ARKANSAS DEPARTMENT OF TRANSPORTATION



SUBSURFACE INVESTIGATION

STATE JOB NO.	040820 (COMBINATION JOB)									
FEDERAL AID PROJECT NO. NHPP-1765(8)											
	HWYS. 59, 64, 96 & 252 STRS. & APPRS. (S)										
STATE HIGHWAY	VARIOUS	SECTION	VARIOUS								
IN	CRAWF	ORD & SEBASTIAN	COUNTY								

The information contained herein was obtained by the Department for design and estimating purposes only. It is being furnished with the express understanding that said information does not constitute a part of the Proposal or Contract and represents only the best knowledge of the Department as to the location, character and depth of the materials encountered. The information is only included and made available so that bidders may have access to subsurface information obtained by the Department and is not intended to be a substitute for personal investigation, interpretation and judgment of the bidder. The bidder should be cognizant of the possibility that conditions affecting the cost and/or quantities of work to be performed may differ from those indicated herein.

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT

June 6, 2017

TO: Mr. Rick Ellis, Bridge Engineer

SUBJECT: Job No. 040625 Hwy. 22 – Hwy. 252 Strs. & Apprs. (S) Route 96 Section 3 Sebastian County

Transmitted herewith are a brief summary of the geology and site conditions, D50 analysis test results, unconfined compressive strength results, RMR, and the logs of the borings conducted for the structures and approaches of the above referenced project. The samples obtained by the Standard Penetration Tests were brought to the laboratory and visually classified by experienced lab personnel to confirm the field identifications. As noted in the attached Site Geology, there are a number of normal faults in this area. An east-west trending, down-to-the-south normal fault has been mapped to the north of the proposed bridge site. The rocks encountered during the subsurface investigation do not correlate very well between the borings (there are two shale beds present in the southern boring that are not present in the northern boring). This may be explained most likely by a moderate dip of the rocks to the south or less likely a small offsetting fault between the borings. The rock cores are available for inspection at the Materials Division.

Based on the depth at which bedrock was encountered, it is anticipated that both end bents will be founded on piling. No borings were obtained at intermediate bents 2 or 3, station 488+88 and 489+33, due to inaccessibility caused by the steep bank and low bridge clearance. Based on discussions with Bridge Design, it is anticipated that all intermediate bents will be founded on drilled shafts. Drilled shafts socketed into the competent shale with sandstone or sandstone with shale should be sized based on the values provided in Table 1.

Foundation Description	Nominal Shaft Side Resistance (ksf)	Factored Shaft Side Resistance (ksf)	Nominal Shaft Tip Resistance (ksf)	Factored Shaft Tip Resistance (ksf)
Drilled Shafts	21.2	11.7	38	19

TABLE 1 – Bearing Capacity Recommendations for	Drilled Shafts
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If you have any questions concerning these recommendations, please contact the Geotechnical Section.

Michael C. Benson

Michael C. Benson Materials Engineer

MCB:rpt:mlg

cc: State Construction Engineer - Master File Copy District 4 Engineer G.C. File

GEOLOGY AND SITE CONDITIONS Job No. 040625

Hwy. 22 – Hwy. 252 Strs. & Apprs. (S) Sebastian County Route 96 Section 3

Site Conditions

The existing structure over Onion Creek is a two span bridge. The deck is constructed of corrugated steel overlain by asphalt. The deck is supported by 10 sets of steel beams. The bents are constructed of rock and mortar. The guardrail is constructed of steel supported by steel posts on the bridge and concrete and timber posts leading up to the bridge. An overhead power line parallels the west side of the roadway. The channel is lined with trees and thick vegetation, with pastureland in the areas beyond the channel. Onion Creek is a slow-moving slough that flows into the Arkansas River to the west.

Site Geology

The project alignment is located on deposits mapped as alluvial deposits (map symbol Qal). Alluvial deposits are typically composed of gravels, sands, silts, clays, and mixtures of any and all of these clastic materials and have been deposited by present-day streams. The alluvial deposits have an unconformable contact with bedrock, meaning that the depth to bedrock could be quite variable. Depth to bedrock in the two borings drilled ranged from 29 to 35.3 feet below ground level (bgl).

The rocks encountered below the alluvial deposits are shales and sandstones of the McAlester Formation (map symbol Pm). The McAlester consists of (in ascending order): several hundred feet of shale with thin sandstone and coal (the Lower Hartshorne coal is just above the base), several hundred feet of shale with a few sandstone beds and coal (Upper Hartshorne Coal), and capped by several hundred feet of shale with a few coal beds. The unit ranges from about 500 to 2,300 feet in thickness. The proposed bridge site is most likely in the lowest part of the McAlester, below the Lower Hartshorne coal.

There are a number of normal faults in this area. An east-west trending, down-to-the-south normal fault has been mapped to the north of the proposed bridge site. The rocks encountered during the subsurface investigation do not correlate very well between the borings (there are two shale beds present in the southern boring that are not present in the northern boring). This may be explained most likely by a moderate dip of the rocks to the south or less likely a small offsetting fault between the borings.

Onion Creek may lie in a previous course of the Arkansas River. Due to the connectivity of Onion Creek to the Arkansas River and the low elevation, the area of the proposed bridge site may be subject to flooding when the Arkansas River floods.

Subsurface Conditions

Based on the results of the borings, the subsurface stratigraphy may be generalized as follows:

- 0 to 20.0 Feet: Consists of moist, soft to stiff, brown **clay**. Many samples in this zone contained some amount of **gravel**.
- 20.0 to 29.0 Feet: Consists of moist to wet, stiff, brown sandy clay to clay with gravel (rock fragments).
- 29.0 to 35.3 Feet: Varies from wet, stiff to very hard, brown clay with gravel (rock fragments) to sandstone with frequent shale seams.
- 35.3 to 51.6 Feet: Varies from unweathered, cemented, gray sandstone with frequent shale seams to unweathered, medium hard, dark gray shale with occasional sandstone layers.
- 51.6 to 57.5 Feet: Consists of unweathered, cemented, gray **sandstone with frequent shale seams**.

D₅₀ AGGREGATE ANALYSIS FOR SCOUR CALCULATIONS

		Job No.	040625		
Creek Name	Station	Sample Type	Location	Depth (FT)	Aggregate Size (D50) (IN)
Onion Creek	489+30	Creek Bank	30' Rt. C.L. Construction	NA	0.0035

2

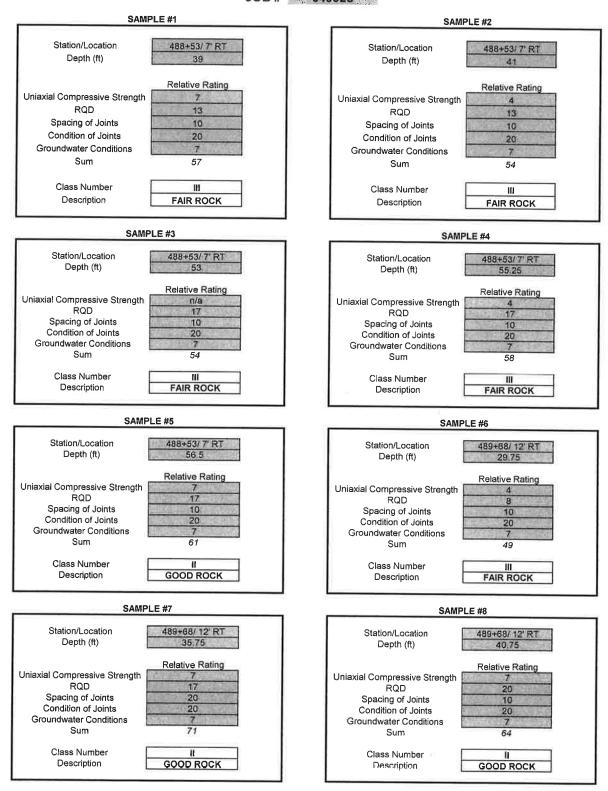
Rock Core Unconfined Compression Test Summary

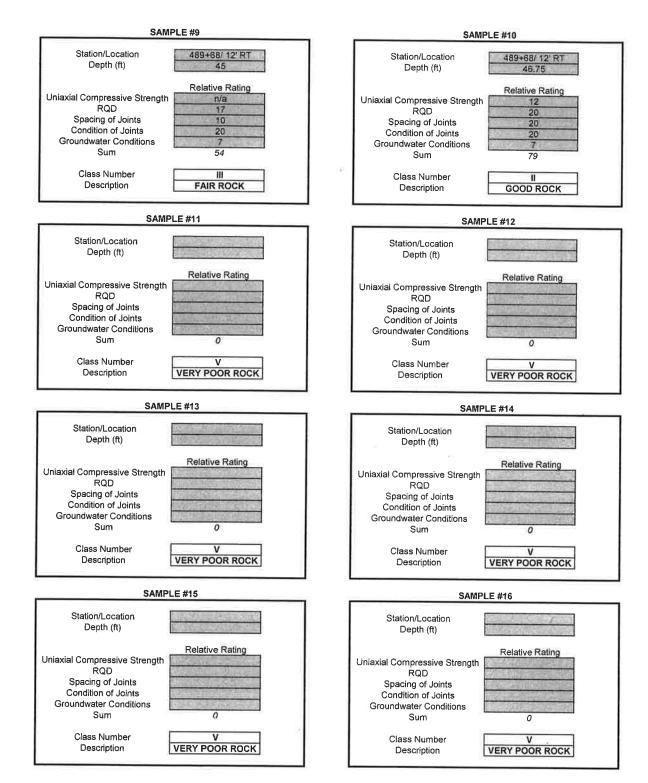
Project Number: 040625 Project Name: Hwy. 22 - Hwy. 252 Str. & Apprs. (S) Date Tested: 5/23/2017

Station	Location	Sample No.	Depth (ft)	Diameter (in)	Height (in)	Total Load (lbs)	Correction Factor	Stress (psi)	Remarks
488+53	7' RT	1	39.00	1.75	3.50	18,430	1.00	7,662	SS w/ Shale Seams & Layers
488+53	7' RT	2	41.00	1.75	3.50	13,140	1.00	5,463	SS w/ Shale Seams & Layers
488+53	7' RT	3	53.00	0	0.00	0	1.00	0	SS w/ Shale Seams (Broke while capping)
488+53	7' RT	4	55.25	1.75	3.50	12,580	1.00	5,230	SS w/ Shale Seams (Shale)
488+53	7' RT	5	56.50	1.75	3.55	19,740	1.00	8,207	SS w/ Shale Seams
489+68	12' RT	6	29.75	1.75	3.50	8,850	1.00	3,679	SS w/ Shale Seams
489+68	12' RT	7	35.75	1.75	3.55	20,030	1.00	8,328	SS w/ Shale Seams
489+68	12' RT	8	40.75	1.75	3.55	32,460	1.00		SS w/ Shale Seams
489+68	12' RT	9	45.00	0	0.00	0	1.00	0	SS w/ Shale Seams (Broke while capping)
489+68	12' RT	10	46.75	1.75	3.50	17,130	1.00	7,122	SS w/ Shale Seams

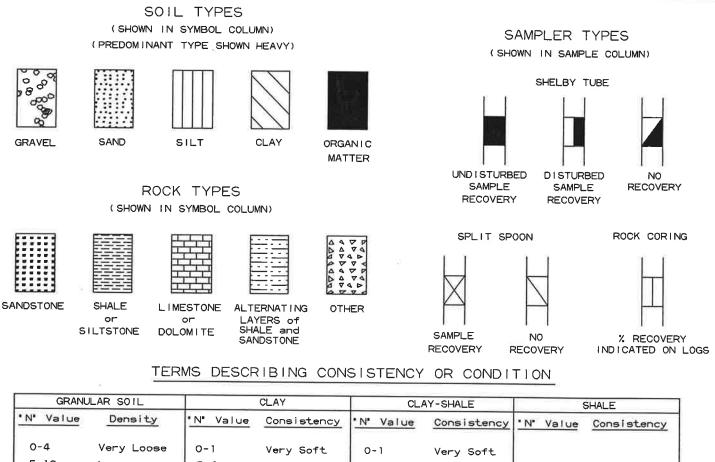
* Please note any broken samples, fractures or other characteristics of sample in Remarks.

ROCK MASS RATING SUMMARY JOB # 040625





EGEND



5-10	Loose	2-4	Soft	2-4	Soft	31-60 Soft	
11-30	Medium Dense	5-8	Medium Stiff	5-8	Medium Stiff	Over 60	
31-50	Dense	9-15	Stiff	9-15	Stiff	More than 2'	
Over 50	Very Dense	16-30	Very Stiff	16-30	Very Stiff	Penetration	
		Э1-60	Hard	31-60	Hard	in 60 Blows: Medium	Hard
		0ver 60	Very Hard	0ver 60	Very Hard	Less than 2'	
						Penetration	
						in 60 Blows: Hard	

- 1. Ground water elevations indicated on boring logs represent ground water elevations at date or time shown on boring log. Absence of water surface implies that no ground water data is available but does not necessarily mean that ground water will not be encountered at locations or within the vertical reaches of these borings.
- 2. Borings represent subsurface conditions at their respective locations for their respective depths. Variations in conditions between or adjacent to boring locations may be encountered.
- 3. Terms used for describing soils according to their texture or grain size distribution are in accordance with the Unified Soil Classification System.

Standard Penetration Test – Driving a 2.0" O.D., 1-3/8" I.D. sampler a distance of 1.0 foot into undisturbed soil with a 140 pound hammer free falling a distance of 30 inches. It is customary to drive the spoon 6.0 inches to seat into undisturbed soil, then perform the test. The number of hammer blows for seating the spoon and performing the test are recorded for each 6 inches of penetration on the drill log. The field "N" Value (N_f) can be obtained by

adding the bottom two numbers for example: $\frac{6}{8-9} \Rightarrow 8+9 = 17blows / ft$. The "N" Value corrected to 60%

efficiency (N_{60}) can be obtained by multiplying N_f by the hammer correction factor published on the boring log.

	HWY. & TRANS. DEPARTMENT DIVISION - GEOTECHNICAL SEC.		BORI PAGE		ю. 1 1 с)F 2					
	040625 Sebastian County DATE: April 19, 2017										
	Hwy. 22 - Hwy. 252 Str. & Apprs. (S)		TYPE OF DRILLING: Hollow Stem Auger					r-			
	Route 96 Section 3				Wash					_	
STATION:	488+53		EQUI	MEN	T:		C	CME	75		
	7' Right of Construction Centerline										
	Coty Campbell		HAMM	AER C	ORREG	CTION	N FAC	TOR:	2	1.37	
COMPLETION	N DEPTH: 57.5		r								
DSA EYA PM TPP		SOIL				GHT	CU.FT.	SWO		% T	% R
H B L FT. L S	SURFACE ELEVATION: 389.3	GROUP	PLASTIC LIMIT	% MOIST.	LIQUID	DRY WEIGHT	LBS PER CU.FT.	NO. OF BLOWS	PER 6-IN.	C R	Q D
	SURFACE ELEVATION: 369.3		ы́Л	~	11			z	<u>P4</u>		_
	Moist, Medium Stiff, Brown Clay with Sand							3-3-	4		
	Moist, Soft, Brown Clay with Sand and Some Gravel (Rock Fragments)							2-			
	Moist, Medium Stiff, Brown Clay							3-	4		
25	Wet, Stiff, Brown Clay							<u>3</u> 4-			
	Wet, Stiff, Brown Sandy Clay							<u>3</u> 4-			
	Wet, Stiff, Brown Clay with Gravel (Rock Fragments)							4			
REMARKS:	×										

			HWY. & TRANS. DEPARTMENT DIVISION - GEOTECHNICAL SEC.				NO. 1						
JOB N		_	040625 Sebastian County		PAGE	_	2 (DF 2	_	0.20	17		
	IO. IAME:		Hwy. 22 - Hwy. 252 Str. & Apprs. (S)		DATE: April 19, 2017 TYPE OF DRILLING: Hollow Stem Auge								
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STAT	ION:		488+53		EQUI			- Di		CME			
	TION:		7' Right of Construction Centerline				1.				,5		
			oty Campbell		HAM	MER (CORRE	CTIO	N FAG	CTOR:		1.37	
		_	DEPTH: 57.5										
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FT ₂	L		SURFACE ELEVATION: 389.3		PLASTIC LIMIT	% MOIST.	LIQUID	DRY WEIGHT	LBS PER CU.FT	NO. OF BLOWS	PER		
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			(Fragments)							1: (4	")		
			SHALE										
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40	4 M 4		SANDSTONE WITH FREQUENT SHALE									98	68
	2:22		SEAMS AND LAYERS - Unweathered, Cemented, Gray									98	00
<u> -</u>	0 D C		Semented, Ordy										
			SHALE WITH OCCASIONAL SANDSTONE								51		
45			SEAMS - Unweathered, Medium Hard, Dark									96	80
	c		Gray						2				
		+									3		
			SHALE WITH OCCASIONAL SANDSTONE										
50			LAYERS - Unweathered, Medium Hard,									100	FG
			Occasional Fractures, Dark Gray				8					100	56
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	: DC		SEAMS - Unweathered, Cemented, Gray									98	85
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JOB N		040625 Sebastian County DATE: April 25, 2017											
JOB N			Hwy. 22 - Hwy. 252 Str. & Apprs. (S)				RILLIN	-	/111 2	5,20			
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			Route 96 Section 3				Stem		er - 1	Diam	nond	Core	
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ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT

November 16, 2016

TO: Mr. Trinity Smith, Engineer of Roadway Design

SUBJECT: Job No. 040625 Hwy. 22 – Hwy. 252 Strs. & Apprs. (S) Route 96 Section 3 Sebastian County

Transmitted herewith is the requested Soil Survey, Strength Data and Resilient Modulus test results for the above referenced job. The project consists of replacing three bridges on Highway 96. Samples were obtained in the existing travel lanes and ditch line. There were no paved shoulders within the project

Based on laboratory results of samples obtained, the subgrade soils consist primarily of moderately plastic sandy clays containing varying amounts of gravel. Isolated locations of highly plastic clay were encountered within the project limits. Rock was encountered at station 510+00 6 feet and 18 feet left of centerline at depths of 4.0 feet and 2.5 feet respectively. Cross-sections are not currently available, but it is anticipated that the construction grade line will closely match that of the existing roadway. The subgrade soils are expected to provide a stable working platform with normal drying and compactive efforts, if the weather is favorable during construction.

Additional earthwork recommendations will be made upon request when plans are further developed.

Listed below is the additional information requested for use in developing the plans:

- 1. The Qualified Products List (QPL) indicates that Aggregate Base Course (Class CL-7) is available from commercial producers located near Lavaca.
- 2. Asphalt Concrete Hot Mix

Туре	Asphalt Cement %	Mineral Aggregate %
Surface Course	5.4	94.6
Binder Course	4.5	95.5
Base Course	4.2	95.8

Michael C. Benson

Materials Engineer

MCB:pt:bjj Attachment

cc: State Constr. Eng. – Master File Copy District 4 Engineer System Information and Research Div. G. C. File ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT - LITTLE ROCK, ARKANSAS MATERIALS DIVISION MICHAEL BENSON, MATERIALS ENGINEER *** SOIL SURVEY STRENGTH TEST REPORT ***

DATE	- 11/14/2016	SEQUENCE NO.	- 1
JOB NUMBER	- 040625	MATERIAL CODE	- SSRV
		SPEC. YEAR	- 2014
		SUPPLIER ID.	- 1
		COUNTY/STATE	- 65
		DISTRICT NO.	- 04
JOB NAME -	HWY.22 - HWY.252 STRS. & APPRS. (S)	
*******	* * * * * * * * * * * * * * * * * * * *	* * * * * * * * * * * * * * * * * * * *	*****
*	STATION LIMITS	R-VALUE AT 240 psi	*
* * * * * * * * * * *	* * * * * * * * * * * * * * * * * * * *	* * * * * * * * * * * * * * * * * * * *	*****
	BEGIN JOB - END JOB	LESS THAN 5	
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STA.	100+00	7320
STA.	495+00	4854

REMARKS -

AASHTO TESTS : T190

AASHTO T 307-99 - RESILIENT MODULUS OF SUBGRADE SOILS RECOMPACTED SAMPLES

Job No. Date Sampled: Date Tested: Name of Project:	040625 11/10/16 November 10, 2016 HWY.22 - HWY.252 STRS & APPRS (S)	Material Code Station No.: Location:	SSRVPS 100+00 18 RT
County: Sampled By: Lab No.: Sample ID: LATITUDE:	Code:65Name:SEBASTIANTHORNTON20163507RV389	Depth: AASHTO Class: Material Type (1 or 2) LONGITUDE:	0-5 A-4(1) 2
1. Testing Inform	nation:		
	Preconditioning - Permanent Strain > 5% (Y=* Testing - Permanent Strain > 5% (Y=Yes or N= Number of Load Sequences Completed (0-15)		N N 15
2. Specimen Info	ormation:		
	Specimen Diameter (in): Top Middle Bottom Average Membrane Thickness (in): Height of Specimen, Cap and Base (in): Height of Cap and Base (in): Initial Length, Lo (in): Initial Area, Ao (sq. in): Initial Volume, AoLo (cu. in):		3.96 3.96 3.96 3.96 0.01 8 0.00 8 12.25 98.03
3. Soil Specimer	1 Weight: Weight of Wet Soil Used (g):		3232.00
4. Soil Propertie	s: Optimum Moisture Content (%); Maximum Dry Density (pcf): 95% of MDD (pcf): In-Situ Moisture Content (%):		14.1 113.7 108.0 N/A
5. Specimen Pro	nerties:		
	Wet Weight (g): Compaction Moisture content (%): Compaction Wet Density (pcf): Compaction Dry Density (pcf): Moisture Content After Mr Test (%):		3232.00 14.0 125.62 110.19 14.1
6. Quick Shear T	est (Y=Yes, N=No, N/A=Not Applicable):		#VALUE!
7. Resilient Mod	ulus, Mr:	7547(5	Sc)^-0.15722(S3)^0.39753
8. Comments	£917		
9. Tested By:	<u>DT</u> D	ate: <u>November 10, 2016</u>	

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AASHTO T 307-99 - RESILIENT MODULUS OF SUBGRADE SOILS RECOMPACTED SAMPLES

Job No.	040625			Material Code	SSRVPS
Date Sampled:	11/10/16			Station No.:	100+00
Date Tested:	November 10, 2016			Location:	18 RT
Name of Project:	HWY.22 - HWY.252 STRS & APPRS (S)	STRS & APP	RS (S)		
County:	Code: 65	Name:	Name: SEBASTIAN		
Sampled By:	THORNTON			Depth:	0-5
Lab No.:	20163507			AASHTO Class:	A-4(1)
Sample ID:	RV389			Material Type (1 or 2): 2	2): 2
LATITUDE:				LONGITUDE:	

t I	s			_																	
Resilient	Modulus				Ar	psi	13,958	13,051	12,062	11,101	10,668	11,916	10,677	9,909	9,525	9,209	8,872	8,222	7,605	7,376	7,320
Resilient	Strain		_		ε ^r	in/in	0.00013	0.00028	0.00045	0.00065	0.00084	0.00015	0.00034	0.00054	0.00075	0.00096	0.00020	0.00043	0.00068	0.00093	0.00117
Average	Recov Def.	LVDT 1	and 2		H _{avg}	.u	0.00106	0.00224	0.00361	0.00518	0.00670	0.00123	0.00271	0.00432	0.00598	0.00767	0.00162	0.00343	0.00545	0.00746	0.00935
Actual	Applied	Contact	Stress		Scontact	psi	0.2	0.2	0.3	0.5	0.7	0.2	0.2	0.2	0.4	0.6	0.2	0.2	0.2	0.4	0.6
Actual	Applied	Cyclic	Stress		S _{cyclic}	psi	1.8	3.7	5.4	7.2	8.9	1.8	3.6	5.4	7.1	8.8	1.8	3.5	5.2	6.9	8.6
Actual	Applied	Max.	Axial	Stress	S _{max}	psi	2.1	3.9	5.7	7.7	9.6	2.1	3.8	5.6	7.5	9.5	2.0	3.7	5.4	7.2	9.1
Actual	Applied	Contact	Load		P _{contact}	lbs	2.7	2.8	3.6	6.1	8.6	2.8	2.8	2.8	5.2	7.7	2.7	2.7	2.7	4.3	6.8
Actual	Applied	Cyclic Load			P _{cyclic}	lbs	22.6	44.9	66.7	88.0	109.5	22.4	44.3	65.6	87.2	108.2	22.0	43.2	63.5	84.3	104.8
Actual	Applied	Max. Axial	Load		P _{max}	lbs	25.3	47.7	70.3	94.1	118.1	25.2	47.1	68.5	92.4	115.8	24.8	45.9	66.2	88.6	111.6
Nominal	Maximum	Axial	Stress		S _{cyclic}	psi	2.0	4.0	6.0	8.0	10.0	2.0	4.0	6.0	8.0	10.0	2.0	4.0	6.0	8.0	10.0
Chamber	Confining	Pressure			S3	psi	6.0	6.0	6.0	6.0	6.0	4.0	4.0	4.0	4.0	4.0	2.0	2.0	2.0	2.0	2.0
		PARAMETER			DESIGNATION	UNIT	Sequence 1	Sequence 2	Sequence 3	Sequence 4	Sequence 5	Sequence 6	Sequence 7	Sequence 8	Sequence 9	Sequence 10	Sequence 11	Sequence 12	Sequence 13	Sequence 14	Sequence 15

REVIEWED BY TESTED BY

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DATE DATE

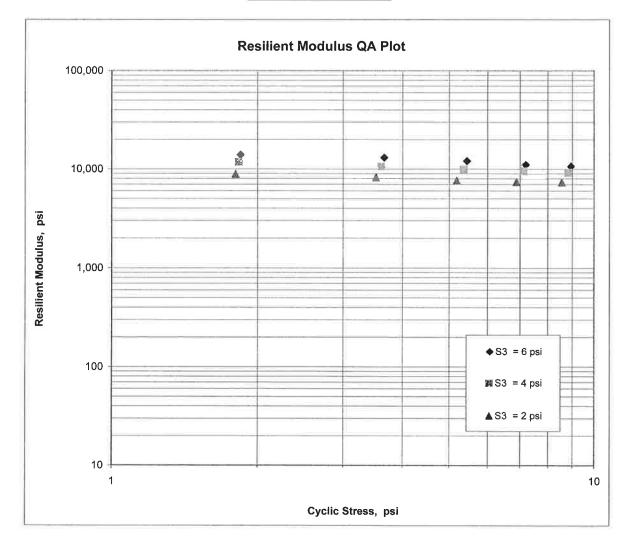
November 10, 2016

AASHTO T 307-99 - RESILIENT MODULUS OF SUBGRADE SOILS RECOMPACTED / THINWALL TUBE SAMPLES

Job No.	040625			Material Code SSRVPS
Date Sampled:	11/10/16			Station No.: 100+00
Date Tested:	November 10, 2016			Location: 18 RT
Name of Project:	HWY.22 - HWY.252	2 STRS &	APPRS (S)	
County:	Code: 65	Name:	SEBASTIAN	
Sampled By:	THORNTON			Depth: 0-5
Lab No.:	20163507			AASHTO Class: A-4(1)
Sample ID:	RV389		Mat	erial Type (1 or 2): 2
LATITUDE:				LONGITUDE:

 $M_R = K1 (S_C)^{K_2} (S_3)^{K_5}$

K1 =	7,547	
K2 =	-0.15722	
K5 =	0.39753	
$R^2 =$	0.99	



AASHTO T 307-99 - RESILIENT MODULUS OF SUBGRADE SOILS RECOMPACTED SAMPLES

Job No. Date Sampled: Date Tested: Name of Project:	040625 11/10/16 November 10, 2016 HWY.22 - HWY.252 STRS & APPRS (S)	Material Code Station No.: Location:	SSRVPS 495+00 18 LT
County: Sampled By: Lab No.: Sample ID: LATITUDE:	Code: 65Name:SEBASTIANTHORNTON20163508RV390	Depth: AASHTO Class: Material Type (1 or LONGITUDE:	0-5 A-7-6(29) 2): 2
1. Testing Inform	nation:		
	Preconditioning - Permanent Strain > 5% (Y=) Testing - Permanent Strain > 5% (Y=Yes or N= Number of Load Sequences Completed (0-15)		N N 15
2. Specimen Info	ormation:		
 Soil Specimer Soil Properties 	Specimen Diameter (in): Top Middle Bottom Average Membrane Thickness (in): Height of Specimen, Cap and Base (in): Height of Cap and Base (in): Initial Length, Lo (in): Initial Area, Ao (sq. in): Initial Volume, AoLo (cu. in): Weight: Weight of Wet Soil Used (g):		3.92 3.94 3.93 0.00 8.03 0.00 8.03 12.15 97.57 3003.30
	Optimum Moisture Content (%):		19.2
	Maximum Dry Density (pcf): 95% of MDD (pcf): In-Situ Moisture Content (%):		104 98.8 N/A
5. Specimen Pro	-		
	Wet Weight (g): Compaction Moisture content (%): Compaction Wet Density (pcf): Compaction Dry Density (pcf): Moisture Content After Mr Test (%):		3003.30 19.6 117.28 98.06 20.1
6. Quick Shear T	est (Y=Yes, N=No, N/A=Not Applicable):		#VALUE!
7. Resilient Mod	ulus, Mr:	8772	2(Sc)^-0.31280(S3)^0.13779
8. Comments			
9. Tested By:	<u>DT</u> Da	ate: November 10, 2016	3

AASHTO T 307-99 - RESILIENT MODULUS OF SUBGRADE SOILS RECOMPACTED SAMPLES

Job No.	040625			Material Code	SSRVPS
Date Sampled:	11/10/16			Station No.:	495+00
Date Tested:	November 10, 2016			Location:	18 LT
Name of Project:	HWY.22 - HWY.252 STRS & APPRS (S)	STRS & API	PRS (S)		
County:	Code: 65	Name:	Name: SEBASTIAN		
Sampled By:	THORNTON			Depth:	0-5
Lab No.:	20163508			AASHTO Class:	A-7-6(29)
Sample ID:	RV390			Material Type (1 or 2): 2	t): 2
LATITUDE:				LONGITUDE:	

Resilient	Modulus				Mr	psi	8,966	8,035	6,845	5,963	5,353	8,634	7,488	6,579	5,817	5,234	7,479	6,639	5,906	5,328	4,854
Resilient	Strain				۴	in/in	0.00021	0.00045	0.00078	0.00117	0.00159	0.00021	0.00048	0.00081	0.00119	0.00163	0.00025	0.00054	0.00089	0.00129	0.00175
Average	Recov Def.	LVDT 1	and 2		H _{avg}	. <u>c</u>	0.00165	0.00364	0.00627	0.00936	0.01277	0.00172	0.00387	0.00649	0.00959	0.01312	0.00198	0.00435	0.00716	0.01037	0.01402
Actual	Applied	Contact	Stress		Scontact	psi	0.2	0.2	0.3	0.5	0.7	0.2	0.2	0.2	0.4	0.6	0.2	0.2	0.2	0.4	0.6
Actual	Applied	Cyclic	Stress		S _{cyclic}	psi	1.8	3.6	5.3	7.0	8.5	1.8	3.6	5.3	6.9	8.6	1.8	3.6	5.3	6.9	8.5
Actual	Applied	Max.	Axial	Stress	S _{max}	psi	2.1	3.9	5.6	7.4	9.2	2.1	3.8	5.5	7.4	9.2	2.1	3.8	5.5	7.2	9.0
Actual	Applied	Contact	Load		P _{contact}	lbs	2.8	2.8	3.5	6.0	8.4	2.7	2.7	2.7	5.1	7.5	2.7	2.7	2.8	4.3	6.7
Actual	Applied	Cyclic Load			P _{cyclic}	lbs	22.4	44.3	65.0	84.5	103.5	22.5	43.9	64.6	84.4	103.9	22.4	43.7	64.0	83.6	103.0
Actual	Applied	Max. Axial	Load		P _{max}	lbs	25.1	47.1	68.5	90.4	111.9	25.1	46.6	67.3	89.5	111.4	25.1	46.5	66.8	87.9	109.7
Nominal	Maximum	Axial	Stress		S _{cyclic}	psi	2.0	4.0	6.0	8.0	10.0	2.0	4.0	6.0	8.0	10.0	2.0	4.0	6.0	8.0	10.0
Chamber	Confining	Pressure			Š	psi	6.0	6.0	6.0	6.0	6.0	4.0	4.0	4.0	4.0	4.0	2.0	2.0	2.0	2.0	2.0
		PARAMETER			DESIGNATION	UNIT	Sequence 1	Sequence 2	Sequence 3	Sequence 4	Sequence 5	Sequence 6	Sequence 7	Sequence 8	Sequence 9	Sequence 10	Sequence 11	Sequence 12	Sequence 13	Sequence 14	Sequence 15

REVIEWED BY TESTED BY

DT

November 10, 2016

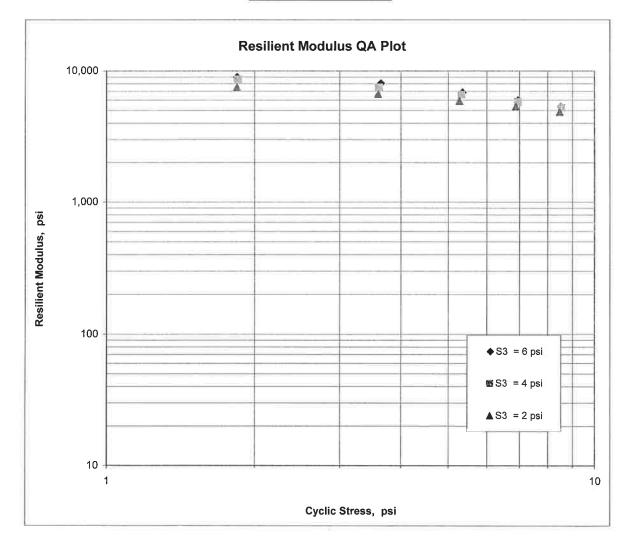
DATE DATE

AASHTO T 307-99 - RESILIENT MODULUS OF SUBGRADE SOILS RECOMPACTED / THINWALL TUBE SAMPLES

Job No.	040625			Material Code SSRVPS
Date Sampled:	11/10/16			Station No.: 495+00
Date Tested:	November 10, 2016			Location: 18 LT
Name of Project:	HWY.22 - HWY.25	2 STRS &	APPRS (S)	
County:	Code: 65	Name:	SEBASTIAN	
Sampled By:	THORNTON			Depth: 0-5
Lab No.:	20163508			AASHTO Class: A-7-6(29)
Sample ID:	RV390		Mate	erial Type (1 or 2): 2
LATITUDE:				LONGITUDE:

 $M_{R} = K1 (S_{C})^{K2} (S_{3})^{K5}$

K1 =	8,772
K2 =	-0.31280
K5 =	0.13779
$R^2 =$	0.95



JOB: 040625

Arkansas State Highway Transporation Department

JOB NAME: HWY.22 - HWY.252 STRS. & APPRS. (S)

COUNTY NO. 65 DATE TESTED

Materials Division Michael Benson, Materials Engineer

STA.#	LOC.	DEPTH	COLOR	#4	#10	#40	#80	#200	L.L.	<i>P.I</i> .	SOIL CLASS	<i>LAB</i> #:	%MOISTURE
100+00	18RT	0-5	BR/RD	98	<u>s /</u> 95	<u>Е</u> 93	<i>v</i> 92	E S 86	22	04	A-4(1)	RV389	
495+00	18 LT	0-5	RD/BR	99	97	95	88	84	50	34	A-7-6(29)	RV390	
100+00	06 RT	0-5	BROWN	99	98	95	94	89	22	5	A-4 (2)	S377	18.3
100+00	17 RT	0-5	BROWN	99	97	94	93	87	21	3	A-4 (0)	S378	12,5
109+00	06 LT	0-5	GRAY	99	97	95	93	82	24	7	A-4 (4)	S379	21
109+00	18 LT	0-5	BR/GR	95	90	86	81	71	21	7	A-4 (2)	S380	15.7
487+00	06 RT	0-5	BROWN	99	93	86	80	73	36	22	A-6 (14)	S381	26.3
487+00	12 RT	0-5	BROWN	90	79	68	62	55	26	12	A-6 (3)	S382	18.4
495+00	06 LT	0-5	BR/RD	96	86	75	56	36	ND	NP	A-4 (0)	S383	24.3
495+00	18 LT	0-5	BR/RD	98	93	86	79	71	42	26	A-7-6(17)	S384	18.2
503+00	06 RT	0-5	BROWN	97	91	80	74	70	34	16	A-6 (9)	S385	25.2
503+00	18 RT	0-5	BROWN	79	72	64	60	53	26	10	A-4 (2)	S386	11.4
510+00	06 LT	0-4Z	BROWN	98	93	87	84	78	32	19	A-6 (13)	S387	10.8
510+00	18' LT	0-2.5Z	BROWN	96	93	87	80	69	31	15	A-6 (8)	S388	9.4

11/2/2016

JOB: JOB NA	0 IME: HV	040625 HWY.22 - HWY.252 (JOB: 040625 JOB NAME: HWY 222 - HWY 252 STRS. & APPRS. (S)	Arkansı	Arkansas State Highway Transporation Department Materials Division 11/2/2016	E TESTED 11/2/2016
COUNTY NO.	rY NO.	65			Michael Benson, Materials Engineer	
STA.# LOC.	LOC.				PAVEMENT SOUNDINGS	
100+00	17 RT	ACHMSC	ACHMSC	ACHMBC	AGG. BASE CRS CL	
100+00	06 RT	ACHMSC	ACHMSC	- ACHMBC	AGG. BASE CRS CL	
		1.0	3.0XW	1	ы	
109+00	18 LT	ACHMSC	ACHMSC	AGG.BASE CRS CL		
109+00	0617	ACHMSC	ACHMSC	ACHMBC	AGG BASE CRS CI	
		3.0W	1.5X	1		
487+00	12 RT	ACHMSC	ACHMSC	AGG.BASE CRS CL		
		1	1	1		
487+00	06 RT	ACHMSC	ACHMSC	AGG.BASE CRS CL		
		1.5	4.0XW	5		
495+00	18 LT	ACHMSC	ACHMSC	AGG.BASE CRS CL		
		1	r	1		
495+00	06 LT	ACHMSC 2 000	ACHMSC	AGG.BASE CRS CL		
		AAD.0	1	n		
503+00	18 RT	ACHMSC	AGG. BASE CRS CL			
		1	1			
503+00	06 RT	ACHMSC 1.75WX	ACHMSC -	AGG.BASE CRS CL 5		
510+00	18' LT	ACHMSC	AGG. BASE CRS CL			
		I	ı			
510+00	06 LT	ACHMSC	AGG, BASE CRS CL			
		3.0W	1.5			
	1					
comments:		=MULTIPLE LAYEI	W=MULTIPLE LAYERS, X=STRIPPED, Z=AUGER REFUSAL	IGER REFUSAL	Monday, November 14, 2016	

Page 1 of 1

ARKANSAS STATE HIGHWAY AND TRANSPORTATIO MATERIALS I	
MICHAEL BENSON, MATER: *** SOIL SURVEY / PAVEMENT	
DATE - 11/03/16 JOB NUMBER - 040625 FEDERAL AID NO TO BE ASSIGNED PURPOSE - SOIL SURVEY SAMPLE SPEC. REMARKS - NO SPECIFICATION CHECK SUPPLIER NAME - STATE NAME OF PROJECT - HWY.22 - HWY.252 STRS. & A PROJECT ENGINEER - NOT APPLICABLE PIT/QUARRY - ARKANSAS	SEQUENCE NO 1 MATERIAL CODE - SSRVPS SPEC. YEAR - 2014 SUPPLIER ID 1 COUNTY/STATE - 65 DISTRICT NO 04 APPRS. (S)
LOCATION - SEBASTIAN, COUNTY SAMPLED BY - THORNTON, BATES SAMPLE FROM - TEST HOLE MATERIAL DESC SOIL SURVEY - R VALUE- PAVI	DATE SAMPLED - 10/25/16 DATE RECEIVED - 10/27/16 DATE TESTED - 11/02/16
LAB NUMBER 20163495 SAMPLE ID - S377 TEST STATUS - INFORMATION ONLY	<pre>- 20163496 - 20163497 - S378 - S379 - INFORMATION ONLY - INFORMATION ONLY - 100+00 - 109+00 - 17 RT - 06 LT - 0-5 - 0-5 - BROWN - GRAY - 35 19 3.00 - 35 19 9.60</pre>
LIQUID LIMIT = 22 PLASTICITY INDEX = 5 AASHTO SOIL = A-4 (2) UNIFIED SOIL = % MOISTURE CONTENT = 18.3 ACHMSC (IN) = 1.0 ACHMSC (IN) = 3.0XW	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
ACHMBC (IN) AGG. BASE CRS CL (IN) - 5 - - - - - -	

REMARKS - W= MULTIPLE LAYERS, X= STRIPPED, Z=AUGER REFUSAL

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ARKANSAS STATE HIGHWAY AND TRANSPORTATI MATERIALS	
MICHAEL BENSON, MATER *** SOIL SURVEY / PAVEMENT	
DATE - 11/02/16 JOB NUMBER - 040625 FEDERAL AID NO TO BE ASSIGNED PURPOSE - SOIL SURVEY SAMPLE SPEC. REMARKS - NO SPECIFICATION CHECK SUPPLIER NAME - STATE NAME OF PROJECT - HWY.22 - HWY.252 STRS, & PROJECT ENGINEER - NOT APPLICABLE PIT/QUARRY - ARKANSAS	DISTRICT NO 04
LOCATION - SEBASTIAN, COUNTY SAMPLED BY - THORNTON, BATES SAMPLE FROM - TEST HOLE MATERIAL DESC SOIL SURVEY - R VALUE- PAV	DATE SAMPLED - 10/25/16 DATE RECEIVED - 10/27/16 DATE TESTED - 11/02/16
LAB NUMBER 20163498 SAMPLE ID - S380 TEST STATUS - INFORMATION ONLY	<pre>20163499 - 20163500 S381 - S382 INFORMATION ONLY - INFORMATION ONLY 487+00 - 487+00 06 RT - 12 RT 0-5 - 0-5 BROWN - BROWN - 35 23 35.30 - 35 23 35.30</pre>
<pre>% PASSING 2 IN 1 1/2 IN 3/4 IN 3/8 IN 100 NO. 4 - 95 NO. 10 - 90 NO. 40 - 86 NO. 80 - 81 NO. 200 - 71 LIQUID LIMIT - 21 PLASTICITY INDEX - 7</pre>	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
PLASTICITY INDEX - 7 AASHTO SOIL - A-4 (2) UNIFIED SOIL - % MOISTURE CONTENT - 15.7	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
ACHMSC (IN) ACHMSC (IN) AGG.BASE CRS CL (IN) -	- 1.5 - 4.0XW - 5

REMARKS - W=MULTIPLE LAYERS, X=STRIPPED, Z=AUGER REFUSAL

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AASHTO TESTS : T24 T88 T89 T90 T265

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DEPARTMENT - LITTLE ROCK, ARKANSAS ISION
S ENGINEER UNDING TEST REPORT ***
SEQUENCE NO 3 MATERIAL CODE - SSRVPS SPEC. YEAR - 2014 SUPPLIER ID 1 COUNTY/STATE - 65 DISTRICT NO 04 RS. (S)
DATE SAMPLED - 10/25/16 DATE RECEIVED - 10/27/16
DATE TESTED - 11/02/16 NT SOUNDINGS
20163502 - 20163503 S384 - S385 INFORMATION ONLY - INFORMATION ONLY 495+00 - 503+00 18 LT - 06 RT 0-5 - 0-5
BR/RD BROWN 35 23 43.00 - 35 23 50.60 94 07 5.80 94 07 10.20
- - - - - - - - - - - - - - - - - - -
$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$
1.75WX 5

REMARKS - W=MULTIPLE LAYERS, X=STRIPPED, Z=AUGER REFUSAL

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ARKANSAS STATE	Γ	ANSPORTATION MATERIALS DIV SON, MATERIAL	ISION	- LITTLE ROC	K, ARKANSAS
**	* SOIL SURVEY /			REPORT ***	
DATE - 11/ JOB NUMBER - 040 FEDERAL AID NO TO PURPOSE - SOI SPEC. REMARKS - NO SUPPLIER NAME - STA NAME OF PROJECT - H PROJECT ENGINEER - N PIT/QUARRY - ARKAN	625 BE ASSIGNED L SURVEY SAMPLE SPECIFICATION (FE WY.22 - HWY.252 OT APPLICABLE	CHECK		SEQUENCE NO. MATERIAL COL SPEC. YEAR SUPPLIER ID. COUNTY/STATE DISTRICT NO.	DE - SSRVPS - 2014 - 1 C - 65
LOCATION - SEBAS SAMPLED BY - THORNT	IIAN, COUNTY ON, BATES			DATE RECEIVE	D - 10/25/16 ED - 10/27/16
SAMPLE FROM - TEST MATERIAL DESC SOI		VALUE - PAVEME			- 11/02/16
3/4 3/8 NO. NO. NO. NO.	- S386 - INFORMA - 503+00 - 18 RT - 0-5 - BROWN - - SEC - 35 2 SEC - 94 0 IN IN IN IN IN IN 10 - 72 40 - 64 80 - 60	ATION ONLY - - - - - - - - - - - - - - - - - - -	S387 INFORMATION 510+00 06 LT 0-4Z BROWN 35 23 56 94 07 12 100 98 93 87 84	- S3 ONLY - IN - 510 - 18 - 0-: - 8 - 8 - 10 - 10 - 10 - 10 - 10 - 10 - 10 - 10	88 FORMATION ONLY 0+00 ' LT 2.5Z DWN 35 23 56.70 94 07 12.40 00 96 93 87 80
NO. LIQUID LIMIT PLASTICITY INDEX AASHTO SOIL UNIFIED SOIL % MOISTURE CONTENT ACHMSC AGG. BASE CRS CL	200 - 53 - 26 - 10 - A-4 (2 - 11.4 (IN) (IN)		78 32 19 A-6 (13) 10.8 3.0W 1.5	- 3 - 1 - A -	
		- - - -		- - - -	

REMARKS - W=MULTIPLE LAYERS, X=STRIPPED, Z=AUGER REFUSAL

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	MATERIALS I	DIVISION	- LITTLE ROCK, ARKANSAS
	ICHAEL BENSON, MATERI IL SURVEY / PAVEMENT		
DATE - 11/03/16 JOB NUMBER - 040625 FEDERAL AID NO TO BE AS PURPOSE - SOIL SUR SPEC. REMARKS - NO SPECI SUPPLIER NAME - STATE NAME OF PROJECT - HWY.22 PROJECT ENGINEER - NOT AE PIT/QUARRY - ARKANSAS	SIGNED VEY SAMPLE FICATION CHECK - HWY.252 STRS. & P PLICABLE	APPRS. (S)	SEQUENCE NO 1 MATERIAL CODE - RV SPEC. YEAR - 2014 SUPPLIER ID 1 COUNTY/STATE - 65 DISTRICT NO 04
LOCATION - SEBASTIAN, SAMPLED BY - THORNTON, F SAMPLE FROM - TEST HOLE MATERIAL DESC SOIL SU	BATES		DATE SAMPLED - 10/25/16 DATE RECEIVED - 10/27/16 DATE TESTED - 11/02/16 RESULTS
LAB NUMBER			
CANDLE ID	DV200	0,00770	-
SAMPLE ID TEST STATUS STATION	- RV389 - INFORMATION ONLY	- TNEOPMATTO	
STATION	- 100+00	= 495+00	-
LOCATION	- 18RT	² 18 LT	19
DEPTH IN FEET	- 0-5	0-5	
MAT'L COLOR		_ RD/BR	-
MAT'L TYPE	-	<u>14</u>	
LATITUDE DEG-MIN-SEC			
LONGITUDE DEG-MIN-SEC	- 94 11 47.10	94 07	5.80
% PASSING 2 IN.	-	2	-
1 1/2 IN.		19 19	-
3/4 IN.		-	-
	- 100	_ 100	-
NO. 4		99 97	-
NO. 10 NO. 40	- 93	_ 95	-
NO. 80		- 88	-
NO. 200		84	
LIQUID LIMIT	- 22	- 50	
PLASTICITY INDEX	- 04	- 34	-
	- A-4(1)	- A-7-6(29)	-
UNIFIED SOIL	-	-	-
% MOISTURE CONTENT	-	-	
	-	-	-
	-	-	-
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REMARKS - W=MULTIPLE LAY	YERS, X=STRIPPED, Z=A	AUGER REFUSAL	
-			
-			

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ARKANSAS DEPARTMENT OF TRANSPORTATION

ARDOT.gov | IDriveArkansas.com | Scott E. Bennett, P.E., Director

MATERIALS DIVISION

11301 West Baseline Road | P.O. Box 2261 | Little Rock, AR 72203-2261 | Phone: 501.569.2185 | Fax: 501.569.2368

August 21, 2017

TO: Mr. Rick Ellis, Bridge Engineer

SUBJECT: Job No. 040622 Washington Co. Line - South Strs. & Apprs. (S) Route 59 Section 5 Crawford County

Transmitted herewith are a brief summary of the geology and site conditions, D50 analysis test results, unconfined compressive strength results, RMR, and the logs of the borings conducted for the structures and approaches of the above referenced project. The samples obtained by Standard Penetration Tests were brought to the laboratory and visually classified by experienced lab personnel to confirm the field identifications. The rock cores are available for inspection at the Materials Division.

Site 1 – Mountain Fork Tributary Creek

Based on the depth at which bedrock was encountered, it is anticipated that both end bents will be founded on piling. Preboring may be necessary to achieve minimum penetration requirements. No borings were obtained at intermediate bents 2 or 3, station 68+40 and 68+80, due to inaccessibility caused by low bridge clearance and high water in the channel. Correlating the elevation of bedrock between the bridge end boring logs, competent bedrock should be encountered less than 15 feet below ground level. Based on this information and plans provided by Bridge Division, it is anticipated that both intermediate bents will be founded on spread footings. Spread Footings founded in competent Limestone should be sized based on the values provided in Table 1.

Foundation Description		Factored Bearing Resistance (ksf)	Bearing Resistance at Service Limit State (ksf)
Spread Footings	296	133	40

TABLE 1 – Bearing Capacity Recommendations for Spread Footings

Site 2 – Mountain Fork Creek

Based on the depth at which bedrock was encountered, it is anticipated that both end bents will be founded on piling and both intermediate bents will be founded on spread footings. Spread footings founded in competent shale should be sized based on the values provided in Table 2. The AASHTO Bridge Design Specification, 7th edition, specifies that bearing resistance for spread footings on rock can be designed utilizing the RMR system to determine the bearing resistance or "other visual systems that have proven to yield accurate results may be used in lieu of the specified method." The RMR system yields unreasonably low bearing resistances for the encountered shale material. Table C10.6.2.6.1-1 for "Compaction shale or other highly argillaceous rock in sound condition" and previous experience in similar conditions were used to determine the recommended bearing resistance.

TABLE 2 - Bearing	Capacity Recommendations	for	Spread Footings
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Foundation	Factored Bearing
Description	Resistance (ksf)
Spread Footings	20

Site 3 – Whitzen Hollow Creek

Based on the depth at which bedrock was encountered, it is anticipated that both end bents will be founded on piling. No borings were obtained at intermediate bents 2 or 3, station 181+32 and 181+82, due to inaccessibility caused by low bridge clearance and conflict with overhead utilities. Correlating the elevation of bedrock between the bridge end boring logs, it is anticipated that competent bedrock should be shallower than 15 feet below ground level. Based on this information and correspondence from Bridge Design, it is anticipated that both intermediate bents will be founded on spread footings. Spread footings founded in competent shale should be sized based on the values provided in Table 3. The AASHTO Bridge Design Specification, 7th edition, specifies that bearing resistance for spread footings on rock can be designed utilizing the RMR system to determine the bearing resistance or "other visual systems that have proven to yield accurate results may be used in lieu of the specified method." The RMR system yields unreasonably low bearing resistances for the encountered shale material. Table C10.6.2.6.1-1 for "Compaction shale or other highly argillaceous rock in sound condition" and previous experience in similar conditions were used to determine the recommended bearing resistance.

TABLE 3 – Bearing	Capacity Recommendations	for Spread Footings
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Foundation	Factored Bearing
Description	Resistance (ksf)
Spread Footings	20

Site 4 – Huey Creek

Based on the depth at which bedrock was encountered, it is anticipated that both end bents will be founded on piling. Preboring may be necessary to achieve minimum penetration requirements. An unmapped fault was discovered between stations 286+49 and 287+29. No boring was obtained at bent 2, station 286+89, due to inaccessibility caused by low bridge clearance and steep banks. Utilizing the data obtained from adjacent borings and assuming competent rock will be encountered at a depth shallower than 15 feet below ground level, it is anticipated that bent 2 will be founded on a spread footing. Based on plans provided by Bridge Division and the depth to competent rock, it is anticipated that bent 3 will also be founded on a spread footing. Spread Footings founded in competent Limestone should be sized based on the values provided in Table 4.

TABLE 4 – Bearing Capacity Recommendations for Spread Footings

ndation cription	Nominal Bearing Resistance (ksf)	Factored Bearing Resistance (ksf)	Bearing Resistance at Service Limit State (ksf)
oread otings	358	161	40

If you have any questions concerning these recommendations, please contact the Geotechnical Section.

Michael C. Benson

Materials Engineer

MCB:rpt:mlg

cc: State Construction Engineer - Master File Copy District 4 Engineer G.C. File

GEOLOGY AND SITE CONDITIONS Job No. 040622

<u>Washington County Line – South Strs. & Apprs. (S)</u> <u>Route 59 Section 5</u> <u>Crawford County</u>

Site Conditions

There are four bridges associated with this job. **Bridge 1** is the northernmost bridge and crosses over Mountain Fork Tributary Creek. The existing bridge is a five span bridge constructed of concrete deck supported by spread footings and concrete end walls. The guardrail is composed of steel with concrete posts. Riprap has been placed on the abutment slopes. A telecommunication line parallels the west side of the roadway, buried north and south of the bridge and overhead over the channel. Limestone is exposed in the channel. A cave is located in a bluff a short distance east of the bridge. The channel was dry at the time of the subsurface investigation. The area around the bridge is primarily wooded with a residence located upstation and downstation of the bridge, on the right side of the roadway.

Bridge 2 crosses over Mountain Fork Creek. The existing bridge is a six span bridge constructed of cast-in-place concrete deck supported by spread footings. The guardrail is composed of steel with concrete posts. Overhead power lines cross the roadway a short distance upstation from the bridge. The upstation side of the channel is moderately wooded. The downstation side of the channel is lined with trees with pasture beyond. The stream flows to the southwest.

Bridge 3 crosses over Whitzen Hollow Creek. The existing bridge is a six span bridge constructed of cast-in-place concrete deck supported by spread footings. The guardrail is composed of steel with concrete posts. Overhead power lines parallel the east side of the bridge then cross the roadway north of the bridge. The area around the bridge is moderately to heavily wooded. The stream flows to the south-southwest.

Bridge 4 is the southernmost bridge and crosses over Huey Creek. The existing bridge is a four span bridge constructed of concrete deck supported by spread footings. The deck is supported by nine sets of steel beams. The guardrail is composed of steel with concrete posts. A buried telecommunication line parallels the west side of the roadway. The area around the bridge is moderately to heavily wooded. A residence is located downstation from the bridge on the right side of the roadway. The stream flows to the southwest.

Site Geology

Bridge 1 is located on the Pitkin Formation. The Pitkin Formation is usually a fine- to coarsegrained, oolitic, bioclastic limestone. Minor sandstone has been reported near the top of the unit in the northwest. The unit becomes shalier to the south. The thickness of the Pitkin Limestone ranges from a thin edge to over 400 feet. The average thickness is about 50 feet in the west and about 200 feet in the east. The Pitkin Formation occasionally has dissolutional features, such as sinkholes, caves, and enlarged fissures. Only one boring encountered a soil-filled cavity at 14.2 to 14.3 feet below ground level. Bedrock was encountered at depths of 11.0 to 16.0 feet below ground level. **Bridge 2** is located on the Fayetteville Shale. The Fayetteville is a black, fissile, concretionary, clay shale. Dark-gray, fine-grained limestones commonly are interbedded with the shales in north-central Arkansas. Septarian concretions are common in lower beds of the Fayetteville, but may be found throughout the formation. The Fayetteville Shale ranges in thickness from 10 to 400 feet. Bedrock was encountered at depths of 4.1 to 9.5 feet below ground level. There are east-west trending normal faults mapped to the south of Bridge 2. No faults were encountered during the subsurface investigation of this job site.

Bridge 3 is located on the Bloyd Formation. In western Arkansas, the Bloyd Formation consists of five members (in ascending order): the Brentwood Limestone, Woolsey, Dye shale, Kessler Limestone, and the Trace Creek. The Brentwood limestone is a sequence of limestones separated by thick intervals of dark shale. The Woolsey member is composed of terrestrial sediments comprised of dark-gray, fissile shale, often interbedded with thin siltstones. A thin coal bed, called the Baldwin coal, occurs at or near the top of the Woolsey member. The marine deposited Dye shale is predominantly a dark-gray shale with scattered calcareous concretions. Where underlain by the Woolsey Member, the Dye Shale frequently has a bed of calcareous sandstone with scattered clay pebbles and quartz granules, called the caprock, at its base. The Kessler member is either a single unit of limestone or a sequence of limestone and shale interbedded. The limestones are bioclastic, oolitic, traces of clay-pebble conglomerate, and minor amounts of calcareous sandstone. The Trace Creek Shale member is composed of dark-gray shales with some thin beds of sandstone. Typical thicknesses for the Bloyd Formation range from 175 to 200 feet.

At **Bridge 3**, the section of the Bloyd Formation encountered consists primarily of shales with some beds of sandy limestone (possibly part of the Brentwood limestone). Bedrock was encountered at depths of 19.0 to 20.0 feet below ground level. There are numerous east-west trending normal faults in the area. No faults were encountered during the subsurface investigation of this job site.

During the subsurface investigation of **Bridge 4**, an unmapped fault was discovered between stations 286+49 and 287+29. Borings at 287+29 and 287+69 encountered shales, limestones, and a coal seam of the Bloyd Formation. Boring at Station 286+49 encountered calcareous sandstone, most likely part of the Prairie Grove member of the Hale Formation. The Hale Formation is made up of two members: a lower Cane Hill member and an upper Prairie Grove member. The Prairie Grove member is composed of thin to massive, often crossbedded, light-gray to dark-brown, limy sandstone or variously sandy limestone with lenses of relatively pure, highly fossiliferous limestone and oolitic limestone. The reported thickness of the Hale Formation ranges from a few feet to more than 300 feet. The Bloyd Formation stratigraphically overlies the Hale Formation. Bedrock was encountered in borings at depths ranging from 14.0 to 17.0 feet below ground level.

Subsurface Conditions

Based on the results of the borings at stations 68+00 to 69+20 (**Bridge 1**-Mountain Fork Tributary Creek), the subsurface stratigraphy may be generalized as follows:

- 0 to 11.0 Feet: Consists of moist, stiff to hard, brown sandy clay with gravel to sandy clay with gravel and cobbles.
- 11.0 to 16.0 Feet*: Varies from moist hard to very hard, brown **sandy clay with gravel** to **sandy clay with gravel and cobbles** to unweathered to slightly weathered, moderately hard, gray **limestone**.
- 16.0 to 18.8 Feet: Consists of unweathered to weathered, moderately hard, gray limestone.
- 18.8 to 20.5 Feet: Consists of highly weathered to weathered, soft to medium hard, dark gray **shale**.
- 20.5 to 27.0 Feet: Consists of unweathered to slightly weathered, moderately hard, gray **limestone**.
- 27.0 to 35.0 Feet: Consists of unweathered to slightly weathered, moderately hard, gray **limestone with occasional to frequent shale seams and layers**.
- 35.0 to 42.0 Feet: Consists of weathered, medium hard, dark gray shale.

* A soil-filled cavity was encountered at 14.2 to 14.3 feet below ground level.

Based on the results of the borings at stations 111+80 to 113+13 (**Bridge 2**-Mountain Fork Creek), the subsurface stratigraphy may be generalized as follows:

- 0 to 4.1 Feet: Varies from moist, very hard, brown **sandy clay with gravel and cobbles** to medium dense, brown **sand with gravel and cobbles**.
- 4.1 to 9.5 Feet: Varies from moist, medium dense, brown **sand with gravel and cobbles** to slightly weathered, medium hard, dark gray **shale**.
- 9.5 to 28.7 Feet: Consists of slightly weathered to unweathered, medium hard, dark gray **shale** with occasional fractures.
- 28.7 to 43.7 Feet: Consists of slightly weathered to unweathered, medium hard, dark gray **shale** with occasional fractures. Some occasional limestone seams and layers are encountered in this zone.

Based on the results of the borings at 180+92 to 182+22 (**Bridge 3**-Whitzen Hollow Creek), the subsurface stratigraphy may be generalized as follows:

0 to 17.5 Feet: Varies from moist, medium dense to very dense, brown sand with clay

and gravel to gravel with sand to very stiff to very hard, brown sandy clay with gravel.

- 17.5 to 19.5 Feet: Varies from moist, very dense, brown sand with clay and gravel to cobbles and boulders.
- 19.5 to 32.1 Feet: Consists of highly weathered to weathered, soft to medium hard, dark gray **shale**.
- 32.1 to 41.9 Feet: Consists of weathered to slightly weathered, medium hard, dark gray **shale** with occasional limestone layers.

Based on the results of the boring at 286+49 (**Bridge 4**-Huey Creek), the subsurface stratigraphy may be generalized as follows:

- 0 to 9.0 Feet: Consists of moist, stiff, brown sandy clay with gravel.
- 9.0 to 15.2 Feet: Varies from moist, medium dense to very dense, brown **sand with gravel** to wet, very dense, brown **gravel with clay and sand**.
- 15.2 to 35.7 Feet: Consists of unweathered, well cemented, calcareous, gray sandstone.

Based on the results of the borings at 287+29 to 287+69 (**Bridge 4**-Huey Creek), the subsurface stratigraphy may be generalized as follows:

- 0 to 9.0 Feet: Consists of moist, stiff to very stiff, brown sandy clay.
- 9.0 to 14.0 Feet: Varies from moist, stiff, brown **sandy clay with gravel** to medium dense, brown **gravel with clay and sand**.
- 14.0 to 17.0 Feet: Varies from wet, dense, brown **gravel with clay and sand** to highly weathered, medium hard, dark gray **shale**.
- 17.0 to 20.8 Feet: Varies from slightly weathered, medium hard, dark gray **shale** to slightly weathered to unweathered, moderately hard, gray **limestone**.
- 20.8 to 24.8 Feet: Varies from slightly weathered, medium hard, dark gray **shale** to unweathered, moderately hard, gray **limestone**. A 0.3 foot coal seam was encountered in this zone.
- 24.8.0 to 27.9 Feet: Varies from weathered, medium hard, dark gray **shale** to unweathered, moderately hard, gray **limestone**.
- 27.9 to 40.0 Feet: Consists of unweathered, moderately hard, gray limestone.

D₅₀ AGGREGATE ANALYSIS FOR SCOUR CALCULATIONS

Job No . 040622									
Creek Name	Station	Sample Type	Location	Depth (FT)	Aggregate Size (D50) (IN)				
Mountain Fork Tributary Creek	68+66	Creek Bank	20' Rt. C.L. Construction	N/A	0.132				
Mountain Fork Creek	112+25	Creek Bank	32' Lt. C.L. Construction	N/A	0.110				
Whitzen Hollow Creek	181+77	Creek Bank	22' Lt. C.L. Construction	N/A	0.0070				
Huey Creek	286+89	Creek Bank	25' Lt. C.L. Construction	N/A	0.0469				

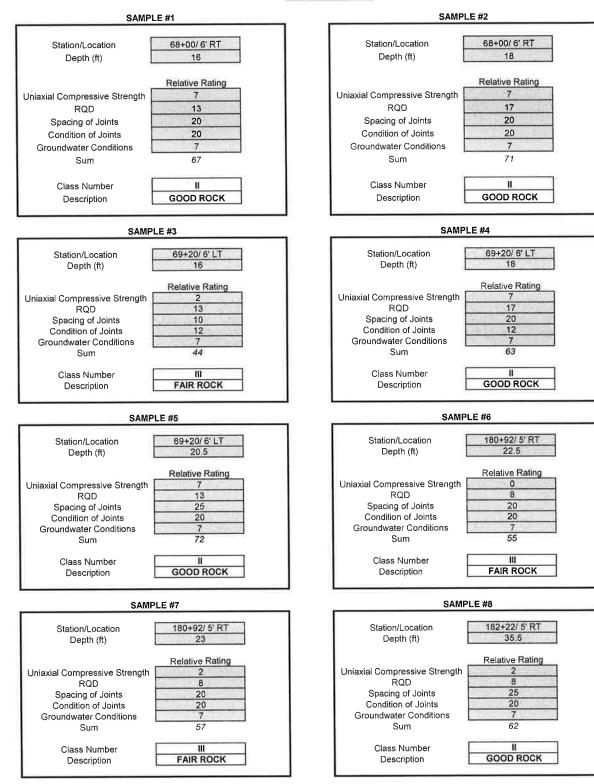
Rock Core Unconfined Compression Test Summary

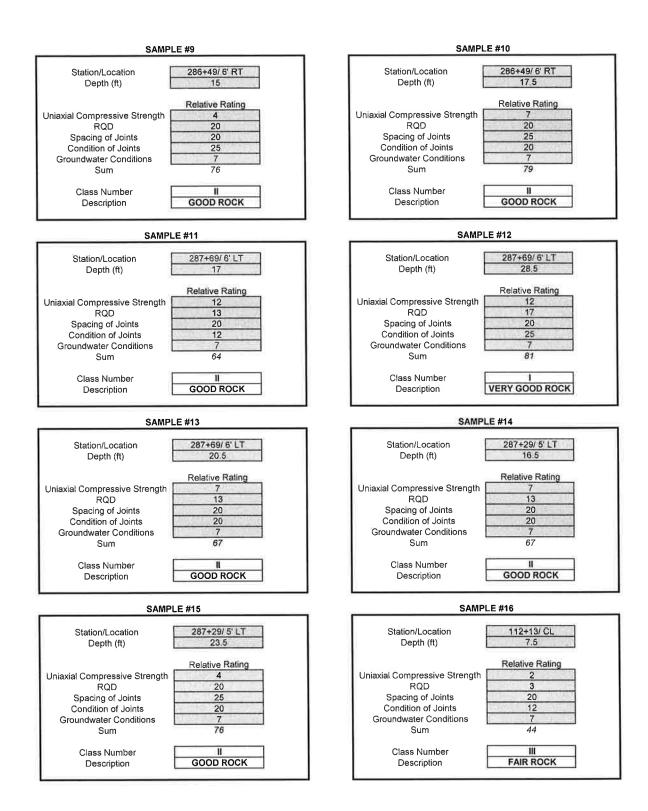
Project Number:040622Project Name:Washington Co. Line - South Strs. & Apprs. (S)Date Tested:7/3/2017

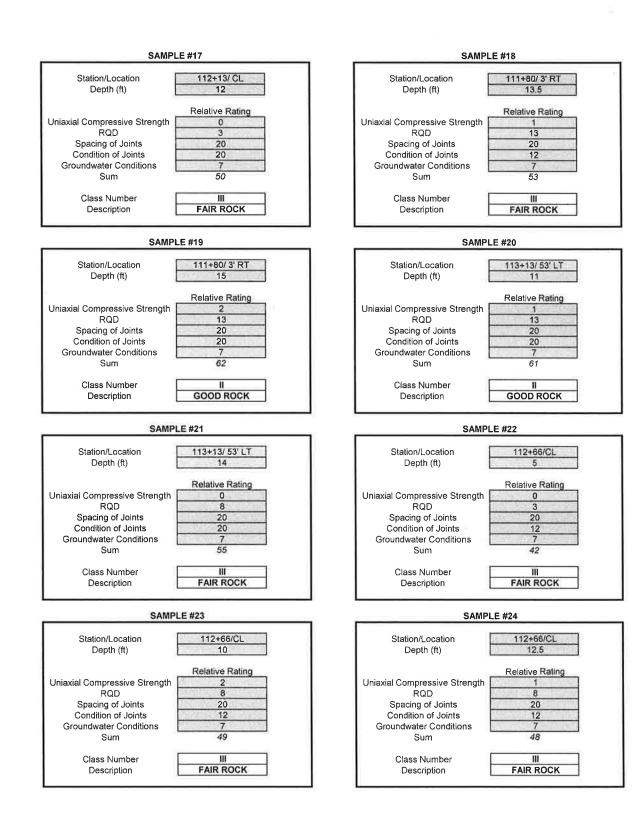
Station	Location	Sample No.	Depth (ft.)	Diameter (in)	Height (in)	Total Load (lbs.)	Correction Factor	Stress (psi)	Remarks
68+00	6' Rt	1	16.0	1.75	3.55	21,410	1.00	8,901	MFTC
68+00	6' Rt	2	18.0	1.75	3.50	34,470	1.00	14,331	MFTC
69+20	6' Lt	3	16.0	1.75	3.50	6,920	1.00	2,877	MFTC
69+20	6' Lt	4	18.0	1.75	3.50	21,310	1.00	8,860	MFTC
69+20	6' Lt	5	20.5	1.75	3.50	19,710	1.00	8,194	MFTC
180+92	5' Rt	6	22.7	1.75	X	Х	X	Broken	WHC - Shale
180+92	5' Rt	7	23.2	1.75	4.40	5,740	1.00	2,386	WHC - Shale
182+22	5' Lt	8	35.5	1.75	3.60	4,580	1.00	1,904	WHC - Shale
286+49	6' Rt	9	15.2	1.75	4.00	10,620	1.00	4,415	Huey - SS
286+49	6' Rt	10	17.5	1.75	3.80	29,800	1.00	12,389	Huey - SS
287+69	6' Lt	11	17.0	1.75	3.80	37,800	1.00	15,715	Huey - LS
287+69	6' Lt	12	28.4	1.75	5.50	38,590	1.00	16,043	Huey - LS
287+69	6' Lt	13	20.6	1.75	5.40	23,880	1.00	9,928	Huey - LS
287+29	5' Lt	14	16.5	1.75	3.50	19,130	1.00	7,953	Huey - LS
287+29	5' Lt	15	23.5	1.75	3.80	15,470	1.00	6,431	Huey - LS
112+13	C.L.	16	7.5	1.75	3.90	4,710	1.00	1,958	MFC - Shale
112+13	C.L.	17	12.0	X	x	X	X	Broken	MFC - Shale
111+80	3' Rt	18	13.5	1.75	4.50	2,880	1.00	1,197	MFC - Shale
111+80	3' Rt	19	15.0	1.75	3.75	3,870	1.00	1,609	MFC - Shale
113+13	53' Lt	20	11.0	1.75	4.00	2,200	1.00	914	MFC - Shale
113+13	53' Lt	21	14.0	X	X	х	X	Broken	MFC - Shale
112+66	C.L.	22	4.9	X	Х	X	X	Broken	MFC - Shale
112+66	C.L.	23	10.0	1.75	3.50	3,850	1.00	1,601	MFC - Shale
112+66	C.L.	24	12.3	1.75	3.50	3,430	1.00	1,426	MFC - Shale

* Please note any broken samples, fractures or other characteristics of sample in Remarks.

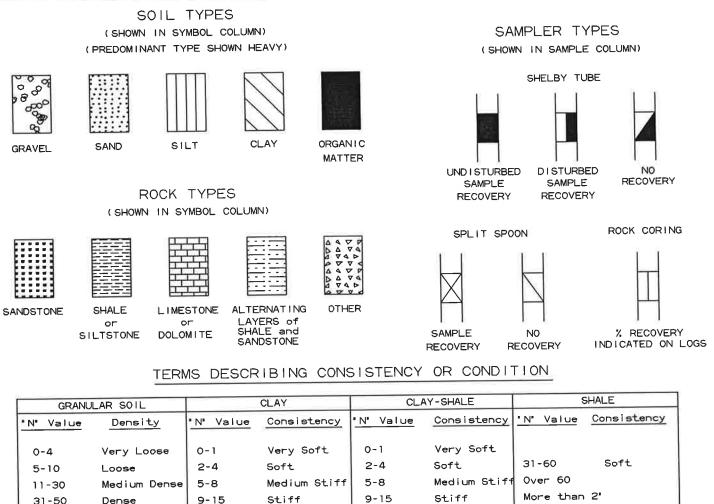
ROCK MASS RATING SUMMARY JOB # 040622







_EGEND



- Penetration Very Stiff 16-30 Verv Stiff 16-30 Over 50 Very Dense in 60 Blows Medium Hard 31-60 Hard 31-60 Hard Less than 2' 0ver 60 Very Hard 0ver 60 Very Hard Penetration in 60 Blows Hard
- 1. Ground water elevations indicated on boring logs represent ground water elevations at date or time shown on boring log. Absence of water surface implies that no ground water data is available but does not necessarily mean that ground water will not be encountered at locations or within the vertical reaches of these borings.
- 2. Borings represent subsurface conditions at their respective locations for their respective depths. Variations in conditions between or adjacent to boring locations may be encountered.
- 3. Terms used for describing soils according to their texture or grain size distribution are in accordance with the Unified Soil Classification System.

Standard Penetration Test – Driving a 2.0" O.D., 1-3/8" I.D. sampler a distance of 1.0 foot into undisturbed soil with a 140 pound hammer free falling a distance of 30 inches. It is customary to drive the spoon 6.0 inches to seat into undisturbed soil, then perform the test. The number of hammer blows for seating the spoon and performing the test are recorded for each 6 inches of penetration on the drill log. The field "N" Value (N_f) can be obtained by

adding the bottom two numbers for example: $\frac{6}{8-9} \Rightarrow 8+9 = 17b lows / ft$. The "N" Value corrected to 60%

efficiency (N_{60}) can be obtained by multiplying N_f by the hammer correction factor published on the boring log.

MATERIALS DIVISION - GEOTECHNICAL SEC. PAGE 1 OF 1 JOB NO. 040622 Crawford County DATE: March 22, 2017 JOB NAME: Washington County Line - South Strs. & Apprs. (S) Route 59 DATE: March 22, 2017 Hollow Stem Auger - Diamond Corr Hollow Stem Auger - Diamond Corr	
JOB NAME: Washington County Line - South Strs. & Apprs. (S) TYPE OF DRILLING:	
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STATION: 68+00 EQUIPMENT: CME 75	
LOCATION: 6' Right of Construction Centerline	
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5 Gravel	
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10 Stiff, Brown Sandy Clay with Moist, 2 Stiff, Brown Sandy Clay with Gravel and 5-6	
Cobbles	-
70	35
LIMESTONE - Slightly Weathered, Moderately	
15 Soil-Filled Cavity (14.2'-14.3') 97	56
LIMESTONE - Unweathered, Moderately Hard,	
Gray	
	1
20 SHALE - Weathered, Medium Hard, Dark Gray 93	70
SHALE - Weathered, Medidin Haid, Dark Gray	
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_25 Gray 95	35
LIMESTONE WITH OCCASIONAL SHALE	
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Gray	
Boring Terminated	
35	
REMARKS: Mountain Fork Tributary Creek	

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 			LIMESTONE - Unweathered, Hard, Occasional Fractures, Dark Gray									92	83
30			SHALE - Weathered, Moderately Hard, Dark Gray LIMESTONE - Unweathered, Hard, Gray									85	19
	日時日		Envicorone - Onweathered, Hard, Oray										
 35			LIMESTONE WITH FREQUENT SHALE SEAMS AND LAYERS - Unweathered, Hard, Gray									80	30
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40			SHALE WITH OCCASIONAL LIMESTONE SEAMS AND LAYERS - Unweathered, Medium Hard, Dark Gray									97	82
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			tanley Bates		HAMN	AER (ORRE	STIO	N FAC	CTOR:		1.23	
			DEPTH: 38.2										
D E	S	S A											
P T H	Y M B O	M P L	DESCRIPTION OF MATERIAL	SOIL GROUP	IX	IST.	Α.	DRY WEIGHT	LBS PER CU.FT	NO. OF BLOWS	-IN.	% T C R	% R Q D
FT.	L	E S	SURFACE ELEVATION: 868.5		PLASTIC LIMIT	% MOIST	LIQUID	DRY	LBS F	NO. C	PER 6-IN.		
	XON				1								
			Moist, Very Hard, Brown Sandy Clay with Gravel and Cobbles										
5	ωœ									2 6 (3	0		
												91	18
			SHALE - Weathered, Medium Hard, Dark Gray									78	20
 			SHALE - Slightly Weathered, Medium Hard, Occasional Fractures, Dark Gray									100	14
												92	56
			SHALE - Slightly Weathered, Medium Hard, Frequent Fractures, Dark Gray									100	36
<u>30</u>			SHALE - Slightly Weathered, Medium Hard, Occasional Fractures, Dark Gray									88	43
35			LIMESTONE WITH OCCASIONAL SHALE LAYERS - Slightly Weathered, Moderately Hard, Gray										
REM	ARKS	S: N	Nountain Fork Creek										

			WY. & TRANS. DEPARTMENT		BORI			- 0					
	_	_	DIVISION - GEOTECHNICAL SEC.		PAGE	_	2 C	F 2	_	7 00	17	_	-
JOB N			040622 Crawford County	`	DATE:				ay 17	7, 20	17		
JOB N.	AME:		Washington County Line - South Strs. & Apprs. (S)			RILLING		т			0	
			Route 59 Section 5				Stem	Aug				Core	
STATI			112+13		EQUIP	MEN	T:		C.	ME 8	350		
LOCA			Construction Centerline							mon		1 22	
		_	tanley Bates		НАМА	AER (CORREC	TION	N FAC	TOR	_	1.23	_
	PLET	_	DEPTH: 38.2										_
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P	Y	Â						н	FT	NS		%	%
ΙτΙ	М	P	DESCRIPTION OF MATERIAL	SOIL GROUP				GH	CC.	5		T	R
н	B O	L		GROUP	LIC .	IST	A.	WEI	ER	FВ	6-IN.	C R	Q D
	L	E			PLASTIC LIMIT	% MOIST.	LIQUID	DRY WEIGHT	LBS PER CU.FT	NO. OF BLOWS	PER 6		
FT		S	SURFACE ELEVATION: 868.5		PL	%	EE	ā	LE	ž	PE		
			SHALE WITH OCCASIONAL LIMESTONE SEAMS AND LAYERS - Slightly Weathered,									100	62
			Medium Hard, Frequent Fractures, Dark Gray										
			Median Hara, Proquent Producto, Ban Cray										
			Boring Terminated					÷ ,					
40			_				e l						
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		5: N	I Nountain Fork Creek	L			L		_				

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JOB N		_	DIVISION - GEOTECHNICAL SEC. 040622 Crawford County	_	DATE:	_	i (_	_	3, 20	17		
JOB N			Washington County Line - South Strs. & Apprs. (S)			RILLIN		ne i.	5, 20	17		
30D IV.	2 117112.		Route 59 Section 5	,			Stem		er - 1	Diam	ond	Core	
STATI	ON:	·	112+66		EQUIE			-		ME			
LOCA	TION:	(Construction Centerline										
		_	tanley Bates	_	HAMN	AER (CORREC	CTIO	N FAC	CTOR:		1.23	
COM	PLET	_	DEPTH: 38.4		r								
D E	s	S A											
P	Y	M	DESCRIPTION OF MATERIAL					E	.FT.	WS		%	%
Т	M B	Ρ	DESCRIPTION OF MATERIAL	SOIL GROUP		4		IGH	CU	3LO		T C	R Q
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FT.	L	E S	SURFACE ELEVATION: 867.7		PLASTIC LIMIT	% MOIST.	LIQUID	DRY WEIGHT	LBS PER CU.FT	NO. OF BLOWS	PER 6-IN.		
	SPON	-	SOR ACE ELEVATION. 001.1			<u>°`</u>			1	~	-		
	2		Moist, Medium Dense, Brown Gravel, Cobbles,										
	8		and Boulders with Sandy Clay					i.					
		\sim	SHALE Highly Mosthered Soft Croy							6	^		
		T	SHALE - Highly Weathered, Soft, Gray							(5	")		
												94	15
													_
10			_		1		ļ.				6		
												76	32
			SHALE - Weathered, Medium Hard, Gray										02
		\vdash											-
15													
											1	98	44
		+											
20			SHALE - Slightly Weathered, Medium Hard,										
			Frequent Fractures, Occasional Calcite Seams,				h					100	60
			Gray										
				1								-	
25			SHALE WITH OCCASIONAL LIMESTONE										
			PARTINGS AND SEAMS - Slightly Weathered,									100	40
			Medium Hard, Gray										
						1							
30			SHALE WITH OCCASIONAL LIMESTONE			1							
			LAYERS AND SEAMS - Unweathered,		1		1					94	34
			Medium Hard, Gray										
25					1			1					
35 DEM		2	I Aountain Fork Creek		1	1	Ļ	1		1		L	
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JOB N	_	_	DIVISION - GEOTECHNICAL SEC. 040622 Crawford County		PAGE DATE:	_	<u> </u>		10.11	3, 20	17	-	
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300 10			Route 59 Section 5	/			Stem		er - I	Diam	ond	Core	
STATI	ON:		112+66		EQUIF			6		ME 8			
LOCA			Construction Centerline		Ì								
			tanley Bates		HAMN	AER C	ORREG	CTION	I FAC	CTOR:		1.23	
COM	PLET	ION	DEPTH: 38.4										
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P	M	M	DESCRIPTION OF MATERIAL	SOIL				HT	U.F	MO		% T	% R
T H	в	P L		GROUP	0	Ë.	_	EIG	R C	BL	ż	C	Q
	0	E			ITS TI	% MOIST		DRY WEIGHT	LBS PER CU.FT	NO. OF BLOWS	PER 6-IN.	R	D
FT.	L		SURFACE ELEVATION: 867.7		PLASTIC LIMIT	% N	LIQUID	DR	LBS	NO.	PER		
			SHALE WITH OCCASIONAL LIMESTONE									100	
			PARTINGS AND SEAMS - Unweathered,									100	20
			Frequent Fractures, Gray										
								-					
40		6	Boring Terminated										
-40													
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45		i.											
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MATERIALS DIVISION - GEOTECHNICAL SEC. JOB NO. 040622 Crawford County JOB NAME: Washington County Line - South Strs. & A Route 59 Section 5 STATION: 113+13 LOCATION: Construction Centerline LOGGED BY: Stanley Bates COMPLETION DEPTH: 43.7 D S P M P M T B O L FT. L S SURFACE ELEVATION: 873.1	Apprs. (S)) SOIL GROUP	EQUIP	OF DI low MEN	RILLIN Stem T:		er - 1 C	ME 8	ond 50	1.23	
LOCATION: Construction Centerline LOGGED BY: Stanley Bates COMPLETION DEPTH: 43.7 D S S A P M M P T B L H O L I E			HAMN	1ER C	ORRE		N FAC	CTOR:		%	
COMPLETION DEPTH: 43.7 D S S E Y A P M M T B L H O L I E										%	
E S A P M M T B P H O L I E			PLASTIC LIMIT	OIST.		IGHT	CU.FT.	SMO			%
				% M	LIMIT	DRY WEIGHT	LBS PER CU.FT	NO. OF BLOWS	PER 6-IN.	T C R	R Q D
Moist, Medium Dense, Brown Gravel, C and Boulders with Sandy Clay								11 	13		
10 SHALE - Weathered, Medium Hard, Da - -						-	19	60 (2")	100 90	70 44
20 SHALE - Slightly Weathered, Medium H Occasional Fractures, Occasional Iron Concretions, Dark Gray	Hard,									100	76
25 SHALE - Slightly Weathered, Medium H Occasional Fractures, Dark Gray	Hard,									97	90
30 30 SHALE WITH OCCASIONAL LIMESTO SEAMS - Slightly Weathered, Hard, Oc Fractures, Dark Gray										99	62
35											

			IWY. & TRANS. DEPARTMENT DIVISION - GEOTECHNICAL SEC.		BORI PAGE			of 2					
		_	040622 Crawford County				2 0		na 6	, 201	7		_
JOB N JOB N			Washington County Line - South Strs. & Apprs. (S)	DATE:		RILLIN		110 0	, 201	. /		
JOBIN			Route 59 Section 5	,			Stem		er - 1	Diam	iond	Core	
STATI	ON:		113+13		EQUIF			B		ME			
LOCA			Construction Centerline										
			tanley Bates		HAMN	IER C	CORREC	CTION	FAC	CTOR:		1.23	
			DEPTH: 43.7										
D E	S	S A							4				
P	Y M	Μ	DESCRIPTION OF MATERIAL	SOIL				HT	J.FT	SWC		% T	% R
Т Н	В	P		GROUP	0	E		EIG	R CI	BL(ż	C	Q
	0	L E			IT TI	OIS	19E	M	PEI	OF	6-D	R	D
FT,	L	S	SURFACE ELEVATION: 873.1		PLASTIC LIMIT	% MOIST	LIQUID	DRY WEIGHT	LBS PER CU.FT	NO. OF BLOWS	PER 6-IN.		
			SHALE WITH OCCASIONAL LIMESTONE										
			SEAMS - Unweathered, Hard, Occasional									95	78
			Fractures, Dark Gray										
40						÷ .							
			SHALE WITH OCCASIONAL LIMESTONE										
			SEAMS AND LAYERS - Unweathered, Hard,									97	80
			Occasional Fractures, Dark Gray										
			Device Termineted			_	-						
45			Boring Terminated						- 8				
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REM	ARKS	S: N	Aountain Fork Creek										
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JOB N		_	040622 Crawford County		DATE:	_	. (_	_	28, 2	017		-
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STATI	ON		Route 59 Section 5 180+92		Ho. EQUIF		Stem	Aug		Diam CME		Core	
LOCA			5' Right of Construction Centerline		LQUI	WILIN	1.				15		
			oty Campbell		HAMN	AER C	CORREC	CTION	N FAC	CTOR	:	1.37	
COM	PLET	_	DEPTH: 38.5										
D E	s	S A											
P	Y M	Â	DESCRIPTION OF MATERIAL	0.011					.FT.	WS		%	%
Т	B	P	DEGORI HON OF MATERIAL	SOIL GROUP	U	н ^а		EIGF	s cu	BLO	Ż	T C	R Q
н	0	L E			PLASTIC LIMIT	% MOIST.	LIQUID	DRY WEIGHI	LBS PER CU.FT	NO. OF BLOWS	PER 6-IN.	R	D
FT _{set}	L		SURFACE ELEVATION: 829.7		PLAST LIMIT	% N	LIMIT	DR	LB(NO	PEF		
	300												
	18 C		5										
	XX												
			Moist, Very Stiff, Brown Sandy Clay with								3		
_5	2	Х	Gravel							-	12		
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10	200	∇								-	5		
	X	\square								19	-50		
	N												
	\sim		Moist, Very Hard, Brown Sandy Clay with										
15	2		Gravel							1	3		
15	200	A								17	-60		
	80.00									(8	3")		
	0.000	-	Boulder										
	80 80 80		Cobbles				10.5						
20	m e o		Cobbles										
												75	26
		_			6								
25			SHALE - Weathered, Medium Hard, Dark Gray										
												85	47
													11
	111		SHALE - Weathered with Highly Weathered										
30	777		Layers, Medium Hard with Soft Layers, Dark										
	777		Gray									75	18
	議論		SANDY LIMESTONE - Slightly Weathered,	-									
			Moderately Hard, Gray										
35			SHALE - Weathered, Medium Hard,										
REM	ARKS	S: V	Vhitzen Hollow Creek										
					_	_			_			_	

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	_	_	DIVISION - GEOTECHNICAL SEC.		PAGE		2 C	F 2	al 1	00 70	017	_	
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JOB N	AME:		Route 59 Section 5)			Stem.			Jiam	ond	Core	
STATI	ON		180+92		EQUIP			Augo		ME .		COIC	
LOCA			5' Right of Construction Centerline		LQUII	IVALAIN	1.		C	14117	15		
			oty Campbell		HAMN	AER C	ORREG	CTION	FAC	TOR:		1.37	
		_	DEPTH: 38.5										
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	0	Ē			PLASTIC LIMIT	% MOIST	LIQUID	DRY WEIGHT	LBS PER CU.FT	NO. OF BLOWS	PER 6-IN.	R	D
FT.,	L	S	SURFACE ELEVATION: 829.7		PL/ LIN	% N	FIN	DR	LB	NON	PEI		
			Occasional Concretions, Dark Gray									96	75
	1 994-1		SANDY LIMESTONE WITH FREQUENT									90	15
	3335		SHALE LAYERS - Weathered, Moderately										
		4	Hard, Gray SHALE - Slightly Weathered, Medium Hard,					-			-		
40			Dark Gray										
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REM	ARKS	S: V	Vhitzen Hollow Creek										
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JOB NO.		OIVISION - GEOTECHNICAL SEC. 040622 Crawford County		PAGE		1 C	F 2	_	0 201	7	
JOB NAN	ME:	Washington County Line - South Strs. & Apprs. (S) Route 59 Section 5)		of Di	RILLIN Stem	G:	er - I	29, 201 Diamor	id Core	;
STATION		182+22		EQUIP	MEN	T:		C	CME 75		
LOCATIO		5' Left of Construction Centerline Coty Campbell				CORREC	אראדי	IEAC	ידרים.	1.37	,
		N DEPTH: 41.9		HAM	IER (UKKE	TION	TAC	TOR:	1.57	
		S									
E P T H	S Y B O	DESCRIPTION OF MATERIAL	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID	RY WEIGHT	LBS PER CU.FT.	NO. OF BLOWS	% T C R	% R Q D
	86.1	SURFACE ELEVATION: 829.5			%		Ω	L	Z		
		Dry, Medium Dense, Brown Gravel with Sand							11 13-15		
10 	200 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Moist, Dense, Sand with Clay and Gravel							8		
15 		Moist, Very Dense, Sand with Clay and Gravel				9			11 30-27	-	
20	77	SHALE - Highly Weathered, Medium Hard,							60 (5")		-
		\Dark Gray								84	0
25		SHALE - Weathered, Medium Hard, Dark Gray							10	98	16
30										80	34
										80	36
REMAR	RKS	Whitzen Hollow Creek									
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JODIN			Route 59 Section 5	/			Stem		er - I	Diam	ond	Core	
STATI	ON:		182+22		EQUIP			1145		ME		0010	
LOCA		:	5' Left of Construction Centerline		Ì								- 1
LOGG	ED BY	: C	oty Campbell		HAMN	1ER C	CORREC	CTION	I FAC	TOR:		1.37	
COM	PLET	ION	DEPTH: 41.9					·					
D	s	S											
E P	Ŷ	A							T.	s'		%	%
г Т	М	M P	DESCRIPTION OF MATERIAL	SOIL				GHI	CU.I	MO		Т	R
Ĥ	B O	Ľ		GROUP	ПС	IST.		VEI	ER (F BI	Ν.	C R	Q D
	L	E			PLASTIC LIMIT	% MOIST	LIQUID	DRY WEIGHT	LBS PER CU.FT	NO. OF BLOWS	PER 6-IN.		-
FT.		S	SURFACE ELEVATION: 829.5		PL LI	%	11	Ď	LE	ž	PE		
			SHALE - Weathered, Medium Hard, Occasional Concretions and Pyrite Nodules,			6							
			Dark Gray										
			SANDY LIMESTONE WITH FREQUENT										
40			SHALE LAYERS - Slightly Weathered,			1						98	82
			Moderately Hard, Gray SHALE - Slightly Weathered, Medium Hard,			C							
		_	Occasional Concretions, Dark Gray			_		-	_			_	
			Boring Terminated		0						U		
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			Route 59 Section 5	<i>,</i>	Ho	llow	Stem	Aug	er - I	Diam	ond	Core	
STATIO	DN:	:	286+49		EQUIF			-		CME			
LOCAT	ION:	(6' Right of Construction Centerline										
LOGGE	DBY	: C	oty Campbell		HAMM	AER (ORRE	CTION	N FAC	TOR:		1.37	
COMP	LETI	ION	DEPTH: 35.7										
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	0	Ē			PLASTIC LIMIT	% MOIST	LIQUID	DRY WEIGHT	LBS PER CU.FT	NO. OF BLOWS	PER 6-IN.	к	D
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	00. A		Moist, Medium Dense, Brown Sand with Gravel										
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15	10.0	\times	Wet, Very Dense, Brown Gravel with Clay and							1			
	P. Q. 14	Ŧ	Sand							18- (8	-60 ")	100	100
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		1											
					÷							100	100
25			SANDSTONE - Unweathered, Well Cemented,										
			Calcareous, Gray										
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													4.0.7
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30													
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35									_				ų
REMA	RKS	5: F	luey Creek										
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JOB N.			Washington County Line - South Strs. & Apprs. (S	5)			RILLIN			í			
			Route 59 Section 5		Ho	llow	Stem	Aug				Core	
STATI			286+49		EQUI	MEN	T:		(CME	75		
LOCA			6' Right of Construction Centerline							-		1 27	
			DEPTH: 35.7		HAMN	AER C	CORREC	CTION	N FAC	TOR:		1.37	_
		S	DEPTH: 55.7		I								_
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P	Y M	М	DESCRIPTION OF MATERIAL	SOIL			2	H	J.FT	MS		% T	% R
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FT.	L		SURFACE ELEVATION: 777.7		PLASTIC LIMIT	% MOIST.	LIQUID	DRY WEIGHT	LBS PER CU.FT	NO. OF BLOWS	PER 6-IN.		
		Т											
			Boring Terminated										
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REM	ARKS	S: F	luey Creek										
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JOB N JOB N			040622 Crawford County Washington County Line - South Strs. & Apprs. (S	3	DATE:		RILLIN	-		1, 20	17		
JODIN			Route 59 Section 5)			Stem		er - l	Diam	ond	Core	
STATI	ON:		287+29		EQUIE					CME		0010	
LOCA			5' Left of Construction Centerline										
LOGG	ED BY	7: C	oty Campbell		HAMN	AER C	CORRE	CTION	N FAC	CTOR:		1.37	
COM	PLET	ION	I DEPTH: 36.5										
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	0 L	E			PLASTIC LIMIT	% MOIST.	LIMIT	DRY WEIGHT	LBS PER CU.FT	NO. OF BLOWS	PER 6-IN.		
FT,	L	S	SURFACE ELEVATION: 777.8		LIN	%]	EE	DR	LB	NO	PE		
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5	\mathbb{N}	\mathbb{N}	Moist, Stiff, Brown Sandy Clay							7-			
	\sim									1.			
	\mathbb{N}												
	\mathbf{X}												
	$\overline{\mathcal{N}}$												
10	N NO	\mathbb{X}								6-			
	\sim	$ \rightarrow$								0-	ʻ		
			Moist, Stiff, Brown Sandy Clay with Gravel										
	8.00												
	X										_		
15	14	\ge	SHALE - Highly Weathered, Medium Hard,							2	1.000		
			Dark Gray							(2	.")		
	朝空		LIMESTONE - Slightly Weathered, Moderately										
			Hard, Gray					1				94	72
20			SHALE - Slightly Weathered, Medium Hard,									•	. –
	×1		Calcareous, Dark Gray	6									
		\vdash	COAL SHALE WITH OCCASIONAL LIMESTONE	5									
			LAYERS - Slightly Weathered, Medium Hard,										
			Calcareous, Dark Gray LIMESTONE - Unweathered, Moderately Hard,	Ę	1							100	96
25			Gray										
		+											
			LIMESTONE WITH OCCASIONAL SHALE										
			LAYERS - Unweathered, Moderately Hard,					•				100	85
30			Gray										
	語時												
	HHH HHH												
			LIMESTONE - Unweathered, Moderatly Hard,									100	89
35			Occasional Fractures, Gray										
REM	ARKS	S: ⊦	luey Creek										
					_								

MATERIALS DIVISION - GEOTECHNICAL SEC. PAGE 2 OF 2 10B NO. 040622 Crawford County Noute 59 Section 5 DATE: April 11, 2017 10B NAME: Washington County Line - South Strs. & Apprs. (S) Route 59 Section 5 TYPE OF DRILLING: STATION: 287+29 Hollow Stem Auger - Diamond Core LOCATION: 5' Left of Construction Centerline HAMMER CORRECTION FACTOR: 1.37 COMPLETION DEPTH: 36.5 DESCRIPTION OF MATERIAL SOIL FT. SOIL SURFACE ELEVATION: T Q 2 P M B L C S SURFACE ELEVATION: 777.8 I I I 40 I I I I I I I I 40 I I I I I I I I 50 I I I I I I I I Boring Terminated I I I I I I I I 60 I I I I I I I I I
NOB NAME: Washington County Line - South Strs. & Apprs. (S) Route 59 Section 5 TYPE OF DRILLING: Hollow Stem Auger - Diamond Core EQUIPMENT: STATION: 287+29 LOCATION: 5' Left of Construction Centerline LOGGED BY: Coty Campbell CME 75 COMPLETION DEPTH: 36.5 HAMMER CORRECTION FACTOR: 1.37 COMPLETION DEPTH: 36.5 DESCRIPTION OF MATERIAL SOIL E SOIL GROUP U <td< td=""></td<>
Route 59 Section 5 Hollow Stem Auger - Diamond Core EQUIPMENT: CME 75 LOCATION: 5' Left of Construction Centerline LOGGED BY: Coty Campbell COMPLETION DEPTH: 36.5 DESCRIPTION OF MATERIAL SOIL DISURFACE ELEVATION: 777.8 Boring Terminated Boring Terminated
LOCATION: 5' Left of Construction Centerline LOGGED BY: Coty Campbell COMPLETION DEPTH: 36.5 DESCRIPTION OF MATERIAL H O L S SURFACE ELEVATION: 777.8 Boring Terminated H O L H O L S SURFACE ELEVATION: 777.8 Boring Terminated H O L H O L S SURFACE ELEVATION: 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
LOGGED BY: Coty Campbell HAMMER CORRECTION FACTOR: 1.37 COMPLETION DEPTH: 36.5 DESCRIPTION OF MATERIAL SOIL U
COMPLETION DEPTH: 36.5 DEPTHON DEPTH: 36.5 DESCRIPTION OF MATERIAL SOIL GROUP THBO THBO SURFACE ELEVATION: 777.8 Boring Terminated Boring Terminated H H H H H H H H H H H H H
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P M M P DESCRIPTION OF MATERIAL SOIL
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			WY. & TRANS. DEPARTMENT DIVISION - GEOTECHNICAL SEC.		BORI PAGE		NO. 1 1 (1 DF 2					
JOB N		_	040622 Crawford County		DATE		<u>, (</u>	_	_	1,20	17		
JOB N			Washington County Line - South Strs. & Apprs. (S)			RILLIN	-	/111 1	1, 20	/1 /		
			Route 59 Section 5	,			Stem		er -	Diam	ond	Croe	
STATI	ION:	:	287+69		EQUI			0		CME			
LOCA	TION:	(6' Left of Construction Centerline										
LOGG	ED BY	: C	oty Campbell		HAM	MER (CORRE	CTIO	N FAG	CTOR:		1.37	
COM	PLET	ION	DEPTH: 40										
D	s	S					1						
E	Ŷ	A							Ľ.	S		%	%
P T	M	M P	DESCRIPTION OF MATERIAL	SOIL				THE	U.F	NO.		Т	R
н	B	Ĺ		GROUP	\square	ST.		/EIC	SR C	BL	z	C R	Q D
	0 L	E			PLASTIC LIMIT	% MOIST	LIQUID	DRY WEIGHT	LBS PER CU.FT	NO. OF BLOWS	PER 6-IN.	ĸ	D
FT _a	L	S	SURFACE ELEVATION: 778.2		PL	%	LIN	DR	LB	2 N	PEI		
	$\backslash \backslash$												
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5	$\langle \rangle$	\bigtriangledown	Moist, Very Stiff, Brown Sandy Clay							7			
-	\mathbb{N}	\bigtriangleup	······································							8-	.9		
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10	00000	А								17-	10		
	1.16		Moist, Medium Dense, Gravel with Clay and										
<u> </u>	2000		Sand					8					
	99. S												
	1.10	\rightarrow					1			1	3		
15	1993	Х								15-			
<u></u>	\mathbb{N}		Wet, Dense, Gravel with Clay and Sand										
	18/96		LIMESTONE - Unweathered, Moderately Hard,										
			SHALE - Slightly Weathered, Medium Hard,	5								99	27
20			Calcareous, Dark Gray										_
	斑白												
			LIMESTONE WITH OCCASIONAL SHALE SEAMS - Unweathered, Moderately Hard, Gray									95	74
	時日		GEANS - Onweathered, Moderately Flard, Glay										
25			COAL WITH OCCASIONAL SHALE LAYERS	S.									
			LIMESTONE - Unweathered, Moderately Hard,)									
			\Gray SHALE - Weathered, Medium Hard, Dark Gray										
			SHALE - Weathered, Wedium Hard, Dark Gray									100	78
30													
	出出		LIMESTONE - Unweathered, Moderately Hard,								1		
	斑		Gray	*									
												100	76
													10
	世日		LIMESTONE WITH FREQUENT SHALE										
35													
KEM.	AKKS	s: ⊢	łuey Creek										
						_	_	_	_	_	_	_	

			IWY. & TRANS. DEPARTMENT DIVISION - GEOTECHNICAL SEC.		BORI PAGE		io. 11 2 c	l DF2					
JOB NO. 040622 Crawford County DATE: April 11, 2017 JOB NAME: Washington County Line - South Strs. & Apprs. (S) Route 59 Section 5 TYPE OF DRILLING: Hollow Stem Auger - Diamond Croe STATION: 287+69 CME 7													
LOCA	TION:	(287+69 6' Left of Construction Centerline oty Campbell		EQUIP			CTION				1.37	
-			DEPTH: 40										
ошртн <mark>г</mark>	S Y M B O L	S A M P L E S	DESCRIPTION OF MATERIAL SURFACE ELEVATION: 778.2	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID	DRY WEIGHT	LBS PER CU.FT.	NO. OF BLOWS	PER 6-IN.	% T C R	% R Q D
			PARTINGS AND SEAMS - Unweathered, Moderately Hard, Gray LIMESTONE - Unweathered, Moderately Hard, Gray									100	92
			Boring Terminated								5		
		5. f	Huey Creek										

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT

May 19, 2016

TO: Mr. Trinity Smith, Engineer of Roadway Design

SUBJECT: Job No. 040622 Washington Co. Line – South Strs. & Apprs. (S) Route 59 Section 5 Crawford County

Transmitted herewith are the requested Soil Survey, strength data and Resilient Modulus test results for the above referenced job. The project consists of replacing four bridges on Highway 59. Samples were obtained in the existing travel lanes, shoulder and ditch line.

Based on laboratory results of samples obtained, the subgrade soils primarily consist of low plasticity sandy clays with varying amounts of gravel. Isolated locations of highly plastic clay were encountered within the project limits. Cross-sections are not currently available, but it is assumed that the construction grade line will closely match that of the existing roadway. The subgrade soils are expected to provide a stable working platform with conventional processing if the weather is favorable during construction. Rock was encountered at station 178+00, 5 feet right of centerline at a depth of 1.5 feet, and at station 185+00, 12 feet left of centerline at a depth of 0.5 feet.

If embankment is to be placed in the existing ditch line all soft unstable organic material should be undercut prior to embankment construction. The undercut is anticipated to be no more than two feet and may be backfilled with locally available unspecified material. Further recommendations will be made when plans are further developed and cross-sections become available.

Listed below is the additional information requested for use in developing the plans:

- 1. The Qualified Products List (QPL) indicates that Aggregate Base Course (Class CL-7) is available from commercial producers located in the vicinity of Van Buren.
- 2. Asphalt Concrete Hot Mix

	PG 64-22	
Туре	Asphalt Cement %	Mineral Aggregate %
Surface Course	5.6	94.4
Binder Course	5.4	94.6
Base Course	4.5	95.5

	PG 70-22	
Туре	Asphalt Cement %	Mineral Aggregate %
Surface Course	5.6	94.4
Binder Course	5.5	94.5
Base Course	4.5	95.5

Job No. 040622 May 19, 2016

	PG 76-22	
Туре	Asphalt Cement %	Mineral Aggregate %
Surface Course	5.6	94.4
Binder Course	5.5	94.5
Base Course	4.7	95.3

0

Michael C. Benson Materials Engineer

MCB:pt:bjj Attachment

cc: State Constr. Eng. – Master File Copy District 4 Engineer System Information and Research Div. G. C. File

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT - LITTLE ROCK, ARKANSAS MATERIALS DIVISION MICHAEL BENSON, MATERIALS ENGINEER *** SOIL SURVEY STRENGTH TEST REPORT *** DATE - 05/19/2016 SEQUENCE NO. - 1 MATERIAL CODE - SSRVPS JOB NUMBER - 040622 SPEC. YEAR - 2014 SUPPLIER ID. - 1 COUNTY/STATE - 17 DISTRICT NO. - 04 JOB NAME - WASHINGTON CO.LINE-SOUTH STRS.& APPRS.(S) * STATION LIMITS R-VALUE AT 240 psi *

10

RESILIENT MODULEUS 017+00 6,174 071+00 6,118 178+00 6,010 290+00 7,938

BEGIN JOB - END JOB

REMARKS -

AASHTO TESTS : T190

AASHTO T 307-99 - RESILIENT MODULUS OF SUBGRADE SOILS RECOMPACTED SAMPLES

Job No.	040622	Material Code	SSRVPS
Date Sampled:	5/11/16	Station No.:	017+00
Date Tested:	May 11, 2016	Location:	15'RT
Name of Project:	WASHINGTON CO.LINE - SOUTH STR. + APPF Code: 17 Name: CRAWFORD	(5)	
County: Sampled By:	GW	Depth:	0-5
Lab No.:	20161159	AASHTO Class:	A-2-4 (0)
Sample ID:	RV210	Material Type (1 or 1	• •
LATITUDE:		LONGITUDE:	-)
1. Testing Inform	nation:		
	Preconditioning - Permanent Strain > 5% (Y=	Yes or N= No)	Ν
	Testing - Permanent Strain > 5% (Y=Yes or N		Ν
	Number of Load Sequences Completed (0-15)		15
2. Specimen Info	rmation:		
	Specimen Diameter (in):		
	Тор		3.97
	Middle		3.96
	Bottom		3.94
	Average		3.96
	Membrane Thickness (in):		0.01
	Height of Specimen, Cap and Base (in):		8.02
	Height of Cap and Base (in):		0.00
	Initial Length, Lo (in):		8.02
			12.22
	Initial Area, Ao (sq. in):		
	Initial Volume, AoLo (cu. in):		98.01
3. Soil Specimen			
	Weight of Wet Soil Used (g):		3259.80
4. Soil Properties			
	Optimum Moisture Content (%):		13.8
	Maximum Dry Density (pcf):		114.9
	95% of MDD (pcf):		109.2
	In-Situ Moisture Content (%):		N/A
5. Specimen Pro			
	Wet Weight (g):		3259.80
	Compaction Moisture content (%):		13.8
	Compaction Wet Density (pcf):		126.72
	Compaction Dry Density (pcf):		111.36
	Moisture Content After Mr Test (%):		13.9
6. Quick Shear T	est (Y=Yes, N=No, N/A=Not Applicable):		#VALUE!
7. Resilient Modu	ulus, Mr:	9055	(Sc)^-0.32147(S3)^0.39045
8. Comments			
9. Tested By:	G. WENDLAND	ate: May 11, 2016	

AASHTO T 307-99 - RESILIENT MODULUS OF SUBGRADE SOILS RECOMPACTED SAMPLES

Job No.	040622			de	SSRVPS
Date Sampled:	5/11/16				017 + 00
Date Tested:	May 11, 2016			Location:	15'RT
Name of Project:	WASHINGTON CO.LINE - SOUTH STR. + APPRS (S)	SOUTH	STR. + APPRS (S)		
County:	Code: 17 Nan	me:	Name: CRAWFORD		
Sampled By:	GW			Depth:	0-5
Lab No.:	20161159			AASHTO Class:	A-2-4 (0)
Sample ID:	RV210			Material Type (1 or 2): 2	7
LATITUDE:				LONGITUDE:	

	Chamber	Nominal	Actual	Actual Annlied	Actual Annlied	Actual Annlied	Actual Annlied	Actual Annlied	Average Recov Def	Resilient Strain	Resilient
PARAMETER	Pressure	Axial	a	Cyclic Load	Contact	Max.	Cyclic	Contact	LVDT 1		
		Stress	Load		Load	Axial Stress	Stress	Stress	and 2		
DESIGNATION	လိ	Scyclic	P _{max}	P _{cyclic}	Pcontact	Smax	S _{cyclic}	Scontact	Havg	చ	Å
UNIT	psi	psi	lbs	lbs	lbs	psi	psi	psi	i	in/in	psi
Sequence 1	6.0	2.0	25.0	22.2	2.8	2.0	1.8	0.2	0.00099	0.00012	14,700
Sequence 2	6.0	4.0	46.9	44.1	2.8	3.8	3.6	0.2	0.00226	0.00028	12,824
Sequence 3	6.0	6.0	68.9	65.2	3.7	5.6	5.3	0.3	0.00375	0.00047	11,397
Sequence 4	6.0	8.0	91.3	85.2	6.1	7.5	7.0	0.5	0.00568	0.00071	9,846
Sequence 5	6.0	10.0	113.4	104.8	8.6	9.3	8.6	0.7	0.00776	0.00097	8,867
Sequence 6	4.0	2.0	24.7	22.0	2.7	2.0	1.8	0.2	0.00116	0.00014	12,473
Sequence 7	4.0	4.0	45.9	43.1	2.8	3.8	3.5	0.2	0.00275	0.00034	10,276
Sequence 8	4.0	6.0	66.0	63.2	2.9	5.4	5.2	0.2	0.00465	0.00058	8,922
Sequence 9	4.0	8.0	88.3	82.9	5.4	7.2	6.8	0.4	0.00672	0.00084	8,098
Sequence 10	4.0	10.0	110.5	102.6	7.9	9.0	8.4	0.6	0.00880	0.00110	7,645
Sequence 11	2.0	2.0	24.5	21.6	2.8	2.0	1.8	0.2	0.00143	0.00018	9,958
Sequence 12	2.0	4.0	44.8	41.9	2.9	3.7	3.4	0.2	0.00338	0.00042	8,138
Sequence 13	2.0	6.0	63.9	60.9	3.0	5.2	5.0	0.2	0.00565	0.00070	7,083
Sequence 14	2.0	8.0	84.5	80.1	4.5	6.9	6.6	0.4	0.00807	0.00101	6,515
Sequence 15	2.0	10.0	105.9	98.9	7.0	8.7	8.1	0.6	0.01051	0.00131	6,174

DATE May 11, 2016 DATE

TESTED BY REVIEWED BY

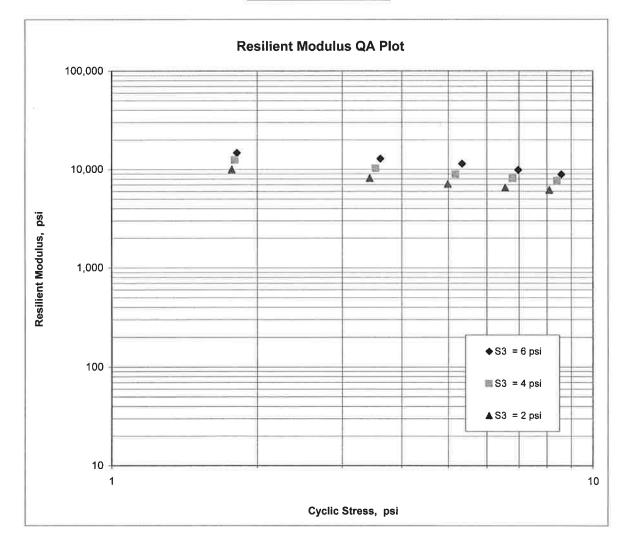
. WENDLAND

AASHTO T 307-99 - RESILIENT MODULUS OF SUBGRADE SOILS RECOMPACTED / THINWALL TUBE SAMPLES

Job No.	040622			Material Code	SSRVPS
Date Sampled:	5/11/16			Station No.:	017+00
Date Tested:	May 11, 2016			Location:	15'RT
Name of Project:	WASHINGTON CO	LINE - S	SOUTH STR. + API	PRS (S)	
County:	Code: 17	Name:	CRAWFORD		
Sampled By:	GW			Depth:	0-5
Lab No.:	20161159		A	ASHTO Class:	A-2-4 (0)
Sample ID:	RV210		Materia	al Type (1 or 2):	2
LATITUDE:				LONGITUDE:	

 $M_{R} = K1 (S_{C})^{K2} (S_{3})^{K5}$

K1 =	9,055
K2 =	-0.32147
K5 =	0.39045
$R^2 =$	0.98



AASHTO T 307-99 - RESILIENT MODULUS OF SUBGRADE SOILS RECOMPACTED SAMPLES

Job No.	040622	Material Code	SSRVPS
Date Sampled: Date Tested:	5/11/16 May 11, 2016	Station No.: Location:	071+00 15'LT
Name of Project:	WASHINGTON CO.LINE - SOUTH STR. + APPF		15.21
County:	Code: 17 Name: CRAWFORD	(0)	
Sampled By:	D. DICKERSON	Depth:	0-5
Lab No.:	20161160	AASHTO Class:	A-4 (0)
Sample ID:	RV211	Material Type (1 or 2):	2
LATITUDE:		LONGITUDE:	
1. Testing Inform	nation:		
	Preconditioning - Permanent Strain > 5% (Y=	Yes or N= No)	N
	Testing - Permanent Strain > 5% (Y=Yes or N	=No)	N
	Number of Load Sequences Completed (0-15)		15
2. Specimen Inf	ormation:		
	Specimen Diameter (in):		
	Тор		3.97
	Middle		3.94
	Bottom		3.96
	Average		3.96
	Membrane Thickness (in):		0.01
	Height of Specimen, Cap and Base (in):		8.02
	Height of Cap and Base (in):		0.00
	Initial Length, Lo (in):		8.02
	Initial Area, Ao (sq. in):		12.22
	Initial Volume, AoLo (cu. in):		98.01
3. Soil Specime	-		
	Weight of Wet Soil Used (g):		3161.20
4. Soil Propertie			
	Optimum Moisture Content (%):		15.8
	Maximum Dry Density (pcf):		111.4
	95% of MDD (pcf):		105.8
	In-Situ Moisture Content (%):		N/A
5. Specimen Pro			
	Wet Weight (g):		3161.20
	Compaction Moisture content (%):		15.6
	Compaction Wet Density (pcf):		122.89
	Compaction Dry Density (pcf):		106.31
	Moisture Content After Mr Test (%):		15.9
6. Quick Shear 1	「est (Y=Yes, N=No, N/A=Not Applicable):		#VALUE!
7. Resilient Mod	ulus, Mr:	12157(8	c)^-0.40566(83)^0.27538
8. Comments	3		
	î		
9. Tested By:	G. WENDLAND	Date: May 11, 2016	

9. Tested By: G. WENDLAND

AASHTO T 307-99 - RESILIENT MODULUS OF SUBGRADE SOILS RECOMPACTED SAMPLES

Job No.	040622	Material Code	SSRVPS
Date Sampled:	5/11/16	Station No.:	071 + 00
Date Tested:	May 11, 2016	Location:	15'LT
Name of Project:	WASHINGTON CO.LINE - SOUTH STR. + APPRS (S)		
County:	Code: 17 Name: CRAWFORD		
Sampled By:	D. DICKERSON	Depth:	0-5
Lab No.:	20161160	AASHTO Class:	A-4 (0)
Sample ID:	RV211	Material Type (1 or 2): 2	2): 2
LATITUDE:		LONGITUDE:	

	Chamber	Nominal	Actual	Actual	Actual	Actual	Actual	Actual	Average	Resilient	Resilient
	Confining	Maximum	Applied	Applied	Applied	Applied	Applied	Applied	Recov Def.	Strain	Modulus
PARAMETER	Pressure	Axial	Max. Axial	Cyclic Load	Contact	Max.	Cyclic	Contact	LVDT 1		
		Stress	Load		Load	Axial	Stress	Stress	and 2		
						Stress					
DESIGNATION	Ŝ	S _{cyclic}	P _{max}	P _{cyclic}	P _{contact}	S _{max}	S _{cyclic}	Scontact	H _{avg}	Ψ	Mr
UNIT	psi	psi	lbs	lbs	lbs	psi	psi	psi	'n	in/in	psi
Sequence 1	6.0	2.0	25.0	22.2	2.8	2.0	1.8	0.2	0.00100	0.00012	14,617
Sequence 2	6.0	4.0	47.0	44.2	2.8	3.8	3.6	0.2	0.00223	0.00028	13,045
Sequence 3	6.0	6.0	69.2	65.5	3.7	5.7	5.4	0.3	0.00382	0.00048	11,251
Sequence 4	6.0	8.0	90.4	84.2	6.2	7.4	6.9	0.5	0.00611	0.00076	9,040
Sequence 5	6.0	10.0	110.7	102.0	8.7	9.1	8.3	0.7	0.00862	0.00107	7,769
Sequence 6	4.0	2.0	25.0	22.2	2.8	2.0	1.8	0.2	0.00111	0.00014	13,122
Sequence 7	4.0	4.0	46.4	43.6	2.8	3.8	3.6	0.2	0.00260	0.00032	11,003
Sequence 8	4.0	6.0	66.7	63.8	2.8	5.5	5.2	0.2	0.00448	0.00056	9,340
Sequence 9	4.0	8.0	88.1	82.9	5.2	7.2	6.8	0.4	0.00678	0.00084	8,027
Sequence 10	4.0	10.0	109.3	101.5	7.8	8.9	8.3	0.6	0.00942	0.00117	7,076
Sequence 11	2.0	2.0	24.8	22.1	2.7	2.0	1.8	0.2	0.00128	0.00016	11,323
Sequence 12	2.0	4.0	45.9	43.2	2.7	3.8	3.5	0.2	0.00303	0.00038	9,342
Sequence 13	2.0	6.0	65.2	62.4	2.8	5.3	5.1	0.2	0.00521	0.00065	7,851
Sequence 14	2.0	8.0	84.9	80.5	4.4	6.9	6.6	0.4	0.00776	0.00097	6,807
Sequence 15	2.0	10.0	105.4	98.5	6.9	8.6	8.1	0.6	0.01056	0.00132	6,118

DATE May 11, 2016 DATE _____

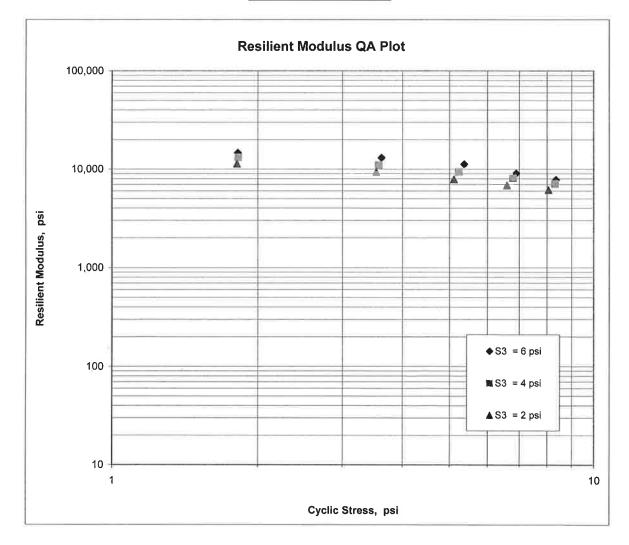
WENDLAND

AASHTO T 307-99 - RESILIENT MODULUS OF SUBGRADE SOILS RECOMPACTED / THINWALL TUBE SAMPLES

Job No.	040622			Material Code SSRVPS
Date Sampled:	5/11/16			Station No.: 071+00
Date Tested:	May 11, 2016			Location: 15'LT
Name of Project:	WASHINGTON CO	D.LINE - S	SOUTH STR. + AI	PPRS (S)
County:	Code: 17	Name:	CRAWFORD	
Sampled By:	D. DICKERSON			Depth: 0-5
Lab No.:	20161160			AASHTO Class: A-4 (0)
Sample ID:	RV211		Mater	ial Type (1 or 2): 2
LATITUDE:				LONGITUDE:

 $M_{R} = K1 (S_{C})^{K2} (S_{3})^{K5}$

K1 =	12,157	
K2 =	-0.40566	
K5 =	0.27538	
$R^2 =$	0.95	



AASHTO T 307-99 - RESILIENT MODULUS OF SUBGRADE SOILS RECOMPACTED SAMPLES

Job No.	040622	Material Code	SSRVPS
Date Sampled:	4/19/16 Marc 12, 2016	Station No.:	178+00
Date Tested: Name of Project:	May 12, 2016 WASHINGTON CO. LINE SOLITH STDS. θ AD	Location:	15'RT
County:	WASHINGTON CO. LINE-SOUTH STRS. & APPRS.(S) Code: 17 Name: CRAWFORD		
Sampled By:	CHRISENBERRY	Depth:	0-5'
Lab No.:	20161161	AASHTO Class:	A-6(1)
Sample ID:	RV212	Material Type (1 or 2):	
LATITUDE:		LONGITUDE:	
1. Testing Inform	nation		
	Preconditioning - Permanent Strain > 5% (Y	=Yes or N= No)	N
	Testing - Permanent Strain > 5% (Y=Yes or N		N
	Number of Load Sequences Completed (0-15		15
2. Specimen Info	ormation.		
2. Opecimen inte	Specimen Diameter (in):		
	Тор		3.97
	Middle		3.95
	Bottom		3.95
	Average		3.96
	Membrane Thickness (in):		0.00
	Height of Specimen, Cap and Base (in):		8
	Height of Cap and Base (in):		0.00
	Initial Length, Lo (in):		8
	Initial Area, Ao (sq. in):		12.30
	Initial Volume, AoLo (cu. in):		98.36
3. Soil Specimer	n Weight:		
or een opeenier	Weight of Wet Soil Used (g):		3213.10
4. Soil Propertie			
	Optimum Moisture Content (%):		15.2
	Maximum Dry Density (pcf):		112.5
	95% of MDD (pcf):		106.9
	In-Situ Moisture Content (%):		N/A
5. Specimen Pro	perties:		
	Wet Weight (g):		3213.10
	Compaction Moisture content (%):		15.4
	Compaction Wet Density (pcf):		124.46
	Compaction Dry Density (pcf):		107.85
	Moisture Content After Mr Test (%):		15.4
6. Quick Shear T	est (Y=Yes, N=No, N/A=Not Applicable):		#VALUE!
7. Resilient Modulus, Mr:		12580(S	c)^-0.41736(S3)^0.21690
8. Comments	· · · · · · · · · · · · · · · · · · ·		
9. Tested By:	C.GARRETT	Date: May 12, 2016	

AASHTO T 307-99 - RESILIENT MODULUS OF SUBGRADE SOILS RECOMPACTED SAMPLES

Job No.	040622			Material Code	SSRVPS
Date Sampled:	4/19/16			Station No.:	178 + 00
Date Tested:	May 12, 2016			Location:	15'RT
Name of Project:	WASHINGTON CO.	LINE-SOUT	WASHINGTON CO. LINE-SOUTH STRS. & APPRS.(S)		
County:	Code: 17	Name:	CRAWFORD		
Sampled By:	CHRISENBERRY			Depth:	0-5'
Lab No.:	20161161			AASHTO Class:	A-6(1)
Sample ID:	RV212			Material Type (1 or 2): 2	2): 2
LATITUDE:				LONGITUDE:	

		-											-								
Resilient	Modulus				Mr	psi	13,705	11,699	10,082	8,205	7,270	12,623	10,306	8,586	7,364	6,661	11,292	9,041	7,503	6,530	6,010
Resilient	Strain				εr	in/in	0.00013	0.00031	0.00053	0.00084	0.00117	0.00014	0.00035	0.00061	0.00093	0.00126	0.00016	0.00039	0.00069	0.00103	0.00138
Average	Recov Def.	LVDT 1	and 2		H _{avg}	. <u>e</u>	0.00106	0.00247	0.00424	0.00676	0.00934	0.00115	0.00277	0.00486	0.00742	0.01012	0.00129	0.00313	0.00548	0.00821	0.01101
Actual	Applied	Contact	Stress		Scontact	psi	0.2	0.2	0.3	0.5	0.7	0.2	0.2	0.2	0.4	0.6	0.2	0.2	0.2	0.4	0.6
Actual	Applied	Cyclic	Stress		S _{cyclic}	psi	1.8	3.6	5.3	6.9	8.5	1.8	3.6	5.2	6.8	8.4	1.8	3.5	5.1	6.7	8.3
Actual	Applied	Max.	Axial	Stress	S _{max}	psi	2.0	3.8	5.6	7.4	9.2	2.0	3.8	5.5	7.3	9.1	2.0	3.8	5.4	7.1	8.8
Actual	Applied	Contact	Load		P _{contact}	sdi	2.8	2.8	3.7	6.2	8.7	2.8	2.8	2.9	5.3	7.9	2.7	2.8	2.8	4.4	7.0
Actual	Applied	Cyclic Load			P _{cyclic}	sdl	22.4	44.4	65.7	85.2	104.4	22.3	43.9	64.2	84.0	103.6	22.3	43.5	63.2	82.4	101.7
Actual	Applied	Max. Axial	Load		P _{max}	lbs	25.2	47.2	69.4	91.4	113.1	25.1	46.7	67.0	89.4	111.4	25.1	46.3	66.1	86.8	108.7
Nominal	Maximum	Axial	Stress		S _{cyclic}	psi	2.0	4.0	6.0	8.0	10.0	2.0	4.0	6.0	8.0	10.0	2.0	4.0	6.0	8.0	10.0
Chamber	Confining	Pressure			S3	psi	6.0	6.0	6.0	6.0	6.0	4.0	4.0	4.0	4.0	4.0	2.0	2.0	2.0	2.0	2.0
		PARAMETER			DESIGNATION	UNIT	Sequence 1	Sequence 2	Sequence 3	Sequence 4	Sequence 5	Sequence 6	Sequence 7	Sequence 8	Sequence 9	Sequence 10	Sequence 11	Sequence 12	Sequence 13	Sequence 14	Sequence 15

May 12, 2016 DATE DATE

REVIEWED BY TESTED BY

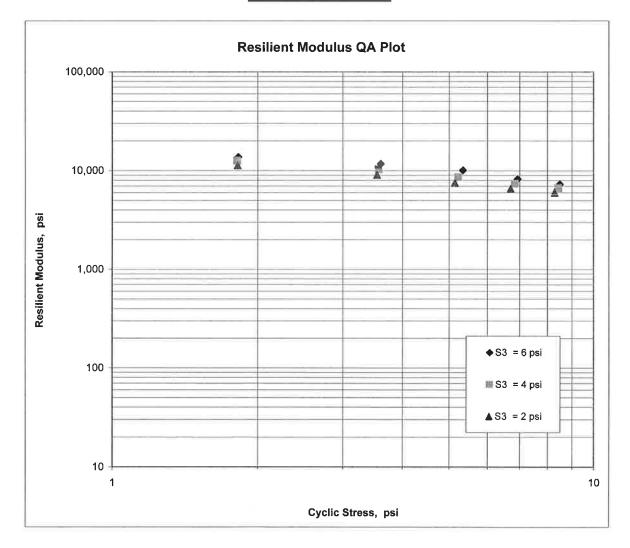
C.GARRETT

AASHTO T 307-99 - RESILIENT MODULUS OF SUBGRADE SOILS RECOMPACTED / THINWALL TUBE SAMPLES

Job No.	040622			Material Code SSRVPS
Date Sampled:	4/19/16			Station No.: 178+00
Date Tested:	May 12, 2016			Location: 15'RT
Name of Project:	WASHINGTON CC	. LINE-S	OUTH STRS. & A	APPRS.(S)
County:	Code: 17	Name:	CRAWFORD	
Sampled By:	CHRISENBERRY			Depth: 0-5'
Lab No.:	20161161			AASHTO Class: A-6(1)
Sample ID:	RV212		Mater	ial Type (1 or 2): 2
LATITUDE:				LONGITUDE:

 $M_R = K1 (S_C)^{K_2} (S_3)^{K_5}$

K1 =	12,580
K2 =	-0.41736
K5 =	0.21690
$R^2 =$	0.97



AASHTO T 307-99 - RESILIENT MODULUS OF SUBGRADE SOILS RECOMPACTED SAMPLES

Job No.	040622	Material Code	SSRVPS
Date Sampled:	5/11/16	Station No.:	290+00
Date Tested:	May 11, 2016	Location:	15'LT
Name of Project:	WASHINGTON CO.LINE - SOUTH STR. + APP	K5 (5)	
County:	Code: 17 Name: CRAWFORD	Dantha	0.5
Sampled By: Lab No.:	D. DICKERSON 20161162	Depth: AASHTO Class:	0-5 A-2-4 (0)
Sample ID:	RV213	Material Type (1 or 2)	
LATITUDE:	RV215	LONGITUDE:	• 2
1. Testing Inform			
	Preconditioning - Permanent Strain > 5% (Y		N
	Testing - Permanent Strain > 5% (Y=Yes or №		N
	Number of Load Sequences Completed (0-15)	15
2. Specimen Info	ormation:		
	Specimen Diameter (in):		
	Тор		3.95
	Middle		3.94
	Bottom		3.95
	Average		3.95
	Membrane Thickness (in):		0.00
	Height of Specimen, Cap and Base (in):		8
	Height of Cap and Base (in):		0.00
	Initial Length, Lo (in):		0.00
			-
	Initial Area, Ao (sq. in):		12.16
	Initial Volume, AoLo (cu. in):		97.27
3. Soil Specimer	-		
	Weight of Wet Soil Used (g):		3171.90
4. Soil Propertie	s:		
	Optimum Moisture Content (%)		13.8
	Maximum Dry Density (pcf):		113.6
	95% of MDD (pcf):		107.9
	In-Situ Moisture Content (%):		N/A
5. Specimen Pro	perties:		
opcontion / 10	Wet Weight (g):		3171.90
	Compaction Moisture content (%):		13.7
	Compaction Wet Density (pcf):		124.24
	Compaction Dry Density (pcf):		109.27
	Moisture Content After Mr Test (%):		13.3
6. Quick Shear 1	est (Y=Yes, N=No, N/A=Not Applicable):		#VALUE!
7. Resilient Mod	ulus, Mr:	12679(5	Sc)^-0.30387(S3)^0.28324
8. Comments	8	·	
	· · · · · · · · · · · · · · · · · · ·		
9. Tested By:	C.GARRETT	Date: May 11, 2016	

9. Tested By: C.GARRETT

Date: May 11, 2016

AASHTO T 307-99 - RESILIENT MODULUS OF SUBGRADE SOILS RECOMPACTED SAMPLES

Job No.	040622			Material Code	SSRVPS
Date Sampled:	5/11/16			Station No.:	290+00
Date Tested:	May 11, 2016			Location:	15'LT
Name of Project:	WASHINGTON CO.LINE - SOUTH STR. + APPRS (S)	JNE - SOUT	H STR. + APPRS (S)		
County:	Code: 17	Name:	CRAWFORD		
Sampled By:	D. DICKERSON			Depth:	0-5
Lab No.:	20161162			AASHTO Class:	A-2-4 (0)
Sample ID:	RV213			Material Type (1 or 2): 2	5
LATITUDE:				LONGITUDE:	

	Actual Actual Actual		Actual	Actual	Average	Resilient	Resilient
Pressure Axial Max. Axial Cyclic Load Contact Max. Axial Stress Load $F_{contact}$ $F_{contact}$ $F_{contact}$ $Axial$ S Sycie P_{max} P_{ovic} $P_{contact}$ $Axial$ S Sycie $P_{contact}$ $P_{contact}$ $P_{contact}$ $Axial$ S Sycie $P_{contact}$ $P_{contact}$ $P_{contact}$ $P_{contact}$ S S $P_{contact}$ $P_{contact}$ $P_{contact}$ $P_{contact}$ S S $P_{contact}$ $P_{contact}$ $P_{contact}$ $P_{contact}$ S S $P_{contact}$ P_{co	Applied	d Applied	Applied	Applied	Recov Def.	Strain	Modulus
Stress Load $Axial$ Sa Sycic P_{max} P_{ovlict} P_{max} Sa Sycic P_{max} P_{ovlict} P_{max} bpsi bpsi bbs bbs bbs bbs 6:0 2:0 2:5:0 22:3 2:8 2:1 6:0 4:0 47:0 44:2 2:8 3:9 6:0 6:0 6:0 6:0 6:0 5:7 5:7 6:0 8:0 92:0 85:9 6:1 7:6 5:7 6:0 10:0 113:8 105:2 8:5 9:4 5:7 6:0 10:0 113:8 105:2 8:5 9:4 5:7 6:0 8:0 8:5 6:1 7:6 9:4 5:7 5:4 7:0 10:0 113:8 105:2 8:5 9:4 5:5 7:4 8:0 8:0 8:0 8:0 5:2 7:4 5:2	Cyclic Load		Cyclic	Contact	LVDT 1		
No. Stress Stress Stress S3 Scyclic P_{max} P_{cyclic} P_{max} S_{max} psi psi lbs lbs lbs lbs psi 6.0 2.0 25.0 25.3 2.8 2.1 6.0 4.0 47.0 44.2 2.8 2.1 6.0 6.0 6.0 6.0 85.9 6.1 7.6 6.0 8.0 92.0 85.9 6.1 7.6 1.5 6.0 10.0 113.8 105.2 3.6 5.7 2.1 4.0 2.0 25.0 22.3 2.8 5.7 1.6 4.0 10.0 113.8 105.2 8.5 9.4 1.6			Stress	Stress	and 2		
S3 Seyclic P_{max} P_{cyclic} P_{max} P_{cyclic} P_{max} S_{max} 6 0 2.0 25.0 22.3 2.8 2.1 S_{max} 6 6.0 4.0 47.0 24.2 2.8 2.1 S_{max} 6 6.0 4.0 47.0 44.2 2.8 3.9 S_{11} 6 6.0 8.0 92.0 85.9 65.7 3.6 S_{11} S_{12} 6 6.0 10.0 113.8 105.2 8.5 9.4 S_{12} 4.0 10.0 113.8 105.2 8.5 9.4 S_{12} S_{14} S_{16} <td></td> <td>Stress</td> <td></td> <td></td> <td></td> <td></td> <td></td>		Stress					
psi psi lbs lbs lbs psi psi 6.0 2.0 25.0 22.3 2.8 2.1 6.0 4.0 47.0 44.2 2.8 3.9 6.0 4.0 47.0 44.2 2.8 3.9 6.0 6.0 6.0 6.0 6.0 6.0 5.7 6.0 10.0 113.8 65.7 3.6 5.7 6.0 10.0 113.8 105.2 8.5 9.4 4.0 2.0 25.0 22.3 2.7 3.8 4.0 10.0 113.8 105.2 8.5 9.4 4.0 6.0 6.7.4 64.7 2.8 7.4 4.0 8.0 89.8 84.7 5.2 7.4 4.0 10.0 111.8 104.2 7.6 9.2 4.0 10.0 111.8 104.2 7.6 9.2 2.0 2.0 2.0	P _{cyclic}		S _{cyclic}	Scontact	H _{avg}	εr	Mr
6.0 2.0 25.0 2.3 2.8 6.0 4.0 47.0 44.2 2.8 6.0 6.0 6.0 69.3 65.7 3.6 6.0 6.0 69.3 65.7 3.6 5.7 3.6 6.0 8.0 92.0 85.9 6.1 3.6 5.7 3.6 6.0 10.0 113.8 105.2 8.5 5.7 3.6 4.0 2.0 25.0 22.3 2.7 3.6 3.7 4.0 2.0 2.0 25.0 22.3 2.7 3.6 4.0 6.0 67.4 64.7 2.8 3.7 3.7 4.0 8.0 89.8 84.7 5.2 3.6 3.6 4.0 10.0 111.8 104.2 7.6 3.7 3.7 4.0 2.0 2.0 2.0 2.0 2.7 3.7 3.7 2.0 2.0 2.0 2.1<	lbs		psi	psi	. <u>c</u>	in/in	psi
6.0 4.0 47.0 44.2 2.8 6.0 6.0 69.3 65.7 3.6 6.0 8.0 92.0 85.9 6.1 3.6 6.0 8.0 92.0 85.9 6.1 3.6 6.0 10.0 113.8 105.2 8.5 5.7 4.0 2.0 25.0 22.3 2.7 5.7 4.0 2.0 25.0 22.3 2.7 5.2 4.0 4.0 46.5 43.8 2.7 5.2 4.0 8.0 89.8 84.7 5.2 5.2 4.0 10.0 111.8 104.2 7.6 7.6 4.0 10.0 111.8 104.2 7.6 7.6 2.0 2.0 2.0 2.0 2.7 5.2 7.6 2.0 2.0 2.0 2.0 2.7 5.2 7.6 7.6 2.0 2.0 2.0 2.0 2.	22.3		1.8	0.2	0.00088	0.00011	16,745
6.0 6.0 69.3 65.7 3.6 6.0 8.0 92.0 85.9 6.1 3.6 6.0 8.0 92.0 85.9 6.1 3.6 6.0 10.0 113.8 105.2 8.5 5.7 4.0 2.0 25.0 22.3 2.7 5.7 4.0 4.0 2.0 25.0 2.7 5.7 4.0 2.0 2.1 3.6 5.7 5.7 4.0 6.0 67.4 64.7 2.8 5.7 4.0 8.0 89.8 84.7 5.2 5.2 4.0 10.0 111.8 104.2 7.6 5.2 2.0 2.0 2.0 2.0 2.7 5.2 5.2 2.0 2.0 43.2 2.7 5.2 5.2 5.2 2.0 2.0 2.0 2.0 2.7 5.2 5.2 5.2 2.0 2.0 4.0	44.2		3.6	0.2	0.00192	0.00024	15,107
6.0 8.0 92.0 85.9 6.1 6.0 10.0 113.8 105.2 8.5 4.0 2.0 25.0 22.3 2.7 4.0 2.0 25.0 22.3 2.7 4.0 4.0 4.0 2.0 25.0 2.7 4.0 2.0 25.0 2.3 2.7 5.2 4.0 6.0 67.4 64.7 2.8 5.2 4.0 8.0 89.8 84.7 5.2 5.2 4.0 10.0 111.8 104.2 7.6 5.2 2.0 2.0 2.0 2.0 2.7 5.2 10.0 111.8 104.2 7.6 7.6 2.0 2.0 2.0 2.7 5.2 7.6 2.0 2.0 4.0 4.0 4.0 5.2 7.6 2.0 2.0 2.0 2.7 5.2 7.6 7.6 2.0 5.0	65.7		5.4	0.3	0.00316	0.00039	13,697
6.0 10.0 113.8 105.2 8.5 4.0 2.0 25.0 22.3 2.7 4.0 2.0 25.0 22.3 2.7 4.0 4.0 46.5 43.8 2.7 4.0 6.0 67.4 64.7 2.8 4.0 8.0 89.8 84.7 2.8 4.0 10.0 111.8 104.2 7.6 4.0 10.0 111.8 104.2 7.6 2.0 2.0 24.7 22.0 2.7 2.0 2.0 24.7 22.0 2.7 2.0 4.0 45.9 43.2 2.7 2.0 2.0 66.0 63.3 2.7 2.0 8.0 86.8 82.6 4.1	85.9	7.6	7.1	0.5	0.00482	0.00060	11,732
4.0 2.0 25.0 22.3 2.7 4.0 4.0 4.0 46.5 43.8 2.7 4.0 4.0 46.5 43.8 2.7 2.7 4.0 6.0 67.4 64.7 2.8 2.7 4.0 8.0 89.8 84.7 2.8 2.8 4.0 10.0 111.8 104.2 7.6 2.8 2.0 2.0 2.4.7 22.0 2.7 2.8 2.0 2.0 2.4.7 22.0 2.7 2.7 2.0 2.0 2.4.7 22.0 2.7 2.7 2.0 2.0 43.2 2.7 2.7 2.7 2.0 6.0 66.0 63.3 2.7 2.7 2.0 8.0 86.8 82.6 4.1 1.1	105.2		8.7	0.7	0.00669	0.00084	10,347
4.0 4.0 46.5 43.8 2.7 4.0 6.0 67.4 64.7 2.8 4.0 8.0 89.8 84.7 2.8 4.0 8.0 89.8 84.7 5.2 4.0 10.0 111.8 104.2 7.6 2.0 2.0 24.7 22.0 2.7 2.0 2.0 24.7 22.0 2.7 2.0 4.0 45.9 43.2 2.7 2.0 6.0 66.0 63.3 2.7 2.0 8.0 86.8 82.6 4.1	22.3	2.1	1.8	0.2	0.00098	0.00012	14,918
4.0 6.0 67.4 64.7 2.8 4.0 8.0 89.8 84.7 5.2 4.0 8.0 89.8 84.7 5.2 4.0 10.0 111.8 104.2 7.6 2.0 2.0 24.7 22.0 2.7 2.0 4.0 45.9 43.2 2.7 2.0 6.0 66.0 63.3 2.7 2.0 8.0 86.8 82.6 4.1	43.8	3.8	3.6	0.2	0.00223	0.00028	12,887
4.0 8.0 89.8 84.7 5.2 4.0 10.0 111.8 104.2 7.6 2.0 2.0 24.7 22.0 2.7 2.0 4.0 4.0 4.2 2.7 2.0 2.0 24.7 22.0 2.7 2.0 4.0 45.9 43.2 2.7 2.0 6.0 66.0 63.3 2.7 2.0 8.0 86.8 82.6 4.1	64.7		5.3	0.2	0.00371	0.00046	11,461
4.0 10.0 111.8 104.2 7.6 2.0 2.0 24.7 22.0 2.7 2.0 4.0 45.9 43.2 2.7 2.0 6.0 66.0 63.3 2.7 2.0 8.0 86.8 82.6 4.1	84.7		7.0	0.4	0.00544	0.00068	10,246
2.0 2.0 24.7 22.0 2.7 2.0 4.0 45.9 43.2 2.7 2.0 6.0 66.0 63.3 2.7 2.0 8.0 86.8 82.6 4.1	104.2		8.6	0.6	0.00735	0.00092	9,331
2.0 4.0 45.9 43.2 2.7 2.0 6.0 66.0 63.3 2.7 2.0 8.0 86.8 82.6 4.1	22.0	2.0	1.8	0.2	0.00113	0.00014	12,799
2.0 6.0 66.0 63.3 2.7 2.0 8.0 86.8 82.6 4.1	43.2	3.8	3.5	0.2	0.00260	0.00032	10,936
2.0 8.0 86.8 82.6 4.1	63.3	5.4	5.2	0.2	0.00438	0.00055	9,516
	82.6	7.1	6.8	0.3	0.00633	0.00079	8,587
Sequence 15 2.0 10.0 108.5 101.8 6.7 8.9	101.8	8.9	8.4	0.6	0.00844	0.00105	7,938

TESTED BY REVIEWED BY

C.GARRETT

May 11, 2016

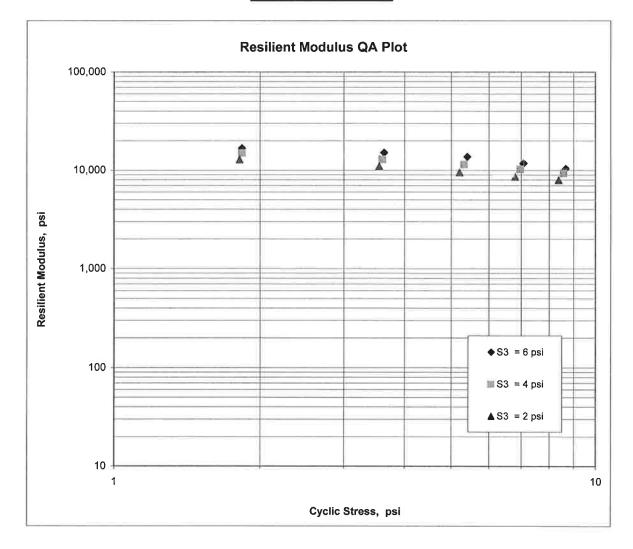
DATE DATE

AASHTO T 307-99 - RESILIENT MODULUS OF SUBGRADE SOILS RECOMPACTED / THINWALL TUBE SAMPLES

Job No.	040622			Material Code SSRVPS
Date Sampled:	5/11/16			Station No.: 290+00
Date Tested:	May 11, 2016			Location: 15'LT
Name of Project:	WASHINGTON CO	D.LINE - S	SOUTH STR. + AF	PPRS (S)
County:	Code: 17	Name:	CRAWFORD	
Sampled By:	D. DICKERSON			Depth: 0-5
Lab No.:	20161162			AASHTO Class: A-2-4 (0)
Sample ID:	RV213		Mater	ial Type (1 or 2): 2
LATITUDE:				LONGITUDE:

 $M_{R} = K1 (S_{C})^{K2} (S_{3})^{K5}$

K1 =	12,679
K2 =	-0.30387
K5 =	0.28324
$R^2 =$	0.97



JOB: 040622

Arkansas State Highway Transporation Department

JOB NAME: WASHINGTON CO.LINE-SOUTH STRS.& APPRS.(S)

Materials Division Michael Benson, Materials Engineer

COUN	TY NO.	17	DATE TESTE	D	5/2/	2016			M	ichael B	enson, Materia	ls Engin	eer
STA.#	LOC.	DEPTH	COLOR	#4	#10	#40	#80	#200	<i>L.L</i> .	<i>P.I</i> .	SOIL CLASS	LAB #:	%MOISTURE
017+00	15RT	0-5	BROWN	60	52	Е 45	ν 36	<i>E S</i> 26	24	06	A-2-4(0)	RV210	
071+00	15LT	0-5	BROWN	77	72	67	59	48	25	03	A-4(0)	RV211	
178+00	15RT	0-5	BROWN	65	56	47	43	38	32	13	A-6(1)	RV212	
290+00	15LT	0-5	BROWN	57	49	44	41	34	25	09	A-2-4(0)	RV213	
017+00	05RT	0-5	BROWN	95	86	77	67	40	21	06	A-4(0)	S191	16.8
017+00	15RT	0-5	BROWN	99	94	86	70	50	29	13	A-6(3)	S192	18.1
031+00	05LT	0-5	GRAY	99	95	86	81	76	40	23	A-6(16)	S193	12.5
031+00	15LT	0-5	GRAY	98	93	80	75	71	37	19	A-6(12)	S194	11.5
063+00	05RT	0-5	RD/BR	98	94	90	79	60	23	09	A-4(2)	S195	15.3
063+00	15RT	0-5	BROWN	86	77	67	58	44	23	07	A-4(0)	S196	16.2
071+00	05LT	0-5	BROWN	96	89	83	74	55	22	07	A-4(1)	S197	11.9
071+00	15LT	0-5	BROWN	95	85	76	71	59	23	08	A-4(2)	S198	15.9
178+00	05RT	1-1.5Z	RD/BR	93	85	79	69	52	28	14	A-6(4)	S199	14.2
178+00	12RT	0-5	RED	89	75	66	62	49	22	07	A-4(1)	S200	12.4
178+00	15RT	0-5	BROWN	77	64	56	52	43	24	02	A-4(0)	S201	9.8
185+00	05LT	0-5	BROWN	86	69	58	52	32	ND	NP	A-2-4(0)	S202	11.4
185+00	12LT	05Z	BROWN	78	61	47	39	25	21	03	A-1-B(0)	S203	
185+00	14LT	0-5	BROWN	88	80	71	62	41	25	06	A-4(0)	S204	15.3
284+00	05RT	0-5	RD/BR	96	90	84	76	60	25	10	A-4(3)	S205	15.5
284+00	11RT	0-5	RED	94	85	77	70	52	23	09	A-4(2)	S206	13
284+00	15RT	0-5	RD/BR	91	82	74	66	47	22	06	A-4(0)	S207	12
290+00	05LT	0-1.5Z	RD/BR	97	86	76	71	50	23	07	A-4(1)	S208	16.4
290+00	15LT	0-5	BROWN	97	95	90	86	81	37	16	A-6(12)	S209	13.3

JOB: JOB N	0 1 <i>ME:</i> w	040622 WASHINGTON CO.I	JOB: 040622 JOB NAME: WASHINGTON CO.LINE-SOUTH STRS.& APPRS.(S)		Arkansas State Highway Transporation Department Materials Division	DATE TESTED 5/3/2016
COUN	COUNTY NO.	17			Michael Benson, Materials Engineer	
STA.# LOC.	LOC.				PAVEMENT SOUNDINGS	
017+00	15RT	ACHMSC	ACHMBC	CHIP SEAL	AGG.BASE CRS CL-7	
017+00	05RT	ACHMSC 5.5	ACHMBC 1.0	CHIP SEAL	AGG.BASE CRS CL-7 3.0	
031+00	05LT	ACHMSC 7.0	ACHMBC	CHIP SEAL 1.5	AGG.BASE CRS CL-7 4.0	
031+00	15LT	ACHMSC -	ACHMBC -	AGG.BASE CRS CL-5 -		
063+00	05RT	ACHMSC 6.5	ACHMBC 1.5	AGG.BASE CRS CL-5 5.0		
063+00	15RT	ACHMSC -	ACHMBC	AGG.BASE CRS CL-5		
071+00	15LT	ACHMSC -	ACHMBC -	AGG.BASE CRS CL-7 -		
071+00	05LT	ACHMSC 7.75	ACHMBC 2.0	AGG.BASE CRS CL-7 7.0		
178+00	12RT	ACHMSC 3.5	AGG.BASE CRS CL-7 7.0			
178+00	15RT	ACHMSC -	AGG.BASE CRS CL-7			
178+00	05RT	ACHMSC 4.0	ACHMBC 1.5	AGG.BASE CRS CL-7 6.0		
185+00	05LT	ACHMSC 6.0	AGG.BASE CRS CL-7 6.0			
185+00	12LT	ACHMSC 2.75	ACHMBC .75	AGG.BASE CRS CL-7 7.0		
185+00	14LT	ACHMSC -	ACHMBC	AGG.BASE CRS CL-7		
284+00	05RT	ACHMSC 4.5	ACHMBC	AGG.BASE CRS CL-7 8.0		
284+00	11RT	ACHMSC 2.5	ACHMBC 2.0	AGG.BASE CRS CL-5	AGG.BASE CRS CL-7 7.0	
284+00	15RT	ACHMSC -	ACHMBC	AGG.BASE CRS CL-5 -	AGG.BASE CRS CL-7	
comments:		Z=AUGER REFUSAL			Monday, May 16, 2016	

Page I of 2

PAVEMENT SOUNDINGS		Monday, May 16, 2016
	6.0 G.0	
	ACHMBC ACHMBC	Z=AUGER REFUSAL
STA.# LOC.	290+00 05LT AC	comments: Z=AUC

Page 2 of 2

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT - LITTLE ROCK, ARKANSAS MATERIALS DIVISION MICHAEL BENSON, MATERIALS ENGINEER									
*** SOIL SURVEY / PAVEMENT SOUNDING TEST REPORT ***									
DATE- 05/09/16SEQUENCE NO 1JOB NUMBER- 040622MATERIAL CODE - SSRVPSFEDERAL AID NOTO BE ASSIGNEDSPEC. YEAR - 2014PURPOSE- SOIL SURVEY SAMPLESUPPLIER ID 1SPEC. REMARKS- NO SPECIFICATION CHECKCOUNTY/STATE - 17SUPPLIER NAME- STATEDISTRICT NO 04NAME OF PROJECT- WASHINGTON CO.LINE-SOUTH STRS.& APPRS.(S)PROJECT ENGINEER- NOT APPLICABLEPIT/QUARRY- ARKANSAS									
LOCATION - CRAWI SAMPLED BY - CHRIS	FORD, CO				PLED - 04/19/16 EIVED - 04/25/16				
SAMPLE FROM - TEST MATERIAL DESC SO	HOLE		VEMENT SOUNDIN	DATE TES	TED - 05/03/16				
LAB NUMBER					20161142				
SAMPLE ID			= S192						
TEST STATUS									
			- 017+00		031+00				
LOCATION			_ 15RT _ 0-5	10. 14	05LT 0-5				
DEPTH IN FEET MAT'L COLOR		BROWN	BROWN	-	GRAY				
MAT'L TYPE		BICOMIN	- Bitonit	-	Giuli				
LATITUDE DEG-MIN-	SEC -				35 42 16.00				
LONGITUDE DEG-MIN-	SEC -	94 29 .60	94 29	.70	94 28 53.80				
<pre>% PASSING 2</pre>	IN:		-						
	2 IN		三 り たい	15. 1.1					
	IN		- 100		100				
	3 IN 4 -		- 99 - 99	-	100 99				
	10 -		94	1975 1921	95				
	40 -		- 86	1	86				
NO.	80 -	67	- 70		81				
NO.	200 =	40	50		76				
LIQUID LIMIT	2	21	- 29	-	40				
PLASTICITY INDEX	~	06	13	-	23				
AASHTO SOIL	5	A-4(0)	- A-6(3)	-	A-6(16)				
UNIFIED SOIL	ਲ ਪੁ	16.8	- 18.1	-	12.5				
% MOISTURE CONTENT									
ACHMSC ACHMBC	(IN) - (IN) -	5.5 1.0			7.0				
CHIP SEAL	(IN) -	1.0	14) 14)	-	1.5				
AGG.BASE CRS CL-7	(IN) -	3.0	-		4.0				
	음 (10) 등 문			-					
	+		2 4 5	-					
	5. 		()	2					
	100 E		27. 12.	- 					
REMARKS = Z=AUGER	REFUSAL								

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ARKANSAS STATE HIGHWAY AND TRANSPORTATIO MATERIALS D									
MICHAEL BENSON, MATERI *** SOIL SURVEY / PAVEMENT									
DATE- 05/09/16SEQUENCE NO 2JOB NUMBER- 040622MATERIAL CODE - SSRVPSFEDERAL AID NOTO BE ASSIGNEDSPEC. YEAR - 2014PURPOSE- SOIL SURVEY SAMPLESUPPLIER ID 1SPEC. REMARKS- NO SPECIFICATION CHECKCOUNTY/STATE - 17SUPPLIER NAME- STATEDISTRICT NO 04NAME OF PROJECT- WASHINGTON CO.LINE-SOUTH STRS.& APPRS.(S)PROJECT ENGINEER- NOT APPLICABLEPIT/QUARRY- ARKANSAS									
PIT/QUARRY - ARKANSAS LOCATION - CRAWFORD, COUNTY SAMPLED BY - CHRISTENBERRY SAMPLE FROM - TEST HOLE MATERIAL DESC. - SOIL SURVEY RATERIAL DESC. - SOIL SURVEY									
TEST STATUS - INFORMATION ONLY STATION - 031+00 LOCATION - 15LT DEPTH IN FEET - 0-5 MAT'L COLOR - GRAY MAT'L TYPE - - LATITUDE DEG-MIN-SEC - 35 42 16.00 LONGITUDE DEG-MIN-SEC - 94 28 54.00 % PASSING 2 IN 3/4 IN - 3/4 IN 3/8 IN 100 NO. 40 98 NO. 10 - 93 NO. 40 - 80 NO. 80 - 75 NO. 200 - 71 LIQUID LIMIT - 37 PLASTICITY INDEX - 19	S195 S196 INFORMATION ONLY INFORMATION ONLY 063+00 063+00 05RT 15RT 0-5 0-5 RD/BR BROWN 35 45 28.20 94 28 15.30 94 28 94 28 15.30 94 28 15.40 98 100 95 86 100 95 86 94 94 67 58 60 44 90 67 58 60 44								
AASHTO SOIL - A-6(12) UNIFIED SOIL - % MOISTURE CONTENT - 11.5	- A-4(2) - A-4(0) - 15.3 - 16.2								
ACHMSC (IN) ACHMBC (IN) AGG.BASE CRS CL-5 (IN) 									

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ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT - LITTLE ROCK, ARKANSA MATERIALS DIVISION									
MICHAEL BENSON, MATERIALS ENGINEER *** SOIL SURVEY / PAVEMENT SOUNDING TEST REPORT ***									
DATE-05/09/16SEQUENCE NO3JOB NUMBER-040622MATERIAL CODE-SSRVPSFEDERAL AID NOTO BE ASSIGNEDSPEC. YEAR-2014PURPOSE-SOIL SURVEY SAMPLESUPPLIER ID1SPEC. REMARKS-NO SPECIFICATION CHECKCOUNTY/STATE-17SUPPLIER NAME-STATEDISTRICT NO04NAME OF PROJECT-WASHINGTON CO.LINE-SOUTH STRS.& APPRS.(S)PROJECT ENGINEER-NOT APPLICABLEPIT/QUARRY-ARKANSAS-ARKANSAS									
LOCATION - CRAWFORD, COUNTY SAMPLED BY - CHRISTENBERRY SAMPLE FROM - TEST HOLE MATERIAL DESC SOIL SURVEY - R VALUE- PAV	DATE SAMPLED - 04/19/16 DATE RECEIVED - 04/25/16 DATE TESTED - 05/03/16 VEMENT SOUNDINGS								
LAB NUMBER - 20161146	- 20161147 - 20161148 S198 - S199 - INFORMATION ONLY - INFORMATION ONLY 071+00 - 178+00 15LT - 05RT 0-5 - 1-1.5Z BROWN - RD/BR - 35 45 19.50 - 35 41 35.10								
LIQUID LIMIT - 22 PLASTICITY INDEX - 07 AASHTO SOIL - A-4(1) UNIFIED SOIL - % MOISTURE CONTENT - 11.9 ACHMSC (IN) - 7.75 ACHMBC (IN) - 2.0 AGG.BASE CRS CL-7 (IN) - 7.0 - - - - - - - - - -	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$								

-AASHTO TESTS : T24 T88 T89 T90 T265

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ARKANSAS STATE	HIGHWAY		SPORTATIO FERIALS DI			- LITTLE	ROCK,	ARKA	NSAS
MICHAEL BENSON, MATERIALS ENGINEER *** SOIL SURVEY / PAVEMENT SOUNDING TEST REPORT ***									
DATE-05/09/16SEQUENCE NO4JOB NUMBER-040622MATERIAL CODE-SSRVPSFEDERAL AID NOTO BE ASSIGNEDSPEC. YEAR-2014PURPOSE-SOIL SURVEY SAMPLESUPPLIER ID1SPEC. REMARKS-NO SPECIFICATION CHECKCOUNTY/STATE-17SUPPLIER NAME-STATEDISTRICT NO04NAME OF PROJECT-WASHINGTON CO.LINE-SOUTH STRS.& APPRS.(S)PROJECT ENGINEER-NOT APPLICABLE									
PIT/QUARRY- ARKANSASLOCATION- CRAWFORD, COUNTYDATE SAMPLED - 04/19/1SAMPLED BY- CHRISTENBERRYDATE RECEIVED - 04/25/1SAMPLE FROM- TEST HOLEDATE TESTED - 05/03/1MATERIAL DESC SOIL SURVEY - R VALUE- PAVEMENT SOUNDINGS									/25/16
LAB NUMBER SAMPLE ID TEST STATUS STATION LOCATION DEPTH IN FEET MAT'L COLOR MAT'L TYPE LATITUDE DEG-MIN-: LONGITUDE DEG-MIN-:	- - - - - - - - - - - - - - - -	INFORMATI 178+00 12RT 0-5 RED 35 41	CON ONLY 35.00		20161150 S201 INFORMATIC 178+00 15RT 0-5 BROWN 35 41 94 28	ON ONLY -	185+ 05L1 0-5 BROW	PRMATI 000 VN 5 41	
<pre>% PASSING 2 1 1/2 3/4 3/8 NO. NO. NO. NO. NO.</pre>	IN IN IN IN 4 - 10 - 40 -	100 99 89			100 91 77 64 56 52 43	-	- 100 95 86 - 69 - 58 - 52 32		
LIQUID LIMIT PLASTICITY INDEX AASHTO SOIL UNIFIED SOIL % MOISTURE CONTENT	- - -	22 07 A-4(1) 12.4			24 02 A-4(0) 9.8		•	2-4(0) L1.4	
ACHMSC AGG.BASE CRS CL-7	(IN) - (IN) - - - - - - - - - - - - - - - - - - -	3.5 7.0						.0.0	

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ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT - LITTLE ROCK, ARKANSAS MATERIALS DIVISION MICHAEL BENSON MATERIALS ENCINEER									
MICHAEL BENSON, MATERIALS ENGINEER *** SOIL SURVEY / PAVEMENT SOUNDING TEST REPORT ***									
DATE - 05/09/16 SEQUENCE NO 5 JOB NUMBER - 040622 MATERIAL CODE - SSRVPS FEDERAL AID NO TO BE ASSIGNED SPEC. YEAR - 2014 PURPOSE - SOIL SURVEY SAMPLE SUPPLIER ID 1 SPEC. REMARKS - NO SPECIFICATION CHECK COUNTY/STATE - 17 SUPPLIER NAME - STATE DISTRICT NO 04 NAME OF PROJECT - WASHINGTON CO.LINE-SOUTH STRS.& APPRS.(S) PROJECT ENGINEER - NOT APPLICABLE PIT/QUARRY - ARKANSAS									
LOCATION - CRAWI SAMPLED BY - CHRIS	FORD, CC FENBERRY				DATE REC	IPLED - 04/19/16 EIVED - 04/25/16			
SAMPLE FROM - TEST MATERIAL DESC SO		Y - R VALUE- PAV	EME	ENT SOUNDING		TED - 05/02/16			
3/4 3/8 NO. NO. NO. NO.	- - - - - - - - - - - - - - - - - - -	S203 INFORMATION ONLY 185+00 12LT 05Z BROWN 35 41 33.60 94 27 59.50 100 96 78 61 47		S204 INFORMATIC 185+00 14LT 0-5 BROWN 35 41 3 94 27	- NONLY - - - 33.60 - 59.50 - - -	S205 INFORMATION ONLY 284+00 05RT 0-5 RD/BR 35 40 46.30			
LIQUID LIMIT PLASTICITY INDEX AASHTO SOIL UNIFIED SOIL % MOISTURE CONTENT	- - - -	21 03 A-1-B(0)		25 06 A-4(0) 15.3		25 10 A-4(3) 15.5			
ACHMSC ACHMBC AGG.BASE CRS CL-7	(IN) - (IN) - (IN) - - - - -	2.75 .75 7.0				4.5 8.0			
		17							

AASHTO TESTS 🕴 T24 T88 T89 T90 T265

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ARKANSAS STAT	MICH	MA AEL BENSO	ATERIALS I ON, MATERI	IAL		٤		RANSAS
DATE - 05 JOB NUMBER - 04 FEDERAL AID NO TO PURPOSE - SO SPEC. REMARKS - NO SUPPLIER NAME - ST NAME OF PROJECT - PROJECT ENGINEER -	/09/16 0622 DE ASSI DIL SURVE DSPECIFI CATE WASHINGT	GNED Y SAMPLE CATION CH ON CO.LIN	IECK			SEQUENCE MATERIAL SPEC. YE SUPPLIER COUNTY/S DISTRICT	NO CODE - AR - ID TATE -	SSRVPS 2014 1 17
PIT/QUARRY - ARKA LOCATION - CRAN SAMPLED BY - CHRIS SAMPLE FROM - TEST MATERIAL DESC SO	IFORD, CO STENBERRY HOLE		ALUE- PAVI	EME		DATE SAI DATE REC DATE TES IGS	CEIVED -	04/25/16
LAB NUMBER	-	20161155		2 0	20161156	8 	2016115	7
SAMPLE ID TEST STATUS STATION LOCATION DEPTH IN FEET	- - -	S206 INFORMAT 284+00 11RT 0-5	ION ONLY	=	S207 INFORMATI 284+00 15RT 0-5	- ON ONLY -	S208 INFORMA 290+00 05LT 0-1.5Z	
MAT'L COLOR MAT'L TYPE		RED		-	RD/BR	9 7 . 200	RD/BR	
LATITUDE DEG-MIN LONGITUDE DEG-MIN	-SEC -							
3/ 3/ NO. NO. NO.	IN 2 IN 4 IN 8 IN 4 - 10 - 40 - 80 - 200 -	94 85 77			100 99 91 82 74 66 47		100 97 86 76 71 50	
LIQUID LIMIT	×	23		1 0	22		23	
PLASTICITY INDEX AASHTO SOIL UNIFIED SOIL	- - -	09 A-4(2)			06 A-4(0)	-	07 A-4(1)	
% MOISTURE CONTEN	т -	13.0		7	12.0		16.4	
ACHMSC ACHMBC AGG.BASE CRS CL-5	(IN) - (IN) - (IN) -	2.5 2.0		- - -		-	3.5 6.0	
AGG.BASE CRS CL-7	(IN) –	7.0		-		-	а 2 тели	
	-			_		2	57 15	
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	-			-		2		
REMARKS - Z=AUGER	REFUSAL							

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ARKANSAS		Y AND TRANSPORTATI MATERIALS I HAEL BENSON, MATER	DIVISION	- LITTLE ROCK, ARKAN	SAS			
		SURVEY / PAVEMENT		REPORT ***				
JOB NUMBER FEDERAL AID NO PURPOSE SPEC. REMARKS SUPPLIER NAME NAME OF PROJECT PROJECT ENGINE PIT/QUARRY -	TO BE ASS - SOIL SURV - NO SPECIF - STATE F - WASHING ER - NOT APP ARKANSAS	EY SAMPLE ICATION CHECK TON CO.LINE-SOUTH LICABLE	STRS.& APPRS.(1			
LOCATION- CRAWFORD, COUNTYDATE SAMPLED- 04/19/1SAMPLED BY- CHRISTENBERRYDATE RECEIVED- 04/25/1SAMPLE FROM- TEST HOLEDATE TESTED- 05/02/1								
MATERIAL DESC.	- SOIL SURV	EY - R VALUE- PAV	EMENT SOUNDING	S				
LAB NUMBER	-	20161158	<u></u>	2				
SAMPLE ID			-	-				
		INFORMATION ONLY	H)	-				
	-		E .	1.55				
LOCATION	-	15LT						
DEPTH IN FEE			-	-				
MAT'L COLOR	-	BROWN		3 				
	-		-	12. 12.				
		35 40 43.10 94 26 27.30	-	-				
<pre>% PASSING</pre>	2 IN -		_	- 20m				
1 INDING	1 1/2 IN		-	-				
	3/4 IN		-	22				
	3/8 IN	100	-					
	NO. 4 -		-	2-				
	NO. 10 -		-) 코- (요)				
	NO. 40 -		_					
	NO. 80 -	86	-					
	NO. 200 -	81						
LIQUID LIMIT		37	1	2 <u>-</u>				
PLASTICITY I	NDEX -	16		2				
AASHTO SOIL	-	A-6(12)	-	-				
UNIFIED SOIL			-					
% MOISTURE C	ONTENT -	13.3						
	-							
	-		-	-				
	-		-	-				
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REMARKS - Z=A								
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AASHTO TESTS : T24 T88 T89 T90 T265

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ARKANSAS STATE HIGHWAY AND TRANSPORTATIO MATERIALS D									
MICHAEL BENSON, MATERI *** SOIL SURVEY / PAVEMENT									
*** SOIL SURVEY / PAVEMENT SOUNDING TEST REPORT ***DATE- 05/09/16SEQUENCE NO 1JOB NUMBER- 040622MATERIAL CODE - RVFEDERAL AID NOTO BE ASSIGNEDSPEC. YEAR - 2014PURPOSE- SOIL SURVEY SAMPLESUPPLIER ID 1SPEC. REMARKS- NO SPECIFICATION CHECKCOUNTY/STATE - 17SUPPLIER NAME- STATEDISTRICT NO 04NAME OF PROJECT- WASHINGTON CO.LINE-SOUTH STRS.& APPRS.(S)PROJECT ENGINEER- NOT APPLICABLEPIT/QUARRY- ARKANSAS									
LOCATION - CRAWFORD, COUNTY SAMPLED BY - CHRISTENBERRY SAMPLE FROM - TEST HOLE MATERIAL DESC SOIL SURVEY - RESISTANCE R-V	DATE SAMPLED - 04/19/16 DATE RECEIVED - 04/25/16 DATE TESTED - 05/02/16 WALUE ACTUAL RESULTS								
LAB NUMBER-20161159SAMPLE ID-RV210TEST STATUS-INFORMATION ONLYSTATION-017+00LOCATION-15RTDEPTH IN FEET-0-5MAT'L COLOR-BROWN	- 20161160 - 20161161 - RV211 - RV212								
MAT'L TYPE - LATITUDE DEG-MIN-SEC - 35 42 27.40 LONGITUDE DEG-MIN-SEC - 94 29 .70	- 35 45 19.50 - 35 41 35.00 94 28 16.10 94 28 7.90								
<pre>% PASSING 2 IN 1 1/2 IN 3/4 IN 100 3/8 IN 78 NO. 4 - 60 NO. 10 - 52 NO. 40 - 45 NO. 80 - 36 NO. 200 - 26</pre>	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$								
LIQUID LIMIT - 24 PLASTICITY INDEX - 06 AASHTO SOIL - A-2-4(0) UNIFIED SOIL - % MOISTURE CONTENT - - - - - - - - - - - - - -	- 25 - 32 - 03 - 13 - A-4(0) - A-6(1) 								
REMARKS - - - -									

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AASHTO TESTS : T24 T88 T89 T90 T265

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ARKANSAS			MATERIALS	DIVISION	- LITTLE ROCK, ARKANSAS
			AEL BENSON, MATER SURVEY / PAVEMENT		
JOB NUMBER FEDERAL AID NO PURPOSE SPEC. REMARKS SUPPLIER NAME	TO BE AS - SOIL SUN - NO SPEC - STATE T - WASHIN ER - NOT AN	SSI RVE LFI NGT	Y SAMPLE CATION CHECK ON CO.LINE-SOUTH		SEQUENCE NO 2 MATERIAL CODE - RV SPEC. YEAR - 2014 SUPPLIER ID 1 COUNTY/STATE - 17 DISTRICT NO 04 (S)
LOCATION - SAMPLED BY - SAMPLE FROM -	CHRISTENBE				DATE SAMPLED - 04/19/16 DATE RECEIVED - 04/25/16 DATE TESTED - 05/02/16
		RVE	Y - RESISTANCE R		
LAB NUMBER				a .	65
SAMPLE ID			RV213	<u>a</u>	38
			INFORMATION ONLY		
STATION LOCATION					-
DEPTH IN FEE					
MAT'L COLOR				14) 141	-
MAT'L TYPE		_		-	-
LATITUDE DE	G-MIN-SEC	-	35 40 43.10		22
LONGITUDE DE	G-MIN-SEC	-	94 26 27.30		
% PASSING	2 IN.	_		_	_
	1 1/2 IN.	_		-	_
	3/4 IN.	-	100	-	-
	3/8 IN.	-	81	-	-
	NO. 4			_	-
	NO. 10			-	-
3	NO. 40			-	-
	NO. 80 NO. 200	_	41 34	-	-
			54		
LIQUID LIMIT		-	25	9%.	1.5.
PLASTICITY I	NDEX	-	09	気)) (23)	
AASHTO SOIL UNIFIED SOIL		-	A-2-4(0)		-
% MOISTURE C		_		=):	. च
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REMARKS -					
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AASHTO TESTS : T24 T88 T89 T90 T265

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