#### ARKANSAS DEPARTMENT OF TRANSPORTATION



#### SUBSURFACE INVESTIGATION

STATE JOB NO.	STATE JOB NO										
FEDERAL AID PROJE	ECT NO. H	ISIP-0004(66)									
	HWY. 12/HWY. 43	INTERS. SAFETY IM	PVTS. (S)								
STATE HIGHWAY	12 & 43	SECTION	0 & 1								
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

June 22, 2017

TO:

Mr. Trinity Smith, Engineer of Roadway Design

SUBJECT:

Job No. 090445

Hwy. 12/Hwy. 43 Inters. Safety Impvts. (S)

Routes 12 & 43 Sections 1 & 0

**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 constructing a roundabout at the intersection of Highway 12 and Highway 43. Samples were obtained in the existing travel lanes and ditch line. There were no paved shoulders within the project limits.

Based on laboratory results of samples obtained, the subgrade soils consist primarily of moderately plasticity cherty clay. Cross sections are not currently available, but it is assumed 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 several locations within the project limits. The locations and depths are listed in Table 1 below.

Table 1 Location and Depth of Rock

Station	Location from Centerline (ft.)	Depth (ft.)
13+00	6, 18 Lt.	3.5, 4.0
58+00	6, 18, 21 Rt.	4.0, 4.0, 4.0

Additional earthwork recommendations will be made upon request when plans are further developed and cross sections are 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 Gravette.
- 2. Asphalt Concrete Hot Mix

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

Michael C. Benson Materials Engineer

MCB:pt:bjj Attachment

CC:

State Constr. Eng. – Master File Copy

District 9 Engineer

System Information and Research Div.

G. C. File

# MICHAEL BENSON, MATERIALS ENGINEER \*\*\* SOIL SURVEY STRENGTH TEST REPORT \*\*\*

DATE - 06/15/2017

SEQUENCE NO. - 1

JOB NUMBER - 090445

MATERIAL CODE - SSRV

SPEC. YEAR - 2014

SUPPLIER ID. - 1

COUNTY/STATE - 04

DISTRICT NO. - 09

JOB NAME - HWY.12/HWY.43 INTERS. SAFETY IMPVTS.(S)

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

BEGIN JOB - END JOB 6

RESILIENT MODULUS

STA. 58+00 8537

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REMARKS -

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AASHTO TESTS : T190

# ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT MATERIALS DIVISION

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

Job No.	090445	Material Code	SSRVPS
Date Sampled:	5/15/17	Station No.:	58+00
Date Tested:	June 12, 2017	Location:	21RT
Name of Project:	HWY. 12/HWY. 43 INTERS. SAFETY IMPVTS. (S)		
County:	Code: 4 Name: BENTON		
Sampled By:	THORNTON/TAYLOR	Depth:	0-5
Lab No.:	20171661	AASHTO Class:	A-6(20)
Sample ID:	RV379	Material Type (1 or 2):	
LATITUDE:		LONGITUDE:	
1. Testing Inform	nation:		
	Preconditioning - Permanent Strain > 5% (Y=Ye	s or N= No)	N
	Testing - Permanent Strain > 5% (Y=Yes or N=N	0)	N
	Number of Load Sequences Completed (0-15)		15
2. Specimen Info	rmation:		
	Specimen Diameter (in):		
	Тор		3.96
	Middle		3.95
	Bottom		3.94
	Average		3.95
	Membrane Thickness (in):		0.01
	Height of Specimen, Cap and Base (in):		8.02
	Height of Cap and Base (in):		0.00
	Initial Length, Lo (in):		
			8.02
	Initial Area, Ao (sq. in):		12.18
	Initial Volume, AoLo (cu. in):		97.68
3. Soil Specimen			
	Weight of Wet Soil Used (g):		3152.90
4. Soil Properties	<b>8:</b>		
•	Optimum Moisture Content (%):		17.2
	Maximum Dry Density (pcf):		107
	95% of MDD (pcf):		101.7
	In-Situ Moisture Content (%):		N/A
5. Specimen Prop			
	Wet Weight (g):		3152.90
	Compaction Moisture content (%):		17.7
	Compaction Wet Density (pcf):		122.98
	Compaction Dry Density (pcf):		104.49
	Moisture Content After Mr Test (%):		17.3
6. Quick Shear To	est (Y=Yes, N=No, N/A=Not Applicable):		#VALUE!
7. Resilient Modu	ulus, Mr:	10620(Sc	c)^-0.18803(S3)^0.26341
8. Comments			
9. Tested By:	GW Date	e: June 12, 2017	

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

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

SSRVPS 58+00 21RT Material Code Station No.: Location: HWY. 12/HWY. 43 INTERS. SAFETY IMPVTS. (S) June 12, 2017 5/15/17 090445 Date Sampled: Date Tested: Job No.

BENTON Name: THORNTON/TAYLOR Code: 4 Name of Project: County:

Material Type (1 or 2): 2 LONGITUDE: **AASHTO Class:** Depth: 20171661 RV379 Sampled By: LATITUDE: Sample ID: Lab No.:

A-6(20)

0-5

		_	-													_				
Resilient				Σ̈́	psi	15,130	14,347	13,068	11,529	10,506	13,133	12,115	11,268	10,578	9,834	10,891	10,143	9,612	8,948	0 527
Resilient Strain				ຜັ	in/in	0.00012	0.00026	0.00042	0.00062	0.00084	0.00014	0.00030	0.00048	0.00067	0.00089	0.00017	0.00036	0.00056	0.00078	0 00101
Average Recov Def.	LVDT 1	and 2		Havg	i	0.00098	0.00205	0.00335	0.00498	0.00673	0.00113	0.00241	0.00385	0.00540	0.00717	0.00135	0.00285	0.00445	0.00627	0 00 0
Actual Applied	Contact	Stress		Scontact	psi	0.2	0.2	0.3	0.5	0.7	0.2	0.2	0.2	0.4	9.0	0.2	0.2	0.2	0.3	20
Actual Applied	Cyclic	Stress		Scyclic	psi	1.9	3.7	5.5	7.2	8.8	1.8	3.6	5.4	7.1	8.8	1.8	3.6	5.3	7.0	ν 2
Actual Applied	Мах.	Axial	Stress	S <sub>max</sub>	psi	2.1	3.9	5.7	7.7	9.5	2.1	3.9	5.6	7.5	9.4	2.1	3.8	5.6	7.3	0.0
Actual Applied	Contact	Load		Pcontact	sql	2.7	2.8	3.6	0.9	8.5	2.8	2.8	2.8	5.1	7.6	2.8	2.7	2.7	4.2	6.7
Actual Applied	Cyclic Load			P <sub>cyclic</sub>	sql	22.5	44.7	66.4	87.1	107.4	22.5	44.3	65.8	86.7	107.1	22.4	43.9	65.0	85.2	105 F
Actual Applied	~	Load		Р <sub>шах</sub>	sql	25.3	47.5	70.0	93.2	115.9	25.3	47.0	68.6	91.9	114.7	25.1	46.6	8.79	89.4	1121
Nominal Maximum	Axial	Stress		Scyclic	psi	2.0	4.0	0.9	8.0	10.0	2.0	4.0	0.9	8.0	10.0	2.0	4.0	6.0	8.0	10.0
Chamber Confining	Pressure			Š	psi	0.9	6.0	0.9	0.9	0.9	4.0	4.0	4.0	4.0	4.0	2.0	2.0	2.0	2.0	2.0
	PARAMETER			DESIGNATION	UNIT	Sequence 1	Sequence 2	Sequence 3	Sequence 4	Sequence 5	Sequence 6	Sequence 7	Sequence 8	Sednence 9	Sequence 10	Sequence 11	Sequence 12	Sequence 13	Sequence 14	Sequence 15

June 12, 2017	
DATE	DATE
GW	
TESTED BY	REVIEWED BY

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

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

Job No.

090445

**Material Code SSRVPS** 

Date Sampled:

5/15/17

Station No.: 58+00

Date Tested:

Location: 21RT

Name of Project: HWY. 12/HWY. 43 INTERS. SAFETY IMPVTS. (S)

June 12, 2017

County:

Code: 4

Name: BENTON

Sampled By:

THORNTON/TAYLOR

**Depth:** 0-5

Lab No.:

20171661

AASHTO Class: A-6(20)

Sample ID:

**RV379** 

Material Type (1 or 2): 2

LATITUDE:

LONGITUDE:

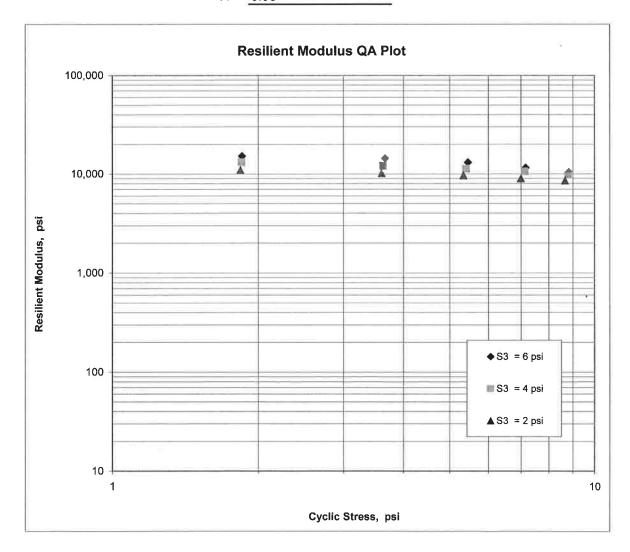
$$M_R = K1 (S_C)^{K2} (S_3)^{K5}$$

K1 = 10,620

K2 = -0.18803

K5 = 0.26341

 $R^2 = 0.95$ 



06 RT 0-4Z

18 RT 0-4Z

06 LT 0-5

18 LT 0-5

58+00

58+00

63+00

63+00

24

17

11

6

35

28

23

JOB NAME: HWY.12/HWY.43 INTERS. SAFETY IMPVTS.(S)

**BROWN** 

**BROWN** 

**BROWN** 

**BROWN** 

Materials Division

A-7-6(17)

A-6(10)

A-6(5)

A-4(2)

S375

S376

S377

S378

19.1

20.5

13.8

19.9

COUN	TY NO.	4	DATE TESTEL	)	6/6/2	2017			M	ichael .	Benson, Materia	ls Engine	ee <b>r</b>
STA.#	LOC.	DEPTH	COLOR	#4	#10	#40	#80	#200 E S	L.L.	<i>P.I.</i>	SOIL CLASS	<i>LAB</i> #:	%MOISTURE
58+00	21 RT	0-4Z	BROWN	100			166.	91	39	22	A-6(20)	RV379	
07+00	06 RT	0-5	BROWN	95	86	78	74	70	30	15	A-6(8)	S371	20
07+00	18 RT	0-5	BROWN	95	88	76	70	65	30	15	A-6(7)	S372	19.7
13+00	06 LT	0-3.5Z	BROWN	96	85	67	62	56	23	9	A-4(2)	S373	13.6
13+00	18 LT	0-4Z	BROWN	90	79	66	60	55	40	21	A-6(8)	S374	14.8

83 80 77

75

86

JOB: JOB NAME: HWY.12/HWY.43 INTERS. SAFETY IMPVTS.(S) 090445

Arkansas State Highway Transporation Department Materials Division

*DATE TESTED* 6/6/2017

COUNTY NO. 4

Michael Benson, Materials Engineer

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STA.# LOC	LOC.			P
07+00	06 RT	ACHMSC.	ACHMBC	AGG BASE CRS CL-7
		3.75X	l	7.0
07+00	18 RT	ACHMSC.	ACHMBC	AGG BASE CRS CL-7
		I	1	1
13+00	06 LT	ACHMSC.	ACHMBC	AGG BASE CRS CL-7
		3.5W	1	8.0
13+00	18 LT	ACHMSC	ACHMBC	AGG BASE CRS CL-7
		1		1
58+00	06 RT	ACHMSC	ACHMBC	AGG BASE CRS CL-7
		1.0	3.0	8.0
58+00	18 RT	ACHMSC	ACHMBC	AGG BASE CRS CL-7
		1	1	1
63+00	06 LT	ACHMSC	ACHMBC	AGG BASE CRS CL-7
		1.25	2.75	8.0
63+00	18 LT	ACHMSC	ACHMBC	AGG BASE CRS CL-7
		25	1	1

#### MICHAEL BENSON, MATERIALS ENGINEER

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

DATE - 06/ JOB NUMBER - 090 FEDERAL AID NO TO PURPOSE - SOI SPEC. REMARKS - NO SUPPLIER NAME - STA NAME OF PROJECT - H PROJECT ENGINEER - N PIT/QUARRY - ARKAN LOCATION - BENTO SAMPLED BY - THORNT SAMPLE FROM - TEST MATERIAL DESC SOI	445 BE ASSIC L SURVEY SPECIFIC TE WY.12/HV OT APPLI SAS N COUNTY ON HOLE	SAMPLE CATION CHECK  YY.43 INTERS CABLE	K S. SAFETY		SPEC. YEAR SUPPLIER COUNTY/ST DISTRICT  DATE SAME DATE RECEDATE TEST	CODE - SSRVPS  R - 2014  ID 1  PATE - 04  NO 09  PLED - 05/15/17  EIVED - 05/22/17
LAB NUMBER  SAMPLE ID  TEST STATUS  STATION  LOCATION  DEPTH IN FEET  MAT'L COLOR  MAT'L TYPE  LATITUDE DEG-MIN-	SEC -	07+00 06 RT 0-5 BROWN 36 16 3	N ONLY -	07+00 18 RT 0-5 BROWN	- ON ONLY - - - - - - - - - - - -	20171655 S373 INFORMATION ONLY 13+00 06 LT 0-3.5Z BROWN 36 16 38.40
3/4 3/8 NO. NO. NO.	IN IN IN IN	94 34 2 100 95 86 78 74 70	5.30		25.20	94 34 25.30 100 96 85 67 62 56
LIQUID LIMIT PLASTICITY INDEX AASHTO SOIL UNIFIED SOIL % MOISTURE CONTENT ACHMSC. ACHMBC AGG BASE CRS CL-7	(IN) - (IN) - - -	30 15 A-6(8) 20.0 3.75X  7.0		30 15 A-6(7) 19.7		23 9 A-4(2) 13.6 3.5W  8.0

REMARKS - X=STRIPPED, Z=AUGER REFUSAL

#### MICHAEL BENSON, MATERIALS ENGINEER

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

DATE - 06/19/17 JOB NUMBER - 090445 FEDERAL AID NO TO BE ASS PURPOSE - SOIL SURV SPEC. REMARKS - NO SPECIN SUPPLIER NAME - STATE NAME OF PROJECT - HWY.12 PROJECT ENGINEER - NOT APP PIT/QUARRY - ARKANSAS LOCATION - BENTON COUN SAMPLED BY - THORNTON SAMPLE FROM - TEST HOLE MATERIAL DESC SOIL SUR	/EY SAMPLE FICATION CHECK /HWY.43 INTERS. SAFI PLICABLE NTY		SPEC. YEAR SUPPLIER OF COUNTY/STATE DISTRICT NOT THE COUNTY STATE DATE SAMPLE DATE RECE DATE TEST.	CODE - SSRVPS R - 2014 ID 1 ATE - 04 NO 09  LED - 05/15/17 IVED - 05/22/17
LAB NUMBER -	20171656	- 20171657		20171658
SAMPLE ID	- \$374	S375		S376
	- INFORMATION ONLY			
	- 13+00	58+00		58+00
LOCATION	- 18 LT	06 RT	=	18 RT
DEPTH IN FEET -	- 0-4Z	0-4Z	-	0-4Z
MAT'L COLOR - MAT'L TYPE -	- BROWN	BROWN	4)	BROWN
LATITUDE DEG-MIN-SEC -	- 36 16 38.40	= 36 16 3	35.60	36 16 35.60
LONGITUDE DEG-MIN-SEC			28.00	94 34 27.90
% PASSING 2 IN 1 1/2 IN 3/4 IN 3/8 IN NO. 4 - NO. 10 - NO. 40 - NO. 80 - NO. 200 -	- 100 - 96 - 90 - 79 - 66	100 98 92 83 80		100 99 92 83 77 74 70
LIQUID LIMIT -	- 40	41	9	35
PLASTICITY INDEX		- 24	21	17
AASHTO SOIL -	- A-6(8)	A-7-6(17)	-	A-6(10)
UNIFIED SOIL - % MOISTURE CONTENT -	14.8	19.1	8	20.5
ACHMSC (IN) -	***	- 1.0		
ACHMBC (IN)		3.0	-	
AGG BASE CRS CL-7 (IN)		8.0	; <del>=</del> 5	****
	% S	÷ <del>5</del>	S <del>=</del> 3	
į		(주) (사람	) <u>=</u> : ) <u>2</u> 5	
-	*0	(2) (2)	:=: :=:	
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5		: <del>=</del>	)=X	
-	5.0	=	-	

REMARKS - X=STRIPPED, Z=AUGER REFUSAL

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#### MICHAEL BENSON, MATERIALS ENGINEER

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

JOB NUMBER - 090 FEDERAL AID NO TO PURPOSE - SOI SPEC. REMARKS - NO SUPPLIER NAME - STA NAME OF PROJECT - I PROJECT ENGINEER - I PIT/QUARRY - ARKAI	BE ASSI L SURVE SPECIFI ATE HWY.12/H NOT APPL NSAS DN COUNT FON HOLE	Y SAMPLE CATION CHECK WY.43 INTERS. ICABLE		DATE SAMPLED DATE RECEIVED DATE TESTED	- 2014 - 1 - 04 - 09
LAB NUMBER  SAMPLE ID  TEST STATUS  STATION  LOCATION  DEPTH IN FEET  MAT'L COLOR  MAT'L TYPE  LATITUDE DEG-MIN-  LONGITUDE DEG-MIN-		63+00 06 LT 0-5 BROWN 36 16 35.		ION ONLY	
3/4	10 - 40 - 80 -	100 89 83 75 71 65	- - - - - 98 - - 96 - - - - - - - - - - - - - - - -	# # # # # # # # # #	
LIQUID LIMIT PLASTICITY INDEX AASHTO SOIL UNIFIED SOIL % MOISTURE CONTENT ACHMSC ACHMBC AGG BASE CRS CL-7	(IN) - (IN) - (IN) - -	28 11 A-6(5) 13.8 1.25 2.75 8.0	- 23 - 6 - A-4(2) - 19.9		

REMARKS - X=STRIPPED, Z=AUGER REFUSAL

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#### MICHAEL BENSON, MATERIALS ENGINEER

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

	,	
DATE - 06/19/17		SEQUENCE NO 1
JOB NUMBER - 090445		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 - 04
SUPPLIER NAME - STATE		DISTRICT NO 09
NAME OF PROJECT - HWY.12/HWY.43 INTERS. SAFETY IMPVTS.(S)		
PROJECT ENGINEER - NOT APPLICABLE		
PIT/QUARRY - ARKANSAS		
LOCATION - BENTON COU	NTY	DATE SAMPLED - 05/15/17
SAMPLED BY - THORNTON		DATE RECEIVED - 05/22/17
SAMPLE FROM - TEST HOLE		DATE TESTED - 06/06/17
	ONIEV - DECTOTANCE D MAINE	
MATERIAL DESC SOIL SURVEY - RESISTANCE R-VALUE ACTUAL RESULTS		
LAB NUMBER	- 20171661 -	
SAMPLE ID	- RV379 -	<b>2</b> 4
	- INFORMATION ONLY -	-
	- 58+00 -	<b>5</b> 70
LOCATION	- 21 RT -	五0
DEPTH IN FEET	- 0-4Z	÷.
MAT'L COLOR	- BROWN	
MAT'L TYPE	-	
LATITUDE DEG-MIN-SEC	- 36 16 35.50 <b>-</b>	
LONGITUDE DEG-MIN-SEC		
% PASSING 2 IN.		-
1 1/2 IN.		<u>-</u>
3/4 IN.		<u>-</u>
3/8 IN.	- ·	_
NO. 4	_	-
NO. 10		-
NO. 40		-
NO 80		-
NO. 200	- 91	
LIQUID LIMIT	- 39 -	20
PLASTICITY INDEX	- 22	₩:
	- A-6(20)	<del>=</del> /
UNIFIED SOIL	<u></u>	<b>3</b>
% MOISTURE CONTENT	<u>.</u>	<u> </u>
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REMARKS - X=STRIPPED, Z=AUGER REFUSAL

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