ARKANSAS DEPARTMENT OF TRANSPORTATION

SUBSURFACE INVESTIGATION

STATE JOB NO. 012318

FEDERAL AID PROJECT NO. NHPP-2653(1)

MIDDLE FORK SALINE RIVER & DRY RUN CREEK STRS. & APPRS. (S)

STATE HIGHWAY 7 **SECTION** 10 & 11

IN GARLAND & PERRY **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

October 10, 2017

TO: Mr. Trinity Smith, Engineer of Roadway Design

SUBJECT: Job No. 061501
Middle Fork Saline River Str. & Apprs. (S)
Route 7 Section 10
Garland 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 bridge crossing the Middle Fork Saline River on Highway 7. 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 Sandy clay with sandstone fragments. 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 drying and compactive effort, if the weather is favorable during construction. Rock was encountered at station 317+10 18 feet left of centerline at a depth of 3 feet. There were no slides observed within the project limits.

Additional earthwork requirements 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 Bryant.

2. Asphalt Concrete Hot Mix

Type	Asphalt Cement %	Mineral Aggregate %
Surface Course	4.9	95.1
Binder Course	4.0	96.0
Base Course	3.6	96.4

Michael C. Benson
Materials Engineer

MCB:pt:bjj
Attachment
cc: State Constr. Eng. – Master File Copy
District 6 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 - 09/19/2017
JOB NUMBER - 061501

SEQUENCE NO. - 1
MATERIAL CODE - SSRV
SPEC. YEAR - 2014
SUPPLIER ID. - 1
COUNTY/STATE - 26
DISTRICT NO. - 06

JOB NAME - MIDDLE FORK SALINE RIVER STR. & APPRS. (S)

STATION LIMITS	R-VALUE AT 240 psi
BEGIN JOB - END JOB	10
RESILIENT MODULUS STA.317+10	9728

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.	061501	**Material Code**	SSRVPS
Date Sampled:	8/3/2017	**Station No.:**	317+10
Date Tested:	September 1, 2017	**Location:**	18'LT
Name of Project:	MIDDLE FORK SALINE RIVER STR. & APPRS. (S)		
County:	**Code:** 26 **Name:** GARLAND		
Sampled By:	THORNTON/BATES	**Depth:**	0-5
Lab No.:	20172631	**AASHTO Class:**	A-6 (3)
Sample ID:	RV545	**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	3.96
Middle	3.95
Bottom	3.94
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):	3090.10

4. Soil Properties:

Optimum Moisture Content (%):	13.8
Maximum Dry Density (pcf):	110.8
95% of MDD (pcf):	105.3
In-Situ Moisture Content (%):	N/A

5. Specimen Properties:

Wet Weight (g):	3090.10
Compaction Moisture content (%):	13.9
Compaction Wet Density (pcf):	120.53
Compaction Dry Density (pcf):	105.82
Moisture Content After Mr Test (%):	14.2

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

7. Resilient Modulus, Mr: 14147(Sc)^-0.27607(S3)^0.30191

8. Comments _____

9. Tested By: GW **Date:** September 1, 2017

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT
MATERIALS DIVISION

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

Job No.	061501	**Material Code**	SSRVPS
Date Sampled:	8/3/2017	**Station No.:**	317+10
Date Tested:	September 1, 2017	**Location:**	18'LT
Name of Project:	MIDDLE FORK SALINE RIVER STR. & APPRS. (S)		
County:	**Code:** 26 **Name:** GARLAND		
Sampled By:	THORNTON/BATES	**Depth:**	0-5
Lab No.:	20172631	**AASHTO Class:**	A-6 (3)
Sample ID:	RV545	**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	22.9	2.2	2.1	1.9	0.2	0.00075	0.00009	20,133
Sequence 2	6.0	4.0	47.5	45.3	2.2	3.9	3.7	0.2	0.00165	0.00021	18,105
Sequence 3	6.0	6.0	69.9	66.9	3.0	5.7	5.5	0.3	0.00275	0.00034	16,038
Sequence 4	6.0	8.0	92.8	87.4	5.4	7.6	7.2	0.4	0.00414	0.00052	13,889
Sequence 5	6.0	10.0	115.1	107.3	7.8	9.5	8.8	0.6	0.00564	0.00070	12,531
Sequence 6	4.0	2.0	25.1	22.8	2.3	2.1	1.9	0.2	0.00086	0.00011	17,537
Sequence 7	4.0	4.0	47.0	44.7	2.3	3.9	3.7	0.2	0.00193	0.00024	15,216
Sequence 8	4.0	6.0	68.4	66.0	2.3	5.6	5.4	0.2	0.00319	0.00040	13,645
Sequence 9	4.0	8.0	91.3	86.5	4.8	7.5	7.1	0.4	0.00460	0.00057	12,385
Sequence 10	4.0	10.0	113.5	106.1	7.4	9.3	8.7	0.6	0.00613	0.00076	11,406
Sequence 11	2.0	2.0	25.0	22.5	2.6	2.1	1.8	0.2	0.00104	0.00013	14,248
Sequence 12	2.0	4.0	46.4	43.8	2.7	3.8	3.6	0.2	0.00233	0.00029	12,386
Sequence 13	2.0	6.0	67.2	64.5	2.7	5.5	5.3	0.2	0.00379	0.00047	11,206
Sequence 14	2.0	8.0	88.7	84.6	4.1	7.3	6.9	0.3	0.00537	0.00067	10,366
Sequence 15	2.0	10.0	110.7	104.1	6.6	9.1	8.5	0.5	0.00705	0.00088	9,728

TESTED BY GW DATE September 1, 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.	061501	**Material Code**	SSRVPS
Date Sampled:	8/3/2017	**Station No.:**	317+10
Date Tested:	September 1, 2017	**Location:**	18'LT
Name of Project:	MIDDLE FORK SALINE RIVER STR. & APPRS. (S)		
County:	**Code:** 26 **Name:** GARLAND		
Sampled By:	THORNTON/BATES	**Depth:**	0-5
Lab No.:	20172631	**AASHTO Class:**	A-6 (3)
Sample ID:	RV545	**Material Type (1 or 2):**	2
LATITUDE:		**LONGITUDE:**	

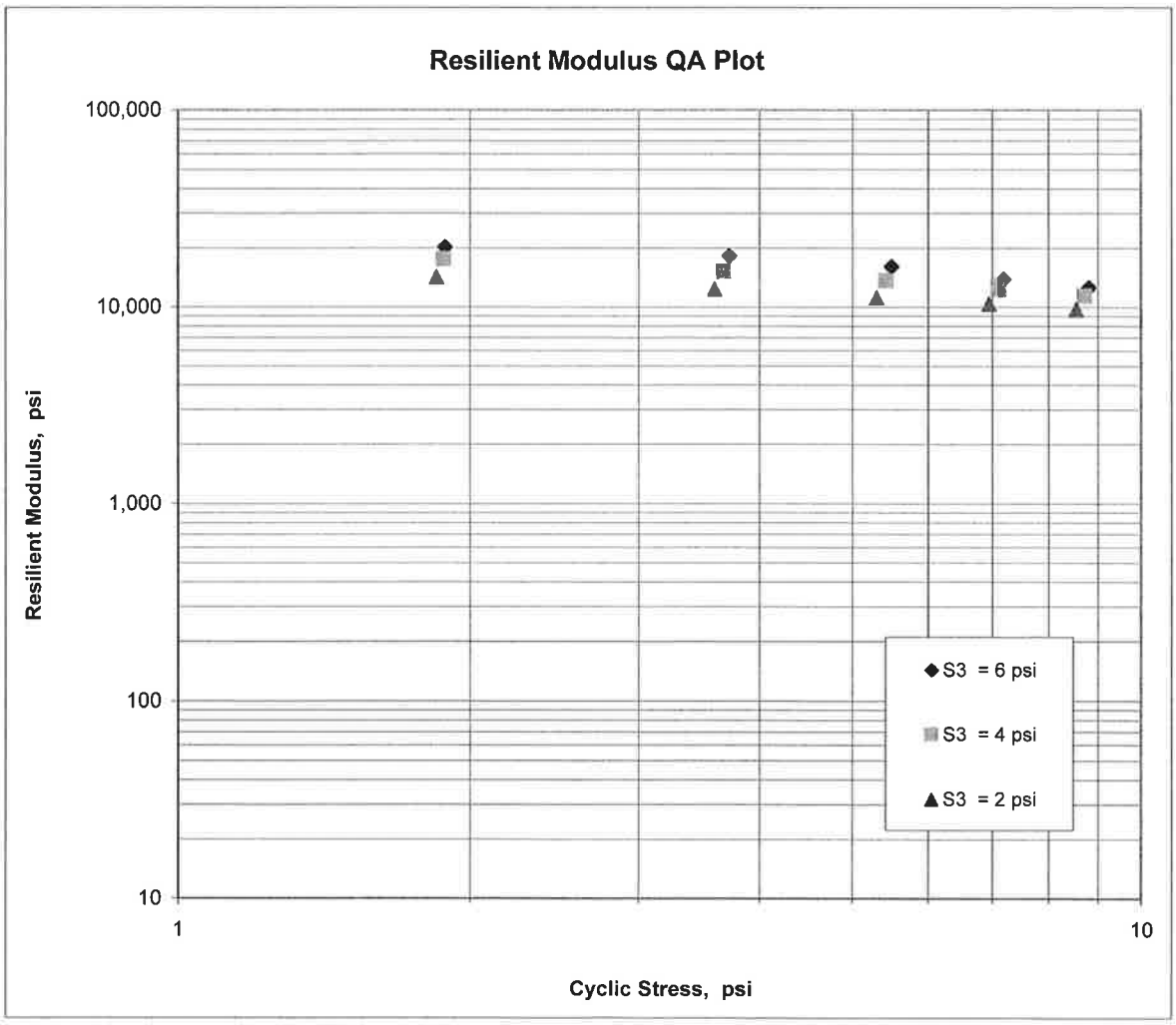
$$M_R = K1\ (S_C)^{K2}\ (S_3)^{K5}$$

K1 = 14,147

K2 = -0.27607

K5 = 0.30191

R^2 = 0.97



JOB: 061501

JOB NAME: MIDDLE FORK SALINE RIVER STR. & APPRS. (S)

COUNTY NO. 26 **DATE TESTED** 8/16/2017

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 SIZES									
317+10	18 LT	0-3	BROWN	90	85	78	66	51	32	11	A-6(3)	RV545	
310+00	06 RT	0-5	GRAY	80	67	53	46	39	41	20	A-7-6(3)	S541	9
310+00	24 RT	0-5	BR/GR	63	50	37	32	26	32	13	A-2-6(0)	S542	8.2
317+00	06 LT	0-3	BROWN	96	89	80	73	63	34	17	A-6(8)	S543	15.4
317+00	18 LT	0-5	BROWN	56	39	29	22	15	30	11	A-2-6(0)	S544	13.5

comments: W=MULTIPLE LAYERS, X=STRIPPED

Monday, October 02, 2017

JOB: 061501
JOB NAME: MIDDLE FORK SALINE RIVER STR. & APPRS. (S)
COUNTY NO. 26

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

DATE TESTED
8/16/2017

PAVEMENT SOUNDINGS

STA.#	LOC.					
310+00	06 RT	ACHMSC	BST	ACHMBC	ACHMBC	AGG BASE CRS CL-7
		2.0W	**.50**	**.50**	**20X**	**7.0**
310+00	24 RT	ACHMSC	BST	ACHMBC	ACHMBC	AGG BASE CRS CL-7
		---	---	---	---	---
317+00	06 LT	ACHMSC	BST	ACHMBC	ACHMBC	AGG BASE CRS CL-7
		2.25X	**3.0W**	**1.25**	---	**9.0**

comments: W=MULTIPLE LAYERS,X=STRIPPED

Monday, October 02, 2017

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

DATE	- 09/19/17	SEQUENCE NO.	- 1
JOB NUMBER	- 061501	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	- 26
SUPPLIER NAME	- STATE	DISTRICT NO.	- 06

NAME OF PROJECT - MIDDLE FORK SALINE RIVER STR. & APPRS. (S)
PROJECT ENGINEER - NOT APPLICABLE
PIT/QUARRY - ARKANSAS

LOCATION	- GARLAND COUNTY	DATE SAMPLED	- 08/03/17
SAMPLED BY	- THORNTON/BATES	DATE RECEIVED	- 08/08/17
SAMPLE FROM	- TEST HOLE	DATE TESTED	- 08/16/17

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

LAB NUMBER	- 20172627	- 20172628	- 20172629
SAMPLE ID	- S541	- S542	- S543
TEST STATUS	- INFORMATION ONLY	- INFORMATION ONLY	- INFORMATION ONLY
STATION	- 310+00	- 310+00	- 317+00
LOCATION	- 06 RT	- 24 RT	- 06 LT
DEPTH IN FEET	- 0-5	- 0-5	- 0-3
MAT'L COLOR	- GRAY	- BR/GR	- BROWN
MAT'L TYPE	-	-	-
LATITUDE DEG-MIN-SEC	- 34 45 46.00	- 34 45 46.00	- 34 45 50.80
LONGITUDE DEG-MIN-SEC	- 93 04 28.10	93 04 27.90	93 04 34.20
% PASSING 2 IN.	-	-	-
1 1/2 IN.	-	-	-
3/4 IN.	- 100	- 100	-
3/8 IN.	- 91	- 80	- 100
NO. 4	- 80	- 63	- 96
NO. 10	- 67	- 50	- 89
NO. 40	- 53	- 37	- 80
NO. 80	- 46	- 32	- 73
NO. 200	- 39	26	63
LIQUID LIMIT	- 41	- 32	- 34
PLASTICITY INDEX	- 20	- 13	- 17
AASHTO SOIL	- A-7-6(3)	- A-2-6(0)	- A-6(8)
UNIFIED SOIL	-	-	-
% MOISTURE CONTENT	- 9.0	8.2	15.4
ACHMSC (IN)	- 2.0W	- ---	- 2.25X
BST (IN)	- .50	- ---	- 3.0W
ACHMBC (IN)	- .50	- ---	- 1.25
ACHMBC (IN)	- 20X	- ---	- ---
AGG BASE CRS CL-7 (IN)	- 7.0	- ---	- 9.0

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	- 09/19/17	SEQUENCE NO.	- 2
JOB NUMBER	- 061501	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	- 26
SUPPLIER NAME	- STATE	DISTRICT NO.	- 06
NAME OF PROJECT	- MIDDLE FORK SALINE RIVER STR. & APPRS. (S)		
PROJECT ENGINEER	- NOT APPLICABLE		
PIT/QUARRY	- ARKANSAS		
LOCATION	- GARLAND COUNTY	DATE SAMPLED	- 08/03/17
SAMPLED BY	- THORNTON/BATES	DATE RECEIVED	- 08/08/17
SAMPLE FROM	- TEST HOLE	DATE TESTED	- 08/16/17

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

LAB NUMBER	20172630
SAMPLE ID	S544
TEST STATUS	INFORMATION ONLY
STATION	317+00
LOCATION	18 LT
DEPTH IN FEET	0-5
MAT'L COLOR	BROWN
MAT'L TYPE	
LATITUDE DEG-MIN-SEC	34 45 50.90
LONGITUDE DEG-MIN-SEC	93 04 34.50
% PASSING 2 IN.	
1 1/2 IN.	
3/4 IN.	100
3/8 IN.	93
NO. 4	56
NO. 10	39
NO. 40	29
NO. 80	22
NO. 200	15
LIQUID LIMIT	30
PLASTICITY INDEX	11
AASHTO SOIL	A-2-6(0)
UNIFIED SOIL	
% MOISTURE CONTENT	13.5

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	- 09/19/17	SEQUENCE NO.	- 1
JOB NUMBER	- 061501	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	- 26
SUPPLIER NAME	- STATE	DISTRICT NO.	- 06

NAME OF PROJECT - MIDDLE FORK SALINE RIVER STR. & APPRS. (S)
PROJECT ENGINEER - NOT APPLICABLE
PIT/QUARRY - ARKANSAS

LOCATION	- GARLAND COUNTY	DATE SAMPLED	- 08/03/17
SAMPLED BY	- THORNTON/BATES	DATE RECEIVED	- 08/08/17
SAMPLE FROM	- TEST HOLE	DATE TESTED	- 08/16/17

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

LAB NUMBER	20172631
SAMPLE ID	RV545
TEST STATUS	INFORMATION ONLY
STATION	317+10
LOCATION	18 LT
DEPTH IN FEET	0-3
MAT'L COLOR	BROWN
MAT'L TYPE	
LATITUDE DEG-MIN-SEC	34 45 50.80
LONGITUDE DEG-MIN-SEC	93 04 34.30

% PASSING 2 IN.	
1 1/2 IN.	
3/4 IN.	100
3/8 IN.	93
NO. 4	90
NO. 10	85
NO. 40	78
NO. 80	66
NO. 200	51

LIQUID LIMIT	32
PLASTICITY INDEX	11
AASHTO SOIL	A-6(3)
UNIFIED SOIL	
% MOISTURE CONTENT	

REMARKS - W=MULTIPLE LAYERS,X=STRIPPED

AASHTO TESTS : T24 T88 T89 T90 T265

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

September 11, 2018

TO: Mr. Rick Ellis, Bridge Engineer

SUBJECT: Job No. 012318 (Formerly Job No. 061501)
Middle Fork Saline River & Dry Run Creek Str. & Apprs. (S)
Route 7 Sections 10 & 11
Garland & Perry Counties

Transmitted herewith are summaries of the site geology and subsurface conditions, unconfined compressive strength test results, RMR, D50 scour analysis test results, and the logs of the borings conducted for the structure and approaches of the above referenced project. The samples obtained by the Standard Penetration Tests were brought to the laboratory and visually classified by experienced lab personnel to confirm the field identifications. The rock cores are available for inspection at the Materials Division.

This project consists of replacing the bridge crossing the Middle Fork of the Saline River, on Highway 7, north of Jesseville. The new bridge will be constructed on the existing alignment. A total of eight borings were requested for this project: one for each end bent, two borings at each intermediate bent, and two borings for the temporary detour bridge. One of the eight requested borings, Station 312+75 20' Left of C.L. Construction, was not accessible due to high water levels, steep slopes, and low bridge clearance.

Bedrock at this site is composed of Shale with varying degrees of weathering and thin bedding planes dipping in different directions. These properties led to low unconfined compressive strength results. Unconfined compressive strength values used in bearing capacity calculations were adjusted to better represent the rock mass and provide appropriate resistance values.

Based on plans provided by Bridge Division and the depth at which bedrock was encountered, it is anticipated that end bents will be founded on piling and intermediate bents will be founded on drilled shafts or spread footings. Piling should be tipped into competent shale and preboring may be necessary to achieve minimum penetration requirements. Spread Footings, founded at least 2 feet in competent shale, should be sized based on the values provided in Table 1.

TABLE 1 – Bearing Capacity Recommendations for Spread Footings

Presumptive Bearing Resistance at Service Limit State (ksf)
20

Drilled Shafts socketed into competent shale, should be sized based on the values provided in Table 2.

TABLE 2 – Bearing Capacity Recommendations for Drilled Shafts

Nominal Side Resistance (ksf)	Factored Side Resistance (ksf)	Nominal Tip Resistance (ksf)	Factored Tip Resistance (ksf)
15.7	8.6	120	60

If you have any questions concerning these recommendations, please contact the Geotechnical Section.

Michael C. Benson
Materials Engineer

MCB:rpt:mlg

cc: State Construction Engineer - Master File Copy
District 6 Engineer
District 8 Engineer
G.C. File