

ARKANSAS DEPARTMENT OF TRANSPORTATION



SUBSURFACE INVESTIGATION

STATE JOB NO. 110643

FEDERAL AID PROJECT NO. NHPP-0054(23)

COFFEE CREEK & DRAINAGE DITCH STRS. & APPRS. (S)

STATE HIGHWAY 316 SECTION 1

IN PHILLIPS 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

May 8, 2017

TO: Mr. Trinity Smith, Engineer of Roadway Design

SUBJECT: Job No. 110643
Coffee Creek & Drainage Ditch Strs. & Apprs. (S)
Route 316 Section 1
Phillips 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 bridges crossing Coffee Creek & Drainage Ditch on Highway 316. 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 moderately plastic fine sandy clay. 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 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 at the river ports in Helena.
2. Asphalt Concrete Hot Mix

<u>Type</u>	<u>Asphalt Cement %</u>	<u>Mineral Aggregate %</u>
Surface Course	5.3	94.7
Binder Course	4.3	95.7
Base Course	4.0	96.0



Michael C. Benson
Materials Engineer

MCB:pt:bjj
Attachment

cc: State Constr. Eng. – Master File Copy
District 1 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 - 05/01/2017
JOB NUMBER - 110643

SEQUENCE NO. - 1
MATERIAL CODE - SSRV
SPEC. YEAR - 2014
SUPPLIER ID. - 1
COUNTY/STATE - 54
DISTRICT NO. - 01

JOB NAME - COFFEE CREEK & DRAINAGE DITCH STRS. & APPRS. (S)

* STATION LIMITS R-VALUE AT 240 psi *

BEGIN JOB - END JOB 6

RESILIENT MODULUS
STA. 111+90 9218
STA. 136+90 7857

REMARKS -

AASHTO TESTS : T190

**ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT
MATERIALS DIVISION**

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

Job No.	110643	Material Code	SSRVPS
Date Sampled:	3/28/17	Station No.:	111+90
Date Tested:	April 28, 2017	Location:	18LT
Name of Project:	COFFEE CREEK & DRAINAGE DITCH STRS. & APPRS. (S)		
County:	Code: 54	Name: PHILLIPS	
Sampled By:	THORNTON/TAYLOR	Depth:	0-5
Lab No.:	20171253	AASHTO Class:	A-4(6)
Sample ID:	RV327	Material Type (1 or 2):	2
LATITUDE:		LONGITUDE:	

1. Testing Information:

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 Information:

Specimen Diameter (in):	
Top	3.96
Middle	3.96
Bottom	3.95
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 Specimen Weight:

Weight of Wet Soil Used (g):	3087.60
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4. Soil Properties:

Optimum Moisture Content (%):	15.2
Maximum Dry Density (pcf):	107.8
95% of MDD (pcf):	102.4
In-Situ Moisture Content (%):	N/A

5. Specimen Properties:

Wet Weight (g):	3087.60
Compaction Moisture content (%):	15.2
Compaction Wet Density (pcf):	120.03
Compaction Dry Density (pcf):	104.19
Moisture Content After Mr Test (%):	15.2

6. Quick Shear Test (Y=Yes, N=No, N/A=Not Applicable): #VALUE!

7. Resilient Modulus, Mr: 9626(Sc)^{-0.12737}(S3)^{0.30439}

8. Comments

9. Tested By: GW **Date:** April 28, 2017

**ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT
MATERIALS DIVISION**

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

Job No. 110643 **Material Code** SSRVPS
Date Sampled: 3/28/17 **Station No.:** 111+90
Date Tested: April 28, 2017 **Location:** 18LT
Name of Project: COFFEE CREEK & DRAINAGE DITCH STRS. & APPRS. (S)
County: Code: 54 **Name:** PHILLIPS
Sampled By: THORNTON/TAYLOR **Depth:** 0-5
Lab No.: 20171253 **AASHTO Class:** A-4(6)
Sample ID: RV327 **Material Type (1 or 2):** 2
LATITUDE: LONGITUDE:

PARAMETER	Chamber Confining Pressure	Nominal Maximum Axial Stress	Actual Applied Max. Axial Load	Actual Applied Cyclic Load	Actual Applied Contact Load	Actual Applied Max. Axial Stress	Actual Applied Cyclic Stress	Actual Applied Contact Stress	Average Recov Def. LVDT 1 and 2	Resilient Strain	Resilient Modulus
	S ₃ psi	S _{cyclic} psi	P _{max} lbs	P _{cyclic} lbs	P _{contact} lbs	S _{max} psi	S _{cyclic} psi	S _{contact} psi	H _{avg} in	ε _r in/in	M _r psi
Sequence 1	6.0	2.0	25.3	22.8	2.5	2.1	1.9	0.2	0.00097	0.00012	15,411
Sequence 2	6.0	4.0	47.5	44.9	2.5	3.9	3.7	0.2	0.00203	0.00025	14,524
Sequence 3	6.0	6.0	70.2	66.7	3.5	5.7	5.5	0.3	0.00319	0.00040	13,729
Sequence 4	6.0	8.0	94.0	88.0	5.9	7.7	7.2	0.5	0.00448	0.00056	12,881
Sequence 5	6.0	10.0	117.4	109.1	8.4	9.6	8.9	0.7	0.00576	0.00072	12,419
Sequence 6	4.0	2.0	25.1	22.5	2.6	2.1	1.8	0.2	0.00111	0.00014	13,364
Sequence 7	4.0	4.0	46.9	44.2	2.7	3.8	3.6	0.2	0.00235	0.00029	12,313
Sequence 8	4.0	6.0	68.4	65.7	2.7	5.6	5.4	0.2	0.00371	0.00046	11,634
Sequence 9	4.0	8.0	92.0	86.9	5.1	7.5	7.1	0.4	0.00509	0.00063	11,219
Sequence 10	4.0	10.0	115.9	108.3	7.6	9.5	8.9	0.6	0.00646	0.00081	10,999
Sequence 11	2.0	2.0	24.8	22.1	2.7	2.0	1.8	0.2	0.00132	0.00016	10,999
Sequence 12	2.0	4.0	46.3	43.5	2.8	3.8	3.6	0.2	0.00281	0.00035	10,165
Sequence 13	2.0	6.0	67.2	64.4	2.8	5.5	5.3	0.2	0.00440	0.00055	9,603
Sequence 14	2.0	8.0	89.7	85.3	4.4	7.3	7.0	0.4	0.00600	0.00075	9,332
Sequence 15	2.0	10.0	113.1	106.3	6.8	9.3	8.7	0.6	0.00756	0.00094	9,218

TESTED BY _____ DATE _____
 REVIEWED BY _____ DATE _____

GW

April 28, 2017

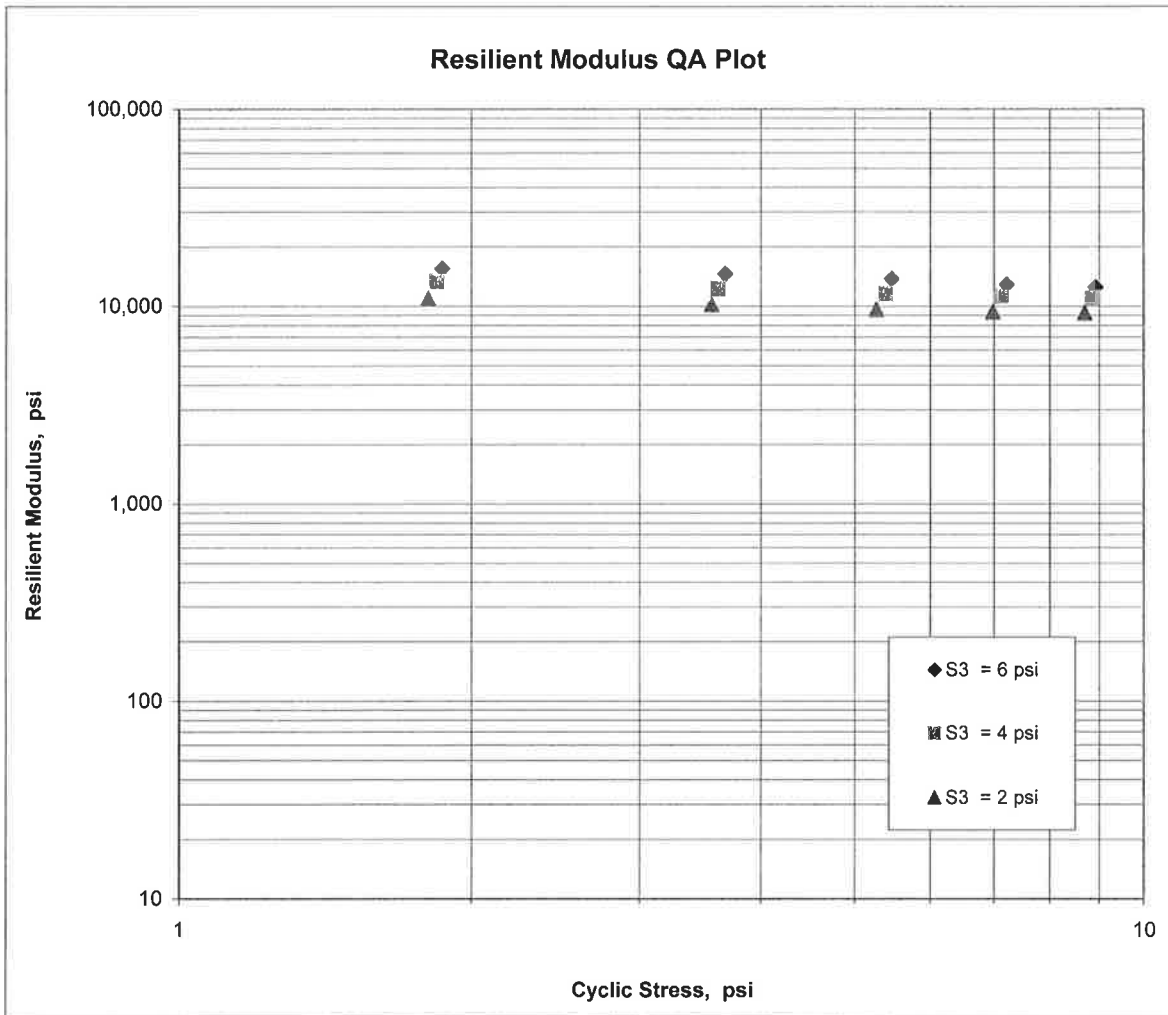
**ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT
MATERIALS DIVISION**

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

Job No.	110643	Material Code	SSRVPS
Date Sampled:	3/28/17	Station No.:	111+90
Date Tested:	April 28, 2017	Location:	18LT
Name of Project:	COFFEE CREEK & DRAINAGE DITCH STRS. & APPRS. (S)		
County:	Code: 54	Name:	PHILLIPS
Sampled By:	THORNTON/TAYLOR	Depth:	0-5
Lab No.:	20171253	AASHTO Class:	A-4(6)
Sample ID:	RV327	Material Type (1 or 2):	2
LATITUDE:		LONGITUDE:	

$$M_R = K_1 (S_C)^{K_2} (S_3)^{K_5}$$

K1 =	<u>9,626</u>
K2 =	<u>-0.12737</u>
K5 =	<u>0.30439</u>
R ² =	<u>0.99</u>



**ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT
MATERIALS DIVISION**

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

Job No.	110643	Material Code	SSRVPS
Date Sampled:	3/28/17	Station No.:	136+90
Date Tested:	April 28, 2017	Location:	18LT
Name of Project:	COFFEE CREEK & DRAINAGE DITCH STRS. & APPRS. (S)		
County:	Code: 54	Name: PHILLIPS	
Sampled By:	THORNTON/TAYLOR	Depth:	0-5
Lab No.:	20171254	AASHTO Class:	A-6(10)
Sample ID:	RV328	Material Type (1 or 2):	2
LATITUDE:		LONGITUDE:	

1. Testing Information:

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 Information:

Specimen Diameter (in):	
Top	3.94
Middle	3.94
Bottom	3.94
Average	3.94
Membrane Thickness (in):	0.01
Height of Specimen, Cap and Base (in):	8.03
Height of Cap and Base (in):	0.00
Initial Length, Lo (in):	8.03
Initial Area, Ao (sq. in):	12.12
Initial Volume, AoLo (cu. in):	97.31

3. Soil Specimen Weight:

Weight of Wet Soil Used (g):	3019.00
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4. Soil Properties:

Optimum Moisture Content (%):	15.1
Maximum Dry Density (pcf):	106.7
95% of MDD (pcf):	101.4
In-Situ Moisture Content (%):	N/A

5. Specimen Properties:

Wet Weight (g):	3019.00
Compaction Moisture content (%):	15.3
Compaction Wet Density (pcf):	118.21
Compaction Dry Density (pcf):	102.53
Moisture Content After Mr Test (%):	15.2

6. Quick Shear Test (Y=Yes, N=No, N/A=Not Applicable): #VALUE!

7. Resilient Modulus, Mr: 8396(Sc)^{-0.12997}(S3)^{0.28570}

8. Comments _____

9. Tested By: GW **Date:** April 28, 2017

**ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT
MATERIALS DIVISION**

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

Job No. 110643 **Material Code** SSRVPS
Date Sampled: 3/28/17 **Station No.:** 136+90
Date Tested: April 28, 2017 **Location:** 18LT
Name of Project: COFFEE CREEK & DRAINAGE DITCH STRS. & APPRS. (S)
County: Code: 54 **Name:** PHILLIPS
Sampled By: THORNTON/TAYLOR **Depth:** 0-5
Lab No.: 20171254 **AASHTO Class:** A-6(10)
Sample ID: RV328 **Material Type (1 or 2):** 2
LATITUDE: LONGITUDE:

PARAMETER	Chamber Confining Pressure	Nominal Maximum Axial Stress	Actual Applied Max. Axial Load	Actual Applied Cyclic Load	Actual Applied Contact Load	Actual Applied Max. Axial Stress	Actual Applied Cyclic Stress	Actual Applied Contact Stress	Average Recov Def. LVDT 1 and 2	Resilient Strain	Resilient Modulus										
												S ₃	psi	S _{cyclic}	psi	P _{max}	lbs	P _{cyclic}	lbs	P _{contact}	lbs
Sequence 1	6.0	2.0	25.1	22.3	2.8	2.1	1.8	0.2	0.00117	0.00015	12,666										
Sequence 2	6.0	4.0	47.1	44.3	2.8	3.9	3.7	0.2	0.00242	0.00030	12,142										
Sequence 3	6.0	6.0	70.0	66.5	3.6	5.8	5.5	0.3	0.00383	0.00048	11,498										
Sequence 4	6.0	8.0	93.8	87.8	6.0	7.7	7.2	0.5	0.00541	0.00067	10,753										
Sequence 5	6.0	10.0	117.8	109.4	8.4	9.7	9.0	0.7	0.00700	0.00087	10,356										
Sequence 6	4.0	2.0	25.1	22.3	2.8	2.1	1.8	0.2	0.00128	0.00016	11,579										
Sequence 7	4.0	4.0	46.9	44.1	2.8	3.9	3.6	0.2	0.00275	0.00034	10,647										
Sequence 8	4.0	6.0	68.7	65.9	2.8	5.7	5.4	0.2	0.00436	0.00054	10,015										
Sequence 9	4.0	8.0	92.5	87.4	5.0	7.6	7.2	0.4	0.00609	0.00076	9,515										
Sequence 10	4.0	10.0	116.3	108.9	7.5	9.6	9.0	0.6	0.00776	0.00097	9,302										
Sequence 11	2.0	2.0	24.9	22.2	2.7	2.1	1.8	0.2	0.00156	0.00019	9,436										
Sequence 12	2.0	4.0	46.4	43.7	2.7	3.8	3.6	0.2	0.00337	0.00042	8,601										
Sequence 13	2.0	6.0	67.7	65.1	2.7	5.6	5.4	0.2	0.00525	0.00065	8,213										
Sequence 14	2.0	8.0	90.3	86.1	4.1	7.4	7.1	0.3	0.00724	0.00090	7,889										
Sequence 15	2.0	10.0	114.2	107.6	6.6	9.4	8.9	0.5	0.00908	0.00113	7,857										

TESTED BY _____ DATE April 28, 2017
 REVIEWED BY _____ DATE _____

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT
MATERIALS DIVISION

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

Job No. 110643 Material Code SSRVPS
Date Sampled: 3/28/17 Station No.: 136+90
Date Tested: April 28, 2017 Location: 18LT
Name of Project: COFFEE CREEK & DRAINAGE DITCH STRS. & APPRS. (S)
County: Code: 54 Name: PHILLIPS
Sampled By: THORNTON/TAYLOR Depth: 0-5
Lab No.: 20171254 AASHTO Class: A-6(10)
Sample ID: RV328 Material Type (1 or 2): 2
LATITUDE: LONGITUDE:

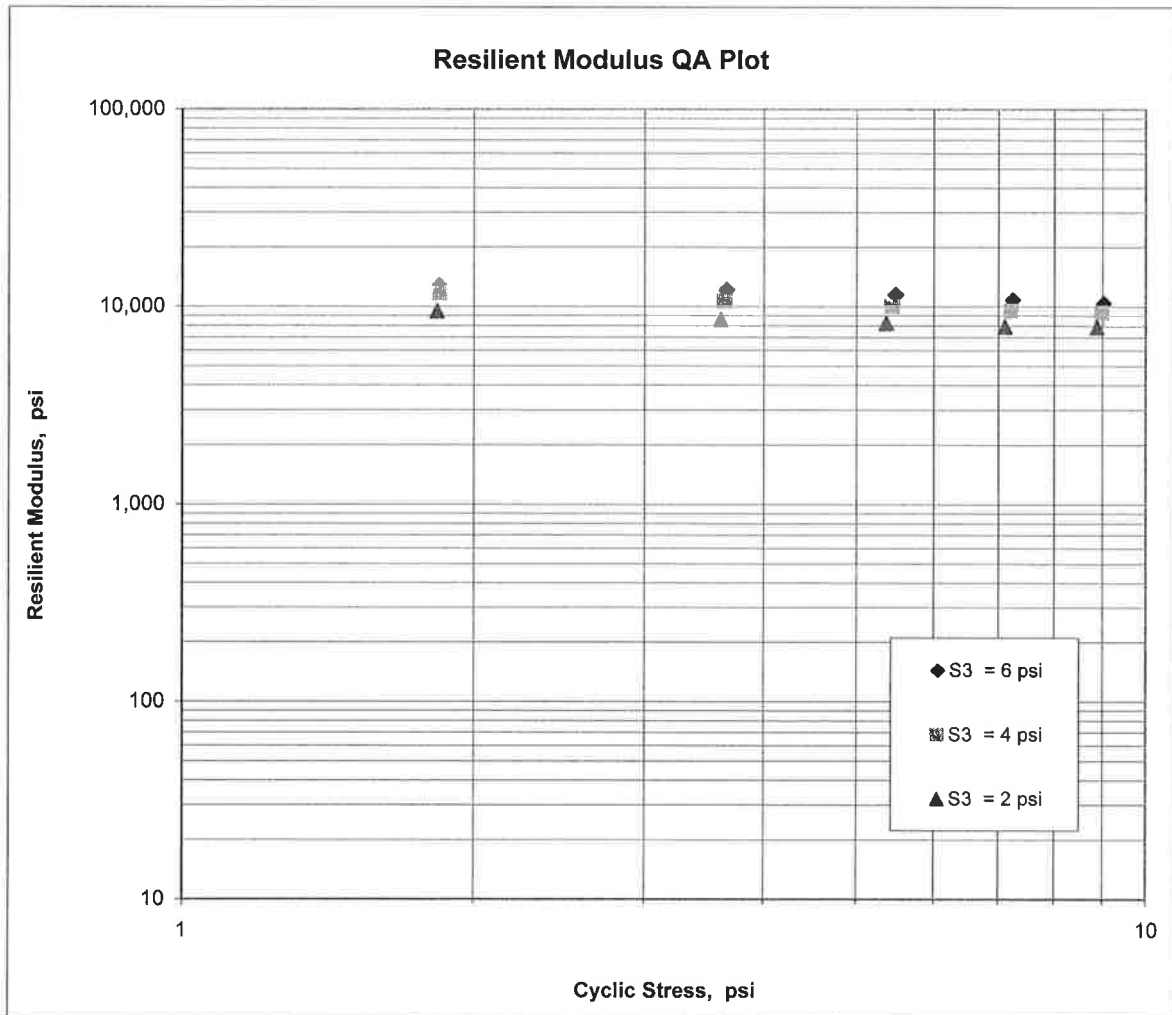
$$M_R = K_1 (S_C)^{K_2} (S_3)^{K_5}$$

$$K_1 = \underline{8,396}$$

$$K_2 = \underline{-0.12997}$$

$$K_5 = \underline{0.28570}$$

$$R^2 = \underline{0.99}$$



JOB: 110643

Arkansas State Highway Transportation Department

JOB NAME: COFFEE CREEK & DRAINAGE DITCH STRS. & APPRS. (S)

Materials Division

COUNTY NO. 54 DATE TESTED 4/28/2017

Michael Benson, Materials Engineer

STA.#	LOC.	DEPTH	COLOR	#					L.L.	P.I.	SOIL CLASS	LAB #:	%MOISTURE
				#4	#10	#40	#80	#200					
111+90	18 LT	0-5	BROWN	100				93	28	07	A-4(6)	RV327	
136+90	18 LT	0-5	BR/GR	100				96	31	11	A-6(10)	RV328	
105+00	06 RT	0-5	BROWN	100				97	35	14	A-6(14)	S339	24.5
105+00	20 RT	0-5	BROWN	100				97	34	13	A-6(13)	S340	24
111+00	06 LT	0-5	GRAY	100				96	31	10	A-4(9)	S341	28.5
111+00	18 LT	0-5	GRAY	100				96	28	07	A-4(6)	S342	24.7
131+00	06 RT	0-5	BROWN	100				98	30	09	A-4(9)	S343	22.2
131+00	18 RT	0-5	BROWN	100				95	34	11	A-6(10)	S344	19
136+00	06 LT	0-5	BR/GR	99	98	96	89	68	30	12	A-6(6)	S345	29.9
136+00	18 LT	0-5	BR/GR	100				97	33	12	A-6(12)	S346	20.9

comments:

Tuesday, May 02, 2017

JOB: 110643

JOB NAME: COFFEE CREEK & DRAINAGE DITCH STRS. & APPRS. (S)

COUNTY NO. 54

STA.# LOC.

*Arkansas State Highway Transportation Department
Materials Division
Michael Benson, Materials Engineer*

DATE TESTED
4/28/2017

PAVEMENT SOUNDINGS

105+00	06 RT	ACHMSC	3.5	SOIL CEMENT	2.0	
105+00	20 RT	ACHMSC		SOIL CEMENT		
111+00	06 LT	ACHMSC	3.5	SOIL CEMENT	3.5	
111+00	18 LT	ACHMSC				
131+00	06 RT	ACHMSC	3.5			
131+00	18 RT	ACHMSC				
136+00	06 LT	ACHMSC	3.0	SOIL CEMENT	4.0	ACHMSC
136+00	18 LT	ACHMSC		SOIL CEMENT		ACHMSC

Comments:

Tuesday, May 02, 2017

