ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT



SUBSURFACE INVESTIGATION

LETTING OF	DEC	EMBER 7, 2016	
IN		PULASKI	COUNTY
STATE HIGHWAY	10 & 430	SECTION	8 & 21
(m. 1)	I-430/HWY. 10 INT	ERCHANGE IMPVT. (L.	R.) (S)
FEDERAL AID PROJI	ECT NO. NH-N	HPP-430-2(265)9	
STATE JOB NO		061333	

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

May 15, 2013

TO:

Mr. Carl Fuselier, Bridge Engineer

SUBJECT:

Job No. 061333

I-430/Hwy 10 Interchange Impvt. (L.R.)(F)

Pulaski County

Route 430 Section 21 Route 10 Section 8

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

This investigation was to obtain preliminary subsurface information for use in evaluating the retaining walls at Pine Buro Road and at Stations 503+00 to 513+00 for the I-430 Northbound On-Ramp. Based on meetings with Bridge Division, it is anticipated that the walls will be cast-in-place retaining walls. The maximum height of the proposed walls is approximately 20 feet on Pine Buro Road and 40 feet on I-430 Northbound On-Ramp. In cut sections, retaining walls should be founded on shale with sandstone fragments as indicated on the boring logs. In areas that have 3' to 8' of overburden at the retaining wall footing, it is recommended that all overburden be excavated to rock for the full width of the footing. This area should be backfilled in accordance with Section 207 of the Standard Specifications for Stone Backfill. The intention of this recommendation is to reduce the required wall height, provide a consistent bearing surface and elevation, and provide drainage for ground water. Drainage must be provided for the Stone Backfill material.

It is also recommended that the fill material for retaining wall be specified as SM-1 and that a chimney drain be required on both sides of the retained embankment to allow for proper drainage. Retained rock cut is not expected to exert significant forces on the retaining wall. Recommendations for bearing resistance are listed in Table 1. Location and elevations where rock was encountered during subsurface investigation is listed in Table 2.

Table 1: Bearing Capacity Recommendations

Location	Factored Bearing Capacity (ksf)	Stone Backfill Allowable Bearing Capacity (ksf)
Pine Buro Rd	10.5	9
I-430 Northbound On-Ramp	10.5	9

Table 2: Rock Locations

Offset	Elevation
	557.0
	571.1
	553.4
	480.9
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	467.3
	455.9
	446.9
	442.6
	439.2
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	Offset 6' RT 112' RT 7' RT 17' LT 12' LT 16' LT 18' LT 18' LT 18' LT 18' LT 18' LT

The investigation was also to obtain information for recommendations on the cut slopes on the right side of the project from Stations 496+00 to 503+00. Table 3 indicates the location and elevation at which rock was encountered during drilling. The rock cut should be excavated using a 1/4H:1V slope. The rock will require blasting during excavation in order to achieve the recommended slopes. Soil should be excavated on a 2H:1V slope from its interface with rock continuing to top of backslope. It is also recommended that the backslopes from Stations 496+00 to 501+00 be plated with Dumped Riprap meeting the requirements of Section 816. Beginning at Station 501+00, a 10' bench is recommended at top of rock cut before transitioning to the 2H:1V slope. Cross-sections have been included to illustrate the above recommendation.

TABLE 3: Rock Locations

	I ADLE 3. NOCK LOCATIONS	
Station	Offset	Elevation
496+50	59' RT	559.9
497+50	80' RT	559.9
499+00	46' RT	546.1
500+00	Centerline	545.2
501+00	30' RT	550.0
502+00	46' RT	552.9
502+50	73' RT	566.6
502+50	103' RT	563.2
	90' RT	566.8
503+00	30 1(1	

It is also recommended that the fill slopes on the right side from Stations 514+00 to 523+00 be constructed using a 2H:1V slope with a rock fill extending from the 6H:1V slope to the toe of slope. An alternative to this recommendation would be to construct the entire embankment utilizing a 2H:1V slope using rock fill. This alternative would require the use of guardrail or concrete barrier wall for minimum safety requirements, but would substantially reduce the required fill and clearing of the existing slope. A Special Provision for Rock Fill will be provided upon request.

Cut slopes on the right side from Stations 525+00 to 529+70 should be constructed using a 1H:1V slope with a 10 foot horizontal bench every 20 feet of vertical cut, extending to top of backslope. A representative cross section has been attached.

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

Michael C. Benson Materials Engineer

MCB:rpt:tgf

CC:

State Construction Engineer - Master File Copy

Roadway Design District 6 Engineer

G.C. File

GEOLOGY AND SITE CONDITIONS

Job No. 061333

I-430/Hwy. 10 Interchange Impvt. (LR) (F)

Pulaski County

Route 430 Section 21
Route10 Section 8

Site Geology

The project alignment is located in the mapped outcrop of the Jackfork Formation of Pennsylvanian age (IPj). The Jackfork Sandstone is composed of thin- to massive-bedded, fine-to coarse-grained, brown, tan, or bluish-gray quartzitic sandstones with subordinate brown, silty sandstones and gray-black shales. Toward the north of its outcrop area the shale units of the lower and middle Jackfork Sandstone take up more of the section and the sandstones are more lenticular, often occurring as chaotic masses in the shale.

The current I-430 road cut at the job site consists primarily of sandstone on the northern half of the cut and primarily shale at the southern end of the cut. The contact between shale section of rock and the sandstone section is between stations 511+00 and 512+00. The rocks in the general area have been mapped as having dips ranging from 45 to 80 degrees. The exposed rocks are dipping in a northeasterly direction. The rocks are cut by numerous reverse faults producing numerous slickensides. The deep valleys associated with this job site may represent large thrust faults. These faults trend from northwest to southeast. The rocks here also contain several quartz veins.

Subsurface Conditions

Based on the results of the borings from **stations 494+61 to 495+50** (elevations ranging from 567.8 to 590.1 feet above MSL), the subsurface stratigraphy may be generalized as follows:

0 to 3.6 Feet:

Varies from moist, soft to very stiff, reddish brown clay with some organic matter to reddish brown clay with gravel, cobbles (sandstone fragments), and some organic matter.

3.6 to 7.5 Feet:

Varies from moist, very stiff, reddish brown clay with gravel, cobbles (sandstone fragments), and some organic matter to medium hard, highly weathered, reddish brown and dark gray shale with sandstone cobbles with traces of clay to medium hard, highly weathered, reddish brown and dark gray shale.

7.5 to 39.0 Feet:

Varies from poorly cemented to well cemented, reddish brown, slightly weathered to highly weathered sandstone to sandstone with shale layers and clay layers to soft to medium hard, highly weathered to weathered reddish brown and dark gray shale with sandstone partings and layers. These rocks have a steep dip and vertical fractures.

Based on the results of the borings from stations 496+50 to 502+00 (elevations ranging from 554.4 to 571.5 feet above MSL), the subsurface stratigraphy may be generalized as follows:

0 to 33.6 Feet:

Consists of soft to medium hard, highly weathered to slightly weathered, reddish brown to dark gray shale. These rocks have a steep dip and some vertical fractures. These rocks are cut by some quartz veins.

Based on the results of the borings from stations 502+47 to 502+95 (elevation 568.8 to 571.7), the subsurface stratigraphy may be generalized as follows:

0 to 27.5 Feet:

Consists of poorly cemented to cemented, reddish brown to brown sandstone to sandstone with shale layers. These rocks have a moderate to steep dip and vertical fractures. These rocks are cut by some quartz veins.

27.5 to 32.5 Feet: Varies from cemented, brown and gray sandstone with occasional shale layers to hard, dark gray shale with some sandstone layers. These rocks have a steep dip and vertical fractures.

Based on the results of the borings from stations 503+50 to 511+00 (elevations ranging from 451.8 to 485.9), the subsurface stratigraphy may be generalized as follows:

0 to 3.7 Feet:

Varies from moist, stiff, brown and gray clay with gravel (sandstone and shale fragments) to soft to medium hard, highly weathered, brown and gray shale.

3.7 to 23.7 Feet:

Consists of medium hard to hard, highly weathered to slightly weathered, dark gray shale to shale with frequent sandstone layers. These rocks have a steep dip and vertical fractures. These rocks are cut by some quartz veins. The shale contains slickensides.

Based on the results of the borings from stations 512+00 to 516+53 (elevations ranging from 425.5 to 445.8), the subsurface stratigraphy may be generalized as follows:

0 to 12.1 Feet:

Varies from moist, very dense, brown sand with gravel (sandstone fragments) to sandstone boulders with reddish brown clay seams to soft, highly weathered, dark gray shale to well cemented, slightly weathered, gray and reddish brown sandstone. These rocks have a moderate to steep dip and vertical fractures

12.1 to 49.1 Feet:

Consists of soft, highly weathered, dark gray shale to poorly to well cemented, highly to slightly weathered, gray to reddish brown sandstone. Some of the sandstone has clay seams. These rocks have a moderate to steep dip and vertical fractures. These rocks are cut by some quartz veins.

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MATERIALS DIVISION - GEOTECHNICAL SEC. JOB NO. 061333 Pulasti County 1-430 STATION: 500+98 LOCATION: 30 Right of Center Line of Construction LOCATION: 430 Right of Center Line of	1			HWY. & TRANS. DEPARTMENT		BORIN PAGE	IG N		F 1					
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to Steep Dip SHALE - Gray and Brown, Laminated, Highly Weathered, Medium Hard to Hard, with Steep Dip SHALE - Dark Gray, Laminated, Weathered, Medium Hard to Hard, with Steep Dip SHALE - Dark Gray, Laminated, Weathered, Medium Hard to Hard, with Steep Dip SHALE - Dark Gray, Laminated, Slightly Weathered, Hard, with Steep Dip Boring Terminated	15	E				ı							3	0
SHALE - Gray and Brown, Laminated, Highly Weathered, Medium Hard to Hard, with Steep Dip SHALE - Dark Gray, Laminated, Weathered, Medium Hard to Hard, with Steep Dip SHALE - Dark Gray, Laminated, Weathered, Medium Hard to Hard, with Steep Dip SHALE - Dark Gray, Laminated, Slightly Weathered, Hard, with Steep Dip Boring Terminated	<u> </u>													
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Weathered, Medium Hard to Hard, with Steep Dip SHALE - Dark Gray, Laminated, Weathered, Medium Hard to Hard, with Steep Dip SHALE - Dark Gray, Laminated, Slightly Weathered, Hard, with Steep Dip SHALE - Dark Gray, Laminated, Slightly Weathered, Hard, with Steep Dip Boring Terminated			3											
Weathered, Medium Hard to Hard, with Steep Dip SHALE - Dark Gray, Laminated, Weathered, Medium Hard to Hard, with Steep Dip SHALE - Dark Gray, Laminated, Slightly Weathered, Hard, with Steep Dip SHALE - Dark Gray, Laminated, Slightly Weathered, Hard, with Steep Dip Boring Terminated	20		3	SHALE - Gray and Brown, Laminated, Highly										
25 SHALE - Dark Gray, Laminated, Weathered, Medium Hard to Hard, with Steep Dip SHALE - Dark Gray, Laminated, Slightly Weathered, Hard, with Steep Dip Boring Terminated	20		3										62	0
Medium Hard to Hard, with Steep Dip SHALE - Dark Gray, Laminated, Slightly Weathered, Hard, with Steep Dip Boring Terminated 35	<u> </u>			Dip										
Medium Hard to Hard, with Steep Dip SHALE - Dark Gray, Laminated, Slightly Weathered, Hard, with Steep Dip Boring Terminated 35			3											
Medium Hard to Hard, with Steep Dip SHALE - Dark Gray, Laminated, Slightly Weathered, Hard, with Steep Dip Boring Terminated 35	L		-		1									
Medium Hard to Hard, with Steep Dip SHALE - Dark Gray, Laminated, Slightly Weathered, Hard, with Steep Dip Boring Terminated 35			3											
Medium Hard to Hard, with Steep Dip SHALE - Dark Gray, Laminated, Slightly Weathered, Hard, with Steep Dip Boring Terminated 35	25		1	SHALE Dark Cray Laminated Weathered		- 1								
SHALE - Dark Gray, Laminated, Slightly Weathered, Hard, with Steep Dip Boring Terminated 35			1			ı							64	16
Weathered, Hard, with Steep Dip Boring Terminated 35		-	-	Wedidiff Hard to Hard, with Steep Dip										
Weathered, Hard, with Steep Dip Boring Terminated 35	<u> </u>		3											
Weathered, Hard, with Steep Dip Boring Terminated 35	<u> </u>		1				-		-		-			
Weathered, Hard, with Steep Dip Boring Terminated 35			3				1						1	
Weathered, Hard, with Steep Dip Boring Terminated 35	30		1	SHALE - Dark Gray Laminated Slightly									100	70
Boring Terminated 35	-55		1										100	70
35	-	===	=	Trouble of the factor of the f										
35	<u> </u>	-												
35	L -	-	1	Boring Terminated			\top		1					
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			HWY. & TRANS. DEPARTMENT DIVISION - GEOTECHNICAL SEC.		BORIN PAGE	IG NO		F 1					
JOB N		-	061333 Pulaski County		DATE:	•			ril 23	3, 20	13		
JOB N			I-430/Hwy. 10 Interchange Impvt. (L.R.)		TYPE C	F DR	ILLING	i: H					&
			I-430									oring	ı
STAT	ION:		502+00		EQUIP	MENT	` :				v/ CN		
LOCA			46' Right of Center Line of Construction								Hamı	1.29	
THE R. P. LEWIS CO., LANSING, MICH.			David Allen		HAMM	ER C	ORREC	TION	FAC	TOR:		1.29	
COM	PLET		N DEPTH: 33.6			Т						Т	
D	s	S											
E P	Y	M	DECORIDATION OF MATERIAL					II	FT.	WS		% S	% R
Т	M B	Р	DESCRIPTION OF MATERIAL	SOIL GROU	P			IGF	CC	31.0	÷	C	Q
Н	0	L			STIC	OIS	E E	WE	PEF	OF]	U-9	R	D
FT.	L	E S	SURFACE ELEVATION: 564.5		PLASTIC LIMIT	"MOIST	LIQUID	DRY WEIGHT	LBS PER CU.FT	NO. OF BLOWS	PER 6-IN.		
		-	SURFACE ELEVATION: 304.3		+==	0,							
<u> </u>													
 			*										
													
<u> </u>			SHALE - Reddish Brown and Gray, Highly							١.,	_		
5		X	Weathered, Soft							1	5 12		
<u> </u>			,										
10										١,	3		
10		X	SHALE - Reddish Brown and Gray, Highly							11 12000 miles	-60		
-			Weathered, Medium Hard							(4	4")		
	讍		SHALE - Reddish Brown and Gray, Laminated, Highly Weathered, Soft, with Moderate Dip and				1					30	0
-			Fractured Layers										
15													
			SHALE - Reddish Brown and Gray, Laminated,									20	0
_			Highly Weathered, Medium Hard, with Moderate									38	U
		3	Dip and Fractured Layers										
												-	
20		1											
		3	SHALE - Brown and Dark Gray, Laminated,									46	0
		3	Highly Weathered, Medium Hard, with Moderate									40	U
		1	Dip and Fractured Layers										
		1		+		1						-	
25	薑												
			SHALE - Dark Gray, Laminated, Highly									52	0
			Weathered, Medium Hard, with Steep Dip and									132	0
			Fractured Layers									-	
				4								-	-
30													
		3	SHALE - Dark Gray, Laminated, Weathered,									62	0
	薑	3	Medium Hard, with Steep Dip and Fractured									102	
			Layers	1									
			Daving Towningtod	-	\dashv	+	+	+		+		+	
35			Boring Terminated										
-	MARI	KS:				-							
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			HWY. & TRANS. DEPARTMENT DIVISION - GEOTECHNICAL SEC.		BORIN PAGE	IG N		F 1					
JOB N			061333 Pulaski County		DATE:			Ap	ril 2	2, 20	13		
JOB N	AME:		I-430/Hwy. 10 Interchange Impvt. (L.R.)		TYPE C	F DR	ILLING	i: F					&
			I-430					C)				oring	
STATI			502+47		EQUIP	MENT	`:				v/ CN Hami		
LOCA			103' Right of Center Line of Construction David Allen		НАММ	FR C	ORREC					1.29	
_		at All States	N DEPTH: 32.5		TH HVIIV	Litto	ordine	11011	1110	10111			
D		S	\ \(\text{DBI 111. 32.3} \)										
Ē	S Y	A							Ľ.	S		%	%
P	M	M	DESCRIPTION OF MATERIAL	SOIL				HT	U.F	WO,		S	R
T H	В	P L	•	GROU	1 🗎	ST.		ÆIC	3R C	BI.	Z.	C R	Q D
''	0	Ε			PLASTIC LIMIT	% MOIST	LIQUID	DRY WEIGHT	LBS PER CU.FT	NO. OF BLOWS	PER 6-IN.	K	D
FT.	L	S	SURFACE ELEVATION: 571.7		P.L.	%	135	DR	LB	ž	PE		
			*										
			SANDSTONE - Reddish Brown, Poorly-								.a		
5		X	Cemented								64 60		
<u> </u>										(6	5")		
													-
 10			CANDOTONIC MUTILIOLIADEZ CEAMS Doddich										
10			SANDSTONE WITH QUARTZ SEAMS - Reddish Brown, Thin Bedded, Weathered, Poorly-									25	0
			Cemented, with Steep Dip and Fractured Layers										
<u> </u>		1											
15			SANDSTONE WITH QUARTZ SEAMS - Brown,									34	0
			Thin Bedded, Weathered, Cemented, with Steep Dip and Fractured Layers									J-7	U
			Dip and Fractared Layers										
	<u></u>	+											
			CANDOTONE WITH OUR ELAYEDO DA High										
20			SANDSTONE WITH SHALE LAYERS - Reddish Brown and Gray, Thin Bedded, Weathered,									56	0
			Cemented, with Steep Dip and Fractured Layers										
<u> </u>			SANDSTONE WITH SHALE LAYERS - Reddish										
25			Brown and Gray, Medium Bedded, Weathered,									52	0
<u> </u>			Cemented, with Steep Dip and Fractured Layers										
<u> </u>	+:::::			7									
 													
<u>-</u>		1	SHALE WITH WEATHERED SHALE LAYERS										
30			AND SOME SANDSTONE - Dark Gray,									62	0
			Laminated, Hard, with Steep Slope										
-				-		_		+		-		-	
H	1		Boring Terminated										
35	1												
-	/AR	S.	1										
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JOB NO. O61333 Pulaski County JOB NAME: L430/Hyby, 10 Interchange Impvt. (L.R.) L430 TYPE OF DRILLING: Hollow Stem Auger & Diamonal Coring EQUEMENT: CME 550 w (CME August & Diamonal Coring EQUEMENT: CME 550 w (CME 55				HWY. & TRANS. DEPARTMENT DIVISION - GEOTECHNICAL SEC.		BORIN PAGE	G NO		F 1				•	
JOB NAME L430/Hwy. 10 Interchange Impvt. (LR.) TYPE OF DRILLING. Hollow Stem Auger & Diamonst Coring EQUIPMENT: CME 850 w/ CME Automatic Hummer HAMMER CORRECTION FACTOR: 1.29						-		I	April	22-	23, 2	013		
TATION: 502+50 LOCATION: 73 Right of Center Line of Construction TOTAL DOGGED BY: David Allen COMPLETION DEPTH: 12.9 DESCRIPTION OF MATERIAL T B P M D L S S S S S S S S S S S S S S S S S S						TYPE O	F DR	ILLING	: F	lollo	w St	em A	uger	&
STATION: 502+50 LOCATION: 73' Right of Center Line of Construction LOCATION: 73' Right of Center Line of Construction LOCATION: David Allen COMPLETION: DEPTH: 12.9 DESTRIPTION OF MATERIAL P M M P D L SURFACE ELEVATION: 568.8 SANDSTONE - Brown Poorly-Cemented SANDSTONE - Brown of Brown and Gray, Medium Bedded, Slightly Weathered, Cemented, with Steep Dip and Fractured Layers Boring Terminated Boring Terminated CME 850 w CME Automatic Hammer LAMMER CORRECTION FACTOR: 1.29 SURFACE ELEVATION: 568.8 SANDSTONE - Brown to Brown and Gray, Medium Bedded, Slightly Weathered, Cemented, with Steep Dip and Fractured Layers Boring Terminated Boring Terminated CME 850 w CME Automatic Hammer LAMMER CORRECTION FACTOR: 1.29 SOIL BROWD SANDSTONE - Brown to Brown and Gray, Medium Bedded, Slightly Weathered, Cemented, with Steep Dip and Fractured Layers Boring Terminated Boring Terminated	1021												_	
LOCATION: 73 Right of Center Line of Construction Automatic Hammer Construction Description Description of MATERIAL P Y N M D DESCRIPTION OF MATERIAL O L E S SURFACE ELEVATION: 568.8 SURFACE ELEVATION: 568.8 SANDSTONE - Brown to Brown and Gray, Medium Bedded, Slightly Weathered, Cemented, with Steep Dip SANDSTONE - Brown and Gray, Medium Bedded, Slightly Weathered, Cemented, with Steep Dip Boring Terminated Boring Terminated Automatic Hammer Automatic Hammer 1.29 Label P V N M D DESCRIPTION OF MATERIAL SOIL GROUP DISTRIPTION OF MATERIAL SOIL GROUP DIS	STAT	ION:				EQUIPN	IENT	:						ı
DESCRIPTION DEPTH: 12.9 DESCRIPTION OF MATERIAL SOIL GROUP DESCRIPTION OF MATERIAL DESCRIPTION OF M				73' Right of Center Line of Construction										
DE R Y A M DESCRIPTION OF MATERIAL SOIL GROUP TO BE SURFACE ELEVATION: 568.8 SANDSTONE - Brown to Brown and Gray, Medium Bedded, Slightly Weathered, Cemented, with Steep Dip and Fractured Layers Boring Terminated Boring Terminated Boring Terminated Boring Terminated SOIL GROUP TO JULY 1 I I I I I I I I I I I I I I I I I I	LOGG	ED B	Y: [David Allen		HAMM	ER CO	ORREC	TION	FAC	ΓOR:	y of Care	1.29	_
E P Y M P T B O L E SURFACE ELEVATION: 568.8 SURFACE ELEVATION: 568.8 SANDSTONE - Brown no Brown and Gray, Medium Bedded, Slightly Weathered, Cemented, with Steep Dip and Fractured Layers Boring Terminated Boring Terminated Boring Terminated Boring Terminated	COM	PLET	IOI	N DEPTH: 12.9										_
DESCRIPTION OF MATERIAL SOIL FIT. SANDSTONE - Brown, Poorly-Cemented SANDSTONE - Brown to Brown and Gray, Medium Bedded, Slightly Weathered, Cemented, with Steep Dip SANDSTONE WITH OCCASIONAL CLAY PARTINGS - Brown and Gray, Medium Bedded, Slightly Weathered, Cemented, with Steep Dip Boring Terminated Boring Terminated Boring Terminated		0	S											1
SANDSTONE - Brown, Poorly-Cemented SANDSTONE - Brown to Brown and Gray, Medium Bedded, Slightly Weathered, Cemented, with Steep Dip SANDSTONE - Brown and Gray, Medium Bedded, Slightly Weathered, Cemented, with Steep Dip and Fractured Layers Boring Terminated Boring Terminated Boring Terminated	. Е			<u>`</u>					٠.	T.	SA		%	%
SANDSTONE - Brown, Poorly-Cemented SANDSTONE - Brown to Brown and Gray, Medium Bedded, Slightly Weathered, Cemented, with Steep Dip SANDSTONE - Brown and Gray, Medium Bedded, Slightly Weathered, Cemented, with Steep Dip and Fractured Layers Boring Terminated Boring Terminated Boring Terminated				DESCRIPTION OF MATERIAL					SH	CU.	0			
SANDSTONE - Brown, Poorly-Cemented SANDSTONE - Brown to Brown and Gray, Medium Bedded, Slightly Weathered, Cemented, with Steep Dip SANDSTONE - Brown and Gray, Medium Bedded, Slightly Weathered, Cemented, with Steep Dip and Fractured Layers Boring Terminated Boring Terminated Boring Terminated		В			GROU	1 \	ST.		VEI	ER (F BI	Ä		
SANDSTONE - Brown, Poorly-Cemented SANDSTONE - Brown to Brown and Gray, Medium Bedded, Slightly Weathered, Cemented, with Steep Dip SANDSTONE - Brown and Gray, Medium Bedded, Slightly Weathered, Cemented, with Steep Dip and Fractured Layers Boring Terminated Boring Terminated Boring Terminated	l ''					AST	MOI	124	X	S PI	0.0	R 6-		
SANDSTONE - Brown to Brown and Gray, Medium Bedded, Slightly Weathered, Cemented, with Steep Dip SANDSTONE WITH OCCASIONAL CLAY PARTINGS - Brown and Gray, Medium Bedded, Slightly Weathered, Cemented, with Steep Dip and Fractured Layers Boring Terminated Boring Terminated Boring Terminated	FT.	L	S	SURFACE ELEVATION: 568.8		PL.	%	H	DR	LB	N	PE		
SANDSTONE - Brown to Brown and Gray, Medium Bedded, Slightly Weathered, Cemented, with Steep Dip SANDSTONE WITH OCCASIONAL CLAY PARTINGS - Brown and Gray, Medium Bedded, Slightly Weathered, Cemented, with Steep Dip and Fractured Layers Boring Terminated Boring Terminated Boring Terminated														
SANDSTONE - Brown to Brown and Gray, Medium Bedded, Slightly Weathered, Cemented, with Steep Dip SANDSTONE WITH OCCASIONAL CLAY PARTINGS - Brown and Gray, Medium Bedded, Slightly Weathered, Cemented, with Steep Dip and Fractured Layers Boring Terminated Boring Terminated Boring Terminated				SANDSTONE - Brown, Poorly-Cemented										
SANDSTONE - Brown to Brown and Gray, Medium Bedded, Slightly Weathered, Cemented, with Steep Dip SANDSTONE WITH OCCASIONAL CLAY PARTINGS - Brown and Gray, Medium Bedded, Slightly Weathered, Cemented, with Steep Dip and Fractured Layers Boring Terminated Boring Terminated											6	0 1"\	98	0
Medium Bedded, Slightly Weathered, Cemented, with Steep Dip SANDSTONE WITH OCCASIONAL CLAY PARTINGS - Brown and Gray, Medium Bedded, Slightly Weathered, Cemented, with Steep Dip and Fractured Layers Boring Terminated Boring Terminated Boring Terminated											0.0	' '		
Medium Bedoed, Signity Weathered, Cemented, with Steep Dip SANDSTONE WITH OCCASIONAL CLAY PARTINGS - Brown and Gray, Medium Bedded, Sighity Weathered, Cemented, with Steep Dip and Fractured Layers Boring Terminated Boring Terminated 25 25 330 330 35	5													
SANDSTONE WITH OCCASIONAL CLAY PARTINGS - Brown and Gray, Medium Bedded, Slightly Weathered, Cemented, with Steep Dip and Fractured Layers Boring Terminated Boring Terminated 20 21 25 30 30 30 31 31 32 35	Ť												98	10
PARTINGS - Brown and Gray, Medium Bedded, Slightly Weathered, Cemented, with Steep Dip and Fractured Layers Boring Terminated Boring Terminated Boring Terminated Boring Terminated				with Steep Dip										
PARTINGS - Brown and Gray, Medium Bedded, Slightly Weathered, Cemented, with Steep Dip and Fractured Layers Boring Terminated Boring Terminated Boring Terminated Boring Terminated				*										
PARTINGS - Brown and Gray, Medium Bedded, Slightly Weathered, Cemented, with Steep Dip and Fractured Layers Boring Terminated Boring Terminated Boring Terminated Boring Terminated	-				1									
PARTINGS - Blown and Gray, with Steep Dip and Fractured Layers Boring Terminated Boring Terminated Boring Terminated 20 25 30 30 31 31 32 35	10													
	10			PARTINGS - Brown and Gray, Medium Bedded,									88	30
Boring Terminated 15 20 20 25 30 30 35														
15 	<u> </u>	-		and Fractured Layers										
15 	<u> </u>		\vdash	Boring Terminated		\top	T							
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			HWY. & TRANS. DEPARTMENT DIVISION - GEOTECHNICAL SEC.		BORIN PAGE	IG N		г 1					
JOB N		The second like	061333 Pulaski County		DATE:			1000	ril 22	2, 20	13		
JOB N			I-430/Hwy. 10 Interchange Impvt. (L.R.)		TYPE (F DR	ILLING	: F					
			I-430									oring	
STATI	ON:		502+95		EQUIP	MENT	:				v/ CN		
LOCA'			90' Right of Center Line of Construction								Hamr		=
AND DESCRIPTION OF THE PARTY OF		1000	David Allen		HAMM	ER C	ORREC	TION	FAC	TOR:		1.29	
	PLET	-	N DEPTH: 32.5			_	T						
D E	S	S											
P	Y	M	DESCRIPTION OF MATERIAL	COIL				11	FT.	WS		% S	% R
Т	M B	Р	DESCRIPTION OF WATERIAL	SOIL GROU	P	L.		IGF.	CC	BLC	÷	C	Q
Н	O	L			SIL	OIS	E E	WE	PEF	OF	e-IN.	R	D
FT.	L	E S	SURFACE ELEVATION: 571.0		PLASTIC LIMIT	% MOIST	LIQUID	DRY WEIGHT	LBS PER CU.FT	NO. OF BLOWS	PER		
		-	GON AGE ELEVATION. 371.0			1							
\vdash													
			SANDSTONE - Brown, Poorly-Cemented										
										1	3		
— – 5		X	SANDSTONE WITH OCCASIONAL QUARTZ							6	0		
			SEAMS - Reddish Brown, Medium Bedded,							(2	2")	75	10
			Weathered, Cemented, with Moderate Dip and									13	10
			Fractured Layers										
			SANDSTONE WITH OCCASIONAL CLAY										
10			SEAMS - Reddish Brown, Thin Bedded,									EO	0
10			Weathered, Cemented, with Moderate Dip and									50	U
			Fractured Layers										
		\coprod	,										
			SANDSTONE WITH OCCASIONAL SHALE AND										
15			QUARTZ LAYERS AND CLAY PARTINGS -									64	0
-10			Brown and Gray, Medium Bedded, Weathered, Cemented, with Moderate Dip and Fractured									04	U
			Layers										
		-	Layere	-									
	Eas		SANDSTONE WITH FREQUENT SHALE AND										
20			QUARTZ LAYERS - Reddish Brown and Gray,									72	8
			Medium Bedded, Weathered, Cemented, with									12	O
		1	Moderate Dip and Fractured Layers				9						
		1		1									
			SANDSTONE WITH OCCASIONAL QUARTZ										
25			LAYERS - Brown, Medium Bedded, Weathered,									26	0
			Cemented, with Moderate Dip and Fractured									20	U
 	1		Layers										
	1												
	1.0		SANDSTONE WITH OCCASIONAL SHALE										
30	T		LAYERS - Brown and Gray, Medium Bedded,									92	18
			Weathered, Cemented, with Steep Dip and									32	10
			Fractured Layers										
	1	1	Double of Township of a d	-	-	+-		+		+		\vdash	-
	1		Boring Terminated										
35													
	1 1ARK	S:	J	-									

			HWY. & TRANS. DEPARTMENT DIVISION - GEOTECHNICAL SEC.		BORIN PAGE	G NO 1		F 1					
	March 1987		061333 Pulaski County		DATE:				ch 2	0, 20	13		\dashv
JOB N JOB N			l-430/Hwy. 10 Interchange Impvt. (L.R.)		TYPE O	F DR						uger	&
JOB N	AIVIE.		1-430								nd Co		
STATI	ON:		503+50		EQUIPM	1ENT	' :	CN	Æ 8	50 w	/ CN	Æ	
LOCA			17' Left of Center Line of Construction					Au	toma	atic I	lamr	ner	l
			Pavid Allen		HAMMI	ER CO	ORREC"	TION	FAC	ΓOR:		1.29	
			J DEPTH: 14.4										
D		S											
E	S	A							ے	70	1		0.4
P	Y	М	DESCRIPTION OF MATERIAL	SOIL			-	Ħ	J.FJ	M		% S	% R.
Т	M B	Р	DESCRIPTION OF WATERWIE	GROU		T.		EIG	CC	BL(7	C	Q
Н	0	L			T	SIO	E L	W	PEF	OF	0-II	R	D
FT.	L	E S	OLIDEA OF ELEVATION. 405 0		PLASTIC LIMIT	% MOIST	LIQUID	DRY WEIGHT	LBS PER CU.FT	NO. OF BLOWS	PER 6-IN.		
Г1.		3	SURFACE ELEVATION: 485.9			0				4.			\neg
													ı
			SHALE - Brown and Gray, Highly Weathered,										
			Medium Hard *										
5			SHALE - Brown and Gray, Weathered, Medium							6	0		-
			\Hard to Hard							(1	")		
			The state of the s									75	0
			SHALE WITH FREQUENT GRAY SANDSTONE									13	Ŭ
			LAYERS - Dark Gray, Laminated, Slightly Weathered, Medium Hard, with Moderate to										
10		+	Steep Dip, with frequent Fractured Layers and										
10			some Slickensides										
<u> </u>			3000									100	22
<u> </u>												100	32
 			SHALE WITH FREQUENT GRAY SANDSTONE										
<u> </u>			LAYERS - Dark Gray, Laminated, Slightly					_					
15			Weathered, Medium Hard, with Moderate to Steep Dip, with frequent Fractured Layers,										
<u> </u>	4		occasional Quartz Seams and some										
			Slickensides										
			Boring Terminated										
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REN	MARI	S:	* A water stratum was encountered at 3.3'.										

8			HWY. & TRANS. DEPARTMENT		BORIN								
	the latest with the latest window		DIVISION - GEOTECHNICAL SEC.		PAGE	1		F 1	-1- 2	0.20	12		\dashv
JOB N			061333 Pulaski County		DATE: TYPE O					0, 20		11.00	. gr
JOB N	IAME:		I-430/Hwy. 10 Interchange Impvt. (L.R.)		TYPE O	F DR	ILLING	i: H	ono Di	w Su amor	ad Co	ring	α
			I-430		COLUDA	(T) IT		CN			/ CN	_	
STAT			505+00		EQUIPM	IENI	:	-			Hamr		1
LOCA			12' Left of Center Line of Construction David Allen		HAMME	ED CO	DDDEC"					1.29	ı
	a series				HAWWI	SIC CC	MALC	HOIV	THE	i Oit.		1127	
	PLEI		N DEPTH: 18.6		T						Т		\neg
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Р	Y	м	DESCRIPTION OF MATERIAL					II	FT.	WS		%	% R
Т	M B	Р	DESCRIPTION OF MATERIAL	SOIL GROUI		L.		IG	CC	3T0	<u>.</u>	S C	Q
Н	0	L			STIC	SIC	E L	WE	PER	0F]	1I-9	R	D
FT.	L	E S	OLIDEA OF ELEVATIONS, 470.0		PLASTIC LIMIT	% MOIST.	LIQUID	DRY WEIGHT	LBS PER CU.FT.	NO. OF BLOWS	PER 6-IN.		
Г1.		3	SURFACE ELEVATION: 479.0			0	H				<u> </u>		\neg
			SHALE - Brown and Gray, Highly Weathered,										
			Medium Hard										
5											4		
		\triangle								35-	-52		
			SHALE - Dark Gray, Weathered, Medium Hard										
			SHALE WITH WEATHERED SHALE LAYERS -										
10		~	¬Dark Gray, Medium Hard							6	0		
					ŀ					(2	2")		2
												66	10
			SHALE WITH WEATHERED SHALE AND					3					
		\vdash	OCCASIONAL GRAY SANDSTONE LAYERS -					190					
15			Dark Gray, Laminated, Medium Hard, with										
			Moderate Dip, with frequent Fractured Layers									06	20
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20	1		Boring Terminated										
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REN	//ARK	S:											

			HWY. & TRANS. DEPARTMENT DIVISION - GEOTECHNICAL SEC.		BORIN PAGE	G No		F 1					
JOB N	-		061333 Pulaski County		DATE:			Australia	ch 2	1, 20	13		\neg
JOB N			I-430/Hwy. 10 Interchange Impvt. (L.R.)		TYPE O	F DR						uger	&
JOBIN	AIVIL.		1-430		TILO		i D D II (O					oring	
STAT	ION:		506+59		EQUIPM	1ENT	:	CI	ME 8	350 v	v/ CN	Æ	1
LOCA			16' Left of Center Line of Construction	2				Au	tom	atic I	Tamı	ner	
LOGG	ED B	Y: [David Allen		HAMMI	ER CO	ORREC	TION	FAC	TOR:		1.29	
COM	PLET	TON	N DEPTH: 13										
D	S	S											1
E	Y	Α	,					_	FT.	SA		%	%
P T	М	M P	DESCRIPTION OF MATERIAL	SOIL				EE	CO.	007		S	R
н	В	L		GROUI	Ξ	IST.	Δ.	WEI	ER (F B	Ä	C R	Q D
	O L	Е			PLASTIC LIMIT	% MOIST	LIQUID	DRY WEIGHT	LBS PER CU.FT	NO. OF BLOWS	PER 6-IN.		
FT.		S	SURFACE ELEVATION: 471.7		PI II	%		ā	17	ž	PI		-
			SHALE - Brown and Gray, Highly Weathered,										1
<u> </u>			Medium Hard										
<u> </u>			SHALE - Dark Gray, Weathered, Medium Hard							6	^		
5			*							(1			
			*									86	0
	,,,,,		SHALE WITH WEATHERED SHALE AND										
	1001	\vdash	FREQUENT GRAY SANDSTONE LAYERS -										
10			Dark Gray, Laminated, Medium Hard, with Moderate to Steep Dip, with frequent Fractured										
10			Layers									100	74
	7551												
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			DIVISION - GEOTECHNICAL SEC.		PAGE	!	O.	F 1	ril 8	201	3		\dashv
JOB N			061333 Pulaski County I-430/Hwy. 10 Interchange Impvt. (L.R.)		DATE: TYPE O	E DD	II I INIC	_				uioer	æ
JOB N	AME:		I-430/Hwy. 10 Interchange Impvt. (L.R.)		TYPEO	r DR	ILLING	i: 11			nd Co		
STATI	ONI		508+00		EQUIPM	(ENT	٠.	CI			v/ CN	_	- 1
LOCA			18' Left of Center Line of Construction		LQUIII	ILIVI	•				Hamr		1
			David Allen		HAMMI	ER CO	ORREC	TION	FAC	TOR:		1.29	
			N DEPTH: 23.7										
D		S			T								
Ē	S Y	Ā							ان	70		0.	
Р	M	М	DESCRIPTION OF MATERIAL	SOIL				HT	U.F	MC		% S	% R
T H	В	Р		GROUI	o o	T.		EIG	RC	BL	z.	C	Q
п	0	Е			PLASTIC LIMIT	% MOIST		DRY WEIGHT	LBS PER CU.FT.	NO. OF BLOWS	PER 6-IN.	R	D
FT.	L	S	SURFACE ELEVATION: 465.5		PLAST	% \	LIQUID	DR	LBS	NO	PEF		
	10/2		Maint Stiff Drawn and Cray Clay with Grayal										
	80/2		Moist, Stiff, Brown and Gray Clay with Gravel (Sandstone and Shale Fragments)										
	8.9		(Sandstone and Shale Fragments)										
5			'							5	3		
		X	SHALE - Dark Gray, Highly Weathered, Medium							43-	-46		
			Hard										
10		_								6	0		
										(1	")		
			*		l							98	52
		\vdash	SHALE - Dark Gray, Laminated, Slightly										-
15			Weathered, Hard, with Moderate to Steep Dip and Vertically Fractured Layers										
			and voltically i ractaled Eayers									100	76
			,			-						100	10
			,										
				1									
20													
			SHALE WITH WEATHERED SHALE LAYERS -									100	8
			Dark Gray, Laminated, Hard, with Moderate to Steep Dip and Vertically Fractured Layers									100	ŭ
			Coop and comments and										
		-	Boring Terminated		_		+	_	-				
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			DIVISION - GEOTECHNICAL SEC.		PAGE DATE:		U		ril 8	201	3		
JOB N			061333 Pulaski County I-430/Hwy. 10 Interchange Impvt. (L.R.)		TYPE O	F DR	ILLING	_	lollo	w St	em A	uger	&
STAT	ION:		I-430 510+00		EQUIPN	1ENT	<u>:</u>		ME 8	50 v	v/ CN	Æ	
LOCA	TION		18' Left of Center Line of Construction			1201					Hamr		
		-	David Allen		HAMM	ER C	ORREC'	TION	FAC	ror:		1.29	\dashv
	PLET		N DEPTH: 23.2		Т						\neg	T	\neg
D E P T H	S Y M B O L	SAMPLE	DESCRIPTION OF MATERIAL	SOIL GROUI	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT	LBS PER CU.FT.	NO. OF BLOWS	PER 6-IN.	% S C R	% R Q D
FT.		S	SURFACE ELEVATION: 456.5			%	111	10		Z	P		\dashv
=			Moist, Stiff, Brown and Gray Clay with Gravel (Sandstone and Shale Fragments)										
<u> </u>	No.		Wet, Stiff, Brown and Gray Clay with Gravel (Sandstone and Shale Fragments) *							4	4		
5		X								5	4		- 1
			SHALE - Dark Gray, Highly Weathered, Soft										
10		X	SHALE - Dark Gray, Highly Weathered, Medium							(£	50 5")		
15			SHALE WITH WEATHERED SHALE SEAMS - Dark Gray, Laminated, Medium Hard, with Steep Dip, Vertically Fractured Layers and Slickensides								,	90	0
20			SHALE - Dark Gray, Laminated, Slightly Weathered, Hard, with Steep Dip, Vertically Fractured Layers and Slickensides									100	48
	-		Boring Terminated	,									
30													
35 REI	MARI	(S·	* A water stratum was encountered at 2.6'.										
INCI	V 1/~\(\V	ν.	A mater endenin was endealed at Eler										

. 100 1000 1000 1000			HWY. & TRANS. DEPARTMENT		BORIN			- 1					
		_	DIVISION - GEOTECHNICAL SEC.		PAGE	1	O	F 1	:10	201	2		\dashv
JOB N			061333 Pulaski County		DATE: TYPE O	מת יי	rr I INIC	-		, 201: w Ste		nger	&
JOB N	AME:		I-430/Hwy. 10 Interchange Impvt. (L.R.) I-430		TYPE O	t DK	ILLIINO	: 11	Dia	amon	id Co	oring	"
STATI	ONI		1-430 511+00		EQUIPM	IENT		CM		50 w		_	
LOCA			18' Left of Center Line of Construction		LQUIL	ILA	•			atic H			
			David Allen		HAMMI	ER CO	ORREC	TION	FACT	ΓOR:		1.29	
_			N DEPTH: 22.2										
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P T	м	M	DESCRIPTION OF MATERIAL	SOIL				SHT	CU.F	NO.	-	S	R
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	O L	Е			PLASTIC LIMIT	% MOIST.	LIQUID	DRY WEIGHT	LBS PER CU.FT	NO. OF BLOWS	PER 6-IN.		
FT.	L-	S	SURFACE ELEVATION: 451.8		PL	%	בב	D	-Ti	ž	-E-	-	-
			,										
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			SHALE WITH GRAY SANDSTONE SEAMS -							7	,		
5		X	Dark Gray, Highly Weathered, Soft							22-			
L	,,,,,,		, and a same and a same a same a same a same a same a same a same a same a same a same a same a same a same a)		
										6	n		
10			CLIALE Davis Cross Laminated Slightly							(1			
L -			SHALE - Dark Gray, Laminated, Slightly Weathered, Hard, with Moderate Dip and									85	26
L -			Vertically Fractured Layers *										
													-
<u> </u>													
15			SHALE - Dark Gray, Laminated, Slightly									400	40
<u> </u>			Weathered, Hard, with Steep Dip, Vertically									100	10
<u> </u>			Fractured Layers and Slickensides *										
<u> </u>		1		-									
<u>-</u> -			SHALE - Dark Gray, Laminated, Weathered,								3		
20			Hard, with Steep Dip, Vertically Fractured Layers									75	0
-			and Slickensides										
<u>-</u> -		1	Decision Township at a d	-	_	+	+	+-		-		я.	
	1		Boring Terminated										
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35 DEA	4A DI	10.	* Partial water loss was encountereed from 13.0' to	16.8'.									
LEI	MAIN	10.	Faltial Water 1035 was effective rect from 10.0 to	.0.0.									

240 000401000000000			HWY. & TRANS. DEPARTMENT DIVISION - GEOTECHNICAL SEC.		BORIN PAGE	G No		г 1					
JOB N			061333 Pulaski County		DATE:		0.		il 8-	9, 20	13		
JOB N			I-430/Hwy. 10 Interchange Impvt. (L.R.)		TYPE O	F DR	ILLING	-				uger	&
JOBIN	111111111111111111111111111111111111111		I-430						Dia	amor	nd Co	oring	
STAT	ION:		512+00		EQUIPM	1ENT	:			350 v			
LOCA	TION	:	18' Left of Center Line of Construction					Au	toma	atic I			
LOGG	ED B	Y: [Pavid Allen		HAMMI	ER CO	ORREC	TION	FAC	TOR:		1.29	_
COM	PLET	OI	N DEPTH: 18.2				Ι	Т					_
D	S	S											
E P	Y	A M						L .	FT.	NS		%	%
Т	M	P	DESCRIPTION OF MATERIAL	SOIL GROU				GH	CU.	TO		S C	R Q
Н	В	L		GROU		IST		WE	ER)FB	N-i	R	Ď
	L	E			PLASTIC LIMIT	% MOIST	LIQUID	DRY WEIGHT	LBS PER CU.FT	NO. OF BLOWS	PER 6-IN.		- 1
FT.		S	SURFACE ELEVATION: 445.5			%	1 1 1 1	Ω	H	Z	P		\dashv
			*										
			SHALE - Dark Gray, Highly Weathered, Soft										
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5		\setminus								6-	Commence of the Commence of th		
											0		_
<u> </u>			SANDSTONE - Gray and Brown, Thin Bedded,							(.0	1")	98	0
<u> </u>			Slightly Weathered, Cemented, with Slight Dip										
<u> </u>													
10			SANDSTONE - Gray, Medium Bedded, Slightly									400	
<u> </u>			Weathered, Well-Cemented, with Moderate Dip									100	24
<u> </u>			and Fractured Layers										
<u> </u>													
<u> </u>	1		CANDOTONIE Crow and Raddish Brown										
15		1	SANDSTONE - Gray and Reddish Brown, Medium Bedded, Slightly Weathered, Well-									00	0
<u> </u>	-		Cemented, with Steep Dip and Vertically									89	8
<u> </u>	-		Fractured Layers										
<u> </u>	-	Ш				-	-	+-		-			
	-		Boring Terminated										
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JOB N			061333 Pulaski County		DATE:				ril 9	, 201	3		
JOB N			I-430/Hwy. 10 Interchange Impvt. (L.R.)		TYPE C	F DR	ILLING	-				Luger	&
0021			I-430									oring	1
STAT	ION:		513+00		EQUIPN	/ENT	' :	CI	ME 8	50 v	v/ CN	Æ	l
LOCA			18' Left of Center Line of Construction		1			Au	toma	atic l	Hamı	ner	ı
			David Allen		HAMM	ER C	ORREC	TION	FAC	ΓOR:		1.29	
-	ALCONO POPULACIONE	No and a second	N DEPTH: 29.3										
D		S	V DIX TIX DIX		T								
E	S	A							, .				
P	Y	М	DESCRIPTION OF MATERIAL	COIL				II	J.F.I	WS		% S	% R
Т	M B	Р	DESCRIPTION OF MATERIAL	SOIL GROUI	, ,	ن ا		IGE	5	3TC	<u>;</u>	C	Q
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	Ľ	E S	0.1554.05 51 51 44 510 N		PLASTIC	WMOIST	LIQUID	DRY WEIGHT	LBS PER CU.FT	NO. OF BLOWS	PER 6-IN.		ı
FT.		8	SURFACE ELEVATION: 445.8		교기	%	111		T	Z	Ь		-
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			SHALE WITH GRAY SANDSTONE SEAMS -										- 1
			Dark Gray, Highly Weathered, Soft										
5			Bank Gray, Filgriny Troumerou, Con-							;	7		
		X								7-	11		
<u> </u>			ALL EXAMPLE OF A VIOLENCE OF A NO								4		ı
<u> </u>		\times	SHALE WITH GRAY SANDSTONE SEAMS -							-	0		-
<u> </u>			Dark Gray, Highly Weathered, Medium Hard SANDSTONE - Gray and Reddish Brown, Thin								2")	42	0
<u> </u>			Bedded, Slightly Weathered, Well-Cemented,										
10			with Slight Dip and Fractured Layers		I							-	
L _			SHALE WITH GRAY AND BROWN										
			SANDSTONE LAYERS - Dark Gray, Laminatede									68	0
	100		Highly Weathered, Medium Hard, with Steep Dip										
<u> </u>	100		, , , , , , , , , , , , , , , , , , , ,										
15	7.7.7.	-		ł									
13	1												- 1
<u> </u>	1		SANDSTONE - Gray and Reddish Brown, Thin										
<u> </u>	-		Bedded, Weathered, Poorly-Cemented, with									96	0
			Steep Dip and Fractured Layers	20									
L -													
20													
												32	0
]:::::												
	1		CANIDOTONIE CONTRACTOR										
25	1	\vdash	SANDSTONE - Gray and Brown, Medium										
	1		Bedded, Weathered, Cemented, with Steep Dip							-			
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JOB N	40	1000	061333 Pulaski County		DATE:		O.		il 15	5, 20	13		
JOB N			I-430/Hwy. 10 Interchange Impvt. (L.R.)		TYPE O	F DR	ILLING					uger	&
JODIY	Z LIVID.		I-430								nd Co		
STAT	ION:		514+00		EQUIPM	IENT	:				v/ CN		
LOCA			25' Right of Center Line of Construction								Hamr		1
Name and Address of the Owner, where		THE RESERVE	Pavid Allen		HAMMI	ER CO	ORREC'	TION	FAC	TOR:		1.29	_
COM	PLET	OI	N DEPTH: 13.5										\dashv
D	S	S										l	
E P	Υ	A M						⊣	FT.	WS		%	%
Ť	M	Р	DESCRIPTION OF MATERIAL	SOIL GROUI		, .		IGH	CC	(C)		S C	R Q
Н	В	L		GROOM	\cong	OIST		WE	PER	JF E	NI-9	R	Ď
FT.	Ĺ	E S	SURFACE ELEVATION: 436.2		PLASTIC LIMIT	% MOIST	LIQUID	DRY WEIGHT	LBS PER CU.FT	NO. OF BLOWS	PER 6-IN.		
1 1.			SURFACE ELEVATION: 430.2			6	НН		I				
			Very Dense, Gravel (Sandstone and Shale										
		\times	Fragments) with Brown Clay							7			
	φ. . ~									6 (2	0	71	0
 5										,-	,		I
												100	20
			*									100	20
			SANDSTONE - Gray, Medium Bedded, Slightly										
		-	Weathered, Well-Cemented, with Moderate Dip and occasional Fractured Layers										
10			and occasional Fractured Layers										
												100	46
		-	Boring Terminated										
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JOB N		-	061333 Pulaski County		DATE:			- A. W S	il 15	5, 201	13		
JOB N			I-430/Hwy. 10 Interchange Impvt. (L.R.)		TYPE O	F DR	ILLING	: H	ollo	w Ste	em A	uger	&
			I-430						Dia	amor	id Co	oring	
STAT	ON:		514+65		EQUIPM	1ENT	:			350 w			1
LOCA			7' Left of Center Line of Construction					Au	toma	atic F			
			David Allen		HAMMI	ER CO	ORREC	TION	FAC	TOR:		1.29	_
COM	PLET	OI	N DEPTH: 22.1								Т		_
D	S	S											
E	Y	A						ے ا	FT.	SA		%	%
P T	М	M P	DESCRIPTION OF MATERIAL	SOIL				GH	CO.	20		S	R
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	0 L	Ε			PLASTIC LIMIT	% MOIST	LIQUID	DRY WEIGHT	LBS PER CU.FT	NO. OF BLOWS	PER 6-IN.		
FT.		S	SURFACE ELEVATION: 437.3		E II	%	33	DI	LE	ž	PE		
L _	. 080 o												
L	φ		N										
	800 0		Moist, Very Dense, Brown Sand with Gravel (Sandstone Fragments)										
	o. oo o. o		(Sandstone Fragments)							-1			
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	133	П								6	0	66	0
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			GRAY SANDSTONE BOULDERS WITH										
10			REDDISH BROWN CLAY SEAMS									96	20
			`										
	370												
				1									
					l								
15												78	0
			SANDSTONE WITH REDDISH BROWN CLAY										
		1	SEAMS AND OCCASIONAL QUARTZ LAYERS										
			- Gray, Medium Bedded, Slightly Weathered,		100								
		1	Cemented to Well- Cemented, with Moderate Dip and Fractured Layers								151		
20			and Fractarea Edyoro									100	10
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			HWY. & TRANS. DEPARTMENT		BORIN								
		-	DIVISION - GEOTECHNICAL SEC.	-	PAGE	1	-	F 1	15	16.2	012		\dashv
JOB N			061333 Pulaski County		DATE:	r DD		-		16, 2		uger	&
JOB N	AME:		I-430/Hwy. 10 Interchange Impvt. (L.R.) I-430		TYPE O	r DK	ILLING	r: I				oring	α
STAT	ION:		515+50		EQUIPM	1ENT	:	CN	ME 8	350 w	v/ CN	Æ	
LOCA			10' Left of Center Line of Construction					Au	toma	atic I			
LOGG	ED B	Y: [David Allen		HAMMI	ER CO	DRREC	TION	FAC	ΓOR:		1.29	_
COM	PLET	TON	N DEPTH: 33.4										-
D E P	S	S A M	DESCRIPTION OF MATERIAL					IT	.FT.	SM		% S	% R
T H	M B O	PLE	DESCRIPTION OF WATERIAL	SOIL GROUI	1 \	% MOIST.	LIQUID	DRY WEIGHT	LBS PER CU.FT	NO. OF BLOWS	PER 6-IN.	C R	Q D
FT.	L	S	SURFACE ELEVATION: 432.5		PLAST LIMIT	% N	LIQUII	DR	LBS	NO	PEF		
5			SHALE - Gray and Brown, Highly Weathered, Soft		4					19-	6 -20		
15		X	SHALE - Dark Gray, Highly Weathered, Soft							6	6 -7		
20		\times	Moist, Very Dense, Brown Sand with Gravel (Sandstone and Gray Shale Fragments)							(3	30 3")		
-	-		SANDSTONE - Gray and Brown, Thin Bedded, Slightly Weathered, Cemented, with Moderate Dip and Fractured Layers *							(.0	60)1")	100	0
25												72	0
30			SANDSTONE - Gray and Brown, Medium Bedded, Slightly Weathered, Well-Cemented, with Moderate Dip and Fractured Layers *									100	14
	-		Boring Terminated										
35				J	1 61	<u>_</u>							
REN	//ARK	S:	* Total water loss was encountered from 21.4' to 28	3.5' and	at 31.	۷.							

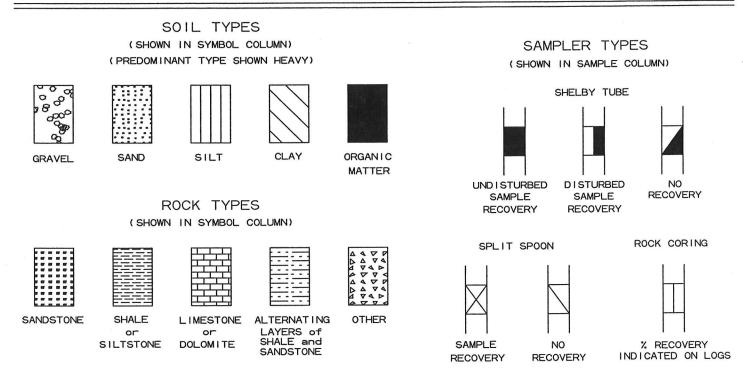
			HWY. & TRANS. DEPARTMENT DIVISION - GEOTECHNICAL SEC.	79	BORIN PAGE	G NO 1		F 2					
JOB N			061333 Pulaski County		DATE:	-	0.		ril 16	5, 20	13		
JOB N			I-430/Hwy. 10 Interchange Impvt. (L.R.)		TYPE O	F DR	ILLING		lollo	w St	em A	luger	. &
			1-430							amoı			
STAT			516+00		EQUIPM	1ENT	:			350 v atic I			
LOCA			5' Right of Center Line of Construction Pavid Allen	2	HAMMI	ER CO	ORREC					1.29	
_			DEPTH: 49.1		TIMIVIIVII	SIC CC	JIGGE	HOI	1110	TOIL.			
D		s	(DEI III, 45.1										
E	S Y	Α							;	S		%	%
P T	м	M P	DESCRIPTION OF MATERIAL	SOIL				3HT	U.F	NO.		S	R
н	В			GROU	1 \(\text{\tin}\xi}\\ \text{\tin}\}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}} \endred\end{\text{\texi}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}	IST.	le.	WEI	ER (F BI	Ä.	C R	Q D
	0	E			PLASTIC LIMIT	% MOIST.	LIQUID	DRY WEIGHT	LBS PER CU.FT	NO. OF BLOWS	PER 6-IN.		
FT.		S	SURFACE ELEVATION: 425.5			%	11	10	T	Z	_ P		-
5					İ						7		
										0	-1		
<u> </u>											7		
10		X									-11		
<u> </u>			SHALE - Dark Gray, Highly Weathered, Soft										
<u> </u>													
<u> </u>			*										
15											7		
										1	8-8		
<u> </u>	薑										7		
20	薑	X								9	9-9		
-	薑												
-				1									
-			· ·										
25			*								5 3-18		
			SHALE WITH HARD WHITE QUARTZ LAYERS							30	0-10		=
			- Dark Gray, Highly Weathered, Soft										
<u> </u>		1								ŀ			
				4							4		
30			3							-	6-5		
	700		SHALE WITH BROWN SANDSTONE SEAMS -		1								
			Dark Gray, Highly Weathered, Soft										
	133	4											
35	θ: °:	- - -		1							26		
	MAR!	S:	* Total water loss was encountered at 37.2'.										

			HWY. & TRANS. DEPARTMENT DIVISION - GEOTECHNICAL SEC.		BORIN PAGE			F 2					
JOB N			061333 Pulaski County		DATE:		. 0		il 16	5, 20	13		\dashv
JOB N			I-430/Hwy. 10 Interchange Impvt. (L.R.)		TYPE O	F DR	ILLING	_				uger	&
JOD IV.	AIVIL.		1-430								nd Co		
STATI	ON:		516+00		EQUIPM	IENT	:				v/ CN		
LOCA	TION:		5' Right of Center Line of Construction	-				Aut	toma	atic I	Hamr	ner	
LOGG	ED B	Y: [David Allen		HAMME	ER CO	ORREC	TION	FAC	TOR:	-	1.29	_
COM	PLET	OI	V DEPTH: 49.1		_								_
D	S	S											
E P	Y	A						L	FT.	NS N		%	%
T	М	M P	DESCRIPTION OF MATERIAL	SOIL GROUI	,			HD	CC.	LC		S	R Q
Н	B O	L		GROOM	$1 \cong$	% MOIST.		DRY WEIGHT	LBS PER CU.FT	NO. OF BLCWS	PER 6-IN.	R	Ď
ЕТ	L	E S	OUDEA OF ELEVATION 405 E		PLAST LIMIT) WC	LIQUID	RY	BS]	10.0	ER (
FT.	o: p: .4	<u>></u>	SURFACE ELEVATION: 425.5 Moist, Very Dense, Brown Sand with Gravel		L P	%		Д	ı	23-	60		\dashv
	6.00		(Sandstone Fragments)							(4	")		I
	0.00 00.00	_	SANDSTONE - Brown, Thin Bedded, Slightly										
			Weathered, Cemented, with Moderate Dip and									100	0
		-	_Fractured Layers *										
40			SANDSTONE WITH POORLY-CEMENTED					,			×		
			SANDSTONE LAYERS AND OCCASIONAL									76	28
			CLAY PARTINGS - Brown, Thick Bedded, Slightly Weathered, Cemented, with Moderate									, 0	
			Dip and Fractured Layers										
 45		\vdash											
40			SANDSTONE WITH OCCASIONAL WHITE										
			QUARTZ PARTINGS - Brown, Thick Bedded,									98	44
			Slightly Weathered, Cemented, with Moderate										
			Dip and Fractured Layers										
 50		-	Boring Terminated		1								
			Ç		1								
	1												
55													
]												
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60	1		·										
	4				ŀ								
	-		А.										
<u> </u>	1					<u> </u>							
	-												
65	-												
<u> </u>	-												
<u> </u>	-												
<u> </u>	-												
<u> </u>	-												
70	AA DI	<u></u>	* Total water loss was answered at 27.0										
I KEW	IAKK	3:	* Total water loss was encountered at 37.2'.										

			HWY. & TRANS. DEPARTMENT DIVISION - GEOTECHNICAL SEC.		BORIN PAGE	G No		F 2		2			
JOB N	_		061333 Pulaski County		DATE:			-0-10-10-10-10-10-10-10-10-10-10-10-10-1	ril 1	7, 20	13		
JOB N			I-430/Hwy. 10 Interchange Impvt. (L.R.)		TYPE O	F DR	ILLING	_	lollo	w St	em A		&
			1-430								nd Co	_	
STAT	ON:		516+53		EQUIPN	1ENT	' :				v/ CN		
LOCA	TION	:	3' Left of Center Line of Construction					Au	tom	atic l	Hamr		
LOGG	ED B	Y: [David Allen		HAMM	ER C	ORREC	TION	FAC	TOR:		1.29	_
COM	PLET	[OI]	N DEPTH: 62.8		_	,	,			i			_
D	S	S											
Ε	Y	Α			l			,	T.	S	l	%	%
P T	М	M	DESCRIPTION OF MATERIAL	SOIL				HE	U.I	NO.		S	R
H	В	P L	, and the second	GROUI	\cong	ST.		ÆIC	3R (BI	Z.	C R	Q D
l ''	0	Ē			PLASTIC LIMIT	% MOIST	LIQUID	DRY WEIGHT	LBS PER CU.FT	NO. OF BLOWS	PER 6-IN.		
FT.	L	S	SURFACE ELEVATION: 427.6		PL.	1%	HH	DR	LB	NC	PE		
			,										
			,										
 5			SHALE - Dark Gray, Highly Weathered, Soft								7		
		X	STALE - Dark Gray, Tilgrilly Weathered, Gott							18	-12		
											3		
10				×						1	5-6		
			я "										
		3											
		1	SHALE WITH TRACE OF BROWN CLAY - Dark										
15			Gray, Highly Weathered, Soft							1	88		
			,				-			6-	-11		
	讍	3											
	讍	3											
 -		3											
20		1		-							16		
20		$\frac{1}{2}X$								19	9-10		
<u> </u>		1											
-			SHALE - Dark Gray, Highly Weathered, Soft										
-													
<u> </u>											60		
25	± ± ±	ĦT	SANDSTONE WITH DARK GRAY SHALE								01")		
L -			SEAMS - Gray, Thin Bedded, Slightly Weathered, Cemented, with Steep Dip							1			
L -	1	7	Soil-filled Cavity (26.5' to 27.8') *	1									
	77		SANDSTONE WITH DARK GRAY SHALE	-	-			-		-			
		=	SEAMS - Gray, Thin Bedded, Slightly										
30	//		Weathered, Cemented, with Steep Dip									46	_
	11	1	Soil-filled Cavity (28.8' to 32.6')									18	0
	11	11	John Iniou Garris (Edia to Gene)										
-	/												
-	Ħ	4	SHALE - Dark Gray and Brown, Laminated,										
<u>-</u> -	1/	1	Highly Weathered, Medium Hard, with Moderate										
35	<u>'Z'</u>	ŽП	\Dip										
REN	//ARI	KS:	* Total water loss was encountered at 27.6'.										

			HWY. & TRANS. DEPARTMENT		BORIN								
		-	DIVISION - GEOTECHNICAL SEC.		PAGE	2	. 0	F 2	11.17	7 20	1.2		_
JOB N			061333 Pulaski County		DATE:			-	ril 17				. 0.
JOB N	AME:		I-430/Hwy. 10 Interchange Impvt. (L.R.)		TYPE O	F DR	ILLING	i: I				ring	
STATI	ON		I-430 516+53		EQUIPM	ENIT	٠.	CN			v/ CN	_	
LOCA			3' Left of Center Line of Construction		EQUIPM	IENI	•				Hami		
			David Allen		HAMMI	ER CO	ORREC	TION	FAC	TOR:		1.29	
		ob-unicomos	N DEPTH: 62.8										
D		S											
E	S Y	Ā							ان	100		0/	
Р	М	M	DESCRIPTION OF MATERIAL	SOIL				HT	U.F	MC		% S	% R
T H	В	Р		GROUI) o	ST.		EIG	RC	BL	ż	C	Q
п	0	L E			PLASTIC LIMIT	% MOIST		DRY WEIGHT	LBS PER CU.FT	NO. OF BLOWS	PER 6-IN.	R	D
FT.	L	s	SURFACE ELEVATION: 427.6		PLAST	% N	LIQUID	DR	LB	NO NO	PEF		
		T	Soil-filled Cavity (33.3' to 36.5')									34	0
	77		SHALE WITH GRAY SANDSTONE LAYERS -	18									
	11		Dark Gray, Laminated, Highly Weathered,										
			Medium Hard, with Moderate Dip										
40			Soil-filled Cavity (36.8' to 40.0')										
-10	,		CHALE WITH WATATHERED CHALE LAVERS		1							42	0
			SHALE WITH WEATHERED SHALE LAYERS - Dark Gray, Laminated, Medium Hard, with										
			Moderate Dip and Fractured Layers										
 45					1								
-70												70	24
-													
			SANDSTONE WITH OCCASIONAL QUARTZ										
			AND CLAY SEAMS - Brown and Gray, Medium Bedded, Weathered, Cemented, with Steep Dip										
			and Fractured Layers										
50			,									100	0
- -				1									
<u> </u>			CANDSTONE Prown and Croy Madium										
55			SANDSTONE - Brown and Gray, Medium Bedded, Weathered, Cemented, with Steep Dip									74	0
<u> </u>			and Fractured Layers										
<u> </u>													
 		\vdash		1									
			SANDSTONE WITH DARK GRAY HIGHLY										
60			WEATHERED SHALE LAYERS - Brown and									64	0
			Gray, Medium Bedded, Weathered, Cemented,									•	
<u> </u>			with Steep Dip and Fractured Layers										
	F====	\vdash	Boring Terminated		+-	\vdash		+		+			
<u> </u>	-		Doning Terminated										
65	-												
<u> </u>	1												
<u> </u>	1												
<u> </u>	1												
L -													
70													
REM	IARK	S:	* Total water loss was encountered at 27.6'.										

IFGEND



TERMS DESCRIBING CONSISTENCY OR CONDITION

GRANU	LAR SOIL		CLAY	CLA	Y-SHALE		SHALE
"N" Value	Density	'N' Value	Consistency	'N' Value	Consistency	"N" Value	Consistency
0-4 5-10 11-30 31-50 Over 50	Very Loose Loose Medium Dense Dense Very Dense	0-1 2-4 5-8 9-15 16-30 31-60 Over 60	Very Soft Soft Medium Stiff Stiff Very Stiff Hard Very Hard	0-1 2-4 5-8 9-15 16-30 31-60 Over 60	Very Soft Soft Medium Stiff Stiff Very Stiff Hard Very Hard	More than Penetrati	on ws: Medium Hard 2' on

- 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_t) 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 (N₆₀) can be obtained by multiplying N_f by the hammer correction factor published on the boring log.

Rock Core Unconfined Compression Test Summary

Project Number:

061333

Project Name:

I-430/Hwy. 10 Interchange Impvt. (L.R.)

Date Tested:

5/6/2013

Station	Location	Sample No.	Depth (ft)	Diameter (in)	Height (in)	Total Load (lbs)	Correction Factor	Stress (psi)	Remarks
505+00	12' LT.	1	15.0	1.75	3.50	4,400	1.000	1830	SHALE
506+59	16' LT.	2	7.0	1.75	3.90	5,290	1.000	2200	SHALE
508+00	18' LT.	3	10.0	1.75	3.50	3,550	1.000	1470	SHALE
510+00	18' LT.	4	19.0	1.75	3.60	3,846	1.000	1600	SHALE
511+00	18' LT.	5	11.0	1.75	3.65	4,890	1.000	2030	SHALE
512+00	18' LT.	6	10.0	1.75	3.55	7,010	1.000	2900	SS
. 1									
							,		
		40							

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

ROCK MASS RATING SUMMARY JOB # 061333

SAMPLE #2 SAMPLE #1 506+59/16 ft LT Station/Location 505+00/12 ft LT Station/Location Depth (ft) Depth (ft) Relative Rating Relative Rating Uniaxial Compressive Strength Uniaxial Compressive Strength RQD 13 RQD 8 Spacing of Joints 20 Spacing of Joints 10 Condition of Joints Condition of Joints 6 **Groundwater Conditions Groundwater Conditions** 48 Sum 33 Sum Class Number IV Class Number **FAIR ROCK** Description POOR ROCK Description SAMPLE #4 SAMPLE #3 Station/Location 510+00/18 ft LT 508+00/18 ft LT Station/Location Depth (ft) Depth (ft) Relative Rating Relative Rating Uniaxial Compressive Strength Uniaxial Compressive Strength RQD RQD 13 Spacing of Joints Spacing of Joints 20 Condition of Joints 6 Condition of Joints 6 **Groundwater Conditions Groundwater Conditions** Sum 28 Sum Class Number Class Number III POOR ROCK Description FAIR ROCK Description SAMPLE #6 SAMPLE #5 512+00/18 ft LT Station/Location 511+00/18 ft LT Station/Location 10 Depth (ft) Depth (ft) Relative Rating Relative Rating Uniaxial Compressive Strength Uniaxial Compressive Strength RQD RQD 3 Spacing of Joints Spacing of Joints 10 Condition of Joints 20 Condition of Joints 6 Groundwater Conditions **Groundwater Conditions** Sum 28 Sum IV Class Number Class Number IV POOR ROCK POOR ROCK Description Description SAMPLE #8 SAMPLE #7 Station/Location Station/Location Depth (ft) Depth (ft) Uniaxial Compressive Strength Uniaxial Compressive Strength RQD RQD Spacing of Joints Spacing of Joints Condition of Joints Condition of Joints **Groundwater Conditions Groundwater Conditions** Sum Sum Class Number Class Number Description Description

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT

November 19, 2012

TO:

Mr. Trinity Smith, Engineer of Roadway Design

SUBJECT:

Job No. 061333

I-430/Hwy. 10 Interchange Impvts. (L.R.)(F)

Route 430 Section 21 Route 10 Section 8 Pulaski County

Transmitted herewith is the requested Soil Survey, Strength Data and Resilient Modulus test results for the above referenced job. The project consists of adding a north bound entrance ramp from Highway 10 to I-430 and an auxiliary lane on Highway 10. Samples were obtained in the existing travel lanes, shoulders and ditch line. Locations were measured from centerline of construction and should be noted as such on the logs.

Based on laboratory results of samples obtained, the subgrade soils consist of moderately plastic sandy clay with varying amounts of shale fragments. The subgrade soils are expected to provide a stable working platform during construction with normal drying and compactive efforts. Cross-sections are currently not available. According to the proposed grade line there is an embankment of 30 feet between stations 502+50 to 516+00 and a cut 30 feet deep between stations 498+00 to 502+00. Cut slope and embankment recommendations will be made when cross-sections are further developed.

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 Little Rock.
- 2. Asphalt Concrete Hot Mix

Type	Asphalt Cement %	Mineral Aggregate %
Surface Course	5.1	94.9
Binder Course	4.3	95.7
Base Course	4.0	96.0

Michael C. Benson Materials Engineer

MCB:pt:bjj Attachment

cc: State Constr. Eng. – Master File Copy

District 6 Engineer Planning 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 - 11/07/2012

SEQUENCE NO. - 1

JOB NUMBER - 061333

MATERIAL CODE - SSRVPS

SPEC. YEAR - 2003

SUPPLIER ID. - 1 COUNTY/STATE - 60

DISTRICT NO. - 06

JOB NAME - I-430/HWY.10 INTERCHANGE IMPROVEMENT(L.R.)(F)

BEGIN JOB - END JOB 20

RESILIENT MODULUS

STA.513+00 5914

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. Date Sampled: Date Tested: Name of Project:	061333 11/5/12 November 6, 2012 1-430/HWY. 10 INTERCHANGE IMPRVT. (LR	Material Code Station No.: Location:	SSRVPS 513+00 CL
County: Sampled By: Lab No.: Sample ID: LATITUDE:	Code: 6 Name: BRADLEY FUALKNER 20124241 RV1221	Depth: AASHTO Class: Material Type (1 or 2 LONGITUDE:	0-2.0Z A-4 (2) 2
1. Testing Inform		-Vas and Na	N
	Preconditioning - Permanent Strain > 5% (Y: Testing - Permanent Strain > 5% (Y=Yes or Number of Load Sequences Completed (0-15)	N=No)	N 15
2. Specimen Info			
	Specimen Diameter (in):		4.00
	Top Middle		3.97
	Bottom		4.00
	Average		3.99
	Membrane Thickness (in):		0.00
	Height of Specimen, Cap and Base (in):		8.03 0.00
	Height of Cap and Base (in): Initial Length, Lo (in):		8.03
	Initial Area, Ao (sq. in):		12.50
	Initial Volume, AoLo (cu. in):		100.40
3. Soil Specimer	Weight:		
	Weight of Wet Soil Used (g):		3223.90
4. Soil Properties	S:		
	Optimum Moisture Content (%):		13.2
	Maximum Dry Density (pcf):		114.5 108.8
	95% of MDD (pcf): In-Situ Moisture Content (%):		N/A
5. Specimen Pro	perties:		
	Wet Weight (g):		3223,90
	Compaction Moisture content (%):		13.2
	Compaction Wet Density (pcf):		122.34
	Compaction Dry Density (pcf): Moisture Content After Mr Test (%):		108.08 13.1
6. Quick Shear T	est (Y=Yes, N=No, N/A=Not Applicable):		#VALUE!
7. Resilient Mod	ulus, Mr:	9541(Sc)^-0.33194(S3)^0.29411
8. Comments		×	
9. Tested By:	AD	Date: November 6, 2012	

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT MATERIALS DIVISION

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

SSRVPS 513+00 0-2.0ZMaterial Code Station No.: Location: Depth: I-430/HWY. 10 INTERCHANGE IMPRVT. (LR) BRADLEY Name: November 6, 2012 Code: 6 FUALKNER 11/5/12 061333 Name of Project: Date Sampled: Date Tested: Sampled By: County: Job No.

LONGITUDE:	
LATITUDE:	

A-4 (2)

AASHTO Class:

20124241 RV1221

Lab No.: Sample ID:

Material Type (1 or 2): 2

	Confining	Nominal Maximum	Actual Applied	Actual Applied	Actual Applied	Actual Applied	Actual Applied	Actual Applied	Average Recov Def.	Resilient Strain	Resilient Modulus
PARAMETER	Pressure	Axial	E	Cyclic Load	Contact	Max.	Cyclic	Contact	LVDT 1		
		Stress	Load		Load	Axial	Stress	Stress	and 2		
						Stress					
DESIGNATION	လိ	Soyelic	Ртах	Poydic	Pcontact	S _{max}	Scyolic	Scontact	Havg	ယ်	Σ
TINU	psi	psi	sql	sql	sql	psi	psi	psi	u	in/in	psi
Sequence 1	6.0	2.0	25.6	22.9	2.7	2.0	1.8	0.2	0.00114	0.00014	12,901
Sequence 2	6.0	4.0	48.2	45.4	2.8	3.9	3.6	0.2	0.00265	0.00033	10,999
Sequence 3	6.0	0.9	71.1	67.2	3.8	5.7	5.4	0.3	0.00450	0.00056	9,595
Sequence 4	6.0	8.0	94.0	87.6	6.4	7.5	7.0	0.5	0.00662	0.00082	8,496
Sequence 5	0.9	10.0	117.4	108.4	8.9	9.4	8.7	0.7	0.00882	0.00110	7,895
Sequence 6	4.0	2.0	25.6	22.8	2.8	2.0	1.8	0.2	0.00127	0.00016	11,545
Sequence 7	4.0	4.0	47.6	44.7	2.8	3.8	3.6	0.2	0.00304	0.00038	9,437
Sequence 8	4.0	0.9	68.5	65.5	3.0	5.5	5.2	0.2	0.00521	0.00065	8,071
Sequence 9	4.0	8.0	91.1	85.6	5.6	7.3	8.9	0.4	0.00753	0.00094	7,294
Sequence 10	4.0	10.0	114.7	106.6	8.1	9,2	8.5	9.0	0.00990	0.00123	6,911
Sequence 11	2.0	2.0	25.5	22.6	2.8	2.0	1.8	0.2	0.00150	0.00019	9,681
Sequence 12	2.0	4.0	46.6	43.8	2.9	3.7	3.5	0.2	0.00356	0.00044	7,887
Sequence 13	2.0	0.9	2.99	63.8	2.9	5.3	5.1	0.2	0.00606	0.00075	6,767
Sequence 14	2.0	8.0	88.2	83.5	4.7	7.1	2.9	0.4	0.00868	0.00108	6,179
Sequence 15	2.0	10.0	110.8	103.5	7.3	8.9	8.3	9.0	0.01124	0.00140	5,914

November 6, 2012	
DATE	DATE
AD	
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.

061333

Material Code SSRVPS

Date Sampled:

11/5/12

Station No.: 513+00

Date Tested:

November 6, 2012

Location: CL

Name of Project: I-430/HWY. 10 INTERCHANGE IMPRVT. (LR)

County:

Code: 6

Depth: 0-2.0Z

Sampled By:

FUALKNER

Lab No .:

20124241

AASHTO Class: A-4 (2) Material Type (1 or 2): 2

Sample ID:

RV1221

Name: BRADLEY

LATITUDE:

LONGITUDE:

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

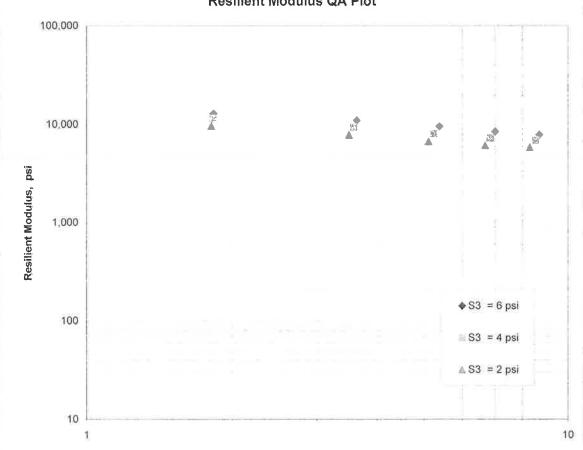
$$K1 = 9,541$$

K2 = -0.33194

K5 = 0.29411

 $R^2 = 0.99$

Resilient Modulus QA Plot



Cyclic Stress, psi

JOB: JOB NAME: 1-430/HWY.10 INTERCHANGE IMPROVEMENT(L.R.)(F) 061333

Arkansas State Highway Transporation Department Materials Division

DATE TESTED 11/6/2012

COUNTY NO. 60

STA.# LOC.

Michael Benson, Materials Engineer

PAVEMENT SOUNDINGS

	521+00		513+00		497+00		489+00
	CL		CL		CL		6'LT
8.0	ACHMBC	1	ACHMSC	1	ACHMSC	12.0	ACHMSC
8.75	PCCP	1	AGG.BASE CRS.CL7	Ī	AGG.BASE CRS.CL7	80	AGG.BASE CRS.CL7

comments:

LOCATIONS MEARSURED FROM CL OF CONST. Z= AUGER

Arkansas State Highway Transporation Department

Materials Division

Materials Division

JOB NAME: 1-430/HWY.10 INTERCHANGE IMPROVEMENT(L.R.)(F)

Michael Benson, Materials Engineer

COUNTY NO. 60 DATE TESTED 11/6/2012

WMOISTURE	:# AV 7	SSVID TIOS	Td	T'T	007#	08#	<i>01</i> #	01#	* #	COTOK	DEPTH	'70T	#'VLS
	recrite	10/V V	J.	- 00	S	3 A	3	1	S				
	RV1221	(Z) ∀- ∀	10	30	19	19	73	08	48	RP/GR	Z0.2-0	СГ	00+819
6	21212	(£)4-A	6	58	78	† 9	69	48	7 6	BR/GR	9-0	T 1'8	00+687
3.11	81218	(S)9-A	11	33	43	74	LG	29	72	BK/GK	Z9.2-0	СГ	00+467
4.11	81218	(S)8-A	11	32	ΔÞ	179	69	94	98	BB/GR	Z0.2-0	СГ	00+819
1.3	21220	(0)4-A	6	52	37	44	90	04	98	GR/BR	9-0	СГ	921+00

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

MICHAEL BENSON, MATERIALS ENGINEER *** SOIL SURVEY / PAVEMENT SOUNDING TEST REPORT ***

**	* SOIL	SURVEY / PAVEMENT	SOUNDING TES	T REPORT **	r *
SPEC. REMARKS - NO SUPPLIER NAME - STA NAME OF PROJECT - I PROJECT ENGINEER - N PIT/QUARRY - ARKAN LOCATION - PULAS SAMPLED BY - FAULKN SAMPLE FROM - TEST	333 BE ASSI L SURVE SPECIFI TE -430/HW O'L APPL SAS KI COUN ER/BOUG HOLE	Y SAMPLE CATION CHECK Y.10 INTERCHANGE LCABLE TY CHNER	IMPROVEMENT (L	SPEC. YEA SUPPLIER COUNTY/ST DISTRICT TR.)(F) DATE SAMI DATE RECE DATE TEST	CODE - SSRVPS R - 2003 ID 1
SAMPLE ID TEST STATUS STATION LOCATION DEPTH IN FEET MAT'L COLOR MAT'L TYPE LATITUDE DEG-MIN- LONGITUDE DEG-MIN- % PASSING 2	- - - - - - SEC - SEC -	20124237 S1217 INFORMATION ONLY 489+00 6'LT 0-5 BR/GR	- 20124238 - S1218 - INFORMATI - 497+00 - CL - 0-2.5Z - BR/GR - 34 47 - 92 23	ON ONLY -	92 23 20.60
3/4 3/8 NO. NO. NO.	IN IN IN 4 - 10 - 40 - 80 - 200 -		- 100 - 99 - 81 - 72 - 62 - 51 - 47	-	100 86 90 85 76 59 54
LIQUID LIMIT PLASTICITY INDEX AASHTO SOIL UNIFIED SOIL % MOISTURE CONTENT ACHMSC AGG.BASE CRS.CL7	-		- 33 - 11 - A-6(2) - 11.5 		32 11 A-6(2) 11.4
	# # #		: :: :: :: ::-	- - - -	

REMARKS - LOCATIONS MEARSURED FROM CL OF CONST. - Z= AUGER

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 - 11/06 JOB NUMBER - 06133 FEDERAL AID NO TO BE PURPOSE - SOIL S SPEC. REMARKS - NO SP SUPPLIER NAME - STATE NAME OF PROJECT - I-4 PROJECT ENGINEER - NOT PIT/QUARRY - ARKANSA	3 ASSIC SURVET ECIFIC 30/HW APPL	Y SAMPLE CATION CHEC: Y.10 INTERC: ICABLE		MATERI SPEC. SUPPLI COUNTY DISTRI /EMENT(L.R.)(F)	ICE NO TAL CODE - YEAR - TER ID TYSTATE - TCT NO	SSRVPS 2003 1 60 06
LOCATION - PULASKI SAMPLED BY - FAULKNER	/BOUG			DATE :	SAMPLED - RECEIVED - IESTED -	10/29/12
SAMPLE FROM - TEST HO MATERIAL DESC SOIL		Y - R VALU	JE- PAVEMENT		IESIED -	11/00/12
LAB NUMBER		20124240	_		1044	
SAMPLE ID		S1220	-		(A)	
TEST STATUS	_	INFORMATION 521+00	N ONLY -		-	
STATION			_		7 <u>2</u>	
LOCATION		CL 0-5	-		3₩	
DEPTH IN FEET		GR/BR	-		·=	
MAT'L COLOR MAT'L TYPE	_	GR/ BR	-		0.5 Vie	
LATITUDE DEG-MIN-SE	c -	34 47 3	37.00 -		-	
LONGITUDE DEG-MIN-SE						
% PASSING 2 I	N		; = :		_	
1 1/2 I			=		-	
3/4 I		100				
3/8 I		99	-		_	
NO.		86	-		_	
NO. 1		70	-		=	
NO. 4		50	-		_	
NO. 8 NO. 20	0 -	44 37	9		_	
LIQUID LIMIT		25	-		-	
PLASTICITY INDEX AASHTO SOIL	-	9	_		=2	
UNIFIED SOIL	_	A-4(0)	_		3	
% MOISTURE CONTENT	-	5.1	-		20	
ACHMBC (I	IN) -	8.0	12		-	
	IN) -	8.75	2		-	
	:#0		=		-	
	7 7. 2				_	
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REMARKS - LOCATIONS MEARSURED FROM CL OF CONST. - Z=AUGER

AASHTO TESTS : T24 T88 T89 T90 T265

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

MICHAEL BENSON, MATERIALS ENGINEER

	*** SOI	L	SURVEY	/ F	AVEI	MENT	SOUNDING	TEST	REPO	RT ***		
SPEC. REMARKS SUPPLIER NAME NAME OF PROJECT PROJECT ENGINEE PIT/OUARRY	- 061333 - TO BE AS - SOIL SUF - NO SPECI - STATE - I-430/ ER - NOT AF ARKANSAS	SSI VE FI 'HW	Y SAMP CATION Y.10 I ICABLE	CHE	ECK				MATER SPEC. SUPPI COUNT DISTR R.) (F		- - - -	RV 2003 1 60 06
LOCATION - SAMPLED BY -	PULASKI CO FAULKNER/BO	NUC OUC	TY HNER						DATE	SAMPLED RECEIVED	-	10/29/12
SAMPLE FROM - MATERIAL DESC.		RVE	EY - RE	ESIS'	TANC	E R-	VALUE A	CTUAL		TESTED TS	-	11/06/12
LAB NUMBER		_	20124	241			Ψ.			3 ≠ 3		
SAMPLE ID			ממונים	1			_					
TEST STATUS		_	TNFOR	т МАТТ	ON (YLINC	=			·		
STATION		_	513+0	0		-	=			·=		
LOCATION		_	CL				= 0:					
DEPTH IN FEET	Г	_	0-2.0	Z			= //			13 5 5		
MAT'L COLOR	_	_	BR/GR				3 0					
MAT'L TYPE		_	,				-					
LATITUDE DEC	3-MTN-SEC	_	34	47	13.	20						
LONGITUDE DE	G-MIN-SEC	-	92	23	12.	70						
% PASSING	2 IN.	_					_			-		
	1 1/2 IN.	-	100				-			=		
	3/4 IN.	-	96				_					
	3/8 IN.	-	90				-					
	NO. 4		87				_			022		
	NO. 10	_	80				_			_		
	NO. 40		73				_					
	NO. 80	_	64				_			(E		
	NO. 200		51									
LIQUID LIMIT		-	30							÷		
PLASTICITY I	NDEX	-	10				-			=		
AASHTO SOIL		-	A-4	(2)			()			=		
UNIFIED SOIL		-					.=			-		
% MOISTURE C	TNETNC	-					-					
		-					-			-		
		-					38			_		
		_					12			_		
		_					-			_		
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		-					/.T			-		
		-					V2			-		
		_					122			-		

REMARKS - LOCATIONS MEARSURED FROM CL OF CONST. - Z=AUGER

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AASHTO TESTS : T24 T88 T89 T90 T265