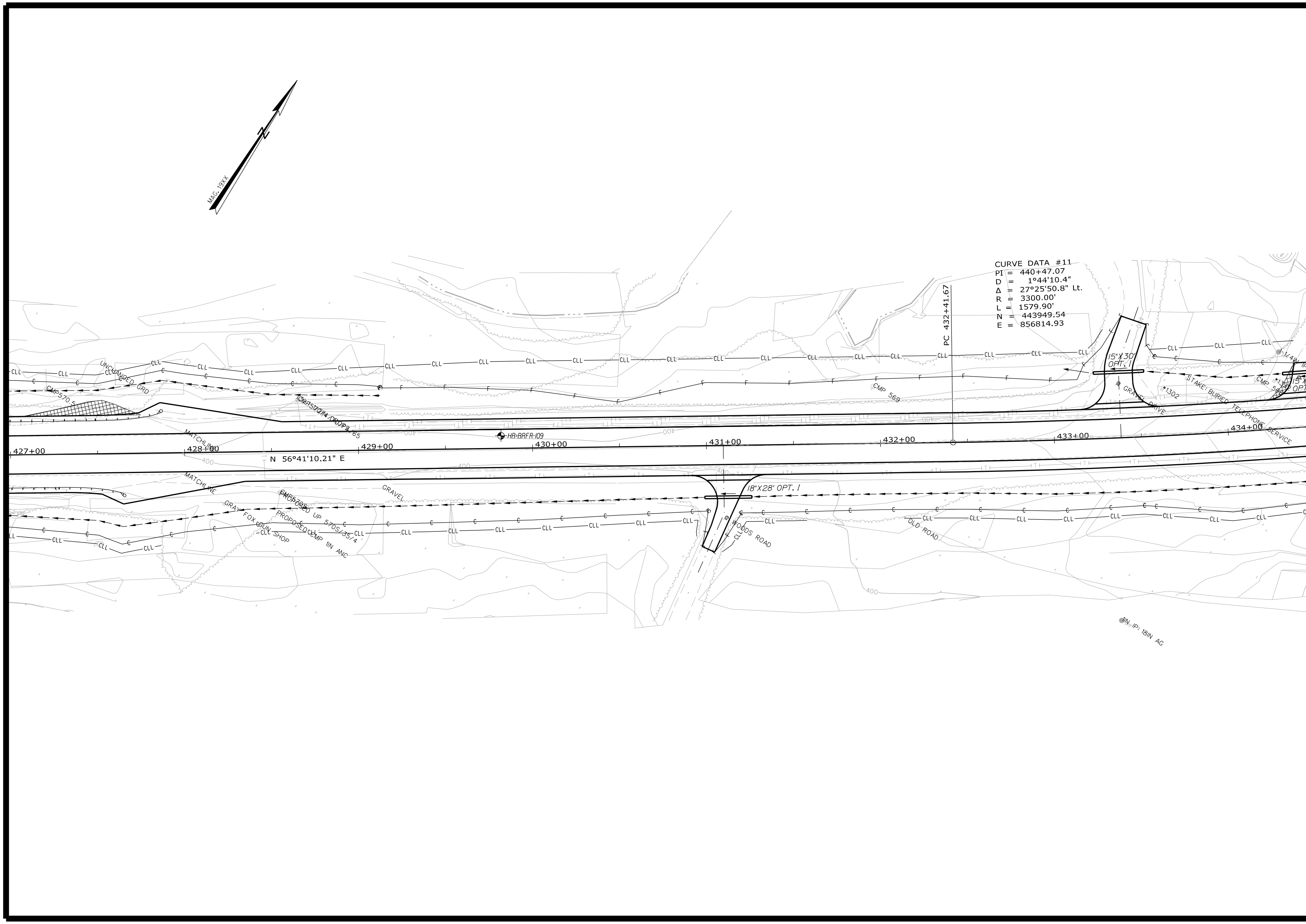
P.E. NUMBER

DATE

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

NH-1910(900)E

PIN
19109.00 HIGHWAY PLANS



Date:2/27/2015

Username: karen.gross

Division: HIGHWAY

Filename: ...\GEOTECH\MSTA\019_Geoplan19.dgn

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

NH-1910(900)E

PIN 19109.00

HIGHWAY PLANS

	BY	DATE
PROJ. MANAGER		
DESIGN-DETAILED	K.GROSS	
CHECKED-REVIEWED	T.WHITE	AUG 2011
DESIGN2-DETAILED2		
DESIGN3-DETAILED3		
REVISIONS 1		
REVISIONS 2		
REVISIONS 3		
REVISIONS 4		
FIELD CHANGES		

SIGNATURE

P.E. NUMBER

DATE

BRIDGTON - FRYEBURG
ROUTE 302

GEOPLANS

SHEET NUMBER

19

OF 43

SHEET NUMBER 20 OF 43	BRIDGTON - FRYEBURG ROUTE 302	PROJ. MANAGER _____	BY / DATE
		DESIGN-DETAILED	K.GROSS / T.WHITE / AUG 2011
		CHECKED-REVIEWED	_____ / _____ / _____
		DESIGN2-DETAILED2	_____ / _____ / _____
		DESIGN3-DETAILED3	_____ / _____ / _____
		REVISIONS 1	_____ / _____ / _____
		REVISIONS 2	_____ / _____ / _____
		REVISIONS 3	_____ / _____ / _____
		REVISIONS 4	_____ / _____ / _____
		FIELD CHANGES	_____ / _____ / _____
	GEOPLANS	SIGNATURE	STATE OF MAINE DEPARTMENT OF TRANSPORTATION
		P.E. NUMBER	**NH-1910(900)E**
		DATE	**PIN** **19109.00** HIGHWAY PLANS

SHEET NUMBER 21 OF 43	BRIDGTON - FRYEBURG ROUTE 302 **GEOPLANS**	PROJ. MANAGER _____ BY DATE DESIGN-DETAILED K.GROSS T.WHITE AUG 2011 CHECKED-REVIEWED _____ _____ _____ DESIGN2-DETAILED2 _____ _____ _____ DESIGN3-DETAILED3 _____ _____ _____ REVISIONS 1 _____ _____ REVISIONS 2 _____ _____ REVISIONS 3 _____ _____ REVISIONS 4 _____ _____ FIELD CHANGES _____ _____ SIGNATURE P.E. NUMBER DATE	STATE OF MAINE DEPARTMENT OF TRANSPORTATION **NH-1910(900)E** PIN 19109.00 HIGHWAY PLANS

PROJ. MANAGER		BY	DATE
DESIGN-DETAILED	K.GROSS	T.WHITE	AUG 2011
CHECKED-REVIEWED	-----	-----	-----
DESIGN2-DETAILED2	------	------	------
DESIGN3-DETAILED3	------	------	------
REVISIONS 1	------		------
REVISIONS 2	------		------
REVISIONS 3	------		------
REVISIONS 4	------		------
FIELD CHANGES			

SIGNATURE

P.E. NUMBER

DATE

SHEET NUMBER 22 OF 43

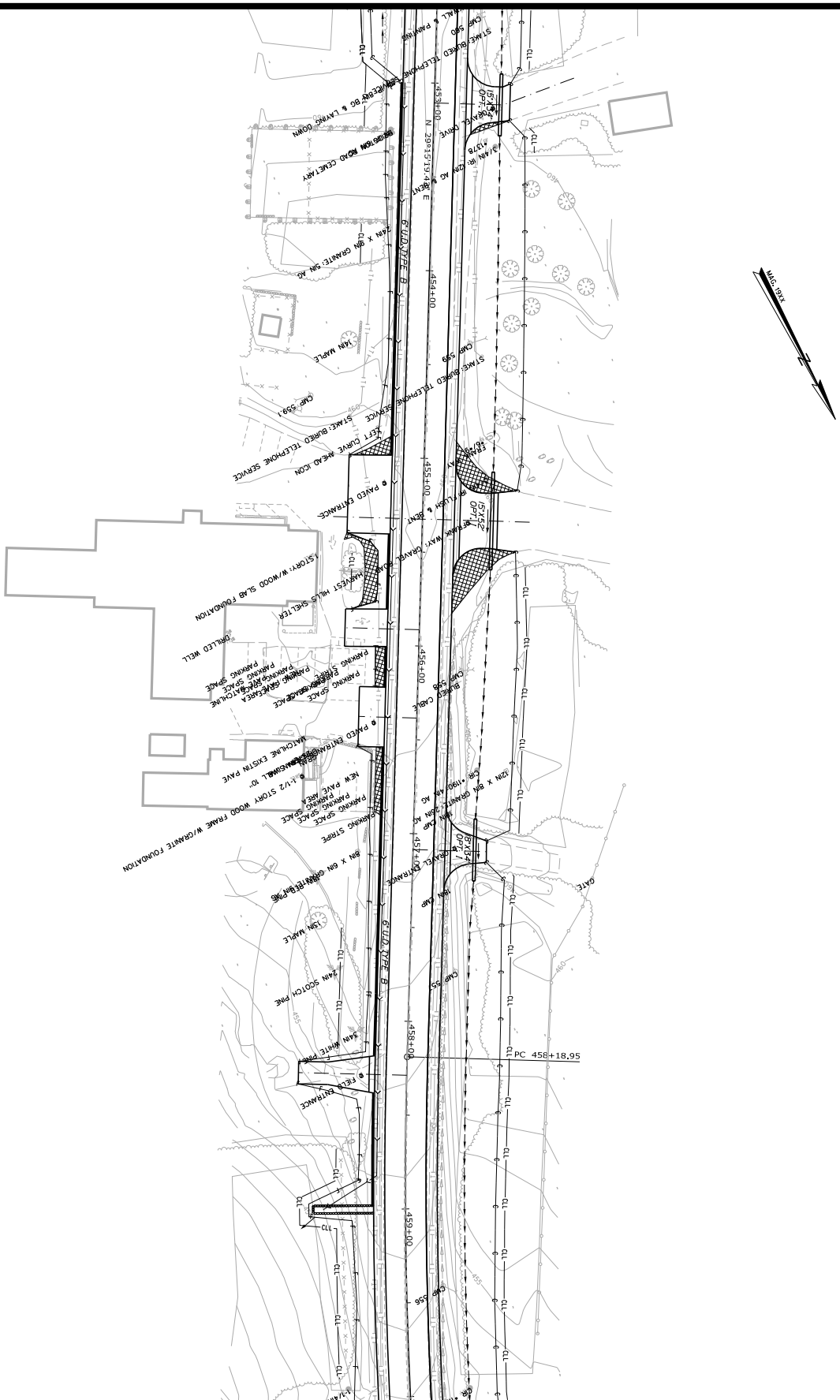
BRIDGTON - FRYEBURG
ROUTE 302

GEOPLANS

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

NH-1910(900)E

PIN
19109.00 HIGHWAY PLANS



PROJ. MANAGER		BY	DATE
DESIGN-DETAILED	K.GROSS	T.WHITE	AUG 2011
CHECKED-REVIEWED	-----	-----	-----
DESIGN2-DETAILED2	-----	-----	-----
DESIGN3-DETAILED3	-----	-----	-----
REVISIONS 1	-----		-----
REVISIONS 2	-----		-----
REVISIONS 3	-----		-----
REVISIONS 4	-----		-----
FIELD CHANGES			

SIGNATURE

P.E. NUMBER

DATE

SHEET NUMBER 23 OF 43

BRIDGTON - FRYEBURG
ROUTE 302

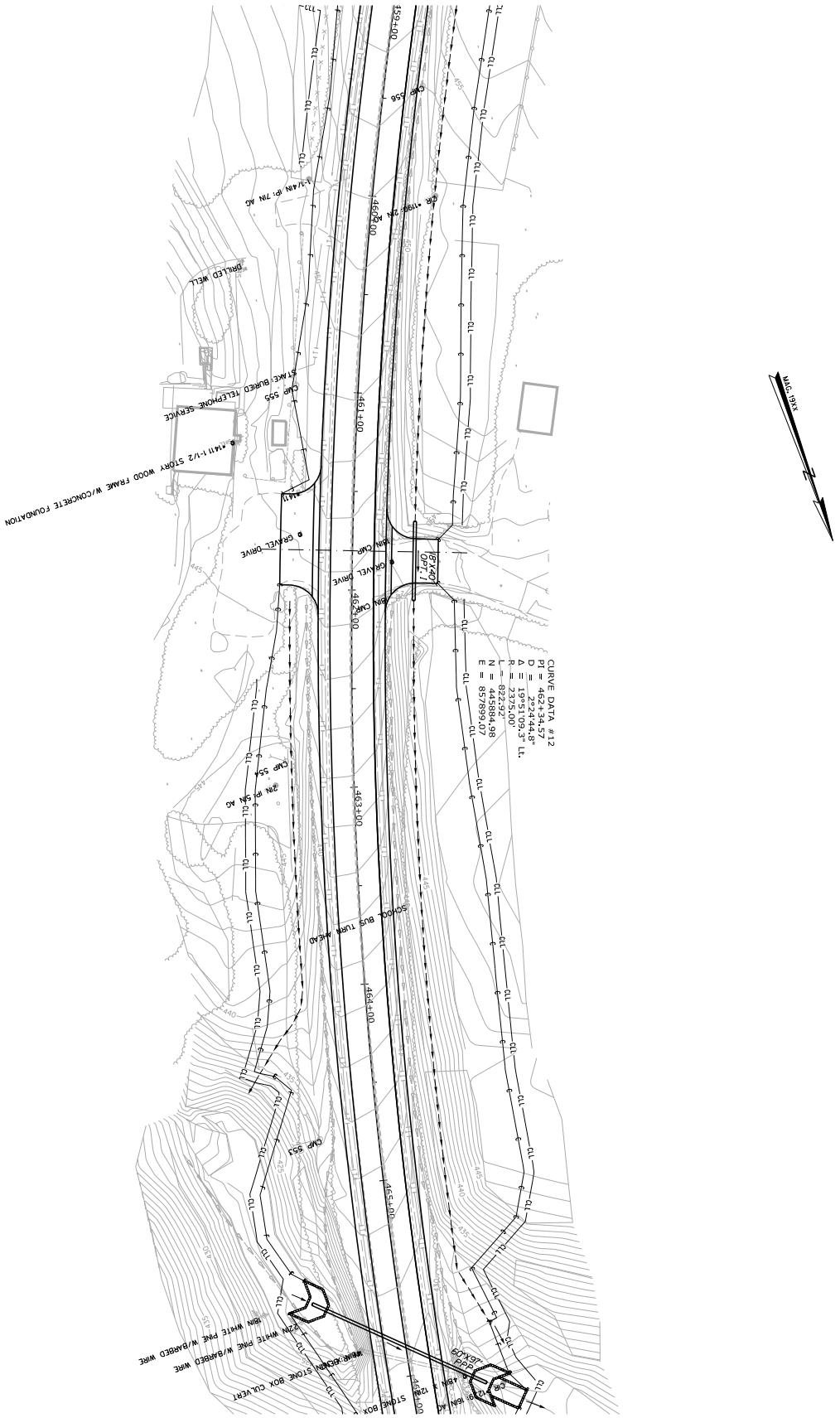
GEOPLANS

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

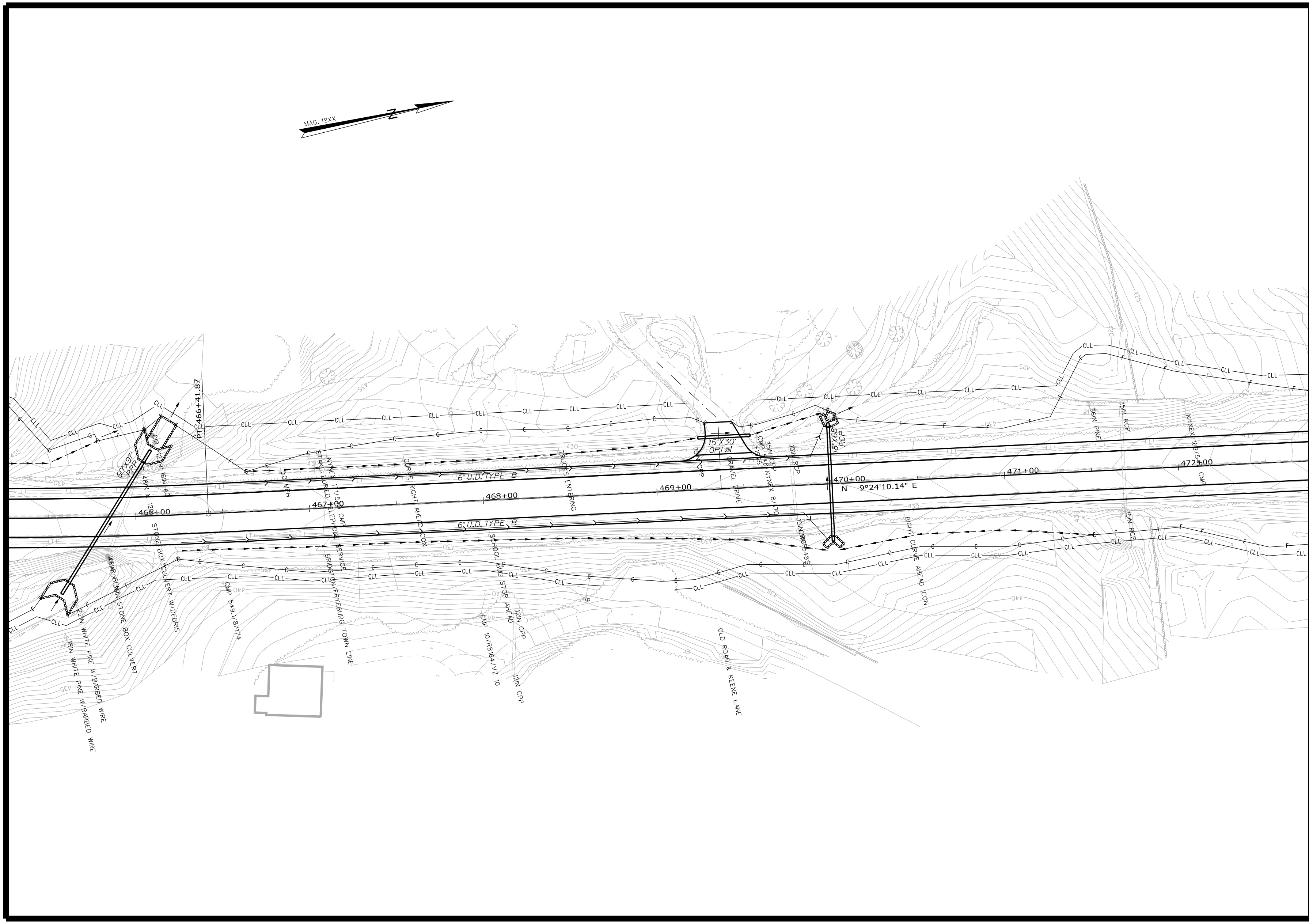
NH-1910(900)E

PIN
19109.00

HIGHWAY PLANS



SHEET NUMBER 24 OF 43	BRIDGTON - FRYEBURG ROUTE 302 **GEOPLANS**	PROJ. MANAGER _____ BY DATE DESIGN-DETAILED K.GROSS T.WHITE AUG 2011 CHECKED-REVIEWED _____ _____ _____ DESIGN2-DETAILED2 _____ _____ _____ DESIGN3-DETAILED3 _____ _____ _____ REVISIONS 1 _____ _____ REVISIONS 2 _____ _____ REVISIONS 3 _____ _____ REVISIONS 4 _____ _____ FIELD CHANGES _____ _____	SIGNATURE P.E. NUMBER DATE	STATE OF MAINE DEPARTMENT OF TRANSPORTATION **NH-1910(900)E** PIN 19109.00 HIGHWAY PLANS



Filename: ...\GEOTECH\MSTA\025_Geoplan25.dgn Division: HIGHWAY Username: karen.gross Date:2/27/2015

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

NH-1910(900)E

PIN 19109.00

HIGHWAY PLANS

PROJ. MANAGER		BY	DATE
DESIGN-DETAILED	K.GROSS	T.WHITE	AUG 2011
CHECKED-REVIEWED			
DESIGN2-DETAILED2			
DESIGN3-DETAILED3			
REVISIONS 1			
REVISIONS 2			
REVISIONS 3			
REVISIONS 4			
FIELD CHANGES			

SIGNATURE

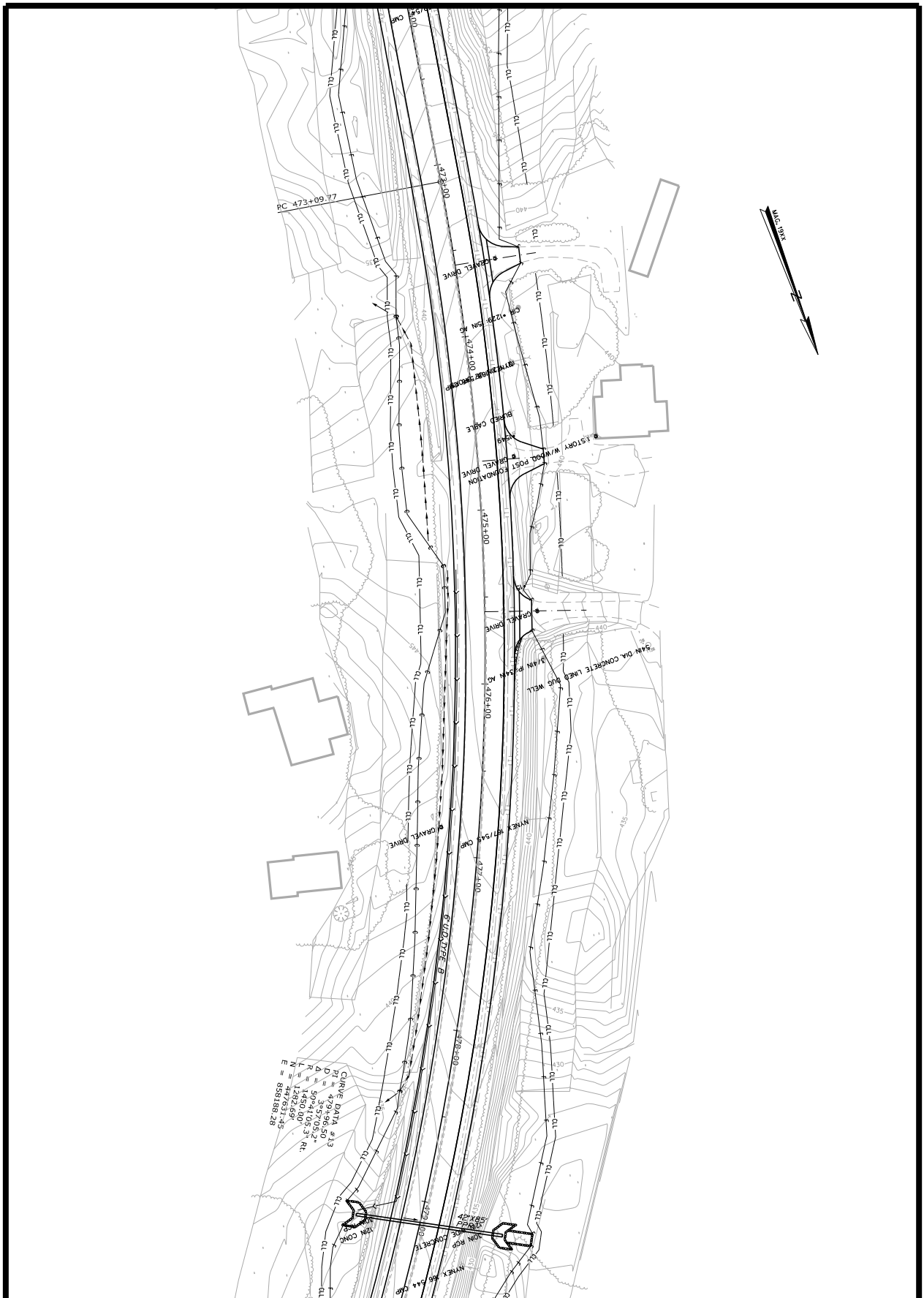
P.E. NUMBER

DATE

BRIDGTON - FRYEBURG
ROUTE 302

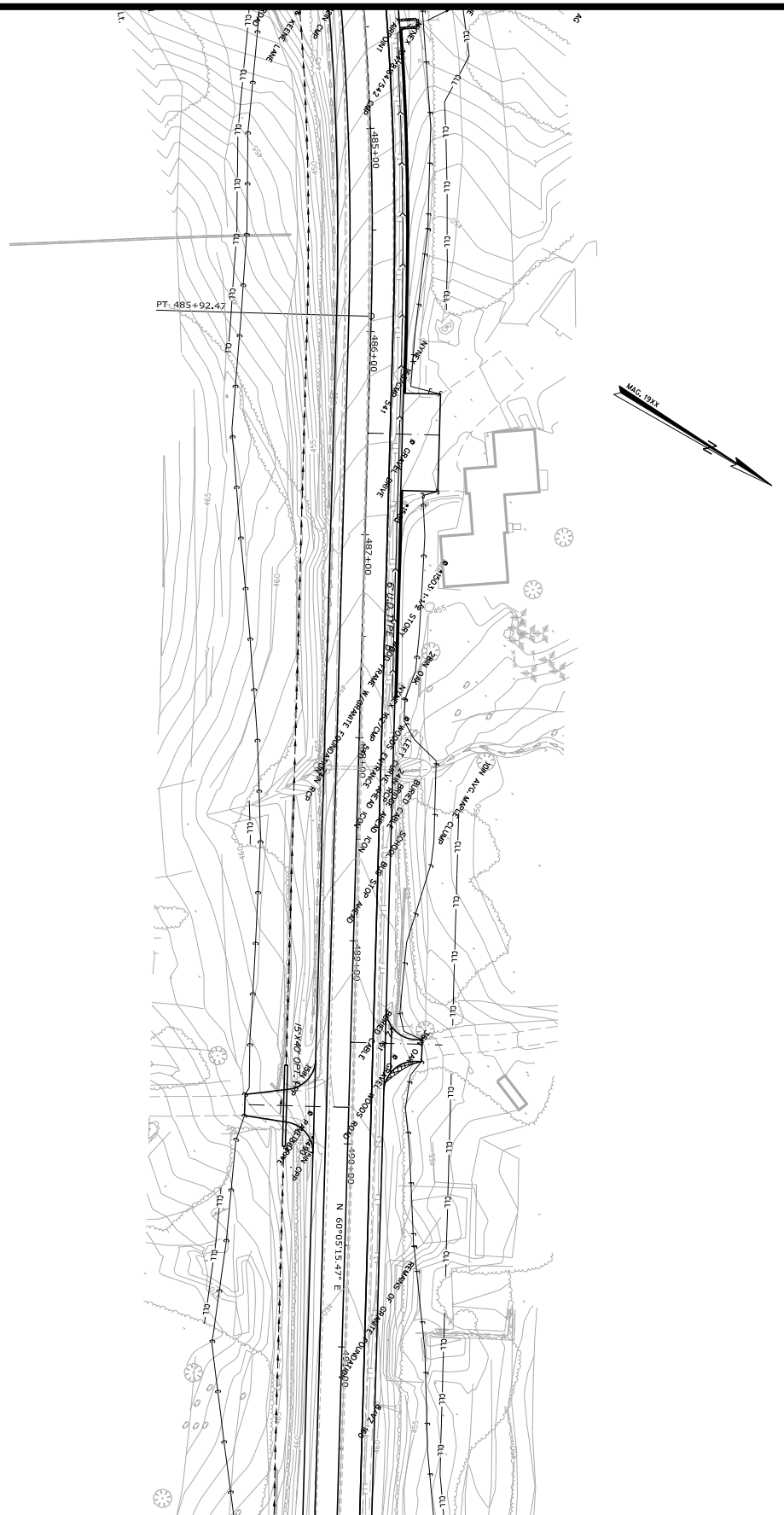
GEOPLANS

SHEET NUMBER
25
OF 43



SHEET NUMBER 26 OF 43	BRIDGTON - FRYEBURG ROUTE 302 **GEOPLANS**	PROJ. MANAGER _____ BY DATE DESIGN-DETAILED K.GROSS T.WHITE AUG 2011 CHECKED-REVIEWED _____ _____ _____ DESIGN2-DETAILED2 _____ _____ _____ DESIGN3-DETAILED3 _____ _____ _____ REVISIONS 1 _____ _____ REVISIONS 2 _____ _____ REVISIONS 3 _____ _____ REVISIONS 4 _____ _____ FIELD CHANGES _____ _____	SIGNATURE P.E. NUMBER DATE	STATE OF MAINE DEPARTMENT OF TRANSPORTATION **NH-1910(900)E** PIN **19109.00** HIGHWAY PLANS

SHEET NUMBER 27 OF 43	BRIDGTON - FRYEBURG ROUTE 302 **GEOPLANS**	PROJ. MANAGER _____	BY / DATE
		DESIGN-DETAILED: K.GROSS	T.WHITE / AUG 2011
		CHECKED-REVIEWED: _____	_____ / _____
		DESIGN2-DETAILED2: _____	_____ / _____
		DESIGN3-DETAILED3: _____	_____ / _____
		REVISIONS 1: _____	_____ / _____
		REVISIONS 2: _____	_____ / _____
		REVISIONS 3: _____	_____ / _____
		REVISIONS 4: _____	_____ / _____
		FIELD CHANGES: _____	_____ / _____
		SIGNATURE	
		P.E. NUMBER	
		DATE	
	STATE OF MAINE DEPARTMENT OF TRANSPORTATION **NH-1910(900)E** **PIN 19109.00** HIGHWAY PLANS		



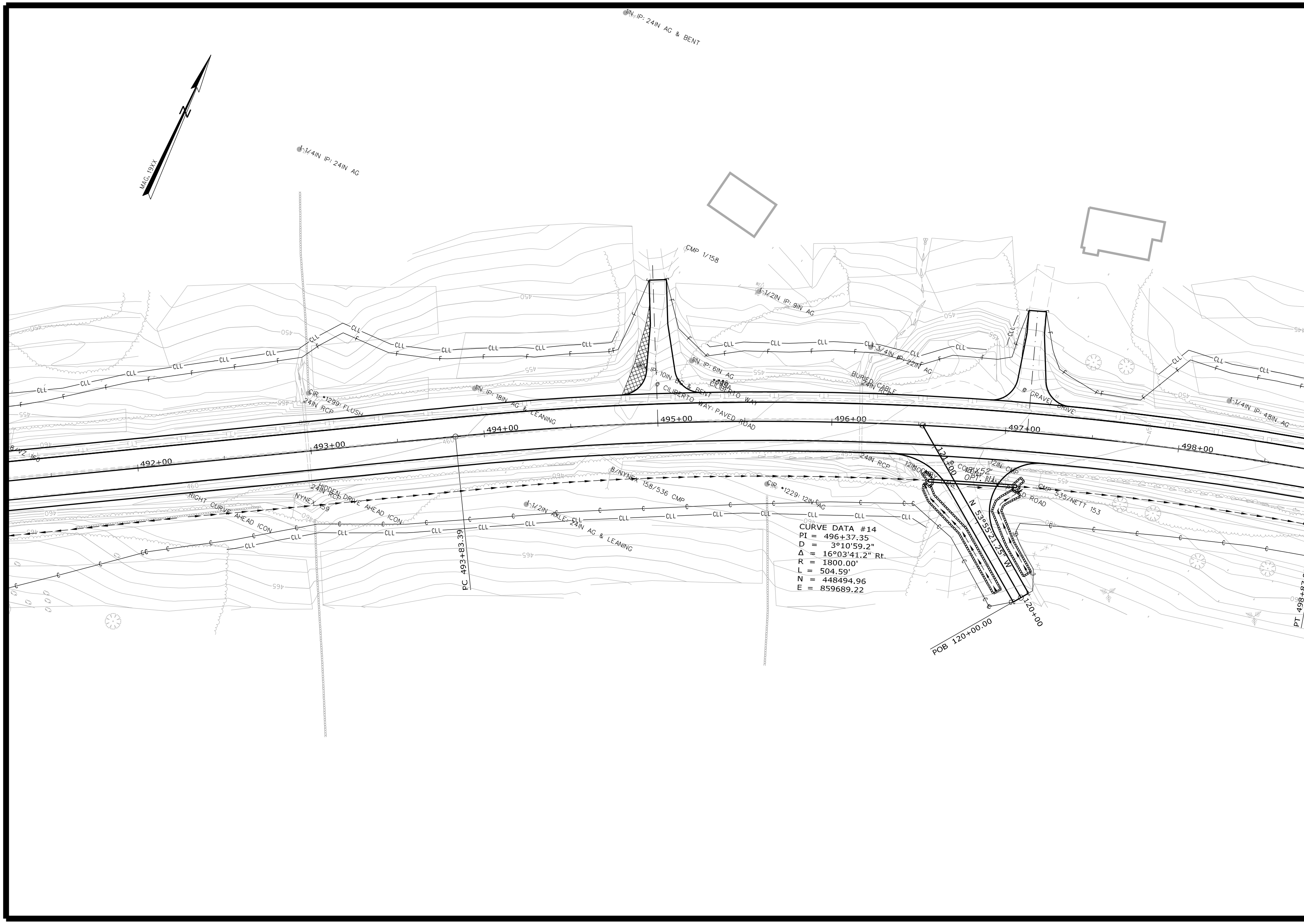
BRIDGTON - FRYEBURG ROUTE 302	PROJ. MANAGER _____	BY	DATE
	DESIGN-DETAILED	K.GROSS	T.WHITE	AUG 2011
	CHECKED-REVIEWED	_____	_____	_____
	DESIGN2-DETAILED2	_____	_____	_____
	DESIGN3-DETAILED3	_____	_____	_____
	REVISIONS 1	_____		_____
	REVISIONS 2	_____		_____
	REVISIONS 3	_____		_____
	REVISIONS 4	_____		_____
	FIELD CHANGES	_____		_____
GEOPLANS	SIGNATURE			
	P.E. NUMBER			
	DATE			

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

NH-1910(900)E

PIN
19109.00 HIGHWAY PLANS

SHEET NUMBER **28** OF 43



Filename: ...\GEOTECH\MSTA\029_Geoplan29.dgn Division: HIGHWAY Username: karen.gross Date:2/27/2015

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

NH-1910(900)E

PIN
19109.00

HIGHWAY PLANS

	BY	DATE
PROJ. MANAGER		
DESIGN-DETAILED	K.GROSS	
CHECKED-REVIEWED	T.WHITE	AUG 2011
DESIGN2-DETAILED2		
DESIGN3-DETAILED3		
REVISIONS 1		
REVISIONS 2		
REVISIONS 3		
REVISIONS 4		
FIELD CHANGES		

SIGNATURE

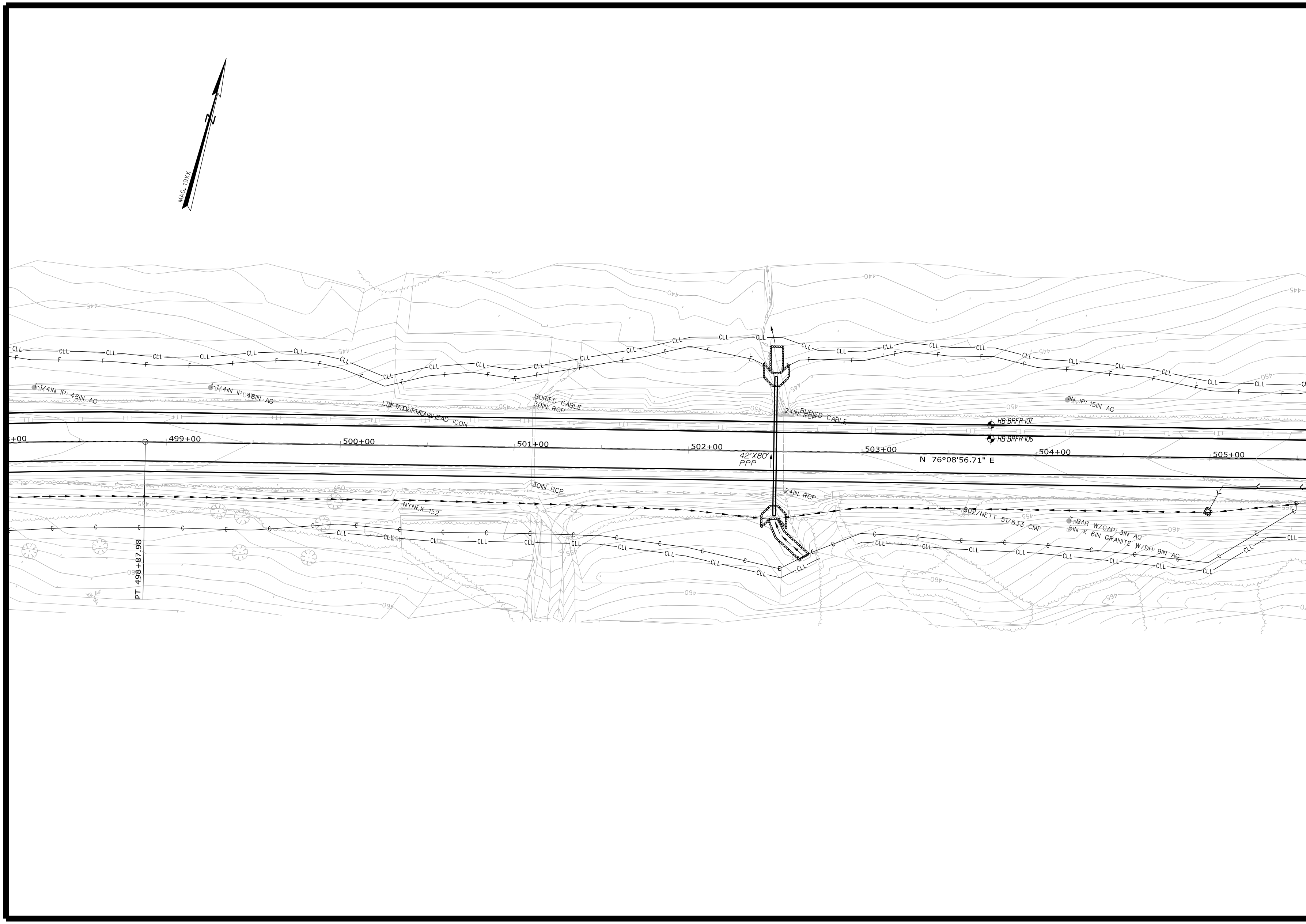
P.E. NUMBER

DATE

BRIDGTON - FRYEBURG
ROUTE 302

GEOPLANS

SHEET NUMBER
29
OF 43



STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

NH-1910(900)E

PIN
19109.00

HIGHWAY PLANS

	BY	DATE
PROJ. MANAGER		
DESIGN-DETAILED	T.WHITE	AUG 2011
CHECKED-REVIEWED	K.GROSS	
DESIGN2-DETAILED2		
DESIGN3-DETAILED3		
REVISIONS 1		
REVISIONS 2		
REVISIONS 3		
REVISIONS 4		
FIELD CHANGES		

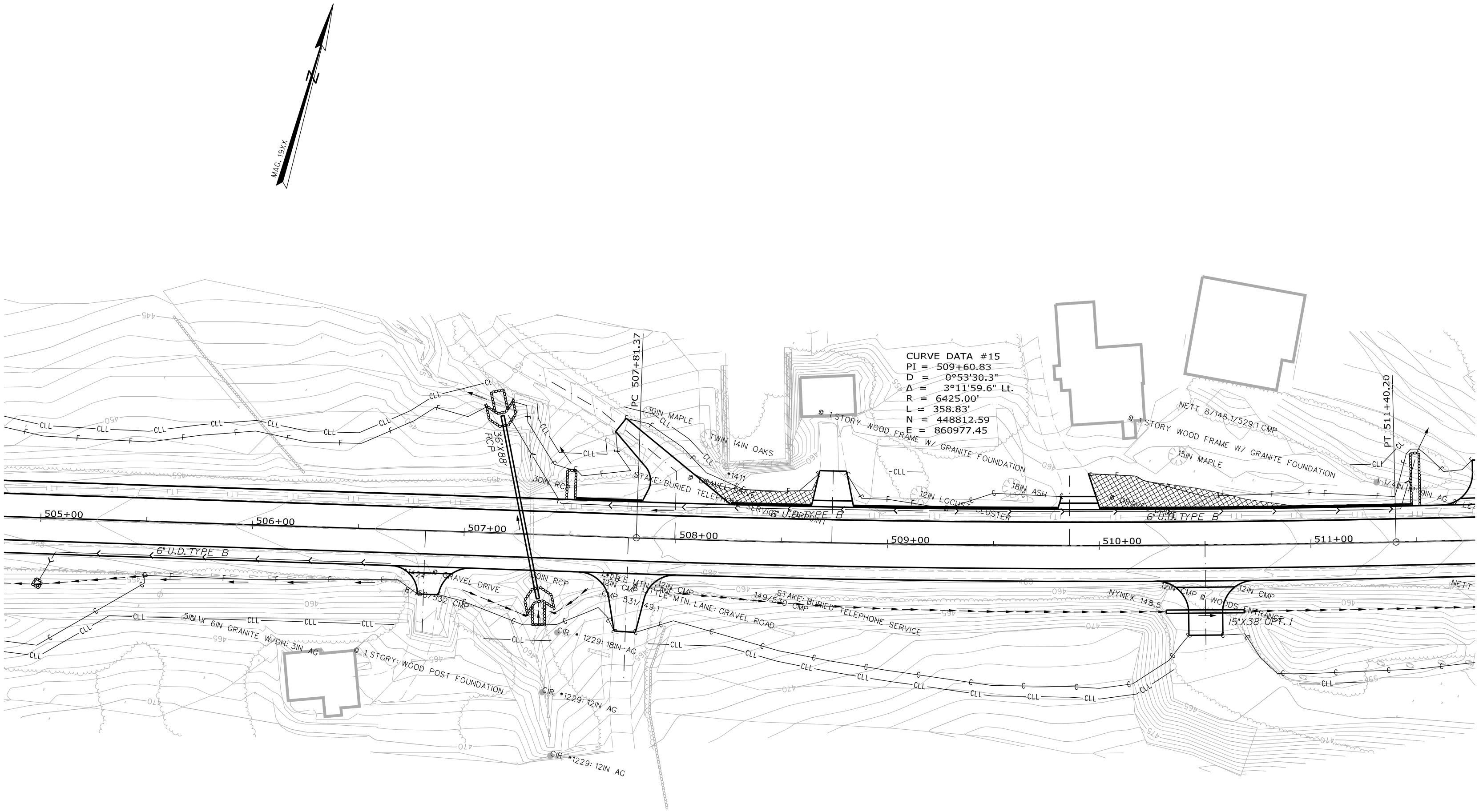
SIGNATURE
P.E. NUMBER
DATE

BRIDGTON - FRYEBURG
ROUTE 302

GEOPLANS

SHEET NUMBER
30
OF 43

Filename: ...\GEOTECH\MSTA\030_Geoplan30.dgn Division: HIGHWAY Username: karen.gross Date:2/27/2015



Filename: ...\GEOTECH\MSTA\031_Geoplan31.dgn Division: HIGHWAY Username: karen.gross Date:2/27/2015

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

NH-1910(900)E

PIN 19109.00

HIGHWAY PLANS

	BY	DATE
PROJ. MANAGER		
DESIGN-DETAILED	K.GROSS	
CHECKED-REVIEWED	T.WHITE	AUG 2011
DESIGN2-DETAILED2		
DESIGN3-DETAILED3		
REVISIONS 1		
REVISIONS 2		
REVISIONS 3		
REVISIONS 4		
FIELD CHANGES		

SIGNATURE
P.E. NUMBER
DATE

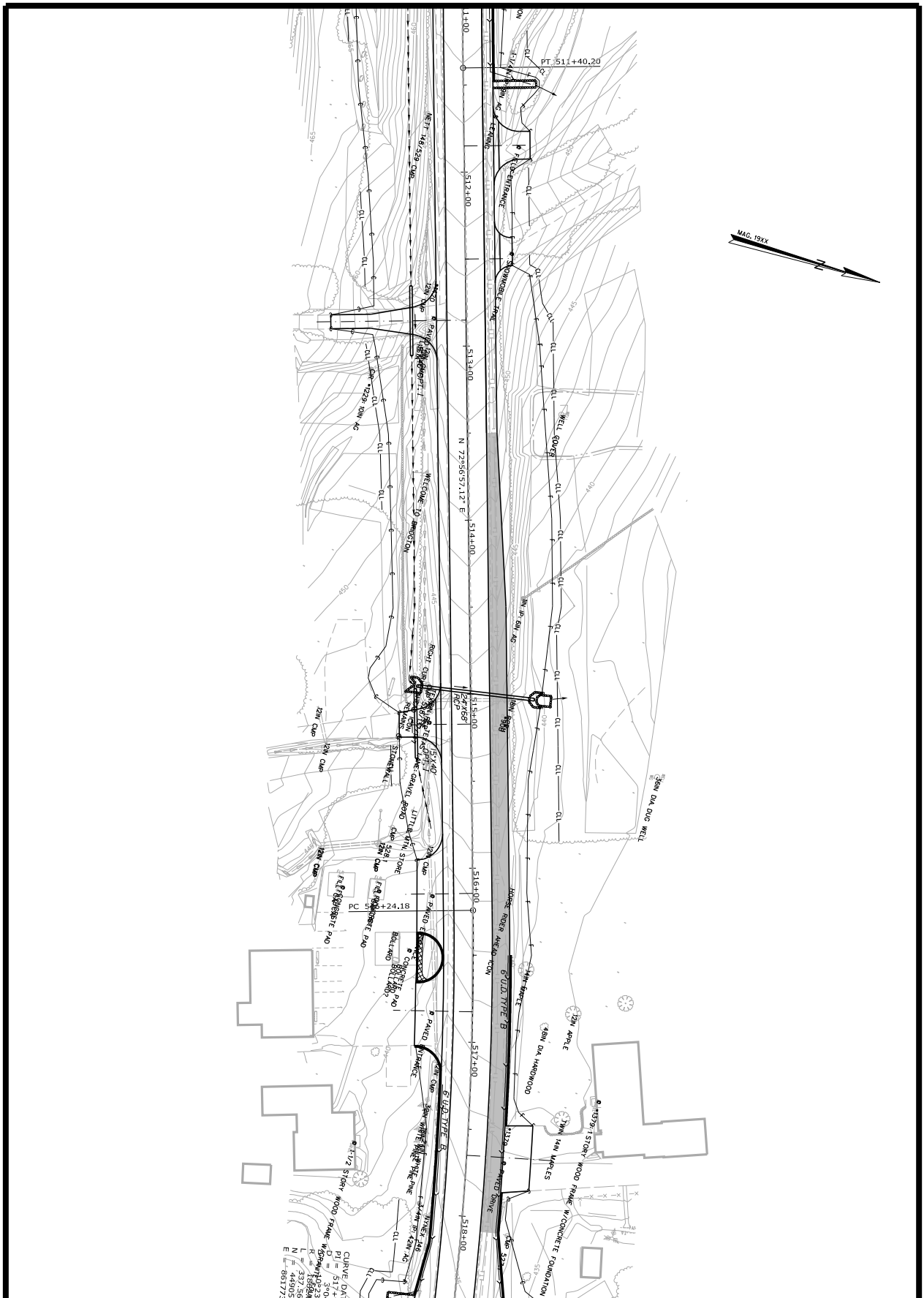
BRIDGTON - FRYEBURG
ROUTE 302

GEOPLANS

SHEET NUMBER

31

OF 43



PROJ. MANAGER		BY	DATE
DESIGN-DETAILED	K.GROSS	T.WHITE	AUG 2011
CHECKED-REVIEWED	-----	-----	-----
DESIGN2-DETAILED2	-----	-----	-----
DESIGN3-DETAILED3	-----	-----	-----
REVISIONS 1	-----		-----
REVISIONS 2	-----		-----
REVISIONS 3	-----		-----
REVISIONS 4	-----		-----
FIELD CHANGES	-----		-----

SIGNATURE

P.E. NUMBER

DATE

SHEET NUMBER 32 OF 43

BRIDGTON - FRYEBURG
ROUTE 302

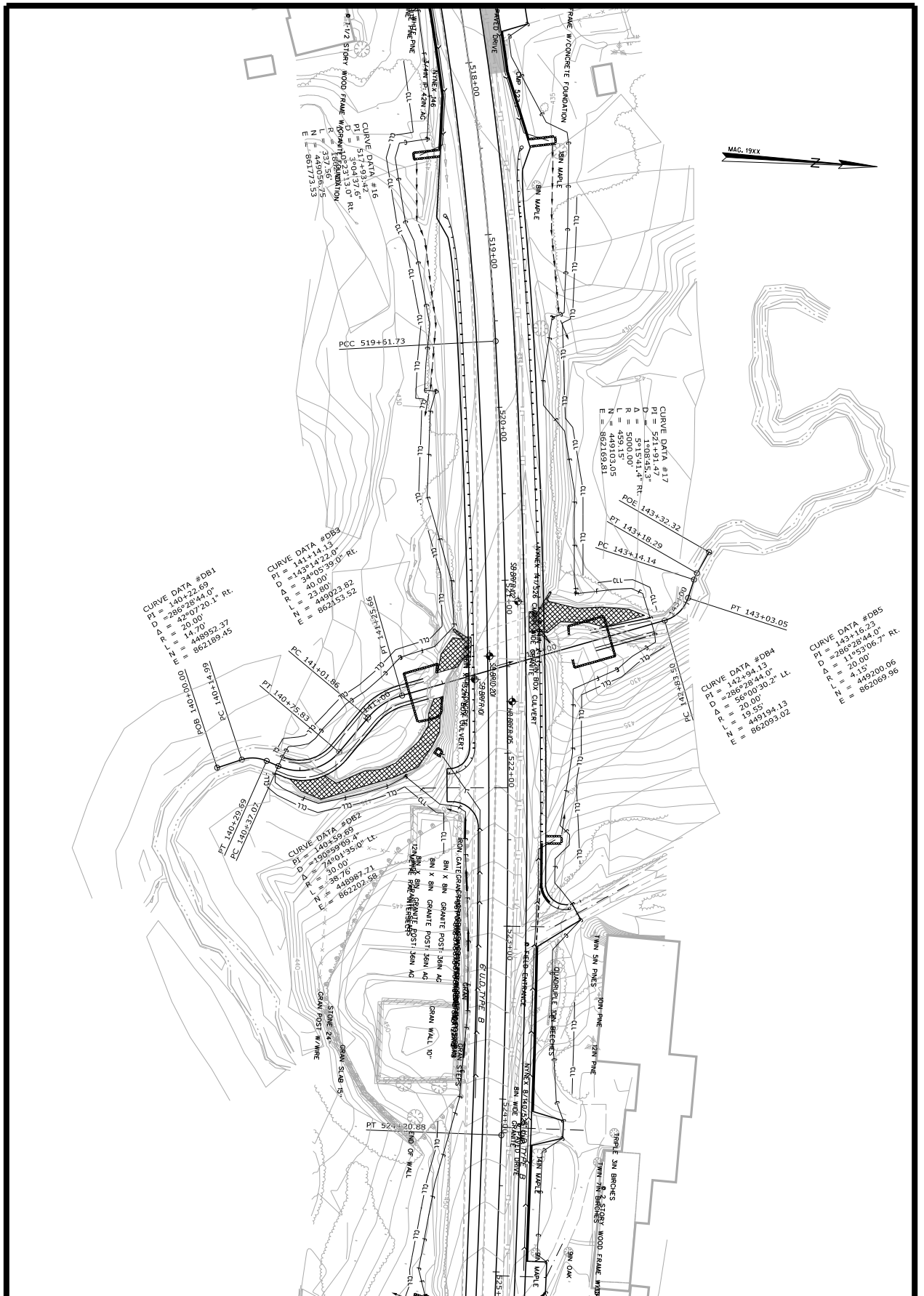
GEOPLANS

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

NH-1910(900)E

PIN 19109.00 HIGHWAY PLANS

Filename: ...\GEOTECH\MSTA\033_Geoplan33.dgn Division: HIGHWAY Username: karen.gross Date:2/27/2015



SHEET NUMBER 33 OF 43

BRIDGTON - FRYEBURG
ROUTE 302

GEOPLANS

PROJ. MANAGER		BY	DATE
DESIGN-DETAILED	K.GROSS	T.WHITE	AUG 2011
CHECKED-REVIEWED	-----	-----	-----
DESIGN2-DETAILED2	------	------	------
DESIGN3-DETAILED3	------	------	------
REVISIONS 1	------		------
REVISIONS 2	------		------
REVISIONS 3	------		------
REVISIONS 4	------		------
FIELD CHANGES	------		------

SIGNATURE

P.E. NUMBER

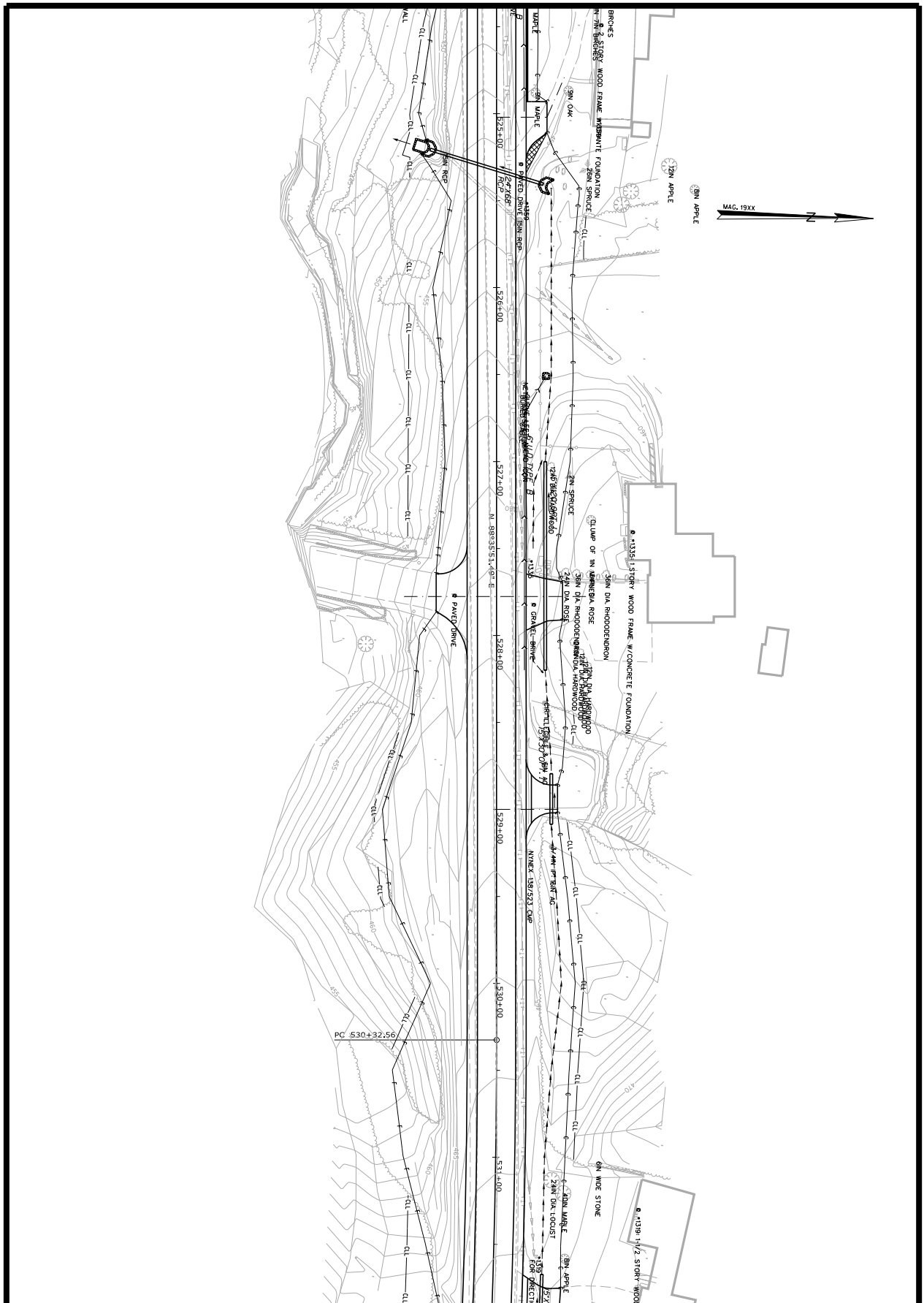
DATE

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

NH-1910(900)E

PIN
19109.00

HIGHWAY PLANS



SHEET NUMBER 34 OF 43

BRIDGTON - FRYEBURG
ROUTE 302

GEOPLANS

		BY	DATE
PROJ. MANAGER	----------		
DESIGN-DETAILED	K.GROSS	T.WHITE	AUG 2011
CHECKED-REVIEWED	-----	-----	-----
DESIGN2-DETAILED2	----------	----------	----------
DESIGN3-DETAILED3	----------	----------	----------
REVISIONS 1	------		------
REVISIONS 2	------		------
REVISIONS 3	------		------
REVISIONS 4	------		------
FIELD CHANGES	------		------

SIGNATURE

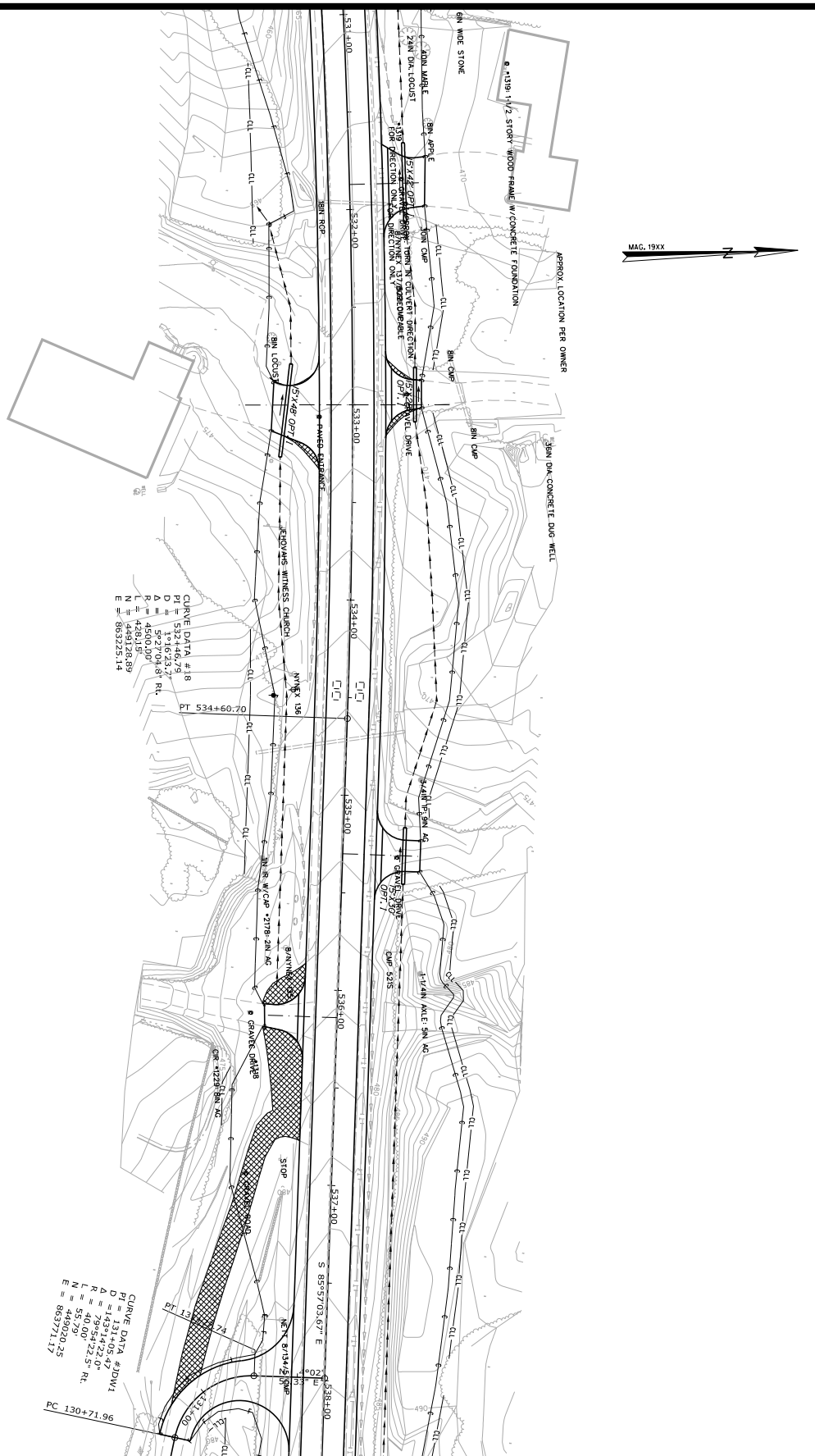
P.E. NUMBER

DATE

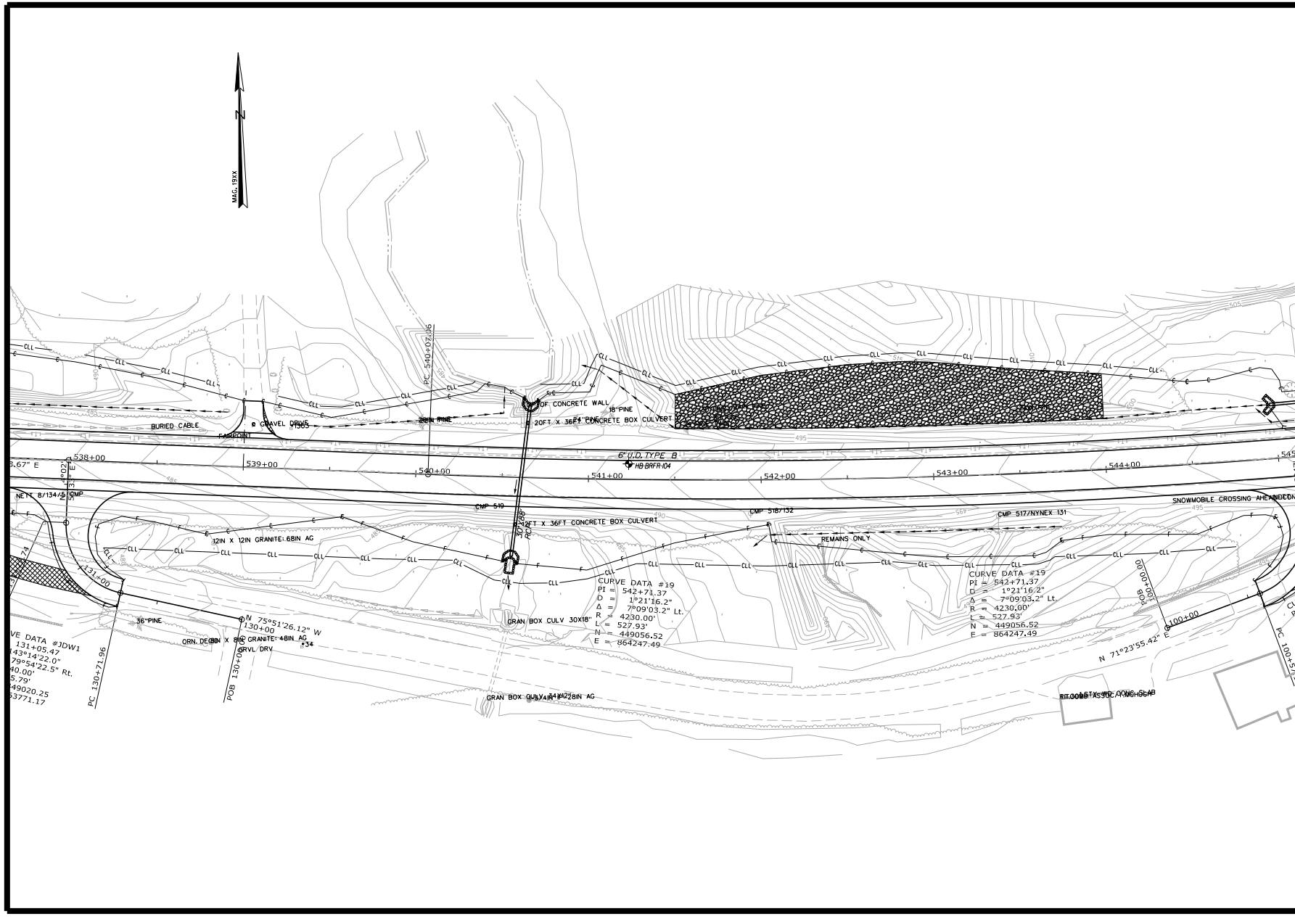
STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

NH-1910(900)E

PIN
19109.00 HIGHWAY PLANS



SHEET NUMBER 35 OF 43	BRIDGTON - FRYEBURG ROUTE 302 **GEOPLANS**	PROJ. MANAGER _____ / BY / DATE DESIGN-DETAILED: K.GROSS / T.WHITE / AUG 2011 CHECKED-REVIEWED: _____ / _____ / _____ DESIGN2-DETAILED2: _____ / _____ / _____ DESIGN3-DETAILED3: _____ / _____ / _____ REVISIONS 1: _____ / _____ REVISIONS 2: _____ / _____ REVISIONS 3: _____ / _____ REVISIONS 4: _____ / _____ FIELD CHANGES: _____ / _____ SIGNATURE P.E. NUMBER DATE	STATE OF MAINE DEPARTMENT OF TRANSPORTATION **NH-1910(900)E** PIN 19109.00 HIGHWAY PLANS



STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

NH-1910(900)E

PIN
19109.00

HIGHWAY PLANS

	BY	DATE
PROJ. MANAGER	----------	-----
DESIGN: DETAILED	C.CROSS	AUG. 2015
DESIGN: DET.ALED1	------	-----
DESIGN: DET.ALED2	------	-----
DESIGN: DET.ALED3	------	-----
REVISIONS 1	------	-----
REVISIONS 2	------	-----
REVISIONS 3	------	-----
REVISIONS 4	------	-----
FIELD CHANGES	------	-----

SIGNATURE

P.E. NUMBER

DATE

BRIDGTON - FRYEBURG
ROUTE 302

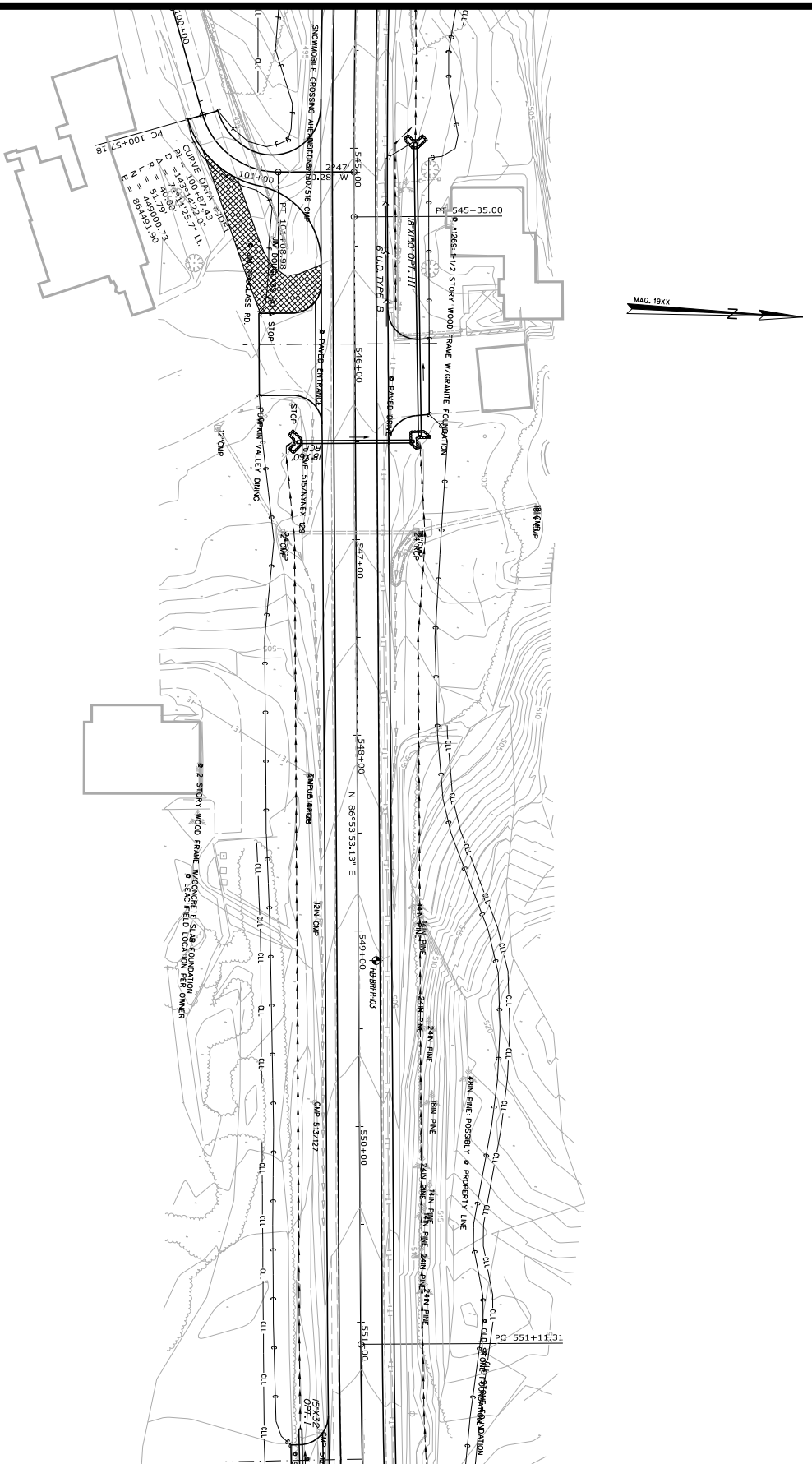
GEOPLANS

SHEET NUMBER

36

OF 43

Filename: ...\GEOTECH\MSTA\036_Geoplan36.dgn Division: HIGHWAY Username: karen.gross Date:2/27/2015



BRIDGTON - FRYEBURG ROUTE 302	PROJ. MANAGER _____	BY	DATE
	DESIGN-DETAILED	K.GROSS	T.WHITE	AUG 2011
	CHECKED-REVIEWED	_____	_____	_____
	DESIGN2-DETAILED2	_____	_____	_____
	DESIGN3-DETAILED3	_____	_____	_____
	REVISIONS 1	_____		_____
	REVISIONS 2	_____		_____
	REVISIONS 3	_____		_____
	REVISIONS 4	_____		_____
	FIELD CHANGES	_____		_____

SIGNATURE

P.E. NUMBER

DATE

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

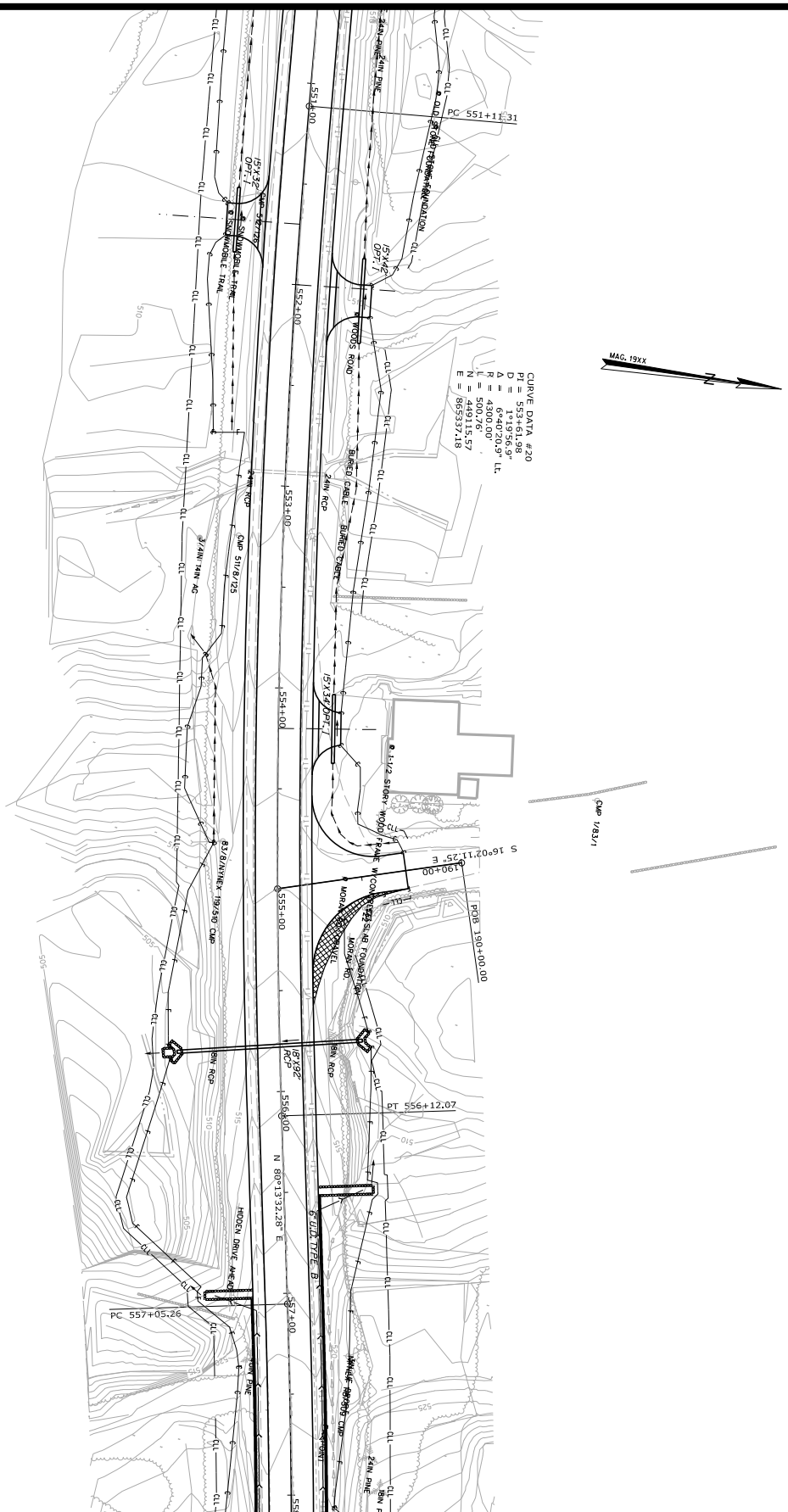
NH-1910(900)E

PIN
19109.00

HIGHWAY PLANS

GEOPLANS

SHEET NUMBER 37 OF 43



PROJ. MANAGER		BY	DATE
DESIGN-DETAILED	K.GROSS	T.WHITE	AUG 2011
CHECKED-REVIEWED	-----	-----	-----
DESIGN2-DETAILED2	-----	-----	-----
DESIGN3-DETAILED3	-----	-----	-----
REVISIONS 1	-----		-----
REVISIONS 2	-----		-----
REVISIONS 3	-----		-----
REVISIONS 4	-----		-----
FIELD CHANGES	-----		-----

SIGNATURE

P.E. NUMBER

DATE

SHEET NUMBER 38 OF 43

BRIDGTON - FRYEBURG
ROUTE 302

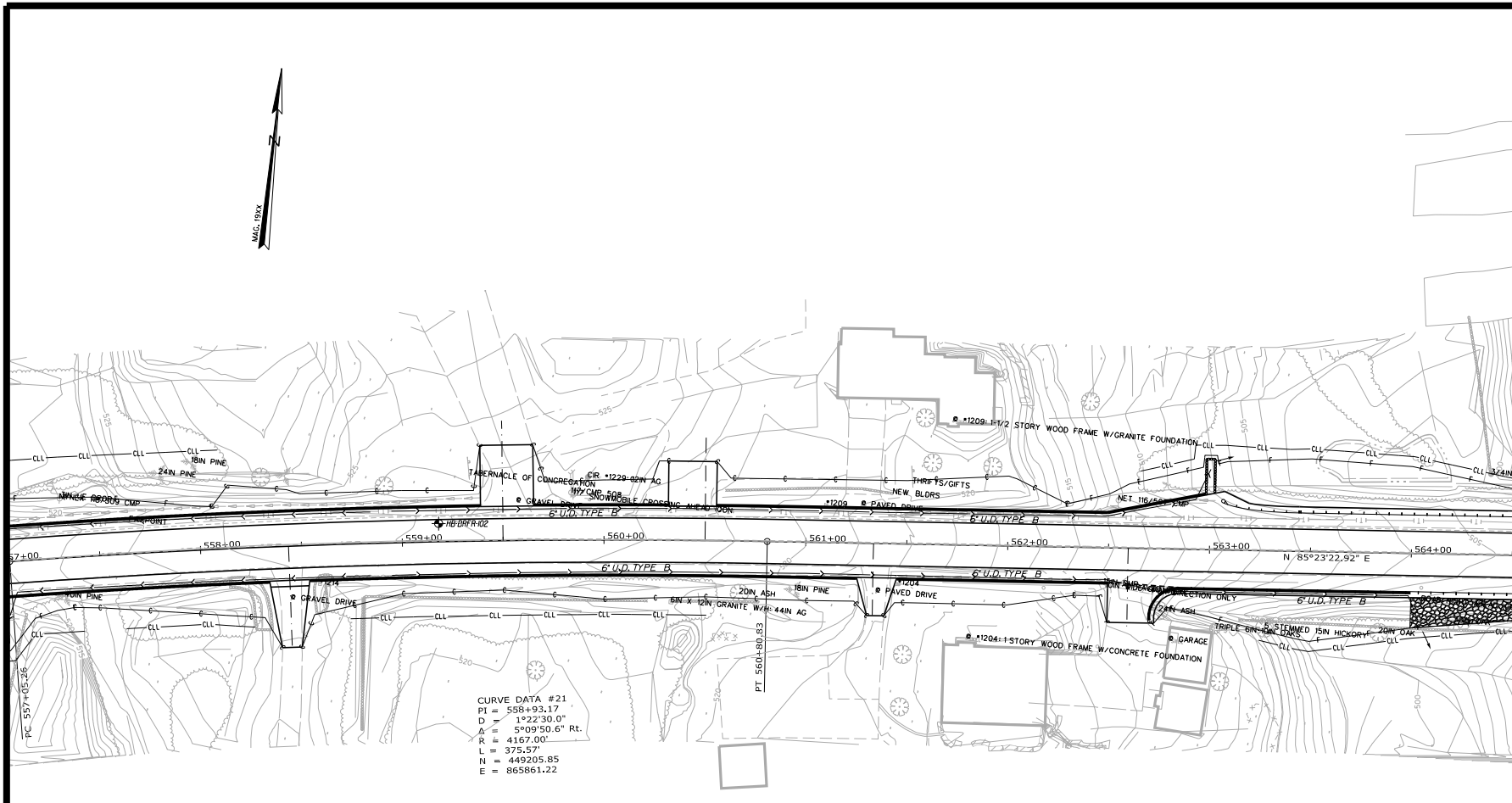
GEOPLANS

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

NH-1910(900)E

PIN 19109.00

HIGHWAY PLANS



STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

NH-1910(900)E

PIN
19109.00

HIGHWAY PLANS

	BY	DATE
PROJ. MANAGER	----------	----------
DESIGN: DET'ALED	T. WHITE	AUG. 2015
DESIGN: CROSS-SECT'NED	C.GROSS	----------
DESIGN: DET'ALED 2	----------	----------
DESIGN: DET'ALED 3	----------	----------
REVISIONS 1	----------	----------
REVISIONS 2	----------	----------
REVISIONS 3	----------	----------
REVISIONS 4	----------	----------
FIELD CHANGES	----------	----------

SIGNATURE

P.E. NUMBER

DATE

BRIDGTON - FRYEBURG
ROUTE 302

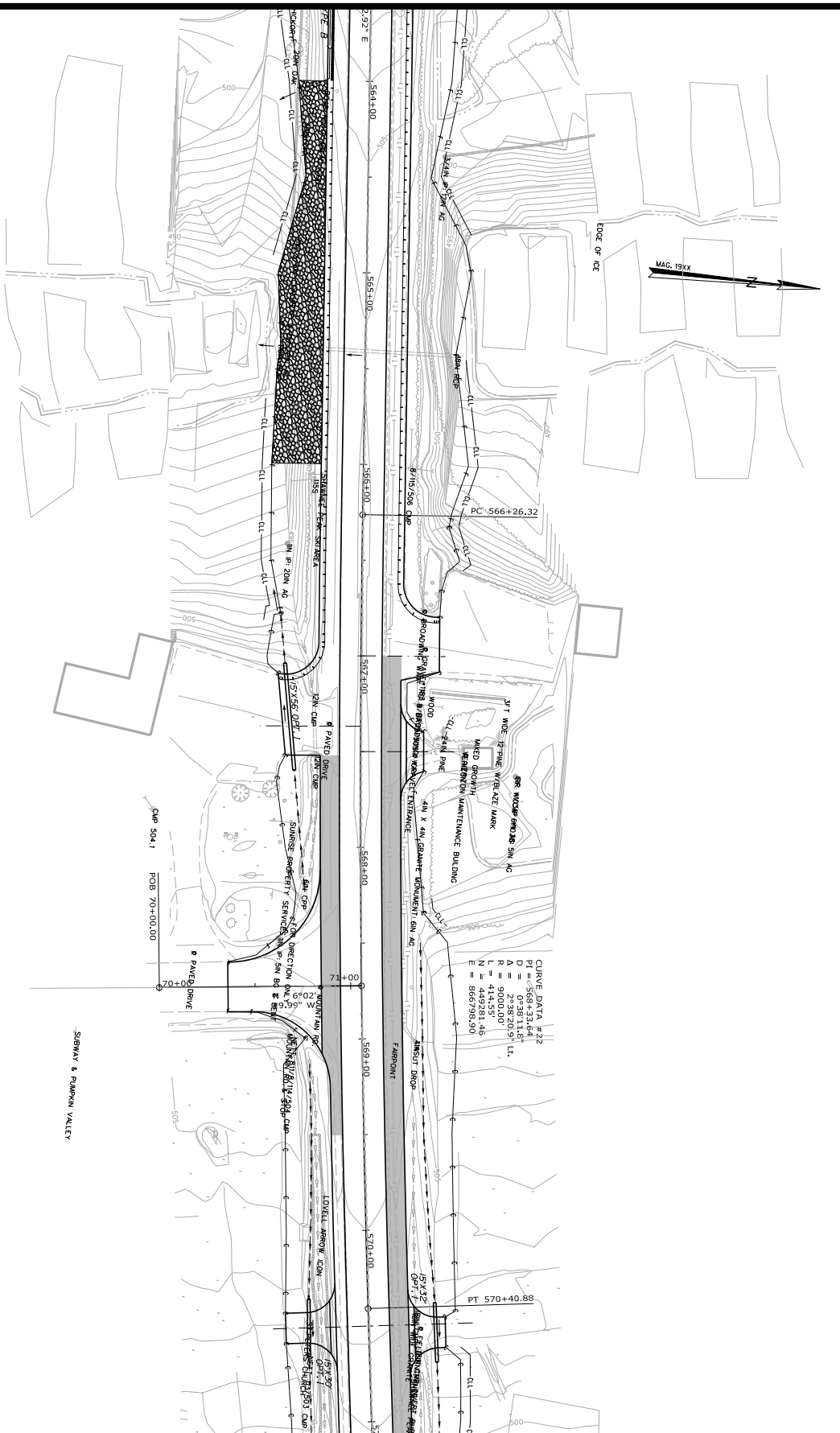
GEOPLANS

SHEET NUMBER

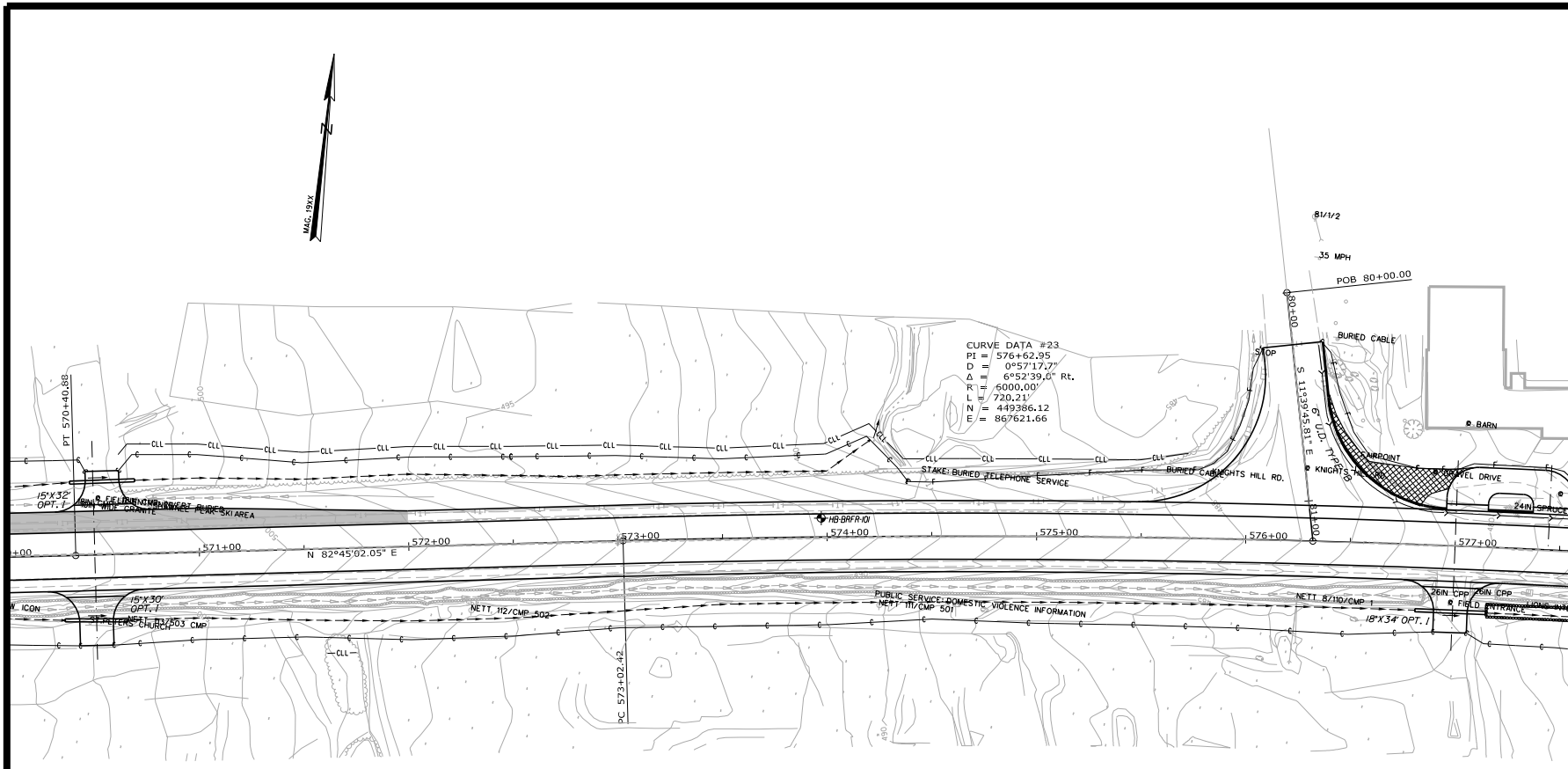
39

OF 43

Filename: ...\GEOTECH\MGTA\039_Geoplan39.dgn Division: HIGHWAY Username: karen.gross Date:2/27/2015



SHEET NUMBER 40 OF 43	BRIDGTON - FRYEBURG ROUTE 302 **GEOPLANS**	PROJ. MANAGER _____ BY DATE DESIGN-DETAILED K.GROSS T.WHITE AUG 2011 CHECKED-REVIEWED _____ _____ _____ DESIGN2-DETAILED2 _____ _____ _____ DESIGN3-DETAILED3 _____ _____ _____ REVISIONS 1 _____ _____ REVISIONS 2 _____ _____ REVISIONS 3 _____ _____ REVISIONS 4 _____ _____ FIELD CHANGES _____ _____ SIGNATURE P.E. NUMBER DATE	STATE OF MAINE DEPARTMENT OF TRANSPORTATION **NH-1910(900)E** PIN 19109.00 HIGHWAY PLANS



STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

NH-1910(900)E

PIN
19109.00

HIGHWAY PLANS

	BY	DATE
PROJ. MANAGER	----------	----------
DESIGN: DETAILED	C.GROSS	AUG. 2015
DESIGN: CHECKED	-----	-----
DESIGN: DETAILED2	-----	-----
DESIGN: DETAILED3	-----	-----
REVISIONS 1	-----	-----
REVISIONS 2	-----	-----
REVISIONS 3	-----	-----
REVISIONS 4	-----	-----
FIELD CHANGES	-----	-----

SIGNATURE

P.E. NUMBER

DATE

BRIDGTON - FRYEBURG
ROUTE 302

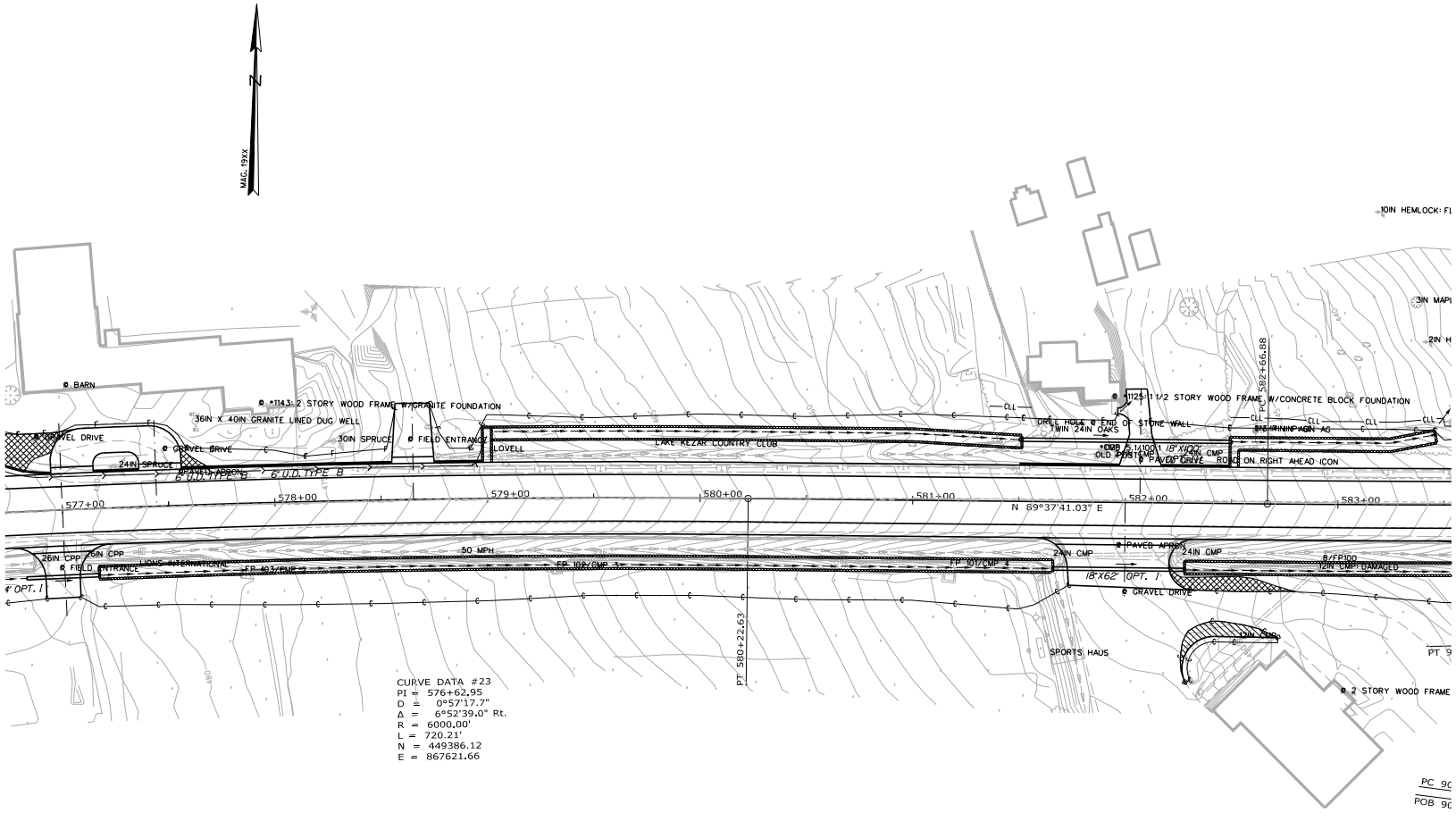
GEOPLANS

SHEET NUMBER

41

OF 43

Filename: ...\GEOTECH\MSTA\041_Geoplan41.dgn Division: HIGHWAY Username: karen.gross Date:2/27/2015



STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

NH-1910(900)E

PIN
19109.00

HIGHWAY PLANS

		BY	DATE
PROJ. MANAGER	----------		
DESIGN: DET'ALED	C.GROSS	T. WHITE	AUG. 2015
DESIGN: SEMI-DET'ALED	----------	----------	----------
DESIGN: DET'AILED 2	----------	----------	----------
DESIGN: DET'AILED 3	----------	----------	----------
REVISIONS 1	----------	----------	----------
REVISIONS 2	----------	----------	----------
REVISIONS 3	----------	----------	----------
REVISIONS 4	----------	----------	----------
FIELD CHANGES	----------	----------	----------

SIGNATURE

P.E. NUMBER

DATE

BRIDGTON - FRYEBURG
ROUTE 302

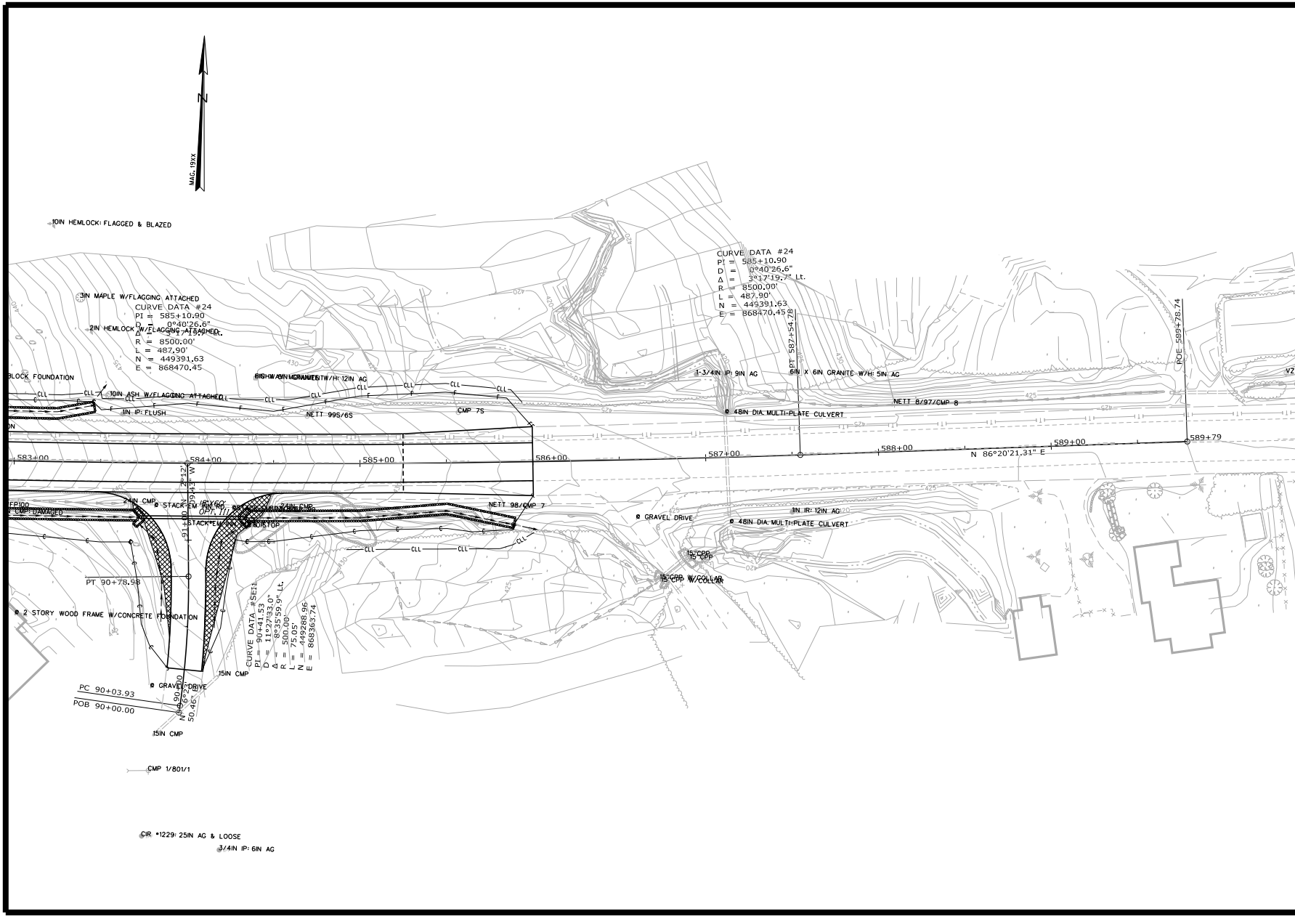
GEOPLANS

SHEET NUMBER

42

OF 43

Filename: ...\GEOTECH\MSTA\042_Geoplan42.dgn Division: HIGHWAY Username: karen.gross Date:2/27/2015



Filename: ...\GEOTECH\MSTA\043_Geoplan43.dgn Division: HIGHWAY Username: karen.gross Date:2/27/2015

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

NH-1910(900)E

PIN
19109.00

HIGHWAY PLANS

	BY	DATE
PROJ. MANAGER	----------	-----
DESIGN: DET'ALED	K.GROSS	AUG. 2015
DESIGN: DET'ALED1	-----	-----
DESIGN: DET'ALED2	-----	-----
DESIGN: DET'ALED3	-----	-----
REVISIONS 1	-----	-----
REVISIONS 2	-----	-----
REVISIONS 3	-----	-----
REVISIONS 4	-----	-----
FIELD CHANGES	-----	-----

SIGNATURE

P.E. NUMBER

DATE

BRIDGTON - FRYEBURG
ROUTE 302

GEOPLANS

SHEET NUMBER

43

OF 43