

ARKANSAS DEPARTMENT OF TRANSPORTATION



SUBSURFACE INVESTIGATION

STATE JOB NO. 110620

FEDERAL AID PROJECT NO. NHPP-0074(34)

DITCH AT L.M. 10.96 STR. & APPRS. (S)

STATE HIGHWAY 17 SECTION 4

IN WOODRUFF 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

April 21, 2017

TO: Mr. Trinity Smith, Engineer of Roadway Design

SUBJECT: Job No. 110620
Ditch at L.M. 10.96 Str. & Apprs. (S)
Route 17 Section 4
Woodruff 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 a bridge on Highway 17 with a box culvert. Samples were obtained in the existing travel lanes and ditch line. There were no paved shoulders within the project.

Based on laboratory results of samples obtained, the subgrade soils consist primarily of low plasticity clays with some sand. The subgrade soils are expected to provide a stable working platform with normal drying and compactive efforts, if the weather is favorable during construction.

Based on currently available cross-sections the maximum embankment height is approximately 9 feet. The construction centerline encroaches on irrigation ditches for agricultural fields. Prior to embankment construction the ditch must be drained and the soft unstable material should be undercut to a maximum depth of three feet. The embankment may be constructed of locally available unspecified material. The box culvert should be constructed on a bed of stone backfill three feet thick. The stone backfill should exceed the length and width of the box culvert by four feet.

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 Judsonia.
2. Asphalt Concrete Hot Mix

PG 64-22		
Type	Asphalt Cement %	Mineral Aggregate %
Surface Course	5.3	94.7
Binder Course	4.3	95.7
Base Course	4.0	96.0

PG 70-22		
Type	Asphalt Cement %	Mineral Aggregate %
Surface Course	5.3	94.7
Binder Course	4.3	95.7
Base Course	4.0	96.0

PG 76-22		
Type	Asphalt Cement %	Mineral Aggregate %
Surface Course	5.3	94.7
Binder Course	4.3	95.7
Base Course	3.8	96.2



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 - 04/20/2017
JOB NUMBER - 110620

SEQUENCE NO. - 1
MATERIAL CODE - SSRV
SPEC. YEAR - 2014
SUPPLIER ID. - 1
COUNTY/STATE - 74
DISTRICT NO. - 01

JOB NAME - DITCH @ LM 1096 STR. & APPRS.(S)

* STATION LIMITS R-VALUE AT 240 psi *

BEGIN JOB - END JOB 8

RESILIENT MODULUS
STA. 118+10 10264

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.	110620	Material Code	SSRVPS
Date Sampled:	3/7/17	Station No.:	118+10
Date Tested:	April 14, 2017	Location:	15LT
Name of Project:	DITCH @ LM 10.96 STR. & APPRS. (S)		
County:	Code: 74	Name:	WOODRUFF
Sampled By:	THORNTON/BATES	Depth:	0-5
Lab No.:	20170764	AASHTO Class:	A-4(4)
Sample ID:	RV245	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	3.95
Middle	3.94
Bottom	3.93
Average	3.94
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):	12.12
Initial Volume, AoLo (cu. in):	97.43

3. Soil Specimen Weight:

Weight of Wet Soil Used (g):	3054.00
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4. Soil Properties:

Optimum Moisture Content (%):	13.7
Maximum Dry Density (pcf):	109.9
95% of MDD (pcf):	104.4
In-Situ Moisture Content (%):	N/A

5. Specimen Properties:

Wet Weight (g):	3054.00
Compaction Moisture content (%):	13.4
Compaction Wet Density (pcf):	119.44
Compaction Dry Density (pcf):	105.32
Moisture Content After Mr Test (%):	13.4

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

7. Resilient Modulus, Mr: 11454(Sc)^{-0.15208}(S3)^{0.28939}

8. Comments

9. Tested By: GW

Date: April 14, 2017

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

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

Job No. 110620 **Material Code** SSRVPS
Date Sampled: 3/7/17 **Station No.:** 118+10
Date Tested: April 14, 2017 **Location:** 15LT

Name of Project: DITCH @ LM 10.96 STR. & APPRS. (S)

County: Code: 74 **Name:** WOODRUFF

Sampled By: THORNTON/BATES

Lab No.: 20170764

Sample ID: RV245

LATTITUDE:

Depth: 0-5

AASHTO Class: A-4(4)

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	psi	psi	lbs	lbs	lbs	psi	psi	psi	in	in/in	psi
Sequence 1	6.0	2.0	25.0	22.3	2.7	2.1	1.8	0.2	0.0084	0.0010	17,519
Sequence 2	6.0	4.0	47.2	44.4	2.8	3.9	3.7	0.2	0.00179	0.0022	16,461
Sequence 3	6.0	6.0	69.7	66.1	3.6	5.8	5.5	0.3	0.00285	0.0035	15,412
Sequence 4	6.0	8.0	93.4	87.4	6.0	7.7	7.2	0.5	0.00409	0.0051	14,197
Sequence 5	6.0	10.0	116.9	108.4	8.5	9.6	8.9	0.7	0.00538	0.0067	13,385
Sequence 6	4.0	2.0	24.9	22.1	2.8	2.1	1.8	0.2	0.00096	0.0012	15,286
Sequence 7	4.0	4.0	46.8	44.0	2.8	3.9	3.6	0.2	0.00209	0.0026	13,970
Sequence 8	4.0	6.0	68.4	65.6	2.8	5.6	5.4	0.2	0.00330	0.0041	13,190
Sequence 9	4.0	8.0	91.8	86.7	5.1	7.6	7.2	0.4	0.00462	0.0058	12,436
Sequence 10	4.0	10.0	115.2	107.6	7.5	9.5	8.9	0.6	0.00593	0.0074	12,039
Sequence 11	2.0	2.0	24.8	22.0	2.8	2.0	1.8	0.2	0.00115	0.0014	12,668
Sequence 12	2.0	4.0	46.2	43.4	2.8	3.8	3.6	0.2	0.00249	0.0031	11,560
Sequence 13	2.0	6.0	67.1	64.3	2.8	5.5	5.3	0.2	0.00391	0.0049	10,905
Sequence 14	2.0	8.0	89.2	84.9	4.2	7.4	7.0	0.3	0.00537	0.0067	10,502
Sequence 15	2.0	10.0	112.3	105.7	6.6	9.3	8.7	0.5	0.00683	0.0085	10,264

TESTED BY _____ DATE April 14, 2017
 REVIEWED BY _____ DATE _____

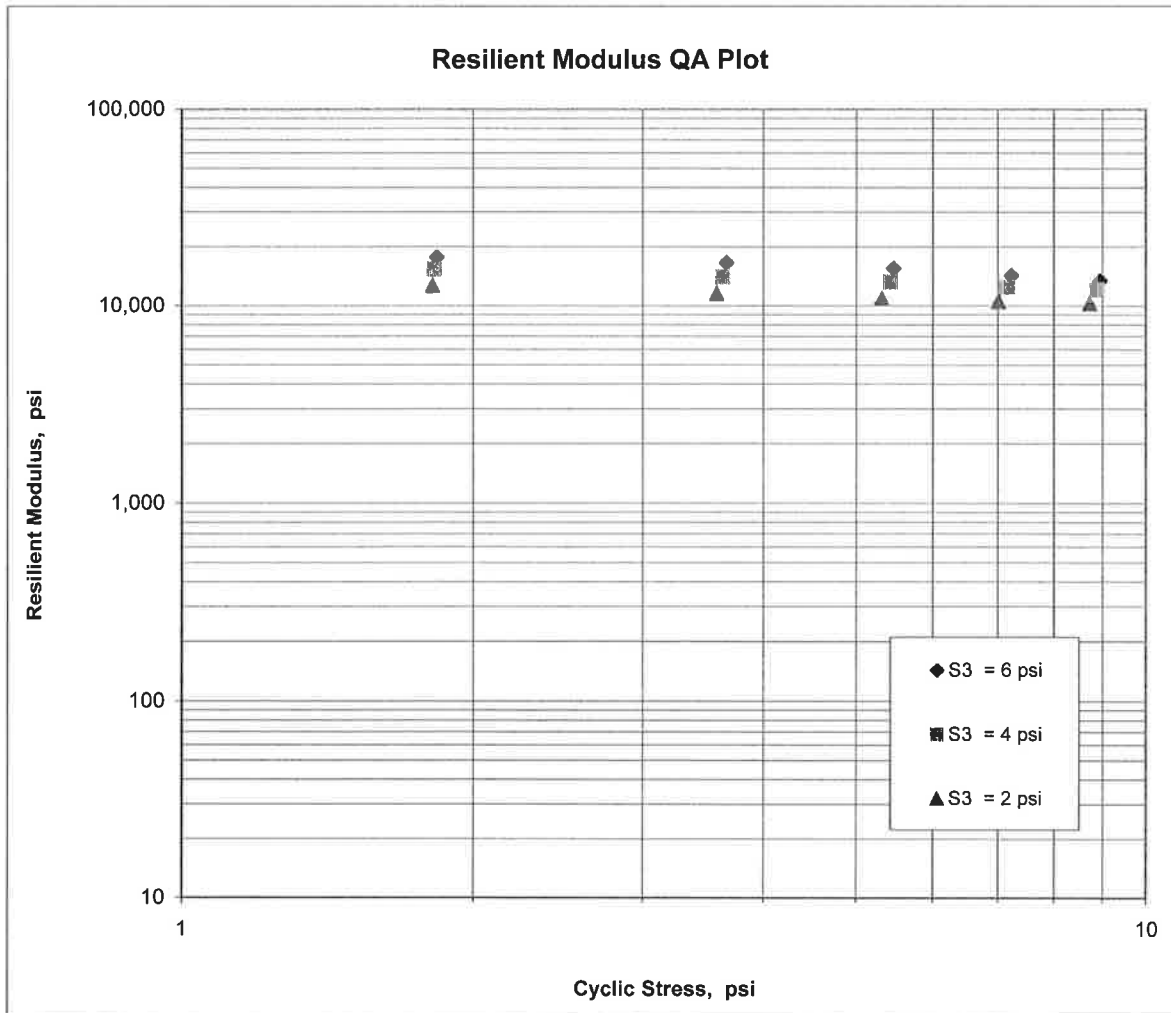
**ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT
MATERIALS DIVISION**

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

Job No.	110620	Material Code	SSRVPS
Date Sampled:	3/7/17	Station No.:	118+10
Date Tested:	April 14, 2017	Location:	15LT
Name of Project:	DITCH @ LM 10.96 STR. & APPRS. (S)		
County:	Code: 74	Name:	WOODRUFF
Sampled By:	THORNTON/BATES	Depth:	0-5
Lab No.:	20170764	AASHTO Class:	A-4(4)
Sample ID:	RV245	Material Type (1 or 2):	2
LATITUDE:		LONGITUDE:	

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

K1 =	11,454
K2 =	-0.15208
K5 =	0.28939
R ² =	0.98



JOB: 110620

Arkansas State Highway Transportation Department

JOB NAME: DITCH @ LM 1096 STR. & APPRS.(S)

Materials Division

COUNTY NO. 74 DATE TESTED 3/28/2017

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					
118+10	15 LT	0-5	GRAY	97	94	89	85	82	26	7	A-4(4)	RV245	
109+00	06 RT	0-5	GRAY	100				97	36	20	A-6(19)	S241	27.2
109+00	20 RT	0-5	GRAY	98	95	90	85	80	29	12	A-6(8)	S242	25.7
118+00	06 LT	0-5	GRAY	100				92	26	6	A-4(4)	S243	25.9
118+00	15 LT	0-5	GRAY	100				96	25	5	A-4(4)	S244	21.9

comments: W=MULTIPLE LAYERS

Thursday, April 20, 2017

JOB: 110620

Arkansas State Highway Transportation Department

DATE TESTED

JOB NAME: DITCH @ LM 1096 STR. & APPRS.(S)

Materials Division

3/28/2017

COUNTY NO. 74

Michael Benson, Materials Engineer

STA.# LOC.

PAVEMENT SOUNDINGS

109+00	20 RT	ACHMSC	BST	ACHMBC	BASE	AGG. BASE CRS. CL-
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109+00	06 RT	ACHMSC	BST	ACHMBC	BASE	AGG. BASE CRS. CL-
		4.0W	0.5	2.25	1.0	5.0
118+00	06 LT	ACHMSC	BST	ACHMBC	BASE	AGG. BASE CRS. CL-
		3.5	1.0	1.5	---	6.0

comments: W=MULTIPLE LAYERS

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

MICHAEL BENSON, MATERIALS ENGINEER

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

DATE	- 03/28/17	SEQUENCE NO.	- 1
JOB NUMBER	- 110620	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	- 74
SUPPLIER NAME	- STATE	DISTRICT NO.	- 01
NAME OF PROJECT	- DITCH @ LM 10,96 STR. & APPRS.(S)		
PROJECT ENGINEER	- NOT APPLICABLE		
PIT/QUARRY	- ARKANSAS	DATE SAMPLED	- 03/07/17
LOCATION	- WOODRUFF COUNTY	DATE RECEIVED	- 03/09/17
SAMPLED BY	- THORNTON/BATES	DATE TESTED	- 03/28/17
SAMPLE FROM	- TEST HOLE		
MATERIAL DESC.	- SOIL SURVEY - R VALUE- PAVEMENT SOUNDINGS		

LAB NUMBER	- 20170760	- 20170761	- 20170762
SAMPLE ID	- S241	- S242	- S243
TEST STATUS	- INFORMATION ONLY	- INFORMATION ONLY	- INFORMATION ONLY
STATION	- 109+00	- 109+00	- 118+00
LOCATION	- 06 RT	- 20 RT	- 06 LT
DEPTH IN FEET	- 0-5	- 0-5	- 0-5
MAT'L COLOR	- GRAY	- GRAY	- GRAY
MAT'L TYPE	-	-	-
LATITUDE DEG-MIN-SEC	- 35 6 23.10	- 35 06 23.20	- 35 6 29.00
LONGITUDE DEG-MIN-SEC	- 91 14 40.30	- 91 14 40.30	- 91 14 46.90
% PASSING			
2 IN.	-	-	-
1 1/2 IN.	-	-	-
3/4 IN.	-	-	-
3/8 IN.	-	- 100	-
NO. 4	- 100	- 98	- 100
NO. 10	-	- 95	-
NO. 40	-	- 90	-
NO. 80	-	- 85	-
NO. 200	- 97	- 80	- 92
LIQUID LIMIT	- 36	- 29	- 26
PLASTICITY INDEX	- 20	- 12	- 6
AASHTO SOIL	- A-6(19)	- A-6(8)	- A-4(4)
UNIFIED SOIL	-	-	-
% MOISTURE CONTENT	- 27.2	- 25.7	- 25.9
ACHMSC (IN)	- 4.0W	- ---	- 3.5
BST (IN)	- 0.5	- ---	- 1.0
ACHMBC (IN)	- 2.25	- ---	- 1.5
BASE (IN)	- 1.0	- ---	- ---
AGG. BASE CRS. CL-7 (IN)	- 5.0	- ---	- 6.0
	-	-	-
	-	-	-
	-	-	-
	-	-	-

REMARKS - W=MULTIPLE LAYERS

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AASHTO TESTS : T24 T88 T89 T90 T265

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