

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT



SUBSURFACE INVESTIGATION

STATE JOB NO. 060432

FEDERAL AID PROJECT NO. CMF-0026(27)

HWY. 290 – OUACHITA RIVER BRIDGE (S)

STATE HIGHWAY 7 SECTION 9

IN GARLAND COUNTY

LETTING OF APRIL 12, 2017

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

October 24, 2013

TO: Mr. Carl Fuselier, Bridge Engineer

SUBJECT: Job No. 060432
 Hwy. 290 – Ouachita River Bridge (S)
 Route 7, Section 9
 Garland County

Transmitted herewith are the logs of the borings conducted for the proposed retaining walls on the above referenced job. The rock cores and samples obtained by the Standard Penetration Tests were brought to the laboratory and visually classified by experienced lab personnel to confirm the field identifications.

The retaining walls should be designed based on the values provided in Table 1. The vicinity of Walls #1 and #2 was inaccessible for drilling. There were open cuts and utility work being performed near the proposed footing elevations in the area that revealed the in situ material.

TABLE 1 – Material Properties for Concrete Retaining Walls

Location	Material	Factored Bearing Resistance (KSF)	Unit Weight (PCF)	Cohesion (PSF)	Internal Friction Angle	Active Pressure (Ka)
Pine Hill Road Wall #1 (Station 20+65 13' RT – 21+52 15' RT)	Gravel w/ Clayey Sand	4.5	125	200	32	0.307
Highway 7 Wall #2 (Station 171+40 42' LT – 172+45 42' LT)	Gravel w/ Clayey Sand	4.5	125	200	32	0.307
Highway 7 Wall #3 (Station 176+30 52' LT – 178+18 43' LT)	Clayey Sand	4.5	125	200	32	0.307
Highway 7 Wall #4 (Station 175+72 42' RT – 178+16 42' RT)	Gravel w/ Clayey Sand	4	120	250	30	0.333

The Geotechnical Section is available to discuss effects of constructing Wall #4 on the existing retaining wall or any other questions you may have.

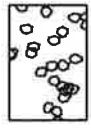

 Michael C. Benson
 Materials Engineer

MCB:rpt
 cc: State Construction Engineer - Master File Copy
 Roadway Design
 G.C. File

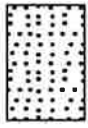
LEGEND

SOIL TYPES

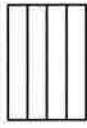
(SHOWN IN SYMBOL COLUMN)
(PREDOMINANT TYPE SHOWN HEAVY)



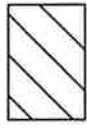
GRAVEL



SAND



SILT



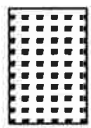
CLAY



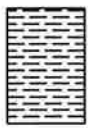
ORGANIC
MATTER

ROCK TYPES

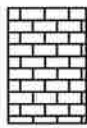
(SHOWN IN SYMBOL COLUMN)



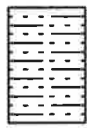
SANDSTONE



SHALE
or
SILTSTONE



LIMESTONE
or
DOLOMITE



ALTERNATING
LAYERS of
SHALE and
SANDSTONE



OTHER

SAMPLER TYPES

(SHOWN IN SAMPLE COLUMN)

SHELBY TUBE



UNDISTURBED
SAMPLE
RECOVERY



DISTURBED
SAMPLE
RECOVERY



NO
RECOVERY

SPLIT SPOON

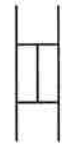


SAMPLE
RECOVERY



NO
RECOVERY

ROCK CORING



% RECOVERY
INDICATED ON LOGS

TERMS DESCRIBING CONSISTENCY OR CONDITION

GRANULAR SOIL		CLAY		CLAY-SHALE		SHALE	
*N ^o Value	Density	*N ^o Value	Consistency	*N ^o Value	Consistency	*N ^o 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 Hard	
		Over 60	Very Hard	Over 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: $\frac{6}{8-9} \Rightarrow 8+9 = 17 \text{ blows/ft}$. 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.




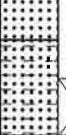
**ARKANSAS HWY. & TRANS. DEPARTMENT
MATERIALS DIVISION - GEOTECHNICAL SEC.**

BORING NO. RW1
PAGE 1 OF 1

JOB NO. 060432 Garland County
JOB NAME: Hwy. 290 - Ouachita River Bridge
S.H. 7
STATION: 175+75
LOCATION: 23' Right of Center Line
LOGGED BY: David Allen

DATE: September 3, 2013
TYPE OF DRILLING: Hollow Stem Auger
EQUIPMENT: CME 850 w/ CME Automatic Hammer
HAMMER CORRECTION FACTOR: 1.23

COMPLETION DEPTH: 20.6

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT	LBS PER CU.FT.	NO. OF BLOWS PER 6-IN.	% S C R	% R O D
			SURFACE ELEVATION: 442.5									
5		X	Moist, Very Loose, Brown and Gray Gravel (Sandstone Fragments) with Clayey Sand							3 2-2		
10		X	Moist, Medium Dense, Reddish Brown and Gray Clayey Sand							5 6-11		
15		X	SANDSTONE - Light Brown, Poorly-Cemented							60 (4")		
			SANDSTONE - Brown, Cemented									
20		X	SANDSTONE WITH GRAY HIGHLY WEATHERED SHALE SEAMS - Brown and Gray, Poorly-Cemented							12 19-30		
			Boring Terminated									
25												
30												
35												

REMARKS:

**ARKANSAS HWY. & TRANS. DEPARTMENT
MATERIALS DIVISION - GEOTECHNICAL SEC.**

BORING NO. RW2

PAGE 1 OF 1

JOB NO. 060432 Garland County
 JOB NAME: Hwy. 290 - Ouachita River Bridge
 S.H. 7
 STATION: 176+55
 LOCATION: 26' Right of Center Line
 LOGGED BY: David Allen

DATE: September 3, 2013
 TYPE OF DRILLING: Hollow Stem Auger &
 Diamond Coring
 EQUIPMENT: CME 850 w/ CME
 Automatic Hammer
 HAMMER CORRECTION FACTOR: 1.23

COMPLETION DEPTH: 17.7

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT	LBS PER CU.FT.	NO. OF BLOWS PER 6-IN.	% S C R	% R O D
			SURFACE ELEVATION: 438.4									
5			SANDSTONE - Light Brown, Poorly-Cemented							26 43-47		
10			SANDSTONE WITH CLAY SEAMS - Brown, Thin Bedded, Weathered, Cemented, with Slight Dip and Fractured Layers *							60 (2")	73	0
15			SANDSTONE WITH CLAY SEAMS AND SHALE PARTINGS - Gray and Brown, Medium Bedded, Weathered, Cemented, with Moderate Dip and Fractured Layers								100	70
20			Boring Terminated									
25												
30												
35												

REMARKS: * Total water loss was encountered at 12.2'.

**ARKANSAS HWY. & TRANS. DEPARTMENT
MATERIALS DIVISION - GEOTECHNICAL SEC.**

BORING NO. RW3
PAGE 1 OF 1

JOB NO. 060432 Garland County
JOB NAME: Hwy. 290 - Ouachita River Bridge
S.H. 7
STATION: 177+35
LOCATION: 36' Right of Center Line
LOGGED BY: David Allen

DATE: September 4, 2013
TYPE OF DRILLING: Hollow Stem Auger &
Diamond Coring
EQUIPMENT: CME 850 w/ CME
Automatic Hammer
HAMMER CORRECTION FACTOR: 1.23

COMPLETION DEPTH: 23.2

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT	LBS PER CU.FT.	NO. OF BLOWS PER 6-IN.	% S C R	% R Q D
5			Dry, Dense, Reddish Brown Clayey Sand							9 13-21		
10			SANDSTONE - Brown and Gray, Poorly-Cemented							30 60 (2")		
			SANDSTONE WITH CLAY AND SHALE SEAMS - Gray and Brown, Thin Bedded, Weathered, Cemented with Poorly_Cemented Layers, with Moderate Dip							60 (.01")	50	0
15			SANDSTONE WITH CLAY AND SHALE SEAMS AND QUARTZ PARTINGS - Gray and Brown, Medium Bedded, Weathered, Cemented, with Moderate Dip and Fractured Layers								66	24
20			SANDSTONE WITH QUARTZ LAYER AND SHALE PARTINGS - Gray, Medium Bedded, Slightly Weathered, Cemented, with Moderate Dip								100	78
25			Boring Terminated									
30												
35												

REMARKS:

**ARKANSAS HWY. & TRANS. DEPARTMENT
MATERIALS DIVISION - GEOTECHNICAL SEC.**

BORING NO. RW4
PAGE 1 OF 1

JOB NO. 060432 Garland County
JOB NAME: Hwy. 290 - Ouachita River Bridge
S.H. 7
STATION: 178+14
LOCATION: 30' Right of Center Line
LOGGED BY: David Allen

DATE: September 24, 2013
TYPE OF DRILLING: Hollow Stem Auger
EQUIPMENT: CME 75 w/ CME Automatic Hammer
HAMMER CORRECTION FACTOR: 1.37

COMPLETION DEPTH: 19.9

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT	LBS PER CU.FT.	NO. OF BLOWS PER 6-IN.	% S C R	% R Q D
			SURFACE ELEVATION: 447.6									
5			Moist, Stiff, Reddish Brown and Gray Clay with Sand							4 6-9		
10			Moist, Very Dense, Brown Sand with Clay							7 13-43		
15			Moist, Very Dense, Brown Sand with some Clay							35 60 (1")		
			Hard, Cemented Light Brown Sand									
			Moist, Very Dense, Brown Sand									
20			SANDSTONE - Light Brown and Gray, Poorly-Cemented							50 60 (1")		
			Boring Terminated									
25												
30												
35												

REMARKS:

**ARKANSAS HWY. & TRANS. DEPARTMENT
MATERIALS DIVISION - GEOTECHNICAL SEC.**

BORING NO. RW5
PAGE 1 OF 1

JOB NO. 060432 Garland County
JOB NAME: Hwy. 290 - Ouachita River Bridge
S.H. 7
STATION: 175+95
LOCATION: 17' Left of Center Line
LOGGED BY: David Allen

DATE: September 25, 2013
TYPE OF DRILLING: Hollow Stem Auger &
Diamond Coring
EQUIPMENT: CME 75 w/ CME Automatic
Hammer
HAMMER CORRECTION FACTOR: 1.37

COMPLETION DEPTH: 18.3

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT	LBS PER CU.FT.	NO. OF BLOWS PER 6-IN.	% S C R	% R Q D
			SURFACE ELEVATION: 444.9									
5			Dry, Very Dense, Gray Clayey sand							11 25-39		
10			SHALE - Gray, Highly Weathered, Soft							9 11-18		
15			SHALE - Gray, Highly Weathered, Medium Hard							60 (4")		
			SHALE WITH WEATHERED SHALE LAYERS AND SANDSTONE SEAMS - Gray and Brown, Laminated, Medium Hard, with Moderate Dip, and Fractured Layers								100	0
20			Boring Terminated									
25												
30												
35												

REMARKS:

**ARKANSAS HWY. & TRANS. DEPARTMENT
MATERIALS DIVISION - GEOTECHNICAL SEC.**

BORING NO. RW6
PAGE 1 OF 1

JOB NO. 060432 Garland County
JOB NAME: Hwy. 290 - Ouachita River Bridge
S.H. 7
STATION: 177+25
LOCATION: 14' Left of Center Line
LOGGED BY: David Allen

DATE: September 25, 2013
TYPE OF DRILLING: Hollow Stem Auger &
Diamond Coring
EQUIPMENT: CME 75 w/ CME Automatic
Hammer
HAMMER CORRECTION FACTOR: 1.37

COMPLETION DEPTH: 27.2

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT	LBS PER CU.FT.	NO. OF BLOWS PER 6-IN.	% S C R	% R Q D
			SURFACE ELEVATION: 447.6									
			Dry, Very Dense, Gray Sand									
5			SHALE - Gray and Brown, Highly Weathered, Medium Hard						9 38-58			
			SHALE - Gray and Brown, Laminated, Highly Weathered, Medium Hard, with Moderate Dip						60 (.01")		29	0
10			SHALE WITH WEATHERED SHALE LAYERS - Gray, Laminated, Medium Hard, with Moderate Dip, and Fractured Layers								70	0
15											68	0
20											48	0
25			SANDSTONE - Gray, Medium Bedded, Slightly Weathered, Cemented, with Moderate Dip								100	57
			Boring Terminated								100	86
30												
35												

REMARKS:

ARKANSAS HWY. & TRANS. DEPARTMENT		BORING NO. RW7	
MATERIALS DIVISION - GEOTECHNICAL SEC.		PAGE 1 OF 1	
JOB NO. 060432	Garland County	DATE: September 24, 2013	
JOB NAME: Hwy. 290 - Ouachita River Bridge	S.H. 7	TYPE OF DRILLING: Hollow Stem Auger & Diamond Coring	
STATION: 178+24		EQUIPMENT: CME 75 w/ CME Automatic Hammer	
LOCATION: 30' Left of Center Line		HAMMER CORRECTION FACTOR: 1.37	
LOGGED BY: David Allen			

COMPLETION DEPTH: 22.5

D E P T H FT.	S Y M B O L	S A M P L E S	DESCRIPTION OF MATERIAL	SOIL GROUP	P L A S T I C L I M I T	% M O I S T.	L I Q U I D L I M I T	D R Y W E I G H T	L B S P E R C U. F T.	N O. O F B L O W S P E R 6- I N.	% C C R	% R Q D
			SURFACE ELEVATION: 448.7									
5			SANDSTONE - Light Gray and Brown, Poorly-Cemented							60 (2")		
			SANDSTONE - Gray, Thin Bedded, Weathered, Cemented, with Steep Dip and Fractured Layers								100	0
			SANDSTONE WITH QUARTZ SEAMS - Gray, Thin Bedded, Weathered, Cemented, with Steep Dip and Fractured Layers								100	0
10			SANDSTONE WITH QUARTZ SEAMS - Gray, Thin Bedded, Weathered, Cemented, with Steep Dip and Fractured Layers								98	0
			SANDSTONE - Gray, Medium Bedded, Slightly Weathered, Cemented, with Moderate Dip and Vertically Fractured Layers								100	8
15			SANDSTONE WITH QUARTZ SEAMS AND SHALE PARTINGS - Gray, Medium Bedded, Slightly Weathered, Cemented, with Moderate Dip and Fractured Layers									
20			SANDSTONE WITH QUARTZ SEAMS AND SHALE PARTINGS - Gray, Medium Bedded, Slightly Weathered, Cemented, with Moderate Dip and Fractured Layers								100	48
25			Boring Terminated									
30												
35												

REMARKS:

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT

September 17, 2012

TO: Mr. Trinity Smith, Engineer of Roadway Design

SUBJECT: Job No. 060432
Hwy. 290 – Ouachita River Bridge (S)
Route 7 Section 9
Garland County

Transmitted herewith is the requested Soil Survey, Strength Data and Resilient Modulus test results for the above referenced job. The project consists of widening approximately 1.5 miles of Highway 7 from two lanes to four lanes with a painted median with curb and gutter. Samples were taken in the existing travel lanes, shoulder and ditch line of the existing roadway.

Based on laboratory results of samples obtained, the subgrade soils consist of moderate to highly plastic clay with varying amounts of sandstone fragments. Cross-sections are not currently available, but it is anticipated that the construction grade line will closely match that of the existing roadway. The soils are expected to provide a stable working platform with normal drying and compactive efforts if the weather is favorable during construction. Rock was encountered at station 101+00 17 feet right of centerline at a depth of 4.0 feet, and at station 165+00 24 feet right of centerline at a depth of 4.0 feet. If embankment is to be placed in the existing ditchline, the soft unstable organic material will need to be undercut a maximum depth of two feet. The undercut areas can be backfilled with locally available material.

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 Mountain Home.
2. Asphalt Concrete Hot Mix

64-22		
<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

70-22		
<u>Type</u>	<u>Asphalt Cement %</u>	<u>Mineral Aggregate %</u>
Surface Course	5.1	94.9
Binder Course	4.3	95.7
Base Course	3.9	96.1

	76-22	
<u>Type</u>	<u>Asphalt Cement %</u>	<u>Mineral Aggregate %</u>
Surface Course	5.2	94.8
Binder Course	4.8	95.2
Base Course	3.7	96.3



Michael C. Benson
Materials Engineer

MCB:pt:bjj
Attachment

cc: State Constr. Eng. – Master File Copy
District 6 Engineer
Planning 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 - 09/06/2012
JOB NUMBER - 060432

SEQUENCE NO. - 1
MATERIAL CODE - SSRVPS
SPEC. YEAR - 2003
SUPPLIER ID. - 1
COUNTY/STATE - 26
DISTRICT NO. - 06

JOB NAME - HWY.290 - OUACHITA RIVER BRIDGE(S)

* STATION LIMITS R-VALUE AT 240 psi *

BEGIN JOB - END JOB 12

RESILIENT MODULUS
STA.125+00 7843

REMARKS -

AASHTO TESTS : T190

JOB: 060432

Arkansas State Highway Transportation Department

JOB NAME: HWY.290 - OUACHITA RIVER BRIDGE(S)

Materials Division

COUNTY NO. 26 DATE TESTED 8/28/2012

Michael Benson, Materials Engineer

STA.#	LOC.	DEPTH	COLOR						L.L.	P.I.	SOIL CLASS	LAB #:	%MOISTURE
				#4	#10	#40	#80	#200					
				S	I	E	V	E	S				
125+00	25'LT	0-5'	BROWN	94	91	88	84	75	26	10	A-4(5)	RV960	
101+00	7'RT	0-5'	BR/GR	92	85	77	73	67	27	11	A-6(6)	S938	17.8
101+00	17'RT	0-4'Z	BR/GR	90	62	52	47	41	29	12	A-6(1)	S939	11.8
101+00	27'RT	0-5'	BR/GR	81	68	56	52	46	26	10	A-4(1)	S940	11.8
109+00	7'LT	0-5'	BR/GR	100	91	79	73	65	37	18	A-6(10)	S941	7.9
109+00	22'LT	0-5'	BR/GR	99	94	84	79	73	44	23	A-7-6(16)	S942	15.6
118+00	7'RT	0-5'	BR/GR	100	96	91	87	83	47	25	A-7-6(21)	S943	12.5
118+00	23'RT	0-5'	BROWN	98	93	88	79	56	20	6	A-4(0)	S944	4.2
125+00	5'LT	0-5'	BR/GR	96	87	74	68	61	32	13	A-6(6)	S945	13.6
125+00	25'LT	0-5'	BR/GR	95	92	88	84	76	27	11	A-6(6)	S946	21.8
133+00	4'RT	0-5'	BR/GR	100	91	78	70	64	39	20	A-6(11)	S947	8
133+00	13'RT	0-5'	BR/GR	98	92	79	73	65	40	20	A-6(11)	S948	11.3
133+00	26'RT	0-5'	BR/GR	100	96	88	84	70	33	16	A-6(9)	S949	8.9
141+00	5'LT	0-5'	BROWN	97	95	89	84	72	24	9	A-4(4)	S950	22
141+00	15'LT	0-5'	GRAY	97	92	87	82	71	23	9	A-4(4)	S951	20.7
149+00	0.5'RT	0-5'	BR/GR	95	89	80	75	62	30	13	A-6(5)	S952	11.8
149+00	27'RT	0-5'	BR/GR	93	73	66	60	45	20	5	A-4(0)	S953	16.1
158+00	5'LT	0-5'	BR/GR	93	85	75	71	57	20	5	A-4(0)	S954	18.4
158+00	12'LT	0-5'	BR/GR	99	85	77	72	54	18	4	A-4(0)	S955	16.8
165+00	5'RT	0-5'	BR/GR	98	94	86	81	70	23	9	A-4(3)	S956	9.3
165+00	24'RT	0-4'Z	BR/GR	94	81	73	69	54	19	5	A-4(0)	S957	6.1
172+60	5'LT	0-5'	BROWN	99	96	91	88	73	19	6	A-4(1)	S958	6.6
172+60	22'LT	0-5'	BR/GR	97	84	73	68	58	27	10	A-4(3)	S959	6.3

comments: Z=REFUSAL,W=MULTIPLE LAYERS,X=STRIPPED

Thursday, September 06, 2012

JOB: 060432

JOB NAME: HWY.290 - OUACHITA RIVER BRIDGE(S)

Arkansas State Highway Transportation Department
Materials Division

DATE TESTED
8/28/2012

COUNTY NO. 26

Michael Benson, Materials Engineer

STA.# LOC.

PAVEMENT SOUNDINGS

101+00	7'RT	ACHMSC 2.0	ACHMSC 4.0X	ACHMSC 2.0	ACHMSC 2.5X	AGG.BASE CRS.CL7 4.0
101+00	17'RT	ACHMSC 3.5W	ACHMSC	ACHMSC	ACHMSC	AGG.BASE CRS.CL7 3.0
101+00	27'RT	ACHMSC	ACHMSC	ACHMSC	ACHMSC	AGG.BASE CRS.CL7 ---
109+00	7'LT	ACHMSC 6.0W	ACHMSC	AGG.BASE CRS.CL7 6.0	---	---
109+00	22'LT	ACHMSC	ACHMSC	AGG.BASE CRS.CL7	---	---
118+00	7'RT	ACHMSC 5.5W	ACHMSC 1.75	AGG.BASE CRS.CL7 4.0	---	---
118+00	23'RT	ACHMSC	AGG.BASE CRS.CL7	---	---	---
125+00	5'LT	ACHMSC 6.0W	AGG.BASE CRS.CL7 5.0	---	---	---
125+00	25'LT	ACHMSC	AGG.BASE CRS.CL7	---	---	---
133+00	4'RT	ACHMSC 5.75	ACHMSC 2.0X	AGG.BASE CRS.CL7 9.0	---	---
133+00	13'RT	ACHMSC 1.75	ACHMSC	AGG.BASE CRS.CL7 3.0	---	---
133+00	26'RT	ACHMSC	ACHMSC	AGG.BASE CRS.CL7 2.0	---	---
141+00	5'LT	ACHMSC 1.75	ACHMSC 7.0X	AGG.BASE CRS.CL7 6.0	---	---
141+00	15'LT	ACHMSC 2.0	ACHMSC	AGG.BASE CRS.CL7 3.0	---	---
149+00	0.5'RT	ACHMSC 6.5W	ACHMSC	AGG.BASE CRS.CL7 5.0	---	---
149+00	27'RT	ACHMSC	ACHMSC	ACHMSC	AGG.BASE CRS.CL7	---
158+00	5'LT	ACHMSC 4.5	ACHMSC 3.5X	ACHMSC 2.0	AGG.BASE CRS.CL7 6.0	---

comments: Z=REFUSAL,W=MULTIPLE LAYERS,X=STRIPPED

STA.# LOC.

PAVEMENT SOUNDINGS

STA.#	LOC.	ACHMSC	ACHMSC	ACHMSC	ACHMSC	AGG.BASE CRS.CL7
158+00	12'LT	ACHMSC	ACHMSC	ACHMSC	ACHMSC	AGG.BASE CRS.CL7
		6.0W	2.75	6.0		
165+00	5'RT	ACHMSC	ACHMBC	AGG.BASE CRS.CL7		
		6.0W	2.75	6.0		
165+00	24'RT	ACHMSC	ACHMBC	AGG.BASE CRS.CL7		
172+60	5'LT	ACHMSC	ACHMBC	AGG.BASE CRS.CL7		
		5.25W	2.25	6.0		

Comments: Z=REFUSAL,W=MULTIPLE LAYERS,X=STRIPPED

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

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

Job No.	060432	Material Code	SSRVPS
Date Sampled:	9/05/12	Station No.:	125+00
Date Tested:	September 5, 2012	Location:	25'LT
Name of Project:	HWY.290 - OUACHITA RIVER BRIDGE (S)		
County:	Code: 26	Name:	GARLAND
Sampled By:		Depth:	0-5
Lab No.:	20123102	AASHTO Class:	A-4 (5)
Sample ID:	RV960	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	3.98
Middle	3.97
Bottom	3.96
Average	3.97
Membrane Thickness (in):	0.01
Height of Specimen, Cap and Base (in):	8.05
Height of Cap and Base (in):	0.00
Initial Length, Lo (in):	8.05
Initial Area, Ao (sq. in):	12.31
Initial Volume, AoLo (cu. in):	99.10

3. Soil Specimen Weight:

Weight of Wet Soil Used (g):	3165.60
------------------------------	---------

4. Soil Properties:

Optimum Moisture Content (%):	16.4
Maximum Dry Density (pcf):	107.5
95% of MDD (pcf):	102.1
In-Situ Moisture Content (%):	N/A

5. Specimen Properties:

Wet Weight (g):	3165.60
Compaction Moisture content (%):	16.7
Compaction Wet Density (pcf):	121.72
Compaction Dry Density (pcf):	104.30
Moisture Content After Mr Test (%):	16.7

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

#VALUE!

7. Resilient Modulus, Mr:

5734(Se)^-0.10138(S3)^0.42092

8. Comments

9. Tested By:

AD _____

Date: September 5, 2012

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

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

Job No. 060432 **Material Code** SSRVPS
Date Sampled: 9/05/12 **Station No.:** 125+00
Date Tested: September 5, 2012 **Location:** 25'LT
Name of Project: HWY.290 - OUACHITA RIVER BRIDGE (S)
County: Code: 26 **Name:** GARLAND
Sampled By: 20123102
Lab No.: RV960
Sample ID: **Depth:** 0-5
LATITUDE: **AAASHTO Class:** A-4 (5)
 Material Type (1 or 2): 2
 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. LVD1 and 2	Resilient Strain	Resilient Modulus
DESIGNATION	S ₃	S _{cyclic}	P _{max}	P _{cyclic}	P _{contact}	S _{max}	S _{cyclic}	S _{contact}	H _{avg}	ε _r	M _r
UNIT	psi	psi	lbs	lbs	lbs	psi	psi	psi	in	in/in	psi
Sequence 1	6.0	2.0	25.2	22.6	2.6	2.0	1.8	0.2	0.00093	0.00012	15,908
Sequence 2	6.0	4.0	47.5	44.9	2.6	3.9	3.6	0.2	0.00197	0.00025	14,869
Sequence 3	6.0	6.0	70.1	66.5	3.6	5.7	5.4	0.3	0.00324	0.00040	13,419
Sequence 4	6.0	8.0	92.9	86.7	6.1	7.5	7.0	0.5	0.00497	0.00062	11,410
Sequence 5	6.0	10.0	114.6	105.8	8.7	9.3	8.6	0.7	0.00683	0.00085	10,131
Sequence 6	4.0	2.0	25.2	22.5	2.7	2.0	1.8	0.2	0.00105	0.00013	14,056
Sequence 7	4.0	4.0	47.0	44.2	2.8	3.8	3.6	0.2	0.00229	0.00028	12,623
Sequence 8	4.0	6.0	68.0	65.1	2.9	5.5	5.3	0.2	0.00376	0.00047	11,314
Sequence 9	4.0	8.0	91.0	85.6	5.4	7.4	7.0	0.4	0.00555	0.00069	10,082
Sequence 10	4.0	10.0	113.1	105.2	7.9	9.2	8.5	0.6	0.00752	0.00093	9,141
Sequence 11	2.0	2.0	25.1	22.2	2.8	2.0	1.8	0.2	0.00124	0.00015	11,696
Sequence 12	2.0	4.0	46.5	43.7	2.8	3.8	3.5	0.2	0.00273	0.00034	10,470
Sequence 13	2.0	6.0	67.0	64.1	2.9	5.4	5.2	0.2	0.00446	0.00055	9,398
Sequence 14	2.0	8.0	88.3	83.7	4.6	7.2	6.8	0.4	0.00642	0.00080	8,519
Sequence 15	2.0	10.0	109.9	102.9	7.0	8.9	8.4	0.6	0.00858	0.00107	7,843

TESTED BY _____ AD DATE September 5, 2012
 REVIEWED BY _____ DATE _____

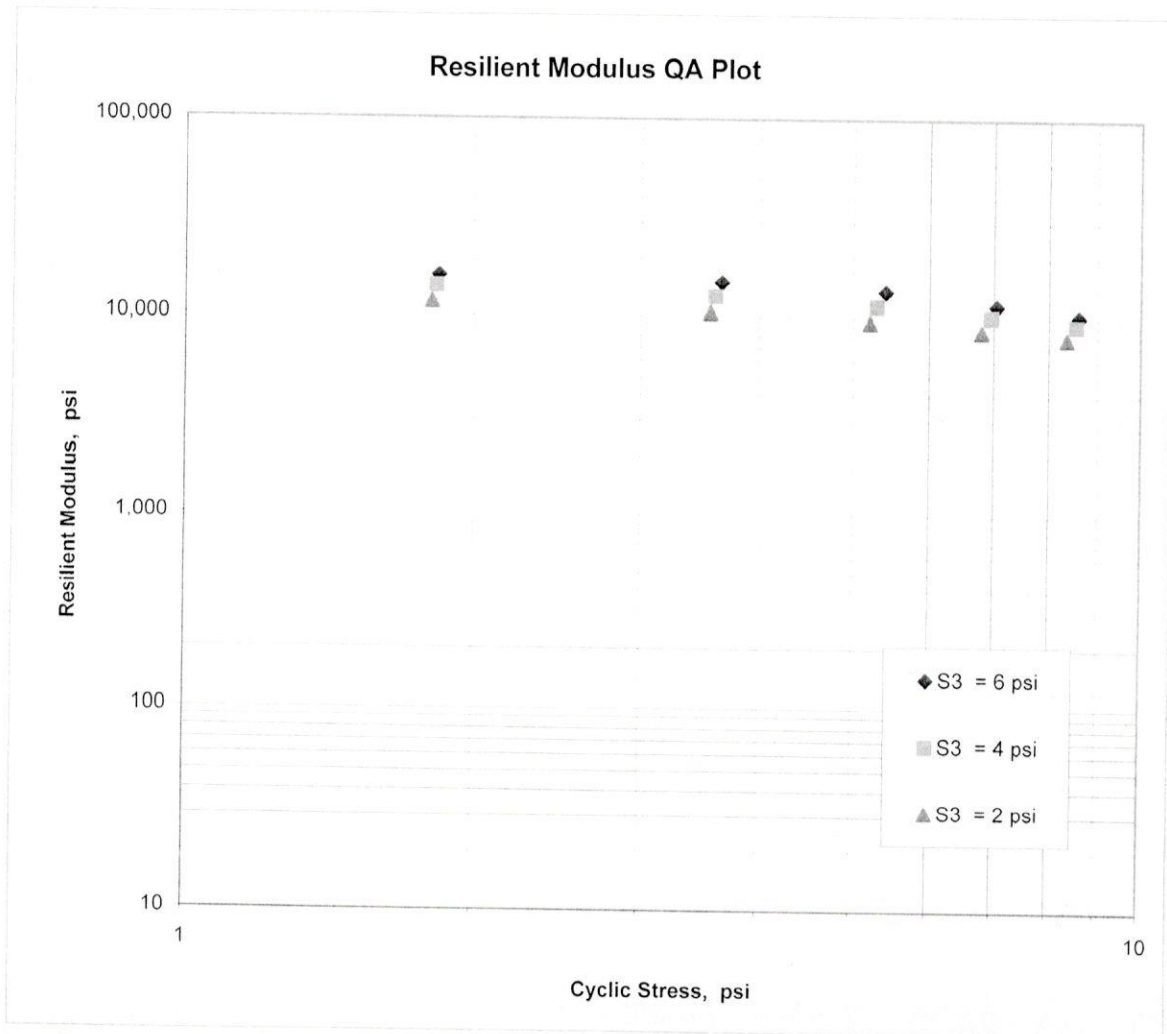
**ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT
MATERIALS DIVISION**

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

Job No.	060432	Material Code	SSRVPS
Date Sampled:	9/05/12	Station No.:	125+00
Date Tested:	September 5, 2012	Location:	25'LT
Name of Project:	HWY.290 - OUACHITA RIVER BRIDGE (S)		
County:	Code: 26	Name:	GARLAND
Sampled By:		Depth:	0-5
Lab No.:	20123102	AASHTO Class:	A-4 (5)
Sample ID:	RV960	Material Type (1 or 2):	2
LATITUDE:		LONGITUDE:	

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

$K_1 = 5,734$
 $K_2 = -0.10138$
 $K_5 = 0.42092$
 $R^2 = 0.98$



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

MICHAEL BENSON, MATERIALS ENGINEER

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

DATE	- 08/28/12	SEQUENCE NO.	- 1
JOB NUMBER	- 060432	MATERIAL CODE	- SSRVPS
FEDERAL AID NO.	- TO BE ASSIGNED	SPEC. YEAR	- 2003
PURPOSE	- SOIL SURVEY SAMPLE	SUPPLIER ID.	- 1
SPEC. REMARKS	- NO SPECIFICATION CHECK	COUNTY/STATE	- 26
SUPPLIER NAME	- STATE	DISTRICT NO.	- 06
NAME OF PROJECT	- HWY.290 - OUACHITA RIVER BRIDGE(S)		
PROJECT ENGINEER	- NOT APPLICABLE		
PIT/QUARRY	- ARKANSAS		
LOCATION	- GARLAND COUNTY		
SAMPLED BY	- S.FAULKNER	DATE SAMPLED	- 08/15/12
SAMPLE FROM	- TEST HOLE	DATE RECEIVED	- 08/22/12
MATERIAL DESC.	- SOIL SURVEY - R VALUE- PAVEMENT SOUNDINGS	DATE TESTED	- 08/28/12

LAB NUMBER	- 20123080	- 20123081	- 20123082
SAMPLE ID	- S938	- S939	- S940
TEST STATUS	- INFORMATION ONLY	- INFORMATION ONLY	- INFORMATION ONLY
STATION	- 101+00	- 101+00	- 101+00
LOCATION	- 7'RT	- 17'RT	- 27'RT
DEPTH IN FEET	- 0-5'	- 0-4'Z	- 0-5'
MAT'L COLOR	- BR/GR	- BR/GR	- BR/GR
MAT'L TYPE	-	-	-
LATITUDE DEG-MIN-SEC	- 34 24 43.50	- 34 24 43.60	- 34 24 43.60
LONGITUDE DEG-MIN-SEC	- 93 05 39.50	- 93 05 39.40	- 93 05 39.30
% PASSING	2 IN. -	-	-
	1 1/2 IN. -	-	-
	3/4 IN. -	-	-
	3/8 IN. - 100	-	100
	NO. 4 - 92	100	92
	NO. 10 - 85	90	81
	NO. 40 - 77	62	68
	NO. 80 - 73	52	56
	NO. 200 - 67	47	52
		41	46
LIQUID LIMIT	- 27	- 29	- 26
PLASTICITY INDEX	- 11	- 12	- 10
AASHTO SOIL	- A-6(6)	- A-6(1)	- A-4(1)
UNIFIED SOIL	-	-	-
% MOISTURE CONTENT	- 17.8	- 11.8	- 11.8
ACHMSC	(IN) - 2.0	- 3.5W	- ----
ACHMSC	(IN) - 4.0X	- ----	- ----
ACHMSC	(IN) - 2.0	- ----	- ----
ACHMSC	(IN) - 2.5X	- ----	- ----
AGG.BASE CRS.CL7	(IN) - 4.0	- 3.0	- ----
	-	-	-
	-	-	-
	-	-	-
	-	-	-

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

