

ARKANSAS DEPARTMENT OF TRANSPORTATION



SUBSURFACE INVESTIGATION

STATE JOB NO. 090402

FEDERAL AID PROJECT NO. NHPP-0004(50)

LITTLE OSAGE CREEK STR. & APPRS. (S)

STATE HIGHWAY 264 SECTION 3

IN BENTON 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 STATE HIGHWAY AND TRANSPORTATION DEPARTMENT

October 2, 2014

TO: Mr. Rick Ellis, Bridge Engineer

SUBJECT: Job No. 090402
Little Osage Creek Str. & Apprs. (S)
Route 264 Section 3
Benton County

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

Based on the depth at which bedrock was encountered, it is anticipated that the interior bents will be founded on spread footings. Spread footings should be sized based on the values provided in Table 1.

TABLE 1 – Bearing Capacity Recommendations for Interior bents

Foundation Description	Nominal Bearing Resistance (ksf)	Resistance Factor	Factored Bearing Resistance (ksf)
Spread Footings	81	0.45	36.5

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



Michael C. Benson
Materials Engineer

MCB:rpt

cc: State Construction Engineer - Master File Copy
District 9 Engineer
G.C. File

GEOLOGY AND SITE CONDITIONS
Job No. 090402
Little Osage Creek Str. & Apprs. (S)
Route 264 Section 3
Benton County

Site Conditions

The existing bridge is an eleven span structure over the Little Osage Creek. The bridge is constructed of precast concrete deck, except spans 6 and 7 which are composed of concrete deck supported by 5 steel beams with concrete bents and end walls. The guardrail is constructed of steel with concrete posts. Overhead power lines parallel the north side of the roadway. Trees line the channel with pasture surrounding the bridge. Located southwest of the bridge is a gated subdivision. The stream flows to the south, at the job location.

Site Geology

The project alignment is located on rocks mapped as the Boone Formation (map symbol Mb). The Boone Formation consists of gray, fine- to coarse-grained fossiliferous limestone interbedded with chert. Some sections may be predominantly limestone or chert. The chert is dark in color in the lower part of the sequence and light in the upper part. The quantity of chert varies considerably both vertically and horizontally. The Boone Formation is well known for dissolutional features, such as sinkholes, caves, and enlarged fissures. Only one small vug (less than one inch in diameter) was observed in the cores.

The thickness of the Boone Formation is 300 to 350 feet in most of northern Arkansas, but as much as 390 feet has been reported. Depth to bedrock varied in borings from 3.7 to 10.2 feet below ground level. The elevation of the top of bedrock varied from 1084.2 to 1085.0 feet above MSL.

Subsurface Conditions

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

- 0 to 3.7 Feet: Consists of wet, loose to very dense, brown sand with gravel (chert fragments) to gravel and cobbles (chert fragments).
- 3.7 to 10.2 Feet: Varies from moist, soft to stiff, brown clay with some gravel (chert fragments) to wet, very dense, white gravel (chert fragments) with sand to moderately hard, gray limestone with chert layers to hard, gray limestone with chert layers. There are some vertical fractures in this zone.
- 10.2 to 33.3 Feet: Consists of hard gray limestone with chert layers. There are some vertical fractures in this zone.

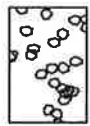
**D₅₀ AGGREGATE ANALYSIS
FOR SCOUR CALCULATIONS**

Job No. 090402					
Creek Name	Station	Sample Type	Location	Depth (FT)	Aggregate Size (D50) (IN)
Little Osage Creek	113+09	Creek Bank	15' Rt. C.L. Construction	N/A	0.75

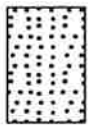
LEGEND

SOIL TYPES

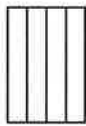
(SHOWN IN SYMBOL COLUMN)
(PREDOMINANT TYPE SHOWN HEAVY)



GRAVEL



SAND



SILT



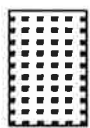
CLAY



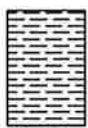
ORGANIC
MATTER

ROCK TYPES

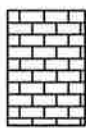
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SANDSTONE



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	

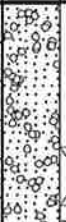

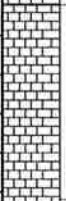
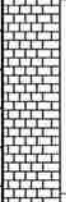

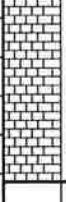
1. Ground water elevations indicated on boring logs represent ground water elevations at date or time shown on boring log. Absence of water surface implies that no ground water data is available but does not necessarily mean that ground water will not be encountered at locations or within the vertical 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, 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 HWY. & TRANS. DEPARTMENT		BORING NO. 1
MATERIALS DIVISION - GEOTECHNICAL SEC.		PAGE 1 OF 1
JOB NO. 090402	Benton County	DATE: September 9, 2014
JOB NAME: Little Osage Creek Str. & Apprs.	S.H. 264	TYPE OF DRILLING: Hollow Stem Auger & Diamond Coring
STATION: 112+04		EQUIPMENT: CME 850 w/ CME Automatic Hammer
LOCATION: 16' Right of Center Line of Construction		HAMMER CORRECTION FACTOR: 1.23
LOGGED BY: David Allen		

COMPLETION DEPTH: 28.2

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.	% S C R	% R Q D
			SURFACE ELEVATION: 1089.9									
5			Wet, Medium Dense to Very Dense, Brown and Gray Sand with Gravel (Cherty Limestone Fragments)							3 2-23		
			LIMESTONE WITH CHERT LAYERS - Gray, Medium Bedded, Slightly Weathered, Hard, with Slight Dip							60 (2")	98	56
10			LIMESTONE WITH CHERT LAYERS - Gray, Thick Bedded, Slightly Weathered, Hard, with Slight Dip								100	38
15			LIMESTONE WITH CHERT LAYERS - Gray, Thick Bedded, Slightly Weathered, Hard, with Slight Dip								100	58
20			LIMESTONE WITH CHERT LAYERS - Gray, Thick Bedded, Slightly Weathered, Hard, with Slight Dip								100	60
25			LIMESTONE WITH CHERT LAYERS - Gray, Medium Bedded, Slightly Weathered, Hard, with Slight Dip								100	40
30			Boring Terminated									
35												

REMARKS:

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

BORING NO. 2
PAGE 1 OF 1

JOB NO. 090402 Benton County
JOB NAME: Little Osage Creek Str. & Apprs.
S.H. 264
STATION: 112+78
LOCATION: 15.5' Right of Center Line of Construction
LOGGED BY: David Allen

DATE: September 10, 2014
TYPE OF DRILLING: Hollow Stem Auger &
Diamond Coring
EQUIPMENT: CME 850 w/ CME
Automatic Hammer
HAMMER CORRECTION FACTOR: 1.23

COMPLETION DEPTH: 23

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.	% S C R	% R O D
			SURFACE ELEVATION: 1088.5									
			Wet, Very Dense, Brown Sand with Gravel (Cherty Limestone Fragments)							60 (2")		
5			LIMESTONE WITH CHERT LAYERS - Gray, Medium Bedded, Slightly Weathered, Hard, with Slight Dip and Fractured Layers								100	30
10											100	24
15											100	18
20											100	40
25			Boring Terminated									
30												
35												

REMARKS:

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

BORING NO. **3**
PAGE **1** OF **1**

JOB NO. **090402** Benton County
JOB NAME: **Little Osage Creek Str. & Apprs.**
S.H. 264
STATION: **113+93**
LOCATION: **11' Right of Center Line of Construction**
LOGGED BY: **David Allen**

DATE: **September 16, 2014**
TYPE OF DRILLING: **Hollow Stem Auger &
Diamond Coring**
EQUIPMENT: **CME 850 w/ CME
Automatic Hammer**
HAMMER CORRECTION FACTOR: **1.23**

COMPLETION DEPTH: **28.4**

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.	% S C R	% R O D
			SURFACE ELEVATION: 1091.1									
5			Gravel (Cherty Limestone Fragments) and Cobbles							5 4-60 (3")		
			LIMESTONE WITH CHERT LAYERS - Gray, Thin Bedded, Slightly Weathered, Hard, with Slight Dip and Fractured Layers								83	0
10			LIMESTONE WITH CHERT LAYERS - Gray, Thick Bedded, Slightly Weathered, Hard, with Slight Dip and Fractured Layers								94	30
15											100	14
20			LIMESTONE WITH CHERT LAYERS - Gray, Medium Bedded, Slightly Weathered, Hard, with Slight Dip and Fractured Layers								100	14
25											100	22
30			Boring Terminated									
35												

REMARKS:

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

BORING NO. 4
PAGE 1 OF 1

JOB NO. 090402 Benton County
JOB NAME: Little Osage Creek Str. & Apprs.
S.H. 264
STATION: 114+95
LOCATION: 6' Right of Center Line of Construction
LOGGED BY: David Allen

DATE: September 16, 2014
TYPE OF DRILLING: Hollow Stem Auger &
Diamond Coring
EQUIPMENT: CME 850 w/ CME
Automatic Hammer
HAMMER CORRECTION FACTOR: 1.23

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.	% S C R	% R O D
			SURFACE ELEVATION: 1094.9									
5		X	Wet, Loose, Brown and Gray Sand with Gravel (Cherty Limestone Fragments) and some Organic Matter							4 34		
10		X	Gravel (Cherty Limestone Fragments) and Cobbles							4 6-60 (5")		
15			LIMESTONE WITH CHERT LAYERS - Gray, Thin Bedded, Slightly Weathered, Hard, with Slight Dip and Fractured Layers **								91	36
20			LIMESTONE WITH CHERT LAYERS - Gray, Medium Bedded, Slightly Weathered, Hard, with Slight Dip and Fractured Layers **								30*	0
25			LIMESTONE WITH CHERT LAYERS - Gray, Thick Bedded, Slightly Weathered, Hard, with Slight Dip								100	30
30			LIMESTONE WITH CHERT LAYERS - Gray, Thick Bedded, Slightly Weathered, Hard, with Slight Dip								100	52
35			Boring Terminated									

REMARKS: * Poor core recovery due to core barrel malfunction. ** Total water loss was encountered from 12.8' to 16.2' and at 24.4'.

ARKANSAS DEPARTMENT OF TRANSPORTATION

August 3, 2017

TO: Mr. Rick Ellis, Bridge Engineer

SUBJECT: Job No. 090402
Little Osage Creek Str. & Apprs. (S)
Route 264 Section 3
Benton County

This is to provide supplementary information to the Geotechnical report submitted October 2, 2014. Transmitted herewith are the boring logs conducted for the intermediate bents and the corresponding unconfined compressive strength test results and RMR. The samples obtained by the Standard Penetration Tests were brought to the laboratory and visually classified by experienced lab personnel to confirm the field identifications. The rock cores are available for inspection at the Materials Division.

Based on correspondence with Bridge Division, it is anticipated that all intermediate bents will be founded using drilled shafts. These shafts should be socketed into the competent limestone with interbedded chert or chert with interbedded limestone and should be designed based on the values provided in Table 1.

TABLE 1 – Bearing Resistance Recommendation for Drilled Shafts

Foundation Description	Nominal Tip Resistance (ksf)	Factor Tip Resistance(ksf)	Nominal Side Resistance (ksf)	Factored Side Resistance (ksf)
Drilled Shafts	58	29	19.9	10.0

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

Rock Core Unconfined Compression Test Summary

Project Number: 090402
 Project Name: Little Osage Creek Str. & Apprs.
 Date Tested: 7/5/2017 & 7/25/2017

Station	Location	Sample No.	Depth (ft)	Diameter (in)	Height (in)	Total Load (lbs)	Correction Factor	Stress (psi)	Remarks
114+22	10' Rt	1	9.4	1.75	3.50	38,940	1.00	16,189	Vertical Seam
114+22	10' Rt	2	10.4	1.75	3.50	34,780	1.00	14,460	
114+22	10' Rt	3	16.1	1.75	3.50	17,810	1.00	7,404	
114+22	10' Rt	4	17.6	1.75	3.50	19,680	1.00	8,182	
114+31	22' Lt	5	10.5	1.75	3.50	16,730	1.00	6,956	
114+31	22' Lt	6	14.0	1.75	3.50	8,100	1.00	3,368	
114+31	22' Lt	7	15.0	1.75	3.50	13,340	1.00	5,546	
114+31	22' Lt	8	18.0	1.75	4.00	9,000	1.00	3,742	
113+67	12' Rt	9	6.8	1.75	4.00	30,490	1.00	12,676	
113+67	12' Rt	10	12.2	1.75	4.50	24,670	1.00	10,257	
113+67	12' Rt	11	15.1	1.75	4.00	22,980	1.00	9,554	
113+67	12' Rt	12	20.7	1.75	3.50	21,180	1.00	8,806	
113+76	20' Lt	13	18.8	1.75	4.50	23,570	1.00	9,799	
113+76	20' Lt	14	21.0	1.75	4.00	26,730	1.00	11,113	
113+11	30' Lt	15	7.0	1.75	3.75	21,250	1.00	8,834	
113+11	30' Lt	16	14.4	1.75	3.50	19,610	1.00	8,153	
113+11	30' Lt	17	22.6	1.75	3.50	28,120	1.00	11,691	
112+56	17' Lt	18	11.2	1.75	3.50	31,900	1.00	13,262	
112+56	17' Lt	19	18.1	1.75	3.50	15,870	1.00	6,598	
112+56	17' Lt	20	23.5	1.75	3.50	14,690	1.00	6,107	
112+47	10' Rt	21	6.8	1.75	4.00	30,160	1.00	12,539	
112+47	10' Rt	22	12.2	1.75	3.75	15,970	1.00	6,640	
112+47	10' Rt	23	18.8	1.75	3.75	28,270	1.00	11,753	
113+02	12' Rt	24	5.8	1.75	3.75	17,120	1.00	7,118	
113+02	12' Rt	25	13.6	1.75	3.75	12,300	1.00	5,114	
113+02	12' Rt	26	22.2	1.75	3.75	13,240	1.00	5,505	

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

ROCK MASS RATING SUMMARY

JOB # 090402

SAMPLE #1

Station/Location	113+67/ 12' RT
Depth (ft)	6.8
Relative Rating	
Uniaxial Compressive Strength	7
RQD	8
Spacing of Joints	10
Condition of Joints	25
Groundwater Conditions	7
Sum	57
Class Number	III
Description	FAIR ROCK

SAMPLE #2

Station/Location	113+67/ 12' RT
Depth (ft)	12.2
Relative Rating	
Uniaxial Compressive Strength	7
RQD	13
Spacing of Joints	10
Condition of Joints	25
Groundwater Conditions	7
Sum	62
Class Number	II
Description	GOOD ROCK

SAMPLE #3

Station/Location	113+67/ 12' RT
Depth (ft)	15.1
Relative Rating	
Uniaxial Compressive Strength	7
RQD	13
Spacing of Joints	10
Condition of Joints	25
Groundwater Conditions	7
Sum	62
Class Number	II
Description	GOOD ROCK

SAMPLE #4

Station/Location	113+67/ 12' RT
Depth (ft)	20.7
Relative Rating	
Uniaxial Compressive Strength	7
RQD	13
Spacing of Joints	10
Condition of Joints	25
Groundwater Conditions	7
Sum	62
Class Number	II
Description	GOOD ROCK

SAMPLE #5

Station/Location	113+76/ 20' LT
Depth (ft)	16
Relative Rating	
Uniaxial Compressive Strength	12
RQD	8
Spacing of Joints	10
Condition of Joints	20
Groundwater Conditions	7
Sum	57
Class Number	III
Description	FAIR ROCK

SAMPLE #6

Station/Location	113+76/ 20' LT
Depth (ft)	18.8
Relative Rating	
Uniaxial Compressive Strength	7
RQD	8
Spacing of Joints	10
Condition of Joints	25
Groundwater Conditions	7
Sum	57
Class Number	III
Description	FAIR ROCK

SAMPLE #7

Station/Location	113+76/ 20' LT
Depth (ft)	21
Relative Rating	
Uniaxial Compressive Strength	7
RQD	8
Spacing of Joints	10
Condition of Joints	25
Groundwater Conditions	7
Sum	57
Class Number	III
Description	FAIR ROCK

SAMPLE #8

Station/Location	114+22/ 10' RT
Depth (ft)	9.4
Relative Rating	
Uniaxial Compressive Strength	12
RQD	8
Spacing of Joints	10
Condition of Joints	20
Groundwater Conditions	7
Sum	57
Class Number	III
Description	FAIR ROCK

SAMPLE #9

Station/Location	114+22/ 10' RT
Depth (ft)	10.4
Relative Rating	
Uniaxial Compressive Strength	7
RQD	8
Spacing of Joints	10
Condition of Joints	20
Groundwater Conditions	7
Sum	52
Class Number	III
Description	FAIR ROCK

SAMPLE #10

Station/Location	114+22/ 10' RT
Depth (ft)	16.1
Relative Rating	
Uniaxial Compressive Strength	4
RQD	8
Spacing of Joints	10
Condition of Joints	25
Groundwater Conditions	7
Sum	54
Class Number	III
Description	FAIR ROCK

SAMPLE #11

Station/Location	114+22/ 10' RT
Depth (ft)	17.6
Relative Rating	
Uniaxial Compressive Strength	7
RQD	8
Spacing of Joints	10
Condition of Joints	25
Groundwater Conditions	7
Sum	57
Class Number	III
Description	FAIR ROCK

SAMPLE #12

Station/Location	114+31/ 22' LT
Depth (ft)	10.5
Relative Rating	
Uniaxial Compressive Strength	4
RQD	8
Spacing of Joints	10
Condition of Joints	25
Groundwater Conditions	7
Sum	54
Class Number	III
Description	FAIR ROCK

SAMPLE #13

Station/Location	114+31/ 22' LT
Depth (ft)	14
Relative Rating	
Uniaxial Compressive Strength	4
RQD	13
Spacing of Joints	10
Condition of Joints	25
Groundwater Conditions	7
Sum	59
Class Number	III
Description	FAIR ROCK

SAMPLE #14

Station/Location	114+31/ 22' LT
Depth (ft)	15
Relative Rating	
Uniaxial Compressive Strength	4
RQD	13
Spacing of Joints	10
Condition of Joints	25
Groundwater Conditions	7
Sum	59
Class Number	III
Description	FAIR ROCK

SAMPLE #15

Station/Location	114+31/ 22' LT
Depth (ft)	18
Relative Rating	
Uniaxial Compressive Strength	4
RQD	8
Spacing of Joints	10
Condition of Joints	25
Groundwater Conditions	7
Sum	54
Class Number	III
Description	FAIR ROCK

SAMPLE #16

Station/Location	113+11/ 30' LT
Depth (ft)	7
Relative Rating	
Uniaxial Compressive Strength	7
RQD	13
Spacing of Joints	20
Condition of Joints	20
Groundwater Conditions	7
Sum	67
Class Number	II
Description	GOOD ROCK

SAMPLE #17

Station/Location	113+11/ 30' LT
Depth (ft)	14.4
Relative Rating	
Uniaxial Compressive Strength	7
RQD	8
Spacing of Joints	20
Condition of Joints	20
Groundwater Conditions	7
Sum	62
Class Number	II
Description	GOOD ROCK

SAMPLE #18

Station/Location	113+11/ 30' LT
Depth (ft)	22.6
Relative Rating	
Uniaxial Compressive Strength	7
RQD	8
Spacing of Joints	20
Condition of Joints	20
Groundwater Conditions	7
Sum	62
Class Number	II
Description	GOOD ROCK

SAMPLE #19

Station/Location	112+56/ 17' LT
Depth (ft)	11.2
Relative Rating	
Uniaxial Compressive Strength	7
RQD	13
Spacing of Joints	20
Condition of Joints	20
Groundwater Conditions	7
Sum	67
Class Number	II
Description	GOOD ROCK

SAMPLE #20

Station/Location	112+56/ 17' LT
Depth (ft)	18.1
Relative Rating	
Uniaxial Compressive Strength	4
RQD	3
Spacing of Joints	10
Condition of Joints	20
Groundwater Conditions	7
Sum	44
Class Number	III
Description	FAIR ROCK

SAMPLE #21

Station/Location	112+56/ 17' LT
Depth (ft)	23.5
Relative Rating	
Uniaxial Compressive Strength	4
RQD	8
Spacing of Joints	10
Condition of Joints	20
Groundwater Conditions	7
Sum	49
Class Number	III
Description	FAIR ROCK

SAMPLE #22

Station/Location	112+47/ 10' RT
Depth (ft)	6.8
Relative Rating	
Uniaxial Compressive Strength	7
RQD	8
Spacing of Joints	10
Condition of Joints	20
Groundwater Conditions	7
Sum	52
Class Number	III
Description	FAIR ROCK

SAMPLE #23

Station/Location	112+47/ 10' RT
Depth (ft)	12.2
Relative Rating	
Uniaxial Compressive Strength	4
RQD	13
Spacing of Joints	20
Condition of Joints	20
Groundwater Conditions	7
Sum	64
Class Number	II
Description	GOOD ROCK

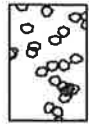
SAMPLE #24

Station/Location	112+47/ 10' RT
Depth (ft)	18.8
Relative Rating	
Uniaxial Compressive Strength	7
RQD	13
Spacing of Joints	25
Condition of Joints	20
Groundwater Conditions	7
Sum	72
Class Number	II
Description	GOOD ROCK

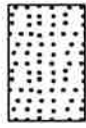
LEGEND

SOIL TYPES

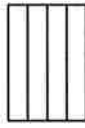
(SHOWN IN SYMBOL COLUMN)
(PREDOMINANT TYPE SHOWN HEAVY)



GRAVEL



SAND



SILT



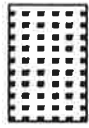
CLAY



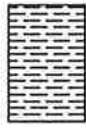
ORGANIC
MATTER

ROCK TYPES

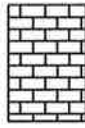
(SHOWN IN SYMBOL COLUMN)



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

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

BORING NO. 1
PAGE 1 OF 2

JOB NO. 090402 Benton County
JOB NAME: Little Osage Creek Str. & Apprs. (S)
STATION: 112+47
LOCATION: 10' Right of Construction Centerline
LOGGED BY: Steve Faulkner

DATE: July 11, 2017
TYPE OF DRILLING: Hollow Stem
Rotary Wash - Diamond Core
EQUIPMENT: CME 850
HAMMER CORRECTION FACTOR: 1.23

COMPLETION DEPTH: 38.8

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 O D
			SURFACE ELEVATION: 1089.0									
5			Wet, Very Dense, Brown and Gray Sand with Gravel (Chert Fragments)							2 1-42 (10.8")		
			CHERT WITH INTERBEDDED LIMESTONE								100	30
10			CHERT WITH INTERBEDDED LIMESTONE - Unweathered, Hard, Frequent Fractures, Light Gray								100	62
15			CHERT WITH INTERBEDDED LIMESTONE - Unweathered, Hard, Occasional Fractures, Light Gray								100	59
20			CHERT WITH INTERBEDDED LIMESTONE - Unweathered, Hard, Frequent Fractures, Light Gray								100	60
25			CHERT WITH INTERBEDDED LIMESTONE - Unweathered, Hard, Frequent Fractures, Light Gray								100	50
30			LIMESTONE WITH INTERBEDDED CHERT - Unweathered, Hard, Frequent Fractures, Light Gray								100	60
35												

REMARKS:


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

BORING NO. 1
PAGE 2 OF 2

JOB NO. 090402 Benton County
JOB NAME: Little Osage Creek Str. & Apprs. (S)
STATION: 112+47
LOCATION: 10' Right of Construction Centerline
LOGGED BY: Steve Faulkner

DATE: July 11, 2017
TYPE OF DRILLING: Hollow Stem
Rotary Wash - Diamond Core
EQUIPMENT: CME 850
HAMMER CORRECTION FACTOR: 1.23

COMPLETION DEPTH: 38.8

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 O D
			SURFACE ELEVATION: 1089.0									
			LIMESTONE WITH INTERBEDDED CHERT - Unweathered, Hard, Occasional Fractures, Light Gray								100	88
40			Boring Terminated									
45												
50												
55												
60												
65												
70												

REMARKS:

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

BORING NO. 2
PAGE 1 OF 2

JOB NO. 090402 Benton County
JOB NAME: Little Osage Creek Str. & Apprs. (S)

STATION: 112+56
LOCATION: 17' Left of Construction Centerline
LOGGED BY: Steve Faulkner

DATE: June 28, 2017
TYPE OF DRILLING: Hollow Stem Auger -
Rotary Wash - Diamond Core
EQUIPMENT: CME 850
HAMMER CORRECTION FACTOR: 1.23

COMPLETION DEPTH: 43.5

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: 1093.9									
5		X	Moist, Medium Dense, Brown and Gray Clayey Sand with Gravel (Chert and Limestone Fragments)							11 10-8		
10		X	Wet, Very Dense, Brown and Gray Sand and Gravel (Limestone and Chert Fragments)							9 20 (3")		
			CHERT WITH INTERBEDDED LIMESTONE - Unweathered, Hard, Occasional Fractures, Gray								96	68
15			LIMESTONE WITH INTERBEDDED CHERT - Unweathered, Hard, Occasional to Frequent Fractures, Gray								40	14*
20			LIMESTONE WITH INTERBEDDED CHERT - Unweathered, Hard, Occasional to Frequent Fractures, Gray								40	0*
25			LIMESTONE WITH INTERBEDDED CHERT - Unweathered, Hard, Occasional to Frequent Fractures, Gray								92	47*
30			CHERT WITH INTERBEDDED LIMESTONE - Unweathered, Hard, Frequent Fractures, Gray								100	28
35			CHERT WITH INTERBEDDED LIMESTONE - Unweathered, Hard, Frequent Fractures, Gray									

REMARKS: *Poor core recovery due to core barrel malfunction from 13.5 to 23.5 feet below ground level (bgl).
Cleaned out hole with tricone bit.

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

BORING NO. 2
PAGE 2 OF 2


JOB NO. 090402 Benton County
JOB NAME: Little Osage Creek Str. & Apprs. (S)

STATION: 112+56
LOCATION: 17' Left of Construction Centerline
LOGGED BY: Steve Faulkner

DATE: June 28, 2017
TYPE OF DRILLING: Hollow Stem Auger -
Rotary Wash - Diamond Core
EQUIPMENT: CME 850

HAMMER CORRECTION FACTOR: 1.23

COMPLETION DEPTH: 43.5

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: 1093.9									
40			LIMESTONE WITH INTERBEDDED CHERT - Unweathered, Hard, Occasional Fractures, Gray								99	72
											98	88
45			Boring Terminated									
50												
55												
60												
65												
70												

REMARKS: *Poor core recovery due to core barrel malfunction from 13.5 to 23.5 feet below ground level (bgl).
Cleaned out hole with tricone bit.

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

BORING NO. 3
PAGE 1 OF 2

JOB NO. 090402 Benton County
JOB NAME: Little Osage Creek Str. & Apprs. (S)
STATION: 113+02
LOCATION: 12' Right of Construction Centerline
LOGGED BY: Steve Faulkner

DATE: July 11, 2017
TYPE OF DRILLING: Hollow Stem Auger
Rotary Wash - Diamond Core
EQUIPMENT: CME 850
HAMMER CORRECTION FACTOR: 1.23

COMPLETION DEPTH: 38.1

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: 1087.6									
			Wet, Very Dense, Brown and Gray Sand with Gravel (Chert Fragments)									
5			CHERT WITH INTERBEDDED LIMESTONE							26 0 (5")	99	35
10											100	46
15											100	66
20			CHERT WITH INTERBEDDED LIMESTONE - Unweathered, Hard, Frequent Fractures, Light Gray								100	45
25											100	62
30											98	68
35												

REMARKS:


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

BORING NO. 3
PAGE 2 OF 2

JOB NO. 090402 Benton County
JOB NAME: Little Osage Creek Str. & Apprs. (S)
STATION: 113+02
LOCATION: 12' Right of Construction Centerline
LOGGED BY: Steve Faulkner

DATE: July 11, 2017
TYPE OF DRILLING: Hollow Stem Auger
Rotary Wash - Diamond Core
EQUIPMENT: CME 850
HAMMER CORRECTION FACTOR: 1.23

COMPLETION DEPTH: 38.1

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: 1087.6									
			CHERT WITH INTERBEDDED LIMESTONE - Unweathered, Hard, Occasional Fractures, Light Gray								100	96
40			Boring Terminated									
45												
50												
55												
60												
65												
70												

REMARKS:

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

BORING NO. 4
PAGE 1 OF 2

JOB NO. 090402 Benton County
JOB NAME: Little Osage Creek Str. & Apprs. (S)

STATION: 113+11
LOCATION: 30' Left of Construction Centerline
LOGGED BY: Steve Faulkner

DATE: June 27, 2017
TYPE OF DRILLING:
Hollow Stem Auger - Diamond Core
EQUIPMENT: CME 850
HAMMER CORRECTION FACTOR: 1.23

COMPLETION DEPTH: 38.5

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: 1089.4									
5		X	Moist, Medium Dense, Brown and Gray Sand with Gravel (Limestone and Chert Fragments)							4 6-7		
10			LIMESTONE WITH INTERBEDDED CHERT - Slightly Weathered, Hard, Frequent Fractures, Gray								99	55
15			LIMESTONE WITH INTERBEDDED CHERT - Unweathered, Hard, Occasional to Frequent Fractures, Gray								99	70
20			LIMESTONE WITH INTERBEDDED CHERT - Unweathered, Hard, Occasional to Frequent Fractures, Gray								100	22
25			CHERT WITH INTERBEDDED LIMESTONE - Unweathered, Hard, Frequent Fractures, Gray								100	17
30			LIMESTONE WITH INTERBEDDED CHERT - Unweathered, Hard, Occasional To Frequent Fractures, Gray								99	35
35			LIMESTONE WITH INTERBEDDED CHERT - Unweathered, Hard, Occasional To Frequent Fractures, Gray									

REMARKS:

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

BORING NO. 4
PAGE 2 OF 2

JOB NO. 090402 Benton County
JOB NAME: Little Osage Creek Str. & Apprs. (S)

STATION: 113+11
LOCATION: 30' Left of Construction Centerline
LOGGED BY: Steve Faulkner

DATE: June 27, 2017
TYPE OF DRILLING:
Hollow Stem Auger - Diamond Core
EQUIPMENT: CME 850

HAMMER CORRECTION FACTOR: 1.23

COMPLETION DEPTH: 38.5

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 O D
			SURFACE ELEVATION: 1089.4									
											99	32
40			Boring Terminated									
45												
50												
55												
60												
65												
70												

REMARKS:

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

BORING NO. 5
PAGE 1 OF 2

JOB NO. 090402 Benton County
JOB NAME: Little Osage Creek Str. & Apprs. (S)
STATION: 113+67
LOCATION: 12' Right of Construction Centerline
LOGGED BY: Stanley Bates

DATE: June 20, 2017
TYPE OF DRILLING:
Hollow Stem Auger - Diamond Core
EQUIPMENT: CME 850
HAMMER CORRECTION FACTOR: 1.23

COMPLETION DEPTH: 38.1

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: 1089.5									
5		X	Wet, Medium Dense, Brown and Gray Gravel with Sand (Chert and Limestone Fragments)*							11 14-15		
			LIMESTONE WITH INTERBEDDED CHERT - Slightly Weathered, Moderately Hard, Frequent Fractures, White and Gray								95	52
10			CHERT WITH INTERBEDDED LIMESTONE - Unweathered, Hard, Frequent Fractures, White and Gray								100	50
15											100	50
20			LIMESTONE WITH INTERBEDDED CHERT - Unweathered, Hard, Frequent Fractures, White and Gray								100	52
25											100	60
30											100	70
35			LIMESTONE WITH INTERBEDDED CHERT - Unweathered, Hard, Occasional Fractures, White and Gray									

REMARKS: * A water stratum was encountered at approximately 3.5 feet below ground level (bgl).

ARKANSAS HWY. & TRANS. DEPARTMENT MATERIALS DIVISION - GEOTECHNICAL SEC.	BORING NO. 5 PAGE 2 OF 2
JOB NO. 090402 Benton County JOB NAME: Little Osage Creek Str. & Apprs. (S)	DATE: June 20, 2017 TYPE OF DRILLING: Hollow Stem Auger - Diamond Core
STATION: 113+67 LOCATION: 12' Right of Construction Centerline LOGGED BY: Stanley Bates	EQUIPMENT: CME 850 HAMMER CORRECTION FACTOR: 1.23

COMPLETION DEPTH: 38.1

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: 1089.5									
											100	90
40			Boring Terminated									
45												
50												
55												
60												
65												
70												

REMARKS: * A water stratum was encountered at approximately 3.5 feet below ground level (bgl).

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

BORING NO. 6
PAGE 1 OF 2

JOB NO. 090402 Benton County
JOB NAME: Little Osage Creek Str. & Apprs. (S)
STATION: 113+76
LOCATION: 20' Left of Construction Centerline
LOGGED BY: Stanley Bates

DATE: June 21, 2017
TYPE OF DRILLING:
Hollow Stem Auger - Diamond Core
EQUIPMENT: CME 850
HAMMER CORRECTION FACTOR: 1.23

COMPLETION DEPTH: 38.5

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 Q D
			SURFACE ELEVATION: 1090.2									
5			Wet, Medium Dense, White and Brown Gravel with Sand (Limestone and Chert Fragments)							3 6-9		
			LIMESTONE WITH INTERBEDDED CHERT								70	0
10			LIMESTONE WITH INTERBEDDED CHERT - Unweathered, Hard, Frequent Fractures, White								100	0
15			LIMESTONE WITH INTERBEDDED CHERT - Unweathered with Highly Weathered Layers, Hard, Frequent Fractures, White and Gray								100	8
20											100	45
25											100	34
30			LIMESTONE WITH INTERBEDDED CHERT - Unweathered, Hard, Frequent Fractures, White and Gray								100	38
35												

REMARKS:

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

BORING NO. 6
PAGE 2 OF 2

JOB NO. 090402 Benton County
JOB NAME: Little Osage Creek Str. & Apprs. (S)

STATION: 113+76
LOCATION: 20' Left of Construction Centerline
LOGGED BY: Stanley Bates

DATE: June 21, 2017
TYPE OF DRILLING:
Hollow Stem Auger - Diamond Core
EQUIPMENT: CME 850

HAMMER CORRECTION FACTOR: 1.23

COMPLETION DEPTH: 38.5

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: 1090.2									
											100	64
40			Boring Terminated									
45												
50												
55												
60												
65												
70												

REMARKS:

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

BORING NO. 7
PAGE 1 OF 2

JOB NO. 090402 Benton County
JOB NAME: Little Osage Creek Str. & Apprs. (S)
STATION: 114+22
LOCATION: 10' Right of Construction Centerline
LOGGED BY: Steve Faulkner

DATE: March 21, 2017
TYPE OF DRILLING:
Hollow Stem Auger - Diamond Core
EQUIPMENT: CME 850
HAMMER CORRECTION FACTOR: 1.23

COMPLETION DEPTH: 43.8

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 O D
			SURFACE ELEVATION: 1090.9									
5			Wet, Very Loose, Brown and Gray Sand with Gravel (Chert Fragments)							2 2-2		
10			LIMESTONE WITH INTERBEDDED CHERT - Unweathered, Hard, Frequent Fractures, Light Gray							10 (0")	98	33
15											100	38
20											100	30
25											100	54
30												
35											100	88

REMARKS:


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

BORING NO. 7
PAGE 2 OF 2

JOB NO. 090402 Benton County
JOB NAME: Little Osage Creek Str. & Apprs. (S)
STATION: 114+22
LOCATION: 10' Right of Construction Centerline
LOGGED BY: Steve Faulkner

DATE: March 21, 2017
TYPE OF DRILLING:
Hollow Stem Auger - Diamond Core
EQUIPMENT: CME 850
HAMMER CORRECTION FACTOR: 1.23

COMPLETION DEPTH: 43.8

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 O D
			SURFACE ELEVATION: 1090.9									
			LIMESTONE WITH INTERBEDDED CHERT - Unweathered, Hard, Occasional Fractures, Light Gray								100	68
40												
45			Boring Terminated									
50												
55												
60												
65												
70												

REMARKS:



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

BORING NO. 8
PAGE 1 OF 2

JOB NO. 090402 Benton County
JOB NAME: Little Osage Creek Str. & Apprs. (S)
STATION: 114+31
LOCATION: 22' Left of Construction Centerline
LOGGED BY: Stanley Bates

DATE: March 28, 2017
TYPE OF DRILLING:
Hollow Stem Auger - Diamond Core
EQUIPMENT: CME 850
HAMMER CORRECTION FACTOR: 1.23

COMPLETION DEPTH: 43.7

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 O D
			SURFACE ELEVATION: 1091.7									
5		X	Wet, Dense, Brown Sand with Gravel (Limestone and Chert Fragments)*							9 15-16		
10										10 (0")	93	35
15											100	56
20											100	36
25			LIMESTONE WITH INTERBEDDED CHERT - Unweathered, Hard, Frequent Fractures, Light Gray								100	56
30											100	40
35												

REMARKS: * A water stratum was encountered at approximately 3.9 feet below ground level (bgl).

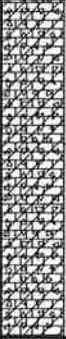
**ARKANSAS HWY. & TRANS. DEPARTMENT
MATERIALS DIVISION - GEOTECHNICAL SEC.**

BORING NO. 8
PAGE 2 OF 2

JOB NO. 090402 Benton County
JOB NAME: Little Osage Creek Str. & Apprs. (S)
STATION: 114+31
LOCATION: 22' Left of Construction Centerline
LOGGED BY: Stanley Bates

DATE: March 28, 2017
TYPE OF DRILLING:
Hollow Stem Auger - Diamond Core
EQUIPMENT: CME 850
HAMMER CORRECTION FACTOR: 1.23

COMPLETION DEPTH: 43.7

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.	% TCR	% ROD
			SURFACE ELEVATION: 1091.7									
39											100	70
40											100	90
45			Boring Terminated									
50												
55												
60												
65												
70												

REMARKS: * A water stratum was encountered at approximately 3.9 feet below ground level (bgl).

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT

May 9, 2014

TO: Mr. Trinity Smith, Engineer of Roadway Design

SUBJECT: Job No. 090402
Little Osage Creek Strs. & Apprs. (S)
Route 264 Section 3
Benton 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 Osage Creek on Highway 264. Samples were obtained in the existing travel lanes, shoulders, ditch line and along the new alignment. Sample locations were measured from centerline of construction and should be noted as such on the logs.

Based on laboratory results of samples obtained, the subgrade soils consist primarily of moderately plastic cherty clay. Cross-sections are not currently available, but it is anticipated that the construction grade line will closely match that of the existing roadway. 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 stations 109+00 20 feet right of centerline at a depth of 4.0 feet, and at 117+00 10 feet right of centerline at a depth of 3.5 feet. Undercut requirements along the new alignment may vary based on seasonal conditions but are anticipated to be no more than two feet. Further embankment recommendations will be made 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 in the vicinity of Lowell.
2. Asphalt Concrete Hot Mix

<u>Type</u>	<u>Asphalt Cement %</u>	<u>Mineral Aggregate %</u>
Surface Course	5.5	94.5
Binder Course	4.3	95.7
Base Course	4.0	96.0


Michael C. Benson
Materials Engineer

MCB:pt:bjj
Attachment

cc: State Constr. Eng. – Master File Copy
District 9 Engineer
Transportation Planning and Policy Div.
G. C. File

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

DATE - 05/09/2014
JOB NUMBER - 090402

SEQUENCE NO. - 1
MATERIAL CODE - SSRVPS
SPEC. YEAR - 2003
SUPPLIER ID. - 1
COUNTY/STATE - 04
DISTRICT NO. - 09

JOB NAME - LITTLE OSAGE CREEK STR. & APPRS. (S)

* STATION LIMITS R-VALUE AT 240 psi *

BEGIN JOB - END JOB 10

RESILIENT MODULUS
STA.101+10 8593

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.	090402	Material Code	SSRVPS
Date Sampled:	5/8/14	Station No.:	101+10
Date Tested:	May 8, 2014	Location:	25'RT
Name of Project:	LITTLE OSAGE CREEK STR. & APPRS.(S)		
County:	Code: 4	Name:	BENTON
Sampled By:	FAULKNER	Depth:	0-5
Lab No.:	20141203	AASHTO Class:	A-6(2)
Sample ID:	RV371	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	3.97
Middle	3.96
Bottom	3.95
Average	3.96
Membrane Thickness (in):	0.01
Height of Specimen, Cap and Base (in):	8.04
Height of Cap and Base (in):	0.00
Initial Length, Lo (in):	8.04
Initial Area, Ao (sq. in):	12.24
Initial Volume, AoLo (cu. in):	98.42

3. Soil Specimen Weight:

Weight of Wet Soil Used (g):	2989.60
------------------------------	---------

4. Soil Properties:

Optimum Moisture Content (%):	17.0
Maximum Dry Density (pcf):	104.6
95% of MDD (pcf):	99.4
In-Situ Moisture Content (%):	N/A

5. Specimen Properties:

Wet Weight (g):	2989.60
Compaction Moisture content (%):	16.4
Compaction Wet Density (pcf):	115.74
Compaction Dry Density (pcf):	99.43
Moisture Content After Mr Test (%):	16.1

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

#VALUE!

7. Resilient Modulus, Mr:

8700(S_c)^{-0.13202}(S₃)^{0.36023}

8. Comments

9. Tested By:

_____ M.W.

Date: May 8, 2014

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

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

Job No. 090402 **Material Code** SSRVPS
Date Sampled: 5/8/14 **Station No.:** 101+10
Date Tested: May 8, 2014 **Location:** 25th RT
Name of Project: LITTLE OSAGE CREEK STR. & APPRS.(S)
County: Code: 4 Name: BENTON
Sampled By: FAULKNER Depth: 0-5
Lab No.: 20141203 AASHTO Class: A-6(2)
Sample ID: RV371 Material Type (1 or 2): 2
LATITUDE: **LONGITUDE:**

PARAMETER	Chamber Confining Pressure	Nominal Maximum Axial Stress	Actual Applied		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
			P _{max}	P _{cyclic}							
DESIGNATION	S ₃	S _{cyclic}	P _{max}	P _{cyclic}	P _{contact}	S _{max}	S _{cyclic}	S _{contact}	H _{avg}	ε _r	M _r
UNIT	psi	psi	lbs	lbs	lbs	psi	psi	psi	in	in/in	psi
Sequence 1	6.0	2.0	25.2	22.5	2.7	2.1	1.8	0.2	0.0095	0.00012	15,576
Sequence 2	6.0	4.0	47.0	44.4	2.7	3.8	3.6	0.2	0.00198	0.00025	14,684
Sequence 3	6.0	6.0	69.5	65.9	3.6	5.7	5.4	0.3	0.00314	0.00039	13,805
Sequence 4	6.0	8.0	93.0	86.9	6.0	7.6	7.1	0.5	0.00452	0.00056	12,638
Sequence 5	6.0	10.0	116.1	107.5	8.6	9.5	8.8	0.7	0.00598	0.00074	11,813
Sequence 6	4.0	2.0	25.0	22.3	2.7	2.0	1.8	0.2	0.00115	0.00014	12,694
Sequence 7	4.0	4.0	46.5	43.8	2.7	3.8	3.6	0.2	0.00236	0.00029	12,168
Sequence 8	4.0	6.0	68.0	65.2	2.8	5.6	5.3	0.2	0.00369	0.00046	11,607
Sequence 9	4.0	8.0	91.2	86.0	5.2	7.5	7.0	0.4	0.00513	0.00064	11,000
Sequence 10	4.0	10.0	114.8	107.1	7.7	9.4	8.7	0.6	0.00669	0.00083	10,516
Sequence 11	2.0	2.0	24.6	21.9	2.7	2.0	1.8	0.2	0.00141	0.00018	10,176
Sequence 12	2.0	4.0	45.9	43.1	2.8	3.7	3.5	0.2	0.00302	0.00038	9,364
Sequence 13	2.0	6.0	66.9	64.1	2.9	5.5	5.2	0.2	0.00464	0.00058	9,062
Sequence 14	2.0	8.0	88.9	84.6	4.4	7.3	6.9	0.4	0.00631	0.00078	8,804
Sequence 15	2.0	10.0	111.9	105.0	6.9	9.1	8.6	0.6	0.00803	0.00100	8,593

TESTED BY _____ M.W. _____ DATE May 8, 2014
 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.	090402	Material Code	SSRVPS
Date Sampled:	5/8/14	Station No.:	101+10
Date Tested:	May 8, 2014	Location:	25'RT
Name of Project:	LITTLE OSAGE CREEK STR. & APPRS.(S)		
County:	Code: 4	Name:	BENTON
Sampled By:	FAULKNER	Depth:	0-5
Lab No.:	20141203	AASHTO Class:	A-6(2)
Sample ID:	RV371	Material Type (1 or 2):	2
LATITUDE:		LONGITUDE:	

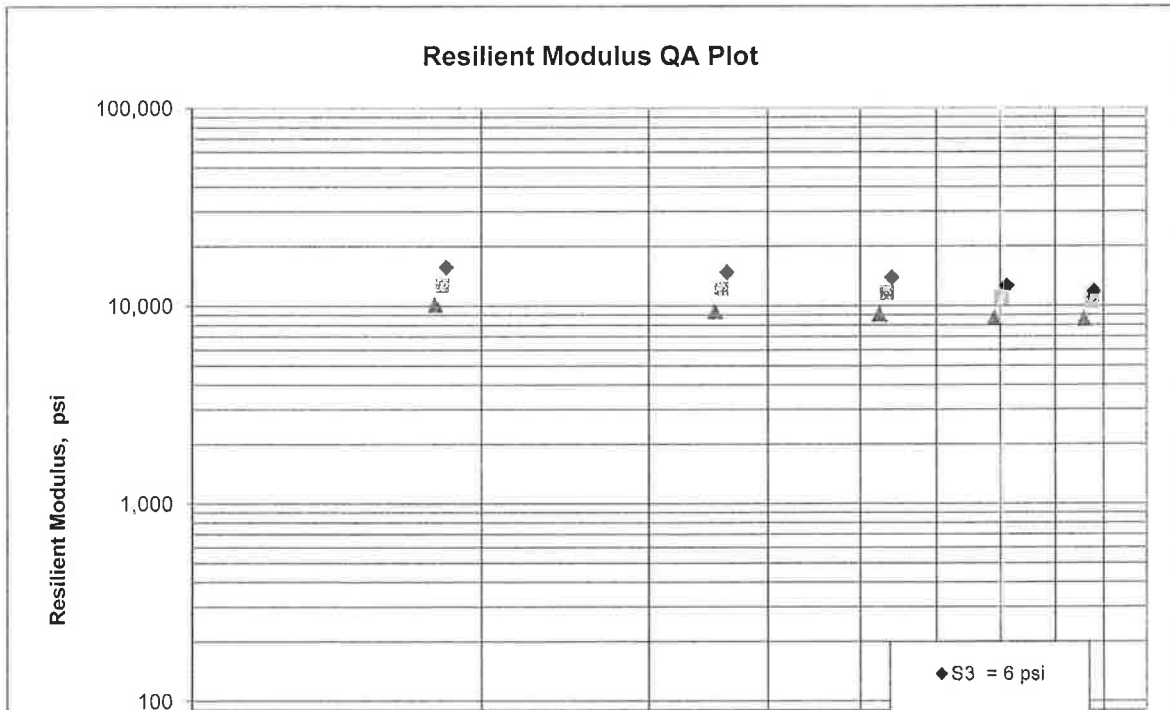
$$M_R = K_1 (S_C)^{K_2} (S_3)^{K_5}$$

$$K_1 = 8,700$$

$$K_2 = -0.13202$$

$$K_5 = 0.36023$$

$$R^2 = 0.98$$



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

MICHAEL BENSON, MATERIALS ENGINEER

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

DATE	- 04/23/14	SEQUENCE NO.	- 1
JOB NUMBER	- 090402	MATERIAL CODE	- SSRVPS
FEDERAL AID NO.	- TO BE ASSIGNED	SPEC. YEAR	- 2003
PURPOSE	- SOIL SURVEY SAMPLE	SUPPLIER ID.	- 1
SPEC. REMARKS	- NO SPECIFICATION CHECK	COUNTY/STATE	- 04
SUPPLIER NAME	- STATE	DISTRICT NO.	- 09
NAME OF PROJECT	- LITTLE OSAGE CREEK STR. & APPRS. (S)		
PROJECT ENGINEER	- NOT APPLICABLE		
PIT/QUARRY	- ARKANSAS		
LOCATION	- BENTON COUNTY	DATE SAMPLED	- 04/09/14
SAMPLED BY	- S.FAULKNER	DATE RECEIVED	- 04/11/14
SAMPLE FROM	- TEST HOLE	DATE TESTED	- 04/22/14
MATERIAL DESC.	- SOIL SURVEY - R VALUE- PAVEMENT SOUNDINGS		

LAB NUMBER	- 20141195	- 20141196	- 20141197
SAMPLE ID	- S363	- S364	- S365
TEST STATUS	- INFORMATION ONLY	- INFORMATION ONLY	- INFORMATION ONLY
STATION	- 101+10	- 101+10	- 101+10
LOCATION	- 06RT	- 16RT	- 25RT
DEPTH IN FEET	- 0-5	- 0-5	- 0-5
MAT'L COLOR	- BR/GR	- BR/GR	- BR/GR
MAT'L TYPE	-	-	-
LATITUDE DEG-MIN-SEC	- 36 15 16.60	- 36 15 16.50	- 36 15 16.40
LONGITUDE DEG-MIN-SEC	- 94 16 29.20	- 94 16 29.20	- 94 16 29.20
% PASSING			
2 IN.	-	-	-
1 1/2 IN.	-	-	-
3/4 IN.	- 100	-	- 100
3/8 IN.	- 98	- 100	- 99
NO. 4	- 89	- 92	- 89
NO. 10	- 75	- 82	- 79
NO. 40	- 61	- 71	- 65
NO. 80	- 57	- 65	- 59
NO. 200	- 53	- 60	- 54
LIQUID LIMIT	- 26	- 28	- 33
PLASTICITY INDEX	- 06	- 10	- 15
AASHTO SOIL	- A-4 (1)	- A-4 (4)	- A-6 (5)
UNIFIED SOIL	-	-	-
% MOISTURE CONTENT	- 17.1	- 27.4	- 21.9
ACHMSC (IN)	- 7.75W	- 7.25W	- --
AGG.BASE CRS CL-7 (IN)	- 7.0	- 7.0	- --
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

REMARKS - LOCATIONS MEASURED FROM C.L. OF CONSTRUCTION, W=MULTIPLE LAYERS
- Z=AUGER REFUSAL

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

MICHAEL BENSON, MATERIALS ENGINEER

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

DATE - 04/23/14 SEQUENCE NO. - 2
JOB NUMBER - 090402 MATERIAL CODE - SSRVPS
FEDERAL AID NO. - TO BE ASSIGNED SPEC. YEAR - 2003
PURPOSE - SOIL SURVEY SAMPLE SUPPLIER ID. - 1
SPEC. REMARKS - NO SPECIFICATION CHECK COUNTY/STATE - 04
SUPPLIER NAME - STATE DISTRICT NO. - 09
NAME OF PROJECT - LITTLE OSAGE CREEK STR. & APPRS. (S)
PROJECT ENGINEER - NOT APPLICABLE
PIT/QUARRY - ARKANSAS
LOCATION - BENTON COUNTY DATE SAMPLED - 04/09/14
SAMPLED BY - S.FAULKNER DATE RECEIVED - 04/11/14
SAMPLE FROM - TEST HOLE DATE TESTED - 04/22/14
MATERIAL DESC. - SOIL SURVEY - R VALUE- PAVEMENT SOUNDINGS

LAB NUMBER	-	20141198	-	20141199	-	20141200
SAMPLE ID	-	S366	-	S367	-	S368
TEST STATUS	-	INFORMATION ONLY	-	INFORMATION ONLY	-	INFORMATION ONLY
STATION	-	109+00	-	117+00	-	127+00
LOCATION	-	20RT	-	10RT	-	06LT
DEPTH IN FEET	-	0-4.0z	-	0-3.5z	-	0-5
MAT'L COLOR	-	BR/GR	-	BR/GR	-	BR/GR
MAT'L TYPE	-	-	-	-	-	-
LATITUDE DEG-MIN-SEC	-	36 15 15.20	-	36 15 13.10	-	36 15 12.40
LONGITUDE DEG-MIN-SEC	-	94 16 19.80	-	94 16 10.20	-	94 15 58.30
% PASSING						
	2	IN.	-	-	-	-
	1 1/2	IN.	-	-	-	-
	3/4	IN.	-	100	-	100
	3/8	IN.	-	84	-	92
	NO. 4		-	77	-	78
	NO. 10		-	70	-	64
	NO. 40		-	63	-	51
	NO. 80		-	59	-	45
	NO. 200		-	55	-	39
LIQUID LIMIT	-	29	-	30	-	26
PLASTICITY INDEX	-	09	-	13	-	08
AASHTO SOIL	-	A-4(3)	-	A-6(8)	-	A-4(0)
UNIFIED SOIL	-	-	-	-	-	-
% MOISTURE CONTENT	-	26.7	-	20.8	-	19.0
ACHMSC	(IN)	--	-	--	-	8.5W
AGG.BASE CRS CL-7	(IN)	--	-	--	-	4.0
	-	-	-	-	-	-
	-	-	-	-	-	-
	-	-	-	-	-	-
	-	-	-	-	-	-
	-	-	-	-	-	-
	-	-	-	-	-	-
	-	-	-	-	-	-
	-	-	-	-	-	-
	-	-	-	-	-	-
	-	-	-	-	-	-
	-	-	-	-	-	-

REMARKS - LOCATIONS MEASURED FROM C.L. OF CONSTRUCTION, 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	- 04/23/14	SEQUENCE NO.	- 3
JOB NUMBER	- 090402	MATERIAL CODE	- SSRVPS
FEDERAL AID NO.	- TO BE ASSIGNED	SPEC. YEAR	- 2003
PURPOSE	- SOIL SURVEY SAMPLE	SUPPLIER ID.	- 1
SPEC. REMARKS	- NO SPECIFICATION CHECK	COUNTY/STATE	- 04
SUPPLIER NAME	- STATE	DISTRICT NO.	- 09
NAME OF PROJECT	- LITTLE OSAGE CREEK STR. & APPRS. (S)		
PROJECT ENGINEER	- NOT APPLICABLE		
PIT/QUARRY	- ARKANSAS		
LOCATION	- BENTON COUNTY	DATE SAMPLED	- 04/09/14
SAMPLED BY	- S.FAULKNER	DATE RECEIVED	- 04/11/14
SAMPLE FROM	- TEST HOLE	DATE TESTED	- 04/22/14
MATERIAL DESC.	- SOIL SURVEY - R VALUE- PAVEMENT SOUNDINGS		

LAB NUMBER	- 20141201	- 20141202	-
SAMPLE ID	- S369	- S370	-
TEST STATUS	- INFORMATION ONLY	- INFORMATION ONLY	-
STATION	- 127+00	- 127+00	-
LOCATION	- 13LT	- 18LT	-
DEPTH IN FEET	- 0-5	- 0-5	-
MAT'L COLOR	- BR/GR	- BR/GR	-
MAT'L TYPE	-	-	-
LATITUDE DEG-MIN-SEC	- 36 15 12.50	- 36 15 12.50	-
LONGITUDE DEG-MIN-SEC	- 94 15 58.30	- 94 15 58.30	-
% PASSING	2 IN. -	-	-
	1 1/2 IN. -	-	-
	3/4 IN. - 100	- 100	-
	3/8 IN. - 96	- 83	-
	NO. 4 - 86	- 72	-
	NO. 10 - 75	- 65	-
	NO. 40 - 61	- 58	-
	NO. 80 - 53	- 54	-
	NO. 200 - 46	- 51	-
LIQUID LIMIT	- 26	- 27	-
PLASTICITY INDEX	- 08	- 08	-
AASHTO SOIL	- A-4 (1)	- A-4 (1)	-
UNIFIED SOIL	-	-	-
% MOISTURE CONTENT	- 22.3	- 20.9	-
ACHMSC (IN)	- 8.0W	- --	-
AGG.BASE CRS CL-7 (IN)	- 4.0	- --	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

REMARKS - LOCATIONS MEASURED FROM C.L. OF CONSTRUCTION, W=MULTIPLE LAYERS
 - Z=AUGER REFUSAL
 -
 -
 -

JOB: 090402

Arkansas State Highway Transportation Department

JOB NAME: LITTLE OSAGE CREEK STR. & APPRS. (S)

Materials Division

COUNTY NO. 4 DATE TESTED 4/22/2014

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					
101+10	25RT	0-5	BR/GR	61	65	47	43	40	31	13	A-6(2)	RV371	
101+10	06RT	0-5	BR/GR	69	75	61	57	58	26	08	A-4(1)	S363	17.1
101+10	16RT	0-5	BR/GR	92	82	74	65	60	28	10	A-4(4)	S364	27.4
101+10	25RT	0-5	BR/GR	89	79	65	59	54	33	15	A-6(5)	S365	21.9
109+00	20RT	0-4.0z	BR/GR	77	70	63	59	55	29	09	A-4(3)	S366	26.7
117+00	10RT	0-3.5z	BR/GR	90	87	83	80	77	30	13	A-6(8)	S367	20.8
127+00	06LT	0-5	BR/GR	78	64	51	45	39	26	08	A-4(0)	S368	19
127+00	13LT	0-5	BR/GR	66	76	61	53	46	26	08	A-4(1)	S369	22.3
127+00	18LT	0-5	BR/GR	72	66	58	54	51	27	08	A-4(1)	S370	20.9

comments: LOCATIONS MEASURED FROM C.L. OF CONSTRUCTION, W=MULTIPLE LAYERS
Z=AUGER REFUSAL

Friday, May 09, 2014

JOB: 090402

Arkansas State Highway Transportation Department

DATE TESTED

JOB NAME: LITTLE OSAGE CREEK STR. & APPRS. (S)

Materials Division

4/22/2014

COUNTY NO. 4

Michael Benson, Materials Engineer

STA.# LOC.

PAVEMENT SOUNDINGS

101+10	06RT	ACHMSC	AGG.BASE CRS CL-7
		7.75W	7.0
101+10	16RT	ACHMSC	AGG.BASE CRS CL-7
		7.25W	7.0
101+10	25RT	ACHMSC	AGG.BASE CRS CL-7
		--	--
109+00	20RT	ACHMSC	AGG.BASE CRS CL-7
		--	--
117+00	10RT	ACHMSC	AGG.BASE CRS CL-7
		--	--
127+00	06LT	ACHMSC	AGG.BASE CRS CL-7
		8.5W	4.0
127+00	13LT	ACHMSC	AGG.BASE CRS CL-7
		8.0W	4.0
127+00	18LT	ACHMSC	AGG.BASE CRS CL-7
		--	--

comments: LOCATIONS MEASURED FROM C.L. OF CONSTRUCTION, W=MULTIPLE LAY
Z=AUGER REFUSAL