ARKANSAS DEPARTMENT OF TRANSPORTATION

SUBSURFACE INVESTIGATION

STATE JOB NO. 040622

FEDERAL AID PROJECT NO. NHPP-0072(46)

WASHINGTON CO. LINE – SOUTH STRS. & APPRS. (S)

STATE HIGHWAY 59 **SECTION** 5

IN CRAWFORD **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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August 21, 2017

TO: Mr. Rick Ellis, Bridge Engineer

SUBJECT: Job No. 040622
Washington Co. Line - South Strs. & Apprs. (S)
Route 59 Section 5
Crawford County

Transmitted herewith are a brief summary of the geology and site conditions, D50 analysis test results, unconfined compressive strength results, RMR, and the logs of the borings conducted for the structures and approaches of the above referenced project. The samples obtained by 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.

Site 1 – Mountain Fork Tributary Creek

Based on the depth at which bedrock was encountered, it is anticipated that both end bents will be founded on piling. Preboring may be necessary to achieve minimum penetration requirements. No borings were obtained at intermediate bents 2 or 3, station 68+40 and 68+80, due to inaccessibility caused by low bridge clearance and high water in the channel. Correlating the elevation of bedrock between the bridge end boring logs, competent bedrock should be encountered less than 15 feet below ground level. Based on this information and plans provided by Bridge Division, it is anticipated that both intermediate bents will be founded on spread footings. Spread Footings founded in competent Limestone should be sized based on the values provided in Table 1.

TABLE 1 – Bearing Capacity Recommendations for Spread Footings

Foundation Description	Nominal Bearing Resistance (ksf)	Factored Bearing Resistance (ksf)	Bearing Resistance at Service Limit State (ksf)
Spread Footings	296	133	40

Site 2 – Mountain Fork Creek

Based on the depth at which bedrock was encountered, it is anticipated that both end bents will be founded on piling and both intermediate bents will be founded on spread footings. Spread footings founded in competent shale should be sized based on the values provided in Table 2. The AASHTO Bridge Design Specification, 7th edition, specifies that bearing resistance for spread footings on rock can be designed utilizing the RMR system to determine the bearing resistance or "other visual systems that have proven to yield accurate results may be used in lieu of the specified method." The RMR system yields unreasonably low bearing resistances for the encountered shale material. Table C10.6.2.6.1-1 for "Compaction shale or other highly argillaceous rock in sound condition" and previous experience in similar conditions were used to determine the recommended bearing resistance.

TABLE 2 – Bearing Capacity Recommendations for Spread Footings

Foundation Description	Factored Bearing Resistance (ksf)
Spread Footings	20

Site 3 – Whitzen Hollow Creek

Based on the depth at which bedrock was encountered, it is anticipated that both end bents will be founded on piling. No borings were obtained at intermediate bents 2 or 3, station 181+32 and 181+82, due to inaccessibility caused by low bridge clearance and conflict with overhead utilities. Correlating the elevation of bedrock between the bridge end boring logs, it is anticipated that competent bedrock should be shallower than 15 feet below ground level. Based on this information and correspondence from Bridge Design, it is anticipated that both intermediate bents will be founded on spread footings. Spread footings founded in competent shale should be sized based on the values provided in Table 3. The AASHTO Bridge Design Specification, 7th edition, specifies that bearing resistance for spread footings on rock can be designed utilizing the RMR system to determine the bearing resistance or "other visual systems that have proven to yield accurate results may be used in lieu of the specified method." The RMR system yields unreasonably low bearing resistances for the encountered shale material. Table C10.6.2.6.1-1 for "Compaction shale or other highly argillaceous rock in sound condition" and previous experience in similar conditions were used to determine the recommended bearing resistance.

TABLE 3 – Bearing Capacity Recommendations for Spread Footings

Foundation Description	Factored Bearing Resistance (ksf)
Spread Footings	20

Site 4 – Huey Creek

Based on the depth at which bedrock was encountered, it is anticipated that both end bents will be founded on piling. Preboring may be necessary to achieve minimum penetration requirements. An unmapped fault was discovered between stations 286+49 and 287+29. No boring was obtained at bent 2, station 286+89, due to inaccessibility caused by low bridge clearance and steep banks. Utilizing the data obtained from adjacent borings and assuming competent rock will be encountered at a depth shallower than 15 feet below ground level, it is anticipated that bent 2 will be founded on a spread footing. Based on plans provided by Bridge Division and the depth to competent rock, it is anticipated that bent 3 will also be founded on a spread footing. Spread Footings founded in competent Limestone should be sized based on the values provided in Table 4.

TABLE 4 – Bearing Capacity Recommendations for Spread Footings

Foundation Description	Nominal Bearing Resistance (ksf)	Factored Bearing Resistance (ksf)	Bearing Resistance at Service Limit State (ksf)
Spread Footings	358	161	40

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 4 Engineer
G.C. File

GEOLOGY AND SITE CONDITIONS
Job No. 040622

Washington County Line – South Strs. & Apprs. (S)
Route 59 Section 5
Crawford County

Site Conditions

There are four bridges associated with this job. **Bridge 1** is the northernmost bridge and crosses over Mountain Fork Tributary Creek. The existing bridge is a five span bridge constructed of concrete deck supported by spread footings and concrete end walls. The guardrail is composed of steel with concrete posts. Riprap has been placed on the abutment slopes. A telecommunication line parallels the west side of the roadway, buried north and south of the bridge and overhead over the channel. Limestone is exposed in the channel. A cave is located in a bluff a short distance east of the bridge. The channel was dry at the time of the subsurface investigation. The area around the bridge is primarily wooded with a residence located upstation and downstation of the bridge, on the right side of the roadway.

Bridge 2 crosses over Mountain Fork Creek. The existing bridge is a six span bridge constructed of cast-in-place concrete deck supported by spread footings. The guardrail is composed of steel with concrete posts. Overhead power lines cross the roadway a short distance upstation from the bridge. The upstation side of the channel is moderately wooded. The downstation side of the channel is lined with trees with pasture beyond. The stream flows to the southwest.

Bridge 3 crosses over Whitzen Hollow Creek. The existing bridge is a six span bridge constructed of cast-in-place concrete deck supported by spread footings. The guardrail is composed of steel with concrete posts. Overhead power lines parallel the east side of the bridge then cross the roadway north of the bridge. The area around the bridge is moderately to heavily wooded. The stream flows to the south-southwest.

Bridge 4 is the southernmost bridge and crosses over Huey Creek. The existing bridge is a four span bridge constructed of concrete deck supported by spread footings. The deck is supported by nine sets of steel beams. The guardrail is composed of steel with concrete posts. A buried telecommunication line parallels the west side of the roadway. The area around the bridge is moderately to heavily wooded. A residence is located downstation from the bridge on the right side of the roadway. The stream flows to the southwest.

Site Geology

Bridge 1 is located on the Pitkin Formation. The Pitkin Formation is usually a fine- to coarse-grained, oolitic, bioclastic limestone. Minor sandstone has been reported near the top of the unit in the northwest. The unit becomes shalier to the south. The thickness of the Pitkin Limestone ranges from a thin edge to over 400 feet. The average thickness is about 50 feet in the west and about 200 feet in the east. The Pitkin Formation occasionally has dissolutional features, such as sinkholes, caves, and enlarged fissures. Only one boring encountered a soil-filled cavity at 14.2 to 14.3 feet below ground level. Bedrock was encountered at depths of 11.0 to 16.0 feet below ground level.

Bridge 2 is located on the Fayetteville Shale. The Fayetteville is a black, fissile, concretionary, clay shale. Dark-gray, fine-grained limestones commonly are interbedded with the shales in north-central Arkansas. Septarian concretions are common in lower beds of the Fayetteville, but may be found throughout the formation. The Fayetteville Shale ranges in thickness from 10 to 400 feet. Bedrock was encountered at depths of 4.1 to 9.5 feet below ground level. There are east-west trending normal faults mapped to the south of Bridge 2. No faults were encountered during the subsurface investigation of this job site.

Bridge 3 is located on the Bloyd Formation. In western Arkansas, the Bloyd Formation consists of five members (in ascending order): the Brentwood Limestone, Woolsey, Dye shale, Kessler Limestone, and the Trace Creek. The Brentwood limestone is a sequence of limestones separated by thick intervals of dark shale. The Woolsey member is composed of terrestrial sediments comprised of dark-gray, fissile shale, often interbedded with thin siltstones. A thin coal bed, called the Baldwin coal, occurs at or near the top of the Woolsey member. The marine deposited Dye shale is predominantly a dark-gray shale with scattered calcareous concretions. Where underlain by the Woolsey Member, the Dye Shale frequently has a bed of calcareous sandstone with scattered clay pebbles and quartz granules, called the caprock, at its base. The Kessler member is either a single unit of limestone or a sequence of limestone and shale interbedded. The limestones are bioclastic, oolitic, traces of clay-pebble conglomerate, and minor amounts of calcareous sandstone. The Trace Creek Shale member is composed of dark-gray shales with some thin beds of sandstone. Typical thicknesses for the Bloyd Formation range from 175 to 200 feet.

At **Bridge 3**, the section of the Bloyd Formation encountered consists primarily of shales with some beds of sandy limestone (possibly part of the Brentwood limestone). Bedrock was encountered at depths of 19.0 to 20.0 feet below ground level. There are numerous east-west trending normal faults in the area. No faults were encountered during the subsurface investigation of this job site.

During the subsurface investigation of **Bridge 4**, an unmapped fault was discovered between stations 286+49 and 287+29. Borings at 287+29 and 287+69 encountered shales, limestones, and a coal seam of the Bloyd Formation. Boring at Station 286+49 encountered calcareous sandstone, most likely part of the Prairie Grove member of the Hale Formation. The Hale Formation is made up of two members: a lower Cane Hill member and an upper Prairie Grove member. The Prairie Grove member is composed of thin to massive, often crossbedded, light-gray to dark-brown, limy sandstone or variously sandy limestone with lenses of relatively pure, highly fossiliferous limestone and oolitic limestone. The reported thickness of the Hale Formation ranges from a few feet to more than 300 feet. The Bloyd Formation stratigraphically overlies the Hale Formation. Bedrock was encountered in borings at depths ranging from 14.0 to 17.0 feet below ground level.

Subsurface Conditions

Based on the results of the borings at stations 68+00 to 69+20 (**Bridge 1**-Mountain Fork Tributary Creek), the subsurface stratigraphy may be generalized as follows:

0 to 11.0 Feet: Consists of moist, stiff to hard, brown **sandy clay with gravel** to **sandy clay with gravel and cobbles**.

11.0 to 16.0 Feet*: Varies from moist hard to very hard, brown **sandy clay with gravel** to **sandy clay with gravel and cobbles** to unweathered to slightly weathered, moderately hard, gray **limestone**.

16.0 to 18.8 Feet: Consists of unweathered to weathered, moderately hard, gray **limestone**.

18.8 to 20.5 Feet: Consists of highly weathered to weathered, soft to medium hard, dark gray **shale**.

20.5 to 27.0 Feet: Consists of unweathered to slightly weathered, moderately hard, gray **limestone**.

27.0 to 35.0 Feet: Consists of unweathered to slightly weathered, moderately hard, gray **limestone with occasional to frequent shale seams and layers**.

35.0 to 42.0 Feet: Consists of weathered, medium hard, dark gray **shale**.

* A soil-filled cavity was encountered at 14.2 to 14.3 feet below ground level.

Based on the results of the borings at stations 111+80 to 113+13 (**Bridge 2**-Mountain Fork Creek), the subsurface stratigraphy may be generalized as follows:

0 to 4.1 Feet: Varies from moist, very hard, brown **sandy clay with gravel and cobbles** to medium dense, brown **sand with gravel and cobbles**.

4.1 to 9.5 Feet: Varies from moist, medium dense, brown **sand with gravel and cobbles** to slightly weathered, medium hard, dark gray **shale**.

9.5 to 28.7 Feet: Consists of slightly weathered to unweathered, medium hard, dark gray **shale** with occasional fractures.

28.7 to 43.7 Feet: Consists of slightly weathered to unweathered, medium hard, dark gray **shale** with occasional fractures. Some occasional limestone seams and layers are encountered in this zone.

Based on the results of the borings at 180+92 to 182+22 (**Bridge 3**-Whitzen Hollow Creek), the subsurface stratigraphy may be generalized as follows:

0 to 17.5 Feet: Varies from moist, medium dense to very dense, brown **sand with clay**

and gravel to **gravel with sand to very stiff to very hard, brown sandy clay with gravel**.

17.5 to 19.5 Feet: Varies from moist, very dense, brown **sand with clay and gravel** to **cobbles and boulders**.

19.5 to 32.1 Feet: Consists of highly weathered to weathered, soft to medium hard, dark gray **shale**.

32.1 to 41.9 Feet: Consists of weathered to slightly weathered, medium hard, dark gray **shale with occasional limestone layers**.

Based on the results of the boring at 286+49 (**Bridge 4**-Huey Creek), the subsurface stratigraphy may be generalized as follows:

0 to 9.0 Feet: Consists of moist, stiff, brown **sandy clay with gravel**.

9.0 to 15.2 Feet: Varies from moist, medium dense to very dense, brown **sand with gravel** to wet, very dense, brown **gravel with clay and sand**.

15.2 to 35.7 Feet: Consists of unweathered, well cemented, calcareous, gray **sandstone**.

Based on the results of the borings at 287+29 to 287+69 (**Bridge 4**-Huey Creek), the subsurface stratigraphy may be generalized as follows:

0 to 9.0 Feet: Consists of moist, stiff to very stiff, brown **sandy clay**.

9.0 to 14.0 Feet: Varies from moist, stiff, brown **sandy clay with gravel** to medium dense, brown **gravel with clay and sand**.

14.0 to 17.0 Feet: Varies from wet, dense, brown **gravel with clay and sand** to highly weathered, medium hard, dark gray **shale**.

17.0 to 20.8 Feet: Varies from slightly weathered, medium hard, dark gray **shale** to slightly weathered to unweathered, moderately hard, gray **limestone**.

20.8 to 24.8 Feet: Varies from slightly weathered, medium hard, dark gray **shale** to unweathered, moderately hard, gray **limestone**. A 0.3 foot coal seam was encountered in this zone.

24.8.0 to 27.9 Feet: Varies from weathered, medium hard, dark gray **shale** to unweathered, moderately hard, gray **limestone**.

27.9 to 40.0 Feet: Consists of unweathered, moderately hard, gray **limestone**.

D_{50} AGGREGATE ANALYSIS FOR SCOUR CALCULATIONS

Job No. 040622

Creek Name	Station	Sample Type	Location	Depth (FT)	Aggregate Size (D50) (IN)
Mountain Fork Tributary Creek	68+66	Creek Bank	20' Rt. C.L. Construction	N/A	0.132
Mountain Fork Creek	112+25	Creek Bank	32' Lt. C.L. Construction	N/A	0.110
Whitzen Hollow Creek	181+77	Creek Bank	22' Lt. C.L. Construction	N/A	0.0070
Huey Creek	286+89	Creek Bank	25' Lt. C.L. Construction	N/A	0.0469

Rock Core Unconfined Compression Test Summary

Project Number: 040622
Project Name: Washington Co. Line - South Strs. & Apprs. (S)
Date Tested: 7/3/2017

Station	Location	Sample No.	Depth (ft.)	Diameter (in)	Height (in)	Total Load (lbs.)	Correction Factor	Stress (psi)	Remarks
68+00	6' Rt	1	16.0	1.75	3.55	21,410	1.00	8,901	MFTC
68+00	6' Rt	2	18.0	1.75	3.50	34,470	1.00	14,331	MFTC
69+20	6' Lt	3	16.0	1.75	3.50	6,920	1.00	2,877	MFTC
69+20	6' Lt	4	18.0	1.75	3.50	21,310	1.00	8,860	MFTC
69+20	6' Lt	5	20.5	1.75	3.50	19,710	1.00	8,194	MFTC
180+92	5' Rt	6	22.7	1.75	X	X	X	Broken	WHC - Shale
180+92	5' Rt	7	23.2	1.75	4.40	5,740	1.00	2,386	WHC - Shale
182+22	5' Lt	8	35.5	1.75	3.60	4,580	1.00	1,904	WHC - Shale
286+49	6' Rt	9	15.2	1.75	4.00	10,620	1.00	4,415	Huey - SS
286+49	6' Rt	10	17.5	1.75	3.80	29,800	1.00	12,389	Huey - SS
287+69	6' Lt	11	17.0	1.75	3.80	37,800	1.00	15,715	Huey - LS
287+69	6' Lt	12	28.4	1.75	5.50	38,590	1.00	16,043	Huey - LS
287+69	6' Lt	13	20.6	1.75	5.40	23,880	1.00	9,928	Huey - LS
287+29	5' Lt	14	16.5	1.75	3.50	19,130	1.00	7,953	Huey - LS
287+29	5' Lt	15	23.5	1.75	3.80	15,470	1.00	6,431	Huey - LS
112+13	C.L.	16	7.5	1.75	3.90	4,710	1.00	1,958	MFC - Shale
112+13	C.L.	17	12.0	X	X	X	X	Broken	MFC - Shale
111+80	3' Rt	18	13.5	1.75	4.50	2,880	1.00	1,197	MFC - Shale
111+80	3' Rt	19	15.0	1.75	3.75	3,870	1.00	1,609	MFC - Shale
113+13	53' Lt	20	11.0	1.75	4.00	2,200	1.00	914	MFC - Shale
113+13	53' Lt	21	14.0	X	X	X	X	Broken	MFC - Shale
112+66	C.L.	22	4.9	X	X	X	X	Broken	MFC - Shale
112+66	C.L.	23	10.0	1.75	3.50	3,850	1.00	1,601	MFC - Shale
112+66	C.L.	24	12.3	1.75	3.50	3,430	1.00	1,426	MFC - Shale

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

ROCK MASS RATING SUMMARY
JOB # 040622

SAMPLE #1

Station/Location	68+00/ 6' RT
Depth (ft)	16
	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 #2

Station/Location	68+00/ 6' RT
Depth (ft)	18
	Relative Rating
Uniaxial Compressive Strength	7
RQD	17
Spacing of Joints	20
Condition of Joints	20
Groundwater Conditions	7
Sum	71
Class Number	II
Description	GOOD ROCK

SAMPLE #3

Station/Location	69+20/ 6' LT
Depth (ft)	16
	Relative Rating
Uniaxial Compressive Strength	2
RQD	13
Spacing of Joints	10
Condition of Joints	12
Groundwater Conditions	7
Sum	44
Class Number	III
Description	FAIR ROCK

SAMPLE #4

Station/Location	69+20/ 6' LT
Depth (ft)	18
	Relative Rating
Uniaxial Compressive Strength	7
RQD	17
Spacing of Joints	20
Condition of Joints	12
Groundwater Conditions	7
Sum	63
Class Number	II
Description	GOOD ROCK

SAMPLE #5

Station/Location	69+20/ 6' LT
Depth (ft)	20.5
	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

SAMPLE #6

Station/Location	180+92/ 5' RT
Depth (ft)	22.5
	Relative Rating
Uniaxial Compressive Strength	0
RQD	8
Spacing of Joints	20
Condition of Joints	20
Groundwater Conditions	7
Sum	55
Class Number	III
Description	FAIR ROCK

SAMPLE #7

Station/Location	180+92/ 5' RT
Depth (ft)	23
	Relative Rating
Uniaxial Compressive Strength	2
RQD	8
Spacing of Joints	20
Condition of Joints	20
Groundwater Conditions	7
Sum	57
Class Number	III
Description	FAIR ROCK

SAMPLE #8

Station/Location	182+22/ 5' RT
Depth (ft)	35.5
	Relative Rating
Uniaxial Compressive Strength	2
RQD	8
Spacing of Joints	25
Condition of Joints	20
Groundwater Conditions	7
Sum	62
Class Number	II
Description	GOOD ROCK

SAMPLE #9

Station/Location	286+49/ 6' RT
Depth (ft)	15
	Relative Rating
Uniaxial Compressive Strength	4
RQD	20
Spacing of Joints	20
Condition of Joints	25
Groundwater Conditions	7
Sum	*76*
Class Number	II
Description	GOOD ROCK

SAMPLE #10

Station/Location	286+49/ 6' RT
Depth (ft)	17.5
	Relative Rating
Uniaxial Compressive Strength	7
RQD	20
Spacing of Joints	25
Condition of Joints	20
Groundwater Conditions	7
Sum	*79*
Class Number	II
Description	GOOD ROCK

SAMPLE #11

Station/Location	287+69/ 6' LT
Depth (ft)	17
	Relative Rating
Uniaxial Compressive Strength	12
RQD	13
Spacing of Joints	20
Condition of Joints	12
Groundwater Conditions	7
Sum	*64*
Class Number	II
Description	GOOD ROCK

SAMPLE #12

Station/Location	287+69/ 6' LT
Depth (ft)	28.5
	Relative Rating
Uniaxial Compressive Strength	12
RQD	17
Spacing of Joints	20
Condition of Joints	25
Groundwater Conditions	7
Sum	*81*
Class Number	I
Description	VERY GOOD ROCK

SAMPLE #13

Station/Location	287+69/ 6' LT
Depth (ft)	20.5
	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 #14

Station/Location	287+29/ 5' LT
Depth (ft)	16.5
	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 #15

Station/Location	287+29/ 5' LT
Depth (ft)	23.5
	Relative Rating
Uniaxial Compressive Strength	4
RQD	20
Spacing of Joints	25
Condition of Joints	20
Groundwater Conditions	7
Sum	*76*
Class Number	II
Description	GOOD ROCK

SAMPLE #16

Station/Location	112+13/ CL
Depth (ft)	7.5
	Relative Rating
Uniaxial Compressive Strength	2
RQD	3
Spacing of Joints	20
Condition of Joints	12
Groundwater Conditions	7
Sum	*44*
Class Number	III
Description	FAIR ROCK

SAMPLE #17

Station/Location	112+13/ CL
Depth (ft)	12
	Relative Rating
Uniaxial Compressive Strength	0
RQD	3
Spacing of Joints	20
Condition of Joints	20
Groundwater Conditions	7
Sum	*50*
Class Number	III
Description	FAIR ROCK

SAMPLE #18

Station/Location	111+80/ 3' RT
Depth (ft)	13.5
	Relative Rating
Uniaxial Compressive Strength	1
RQD	13
Spacing of Joints	20
Condition of Joints	12
Groundwater Conditions	7
Sum	*53*
Class Number	III
Description	FAIR ROCK

SAMPLE #19

Station/Location	111+80/ 3' RT
Depth (ft)	15
	Relative Rating
Uniaxial Compressive Strength	2
RQD	13
Spacing of Joints	20
Condition of Joints	20
Groundwater Conditions	7
Sum	*62*
Class Number	II
Description	GOOD ROCK

SAMPLE #20

Station/Location	113+13/ 53' LT
Depth (ft)	11
	Relative Rating
Uniaxial Compressive Strength	1
RQD	13
Spacing of Joints	20
Condition of Joints	20
Groundwater Conditions	7
Sum	*61*
Class Number	II
Description	GOOD ROCK

SAMPLE #21

Station/Location	113+13/ 53' LT
Depth (ft)	14
	Relative Rating
Uniaxial Compressive Strength	0
RQD	8
Spacing of Joints	20
Condition of Joints	20
Groundwater Conditions	7
Sum	*55*
Class Number	III
Description	FAIR ROCK

SAMPLE #22

Station/Location	112+66/CL
Depth (ft)	5
	Relative Rating
Uniaxial Compressive Strength	0
RQD	3
Spacing of Joints	20
Condition of Joints	12
Groundwater Conditions	7
Sum	*42*
Class Number	III
Description	FAIR ROCK

SAMPLE #23

Station/Location	112+66/CL
Depth (ft)	10
	Relative Rating
Uniaxial Compressive Strength	2
RQD	8
Spacing of Joints	20
Condition of Joints	12
Groundwater Conditions	7
Sum	*49*
Class Number	III
Description	FAIR ROCK

SAMPLE #24

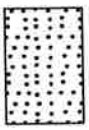
Station/Location	112+66/CL
Depth (ft)	12.5
	Relative Rating
Uniaxial Compressive Strength	1
RQD	8
Spacing of Joints	20
Condition of Joints	12
Groundwater Conditions	7
Sum	*48*
Class Number	III
Description	FAIR ROCK

LEGEND

SOIL TYPES

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


GRAVEL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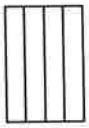
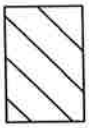
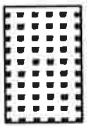

SILT

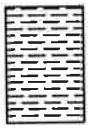

CLAY

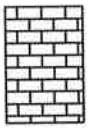

ORGANIC MATTER

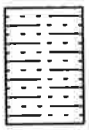
ROCK TYPES

(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: $\frac{6}{8-9} \Rightarrow 8+9=17 blows/ft$. 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 1

JOB NO. 040622 Crawford County
JOB NAME: Washington County Line - South Strs. & Apprs. (S)
Route 59 Section 5
STATION: 68+00
LOCATION: 6' Right of Construction Centerline
LOGGED BY: Coty Campbell

DATE: March 22, 2017
TYPE OF DRILLING:
Hollow Stem Auger - Diamond Core
EQUIPMENT: CME 75

HAMMER CORRECTION FACTOR: 1.37

COMPLETION DEPTH: 32

SURFACE ELEVATION: 1096.3

DEPTH FT.	DESCRIPTION OF MATERIAL	SOIL GROUP	NO. OF BLOWS PER 6-IN.	% TCR	% RQD
5	Moist, Very Stiff, Brown Sandy Clay with Gravel		17 16-10		
10	Moist, Very Stiff, Brown Sandy Clay with Moist, Stiff, Brown Sandy Clay with Gravel and Cobbles		2 5-6		
	LIMESTONE - Slightly Weathered, Moderately Hard, Gray			70	35
15	Soil-Filled Cavity (14.2'-14.3')			97	56
	LIMESTONE - Unweathered, Moderately Hard, Gray				
20	SHALE - Weathered, Medium Hard, Dark Gray			93	70
	LIMESTONE - Unweathered, Moderately Hard, Gray				
25				95	95
30	LIMESTONE WITH OCCASIONAL SHALE LAYERS - Unweathered, Moderately Hard, Gray			95	80
35	Boring Terminated				

PLASTIC LIMIT | % MOIST. | LIQUID LIMIT | DRY WEIGHT LBS PER CU.FT.

REMARKS: Mountain Fork Tributary Creek

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

BORING NO. 2
PAGE 1 OF 2

JOB NO. 040622 Crawford County
JOB NAME: Washington County Line - South Strs. & Apprs. (S)
Route 59 Section 5
STATION: 69+20
LOCATION: 6' Left of Construction Centerline
LOGGED BY: Coty Campbell

DATE: March 22, 2017
TYPE OF DRILLING:
Hollow Stem Auger - Diamond Core
EQUIPMENT: CME 75

HAMMER CORRECTION FACTOR: 1.37

COMPLETION DEPTH: 42

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: 1096.3								
5			Moist, Stiff, Brown, Sandy Clay with Gravel						2 4-6		
10			Moist, Hard, Brown Clay with Gravel and Cobbles						5 30-14		
15			Moist, Very Hard, Brown Clay with Gravel						7 30-40		
			LIMESTONE - Unweathered, Moderately Hard, Gray							85	65
			LIMESTONE - Weathered, Moderately Hard, Occasional Fractures, Gray								
20			SHALE - Highly Weathered to Weathered, Soft to Medium Hard, Dark Gray							91	50
			LIMESTONE - Unweathered, Hard, Dark Gray								
25			LIMESTONE - Unweathered, Hard, Occasional Fractures, Dark Gray							92	83
30			SHALE - Weathered, Moderately Hard, Dark Gray							85	19
			LIMESTONE - Unweathered, Hard, Gray								
35			LIMESTONE WITH FREQUENT SHALE SEAMS AND LAYERS - Unweathered, Hard, Gray							80	30

REMARKS: Mountain Fork Tributary Creek

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

BORING NO. 2
PAGE 2 OF 2

JOB NO. 040622 Crawford County
JOB NAME: Washington County Line - South Strs. & Apprs. (S)
Route 59 Section 5
STATION: 69+20
LOCATION: 6' Left of Construction Centerline
LOGGED BY: Coty Campbell

DATE: March 22, 2017
TYPE OF DRILLING:
Hollow Stem Auger - Diamond Core
EQUIPMENT: CME 75

HAMMER CORRECTION FACTOR: 1.37

COMPLETION DEPTH: 42

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL SURFACE ELEVATION: 1096.3	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT LBS PER CU.FT.	NO. OF BLOWS PER 6-IN.	% TCR	% RQD
			SHALE - Weathered, Medium Hard, Dark Gray								
40			SHALE - Weathered, Medium Hard, Occasional Fractures, Dark Gray							92	44
			Boring Terminated								
45											
50											
55											
60											
65											
70											

REMARKS: Mountain Fork Tributary Creek

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

BORING NO. 3
PAGE 1 OF 2

JOB NO. 040622 Crawford County
JOB NAME: Washington County Line - South Strs. & Apprs. (S)
Route 59 Section 5
STATION: 111+80
LOCATION: 3' Right of Construction Centerline
LOGGED BY: Stanley Bates

DATE: May 23, 2017
TYPE OF DRILLING:
Hollow Stem Auger - Diamond Core
EQUIPMENT: CME 850

HAMMER CORRECTION FACTOR: 1.23

COMPLETION DEPTH: 43.2

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.	% TCR	% RQD
			SURFACE ELEVATION: 873.5								
5			Moist, Medium Dense, Brown Sand with Gravel and Cobbles						13 10-6		
10									60 (5")	54	9
15			SHALE - Weathered, Medium Hard, Dark Gray							92	73
20										94	56
25			SHALE - Slightly Weathered, Medium Hard, Occasional Fractures, Dark Gray							98	55
30										100	81
35			SHALE - Unweathered, Medium Hard, Occasional Fractures, Dark Gray								

REMARKS: Mountain Fork Creek

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

BORING NO. 3
PAGE 2 OF 2

JOB NO. 040622 Crawford County
JOB NAME: Washington County Line - South Strs. & Apprs. (S)
Route 59 Section 5
STATION: 111+80
LOCATION: 3' Right of Construction Centerline
LOGGED BY: Stanley Bates

DATE: May 23, 2017
TYPE OF DRILLING:
Hollow Stem Auger - Diamond Core
EQUIPMENT: CME 850

HAMMER CORRECTION FACTOR: 1.23

COMPLETION DEPTH: 43.2

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.	% TCR	% RQD
			SURFACE ELEVATION: 873.5								
										97	60
40			SHALE WITH OCCASIONAL LIMESTONE SEAMS AND LAYERS - Unweathered, Medium Hard, Dark Gray							97	82
45			Boring Terminated								
50											
55											
60											
65											
70											

REMARKS: Mountain Fork Creek

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

BORING NO. 4
PAGE 1 OF 2

JOB NO. 040622 Crawford County
JOB NAME: Washington County Line - South Strs. & Apprs. (S)
Route 59 Section 5
STATION: 112+13
LOCATION: Construction Centerline
LOGGED BY: Stanley Bates

DATE: May 17, 2017
TYPE OF DRILLING:
Hollow Stem Auger - Diamond Core
EQUIPMENT: CME 850

HAMMER CORRECTION FACTOR: 1.23

COMPLETION DEPTH: 38.2

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT LBS PER CU.FT.	NO. OF BLOWS PER 6-IN.	% TCR	% RQD
			SURFACE ELEVATION: 868.5								
			Moist, Very Hard, Brown Sandy Clay with Gravel and Cobbles								
5									27 / 60 (3")		
			SHALE - Weathered, Medium Hard, Dark Gray							91	18
10										78	20
15			SHALE - Slightly Weathered, Medium Hard, Occasional Fractures, Dark Gray							100	14
20										92	56
25			SHALE - Slightly Weathered, Medium Hard, Frequent Fractures, Dark Gray							100	36
30			SHALE - Slightly Weathered, Medium Hard, Occasional Fractures, Dark Gray							88	43
35			LIMESTONE WITH OCCASIONAL SHALE LAYERS - Slightly Weathered, Moderately Hard, Gray								

REMARKS: Mountain Fork Creek

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

BORING NO. 4
PAGE 2 OF 2

JOB NO. 040622 Crawford County
JOB NAME: Washington County Line - South Strs. & Apprs. (S)
Route 59 Section 5
STATION: 112+13
LOCATION: Construction Centerline
LOGGED BY: Stanley Bates

DATE: May 17, 2017
TYPE OF DRILLING:
Hollow Stem Auger - Diamond Core
EQUIPMENT: CME 850

HAMMER CORRECTION FACTOR: 1.23

COMPLETION DEPTH: 38.2

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT LBS PER CU.FT.	NO. OF BLOWS PER 6-IN.	% TCR	% RQD
			SURFACE ELEVATION: 868.5								
			SHALE WITH OCCASIONAL LIMESTONE SEAMS AND LAYERS - Slightly Weathered, Medium Hard, Frequent Fractures, Dark Gray							100	62
40			Boring Terminated								
45											
50											
55											
60											
65											
70											

REMARKS: Mountain Fork Creek

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

BORING NO. 5
PAGE 1 OF 2

JOB NO. 040622 Crawford County
JOB NAME: Washington County Line - South Strs. & Apprs. (S)
Route 59 Section 5
STATION: 112+66
LOCATION: Construction Centerline
LOGGED BY: Stanley Bates

DATE: June 13, 2017
TYPE OF DRILLING: Hollow Stem Auger - Diamond Core
EQUIPMENT: CME 850

HAMMER CORRECTION FACTOR: 1.23

COMPLETION DEPTH: 38.4

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL SURFACE ELEVATION: 867.7	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT LBS PER CU.FT.	NO. OF BLOWS PER 6-IN.	% TCR	% RQD
			Moist, Medium Dense, Brown Gravel, Cobbles, and Boulders with Sandy Clay								
5			SHALE - Highly Weathered, Soft, Gray						60 (5")		
										94	15
10			SHALE - Weathered, Medium Hard, Gray							76	32
15										98	44
20			SHALE - Slightly Weathered, Medium Hard, Frequent Fractures, Occasional Calcite Seams, Gray							100	60
25			SHALE WITH OCCASIONAL LIMESTONE PARTINGS AND SEAMS - Slightly Weathered, Medium Hard, Gray							100	40
30			SHALE WITH OCCASIONAL LIMESTONE LAYERS AND SEAMS - Unweathered, Medium Hard, Gray							94	34
35											

REMARKS: Mountain Fork Creek

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

BORING NO. 5
PAGE 2 OF 2

JOB NO. 040622 Crawford County
JOB NAME: Washington County Line - South Strs. & Apprs. (S)
Route 59 Section 5
STATION: 112+66
LOCATION: Construction Centerline
LOGGED BY: Stanley Bates

DATE: June 13, 2017
TYPE OF DRILLING: Hollow Stem Auger - Diamond Core
EQUIPMENT: CME 850

HAMMER CORRECTION FACTOR: 1.23

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.	% TCR	% RQD
			SURFACE ELEVATION: 867.7								
			SHALE WITH OCCASIONAL LIMESTONE PARTINGS AND SEAMS - Unweathered, Frequent Fractures, Gray							100	20
40			Boring Terminated								
45											
50											
55											
60											
65											
70											

REMARKS: Mountain Fork Creek

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

BORING NO. 6
PAGE 1 OF 2

JOB NO. 040622 Crawford County
JOB NAME: Washington County Line - South Strs. & Apprs. (S)
Route 59 Section 5
STATION: 113+13
LOCATION: Construction Centerline
LOGGED BY: Stanley Bates

DATE: June 6, 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 SURFACE ELEVATION: 873.1	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT LBS PER CU.FT.	NO. OF BLOWS PER 6-IN.	% TCR	% RQD
5			Moist, Medium Dense, Brown Gravel, Cobbles, and Boulders with Sandy Clay						11 11-13		
10			SHALE - Weathered, Medium Hard, Dark Gray						54 60 (2")	100	70
15			SHALE - Slightly Weathered, Medium Hard, Occasional Fractures, Dark Gray							90	44
20			SHALE - Slightly Weathered, Medium Hard, Occasional Fractures, Occasional Iron Concretions, Dark Gray							100	76
25			SHALE - Slightly Weathered, Medium Hard, Occasional Fractures, Dark Gray							97	90
30			SHALE WITH OCCASIONAL LIMESTONE SEAMS - Slightly Weathered, Hard, Occasional Fractures, Dark Gray							99	62
35											

REMARKS: Mountain Fork Creek

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

BORING NO. 6
PAGE 2 OF 2

JOB NO. 040622 Crawford County
JOB NAME: Washington County Line - South Strs. & Apprs. (S)
Route 59 Section 5
STATION: 113+13
LOCATION: Construction Centerline
LOGGED BY: Stanley Bates

DATE: June 6, 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 SURFACE ELEVATION: 873.1	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT LBS PER CU.FT.	NO. OF BLOWS PER 6-IN.	% TCR	% RQD
			SHALE WITH OCCASIONAL LIMESTONE SEAMS - Unweathered, Hard, Occasional Fractures, Dark Gray							95	78
40			SHALE WITH OCCASIONAL LIMESTONE SEAMS AND LAYERS - Unweathered, Hard, Occasional Fractures, Dark Gray							97	80
45			Boring Terminated								
50											
55											
60											
65											
70											

REMARKS: Mountain Fork Creek

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

BORING NO. 7
PAGE 1 OF 2

JOB NO. 040622 Crawford County
JOB NAME: Washington County Line - South Strs. & Apprs. (S)
Route 59 Section 5
STATION: 180+92
LOCATION: 5' Right of Construction Centerline
LOGGED BY: Coty Campbell

DATE: March 28, 2017
TYPE OF DRILLING:
Hollow Stem Auger - Diamond Core
EQUIPMENT: CME 75

HAMMER CORRECTION FACTOR: 1.37

COMPLETION DEPTH: 38.5

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL SURFACE ELEVATION: 829.7	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT LBS PER CU.FT.	NO. OF BLOWS PER 6-IN.	% TCR	% RQD
5			Moist, Very Stiff, Brown Sandy Clay with Gravel						3 8-12		
10			Moist, Very Hard, Brown Sandy Clay with Gravel						15 19-50		
15									13 17-60 (8")		
20			Boulder Cobbles								
25			SHALE - Weathered, Medium Hard, Dark Gray							75	26
30			SHALE - Weathered with Highly Weathered Layers, Medium Hard with Soft Layers, Dark Gray							85	47
35			SANDY LIMESTONE - Slightly Weathered, Moderately Hard, Gray SHALE - Weathered, Medium Hard,							75	18

REMARKS: Whitzen Hollow Creek

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

BORING NO. 7
PAGE 2 OF 2

JOB NO. 040622 Crawford County
JOB NAME: Washington County Line - South Strs. & Apprs. (S)
Route 59 Section 5
STATION: 180+92
LOCATION: 5' Right of Construction Centerline
LOGGED BY: Coty Campbell

DATE: March 28, 2017
TYPE OF DRILLING:
Hollow Stem Auger - Diamond Core
EQUIPMENT: CME 75

HAMMER CORRECTION FACTOR: 1.37

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.	% TCR	% RQD
			SURFACE ELEVATION: 829.7								
			Occasional Concretions, Dark Gray							96	75
			SANDY LIMESTONE WITH FREQUENT SHALE LAYERS - Weathered, Moderately Hard, Gray								
40			SHALE - Slightly Weathered, Medium Hard, Dark Gray								
			Boring Terminated								
45											
50											
55											
60											
65											
70											

REMARKS: Whitzen Hollow Creek

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

BORING NO. 8
PAGE 1 OF 2

JOB NO. 040622 Crawford County
JOB NAME: Washington County Line - South Strs. & Apprs. (S)
Route 59 Section 5
STATION: 182+22
LOCATION: 5' Left of Construction Centerline
LOGGED BY: Coty Campbell

DATE: March 29, 2017
TYPE OF DRILLING:
Hollow Stem Auger - Diamond Core
EQUIPMENT: CME 75

HAMMER CORRECTION FACTOR: 1.37

COMPLETION DEPTH: 41.9

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: 829.5								
5			Dry, Medium Dense, Brown Gravel with Sand						11 13-15		
10			Moist, Dense, Sand with Clay and Gravel						8 12-20		
15			Moist, Very Dense, Sand with Clay and Gravel						11 30-27		
20			SHALE - Highly Weathered, Medium Hard, Dark Gray						60 (5")	84	0
25			SHALE - Weathered, Medium Hard, Dark Gray							98	16
30										80	34
35										80	36

REMARKS: Whitzen Hollow Creek

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

BORING NO. 8
PAGE 2 OF 2

JOB NO. 040622 Crawford County
JOB NAME: Washington County Line - South Strs. & Apprs. (S)
Route 59 Section 5
STATION: 182+22
LOCATION: 5' Left of Construction Centerline
LOGGED BY: Coty Campbell

DATE: March 29, 2017
TYPE OF DRILLING:
Hollow Stem Auger - Diamond Core
EQUIPMENT: CME 75

HAMMER CORRECTION FACTOR: 1.37

COMPLETION DEPTH: 41.9

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: 829.5								
			SHALE - Weathered, Medium Hard, Occasional Concretions and Pyrite Nodules, Dark Gray								
40			SANDY LIMESTONE WITH FREQUENT SHALE LAYERS - Slightly Weathered, Moderately Hard, Gray							98	82
			SHALE - Slightly Weathered, Medium Hard, Occasional Concretions, Dark Gray								
			Boring Terminated								
45											
50											
55											
60											
65											
70											

REMARKS: Whitzen Hollow Creek

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

BORING NO. 9
PAGE 1 OF 2

JOB NO. 040622 Crawford County
JOB NAME: Washington County Line - South Strs. & Apprs. (S)
Route 59 Section 5
STATION: 286+49
LOCATION: 6' Right of Construction Centerline
LOGGED BY: Coty Campbell

DATE: April 12, 2017
TYPE OF DRILLING:
Hollow Stem Auger - Diamond Core
EQUIPMENT: CME 75

HAMMER CORRECTION FACTOR: 1.37

COMPLETION DEPTH: 35.7

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	% RQD
			SURFACE ELEVATION: 777.7								
5			Moist, Stiff, Brown Sandy Clay with Gravel						5 5-5		
10			Moist, Medium Dense, Brown Sand with Gravel						8 9-8		
15			Wet, Very Dense, Brown Gravel with Clay and Sand						12 18-60 (8")	100	100
20										100	100
25			SANDSTONE - Unweathered, Well Cemented, Calcareous, Gray							100	100
30										100	100
35										98	98

REMARKS: Huey Creek

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

BORING NO. 9
PAGE 2 OF 2

JOB NO. 040622 Crawford County
JOB NAME: Washington County Line - South Strs. & Apprs. (S)
Route 59 Section 5
STATION: 286+49
LOCATION: 6' Right of Construction Centerline
LOGGED BY: Coty Campbell

DATE: April 12, 2017
TYPE OF DRILLING:
Hollow Stem Auger - Diamond Core
EQUIPMENT: CME 75

HAMMER CORRECTION FACTOR: 1.37

COMPLETION DEPTH: 35.7

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	% RQD
			SURFACE ELEVATION: 777.7								
			Boring Terminated								

40
45
50
55
60
65
70

REMARKS: Huey Creek

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

BORING NO. 10
PAGE 1 OF 2

JOB NO. 040622 Crawford County
JOB NAME: Washington County Line - South Strs. & Apprs. (S)
Route 59 Section 5
STATION: 287+29
LOCATION: 5' Left of Construction Centerline
LOGGED BY: Coty Campbell

DATE: April 11, 2017
TYPE OF DRILLING:
Hollow Stem Auger - Diamond Core
EQUIPMENT: CME 75

HAMMER CORRECTION FACTOR: 1.37

COMPLETION DEPTH: 36.5

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.	% TCR	% RQD
			SURFACE ELEVATION: 777.8								
5			Moist, Stiff, Brown Sandy Clay						4 7-6		
10			Moist, Stiff, Brown Sandy Clay with Gravel						4 6-7		
15			SHALE - Highly Weathered, Medium Hard, Dark Gray						27 60 (2")		
20			LIMESTONE - Slightly Weathered, Moderately Hard, Gray							94	72
			SHALE - Slightly Weathered, Medium Hard, Calcareous, Dark Gray								
			COAL								
			SHALE WITH OCCASIONAL LIMESTONE LAYERS - Slightly Weathered, Medium Hard, Calcareous, Dark Gray								
25			LIMESTONE - Unweathered, Moderately Hard, Gray							100	96
30			LIMESTONE WITH OCCASIONAL SHALE LAYERS - Unweathered, Moderately Hard, Gray							100	85
35			LIMESTONE - Unweathered, Moderatly Hard, Occasional Fractures, Gray							100	89

REMARKS: Huey Creek

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

BORING NO. 10
PAGE 2 OF 2

JOB NO. 040622 Crawford County
JOB NAME: Washington County Line - South Strs. & Apprs. (S)
Route 59 Section 5
STATION: 287+29
LOCATION: 5' Left of Construction Centerline
LOGGED BY: Coty Campbell

DATE: April 11, 2017
TYPE OF DRILLING:
Hollow Stem Auger - Diamond Core
EQUIPMENT: CME 75

HAMMER CORRECTION FACTOR: 1.37

COMPLETION DEPTH: 36.5

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.	% TCR	% RQD
			SURFACE ELEVATION: 777.8								
			Boring Terminated								

40
45
50
55
60
65
70

REMARKS: Huey Creek

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

BORING NO. 11
PAGE 1 OF 2

JOB NO. 040622 Crawford County
JOB NAME: Washington County Line - South Strs. & Apprs. (S)
Route 59 Section 5
STATION: 287+69
LOCATION: 6' Left of Construction Centerline
LOGGED BY: Coty Campbell

DATE: April 11, 2017
TYPE OF DRILLING:
Hollow Stem Auger - Diamond Croe
EQUIPMENT: CME 7

HAMMER CORRECTION FACTOR: 1.37

COMPLETION DEPTH: 40

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL SURFACE ELEVATION: 778.2	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT LBS PER CU.FT.	NO. OF BLOWS PER 6-IN.	% TCR	% RQD
5			Moist, Very Stiff, Brown Sandy Clay						7 8-9		
10			Moist, Medium Dense, Gravel with Clay and Sand						14 17-10		
15			Wet, Dense, Gravel with Clay and Sand						13 15-16		
20			LIMESTONE - Unweathered, Moderately Hard, Gray SHALE - Slightly Weathered, Medium Hard, Calcareous, Dark Gray							99	27
25			LIMESTONE WITH OCCASIONAL SHALE SEAMS - Unweathered, Moderately Hard, Gray							95	74
30			COAL WITH OCCASIONAL SHALE LAYERS LIMESTONE - Unweathered, Moderately Hard, Gray SHALE - Weathered, Medium Hard, Dark Gray							100	78
35			LIMESTONE - Unweathered, Moderately Hard, Gray							100	76
			LIMESTONE WITH FREQUENT SHALE								

REMARKS: Huey Creek

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

BORING NO. 11
PAGE 2 OF 2

JOB NO. 040622 Crawford County
JOB NAME: Washington County Line - South Strs. & Apprs. (S)
Route 59 Section 5
STATION: 287+69
LOCATION: 6' Left of Construction Centerline
LOGGED BY: Coty Campbell

DATE: April 11, 2017
TYPE OF DRILLING:
Hollow Stem Auger - Diamond Croe
EQUIPMENT: CME 7

HAMMER CORRECTION FACTOR: 1.37

COMPLETION DEPTH: 40

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: 778.2								
			PARTINGS AND SEAMS - Unweathered, Moderately Hard, Gray								
			LIMESTONE - Unweathered, Moderately Hard, Gray							100	92
40			Boring Terminated								
45											
50											
55											
60											
65											
70											

REMARKS: Huey Creek

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT

May 19, 2016

TO: Mr. Trinity Smith, Engineer of Roadway Design

SUBJECT: Job No. 040622
Washington Co. Line – South Strs. & Apprs. (S)
Route 59 Section 5
Crawford County

Transmitted herewith are the requested Soil Survey, strength data and Resilient Modulus test results for the above referenced job. The project consists of replacing four bridges on Highway 59. Samples were obtained in the existing travel lanes, shoulder and ditch line.

Based on laboratory results of samples obtained, the subgrade soils primarily consist of low plasticity sandy clays with varying amounts of gravel. Isolated locations of highly plastic clay were encountered within the project limits. Cross-sections are not currently available, but it is assumed 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 station 178+00, 5 feet right of centerline at a depth of 1.5 feet, and at station 185+00, 12 feet left of centerline at a depth of 0.5 feet.

If embankment is to be placed in the existing ditch line all soft unstable organic material should be undercut prior to embankment construction. The undercut is anticipated to be no more than two feet and may be backfilled with locally available unspecified material. Further 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 located in the vicinity of Van Buren.

2. Asphalt Concrete Hot Mix

	PG 64-22	
Type	**Asphalt Cement %**	**Mineral Aggregate %**
Surface Course	5.6	94.4
Binder Course	5.4	94.6
Base Course	4.5	95.5

	PG 70-22	
Type	**Asphalt Cement %**	**Mineral Aggregate %**
Surface Course	5.6	94.4
Binder Course	5.5	94.5
Base Course	4.5	95.5

PG 76-22

Type	Asphalt Cement %	Mineral Aggregate %
Surface Course	5.6	94.4
Binder Course	5.5	94.5
Base Course	4.7	95.3

Michael C. Benson
Materials Engineer

MCB:pt:bjj
Attachment
cc: State Constr. Eng. – Master File Copy
District 4 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 - 05/19/2016
JOB NUMBER - 040622

SEQUENCE NO. - 1
MATERIAL CODE - SSRVPS
SPEC. YEAR - 2014
SUPPLIER ID. - 1
COUNTY/STATE - 17
DISTRICT NO. - 04

JOB NAME - WASHINGTON CO.LINE-SOUTH STRS.& APPRS.(S)

STATION LIMITS	R-VALUE AT 240 psi
BEGIN JOB - END JOB	10
RESILIENT MODULEUS	
017+00	6,174
071+00	6,118
178+00	6,010
290+00	7,938

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.	040622	**Material Code**	SSRVPS
Date Sampled:	5/11/16	**Station No.:**	017+00
Date Tested:	May 11, 2016	**Location:**	15'RT
Name of Project:	WASHINGTON CO.LINE - SOUTH STR. + APPRS (S)		
County:	**Code:** 17 **Name:** CRAWFORD		
Sampled By:	GW	**Depth:**	0-5
Lab No.:	20161159	**AASHTO Class:**	A-2-4 (0)
Sample ID:	RV210	**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	3.94
Average	3.96
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):	12.22
Initial Volume, AoLo (cu. in):	98.01

3. Soil Specimen Weight:

Weight of Wet Soil Used (g):	3259.80

4. Soil Properties:

Optimum Moisture Content (%):	13.8
Maximum Dry Density (pcf):	114.9
95% of MDD (pcf):	109.2
In-Situ Moisture Content (%):	N/A

5. Specimen Properties:

Wet Weight (g):	3259.80
Compaction Moisture content (%):	13.8
Compaction Wet Density (pcf):	126.72
Compaction Dry Density (pcf):	111.36
Moisture Content After Mr Test (%):	13.9

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

7. Resilient Modulus, Mr: 9055(Sc)^-0.32147(S3)^0.39045

8. Comments _____

9. Tested By: G. WENDLAND **Date:** May 11, 2016

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT
MATERIALS DIVISION

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

Job No.	040622	**Material Code**	SSRVPS
Date Sampled:	5/11/16	**Station No.:**	017+00
Date Tested:	May 11, 2016	**Location:**	15'RT
Name of Project:	WASHINGTON CO.LINE - SOUTH STR. + APPRS (S)		
County:	**Code:** 17 **Name:** CRAWFORD		
Sampled By:	GW	**Depth:**	0-5
Lab No.:	20161159	**AASHTO Class:**	A-2-4 (0)
Sample ID:	RV210	**Material Type (1 or 2):**	2
LATITUDE:		**LONGITUDE:**	

PARAMETER	*Chamber Confining Pressure*	*Nominal Maximum Axial Stress*	*Actual Applied Max. Axial Load*	*Actual Applied Cyclic Load*	*Actual Applied Contact Load*	*Actual Applied Max. Axial Stress*	*Actual Applied Cyclic Stress*	*Actual Applied Contact Stress*	*Average Recov Def. LVDT 1 and 2*	*Resilient Strain*	*Resilient Modulus*
DESIGNATION	S_3	S_{cyclic}	P_{max}	P_{cyclic}	$P_{contact}$	S_{max}	S_{cyclic}	$S_{contact}$	H_{avg}	ε_r	M_r
UNIT	psi	psi	lbs	lbs	lbs	psi	psi	psi	in	in/in	psi
Sequence 1	6.0	2.0	25.0	22.2	2.8	2.0	1.8	0.2	0.00099	0.00012	14,700
Sequence 2	6.0	4.0	46.9	44.1	2.8	3.8	3.6	0.2	0.00226	0.00028	12,824
Sequence 3	6.0	6.0	68.9	65.2	3.7	5.6	5.3	0.3	0.00375	0.00047	11,397
Sequence 4	6.0	8.0	91.3	85.2	6.1	7.5	7.0	0.5	0.00568	0.00071	9,846
Sequence 5	6.0	10.0	113.4	104.8	8.6	9.3	8.6	0.7	0.00776	0.00097	8,867
Sequence 6	4.0	2.0	24.7	22.0	2.7	2.0	1.8	0.2	0.00116	0.00014	12,473
Sequence 7	4.0	4.0	45.9	43.1	2.8	3.8	3.5	0.2	0.00275	0.00034	10,276
Sequence 8	4.0	6.0	66.0	63.2	2.9	5.4	5.2	0.2	0.00465	0.00058	8,922
Sequence 9	4.0	8.0	88.3	82.9	5.4	7.2	6.8	0.4	0.00672	0.00084	8,098
Sequence 10	4.0	10.0	110.5	102.6	7.9	9.0	8.4	0.6	0.00880	0.00110	7,645
Sequence 11	2.0	2.0	24.5	21.6	2.8	2.0	1.8	0.2	0.00143	0.00018	9,958
Sequence 12	2.0	4.0	44.8	41.9	2.9	3.7	3.4	0.2	0.00338	0.00042	8,138
Sequence 13	2.0	6.0	63.9	60.9	3.0	5.2	5.0	0.2	0.00565	0.00070	7,083
Sequence 14	2.0	8.0	84.5	80.1	4.5	6.9	6.6	0.4	0.00807	0.00101	6,515
Sequence 15	2.0	10.0	105.9	98.9	7.0	8.7	8.1	0.6	0.01051	0.00131	6,174

TESTED BY . WENDLAND DATE May 11, 2016

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.	040622	**Material Code**	SSRVPS
Date Sampled:	5/11/16	**Station No.:**	017+00
Date Tested:	May 11, 2016	**Location:**	15'RT
Name of Project:	WASHINGTON CO.LINE - SOUTH STR. + APPRS (S)		
County:	**Code:** 17 **Name:** CRAWFORD		
Sampled By:	GW	**Depth:**	0-5
Lab No.:	20161159	**AASHTO Class:**	A-2-4 (0)
Sample ID:	RV210	**Material Type (1 or 2):**	2
LATITUDE:		**LONGITUDE:**	

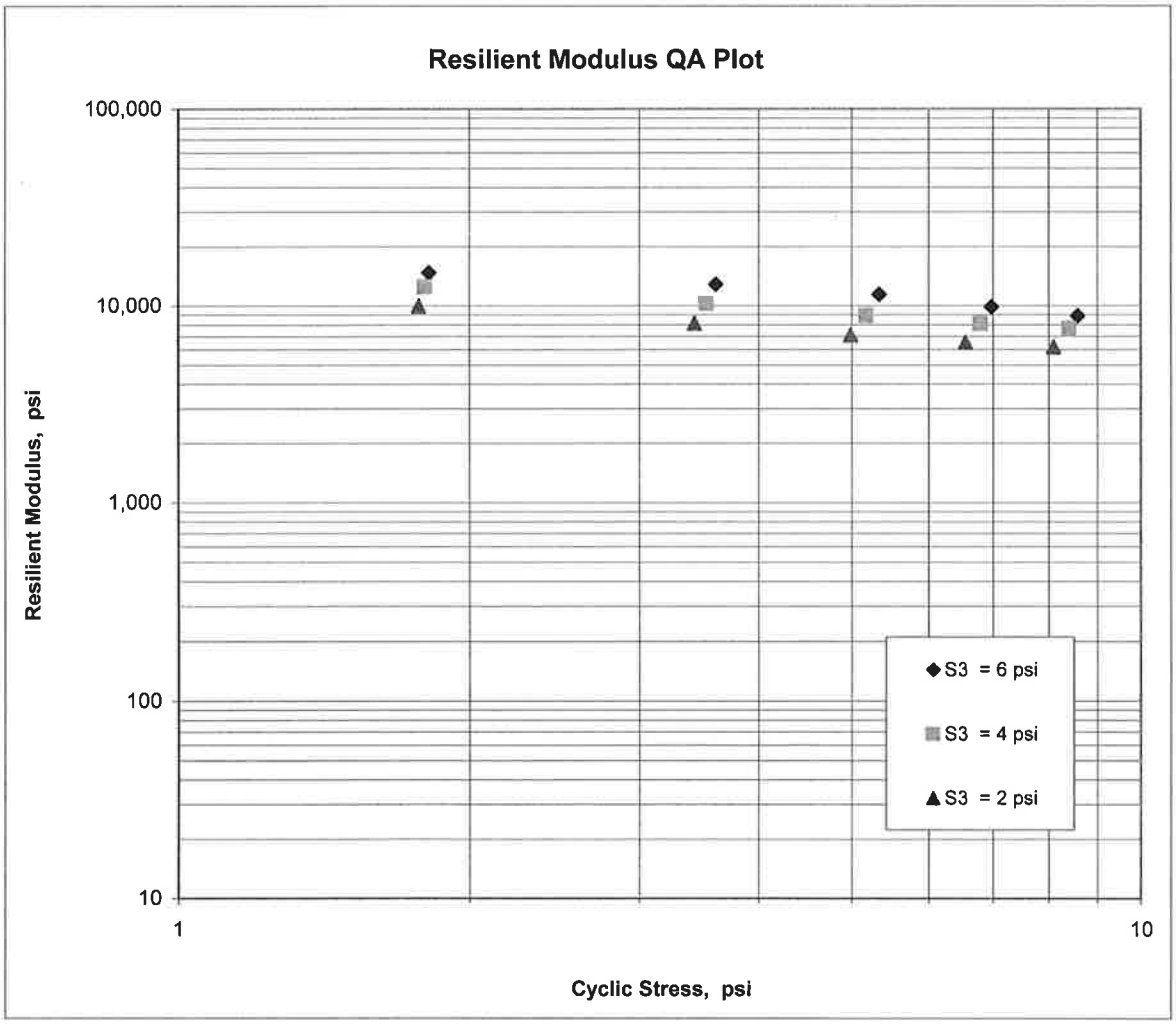
$$M_R = K1\ (S_C)^{K2}\ (S_3)^{K5}$$

K1 = 9,055

K2 = -0.32147

K5 = 0.39045

R^2 = 0.98



ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT
MATERIALS DIVISION

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

Job No.	040622	**Material Code**	SSRVPS
Date Sampled:	5/11/16	**Station No.:**	071+00
Date Tested:	May 11, 2016	**Location:**	15'LT
Name of Project:	WASHINGTON CO.LINE - SOUTH STR. + APPRS (S)		
County:	**Code:** 17 **Name:** CRAWFORD		
Sampled By:	D. DICKERSON	**Depth:**	0-5
Lab No.:	20161160	**AASHTO Class:**	A-4 (0)
Sample ID:	RV211	**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	3.94
Bottom	3.96
Average	3.96
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):	12.22
Initial Volume, AoLo (cu. in):	98.01

3. Soil Specimen Weight:

Weight of Wet Soil Used (g):	3161.20

4. Soil Properties:

Optimum Moisture Content (%):	15.8
Maximum Dry Density (pcf):	111.4
95% of MDD (pcf):	105.8
In-Situ Moisture Content (%):	N/A

5. Specimen Properties:

Wet Weight (g):	3161.20
Compaction Moisture content (%):	15.6
Compaction Wet Density (pcf):	122.89
Compaction Dry Density (pcf):	106.31
Moisture Content After Mr Test (%):	15.9

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

7. Resilient Modulus, Mr: 12157(Sc)^-0.40566(S3)^0.27538

8. Comments

9. Tested By: G. WENDLAND **Date:** May 11, 2016

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT
MATERIALS DIVISION

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

Job No.	040622	**Material Code**	SSRVPS
Date Sampled:	5/11/16	**Station No.:**	071+00
Date Tested:	May 11, 2016	**Location:**	15'LT
Name of Project:	WASHINGTON CO.LINE - SOUTH STR. + APPRS (S)		
County:	**Code:** 17 **Name:** CRAWFORD		
Sampled By:	D. DICKERSON	**Depth:**	0-5
Lab No.:	20161160	**AASHTO Class:**	A-4 (0)
Sample ID:	RV211	**Material Type (1 or 2):**	2
LATITUDE:		**LONGITUDE:**	

PARAMETER	*Chamber Confining Pressure*	*Nominal Maximum Axial Stress*	*Actual Applied Max. Axial Load*	*Actual Applied Cyclic Load*	*Actual Applied Contact Load*	*Actual Applied Max. Axial Stress*	*Actual Applied Cyclic Stress*	*Actual Applied Contact Stress*	*Average Recov Def. LVDT 1 and 2*	*Resilient Strain*	*Resilient Modulus*
DESIGNATION	S_3	S_{cyclic}	P_{max}	P_{cyclic}	$P_{contact}$	S_{max}	S_{cyclic}	$S_{contact}$	H_{avg}	ε_r	M_r
UNIT	psi	psi	lbs	lbs	lbs	psi	psi	psi	in	in/in	psi
Sequence 1	6.0	2.0	25.0	22.2	2.8	2.0	1.8	0.2	0.00100	0.00012	14,617
Sequence 2	6.0	4.0	47.0	44.2	2.8	3.8	3.6	0.2	0.00223	0.00028	13,045
Sequence 3	6.0	6.0	69.2	65.5	3.7	5.7	5.4	0.3	0.00382	0.00048	11,251
Sequence 4	6.0	8.0	90.4	84.2	6.2	7.4	6.9	0.5	0.00611	0.00076	9,040
Sequence 5	6.0	10.0	110.7	102.0	8.7	9.1	8.3	0.7	0.00862	0.00107	7,769
Sequence 6	4.0	2.0	25.0	22.2	2.8	2.0	1.8	0.2	0.00111	0.00014	13,122
Sequence 7	4.0	4.0	46.4	43.6	2.8	3.8	3.6	0.2	0.00260	0.00032	11,003
Sequence 8	4.0	6.0	66.7	63.8	2.8	5.5	5.2	0.2	0.00448	0.00056	9,340
Sequence 9	4.0	8.0	88.1	82.9	5.2	7.2	6.8	0.4	0.00678	0.00084	8,027
Sequence 10	4.0	10.0	109.3	101.5	7.8	8.9	8.3	0.6	0.00942	0.00117	7,076
Sequence 11	2.0	2.0	24.8	22.1	2.7	2.0	1.8	0.2	0.00128	0.00016	11,323
Sequence 12	2.0	4.0	45.9	43.2	2.7	3.8	3.5	0.2	0.00303	0.00038	9,342
Sequence 13	2.0	6.0	65.2	62.4	2.8	5.3	5.1	0.2	0.00521	0.00065	7,851
Sequence 14	2.0	8.0	84.9	80.5	4.4	6.9	6.6	0.4	0.00776	0.00097	6,807
Sequence 15	2.0	10.0	105.4	98.5	6.9	8.6	8.1	0.6	0.01056	0.00132	6,118

TESTED BY . WENDLAND DATE May 11, 2016

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.	040622	**Material Code**	SSRVPS
Date Sampled:	5/11/16	**Station No.:**	071+00
Date Tested:	May 11, 2016	**Location:**	15'LT
Name of Project:	WASHINGTON CO.LINE - SOUTH STR. + APPRS (S)		
County:	**Code:** 17 **Name:** CRAWFORD		
Sampled By:	D. DICKERSON	**Depth:**	0-5
Lab No.:	20161160	**AASHTO Class:**	A-4 (0)
Sample ID:	RV211	**Material Type (1 or 2):**	2
LATITUDE:		**LONGITUDE:**	

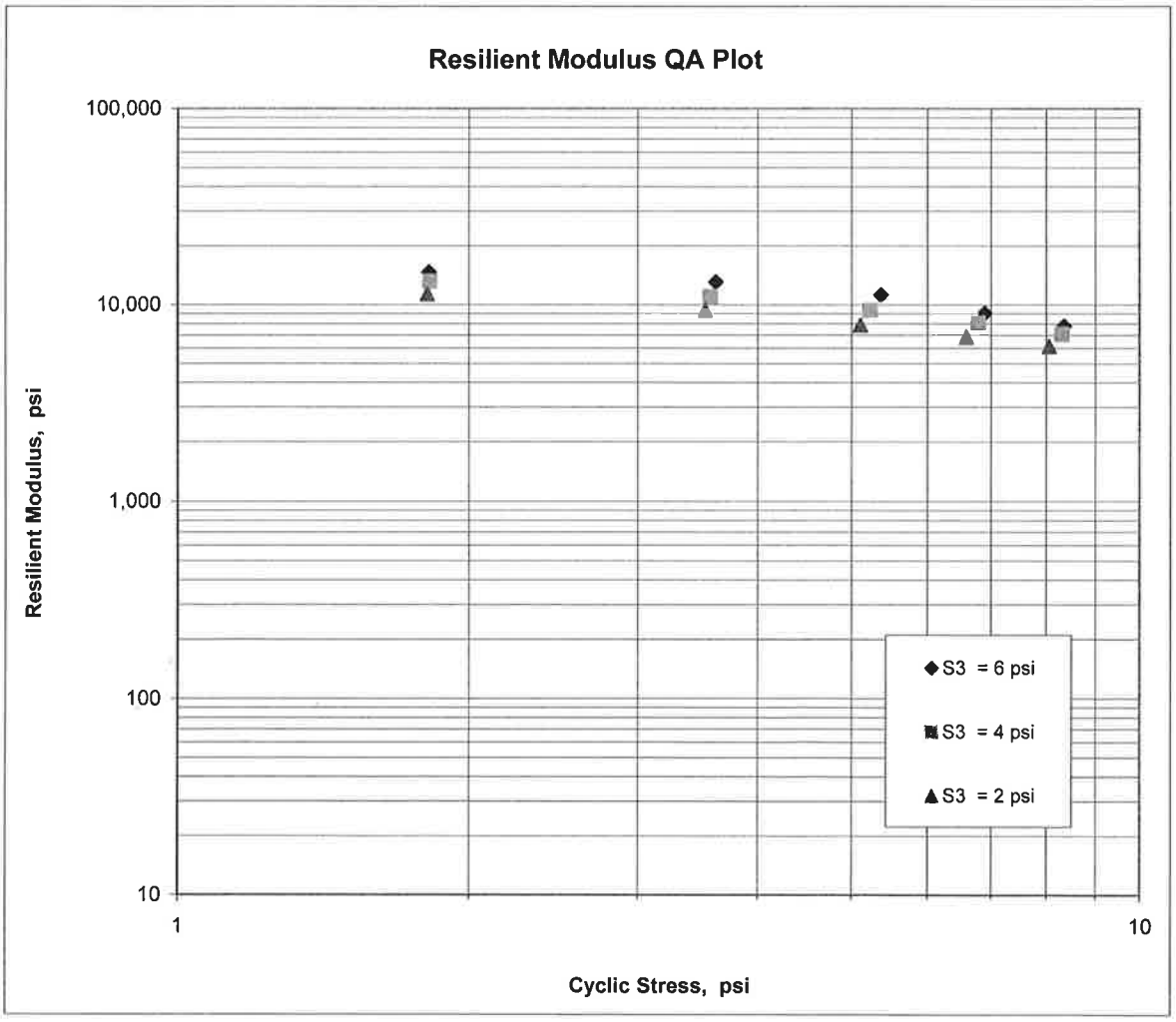
$$M_R = K1\,(S_C)^{K2}\,(S_3)^{K5}$$

K1 = 12,157

K2 = -0.40566

K5 = 0.27538

R^2 = 0.95



ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT
MATERIALS DIVISION

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

Job No.	040622	**Material Code**	SSRVPS
Date Sampled:	4/19/16	**Station No.:**	178+00
Date Tested:	May 12, 2016	**Location:**	15'RT
Name of Project:	WASHINGTON CO. LINE-SOUTH STRS. & APPRS.(S)		
County:	**Code:** 17 **Name:** CRAWFORD		
Sampled By:	CHRISENBERRY	**Depth:**	0-5'
Lab No.:	20161161	**AASHTO Class:**	A-6(1)
Sample ID:	RV212	**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	3.95
Bottom	3.95
Average	3.96
Membrane Thickness (in):	0.00
Height of Specimen, Cap and Base (in):	8
Height of Cap and Base (in):	0.00
Initial Length, Lo (in):	8
Initial Area, Ao (sq. in):	12.30
Initial Volume, AoLo (cu. in):	98.36

3. Soil Specimen Weight:

Weight of Wet Soil Used (g):	3213.10

4. Soil Properties:

Optimum Moisture Content (%):	15.2
Maximum Dry Density (pcf):	112.5
95% of MDD (pcf):	106.9
In-Situ Moisture Content (%):	N/A

5. Specimen Properties:

Wet Weight (g):	3213.10
Compaction Moisture content (%):	15.4
Compaction Wet Density (pcf):	124.46
Compaction Dry Density (pcf):	107.85
Moisture Content After Mr Test (%):	15.4

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

7. Resilient Modulus, Mr: 12580(Sc)^-0.41736(S3)^0.21690

8. Comments

9. Tested By: C.GARRETT **Date:** May 12, 2016

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT
MATERIALS DIVISION

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

Job No.	040622	**Material Code**	SSRVPS
Date Sampled:	4/19/16	**Station No.:**	178+00
Date Tested:	May 12, 2016	**Location:**	15'RT
Name of Project:	WASHINGTON CO. LINE-SOUTH STRS. & APPRS.(S)		
County:	**Code:** 17 **Name:** CRAWFORD		
Sampled By:	CHRISENBERRY	**Depth:**	0-5'
Lab No.:	20161161	**AASHTO Class:**	A-6(1)
Sample ID:	RV212	**Material Type (1 or 2):**	2
LATITUDE:		**LONGITUDE:**	

PARAMETER	*Chamber Confining Pressure*	*Nominal Maximum Axial Stress*	*Actual Applied Max. Axial Load*	*Actual Applied Cyclic Load*	*Actual Applied Contact Load*	*Actual Applied Max. Axial Stress*	*Actual Applied Cyclic Stress*	*Actual Applied Contact Stress*	*Average Recov Def. LVDT 1 and 2*	*Resilient Strain*	*Resilient Modulus*
DESIGNATION	S_3	S_{cyclic}	P_{max}	P_{cyclic}	$P_{contact}$	S_{max}	S_{cyclic}	$S_{contact}$	H_{avg}	ε_r	M_r
UNIT	psi	psi	lbs	lbs	lbs	psi	psi	psi	in	in/in	psi
Sequence 1	6.0	2.0	25.2	22.4	2.8	2.0	1.8	0.2	0.00106	0.00013	13,705
Sequence 2	6.0	4.0	47.2	44.4	2.8	3.8	3.6	0.2	0.00247	0.00031	11,699
Sequence 3	6.0	6.0	69.4	65.7	3.7	5.6	5.3	0.3	0.00424	0.00053	10,082
Sequence 4	6.0	8.0	91.4	85.2	6.2	7.4	6.9	0.5	0.00676	0.00084	8,205
Sequence 5	6.0	10.0	113.1	104.4	8.7	9.2	8.5	0.7	0.00934	0.00117	7,270
Sequence 6	4.0	2.0	25.1	22.3	2.8	2.0	1.8	0.2	0.00115	0.00014	12,623
Sequence 7	4.0	4.0	46.7	43.9	2.8	3.8	3.6	0.2	0.00277	0.00035	10,306
Sequence 8	4.0	6.0	67.0	64.2	2.9	5.5	5.2	0.2	0.00486	0.00061	8,586
Sequence 9	4.0	8.0	89.4	84.0	5.3	7.3	6.8	0.4	0.00742	0.00093	7,364
Sequence 10	4.0	10.0	111.4	103.6	7.9	9.1	8.4	0.6	0.01012	0.00126	6,661
Sequence 11	2.0	2.0	25.1	22.3	2.7	2.0	1.8	0.2	0.00129	0.00016	11,292
Sequence 12	2.0	4.0	46.3	43.5	2.8	3.8	3.5	0.2	0.00313	0.00039	9,041
Sequence 13	2.0	6.0	66.1	63.2	2.8	5.4	5.1	0.2	0.00548	0.00069	7,503
Sequence 14	2.0	8.0	86.8	82.4	4.4	7.1	6.7	0.4	0.00821	0.00103	6,530
Sequence 15	2.0	10.0	108.7	101.7	7.0	8.8	8.3	0.6	0.01101	0.00138	6,010

TESTED BY C.GARRETT DATE May 12, 2016

REVIEWED BY _____ DATE _____

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT

MATERIALS DIVISION

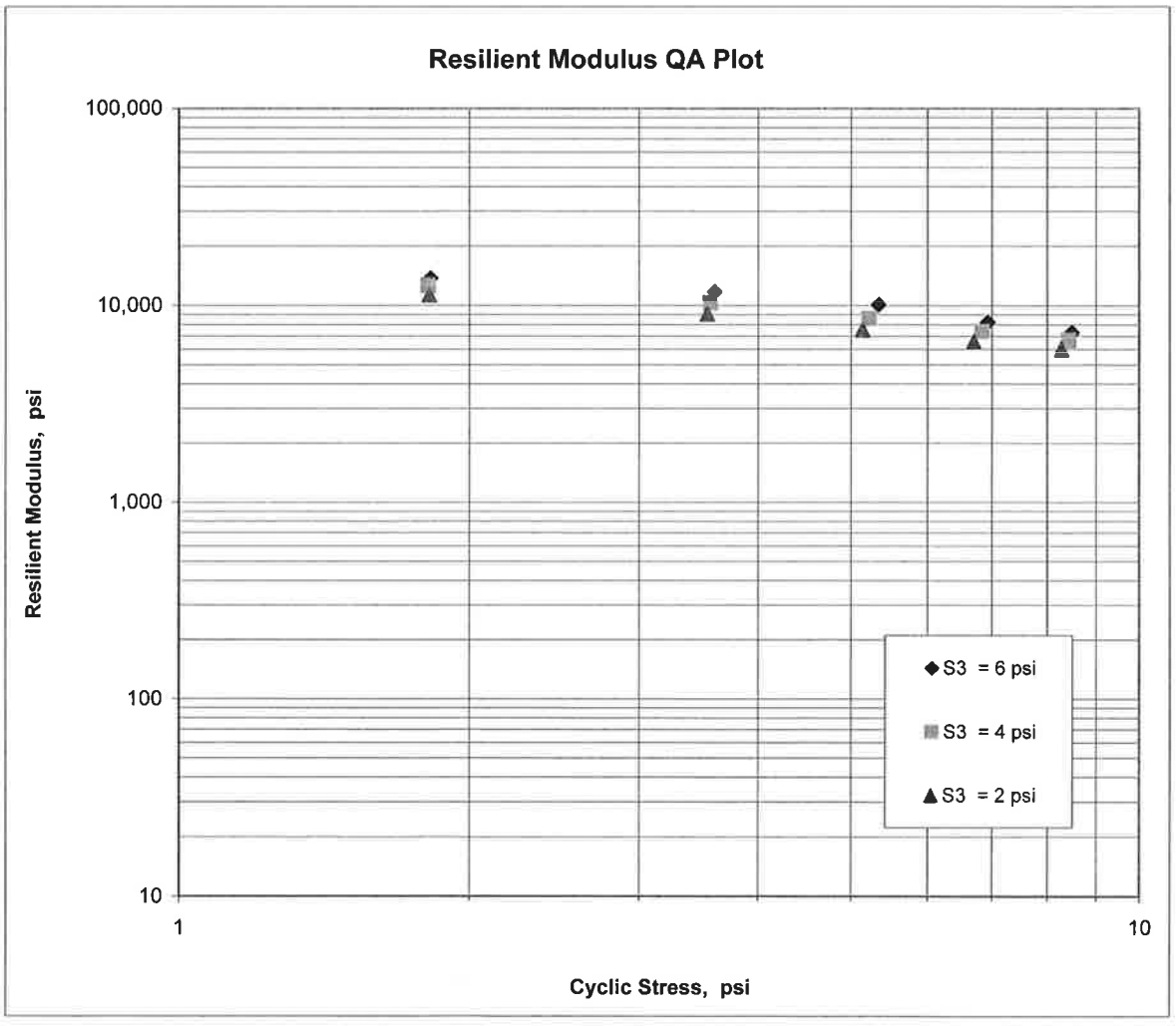
AASHTO T 307-99 - RESILIENT MODULUS OF SUBGRADE SOILS

RECOMPACTED / THINWALL TUBE SAMPLES

Job No.	040622	**Material Code**	SSRVPS
Date Sampled:	4/19/16	**Station No.:**	178+00
Date Tested:	May 12, 2016	**Location:**	15'RT
Name of Project:	WASHINGTON CO. LINE-SOUTH STRS. & APPRS.(S)		
County:	**Code:** 17 **Name:** CRAWFORD		
Sampled By:	CHRISENBERRY	**Depth:**	0-5'
Lab No.:	20161161	**AASHTO Class:**	A-6(1)
Sample ID:	RV212	**Material Type (1 or 2):**	2
LATITUDE:		**LONGITUDE:**	

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

K1 =	12,580
K2 =	-0.41736
K5 =	0.21690
R^2 =	0.97



ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT
MATERIALS DIVISION

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

Job No.	040622	**Material Code**	SSRVPS
Date Sampled:	5/11/16	**Station No.:**	290+00
Date Tested:	May 11, 2016	**Location:**	15'LT
Name of Project:	WASHINGTON CO.LINE - SOUTH STR. + APPRS (S)		
County:	**Code:** 17 **Name:** CRAWFORD		
Sampled By:	D. DICKERSON	**Depth:**	0-5
Lab No.:	20161162	**AASHTO Class:**	A-2-4 (0)
Sample ID:	RV213	**Material Type (1 or 2):**	2
LATITUDE:		**LONGITUDE:**	

1. Testing Information:

Preconditioning - Permanent Strain > 5% (Y=Yes or N= No)	N
Testing - Permanent Strain > 5% (Y=Yes or N=No)	N
Number of Load Sequences Completed (0-15)	15

2. Specimen Information:

Specimen Diameter (in):	
Top	3.95
Middle	3.94
Bottom	3.95
Average	3.95
Membrane Thickness (in):	0.01
Height of Specimen, Cap and Base (in):	8
Height of Cap and Base (in):	0.00
Initial Length, Lo (in):	8
Initial Area, Ao (sq. in):	12.16
Initial Volume, AoLo (cu. in):	97.27

3. Soil Specimen Weight:

Weight of Wet Soil Used (g):	3171.90

4. Soil Properties:

Optimum Moisture Content (%):	13.8
Maximum Dry Density (pcf):	113.6
95% of MDD (pcf):	107.9
In-Situ Moisture Content (%):	N/A

5. Specimen Properties:

Wet Weight (g):	3171.90
Compaction Moisture content (%):	13.7
Compaction Wet Density (pcf):	124.24
Compaction Dry Density (pcf):	109.27
Moisture Content After Mr Test (%):	13.3

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

7. Resilient Modulus, Mr: 12679(Sc)^-0.30387(S3)^0.28324

8. Comments _____

9. Tested By: C.GARRETT **Date:** May 11, 2016

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT
MATERIALS DIVISION

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

Job No.	040622	**Material Code**	SSRVPS
Date Sampled:	5/11/16	**Station No.:**	290+00
Date Tested:	May 11, 2016	**Location:**	15'LT
Name of Project:	WASHINGTON CO.LINE - SOUTH STR. + APPRS (S)		
County:	**Code:** 17 **Name:** CRAWFORD		
Sampled By:	D. DICKERSON	**Depth:**	0-5
Lab No.:	20161162	**AASHTO Class:**	A-2-4 (0)
Sample ID:	RV213	**Material Type (1 or 2):**	2
LATITUDE:		**LONGITUDE:**	

PARAMETER	*Chamber Confining Pressure*	*Nominal Maximum Axial Stress*	*Actual Applied Max. Axial Load*	*Actual Applied Cyclic Load*	*Actual Applied Contact Load*	*Actual Applied Max. Axial Stress*	*Actual Applied Cyclic Stress*	*Actual Applied Contact Stress*	*Average Recov Def. LVDT 1 and 2*	*Resilient Strain*	*Resilient Modulus*
DESIGNATION	S_3	S_{cyclic}	P_{max}	P_{cyclic}	$P_{contact}$	S_{max}	S_{cyclic}	$S_{contact}$	H_{avg}	ε_r	M_r
UNIT	psi	psi	lbs	lbs	lbs	psi	psi	psi	in	in/in	psi
Sequence 1	6.0	2.0	25.0	22.3	2.8	2.1	1.8	0.2	0.00088	0.00011	16,745
Sequence 2	6.0	4.0	47.0	44.2	2.8	3.9	3.6	0.2	0.00192	0.00024	15,107
Sequence 3	6.0	6.0	69.3	65.7	3.6	5.7	5.4	0.3	0.00316	0.00039	13,697
Sequence 4	6.0	8.0	92.0	85.9	6.1	7.6	7.1	0.5	0.00482	0.00060	11,732
Sequence 5	6.0	10.0	113.8	105.2	8.5	9.4	8.7	0.7	0.00669	0.00084	10,347
Sequence 6	4.0	2.0	25.0	22.3	2.7	2.1	1.8	0.2	0.00098	0.00012	14,918
Sequence 7	4.0	4.0	46.5	43.8	2.7	3.8	3.6	0.2	0.00223	0.00028	12,887
Sequence 8	4.0	6.0	67.4	64.7	2.8	5.5	5.3	0.2	0.00371	0.00046	11,461
Sequence 9	4.0	8.0	89.8	84.7	5.2	7.4	7.0	0.4	0.00544	0.00068	10,246
Sequence 10	4.0	10.0	111.8	104.2	7.6	9.2	8.6	0.6	0.00735	0.00092	9,331
Sequence 11	2.0	2.0	24.7	22.0	2.7	2.0	1.8	0.2	0.00113	0.00014	12,799
Sequence 12	2.0	4.0	45.9	43.2	2.7	3.8	3.5	0.2	0.00260	0.00032	10,936
Sequence 13	2.0	6.0	66.0	63.3	2.7	5.4	5.2	0.2	0.00438	0.00055	9,516
Sequence 14	2.0	8.0	86.8	82.6	4.1	7.1	6.8	0.3	0.00633	0.00079	8,587
Sequence 15	2.0	10.0	108.5	101.8	6.7	8.9	8.4	0.6	0.00844	0.00105	7,938

TESTED BY C.GARRETT DATE May 11, 2016

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.	040622	**Material Code**	SSRVPS
Date Sampled:	5/11/16	**Station No.:**	290+00
Date Tested:	May 11, 2016	**Location:**	15'LT
Name of Project:	WASHINGTON CO.LINE - SOUTH STR. + APPRS (S)		
County:	**Code:** 17 **Name:** CRAWFORD		
Sampled By:	D. DICKERSON	**Depth:**	0-5
Lab No.:	20161162	**AASHTO Class:**	A-2-4 (0)
Sample ID:	RV213	**Material Type (1 or 2):**	2
LATITUDE:		**LONGITUDE:**	

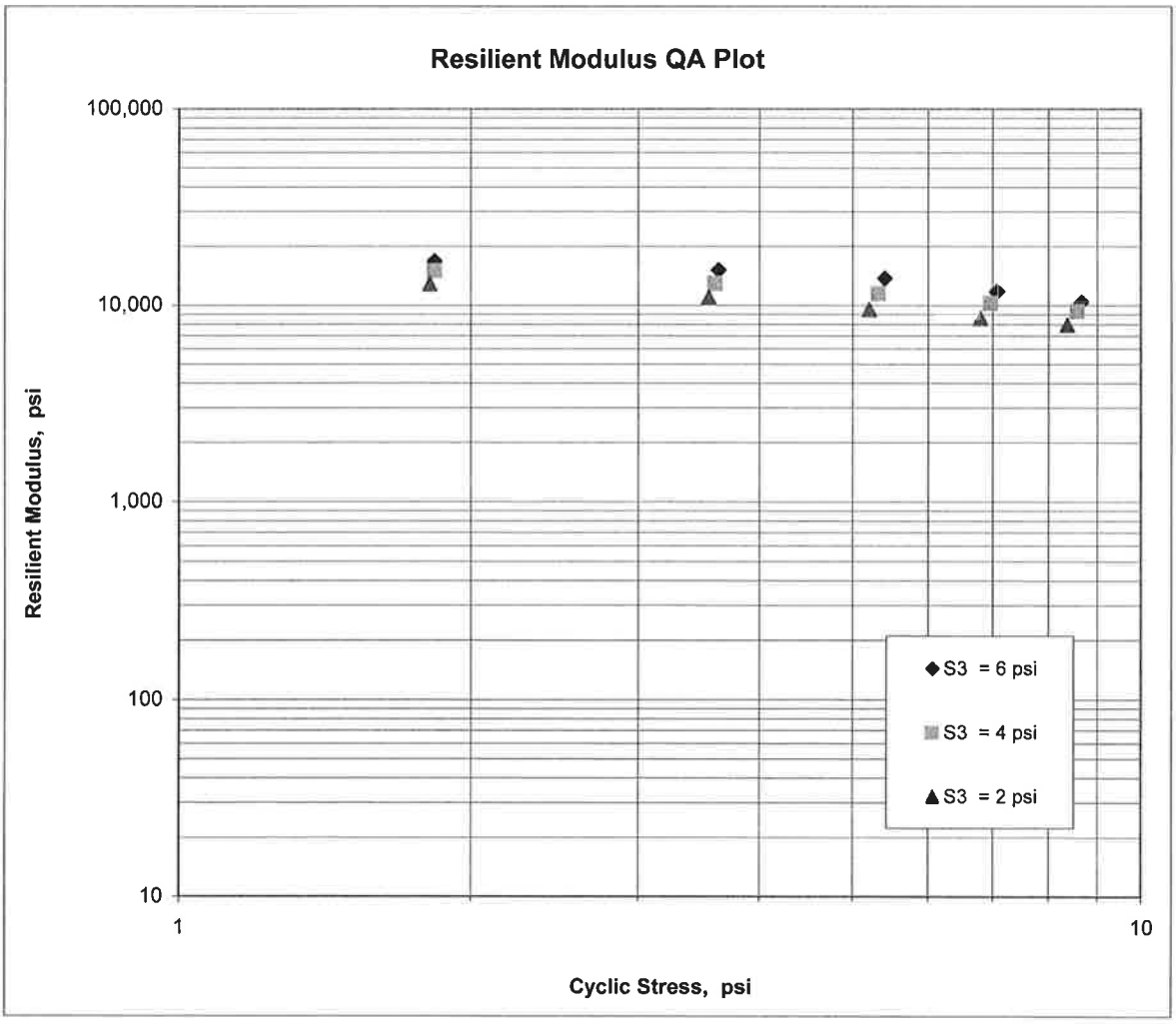
$$M_R = K1\,(S_C)^{K2}\,(S_3)^{K5}$$

K1 = 12,679

K2 = -0.30387

K5 = 0.28324

R^2 = 0.97



JOB: 040622

JOB NAME: WASHINGTON CO.LINE-SOUTH STRS.& APPRS.(S)

COUNTY NO. 17 **DATE TESTED** 5/2/2016

Arkansas State Highway Transporation Department

Materials Division

Michael Benson, Materials Engineer

STA.#	LOC.	DEPTH	COLOR	#4	#10	#40	#80	#200	L.L.	P.I.	SOIL CLASS	LAB #:	%MOISTURE
				S	I	E	V	E S					
017+00	15RT	0-5	BROWN	60	52	45	36	26	24	06	A-2-4(0)	RV210	
071+00	15LT	0-5	BROWN	77	72	67	59	48	25	03	A-4(0)	RV211	
178+00	15RT	0-5	BROWN	65	56	47	43	38	32	13	A-6(1)	RV212	
290+00	15LT	0-5	BROWN	57	49	44	41	34	25	09	A-2-4(0)	RV213	
017+00	05RT	0-5	BROWN	95	86	77	67	40	21	06	A-4(0)	S191	16.8
017+00	15RT	0-5	BROWN	99	94	86	70	50	29	13	A-6(3)	S192	18.1
031+00	05LT	0-5	GRAY	99	95	86	81	76	40	23	A-6(16)	S193	12.5
031+00	15LT	0-5	GRAY	98	93	80	75	71	37	19	A-6(12)	S194	11.5
063+00	05RT	0-5	RD/BR	98	94	90	79	60	23	09	A-4(2)	S195	15.3
063+00	15RT	0-5	BROWN	86	77	67	58	44	23	07	A-4(0)	S196	16.2
071+00	05LT	0-5	BROWN	96	89	83	74	55	22	07	A-4(1)	S197	11.9
071+00	15LT	0-5	BROWN	95	85	76	71	59	23	08	A-4(2)	S198	15.9
178+00	05RT	1-1.5Z	RD/BR	93	85	79	69	52	28	14	A-6(4)	S199	14.2
178+00	12RT	0-5	RED	89	75	66	62	49	22	07	A-4(1)	S200	12.4
178+00	15RT	0-5	BROWN	77	64	56	52	43	24	02	A-4(0)	S201	9.8
185+00	05LT	0-5	BROWN	86	69	58	52	32	ND	NP	A-2-4(0)	S202	11.4
185+00	12LT	0-.5Z	BROWN	78	61	47	39	25	21	03	A-1-B(0)	S203	
185+00	14LT	0-5	BROWN	88	80	71	62	41	25	06	A-4(0)	S204	15.3
284+00	05RT	0-5	RD/BR	96	90	84	76	60	25	10	A-4(3)	S205	15.5
284+00	11RT	0-5	RED	94	85	77	70	52	23	09	A-4(2)	S206	13
284+00	15RT	0-5	RD/BR	91	82	74	66	47	22	06	A-4(0)	S207	12
290+00	05LT	0-1.5Z	RD/BR	97	86	76	71	50	23	07	A-4(1)	S208	16.4
290+00	15LT	0-5	BROWN	97	95	90	86	81	37	16	A-6(12)	S209	13.3

comments: Z=AUGER REFUSAL

Monday, May 16, 2016

JOB: 040622
JOB NAME: WASHINGTON CO.LINE-SOUTH STRS.& APPRS.(S)

COUNTY NO. 17

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

DATE TESTED
5/3/2016

PAVEMENT SOUNDINGS

STA.#	LOC.				
017+00	15RT	ACHMSC	ACHMBC	CHIP SEAL	AGG.BASE CRS CL-7
		--	--	--	--
017+00	05RT	ACHMSC	ACHMBC	CHIP SEAL	AGG.BASE CRS CL-7
		5.5	1.0	--	3.0
031+00	05LT	ACHMSC	ACHMBC	CHIP SEAL	AGG.BASE CRS CL-7
		7.0	--	1.5	4.0
031+00	15LT	ACHMSC	ACHMBC	AGG.BASE CRS CL-5	
		--	--	--	
063+00	05RT	ACHMSC	ACHMBC	AGG.BASE CRS CL-5	
		6.5	1.5	5.0	
063+00	15RT	ACHMSC	ACHMBC	AGG.BASE CRS CL-5	
		--	--	--	
071+00	15LT	ACHMSC	ACHMBC	AGG.BASE CRS CL-7	
		--	--	--	
071+00	05LT	ACHMSC	ACHMBC	AGG.BASE CRS CL-7	
		7.75	2.0	7.0	
178+00	12RT	ACHMSC	AGG.BASE CRS CL-7		
		3.5	7.0		
178+00	15RT	ACHMSC	AGG.BASE CRS CL-7		
		--	--		
178+00	05RT	ACHMSC	ACHMBC	AGG.BASE CRS CL-7	
		4.0	1.5	6.0	
185+00	05LT	ACHMSC	AGG.BASE CRS CL-7		
		6.0	6.0		
185+00	12LT	ACHMSC	ACHMBC	AGG.BASE CRS CL-7	
		2.75	.75	7.0	
185+00	14LT	ACHMSC	ACHMBC	AGG.BASE CRS CL-7	
		--	--	--	
284+00	05RT	ACHMSC	ACHMBC	AGG.BASE CRS CL-7	
		4.5	--	8.0	
284+00	11RT	ACHMSC	ACHMBC	AGG.BASE CRS CL-5	AGG.BASE CRS CL-7
		2.5	2.0	--	7.0
284+00	15RT	ACHMSC	ACHMBC	AGG.BASE CRS CL-5	AGG.BASE CRS CL-7
		--	--	--	--

comments: Z=AUGER REFUSAL

Monday, May 16, 2016

STA.#	LOC.	PAVEMENT SOUNDINGS			
290+00	05LT	ACHMSC	ACHMBC	AGG.BASE CRS CL-5	AGG.BASE CRS CL-7
		3.5	--	**6.0**	--

comments: Z=AUGER REFUSAL

Monday, May 16, 2016

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

DATE - 05/09/16
JOB NUMBER - 040622
FEDERAL AID NO.- TO BE ASSIGNED
PURPOSE - SOIL SURVEY SAMPLE
SPEC. REMARKS - NO SPECIFICATION CHECK
SUPPLIER NAME - STATE
SEQUENCE NO. - 1
MATERIAL CODE - SSRVPS
SPEC. YEAR - 2014
SUPPLIER ID. - 1
COUNTY/STATE - 17
DISTRICT NO. - 04
NAME OF PROJECT - WASHINGTON CO.LINE-SOUTH STRS.& APPRS.(S)
PROJECT ENGINEER - NOT APPLICABLE
PIT/QUARRY - ARKANSAS
LOCATION - CRAWFORD, COUNTY
SAMPLED BY - CHRISTENBERRY
SAMPLE FROM - TEST HOLE
DATE SAMPLED - 04/19/16
DATE RECEIVED - 04/25/16
DATE TESTED - 05/03/16
MATERIAL DESC. - SOIL SURVEY - R VALUE- PAVEMENT SOUNDINGS

LAB NUMBER	20161140	20161141	20161142
SAMPLE ID	S191	S192	S193
TEST STATUS	INFORMATION ONLY	INFORMATION ONLY	INFORMATION ONLY
STATION	017+00	017+00	031+00
LOCATION	05RT	15RT	05LT
DEPTH IN FEET	0-5	0-5	0-5
MAT'L COLOR	BROWN	BROWN	GRAY
MAT'L TYPE			
LATITUDE DEG-MIN-SEC	35 42 27.40	35 42 27.40	35 42 16.00
LONGITUDE DEG-MIN-SEC	94 29 .60	94 29 .70	94 28 53.80
% PASSING 2 IN.			
1 1/2 IN.			
3/4 IN.	100	100	
3/8 IN.	98	99	100
NO. 4	95	99	99
NO. 10	86	94	95
NO. 40	77	86	86
NO. 80	67	70	81
NO. 200	40	50	76
LIQUID LIMIT	21	29	40
PLASTICITY INDEX	06	13	23
AASHTO SOIL	A-4(0)	A-6(3)	A-6(16)
UNIFIED SOIL			
% MOISTURE CONTENT	16.8	18.1	12.5
ACHMSC (IN)	5.5	--	7.0
ACHMBC (IN)	1.0	--	--
CHIP SEAL (IN)	--	--	1.5
AGG.BASE CRS CL-7 (IN)	3.0	--	4.0

REMARKS - 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 - 05/09/16
JOB NUMBER - 040622
FEDERAL AID NO.- TO BE ASSIGNED
PURPOSE - SOIL SURVEY SAMPLE
SPEC. REMARKS - NO SPECIFICATION CHECK
SUPPLIER NAME - STATE
SEQUENCE NO. - 2
MATERIAL CODE - SSRVPS
SPEC. YEAR - 2014
SUPPLIER ID. - 1
COUNTY/STATE - 17
DISTRICT NO. - 04
NAME OF PROJECT - WASHINGTON CO.LINE-SOUTH STRS.& APPRS.(S)
PROJECT ENGINEER - NOT APPLICABLE
PIT/QUARRY - ARKANSAS
LOCATION - CRAWFORD, COUNTY
SAMPLED BY - CHRISTENBERRY
SAMPLE FROM - TEST HOLE
DATE SAMPLED - 04/19/16
DATE RECEIVED - 04/25/16
DATE TESTED - 05/03/16
MATERIAL DESC. - SOIL SURVEY - R VALUE- PAVEMENT SOUNDINGS

LAB NUMBER	20161143	20161144	20161145
SAMPLE ID	S194	S195	S196
TEST STATUS	INFORMATION ONLY	INFORMATION ONLY	INFORMATION ONLY
STATION	031+00	063+00	063+00
LOCATION	15LT	05RT	15RT
DEPTH IN FEET	0-5	0-5	0-5
MAT'L COLOR	GRAY	RD/BR	BROWN
MAT'L TYPE			
LATITUDE DEG-MIN-SEC	35 42 16.00	35 45 28.20	35 45 28.30
LONGITUDE DEG-MIN-SEC	94 28 54.00	94 28 15.30	94 28 15.40
% PASSING 2 IN.			
1 1/2 IN.			
3/4 IN.			100
3/8 IN.	100	100	95
NO. 4	98	98	86
NO. 10	93	94	77
NO. 40	80	90	67
NO. 80	75	79	58
NO. 200	71	60	44
LIQUID LIMIT	37	23	23
PLASTICITY INDEX	19	09	07
AASHTO SOIL	A-6(12)	A-4(2)	A-4(0)
UNIFIED SOIL			
% MOISTURE CONTENT	11.5	15.3	16.2
ACHMSC (IN)	--	6.5	--
ACHMBC (IN)	--	1.5	--
AGG.BASE CRS CL-5 (IN)	--	5.0	--

REMARKS - 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	- 05/09/16	SEQUENCE NO.	- 3
JOB NUMBER	- 040622	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	- 17
SUPPLIER NAME	- STATE	DISTRICT NO.	- 04
NAME OF PROJECT	- WASHINGTON CO.LINE-SOUTH STRS.& APPRS.(S)		
PROJECT ENGINEER	- NOT APPLICABLE		
PIT/QUARRY	- ARKANSAS		
LOCATION	- CRAWFORD, COUNTY	DATE SAMPLED	- 04/19/16
SAMPLED BY	- CHRISTENBERRY	DATE RECEIVED	- 04/25/16
SAMPLE FROM	- TEST HOLE	DATE TESTED	- 05/03/16

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

LAB NUMBER	20161146	20161147	20161148
SAMPLE ID	S197	S198	S199
TEST STATUS	INFORMATION ONLY	INFORMATION ONLY	INFORMATION ONLY
STATION	071+00	071+00	178+00
LOCATION	05LT	15LT	05RT
DEPTH IN FEET	0-5	0-5	1-1.5Z
MAT'L COLOR	BROWN	BROWN	RD/BR
MAT'L TYPE			
LATITUDE DEG-MIN-SEC	35 45 19.60	35 45 19.50	35 41 35.10
LONGITUDE DEG-MIN-SEC	94 28 16.20	94 28 16.10	94 28 7.80
% PASSING 2 IN.			
1 1/2 IN.			
3/4 IN.			100
3/8 IN.	100	100	99
NO. 4	96	95	93
NO. 10	89	85	85
NO. 40	83	76	79
NO. 80	74	71	69
NO. 200	55	59	52
LIQUID LIMIT	22	23	28
PLASTICITY INDEX	07	08	14
AASHTO SOIL	A-4(1)	A-4(2)	A-6(4)
UNIFIED SOIL			
% MOISTURE CONTENT	11.9	15.9	14.2
ACHMSC (IN)	7.75	--	4.0
ACHMBC (IN)	2.0	--	1.5
AGG.BASE CRS CL-7 (IN)	7.0	--	6.0

REMARKS - 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	- 05/09/16	SEQUENCE NO.	- 4
JOB NUMBER	- 040622	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	- 17
SUPPLIER NAME	- STATE	DISTRICT NO.	- 04

NAME OF PROJECT - WASHINGTON CO.LINE-SOUTH STRS.& APPRS.(S)
PROJECT ENGINEER - NOT APPLICABLE
PIT/QUARRY - ARKANSAS

LOCATION	- CRAWFORD, COUNTY	DATE SAMPLED	- 04/19/16
SAMPLED BY	- CHRISTENBERRY	DATE RECEIVED	- 04/25/16
SAMPLE FROM	- TEST HOLE	DATE TESTED	- 05/03/16

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

LAB NUMBER	- 20161149	- 20161150	- 20161151
SAMPLE ID	- S200	- S201	- S202
TEST STATUS	- INFORMATION ONLY	- INFORMATION ONLY	- INFORMATION ONLY
STATION	- 178+00	- 178+00	- 185+00
LOCATION	- 12RT	- 15RT	- 05LT
DEPTH IN FEET	- 0-5	- 0-5	- 0-5
MAT'L COLOR	- RED	- BROWN	- BROWN
MAT'L TYPE	-	-	-
LATITUDE DEG-MIN-SEC	- 35 41 35.00	- 35 41 35.00	- 35 41 33.50
LONGITUDE DEG-MIN-SEC	- 94 28 7.90	94 28 7.90	94 27 59.60
% PASSING 2 IN.	-	-	-
1 1/2 IN.	-	-	-
3/4 IN.	- 100	- 100	- 100
3/8 IN.	- 99	- 91	- 95
NO. 4	- 89	- 77	- 86
NO. 10	- 75	- 64	- 69
NO. 40	- 66	- 56	- 58
NO. 80	- 62	- 52	- 52
NO. 200	- 49	43	32
LIQUID LIMIT	- 22	- 24	- ND
PLASTICITY INDEX	- 07	- 02	- NP
AASHTO SOIL	- A-4(1)	- A-4(0)	- A-2-4(0)
UNIFIED SOIL	-	-	-
% MOISTURE CONTENT	- 12.4	9.8	11.4
ACHMSC (IN)	- 3.5	- --	- 6.0
AGG.BASE CRS CL-7 (IN)	- 7.0	- --	- 6.0

REMARKS - 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 - 05/09/16
JOB NUMBER - 040622
FEDERAL AID NO.- TO BE ASSIGNED
PURPOSE - SOIL SURVEY SAMPLE
SPEC. REMARKS - NO SPECIFICATION CHECK
SUPPLIER NAME - STATE
SEQUENCE NO. - 5
MATERIAL CODE - SSRVPS
SPEC. YEAR - 2014
SUPPLIER ID. - 1
COUNTY/STATE - 17
DISTRICT NO. - 04
NAME OF PROJECT - WASHINGTON CO.LINE-SOUTH STRS.& APPRS.(S)
PROJECT ENGINEER - NOT APPLICABLE
PIT/QUARRY - ARKANSAS
LOCATION - CRAWFORD, COUNTY
SAMPLED BY - CHRISTENBERRY
SAMPLE FROM - TEST HOLE
DATE SAMPLED - 04/19/16
DATE RECEIVED - 04/25/16
DATE TESTED - 05/02/16
MATERIAL DESC. - SOIL SURVEY - R VALUE- PAVEMENT SOUNDINGS

LAB NUMBER	20161152	20161153	20161154
SAMPLE ID	S203	S204	S205
TEST STATUS	INFORMATION ONLY	INFORMATION ONLY	INFORMATION ONLY
STATION	185+00	185+00	284+00
LOCATION	12LT	14LT	05RT
DEPTH IN FEET	0-.5Z	0-5	0-5
MAT'L COLOR	BROWN	BROWN	RD/BR
MAT'L TYPE			
LATITUDE DEG-MIN-SEC	35 41 33.60	35 41 33.60	35 40 46.30
LONGITUDE DEG-MIN-SEC	94 27 59.50	94 27 59.50	94 26 34.10
% PASSING 2 IN.			
1 1/2 IN.			
3/4 IN.	100	100	
3/8 IN.	96	94	100
NO. 4	78	88	96
NO. 10	61	80	90
NO. 40	47	71	84
NO. 80	39	62	76
NO. 200	25	41	60
LIQUID LIMIT	21	25	25
PLASTICITY INDEX	03	06	10
AASHTO SOIL	A-1-B(0)	A-4(0)	A-4(3)
UNIFIED SOIL			
% MOISTURE CONTENT		15.3	15.5
ACHMSC (IN)	2.75	--	4.5
ACHMBC (IN)	.75	--	--
AGG.BASE CRS CL-7 (IN)	7.0	--	8.0

REMARKS - 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 - 05/09/16
JOB NUMBER - 040622
FEDERAL AID NO.- TO BE ASSIGNED
PURPOSE - SOIL SURVEY SAMPLE
SPEC. REMARKS - NO SPECIFICATION CHECK
SUPPLIER NAME - STATE
SEQUENCE NO. - 6
MATERIAL CODE - SSRVPS
SPEC. YEAR - 2014
SUPPLIER ID. - 1
COUNTY/STATE - 17
DISTRICT NO. - 04
NAME OF PROJECT - WASHINGTON CO.LINE-SOUTH STRS.& APPRS.(S)
PROJECT ENGINEER - NOT APPLICABLE
PIT/QUARRY - ARKANSAS
LOCATION - CRAWFORD, COUNTY
SAMPLED BY - CHRISTENBERRY
SAMPLE FROM - TEST HOLE
DATE SAMPLED - 04/19/16
DATE RECEIVED - 04/25/16
DATE TESTED - 05/02/16
MATERIAL DESC. - SOIL SURVEY - R VALUE- PAVEMENT SOUNDINGS

LAB NUMBER	20161155	20161156	20161157
SAMPLE ID	S206	S207	S208
TEST STATUS	INFORMATION ONLY	INFORMATION ONLY	INFORMATION ONLY
STATION	284+00	284+00	290+00
LOCATION	11RT	15RT	05LT
DEPTH IN FEET	0-5	0-5	0-1.5Z
MAT'L COLOR	RED	RD/BR	RD/BR
MAT'L TYPE			
LATITUDE DEG-MIN-SEC	35 40 46.20	35 40 46.10	35 40 43.00
LONGITUDE DEG-MIN-SEC	94 26 34.20	94 26 34.20	94 26 27.40
% PASSING 2 IN.			
1 1/2 IN.			
3/4 IN.		100	
3/8 IN.	100	99	100
NO. 4	94	91	97
NO. 10	85	82	86
NO. 40	77	74	76
NO. 80	70	66	71
NO. 200	52	47	50
LIQUID LIMIT	23	22	23
PLASTICITY INDEX	09	06	07
AASHTO SOIL	A-4(2)	A-4(0)	A-4(1)
UNIFIED SOIL			
% MOISTURE CONTENT	13.0	12.0	16.4
ACHMSC (IN)	2.5	--	3.5
ACHMBC (IN)	2.0	--	--
AGG.BASE CRS CL-5 (IN)	--	--	6.0
AGG.BASE CRS CL-7 (IN)	7.0	--	--

REMARKS - 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	- 05/09/16	SEQUENCE NO.	- 7
JOB NUMBER	- 040622	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	- 17
SUPPLIER NAME	- STATE	DISTRICT NO.	- 04
NAME OF PROJECT	- WASHINGTON CO.LINE-SOUTH STRS.& APPRS.(S)		
PROJECT ENGINEER	- NOT APPLICABLE		
PIT/QUARRY	- ARKANSAS		
LOCATION	- CRAWFORD, COUNTY	DATE SAMPLED	- 04/19/16
SAMPLED BY	- CHRISTENBERRY	DATE RECEIVED	- 04/25/16
SAMPLE FROM	- TEST HOLE	DATE TESTED	- 05/02/16

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

LAB NUMBER	20161158
SAMPLE ID	S209
TEST STATUS	INFORMATION ONLY
STATION	290+00
LOCATION	15LT
DEPTH IN FEET	0-5
MAT'L COLOR	BROWN
MAT'L TYPE	
LATITUDE DEG-MIN-SEC	35 40 43.10
LONGITUDE DEG-MIN-SEC	94 26 27.30
% PASSING 2 IN.	
1 1/2 IN.	
3/4 IN.	
3/8 IN.	100
NO. 4	97
NO. 10	95
NO. 40	90
NO. 80	86
NO. 200	81
LIQUID LIMIT	37
PLASTICITY INDEX	16
AASHTO SOIL	A-6(12)
UNIFIED SOIL	
% MOISTURE CONTENT	13.3

REMARKS - 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	- 05/09/16	SEQUENCE NO.	- 1
JOB NUMBER	- 040622	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	- 17
SUPPLIER NAME	- STATE	DISTRICT NO.	- 04
NAME OF PROJECT	- WASHINGTON CO.LINE-SOUTH STRS.& APPRS.(S)		
PROJECT ENGINEER	- NOT APPLICABLE		
PIT/QUARRY	- ARKANSAS		
LOCATION	- CRAWFORD, COUNTY	DATE SAMPLED	- 04/19/16
SAMPLED BY	- CHRISTENBERRY	DATE RECEIVED	- 04/25/16
SAMPLE FROM	- TEST HOLE	DATE TESTED	- 05/02/16

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

LAB NUMBER	20161159	20161160	20161161
SAMPLE ID	RV210	RV211	RV212
TEST STATUS	INFORMATION ONLY	INFORMATION ONLY	INFORMATION ONLY
STATION	017+00	071+00	178+00
LOCATION	15RT	15LT	15RT
DEPTH IN FEET	0-5	0-5	0-5
MAT'L COLOR	BROWN	BROWN	BROWN
MAT'L TYPE			
LATITUDE DEG-MIN-SEC	35 42 27.40	35 45 19.50	35 41 35.00
LONGITUDE DEG-MIN-SEC	94 29 .70	94 28 16.10	94 28 7.90
% PASSING 2 IN.			
1 1/2 IN.		100	
3/4 IN.	100	93	100
3/8 IN.	78	86	79
NO. 4	60	77	65
NO. 10	52	72	56
NO. 40	45	67	47
NO. 80	36	59	43
NO. 200	26	48	38
LIQUID LIMIT	24	25	32
PLASTICITY INDEX	06	03	13
AASHTO SOIL	A-2-4(0)	A-4(0)	A-6(1)
UNIFIED SOIL			
% MOISTURE CONTENT			

REMARKS -

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	- 05/09/16	SEQUENCE NO.	- 2
JOB NUMBER	- 040622	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	- 17
SUPPLIER NAME	- STATE	DISTRICT NO.	- 04

NAME OF PROJECT - WASHINGTON CO.LINE-SOUTH STRS.& APPRS.(S)
PROJECT ENGINEER - NOT APPLICABLE
PIT/QUARRY - ARKANSAS

LOCATION	- CRAWFORD, COUNTY	DATE SAMPLED	- 04/19/16
SAMPLED BY	- CHRISTENBERRY	DATE RECEIVED	- 04/25/16
SAMPLE FROM	- TEST HOLE	DATE TESTED	- 05/02/16

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

LAB NUMBER	20161162
SAMPLE ID	RV213
TEST STATUS	INFORMATION ONLY
STATION	290+00
LOCATION	15LT
DEPTH IN FEET	0-5
MAT'L COLOR	BROWN
MAT'L TYPE	
LATITUDE DEG-MIN-SEC	35 40 43.10
LONGITUDE DEG-MIN-SEC	94 26 27.30

% PASSING 2 IN.	
1 1/2 IN.	
3/4 IN.	100
3/8 IN.	81
NO. 4	57
NO. 10	49
NO. 40	44
NO. 80	41
NO. 200	34

LIQUID LIMIT	25
PLASTICITY INDEX	09
AASHTO SOIL	A-2-4(0)
UNIFIED SOIL	
% MOISTURE CONTENT	

REMARKS -

AASHTO TESTS : T24 T88 T89 T90 T265