ARKANSAS DEPARTMENT OF TRANSPORTATION

SUBSURFACE INVESTIGATION

STATE JOB NO. 110615

FEDERAL AID PROJECT NO. NHPP-0074(35)

HWY. 33 STR. & APPRS. (S)

STATE HIGHWAY 33 **SECTION** 7

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 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 22, 2017

TO: Mr. Trinity Smith, Engineer of Roadway Design

SUBJECT: Job No. 110615
Hwy. 33 Strs. & Apprs. (S)
Route 33 Section 7
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 33. 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 plastic sandy 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 normal processing if the weather is favorable during construction. However, if a stable working platform cannot be obtain, stabilization with Lime is the most appropriate remediation technique. It is recommended that the addition of 3% Lime (by dry Wt.) mixed to a depth of 16 inches be used for quantity estimation purposes; if the Engineer determines that stabilization is necessary, field trial or local experience may dictate that a stable working platform can be achieved at a lower lime content.

The proposed detour alignment for the bridge will cross irrigation ditches that contain water. The ditches should be drained and the soft unstable organic material in the ditches should be undercut prior to embankment construction, anticipated to be no more than 2 feet. The undercut may be backfilled 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 Judsonia.

2. Asphalt Concrete Hot Mix

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

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 - 11/03/2017
JOB NUMBER - 110615

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

JOB NAME - HIGHWAY 33 STR.& APPRS.(S)

STATION LIMITS	R-VALUE AT 240 psi
BEGIN JOB - END JOB	LESS THAN 5
RESILIENT MODULUS	
STA. 109 + 90	4596

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.	110615	**Material Code**	SSRVPS
Date Sampled:	10/04/17	**Station No.:**	109+90
Date Tested:	October 26, 2017	**Location:**	18'LT
Name of Project:	HIGHWAY 33 STR. & APPRS. (S)		
County:	**Code:** 74 **Name:** WOODRUFF		
Sampled By:	THORNTON/BUIE	**Depth:**	0-5
Lab No.:	20173094	**AASHTO Class:**	A-7-6 (26)
Sample ID:	RV637	**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	3.95
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):	12.16
Initial Volume, AoLo (cu. in):	97.52

3. Soil Specimen Weight:

Weight of Wet Soil Used (g):	3027.60

4. Soil Properties:

Optimum Moisture Content (%):	20.8
Maximum Dry Density (pcf):	101.9
95% of MDD (pcf):	96.8
In-Situ Moisture Content (%):	N/A

5. Specimen Properties:

Wet Weight (g):	3027.60
Compaction Moisture content (%):	21.1
Compaction Wet Density (pcf):	118.30
Compaction Dry Density (pcf):	97.68
Moisture Content After Mr Test (%):	20.5

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

7. Resilient Modulus, Mr: 9414(Sc)^-0.36567(S3)^0.13360

8. Comments _____

9. Tested By: GW **Date:** October 26, 2017

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT
MATERIALS DIVISION

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

Job No.	110615	**Material Code**	SSRVPS
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Date Tested:	October 26, 2017	**Location:**	18'LT
Name of Project:	HIGHWAY 33 STR. & APPRS. (S)		
County:	**Code:** 74 **Name:** WOODRUFF		
Sampled By:	THORNTON/BUIE	**Depth:**	0-5
Lab No.:	20173094	**AASHTO Class:**	A-7-6 (26)
Sample ID:	RV637	**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. LVDT 1 and 2*	*Resilient Strain*	*Resilient Modulus*
DESIGNATION	S_3	S_{cyclic}	P_{max}	P_{cyclic}	$P_{contact}$	S_{max}	S_{cyclic}	$S_{contact}$	H_{avg}	ε_r	M_r
UNIT	psi	psi	lbs	lbs	lbs	psi	psi	psi	in	in/in	psi
Sequence 1	6.0	2.0	25.3	22.5	2.8	2.1	1.9	0.2	0.00160	0.00020	9,274
Sequence 2	6.0	4.0	47.5	44.7	2.8	3.9	3.7	0.2	0.00353	0.00044	8,339
Sequence 3	6.0	6.0	69.2	65.6	3.6	5.7	5.4	0.3	0.00613	0.00076	7,054
Sequence 4	6.0	8.0	90.1	84.0	6.1	7.4	6.9	0.5	0.00964	0.00120	5,746
Sequence 5	6.0	10.0	110.0	101.5	8.5	9.0	8.3	0.7	0.01374	0.00171	4,872
Sequence 6	4.0	2.0	25.3	22.5	2.8	2.1	1.8	0.2	0.00176	0.00022	8,442
Sequence 7	4.0	4.0	47.0	44.2	2.8	3.9	3.6	0.2	0.00391	0.00049	7,459
Sequence 8	4.0	6.0	67.6	64.8	2.8	5.6	5.3	0.2	0.00657	0.00082	6,510
Sequence 9	4.0	8.0	89.1	83.9	5.2	7.3	6.9	0.4	0.00996	0.00124	5,561
Sequence 10	4.0	10.0	109.6	102.0	7.6	9.0	8.4	0.6	0.01396	0.00174	4,817
Sequence 11	2.0	2.0	25.2	22.4	2.8	2.1	1.8	0.2	0.00194	0.00024	7,618
Sequence 12	2.0	4.0	46.8	44.0	2.8	3.8	3.6	0.2	0.00428	0.00053	6,780
Sequence 13	2.0	6.0	67.2	64.4	2.8	5.5	5.3	0.2	0.00713	0.00089	5,956
Sequence 14	2.0	8.0	87.6	83.3	4.3	7.2	6.9	0.4	0.01053	0.00131	5,218
Sequence 15	2.0	10.0	108.2	101.4	6.7	8.9	8.3	0.6	0.01456	0.00182	4,596

TESTED BY GW DATE October 26, 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.	110615	**Material Code**	SSRVPS
Date Sampled:	10/04/17	**Station No.:**	109+90
Date Tested:	October 26, 2017	**Location:**	18'LT
Name of Project:	HIGHWAY 33 STR. & APPRS. (S)		
County:	**Code:** 74 **Name:** WOODRUFF		
Sampled By:	THORNTON/BUIE	**Depth:**	0-5
Lab No.:	20173094	**AASHTO Class:**	A-7-6 (26)
Sample ID:	RV637	**Material Type (1 or 2):**	2
LATITUDE:		**LONGITUDE:**	

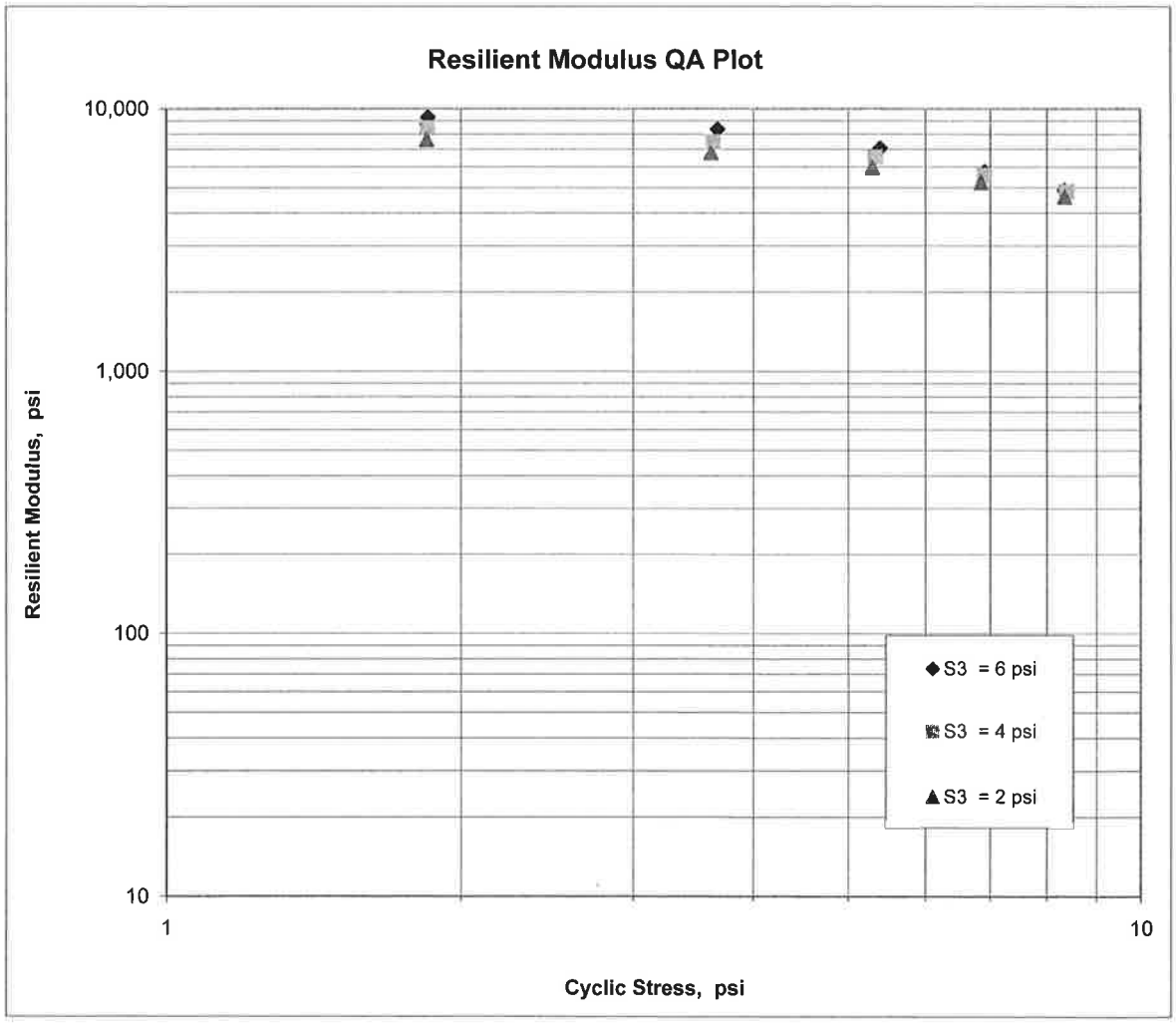
$$M_R = K1\ (S_C)^{K2}\ (S_3)^{K5}$$

K1 = 9,414

K2 = -0.36567

K5 = 0.13360

R^2 = 0.90



JOB: 110615

JOB NAME: HIGHWAY 33 STR.& APPRS.(S)

COUNTY NO. 74 **DATE TESTED** 10/31/2017

Arkansas State Highway Transporation Department

Materials Division

Michael Benson, Materials Engineer

STA.#	LOC.	DEPTH	COLOR	#4 SIEVE	#10	#40	#80	#200	L.L.	P.I.	SOIL CLASS	LAB #:	%MOISTURE
109+90	18 LT	0-5	BROWN	100				93	44	27	A-7-6(26)	RV637	
104+00	06 RT	0-5	BROWN	97	93	86	74	55	29	17	A-6(6)	S633	20.1
104+00	18 RT	0-5	BROWN	95	92	88	83	70	29	16	A-6(8)	S634	22.7
110+00	06 LT	0-5	BROWN	98	94	88	81	73	29	17	A-6(10)	S635	17.8
110+00	18LT	0-5	BROWN					93	47	29	A-7-6(28)	S636	22.3

comments: X=STRIPPED

Thursday, November 16, 2017

JOB: 110615
JOB NAME: HIGHWAY 33 STR.& APPRS.(S)

COUNTY NO. 74

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

DATE TESTED
10/31/2017

PAVEMENT SOUNDINGS

STA.#	LOC.					
104+00	06 RT	ACHMSC	BST	SAND ASPHALT	ACHMBC	AGG.BASE CRS CL-7
		2.0	**1.0**	**3.0**	**1.25**	**5.0**
104+00	18 RT	ACHMSC	BST	SAND ASPHALT	ACHMBC	AGG.BASE CRS CL-7
		--	--	--	--	--
110+00	06 LT	ACHMSC	BST	SAND ASPHALT	ACHMBC	AGG.BASE CRS CL-7
		1.5	**1.5X**	--	--	**7.0**

comments: X=STRIPPED

Thursday, November 16, 2017

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT - LITTLE ROCK, ARKANSAS
MATERIALS DIVISION
MICHAEL BENSON, MATERIALS ENGINEER
*** SOIL SURVEY / PAVEMENT SOUNDING TEST REPORT ***

DATE - 10/31/17
JOB NUMBER - 110615
FEDERAL AID NO.- TO BE ASSIGNED
PURPOSE - SOIL SURVEY SAMPLE
SPEC. REMARKS - NO SPECIFICATION CHECK
SUPPLIER NAME - STATE
NAME OF PROJECT - HIGHWAY 33 STR.& APPRS.(S)
PROJECT ENGINEER - NOT APPLICABLE
PIT/QUARRY - ARKANSAS
LOCATION - WOODRUFF COUNTY
SAMPLED BY - THORNTON/BUIE
SAMPLE FROM - TEST HOLE
MATERIAL DESC. - SOIL SURVEY - R VALUE- PAVEMENT SOUNDINGS

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

DATE SAMPLED - 10/04/17
DATE RECEIVED - 10/06/17
DATE TESTED - 10/31/17

LAB NUMBER	20173090	20173091	20173092
SAMPLE ID	S633	S634	S635
TEST STATUS	INFORMATION ONLY	INFORMATION ONLY	INFORMATION ONLY
STATION	104+00	104+00	110+00
LOCATION	06 RT	18 RT	06 LT
DEPTH IN FEET	0-5	0-5	0-5
MAT'L COLOR	BROWN	BROWN	BROWN
MAT'L TYPE			
LATITUDE DEG-MIN-SEC	35 33.10	35 00 33.00	35 39.10
LONGITUDE DEG-MIN-SEC	91 21 52.60	91 21 52.50	91 21 52.70
% PASSING 2 IN.			
1 1/2 IN.			
3/4 IN.	100	100	
3/8 IN.	98	99	100
NO. 4	97	95	98
NO. 10	93	92	94
NO. 40	86	88	88
NO. 80	74	83	81
NO. 200	55	70	73
LIQUID LIMIT	29	29	29
PLASTICITY INDEX	17	16	17
AASHTO SOIL	A-6(6)	A-6(8)	A-6(10)
UNIFIED SOIL			
% MOISTURE CONTENT	20.1	22.7	17.8
ACHMSC (IN)	2.0	--	1.5
BST (IN)	1.0	--	1.5X
SAND ASPHALT (IN)	3.0	--	--
ACHMBC (IN)	1.25	--	--
AGG.BASE CRS CL-7 (IN)	5.0	--	7.0

REMARKS - X=STRIPPED

AASHTO TESTS : T24 T88 T89 T90 T265

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT - LITTLE ROCK, ARKANSAS
MATERIALS DIVISION
MICHAEL BENSON, MATERIALS ENGINEER
*** SOIL SURVEY / PAVEMENT SOUNDING TEST REPORT ***

DATE - 10/31/17
JOB NUMBER - 110615
FEDERAL AID NO.- TO BE ASSIGNED
PURPOSE - SOIL SURVEY SAMPLE
SPEC. REMARKS - NO SPECIFICATION CHECK
SUPPLIER NAME - STATE
NAME OF PROJECT - HIGHWAY 33 STR.& APPRS.(S)
PROJECT ENGINEER - NOT APPLICABLE
PIT/QUARRY - ARKANSAS
LOCATION - WOODRUFF COUNTY
SAMPLED BY - THORNTON/BUIE
SAMPLE FROM - TEST HOLE
MATERIAL DESC. - SOIL SURVEY - R VALUE- PAVEMENT SOUNDINGS

SEQUENCE NO. - 2
MATERIAL CODE - SSRVPS
SPEC. YEAR - 2014
SUPPLIER ID. - 1
COUNTY/STATE - 74
DISTRICT NO. - 01

DATE SAMPLED - 10/04/17
DATE RECEIVED - 10/06/17
DATE TESTED - 10/31/17

LAB NUMBER	20173093
SAMPLE ID	S636
TEST STATUS	INFORMATION ONLY
STATION	110+00
LOCATION	18LT
DEPTH IN FEET	0-5
MAT'L COLOR	BROWN
MAT'L TYPE	
LATITUDE DEG-MIN-SEC	35 39.00
LONGITUDE DEG-MIN-SEC	91 21 52.70
% PASSING 2 IN.	
1 1/2 IN.	
3/4 IN.	
3/8 IN.	100
NO. 4	
NO. 10	
NO. 40	
NO. 80	
NO. 200	93
LIQUID LIMIT	47
PLASTICITY INDEX	29
AASHTO SOIL	A-7-6(28)
UNIFIED SOIL	
% MOISTURE CONTENT	22.3

REMARKS - X=STRIPPED

AASHTO TESTS : T24 T88 T89 T90 T265

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT - LITTLE ROCK, ARKANSAS
MATERIALS DIVISION
MICHAEL BENSON, MATERIALS ENGINEER
*** SOIL SURVEY / PAVEMENT SOUNDING TEST REPORT ***

DATE - 10/31/17
JOB NUMBER - 110615
FEDERAL AID NO.- TO BE ASSIGNED
PURPOSE - SOIL SURVEY SAMPLE
SPEC. REMARKS - NO SPECIFICATION CHECK
SUPPLIER NAME - STATE
NAME OF PROJECT - HIGHWAY 33 STR.& APPRS.(S)
PROJECT ENGINEER - NOT APPLICABLE
PIT/QUARRY - ARKANSAS
LOCATION - WOODRUFF COUNTY
SAMPLED BY - THORNTON/BUIE
SAMPLE FROM - TEST HOLE

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

DATE SAMPLED - 10/04/17
DATE RECEIVED - 10/06/17
DATE TESTED - 10/31/17

MATERIAL DESC. - SOIL SURVEY - RESISTANCE R-VALUE ACTUAL RESULTS

LAB NUMBER	20173094		
SAMPLE ID	RV637		
TEST STATUS	INFORMATION ONLY		
STATION	109+90		
LOCATION	18 LT		
DEPTH IN FEET	0-5		
MAT'L COLOR	BROWN		
MAT'L TYPE			
LATITUDE DEG-MIN-SEC	35 38.70		
LONGITUDE DEG-MIN-SEC	91 21 52.70		
% PASSING 2 IN.			
1 1/2 IN.			
3/4 IN.			
3/8 IN.			
NO. 4	100		
NO. 10			
NO. 40			
NO. 80			
NO. 200	93		
LIQUID LIMIT	44		
PLASTICITY INDEX	27		
AASHTO SOIL	A-7-6(26)		
UNIFIED SOIL			
% MOISTURE CONTENT			

REMARKS - X=STRIPPED

AASHTO TESTS : T24 T88 T89 T90 T265