ARKANSAS DEPARTMENT OF TRANSPORTATION

SUBSURFACE INVESTIGATION

STATE JOB NO. 100998

FEDERAL AID PROJECT NO. NHPP-0047(75)

DITCH NO. 13 STR. & APPRS. (S)

STATE HIGHWAY 151 **SECTION** 1

IN MISSISSIPPI **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

June 19, 2019

TO: Mr. Trinity Smith, Engineer of Roadway Design

SUBJECT: Job No. 100998
Ditch No. 13 Str. & Apprs. (S)
Route 151 Section 1
Mississippi County

Attached is the requested soil survey, strength data, and Resilient Modulus test results for the above referenced job. The project consists of replacing the bridge over Ditch No. 13 on Highway 151. Samples were taken in the existing travel lanes and ditch line.

The subgrade soils consist primarily of highly plastic clay. The subgrade soils are expected to provide a stable working platform with conventional processing if the weather is favorable during construction. If a stable working platform cannot be achieved, then stabilization with lime is the most appropriate remediation technique. It is recommended that 4% 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 trials or local experience may dictate that a lower lime content may be appropriate.

Additional earthwork recommendations will be made upon request when plans are further developed and cross sections become 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 Hickman.

2. Asphalt Concrete Hot Mix

Type	Asphalt Cement %	Mineral Aggregate %
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 10 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 - 06/10/2019
JOB NUMBER - 100998

SEQUENCE NO. - 1
MATERIAL CODE - SSRV
SPEC. YEAR - 2014
SUPPLIER ID. - 1
COUNTY/STATE - 47
DISTRICT NO. - 10

JOB NAME - DITCH NO. 13 STR. & APPRS. (S)

STATION LIMITS	R-VALUE AT 240 psi
BEGIN JOB - END JOB	LESS THAN 5
RESILIENT MODULUS	
STA. LM 0.58	6884

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.	100998	**Material Code**	SSRVPS
Date Sampled:	5/6/19	**Station No.:**	LM 0.58
Date Tested:	June 4, 2019	**Location:**	14'LT
Name of Project:	DITCH NO. 13 STR. & APPRS. (S)		
County:	**Code:** 47 **Name:** MISSISSIPPI		
Sampled By:	FRAZIER / BATES	**Depth:**	0-5
Lab No.:	20191431	**AASHTO Class:**	A-7-6 (25)
Sample ID:	RV345	**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	3.94
Middle	3.95
Bottom	3.94
Average	3.94
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):	12.14
Initial Volume, AoLo (cu. in):	97.35

3. Soil Specimen Weight:

Weight of Wet Soil Used (g):	3040.90

4. Soil Properties:

Optimum Moisture Content (%):	19.5
Maximum Dry Density (pcf):	103.5
95% of MDD (pcf):	98.3
In-Situ Moisture Content (%):	N/A

5. Specimen Properties:

Wet Weight (g):	3040.90
Compaction Moisture content (%):	19.6
Compaction Wet Density (pcf):	119.02
Compaction Dry Density (pcf):	99.51
Moisture Content After Mr Test (%):	19.6

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

7. Resilient Modulus, Mr: 12090(Sc)^-0.28937(S3)^0.12307

8. Comments _____

_____

9. Tested By: GW **Date:** June 4, 2019

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT
MATERIALS DIVISION

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

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Date Tested:	June 4, 2019	**Location:**	14'LT
Name of Project:	DITCH NO. 13 STR. & APPRS. (S)		
County:	**Code:** 47 **Name:** MISSISSIPPI		
Sampled By:	FRAZIER / BATES	**Depth:**	0-5
Lab No.:	20191431	**AASHTO Class:**	A-7-6 (25)
Sample ID:	RV345	**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	25.1	22.3	2.8	2.1	1.8	0.2	0.00119	0.00015	12,346
Sequence 2	6.0	4.0	47.0	44.2	2.8	3.9	3.6	0.2	0.00257	0.00032	11,374
Sequence 3	6.0	6.0	69.1	65.5	3.6	5.7	5.4	0.3	0.00433	0.00054	10,000
Sequence 4	6.0	8.0	91.2	85.2	6.0	7.5	7.0	0.5	0.00664	0.00083	8,477
Sequence 5	6.0	10.0	112.3	103.8	8.5	9.3	8.6	0.7	0.00934	0.00117	7,342
Sequence 6	4.0	2.0	25.0	22.2	2.8	2.1	1.8	0.2	0.00130	0.00016	11,294
Sequence 7	4.0	4.0	46.8	44.0	2.8	3.9	3.6	0.2	0.00284	0.00035	10,221
Sequence 8	4.0	6.0	67.9	65.1	2.8	5.6	5.4	0.2	0.00469	0.00058	9,186
Sequence 9	4.0	8.0	90.2	85.1	5.1	7.4	7.0	0.4	0.00692	0.00086	8,121
Sequence 10	4.0	10.0	111.7	104.2	7.5	9.2	8.6	0.6	0.00953	0.00119	7,227
Sequence 11	2.0	2.0	25.1	22.4	2.7	2.1	1.8	0.2	0.00141	0.00018	10,447
Sequence 12	2.0	4.0	46.7	43.9	2.7	3.8	3.6	0.2	0.00308	0.00038	9,431
Sequence 13	2.0	6.0	67.5	64.8	2.7	5.6	5.3	0.2	0.00504	0.00063	8,495
Sequence 14	2.0	8.0	88.9	84.7	4.2	7.3	7.0	0.3	0.00732	0.00091	7,640
Sequence 15	2.0	10.0	110.5	103.9	6.6	9.1	8.6	0.5	0.00998	0.00124	6,884

TESTED BY GW DATE June 4, 2019

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.	100998	**Material Code**	SSRVPS
Date Sampled:	5/6/19	**Station No.:**	LM 0.58
Date Tested:	June 4, 2019	**Location:**	14'LT
Name of Project:	DITCH NO. 13 STR. & APPRS. (S)		
County:	**Code:** 47 **Name:** MISSISSIPPI		
Sampled By:	FRAZIER / BATES	**Depth:**	0-5
Lab No.:	20191431	**AASHTO Class:**	A-7-6 (25)
Sample ID:	RV345	**Material Type (1 or 2):**	2
LATITUDE:		**LONGITUDE:**	

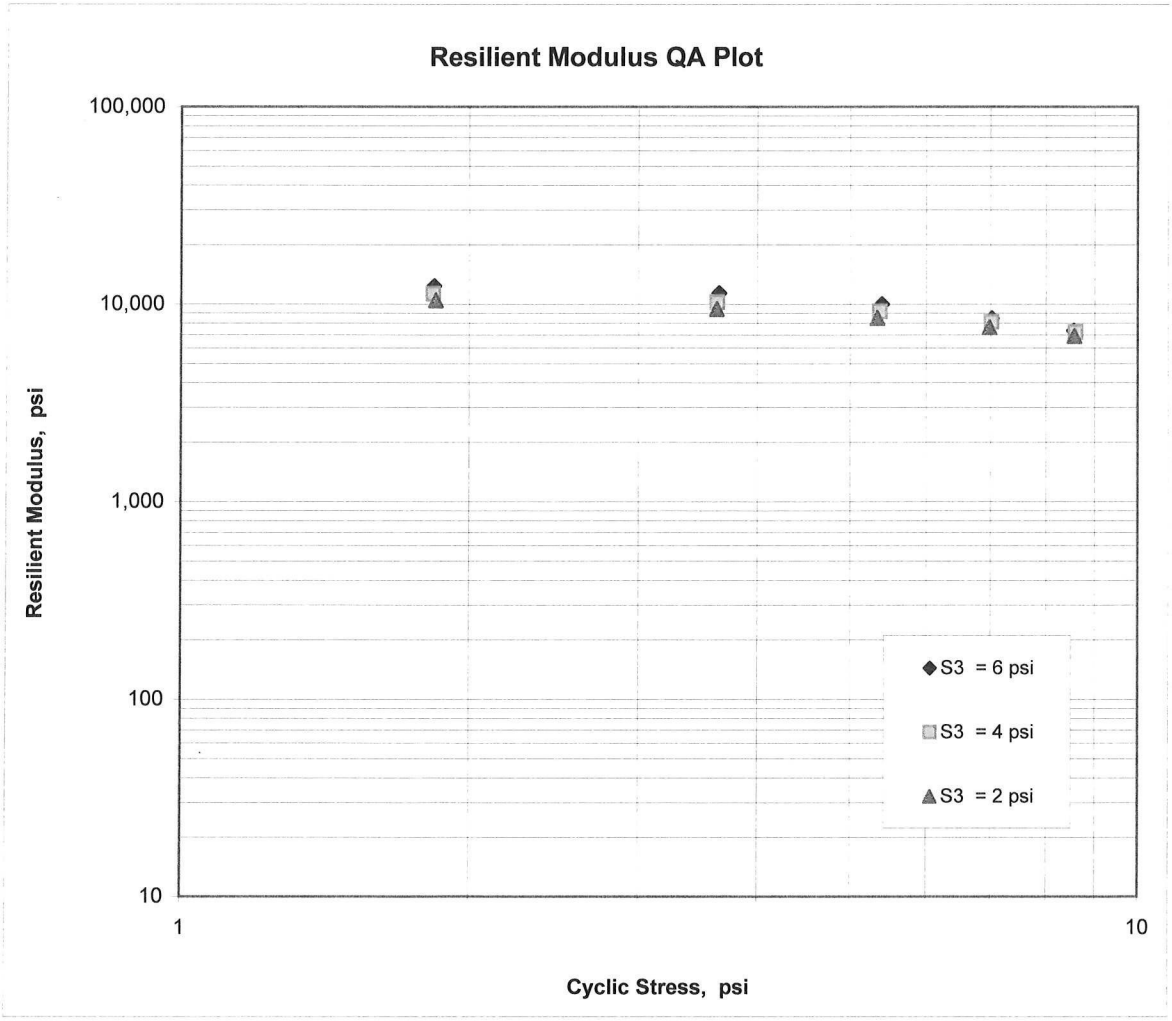
$$M_R = K1\ (S_C)^{K2}\ (S_3)^{K5}$$

K1 = 12,090

K2 = -0.28937

K5 = 0.12307

R^2 = 0.91



JOB: 100998

JOB NAME: DITCH NO. 13 STR. & APPRS. (S)

COUNTY NO. 47 **DATE TESTED** 6/5/2019

Arkansas State Highway Transporation Department

Materials Division

Michael Benson, Materials Engineer

STA.#	LOC.	DEPTH	COLOR	#4	#10	#40	#80	#200	L.L.	P.I.	SOIL CLASS	LAB #:	%MOISTURE
				SIEVE									
LM 0.58	14 LT	0-5	BROWN	99	98	95	90	86	47	29	A-7-6(25)	RV345	
LM 0.42	05 RT	0-5	BROWN	100				94	38	20	A-6(19)	S341	33.2
LM 0.42	14 RT	0-5	BROWN	100				91	36	19	A-6(17)	S342	27.6
LM 0.58	05 LT	0-5	BR/GR	100				91	43	27	A-7-6(25)	S343	38.5
LM 0.58	14 LT	0-5	BROWN	97	95	91	85	81	48	34	A-7-6(25)	S344	26.8

comments:

Monday, June 10, 2019

JOB: 100998

JOB NAME: DITCH NO. 13 STR. & APPRS. (S)

COUNTY NO. 47

Arkansas State Highway Transporation Department

Materials Division

Michael Benson, Materials Engineer

DATE TESTED

6/5/2019

PAVEMENT SOUNDINGS

STA.#	LOC.		
LM 0.42	05 RT	ACHM SC	PCCP
		1.5	**7.0**
LM 0.42	14 RT	ACHM SC	PCCP
		---	---
LM 0.58	05 LT	ACHM SC	PCCP
		2.0	**6.5**

comments:

Monday, June 10, 2019

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

DATE - 06/05/19
JOB NUMBER - 100998
FEDERAL AID NO.- TO BE ASSIGNED
PURPOSE - SOIL SURVEY SAMPLE
SPEC. REMARKS - NO SPECIFICATION CHECK
SUPPLIER NAME - STATE
SEQUENCE NO. - 1
MATERIAL CODE - SSRVPS
SPEC. YEAR - 2014
SUPPLIER ID. - 1
COUNTY/STATE - 47
DISTRICT NO. - 10
NAME OF PROJECT - DITCH NO. 13 STR. & APPRS. (S)
PROJECT ENGINEER - NOT APPLICABLE
PIT/QUARRY - ARKANSAS
LOCATION - MISSISSIPPI COUNTY
SAMPLED BY - FRAZIER/BATES
SAMPLE FROM - TEST HOLE
DATE SAMPLED - 05/06/19
DATE RECEIVED - 05/13/19
DATE TESTED - 06/05/19
MATERIAL DESC. - SOIL SURVEY - R VALUE- PAVEMENT SOUNDINGS

LAB NUMBER	20191427	20191428	20191429
SAMPLE ID	S341	S342	S343
TEST STATUS	INFORMATION ONLY	INFORMATION ONLY	INFORMATION ONLY
STATION	LM 0.42	LM 0.42	LM 0.58
LOCATION	05 RT	14 RT	05 LT
DEPTH IN FEET	0-5	0-5	0-5
MAT'L COLOR	BROWN	BROWN	BR/GR
MAT'L TYPE			
LATITUDE DEG-MIN-SEC	35 52 9.00	35 52 9.00	35 52 17.50
LONGITUDE DEG-MIN-SEC	89 49 43.50	89 49 43.40	89 49 43.60
% PASSING 2 IN.			
1 1/2 IN.			
3/4 IN.			
3/8 IN.			
NO. 4	100	100	100
NO. 10			
NO. 40			
NO. 80			
NO. 200	94	91	91
LIQUID LIMIT	38	36	43
PLASTICITY INDEX	20	19	27
AASHTO SOIL	A-6(19)	A-6(17)	A-7-6(25)
UNIFIED SOIL			
% MOISTURE CONTENT	33.2	27.6	38.5
ACHM SC (IN)	1.5	---	2.0
PCCP (IN)	7.0	---	6.5

REMARKS -

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	- 06/05/19	SEQUENCE NO.	- 2
JOB NUMBER	- 100998	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	- 47
SUPPLIER NAME	- STATE	DISTRICT NO.	- 10
NAME OF PROJECT	- DITCH NO. 13 STR. & APPRS. (S)		
PROJECT ENGINEER	- NOT APPLICABLE		
PIT/QUARRY	- ARKANSAS		
LOCATION	- MISSISSIPPI COUNTY	DATE SAMPLED	- 05/06/19
SAMPLED BY	- FRAZIER/BATES	DATE RECEIVED	- 05/13/19
SAMPLE FROM	- TEST HOLE	DATE TESTED	- 06/05/19

MATERIAL DESC. - SOIL SURVEY - R VALUE- PAVEMENT SOUNDINGS

LAB NUMBER	20191430
SAMPLE ID	S344
TEST STATUS	INFORMATION ONLY
STATION	LM 0.58
LOCATION	14 LT
DEPTH IN FEET	0-5
MAT'L COLOR	BROWN
MAT'L TYPE	
LATITUDE DEG-MIN-SEC	35 52 17.50
LONGITUDE DEG-MIN-SEC	89 49 43.70
% PASSING 2 IN.	
1 1/2 IN.	
3/4 IN.	100
3/8 IN.	99
NO. 4	97
NO. 10	95
NO. 40	91
NO. 80	85
NO. 200	81
LIQUID LIMIT	48
PLASTICITY INDEX	34
AASHTO SOIL	A-7-6(25)
UNIFIED SOIL	
% MOISTURE CONTENT	26.8

REMARKS -

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	- 06/05/19	SEQUENCE NO.	- 1
JOB NUMBER	- 100998	MATERIAL CODE	- RV
FEDERAL AID NO.	- TO BE ASSIGNED	SPEC. YEAR	- 2014
PURPOSE	- SOIL SURVEY SAMPLE	SUPPLIER ID.	- 1
SPEC. REMARKS	- NO SPECIFICATION CHECK	COUNTY/STATE	- 47
SUPPLIER NAME	- STATE	DISTRICT NO.	- 10
NAME OF PROJECT	- DITCH NO. 13 STR. & APPRS. (S)		
PROJECT ENGINEER	- NOT APPLICABLE		
PIT/QUARRY	- ARKANSAS		
LOCATION	- MISSISSIPPI COUNTY	DATE SAMPLED	- 05/06/19
SAMPLED BY	- FRAZIER/BATES	DATE RECEIVED	- 05/13/19
SAMPLE FROM	- TEST HOLE	DATE TESTED	- 06/05/19

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

LAB NUMBER	- 20191431	-	-
SAMPLE ID	- RV345	-	-
TEST STATUS	- INFORMATION ONLY	-	-
STATION	- LM 0.58	-	-
LOCATION	- 14 LT	-	-
DEPTH IN FEET	- 0-5	-	-
MAT'L COLOR	- BROWN	-	-
MAT'L TYPE	-	-	-
LATITUDE DEG-MIN-SEC	- 35 52 17.50	-	-
LONGITUDE DEG-MIN-SEC	- 89 49 43.70		
% PASSING 2 IN.	-	-	-
1 1/2 IN.	-	-	-
3/4 IN.	-	-	-
3/8 IN.	- 100	-	-
NO. 4	- 99	-	-
NO. 10	- 98	-	-
NO. 40	- 95	-	-
NO. 80	- 90	-	-
NO. 200	- 86		
LIQUID LIMIT	- 47	-	-
PLASTICITY INDEX	- 29	-	-
AASHTO SOIL	- A-7-6(25)	-	-
UNIFIED SOIL	-	-	-
% MOISTURE CONTENT	-		

REMARKS -

AASHTO TESTS : T24 T88 T89 T90 T265