

ARKANSAS DEPARTMENT OF TRANSPORTATION



SUBSURFACE INVESTIGATION

STATE JOB NO. 020581

FEDERAL AID PROJECT NO. NHPP-0040(33)

CANAL AT L.M. 20.98 STR. & APPRS. (S)

STATE HIGHWAY 11 SECTION 3

IN LINCOLN 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

June 22, 2017

TO: Mr. Trinity Smith, Engineer of Roadway Design

SUBJECT: Job No. 020581
Canal at L.M. 20.98 Str. & Apprs. (S)
Route 11 Section 3
Lincoln 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 a canal at log mile 20.98 on Highway 11. 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 highly plastic clay. 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 conventional processing, if the weather is favorable during construction. If soil remediation is needed to allow construction to proceed during adverse weather conditions or if a stable working platform cannot be obtained with normal drying and compactive effort, stabilization with lime is the most appropriate remediation technique. It is recommended that the addition of 4% lime (by dry weight) mixed to a depth of 16 inches be used for soil stabilization quantity estimation purposes; however, if the Engineer determines that 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 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 Avoca.
2. Asphalt Concrete Hot Mix

<u>Type</u>	<u>Asphalt Cement %</u>	<u>Mineral Aggregate %</u>
Surface Course	5.2	94.8
Binder Course	4.2	95.8
Base Course	3.5	96.5


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 - 06/16/2017
JOB NUMBER - 020581

SEQUENCE NO. - 1
MATERIAL CODE - SSRV
SPEC. YEAR - 2014
SUPPLIER ID. - 1
COUNTY/STATE - 40
DISTRICT NO. - 02

JOB NAME - CANAL @ L.M. 20.98 STR. & APPRS.(S)

* STATION LIMITS R-VALUE AT 240 psi *

BEGIN JOB - END JOB LESS THAN 5

RESILIENT MODULUS
STA. 117+90 6515

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.	020581	Material Code	SSRVPS
Date Sampled:	5/30/17	Station No.:	117+90
Date Tested:	June 15, 2017	Location:	18'LT
Name of Project:	CANAL AT L.M. 20.98 STR. & APPRS. (S)		
County:	Code: 40	Name: LINCOLN	
Sampled By:	THORNTON/TAYLOR	Depth:	0-5
Lab No.:	20171801	AASHTO Class:	A-6(13)
Sample ID:	RV406	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	3.93
Middle	3.93
Bottom	3.93
Average	3.93
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):	12.06
Initial Volume, AoLo (cu. in):	96.69

3. Soil Specimen Weight:

Weight of Wet Soil Used (g):	2961.90
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4. Soil Properties:

Optimum Moisture Content (%):	18.6
Maximum Dry Density (pcf):	102.4
95% of MDD (pcf):	97.3
In-Situ Moisture Content (%):	N/A

5. Specimen Properties:

Wet Weight (g):	2961.90
Compaction Moisture content (%):	18.4
Compaction Wet Density (pcf):	116.72
Compaction Dry Density (pcf):	98.58
Moisture Content After Mr Test (%):	18.8

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

#VALUE!

7. Resilient Modulus, Mr:

9706(Sc)^{-0.23952}(S3)^{0.18273}

8. Comments

9. Tested By:

B.H.

Date: June 15, 2017

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

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

Job No. 020581 **Material Code** SSRVPS
Date Sampled: 5/30/17 **Station No.:** 117+90
Date Tested: June 15, 2017 **Location:** 18LT
Name of Project: CANAL AT L.M. 20.98 STR. & APPRS. (S)
County: Code: 40 **Name:** LINCOLN
Sampled By: THORNTON/TAYLOR **Depth:** 0-5
Lab No.: 20171801 **AAASHTO Class:** A-6(13)
Sample ID: RV406 **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. LVD1 and 2	Resilient Strain	Resilient Modulus
DESIGNATION	psi	psi	lbs	lbs	lbs	psi	psi	psi	in	in/in	psi
Sequence 1	6.0	2.0	24.9	22.1	2.8	2.1	1.8	0.2	0.00129	0.00016	11,437
Sequence 2	6.0	4.0	46.8	43.9	2.8	3.9	3.6	0.2	0.00274	0.00034	10,674
Sequence 3	6.0	6.0	68.9	65.3	3.6	5.7	5.4	0.3	0.00452	0.00056	9,608
Sequence 4	6.0	8.0	91.5	85.5	6.0	7.6	7.1	0.5	0.00683	0.00085	8,334
Sequence 5	6.0	10.0	113.4	105.0	8.4	9.4	8.7	0.7	0.00944	0.00118	7,402
Sequence 6	4.0	2.0	24.9	22.0	2.8	2.1	1.8	0.2	0.00141	0.00018	10,369
Sequence 7	4.0	4.0	46.5	43.6	2.9	3.9	3.6	0.2	0.00310	0.00039	9,378
Sequence 8	4.0	6.0	67.6	64.7	2.8	5.6	5.4	0.2	0.00506	0.00063	8,506
Sequence 9	4.0	8.0	90.1	85.0	5.1	7.5	7.0	0.4	0.00727	0.00091	7,772
Sequence 10	4.0	10.0	112.6	105.1	7.5	9.3	8.7	0.6	0.00982	0.00122	7,120
Sequence 11	2.0	2.0	24.8	22.0	2.8	2.1	1.8	0.2	0.00160	0.00020	9,141
Sequence 12	2.0	4.0	46.2	43.4	2.8	3.8	3.6	0.2	0.00349	0.00044	8,271
Sequence 13	2.0	6.0	67.1	64.3	2.8	5.6	5.3	0.2	0.00559	0.00070	7,654
Sequence 14	2.0	8.0	88.8	84.5	4.2	7.4	7.0	0.4	0.00801	0.00100	7,023
Sequence 15	2.0	10.0	110.7	104.0	6.7	9.2	8.6	0.6	0.01062	0.00132	6,515

TESTED BY _____ DATE June 15, 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. 020581 Material Code SSRVPS
Date Sampled: 5/30/17 Station No.: 117+90
Date Tested: June 15, 2017 Location: 18'LT
Name of Project: CANAL AT L.M. 20.98 STR. & APPRS. (S)
County: Code: 40 Name: LINCOLN
Sampled By: THORNTON/TAYLOR Depth: 0-5
Lab No.: 20171801 AASHTO Class: A-6(13)
Sample ID: RV406 Material Type (1 or 2): 2
LATITUDE: LONGITUDE:

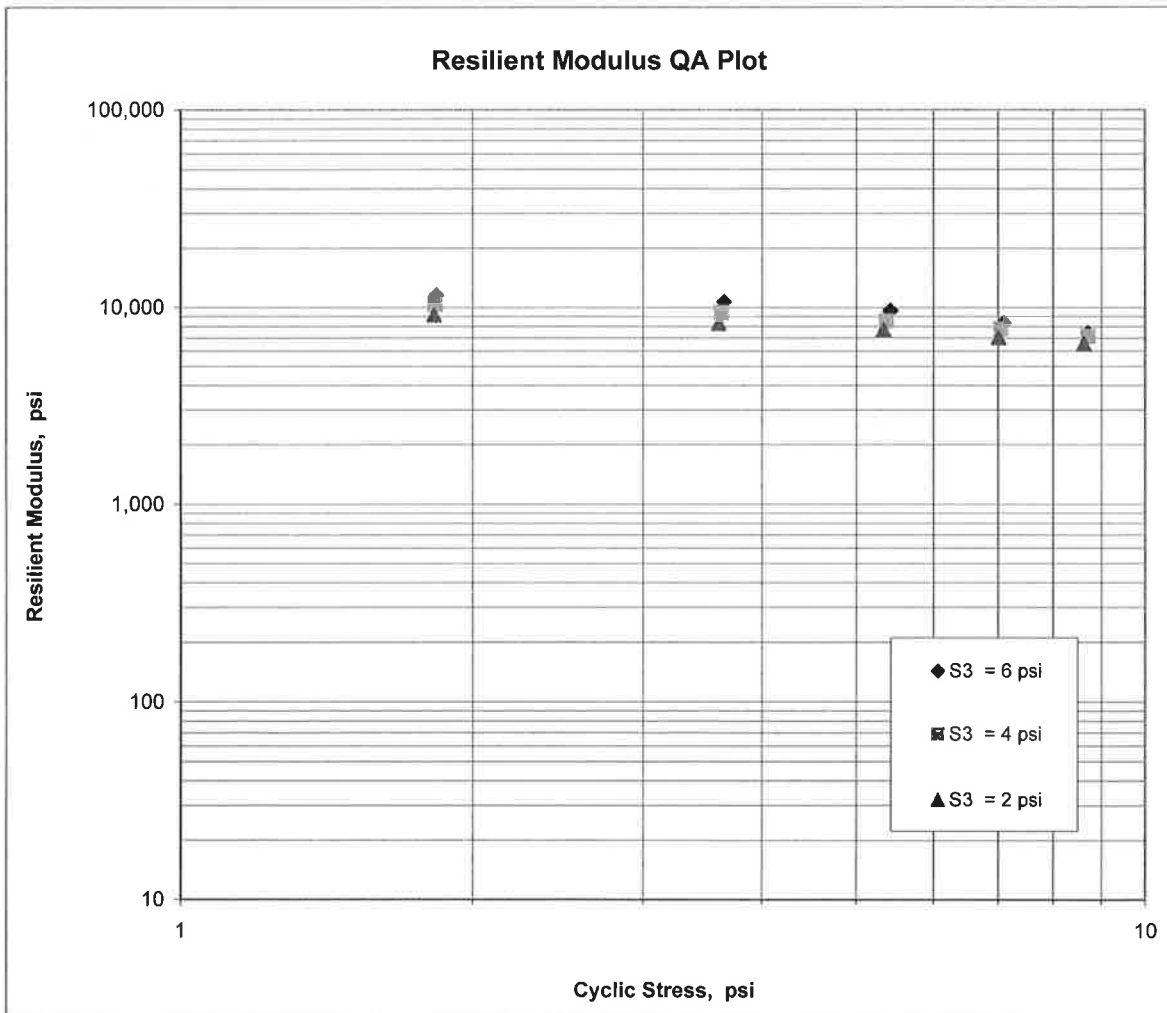
$$M_R = K_1 (S_C)^{K_2} (S_3)^{K_5}$$

$$K_1 = \underline{9,706}$$

$$K_2 = \underline{-0.23952}$$

$$K_5 = \underline{0.18273}$$

$$R^2 = \underline{0.93}$$



JOB: 020581

Arkansas State Highway Transportation Department

JOB NAME: CANAL @ L.M. 20.98 STR. & APPRS.(S)

Materials Division

COUNTY NO. 40 DATE TESTED 6/12/2017

Michael Benson, Materials Engineer

STA.#	LOC.	DEPTH	COLOR	SIEVES					L.L.	P.I.	SOIL CLASS	LAB #:	%MOISTURE
				#4	#10	#40	#80	#200					
117+90	18 LT	0-5	BROWN	92	90	88	87	84	32	17	A-6(13)	RV 406	
111+00	05 RT	0-5	BROWN	100				92	37	22	A-6(20)	S402	28.2
111+00	18 RT	0-5	BROWN	100				97	41	25	A-7-6(25)	S403	22.7
118+00	05 LT	0-5	BROWN	98	96	94	93	89	33	18	A-6(15)	S404	28.6
118+00	18 LT	0-5	BROWN	98	96	94	93	88	35	21	A-6(17)	S405	20.2

comments: W=MULTIPLE LAYERS

Monday, June 19, 2017

JOB: 020581 **DATE TESTED** 6/12/2017
JOB NAME: CANAL @ L.M. 20.98 STR. & APPRS.(S)

Arkansas State Highway Transportation Department
 Materials Division
 Michael Benson, Materials Engineer

COUNTY NO. 40

STA.# LOC. [REDACTED] **PAVEMENT SOUNDINGS**

111+00	05 RT	ACHMSC 3.5W	CHIP SEAL ---	AGG BASE CRS CL-5 7.0
111+00	18 RT	ACHMSC ---	CHIP SEAL ---	AGG BASE CRS CL-5 ---
118+00	05 LT	ACHMSC ---	CHIP SEAL 1.25W	AGG BASE CRS CL-5 7.0

comments: W=MULTIPLE LAYERS

