

ARKANSAS DEPARTMENT OF TRANSPORTATION



SUBSURFACE INVESTIGATION

STATE JOB NO. 110644

FEDERAL AID PROJECT NO. NHPP-0019(41)

DRAINAGE DITCH STR. & APPRS. (S)

STATE HIGHWAY 75 SECTION 2

IN _____ CROSS _____ 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

March 15, 2017

TO: Mr. Trinity Smith, Engineer of Roadway Design

SUBJECT: Job No. 110644
Drainage Ditch Str. & Apprs. (S)
Route 75 Section 2
Cross 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 crossing drainage ditch on Highway 75. 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; it is assumed 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 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" 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 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 at the river port in West Memphis.
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

<u>Type</u>	PG 76-22	
	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 - 03/09/2017
JOB NUMBER - 110644

SEQUENCE NO. - 1
MATERIAL CODE - SSRV
SPEC. YEAR - 2014
SUPPLIER ID. - 1
COUNTY/STATE - 19
DISTRICT NO. - 01

JOB NAME - DRAINAGE DITCH STR. & APPRS.(S)

* STATION LIMITS R-VALUE AT 240 psi *

BEGIN JOB - END JOB LESS THAN 5

RESILIENT MODULUS
103+00 9170

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.	110644	Material Code	SSRVPS
Date Sampled:	2/15/17	Station No.:	103+00
Date Tested:	March 8, 2017	Location:	22RT
Name of Project:	DRAINAGE DITCH STR. & APPRS. (S)		
County:	Code: 19	Name: CROSS	
Sampled By:	THORNTON/TAYLOR		Depth: 0-5
Lab No.:	20170623	AASHTO Class:	A-7-6(46)
Sample ID:	RV157	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	3.95
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):	12.18
Initial Volume, AoLo (cu. in):	97.68

3. Soil Specimen Weight:

Weight of Wet Soil Used (g):	2824.10
------------------------------	---------

4. Soil Properties:

Optimum Moisture Content (%):	23.5
Maximum Dry Density (pcf):	94.1
95% of MDD (pcf):	89.4
In-Situ Moisture Content (%):	N/A

5. Specimen Properties:

Wet Weight (g):	2824.10
Compaction Moisture content (%):	24.6
Compaction Wet Density (pcf):	110.16
Compaction Dry Density (pcf):	88.41
Moisture Content After Mr Test (%):	24.6

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

#VALUE!

7. Resilient Modulus, Mr:

11002(Sc)^{-0.11410}(S3)^{0.10736}

8. Comments

9. Tested By:

GW

Date: March 8, 2017

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

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

Job No.	110644	Material Code	SSRVPS
Date Sampled:	2/15/17	Station No.:	103+00
Date Tested:	March 8, 2017	Location:	22RT
Name of Project:	DRAINAGE DITCH STR. & APPRS. (S)		
County:	Code: 19	Name:	CROSS
Sampled By:	THORNTON/TAYLOR		
Lab No.:	20170623	Depth:	0-5
Sample ID:	RV157	AAASHTO Class:	A-7-6(46)
LATITUDE:		Material Type (1 or 2):	2
		LONGITUDE:	

PARAMETER	Chamber Confining Pressure	Nominal Maximum Axial Stress	Actual Applied Max. Axial Load	Actual Applied Max. Axial Load	Actual Applied Max. Axial Stress	Actual Applied Cyclic Load	Actual Applied Cyclic Load	Actual Applied Cyclic Stress	Actual Applied Cyclic Stress	Actual Applied Contact Stress	Actual Applied Contact Stress	Average Recov Def. LVD1 and 2	Resilient Strain	Resilient Modulus
DESIGNATION	psi	psi	lbs	lbs	psi	lbs	lbs	psi	psi	psi	psi	in	in/in	psi
Sequence 1	6.0	2.0	25.2	22.6	2.1	2.6	2.6	1.9	0.2	0.00120	0.00015	12,355		
Sequence 2	6.0	4.0	47.2	44.6	3.9	2.7	2.7	3.7	0.2	0.00245	0.00031	11,969		
Sequence 3	6.0	6.0	69.9	66.4	5.7	3.5	3.5	5.5	0.3	0.00382	0.00048	11,436		
Sequence 4	6.0	8.0	93.2	87.3	7.7	5.9	5.9	7.2	0.5	0.00544	0.00068	10,570		
Sequence 5	6.0	10.0	115.5	107.1	9.5	8.4	8.4	8.8	0.7	0.00733	0.00091	9,623		
Sequence 6	4.0	2.0	25.3	22.5	2.1	2.8	2.8	1.8	0.2	0.00127	0.00016	11,640		
Sequence 7	4.0	4.0	47.3	44.4	3.9	2.8	2.8	3.6	0.2	0.00259	0.00032	11,316		
Sequence 8	4.0	6.0	69.0	66.2	5.7	2.8	2.8	5.4	0.2	0.00400	0.00050	10,892		
Sequence 9	4.0	8.0	92.6	87.4	7.6	5.2	5.2	7.2	0.4	0.00559	0.00070	10,302		
Sequence 10	4.0	10.0	115.4	107.8	9.5	7.6	7.6	8.9	0.6	0.00734	0.00092	9,667		
Sequence 11	2.0	2.0	25.1	22.4	2.1	2.8	2.8	1.8	0.2	0.00139	0.00017	10,559		
Sequence 12	2.0	4.0	47.1	44.3	3.9	2.8	2.8	3.6	0.2	0.00283	0.00035	10,329		
Sequence 13	2.0	6.0	68.9	66.0	5.7	2.8	2.8	5.4	0.2	0.00435	0.00054	9,988		
Sequence 14	2.0	8.0	91.6	87.3	7.5	4.3	4.3	7.2	0.4	0.00598	0.00075	9,611		
Sequence 15	2.0	10.0	114.6	107.9	9.4	6.7	6.7	8.9	0.6	0.00775	0.00097	9,170		

TESTED BY _____ DATE March 8, 2017
 REVIEWED BY _____ DATE _____

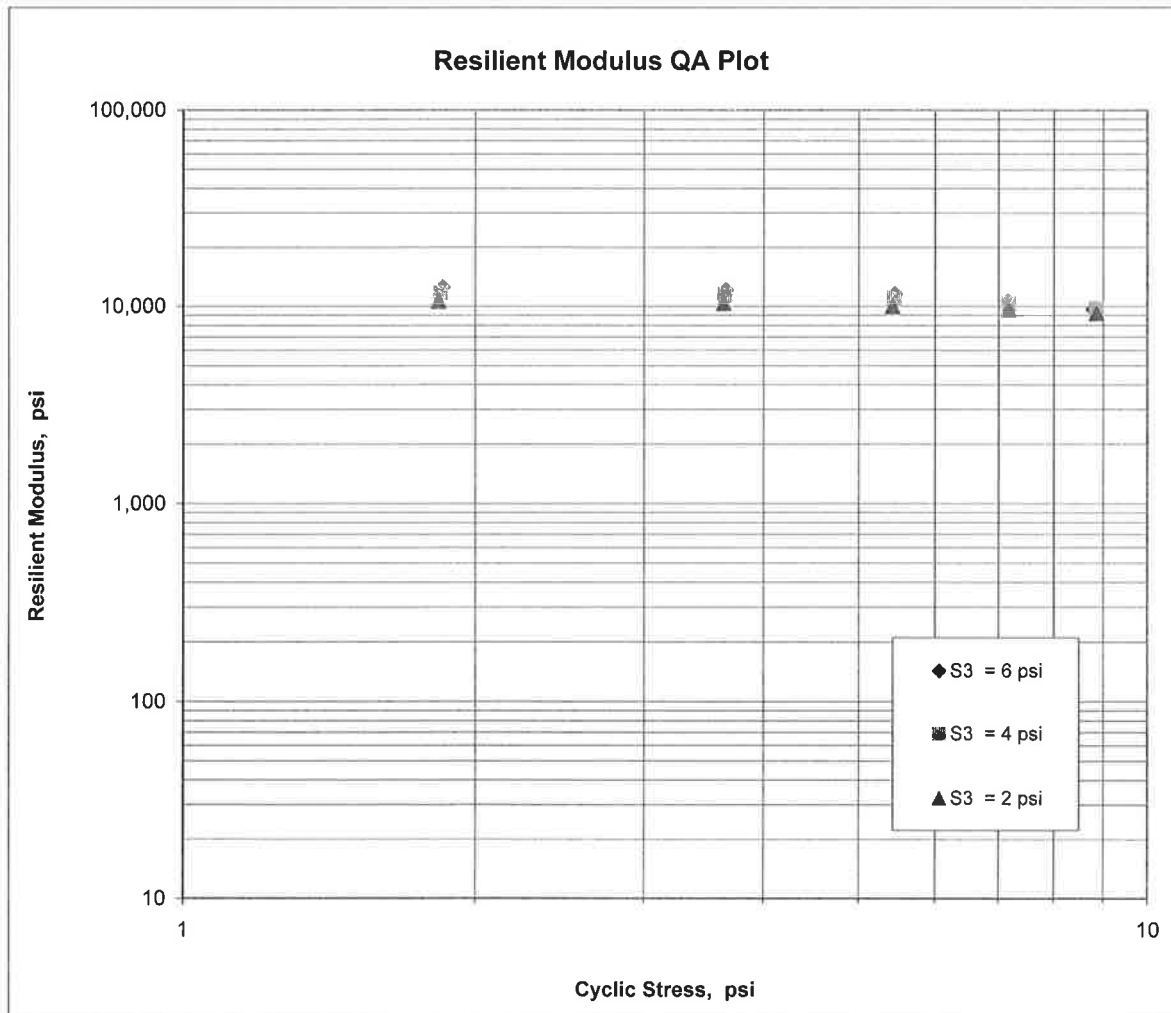
**ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT
MATERIALS DIVISION**

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

Job No.	110644	Material Code	SSRVPS
Date Sampled:	2/15/17	Station No.:	103+00
Date Tested:	March 8, 2017	Location:	22RT
Name of Project:	DRAINAGE DITCH STR. & APPRS. (S)		
County:	Code: 19	Name:	CROSS
Sampled By:	THORNTON/TAYLOR		
Lab No.:	20170623	Depth:	0-5
Sample ID:	RV157	AASHTO Class:	A-7-6(46)
LATITUDE:		Material Type (1 or 2):	2
		LONGITUDE:	

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

$K_1 = \underline{11,002}$
 $K_2 = \underline{-0.11410}$
 $K_5 = \underline{0.10736}$
 $R^2 = \underline{0.86}$



JOB: 110644

Arkansas State Highway Transportation Department

JOB NAME: DRAINAGE DITCH STR. & APPRS.(S)

Materials Division

COUNTY NO. 19 DATE TESTED 3/8/2017

Michael Benson, Materials Engineer

STA.#	LOC.	DEPTH	COLOR						L.L.	P.I.	SOIL CLASS	LAB #:	%MOISTURE	
				#4	#10	#40	#80	#200						
				S	I	E	V	E	S					
103+00	22'RT	0-5	BROWN	100					95	64	43	A-7-6(46)	RV157	
103+00	06' RT	0-5	BROWN	96	94	90	87		85	50	30	A-7-6(27)	S153	38.4
103+00	21'RT	0-5	BROWN	96	93	86	82		81	67	48	A-7-6(41)	S154	33.7
120+00	06' LT	0-5	BR/GR	100					94	71	51	A-7-6(53)	S155	28.9
120+00	21'LT	0-5	BR/GR	98	95	90	87		86	74	55	A-7-6(51)	S156	40.5

comments: W=MULTIPLE LAYERS, X=STRIPPED

Monday, March 13, 2017

JOB: 110644

JOB NAME: DRAINAGE DITCH STR. & APPRS.(S)

*Arkansas State Highway Transportation Department
Materials Division*

*DATE TESTED
3/8/2017*

COUNTY NO. 19

Michael Benson, Materials Engineer

STA.# LOC.

PAVEMENT SOUNDINGS

103+00	21' RT	ACHMSC	ACHMBC
103+00	06' RT	ACHMSC 5.5WX	ACHMBC 3.5
120+00	06' LT	ACHMSC 7.25W	ACHMBC 2.0

comments: W=MULTIPLE LAYERS, X=STRIPPED

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

MICHAEL BENSON, MATERIALS ENGINEER

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

DATE	- 03/10/17	SEQUENCE NO.	- 2
JOB NUMBER	- 110644	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	- 19
SUPPLIER NAME	- STATE	DISTRICT NO.	- 01
NAME OF PROJECT	- DRAINAGE DITCH STR. & APPRS. (S)		
PROJECT ENGINEER	- NOT APPLICABLE		
PIT/QUARRY	- ARKANSAS		
LOCATION	- CROSS, COUNTY	DATE SAMPLED	- 02/15/17
SAMPLED BY	- THORNTON/TAYLOR	DATE RECEIVED	- 02/21/17
SAMPLE FROM	- TEST HOLE	DATE TESTED	- 03/08/17
MATERIAL DESC.	- SOIL SURVEY - R VALUE- PAVEMENT SOUNDINGS		

LAB NUMBER	-	20170622	-	-
SAMPLE ID	-	S156	-	-
TEST STATUS	-	INFORMATION ONLY	-	-
STATION	-	120+00	-	-
LOCATION	-	21'LT	-	-
DEPTH IN FEET	-	0-5	-	-
MAT'L COLOR	-	BR/GR	-	-
MAT'L TYPE	-		-	-
LATITUDE DEG-MIN-SEC	-	35 9 28.50	-	-
LONGITUDE DEG-MIN-SEC	-	90 33 39.40	-	-
% PASSING	2	IN.	-	-
	1 1/2	IN.	-	-
	3/4	IN.	-	-
	3/8	IN.	-	100
	NO. 4		-	98
	NO. 10		-	95
	NO. 40		-	90
	NO. 80		-	87
	NO. 200		-	86
LIQUID LIMIT	-	74	-	-
PLASTICITY INDEX	-	55	-	-
AASHTO SOIL	-	A-7-6(51)	-	-
UNIFIED SOIL	-		-	-
% MOISTURE CONTENT	-	40.5	-	-
	-		-	-
	-		-	-
	-		-	-
	-		-	-
	-		-	-
	-		-	-
	-		-	-
	-		-	-
	-		-	-
	-		-	-
	-		-	-
	-		-	-
	-		-	-
	-		-	-
	-		-	-
	-		-	-
	-		-	-
	-		-	-

REMARKS - W=MULTIPLE LAYERS, 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	- 03/10/17	SEQUENCE NO.	- 1
JOB NUMBER	- 110644	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	- 19
SUPPLIER NAME	- STATE	DISTRICT NO.	- 01
NAME OF PROJECT	- DRAINAGE DITCH STR. & APPRS.(S)		
PROJECT ENGINEER	- NOT APPLICABLE		
PIT/QUARRY	- ARKANSAS		
LOCATION	- CROSS, COUNTY	DATE SAMPLED	- 02/15/17
SAMPLED BY	- THORNTON/TAYLOR	DATE RECEIVED	- 02/21/17
SAMPLE FROM	- TEST HOLE	DATE TESTED	- 03/08/17
MATERIAL DESC.	- SOIL SURVEY - RESISTANCE R-VALUE	ACTUAL RESULTS	

LAB NUMBER	- 20170623	-	-
SAMPLE ID	- RV157	-	-
TEST STATUS	- INFORMATION ONLY	-	-
STATION	- 103+00	-	-
LOCATION	- 22'RT	-	-
DEPTH IN FEET	- 0-5	-	-
MAT'L COLOR	- BROWN	-	-
MAT'L TYPE	-	-	-
LATITUDE DEG-MIN-SEC	- 35 9 12.80	-	-
LONGITUDE DEG-MIN-SEC	- 90 33 38.30	-	-
% PASSING	2 IN.	-	-
	1 1/2 IN.	-	-
	3/4 IN.	-	-
	3/8 IN.	-	-
	NO. 4	- 100	-
	NO. 10	-	-
	NO. 40	-	-
	NO. 80	-	-
	NO. 200	- 95	-
LIQUID LIMIT	- 64	-	-
PLASTICITY INDEX	- 43	-	-
AASHTO SOIL	- A-7-6(46)	-	-
UNIFIED SOIL	-	-	-
% MOISTURE CONTENT	-	-	-
	-	-	-
	-	-	-
	-	-	-
	-	-	-
	-	-	-
	-	-	-
	-	-	-
	-	-	-
	-	-	-
	-	-	-
	-	-	-
	-	-	-
	-	-	-
	-	-	-
	-	-	-

REMARKS - W=MULTIPLE LAYERS, X=STRIPPED

AASHTO TESTS : T24 T88 T89 T90 T265