REPORT FOR PAVEMENT RECOMMENDATIONS

I-64 High Rise Bridge Corridor

Chesapeake, Virginia

Prepared for:

Virginia Department of Transportation
Suffolk, Virginia

Prepared by:
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April 21, 2016

Project No. 642015V010

April 21, 2016

Mr. Thomas R. Tate, P.E.
District Pavement Engineer
Hampton Roads District
Virginia Department of Transportation
1700 North Main Street
Suffolk, VA 23434

Subject: **Revised Report for Pavement Recommendations**
I-64 High Rise Bridge Corridor, Norfolk, Virginia
VDOT Contract No. 432777
Amec Foster Wheeler Reference 642015V010

Dear Mr. Tate,

Amec Foster Wheeler is pleased to provide this revised report for pavement repair recommendations for the I-64 High Rise Bridge corridor. Our services were performed in general accordance with the terms and conditions outlined in the above referenced agreement between the Virginia Department of Transportation and Amec Foster Wheeler and our proposal of October 30, 2015. The report has been revised per comments received from you on March 14, 2016.

The I-64 High Rise Bridge corridor encompassed the following project limits:

- I-64: From the pavement change E of I-464 (change from CRCP to asphalt) to I-664
- I-264: From Bowers Hill to 1.0 mile E of Bowers Hill
- I-464: From the split South of I-64 to Military Hwy (see City of Chesapeake web site for limits of Dominion Blvd project for additional information on pavements south of I-64)
- I-664: From I-64 at Bowers Hill to the Goose Creek Bridge (first bridge over water north of Bowers Hill)
- US-13/58/460: From Bowers Hill to 1.0 mile W of Bowers Hill

The recommendations developed were based upon a series of investigations including construction history, a visual survey, non-destructive deflection testing, ground penetrating radar, non-destructive deflection testing, coring information, laboratory testing, and traffic records.

If you have any questions regarding the recommendations provided, please feel free to contact us.

Sincerely,

Amec Foster Wheeler Environment & Infrastructure, Inc.

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EXECUTIVE SUMMARY

The objective of this project was to provide:

- Thickness of existing pavements, including mainline, shoulders, and ramps
- Structural condition of existing pavements
- Type and strength of subgrade under the pavements.

The project consists of five segments with the limits as follows:

- I-64: From the pavement change E of I-464 (change from CRCP to asphalt) to I-664
- I-664: From I-64 at Bowers Hill to the Goose Creek Bridge (first bridge over water north of Bowers Hill)
- I-464: From the split South of I-64 to Military Hwy (see City of Chesapeake web site for limits of Dominion Blvd project for additional information on pavements south of I-64)
- I-264: From Bowers Hill to 1.0 mile E of Bowers Hill
- US-13/58/460: From Bowers Hill to 1.0 mile W of Bowers Hill

The pavement evaluation included a visual inspection of functional condition, ground penetrating radar testing, structural testing, pavement coring and boring, and laboratory soil testing.

A visual survey of the project was conducted. The condition of the pavement was variable across the project. The most predominant distresses found in all of the sections were low (L) to medium (M) severity longitudinal/transverse (LT) cracking. The survey also identified the presence of weathering, block cracking (BL), and small amounts of alligator cracking (AL) and patching.

A ground penetrating radar (GPR) survey was performed to estimate the thickness of the bound and unbound pavement layers along the project segments. The GPR survey was used to estimate thickness along the project in the lanes of travel and the shoulders of the project. The GPR testing was also used to identify recommended areas of coring and boring.

Amec Foster Wheeler conducted non-destructive deflection testing on the project as noted above using a falling weight deflectometer (FWD) to determine the existing structural capacity of the project pavement. Based on a preliminary analysis of the FWD deflection using the cumulative differences approach, the mainline pavement was divided into sections for each segment identified. The sectioning was used to determine locations for coring and boring.

A total of 36 cores were taken on the mainline and shoulder pavements across the project segments. The pavement cores revealed an average thickness as illustrated in Table 1. A couple of the cores were cracked and several separated at the layer interfaces.

Table 1. Estimated Pavement Structure from Cores and GPR

Road	HMA Thickness, in	PCC Thickness, in	Treated Base Thickness, in	Stone Base Thickness, in
I-64 EB	4.0	8.5	6.0	0.0
I-64 WB	3.7	8.5	6.0	0.0
I-664 NB	11.0	0.0	0.0	4.0
I-664 SB	11.0	0.0	0.0	2.0
I-464 NB	0.0	9.5	4.0	0.0
I-464 SB	0.0	9.5	4.0	0.0
I-264 EB	12.0	0.0	0.0	5.0
I-264 WB	10.5	0.0	0.0	5.5
US-58 EB Ramp A	8.3	0.0	0.0	6.0
US-58 WB Ramp B	8.0	0.0	0.0	4.0
US-58 EB Ramp C	11.0	0.0	0.0	5.5

Prepared: AZA Reviewed: ALS

High Rise Bridge Corridor

Section 1. Project Information

Amec Foster Wheeler was contracted by Virginia Department of Transportation (VDOT) to provide pavement designs on I-64 in Chesapeake, Virginia from the Bowers Hill interchange to the interchange with I-464. This project is part of a design-build project to be constructed on the High Rise Bridge Corridor on I-64. The project consists of a combination of pavement sections including asphalt pavement, jointed concrete pavement (JCP), and composite (asphalt on JCP or continuously-reinforced concrete (CRC)) pavement. The project limits are identified as follow:

Table 1. Summary of Project Limits

Section	From	To	Length (mile)
I-64 EB	0.43 mi E of I-464	I-664	7.97
I-64 WB	I-664	0.46 mi E of I-464	8.28
I-664 NB	I-64 at Bowers Hill	Goose Creek Bridge	2.44
I-664 SB	Goose Creek Bridge	I-64 at Bowers Hill	2.10
I-464 NB	0.7 mi South of I-64	Military Hwy	1.57
I-464 SB	Military Hwy	0.1 mile South of I-64	1.10
I-264 EB	Bowers Hill	1 mile E of Bowers Hill	1.00
I-264 WB	1 mile E of Bowers Hill	Bowers Hill	1.00
US-58 EB Ramp A	1 mile W of Bowers Hill	I 664 S	0.81
US-58 WB Ramp B	Exit 13 A on I 664 N	1 mile W of Bowers Hill	1.00
US-58 EB Ramp C	1 mile W of Bowers Hill	Airline Blvd	1.00

Prepared: AZA Reviewed: ALS

A site location map is included in Appendix A. Figures 1 through 3 are provided to illustrate the 0+00 stationing identified for each segment of the project. The objective of this project was to develop recommended pavement structures for widening and rehabilitation/reconstruction of the existing lanes within the project limits.

Our services were performed under the terms and conditions outlined in our contract dated October 30, 2015, between Hampton Roads District of VDOT and Amec Foster Wheeler. Our scope of services included pavement condition survey, field data collection, material testing, and data analysis.

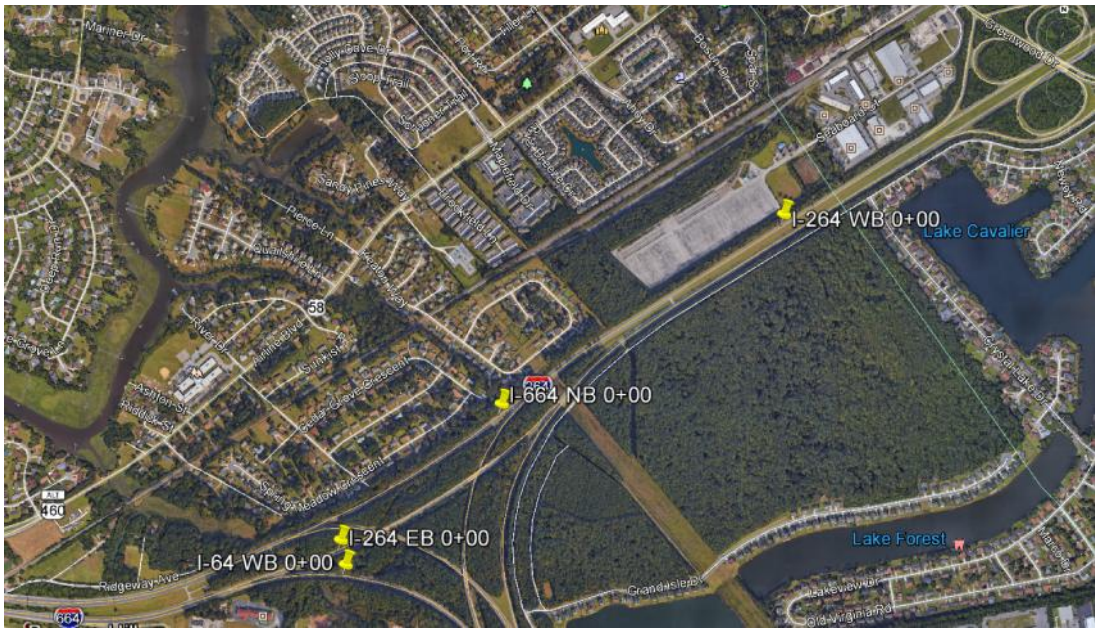


Figure 1. Station 0+00 for I-64 WB, I-664 NB, I-264 EB, and I-264 WB

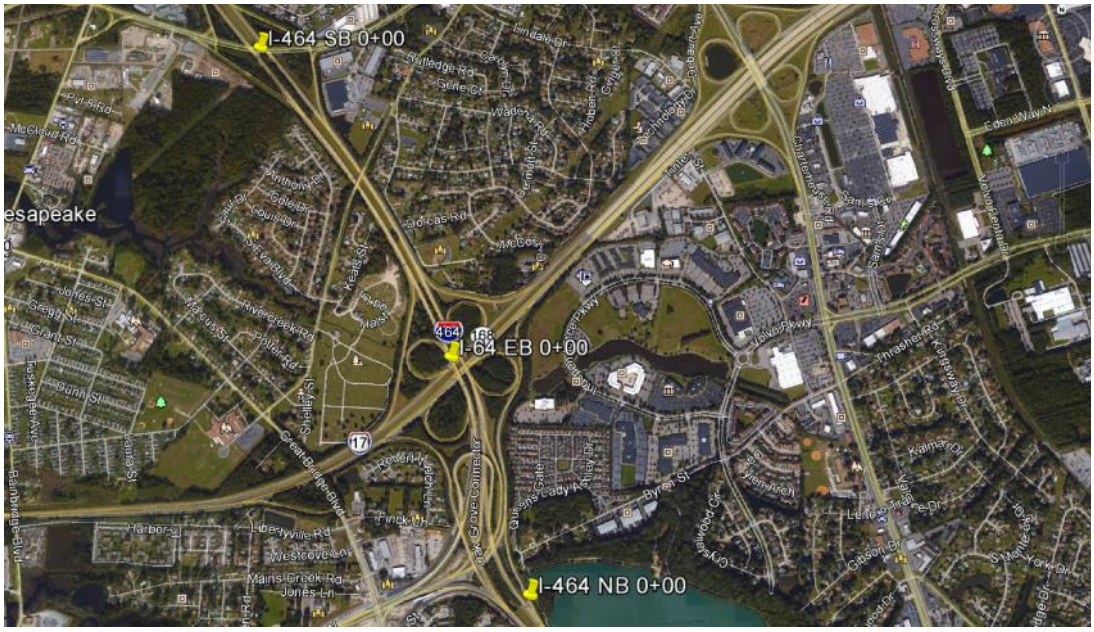


Figure 2. Station 0+00 for I-64 EB, I-464 NB, and I-464 SB

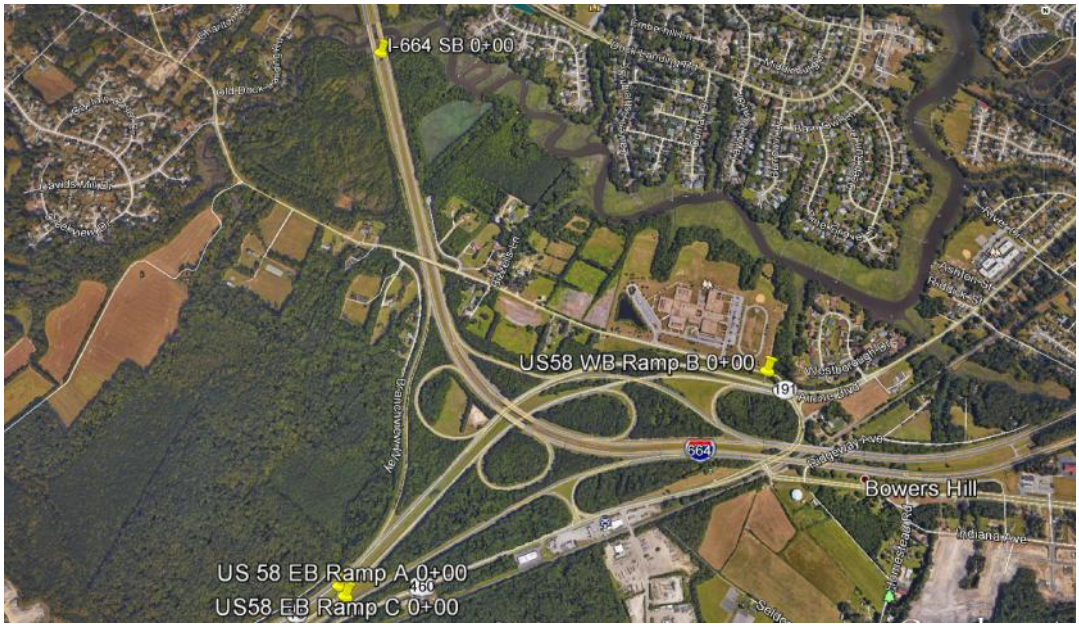


Figure 3. Station 0+00 for I-664 SB, US 58 EB Ramp A, US 58 WB Ramp B, and US 58 EB Ramp C

Section 2. Existing Pavement Information

The following sections describe the pavement structure and existing conditions.

2.1 Pavement Structure

The VDOT pavement management database indicates the following pavement sections:

- I-64: 3.5 inches of asphalt concrete on 9 inches of JCP or CRCP and 6 inches soil cement
- I-664: 10 inches of asphalt concrete on 6 inches granular base and 6 inches soil cement
- I-464: 9 inches of JCP on 6 inches of soil cement
- I-264: 12 inches of asphalt concrete on 7 inches granular base and 6 inches soil cement
- US-58 EB Ramp A: No Data in PMS
- US-58 WB Ramp B: No Data in PMS
- US-58 EB Ramp C: 12 inches of asphalt concrete on 7 inches granular base and 6 inches soil cement

<u>Non-destructive Deflection Testing</u>

On December 2-4, 2015, Amec Foster Wheeler conducted non-destructive deflection testing using an Amec Foster Wheeler owned and operated falling weight deflectometer (FWD) in accordance with Section 602 of VDOT's Manual of Instruction (MOI) to determine the existing structural capacity of the project pavement. Impulse loads of approximately 6,000, 9,000, 12,000 and 16,000 pounds were applied to the pavement and the resulting deflections were recorded at radial distances of 0, 8, 12, 18, 24, 36, 48, 60 and 72 inches from the center of the load plate.

Testing on asphalt pavement was conducted at intervals from 200 to 500 ft in the outside lane of each direction of travel for a total of 285 test locations. Shorter intervals were used for shorter

segments as outlined in Table 2 below. For concrete pavement on I-464, FWD testing was conducted for 15 slabs in the northbound direction and 12 slabs on the southbound direction. Testing was performed at the center and joint of each slab. During testing, surface and air temperatures were measured automatically with an infrared sensor mounted on the FWD. Table 2 illustrates the total length and test spacing for each section.

Table 2. FWD Spacing

Road	From	To	Begin Station	End Station	Distance (ft)	Spacing (ft)
I-64 EB	0.43 mi E of I-464	I-664	0.00	7.97	42,082	500
I-64 WB	I-664	0.46 mi E of I-464	8.28	0.00	43,718	500
I-664 NB	I-64 at Bowers Hill	Goose Creek Bridge	0.00	2.44	12,883	500
I-664 SB	Goose Creek Bridge	I-64 at Bowers Hill	2.10	0.00	11,088	500
I-264 EB	Bowers Hill	1 mile E of Bowers Hill	0.00	1.00	5,280	200
I-264 WB	1 mile E of Bowers Hill	Bowers Hill	0.62	0.00	3,274	200
US-58 EB Ramp A	Bowers Hill	I 664 S	0.00	0.81	4,277	500
US-58 WB Ramp B	Exit 13 A on I 664 N	1 mile W of Bowers Hill	0.00	1.00	5,280	500
US-58 EB Ramp C	1 mile W of Bowers Hill	Airline Blvd	0.00	1.00	5,280	500

Prepared: AZA Reviewed: ALS

In order to correct for temperature effects, the average temperature of the day before testing was obtained from the website "Weather Underground" (www.weatherunderground.com). It is important to know the temperature from the prior day to account for heat retention within the pavement materials.

Based on a preliminary analysis of the FWD deflection data using the cumulative differences approach outlined in Appendix J of the 1993 AASHTO *Guide for Design of Pavement Structures*, each roadway was divided into sections. Based on the deflection responses, these sections could represent different pavement structures.

Ground Penetrating Radar

A ground penetrating radar (GPR) survey was performed on December 2, 2015 by Amec Foster Wheeler's subcontractor, Infrasense. The Infrasense report is provided in full as Appendix B to this report. The pavement structure data were collected continuously with survey lines along the centerline of both the left and right lanes, right edge of the right lane, and centerline of the left and right shoulders. A detailed pavement structure observed from the GPR survey for each of the

roadway is provided in Appendix B. A summary of the pavement structure identified for the mainlines of each segment are:

- I-64: 4 inches of asphalt concrete on 9 inches of reinforced concrete pavement
- I-664:11 inches of asphalt concrete on 6 inches granular base
- I-464 PCC: 9 inches of jointed concrete pavement
- I-464 AC: 10 inches of asphalt concrete
- I-264: 12 inches of asphalt concrete on 5 inches granular base
- US-58 Ramp A: 8 inches of asphalt concrete on 6 inches granular base
- US-58 Ramp B: 9 inches of asphalt concrete on 5 inches granular base
- US-58 Ramp C: 11 inches of asphalt concrete on 5 inches granular base

Pavement Coring and Boring

Coring and boring were performed to identify the material type and thickness of each layer in the pavement section. From a review of the FWD testing and GPR surveys, core locations were selected. FWD data were analyzed to section each roadway based on significant changes in pavement structural conditions. The location and number of cores were taken based on the observation from GPR review and FWD response to minimize the destruction of the existing roadway, and to perform design requirements considering weaker areas of each roadway. A total of 36 cores were taken from roadway sections in this study. The pavement coring was performed by Amec Foster Wheeler's SWaM subcontractor, Froehling & Robertson, Inc. The cores taken from the roadways within the project limit are illustrated in Table 3. A full report containing the core logs is provided in Appendix C.

The thicknesses identified by the cores are generally very similar to those observed from the GPR data. The base material observed from the cores on I464 was not detected by the GPR. This lack of detection by the GPR could be caused by similarities of the base and subgrade materials. On I664, I264, and US58 Ramps A and C, the base material identified from the GPR was not observed during coring. The soil cement reported in the pavement management data provided by VDOT was not observed in the investigations performed on the project.

Table 3. Apparent Pavement Structure

Section	Core	Core Station	Location	Structure	Subgrade	Condition of Core
I-64 EB	C1	55+00	Right Lane	4.0” HMA 9.0” PCC	Silty Sand	Concrete cracked
	C2	350+00	Right Lane	4.0” HMA 8.0” PCC 6.0” CTB	Silty Sand	Good
	C3	150+00	Right Shoulder	8.0” HMA 4.0” CTB	Silty Sand	Good
	C4	250+00	Left Shoulder	7.5” HMA 10.0” CTB	Silty Sand	Good
	C37	East of I-464	Right Lane	3.5” HMA 9.5” PCC 5.5” CTB	Silty Sand	Good
	C38	East of I-464	Right Lane	4.0” HMA 9.5” PCC 5.0” CTB	Silty Sand	Good
I-64 WB	C5	70+00	Right Lane	4.0” HMA 8.0” PCC 6.5” CTB	Silty Sand	Good
	C6	115+00	Right Lane	3.0” HMA 8.0” PCC 5.0” CTB	Silty Sand	Good
	C7	255+00	Right Lane	3.5” HMA 8.5” PCC 6.0” CTB	Silty Sand	Good
	C8	420+00	Right Lane	4.0” HMA 9.0” PCC	Silty Sand	Good
	C9	255+00	Left Lane	4.0” HMA 8.0” PCC 5.0” CTB	Silty Sand	Crack in concrete layer
	C10	150+00	Left Shoulder	3.0” HMA 8.0” PCC 6.0” CTB	Silty Sand	Good
I-664 NB	C25	75+00	Right Lane	11.0” HMA	Silty Sand	Separation at layers
	C26	120+00	Left Lane	12.0” HMA	Silty Sand	Separation at layers
I-664 SB	C27	85+00	Right Lane	11.5” HMA 6.0” CTB	Silty Sand	Good
	C28	85+00	Right Shoulder	13.0” HMA 4.0” Stone Base	Silty Sand	Good
I-464 NB	C18	60+00	Right Shoulder	3.5” HMA 10.0” Stone Base	Silty Sand	Good
	C19	40+00	Left Shoulder	9.0” PCC 12.0” CTB	Silty Sand	Good
	C23	41+50	Right Lane	9.5” PCC 9.0” CTB	Silty Sand	Good

Table 3. Apparent Pavement Structure, Cont.

Section	Core	Core Station	Location	Structure	Subgrade	Condition of Core
I-464 SB	C20	4+00	Right Lane	12.0” HMA 4.0” Stone Base	Silty Sand	Separation at layers
	C21	35+00	Right Shoulder	4.0” HMA	Silty Sand	Bottom of core broken
	C22	10+00	Left Lane	8.5” PCC 4.0” CTB	Silty Sand	Good
	C24	15+28	Right Lane	10.0” PCC 5.0” CTB	Silty Sand	Good
I-264 EB	C11	4+00	Right Lane	13.0” HMA	Silty Sand	Good
	C12	36+00	Right Lane	13.0” HMA	Silty Sand	Separation at layer
	C13	46+00	Right Shoulder	13.0” HMA	Silty Sand	Separation at layer
I-264 WB	C14	12+00	Right Lane	11.5” HMA	Silty Sand	Good
	C15	30+00	Left Lane	12.0” HMA 6.0” Stone Base		Good
	C16	25+00	Left Shoulder	8.0” HMA 4.0” CTB	Silty Sand	Separation at layers, bottom unrecovere d
US-58 EB Ramp A	C29	15+00	Right Lane	8.25” HMA	Silty Sand	Good
	C31	25+00	Right Shoulder	5.0” HMA 1.0” Stone Base	Silty Sand	Good
	C32	20+00	Left Shoulder	3.0” HMA 3.0” Stone Base	Silty Sand	Good
US-58 WB Ramp B	C33	15+00	Right Lane	8.0” HMA 4.0” Stone Base	Silty Sand	Good
	C34	45+00	Left Lane	10.5” HMA 2.0” Stone Base	Silty Sand	Good
US-58 EB Ramp C	C35	30+00	Right Lane	15.5” HMA	Silty Sand	Separation at layers
	C36	45+00	Right Shoulder	6.0” HMA	Silty Sand	Separation at layers

Prepared: AZA Reviewed: ALS

In addition to the thicknesses, compressive strength testing of the concrete cores was performed on two cores from I-64 and two cores from I-464 is included in Table 4. The modulus of elasticity of each concrete sample was estimated as a function of compressive strength using the following formula proposed by ACI:

$$Ec = 57000\sqrt{f'_c}$$

Where f'_c is the concrete compressive strength.

Table 4. Summary of Concrete Compressive Strength

Section	Core	Core Station	Offset	Compressive Strength (psi)	Modulus of Elasticity (psi)
I-64 EB	C2	350+00	Right Lane	7,290	4,867,000
I-64 WB	C9	255+00	Right Lane	10,060	5,717,000
I-464 NB	C23	14+04	Right Lane	9,660	5,602,000
I-464 SB	C24	15+28	Right Lane	9,360	5,515,000

Prepared: AZA Reviewed: ALS

2.2 Pavement Condition Data

For this project the existing pavement condition was evaluated using visual condition survey.

Visual Condition Survey

Amec Foster Wheeler conducted a functional condition evaluation on the site on November 24 and 25, 2015. This evaluation consisted of a windshield survey of the pavement condition from the shoulder of the pavement section performed under normal traffic conditions. Information on the visual survey is summarized in Appendix D. The most predominant distresses found in all of the sections were low (L) to medium (M) severity longitudinal/transverse (LT) cracking. The survey also identified the presence of weathering, block cracking (BL), and small amounts of alligator cracking (AL) and patching. A full patching survey was not part of the scope of this project. Table 5 provides a summary of pavement condition for all the evaluated section along with any items that should be considered when evaluating the impact of potential repairs to the finish grade.

Section 3. Structural Analysis

Based on the deflection data collected with the FWD and structure information from coring, GPR review and construction and rehabilitation history the existing structural condition of the pavement structures for each road was estimated in accordance with SECTION 604 of VDOT's MOI. Two directions of each intestate road were treated as a separate sections. The three ramps in this project were also evaluated as a separate sections. Based on the deflection data and GPR review, each section was initially divided into structurally equivalent segments during the analysis where necessary. Existing effective structural capacity was computed for each segment based on deflection and coring data.

Table 5. Summary of Condition Survey

Section	Surface Type	Distress Type	Full Patch %	Partial Patch %	Observations
I-64 EB	AC	LT (L to M), Patching (L), Weathering (L)	< 5	< 10	Overpass Bridge, PCC under overpass bridge
I-64 WB	AC	LT (L), Patching (L), Weathering (L)	< 5	< 10	Overpass Bridge, PCC under overpass bridge
I-664 NB	AC	LT (L to M), AL (L), Patching (L), Weathering (L)	< 10	10-20	Overpass Bridge/ Last 0.25 mile require 50% patching
I-664 SB	AC	LT (L to M), AL (L to M), Patching (L), Weathering (L)	< 10	10-20	Overpass Bridge
I-464 NB	AC	LT (L)	< 5	< 5	
I-464 SB	AC	LT (L)	< 5	< 5	
I-464 NB	PCC	Joint seal damage and surface scaling	< 5	< 5	
I-464 SB	PCC	Joint seal damage and surface scaling	< 5	< 5	
I-264 EB	AC	LT (L), Weathering (L)	< 5	< 10	
I-264 WB	AC	LT (L, M), BL (M), Weathering (L)	< 10	10-20	Last 0.2 miles requires 30% patching

Table 5. Summary of Condition Survey (Contd.)

Section	Surface Type	Distress Type	Full Patch %	Partial Patch %	Observations
US-58 EB Ramp A	AC	LT (L), Weathering (L)	< 5	< 10	
US-58 WB Ramp B	AC	LT (L, M), Weathering (L)	< 5	< 10	
US-58 EB Ramp C	AC	AL (L), LT (M), BL (L), Weathering (L)	<10	40-50	Overpass Bridge

The computer-based software ModTag provided by VDOT incorporating the AASHTO backcalculation algorithm was used to estimate the effective structural number (SN_{eff}) as well as the subgrade resilient modulus (M_R) in flexible pavements and the effective modulus of subgrade reaction (k-value) in rigid pavements. Table 6 illustrates the average SN_{eff} and M_R of each section for the four drops collected at each of the four drop heights for flexible pavements and Table 7 shows the average effective modulus of subgrade reaction for the four drops and collected at each of the four drop heights for rigid and composite pavements. Detailed results of these calculations are provided in Appendix E.

The joint load transfer efficiency was estimated for the jointed concrete pavement observed on I-464. The estimated load transfer efficiency in the northbound direction ranged from 39 percent to 99 percent with an average of 70 percent. The estimated load transfer efficiency in the southbound direction ranged from 28 percent to 96 percent with an average of 70 percent. The average value by joint is presented in Table 8 with detailed results provided in Appendix E.

Table 6. Results of Structural Analysis – Flexible Pavements

Road	Section	From	To	Structure	SN_{eff}	Subgrade Modulus (Mr), psi	Effective Pavement Modulus (Ep), psi
I-664 NB	1	0+00	40+00	12.0” HMA 6.0” Stone Base	4.82	8,100	216,000
	2	40+00	75+00	10.0” HMA 6.0” Stone Base	5.00	11,100	337,000
	3	75+00	115+00	11.0” HMA 0.0” Stone Base	4.53	9,000	869,000
	4	115+00	135+00	11.0” HMA 5.0” Stone Base	5.07	7,100	351,000
I-664 SB	1	0+00	40+00	11.0” HMA 0.0” Stone Base	4.51	9,000	768,000
	2	46+00	65+00	11.0” HMA 0.0” Stone Base	3.72	9,600	434,000
	3	77+00	115+00	11.0” HMA 6.0” Stone Base	5.24	12,000	328,000
I-264 EB	1	0+00	24+00	12.0” HMA 5.0” Stone Base	5.76	8,700	457,000
	2	24+00	52+00	12.0” HMA 5.0” Stone Base	4.67	11,200	229,000
I-264 WB	1	0+00	20+00	10.5” HMA 5.5” Stone Base	3.99	8,600	171,000
	2	20+00	35+00	10.5” HMA 5.5” Stone Base	4.20	9,500	199,000
US-58 EB Ramp A	1	0+00	50+00	8.3” HMA 6.0” Stone Base	3.65	8,600	186,000
US-58 WB Ramp B	1	0+00	50+00	8.0” HMA 4.0” Stone Base	3.05	8,000	184,000
US-58 EB Ramp C	1	0+00	60+00	11.0” HMA 5.5” Stone Base	4.23	7,000	206,000

Prepared: AZA Reviewed: ALS

Table 7. Results of Structural Analysis – Rigid and Composite Pavements

Road	Section	From	To	Structure	Dynamic k-value (psi/in.)	Static k-value (psi/in.)
I-64 EB	1	0+00	60+00	4.0” HMA 8.5” PCC 6.0” Treated Base	210	100
	N/A	60+00	110+00	High Rise Bridge	N/A	N/A
	2	110+00	420+00	4.0” HMA 8.5” PCC 6.0” Treated Base	250	130
I-64 WB	1	0+00	235+00	3.5” HMA 8.0” PCC 6.0” CTB	260	130
	2	235+00	325+00	3.5” HMA 8.5” PCC 6.0” CTB	160	80
	N/A	325+00	375+50	High Rise Bridge	N/A	N/A
	3	375+50	430+00	4.0” HMA 9.0” PCC 6.0” CTB	170	90
I-464 NB	1	0+00	51+00	9.5” PCC 4.0” CTB	230	110
I-464 SB	1	6+70	45+50	9.5” PCC 4.0” CTB	300	150

Prepared: AZA Reviewed: ALS

Table 8. Estimated Load Transfer Efficiency by Joint

Road	Direction	Station	Average LTE %
I-464	NB	0+07	97
		11+89	95
		14+27	56
		17+82	91
		19+88	45
		21+36	59
		23+31	80
		24+95	58
		27+00	81
		29+60	63
		31+94	66
		36+20	66
		40+57	57
		44+89	67
	SB	6+78	88
		10+43	41
		13+41	94
		15+36	30
		19+60	71
		22+12	87
		25+09	94
		27+82	35
		31+66	88
		34+43	81
		39+54	66
		45+72	68

Prepared: AZA Reviewed: ALS

Section 4. Soils Summary

An investigation of the soils present on the project included laboratory testing of the soil samples obtained during coring operations as well as the visual classification in the field and standard penetration testing (SPT) in the field. The laboratory testing program included classification and California Bearing Ratio (CBR) testing. These results are summarized in Table 9 and provided in full in the report in Appendix C. The laboratory test results reveal the consistency of the soils throughout the project with most soils consisting of a silty subgrade, although a few areas of lean clay were identified within the project limits.

Table 9. Summary of Laboratory Testing on Soils

Road	USCS Classification	AASHTO Soil Classification	Average Water Content	Average CBR
I-64 EB	SM, SM-SC, CL	A-2-4, A-3, A-4, A-6	12.0%	30.4
I-64 WB	SM, SM-SC, SC	A-2-4, A-3	14.5%	27.8
I-664 NB	SM	A-2-4	10.6%	39.6
I-664 SB	SM	A-2-4	10.2%	Not Tested
I-464 NB	SM, SP	A-2-4, A-3	11.0%	30.1
I-464 SB	SM, SP	A-2-4, A-3	10.2%	48.5
I-264 EB	SM	A-2-4	13.7%	40.3
I-264 WB	SM, SM-SC	A-2-4	12.6%	Not Tested
US-58 Ramp A	SM	A-2-4	17.0%	43.4
US-58 Ramp B	SM	A-2-4	13.8%	Not Tested
US-58 Ramp C	SM-SC, CL	A-3, A-6	12.9%	Not Tested

Prepared: AZA Reviewed: ALS

Appendix A

Site Location Map

Appendix A

Site Location Map

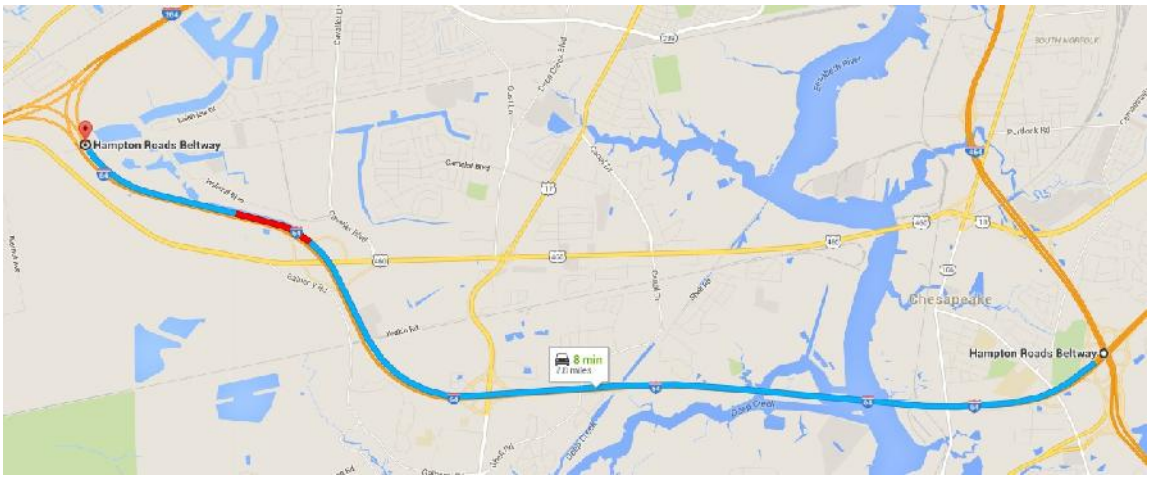


Figure A1. I-64 WB

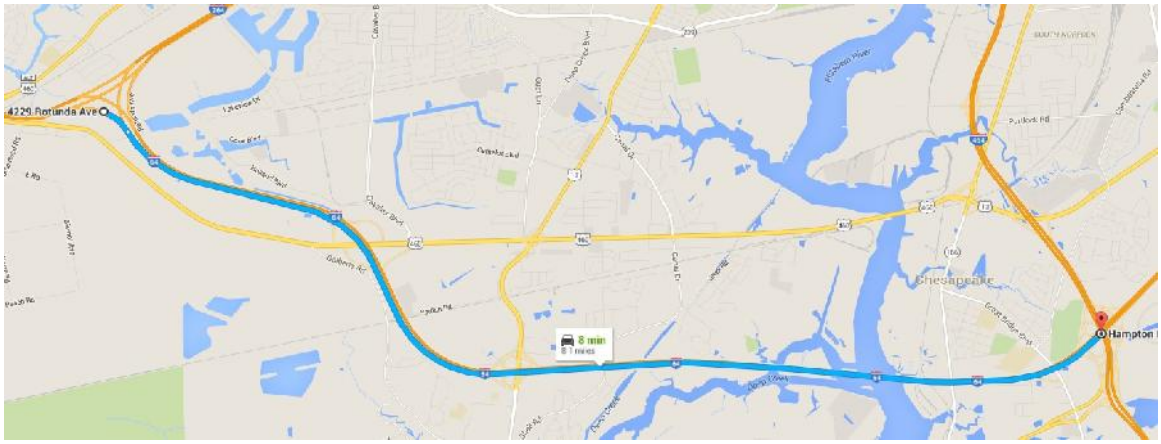


Figure A2. I-64 EB

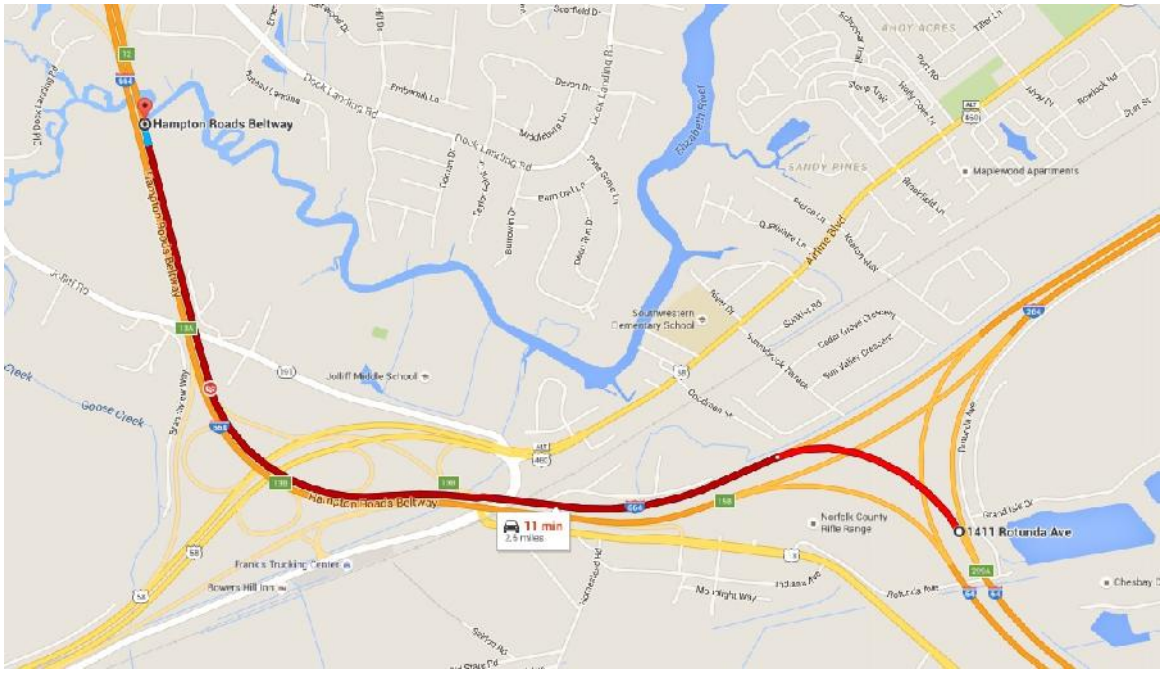


Figure A3. I-664 NB

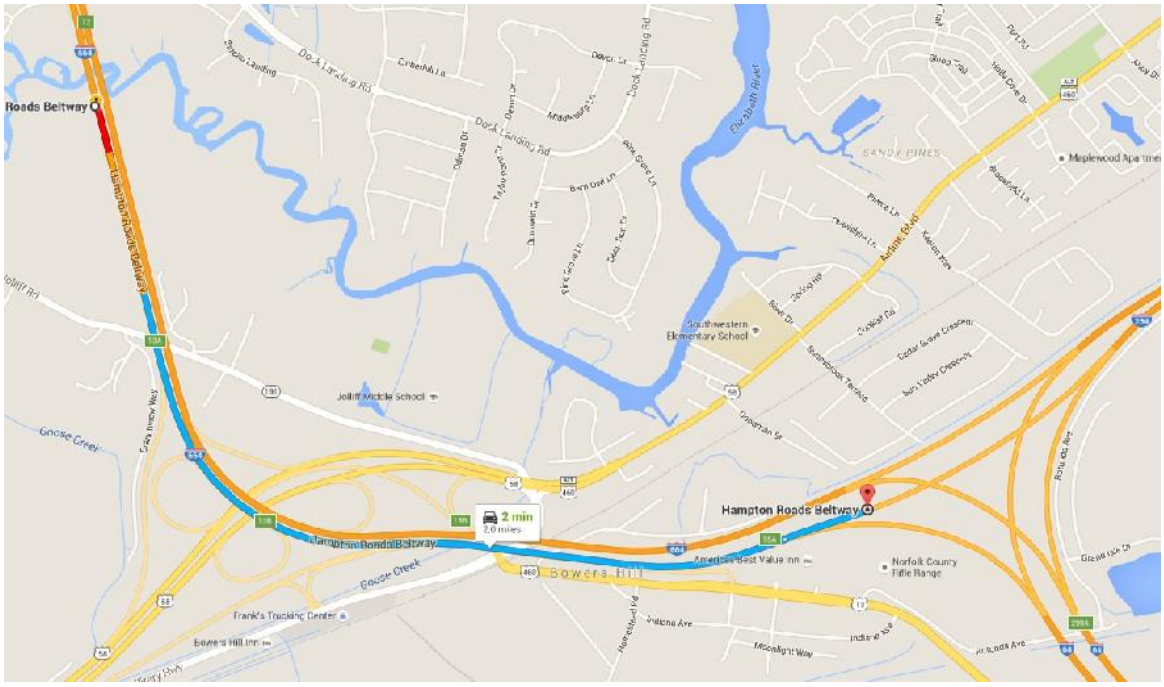


Figure A4. I-664 SB

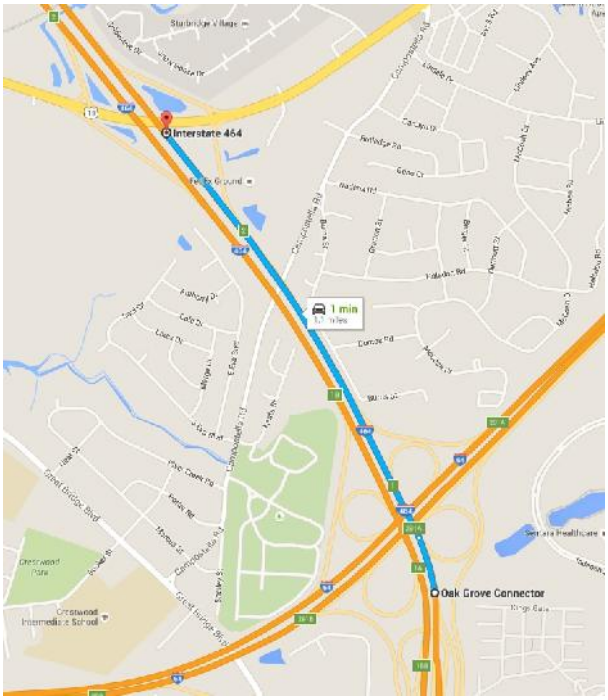


Figure A5. I-464 NB

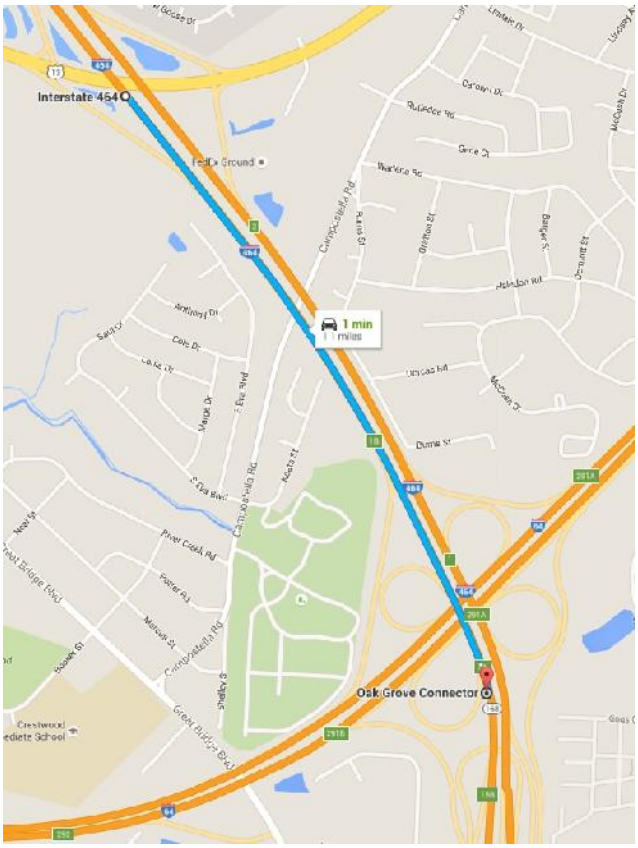


Figure A6. I-464 SB

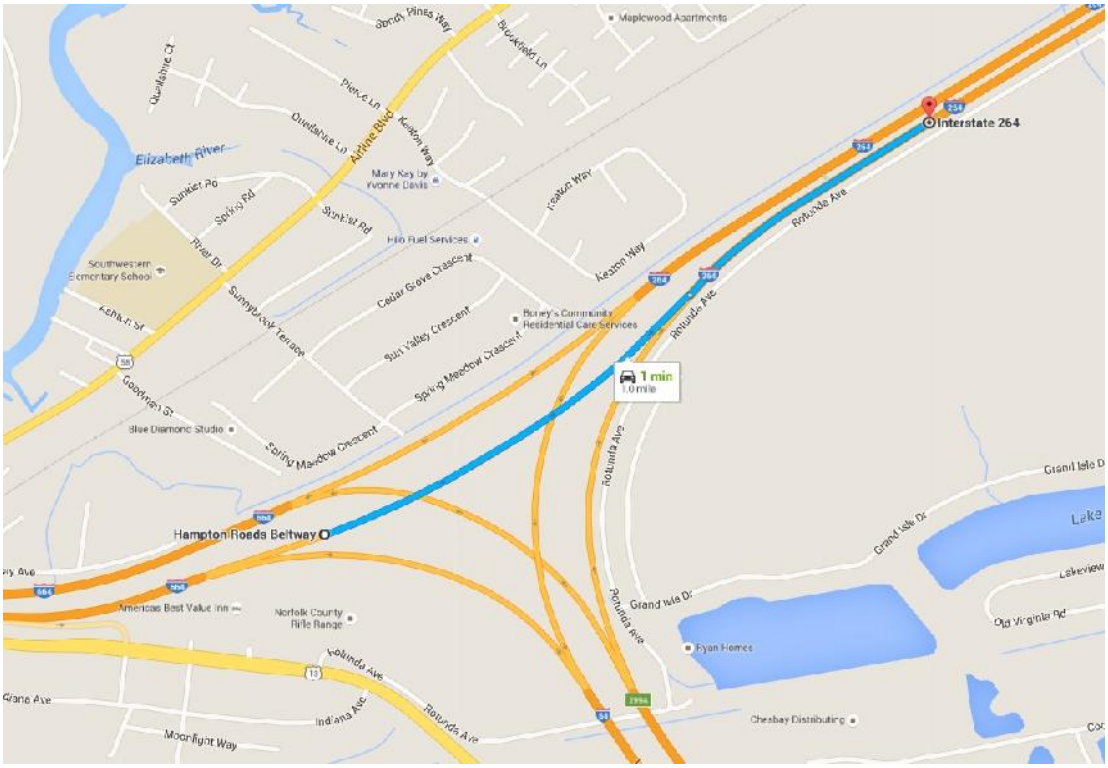


Figure A7. I-264 EB

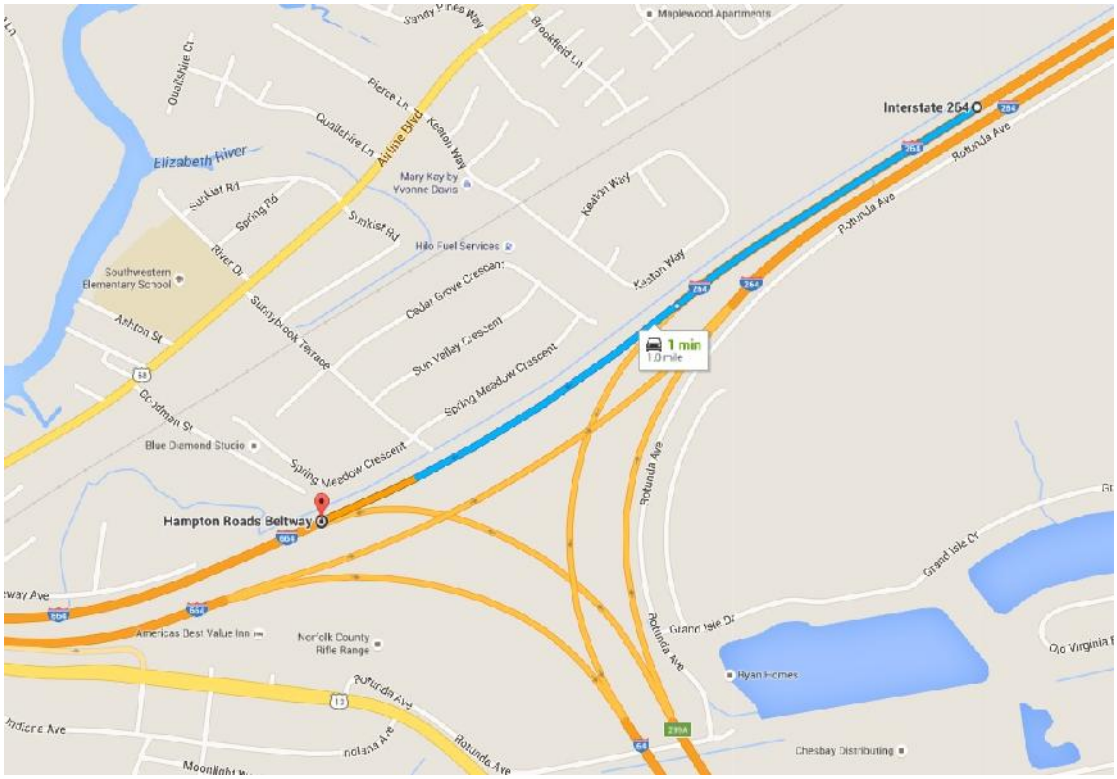


Figure A8. I-264 WB

Figure A9. US-58 EB Ramp A

Figure A10. US-58 WB Ramp B

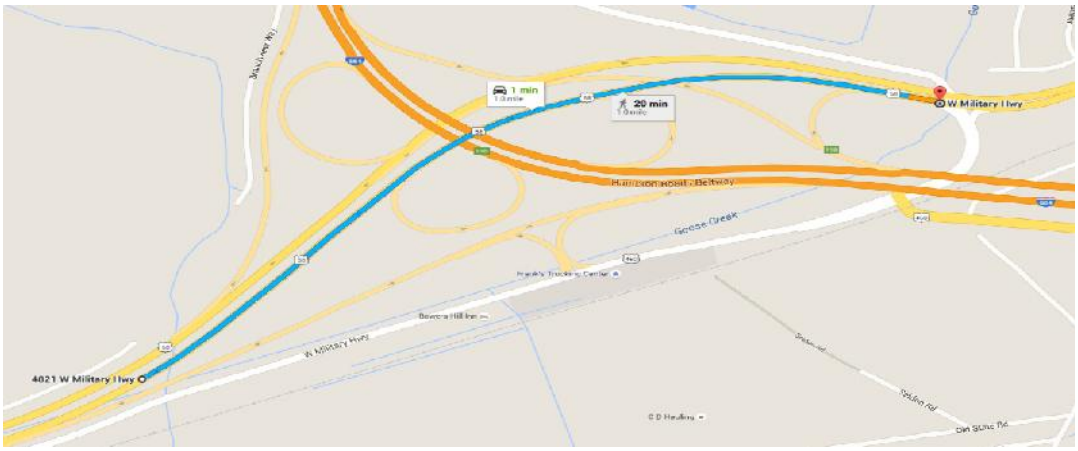


Figure A11. US-58 EB Ramp C

Appendix B

Ground Penetrating Radar Report

Ground Penetrating Radar (GPR) Pavement Structure Evaluation Along I-64 in Chesapeake, VA

Final Report

submitted to

AMEC Foster Wheeler
1200 Indian Creek Court, Suite F
Beltsville, MD 20705

by

Infrasense, Inc.
21-G Olympia Avenue, Suite 45
Woburn, MA 01801

April 18, 2016

1. Introduction

The objective of the project was to measure the thickness of the bound and unbound pavement layers. The project consists of a section along Interstate-64 known as the "High Rise Bridge Corridor" in Chesapeake, Virginia. The specific project limits are as follows:

- I-64 from the pavement change East of I-464 to I-664
- I-664 from I-64 at Bowers Hill to the Goose Creek Bridge
- I-464 from the split South of I-64 to Military Highway
- I-264 from Bowers Hill to 1 mile East of Bowers Hill
- US-13/58/460 from Bowers Hill to 1 mile West of Bowers Hill

The evaluation has been carried out using Ground Penetrating Radar (GPR). The pavement structure data was collected continuously with survey lines along the centerline of both the left and right lanes, right edge of the right lane, and centerline of the left and right shoulders. Layer thickness data has been reported at 5-foot longitudinal increments along each of these lines in a tabular format with associated project milepost stationing and GPS coordinates. Additionally, plots of the pavement structure profile are provided, showing the depth of each layer along the length of the section for each of the 5 offset-lines. The following sections describe the GPR data collection procedures, analysis methods, and results obtained.

2. Data Collection

The GPR survey was conducted on December 2, 2015. Weather conditions during data collection were mostly cloudy with temperatures in the mid 60's °F.

The GPR equipment used for this survey was a dual 1-GHz horn antenna system manufactured by GSSI, Inc. of Salem, NH, and is shown in Figure 1. The vehicle was equipped with an electronic distance-measuring instrument (DMI) mounted to the rear wheel, providing synchronous distance data as the GPR data was collected; and a Trimble GPS unit, providing high resolution, differentially corrected geo-spatial information. The data collection and recording was controlled by the SIR-20 GPR system operated from within the survey vehicle. The data was collected at a rate of 4 scans per foot of travel.

Figure 1 – Field Setup of GPR Equipment

During the data collection, the GPR operator placed marks in the data at observed mileposts within the project limits. The survey was carried out at the posted speed limit, so traffic was not disrupted.

3. Pavement Layer Thickness Analysis and Results

A thorough description of the GPR principles used to analyze this data is presented in Attachment C. The GPR data, when displayed in a gray scale "B-scan", reveals the pavement cross-section including the individual pavement layers. Figure 2 shows a representative sample of the data and identifies the layers detected and reported for this project section. Figure 3 shows the same sample data, but with individual asphalt and base layers "picked" by the GPR analyst. The software carries out the dielectric and thickness calculations on this picked data.

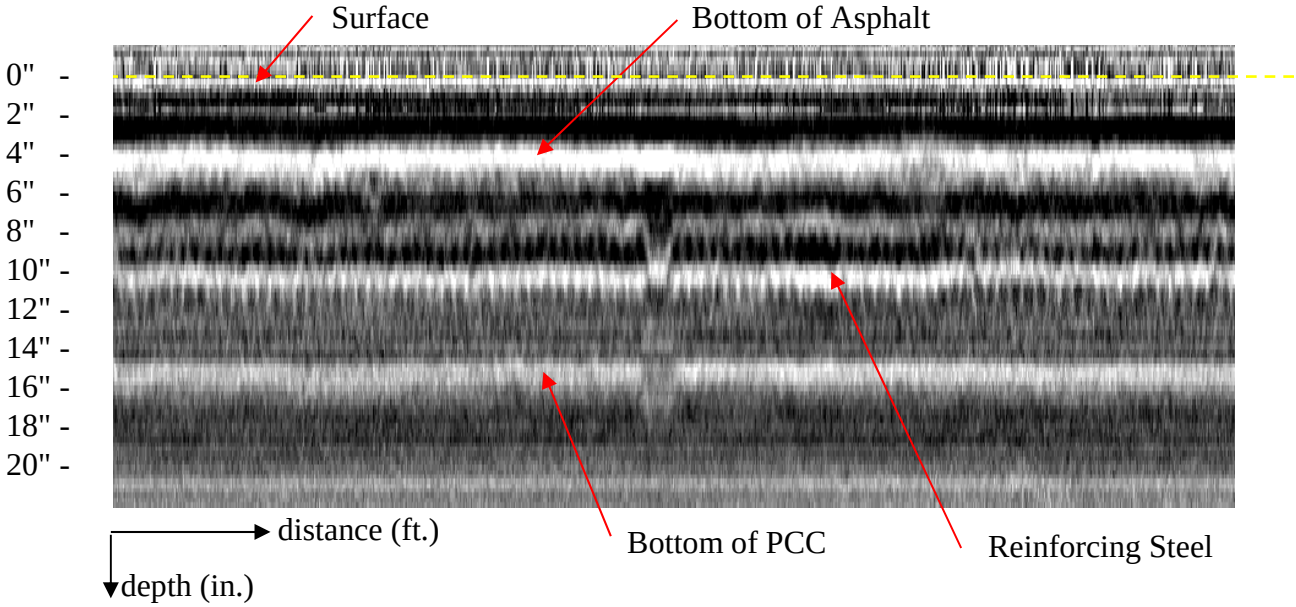


Figure 2 – Sample Raw GPR Data Showing Pavement Layers
(Centerline of Right Lane, I-64 WB)

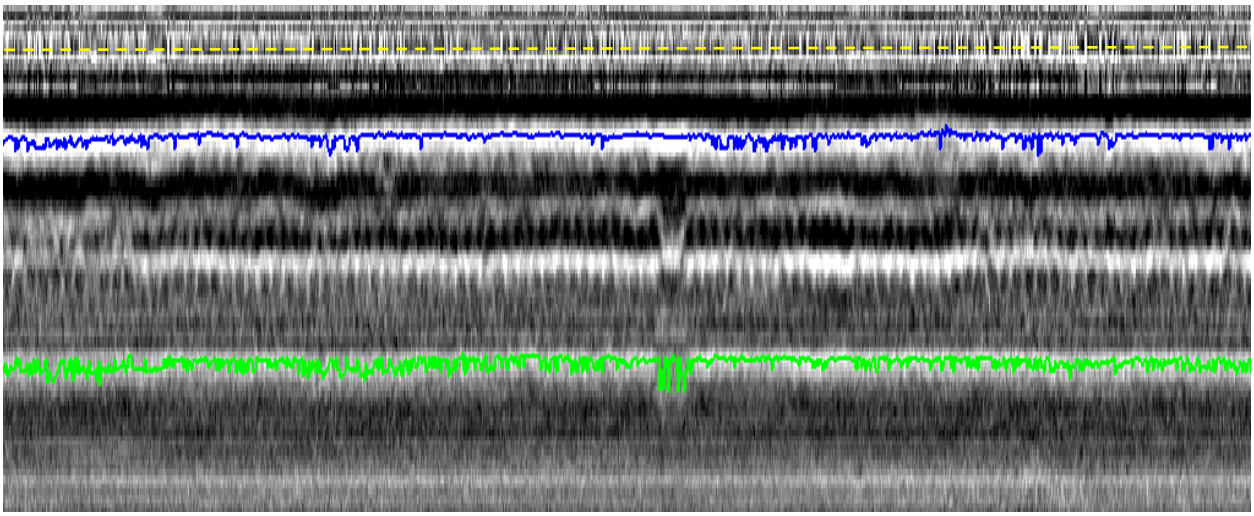


Figure 3 – Sample Raw GPR Data Showing Pavement Layers "Picked" By Analyst
(Centerline of Right Lane, I-64 WB)

The pavement layer thicknesses were calculated and reported at 5-foot increments. The reported values represent the average of individual readings calculated over an interval ± 2.5 feet on either side of the reported location.

Table 1 provides recommended core locations. The complete set of layer thickness results for each section and offset have been submitted as tabular Excel files (see Attachment A). In addition, depth profile plots of the pavement structure have been provided as Attachment B.

Table 1 – Recommended Core Locations

Section	Direction	Lane	Lat	Long	Expected
US-58 Ramp A	EB	Right Edge, RL	36.7848168	-76.4217781	9.4" AC over base
US-58 Ramp B	WB	CL of RL	36.7860574	-76.424415	8.2" AC over base
US-58 Ramp C	EB	CL of LL	36.7877712	-76.4192257	12" AC
I-264	EB	CL of RS	36.794134	-76.3883438	11.7" AC
I-264	WB	CL of RL	36.7947088	-76.3879793	11" AC over base
I-464	NB	Right Edge, RL	36.7698463	-76.2725624	8.8" PCC
I-664	SB	CL of RL	36.7899198	-76.425956	11.3" AC
I-64	WB	CL of RS	36.7606161	-76.3568235	7.6" AC
I-64	WB	CL of LL	36.7766805	-76.3774276	3.9" AC over 8.6" PCC
I-64	EB	CL of RL	36.7697777	-76.362919	3.9" AC over 9" PCC

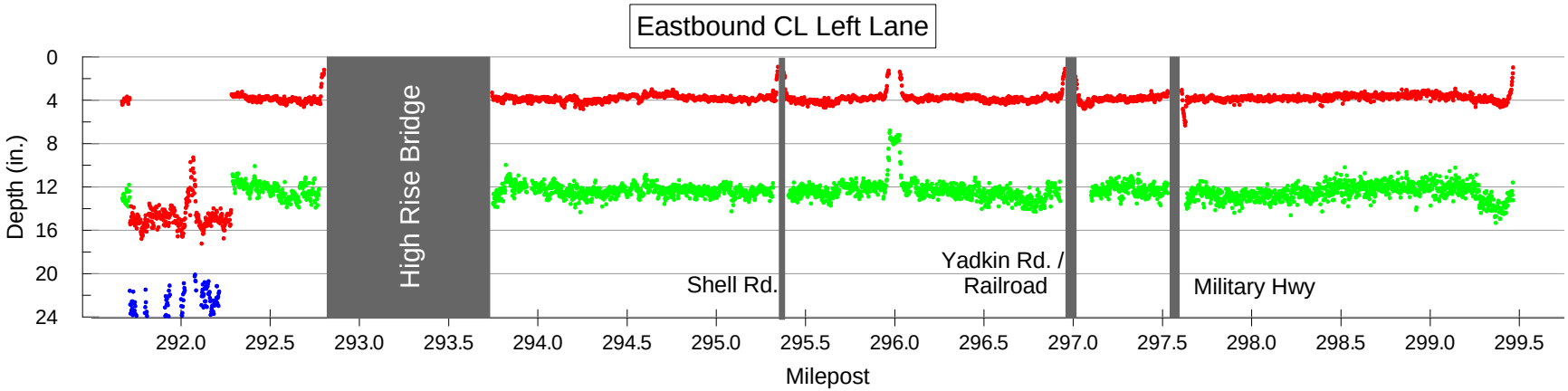
ATTACHMENT A

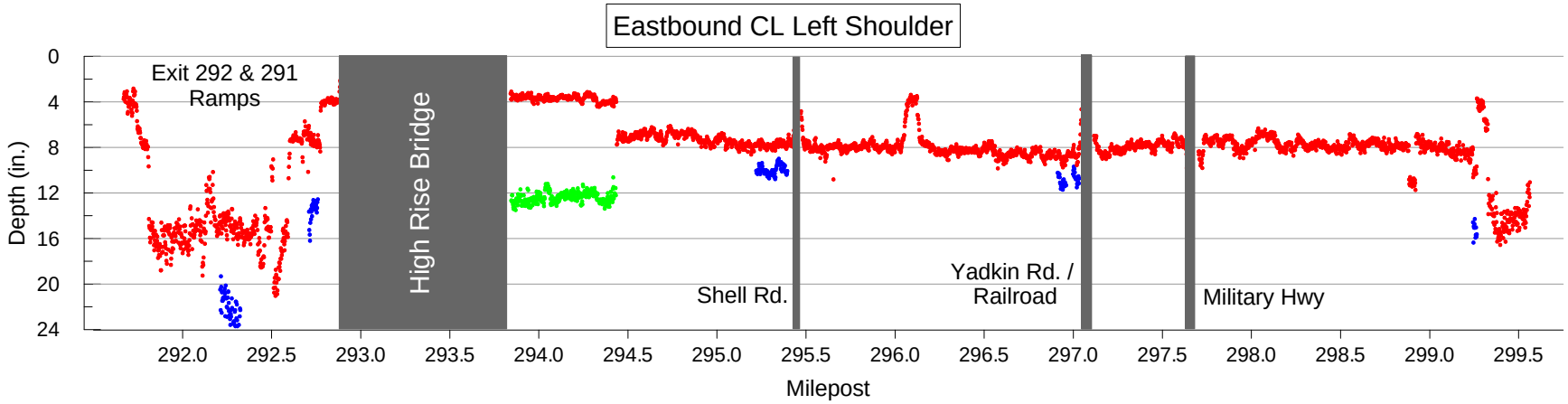
TABULAR PAVEMENT THICKNESS RESULTS

transmitted electronically as
"I-64 EB.xlsx"
"I-64 WB.xlsx"
"I-264 EB.xlsx"
"I-264 WB.xlsx"
"I-464 NB.xlsx"
"I-464 SB.xlsx"
"I-664 NB.xlsx"
"I-664 SB.xlsx"
"US 58 – Ramp A.xlsx"
"US 58 – Ramp B.xlsx"
"US 58 – Ramp C.xlsx"

ATTACHMENT B

PAVEMENT STRUCTURE PROFILE PLOTS





Project ID: AMEC - Chesapeake Pavement

Section: I-64 EB

Client: **AMEC**

- Bottom of AC
- Bottom of PCC
- Bottom of Base Layer
- Core
- Bridge

Date Completed: 12/08/15

Sheet 1 of 2

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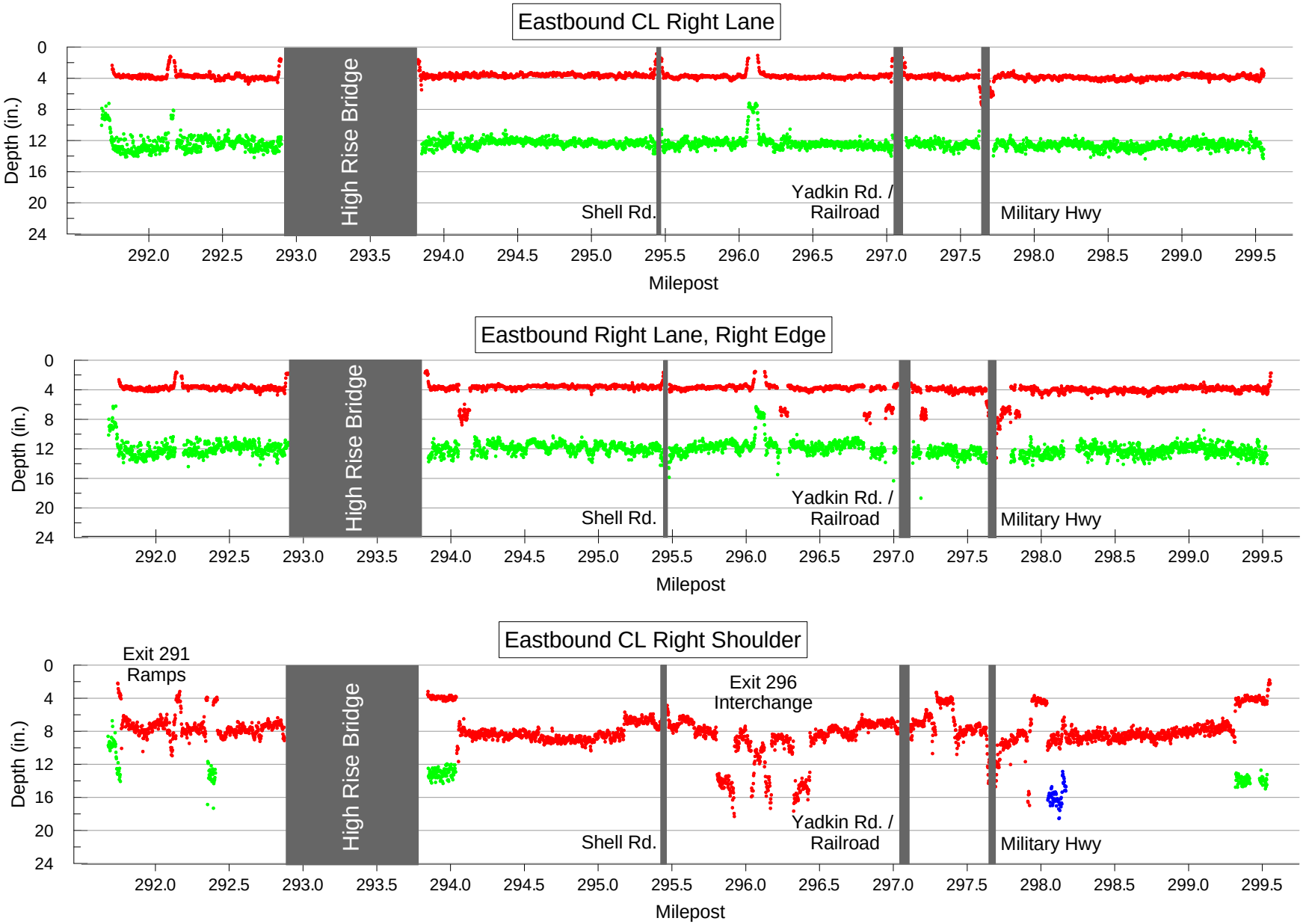

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Section: I-64 EB

Client: AMEC

Bottom of AC
Bottom of PCC
Bottom of Base Layer
Core
Bridge

Date Completed: 12/08/15

Sheet 2 of 2

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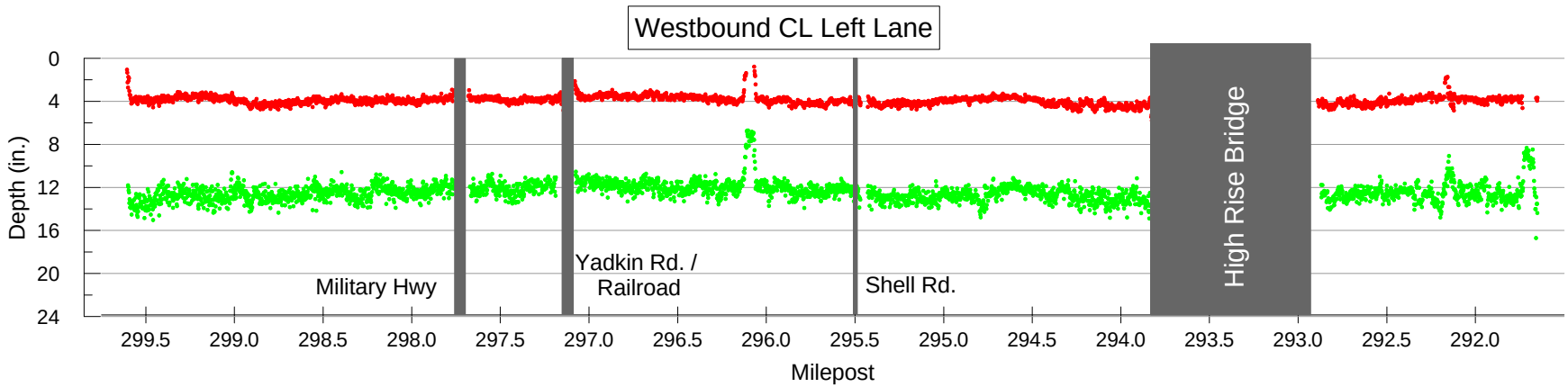

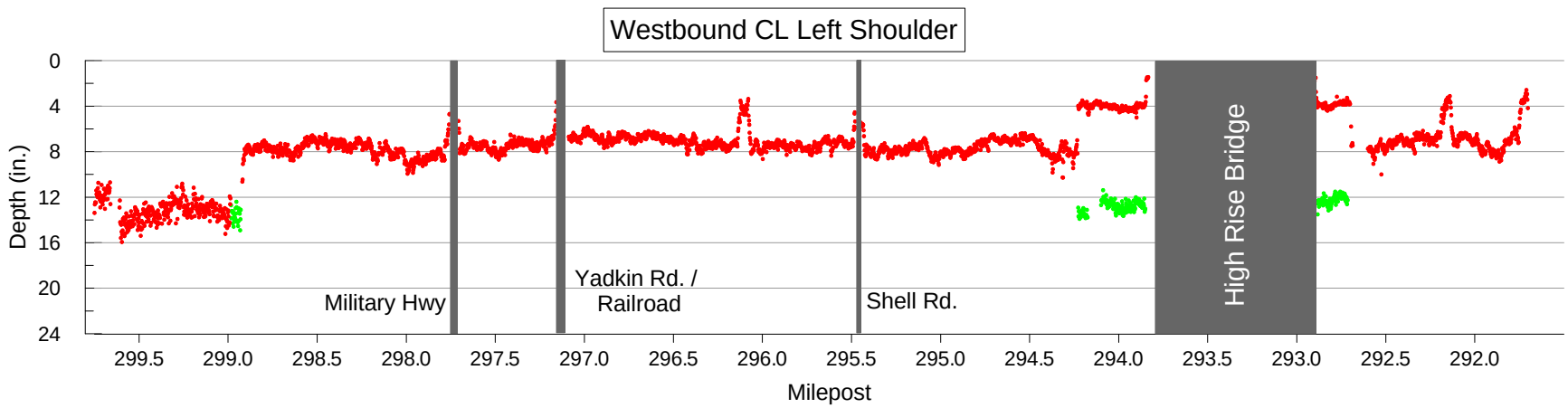

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Section: I-64 WB		
Client: **AMEC**	**Date Completed:** 12/08/15	Sheet 1 of 2

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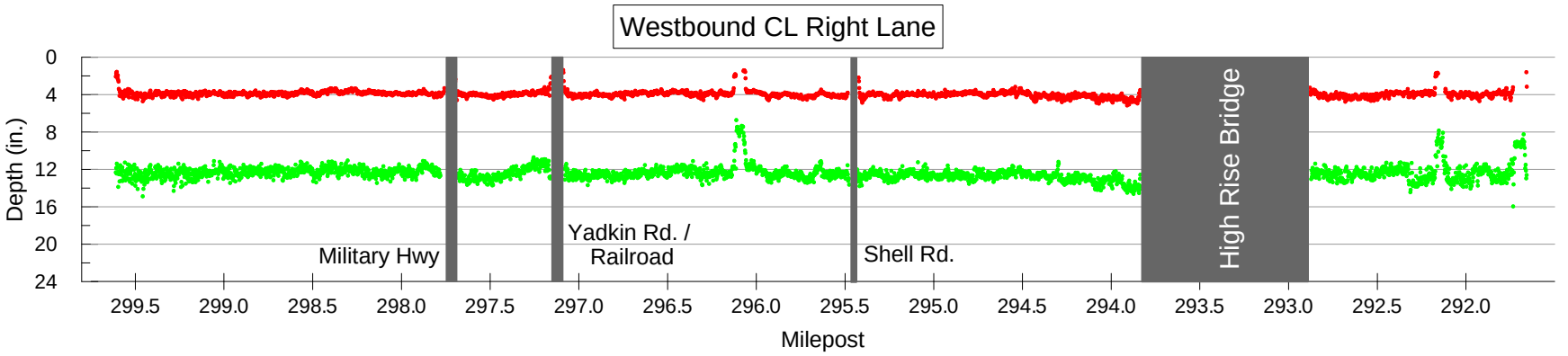

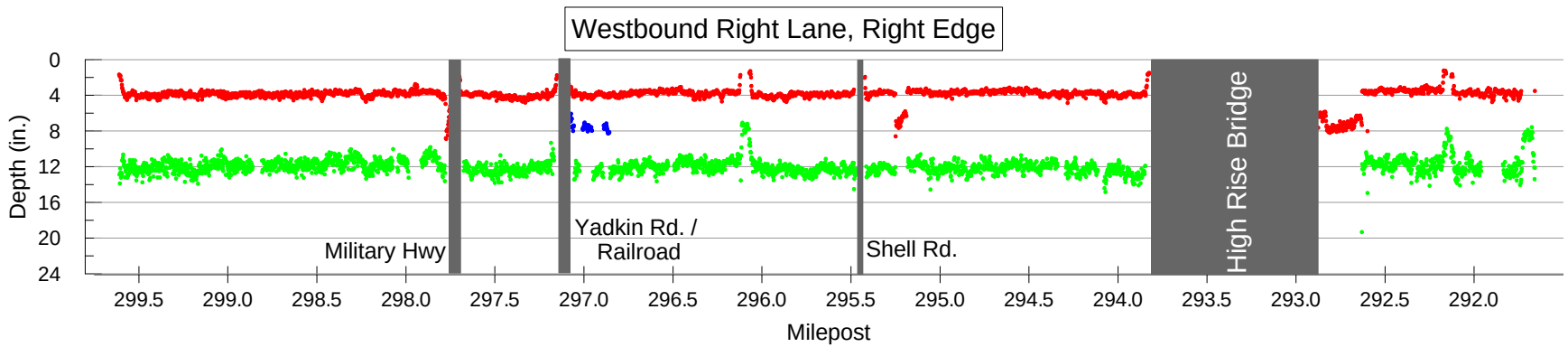

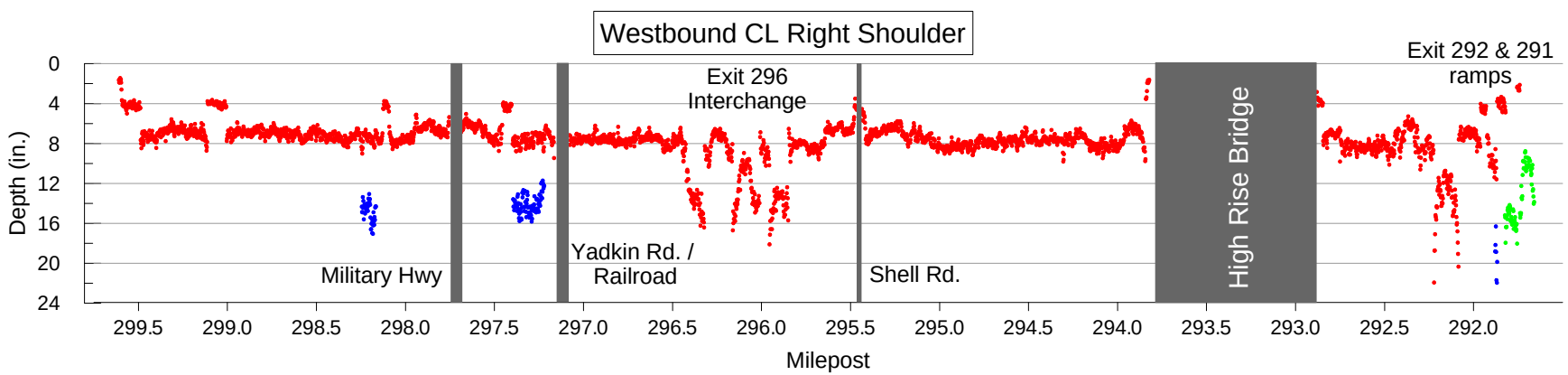

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Section: I-64 WB

Client: AMEC

- Bottom of AC
- Bottom of PCC
- Bottom of Base Layer
- Core
- Bridge

Date Completed: 12/08/15

Sheet 2 of 2

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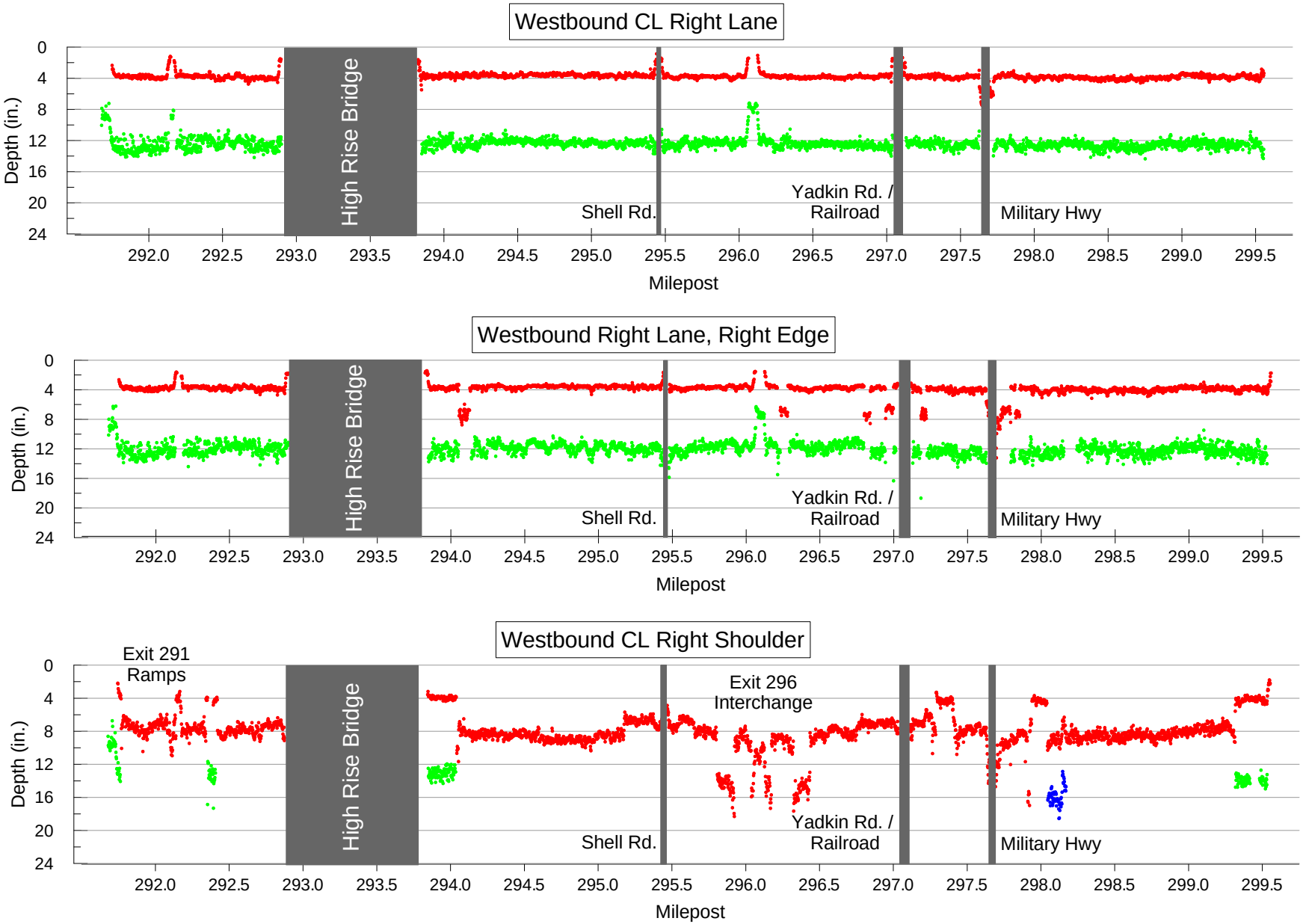

Project ID: AMEC - Chesapeake Pavement

Section: I-64 WB

Client: AMEC

Bottom of AC
Bottom of PCC
Bottom of Base Layer
Core
Bridge

Date Completed: 12/08/15

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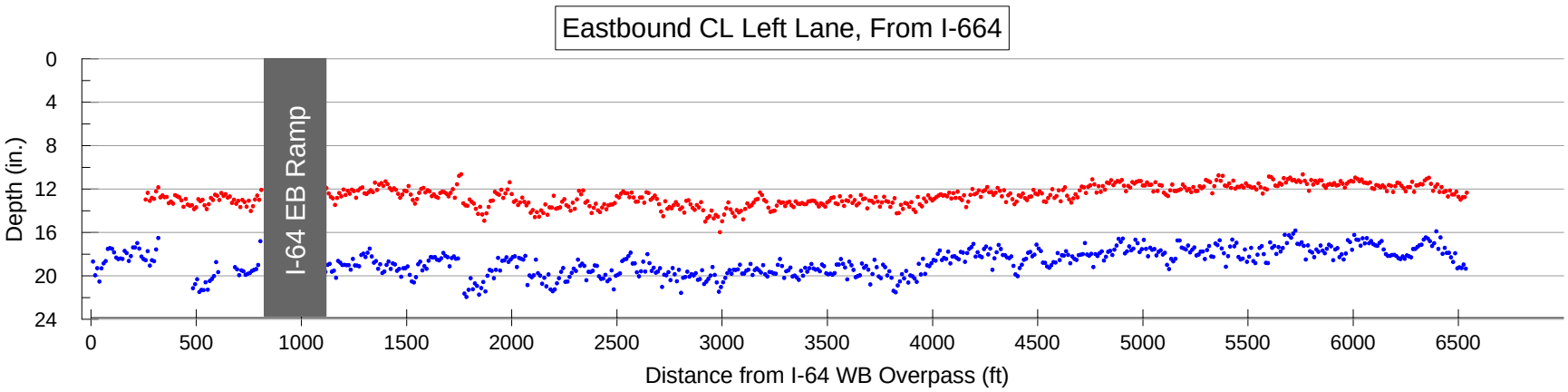

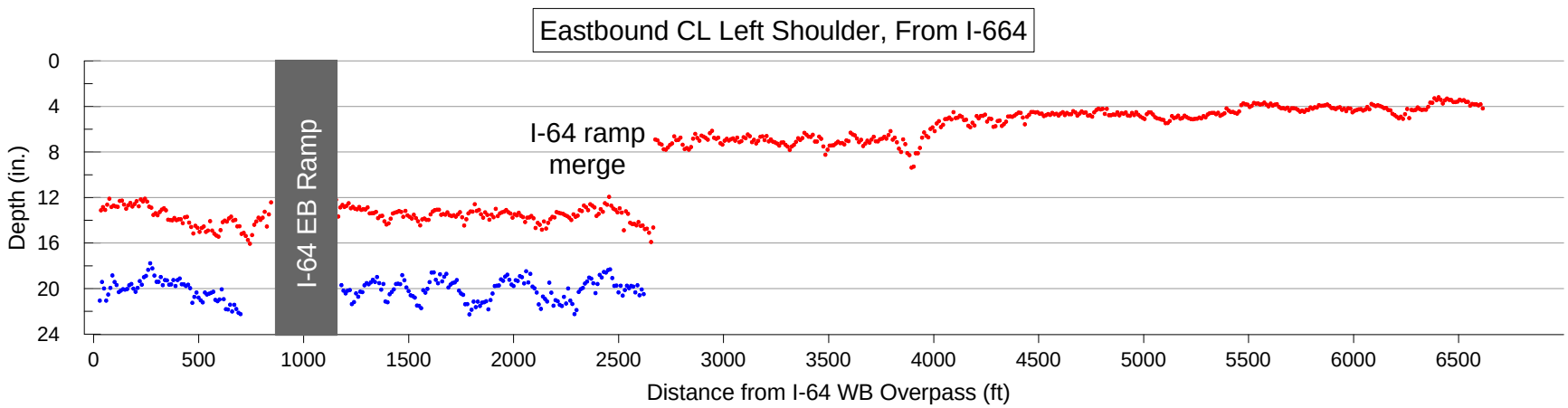

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Section: I-264 EB		
Client: **AMEC**	**Date Completed:** 12/08/15	Sheet 1 of 2

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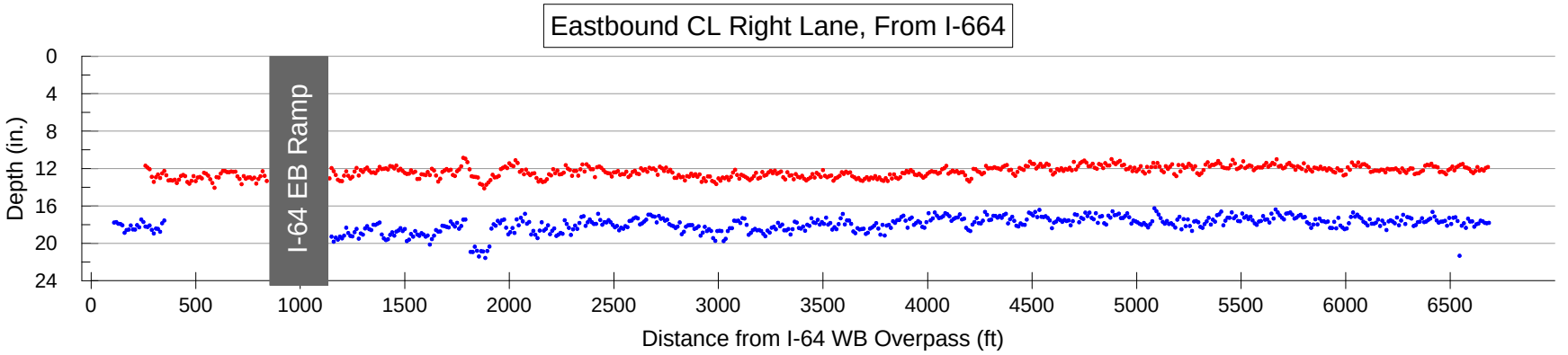

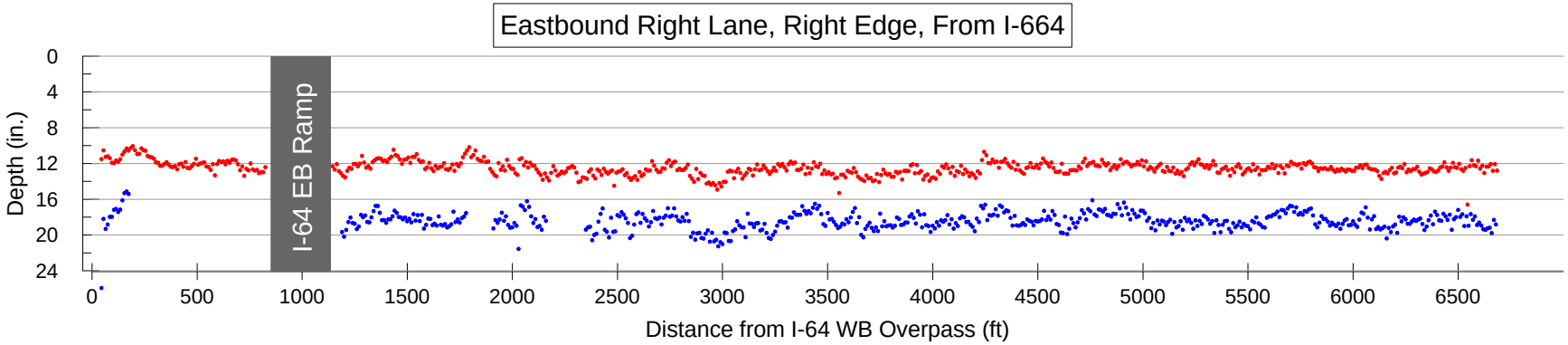

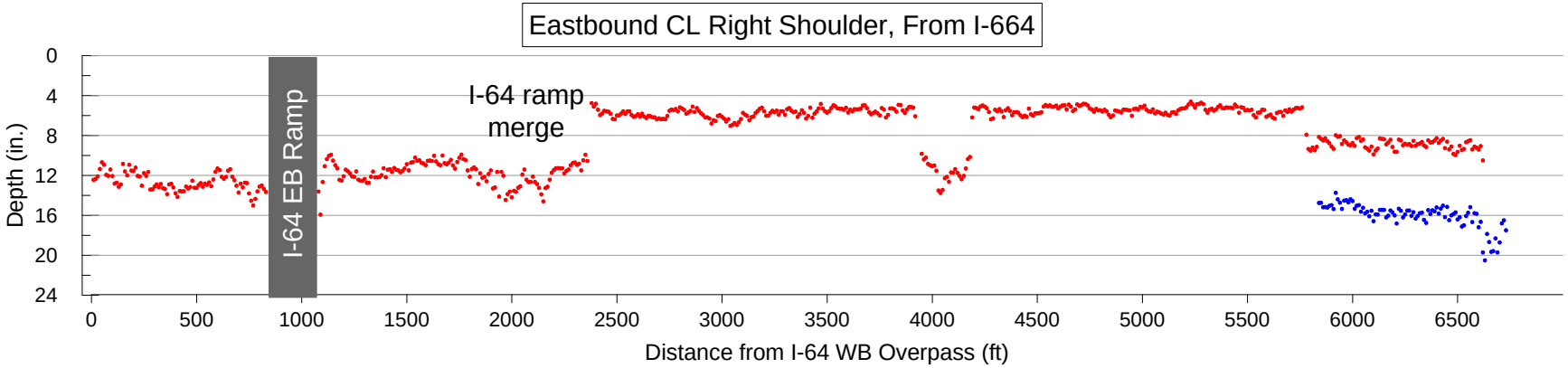

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Section: I-264 EB

Client: **AMEC**

Bottom of AC
Bottom of PCC
Bottom of Base Layer
Core
Bridge

Date Completed: 12/08/15

Sheet 2 of 2

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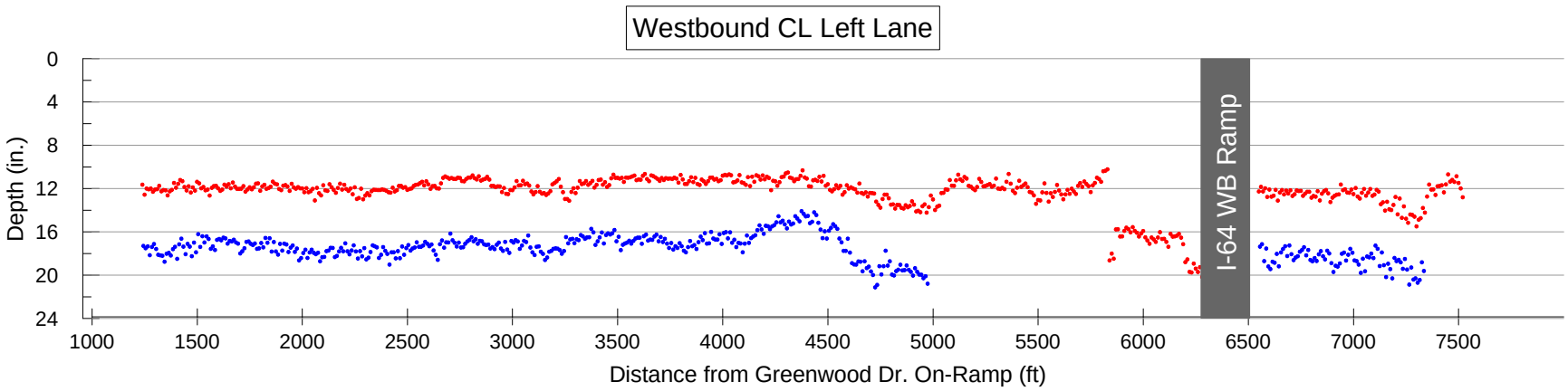

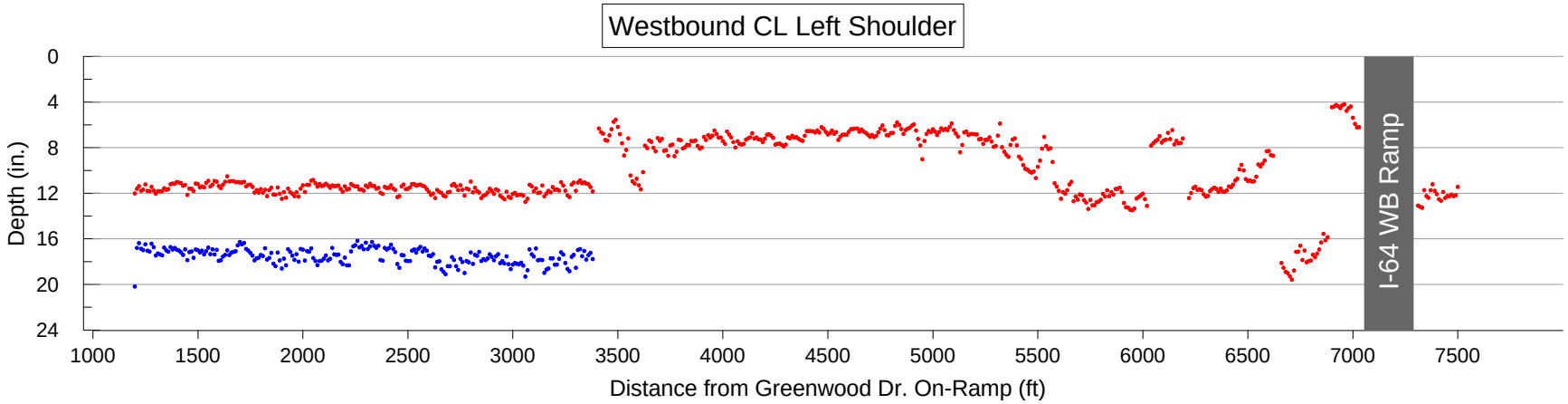

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Section: I-264 WB		
Client: **AMEC**	**Date Completed:** 12/08/15	Sheet 1 of 2

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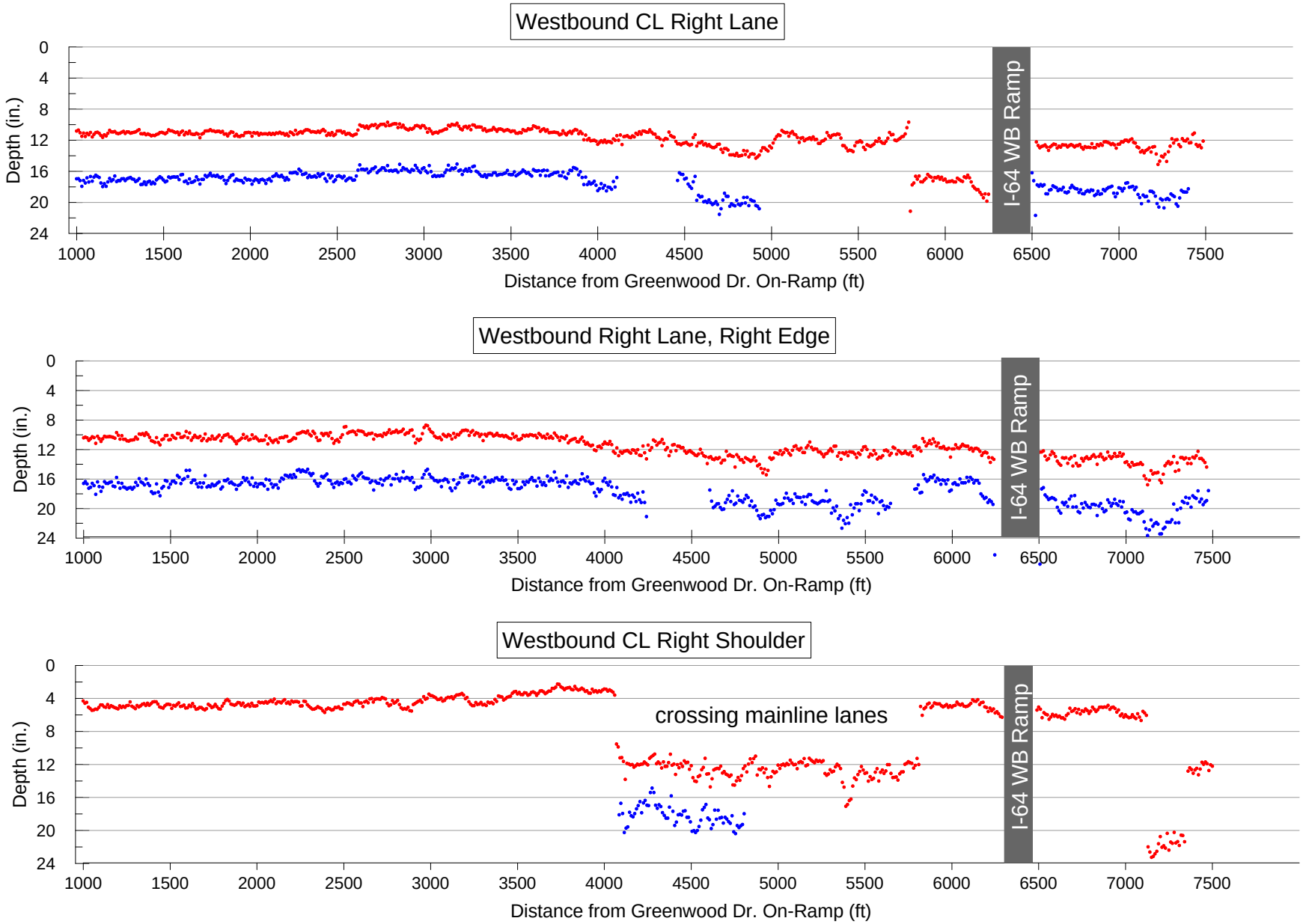

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Section: I-264 WB

Client: **AMEC**

Bottom of AC
Bottom of PCC
Bottom of Base Layer
Core
Bridge

Date Completed: 12/08/15

Sheet 2 of 2

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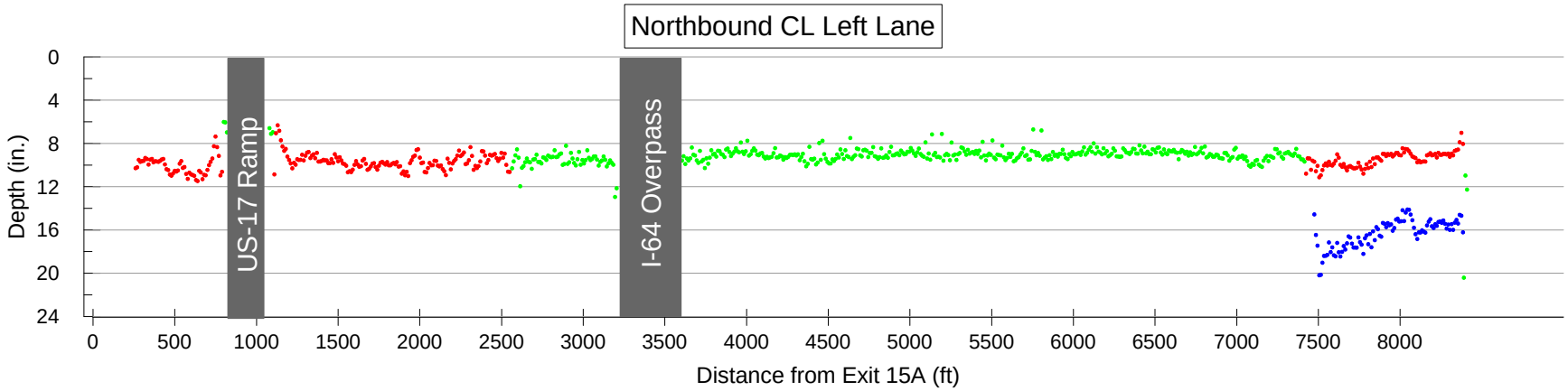

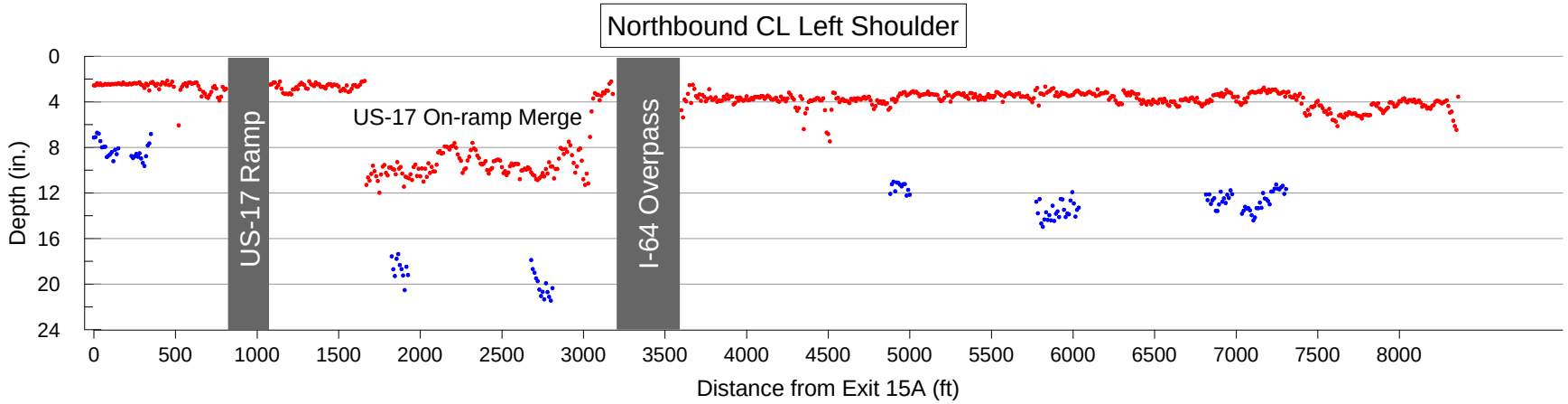

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Section: I-464 NB		
Client: **AMEC**	**Date Completed:** 12/08/15	Sheet 1 of 2

INFRASENSE

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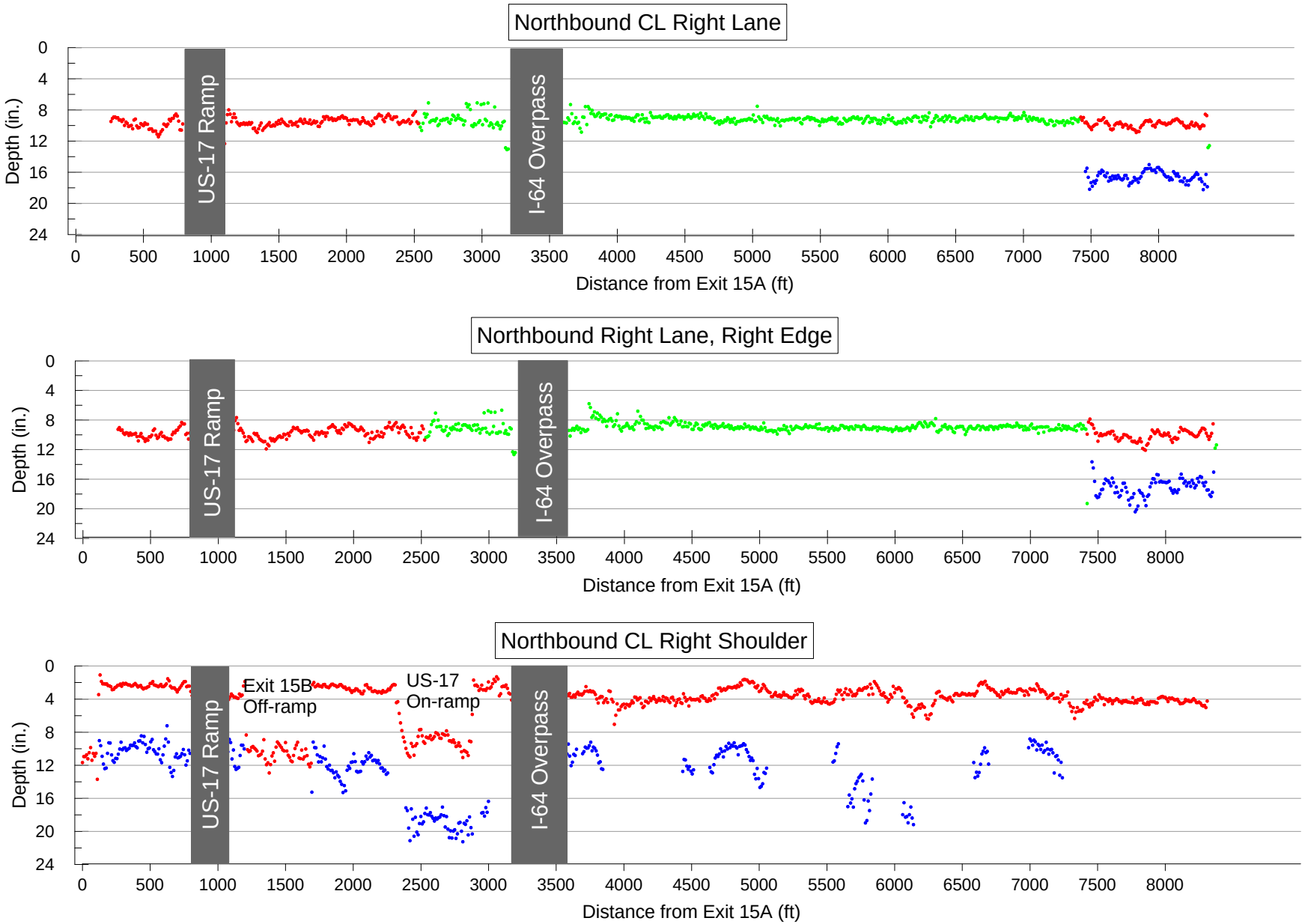

Project ID: AMEC - Chesapeake Pavement

Section: I-464 NB

Client: AMEC

Bottom of AC
Bottom of PCC
Bottom of Base Layer
Core
Bridge

Date Completed: 12/08/15

Sheet 2 of 2

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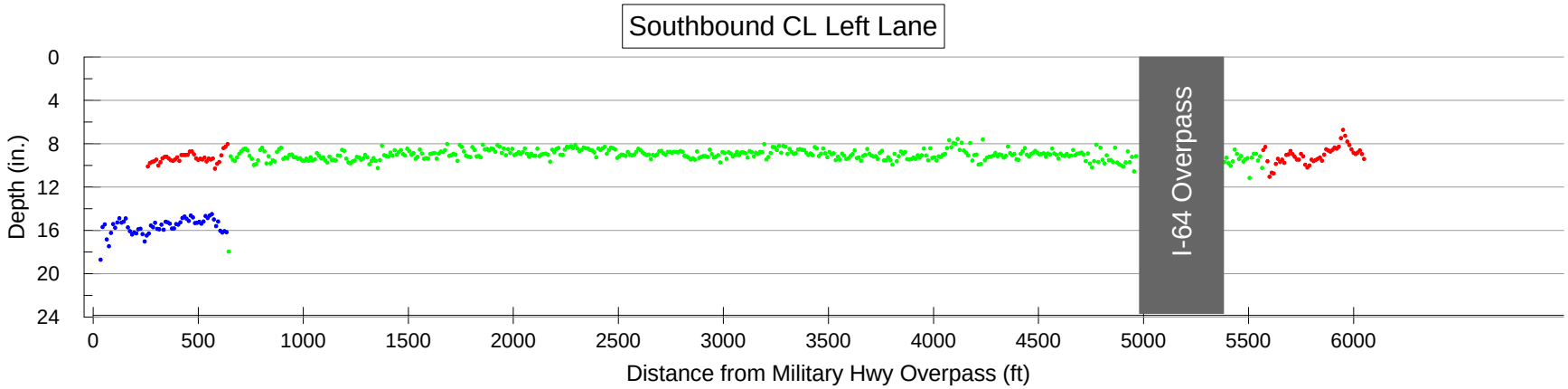
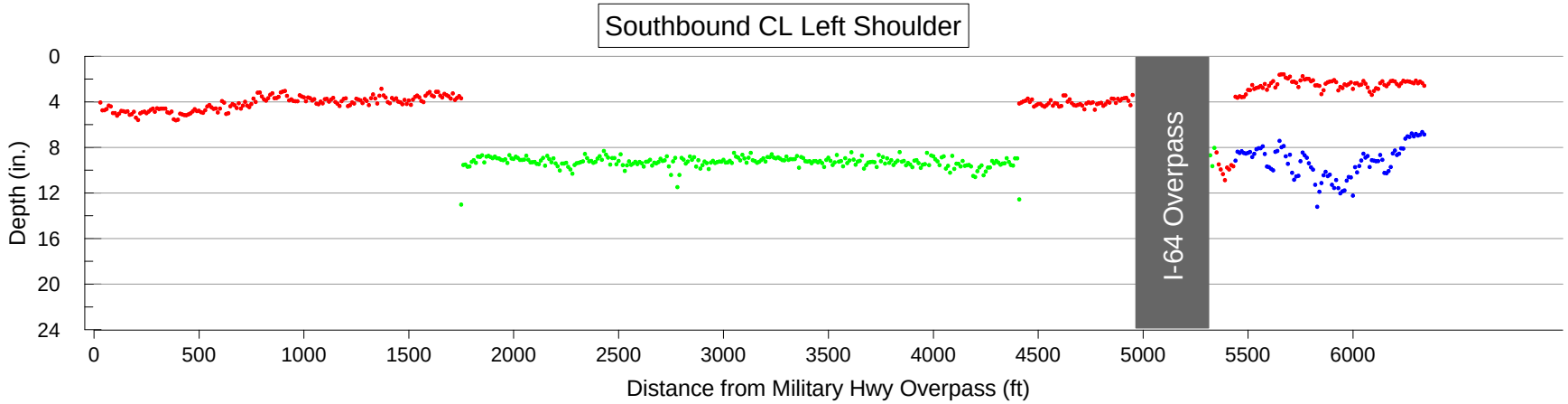
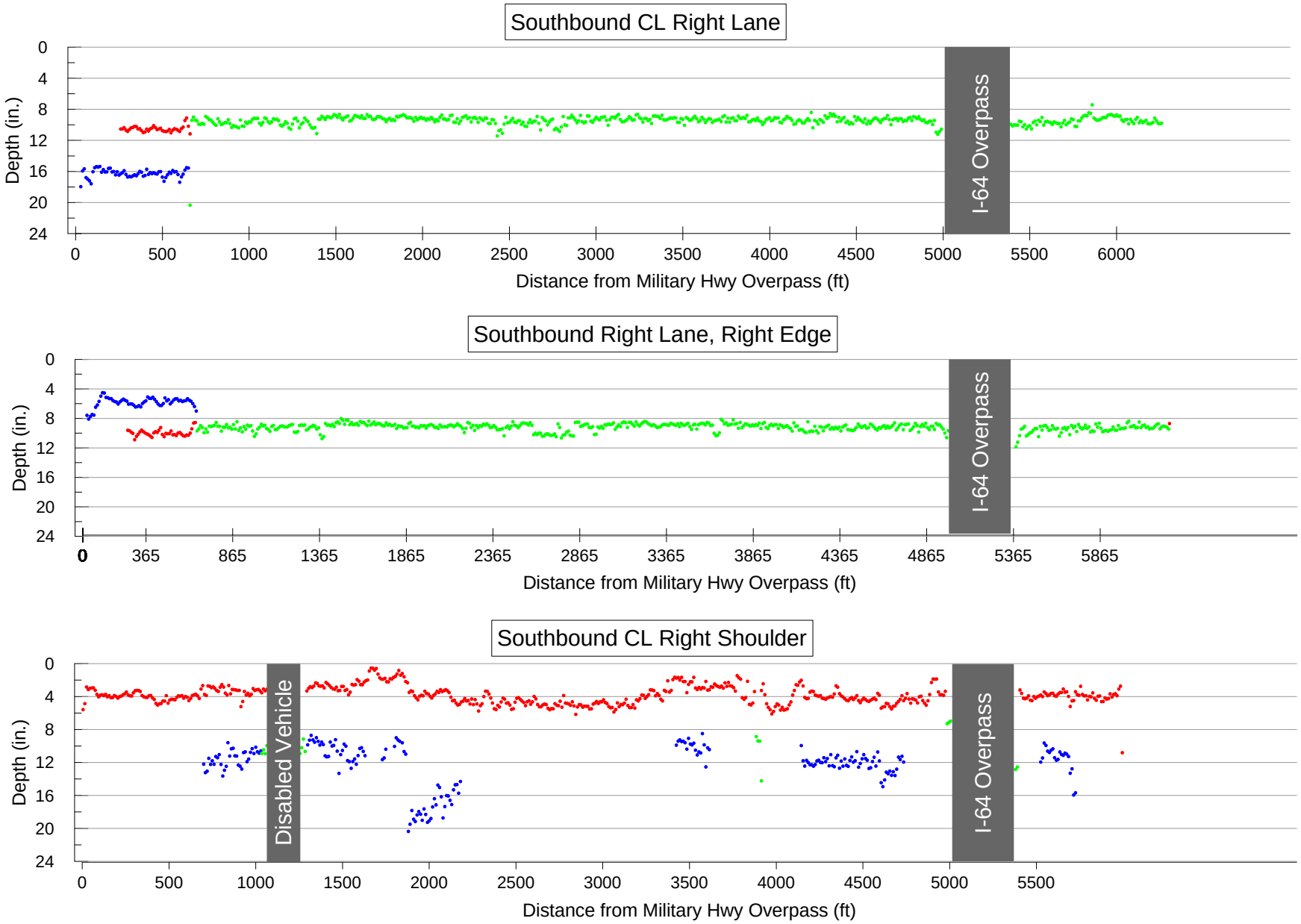




Project ID: AMEC - Chesapeake Pavement	Bottom of AC Bottom of PCC Bottom of Base Layer	Core Bridge
Section: I-464 SB		
Client: **AMEC**	**Date Completed:** 12/08/15	Sheet 1 of 2

INFRASENSE

Woburn, MA 01801



Project ID: AMEC - Chesapeake Pavement

Section: I-464 SB

Client: **AMEC**

- Bottom of AC
- Bottom of PCC
- Bottom of Base Layer
- Core
- Bridge

Date Completed: 12/08/15

Sheet 2 of 2

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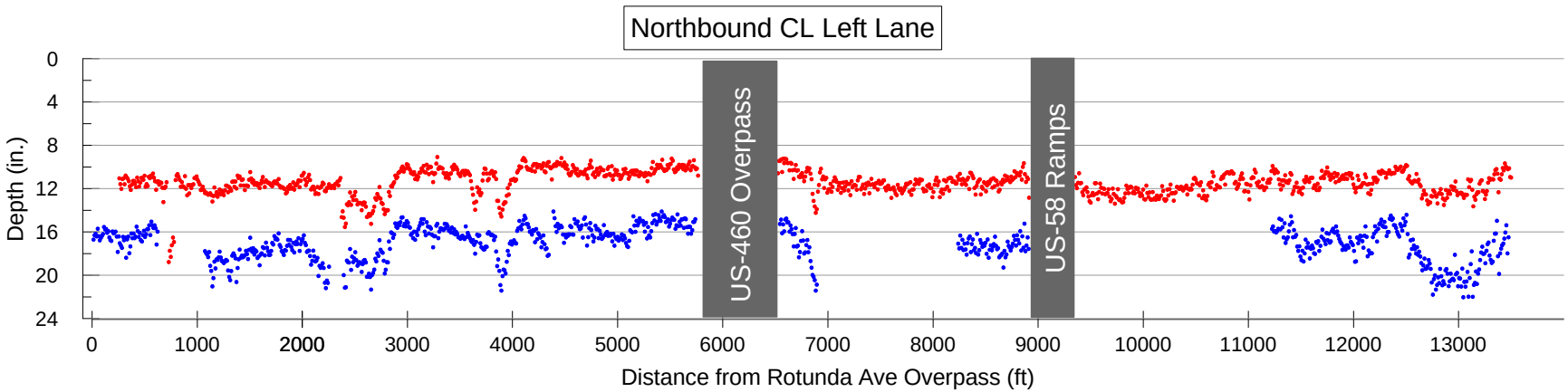
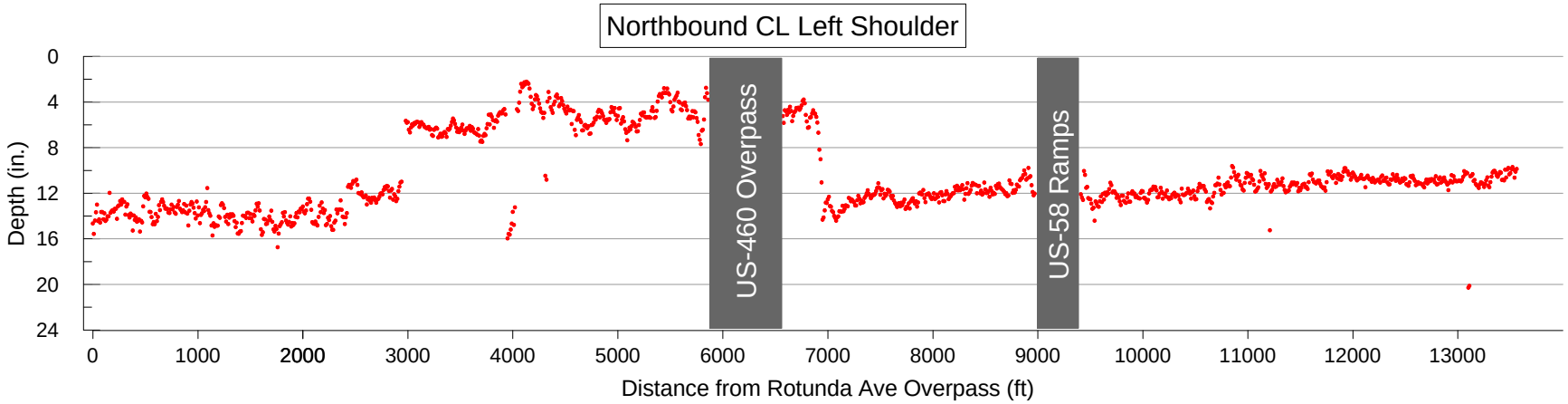
Woburn, MA 01801





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Section: I-664 NB		
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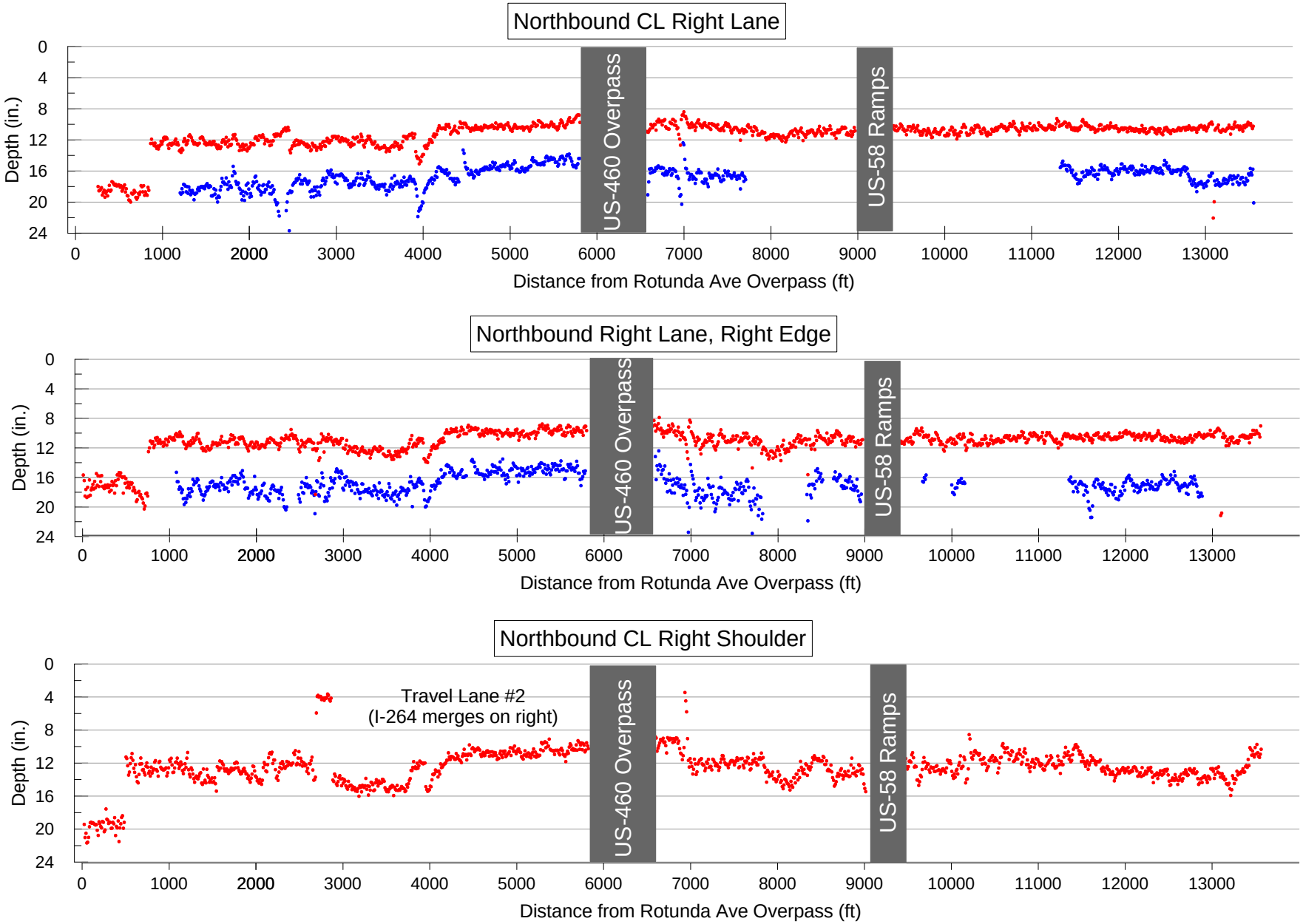
INFRASENSE

Woburn, MA 01801



Project ID: AMEC - Chesapeake Pavement

Section: I-664 NB

Client: AMEC

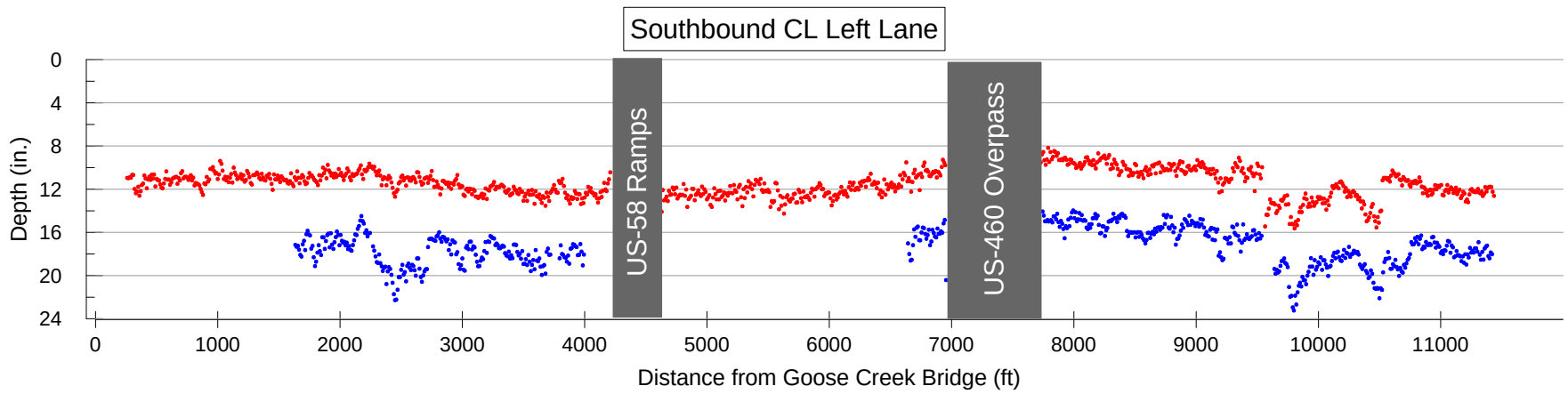
Bottom of AC
Bottom of PCC
Bottom of Base Layer
Core
Bridge

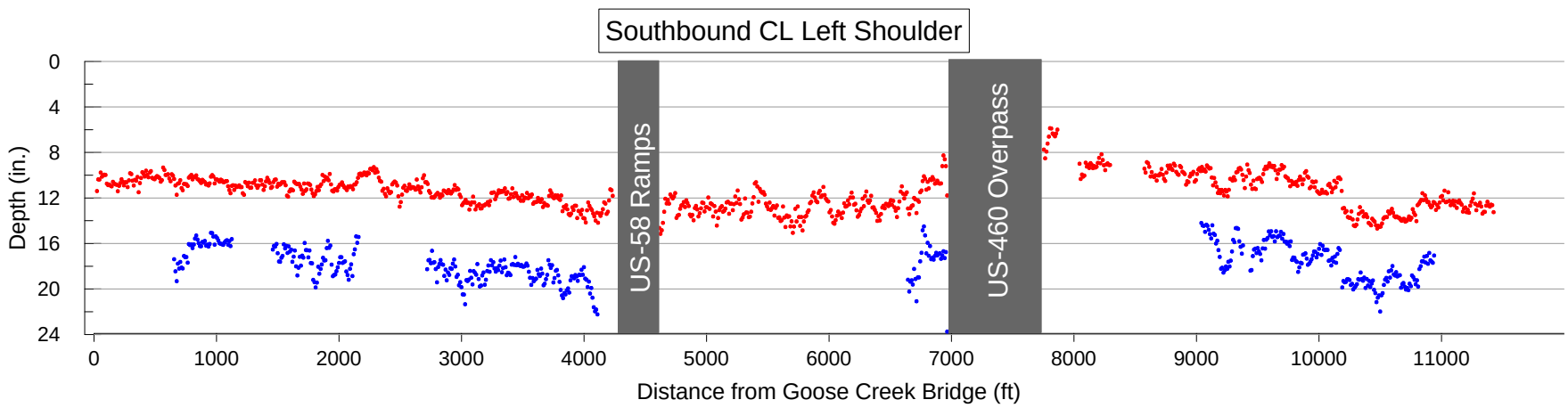
Date Completed: 12/08/15

Sheet 2 of 2

INFRASENSE

Woburn, MA 01801

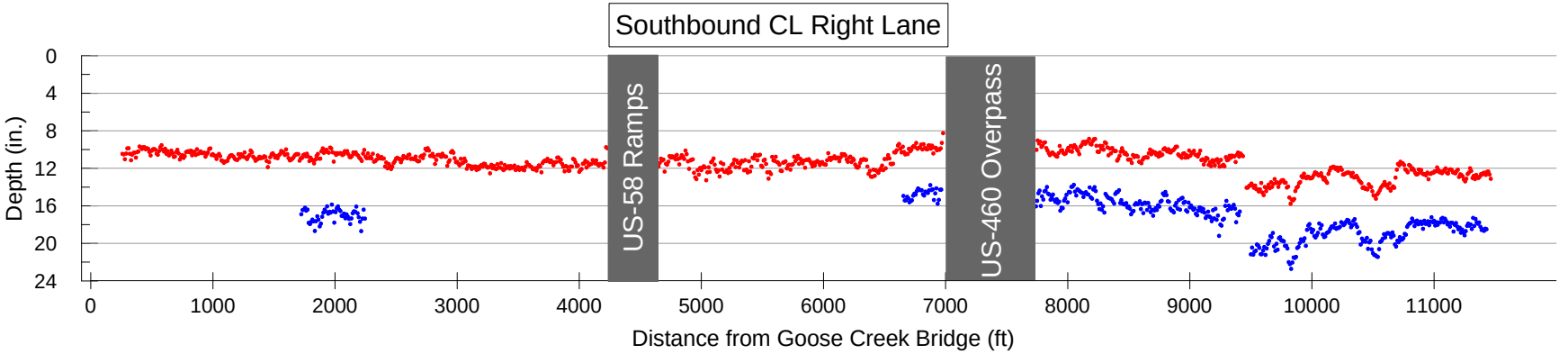


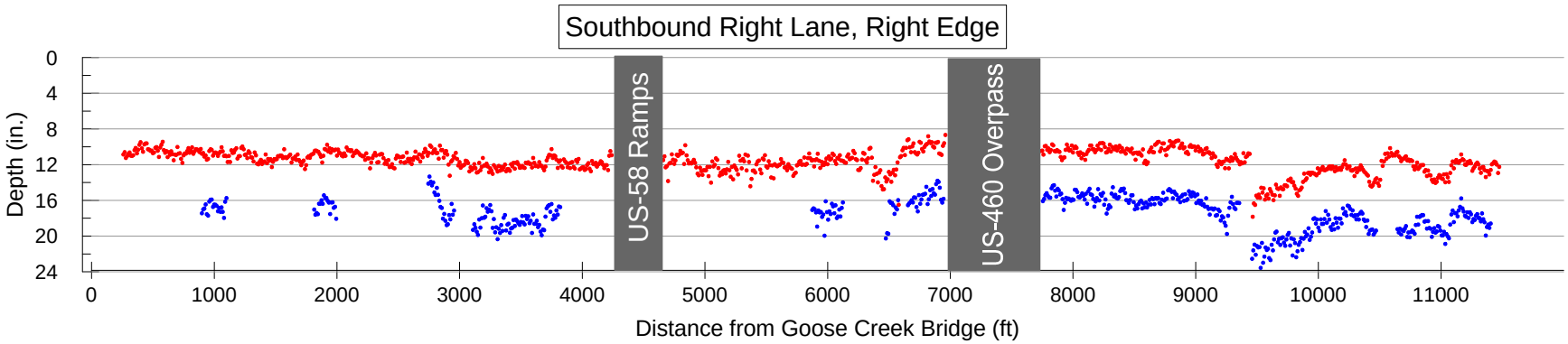


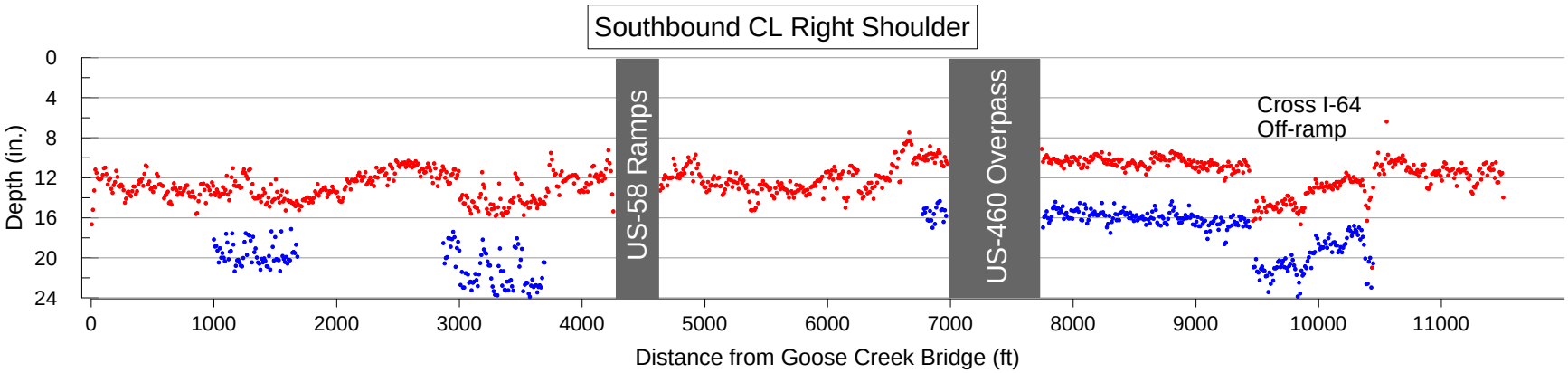
Project ID: AMEC - Chesapeake Pavement	Bottom of AC Bottom of PCC Bottom of Base Layer	Core Bridge
Section: I-664 SB		
Client: AMEC	**Date Completed:** 12/08/15	Sheet 1 of 2

INFRASENSE

Woburn, MA 01801







Project ID: AMEC - Chesapeake Pavement

Section: I-664 SB

Client: **AMEC**

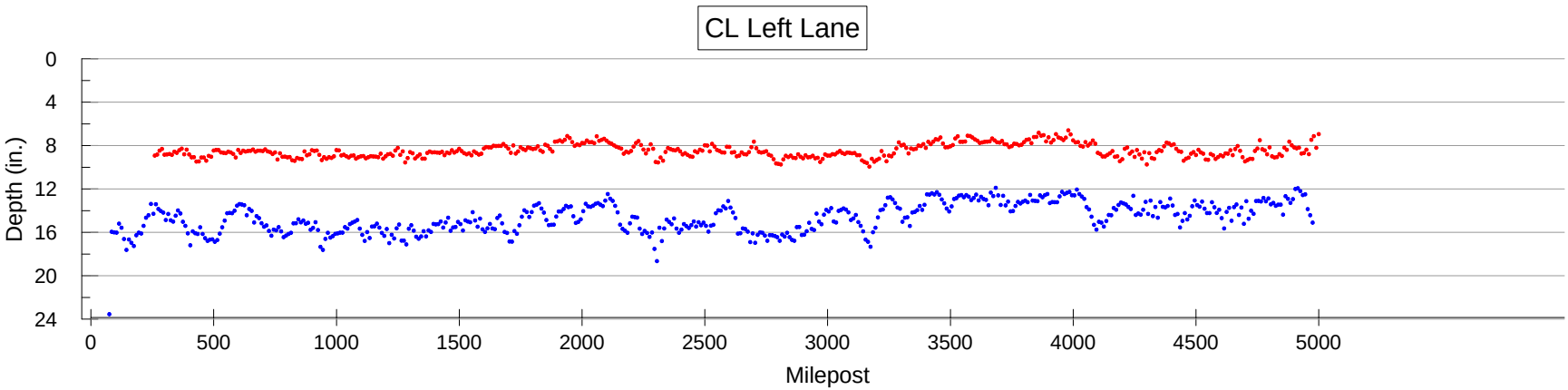
- Bottom of AC
- Bottom of PCC
- Bottom of Base Layer
- Core
- Bridge

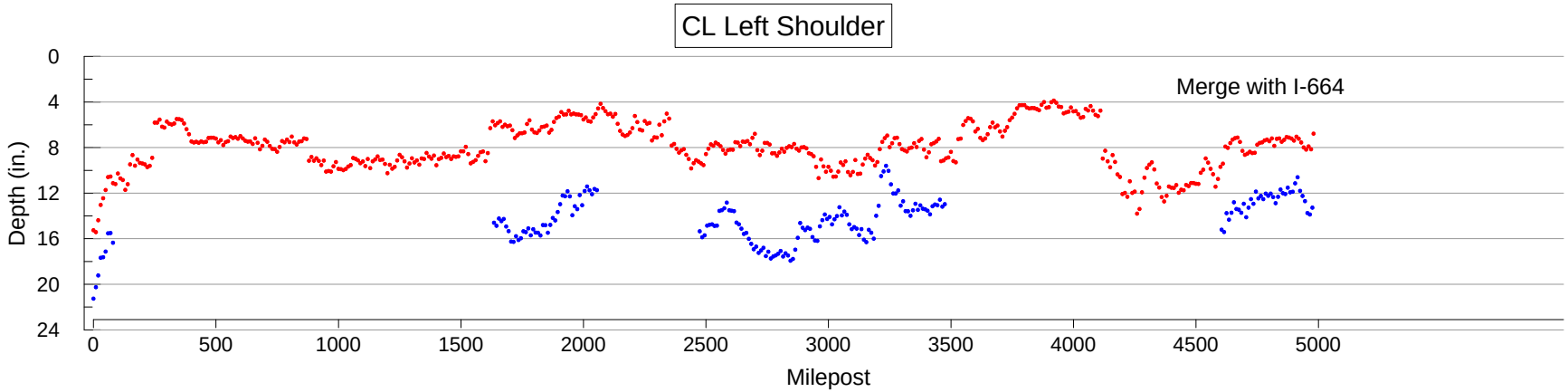
Date Completed: 12/08/15

Sheet 2 of 2

INFRASENSE

Woburn, MA 01801

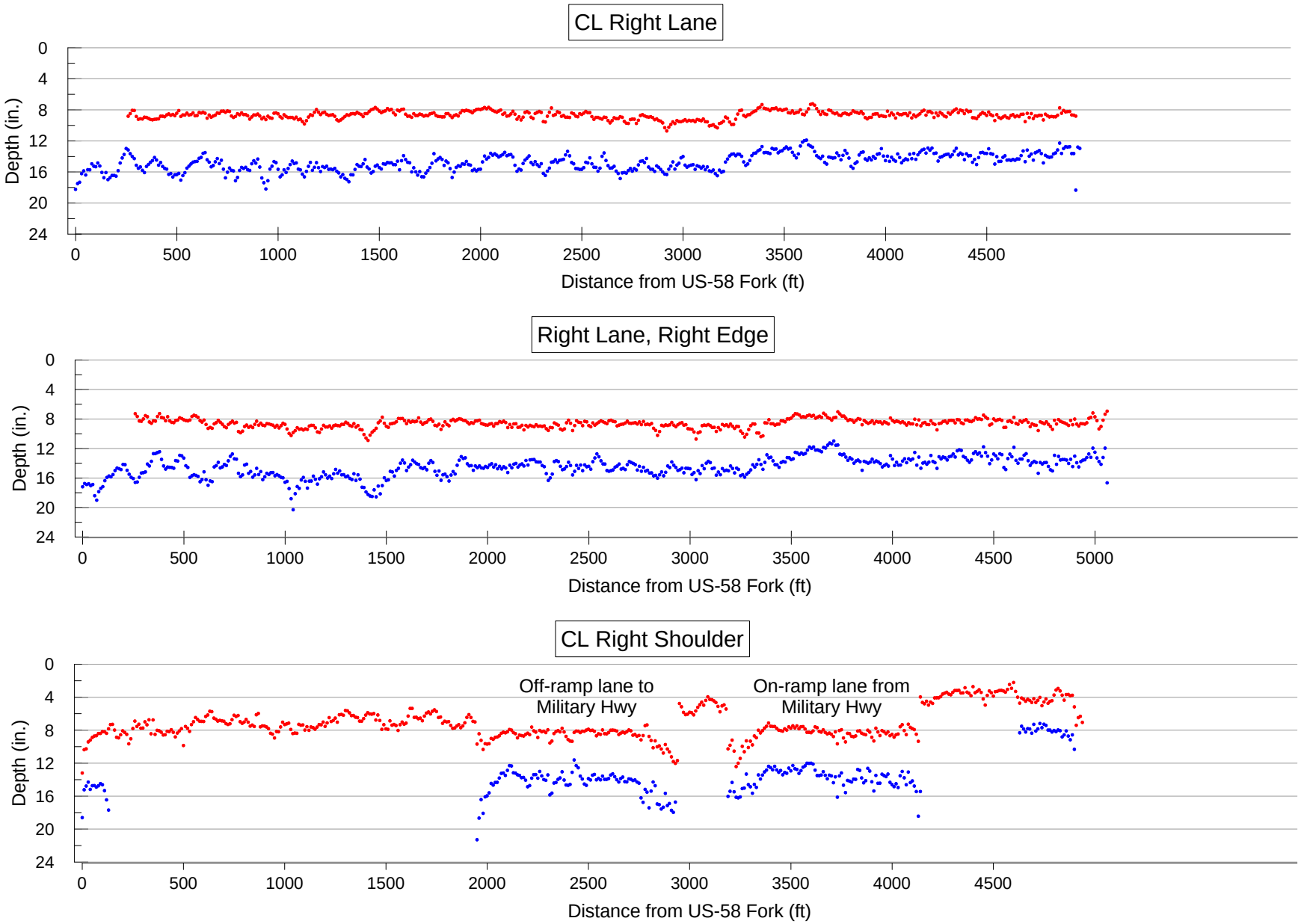




Project ID: AMEC - Chesapeake Pavement	Bottom of AC Bottom of PCC Bottom of Base Layer	Core Bridge
Section: US 58 - Ramp A		
Client: **AMEC**	**Date Completed:** 12/08/15	Sheet 1 of 2

INFRASENSE

Woburn, MA 01801



Project ID: AMEC - Chesapeake Pavement

Section: US 58 - Ramp A

Client: **AMEC**

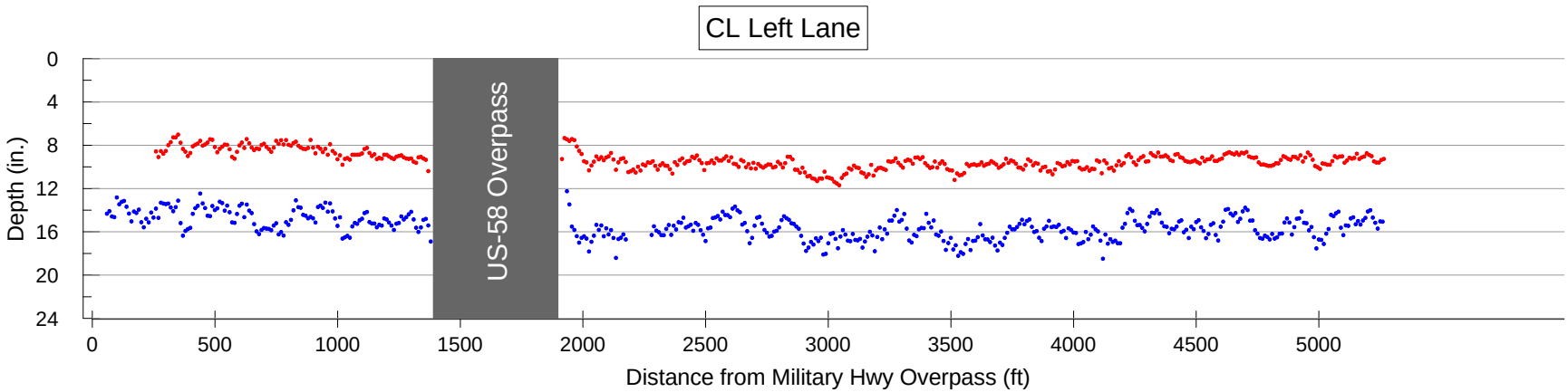
- Bottom of AC
- Bottom of PCC
- Bottom of Base Layer
- Core
- Bridge

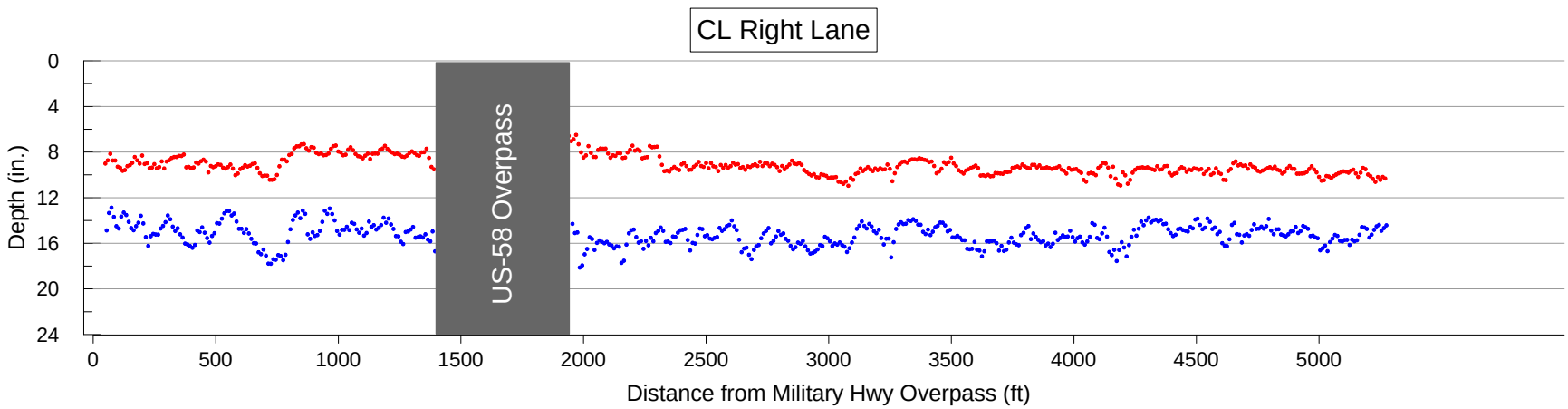
Date Completed: 12/08/15

Sheet 2 of 2

INFRASENSE

Woburn, MA 01801

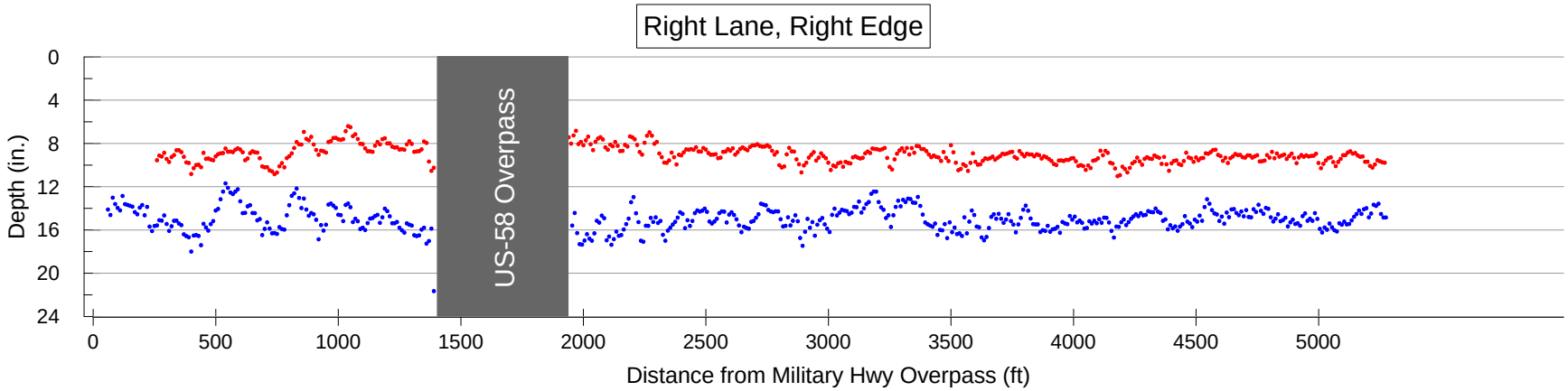


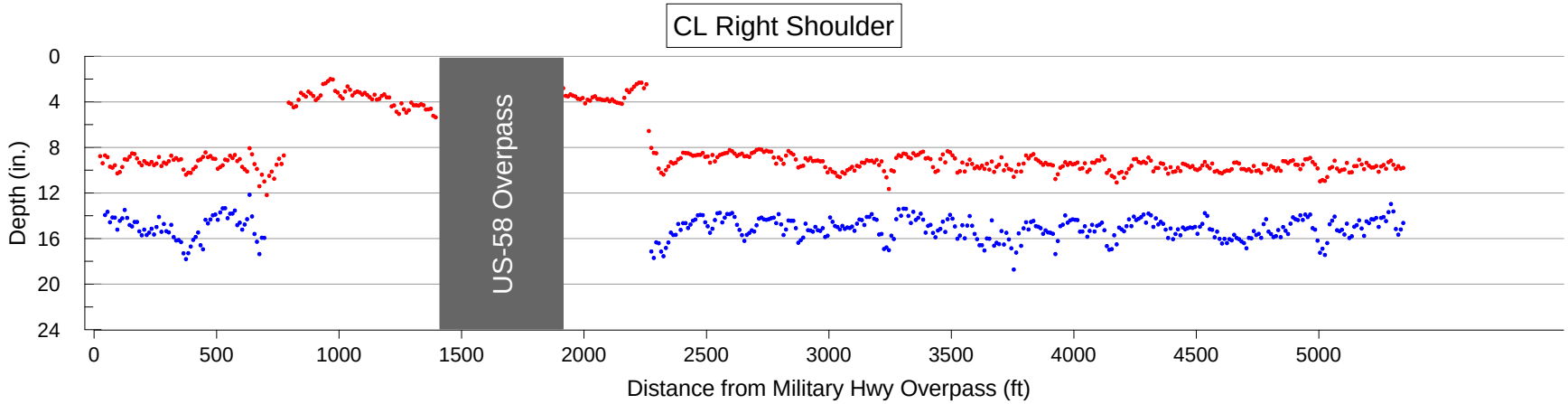


Project ID: AMEC - Chesapeake Pavement	Bottom of AC Bottom of PCC Bottom of Base Layer	Core Bridge
Section: US 58 - Ramp B		
Client: **AMEC**	**Date Completed:** 12/08/15	Sheet 1 of 2

INFRASENSE

Woburn, MA 01801

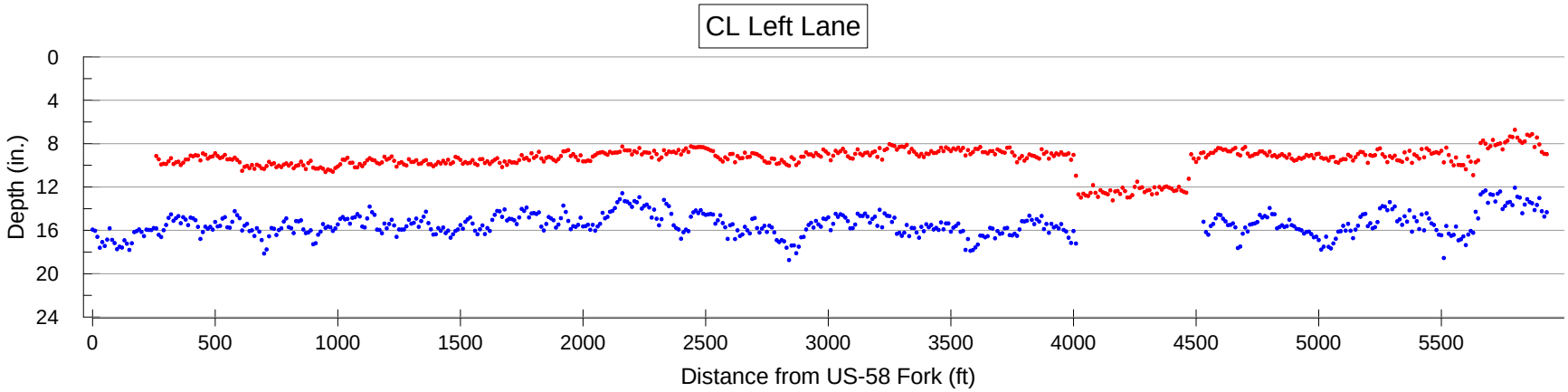


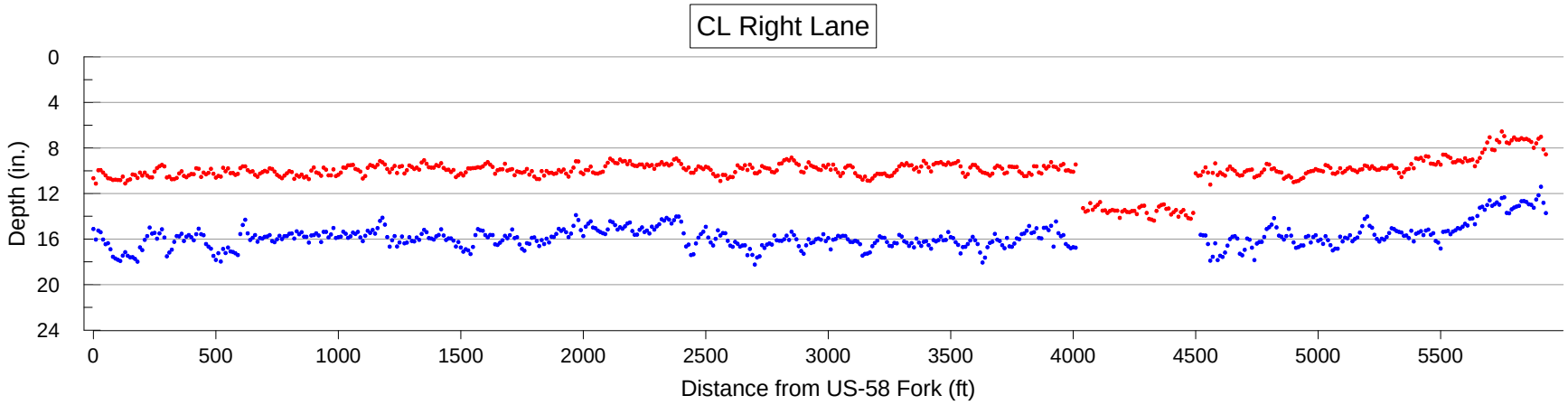


Project ID: AMEC - Chesapeake Pavement	Bottom of AC Bottom of PCC Bottom of Base Layer	Core Bridge
Section: US 58 - Ramp B		
Client: **AMEC**	**Date Completed:** 12/08/15	Sheet 2 of 2

INFRASENSE

Woburn, MA 01801

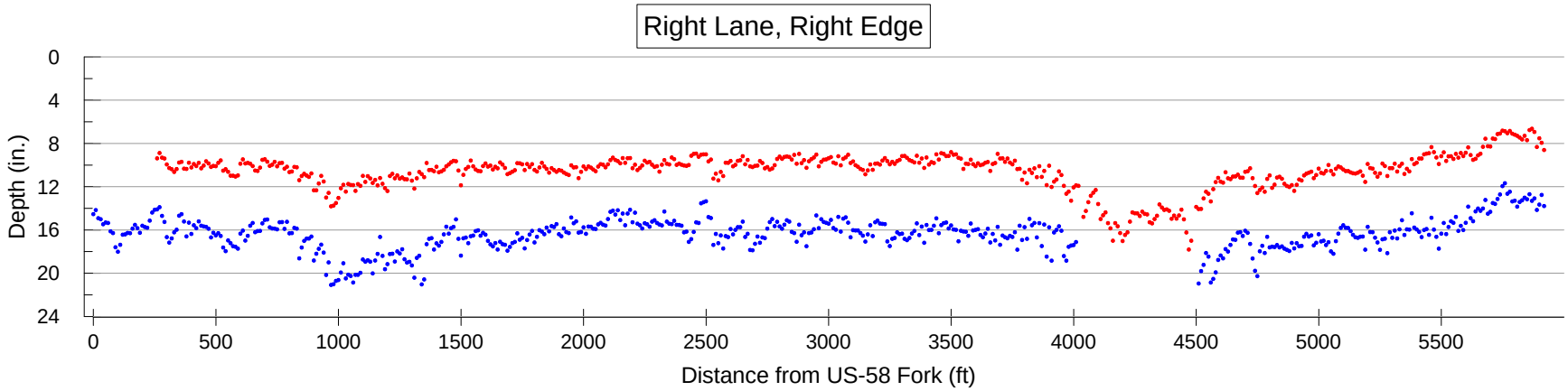


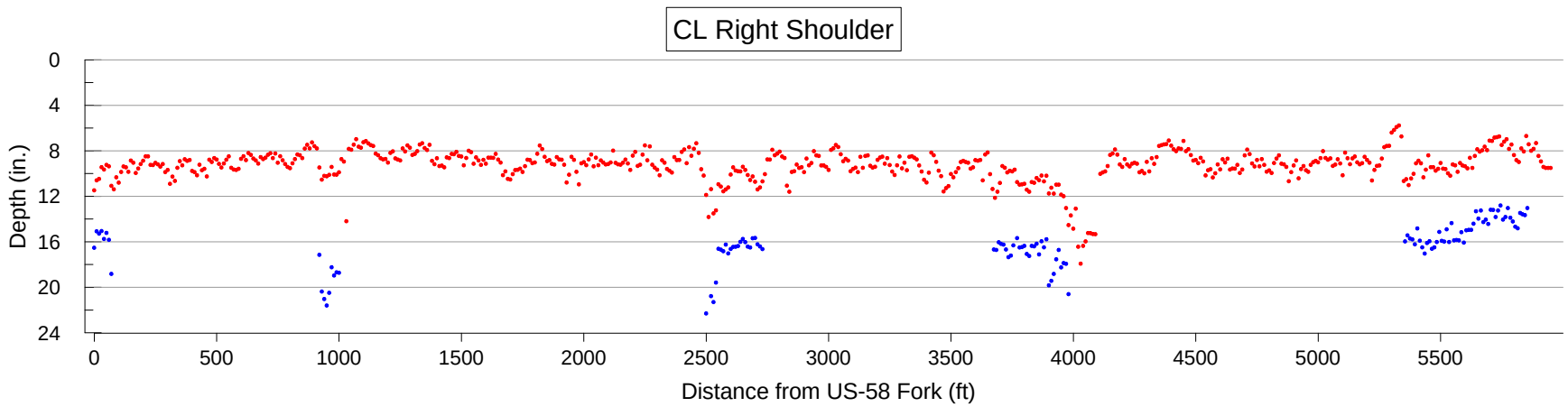


Project ID: AMEC - Chesapeake Pavement	Bottom of AC Bottom of PCC Bottom of Base Layer	Core Bridge
Section: US 58 - Ramp C		
Client: **AMEC**	**Date Completed:** 12/08/15	Sheet 1 of 2

INFRASENSE

Woburn, MA 01801





Project ID: AMEC - Chesapeake Pavement	Bottom of AC Bottom of PCC Bottom of Base Layer	Core Bridge
Section: US 58 - Ramp C		
Client: **AMEC**	**Date Completed:** 12/08/15	Sheet 2 of 2

INFRASENSE

Woburn, MA 01801

ATTACHMENT C

PRINCIPLES OF GPR FOR PAVEMENT EVALUATION

Ground penetrating radar operates by transmitting short pulses of electromagnetic energy into the pavement using an antenna attached to a survey vehicle. These pulses are reflected back to the antenna with an arrival time and amplitude that is related to the location and nature of dielectric discontinuities in the material (air/asphalt or asphalt/concrete, reinforcing steel, etc). The reflected energy is captured and may be displayed on an oscilloscope to form a series of pulses that are referred to as the radar waveform. The waveform contains a record of the properties and thicknesses of the layers within the pavement (Figure C.1).

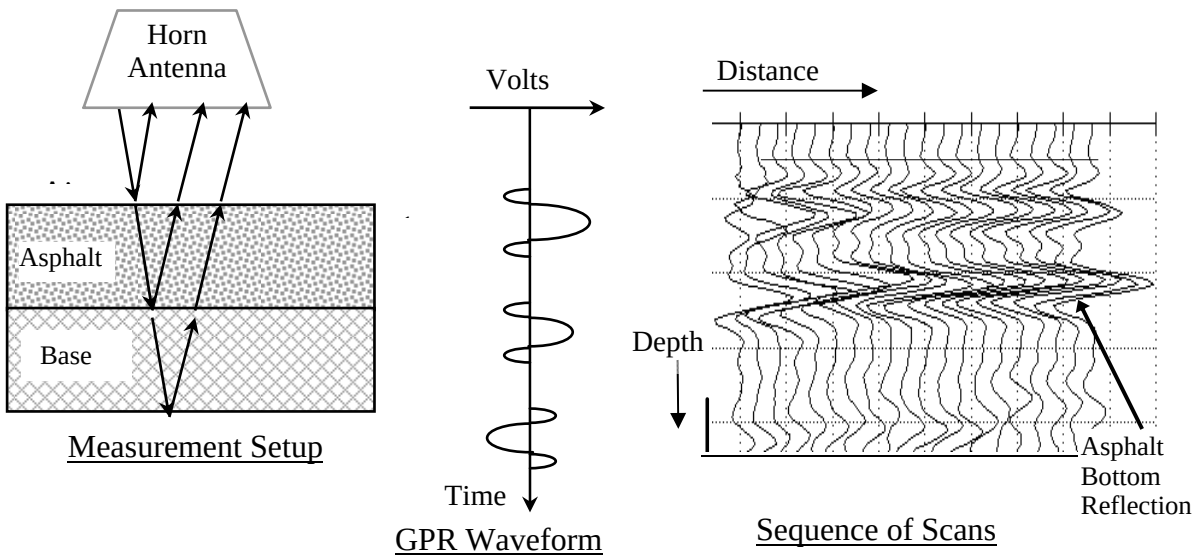


Figure C.1 – Structure of the GPR Signal for Pavements

The sequence of scans shown on the right of Figure C.1 is frequently coded in color or gray scale to produce the "b" scan representation, examples of which have been shown in the body of the report. The b-scan provides the equivalent of a cross sectional view of the pavement, with the individual pavement layers showing up as colored horizontal bands. The white and black bands indicate stronger reflections and occur when the dielectric contrast is greater. The grey regions indicate weaker reflections and occur when there is little dielectric contrast.

Layer thickness is calculated from the arrival time of the reflection from the top and bottom of each layer as follows:

$$\text{Thickness (in.)} = (5.9\ t)/\sqrt{\varepsilon_a} \qquad (1)$$

where time (t) is measured in nanoseconds and ε_a is the relative dielectric permittivity or "dielectric constant" of the pavement layer (Roddis, et. al., 1992).

Computation of the dielectric constant of the surface layer can be made by measuring the ratio of

the radar reflection from the pavement surface to the radar amplitude incident on the pavement. The incident amplitude on the pavement is determined by measuring the reflection from a metal plate on the pavement surface, since the metal plate reflects 100% of the incident energy. Using this data, one obtains the asphalt dielectric constant, ε_a as follows:

$$\varepsilon_a = [(A_{pl} + A)/(A_{pl} - A)]^2 \qquad (2)$$

where A = amplitude of reflection from asphalt, and A_{pl} = amplitude of reflection from metal plate (= negative of incident amplitude) (Roddis, et. al., 1992). Table C.1 shows typical dielectric constants and associated GPR velocities for pavement materials. Note that the range of dielectric constant for asphalt is large, due to the variations in density and aggregate composition.

Table C.1 – GPR Velocities and Dielectric Constants for Pavement Materials

VELOCITY			DIELECTRIC CONSTANT	NOTES
METRIC		ENGLISH		
M/NS	CM/NS	IN/NS		
0.90	9.0	3.54	11.00	typical for PCC
0.100	10.0	3.94	9.00	
0.105	10.5	4.13	8.16	
0.110	11.0	4.33	7.44	
0.115	11.5	4.53	6.81	
0.120	12.0	4.72	6.25	
0.125	12.5	4.92	5.76	
0.130	13.0	5.12	5.33	
0.135	13.5	5.31	4.94	typical for AC
0.140	14.0	5.51	4.59	
0.145	14.5	5.71	4.28	
0.150	15.0	5.90	4.00	
0.155	15.5	6.10	3.75	

A similar calculation can be made for the dielectric constant of the base material. Changes in base moisture content have a strong effect on the base dielectric constant, and thus the base dielectric constant can be used as an indicator of high moisture content.

The calculations described above are automated in Infrasense's *win*Decar© data analysis software program for computing pavement layer thickness and changes in pavement layer properties. The analytical techniques described above serve as the basis for data analysis carried out during this project, as described in Section 3 of the report.

References

ASTM D 4748–98, "Standard Test Method for Determining the Thickness of Bound Pavement Layers Using Short-Pulse Radar." Annual Book of ASTM Standards, American Society for Testing and Materials (March 1998).

Maser, K.R., Scullion, T., "Influence of Asphalt Layering and Surface Treatments on Asphalt and Base Layer Thickness Computations Using Radar." Texas DOTPD Report TX-92-1923-1, Austin, TX (1992b).

Roddis, W.M., Kim, Maser, K.R., and Gisi, A.J., "Radar Pavement Thickness Evaluations for Varying Base Conditions," Transportation Research Record No. 1355, TRB National Research Council, pp. 90-98, 1992.

Appendix C

Boring and Laboratory Testing Report

SINCE 1881

FROEHLING & ROBERTSON, INC.

Engineering Stability Since 1881

3015 Dumbarton Road
Richmond, Virginia 23228-5831 I USA
T 804.264.2701 I F 804.264.7862

F&R Project No.: 60T-0570 April 20, 2016

Amec Foster Wheeler
12000 Indian Creek Court, Suite F
Beltsville, MD 20705

Attention: Mr. Jonathan Groeger

Subject: Interstate-64 High Rise Bridge Corridor
Pavement Coring & Boring Exploration
VDOT Project No. TBD (UPC 106692, Activity Code 612)
Chesapeake, Virginia

Dear Mr. Groeger:

The purpose of this letter is to present the results of the contract drilling, boring log preparation, pavement core log preparation, and laboratory testing program undertaken by Froehling & Robertson, Inc. (F&R) in connection with the above referenced project. Our services were performed in general accordance with our Proposal No. 1660-00257. The following information reviews our exploration procedures and summarizes the results of our laboratory testing program.

The subsurface exploration program was performed between January 4, 2016 and February 3, 2016 and consisted of thirty-six (36) pavement cores/borings within the existing Interstate roadways and ramps within the I-64 High Rise Bridge Corridor; work was performed in both directions of I-64, I-264, I-464, and I-664 as well as along Ramps A, B, and C for the I-664/US Rte. 58 Interchange. Coring/boring locations are noted as C1 through C16, C18 through C29, and C31 though C38. The boring/coring locations were initially selected by VDOT and were marked in the field (modified if necessary) by F&R personnel using a handheld GPS unit with an accuracy of <10 feet. Boring logs depict a surface elevation of 999 feet, this is a default elevation since elevations were not provided. The stationing provided on the attached logs are based on data provided to F&R from AMEC; offset data is relative to the travel lane. The Station and Offset data provided on the attached boring logs are staked data. The Latitude and Longitude data provided on the attached boring logs are as-drilled data.

The borings/corings were performed in accordance with generally accepted practice using a truck-mounted drill rig, equipped with automatic hammers. For the SPT sampling methods, hollow-stem augers were advanced to pre-selected depths, the center plug was removed, and representative soil samples were recovered with a standard split-spoon sampler (1 3/8 in. ID, 2

in. OD) in general accordance with ASTM D 1586, the Standard Penetration Test. For these tests, a weight of 140 pounds was freely dropped from a height of 30 inches to drive the split-spoon sampler into the soil. The number of blows required to drive the split-spoon sampler four consecutive 6-inch increments was recorded, and the blows of the middle two increments were summed to obtain the Standard Penetration Resistance (N-value). At select locations, the number of blows required to drive the split-spoon sampler three consecutive 6-inch increments was recorded, and the blows of the last two increments were summed to obtain the Standard Penetration Resistance (N-value).

An automatic hammer was used to perform the Standard Penetration Test (SPT) on this project. Research has shown that the Standard Penetration Resistance (N-value) determined by an automatic hammer is different than the N-value determined by the safety hammer method. Most correlations that are published in the technical literature are based on the N-value determined by the safety hammer method. This is commonly termed N_{60} as the rope and cathead with a safety hammer delivers about 60 percent of the theoretical energy delivered by a 140-pound hammer falling 30 inches. Several researchers have proposed correction factors for the use of hammers other than the safety hammer to correct the values to be equivalent to the safety hammer SPT N_{60}-values. The correction is made using the following equation:

$$N_{60} = N_{field} \times C_E$$

N_{field} is the value recorded in the field and C_E is the energy ratio for the hammer utilized in the field. The guidelines provided in the Performance and Use of the Standard Penetration Test in Geotechnical Engineering Practice manual, published by the Center for Geotechnical Practice and Research at the Virginia Polytechnic Institute and State University, recommend that a correction factor (C_E) be used to covert N_{field} values to N_{60} values, when using an automatic hammer. It is recommended that corrected N_{60} values be used for engineering analysis, and, for the hammers used on this project, we recommend that a correction factor (C_E) of 1.3 be used to convert N_{field} values to N_{60} values.

Subsurface water was encountered at 5 locations (C8, C13, C14, C18, and C25) during drilling operations at depths ranging from 4 to 5 feet below existing ground surface. Long-term, 24-hour readings, were unable to be obtained due to safety. Upon completion of drilling activities, the borings/corings were grouted and were capped with a concrete/asphalt patch. Periodic observation and maintenance of the boreholes should be performed due to potential subsidence at the ground surface, as the borehole backfill could settle over time.

Representative portions of the split-spoon soil samples obtained throughout the exploration program were placed in glass jars and transported to our laboratory for moisture content testing. In the laboratory, the soil samples were evaluated by a member of our engineering staff, in general accordance with techniques outlined in the visual-manual identification procedure (ASTM D 2488). Although some laboratory testing (47 classifications) was performed, most of the soil descriptions and classifications discussed in this report and shown on the attached boring logs are based on visual observation and should be considered approximate. The subsurface conditions noted in the attachments to this report provide an

estimate of the subsurface conditions based on interpretation of the boring/coring data using normally accepted geotechnical engineering judgments.

Soil samples recovered on this project will be stored at F&R's office for a period of 60 days. The samples will be discarded after 60 days, unless prior notification is provided to us in writing.

I-64

Twelve (12) coring/borings were performed along I-64. Asphalt pavement was encountered at all 12 locations and generally consisted of 3 to 8 inches of asphalt. Underlying concrete was encountered at 10 locations and generally ranged from 8 to 9.5 inches in thickness. Cement Treated Base (CTB) was encountered at 9 locations and ranged in thickness from 4 to 10 inches in thickness. Subbase aggregate was encountered at 1 location and was approximately 5 inches in thickness. The subgrade generally consisted of Silty SAND (SM).

I-264

Six (6) coring/borings were performed along I-264. Asphalt pavement was encountered at all 6 locations and generally consisted of 8 to 13 inches of asphalt. Cement Treated Base (CTB) was encountered at 1 location and was approximately 4 inches in thickness. Subbase aggregate was encountered at 1 location and was approximately 6 inches in thickness. The subgrade generally consisted of Silty SAND (SM).

I-464

Seven (7) coring/borings were performed along I-464. Asphalt pavement was encountered at 3 locations and generally consisted of 4 to 12 inches of asphalt. Concrete was encountered at 4 locations and generally ranged from 8.5 to 10 inches in thickness. Cement Treated Base (CTB) was encountered at 4 locations and ranged in thickness from 4 to 12 inches in thickness. Subbase aggregate was encountered at 2 locations and ranged in thickness from 4 to 10 inches in thickness. The subgrade generally consisted of Silty SAND (SM).

I-664

Four (4) coring/borings were performed along I-664. Asphalt pavement was encountered at all 4 locations and generally consisted of 11 to 13 inches of asphalt. Cement Treated Base (CTB) was encountered at 1 location and was approximately 6 inches in thickness. Subbase aggregate was encountered at 1 location and was approximately 4 inches in thickness. The subgrade generally consisted of Silty SAND (SM).

I-664/US Rte. 58 Interchange (Ramps A, B, & C)

Seven (7) coring/borings were performed along the I-664/US Rte. 58 Interchange Ramps. Asphalt pavement was encountered at all 7 locations and generally consisted of 3 to 15.5 inches of asphalt. Subbase aggregate was encountered at 4 locations and ranged from 1 to 4 inches in thickness. The subgrade generally consisted of Silty SAND (SM).

Laboratory testing was performed in general accordance with applicable Virginia Test Method (VTM) standards. Samples were tested for moisture content (ASTM D 2216), Atterberg limits (VTM-7), particle size distribution passing the No. 200 sieve (VTM-25), Standard Proctor (VTM-1) and CBR (VTM-8). It is our understanding that the latest version of VTM-8 no longer requires the sample to be re-run to verify the 0.2-inch value and that the 0.1-inch value should be reported, therefore we have reported the 0.1-inch penetration in our lab summary.

Unconfined compressive strength testing was performed on nine (9) CTB core samples as well as four (4) concrete core samples. The unconfined compressive strength of the CTB core samples ranged from 530 to 2,040 psi. The unconfined compressive strength of the concrete core samples ranged from 7,290 to 10,060 psi.

The attachments to this letter have been prepared for the exclusive use of Amec Foster Wheeler or their agent for specific application to the Interstate-64 High Rise Bridge Corridor project in Chesapeake, Virginia. Our scope of services did not include the identification and evaluation of environmental aspects of the project site. No other warranty, express or implied, is made. Froehling & Robertson, Inc. claims no responsibility for the conclusions, opinions, and/or recommendations made by others based on the attached data.

We appreciate the opportunity to provide contract drilling, and laboratory testing services for you on this project. If you have additional questions, please do not hesitate to call.

Sincerely,
FROEHLING & ROBERTSON, INC.

Brian A. Bucek, E.I.T.
Staff Geotechnical Engineer

Robert H. Vester, Jr., P.E.
Transportation Program Manager

Attachments:
- Boring Logs (36 pages)
- Pavement Core Logs (44 pages)
- Summary of CTB Unconfined Compressive Strength Results (1 page)
- Summary of Concrete Core Compressive Strength Results (1 page)
- Summary of SPT Jar Sample Laboratory Testing Results (1 page)
- Summary of Bulk Sample Laboratory Testing Results (1 page)
- Standard Proctor Test Results (10 pages)
- California Bearing Ratio (CBR) Test Results (10 pages)

F:\Projects 60T\60T-0570 (AMEC - High Rise Bridge)\Report\Revised Report\160420 60T-0570 I-64 High Rise Corridor Letter Report.docx

Virginia Department of Transportation

PROJECT #: VDOT I-64 High Rise Bridge
LOCATION: Chesapeake, Virginia
STRUCTURE: I-64 EB PAVEMENT

C1
PAGE 1 OF 1

STATION: 55+00 OFFSET: Rt Lane
LATITUDE: 36.757654° N LONGITUDE: 76.285642° W
SURFACE ELEVATION: 999.0 ft COORD. DATUM: NAD 83

Date(s) Drilled: 1/14/16 - 1/15/16
Drilling Method(s): HSA 2-1/4" ID
SPT Method: Automatic Hammer
Other Test(s):
Driller: W. Gooden
Logger: J. Morris

GROUND WATER
DRY

FIELD DATA / **LAB DATA**

DEPTH (ft)	ELEVATION (ft)	SOIL: STANDARD PENETRATION TEST HAMMER BLOWS	SOIL: SOIL RECOVERY (%)	SAMPLE LEGEND	SAMPLE INTERVAL	ROCK: CORE RECOVERY (%)	ROCK: ROCK QUALITY DESIGNATION	ROCK: DIP ° STRATA	ROCK: DIP ° JOINTS	STRATA LEGEND	FIELD DESCRIPTION OF STRATA	LIQUID LIMIT (LL)	PLASTICITY INDEX (PI)	MOISTURE CONTENT (%)	FINES CONTENT -#200 (%)
											0.0 / 999.0 4" ASPHALT **ASPH**				
0.5											0.3 / 998.7 9" CONCRETE **CONC**				
1.0	998				1.1						1.1 / 997.9 *Fill,* Light Brown-Gray, Poorly Graded SAND with silt, very dense, moist **SP-SM**				
1.5		13													
		16													
2.0			100											8.4	
		24													
2.5															
		23													
3.0	996				3.1						3.1 / 995.9 *Fill,* Light Brown-Gray, Poorly Graded SAND with silt, dense, moist **SP-SM**				
3.5		15													
		14													
4.0			100									NP	NP	10.0	13.1
		17													
4.5															
		23													
5.0	994				5.1						5.1 / 993.9 *Fill,* Light Brown-Gray, Poorly Graded SAND with silt, very dense, moist **SP-SM**				
5.5		13													
		19													
6.0			100											5.8	
		26													
6.5															
		30													
7.0	992				7.1						Boring terminated at 7.1 feet below existing grade				

REMARKS: Rig Type: CME 55 Truck. Bulk Sample Obtained. Boring backfilled/grouted and patched upon completion.

PAGE 1 OF 1
C1

SPT_LOGB:60T-0570.GPJ:8.30.004:021011:4/20/16

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Virginia Department of Transportation

PROJECT #: VDOT I-64 High Rise Bridge
LOCATION: Chesapeake, Virginia
STRUCTURE: I-64 EB PAVEMENT

C2
PAGE 1 OF 1

STATION: 355+00 OFFSET: Rt Lane
LATITUDE: 36.776891° N LONGITUDE: 76.376527° W
SURFACE ELEVATION: 999.0 ft COORD. DATUM: NAD 83

Date(s) Drilled: 1/28/16 - 1/29/16
Drilling Method(s): HSA 2-1/4" ID
SPT Method: Automatic Hammer
Other Test(s):
Driller: W. Gooden
Logger: J. Morris

GROUND WATER
DRY

FIELD DATA / **LAB DATA**

DEPTH (ft)	ELEVATION (ft)	SOIL: STANDARD PENETRATION TEST HAMMER BLOWS	SOIL: SOIL RECOVERY (%)	SAMPLE LEGEND	SAMPLE INTERVAL	ROCK: CORE RECOVERY (%)	ROCK: ROCK QUALITY DESIGNATION	ROCK: DIP ° STRATA	ROCK: DIP ° JOINTS	STRATA LEGEND	FIELD DESCRIPTION OF STRATA	LIQUID LIMIT (LL)	PLASTICITY INDEX (PI)	MOISTURE CONTENT (%)	FINES CONTENT -#200 (%)
											0.0 / 999.0 4" ASPHALT **ASPH**				
0.5											0.3 / 998.7 8" Concrete **CONC**				
1.0	998										1.0 / 998.0 6" Cement Treated Base **SM**				
1.5		12			1.5						1.5 / 997.5 *Fill,* Gray, SILTY SAND, very dense, moist **SM**				
2.0		20	100									NP	NP	13.7	16.9
2.5		22													
3.0	996	23			3						3.0 / 996.0 *Fill,* Gray, SILTY SAND, very dense, moist **SM**				
3.5		33	100											12.7	
4.0		34													
4.5		21			4.5						4.5 / 994.5 *Fill,* Gray-Brown, SILTY SAND, very dense, moist **SM**				
5.0	994	28	100											19.2	
5.5		32													
6.0					6						Boring terminated at 6 feet below existing grade				

REMARKS: Rig Type: CME 55 Truck. Boring backfilled/grouted and patched upon completion.

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PROJECT #: VDOT I-64 High Rise Bridge
LOCATION: Chesapeake, Virginia
STRUCTURE: I-64 EB PAVEMENT

C3
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STATION: 150+00 OFFSET: Rt Shoulder
LATITUDE: 36.759714° N LONGITUDE: 76.318769° W
SURFACE ELEVATION: 999.0 ft COORD. DATUM: NAD 83

Date(s) Drilled: 1/14/16 - 1/15/16
Drilling Method(s): HSA 2-1/4" ID
SPT Method: Automatic Hammer
Other Test(s):
Driller: W. Gooden
Logger: J. Morris

GROUND WATER
DRY

FIELD DATA / **LAB DATA**

DEPTH (ft)	ELEVATION (ft)	SOIL: STANDARD PENETRATION TEST HAMMER BLOWS	SOIL: SOIL RECOVERY (%)	SAMPLE LEGEND	SAMPLE INTERVAL	ROCK: CORE RECOVERY (%)	ROCK: ROCK QUALITY DESIGNATION	ROCK: DIP ° STRATA	ROCK: DIP ° JOINTS	STRATA LEGEND	FIELD DESCRIPTION OF STRATA	LIQUID LIMIT (LL)	PLASTICITY INDEX (PI)	MOISTURE CONTENT (%)	FINES CONTENT -#200 (%)
											0.0 / 999.0 8" ASPHALT **ASPH**				
0.5															
					0.7						0.7 / 998.3 4" Cement Treated Base **SM**			23.1	
1.0	998	8			1						1.0 / 998.0 *Fill,* Light Brown, SILTY SAND, dense, moist **SM**				
1.5		13													
2.0			100									NP	NP	9.4	13.7
		13													
2.5															
		18													
3.0	996				3						3.0 / 996.0 *Fill,* Light Brown, SILTY SAND, dense, moist **SM**				
		12													
3.5															
		13													
4.0			100											12.7	
		14													
4.5															
		20													
5.0	994				5						5.0 / 994.0 *Fill,* Light Brown, SILTY SAND, very dense, moist **SM**				
		18													
5.5															
		26													
6.0			100											12.3	
		28													
6.5															
		36													
7.0	992				7						Boring terminated at 7 feet below existing grade				

REMARKS: Rig Type: CME 55 Truck. Boring backfilled/grouted and patched upon completion.

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SPT_LOGB:60T-0570.GPJ:8.30.004:021011:4/20/16

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PROJECT #: VDOT I-64 High Rise Bridge
LOCATION: Chesapeake, Virginia
STRUCTURE: I-64 EB PAVEMENT

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STATION: 250+00 OFFSET: Lt Lane
LATITUDE: 36.759264° N LONGITUDE: 76.352617° W
SURFACE ELEVATION: 999.0 ft COORD. DATUM: NAD 83

Date(s) Drilled: 1/14/16 - 1/15/16
Drilling Method(s): HSA 2-1/4" ID
SPT Method: Automatic Hammer
Other Test(s):
Driller: W. Gooden
Logger: J. Morris

GROUND WATER
DRY

FIELD DATA / **LAB DATA**

DEPTH (ft)	ELEVATION (ft)	SOIL: STANDARD PENETRATION TEST HAMMER BLOWS	SOIL: SOIL RECOVERY (%)	SAMPLE LEGEND	SAMPLE INTERVAL	ROCK: CORE RECOVERY (%)	ROCK: ROCK QUALITY DESIGNATION	ROCK: DIP ° STRATA	ROCK: DIP ° JOINTS	STRATA LEGEND	FIELD DESCRIPTION OF STRATA	LIQUID LIMIT (LL)	PLASTICITY INDEX (PI)	MOISTURE CONTENT (%)	FINES CONTENT -#200 (%)
0.0											0.0 / 999.0 7.5" ASPHALT **ASPH**				
0.5															
1.0	998										0.6 / 998.4 10" Cement Treated Base **SM**				
1.5		6			1.5						1.5 / 997.5 *Possible Fill,* Light Brown-Gray, SILTY SAND, medium dense, moist **SM**				
2.0		9													
2.5			100									NP	NP	13.1	39.3
		12													
3.0	996														
		7													
3.5					3.5						3.5 / 995.5 *Alluvial,* Gray, SILTY SAND, medium dense, moist **SM**				
		6													
4.0															
		5													
4.5			100											13.8	
		6													
5.0	994														
		12													
5.5					5.5						5.5 / 993.5 *Alluvial,* Gray, Clayey SAND, medium dense, moist **SC**				
		8													
6.0															
		4													
6.5			100											19.4	
		4													
7.0	992														
		5													
7.5					7.5						Boring terminated at 7.5 feet below existing grade				

REMARKS: Rig Type: CME 55 Truck. Boring backfilled/grouted and patched upon completion.

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PROJECT #: VDOT I-64 High Rise Bridge
LOCATION: Chesapeake, Virginia
STRUCTURE: I-64 WB PAVEMENT

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STATION: 70+00 OFFSET: Rt Lane
LATITUDE: 36.777334° N LONGITUDE: 76.380920° W
SURFACE ELEVATION: 999.0 ft COORD. DATUM: NAD 83

Date(s) Drilled: 1/27/16 - 1/28/16
Drilling Method(s): HSA 2-1/4" ID
SPT Method: Automatic Hammer
Other Test(s):
Driller: W. Gooden
Logger: J. Morris

GROUND WATER
DRY

FIELD DATA / **LAB DATA**

DEPTH (ft)	ELEVATION (ft)	SOIL: STANDARD PENETRATION TEST HAMMER BLOWS	SOIL: SOIL RECOVERY (%)	SAMPLE LEGEND	SAMPLE INTERVAL	ROCK: CORE RECOVERY (%)	ROCK: ROCK QUALITY DESIGNATION	ROCK: DIP ° STRATA	ROCK: DIP ° JOINTS	STRATA LEGEND	FIELD DESCRIPTION OF STRATA	LIQUID LIMIT (LL)	PLASTICITY INDEX (PI)	MOISTURE CONTENT (%)	FINES CONTENT -#200 (%)
											0.0 / 999.0 4" ASPHALT **ASPH**				
0.5											0.3 / 998.7 8" CONCRETE **CONC**				
1.0	998										1.0 / 998.0 6.5" Cement Treated Base **SM**				
1.5		13			1.5						1.5 / 997.5 *Fill,* Light Brown-Gray, SILTY SAND, very dense, moist **SM**				
2.0			67											16.0	
		25													
2.5															
		26													
3.0	996				3						3.0 / 996.0 *Fill,* Light Gray, SILTY SAND, very dense, moist **SM**				
		24													
3.5															
		21	100									NP	NP	14.9	18.1
4.0															
		21													
4.5					4.5						4.5 / 994.5 *Possible Fill,* Light Gray, SILTY SAND, dense, moist **SM**				
		11													
5.0	994														
		13	78											13.2	
5.5															
		12													
6.0					6						Boring terminated at 6 feet below existing grade				

REMARKS: Rig Type: CME 55 Truck. Boring backfilled/grouted and patched upon completion.

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PROJECT #: VDOT I-64 High Rise Bridge
LOCATION: Chesapeake, Virginia
STRUCTURE: I-64 WB PAVEMENT

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STATION: 115+00 OFFSET: Rt Lane
LATITUDE: 36.773679° N LONGITUDE: 76.367368° W
SURFACE ELEVATION: 999.0 ft COORD. DATUM: NAD 83

Date(s) Drilled: 1/27/16 - 1/28/16
Drilling Method(s): HSA 2-1/4" ID
SPT Method: Automatic Hammer
Other Test(s):
Driller: W. Gooden
Logger: J. Morris

GROUND WATER
DRY

FIELD DATA / **LAB DATA**

DEPTH (ft)	ELEVATION (ft)	SOIL: STANDARD PENETRATION TEST HAMMER BLOWS	SOIL: SOIL RECOVERY (%)	SAMPLE LEGEND	SAMPLE INTERVAL	ROCK: CORE RECOVERY (%)	ROCK: ROCK QUALITY DESIGNATION	ROCK: DIP ° STRATA	ROCK: DIP ° JOINTS	STRATA LEGEND	FIELD DESCRIPTION OF STRATA	LIQUID LIMIT (LL)	PLASTICITY INDEX (PI)	MOISTURE CONTENT (%)	FINES CONTENT -#200 (%)
											0.0 / 999.0 3" ASPHALT **ASPH**				
0.5											0.3 / 998.7 8" CONCRETE **CONC**				
1.0	998										1.0 / 998.0 5" Cement Treated Base **SM**				
1.5		11			1.5						1.5 / 997.5 *Fill,* Light Gray, SILTY SAND, dense, moist **SM**				
2.0		18	100											8.2	
2.5		19													
3.0	996	20			3						3.0 / 996.0 *Fill,* Gray, SILTY SAND, very dense, moist **SM**				
3.5		23	100											10.4	
4.0		23													
4.5		21			4.5						4.5 / 994.5 *Fill,* Gray, SILTY SAND, very dense, moist **SM**				
5.0	994	20	100									NP	NP	10.9	15.3
5.5		21													
6.0					6						Boring terminated at 6 feet below existing grade				

REMARKS: Rig Type: CME 55 Truck. Boring backfilled/grouted and patched upon completion.

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PROJECT #: VDOT I-64 High Rise Bridge
LOCATION: Chesapeake, Virginia
STRUCTURE: I-64 WB PAVEMENT

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STATION: 255+00 OFFSET: Rt Lane
LATITUDE: 36.759339° N LONGITUDE: 76.329269° W
SURFACE ELEVATION: 999.0 ft COORD. DATUM: NAD 83

Date(s) Drilled: 1/27/16 - 1/28/16
Drilling Method(s): HSA 2-1/4" ID
SPT Method: Automatic Hammer
Other Test(s):
Driller: W. Gooden
Logger: J. Morris

GROUND WATER
DRY

FIELD DATA / **LAB DATA**

DEPTH (ft)	ELEVATION (ft)	SOIL: STANDARD PENETRATION TEST HAMMER BLOWS	SOIL: SOIL RECOVERY (%)	SAMPLE LEGEND	SAMPLE INTERVAL	ROCK: CORE RECOVERY (%)	ROCK: ROCK QUALITY DESIGNATION	ROCK: DIP ° STRATA	ROCK: DIP ° JOINTS	STRATA LEGEND	FIELD DESCRIPTION OF STRATA	LIQUID LIMIT (LL)	PLASTICITY INDEX (PI)	MOISTURE CONTENT (%)	FINES CONTENT -#200 (%)
											0.0 / 999.0 3.5" ASPHALT **ASPH**				
0.5											0.3 / 998.7 8.5" CONCRETE **CONC**				
1.0	998										1.0 / 998.0 6" Cement Treated Base **SP-SM**				
1.5		6			1.5						1.5 / 997.5 *Fill,* Light Brown, Poorly Graded SAND with silt, dense, moist **SP-SM**				
2.0		17	67											8.0	
2.5		14													
3.0	996	12			3						3.0 / 996.0 *Possible Fill,* Gray, Poorly Graded SAND with silt, medium dense, moist **SP-SM**				
3.5		11	100									NP	NP	7.7	8.4
4.0		11													
4.5		11			4.5						4.5 / 994.5 *Alluvial,* Light Brown-Gray, Poorly Graded SAND with silt, medium dense, moist **SP-SM**				
5.0	994	9	100											16.8	
5.5		8													
6.0					6						Boring terminated at 6 feet below existing grade				

REMARKS: Rig Type: CME 55 Truck. Boring backfilled/grouted and patched upon completion.

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PROJECT #: VDOT I-64 High Rise Bridge
LOCATION: Chesapeake, Virginia
STRUCTURE: I-64 WB PAVEMENT

C8

STATION: 420+00 OFFSET: Rt Lane
LATITUDE: 36.758309° N LONGITUDE: 76.276234° W
SURFACE ELEVATION: 999.0 ft COORD. DATUM: NAD 83

Date(s) Drilled: 1/10/16 - 1/11/16
Drilling Method(s): HSA 2-1/4" ID
SPT Method: Automatic Hammer
Other Test(s):
Driller: W. Gooden
Logger: B. Bucek

GROUND WATER
FIRST ENCOUNTERED AT 5.0 ft DEPTH

FIELD DATA / **LAB DATA**

DEPTH (ft)	ELEVATION (ft)	SOIL: STANDARD PENETRATION TEST HAMMER BLOWS	SOIL: SOIL RECOVERY (%)	SAMPLE LEGEND	SAMPLE INTERVAL	ROCK: CORE RECOVERY (%)	ROCK: ROCK QUALITY DESIGNATION	ROCK: DIP ° STRATA	ROCK: DIP ° JOINTS	STRATA LEGEND	FIELD DESCRIPTION OF STRATA	LIQUID LIMIT (LL)	PLASTICITY INDEX (PI)	MOISTURE CONTENT (%)
0.0											0.0 / 999.0 4" ASPHALT **ASPH**			
0.5											0.3 / 998.7 9" CONCRETE **CONC**			
1.0	998				1.1						1.1 / 997.9 *Possible Fill,* Brown, fine, SILTY SAND, dense, moist **SM**			
1.5		23												
2.0		16	75											12.2
2.5		11												
3.0	996	14			3.1						3.1 / 995.9 *Possible Fill,* Brown, fine, SILTY SAND, dense, moist **SM**			
3.5		11												
4.0		11	71											11.3
4.5		15												
5.0	994	18			5.1						5.1 / 993.9 *Possible Fill,* Gray, fine, SILTY SAND, dense, wet **SM**			
5.5		9												
6.0		12	67											16.7
6.5		11												
7.0	992	12			7.1						Boring terminated at 7.1 feet below existing grade			

REMARKS: Rig Type: CME 55 Truck. Bulk Sample Obtained. Boring backfilled/grouted and patched upon completion.

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PROJECT #: VDOT I-64 High Rise Bridge
LOCATION: Chesapeake, Virginia
STRUCTURE: I-64 WB PAVEMENT

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STATION: 255+00 | OFFSET: Lt Lane
LATITUDE: 36.759377° N | LONGITUDE: 76.329314° W
SURFACE ELEVATION: 999.0 ft | COORD. DATUM: NAD 83

Date(s) Drilled: 1/27/16 - 1/28/16
Drilling Method(s): HSA 2-1/4" ID
SPT Method: Automatic Hammer
Other Test(s):
Driller: W. Gooden
Logger: J. Morris

GROUND WATER
DRY

FIELD DATA / **LAB DATA**

DEPTH (ft)	ELEVATION (ft)	SOIL: STANDARD PENETRATION TEST HAMMER BLOWS	SOIL: SOIL RECOVERY (%)	SAMPLE LEGEND	SAMPLE INTERVAL	ROCK: CORE RECOVERY (%)	ROCK: ROCK QUALITY DESIGNATION	ROCK: DIP ° STRATA	ROCK: DIP ° JOINTS	STRATA LEGEND	FIELD DESCRIPTION OF STRATA	LIQUID LIMIT (LL)	PLASTICITY INDEX (PI)	MOISTURE CONTENT (%)	FINES CONTENT -#200 (%)
											0.0 / 999.0 4" ASPHALT **ASPH**				
0.5											0.3 / 998.7 8" CONCRETE **CONC**				
1.0	998										1.0 / 998.0 5" Cement Treated Base **SM**				
1.5		6			1.5						1.5 / 997.5 *Possible Fill,* Light Brown, SILTY SAND, medium dense, moist **SM**				
2.0		10	100											15.1	
2.5		11													
3.0	996	11			3						3.0 / 996.0 *Possible Fill,* Light Brown, SILTY SAND, medium dense, moist **SM**				
3.5		9	100									NP	NP	11.2	11.4
4.0		12													
4.5		10			4.5						4.5 / 994.5 *Alluvial,* Light Brown, SILTY SAND, medium dense, moist **SM**				
5.0	994	7	100											16.0	
5.5		8													
6.0					6						Boring terminated at 6 feet below existing grade				

REMARKS: Rig Type: CME 55 Truck. Boring backfilled/grouted and patched upon completion.

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PROJECT #: VDOT I-64 High Rise Bridge
LOCATION: Chesapeake, Virginia
STRUCTURE: I-64 WB PAVEMENT

C10

STATION: 150+00 OFFSET: Lt Lane
LATITUDE: 36.765552° N LONGITUDE: 76.361108° W
SURFACE ELEVATION: 999.0 ft COORD. DATUM: NAD 83

Date(s) Drilled: 1/28/16 - 1/29/16
Drilling Method(s): HSA 2-1/4" ID
SPT Method: Automatic Hammer
Other Test(s):
Driller: W. Gooden
Logger: J. Morris

GROUND WATER
DRY

FIELD DATA												LAB DATA		
		SOIL				ROCK								
DEPTH (ft)	ELEVATION (ft)	STANDARD PENETRATION TEST HAMMER BLOWS	SOIL RECOVERY (%)	SAMPLE LEGEND	SAMPLE INTERVAL	CORE RECOVERY (%)	ROCK QUALITY DESIGNATION	DIP ° STRATA	DIP ° JOINTS	STRATA LEGEND	FIELD DESCRIPTION OF STRATA	LIQUID LIMIT LL	PLASTICITY INDEX PI	MOISTURE CONTENT (%)
											0.0 / 999.0 3" ASPHALT **ASPH**			
0.5											0.3 / 998.7 8" CONCRETE **CONC**			
1.0	998										1.0 / 998.0 6" Cement Treated Base **SC**			
1.5		11			1.5						1.5 / 997.5 *Possible Fill,* Gray, CLAYEY SAND, medium dense, moist **SC**			
2.0		10	100											15.4
2.5		9												
3.0	996	9			3						3.0 / 996.0 *Possible Fill,* Gray, CLAYEY SAND, dense, moist **SC**			
3.5		13	78											23.9
4.0		16												
4.5		18			4.5						4.5 / 994.5 *Possible Fill,* Gray, CLAYEY SAND, dense, moist **SC**			
5.0	994	13	100											18.4
5.5		15												
6.0					6						Boring terminated at 6 feet below existing grade			

REMARKS: Rig Type: CME 55 Truck. Boring offset to feet inside left lane due to narrow shoulder. Bulk sample obtained. Boring backfilled/grouted and patched upon completion.

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PROJECT #: VDOT I-64 High Rise Bridge
LOCATION: Chesapeake, Virginia
STRUCTURE: I-264 EB PAVEMENT

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STATION: 4+00 OFFSET: Rt Lane
LATITUDE: 36.787588° N LONGITUDE: 76.399361° W
SURFACE ELEVATION: 999.0 ft COORD. DATUM: NAD 83

Date(s) Drilled: 1/12/16 - 1/13/16
Drilling Method(s): HSA 2-1/4" ID
SPT Method: Automatic Hammer
Other Test(s):
Driller: W. Gooden
Logger: B. Bucek

GROUND WATER
DRY

FIELD DATA / **LAB DATA**

DEPTH (ft)	ELEVATION (ft)	SOIL: STANDARD PENETRATION TEST HAMMER BLOWS	SOIL: SOIL RECOVERY (%)	SAMPLE LEGEND	SAMPLE INTERVAL	ROCK: CORE RECOVERY (%)	ROCK: ROCK QUALITY DESIGNATION	ROCK: DIP ° STRATA	ROCK: DIP ° JOINTS	STRATA LEGEND	FIELD DESCRIPTION OF STRATA	LIQUID LIMIT (LL)	PLASTICITY INDEX (PI)	MOISTURE CONTENT (%)	FINES CONTENT -#200 (%)
0.5											0.0 / 999.0 13" ASPHALT **ASPH**				
1.0	998				1.2										
1.5		18									1.2 / 997.8 *Fill,* Gray-Brown, fine, SILTY SAND, very dense, moist **SM**				
2.0		56	96											13.0	
2.5		25													
3.0	996	31			3.2										
3.5		25									3.2 / 995.8 *Fill,* Gray-Brown, fine, SILTY SAND, very dense, moist **SM**				
4.0		30	79											12.6	
4.5		30													
5.0	994	30			5.2										
5.5		4									5.2 / 993.8 *Fill,* Gray-Brown, fine, SILTY SAND, dense, moist **SM**				
6.0		11	50									NP	NP	16.4	15.1
6.5		18													
7.0	992	22			7.2						Boring terminated at 7.2 feet below existing grade				

REMARKS: Rig Type: CME 55 Truck. Bulk Sample Obtained. Boring backfilled/grouted and patched upon completion.

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PROJECT #: VDOT I-64 High Rise Bridge
LOCATION: Chesapeake, Virginia
STRUCTURE: I-264 EB PAVEMENT

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STATION: 36+00 OFFSET: Rt Lane
LATITUDE: 36.792663° N LONGITUDE: 76.391365° W
SURFACE ELEVATION: 999.0 ft COORD. DATUM: NAD 83

Date(s) Drilled: 1/12/16 - 1/13/16
Drilling Method(s): HSA 2-1/4" ID
SPT Method: Automatic Hammer
Other Test(s):
Driller: W. Gooden
Logger: B. Bucek

GROUND WATER
DRY

FIELD DATA / **LAB DATA**

DEPTH (ft)	ELEVATION (ft)	SOIL: STANDARD PENETRATION TEST HAMMER BLOWS	SOIL: SOIL RECOVERY (%)	SAMPLE LEGEND	SAMPLE INTERVAL	ROCK: CORE RECOVERY (%)	ROCK: ROCK QUALITY DESIGNATION	ROCK: DIP ° STRATA	ROCK: DIP ° JOINTS	STRATA LEGEND	FIELD DESCRIPTION OF STRATA	LIQUID LIMIT (LL)	PLASTICITY INDEX (PI)	MOISTURE CONTENT (%)	FINES CONTENT -#200 (%)
0.5											0.0 / 999.0 13" ASPHALT **ASPH**				
1.0	998				1.2										
1.5		44									1.2 / 997.8 *Fill,* Gray, fine, SILTY SAND, very dense, moist **SM**				
2.0		43	88											10.8	
2.5		29													
3.0	996	33			3.2										
3.5		23									3.2 / 995.8 *Fill,* Gray, fine, SILTY SAND, very dense, moist **SM**				
4.0		30	79									NP	NP	13.9	19.8
4.5		26													
5.0	994	23			5.2										
5.5		5									5.2 / 993.8 *Alluvial,* Gray, fine, SILTY SAND, medium dense, moist **SM**				
6.0		6	100											17.0	
6.5		7													
7.0	992	9			7.2										
											Boring terminated at 7.2 feet below existing grade				

REMARKS: Rig Type: CME 55 Truck. Boring backfilled/grouted and patched upon completion.

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PROJECT #: VDOT I-64 High Rise Bridge
LOCATION: Chesapeake, Virginia
STRUCTURE: I-264 EB PAVEMENT

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STATION: 46+00 OFFSET: Rt Shoulder
LATITUDE: 36.794073° N LONGITUDE: 76.388461° W
SURFACE ELEVATION: 999.0 ft COORD. DATUM: NAD 83

Date(s) Drilled: 1/12/16 - 1/13/16
Drilling Method(s): HSA 2-1/4" ID
SPT Method: Automatic Hammer
Other Test(s):
Driller: W. Gooden
Logger: B. Bucek

GROUND WATER
FIRST ENCOUNTERED AT 5.2 ft DEPTH

FIELD DATA / **LAB DATA**

DEPTH (ft)	ELEVATION (ft)	SOIL: STANDARD PENETRATION TEST HAMMER BLOWS	SOIL: SOIL RECOVERY (%)	SAMPLE LEGEND	SAMPLE INTERVAL	ROCK: CORE RECOVERY (%)	ROCK: ROCK QUALITY DESIGNATION	ROCK: DIP ° STRATA	ROCK: DIP ° JOINTS	STRATA LEGEND	FIELD DESCRIPTION OF STRATA	LIQUID LIMIT (LL)	PLASTICITY INDEX (PI)	MOISTURE CONTENT (%)	FINES CONTENT -#200 (%)
0.0											0.0 / 999.0 13" ASPHALT **ASPH**				
0.5															
1.0	998				1.2										
1.5		25									1.2 / 997.8 *Fill,* Gray, medium, Silty SAND, very dense, moist **SM**				
2.0		43	92											14.7	
2.5		28													
3.0	996	26			3.2										
3.5		15									3.2 / 995.8 *Fill,* Gray, fine, Clayey SAND, dense, moist **SC**				
4.0		15	92									18	5	13.5	35.6
4.5		13													
5.0	994	10			5.2										
5.5		6									5.2 / 993.8 *Alluvial,* Gray, fine, Silty SAND, loose, wet **SM**				
6.0		4	100											22.5	
6.5		3													
7.0	992	3			7.2						Boring terminated at 7.2 feet below existing grade				

REMARKS: Rig Type: CME 55 Truck. Bulk Sample Obtained. Boring backfilled/grouted and patched upon completion.

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PROJECT #: VDOT I-64 High Rise Bridge
LOCATION: Chesapeake, Virginia
STRUCTURE: I-264 WB PAVEMENT

C14
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STATION: 12+00 OFFSET: Rt Lane
LATITUDE: 36.793615° N LONGITUDE: 76.390215° W
SURFACE ELEVATION: 999.0 ft COORD. DATUM: NAD 83

Date(s) Drilled: 1/12/16 - 1/13/16
Drilling Method(s): HSA 2-1/4" ID
SPT Method: Automatic Hammer
Other Test(s):
Driller: W. Gooden
Logger: B. Bucek

GROUND WATER
FIRST ENCOUNTERED AT 5.0 ft DEPTH

FIELD DATA / **LAB DATA**

DEPTH (ft)	ELEVATION (ft)	SOIL: STANDARD PENETRATION TEST HAMMER BLOWS	SOIL: SOIL RECOVERY (%)	SAMPLE LEGEND	SAMPLE INTERVAL	ROCK: CORE RECOVERY (%)	ROCK: ROCK QUALITY DESIGNATION	ROCK: DIP ° STRATA	ROCK: DIP ° JOINTS	STRATA LEGEND	FIELD DESCRIPTION OF STRATA	LIQUID LIMIT (LL)	PLASTICITY INDEX (PI)	MOISTURE CONTENT (%)	FINES CONTENT -#200 (%)
0.0											0.0 / 999.0 11.5" ASPHALT **ASPH**				
0.5															
1.0	998	62			1						1.0 / 998.0 *Fill,* Brown-Gray, fine, Poorly Graded SAND with silt, very dense, moist **SP-SM**				
1.5		56													
2.0			92									NP	NP	8.9	10.8
		35													
2.5															
		37													
3.0	996	28			3						3.0 / 996.0 *Fill,* Brown-Gray, fine, Poorly Graded SAND with silt, very dense, moist **SP-SM**				
3.5		32													
4.0			79											14.2	
		29													
4.5															
		26													
5.0	994	10			5						5.0 / 994.0 *Alluvial,* Brown-Gray, fine, Poorly Graded SAND with silt, medium dense, wet **SP-SM**				
5.5		7													
6.0			79											15.5	
		8													
6.5															
		9													
7.0	992				7						Boring terminated at 7 feet below existing grade				

REMARKS: Rig Type: CME 55 Truck. Bulk Sample Obtained. Boring backfilled/grouted and patched upon completion.

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SPT_LOGB:60T-0570.GPJ:8.30.004:021011:4/20/16

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PROJECT #: VDOT I-64 High Rise Bridge
LOCATION: Chesapeake, Virginia
STRUCTURE: I-264 WB PAVEMENT

STATION: 30+00 OFFSET: Lt Lane
LATITUDE: 36.790747° N LONGITUDE: 76.395345° W
SURFACE ELEVATION: 999.0 ft COORD. DATUM: NAD 83

Date(s) Drilled: 1/28/16 - 1/29/16
Drilling Method(s): HSA 2-1/4" ID
SPT Method: Automatic Hammer
Other Test(s):
Driller: W. Gooden
Logger: J. Morris

GROUND WATER
DRY

FIELD DATA											LAB DATA			
DEPTH (ft)	ELEVATION (ft)	SOIL: STANDARD PENETRATION TEST HAMMER BLOWS	SOIL: SOIL RECOVERY (%)	SAMPLE LEGEND	SAMPLE INTERVAL	ROCK: CORE RECOVERY (%)	ROCK: ROCK QUALITY DESIGNATION	ROCK: DIP ° STRATA	ROCK: DIP ° JOINTS	STRATA LEGEND	LIQUID LIMIT LL	PLASTICITY INDEX PI	MOISTURE CONTENT (%)	FINES CONTENT -#200 (%)
0.5														
1.0	998													
1.5		33			1.5									
2.0			78								NP	NP	12.9	13.5
		22												
2.5														
		15												
3.0	996				3									
		16												
3.5			45										15.5	
		22												
4.0														
		23												
4.5					4.5									
		21												
5.0	994													
		22	78										13.8	
5.5														
		20												
6.0					6									

FIELD DESCRIPTION OF STRATA

0.0 / 999.0
12" ASPHALT **ASPH**

1.0 / 998.0
6" Crushed Aggregate Base **CRA**

1.5 / 997.5
Fill, Gray, SILTY SAND with gravel, dense, moist **SM**

3.0 / 996.0
Fill, Gray, SILTY SAND with gravel, very dense, moist **SM**

4.5 / 994.5
Fill, Gray, SILTY SAND, very dense, moist **SM**

Boring terminated at 6 feet below existing grade

REMARKS: Rig Type: CME 55 Truck. Bulk sample obtained. Boring backfilled/grouted and patched upon completion.

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PROJECT #: VDOT I-64 High Rise Bridge
LOCATION: Chesapeake, Virginia
STRUCTURE: I-264 WB PAVEMENT

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STATION: 25+00 | OFFSET: Lt Shoulder
LATITUDE: 36.791577° N | LONGITUDE: 76.393947° W
SURFACE ELEVATION: 999.0 ft | COORD. DATUM: NAD 83

Date(s) Drilled: 1/13/16 - 1/14/16
Drilling Method(s): HSA 2-1/4" ID
SPT Method: Automatic Hammer
Other Test(s):
Driller: W. Gooden
Logger: J. Morris

GROUND WATER
DRY

FIELD DATA / **LAB DATA**

DEPTH (ft)	ELEVATION (ft)	SOIL: STANDARD PENETRATION TEST HAMMER BLOWS	SOIL: SOIL RECOVERY (%)	SAMPLE LEGEND	SAMPLE INTERVAL	ROCK: CORE RECOVERY (%)	ROCK: ROCK QUALITY DESIGNATION	ROCK: DIP ° STRATA	ROCK: DIP ° JOINTS	STRATA LEGEND	FIELD DESCRIPTION OF STRATA	LIQUID LIMIT (LL)	PLASTICITY INDEX (PI)	MOISTURE CONTENT (%)	FINES CONTENT -#200 (%)
											0.0 / 999.0 8" ASPHALT **ASPH**				
0.5															
					0.7						0.7 / 998.3 4" Cement Treated Base **SM**			13.0	
1.0	998				1						1.0 / 998.0 *Fill,* Gray, SILTY SAND with gravel, dense, moist **SM**				
		14													
1.5															
		17													
2.0			100									NP	NP	16.1	20.1
		10													
2.5															
		8													
3.0	996				3						3.0 / 996.0 *Alluvial,* Gray, SILTY SAND, loose, moist **SM**				
		11													
3.5															
		2													
4.0			100											15.0	
		3													
4.5															
		4													
5.0	994				5						5.0 / 994.0 *Alluvial,* Gray, Poorly Graded SAND with silt, medium dense, moist **SP-SM**				
		6													
5.5															
		11													
6.0			100											20.2	
		9													
6.5															
		8													
7.0	992				7						Boring terminated at 7 feet below existing grade				

REMARKS: Rig Type: CME 55 Truck. Boring backfilled/grouted and patched upon completion.

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PROJECT #: VDOT I-64 High Rise Bridge
LOCATION: Chesapeake, Virginia
STRUCTURE: I-464 NB PAVEMENT

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STATION: 60+00 | OFFSET: Rt Shoulder
LATITUDE: 36.769509° N | LONGITUDE: 76.272249° W
SURFACE ELEVATION: 999.0 ft | COORD. DATUM: NAD 83

FIELD DATA

Date(s) Drilled: 1/21/16 - 1/22/16
Drilling Method(s): HSA 2-1/4" ID
SPT Method: Automatic Hammer
Other Test(s):
Driller: W. Gooden
Logger: B. Bucek

GROUND WATER
FIRST ENCOUNTERED AT 4.0 ft DEPTH

LAB DATA

DEPTH (ft)	ELEVATION (ft)	SOIL: STANDARD PENETRATION TEST HAMMER BLOWS	SOIL: SOIL RECOVERY (%)	SAMPLE LEGEND	SAMPLE INTERVAL	ROCK: CORE RECOVERY (%)	ROCK: ROCK QUALITY DESIGNATION	ROCK: DIP ° STRATA	ROCK: DIP ° JOINTS	STRATA LEGEND	FIELD DESCRIPTION OF STRATA	LIQUID LIMIT (LL)	PLASTICITY INDEX (PI)	MOISTURE CONTENT (%)	FINES CONTENT -#200 (%)
											0.0 / 999.0 3.5" ASPHALT **ASPH**				
0.5		13			0.5						0.4 / 998.6 10" Crushed Aggregate Base **CRA**				
1.0	998	14													
1.5		14									1.5 / 997.5 *Fill,* Gray, fine, SILTY SAND, dense, moist **SM**			12.6	
2.0		17													
2.5		11			2.5						2.5 / 996.5 *Alluvial,* Brown-Gray, fine to coarse, SILTY SAND, dense, moist to wet **SM**				
3.0	996	17													
3.5		9										NP	NP	14.0	19.8
4.0		3													
4.5					4.5						Boring terminated at 4.5 feet below existing grade				

REMARKS: Rig Type: CME 55 Truck. Running sands at 4.5 feet bgs. CRA may be decomposed concrete. Boring backfilled/grouted and patched upon completion.

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PROJECT #: VDOT I-64 High Rise Bridge
LOCATION: Chesapeake, Virginia
STRUCTURE: I-464 NB PAVEMENT

STATION: 40+00 OFFSET: Lt Lane
LATITUDE: 36.764682° N LONGITUDE: 76.269082° W
SURFACE ELEVATION: 999.0 ft COORD. DATUM: NAD 83

Date(s) Drilled: 1/21/16 - 1/22/16
Drilling Method(s): HSA 2-1/4" ID
SPT Method: Automatic Hammer
Other Test(s):
Driller: W. Gooden
Logger: B. Bucek

GROUND WATER
DRY

FIELD DATA / **LAB DATA**

DEPTH (ft)	ELEVATION (ft)	SOIL: STANDARD PENETRATION TEST HAMMER BLOWS	SOIL: SOIL RECOVERY (%)	SAMPLE LEGEND	SAMPLE INTERVAL	ROCK: CORE RECOVERY (%)	ROCK: ROCK QUALITY DESIGNATION	ROCK: DIP ° STRATA	ROCK: DIP ° JOINTS	STRATA LEGEND	FIELD DESCRIPTION OF STRATA	LIQUID LIMIT (LL)	PLASTICITY INDEX (PI)	MOISTURE CONTENT (%)	FINES CONTENT -#200 (%)
0.5											0.0 / 999.0 9" CONCRETE **CONC**				
1.0	998										0.8 / 998.2 12" Cement Treated Base **SP**				
1.5					1.8										
2.0		6									1.8 / 997.2 *Alluvial,* Brown-Gray, fine, Poorly Graded SAND, medium dense, moist **SP**				
2.5		7													
			58											20.0	
3.0	996	5													
3.5		7													
					3.8										
4.0		7									3.8 / 995.2 *Alluvial,* Brown-Gray, fine, Poorly Graded SAND, medium dense, moist **SP**				
4.5		7													
			88									NP	NP	10.2	4.7
5.0	994	5													
5.5		11													
					5.8										
6.0		10									5.8 / 993.2 *Alluvial,* Brown-Gray, fine, Poorly Graded SAND, medium dense, moist **SP**				
6.5		10													
			100											4.7	
7.0	992	9													
7.5		10													
					7.8						Boring terminated at 7.8 feet below existing grade				

REMARKS: Rig Type: CME 55 Truck. Boring backfilled/grouted and patched upon completion.

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PROJECT #: VDOT I-64 High Rise Bridge
LOCATION: Chesapeake, Virginia
STRUCTURE: I-464 SB PAVEMENT

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STATION: 4+00 OFFSET: Rt Lane
LATITUDE: 36.773543° N LONGITUDE: 76.276859° W
SURFACE ELEVATION: 999.0 ft COORD. DATUM: NAD 83

Date(s) Drilled: 1/4/16 - 1/5/16
Drilling Method(s): HSA 2-1/4" ID
SPT Method: Automatic Hammer
Other Test(s):
Driller: W. Gooden
Logger: J. Morris

GROUND WATER
DRY

FIELD DATA / **LAB DATA**

DEPTH (ft)	ELEVATION (ft)	SOIL: STANDARD PENETRATION TEST HAMMER BLOWS	SOIL: SOIL RECOVERY (%)	SAMPLE LEGEND	SAMPLE INTERVAL	ROCK: CORE RECOVERY (%)	ROCK: ROCK QUALITY DESIGNATION	ROCK: DIP ° STRATA	ROCK: DIP ° JOINTS	STRATA LEGEND	FIELD DESCRIPTION OF STRATA	LIQUID LIMIT (LL)	PLASTICITY INDEX (PI)	MOISTURE CONTENT (%)	FINES CONTENT -#200 (%)
											0.0 / 999.0 12" ASPHALT **ASPH**				
0.5															
1.0	998				1						1.0 / 998.0 4" Crushed Aggregate Base **CRA**			9.7	
		25			1.3						1.3 / 997.7 *Fill,* Light Brown, SILTY SAND, very dense, moist **SM**				
1.5		55													
2.0			100											7.6	
		34													
2.5															
		37													
3.0	996				3						3.0 / 996.0 *Fill,* Light Brown-Gray, SILTY SAND, very dense, moist **SM**				
		20													
3.5															
		33													
4.0			100									NP	NP	10.7	22.9
		29													
4.5															
		25													
5.0	994				5						5.0 / 994.0 *Possible Fill,* Light Gray, SILTY SAND, dense, moist **SM**				
		11													
5.5															
		10													
6.0			100											9.5	
		15													
6.5															
		24													
7.0	992				7						Boring terminated at 7 feet below existing grade				

REMARKS: Rig Type: CME 55 Truck. Bulk Sample Obtained. Boring backfilled/grouted and patched upon completion.

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PROJECT #: VDOT I-64 High Rise Bridge
LOCATION: Chesapeake, Virginia
STRUCTURE: I-464 SB PAVEMENT

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STATION: 35+00 OFFSET: Rt Shoulder
LATITUDE: 36.764151° N LONGITUDE: 76.269246° W
SURFACE ELEVATION: 999.0 ft COORD. DATUM: NAD 83

Date(s) Drilled: 1/10/16 - 1/11/16
Drilling Method(s): HSA 2-1/4" ID
SPT Method: Automatic Hammer
Other Test(s):
Driller: W. Gooden
Logger: B. Bucek

GROUND WATER
DRY

FIELD DATA / **LAB DATA**

DEPTH (ft)	ELEVATION (ft)	SOIL: STANDARD PENETRATION TEST HAMMER BLOWS	SOIL: SOIL RECOVERY (%)	SAMPLE LEGEND	SAMPLE INTERVAL	ROCK: CORE RECOVERY (%)	ROCK: ROCK QUALITY DESIGNATION	ROCK: DIP ° STRATA	ROCK: DIP ° JOINTS	STRATA LEGEND	FIELD DESCRIPTION OF STRATA	LIQUID LIMIT (LL)	PLASTICITY INDEX (PI)	MOISTURE CONTENT (%)	FINES CONTENT -#200 (%)
											0.0 / 999.0 4" ASPHALT **ASPH**				
0.5		7			0.5						0.4 / 998.6 *Possible Fill,* Brown-Gray, fine, Poorly Graded SAND, medium dense, moist **SP**				
1.0	998	10													
1.5			83											6.5	
		10													
2.0															
		11													
2.5					2.5						2.5 / 996.5 *Alluvial,* Brown-Gray, fine, Poorly Graded SAND, medium dense, moist **SP**				
		7													
3.0	996														
		6													
3.5			79									NP	NP	6.3	4.2
		5													
4.0															
		7													
4.5					4.5						4.5 / 994.5 *Alluvial,* Brown-Gray, fine, Poorly Graded SAND, medium dense, moist **SP**				
		7													
5.0	994														
		5													
5.5			96											15.6	
		5													
6.0															
		5													
6.5					6.5						Boring terminated at 6.5 feet below existing grade				

REMARKS: Rig Type: CME 55 Truck. Bulk Sample Obtained. Boring backfilled/grouted and patched upon completion.

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PROJECT #: VDOT I-64 High Rise Bridge
LOCATION: Chesapeake, Virginia
STRUCTURE: I-464 SB PAVEMENT

STATION: 10+00 OFFSET: Lt Lane
LATITUDE: 36.771880° N LONGITUDE: 76.275099° W
SURFACE ELEVATION: 999.0 ft COORD. DATUM: NAD 83

Date(s) Drilled: 1/10/16 - 1/11/16
Drilling Method(s): HSA 2-1/4" ID
SPT Method: Automatic Hammer
Other Test(s):
Driller: W. Gooden
Logger: B. Bucek

GROUND WATER
DRY

FIELD DATA / **LAB DATA**

DEPTH (ft)	ELEVATION (ft)	SOIL: STANDARD PENETRATION TEST HAMMER BLOWS	SOIL: SOIL RECOVERY (%)	SAMPLE LEGEND	SAMPLE INTERVAL	ROCK: CORE RECOVERY (%)	ROCK: ROCK QUALITY DESIGNATION	ROCK: DIP ° STRATA	ROCK: DIP ° JOINTS	STRATA LEGEND	FIELD DESCRIPTION OF STRATA	LIQUID LIMIT (LL)	PLASTICITY INDEX (PI)	MOISTURE CONTENT (%)	FINES CONTENT -#200 (%)
0.5											0.0 / 999.0 8.5" CONCRETE **CONC**				
1.0	998				1.1						0.8 / 998.2 4" Cement Treated Base **SM**				
1.5		14									1.1 / 997.9 *Fill,* Brown-gray, fine, SILTY SAND, dense, moist **SM**				
2.0		19	75									NP	NP	13.4	27.5
2.5		14													
3.0	996	16			3.1										
3.5		12									3.1 / 995.9 *Fill,* Gray, fine, SILTY SAND, dense, moist **SM**				
4.0		16	96											16.7	
4.5		17													
5.0	994	18			5.1										
5.5		14									5.1 / 993.9 *Fill,* Gray, fine, SILTY SAND, dense, moist **SM**				
6.0		17	100											17.3	
6.5		17													
7.0	992	21			7.1						Boring terminated at 7.1 feet below existing grade				

REMARKS: Rig Type: CME 55 Truck. Boring backfilled/grouted and patched upon completion.

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PROJECT #: VDOT I-64 High Rise Bridge
LOCATION: Chesapeake, Virginia
STRUCTURE: I-464 NB PAVEMENT

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STATION: 14+04 OFFSET: Rt Lane
LATITUDE: 36.764414° N LONGITUDE: 76.268857° W
SURFACE ELEVATION: 999.0 ft COORD. DATUM: NAD 83

FIELD DATA

Date(s) Drilled: 1/21/16 - 1/22/16
Drilling Method(s): HSA 2-1/4" ID
SPT Method: Automatic Hammer
Other Test(s):
Driller: W. Gooden
Logger: B. Bucek

GROUND WATER

DRY

LAB DATA

DEPTH (ft)	ELEVATION (ft)	SOIL: STANDARD PENETRATION TEST HAMMER BLOWS	SOIL: SOIL RECOVERY (%)	SAMPLE LEGEND	SAMPLE INTERVAL	ROCK: CORE RECOVERY (%)	ROCK: ROCK QUALITY DESIGNATION	ROCK: DIP ° STRATA	ROCK: DIP ° JOINTS	STRATA LEGEND	FIELD DESCRIPTION OF STRATA	LIQUID LIMIT (LL)	PLASTICITY INDEX (PI)	MOISTURE CONTENT (%)
0.5											0.0 / 999.0 9.5" CONCRETE **CONC**			
1.0	998										0.9 / 998.1 9" Cement Treated Base **SP-SM**			
1.5		2			1.5						1.5 / 997.5 *Alluvial,* Brown, fine, Poorly Graded SAND with silt, medium dense, moist **SP-SM**			
2.0		5												
2.5			100											9.0
		7												
3.0	996													
		10												
3.5		8			3.5						3.5 / 995.5 *Alluvial,* Brown, fine, Poorly Graded SAND with silt, medium dense, moist **SP-SM**			
4.0		10												
4.5			88											6.0
		9												
5.0	994													
		9												
5.5		8			5.5						5.5 / 993.5 *Alluvial,* Brown, fine, Poorly Graded SAND with silt, medium dense, moist **SP-SM**			
6.0		8												
6.5			100											15.3
		6												
7.0	992													
		7												
7.5					7.5						Boring terminated at 7.5 feet below existing grade			

REMARKS: Rig Type: CME 55 Truck. Bulk Sample Obtained. Boring backfilled/grouted and patched upon completion.

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PROJECT #: VDOT I-64 High Rise Bridge
LOCATION: Chesapeake, Virginia
STRUCTURE: I-464 SB PAVEMENT

STATION: 15+28 OFFSET: Rt Lane
LATITUDE: 36.772395° N LONGITUDE: 76.275718° W
SURFACE ELEVATION: 999.0 ft COORD. DATUM: NAD 83

Date(s) Drilled: 1/10/16 - 1/11/16
Drilling Method(s): HSA 2-1/4" ID
SPT Method: Automatic Hammer
Other Test(s):
Driller: W. Gooden
Logger: B. Bucek

GROUND WATER
DRY

FIELD DATA / **LAB DATA**

DEPTH (ft)	ELEVATION (ft)	SOIL: STANDARD PENETRATION TEST HAMMER BLOWS	SOIL: SOIL RECOVERY (%)	SAMPLE LEGEND	SAMPLE INTERVAL	ROCK: CORE RECOVERY (%)	ROCK: ROCK QUALITY DESIGNATION	ROCK: DIP ° STRATA	ROCK: DIP ° JOINTS	STRATA LEGEND	FIELD DESCRIPTION OF STRATA	LIQUID LIMIT (LL)	PLASTICITY INDEX (PI)	MOISTURE CONTENT (%)	FINES CONTENT -#200 (%)
0.5											0.0 / 999.0 10" CONCRETE **CONC**				
1.0	998										0.9 / 998.1 5" Cement Treated Base **SM**				
					1.3						1.3 / 997.7 *Fill,* Gray, fine, SILTY SAND, dense, moist **SM**				
1.5		18													
2.0		16													
			79									NP	NP	9.8	19.9
2.5		20													
3.0	996	23													
					3.3						3.3 / 995.7 *Fill,* Gray, fine, SILTY SAND, very dense, moist **SM**				
3.5		14													
4.0		25													
			71											18.0	
4.5		20													
5.0	994	28													
					5.3						5.3 / 993.7 *Fill,* Gray, fine, SILTY SAND, very dense, moist **SM**				
5.5		16													
6.0		24													
			100											13.0	
6.5		24													
7.0	992	21													
					7.3						Boring terminated at 7.3 feet below existing grade				

REMARKS: Rig Type: CME 55 Truck. Boring backfilled/grouted and patched upon completion.

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PROJECT #: VDOT I-64 High Rise Bridge
LOCATION: Chesapeake, Virginia
STRUCTURE: I-664 NB PAVEMENT

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STATION: 75+00 OFFSET: Rt Lane
LATITUDE: 36.786059° N LONGITUDE: 76.417286° W
SURFACE ELEVATION: 999.0 ft COORD. DATUM: NAD 83

Date(s) Drilled: 1/11/16 - 1/12/16
Drilling Method(s): HSA 2-1/4" ID
SPT Method: Automatic Hammer
Other Test(s):
Driller: W. Gooden
Logger: B. Bucek

GROUND WATER
FIRST ENCOUNTERED AT 4.0 ft DEPTH

FIELD DATA / **LAB DATA**

DEPTH (ft)	ELEVATION (ft)	SOIL: STANDARD PENETRATION TEST HAMMER BLOWS	SOIL: SOIL RECOVERY (%)	SAMPLE LEGEND	SAMPLE INTERVAL	ROCK: CORE RECOVERY (%)	ROCK: ROCK QUALITY DESIGNATION	ROCK: DIP ° STRATA	ROCK: DIP ° JOINTS	STRATA LEGEND	FIELD DESCRIPTION OF STRATA	LIQUID LIMIT (LL)	PLASTICITY INDEX (PI)	MOISTURE CONTENT (%)	FINES CONTENT -#200 (%)
											0.0 / 999.0 11" ASPHALT **ASPH**				
0.5															
1.0	998	45			1						1.0 / 998.0 *Fill,* Gray-brown, fine, SILTY SAND, very dense, moist **SM**				
1.5		29													
2.0			88									NP	NP	11.4	13.5
		23													
2.5															
		25													
3.0	996	18			3						3.0 / 996.0 *Fill,* Gray-brown, fine, SILTY SAND, dense, wet **SM**				
3.5															
		12													
4.0			100											5.6	
		14													
4.5															
		24													
5.0	994	9			5						5.0 / 994.0 *Fill,* Gray-brown, fine, SILTY SAND, dense, wet **SM**				
5.5															
		19													
6.0			75											8.0	
		19													
6.5															
		26													
7.0	992				7						Boring terminated at 7 feet below existing grade				

REMARKS: Rig Type: CME 55 Truck. Bulk Sample Obtained. Boring backfilled/grouted and patched upon completion.

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PROJECT #: VDOT I-64 High Rise Bridge
LOCATION: Chesapeake, Virginia
STRUCTURE: I-664 NB PAVEMENT

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STATION: 120+00 OFFSET: Lt Lane
LATITUDE: 36.793898° N LONGITUDE: 76.426891° W
SURFACE ELEVATION: 999.0 ft COORD. DATUM: NAD 83

Date(s) Drilled: 1/11/16 - 1/12/16
Drilling Method(s): HSA 2-1/4" ID
SPT Method: Automatic Hammer
Other Test(s):
Driller: W. Gooden
Logger: B. Bucek

GROUND WATER
DRY

FIELD DATA / **LAB DATA**

DEPTH (ft)	ELEVATION (ft)	SOIL: STANDARD PENETRATION TEST HAMMER BLOWS	SOIL: SOIL RECOVERY (%)	SAMPLE LEGEND	SAMPLE INTERVAL	ROCK: CORE RECOVERY (%)	ROCK: ROCK QUALITY DESIGNATION	ROCK: DIP ° STRATA	ROCK: DIP ° JOINTS	STRATA LEGEND	FIELD DESCRIPTION OF STRATA	LIQUID LIMIT (LL)	PLASTICITY INDEX (PI)	MOISTURE CONTENT (%)	FINES CONTENT -#200 (%)
											0.0 / 999.0 12" ASPHALT **ASPH**				
0.5															
1.0	998				1						1.0 / 998.0 *Fill,* Brown-gray, fine, Poorly Graded SAND with silt, very dense, moist **SP-SM**				
		49													
1.5															
		29													
2.0			83											10.0	
		21													
2.5															
		25													
3.0	996				3						3.0 / 996.0 *Fill,* Brown-gray, fine, Poorly Graded SAND with silt, dense, moist **SP-SM**				
		15													
3.5															
		14													
4.0			71									NP	NP	13.0	10.7
		16													
4.5															
		16													
5.0	994				5						5.0 / 994.0 *Possible Fill,* Brown-gray, fine, Poorly Graded SAND with silt, dense, moist **SP-SM**				
		10													
5.5															
		10													
6.0			88											15.5	
		15													
6.5															
		15													
7.0	992				7						Boring terminated at 7 feet below existing grade				

REMARKS: Rig Type: CME 55 Truck. Bulk Sample Obtained. Boring backfilled/grouted and patched upon completion.

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SPT_LOGB:60T-0570.GPJ:8.30.004:021011:4/20/16

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PROJECT #: VDOT I-64 High Rise Bridge
LOCATION: Chesapeake, Virginia
STRUCTURE: I-664 SB PAVEMENT

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STATION: 85+00 OFFSET: Rt Lane
LATITUDE: 36.793719° N LONGITUDE: 76.427165° W
SURFACE ELEVATION: 999.0 ft COORD. DATUM: NAD 83

Date(s) Drilled: 1/11/16 - 1/12/16
Drilling Method(s): HSA 2-1/4" ID
SPT Method: Automatic Hammer
Other Test(s):
Driller: W. Gooden
Logger: B. Bucek

GROUND WATER
DRY

FIELD DATA / **LAB DATA**

DEPTH (ft)	ELEVATION (ft)	SOIL: STANDARD PENETRATION TEST HAMMER BLOWS	SOIL: SOIL RECOVERY (%)	SAMPLE LEGEND	SAMPLE INTERVAL	ROCK: CORE RECOVERY (%)	ROCK: ROCK QUALITY DESIGNATION	ROCK: DIP ° STRATA	ROCK: DIP ° JOINTS	STRATA LEGEND	FIELD DESCRIPTION OF STRATA	LIQUID LIMIT (LL)	PLASTICITY INDEX (PI)	MOISTURE CONTENT (%)	FINES CONTENT -#200 (%)
0.0											0.0 / 999.0 11.5" ASPHALT **ASPH**				
0.5															
1.0	998										1.0 / 998.0 6" Cement Treated Base **SM**				
1.5		50			1.5						1.5 / 997.5 *Fill,* Gray-brown, fine, SILTY SAND, very dense, moist **SM**				
2.0		34													
2.5			88									NP	NP	10.0	12.4
		24													
3.0	996														
		24													
3.5		12			3.5						3.5 / 995.5 *Alluvial,* Gray-brown, fine, SILTY SAND, medium dense, moist **SM**				
4.0		9													
4.5			71											10.8	
		6													
5.0	994														
		5													
5.5		5			5.5						5.5 / 993.5 *Alluvial,* Gray-brown, fine, SILTY SAND, medium dense, moist **SM**				
6.0		5													
6.5			67											17.1	
		6													
7.0	992														
		4													
7.5					7.5						Boring terminated at 7.5 feet below existing grade				

REMARKS: Rig Type: CME 55 Truck. Boring backfilled/grouted and patched upon completion.

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PROJECT #: VDOT I-64 High Rise Bridge
LOCATION: Chesapeake, Virginia
STRUCTURE: I-664 SB PAVEMENT

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PAGE 1 OF 1

STATION: 85+00 OFFSET: Rt Shoulder
LATITUDE: 36.793719° N LONGITUDE: 76.427209° W
SURFACE ELEVATION: 999.0 ft COORD. DATUM: NAD 83

Date(s) Drilled: 1/11/16 - 1/12/16
Drilling Method(s): HSA 2-1/4" ID
SPT Method: Automatic Hammer
Other Test(s):
Driller: W. Gooden
Logger: B. Bucek

GROUND WATER
DRY

FIELD DATA / **LAB DATA**

DEPTH (ft)	ELEVATION (ft)	SOIL: STANDARD PENETRATION TEST HAMMER BLOWS	SOIL: SOIL RECOVERY (%)	SAMPLE LEGEND	SAMPLE INTERVAL	ROCK: CORE RECOVERY (%)	ROCK: ROCK QUALITY DESIGNATION	ROCK: DIP ° STRATA	ROCK: DIP ° JOINTS	STRATA LEGEND	FIELD DESCRIPTION OF STRATA	LIQUID LIMIT (LL)	PLASTICITY INDEX (PI)	MOISTURE CONTENT (%)	FINES CONTENT -#200 (%)
0.0											0.0 / 999.0 13" ASPHALT **ASPH**				
0.5															
1.0	998														
					1.4						1.1 / 997.9 4" Crushed Aggregate Base **CRA**				
1.5		9									1.4 / 997.6 *Possible Fill,* Brown-gray, fine, SILTY SAND, dense, moist **SM**				
2.0		13													
2.5		13	79											11.2	
3.0	996	14													
					3.4						3.4 / 995.6 *Alluvial,* Brown-gray, fine, SILTY SAND, medium dense, moist **SM**				
3.5		7													
4.0		8													
4.5		7	100									NP	NP	10.5	34.5
5.0	994	8													
					5.4						5.4 / 993.6 *Alluvial,* Brown-gray, fine, SILTY SAND, medium dense, moist **SM**				
5.5		6													
6.0		6													
6.5		5	92											16.5	
7.0	992	5													
					7.4						Boring terminated at 7.4 feet below existing grade				

REMARKS: Rig Type: CME 55 Truck. Boring backfilled/grouted and patched upon completion.

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PROJECT #: VDOT I-64 High Rise Bridge
LOCATION: Chesapeake, Virginia
STRUCTURE: US RT 58 RAMP A

STATION: 15+00 OFFSET: Rt Lane
LATITUDE: 36.783702° N LONGITUDE: 76.424314° W
SURFACE ELEVATION: 999.0 ft COORD. DATUM: NAD 83

Date(s) Drilled: 1/21/16 - 1/22/16
Drilling Method(s): HSA 2-1/4" ID
SPT Method: Automatic Hammer
Other Test(s):
Driller: W. Gooden
Logger: B. Bucek

GROUND WATER
DRY

FIELD DATA / **LAB DATA**

DEPTH (ft)	ELEVATION (ft)	SOIL: STANDARD PENETRATION TEST HAMMER BLOWS	SOIL: SOIL RECOVERY (%)	SAMPLE LEGEND	SAMPLE INTERVAL	ROCK: CORE RECOVERY (%)	ROCK: ROCK QUALITY DESIGNATION	ROCK: DIP ° STRATA	ROCK: DIP ° JOINTS	STRATA LEGEND	FIELD DESCRIPTION OF STRATA	LIQUID LIMIT (LL)	PLASTICITY INDEX (PI)	MOISTURE CONTENT (%)	FINES CONTENT -#200 (%)
0.0											0.0 / 999.0 8.25" ASPHALT **ASPH**				
0.5															
1.0	998	23			1						0.7 / 998.3 *Fill,* Gray-brown, fine, SILTY SAND, very dense, moist **SM**				
1.5		44													
2.0			79											9.8	
2.5		20													
3.0	996	17			3						3.0 / 996.0 *Alluvial,* Gray-brown, fine, SILTY SAND, medium dense, moist **SM**				
3.5		10													
4.0		9	88											13.0	
4.5		8													
5.0	994	11			5						5.0 / 994.0 *Alluvial,* Gray-brown, fine, SILTY SAND, medium dense, moist **SM**				
5.5		6													
6.0		7	100									NP	NP	20.8	18.1
6.5		6													
7.0	992	5			7						Boring terminated at 7 feet below existing grade				

REMARKS: Rig Type: CME 55 Truck. Boring backfilled/grouted and patched upon completion.

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PROJECT #: VDOT I-64 High Rise Bridge
LOCATION: Chesapeake, Virginia
STRUCTURE: US RT 58 RAMP A

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STATION: 25+00 | OFFSET: Rt Shoulder
LATITUDE: 36.784975° N | LONGITUDE: 76.421252° W
SURFACE ELEVATION: 999.0 ft | COORD. DATUM: NAD 83

FIELD DATA

Date(s) Drilled: 2/2/16 - 2/3/16
Drilling Method(s): HSA 2-1/4" ID
SPT Method: Automatic Hammer
Other Test(s):
Driller: W. Gooden
Logger: J. Morris

GROUND WATER

DRY

LAB DATA

DEPTH (ft)	ELEVATION (ft)	SOIL: STANDARD PENETRATION TEST HAMMER BLOWS	SOIL: SOIL RECOVERY (%)	SAMPLE LEGEND	SAMPLE INTERVAL	ROCK: CORE RECOVERY (%)	ROCK: ROCK QUALITY DESIGNATION	ROCK: DIP ° STRATA	ROCK: DIP ° JOINTS	STRATA LEGEND	FIELD DESCRIPTION OF STRATA	LIQUID LIMIT (LL)	PLASTICITY INDEX (PI)	MOISTURE CONTENT (%)	FINES CONTENT -#200 (%)
											0.0 / 999.0 5" ASPHALT **ASPH**				
0.5					0.5						0.4 / 998.6 1" Crushed Aggregate Base **CRA**				
		3									0.5 / 998.5 *Alluvial,* Gray-brown, SILTY SAND, medium dense, moist **SM**				
1.0	998														
		8													
1.5			75											14.5	
		10													
2.0															
		15													
2.5					2.5						2.5 / 996.5 *Alluvial,* Gray, SILTY SAND, medium dense, moist **SM**				
		8													
3.0	996														
		9													
3.5			75									NP	NP	17.8	14.4
		9													
4.0															
		11													
4.5					4.5						4.5 / 994.5 *Alluvial,* Gray, SILTY SAND, medium dense, moist **SM**				
		4													
5.0	994														
		4													
5.5			75											18.0	
		5													
6.0															
		4													
6.5					6.5						Boring terminated at 6.5 feet below existing grade				

REMARKS: Rig Type: CME 55 Truck. Boring backfilled/grouted and patched upon completion.

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PROJECT #: VDOT I-64 High Rise Bridge
LOCATION: Chesapeake, Virginia
STRUCTURE: US RT 58 RAMP A

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STATION: 20+00 OFFSET: Lt Lane
LATITUDE: 36.784436° N LONGITUDE: 76.422832° W
SURFACE ELEVATION: 999.0 ft COORD. DATUM: NAD 83

Date(s) Drilled: 2/2/16 - 2/3/16
Drilling Method(s): HSA 2-1/4" ID
SPT Method: Automatic Hammer
Other Test(s):
Driller: W. Gooden
Logger: J. Morris

GROUND WATER
DRY

FIELD DATA / **LAB DATA**

DEPTH (ft)	ELEVATION (ft)	SOIL: STANDARD PENETRATION TEST HAMMER BLOWS	SOIL: SOIL RECOVERY (%)	SAMPLE LEGEND	SAMPLE INTERVAL	ROCK: CORE RECOVERY (%)	ROCK: ROCK QUALITY DESIGNATION	ROCK: DIP ° STRATA	ROCK: DIP ° JOINTS	STRATA LEGEND	FIELD DESCRIPTION OF STRATA	LIQUID LIMIT (LL)	PLASTICITY INDEX (PI)	MOISTURE CONTENT (%)	FINES CONTENT -#200 (%)
											0.0 / 999.0 3" ASPHALT **ASPH**				
											0.3 / 998.7 3" Crushed Aggregate Base **CRA**				
0.5		12			0.5						0.5 / 998.5 *Fill,* Gray-brown, SILTY SAND, dense, moist **SM**				
1.0	998														
		15													
1.5			70									NP	NP	13.3	17.3
		15													
2.0															
		15													
2.5					2.5						2.5 / 996.5 *Possible Fill,* Gray, coarse, SILTY SAND, dense, moist **SM**				
		10													
3.0	996														
		11													
3.5			75											14.4	
		13													
4.0															
		14													
4.5					4.5						4.5 / 994.5 *Alluvial,* Red-brown, SILTY SAND, medium dense, moist **SM**				
		5													
5.0	994														
		7													
5.5			75									NP	NP	21.3	14.2
		5													
6.0															
		6													
6.5					6.5						Boring terminated at 6.5 feet below existing grade				

REMARKS: Rig Type: CME 55 Truck. Bulk Sample Obtained. Boring backfilled/grouted and patched upon completion.

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PROJECT #: VDOT I-64 High Rise Bridge
LOCATION: Chesapeake, Virginia
STRUCTURE: US RT 58 RAMP B

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STATION: 15+00 OFFSET: Rt Lane
LATITUDE: 36.787904° N LONGITUDE: 76.420071° W
SURFACE ELEVATION: 999.0 ft COORD. DATUM: NAD 83

FIELD DATA

Date(s) Drilled: 2/1/16 - 2/2/16
Drilling Method(s): HSA 2-1/4" ID
SPT Method: Automatic Hammer
Other Test(s):
Driller: W. Gooden
Logger: J. Morris

GROUND WATER
DRY

LAB DATA

DEPTH (ft)	ELEVATION (ft)	SOIL: STANDARD PENETRATION TEST HAMMER BLOWS	SOIL: SOIL RECOVERY (%)	SAMPLE LEGEND	SAMPLE INTERVAL	ROCK: CORE RECOVERY (%)	ROCK: ROCK QUALITY DESIGNATION	ROCK: DIP ° STRATA	ROCK: DIP ° JOINTS	STRATA LEGEND	FIELD DESCRIPTION OF STRATA	LIQUID LIMIT (LL)	PLASTICITY INDEX (PI)	MOISTURE CONTENT (%)	FINES CONTENT -#200 (%)
											0.0 / 999.0 8" ASPHALT **ASPH**				
0.5															
					0.7						0.7 / 998.3 4" Crushed Aggregate Base **CRA**			13.0	
1.0	998				1						1.0 / 998.0 *Fill,* Gray, SILTY SAND with gravel, very dense, moist **SM**				
		36													
1.5															
		28													
2.0			63									NP	NP	13.3	22.4
		18													
2.5															
		16													
3.0	996				3						3.0 / 996.0 *Possible Fill,* Gray, SILTY SAND, medium dense, moist **SM**				
		6													
3.5															
		12													
4.0			50											13.3	
		10													
4.5															
		6													
5.0	994				5						5.0 / 994.0 *Alluvial,* Gray-brown, SILTY SAND, medium dense, moist **SM**				
		4													
5.5															
		4													
6.0			50											14.0	
		5													
6.5															
		7													
7.0	992				7						Boring terminated at 7 feet below existing grade				

REMARKS: Rig Type: CME 55 Truck. Bulk Sample Obtained. Boring backfilled/grouted and patched upon completion.

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PROJECT #: VDOT I-64 High Rise Bridge
LOCATION: Chesapeake, Virginia
STRUCTURE: US RT 58 RAMP B

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STATION: 45+00 OFFSET: Lt Lane
LATITUDE: 36.783053° N LONGITUDE: 76.427849° W
SURFACE ELEVATION: 999.0 ft COORD. DATUM: NAD 83

Date(s) Drilled: 2/1/16 - 2/2/16
Drilling Method(s): HSA 2-1/4" ID
SPT Method: Automatic Hammer
Other Test(s):
Driller: W. Gooden
Logger: J. Morris

GROUND WATER
DRY

FIELD DATA / **LAB DATA**

DEPTH (ft)	ELEVATION (ft)	SOIL: STANDARD PENETRATION TEST HAMMER BLOWS	SOIL: SOIL RECOVERY (%)	SAMPLE LEGEND	SAMPLE INTERVAL	ROCK: CORE RECOVERY (%)	ROCK: ROCK QUALITY DESIGNATION	ROCK: DIP ° STRATA	ROCK: DIP ° JOINTS	STRATA LEGEND	FIELD DESCRIPTION OF STRATA	LIQUID LIMIT (LL)	PLASTICITY INDEX (PI)	MOISTURE CONTENT (%)	FINES CONTENT -#200 (%)
											0.0 / 999.0 10.5" ASPHALT **ASPH**				
0.5															
1.0	998	45			0.9 1						0.9 / 998.1 2" Crushed Aggregate Base **CRA**			8.3	
1.5		23									1.0 / 998.0 *Fill,* Gray, SILTY SAND, very dense, moist **SM**				
2.0			35											13.1	
2.5		21													
3.0	996	22			3						3.0 / 996.0 *Fill,* Gray, SILTY SAND, dense, moist **SM**				
3.5		12													
4.0		13	75									NP	NP	14.4	26.8
4.5		15													
5.0	994	18			5						5.0 / 994.0 *Fill,* Gray, SILTY SAND, dense, moist **SM**				
5.5		11													
6.0		13	75											13.3	
6.5		18													
7.0	992	27			7						Boring terminated at 7 feet below existing grade				

REMARKS: Rig Type: CME 55 Truck. Boring backfilled/grouted and patched upon completion.

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PROJECT #: VDOT I-64 High Rise Bridge
LOCATION: Chesapeake, Virginia
STRUCTURE: US RT 58 RAMP C

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STATION: 30+00 OFFSET: Rt Lane
LATITUDE: 36.787838° N LONGITUDE: 76.418548° W
SURFACE ELEVATION: 999.0 ft COORD. DATUM: NAD 83

Date(s) Drilled: 1/13/16 - 1/14/16
Drilling Method(s): HSA 2-1/4" ID
SPT Method: Automatic Hammer
Other Test(s):
Driller: W. Gooden
Logger: J. Morris

GROUND WATER
DRY

FIELD DATA / **LAB DATA**

DEPTH (ft)	ELEVATION (ft)	SOIL: STANDARD PENETRATION TEST HAMMER BLOWS	SOIL: SOIL RECOVERY (%)	SAMPLE LEGEND	SAMPLE INTERVAL	ROCK: CORE RECOVERY (%)	ROCK: ROCK QUALITY DESIGNATION	ROCK: DIP ° STRATA	ROCK: DIP ° JOINTS	STRATA LEGEND	FIELD DESCRIPTION OF STRATA	LIQUID LIMIT (LL)	PLASTICITY INDEX (PI)	MOISTURE CONTENT (%)	FINES CONTENT -#200 (%)
0.5											0.0 / 999.0 15.5" ASPHALT **ASPH**				
1.0	998														
1.5		10			1.3 1.5						1.3 / 997.7 *Fill,* Red-brown, Poorly Graded SAND with silt, dense, moist **SP-SM**			10.4	
2.0		14													
2.5		16	100									NP	NP	12.7	6.5
3.0	996	25			3.3										
3.5		12									3.3 / 995.7 *Fill,* Red-brown, Poorly Graded SAND with silt, dense, moist **SP-SM**				
4.0		11													
4.5		13	100											11.8	
5.0	994	16			5.3										
5.5		17									5.3 / 993.7 *Fill,* Light brown, SILTY SAND, dense, moist **SM**				
6.0		20													
6.5		13	100											16.5	
7.0	992	27			7.3						Boring terminated at 7.3 feet below existing grade				

REMARKS: Rig Type: CME 55 Truck. Bulk Sample Obtained. Boring backfilled/grouted and patched upon completion.

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PROJECT #: VDOT I-64 High Rise Bridge
LOCATION: Chesapeake, Virginia
STRUCTURE: US RT 58 RAMP C

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STATION: 45+00 OFFSET: Rt Shoulder
LATITUDE: 36.787769° N LONGITUDE: 76.416284° W
SURFACE ELEVATION: 999.0 ft COORD. DATUM: NAD 83

Date(s) Drilled: 1/13/16 - 1/14/16
Drilling Method(s): HSA 2-1/4" ID
SPT Method: Automatic Hammer
Other Test(s):
Driller: W. Gooden
Logger: J. Morris

GROUND WATER
DRY

FIELD DATA / **LAB DATA**

DEPTH (ft)	ELEVATION (ft)	SOIL: STANDARD PENETRATION TEST HAMMER BLOWS	SOIL: SOIL RECOVERY (%)	SAMPLE LEGEND	SAMPLE INTERVAL	ROCK: CORE RECOVERY (%)	ROCK: ROCK QUALITY DESIGNATION	ROCK: DIP ° STRATA	ROCK: DIP ° JOINTS	STRATA LEGEND	FIELD DESCRIPTION OF STRATA	LIQUID LIMIT (LL)	PLASTICITY INDEX (PI)	MOISTURE CONTENT (%)	FINES CONTENT -#200 (%)
											0.0 / 999.0 6" ASPHALT **ASPH**				
0.5					0.5						0.5 / 998.5 *Alluvial,* Gray, CLAYEY SAND, medium dense, moist **SC**				
1.0	998	3													
		6													
1.5			100											20.8	
		6													
2.0															
		11													
2.5					2.5						2.5 / 996.5 *Alluvial,* Gray, CLAYEY SAND, contains roots, dense, moist **SC**				
		13													
3.0	996														
		16													
3.5			100									18	6	10.7	43.0
		13													
4.0															
		9													
4.5					4.5						4.5 / 994.5 *Alluvial,* Gray, CLAYEY SAND, medium dense, moist **SC**				
		6													
5.0	994														
		4													
5.5			8											16.6	
		5													
6.0															
		7													
6.5					6.5						Boring terminated at 6.5 feet below existing grade				

REMARKS: Rig Type: CME 55 Truck. Boring backfilled/grouted and patched upon completion.

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SPT_LOGB:60T-0570.GPJ:8.30.004:021011:4/20/16

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Virginia Department of Transportation

PROJECT #: VDOT I-64 High Rise Bridge
LOCATION: Chesapeake, Virginia
STRUCTURE: I-64 EB PAVEMENT

STATION: Not Provided
OFFSET: Rt Lane
LATITUDE: 36.764837° N
LONGITUDE: 76.266025° W
SURFACE ELEVATION: 999.0 ft
COORD. DATUM: NAD 83

Date(s) Drilled: 2/1/16 - 2/2/16
Drilling Method(s): HSA 2-1/4" ID
SPT Method: Automatic Hammer
Other Test(s):
Driller: W. Gooden
Logger: J. Morris

GROUND WATER
DRY

FIELD DATA / **LAB DATA**

DEPTH (ft)	ELEVATION (ft)	SOIL: STANDARD PENETRATION TEST HAMMER BLOWS	SOIL: SOIL RECOVERY (%)	SAMPLE LEGEND	SAMPLE INTERVAL	ROCK: CORE RECOVERY (%)	ROCK: ROCK QUALITY DESIGNATION	ROCK: DIP ° STRATA	ROCK: DIP ° JOINTS	STRATA LEGEND	FIELD DESCRIPTION OF STRATA	LIQUID LIMIT (LL)	PLASTICITY INDEX (PI)	MOISTURE CONTENT (%)	FINES CONTENT -#200 (%)
											0.0 / 999.0 3.5" ASPHALT **ASPH**				
0.5											0.3 / 998.7 9.5" CONCRETE **CONC**				
1.0	998										1.0 / 998.0 5.5" Cement Treated Base **SP-SM**				
1.5		4			1.5						1.5 / 997.5 *Possible Fill,* Light Gray, Poorly Graded SAND with silt, dense, moist **SP-SM**				
2.0			15	78								NP	NP	10.0	8.0
2.5			10												
3.0	996	11			3						3.0 / 996.0 *Possible Fill,* Light Gray, Poorly Graded SAND with silt, dense, moist **SP-SM**				
3.5			15	89								NP	NP	13.0	5.8
4.0			14												
4.5		7			4.5						4.5 / 994.5 *Alluvial,* Gray, Lean CLAY, stiff, moist **CL**				
5.0	994		6	100								20	7	14.5	58.5
5.5			4												
6.0					6						Boring terminated at 6 feet below existing grade				

REMARKS: Rig Type: CME 55 Truck. Boring backfilled/grouted and patched upon completion.

SPT_LOGB:60T-0570.GPJ:8.30.004:021011:4/20/16
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PROJECT #: VDOT I-64 High Rise Bridge
LOCATION: Chesapeake, Virginia
STRUCTURE: I-64 WB PAVEMENT

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PAGE 1 OF 1

STATION: Not Provided
OFFSET: Rt Lane
LATITUDE: 36.763738° N
LONGITUDE: 76.266576° W
SURFACE ELEVATION: 999.0 ft
COORD. DATUM: NAD 83

Date(s) Drilled: 2/2/16 - 2/3/16
Drilling Method(s): HSA 2-1/4" ID
SPT Method: Automatic Hammer
Other Test(s):
Driller: W. Gooden
Logger: J. Morris

GROUND WATER
DRY

FIELD DATA / **LAB DATA**

DEPTH (ft)	ELEVATION (ft)	SOIL: STANDARD PENETRATION TEST HAMMER BLOWS	SOIL: SOIL RECOVERY (%)	SAMPLE LEGEND	SAMPLE INTERVAL	ROCK: CORE RECOVERY (%)	ROCK: ROCK QUALITY DESIGNATION	ROCK: DIP ° STRATA	ROCK: DIP ° JOINTS	STRATA LEGEND	FIELD DESCRIPTION OF STRATA	LIQUID LIMIT (LL)	PLASTICITY INDEX (PI)	MOISTURE CONTENT (%)	FINES CONTENT -#200 (%)
											0.0 / 999.0 4" ASPHALT **ASPH**				
0.5											0.3 / 998.7 9.5" CONCRETE **CONC**				
1.0	998														
											1.1 / 997.9 5" Crushed Aggregate Base **CRA**				
1.5					1.5						1.5 / 997.5 *Fill,* Light Gray, Poorly Graded SAND with silt, dense, moist **SP-SM**				
		6													
2.0															
		18	100											9.3	
2.5															
			18												
3.0	996				3						3.0 / 996.0 *Fill,* Light Gray-red-brown, Poorly Graded SAND with silt, dense, moist **SP-SM**				
		17													
3.5															
		18	93									NP	NP	14.3	11.5
4.0															
			10												
4.5					4.5						4.5 / 994.5 *Alluvial,* Gray-red-brown, Lean CLAY, very stiff, moist **CL**				
		4													
5.0	994														
		6	53									24	11	15.8	61.8
5.5															
			7												
6.0					6						Boring terminated at 6 feet below existing grade				

REMARKS: Rig Type: CME 55 Truck. Bulk Sample Obtained. Boring backfilled/grouted and patched upon completion.

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SPT_LOGB:60T-0570.GPJ:8.30.004:021011:4/20/16

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PAVEMENT SECTION COMPOSITION AND DESCRIPTION

Project Name:	I-64 High Rise Bridge Pavement Coring and Boring Exploration	Date of Extraction:	1/14/2016
Project Number:	60T-0570	Project Location:	Chesapeake, VA

Boring/Core Identification: C1

Boring/Core GPS Coordinates:
Latitude: 36.757654
Longitude: -76.285642

General Boring/Core Location: I-64, Eastbound, STA 55+00, Right Lane

Pavement Section Composition:	Asphalt:	4 in.	Void Underlying Pavement	no	(yes/no)
	Aggregate Base Material:	0 in.	Void Depth Below Pavement	N/A	in.
	Cement Treated Base:	0 in.			
	Concrete	9 in.			
Welded Wire Fabric (WWF) or Rebar:		#6 WWF/Rebar/Both			
Embedment Depths from Top of Core:		8 in.	Rebar (4-inch from top of concrete)		
		N/A in.	Welded Wire Fabric		
Vapor Barrier or Geotextile Fabric:		no (yes/no)			
Description of Vapor Barrier or Geotextile:		N/A			

Subgrade Soil Description: Light Brown-Gray, Poorly Graded SAND with silt (SP-SM), very dense

Notes:

Top of Core

Asphalt

Concrete

PAVEMENT SECTION COMPOSITION AND DESCRIPTION

Project Name:	I-64 High Rise Bridge Pavement Coring and Boring Exploration	Date of Extraction:	1/28/2016
Project Number:	60T-0570	Project Location:	Chesapeake, VA

Boring/Core Identification:	Boring/Core GPS Coordinates:	
	Latitude:	36.776891
C2	Longitude:	-76.376527

General Boring/Core Location: I-64, Eastbound, STA 350+00, Right Lane

Pavement Section Composition: Asphalt:	4	in.	Void Underlying Pavement	no	(yes/no)
Aggregate Base Material:	0	in.	Void Depth Below Pavement	N/A	in.
Cement Treated Base:	6	in.			
Concrete	8	in.			
Welded Wire Fabric (WWF) or Rebar:	#5	WWF/Rebar/Both			
Embedment Depths from Top of Core:	3	in.	Rebar		
	N/A	in.	Welded Wire Fabric		
Vapor Barrier or Geotextile Fabric:	no	(yes/no)			
Description of Vapor Barrier or Geotextile:	N/A				

Subgrade Soil Description: Gray, Silty SAND (SM), very dense

Notes: 1.5-inch of CTB broke of core sample

Top of Core

Asphalt

Concrete

PAVEMENT SECTION COMPOSITION AND DESCRIPTION

Project Name:	I-64 High Rise Bridge Pavement Coring and Boring Exploration	Date of Extraction:	1/28/2016
Project Number:	60T-0570	Project Location:	Chesapeake, VA

Boring/Core Identification: C2

Boring/Core GPS Coordinates:

Latitude: 36.776891

Longitude: -76.376527

General Boring/Core Location: I-64, Eastbound, STA 350+00, Right Lane

Pavement Section Composition:	Asphalt:	4 in.	Void Underlying Pavement	no	(yes/no)
	Aggregate Base Material:	0 in.	Void Depth Below Pavement	N/A	in.
	Cement Treated Base:	6 in.			
	Concrete	8 in.			
Welded Wire Fabric (WWF) or Rebar:		#5	WWF/Rebar/Both		
Embedment Depths from Top of Core:		3 in.	Rebar		
		N/A in.	Welded Wire Fabric		
Vapor Barrier or Geotextile Fabric:		no	(yes/no)		
Description of Vapor Barrier or Geotextile:		N/A			

Subgrade Soil Description: Gray, Silty SAND (SM), very dense

Notes: 1.5-inch of CTB broke of core sample

Cement Treated Base

Top of Core

Bottom of Core

PAVEMENT SECTION COMPOSITION AND DESCRIPTION

Project Name:	I-64 High Rise Bridge Pavement Coring and Boring Exploration	Date of Extraction:	1/15/2016
Project Number:	60T-0570	Project Location:	Chesapeake, VA

Boring/Core Identification: C3

Boring/Core GPS Coordinates:
Latitude: 36.759714
Longitude: -76.318769

General Boring/Core Location: I-64, Eastbound, STA 150+00, Right Shoulder

Pavement Section Composition:	Asphalt:	8 in.	Void Underlying Pavement	no	(yes/no)
	Aggregate Base Material:	0 in.	Void Depth Below Pavement	N/A	in.
	Cement Treated Base:	4 in.			
	Concrete	0 in.			
Welded Wire Fabric (WWF) or Rebar:		N/A WWF/Rebar/Both			
Embedment Depths from Top of Core:		N/A in.	Rebar		
		N/A in.	Welded Wire Fabric		
Vapor Barrier or Geotextile Fabric:		no (yes/no)			
Description of Vapor Barrier or Geotextile:		N/A			

Subgrade Soil Description: Light Brown, Silty SAND (SM), dense

Notes:

Top of Core

Asphalt

Cement Treated Base

PAVEMENT SECTION COMPOSITION AND DESCRIPTION

Project Name:	I-64 High Rise Bridge Pavement Coring and Boring Exploration	Date of Extraction:	1/14/2016
Project Number:	60T-0570	Project Location:	Chesapeake, VA

Boring/Core Identification: C4

Boring/Core GPS Coordinates:
Latitude: 36.759264
Longitude: -76.352617

General Boring/Core Location: I-64, Eastbound, STA 250+00, Left Lane

Pavement Section Composition:	Asphalt:	7.5 in.	Void Underlying Pavement	no	(yes/no)
	Aggregate Base Material:	0 in.	Void Depth Below Pavement	N/A	in.
	Cement Treated Base:	10 in.			
	Concrete	0 in.			
Welded Wire Fabric (WWF) or Rebar:		N/A WWF/Rebar/Both			
Embedment Depths from Top of Core:		N/A in.	Rebar		
		N/A in.	Welded Wire Fabric		
Vapor Barrier or Geotextile Fabric:		no (yes/no)			
Description of Vapor Barrier or Geotextile:		N/A			

Subgrade Soil Description: Light Brown-Gray, Silty SAND (SM), medium dense

Notes:

Asphalt

Top of Core

Bottom of Core

PAVEMENT SECTION COMPOSITION AND DESCRIPTION

Project Name:	I-64 High Rise Bridge Pavement Coring and Boring Exploration	Date of Extraction:	1/14/2016
Project Number:	60T-0570	Project Location:	Chesapeake, VA

Boring/Core Identification:	Boring/Core GPS Coordinates:	
	Latitude:	36.759264
C4	Longitude:	-76.352617

General Boring/Core Location: I-64, Eastbound, STA 250+00, Left Lane

Pavement Section Composition:	Asphalt:	7.5 in.	Void Underlying Pavement	no	(yes/no)
	Aggregate Base Material:	0 in.	Void Depth Below Pavement	N/A	in.
	Cement Treated Base:	10 in.			
	Concrete	0 in.			
Welded Wire Fabric (WWF) or Rebar:		N/A WWF/Rebar/Both			
Embedment Depths from Top of Core:		N/A in.	Rebar		
		N/A in.	Welded Wire Fabric		
Vapor Barrier or Geotextile Fabric:		no (yes/no)			
Description of Vapor Barrier or Geotextile:		N/A			

Subgrade Soil Description: Light Brown-Gray, Silty SAND (SM), medium dense

Notes:

Cement Treated Base

Top of Core

Bottom of Core

PAVEMENT SECTION COMPOSITION AND DESCRIPTION

Project Name:	I-64 High Rise Bridge Pavement Coring and Boring Exploration	Date of Extraction:	1/27/2016
Project Number:	60T-0570	Project Location:	Chesapeake, VA

Boring/Core Identification:	Boring/Core GPS Coordinates:	
	Latitude:	36.777334
C5	Longitude:	-76.380920

General Boring/Core Location: I-64, Westbound, STA 70+00, Right Lane

Pavement Section Composition:	Asphalt:	4 in.	Void Underlying Pavement	no	(yes/no)
	Aggregate Base Material:	0 in.	Void Depth Below Pavement	N/A	in.
	Cement Treated Base:	6.5 in.			
	Concrete	8 in.			
Welded Wire Fabric (WWF) or Rebar:		#5	WWF/Rebar/Both		
Embedment Depths from Top of Core:		3 in.	Rebar		
		in.	Welded Wire Fabric		
Vapor Barrier or Geotextile Fabric:		no	(yes/no)		
Description of Vapor Barrier or Geotextile:		N/A			

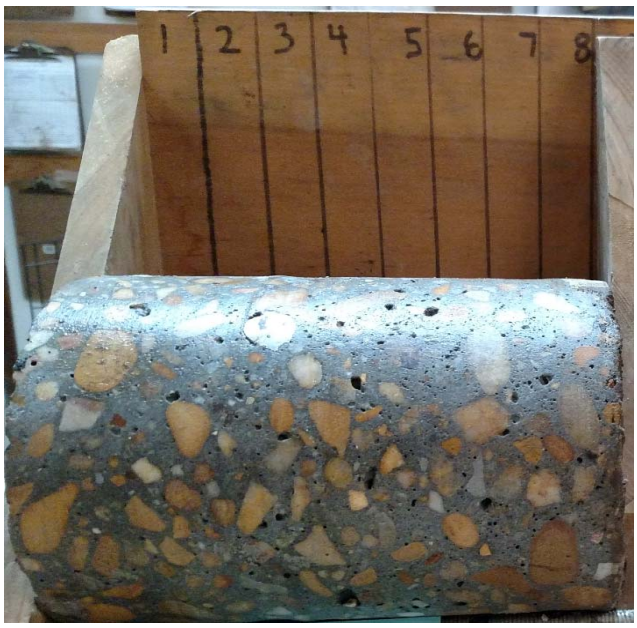
Subgrade Soil Description: Light Brown-Gray, Silty SAND (SM), very dense

Notes: 0.5-inch of CTB broke off.

Top of Core

Asphalt

Concrete



PAVEMENT SECTION COMPOSITION AND DESCRIPTION

Project Name:	I-64 High Rise Bridge Pavement Coring and Boring Exploration	Date of Extraction:	1/27/2016
Project Number:	60T-0570	Project Location:	Chesapeake, VA

Boring/Core Identification:	Boring/Core GPS Coordinates:	
	Latitude:	36.777334
C5	Longitude:	-76.380920

General Boring/Core Location: I-64, Westbound, STA 70+00, Right Lane

Pavement Section Composition:	Asphalt:	4 in.	Void Underlying Pavement	no	(yes/no)
	Aggregate Base Material:	0 in.	Void Depth Below Pavement	N/A	in.
	Cement Treated Base:	6.5 in.			
	Concrete	8 in.			
Welded Wire Fabric (WWF) or Rebar:		#5 WWF/Rebar/Both			
Embedment Depths from Top of Core:		3 in.	Rebar		
		in.	Welded Wire Fabric		
Vapor Barrier or Geotextile Fabric:		no (yes/no)			
Description of Vapor Barrier or Geotextile:		N/A			

Subgrade Soil Description: Light Brown, Silty SAND (SM), very dense

Notes: 0.5-inch of CTB broke off.

Top of Core

Bottom of Core

SINCE F&R 1881

PAVEMENT SECTION COMPOSITION AND DESCRIPTION

Project Name:	I-64 High Rise Bridge Pavement Coring and Boring Exploration	Date of Extraction:	1/27/2016
Project Number:	60T-0570	Project Location:	Chesapeake, VA

Boring/Core Identification: C6

Boring/Core GPS Coordinates:
Latitude: 36.773679
Longitude: -76.367368

General Boring/Core Location: I-64, Westbound, STA 115+00, Right Lane

Pavement Section Composition:	Asphalt:	3 in.	Void Underlying Pavement	no (yes/no)
	Aggregate Base Material:	0 in.	Void Depth Below Pavement	N/A in.
	Cement Treated Base:	5 in.		
	Concrete	8 in.		
Welded Wire Fabric (WWF) or Rebar:		#5 WWF/Rebar/Both		
Embedment Depths from Top of Core:		3 in.	Rebar	
		in.	Welded Wire Fabric	
Vapor Barrier or Geotextile Fabric:		no (yes/no)		
Description of Vapor Barrier or Geotextile:		N/A		

Subgrade Soil Description: Light Gray, Silty SAND (SM), dense

Notes:

Top of Core

Asphalt

Concrete

PAVEMENT SECTION COMPOSITION AND DESCRIPTION

Project Name:	I-64 High Rise Bridge Pavement Coring and Boring Exploration	Date of Extraction:	1/27/2016
Project Number:	60T-0570	Project Location:	Chesapeake, VA

Boring/Core Identification: C6

Boring/Core GPS Coordinates:
Latitude: 36.773679
Longitude: -76.367368

General Boring/Core Location: I-64, Westbound, STA 115+00, Right Lane

Pavement Section Composition:	Asphalt:	3 in.	Void Underlying Pavement	no	(yes/no)
	Aggregate Base Material:	0 in.	Void Depth Below Pavement	N/A	in.
	Cement Treated Base:	5 in.			
	Concrete	8 in.			
Welded Wire Fabric (WWF) or Rebar:		#5	WWF/Rebar/Both		
Embedment Depths from Top of Core:		3 in.	Rebar		
		in.	Welded Wire Fabric		
Vapor Barrier or Geotextile Fabric:		no	(yes/no)		
Description of Vapor Barrier or Geotextile:		N/A			

Subgrade Soil Description: Light Gray, Silty SAND (SM), dense

Notes:

Cement Treated Base

Top of Core

Bottom of Core

PAVEMENT SECTION COMPOSITION AND DESCRIPTION

Project Name:	I-64 High Rise Bridge Pavement Coring and Boring Exploration	Date of Extraction:	1/28/2016
Project Number:	60T-0570	Project Location:	Chesapeake, VA

Boring/Core Identification:	Boring/Core GPS Coordinates:	
	Latitude:	36.759339
C7	Longitude:	-76.329269

General Boring/Core Location: I-64, Westbound, STA 255+00, Right Lane

Pavement Section Composition:	Asphalt:	3.5 in.	Void Underlying Pavement	no	(yes/no)
	Aggregate Base Material:	0 in.	Void Depth Below Pavement	N/A	in.
	Cement Treated Base:	6 in.			
	Concrete	8.5 in.			
Welded Wire Fabric (WWF) or Rebar:		#5 WWF/Rebar/Both			
Embedment Depths from Top of Core:		3 in.	Rebar		
		N/A in.	Welded Wire Fabric		
Vapor Barrier or Geotextile Fabric:		no (yes/no)			
Description of Vapor Barrier or Geotextile:		N/A			

Subgrade Soil Description: Light Brown,Poorly Graded SAND with silt (SP-SM), dense

Notes:

Top of Core

Asphalt

Concrete

PAVEMENT SECTION COMPOSITION AND DESCRIPTION

Project Name:	I-64 High Rise Bridge Pavement Coring and Boring Exploration	Date of Extraction:	1/28/2016
Project Number:	60T-0570	Project Location:	Chesapeake, VA

Boring/Core Identification: C7

Boring/Core GPS Coordinates:

Latitude: 36.759339

Longitude: -76.329269

General Boring/Core Location: I-64, Westbound, STA 255+00, Right Lane

Pavement Section Composition:	Asphalt:	3.5 in.	Void Underlying Pavement	no	(yes/no)
	Aggregate Base Material:	0 in.	Void Depth Below Pavement	N/A	in.
	Cement Treated Base:	6 in.			
	Concrete	8.5 in.			
Welded Wire Fabric (WWF) or Rebar:		#5	WWF/Rebar/Both		
Embedment Depths from Top of Core:		3 in.	Rebar		
		N/A in.	Welded Wire Fabric		
Vapor Barrier or Geotextile Fabric:		no	(yes/no)		
Description of Vapor Barrier or Geotextile:		N/A			

Subgrade Soil Description: Light Brown,Poorly Graded SAND with silt (SP-SM), dense

Notes:

Cement Treated Base

Top of Core

Bottom of Core

SINCE F&R 1881

PAVEMENT SECTION COMPOSITION AND DESCRIPTION

Project Name:	I-64 High Rise Bridge Pavement Coring and Boring Exploration	Date of Extraction:	1/12/2016
Project Number:	60T-0570	Project Location:	Chesapeake, VA

Boring/Core Identification: C8

Boring/Core GPS Coordinates:
Latitude: 36.758309
Longitude: -76.276234

General Boring/Core Location: I-64, Westbound, STA 420+00, Right Lane

Pavement Section Composition:	Asphalt:	4 in.	Void Underlying Pavement	no	(yes/no)
	Aggregate Base Material:	0 in.	Void Depth Below Pavement	N/A	in.
	Cement Treated Base:	0 in.			
	Concrete	9 in.			
Welded Wire Fabric (WWF) or Rebar:		#2 WWF/Rebar/Both			
Embedment Depths from Top of Core:		3.25 & 4.75 in.	Rebar		
		N/A in.	Welded Wire Fabric		
Vapor Barrier or Geotextile Fabric:		no (yes/no)			
Description of Vapor Barrier or Geotextile:		N/A			

Subgrade Soil Description: Brown, fine Silty SAND (SM), dense

Notes:

Asphalt **Concrete**

Top of Core **Bottom of Core**

PAVEMENT SECTION COMPOSITION AND DESCRIPTION

Project Name:	I-64 High Rise Bridge Pavement Coring and Boring Exploration	Date of Extraction:	1/28/2016
Project Number:	60T-0570	Project Location:	Chesapeake, VA

Boring/Core Identification: C9

Boring/Core GPS Coordinates:
Latitude: 36.759377
Longitude: -76.329314

General Boring/Core Location: I-64, Westbound, STA 255+00, Left Lane

Pavement Section Composition:	Asphalt:	4 in.	Void Underlying Pavement	no	(yes/no)
	Aggregate Base Material:	0 in.	Void Depth Below Pavement	N/A	in.
	Cement Treated Base:	5 in.			
	Concrete	8 in.			
Welded Wire Fabric (WWF) or Rebar:		#5 WWF/Rebar/Both			
Embedment Depths from Top of Core:		3 in.	Rebar		
		N/A in.	Welded Wire Fabric		
Vapor Barrier or Geotextile Fabric:		no (yes/no)			
Description of Vapor Barrier or Geotextile:		N/A			

Subgrade Soil Description: Light Brown, Silty SAND (SM), medium dense

Notes:

Top of Core

Asphalt

Concrete

PAVEMENT SECTION COMPOSITION AND DESCRIPTION

Project Name:	I-64 High Rise Bridge Pavement Coring and Boring Exploration	Date of Extraction:	1/28/2016
Project Number:	60T-0570	Project Location:	Chesapeake, VA

Boring/Core Identification: C9

Boring/Core GPS Coordinates:
Latitude: 36.759377
Longitude: -76.329314

General Boring/Core Location: I-64, Westbound, STA 255+00, Left Lane

Pavement Section Composition:	Asphalt:	4 in.	Void Underlying Pavement	no	(yes/no)
	Aggregate Base Material:	0 in.	Void Depth Below Pavement	N/A	in.
	Cement Treated Base:	5 in.			
	Concrete	8 in.			
Welded Wire Fabric (WWF) or Rebar:		#5	WWF/Rebar/Both		
Embedment Depths from Top of Core:		3 in.	Rebar		
		N/A in.	Welded Wire Fabric		
Vapor Barrier or Geotextile Fabric:		no	(yes/no)		
Description of Vapor Barrier or Geotextile:		N/A			

Subgrade Soil Description: Light Brown, Silty SAND (SM), medium dense

Notes:

Top of Core

Bottom of Core

PAVEMENT SECTION COMPOSITION AND DESCRIPTION

Project Name:	I-64 High Rise Bridge Pavement Coring and Boring Exploration	Date of Extraction:	1/28/2016
Project Number:	60T-0570	Project Location:	Chesapeake, VA

Boring/Core Identification: C10

Boring/Core GPS Coordinates:
Latitude: 36.765552
Longitude: -76.361108

General Boring/Core Location: I-64 Westbound, STA 150+00, Left Lane

Pavement Section Composition:	Asphalt:	3 in.	Void Underlying Pavement	no	(yes/no)
	Aggregate Base Material:	0 in.	Void Depth Below Pavement	N/A	in.
	Cement Treated Base:	6 in.			
	Concrete	8 in.			
Welded Wire Fabric (WWF) or Rebar:		#5	WWF/Rebar/Both		
Embedment Depths from Top of Core:		2.5 in.	Rebar		
		N/A in.	Welded Wire Fabric		
Vapor Barrier or Geotextile Fabric:		no	(yes/no)		
Description of Vapor Barrier or Geotextile:		N/A			

Subgrade Soil Description: Gray, Clayey SAND (SC), medium dense

Notes:

Top of Core

Asphalt

Concrete

PAVEMENT SECTION COMPOSITION AND DESCRIPTION

Project Name:	I-64 High Rise Bridge Pavement Coring and Boring Exploration	Date of Extraction:	1/28/2016
Project Number:	60T-0570	Project Location:	Chesapeake, VA

Boring/Core Identification: C10

Boring/Core GPS Coordinates:
Latitude: 36.765552
Longitude: -76.361108

General Boring/Core Location: I-64 Westbound, STA 150+00, Left Lane

Pavement Section Composition:	Asphalt:	3 in.	Void Underlying Pavement	no	(yes/no)
	Aggregate Base Material:	0 in.	Void Depth Below Pavement	N/A	in.
	Cement Treated Base:	6 in.			
	Concrete	8 in.			
Welded Wire Fabric (WWF) or Rebar:		#5	WWF/Rebar/Both		
Embedment Depths from Top of Core:		2.5 in.	Rebar		
		N/A in.	Welded Wire Fabric		
Vapor Barrier or Geotextile Fabric:		no	(yes/no)		
Description of Vapor Barrier or Geotextile:		N/A			

Subgrade Soil Description: Gray, Silty SAND (SM), medium dense

Notes:

Cement Treated Base

Top of Core

Bottom of Core

PAVEMENT SECTION COMPOSITION AND DESCRIPTION

Project Name:	I-64 High Rise Bridge Pavement Coring and Boring Exploration	Date of Extraction:	1/12/2016
Project Number:	60T-0570	Project Location:	Chesapeake, VA

Boring/Core Identification: C11

Boring/Core GPS Coordinates:
Latitude: 36.787588
Longitude: -76.399361

General Boring/Core Location: I-264, Eastbound, STA 4+00, Right Lane

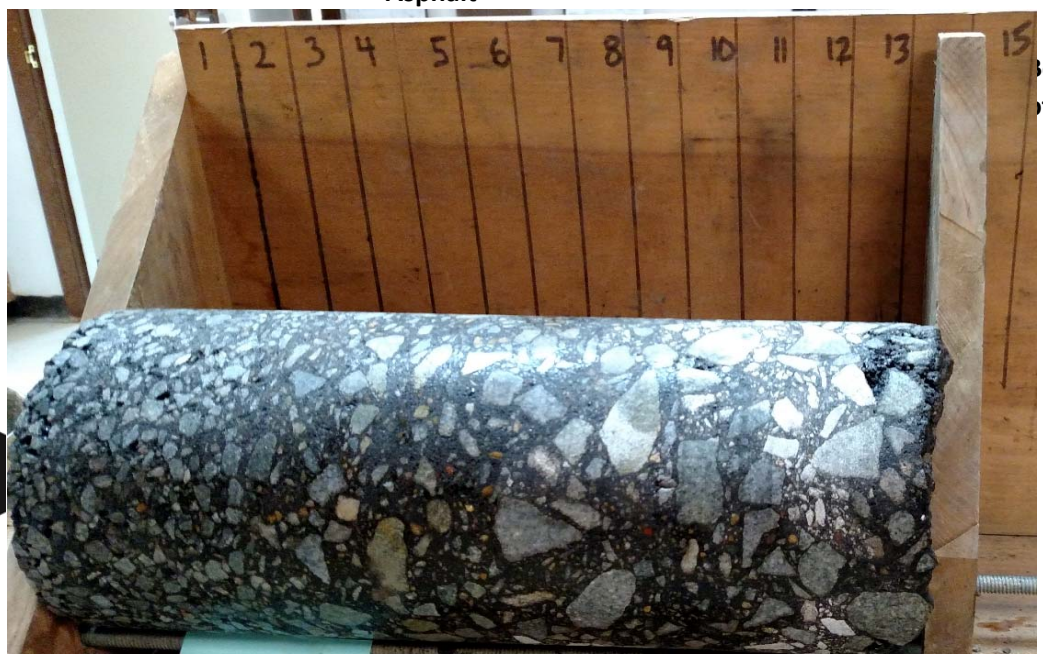
Pavement Section Composition:	Asphalt:	13 in.	Void Underlying Pavement	no	(yes/no)
	Aggregate Base Material:	0 in.	Void Depth Below Pavement	N/A	in.
	Cement Treated Base:	0 in.			
	Concrete	0 in.			
Welded Wire Fabric (WWF) or Rebar:		N/A	WWF/Rebar/Both		
Embedment Depths from Top of Core:		N/A in.	Rebar		
		N/A in.	Welded Wire Fabric		
Vapor Barrier or Geotextile Fabric:		no	(yes/no)		
Description of Vapor Barrier or Geotextile:		N/A			

Subgrade Soil Description: Gray-Brown, fine Silty SAND (SM), Very dense

Notes:

Asphalt

Top of Core



Bottom of Core

PAVEMENT SECTION COMPOSITION AND DESCRIPTION

Project Name:	I-64 High Rise Bridge Pavement Coring and Boring Exploration	Date of Extraction:	1/12/2016
Project Number:	60T-0570	Project Location:	Chesapeake, VA

Boring/Core Identification: C12

Boring/Core GPS Coordinates:
Latitude: 36.792663
Longitude: -76.391365

General Boring/Core Location: I-264, Eastbound, STA 36+00, Right Lane

Pavement Section Composition:	Asphalt:	13 in.	Void Underlying Pavement	no	(yes/no)
	Aggregate Base Material:	0 in.	Void Depth Below Pavement	N/A	in.
	Cement Treated Base:	0 in.			
	Concrete	0 in.			
Welded Wire Fabric (WWF) or Rebar:		N/A	WWF/Rebar/Both		
Embedment Depths from Top of Core:		N/A in.	Rebar		
		N/A in.	Welded Wire Fabric		
Vapor Barrier or Geotextile Fabric:		no	(yes/no)		
Description of Vapor Barrier or Geotextile:		N/A			

Subgrade Soil Description: Gray, fine Silty SAND (SM), very dense

Notes:

Asphalt

Top of Core

Bottom of Core

PAVEMENT SECTION COMPOSITION AND DESCRIPTION

Project Name:	I-64 High Rise Bridge Pavement Coring and Boring Exploration	Date of Extraction:	1/11/2016
Project Number:	60T-0570	Project Location:	Chesapeake, VA

Boring/Core Identification: C13

Boring/Core GPS Coordinates:
Latitude: 36.794073
Longitude: -76.388461

General Boring/Core Location: I-264, Eastbound, STA 46+00, Right Shoulder

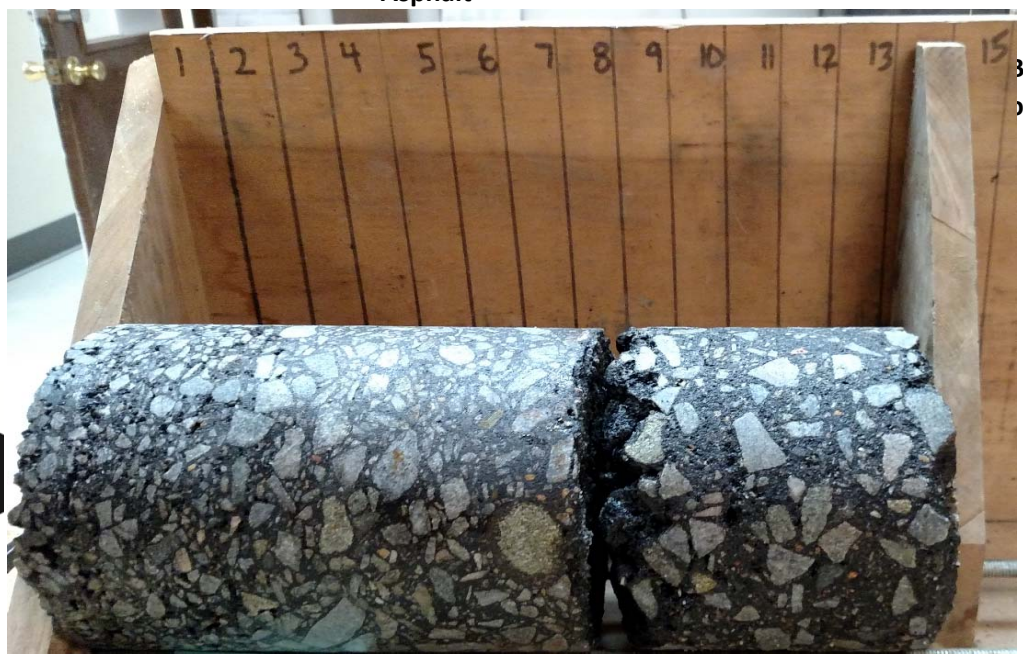
Pavement Section Composition:	Asphalt:	13 in.	Void Underlying Pavement	no	(yes/no)
	Aggregate Base Material:	0 in.	Void Depth Below Pavement	N/A	in.
	Cement Treated Base:	0 in.			
	Concrete	0 in.			
Welded Wire Fabric (WWF) or Rebar:		N/A	WWF/Rebar/Both		
Embedment Depths from Top of Core:		N/A in.	Rebar		
		N/A in.	Welded Wire Fabric		
Vapor Barrier or Geotextile Fabric:		no	(yes/no)		
Description of Vapor Barrier or Geotextile:		N/A			

Subgrade Soil Description: Gray, fine Silty SAND (SM), Very Dense

Notes:

Asphalt

Top of Core



Bottom of Core

PAVEMENT SECTION COMPOSITION AND DESCRIPTION

Project Name:	I-64 High Rise Bridge Pavement Coring and Boring Exploration	Date of Extraction:	1/12/2016
Project Number:	60T-0570	Project Location:	Chesapeake, VA

Boring/Core Identification: C14

Boring/Core GPS Coordinates:
Latitude: 36.793615
Longitude: -76.390215

General Boring/Core Location: I-264, Westbound, STA 12+00, Right Lane

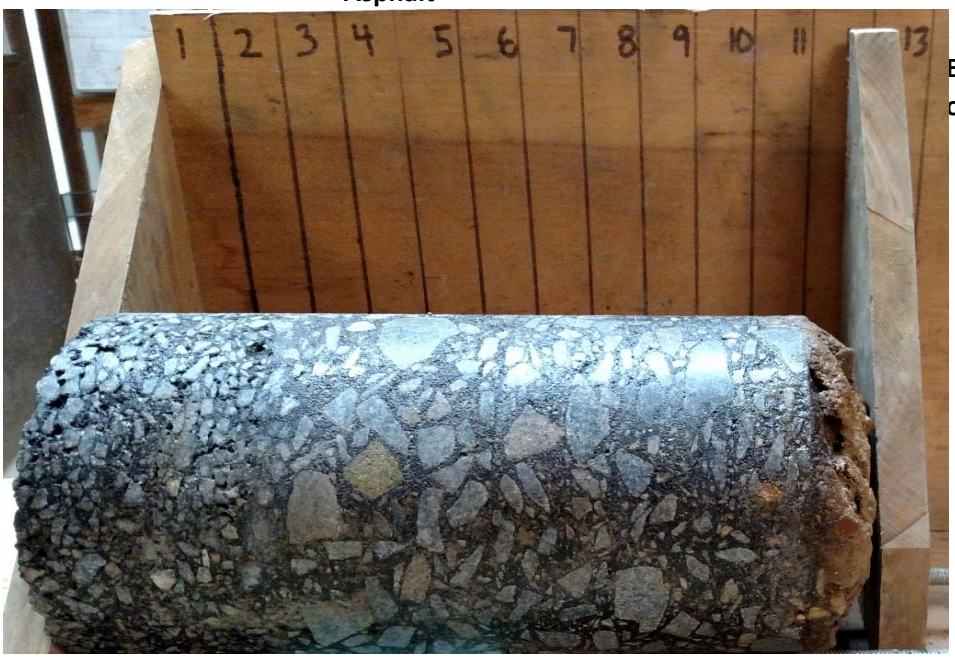
Pavement Section Composition:	Asphalt:	11.5 in.	Void Underlying Pavement	no	(yes/no)
	Aggregate Base Material:	0 in.	Void Depth Below Pavement	N/A	in.
	Cement Treated Base:	0 in.			
	Concrete	0 in.			
Welded Wire Fabric (WWF) or Rebar:		N/A WWF/Rebar/Both			
Embedment Depths from Top of Core:		N/A in.	Rebar		
		N/A in.	Welded Wire Fabric		
Vapor Barrier or Geotextile Fabric:		no (yes/no)			
Description of Vapor Barrier or Geotextile:		N/A			

Subgrade Soil Description: Brown-Gray, finePoorly Graded SAND with silt (SP-SM), Very Dense

Notes:

Asphalt

Top of Core



Bottom of Core

PAVEMENT SECTION COMPOSITION AND DESCRIPTION

Project Name:	I-64 High Rise Bridge Pavement Coring and Boring Exploration	Date of Extraction:	1/29/2015
Project Number:	60T-0570	Project Location:	Chesapeake, VA

Boring/Core Identification: C15

Boring/Core GPS Coordinates:
Latitude: 36.790747
Longitude: -76.395345

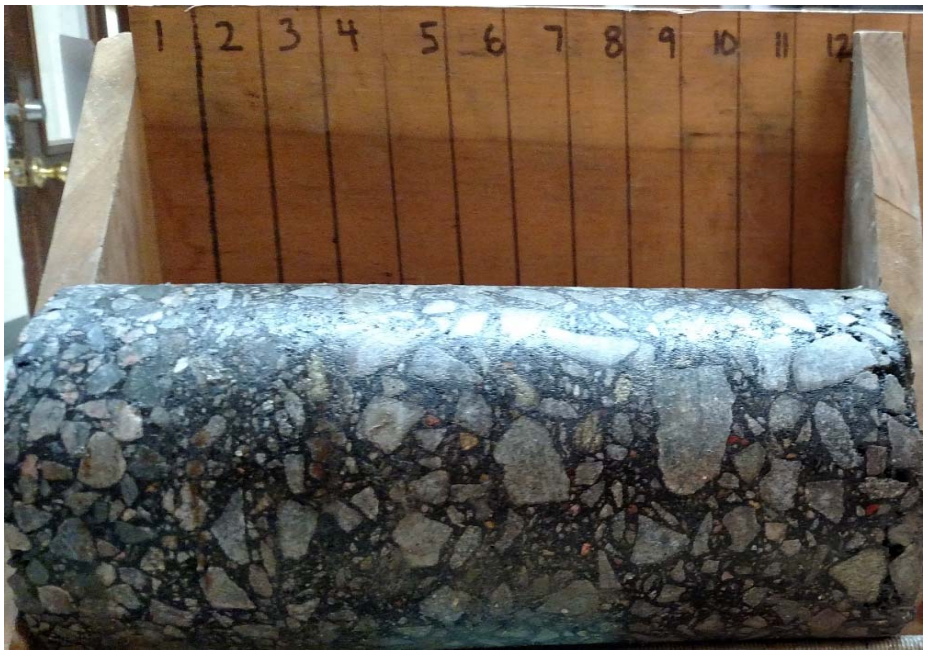
General Boring/Core Location: I-264, Westbound, STA 30+00, Left Lane

Pavement Section Composition:	Asphalt:	12 in.	Void Underlying Pavement	no	(yes/no)
	Aggregate Base Material:	6 in.	Void Depth Below Pavement	N/A	in.
	Cement Treated Base:	0 in.			
	Concrete	0 in.			
Welded Wire Fabric (WWF) or Rebar:		N/A WWF/Rebar/Both			
Embedment Depths from Top of Core:		N/A in.	Rebar		
		N/A in.	Welded Wire Fabric		
Vapor Barrier or Geotextile Fabric:		no (yes/no)			
Description of Vapor Barrier or Geotextile:		N/A			

Subgrade Soil Description: Gray, Silty SAND (SM), with Gravel, dense

Notes:

Top of Core



Bottom of Core

SINCE F&R 1881

PAVEMENT SECTION COMPOSITION AND DESCRIPTION

Project Name:	I-64 High Rise Bridge Pavement Coring and Boring Exploration	Date of Extraction:	1/13/2016
Project Number:	60T-0570	Project Location:	Chesapeake, VA

Boring/Core Identification: C16

Boring/Core GPS Coordinates:
Latitude: 36.791577
Longitude: -76.393947

General Boring/Core Location: I-264, Westbound, STA 25+00, Left Shoulder

Pavement Section Composition:	Asphalt:	8 in.	Void Underlying Pavement	no	(yes/no)
	Aggregate Base Material:	0 in.	Void Depth Below Pavement	N/A	in.
	Cement Treated Base:	4 in.			
	Concrete	0 in.			
Welded Wire Fabric (WWF) or Rebar:		N/A WWF/Rebar/Both			
Embedment Depths from Top of Core:		N/A in.	Rebar		
		N/A in.	Welded Wire Fabric		
Vapor Barrier or Geotextile Fabric:		no (yes/no)			
Description of Vapor Barrier or Geotextile:		N/A			

Subgrade Soil Description: Gray, Silty SAND (SM), with Gravel, dense

Notes: Intact core length 6.5 inches.
No Cement Treated Base core unable to be obtained.

Asphalt

Top of Core

Bottom of Core

PAVEMENT SECTION COMPOSITION AND DESCRIPTION

Project Name:	I-64 High Rise Bridge Pavement Coring and Boring Exploration	Date of Extraction:	1/22/2016
Project Number:	60T-0570	Project Location:	Chesapeake, VA

Boring/Core Identification: C18

Boring/Core GPS Coordinates:
Latitude: 36.769509
Longitude: -76.272249

General Boring/Core Location: I-464, Northbound, STA 60+00, Right Shoulder

Pavement Section Composition:	Asphalt:	3.5 in.	Void Underlying Pavement	no	(yes/no)
	Aggregate Base Material:	10 in.	Void Depth Below Pavement	N/A	in.
	Cement Treated Base:	0 in.			
	Concrete	0 in.			
Welded Wire Fabric (WWF) or Rebar:		N/A	WWF/Rebar/Both		
Embedment Depths from Top of Core:		N/A in.	Rebar		
		N/A in.	Welded Wire Fabric		
Vapor Barrier or Geotextile Fabric:		no	(yes/no)		
Description of Vapor Barrier or Geotextile:		N/A			

Subgrade Soil Description: Gray, fine Silty SAND (SM), dense

Notes: Aggregate base material may be decomposed concrete. Material was sampled as sandy GRAVEL with trace metal.

Asphalt

Top of Core

Bottom of Core

PAVEMENT SECTION COMPOSITION AND DESCRIPTION

Project Name:	I-64 High Rise Bridge Pavement Coring and Boring Exploration	Date of Extraction:	1/21/2016
Project Number:	60T-0570	Project Location:	Chesapeake, VA

Boring/Core Identification: C-19

Boring/Core GPS Coordinates:
Latitude: 36.764682
Longitude: -76.269082

General Boring/Core Location: I-464, Northbound, STA 40+00, Left Lane

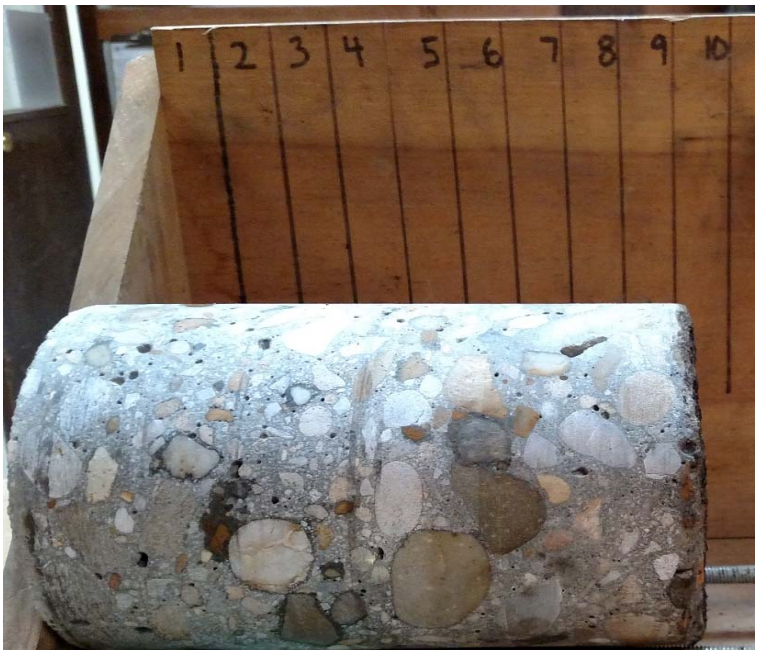
Pavement Section Composition:	Asphalt:	0 in.	Void Underlying Pavement	no	(yes/no)
	Aggregate Base Material:	0 in.	Void Depth Below Pavement	N/A	in.
	Cement Treated Base:	12 in.			
	Concrete	9 in.			
Welded Wire Fabric (WWF) or Rebar:		#2	WWF/Rebar/Both		
Embedment Depths from Top of Core:		4.5 in.	Rebar		
		N/A in.	Welded Wire Fabric		
Vapor Barrier or Geotextile Fabric:		no	(yes/no)		
Description of Vapor Barrier or Geotextile:		N/A			

Subgrade Soil Description: Brown-Gray, fine Poorly Graded SAND (SP), medium dense

Notes: No Cement Treated Base core unable to be obtained.

Concrete

Top of Core



Bottom of Core

PAVEMENT SECTION COMPOSITION AND DESCRIPTION

Project Name:	I-64 High Rise Bridge Pavement Coring and Boring Exploration	Date of Extraction:	1/4/2016
Project Number:	60T-0570	Project Location:	Chesapeake, VA

Boring/Core Identification: C20

Boring/Core GPS Coordinates:
Latitude: 36.773543
Longitude: -76.276859

General Boring/Core Location: I-464, Southbound, STA 4+00, Right Lane

Pavement Section Composition:	Asphalt:	12 in.	Void Underlying Pavement	no	(yes/no)
	Aggregate Base Material:	4 in.	Void Depth Below Pavement	N/A	in.
	Cement Treated Base:	0 in.			
	Concrete	0 in.			
Welded Wire Fabric (WWF) or Rebar:		N/A WWF/Rebar/Both			
Embedment Depths from Top of Core:		N/A in.	Rebar		
		N/A in.	Welded Wire Fabric		
Vapor Barrier or Geotextile Fabric:		no (yes/no)			
Description of Vapor Barrier or Geotextile:		N/A			

Subgrade Soil Description: Light Brown, Silty SAND (SM), very dense

Notes: Intact core 11.5 inches

Asphalt

Top of Core

Bottom of Core

PAVEMENT SECTION COMPOSITION AND DESCRIPTION

Project Name:	I-64 High Rise Bridge Pavement Coring and Boring Exploration	Date of Extraction:	1/10/2016
Project Number:	60T-0570	Project Location:	Chesapeake, VA

Boring/Core Identification: C21

Boring/Core GPS Coordinates:

Latitude: 36.764151

Longitude: -76.269246

General Boring/Core Location: I-464, Southbound, STA 35+00, Right Shoulder

Pavement Section Composition:	Asphalt:	4 in.	Void Underlying Pavement	no	(yes/no)
	Aggregate Base Material:	0 in.	Void Depth Below Pavement	N/A	in.
	Cement Treated Base:	0 in.			
	Concrete	0 in.			
Welded Wire Fabric (WWF) or Rebar:		N/A	WWF/Rebar/Both		
Embedment Depths from Top of Core:		N/A in.	Rebar		
		N/A in.	Welded Wire Fabric		
Vapor Barrier or Geotextile Fabric:		no	(yes/no)		
Description of Vapor Barrier or Geotextile:		N/A			

Subgrade Soil Description: Brown-Gray, fine Poorly Graded SAND (SP), Medium dense

Notes: Cored amount was 4 inches, intact core sample is 3.5 inches.

Asphalt

Top of Core

Bottom of Core

PAVEMENT SECTION COMPOSITION AND DESCRIPTION

Project Name:	I-64 High Rise Bridge Pavement Coring and Boring Exploration	Date of Extraction:	1/11/2016
Project Number:	60T-0570	Project Location:	Chesapeake, VA

Boring/Core Identification: C22

Boring/Core GPS Coordinates:
Latitude: 36.771880
Longitude: -76.275099

General Boring/Core Location: I-464, Southbound, STA 10+00, Left Lane

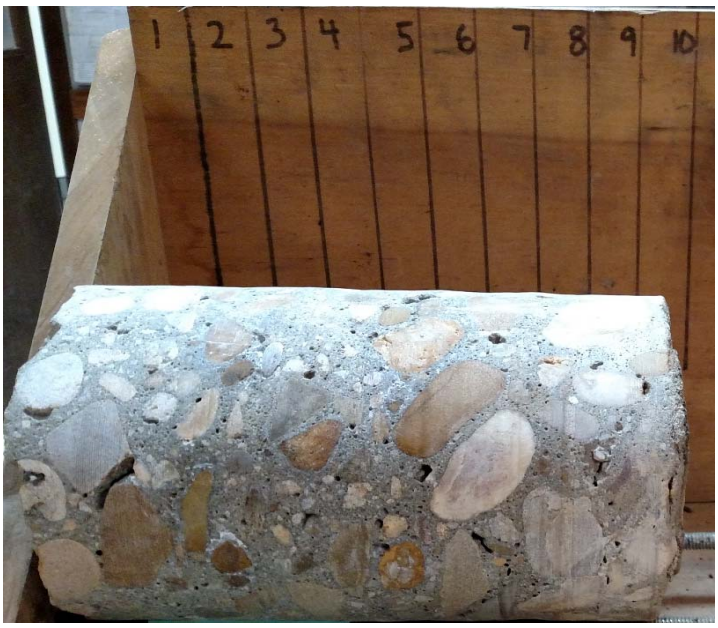
Pavement Section Composition:	Asphalt:	0 in.	Void Underlying Pavement	no	(yes/no)
	Aggregate Base Material:	0 in.	Void Depth Below Pavement	N/A	in.
	Cement Treated Base:	4 in.			
	Concrete	9.75 in.			
Welded Wire Fabric (WWF) or Rebar:		#2 WWF/Rebar/Both			
Embedment Depths from Top of Core:		3.5 in.	Rebar		
		N/A in.	Welded Wire Fabric		
Vapor Barrier or Geotextile Fabric:		no (yes/no)			
Description of Vapor Barrier or Geotextile:		N/A			

Subgrade Soil Description: Brown-Gray, fine Silty SAND (SM), dense

Notes:

Top of Core

Concrete



Cement Treated Base

PAVEMENT SECTION COMPOSITION AND DESCRIPTION

Project Name:	I-64 High Rise Bridge Pavement Coring and Boring Exploration	Date of Extraction:	1/20/2016
Project Number:	60T-0570	Project Location:	Chesapeake, VA

Boring/Core Identification: C23

Boring/Core GPS Coordinates:

Latitude: 36.764414

Longitude: -76.268857

General Boring/Core Location: I-464, Northbound, STA 14+04, Right Lane

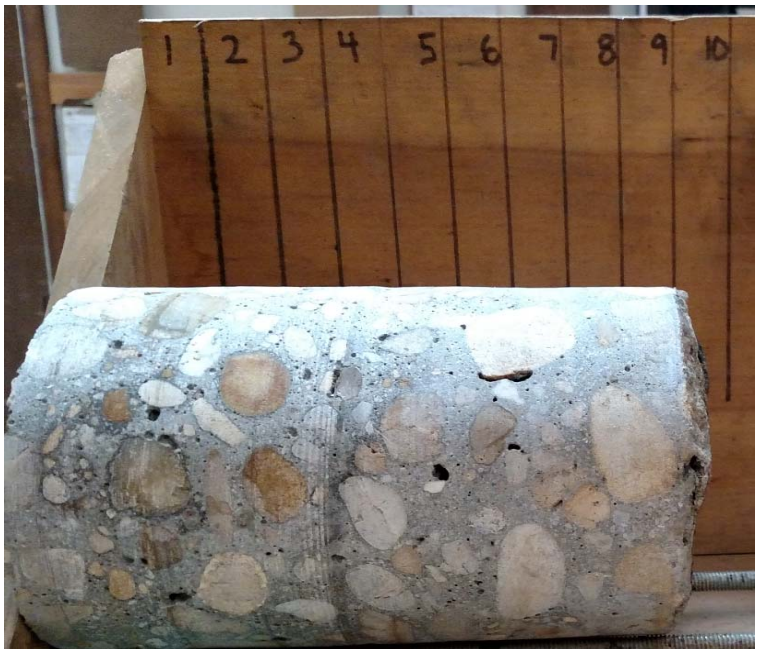
Pavement Section Composition:	Asphalt:	0 in.	Void Underlying Pavement	no	(yes/no)
	Aggregate Base Material:	0 in.	Void Depth Below Pavement	N/A	in.
	Cement Treated Base:	9 in.			
	Concrete	9.5 in.			
Welded Wire Fabric (WWF) or Rebar:		#2	WWF/Rebar/Both		
Embedment Depths from Top of Core:		4 in.	Rebar		
		N/A in.	Welded Wire Fabric		
Vapor Barrier or Geotextile Fabric:		no	(yes/no)		
Description of Vapor Barrier or Geotextile:		N/A			

Subgrade Soil Description: Brown, fine Poorly Graded SAND with silt (SP-SM), medium dense

Notes: Cement treated aggregate intact core 3-inches.

Top of Core

Concrete



Cement Treated Base

PAVEMENT SECTION COMPOSITION AND DESCRIPTION

Project Name:	I-64 High Rise Bridge Pavement Coring and Boring Exploration	Date of Extraction:	1/10/2016
Project Number:	60T-0570	Project Location:	Chesapeake, VA

Boring/Core Identification: C24

Boring/Core GPS Coordinates:
Latitude: 36.772395
Longitude: -76.275718

General Boring/Core Location: I-464, Southbound, STA15+28, Right Lane

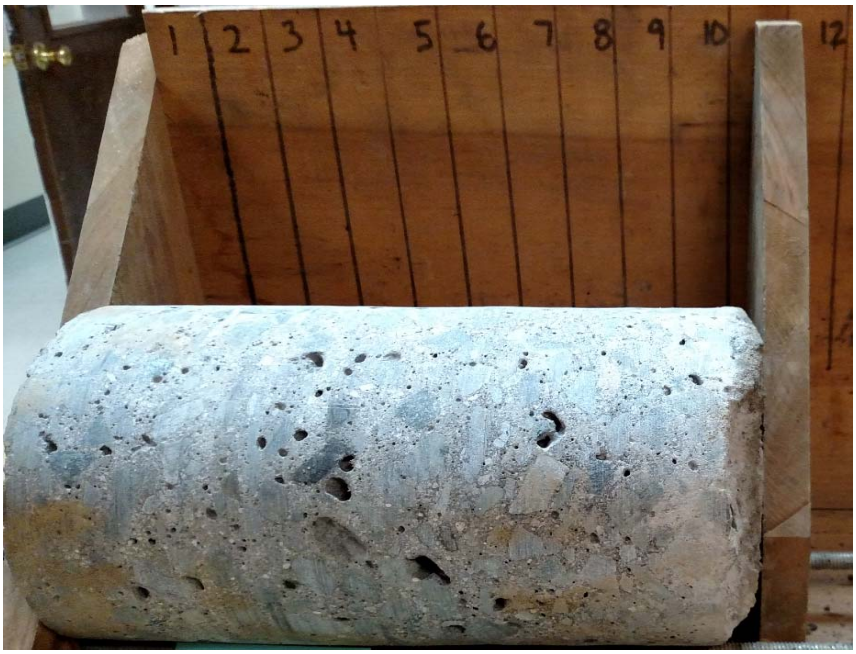
Pavement Section Composition:	Asphalt:	0 in.	Void Underlying Pavement	no	(yes/no)
	Aggregate Base Material:	0 in.	Void Depth Below Pavement	N/A	in.
	Cement Treated Base:	5 in.			
	Concrete	10 in.			
Welded Wire Fabric (WWF) or Rebar:		N/A	WWF/Rebar/Both		
Embedment Depths from Top of Core:		N/A in.	Rebar		
		N/A in.	Welded Wire Fabric		
Vapor Barrier or Geotextile Fabric:		no	(yes/no)		
Description of Vapor Barrier or Geotextile:		N/A			

Subgrade Soil Description: Gray, fine Silty SAND (SM), dense

Notes: No rebar encountered in the core sample

Concrete

Top of Core



Bottom of Core

PAVEMENT SECTION COMPOSITION AND DESCRIPTION

Project Name:	I-64 High Rise Bridge Pavement Coring and Boring Exploration	Date of Extraction:	1/10/2016
Project Number:	60T-0570	Project Location:	Chesapeake, VA

Boring/Core Identification: C24

Boring/Core GPS Coordinates:
Latitude: 36.772395
Longitude: -76.275718

General Boring/Core Location: I-464, Southbound, STA15+28, Right Lane

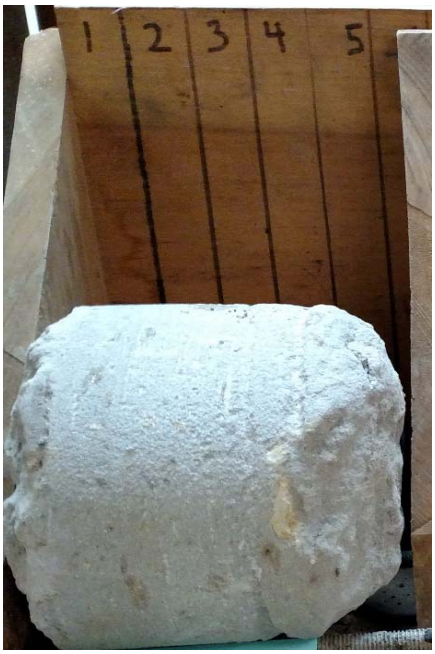
Pavement Section Composition:	Asphalt:	0 in.	Void Underlying Pavement	no	(yes/no)
	Aggregate Base Material:	0 in.	Void Depth Below Pavement	N/A	in.
	Cement Treated Base:	5 in.			
	Concrete	10 in.			
Welded Wire Fabric (WWF) or Rebar:		N/A	WWF/Rebar/Both		
Embedment Depths from Top of Core:		N/A in.	Rebar		
		N/A in.	Welded Wire Fabric		
Vapor Barrier or Geotextile Fabric:		no	(yes/no)		
Description of Vapor Barrier or Geotextile:		N/A			

Subgrade Soil Description: Gray, fine Silty SAND (SM), dense

Notes: No rebar encountered in the core sample

Cement Treated Base

Top of Core



Bottom of Core

SINCE F&R 1881

PAVEMENT SECTION COMPOSITION AND DESCRIPTION

Project Name:	I-64 High Rise Bridge Pavement Coring and Boring Exploration	Date of Extraction:	1/11/2016
Project Number:	60T-0570	Project Location:	Chesapeake, VA

Boring/Core Identification: C25

Boring/Core GPS Coordinates:
Latitude: 36.786059
Longitude: -76.417286

General Boring/Core Location: I-664, Northbound, STA 75+00, Right Lane

Pavement Section Composition:	Asphalt:	11 in.	Void Underlying Pavement	no	(yes/no)
	Aggregate Base Material:	0 in.	Void Depth Below Pavement	N/A	in.
	Cement Treated Base:	0 in.			
	Concrete	0 in.			
Welded Wire Fabric (WWF) or Rebar:		N/A	WWF/Rebar/Both		
Embedment Depths from Top of Core:		N/A in.	Rebar		
		N/A in.	Welded Wire Fabric		
Vapor Barrier or Geotextile Fabric:		no	(yes/no)		
Description of Vapor Barrier or Geotextile:		N/A			

Subgrade Soil Description: Gray-Brown, fine Silty SAND (SM), very dense

Notes:

Asphalt

Top of Core

Bottom of Core

PAVEMENT SECTION COMPOSITION AND DESCRIPTION

Project Name:	I-64 High Rise Bridge Pavement Coring and Boring Exploration	Date of Extraction:	1/11/2016
Project Number:	60T-0570	Project Location:	Chesapeake, VA

Boring/Core Identification: C26

Boring/Core GPS Coordinates:
Latitude: 36.793898
Longitude: -76.426891

General Boring/Core Location: I-664, Northbound, STA 120+00, Left Lane

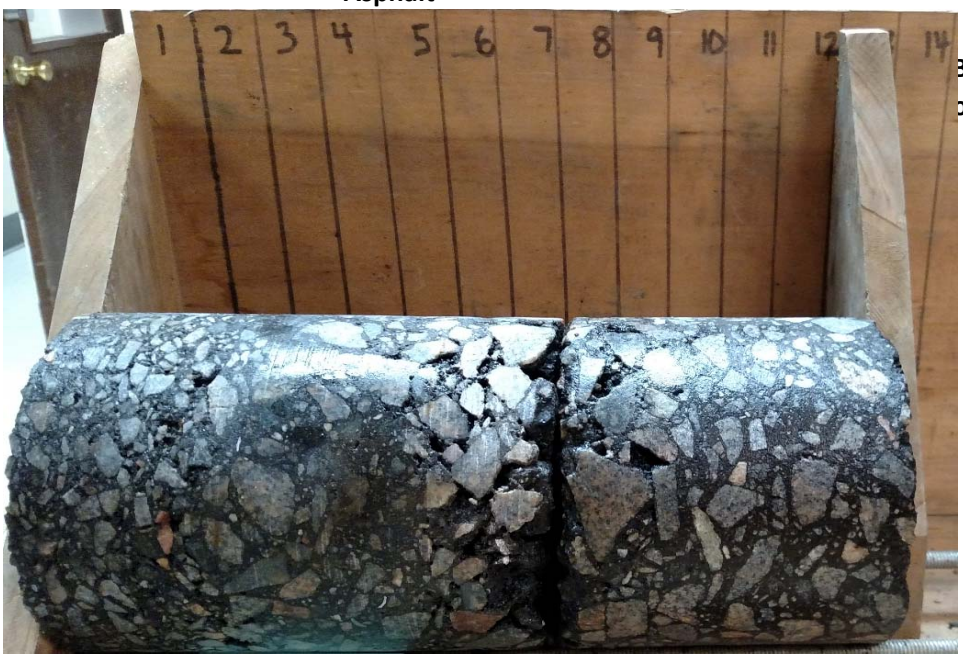
Pavement Section Composition:	Asphalt:	12 in.	Void Underlying Pavement	no	(yes/no)
	Aggregate Base Material:	0 in.	Void Depth Below Pavement	N/A	in.
	Cement Treated Base:	0 in.			
	Concrete	0 in.			
Welded Wire Fabric (WWF) or Rebar:		N/A	WWF/Rebar/Both		
Embedment Depths from Top of Core:		N/A in.	Rebar		
		N/A in.	Welded Wire Fabric		
Vapor Barrier or Geotextile Fabric:		no	(yes/no)		
Description of Vapor Barrier or Geotextile:		N/A			

Subgrade Soil Description: Brown-Gray, fine Poorly Graded SAND with Silt (SP-SM), very dense

Notes:

Asphalt

Top of Core



Bottom of Core

PAVEMENT SECTION COMPOSITION AND DESCRIPTION

Project Name:	I-64 High Rise Bridge Pavement Coring and Boring Exploration	Date of Extraction:	1/11/2016
Project Number:	60T-0570	Project Location:	Chesapeake, VA

Boring/Core Identification: C27

Boring/Core GPS Coordinates:
Latitude: 36.793719
Longitude: -76.427165

General Boring/Core Location: I-664, Southbound, STA 85+00, Right Lane

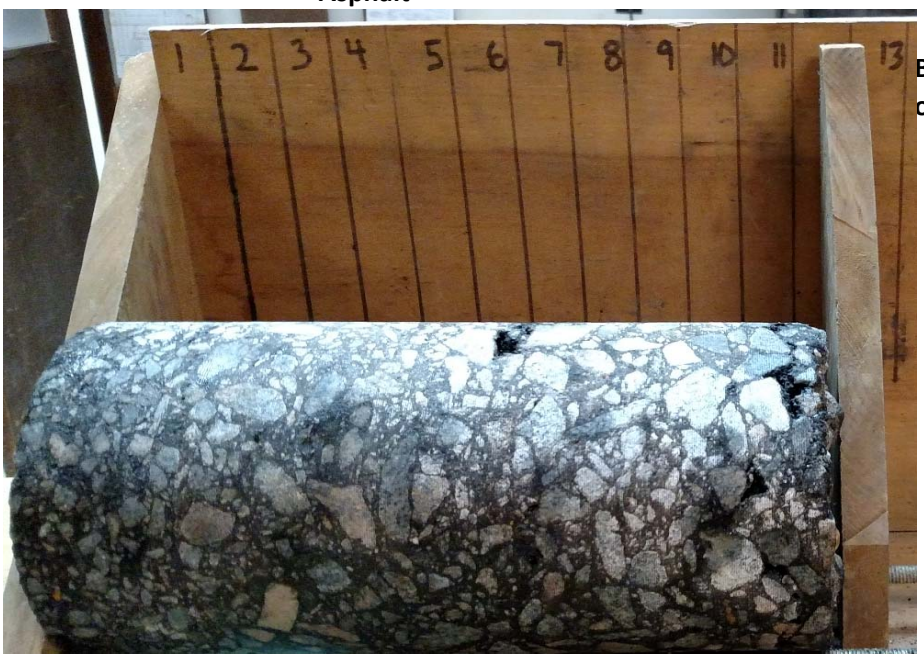
Pavement Section Composition:	Asphalt:	11.5 in.	Void Underlying Pavement	no	(yes/no)
	Aggregate Base Material:	0 in.	Void Depth Below Pavement	N/A	in.
	Cement Treated Base:	6 in.			
	Concrete	0 in.			
Welded Wire Fabric (WWF) or Rebar:		N/A	WWF/Rebar/Both		
Embedment Depths from Top of Core:		N/A in.	Rebar		
		N/A in.	Welded Wire Fabric		
Vapor Barrier or Geotextile Fabric:		no	(yes/no)		
Description of Vapor Barrier or Geotextile:		N/A			

Subgrade Soil Description: Gray-Brown, fine Silty SAND (SM), very dense

Notes: Cement Treated Base core unable to be obtained.

Asphalt

Top of Core



Bottom of Core

PAVEMENT SECTION COMPOSITION AND DESCRIPTION

Project Name:	I-64 High Rise Bridge Pavement Coring and Boring Exploration	Date of Extraction:	1/11/2016
Project Number:	60T-0570	Project Location:	Chesapeake, VA

Boring/Core Identification: C28

Boring/Core GPS Coordinates:
Latitude: 36.793719
Longitude: -76.427209

General Boring/Core Location: I-664, Southbound, STA 85+00, Right Shoulder

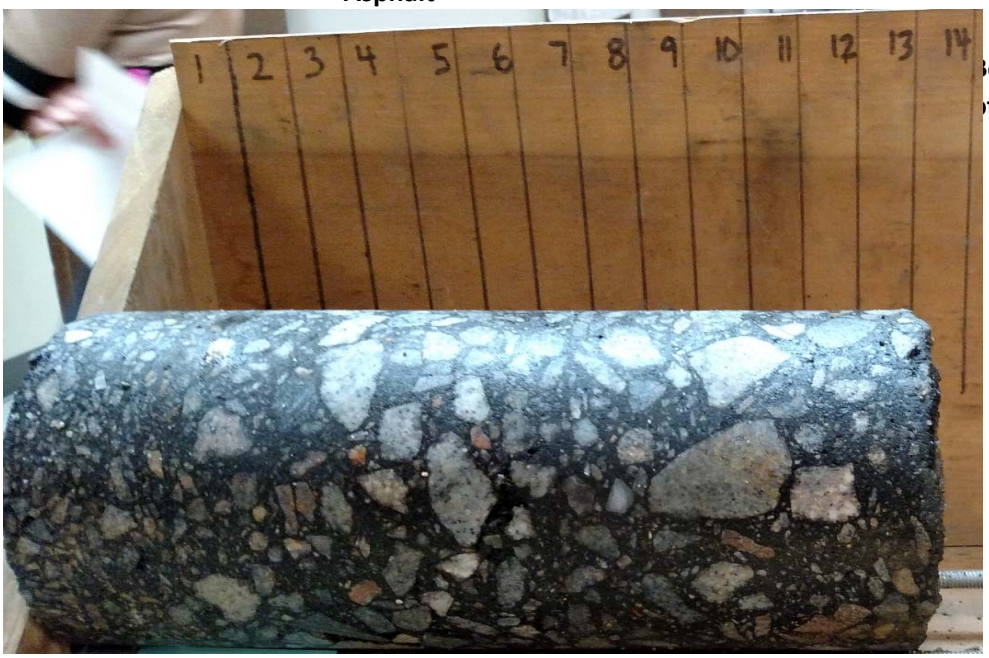
Pavement Section Composition:	Asphalt:	13 in.	Void Underlying Pavement	no	(yes/no)
	Aggregate Base Material:	4 in.	Void Depth Below Pavement	N/A	in.
	Cement Treated Base:	0 in.			
	Concrete	0 in.			
Welded Wire Fabric (WWF) or Rebar:		N/A	WWF/Rebar/Both		
Embedment Depths from Top of Core:		N/A in.	Rebar		
		N/A in.	Welded Wire Fabric		
Vapor Barrier or Geotextile Fabric:		no	(yes/no)		
Description of Vapor Barrier or Geotextile:		N/A			

Subgrade Soil Description: Brown-Gray, fine Silty SAND (SM), dense

Notes:

Asphalt

Top of Core



Bottom of Core

PAVEMENT SECTION COMPOSITION AND DESCRIPTION

Project Name:	I-64 High Rise Bridge Pavement Coring and Boring Exploration	Date of Extraction:	1/22/2016
Project Number:	60T-0570	Project Location:	Chesapeake, VA

Boring/Core Identification: C29

Boring/Core GPS Coordinates:
Latitude: 36.783702
Longitude: -76.424314

General Boring/Core Location: US Rt 58, Ramp A, Eastbound, STA 15+00, Right Lane

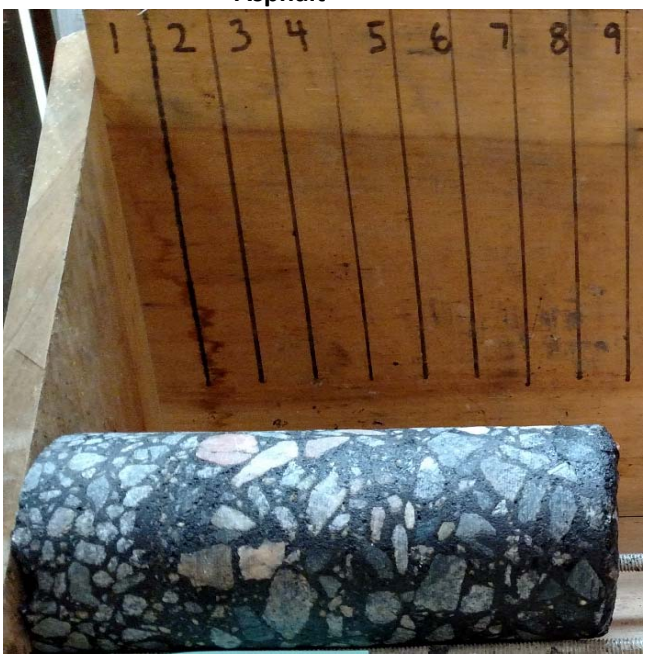
Pavement Section Composition:	Asphalt:	8.25 in.	Void Underlying Pavement	no	(yes/no)
	Aggregate Base Material:	0 in.	Void Depth Below Pavement	N/A	in.
	Cement Treated Base:	0 in.			
	Concrete	0 in.			
Welded Wire Fabric (WWF) or Rebar:		N/A WWF/Rebar/Both			
Embedment Depths from Top of Core:		N/A in.	Rebar		
		N/A in.	Welded Wire Fabric		
Vapor Barrier or Geotextile Fabric:		no (yes/no)			
Description of Vapor Barrier or Geotextile:		N/A			

Subgrade Soil Description: Gray-Brown, fine Silty SAND (SM), very dense

Notes:

Asphalt

Top of Core



Bottom of Core

PAVEMENT SECTION COMPOSITION AND DESCRIPTION

Project Name:	I-64 High Rise Bridge Pavement Coring and Boring Exploration	Date of Extraction:	2/2/2016
Project Number:	60T-0570	Project Location:	Chesapeake, VA

Boring/Core Identification: C31

Boring/Core GPS Coordinates:
Latitude: 36.784975
Longitude: -76.421252

General Boring/Core Location: US Rt 58, Ramp A, STA 25+00, Right Shoulder

Pavement Section Composition:	Asphalt:	5 in.	Void Underlying Pavement	no	(yes/no)
	Aggregate Base Material:	1 in.	Void Depth Below Pavement	N/A	in.
	Cement Treated Base:	0 in.			
	Concrete	0 in.			
Welded Wire Fabric (WWF) or Rebar:		N/A	WWF/Rebar/Both		
Embedment Depths from Top of Core:		N/A in.	Rebar		
		N/A in.	Welded Wire Fabric		
Vapor Barrier or Geotextile Fabric:		no	(yes/no)		
Description of Vapor Barrier or Geotextile:		N/A			

Subgrade Soil Description: Gray-brown, Silty SAND (SM), medium dense

Notes:

Asphalt

Top of Core

Bottom of Core

PAVEMENT SECTION COMPOSITION AND DESCRIPTION

Project Name:	I-64 High Rise Bridge Pavement Coring and Boring Exploration	Date of Extraction:	2/2/2016
Project Number:	60T-0570	Project Location:	Chesapeake, VA

Boring/Core Identification: C32

Boring/Core GPS Coordinates:
Latitude: 36.784436
Longitude: -76.422832

General Boring/Core Location: US Rt 58, Ramp A, STA 20+00, Left Lane

Pavement Section Composition:	Asphalt:	3 in.	Void Underlying Pavement	no	(yes/no)
	Aggregate Base Material:	3 in.	Void Depth Below Pavement	N/A	in.
	Cement Treated Base:	0 in.			
	Concrete	0 in.			
Welded Wire Fabric (WWF) or Rebar:		N/A	WWF/Rebar/Both		
Embedment Depths from Top of Core:		N/A in.	Rebar		
		N/A in.	Welded Wire Fabric		
Vapor Barrier or Geotextile Fabric:		no	(yes/no)		
Description of Vapor Barrier or Geotextile:		N/A			

Subgrade Soil Description: Gray-brown, Silty SAND (SM), dense

Notes:

Asphalt

Top of Core

Bottom of Core

PAVEMENT SECTION COMPOSITION AND DESCRIPTION

Project Name:	I-64 High Rise Bridge Pavement Coring and Boring Exploration	Date of Extraction:	2/1/2016
Project Number:	60T-0570	Project Location:	Chesapeake, VA

Boring/Core Identification:	Boring/Core GPS Coordinates:	
	Latitude:	36.787904
C33	Longitude:	-76.420071

General Boring/Core Location: US Rt 58, Ramp B, STA 15+00, Right Lane

Pavement Section Composition:	Asphalt:	8 in.	Void Underlying Pavement	no	(yes/no)
	Aggregate Base Material:	4 in.	Void Depth Below Pavement	N/A	in.
	Cement Treated Base:	0 in.			
	Concrete	0 in.			
Welded Wire Fabric (WWF) or Rebar:		N/A	WWF/Rebar/Both		
Embedment Depths from Top of Core:		N/A in.	Rebar		
		N/A in.	Welded Wire Fabric		
Vapor Barrier or Geotextile Fabric:		no	(yes/no)		
Description of Vapor Barrier or Geotextile:		N/A			

Subgrade Soil Description: Gray, Silty SAND (SM), very dense

Notes: 1" Aggregate stuck to bottom of asphalt core

Top of Core

Bottom of Core

PAVEMENT SECTION COMPOSITION AND DESCRIPTION

Project Name:	I-64 High Rise Bridge Pavement Coring and Boring Exploration	Date of Extraction:	2/1/2016
Project Number:	60T-0570	Project Location:	Chesapeake, VA

Boring/Core Identification: C34

Boring/Core GPS Coordinates:
Latitude: 36.783053
Longitude: -76.427849

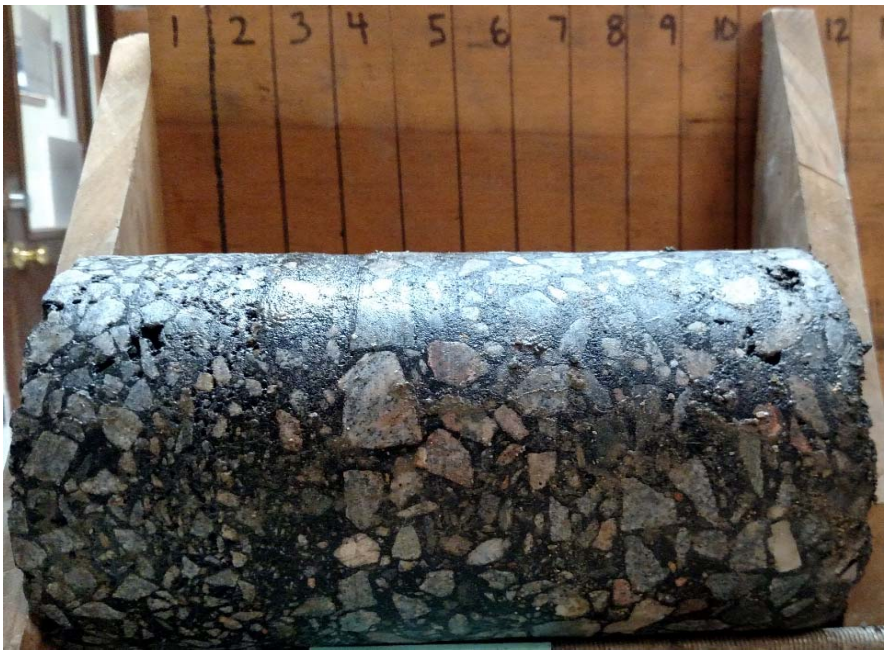
General Boring/Core Location: US Rt 58, Ramp B, STA 45+00, Left Lane

Pavement Section Composition:	Asphalt:	10.5 in.	Void Underlying Pavement	no	(yes/no)
	Aggregate Base Material:	2 in.	Void Depth Below Pavement	N/A	in.
	Cement Treated Base:	0 in.			
	Concrete	0 in.			
Welded Wire Fabric (WWF) or Rebar:		N/A WWF/Rebar/Both			
Embedment Depths from Top of Core:		N/A in.	Rebar		
		N/A in.	Welded Wire Fabric		
Vapor Barrier or Geotextile Fabric:		no (yes/no)			
Description of Vapor Barrier or Geotextile:		N/A			

Subgrade Soil Description: Gray, Silty SAND (SM), very dense

Notes:

Top of Core



Bottom of Core

SINCE F&R 1881

PAVEMENT SECTION COMPOSITION AND DESCRIPTION

Project Name:	I-64 High Rise Bridge Pavement Coring and Boring Exploration	Date of Extraction:	1/13/2016
Project Number:	60T-0570	Project Location:	Chesapeake, VA

Boring/Core Identification: C35

Boring/Core GPS Coordinates:
Latitude: 36.787838
Longitude: -76.418548

General Boring/Core Location: US Rt 58, Ramp C, STA 30+00, Right Lane

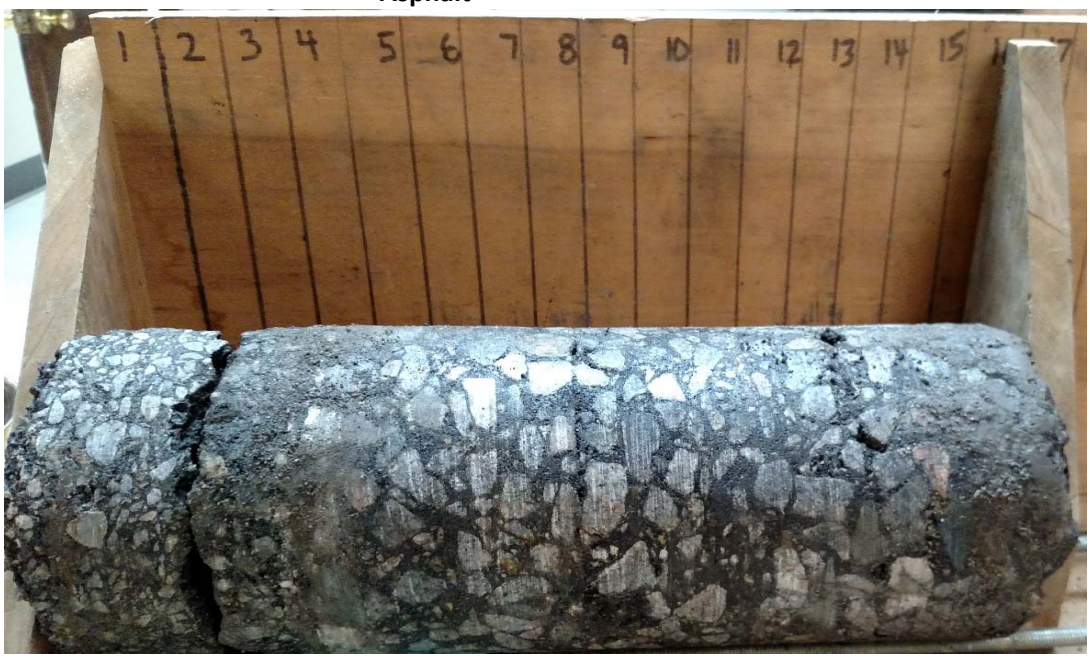
Pavement Section Composition:	Asphalt:	15.5 in.	Void Underlying Pavement	no	(yes/no)
	Aggregate Base Material:	0 in.	Void Depth Below Pavement	N/A	in.
	Cement Treated Base:	0 in.			
	Concrete	0 in.			
Welded Wire Fabric (WWF) or Rebar:		N/A WWF/Rebar/Both			
Embedment Depths from Top of Core:		N/A in.	Rebar		
		N/A in.	Welded Wire Fabric		
Vapor Barrier or Geotextile Fabric:		no (yes/no)			
Description of Vapor Barrier or Geotextile:		N/A			

Subgrade Soil Description: Red-Brown, Poorly Graded SAND with silt(SP-SM), dense

Notes:

Asphalt

Top of Core



PAVEMENT SECTION COMPOSITION AND DESCRIPTION

Project Name:	I-64 High Rise Bridge Pavement Coring and Boring Exploration	Date of Extraction:	1/13/2016
Project Number:	60T-0570	Project Location:	Chesapeake, VA

Boring/Core Identification: C-36

Boring/Core GPS Coordinates:
Latitude: 36.787769
Longitude: -76.416284

General Boring/Core Location: US RT 58, Ramp C, STA 45+00, Right Shoulder

Pavement Section Composition:	Asphalt:	6 in.	Void Underlying Pavement	no	(yes/no)
	Aggregate Base Material:	0 in.	Void Depth Below Pavement	N/A	in.
	Cement Treated Base:	0 in.			
	Concrete	0 in.			
Welded Wire Fabric (WWF) or Rebar:		N/A WWF/Rebar/Both			
Embedment Depths from Top of Core:		N/A in.	Rebar		
		N/A in.	Welded Wire Fabric		
Vapor Barrier or Geotextile Fabric:		no (yes/no)			
Description of Vapor Barrier or Geotextile:		N/A			

Subgrade Soil Description: Gray, Clayey SAND (SC), medium dense

Notes:

Asphalt

Top of Core

Bottom of Core

PAVEMENT SECTION COMPOSITION AND DESCRIPTION

Project Name:	I-64 High Rise Bridge Pavement Coring and Boring Exploration	Date of Extraction:	2/2/2016
Project Number:	60T-0570	Project Location:	Chesapeake, VA

Boring/Core Identification:	Boring/Core GPS Coordinates:	
	Latitude:	36.764837
C-37	Longitude:	-76.266025

General Boring/Core Location: I-64, Eastbound, Right Lane

Pavement Section Composition:	Asphalt:	3.5 in.	Void Underlying Pavement	no	(yes/no)
	Aggregate Base Material:	0 in.	Void Depth Below Pavement	N/A	in.
	Cement Treated Base:	5.5 in.			
	Concrete	9.5 in.			
Welded Wire Fabric (WWF) or Rebar:		#2 WWF/Rebar/Both			
Embedment Depths from Top of Core:		4.5 in.	Rebar		
		N/A in.	Welded Wire Fabric		
Vapor Barrier or Geotextile Fabric:		no (yes/no)			
Description of Vapor Barrier or Geotextile:		N/A			

Subgrade Soil Description: Light Gray, Poorly Graded SAND (SP-SM) with silt, dense

Notes: Cement Treated Base unable to be retrieved.

Top of Core

Asphalt

Concrete

PAVEMENT SECTION COMPOSITION AND DESCRIPTION

Project Name:	I-64 High Rise Bridge Pavement Coring and Boring Exploration	Date of Extraction:	2/2/2016
Project Number:	60T-0570	Project Location:	Chesapeake, VA

Boring/Core Identification: C38

Boring/Core GPS Coordinates:
Latitude: 36.763738
Longitude: -76.266576

General Boring/Core Location: I-64 Westbound, Right Lane

Pavement Section Composition:	Asphalt:	4 in.	Void Underlying Pavement	no	(yes/no)
	Aggregate Base Material:	5 in.	Void Depth Below Pavement	N/A	in.
	Cement Treated Base:	0 in.			
	Concrete	9.5 in.			
Welded Wire Fabric (WWF) or Rebar:		#2 WWF/Rebar/Both			
Embedment Depths from Top of Core:		4 in.	Rebar		
		N/A in.	Welded Wire Fabric		
Vapor Barrier or Geotextile Fabric:		no (yes/no)			
Description of Vapor Barrier or Geotextile:		N/A			

Subgrade Soil Description: Light Gray, Poorly Graded SAND with silt (SP-SM), dense

Notes:

Top of Core

Asphalt

Concrete

SINCE F&R 1881

I-64 High Rise Corridor: Summary of Concrete Compressive Strength Results

F&R Project No: 60-0570

Coring Location	Roadway	Direction	Station	Offset	Diameter (inch)	Area (in2)	Load (lb)	Compressive Strength (psi)	Correction Factor	Compressive Strength (psi)
C2	I-64	EB	350+00	Rt Lane	5.73	25.8	198000	7670	0.9504	7,290
C9	I-64	WB	255+00	Lt Lane	4"x4"x4"	16.0	10060	160960	1.0000	10,060
C23	I-464	NB	14+04	Rt Lane	5.7	25.5	255000	10000	0.9664	9,660
C24	I-464	SB	15+28	Rt Lane	5.66	25.1	235000	9360	1.0000	9,360

I-64 High Rise Corridor: Summary of SPT Jar Sample Testing Results

F&R Project No: 60-0570

Coring Location	Sample Depth Interval (feet)	Soil Sample #	Roadway	Direction	Station	Offset	LL/PI	%Finer 200 sieve	USCS Class	AASHTO Class	NMC (%)
C1	3.1 to 5.1	SS2	I-64	EB	55+00	Rt Lane	NP/NP	13.11	SP-SM	A-2-4	10.0
C2	1.5 to 3.0	SS1	I-64	EB	350+00	Rt Lane	NP/NP	16.94	SM	A-2-4	13.7
C3	1.0 to 3.0	SS1	I-64	EB	150+00	Rt Shoulder	NP/NP	13.72	SM	A-2-4	9.4
C4	1.5 to 3.5	SS1	I-64	EB	250+00	Lt Lane	NP/NP	39.27	SM	A-4	13.1
C5	3.0 to 4.5	SS2	I-64	WB	70+00	Rt Lane	NP/NP	18.09	SM	A-2-4	14.9
C6	4.5 to 6.0	SS3	I-64	WB	115+00	Rt Lane	NP/NP	15.29	SM	A-2-4	10.9
C7	3.0 to 4.5	SS2	I-64	WB	255+00	Rt Lane	NP/NP	8.35	SP-SM	A-3	7.7
C9	3.0 to 4.5	SS2	I-64	WB	255+00	Lt Lane	NP/NP	11.40	SM	A-2-4	11.2
C11	5.2 to 7.2	SS3	I-264	EB	4+00	Rt Lane	NP/NP	15.14	SM	A-2-4	16.4
C12	3.2 to 5.2	SS2	I-264	WB	36+00	Rt Lane	NP/NP	19.82	SM	A-2-4	13.9
C13	3.2 to 5.2	SS2	I-264	EB	46+00	Rt Shoulder	18/5	35.62	SC	A-4	13.5
C14	1.0 to 3.0	SS1	I-264	WB	12+00	Rt Lane	NP/NP	10.80	SP-SM	A-2-4	8.9
C15	1.5 to 3.0	SS1	I-264	WB	30+00	Lt Lane	NP/NP	13.47	SM	A-2-4	12.9
C16	1.0 to 3.0	SS1	I-264	WB	25+00	Lt Shoulder	NP/NP	20.07	SM	A-2-4	16.1
C18	2.5 to 4.5	SS2	I-464	NB	60+00	Rt Shoulder	NP/NP	19.78	SM	A-2-4	14.0
C19	3.8 to 5.8	SS2	I-464	NB	40+00	Lt Lane	NP/NP	4.67	SP	A-3	10.2
C20	3.0 to 5.0	SS2	I-464	SB	4+00	Rt Lane	NP/NP	22.85	SM	A-2-4	10.7
C21	2.5 to 4.5	SS2	I-464	SB	35+00	Rt Shoulder	NP/NP	4.19	SP	A-3	6.3
C22	1.1 to 3.1	SS1	I-464	SB	10+00	Lt Lane	NP/NP	27.54	SM	A-2-4	13.4
C24	1.3 to 3.3	SS1	I-464	SB	15+28	Rt Lane	NP/NP	19.92	SM	A-2-4	9.8
C25	1.0 to 3.0	SS1	I-664	NB	75+00	Rt Lane	NP/NP	13.53	SM	A-2-4	11.4
C26	3.0 to 5.0	SS2	I-664	NB	120+00	Lt Lane	NP/NP	10.71	SP-SM	A-2-4	13.0
C27	1.5 to 3.5	SS1	I-664	SB	85+00	Rt Lane	NP/NP	12.37	SM	A-2-4	10.0
C28	3.4 to 5.4	SS2	I-664	SB	85+00	Rt Shoulder	NP/NP	34.52	SM	A-2-4	10.5
C29	5.0 to 7.0	SS3	US 58	Ramp A	15+00	Rt Lane	NP/NP	18.05	SM	A-2-4	20.8
C31	2.5 to 4.5	SS2	US 58	Ramp A	25+00	Rt Shoulder	NP/NP	14.43	SM	A-2-4	17.8
C32	0.5 to 2.5	SS1	US 58	Ramp A	20+00	Lt Lane	NP/NP	17.32	SM	A-2-4	13.3
C32	4.5 to 6.5	SS3	US 58	Ramp A	20+00	Lt Lane	NP/NP	14.19	SM	A-2-4	21.3
C33	3.0 to 5.0	SS1	US 58	Ramp B	15+00	Rt Lane	NP/NP	22.44	SM	A-2-4	13.3
C34	3.0 to 5.0	SS2	US 58	Ramp B	45+00	Lt Lane	NP/NP	26.79	SM	A-2-4	14.4
C35	1.3 to 3.3	SS1	US 58	Ramp C	30+00	Rt Lane	NP/NP	6.45	SP-SM	A-1-b	12.7
C36	2.5 to 4.5	SS2	US 58	Ramp C	45+00	Rt Shoulder	18/6	43.03	SC	A-4	10.7
C37	1.5 to 3.0	SS1	I-64	EB	N/A	Rt Lane	NP/NP	8.03	SP-SM	A-3	10.0
C37	3.0 to 4.5	SS2	I-64	EB	N/A	Rt Lane	NP/NP	5.79	SP-SM	A-3	14.5
C37	4.5 to 6.0	SS3	I-64	EB	N/A	Rt Lane	20/7	58.49	CL	A-4	13.0
C38	3.0 to 4.5	SS2	I-64	WB	N/A	Rt Lane	NP/NP	11.49	SP-SM	A-2-4	14.3
C38	4.5 to 6.0	SS3	I-64	WB	N/A	Rt Lane	24/11	61.81	CL	A-6	15.8

I-64 High Rise Corridor: Summary of Bulk Sample Laboratory Testing Results

F&R Project No: 60-0570

Coring Location	Sample Depth Interval (feet)	Roadway	Direction	Station	Offset	LL/PI	%Finer 200 sieve	USCS Class	AASHTO Class	Swell (%)	NMC (%)	MDD (pcf)	OMC (%)	CBR at 0.1"
C-1	1.1 to7.1	I-64	EB	55+00	Rt Lane	NP/NP	11.32	SM-SC	A-2-4	0.0	10.0	109.4	12.1	30.4
C-8	1.1 to 7.1	I-64	WB	420+00	Rt Lane	NP/NP	20.75	SM	A-2-4	-0.1	18.3	119.7	10.2	43.1
C-10	1.5 to 6.0	I-64	WB	150+00	Lt Lane	22/4	27.63	SC	A-2-4	0.0	23.9	120.0	13.9	12.5
C-11	1.2 to 7.2	I-264	EB	4+00	Rt Lane	NP/NP	16.60	SM	A-2-4	-0.1	13.5	114.4	13.1	37.5
C-13	1.2 to 7.2	I-264	EB	46+00	Rt Shoulder	NP/NP	15.65	SM	A-2-4	0.0	13.7	111.2	10.6	43.1
C-20	1.3 to 7.0	I-464	SB	4+00	Rt Lane	NP/NP	17.07	SM	A-2-4	0.0	11.2	115.9	9.9	48.5
C-23	1.5 to 7.5	I-464	NB	14+04	Rt Lane	NP/NP	2.64	SP	A-3	-0.1	8.9	108.9	11.2	30.1
C-25	1.0 to 7.0	I-664	NB	75+00	Rt Lane	NP/NP	14.07	SM	A-2-4	0.0	10.8	112.2	12.0	39.9
C-26	1.0 to 7.0	I-664	NB	120+00	Lt Lane	NP/NP	12.35	SM	A-2-4	0.0	10.4	110.9	11.0	39.2
C-32	0.5 to 6.5	US 58	Ramp A	20+00	Lt Lane	NP/NP	18.42	SM	A-2-4	0.0	12.5	118.4	11.2	43.4

MOISTURE/DENSITY RELATIONSHIP

Curve No.: 1

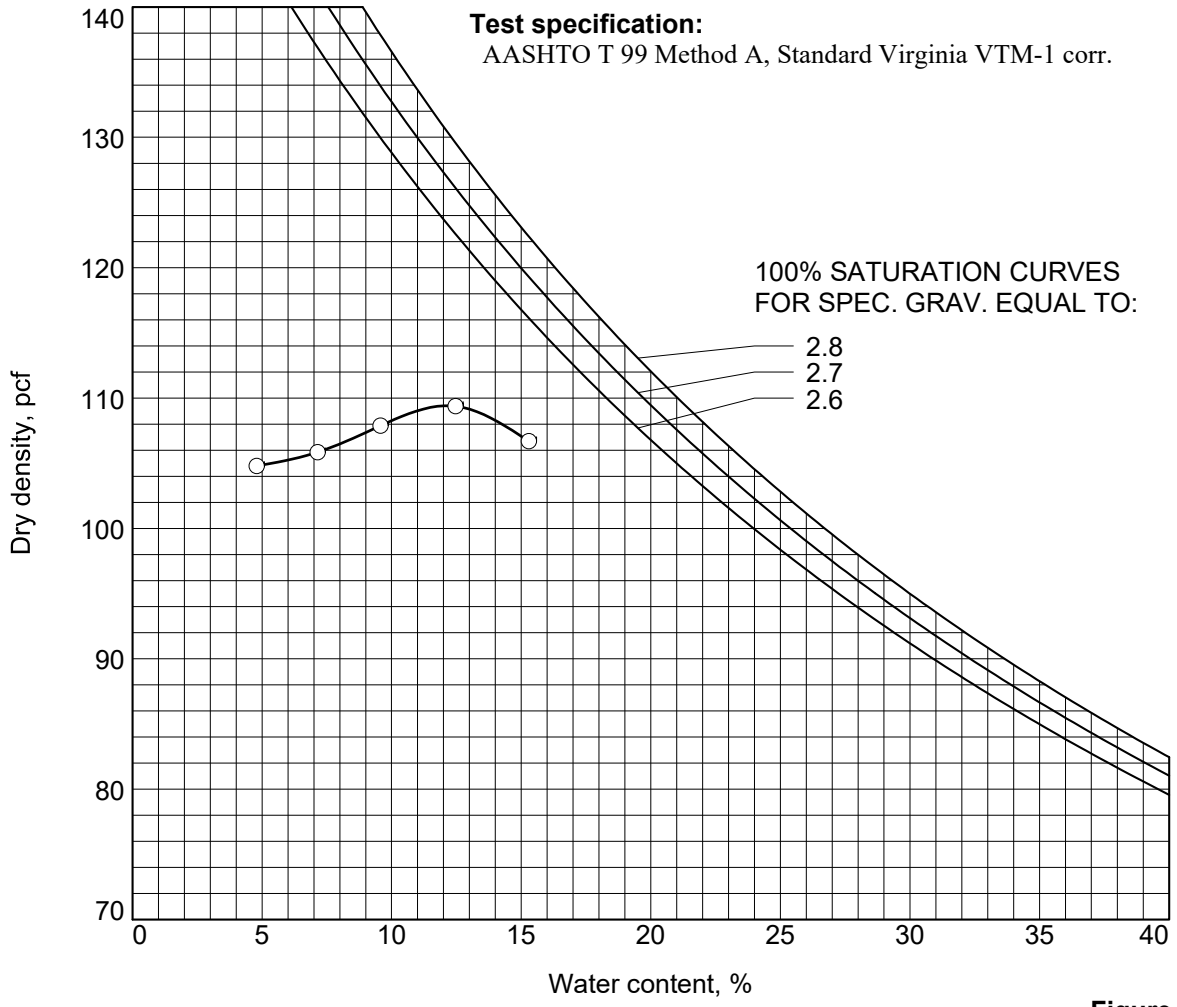
Project No.: 60T0570 **Date:** 2-1-16
Project: I-64 High Rise Corridor Pavement
Client: AMEC
Location: Chesapeake, Virginia
Sample Number: 1 [Control #123100]
Remarks: N/A

MATERIAL DESCRIPTION

Description: Sample Marked C-1 [Brown Silty Sand]

Classifications - **USCS:** SM **AASHTO:**
Nat. Moist. = 10.0 % **Sp.G. =**
Liquid Limit = N/P **Plasticity Index =** N/P
%<No.10 = 96.8 % **%<No.40 =** 88.1 %
%<No.60 = **%<No.200 =** 11.0 %

TEST RESULTS
Maximum dry density = 109.4 pcf
Optimum moisture = 12.1 %



Figure

FROEHLING & ROBERTSON, INC.

MOISTURE/DENSITY RELATIONSHIP

Curve No.: 2

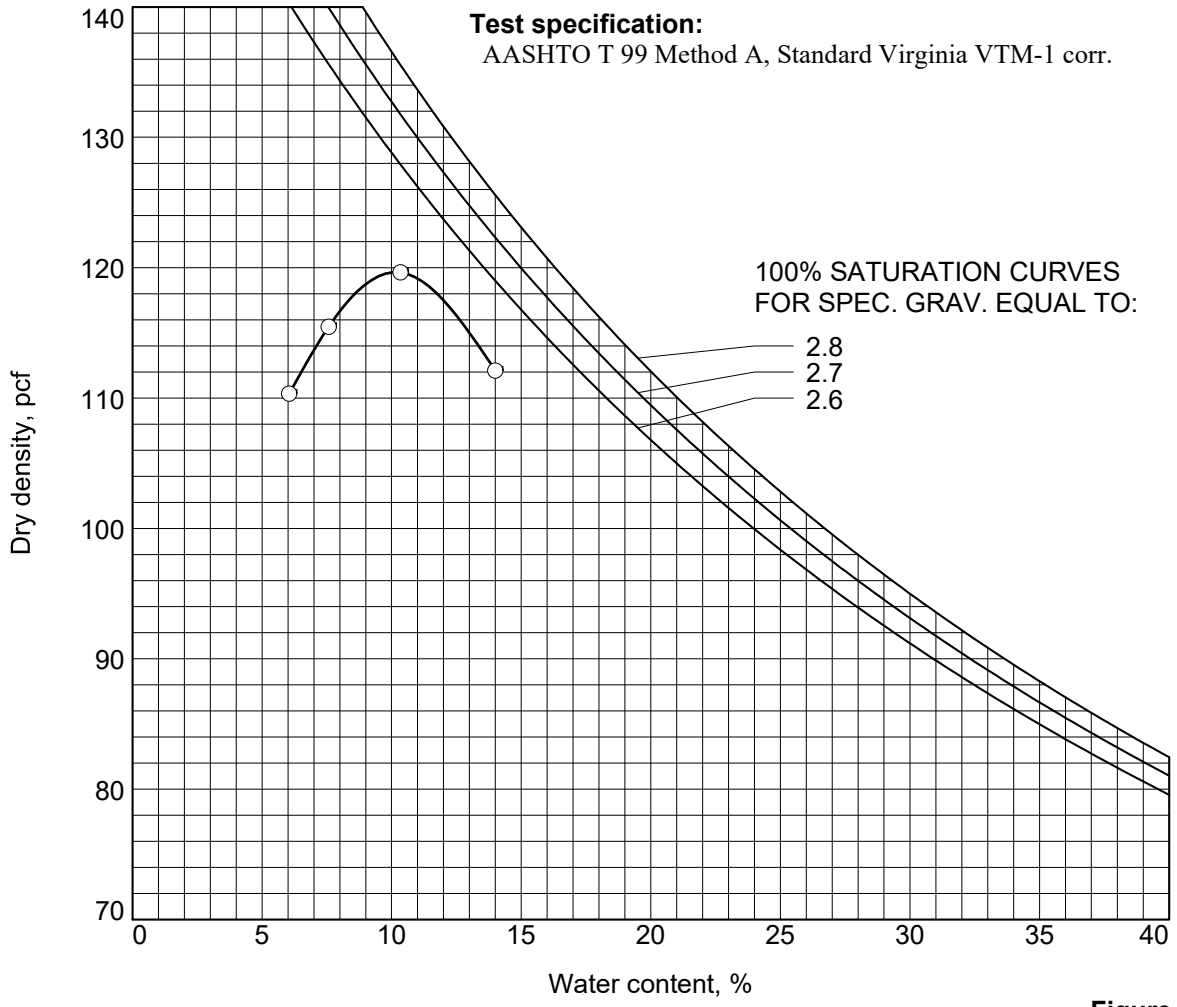
Project No.: 60T0570 **Date:** 2-2-16
Project: I-64 High Rise Corridor Pavement
Client: AMEC
Location: Chesapeake, Virginia
Sample Number: 2 [Control #123100]
Remarks: N/A

MATERIAL DESCRIPTION

Description: Sample Marked C-8 [Brown, Fine Silty Sand]

Classifications - **USCS:** SM **AASHTO:**
Nat. Moist. = 18.3 % **Sp.G. =**
Liquid Limit = N/P **Plasticity Index =** N/P
%<No.10 = 98.1 % **%<No.40 =** 89.1 %
%<No.60 = **%<No.200 =** 20.6 %

TEST RESULTS
Maximum dry density = 119.7 pcf
Optimum moisture = 10.2 %



Figure

FROEHLING & ROBERTSON, INC.

MOISTURE/DENSITY RELATIONSHIP

Curve No.: 3

Project No.: 60T0570 **Date:** 2-1-16
Project: I-64 High Rise Corridor Pavement
Client: AMEC
Location: Chesapeake, Virginia
Sample Number: 3 [Control #123100]
Remarks: N/A

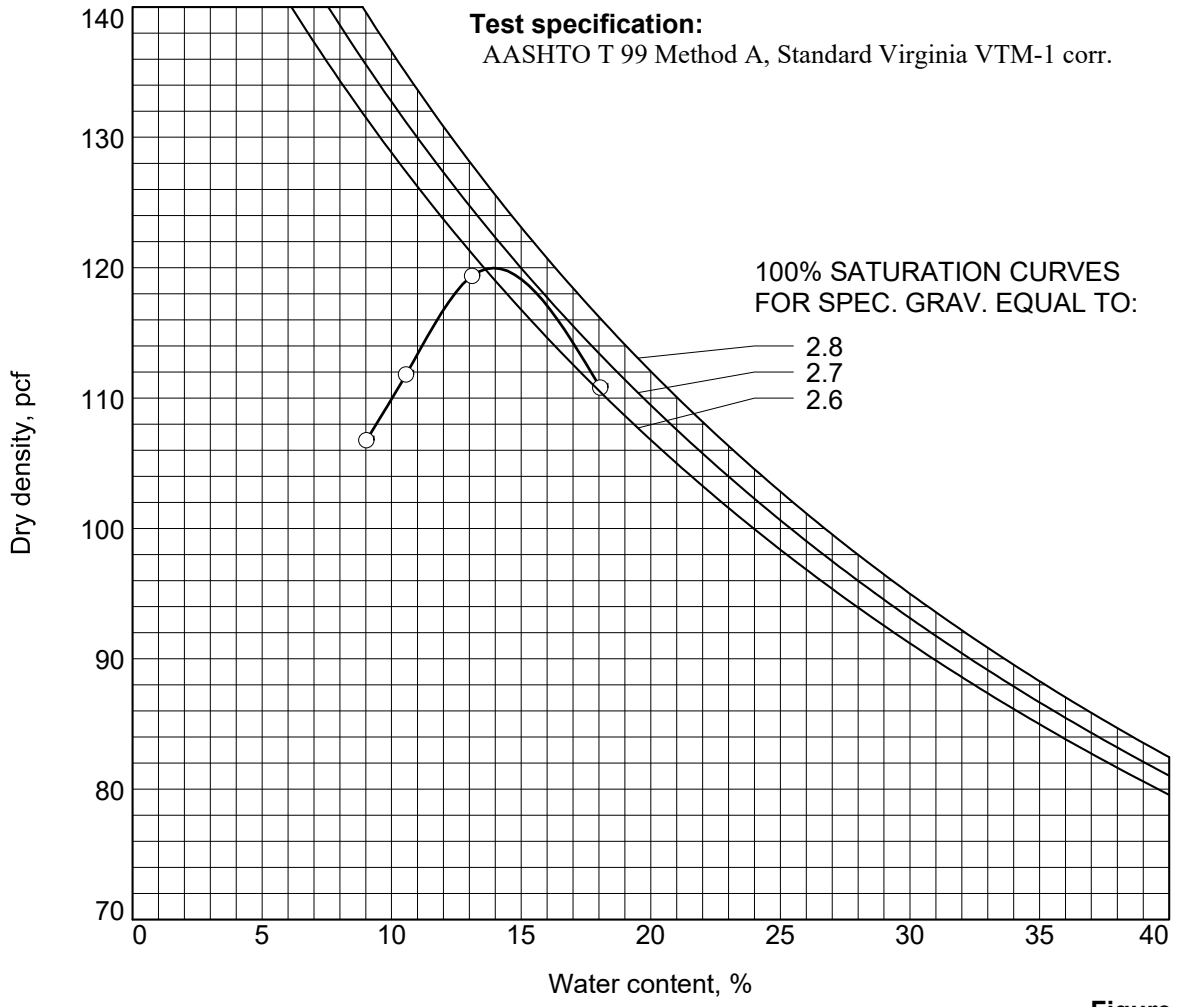
MATERIAL DESCRIPTION

Description: Sample Marked C-10 [Gray, Clayey Sand]

Classifications - **USCS:** SC **AASHTO:**

Nat. Moist. = 23.9 % **Sp.G. =**
Liquid Limit = 22 **Plasticity Index =** 4
%<No.10 = 94.9 % **%<No.40 =** 71.2 %
%<No.60 = **%<No.200 =** 27.5 %

TEST RESULTS
Maximum dry density = 120.0 pcf
Optimum moisture = 13.9 %



Figure

FROEHLING & ROBERTSON, INC.

MOISTURE/DENSITY RELATIONSHIP

Curve No.: 4

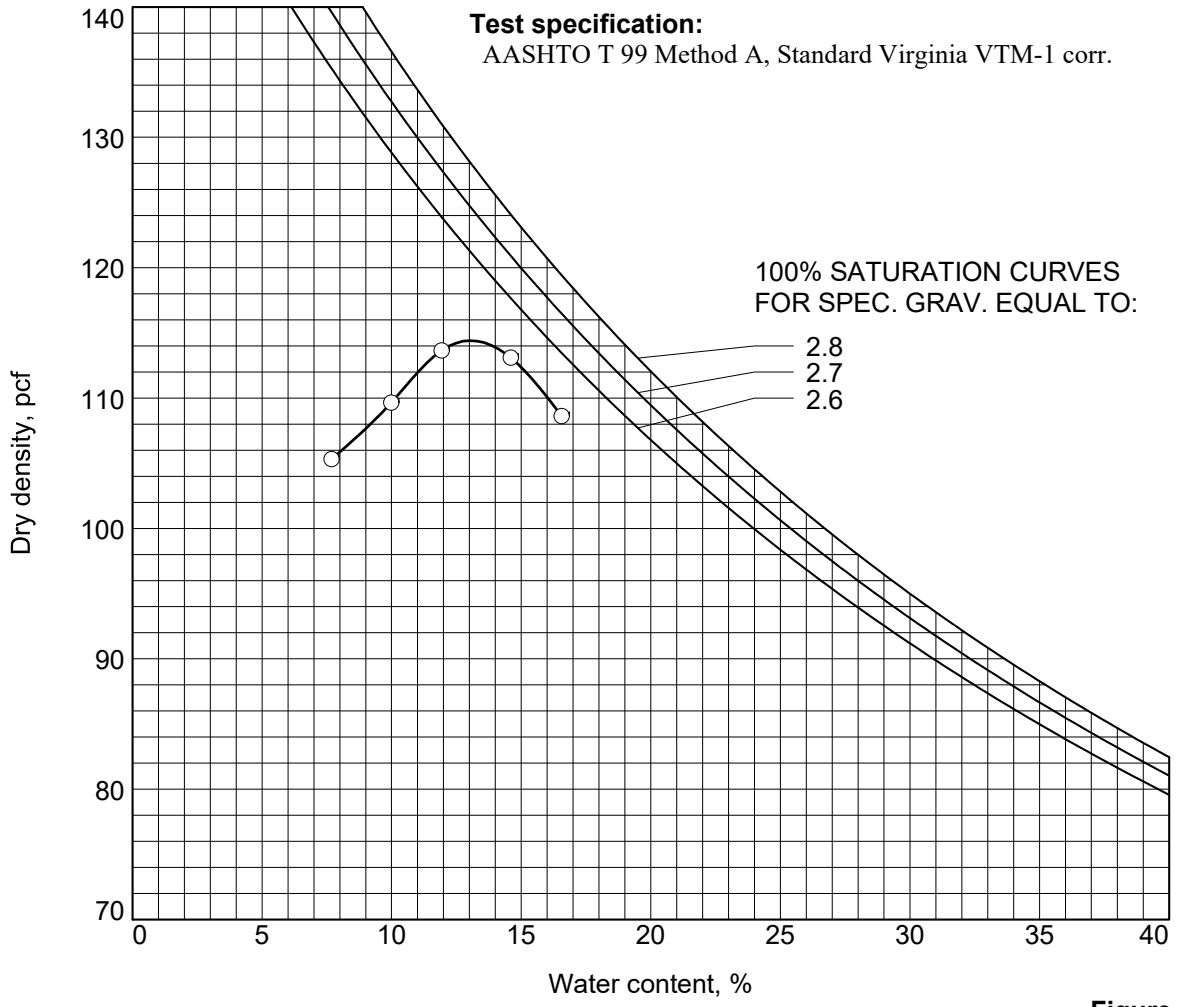
Project No.: 60T0570 **Date:** 2-3-16
Project: I-64 High Rise Corridor Pavement
Client: AMEC
Location: Chesapeake, Virginia
Sample Number: 4 [Control #123100]
Remarks: N/A

MATERIAL DESCRIPTION

Description: Sample Marked C-11 [Gray-Brown, Silty Sand]

Classifications - **USCS:** SM **AASHTO:**
Nat. Moist. = 13.5 % **Sp.G. =**
Liquid Limit = N/P **Plasticity Index =** N/P
%<No.10 = 81.0 % **%<No.40 =** 72.2 %
%<No.60 = **%<No.200 =** 16.2 %

TEST RESULTS
Maximum dry density = 114.4 pcf
Optimum moisture = 13.1 %



Figure

FROEHLING & ROBERTSON, INC.

MOISTURE/DENSITY RELATIONSHIP

Curve No.: 5

Project No.: 60T0570 **Date:** 2-2-16
Project: I-64 High Rise Corridor Pavement
Client: AMEC
Location: Chesapeake, Virginia
Sample Number: 5 [Control #123100]
Remarks: N/A

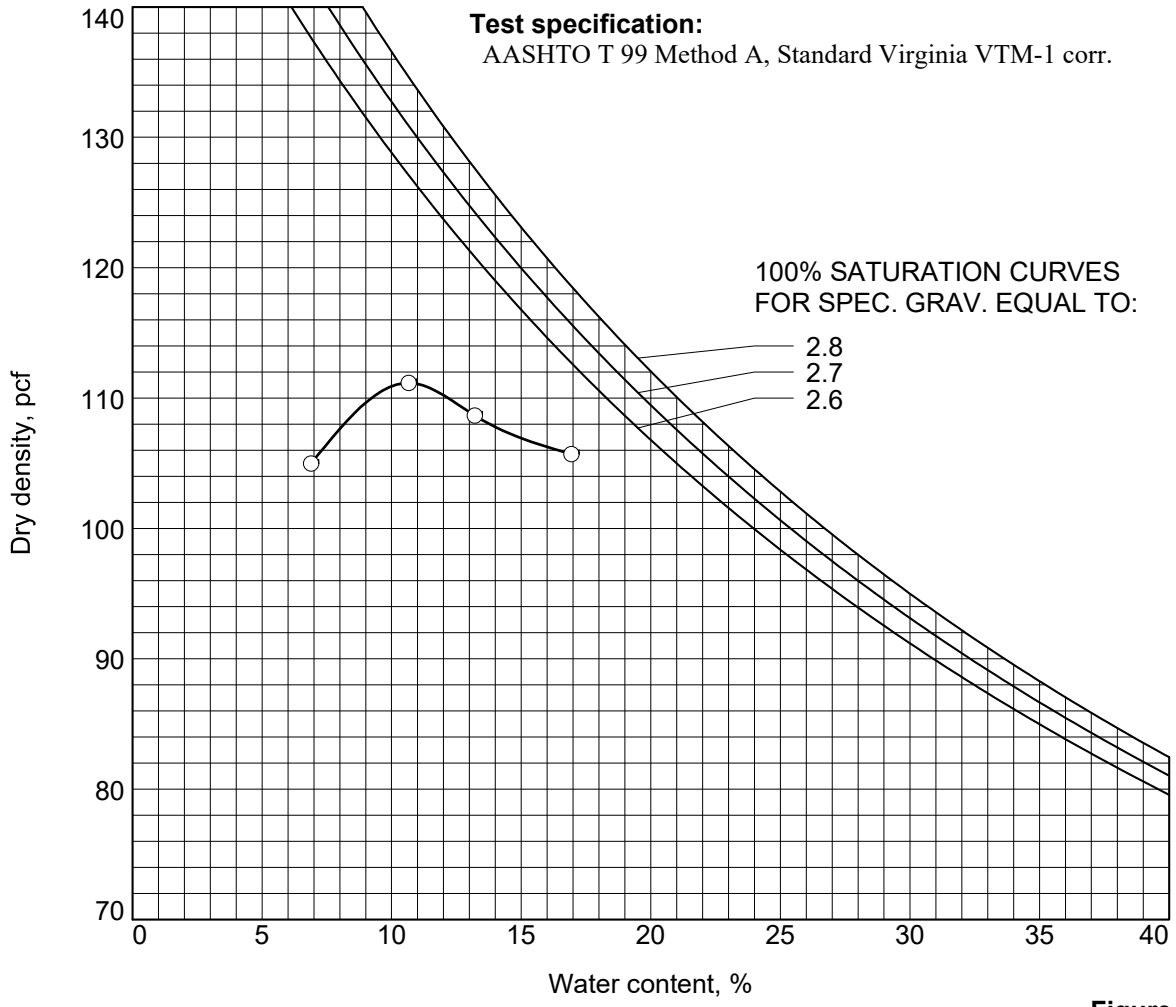
MATERIAL DESCRIPTION

Description: Sample Marked C-13 [Gray, Silty Sand]

Classifications - **USCS:** SM **AASHTO:**

Nat. Moist. = 13.7 % **Sp.G. =**
Liquid Limit = N/P **Plasticity Index =** N/P
%<No.10 = 95.4 % **%<No.40 =** 91.5 %
%<No.60 = **%<No.200 =** 15.4 %

TEST RESULTS
Maximum dry density = 111.2 pcf
Optimum moisture = 10.6 %



Figure

FROEHLING & ROBERTSON, INC.

MOISTURE/DENSITY RELATIONSHIP

Curve No.: 6

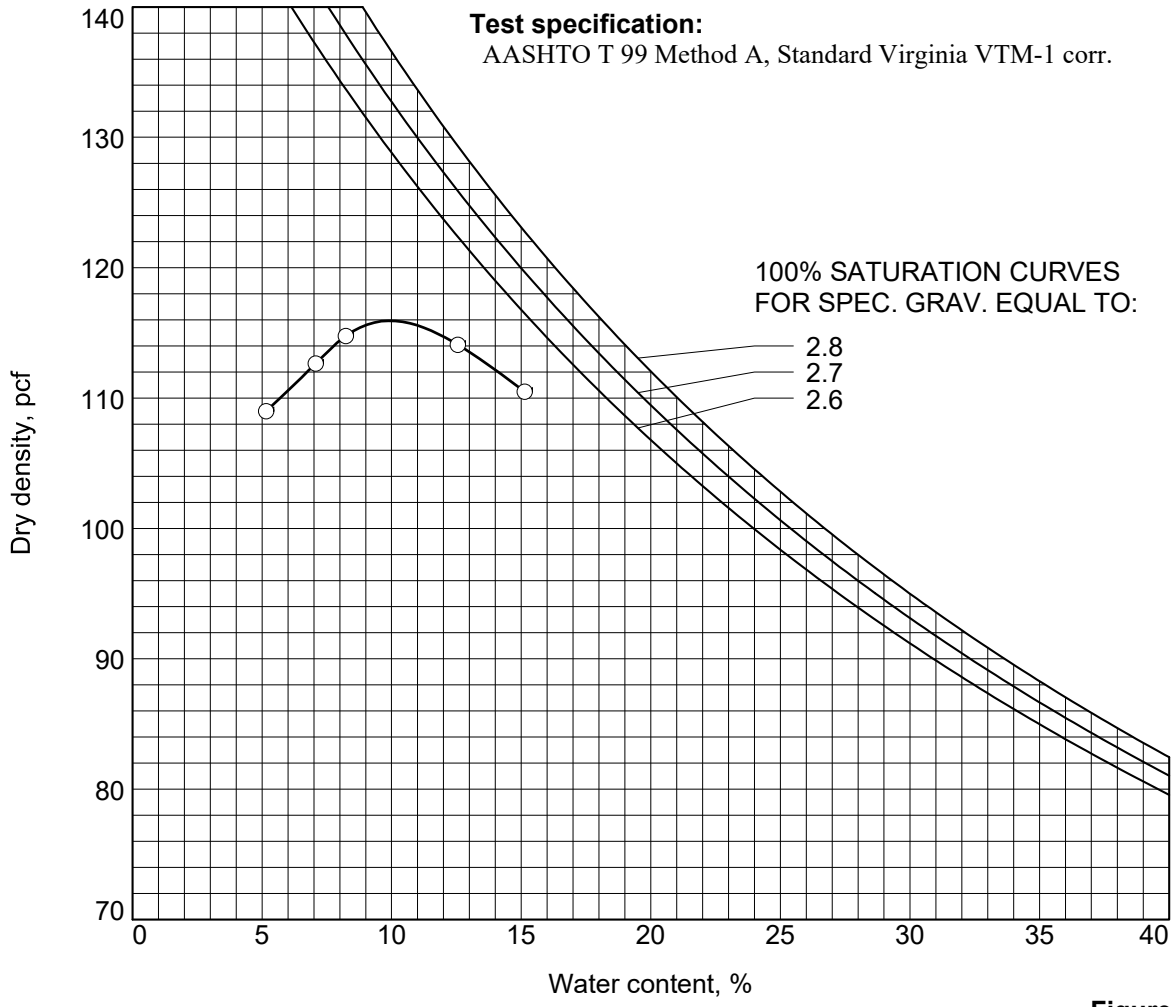
Project No.: 60T0570 **Date:** 2-5-16
Project: I-64 High Rise Corridor Pavement
Client: AMEC
Location: Chesapeake, Virginia
Sample Number: 6 [Control #123100]
Remarks: N/A

MATERIAL DESCRIPTION

Description: Sample Marked C-20 [Light Brown-Gray, Silty Sand]

Classifications - **USCS:** SM **AASHTO:**
Nat. Moist. = 11.2 % **Sp.G. =**
Liquid Limit = N/P **Plasticity Index =** N/P
%<No.10 = 97.0 % **%<No.40 =** 86.3 %
%<No.60 = **%<No.200 =** 16.9 %

TEST RESULTS
Maximum dry density = 115.9 pcf
Optimum moisture = 9.9 %



Figure

FROEHLING & ROBERTSON, INC.

MOISTURE/DENSITY RELATIONSHIP

Curve No.: 7

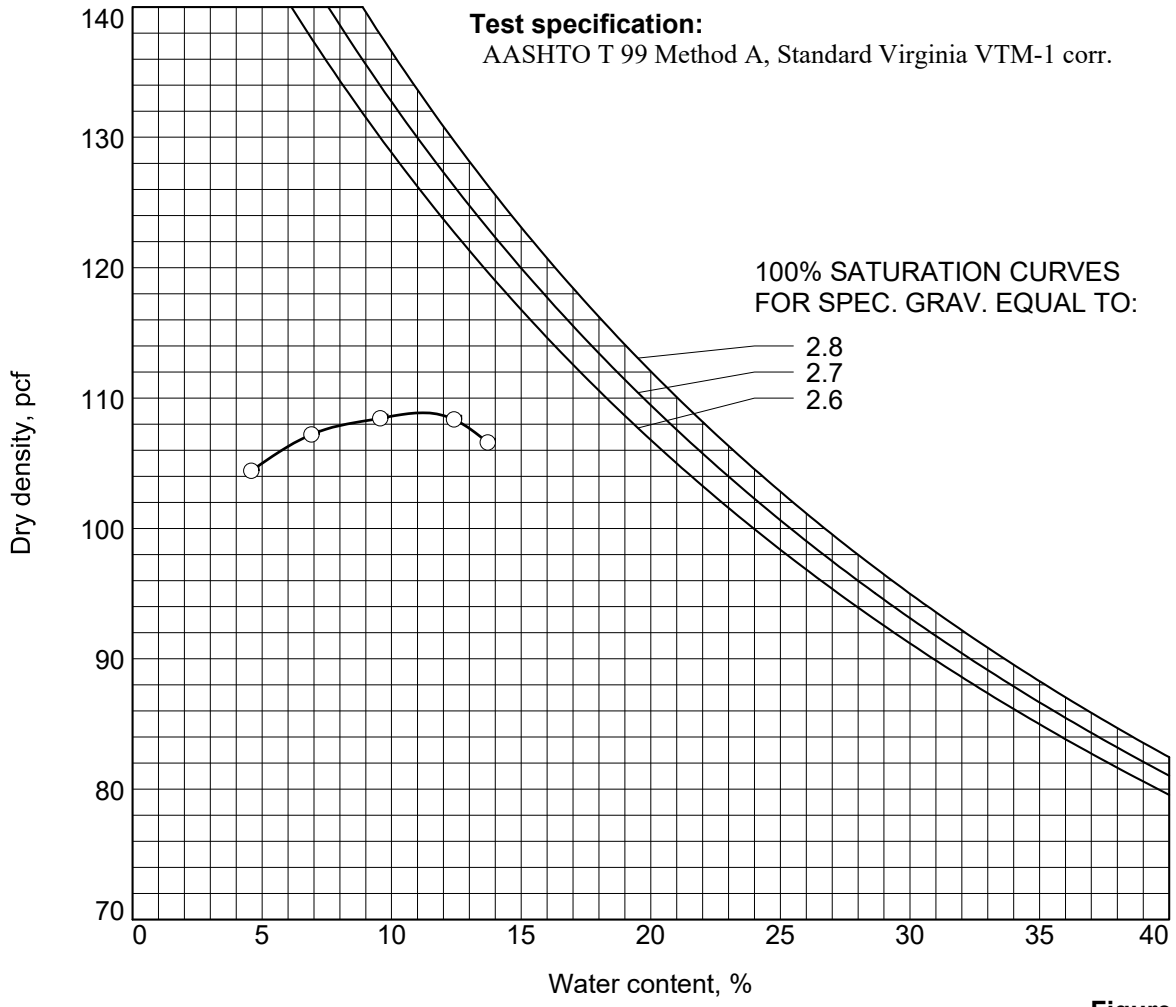
Project No.: 60T0570 **Date:** 2-5-16
Project: I-64 High Rise Corridor Pavement
Client: AMEC
Location: Chesapeake, Virginia
Sample Number: 7 [Control #123100]
Remarks: N/A

MATERIAL DESCRIPTION

Description: Sample Marked C-23 [Brown, Poorly Graded Sand]

Classifications - **USCS:** SM **AASHTO:**
Nat. Moist. = 8.9 % **Sp.G. =**
Liquid Limit = N/P **Plasticity Index =** N/P
%<No.10 = 71.3 % **%<No.40 =** 53.8 %
%<No.60 = **%<No.200 =** 2.5 %

TEST RESULTS
Maximum dry density = 108.9 pcf
Optimum moisture = 11.2 %



Figure

FROEHLING & ROBERTSON, INC.

MOISTURE/DENSITY RELATIONSHIP

Curve No.: 8

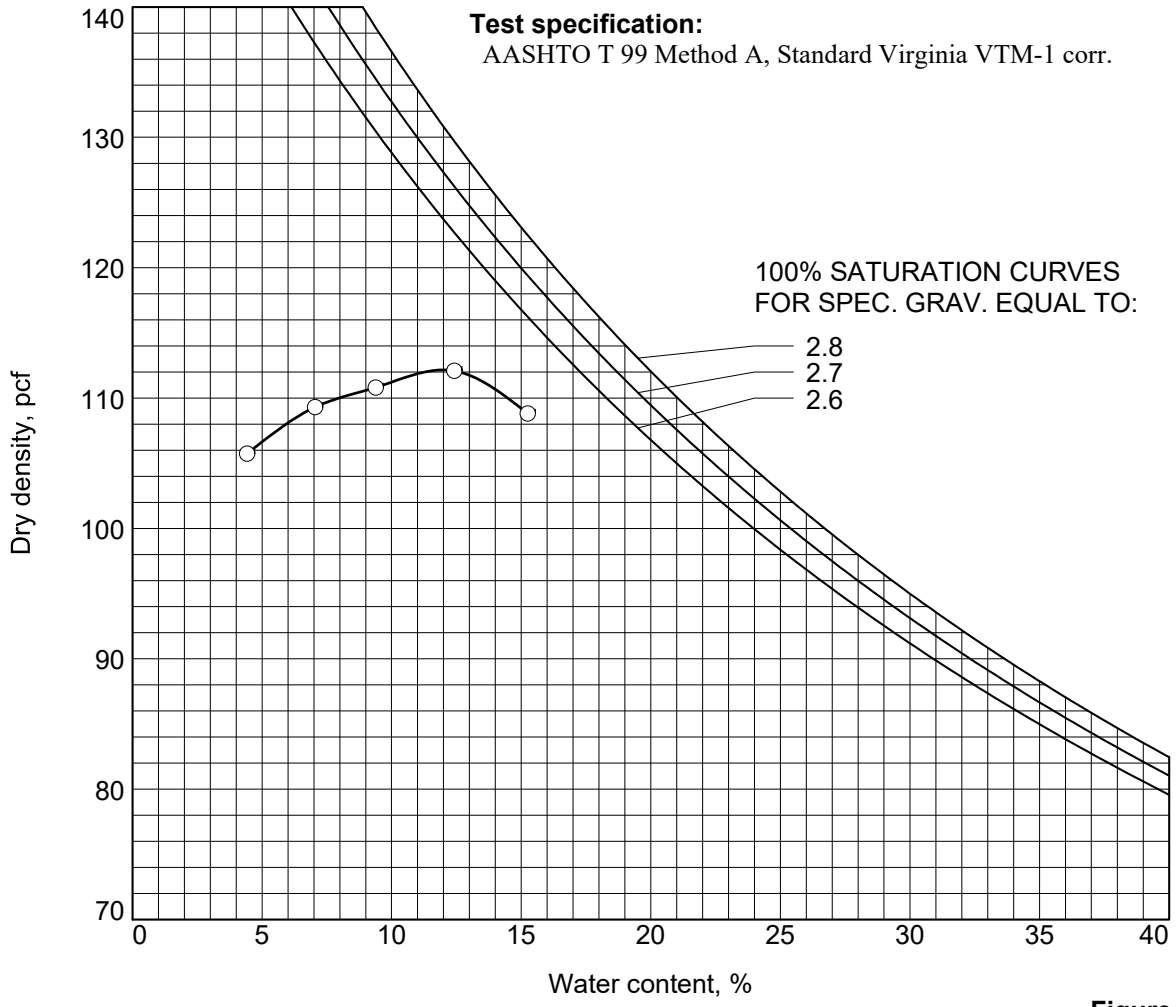
Project No.: 60T0570 **Date:** 2-5-16
Project: I-64 High Rise Corridor Pavement
Client: AMEC
Location: Chesapeake, Virginia
Sample Number: 8 [Control #123100]
Remarks: N/A

MATERIAL DESCRIPTION

Description: Sample Marked C-25 [Gray-Brown, Silty Sand]

Classifications - **USCS:** SM **AASHTO:**
Nat. Moist. = 10.8 % **Sp.G. =**
Liquid Limit = N/P **Plasticity Index =** N/P
%<No.10 = 88.1 % **%<No.40 =** 78.5 %
%<No.60 = **%<No.200 =** 13.9 %

TEST RESULTS
Maximum dry density = 112.2 pcf
Optimum moisture = 12.0 %



Figure

FROEHLING & ROBERTSON, INC.

MOISTURE/DENSITY RELATIONSHIP

Curve No.: 9

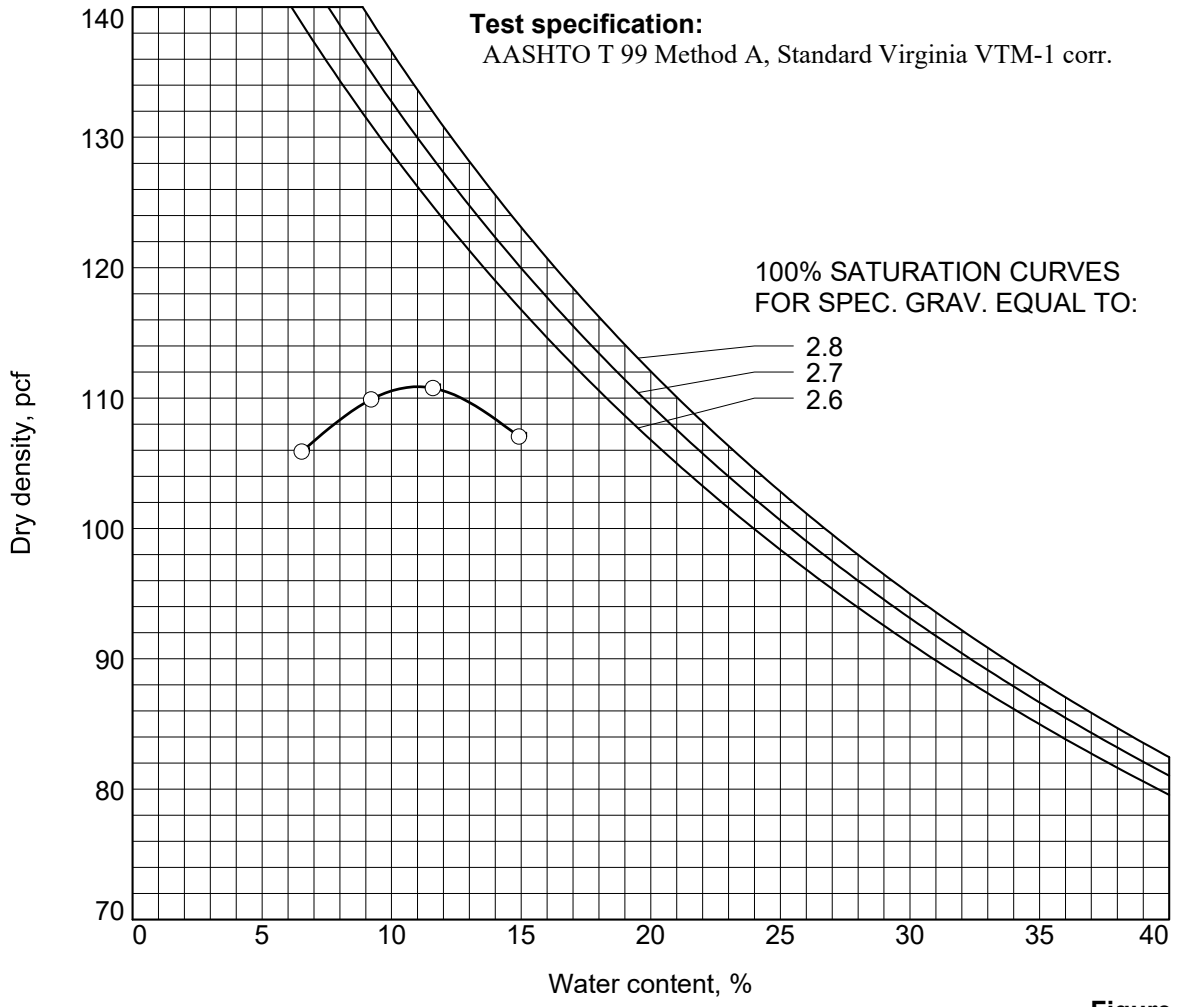
Project No.: 60T0570 **Date:** 2-4-16
Project: I-64 High Rise Corridor Pavement
Client: AMEC
Location: Chesapeake, Virginia
Sample Number: 9 [Control #123100]
Remarks: N/A

MATERIAL DESCRIPTION

Description: Sample Marked C-26 [Brown-Gray, Silty Sand]

Classifications - **USCS:** SM **AASHTO:**
Nat. Moist. = 10.4 % **Sp.G. =**
Liquid Limit = NP **Plasticity Index =** NP
%<No.10 = 93.6 % **%<No.40 =** 84.3 %
%<No.60 = **%<No.200 =** 12.2 %

TEST RESULTS
Maximum dry density = 110.9 pcf
Optimum moisture = 11.0 %



Figure

FROEHLING & ROBERTSON, INC.

MOISTURE/DENSITY RELATIONSHIP

Curve No.: 10

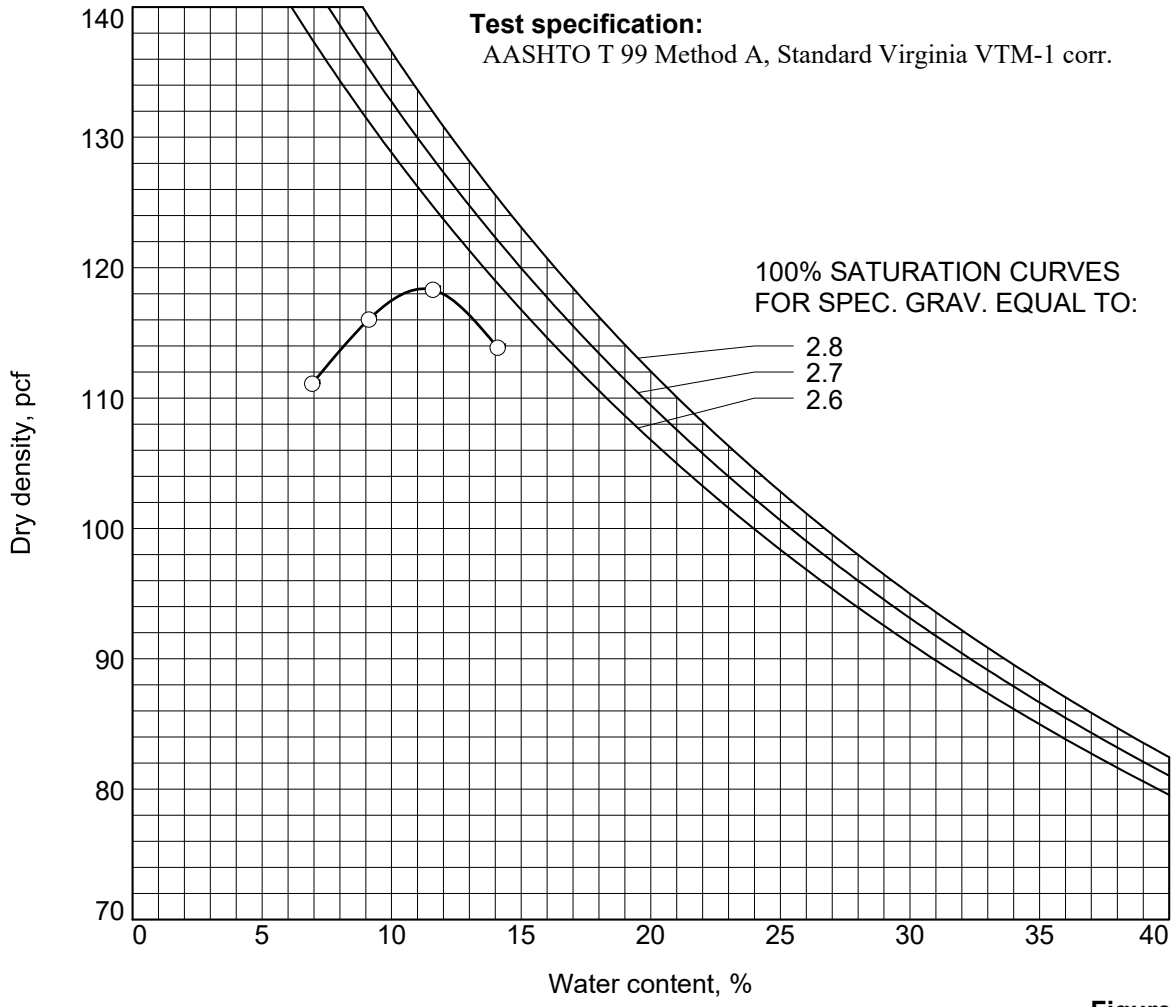
Project No.: 60T0570 **Date:** 2-5-16
Project: I-64 High Rise Corridor Pavement
Client: AMEC
Location: Chesapeake, Virginia
Sample Number: 10 [Control #123100]
Remarks: N/A

MATERIAL DESCRIPTION

Description: Sample Marked C-32 [Gray,Silty Sand]

Classifications - **USCS:** SM **AASHTO:**
Nat. Moist. = 12.5 % **Sp.G. =**
Liquid Limit = N/P **Plasticity Index =** N/P
%<No.10 = 84.8 % **%<No.40 =** 76.7 %
%<No.60 = **%<No.200 =** 18.3 %

TEST RESULTS
Maximum dry density = 118.4 pcf
Optimum moisture = 11.2 %



Figure

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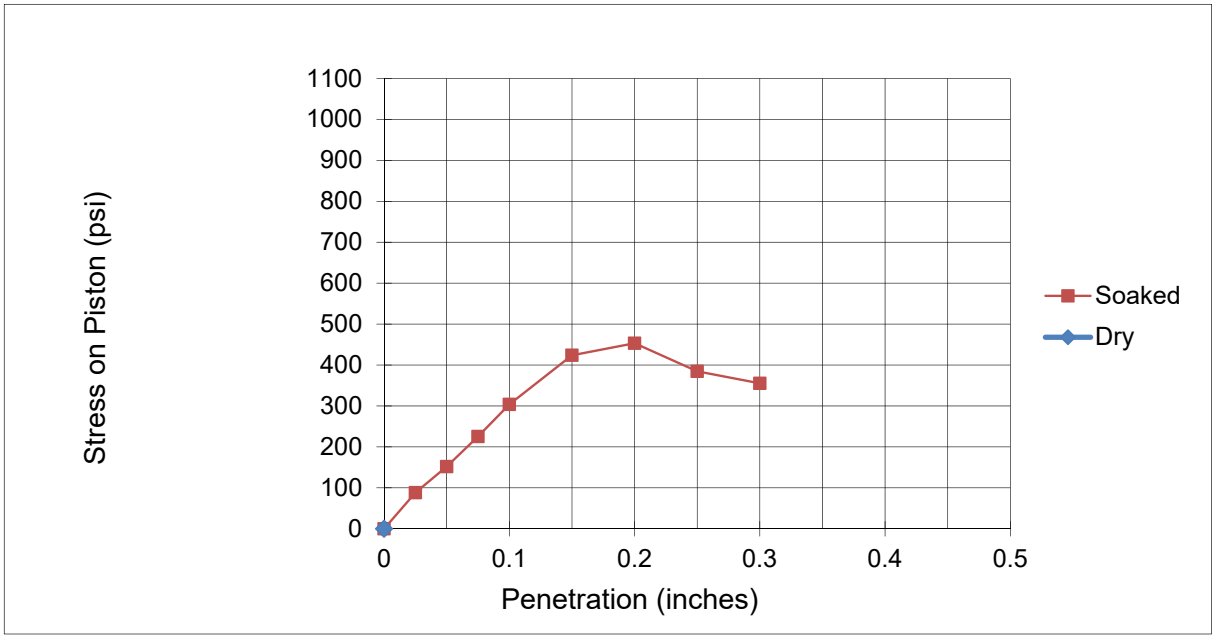
California Bearing Ratio

Project No.:	60T-570	Test Date:	2/15/2016
Client:	AMEC	Tested By:	C. Mallory
Project:	I-64 High Rise Corridor Pavement	Compaction method: ASTM D1883/AASHTO T193/VTM8	
Location:	Chesapeake, Virginia	X	Soaked CBR
		X	65 Blows



CBR @ 0.1 in. penetration (wet):	30.4
Swell (%):	0.0
Dry Density Before Soaking (pcf):	106.0
Dry Density After Soaking (pcf):	107.4
Retained on 3/4 inch sieve (%):	0.0
Surcharge Weight (pounds):	10.0
Moisture Content Before Soaking (%):	11.2%
Moisture Content After Soak, Top in. (%):	15.2%
Moisture Content After Soak, Ave. (%):	14.7%

Maximum Dry Density (pcf):	109.4
Optimum Moisture Content (%):	12.1
Visual Description:	Light Brown-Gray Silty Sand
F&R Lab No.:	123100
Source:	C1

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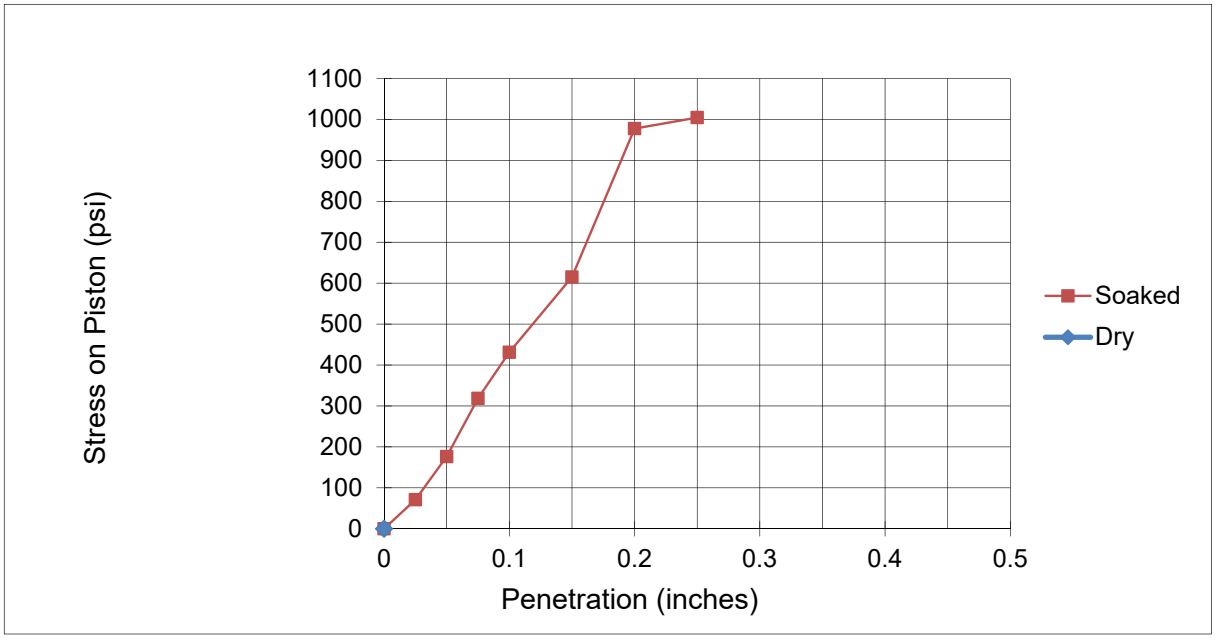
California Bearing Ratio

Project No.:	60T-570	Test Date:	2/9/2016
Client:	AMEC	Tested By:	C. Mallory
Project:	I-64 High Rise Corridor Pavement	Compaction method: ASTM D1883/AASHTO T193/VTM8	
Location:	Chesapeake, Virginia	X	Soaked CBR
		X	65 Blows



CBR @ 0.1 in. penetration (wet):	43.1		
		Maximum Dry Density (pcf):	119.7
Swell (%):	-0.1	**Optimum Moisture Content (%):**	10.2
Dry Density Before Soaking (pcf):	119.5		
Dry Density After Soaking (pcf):	120.2	**Visual Description:**	
Retained on 3/4 inch sieve (%):	0.0	Brown, fine Silty SAND	
Surcharge Weight (pounds):	10.0		
		F&R Lab No.:	123100
Moisture Content Before Soaking (%):	9.6%		
Moisture Content After Soak, Top in. (%):	11.4%	**Source:**	C8
Moisture Content After Soak, Ave. (%):	10.7%		

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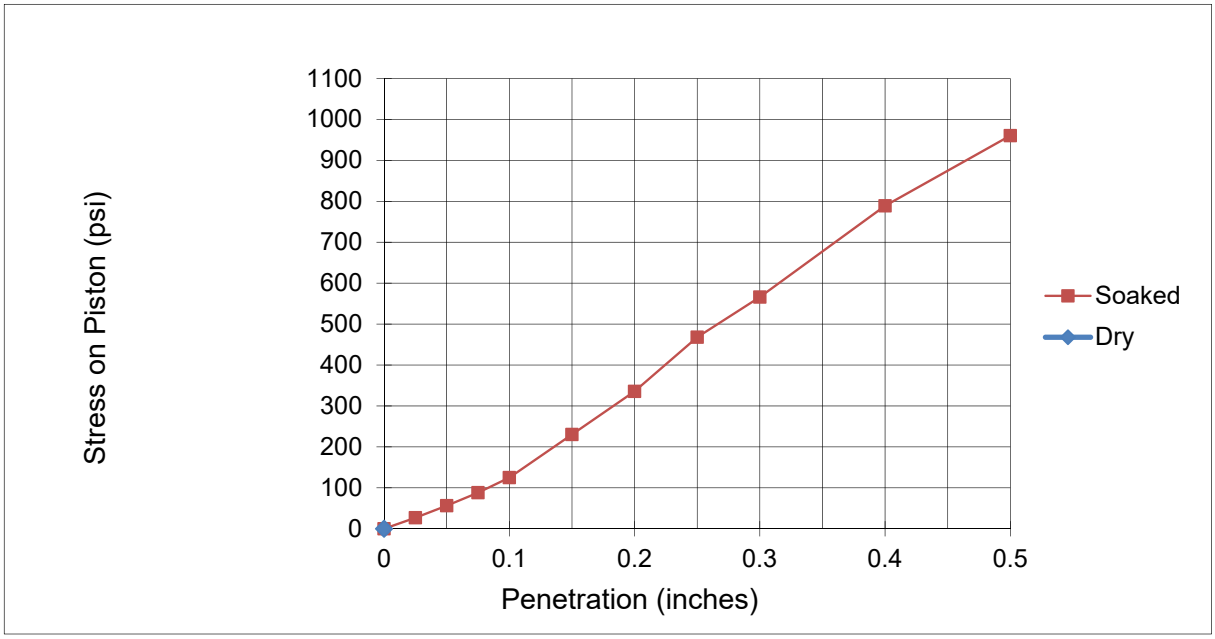
California Bearing Ratio

Project No.:	60T-570	Test Date:	2/9/2016
Client:	AMEC	Tested By:	C. Mallory
Project:	I-64 High Rise Corridor Pavement	Compaction method: ASTM D1883/AASHTO T193/VTM8	
Location:	Chesapeake, Virginia	X	Soaked CBR
		X	65 Blows



CBR @ 0.1 in. penetration (wet):	12.5		
		Maximum Dry Density (pcf):	120.0
Swell (%):	0.0	**Optimum Moisture Content (%):**	13.9
Dry Density Before Soaking (pcf):	120.0		
Dry Density After Soaking (pcf):	121.1	**Visual Description:**	
Retained on 3/4 inch sieve (%):	0.0	Gray, Clayey SAND	
Surcharge Weight (pounds):	10.0		
		F&R Lab No.:	123100
Moisture Content Before Soaking (%):	13.7%		
Moisture Content After Soak, Top in. (%):	14.1%	**Source:**	C10
Moisture Content After Soak, Ave. (%):	13.4%		

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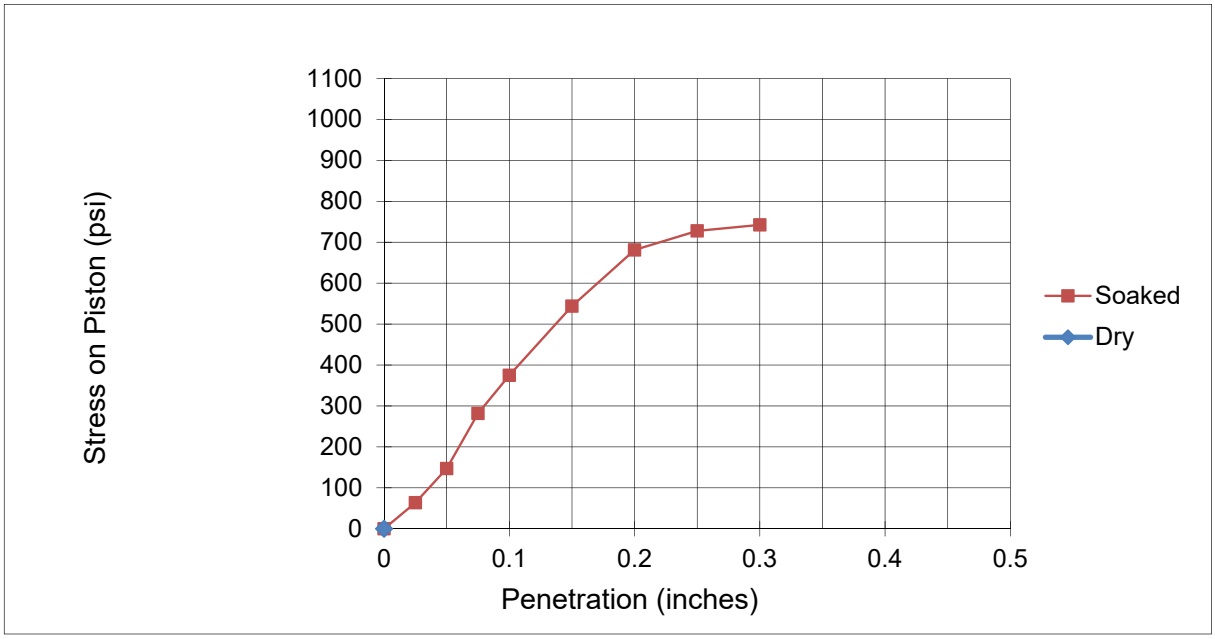
California Bearing Ratio

Project No.:	60T-570	Test Date:	2/15/2016
Client:	AMEC	Tested By:	C. Mallory
Project:	I-64 High Rise Corridor Pavement	Compaction method: ASTM D1883/AASHTO T193/VTM8	
Location:	Chesapeake, Virginia	X	Soaked CBR
		X	65 Blows



CBR @ 0.1 in. penetration (wet):	37.5		
		Maximum Dry Density (pcf):	114.4
Swell (%):	-0.1	**Optimum Moisture Content (%):**	13.1
Dry Density Before Soaking (pcf):	113.5		
Dry Density After Soaking (pcf):	113.4	**Visual Description:**	
Retained on 3/4 inch sieve (%):	0.0	Gray-Brown, Silty SAND	
Surcharge Weight (pounds):	10.0		
		F&R Lab No.:	123100
Moisture Content Before Soaking (%):	13.1%		
Moisture Content After Soak, Top in. (%):	14.7%	**Source:**	C11
Moisture Content After Soak, Ave. (%):	13.4%		

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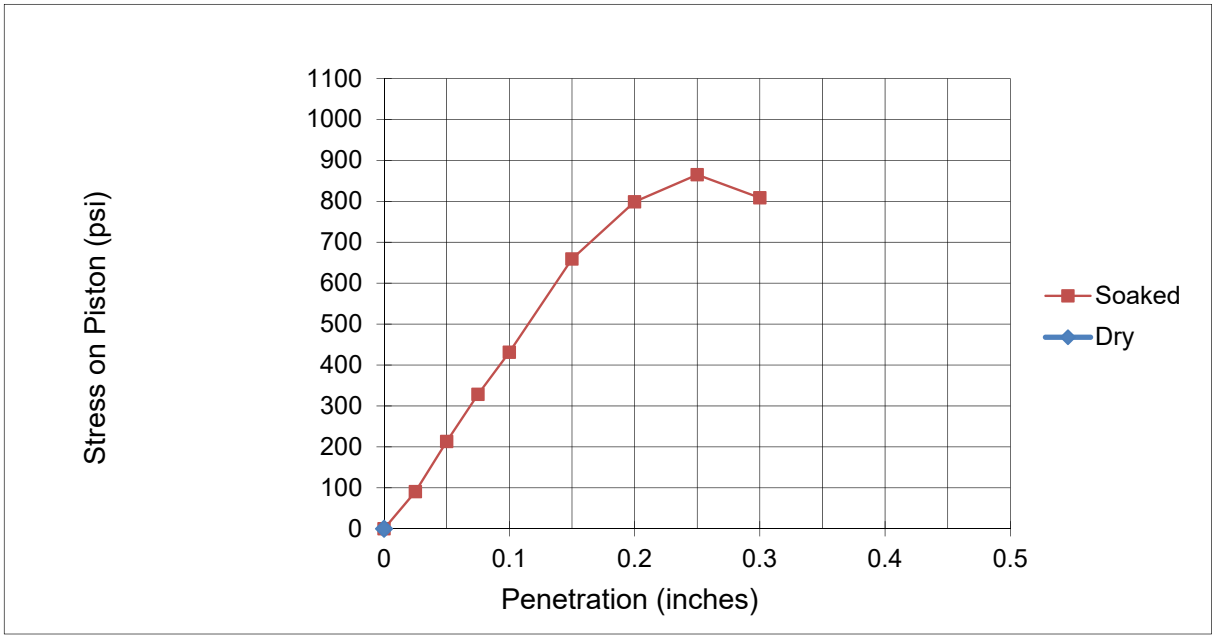
California Bearing Ratio

Project No.:	60T-570	Test Date:	2/15/2016
Client:	AMEC	Tested By:	C. Mallory
Project:	I-64 High Rise Corridor Pavement	Compaction method: ASTM D1883/AASHTO T193/VTM8	
Location:	Chesapeake, Virginia	X	Soaked CBR
		X	65 Blows



CBR @ 0.1 in. penetration (wet):	43.1		
		Maximum Dry Density (pcf):	111.2
Swell (%):	0.0	**Optimum Moisture Content (%):**	10.6
Dry Density Before Soaking (pcf):	111.3		
Dry Density After Soaking (pcf):	115.7	**Visual Description:**	
Retained on 3/4 inch sieve (%):	0.0	Gray, Silty SAND	
Surcharge Weight (pounds):	10.0		
		F&R Lab No.:	123100
Moisture Content Before Soaking (%):	10.0%		
Moisture Content After Soak, Top in. (%):	13.1%	**Source:**	C13
Moisture Content After Soak, Ave. (%):	12.9%		

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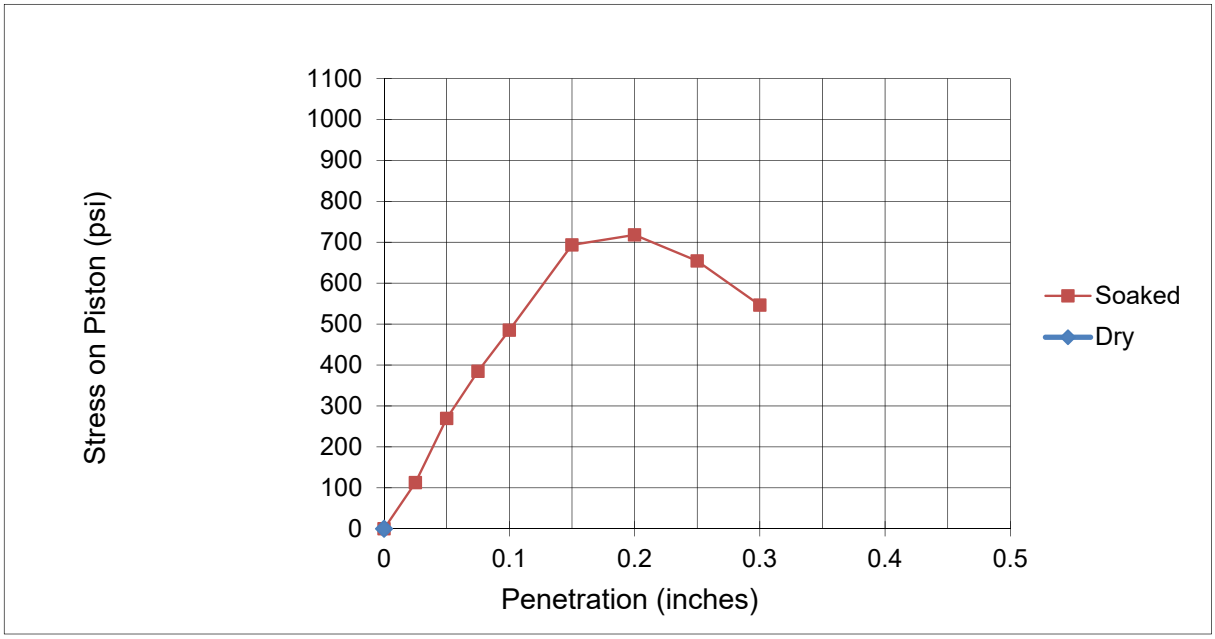
California Bearing Ratio

Project No.:	60T-570	Test Date:	2/15/2016
Client:	AMEC	Tested By:	C. Mallory
Project:	I-64 High Rise Corridor Pavement	Compaction method: ASTM D1883/AASHTO T193/VTM8	
Location:	Chesapeake, Virginia	X	Soaked CBR
		X	65 Blows



CBR @ 0.1 in. penetration (wet):	48.5		
		Maximum Dry Density (pcf):	115.9
Swell (%):	0.0	**Optimum Moisture Content (%):**	9.9
Dry Density Before Soaking (pcf):	114.5		
Dry Density After Soaking (pcf):	117.7	**Visual Description:**	
Retained on 3/4 inch sieve (%):	0.0	Light Brown-Gray, Silty SAND	
Surcharge Weight (pounds):	10.0		
		F&R Lab No.:	123100
Moisture Content Before Soaking (%):	9.2%		
Moisture Content After Soak, Top in. (%):	12.0%	**Source:**	C20
Moisture Content After Soak, Ave. (%):	11.5%		

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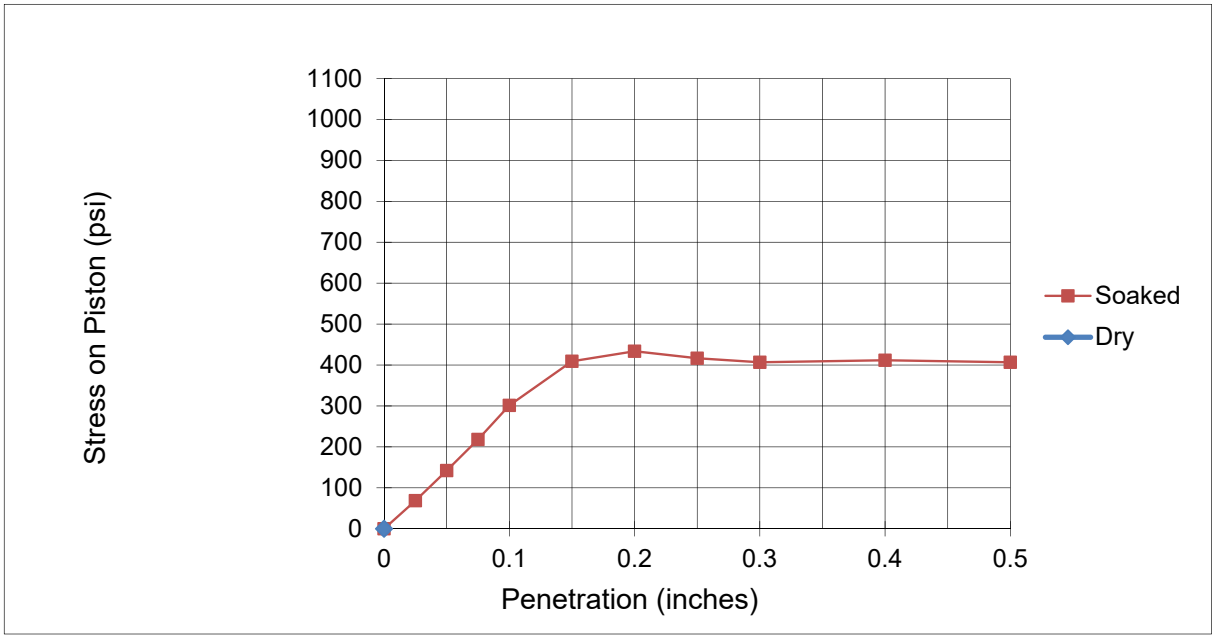
California Bearing Ratio

Project No.:	60T-570	Test Date:	2/9/2016
Client:	AMEC	Tested By:	C. Mallory
Project:	I-64 High Rise Corridor Pavement	Compaction method: ASTM D1883/AASHTO T193/VTM8	
Location:	Chesapeake, Virginia	X	Soaked CBR
		X	65 Blows



CBR @ 0.1 in. penetration (wet):	30.1		
		Maximum Dry Density (pcf):	108.9
Swell (%):	-0.1	**Optimum Moisture Content (%):**	11.2
Dry Density Before Soaking (pcf):	107.1		
Dry Density After Soaking (pcf):	107.7	**Visual Description:**	
Retained on 3/4 inch sieve (%):	6.2	Brown, Poorly graded SAND	
Surcharge Weight (pounds):	10.0		
		F&R Lab No.:	123100
Moisture Content Before Soaking (%):	6.1%		
Moisture Content After Soak, Top in. (%):	14.9%	**Source:**	C23
Moisture Content After Soak, Ave. (%):	14.9%		

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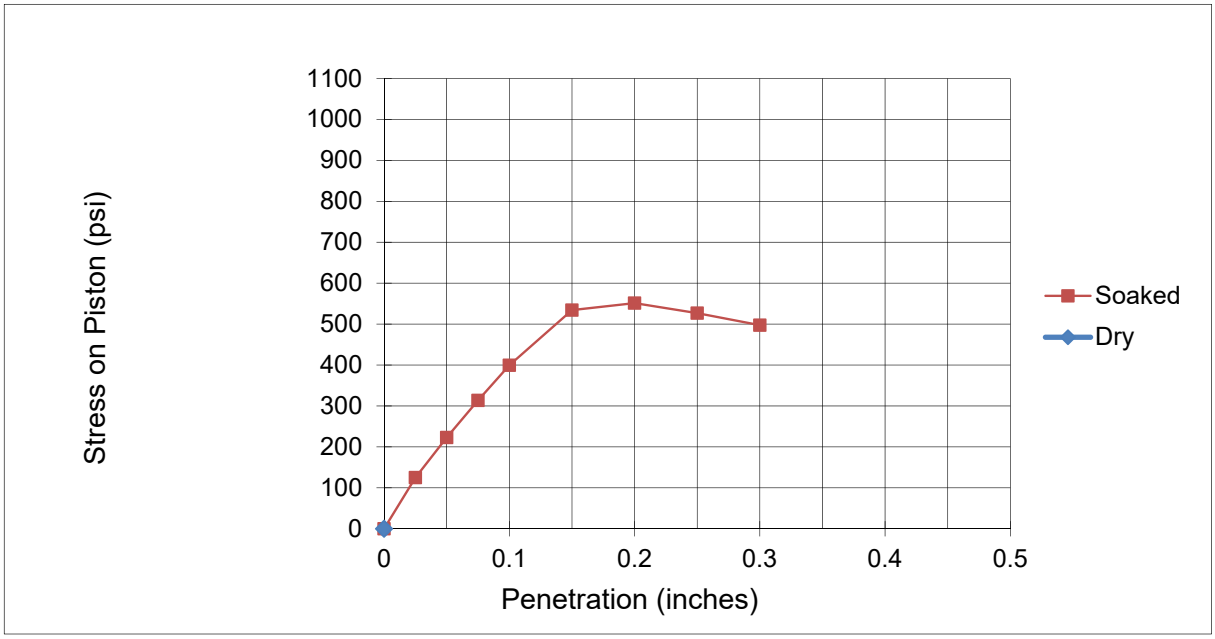
California Bearing Ratio

Project No.:	60T-570	Test Date:	2/9/2016
Client:	AMEC	Tested By:	C. Mallory
Project:	I-64 High Rise Corridor Pavement	Compaction method: ASTM D1883/AASHTO T193/VTM8	
Location:	Chesapeake, Virginia	X	Soaked CBR
		X	65 Blows



CBR @ 0.1 in. penetration (wet):	39.9		
		Maximum Dry Density (pcf):	112.2
Swell (%):	0.0	**Optimum Moisture Content (%):**	12.0
Dry Density Before Soaking (pcf):	111.3		
Dry Density After Soaking (pcf):	111.9	**Visual Description:**	
Retained on 3/4 inch sieve (%):	0.0	Gray-Brown, Silty SAND	
Surcharge Weight (pounds):	10.0		
		F&R Lab No.:	123100
Moisture Content Before Soaking (%):	8.5%		
Moisture Content After Soak, Top in. (%):	14.4%	**Source:**	C25
Moisture Content After Soak, Ave. (%):	13.4%		

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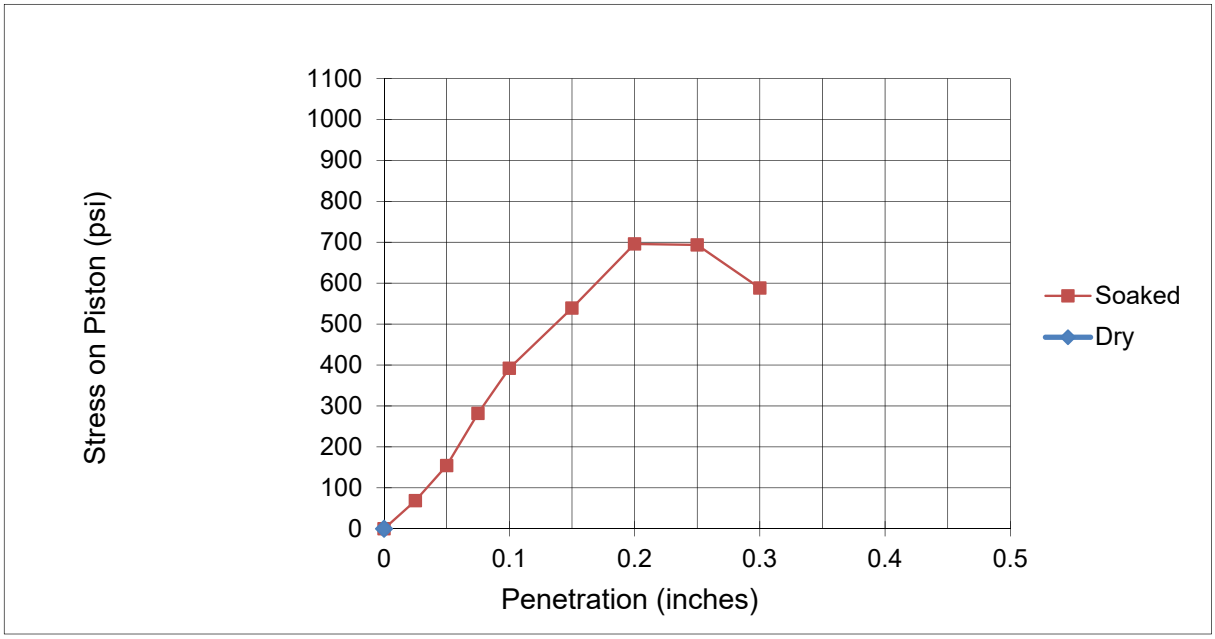
California Bearing Ratio

Project No.:	60T-570	Test Date:	2/9/2016
Client:	AMEC	Tested By:	C. Mallory
Project:	I-64 High Rise Corridor Pavement	Compaction method: ASTM D1883/AASHTO T193/VTM8	
Location:	Chesapeake, Virginia	X	Soaked CBR
		X	65 Blows



CBR @ 0.1 in. penetration (wet):	39.2		
		Maximum Dry Density (pcf):	110.9
Swell (%):	0.0	**Optimum Moisture Content (%):**	11.0
Dry Density Before Soaking (pcf):	109.4		
Dry Density After Soaking (pcf):	110.3	**Visual Description:**	
Retained on 3/4 inch sieve (%):	0.0	Brown-Gray, Silty SAND	
Surcharge Weight (pounds):	10.0		
		F&R Lab No.:	123100
Moisture Content Before Soaking (%):	10.2%		
Moisture Content After Soak, Top in. (%):	14.0%	**Source:**	C26
Moisture Content After Soak, Ave. (%):	13.4%		

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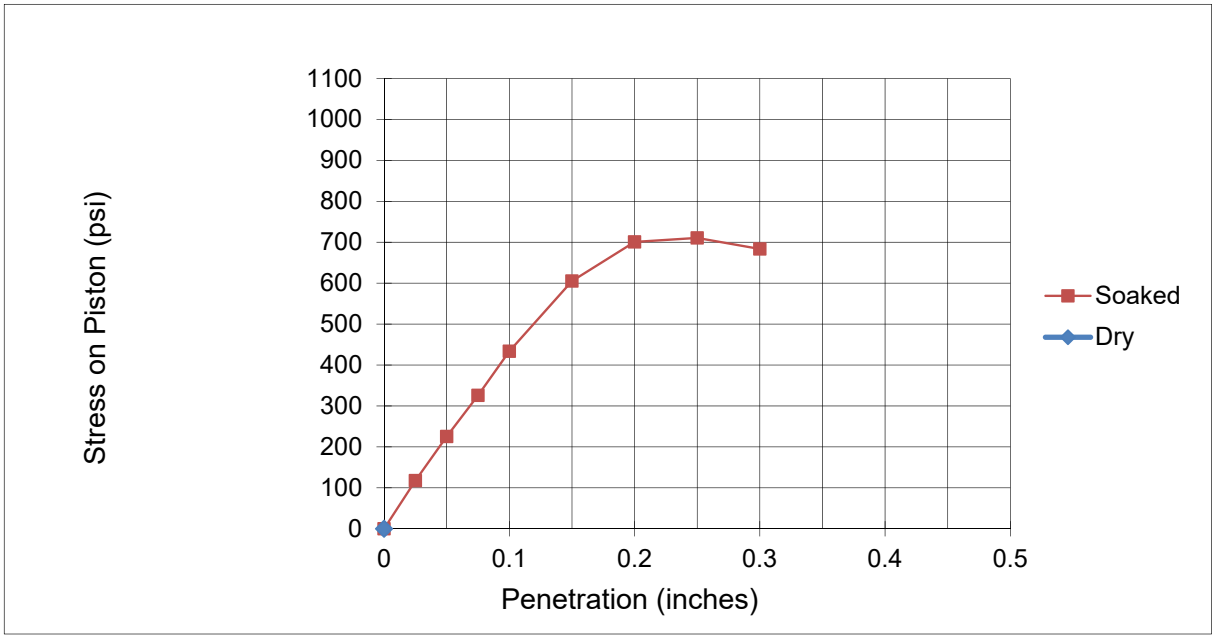
California Bearing Ratio

Project No.:	60T-570	Test Date:	2/15/2016
Client:	AMEC	Tested By:	C. Mallory
Project:	I-64 High Rise Corridor Pavement	Compaction method: ASTM D1883/AASHTO T193/VTM8	
Location:	Chesapeake, Virginia	X	Soaked CBR
		X	65 Blows



CBR @ 0.1 in. penetration (wet):	43.4	**Maximum Dry Density (pcf):**	118.4
Swell (%):	0.0	**Optimum Moisture Content (%):**	11.2
Dry Density Before Soaking (pcf):	117.2		
Dry Density After Soaking (pcf):	117.3	**Visual Description:**	
Retained on 3/4 inch sieve (%):	0.0	Gray, Silty SAND	
Surcharge Weight (pounds):	10.0		
		F&R Lab No.:	123100
Moisture Content Before Soaking (%):	10.8%		
Moisture Content After Soak, Top in. (%):	11.4%	**Source:**	C32
Moisture Content After Soak, Ave. (%):	10.9%		

Appendix D

Functional Condition Survey Results

Table D.1

Windshield Survey Sheet

Date: 11/24/2015
Road Name: I-64 EB
Begin: I-464
End: I-664
Surface Type: Asphalt Concrete
No. Lanes: 3
Lane Width: 12'
Shoulder Width: 12'

Distress Type	**Severity**	**Extent**		
		L	**M**	**H**
Alligator Cracking	L			
	M			
	H			
Longitudinal/Transverse Cracking	L		X	
	M		X	
	H	X		
Edge Cracking	L			
	M			
	H			
Patch/Pothole		X		
		Severity		
		Good	Fair	Poor
Roughness			X	
Rutting		X		
Drainage		X		

Prepared: AZA Reviewed: ALS

Table D.2

Windshield Survey Sheet

Date: 11/24/2015
Road Name: I-64 WB
Begin: I-664
End: I-464
Surface Type: Asphalt Concrete
No. Lanes: 3
Lane Width: 12'
Shoulder Width: 12'

Distress Type	**Severity**	**Extent**		
		L	**M**	**H**
Alligator Cracking	L			
	M			
	H			
Longitudinal/Transverse Cracking	L		X	
	M		X	
	H	X		
Edge Cracking	L			
	M			
	H			
Patch/Pothole		X		
		Severity		
		Good	Fair	Poor
Roughness			X	
Rutting		X		
Drainage		X		

Prepared: AZA Reviewed: ALS

Table D.3

Windshield Survey Sheet

Date: 11/24/2015
Road Name: I-664 NB
Begin: I-64
End: Bridge over Goose Creek
Surface Type: Asphalt Concrete
No. Lanes: 3
Lane Width: 12'
Shoulder Width: 12'

Distress Type	**Severity**	**Extent**		
		L	**M**	**H**
Alligator Cracking	L	X		
	M			
	H			
Longitudinal/Transverse Cracking	L		X	
	M		X	
	H			
Edge Cracking	L			
	M			
	H			
Patch/Pothole		X		
		Severity		
		Good	Fair	Poor
Roughness			X	
Rutting		X		
Drainage		X		

Prepared: AZA Reviewed: ALS

Table D.4

Windshield Survey Sheet

Date: 11/24/2015
Road Name: I-664 SB
Begin: Bridge over Goose Creek
End: I-64
Surface Type: Asphalt Concrete
No. Lanes: 3
Lane Width: 12'
Shoulder Width: 12'

Distress Type	**Severity**	**Extent**		
		L	**M**	**H**
Alligator Cracking	L	X		
	M	X		
	H			
Longitudinal/Transverse Cracking	L		X	
	M		X	
	H			
Edge Cracking	L			
	M			
	H			
Patch/Pothole		X		
		Severity		
		Good	Fair	Poor
Roughness			X	
Rutting		X		
Drainage		X		

Prepared: AZA Reviewed: ALS

Table D.5

Windshield Survey Sheet

Date: 11/24/2015
Road Name: I-464 NB
Begin: I-64
End: Bridge over Military Highway
Surface Type: Portland Cement Concrete
No. Lanes: 3
Lane Width: 12'
Shoulder Width: 12'

Distress Type	**Severity**	**Extent**		
		L	**M**	**H**
Linear Cracking	L			
	M			
	H			
Spalling	L			
	M			
	H			
Corner Break	L			
	M			
	H			
Joint Seal Damage				X
		Severity		
		Good	Fair	Poor
Roughness			X	
Faulting		X		
Drainage		X		

Prepared: AZA Reviewed: ALS

Table D.6

Windshield Survey Sheet

Date: 11/24/2015
Road Name: I-464 SB
Begin: Bridge over Military Highway
End: I-64
Surface Type: Portland Cement Concrete
No. Lanes: 3
Lane Width: 12'
Shoulder Width: 12'

Distress Type	**Severity**	**Extent**		
		L	**M**	**H**
Linear Cracking	L			
	M			
	H			
Spalling	L			
	M			
	H			
Corner Break	L			
	M			
	H			
Joint Seal Damage				X
		Severity		
		Good	Fair	Poor
Roughness			X	
Faulting		X		
Drainage		X		

Prepared: AZA Reviewed: ALS

Table D.7

Windshield Survey Sheet

Date: 11/24/2015
Road Name: I-264 EB
Begin: I-664
End: 1.0 mile after Bowers Hill
Surface Type: Asphalt Concrete
No. Lanes: 2
Lane Width: 12'
Shoulder Width: 12'

Distress Type	**Severity**	**Extent**		
		L	**M**	**H**
Alligator Cracking	L			
	M			
	H			
Longitudinal/Transverse Cracking	L	X		
	M			
	H			
Edge Cracking	L			
	M			
	H			
Patch/Pothole				
		Severity		
		Good	Fair	Poor
Roughness			X	
Rutting		X		
Drainage		X		

Prepared: AZA Reviewed: ALS

Table D.8

Windshield Survey Sheet

Date: 11/24/2015
Road Name: I-264 WB
Begin: 1.0 mile after Bowers Hill
End: I-664
Surface Type: Asphalt Concrete
No. Lanes: 2
Lane Width: 12'
Shoulder Width: 12'

Distress Type	**Severity**	**Extent**		
		L	**M**	**H**
Alligator Cracking	L			
	M			
	H			
Longitudinal/Transverse Cracking	L		X	
	M		X	
	H			
Edge Cracking	L			
	M			
	H			
Patch/Pothole				
		Severity		
		Good	Fair	Poor
Roughness			X	
Rutting		X		
Drainage		X		

Prepared: AZA Reviewed: ALS

Table D.9

Windshield Survey Sheet

Date: 11/24/2015
Road Name: US-58 Ramp A
Begin: 1.0 mile west of Bowers Hill
End: I-664 S
Surface Type: Asphalt Concrete
No. Lanes: 2
Lane Width: 12'
Shoulder Width: 12'

Distress Type	**Severity**	**Extent**		
		L	**M**	**H**
Alligator Cracking	L			
	M			
	H			
Longitudinal/Transverse Cracking	L		X	
	M			
	H			
Edge Cracking	L			
	M			
	H			
Patch/Pothole				
		Severity		
		Good	Fair	Poor
Roughness			X	
Rutting		X		
Drainage		X		

Prepared: AZA Reviewed: ALS

Table D.10

Windshield Survey Sheet

Date: 11/24/2015
Road Name: US-58 Ramp B
Begin: I-664 SB before exit 13A
End: 1.0 mile after Begin
Surface Type: Asphalt Concrete
No. Lanes: 2
Lane Width: 12’
Shoulder Width: 6’

Distress Type	**Severity**	**Extent**		
		L	**M**	**H**
Alligator Cracking	L			
	M			
	H			
Longitudinal/Transverse Cracking	L	X	X	
	M			
	H			
Edge Cracking	L			
	M			
	H			
Patch/Pothole				
		Severity		
		Good	Fair	Poor
Roughness			X	
Rutting		X		
Drainage		X		

Prepared: AZA Reviewed: ALS

Table D.11

Windshield Survey Sheet

Date: 11/24/2015
Road Name: US-58 Ramp C
Begin: 1.0 mile west of Bowers Hill
End: Airline Blvd
Surface Type: Asphalt Concrete
No. Lanes: 2 and 3
Lane Width: 12'
Shoulder Width: 12'

Distress Type	**Severity**	**Extent**		
		L	**M**	**H**
Alligator Cracking	L	X		
	M			
	H			
Longitudinal/Transverse Cracking	L		X	
	M		X	
	H			
Edge Cracking	L			
	M			
	H			
Patch/Pothole				
		Severity		
		Good	Fair	Poor
Roughness			X	
Rutting		X		
Drainage		X		

Prepared: AZA Reviewed: ALS

Table D.12

Windshield Survey Sheet

Date: 11/24/2015
Road Name: US-58 Ramp A
Begin: 1.0 mile west of Bowers Hill
End: I-664 S
Surface Type: Asphalt Concrete
No. Lanes: 2
Lane Width: 12'
Shoulder Width: 12'

Distress Type	**Severity**	**Extent**		
		L	**M**	**H**
Alligator Cracking	L			
	M			
	H			
Longitudinal/Transverse Cracking	L		X	
	M			
	H			
Edge Cracking	L			
	M			
	H			
Patch/Pothole				
		Severity		
		Good	Fair	Poor
Roughness			X	
Rutting		X		
Drainage		X		

Prepared: AZA Reviewed: ALS

Table D.13

Windshield Survey Sheet

Date: 11/24/2015
Road Name: US-58 Ramp B
Begin: I-664 SB before exit 13A
End: 1.0 mile after Begin
Surface Type: Asphalt Concrete
No. Lanes: 2
Lane Width: 12'
Shoulder Width: 6'

Distress Type	**Severity**	**Extent**		
		L	**M**	**H**
Alligator Cracking	L			
	M			
	H			
Longitudinal/Transverse Cracking	L	X	X	
	M			
	H			
Edge Cracking	L			
	M			
	H			
Patch/Pothole				
		Severity		
		Good	Fair	Poor
Roughness			X	
Rutting		X		
Drainage		X		

Prepared: AZA Reviewed: ALS

Table D.14

Windshield Survey Sheet

Date: 11/24/2015
Road Name: US-58 Ramp C
Begin: 1.0 mile west of Bowers Hill
End: Airline Blvd
Surface Type: Asphalt Concrete
No. Lanes: 2 and 3
Lane Width: 12'
Shoulder Width: 12'

Distress Type	**Severity**	**Extent**		
		L	**M**	**H**
Alligator Cracking	L	X		
	M			
	H			
Longitudinal/Transverse Cracking	L		X	
	M		X	
	H			
Edge Cracking	L			
	M			
	H			
Patch/Pothole				
		Severity		
		Good	Fair	Poor
Roughness			X	
Rutting		X		
Drainage		X		

Prepared: AZA Reviewed: ALS

Appendix E

Detailed Results of k-value, Effective Structural Number, Subgrade Modulus, and Load Transfer Efficiency Calculations

Table E.1 Subgrade Resilient Modulus, Effective Pavement Modulus, and Effective Structural Number

Road	Direction	Section	Drop Height	Station	Mr, psi	Ep, psi	SNeff
I-264	EB	1	1	0	27,238	451,500	5.87
				200	32,874	435,000	5.80
				600	27,376	356,500	5.42
				799	26,421	282,500	5.02
				1001	24,962	405,500	5.66
				1200	34,359	291,500	5.07
				1400	19,695	1,027,000	7.72
				1665	14,364	725,500	6.87
				1800	25,686	299,000	5.12
				2000	24,351	366,500	5.47
				2200	31,738	335,500	5.32
				2400	30,017	212,500	4.57
			2	0	28,175	428,500	5.77
				200	32,179	462,000	5.91
				600	27,143	369,500	5.49
				799	26,478	305,000	5.15
				1001	24,581	430,500	5.78
				1200	32,882	320,500	5.24
				1400	19,752	1,153,000	8.02
				1665	14,630	785,000	7.06
				1800	25,597	316,000	5.21
				2000	23,964	362,000	5.45
				2200	31,288	350,500	5.39

Road	Direction	Section	Drop Height	Station	Mr, psi	Ep, psi	SNeff
I-264	EB	1	2	2400	29,775	226,000	4.66
			3	0	26,947	458,500	5.90
				200	31,596	481,000	5.99
				600	27,339	372,500	5.50
				799	26,561	303,000	5.14
				1001	25,079	441,500	5.83
				1200	33,416	314,500	5.20
				1400	19,972	1,154,500	8.03
				1665	15,231	795,000	7.09
				1800	25,388	330,500	5.29
				2000	23,764	375,000	5.52
				2200	30,888	355,500	5.42
				2400	30,109	231,000	4.69
			4	0	27,010	449,500	5.86
				200	30,629	484,500	6.01
				600	26,745	370,500	5.49
				799	26,292	305,000	5.15
				1001	25,021	430,000	5.77
				1200	32,407	315,500	5.21
				1400	19,891	1,162,000	8.04
				1665	15,919	813,500	7.14
				1800	25,352	334,000	5.31
				2000	24,170	370,000	5.49
				2200	30,828	359,500	5.44

Road	Direction	Section	Drop Height	Station	Mr, psi	Ep, psi	SNeff
I-264	EB	1	4	2400	27,753	253,500	4.84
			Average		26,330	457,438	5.76
		2	1	2602	37,571	189,500	4.39
				2801	36,244	258,500	4.87
				3000	35,445	225,500	4.66
				3201	34,837	218,500	4.61
				3400	35,493	203,000	4.50
				3600	33,052	213,500	4.57
				3801	34,398	191,500	4.41
				4000	34,455	183,000	4.34
				4200	40,204	240,000	4.75
				4400	35,626	201,500	4.48
				4600	35,000	200,000	4.47
				4800	32,292	209,000	4.54
				5001	30,435	182,000	4.34
				5200	31,859	192,500	4.42
			2	2602	36,615	207,000	4.53
				2801	31,251	312,500	5.19
				3000	34,628	252,000	4.83
				3201	34,367	235,000	4.72
				3400	34,782	219,500	4.61
				3600	32,169	232,000	4.70
				3801	33,721	213,500	4.57
				4000	33,717	196,000	4.44

Road	Direction	Section	Drop Height	Station	Mr, psi	Ep, psi	SNeff
I-264	EB	2	2	4200	38,447	254,000	4.84
				4400	35,098	216,000	4.59
				4600	34,075	210,000	4.55
				4800	31,139	228,500	4.68
				5001	29,677	199,500	4.47
				5200	31,503	213,500	4.57
			3	2602	37,194	213,500	4.57
				2801	31,381	323,500	5.25
				3000	35,045	258,000	4.87
				3201	34,603	245,500	4.79
				3400	34,360	232,500	4.70
				3600	32,465	238,000	4.74
				3801	33,938	225,500	4.66
				4000	33,844	206,000	4.52
				4200	37,898	261,500	4.89
				4400	34,974	226,000	4.66
				4600	34,306	224,000	4.65
				4800	30,991	235,000	4.72
				5001	30,170	210,500	4.55
				5200	31,570	220,500	4.62
			4	2602	36,850	215,000	4.58
				2801	31,510	321,500	5.24
				3000	35,287	259,500	4.88
				3201	34,713	250,000	4.82

Road	Direction	Section	Drop Height	Station	Mr, psi	Ep, psi	SNeff
I-264	EB	2	4	3400	35,242	237,000	4.73
				3600	32,405	243,500	4.78
				3801	34,277	232,000	4.70
				4000	33,822	216,000	4.59
				4200	37,062	268,500	4.94
				4400	34,677	232,500	4.70
				4600	34,250	235,000	4.72
				4800	27,991	260,000	4.88
				5001	30,056	223,500	4.64
				5200	31,870	227,000	4.67
			Average		33,944	229,250	4.67
	WB	1	1	0	27,901	182,000	4.08
				200	24,026	154,000	3.86
				400	25,481	173,500	4.02
				600	28,316	174,500	4.02
				801	24,691	134,500	3.69
				1000	31,781	139,500	3.73
				1200	25,368	144,000	3.77
				1400	22,439	136,000	3.70
				1600	22,878	138,500	3.73
				1800	26,569	160,000	3.91
				2000	27,542	145,000	3.78
			2	0	27,682	193,500	4.16
				200	23,713	168,000	3.97

Road	Direction	Section	Drop Height	Station	Mr, psi	Ep, psi	SNeff
I-264	WB	1	2	400	25,278	189,500	4.14
				600	27,906	183,000	4.09
				801	24,543	146,000	3.79
				1000	29,999	162,000	3.92
				1200	25,061	160,000	3.91
				1400	22,012	157,000	3.88
				1600	22,706	159,000	3.90
				1800	26,352	180,000	4.07
				2000	27,152	159,500	3.90
			3	0	27,970	201,000	4.22
				200	24,412	173,500	4.02
				400	25,672	199,500	4.21
				600	28,397	190,500	4.14
				801	24,897	156,500	3.88
				1000	30,112	167,500	3.97
				1200	25,336	172,500	4.01
				1400	22,459	167,500	3.97
				1600	23,520	164,500	3.95
				1800	26,966	189,500	4.14
				2000	27,699	169,000	3.98
			4	0	28,203	204,500	4.24
				200	24,768	180,500	4.07
				400	26,108	207,000	4.26
				600	28,908	198,500	4.20

Road	Direction	Section	Drop Height	Station	Mr, psi	Ep, psi	SNeff
I-264	WB	1	4	801	25,319	166,000	3.96
				1000	29,499	180,000	4.07
				1200	25,790	179,500	4.06
				1400	22,960	177,000	4.04
				1600	24,171	174,000	4.02
				1800	27,700	196,500	4.19
				2000	27,825	179,000	4.06
				Average	26,093	171,205	3.99
		2	1	2200	29,712	175,500	4.03
				2400	31,647	199,000	4.20
				2600	30,485	191,500	4.15
				2800	25,470	179,000	4.06
				3000	26,524	169,000	3.98
				3201	29,281	143,500	3.77
			2	2200	28,775	203,500	4.24
				2400	30,975	221,500	4.36
				2600	29,742	215,500	4.32
				2800	25,454	201,500	4.22
				3000	26,009	188,500	4.13
				3201	29,048	156,000	3.88
			3	2200	29,531	207,500	4.26
				2400	31,260	236,000	4.45
				2600	30,053	219,500	4.34
				2800	26,103	214,000	4.31

Road	Direction	Section	Drop Height	Station	Mr, psi	Ep, psi	SNeff
I-264	WB	2	3	3000	26,024	198,000	4.20
				3201	28,935	166,500	3.96
			4	2200	30,026	222,500	4.36
				2400	31,459	243,500	4.50
				2600	30,381	227,000	4.39
				2800	26,786	227,500	4.40
				3000	26,180	206,500	4.26
				3201	28,953	174,500	4.02
			Average		28,701	199,458	4.20
I-664	NB	1	1	0	28,112	150,000	4.30
				500	28,670	159,500	4.39
				1000	24,428	134,000	4.14
				1500	24,440	208,000	4.80
				2001	26,075	233,500	4.99
				2500	23,081	205,000	4.78
				3001	29,065	324,500	5.57
				3500	17,333	149,500	4.30
			2	0	27,339	168,000	4.47
				500	28,112	172,000	4.50
				1000	24,187	147,500	4.28
				1500	24,155	225,000	4.93
				2001	25,859	269,500	5.23
				2500	22,730	223,000	4.91
				3001	27,545	344,000	5.68

Road	Direction	Section	Drop Height	Station	Mr, psi	Ep, psi	SNeff
I-664	NB	1	2	3500	17,001	159,500	4.39
			3	0	27,457	177,500	4.55
				500	28,011	179,500	4.57
				1000	24,443	156,000	4.36
				1500	24,206	240,000	5.03
				2001	24,308	279,000	5.29
				2500	22,986	229,500	4.96
				3001	27,529	355,500	5.74
				3500	17,084	166,000	4.45
			4	0	25,995	191,000	4.66
				500	26,516	193,000	4.68
				1000	23,778	170,000	4.49
				1500	24,658	251,000	5.11
				2001	25,246	282,000	5.31
				2500	23,060	234,000	4.99
				3001	27,463	361,000	5.77
				3500	17,239	169,000	4.48
			Average		24,628	215,828	4.82
		2	1	4002	43,412	332,500	4.99
				4500	40,227	319,500	4.92
				5001	52,740	373,500	5.19
				6000	31,109	210,500	4.28
				6500	19,504	358,000	5.11
				7001	17,636	341,000	5.03

Road	Direction	Section	Drop Height	Station	Mr, psi	Ep, psi	SNeff
I-664	NB	2	2	4002	43,140	359,000	5.12
				4500	39,251	329,000	4.97
				5001	53,423	378,000	5.21
				6000	31,106	228,000	4.40
				6500	19,206	375,500	5.19
				7001	17,620	364,000	5.14
			3	4002	43,475	356,500	5.11
				4500	38,958	332,500	4.99
				5001	51,961	374,000	5.19
				6000	31,239	232,500	4.43
				6500	19,581	383,500	5.23
				7001	18,244	373,000	5.18
			4	4002	42,771	357,500	5.11
				4500	38,490	333,000	4.99
				5001	49,501	375,000	5.19
				6000	30,876	238,500	4.47
				6500	19,998	388,500	5.25
				7001	18,895	378,500	5.21
				Average	33,848	337,146	5.00
		3	1	7500	24,953	613,000	4.20
				8021	37,802	804,000	4.60
				8660	28,694	1,818,000	6.04
				9000	25,670	570,000	4.10
				9500	21,064	351,000	3.49

Road	Direction	Section	Drop Height	Station	Mr, psi	Ep, psi	SNeff
I-664	NB	3	1	10001	28,406	619,500	4.22
				10500	24,220	588,500	4.15
				11000	30,535	605,500	4.19
			2	7500	26,134	631,500	4.25
				8021	37,346	890,000	4.76
				8660	26,703	2,662,500	6.86
				9000	25,222	623,000	4.23
				9500	20,347	374,000	3.57
				10001	27,829	646,500	4.28
				10500	23,427	609,500	4.20
				11000	29,692	709,500	4.41
			3	7500	26,697	659,500	4.31
				8021	37,072	879,000	4.74
				8660	27,002	2,645,000	6.85
				9000	25,471	600,500	4.18
				9500	20,135	387,000	3.61
				10001	28,025	640,000	4.27
				10500	23,708	619,500	4.22
				11000	29,532	709,500	4.41
			4	7500	27,203	637,000	4.26
				8021	36,818	852,500	4.69
				8660	24,235	3,137,000	7.25
				9000	25,550	622,000	4.23
				9500	20,291	384,500	3.60

Road	Direction	Section	Drop Height	Station	Mr, psi	Ep, psi	SNeff
I-664	NB	3	4	10001	27,747	626,500	4.24
				10500	23,758	602,000	4.18
				11000	29,099	694,500	4.38
			Average		27,200	869,125	4.53
		4	1	11500	19,705	314,000	4.89
				12002	20,797	340,000	5.03
				12539	25,277	312,500	4.89
			2	11500	19,051	365,000	5.15
				12002	20,406	368,500	5.16
				12539	24,446	337,000	5.01
			3	11500	19,222	368,500	5.16
				12002	20,382	390,000	5.26
				12539	24,601	325,000	4.95
			4	11500	19,543	381,500	5.22
				12002	20,760	390,500	5.26
				12539	24,682	314,500	4.90
			Average		21,573	350,583	5.07
	SB	1	1	500	34,102	627,000	4.24
				1000	22,945	552,500	4.06
				1500	26,886	706,000	4.41
				2000	29,820	797,500	4.59
				2511	25,920	714,000	4.42
				3000	29,974	816,500	4.63
				3500	22,449	1,175,500	5.22

Road	Direction	Section	Drop Height	Station	Mr, psi	Ep, psi	SNeff
I-664	SB	1	1	4000	29,708	746,000	4.49
			2	500	32,596	619,500	4.22
				1000	22,824	557,000	4.07
				1500	26,627	741,500	4.48
				2000	29,236	797,000	4.59
				2511	25,124	710,000	4.42
				3000	25,644	1,188,000	5.24
				3500	28,484	809,000	4.61
				4000	30,077	746,500	4.49
			3	500	31,347	627,500	4.24
				1000	22,941	577,500	4.12
				1500	26,441	728,000	4.45
				2000	29,178	785,500	4.57
				2511	25,136	717,000	4.43
				3000	25,153	1,141,000	5.17
				3500	28,669	810,500	4.62
				4000	30,203	772,500	4.54
			4	500	30,102	618,500	4.22
				1000	23,031	581,000	4.13
				1500	25,750	718,500	4.43
				2000	28,353	764,500	4.53
				2511	24,163	699,000	4.39
				3000	24,599	1,139,000	5.17
				3500	28,597	799,000	4.59

Road	Direction	Section	Drop Height	Station	Mr, psi	Ep, psi	SNeff
I-664	SB	1	4	4000	30,051	792,000	4.58
				Average	27,379	767,953	4.51
		2	1	4611	24,761	456,500	3.81
				5501	25,482	280,500	3.24
				6000	33,558	579,000	4.13
				6500	33,926	312,000	3.36
			2	4611	24,426	473,000	3.86
				5501	25,784	301,500	3.32
				6000	33,637	601,000	4.18
				6500	33,862	326,500	3.41
			3	4611	24,269	469,500	3.85
				5501	22,611	380,000	3.59
				6000	33,660	608,000	4.19
				6500	34,111	334,500	3.44
			4	4611	23,938	476,000	3.86
				5501	22,966	398,000	3.64
				6000	33,341	601,500	4.18
				6500	33,711	340,500	3.46
			Average		29,003	433,625	3.72
		3	1	7724	54,546	247,000	4.80
				8001	52,352	286,000	5.04
				8500	35,372	208,000	4.53
				9000	40,408	268,500	4.94
				9500	31,250	476,000	5.97

Road	Direction	Section	Drop Height	Station	Mr, psi	Ep, psi	SNeff
I-664	SB	3	1	10000	32,727	335,000	5.31
				10501	25,563	318,500	5.22
				11028	26,915	410,000	5.68
			2	7724	52,235	263,500	4.90
				8001	51,510	277,500	4.99
				8500	34,899	214,500	4.58
				9000	38,889	275,500	4.98
				9500	30,179	486,000	6.01
				10000	32,134	358,000	5.43
				10501	25,078	341,500	5.35
				11028	26,292	397,500	5.62
			3	7724	50,992	267,500	4.93
				8001	50,526	288,500	5.05
				8500	34,594	215,000	4.58
				9000	38,711	273,500	4.97
				9500	29,770	494,000	6.05
				10000	31,811	367,000	5.48
				10501	25,463	337,500	5.33
				11028	26,103	424,000	5.75
			4	7724	48,986	274,500	4.97
				8001	48,930	289,000	5.06
				8500	34,265	223,500	4.64
				9000	38,197	279,500	5.00
				9500	29,281	482,000	6.00

Road	Direction	Section	Drop Height	Station	Mr, psi	Ep, psi	SNeff
I-664	SB	3	4	10000	30,954	367,500	5.48
				10501	25,404	336,000	5.32
				11028	25,963	415,500	5.71
			Average		36,259	328,047	5.24
US58	Ramp A	1	1	0	23,952	167,500	3.55
				501	21,569	154,000	3.45
				1000	18,282	144,000	3.37
				1500	20,997	139,000	3.33
				2000	20,294	175,500	3.60
				2499	19,925	249,000	4.05
				3000	39,421	194,000	3.73
				3500	36,371	163,000	3.52
				4000	32,131	151,500	3.43
				4294	30,893	131,000	3.27
			2	0	23,858	179,000	3.63
				501	21,877	168,500	3.55
				1000	18,667	155,500	3.46
				1500	20,867	147,500	3.40
				2000	19,895	184,500	3.66
				2499	17,696	322,500	4.41
				3000	39,370	210,000	3.82
				3500	35,998	179,500	3.63
				4000	31,861	163,000	3.52
				4294	31,271	146,500	3.39

Road	Direction	Section	Drop Height	Station	Mr, psi	Ep, psi	SNeff
US58	Ramp A	1	3	0	24,133	187,000	3.68
				501	22,187	176,000	3.61
				1000	18,353	166,500	3.54
				1500	20,771	155,500	3.46
				2000	19,896	189,500	3.70
				2499	18,161	327,000	4.43
				3000	37,864	225,000	3.91
				3500	36,650	182,500	3.65
				4000	32,094	167,000	3.54
				4294	31,642	153,500	3.45
			4	0	24,297	194,000	3.73
				501	22,390	181,000	3.64
				1000	18,308	170,500	3.57
				1500	20,610	160,000	3.49
				2000	19,578	189,500	3.70
				2499	18,705	336,500	4.48
				3000	37,329	235,500	3.97
				3500	36,659	188,000	3.69
				4000	30,827	180,000	3.63
				4294	31,836	163,000	3.52
			Average		26,187	186,313	3.65
	Ramp B	1	1	0	24,022	149,000	2.86
				500	23,870	173,500	3.01
				1000	22,111	123,000	2.69

Road	Direction	Section	Drop Height	Station	Mr, psi	Ep, psi	SNeff
US 58	Ramp B	1	1	1500	23,889	158,500	2.92
				2001	22,067	133,500	2.76
				2500	25,852	178,500	3.04
				3004	22,089	150,500	2.87
				3501	23,574	152,500	2.89
				4000	23,446	181,500	3.06
				4527	24,088	193,500	3.12
				5022	30,835	241,500	3.36
			2	0	23,499	159,500	2.93
				500	24,129	183,500	3.07
				1000	22,291	143,000	2.82
				1500	24,301	163,000	2.95
				2001	22,310	136,000	2.78
				2500	26,262	183,500	3.07
				3004	21,611	159,000	2.93
				3501	22,636	162,000	2.94
				4000	23,119	192,000	3.12
				4527	21,985	239,000	3.35
				5022	30,838	262,500	3.46
			3	0	23,313	166,000	2.97
				500	24,416	190,500	3.11
				1000	22,912	149,500	2.87
				1500	24,133	169,000	2.99
				2001	22,552	139,500	2.80

Road	Direction	Section	Drop Height	Station	Mr, psi	Ep, psi	SNeff
US 58	Ramp B	1	3	2500	26,570	194,500	3.13
				3004	21,864	169,000	2.99
				3501	23,085	166,500	2.97
				4000	23,390	203,000	3.17
				4527	24,271	220,000	3.26
				5022	31,304	277,000	3.52
			4	0	22,730	172,000	3.00
				500	24,938	198,500	3.15
				1000	23,569	161,500	2.94
				1500	23,712	175,000	3.02
				2001	22,653	143,500	2.83
				2500	26,291	203,000	3.17
				3004	21,985	174,500	3.02
				3501	22,898	169,000	2.99
				4000	23,443	205,500	3.19
				4527	29,587	338,000	3.76
				5022	31,156	280,500	3.53
			Average		24,309	183,727	3.05
	Ramp C	1	1	0	25,032	185,000	4.10
				200	24,133	175,000	4.03
				400	22,121	170,500	3.99
				601	21,215	169,000	3.98
				799	16,705	219,000	4.34
				1000	19,127	141,500	3.75

Road	Direction	Section	Drop Height	Station	Mr, psi	Ep, psi	SNeff
US 58	Ramp C	1	1	1500	23,141	190,000	4.14
				2000	22,458	204,500	4.24
				2500	18,347	290,500	4.77
				3001	19,674	171,500	4.00
				3500	14,743	214,500	4.31
				4000	22,171	175,500	4.03
				4500	24,649	134,500	3.69
				5001	32,092	163,000	3.93
			2	0	24,744	198,000	4.20
				200	24,166	181,000	4.07
				400	22,006	186,000	4.11
				601	21,059	180,500	4.07
				799	16,262	232,000	4.42
				1000	18,775	152,000	3.84
				1500	22,903	206,000	4.25
				2000	17,934	269,000	4.65
				2500	17,975	302,500	4.83
				3001	16,108	227,000	4.39
				3500	14,363	247,500	4.52
				4000	21,775	190,500	4.14
				4500	24,399	146,500	3.80
				5001	31,781	183,000	4.09
			3	0	25,056	200,000	4.21
				200	24,404	188,000	4.12

Road	Direction	Section	Drop Height	Station	Mr, psi	Ep, psi	SNeff
US 58	Ramp C	1	3	400	22,093	186,500	4.11
				601	21,164	186,000	4.11
				799	16,369	241,500	4.48
				1000	18,740	159,500	3.90
				1500	23,374	215,000	4.31
				2000	17,961	278,000	4.70
				2500	18,176	312,000	4.88
				3001	16,425	232,000	4.42
				3500	15,417	248,500	4.53
				4000	22,255	200,000	4.21
				4500	24,652	155,000	3.87
				5001	31,751	187,000	4.12
			4	0	25,202	205,000	4.25
				200	24,317	190,500	4.14
				400	22,418	191,000	4.15
				601	21,053	190,500	4.14
				799	16,265	247,000	4.52
				1000	18,665	164,000	3.94
				1500	23,612	218,000	4.33
				2000	17,909	279,500	4.71
				2500	18,276	318,000	4.91
				3001	16,606	237,500	4.46
				3500	15,379	266,000	4.63
				4000	22,513	204,000	4.24

Road	Direction	Section	Drop Height	Station	Mr, psi	Ep, psi	SNeff
US 58	Ramp C	1	4	4500	24,514	159,000	3.90
				5001	31,466	195,500	4.18
			Average		21,355	206,429	4.24

Table E.2. k-value and Elastic Modulus of PCC of I64, Eastbound Section 2

Road	Direction	Section	Drop Height	Station	Dynamic K, psi/in	Static K, psi/in	EPCC, psi
I-64	EB	1	1	0	145	72	5,358,802
				500	244	122	6,756,652
				1000	269	135	16,328,405
				1500	252	126	17,368,162
				2000	195	97	11,236,656
				2500	224	112	19,033,862
				3000	259	130	19,804,714
				3500	197	99	13,319,337
				4000	174	87	8,348,103
				4500	184	92	11,422,429
				5001	190	95	11,218,541
				5500	184	92	9,828,835
				6000	154	77	7,676,396
			2	0	186	93	4,564,687
				500	241	120	7,529,142
				1000	288	144	16,421,971
				1500	258	129	16,878,804
I-64	EB	1	2	2000	201	100	

Road	Direction	Section	Drop Height	Station	Dynamic K, psi/in	Static K, psi/in	EPCC, psi
							11,184,800
				2500	227	113	19,172,414
				3000	273	137	18,606,864
				3500	204	102	13,107,302
				4000	173	87	8,822,721
				4500	184	92	11,588,268
				5001	189	95	11,541,423
				5500	178	89	10,432,029
				6000	155	77	7,936,735
			3	0	191	95	4,443,736
				500	245	122	7,452,538
				1000	298	149	16,473,501
				1500	265	133	15,940,633
				2000	199	99	12,041,368
				2500	231	116	18,166,236
				3000	269	135	18,873,278
				3500	212	106	12,306,098
				4000	175	88	8,999,351
				4500	184	92	12,028,708
				5001	190	95	12,040,017
				5500	183	92	10,413,791
				6000	156	78	8,373,409
			4	0	196	98	4,232,982
				500	242	121	7,486,547

Road	Direction	Section	Drop Height	Station	Dynamic K, psi/in	Static K, psi/in	EPCC, psi
I-64	EB	1	4	1000	305	152	15,558,954
				1500	264	132	14,787,400
				2000	200	100	11,389,253
				2500	233	117	17,217,500
				3000	272	136	17,521,784
				3500	213	107	12,026,338
				4000	178	89	8,756,949
				4500	183	91	11,801,045
				5001	196	98	11,654,652
				5500	188	94	10,272,372
				6000	156	78	8,743,292
				Average	213	106	12,009,419
		2	1	11000	129	64	2,090,736
				11500	113	57	9,647,060
				12000	125	63	3,961,212
				12500	157	78	7,672,098
				13000	170	85	8,273,449
				13500	164	82	10,963,906
				14000	167	84	11,094,165
				14500	179	89	7,179,462
				15001	181	90	9,660,211
				15500	197	99	6,756,042
				16000	303	151	7,305,119
				16501	239	119	10,881,888

Road	Direction	Section	Drop Height	Station	Dynamic K, psi/in	Static K, psi/in	EPCC, psi
I-64	EB	2	1	17000	244	122	9,819,340
				17500	165	82	6,931,500
				18000	163	82	9,341,518
				18500	135	67	6,438,224
				19000	155	78	8,931,254
				19466	106	53	13,765,345
				20000	224	112	10,293,225
				20500	232	116	9,282,232
				21000	301	150	6,646,358
				21500	359	179	5,453,966
				22000	352	176	8,845,822
				22500	327	164	5,363,543
				23001	346	173	5,039,997
				23500	281	141	9,222,303
				24000	252	126	7,038,093
				24500	250	125	8,178,836
				25001	225	113	5,530,381
				25500	217	108	6,340,702
				26000	235	117	7,223,423
				26500	244	122	5,403,667
				27000	254	127	5,932,087
				27501	308	154	9,003,591
				27901	265	133	3,891,799
				28500	480	240	6,235,531

Road	Direction	Section	Drop Height	Station	Dynamic K, psi/in	Static K, psi/in	EPCC, psi
I-64	EB	2	1	29000	325	162	7,659,245
				29500	312	156	8,761,012
				30000	312	156	7,774,079
				30500	252	126	3,990,123
				31000	203	101	4,973,382
				32000	168	84	5,088,278
				32500	275	137	7,900,213
				33000	267	134	4,566,465
				33500	337	168	5,676,795
				34000	248	124	7,094,524
				34500	267	133	5,203,655
				35001	215	108	5,953,055
				35500	264	132	6,581,714
				36000	262	131	7,712,941
				36500	276	138	8,690,872
				37000	298	149	7,640,115
				37500	286	143	7,659,116
				38000	286	143	6,683,008
				38501	272	136	8,262,329
				39000	290	145	7,141,463
				39500	288	144	7,237,091
				40000	309	155	8,070,932
				40499	182	91	7,572,939
				41000	129	64	13,495,234

Road	Direction	Section	Drop Height	Station	Dynamic K, psi/in	Static K, psi/in	EPCC, psi
I-64	EB	2	1	41500	366	183	3,116,179
				42000	347	173	3,057,725
			2	11000	132	66	2,134,021
				11500	116	58	8,962,573
				12000	125	63	4,164,066
				12500	149	75	8,673,058
				13000	170	85	8,916,224
				13500	176	88	9,539,429
				14000	173	87	10,663,757
				14500	184	92	7,221,861
				15001	192	96	8,155,439
				15500	196	98	7,084,884
				16000	301	151	7,811,853
				16501	258	129	9,613,021
				17000	254	127	9,907,839
				17500	172	86	6,627,144
				18000	167	83	8,950,686
				18500	138	69	6,735,098
				19000	152	76	9,718,146
				19466	104	52	14,516,060
				20000	226	113	10,458,791
				20500	233	117	9,464,713
				21000	299	150	6,846,928
				21500	366	183	5,751,947

Road	Direction	Section	Drop Height	Station	Dynamic K, psi/in	Static K, psi/in	EPCC, psi
I-64	EB	2	2	22000	365	182	8,648,128
				22500	308	154	6,389,741
				23001	355	178	5,106,794
				23500	292	146	9,086,256
				24000	263	131	6,904,383
				24500	265	133	7,766,976
				25001	236	118	5,478,748
				25500	227	114	6,416,864
				26000	248	124	6,958,019
				26500	243	122	5,840,390
				27000	253	127	6,197,552
				27501	311	156	9,215,256
				27901	273	137	3,855,021
				28500	500	250	6,043,525
				29000	340	170	7,186,828
				29500	315	157	8,887,847
				30000	312	156	8,202,387
				30500	252	126	4,210,763
				31000	199	100	5,255,036
				32000	168	84	5,363,272
				32500	278	139	7,766,094
				33000	258	129	5,034,685
				33500	310	155	6,416,685
				34000	243	122	7,409,999

Road	Direction	Section	Drop Height	Station	Dynamic K, psi/in	Static K, psi/in	EPCC, psi
I-64	EB	2	2	34500	259	130	5,639,280
				35001	220	110	6,169,967
				35500	263	131	6,569,582
				36000	261	131	7,943,930
				36500	294	147	7,726,621
				37000	295	147	7,675,944
				37500	283	141	7,812,019
				38000	284	142	6,696,480
				38501	267	133	8,408,993
				39000	287	144	7,151,583
				39500	279	139	7,618,081
				40000	308	154	7,773,404
				40499	182	91	7,952,806
				41000	134	67	13,409,196
				41500	350	175	3,579,966
				42000	341	171	3,272,241
			3	11000	134	67	2,164,355
				11500	113	56	9,769,826
				12000	125	62	4,449,367
				12500	153	76	8,382,156
				13000	173	87	9,002,417
				13500	171	85	10,454,413
				14000	176	88	10,705,846
				14500	185	92	7,688,290

Road	Direction	Section	Drop Height	Station	Dynamic K, psi/in	Static K, psi/in	EPCC, psi
I-64	EB	2	3	15001	182	91	9,555,914
				15500	197	99	7,262,523
				16000	306	153	7,951,582
				16501	273	137	9,043,194
				17000	271	135	9,485,454
				17500	174	87	7,078,499
				18000	169	85	9,312,854
				18500	139	70	7,318,772
				19000	153	77	9,977,737
				19466	103	52	15,084,713
				20000	227	114	10,805,690
				20500	233	117	9,630,963
				21000	311	155	6,751,883
				21500	373	187	5,522,691
				22000	370	185	8,319,005
				22500	323	162	5,968,268
				23001	375	188	5,045,837
				23500	300	150	9,324,776
				24000	264	132	7,128,327
				24500	266	133	7,949,438
				25001	240	120	5,664,532
				25500	233	117	6,436,394
				26000	250	125	7,030,867
				26500	255	128	5,652,189

Road	Direction	Section	Drop Height	Station	Dynamic K, psi/in	Static K, psi/in	EPCC, psi
I-64	EB	2	3	27000	260	130	6,248,036
				27501	321	160	9,151,138
				27901	277	138	3,922,834
				28500	494	247	6,017,685
				29000	345	173	6,932,420
				29500	318	159	8,789,499
				30000	317	158	8,015,102
				30500	257	128	4,344,492
				31000	207	103	5,442,808
				32000	171	86	5,363,291
				32500	279	140	7,684,145
				33000	269	134	4,649,840
				33500	310	155	6,488,754
				34000	246	123	7,753,197
				34500	258	129	6,034,003
				35001	222	111	6,431,521
				35500	266	133	6,578,326
				36000	263	132	8,095,709
				36500	285	142	8,570,614
				37000	294	147	7,942,245
				37500	286	143	7,916,446
				38000	289	145	6,774,881
				38501	271	135	8,398,216
				39000	292	146	7,238,802

Road	Direction	Section	Drop Height	Station	Dynamic K, psi/in	Static K, psi/in	EPCC, psi
I-64	EB	2	3	39500	285	142	7,825,841
				40000	305	153	8,057,234
				40499	191	96	7,933,045
				41000	136	68	13,710,832
				41500	349	174	3,778,649
				42000	343	172	3,389,559
			4	11000	136	68	2,145,912
				11500	116	58	9,938,093
				12000	132	66	4,268,021
				12500	156	78	8,078,852
				13000	173	87	9,179,321
				13500	172	86	10,261,729
				14000	179	90	10,639,784
				14500	191	95	7,620,268
				15001	183	91	9,452,739
				15500	204	102	6,865,751
				16000	307	154	7,879,557
				16501	281	140	8,503,910
				17000	260	130	10,625,159
				17500	186	93	6,512,396
				18000	169	85	9,436,656
				18500	143	71	7,199,048
				19000	156	78	9,962,071
				19466	105	53	15,369,720

Road	Direction	Section	Drop Height	Station	Dynamic K, psi/in	Static K, psi/in	EPCC, psi
I-64	EB	2	4	20000	220	110	11,219,412
				20500	233	116	9,541,917
				21000	308	154	6,688,748
				21500	368	184	5,478,886
				22000	365	182	8,195,408
				22500	319	159	6,095,757
				23001	384	192	4,933,584
				23500	310	155	8,840,187
				24000	267	134	6,898,212
				24500	270	135	7,484,268
				25001	243	122	5,570,433
				25500	235	117	6,224,713
				26000	252	126	6,678,695
				26500	270	135	5,094,021
				27000	258	129	6,274,399
				27501	329	164	8,853,842
				27901	276	138	4,054,590
				28500	488	244	6,008,745
				29000	333	166	7,080,596
				29500	318	159	8,532,526
				30000	311	155	7,821,207
				30500	260	130	4,445,282
				31000	215	107	5,470,522
				32000	170	85	5,549,635

Road	Direction	Section	Drop Height	Station	Dynamic K, psi/in	Static K, psi/in	EPCC, psi
I-64	EB	2	4	32500	273	136	7,609,522
				33000	268	134	4,678,070
				33500	311	156	6,196,050
				34000	250	125	7,751,565
				34500	272	136	5,798,982
				35001	230	115	6,569,948
				35500	265	132	6,629,469
				36000	266	133	7,908,660
				36500	292	146	7,981,851
				37000	297	149	7,794,801
				37500	290	145	7,562,831
				38000	288	144	6,707,853
				38501	272	136	8,130,167
				39000	295	148	7,002,069
				39500	283	141	7,634,522
				40000	306	153	7,579,014
				40499	193	97	8,234,580
				41000	137	69	13,790,458
				41500	353	176	3,809,161
				42000	355	177	3,525,203
			Average		250	125	7,400,914
	WB	1	1	0	387	194	3,213,733
				502	302	151	3,994,699
				1001	281	141	3,438,842

Road	Direction	Section	Drop Height	Station	Dynamic K, psi/in	Static K, psi/in	EPCC, psi
I-64	WB	1	1	1501	351	175	4,203,019
				2001	142	71	17,740,972
				2500	175	88	10,238,367
				3000	224	112	11,546,096
				3500	257	128	13,795,585
				4000	255	128	12,817,600
				4499	257	128	11,670,369
				5001	214	107	10,410,266
				5500	261	130	9,174,643
				5998	254	127	8,698,958
				6500	261	130	8,020,178
				7001	261	131	9,005,676
				7500	255	127	8,143,615
				7999	201	100	8,860,086
				8500	242	121	7,296,757
				9000	242	121	7,411,751
				9500	290	145	4,123,898
				10000	245	123	6,610,632
				10500	262	131	8,783,800
				11000	171	85	7,373,945
				11499	187	93	7,639,475
				11994	281	141	4,983,559
				12500	199	99	7,218,337
				13000	269	135	9,438,313

Road	Direction	Section	Drop Height	Station	Dynamic K, psi/in	Static K, psi/in	EPCC, psi
I-64	WB	1	1	13500	228	114	10,798,485
				14000	380	190	9,093,762
				14500	252	126	8,033,022
				15001	311	156	6,735,228
				15500	243	122	6,350,945
				16000	278	139	10,824,254
				16500	259	130	7,881,566
				17000	232	116	9,190,818
				17500	253	126	8,912,643
				18000	222	111	7,354,472
				18501	205	102	8,232,920
				19000	262	131	8,364,896
				19500	297	148	5,424,006
				20000	272	136	9,160,421
				20500	317	159	10,087,575
				21002	353	176	10,680,968
				21501	273	137	11,132,394
				22001	296	148	9,685,336
				22500	271	136	9,222,782
				23000	210	105	8,734,918
				23500	195	97	9,200,194
			2	0	382	191	3,435,308
				502	293	146	4,232,588
				1001	272	136	3,928,215

Road	Direction	Section	Drop Height	Station	Dynamic K, psi/in	Static K, psi/in	EPCC, psi
I-64	WB	1	2	1501	337	168	4,804,877
				2001	137	68	17,228,534
				2500	186	93	9,471,927
				3000	221	111	11,822,201
				3500	237	118	13,838,198
				4000	255	128	11,987,289
				4499	246	123	11,852,782
				5001	238	119	8,988,163
				5500	246	123	9,867,560
				5998	278	139	7,329,575
				6500	251	125	8,167,504
				7001	240	120	9,243,717
				7500	241	121	8,730,150
				7999	197	98	9,019,550
				8500	236	118	7,492,222
				9000	215	108	8,192,310
				9500	261	130	5,120,539
				10000	240	120	6,575,808
				10500	271	136	8,532,717
				11000	171	85	7,432,378
				11499	189	95	7,661,992
				11994	318	159	4,143,737
				12500	199	99	7,417,585
				13000	284	142	9,137,245

Road	Direction	Section	Drop Height	Station	Dynamic K, psi/in	Static K, psi/in	EPCC, psi
I-64	WB	1	2	13500	231	116	10,743,399
				14000	363	182	9,408,254
				14500	255	127	8,245,289
				15001	320	160	6,583,673
				15500	245	123	6,281,967
				16000	294	147	9,836,386
				16500	261	130	7,906,607
				17000	243	122	8,760,231
				17500	249	124	8,951,046
				18000	220	110	7,743,654
				18501	214	107	7,906,663
				19000	271	135	8,223,758
				19500	311	156	5,383,812
				20000	294	147	8,240,010
				20500	334	167	9,853,583
				21002	363	181	10,422,858
				21501	278	139	11,232,684
				22001	323	162	9,279,008
				22500	285	143	9,182,279
				23000	211	106	8,971,159
				23500	193	97	9,540,253
			3	0	385	192	3,551,404
				502	307	154	4,150,465
				1001	279	140	3,812,084

Road	Direction	Section	Drop Height	Station	Dynamic K, psi/in	Static K, psi/in	EPCC, psi
I-64	WB	1	3	1501	358	179	4,284,459
				2001	139	70	16,746,821
				2500	187	93	9,708,872
				3000	220	110	12,152,283
				3500	247	124	12,130,711
				4000	257	129	11,746,909
				4499	252	126	11,705,675
				5001	240	120	9,215,006
				5500	247	124	10,097,472
				5998	246	123	9,209,237
				6500	253	126	8,274,595
				7001	242	121	9,364,369
				7500	246	123	8,711,385
				7999	200	100	9,104,302
				8500	238	119	7,556,885
				9000	218	109	8,175,534
				9500	283	141	4,618,781
				10000	256	128	6,268,954
				10500	277	138	8,411,356
				11000	170	85	7,692,049
				11499	191	96	7,950,708
				11994	287	143	4,964,735
				12500	202	101	7,769,967
				13000	284	142	9,481,917

Road	Direction	Section	Drop Height	Station	Dynamic K, psi/in	Static K, psi/in	EPCC, psi
I-64	WB	1	3	13500	228	114	11,317,155
				14000	364	182	9,486,401
				14500	273	136	7,796,656
				15001	318	159	6,441,609
				15500	246	123	5,931,782
				16000	291	145	10,100,329
				16500	255	128	8,089,344
				17000	240	120	8,566,783
				17500	252	126	8,429,685
				18000	220	110	7,644,297
				18501	214	107	7,954,295
				19000	275	138	7,834,533
				19500	312	156	5,125,192
				20000	284	142	8,528,999
				20500	346	173	9,217,471
				21002	373	187	10,023,716
				21501	277	139	11,121,506
				22001	331	166	8,977,920
				22500	290	145	8,871,437
				23000	209	104	9,375,531
				23500	194	97	9,711,843
			4	0	384	192	3,626,139
				502	315	157	4,065,970
				1001	281	140	3,715,153

Road	Direction	Section	Drop Height	Station	Dynamic K, psi/in	Static K, psi/in	EPCC, psi
I-64	WB	1	4	1501	366	183	4,049,172
				2001	144	72	15,633,992
				2500	199	99	9,224,942
				3000	221	111	12,367,818
				3500	236	118	13,253,805
				4000	256	128	11,775,896
				4499	250	125	11,313,847
				5001	246	123	8,753,245
				5500	251	125	10,026,890
				5998	243	121	9,537,673
				6500	253	126	8,209,095
				7001	245	122	9,292,046
				7500	250	125	8,453,516
				7999	205	103	8,862,493
				8500	243	122	7,473,216
				9000	227	113	7,960,424
				9500	280	140	4,707,684
				10000	249	124	6,643,578
				10500	277	138	8,227,156
				11000	172	86	7,602,932
				11499	196	98	7,916,421
				11994	307	153	4,432,583
				12500	209	105	7,672,700
				13000	293	147	9,105,552

Road	Direction	Section	Drop Height	Station	Dynamic K, psi/in	Static K, psi/in	EPCC, psi
I-64	WB	1	4	13500	236	118	10,834,819
				14000	366	183	9,075,116
				14500	271	135	7,993,262
				15001	305	153	6,473,633
				15500	246	123	5,537,677
				16000	292	146	9,561,203
				16500	254	127	7,896,440
				17000	234	117	8,584,729
				17500	243	122	8,273,852
				18000	218	109	7,271,754
				18501	210	105	7,774,280
				19000	266	133	7,832,524
				19500	298	149	5,266,768
				20000	288	144	7,897,187
				20500	358	179	8,233,346
				21002	367	184	9,722,124
				21501	270	135	11,021,540
				22001	323	161	8,845,538
				22500	284	142	8,832,238
				23000	213	106	9,118,825
				23500	194	97	9,575,485
			Average		259	130	8,469,978
		2	1	24000	132	66	2,469,089
				24500	121	61	8,720,672

Road	Direction	Section	Drop Height	Station	Dynamic K, psi/in	Static K, psi/in	EPCC, psi
I-64	WB	2	1	25001	143	72	8,826,550
				25500	150	75	5,045,105
				26000	155	77	3,586,405
				26500	242	121	9,553,205
				27000	213	106	6,457,506
				27500	193	97	7,528,288
				27999	182	91	10,613,726
				28500	142	71	7,524,024
				29000	144	72	8,626,961
				29500	166	83	9,233,126
				30000	169	84	7,831,130
				30500	142	71	7,282,778
				31000	148	74	7,942,405
				31499	100	50	9,307,256
				32000	105	53	8,057,605
				32500	152	76	17,669,188
				24000	120	60	3,176,054
			2	24500	123	61	8,946,351
				25001	142	71	9,315,342
				25500	154	77	5,323,304
				26000	157	79	3,763,559
				26500	241	121	10,273,009
				27000	216	108	6,632,927
				27500	185	93	8,496,429

Road	Direction	Section	Drop Height	Station	Dynamic K, psi/in	Static K, psi/in	EPCC, psi
I-64	WB	2	2	27999	181	90	10,932,980
				28500	145	73	7,593,113
				29000	147	74	8,873,550
				29500	168	84	9,416,027
				30000	165	83	8,169,293
				30500	140	70	7,521,152
				31000	142	71	8,206,132
				31499	100	50	9,214,559
				32000	106	53	8,314,162
				32500	155	77	16,730,404
			3	24000	133	67	2,966,448
				24500	126	63	9,010,841
				25001	143	71	9,738,558
				25500	155	78	5,610,367
				26000	166	83	3,907,214
				26500	238	119	11,191,922
				27000	219	109	6,805,478
				27500	192	96	8,480,981
				27999	182	91	11,298,741
				28500	148	74	7,745,352
				29000	149	74	9,246,909
				29500	169	84	9,784,207
				30000	163	81	8,459,338
				30500	141	70	7,771,621

Road	Direction	Section	Drop Height	Station	Dynamic K, psi/in	Static K, psi/in	EPCC, psi
I-64	WB	2	3	31000	141	70	8,543,285
				31499	104	52	9,484,887
				32000	104	52	8,866,355
				32500	160	80	17,009,944
			4	24000	132	66	3,359,221
				24500	128	64	9,079,204
				25001	144	72	9,810,360
				25500	159	79	5,847,098
				26000	171	85	4,051,569
				26500	237	118	11,048,975
				27000	221	111	6,720,903
				27500	197	98	8,359,846
				27999	186	93	11,359,416
				28500	151	75	7,813,221
				29000	151	76	9,452,590
				29500	172	86	9,752,501
				30000	161	81	8,578,377
				30500	141	71	8,074,967
				31000	142	71	8,623,361
				31499	105	52	9,458,069
				32000	107	53	9,127,483
				32500	157	79	17,423,042
			Average		157	78	8,486,611
		3	1	37550	99	50	12,341,012

Road	Direction	Section	Drop Height	Station	Dynamic K, psi/in	Static K, psi/in	EPCC, psi
I-64	WB	3	1	38000	139	70	6,634,085
				38500	161	81	4,871,363
				39000	143	72	5,564,696
				39500	152	76	6,314,443
				40000	189	95	3,560,105
				40500	137	68	7,445,922
				41001	172	86	9,681,466
				41500	199	99	7,960,627
				42053	240	120	7,324,936
				42500	172	86	12,391,064
				43000	205	102	4,152,326
				43500	140	70	3,413,995
			2	37550	100	50	12,584,510
				38000	139	70	6,583,408
				38500	157	79	5,014,373
				39000	138	69	5,813,656
				39500	155	78	6,304,096
				40000	185	92	3,811,864
				40500	148	74	6,845,903
				41001	170	85	10,038,069
				41500	201	100	8,440,146
				42053	246	123	7,327,171
				42500	180	90	12,456,122
				43000	209	105	4,185,394

Road	Direction	Section	Drop Height	Station	Dynamic K, psi/in	Static K, psi/in	EPCC, psi
I-64	WB	3	2	43500	147	73	3,448,828
			3	37550	104	52	12,724,594
				38000	142	71	6,672,093
				38500	156	78	5,272,186
				39000	139	70	6,117,179
				39500	157	78	6,484,784
				40000	186	93	3,962,007
				40500	150	75	7,161,441
				41001	174	87	9,927,809
				41500	210	105	8,383,857
				42053	253	127	7,415,543
				42500	185	92	12,568,964
				43000	213	106	4,268,757
				43500	153	76	3,470,115
			4	37550	105	53	12,778,956
				38000	151	75	6,490,145
				38500	165	83	5,101,883
				39000	145	72	6,181,778
				39500	156	78	6,475,440
				40000	187	93	4,097,689
				40500	155	77	7,085,449
				41001	174	87	9,877,931
				41500	214	107	8,203,629
				42053	260	130	7,053,576

Road	Direction	Section	Drop Height	Station	Dynamic K, psi/in	Static K, psi/in	EPCC, psi
I-64	WB	3	4	42500	190	95	12,132,715
				43000	215	107	4,287,259
				43500	162	81	3,382,272
			Average		170	85	7,155,531
I-464	NB	1	1	0	227	113	10,710,606
				194	157	78	4,561,775
				1404	128	64	7,609,310
				1775	229	114	11,492,568
				1980	353	176	6,185,330
				2131	264	132	14,285,940
				2322	214	107	7,124,577
				2489	256	128	10,239,051
				2690	234	117	7,923,897
				2953	292	146	9,021,355
				3168	242	121	7,237,283
				3594	262	131	6,735,937
				4030	216	108	6,536,091
				4465	207	104	7,162,211
			2	0	221	111	11,182,724
				194	116	58	10,666,123
				1404	135	68	7,873,476
				1775	230	115	12,342,729
				1980	316	158	8,302,015
				2131	262	131	15,121,518

Road	Direction	Section	Drop Height	Station	Dynamic K, psi/in	Static K, psi/in	EPCC, psi
I-464	NB	1	2	2322	225	113	6,899,713
				2489	229	114	15,265,014
				2690	242	121	7,717,271
				2953	263	132	12,170,943
				3168	230	115	7,674,990
				3594	236	118	7,681,791
				4030	190	95	8,078,389
				4465	193	96	8,432,839
			3	0	228	114	10,599,107
				194	62	31	3,104,915,456
				1404	133	67	8,373,047
				1775	234	117	12,474,529
				1980	328	164	7,258,627
				2131	264	132	15,842,849
				2322	239	119	6,715,633
				2489	245	122	13,161,226
				2690	249	125	7,682,597
				2953	277	139	10,936,201
				3168	250	125	7,354,135
				3594	243	122	7,670,808
				4030	175	87	8,783,635
				4465	193	97	8,824,349
			4	0	220	110	10,928,008
				194	64	32	2,226,906,368

Road	Direction	Section	Drop Height	Station	Dynamic K, psi/in	Static K, psi/in	EPCC, psi
I-464	NB	1	4	1404	139	70	8,042,034
				1775	235	117	11,926,480
				1980	307	154	7,907,100
				2131	272	136	14,279,010
				2322	235	118	6,956,009
				2489	159	79	47,801,472
				2690	258	129	7,267,012
				2953	282	141	10,579,976
				3168	254	127	7,315,585
				3594	263	132	6,859,643
				4030	188	94	8,136,703
				4465	208	104	8,158,380
			Average		225	112	104,819,490
	SB	1	1	669	181	91	22,975,542
				1034	248	124	58,379,976
				1334	474	237	151,745,664
				1528	349	175	66,093,468
				2206	371	185	115,718,104
				2500	277	138	148,014,032
				2774	263	132	232,942,976
				3159	283	141	156,389,440
				3436	366	183	115,559,456
				3930	239	120	99,224,840
				4546	214	107	83,493,056

Road	Direction	Section	Drop Height	Station	Dynamic K, psi/in	Static K, psi/in	EPCC, psi
I-464	SB	1	2	669	185	93	25,111,614
				1034	240	120	66,005,128
				1334	468	234	177,218,768
				1528	342	171	70,802,544
				2206	358	179	133,585,352
				2500	308	154	121,891,632
				2774	254	127	244,133,808
				3159	258	129	235,265,104
				3436	323	162	165,632,288
				3930	230	115	120,581,928
				4546	202	101	116,558,912
			3	669	194	97	23,876,834
				1034	241	121	68,513,672
				1334	467	234	179,044,864
				1528	345	172	72,433,800
				2206	365	182	131,671,440
				2500	302	151	130,927,840
				2774	254	127	254,738,704
				3159	276	138	194,079,504
				3436	360	180	140,486,800
				3930	232	116	131,128,024
				4546	214	107	111,461,624
			4	669	198	99	25,649,024
				1034	246	123	67,657,936

Road	Direction	Section	Drop Height	Station	Dynamic K, psi/in	Static K, psi/in	EPCC, psi
I-464	SB	1	4	1334	469	235	165,451,328
				1528	357	178	65,869,608
				2206	367	184	124,655,584
				2500	308	154	121,340,096
				2774	258	129	243,537,264
				3159	294	147	158,866,960
				3436	373	187	128,546,392
				3930	238	119	123,874,296
				4546	223	111	113,204,696
			Average		296	148	125,098,635

Table E.3. Load Transfer Efficiency Estimated for I-464 Northbound

Station	Slab	Load Level	Average LTE %
7	1	1	96
		2	99
		3	96
		4	96
1189	4	1	93
		2	96
		3	95
		4	96
1427	6	1	54
		2	56
		3	56
		4	57
1782	8	1	90
		2	92
		3	91
		4	91
1988	10	1	39
		2	43
		3	46
		4	51

Station	Slab	Load Level	Average LTE %
2136	12	1	55
		2	57
		3	60
		4	63
2331	14	1	79
		2	81
		3	80
		4	80
2495	16	1	65
		2	60
		3	56
		4	53
2700	18	1	81
		2	81
		3	80
		4	80
2960	20	1	62
		2	62
		3	62
		4	65
3194	22	1	64
		2	67
		3	67
		4	67
3620	24	1	64
		2	66
		3	67
		4	68
4057	26	1	53
		2	57
		3	58
		4	60
4489	28	1	64
		2	68
		3	68
		4	68

Table E.4. Load Transfer Efficiency Estimated for I-464 Southbound

Station	Slab	Load Level	Average LTE %
678	1	1	89
		2	89
		3	87
		4	87
1043	3	1	39
		2	41
		3	42
		4	42
1341	5	1	92
		2	96
		3	94
		4	94
1536	7	1	28
		2	31
		3	31
		4	32
1960	9	1	71
		2	71
		3	71
		4	71
2212	11	1	87
		2	88
		3	88
		4	87
2509	13	1	95
		2	94
		3	94
		4	93
2782	15	1	35
		2	35
		3	35
		4	35
3166	17	1	88
		2	88
		3	88
		4	88
3443	19	1	80
		2	81
		3	82
		4	82

Station	Slab	Load Level	Average LTE %
3954	21	1	61
		2	68
		3	66
		4	68
4572	23	1	67
		2	68
		3	68
		4	68