NOTE: SEE SHEET IA FOR PLAN SHEET

LAYOUT AT TIME OF INVESTIGATION

**CONTENTS** 

**LINE** 

201850

**STATION** 

PLAN PROFILE XSECT

11+90.00 to 16+12.00

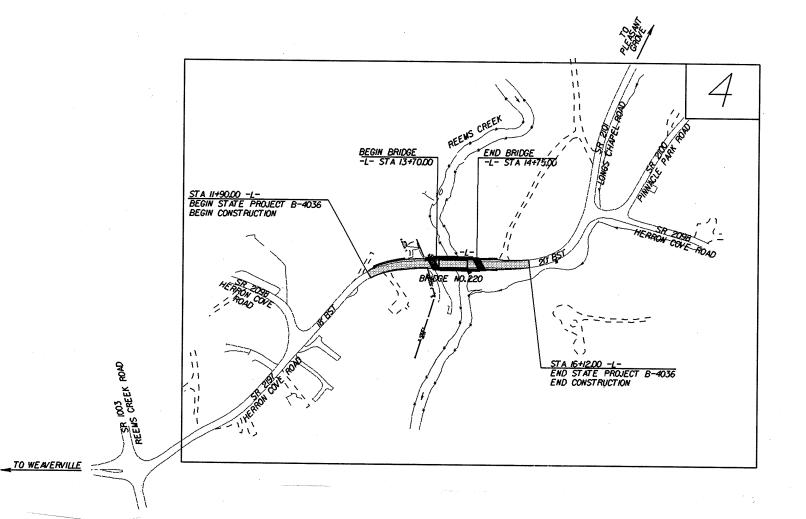
#### STATE OF NORTH CAROLINA

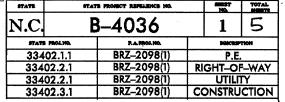
DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT

## ROADWAY SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 33402.I.I (B-4036) \_\_ F.A. PROJ. <u>BRZ-2098(I)</u> BUNCOMBE COUNTY \_\_\_\_ PROJECT DESCRIPTION APPROACHES TO BRIDGE NO. 220 ON SR-2098 OVER REEMS CREEK

#### INVENTORY





#### **CAUTION NOTICE**

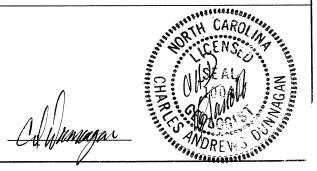
THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, FLANNING, AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORNAC LOCS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING JUST AT (1919) 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, 1917 ATT 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 CEMERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A CEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSUPFACE DATA AND MAY NOT 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 RELIABLITY INNERENT 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 MOICATED. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLIDING 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 THESE MOISCATED IN THE SUBSURFACE INSURPRESSION FORMATION FROM THOSE MOISCATED IN THE SUBSURFACE INFORMATION. THOSE INDICATED IN THE SUBSURFACE INFORMATION.

_	
INVESTIGATED BY_	C A DUNNAGAN
CHECKED BY	
SUBMITTED BY	
DATE	JUNE 2006

PERSONNEL

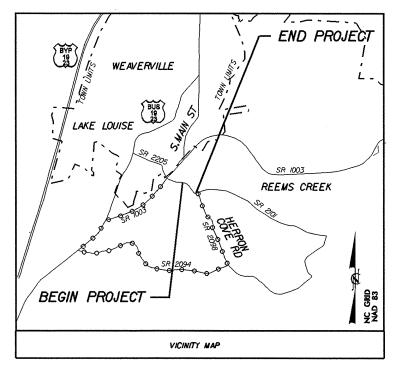


NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS BEING ACCURATE NOR IT IS CONSIDERED TO BE PART OF THE PLANS, SPECIFICATIONS, OR CONTRACT FOR THE PROJECT.

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.

# 4036 Ö **PROJECT** TIP

SEE SHEET 1-A FOR INDEX OF SHEETS SEE SHEET 1-B FOR CONVENTIONAL PLAN SHEET SYMBOLS

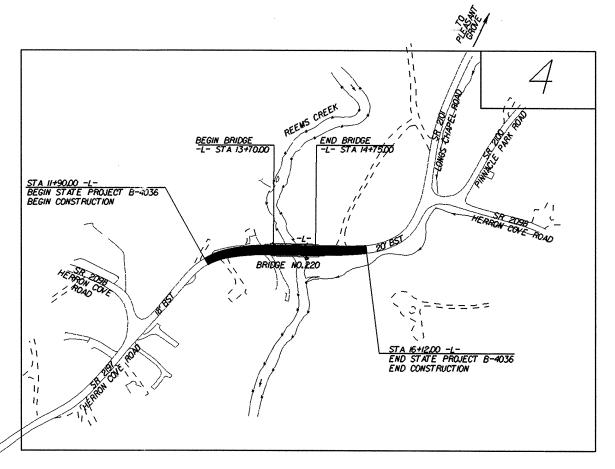


## STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

#### N.C. B-4036 5 IA BRZ-2098(1) 33402.1.1 P.E.

### BUNCOMBE COUNTY

LOCATION: BRIDGE NO. 220 OVER REEMS CREEK ON SR 2098 TYPE OF WORK: GRADING, PAVING, DRAINAGE, AND STRUCTURE



CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION PRELIMINARY PLANS

GRAPHIC SCALES

50 25 0 PROFILE (HORIZONTAL) PROFILE (VERTICAL)

NCDOT CONTACT: B.D. TAYLOR, P.E.
PROJECT ENGINEER
ROADWAY DESIGN UNIT

◆ ◆ ◆ OFF-SITE DETOUR ROUTE

#### DESIGN DATA

ADT 2008 = 1,900 VPD ADT 2030 = 3,100 VPD DHV = 9% D = 55%T = 4% \*V = 25 mph

#### DESIGN EXCEPTION: DESIGN SPEED

\* (TTST 1% + DUAL 3%)

#### PROJECT LENGTH

1003 ROAD

\_TO WEAVERVILLE

LENGTH OF ROADWAY TIP PROJECT B-4036 = 0.059 MILE LENGTH OF STRUCTURE TIP PROJECT B-4036 = 0.021 MILE TOTAL LENGTH OF TIP PROJECT B-4036 = 0.080 MILE

#### Kimley-Horn and Associates, Inc. PLANS PREPARED FOR THE NCDOT BY: Post Office Sec. \$3066 Roleigh, North Carolina 27626 906 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: **SEPTEMBER 15, 2006** 

LETTING DATE: JANUARY 15, 2008

## JEFFREY W. MOORE, PE

I. JASON PACE

PROJECT DESIGN ENGINEER

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER



STATE HIGHWAY DESIGN ENGINE

#### NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

#### DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

### SUBSURFACE INVESTIGATION

#### SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

CON DECODIOTION		K LEGEND, TERM	is, simbols, AND					
SOIL DESCRIPTION	GRADATION  WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FRO	OM FINE TO COARSE.	HARD ROCK IS NON-COASTAL PL	ROCK DESCRIPTION  AIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL, AN INFERRED	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 THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN		SAME SIZE. (ALSO	ROCK LINE INDICATES THE LEVE	EL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.			
100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO 1206, ASTM D-1586), SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM, BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE:	GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MO	RE SIZES.	IN NON-COASTAL PLAIN MATERI OF WEATHERED ROCK.	AL. THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZON	ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS,			
CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:	ANGULARITY OF GRAINS THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TE	FRMS. ANGULAR	ROCK MATERIALS ARE TYPICALL					
VERY STIFF, GRAV, SILTY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6	SUBANGULAR, SUBROUNDED, OR ROUNDED.	ENTITO HINDOLHIA	WEATHERED WEATHERED	NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100	OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC.			
SOIL LEGEND AND AASHTO CLASSIFICATION	MINERALOGICAL COMPOSITION	l .	ROCK (WR)	BLOWS PER FOOT IF TESTED.	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			
GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS ORGANIC MATERIALS	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USE	ED IN DESCRIPTIONS	CRYSTALLINE ROCK (CR)	FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE,	GROUND SURFACE.			
CLASS. (\$\(\sigma\) 35% PASSING "200) (> 35% PASSING "200)	WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.			GNEISS, GABBRO, SCHIST, ETC.  FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN	CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.			
GROUP A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-4, A-5 A-6 A-7 A-1, A-2 A-4, A-5 A-6, A-7 A-1, A-2 A-4, A-5 A-6, A-7	COMPRESSIBILITY  SLIGHTLY COMPRESSIBLE LIQUID LIMIT LI	ECC TUAN OL	NON-CRYSTALLINE ROCK (NCR)	SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED. ROCK TYPE	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.			
SYMBOL SOSSESSESSESSESSESSESSESSESSESSESSESSESS	MODERATELY COMPRESSIBLE LIQUID LIMIT E	QUAL TO 31-50	COASTAL PLAIN	INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC. COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL			
2. PASSING	HIGHLY COMPRESSIBLE LIQUID LIMIT G	REATER THAN 50	SEDIMENTARY ROCK (CP)	SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.	LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.			
* 10 50 MX GRANULAR SILT- MUCK.	GRANULAR SILT - CLAY			WEATHERING	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT			
# 40 38 MX 58 MX 51 MN	SUILS SUILS	OTHER MATERIAL	FRESH ROCK FRESH, CRYSTA	ALS 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			
	LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTL		HAMMER IF CRYSTAL		HORIZONTAL.			
PLASTIC INDEX 6 MX NP 18 MX 19 MX 11 MN 19 MX 11 MN 11	MODERATELY ORGANIC         5 - 10%         12 - 20%         SOME           HIGHLY ORGANIC         >10%         >20%         HIGHL		(V SLI.) CRYSTALS ON A BRO	RESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, DKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.			
GROUP INDEX 0 0 0 4 MX 8 MX 12 MX 16 MX No MX MODERATE ORGANIC		30% HISD HBOVE	OF A CRYSTALLINE	NATURE.	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE			
USUAL TYPES STONE FRAGS. STATE STATE OR CLOVEY STATE CLOVEY ORGANIC	WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRI	ILLING	SLIGHT ROCK GENERALLY FF (SLI.) 1 INCH. OPEN JOINTS	RESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO S MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR	SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.			
OF MAJOR GRAVEL, AND SAND GRAVEL AND SAND SOILS SOILS MATTER	STATIC WATER LEVEL AFTER 24 HOURS		CRYSTALS ARE DULL	L AND DISCOLORED, CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.			
GEN. RATING	724		MODERATE SIGNIFICANT PORTIO	INS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN OST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM			
AS A EXCELLENT TO GOOD FAIR TO POOR POOR UNSUITABLE SUBGRADE	E TENSILES WITTER OF WITTER OF WITTER	SIRAIA	DULL SOUND UNDER	HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED	PARENT MATERIAL.			
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 OF	NIADZZ DIGGOLADED AD CZANED IN ADMINISTRA	FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.			
CONSISTENCY OR DENSENESS	MISCELLANEOUS SYMBOLS		SEVERE AND DISCOLORED AN	DUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL ID 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 RANGE OF STANDARD RANGE OF UNCONFINED PENETRATION RESISTENCE COMPRESSIVE STRENGTH	ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION  SPT CPT OPT DWIT TEST BORING	SAMPLE	(MOD. SEV.) AND CAN BE EXCAVA  IF TESTED, WOULD Y	ATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK.	THE FIELD.			
CUNSISTENCY (N-VALUE) (TONS/FT2 )	WITH SOIL DESCRIPTION VST PHT	DESIGNATIONS S - BULK SAMPLE		DUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.			
GENERALLY VERY LOOSE	SOIL SYMBOL AUGER BORING	SS - SPLIT SPOON	(SEV.) IN STRENGTH TO ST	RONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.			
MATERIAL MEDIUM DENSE 10 TO 30 N/A	ARTIFICIAL FILL (AF) OTHER	SAMPLE		MENTS OF STRONG ROCK USUALLY REMAIN. <u>SPT N VALUES &gt; 100 BPF</u>	LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.			
(NON-COHESIVE) DENSE 30 TO 50 VERY DENSE >50	THAN ROADWAY EMBANKMENT - CORE BORING	ST - SHELBY TUBE		DUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT	MOTITED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS MOTTLING IN			
VERY SOFT <2 <0.25	— INFERRED SOIL BOUNDARY  MM  MONITORING WELL	SAMPLE .		TIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG FOCK TE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR	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 SOFT 2 TO 4 0.25 TO 0.50	THE INFERRED ROCK LINE	RS - ROCK SAMPLE	VESTIGES OF THE O	RIGINAL ROCK FABRIC REMAIN. IF TESTED, YIELDS SPT N VALUES < 100 BPF	INTERVENING IMPERVIOUS STRATUM.			
SILT-CLAY   MEDIUM STIFF   4 TO 8   0.5 TO 1.0   MATERIAL   STIFF   8 TO 15   1 TO 2	ALLUVIAL SOIL BOUNDARY  ALLUVIAL SOIL BOUNDARY  ALLUVIAL SOIL BOUNDARY	RT - RECOMPACTED TRIAXIAL	COMPLETE ROCK REDUCED TO S	OIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.			
(COHESIVE) VERY STIFF 15 TO 30 2 TO 4 HARD >30 >4	SLOPE INDICATOR	. SAMPLE	ALSO AN EXAMPLE.	RATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS	ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF			
TEXTURE OR GRAIN SIZE	25/025 DIP & DIP DIRECTION OF INSTALLATION ROCK STRUCTURES	CBR - CALIFORNIA BEARING RATIO SAMPLE		ROCK HARDNESS	ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RI EXPRESSED AS A PERCENTAGE.			
	SOUNDING POD		VERY HARD CANNOT BE SCRATO	CHED BY KNIFE OR SHARP PICK, BREAKING OF HAND SPECIMENS REQUIRES	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE			
U.S. STD. SIEVE SIZE 4 10 40 60 200 270 OPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053	SOUNDING ROD     REF— SPT REFUSAL		SEVERAL HARD BLO	DWS OF THE GEOLOGIST'S PICK.	PARENT ROCK.			
COARSE FINE	ABBREVIATIONS		HARD CAN BE SCRATCHED TO DETACH HAND S	D BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED	SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL			
BOULDER CUBBLE GRAVEL SAND SAND SILT CLAY	AR - AUGER REFUSAL HI HIGHLY BT - BORING TERMINATED MED MEDIUM	w - MOISTURE CONTENT		D BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE	TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.			
(CSC, SU,) (F SU,)	CL CLAY MICA MICACEOUS	V - VERY VST - VANE SHEAR TEST	HARD EXCAVATED BY HAR	RD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.			
GRAIN MM 305 75 2.0 0.25 0.05 0.005 SIZE IN. 12 3	CPT - CONE PENETRATION TEST MOD MODERATELY CSE COARSE NP - NON PLASTIC	WEA WEATHERED	BY MODERATE BLOW MEDIUM CAN BE GROOVED O	WS. OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK PCINT.	STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF			
SOIL MOISTURE - CORRELATION OF TERMS	DMT - DILATOMETER TEST ORG ORGANIC		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			
SOIL MOISTURE SCALE FIELD MOISTURE CHIEF FOR FIELD MOISTURE DESCRIPTION	DPT - DYNAMIC PENETRATION TEST PMT - PRESSUREMETER TEST  • - VOID RATIO SAP SAPROLITIC	· <b>v</b>	POINT OF A GEOLO	GIST'S PICK.	A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER, SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.			
(ATTERBERG LIMITS) DESCRIPTION SOLDE FOR FIELD MOISTORE DESCRIPTION	F - FINE SD SAND, SANDY		FROM CHIPS TO SE	R GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS EVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, I'HIN	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH			
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY	FOSS FOSSILIFEROUS SL SILT, SILTY FRAC FRACTURED, FRACTURES SLI SLIGHTLY		i .	OKEN BY FINGER PRESSURE.	OF STRATUM AND EXPRESSED AS A PERCENTAGE.  STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY			
LL LIOUID LIMIT (SAT.) FROM BELOW THE GROUND WATER TABLE	FRAGS FRAGMENTS TCR - TRICONE REFUSAL			TH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK, PIECES 1 INCH NESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY	TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY TH			
PLASTIC SEMISOLIDA PEOLITIPES DEVING TO			FINGERNAIL.		TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.			
RANGE - WET - (W) ATTAIN OPTIMUM MOISTURE	EQUIPMENT USED ON SUBJECT PR	ROJECT	FRACTURE SPAC	TEDA: TUTO/A/EGO	JOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.			
	DRILL UNITS: ADVANCING TOOLS:	HAMMER TYPE:		PACING         TERM         THICKNESS           THAN 18 FEET         VERY THICKLY BEDDED         > 4 FEET	BENCH MARK:			
OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE	MOBILE B CLAY BITS	AUTOMATIC MANUAL		THICKLY BEDDED 1.5 - 4 FEET	ELEVATION ET			
SL SHRINKAGE LIMIT	MOBILE B- 6° CONTINUOUS FLIGHT AUGER	CORE SIZE:	MODERATELY CLOSE 1 TO 3		ELEVATION: FT.			
- DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE	BK-51 8* HOLLOW AUGERS			THON 0 16 FEFT THICKLY LAMINATED 0.008 - 0.03 FEET	NOTES:			
PLASTICITY	O ROLLOW HOUSENS			THINLY LAMINATED < 0.008 FEET  INDURATION	-			
PLASTICITY  PLASTICITY INDEX (PI) DRY STRENGTH	CME-45C HARD FACED FINGER BITS		FOR SEDIMENTARY ROCKS, INDURATE	ON IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	†			
NONPLASTIC 0-5 VERY LOW	TUNG,-CARBIDE INSERTS	н		RUBBING WITH FINGER FREES NUMEROUS GRAINS:				
LOW PLASTICITY 6-15 SLIGHT	CASING W/ ADVANCER	HAND TOOLS:	FRIABLE	GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.				
MED. PLASTICITY	PORTABLE HOIST TRICONE STEEL TEETH	POST HOLE DIGGER	MODERATELY INDURATED	GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE:				
COLOR	TRICONE TUNGCARB.	HAND AUGER		BREAKS EASILY WHEN HIT WITH HAMMER.				
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY).	CORE BIT	SOUNDING ROD	INDURATED	GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE: DIFFICULT TO BREAK WITH HAMMER.				
MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.		VANE SHEAR TEST	EXTREMELY INDURATED	SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE;				
			CATHEREET INDONATED	SAMPLE BREAKS ACROSS GRAINS.				

PROJECT REFERENCE NO.

33402.I.I (B-4036)



#### STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY **GOVERNOR** 

LYNDO TIPPETT **SECRETARY** 

June 16, 2006

STATE PROJECT:

33402.1.1 (B-4036)

FEDERAL PROJECT: COUNTY:

DESCRIPTION:

BRZ-2098(1) Buncombe

Approaches to Bridge No. 220 on SR-2098 over Reams Creek

SUBJECT:

Geotechnical Report – Inventory

#### **Project Description**

This project centers around the replacement of Bridge No. 220. The approaches will remain in the same location, but will be widened by a maximum of 6.0 feet. A field reconnaissance of this project was conducted on June 14, 2006. The only factor that needs to be commented upon is the rock exposed near the end of the project.

#### **Geology and Rock Properties**

The rocks involved in this project belong to the Ashe Metamorphic Suite. This formation is labeled Zatm on the Geologic Map of North Carolina (1985). Within the project corridor, rock is exposed in the proposed cut section left of approximate -L- Station interval 16+00 to 16+12 (end of project). This rock is an amphibolite, hard and slightly weathered. Generally, the outcrop is fractured into blocks 3.0 feet on an edge. Occasional seams fractured to 0.5 feet are present. Half-casts from previous construction are also present.

Respectfully Submitted,

Charles A. Dunnagan, L.G. Project Geological Engineer

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LOCATION: CENTURY CENTER COMPLEX 1020 BIRCH RIDGE DRIVE

RALEIGH NC 27610

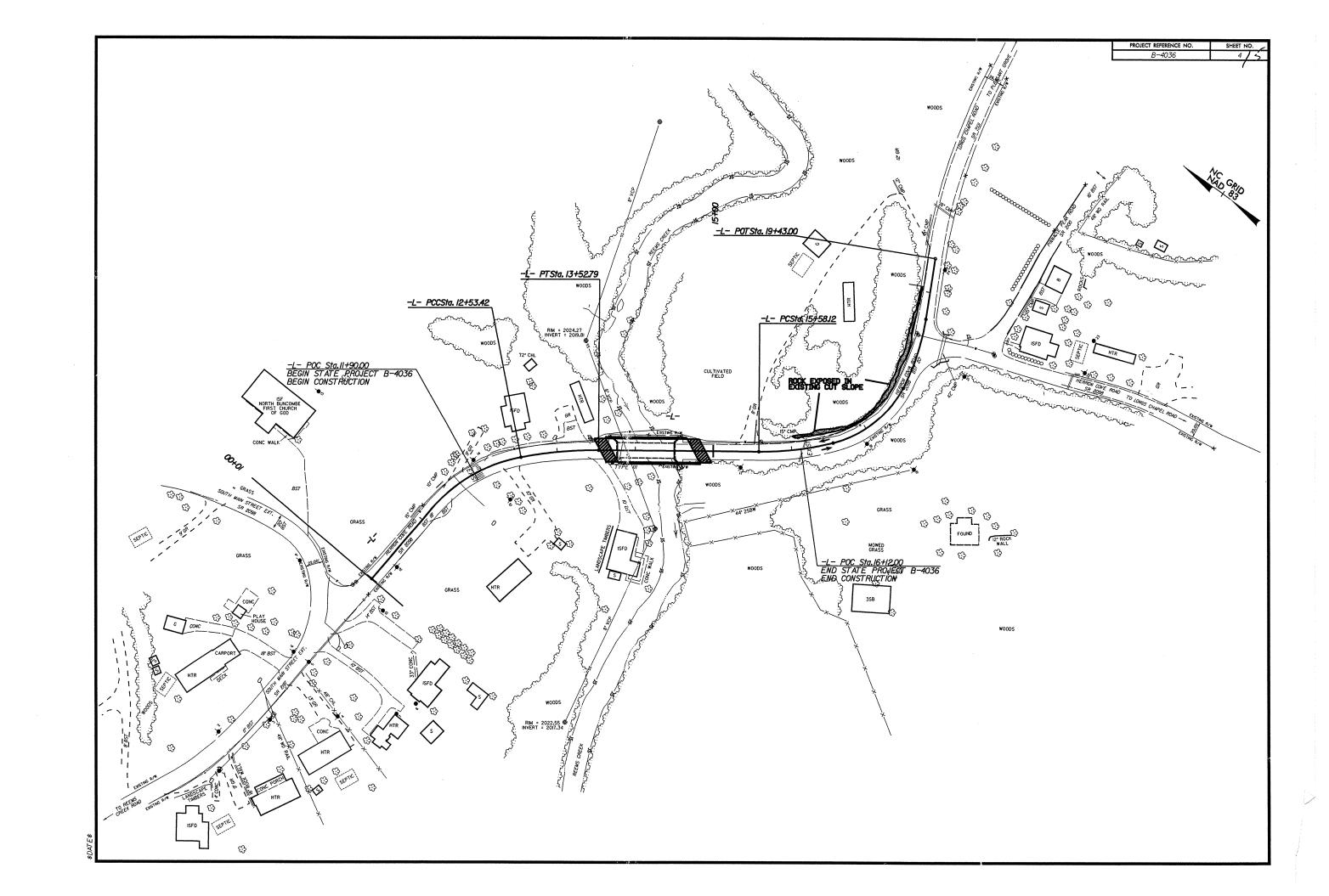
#### **EARTHWORK BALANCE SHEET**

Volumes in Cubic Yards

PROJECT	TIP # B-403	6				COUNTY	Buncombe	, ordine	os III Cubi		DATE	3/28/2008			CITETE	A 6)
LINE	STATION	STATION	TOTAL EXCAV. (UNCL.)	ROCK EXCAV.	UNDERCUT EXCAV.	UNSUIT. EXCAV.	SUITABLE EXCAV.	TOTAL EMB.	ROCK EMB. 25%	UNDERCUT	EARTH EMB.	EMBANK. 15%	BORROW	SUITABLE WASTE	UNSUIT. WASTE	TOTAL WASTE
L	11+90	13+70	149				149	250			250	288	120			
L	14+75	16+12	101	10			91	93	13		80	105	139			
											7					
P	ROJECT SUB	ГОТАL	250	10	0	0	240	343	13	0	330	393	140	0	0	0
AD	DITIONAL UN	DERCUT			50				***************************************				110			V
	HOULDER MA															
	TE IN LIEU OF											-				
	LOSS DUE TO CLEARING & GRUBBING		-15				-15						15			
	PROJECT TO	OTAL	235	10	50		225	343	13		330	393	155			
EST 5%	TO REPLACE TO BORROW P												8			
	GRAND TOT	ΓAL	235										163			
													103			
	SAY		250										200			

<sup>\*</sup> EARTHWORK QUANTITIES ARE CALCULATED BY THE ROADWAY DESIGN UNIT. THESE EARTHWORK QUANTITIES ARE BASED IN PART ON SUBSURFACE DATA PROVIDED BY THE GEOTECHNICAL ENGINEERING UNIT.

b-4036\_balance\_card.xls: Balance Sheet



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