ARKANSAS DEPARTMENT OF TRANSPORTATION

SUBSURFACE INVESTIGATION

STATE JOB NO. 070378

FEDERAL AID PROJECT NO. NHPP-0014(34)

SPRING BRANCH STR. & APPRS. (S)

STATE HIGHWAY 98 **SECTION** 2

IN COLUMBIA **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 4, 2019

TO: Mr. Trinity Smith, Engineer of Roadway Design

SUBJECT: Job No. 070378
Spring Branch Creek Str. & Apprs. (S)
Route 98 Section 2
Columbia 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 at Spring Branch with a box culvert. Samples were taken in the existing travel lanes and ditch line.

The subgrade soils consist primarily of non-plastic sands. The subgrade soils are expected to provide a stable working platform with conventional processing if the weather is favorable during construction.

Based on currently available cross sections the maximum embankment height is approximately 13 feet. Prior to embankment construction all soft unstable organic material in the ditch line should be undercut, anticipated to be no more than two feet. The embankment may be constructed with locally available unspecified material utilizing the 3:1 slope configuration shown.

The proposed 3:1 cut slopes are acceptable as shown.

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 Bismarck.

2. Asphalt Concrete Hot Mix

Type	Asphalt Cement %	Mineral Aggregate %
Surface Course	5.3	94.7
Binder Course	4.4	95.6
Base Course	4.0	96.0

Michael C. Benson
Materials Engineer

MCB:pt:bjj
Attachment
cc: State Constr. Eng. – Master File Copy
District 7 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 - 05/15/2019
JOB NUMBER - 070378

SEQUENCE NO. - 1
MATERIAL CODE - SSRV
SPEC. YEAR - 2014
SUPPLIER ID. - 1
COUNTY/STATE - 14
DISTRICT NO. - 07

JOB NAME - SPRING BRANCH STR. & APPRS. (S)

STATION LIMITS	R-VALUE AT 240 psi
BEGIN JOB - END JOB	10
RESILIENT MODULUS	
STA. 15 + 00	11586

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.	070378	**Material Code**	SSRVPS
Date Sampled:	3/25/19	**Station No.:**	15+00
Date Tested:	April 17, 2019	**Location:**	15'RT
Name of Project:	SPRING BRANCH STR. & APPRS. (S)		
County:	**Code:** 35 **Name:** JEFFERSON		
Sampled By:	FRAZIER/BATES	**Depth:**	0-5
Lab No.:	20190847	**AASHTO Class:**	A-6(4)
Sample ID:	RV99	**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):	3171.40

4. Soil Properties:

Optimum Moisture Content (%):	14.2
Maximum Dry Density (pcf):	113
95% of MDD (pcf):	107.4
In-Situ Moisture Content (%):	N/A

5. Specimen Properties:

Wet Weight (g):	3171.40
Compaction Moisture content (%):	14.5
Compaction Wet Density (pcf):	123.71
Compaction Dry Density (pcf):	108.04
Moisture Content After Mr Test (%):	14.5

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

7. Resilient Modulus, Mr: 13292(Sc)^-0.14945(S3)^0.25407

8. Comments _____

_____

9. Tested By: GW **Date:** April 17, 2019

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT
MATERIALS DIVISION

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

Job No.	070378	**Material Code**	SSRVPS
Date Sampled:	3/25/19	**Station No.:**	15+00
Date Tested:	April 17, 2019	**Location:**	15'RT
Name of Project:	SPRING BRANCH STR. & APPRS. (S)		
County:	**Code:** 35 **Name:** JEFFERSON		
Sampled By:	FRAZIER/BATES	**Depth:**	0-5
Lab No.:	20190847	**AASHTO Class:**	A-6(4)
Sample ID:	RV99	**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	25.2	22.7	2.6	2.1	1.9	0.2	0.00077	0.00010	19,275
Sequence 2	6.0	4.0	47.0	44.5	2.5	3.9	3.7	0.2	0.00161	0.00020	18,205
Sequence 3	6.0	6.0	69.5	66.0	3.4	5.7	5.4	0.3	0.00257	0.00032	16,912
Sequence 4	6.0	8.0	92.7	86.7	6.0	7.6	7.1	0.5	0.00373	0.00046	15,319
Sequence 5	6.0	10.0	115.2	106.8	8.5	9.5	8.8	0.7	0.00496	0.00062	14,170
Sequence 6	4.0	2.0	25.1	22.4	2.7	2.1	1.8	0.2	0.00087	0.00011	16,853
Sequence 7	4.0	4.0	46.7	44.0	2.7	3.8	3.6	0.2	0.00183	0.00023	15,804
Sequence 8	4.0	6.0	68.2	65.5	2.8	5.6	5.4	0.2	0.00288	0.00036	14,956
Sequence 9	4.0	8.0	91.5	86.3	5.2	7.5	7.1	0.4	0.00402	0.00050	14,129
Sequence 10	4.0	10.0	114.4	106.8	7.6	9.4	8.8	0.6	0.00530	0.00066	13,269
Sequence 11	2.0	2.0	24.7	22.0	2.7	2.0	1.8	0.2	0.00105	0.00013	13,821
Sequence 12	2.0	4.0	46.4	43.7	2.8	3.8	3.6	0.2	0.00219	0.00027	13,147
Sequence 13	2.0	6.0	67.5	64.8	2.7	5.5	5.3	0.2	0.00338	0.00042	12,610
Sequence 14	2.0	8.0	89.8	85.6	4.2	7.4	7.0	0.3	0.00465	0.00058	12,123
Sequence 15	2.0	10.0	111.9	105.2	6.7	9.2	8.6	0.5	0.00598	0.00075	11,586

TESTED BY GW DATE April 17, 2019

REVIEWED BY _____ DATE _____

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT

MATERIALS DIVISION

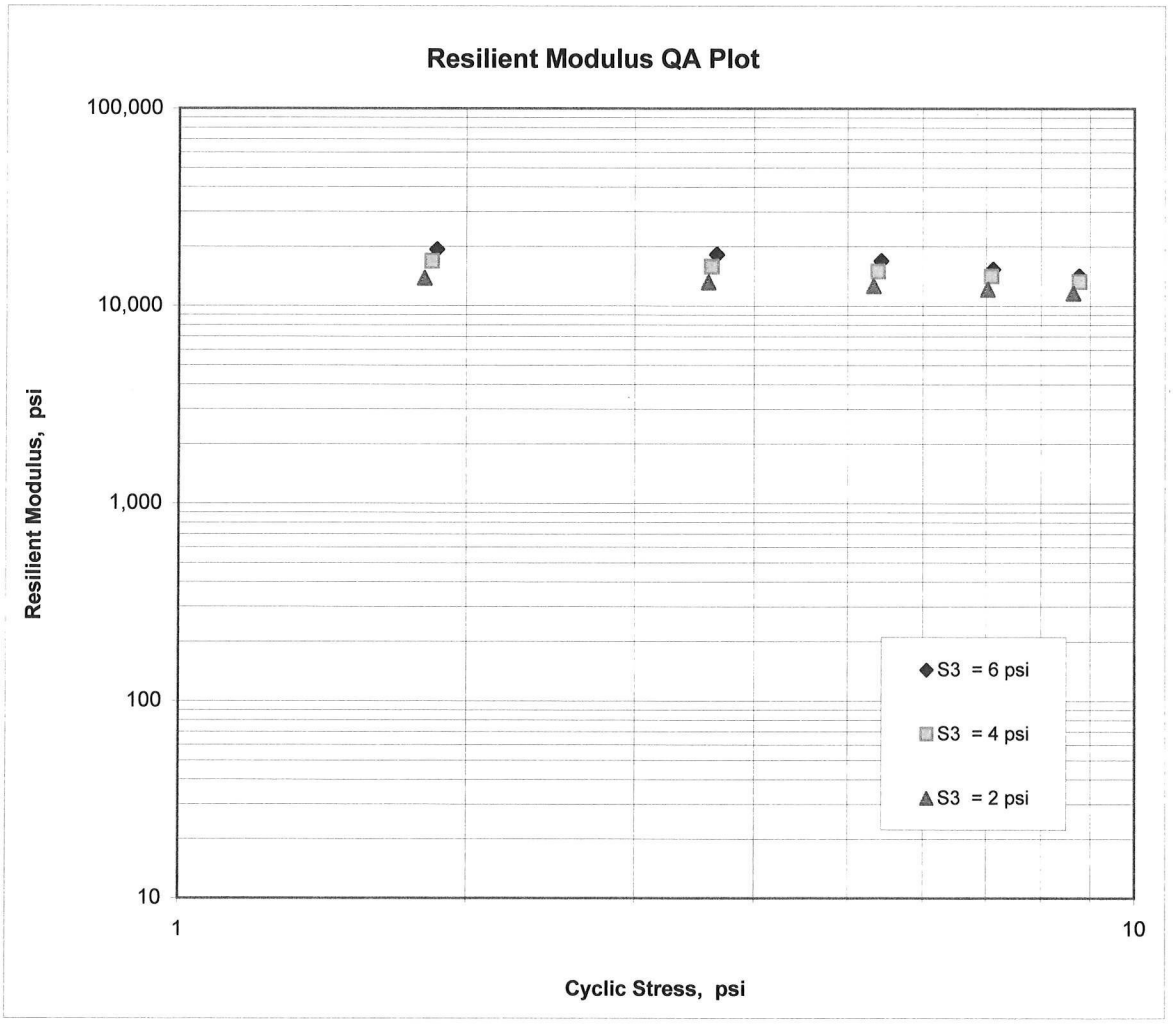
AASHTO T 307-99 - RESILIENT MODULUS OF SUBGRADE SOILS

RECOMPACTED / THINWALL TUBE SAMPLES

Job No.	070378	**Material Code**	SSRVPS
Date Sampled:	3/25/19	**Station No.:**	15+00
Date Tested:	April 17, 2019	**Location:**	15'RT
Name of Project:	SPRING BRANCH STR. & APPRS. (S)		
County:	**Code:** 35 **Name:** JEFFERSON		
Sampled By:	FRAZIER/BATES	**Depth:**	0-5
Lab No.:	20190847	**AASHTO Class:**	A-6(4)
Sample ID:	RV99	**Material Type (1 or 2):**	2
LATITUDE:		**LONGITUDE:**	

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

K1 =	13,292
K2 =	-0.14945
K5 =	0.25407
R^2 =	0.95



JOB: 070378

JOB NAME: SPRING BRANCH STR. & APPRS. (S)

COUNTY NO. 14

STA.# LOC.

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

DATE TESTED
5/15/2019

PAVEMENT SOUNDINGS

15+00	05 RT	ACHM SC **3.875W**
15+00	15 RT	ACHM SC ---
22+00	05 LT	ACHM SC **3.25W**

comments: W=MULTIPLE LAYERS

Friday, May 31, 2019

JOB: 070378

JOB NAME: SPRING BRANCH STR. & APPRS. (S)

COUNTY NO. 14 **DATE TESTED** 5/15/2019

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
				S	I	E	V	E S					
15+00	15 RT	0-5	BROWN	83	80	75	62	48	30	15	A-6(4)	RV99	
15+00	05 RT	0-5	BROWN	94	91	84	52	29	ND	NP	A-2-4(0)	S95	16.9
15+00	15 RT	0-5	BROWN	94	91	88	64	39	ND	NP	A-4(0)	S96	18.2
22+00	05 LT	0-5	BROWN	77	71	68	58	42	ND	NP	A-4(0)	S97	24.9
22+00	15 LT	0-5	BROWN	98	96	93	87	67	36	18	A-6(10)	S98	16.3

comments: W=MULTIPLE LAYERS

Friday, May 31, 2019

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

DATE - 05/15/19
JOB NUMBER - 070378
FEDERAL AID NO.- TO BE ASSIGNED
PURPOSE - SOIL SURVEY SAMPLE
SPEC. REMARKS - NO SPECIFICATION CHECK
SUPPLIER NAME - STATE
NAME OF PROJECT - SPRING BRANCH STR. & APPRS. (S)
PROJECT ENGINEER - NOT APPLICABLE
PIT/QUARRY - ARKANSAS
LOCATION - COLUMBIA, COUNTY
SAMPLED BY - FRAZIER/BATES
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 - 14
DISTRICT NO. - 07

DATE SAMPLED - 03/25/19
DATE RECEIVED - 03/26/19
DATE TESTED - 05/15/19

LAB NUMBER	20190843	20190844	20190845
SAMPLE ID	S95	S96	S97
TEST STATUS	INFORMATION ONLY	INFORMATION ONLY	INFORMATION ONLY
STATION	15+00	15+00	22+00
LOCATION	05 RT	15 RT	05 LT
DEPTH IN FEET	0-5	0-5	0-5
MAT'L COLOR	BROWN	BROWN	BROWN
MAT'L TYPE			
LATITUDE DEG-MIN-SEC	33 21 57.00	33 21 56.90	33 21 51.20
LONGITUDE DEG-MIN-SEC	93 09 33.40	93 09 33.40	93 09 28.70
% PASSING 2 IN.			
1 1/2 IN.			
3/4 IN.	100	100	100
3/8 IN.	98	98	94
NO. 4	94	94	77
NO. 10	91	91	71
NO. 40	84	88	68
NO. 80	52	64	58
NO. 200	29	39	42
LIQUID LIMIT	ND	ND	ND
PLASTICITY INDEX	NP	NP	NP
AASHTO SOIL	A-2-4(0)	A-4(0)	A-4(0)
UNIFIED SOIL			
% MOISTURE CONTENT	16.9	18.2	24.9
ACHM SC (IN)	3.875W	---	3.25W

REMARKS - W=MULTIPLE LAYERS

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	- 05/15/19	SEQUENCE NO.	- 2
JOB NUMBER	- 070378	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	- 14
SUPPLIER NAME	- STATE	DISTRICT NO.	- 07
NAME OF PROJECT	- SPRING BRANCH STR. & APPRS. (S)		
PROJECT ENGINEER	- NOT APPLICABLE		
PIT/QUARRY	- ARKANSAS		
LOCATION	- COLUMBIA, COUNTY	DATE SAMPLED	- 03/25/19
SAMPLED BY	- FRAZIER/BATES	DATE RECEIVED	- 03/26/19
SAMPLE FROM	- TEST HOLE	DATE TESTED	- 05/15/19

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

LAB NUMBER	20190846
SAMPLE ID	S98
TEST STATUS	INFORMATION ONLY
STATION	22+00
LOCATION	15 LT
DEPTH IN FEET	0-5
MAT'L COLOR	BROWN
MAT'L TYPE	
LATITUDE DEG-MIN-SEC	33 21 51.30
LONGITUDE DEG-MIN-SEC	93 09 28.60
% PASSING 2 IN.	
1 1/2 IN.	
3/4 IN.	
3/8 IN.	100
NO. 4	98
NO. 10	96
NO. 40	93
NO. 80	87
NO. 200	67
LIQUID LIMIT	36
PLASTICITY INDEX	18
AASHTO SOIL	A-6(10)
UNIFIED SOIL	
% MOISTURE CONTENT	16.3

REMARKS - W=MULTIPLE LAYERS

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 - 05/15/19
JOB NUMBER - 070378
FEDERAL AID NO.- TO BE ASSIGNED
PURPOSE - SOIL SURVEY SAMPLE
SPEC. REMARKS - NO SPECIFICATION CHECK
SUPPLIER NAME - STATE
NAME OF PROJECT - SPRING BRANCH STR. & APPRS. (S)
PROJECT ENGINEER - NOT APPLICABLE
PIT/QUARRY - ARKANSAS
LOCATION - COLUMBIA, COUNTY
SAMPLED BY - FRAZIER/BATES
SAMPLE FROM - TEST HOLE
MATERIAL DESC. - SOIL SURVEY - RESISTANCE R-VALUE

SEQUENCE NO. - 1
MATERIAL CODE - RV
SPEC. YEAR - 2014
SUPPLIER ID. - 1
COUNTY/STATE - 14
DISTRICT NO. - 07

DATE SAMPLED - 03/25/19
DATE RECEIVED - 03/26/19
DATE TESTED - 05/15/19

		ACTUAL RESULTS
LAB NUMBER	20190847	
SAMPLE ID	RV99	
TEST STATUS	INFORMATION ONLY	
STATION	15+00	
LOCATION	15 RT	
DEPTH IN FEET	0-5	
MAT'L COLOR	BROWN	
MAT'L TYPE		
LATITUDE DEG-MIN-SEC	33 21 56.90	
LONGITUDE DEG-MIN-SEC	93 09 33.40	
% PASSING 2 IN.		
1 1/2 IN.		
3/4 IN.	100	
3/8 IN.	88	
NO. 4	83	
NO. 10	80	
NO. 40	75	
NO. 80	62	
NO. 200	48	
LIQUID LIMIT	30	
PLASTICITY INDEX	15	
AASHTO SOIL	A-6(4)	
UNIFIED SOIL		
% MOISTURE CONTENT		

REMARKS -

AASHTO TESTS : T24 T88 T89 T90 T265