ARKANSAS DEPARTMENT OF TRANSPORTATION



SUBSURFACE INVESTIGATION

STATE JOB NO.	BR3714	
FEDERAL AID PROJECT NO.	STPB-0037(33)	
	LITTLE BODCAU CREEK STR. & APPRS. (S)	
COUNTY ROAD NO.	25	
IN	LAFAYETTE	COUNTY

The information contained herein was obtained by the Department for design and estimating purposes only. It is being furnished with the express understanding that said information does not constitute a part of the Proposal or Contract and represents only the best knowledge of the Department as to the location, character and depth of the materials encountered. The information is only included and made available so that bidders may have access to subsurface information obtained by the Department and is not intended to be a substitute for personal investigation, interpretation and judgment of the bidder. The bidder should be cognizant of the possibility that conditions affecting the cost and/or quantities of work to be performed may differ from those indicated herein.

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT

October 6, 2016

TO: Mr. Rick Ellis, Bridge Engineer

SUBJECT: Job No. BR3714 Little Bodcaw Creek Str. & Apprs. (S) County Road 25 Lafayette County

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

It is anticipated that concrete piling will be utilized at all bents. 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 3 Engineer G.C. File

GEOLOGY AND SITE CONDITIONS Job No. BR3714 Little Bodcaw Creek Str. & Apprs. (S) Lafayette County County Road 25

Site Conditions

The existing bridge is a single span bridge that crosses over Little Bodcaw Creek. The main structure of the bridge consists of two rail cars covered by dirt and gravel. At the time of inspection the bridge contained both patched and unpatched holes in the decking. The bridge embankments are supported by concrete and rusted sheet metal held in place by timber pilings. There are timber pilings from a previous bridge under the existing bridge in the channel. There are no guardrails leading up to the bridge and the guardrails over the bridge consist of steel piping. Little Bodcaw is a black water creek that flows west to east under the bridge and is part of the Bodcaw Bottoms Watershed. This particular section of the creek runs through a recently harvested pine plantation and multiple oil well pads exist to the north. Overhead powerlines and an underground telecommunication line parallel the east side of the bridge.

Site Geology

The project is located over Quaternary alluvial deposits (map symbol Qal). These are typically river deposits composed of gravels, sands, silts, clays, and mixtures of any and all of these. These alluvial deposits are located over the Cane River member of the Claiborne Group (map symbol Tc). Cane River Claiborne deposits are Tertiary in age and consist of locally lignitic sand, silt ,and clay with occasional glauconitic sand, ironstone layers, and interbedded sand in updip areas. The contact between the Quaternary alluvial deposits and the underlying Claiborne Group is an erosional surface and was encountered in borings at approximately 40' below ground level (bgl) during the subsurface investigation. The thickness of the Claiborne ranges from a thin edge to as much as 1,500 feet. At the project location, a cemented sandstone layer was encountered in two of the borings at approximately 50 feet bgl.

Subsurface Conditions

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

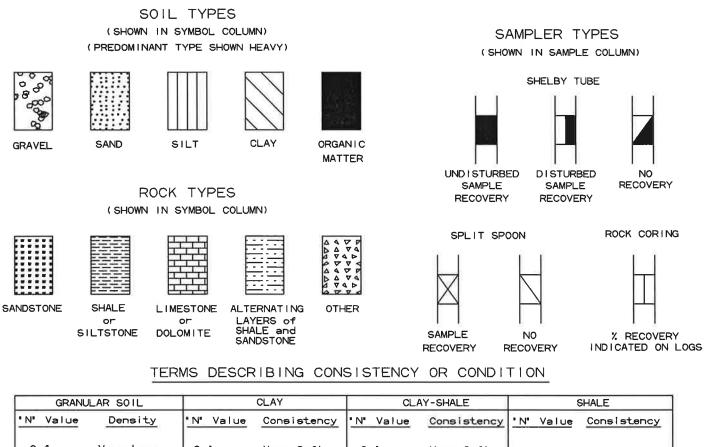
0 to 40 Feet:*	Varies from moist to wet, very loose to medium dense, brown to gray sand to clayey sand with occasional gravel .
40 to 75 Feet:**	Varies from moist, dense to very dense, dark brown silty and clayey sand to moist, very hard sandy clay with lignite and some gravel.
75 to 94 Feet:	Consists of moist, very dense, dark brown to gray silty to clayey sand with some cemented seams to moist, hard to very hard, sandy clay with lignite.
94 to 101.2 Feet:	Varies from moist, very dense, dark brown to gray sand to moist, very hard, dark brown sandy lignitic clay .
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- * Cemented sandstone was encountered in borings 1 and 4 at approximately 50 feet (bgl).
- ** Sampler advanced by the static weight of the hammer 1.5 feet.

D₅₀ AGGREGATE ANALYSIS FOR SCOUR CALCULATIONS

-		Job No.	3R3714		
Creek Name	Station	Sample Type	Location	Depth (FT)	Aggregate Size (D50) (IN)
Little Bodcaw Creek	101+58	Creek Bank	9' Lt. C.L. Construction	N/A	0.0041

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0.	-4	Very Loose	0-1	Very Soft	0-1	Very Soft		
5	-10	Loose	2-4	Soft	2-4	Soft	31-60	Soft
1 11	1-30	Medium Dense	5-8	Medium Stiff	5-8	Medium Stiff	Over 60	
3	1-50	Dense	9-15	Stiff	9-15	Stiff	More than 2"	
0	ver 50	Very Dense	16-30	Very Stiff	16-30	Very Stiff	Penetration	
			31-60	Hard	31-60	Hard	in 60 Blows	Medium Har
			0ver 60	Very Hard	0ver 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.
- 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: $\frac{6}{8-9} \Rightarrow 8+9 = 17b lows / ft$. 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.

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	Wet, Loose, Light Gray Sand							3 3-4		
X	Wet, Very Loose, Light Gray Silty Sand							1 2-2		
X	Wet, Medium Dense, Light Gray Sand with Some Gravel							5 8-17	-	
	Encountered cemented sand at approximately 75.	5 feet								

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— -	\mathbb{N}	$ \ge $								25-40	5		
{	\mathbb{N}												
— — <u>–</u> Ř	\mathbb{N}												
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70	\mathbf{X}												
REMA	RKS	:											
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			HWY. & TRANS. DEPARTMENT		BORI	NG 1	NO. 3									
MATERIALS DIVISION - GEOTECHNICAL SEC.						PAGE 3 OF 3										
JOB NO. BR3714 Lafayette County							DATE: September 27, 2016									
I JOB N	JOB NAME: Little Bodcaw Creek Str. & Apprs. (S) Co. Rd. No. 25						RILLIN			D						
STATI	ION·		Co. Rd. No. 25 106+08		Hollow Stem Auger - Rotary Wash											
LOCATION: 10' Left of Construction Centerline					EQUIPMENT: CME											
			roy Frazier		НАММ	MER (CORRE	CTIOI	N FA(TOR	1.23					
COM	PLET	ION	DEPTH: 100.4							oron.	1.20					
D	s	S														
E P	Ŷ	A M							Å	S	0/	0/				
T	M	P	DESCRIPTION OF MATERIAL	SOIL				THE	U.F	MO	% T	% R				
H	B O	L		GROUP	IC	ST.		EIC	RC	BL BL.	C R	Q D				
	Ľ	E			PLASTIC LIMIT	% MOIST.	LIMIT	DRY WEIGHT	LBS PER CU.FT	NO. OF BLOWS PER 6-IN.	<u>K</u>	U				
FT,	NON	S	SURFACE ELEVATION: 262.8		LI	%	Eč	DR	LB							
	$\langle \rangle$	Х								10						
	\mathbf{N}		Moist, Very Hard, Dark Gray Sandy Clay with							2 4 -40						
	\mathbb{N}		Trace Gravel													
75	$\backslash \rangle$															
/5	XX	\times		-						40						
		$ \simeq$								60						
			Moist, Very Dense, Gray Silty Sand with							(5")						
			Cemented Seams													
80																
		\bigtriangledown								15						
		\bigtriangleup								37-60 (10")						
			Moist, Very Dense, Dark Brown Silty Sand							(10)						
85																
	ÚÚ)	\times								19						
	199	\rightarrow								27-60 (11")						
	111		Moist, Very Dense, Dark Brown Clayey Sand				i i									
	1.1.															
90	UN.															
	$\langle \rangle$	X								18						
		\rightarrow								26-45						
	$\langle \rangle$															
[
95	\mathbb{N}		Moist, Very Hard, Dark Brown Sandy Clay													
	1	XI								17 30-56						
	\mathbb{N}	Ť								00-00						
	$\langle \rangle$															
	$\langle \rangle$															
100	x X .	\ge	Moist, Very Dense, Dark Brown Sand							60						
		ľ	Boring Terminated							(5")						
105							1									
REMA	BKG							_								
	1110	•														
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	HWY. & TRANS. DEPARTMENT DIVISION - GEOTECHNICAL SEC.				NO. 4													
	BR3714 Lafayette County	PAGE 1 OF 3																
	Little Bodcaw Creek Str. & Apprs. (S)	DATE: September 13 and 14, 2016																
SOB WRITE.	TYPE OF DRILLING: Hollow Stam Auger Batery West																	
	STATION: 107+63							Hollow Stem Auger - Rotary Wash EQUIPMENT: CME 750										
LOCATION:	Children Child 150																	
LOGGED BY: F	Raymond Taylor		HAMN	AER (CORREC	CTION	N FAC	CTOR:		1.23								
COMPLETION	N DEPTH: 101.5										_							
D S A E Y A P M P T B	DESCRIPTION OF MATERIAL	SOIL GROUP				[GHT	CU.FT.	TOWS		% T C	% R							
	SURFACE ELEVATION: 260.8	GROOT	PLASTIC LIMIT	% MOIST.	LIQUID	DRY WEIGHT	LBS PER CU.FT.	NO. OF BLOWS	PER 6-IN.	R	Q D							
	Wet, Very Loose, Brown Clayey Sand with Some Gravel			%		Q	Γ	3 2-2										
	Wet, Loose, Brown Sand			00				3 4-6 2 3-3	3		22							
X	Wet, Medium Dense, Gray Sand							6 6-6	5									
X	Wet, Very Loose, Gray Sand							1 1-2										
X	Wet, Dense, Brown Sand							16 24-2										
REMARKS:																		

	HWY. & TRANS. DEPARTMENT DIVISION - GEOTECHNICAL SEC.				IO. 4						
	PAGE 2 OF 3										
JOB NO. JOB NAME:		DATE: September 13 and 14, 2016 TYPE OF DRILLING: Hollow Stem Auger - Rotary Wash									
	107+63 8' Left of Construction Centerline		EQUIF			0		ME 750			
	Raymond Taylor		HAMN	1ER C	ORRE	CTIOI	N FAC	CTOR:	1.23		
	N DEPTH: 101.5		,						-		
D S A P M P T B L H O E FT. S	DESCRIPTION OF MATERIAL SURFACE ELEVATION: 260.8	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID	DRY WEIGHT	LBS PER CU.FT.	NO. OF BLOWS PFR 6-IN	% T C R	% R Q D	
	SURFACE ELEVATION. 200.0			~		D	Ξ	Ž 13			
	Moist, Dense, Dark Brown Silty Sand with Gravel							13-18	8		
	Moist, Dense, Silty Sand with Some Gravel							12 23-23	8		
	Moist, Very Dense, Silty Sand with Some Lignite							29 48-60	2		
50	Cemented Sand										
	Moist, Very Dense, Dark Brown Sand with Lignite							22 38-54			
	Moist, Very Dense, Dark Brown Sand with Lignite and Some Clay							23 28-33			
								20 33-52			
	Moist, Very Dense, Dark Brown Sand with Clay and Lignite							21 28-41			
70 REMARKS:											

			HWY. & TRANS. DEPARTMENT DIVISION - GEOTECHNICAL SEC.				NO. 4									
JOB NO. BR3714 Lafayette County							PAGE 3 OF 3 DATE: September 13 and 14, 2016									
JOB NAME: Little Bodcaw Creek Str. & Apprs. (S)						TYPE OF DRILLING:										
			Co. Rd. No. 25		Ho	llow	Stem	Aug			-	ash				
STATI LOCA			107+63 8' Left of Construction Centerline		EQUI	MEN	T:		С	ME 7	750					
			aymond Taylor		нами	AFR (CORRE	CTIO		יערידי		1.23				
			DEPTH: 101.5						IT A	STOR.		1.25	_			
D	s	S														
E P	Y	A M						k	É	s		%	%			
Γ	М	P	DESCRIPTION OF MATERIAL	SOIL				THE	CU.F	MO	- 1	T	R			
н	B	L		GROUP	ЦС ЦС	IST.	Ω.	VEI	ER (FBI	z	C R	Q D			
FT.	Ľ	E S			PLASTIC LIMIT	% MOIST.	LIMIT	DRY WEIGHT	LBS PER CU.FT	NO. OF BLOWS	PER 6-IN.		-			
<u> </u>		\sim	SURFACE ELEVATION: 260.8			%		Ω	П	Ž 20		_	_			
		\square								60						
			Moist, Very Dense, Dark Brown Silty Sand							(5'	"					
75												, i				
		Х								17 41-0						
			Moist, Very Dense, Dark Brown Sand with Clay							(8'))					
			and Lignite													
80					(21						
	\mathbb{N}	X								27-3						
	\mathbb{N}		Moist, Hard, Dark Brown Sandy Clay													
			Molst, Hald, Dark brown Gandy Clay													
85	\mathbb{N}															
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	X	Х	Lignite							22 26-3						
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