

Maine Department of Transportation
Highway Program

GEOTECHNICAL SERIES 100 REPORT

Route 1
Ellsworth, Maine

Prepared by:
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Hancock County

WIN 19204.00
Federal Number AC-IB-1920(400)X
February 6, 2012

Soils Report No. 2012-110

Highway Program

Brad Foley, Program Manager

Memorandum

DATE: February 6, 2012

TO: Shawn Davis

DEPT: Region 4

FROM: Scott A. Hayden

DEPT: Highway Program

SUBJECT: Geotechnical Pavement Report – Ellsworth Route 1, WIN 19204.00
Report # 2012-110

Project Description

A geotechnical pavement assessment investigation has been conducted for a 3.0 mile portion of Route 1 in the town of Ellsworth. The investigation included the drilling of pavement cores, falling weight deflectometer testing, and ground penetrating radar testing.

The project begins 1.11 miles north of the Ellsworth/Orland town line and extends north 3.0 miles to 0.10 miles north of North Bend Road.

A beginning project stationing of 407+12 (RLM 184.26) was provided in the field by Region 4 personnel. All other station reference is provided as determined by an electronic distance measuring instrument (DMI). All offsets are referenced from the yellow traffic centerline (unless otherwise noted).

Existing Pavement Conditions/ARAN Data

The existing roadway consists of two 12-foot travel lanes with 8-foot paved shoulders. Truck lanes are present northbound between stations 488+50 – 508+33 and 537+38 – 561+48. Pavement distress is slight to moderate consisting primarily of longitudinal cracking with some slight rutting.

ARAN data was collected for this project in 2010. A summary of this data is presented in Table 1 below. A detailed explanation of this data is presented on the next page. A complete listing of the ARAN data is listed in the attached Pavement Performance Summary Sheet.

Table 1: Summary of 2010 ARAN Pavement Data

ARAN Pavement Data	Range	Average
Pavement Condition Rating (PCR)	3.03 – 3.87	3.43
International Roughness Index (IRI)	113 - 169	143
Rut Depth (left)	0.2" – 0.3"	0.22"
Rut Depth (right)	0.1" – 0.2"	0.17"

Pavement Condition Rating (PCR)

PCR is defined as the composite condition of the pavement on a roadway. The PCR is compiled from the severity and extent of pavement distresses such as cracking, rutting, and ride quality. The rating system uses a scale of 5.00 (perfect) to 0.00 (fully deteriorated). The PCR is the condition of the pavement only, not necessarily a reflection of the condition of the roadway base structure. A description PCR rating follows:

Scale Value	Scale Rating	Description
5	Excellent	New or nearly new pavements. Free of cracks, patches or rutting.
4	Good	Pavements exhibit little to no visible signs of surface deterioration. Evidence of initial cracking or rutting.
3	Fair	Visible defects including moderate cracking, distortion and rutting. Some patching may now be present.
2	Poor	Pavement deterioration consisting of advanced cracking and severe distortion. Extensive patching and rutting also present.
1	Very Poor	Extremely deteriorated pavements. Defects include severe cracking, distortion, rutting and typically very extensive patching.

The PCR rating for this project ranges from 3.03 – 3.87 with an average PCR of 3.42. The lowest PCR value (3.03) was encountered between stations 407+12 – 428+24.

International Roughness Index (IRI)

Ride quality is expressed in terms of International Roughness Index (IRI) and is measured in inches per mile. IRI is a measurement of the inches of vertical displacement experienced by a vehicle in a mile of roadway. The lower the IRI, the smoother the ride will be. A description IRI scale follows:

IRI Value (In./mile)	Ride Rating
< 100	Good Ride
100 - 170	Fair Ride
> 170	Poor Ride

The IRI value for this project ranged between 113 in/mile and 169 in/mile with an average IRI value of 143 in/mile. The poorest IRI value was encountered between stations 492+13 – 520+64.

Wheel Path Rutting Values

Wheel path rutting values are measured in inches and are presented in the ARAN pavement data every 50 feet. Rutting depths ranged between 0.2" – 0.3" in the inside wheel path and 0.1" – 0.2" in the outside wheel path. The worse rutting was encountered in the inside wheel path between stations 428+77 and 457+28.

FWD Results

FWD data was collected every 250 feet along the northbound travel lane at an approximate offset of 9' right.

FWD Deflections

Pavement Layer Deflection - FWD deflection data for the pavement layer varies. Increased pavement deflections and spikes were encountered at the following stations:

Increased Deflections	Deflection Spikes
412+00 – 422+00	415+00
425+00 – 435+00	419+62
459+00 – 467+00	429+63
477+00 – 481+00	459+63
490+00 – 493+00	479+63
502+00 – 523+00	492+14
535+00 – 538+00	522+13
544+00 – 547+50	562+17
559+50 – 564+00	

Underlying Layer Deflections - FWD deflections in the lower layers generally mirror the pavement deflections. Deflections are particularly higher or less uniform between the following stations:

410+00 – 429+00	504+00 – 515+00
445+00 – 448+00	520+00 – 523+00
475+00 – 482+00	535+00 – 538+00
489+00 – 493+00	554+00 – 555+00
	560+00 – 564+00

These deflection increases may indicate the presence of moist to wet soil conditions.

FWD Analysis

DARWin calculations were conducted based upon 2011 traffic data. The following variables were used:

Design Life: 12 years, Future 18-kip ESAL's (Design Life): 1,042,440, Reliability Level: 95%

Pavement depths for these calculations were taken from Ground Penetrating Radar estimates. A gravel depth of 24 inches was assumed for the entire project. From station 492+14 to 509+63 and from station 540+26 to 557+14, FWD testing was completed in the truck lane. A summary of the FWD analysis is shown in Table 2.

Table 2: Summary of FWD Analysis

Design Variables	% Exceeding Existing SN	Range	Average	75 Percentile
Existing SN exceeds Future SN	100%			
Pavement Modulus (psi)		40,447 – 143,688	84,534	71,090
Subgrade Resilient Modulus (psi)		4,146 – 13,386	6,610	5,910

Coring/GPR Information

Existing pavement thickness estimates have been provided based upon pavement coring and ground penetrating radar data.

Coring Data

Thirty pavement cores were obtained using a hand held, gas powered, coring machine utilizing a 2" thin wall core bit. Pavement cores were drilled at the following stations: 423+00, 463+00, 490+00, 530+00, and 559+57. (See pavement core summary sheets). Pictures of the pavement cores are included at the back of this report. A summary/comparison of the existing pavement thickness derived from coring data verses the GPR data is shown in Table 3 below.

GPR Data

GPR data was collected in the left and right wheel path of both the North and South bound lanes. Data was also collected in the left and right wheel path of the two northbound truck lanes. Data was collected at high speed using an air launch antenna at 1 foot intervals along the entire project.

Pavement thickness estimates were developed every foot using Geophysical Survey Systems Inc. (GSSI) RADAN GPR Data Processing Software and pavement core data (where available). These values were averaged to produce an estimated pavement thickness every 100'. This information is presented on the GPR Estimated Pavement Thickness Summary sheets found at the back of this report.

A summary/comparison of the GPR and pavement core data is presented below in Table 3.

Table 3: Pavement Thickness Summary/Comparison

	South	North	Shoulders	Truck/Turn
	Travel	Travel		Lane
	Lanes	Lanes		
Pavement Core Data				
Range of Thickness(in)	7.5 – 10.0	7.5 – 11.0	1.25 – 1.75	8.5 – 9.5
Average Thickness(in)	6.1	6.3	1.5	8.0
Ground Penetrating Radar Data				
Range of GPR Pavement Thickness(in)	5.9 – 10.3		na	7.7 – 10.8
Average GPR Pavement Thickness(in)	7.8		na	9.2

Pavement Performance Assessment Summary Sheet (PPAS)

A pavement performance assessment summary (PPAS) has been created utilizing FWD and ARAN data. The purpose of the PPAS is to highlight potential areas along the project that may not be performing as well as other areas. Six potential performance criteria are used to provide this relative performance assessment. The 6 criteria are listed and explained below:

1. Existing Structural Number (SN) is less than the Future Structural Number (FWD Data) - If the existing SN is less than the future SN at any station along the project an X will be placed in the corresponding column and the box will be shaded.
2. Increased FWD Pavement Deflections (FWD Data) – If pavement deflections on the FWD deflection plots show a relative increase an X will be placed in the column for the corresponding station and the box will be shaded.
3. IRI > 150 (ARAN Data) – A complete listing of all ARAN IRI values collected for the project are listed on the PPAS in the IRI column. If the IRI value becomes greater than 150 (indicating a reduction in ride performance) for any station the box will be shaded on the PPAS. This information includes the complete data collection from the ARAN inventory for the project rather than just the node data points supplied in ProjEx.
4. PCR < 3.5 (ARAN Data) – A complete listing of all ARAN PCR values collected for the project are listed on the PPAS in the PCR column. If the PCR value becomes 3.5 or less (indicating increased pavement deterioration) for any station the box will be shaded on the PPAS. This information includes the complete data collection from the ARAN inventory for the project rather than just the node data points supplied in ProjEx.
5. Left Rut Depth (ARAN Data) – A complete listing of all left rut depth values collected for the project are listed on the PPAS in the rut depth column. If the left rut depth becomes 0.5" or greater the box will be shaded on the PPAS. This information includes the complete data collection from the ARAN inventory for the project rather than just the node data points supplied in ProjEx.
6. Right Rut Depth (ARAN Data) – A complete listing of all right rut depth values collected for the project are listed on the PPAS in the rut depth column. If the right rut depth becomes 0.5" or greater the box will be shaded on the PPAS. This information includes the complete data collection from the ARAN inventory for the project rather than just the node data points supplied in ProjEx.

The number of shaded boxes are totaled for each station and listed in the deficient column (Def). If the total listed becomes 3 or greater the box will then be shaded. Thus any shaded area on the PPAS represents a poorer performing area relative to the rest of the project. See Pavement Performance Assessment Summary Sheet.

PPAS Conclusions

Based upon the pavement performance assessment summary sheet, existing/future pavement performance conditions may be relatively lower between stations: 410+00 – 443+00, 477+00 – 505+00, 560+00 – 566+00.

Potentially, the lowest performing areas are between stations 414+00 – 429+00, 477+00 - 495+00.

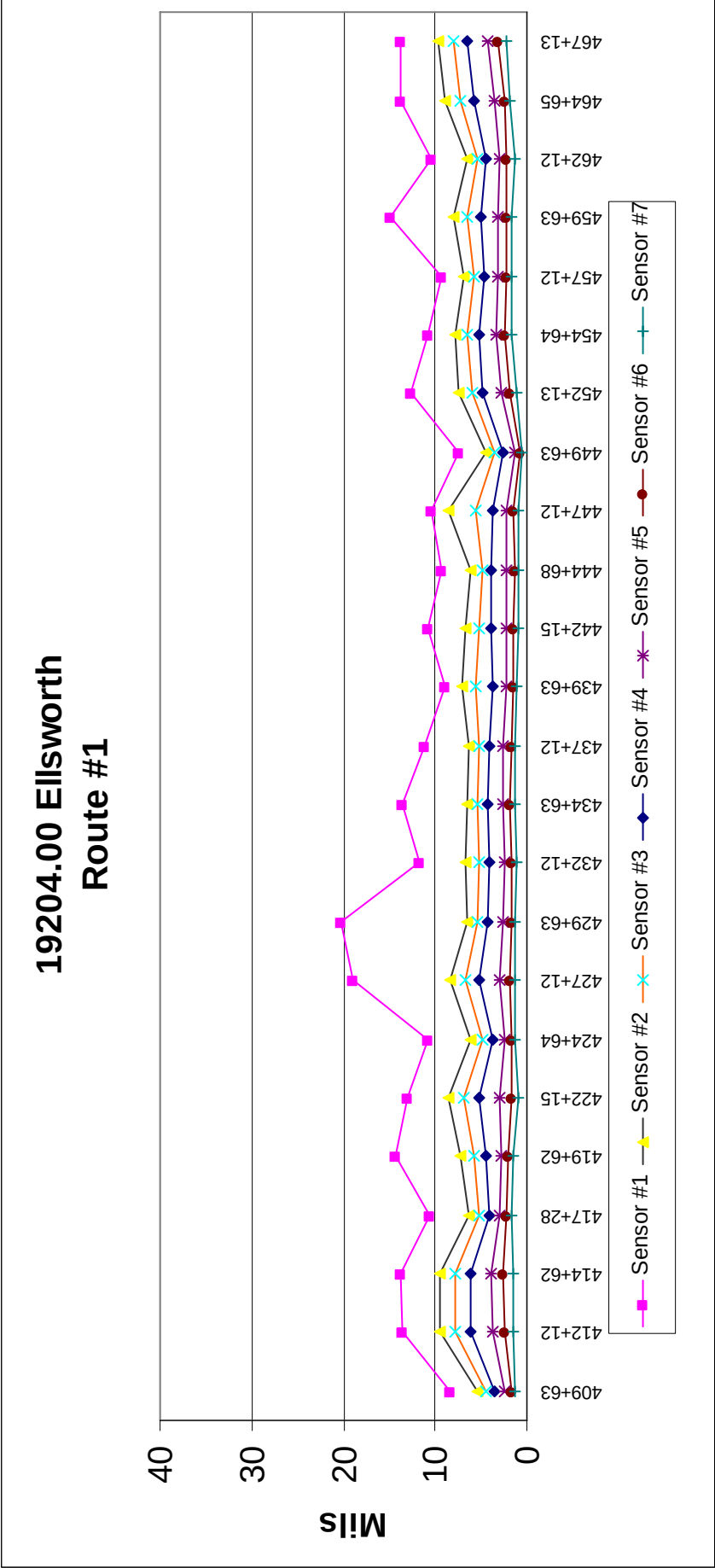
Pavement Performance Assessment Summary
(PPAS)
Ellsworth Route 1
19204.00

				FWD DATA		ARAN DATA			
Station	RLM	Inv Yr	Def (≥ 3)	Existing SN Less Than Future SN	Increased and/or Non-Uniform FWD Pavement Deflections	PCR < 3.5	IRI > 150	Rut Depth > 0.5"	
								Left (in.)	Right (in.)
403+95	184.2		1			3.0	127	0.2	0.2
408+70	184.29		1			3.0	127	0.2	0.2
410+81	184.33		2		X	3.0	127	0.2	0.2
411+87	184.35		2		X	3.0	127	0.2	0.2
413+45	184.38		2		X	3.0	127	0.2	0.2
413+98	184.39		3		X	3.4	156	0.3	0.2
416+09	184.43		3		X	3.4	156	0.3	0.2
418+73	184.48		3		X	3.4	156	0.3	0.2
419+26	184.49		3		X	3.4	156	0.3	0.2
419+79	184.5		3		X	3.4	156	0.3	0.2
420+32	184.51		3		X	3.4	156	0.3	0.2
420+85	184.52		3		X	3.4	156	0.3	0.2
428+77	184.67		3		X	3.4	156	0.3	0.2
442+49	184.93		2			3.4	156	0.3	0.2
445+66	184.99		1		X	3.9	113	0.2	0.2
460+97	185.28		0			3.9	113	0.2	0.2
469+42	185.44		0			3.9	113	0.2	0.2
474+17	185.53		1		X	3.9	113	0.2	0.2
477+34	185.59		3		X	3.3	169	0.2	0.1
485+79	185.75		3		X	3.3	169	0.2	0.1
490+01	185.83		3		X	3.3	169	0.2	0.1
491+60	185.86		3		X	3.3	169	0.2	0.1
492+13	185.87		3		X	3.3	169	0.2	0.1
494+77	185.92		3		X	3.3	169	0.2	0.1
496+88	185.96		2			3.3	169	0.2	0.1
498+46	185.99		2			3.3	169	0.2	0.1
500+57	186.03		2			3.3	169	0.2	0.1
503+74	186.09		3		X	3.3	169	0.2	0.1
505+85	186.13		3		X	3.3	169	0.2	0.1
509+02	186.19		1		X	3.7	122	0.2	0.2
511+13	186.23		1		X	3.7	122	0.2	0.2
533+31	186.65		1		X	3.7	122	0.2	0.2
534+37	186.67		1		X	3.7	122	0.2	0.2
537+53	186.73		1		X	3.7	122	0.2	0.2
538+06	186.74		1		X	3.7	122	0.2	0.2
540+70	186.79		1			3.3	143	0.2	0.2
543+34	186.84		1			3.3	143	0.2	0.2
548+09	186.93		1			3.3	143	0.2	0.2
549+68	186.96		1			3.3	143	0.2	0.2

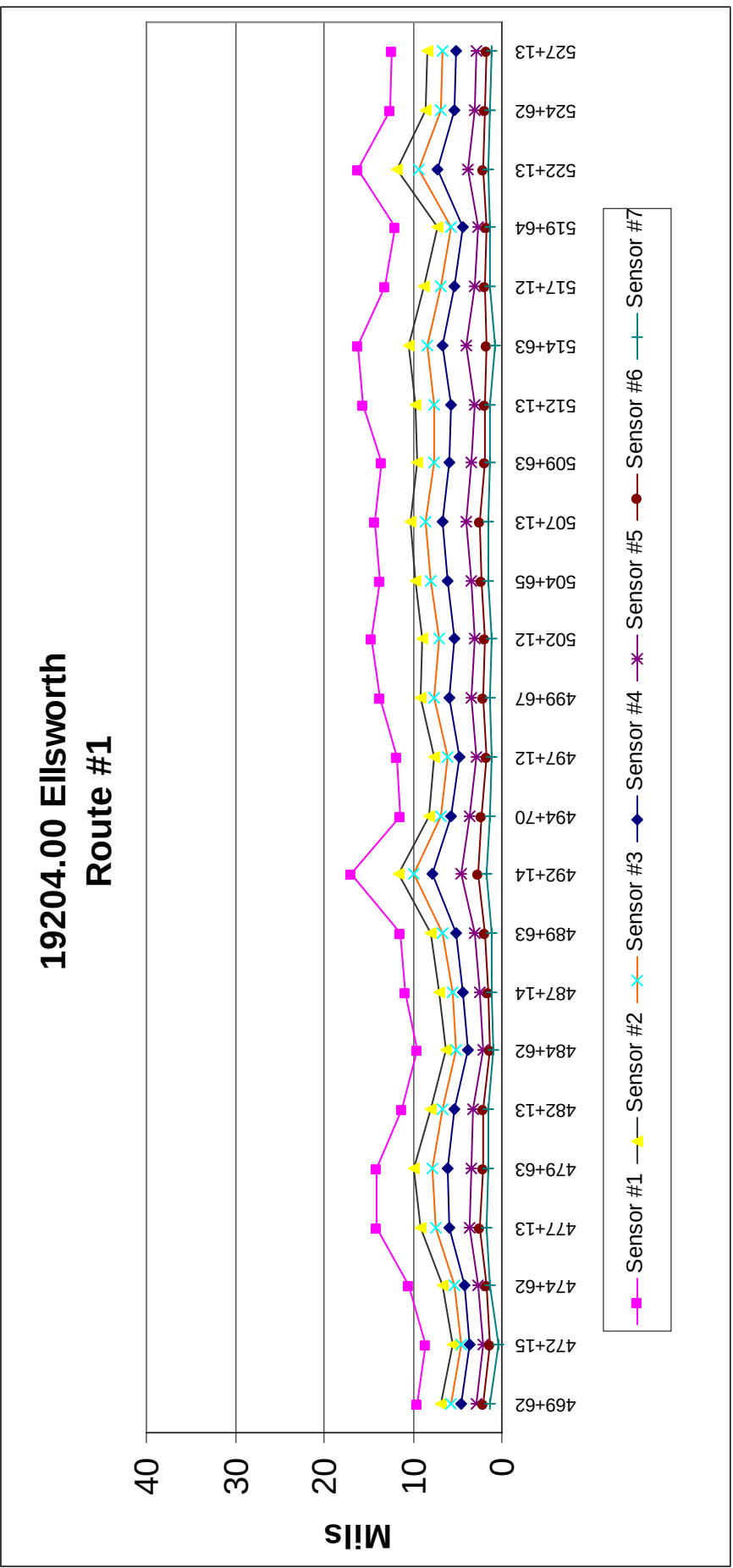
Ellsworth Route 1
19204.00

				FWD DATA		ARAN DATA			
Station	RLM	Inv Yr	Def (≥ 3)	Existing SN Less Than Future SN	Increased and/or Non-Uniform FWD Pavement Deflections	PCR < 3.5	IRI > 150	Rut Depth > 0.5"	
550+73	186.98		1			3.3	143	0.2	0.2
553+37	187.03		1			3.3	143	0.2	0.2
553+90	187.04		1			3.3	143	0.2	0.2
554+43	187.05		2		X	3.3	143	0.2	0.2
554+96	187.06		2		X	3.3	143	0.2	0.2
555+49	187.07		2		X	3.3	143	0.2	0.2
556+01	187.08		1			3.3	143	0.2	0.2
557+07	187.1		1			3.3	143	0.2	0.2
558+13	187.12		1			3.3	143	0.2	0.2
559+18	187.14		1			3.3	143	0.2	0.2
559+71	187.15		1			3.3	143	0.2	0.2
560+24	187.16		2		X	3.3	143	0.2	0.2
560+77	187.17		2		X	3.3	143	0.2	0.2
561+29	187.18		2		X	3.3	143	0.2	0.2
561+82	187.19		2		X	3.3	143	0.2	0.2
562+35	187.2		2		X	3.3	143	0.2	0.2
562+88	187.21		2		X	3.3	143	0.2	0.2
563+41	187.22		2		X	3.3	143	0.2	0.2
564+46	187.24		2		X	3.3	143	0.2	0.2
564+99	187.25		2		X	3.3	143	0.2	0.2
565+52	187.26		2		X	3.3	143	0.2	0.2
AVERAGE			1.8			3.4	144	0.22	0.18

FWD Deflection Plots

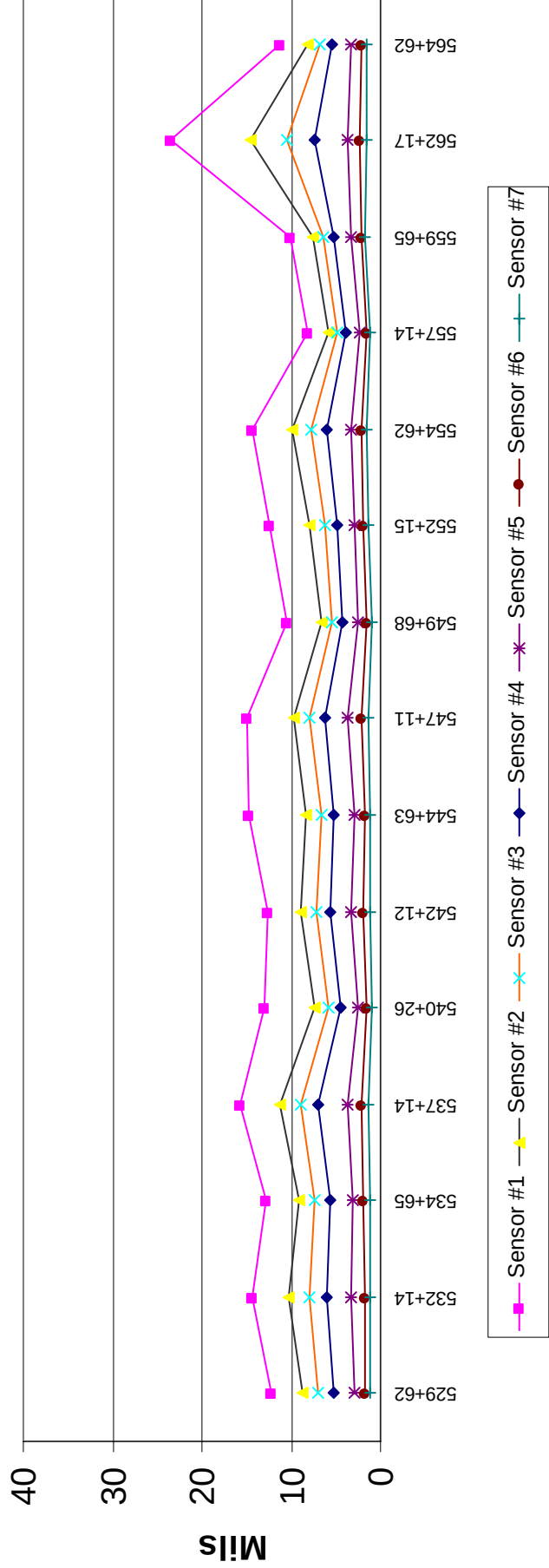


FWD Deflection Plots



FWD Deflection Plots

19204.00 Ellsworth
Route #1



19204.00 Ellsworth

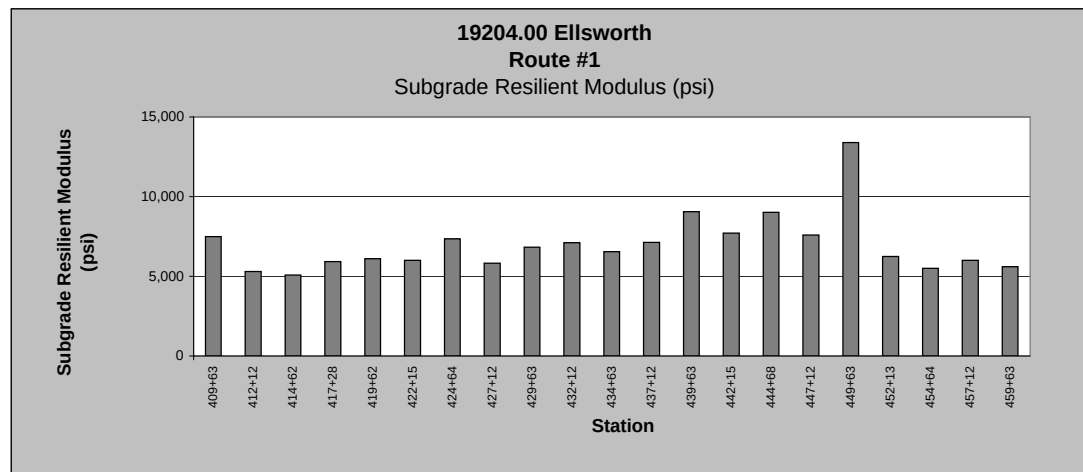
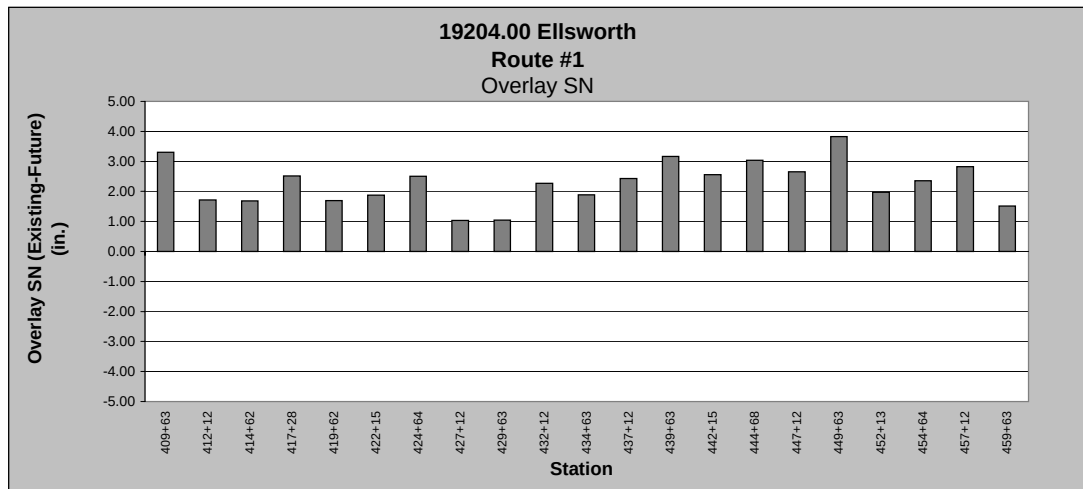
Route #1

Station (Feet)	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)
409+63	6.90	3.60	3.30	-	133,703	7,490	8.0	30.0
412+12	5.78	4.06	1.72	-	78,334	5,304	7.9	30.0
414+62	5.80	4.12	1.68	-	79,247	5,084	8.6	30.0
417+28	6.43	3.91	2.52	-	108,175	5,930	8.6	30.0
419+62	5.57	3.87	1.70	-	70,109	6,113	8.7	30.0
422+15	5.77	3.89	1.88	-	77,902	6,003	8.1	30.0
424+64	6.13	3.62	2.51	-	93,774	7,347	7.7	30.0
427+12	4.96	3.93	1.03	-	49,621	5,833	7.1	30.0
429+63	4.76	3.72	1.04	-	43,761	6,835	8.2	30.0
432+12	5.94	3.67	2.27	-	85,264	7,106	7.7	30.0
434+63	5.66	3.77	1.89	-	73,555	6,549	8.0	30.0
437+12	6.10	3.67	2.43	-	92,064	7,121	8.5	30.0
439+63	6.53	3.36	3.17	-	113,165	9,057	8.2	30.0
442+15	6.12	3.56	2.56	-	93,331	7,719	8.2	30.0
444+68	6.41	3.37	3.04	-	106,846	9,011	7.0	30.0
447+12	6.23	3.58	2.65	-	98,427	7,585	7.0	30.0
449+63	6.75	2.92	3.83	-	124,930	13,386	6.5	30.0
452+13	5.81	3.84	1.97	-	79,612	6,251	6.6	30.0
454+64	6.37	4.01	2.36	-	104,983	5,509	7.2	30.0
457+12	6.71	3.89	2.82	-	122,654	6,012	7.1	30.0
459+63	5.49	3.98	1.51	-	67,216	5,602	6.8	30.0

Possible Weak Soils (<3000)

Possible Shallow Bedrock (>8000)

Gravel Depth was estimated for this project (24"). Pavement depths were taken from Ground Penetrating Radar Summary Sheet.



**19204.00 Ellsworth
Route #1**

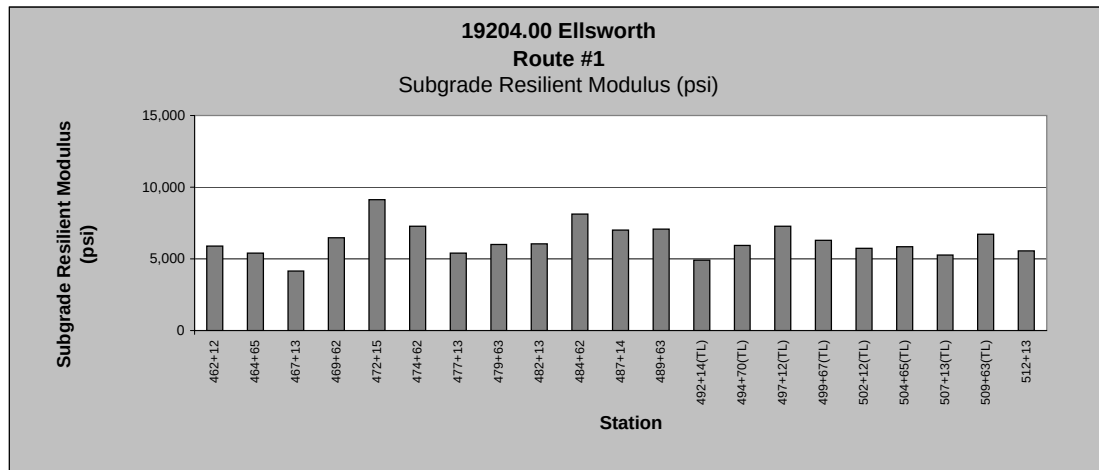
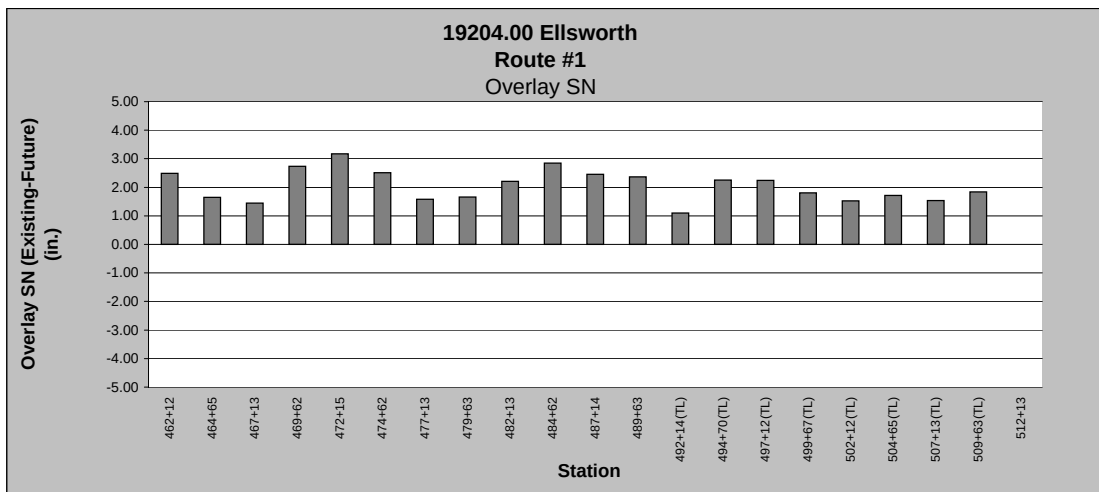
Station (Feet)	Existing Structural Number (in.)	Future Traffic Structural Number (in.)	Overlay Structural Number (Existing - Future)	Recommended Pavement Thickness (in.)	Pavement Modulus (psi)	Subgrade Resilient Modulus (psi)	Pavement Depth (in)	Combined Pavement/Gravel Depth Used for Calculation (in)
462+12	6.41	3.92	2.49	-	106,893	5,886	7.1	30.0
464+65	5.69	4.04	1.65	-	74,718	5,398	7.1	30.0
467+13	5.86	4.41	1.45	-	81,958	4,146	7.3	30.0
469+62	6.52	3.79	2.73	-	112,477	6,481	7.7	30.0
472+15	6.52	3.35	3.17	-	112,806	9,138	7.2	30.0
474+62	6.15	3.64	2.51	-	94,622	7,276	7.2	30.0
477+13	5.62	4.04	1.58	-	72,314	5,391	6.9	30.0
479+63	5.55	3.89	1.66	-	69,546	5,997	7.3	30.0
482+13	6.09	3.88	2.21	-	91,997	6,049	7.5	30.0
484+62	6.35	3.50	2.85	-	104,269	8,121	7.5	30.0
487+14	6.14	3.69	2.45	-	94,281	6,999	8.0	30.0
489+63	6.03	3.67	2.36	-	89,029	7,086	8.0	30.0
492+14(TL)	5.27	4.17	1.10	-	59,427	4,915	9.8	30.0
494+70(TL)	6.15	3.90	2.25	-	94,694	5,939	10.1	30.0
497+12(TL)	5.88	3.64	2.24	-	82,748	7,286	9.2	30.0
499+67(TL)	5.63	3.83	1.80	-	72,498	6,285	10.5	30.0
502+12(TL)	5.47	3.95	1.52	-	66,415	5,727	8.0	30.0
504+65(TL)	5.64	3.93	1.71	-	73,009	5,849	8.2	30.0
507+13(TL)	5.61	4.07	1.54	-	71,598	5,274	7.9	30.0
509+63(TL)	5.58	3.74	1.84	-	70,579	6,725	7.9	30.0
512+13	5.35	4.00	-	-	62,144	5,557	7.8	30.0

Possible Weak Soils (<3000)

Possible Shallow Bedrock (>8000)

Gravel Depth was estimated for this project (24"). Pavement depths were taken from Ground Penetrating Radar Summary Sheet.

TL - Indicates FWD test was performed in the Truck lane



**19204.00 Ellsworth
Route #1**

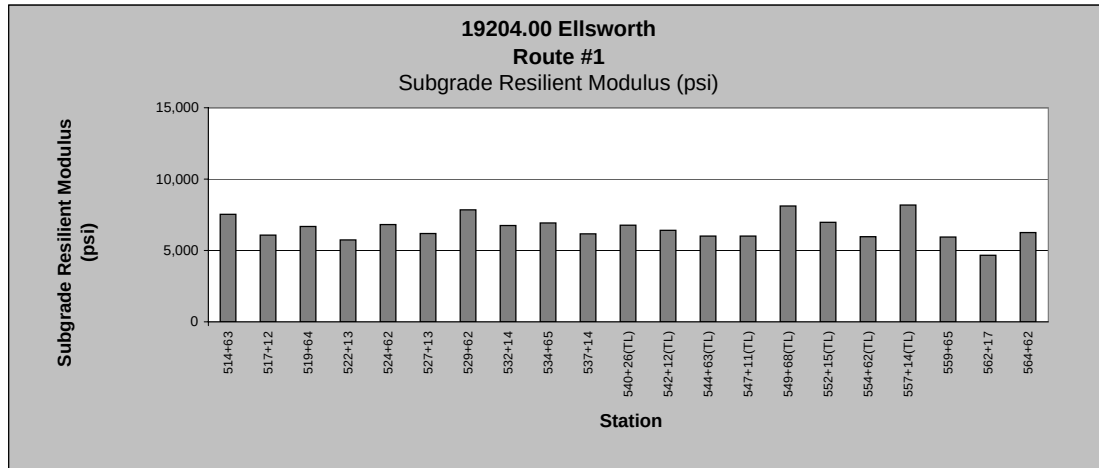
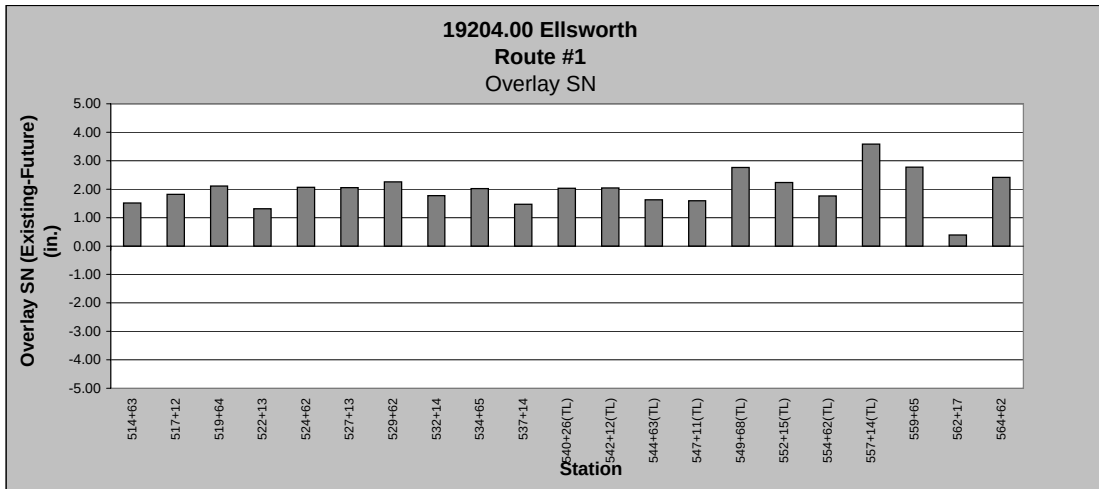
Station (Feet)	Existing Structural Number (in.)	Future Traffic Structural Number (in.)	Overlay Structural Number (Existing - Future)	Recommended Pavement Thickness (in.)	Pavement Modulus (psi)	Subgrade Resilient Modulus (psi)	Pavement Depth (in)	Combined Pavement/Gravel Depth Used for Calculation (in)
514+63	5.10	3.59	1.51	-	53,827	7,544	8.4	30.0
517+12	5.69	3.87	1.82	-	74,900	6,079	7.8	30.0
519+64	5.86	3.75	2.11	-	81,973	6,677	7.4	30.0
522+13	5.26	3.95	1.31	-	59,040	5,734	7.9	30.0
524+62	5.78	3.72	2.06	-	78,501	6,823	8.7	30.0
527+13	5.90	3.85	2.05	-	83,311	6,179	9.4	30.0
529+62	5.80	3.54	2.26	-	79,493	7,856	9.3	30.0
532+14	5.51	3.74	1.77	-	67,888	6,743	9.3	30.0
534+65	5.72	3.70	2.02	-	76,090	6,925	7.9	30.0
537+14	5.32	3.85	1.47	-	61,193	6,176	8.0	30.0
540+26(TL)	5.76	3.73	2.03	-	77,561	6,781	9.7	30.0
542+12(TL)	5.84	3.80	2.04	-	80,811	6,403	9.6	30.0
544+63(TL)	5.51	3.89	1.62	-	68,126	6,018	9.4	30.0
547+11(TL)	5.48	3.89	1.59	-	66,797	6,005	9.0	30.0
549+68(TL)	6.26	3.50	2.76	-	99,564	8,119	9.4	30.0
552+15(TL)	5.92	3.69	2.23	-	84,467	6,965	9.0	30.0
554+62(TL)	5.66	3.90	1.76	-	73,532	5,973	10.8	30.0
557+14(TL)	7.07	3.49	3.58	-	143,688	8,192	10.7	30.0
559+65	6.67	3.90	2.77	-	120,405	5,942	9.1	30.0
562+17	4.63	4.24	0.39	-	40,447	4,662	6.0	30.0
564+62	6.25	3.84	2.41	-	99,313	6,252	8.1	30.0

Possible Weak Soils (<3000)

Possible Shallow Bedrock (>8000)

Gravel Depth was estimated for this project (24"). Pavement depths were taken from Ground Penetrating Radar Summary Sheet.

TL - Indicates FWD test was performed in the Truck lane

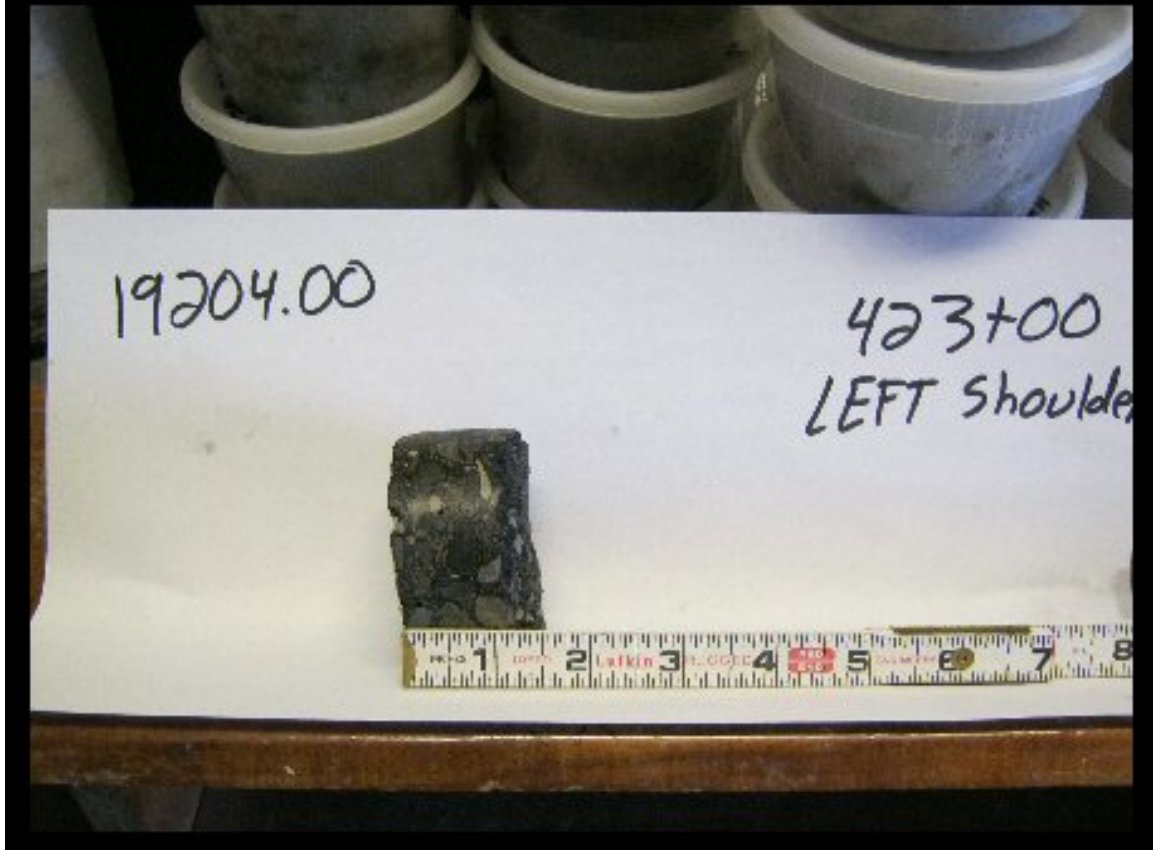


State of Maine - Department of Transportation

Pavement Core Summary Sheet**Town(s): Ellsworth****Work Number: 19204.00**

Station (Feet)	Offset (Feet)	Pavement Depth (Inches)	Unbound Pavement	PC- Number	Saved Core	Comments / Date 11/15/2011
423+00	LS	1.5				
423+00	9.0 Lt.	9.0				
423+00	3.0 Lt.	8.5				
423+00	3.0 Rt.	8.25				
423+00	9.0 Rt.	7.75				
423+00	RS	1.75				Right Shoulder
463+00	LS	1.5				Left Shoulder
463+00	9.0 Lt.	7.5				
463+00	3.0 Lt.	7.5				
463+00	3.0 Rt.	8.0				
463+00	9.0 Rt.	7.5				
463+00	RS	1.25				Right Shoulder
490+00	9.0 Lt.	8.5				
490+00	3.0 Lt.	8.5				
490+00	3.0 Rt.	9.0				
490+00	9.0 Rt.	8.25				
490+00	18.0 Rt.	8.25				Truck Lane
530+00	LS	1.75				Left Shoulder
530+00	9.0 Lt.	9.5				
530+00	3.0 Lt.	10.0				
530+00	3.0 Rt.	9.75				
530+00	9.0 Rt.	8.75				
530+00	RS	1.5				Right Shoulder
559+57	LS	5.75				
559+57	9.0 Lt.	8.25				
559+57	3.0 Lt.	8.75				
559+57	3.0 Rt.	9.5				
559+57	9.0 Rt.	11.0				
559+57	RS	9.5				Truck/Turn Lane
LS = Left Shoulder RS = Right Sholder						

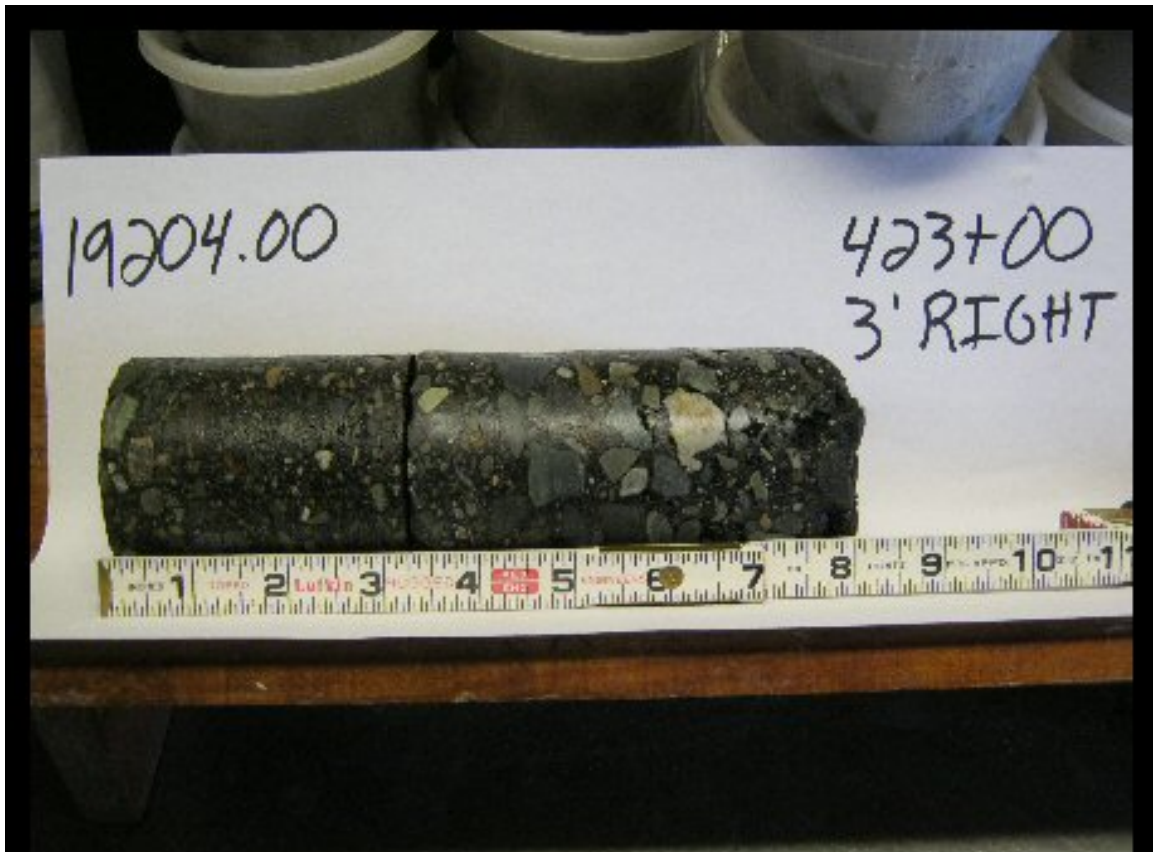
Ellsworth Route 1
19204.00
Pavement Core



Ellsworth Route 1
19204.00
Pavement Core



Ellsworth Route 1
19204.00
Pavement Core



Ellsworth Route 1
19204.00
Pavement Core



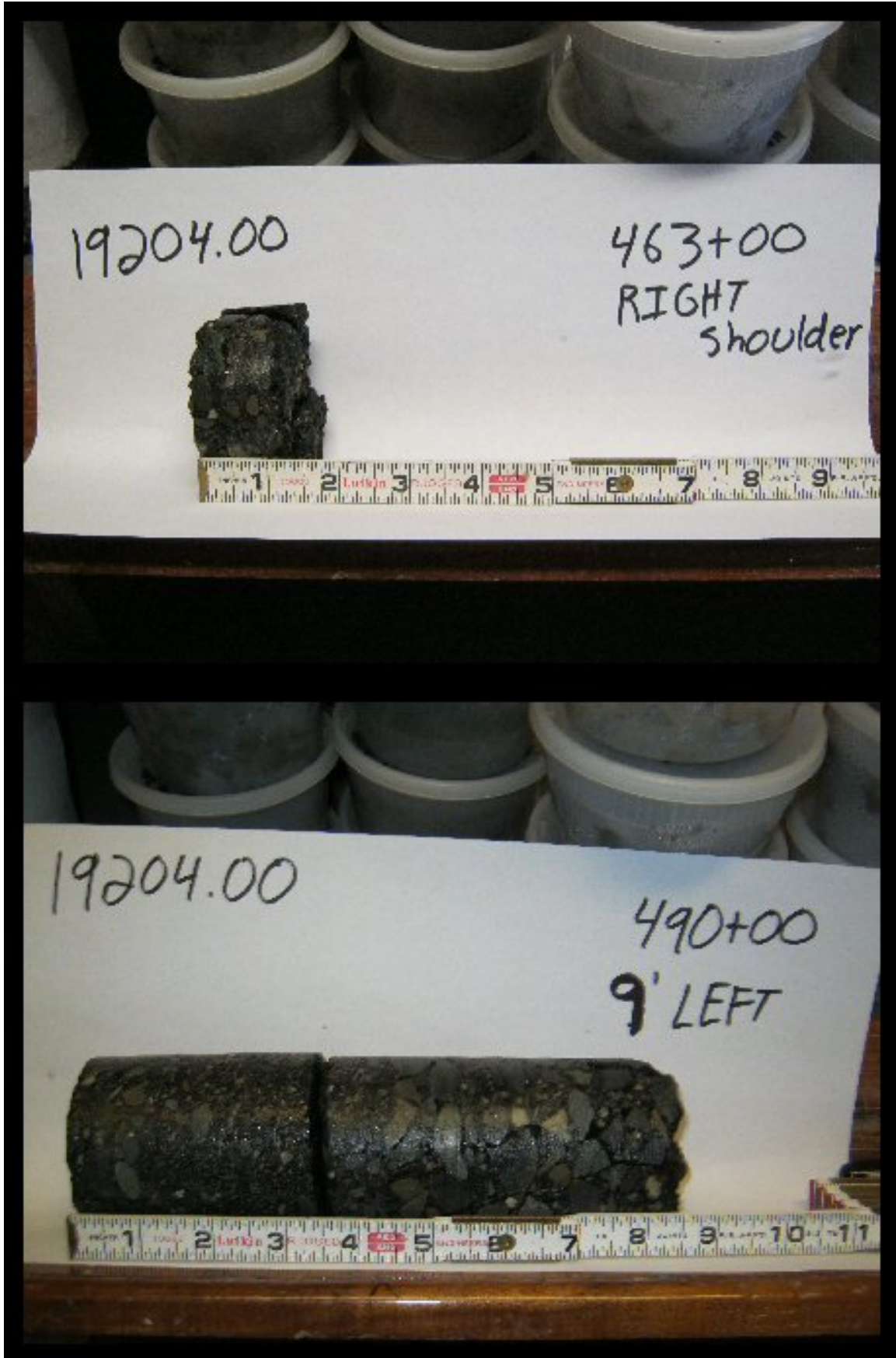
Ellsworth Route 1
19204.00
Pavement Core



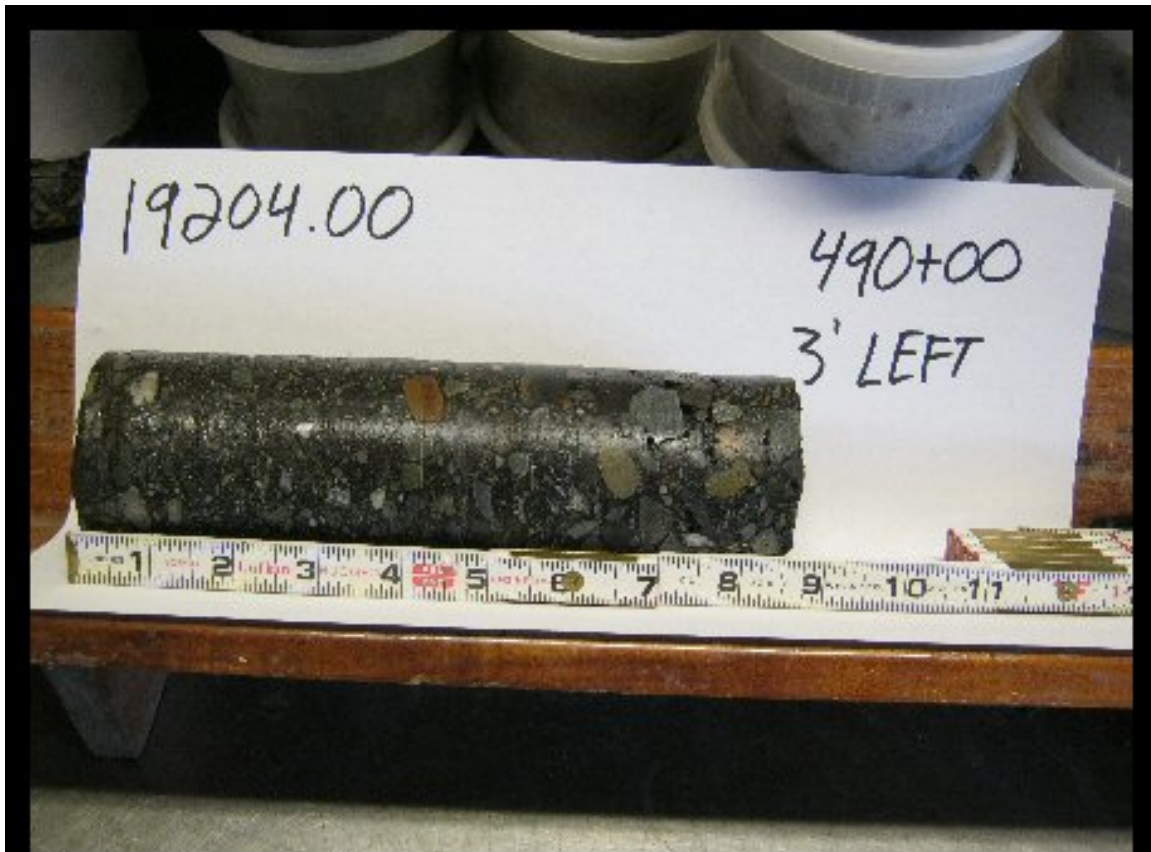
Ellsworth Route 1
19204.00
Pavement Core



Ellsworth Route 1
19204.00
Pavement Core



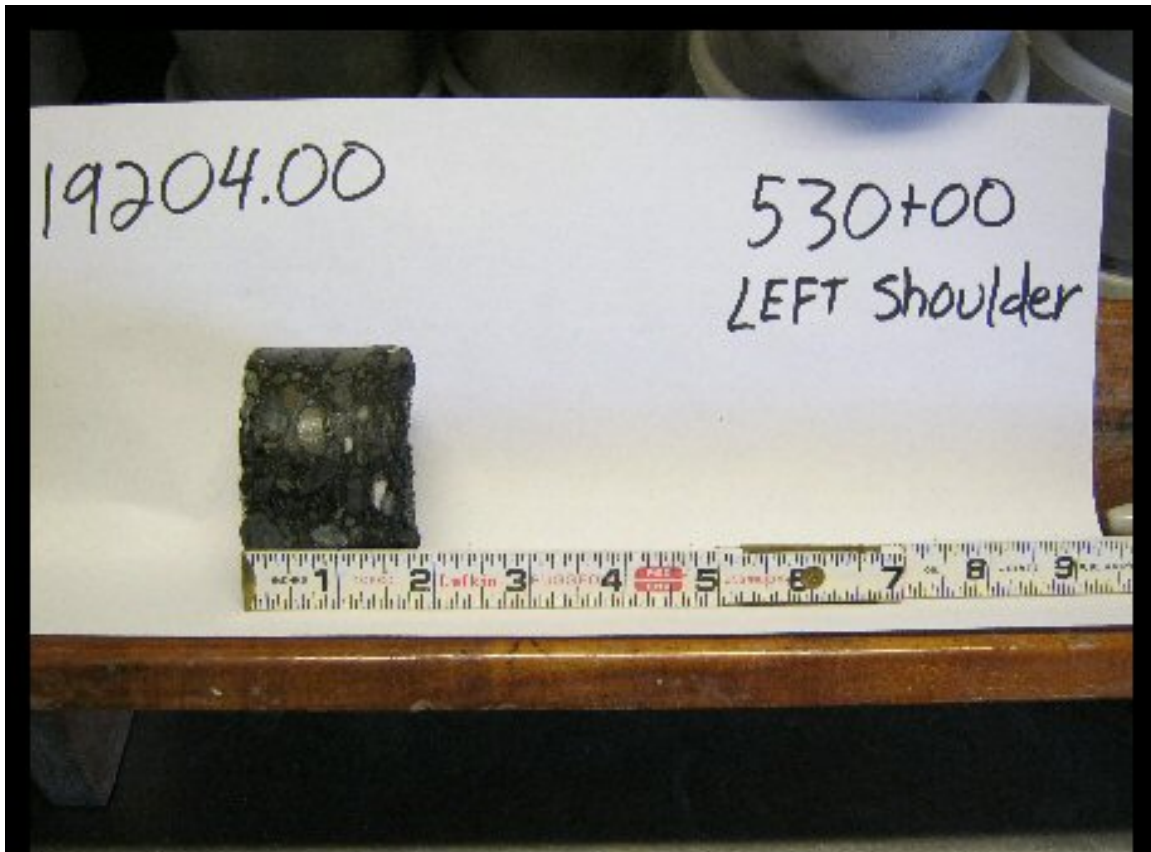
Ellsworth Route 1
19204.00
Pavement Core



Ellsworth Route 1
19204.00
Pavement Core



Ellsworth Route 1
19204.00
Pavement Core



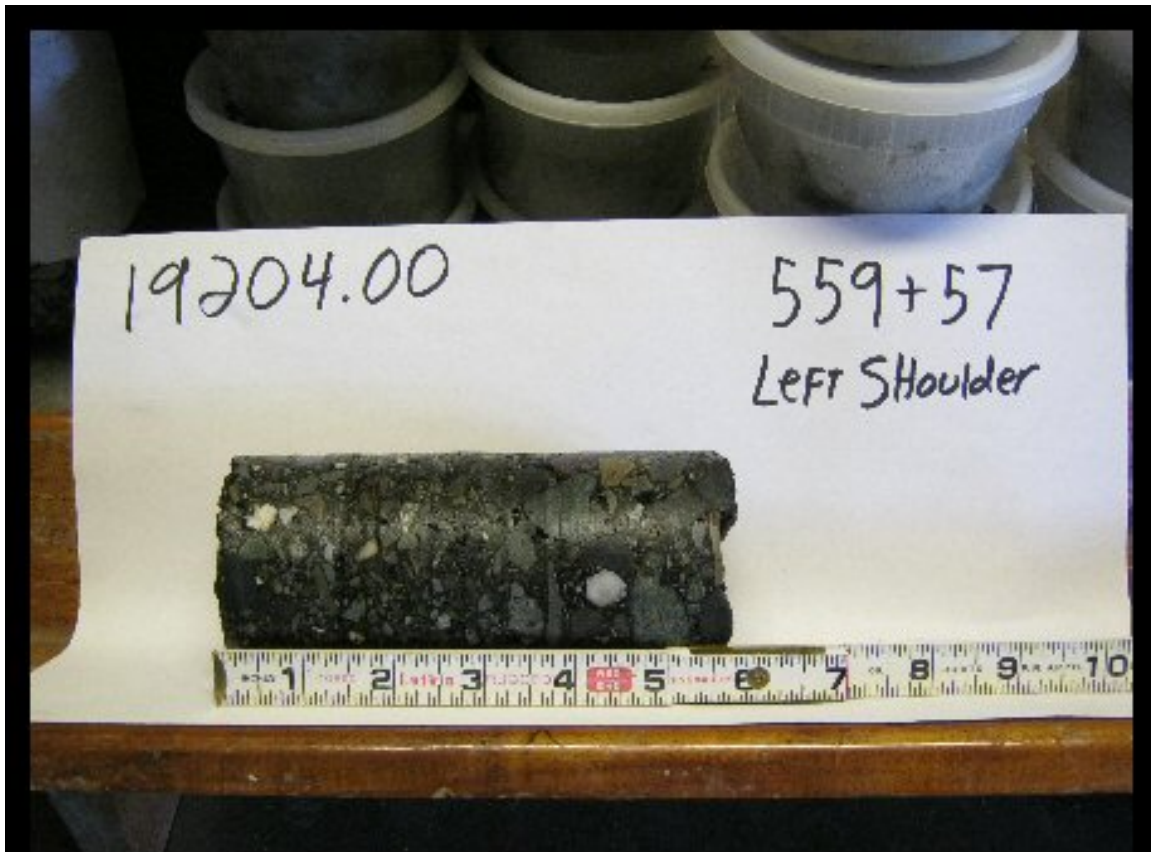
Ellsworth Route 1
19204.00
Pavement Core



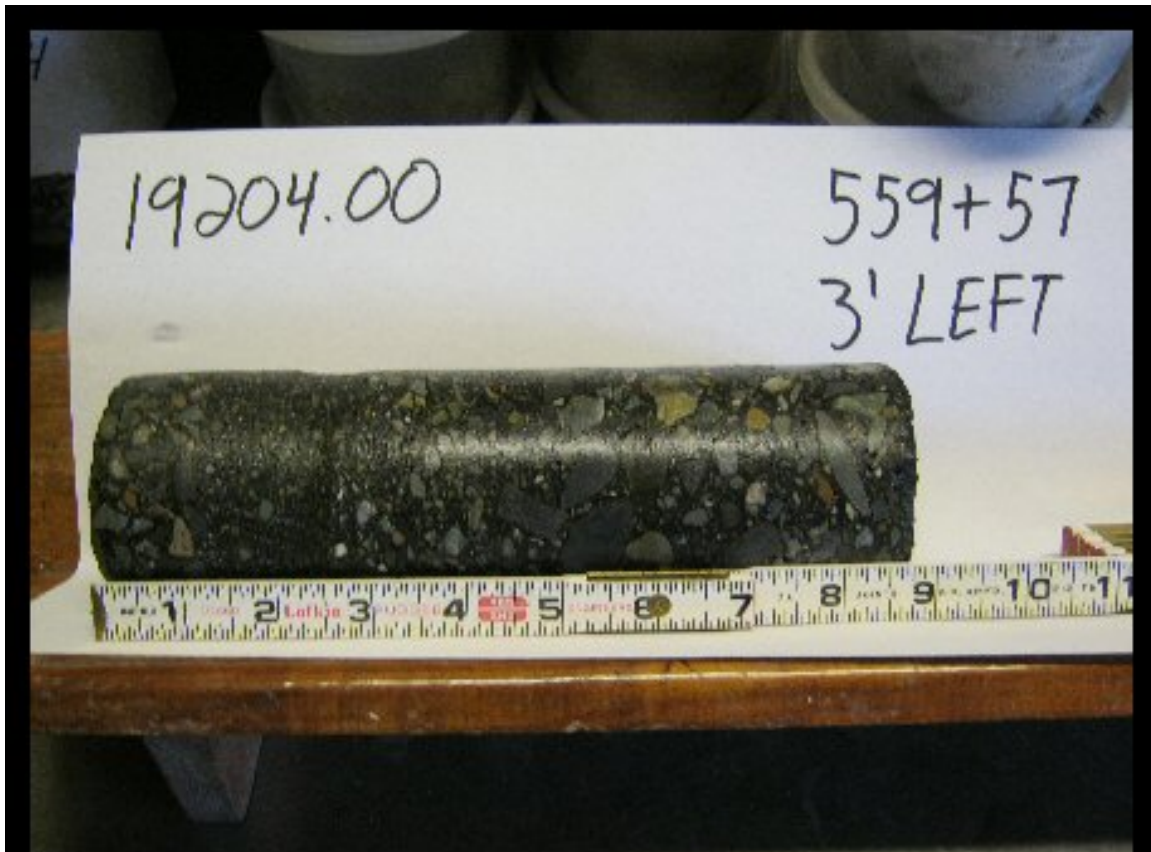
Ellsworth Route 1
19204.00
Pavement Core



Ellsworth Route 1
19204.00
Pavement Core



Ellsworth Route 1
19204.00
Pavement Core



Ellsworth Route 1
19204.00
Pavement Core



Ground Penetrating Radar (GPR)

Actual pavement thickness may vary.

19204.00 Ellsworth Route 1 (Mainline)

Station Limits		Average Depth (in)	Station Limits		Average Depth (in)	Station Limits		Average Depth (in)	Station Limits		Average Depth (in)
407+12	408+12	7.9	422+12	423+12	8.1	437+12	438+12	8.5	452+12	453+12	6.6
408+12	409+12	8.2	423+12	424+12	8.0	438+12	439+12	8.2	453+12	454+12	7.0
409+12	410+12	8.0	424+12	425+12	7.7	439+12	440+12	8.2	454+12	455+12	7.2
410+12	411+12	7.9	425+12	426+12	7.2	440+12	441+12	8.4	455+12	456+12	7.0
411+12	412+12	7.9	426+12	427+12	7.1	441+12	442+12	8.3	456+12	457+12	7.1
412+12	413+12	8.3	427+12	428+12	7.4	442+12	443+12	8.2	457+12	458+12	7.2
413+12	414+12	8.3	428+12	429+12	7.4	443+12	444+12	7.1	458+12	459+12	6.9
414+12	415+12	8.6	429+12	430+12	8.2	444+12	445+12	7.0	459+12	460+12	6.8
415+12	416+12	8.6	430+12	431+12	8.1	445+12	446+12	7.2	460+12	461+12	6.9
416+12	417+12	8.4	431+12	432+12	7.7	446+12	447+12	7.0	461+12	462+12	7.1
417+12	418+12	8.6	432+12	433+12	7.8	447+12	448+12	7.2	462+12	463+12	7.1
418+12	419+12	9.7	433+12	434+12	8.1	448+12	449+12	6.7	463+12	464+12	7.0
419+12	420+12	8.7	434+12	435+12	8.0	449+12	450+12	6.5	464+12	465+12	7.1
420+12	421+12	8.5	435+12	436+12	8.0	450+12	451+12	6.8	465+12	466+12	7.2
421+12	422+12	8.0	436+12	437+12	8.5	451+12	452+12	6.8	466+12	467+12	7.3

Station Limits		Average Depth (in)	Station Limits		Average Depth (in)	Station Limits		Average Depth (in)	Station Limits		Average Depth (in)	Station Limits		Average Depth (in)
467+12	468+12	7.8	502+12	503+12	7.3	537+12	538+12	8.0	502+12	503+12	7.3	537+12	538+12	8.0
468+12	469+12	7.4	503+12	504+12	7.4	538+12	539+12	8.0	503+12	504+12	7.4	538+12	539+12	8.0
469+12	470+12	7.7	504+12	505+12	7.7	539+12	540+12	8.3	504+12	505+12	7.7	539+12	540+12	8.3
470+12	471+12	7.0	505+12	506+12	7.4	540+12	541+12	8.0	505+12	506+12	7.4	540+12	541+12	8.0
471+12	472+12	7.0	506+12	507+12	7.5	541+12	542+12	8.0	506+12	507+12	7.5	541+12	542+12	8.0
472+12	473+12	7.2	507+12	508+12	7.3	542+12	543+12	7.5	507+12	508+12	7.3	542+12	543+12	7.5
473+12	474+12	7.5	508+12	509+12	7.7	543+12	544+12	7.9	508+12	509+12	7.7	543+12	544+12	7.9
474+12	475+12	7.2	509+12	510+12	7.9	544+12	545+12	7.5	509+12	510+12	7.9	544+12	545+12	7.5
475+12	476+12	7.3	510+12	511+12	7.8	545+12	546+12	7.2	510+12	511+12	7.8	545+12	546+12	7.2
476+12	477+12	7.0	511+12	512+12	7.8	546+12	547+12	6.9	511+12	512+12	7.8	546+12	547+12	6.9
477+12	478+12	6.9	512+12	513+12	7.8	547+12	548+12	7.4	512+12	513+12	7.8	547+12	548+12	7.4
478+12	479+12	7.3	513+12	514+12	7.9	548+12	549+12	7.0	513+12	514+12	7.9	548+12	549+12	7.0
479+12	480+12	7.3	514+12	515+12	8.4	549+12	550+12	6.6	514+12	515+12	8.4	549+12	550+12	6.6
480+12	481+12	7.8	515+12	516+12	8.2	550+12	551+12	6.6	515+12	516+12	8.2	550+12	551+12	6.6
481+12	482+12	7.7	516+12	517+12	8.1	551+12	552+12	6.8	516+12	517+12	8.1	551+12	552+12	6.8
482+12	483+12	7.5	517+12	518+12	7.8	552+12	553+12	6.8	517+12	518+12	7.8	552+12	553+12	6.8
483+12	484+12	7.6	518+12	519+12	7.5	553+12	554+12	8.1	518+12	519+12	7.5	553+12	554+12	8.1
484+12	485+12	7.5	519+12	520+12	7.4	554+12	555+12	7.7	519+12	520+12	7.4	554+12	555+12	7.7
485+12	486+12	7.3	520+12	521+12	7.3	555+12	556+12	7.9	520+12	521+12	7.3	555+12	556+12	7.9
486+12	487+12	7.5	521+12	522+12	7.9	556+12	557+12	8.9	521+12	522+12	7.9	556+12	557+12	8.9
487+12	488+12	8.0	522+12	523+12	8.7	557+12	558+12	8.6	522+12	523+12	8.7	557+12	558+12	8.6
488+12	489+12	7.8	523+12	524+12	8.5	558+12	559+12	8.3	523+12	524+12	8.5	558+12	559+12	8.3
489+12	490+12	8.0	524+12	525+12	8.7	559+12	560+12	9.1	524+12	525+12	8.7	559+12	560+12	9.1
490+12	491+12	7.8	525+12	526+12	8.8	560+12	561+12	7.1	525+12	526+12	8.8	560+12	561+12	7.1
491+12	492+12	8.4	526+12	527+12	9.4	561+12	562+12	5.9	526+12	527+12	9.4	561+12	562+12	5.9
492+12	493+12	10.2	527+12	528+12	9.6	562+12	563+12	6.0	527+12	528+12	9.6	562+12	563+12	6.0
493+12	494+12	9.0	528+12	529+12	9.4	563+12	564+12	8.0	528+12	529+12	9.4	563+12	564+12	8.0
494+12	495+12	9.4	529+12	530+12	9.3	564+12	565+12	8.1	529+12	530+12	9.3	564+12	565+12	8.1
495+12	496+12	9.0	530+12	531+12	9.0	565+12	565+30	7.7	530+12	531+12	9.0	565+12	565+30	7.7
496+12	497+12	8.7	531+12	532+12	9.0				531+12	532+12	9.0			
497+12	498+12	8.7	532+12	533+12	9.3				532+12	533+12	9.3			
498+12	499+12	10.3	533+12	534+12	9.0				533+12	534+12	9.0			
499+12	500+12	8.7	534+12	535+12	7.9				534+12	535+12	7.9			
500+12	501+12	7.4	535+12	536+12	7.8				535+12	536+12	7.8			
501+12	502+12	7.2	536+12	537+12	8.1				536+12	537+12	8.1			

Ground Penetrating Radar (GPR)

Actual pavement thickness may vary.

Overall Maximum Thickness (in.)	10.5
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[illegible]

19204.00 Ellsworth - Route 1 Truck Lane (Station 537+38 - 559+57)

Estimated Pavement Thickness

Ground Penetrating Radar (GPR)

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

For Project 19204.00(Ellsworth), GPR data was collected in the left and right wheel path of both the North and South bound lanes. Data was also collected in the left and right wheel path of the two northbound truck lanes. Data was collected at 1 foot intervals along the entire section. Data is presented for the two primary lanes and each of the two northbound truck lanes. Pavement thickness estimates were developed using Geophysical Survey Systems Inc. (GSSI) RADAN GPR Data Processing Software. Where available, pavement thicknesses from pavement cores collected by MaineDOT personnel were used in developing the estimated GPR pavement thicknesses.

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

Actual pavement thickness may vary.

Analysis Distance (ft) - 100	Overall Average Thickness (in.)		Overall Minimum Thickness (in.)		Overall Maximum Thickness (in.)	
	9.6		8.6		10.8	

19204.00 Ellsworth - Route 1 Truck Lane (Station 537+38 - 559+57)

Station Limits		Average Depth (in)	Station Limits		Average Depth (in)	Station Limits		Average Depth (in)
537+38	538+38	8.6	552+38	553+38	9.1			
538+38	539+38	9.0	553+38	554+38	10.1			
539+38	540+38	9.7	554+38	555+38	10.8			
540+38	541+38	9.6	555+38	556+38	10.7			
541+38	542+38	9.6	556+38	557+38	10.7			
542+38	543+38	9.2	557+38	558+38	10.8			
543+38	544+38	9.0	558+38	559+38	9.6			
544+38	545+38	9.4	559+38	559+44	9.7			
545+38	546+38	9.6						
546+38	547+38	9.0						
547+38	548+38	10.0						
548+38	549+38	10.0						
549+38	550+38	9.4						
550+38	551+38	9.1						
551+38	552+38	9.0						