

ARKANSAS DEPARTMENT OF TRANSPORTATION



SUBSURFACE INVESTIGATION

STATE JOB NO. 090523

FEDERAL AID PROJECT NO. BFP-0044(35)

WAR EAGLE CREEK STR. & APPRS. (S)

STATE HIGHWAY 23 SECTION 9

IN MADISON 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

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April 13, 2020

TO: Mr. Rick Ellis, Bridge Engineer

SUBJECT: Job No. 090523
War Eagle Creek Str. & Apprs. (S)
Madison County
Route 23 Section 9

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 Highway 23 Bridge crossing War Eagle Creek, north of Huntsville. The new bridge will be constructed southwest of the existing. A total of six borings were requested for this bridge and six borings were obtained. A few of the borings had to be offset due to steep slopes and high water levels in the channel.

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 bearing on rock. Preboring may be necessary to achieve minimum pile penetration requirements.

Due to the karst geology and the presence of voids encountered in the borings, it is anticipated that all intermediate bents will be founded on drilled shafts socketed into competent rock or pilings bearing on rock. If drilled shafts are to be utilized, it is recommended that exploratory borings be performed at each shaft location to identify potential cavities. Drilled shafts socketed in competent Sandstone with Shale should be designed based on the values provided in Table 1.

TABLE 1 – Bearing Capacity Recommendations for Drilled Shafts

Nominal Tip Resistance (KSF)	Factored Tip Resistance (KSF)	Nominal Side Resistance (KSF)	Factored Side Resistance (KSF)
1005	502	32.7	18

It is acceptable to utilize 2H:1V end slopes for the proposed embankments. This embankment geometry provides a satisfactory Factor of Safety for static conditions. 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 9 Engineer
G.C. File

GEOLOGY AND SITE CONDITIONS

Job No. 090523

War Eagle Creek Str. & Apprs. (S)

Madison County

Route 23 Section 9

Site Conditions

The existing bridge is a 6-span structure on Highway 23 that crosses over War Eagle Creek. The existing bridge is constructed of concrete deck supported by five sets of steel beams. The bents are composed of concrete wall piers on spread footings. The guardrail is composed steel supported by concrete posts on the bridge and steel posts leading up to the bridge. Stacked stone riprap has been placed on the slopes below the abutments. A water line and telecommunication line run under the west side of the bridge and are buried north and south of the bridge.

At the job site, War Eagle Creek flows to the southwest. The channel is located under Span 5. The area north of the channel is primarily wooded with a parking area located on the west side of the bridge, providing access to a trailhead that leads under Span 6. The area northeast of the bridge has a limestone (Boone Formation) bluff that parallels War Eagle Creek. The area southwest of the bridge is wooded with pastureland beyond and the area southeast of the bridge is pastureland.

Site Geology

The area of the proposed bridge has been mapped as the Boone Formation (Mb). The St. Joe Formation, sometimes included as a member of the Boone Formation, is exposed along the north bank of War Eagle Creek. The St. Joe Limestone is a fine-grained, crinoidal limestone that may occasionally contain some smoothly bedded chert. Some beds may display a coarse bioclastic texture. The limestones (and cherts) are frequently gray, but may also be red, pink, purple, brown, or amber. Some thin calcareous shales are found in the sequence. The base of the St. Joe Limestone is generally marked by a phosphatic, greenish shale or conglomerate. The St. Joe Limestone ranges from a feather edge to over 110 feet in thickness. The Boone and St. Joe formations are well known for dissolutional features, such as sinkholes, caves, and enlarged fissures. There are a number of caves in this region. Many borings encountered shallow, soil-filled cavities. It is unclear if some of these are in fact cavities or boulders overlying more soil before rock. There are a number of faults in this region; however, none were encountered in borings.

Scour Potential

Both banks of the channel were sampled to ascertain the scour potential of the job site. The banks consisted of silty sand and silty sand with some gravel (SM). Silty sand has a high potential for scour and efforts should be taken to minimize this problem.

Subsurface Conditions

Based on the results of the borings from Station 107+60 to Station 109+97, the subsurface stratigraphy may be generalized as follows:

- 0 to 11.0 Feet: Consists of moist, very loose to very dense, brown **silty sand to silty sand with gravel**.
- 11.0 to 23.3 Feet: Varies from moist, medium dense, brown **silty sand to sand with gravel to gravel and cobbles** to gray to reddish gray, moderately hard, slightly weathered to unweathered **limestone to limestone with occasional shale partings and seams**. Borings 1 and 2 encountered a single soil-filled cavity with a thickness of 0.2 feet.
- 23.3 to 45.8 Feet: Consists of gray to reddish gray, moderately hard, slightly weathered to unweathered **limestone to limestone with occasional shale partings and seams**.

Based on the results of the borings from Station 111+33 to Station 111+85, the subsurface stratigraphy may be generalized as follows:

- 0 to 11.9 Feet: Varies from moist, very dense, brown **silty sand to clay with cobbles and boulders to limestone**. It is unclear if the limestone in this zone represents boulders or if the soil underneath the limestone represents a cavity. If they represent cavities, the dissolution thickness varies from 2.9' to 5.9'.
- 11.9 to 38.6 Feet: Consists of gray to reddish gray, moderately hard, slightly weathered to unweathered **limestone to limestone with occasional shale partings and seams**. Boring 6 encountered a single soil-filled cavity with a thickness of 0.2 ft.

Rock Core Unconfined Compression Test Summary

Project Number: 090523
Project Name: War Eagle Creek Str. & Apprs. (S)
Date Tested: 3/19/2020

[illegible]

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

ROCK MASS RATING SUMMARY

JOB # 090523

SAMPLE #1

Station/Location	111+85/CL
Depth (ft.)	5.4
	Relative Rating
Uniaxial Compressive Strength	4
RQD	0
Spacing of Joints	30
Condition of Joints	25
Groundwater Conditions	7
Sum	66
Class Number	II
Description	GOOD ROCK

SAMPLE #2

Station/Location	111+85/CL
Depth (ft.)	15.3
	Relative Rating
Uniaxial Compressive Strength	4
RQD	13
Spacing of Joints	30
Condition of Joints	25
Groundwater Conditions	7
Sum	79
Class Number	II
Description	GOOD ROCK

SAMPLE #3

Station/Location	111+33/CL
Depth (ft.)	9.3
	Relative Rating
Uniaxial Compressive Strength	4
RQD	8
Spacing of Joints	30
Condition of Joints	25
Groundwater Conditions	7
Sum	74
Class Number	II
Description	GOOD ROCK

SAMPLE #4

Station/Location	111+33/CL
Depth (ft.)	12.1
	Relative Rating
Uniaxial Compressive Strength	4
RQD	17
Spacing of Joints	30
Condition of Joints	25
Groundwater Conditions	7
Sum	83
Class Number	I
Description	VERY GOOD ROCK

SAMPLE #5

Station/Location	109+97/CL
Depth (ft.)	26
	Relative Rating
Uniaxial Compressive Strength	4
RQD	20
Spacing of Joints	30
Condition of Joints	25
Groundwater Conditions	7
Sum	86
Class Number	I
Description	VERY GOOD ROCK

SAMPLE #6

Station/Location	109+97/CL
Depth (ft.)	30.3
	Relative Rating
Uniaxial Compressive Strength	7
RQD	20
Spacing of Joints	30
Condition of Joints	25
Groundwater Conditions	7
Sum	89
Class Number	I
Description	VERY GOOD ROCK

SAMPLE #7

Station/Location	109+97/CL
Depth (ft.)	36.7
	Relative Rating
Uniaxial Compressive Strength	4
RQD	20
Spacing of Joints	30
Condition of Joints	25
Groundwater Conditions	7
Sum	86
Class Number	I
Description	VERY GOOD ROCK

SAMPLE #8

Station/Location	109+30/8' Rt
Depth (ft.)	21.5
	Relative Rating
Uniaxial Compressive Strength	4
RQD	8
Spacing of Joints	30
Condition of Joints	25
Groundwater Conditions	7
Sum	74
Class Number	II
Description	GOOD ROCK

SAMPLE #9

Station/Location	109+30/8' Rt
Depth (ft.)	23.9
	Relative Rating
Uniaxial Compressive Strength	7
RQD	17
Spacing of Joints	30
Condition of Joints	25
Groundwater Conditions	7
Sum	86
Class Number	I
Description	VERY GOOD ROCK

SAMPLE #10

Station/Location	109+30/8' Rt
Depth (ft.)	29.4
	Relative Rating
Uniaxial Compressive Strength	2
RQD	20
Spacing of Joints	30
Condition of Joints	25
Groundwater Conditions	7
Sum	84
Class Number	I
Description	VERY GOOD ROCK

SAMPLE #11

Station/Location	111+85/CL
Depth (ft.)	21.4
	Relative Rating
Uniaxial Compressive Strength	4
RQD	13
Spacing of Joints	30
Condition of Joints	25
Groundwater Conditions	7
Sum	79
Class Number	II
Description	GOOD ROCK

SAMPLE #12

Station/Location	111+33/CL
Depth (ft.)	18.1
	Relative Rating
Uniaxial Compressive Strength	4
RQD	8
Spacing of Joints	30
Condition of Joints	25
Groundwater Conditions	7
Sum	74
Class Number	II
Description	GOOD ROCK

SAMPLE #13

Station/Location	108+40/CL
Depth (ft.)	13.5
	Relative Rating
Uniaxial Compressive Strength	4
RQD	8
Spacing of Joints	30
Condition of Joints	25
Groundwater Conditions	7
Sum	74
Class Number	II
Description	GOOD ROCK

SAMPLE #14

Station/Location	108+40/CL
Depth (ft.)	17.6
	Relative Rating
Uniaxial Compressive Strength	4
RQD	13
Spacing of Joints	30
Condition of Joints	25
Groundwater Conditions	7
Sum	79
Class Number	II
Description	GOOD ROCK

SAMPLE #15

Station/Location	108+40/CL
Depth (ft.)	22.6
	Relative Rating
Uniaxial Compressive Strength	4
RQD	17
Spacing of Joints	30
Condition of Joints	25
Groundwater Conditions	7
Sum	83
Class Number	I
Description	VERY GOOD ROCK

SAMPLE #16

Station/Location	
Depth (ft.)	
	Relative Rating
Uniaxial Compressive Strength	
RQD	
Spacing of Joints	
Condition of Joints	
Groundwater Conditions	
Sum	
Class Number	
Description	

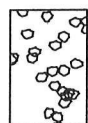
**D₅₀ AGGREGATE ANALYSIS
FOR SCOUR CALCULATIONS**

Job No. 090523						
Creek Name	Station	Sample Type	Location	Depth (FT)	Soil Description	Aggregate Size (D50) (IN)
War Eagle Creek	111+97	Creek Bank	27' Right of Const. C.L.	N/A	SM Silty Sand	0.0059
War Eagle Creek	110+10	Creek Bank	60' Right of Const. C.L.	N/A	SM Silty Sand with Some Gravel	0.0059

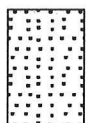
LEGEND

SOIL TYPES

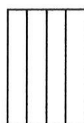
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(PREDOMINANT TYPE SHOWN HEAVY)



GRAVEL



SAND



SILT



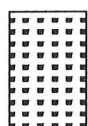
CLAY



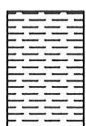
ORGANIC
MATTER

ROCK TYPES

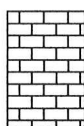
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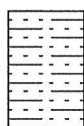
SANDSTONE



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	

1. 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.
2. Borings represent subsurface conditions at their respective locations for their respective depths. Variations in conditions between or adjacent to boring locations may be encountered.
3. 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 2

JOB NO. 090523 Madison County
JOB NAME: War Eagle Creek Str. & Apprs. (S)
Route 23 Section 9
STATION: 107+60
LOCATION: 9' Right of Construction Centerline
LOGGED BY: Troy Frazier

DATE: March 10, 2020
TYPE OF DRILLING:
Hollow Stem Auger - Diamond Core
EQUIPMENT: Acker 2094

HAMMER CORRECTION FACTOR: N/A

COMPLETION DEPTH: 38.4

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: 1237.6									
5			Not Sampled									
10												
15												
			LIMESTONE - Unweathered, Moderately Hard, Gray*								87	77
20			Soil Filled Cavity (Clay with Sand) (18.4' to 18.6')									
			LIMESTONE WITH OCCASIONAL SHALE SEAMS - Unweathered, Moderately Hard, Gray to Reddish Gray								93	81
25												
											100	88
30												
											96	96
35												

REMARKS: * Total water loss at 16.2' below ground level.

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

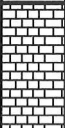
BORING NO. 1

PAGE 2 OF 2

JOB NO. 090523 Madison County
JOB NAME: War Eagle Creek Str. & Apprs. (S)
Route 23 Section 9
STATION: 107+60
LOCATION: 9' Right of Construction Centerline
LOGGED BY: Troy Frazier

DATE: March 10, 2020
TYPE OF DRILLING:
Hollow Stem Auger - Diamond Core
EQUIPMENT: Acker 2094
HAMMER CORRECTION FACTOR: N/A

COMPLETION DEPTH: 38.4

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: 1237.6									
											100	89
40			Boring Terminated									
45												
50												
55												
60												
65												
70												

REMARKS: * Total water loss at 16.2' below ground level.

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

BORING NO. 1A
PAGE 1 OF 1

JOB NO. 090523 Madison County
JOB NAME: War Eagle Creek Str. & Apprs. (S)
Route 23 Section 9
STATION: 107+65
LOCATION: 9' Right of Construction Centerline
LOGGED BY: Troy Frazier

DATE: March 10, 2020
TYPE OF DRILLING:
Hollow Stem Auger - Diamond Core
EQUIPMENT: Acker 2094
HAMMER CORRECTION FACTOR: N/A

COMPLETION DEPTH: 13.7

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: 1237.3									
			Silty Sand with Some Gravel and Cobbles									
5		X	Moist, Loose, Brown Silty Sand with Trace Gravel							2 3-5		
10		X	Moist, Loose, Brown Silty Sand*							2 3-5		
15			Boring Terminated							20 (0")		
20												
25												
30												
35												

REMARKS: * Boring terminated after encountering rock due to crooked auger.

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

BORING NO. 2

PAGE 1 OF 2

JOB NO. 090523 Madison County
JOB NAME: War Eagle Creek Str. & Apprs. (S)
Route 23 Section 9
STATION: 108+40
LOCATION: Construction Centerline
LOGGED BY: Troy Frazier

DATE: March 10, 2020
TYPE OF DRILLING:
Hollow Stem Auger - Diamond Core
EQUIPMENT: Acker 2094
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: 1235.6									
5			Moist, Loose, Brown Silty Sand							2 3-3		
10			Moist, Very Dense, Brown Silty Sand							3 4-20 (8")		
			LIMESTONE								97	41
15			LIMESTONE - Unweathered, Moderately Hard, Gray to Reddish Gray									
			Soil Filled Cavity (Clay with Sand) (15.7' to 16.5')								84	35
20			LIMESTONE WITH OCCASIONAL SHALE PARTINGS - Unweathered, Moderately Hard, Gray to Reddish Gray								100	83
25											100	87
30			LIMESTONE - Unweathered, Moderately Hard, Gray to Reddish Gray								99	75
35												

REMARKS:

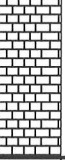
**ARKANSAS DEPARTMENT OF TRANSPORTATION
MATERIALS DIVISION - GEOTECHNICAL SEC.**

BORING NO. 2
PAGE 2 OF 2

JOB NO. 090523 Madison County
JOB NAME: War Eagle Creek Str. & Apprs. (S)
Route 23 Section 9
STATION: 108+40
LOCATION: Construction Centerline
LOGGED BY: Troy Frazier

DATE: March 10, 2020
TYPE OF DRILLING:
Hollow Stem Auger - Diamond Core
EQUIPMENT: Acker 2094
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: 1235.6									
			LIMESTONE WITH OCCASIONAL SHALE SEAMS - Unweathered, Moderately Hard, Gray to Reddish Gray								99	83
40			Boring Terminated									
45												
50												
55												
60												
65												
70												

REMARKS:

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

BORING NO. 3

PAGE 1 OF 2

JOB NO. 090523 Madison County
JOB NAME: War Eagle Creek Str. & Apprs. (S)
Route 23 Section 9
STATION: 109+30
LOCATION: 8' Right of Construction Centerline
LOGGED BY: Troy Frazier

DATE: March 4, 2020
TYPE OF DRILLING:
Hollow Stem Auger - Diamond Core
EQUIPMENT: Acker 2094
HAMMER CORRECTION FACTOR: N/A

COMPLETION DEPTH: 39.7

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: 1229.8									
5			No Sampling occurred in this zone									
10												
15												
20												
25												
30												
35			LIMESTONE								94	26
			LIMESTONE WITH OCCASIONAL SHALE SEAMS - Slightly Weathered, Moderately Hard, Gray and Reddish Gray									
			LIMESTONE WITH OCCASIONAL SHALE SEAMS - Unweathered, Moderately Hard, Gray*								100	89
											98	60

REMARKS: * Total Water Loss at 25.2' below ground level.

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


BORING NO. 3

PAGE 2 OF 2

JOB NO. 090523 Madison County
JOB NAME: War Eagle Creek Str. & Apprs. (S)
Route 23 Section 9
STATION: 109+30
LOCATION: 8' Right of Construction Centerline
LOGGED BY: Troy Frazier

DATE: March 4, 2020
TYPE OF DRILLING:
Hollow Stem Auger - Diamond Core
EQUIPMENT: Acker 2094
HAMMER CORRECTION FACTOR: N/A

COMPLETION DEPTH: 39.7

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: 1229.8									
40			LIMESTONE WITH FREQUENT SHALE SEAMS - Unweathered, Moderately Hard, Gray and Reddish Gray								100	96
45			Boring Terminated									
50												
55												
60												
65												
70												

REMARKS: * Total Water Loss at 25.2' below ground level.

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

BORING NO. 3A
PAGE 1 OF 1

JOB NO. 090523 Madison County
JOB NAME: War Eagle Creek Str. & Apprs. (S)
Route 23 Section 9
STATION: 109+30
LOCATION: 10' Right of Construction Centerline
LOGGED BY: Troy Frazier

DATE: March 4, 2020
TYPE OF DRILLING:
Hollow Stem Auger - Diamond Core
EQUIPMENT: Acker 2094
HAMMER CORRECTION FACTOR: N/A

COMPLETION DEPTH: 20.2

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: 1230.3									
5			Moist, Loose, Brown Silty Sand with Some Organic Matter							2 2-3		
10			Wet, Medium Dense, Brown Sand with Some Clay and Some Gravel*							5 8-14		
15			Wet, Medium Dense, Brown Silty Sand with Gravel							5 5-8		
20			Gravel and Cobbles**							25 (2")		
			Boring Terminated									
25												
30												
35												

REMARKS: * Water was encountered at 13.2 feet below ground level.
** Hole abandoned due to crooked auger.

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

BORING NO. 4

PAGE 1 OF 2

JOB NO. 090523 Madison County
JOB NAME: War Eagle Creek Str. & Apprs. (S)
Route 23 Section 9
STATION: 109+97
LOCATION: Construction Centerline
LOGGED BY: Troy Frazier

DATE: March 3, 2020
TYPE OF DRILLING:
Hollow Stem Auger - Diamond Core
EQUIPMENT: Acker 2094
HAMMER CORRECTION FACTOR: N/A

COMPLETION DEPTH: 45.8

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: 1228.7									
5			Moist, Very Loose, Brown Silty Sand with Organic Matter							2 2-2		
10			Moist, Medium Dense, Brown Sand with Gravel*							11 12		
15										6 10-1		
20			Moist, Medium Dense, Brown Sand with Gravel and Cobbles							5 8-10		
25			LIMESTONE LIMESTONE - Unweathered, Moderately Hard, Gray							10 (0")	91	50
30											100	96
35			LIMESTONE WITH OCCASIONAL SHALE SEAMS - Unweathered, Moderately Hard, Gray								100	95

REMARKS: * Water was encountered at 13.4' below ground level.

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

BORING NO. 4

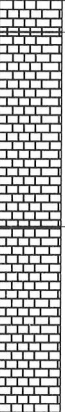
PAGE 2 OF 2

JOB NO. 090523 Madison County
JOB NAME: War Eagle Creek Str. & Apprs. (S)
Route 23 Section 9
STATION: 109+97
LOCATION: Construction Centerline
LOGGED BY: Troy Frazier

DATE: March 3, 2020
TYPE OF DRILLING:
Hollow Stem Auger - Diamond Core
EQUIPMENT: Acker 2094

HAMMER CORRECTION FACTOR: N/A

COMPLETION DEPTH: 45.8

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: 1228.7									
40			LIMESTONE WITH OCCASIONAL SHALE SEAMS - Unweathered, Moderately Hard, Gray and Reddish Gray								96	96
45			LIMESTONE WITH OCCASIONAL SHALE SEAMS - Unweathered, Moderately Hard, Gray								100	100
50			Boring Terminated									
55												
60												
65												
70												

REMARKS: * Water was encountered at 13.4' below ground level.

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

BORING NO. 5

PAGE 1 OF 1

JOB NO. 090523 Madison County
JOB NAME: War Eagle Creek Str. & Apprs. (S)
Route 23 Section 9
STATION: 111+33
LOCATION: Construction Centerline
LOGGED BY: Stanley Bates

DATE: February 25, 2020
TYPE OF DRILLING:
Hollow Stem Auger - Diamond Core
EQUIPMENT: Acker 2094

HAMMER CORRECTION FACTOR: N/A

COMPLETION DEPTH: 32.4

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: 1231.8									
			Silty Sand									
5			Very Dense, Cobbles and Boulders							10 (0")		
			LIMESTONE - Slightly Weathered, Moderately Hard, Gray to Reddish Gray								59	0
10			Clay with Sand								82	60
15											100	87
20			LIMESTONE WITH OCCASIONAL SHALE PARTINGS AND SEAMS - Unweathered, Moderately Hard, Gray to Reddish Gray								100	40
25											100	95
30											98	98
35			Boring Terminated									

REMARKS:

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

BORING NO. 6

PAGE 1 OF 2

JOB NO. 090523 Madison County
JOB NAME: War Eagle Creek Str. & Apprs. (S)
Route 23 Section 9
STATION: 111+85
LOCATION: Construction Centerline
LOGGED BY: Stanley Bates

DATE: February 25, 2020
TYPE OF DRILLING:
Hollow Stem Auger - Diamond Core
EQUIPMENT: Acker 2094
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: 1240.2									
			Cobbles and Boulders									
5			LIMESTONE - Slightly Weathered, Moderately Hard, Gray								81	0
10			Clay with Gravel and Cobbles								0	0
15			LIMESTONE WITH OCCASIONAL SHALE PARTINGS AND SEAMS - Slightly Weathered, Moderately Hard, Occasional Vugs, Gray to Reddish Gray								95	0
			Cavity (15.1' - 15.3')								96	49
20											100	62
25											100	46
30			LIMESTONE WITH OCCASIONAL SHALE PARTINGS AND SEAMS - Unweathered, Moderately Hard, Gray to Reddish Gray								100	93
35												

REMARKS:

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

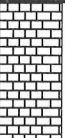
BORING NO. 6

PAGE 2 OF 2

JOB NO. 090523 Madison County
 JOB NAME: War Eagle Creek Str. & Apprs. (S)
 Route 23 Section 9
 STATION: 111+85
 LOCATION: Construction Centerline
 LOGGED BY: Stanley Bates

DATE: February 25, 2020
 TYPE OF DRILLING:
 Hollow Stem Auger - Diamond Core
 EQUIPMENT: Acker 2094
 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: 1240.2									
											100	87
40			Boring Terminated									
45												
50												
55												
60												
65												
70												

REMARKS:



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

July 25, 2019

TO: Mr. Trinity Smith, Engineer of Roadway Design

SUBJECT: Job No. 090523
War Eagle Creek Str. & Apprs. (S)
Route 23 Section 9
Madison 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 over War Eagle Creek on Highway 23. Samples were taken in the existing travel lanes, ditch line and along the new alignment.


The subgrade soils consist of moderately plastic sandy clay with varying amounts of gravel. Highly plastic clay was encountered at isolated locations within the project limits. The subgrade soils are expected to provide a stable working platform with conventional processing if the weather is favorable during construction. Rock was encountered at station 109+00.6 and 15 feet right of centerline at depths of 3.0 and 2.5 feet respectively.

Earthwork recommendations will be made upon request 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 near Spring Valley.
2. Asphalt Concrete Hot Mix

Type	Asphalt Cement %	Mineral Aggregate %
Surface Course	5.5	94.5
Binder Course	4.5	95.5
Base Course	4.1	95.9



Michael C. Benson
Materials Engineer

MCB:pt:bjj
Attachment

cc: State Constr. Eng. – Master File Copy
District 9 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 - 07/12/2019

JOB NUMBER - 090523

SEQUENCE NO. - 1

MATERIAL CODE - SSRV

SPEC. YEAR - 2014

SUPPLIER ID. - 1

COUNTY/STATE - 44

DISTRICT NO. - 09

JOB NAME - WAR EAGLE CREEK STR. & APPRS. (S)

* STATION LIMITS R-VALUE AT 240 psi *

BEGIN JOB - END JOB 11

RESILIENT MODULUS

STA. 122+00 6726

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.	090523	Material Code	SSRVPS
Date Sampled:	6/3/19	Station No.:	122+00
Date Tested:	July 11, 2019	Location:	CL
Name of Project:	WAR EAGLE CREEK STR. & APPRS. (S)		
County:	Code: 44	Name:	MADISON
Sampled By:	FRAZIER / DICKERSON		Depth: 0-5
Lab No.:	20191801	AASHTO Class:	A-4 (0)
Sample ID:	RV483	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):	3025.20
------------------------------	---------

4. Soil Properties:

Optimum Moisture Content (%):	15.5
Maximum Dry Density (pcf):	107.1
95% of MDD (pcf):	101.7
In-Situ Moisture Content (%):	N/A

5. Specimen Properties:

Wet Weight (g):	3025.20
Compaction Moisture content (%):	15.7
Compaction Wet Density (pcf):	118.00
Compaction Dry Density (pcf):	101.99
Moisture Content After Mr Test (%):	15.5

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

7. Resilient Modulus, Mr: $6446(\text{Sc})^{-0.12071}(\text{S3})^{0.37457}$

8. Comments

9. Tested By:

GW

Date: July 11, 2019

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

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

Job No. 090523	Material Code SSRVPS	
Date Sampled: 6/3/19	Station No.: 122+00	
Date Tested: July 11, 2019	Location: CL	
Name of Project: WAR EAGLE CREEK STR. & APPRS. (S)		
County: Code: 44 Name: MADISON		
Sampled By: FRAZIER / DICKERSON	Depth: 0-5	
Lab No.: 20191801	AASHTO Class: A-4 (0)	
Sample ID: RV483	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 UNIT	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	25.0	22.5	2.5	2.1	1.8	0.2	0.00125	0.00016	11,882
Sequence 2	6.0	4.0	47.3	44.8	2.5	3.9	3.7	0.2	0.00269	0.00034	10,944
Sequence 3	6.0	6.0	70.2	66.7	3.5	5.8	5.5	0.3	0.00418	0.00052	10,502
Sequence 4	6.0	8.0	94.1	88.3	5.8	7.7	7.3	0.5	0.00588	0.00073	9,888
Sequence 5	6.0	10.0	118.2	110.0	8.3	9.7	9.0	0.7	0.00759	0.00095	9,541
Sequence 6	4.0	2.0	24.9	22.5	2.4	2.0	1.8	0.2	0.00145	0.00018	10,221
Sequence 7	4.0	4.0	46.7	44.3	2.5	3.8	3.6	0.2	0.00320	0.00040	9,111
Sequence 8	4.0	6.0	68.1	65.5	2.5	5.6	5.4	0.2	0.00504	0.00063	8,556
Sequence 9	4.0	8.0	91.6	86.8	4.8	7.5	7.1	0.4	0.00682	0.00085	8,380
Sequence 10	4.0	10.0	115.9	108.7	7.2	9.5	8.9	0.6	0.00861	0.00107	8,313
Sequence 11	2.0	2.0	24.6	22.2	2.3	2.0	1.8	0.2	0.00189	0.00024	7,730
Sequence 12	2.0	4.0	45.7	43.2	2.5	3.7	3.5	0.2	0.00407	0.00051	6,995
Sequence 13	2.0	6.0	66.1	63.7	2.4	5.4	5.2	0.2	0.00623	0.00078	6,726
Sequence 14	2.0	8.0	88.7	84.7	4.0	7.3	7.0	0.3	0.00828	0.00103	6,738
Sequence 15	2.0	10.0	112.3	105.9	6.4	9.2	8.7	0.5	0.01031	0.00129	6,763

TESTED BY	DATE	DATE
GW	July 11, 2019	
REVIEWED BY		

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT
MATERIALS DIVISION

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

Job No.	090523	Material Code	SSRVPS
Date Sampled:	6/3/19	Station No.:	122+00
Date Tested:	July 11, 2019	Location:	CL
Name of Project:	WAR EAGLE CREEK STR. & APPRS. (S)		
County:	Code: 44	Name:	MADISON
Sampled By:	FRAZIER / DICKERSON		
Lab No.:	20191801	Depth:	0-5
Sample ID:	RV483	AASHTO Class:	A-4 (0)
LATITUDE:		Material Type (1 or 2):	2
		LONGITUDE:	

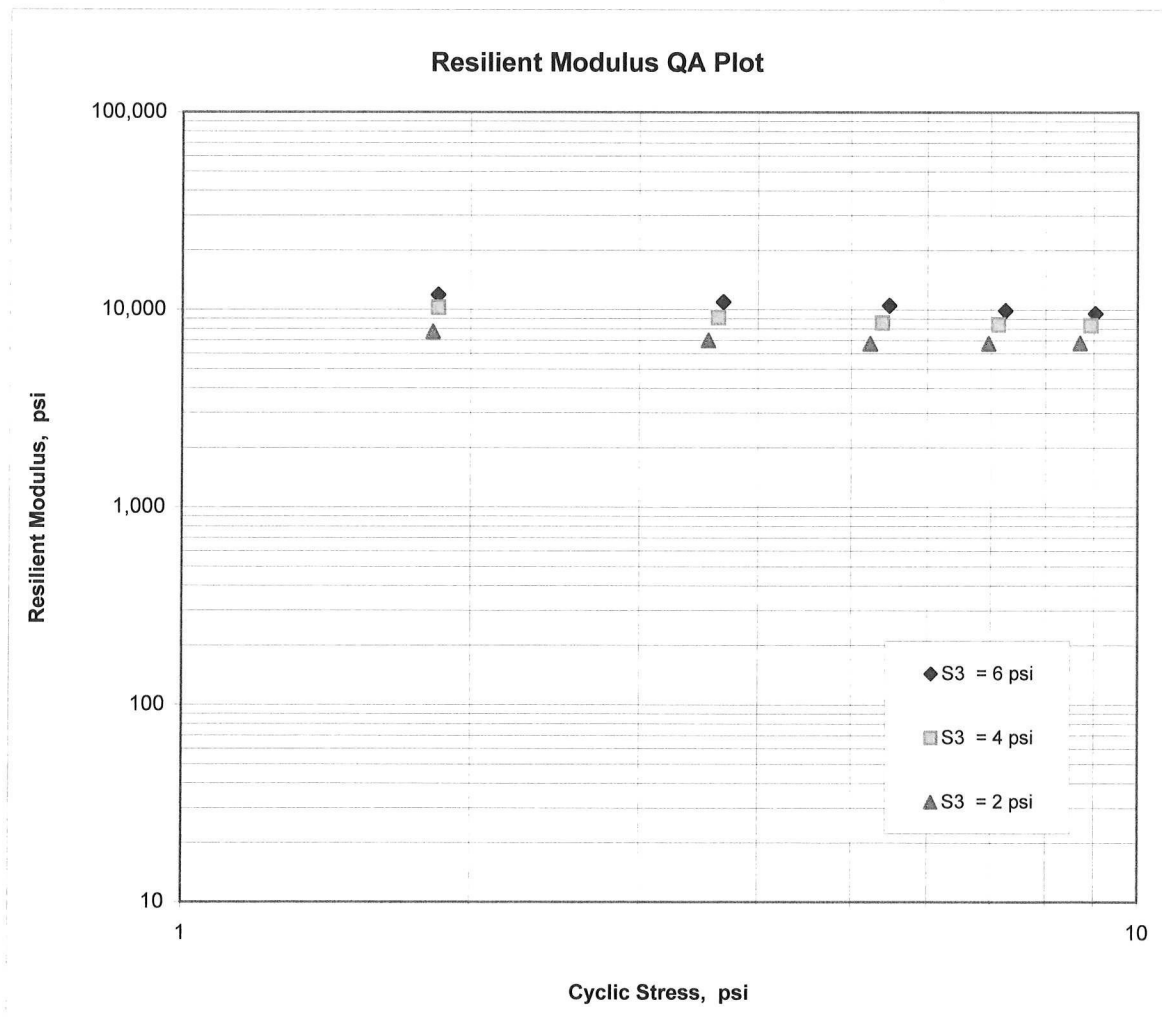
$$M_R = K_1 (S_c)^{K_2} (S_3)^{K_5}$$

$$K_1 = 6,446$$

$$K_2 = -0.12071$$

$$K_5 = 0.37457$$

$$R^2 = 0.99$$



JOB: 090523

Arkansas State Highway Transportation Department

JOB NAME: WAR EAGLE CREEK STR. & APPRS. (S)

Materials Division

COUNTY NO. 44 DATE TESTED 7/12/2019

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					
122+00	CL	0-5	RD/BR	56	50	44	41	36	26	5	A-4(0)	RV483	
109+00	06 RT	0-3Z	BROWN	92	83	75	72	68	55	36	A-7-6(23)	S477	29.4
109+00	15 RT	0-3Z	BROWN	79	74	67	62	56	35	16	A-6(6)	S478	23.9
122+00	CL	0-5	BROWN	65	58	52	49	44	30	8	A-4(1)	S479	23.2
134+70	CL	0-5	RD/BR	60	47	38	35	33	26	9	A-4(2)	S480	11.5
143+00	06 LT	0-5	RD/BR	81	71	60	57	54	37	23	A-6(9)	S481	19.2
143+00	15 LT	0-5	RD/BR	85	75	63	60	57	32	15	A-6(6)	S482	16.2

comments: W=MULTIPLE LAYERS, Z=AUGER REFUSAL

Monday, July 15, 2019

STA.#

LOC.

PAVEMENT SOUNDINGS

109+00	06 RT	ACHMSC 4.5	AGG.BASE CRS CL-7 10.0
109+00	15 RT	ACHMSC ---	AGG.BASE CRS CL-7 ---
122+00	CL	ACHMSC ---	AGG.BASE CRS CL-7 ---
134+70	CL	ACHMSC 1.5W	AGG.BASE CRS CL-7 8.0
143+00	06 LT	ACHMSC 3.75	AGG.BASE CRS CL-7 8.0
143+00	15 LT	ACHMSC ---	AGG.BASE CRS CL-7 ---

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT - LITTLE ROCK, ARKANSAS
MATERIALS DIVISION

MICHAEL BENSON, MATERIALS ENGINEER

*** SOIL SURVEY / PAVEMENT SOUNDING TEST REPORT ***

DATE	- 07/15/19	SEQUENCE NO.	- 2
JOB NUMBER	- 090523	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	- 44
SUPPLIER NAME	- STATE	DISTRICT NO.	- 09
NAME OF PROJECT	- WAR EAGLE CREEK STR. & APPRS. (S)		
PROJECT ENGINEER	- NOT APPLICABLE		
PIT/QUARRY	- ARKANSAS		
LOCATION	- MADISON COUNTY	DATE SAMPLED	- 06/03/19
SAMPLED BY	- FRAZIER/DICKERSON	DATE RECEIVED	- 06/07/19
SAMPLE FROM	- TEST HOLE	DATE TESTED	- 07/12/19
MATERIAL DESC.	- SOIL SURVEY - R VALUE- PAVEMENT SOUNDINGS		
LAB NUMBER	- 20191798	- 20191799	- 20191800
SAMPLE ID	- S480	- S481	- S482
TEST STATUS	- INFORMATION ONLY	- INFORMATION ONLY	- INFORMATION ONLY
STATION	- 134+70	- 143+00	- 143+00
LOCATION	- CL	- 06 LT	- 15 LT
DEPTH IN FEET	- 0-5	- 0-5	- 0-5
MAT'L COLOR	- RD/BR	- RD/BR	- RD/BR
MAT'L TYPE	-	-	-
LATITUDE DEG-MIN-SEC	- 36 9 11.60	- 36 09 12.10	- 36 9 12.20
LONGITUDE DEG-MIN-SEC	- 93 44 17.10	- 93 44 5.60	- 93 44 5.60
% PASSING	2 IN. -	-	-
	1 1/2 IN. -	- 100	-
	3/4 IN. - 100	- 97	- 100
	3/8 IN. - 81	- 92	- 96
	NO. 4 - 60	- 81	- 85
	NO. 10 - 47	- 71	- 75
	NO. 40 - 38	- 60	- 63
	NO. 80 - 35	- 57	- 60
	NO. 200 - 33	- 54	- 57
LIQUID LIMIT	- 26	- 37	- 32
PLASTICITY INDEX	- 9	- 23	- 15
AASHTO SOIL	- A-4 (2)	- A-6 (9)	- A-6 (6)
UNIFIED SOIL	-	-	-
% MOISTURE CONTENT	- 11.5	- 19.2	- 16.2
ACHMSC (IN)	- 1.5W	- 3.75	- ---
AGG.BASE CRS CL-7 (IN)	- 8.0	- 8.0	- ---
	-	-	-
	-	-	-
	-	-	-
	-	-	-
	-	-	-
	-	-	-
	-	-	-
	-	-	-

REMARKS - W=MULTIPLE LAYERS, Z=AUGER REFUSAL

-
-
-
-

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	- 07/15/19	SEQUENCE NO.	- 1
JOB NUMBER	- 090523	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	- 44
SUPPLIER NAME	- STATE	DISTRICT NO.	- 09
NAME OF PROJECT - WAR EAGLE CREEK STR. & APPRS. (S)			
PROJECT ENGINEER - NOT APPLICABLE			
PIT/QUARRY	- ARKANSAS		
LOCATION	- MADISON COUNTY	DATE SAMPLED	- 06/03/19
SAMPLED BY	- FRAZIER/DICKERSON	DATE RECEIVED	- 06/07/19
SAMPLE FROM	- TEST HOLE	DATE TESTED	- 07/12/19
MATERIAL DESC. - SOIL SURVEY - RESISTANCE R-VALUE ACTUAL RESULTS			

LAB NUMBER	-	20191801	-	-
SAMPLE ID	-	RV483	-	-
TEST STATUS	-	INFORMATION ONLY	-	-
STATION	-	122+00	-	-
LOCATION	-	CL	-	-
DEPTH IN FEET	-	0-5	-	-
MAT'L COLOR	-	RD/BR	-	-
MAT'L TYPE	-		-	-
LATITUDE DEG-MIN-SEC	-	36 9 3.20	-	-
LONGITUDE DEG-MIN-SEC	-	93 44 26.70	-	-
% PASSING	2	IN.	-	-
	1 1/2	IN.	-	-
	3/4	IN.	-	100
	3/8	IN.	-	77
	NO. 4	-	56	-
	NO. 10	-	50	-
	NO. 40	-	44	-
	NO. 80	-	41	-
	NO. 200	-	36	-
LIQUID LIMIT	-	26	-	-
PLASTICITY INDEX	-	5	-	-
AASHTO SOIL	-	A-4 (0)	-	-
UNIFIED SOIL	-		-	-
% MOISTURE CONTENT	-		-	-
	-		-	-
	-		-	-
	-		-	-
	-		-	-
	-		-	-
	-		-	-
	-		-	-
	-		-	-
	-		-	-
	-		-	-
	-		-	-

REMARKS - W=MULTIPLE LAYERS, Z=AUGER REFUSAL

-
-
-
-

AASHTO TESTS : T24 T88 T89 T90 T265

: