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COMBINED AASHTO SOIL CLASSIFICATION AND GRADATION SHEET AND SUMMARY

OF ROCK CORE TEST RESULTS

SITE PHOTOGRAPHS

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT

STRUCTURE SUBSURFACE INVESTIGATION

F.A. PROJ. <u>STTP-1445(4)</u> PROJ. REFERENCE NO. 40373.1.1 (U-4910) COUNTY <u>CABARRUS</u> PROJECT DESCRIPTION SR 1445 (DERITA ROAD) WIDENING FROM NORTH OF SR 3894 (CONCORD MILLS BOULEVARD) TO SR 1394 (POPLAR TENT ROAD) SITE DESCRIPTION BRIDGE NO. 3 ON SR 1445 (DERITA ROAD) OVER ROCKY RIVER

STATE PROJECT REFERENCE NO. N.C. 40373.1.1(U-4910) 1 26

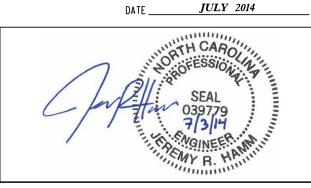
CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING, AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING LINIT AT (919) 707-6850, NEITHER THE SUBSURFACE PLANS AND REPORTS. NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSUBFACE DATA AND MAY NOT NECESSARLY REFLECT THE ACTUAL SUBSUBFACE CONDITIONS BETWEEN BORNOS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE, THE LABORATORY SAMPLE DATA AND THE IN SITU IN-PLACED TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIBBILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSUBFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION, THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURE PREPRINTATION AND WIND, AS WEIL AS CHIFF NON-CLIMATIC FOOTORS. TEMPERATURES, PRECIPITATION, AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT, FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPNION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED, THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THIS PROJECT. THE NECESSARI TO SAFET INSIGHT AND CLAIM FOR A DOTTIONAL COMPENSATION OF FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

	PERSONNEL EVANS, T. E.
	SOIL DRILLING
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INVESTIGATED B	Y EVANS, T. E.
CHECKED BY	<i>HAMM</i> , <i>J. R</i> .



SUBMITTED BY_ FALCON

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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. SPECIFICATIONS, OR CONTRACT FOR THE PROJECT.

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.

PROJECT REFERENCE NO. SHEET NO. 40373.I.I (U-4910) 2

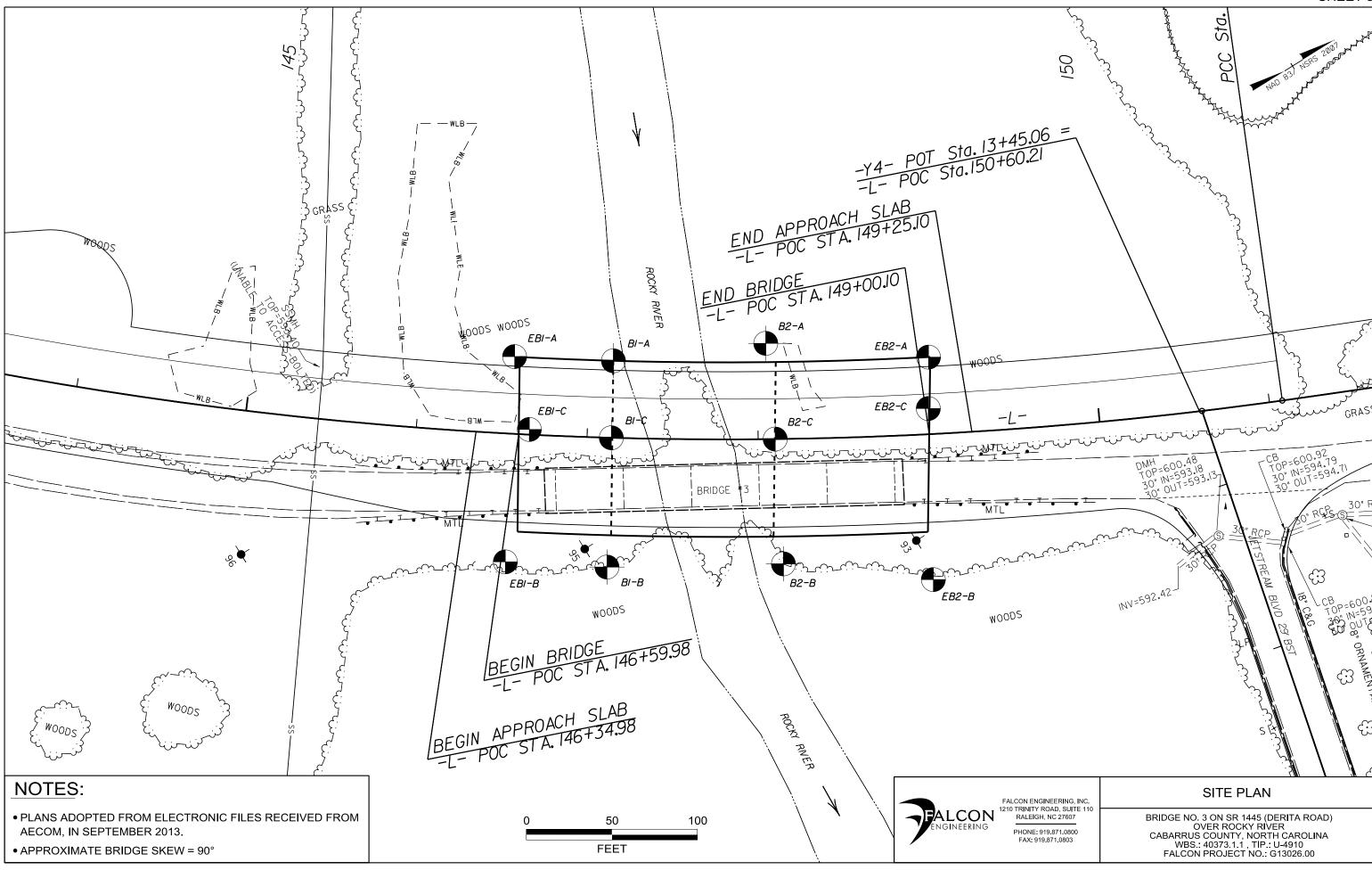
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

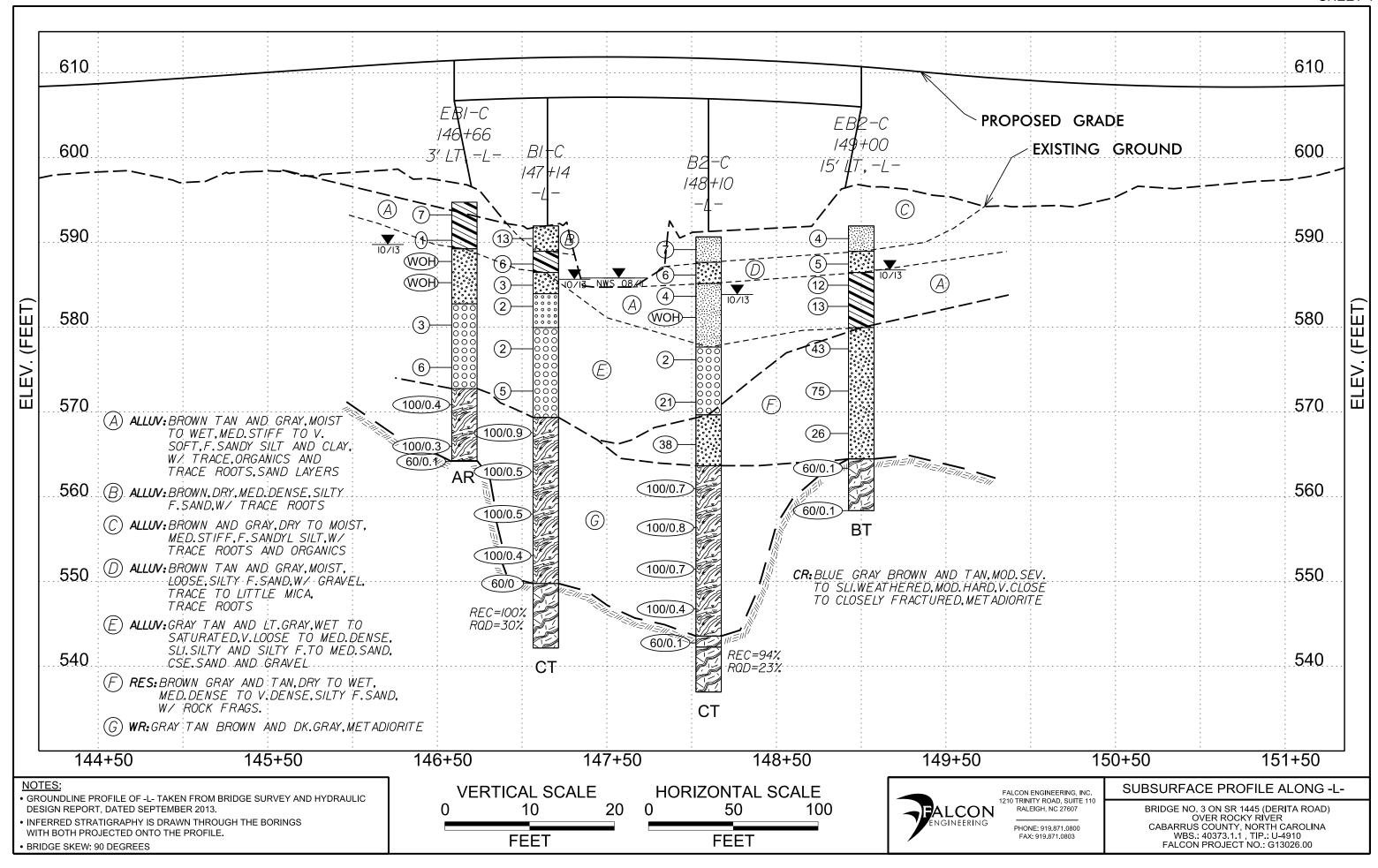
DIVISION OF HIGHWAYS

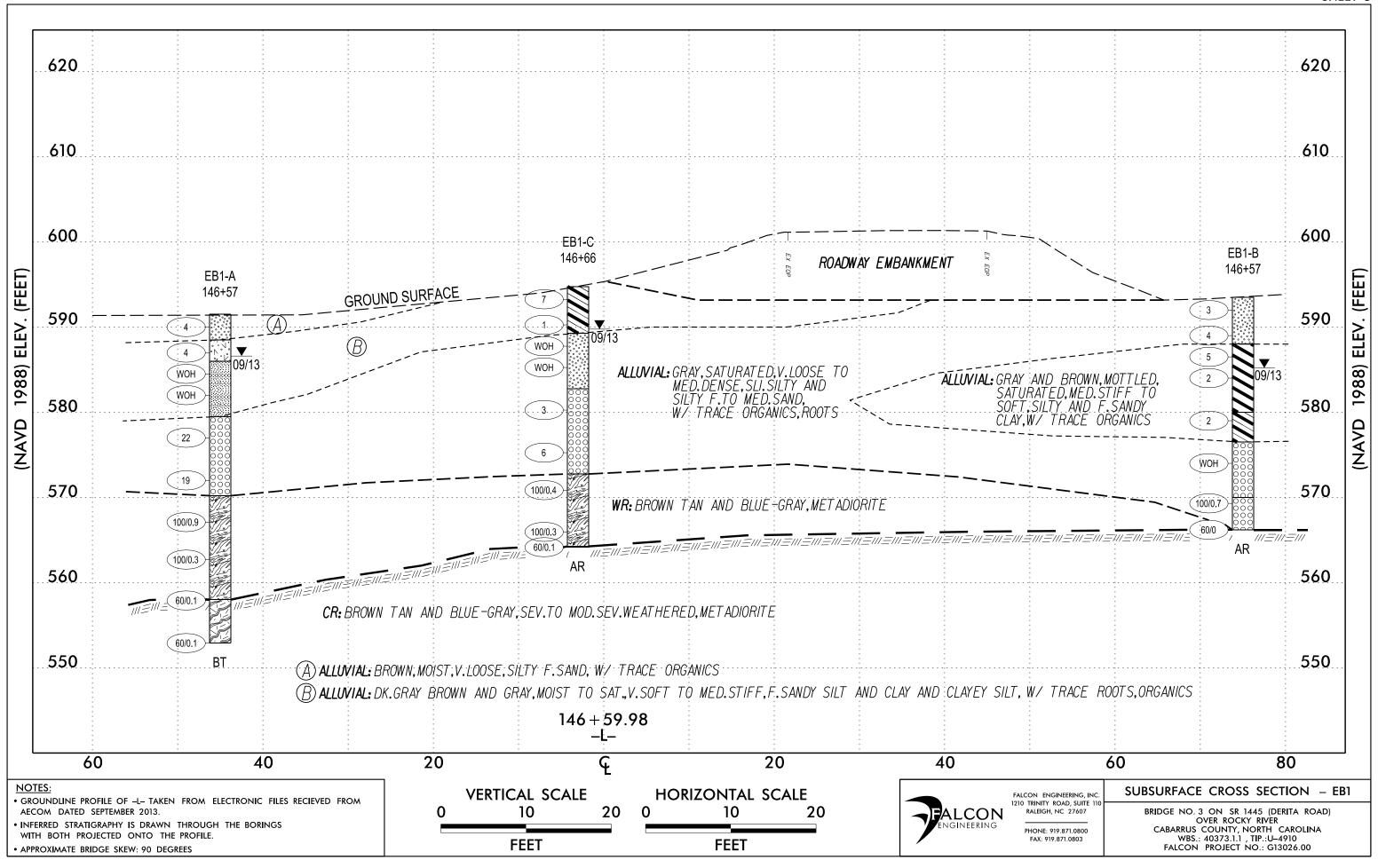
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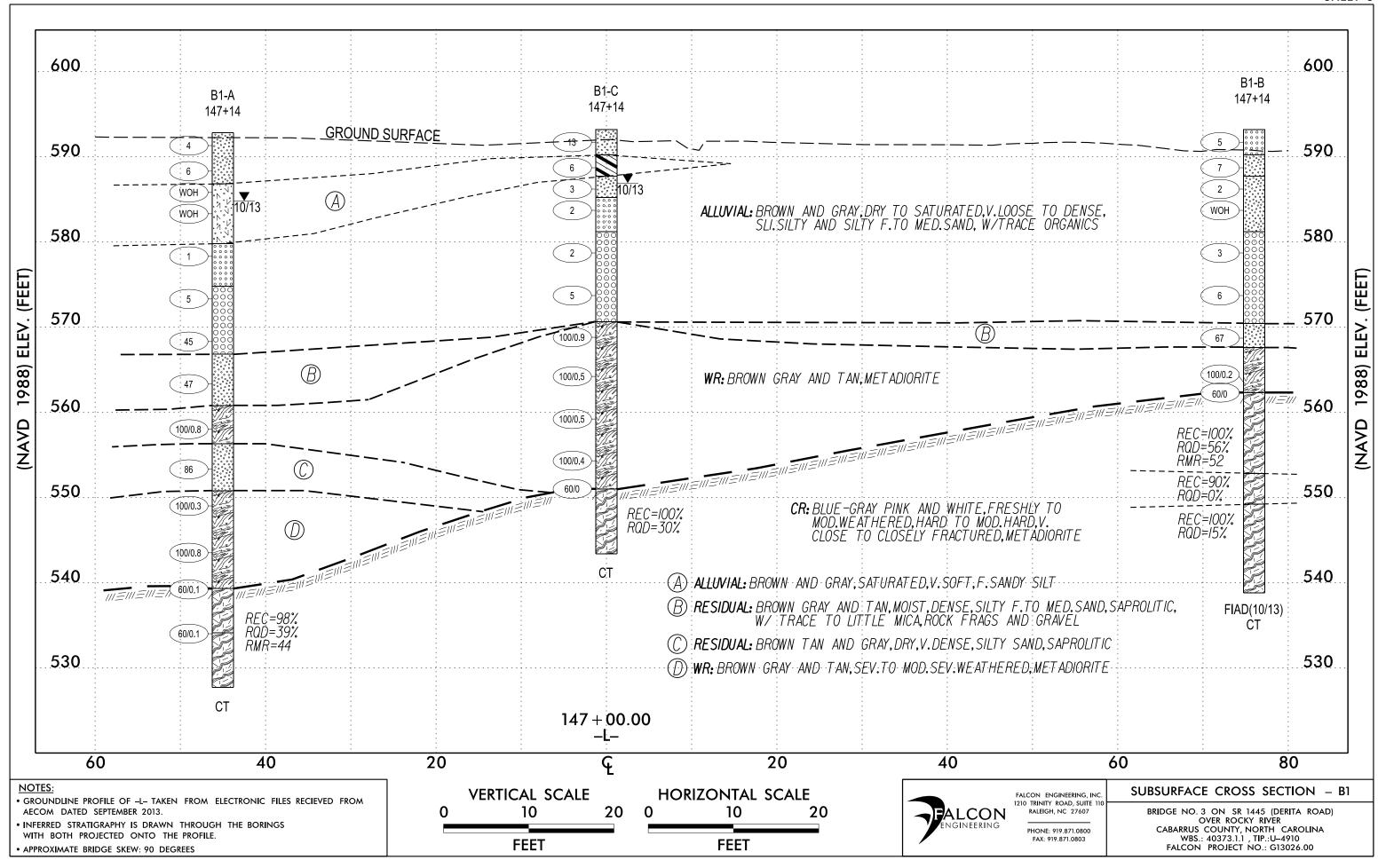
SUBSURFACE INVESTIGATION

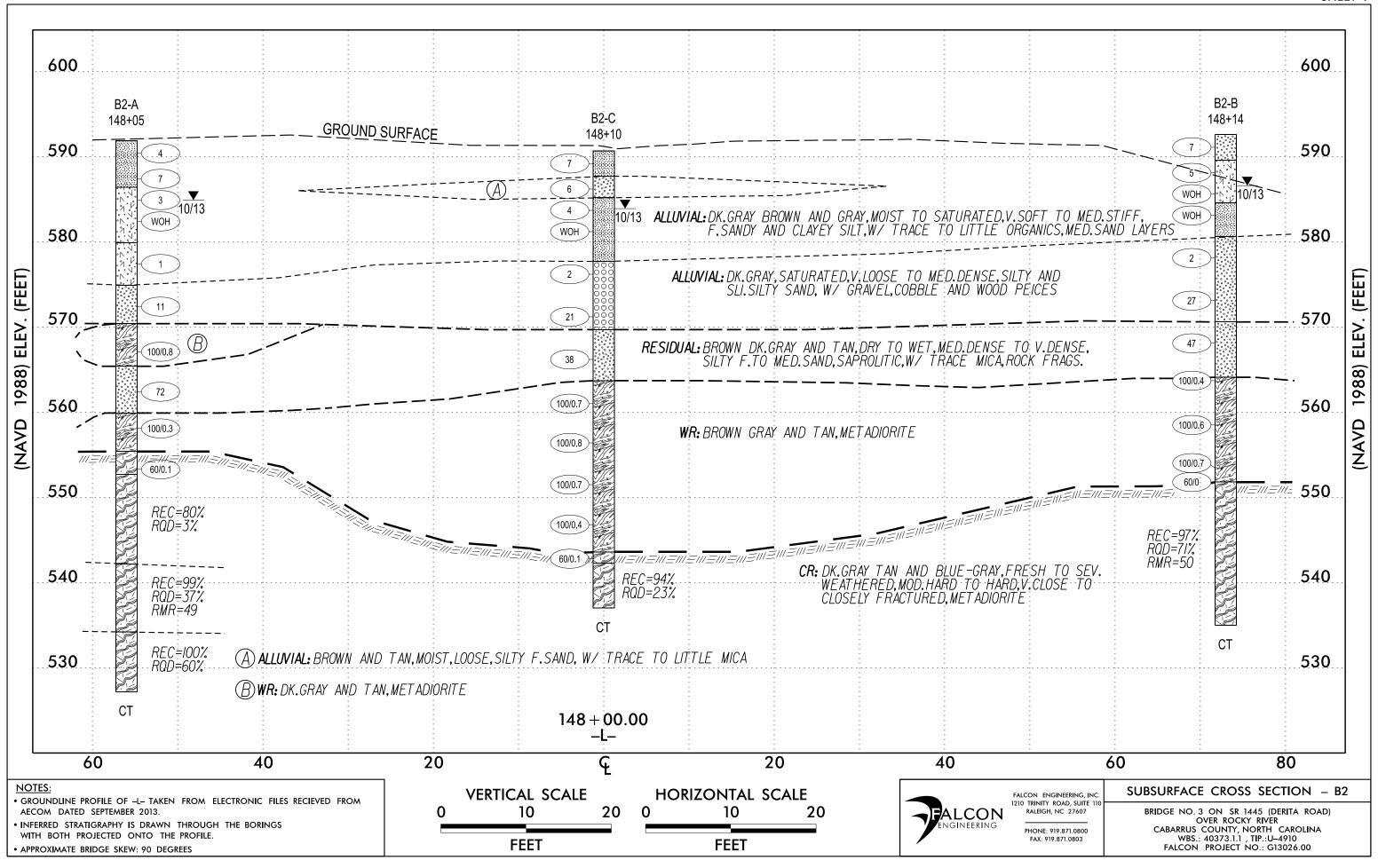
	SOIL AND ROCK LEGEN	D, TERMS, SYMBOLS, AND ABBREVIATIONS	
SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, ASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE: VERY STIFF, GRAY, SULY CLAY, MOST WITH INTERBEDGED FINE SAND LAVERS, MIGHLY PLASTIC, A-7-6	WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARS UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE, (ALSO POORLY GRADED) - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES. - ANGULARITY OF GRAINS THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.	E. HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSE ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0. IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS: WEATHERED NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT ROCK (WR) BLOWS PER FOOT IF TESTED.	SPT REFUSAL. IFOOT PER 60 BLOWS. REPRESENTED BY A ZONE ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVEN A NOTABLE PROPODOTION OF CLAY MINERALS, OR HAVEN A NOTABLE PROPODOTION OF CLAY MINERALS,
SOIL LEGEND AND AASHTO CLASSIFICATION	MINERALOGICAL COMPOSITION MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTION WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE. COMPRESSIBILITY	S CRYSTALLINE FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC RO WOULD YIELD SPT REFUSAL IT FESTED, ROCK TYPE IN ONESS, GABBRO, SCHIST, ETC. NON-CRYSTALLINE NON-CRYSTALLINE NON-CRYSTALLINE NON-CRYSTALLINE NON-CRYSTALLINE NON-CRYSTALLINE	CK THAT CLUDES GRANITE, CLUDES GRANITE, CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. L PLAIN
CLASS. A-1-a A-1-b A-2-4 A-2-5 A-2-6 A-2-7 A-7-6 A-3 A-6, A-7 SYMBOL 000000000000000000000000000000000000	SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN 31 MODERATELY COMPRESSIBLE LIQUID LIMIT EQUAL TO 31-50 HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THAN 50	COASTAL PLAIN COASTAL PLAIN SEDIMENTARY ROCK SPET REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDS	OF SLOPE. MAY NOT YIELD CORE RECOVERY (REC.) - IDIAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE RARREL DIVIDED BY IDIAL
X PASSING SILT- MUCK	PERCENTAGE OF MATERIAL GRANULAR SILT - CLAY	(CP) SHELL BEDS, ETC. WEATHERING	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT
* 10 56 MX GRANULAR CLAY SOILS SOILS SOILS SOILS SOILS CLAY SOI	ORGANIC MATERIAL ORTHER MATERIAL TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10% LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20%	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCHAMMER IF CRYSTALLINE.	ROCKS OR CUTS MASSIVE ROCK. K RINGS UNDER DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.
LIQUID LIMIT	MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35% HIGHLY ORGANIC >10% >20% HIGHLY 35% AND 0	VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY (IY SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER OF A CRYSTALLINE NATURE.	THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
USUAL TYPES STONE FRAGS. OF MAJOR GRAVEL AND GRAVEL AND GRAVEL AND SAND GRAVEL AND SAND SOILS SOILS MATTER	GROUND WATER WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING	SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO (SLI,) I INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIC CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAM	DNAL FELDSPAR SIDES RECHTIVE TO THE HAUTHER PARALLEL TO THE PRACTORS.
GEN. RATING AS A EXCELLENT TO GOOD FAIR TO POOR POOR UNSUITABLE	STATIC WATER LEVEL AFTER $\underline{24}$ HOURS $ abla_{PW} $ PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA	MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFE (MOD.) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW (DULL SOUND UNDER HAMMER BLOWS AND SIGNIFICANT LOSS OF STRENG	CLAY, ROCK HAS PARENT MATERIAL. THAS COMPARED
SUBGRADE PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30	SPRING OR SEEP	WITH FRESH ROCK. MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL	FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM,
CONSISTENCY OR DENSENESS RANGE OF STANDARD RANGE OF UNCONFINED	MISCELLANEOUS SYMBOLS	SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION, ROCK SHOWS SEVERE	: LOSS OF STRENGTH FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY PENETRATION RESISTENCE (N-VALUE) (TONS/FT2)		TEST BORING W/ CORE ### TESTED, WOULD YIELD SPT REFUSAL SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
GENERALLY VERY LOOSE 4 CONNINCE 4 TO 10	SOIL SYMBOL AUGER BORING	SPT N-VALUE (SEV.) IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELOSPARS ARE KA EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN.	
MATERIAL MEDIUM DENSE 10 TO 30	THAN ROADWAY EMBANKMENT INFERRED SOIL BOUNDARY MONITORING WELL	SPT REFUSAL VERY SEVEN VERY SEVEN VERY SEVEN VERY SEVEN ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRADMENTS REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SI VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. IF TESTED, VIELDS SPT IN	OF STRONG ROCK SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN
GENERALLY SUP-1 2 10 4 0.25 TO 0.50	INFERRED ROCK LINE INSTALLATION SLOPE INDICATOR INSTALLATION 25/825 DIP & DIP DIRECTION OF	COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONL SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGE ALSO AN EXAMPLE.	Y IN SMALL AND RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
TEXTURE OR GRAIN SIZE	ROCK STRUCTURES CONE PENETROMETER TEST	ROCK HARDNESS	EXPRESSED AS A PERCENTAGE.
U.S. STD. SIEVE SIZE 4 10 40 60 200 270	SOUNDING ROD	VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK, BREAKING OF HAND SPECI SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.	PARENT ROCK.
OPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053 BOULDER COBBLE GRAVEL COARSE SAND FINE SILT CLAY	ABBREVIATIONS AR - AUGER REFUSAL MED MEDIUM VST - VANE		TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
(BLDR.) (CUB.) (GR.) (CSE. SD.) (F SD.) (SL.) (CL.) (CL.) (GRAIN MM 305 75 2.0 0.25 0.05 0.005	BT - BORING TERMINATED MICA MICACEOUS WEA WEAT CL CLAY MOD MODERATELY 7 - UNIT WI CPT - CONE PENETRATION TEST NP - NON PLASTIC 7 DRY UN	IGHT HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN B	SEIDETACHED SLIP PLANE.
SOIL MOISTURE - CORRELATION OF TERMS SOIL MOISTURE SCALE FIELD MOISTURE CHIPS PROFESSIONAL PROF	CSE COARSE ORG ORGANIC	MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIF BBREVIATIONS HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES I INCH MAXIMUM SIZE BY H POINT OF A GEOLOGIST'S PICK.	
(ATTERBERG LIMITS) - SATURATED - USUALLY LIQUID: VERY WET, USUALLY	e - VOID RATIO		POINT. SMALL, THIN STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
LL LIOUID LIMIT (SAT.) FROM BELOW THE GROUND WATER TABLE		ACTED TRIAXIAL VERY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF P. OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRE FINGERNALL.	ATCHED READILY BY TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
RANDE SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE	EQUIPMENT USED ON SUBJECT PROJECT	FRACTURE SPACING BEDDING	THICKNESS DENCH MADIX
MOICT (N) COLIDATION NEAD OPTIMIM MOISTINE	DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:	SI HELIVE VERY THICKLY BEDDED	BENCH MARK: 5 - 4 FEET 1.5 - 4 FEET
OM OPTIMUM MOISTURE - MOIST - (M) SULID; AT UR NEAR OPTIMUM MUISTURE SL SHRINKAGE LIMIT	MOBILE B- CLAY BITS	MODERATELY CLOSE 1 TO 3 FEET THINLY BEDDED	GROUND ELEVATIONS OBTAINED FROM .TIN FILES ELEVATION: FT.
- DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE	BK-51 G* CONTINUOUS FLIGHT AUGER CORE SIZE: X 8* HOLLOW AUGERS	CLOSE 0.16 TO 1 FEET THICKLY LAMINATED 0.	NOTES: < 0.008 FEET NOTES: < 0.008 FEET FIAD - "FILLED IMMEDIATELY AFTER DRILLING"
PLASTICITY	CME-45C HARD FACED FINGER BITS X -N 02	INDURATION	
PLASTICITY INDEX (PI) DRY STRENGTH NONPLASTIC 0-5 VERY LOW	TUNGCARBIDE INSERTS -H	FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, F RUBBING WITH FINGER FREES NUMEROUS GRAINS	
LOW PLASTICITY 6-15 SLIGHT	X CASING W/ ADVANCER HAND TOOLS:	GENTLE BLOW BY HAMMER DISINTEGRATES SAME	PLE.
HIGH PLASTICITY 26 OR MORE HIGH	PORTABLE HOIST TRICONE STEEL TEETH POST HOLE	BREAKS EASILY WHEN HIT WITH HAMMER.	STEEL PROBE;
COLOR	TRICONE TUNGCARB. HAND AUGE X CORE BIT SOUNDING	ROD INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STE	EEL PROBE:
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY), MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.	CORE BIT	DIFFICULT TO BREAK WITH HAMMER. R TEST EXTREMELY INDURATED SAMPLE BREAKS ACROSS GRAINS.	MPLE:

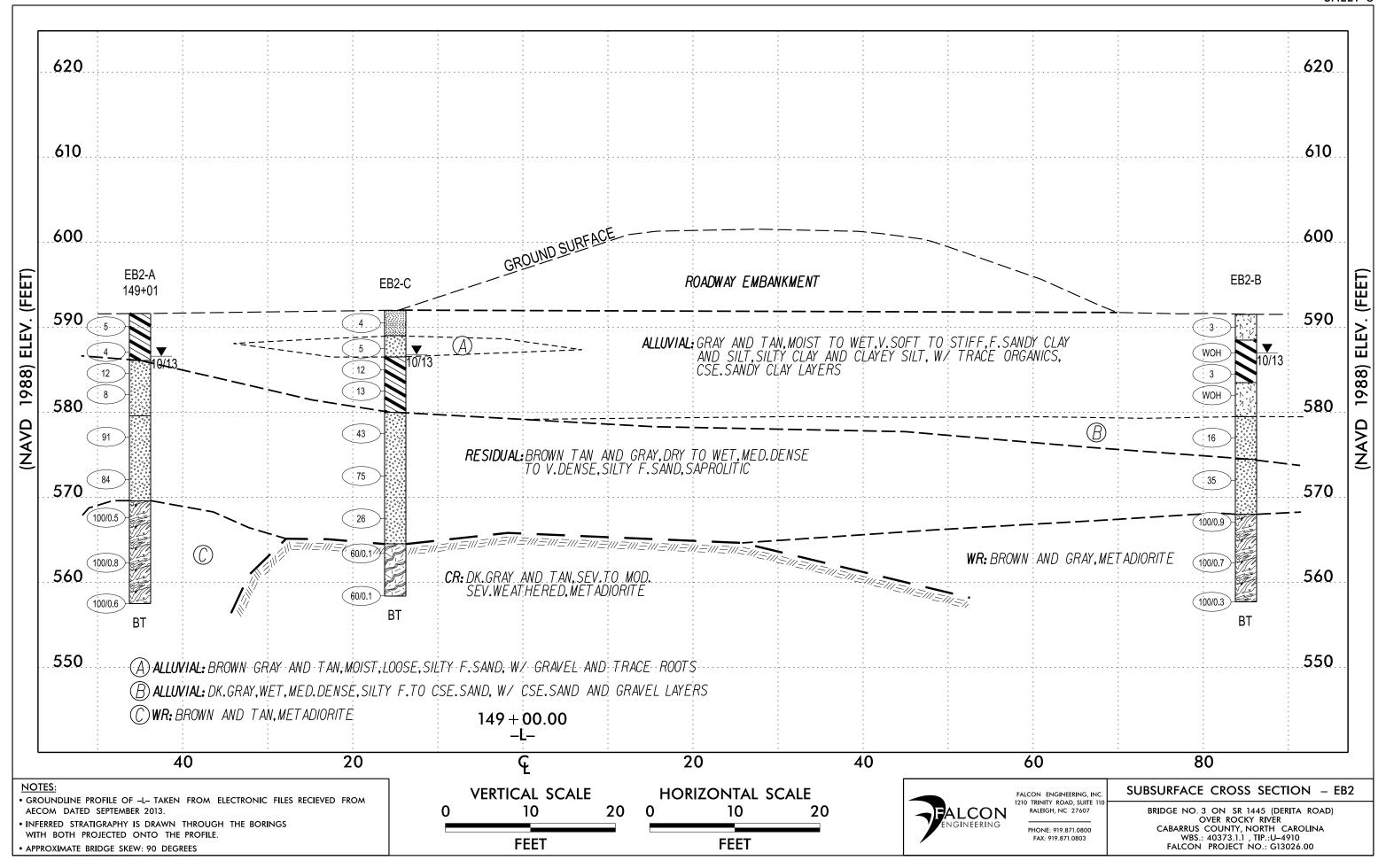












WBS 403	373.1.1				TIP	U-4910	1		COUNT	Y CABAI	RRUS			GEOL	OGIST EVA	NS, T. E.			WBS	4037	3.1.1			TII	P U-4910	1	COU	NTY CABARI	RUS		GEC	LOGIST EVANS,	T. E.	
SITE DES	CRIPTIC	ON B	RIDGE	NO.	3 ON	SR 1445	(DER	ITA RO	OAD) O\	/ER ROC	KY RIV	ÆR					GROUN	D WTR (ft)	SITE	DESCF	RIPTION	BRID	OGE N	O. 3 OI	N SR 144	(DERITA	(ROAD	OVER ROCK	Y RIVER				GI	ROUND WTR
BORING N	O. EB	1-A			STA	TION 1	46+57	•		OFFSET	45 ft	LT		ALIGN	IMENT -L-		0 HR.	6.8	BOR	NG NO	. EB1-	3		ST	TATION	46+57		OFFSET	75 ft RT	-	ALIC	SNMENT -L-	0	HR. 1
COLLAR	ELEV.	591.5	ft		тот	AL DEP	TH 38	8.6 ft		NORTHI	NG 59	98,701		EAST	NG 1,486,8	11	24 HR.	4.9	COLI	AR EL	EV . 59	3.5 ft		TC	OTAL DEF	TH 27.3	ft	NORTHIN	G 598,6	32	EAS	TING 1,486,910	24	HR.
DRILL RIG/H	AMMER	EFF./D	ATE	SOI851	3 CME	550X 90%	6 08/21/2	2013			DR	ILL MET	HOD H	I.S. Augers		HAMI	MER TYPE	Automatic	DRILL	RIG/HA	MMER EF	F./DATE	E SOI	8513 CN	/IE-550X 90°	6 08/21/201	3		DRILL N	METHO	D H.S. Augers	3	HAMMER T	YPE Automation
DRILLER	WHITI	Ξ, J. D			STA	RT DAT	E 09/	/30/13		СОМР. І	DATE	09/30/	13	SURF	ACE WATER	DEPTH N	N/A		DRIL	LER V	VHITE,	J. D.		ST	TART DAT	E 10/01	/13	COMP. DA	ATE 10/	/01/13	SUR	FACE WATER DEF	PTH N/A	
ELEV DRIV			BLOW				BLO	WS PE	ER FOOT		SA	AMP.	L		SOIL AND) ROCK DE	SCRIPTION		ELEV	DRIVE FLEV	DEPTH	BLO	W CO	UNT		BLOW	S PER FO	ООТ	SAMP.	· /		SOIL AND RO	OCK DESCRIE	TION
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	+	100	/0.3				: :			_ 100/0	.3♥			F							Ŧ										F			
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558	<u>0 ‡ 33</u>	5 60/	0.1							60/0	.1			558.0	- -	STALLINE	<u> </u>	33.5			‡													
	‡	100/	0.1				: :	: :			·			1	BROWN TAN	AND BLUE-	-GRAY, SEV	. TO			‡													
555	+				-		+							552.9	MOD. SEV. W	EATHERED), METADIOF				‡										-			
_553	<u>0 38</u>	5 60/	0.1	+	\dashv		<u> </u>			60/0	11	-		552.9	Boring Te	rminated wi	ith Standard	38.6			İ										<u> </u>			
	\pm													Ł	Penetration Te	st Refusal a	at Elevation 5	52.9			Ŧ										1 E			
	Ŧ													F	it iii v	JIV. WETADI	JOHNE				Ŧ										F			
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NBS	40373.	.1.1			TI	IP U-49	910	COU	ITY CABA	RRU:	S			GEOLOGIST EVANS, T.	E.		
SITE	DESCRI	PTION	BRIE	DGE N	O. 3 O	N SR 14	445 (DERIT	A ROAD)	OVER ROO	CKY F	RIVER			•	GRO	DUND WT	ſR (f
BORII	NG NO.	EB1-0	C		S.	TATION	146+66		OFFSE	T 31	ft LT			ALIGNMENT -L-	ОН	R.	7.
COLL	AR ELE	V. 59	94.8 ft		T	OTAL D	EPTH 30.6	S ft	NORTH	ING	598,68	34		EASTING 1,486,851	24 H	R.	5.
RILL	RIG/HAM	MER EF	F./DATI	E SOI	8513 CI	ME-550X	90% 08/21/20	13			DRILL M	ETHOD) H.S	S. Augers	HAMMER TYP	PE Autom	natic
RILL	LER W	HITE, 、	J. D.		S.	TART D	ATE 09/30)/13	COMP.	_				SURFACE WATER DEPTH	l N/A		
EV	DRIVE	DEPTH	T	W CO	UNT		BLOW	S PER FO	OT		SAMP.	V /	L				
ft)	ELEV (ft)	(ft)	0.5ft	0.5ft	0.5ft	0	25	50	75	100	NO.	мог	O G	SOIL AND ROCK ELEV. (ft)	DESCRIPT		EPTH
							<u>.</u>		<u>.</u>								
95														_594.8 GROUND S	SURFACE		
	594.3	0.5	3	3	4	.].		-		-		М		BROWN AND GRA	VIAL	CLAV	
	591.3	- - 3.5] [29%		(A-6) W/ TRACE R			
90	1	-	WOH	WOH	1	1				[SS-37	V		- _{589.3}			
ŀ	588.8	- 6.0 -	WOH	WOH	WOH	0						Sat.		GRAY, SILTY SANI		CLAY	
35	586.3	8.5	WOH	WOH	WOH					:		Sat.			,20		
5	†	-				0				-		Jai.		- •			
	504.0	-								:			000	. 582.8 GRAY, SLI. SILT	Y SAND (A-		1
0	581.3	13.5 _	2	2	1							Sat.	000	· -	•	,	
	1	-				<u>i</u> : :	: : : : :										
	576.3	18.5				. ; []		-		-				•			
'5	4	-	3	4	2	6						Sat.	000				
	7	-				:,;_								GRAVEL / COBBLE WEATHER		2.0 FT	2
, ₀	571.3	23.5	100/0.4						100	1				GRAY BROWN AND		DIORITE	
Ŭ	1	-								.				- ·			
	566.3	- 28.5												•			
35	564.3	-	100/0.3						100	0.3				- - 564 3			9
Ī	304.3	- 30.5 -	60/0.1						60	′0.1			3477	564.3 564.2 / CRYSTALL GRAY BROWN ANI			ئے
	‡	- -												WEATHERED,	METAĎIORI	TE	
	+	<u>-</u> -												Boring Terminated be Elevation 564.2 ft in			
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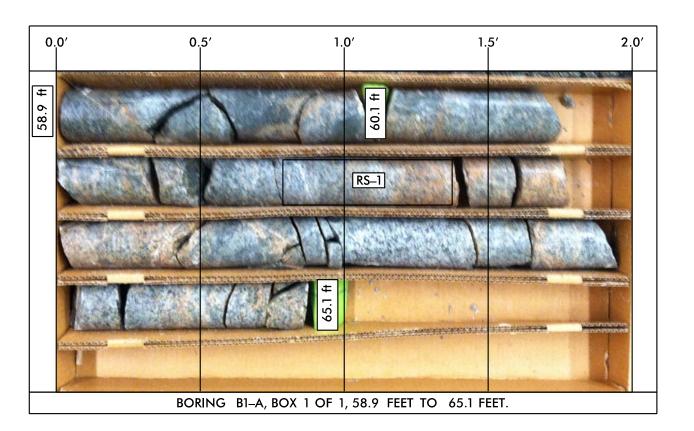
NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

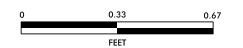
WBS 4	0373.1.1			TI	IP U-4	910		COUN	ITY	CABARR	US			GEOLOGI	ST EVANS,	T. E.		
SITE DE	SCRIPTIO	N BRI	DGE N	10.30	N SR 1	1445 (DERITA	ROAD)	OVE	R ROCKY	RIVER						GROUN	ID WTR (f
BORING	NO. B1-A	١		s ⁻	TATIO	N 14	7+14		T 0	OFFSET .	45 ft LT			ALIGNME	NT -L2-		0 HR.	N/A
COLLAR	R ELEV. 5	92.8 ft		Т	OTAL [DEPT	H 65.1 f	t	N	IORTHING	598,74	47		EASTING	1,486,843		24 HR.	8.
ORILL RIG	G/HAMMER E	FF./DAT	E SO	18513 CN	ME-550>	(90% (08/21/2013				DRILL M	IETHOI	SP1	Core Boring		НАММ	ER TYPE	Automatic
ORILLEF	R WHITE,	J. D.		S	TART [DATE	10/10/1	3		OMP. DA	TE 10/	10/13		SURFACE	WATER DEF	TH N/	Α	
	RIVE DEPT	H BLO	ow cc	UNT			BLOWS	PER FO	от		SAMP.	V /	1 [L	SOIL AND RC	CK DEC	CDIDTION	1
	LEV (ft)	0.5ft	0.5ft	0.5ft	0	2	5	50	75	5 100	NO.	MO	O G	ELEV. (ft)	SOIL AND RC	CK DES	SKIPTION	DEPTH
595													ΙL	_				
	+												<u> </u>	592.8	GROUN	ID SURF	ACE	(
	92.3 7 0.5	2	2	2	 Q 4 .							D		ВІ	AL ROWN, SLI. SI	LUVIAL LTY SAN	D (A-2-4)	W/
590 58	89.3 + 3.5	4	4	2	-			 						-	SILTY LAYER			
58	86.8 - 6.0	4	4	2	6.							D D		586.8				
585	+	WOF	WOH	WOH	<u></u> 6							Sat.	N. 1	BRC	WN AND GRA	Y, F. SA	NDY SILT	(A-5)
58	84.3 7 8.5	WOF	I WOH	I WOH	0							Sat.]:\ <u>`</u>					
	±				: :													
580 57	79.3 13.5		<u> </u>	IMO.										<u>579.8</u>	GRAY, SLI. SI	TYF S	AND (A-3)	1
	Ŧ	2	1	WOH	1							Sat.	0000		O1 0 11, OLI. O1		, 12 (, t o)	,
575	Ŧ				/			: : :					0000	_574.8				1
_57	74.3 18.5	2	2	3	1.			ļ				Sat.	000	· · · · · · · · · · · · · · · · · · ·	GRAY, SLI. S	LTY SAN	ND (A-1-b)	·
	Ŧ				~~``	·							0000	GR	AVEL COBBLE	LAYER	21.5 - 26.0) FT
570 56	59.3 [‡] 23.5							+	•				0000	-				
	1	31	20	25] ::			 45				Sat.	000	====				_
565	‡				: :		ļ : : : į						000_	566.8		SIDUAL		2
_56	64.3 ‡ 28.5	21	23	24								М			OWN GRAY A A-2-4) W/ TRAC			
	‡				::			₹ 47 \				IVI			ROCK FRAC SAF	SS AND (PROLITIC		
560	+ 59.3 + 33.5				: : :			\ <u>-</u>					777	560.8		ERED RO		3
	33.3	32	52	48/0.3	::					100/0.8				i	BROWN AND ⁻	ΓAN, ME	FADIORIT	E
	‡									. 1				556.3	DE	SIDUAL		3
555 55	54.3 🛨 38.5	27	31	55	<u> </u>			+		. j				BR	ROWN TAN AN	D GRAY		AND
	‡	"	"		::					. ♦ 86 . . .]		ט	-		(A-2-4)	SAPROL	IIIC	
550					• •	• •				·			777	<u>550.8</u>	WEATH	ERED RO		4
54	49.3 7 43.5	100/0.	3		: :					100/0.3				BRO	OWN GRAY AN	ID TAN,	METADIO	RITE
	<u> </u>																	
545 54	44.3 🕇 48.5	60	40/0.3		 			+						=				
	±	60	40/0.3		: :					. 100/0.8								
540	<u> </u>				L. :			<u> </u>						- F00 C				
53	39.3 7 53.5	60/0.1	1			: -			: -]	60/0.1				539.3	CRYSTA			5
	Ŧ				::									G	RAY AND TAN WEATHERE	, SEV. TO D, META) MOD. SI DIORITE	≡V.
535	$\frac{1}{33.9}$								-					533.9				5
	+ 50.9	60/0.1	1							60/0.1	<u> </u>				CRYSTA BLUE-GRAY A	LLINE R		
530	Ŧ										RS-1 /			٧	VEATHERED, I OSELY FRACT	HARD, V	CLOSE 1	-O
	Ŧ							1						527.7	OSELI FRACI	UNED, N	IL I ADIOF	
	+				 			1	-				-		ring Terminated			ft in
	‡													-	CR: ME	TADIOR	IIE	
	‡																	
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	+	1		1									1 +					



SHEET 11

	<u>/ </u>		JKE I												
	40373.1.				U-491					ABARRU			GEOLOGIST E	VANS, T. E.	I
	DESCRIPT		RIDGE NO				A RO	4D) O'	_			-			GROUND WTR (ft)
BOR	ING NO. E	31-A		STA	TION	147+14			OF	FSET 4	5 ft LT		ALIGNMENT -L	_2-	0 HR. N/A
COLI	LAR ELEV	. 592.8	ft	ТОТ	AL DE	PTH 65.	1 ft		NO	RTHING	598,747		EASTING 1,486	5,843	24 HR. 8.0
DRILL	. RIG/HAMME	ER EFF./D/	ATE SOI8	13 CME	-550X 90	0% 08/21/20)13				DRILL METHOD	SPT	Core Boring	HAMI	MER TYPE Automatic
DRIL	LER WHI	ITE, J. D.	•	STA	RT DA	TE 10/1	0/13		СО	MP. DAT	E 10/10/13		SURFACE WAT	ER DEPTH N	I/A
COR	E SIZE N	Q2				N 6.2 ft									
ELEV		EPTH RU		REC.	UN RQD	SAMP.	STR REC.	RQD	P			DE	ESCRIPTION AND F	REMARKS	
(ft)	(ft)	(ft) (ft	(Min/ft		(ft) %	NO.	(ft) %	(ft) %	Ğ	ELEV. (ft)				DEPTH (ft)
533.9	522.0	500			(0.0)		(0.4)	(0.1)					Begin Coring @		
	533.9 532.7 + 8	58.9 1. 5.	- 1 1·50/1	2 (1.1) 0 (92%	(0.0) Λ 0% /	ł	(6.1) 98%	(2.4) 39%		_ 533.9 -			CRYSTALLINE IK, FRESHLY WEA	THERED, HAR	
530	‡		0 1:25/1 1:37/1 1:42/1 1:32/1 1:50/1	(5.0) 0 100%	(2.4) 48%	RS-1	1			- 		CLOS	ELY FRACTURED,	METADIORITE	≣
	527.7	65.1	1:32/1	0 100 /s	1070					- - 527.7		R	1=5, R2=8, R3=8, R TYPE=E, CLAS		65.1
	Ī		1,00,1,							-			RMR=44		
	 									_	Boring Te	rmınat	ed at Elevation 527	.7 ft in CR: MET	ADIORITE
	‡									- -					
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ROCK CORE PHOTOGRAPHS

BRIDGE NO. 3 ON SR 1445 (DERITA ROAD)
OVER ROCKY RIVER
CABARRUS COUNTY, NORTH CAROLINA
WBS.: 40373.1.1 , TIP.: U-4910
FALCON PROJECT NO.: G13026.00

NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

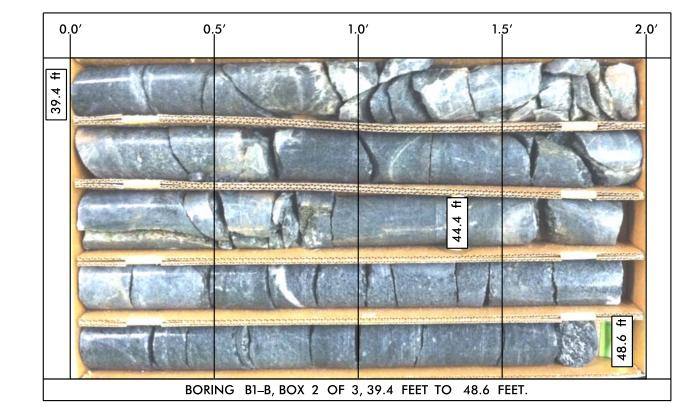
WBS	40373.1.1				TI	IP U-4910	COUNTY	CABARR	US			GEOLOGIST EVANS, T.	E.	
SITE	DESCRIPTION	ON	BRID	OGE N	10.30	ON SR 1445 (DER I TA	ROAD) OV	ER ROCKY	RIVER				GROUND WTF	۲ (ft)
BOR	ING NO. B1	-B			S ⁻	STATION 147+14		OFFSET	76 ft RT			ALIGNMENT -L2-	0 HR.	N/A
COL	LAR ELEV.	593	3.2 ft		Т	OTAL DEPTH 54.4 f	t	NORTHING	598,68	80		EASTING 1,486,943	24 HR. F	FIAD
DRILL	. RIG/HAMMER	EFF	./DATI	E SO	18513 CM	ME-550X 90% 08/21/2013	•		DRILL M	IETHOD) SP	T Core Boring	HAMMER TYPE Automa	ntic
DRIL	LER WHIT	E, J	. D.		S	TART DATE 10/11/1	3	COMP. DA	TE 10/	11/13		SURFACE WATER DEPTI	H N/A	
ELEV	DRIVE DEF			w co		- 	PER FOOT		SAMP.	lacksquare		SOIL AND ROCK	K DESCRIPTION	
(ft)	(ft) (fi	ι)	0.5ft	0.5ft	0.5ft	0 25	50 	75 100	NO.	/MOI	G	ELEV. (ft)	DEP	PTH (f
595	 											_		
	592.7 - 0.	5	2	2	3	 		 		_	0000	593.2 GROUND ALLU		0.
590	589.7 - 3.	_	۷	_		•5				D	0000	BROWN AND TAN, I 590.2 TRACE O	RGANICS	3.
	+		2	3	4	7				М		BROWN, SILTY	Y SAND (A-2-4)	_ <u>5</u> .
	587.2 T 6.	0	2	1	1	- <u> </u>				Sat.		GRAY, SILTY	SAND (A-2-4)	
585	584.7 + 8.	5	WOH	WOH	 WOH	<u> </u>		 		Sat.				
	1									Sal.				
580	579.7 13	5				<u> </u>					000		Y SAND (A-1-b)	<u>12</u> .
	1		1	2	1] •3 : · · · · · · ·				Sat.		• •		
E7E	‡										0000	• •		
575	574.7 + 18	.5	3	3	3	- 		1		Sat.	000	- ·		
	‡										000	. •		
570	569.7 23	.5					<u> </u>				ŏŏŏ	- 570.4 RESII	DUAL	22.
	‡		28	29	38		· • • 67	,		М		BLUE-GRAY AND T - 567.6 (A-2-4) SA		25.
565	‡											WEATHER BROWN TAN AND G	RED ROCK	
000	564.7 + 28	.5	31	56	44/0.2	2		100/0.0				_ BROWN TAN AND G	NAT, WETADIONITE	
	562.2 7 31	.0	60/0	-				- 100/0.2 60/0				562.2 CRYSTALL	INE ROCK	31.
560	‡						1					BLUE-GRAY A WEATHERED, HA	ND GRAY, SLI. .RD, V. CLOSE TO	
	1								RS-2	,		CLOSELY FRACTUR	RED, METADIORITE	
555	l													
	I											- - 552.8		40.
	<u> </u>											BLUE-GRAY AN WEATHERED, HA		
550	+											- _{549.2} CLOSELY FRACTUR	RED, METADIORITE	44.
	‡											BLUE-GRAY A WEATHERED, HA	RD, V. CLOSE TO	
545	‡											CLOSELY FRACTUR	RED, METADIORITE	
	‡											•		
540	‡											• •		
340	+						1						+ Florestion F20 0 # in	54.
	‡											Boring Terminated at CR: META		
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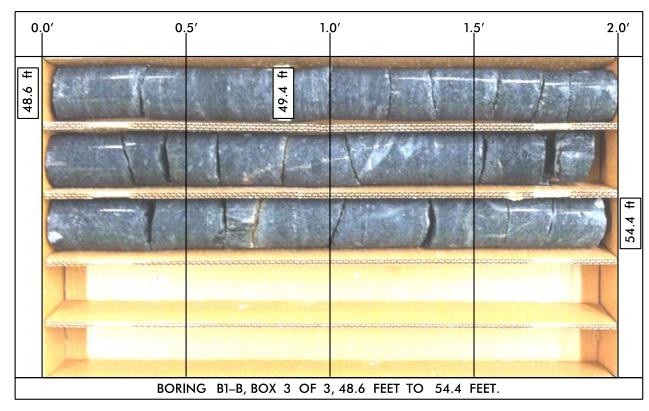


SHEET 13

WBS	40373	3.1.1			TIP	U-491	0	С	OUNT	Y C	CABARRUS GEOLOGIST EVANS, T. E.	
SITE	DESCR	IPTION	BRID	OGE NO.	3 ON S	SR 144	5 (DERIT	A RO	4D) O'	VER	ROCKY RIVER GROUND WT	R (ft)
BOR	NG NO.	B1-B			STAT	ΓΙΟΝ	147+14			OF	FSET 76 ft RT ALIGNMENT -L2- 0 HR.	N/A
COLI	LAR EL	EV . 59	3.2 ft		тот	AL DE	PTH 54.	4 ft		NO	PRTHING 598,680 EASTING 1,486,943 24 HR.	FIAD
DRILL	. RIG/HAN	MER EF	F./DATI	E SOI851	3 CME-	550X 90	08/21/20	013			DRILL METHOD SPT Core Boring HAMMER TYPE Automa	atic
DRIL	LER V	/HITE, .	J. D.		STAF	RT DA	TE 10/1	1/13		СО	MP. DATE 10/11/13 SURFACE WATER DEPTH N/A	
COR	E SIZE	NQ2					N 23.4 ft					
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	REC. (ft) %	JN RQD (ft) %	SAMP. NO.	STR REC. (ft) %	RATA RQD (ft) %	L O G	DESCRIPTION AND REMARKS ELEV. (ft) DEI	PTH (
562.2	562.2	31.0	3.4	0.26/0.4	(3.3)	(0.3)		(8.6)	(4.8)		Begin Coring @ 31.0 ft 562.2 CRYSTALLINE ROCK	31
560	558.8	İ	5.0	0:26/0.4 1:12/1.0 1:51/1.0 1:54/1.0 1:29/1.0	97%	(3.5)		91%	51%		BLUE-GRAY AND GRAY, SLI. WEATHERED, HARD, V. CLOSE TO CLOSELY FRACTURED, METADIORITE	31
555	553.8	39.4		1:39/1.0 1:48/1.0 1:52/1.0 2:00/1.0	100%	70%	RS-2				R1=7, R2=15, R3=6, R4=20, R5=4 TYPE=E, CLASS=III RMR=52	
550		- 00.1	5.0	1:28/1.0 1:22/1.0 1:35/1.0	(5.0) 100%	(1.0) 20%		(3.6) 100%	(0.0) 0%		552.8 BLUE-GRAY AND GRAY, MOD. WEATHERED, HARD, V. CLOSE TO CLOSELY FRACTURED, METADIORITE	40
000	548.8	44.4	5.0	1:58/1.0 2:57/1.0 2:17/1.0 1:56/1.0	(5.0) 100%	(0.8) 16%		(10.4) 100%	(1.6) 15%		549.2 BLUE-GRAY AND GRAY, SLI. WEATHERED, HARD, V. CLOSE TO CLOSELY FRACTURED, METADIORITE	4
545	543.8	49.4	5.0	2:13/1.0 2:06/1.0 2:18/1.0 2:23/1.0	(5.0)	(0.8)						
540	538.8	54.4		1:54/1.0 1:45/1.0 1:59/1.0 2:10/1.0	100%	16%						54
	-											
	-	† - - - - - - - - - - - - - - - - - - -									- - - - - - - - - - -	







FALCON ENGINEERING, INC.
1210 TRINITY ROAD, SUITE 110
RALEIGH, NC 27607

PHONE: 919.871.0800
FAX: 919.871.0803

ROCK CORE PHOTOGRAPHS

BRIDGE NO. 3 ON SR 1445 (DERITA ROAD)
OVER ROCKY RIVER
CABARRUS COUNTY, NORTH CAROLINA
WBS.: 40373.1.1 , TIP.: U-4910
FALCON PROJECT NO.: G13026.00

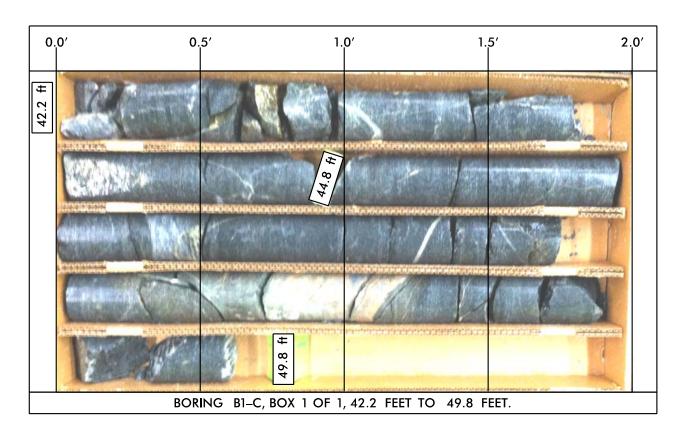
NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

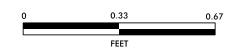
WBS	40373	.1.1			Т	ΊP	U-4910		COUNT	Y CABAF	RRU	S			GEOLOGIST EVANS, T. I	E.		
SITE	DESCR	IPTION	BRII	DGE N	IO. 3 C	NC	SR 1445	(DERITA I	ROAD) O	/ER ROC	(Y F	RIVER					GROUN	ID WTR (ft)
BOR	NG NO.	В1-С			s	TA	ATION 14	7+14		OFFSET	С	L			ALIGNMENT -L2-		0 HR.	N/A
COL	LAR ELE	EV . 59	92.0 ft		Т.	ОТ	TAL DEPT	H 49.8 f	t	NORTHIN	٧G	598,7	22		EASTING 1,486,880		24 HR.	6.3
DRILL	. RIG/HAM	IMER EF	F./DAT	E SO	I8513 C	ME	-550X 90%	08/21/2013		•		DRILL N	IETHO) SP	T Core Boring	IAMME	R TYPE	Automatic
DRIL	LER W	/HITE,	J. D.		s	TA	ART DATE	10/04/1	3	COMP. D	ÞΑΤ	E 10/0	04/13		SURFACE WATER DEPTH	1 N/A	4	
ELEV	DRIVE ELEV	DEPTH	BLC	ow cc	UNT			BLOWS	PER FOOT			SAMP.	lacksquare	LO	SOIL AND ROCK	DESC	'DIDTION	
(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft		0 2	25	50 	75 10	00	NO.	моі	1 1	ELEV. (ft)	DLOC	JULI LION	DEPTH (ft
595															_			
	_														-			
	591.5	0.5	2	5	8	+			Τ	Т	_		_		592.0 GROUND S ALLU	VIAL		0.0
590		F	-	"	°	-	<u>●13</u>		+	+	4		D		BROWN, SILTY F. 589.0 TRACE F	SAND	(A-2-4) V	V/ 3.0
	588.5	3.5	3	3	3	\parallel	1 6						М		- GRAY AND BROWN	N, F. S	ANDY CL	ĀŢ
585	586.0	6.0	WOH	2	1	$\ \ $	<i>[</i>				-		V					
000	583.5 ⁻	8.5				╛	P ³			1			Sat.	0 0 0 0				
	-		WOH	1	1	1	• <u>2</u>				:		Sat.	0000	GRAT, SLI. SILT	1 F. SF	AND (A-3)	
580	_	_				П	<u> </u>							0000	_ <u>580.0</u>			12.0
	578.5	13.5	WOH	WOH	1 2	41	:::::				.		١	000		Y SAN	D (A-1-b)	
	_	-	I WOII	***		۱ľ	Q 2						Sat.	000	- -			
575	_	F				$\ \cdot\ $	 		 		_			000	<u>-</u>			
	573.5	18.5	2	3	2	$\parallel \parallel$,				•		Sat.	000	- -			
570	-	‡				П	1				:		0	000	- -			
570	 568.5 -	23.5					-!			+				000	— 569.4 - WEATHER	ED BC	CK.	22.6
		23.3	32	38	62/0.4	Ŧ			: : : :	. 100/0	9				GRAY TAN AND BRO			RITE
565	-	}				П					.				-			
	563.5 ⁻	28.5									-				- -			
	-	ļ	100/0.	5		П				100/0	.				- -			
560	_	<u> </u>							ļ · · · ·						- -			
	558.5	33.5	100/0.5	5		П									- -			
	-	t				П				100/0	."				- -			
555		-				-			ļ	 	\dashv				_			
	553.5	38.5	100/0.4	4		П			: : : :	100/0	4				-			
550		ļ				П					:				-			40.0
000	549.8 <u> </u>	42.2	60/0	1						60	/O •				549.8 - CRYSTALL			42.2
	-	‡				П					:				- BLUE-GRAY AND WI - WEATHERED, MOD			
545	-	Ł				Ш									- TO CLOŚELY V METADI	NEATI	HERED,	
	_	ł				П					:				-		-	
		<u> </u>			+	╀				1					542.2 Boring Terminated at	Elevat	ion 542.2	49.8 ft in
	_	‡													CR: META			
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	1	1	1	1	1													



SHEET 15

W	D (CO	RE B	OR	ING	REF	<i>POI</i>	RT							
WBS 40373.					U-491				Y C	ABARRI	JS	GEOLOGIST EVANS,	T. E.		
SITE DESCRI	PTION	BRID	OGE NO.	3 ON S	SR 144	5 (DERIT	A RO	4D) O'	VER	ROCKY	RIVER	•		GROUN	ID WTR (ft)
BORING NO.	B1-C			STA	ΓΙΟΝ	147+14			OF	FSET (CL	ALIGNMENT -L2-		0 HR.	N/A
COLLAR ELE	V. 59	2.0 ft		тот	AL DE	PTH 49.	8 ft		NO	RTHING	598,722	EASTING 1,486,880		24 HR.	6.3
DRILL RIG/HAMI	MER EF	F./DATE	E SOI851	3 CME-	550X 90	0% 08/21/20	13				DRILL METHOD SP1	Γ Core Boring	HAMN	IER TYPE	Automatic
DRILLER W	HITE, J	J. D.		STAI	RT DA	TE 10/0	4/13		СО	MP. DA	ΓE 10/04/13	SURFACE WATER DE	PTH N	/A	
CORE SIZE	NQ2			TOTA	AL RUI	N 7.6 ft						_			
ELEV RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	REC. (ft) %	JN RQD (ft) %	SAMP NO	STR REC. (ft) %	RQD (ft) %	L O G	ELEV. (1		DESCRIPTION AND REMAR	KS		DEPTH (ft
549.8											~	Begin Coring @ 42.2 ft			,
549.8 <u>547.2</u> <u>545</u>	42.2	5.0	0:53/0.6 1:36/1.0 1:44/1.0 1:29/1.0 1:35/1.0 2:03/1.0 2:13/1.0 1:45/1.0	(5.0) 100%	(1.4)		(7.6) 100%	(2.3) 30%	KKKK	_ 549.8 - - - - - 542.2	V. CLOSE T	CRYSTALLINE ROCK WHITE, MOD. TO SLI. WEA O CLOSELY WEATHERED	, METAD	IORITE	49.8
											boring Termina	ated at Elevation 542.2 ft in C	rk: ME17	ADIORITE	







ROCK CORE PHOTOGRAPHS

BRIDGE NO. 3 ON SR 1445 (DERITA ROAD)
OVER ROCKY RIVER
CABARRUS COUNTY, NORTH CAROLINA
WBS.: 40373.1.1 , TIP.: U-4910
FALCON PROJECT NO.: G13026.00

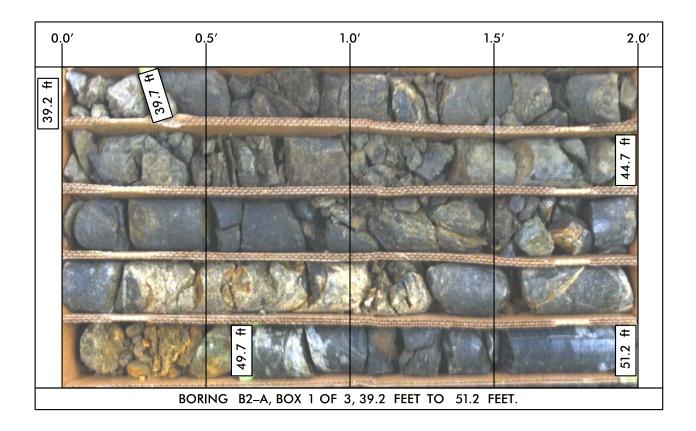
NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

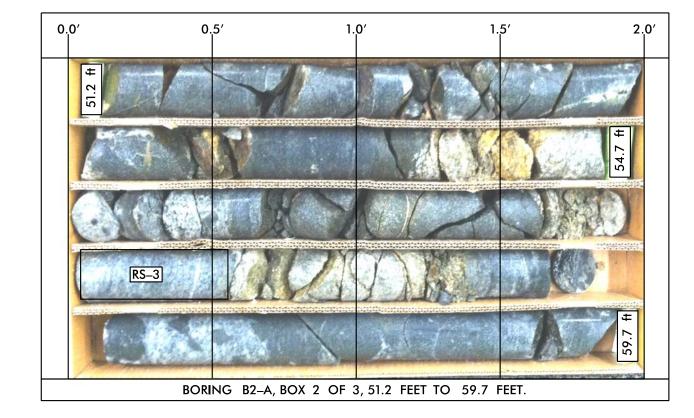
		.1.1				P U-4910		COOM	/ CABARR	00			GEOLOGIST EVANS,	<u> </u>		
SITE	DESCR	IPTION	BRID	DGE N	10.30	N SR 1445 (DERITA F	ROAD) O\	ER ROCKY	RIVER					GROUN	ID WTR (
BOR	NG NO.	B2-A			ST	TATION 14	8+05		OFFSET	56 ft LT			ALIGNMENT -L2-		0 HR.	9
COL	AR ELE	V . 59	1 9 ft			OTAL DEPT			NORTHING		28		EASTING 1.486.881		24 HR.	7
				F SOI		ME-550X 90%		'		DRILL N		n SP	T Core Boring	НАММІ	<u> </u>	Automatic
						TART DATE		2	COMP. DA			<u> </u>	SURFACE WATER DEF			Automatic
	DRIVE		1	W CO				PER FOOT		SAMP.	J3/13	1 L T	SURFACE WATER DEF	'I	4	
ELEV (ft)	ELEV	DEPTH (ft)	0.5ft		_	0 2		50	75 100	NO.	V	ō	SOIL AND RO	CK DES	CRIPTION	
. ,	(ft)	. ,	0.51	0.510	0.511			<u> </u>	100	NO.	/MOI	I G	ELEV. (ft)			DEPTH
595		_										-	_			
		-											591.9 GROUN	D SURF	ACE	
590	591.4	0.5	2	2	2	1					М		. AL	LUVIAL		
390	- 588.4	- - 3.5				\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \					'''		_ BROWN AND GRA . W/ TRACE RO			
	300.4	- 3.3	2	3	4	i					М		· E06 /			
585	585.9 -	- 6.0	1	1	2	$\left \left \int_{\mathbf{J}_{0}}^{\mathbf{J}}\cdot\cdot\cdot\cdot\right $					\blacksquare		<u>586.4</u>	SILT (A-5) W/ TRA	CE
	583.4	8.5				7					w],',\ <u> </u>	- OR	GANICS		
	-		WOH	WOH	WOH	0					Sat.	17.5	•			
580	_	_										7.1	579.9		= = = =	1
	578.4	13.5	WOH	 woн	1						C-4	1, 1	DK. GRAY, F. S LITTLE ORGAN			
	-					₹ 1					Sat.	1,2,1		YERS		
575									<u> </u>			· V	574.9 . DK. GRAY, SI	LTYSAN	ID (A-2-4)	1
	573.4	18.5	5	4	7	11			: : : :		Sat.				(, , , , , , , , , , , , , , , , , ,	
570	1												· · 570.4			2
310	 568.4	- 23.5											- WEATH BROWN AND G	RAY ME		ΓE
		-	41	51	49/0.3				100/0.8						,	_
565		_							100/0.8				· <u>565.4</u>	SIDUAL		2
	563.4	28.5	40	10								-	DK. GRAY AND	TAN, SIL		
			40	40	32			1	72		D		(A-2-4) SAPROLI	TIC, W/	FRACE MI	CA
560	-								<u> </u>			am	559.9	EDED D	2014	3
	558.4	33.5	100/0.3	<u> </u>					100/0.3				. WEATH . DK. GRAY AND	E RED RO TAN, ME		ГЕ
	-]					100/0.0				· 555.4			3
555	-	_				 		 	 	1			CRYSTA			
	552.7 -	- 39.2	60/0.1										DK. GRAY AND TA WEATHERE			SEV3
550	-		00/0.1										CRYSTA DK. GRAY AN	LLINE R		
	1												. WEATHERED, M	OD. HÀR	D, V. CLC	
	-	_											. TO CLOSEL . META	ADIORITI		
545													-			
	-	_														
	-	_											542.2 DK. GRAY	AND TAN	I, MOD.	4
540	-												WEATHERED, M TO CLOSEL			SE
	-													DIORITI		
.05	-	_														
535	-	_								RS-3	1			NID TAL	LMOD	5
	-												DK. GRAY A WEATHERED, M	OD. HAR	D, CLOSE	ΞLY
530	-												FRACTURE	D, METAI	DIORITE	
	7	-							1				-			
	-	-		-									527.2 Boring Terminated	at Fleva	tion 527 2	ft in
	_	_												TADIOR		14.111
	}	-														
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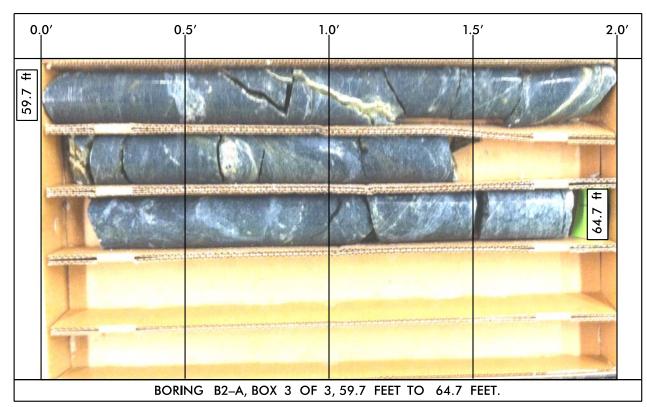


SHEET 17

WBS	40373	.1.1			TIP	U-491	0	С	OUNT	Y C	ABARRI	JS			GEOLO	GIS	T EV	ANS, T	. E.			
SITE	DESCRI	PTION	BRID	OGE NO.	3 ON 5	SR 144	5 (DERIT	A RO	AD) O	VER	ROCKY	RIVE	R							GROU	ND WTR	(ft
BOR	NG NO.	B2-A			STA	TION	148+05			OF	FSET 5	56 ft L	Т		ALIGNN	/IEN	IT -L2	-		0 HR.		9.0
COLI	AR ELE	V . 59	1.9 ft		тот	AL DE	PTH 64.	7 ft		NO	RTHING	598	,828		EASTIN	G	1,486,8	381		24 HR.		7.0
DRILL	RIG/HAM	MER EF	F./DATI	E SOI851	3 CME-	550X 90	0% 08/21/20)13				DRIL	L METH	SP1	Γ Core Borin	ıg			HAMM	ER TYPE	Automati	ic
DRIL	LER W	HITE, .	J. D.		STAI	RT DA	TE 10/0	3/13		СО	MP. DAT	ΤΕ 1	0/03/13	3	SURFAC	CE	WATER	R DEP	TH N/.	A		
COR	SIZE	NQ2			тот	AL RUI	V 25.5 ft	t .														
LEV	RUN	DEPTH	RUN	DRILL	REC.	JN RQD	SAMP.	STR REC.	RATA	Г					ESCRIPTION	ON.	AND DE					
(ft)	ELEV (ft)	(ft)	(ft)	RATE (Min/ft)	(ft) %	(ft) %	NO.	(ft) %	(ft) %	Ğ	ELEV. (f	ft)			ESCRIPTIO	ON.	AND RE	IVIARK	5		DEPT	TH (
552.7															Begin C							
550	_552.7 _552.2_7	39.7 39.7	0.5 5.0	1:20/0.5 1:38/1.0	(0.3) 60%	(0.0) 0%		(8.4) 80%	(0.3) 3%		- 552.7 -		K. GRA	Y AND	CRYS TAN, MOD		LINE RO		D, MOI	D. HARD,	V.	39.
550	-	-	0.0	1:38/1 0 1:40/1 0 1:27/1 0 1:46/1 0	(3.5)	(0.0)					-				CLOSELY							
	547.2	44.7		1:38/1.0							-											
545	-	-	5.0	1:30/1.0 1:32/1.0 1:33/1.0	(4.6) 92%	(0.3) 6%					-											
	-	-		1:48/1.0							-											
	542.2	49.7	5.0	2:21/1.0 1:02/1.0	(4.8)	(0.8)		(7.8)	(1.3)		542.2	DK.	GRAY A	ND TAN	N, MOD. WI	EAT	HERED	, MOD.	. HARD,	, V. CLOS	E TO	49
40	-	-		0:59/1.0 1:03/1.0	96%	16%		98%	16%		- -				SELY FRA					,		
	537.2	- 54.7		1:14/1.0 1:22/1.0							-			F	R1=10, R2=		3=8, R4 , CLASS		5=4			
35	-	-	5.0	1:30/1.0 1:11/1.0	(5.0) 100%	(1.9) 38%					- -				1176		, CLASS IR=49)—III				
33	-	-		1:21/1.0 1:22/1.0	100%	30 %	RS-3	(7.0)	(4.2)		534.2		(CDA)	ANDT	AN, MOD. V	Λ/ □ /	THERE	D MO	р пур	ח כו ספו	=1 ∨	57
	532.2	59.7	F 0	1:50/1.0	(F 0)	(2.0)		100%	(4.2) 60%		- -	Di	. GIVAI	AND II	FRACTUR	RED	, METAI	DIORIT	E. HAIN	D, OLOGI	_L I	
30	-	-	5.0	1:21/1.0 1:20/1.0	(5.0) 100%	(2.8) 56%					-											
	-	-		1:21/1.0 1:22/1.0							-											_
	527.2	64.7		1:29/1.0							527.2		Boring	Termina	ated at Elev	/atio	n 527.2	ft in CF	R: META	DIORITE		64
	-	_									_											
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PHONE: 919.871.0800 FAX: 919.871.0803

FALCON ENGINEERING, INC. 1210 TRINITY ROAD, SUITE 110 RALEIGH, NC 27607

ROCK CORE PHOTOGRAPHS

BRIDGE NO. 3 ON SR 1445 (DERITA ROAD)
OVER ROCKY RIVER
CABARRUS COUNTY, NORTH CAROLINA
WBS.: 40373.1.1 , TIP.: U-4910
FALCON PROJECT NO.: G13026.00

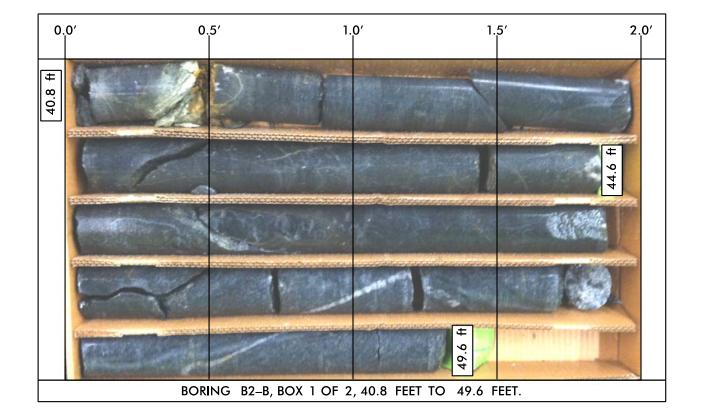
NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

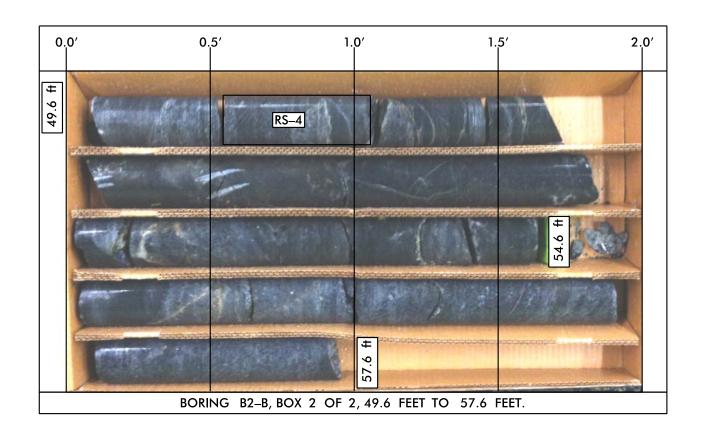
WBS	4037	'3.1.1			TI	IP U-4910		COUNT	Y CABAF	RUS			GEOLOGIST EVANS,	T. E.		
SITE	DESC	RIPTION	BRII	DGE N	10.3 C	N SR 1445	(DERITA I	ROAD) O'	/ER ROCI	Y RIVER			•		GROU	ND WTR (ft
BOR	NG NC). B2-B			S ⁻	TATION 14	18+14		OFFSET	73 ft RT			ALIGNMENT -L2-		0 HR.	8.5
COLI	LAR EI	.EV . 59	92.6 ft		T	OTAL DEPT	H 57.6 ft	t	NORTHI	IG 598,7	69		EASTING 1,486,996		24 HR.	6.0
DRILL	. RIG/HA	MMER E	F./DAT	E SO	18513 CI	ME-550X 90%	08/21/2013			DRILL I	NETHO	D SF	T Core Boring	НАММ	ER TYPE	Automatic
DRIL	LER	WHITE,	J. D.		S	TART DATE	10/02/1	3	СОМР. [ATE 10/	03/13		SURFACE WATER DEF	TH N/	A	
ELEV	DRIVE ELEV	DEFIR	BLC	ow cc	UNT		BLOWS	PER FOO		SAMP	V /	L	SOIL AND RO	CK DES	CRIPTIO	N
(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0 2	25 	50 	75 10	00 NO.	MOI		ELEV. (ft)			DEPTH (
595		_											_			
	592.1	+				Ш.							- - 592.6 GROUN		ACE	0
590	592.1	- 0.5	4	5	2	1					D		 BROWN, SILTY 	L UVIAL ´F. SANI	D (A-2-4)	W/
330	589.1	3.5	2	3	2	 					М	77	= 589.6 GRAVEL, TRACE BROWN AND GRA	ROOTS,	TRACE EY SILT	MICA3 (A-5)
	586.6	6.0				5: : :					\blacksquare	, , , , , , , , , , , , , , , , , , ,	W/ TRAC			(,, , , ,
585	584.1	‡ + 8.5			WOH	 					W	17	- <u>584.6</u>			
	304.1	‡ 0.3	WOH	WOH	WOH	•0					W		- GRAY AND BROW - W/ TRAC	N, F. SAI E ORGA	NDY SIL [*] .NICS	Г (А-4)
580		‡				[: : : :							- - <u>580.6</u>			12
000	579.1	13.5	2	1	1	1:					l w		DK. GRAY AND C (A-2-4) INTERLA	/ERED V	V/ THIN	
		‡				2					**		-	LAYER		
575	574.1	‡ 18.5								41			- GRAVEL AND WO	OOD PIE 0.0 FT	CES @ 1	8.5 -
		+	2	7	20] :::::``	27				Sat.		- -			
570		Ŧ					i,						- - 570 <u>.6</u>			22
	569.1	23.5	18	24	23						М		 BROWN AND GRA 	SIDUAL Y, SILTY	SAND (A-2-4)
		Ŧ					: : : :				'*'		- SAP -	ROLITIC		
565	564.1	‡ _{28.5}								_			 564.1			28
		+	100/0.	4					. 100/0	4			WEATH BROWN AND G	E RED RO RAY, ME		
560		Ŧ					: : : :						- -			
	559.1	33.5	62	38/0.1	┪				. 100/0	6						
		Ī								<u> </u>			- - -			
555	554.1	38.5				 	 	 		-			<u>-</u> -			
	551.8	40.8	70	30/0.2	2				- 100/0	11			_ _ 551.8			40
550		1	60/0						60				_ CRYSTA _ DK. GRAY, V. SI			то
		‡											- FRESHLY WEA - CLOSELY FRACT	THERE	D, V. HAF	RD,
		‡				: : : :							- -	,		
545		‡											<u>-</u> -			
		‡								RS-4			- -			
540		‡											- 			
		‡								11			- -			
535		‡								11			- - 505 0			
555		‡			†			<u> </u>		-!			535.0Boring Terminated			57 0 ft in
		‡											_	TADIOR	116	
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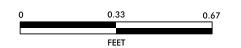


SHEET 19

WBS	40373.1.	1			TIP	U-491	0	С	DUNT	Y C	ABARRI	JS			GEOLO	GIS	T EVA	NS, T.	E.		
SITE	DESCRIPT	ION	BRID	GE NO.	3 ON S	SR 144	5 (DERIT	A RO	AD) O'	VER	ROCKY	RIVE	٦							GROUN	ID WTR (ff
BOR	I NG NO . B	32-B			STAT	TION	148+14			OF	FSET 7	'3 ft R	Т		ALIGNM	/IEN	T -L2-			0 HR.	8.8
COLI	LAR ELEV.	592	2.6 ft		TOTA	AL DEI	PTH 57.	6 ft		NO	RTHING	598	,769		EASTIN	G	1,486,99	96		24 HR.	6.0
DRILL	. RIG/HAMME	REF	./DATE	SOI851	3 CME-	550X 90	08/21/20)13				DRILL	. METH	OD SP	T Core Boring	g		l l	HAMMEI	R TYPE	Automatic
DRIL	LER WHI	TE, J	. D.		STAF	RT DA	TE 10/0:	2/13		СО	MP. DA	ΓE 10	0/03/13	3	SURFAC	CE V	WATER	DEPTI	H N/A		
COR	E SIZE NO	ີ 22			TOTA	AL RUI	1 16.8 ft								•						
ELEV (ft)		PTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	REC. (ft) %	JN RQD (ft) %	SAMP NO	STR REC. (ft) %	ATA RQD (ft) %	L O G	ELEV. (f	t)		С	DESCRIPTION	ON A	AND REM	MARKS			DEPTH (
51.8					,,,	,,,		-,-	70			-,			Begin Co	orino	a @ 40.8	3 ft			
550	551.8 + 4	0.8 4.6	3.8	1:19/0.8 1:55/1.0 1:25/1.0 1:21/1.0	(3.8) 100%	(2.8) 74%		(16.3) 97%	(12.0) 71%		_ 551.8 	D				TALI REI	LINE ROO	CK ESHLY			V. 40
545			5.0	1;01/1.0 1:16/1.0 1:21/1.0	(4.9) 98%	(3.6) 72%					- - -			F		ΞĖΕ,	3=6, R4=2 CLASS= R=50		=4		
	543.0 4	9.6	5.0	1:43/1.0 2:22/1.0 1:30/1.0 1:52/1.0	(5.0) 100%	(3.2) 64%	RS-4 /				- - -										
540	538.0 5	4.6	3.0	1:35/1.0 1:26/1.0 1:45/1.0	(2.6)	(2.4)					<u>-</u> - -										
535	535.0 5	7.6	0.0	1:25/1.0 1:28/1.0 1:36/1.0	87%	80%					- - 535.0										57
	+			11007 110							-		Boring	Termina	ated at Elev	atior	n 535.0 ft	in CR:	METAD	IORITE	









ROCK CORE PHOTOGRAPHS

BRIDGE NO. 3 ON SR 1445 (DERITA ROAD)
OVER ROCK RIVER
CABARRUS COUNTY, NORTH CAROLINA
WBS.: 40373.1.1 , TIP.: U-4910
FALCON PROJECT NO.: G13026.00

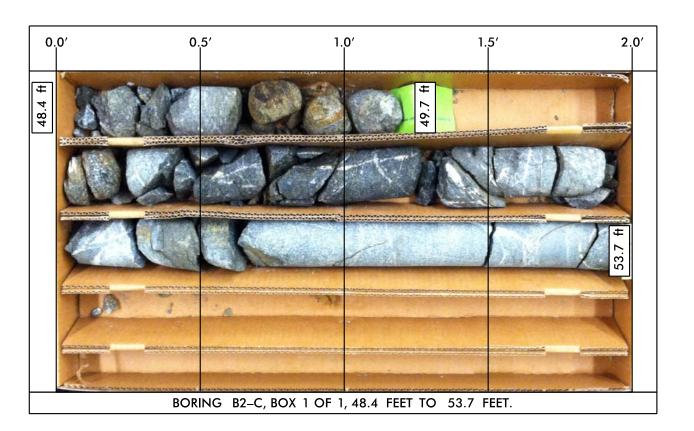
NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

WDC	40070		Ьυ	KEI		G REP	UKI	COLINITY	. CADADD	10			CEOL OCI	ST EVANO			
	40373		DDU	205.1		IP U-4910	/DEDITA F		CABARR				GEOLOGI	ST EVANS,	I.E.	0001111	D 14/TD (61)
				JGE N			•	ROAD) OV	ER ROCKY				AL IONBAE	NT 10		ł	O WTR (ft)
-	NG NO.				_	TATION 14			OFFSET (00		ALIGNME			0 HR.	6.6
	_AR ELE			- 00		OTAL DEPT			NORTHING	· · ·			l .	1,486,932	T	24 HR.	6.8
				E 501		ME-550X 90%			00110 04			SPI	Core Boring			R TYPE	Automatic
	LER W		T	ow co		TART DATE		SER FOOT	COMP. DA	SAMP.		1 🗆	SURFACE	WATER DEF	IH N//	4	
ELEV (ft)	ELEV (ft)	DEPTH (ft)	0.5ft			$\left\ \cdot \right\ _{0}$			75 100	NO	MOI	O G	ELEV. (ft)	SOIL AND RC	CK DESC	CRIPTION	DEDTIL #
	(11)						1				/ IVICI		ELEV. (II)				DEPTH (fi
595																	
555	-	†											•				
	-	‡											500.7	CDOUN		VCE	0
590	590.2	0.5	3	4	3	1 1			1		D		590.7	AL	ID SURFA		0.
	- 587.2	35		'		• 7 · · ·							BRC . <u>58</u> 7 <u>.7</u>	WN, F. SAND R	Y SILT (A OOTS	-4) W/ TR/	ACE <u>3.</u> !
585		Į	4	3	3	6					М	-		ROWN AND 7 4-2-4) W/ TRA			
303	584.7 -	6.0	1	2	2	4			1					WN AND GRA			
	582.2	8.5	I WOH	 WOH	 WOH	/::::					M W						
580	-	‡				0					l vv		-				
	577.2 -	125				:::::							577.7				13.0
575	- 311.2	13.5	WOH	1	1	2					Sat.	0000-		RAY TAN AND SAND (A-1-b) V	V/ THIN (
3/3	-	‡							1			0000-	-	L	AYERS		
	572.2	18.5	4	11	10	: : \.					0-4	0000					
570	-	‡	'	''	"	•	21				Sat.	0000	. 569.7 CO	BBLE / GRAVI		R 19.8 - 21	FT 21.0
	567.2	23.5					\						E	RE ROWN AND 1	SIDUAL TAN, SILT	Y F. SAND)
565	307.2	23.5	14	19	19	::::	•38-				W	-		(A-2-4) W	ROCK F	RAGS	
565	-	<u> </u>					· · · · ·	\ <u>\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\</u>	<u> </u>				563.7				27.0
	562.2	28.5	22	36	64/0.2	: : : :							BRC	WEATH WN GRAY AN	ERED RO ID TAN, M		RITE
560	-	‡			0 170.2	1			100/0.7)							
	557.2 -	33.5															
555	- 337.2	- 33.3	44	56/0.3	<u> </u>				- 100/0.8								
333	-	<u> </u>							: : : :								
	552.2	38.5	71	29/0.2													
550	-	‡	' '	20,0.2					- 100/0.7	'							
	547.2	43.5															
545	- 341.2 -	+3.5	100/0.4	4					100/0.4)							
545		<u> </u>											543.6				47.1
	542.9 -	47.8	60/0.1	1					60/0_1)			<u>542.3</u>	CRYST<i>A</i> BLUE-GRAY, S	LLINE RO		ı — 48.4
540	-	‡											. <u>Ĺ</u>	WEATHERE GRAY. MOD			ال ج
	-	‡												DD. HARD, V. FRACTURE	CLOSE T	O CLOSEI	
	-	<u> </u>						 		1				ing Terminated	at Eleva	tion 537.0 f	
	-	‡												CR: ME	TADIORI	ı E	
	-	‡															
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545	-	‡															
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			1							1	1						



SHEET 21

WDS	40373					U-491	REF			<u> </u>	:ABARRU		GEOLOGIST EVAN	C T F		
			DDII	DGE NO.									GEOLOGIST EVAN	S, I. E.	GPOUR	ID WTR (ft)
	ING NO.			JGE NO.			148+10	A RO	4D) O		FSET C		ALIGNMENT -L2-		0 HR.	6.6
	LAR ELI						PTH 53.	7 ft		-		598,803	EASTING 1,486,933	<u> </u>	24 HR.	6.8
				E SOI851						NO		DRILL METHOD SF				Automatic
	LER W			L 301031			TE 10/03			co		E 10/04/13	SURFACE WATER D			Automatic
	E SIZE		J. D.				1 5.3 ft	J/ 10				L 10/04/13	SORI ACE WATER	<u> </u>		
ELEV	DUN	DEPTH	DLIN	DRILL		JN RQD	SAMP.	STR REC.	ATA	L						
(ft)	(ft)	(ft)	(ft)	RATE (Min/ft)	(ft) %	(ft) %	NO.	(ft) %	RQD (ft) %	O G	ELEV. (ft		DESCRIPTION AND REM			DEPTH (ff
542.3 540	547.3	48:4	1.3	0:30/0.3 2:00/1.0 1:06/1.0	(1.0) 77%	(0.0)		(5.0) 94%	(1.2) 23%		542.3 -	DK. GRAY, MOD CLO	Begin Coring @ 48.4 D. SEV. WEATHERED, MO DSELY FRACTURED, MET	D. HARD, \	. CLOSE	ΓΟ 48.4
	537.0	F 52.7		1:06/1.0 1:00/1.0 0:53/1.0 1:13/1.0	(4.0) 100%	(1.2) 30%					- 537.0					53.7
												Boring Termin	nated at Elevation 537.0 ft i	n CR: MET	ADIORITE	

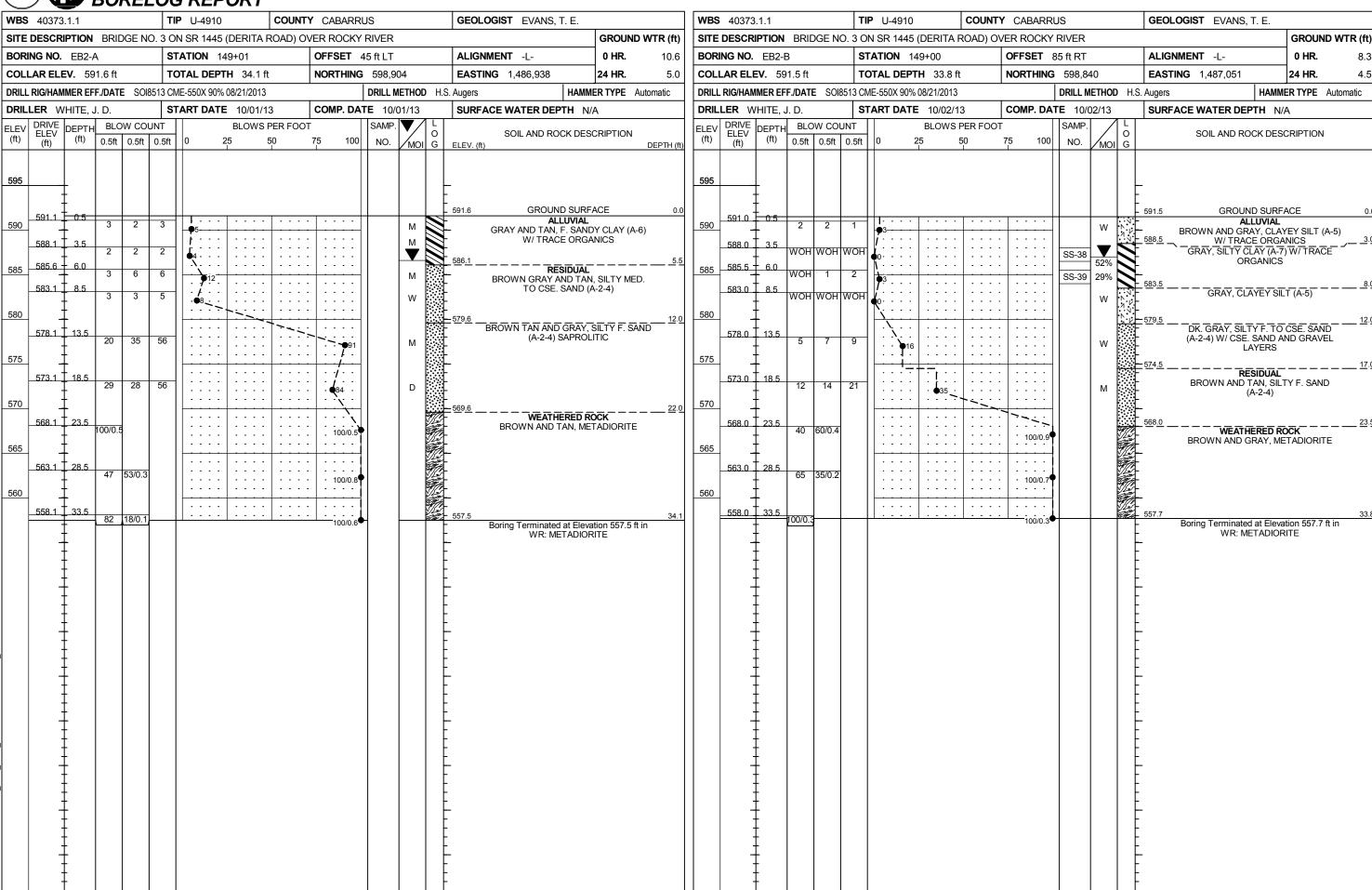






ROCK CORE PHOTOGRAPHS

BRIDGE NO. 3 ON SR 1445 (DERITA ROAD)
OVER ROCKY RIVER
CABARRUS COUNTY, NORTH CAROLINA
WBS.: 40373.1.1 , TIP.: U-4910
FALCON PROJECT NO.: G13026.00



189	40373	B.1.1			TI	IP U-4910		COUNT	CABARRI	JS			GEOLOGIST EVANS, T. E.		
ITE [DESCR	IPTION	BRII	DGE N	O. 3 C	N SR 1445	(DERITA F	ROAD) O\	/ER ROCKY	RIVER				GROUND WT	R (f
ORIN	NG NO.	EB2-0	 Э		S	TATION 1	49+00		OFFSET 1	15 ft LT			ALIGNMENT -L-	0 HR.	11.
OLL	AR ELE	EV . 59	2.0 ft		T	OTAL DEP	FH 33.6 ft	:	NORTHING	598,8	88		EASTING 1,486,964	24 HR.	5.
RILL	RIG/HAN	MER EF	F./DAT	E SOI	8513 CI	ME-550X 90%	08/21/2013			DRILL N	IETHOE) H.S	S. Augers HA	MMER TYPE Autom	atic
RILL	ER W	/HITE, 、	J. D.		S	TART DATI	= 10/01/1	3	COMP. DA	ΓE 10/	01/13		SURFACE WATER DEPTH	N/A	
	DRIVE	DEPTH		W CO	UNT		BLOWS	PER FOOT	-	SAMP.	V /	1 L	OO! AND DOOK D	FOODIDTION	
ft)	ELEV (ft)	(ft)	0.5ft	0.5ft	0.5ft	0	25	50	75 100	NO.	МОІ	O G	SOIL AND ROCK D		PTH
95															
	-	Ŧ										lF	- ·		
	591.5 -	0.5		L.		 							592.0 GROUND SU ALLUVI		
90	_	‡	2	1	3	4					M		BROWN AND GRAY, F. 589.0 W/ TRACE ROOTS A	SANDY SILT (A-4)	:
H	588.5	3.5	2	3	2						M		BROWN GRAY AND TA	N, SILTY F. SAND	
35	586.0	6.0	4	6	6] 🏋 : :					_		<u>586.5</u> (<u>A-2-4)</u> W/ GRAVEL AN GRAY AND TAN, F. SA		
55	- 583.5 ⁻	8.5	4	0	0	12-					M		W/ CSE. SANDY C		
	-	1 0.5	3	7	6	13					w				
30	-	ŧ				>,							580.0		_ 1
	578.5	13.5	10	17	26						١	-	RESIDU BROWN GRAY AND TA		
	-	Ŧ	10	17	20		43				M	F	(A-2-4) SAPR	OLITIC	
75	_	Ŧ					1	\				-	- -		
H	573.5	18.5	25	38	37	{ ::::			75		D				
,	-	‡						1.7.7.	7,5		-				
70	568.5	22.5				 							_		
F	306.5	23.5	19	15	11	11 : : : :	•26.				D	<u> </u>			
35	-	F										F			
	563.5	28.5											-564.5 CRYSTALLIN		2
	-	‡	60/0.1						60/0.1				DK. GRAY AND TAN, SE WEATHERED, ME		
60	-	‡													
_	558.5	33.5	60/0.1						60/0.1	\dashv			558.4 Boring Terminated	with Standard	3
	-	ł	00/0.1	1								l E	Penetration Test Refusa	at Elevation 558.4	
	_	+										 	ft in CR: META	DIORITE	
	-	Ŧ										l F			
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FALCON ENGINEERING

1210 TRINITY ROAD, SUITE 110, RALEIGH, NORTH CAROLINA 27607

AASHTO SOIL CLASSIFICATION AND GRADATION SHEET

BRIDGE NO. 3 ON SR 1445 (DERITA ROAD) OVER ROCKY RIVER

WBS: 403732.1; TIP: U-4910

CABARRUS COUNTY, NORTH CAROLINA FALCON ENGINEERING, INC. PROJECT NO: G13026.00

	RING SHTO Classifica	SAMPLE		OTAL SAMP		Atterbe	Results	Natural Moisture Content	
STATION	OFFSET (FEET)	DEPTH (FEET)	#10	#40	#200	LL	PL	PI	%
EB	1-B	SS-36							
	A-7-6	•	100	98	89	54	26	28	32.4
146+57	75' RT	6-7.5							
EB	11-C	SS-37							
	A-6		100	92	67	36	20	16	29.3
146+66	3' LT	3.5-5							
EB	32-B	SS-38							
	A-7-5	•	100	98	94	64	33	31	52.0
149+00	149+00 85' RT 3.5-5								
EB	EB2-B SS-39								
	A-7-6		100	95	80	43	24	19	28.8
149+00	85' RT	6-7.5							

SIGNATURE 123-01-0509

Notes: LL = Liquid limit PL = Plastic limit

PI = Plasticity index = LL - PL

SHEET 25

FALCON ENGINEERING

1210 TRINITY ROAD, SUITE 110, RALEIGH, NORTH CAROLINA 27607

SUMMARY OF ROCK CORE TEST RESULTS

BRIDGE NO. 3 ON SR 1445 (DERITA ROAD) OVER ROCKY RIVER

WBS NO.: 40373.1.1, TIP NO.: U-4910

CABARRUS COUNTY, NORTH CAROLINA

FALCON ENGINEERING, INC. PROJECT NO: G13026.00

Sample No.	Boring	Station	Offset	Depth (ft)	Rock Type	Geologic Map Unit	Run RQD	Length (ft)	Diameter (ft)	Unit Weight (PCF)	Unconfined Compressive Strength (PSI)	Young's Modulus (PSI)	Rock Mass Rating (RMR)	Failure
RS-1	B1-A	147+14	45' LT	61.8-62.1	METAMORPHOSED QUARTZ DIORITE	PzZq	48%	0.34	0.17	162.9	6,518	858,893	43	01-0.1
RS-2	B1-B	147+14	76' RT	35.0-35.3	METAMORPHOSED QUARTZ DIORITE	PzZq	70%	0.36	0.17	176.9	11,978	2,458,265	43	Su. 05 8-11
RS-3	B2-A	148+05	56' LT	56.7-57.0	METAMORPHOSED QUARTZ DIORITE	PzZq	38%	0.35	0.17	171.1	19,314	3,566,373	49	12 695 V-28
RS-4	B2-B	148+14	73' RT	50.0-50.3	METAMORPHOSED QUARTZ DIORITE	PzZq	64%	0.35	0.17	177.5	6,955	1,461,947	50	KS-H

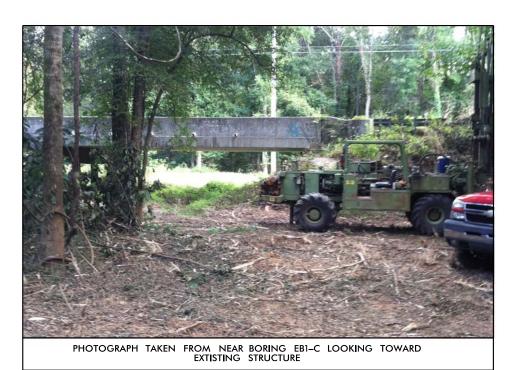
SIGNATURE: NCDOT No.: 123-01-0509

 Notes:
 LL
 =
 Liquid limit

 PL
 =
 Plastic limit

 PI
 =
 Plasticity index = LL - PL











SITE PHOTOGRAPHS

BRIDGE NO. 3 ON SR 1445 (DERITA ROAD)
OVER ROCKY RIVER
CABARRUS COUNTY, NORTH CAROLINA
WBS.: 40373.1.1 , TIP.: U-4910
FALCON PROJECT NO.: G13026.00

REFERENCE: U-4910	CONTENTS SHEET NO. 2
<i>SOJECT:</i> 40373	

DESCRIPTION

SITE PLAN AND WALL ENVELOPES

TITLE SHEET LEGEND

BORING LOGS SOIL TEST RESULTS STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION **DIVISION OF HIGHWAYS** GEOTECHNICAL ENGINEERING UNIT

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY _CABARRUS

PROJECT DESCRIPTION SR 1445 DERITA ROAD WIDENING FROM NORTH OF SR 2894 TO SR 1394

SITE DESCRIPTION

WALL -W1- 172+15.00, 52.5' RT, TO 179+50.00 64.5' RT WALL -W2- 185 + 75.66, 76.5'LT, TO 186 + 39.31, 76.5'LT

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-4910	1	9

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT 1999 707-6805. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

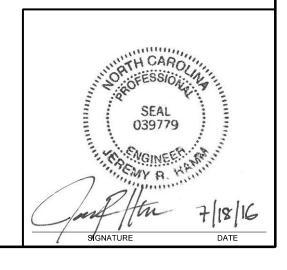
GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS MOLCATED IN THE SUBSURFACE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR CUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISTY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THE PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

- IES:
 THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N.C. DEPARTMENT
 OF TRANSPORTATION AS ACCURATE NOR IS IT CONSIDERED PART OF THE PLANS, SPECIFICATIONS
 OR CONTRACT FOR THE PROJECT.
 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.

_	GOODNIGHT, D. J.
_	TRIGON EXP.
_	
_	
_	
_	
_	COODWIGHT D. I.
INVESTIGATED BY	GOODNIGHT, D. J.
DRAWN BYHU	UNSBERGER, W. S.
CHECKED BY	<i>НАММ, J. R.</i>
	FALCON ENG.
ZORWILLED BY -	TILLOUIT LITTO
DATE JULY	2017

PERSONNEL



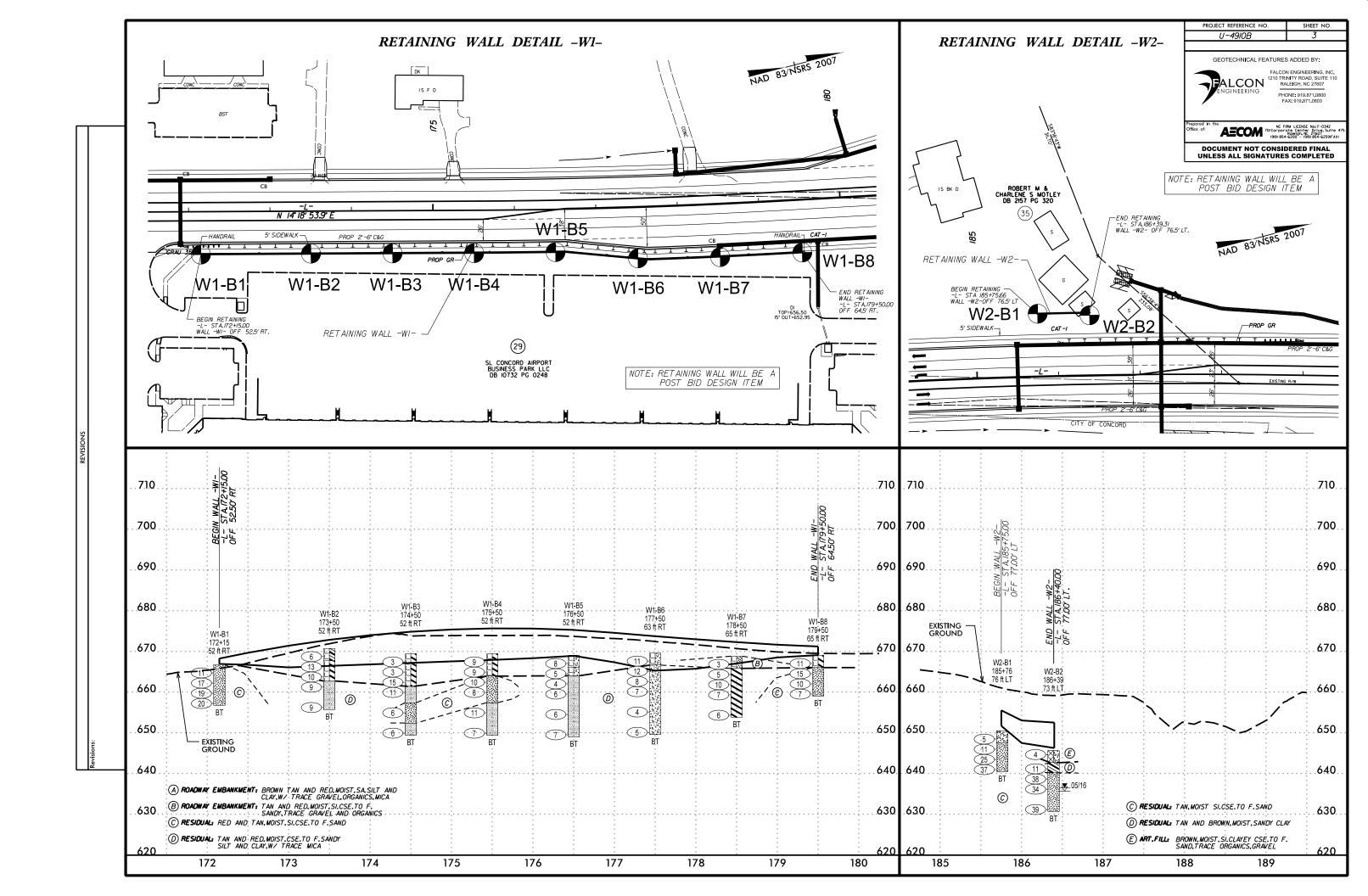
PROJECT REFERENCE NO. SHEET NO. 2

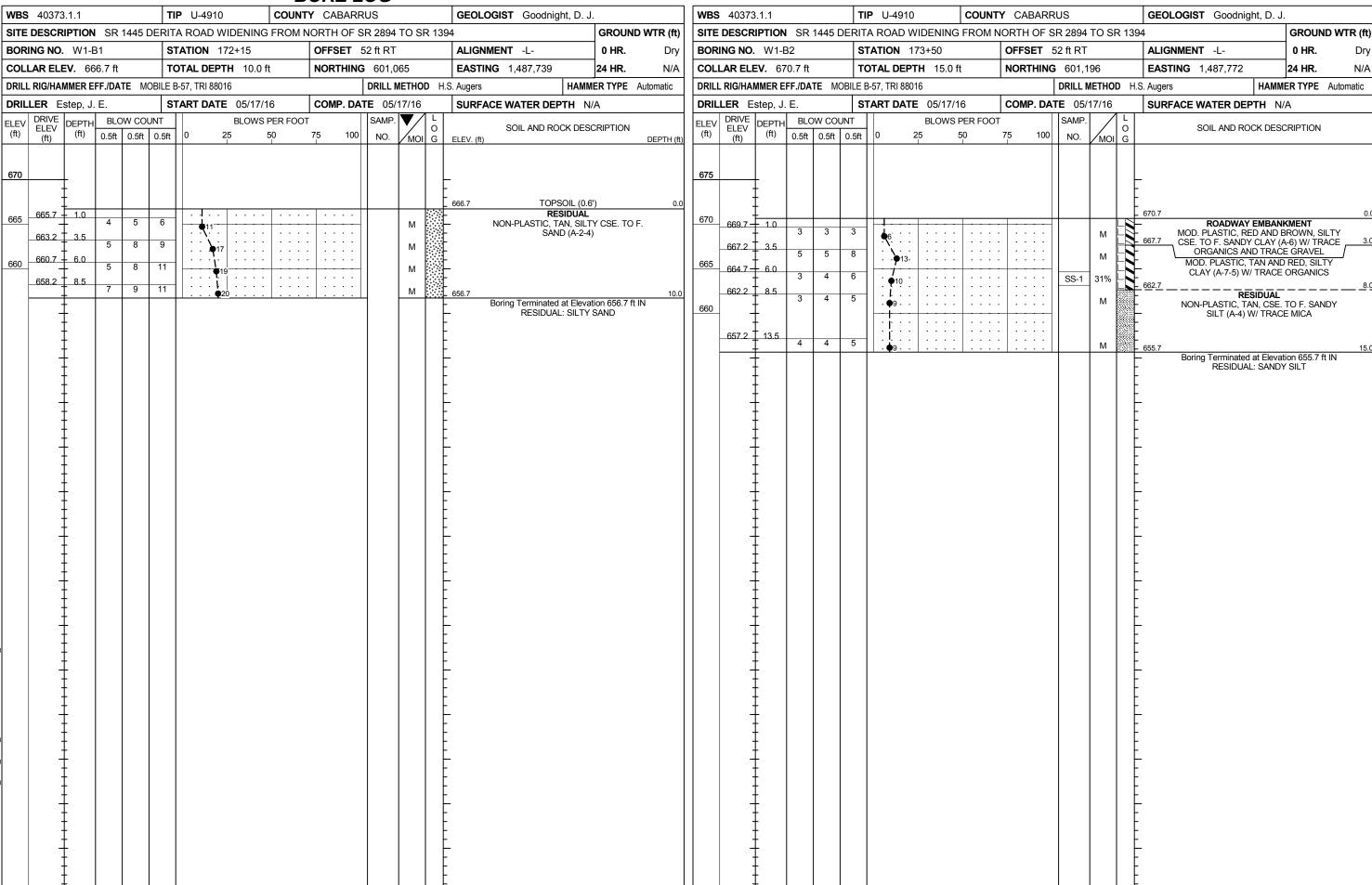
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT

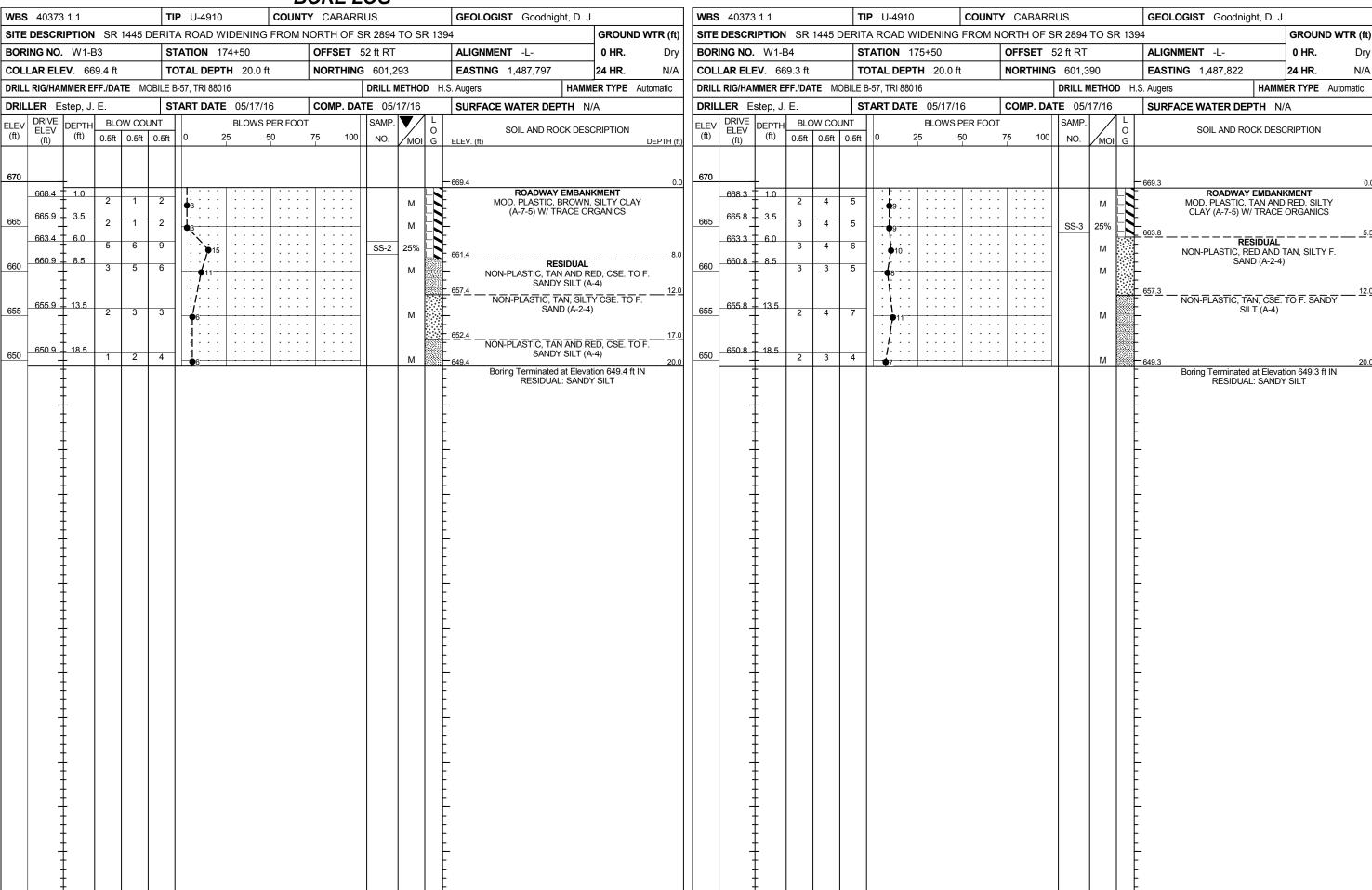
SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT	WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.	HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL.	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION	UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.	SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60	<u>AQUIFER</u> - A WATER BEARING FORMATION OR STRATA.
IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH	ANGULARITY OF GRAINS	BLOWS IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK.	ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE,	THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS:	ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:	ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING
VERY STIFF,GRAY,SILTY CLAY,MOIST WITH INTERBEDDED FINE SAND LAYERS,HIGHLY PLASTIC,A-7-6 SOIL LEGEND AND AASHTO CLASSIFICATION	ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.	WEATHERED NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.	A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.
CENEDAL CRANIII AD MATERIAL C CILIT CLAY MATERIAL C	MINERALOGICAL COMPOSITION	FINE TO COARSE CRAIN ICNEOUS AND METAMORPHIC ROCK THAT	ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND
CLASS. (≤ 35%, PASSING *200) (> 35L1*CLM1* PHITERIALS ORGANIC MATERIALS	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC.	ROCK (CP) WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE,	SURFACE.
GROUP A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-4, A-5	ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.	SINE TO CORPE CRAIN METAMORPHIC AND NON-COASTAL PLAIN	CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
CLASS. A-1-b A-2-4 A-2-5 A-2-6 A-2-7 A-7-6 A-3 A-6, A-7	COMPRESSIBILITY	NON-CRYSTALLINE ROCK (NCR) SEDIMENTARY ROCK THAT WOULD YELLD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.
SYMBOL 000000000000000000000000000000000000	SLIGHTLY COMPRESSIBLE LL < 31 MODERATELY COMPRESSIBLE LL = 31 - 50	COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED
% PASSING SILT-	HIGHLY COMPRESSIBLE LL > 50	SEDIMENTARY ROCK SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.	BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
"10 50 MX GRANULAR GRANULAR GRANULAR GRANULAR GLAY PEAT SOILS GRANULAR GRAN	PERCENTAGE OF MATERIAL	WEATHERING	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT
*200 15 MX 25 MX 10 MX 35 MX 35 MX 35 MX 35 MX 36 MN 36 MN 36 MN 36 MN 36 MN 36 MN	GRANULAR SILT - CLAY ORGANIC MATERIAL SOILS SOILS OTHER MATERIAL	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER	ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE
MATERIAL	TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10% LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20%	HAMMER IF CRYSTALLINE.	HORIZONTAL.
PASSING *40	MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35%	VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, (V SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE
PI 6 MX NP 10 MX 10 MX 11 MN 11 MN 10 MX 10 MX 11 MN 11 MN 11 MN MODERATE HIGHLY	HIGHLY ORGANIC > 10% > 20% HIGHLY 35% AND ABOVE	OF A CRYSTALLINE NATURE.	LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
GROUP INDEX 0 0 0 4 MX 8 MX 12 MX 16 MX NO MX AMOUNTS OF SOLIS	GROUND WATER	SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
USUAL TYPES STONE FRAGS. FINE SILTY OR CLAYEY SILTY CLAYEY MATTER	✓ WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING	(SLI.) 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
OF MAJOR GRAVEL, AND SAND GRAVEL AND SAND SOILS SOILS	STATIC WATER LEVEL AFTER 24 HOURS	MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM
CEN RATING FAIR TO	<u> </u>	(MOD.) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY, ROCK HAS	PARENT MATERIAL.
AS SUBGRADE EXCELLENT TO GOOD FAIR TO POOR POOR UNSUITABLE	SPRING OR SEEP	DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.	FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.
PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ;PI OF A-7-6 SUBGROUP IS > LL - 30	SPAING ON SEEP	MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE
CONSISTENCY OR DENSENESS	MISCELLANEOUS SYMBOLS	SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH	FIELD.
PRIMARY SOIL TYPE COMPACTNESS OR RANGE OF STANDARD RANGE OF UNCONFINED PENETRATION RESISTENCE COMPRESSIVE STRENGTH	ROADWAY EMBANKMENT (RE) 25/025 DIP & DIP DIRECTION	(MOD. SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK, ROCK GIVES "CLUNK" SOUND WHEN STRUCK. IF TESTED, WOULD YIELD SPT REFUSAL	<u>JOINT</u> - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO
CONSISTENCY (N-VALUE) (TONS/FT ²)	WITH SOIL DESCRIPTION OF ROCK STRUCTURES	SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC CLEAR AND EVIDENT BUT	ITS LATERAL EXTENT.
GENERALLY VERY LOOSE < 4	SOIL SYMBOL SOIL SYMBOL SPT DOT TEST BORING SLOPE INDICATOR INSTALLATION	(SEV.) REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN.	LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.
GRANULAR LUUSE 4 10 100	VST PMT INSTRICTION	IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF	MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS
(NON-COHESTVE) DENSE 30 TO 50	ARTIFICIAL FILL (AF) OTHER AUGER BORING CONE PENETROMETER THAN ROADWAY EMBANKMENT AUGER BORING TEST	VERY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE	USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
VERT DENSE / DE	A COUNDING DOD	SEVERE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK (V SEV.) REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.
VERY SOFT < 2 < 0.25 GENERALLY SOFT 2 TO 4 0.25 TO 0.5	── INFERRED SOIL BOUNDARY ← CORE BORING SOUNDING ROD	VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
SILT-CLAY MEDIUM STIFF 4 TO 8 0.5 TO 1.0	INFERRED ROCK LINE MONITORING WELL TEST BORING WITH CORE	COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND	ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF
MATERIAL STIFF 8 TO 15 1 TO 2	A ALLUMIAL SOIL BOUNDARY A PIEZOMETER COST NEVALUE	SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.	ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE
HARD > 30 > 4	INSTALLATION	ROCK HARDNESS	RUN AND EXPRESSED AS A PERCENTAGE.
TEXTURE OR GRAIN SIZE	RECOMMENDATION SYMBOLS	VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.
U.S. STD. SIEVE SIZE 4 10 40 60 200 270	UNDERCUT UNCLASSIFIED EXCAVATION - UNCLASSIFIED EXCAVATION - UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE	SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.	SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND
OPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053	SHALLOW STEED EVENUE OF USED IN THE TOP 3 FEET OF	HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED	RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
BOULDER COBBLE GRAVEL COARSE FINE SILT CLAY	UNDERCUT ACCEPTABLE DEGRADABLE ROCK EMBANKMENT OR BACKFILL	TO DETACH HAND SPECIMEN.	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT
(BLDR.) (COB.) (GR.) (SE. SD.) (F SD.) (SL.) (CL.)	ABBREVIATIONS	MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED	OR SLIP PLANE.
GRAIN MM 305 75 2.0 0.25 0.05 0.005	AR - AUGER REFUSAL MED MEDIUM VST - VANE SHEAR TEST	BY MODERATE BLOWS.	STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF
SIZE IN. 12 3	BT - BORING TERMINATED MICA MICACEOUS WEA WEATHERED CL CLAY MOD MODERATELY 7 - UNIT WEIGHT	MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE	A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL
SOIL MOISTURE - CORRELATION OF TERMS	CPT - CONE PENETRATION TEST NP - NON PLASTIC $\gamma_{ m d}$ - DRY UNIT WEIGHT	POINT OF A GEOLOGIST'S PICK.	TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.
SOIL MOISTURE SCALE FIELD MOISTURE GUIDE FOR FIELD MOISTURE DESCRIPTION OUTPER OUTPE	CSE COARSE ORG ORGANIC DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST SAMPLE ABBREVIATIONS	SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
(HITEROERG ELIMITS) DESCRIPTION	DPT - DYNAMIC PENETRATION TEST SAP SAPROLITIC S - BULK	FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.	STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY (SAT.) FROM BELOW THE GROUND WATER TABLE	e - VOID RATIO SD SAND, SANDY SS - SPLIT SPOON F - FINE SL SILT, SILTY ST - SHELBY TUBE	VERY CAN BE CARVED WITH KNIFE, CAN BE EXCAVATED READILY WITH POINT OF PICK, PIECES 1 INCH	EENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY
LL LIQUID LIMIT	F - FINE SL SILT, SILTY ST - SHELBY TUBE FOSS FOSSILIFEROUS SLI SLIGHTLY RS - ROCK	SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE, CAN BE SCRATCHED READILY BY FINGERNALL.	THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
PLASTIC SEMISOLID; REQUIRES DRYING TO	FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL		TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
(PI) PL PLASTIC LIMIT	FRAGS FRAGMENTS	FRACTURE SPACING BEDDING TERM SPACING TERM THICKNESS	BENCH MARK: CURB INLET STA.183+33, 97 ft RT
	EQUIPMENT USED ON SUBJECT PROJECT	VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED 4 FEET	ELEVATION: 656.81 FEET
OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE	DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:	WIDE 3 TO 10 FEET THICKLY BEDDED 1.5 - 4 FEET MODERATELY CLOSE 1 TO 3 FEET THINLY BEDDED 0.16 - 1.5 FEET	
SL SHRINKAGE LIMIT	CME-45C CLAY BITS X AUTOMATIC MANUAL	CLOSE 0.16 TO 1 FOOT VERY THINLY BEDDED 0.03 - 0.16 FEET	NOTES:
- DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE	6' CONTINUOUS FLIGHT AUGER	VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET THINLY LAMINATED < 0.008 FEET	
	CME-55	INDURATION	
PLASTICITY		FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	
PLASTICITY INDEX (PI) DRY STRENGTH NON PLASTIC 0-5 VERY LOW	CME-550 HARD FACED FINGER BITS TUNGCARBIDE INSERTS	PURRING WITH FINGED EREES NUMEROUS CRAINS.	
SLIGHTLY PLASTIC 6-15 SLIGHT	I VANE SHEAR TEST ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐	FRIABLE GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.	
MODERATELY PLASTIC 16-25 MEDIUM HIGHLY PLASTIC 26 OR MORE HIGH	CASING W/ ADVANCER POST HOLE DIGGER	MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE;	
COLOR	PORTABLE HOIST TRICONE STEEL TEETH HAND AUGER	BREAKS EASILY WHEN HIT WITH HAMMER.	
LULUK	X Mobile B-57 TRICONE TUNGCARB. SOUNDING ROD	INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER,	
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY).	CORE BIT VANE SHEAR TEST	SHARP HAMMED BLOWS REQUIRED TO RREAK SAMPLE.	
			DATE OF I
MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.		SAMPLE BREAKS ACROSS GRAINS.	DATE: 8-15-1-

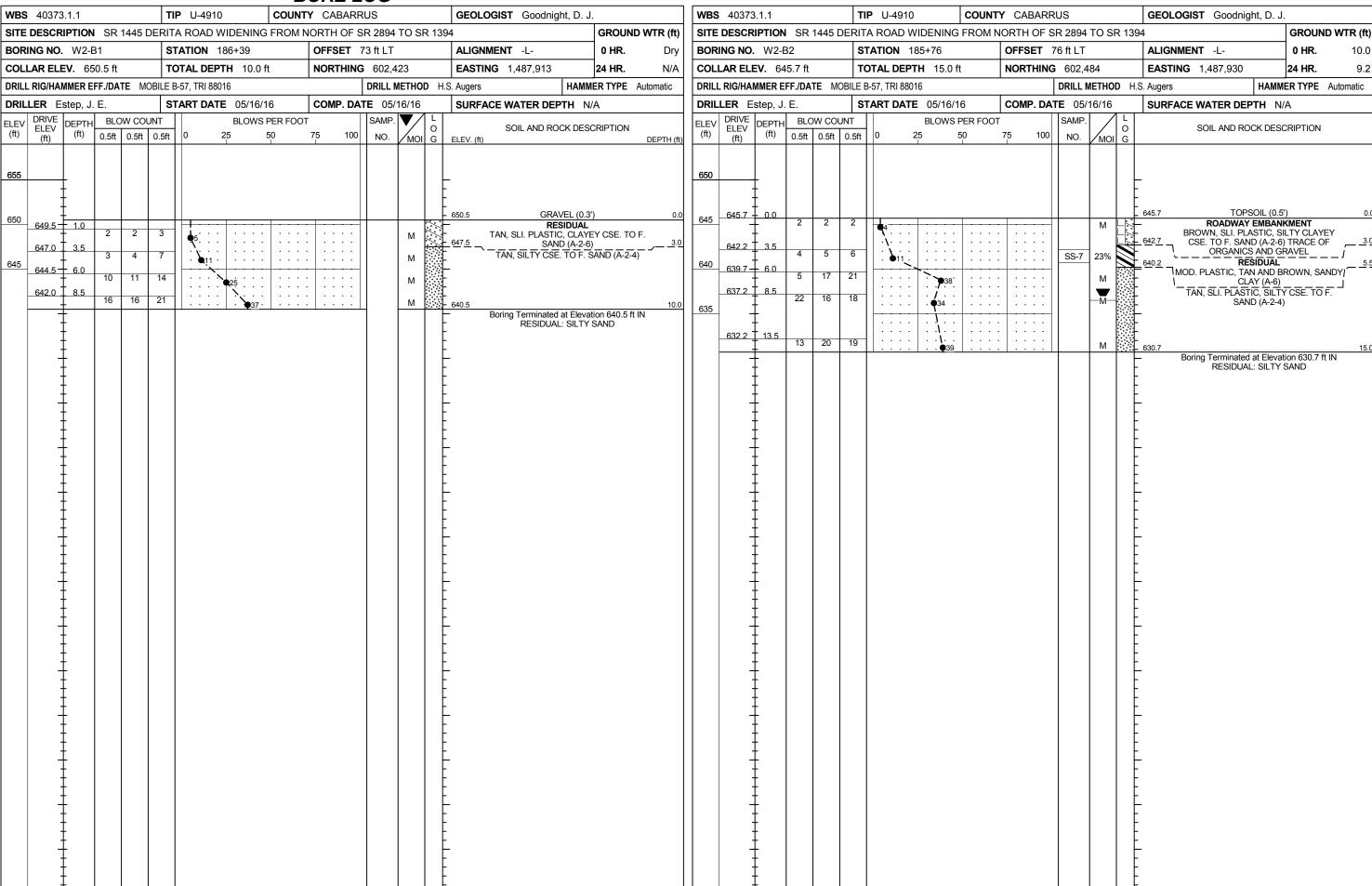






	BORE	: LOG					
WBS 40373.1.1 TIP	U-4910 COUNTY CABAR	ARRUS GEOLOGIST Goo	dnight, D. J.	WBS 40373.1.1	TIP U-4910 COUNTY	CABARRUS	GEOLOGIST Goodnight, D. J.
SITE DESCRIPTION SR 1445 DERITA	ROAD WIDENING FROM NORTH OF	OF SR 2894 TO SR 1394	GROUND WTR (ft)	SITE DESCRIPTION SR 1445 DE	ERITA ROAD WIDENING FROM NOR	TH OF SR 2894 TO SR 13	GROUND WTR (ft)
BORING NO. W1-B5	ATION 176+50 OFFSET	ET 52 ft RT ALIGNMENT -L-	0 HR. Dry	BORING NO. W1-B6	STATION 177+50 OI	FFSET 63 ft RT	ALIGNMENT -L- 0 HR. Dry
COLLAR ELEV. 669.0 ft TOT	TAL DEPTH 20.0 ft NORTHII	HING 601,487 EASTING 1,487,8	46 24 HR. N/A	COLLAR ELEV. 668.6 ft	TOTAL DEPTH 20.0 ft NO	ORTHING 601,583	EASTING 1,487,879 24 HR. N/A
DRILL RIG/HAMMER EFF./DATE MOBILE B-5	57, TRI 88016	DRILL METHOD H.S. Augers	HAMMER TYPE Automatic	DRILL RIG/HAMMER EFF./DATE MOR	BILE B-57, TRI 88016	DRILL METHOD H	H.S. Augers HAMMER TYPE Automatic
		DATE 05/17/16 SURFACE WATER	DEPTH N/A	DRILLER Estep, J. E.		OMP. DATE 05/17/16	SURFACE WATER DEPTH N/A
ELEV (ft) DEPTH BLOW COUNT (ft) 0.5ft 0.5ft 0.5ft	BLOWS PER FOOT 0 25 50 75 10	SAMP. L O SOIL AND MOI G ELEV. (ft)) ROCK DESCRIPTION DEPTH (ft)	ELEV (ft) DEPTH BLOW COUNTY (ft) (ft) 0.5ft 0.5ft (ft)	I	100 NO. MOI G	SOIL AND ROCK DESCRIPTION
ELEV DRIVE DEPTH BLOW COUNT (ft)	BLOWS PER FOOT	SAMP.) ROCK DESCRIPTION	ELEV (ft) DEPTH (ft) 0.5ft 0.5ft 0 670 667.6 - 1.0 2 5 665 665.1 3.5 4 5 660 660.1 8.5 2 3	BLOWS PER FOOT 0.5ft 0 25 50 75	SAMP.	

	E	BORE LOG							
WBS 40373.1.1	TIP U-4910 COUN	TY CABARRUS	GEOLOGIST Goodnight, D.	J.	WBS 40373.1.1	TIP U-4910 COU	NTY CABARRUS	GEOLOGIST Goodnight, D.	J.
SITE DESCRIPTION SR 1445 DE	RITA ROAD WIDENING FROM	NORTH OF SR 2894 TO SR 1	394	GROUND WTR (ft)	SITE DESCRIPTION SR 1445 I	DERITA ROAD WIDENING FROM	M NORTH OF SR 2894 TO SR	1394	GROUND WTR (ft)
BORING NO. W1-B7	STATION 178+50	OFFSET 65 ft RT	ALIGNMENT -L-	0 HR. Dry	BORING NO. W1-B8	STATION 179+50	OFFSET 65 ft RT	ALIGNMENT -L-	0 HR. N/A
COLLAR ELEV. 668.8 ft	TOTAL DEPTH 15.0 ft	NORTHING 601,681	EASTING 1,487,903	24 HR. N/A	COLLAR ELEV. 669.0 ft	TOTAL DEPTH 10.0 ft	NORTHING 601,780	EASTING 1,487,923	24 HR. N/A
DRILL RIG/HAMMER EFF./DATE MOBI		DRILL METHOD		MER TYPE Automatic	DRILL RIG/HAMMER EFF./DATE M		DRILL METHOD		MMER TYPE Automatic
DRILLER Estep, J. E.	START DATE 05/16/16	COMP. DATE 05/16/16	SURFACE WATER DEPTH	N/A	DRILLER Estep, J. E.	START DATE 05/16/16	COMP. DATE 05/16/16	SURFACE WATER DEPTH	N/A
ELEV CHIP CHIP CHIP CHIP CHIP CHIP CHIP CHIP	 	75 400 / 0	SOIL AND ROCK DES	SCRIPTION DEPTH (ft)	ELEV CHI CHI CHI CHI CHI CHI CHI CHI CHI CHI	 	75 100 NO. MOI	O SOIL AND ROCK DE	.SCRIPTION
665 665.3 3.5 3 2 662.8 6.0 4 4 4 660 660.3 8.5 3 3 3 6655 655.3 13.5	1	SS-6 M M M M M	ROADWAY EMBA TAN AND RED, SILTY CS (A-2-4) TRACE OF GI ORGANIC: RESIDUAL HIGHLY PLASTIC, TAN A CLAY (A-7-5) W/ TR 653.8 Boring Terminated at Elev RESIDUAL: SILTY RESIDUAL: SILTY	SE. TO F. SAND RAVEL AND 3.0 S L NND RED, SILTY ACE MICA ration 653.8 ft IN	668.0 1.0 3 7 665 665.5 3.5 3 6 663.0 6.0 4 4 660 660.5 8.5 3 3 3	4 · • • • · · · · · · · · · · · · · · ·	M M	ROADWAY EMBA RED, HIGHLY PLASTIC, CLAY (A-7) W/ TRAC RESIDUAL TAN AND RED, SILTY F 659.0 Boring Terminated at Elev RESIDUAL: SILT	c; SANDY SILTY CE GRAVEL



Falcon Engineering, Inc.

1210 Trinity Road, Suite 110, Raleigh, NC 27607

LABORATORY TEST RESULTS

SR 1445 Derita Road Widening from north of SR 2894 Concord Mills Boulevard to Sr 1394 Poplar Tent Road
City of Concord | Cabarrus County, NC

WBS: 40373.1.1 | TIP No.: U-4910 Falcon Engineering Project No.: G16014.00

	5 1 5 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1										
SAMPLE		DEDTH AACHTO CLASS		ACC ATTERBERG LIMITS			% PASSING (SIEVES)			0/ MOISTURE	0/ ODCANIOC
NO.	BORING	- DEPTH	AASHTO CLASS	LL	PL	PI	#10	#40	#200	% MOISTURE	% ORGANICS
SS-1	W1_B2	6.0-7.5	A-7-5	57	39	18	100	85	58	31.2	-
SS-2	W1_B3	6.0-7.5	A-7-5	65	40	25	99	83	63	25.4	•
SS-3	W1_B4	3.5-5.0	A-7-5	57	41	16	100	79	55	25.2	1
SS-4	W1_B5	3.5-5.0	A-5	49	43	6	100	81	51	24.7	1
SS-5	W1_B6	8.5-10.0	A-5	52	51	1	100	96	71	31.2	•
SS-6	W1_B7	3.5-5.0	A-7-5	52	32	20	100	90	72	27.3	-
SS-7	W2_B2	3.5-5.0	A-6	38	21	17	97	78	51	22.8	1

Notes: LL Liquid Limit

PL Plastic Limit

PI Plasticity Index = LL - PL

REFERENCE: U-4910	CONTENTS SHEET NO. 2 3 4-10
OJECT: 40373	

DESCRIPTION

SITE PLAN AND WALL ENVELOPES

TITLE SHEET LEGEND

BORING LOGS SOIL TEST RESULTS STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION **DIVISION OF HIGHWAYS** GEOTECHNICAL ENGINEERING UNIT

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY <u>CABARRUS</u>

PROJECT DESCRIPTION SR 1445 DERITA ROAD WIDENING FROM NORTH OF SR 2894 TO SR 1394

SITE DESCRIPTION

WALL -WI- 172+15.00, 67.58' RT, TO 179+50.00 89.54' RT WALL -W2- 185 + 75.66, 76.5'LT, TO 186 + 39.31, 76.5'LT

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAI SHEET
N.C.	U-4910	1	11

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT 1991 707-6805. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

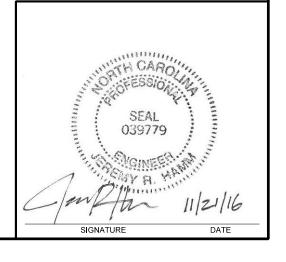
GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS NCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR CUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISTY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THE PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

- ES:
 THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N.C. DEPARTMENT
 OF TRANSPORTATION AS ACCURATE NOR IS IT CONSIDERED PART OF THE PLANS, SPECIFICATIONS
 OR CONTRACT FOR THE PROJECT.
 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.

GOODNIGHT, D. J. TRIGON EXP. HOGLEN, J. R. INVESTIGATED BY __DJG/JRH DRAWN BY HUNSBERGER, W. S. CHECKED BY HAMM, J. R. SUBMITTED BY FALCON ENG.

PERSONNEL



DATE NOVEMBER 2016

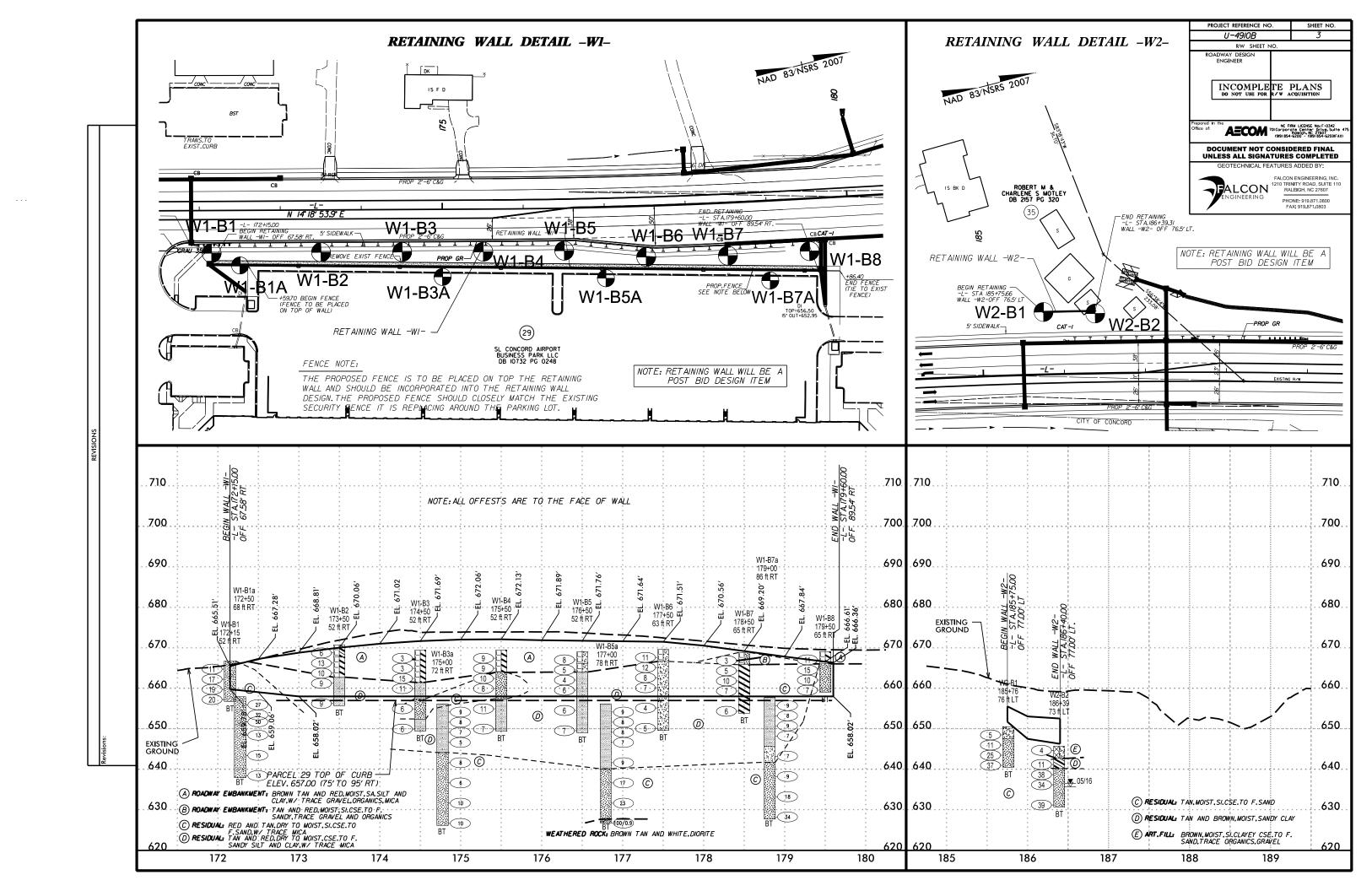
PROJECT REFERENCE NO.	SHEET NO.
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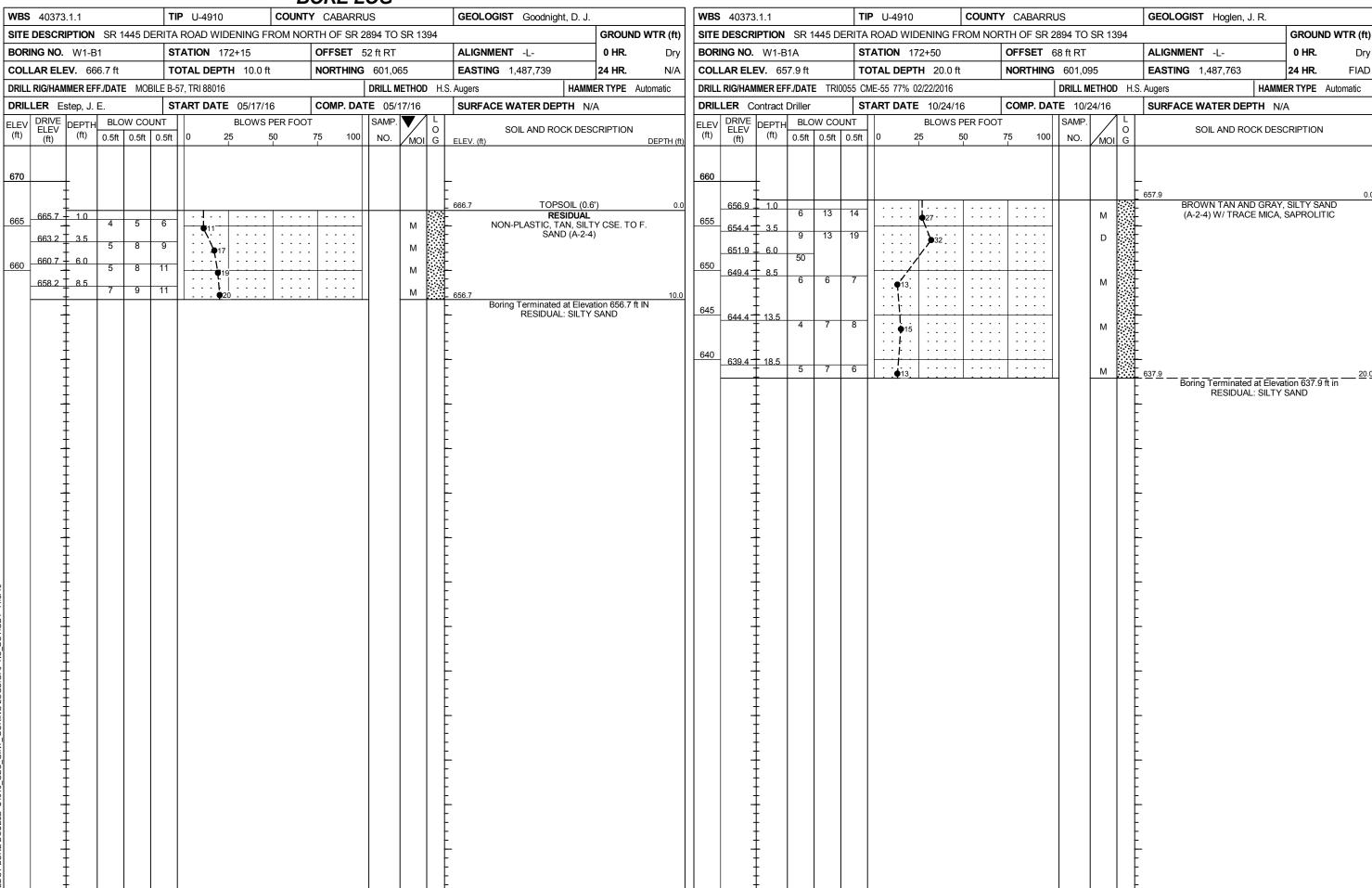
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT

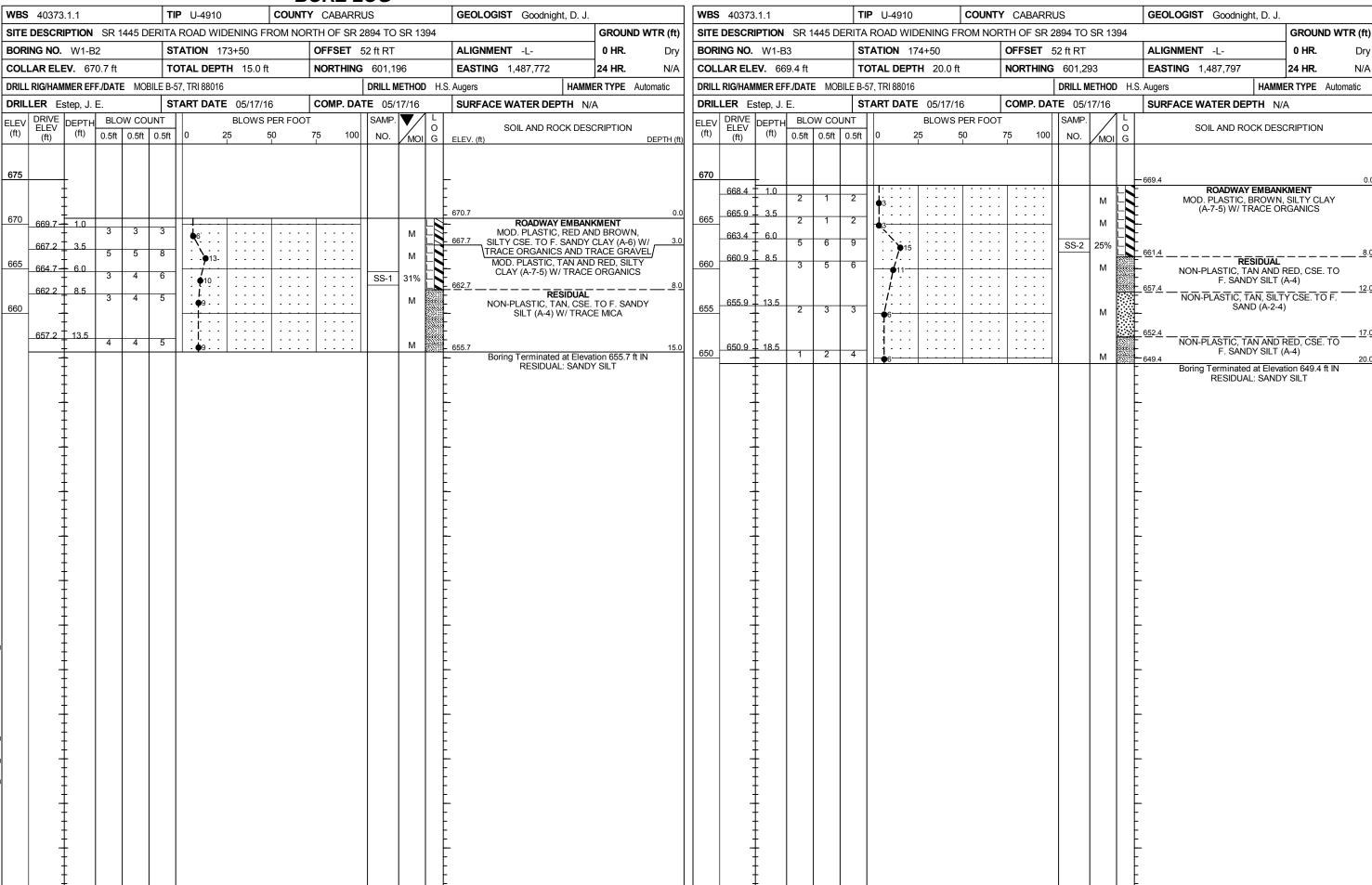
SUBSURFACE INVESTIGATION

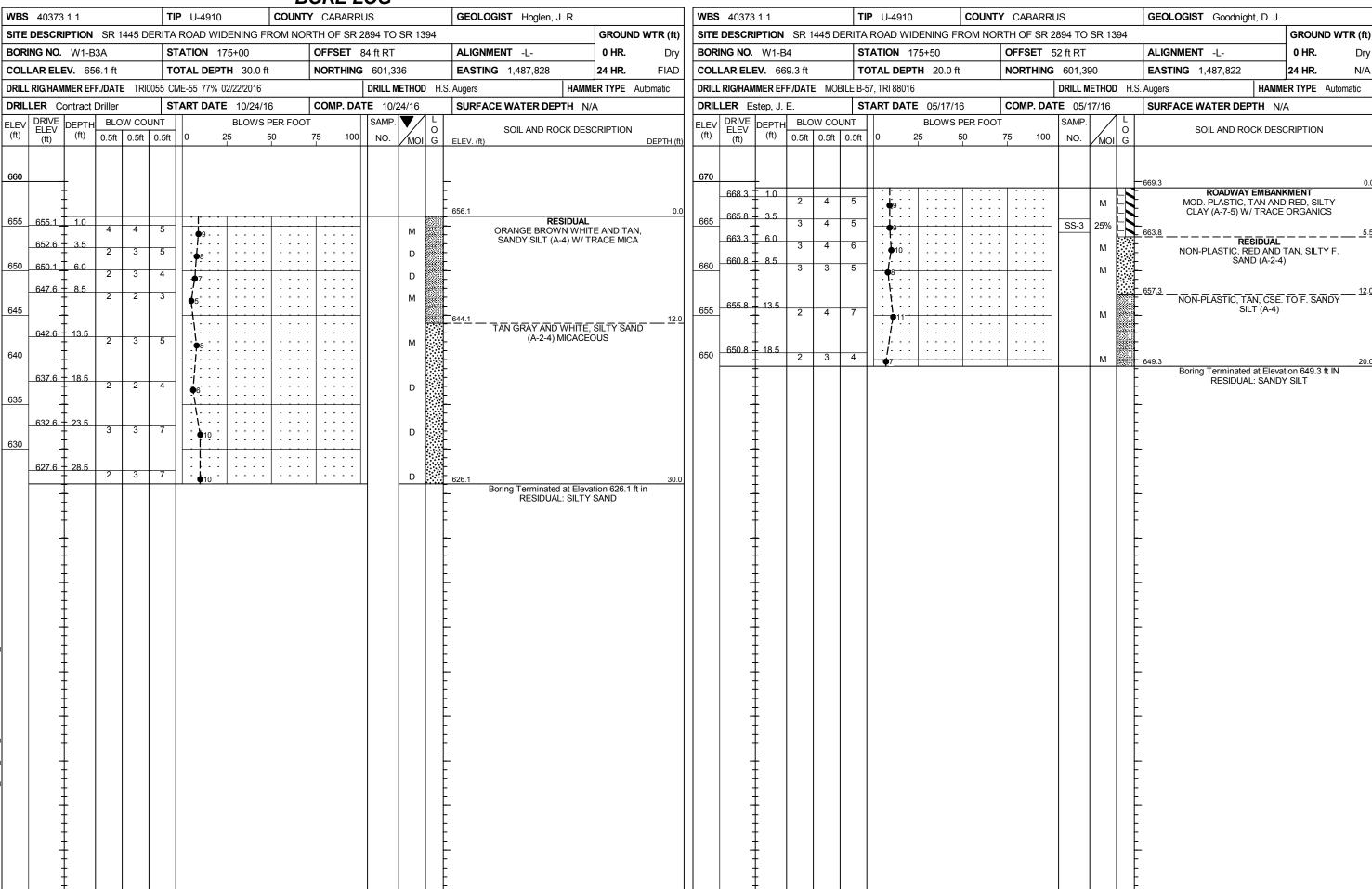
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

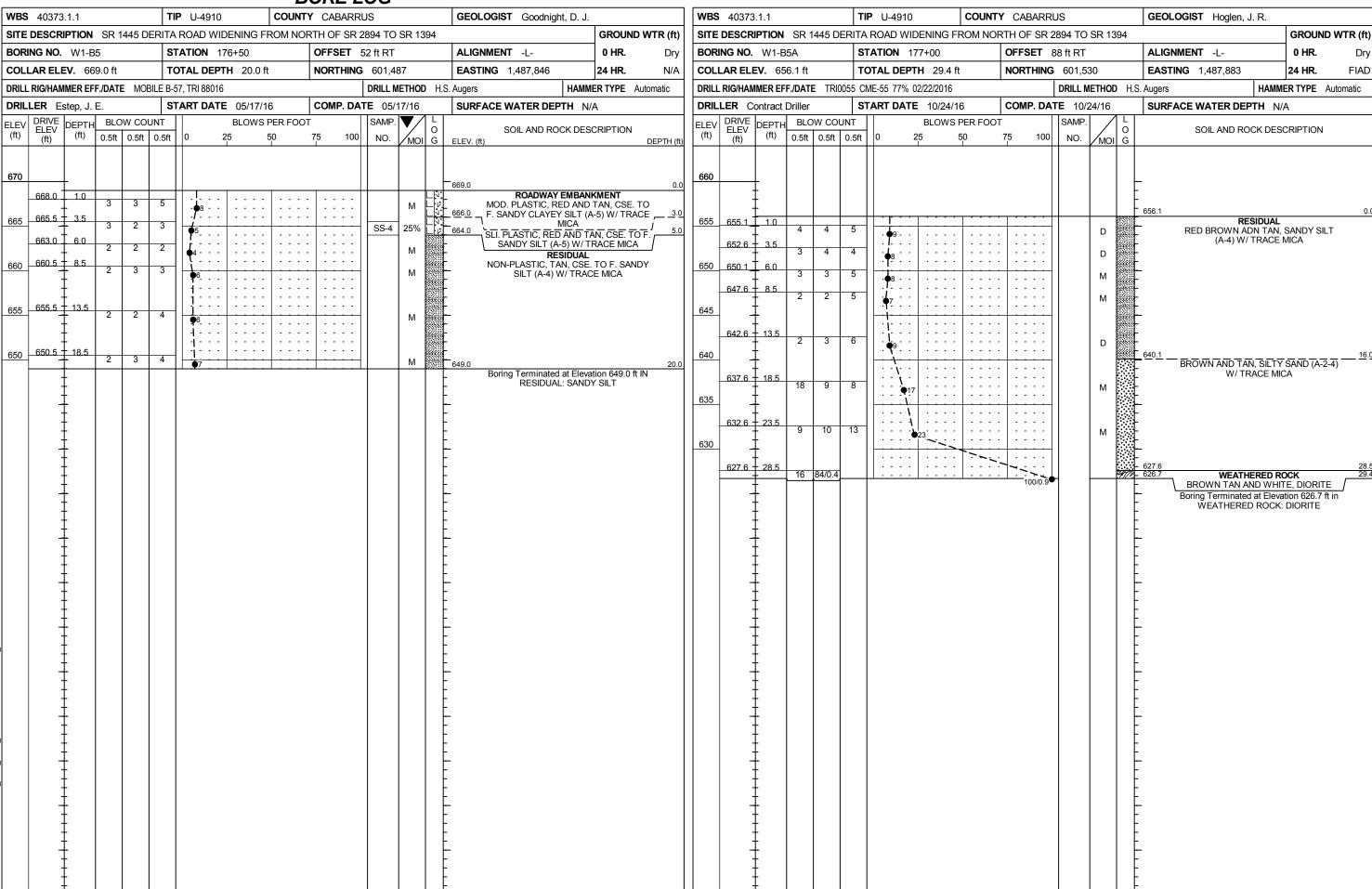
SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT	WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.	HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL.	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION	<u>UNIFORMLY GRADED</u> - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. <u>GAP-GRADED</u> - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.	SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60	AQUIFER - A WATER BEARING FORMATION OR STRATA.
IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH	ANGULARITY OF GRAINS	BLOWS IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK.	ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6	THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS:	ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:	ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING
SOIL LEGEND AND AASHTO CLASSIFICATION	ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.	WEATHERED NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.	A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC. ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT
CENERAL CRANIII AR MATERIALS SILT-CLAY MATERIALS	MINERALOGICAL COMPOSITION	FINE TO COARSE CRAIN ICNEQUE AND METAMORPHIC ROCK THAT	WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND
CLASS. (≤ 35% PASSING *200) (> 35% PASSING *200) ORGANIC MATERIALS	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC.	WOULD YIELD SPT REFUSAL IF TESTED, ROCK TYPE INCLUDES GRANITE,	SURFACE.
GROUP A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-4, A-5	ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.	NON-CRYSTALLINE NON-CRYSTALLINE FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN FOR TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN FOR TOWN THE PROPERTY OF THE PROP	CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
CLASS. A-1-a A-1-b A-2-4 A-2-5 A-2-6 A-2-7 A-7-6 A-3 A-6, A-7	COMPRESSIBILITY SLIGHTLY COMPRESSIBLE LL < 31	ROCK (NCR) SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.
SYMBOL 0000 d00000 00000 00000 00000 00000 00000 0000	MODERATELY COMPRESSIBLE LL = 31 - 50	COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED
7. PASSING SILT-	HIGHLY COMPRESSIBLE LL > 50 PERCENTAGE OF MATERIAL	SEDIMENTARY ROCK SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED (CP) SHELL BEDS, ETC.	BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
*10 59 MX GRANULAR CLAY PEAT MUCK, SOILS SOILS	GRANULAR SILT - CLAY	WEATHERING	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.
25 MA CS KM DI KM CS KM CS KM CS KM CS KM CS KM DI KM CS KM	ORGANIC MATERIAL SOILS SOILS OTHER MATERIAL	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER	DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE
MATERIAL PASSING *40	TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10% LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20%	HAMMER IF CRYSTALLINE. VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN.	HORIZONTAL.
LL - - 40 MX 41 MN 40 MX 41 MN 40 MX 41 MN 40 MX 41 MN 1111 F OR	MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35% HIGHLY ORGANIC > 10% > 20% HIGHLY 35% AND ABOVE	VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, (V SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE
PI 6 MX NP IW MX IW MX II MN II MN IW MX II MN II MN II MN MODERATE ORGANIC	HIGHLY ORGANIC > 10% > 20% HIGHLY 35% AND ABOVE GROUND WATER	OF A CRYSTALLINE NATURE.	LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE
GROUP INDEX W W 4 MX 8 MX 12 MX 16 MX NU MX AMUNTS OF SOILS		SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO (SLI.) 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR	SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
USUAL TITES STUNE FRAUS. FINE SILTY OR CLAYEY SILTY CLAYEY MATTER	WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING	CRYSTALS ARE DULL AND DISCOLORED, CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
MATERIALS SAND SAND GRAVEL AND SAND SOILS SOILS	STATIC WATER LEVEL AFTER <u>24</u> HOURS	MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM
GEN. RATING EXCELLENT TO GOOD FAIR TO POOR POOR POOR UNSUITABLE	<u>∨PW</u> PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA	(MOD.) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED	PARENT MATERIAL.
HS SUBURHUE PUUR	SPRING OR SEEP	WITH FRESH ROCK.	FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE
PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30 CONSISTENCY OR DENSENESS	MISCELLANEOUS SYMBOLS	MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH	FIELD.
DANCE OF CTANDARD DANCE OF UNICONSTITUT	TI SOCCEPHICOUS STILLOUS	(MOD.SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK.	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY PENETRATION RESISTENCE COMPRESSIVE STRENGTH (IN-VALUE) (TONS/FT ²)	ROADWAY EMBANKMENT (RE) 25/025 DIP & DIP DIRECTION WITH SOIL DESCRIPTION OF ROCK STRUCTURES	IF TESTED, WOULD YIELD SPT REFUSAL	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO
VERY LOOSE < 4	T SPT C SLOPE INDICATOR	SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC CLEAR AND EVIDENT BUT (SEV.) REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED	ITS LATERAL EXTENT.
GENERALLY LOOSE 4 TO 10	SOIL SYMBOL OPT DAT TEST BORING INSTALLATION	TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN.	LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN SOILS
MATERIAL MEDIUM DENSE 10 10 30 N/A	ARTIFICIAL FILL (AF) OTHER AUGER BORING CONE PENETROMETER THAN ROADWAY EMBANKMENT TEST	IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF VERY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC ELEMENTS ARE DISCERNIBLE	USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
(NON-COHESIVE) VERY DENSE > 50	I IHAN RUADWAT EMBANKMENI 🔾 🔾	SEVERE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE
VERY SOFT < 2 < 0.25	── INFERRED SOIL BOUNDARY - CORE BORING SOUNDING ROD	(V SEV.) REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <u>IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF</u>	OF AN INTERVENING IMPERVIOUS STRATUM.
GENERALLY SOFT 2 TO 4 0.25 TO 0.5 SILT-CLAY MEDIUM STIFF 4 TO 8 0.5 TO 1.0	INFERRED ROCK LINE MONITORING WELL TEST BORING WITH CORE	COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
MATERIAL STIFF 8 TO 15 1 TO 2 (COHESIVE) VERY STIFF 15 TO 30 2 TO 4	A DIETOMETED	SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS	ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE
HARD > 30 > 4	TTTT ALLUVIAL SOIL BOUNDARY ALLUVIAL SOIL BOUNDARY INSTALLATION SPT N-VALUE	ALSO AN EXAMPLE.	RUN AND EXPRESSED AS A PERCENTAGE.
TEXTURE OR GRAIN SIZE	RECOMMENDATION SYMBOLS	ROCK HARDNESS VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK, BREAKING OF HAND SPECIMENS REQUIRES	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.
U.S. STD. SIEVE SIZE 4 10 40 60 200 270	UNDERCUT UNCLASSIFIED EXCAVATION - UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE	VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK, BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.	SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND
OPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053	USED IN THE TOP 3 FEET OF	HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED	RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
BOULDER COBBLE GRAVEL COARSE FINE SILT CLAY	UNDERCUT UNDERCUT SHALLOW - EMBANKMENT OR BACKFILL	TO DETACH HAND SPECIMEN.	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT
(BLDR,) (COB,) (GR,) (CSE, SD,) (F SD,) (SL,) (CL,)	ABBREVIATIONS	MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK, GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK, HAND SPECIMENS CAN BE DETACHED	OR SLIP PLANE.
GRAIN MM 305 75 2.0 0.25 0.05 0.005	AR - AUGER REFUSAL MED MEDIUM VST - VANE SHEAR TEST	BY MODERATE BLOWS.	STANDARD PENETRATION TEST (PENETRATION RESISTANCE)(SPT) - NUMBER OF BLOWS (N OR BPF) OF
SIZE IN. 12 3	BT - BORING TERMINATED MICA MICACEOUS WEA WEATHERED CL CLAY MOD MODERATELY 7 - UNIT WEIGHT	MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES I INCH MAXIMUM SIZE BY HARD BLOWS OF THE	A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL
SOIL MOISTURE - CORRELATION OF TERMS	$ullet$ CPT - CONE PENETRATION TEST NP - NON PLASTIC $\gamma_{ extsf{d}}$ - DRY UNIT WEIGHT	POINT OF A GEOLOGIST'S PICK.	TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.
SOIL MOISTURE SCALE FIELD MOISTURE (ATTERBERG LIMITS) DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION	CSE COARSE ORG ORGANIC DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST SAMPLE ABBREVIATIONS	SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK, CAN BE EXCAVATED IN FRAGMENTS	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
	DPT - DYNAMIC PENETRATION TEST SAP SAPROLITIC S - BULK	FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.	STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY (SAT.) FROM BELOW THE GROUND WATER TABLE	e - VOID RATIO SD SAND, SANDY SS - SPLIT SPOON F - FINE SL SILT, SILTY ST - SHELBY TUBE	VERY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH	LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
	FOSS FOSSILIFEROUS SLI SLIGHTLY RS - ROCK	SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE, CAN BE SCRATCHED READILY BY FINGERNAIL.	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
PLASTIC SEMISOLID; REQUIRES DRYING TO	FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL W - MOISTURE CONTENT CBR - CALIFORNIA BEARING	FRACTURE SPACING BEDDING	
(PI) PLASTIC LIMIT	HI HIGHLY V - VERY RATIO	TERM SPACING TERM THICKNESS	BENCH MARK: CURB INLET STA. 183+33, 97 ft RT
- MOIST - (M) COLID. AT OR NEAR ORTIMIN MOISTURE	EQUIPMENT USED ON SUBJECT PROJECT	VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED 4 FEET	ELEVATION: 656.81 FEET
OM OPTIMUM MOISTURE	DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:	WIDE 3 TO 10 FEET THICKLY BEDDED 1.5 - 4 FEET MODERATELY CLOSE 1 TO 3 FEET THINLY BEDDED 0.16 - 1.5 FEET	NOTEC:
PECULIPES ADDITIONAL MATER TO	CME-45C CLAY BITS X AUTOMATIC MANUAL	CLOSE 0.16 TO 1 FOOT VERY THINLY BEDDED 0.03 - 0.16 FEET VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET	NOTES:
- DRY - (D) ATTAIN OPTIMUM MOISTURE	X CME-55 G* CONTINUOUS FLIGHT AUGER CORE SIZE:	THINLY LAMINATED 4.008 FEET THINLY LAMINATED 4.008 FEET	
PLASTICITY	X 8*HOLLOW AUGERS	INDURATION	
PLASTICITY INDEX (PI) DRY STRENGTH	CME-550 HARD FACED FINGER BITS	FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	
NON PLASTIC 0-5 VERY LOW	TUNGCARBIDE INSERTS	RUBBING WITH FINGER FREES NUMEROUS GRAINS; FRIABLE GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.	
SLIGHTLY PLASTIC 6-15 SLIGHT MODERATELY PLASTIC 16-25 MEDIUM	VANE SHEAR TEST CASING W/ ADVANCER HAND TOOLS: CASING POST HOLE DIGGER	COANG CAN DE CEDADATED FROM CAMPILE MITH CTEEL DOOR	
HIGHLY PLASTIC 26 OR MORE HIGH	PORTABLE HOIST TRICONE STEEL TEETH HAND AUGER	MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.	
COLOR	TRICONE 'TUNGCARB, SOUNDING POD	INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE;	
•	X MODILE B-57	DIFFICULT TO BREAK WITH HAMMER.	
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN BED VELLOW-REDUM) PLUE-CRAVI	CORE BIT VANE SHEAR TEST		
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.	CORE BIT VANE SHEAR TEST	EXTREMELY INDURATED SHAPP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.	DATE: 8-15-1-





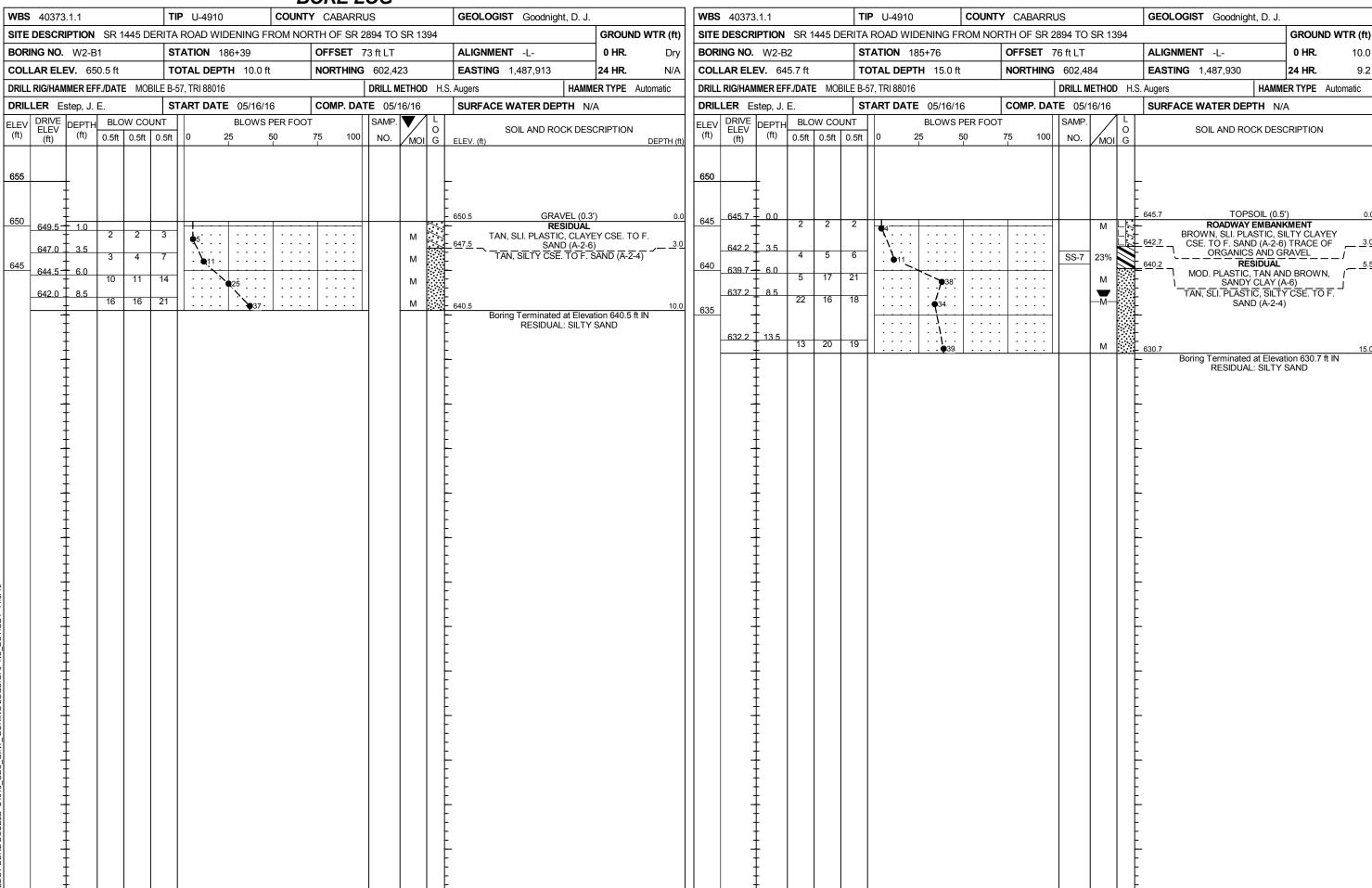






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WBS 40373.1.1		TY CABARRUS	GEOLOGIST Goodnight, D. J.	_	WBS 40373.1.1		ITY CABARRUS	GEOLOGIST Goodnight, D. J.
SITE DESCRIPTION SR 1445 DI	ERITA ROAD WIDENING FROM NO	1	1	GROUND WTR (ft)	SITE DESCRIPTION SR 1445 DEI	RITA ROAD WIDENING FROM NO	ORTH OF SR 2894 TO SR 13	
BORING NO. W1-B6	STATION 177+50	OFFSET 63 ft RT	ALIGNMENT -L-	0 HR. Dry	BORING NO. W1-B7	STATION 178+50	OFFSET 65 ft RT	ALIGNMENT -L- 0 HR. Dry
COLLAR ELEV. 668.6 ft	TOTAL DEPTH 20.0 ft	NORTHING 601,583	EASTING 1,487,879	24 HR. N/A	COLLAR ELEV. 668.8 ft	TOTAL DEPTH 15.0 ft	NORTHING 601,681	EASTING 1,487,903 24 HR. N/A
DRILL RIG/HAMMER EFF./DATE MOE	ILE B-57, TRI 88016	DRILL METHOD H.S	S. Augers HAMN	MER TYPE Automatic	DRILL RIG/HAMMER EFF./DATE MOBIL	LE B-57, TRI 88016	DRILL METHOD	D H.S. Augers HAMMER TYPE Automatic
DRILLER Estep, J. E.	START DATE 05/17/16	COMP. DATE 05/17/16	SURFACE WATER DEPTH N	I/A	DRILLER Estep, J. E.	START DATE 05/16/16	COMP. DATE 05/16/16	SURFACE WATER DEPTH N/A
ELEV (ft) DRIVE (ft) DEPTH BLOW COU		75 100 NO. MOI G	SOIL AND ROCK DES	SCRIPTION DEPTH (ft)	ELEV CHIP DEPTH BLOW COUNTY (ft) (ft) 0.5ft 0.5ft (NT BLOWS PER FOO 0.5ft 0 25 50	OT SAMP. 75 100 NO. MOI	C SOIL AND ROCK DESCRIPTION G
667.6 + 1.0		-		0.0 NKMENT	670			668.8 0.0
665 665.1 3.5 4 5	7	M []	MOD. PLASTIC, TAN A SANDY CLAYEY SILT (A ORGANICS	AND RED, F. (-5) W/ TRACE3.0_ S	665 665.3 7 3.5	3	M SS-6 27%	TAN AND RED, SILTY CSE. TO F. SAND (A-2-4) TRACE OF GRAVEL AND ORGANICS RESIDUAL
662.6 + 6.0 2 4 660 660.1 8.5 2 3	4		RESIDUAL SLI. PLASTIC, TAN AND F SILT (A-5)	RED, F. SANDY	660 660.3 + 8.5	4	M	HIGHLY PLASTIC, TAN AND RED, SILTY CLAY (A-7-5) W/ TRACE MICA
655 655.1 13.5 2 1	3		.		655 655.3 13.5 2 3	3		653.815.0
650 650.1 18.5 2 2	3	・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・	. 648.6	20.0	+			Boring Terminated at Elevation 653.8 ft IN RESIDUAL: SILTY CLAY
	9		Boring Terminated at Eleva RESIDUAL: SAND	ration 648.6 ft IN				
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WBS 40373.1.1			GEOLOGIST Hoglen, J. R.		WBS 40373.1.1		NTY CABARRUS	GEOLOGIST Goodnight, D. J.	1
SITE DESCRIPTION SR 144	5 DERITA ROAD WIDENING FROM NOR	1		GROUND WTR (ft)	SITE DESCRIPTION SR 1445 DE	1			GROUND WTR (ft)
BORING NO. W1-B7A	STATION 179+00		ALIGNMENT -L-	0 HR. Dry	BORING NO. W1-B8	STATION 179+50	OFFSET 65 ft RT	ALIGNMENT -L-	0 HR. N/A
COLLAR ELEV. 657.7 ft	TOTAL DEPTH 30.0 ft	<u> </u>	EASTING 1,487,934	24 HR. FIAD	COLLAR ELEV. 669.0 ft	TOTAL DEPTH 10.0 ft	NORTHING 601,780	EASTING 1,487,923	24 HR. N/A
DRILL RIG/HAMMER EFF./DATE		DRILL METHOD H.S. A	-	IER TYPE Automatic	DRILL RIG/HAMMER EFF./DATE MOBI		DRILL METHOD	_	IER TYPE Automatic
DRILLER Contract Driller	START DATE 10/24/16		SURFACE WATER DEPTH N/	<u>/A</u>	DRILLER Estep, J. E.	START DATE 05/16/16	COMP. DATE 05/16/16	SURFACE WATER DEPTH N	/A
ELEV (ft) DRIVE ELEV (ft) DEPTH BLOW (ft) 0.5ft 0	COUNT BLOWS PER FOOT 5ft 0.5ft 0 25 50	T SAMP. V O O O O O O O O O O O O O O O O O O	SOIL AND ROCK DES	CRIPTION DEPTH (ft)	ELEV DRIVE ELEV (ft) DEPTH BLOW COU (ft) 0.5ft 0.5ft	UNT BLOWS PER FO 0.5ft 0 25 50	75 100 NO. MOI	O SOIL AND ROCK DES	CRIPTION
660					670				
656.7 + 1.0		-	957.7 RESIDUAL	0.0	668.0 1.0	4 . 11		ROADWAY EMBAN RED, HIGHLY PLASTIC,	0.0 KMENT SANDY SILTY
655 4 3.5	5	- - · · · · M -	ORANGE TAN AND BLAC SILT (A-4) W/ TRACE MICA	CK, F. SANDY	665 665.5 3.5 3 6	9	- · · · · · ·	666.0 CLAY (A-7) W/ TRAC RESIDUAL TAN AND RED, SILTY F.	E GRAVEL
651.7 + 6.0	4 5				660 660.5 8.5	6	м	TAN AND NED, SIETTT	OAND (A-Z-4)
650 649.2 8.5 2	3 4 7	- 			660 660.5 7 8.5 3 3	4 7		659.0 Boring Terminated at Elevent RESIDUAL: SILTY	ation 659.0 ft IN
645 644.2 13.5		- 	945.7 WHITE TAN AND BLACI ELASTIC SILT (K, F. SANDY 12.0				- RESIDUAL. SILT	SAND
	3 4 ♦ 7 · · · · · · · · · · · · · · · · · · ·	.	ELASTIC SILT (WHITE TAN GRAY AND E	16.0				-	
639.2 18.5	3 6	-	SAND (A-2-4) W/ TRA	ACE MICA				- - -	
635 634.2 23.5	3 10							<u>-</u>	
630	10	.						- - -	
629 2 T 28 5 I	7 17		827.7 Boring Terminated at Eleva	30.0					
			RESIDUAL: SILTY	SAND				<u>-</u> -	
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Falcon Engineering, Inc.

1210 Trinity Road, Suite 110, Raleigh, NC 27607

LABORATORY TEST RESULTS

SR 1445 Derita Road Widening from north of SR 2894 Concord Mills Boulevard to Sr 1394 Poplar Tent Road
City of Concord | Cabarrus County, NC

WBS: 40373.1.1 | TIP No.: U-4910 Falcon Engineering Project No.: G16014.00

SAMPLE		DEDTH AACHTO CLACC		ATTERBERG LIMITS			% PASSING (SIEVES)			0/ MOICTUDE	0/ ODCANICC
NO.	BORING	DEPTH	AASHTO CLASS	LL	PL	PI	#10	#40	#200	% MOISTURE	% ORGANICS
SS-1	W1_B2	6.0-7.5	A-7-5	57	39	18	100	85	58	31.2	1
SS-2	W1_B3	6.0-7.5	A-7-5	65	40	25	99	83	63	25.4	ı
SS-3	W1_B4	3.5-5.0	A-7-5	57	41	16	100	79	55	25.2	1
SS-4	W1_B5	3.5-5.0	A-5	49	43	6	100	81	51	24.7	1
SS-5	W1_B6	8.5-10.0	A-5	52	51	1	100	96	71	31.2	•
SS-6	W1_B7	3.5-5.0	A-7-5	52	32	20	100	90	72	27.3	1
SS-7	W2_B2	3.5-5.0	A-6	38	21	17	97	78	51	22.8	-

Notes: LL Liquid Limit
PL Plastic Limit

PI Plasticity Index = LL - PL