

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT



**SUBSURFACE INVESTIGATION**

STATE JOB NO. 090346

FEDERAL AID PROJECT NO. NHPP-0008(32)

FREEMAN BRANCH STR. & APPRS. (S)

STATE HIGHWAY 221 SECTION 0

IN CARROLL COUNTY

LETTING OF SEPTEMBER 21, 2016

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

August 5, 2014

TO: Mr. Trinity Smith, Engineer of Roadway Design

SUBJECT: Job No. 090346
Town Branch Str. & Apprs. (S)
Route 221 Section 0
Carroll 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 existing bridge crossing Town Branch Creek on Highway 221 on new location. Samples were taken 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 cherty clay. 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 conventional processing if the weather is favorable during construction. Rock was encountered at several locations within the project limits, the depth and location of rock is shown in Table 1 below.

Table 1 Location and Depth of Rock

Table with 3 columns: Station, Location from Centerline, Depth (ft.). Rows include stations 23+00, 101+00, and 109+00 with their respective locations and depths.

Embankment and cut slope recommendations will be made when plans are further developed and cross-section 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 in the vicinity of Berryville.

- 2. Asphalt Concrete Hot Mix

Table with 3 columns: Type, Asphalt Cement %, Mineral Aggregate %. Rows include Surface Course, Binder Course, and Base Course.

Handwritten signature of Michael C. Benson, Materials Engineer.

MCB:pt:bjj
Attachment

cc: State Constr. Eng. - Master File Copy
District 9 Engineer
Transportation Planning and Policy 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 - 08/05/2014  
JOB NUMBER - 090346

SEQUENCE NO. - 1  
MATERIAL CODE - SSRVPS  
SPEC. YEAR - 2014  
SUPPLIER ID. - 1  
COUNTY/STATE - 08  
DISTRICT NO. - 09

JOB NAME - TOWN BRANCH STR. & APPRS. (S)

\*\*\*\*\*  
\* STATION LIMITS R-VALUE AT 240 psi \*  
\*\*\*\*\*

BEGIN JOB - END JOB 15

RESILIENT MODULUS  
STA.109+00 7944

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REMARKS -

-  
AASHTO TESTS : T190

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

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

<b>Job No.</b>	090346	<b>Material Code</b>	SSRVPS
<b>Date Sampled:</b>	7/24/14	<b>Station No.:</b>	109+00
<b>Date Tested:</b>	July 24, 2014	<b>Location:</b>	15'LT
<b>Name of Project:</b>	TOWN BRANCH STR. APPRS (S)		
<b>County:</b>	<b>Code:</b> 8	<b>Name:</b> CARROLL	
<b>Sampled By:</b>	FAULKNER	<b>Depth:</b>	0-4Z
<b>Lab No.:</b>	20142471	<b>AASHTO Class:</b>	A-6(14)
<b>Sample ID:</b>	RV777	<b>Material Type (1 or 2):</b>	2
<b>LATITUDE:</b>		<b>LONGITUDE:</b>	

**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	3.97
Middle	3.96
Bottom	3.96
Average	3.96
Membrane Thickness (in):	0.01
Height of Specimen, Cap and Base (in):	8.04
Height of Cap and Base (in):	0.00
Initial Length, Lo (in):	8.04
Initial Area, Ao (sq. in):	12.27
Initial Volume, AoLo (cu. in):	98.66

**3. Soil Specimen Weight:**

Weight of Wet Soil Used (g):	3134.40
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**4. Soil Properties:**

Optimum Moisture Content (%):	14.9
Maximum Dry Density (pcf):	109.6
95% of MDD (pcf):	104.1
In-Situ Moisture Content (%):	N/A

**5. Specimen Properties:**

Wet Weight (g):	3134.40
Compaction Moisture content (%):	14.8
Compaction Wet Density (pcf):	121.04
Compaction Dry Density (pcf):	105.44
Moisture Content After Mr Test (%):	14.8

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

#VALUE!

**7. Resilient Modulus, Mr:**

8959(S<sub>c</sub>)<sup>-0.15406</sup>(S<sub>3</sub>)<sup>0.31420</sup>

**8. Comments**

\_\_\_\_\_

\_\_\_\_\_

**9. Tested By:**

DT/MW \_\_\_\_\_

**Date:** July 24, 2014

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT  
MATERIALS DIVISION

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

Job No. 090346 Material Code SSRVPS  
 Date Sampled: 7/24/14 Station No.: 109+00  
 Date Tested: July 24, 2014 Location: 15'LT  
 Name of Project: TOWN BRANCH STR. APPRS (S)  
 County: Code: 8 Name: CARROLL  
 Sampled By: FAULKNER Depth: 0-4Z  
 Lab No.: 20142471 AASHTO Class: A-6(14)  
 Sample ID: RV777 Material Type (1 or 2): 2  
 LATITUDE: LONGITUDE:

PARAMETER	Chamber Confining Pressure	Nominal Maximum Axial Stress	Actual Applied		Actual Applied		Actual Applied		Average Recov Def. LVDT 1 and 2	Resilient Strain	Resilient Modulus
			Max. Axial Load	Cyclic Load	Max. Axial Stress	Cyclic Stress	Max. Axial Stress	Cyclic Stress			
DESIGNATION	S <sub>3</sub>	S <sub>cyclic</sub>	P <sub>max</sub>	P <sub>cyclic</sub>	P <sub>contact</sub>	S <sub>max</sub>	S <sub>cyclic</sub>	S <sub>contact</sub>	H <sub>avg</sub>	ε <sub>r</sub>	M <sub>r</sub>
UNIT	psi	psi	lbs	lbs	lbs	psi	psi	psi	in	in/in	psi
Sequence 1	6.0	2.0	25.0	22.3	2.7	2.0	1.8	0.2	0.00105	0.00013	13,928
Sequence 2	6.0	4.0	47.0	44.3	2.7	3.8	3.6	0.2	0.00219	0.00027	13,259
Sequence 3	6.0	6.0	69.4	65.8	3.6	5.7	5.4	0.3	0.00340	0.00042	12,685
Sequence 4	6.0	8.0	92.9	86.8	6.1	7.6	7.1	0.5	0.00480	0.00060	11,853
Sequence 5	6.0	10.0	115.5	107.0	8.5	9.4	8.7	0.7	0.00638	0.00079	10,985
Sequence 6	4.0	2.0	24.8	22.3	2.6	2.0	1.8	0.2	0.00118	0.00015	12,355
Sequence 7	4.0	4.0	46.5	43.8	2.7	3.8	3.6	0.2	0.00254	0.00032	11,286
Sequence 8	4.0	6.0	67.6	64.9	2.7	5.5	5.3	0.2	0.00393	0.00049	10,813
Sequence 9	4.0	8.0	90.6	85.5	5.2	7.4	7.0	0.4	0.00551	0.00069	10,165
Sequence 10	4.0	10.0	113.3	105.6	7.6	9.2	8.6	0.6	0.00711	0.00088	9,740
Sequence 11	2.0	2.0	24.6	22.1	2.5	2.0	1.8	0.2	0.00140	0.00017	10,361
Sequence 12	2.0	4.0	45.4	42.7	2.7	3.7	3.5	0.2	0.00302	0.00038	9,262
Sequence 13	2.0	6.0	65.6	63.0	2.6	5.3	5.1	0.2	0.00472	0.00059	8,743
Sequence 14	2.0	8.0	87.1	82.8	4.3	7.1	6.7	0.4	0.00657	0.00082	8,255
Sequence 15	2.0	10.0	109.4	102.7	6.7	8.9	8.4	0.5	0.00847	0.00105	7,944

TESTED BY \_\_\_\_\_ DATE July 24, 2014  
 REVIEWED BY \_\_\_\_\_ DATE \_\_\_\_\_

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

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

<b>Job No.</b>	090346	<b>Material Code</b>	SSRVPS
<b>Date Sampled:</b>	7/24/14	<b>Station No.:</b>	109+00
<b>Date Tested:</b>	July 24, 2014	<b>Location:</b>	15'LT
<b>Name of Project:</b>	TOWN BRANCH STR. APPRS (S)		
<b>County:</b>	<b>Code:</b> 8	<b>Name:</b>	CARROLL
<b>Sampled By:</b>	FAULKNER	<b>Depth:</b>	0-4Z
<b>Lab No.:</b>	20142471	<b>AASHTO Class:</b>	A-6(14)
<b>Sample ID:</b>	RV777	<b>Material Type (1 or 2):</b>	2
<b>LATITUDE:</b>		<b>LONGITUDE:</b>	

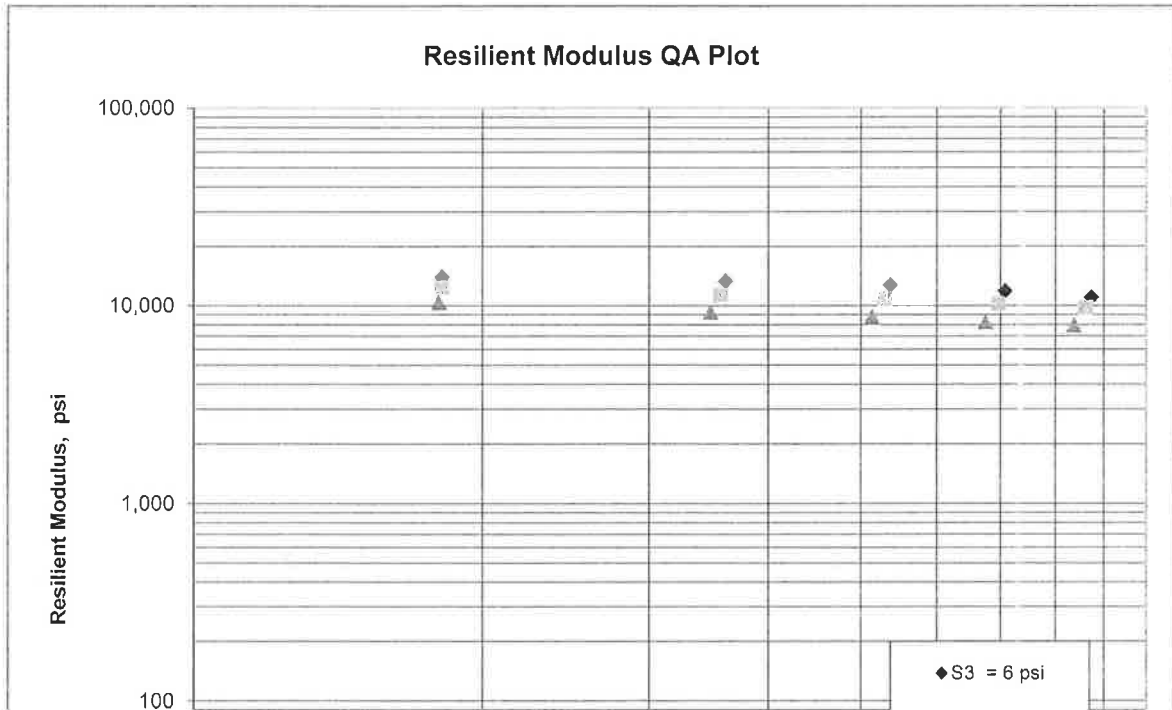
$$M_R = K_1 (S_C)^{K_2} (S_3)^{K_5}$$

$$K_1 = 8,959$$

$$K_2 = -0.15406$$

$$K_5 = 0.31420$$

$$R^2 = 0.98$$



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

MICHAEL BENSON, MATERIALS ENGINEER

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

DATE	- 08/04/14	SEQUENCE NO.	- 1
JOB NUMBER	- 090346	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	- 08
SUPPLIER NAME	- STATE	DISTRICT NO.	- 09
NAME OF PROJECT - TOWN BRANCH STR. & APPRS.(S)			
PROJECT ENGINEER - NOT APPLICABLE			
PIT/QUARRY	- ARKANSAS	DATE SAMPLED	- 07/14/14
LOCATION	- CARROLL, COUNTY	DATE RECEIVED	- 07/16/14
SAMPLED BY	- S.FAULKNER	DATE TESTED	- 07/22/14
SAMPLE FROM	- TEST HOLE		
MATERIAL DESC.	- SOIL SURVEY - R VALUE- PAVEMENT SOUNDINGS		

LAB NUMBER	- 20142465	- 20142466	- 20142467
SAMPLE ID	- S771	- S772	- S773
TEST STATUS	- INFORMATION ONLY	- INFORMATION ONLY	- INFORMATION ONLY
STATION	- 023+00	- 023+00	- 101+00
LOCATION	- 05LT	- 15LT	- 05RT
DEPTH IN FEET	- 0-5	- 0-4Z	- 0-4Z
MAT'L COLOR	- BROWN	- BROWN	- BROWN
MAT'L TYPE	-	-	-
LATITUDE DEG-MIN-SEC	- 36 21 28.10	- 36 21 28.10	- 36 21 21.10
LONGITUDE DEG-MIN-SEC	- 93 34 16.20	- 93 34 16.20	- 93 34 16.00
% PASSING	2 IN. -	-	-
	1 1/2 IN. -	-	-
	3/4 IN. - 100	-	- 100
	3/8 IN. - 93	- 100	- 95
	NO. 4 - 86	- 98	- 89
	NO. 10 - 81	- 96	- 81
	NO. 40 - 74	- 94	- 78
	NO. 80 - 66	- 92	- 76
	NO. 200 - 61	- 90	- 38
LIQUID LIMIT	- 35	- 29	- 42
PLASTICITY INDEX	- 21	- 14	- 26
AASHTO SOIL	- A-6(10)	- A-6(11)	- A-7-6(18)
UNIFIED SOIL	-	-	-
% MOISTURE CONTENT	- 16.6	- 34.4	- 22.5
ACHMSC (IN)	- 2.0	- --	- 1.50
CHIP SEAL (IN)	- 3.0	- --	- 3.0
AGG.BASE CRS CL-7 (IN)	- 2.0	- --	- 3.0
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

REMARKS - 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 - 07/22/14	SEQUENCE NO. - 2
JOB NUMBER - 090346	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 - 08
SUPPLIER NAME - STATE	DISTRICT NO. - 09
NAME OF PROJECT - TOWN BRANCH STR. & APPRS.(S)	
PROJECT ENGINEER - NOT APPLICABLE	
PIT/QUARRY - ARKANSAS	
LOCATION - CARROLL, COUNTY	DATE SAMPLED - 07/14/14
SAMPLED BY - S.FAULKNER	DATE RECEIVED - 07/16/14
SAMPLE FROM - TEST HOLE	DATE TESTED - 07/22/14
MATERIAL DESC. - SOIL SURVEY - R VALUE- PAVEMENT SOUNDINGS	

LAB NUMBER	- 20142468	- 20142469	- 20142470
SAMPLE ID	- S774	- S775	- S776
TEST STATUS	- INFORMATION ONLY	- INFORMATION ONLY	- INFORMATION ONLY
STATION	- 101+00	- 109+00	- 109+00
LOCATION	- 18RT	- 05LT	- 15LT
DEPTH IN FEET	- 0-1.5Z	- 0-4Z	- 0-4Z
MAT'L COLOR	- BROWN	- BROWN	- BROWN
MAT'L TYPE	-	-	-
LATITUDE DEG-MIN-SEC	- 36 21 21.10	- 36 21 27.10	- 36 21 27.20
LONGITUDE DEG-MIN-SEC	- 93 34 15.80	- 93 34 11.50	- 93 34 11.50
% PASSING	2 IN. -	-	-
	1 1/2 IN. - 100	-	-
	3/4 IN. - 92	-	- 100
	3/8 IN. - 92	- 100	- 99
	NO. 4 - 84	- 78	- 98
	NO. 10 - 75	- 68	- 96
	NO. 40 - 65	- 56	- 94
	NO. 80 - 57	- 50	- 92
	NO. 200 - 50	- 47	- 90
LIQUID LIMIT	- 25	- 32	- 61
PLASTICITY INDEX	- 10	- 18	- 39
AASHTO SOIL	- A-4(2)	- A-6(4)	- A-7-6(39)
UNIFIED SOIL	-	-	-
% MOISTURE CONTENT	- 19.5	- 14.6	- 18.1
ACHMSC (IN)	- --	- 1.25	- --
CHIP SEAL (IN)	- --	- 3.50	- --
AGG.BASE CRS CL-7 (IN)	- --	- 3.0	- --
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

REMARKS - Z=AUGER REFUSAL



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

MICHAEL BENSON, MATERIALS ENGINEER

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

DATE	-	08/04/14	SEQUENCE NO.	-	1
JOB NUMBER	-	090346	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	-	08
SUPPLIER NAME	-	STATE	DISTRICT NO.	-	09
NAME OF PROJECT	-	TOWN BRANCH STR. & APPRS.(S)			
PROJECT ENGINEER	-	NOT APPLICABLE			
PIT/QUARRY	-	ARKANSAS			
LOCATION	-	CARROLL, COUNTY	DATE SAMPLED	-	07/14/14
SAMPLED BY	-	S.FAULKNER	DATE RECEIVED	-	07/16/14
SAMPLE FROM	-	TEST HOLE	DATE TESTED	-	07/22/14
MATERIAL DESC.	-	SOIL SURVEY - RESISTANCE R-VALUE	ACTUAL RESULTS		

LAB NUMBER	-	20142471	-	-
SAMPLE ID	-	RV777	-	-
TEST STATUS	-	INFORMATION ONLY	-	-
STATION	-	109+00	-	-
LOCATION	-	15LT	-	-
DEPTH IN FEET	-	0-4Z	-	-
MAT'L COLOR	-	BROWN	-	-
MAT'L TYPE	-		-	-
LATITUDE DEG-MIN-SEC	-	36 21 27.20	-	-
LONGITUDE DEG-MIN-SEC	-	93 34 11.50	-	-
% PASSING	2	IN.	-	-
	1 1/2	IN.	-	-
	3/4	IN.	-	100
	3/8	IN.	-	99
	NO. 4		-	98
	NO. 10		-	96
	NO. 40		-	94
	NO. 80		-	92
	NO. 200		-	90
LIQUID LIMIT	-	31	-	-
PLASTICITY INDEX	-	17	-	-
AASHTO SOIL	-	A-6(14)	-	-
UNIFIED SOIL	-		-	-
% MOISTURE CONTENT	-		-	-
	-		-	-
	-		-	-
	-		-	-
	-		-	-
	-		-	-
	-		-	-
	-		-	-
	-		-	-
	-		-	-
	-		-	-

REMARKS - Z=AUGER REFUSAL

JOB: 090346

Arkansas State Highway Transportation Department

JOB NAME: TOWN BRANCH STR. & APPRS.(S)

Materials Division

COUNTY NO. 8 DATE TESTED 7/22/2014

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				
109+00	15LT	0-4Z	BROWN	98	96	94	92	90	31	17	A-6(14)	RV777	
023+00	05LT	0-5	BROWN	86	81	74	66	61	35	21	A-6(10)	S771	16.6
023+00	15LT	0-4Z	BROWN	98	96	94	92	90	29	14	A-6(11)	S772	34.4
101+00	05RT	0-4Z	BROWN	89	81	78	76	38	42	26	A-7-6(18)	S773	22.5
101+00	18RT	0-1.5Z	BROWN	84	75	65	57	50	25	10	A-4(2)	S774	19.5
109+00	05LT	0-4Z	BROWN	78	68	56	50	47	32	18	A-6(4)	S775	14.6
109+00	15LT	0-4Z	BROWN	98	96	94	92	90	61	39	A-7-6(39)	S776	18.1

comments: Z=AUGER REFUSAL

Tuesday, August 05, 2014

JOB: 090346

Arkansas State Highway Transportation Department  
Materials Division

DATE TESTED  
7/22/2014

JOB NAME: TOWN BRANCH STR & APPRS (S)

COUNTY NO. 8

Michael Benson, Materials Engineer

STA.# LOC.

PAVEMENT SOUNDINGS

023+00	05LT	ACHMSC	2.0	CHIP SEAL	3.0	AGG.BASE CRS CL-7	2.0
023+00	15LT	ACHMSC	--	CHIP SEAL	--	AGG.BASE CRS CL-7	--
101+00	05RT	ACHMSC	1.50	CHIP SEAL	3.0	AGG.BASE CRS CL-7	3.0
101+00	18RT	ACHMSC	--	CHIP SEAL	--	AGG.BASE CRS CL-7	--
109+00	05LT	ACHMSC	1.25	CHIP SEAL	3.50	AGG.BASE CRS CL-7	3.0
109+00	15LT	ACHMSC	--	CHIP SEAL	--	AGG.BASE CRS CL-7	--

comments: Z=AUGER REFUSAL