STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	33649.1.1(B-4312)	1	11

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

STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 33649.1.1(B-4312) F.A. PROJ. BRZ-1613(2)

COUNTY WARREN

PROJECT DESCRIPTION BRIDGE No. 42 ON -L- (SR 1613, SHOCCO SPRINGS ROAD) OVER SHOCCO CREEK

INVENTORY

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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.

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CHECKED BY N.T. ROBERSON

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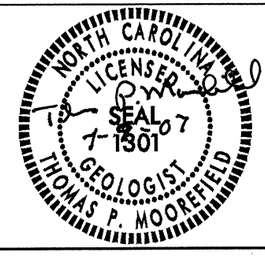
DATE JULY 2007



PROJECT: 33649.1.1

ID: B-4312

DRAWN BY: N.D. MOHS

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

NOTE - BY HAVING REQUESTED THIS INFORMATION THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

PROJECT REFERENCE NO.	SHEET NO.
33649.1.1(B-4312)	2

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION

SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:

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

SOIL LEGEND AND AASHTO CLASSIFICATION

GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)						SILT-CLAY MATERIALS (> 35% PASSING #200)				ORGANIC MATERIALS		
GROUP CLASS.	A-1		A-3	A-2			A-4	A-5	A-6	A-7	A-1, A-2, A-3	A-4, A-5, A-6, A-7	
	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7				A-7-5, A-7-6			
SYMBOL													
% PASSING #10	50 MX										GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
#40	30 MX	50 MX	51 MN										
#200	15 MX	25 MX	10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN		
LIQUID LIMIT	6 MX		NP	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER	HIGHLY ORGANIC SOILS
PLASTIC INDEX				10 MX	10 MX	11 MN	11 MN	10 MX	10 MX	11 MN	11 MN		
GROUP INDEX	0		0	0		4 MX		8 MX	12 MX	16 MX	No MX		
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL, AND SAND		FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND				SILTY SOILS		CLAYEY SOILS			
GEN. RATING AS A SUBGRADE	EXCELLENT TO GOOD							FAIR TO POOR			FAIR TO POOR	POOR	UNSUITABLE

PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30

CONSISTENCY OR DENSENESS

PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTENCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH ($TONS/FT^2$)
GENERALLY GRANULAR MATERIAL (NON-COHESIVE)	VERY LOOSE	<4	N/A
	LOOSE	4 TO 10	
	MEDIUM DENSE	10 TO 30	
	DENSE	30 TO 50	
	VERY DENSE	>50	
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT	<2	<0.25
	SOFT	2 TO 4	0.25 TO 0.50
	MEDIUM STIFF	4 TO 8	0.5 TO 1.0
	STIFF	8 TO 15	1 TO 2
	VERY STIFF	15 TO 30	2 TO 4
	HARD	>30	>4

TEXTURE OR GRAIN SIZE

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

BOULDER (BLDR.)	COBBLE (COB.)	GRAVEL (GR.)	COARSE SAND (CSE. SD.)	FINE SAND (F SD.)	SILT (SL.)	CLAY (CL.)

GRAIN SIZE	MM	305	75	2.0	0.25	0.05	0.005
	IN.	12	3				

SOIL MOISTURE - CORRELATION OF TERMS

SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION
	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE
LL — LIQUID LIMIT		
PLASTIC RANGE (PI)	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
PL — PLASTIC LIMIT		
	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE
OM — OPTIMUM MOISTURE		
SL — SHRINKAGE LIMIT		
	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE

PLASTICITY

	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

COLOR

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.

GRADATION

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 POORLY GRADED)
GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.

ANGULARITY OF GRAINS

THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.

MINERALOGICAL COMPOSITION

MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.

COMPRESSIBILITY

SLIGHTLY COMPRESSIBLE	LIQUID LIMIT LESS THAN 31
MODERATELY COMPRESSIBLE	LIQUID LIMIT EQUAL TO 31-50
HIGHLY COMPRESSIBLE	LIQUID LIMIT GREATER THAN 50

PERCENTAGE OF MATERIAL

ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL	
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE	1 - 10%
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE	10 - 20%
MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME	20 - 35%
HIGHLY ORGANIC	>10%	>20%	HIGHLY	35% AND ABOVE

GROUND WATER

- WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING
- STATIC WATER LEVEL AFTER 24 HOURS
- PW — PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA
- SPRING OR SEEP

MISCELLANEOUS SYMBOLS

- ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION
- SOIL SYMBOL
- ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT
- INFERRED SOIL BOUNDARY
- INFERRED ROCK LINE
- ALLUVIAL SOIL BOUNDARY
- 25/025 — DIP & DIP DIRECTION OF ROCK STRUCTURES
- SOUNDING ROD
- SPT, CPT, DPT, DMT, PMT, VST — TEST BORING
- AUGER BORING
- CORE BORING
- MW — MONITORING WELL
- PIEZOMETER INSTALLATION
- SLOPE INDICATOR INSTALLATION
- SPT N-VALUE
- REF — SPT REFUSAL

SAMPLE DESIGNATIONS
S - BULK SAMPLE
SS - SPLIT SPOON SAMPLE
ST - SHELBY TUBE SAMPLE
RS - ROCK SAMPLE
RT - RECOMPACTED TRIAXIAL SAMPLE
CBR - CALIFORNIA BEARING RATIO SAMPLE

ABBREVIATIONS

AR - AUGER REFUSAL
BT - BORING TERMINATED
CL. - CLAY
CPT - CONE PENETRATION TEST
CSE. - COARSE
DMT - DILATOMETER TEST
DPT - DYNAMIC PENETRATION TEST
e - VOID RATIO
F - FINE
FOSS. - FOSSILIFEROUS
FRAC. - FRACTURED, FRACTURES
FRAGS. - FRAGMENTS
HI. - HIGHLY
MED. - MEDIUM
MICA. - MICACEOUS
MOD. - MODERATELY
NP - NON PLASTIC
ORG. - ORGANIC
PMT - PRESSUREMETER TEST
SAP. - SAPROLITIC
SD. - SAND, SANDY
SL. - SILT, SILTY
SLI. - SLIGHTLY
TCR - TRICONE REFUSAL
#- MOISTURE CONTENT
V - VERY
VST - VANE SHEAR TEST
WEA. - WEATHERED
γ - UNIT WEIGHT
γ_d - DRY UNIT WEIGHT

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- ☐ MOBILE B-___
- ☐ BK-51
- ■ CME-45C
- ■ CME-550
- ☐ PORTABLE HOIST
- ☐ _____
- ☐ _____

ADVANCING TOOLS:
- ☐ CLAY BITS
- ☐ 6" CONTINUOUS FLIGHT AUGER
- ■ 8" HOLLOW AUGERS
- ■ HARD FACED FINGER BITS
- ☐ TUNG.-CARBIDE INSERTS
- ☐ CASING ☐ W/ ADVANCER
- ☐ TRICONE _____" STEEL TEETH
- ☐ TRICONE _____" TUNG.-CARB.
- ☐ CORE BIT
- ☐ _____

HAMMER TYPE:
- ■ AUTOMATIC ☐ MANUAL

CORE SIZE:
- ☐ -B_____
- ☐ -N_____
- ☐ -H_____

HAND TOOLS:
- ☐ POST HOLE DIGGER
- ☐ HAND AUGER
- ☐ SOUNDING ROD
- ☐ VANE SHEAR TEST
- ☐ _____

ROCK DESCRIPTION

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:

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 YEILD 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.

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. *IF TESTED, WOULD YIELD SPT REFUSAL*
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. *IF TESTED, YIELDS SPT N VALUES > 100 BPF*
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. *IF TESTED, YIELDS SPT N VALUES < 100 BPF*
COMPLETE	ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. 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 FINGERNAIL.

FRACTURE SPACING

TERM	SPACING
VERY WIDE	MORE THAN 10 FEET
WIDE	3 TO 10 FEET
MODERATELY CLOSE	1 TO 3 FEET
CLOSE	0.16 TO 1 FEET
VERY CLOSE	LESS THAN 0.16 FEET

BEDDING

TERM	THICKNESS
VERY THICKLY BEDDED	> 4 FEET
THICKLY BEDDED	1.5 - 4 FEET
THINLY BEDDED	0.16 - 1.5 FEET
VERY THINLY BEDDED	0.03 - 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.

TERMS AND DEFINITIONS

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 DISLODGED 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 (SRQD) - 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.

BENCH MARK: -BL-4 AT -L- STATION 19+98.97, 11.43' LT

ELEVATION: 249.17 FT.

NOTES:

REVISED 02/23/06

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

June 29, 2007

STATE PROJECT: 33649.1.1 (B-4312)
F.A. PROJECT: BRZ-1613 (2)
COUNTY: Warren
DESCRIPTION: Bridge No. 42 on -L- (SR 1613, Shocco Springs Rd.) over Shocco Creek at Station 20+48

SUBJECT: Geotechnical Report – Structure Inventory

Project Description

A single-span bridge, 100-feet in length with a 70° skew, is proposed at the same location on -L- (SR 1613, Shocco Springs Rd.) over Shocco Creek to replace the existing structure. The new bridge is 100 feet long and 33 feet in width, and will accommodate two travel lanes. The existing structure is 53.6 feet in length and 19 feet in width. Stone rubble from an old bridge foundation is located approximately 200 feet downstream. An offsite detour will be used during the construction of the new bridge. The project is located in Warren County outside the city limits of Warrenton.

The subsurface investigation for the structure was conducted during July 2006 using an ATV-mounted CME-45C drill machine, and in June 2007 using an ATV-mounted CME-550 drill machine. Two Standard Penetration Test borings were performed at each end bent location. All borings were advanced until crystalline rock was encountered. Representative soil samples were obtained for visual classification in the field and selected samples were sent to the Materials and Tests Unit for laboratory analysis.

Physiography and Geology

The project is located in the rolling terrain of the Piedmont Physiographic province. The project area is rural, with few homes located nearby. The area along Shocco Creek is wooded. Geologically, the project is located within the Raleigh Belt and is underlain by biotite gneiss and mica schist.

Soil Properties

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

Roadway embankment from the existing alignment was encountered in all borings. Embankment soils are 6.0 feet thick, and are composed of red-orange and brown, very soft to soft, moist, silty clay (A-7-6).

Alluvial soils were encountered in all boring locations. The alluvial soils range from 10.5 to 13.5 feet in thickness. These soils mainly consist of blue-gray, very soft to stiff, moist to wet, sandy silt (A-4), and blue-gray, and gray, very soft to medium stiff, moist, sandy clay (A-6) and silty clay (A-7-5). Blue-gray, medium dense, wet, silty sand (A-2-4) was also encountered. The alluvial soils were deposited on residual soil.

Residual soils were encountered at all boring locations and range from 1.6 to 3.3 feet in thickness. The residual soils consist of orange-tan and gray, medium dense, moist to wet, silty sand (A-2-4), and brown, stiff, sandy silt (A-4). The residual soils are underlain by weathered rock (Mica schist).

Rock Properties

Weathered rock was derived from the underlying bedrock of mica schist. The weathered rock ranges in thickness from 0.6 to 3.7 feet. Weathered rock was encountered in all borings. The top of weathered rock ranges in elevation from 227.0 feet at EB1-B to 231.7 feet at EB1-A.

Crystalline rock was encountered at each boring location. The top of crystalline rock ranges in elevation from 224.1 feet at EB1-B, to 228.0 feet at EB1-A. Crystalline rock at consists of mica schist.

Groundwater

Groundwater was present in all borings. The groundwater elevations range from 240.4 feet at EB2-B to 241.7 feet at EB1-A. Surface water in Shocco Creek was measured at elevation 241.2 feet from the field survey on the Hydraulic Report dated March 2006.

Notice

This Geotechnical foundation report is based on the Bridge Survey and Hydraulic Report for Shocco Creek dated June 14, 2006 and the Preliminary General Drawing dated July 17, 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.

Prepared by,

Nathan Mohs
Engineering Geologist

PROJECT REFERENCE NO.	SHEET
33649.1.1 (B-4312)	4

SITE PLAN

0 50 100

FEET

NAD 83

-L- Sta. 19+98.97 =
-BL- 4 PINC 14+81.27
11.43' LT.
-TI- PINC 7+02.44
ELEV.= 249.17'

WOODS

WOODS

WOODS

WOODS

WOODS

20+00

-L-

-L-

SHOCCO SPRINGS RD. SR 1613

JURISDICTIONAL STREAM
SHOCCO CREEK

OLD STONE BRIDGE
END BENT

OLD BRIDGE
END BENT
STONE RUBBLE

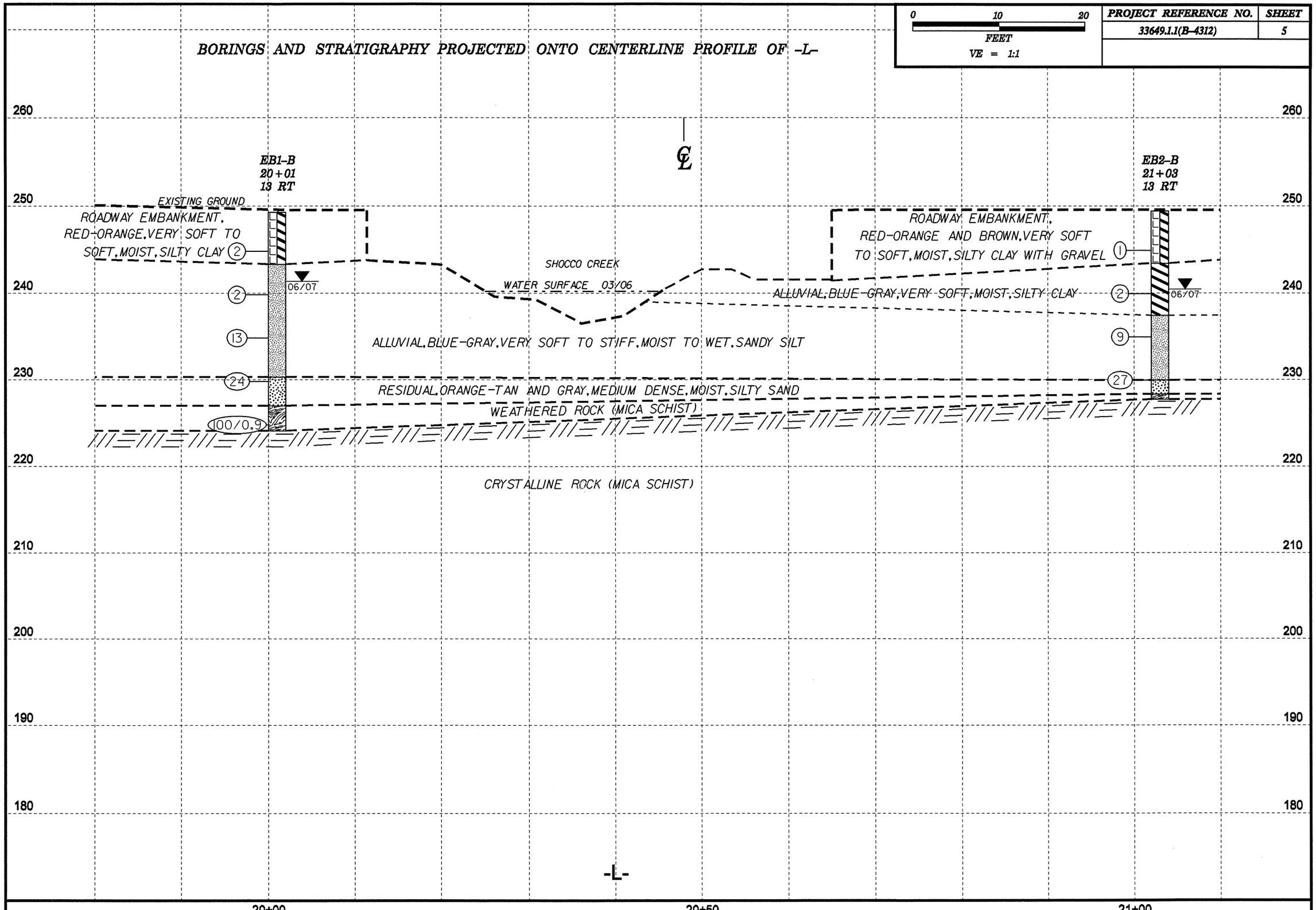
SKEW = 70°

PROPOSED STRUCTURE DRAWING BASED ON HYDRO REPORT DATED 6/14/06

0	10	20
FEET		
VE = 1:1		

PROJECT REFERENCE NO.	SHEET
33649.1.1(B-4312)	5

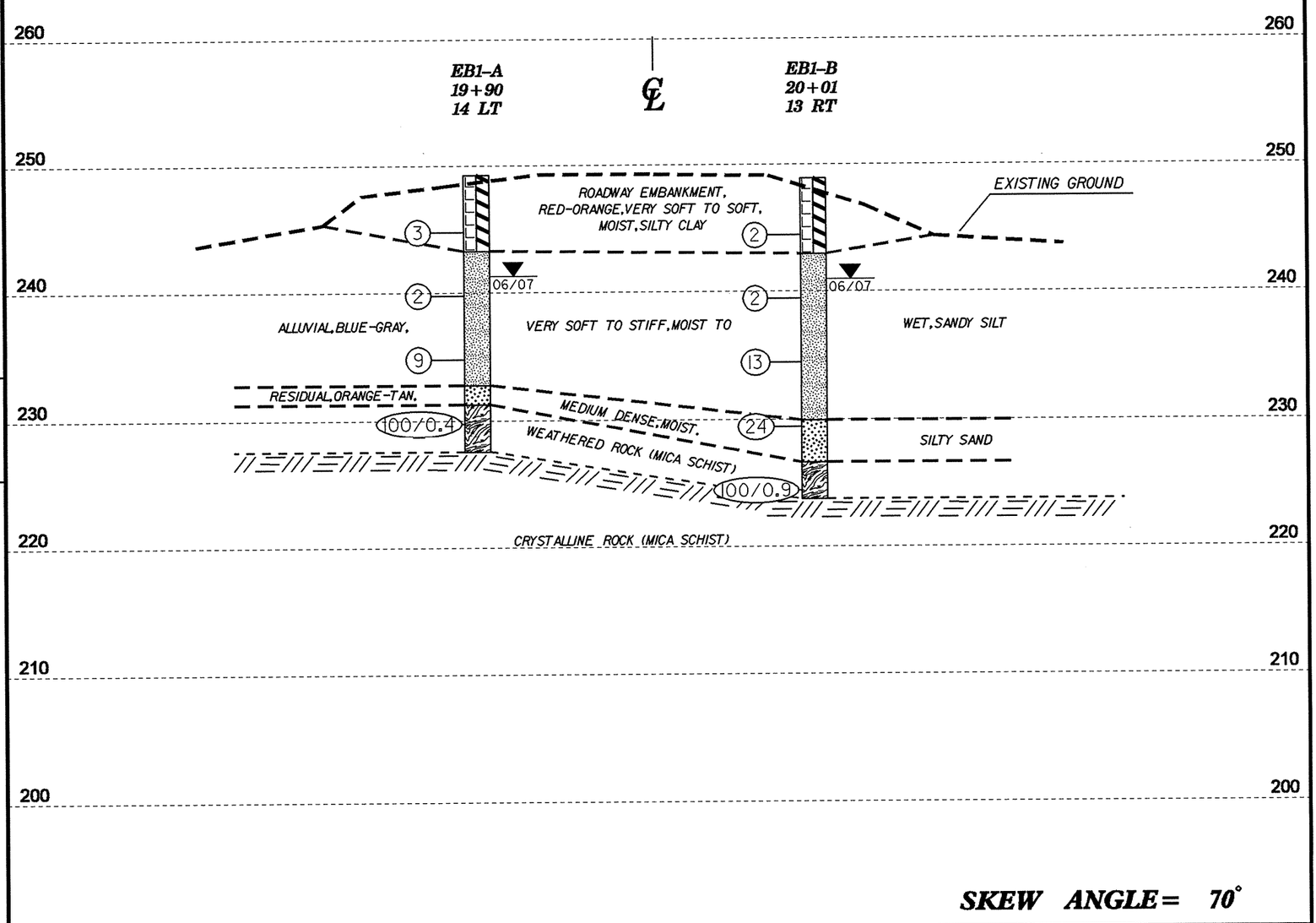
BORINGS AND STRATIGRAPHY PROJECTED ONTO CENTERLINE PROFILE OF -L-



HORIZ. SCALE (FEET) 0 10 20

VE =

CROSS SECTION THROUGH END BENT 1

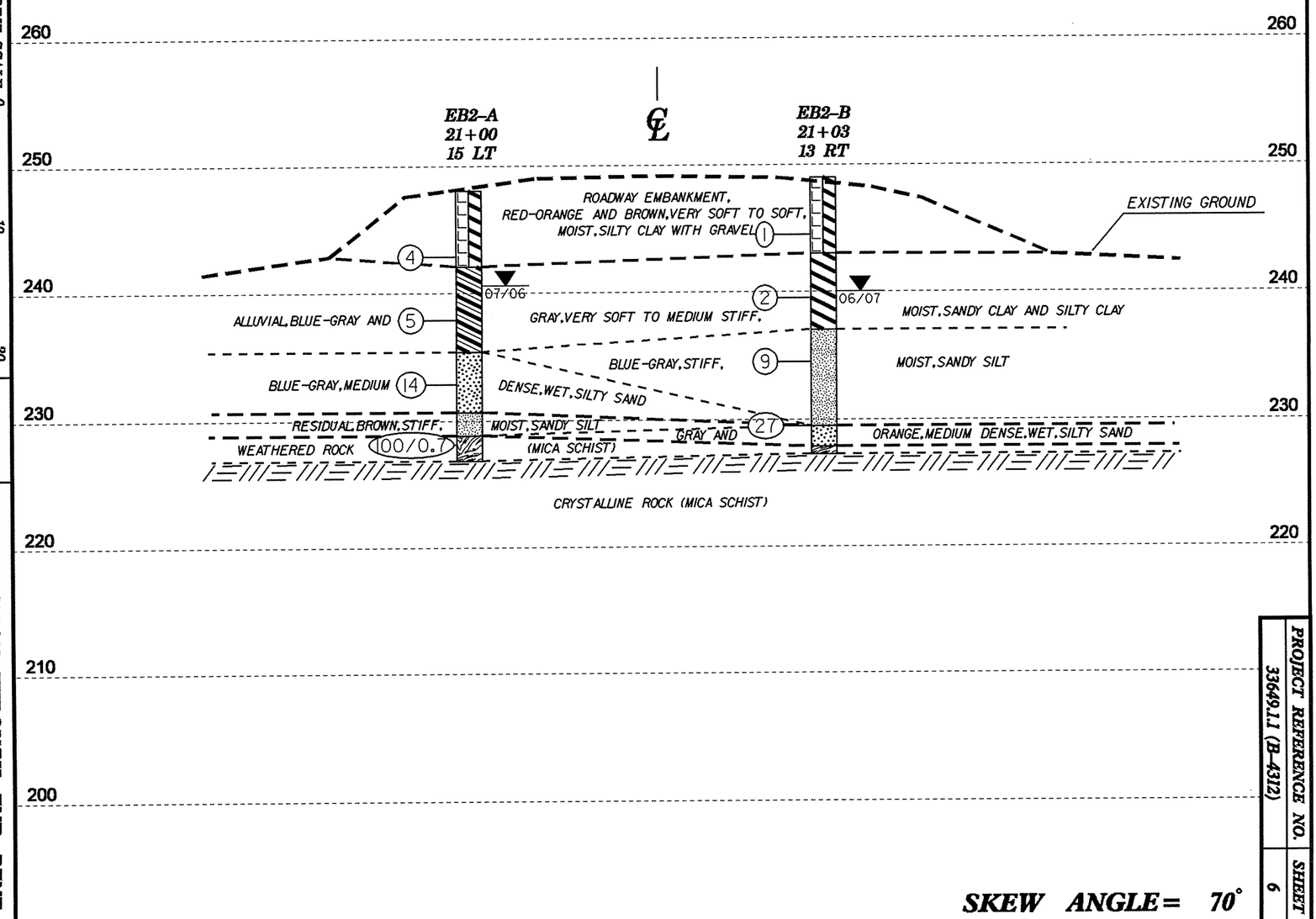


SKEW ANGLE = 70°

HORIZ. SCALE (FEET) 0 10 20

VE =

CROSS SECTION THROUGH END BENT 2



SKEW ANGLE = 70°

PROJECT REFERENCE NO.	SHEET
33649.1.1 (B-4312)	6

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 33649.1.1	**ID.** B-4312	**COUNTY** WARREN	**GEOLOGIST** Mohs, N. D.	
SITE DESCRIPTION BRIDGE No. 42 ON -L- (SR 1613, SHOCCO SPRINGS RD.) OVER SHOCCO CREEK				**GROUND WTR (ft)**
BORING NO. EB1-A	**STATION** 19+90	**OFFSET** 14ft LT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 249.7 ft	**TOTAL DEPTH** 21.7 ft	**NORTHING** 924,577	**EASTING** 2,240,093	**24 HR.** 8.0
DRILL MACHINE CME-550	**DRILL METHOD** H.S. Augers		**HAMMER TYPE** Automatic	
START DATE 06/19/07	**COMP. DATE** 06/19/07	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** 21.7 ft	

ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
255										
									249.7 GROUND SURFACE	0.0
246.2	3.5								**ROADWAY EMBANKMENT** RED-ORANGE, SILTY CLAY	
		2	1	2	3		M		243.7	6.0
241.2	8.5								**ALLUVIAL** BLUE-GRAY, SANDY SILT	
		1	1	1	2		M			
236.2	13.5									
		2	4	5	9		M		233.2	16.5
231.2	18.5								231.7 **RESIDUAL** ORANGE-TAN, SILTY SAND	18.0
		100/0.4			100/0.4				**WEATHERED ROCK** WEATHERED ROCK (MICA SCHIST)	
									228.0	21.7
									Boring Terminated by Auger Refusal at Elevation 228.0 ft on Crystalline Rock (Mica Schist)	

PROJECT NO. 33649.1.1	**ID.** B-4312	**COUNTY** WARREN	**GEOLOGIST** Mohs, N. D.	
SITE DESCRIPTION BRIDGE No. 42 ON -L- (SR 1613, SHOCCO SPRINGS RD.) OVER SHOCCO CREEK				**GROUND WTR (ft)**
BORING NO. EB1-B	**STATION** 20+01	**OFFSET** 13ft RT	**ALIGNMENT** -L-	**0 HR.** 10.0
COLLAR ELEV. 249.3 ft	**TOTAL DEPTH** 25.2 ft	**NORTHING** 924,577	**EASTING** 2,240,122	**24 HR.** 8.0
DRILL MACHINE CME-550	**DRILL METHOD** H.S. Augers		**HAMMER TYPE** Automatic	
START DATE 06/18/07	**COMP. DATE** 06/18/07	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** 25.2 ft	

ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
255										
									249.3 GROUND SURFACE	0.0
245.8	3.5								**ROADWAY EMBANKMENT** RED-ORANGE, SILTY CLAY	
		2	1	1	2	SS-1	M		243.3	6.0
240.8	8.5								**ALLUVIAL** BLUE-GRAY, SANDY SILT	
		1	1	1	2	SS-2	W			
235.8	13.5									
		5	5	8	13		M			
230.3	19.0								230.3	19.0
		2	5	19	24	SS-3	M		**RESIDUAL** ORANGE-TAN, SILTY SAND	
225.8	23.5								227.0	22.3
		27	73/0.4		100/0.9				**WEATHERED ROCK** WEATHERED ROCK (MICA SCHIST)	
									224.1	25.2
									Boring Terminated by Auger Refusal at Elevation 224.1 ft on Crystalline Rock (Mica Schist)	

NCDOT BORE DOUBLE B4312_GEO_BH.GPJ NC_DOT.GDT 07/05/07

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 33649.1.1	**ID.** B-4312	**COUNTY** WARREN		**GEOLOGIST** Czajka, C. D.
SITE DESCRIPTION BRIDGE No. 42 ON -L- (SR 1613, SHOCCO SPRINGS RD.) OVER SHOCCO CREEK				**GROUND WTR (ft)**
BORING NO. EB2-A	**STATION** 21+00	**OFFSET** 15ft LT	**ALIGNMENT** -L-	**0 HR.** 11.3
COLLAR ELEV. 248.5 ft	**TOTAL DEPTH** 21.2 ft	**NORTHING** 924,679	**EASTING** 2,240,135	**24 HR.** 7.5
DRILL MACHINE CME-45C	**DRILL METHOD** H.S. Augers		**HAMMER TYPE** Automatic	
START DATE 07/26/06	**COMP. DATE** 07/26/06	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** 21.2 ft	

ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
255										
									248.5 GROUND SURFACE	0.0
									ROADWAY EMBANKMENT BROWN, SILTY CLAY WITH GRAVEL	
244.3	4.2									
		4	2	2	4		M		242.5 **ALLUVIAL** BLUE-GRAY, SANDY CLAY	6.0
239.3	9.2									
		3	2	3	5	SS-7	M			
234.3	14.2								235.8 BLUE-GRAY, SILTY SAND	12.7
		7	8	6	14	SS-8	W			
229.3	19.2								231.1 **RESIDUAL** BROWN, SANDY SILT	17.4
		24	76/0.2		100/0.7				229.3 **WEATHERED ROCK** (MICA SCHIST)	19.2
									227.3 Boring Terminated by Auger Refusal at Elevation 227.3 ft on Crystalline Rock (Mica Schist)	21.2

PROJECT NO. 33649.1.1	**ID.** B-4312	**COUNTY** WARREN		**GEOLOGIST** Mohs, N. D.
SITE DESCRIPTION BRIDGE No. 42 ON -L- (SR 1613, SHOCCO SPRINGS RD.) OVER SHOCCO CREEK				**GROUND WTR (ft)**
BORING NO. EB2-B	**STATION** 21+03	**OFFSET** 13ft RT	**ALIGNMENT** -L-	**0 HR.** 10.0
COLLAR ELEV. 249.4 ft	**TOTAL DEPTH** 21.7 ft	**NORTHING** 924,671	**EASTING** 2,240,162	**24 HR.** 9.0
DRILL MACHINE CME-550	**DRILL METHOD** H.S. Augers		**HAMMER TYPE** Automatic	
START DATE 06/19/07	**COMP. DATE** 06/19/07	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** 21.7 ft	

ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	
255										
									249.4 GROUND SURFACE	0.0
									ROADWAY EMBANKMENT RED-BROWN, SILTY CLAY	
245.9	3.5									
		1	0	1	1		M		243.4 **ALLUVIAL** GRAY, SILTY CLAY	6.0
240.9	8.5									
		1	1	1	2	SS-4	M			
235.9	13.5								237.4 BLUE-GRAY, SANDY SILT	12.0
		3	4	5	9	SS-5	M			
230.9	18.5									
		1	5	22	27		W		229.9	19.5
									228.3 **RESIDUAL** GRAY AND ORANGE, SILTY SAND	21.1
									227.7 **WEATHERED ROCK** WEATHERED ROCK (MICA SCHIST)	21.7
									Boring Terminated by Auger Refusal at Elevation 227.7 ft on Crystalline Rock (Mica Schist)	

NCDOT BORE DOUBLE B4312_GEO_BH.GPJ NC_DOT.GDT 07/05/07

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-1	13 RT	20+01	3.5-5.0	A-7-6(12)	42	20	9.7	29.6	20.2	40.5	99	93	68	-	-
SS-2	13 RT	20+01	8.5-10.0	A-4(5)	29	9	2.4	33.4	31.7	32.4	100	99	74	-	-
SS-3	13 RT	20+01	19.0-20.0	A-2-4(0)	29	NP	17.2	54.9	23.8	4.1	85	77	35	-	-

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-7	15 LT	21+00	9.2-10.7	A-6(8)	31	13	1.6	33.4	26.3	38.7	100	99	74	-	-
SS-8	15 LT	21+00	14.2-15.7	A-2-4(0)	24	NP	16.9	73.3	3.7	6.1	100	98	17	-	-

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-4	13 RT	21+03	8.5-10.0	A-7-5(26)	54	21	0.8	3.4	32.9	62.8	100	100	97	-	-
SS-5	13 RT	21+03	13.5-15.0	A-4(1)	26	6	0.6	54.7	20.4	24.3	100	100	58	-	-

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL ENGINEERING UNIT

FIELD SCOUR REPORT

WBS: 33649.1.1 TIP: B-4312 COUNTY: WARREN

DESCRIPTION(1): BRIDGE NO. 42 ON -L- (SR 1613, SHOCCO SPRINGS RD.) OVER SHOCCO CREEK

EXISTING BRIDGE

Information from: Field Inspection X Microfilm ____ (reel ____ pos: ____)
Other (explain) ____

Bridge No.: 42 Length: 53.6' Total Bents: 4 Bents in Channel: 2 Bents in Floodplain: 2
Foundation Type: TIMBER PILES

EVIDENCE OF SCOUR(2)

Abutments or End Bent Slopes: LARGE (4'X10') SCOUR PIT ON END BENT ONE SLOPE.
SMALL (2'X3') SCOUR PIT ON UPSTREAM SIDE OF END BENT TWO.

Interior Bents: MODERATE SCOUR. RIP-RAP PLACED AROUND ALL PILES.

Channel Bed: NONE.

Channel Bank: NONE

EXISTING SCOUR PROTECTION

Type(3): RIP-RAP

Extent(4): SURROUNDING INTERIOR BENT PILES, SOME ON END BENT SLOPES

Effectiveness(5): EFFECTIVE

Obstructions(6): NONE

DESIGN INFORMATION

Channel Bed Material(7): SILTY CLAY (A-7-6) AND SANDY SILT (A-4)

Channel Bank Material(8): BROWN, SANDY CLAY

Channel Bank Cover(9): VINES AND BRUSH

Floodplain Width(10): 150' TO 200'

Floodplain Cover(11): TREES AND BRUSH

Stream is(12): Aggrading ____ Degrading X Static ____

Channel Migration Tendency(13): SOUTH

Observations and Other Comments: ____

DESIGN SCOUR ELEVATIONS(14) Feet X Meters ____

BENTS EB1	EB2									
226.6	227.8									

Comparison of DSE to Hydraulics Unit theoretical scour:
The DSE ranges between 226.6 and 227.8 feet across the site, compared to the Hydraulic Units Theoretical Scour Elevation of 224.8 feet for the 100 year event.

SOIL ANALYSIS RESULTS FROM CHANNEL BED AND BANK MATERIAL

	BED	BANK					
Sample No.	SS-2	SS-4					
Retained #4							
Passed #10	100	100					
Passed #40	99	100					
Passed #200	74	97					
Coarse Sand	2.4	0.8					
Fine Sand	33.4	3.4					
Silt	31.7	32.9					
Clay	32.4	62.8					
LL	29	54					
PI	2	21					
AASHTO	A-4 (5)	A-7-5 (26)					
Station	20+01	21+03					
Offset	13 RT	13 RT					
Depth	8.5-10.0	8.5-10.0					

Template Revised 02/07/06

Reported by: NATHAN MOHS **Date:** 6/18/2007

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).
14 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.

SITE PHOTOGRAPH

BRIDGE No. 42 ON -L- (SR 1613, SHOCCO SPRINGS RD.) OVER SHOCCO CREEK

LOOKING NORTHWEST FROM EB1-B