ARKANSAS DEPARTMENT OF TRANSPORTATION



SUBSURFACE INVESTIGATION

IN		MONTGOMERY	COUNTY
STATE HIGHWAY	27		7
	DEER CR	EEK STR. & APPRS. (S)	
FEDERAL AID PROJEC	CT NO	NHPP-0049(16)	
STATE JOB NO.			

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 DEPARTMENT OF TRANSPORTATION

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MATERIALS DIVISION

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January 17, 2019

TO: Mr. Rick Ellis, Bridge Engineer

SUBJECT: Job No. 080504 Deer Creek Str. & Apprs. (S) Route 27 Section 7 Montgomery County

Transmitted herewith are a brief summary of the geology and site conditions, rock core unconfined compression test summary, RMR, and the logs of borings conducted for the structure 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.

This project consists of replacing the bridge crossing Deer Creek, on Highway 27, at Washita. The new bridge alignment will be to the west, upstream, of the existing. Two of the five requested borings were inaccessible due to steep slopes and high water levels in the channel. The borings that were not obtained are located at: 110+18 C.L. Construction and 110+88 C.L. Construction.

The subsurface investigation revealed that bedrock is less than 5 feet deep at the obtained borings and exposed in channel. Utilizing this site information and correlating the elevation of bedrock between the obtained bridge boring logs, competent bedrock should be encountered less than 15 feet below ground level. Based on this information and correspondence with Bridge Division, it is anticipated that all intermediate bents will be founded on drilled shafts and end bents will be founded on piling. Preboring may be necessary in order to achieve minimum piling penetration requirements. Drilled shafts socketed into competent slightly weathered to unweathered Shale should be designed based on the values provided in Table 1.

Nominal Shaft Side	Factored Shaft Side	Nominal Shaft Tip	Factored Shaft Tip
Resistance (ksf)	Resistance (ksf)	Resistance (ksf)	Resistance (ksf)
32.7	18	137	68.5

TABLE 1 – Bearing Capacity Recommendations for Drilled Shafts

The Bigfork Chert formation is exposed in a road cut just south of the existing bridge. Although all obtained borings consisted primarily of shale, it is anticipated that Bigfork Chert will be encountered in the channel and/or to the south, based on geologic maps and visual geologic investigations. Geologic maps show the presence of a contact between the Polk Creek Shale and Bigfork Chert within the limits of this project. Drilling shafts into Bigfork Chert will require considerably more effort than Polk Creek Shale.

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

Michael C. Benson Materials Engineer

MCB:rpt:mlg

State Construction Engineer - Master File Copy CC: District 8 Engineer G.C. File

GEOLOGY AND SITE CONDITIONS Job No. 080504

Deer Creek Str. & Apprs. (S) Montgomery County Route 27 Section 7

Site Conditions

The existing Deer Creek Bridge, on Highway 27, is a five span bridge. It is constructed of concrete decking, end walls, and spread footings with four steel I-beams supporting the deck. The guardrail is composed of steel, supported by concrete posts on the bridge and steel posts leading up to the bridge. Overhead power lines parallel the roadway on the east. Highway 88 intersects Highway 27 on the west, approximately 400 feet north of the existing bridge. On the opposite side of the intersection, a gravel road, with a paved intersection, leads to a lake recreation area.

Deer Creek flows to the east at the bridge and turns sharply south a short distance east of the bridge. Water level in the creek is strongly influenced by the water elevation of Lake Ouachita. The location of the bridge is within the detention basin for Lake Ouachita. Bedrock is exposed extensively along the channel. The rock exposed consists of moderately to steeply dipping shale with chert lenses along the north side of the channel and chert along the south side of the channel. Rock is exposed in the road cut on both sides of the roadway, south of the bridge, and consists of near vertical beds of chert. The area around the bridge is moderately to heavily wooded except to the southeast, which consists of a gravel bar with grasses. There is a residence on the hill immediately above the proposed bridge site on the southwest.

Site Geology

The rocks at the proposed job site are moderately to steeply dipping to the north-northwest. The units exposed consist of the Bigfork Chert on the south and the Polk Creek Shale on the north. Deer Creek flows along the contact between these two formations. The Bigfork Chert consists of thinbedded, dark-gray, cryptocrystalline chert interbedded with varying amounts of black siliceous shale, calcareous siltstone, and dense, bluish-gray limestone. The cherts normally occur in thin to medium beds and are usually highly fractured. The interbedded siliceous shales occur in thin to thick sequences and are often pyritic. Limestones occur mostly as interbeds in the chert and typically weather to soft brown layers. The limestones are more common in the northwestern exposures. The Bigfork Chert in Arkansas ranges in thickness from about 450 feet in the northern Ouachitas to about 750 feet in the southern Ouachitas.

The Bigfork Chert is overlain by the Polk Creek Shale. The Polk Creek rocks are black, sooty, fissile shale with minor black chert and traces of gray sandstone and limestone. The Polk Creek Shale rests conformably on the Bigfork Chert. Its thickness ranges from about 50 to 225 feet.

Subsurface Conditions

Based on the results of the borings made from Station 111+58 to 112+98, the subsurface stratigraphy may be generalized as follows:

- 0 to 4.5 Feet: Varies from **clay** with **gravel** (**shale fragments**) to highly weathered to slightly weathered, soft to hard, dark gray **shale**.
- 4.5 to 33.9 Feet: Consists of weathered to unweathered, medium hard to hard with very hard layers, occasionally to frequently fractured and slickensided, steeply dipping dark gray **shale** with frequent to occasional seams of quartz and calcite.
- 33.9 to 38.9 Feet: Varies from unweathered, hard to very hard, steeply dipping, frequently slickensided, dark gray **shale** with frequent to occasional layers and seams of calcite and guartz to unweathered, hard, steeply dipping gray **chert.**

*No borings were made down-station of 111+55 due to high water levels. Based on current Geologic maps and visual geologic analysis it is likely that the Bigfork Chert, as described in the Site Geology, will be encountered on the south bank of Deer Creek.

Rock Core Unconfined Compression Test Summary

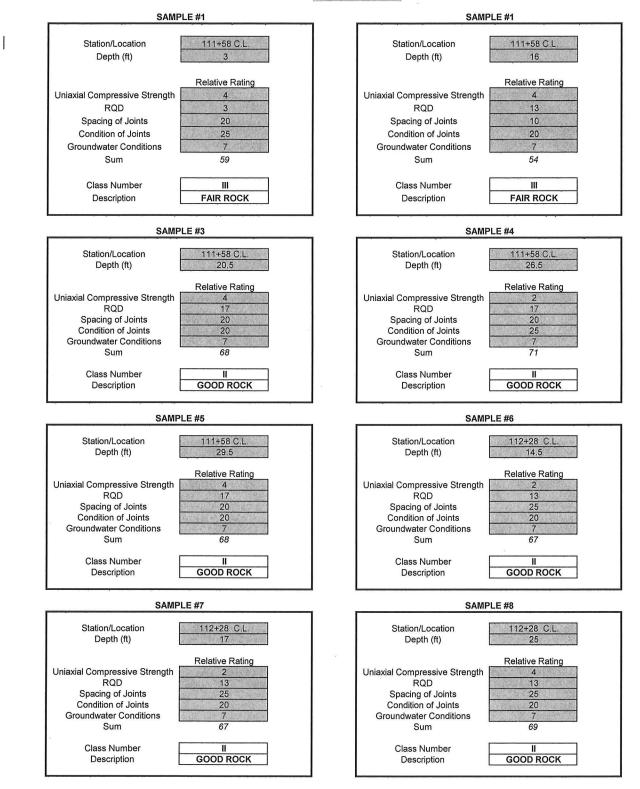
Project Number:080504Project Name:Deer Creek Str. & Apprs. (S)Date Tested:7/31/2018

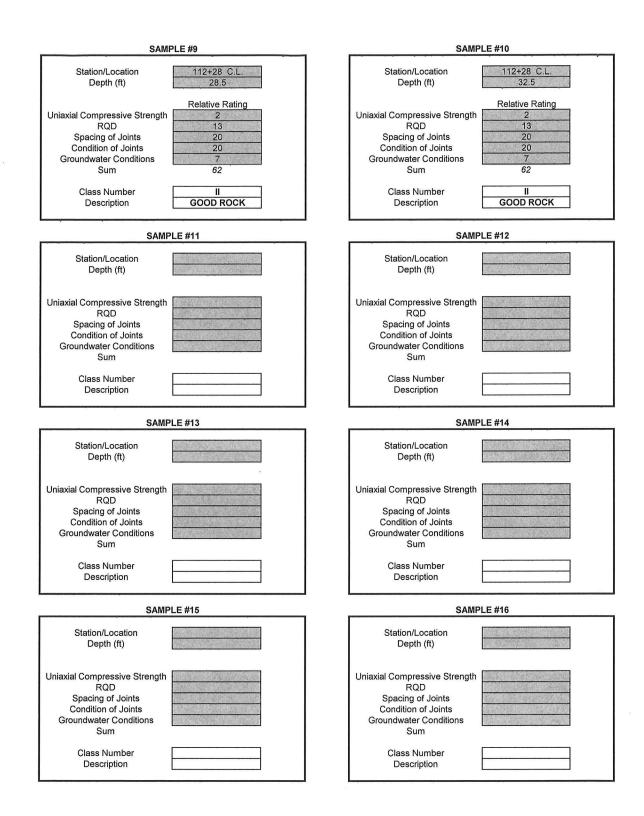
	No.	(ft)	Diameter (in)	Height (in)	Total Load (lbs)	Correction Factor	(psi)	Remarks
C.L.	1	3.1	1.75	3.60	13,550	1.00	5,633	
C.L.	2	11.3	1.75	2.85	4,380	1.00	1,821	Not a 2:1 ratio
C.L.	3	16.0	1.75	4.05	14,110	1.00	5,866	
C.L.	4	20.3	1.75	4.00	10,230	1.00	4,253	
C.L.	5	26.3	1.75	3.75	6,390	1.00	2,656	
C.L.	6	29.3	1.75	3.35	17,050	1.00	7,089	
C.L.	7	14.3	1.75	3.85	5,560	1.00	2,311	
C.L.	8	17.0	1.75	3.65	8,090	1.00	3,363	
C.L.	9	22.6	-	-	-	-	-	Dropped & Broke
C.L.	10	24.9	1.75	3.85	11,940	1.00	4,964	
C.L.	11	28.3	1.75	3.55	7,270	1.00	3,022	
C.L.	12	32.6	1.75	3.60	4,000	1.00	1,663	
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* Please note any broken samples, fractures or other characteristics of sample in Remarks.

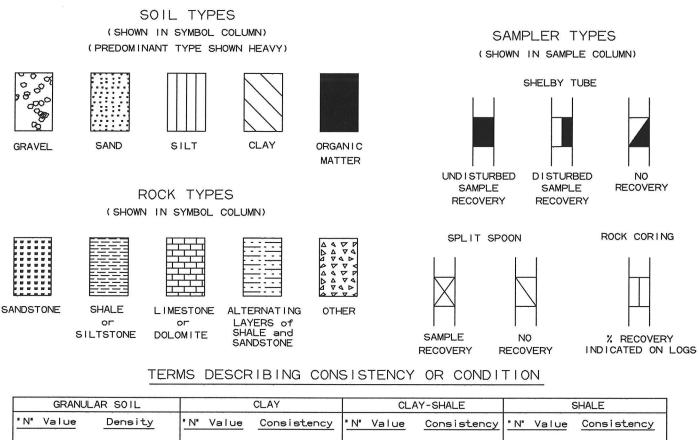
ROCK MASS RATING SUMMARY

JOB # 080504





_EGEND



	Density	<u>"N" Value</u>	Consistency	"N" Value	Consistency	"N" Value Consistency	
0-4	Very Loose	0-1	Very Soft	0-1	Very Soft		
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	
		31-60	Hard	31-60	Hard	in 60 Blows: Medium Har	d
		Over 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: $\frac{6}{8-9} \Rightarrow 8+9 = 17b lows / ft$. 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 2 JOB NO. 080504 Montgomery County JOB NO. 080504 Montgomery County JOB NAME: Deer Creek Str. & Apprs. (S) Route 27 Section 7 Date: January 31, 2018 STATION: 111+58 Construction Hollow Stem Auger - Diamond Core LOCATION: CL. Construction Deer Creek Str. & Apprs. N/A COMPLETION DEPTH: 34.3 DESCRIPTION OF MATERIAL SOIL GROUP SOIL GROUP Image: Signed Step Step Step Step Step Step Step Step				EPARTMENT OF TRANSPORTATION			RINC								
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JOB N			080504 Montgomery County		DATE:			anuary	31,	2018		
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D E P T H FT.	S Y M B O L	S A M P L E S	DESCRIPTION OF MATERIAL	SOIL GROU	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT	NO OF PLOUF 1.	PER 6-IN.	% T C R	% R Q D
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			Boring Terminated									
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	ARKANSAS DEPARTMENT OF TRANSPORTATIONBORING NO. 2MATERIALS DIVISION - GEOTECHNICAL SEC.PAGE 1 OF 2												
JOB N	AND COLOR OF COLOR		080504 Montgomery County		DATE:		01	anuar	y 3	0, 20	18		
JOB N	JAME:		Deer Creek Str. & Apprs. (S)		TYPE O							_	
STAT	ION		Route 27 Section 7 112+28		Holle		tem A			iamo er 17		Core	6
LOCA			C.L. Construction		EQUIPM	ENT		F	ACK	er 17	19		
LOGO	GED B		Steve Faulkner		HAMME	R CO	RRECT	ION F	ACT	OR:	Į	N/A	
COM	PLET	IOI	N DEPTH: 38.9	-									
D E P T H	SY MBOL	S A M P L E S	DESCRIPTION OF MATERIAL SURFACE ELEVATION: 572.9	SOIL GROU	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT	LBS PER CU.FT.	NO. OF BLOWS	PER 6-IN.	% T C R	% R Q D
	Polo												
			Clay with Gravel (Rock Fragments)										
 			SHALE - Highly Weathered, Soft, Dark Gray							20	h		
		X	SHALE - Weathered, Medium Hard, Dark Gray*							32-2			
			SHALL - Weathered, Medium Haid, Dark Gray									7	0
			SHALE - Slightly Weathered, Hard, Steeply Dipping, Occasional Fractures, Frequent Calcite and Quartz Seams, Dark Gray									90	28
 20			SHALE - Unweathered, Hard, Steeply Dipping, Frequent Fractures, Frequent Quartz Seams, Dark Gray									100	64
 												98	56
			χ.									99	62
30			SHALE - Unweathered, Hard, Steeply Dipping, Occasional Fractures, Frequent Quartz Seams, Dark Gray									90	62
	35 EEEE REMARKS: Water encountered at 4.5' below ground level. Lat/Long: 34.651644, -93.533241												

			DEPARTMENT OF TRANSPORTATION DIVISION - GEOTECHNICAL SEC.		BORIN PAGE	G NC 2		2				
JOB N JOB N	Ю.		080504 Montgomery County	1	DATE:		J	anua	ry 3	0, 20	18	
JOB N	AME	:	Deer Creek Str. & Apprs. (S) Route 27 Section 7		TYPE OI Hollo				- D	iamo	nd (ore
STAT	ION:		112+28	,	EQUIPM					er 17		.010
LOCA			C.L. Construction	î	JQ011 II	LITT.			I ION	01 17	17	
LOGC	ED B	Y: \$	Steve Faulkner	1	IAMME	R CO	RRECT	TON F	ACT	OR:	1	N/A
COM	PLE	1	N DEPTH: 38.9	1								
D E	s	S										
P	Y	A M						5	FT.	NS		%
Т	M B	P	DESCRIPTION OF MATERIAL	SOIL GROUP				GH	CU.	LOV		T
Н	0	L		GROUP	Ξ	IST	Θ,	WEI	ER	F B	Ϋ́.	C R
FT.	Ĺ	E S	SURFACE ELEVATION: 572.9		PLASTIC LIMIT	% MOIST.	LIQUID	DRY WEIGHT	LBS PER CU.FT.	NO. OF BLOWS	PER 6-IN.	
1 1.		5	SURFACE ELEVATION: 572.9			%		D	L	Ż	Ы	
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				ARKANSAS DEPARTMENT OF TRANSPORTATIONBORING NO. 3MATERIALS DIVISION - GEOTECHNICAL SEC.PAGE 1 OF 1									
JOB N	10.		080504 Montgomery County		DATE				ary 2	24, 20)18		
JOB N	IAME:		Deer Creek Str. & Apprs. (S)				ILLING			-			
OTAT.	ION.		Route 27 Section 7 112+98				Stem A	Auge				Core	;
STAT: LOCA			3' Left of C.L. Construction		EQUI	PMEN	ľ:		Аск	cer 17	/79		
			Stanley Bates		НАМ	MER C	ORREC'	ΓΙΟΝ	FACT	OR:	ţ.	N/A	
and the second se			N DEPTH: 28.4										
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E	S Y	A							Γ.	s		%	0/
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н н	В	Г L		GROU	Ĭ	LS		/EIC	ER C	BL	Ż	C	Q
	O L	Е			PLASTIC	% MOIST	LIMIT	DRY WEIGHT	LBS PER CU.FT	NO. OF BLOWS	PER 6-IN.	R	D
FT.		S	SURFACE ELEVATION: 576.7		PL	LIN %	LIC	DR	LB	NO	PE		
			Ne Recovery*										
			Ne Recovery										
													æ
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			SHALE - Weathered, Medium Hard, Dark Gray							6 (3	0 ")		
			Shale - Weathered, Medium Hard, Steeply	1								67	0
			Dipping, Dark Gray									67	0
				1									
10			Obels - Henry ethogen I Hand - Exemptor - Exemptor										
			Shale - Unweathered, Hard, Frequent Fractures, Steeply Dipping, Dark Gray									48	0
			Oldepiy Dipping, Dark Oldy										
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			я.										
15													
												82	15
			Chela Universitaria Hard Ereguent Freedures										
		\square	Shale - Unweathered, Hard, Frequent Fractures, Steeply Dipping, Occasional Quartz Seams, Dark										
			Gray										
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			Shale - Unweathered, Hard, Steeply Dipping,							I			
	<u> </u>		Occasional Fractures, Frequent Calcite and Quartz Seams and Layers, Dark Gray									96	66
			Qualiz Seams and Layers, Dark Gray										
	<u> 223</u>	\rightarrow	Boring Terminated			_							
30			Donny reminated										
35													
DEMA	REMARKS: * Water was encountered at 3.9' below ground level. Lat/Long: 34.651644, -93.533241												



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 24, 2017

TO: Mr. Trinity Smith, Engineer of Roadway Design

SUBJECT: Job No. 080504 Deer Creek Str. & Apprs. (S) Route 27 Section 7 Montgomery 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 the bridge crossing Deer Creek on new location. Samples were obtained in the existing travel lanes and ditch line. There were no paved shoulders within the project limits.

Based on laboratory results of samples obtained, the subgrade soils consist primarily of clayey sands with varying amounts of shale. Cross-sections are not currently available, but it is assumed 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 effort, if the weather is favorable during construction. Rock was encountered at station 102+00, 6 feet right of centerline at a depth of 3.0 feet.

Additional earthwork recommendations will be made upon request when plans are further developed and cross sections are 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 Bismarck.
- 2. Asphalt Concrete Hot Mix

	PG 64-22	
Туре	Asphalt Cement %	Mineral Aggregate %
Surface Course	5.5	94.5
Binder Course	4.4	95.6
Base Course	4.0	96.0

	PG 70-22	3
Туре	Asphalt Cement %	Mineral Aggregate %
Surface Course	5.5	94.5
Binder Course	4.5	95.5
Base Course	4.0	96.0

Job 080504 August 25, 2017

8

	PG 76-22	
Туре	Asphalt Cement %	Mineral Aggregate %
Surface Course	5.4	94.6
Binder Course	4.3	95.7
Base Course	3.8	96.2
		00:E

1 Michael C. Benson Materials Engineer

MCB:pt:bjj

Attachment cc: State Constr. Eng. – Master File Copy District 8 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 ***

> RESILIENT MODULUS STA. 102+00 11281

REMARKS -

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1.

AASHTO TESTS : T190

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ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT MATERIALS DIVISION

14

Q.,

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

Testing - Permanent Strain > 5% (Y=Yes or N=No) Number of Load Sequences Completed (0-15) 1 2. Specimen Information: Specimen Diameter (in): 3.3 Top 3.5 Bottom 3.6 Middle 3.6 Bottom 3.6 Average 3.6 Membrane Thickness (in): 0.0 Height of Specimen, Cap and Base (in): 0.0 Initial Length, Lo (in): 8.0 Initial Length, Lo (in): 8.1 Initial Length, Lo (in): 8.1 Initial Volume, AoLo (cu. in): 97.6 3. Soil Specimen Weight: Weight of Wet Soil Used (g): 3203.3 4. Soil Properties: 0 0 Optimum Moisture Content (%): 16 10 Maximum Dry Density (pcf): 111 95% of MDD (pcf): 105 In-Situ Moisture content (%): 16 2003.3 2003.3 Compaction Weight (g): 3203.3 2003.3 2003.3 Compaction Weight (pcf): 105 105 107.0 In-Situ Moisture content (%): 16	Job No. Date Sampled: Date Tested: Name of Project:	080504 7/18/17 August 11, 2017 DEER CREEK STR. & APPRS. (S)	Material Code Station No.: Location:	SSRVPS 102+00 30'RT
Preconditioning - Permanent Strain > 5% (Y=Yes or N=No) Testing - Permanent Strain > 5% (Y=Yes or N=No) Number of Load Sequences Completed (0-15) 1 2. Specimen Information: Specimen Diameter (in): Top 3.9 Middle 3.9 Bottom 3.3 Middle 3.5 Average 3.2 Membrane Thickness (in): 0.0 Height of Specimen, Cap and Base (in): 6.0 Initial Area, Ao (sq. in): 12. Initial Volume, AoLo (cu. in): 97.6 3. Soil Specimen Weight: Weight of Wet Soil Used (g): 3203.3 4. Soil Properties: 0ptimum Moisture Content (%): 16 Maximum Dry Density (pcf): 111 95% of MDD (pcf): 12. In-Situ Moisture Content (%): N 17 16 Compaction Moisture content (%): 107. 12.4 17 Compaction Weight (g): 3203.3 107.1 12.4 Soil Specimen Properties: 16 17.2 16 Compaction Dry Density (pcf):	Sampled By: Lab No.: Sample ID:	BATES/JORDAN 20172450	AASHTO Class: Material Type (1 or 2)	A-6(32)
Testing - Permanent Strain > 5% (Y=Yes or N=No) Number of Load Sequences Completed (0-15) 1 2. Specimen Information: Specimen Diameter (in): 3.8 Top 3.8 Middle 3.6 Bottom 3.6 Average 3.6 Membrane Thickness (in): 0.0 Height of Specimen, Cap and Base (in): 0.0 Initial Length, Lo (in): 8.0 Initial Volume, AoLo (cu. in): 97.6 3. Soil Specimen Weight: 97.6 Weight of Wet Soil Used (g): 3203.3 4. Soil Properties: 0 Optimum Moisture Content (%): 16 Maximum Dry Density (pcf): 111 95% of MDD (pcf): 105 In-Situ Moisture content (%): 16 Compaction Moisture content (%): 16 Compaction Dry Density (pcf): 124.2 Compaction Dry Density (pcf): 107.0 Moisture Content (%): 16 Compaction Weit Density (pcf): 107.0 Moisture Content (%): 16 Compaction Dry Density (pcf): 1790(Sc)~-0.27	1. Testing Inform			······
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Moisture Content After Mr Test (%): 16 6. Quick Shear Test (Y=Yes, N=No, N/A=Not Applicable): #VALU 7. Resilient Modulus, Mr: 17790(Sc)^-0.27240(S3)^0.2134 8. Comments			2	124.79
6. Quick Shear Test (Y=Yes, N=No, N/A=Not Applicable): #VALU 7. Resilient Modulus, Mr: 17790(Sc)^-0.27240(S3)^0.2134 8. Comments				107.03
7. Resilient Modulus, Mr: 17790(Sc)^-0.27240(S3)^0.2134 8. Comments		Moisture Content Alter Mr. Test (76).		10.4
8. Comments	6. Quick Shear 1	Гest (Y=Yes, N=No, N/A=Not Applicable):		#VALUE!
	7. Resilient Mod	lulus, Mr:	17790(5	Sc)^-0.27240(S3)^0.21340
9 Tested By: CW Date: August 11, 2017	8. Comments	3		
J. IESIEU DV. GVV DATE, ADDISE 1 2017	9. Tested By:	GW Da	te: August 11, 2017	

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT MATERIALS DIVISION

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

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Job No.	080504			Material Code	SSRVPS
Date Sampled:	7/18/17			Station No.:	102 + 00
Date Tested:	August 11, 2017			Location:	30'RT
Name of Project:	DEER CREEK STR. & APPRS. (S)	& APPRS. (S)			
County:	Code: 49	Name:	MONTGOMERY		
Sampled By:	BATES/JORDAN			Depth:	0-5
Lab No.:	20172450			AASHTO Class:	A-6(32)
Sample ID:	RV486			Material Type (1 or 2): 2	2): 2
LATITUDE:				LONGITUDE:	

Resilient	Modulus				Mr	psi	21,314	19,413	17,355	15,115	13,617	19,433	17,408	15,481	13,770	12,680	17,028	14,921	13,330	12,117	11,281
Resilient	Strain				εr	in/in	0.0000	0.00019	0.00032	0.00048	0.00065	0.00010	0.00021	0.00035	0.00052	0.00070	0.00011	0.00024	0.00040	0.00058	0.00077
Average	Recov Def.	LVDT 1	and 2		H _{avg}	. <u>C</u>	0.00070	0.00152	0.00254	0.00384	0.00524	0.00076	0.00169	0.00282	0.00417	0.00562	0.00087	0.00196	0.00324	0.00469	0.00621
Actual	Applied	Contact	Stress		Scontact	psi	0.2	0.2	0.3	C.5	0.7	0.2	0.2	0.2	0.4	C.6	0.2	C.2	0.2	0.3	0.5
Actual	Applied	Cyclic	Stress		S _{cyclic}	psi	1.9	3.7	5.5	7.2	8.9	1.8	3.7	5.4	7.1	8.9	1.8	3.6	5.4	7.1	8.7
Actual	Applied	Max.	Axial	Stress	S _{max}	psi	2.1	3.9	5.8	7.7	9.6	2.1	3.9	5.7	7.6	9.5	2.1	3.9	5.6	7.4	9.3
Actual	Applied	Contact	Load		Pcontact	lbs	2.8	2.8	3.6	6.0	8.5	2.8	2.8	2.8	5.1	7.6	2.7	2.8	2.8	4.2	6.6
Actual	Applied	Cyclic Load			P _{cyclic}	lbs	22.5	44.8	66.8	87.9	108.3	22.5	44.6	66.3	87.0	108.0	22.4	44.3	65.5	86.2	106.3
Actual	Applied	7	Load		P _{max}	sdl	25.3	47.6	70.4	94.0	116.7	25.3	47.4	69.0	92.2	115.6	25.2	47.0	68.3	90.4	112.9
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			လိ	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

DATE August 11, 2017 DATE DATE

GW

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT MATERIALS DIVISION

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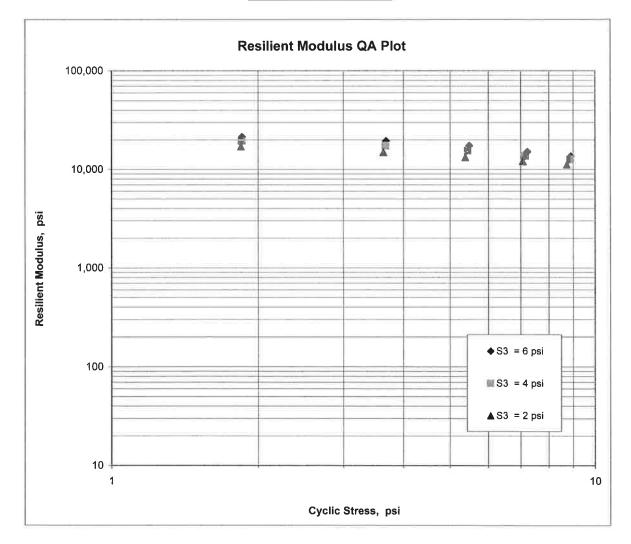
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AASHTO T 307-99 - RESILIENT MODULUS OF SUBGRADE SOILS RECOMPACTED / THINWALL TUBE SAMPLES

Job No.	080504			Material Code SSRVPS
Date Sampled:	7/18/17			Station No.: 102+00
Date Tested:	August 11, 2017			Location: 30'RT
Name of Project:	DEER CREEK STR	. & APPR	LS. (S)	
County:	Code: 49	Name:	MONTGOMERY	
Sampled By:	BATES/JORDAN			Depth: 0-5
Lab No.:	20172450		A	ASHTO Class: A-6(32)
Sample ID:	RV486		Material	Type (1 or 2): 2
LATITUDE:]	LONGITUDE:

 $M_{R} = K1 (S_{C})^{K_{2}} (S_{3})^{K_{5}}$

K1 =	17,790	
K2 =	-0.27240	
K5 =	0.21340	
$R^2 =$	0.96	



JOB: 080504

Arkansas State Highway Transporation Department Materials Division

· JOB NAME: DEER CREEK STR. & APPRS.(S)

COUNTY NO. 49 DATE TESTED

Michael Benson, Materials Engineer

STA.#	LOC.	DEPTH	COLOR	#4	#10	# 40	#80 V	#200 E S	L.L.	<i>P.I.</i>	SOIL CLASS	LAB #:	%MOISTURE
102+00	30 RT	0-5	RD/BR	83	71	56	49	43	38	16	A-6(32)	RV486	
102+00	06 RT	0-3Z	RD/BR	82	66	54	48	40	32	10	A-4(0)	S482	13.1
102+00	21 RT	0-5	RD/BR	78	68	54	48	44	33	14	A-6(2)	S483	12.1
119+00	06 LT	0-5	BR/GR	91	81	64	59	55	30	10	A-4(3)	S484	22.8
119+00	19 LT	0-5	BROWN	83	69	53	47	43	31	12	A-6(2)	S485	12.9

8/1/2017

TYNO.	49			Michael Bens	on, Materials Engin	eer	
STA.# LOC.				PAVEMENI	SOUNDINGS		
06 RT	ACHMSC	ACHMSC	ACHMSC	ACHMSC	ACHMSC	ACHMBC	AGG.BASE CRS C
	3.0W	1.0X	2.0	1.0X	1.5		7.0
21 RT	ACHMSC	ACHMSC	ACHMSC	ACHMSC	ACHMSC	ACHMBC	AGG.BASE CRS C
	1	ı	I	1	ľ	1	1
06 LT	ACHMSC	ACHMSC	ACHMSC	AUTIVOU Development Developmen		ACHMRO	
	2.5	0.5X	4.0W		ACHMISC		
	06 RT 06 RT 06 LT	COUNTY NO. 49 STA.# LOC. 102+00 06 RT ACHMSC 102+00 21 RT ACHMSC 119+00 06 LT ACHMSC 2.5 2.5	IVY NO. 49 LOC. ACHMSC 06 RT ACHMSC 3.0W 1.0X 21 RT ACHMSC ACHMSC ACHMSC 06 LT ACHMSC 25 0.5X	ACHMSC ACHMSC	, 49 ACHMSC ACHMSC ACHM	ACHMSC	ACHMSC AC

Monday, August 21, 2017

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ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT - LITTLE ROCK, ARKANSAS MATERIALS DIVISION MICHAEL BENSON, MATERIALS ENGINEER *** SOIL SURVEY / PAVEMENT SOUNDING TEST REPORT *** DATE - 08/21/17 SEQUENCE NO. - 1 JOB NUMBER - 080504 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 - 49 SUPPLIER NAME - STATE DISTRICT NO. - 06 NAME OF PROJECT - DEER CREEK STR. & APPRS.(S) PROJECT ENGINEER - NOT APPLICABLE PIT/QUARRY - ARKANSAS - MONTGOMERY, COUNTY LOCATION DATE SAMPLED - 07/18/17 SAMPLED BY - BATES/JORDAN DATE RECEIVED - 07/25/17 SAMPLE FROM - TEST HOLE DATE TESTED - 08/01/17 MATERIAL DESC. - SOIL SURVEY - R VALUE- PAVEMENT SOUNDINGS LAB NUMBER - 20172446 - 20172447 - S482 - S483 20172448 SAMPLE ID - S484 - INFORMATION ONLY - INFORMATION ONLY - INFORMATION ONLY - 102+00 - 102+00 - 119+00 TEST STATUS STATION - 06 RT - 0-3Z - RD/BR - 21 RT - 0-5 _ RD/BR - 06 LT LOCATION - 0-5 DEPTH IN FEET BR/GR MAT'L COLOR 20 MAT'L TYPE LATITUDE DEG-MIN-SEC - 34 38 55.20 - 34 38 55.20 - 34 39 11.70 LONGITUDE DEG-MIN-SEC = 93 32 1.30 93 32 1.20 93 32 1.30 -78 68 54 48 44 -3 2 % PASSING IN. -1 1/2 IN. = 3/4 IN. - 100 100 3/8 IN. - 98 96 82 NO. 4 -91 NO. 10 - 66 81 NO. 40 - 54 64 NO. 80 - 48 -59 NO. 200 = 40 55 - 32 LIQUID LIMIT 30 PLASTICITY INDEX - 10 10 14 - A-4(0) -AASHTO SOIL A-6(2) A-4(3) UNIFIED SOIL -% MOISTURE CONTENT - 13.1 -12.1 22.8 (IN) - 3.0W ACHMSC -----2.5 -1 ACHMSC (IN) -1.0X ---0.5X 100 (IN) ⁻ 2.0 ACHMSC 4 OW (IN) -1.0X ACHMSC ---- --ACHMSC (IN) _ -- -1.5 -ACHMBC (IN) _ ----3.0W -AGG.BASE CRS CL-7 (IN) - 7.0

6.0

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

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ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT - LITTLE ROCK, ARKANSAS MATERIALS DIVISION

MICHAEL BENSON, MATERIALS ENGINEER

*** SOIL SURVEY / PAVEMENT SOUNDING TEST REPORT ***

DATE - 08/15/17 JOB NUMBER - 080504 FEDERAL AID NO TO BE AS PURPOSE - SOIL SUR SPEC. REMARKS - NO SPECI SUPPLIER NAME - STATE NAME OF PROJECT - DEER O PROJECT ENGINEER - NOT AF PIT/QUARRY - ARKANSAS LOCATION - MONTGOMERY SAMPLED BY - BATES/JORDA SAMPLE FROM - TEST HOLE MATERIAL DESC SOIL SUR	SIGNED VEY SAMPLE FICATION CHECK REEK STR. & APPRS.(S PLICABLE , COUNTY N		SEQUENCE NO 2 MATERIAL CODE - SSRVPS SPEC. YEAR - 2014 SUPPLIER ID 1 COUNTY/STATE - 49 DISTRICT NO 06 DATE SAMPLED - 07/18/17 DATE RECEIVED - 07/25/17 DATE TESTED - 08/01/17
LAB NUMBER	- 20172449	-	
SAMPLE ID	- S485	-	<u></u>
TEST STATUS	- INFORMATION ONLY	-	-
	- 119+00	-	-
	- 19 LT	-	5
	- 0-5	-	55 50
	- BROWN	-	-
MAT'L COLOR MAT'L TYPE	- BROWN	-	÷
	- 34 39 11.60	-	
LATITUDE DEG-MIN-SEC LONGITUDE DEG-MIN-SEC		-	
LONGITUDE DEG-MIN-SEC	- 93 32 1.30		
% PASSING 2 IN.	-	=	-
1 1/2 IN.	-		
3/4 IN.	- 100		.
3/8 IN.	- 97	1993 1997	
NO. 4	- 83		-
NO. 10		1775 1772	-
NO. 40			1077. 1722
NO. 80		-	
NO. 200			
LIQUID LIMIT	- 31		
	- 12		-
AASHTO SOIL	- A-6(2)		-
UNIFIED SOIL	-	-	-
% MOISTURE CONTENT	- 12.9		
	_	-	-
	_	_	200 201
	-	-	
	-	-	-
	-	-	-
	-	-	
	-	-	
	-	-	-
	_	-	
		-	27.
REMARKS - W-MILTIDLE LA	ק השפפיניסייטע א-מאיי		

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

AASHTO TESTS : T24 T88 T89 T90 T265

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	MATERIALS DIVISION MICHAEL BENSON, MATERIALS ENGI	אנידים
***	SOIL SURVEY / PAVEMENT SOUNDING	
DATE - 08/1		SEQUENCE NO 1
JOB NUMBER - 0805		MATERIAL CODE 🛥 RV
FEDERAL AID NO TO B		SPEC. YEAR - 2014
	SURVEY SAMPLE	SUPPLIER ID 1
SUPPLIER NAME - STAT	PECIFICATION CHECK	COUNTY/STATE - 49
	ER CREEK STR. & APPRS.(S)	DISTRICT NO 06
PROJECT ENGINEER - NO		
PIT/QUARRY - ARKANS		
LOCATION - MONTGO		DATE SAMPLED - 07/18
SAMPLED BY - BATES/J		DATE RECEIVED - 07/25
SAMPLE FROM - TEST HO	JLE SURVEY - RESISTANCE R-VALUE AC	DATE TESTED - 08/01
		IUAL RESULTS
LAB NUMBER	- 20172450 -	-
SAMPLE ID TEST STATUS	- RV486 -	2
STATION	- INFORMATION ONLY - - 102+00 -	-
LOCATION	-30 RT $-$	
DEPTH IN FEET	- 0-5 -	-
MAT'L COLOR	- RD/BR	-
MAT'L TYPE		∞. ≅
	EC - 34 38 55.10 -	-
LONGITUDE DEG-MIN-S	EC - 93 32 1.10	
	IN	::=:
1 1/2 :		
	IN 100 - IN 94 -	25 26
	4 - 83	1.
	10 - 71	9. 55 264
NO.	10 - 56 -	
NO. 8	30 - 49 -	0
NO. 20	00 - 43	
LIQUID LIMIT	- 38 -	÷
PLASTICITY INDEX	- 16 -	-
AASHTO SOIL	- A-6(32) -	-
UNIFIED SOIL	-	
% MOISTURE CONTENT	-	
	-	-
		-
	- :	
	-	-
	-	-
	-	-
	-	

AASHTO TESTS : T24 T88 T89 T90 T265

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