

GEOTECHNICAL ATTACHMENT

The following geotechnical report is for information only and is not a part of this contract. This information is for investigation only and no accuracy is implied or guaranteed. No claim will be allowed as a result of the use of this information.

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.10.R.53	1	8

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

STRUCTURE
SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 17BP.10.R.53 F.A. PROJ. _____
COUNTY CABARRUS
PROJECT DESCRIPTION BRIDGE 12 ON SR 1442 (WINDY RD.)
OVER EMERSON BRANCH
SITE DESCRIPTION _____

CONTENTS

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PERSONNEL

J.K. STICKNEY

C.L. SMITH

INVESTIGATED BY J.E. BEVERLY

CHECKED BY C.B. LITTLE

SUBMITTED BY C.B. LITTLE

DATE APRIL 2014

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 (919) 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE PART OF THE CONTRACT.

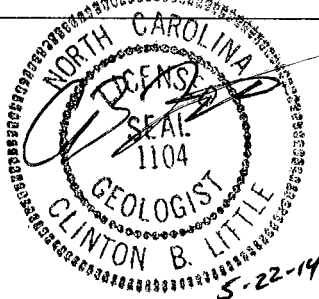
GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND 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 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 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 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 SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THIS 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.

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.

DRAWN BY: J.K. McCLURE



SOIL DESCRIPTION

VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6

GRADATION

ANGULARITY OF GRAINS

MINERALOGICAL COMPOSITION

COMPRESSIBILITY


PERCENTAGE OF MATERIAL

GROUND WATER




















RE HOLE IMMEDIATELY AFTER DRILLING

STATIC WATER LEVEL AFTER 24 HOURS

PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA

 SPRING OR SEEP

MISCELLANEOUS SYMBOLS

	ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION	 SPT DPT YST	TEST BORING		TEST BORING W/ CORE
	SOIL SYMBOL		AUGER BORING		SPT N-VALUE
	ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT		CORE BORING		SPT REFUSAL
	INFERRED SOIL BOUNDARY		MONITORING WELL		
	INFERRED ROCK LINE		PIEZOMETER INSTALLATION		
	ALLUVIAL SOIL BOUNDARY		SLOPE INDICATOR INSTALLATION		
	DIP & DIP DIRECTION OF ROCK STRUCTURES		CONE PENETROMETER TEST		
			SOUNDING ROD		

ABBREVIATIONS

AR - AUGER REFUSAL	MED. - MEDIUM	VST - VANE SHEAR TEST
BT - BORING TERMINATED	MICA - MICACEOUS	WEA. - WEATHERED
CL. - CLAY	MOD. - MODERATELY	γ - UNIT WEIGHT
CPT - CONE PENETRATION TEST	NP - NON PLASTIC	γ_d - DRY UNIT WEIGHT
CSE. - COARSE	ORG. - ORGANIC	
DMT - DILATOMETER TEST	PMT - PRESSUREMETER TEST	<u>SAMPLE ABBREVIATIONS</u>
DPT - DYNAMIC PENETRATION TEST	SAP. - SAPROLITIC	S - BULK
e - VOID RATIO	SD. - SAND, SANDY	SS - SPLIT SPOON
F - FINE	SL. - SILT, SILTY	ST - SHELBY TUBE
FOSS. - FOSSILIFEROUS	SLG. - SLIGHTLY	RS - ROCK
FRAC. - FRACTURED, FRACTURES	TCR - TRICONE REFUSAL	RT - RECOMPACTED TRIAXIAL
FRAGS. - FRAGMENTS	w - MOISTURE CONTENT	CBR - CALIFORNIA BEARING
HL. - HIGHLY	v - VERY	RATIO

EQUIPMENT USED ON SUBJECT PROJECT

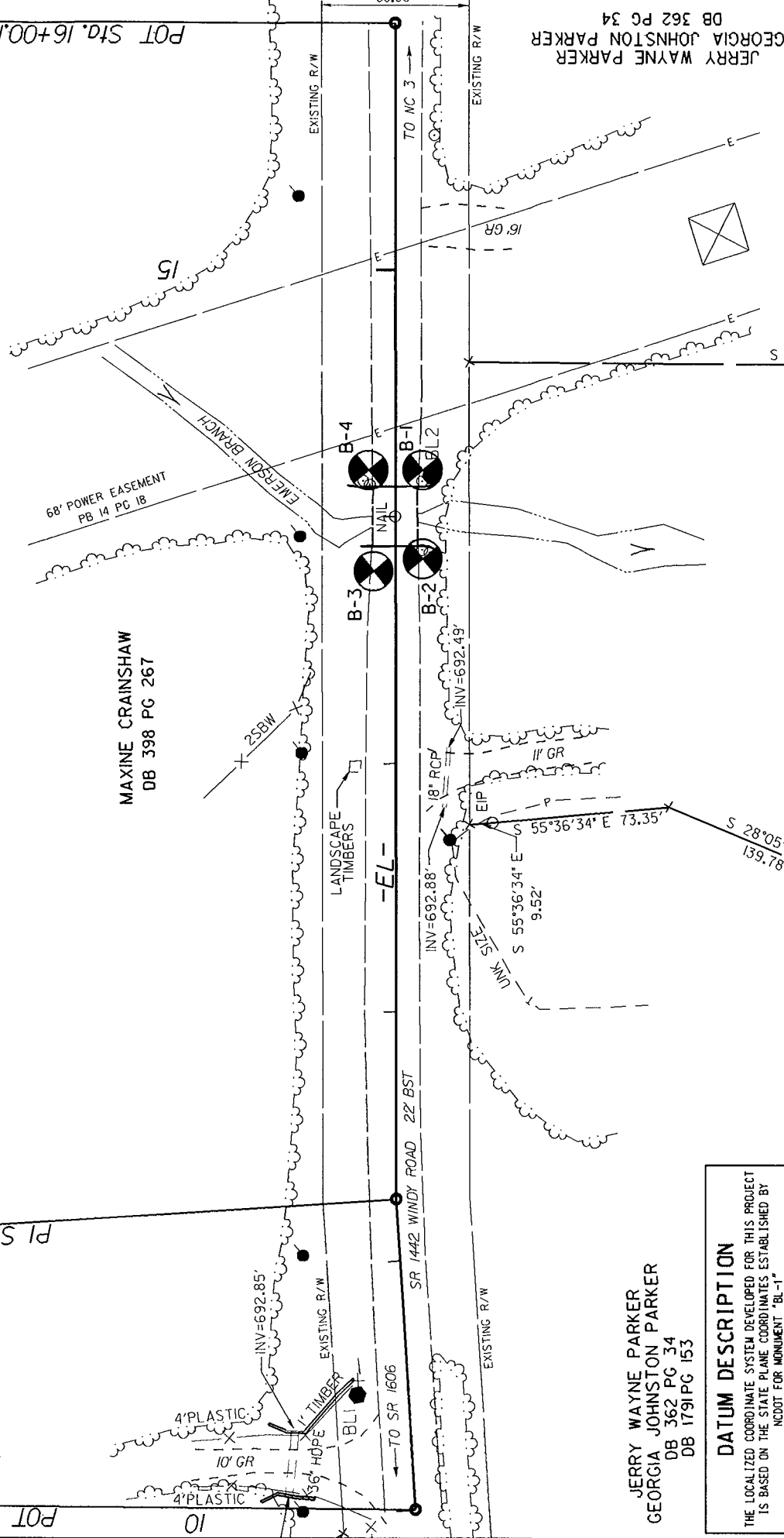
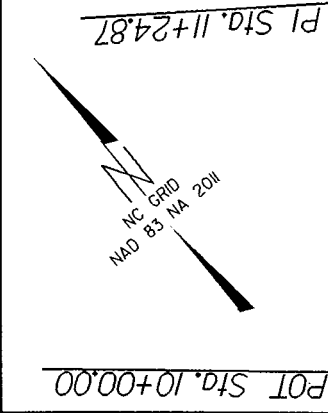
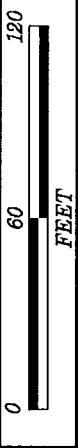
DRILL UNITS: <input type="checkbox"/> MOBILE B- ____ <input type="checkbox"/> BK-51 <input type="checkbox"/> CME-45C <input checked="" type="checkbox"/> CME-550 <input type="checkbox"/> PORTABLE HOIST <input type="checkbox"/> _____ <input type="checkbox"/> _____	ADVANCING TOOLS: <input type="checkbox"/> CLAY BITS <input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER <input checked="" type="checkbox"/> 8" HOLLOW AUGERS <input type="checkbox"/> HARD FACED FINGER BITS <input checked="" type="checkbox"/> TUNG.-CARBIDE INSERTS <input type="checkbox"/> CASING <input type="checkbox"/> W/ ADVANCER <input type="checkbox"/> TRICONE _____ * STEEL TEETH <input type="checkbox"/> TRICONE _____ * TUNG.-CARB. <input type="checkbox"/> CORE BIT <input type="checkbox"/> _____	HAMMER TYPE: <input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL CORE SIZE: <input type="checkbox"/> -B _____ <input type="checkbox"/> -N _____ <input type="checkbox"/> -H _____ HAND TOOLS: <input type="checkbox"/> POST HOLE DIGGER <input type="checkbox"/> HAND AUGER <input type="checkbox"/> SOUNDING ROD <input type="checkbox"/> VANE SHEAR TEST <input type="checkbox"/> _____
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	PLASTICITY INDEX (PI)	DRY STRENGTH
NONPLASTIC	0-5	VERY LOW
LOW PLASTICITY	6-15	SLIGHT
MED. PLASTICITY	16-25	MEDIUM
HIGH PLASTICITY	26 OR MORE	HIGH

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.

		PROJECT REFERENCE NO. 17BP.10.R.53	SHEET NO. 2A												
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS															
ROCK DESCRIPTION		TERMS AND DEFINITIONS													
<p>HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:</p> <table><tr><td></td><td>WEATHERED ROCK (WR)</td><td>NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.</td></tr><tr><td></td><td>CRYSTALLINE ROCK (CR)</td><td>FINE TO COARSE GRAIN (IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.</td></tr><tr><td></td><td>NON-CRYSTALLINE ROCK (NCR)</td><td>FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.</td></tr><tr><td></td><td>COASTAL PLAIN SEDIMENTARY ROCK (CP)</td><td>COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.</td></tr></table>			WEATHERED ROCK (WR)	NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.		CRYSTALLINE ROCK (CR)	FINE TO COARSE GRAIN (IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.		NON-CRYSTALLINE ROCK (NCR)	FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.		COASTAL PLAIN SEDIMENTARY ROCK (CP)	COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.	<p>ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA. 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 HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC. 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 SURFACE. CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOOED FROM PARENT MATERIAL. 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 FIELD. JOINT - 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 ITS LATERAL EXTENT. 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 USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (RQD) - 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 RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF 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 TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL 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. TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p>	
	WEATHERED ROCK (WR)	NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.													
	CRYSTALLINE ROCK (CR)	FINE TO COARSE GRAIN (IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.													
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WEATHERING															
FRESH	ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.														
VERY SLIGHT (V SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN. CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.														
SLIGHT (SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.														
MODERATE (MOD.)	SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN 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 WITH FRESH ROCK.														
MODERATELY SEVERE (MOD. SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. <i>IF TESTED, WOULD YIELD SPT REFUSAL.</i>														
SEVERE (SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. <i>IF TESTED, YIELDS SPT N VALUES > 100 BPF.</i>														
VERY SEVERE (V SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. <i>IF TESTED, YIELDS SPT N VALUES < 100 BPF.</i>														
COMPLETE	ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINDERS. SAPROLITE IS ALSO AN EXAMPLE.														
ROCK HARDNESS															
VERY HARD	CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.														
HARD	CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.														
MODERATELY HARD	CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.														
MEDIUM HARD	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 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.														
SOFT	CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.														
VERY SOFT	CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGER NAIL.														
FRACTURE SPACING		BEDDING													
TERM	SPACING	TERM	THICKNESS												
VERY WIDE	MORE THAN 10 FEET	VERY THICKLY BEDDED	> 4 FEET												
WIDE	3 TO 10 FEET	THICKLY BEDDED	1.5 - 4 FEET												
MODERATELY CLOSE	1 TO 3 FEET	THINLY BEDDED	0.16 - 1.5 FEET												
CLOSE	0.16 TO 1 FEET	VERY THINLY BEDDED	0.03 - 0.16 FEET												
VERY CLOSE	LESS THAN 0.16 FEET	THICKLY LAMINATED	0.008 - 0.03 FEET												
		THINLY LAMINATED	< 0.008 FEET												
INDURATION															
FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.															
FRIABLE	RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.														
MODERATELY INDURATED	GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.														
INDURATED	GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.														
EXTREMELY INDURATED	SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.														
		BENCH MARK: BL-2 STA. 14+16.70 -EL- 14.48 RT. N 633851.9560 E 1485233.6500 ELEVATION: 692.944 FT.													
		NOTES:													

SITE PLAN



JERRY WAYNE PARKER
 GEORGIA JOHNSTON PARKER
 DB 362 PG 34
 DB 1791 PG 153

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCOT FOR MONUMENT "BL-1" WITH NAD 83 (2011) STATE PLANE GRID COORDINATES OF NORTHING: 633585.2107 (ft) EASTING: 1484974.8330 (ft) ELEVATION: 700.22 (ft) THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99985182 THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "BL-1" TO -EL- STATION 10+00 IS S 12°15'26" W 51.76' ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES VERTICAL DATUM USED IS NAVD 88

WENDY PARKER ALLEN
 DB 2171 PG 69

BL	POINT	DESC.	NORTH	EAST	ELEVATION	EL STATION	OFFSET
1	BL-1		633585.2107	1484974.8330	700.222	10+47.41	20.77 LT
2	BL-2		633851.9560	1485233.6500	692.944	14+16.70	14.48 RT
3	BL-3		634085.2166	1485383.9460	690.634	16+92.32	17.61 LT



NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

SHEET 4

WBS 17BP.10.R.53		TIP 17BP10R53		COUNTY CABARRUS		GEOLOGIST Stickney, J. K.									
SITE DESCRIPTION BRIDGE 12 ON SR 1442 (WINDY RD.) OVER EMERSON BRANCH							GROUND WTR (ft)								
BORING NO. B-1		STATION 14+19		OFFSET 11 ft RT		ALIGNMENT -EL-									
COLLAR ELEV. 693.9 ft		TOTAL DEPTH 5.9 ft		NORTHING 633,856		EASTING 1,485,232									
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550 88% 03/19/2014				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic									
DRILLER Smith, C. L.		START DATE 04/21/14		COMP. DATE 04/21/14		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					ELEV. (ft)
695															
														693.9	GROUND SURFACE 0.0
690	690.6	3.3	1	6	8										ROADWAY EMBANKMENT
															BRN V. LOOSE TO MED. DENSE MOIST TO WET SILTY SAND (A-2) W/ ASPHALT & ROCK FRAGS.
														688.0	5.9
															Boring Terminated BY AUGER REFUSAL at Elevation 688.0 ft ON BOULDER IN ROADWAY EMBANKMENT FILL
															NOTE: AASHTO CLASSIFICATIONS ON BORLOG ARE BASED ON FIELD DESCRIPTIONS.

NCDOT BORE SINGLE 12_GEO_BH_CULV0012.GPJ NC_DOT_GDT 4/24/14



WBS 17BP.10.R.53						TIP 17BP10R53						COUNTY CABARRUS						GEOLOGIST Stickney, J. K.							
SITE DESCRIPTION BRIDGE 12 ON SR 1442 (WINDY RD.) OVER EMERSON BRANCH																		GROUND WTR (ft)							
BORING NO. B-2						STATION 13+83						OFFSET 11 ft RT						ALIGNMENT -EL-						0 HR. 16.0	
COLLAR ELEV. 693.9 ft						TOTAL DEPTH 16.1 ft						NORTHING 633,828						EASTING 1,485,210						24 HR. FIAD	
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550 88% 03/19/2014												DRILL METHOD H.S. Augers						HAMMER TYPE Automatic							
DRILLER Smith, C. L.						START DATE 04/21/14						COMP. DATE 04/21/14						SURFACE WATER DEPTH N/A							
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT				SAMP. NO.	MOI	L O G	SOIL AND ROCK DESCRIPTION												
			0.5ft	0.5ft	0.5ft	0	25	50	75	100			ELEV. (ft)	DEPTH (ft)											
695													693.9	GROUND SURFACE 0.0											
690	690.2	3.7										M/W		ROADWAY EMBANKMENT BRN-GRAY V. LOOSE MOIST TO WET SILTY SAND (A-2) W/ ASPHALT & ROCK											
685	685.2	8.7	1	1	1							M/W		685.2	8.7										
			3	3	3																				
680	680.2	13.7	3	35	65/0.4								679.7	14.2											
													677.8	16.1											
WEATHERED ROCK SEV. WEATH. CRYSTALLINE ROCK Boring Terminated BY AUGER REFUSAL at Elevation 677.8 ft ON CRYSTALLINE ROCK NOTE: AASHTO CLASSIFICATIONS ON BORLOG ARE BASED ON FIELD DESCRIPTIONS.																									



NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

SHEET 6

WBS 17BP.10.R.53		TIP 17BP10R53		COUNTY CABARRUS		GEOLOGIST Stickney, J. K.					
SITE DESCRIPTION BRIDGE 12 ON SR 1442 (WINDY RD.) OVER EMERSON BRANCH							GROUND WTR (ft)				
BORING NO. B-3		STATION 13+78		OFFSET 9 ft LT		ALIGNMENT -EL-					
COLLAR ELEV. 693.9 ft		TOTAL DEPTH 15.5 ft		NORTHING 633,837		EASTING 1,485,191					
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550 88% 03/19/2014				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic					
DRILLER Smith, C. L.		START DATE 04/21/14		COMP. DATE 04/21/14		SURFACE WATER DEPTH N/A					
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT		SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100	ELEV. (ft) DEPTH (ft)
695											
											693.9 GROUND SURFACE 0.0
690	690.2	3.7	1	1	1						ROADWAY EMBANKMENT BRN-GRAY V. LOOSE MOIST TO WET SILTY SAND (A-2)
685	685.2	8.7	1	1	1						685.2 8.7
680	680.2	13.7	6	10	11						ALLUVIAL GRAY SOFT MOIST TO WET SANDY SILTY CLAY (A-7)
											680.2 13.7
											RESIDUAL BRN-GRAY MED. DENSE MOIST CLAYEY SILTY SAND (A-2)
											678.6 15.3
											678.4 15.5
											WEATHERED ROCK SEV. WEATH. CRYSTALLINE ROCK Boring Terminated BY AUGER REFUSAL at Elevation 678.4 ft ON CRYSTALLINE ROCK
											NOTE: AASHTO CLASSIFICATIONS ON BORLOG ARE BASED ON FIELD DESCRIPTIONS.



WBS 17BP.10.R.53			TIP 17BP10R53			COUNTY CABARRUS			GEOLOGIST Stickney, J. K.							
SITE DESCRIPTION BRIDGE 12 ON SR 1442 (WINDY RD.) OVER EMERSON BRANCH									GROUND WTR (ft)							
BORING NO. B-4			STATION 14+19			OFFSET 11 ft LT			ALIGNMENT -EL-							
COLLAR ELEV. 693.8 ft			TOTAL DEPTH 20.9 ft			NORTHING 633,870			EASTING 1,485,215							
									0 HR. 17.1							
									24 HR. FIAD							
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550 88% 03/19/2014						DRILL METHOD H.S. Augers			HAMMER TYPE Automatic							
DRILLER Smith, C. L.			START DATE 04/21/14			COMP. DATE 04/21/14			SURFACE WATER DEPTH N/A							
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	L O G	SOIL AND ROCK DESCRIPTION		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)	
695																
														693.8	0.0	GROUND SURFACE
																ROADWAY EMBANKMENT
																BRN V. LOOSE MOIST TO WET SILTY SAND (A-2) W/ ASPHALT
690	689.8	4.0	0	1	1								M/W			
685	684.8	9.0	3	2	2								M/W		9.0	ALLUVIAL
																BRN-GRAY LOOSE MOIST TO WET CLAYEY SILTY SAND (A-2) W/ SOME MICA.
680	679.8	14.0	6	11	15								M		12.0	RESIDUAL
																BRN-GRAY MED. DENSE MOIST CLAYEY SILTY SAND (A-2) W/ LITTLE MICA
675	674.8	19.0	18	50	50/0.3								D		19.5	WEATHERED ROCK
														674.3	20.9	SEV. WEATH. CRYSTALLINE ROCK
														672.9		Boring Terminated BY AUGER REFUSAL at Elevation 672.9 ft ON CRYSTALLINE ROCK
																NOTE: AASHTO CLASSIFICATIONS ON BORLOG ARE BASED ON FIELD DESCRIPTIONS.

