

CULVERT FOUNDATION RECOMMENDATIONS REPORT REPLACMENT OF BRIDGE 890356 ON SR 2133 (SANDY RIDGE ROAD) OVER LITTLE RICHARDSON CREEK

WBS No.: 17BP.10.R.17 Tip No.: NA County: UNION

Prepared by:

AMEC Environment and Infrastructure, Inc. 4021 Stirrup Creek Drive, Suite 100 Durham, North Carolina 27703 (Project No. 6469-12-1040)

Prepared for:

NCDOT

July 23, 2012



July 23, 2012

Division Bridge Program Manager NCDOT Division 10 Office 716 W. Main Street Albemarle, North Carolina 28001

Attention: Mr. James Wally, E.I.:

INCLUDE AS NOTE ON PLANS

Subject: Culvert Foundation Recommendation Report Replacement of Bridge No. 890356 on SR 2133 (Sandy Ridge Road) over Little Richardson Creek WBS No.: 17BP.10.R.17 TIP No.: NA County: Union AMEC Project Number: 6469-12-1040

Dear Mr. Wally:

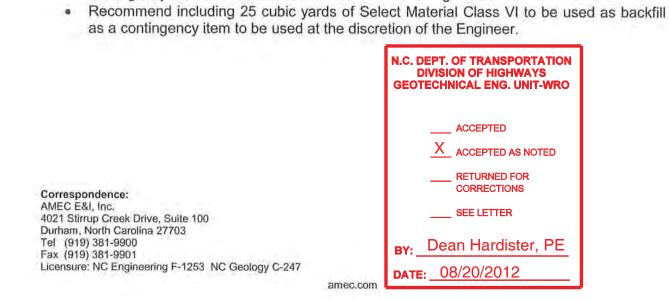
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AMEC Environment and Infrastructure, Inc. (AMEC) is pleased to transmit the Culvert Foundation Recommendations Report in association with the replacement of Bridge No. 356 on SR 2133 (Sandy Ridge Road) over Little Richardson Creek. The recommended structure type is two Reinforced Concrete Box Culverts (2 @ 12' x 5'). The Structure Subsurface Investigation Report provided by NCDOT and the additional Structure Subsurface Report performed by AMEC are provided in the Appendix of this report. The Foundations Recommendations Report has been prepared using boring data obtained by AMEC and others.

RECOMMENDATIONS

Excavate 1 foot below culvert and footings and replace with foundation conditioning

· Recommend including 25 cubic yards of undercut of soft foundation soils as a



material in accordance with Article 414 of the Standard Specifications.

contingency item to be used at the discretion of the Engineer.

Culvert Foundation Recommendations Report – 17BP.10.R.17 AMEC Project No.: 6469-12-1040

July 23, 2012 Page 2

If you have any questions regarding recommendations contained in this report, please contact us at 919-381-9900.

Sincerely, AMEC Environment and Infrastructure, INC.

Manelahusan

J. Shane Johnson, P.E., P.G. Senior Geotechnical Engineer Registered, North Carolina 037422

Tan Gary R. Taylor, P.E.

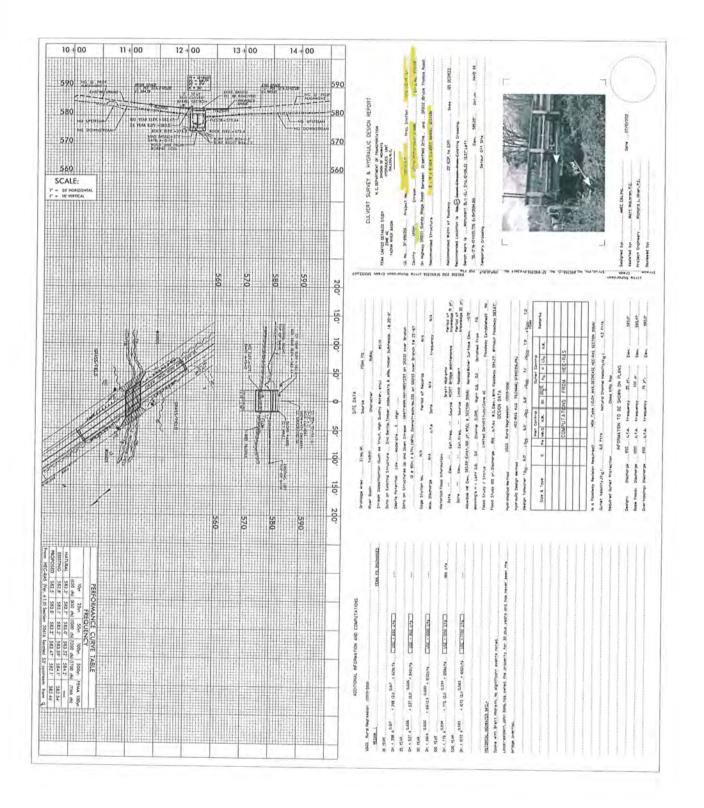
Geotechnical Department Manager Registered, North Carolina 18580

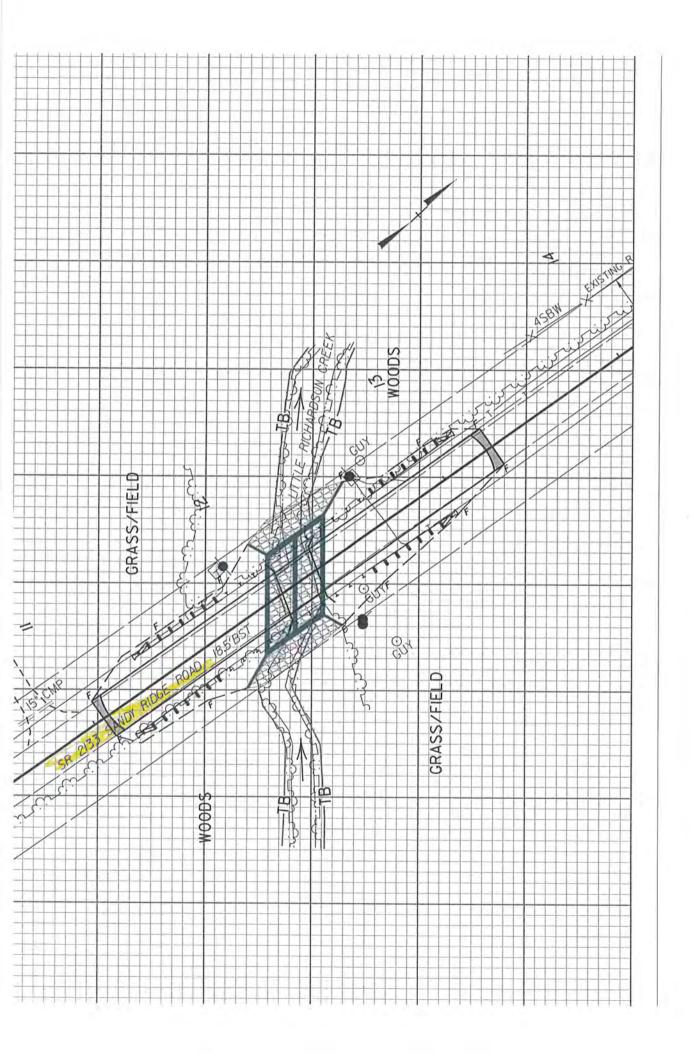


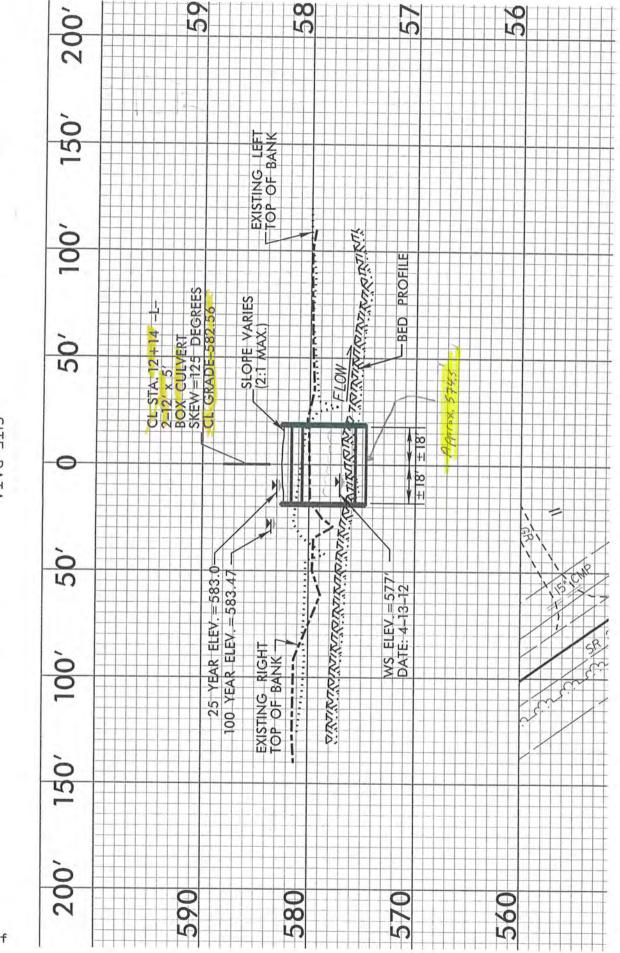
N.C. DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENG. UNIT-WRO
ACCEPTED
RETURNED FOR RETURNED FOR CORRECTIONS
SEE LETTER
BY: Dean Hardister, PE
date: 08/20/2012

APPENDIX

PROVIDED INFORMATION







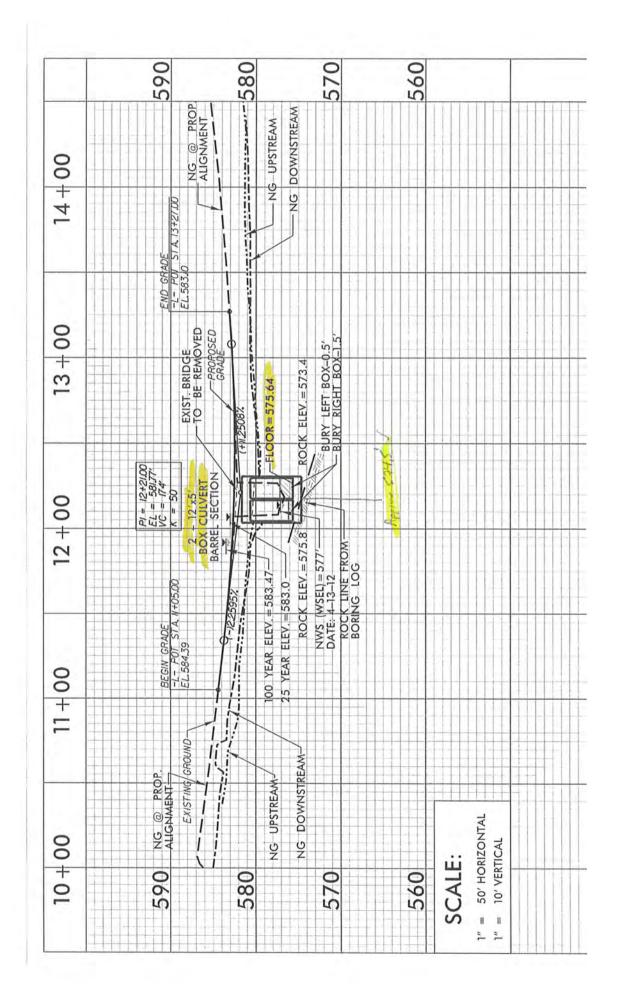
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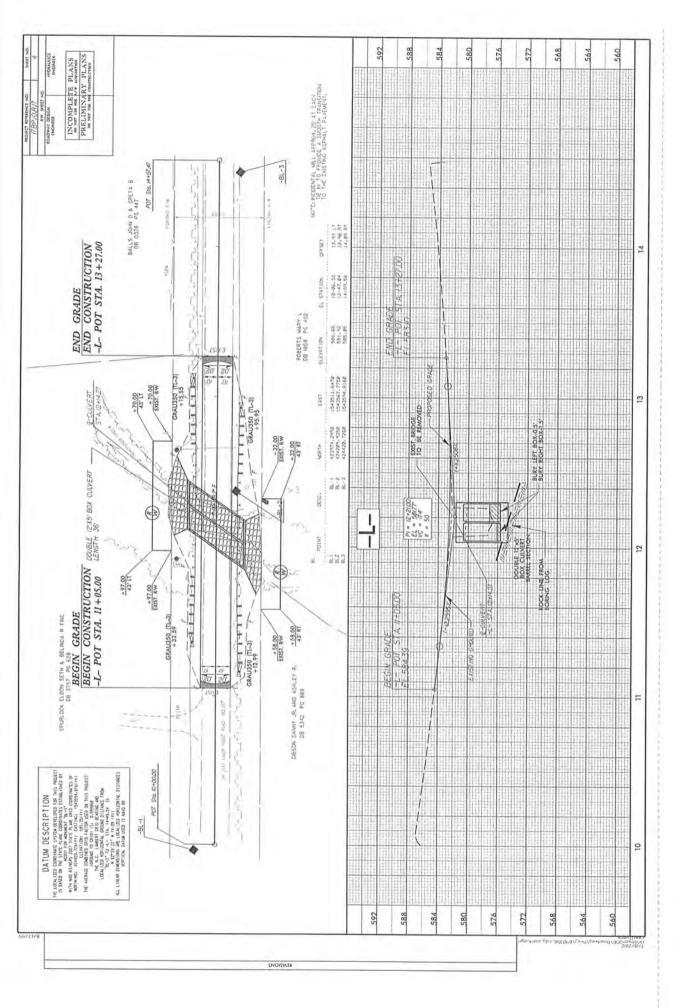
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SITE DATA

Source

Drainage Area2.1.sq. Mi.

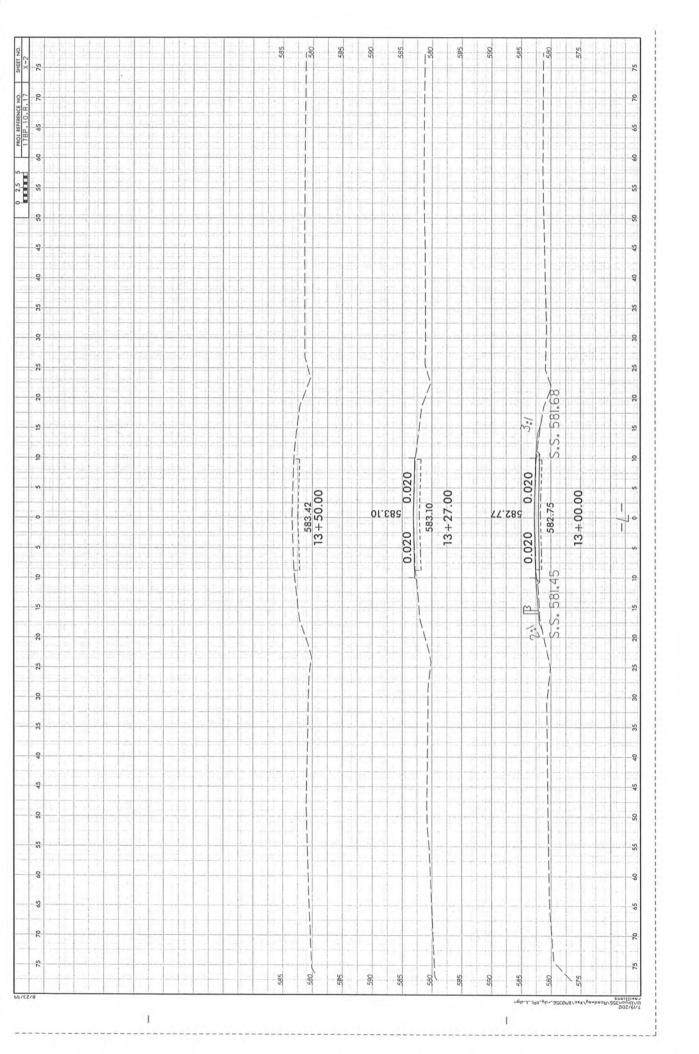




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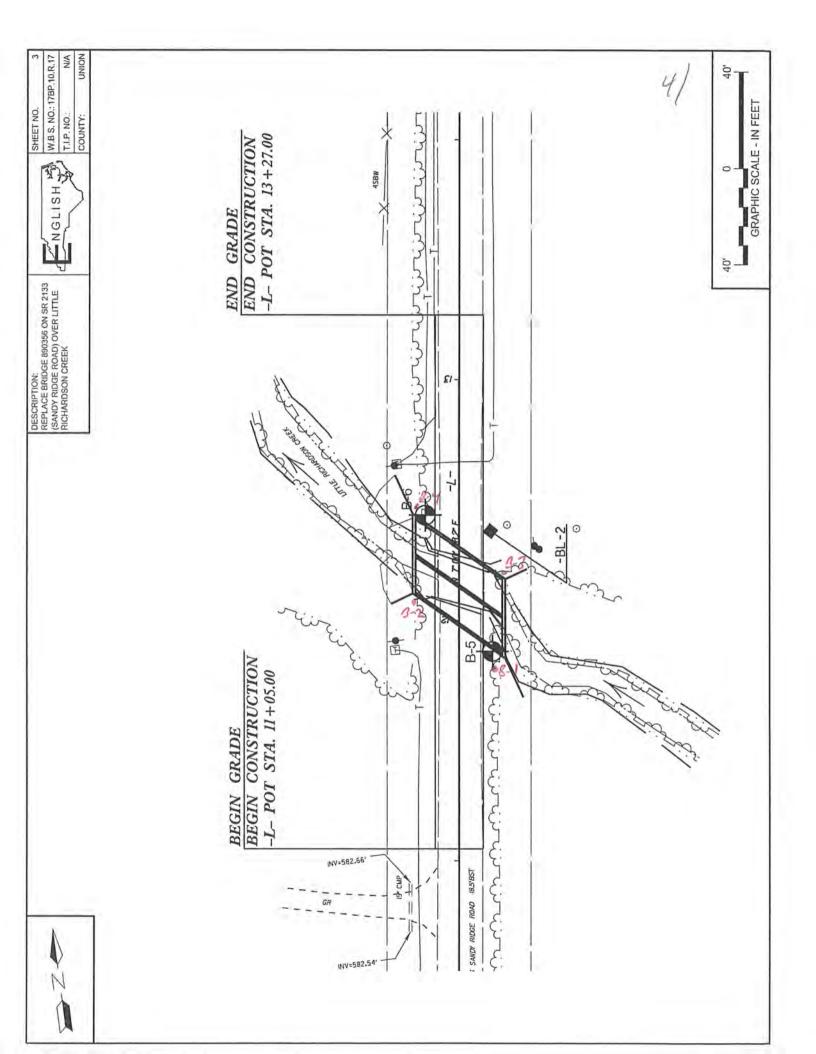


FOUNDATION CALCULATIONS

AMEC E&I, Inc. 4021 Stirrup Creek Drive, Suite 100 Durham, NC 27703	JOB NO. 6468-12-1103 SHEET / OF X PHASE GROUP N Bridges TASK X JOB NAME ONION CO. Br. 256 X BY JSJ DATE 7/19/12 X CHECKED BY SG DATE 7/28/12 X
BR. 356 UNIEON GO,	
- Recommended Structure =	2 @ 12 X 5' RCBC
	= (Floor = 575.64) Restinated from N 574.5' CSR
- Existing Btm of scale - Proposed Gende @ E =	= = 577 (CSR) 582.56 -
	Ways and the proliminary I GRADE Charge. A < 2
For Lucotrinu, Ame	Borring to Returnel ON each (4 total). See Inventory Report Provided 1-Baring (w/Rock Corry) Creek. See Amer, Inventory
Report For location	ve and logs.
NCOUT Beachmarker.	Ec is Barryy where references to Collar Elevations are relative to
AMEC Assigned collo	(100') locoted on exciting Bridge. r eleventions to NCOUT'S Borneys vided (-4-) proble.

AMEC E&	up Creek Drive, Sui	te 100	PHASE <u>Gros</u> JOB NAME <u>Un</u> BY JSJ	-12-1103 SHEET <u>p N Bridgel</u> TASK ZON Co. Br. 33 DATE SG DATE	x x 7/20/12 x
END	BENT 1	SIOE OF	CULVERT	(Down station	of Greek)
BORTNG	Collar <u>Elev</u> .	WR Elen,	<u>HR Elw,</u>	Btm. of Culturt Elev,	Dep H. to WR/HR
B-1	\$ 582,5		576.2	\$ 574.5	-1.7'2
ß-2	3 582,5	577,5%	576.2	* 574,5	-31/
<i>B-5</i>	~ 582,3	575,8'	574	7 574,5	1.3 -
<u>в-з</u> в-ч	582 582		573,4 / 573,8 /	stedren of one 4 574,5 2 574,5	l.1 0.7
B-6 Sum		575.9	574.2	\$ 574.5	-/e¥'~
	The Btm 1-3 In	of cult to wr//	int on YR	the SRI side	is Approve,
+ 7	The Btm 1.5 Abosi	of culve WR to	rt on th Approx	e ERZ side 15 juit w	15 Approx 2/1412
*	BASED Culvert	ON THE	BOATNES, ARTNE	The proposed NEAR O'R C	Rtm. of welle.

AMEC E&I, Inc. 4021 Stirrup Creek Drive, Suite 100 Durham, NC 27703	JOB NO. <u>6468-12-1103</u> SHEET <u>3</u> OF <u>X</u> PHASE <u>GROUP N Bridge</u> TASK <u>X</u> JOB NAME <u>UNTUN Co. Rridge</u> <u>356</u> <u>X</u> BY JSJ DATE <u>7/20/12 X</u> CHECKED BY <u>SG</u> DATE <u>7/28/12 X</u>
With Poundation condition With Articla 414 * Roundations conditions on It Culjust should not	a columnt and footings and replace inty material in Accordance of the standard Specifications, actual = CLAII VI (No. 57). Bear on welther (pr. 414 of standard
do not ontrapato Settlement of the	sering on or near welter, we Significant immediate on long term culvet.
- Due to minimal Fill grade, we do not term rettlements. - If soft foursations	required to reach proposed antraipate significant long swills are enclosatored, they should
material. Quanty (0.5 x 245' x 30	placed up CLAN UZ (select of undercet/BACEFUL Estimate is) = 675 ft = 25 yd ³ hity AL a contingency





RCDOT GEOTECHNICAL ENGINEERING UNIT

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	17BP	1	1. Carlos 1. Carlos			P 178P.		and the second second	TY UNION				GEOLOGIST R. Clark	
SITE	DESCR	IPTIO	N Rep	place E	Bridge	890356 or	n SR 213	3 (Sandy	Ridge Rd.) o	over Little	Richa	rdsor	Creek	GROUND WTR (
BORI	ING NO	. B-5			ST	TATION	11+87	_	OFFSET	14 ft R	Г		ALIGNMENT -L-	0 HR. 1
COLL	AR EL	EV. 5	82.3 ft		T	OTAL DEP	TH 18.0) ft	NORTHI	IG 424	160		EASTING 1,543,563	24 HR. 3
DRILL	RIG/HA	MMER	EFF./DA	TE M	AC9354	CME-45C 8	1% 03/01/1	1		DRILL	METHO	DD SI		MER TYPE Automatic
DRIL	LER F	. Cox			ST	TART DAT	E 05/24	/12	COMP. D	_			SURFACE WATER DEPTH	
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		ŧ	WOH	1	4	15 Q.	1 dala	shuck	2 224	5	M		ALLUVIAL Yellowish brown, medium s	tiff, moist to wet
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SITE	DESCR	IPTION	N RE	PLAC	E BRID	GE NO	. 356 ON	SR 213	33 (SA	NDY RIDG	E RD.) (OVER L	ITTL	E RICHARDSON CREEK	GROUND WT	R (f
BOR	NG NO.	B2			S	TATION	N/A			OFFSET	N/A			ALIGNMENT N/A	0 HR.	Dr
COLL	AR ELE	EV. 9	9.2 ft		T	DTAL D	EPTH 6.3	3 ft	_	NORTHING	G N/A			EASTING N/A	24 HR.	N
RILL	RIG/HAN	IMER E	FF./DA	TE H	F00072	CME-550	89% 09/02	/2009		1	DRILL	METHOD	H.S	Augers HAM	MER TYPE Autom	atic
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LEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)		0.5ft	1	0	25	VS PER 50		75 100	SAMP. NO.	MOI	O G	SOIL AND ROCK DE ELEV. (ft)		РТН
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Lisa natura natu						Rt	nof C	alver	+	4.5				BRN-GRAY MED. DE CLAYEY SILTY SAND (WEATH. CRYSTALLINE WEATH- CRYSTALLINE Boring Terminated BY AL at Elevation 92.9 ft ON (ROCK WR = 577.5' CR = 576.2'	NSE MOIST A-2-8) W/ SEV. ROCK FRAGS. ROCK ALLINE ROCK GER REFUSAL	

WBS	17BP.	.10.R.1	7		Т	P 17BP1	0R17	COUNT	Y UNION		1		GEOLOGIST Stick	ney, J. K.		1
SITE	DESCR	IPTION	RE	PLAC	BRID	GE NO. 3	56 ON SI	R 2133 (SA	ANDY RIDGE	RD.) (OVER	LITT	E RICHARDSON CR		GROUN	D WTR (f
	NG NO.					TATION N			OFFSET N				ALIGNMENT N/A		0 HR.	Dr
COLL	AREL	EV. 99	9.2 ft	1	T	OTAL DEP	TH 6.3 f	t	NORTHING	N/A			EASTING N/A		24 HR.	NN
DRILL	RIG/HAM	MMER E	FF./DA	TE H	00072	CME-550 89	% 09/02/20	009		DRILL	METHO	D H.	S. Augers	HAMM	ER TYPE	Automatic
	LER S				S	FART DAT	E 10/20/	/11	COMP. DA	TE 10/	/20/11		SURFACE WATER	DEPTH N	/A	
(ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLC 0.5ft	0.5ft		0	BLOWS	50	75 100	SAMP. NO.	мо	L O G	SOIL AND ELEV. (ft)	ROCK DES	CRIPTION	DEPTH (
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95	95.7 -	- 35	0	1	3				····	SS-1	м		96.2 RED-BRN M	CLAY (A-6) ALLUVIAL FT TO MED	STIFF MC	3. DIST 5.
				_	_		R						BRN-GRAY I	Y SAND (A-	ST CLAYE	
						Btm	of cu	574	5'				Boring Termina at Elevation 9	2.9 ft ON CF ROCK	YSTALLIN	E
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NCDOT GEOTECHNICAL ENGINEERING UNIT **BORELOG REPORT** 9 TIP 178P.10.R.17 WBS 17BP.10.R.17 COUNTY UNION GEOLOGIST R. Clark SITE DESCRIPTION Replace Bridge 890356 on SR 2133 (Sandy Ridge Rd.) over Little Richardson Creek GROUND WTR (ft) BORING NO. B-6 STATION 12+44 OFFSET 14 ft LT ALIGNMENT -L-0 HR. 0.5 COLLAR ELEV. 581.9 ft TOTAL DEPTH 17.7 ft NORTHING 424,220 EASTING 1,543,542 24 HR. 2.3 DRILL RIG/HAMMER EFF./DATE MAC9354 CME-45C 81% 03/01/11 DRILL METHOD SPT Core Boring HAMMER TYPE Automatic DRILLER F. Cox START DATE 05/24/12 COMP. DATE 05/24/12 SURFACE WATER DEPTH N/A DRIVE BLOW COUNT **BLOWS PER FOOT** SAMP. DEPTH ELEV ELEV 0 SOIL AND ROCK DESCRIPTION (ft) (ft) 0.5ft 0 25 100 0.5ft 0.5ft 50 75 NO. MOI (ft) G ELEV. (ft) DEPTH (ft) 585 581.9 0.0 581.9 GROUND SURFACE 0.0 2 3 ROADWAY EMBANKMENT 65. 2.4 . . . 2.2.2.2 ₩ 580 Brown, medium stiff, moist, fine sandy, 579.4 clayey SILT (A-4) with trace organics 578.4 35 1.57 2 ALLUVIAL 3 W FC WWXX 5 Light yellowish brown, medium stiff, wet, silty 575.9 6.0 CLAY (A-6) with little fine to coarse sand 575 5742 77 WEATHERED ROCK -60/0.0 60/0.0 Gray, METAVOLCANIC ROCK NON-CRYSTALLINE ROCK . Gray, METAVOLCANIC ROCK 1 570 ÷ 14 . . . :::: 2 . . . 565 564 2 17. Boring Terminated at Elevation 564.2 ft in Non-Crystalline Rock: METAVOLCANIC ROCK Driller indicates harder drilling at 6.0 feet. Auger refusal at 7.7 feet. BRIDGE 356 LOGS.GPJ NC DOT.GDT 6/20/12

VCDOT BORE SINGLE

E DESCRIPTION REPLACE BRIDGE NO. 356 ON SR 2133 (SANDY RIDGE RD.) OVER LITTLE RICHARDSON CREEK INIG NO. E4 LLAR ELEV. 99.1 ft TOTAL DEPTH 8.2.ft NORTHING N/A LLAR ELEV. 99.1 ft TOTAL DEPTH 8.2.ft NORTHING N/A LLAR BOUND CM-ESSO 8% 6607/2009 DRUL WETHOD HS. Augens HAMMER TYPE A LLOR SAMER FF/DATE H7007/CM-ESSO 8% 6607/2009 DRUL WETHOD HS. Augens NO. CL SOIL AND ROCK DESCRIPTION BLOWS PER FOOT CM 00 056 0.56 0.25 0.075 100 SAMP CM 00 056 0.56 0.55 0.075 100 SAMP CM 00 056 0.56 0.55 0.075 100 SAMP CM 00 056 0.56 0.55 0.075 100 SAMP CM 00 056 0.56 0.55 0.075 100 SAMP CM 00 056 0.56 0.56 0.25 0.075 100 SAMP CM 00 056 0.56 0.56 0.25 0.075 100 SAMP CM 00 056 0.56 0.56 0.25 0.075 100 SAMP CM 00 056 0.56 0.56 0.25 0.075 100 SAMP CM 00 05 0.575 2.07 CM 00 058 0.575 2.075 2.075 CM 00 058 0.575 2.075 2.075 2.075 2.075 2.075 2.075 2.075 2.075 2.075 2.075 2.075 2.075 2.075 2.075 2.075 2.075 2.075 2.075 2.075 2	
LLAR ELEV. 99.1 ft TOTAL DEPTH 8.2 ft NORTHING N/A EASTING N/A 24 HR. LLRIG/HAMMER EFF/DATE HF00072 CME-550 89% 09/02/2009 DRILL METHOD H.S. Augers HAMMER TYPE A LLER START DATE 10/20/11 COMP. DATE 10/20/11 SURFACE WATER DEPTH N/A // DRIVE DEPTH BLOW COUNT BLOWS PER FOOT SAMP. V 0 SOIL AND ROCK DESCRIPTION (ft) 0.5ft 0.5ft 0.5ft 0.5ft 0 25 50 75 100 NO. MOI G ELEV. (ft) SOIL AND ROCK DESCRIPTION 99.1 582 GROUND SURFACE RED-BRN MED. STIFF MOIST SILTY B6.1 CLAY (A-6) ALLUVIAL TAN-GRAY SOFT TO MED. STIFF MOIST SILTY 95.2 3.9 1 2 2 4<	
LL RIG/HAMMER EFF/DATE HF00072 CME-550 89% 09/02/2009 DRILL METHOD H.S. Augers HAMMER TYPE Augers LLER Smith, C. L. START DATE 10/20/11 COMP. DATE 10/20/11 SURFACE WATER DEPTH N/A Image: comparison of the co	
LLER Smith, C. L. START DATE 10/20/11 COMP. DATE 10/20/11 SURFACE WATER DEPTH N/A DRIVE (ft) DEPTH (ft) BLOW COUNT (ft) BLOWS PER FOOT 0.5ft 0.5ft	100 100 100
DRIVE (ft) BLOW COUNT (ft) BLOWS PER FOOT 0.5ft SAMP. 0 SAMP. NO. Soll AND ROCK DESCRIPTION ELEV. (ft) 99.1 582 GROUND SURFACE ELEV. (ft) 99.1 582 GROUND SURFACE ELEV. (ft) 99.1 582 GROUND SURFACE ELEV. (ft) 99.1 582 GROUND SURFACE CLAY (A-6) 95.2 3.9 1 2 1 2 44 1 1 2 44 1 1 2 44 1 1 2 44 1 1 2 44 1 1 2 44 1 1 2 44 1 1 2 44 1 1 3 3 1 2 44 1 1 1 1 1 1 1 1 1 1 3 1 1 1 1 1 2 1 1 1 1 1 1 1 1 <td>utomat</td>	utomat
(ft) (ii) 0.5ft 0.5ft 0 23 50 75 100 NO. MOI G ELEV. (ft) 99:1 582 GROUND SURFACE 99:1 582 GROUND SURFACE RED-BRN MED. STIFF MOIST SILTY 95:2 3.9 1 2 4 4 4 5:2 3.9 1 2 4 4 5:2 9:3 1 2 1 2 1 4 1 1 2 1 2 1 3.9 1 2 1 1 1 1 2 3.9 3.9 3.9	
(ii) 0.5iii	
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95.2 3.9 1 2 2 4	_
95.2 3.9 1 2 2 4 ALLUVIAL 4 TAN-GRAY SOFT TO MED. STIFF MOIS 92.3 SANDY CLAYEY SILT (A-4) 92.3 SANDY CLAYEY SILT (A-4) RESIDUAL 90.9 RESIDUAL CLAYEY SILTY SAND (A-2-6) Boring Terminated BY AUGER REFUSA at Elevation 90.9 ft ON CRYSTALLINE ROCK	
Image: Sampy clayery site of the second s	
BRN-GRAY MED. DENSE MOIST CLAYEY SILTY SAND (A-2-6) Boring Terminated BY AUGER REFUSA at Elevation 90.9 ft ON CRYSTALLINE ROCK	51
Boring Terminated BY AUGER REFUSA at Elevation 90.9 ft ON CRYSTALLINE ROCK	Г
at Elevation 90.9 ft ON CRYSTALLINE	

NBS	17BP	.10.R.1	7		Т	P 17BP10R17	COUNT	Y UNION				GEOLOGIST Stickney, J. K.	
SITE	DESCR	IPTION	RE	PLACE	EBRID	DGE NO. 356 ON \$	R 2133 (S	ANDY RIDG	ERD.)	OVER	LITTL	E RICHARDSON CREEK	GROUND WTR
BORI	ING NO	B3			S	TATION N/A		OFFSET	N/A			ALIGNMENT N/A	0 HR. 0
COLL	LAR EL	EV. 99	9.1 ft		Т	OTAL DEPTH 8.6	ft	NORTHING	S N/A			EASTING N/A	24 HR. N
RILL	RIG/HAM	MMER E	FF./DA	TE HF	00072	CME-550 89% 09/02/	2009		DRILL	METHO	D H.S	S. Augers HAM	MER TYPE Automatic
	LER S	mith, C			_	TART DATE 10/20	0/11	COMP. DA	TE 10	/20/11		SURFACE WATER DEPTH	N/A
LEV (ft)	ELEV	DEPTH (ft)		0.5ft		BLOW 0 25	S PER FOO 50	100 million (1997)	SAMP.	11	L O	SOIL AND ROCK DE	SCRIPTION
	(ft)		0.51	0.51	0.51		50	75 100	NO.	MOI	G	ELEV. (ft)	DEPTH
100													
	-	-				4					F	997 582 GROUND SUR	
	1	-				i::: :::	: : : : :	1::::		11.1		ROADWAY EMBA RED-BRN MED. STIFF	MOIST SILTY
95	95.3	3.8	2	4	4	1			SS-3			96.1 CLAY (A-6 ALLUVIAI	
	-	-				·••*	1 Ciluic	10. 524	33-3	м		TAN-GRAY MED. STIFF 92.5 CLAYEY SILT	MOIST SANDY (A-4)
-		-				· · · · · · · · · ·	- quivo	1 .J. 7.	6.3	-	1	90.5 BRN-GRAY MED. DE	
	-										F	CLAYEY SILTY SAI	ND (A-2-6)
	1											Boring Terminated BY AU at Elevation 90.5 ft ON C	CRYSTALLINE
	1										L	ROCK	
	1										E	110/110- 07.211	1
	1										-	WR HR = 573.4	
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STRUCTURE SUBSURFACE INVESTIGATION PROVIDED BY NCDOT

	STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT	
	STRUCTURE SUBSURFACE INVESTIGATIO	N
	PROJ. REFERENCE NO. 17BP.10.R.17 (17BP10R17) F.A. PROJ.	
	PROJECT DESCRIPTION REPLACE BRIDGE NO. 356 ON SR 2133 (SANDY RIDGE RD.) OVER LITTLE RICHARDSON CREEK	
	SITE DESCRIPTION	
CONT	ENTS	PERSONNEL
<u>SHEET</u> 1 2	DESCRIPTION TITLE SHEET	J.K. STICKNEY C.L. SMITH
3	SITE PLAN BORE LOGS SOIL TEST RESULTS	
	INVESTIGATED	BY J.E. BEVERLY
	CHECKED BY_	C.B. LITTLE
	SUBMITTED BY	NOVEMBER
THE VAR GEOTECH	CAUTION NOTICE SURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STLOY, PLANNING, AND DESIGN, AND NOT FOR CONSTRUCTION OR P DUS FIELD BORING LOGS, ROCK CORES, AND SOL TEST DATA AVAILABLE MAY BE REVEWED OR INSPECTED IN RALEDRIA BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, INCAL ENGINEERING UNIT AT 1999 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOL TEST DATA ARE PART OF THE CONTR	RACT.
REFLECT RELIED C WVESTIG	SOL AND ROCK STRATA DESCRIPTIONS AND NOCATED BOUNDARES ARE BASED ON A GEOTECHOCAL INTERPRETATION OF ALL AVALABLE SUBSUFFACE DATA AND MAY NOT NECESSAR THE ACTUAL SUBSURFACE CONTIONS ENTERIN BORNGS OR BETWEND SAMPLED STRATA WITHIN THE BORDWALL THE LABORDATORY SAMPLE DATA AND THE STLUBA-LED TEST DA N ONLY TO THE DEGREE OF RELIMBUITY INFERDIT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOL MOSTURE CONDITIONS HOUCATED IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOL MOSTURE CONDITIONS HOUCATED IN THE SUBSUFFACE INFONS ARE AS RECORDED AT THE INVESTIGATION. THESE WATER LEVELS OR SOL MOSTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CON TURES. PRECIPITATION, AND WIND, AS WELL AS OTHER HON-CLIMATIC FACTORS.	TA CAN BE
AND CON OR ACCU CONTRAC CONTRAC	ER OR CONTRACTOR IS CAUTIONED THAT DETALS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETALS ARE DIFFERENT, FOR BI STRUCTOM PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT, THE DEPARTIMENT DOES NOT WARRANT OR GUARANTE RACY OF THE WINSTRUCTION MORE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTIMENT AS TO THE TYPE OF MATERILLS AND CONDITIONS TO BE ENCOUNTERED. THE BI TOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS INCESSARY TO SATISFY HIMSELF AS TO CONCITIONS TO BE ENCOUNTERED. THE BI TOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS INCESSARY TO SATISFY HIMSELF AS TO CONCITIONS TO BE ENCOUNTERED AT THE STROJE TOR SHALL HAVE NO CLAMA FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF THE FOR ANY REASON RESULTING FROM THE ACTUAL CONCITIONS ENCOUNTERED AT THE SITE I DICATED IN THE SUBSURFACE MORDIATION.	E THE SUFFICIENCY DDER OR CT. THE
	INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N.C. DEPARTMENT RANSPORTATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N.C. DEPARTMENT RANSPORTATION AS BEING ACCURATE NOR IT IS CONSIDERED TO BE PART OF THE PLANS, FICATIONS, OR CONTRACT FOR THE PROJECT. AVING REQUESTED THIS INFORMATION THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS INFORMATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE TIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.	Inna
OF T	NFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT RANSPORTATION AS BEING ACCURATE NOR IT IS CONSIDERED TO BE PART OF THE PLANS, FICATIONS, OR CONTRACT FOR THE PROJECT.	aster a

							PROJECT REFERENCE NO. SH 17BP-IO-R.17 (17BPIOR)7)	EET N
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		NORT	H CAI			5.57	MENT OF TRANSPORTATION HIGHWAYS	
							IGINEERING UNIT	
	SOIL AN	VD RO	OCK I	EGE	ND, 1	FERM	S, SYMBOLS, AND ABBREVIATIONS	
	SOIL DE	ESCRIPTIC	N				GRADATION	
	CONTINUOUS FLIGH TO STANDARD PENET AASHTO SYSTEM, B STURE, AASHTO CLAS WOULARLTY, STRUCTU SULY CLA, AUST WITH MTE	IT POWER AUGE TRATION TEST BASIC DESCRIPT SSIFICATION, AN URE, PLASTICIT FREEDED FILE SAM	R, AND YIELD (AASHTO T22 FLONS GENERI ID OTHER PE Y, ETC, EXAMP D LATERS, MINUT /	D LESS THAN 16, ASTM D-11 ALLY SMALL RTINENT FAC PLE: PUSTC, A-7-6	586), SOIL		VELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORM - NOICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE, (ALSO POORLY GRADED <u>CAP-ERADED</u> - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES, <u>ANGULARITY OF CRAINS</u> THE ANGULARITY OR ROUNCHESS OF SOIL GRADIS IS DESIGNATED BY THE TERMS <u>ANGULAR</u> , <u>SUBANGULAR</u> , <u>SUBROUNCED</u> , OR <u>ROUNCED</u>	_
GENERAL GRANULAR M	SEND AND AND AND AND AND AND AND AND AND A	SILT-CLAY		1	21. 1.1.1	-	MINERAL OGICAL COMPOSITION MINERAL NAMES SUCH AS QUARTZ, FELOSPAR, MICA, TALC, KAOLIN, ETC, ARE USED IN DESCRIPTIONS	_
CLASS. (≤ 35% PASSI	NG *200)	(> 35% PAS	SING *200)		NIC MATER		WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.	_
CROUP A-1 A-3 CLASS. A-1-6 A-1-6 A-2	A-2		A-6 A-7 A-7-8 A-7-8	A-1, A-2 A-3	A-4, A-5 A-8, A-7		COMPRESSIBILITY SLIGHTLY COMPRESSIBLE LIDUID LIMIT LESS THAN 31	
SYMBOL							MODERATELY COMPRESSIBLE LIQUID LIMIT EQUAL TO 31-50 HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THAN 50	
* PASSING * 10 50 HX * 40 30 HX 50 HX 51 MN * 200 15 MX 25 HX 10 HX 25	MX 35 MX 35 MX 35 M	4X 36 MN 36 MN	36 MN 36 MN	GRANULAR SOILS	SILT- CLAY SOILS	MUCK. PEAT	PERCENTAGE OF MATERIAL ORGANIC MATERIAL ORGANIC MATERIAL SOILS TRACE OF ORCANIC MATTER 2 - 32 3 - 52 TRACE 1 - 182	
10000 LINIT LASTIC BIOEX 5 MX NP 13 7 ROUP DIDEX 6 8	HX 41 MN 40 HX 41 M HX 10 HX 11 MN 11 MN 0 4 MX	N 40 MX 41 MN 10 MX 10 MX 3 MX 12 MX	LL MIN LL MIN	LITTLE	E OR	HIGHL Y ORGANIC	LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 18 - 28% MODERATELY ORGANIC 5 - 18% 12 - 28% SOME 20 - 35% HIGHLY ORGANIC 318% 228% HIGHLY 35% AND ABOVE	
ISUAL TYPES STONE FRAGS. CINE C	LTY OR CLAYEY	SILTY	CLAYEY	ORGAN	TS OF	SOILS	GROUND WATER	
ATERIALS SAND SAND G	RAVEL AND SAND	SOILS	SOILS	MATTE	R		STATIC WATER LEVEL AFTER 24 HOURS	
ENLRATING AS A EXCELLENT T SUBORADE			O POOR	FAIR TO POOR	POOR	UNSUITABLE	∑P¥ PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA ○\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	
PLOF A-7-5 SUBGROU	$P IS \leq LL - 36$			10UP 15 >	LL - 30	-	MISCELLANEOUS SYMBOLS	
ERIMARY SOL TYPE COMP	ACTICCC OD	RANGE OF S	STANDARD ESISTENCE	COMPRES	OF UNCON SSIVE STR TONS/FT ²	RENGTH		BORING
GRANULAR MEL MATERIAL MEL	RY LOOSE LOOSE DIUM DENSE DENSE RY DENSE	4 TO 18 TO 38 TO 55	30 50		N/A		ARTIFICIAL FILL (AF) OTHER	I-VALUE
GENERALLY S SILT-CLAY MED MATERIAL S (COHESIVE) VER	RY SOFT SOFT DIUM STIFF STIFF KY STIFF WRD TEXTURE O	(2 2 TO 4 TO 8 TO 15 TO 236	4 8 15 30		<pre> <0.25 .25 TO 8. 8.5 TO 1.0 1 TO 2 2 TO 4 >4 >4</pre>	3	INFERRED SOIL BOUNDARY MONITORING WELL PIEZOMETER INSTALLATION SUBPE INDICATOR INSTALLATION SUBPE INDICATOR INSTALLATION SUBPE INDICATOR INSTALLATION SUBPE INDICATOR INSTALLATION CONE PENETROMETER TEST	
LS. STD. SIEVE SIZE	4 18		51ZE 60 200	278			SOUNDING ROD	
PENING (MHO	4.76 2.00		25 0.075				ABBREVIATIONS	
BOULDER (BLDR.) COBBLE (COB.) GRAIN MM 305 75	GRAVEL (GR.) 2.8	COARSE SAND (CSE, SD.)	FINE SAND (F SI 0.25		STLT (SL.) 0.005	CLAY ICLJ	AR - AUGER REFUSAL MED MEDIUM YST - YANE SHEAR BT - BORING TERMINATED HICA MICACEOUS WEA WEATHERED CL CLAY MOO MOGENATELY "/"	
SIZE IN. 12 3	1071105 00					-	CPT - CONE PENETRATION TEST NP - NON PLASTIC 7/2- DRY UNIT VEU CSE COARSE 0RG ORGANIC 7/2- DRY UNIT VEU DMT - DILATOMETER TEST PNT - PRESSUREMETER TEST SAMPLE ABBREVI	
SOIL MO SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOI DESCRIPT	ISTURE	UN DF		STURE DES	SCRIPTION	OPT - DYNAMIC PENETRATION TEST SAP SAPROLITIC S - BULK a - void RATIO S0 SAPROLITIC S - BULK F - FINE SL - SLLT, SLLTY ST - SHELBY TUBE	ALLUNG
	- SATURA (SATJ		USUALLY L				FOSS FOSSILIFEROUS SLI SLIGHTLY RS - ROCK FRAC FRACTURED, FRACTURES TCR - TRICOME REFUSAL RT - RECOMPACTED FRAGS FRACMENTS # - MOISTURE CONTENT CBR - CALIFORNIA H HICHAY Y - VERY RATIO	
RANGE C PLASTIC LIMIT	- WET -	- 00		REQUIRES		0	EQUIPMENT USED ON SUBJECT PROJECT	_
OM OPTIMUM MOISTU		- 040	SOLID: AT	OR NEAR (OPTIMUM N	MOISTURE	DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE: MOBILE 8 CLAY BITS X AUTOMATIC	MANUAL
	- DRY -		REQUIRES /	ADDITIONAL TIMUM MOIS		o	BK-51 BK-51	
		TICITY		DRY STR	ENGTH		CHE-45C HARD FACED FINCER BITS	
NONPLASTIC	0-5			VERY L	LOW			
LOW PLASTICITY MED. PLASTICITY HIGH PLASTICITY		5 IR MORE		SL IGH MEDIL HIGH	H		CASING V ADVANCER HAND TOOLS	R
DESCRIPTIONS MAY INCLUDE CO	1. 1. 1. 1. 1. 1. 1. 1.		TAN, RED, Y			GRAY).		6

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						and the second second second second second second second second second second second second second second second	<u>ZA</u>
			NORTH CAROLIN			SPORTATION	
			and the second se	DIVISION OF			
			0		INEERING UNI	and the state and the state of the boundary of the	
	SC	DIL AN	D ROCK LEGE	ND, TERMS,	SYMBOLS, AN	D ABBREVIATIONS	
HARD ROCK IS	S NON-COASTAL PLAT	IN MATERIAL THAT	DESCRIPTION IF TESTED, WOULD YIELD SPT REI	USAL, AN INFERRED		TERMS AND DEFINITIONS	
SPT REFUSAL	IS PENETRATION BY	A SPLIT SPOON	DASTAL PLAIN MATERIAL WOLLD YI SAMPLER EQUAL TO OR LESS THAN N BETWEEN SOLL AND ROCK IS OF I	8.1 FOOT PER 68 BLOWS.	AQUIFER - A WATER BEARING		
OF WEATHERE	ED ROCK.			EN REPRESENTED BI H ZUNE	ARENACEOUS - APPLIED TO RO	CKS THAT HAVE BEEN DERIVED FROM SAND OR THAT C ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINER/	and from a stranger
WEATHERED	15103	NON-COASTAL PL	AIN MATERIAL THAT WOULD YIELD	SPT N VALUES > 100	OR HAVING A NOTABLE PROPOR	TION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATI	E, ETC.
ROCK (WR) CRYSTALLINE	2.5		GRAIN IGNEOUS AND METAMORPHIC			NAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE T BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOV	
ROCK (CR)	HA	GNEISS, GABBRO.		and the second s		HAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARE	IONATE.
NON-CRYSTALLON ROCK (NCR)	e	SEDIMENTARY RO	GRAIN METAMORPHIC AND NON-COA CK THAT WOULD YEILD SPT REFUSA ITE, SLATE, SANDSTONE, ETC.		COLLUVIUM - ROCK FRAGMENTS	MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE	DR AT BOTTOM
COASTAL PLAIN		COASTAL PLAIN	SEDIMENTS CEMENTED INTO ROCK, B ICK TYPE INCLUDES LIMESTONE, SA	UT MAY NOT YIELO		LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BAR	REL DIVIDED BY TOTA
CP)	hard and	SHELL BEDS, ETC	THERING		DIKE - A TABULAR BOOY OF I	CHEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF	ADJACENT
FRESH RI	OCK FRESH, CRYSTAL	S BRIGHT, FEW JO	INTS MAY SHOW SLICHT STAINING.	ROCK RINGS UNDER	ROCKS OR CUTS MASSIVE ROCK	C. STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM	THE
H	AMMER IF CRYSTALL	INE.	ED, SOME JOINTS MAY SHOW THIN C		HORIZONTAL.		
V SLL) CH		EN SPECIMEN FAC	E SHINE BRIGHTLY, ROCK RINGS UN		THE LINE OF DIP, MEASURED C		
SLIGHT RI	OCK GENERALLY FRE	SH, JOINTS STAINE	O AND DISCOLORATION EXTENDS D			TURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEM HER PARALLEL TO THE FRACTURE.	ENT OF THE
C	RYSTALS ARE DULL	AND DISCOLORED.	CRYSTALLINE ROCKS RING UNDER H	WHMER BLOWS.		ITTING ALONG CLOSELY SPACED PARALLEL PLANES.	
CE LOOM	RANITOID ROCKS, MOS	T FELOSPARS ARE	DISCOLORATION AND WEATHERING E DULL AND DISCOLORED, SOME SHO SHOWS SIGNIFICANT LOSS OF STR	W CLAY. ROCK HAS	FLOAT - ROCK FRACMENTS ON PARENT MATERIAL.	SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODO	ED FROM
WI	ITH FRESH ROCK,				FLOOD PLAIN (FP) - LAND BORD	ERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY	
SEVERE AN	ND DISCOLORED AND	A MAJORITY SHOW	OR STAINED, IN GRANITOID ROCKS, KAOLINIZATION, ROCK SHOWS SEV	ERE LOSS OF STRENGTH		GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACE	D IN
	TESTED, WOULD YTE		DIST'S PICK, ROCK GIVES "CLUNK" S	OUND WHEN STRUCK.	THE FIELD. JOINT - FRACTURE IN ROCK AL	ONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED	
			OR STAINED ROCK FABRIC CLEAR		LEDCE - A SHELF-LIKE RIDGE	OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL	COMPARED TO
E)	XTENT. SOME FRAGME F TESTED, YIELDS SP		ROCK USUALLY REMAIN.		ITS LATERAL EXTENT.	OCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.	
			OR STAINED. ROCK FABRIC ELEMEN SOIL STATUS, WITH ONLY FRAGMED			MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING R AERATION AND LACK OF GOOD DRAINAGE.	5 IN
RE	EMAINING. SAPROLITE	IS AN EXAMPLE	OF ROCK WEATHERED TO A DEGREE	SUCH THAT ONLY MINOR	PERCHED WATER - WATER MAIN	TAINED ABOVE THE NORMAL GROUND WATER LEVEL BY	THE PRESENCE OF A
			OT DISCERNIBLE, OR DISCERNIBLE		The second	ORMED IN PLACE BY THE WEATHERING OF ROCK.	
	SO AN EXAMPLE.		AY BE PRESENT AS DIKES OR STRI	NUCHS. SAPAULITE IS	ROCK SEGMENTS EQUAL TO OR	000 - A MEASURE OF ROCK QUALITY DESCRIBED BY TOT GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LEN	
			HARDNESS SHARP PICK, BREAKING OF HAND SP		EXPRESSED AS A FERCENTAGE.	OLL THAT RETAINS THE RELIC STRUCTURE OR FABRIC	OF THE
5	SEVERAL HARD BLOWS	S OF THE GEOLOG	157'S PICK.		PARENT ROCK.	IGNEDUS ROCK OF APPROXIMATELY UNIFORM THICKNES	
	CAN BE SCRATCHED E TO DETACH HAND SPE		ONLY WITH DIFFICULTY, HARD HAN	HER BLOWS REQUIRED		ITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED I	
HOOERATELY C	CAN BE SCRATCHED E EXCAVATED BY HARD	BLOW OF A GEOL	GOUGES OR GROOVES TO 0.25 INC OGIST'S PICK, HAND SPECIMENS CA	HES DEEP CAN BE	a case of the second of the second second	STRIATED SURFACE THAT RESULTS FROM FRICTION ALC	ING A FAULT OR
8	BY MODERATE BLOWS.		HES DEEP BY FIRM PRESSURE OF		STANDARD PENETRATION TEST	PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS	
HARD C		IN SMALL CHIPS T	O PEICES 1 INCH MAXIMUM SIZE B		A 2 INCH OUTSIDE DIAMETER S	INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 F SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION	
SOFT C	CAN BE GROVED OR C	OUGED READILY E	Y KNIFE OR PICK. CAN BE EXCAVA		THAN 0.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY ISREC.)	- TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVID	ED BY TOTAL LENGTH
P	PIECES CAN BE BROK	EN BY FINGER PR			OF STRATUH AND EXPRESSED AS STRATA ROCK QUALITY DESIGNAT	TION (SROC) - A MEASURE OF ROCK QUALITY DESCRIBED B	Y
SOFT D			N BY FINGER PRESSURE. CAN BE S		TOTAL LENGTH OF ROCK SECMEN TOTAL LENGTH OF STRATA AND	IT'S WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 D	ICHES DIVIDED BY TH
	CTURE SPACE	NG	BEDOIN		TOPSOIL (TS.) - SURFACE SOILS	S USUALLY CONTAINING ORGANIC MATTER.	
TERM VERY VIDE		CING	IERM VERY THICKLY BEDDED	THICKNESS > 4 FEET	BENCH MARK: TBM: BO	LT ON END OF BRIDGE (S.E. CORNER)	LECINICO.
VIDE HODERATELY	3 TO 10	FEET	THICKLY BEDDED THINLY BEDDED	1.5 - 4 FEET Ø.16 - 1.5 FEET		ELEVATION	(ASSUMED) I: 100.00 FT
CLOSE VERY CLOSE	8.16 TO 1		VERY THINLY BEDDED THICKLY LAHINATED	0.03 - 0.16 FEET 0.006 - 0.03 FEET	NOTES:		
			THINLY LAMINATED	< 0.000 FEET			
OR SEDIMENTARY	ROCKS, INDURATION		IG OF THE MATERIAL BY CEMENTIN	a succession and a second			
FRIAB	LE		ITH FINCER FREES NUMEROUS GRA LOW BY HAMMER DISINTEGRATES S				
MODER	ATELY INDURATED		N BE SEPARATED FROM SAMPLE W ASILY WHEN HIT WITH HAMMER.	TH STEEL PROBE			
INDURA	ATED	CRAINS A	E DIFFICULT TO SEPARATE WITH	TEEL PROBE			
ENTOP	MELY INDURATED		TO BREAK WITH HANMER.	SAMPLE.			
EATHER	mat mummitu		REAKS ACROSS GRAINS.				



VBS	17BP.10.F	8.17		Т	IP 17	BP10	R17	cou	NTY	UNION				GEOLOGIST Stickney, J. K.		
SITE DI	ESCRIPTI	ON R	EPLAC	EBRI	DGE N	10.35	6 ON SE	R 2133	(SAND	Y RIDGE	ERD.) C	OVER	LITTL	E RICHARDSON CREEK	GROUND WT	R (ff
BORING	GNO. B			S	TATIC	N N/	Ά		0	FFSET	A/A			ALIGNMENT N/A	0 HR.	Dŋ
OLLA	R ELEV.	99.2 ft	-	Т	OTAL	DEPT	H 6.3 f	t	N	ORTHING	N/A	2		EASTING N/A	24 HR.	NM
RILL RI	IG/HAMMER	EFF./D	ATE H	F00072	CME-5	50 89%	6 09/02/20	009			DRILL M	NETHO	D H.S	S. Augers HAM	MER TYPE Autom	natic
	R Smith				TART	DATE	10/20/		-	OMP. DA	-			SURFACE WATER DEPTH	N/A	
	RIVE ELEV (ft)	TH BU 0.51	OW CC	-	0	2	BLOWS	50	75 1	100	SAMP. NO.	MOI	O G	SOIL AND ROCK DE		PTH (
100		-									-			99.2 GROUND SUR ROADWAY EMBA		0.
5	957 - 35	0	1	3		::	::::		::					96.2 RED-BRN MED. STIFF 96.2 CLAY (A-6 ALLUVIAI	MOIST SILTY	3.
		-		3	4						SS-1	м	1	93.7 TAN-GRAY SOFT TO ME 92.9 SANDY CLAYEY S	D. STIFF MOIST	5. 6.
	***************************************													RESIDUAL BRN-GRAY LOOSE MU SILTY SAND (J Boring Terminated BY AU at Elevation 92.9 ft ON C ROCK	DIST CLAYEY A-2-6) GER REFUSAL	

NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

AADO	17BP	.10.R.1	1		1		7BP10	R17	COUN	TY UN	IION				GEOLOGIST Stickney	, J. K.		
SITE	DESCR	RIPTION	REF	PLACE	EBRI	DGE	NO. 35	6 ON SF	2133 (5	SANDY	RIDGE	RD.) (OVER	LITTI	E RICHARDSON CREEK		GROUNE	WTR (ft
BOR	NG NO). B2			S	TATI	ON N	Ά		OFFS	SET N	N/A			ALIGNMENT N/A		0 HR.	Dry
COLI	AREL	EV. 9	9.2 ft		T	OTAL	DEPT	H 6.3 f		NOR	THING	N/A			EASTING N/A		24 HR.	NM
DRILL	RIG/HA	MMER E	FF./DA	TE HF	00072	CME-	550 89%	6 09/02/20	09	-		DRILL N	NETHO	D H.	S. Augers	HAMM	ER TYPE	Automatic
DRIL	LER S	Smith, C	. L.		S	TART	DATE	10/20/	11	COM	P. DAT	TE 10/	20/11		SURFACE WATER DEP	TH N	A	
LEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)		0.5ft		0	2	BLOWS 5	PER FOO	75	100	SAMP. NO.	мо	L O G	SOIL AND RO	CK DESC	CRIPTION	DEPTH (
100	_								1						-99.2 GROUNI			0
95			3	6	5							<u>SS-2</u>	M/W		97.2 RED-BRN MED. 294.7 ALL 92.9 SANDY CLA BRN-GRAY SOFT 7 92.9 SANDY CLA RES BRN-GRAY ME CLAYEY SILTY S WEATH. CRYSTA WEATH. CRYSTA WEATH. C SEV. WEATH. C Boring Terminated at Elevation 92.9	EMBANH STIFF M Y (A-6) UVIAL O MED. YEY SIL SIDUAL CD. DENS AND (A-2) LINE R RED RC RYSTAL BY AUG	STIFF MOI T (A-4) SE MOIST 2-6) W/ SEV OCK FRAG OCK LINE ROCK ER REFUS.	4 1ST 5 6 /. S. AL

NBS	17BP					G REPOR	COUN	TY UNION			-	GEOLOGIST Stickney, J. K.		
SITE	DESCR	IPTIO	N RE	PLAC	EBRID	DGE NO. 356 ON	SR 2133 (SANDY RIDGE	E RD.) (OVER	LITT	LE RICHARDSON CREEK	GROUND W	TR (f
BORI	NG NO	. B3			S	TATION N/A		OFFSET	N/A	_		ALIGNMENT N/A	0 HR.	Dŋ
COLL	AR EL	EV. 9	9.1 ft		T	OTAL DEPTH 8.6	ft	NORTHING	N/A			EASTING N/A	24 HR.	NM
RILL	RIG/HAI	MMER E	FF./DA	TE H	F00072	CME-550 89% 09/02	2009		DRILL	METHO	D H.	S. Augers HAM	MER TYPE Auto	matic
RIL	LER S	mith, C	C. L.		S	TART DATE 10/2	0/11	COMP. DA	TE 10	20/11		SURFACE WATER DEPTH	N/A	
LEV (ft)	DRIVE	DEPTH (ft)	·	w co	r		S PER FO	Sector Sector	SAMP.	-	O	SOIL AND ROCK DE	SCRIPTION	
	(ft)	110	0.5ft	0.5ft	0.5ft	0 25	50	75 100	NO.	MOI	G	ELEV. (ft)	D	EPTH
100		-							-			99.1 GROUND SUR		(
		ŧ					: : : :					ROADWAY EMBA RED-BRN MED. STIFF	MOIST SILTY	
95	95.3	3.8	2	4	4			· · · · ·	00.0			96.1 CLAY (A-6 ALLUVIAI		3
	-	t .	-			· • • • • • • • • • • • • • • • • • • •	: :::	: ::::	SS-3	M		TAN-GRAY MED. STIFF 92.5 CLAYEY SILT		6
	1	t .	1				: : : :	: ::::			11	90.5 BRN-GRAY MED. DE		8
	1	Ē										CLAYEY SILTY SAI Boring Terminated BY AU	ND (A-2-6)	
	-	È.				P 0						at Elevation 90.5 ft ON 0	CRYSTALLINE	
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WBS	17BP.	10.R.1	7		TI	P 17BP10	R17	COUN	TY UNION				GEOLOGIST Stickney	, J. K.		
SITE	DESCR	IPTION	RE	PLACE	EBRID	GE NO. 35	6 ON S	R 2133 (S	ANDY RIDO	ERD.)	OVER	LITT	LE RICHARDSON CREEK	(GROUND W	TR (f
BOR	NG NO.	. B4			ST	ATION N/	A		OFFSET	N/A			ALIGNMENT N/A		0 HR.	Dr
COLL	AREL	EV. 99	9.1 ft		TC	TAL DEPT	H 8.21	t	NORTHIN	G N/A			EASTING N/A		24 HR.	NN
DRILL	RIG/HAM	MMER E	FF./DA	TE H	-00072	CME-550 89%	09/02/2	009	-	DRILL	METHO	D H.	S. Augers	HAMME	R TYPE Autor	matic
ORIL	LER S	mith, C	. L.		ST	ART DATE	10/20	/11	COMP. D	ATE 10	/20/11		SURFACE WATER DEP	TH N/	4	
LEV	DRIVE	DEPTH	BLC	ow co	UNT		BLOWS	PER FOO	T	SAMP.	1	L	SOIL AND RO	CK DESC	RIPTION	
(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0 2	5	50	75 100	NO.	MOI		ELEV. (ft)	ONDEOU		PTH
100		-											99.1 GROUN	D SURFA	CE	0
	1	-	-			1				1	-	-5	ROADWAY	EMBANK	MENT	
			2 8			1::::	:::	::::	: ::::					Y (A-6)	JIST SILTY	3
95	95.2	3.9	1	2	2	4					м		- ALI TAN-GRAY SOFT	UVIAL	STIFF MOIST	
	-	t l				14:::	:::	::::	: ::::				92.3 SANDY CLA	YEY SILT		6
-			-			<u> </u>		1		4			BRN-GRAY ME			8
	-	-										ļĘ	Boring Terminated	TY SAND	(A-2-6)	
	1	1											at Elevation 90.9	ft ON CRY	YSTALLINE	
	_												. R	OCK		
	-	-														
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NCDOT GEOTECHNICAL ENGINEEDING LINIT

M & T Form 503

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAY MATERIALS & TESTS UNIT SOILS LABORATORY

T. I. P. No. 17BP10R17

	REPORT ON SAM	IPLES OF	SOILS FOR	QUALI	TY	
Project	17BP.10.R.17	County	UNION		Owner	
Date: Sampled	10/20/11	Received	10/25/11		Reported	10/27/11
Sampled from	BRIDGE			By	J E BEVE	CRLY
Submitted by	N WAINAINA				1995	Standard Specifications

775130 TO 775132 11/30/11

		TE	ST RESU	LIS	
Proj. Sample No.		SS-1	SS-2	SS-3	
Lab. Sample No.		775130	775131	775132	
Retained #4 Sieve	%	-	46	-	
Passing #10 Sieve	%	96	45	97	
Passing #40 Sieve	%	93	38	91	
Passing #200 Sieve	%	86	32	77	

OT DECLI TO

MINUS NO. 10 FRACTION

SOIL MORTAR - 100%					1
Coarse Sand Ret - #60	%	5.1	20.4	11.0	
Fine Sand Ret - #270	%	8.4	10.4	11.8	
Silt 0.05 - 0.005 mm	%	43.7	36.5	32.2	
Clay < 0.005 mm	%	42.9	32.7	44.9	
Passing #40 Sieve	%	-	-	-	_
Passing #200 Sieve	%	-	1.00	-	

L. L.	30	36	32		1
P. I.	10	14	9		
AASHTO Classification	A-4(8)	A-2-6(1)	A-4(6)		
Station					
Offset					
Alignment					
Location	B1	B2	B3		
Depth (Ft)	4.00	4.30	4.30		
to	5.00	5.30	5.30		

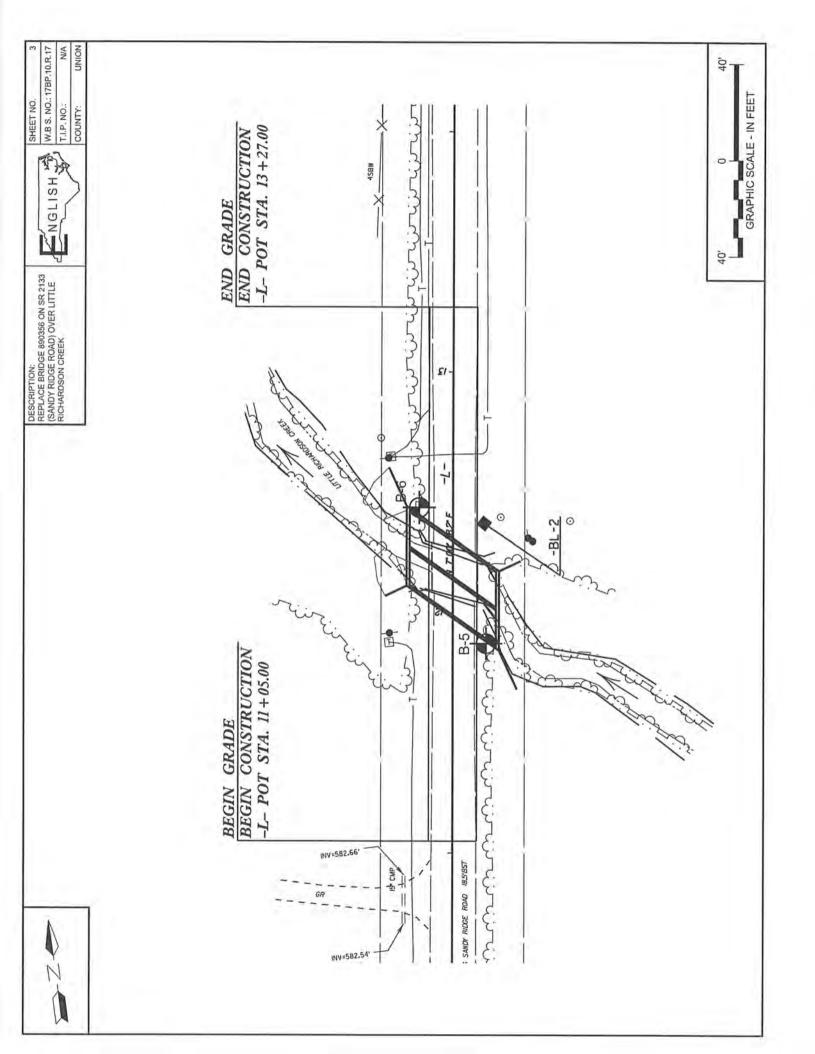
cc: J E BEVERLY

SUPPLEMENTAL STRUCTURE SUBSURFACE INVESTIGATION PROVIDED BY AMEC

	BTATE N.C.	STATE PROJECT REPERENCE NO. 17BP.10.R.17	MEET BURET 1 10
STATE OF NORTH DEPARTMENT OF TRANS DIVISION OF HIGH GEOTECHNICAL ENGINEE	PORTATION WAYS		
STRUCTU SUBSURFACE INV	contraction of the second second second second second second second second second second second second second s	ION	
PROJ. REFERENCE NO. <u>17BP.10.R.17</u> COUNTY <u>UNION</u>	F.A. PROJ <u>N/A</u>		
PROJECT DESCRIPTION DIVISION 10 GROU	P N BRIDGE		
<u>REPLACEMENT</u> SITE DESCRIPTION <u>REPLACE BRIDGE 8903</u>	256 ON SR 2133		
(SANDY RIDGE ROAD) OVER LITTLE	a the strength of some states and the states of the	EEK	
CONTENTS			
SHEET DESCRIPTION			
2-2A LEGEND SHEETS			
3 SITE PLAN 4-9 BORING LOGS			
		PERSON F. Cox	INEL
		D. Rhodes	-
		R. Clark	
	INVE	STIGATED BY AMEC E	&I, Inc.
		CKED BY S. Johnson	
		WITTED BY M. Lear, P	
	DATI	T. I. 2012	
THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF THE VARIOUS FIELD BORING LOOS, ROCK CORES, AND SOIL TEST DATA AVALABLE MAY BE REVEWED OR INSPECTED IN RALEGH GEOTECHNICAL EXPOREENING UNIT AT 1999 TOT-BOSO, THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOOS, ROCK CORES,	PREPARING THE SCOPE OF WORK TO BE INCLUDED BY CONTACTING THE N. C. DEPARTMENT OF TRANS	IN THE RECUEST FOR PROPOSAL.	
SOIL AND ROCK BOUNDARES WITHN A BOREHOLE ARE BASED ON GEOTECHNICAL INTERPRETATION UNLESS ENCOUNTERED IN A SU CONDITIONS BETWEEN SAMPLED STRATA, AND BOREHOLE INFORMATION MAY NOT NECESSARILY REFLECT ACTUAL SUBSURFACE CO TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABLITY INGERENT IN THE STANDARD TEST METHOD. THE OBSERN INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE WYESTIGATION, THESE WATER LEVELS OR SOL MOISTURE CONDITIONS TEMPERATURES, RECHTATION, AND NING, AS WELL AS OTHER NON-CLIMATIC FACTORS.	INDITIONS BETWEEN BORINGS. THE LABORATORY SAN	PLE DATA AND THE IN SITU IN-PLAC	E)
THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, OR OPINI ENCOUNTERED. THE BODER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH NOBPENDENT SUBSURFACE INVESTIGATIONS AS HED THE PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.	EEMS NECESSARY TO SATISFY HIMSELF AS TO COM	DITIONS TO BE ENCOUNTERED ON	
	STH CAPONE		0
NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N.C. DEPARTMENT OF TRANSPORTATION AS BEING ACCURATE NOR IT IS CONSIDERED TO BE PART OF THE PLANS. SPECFICATIONS, OR CONTRACT FOR THE PROJECT.	7-20-2012		
NOTE - BY HAVING REQUESTED THIS INFORMATION THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.	1927	AUZI STIRRUP CREEK DRID DURHAM, NORTH CAROL (9)6) JB1-991 BAL	VE. SUITE 100
BY: R. Rahie	61 8. VANC	Engineering F-1253 NC G	Sectory C-247

Consistency Cons														PR	OJECT REFERE		SHEET NO.
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				_	SOIL DE	SCRIPTI	ON										1.2.2.1
	THAT CAN BE 100 BLOWS P CLASSIFICATI CONSISTENCY	E PENETRATE PER FOOT ACTION IS BASE COLOR, TEX DGICAL COMP VER	ED WITH CORDIN D ON T TURE, M OSITION T STIFF. 6	H A CONT IG TO STA THE AASH HOISTURE, N, ANGULA RM, SETT CLA	INUOUS FLIGH MNDARD PENET TO SYSTEM, E AASHTO CLAS RITY, STRUCTU W, WIST WITH MITE	T POWER AUG RATION TEST ASIC DESCRIP SSIFICATION, A JRE, PLASTICIT RBEDDED FINE SM	ER, AND YIELD (AASHTO T20 TIONS GENER ND OTHER PE Y, ETC, EXAMI IO LATERS, HIGHLY () LESS THAM 6, ASTM D-1 ALLY SHALL RTINENT FAI PLE: PLASTIC, A-7-6	1 586), SOIL INCLUDE:		UNIFORM POORLY G GAP-GRADE	- Indicates that Radedi ED - Indicates a ULARITY OR ROUND	SOIL PAR	TICLES ARE ALL DF UNIFORM PA ANGULARIT SOIL GRAINS IS D	APPROXIMATELY ATICLES OF TWO O Y OF GRAIN DESIGNATED BY T	THE SAME SIZE. DR MORE SIZES. NS THE TERMS <u>ANGUL</u>	IAL SO
LULUS. 13.38 / PROJUK - 200 2.88 / PROJUK - 200 2.88 / PROJUK - 200 PROVE Not an explore a construction of the cons		GRA	NULAR	MATERIA	LS	SILT-CLAY	MATERIALS	1		PIALS	MINERAL N	AMES SUCH AS O	ARTZ, FEL	DSPAR, NICA, TA			RIPTIONS
CLASS Art - Art - S </td> <td></td> <td></td> <td>10100</td> <td></td> <td></td> <td>21.4.2.4. 1992.4.</td> <td></td> <td></td> <td>-</td> <td>WHENEVER</td> <td>THEY ARE CONSIL</td> <td>DERED OF S</td> <td>1.</td> <td>SSIBIL ITY</td> <td></td> <td></td>				10100			21.4.2.4. 1992.4.			-	WHENEVER	THEY ARE CONSIL	DERED OF S	1.	SSIBIL ITY		
••• It op is million (in milli	CLASS, A	A-1-6 A-1-b		A-2-4 A-2	-5 A-2-6 A-2		A-7-5					MODERATELY COM	PRESSIBLE		L10UID L1 L10UID L1 L10UID L1	MIT EQUAL TO 31 MIT GREATER THA	-58
DBD UNIT SK W and we prody we prody State we prody<	10 5 40 3	B MX 58 MX		25 MX 35	MX 35 MX 35 M	1X 36 MN 36 M	1 36 MN 36 MN	SOILS	CLAY		A CONTRACTOR OF THE OWNER	and the state of the state of the state of the state of the state of the state of the state of the state of the	GRANUL	AR SILT - C S SOILS	LAY	OTHER MATER	
Construction Construction	PLASTIC INDEX		NP	IB MX 41 M B MX 10 M	AX 11 MIN 11 MIN	18 MX 18 M	II MN II MN	LITTL	E OR		NODERATE	LY DRGANIC	5 - 1	X 5 - 12 BX 12 - 20 320%	X X	LITTLE 10 SOME 20	- 20X - 35X
GEX.NIM EXCELLENT TO 0000 FAIL TO POOR FAIL TO POOR<	USUAL TYPES 5 OF MAJOR G	TONE FRADS.	FINE		OR CLAYEY	SILTY	CLAYEY	AMOUN	IC OF					BORE HOLE I	MEDIATELY AFTE	R DRILLING	
Mile in to consist the construction of the construction o	gen. Rating AS: A Subgrade	-				19.22		POOR		UNSUITABLE	12372	PERCHE	D WATER,			CARING STRATA	
PRIMARY SOL TWE COMPACTNESS of CONSISTENCY PRACE of UNCOMPLEX PERTAILON RESISTENCY PRACE of UNCOMPLEX CONSISTENCY PRACE of UNCOMPLE	P1 0	F A-7-5 5	SUBGR					OUP IS >	LL - 30		Gui	J- 3-1140	7.6.7.6.20	ISCELLAN	OUS SYMBO	IS	
BERRALLY GRAVELRY MODER MODUM DERSE WEDUM DERSE WEDUW DERSE WEDUW DERSE WEDUW DERSE WEDUW DERSE WEDUW DERSE WEDUW DERSE WEDUW DERSE WEDUW DERSE WEDUW DERSE WEDUW DERSE WEDUW STIFF HARD 4 TO 8 TO 4 SUTUM WEDUW STIFF B TO 15 B TO 2 B TO 15 B TO 2 B TO 15 B TO 2 B TO	PRIMARY S	SOIL TYPE		MPACTNE	SS OR	RANGE OF	STANDARD	COMPRE	SSIVE STR	RENGTH	F		NKMENT (R				TEST BORING
GENERALLY SUF-CLAY MATERIAL WATERIAL (COHESIVE) Soft MEDIUM STIFF Z 10 4 4 10 8 5 0 15 STIFF Soft 4 10 8 8 0.5 10 16 8 0.5 10 16 8 0.5 10 16 10 2 34 METERIED ROCK LINE WERNED ROCK LINE TO 2 2 10 4 34 METERIED ROCK LINE WERNED ROCK LINE PIEZONETER INSTALLATION WILL (COHESIVE) STIFF VEN STIFF 15 10 38 2 10 4 3 38 2 10 4 3 4 2 10 4 3 4 Soft 2 10 4 <t< td=""><td>GRANUL</td><td>AR</td><td>6</td><td>LOOSE MEDIUM D DENSE</td><td>DENSE</td><td>4 TC 10 TO 30 TO</td><td>10 30 50</td><td></td><td>N/A</td><td></td><td></td><td>ARTIFICIAL FIL</td><td></td><td></td><td>AUGER BORIN</td><td>vo C</td><td>- SPT N-VALUE</td></t<>	GRANUL	AR	6	LOOSE MEDIUM D DENSE	DENSE	4 TC 10 TO 30 TO	10 30 50		N/A			ARTIFICIAL FIL			AUGER BORIN	vo C	- SPT N-VALUE
OPENING (MM) 4.76 2.08 6.42 6.25 6.053 BOULDER (BLDR.) COBBLE (COB.) GRAVEL (GR.) COARSE (GR.) FINE (SAND (CSE, SD.) SILT (SL.) CLAY (SL.) AR - AUGER REFUSAL (CL.) MED MEDIUM MICA MICACEOUS WEA WEATHERED MICA MICACEOUS GRAIN MM 305 75 2.8 B.25 8.05 8.005 CDF - CONPENENTATION TEST (CT - CONPENENTATION TEST SOIL MOISTURE - CORRELATION OF TERMS MICA MICACEOUS WEA WEATHERED MICA MICACEOUS WEA WEATHERED MICA MICACEOUS SOIL MOISTURE CALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION (GUIDE FOR FIELD MOISTURE DESCRIPTION (ATTERBERG LIMITS) MICA MICACEOUS MICA MICACEOUS WEA WEATHERED MICA MICACEOUS LL (LL (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION (GUIDE FOR FIELD MOISTURE DESCRIPTION (ATTERBERG LIMITS) GUIDE FOR FIELD MOISTURE DESCRIPTION (GUIDE FOR FIELD MOISTURE DESCRIPTION (GUIDE FOR FIELD MOISTURE DESCRIPTION (ATTERBERG LIMITS) SAND, SANDY (S SULGALY (FROM BELOW THE GROUND WATER TABLE (FOS FOSSILIFEROUS (FRAGE FRACTURED, FRACTURES (FRAGE FRACTURED, FRACTURES (FRAGE FRACTURES, FRACTURES (FRAGE FRACTURES, FRACTURES (FRAGE FRACTURES, FRACTURES (FRAGE FRACTURES, FRACTURES, FRACTURES, TRACTURES (FRAGE FRACTURES, FRACTURES, FRACTURES, FRACTURES, TRACTURE, MOISTURE (FOS FRACTURED,	SILT-CL MATERIA	AL		SOFT MEDIUM S STIFF VERY STI HARD	STIFF FF	2 TO 4 TO 8 TO 15 TO 33	4 15 30 8		0.25 TO 0. 0.5 TO 1.0 1 TO 2 2 TO 4	9	******* 25/825	INFERRED ROCK ALLUVIAL SOIL DIP & DIP DIRE	LINE BOUNDARY	Δ	PIEZOMETER INSTALLATIO SLOPE INDIC INSTALLATIO	IN IATOR IN	
BOULDER (BLDR.) COBBLE (COBL GRAVEL (COB.) COARSE SAND (GR.) FINE SAND (GR.) SILT (SL.) CLAY (SL.) AR - AUGER REFUSAL BT - BORING TERMINATED CL CLAY MED MEDICM MCD MEDICM VST - VANE SHEAR TEST WEA VEATHERED CL CLAY GRAIN MM 305 75 2.8 8.25 8.85 8.085 0.005 0.1 0.1 0.1 0.1 VST - VANE SHEAR TEST WEA VEATHERED CL CLAY MCD MEDICM VST - VANE SHEAR TEST MCD MICACOUS VST - VANE SHEAR TEST WEA VEATHERED CL CLAY VST - VANE SHEAR TEST MCD MODERATELY VST - VANE SHEAR TEST WEA VEATHERED CL CLAY VST - VANE SHEAR TEST MCD MODERATELY VST - VANE SHEAR TEST WEA VEATHERED CL CLAY VST - VANE SHEAR TEST MCD MODERATELY VST - VANE SHEAR TEST WEA VEATHERED CL CLAY VST - VANE SHEAR TEST MCD MODERATELY VST - VANE SHEAR TEST WEA VEATHERED CL CLAY VST - VANE SHEAR TEST MCD MODERATELY VST - VANE SHEAR TEST WEA VEATHERED CL CLAY MCD MODERATELY VST - VANE SHEAR TEST MCD VEATHERED VST - VANE SHEAR TEST WEA VEATHERED VST - VANE SHEAR TEST VST - VANE SHEAR TEST VST - VANE SHEAR TEST VST - VANE SHEAR TEST VST - VANE SHEAR TEST VST - VANE SHEAR TEST VST - VANE SHEAR TEST VST - VANE SHEAR TEST VST - VANE SHEAR TEST VST - VANE SHEAR TEST VST - VANE SHEAR TEST VST - VANE SHEAR TEST VST - VANE SHEAR TEST VST - VANE SHEAR TEST VST - VANE SHEAR TEST VST - VAN										1					SOUNDING RO	ac	
GRAIN MM 305 75 2.8 8.25 8.85 8.005 SIZE IN. 12 3 2.8 8.25 8.85 8.005 SOIL MOISTURE - CORRELATION OF TERMS OH OH - DIA/ N= - NON PLASTIC OH N= - NON PLASTIC OH N= - NON PLASTIC OH N= - NON PLASTIC OH N= - NON PLASTIC OH N= - NON PLASTIC OH N= - NON PLASTIC OH N= - NON PLASTIC OH N= - NON PLASTIC OH N= - NON PLASTIC	BOULDER	1 CO8		GRA	AVEL	COARSE	FINE	6-14						MED MED	UM.		
Suble Mole Solve		. 12	_	3	- 10		8,25	0.05	0.005	5	CPT - C CSE C DMT - D	ONE PENETRATIO OARSE DILATOMETER TES	T	NP - NON F ORG ORG/ PMT - PRES	LASTIC NIC SSUREMETER TES		
LL LIQUID LIMIT - SATURATED - (SAT.) USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE FOSS FOSSILIFEROUS FRAC FRACTURED, FRACTURES, FRACURES FRAC FRACTURED, FRACTURES, FRACURES FRAC FRACTURED, FRACURES FRAC FRACTURED, FRACURES FRAC FRACTURED, FRACURES TCR - TRICORE REFUSAL W - WOISTURE CONTENT SL SLICHTLY TCR - TRICORE REFUSAL W - WOISTURE CONTENT R5 - ROCK RT - RECOMPACTED TRIAK RT - RECOMPACTED TRIAK W - VERY PLASTIC LIMIT - WET - WI SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE FOSS FOSSILIFEROUS FRAC., FRACHERS SL SLICHTLY W - VERY R5 - ROCK RT - RECOMPACTED TRIAK W - VERY OM OPTIMUM MOISTURE SL SHRINKAGE LIMIT - WOIST - (MI) SOLID; AT OR NEAR OPTIMUM MOISTURE SL SHRINKAGE LIMIT ON SUBJECT PROJECT ON OPTIMUM MOISTURE SL SHRINKAGE LIMIT - DRY - (D) REQUIRES ADDITIONAL WATER TO SECONTINUOUS FLIGHT AUGER CAY BITS SC CONTINUOUS FLIGHT AUGER CORE SIZE:							GUIDE FOR	FIELD MOI	STURE DE	SCRIPTION	e - VD!	D RATIO	TION TEST	SD SAND.	SANDY	55 - 5	SPLIT SPOON
PANGE -wet - (w) Semisolidi recuires dring to attain drinum moisture Device of the continue Device of the continuous flight auger DM DFIMUM MOISTURE - MOIST - (M) SOLID; AT DR NEAR OPTIMUM MOISTURE DRILL UNITS: ADVANCING TOOLS: Hammer type; DM DFIMUM MOISTURE - MOIST - (M) SOLID; AT DR NEAR OPTIMUM MOISTURE DRILL UNITS: ADVANCING TOOLS: Hammer type; SL SHRINKAGE LIMIT - DRY - (D) REQUIRES ADDITIONAL WATER TO Gr CONTINUOUS FLIGHT AUGER CORE SIZE;			LIMIT								F055 FRAC FRAGS	FOSSILIFEROUS FRACTURED. FRAC FRAGMENTS	TURES	SLI SLIG TCR - TRIC W - MDISTU	TLY	R5 - R RT - R	ROCK RECOMPACTED TRIAXIAL CALIFORNIA BEARING
OMOPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE: SLSHRINKAGE LIMIT - DRY - (D) REQUIRES ADDITIONAL WATER TO Image: Clay Bits Image: Clay Bits Image: Clay Bits	RANGE CPU	PLASTI	- 1 160		- WET	- 6W2				0	HL, - HIG		UIPMEN	and the second second second	N SUBJECT	PROJECT	HATIO
- DRY - IDI	DM _		MOIST	TURE	- Moist	- (M)	SOLID; AT	OR NEAR	OPTIMUM I	MOISTURE	-						
					- DRY -	(C)				٥	-					CORE SIZE	r.
PLASTICITY Image: Plasticity index (P) DRY STRENGTH NONPLASTIC 0-5 VERY LOW LOW PLASTICITY 6-15 NONPLASTIC 0-5 VERY LOW CME-550 Idw PLASTICITY 16-25 MED. PLASTICITY 16-2	LOW PLASTIC	CITY			PLASTICITY 0-5 6-1 16-2	INDEX (PI)		VERY SLIG MEDI	LOW HT UM		СМБ	-550		HARD FACED F TUNGCARBIDE CASING	INGER BITS INSERTS W/ ADVANCER		
HIGH PLASTICITY 26 OR MORE HIGH PORTABLE HOLDT X TRICORE 226 STEEL TEETH POST HOLE DIGGER COLOR TRICONE TRICONE TRICONE TRICONE TRICONE SOUNDING ROO DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-ORAY), MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC, ARE USED TO DESCRIBE APPEARANCE.	DESCRIPTION	NS MAY INC			C R COLOR CO	OLOR		ELLOW-BRO	WN, BLUE-	GRAY).				TRICONE			AUGER NDING ROO

							PROJECT REFERENCE NO.	SHEET NO.
							17BP.10.R.17	24
				NORTH CAROLI	NA DEPARTM	ENT OF TRANS	SPORTATION	
					DIVISION OF		2 - 41 - 17 - 17 - 17 - 17 - 17 - 17 - 17	
				GEOTE		INEERING UNI	F	
		SO	II. AN				D ABBREVIATIONS	
		50	LL TAIN	D ROCK LEGI	END, IERMO,	SIMBOLS, AN	D ABBREVIATIONS	
			ROCK I	DESCRIPTION		1	TERMS AND DEFINITIONS	
ROCK LINE	INDICATES 1	THE LEVEL A	MATERIAL THAT	IF TESTED, WOULD YIELD SPT F	YIELD SPT REFUSAL	ALLUVIUM ALLUV, - SOILS TH	AT HAVE BEEN TRANSPORTED BY WATER.	
SPT REFUS	SAL IS PENET DASTAL PLAIN	RATION BY #	SPLIT SPOON	SAMPLER EQUAL TO OR LESS TH N BETWEEN SOIL AND ROCK IS O	AN ALL FOOT PER SA BLOWS	AQUIFER - A WATER BEARING		
	ERED ROCK.	YPICALLY DI	VIDED AS FOLL	OwS:		ARGILLACEOUS - APPLIED TO A	CKS THAT HAVE BEEN DERIVED FROM SAND OR THAT C ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINER	ALS.
WEATHERED ROCK (WR)			ION-COASTAL PL	AIN MATERIAL THAT WOULD YIEL IF TESTED.	D SPT N VALUES > 100	OR HAVING A NOTABLE PROPOR	TION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLAT AT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE 1	E, ETC.
CRYSTALLINE ROCK (CR)		120	INE TO COARSE	GRAIN IGNEOUS AND METAMORPH T REFUSAL IF TESTED, ROCK TY	C ROCK THAT	AT WHICH IT IS ENCOUNTERED	BUT WHICH DOES NOT NECESSARILY RISE TO OR ABO	VE THE
NON-CRYSTALL		F	NEISS, GABBRO, INE TO COARSE	SCHIST, ETC. GRAIN METAMORPHIC AND NON-CO	ASTAL PLAIN	CALCAREOUS (CALC.) - SOILS T	HAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CAR	
ROCK (NCR)	-	SI IN	EDIMENTARY RO	CK THAT WOULD YEILD SPT REFU TE, SLATE, SANDSTONE, ETC.	SAL IF TESTED, ROCK TYPE	COLLUVIUM - ROCK FRAGMENTS	MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE	OR AT BOTTOM
COASTAL PLAI SEDIMENTARY CP)	ROCK	51	PT REFUSAL, RO	SEDIMENTS CEMENTED INTO ROCK.	BUT MAY NOT YIELD ANDSTONE, CEMENTED	CORE RECOVERY (REC.) - TOTAL	LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BAR	REL DIVIDED BY TOTAL
ur f	1.7	5	HELL BEDS, ETC	THERING		DIKE - A TABULAR BODY OF 10	NEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF	ADJACENT
FRESH	ROCK FRESH	CRYSTALS	BRIGHT, FEW JO	INTS MAY SHOW SLIGHT STAININ	ROCK RINGS UNDER	ROCKS OR CUTS MASSIVE ROCK	STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM	
ERY SLIGHT	ROCK GENER	ALLY FRESH	JOINTS STAINE	D, SOME JOINTS MAY SHOW THIN	CLAY COATINGS IF OPEN.	HORIZONTAL.		
V SLI.)	CRYSTALS O OF A CRYST	IN A BROKEN	SPECIMEN FAC	E SHINE BRIGHTLY. ROCK RINGS	NDER HAMMER BLOWS IF	THE LINE OF DIP, MEASURED C		
SLIGHT SLIJ	ROCK GENER	ALLY FRESH	JOINTS STAINE	O AND DISCOLORATION EXTENDS Y. IN GRANITOID ROCKS SOME OC	INTO ROCK UP TO	FAULT - A FRACTURE OR FRACT	TURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEN HER PARALLEL TO THE FRACTURE,	ENT OF THE
ODERATE	CRYSTALS A	RE DULL AN	D DISCOLORED.	CRYSTALLINE ROCKS RING UNDER DISCOLDRATION AND WEATHERING	HAMMER BLOWS,	the second	ITTING ALONG CLOSELY SPACED PARALLEL PLANES,	
MOD.1	GRANITOID P	ROCKS, MOST	FELDSPARS ARE	DULL AND DISCOLORED, SOME SI SHOWS SIGNIFICANT LOSS OF S	OW CLAY, ROCK HAS	FLOAT - ROCK FRAGMENTS ON PARENT MATERIAL.	SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOD	GED FROM
	WITH FRESH	ROCK.				FLOOD PLAIN (FP) - LAND BORD	ERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY	
SEVERE	AND DISCOLD	DRED AND A	MAJORITY SHOW	OR STAINED. IN GRANITOID ROCK KAOLINIZATION, ROCK SHOWS SI	VERE LOSS OF STRENGTH	FORMATION (FM.) - A MAPPABLE	GEOLOGIC UNIT THAT CAN BE RECOONIZED AND TRACE	D IN
MOD. SEV.)	AND CAN BE	EXCAVATED	SPT REFUSAL	SIST'S PICK. ROCK GIVES 'CLUNK'	SOUND WHEN STRUCK.	THE FIELD. JOINT - FRACTURE IN ROCK AL	ONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED	
SEVERE	ALL ROCK E	KCEPT QUART	Z DISCOLORED	OR STAINED ROCK FABRIC CLEAR	AND EVIDENT BUT REDUCED	LEDGE - A SHELF-LIKE RIDGE	OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL	
	EXTENT. SON	ME FRAGMENT	S OF STRONG	ROCK USUALLY REMAIN.		ITS LATERAL EXTENT.	OCK THAT THINS OUT IN ONE OF MORE DIRECTIONS.	
ERY SEVERE	ALL ROCK E	XCEPT DUART	Z DISCOLORED	OR STAINED. ROCK FABRIC ELEM SOIL STATUS, WITH DNLY FRAGM	INTS ARE DISCERNIBLE BUT	MOTTLED (MOT.) - IRREGULARLY	MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLIN R AERATION AND LACK OF GOOD DRAINAGE.	G IN
	REMAINING.	SAPROLITE 19	S AN EXAMPLE	OF ROCK WEATHERED TO A DEGRE C REMAIN. IF TESTED, VIELOS	E SUCH THAT ONLY MINDR		TAINED ABOVE THE NORMAL GROUND WATER LEVEL BY	THE PRESENCE OF AN
OMPLETE	ROCK REDUCE	D TO SOIL.	ROCK FABRIC N	OT DISCERNIBLE, OR DISCERNIBLE	ONLY IN SMALL AND	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	DRMED IN PLACE BY THE WEATHERING OF ROCK.	
	ALSO AN EXA	CONCENTRATIO	ONS. QUARTZ M	AY BE PRESENT AS DIKES OR ST	RINGERS. SAPROLITE IS	ROCK QUALITY DESIGNATION (R	DD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TO GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LEN	TAL LENGTH OF
		A	ROCK	HARDNESS		EXPRESSED AS A PERCENTAGE.		
VERY HARD	CANNOT BE	SCRATCHED	BY KNIFE OR S	HARP PICK. BREAKING OF HAND S ST'S PICK.	PECIMENS REQUIRES	SAPROLITE (SAP.) - RESIDUAL S	DIL THAT RETAINS THE RELIC STRUCTURE DR FABRIC.	OF THE
HARD	CAN BE SCR	HAND SPECI	KNIFE OR PICK	ONLY WITH DIFFICULTY, HARD H	AMMER BLOWS REQUIRED	RELATIVELY THIN COMPARED W.	IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNES ITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED	SS AND PARALLEL
MODERATELY	CAN BE SCH	RATCHED BY	KNIFE OR PICK	COUGES OR GROOVES TO 0.25 1	NCHES DEEP CAN BE	TO THE BEDDING OR SCHISTOSI	TY OF THE INTRUDED ROCKS. STRIATED SURFACE THAT RESULTS FROM FRICTION ALC	
HARD	BY MODERA	TE BLOWS,		DOIST'S PICK, MAND SPECIMENS C		SLIP PLANE.		
MEDIUM	CAN BE EXC	CAVATED IN	SMALL CHIPS T	ES DEEP BY FIRM PRESSURE OF O PEICES 1 INCH MAXIMUM SIZE 1	KNIFE OR PICK POINT.	A 140 LB. HAMMER FALLING 30	PENETRATION RESISTANCEI (SPT) - NUMBER OF BLOWS (INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 F	TOOT INTO SOIL WITH
SOFT	CAN BE GRO	GEOLOGIST	GED READILY B	Y KNIFE OR PICK. CAN BE EXCAN	ATED IN FRAGMENTS	THAN 8.1 FOOT PER 68 BLOWS.	PLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION	
	FROM CHIPS	5 TO SEVERA	L INCHES IN SI BY FINGER PRI	ZE BY MODERATE BLOWS OF A P	ICK POINT. SMALL, THIN	OF STRATUM AND EXPRESSED AS		
VERY SOFT	CAN BE CAR	THICKNESS	TAN BE BROKE	XCAVATED READILY WITH POINT I	F PICK, FIECES I INCH	TOTAL LENGTH OF ROCK SEGMEN	<u>10N (SROD)</u> - A MEASURE OF ROCK QUALITY DESCRIBED B TS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 1	Y NCHES DIVIDED BY THE
	FINGERNAIL.	1.0	and the second second	and the second se		TOTAL LENGTH OF STRATA AND I	EXPRESSED AS A PERCENTAGE. USUALLY CONTAINING ORGANIC MATTER.	
TERM	HETONE	SPACING		BEDDI TERM	THICKNESS		REBAR & CAP STAMPED BL-2 LOCATE	AT STATION
VERY WIDE		MORE THAN 3 TO 10 FEI	10 FEET	VERY THICKLY BEDDED THICKLY BEDDED	> 4 FEET 1.5 - 4 FEET	12+47.04 (-EL-), 12.98	RT	
MODERATEL		1 TO 3 FEET B.16 TO 1 FE		THINLY BEDDED VERY THINLY BEDDED	0.16 - 1.5 FEET 0.03 - 0.16 FEET	Dates	ELEVATION	1: 581.92 FT.
VERY CLOS	SE	LESS THAN		THICKLY LAMINATED	0.008 - 0.03 FEET C 0.008 FEET	NOTES:		
R SEDIMENTA	RY ROCKS. IN	DURATION 15		RATION 5 OF THE MATERIAL BY CEMENTE	NG HEAT PRESSURE FTC	2 C		
	ABLE	Section 12	RUBBING W	TH FINGER FREES NUMEROUS GR	AINS;			
			100 C 100 C 100 C	OW BY HAMMER DISINTEGRATES				
MODE	ERATELY INDU	RATED		N BE SEPARATED FROM SAMPLE SILY WHEN HIT WITH HAMMER.	THA STEEL PHOBE:			
INDU	URATED			E DIFFICULT TO SEPARATE WITH TO BREAK WITH HAMMER.	STEEL PROBER			
				MER BLOWS REQUIRED TO BREAK	100000			



NCDOT GEOTECHNICAL ENGINEERING UNIT

SHEET 4

_	1101	.10.R.1	1	_		IP 17BP.10.R		COONT	Y UNION			_	GEOLOGIST R. Clark					
SITE	DESCR	IPTION	Rep	lace E	Bridge	890356 on SR	2133	(Sandy R	dge Rd.) o	ver Little	Richa	dson	Creek		GROUN	DWTR		
	ING NO					TATION 11+8			OFFSET				ALIGNMENT -L-		0 HR.	1		
COL	LAR ELI	EV. 58	32.3 ft		-	OTAL DEPTH		ft	NORTHIN	2014 - 101- 2			EASTING 1,543,563		24 HR.	3		
_			a factor and the	TE M		CME-45C 81% 0	-		1.000	1		n se	PT Core Boring	LHAMM	ER TYPE			
-	LER F				-	TART DATE			COMP. D	-		0 01	SURFACE WATER DEF	-		Automati		
ELEV	DRIVE	DEPTH	BLC	W CO		F 1		PER FOOT		SAMP.	V /	L	SURFACE WATER DE	TH N	A			
(ft)	ELEV (ft)	(ft)	0.5ft	0.5ft		0 25		50	75 100		моі	0	SOIL AND RC ELEV. (ft)	CK DES	CRIPTION	DEPT		
585 580	582.3	Ē	1 WOH	2	7	. e	111	<u> </u>	<u></u>	-	M		582.3 GROUN ROADWAY Yellowish brown, stil 579.3 with little gravel	EMBAN f, moist, and trac	KMENT silty CLAY (A-6)		
575		8.3	60/0.1	4	4	\$ 5,			60/0.1	•	м		Yellowish brown, m 575.8 silty CLAY (A-6) w 574.0 trace 573.9 WEATH	ALLUVIAL Yellowish brown, medium stiff silty CLAY (A-6) with some of trace fine sand WEATHERED RO Gray, METAVOLCANIC				
570		-											NON-CRYS	Gray, METAVOLCANIC NON-CRYSTALLINE Gray, METAVOLCANIC				
													Driller indicates ha Auger refu	ROCK rder drillin sal at 8.3	ng at 6.5 fer	et.		

NCDOT GEOTECHNICAL ENGINEERING UNIT

	17BP				-		.10.R.17		and the second second		NION	GEOLOGIST R. Clar	k		
			Rep	place Bric				33 (Sa	andy F	Ridge	Rd.) over Little Richardson	Creek		GROUN	ND WTR (ft
	ING NO		_	-			11+87	-		OF	SET 14 ft RT	ALIGNMENT -L-		0 HR.	1.1
-	LAR EL		AA				PTH 18	a construction of the second		NO	RTHING 424,160	EASTING 1,543,563	6 L	24 HR.	3.3
DRIL	RIG/HA	MMER E	FF./DA	TE MACS	9354 CN	/E-45C	81% 03/0	1/11			DRILL METHOD SP	PT Core Boring	HAMN	ER TYPE	Automatic
	LER F		_		STA	RT DA	TE 05/2	24/12		co	MP. DATE 05/24/12	SURFACE WATER DE	PTH N	/A	
COR	E SIZE	NQ					N 9.6 ft		1.1			A			
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	REC. (ft) %	RQD (ft) %	SAMP. NO.	STF REC. (ft) %	RQD (ft)	LOG	ELEV. (ft)	DESCRIPTION AND REMAR	KS		DEPTH (fi
573.9			1	-		F		1.1	1-21	1.5		Begin Coring @ 8.4 ft	-		
570	573.9 573.3 568.3	8:4 14.0	0.6	2:58/0.6 3:55 3:47 4:12 4:08 3:51	(0.6) 100% (4.4) 88%	(0.0) 0% (2.2) 44%		(8.7) 91%	(5.1) 53%		573.9 Gray, slightly we moderately c	athered to fresh, moderately lose fracture spacing, META	hard to ha	rd, close to ROCK	9 8,4
565	564.3	- 18.0	4.0	3:47 4:05 4:22 4:15	(3.7) 93%	(2.9) 73%					- 564.3				
	113	-		1110								ated at Elevation 564.3 ft in N METAVOLCANIC ROCK	on-Crystal	line Rock:	18.0
											Driller indicates h	harder drilling at 6.5 feet. Aug	er refusal	at 8.3 feet	

NCDOT CORE SINGLE BRIDGE 356 LOGS GPJ NC_DOT GDT 6/20/12

17BP.10.R.17/BRIDGE NO. 890356

CORE PHOTOGRAPHS

B-5 BOX 1: 8.4 - 18.0 FEET



FEET

NCDOT GEOTECHNICAL ENGINEERING UNIT

SHEET 7

6/20/	
GDT	
DOT	
NC	
BRIDGE 356 LOGS.GPJ	
NCDOT BORE SINGLE	

12

LANDE	17BP.			RE		G RE			COUNT		HON			_	GEOLOGIST R. Clar		
-				lace F		890356 or		-				ar Little	Picha	rdeor	The second second second second second	<u> </u>	GROUND WTR (ft)
	ING NO.		· Nop	nace L		TATION		100 10	Januy I	1	SET 1			10501	ALIGNMENT -L-		0 HR. 0.5
	LAR EL		R1 Q ft		-	DTAL DEP		7 7 ft		-	THING	100.00			EASTING 1,543,542		
				TE M		CME-45C 8			_	INON			_		PT Core Boring	LIAM	24 HR. 2.3 MER TYPE Automatic
	LER F				-	TART DAT		_	() ()	CON	IP. DAT				SURFACE WATER DE		A LA CONTRACTOR
ELEV	DOUG	DEPTH	BLC	W CO					ER FOO	-	IF. DAI	SAMP.	V/	111	SURFACE WATER DE	PIR	W/A
(ft)	ELEV (ft)	(ft)	0.5ft		0.5ft	0	25	50		75	100	NO.	MOI	O G	SOIL AND R	DCK DES	SCRIPTION DEPTH (ft)
585	581.9	-	1	2	3	•5· · ·	199	••	•••		· (+ +)		₩		581.9 GROU 581.9 GROU FOR Brown, medium 579.4 Clayey SILT (A	stiff, moi 4) with tr	ACE 0.0 NKMENT st, fine sandy,25 race organics25
<u>575</u> <u>570</u> 565	574.2		60/0.0	2	3	•5					60/0.0		w		575.9 Light yellowish bro CLAY (A-6) with	Ittle fine HERED R VOLCAN	um stiff, wet, silty 6.0 to coarse sand 7.7 ROCK 7.7 NIC ROCK FROCK
															Non-Crystalline I Driller indicates h Auger re	ROCK	lling at 6.0 feet.

NCDOT GEOTECHNICAL ENGINEERING UNIT CORE BORING REPORT

WBS	17BP.	10.R.1	7		TIP	17BP	.10.R.17	C	OUNT	YU	ION	GEOLOGIST R. Clar	k		
SITE	DESCR	IPTION	Rep	blace Brid	lge 89	0356 o	n SR 213	3 (Sa	ndy F	idge l	d.) over Little Richardson	Creek		GROUN	D WTR (f
	NG NO.						12+44				ET 14 ft LT	ALIGNMENT -L-		0 HR.	0.
COLL	AR ELE	EV. 58	31.9 ft		TOT	AL DE	PTH 17.	7 ft		NO	HING 424,220	EASTING 1,543,542		24 HR.	2.
DRILL	RIG/HAI	MMER E	FF./DA	TE MACS	9354 CN	1E-45C	81% 03/01/	11			DRILL METHOD SP	PT Core Boring	HAMM	ER TYPE	Automatic
DRIL	LER F	Cox			STA	RT DA	TE 05/24	1/12		CO	P. DATE 05/24/12	SURFACE WATER DE	PTH N	'A	
COR	E SIZE	NQ			TOT	AL RUI	N 10.0 ft								
ELEV	RUN ELEV	DEPTH		DRILL RATE	REC.	JN RQD	SAMP.	STR REC.	ATA	L		DESCRIPTION AND REMAR	W.C		-
(ft)	(ft)	(ft)	(ft)	(Min/ft)	(ft) %	(ft) %	NO.	(ft) %	RQD (ft) %	G	ELEV. (ft)	DESCRIF HON AND REMAR			DEPTH
574.2	574.2 -	- 7.7	0.0	1.05	(0.0)	74.73		(0.0)	10.41			Begin Coring @ 7.7 ft			
	572.2	9.7	2.0	4:05 N=60/0.0 4:05 3:48	(2.0) 100%	(1.7) 85%		(9.9) 99%	(9.1) 91%		Gray, slightly we	NON-CRYSTALLINE RO athered to fresh, moderately	hard to ha	rd, close to	
570	1	-	5.0	3:48	(4.9) 98%	(4.6) 92%					moderately c	lose fracture spacing, META	VOLCANIC	ROCK	
	567.2	- 14 7		4:21 4:18 4:33 4:40 3:58 3:39 3:51 4:06											
	307.2	14.7	3.0	3:58	(3.0)	(2.8)	5 4 1	1							
565	564.2	17.7	-	3:51 4:06	100%	93%		_	121		64.2 Review Territor				17
											Boring Fermina	METAVOLCANIC ROCK	on-Crystal	ine Rock:	
	4	2									Driller indicates h	narder drilling at 6.0 feet. Au	ger refusal	at 7.7 feet.	
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17BP.10.R.17/BRIDGE NO. 890356

CORE PHOTOGRAPHS

B-6 BOXES 1 & 2: 7.7 - 17.7 FEET





