

ARKANSAS DEPARTMENT OF TRANSPORTATION



**SUBSURFACE INVESTIGATION**

STATE JOB NO. 110646

FEDERAL AID PROJECT NO. NHPP-0048(27)

CYPRESS CREEK & CANAL STRS. & APPRS. (S)

STATE HIGHWAY 241 SECTION 1 & 2

IN MONROE 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

January 31, 2017

**TO:** Mr. Trinity Smith, Engineer of Roadway Design

**SUBJECT:** Job No. 110646  
Cypress Creek & Canal Strs. & Apprs. (S)  
Route 241 Sections 1 & 2  
Monroe 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 two bridges on Highway 241. 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 to highly plastic clays containing some sand. 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 normal drying and compactive efforts, if the weather is favorable during construction. If construction must proceed under adverse weather conditions or if a stable working platform cannot be obtained, stabilization with lime is the most appropriate remediation technique. It is recommended that the addition of 4% of lime (by dry weight) mixed to a depth of 16 inches be used for quantity estimation purposed. However, if the Engineer determines that soil stabilization is necessary, field trials or local experience may dictate that a stable working platform can be achieved at a lower lime content.

Additional earthwork requirements 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 near Little Rock.
2. Asphalt Concrete Hot Mix

<u>Type</u>	<u>Asphalt Cement %</u>	<u>Mineral Aggregate %</u>
Surface Course	5.2	94.8
Binder Course	4.1	95.9
Base Course	3.9	96.1

  
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 = 01/20/2017  
JOB NUMBER = 110646

SEQUENCE NO. - 1  
MATERIAL CODE - SSRV  
SPEC. YEAR - 2014  
SUPPLIER ID. - 1  
COUNTY/STATE - 48  
DISTRICT NO. - 01

JOB NAME - CYPRESS CREEK & CANAL STRS. & APPRS. (S)

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

BEGIN JOB - END JOB LESS THAN 5  
  
RESILIENT MODULUS  
109+00 7831

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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**

Job No.	110646	Material Code	SSRVPS
Date Sampled:	12/29/2016	Station No.:	109+00
Date Tested:	January 18, 2017	Location:	18'RT
Name of Project:	CYPRESS CREEK & CANAL STRS. & APPRS. (S)		
County:	Code: 48	Name:	MONROE
Sampled By:	Thornton/CAMPBELL	Depth:	0-5
Lab No.:	20164188	AASHTO Class:	A-6(12)
Sample ID:	RV546	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	3.91
Middle	3.90
Bottom	3.91
Average	3.91
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):	11.91
Initial Volume, AoLo (cu. in):	95.78

**3. Soil Specimen Weight:**

Weight of Wet Soil Used (g):	3065.00
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**4. Soil Properties:**

Optimum Moisture Content (%):	18.0
Maximum Dry Density (pcf):	103.3
95% of MDD (pcf):	98.1
In-Situ Moisture Content (%):	N/A

**5. Specimen Properties:**

Wet Weight (g):	3065.00
Compaction Moisture content (%):	18.4
Compaction Wet Density (pcf):	121.93
Compaction Dry Density (pcf):	102.98
Moisture Content After Mr Test (%):	18.9

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

**7. Resilient Modulus, Mr:** 12590(Sc)<sup>-0.27331</sup>(S3)<sup>0.17671</sup>

**8. Comments** \_\_\_\_\_  
\_\_\_\_\_

**9. Tested By:** B.H. G.W. **Date:** January 18, 2017

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

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

Job No. 110646 Material Code SSRVPS  
 Date Sampled: 12/29/2016 Station No.: 109+00  
 Date Tested: January 18, 2017 Location: 18'RT

Name of Project: CYPRESS CREEK & CANAL STRS. & APPRS. (S)

County: Code: 48 Name: MONROE

Sampled By: Thornton/CAMPBELL

Lab No.: 20164188

Sample ID: RV546

LATITUDE:

Depth: 0-5

AASHTO Class: A-6(12)

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. LVDT 1 and 2	Resilient Strain	Resilient Modulus
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	24.7	21.9	2.7	2.1	1.8	0.2	0.00102	0.00013	14,507
Sequence 2	6.0	4.0	46.3	43.5	2.8	3.9	3.7	0.2	0.00220	0.00027	13,375
Sequence 3	6.0	6.0	67.6	64.2	3.4	5.7	5.4	0.3	0.00364	0.00045	11,895
Sequence 4	6.0	8.0	89.1	83.4	5.8	7.5	7.0	0.5	0.00560	0.00070	10,039
Sequence 5	6.0	10.0	109.3	101.2	8.1	9.2	8.5	0.7	0.00790	0.00098	8,638
Sequence 6	4.0	2.0	24.6	21.9	2.7	2.1	1.8	0.2	0.00116	0.00014	12,697
Sequence 7	4.0	4.0	45.9	43.2	2.7	3.8	3.6	0.2	0.00252	0.00031	11,545
Sequence 8	4.0	6.0	66.2	63.6	2.7	5.6	5.3	0.2	0.00408	0.00051	10,505
Sequence 9	4.0	8.0	87.7	82.9	4.8	7.4	7.0	0.4	0.00594	0.00074	9,414
Sequence 10	4.0	10.0	108.5	101.4	7.1	9.1	8.5	0.6	0.00815	0.00101	8,396
Sequence 11	2.0	2.0	24.6	22.0	2.6	2.1	1.8	0.2	0.00131	0.00016	11,369
Sequence 12	2.0	4.0	45.7	43.0	2.6	3.8	3.6	0.2	0.00280	0.00035	10,379
Sequence 13	2.0	6.0	65.8	63.1	2.7	5.5	5.3	0.2	0.00451	0.00056	9,436
Sequence 14	2.0	8.0	86.0	82.1	3.9	7.2	6.9	0.3	0.00644	0.00080	8,606
Sequence 15	2.0	10.0	106.5	100.2	6.3	8.9	8.4	0.5	0.00863	0.00107	7,831

TESTED BY: B.H. G.W.

DATE

January 18, 2017

REVIEWED BY

DATE

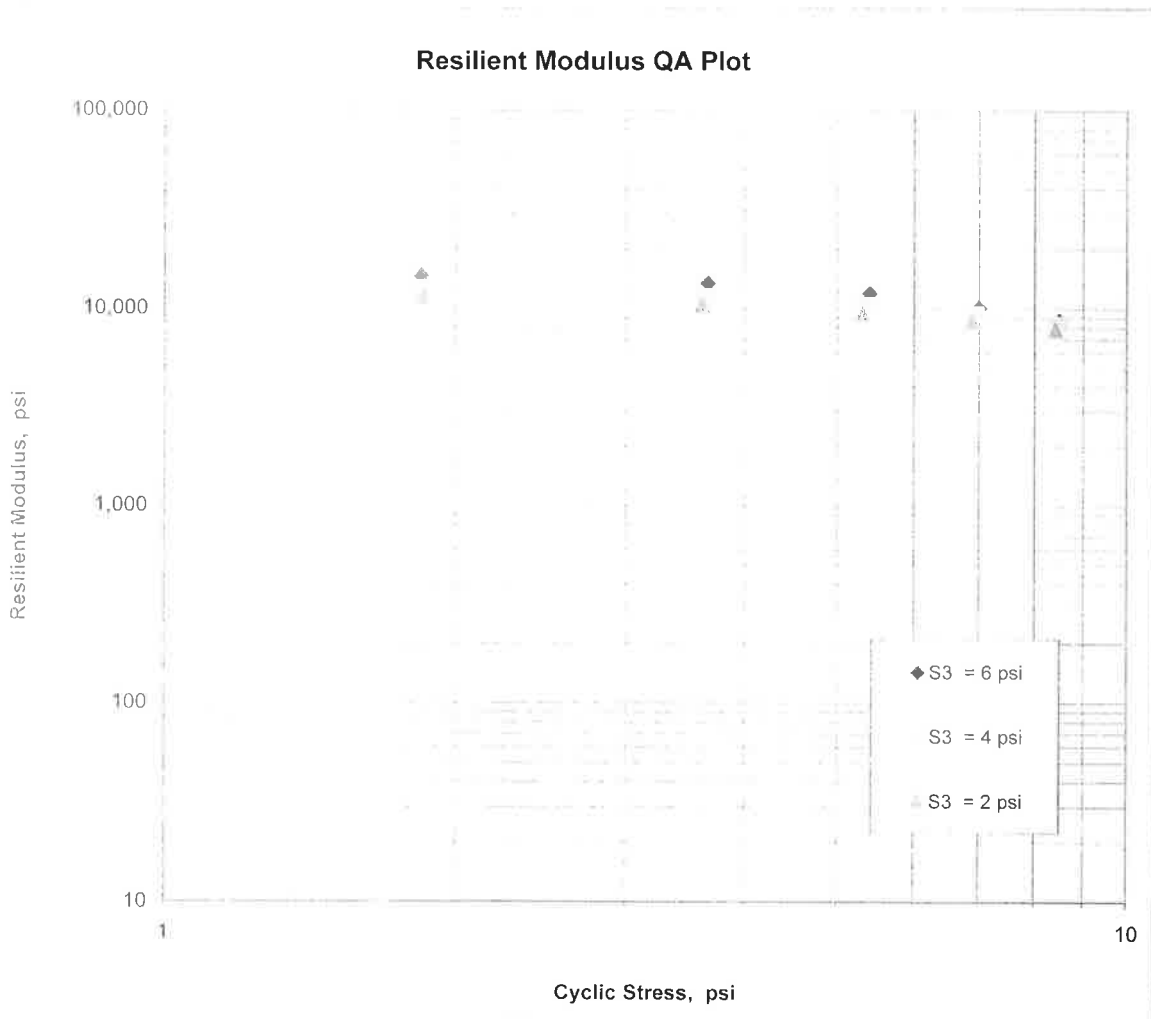
**ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT  
MATERIALS DIVISION**

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

Job No.	110646	Material Code	SSRVPS
Date Sampled:	12/29/2016	Station No.:	109+00
Date Tested:	January 18, 2017	Location:	18'RT
Name of Project:	CYPRESS CREEK & CANAL STRS. & APPRS. (S)		
County:	Code: 48	Name:	MONROE
Sampled By:	Thornton/CAMPBELL	Depth:	0-5
Lab No.:	20164188	AASHTO Class:	A-6(12)
Sample ID:	RV546	Material Type (1 or 2):	2
LATITUDE:		LONGITUDE:	

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

$K_1 = \underline{\underline{12,590}}$   
 $K_2 = \underline{\underline{-0.27331}}$   
 $K_5 = \underline{\underline{0.17671}}$   
 $R^2 = \underline{\underline{0.90}}$



JOB: 110646

Arkansas State Highway Transportation Department

JOB NAME: CYPRESS CREEK & CANAL STRS. & APPRS. (S)

Materials Division

COUNTY NO. 48 DATE TESTED 1/11/2017

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					
109+00	18RT	0-5	GRAY	99	98	95	87	78	34	17	A-6(12)	RV546	
109+00	06RT	0-5	GRAY	99	99	97	95	91	31	15	A-6(12)	S538	25.7
109+00	17RT	0-5	GRAY	96	93	90	81	70	30	16	A-6(9)	S539	22.6
112+00	06LT	0-5	GRAY	100				90	46	30	A-7-6(28)	S540	27
112+00	15LT	0-5	GRAY	99	97	95	89	82	46	31	A-7-6(25)	S541	18.9
209+00	06RT	0-5	GRAY					97	41	24	A-7-6(24)	S542	31.3
209+00	15RT	0-5	GRAY	94	88	80	76	72	44	27	A-7-6(18)	S543	25
212+00	06LT	0-5	GRAY	97	95	91	87	83	38	19	A-6(15)	S544	26.1
212+00	18LT	0-5	GRAY	100				94	34	18	A-6(16)	S545	28.6

comments: X=STRIPPED

Monday, January 23, 2017

**PAVEMENT SOUNDINGS**

STA.#	LOC.	17RT	BST	CTCSB	15LT	BST	ACHMSC	CTCSB	18LT	BST	ACHMSC	ASPSA	06LT	BST	ACHMSC	ASPSA
109+00	17RT	BST	---	CTCSB	15LT	BST	ACHMSC	CTCSB	18LT	BST	ACHMSC	ASPSA	06LT	BST	ACHMSC	ASPSA
109+00	06RT	BST	1.25	CTCSB	15LT	BST	5.0	CTCSB	18LT	BST	4.0	6.5	06LT	BST	1.0	7.0
112+00	15LT	BST	---	ACHMSC	15LT	BST	---	---	18LT	BST	---	---	06LT	BST	---	---
112+00	06LT	BST	2.0	CTCSB	15LT	BST	---	CTCSB	18LT	BST	---	---	06LT	BST	---	---
209+00	15RT	BST	---	ACHMSC	15LT	BST	---	ACHMSC	18LT	BST	---	---	06LT	BST	---	---
209+00	06RT	BST	0.75	ACHMSC	15LT	BST	4.0	ACHMSC	18LT	BST	4.0	6.5	06LT	BST	1.0	7.0
212+00	18LT	BST	---	ACHMSC	15LT	BST	---	ACHMSC	18LT	BST	---	---	06LT	BST	---	---
212+00	06LT	BST	1.0	ACHMSC	15LT	BST	2.25	ACHMSC	18LT	BST	1.0	1.0X	06LT	BST	1.0	1.0X

**comments: X=STRIPPED**





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

MICHAEL BENSON, MATERIALS ENGINEER

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

DATE - 01/23/17 SEQUENCE NO. - 2  
 JOB NUMBER - 110646 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 - 48  
 SUPPLIER NAME - STATE DISTRICT NO. - 01  
 NAME OF PROJECT - CYPRESS CREEK & CANAL STRS. & APPRS. (S)  
 PROJECT ENGINEER - NOT APPLICABLE  
 PIT/QUARRY - ARKANSAS  
 LOCATION - MONROE, COUNTY DATE SAMPLED - 12/29/16  
 SAMPLED BY - THORNTON/CAMPBELL DATE RECEIVED - 12/30/16  
 SAMPLE FROM - TEST HOLE DATE TESTED - 01/11/17  
 MATERIAL DESC. - SOIL SURVEY - R VALUE- PAVEMENT SOUNDINGS

LAB NUMBER	20164183	20164184	20164185
SAMPLE ID	S541	S542	S543
TEST STATUS	INFORMATION ONLY	INFORMATION ONLY	INFORMATION ONLY
STATION	112+00	209+00	209+00
LOCATION	15LT	06RT	15RT
DEPTH IN FEET	0-5	0-5	0-5
MAT'L COLOR	GRAY	GRAY	GRAY
MAT'L TYPE			
LATITUDE DEG-MIN-SEC	34 46 51.30	34 45 52.70	34 45 52.60
LONGITUDE DEG-MIN-SEC	91 15 6.10	91 09 39.60	91 09 39.60
% PASSING			
2 IN.			
1 1/2 IN.			
3/4 IN.			
3/8 IN.	100	100	100
NO. 4	99		94
NO. 10	97		88
NO. 40	95		80
NO. 80	89		76
NO. 200	82	97	72
LIQUID LIMIT	46	41	44
PLASTICITY INDEX	31	24	27
AASHTO SOIL	A-7-6(25)	A-7-6(24)	A-7-6(18)
UNIFIED SOIL			
% MOISTURE CONTENT	18.9	31.3	25.0
BST (IN)	---	0.75	---
ACHMSC (IN)	---	4.0	---
BST (IN)	---	1.0	---
CTCSB (IN)	---	6.5	---

REMARKS - X=STRIPPED



