

ARKANSAS DEPARTMENT OF TRANSPORTATION



SUBSURFACE INVESTIGATION

STATE JOB NO. 080506

FEDERAL AID PROJECT NO. NHPP-0058(47)

CROOKED BRANCH STR. & APPRS. (S)

STATE HIGHWAY 7 SECTION 15

IN POPE 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 25, 2017

TO: Mr. Rick Ellis, Bridge Engineer

SUBJECT: Job No. 080506
Crooked Branch Str. & Apprs. (S)
Route 7 Section 15
Pope County

Transmitted herewith are a brief summary of the geology and site conditions, rock core unconfined compression test summary, RMR, D50 scour analysis, and the logs of the borings conducted for the structures 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.

This project consists of replacing the bridge crossing Crooked Branch, on Highway 7, northwest of Dover. The new bridge will be constructed on the existing alignment. Two of the four requested borings, all intermediate bents, were inaccessible due to steep slopes and low bridge clearance. The borings that were not obtained were located at: 310+62 C.L. Construction and 311+02 C.L. Construction. Both proposed bridge end borings were located on the centerline of the existing roadway and were offset to only impact one travel lane, due to the large volume of traffic on this section of Highway 7.

The subsurface investigation revealed that bedrock is approximately 15 feet deep at each bridge end. It is anticipated that both end bents will be founded on piling. Preboring may be necessary in order to achieve minimum penetration requirements. Correlating the elevation of bedrock between the bridge end boring logs, competent bedrock should be encountered less than 15 feet below ground level. Based on this information and correspondence with Bridge Division, it is anticipated that both intermediate bents will be founded on spread footings or drilled shafts. Spread Footings founded in competent Shale should be sized based on the values provided in Table 1.

TABLE 1 – Bearing Capacity Recommendations for Spread Footings

Nominal Bearing Resistance (ksf)	Factored Bearing Resistance (ksf)	Bearing Resistance at Service Limit State (ksf)
144	65	40

Drilled Shafts socketed into Shale to Sandstone with Shale should be designed based on the values provided in Table 2.

TABLE 2 – Bearing Capacity Recommendations for Drilled Shafts

Nominal Shaft Side Resistance (ksf)	Factored Shaft Side Resistance (ksf)	Nominal Shaft Tip Resistance (ksf)	Factored Shaft Tip Resistance (ksf)
32.7	18	163	81.5

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 8 Engineer
G.C. File

GEOLOGY AND SITE CONDITIONS
Job No. 080506
Crooked Branch Str. & Apprs. (S)
Route 7 Section 15
Pope County

Site Conditions

The existing bridge is located over Crooked Branch on highway 7 in Pope County, northwest of Dover. It is a 2 span bridge, approximately 70 foot long, running north to south. The existing bridge is constructed of concrete deck, cast-in-place, supported by a single spread footing and end walls constructed of stone and mortar. The bridge has been widened by the addition of concrete to the decking and supports. Additional Steel beams were added, vertically and horizontally, at the bridge ends to provide additional support and stability. There is riprap lining the channel bank at the north bridge end. There are remnants of an older bridge abutment under the northern end of the existing structure. Overhead power lines and buried telecommunication lines both parallel the east side of the existing bridge. A buried water line runs east to west under the bridge, adjacent to the river channel, and has been covered by concrete.

Crooked Branch Creek flows west to east under the bridge before making its confluence with the Illinois Bayou. This creek appears to be capable of transporting large amounts of debris, as evident by trees and branches piled up at the base of the middle bent. On the west side of highway 7, there is a business located down-station from the bridge and a residence located up-station from the bridge. The east side of the bridge is primarily pastureland with the exception of scattered trees lining the Crooked Branch Creek channel. West of the bridge, the creek channel runs through moderately to heavily wooded property. There are multiple faults mapped to the north and south of the project alignment and additional unmapped faults in the area are possible.

Site Geology

The project alignment is located in the mapped outcrop of the Atoka Formation (map symbol Pa). This formation is Pennsylvanian in age and has the widest areal extent of all the Paleozoic rocks in Arkansas. The Atoka is a sequence of mostly tan to gray marine sandstones and grayish black shales. This formation represents prominent surface exposures in the Boston Mountains, along the Arkansas River Valley, and along the frontal Ouachita Mountains, where unit thickness can be up to 25,000 feet. This formation contains rare calcareous beds, discontinuous coal, and abundant trace fossils.

Subsurface Conditions

Based on the results of the borings, the subsurface stratigraphy may be generalized as follows:

- 0 to 14.5 Feet: Consists of moist, medium stiff, brown **sandy clay with some gravel** (rock fragments) to moist, loose, brown **clayey sand with some gravel** (rock fragments).
- 14.5 to 38.5 Feet: Consists of slightly weathered to unweathered, medium hard, dark gray **shale with occasional fractures and coal seams**.
- 38.5 to 48.6 Feet: Consists of unweathered, well cemented, gray **sandstone with occasional shale seams and layers**.

ROCK MASS RATING SUMMARY
JOB # 080506

SAMPLE #1

Station/Location	310+32/8' Rt CL
Depth (ft)	15.5
Relative Rating	
Uniaxial Compressive Strength	2
RQD	13
Spacing of Joints	25
Condition of Joints	20
Groundwater Conditions	7
Sum	67
Class Number	II
Description	GOOD ROCK

SAMPLE #2

Station/Location	310+32/8' Rt CL
Depth (ft)	22
Relative Rating	
Uniaxial Compressive Strength	4
RQD	13
Spacing of Joints	25
Condition of Joints	25
Groundwater Conditions	7
Sum	74
Class Number	II
Description	GOOD ROCK

SAMPLE #3

Station/Location	310+32/8' Rt CL
Depth (ft)	29.5
Relative Rating	
Uniaxial Compressive Strength	4
RQD	8
Spacing of Joints	25
Condition of Joints	25
Groundwater Conditions	7
Sum	69
Class Number	II
Description	GOOD ROCK

SAMPLE #4

Station/Location	310+32/8' Rt CL
Depth (ft)	37.5
Relative Rating	
Uniaxial Compressive Strength	12
RQD	17
Spacing of Joints	25
Condition of Joints	25
Groundwater Conditions	7
Sum	86
Class Number	I
Description	VERY GOOD ROCK

SAMPLE #5

Station/Location	311+46/8' Lt CL
Depth (ft)	19
Relative Rating	
Uniaxial Compressive Strength	4
RQD	13
Spacing of Joints	25
Condition of Joints	20
Groundwater Conditions	7
Sum	69
Class Number	II
Description	GOOD ROCK

SAMPLE #6

Station/Location	311+46/8' Lt CL
Depth (ft)	30.5
Relative Rating	
Uniaxial Compressive Strength	4
RQD	13
Spacing of Joints	25
Condition of Joints	25
Groundwater Conditions	7
Sum	74
Class Number	II
Description	GOOD ROCK

SAMPLE #7

Station/Location	311+46/8' Lt CL
Depth (ft)	36
Relative Rating	
Uniaxial Compressive Strength	2
RQD	13
Spacing of Joints	25
Condition of Joints	25
Groundwater Conditions	7
Sum	72
Class Number	II
Description	GOOD ROCK

SAMPLE #8

Station/Location	311+46/8' Lt CL
Depth (ft)	40
Relative Rating	
Uniaxial Compressive Strength	7
RQD	17
Spacing of Joints	25
Condition of Joints	25
Groundwater Conditions	7
Sum	81
Class Number	I
Description	VERY GOOD ROCK

**D₅₀ AGGREGATE ANALYSIS
FOR SCOUR CALCULATIONS**

Job No. 080506					
Creek Name	Station	Sample Type	Location	Depth (FT)	Aggregate Size (D50) (IN)
Crooked Branch	311+00	Creek Bank	Construction C.L.	N/A	0.007

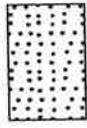
LEGEND

SOIL TYPES

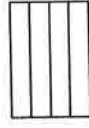
(SHOWN IN SYMBOL COLUMN)
(PREDOMINANT TYPE SHOWN HEAVY)



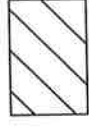
GRAVEL



SAND



SILT



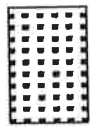
CLAY



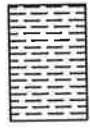
ORGANIC
MATTER

ROCK TYPES

(SHOWN IN SYMBOL COLUMN)



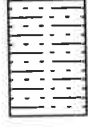
SANDSTONE



SHALE
or
SILTSTONE



LIMESTONE
or
DOLOMITE



ALTERNATING
LAYERS of
SHALE and
SANDSTONE



OTHER

SAMPLER TYPES

(SHOWN IN SAMPLE COLUMN)

SHELBY TUBE



UNDISTURBED
SAMPLE
RECOVERY



DISTURBED
SAMPLE
RECOVERY



NO
RECOVERY

SPLIT SPOON



SAMPLE
RECOVERY



NO
RECOVERY

ROCK CORING



% RECOVERY
INDICATED ON LOGS

TERMS DESCRIBING CONSISTENCY OR CONDITION

GRANULAR SOIL		CLAY		CLAY-SHALE		SHALE	
*N ^o Value	Density	*N ^o Value	Consistency	*N ^o Value	Consistency	*N ^o Value	Consistency
0-4	Very Loose	0-1	Very Soft	0-1	Very Soft		
5-10	Loose	2-4	Soft	2-4	Soft	31-60	Soft
11-30	Medium Dense	5-8	Medium Stiff	5-8	Medium Stiff	Over 60	
31-50	Dense	9-15	Stiff	9-15	Stiff	More than 2'	
Over 50	Very Dense	16-30	Very Stiff	16-30	Very Stiff	Penetration	
		31-60	Hard	31-60	Hard	in 60 Blows: Medium Hard	
		Over 60	Very Hard	Over 60	Very Hard	Less than 2'	
						Penetration	
						in 60 Blows: Hard	

- Ground water elevations indicated on boring logs represent ground water elevations at date or time shown on boring log. Absence of water surface implies that no ground water data is available but does not necessarily mean that ground water will not be encountered at locations or within the vertical reaches of these borings.
- Borings represent subsurface conditions at their respective locations for their respective depths. Variations in conditions between or adjacent to boring locations may be encountered.
- Terms used for describing soils according to their texture or grain size distribution are in accordance with the Unified Soil Classification System.

Standard Penetration Test – Driving a 2.0" O.D., 1-3/8" I.D. sampler a distance of 1.0 foot into undisturbed soil with a 140 pound hammer free falling a distance of 30 inches. It is customary to drive the spoon 6.0 inches to seat into undisturbed soil, then perform the test. The number of hammer blows for seating the spoon and performing the test are recorded for each 6 inches of penetration on the drill log. The field "N" Value (N_f) can be obtained by

adding the bottom two numbers for example: $\frac{6}{8-9} \Rightarrow 8+9 = 17 \text{ blows} / \text{ft}$. The "N" Value corrected to 60% efficiency (N₆₀) can be obtained by multiplying N_f by the hammer correction factor published on the boring log.

**ARKANSAS HWY. & TRANS. DEPARTMENT
MATERIALS DIVISION - GEOTECHNICAL SEC.**

BORING NO. 1
PAGE 1 OF 2

JOB NO. 080506 Pope County
JOB NAME: Crooked Branch Str. & Apprs.(S)
Route 7 Section 15
STATION: 310+32
LOCATION: 8' Right of Construction Centerline
LOGGED BY: Stanley Bates

DATE: September 20, 2017
TYPE OF DRILLING:
Hollow Stem Auger - Diamond Core
EQUIPMENT: Acker
HAMMER CORRECTION FACTOR: N/A

COMPLETION DEPTH: 48.6

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT	LBS PER CU.FT.	NO. OF BLOWS PER 6-IN.	% T C R	% R Q D
			SURFACE ELEVATION: 428.8									
5			Moist, Very Stiff, Brown Sandy Clay with Gravel (Rock Fragments)							11 14-12		
10										6 14-12		
15			SHALE							10 (0")		
			SHALE - Slightly Weathered, Medium Hard, Occasional Coal Seams, Dark Gray								100	60
20			SHALE - Slightly Weathered, Medium Hard, Dark Gray								100	44
25			SHALE - Unweathered, Medium Hard, Dark Gray								94	84
30			SHALE - Unweathered, Medium Hard, Occasional Coal Seams, Dark Gray								84	40
35												

REMARKS:

**ARKANSAS HWY. & TRANS. DEPARTMENT
MATERIALS DIVISION - GEOTECHNICAL SEC.**

BORING NO. 1
PAGE 2 OF 2

JOB NO. 080506 Pope County
JOB NAME: Crooked Branch Str. & Apprs.(S)
Route 7 Section 15
STATION: 310+32
LOCATION: 8' Right of Construction Centerline
LOGGED BY: Stanley Bates

DATE: September 20, 2017
TYPE OF DRILLING:
Hollow Stem Auger - Diamond Core
EQUIPMENT: Acker
HAMMER CORRECTION FACTOR: N/A

COMPLETION DEPTH: 48.6

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT	LBS PER CU.FT.	NO. OF BLOWS PER 6-IN.	% TCR	% RQD
			SURFACE ELEVATION: 428.8									
			SHALE WITH OCCASIONAL SANDSTONE SEAMS - Unweathered, Medium Hard, Dark Gray								98	72
40			SANDSTONE WITH OCCASIONAL SHALE SEAMS AND LAYERS - Unweathered, Well Cemented, Gray								100	80
45			SHALE WITH FREQUENT SANDSTONE SEAMS AND LAYERS - Unweathered, Medium Hard, Dark Gray								97	51
			SANDSTONE WITH OCCASIONAL SHALE SEAMS AND LAYERS - Unweathered, Well Cemented, Gray									
50			Boring Terminated									
55												
60												
65												
70												

REMARKS:

**ARKANSAS HWY. & TRANS. DEPARTMENT
MATERIALS DIVISION - GEOTECHNICAL SEC.**

BORING NO. 2
PAGE 1 OF 2

JOB NO. 080506 Pope County
JOB NAME: Crooked Branch Str. & Apprs.(S)
Route 7 Section 15
STATION: 311+46
LOCATION: 8' Left of Construction Centerline
LOGGED BY: Stanley Bates

DATE: September 20, 2017
TYPE OF DRILLING:
Hollow Stem Auger - Diamond Core
EQUIPMENT: Acker
HAMMER CORRECTION FACTOR: N/A

COMPLETION DEPTH: 48.5

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT	LBS PER CU.FT.	NO. OF BLOWS PER 6-IN.	% T C R	% R O D
			SURFACE ELEVATION: 428.8									
5			Moist, Medium Stiff, Brown Sandy Clay with Some Gravel (Rock Fragments)							3 3-3		
10			Moist, Loose, Brown Clayey Sand with Some Gravel and Cobbles (Rock Fragments)							3 3-4		
15			SHALE							10 (0")		
			SHALE - Slightly Weathered, Medium Hard, Occasional Fractures, Dark Gray								90	40
20			SHALE - Slightly Weathered, Medium Hard, Occasional Coal Seams, Dark Gray								80	66
25			SHALE - Unweathered, Medium Hard, Occasional Fractures, Dark Gray*								47	28
30			SHALE - Unweathered, Medium Hard, Occasional Fractures, Dark Gray								100	66
35												

REMARKS: * Poor recovery due to core barrel malfunction.

**ARKANSAS HWY. & TRANS. DEPARTMENT
MATERIALS DIVISION - GEOTECHNICAL SEC.**

BORING NO. 2
PAGE 2 OF 2

JOB NO. 080506 Pope County
JOB NAME: Crooked Branch Str. & Apprs.(S)
Route 7 Section 15
STATION: 311+46
LOCATION: 8' Left of Construction Centerline
LOGGED BY: Stanley Bates

DATE: September 20, 2017
TYPE OF DRILLING:
Hollow Stem Auger - Diamond Core
EQUIPMENT: Acker
HAMMER CORRECTION FACTOR: N/A

COMPLETION DEPTH: 48.5

DEPTH FT.	S Y M B O L	S A M P L E S	DESCRIPTION OF MATERIAL	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT	LBS PER CU.FT.	NO. OF BLOWS PER 6-IN.	% T C R	% R Q D
			SURFACE ELEVATION: 428.8									
			COAL (34.8' to 35.1')									
			SHALE - Unweathered, Medium Hard, Dark Gray								99	70
40			SANDSTONE WITH OCCASIONAL SHALE SEAMS AND LAYERS - Unweathered, Well Cemented, Gray								98	70
45											100	80
			SANDSTONE WITH INTERBEDDED SHALE - Unweathered, Well Cemented, Gray									
50			Boring Terminated									
55												
60												
65												
70												

REMARKS: * Poor recovery due to core barrel malfunction.

ARKANSAS DEPARTMENT OF TRANSPORTATION

July 17, 2017

TO: Mr. Trinity Smith, Engineer of Roadway Design

SUBJECT: Job No. 080506
Crooked Branch Str. & Apprs. (S)
Route 7 Section 7
Pope 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 Crooked Branch creek 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 of non-plastic sands to low plasticity clayey 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 9 feet. Where embankment is placed in the existing ditch line, all soft unstable organic material should be undercut a maximum of two feet prior to construction. The embankment may be constructed with locally available unspecified material utilizing the slope configuration shown in the cross sections.

The proposed 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 Russellville.
2. Asphalt Concrete Hot Mix

PG 64-22		
Type	Asphalt Cement %	Mineral Aggregate %
Surface Course	5.5	94.5
Binder Course	4.4	95.6
Base Course	4.0	96.0

PG 70-22		
Type	Asphalt Cement %	Mineral Aggregate %
Surface Course	5.5	94.5
Binder Course	4.5	95.5
Base Course	4.0	96.0

PG 76-22		
Type	Asphalt Cement %	Mineral Aggregate %
Surface Course	5.4	94.6
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 8 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 - 07/05/2017
JOB NUMBER - 080506

SEQUENCE NO. - 1
MATERIAL CODE - SSRV
SPEC. YEAR - 2014
SUPPLIER ID. - 1
COUNTY/STATE - 58
DISTRICT NO. - 08

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

* STATION LIMITS R-VALUE AT 240 psi *

BEGIN JOB - END JOB 15

RESILIENT MODULUS
308 + 00 11198

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.	080506	Material Code	SSRVPS
Date Sampled:	6/15/17	Station No.:	308+00
Date Tested:	June 28, 2017	Location:	18'RT
Name of Project:	CROOKED BRANCH STR. & APPRS. (S)		
County:	Code: 58	Name: POPE	
Sampled By:	THORNTON	Depth:	0-5
Lab No.:	20172006	AASHTO Class:	A-4(2)
Sample ID:	RV443	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	3.94
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):	12.16
Initial Volume, AoLo (cu. in):	97.52

3. Soil Specimen Weight:

Weight of Wet Soil Used (g):	3183.20
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4. Soil Properties:

Optimum Moisture Content (%):	14.3
Maximum Dry Density (pcf):	113.2
95% of MDD (pcf):	107.5
In-Situ Moisture Content (%):	N/A

5. Specimen Properties:

Wet Weight (g):	3183.20
Compaction Moisture content (%):	14.6
Compaction Wet Density (pcf):	124.38
Compaction Dry Density (pcf):	108.53
Moisture Content After Mr Test (%):	14.4

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

7. Resilient Modulus, Mr: 13696(Sc)^{-0.17193(S3)^{0.24596}}

8. Comments _____

9. Tested By: GW **Date:** June 28, 2017

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

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

Job No. 080506 **Material Code** SSRVPS
Date Sampled: 6/15/17 **Station No.:** 308+00
Date Tested: June 28, 2017 **Location:** 18'RT

Name of Project: CROOKED BRANCH STR. & APPRS. (S)
County: Code: 58 **Name:** POPE
Sampled By: THORNTON
Lab No.: 20172006
Sample ID: RV443
LATITUDE:

Depth: 0-5
AAASHTO Class: A-4(2)
Material Type (1 or 2): 2
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	25.4	22.7	2.7	2.1	1.9	0.2	0.00079	0.00010	19,049
Sequence 2	6.0	4.0	47.6	44.9	2.7	3.9	3.7	0.2	0.00162	0.00020	18,269
Sequence 3	6.0	6.0	70.5	66.9	3.6	5.8	5.5	0.3	0.00263	0.00033	16,775
Sequence 4	6.0	8.0	94.3	88.3	6.0	7.8	7.3	0.5	0.00394	0.00049	14,793
Sequence 5	6.0	10.0	117.2	108.8	8.4	9.6	8.9	0.7	0.00527	0.00066	13,611
Sequence 6	4.0	2.0	25.4	22.6	2.8	2.1	1.9	0.2	0.00091	0.00011	16,480
Sequence 7	4.0	4.0	47.4	44.6	2.8	3.9	3.7	0.2	0.00188	0.00023	15,656
Sequence 8	4.0	6.0	69.3	66.5	2.8	5.7	5.5	0.2	0.00299	0.00037	14,676
Sequence 9	4.0	8.0	92.9	87.8	5.1	7.6	7.2	0.4	0.00422	0.00053	13,727
Sequence 10	4.0	10.0	116.2	108.6	7.6	9.6	8.9	0.6	0.00563	0.00070	12,733
Sequence 11	2.0	2.0	25.1	22.3	2.8	2.1	1.8	0.2	0.00104	0.00013	14,134
Sequence 12	2.0	4.0	47.1	44.3	2.8	3.9	3.6	0.2	0.00221	0.00028	13,194
Sequence 13	2.0	6.0	68.6	65.8	2.8	5.6	5.4	0.2	0.00349	0.00044	12,430
Sequence 14	2.0	8.0	91.1	86.8	4.3	7.5	7.1	0.4	0.00488	0.00061	11,733
Sequence 15	2.0	10.0	114.1	107.3	6.7	9.4	8.8	0.6	0.00632	0.00079	11,198

TESTED BY _____ DATE June 28, 2017
 REVIEWED BY _____ DATE _____

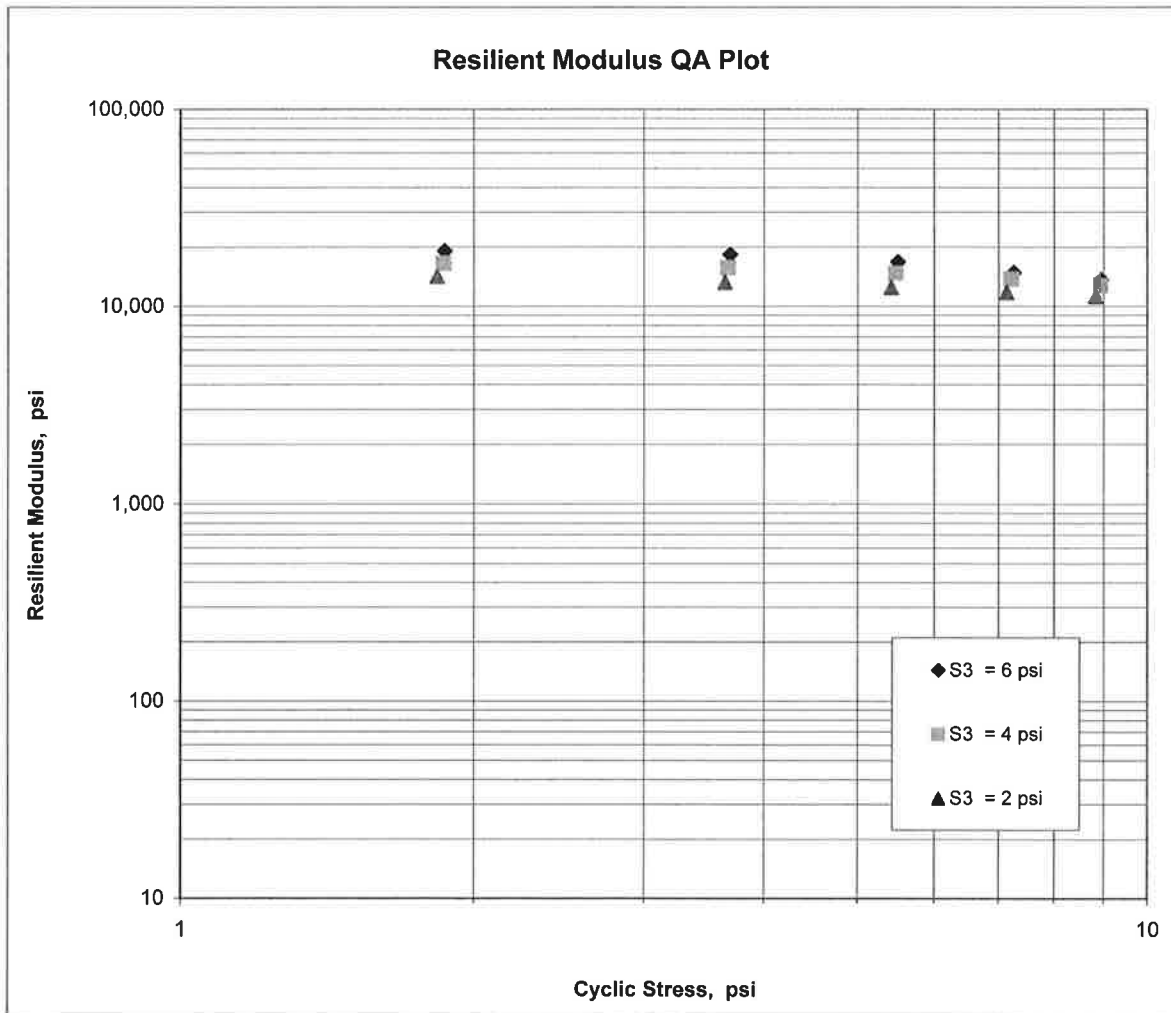
**ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT
MATERIALS DIVISION**

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

Job No.	080506	Material Code	SSRVPS
Date Sampled:	6/15/17	Station No.:	308+00
Date Tested:	June 28, 2017	Location:	18'RT
Name of Project:	CROOKED BRANCH STR. & APPRS. (S)		
County:	Code: 58	Name:	POPE
Sampled By:	THORNTON	Depth:	0-5
Lab No.:	20172006	AASHTO Class:	A-4(2)
Sample ID:	RV443	Material Type (1 or 2):	2
LATITUDE:		LONGITUDE:	

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

$K_1 = \underline{\underline{13,696}}$
 $K_2 = \underline{\underline{-0.17193}}$
 $K_5 = \underline{\underline{0.24596}}$
 $R^2 = \underline{\underline{0.94}}$



JOB: 080506

Arkansas State Highway Transportation Department

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

Materials Division

COUNTY NO. 58 DATE TESTED 6/26/2017

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					
308+00	18 RT	0-5	BROWN	93	87	81	75	60	26	7	A-4(2)	RV443	
308+00	06 RT	0-5	BROWN	96	91	84	74	59	28	10	A-4(3)	S439	15.4
308+00	18 RT	0-5	BROWN	97	93	88	82	67	ND	NP	A-4(0)	S440	18.2
314+00	06 LT	0-5	BROWN	89	82	76	58	42	ND	NP	A-4(0)	S441	11.6
314+00	18 LT	0-5	BROWN	99	96	90	76	57	24	8	A-4(1)	S442	11.6

comments: W=MULTIPLE LAYERS, X=STRIPPED

Friday, July 14, 2017

JOB: 080506

*Arkansas State Highway Transportation Department
Materials Division*

DATE TESTED
6/26/2017

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

COUNTY NO. 58

Michael Benson, Materials Engineer

STA.# LOC. PAVEMENT SOUNDINGS

308+00	06 RT	ACHMSC 2.0W	ACHMSC 6.0X	AGG. BASE CRS CL-7 9.0
308+00	18 RT	ACHMSC ---	ACHMSC ---	AGG. BASE CRS CL-7 ---
314+00	06 LT	ACHMSC 5.0W	ACHMSC 3.0X	AGG. BASE CRS CL-7 9.0

comments: W=MULTIPLE LAYERS, X=STRIPPED

Friday, July 14, 2017

