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### STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

## STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 33245.1.1 (B-3705) F.A. PROJ. BRZ-2045(1)
COUNTY WAKE
PROJECT DESCRIPTION BRIDGE NO. 125 ON -L- (SR 2045) OVER
SMITHS CREEK

## INVENTORY REVISION

#### **CAUTION NOTICE**

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF PREPARING THE SCOPE OF WORK TO BE INCLUDED IN THE REQUEST FOR PROPOSAL. THE VARIOUS FELD BORING LOOS, ROCK CORPCS, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (9)9) 250-4088. THE SUBSURFACE PLANS, FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

SOIL AND ROCK BOUNDARIES WITHIN A BOREHOLE ARE BASED ON GEOTECHNICAL INTERPRETATION UNLESS ENCOUNTERED IN A SAMPLE. INTERPRETED BOUNDARIES MAY NOT NECESSARILY REFLECT ACTUAL SUBSURFACE CONDITIONS BETWEEN SAMPLED STRATA, AND BOREHOLE INFORMATION MAY NOT NECESSARILY REFLECT ACTUAL SUBSURFACE CONDITIONS BETWEEN BORNOS. THE LABORATORY SAMPLE DATA MAD THE IN SITU IN-PLACE) TEST DATA CAN BE RELED 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 MATER LEVELS OR SOIL MOISTURE CONDITIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE MATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS, INCLUDING TEMPERATURES, PRECIPITATION, MAY WIND, AS WELL AS OTHER MON-CLIMATIC FACTORS.

THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, OR THE OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONOMITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS RECESSARY TO SATISFY HIMSELF AS TO COMPTIONS 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.

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.

PERSONNEL W.F. GOFORTH

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T.T. WALKER

RAWN BY

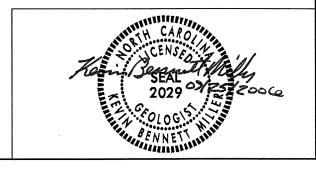
K.B. MILLER

INVESTIGATED BY K.B. MILLER

SUBMITTED BY \_\_\_ N.T. ROBERSON

005.....

AUGUST 2006



#### NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

#### DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

### SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS SOIL DESCRIPTION TERMS AND DEFINITIONS WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL AN INFERRE SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLICHT POWER AUGER, AND VIELD LESS THAN 1008 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AGSHTO T268, ASTM D-1586), SOIL CLASSIFICATION IS BASED ON THE AGSHTO SYSTEM, BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPON SAMPLER EQUAL TO OR LESS THAN 04 FOOT PER 60 BLOWS. IN NON-CORRISTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE POORLY GRADED)

GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES. ADUIFER - A WATER BEARING FORMATION OR STRATA ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. ANGULARITY OF GRAINS CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS: ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS. AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE: THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOVS PER FOOT IF TESTED. SUBANGULAR, SUBROUNDED, OR ROUNDED. WEATHERED ROCK (WR) R HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC. VERY STIFF, GRAY, SULTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6 ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL MINERALOGICAL COMPOSITION SOIL LEGEND AND AASHTO CLASSIFICATION AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE. MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KADLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE. GRANULAR MATERIALS WOULD YIELD SPT REFUSAL IF TESTED, ROCK TYPE INCLUDES GRANITE. DRGANIC MATERIALS MODED FIGHED AT PETIDATE IT ESTEEM HOUR TYPE INCLODES GRANTE,
ONEISS, GABBRO, SCHIST, ETC.

FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN
SEDIMENTARY ROCK THAT WOULD YELLD SYT REFUSAL IF TESTED. ROCK TYPE
INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.
COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD
COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD
SET REFEREND, ROCK TYPE INCLUDED. INTEGRATOR COMPANYED. CLASS. ( \$ 35% PASSING #200) > 35% PASSING #200 CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. A-2 NON-CRYSTALLINE ROCK (NCR) A-1. A-2 COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM CLASS. 1-- A-1-h 0-2-40-2-50-2-6 A-3 A-6. A-7 SLIGHTLY COMPRESSIBLE MODERATELY COMPRESSIBLE LIQUID LIMIT LESS THAN 31 LIQUID LIMIT EQUAL TO 31-50 LIQUID LIMIT GREATER THAN 50 COASTAL PLAIN SEDIMENTARY ROCK 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. SYMBOL SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED HIGHLY COMPRESSIBLE SHELL BEDS, ETC PERCENTAGE OF MATERIAL PASSING SII T-WEATHERING DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT MUCK, PEAT SILT - CLAY ROCKS OR CUTS MASSIVE ROCK. ORGANIC MATERIAL OTHER MATERIAL SOILS SDILS SOILS SDILS 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 \* 200 RACE OF ORGANIC MATTER 1 - 10% HORIZONTAL. 5 - 12% LITTLE 10 - 20% LIQUID LIMIT SOUS WITH MODERATELY ORGANIC 5 - 10% 12 - 20% DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF NP 10 MX 10 MX 11 MN 11 MN 10 MX 10 MX 11 MN 11 MN HIGHLY ORGANIC (V SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF 35% AND ABOVE THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. OF A CRYSTALLINE NATURE. GROUP INDEX Ø 0 0 4 MX 8 MX 12 MX 16 MX No MODERATE GROUND WATER FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE AMOUNTS OF ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO USUAL TYPES STONE FRAGS. FINE SOILS I INCH. OPEN JOINTS MAY CONTAIN CLAY, IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAY CRYSTALS ARE DULL AND DISCOLORED, CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS, WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING SILTY OR CLAYEY SILTY CLAYET OF MAJOR GRAVEL, AND FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. GRAVEL AND SAND SOILS SOILS MATERIALS SAND STATIC WATER LEVEL AFTER 24 HOURS SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN MODERATE  $\underline{\text{FLOAT}}$  - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOGGED FROM PARENT MATERIAL. GEN. RATING VPW. AIR TO PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY, ROCK HAS POOR EXCELLENT TO GOOD DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED POOR SUBGRADE FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY OM-SPRING OR SEEP PI OF A-7-5 SUBGROUP IS ≤ LL - 30 : PI OF A-7-6 SUBGROUP IS > LL - 30 ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL CONSISTENCY OR DENSENESS MISCELLANEOUS SYMBOLS FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN SEVERE AND DISCOLORED AND A MAJORITY SHOW KAGLINIZATION, ROCK SHOWS SEVERE LOSS OF STRENGTH RANGE OF UNCONFINED AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. THE FIELD. COMPACTNESS OR CONSISTENCY DPT DNT TEST BORING PRIMARY SOIL TYPE ROADWAY EMBANKMENT (RE) IF TESTED, WOULD YIELD SPT REFUSAL JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. WITH SOIL DESCRIPTION DESIGNATIONS (N-VALUE) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED SEVERE S - BULK SAMPLE LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. VERY LODSE AUGER BORING IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME LODSE SS - SPLIT SPOON EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. GRANULAR MEDIUM DENSE LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS ARTIFICIAL FILL (AF) OTHER MATERIAL SAMPLE IF TESTED, YIELDS SPT N VALUES > 100 BPF OTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN (NON-COHESIVE 30 TD 50 THAN ROADWAY EMBANKMENT VERY SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT ST - SHELBY TUBE VERY DENSE >50 THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAMENTS OF STRONG ROCK REMAINING, SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR SOILS USUALLY INDICATES POOR AFRATION AND LACK OF GOOD DRAINAGE. INFERRED SOIL BOUNDAR' VEDY COET PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN <0.25 O" MONITORING WELL RS - ROCK SAMPLE 0.25 TO 0.50 0.5 TO 1.0 GENERALLY SOFT 2 TO 4 VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. IF TESTED, YIELDS SPT N VALUES < 100 BPF NTERVENING IMPERVIOUS STRATUM. INFERRED ROCK LINE MEDIUM STIFF 4 TO 8 PIEZOMETER Δ 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. STIFF INSTALLATION ALLUVIAL SOTI, ROUNDARY VERY STIFF SAMPLE SCATTERED CONCENTRATIONS, QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS, SAPROLITE IS ROCK DUALITY 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 RUN AND (COHESIVE) 2 TO 4 SLOPE INDICATOR INSTALLATION  $\bigcirc$ ALSO AN EXAMPLE. HARD EXPRESSED AS A PERCENTAGE. ROCK HARDNESS RATIO SAMPLE TEXTURE OR GRAIN SI - SPT N-VALUE SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES J.S. STD. SIEVE SIZE SOUNDING ROD (REF)- SPT REFUSAL SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK. 0.25 DPENING (MM) 2,00 0.42 0.075 STILL - AN INTRUSTVE BODY OF IGNEOUS BOCK OF APPROXIMATELY UNIFORM THICKNESS AND CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED **ABBREVIATIONS** TREATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. COARSE TO DETACH HAND SPECIMEN. GRAVEL COBBLE SILT CLAY BOULDER AR - AUGER REFUSAL HI. - HIGHLY w - MOISTURE CONTENT SAND MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK, GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE (BLDR.) (COB.) (GR.) (SL.) (CL.) BT - BORING TERMINATED SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED VST - VANE SHEAR TEST CL. - CLAY MICA. - MICACEOUS GRAIN MM SIZE IN. 0.25 0.05 0.005 WEA. - WEATHERED

7 - UNIT WEIGHT CPT - CONE PENETRATION TEST MOD. - MODERATELY 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 CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT - NON PLASTIC DMT - DILATOMETER TEST ORG. - ORGANIC 7 - DRY UNIT WEIGHT CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE SOIL MOISTURE - CORRELATION OF TERMS A 2 INCH DUTSIDE DIAMETER SPLIT SPOON SAMPLER, SPT REFUSAL IS PENETRATION EQUAL TO OR LESS DPT - DYNAMIC PENETRATION TEST - PRESSUREMETER TEST POINT OF A GEOLOGIST'S PICK. SOIL MOISTURE SCALE GUIDE FOR FIELD MOISTURE DESCRIPTION e - VOID RATIO SAP. - SAPROLITIC CAN BE GROVED OR GOLIGED 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. (ATTERBERG LIMITS) DESCRIPTION - FINE FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE. SD. - SAND, SANDY FOSS. - FOSSILIFEROUS USUALLY LIQUID: VERY WET, USUALLY SL. - SILT, SILTY STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM GOUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. FRAC. - FRACTURED, FRACTURES SLI, - SLIGHTLY FROM BELOW THE GROUND WATER TABLE CAN BE CARVED WITH KNIFE, CAN BE EXCAVATED READILY WITH POINT OF PICK, PIECES 1 INCH (SAT.) FRAGS. - FRAGMENTS TCR - TRICONE REFUSAL LIQUID LIMIT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL. SEMISOLID: REQUIRES DRYING TO RANGE TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER. - WET - (W) EOUIPMENT USED ON SUBJECT PROJECT ATTAIN OPTIMUM MOISTURE PLASTIC LIMIT IERM THICKNESS SPACING BENCH MARK: BL-3 -L- STA. 25+35.94, 64.78' RT REBAR & CAP HAMMER TYPE: DRILL UNITS ADVANCING TOOLS VERY THICKLY BEDDED > 4 FEET MORE THAN 10 FEET 3 TO 10 FEET VERY WIDE - MOIST - (M) SOLID: AT OR NEAR OPTIMUM MOISTURE AUTOMATIC MANUAL OPTIMUM MOISTURE 1.5 - 4 FEE THICKLY BEDDED CLAY BITS ELEVATION: 200.85 FT. MOBILE B-SHRINKAGE LIMIT THINLY BEDDED 0.16 - 1.5 FEET MODERATELY CLOSE 1 TO 3 FEET 0.03 - 0.16 FEET 0.008 - 0.03 FEET VERY THINLY BEDDED 6° CONTINUOUS ELIGHT AUGER REQUIRES ADDITIONAL WATER TO NOTES: THICKLY LAMINATED - DRY - (D) BK-51 VERY CLOSE LESS THAN 0.16 FEET ATTAIN OPTIMUM MOISTURE 8" HOLLOW AUGERS П-в\_ THINLY LAMINATED < 0.008 FFFT INDURATION PLASTICITY HARD FACED FINGER BITS CME-450 -N\_Q FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC. PLASTICITY INDEX (PI) DRY STRENGTH TUNG .- CARBIDE INSERTS \_\_-H\_\_\_\_ RUBBING WITH FINGER FREES NUMEROUS GRAINS NUNE VELL 0~5 6-15 VERY LOW CME-550 FRIABLE CASING W/ ADVANCER LOW PLASTICITY GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE. HAND TOOLS: MEDIUM MED. PLASTICITY 16-25 PORTABLE HOIST TRICONE GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; POST HOLE DIGGER HIGH PLASTICITY HIGH MODERATELY INDURATED 26 OR MORE BREAKS EASILY WHEN HIT WITH HAMMER. HAND AUGER TRICONE CME-550X GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; SOUNDING ROD INDURATED CORE BIT DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY) DIFFICULT TO BREAK WITH HAMMER. VANE SHEAR TEST MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE. SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE: EXTREMELY INDURATED

SAMPLE BREAKS ACROSS GRAINS.

PROJECT REFERENCE NO.

33245.I.(B-3705)

SHEET NO.



## STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT SECRETARY

August 18, 2006

STATE PROJECT:

33245.1.1 B-3705

FEDERAL PROJECT:

BRZ-2045(1)

COUNTY:

Wake

**DESCRIPTION:** 

Bridge No. 125 on -L- (SR 2045) over Smiths Creek

SUBJECT:

Geotechnical Report – Structure Inventory Revision

#### **Site Description**

The original proposed structure has been redesigned by the Structure Design Unit. This Structure Inventory report supercedes the report dated August 15, 2005. No additional borings were performed for the completion of this report.

The proposed structure is comprised of three 50.5' wide spans, 2 at 50' and 1 at 70' in length. The project is located in Wake County approximately three miles southwest of the town of Wake Forest. The proposed bridge is on a 115° skew and will replace the existing structure on new location. The existing structure will be used to maintain traffic during construction.

During the month of April 2005, borings were advanced via hollow stem augers using a CME-550X drill machine equipped with an automatic hammer. Three Standard Penetration Tests borings were performed at each bent location. All borings were advanced to either weathered or crystalline rock. Representative soil samples were collected for visual classification in the field and for laboratory analysis. Six borings were cored using a NQ core barrel. Seven rock core samples were submitted for laboratory analysis.

### **Physiography and Geology**

The project is located in rolling terrain within the Piedmont Physiographic Province. The area is highly developed with some commercial property, but mostly single family dwellings in large subdivisions. Geologically the site lies within the Raleigh Belt and is located in an area predominately composed of granitic intrusions associated with the Pennsylvanian to Permian age Rolesville Batholith. The Rolesville Batholith is a north-south trending granite pluton approximately 650 mi<sup>2</sup> in size.

MAILING ADDRESS:

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WEBSITE: WWW.DOH.DOT.STATE.NC.US

LOCATION:
CENTURY CENTER COMPLEX
ENTRANCE B-2
1020 BIRCH RIDGE DRIVE
RALEIGH NC

SHEET 3 33245.1.1 B-3705

#### **Soil Properties**

Soils encountered at the project site include roadway embankment materials, alluvial sediments and residual soils.

Roadway Embankment material was encountered at End Bent 1 and 2 along the existing alignment. This material consists of approximately 10 feet of medium stiff to stiff, silty/sandy clay (A-7, A-6) and loose, clayey sand (A-2-6).

Alluvial soils at the site are primarily composed of 10 to 13 feet of very loose to medium dense, sand with some gravel (A-2-4, A-1-b). However, locally 5 to 7 feet of very soft to soft, clayey/sandy silt and sandy clay (A-4, A-6) occur above the alluvial sands.

Residual soils primarily consist of up to 15 feet of medium dense to very dense sand (A-2-4, A-1-b).

### **Rock Properties**

Weathered granite was encountered in all borings at elevations 180.2 to 168.4 feet and ranges in thickness from 6 to 22 feet.

Crystalline rock, granite, is present in all borings except EB1-B and EB2-B. Top of crystalline rock ranges from 165.1 to 157.5 feet with the shallowest occurrence being at B2-A. A potential granite boulder was encountered in B1-A at elevation 173.7 and was approximately 3 feet thick. Core borings were performed at all interior bent locations to evaluate rock type and competency. Core Recovery (REC) ranges from 85% to 100%. Rock Quality Designation (RQD) ranges from 52% to 84%. Laboratory tests of the granite show compressive strengths from 2.17 ksi to 12.47 ksi and a unit weight ranging from 155.1 lb/ft<sup>3</sup> to 168.8 lb/ft<sup>3</sup>. More detailed descriptions may be found in the Core Boring Report.

### Groundwater

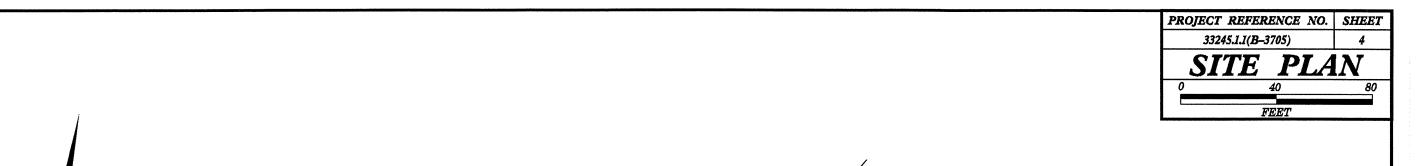
Groundwater at the site was measured at elevations 188.7 to 186.4 feet at the time of the investigation. The surface water of Smiths Creek was noted at elevation 187.1 feet in May 2005.

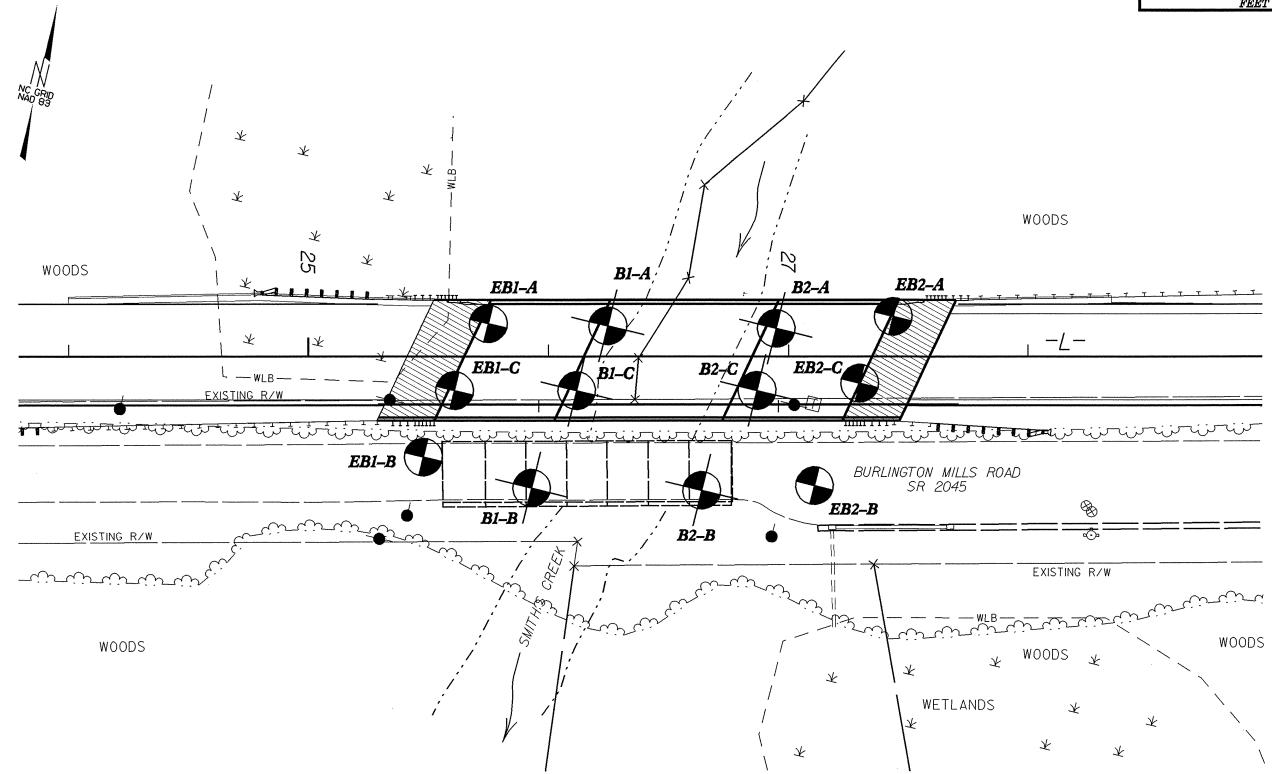
#### Notice

This report is based on the bent locations provided in the memo "Request for Foundation Recommendations" and the Preliminary General Drawing dated June 1, 2006 and the Bridge Survey and Hydraulic Design Report dated June 6, 2006. If significant changes are made in the design, or location of the proposed structure, the subsurface information should be reviewed and modified as necessary.

Kevin B. Miller, LG

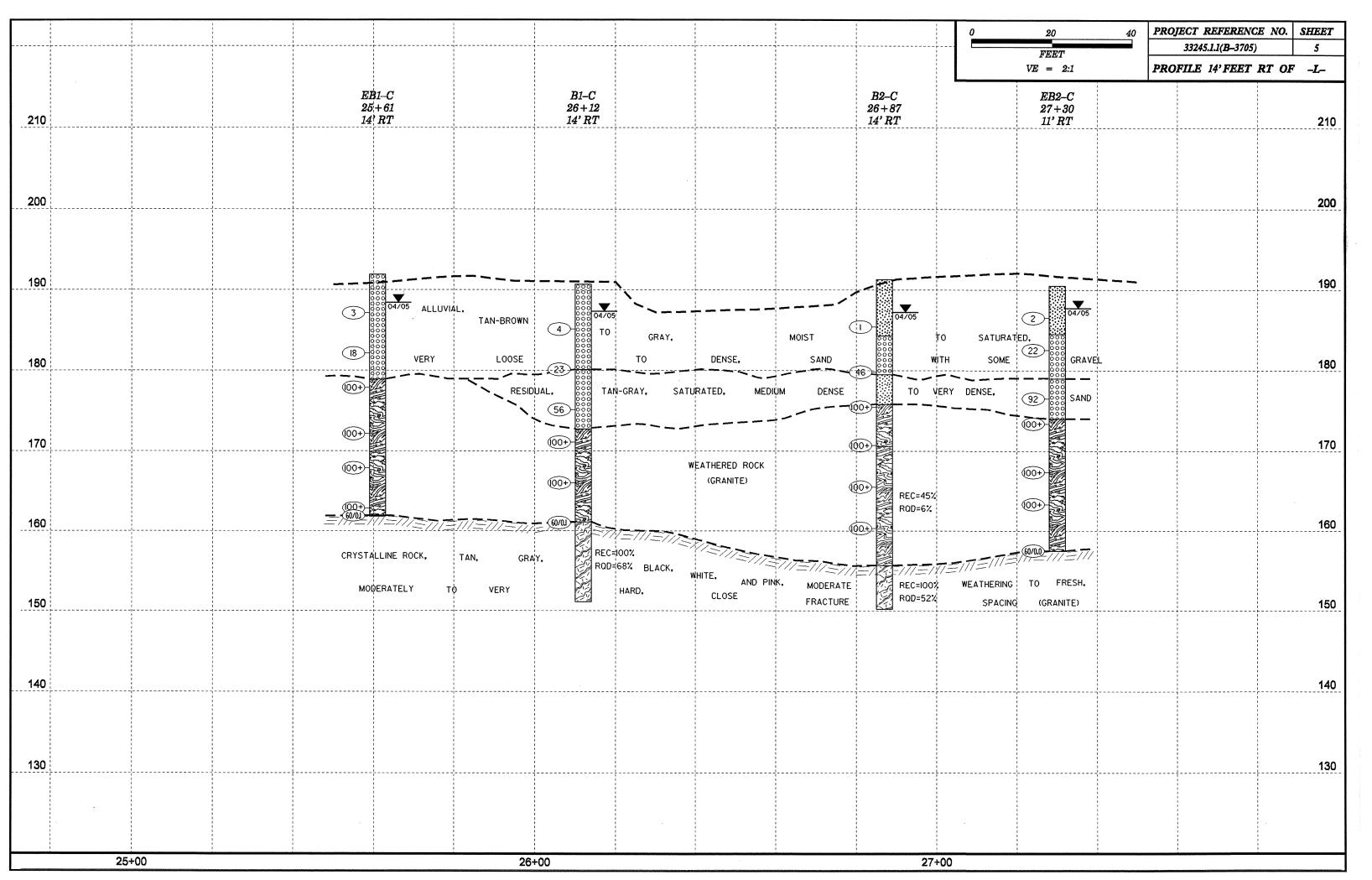
Project Geological Engineer

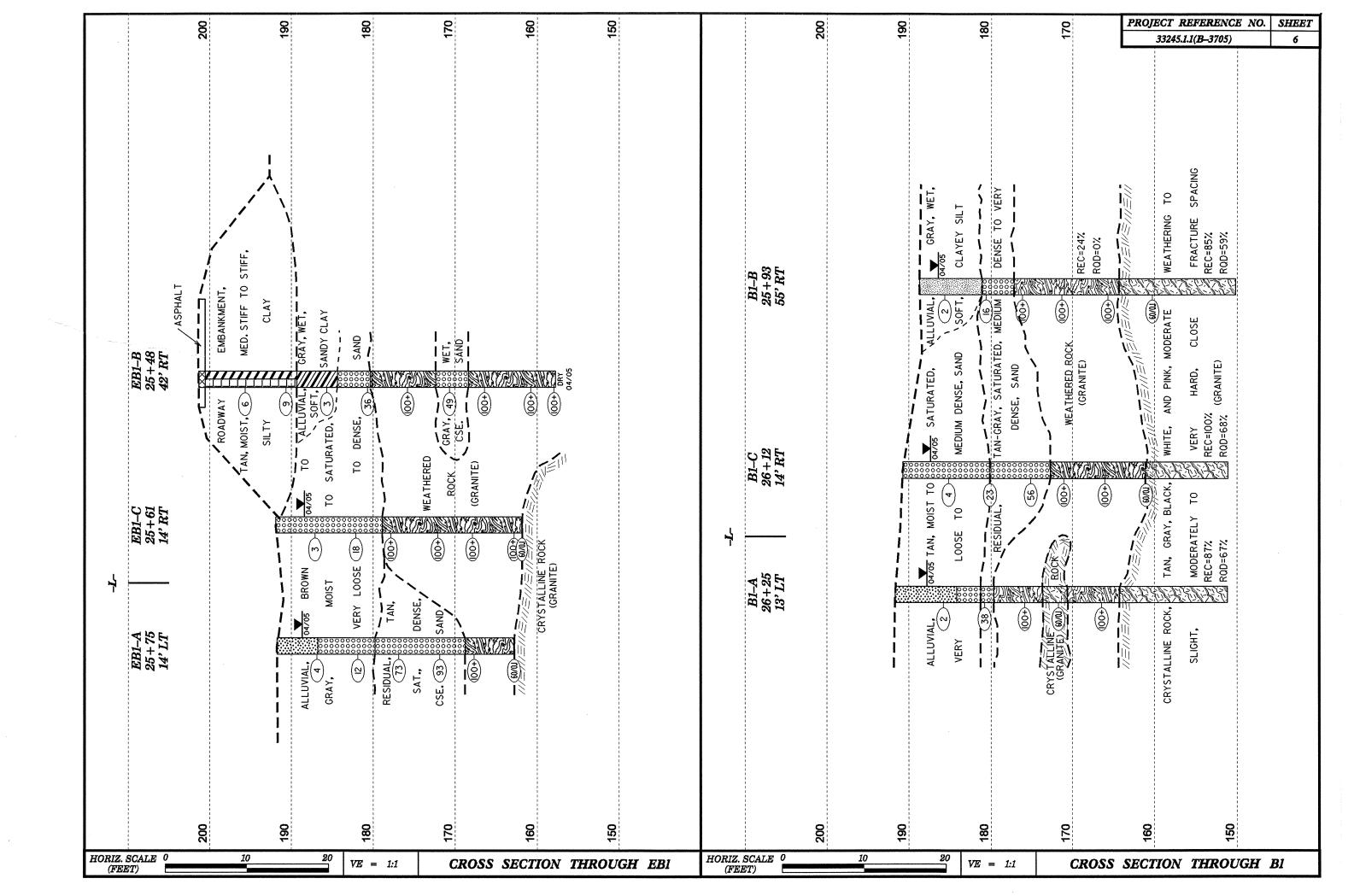


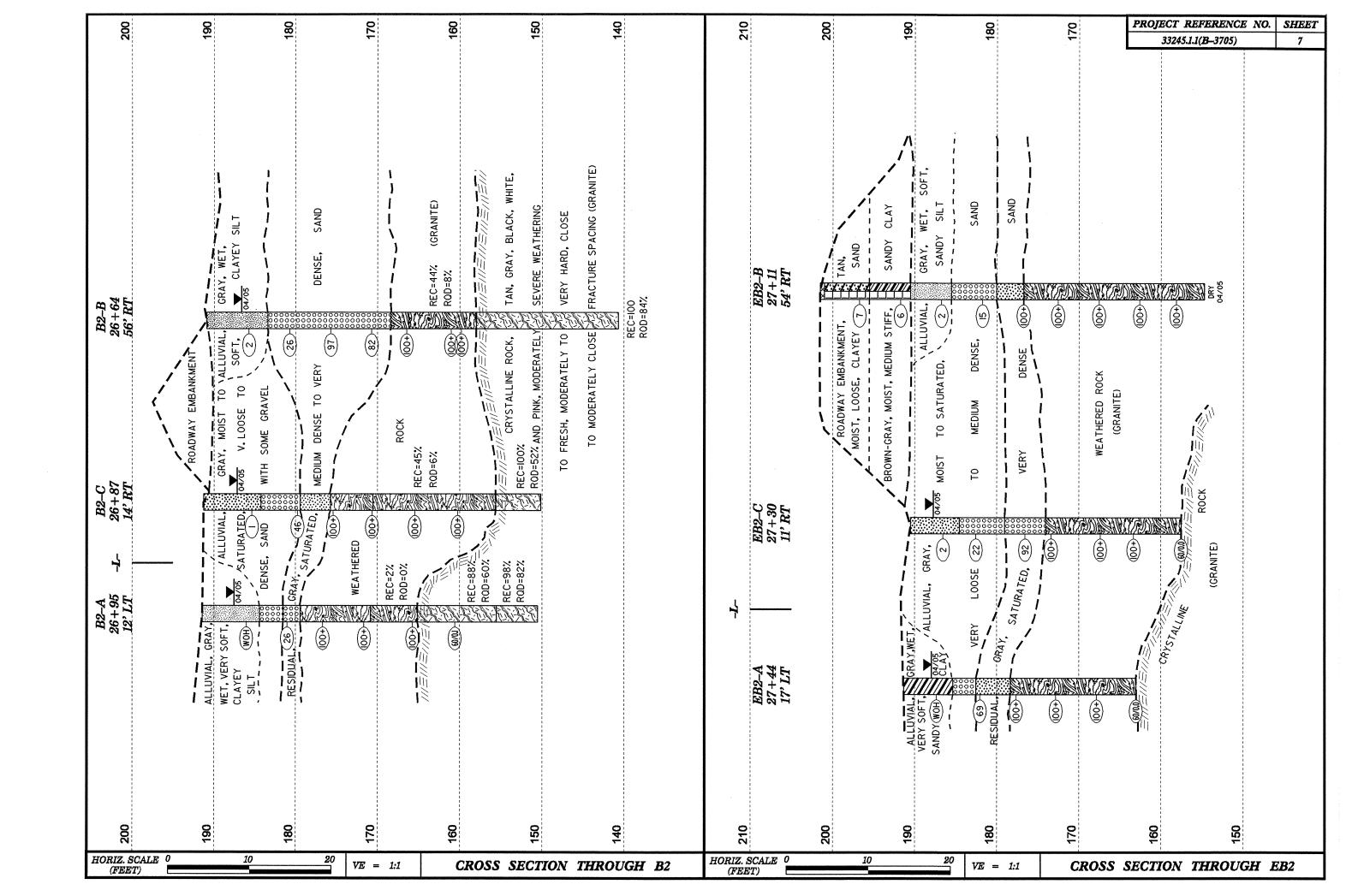


NOTE: EXISTING PRIVATE 2" SAN. SEWER LINE ALONG EDGE OF PAVEMENT TO US #1.

NOTE: TERMINUS OF 2" PVC SEWER PAST BRIDGE IS UNKNOWN.







north carolina department of transportation horth carolina department of transportation GEOTECHNICAL UNIT BORING LOG

GEOTECHNICAL UNIT BORING LOG SHEET 8

DDOIDOT NO 33045 III	B-3705 <b>COUNTY</b> WAKE	GEOLOGIST W.F. GOFOR	RTH PROJECT NO. 332	0/511 In P-3705	COLINTY IN A IZE	SHEET 8
					COUNTY WAKE	GEOLOGIST W.F. GOFORTH
	5 ON -L- (SR 2045) OVER SN		GROUND WATER SITE DESCRIPTION		(SR 2045) OVER SMITHS CRE	
BORING NO. EBI-A BORING LOC			O HR. 3.2' BORING NO. EBI-		5+61 <b>OFFSET</b> 14' RT	ALIGNMENT -L- 0 HR. 3.9'
	NORTHING 789577'		24 HR. 3.1' COLLAR ELEVATION		789547' <b>EASTING</b>	2137791' <b>24 HR.</b> 3.5'
			PE AUTOMATIC TOTAL DEPTH 30.			
	<del></del>		ROCK 28.9' START DATE 4/2		<del></del>	4 .
ELEV. DEPTH BLOW COUNT PEN (FT.) 0.510.510.516T.		SAMPLE O SOIL AND DESCRIPT		BLOW COUNT PEN. BLOW 25 25	S PER FOOT SAMPLE TO THE SAMPLE NUMBER	SOIL AND ROCK DESCRIPTION
+			+ 1			
191.8		222	191 <b>.</b> 9 <del>†    </del>			000
190.0 $+$		ALLUVIAI ALLUVIAI	AL.   190.0 +			000
+ 3.9   1   2   2   1.0		BROWN, SILTY	( CAND     +	3 2 1 1.0 1 +-		✓ S S S ALLUVIAL.
		000	<u>†</u>	3+-		S (888) ALLUVIAL,
185.0 +	1	0000	185.0 +			GRAY, SILTY COARSE SAND
+ 8.9 3 5 7 I.0		S 888 GRAY, COARSI	SE SAND    + 8.8	7   6   12   1.0		S SSS
180 0 ±	-       -	000				000
180.0 + 17.0   07.1   07		S (000)	180.0 + 17.0	05 15 0 5 5		ŏŏŏ <i>\$00</i>
		RESIDU	ΠΔΙ ‡ 13.8	85   15   0.5	+	
175.0 ‡		000	175.0 +			
± 18.9   22   33   60   1.0		S 👸 TAN, SAPROLITIC, SILT	11 1	32 68     1.0   + -		
	93.\	000			_   _   _	WEATHERED DOOK (CDANITE)
170.0 +		000	170.0 +			WEATHERED ROCK (GRANITE)
<u>+ 23.9 100    0.4</u>	1 <u>0</u> 0+-*		± 23.8	77   23     0.5	<u></u>	
165.0 +		WEATHERED ROCK	K (GRANITE)   165.0 +			
28.9 60 0.1		WEATHERED ROCK	los.0 + 28.8	56 44 0.6 = = = = = = = = = = = = = = = = = = =		WEATHERED ROCK (GRANITE)
	SPT REFUSAL AT ELEVATION	CRYSTALLINE ROO	OCK (GRANITE) 7 30.0			CRYSTALLINE ROCK (GRANITE) /
160.0 +	162.8 FEET IN CRYSTALLINE				REFUSAC AT	CRISTALLINE ROCK (GRANITE)
<del> </del>	ROCK (GRANITE)				DN_16[8 FEET_IN_	
					TALILINE TROCK TO THE	
155.0 +			155.0 +		GRANITEX	
150.0 ‡			150.0 +			
			±			
145.0 +	<del>   </del>		145.0 +			
<u> </u>						
140.0 +			140 0 <del>I</del>			
170.0 <u>+                                     </u>			140.0 +			
<del> </del>						
135.0 +			135.0 +			
130.0 +			130.0 +			
	<del>                   </del>		±			
125.0 +	1		125 0 ±			
125.0			125.0 +			
			‡			
120.0 ‡			120.0 +			
115.0 +			115.0 +			
		1 1 1			T	1 1

																		_
l M	M O	RT	H	C	A	RO		NA		EP A	RT	MEN	T (0	T	R/	anspo	RTATIO	N
					G	E(	T	EC		CAL	. V	TIM	BOR	ING	i [	LOG	SHEET 9	)
PROJE	IECT N	<b>NO.</b> 3	324	15.1.1	,I		ID. E	3-37	705	COUN	TY	WAKE		GE	OLO(	GIST W.F. GOF	ORTH/M.D. VALIO	
SITE D											)45) (		SMITHS C					ID WATER
		O. EE				************	LOC			+48 '89517	,	OFFSET	42' RT EASTIN			<b>MENT</b> -L- 7785′	0 HR.	
TOTAL									CME-550			ILL MET	HOD H.S.				24 HR. MER TYPE AUTO	
START									ON DATE				RFACE WAT				PTH TO ROCK N	
	v.	DEPTI							BLOWS				SAMPLE			SOI	AND ROCK	
		(FT.)	0.	<u>.510</u>	) <u>.5</u> (	<u>0.51</u>	(FT.)	Ų —	25 ————	50	7	5 10	NUMBER	MOI.	Ğ	DE	SCRIPTION	
201.4	. , ]	_															•	
)	#							FF	== ‡ = =	=					K	\	ASPHALT	
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, ‡	-	4.7 -	2	·   `	3	3	1.0	-	6				SS-6	M	H	ROAD	WAY EMBANKMENT	IT,
· .	‡	<u>-</u>			l					-					B	TAI	, SILTY CLAY	
)	1	9.7	3	3   1	4	5	1.0	-	(-9-				SS-7	M	B			
#	-							悍	'	==							ALLUVIAL,	
Ė	-	14.7	'   2	2   3	2	1	1.0	-   X-3					SS-8	М		GRA	Y, SANDY CLAY	
+	-								$\leq 1$						000	GRAY, COA	RSE SAND WITH	WOOD
<u></u> ‡		19.7	'   3	3   1	13	23	1.0		36	<del></del>			SS-9	1	000		FRAGMENTS	
) <del>-</del>	1	-								<u> </u>						CP/	RESIDUAL, Y, SILTY SAND	,
+		24.7	7   17	7   5	55	45	0.7					= - = - = - = - = - = - = = = =						
) -	†	<del></del> -							==							WEATHE	RED ROCK (GRANI	NITE)
-	Ī	29.7	7 3:	1 3	35	14	1.0	F =			19 – –		SS-10	W	000		RESIDUAL,	
)	+	<b></b>								1 -					000000000000000000000000000000000000000	GRAY	, COARSE SAND	
主 3	- 3	34.7	7 88	8   1	12		0.5	=		====		 	kl					
' 寸	ŀ	<del>-</del>						-							S	WEATHE	ED DOOK (CDANIII	ITC\
‡	-	39 <b>.</b> 7	7 19	9   5	55	45	0.8			_		 -100+->				WEATHER	ED ROCK (GRANI)	IIE)
) +	_							=							CAN TO PLACE A REPORT OF THE PARTY OF THE PA			
+	<u></u> '	40.C	3 10	שי	$\dashv$		0.3		BORING	TEDE		<u> </u>	<u> </u>	<del> </del>				
) <del>-</del>	†		-					1 1	EVATIO	1								
	1	_			-			F =		HEBE								
50.0	.0 +	_	***************************************						l l	GRAN								
	‡	_						-		=								
45 <b>.</b> 0	Lo I	_						<u>  -</u>										
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10 <b>.</b> C	·•	<u>-</u>			l			<u>                                   </u>		<u>-</u>								
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PROJEC	PROJECT NO. 33245.I.I ID. B-3705 COUNTY WAKE GEOLOGIST W.F. GOLFORTH/M.D. VALIQUETTE DESCRIPTION BRIDGE NO. 125 ON -L- (SR 2045) OVER SMITHS CREEK GROUND WATER															
SITE D	ESCF	RIPTION	BF	RIDGI	E NO	). 125	ON -						REEK			GROUND WATE
BORING							ATION	26+25		OFFSET	13				MENT -L-	0 HR. 4.5′
		LEVATION		191.7			ORTHIN					EASTING			7846′	<b>24 HR.</b> 3.9′
		PTH 40					INE CM			RILL MET						PE AUTOMATIC
STAKT		TE 4/ Depth						DATE 4/ LOWS P				CE WATI	EK DEI	7.	T	ROCK 27.4'
ELE'	١.	(FT.)				1 1					O N	AMPLE UMBER	MOI	- G	SOIL AND DESCRIP	
191.7	+	-						- <del> </del> - <del> </del>	<u> </u>							
190.0	1							1					•		ALLUVIA	AL,
185.0	1	4.9	WOH	1	1	1.0	X2-						\$	000	TAN-GRAY, SIL	.TY SAND
	#	9.9	10	19	19	1.0		- - - - - - - - - - - - - - - - - - -	- - 				S	000		
180.0	#	<del></del> -						- <del> </del> - <del>1</del>							RESIDUAL, GRAY,	CUARSE SAND
175.0	#	14.9	31	50	50	0.8				(±00t					WEATHERED ROC	CK (GRANITE)
170.0	‡	19.9	60			0.1				0/0.1>					CRYSTALLINE RO	OCK (GRANITE)
170.0	1	_ : : 25 <b>.</b> 0	100			0.5				- IOO+>					WEATHERED RO	CK (GRANITE)
165.0 160.0 155.0												RS-7			CRYSTALLIN TAN-GRAY, BLAC MODERATE TO WEATHERING, MODE HARD, CLOSE FRAC (GRANITE REC=87%	K AND PINK, /ERY SLIGHT RATE TO VERY CTURE SPACING
150.0	#	<b>-</b>					1	NG TEE	1	1						
145.0	+	<del></del>					1	CRYSTA	1	1 1						
140.0	+	- -														
135.0	#	- -														
130.0	#	<b></b>														
125.0	+	-			1											
120.0	<del>-</del>	-														•
115.0	‡	-														

	CORE BORING REPORT PROJECT: 33245.1.1 ID: B-3705 COUNTY: WAKE BORING NO: B1-A														
PRC	JECT:	33245.1	1.1	ID:	B-3	705	COUNTY:	WAKE	BORING NO: B1-A						
DES	CRIPTIC	ON: BRID	GE NC	). 125 C	DN -L- (	SR 2045)	OVER SMITHS CREEK								
LOC	ATION	OF BORIN	NG: <u>-L-</u>	26+25	13' LT			-	COMPLETION DATE: 4/26/2005						
COL	LAR or	GROUND	ELEV	ATION:	191	.7ft	CORE SIZE: NQ	GEOLOG	SIST: W. F. GOFORTH						
COF	RE EQUI	PMENT:				СМЕ	-550X	DRILI	LER: R. NORWOOD						
		DRILL		REC	RQD										
	DEPTH	RATE	RUN	(ft)	(ft)	SAMPLE		FIELD CLASSIFICATION and	I REMARKS						
(ft) 171.7	(ft) 20.0	(min/ft) 0:46	(ft)	(%)	(%)	NUMBER	Weathered Rock (Granite)								
		0:32		,			·		·						
		0:23 0:37	5.0	0.0 0%	0.0 0%										
166.7	25.0	0:23					SPT drive 25.0-25.5 (100/0.5)								
166.2	25.5	1:05 0:55					27.4'- Crystalline Rock, Tan-gray	black pink modrate to very sli	aht weathering moderately to year hard close						
	2:13 5.0 3.5 3.0 fracture spacing, granite 70% 60%														
464.0	1:58 70% 60% RS-7 RS-7														
161.2	Crystalline Rock, Tan-gray, black, pink, modrate to very slight weathering, moderately to very hard, close														
		1:16					fracture spacing, granite								
		1:58 2:49	5.0	4.8 96%	2.6 52%										
156.2	35.5	1:57			<b>02</b> //0										
156.2	35.5	1:50													
		3:45 3:59	5.0	4.7	4.4										
		4:09		94%	88%										
151.2	40.5	5:1 <b>0</b>													
									•						
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	ľ														
	ŀ														
								T E I E VATION OF 454 2 EEE7							

PROJECT					1	3-3705		DUNTY	WAK					GIST W.F. GOLFORTH/	<del></del>
SITE DESC								2045			SMITHS				GROUND WATE
BORING 1					G LOC		26+12		OF	FSET	14' RT			MENT -L-	0 HR. 3.0'
COLLAR			190.7			ORTHING	7895 FEAV			- There	EASTIN			7840′	24 HR. 3.4'
TOTAL D						INE CME- LETION DA					IOD CORE				PE AUTOMATIC ROCK 29.6'
	DEPTH						OWS P			Jour	SAMPLE		7 L	SOIL AND	
ELEV.	(FT.)				1 1			50	75	100	NUMBER	MOI	Ō G	DESCRIP	
	‡ ‡														
198:3 -	<b>‡</b>					<del> </del>				==			0000		
105.0	‡ ‡ 4.6	3	2	2	1.0				<u> </u>			<b>▼</b> S	00000	ALLUVIA	L,
185.0 -	Ŧ												00000	TAN, SILTY CO	ARSE SAND
180.0 -	9.6	5	8	15	1.0		23					S	00000		
	‡ ‡ 14 <b>.</b> 6	15	25	31	1.0						SS-19	S	00000	RESIDU	
175.0 -	‡							¥-56					0000	GREEN-TAN, COA	AKSE SAND
170.0 -	19.6	100			0.5				- <u> </u> -	 +-X					
	‡							 						WEATHERED ROCI	(GRANITE)
165.0 -	<u>+</u> 24 <b>.</b> 6	שטון			0.2			<u> </u>	- +00	<del>                                    </del>				WEATHERED HOOK	
100.0	‡ ‡ 29 <b>.</b> 6	60			0.1				-6076	 				CRYSTALLINE	BUCK
160.0 -	Ŧ							Ī	]					TAN, GRAY, BLAC	K, AND PINK,
155.0 -	<u>‡</u>										RS-6			MODERATE TO SLIG MEDIUM HARD TO	
	<u> </u>								]					FRACTURE (GRANI	
150.0 -	$\pm$					1 1	IG_TEE	1	1	1				REC=100% F	. /
145.0 -	<u>‡</u>					1 1	VAJUO ATSYS	i	i	1					
140.0	<u>‡</u>							NITET.	1						
140.0 -	Ŧ							[							
	Ŧ														
135.0 -	Ŧ								1						
130.0 -	<u>‡</u>														
150.0	‡								-						
125.0 -	<u> </u>														
	+			,											
120.0	<del> </del>														
	‡								1						
115.0	Ŧ														

	CORE BORING REPORT  PROJECT: 33245.1.1 ID: B-3705 COUNTY: WAKE BORING NO: B1-C														
PRO	JECT:	33245.1	<u>1.1</u>	ID:	B-3	705	COUNTY:	WAKE	BORING NO: B1-C						
DES	CRIPTIC	ON: BRID	GE NO	). 125 (	DN -L- 1	(SR 2045)	OVER SMITHS CREEK								
						(0.1. 20 10)									
LOC	ATION	OF BORIN	NG: <u>-L-</u>	26+12	14' RT				COMPLETION DATE: 4/25/2005						
COL	LAR or	GROUND	ELEV	ATION:	190	.7_ft	CORE SIZE: N	IQ GEOL	.OGIST: W. F. GOFORTH						
COF	RE EQUI	PMENT:				СМЕ	E-550X	DF	RILLER: R. NORWOOD						
		DRILL		REC	RQD										
ELEV (ft)	DEPTH (ft)	RATE (min/ft)	RUN (ft)	(ft) (%)	(ft) (%)	SAMPLE NUMBER		FIELD CLASSIFICATION	and REMARKS						
161.1	29.6	0:23	(19	(,0)	(10)		Crystalline Rock, Tan, gray, bl	ack, pink, moderate to slight w	eathering, medium hard to hard, close fracture						
		0:29					spacing, granite								
		0:25 0:37	5.0	5.0 100%	1.8 36%										
156.1	34.6	0:37		100%	30%										
156.1	34.6	1:03				RS-6									
		2:03	E.	E.	F.0			•							
151.1															
									•						
									•						
						,									
							·								
									1						
	L						DODELIO E TEDI MILITARI	ATEL EVATION OF 15: -	EET IN DOOM						
i							BOKEHOLE LEKMINATE	DATELEVATION OF 151.1 F	EE I, IN ROCK.						

	PROJECT NO. 33245.1.1 ID. B-3705 COUNTY WAKE GEOLOGIST W.F. GOLFORTH/M.D. VALIQUETTE													
<u></u>									WAKE .			<u>OLO</u>	GIST W.F. GOLFORTH/	
SITE DESC									OVER S			1037	NED YM	GROUND WATER
BORING N	·					ATION	25+93		OFFSET	55′ RT			MENT -L-	0 HR. 1.4'
COLLAR E	<del></del>		88.7			ORTHING INE CM			RILL METH	EASTING			7831'	PE AUTOMATIC
START DA							DATE 4			FACE WATI				ROCK 24.4'
START DA	DEPTH						LOWS F			SAMPLE			SOIL AND	
ELEV.	(FT.)	•						50		NUMBER	моі.	0	DESCRIP	
188.7		0.5	0.5	0.5		<del></del>						70.55		
-	2.1	WOH	1	1	1.0			<del></del>			<b>Y</b>		ALLUVI	ΙΔΙ .
185.0							-}	]			S			
	71	7	6	10				<del> </del>					GRAY, CLAYE	i SILI
180.0	7.1		б	10	1.0	<u> </u>	16			SS-13	S	000	RESIDL	 JAL <b>.</b>
_	-							<u> </u>				0000	GRAY, COARS	
175.0	12.1	100			0.9				- <del>- 100+</del> X					
113.0								<u> </u>						
-	17.1	100			0.6			-	-  -				WEATHERED ROO	CK (GRANITE)
170.0	<del>-</del>							ļ					"CATTIENCED NOC	ZIC TORRATE Z
-	1 2/2 7	100				ļ			-   - - 00+-X				REC=24%	RQD=0%
165.0 -	22.7	ששו			0.7	E	-]						*	
-							-}						CRYSTALLIN	
160.0 -	28.4	60			0.1		-	<del> </del>	6020.LX				GRAY, BLACK, WH	
_	Ė						+						MODERATE WEATHERING, MOD	
155.0	<u> </u>							Ī	-	RS-2			TO HARD, CLOSE FR	
155.0									]				(GRAN	
-								ļ·					REC=85%	
150.0						COR	ING TE		ED_AT_			@ J _		
-						1	1	1	EEET_					
145.0 -	_					1		1	ROCK_					
_						<u> </u>	•	ANTET.						
140.0 -	_						-	<u> </u>	-					
_	-								-					
135.0								1						
155.0	<u> </u>							<u> </u>						
1700	<del> </del>							<del> </del>						
130.0	-								<del>  </del>					
														•
125.0	_					<u> </u>								
-	-						+	<del></del>						
120.0	_					<u> </u>	+	<del></del>						
	_						<del></del>	<del></del>						
1150	_				.		<del>-</del> <del></del>	<del> </del> -	71					
115.0	<u> </u>							<u> </u>						
	_								1					
110.0 -	<del> -</del>  -							<del></del>						
[	L				<u> </u>					<u> </u>	L	لــــا		

							SHEET 12							
			·			С	ORE BORING REPORT							
PRC	JECT:	33245.1	1.1	ID:	B-3		COUNTY: WAKE BORING NO: B1-B							
DES	CRIPTIC	ON: BRID	GE NC	). 125 C	DN -L- (	(SR 2045)	OVER SMITHS CREEK							
						•								
LOC	ATION (	OF BORIN	NG: <u>-L-</u>	25+93	55' RT		COMPLETION DATE: 4/20/2005							
COL	LAR or	GROUND	ELEV	ATION:	188	.7_ft	CORE SIZE: NQ GEOLOGIST: W. F. GOFORTH							
COF	RE EQUI	PMENT:				СМЕ	E-550X DRILLER: R. NORWOOD							
<u> </u>	I	DRILL	I	REC	RQD									
•	DEPTH	RATE	RUN	(ft) (%)	(ft) (%)	SAMPLE NUMBER								
(ft) 171.0	(ft) 17.7	(min/ft) 0:23	(ft)	(70)	(70)		Weathered Rock (Granite)							
		0:29												
		0:25 0:37	5.0	1.2 24%	0.0									
166.0	22.7	0:47					SPT drive 22.7-23.4 (100/0.7)							
165.3	23.4	1:03 2:03					24.4'- Crystalline Rock, Gray, black,white, pink, moderate to slight weathering, moderately hard to hard, close							
		1:02	5.0	4.0	3.3		fracture spacing, granite							
160.3	160.3 28.4 1:28 SPT drive 28.4-28.5 (60/0.1) SPT drive 28.4-28.5 (60/0.1)													
160.2	· · · · · · · · · · · · · · · · · · ·													
		2:18 1:47	5.0	4.5	2.7									
		1:47	5.0	90%	54%	RS-2								
155.2	33.5	1:11												
155.2	33.5	1:24 1:59												
		1:11	5.0	4.2	2.9									
150.2	38.5	2:14 2:42		84%	58%									
ļ														
İ														
<b></b>														
	1		<u></u>	L			BOREHOLE TERMINATED AT ELEVATION OF 150.2 FEET, IN ROCK.							

PROJECT	<b>NO.</b> 3	3245				3-3705		OUNTY	WAKE				GIST W.F. GOLFORTH/	M.D. VALIOUETTE
	CRIPTION			E N						MITHS CI		0.00	TOTAL	GROUND WATER
BORING	<b>NO.</b> B2	2-A	В	ORIN(	G LOC	ATION	26+95		OFFSET	12' LT	AL	IGN	MENT -L-	0 HR. 3.6'
COLLAR	ELEVATI	ON	191.4	· ,	N	ORTHING	7896	504′		EASTING	G 2	213	7915′	<b>24 HR.</b> 3.9′
	DEPTH 4					INE CME-			·	IOD CORE				PE AUTOMATIC
START I	DATE 4					ETION DA				FACE WAT	ER DEP	TH	N/A DEPTH TO	<b>ROCK</b> 26.3′
ELEV.	DEPTH (FT.)	1						ER FO		SAMPLE NUMBER	MOI.	O G	SOIL AND DESCRIP	
191.4	<u> </u>	-										387491		
190.0	<u> </u>	WOH	IIWOH	WOH	10						<b>Y</b>		ALLUVIA GRAY, CLAYE	
185.0	<u>+</u> '''	"01		"0"	1.0	* WOH-				MS-2	42.3%	000		
180.0	+ 9.4 +	8	14	12	1.0		X-2-6			SS-17	S		GRAY, CSE. SAND W RESIDUAL, GRAY,	
175.0	14.4		40		0.7				X				WEATHERED ROO	CK (GRANITE)
170.0	19.4	53	47		0.8				_100±X				REC=2% RC	D=0%
165.0	<u>+</u> 25.6 <u>+</u>	100			0.2				<u> 100+</u>	RS-3			CRYSTALLIN	E ROCK,
160.0	± 30.8	60			0.1				 50ZQ.TX 				TAN, GRAY, MODERAT SLIGHT WEATHERING HARD, CLOSE FRAC	G, MODERATELY
155.0	<u>+</u> +	-											(GRAN REC=88%	
150.0	<del>-</del>					1 1		 MINATE _150.5	D_AT_ FEET_			27	GRAY, BLACK, WHITE, SLIGHT WEATHERIN	
145.0	‡					NCF	RYSTAL _(GRA	TINE T	OCK				HARD TO HARD, CL SPACI (GRAN	OSE FRACTURE NG
140.0 -	<del> </del>												REC=98%	,
135.0 -	<u>+</u> <u>+</u>													
130.0 -	<del> </del> 													
125.0 -	<del> </del> 			,										
120.0 -	<del> </del>  -  -													
115.0 -	<u>‡</u>													

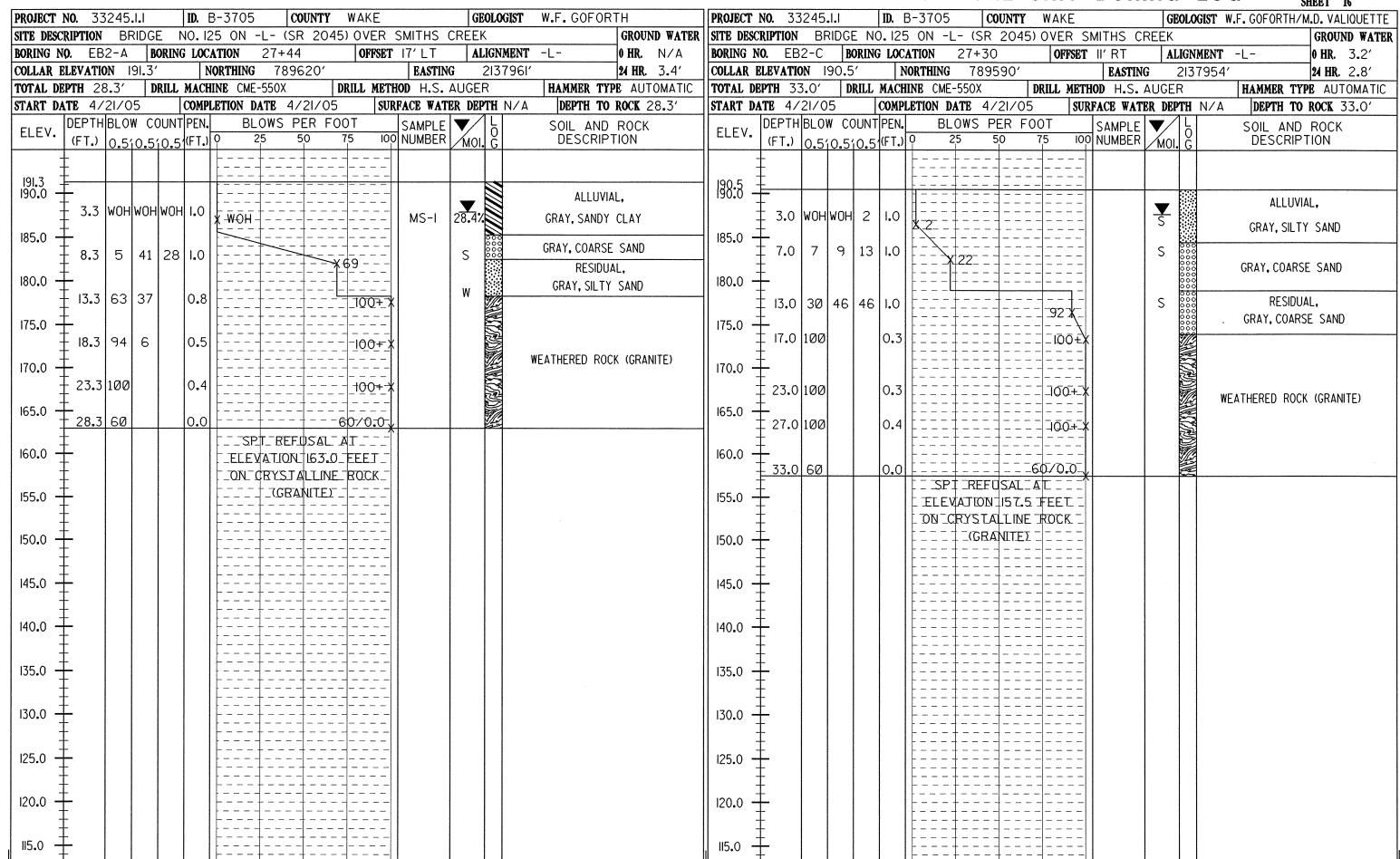
	P					C	CORE BORING REPORT								
PRO	JECT:	33245.1	1.1_	ID:	B-3										
DES	CRIPTIC	ON: BRID	GE NC	<u>). 125 (</u>	<u> </u>	(SR 2045)	OVER SMITHS CREEK								
	* TION														
		OF BORIN					COMPLETION DATE: 4/22/2005								
							CORE SIZE: NQ GEOLOGIST: W. F. GOFORTH								
COR	E EQUI	PMENT:			,	СМЕ	E-550X DRILLER: R. NORWOOD								
ELEV	DEPTH	DRILL RATE	RUN	REC (ft)	RQD (ft)	SAMPLE	FIELD CLASSIFICATION and REMARKS								
(ft) 170.8	(ft)	(min/ft)	(ft)	(%)	(%)	NUMBER	Weathered Rock (Granite)								
1/0.0	20.6	1:44 0:49	] !	1			Weathered Noon (Chaine)								
		0:21	5.0	0.1	0.0										
165.8	25.6	0:23 0:26		2%	0%		SPT drive 25.6-25.8 (100/0.2)								
165.6	25.8	0:54					26.3'- Crystalline Rock, Tan, gray, moderately severe weathering, moderately hard, close fracture spacing, granite								
	0:52 0:51 0:34 5.0 4.5 3.0 RS-3 90% 60%														
	0:34 90% 60% SPT drive 30.8-30.9 (60/0.1)														
160.6 160.5	SPT drive 30.8-30.9 (60/0.1)  Crystalline Rock, gray, black, white, pink, very slight weathering, moderately hard to hard, close fracture														
100.0	1:25 spacing, granite														
		1:38	5.0	4.3	3.0		·								
155.5	35.9	1:46 0:58		86%	60%										
155.5	35.9	1:13													
		1:58 2:12	5.0	4.9	4.1										
		2:28	] "."	98%	82%										
150.5	40.9	2:48	<b>  </b>	$\vdash$	<b> </b>										
					'		·								
					'										
					'										
.															
.															
			<b>  </b>	<b>  </b>	<b> </b>	<u> </u>									
	, 1														
	,														
1	.														
	.														
L				1			BOREHOLE TERMINATED AT ELEVATION OF 150.5 FEET, IN ROCK.								

PROJECT	<b>NO.</b> 33	3245				3-3705		DUNTY	WAK					GIST W.	F.GOLFORTH	/M.D. VA	LIQUETTE
SITE DESC				E NC	L						MITHS CF						ND WATER
BORING N	<b>10.</b> B2	-C	В	ORIN(	LOCA	ATION	26+87	7	OF	FSET	14' RT	AI	JGN	MENT	-L-	0 HR.	3.2'
COLLAR 1	ELEVATIO	)N I	9I <b>.</b> 3′		N	<b>ORTHING</b>	7899	577′			EASTING	3	213	7913′		24 HR.	4.1′
TOTAL DI						INE CME					OD CORE				HAMMER T		
START DA						LETION D.				SUR	FACE WATI	R DEP	TH	N/A	DEPTH T		
ELEV.	DEPTH (FT.)	1			1 1		OWS P	ER F( 50	00T 75	100	SAMPLE NUMBER	MOI.	l b		SOIL ANI DESCRI		
-												ć					
191.3	<u> </u>									==					ALLUV	/I A I	
	1 4.9	woh	1	Ø	1.0		 					<u>¥</u> S			GRAY, SILT		
185.0			-									J	000	GRA	Y, COARSE S		I SOME
180.0	10.5	13	13	33	1.0			-46			SS-18	S	000	OILA	GRA		JOHL
	<u>+</u>						<u> </u>		-			,			RESIDI GREEN-GRAY,		AND
175.0	15.5	52	48		0.7				100	) <del>+</del>		W			ONLEN ONAT	JIL 11 3	
170.0	20 <b>.</b> 5	100			0.2					 )+ X					WEATHERE	D ROCK,	_3
110.0									-						TAN AND ORA	•	
165.0	25.7	100			0.2					<u>r</u> +_*	RS-4				HERING, SOFT CLOSE FRACT		
-	30.9	10707			0.2			<del> </del>		   					(GRAN		
160.0	- 30.3	100			0.2				<del>- 100</del>						REC=45%	RQD=6%	
155.0															CRYSTALL		
-	+										RS-5			1	RAY, BLACK,W RATE WEATH		
150.0						1	G TER	1		3				MODI	ERATE TO VE (GRAN		, CLOSE
145.0	<del> </del>					1	RYSTAI	1	i	1				\_	REC=100%		<u>%</u> /
-	<del> </del>						_GRA	NITE									
140.0	<u> </u>							 	-								
175.0	+									==							
135.0	-										·						
130.0	_																
-	-							 									
125.0	<del> </del>  -			,													
120.0	-							<del> </del>									
-	<del> </del>																
115.0	_										.						
<u> </u>	L					1	L							L			

						С	CORE BORING REPORT
PRC	JECT:	33245.1	1.1	ID:	B-37	705	COUNTY: WAKE BORING NO: B2-C
DES	CRIPTIC	ON: BRID	GE NO	). 125 C	)N -L- (	SR 2045)	) OVER SMITHS CREEK
LOC	ATION (	OF BORIN	1G: <u>-L-</u>	26+87	14' RT		COMPLETION DATE: 4/22/2005
COL	.LAR or (	GROUND	ELEV	ATION:	191	.3 ft	CORE SIZE: NQ GEOLOGIST: W. F. GOFORTH
COR	RE EQUI	PMENT:				СМЕ	E-550X DRILLER: R. NORWOOD
E! E\/	DEPTH	DRILL RATE	RUN	REC (ft)	RQD (ft)	SAMPLE	FIELD CLASSIFICATION and REMARKS
(ft)	(ft)	(min/ft)	(ft)	(%)	(%)	NUMBER	₹
170.6	20.7	0:57 0:24			'		Weathered Rock (Granite)
		0:24	5.0	1.0	0.0		
165.6	25.7	0:27 0:38		20%	0%		SPT drive 25.7-25.9 (100/0.2)
165.4	25.7	0:38					1
		0:31	_		1!	RS-4	
		0:33 0:45	5.0	3.3 66%	0.9 18%		· ·
160.4	30.9	0:55	<u> </u>		<u>                                     </u>	<u> </u>	SPT drive 30.9-31.1 (100/0.2)
160.2	31.1	0:37 0:32					
		0:32	5.0	2.7	0.0	'	
		0:41		54%	0%		35.6'- Crystalline Rock, Gray, black, white, pink, moderate weathering to fresh, moderately to very hard, close fracture spacing, granite.
155.2 155.2	36.1 36.1	0:50 1:25				1	Crystalline Rock, Gray, black, white, pink, moderate weathering to fresh, moderately to very hard, close
		1:38				RS-5	fracture spacing, granite.
		2:00 1:59	5.0	5.0 100%	2.6 52%		
150.2	41.1	2:28		100 /0	32 /0	<u>                                     </u>	
		· ·		$\vdash$			
	l				l!		•
							·
	$\longrightarrow$		<b> </b>	<b></b>			
	i						
	i }						
						7	BOREHOLE TERMINATED AT ELEVATION OF 150.2 FEET, IN ROCK.

PROJEC	r N	<b>0.</b> 33				1	B-3705	i	OUNTY	WAKE				OLO	GIST W.	F.GOLFOR	TH/M.D. VALIQUETTE
SITE DE	SCR	IPTION	ВІ	RIDG	E N	0.12	5 ON -	L- (SR	2045	) OVER	SI	MITHS CI	REEK				GROUND WATER
BORING	NO.	. B2	-B	B	ORIN(	G LOC	ATION	26+64	4	OFF	SET	56' RT		JGN	MENT	-L-	0 HR. 2.8′
COLLAR	EL	EVATIO	ON I	90.9	)′	N	ORTHING	789				EASTING			7901′		<b>24 HR.</b> 4.3′
TOTAL	DEP	<b>TH</b> 50	0.2′	D			IINE CME				ETH	OD CORE	BOR	SINC	<del>)</del>		TYPE AUTOMATIC
START							,	DATE 4/	/19/05		SURI	FACE WATI	ER DEP	TH	N/A	DEPTH	TO ROCK 32.9'
ELEV	ŧ	EPTH (FT.)	1			1		_OWS_P	PER FO	00T 75	100	SAMPLE NUMBER	MOI.	L 0 0			ND ROCK RIPTION
	#										-						
198:8	#	-									-				0041		JVIAL,
185.0	#	4.2	1	1	1	1.0	   2 				- - - -	SS-II	W	000	GRAY	, CLAYEY S	SILT WITH FINE SAND
180.0	#	9.2	9	13	13	1.0		26-		 	· _  - - -	SS-I2	S	000		RE:	SIDUAL,
175.0	‡ ‡	14.2	13	43	54	1.0		<del></del>		97	<u> </u>		S	000	ا		N, COARSE SAND
170.0	#	19.2	16	43	39	1.0		]		82 X -			S	000			
165.0	‡	24.2	100			0.5		‡==== ‡====			F_X				W	EATHERED	ROCK (GRANITE)
160.0	#	. 29 <b>.</b> 7	100			0.3				-  - -100-	- - - -					REC=44	% ROD=8%
155.0	#	35.0	100			0.2		<del></del>			- - X -	RS-I				AY, BLACK,	LINE ROCK, WHITE, AND PINK,
150.0	#	-		-							   				MOD	ERATE TO	ERING TO FRESH, VERY HARD, CLOSE CLOSE FRACTURE
145 <b>.</b> 0	#										_ _ _ _				10 11	SF	PACING RANITE)
140.0	#	•						NG TEE	MINAT	ED_AT	- - - - -					REC=100	% ROD=84%
135.0		•					1	VATION CRYSTA (GRA		-kock	- 11						
130.0	+ + + + + + + + + + + + + + + + + + + +	•															
125.0	+++++++++++++++++++++++++++++++++++++++	•			1						- - - -						
120.0	+++++++++++++++++++++++++++++++++++++++										_ _ _ _						
115.0	‡	•									- - -						

						С	ORE BORING R	EPORT	
PRC	JECT:	33245.	1.1_	ID:	B-3	705	COUNTY:	WAKE	BORING NO: B2-B
DES	CRIPTIO	ON: BRIT	GE NO	) 125 (	י - ו- מכ	(SR 2045)	OVER SMITHS CREEK	-	
	2 III	-··· <u>DIVIL</u>	OL INC	, , , , , (	-17 -L- (	(31, 2040)	OVER OWN HIS ONEER		,
LOC	ATION (	OF BORII	NG: -L-	26+64	56' RT				COMPLETION DATE: 4/19/05
							CORE SIZE: NQ	<del></del>	GIST: W. F. GOFORTH
COR	E EQUI	PMENT:				СМЕ	E-550X	DRI	LLER: R. NORWOOD
ELEV	DEPTH	DRILL RATE	RUN	REC (ft)	RQD (ft)	SAMPLE		FIELD CLASSIFICATION a	-1 DEMARKS
(ft)	(ft)	(min/ft)	(ft)	(%)	(%)	NUMBER		TIEED CLASSIFICATION a	III REWARKS
166.2	24.7	1:40					Weathered Rock (Granite)		
		1:02 0:59	5.0	1.9	0.0				
		0:43	0.0	38%	0%				
161.2	29.7	0:42					SPT drive 29.7-30.0 (100/0.3)		
160.9	30.0	0:45 0:45							
		0:45	5.0	2.5	0.8		32.9'- Crystalline Rock, Grav, blad	k, white and pink, slight weat	hering to fresh, moderately to very hard, close
		0:47		50%	16%		to moderately close fracturing, gra	nite. Weathered zones from	34.4-37.5.
155.9 155.7	35.0 35.2	1:55 1:23					SPT drive 35.0-35.2 (100/0.2)		
100.7	55.2	2:01				RS-1		•	
		2:05	5.0	5.0	3.2				·
150.7	40.2	2:23 2:32		100%	64%				
150.7	40.2	3:24		.,					
		3:03							
	1	2:47 2:50	5.0	5.0 100%	4.9 98%				
145.7	45.2	3:05		100%	9070				
145.7	45.2	3:53							
	ŀ	3:14 8:03	5.0	5.0	4.5				
	ŀ	4:44	5.0	100%					
140.7	50.2	2:56							
	ŀ								
	ŀ								
	I							No.	
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	}								
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l									i
l	ŀ			. ]					1
_							BOREHOLE TERMINATED A	T ELEVATION OF 140.7 FEE	T, IN ROCK.



#### NORTH CAROLINA DEPARTMENT OF TRANSPORTATION GEOTECHNICAL UNIT BORING LOG SHEET 17 PROJECT NO. 33245.1.1 **ID.** B-3705 COUNTY WAKE GEOLOGIST W.F. GOFORTH/M.D. VALIQUETTE SITE DESCRIPTION BRIDGE NO. 125 ON -L- (SR 2045) OVER SMITHS CREEK GROUND WATER BORING NO. EB2-B BORING LOCATION 27+11 OFFSET 54' RT 0 HR. 14.3' ALIGNMENT -L-COLLAR ELEVATION 201.5 **NORTHING** 789544' **EASTING** 2137946' 24 HR. N/A TOTAL DEPTH 46.8' DRILL MACHINE CME-550X DRILL METHOD H.S. AUGER HAMMER TYPE AUTOMATIC **START DATE** 4/18/05 COMPLETION DATE 4/18/05 SURFACE WATER DEPTH N/A DEPTH TO ROCK N/A DEPTH|BLOW COUNT|PEN. BLOWS PER FOOT SAMPLE SOIL AND ROCK 100 NUMBER MOIL & 10.510.510.5作T.) [P 75 DESCRIPTION 201.5 **ASPHALT** 200.0 ROADWAY EMBANKMENT, 3.8 2 2 5 | 1.0 | SS-I М TAN. CLAYEY SAND 195.0 2 BROWN-GRAY, SANDY CLAY 8.8 2 4 1.0 SS-2 М 190.0 ALLUVIAL, W 13.8 | 1 | 1 | 1 | 1.0 | SS-3 GRAY, SANDY SILT 185.0 S 18.8 4 4 | 11 | 1.0 | SS-4 GRAY, COARSE SAND 180.0 RESIDUAL, 23.8 15 43 74 1.0 100+7 SS-5 S GRAY, SILTY SAND 175.0 28.8 100 100+D 170.0 33.8 100 100+ WEATHERED ROCK (GRANITE) 165.0 38.8 100 0.3 100+ 160.0 43.3 100 155.0 BORING TERMINATED WITH I ADGERI REFUSALIAII 150.0 ELEVATION 154.7 EEET \_IN\_WEATHERED\_BOCK\_\_ \_(GRANITEΣ \_ 145.0 140.0 135.0 130.0 125.0

## Soil Test Results Bridge No. 125 on -L- (SR 2045) over Smiths Creek

		formation		Natural	iral AASHTO Atterberg Limits					Gradation Results								
Boring No.	Sample IIII	formation Sample Depth (ft.)	N Value	Moisture Content	Soil Class	L.L.	P.L.	P.I.	Ret #4 Sieve	Pass #10 Sieve	Pass #40 Sieve	Pass #200 Sieve 31	Coarse Sand (%) 48.2	Fine Sand (%) 20.9	Silt (%) 14.7	Clay (%) 16,2		
EB2-B	SS-1	3.8-5.3	7	-	A-2-6(1)	35	21	14	1	91	57	39	41.8	17.6	16.4	24.2		
EB2-B	SS-2	8.8-10.3	6	-	A-6(3)	39	18	21	•	91	62	36	28.7	38.4	18.8	14.1		
EB2-B	SS-3	13.8-15.3	2	-	A-4(0)	21	17	4		98	83	7	74.7	18.6	3.6	3.0		
EB2-B	SS-4	18.8-20.3	15	-	A-1-b(0)	22	NP	NP	2	87	38 53	24	55.1	21.8	16.1	7.1		
EB2-B	SS-5	23.8-25.3	117	-	A-2-4(0)	29	24	5	-	92	71	43	40.4	16.6	12.7	30.3		
EB1-B	SS-6	4.7-6.2	6	•	A-7-6(5)	43	20	23	-	96 97	69	41	42.6	16.6	11.5	29.3		
EB1-B	SS-7	9.7-11.2	9	-	A-7-6(6)	46	17	29	-	93	58	37	45.8	16.1	22.0	16.2		
EB1-B	SS-8	14.7-16.2	3	-	A-6(1)	32	20	12	- 10	79	46	9	67.7	22.4	5.9	4.0		
EB1-B	SS-9	19.7-21.2	36		A-1-b(0)	21	NP	NP	13	91	49	19	59.9	22.6	13.4	4.0		
EB1-B	SS-10	29.7-31.2	49	-	A-1-b(0)	26	NP	NP		99	94	57	12.3	34.1	31.3	22.2		
B2-B	SS-11	4.2-5.7	2	-	A-4(3)	31	21	10	3	89	48	16	61.2	23.6	11.1	4.0		
B2-B	SS-12	9.2-10.7	26	-	A-1-b(0)	32	NP	NP	3	87	41	15	64.9	21.0	11.0	3.0		
B1-B	SS-13	7.1-8.6	16	-	A-1-b(0)	34	NP	NP	2	94	72	17	44.7	39.9	9.3	6.1		
EB2-C	SS-14	3.0-4.5	2	-	A-2-4(0)	21	NP	NP NP	18	71	29	8	72.5	17.9	5.6	4.0		
EB2-C	SS-15	7.0-8.5	22	-	A-1-b(0)	22	NP	NP NP	10	88	48	20	58.6	21.2	16.2	4.0		
EB2-C	SS-16	13.0-14.5	92	-	A-1-b(0)	22	NP	NP NP	36	51	22	6	70.1	19.2	6.7	4.0		
B2-A	SS-17	9.4-10.9	26	-	A-1-b(0)	21	NP	NP NP	24	61	30	7	68.0	22.5	7.5	2.0		
B2-C	SS-18	10.5-12.0	46	-	A-1-b(0)	21	NP		24	84	39	15	65.1	19.2	11.7	4.0		
B1-C	SS-19	14.6-16.1	56	-	A-1-b(0)	28	23	5	<del>  -</del>	- 04	+	<del>                                     </del>	-	-	-	-		
EB2-A	MS-1	3.3-4.8	0	28.4	<del>-</del>	<u> </u>	<del>-</del> -		<del></del>	<del>                                     </del>	<del>                                     </del>	<del>  -</del>	-	-	-	-		
B2-A	MS-2	4.4-5.9	0	42.3	-	<u> </u>	<del>  -</del> -		<u> </u>	+	<del>                                     </del>	-	<u> </u>					
						<u> </u>				1								



# FIELD SCOUR REPORT

WBS:	33245.1.1	TIP:	B-3705	COUNTY: WAKE
DESCRIPTION(1):	BRIDGE NO. 1	25 ON -L- (	(SR 2045) OVEF	R SMITHS CREEK
			EXISTING	BRIDGE
Information from:	Field II Other	nspection _ (explain) _	X Micr	ofilm (reel pos:) Hydraulic Design Report
Bridge No.: Foundation Type:		: 121.3'		Bents in Channel: 4 Bents in Floodplain: 4
EVIDENCE OF S Abutments or E	` '	: End Bent	1 slope has evi	dence of scour
Interior Bents:	Scour holes pre	esent at inte	erior bents	
Channel Bed:	Some scour po	ckets		
Channel Bank:	Some tree roots	s are expos	sed along the ba	nks indicating erosion
EXISTING SCOU		ON		
Extent(4):	Approximately (	5-10 feet fro	om outside edge	of bridge; End Slopes are unprotected
Effectiveness(5):	Effective where	used; End	Slopes need pr	otection
Obstructions(6):	At the time of the	ne investiga	ition trees and o	ther debris were noted just upstream of the bridge

#### **INSTRUCTIONS**

- 1 Describe the specific site's location, including route number and body of water crossed.
- 2 Note scour evidence at existing end bents or abutments (e.g. undermining, sloughing, degradations).
- 3 Note existing scour protection (e.g. rip rap).
- 4 Describe extent of existing scour protection.
- 5 Describe whether or not the scour protection appears to be working.
- 6 Note obstructions such as dams, fallen trees, debris at bents, etc.
- 7 Describe the channel bed material based on observation and/or samples. Include any lab results with report.
- 8 Describe the channel bank material based on observation and/or samples. Include any lab results with report.
- **9** Describe the material covering the banks (e.g. grass, trees, rip rap, none).
- 10 Determine the approximate floodplain width from field observation or a topographic map.
- 11 Describe the material covering the floodplain (e.g. grass, trees, crops).
- 12 Use professional judgement to specify if the stream is degrading, aggrading, or static.
- 13 Describe potential and direction of the stream to migrate laterally during the bridge's life (approx. 100 years).
- Give the design scour elevation (DSE) expected over the life of the bridge (approx. 100 years). This elevation can be given as a range across the site, or for each bent. Discuss the relationship between the Hydraulics Unit theoritical scour and the DSE. If the DSE is dependent on scour counter measures, explain (e.g. rip rap armoring on slopes). The DSE is based on the erodability of materials, giving consideration to the influence of joints, foliation, bedding characteristics, % core recovery, % RQD, differential weathering, shear strength, observations at existing structures, other tests deemed appropriate, and overall geologic conditions at the site.

			DE	<u>ESIGN IN</u>	<u>IFORM</u>	<u>IATIO</u>	<u>N</u>				
Channel Bed	d Material(7)	: Fine to	coarse	sand							
Q			_					21.		***************************************	
Channel Banl	k Material(8)	: <u>(</u> SS-13)	Coars	e sand							
Channel Ba	ank Cover(9)	: Trees a	nd scru	ıb							100 mm 1 mm
Floodpla	in Width(10)	: Approxi	mately	500'					·		
Floodpla	in Cover(11)	: Wooded	1								
S	tream is(12)	): A	ggradir	g	Degr	ading_		Sta	atic X	_	
hannel Migration To	endency(13)	): Slight te	ndenc	y to the we	est towar	ds End	Bent 1				
Observations and	Other Com	ments: N	Α								
		<u> </u>									
DESIGN SCOUR	ELEVATIO	NS(14)				Fe	et X	Met	ers		
	BENTS									-	
		⊇ 1 Bent 2									
10	00 yr 180.9				I	I		1	Γ	T	T
.,	7. 100.0	100.2									
	ļ <u> </u>								l		-
	<del></del>	1				<u> </u>					
Comparison of DS No scour is antici scour in the Bridg	pated beyor	d the end	bents.	The Geot	echnical			it agrees	with the	predicted	<u>t</u>
SOIL ANALYSIS Bed or Bank	RESULTS	FROM CH	IANNE	L BED AN	ID BAN	K MAT	ERIAL			T	
Sample No.											
Retained #4											
Passed #10			$-\Gamma$								
Passed #40											
Passed #200											
Coarse Sand				See Shee	t 18.				***************************************		
Fine Sand				"Soil Test		',		***************************************			
Silt				for sample		•					
Clay				SS-13							
LL			$\neg   \neg  $	-						1	
PI										1	
AASHTO										1	
Station					<u> </u>						
Offset											
Denth					<b>1</b>		· · · · · · · · · · · · · · · · · · ·				

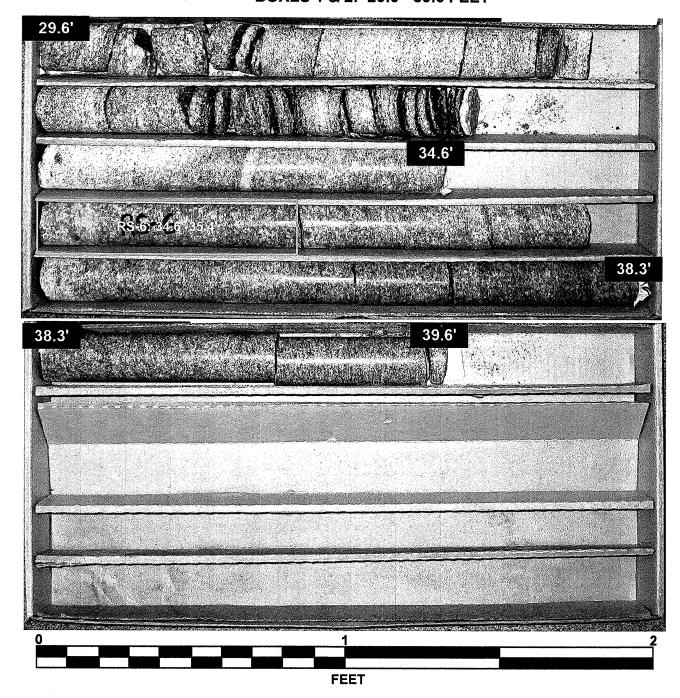
Template Revised 02/07/06

Project Geological Engineer

**B1-A**BOXES 1 & 2: 20.0 - 40.5 FEET



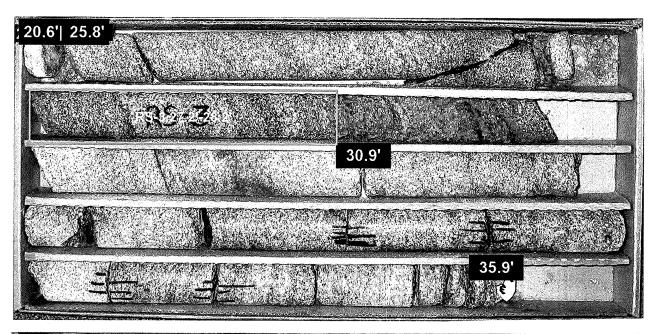
**B1-C**BOXES 1 & 2: 29.6 - 39.6 FEET



**B1-B**BOXES 1 & 2: 17.7 - 38.5 FEET

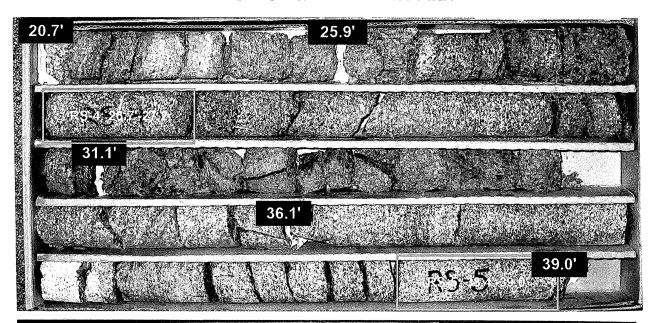


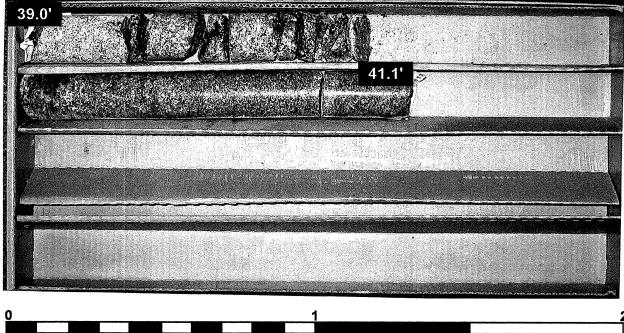
**B2-A**BOXES 1 & 2: 20.6 - 40.9 FEET





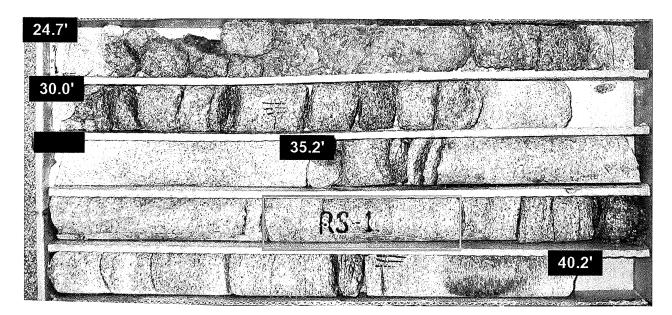
**B2-C**BOXES 1 & 2: 20.7 - 41.1 FEET





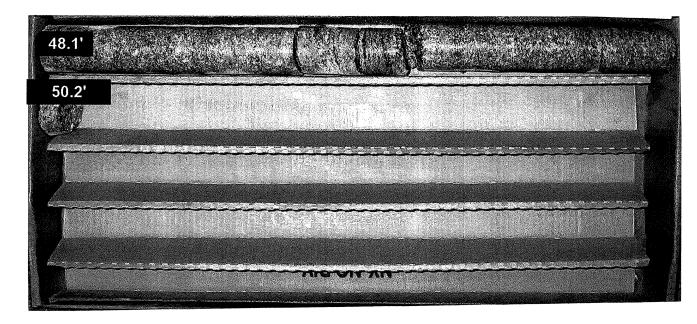
FEET

**B2-B**BOXES 1 & 2: 24.7 - 48.1 FEET





**B2-B**BOX 3: 48.1 - 50.2 FEET



## **SITE PHOTOGRAPH**

Bridge No. 125 on -L- (SR 2045) Over Smiths Creek



Looking North Towards End Bent 2