

ARKANSAS DEPARTMENT OF TRANSPORTATION



SUBSURFACE INVESTIGATION

STATE JOB NO. 110567

FEDERAL AID PROJECT NO. STPR-0018(51)

DEER BAYOU STR. & APPRS. (S)

STATE HIGHWAY 42 SECTION 5

IN CRITTENDEN 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

August 9, 2013

TO: Mr. Trinity Smith, Engineer of Roadway Design

SUBJECT: Job No. 110567
Deer Bayou Str. & Apprs. (S)
Route 42 Section 5
Crittenden 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 existing bridge crossing Deer Bayou. 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 with some sand and high moisture contents. Cross-sections are not currently available, but it is anticipated that the construction grade line will closely match that of the existing roadway. Based on the moisture content of the highly plastic clay, stabilization will likely be required throughout the project to construct a stable working platform. If so, stabilization with lime is the most appropriate remediation technique. It is recommended that the addition of 6% 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.

Embankment recommendations will be made 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 the river ports at West Memphis.

2. Asphalt Concrete Hot Mix

Type	Asphalt Cement %	Mineral Aggregate %
Surface Course	5.2	94.8
Binder Course	4.3	95.7
Base Course	3.9	96.1



Michael C. Benson
Materials Engineer

MCB:pt:bjj
Attachment

cc: State Constr. Eng. – Master File Copy
District 1 Engineer
Planning 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 - 08/07/2013
JOB NUMBER - 110567

SEQUENCE NO. - 1
MATERIAL CODE - SSRVPS
SPEC. YEAR - 2003
SUPPLIER ID. - 1
COUNTY/STATE - 18
DISTRICT NO. - 01

JOB NAME - DEER BAYOU STR. & APPRS. (S)

* STATION LIMITS R-VALUE AT 240 psi *

BEGIN JOB - END JOB LESS THAN 5

RESILIENT MODULUS
STA.112+00 10084

REMARKS -

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AASHTO TESTS : T190

JOB: 110567

Arkansas State Highway Transportation Department

JOB NAME: DEER BAYOU STR.& APPRS.(S)

Materials Division

COUNTY NO. 18 DATE TESTED 8/6/2013

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					
112+00	15'LT	0-5	BROWN	98	96	91	86	83	81	59	A-7-5(24)	RV1459	
103+00	5'RT	0-5	BROWN	95	96	89	84	78	43	24	A-7-6(18)	S1455	42
103+00	15'RT	0-5	BROWN	91	84	70	60	57	53	34	A-7-6(16)	S1456	41.2
112+00	5'LT	0-5	BROWN	98	96	88	83	82	68	40	A-7-6(36)	S1457	38.9
112+00	15'LT	0-5	BROWN	89	81	67	60	56	50	31	A-7-6(14)	S1458	43.1



JOB: 110567

Arkansas State Highway Transportation Department

DATE TESTED
8/6/2013

JOB NAME: DEER BAYOU STR. & APPRS.(S)

Materials Division

Michael Benson, Materials Engineer

COUNTY NO. 18

PAVEMENT SOUNDINGS

STA.# LOC.

103+00	5'RT	ACHMSC 10.5W	AGG.BASE CRS, CL-5 5.0
103+00	15'RT	ACHMSC ---	AGG.BASE CRS, CL-5 ---
112+00	5'LT	ACHMSC 11.25WX	AGG.BASE CRS, CL-5 9.0

comments: W=MULTIPLE LAYERS, X=STRIPPED

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

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

Job No.	110567	Material Code	SSRVPS
Date Sampled:	8/02/2013	Station No.:	112+00
Date Tested:	August 2, 2013	Location:	15'LT
Name of Project:	DEER BAYOU STR. & APPRS.(S)		
County:	Code: 18	Name:	CRITTENDEN
Sampled By:	FAULKNER	Depth:	0-5
Lab No.:	20133276	AASHTO Class:	A-7-5(24)
Sample ID:	RV1459	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	3.96
Bottom	3.96
Average	3.96
Membrane Thickness (in):	0.00
Height of Specimen, Cap and Base (in):	8.03
Height of Cap and Base (in):	0.00
Initial Length, Lo (in):	8.03
Initial Area, Ao (sq. in):	12.30
Initial Volume, AoLo (cu. in):	98.73

3. Soil Specimen Weight:

Weight of Wet Soil Used (g):	2825.40
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4. Soil Properties:

Optimum Moisture Content (%):	27.2
Maximum Dry Density (pcf):	90.8
95% of MDD (pcf):	86.3
In-Situ Moisture Content (%):	N/A

5. Specimen Properties:

Wet Weight (g):	2825.40
Compaction Moisture content (%):	26.8
Compaction Wet Density (pcf):	109.04
Compaction Dry Density (pcf):	85.99
Moisture Content After Mr Test (%):	26.8

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

#VALUE!

7. Resilient Modulus, Mr:

11114(Sc)^{-0.11966(S3)}^{0.20584}

8. Comments

9. Tested By:

DEB _____

Date: August 2, 2013 _____

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

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

Job No. 110567 **Material Code** SSRVPS
Date Sampled: 8/02/2013 **Station No.:** 112+00
Date Tested: August 2, 2013 **Location:** 15'LT
Name of Project: DEER BAYOU STR. & APPRS.(S)
County: Code: 18 **Name:** CRITTENDEN
Sampled By: FAULKNER **Depth:** 0-5
Lab No.: 20133276 **AASHTO Class:** A-7-5(24)
Sample ID: RV1459 **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
	S ₃ psi	S _{cyclic} psi	P _{max} lbs	P _{cyclic} lbs	P _{contact} lbs	S _{max} psi	S _{cyclic} psi	S _{contact} psi	H _{avg} in	ε _r in/in	M _r psi
Sequence 1	6.0	2.0	25.2	22.4	2.9	2.1	1.8	0.2	0.00096	0.00012	15,171
Sequence 2	6.0	4.0	47.1	44.2	2.9	3.8	3.6	0.2	0.00201	0.00025	14,338
Sequence 3	6.0	6.0	69.6	65.8	3.8	5.7	5.4	0.3	0.00318	0.00040	13,503
Sequence 4	6.0	8.0	92.4	86.1	6.2	7.5	7.0	0.5	0.00459	0.00057	12,266
Sequence 5	6.0	10.0	114.0	105.3	8.7	9.3	8.6	0.7	0.00620	0.00077	11,095
Sequence 6	4.0	2.0	25.1	22.2	2.8	2.0	1.8	0.2	0.00103	0.00013	14,095
Sequence 7	4.0	4.0	46.9	44.0	2.8	3.8	3.6	0.2	0.00216	0.00027	13,337
Sequence 8	4.0	6.0	68.3	65.4	2.9	5.6	5.3	0.2	0.00334	0.00042	12,809
Sequence 9	4.0	8.0	91.3	86.0	5.3	7.4	7.0	0.4	0.00471	0.00059	11,919
Sequence 10	4.0	10.0	113.5	105.6	7.8	9.2	8.6	0.6	0.00624	0.00078	11,047
Sequence 11	2.0	2.0	24.7	21.9	2.8	2.0	1.8	0.2	0.00135	0.00017	10,594
Sequence 12	2.0	4.0	46.8	43.9	2.9	3.8	3.6	0.2	0.00262	0.00033	10,958
Sequence 13	2.0	6.0	68.0	65.1	2.9	5.5	5.3	0.2	0.00390	0.00049	10,893
Sequence 14	2.0	8.0	90.0	85.5	4.5	7.3	7.0	0.4	0.00533	0.00066	10,486
Sequence 15	2.0	10.0	111.8	104.8	7.0	9.1	8.5	0.6	0.00679	0.00084	10,084

TESTED BY DEB **DATE** August 2, 2013
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.	110567	Material Code	SSRVPS
Date Sampled:	8/02/2013	Station No.:	112+00
Date Tested:	August 2, 2013	Location:	15'LT
Name of Project:	DEER BAYOU STR. & APPRS.(S)		
County:	Code: 18	Name:	CRITTENDEN
Sampled By:	FAULKNER	Depth:	0-5
Lab No.:	20133276	AASHTO Class:	A-7-5(24)
Sample ID:	RV1459	Material Type (1 or 2):	2
LATITUDE:		LONGITUDE:	

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

$$K_1 = 11,114$$

$$K_2 = -0.11966$$

$$K_5 = 0.20584$$

$$R^2 = 0.82$$



