

ARKANSAS DEPARTMENT OF TRANSPORTATION



**SUBSURFACE INVESTIGATION**

STATE JOB NO. 070379

FEDERAL AID PROJECT NO. NHPP-0007(29)

HURRICANE CREEK STR. & APPRS. (S)

STATE HIGHWAY 172 SECTION 1

IN CALHOUN 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 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

November 28, 2017

TO: Mr. Trinity Smith, Engineer of Roadway Design

SUBJECT: Job No. 070379
Hurricane Creek Strs. & Apprs. (S)
Route 172 Section 1
Calhoun 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 Hurricane Creek on Highway 172. 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 non-plastic sand and gravel. 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 processing if the weather is favorable during construction.

The proposed detour crosses the ditch on the south side of Highway 172, and based on seasonal conditions may contain standing water. Prior to embankment construction the ditch should be drained and all organic material should be undercut, anticipated to be no more than 2 feet. The embankment may be constructed with locally available unspecified material.

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 of Little Rock.
2. Asphalt Concrete Hot Mix

Table with 3 columns: Type, Asphalt Cement %, Mineral Aggregate %. Header: PG64-22. Rows: Surface Course (5.3, 94.7), Binder Course (4.4, 95.6), Base Course (4.0, 96.0).

Table with 3 columns: Type, Asphalt Cement %, Mineral Aggregate %. Header: PG70-22. Rows: Surface Course (5.2, 94.8), Binder Course (4.4, 95.6), Base Course (4.0, 96.0).

PG76-22		
Type	Asphalt Cement %	Mineral Aggregate %
Surface Course	5.2	94.8
Binder Course	3.8	96.2
Base Course	3.6	96.4



Michael C. Benson  
Materials Engineer

MCB:pt:bjj  
Attachment

cc: State Constr. Eng. – Master File Copy  
District 7 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 - 11/22/2017  
JOB NUMBER - 070379

SEQUENCE NO. - 1  
MATERIAL CODE - SSRV  
SPEC. YEAR - 2014  
SUPPLIER ID. - 1  
COUNTY/STATE - 07  
DISTRICT NO. - 07

JOB NAME - HURRICANE CREEK STR. & APPRS. (S)

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

BEGIN JOB - END JOB 35

RESILIENT MODULUS  
STA. 102 + 00 8209

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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>	070379	<b>Material Code</b>	SSRVPS
<b>Date Sampled:</b>	11/7/17	<b>Station No.:</b>	102+00
<b>Date Tested:</b>	November 15, 2017	<b>Location:</b>	20'RT
<b>Name of Project:</b>	HURRICANE CREEK STR. & APPRS. (S)		
<b>County:</b>	<b>Code:</b> 7	<b>Name:</b>	CALHOUN
<b>Sampled By:</b>	BUIE/JORDAN	<b>Depth:</b>	0-5
<b>Lab No.:</b>	20173368	<b>AASHTO Class:</b>	A-4 (0)
<b>Sample ID:</b>	RV668	<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	3.95
Middle	3.95
Bottom	3.95
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):	12.18
Initial Volume, AoLo (cu. in):	97.68

**3. Soil Specimen Weight:**

Weight of Wet Soil Used (g):	3302.30
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**4. Soil Properties:**

Optimum Moisture Content (%):	10.0
Maximum Dry Density (pcf):	120.1
95% of MDD (pcf):	114.1
In-Situ Moisture Content (%):	N/A

**5. Specimen Properties:**

Wet Weight (g):	3302.30
Compaction Moisture content (%):	9.8
Compaction Wet Density (pcf):	128.81
Compaction Dry Density (pcf):	117.31
Moisture Content After Mr Test (%):	9.8

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

#VALUE!

**7. Resilient Modulus, Mr:**

7215(Sc)^-0.09403(S3)^0.46904

**8. Comments**

\_\_\_\_\_

\_\_\_\_\_

**9. Tested By:**

GW

**Date:** November 15, 2017

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

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

**Job No.** 070379 **Material Code** SSRVPS  
**Date Sampled:** 11/7/17 **Station No.:** 102+00  
**Date Tested:** November 15, 2017 **Location:** 20'RT

**Name of Project:** HURRICANE CREEK STR. & APPRS. (S)

**County:** Code: 7 **Name:** CALHOUN

**Sampled By:** BUIE/JORDAN

**Lab No.:** 20173368

**Sample ID:** RV668

**LATITUDE:**

**Depth:** 0-5

**AASHTO Class:** A-4 (0)

**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
	S <sub>3</sub> psi	S <sub>cyclic</sub> psi	P <sub>max</sub> lbs	P <sub>cyclic</sub> lbs	P <sub>contact</sub> lbs	S <sub>max</sub> psi	S <sub>cyclic</sub> psi	S <sub>contact</sub> psi	H <sub>avg</sub> in	ε <sub>r</sub> in/in	M <sub>r</sub> psi
Sequence 1	6.0	2.0	25.1	22.3	2.8	2.1	1.8	0.2	0.00090	0.00011	16,267
Sequence 2	6.0	4.0	47.1	44.3	2.9	3.9	3.6	0.2	0.00196	0.00024	14,878
Sequence 3	6.0	6.0	69.6	66.0	3.6	5.7	5.4	0.3	0.00300	0.00037	14,497
Sequence 4	6.0	8.0	93.4	87.4	6.0	7.7	7.2	0.5	0.00412	0.00051	13,980
Sequence 5	6.0	10.0	117.6	109.1	8.5	9.7	9.0	0.7	0.00523	0.00065	13,735
Sequence 6	4.0	2.0	24.7	22.1	2.6	2.0	1.8	0.2	0.00107	0.00013	13,587
Sequence 7	4.0	4.0	45.8	43.2	2.6	3.8	3.5	0.2	0.00240	0.00030	11,823
Sequence 8	4.0	6.0	66.8	64.0	2.8	5.5	5.3	0.2	0.00380	0.00047	11,086
Sequence 9	4.0	8.0	90.7	85.6	5.1	7.4	7.0	0.4	0.00509	0.00063	11,069
Sequence 10	4.0	10.0	114.4	106.9	7.6	9.4	8.8	0.6	0.00626	0.00078	11,234
Sequence 11	2.0	2.0	23.7	21.0	2.7	1.9	1.7	0.2	0.00144	0.00018	9,633
Sequence 12	2.0	4.0	43.4	40.7	2.7	3.6	3.3	0.2	0.00319	0.00040	8,415
Sequence 13	2.0	6.0	63.3	60.5	2.8	5.2	5.0	0.2	0.00485	0.00061	8,209
Sequence 14	2.0	8.0	85.9	81.6	4.3	7.1	6.7	0.4	0.00625	0.00078	8,588
Sequence 15	2.0	10.0	109.0	102.2	6.7	8.9	8.4	0.6	0.00746	0.00093	9,023

TESTED BY \_\_\_\_\_ DATE \_\_\_\_\_

GW November 15, 2017

REVIEWED BY \_\_\_\_\_ DATE \_\_\_\_\_

DATE

DATE

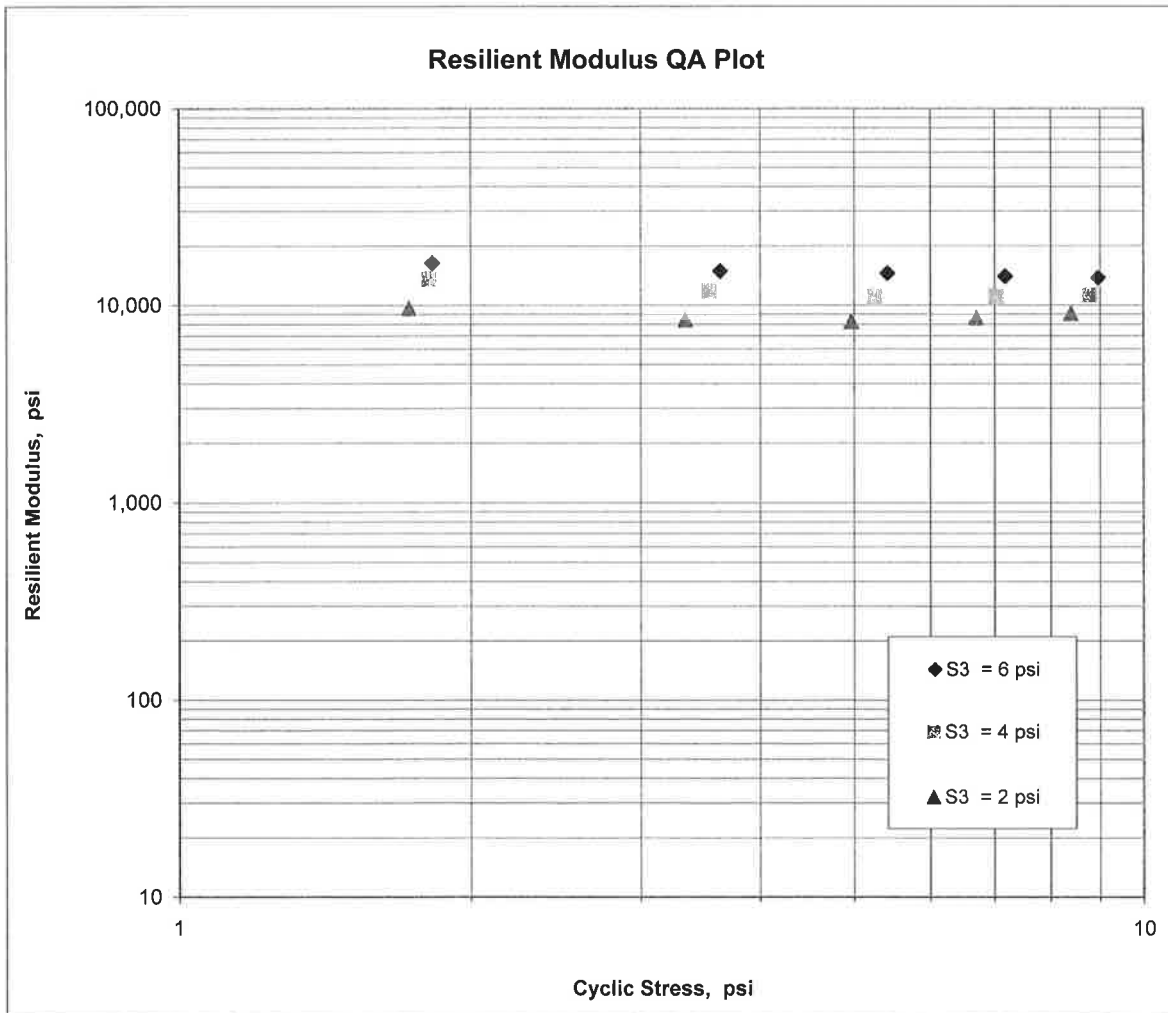
**ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT  
MATERIALS DIVISION**

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

<b>Job No.</b>	070379	<b>Material Code</b>	SSRVPS
<b>Date Sampled:</b>	11/7/17	<b>Station No.:</b>	102+00
<b>Date Tested:</b>	November 15, 2017	<b>Location:</b>	20'RT
<b>Name of Project:</b>	HURRICANE CREEK STR. & APPRS. (S)		
<b>County:</b>	<b>Code:</b> 7	<b>Name:</b>	CALHOUN
<b>Sampled By:</b>	BUIE/JORDAN		
<b>Lab No.:</b>	20173368	<b>Depth:</b>	0-5
<b>Sample ID:</b>	RV668	<b>AASHTO Class:</b>	A-4 (0)
<b>LATITUDE:</b>		<b>Material Type (1 or 2):</b>	2
		<b>LONGITUDE:</b>	

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

$K_1 = \underline{7,215}$   
 $K_2 = \underline{-0.09403}$   
 $K_5 = \underline{0.46904}$   
 $R^2 = \underline{0.96}$



**JOB: 070379**

*Arkansas State Highway Transportation Department*

**JOB NAME: HURRICANE CREEK STR. & APPRS. (S)**

*Materials Division*

**COUNTY NO. 7 DATE TESTED 11/15/2017**

*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					
102+00	20RT	0-5	RD/BR	89	85	82	65	44	ND	NP	A-4 (0)	RV668	
102+00	05RT	0-5	RD/BR	80	67	56	42	29	ND	NP	A-2-4 (0)	S664	7.1
102+00	20RT	0-5	BR/GR	99	98	97	79	53	ND	NP	A-4 (0)	S665	15.4
108+00	05LT	0-5	BR/GR	94	89	84	69	51	ND	NP	A-4 (0)	S666	12
108+00	20LT	0-5	BR/GR	97	94	91	74	57	ND	NP	A-4 (0)	S667	16.3

*comments:* W=MULTIPLE LAYERS

*Monday, November 27, 2017*



**JOB:** 070379

**JOB NAME:** HURRICANE CREEK STR. & APPRS. (S)

**Arkansas State Highway Transportation Department  
Materials Division**

**DATE TESTED**  
11/15/2017

**COUNTY NO.** 7

**Michael Benson, Materials Engineer**

**STA.# LOC.** PAVEMENT SOUNDINGS

102+00	05RT	CHIP SEAL 1.5W	AGG. BASE CRS. CL-7 7.0
102+00	20RT	CHIP SEAL ---	AGG. BASE CRS. CL-7 ---
108+00	05LT	CHIP SEAL 2.0W	AGG. BASE CRS. CL-7 6.0

**comments:** W=MULTIPLE LAYERS





