

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT



SUBSURFACE INVESTIGATION

STATE JOB NO. 020595

FEDERAL AID PROJECT NO. PEN-0009(33)

HWY. 35 REALIGNMENT (SAFETY IMPVTS.) (S)

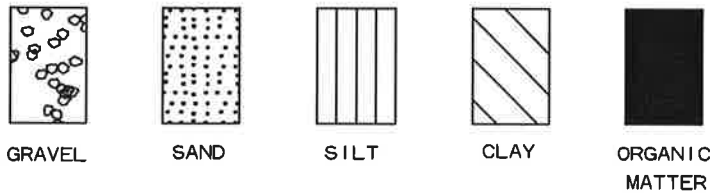
STATE HIGHWAY 35 SECTION 9

IN CHICOT COUNTY

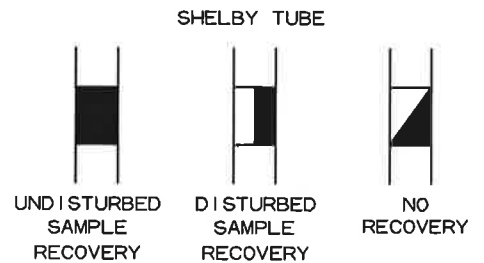
The information contained herein was obtained by the Department for design and estimating purposes only. It is being furnished with the express understanding that said information does not constitute a part of the Proposal or Contract and represents only the best knowledge of the Department as to the 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.

LEGEND

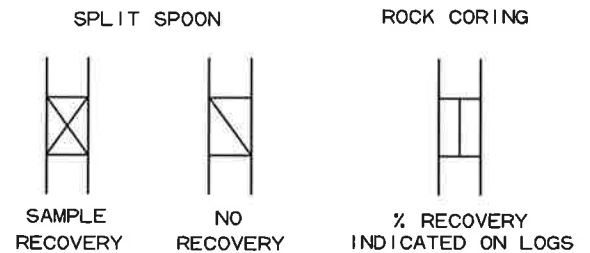
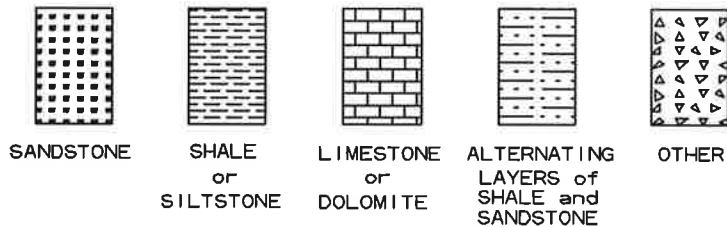
SOIL TYPES (SHOWN IN SYMBOL COLUMN) (PREDOMINANT TYPE SHOWN HEAVY)



SAMPLER TYPES (SHOWN IN SAMPLE COLUMN)



ROCK TYPES (SHOWN IN SYMBOL COLUMN)



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 STATE HIGHWAY AND TRANSPORTATION DEPARTMENT

February 8, 2016

TO: Mr. Trinity Smith, Engineer of Roadway Design

SUBJECT: Job No. 020595
Hwy. 65/Hwy. 35 Inters. Realignment (Safety Impvts.) (S)
Route 65 Section 9
Chicot County

Transmitted herewith are the requested Soil Survey, Strength Data, and Resilient Modulus test results for the above referenced job. The project consists of realigning Highway 35 on new location. Samples were obtained in the existing travel lanes, ditch line and along the new alignment. Sample locations were measured from centerline of the existing roadway and should be noted as such on the logs.

Based on laboratory results of samples obtained, the subgrade soils consist of sandy non-plastic soils to highly plastic clays. 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.

Between stations 8+00 to 15+00, the alignment traverses agricultural fields, where the soils consist of highly plastic clays. It is recommended that all soft unstable organic material be excavated prior to embankment construction. Undercut requirements may vary based on season conditions but should not exceed two feet. The undercut may be backfilled with upgraded borrow material. Additional embankment recommendations will be made when plans are further developed and cross-sections are complete.

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 the river port in the vicinity of Yellow Bend.
2. Asphalt Concrete Hot Mix

<u>Type</u>	<u>Asphalt Cement %</u>	<u>Mineral Aggregate %</u>
Surface Course	5.2	94.8
Binder Course	4.5	95.5
Base Course	3.9	96.1


Michael C. Benson
Materials Engineer

MCB:pt:bjj
Attachment

cc: State Constr. Eng. – Master File Copy
District 2 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 - 02/03/2016 SEQUENCE NO. - 1
JOB NUMBER - 020595 MATERIAL CODE - SSRVPS
SPEC. YEAR - 2014
SUPPLIER ID. - 1
COUNTY/STATE - 09
DISTRICT NO. - 02

JOB NAME - HWY.65/HWY.35 INTERS.REALINGMET (SAFETY IMPVTS.(S))

* STATION LIMITS R-VALUE AT 240 psi *

BEGIN JOB - END JOB 6

RESILIENT MODULUS
STA.3+00 6166

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.	020595	Material Code	SSRVPS
Date Sampled:	2/2/2016	Station No.:	003+00
Date Tested:	February 2, 2016	Location:	21'RT
Name of Project:	HWY.65/HWY.35 INTERS. REALIGNMENT		
County:	Code: 9	Name:	CHICOT
Sampled By:		Depth:	0-5
Lab No.:	20160029	AASHTO Class:	A-4(0)
Sample ID:	RV006	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	3.94
Bottom	3.96
Average	3.95
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):	12.21
Initial Volume, AoLo (cu. in):	97.90

3. Soil Specimen Weight:

Weight of Wet Soil Used (g):	3232.80
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4. Soil Properties:

Optimum Moisture Content (%):	13.9
Maximum Dry Density (pcf):	111.9
95% of MDD (pcf):	106.3
In-Situ Moisture Content (%):	N/A

5. Specimen Properties:

Wet Weight (g):	3232.80
Compaction Moisture content (%):	13.8
Compaction Wet Density (pcf):	125.82
Compaction Dry Density (pcf):	110.57
Moisture Content After Mr Test (%):	13.8

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

7. Resilient Modulus, Mr: $6471(S_c)^{-0.21477}(S_3)^{0.47997}$

8. Comments

9. Tested By: GW **Date:** February 2, 2016

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

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

Job No. 020595 **Material Code** SSRVPS
Date Sampled: 2/2/2016 **Station No.:** 003+00
Date Tested: February 2, 2016 **Location:** 21'RT

Name of Project: HWY.65/HWY.35 INTERS. REALIGNMENT
County: Code: 9 **Name:** CHICOT

Sampled By: 20160029 **Depth:** 0-5
Lab No.: RV006 **AAASHTO Class:** A-4(0)
Sample ID: **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	24.5	21.7	2.8	2.0	1.8	0.2	0.00103	0.00013	13,895
Sequence 2	6.0	4.0	45.6	42.8	2.8	3.7	3.5	0.2	0.00237	0.00030	11,871
Sequence 3	6.0	6.0	66.7	63.1	3.6	5.5	5.2	0.3	0.00376	0.00047	11,027
Sequence 4	6.0	8.0	88.7	82.6	6.1	7.3	6.8	0.5	0.00535	0.00067	10,154
Sequence 5	6.0	10.0	110.1	101.6	8.5	9.0	8.3	0.7	0.00692	0.00086	9,643
Sequence 6	4.0	2.0	24.0	21.3	2.7	2.0	1.7	0.2	0.00126	0.00016	11,128
Sequence 7	4.0	4.0	43.9	41.1	2.8	3.6	3.4	0.2	0.00289	0.00036	9,323
Sequence 8	4.0	6.0	62.8	59.9	2.9	5.1	4.9	0.2	0.00462	0.00058	8,519
Sequence 9	4.0	8.0	84.2	78.9	5.2	6.9	6.5	0.4	0.00626	0.00078	8,286
Sequence 10	4.0	10.0	106.2	98.5	7.7	8.7	8.1	0.6	0.00800	0.00100	8,083
Sequence 11	2.0	2.0	23.1	20.3	2.8	1.9	1.7	0.2	0.00163	0.00020	8,194
Sequence 12	2.0	4.0	41.3	38.5	2.8	3.4	3.2	0.2	0.00365	0.00045	6,944
Sequence 13	2.0	6.0	58.7	55.8	2.9	4.8	4.6	0.2	0.00577	0.00072	6,361
Sequence 14	2.0	8.0	77.7	73.2	4.5	6.4	6.0	0.4	0.00774	0.00096	6,220
Sequence 15	2.0	10.0	98.3	91.4	7.0	8.1	7.5	0.6	0.00973	0.00121	6,166

TESTED BY _____ DATE February 2, 2016
 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.	020595	Material Code	SSRVPS
Date Sampled:	2/2/2016	Station No.:	003+00
Date Tested:	February 2, 2016	Location:	21'RT
Name of Project:	HWY.65/HWY.35 INTERS. REALIGNMENT		
County:	Code: 9	Name:	CHICOT
Sampled By:		Depth:	0-5
Lab No.:	20160029	AASHTO Class:	A-4(0)
Sample ID:	RV006	Material Type (1 or 2):	2
LATITUDE:		LONGITUDE:	

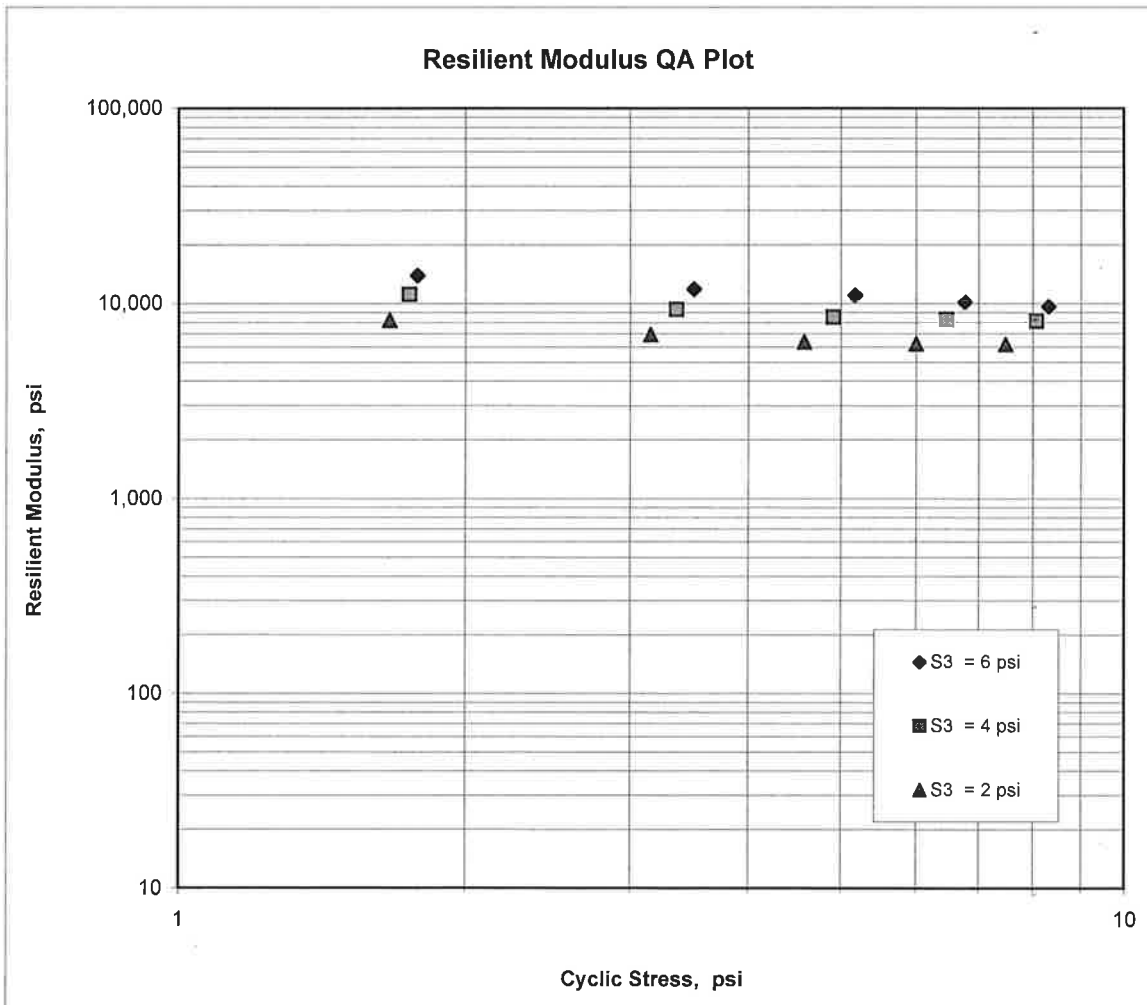
$$M_R = K_1 (S_c)^{K_2} (S_3)^{K_5}$$

$$K_1 = \underline{\underline{6,471}}$$

$$K_2 = \underline{\underline{-0.21477}}$$

$$K_5 = \underline{\underline{0.47997}}$$

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



JOB: 020595

Arkansas State Highway Transportation Department

JOB NAME: HWY.65/HWY.35 INTERS.REALINGMET (SAFETY IMPVTS.(S)

Materials Division

COUNTY NO. 9 DATE TESTED 2/2/2016

Michael Benson, Materials Engineer

STA.#	LOC.	DEPTH	COLOR	#4 #10 #40 #80 #200					L.L.	P.I.	SOIL CLASS	LAB #:	%MOISTURE
				S	I	E	V	E					
003+00	021' RT	0-5	BROWN	75	69	60	56	42	ND	NP	A-4(0)	RV006	
003+00	006' RT	0-5	BROWN	100				99	46	29	A-7-6(31)	S001	26.7
003+00	021' RT	0-5	BROWN	99	99	96	93	83	48	30	A-7-6(25)	S002	22.6
011+00	162' LT	0-5	BROWN	100				98	ND	NP	A-4(0)	S003	25.1
017+00	006' LT	0-5	BROWN	100				94	ND	NP	A-4(0)	S004	28.7
017+00	020' LT	0-5	BROWN	98	96	90	87	84	ND	NP	A-4(0)	S005	17.4

comments: W=MULTIPLE LAYERS, X=STRIPPED
LOCATIONS MEASURED FROM C.L. OF EXISTING RDWY.

Wednesday, February 03, 2016

JOB: 020595

Arkansas State Highway Transportation Department

DATE TESTED

JOB NAME: HWY.65/HWY.35 INTERS.REALINGMET (SAFETY IMPVTS.(S))

Materials Division

2/2/2016

COUNTY NO. 9

Michael Benson, Materials Engineer

STA.# LOC.

PAVEMENT SOUNDINGS

003+00	021' RT	ACHMSC	PCCP
		--	--
003+00	006' RT	ACHMSC	PCCP
		7.0W	4.75
011+00	162' LT	ACHMSC	PCCP
		--	--
017+00	020' LT	ACHMSC	PCCP
		--	--
017+00	006' LT	ACHMSC	PCCP
		7.0WX	4.0

comments: W=MULTIPLE LAYERS, X=STRIPPED
LOCATIONS MEASURED FROM C.L. OF EXISTING RDWY.

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

MICHAEL BENSON, MATERIALS ENGINEER

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

DATE	- 02/03/16	SEQUENCE NO.	- 1
JOB NUMBER	- 020595	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	- 09
SUPPLIER NAME	- STATE	DISTRICT NO.	- 02
NAME OF PROJECT	- HWY.65/HWY.35 INTERS.REALINGMET (SAFETY IMPVTS.(S)		
PROJECT ENGINEER	- NOT APPLICABLE		
PIT/QUARRY	- ARKANSAS		
LOCATION	- CHICOT COUNTY	DATE SAMPLED	- 01/07/16
SAMPLED BY	- T.FRAZIER	DATE RECEIVED	- 01/08/16
SAMPLE FROM	- TEST HOLE	DATE TESTED	- 02/02/16
MATERIAL DESC.	- SOIL SURVEY - R VALUE- PAVEMENT SOUNDINGS		

LAB NUMBER	20160024	20160025	20160026
SAMPLE ID	S001	S002	S003
TEST STATUS	INFORMATION ONLY	INFORMATION ONLY	INFORMATION ONLY
STATION	003+00	003+00	011+00
LOCATION	006' RT	021' RT	162' LT
DEPTH IN FEET	0-5	0-5	0-5
MAT'L COLOR	BROWN	BROWN	BROWN
MAT'L TYPE			
LATITUDE DEG-MIN-SEC	33 31 56.20	33 31 56.10	33 31 58.40
LONGITUDE DEG-MIN-SEC	91 22 33.30	91 22 33.30	91 22 24.40
% PASSING			
2 IN.			
1 1/2 IN.			
3/4 IN.			
3/8 IN.		100	
NO. 4	100	99	100
NO. 10		99	
NO. 40		96	
NO. 80		93	
NO. 200	99	83	98
LIQUID LIMIT	46	48	ND
PLASTICITY INDEX	29	30	NP
AASHTO SOIL	A-7-6(31)	A-7-6(25)	A-4(0)
UNIFIED SOIL			
% MOISTURE CONTENT	26.7	22.6	25.1
ACHMSC (IN)	7.0W	--	--
PCCP (IN)	4.75	--	--

REMARKS - W=MULTIPLE LAYERS, X=STRIPPED
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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	- 02/03/16	SEQUENCE NO.	- 2
JOB NUMBER	- 020595	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	- 09
SUPPLIER NAME	- STATE	DISTRICT NO.	- 02
NAME OF PROJECT	- HWY.65/HWY.35 INTERS.REALINGMET (SAFETY IMPVTS.(S))		
PROJECT ENGINEER	- NOT APPLICABLE		
PIT/QUARRY	- ARKANSAS		
LOCATION	- CHICOT COUNTY	DATE SAMPLED	- 01/07/16
SAMPLED BY	- T.FRAZIER	DATE RECEIVED	- 01/08/16
SAMPLE FROM	- TEST HOLE	DATE TESTED	- 02/02/16
MATERIAL DESC.	- SOIL SURVEY - R VALUE- PAVEMENT SOUNDINGS		

LAB NUMBER	- 20160027	- 20160028	-
SAMPLE ID	- S004	- S005	-
TEST STATUS	- INFORMATION ONLY	- INFORMATION ONLY	-
STATION	- 017+00	- 017+00	-
LOCATION	- 006' LT	- 020' LT	-
DEPTH IN FEET	- 0-5	- 0-5	-
MAT'L COLOR	- BROWN	- BROWN	-
MAT'L TYPE	-	-	-
LATITUDE DEG-MIN-SEC	- 33 31 57.40	- 33 31 57.50	-
LONGITUDE DEG-MIN-SEC	- 91 22 17.50	- 91 22 17.50	-
% PASSING	2 IN. -	-	-
	1 1/2 IN. -	-	-
	3/4 IN. -	-	-
	3/8 IN. -	-	-
	NO. 4 - 100	- 100	-
	NO. 10 -	- 98	-
	NO. 40 -	- 96	-
	NO. 80 -	- 90	-
	NO. 200 - 94	- 87	-
		- 84	-
LIQUID LIMIT	- ND	- ND	-
PLASTICITY INDEX	- NP	- NP	-
AASHTO SOIL	- A-4 (0)	- A-4 (0)	-
UNIFIED SOIL	-	-	-
% MOISTURE CONTENT	- 28.7	- 17.4	-
ACHMSC	(IN) - 7.0WX	- --	-
PCCP	(IN) - 4.0	- --	-
	-	-	-
	-	-	-
	-	-	-
	-	-	-
	-	-	-
	-	-	-
	-	-	-
	-	-	-
	-	-	-
	-	-	-

REMARKS - W=MULTIPLE LAYERS, X=STRIPPED
 - LOCATIONS MEASURED FROM C.L. OF EXISTING RDWY.
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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	- 02/03/16	SEQUENCE NO.	- 1
JOB NUMBER	- 020595	MATERIAL CODE	- RV
FEDERAL AID NO.	- TO BE ASSIGNED	SPEC. YEAR	- 2014
PURPOSE	- SOIL SURVEY SAMPLE	SUPPLIER ID.	- 1
SPEC. REMARKS	- NO SPECIFICATION CHECK	COUNTY/STATE	- 09
SUPPLIER NAME	- STATE	DISTRICT NO.	- 02
NAME OF PROJECT	- HWY.65/HWY.35 INTERS.REALINGMET (SAFETY IMPVTS.(S))		
PROJECT ENGINEER	- NOT APPLICABLE		
PIT/QUARRY	- ARKANSAS	DATE SAMPLED	- 01/07/16
LOCATION	- CHICOT COUNTY	DATE RECEIVED	- 01/08/16
SAMPLED BY	- T.FRAZIER	DATE TESTED	- 02/02/16
SAMPLE FROM	- TEST HOLE		
MATERIAL DESC.	- SOIL SURVEY - RESISTANCE R-VALUE	ACTUAL RESULTS	

LAB NUMBER	-	20160029	-	-
SAMPLE ID	-	RV006	-	-
TEST STATUS	-	INFORMATION ONLY	-	-
STATION	-	003+00	-	-
LOCATION	-	021' RT	-	-
DEPTH IN FEET	-	0-5	-	-
MAT'L COLOR	-	BROWN	-	-
MAT'L TYPE	-		-	-
LATITUDE DEG-MIN-SEC	-	33 31 56.10	-	-
LONGITUDE DEG-MIN-SEC	-	91 22 33.30	-	-
% PASSING	2	IN.	-	-
	1 1/2	IN.	-	100
	3/4	IN.	-	95
	3/8	IN.	-	85
	NO. 4		-	75
	NO. 10		-	69
	NO. 40		-	60
	NO. 80		-	56
	NO. 200		-	42
LIQUID LIMIT	-	ND	-	-
PLASTICITY INDEX	-	NP	-	-
AASHTO SOIL	-	A-4 (0)	-	-
UNIFIED SOIL	-		-	-
% MOISTURE CONTENT	-		-	-

REMARKS - W=MULTIPLE LAYERS, X=STRIPPED
- LOCATIONS MEASURED FROM C.L. OF EXISTING RDWY.