

# ARKANSAS DEPARTMENT OF TRANSPORTATION



## SUBSURFACE INVESTIGATION

STATE JOB NO. BR6210

FEDERAL AID PROJECT NO. STPB-0062(52)

HURRICANE CREEK STRS. & APPRS. NO. 2 (S)

COUNTY ROAD NO. CR 65

IN SALINE 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

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## MATERIALS DIVISION

11301 West Baseline Road | P.O. Box 2261 | Little Rock, AR 72203-2261 | Phone: 501.569.2185 | Fax: 501.569.2368

August 25, 2020

**TO:** Mr. Rick Ellis, Bridge Engineer

**SUBJECT:** Job No. BR6210  
Hurricane Creek Strs. & Apprs. No. 2 (S)  
Saline County  
County Road 65 (Samples Rd.)

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 is located north of the town of Salem and consists of shifting the alignment of a section of County Road 65 (Samples Rd.), to the east and replacing two bridges crossing separate forks of Hurricane Creek. This will eliminate some sharp curves and will allow the grade of the roadway and adjacent bridges to be raised, to prevent flooding. Five borings were requested for Bridge 1, whose station limits extend from 108+29 to 111+11 and four borings were requested for Bridge 2, whose station limits extend from 114+04 to 116+16. All requested borings were obtained.

### **Bridge 1**

Based on the depth at which bedrock was encountered and correspondence with Bridge Design, it is anticipated that both end bents will be founded on piling and all intermediate bents will be founded on spread footings. Preboring may be necessary to achieve minimum pile penetration requirements. Spread footings founded in competent Limestone with interbedded Shale should be designed 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)
137.5	62	20

### **Bridge 2**

Based on the depth at which bedrock was encountered and correspondence with Bridge Design, it is anticipated that both end bents will be founded on piling. Piling should be tipped into competent Interbedded Limestone and Shale. Preboring may be necessary to achieve minimum pile penetration requirements. Spread footings founded in competent Interbedded Limestone and Shale should be designed based on the values provided in Table 2.

No rock core unconfined compressive strength tests were performed for this bridge. The rock mass underlying this bridge is composed of interbedded limestone and shale. Shale tends to be brittle in the unconfined condition causing the cores to break along weak planes. Therefore, testing of the rock cores unconfined compressive strength is not practical and yields

unreliable results. After inspection, this interbedded limestone and shale has been deemed a sound Hard rock and spread footing Bearing Resistance values have been determined from Table C10.6.2.6.1-1 of the AASHTO LRFD Bridge Design Specifications, edition 2017. This Factored Bearing Resistance is equivalent to the Bearing Resistance at the Service Limit State.

TABLE 2 – Bearing Capacity Recommendations for Spread Footings

Factored Bearing Resistance (KSF)
20

It is acceptable to utilize 2H:1V end slopes for the proposed embankments. This embankment geometry provides a satisfactory Factor of Safety for seismic and static conditions. If you have any questions concerning these recommendations, please contact the Geotechnical Section.

  
Jonathan A. Annable  
Materials Engineer

MCB:rpt:mlg

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

**GEOLOGY AND SITE CONDITIONS**  
**Job No. BR6210**  
**Hurricane Creek Str. & Apprs. No. 2 (S)**  
**Saline County**  
**Co Rd. 65 (Samples Road)**

**Site Conditions**

This job consists of rerouting County Road 65 (Samples Rd.), to the east, and replacing two bridges that span separate forks of Hurricane Creek. Both bridges appear to be constructed similarly and both bridges were widened in the past by additions to the wall piers and the concrete decking. **Bridge 1** is a two span bridge with cast-in-place concrete decking and an asphalt overlay. The decking is supported on each end by concrete endwalls with a single skewed wall pier intermediate support, resting on a spread footing. The channel beneath the bridge and the end slopes have been reinforced with a combination of stone riprap, concrete, and asphalt. The bridge has concrete curbs, but no guardrail. **Bridge 2** is a three span bridge with cast-in-place concrete decking and an asphalt overlay. The decking is supported on each end by concrete endwalls. There are also two intermediate supports composed of two skewed wall piers, resting on spread footings. The end slopes have been reinforced with a combination of stone riprap, concrete, and asphalt. The bridge has concrete curbs, but no guardrail.

Hurricane Creek is a perennial watershed that flows west to east and has a shallow rocky channel. There are two separate forks of Hurricane Creek surrounding the project alignment. The land between these forks appears to be susceptible to flooding, as evident by gravel bars and older channels where the water has run in the past. The majority of the land surrounding the project alignment is composed of sand, gravel, rocks, and boulders. The area surrounding the Hurricane Creek channels consists primarily of pastureland to the west and woodlands to the east. Overhead power lines parallel the west side of County Road 65 (Samples Rd.) up-station and down-station of both bridges and a buried telecommunication line parallels the east side of both bridges.

**Site Geology**

The project alignment is located in the mapped outcrop of the Mazarn Formation. This Formation is Ordovician in age and is found throughout the Ouachita Mountains, in the west central part of the state. This formation consists primarily of shale with small amounts of siltstone, silty to conglomeratic sandstone, limestone, and glossy black chert. The shale is mostly gray-black, but thin layers of olive-gray silty shale or siltstone are interbedded with darker shales in some sequences. When the dark and greenish shales are cleaved at an angle to bedding, they yield a ribboned surface. In many places, quartzose siltstone or very fine-grained sandstone is present. Dense, bluish-gray, thin-bedded limestones may be present throughout the interval. Thin to thick beds of gray sandstone are occasionally found at random horizons, notably in the upper and lower portions of the sequence. Chert is usually found in the upper part of the unit. Milky quartz veins are common in some areas. The unit is conformable with the underlying Crystal Mountain Sandstone. The thickness of the Mazarn Shale ranges from 1000 feet to over 2500 feet. The rock exposed at the project location is most likely part of the middle section of the Mazarn Formation due to the abundance of limestone found throughout the core. An abundance of thick to thin calcite veins, quartz veins, and pyrite crystals were observed throughout the majority of the core. The shales and limestones have been slickensided from

previous tectonic activity. There are no mapped faults or igneous dikes directly along the project alignment; however, there are faults and igneous dikes mapped in the surrounding area and throughout the Mazarn Formation.

### Scour Potential

There were no obvious signs of scour at either of the two existing bridges and scour is not anticipated along the new bridge alignments.



Bridge 1 looking downstream.



Bridge 2 looking upstream.

### Subsurface Conditions

Based on the results of the borings, the subsurface stratigraphy for **Bridge 1** may be generalized as follows:

- |                    |  |
|--------------------|--|
| 0 to 3.3 Feet:     | Varies from brown <b>sandy clay</b> to <b>clay with organic matter</b> to moist, brown, <b>clayey sand with gravel</b> .   |
| 3.3 to 9.5 Feet: * | Varies from brown <b>clay with organic matter</b> to moist, medium dense brown <b>sand with gravel and clay</b> to highly weathered to unweathered, moderately hard to hard, slickensided, slightly dipping gray <b>limestone with interbedded shale</b> with frequent to occasional fractures, pyrite, and mineral veins. |
| 9.5 to 38.2 Feet:  | Consists of unweathered, moderately hard to hard, slickensided, slightly dipping gray <b>limestone with interbedded shale and sandstone</b> with frequent to occasional fractures, pyrite, and mineral veins.  |

\* A water stratum was encountered in two of the borings between 4.8 and 6.5 feet below ground level. Thick layers of **quartz** and **calcite** were encountered in boring 1 at 10.7 feet and 13.9 feet below ground level.



Based on the results of the borings, the subsurface stratigraphy for **Bridge 2** may be generalized as follows:

- 0 to 6.4 Feet: Varies from moist, very hard, brown and white **sandy clay with gravel and organic matter** to moist to wet, medium dense to very dense, brown **sand with gravel to gravel with sand and occasional cobbles**.
- 6.4 to 9.6 Feet: Varies from moist to wet, medium dense to very dense, brown **sand with gravel to gravel with sand and occasional cobbles** to weathered to unweathered, moderately hard, slightly dipping, slickensided gray **limestone with interbedded sandstone and shale** with frequent to occasional fractures, mineral veins, and pyrite.
- 9.6 to 39.3 Feet:\* Consists of unweathered, moderately hard, slightly dipping, slickensided gray **limestone with interbedded sandstone and shale** with frequent to occasional fractures, mineral veins, and pyrite.

\* A water stratum was encountered in two of the borings between 4.4 and 8.4 feet below ground level. A 0.3 feet thick layer of **quartz** and **calcite** was encountered in the boring at station 115+45 at 35.3 feet below ground level and in the boring at station 116+15 at 28.3 feet below ground level.

# Rock Core Unconfined Compression Test Summary

Project Number: BR6210  
Project Name: Hurricane Creek Strs. & Apprs. No. 2 (S)  
Date Tested: 7/29/2020

[illegible]

## Terminology

NT = No Test

N/A = Not Applicable

\* Please note any broken samples, fractures or other characteristics of sample in Remarks.

# **ROCK MASS RATING SUMMARY** **JOB # BR6210**

**SAMPLE #1**

Station/Location	109+00, 3' RT CL
Depth (ft)	13.2
	<b>Relative Rating</b>
Uniaxial Compressive Strength	4
RQD	20
Spacing of Joints	20
Condition of Joints	10
Groundwater Conditions	7
Sum	61
Class Number	II
Description	GOOD ROCK

**SAMPLE #2**

Station/Location	109+00, 3' RT CL
Depth (ft)	14.1
	<b>Relative Rating</b>
Uniaxial Compressive Strength	N/A
RQD	20
Spacing of Joints	20
Condition of Joints	10
Groundwater Conditions	7
Sum	57
Class Number	III
Description	FAIR ROCK

**SAMPLE #3**

Station/Location	
Depth (ft)	
	<b>Relative Rating</b>
Uniaxial Compressive Strength	
RQD	
Spacing of Joints	
Condition of Joints	
Groundwater Conditions	
Sum	0
Class Number	N/A
Description	

**SAMPLE #4**

Station/Location	
Depth (ft)	
	<b>Relative Rating</b>
Uniaxial Compressive Strength	
RQD	
Spacing of Joints	
Condition of Joints	
Groundwater Conditions	
Sum	0
Class Number	N/A
Description	

**SAMPLE #5**

Station/Location	
Depth (ft)	
	<b>Relative Rating</b>
Uniaxial Compressive Strength	
RQD	
Spacing of Joints	
Condition of Joints	
Groundwater Conditions	
Sum	0
Class Number	N/A
Description	

**SAMPLE #6**

Station/Location	
Depth (ft)	
	<b>Relative Rating</b>
Uniaxial Compressive Strength	
RQD	
Spacing of Joints	
Condition of Joints	
Groundwater Conditions	
Sum	0
Class Number	N/A
Description	

**SAMPLE #7**

Station/Location	
Depth (ft)	
	<b>Relative Rating</b>
Uniaxial Compressive Strength	
RQD	
Spacing of Joints	
Condition of Joints	
Groundwater Conditions	
Sum	0
Class Number	N/A
Description	

**SAMPLE #8**

Station/Location	
Depth (ft)	
	<b>Relative Rating</b>
Uniaxial Compressive Strength	
RQD	
Spacing of Joints	
Condition of Joints	
Groundwater Conditions	
Sum	0
Class Number	N/A
Description	



**D<sub>50</sub> AGGREGATE ANALYSIS  
FOR SCOUR CALCULATIONS**

<b>Job No. BR6210</b>					
<b>Creek Name</b>	<b>Station</b>	<b>Sample Type</b>	<b>Location</b>	<b>Depth (Ft.)</b>	<b>Aggregate Size (D50) (In.)</b>
Hurricane Creek	115+04	Creek Bank	15' LT Const. CL	N/A	0.438
Hurricane Creek	110+08	Creek Bank	12' LT Const. CL	N/A	0.750

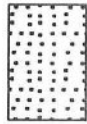
# LEGEND

## SOIL TYPES

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



GRAVEL



SAND



SILT



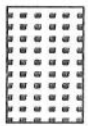
CLAY



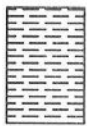
ORGANIC  
MATTER

## ROCK TYPES

(SHOWN IN SYMBOL COLUMN)



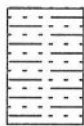
SANDSTONE



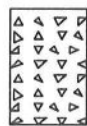
SHALE  
or  
SILTSTONE



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

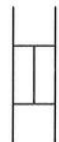


SAMPLE  
RECOVERY



NO  
RECOVERY

### ROCK CORING



% RECOVERY  
INDICATED ON LOGS

## TERMS DESCRIBING CONSISTENCY OR CONDITION

GRANULAR SOIL		CLAY		CLAY-SHALE		SHALE	
*N* Value	Density	*N* Value	Consistency	*N* Value	Consistency	*N* 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, and 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:  $\frac{6}{8-9} \Rightarrow 8+9 = 17 \text{ blows/ft}$ . The "N" Value corrected to 60%

efficiency ( $N_{60}$ ) can be obtained by multiplying  $N_f$  by the hammer correction factor published on the boring log.

**ARKANSAS DEPARTMENT OF TRANSPORTATION  
MATERIALS DIVISION - GEOTECHNICAL SEC.**

BORING NO. 1

PAGE 1 OF 1

JOB NO. BR6210  
JOB NAME: Hurricane Creek STRS. & APPRS. NO.2(S)  
C0. Rd. 65 (Samples) Saline County  
STATION: 108+30  
LOCATION: 12' Right of Construction Centerline  
LOGGED BY: Brandon McKinney and Paul Campbell

DATE: July 14 and 20, 2020  
TYPE OF DRILLING:  
Hollow Stem Auger - Diamond Core  
EQUIPMENT: Acker 1779  
HAMMER CORRECTION FACTOR: N/A

COMPLETION DEPTH: 15.8

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: 430.5									
			Sandy Clay with Gravel									
5			SHALE - Highly Weathered, Very Soft, Gray*							6 8-12		
			SHALE - Highly Weathered, Very Soft, Gray							3 4-10		
10			SHALE - Slightly Weathered, Medium Hard, Gray							20 (5")		
			Quartz								57	25
			LIMESTONE WITH INTERBEDDED SHALE - Unweathered, Moderately Hard, Slickensided, Gray									
15			Fractured Quartz**								36	0
			Boring Terminated									
20												
25												
30												
35												

REMARKS: \*A water stratum was encountered at approximately 6.9' below ground level. \*\*Boring terminated at approximately 15.8' below ground level due to engine problems. Bridge 1

**ARKANSAS DEPARTMENT OF TRANSPORTATION**  
**MATERIALS DIVISION - GEOTECHNICAL SEC.**

BORING NO. 2  
 PAGE 1 OF 1

JOB NO. BR6210  
 JOB NAME: Hurricane Creek STRS. & APPRS. NO.2(S)  
 C0. Rd. 65 (Samples) Saline County  
 STATION: 109+00  
 LOCATION: 3' Right of Construction Centerline  
 LOGGED BY: Brandon McKinney

DATE: July 13, 2020  
 TYPE OF DRILLING:  
 Hollow Stem Auger - Diamond Core  
 EQUIPMENT: Acker 1779  
 HAMMER CORRECTION FACTOR: N/A

COMPLETION DEPTH: 31

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: 430.5									
5			Light Brown Sandy Clay									
			SHALE - Weathered, Medium Hard, Gray							7 12-47 (11")		
10											53	0
15											98	98
20			LIMESTONE WITH INTERBEDDED SHALE - Unweathered, Hard, Slickensided, Frequent Mineral Veins, Trace Pyrite, Gray								100	90
25											100	95
30											100	90
			Boring Terminated									
35												

REMARKS: Bridge 1

**ARKANSAS DEPARTMENT OF TRANSPORTATION  
MATERIALS DIVISION - GEOTECHNICAL SEC.**

BORING NO. 3

PAGE 1 OF 1

JOB NO. BR6210  
JOB NAME: Hurricane Creek STRS. & APPRS. NO.2(S)  
C0. Rd. 65 (Samples) Saline County  
STATION: 109+70  
LOCATION: Constructin Centerline  
LOGGED BY: Brandon McKinney

DATE: July 7, 2020  
TYPE OF DRILLING:  
Hollow Stem Auger - Diamond Core  
EQUIPMENT: Acker 1799  
HAMMER CORRECTION FACTOR: N/A

COMPLETION DEPTH: 33

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: 429.9									
5			Moist, Brown, Clayey Sand with Gravel									
			SHALE - Highly Weathered, Very Soft, Gray							7 10-10		
10										13 (11)	74	74
15											64	32
20			LIMESTONE WITH INTERBEDDED SHALE - Unweathered, Moderately Hard, Occasional Mineral Partings, Seams, and Layers, Frequent to Occasional Fractures, Slickensided, Trace Pyrite, Gray*								28	4
25											100	93
30											100	100
35			Boring Terminated									

REMARKS: \*A water stratum was encountered at approximately 6.5' below ground level. Bridge 1

**ARKANSAS DEPARTMENT OF TRANSPORTATION  
MATERIALS DIVISION - GEOTECHNICAL SEC.**

BORING NO. 4  
PAGE 1 OF 1

JOB NO. BR6210  
JOB NAME: Hurricane Creek STRS. & APPRS. NO.2(S)  
C0. Rd. 65 (Samples) Saline County  
STATION: 110+40  
LOCATION: Construction Centerline  
LOGGED BY: Brandon McKinney

DATE: July 6, 2020  
TYPE OF DRILLING:  
Hollow Stem Auger - Diamond Core  
EQUIPMENT: Acker 1779  
HAMMER CORRECTION FACTOR: N/A

COMPLETION DEPTH: 29.2

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: 429.6									
			No Sample									
5			SHALE - Weathered, Medium Hard, Gray							33 13 (1")	56	0
10			SHALE WITH INTERBEDDED LIMESTONE - Unweathered, Medium Hard, Frequent Mineral Veins, Occasional Fractures, Slickensided, Trace Pyrite, Gray								94	94
15											84	84
20												
25			LIMESTONE WITH INTERBEDDED SHALE - Unweathered, Moderately Hard, Frequent Mineral Partings, Layers, and Seams, Occasional Fractures, Slickensided, Trace Pyrite, Gray								100	16
											84	70
30			Boring Terminated									
35												

REMARKS: Bridge 1



**ARKANSAS DEPARTMENT OF TRANSPORTATION  
MATERIALS DIVISION - GEOTECHNICAL SEC.**

BORING NO. 5

PAGE 1 OF 2

JOB NO. BR6210  
JOB NAME: Hurricane Creek STRS. & APPRS. NO.2(S)  
C0. Rd. 65 (Samples) Saline County  
STATION: 111+10  
LOCATION: 6' Right of Construction Centerline  
LOGGED BY: Stanely Bates and Austin Dillman

DATE: June 30, 2020  
TYPE OF DRILLING:  
Hollow Stem Auger - Diamond Core  
EQUIPMENT: Acher 1779  
HAMMER CORRECTION FACTOR: N/A

COMPLETION DEPTH: 38.2

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: 432.3									
5			Clay with Organic Matter							15 16-11		
10			Moist, Medium Dense, Brown and White Sand with Gravel							11 38 (2")	50	0
15			SHALE - Weathered, Medium Hard, Gray								78	22
20			LIMESTONE WITH INTERBEDDED SHALE - Unweathered, Moderately Hard, Frequent Fractures and Mineral Partings, Layers, and Seams, Moderately Dipping, Gray								60	42
25			SANDSTONE - Unweathered, Cemented, Occasional Fractures, Slightly Calcareous, Gray								82	38
30			LIMESTONE WITH INTERBEDDED SHALE - Unweathered, Moderately Hard, Frequent Fractures and Mineral Partings, Layers, and Seams, Slickensided, Moderately Dipping, Gray								78	78
35			SANDSTONE WITH INTERBEDDED LIMESTONE AND SHALE - Unweathered, Well Cemented, Frequent to Occasional Fractures, Slightly Dipping, Brecciated In Part, Gray									
			LIMESTONE WITH INTERBEDDED SHALE - Unweathered, Medium Hard, Occasional Mineral Veins, Slickensided, Gray									

REMARKS: Bridge 1. 17 hour water level was measured at approximately 2.4' below ground level.

**ARKANSAS DEPARTMENT OF TRANSPORTATION  
MATERIALS DIVISION - GEOTECHNICAL SEC.**

BORING NO. 5  
PAGE 2 OF 2

JOB NO. BR6210  
JOB NAME: Hurricane Creek STRS. & APPRS. NO.2(S)  
C0. Rd. 65 (Samples) Saline County  
STATION: 111+10  
LOCATION: 6' Right of Construction Centerline  
LOGGED BY: Stanely Bates and Austin Dillman

DATE: June 30, 2020  
TYPE OF DRILLING:  
Hollow Stem Auger - Diamond Core  
EQUIPMENT: Acher 1779  
HAMMER CORRECTION FACTOR: N/A

COMPLETION DEPTH: 38.2

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: 432.3									
											90	90
40			Boring Terminated									
45												
50												
55												
60												
65												
70												

REMARKS: Bridge 1. 17 hour water level was measured at approximately 2.4' below ground level.

**ARKANSAS DEPARTMENT OF TRANSPORTATION  
MATERIALS DIVISION - GEOTECHNICAL SEC.**

BORING NO. 6

PAGE 1 OF 2

JOB NO. BR6210  
JOB NAME: Hurricane Creek STRS. & APPRS. NO.2(S)  
C0. Rd. 65 (Samples) Saline County  
STATION: 114+05  
LOCATION: Construction Centerline  
LOGGED BY: Stanley Bates

DATE: March 11, 2020  
TYPE OF DRILLING:  
Hollow Stem Auger - Diamond Core  
EQUIPMENT: Acker 1779  
HAMMER CORRECTION FACTOR: N/A

COMPLETION DEPTH: 39.3

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: 432.0									
			Sandy Clay with Organic Matter									
			Gravel									
5			Moist, Medium Dense, Brown Sand with Gravel*							17 19-10		
10			SHALE - Weathered, Medium Hard, Brown							10 (4")		
			LIMESTONE WITH INTERBEDDED SHALE - Weathered, Moderately Hard, Slickensided, Frequent Fractures and Mineral Veins, Slightly Dipping, Brown and Gray								40	0
15			LIMESTONE WITH INTERBEDDED SHALE - Slightly Weathered, Moderately Hard, Slickensided, Frequent Fractures and Mineral Veins, Slightly Dipping, Brown and Gray								36	0
20											56	0
25											50	0
30			LIMESTONE WITH INTERBEDDED SHALE - Unweathered, Hard, Slickensided, Frequent Fractures and Mineral Veins, Slightly Dipping, Brown and Gray								62	22
35												

REMARKS: \*A water stratum was encountered at approximately 8.4' below ground level. Bridge 2

**ARKANSAS DEPARTMENT OF TRANSPORTATION  
MATERIALS DIVISION - GEOTECHNICAL SEC.**

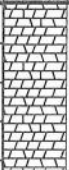
BORING NO. 6

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JGB NO. BR6210  
JOB NAME: Hurricane Creek STRS. & APPRS. NO.2(S)  
C0. Rd. 65 (Samples) Saline County  
STATION: 114+05  
LOCATION: Construction Centerline  
LOGGED BY: Stanley Bates

DATE: March 11, 2020  
TYPE OF DRILLING:  
Hollow Stem Auger - Diamond Core  
EQUIPMENT: Acker 1779  
HAMMER CORRECTION FACTOR: N/A

COMPLETION DEPTH: 39.3

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: 432.0									
40											80	9
45			Boring Terminated									
50												
55												
60												
65												
70												

REMARKS: \*A water stratum was encountered at approximately 8.4' below ground level. Bridge 2

**ARKANSAS DEPARTMENT OF TRANSPORTATION  
MATERIALS DIVISION - GEOTECHNICAL SEC.**

BORING NO. 6A  
PAGE 1 OF 2

JOB NO. BR6210  
JOB NAME: Hurricane Creek STRS. & APPRS. NO.2(S)  
C0. Rd. 65 (Samples) Saline County  
STATION: 114+09  
LOCATION: 2' Right of Consturction Centerline  
LOGGED BY: Connor Bunton

DATE: March 17, 2020  
TYPE OF DRILLING:  
Hollow Stem Auger - Diamond Core  
EQUIPMENT: Acker 1779  
HAMMER CORRECTION FACTOR: N/A

COMPLETION DEPTH: 39.2

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: 432.0									
5			Wet, Brown, Sand with Gravel									
10			Wet, Dense, Brown Gravel with Sand							18 22-15		
15			Wet, Very Dense, Brown Gravel (Rock Fragments)							10 (0")	35	0
20											27	0
25			LIMESTONE WITH INTERBEDDED SANDSTONE AND SHALE - Unweathered, Hard, Frequent Fractures, Occasional Mineral Veins, Slightly Dipping, Gray								33	0
30											67	46
35											38	0

REMARKS: Bridge 2

**ARKANSAS DEPARTMENT OF TRANSPORTATION  
MATERIALS DIVISION - GEOTECHNICAL SEC.**

BORING NO. 6A  
PAGE 2 OF 2

JOB NO. BR6210  
JOB NAME: Hurricane Creek STRS. & APPRS. NO.2(S)  
C0. Rd. 65 (Samples) Saline County  
STATION: 114+09  
LOCATION: 2' Right of Consturction Centerline  
LOGGED BY: Connor Bunton

DATE: March 17, 2020  
TYPE OF DRILLING:  
Hollow Stem Auger - Diamond Core  
EQUIPMENT: Acker 1779  
HAMMER CORRECTION FACTOR: N/A

COMPLETION DEPTH: 39.2

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: 432.0									
											81	52
40			Boring Terminated									
45												
50												
55												
60												
65												
70												

REMARKS: Bridge 2



**ARKANSAS DEPARTMENT OF TRANSPORTATION  
MATERIALS DIVISION - GEOTECHNICAL SEC.**

BORING NO. 7

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JOB NO. BR6210  
JOB NAME: Hurricane Creek STRS. & APPRS. NO.2(S)  
C0. Rd. 65 (Samples) Saline County  
STATION: 114+75  
LOCATION: 6' Right of Construction Centerline  
LOGGED BY: Austin Dillman

DATE: March 10, 2020  
TYPE OF DRILLING:  
Hollow Stem Auger - Diamond Core  
EQUIPMENT: Acker 1779  
HAMMER CORRECTION FACTOR: N/A

COMPLETION DEPTH: 29.2

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: 432.8									
			No Sample									
			Gravel									
5			Moist, Very Hard, Brown and White Sandy Clay							16 35-28		
10			Moist, Very Hard, White and Gray Clay with Gravel (Quartz Fragments)							11 (0")	96	84
15			LIMESTONE WITH INTERBEDDED SHALE - Unweathered, Hard, Frequent to Occasional Fractures and Mineral Veins, Trace Pyrite, Slickensided, Gray								80	72
20											86	86
25												
											98	96
30			Boring Terminated									
35												

REMARKS: Bridge 2

**ARKANSAS DEPARTMENT OF TRANSPORTATION  
MATERIALS DIVISION - GEOTECHNICAL SEC.**

BORING NO. 8  
PAGE 1 OF 2

JOB NO. BR6210  
JOB NAME: Hurricane Creek STRS. & APPRS. NO.2(S)  
C0. Rd. 65 (Samples) Saline County  
STATION: 115+45  
LOCATION: Construction Centerline  
LOGGED BY: Austin Dillman

DATE: March 9, 2020  
TYPE OF DRILLING:  
Hollow Stem Auger - Diamond Core  
EQUIPMENT: Acker 1779  
HAMMER CORRECTION FACTOR: N/A

COMPLETION DEPTH: 38.6

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: 431.5									
			No Sample									
			Gravel and Cobbles									
5			Wet, Medium Dense, Brown Gravel with Sand							7 7-16		
10			LIMESTONE WITH INTERBEDDED SHALE - Unweathered, Hard, Frequent Fractures, Trace Pyrite, Gray							11 (0")	80	34
15											72	54
20											96	76
25			LIMESTONE WITH INTERBEDDED SHALE - Unweathered, Hard, Occasional Fractures, Frequent to Occasional Mineral Veins, Trace Pyrite, Gray								100	98
30											96	60
35												

REMARKS: \*Boring terminated at 38.6' below ground level due to blocked off core barrel. Bridge 2

**ARKANSAS DEPARTMENT OF TRANSPORTATION  
MATERIALS DIVISION - GEOTECHNICAL SEC.**

BORING NO. 8  
PAGE 2 OF 2

JOB NO. BR6210  
JOB NAME: Hurricane Creek STRS. & APPRS. NO.2(S)  
C0. Rd. 65 (Samples) Saline County  
STATION: 115+45  
LOCATION: Construction Centerline  
LOGGED BY: Austin Dillman

DATE: March 9, 2020  
TYPE OF DRILLING:  
Hollow Stem Auger - Diamond Core  
EQUIPMENT: Acker 1779  
HAMMER CORRECTION FACTOR: N/A

COMPLETION DEPTH: 38.6

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: 431.5									
			Quartz Layer									
			LIMESTONE WITH INTERBEDDED SHALE -								72	56
			Unweathered, Hard, Occasional Fractures,									
			Frequent to Occasional Mineral Veins, Trace									
			Pyrite, Gray									
40			Boring Terminated									
45												
50												
55												
60												
65												
70												

REMARKS: \*Boring terminated at 38.6' below ground level due to blocked off core barrel. Bridge 2

**ARKANSAS DEPARTMENT OF TRANSPORTATION  
MATERIALS DIVISION - GEOTECHNICAL SEC.**

BORING NO. 9  
PAGE 1 OF 2

JOB NO. BR6210  
JOB NAME: Hurricane Creek STRS. & APPRS. NO.2(S)  
C0. Rd. 65 (Samples) Saline County  
STATION: 116+15  
LOCATION: Construction Centerline  
LOGGED BY: Austin Dillman

DATE: March 4, 2020  
TYPE OF DRILLING:  
Hollow Stem Auger - Diamond Core  
EQUIPMENT: Acker 1779  
HAMMER CORRECTION FACTOR:

COMPLETION DEPTH: 38.6

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: 431.9									
5			Clay with Organic Matter.									
			SHALE - Weathered, Medium Hard, Gray*							6 6-60 (11")		
10											100	0
15											6	0
20			LIMESTONE WITH INTERBEDDED SHALE - Unweathered, Hard, Occasional Fractures, Slickensided, Slightly Dipping, Trace Pyrite, Light and Dark Gray*								92	58
25											92	92
30			Quartz and Calcite Layer								48	28
35			LIMESTONE WITH INTERBEDDED SHALE - Unweathered, Hard, Occasional Fractures, Slickensided, Slightly Dipping, Trace Pyrite,								98	48

REMARKS: \*A water stratum was encountered at approximately 4.4' below ground level. \*\*Poor recovery from 8.6 to 13.6' below ground level due to drilling malfunction. Bridge 2


**ARKANSAS DEPARTMENT OF TRANSPORTATION  
MATERIALS DIVISION - GEOTECHNICAL SEC.**

BORING NO. 9  
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JOB NO. BR6210  
JOB NAME: Hurricane Creek STRS. & APPRS. NO.2(S)  
C0. Rd. 65 (Samples) Saline County  
STATION: 116+15  
LOCATION: Construction Centerline  
LOGGED BY: Austin Dillman

DATE: March 4, 2020  
TYPE OF DRILLING:  
Hollow Stem Auger - Diamond Core  
EQUIPMENT: Acker 1779  
HAMMER CORRECTION FACTOR:

COMPLETION DEPTH: 38.6

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: 431.9									
			Light and Dark Gray								96	90
40			Boring Terminated									
45												
50												
55												
60												
65												
70												

REMARKS: \*A water stratum was encountered at approximately 4.4' below ground level. \*\*Poor recovery from 8.6 to 13.6' below ground level due to drilling malfunction. Bridge 2