

CONTRACT: ID: R-2911B

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

GEOTECHNICAL UNIT

STRUCTURE SUBSURFACE INVESTIGATION

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2911B	1	30
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
		P.E.	
		CONST.	

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CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WAS 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 UNIT @ (919) 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA IS 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.

STATE PROJECT 34517.1.1 I.D. NO. R-2911B

F.A. PROJECT _____

COUNTY ROWAN

PROJECT DESCRIPTION US 70 FROM
IREDELL COUNTY LINE TO EAST OF
SR 1001 (AMITY HILL RD.)

SITE DESCRIPTION BRIDGE ON US 70
OVER THIRD CREEK

INVESTIGATED BY J.E. BEVERLY PERSONNEL J.K. STICKNEY

CHECKED BY C.B. LITTLE C.L. SMITH

SUBMITTED BY C.B. LITTLE K. WISE

DATE NOVEMBER 2005

DRAWN BY: J.E. BEVERLY

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.

12-22-05

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION





DIVISION OF HIGHWAYS

GEOTECHNICAL UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

ID	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
R-2911B	34517.1.1	2	30

SOIL DESCRIPTION		GRADATION		ROCK DESCRIPTION		TERMS AND DEFINITIONS					
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED OR WEATHERED EARTH MATERIALS WHICH CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND WHICH YIELDS LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM AND BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE: <i>VERY STIFF, GRAY SILTY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6</i>		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 ARE DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.		HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WHEN 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 6.1 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)  CRYSTALLINE ROCK (CR)  NON-CRYSTALLINE ROCK (NCR)  COASTAL PLAIN SEDIMENTARY ROCK (CP)		ALLUVIUM (ALLUV.) - SOILS WHICH 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 WHICH 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 DISLOGGED FROM PARENT MATERIAL. FLOOD PLAIN (F.P.) - 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 SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (R.Q.D.) - 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 WHICH 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, WHICH 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 (IN OR B.P.F.) 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 LESS THAN 0.1 FOOT PENETRATION WITH 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 (S.R.Q.D.) - A MEASURE OF ROCK QUALITY DESCRIBED BY: TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 10 CENTIMETERS DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (T.S.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.					
SOIL LEGEND AND AASHTO CLASSIFICATION		MINERALOGICAL COMPOSITION		WEATHERING							
GENERAL CLASS. GRANULAR MATERIALS (>5% PASSING #200) SILT-CLAY MATERIALS (>85% PASSING #200) ORGANIC MATERIALS		MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEREVER THEY ARE CONSIDERED OF SIGNIFICANCE.		FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER HAMMER IF CRYSTALLINE. VERY SLIGHT (V. SL.) 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 (SL.) ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED, CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS. MODERATE (MOD.) SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK. MODERATELY SEVERE (MOD. SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. <i>IF TESTED, YIELDS SPT REFUSAL</i> SEVERE (SEV.) ALL ROCKS EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT, SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. <i>IF TESTED, YIELDS SPT N VALUES > 100 BPF</i> VERY SEVERE (V. SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. <i>IF TESTED, YIELDS SPT N VALUES < 100 BPF</i> COMPLETE ROCK REDUCED TO SOIL, ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.		COMPRESSIONIBILITY SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN 30 MODERATELY COMPRESSIBLE LIQUID LIMIT 31-50 HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THAN 50		WEATHERING FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER HAMMER IF CRYSTALLINE. VERY SLIGHT (V. SL.) 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 (SL.) ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED, CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS. MODERATE (MOD.) SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK. MODERATELY SEVERE (MOD. SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. <i>IF TESTED, YIELDS SPT REFUSAL</i> SEVERE (SEV.) ALL ROCKS EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT, SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. <i>IF TESTED, YIELDS SPT N VALUES > 100 BPF</i> VERY SEVERE (V. SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. <i>IF TESTED, YIELDS SPT N VALUES < 100 BPF</i> COMPLETE ROCK REDUCED TO SOIL, ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.			
GROUP CLASS. A-1, A-3, A-2, A-4, A-5, A-6, A-7, A-1-A, A-1-B, A-2-1, A-2-5, A-2-6, A-2-7, A-4, A-5, A-6, A-7, A-1, A-2, A-3, A-4, A-5, A-6, A-7		PERCENTAGE OF MATERIAL ORGANIC MATERIAL GRANULAR SILT-CLAY OTHER MATERIAL TRACE OF ORGANIC MATTER SOILS SOILS LITTLE LITTLE ORGANIC MATTER 2 - 3% 3 - 5% 3 - 5% MODERATELY ORGANIC 3 - 5% 5 - 12% LITTLE HIGHLY ORGANIC 5 - 10% 12 - 20% SOME >10% >20% HIGHLY		NON-COASTAL PLAIN MATERIAL THAT YIELDS SPT N VALUES > 100 BLOWS PER FOOT. FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC. FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC. COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.							
SYMBOL		GROUND WATER WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING. STATIC WATER LEVEL AFTER 24 HOURS. PERCHED WATER, SATURATED ZONE OR WATER BEARING STRATA SPRING OR SEEPAGE		GROUND WATER WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING. STATIC WATER LEVEL AFTER 24 HOURS. PERCHED WATER, SATURATED ZONE OR WATER BEARING STRATA SPRING OR SEEPAGE							
% PASSING #10 #40 #200		MISCELLANEOUS SYMBOLS ROADWAY EMBANKMENT WITH SOIL DESCRIPTION SOIL SYMBOL ARTIFICIAL FILL OTHER THAN ROADWAY EMBANKMENTS INFERRED SOIL BOUNDARIES INFERRED ROCK LINE ALLUVIAL SOIL BOUNDARY DIP/DIP DIRECTION OF ROCK STRUCTURES SOUNDING ROD		MISCELLANEOUS SYMBOLS SPT TEST BORING AUGER BORING CORE BORING MONITORING WELL PIEZOMETER INSTALLATION SLOPE INDICATOR INSTALLATION SPT N-VALUE SPT REFUSAL							
LIQUID LIMIT PLASTIC INDEX GROUP INDEX		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 FRAGS - FRAGMENTS MED - MEDIUM PMT - PRESSUREMETER TEST SD - SAND, SANDY SL - SILT, SILTY SLI - SLIGHTLY TCR - TRICONE REFUSAL γ - UNIT WEIGHT γ _d - DRY UNIT WEIGHT w - MOISTURE CONTENT v - VERY VST - VANE SHEAR TEST		ABBREVIATIONS PMT - PRESSUREMETER TEST SD - SAND, SANDY SL - SILT, SILTY SLI - SLIGHTLY TCR - TRICONE REFUSAL γ - UNIT WEIGHT γ _d - DRY UNIT WEIGHT w - MOISTURE CONTENT v - VERY VST - VANE SHEAR TEST							
USUAL TYPES OF MAJOR MATERIALS		EQUIPMENT USED ON SUBJECT PROJECT DRILL UNITS: MOBILE B- BK-51 CME-45C CME-550X PORTABLE HOIST OTHER OTHER		EQUIPMENT USED ON SUBJECT PROJECT ADVANCING TOOLS: CLAY BITS 6" CONTINUOUS FLIGHT AUGER 6" HOLLOW AUGERS HARD FACED FINGER BITS TUNG-CARBIDE INSERTS CASING w/ ADVANCER TRICONE STEEL TEETH TRICONE TUNG-CARB. CORE BIT OTHER		EQUIPMENT USED ON SUBJECT PROJECT HAMMER TYPE: AUTOMATIC MANUAL CORE SIZE: B N XWL H HAND TOOLS: POST HOLE DIGGER HAND AUGER SOUNDING ROD VANE SHEAR TEST OTHER					
GEN. RATINGS AS A SUBGRADE		TEXTURE OR GRAIN SIZE U.S. STD. SIEVE SIZE OPENING (MM) BOULDER (BLDR.) COBBLE (COB.) GRAVEL (GR.) COARSE SAND (CSE, SD.) FINE SAND (F, SD.) SILT (SL.) CLAY (CL.) GRAIN SIZE MM IN. 305 12' 75 3' 2.0 0.25 0.05 0.005		TEXTURE OR GRAIN SIZE U.S. STD. SIEVE SIZE OPENING (MM) BOULDER (BLDR.) COBBLE (COB.) GRAVEL (GR.) COARSE SAND (CSE, SD.) FINE SAND (F, SD.) SILT (SL.) CLAY (CL.) GRAIN SIZE MM IN. 305 12' 75 3' 2.0 0.25 0.05 0.005							
CONSISTENCY OR DENSENESS		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 PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK. SOFT CAN BE GROOVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE. VERY SOFT CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGER NAIL.		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 PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK. SOFT CAN BE GROOVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE. VERY SOFT CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGER NAIL.							
PRIMARY SOIL TYPE		SOIL MOISTURE - CORRELATION OF TERMS SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION LL LIQUID LIMIT - SATURATED - (SAT.) USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE PLASTIC RANGE (PI) PL PLASTIC LIMIT - WET - (W) SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE SL SHRINKAGE LIMIT - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE		SOIL MOISTURE - CORRELATION OF TERMS SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION LL LIQUID LIMIT - SATURATED - (SAT.) USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE PLASTIC RANGE (PI) PL PLASTIC LIMIT - WET - (W) SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE SL SHRINKAGE LIMIT - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE							
PLASTICITY		FRACATURE 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		FRACATURE 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							
COLOR		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		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							
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YEL-BRN, BLUE-GRAY) MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.		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.		INDURATION FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC. FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE. MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER. INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER. EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.							
		BENCH MARK: BL #12 AT -L- STATION 136+91.47, 0.43' LT		ELEVATION: 716.65							
		NOTES:									

Bent 2:

Bent 2 lies along the western creek bank and a total of 4 borings were performed along its length. The stratigraphic soil sequence begins with 5 to 9 feet of alluvial soft to medium stiff tan-brown micaceous clayey sandy silt (A-4). Residual soil underlies alluvium between 687.5 and 689 feet and is comprised of 4 to 11 feet of stiff to hard gray-white sandy silt (A-4). Weathered rock lies at the base of residual material at the following elevations:

Boring #	Weathered Rock Elevation (feet)	Hard Rock Elevation (feet)
B2-A LT LN	683.40	N/A
B2-B LT LN	681.70	N/A
B2-A RT LN	680.83	N/A
B2-B RT LN	677.00	675.30

Bent 3:

Bent 3 lies along the eastern creek bank and a total of 4 borings were performed along its length. Alluvium up to 18 feet in thickness is encountered at all boring locations and consists of very loose to loose gray silty clayey sand (A-2-4, A-1-b) and soft to medium stiff brown-gray clayey sandy silt (A-4). Residual soil underlies alluvium between 687 and 688 feet and is comprised of 6 to 12 feet of hard brown-gray micaceous clayey sandy silt (A-4). Weathered rock lies at the base of residual material at the following elevations:

Boring #	Weathered Rock Elevation (feet)	Hard Rock Elevation (feet)
B3-A LT LN	675.80	N/A
B3-B LT LN	674.90	N/A
B3-A RT LN	680.68	664.58
B3-B RT LN	680.50	677.70

End Bent 2:

End Bent 2 lies east of Third Creek and 4 borings were performed along its length. Our 2 left lane borings were performed through the existing roadway fill that is comprised of 14.5 feet of medium stiff red-brown silty sandy clay (A-7-5). Beneath the left lane fill, and beginning at the ground surface in right lane borings, alluvial soil is present and consists of up to 17 feet of loose to medium dense brown-gray silty clayey sand (A-2-4, A-1-b). Residual soil follows between elevation 688 and 690 feet and consists of medium dense to very dense gray-white silty sand (A-2-4). Weathered rock lies at the base of residual material at the following elevations:


Boring #	Weathered Rock Elevation (feet)	Hard Rock Elevation (feet)
B3-A LT LN	677.70	N/A
B3-B LT LN	682.60	N/A
B3-A RT LN	687.50	670.47
B3-B RT LN	684.37	682.27

Groundwater

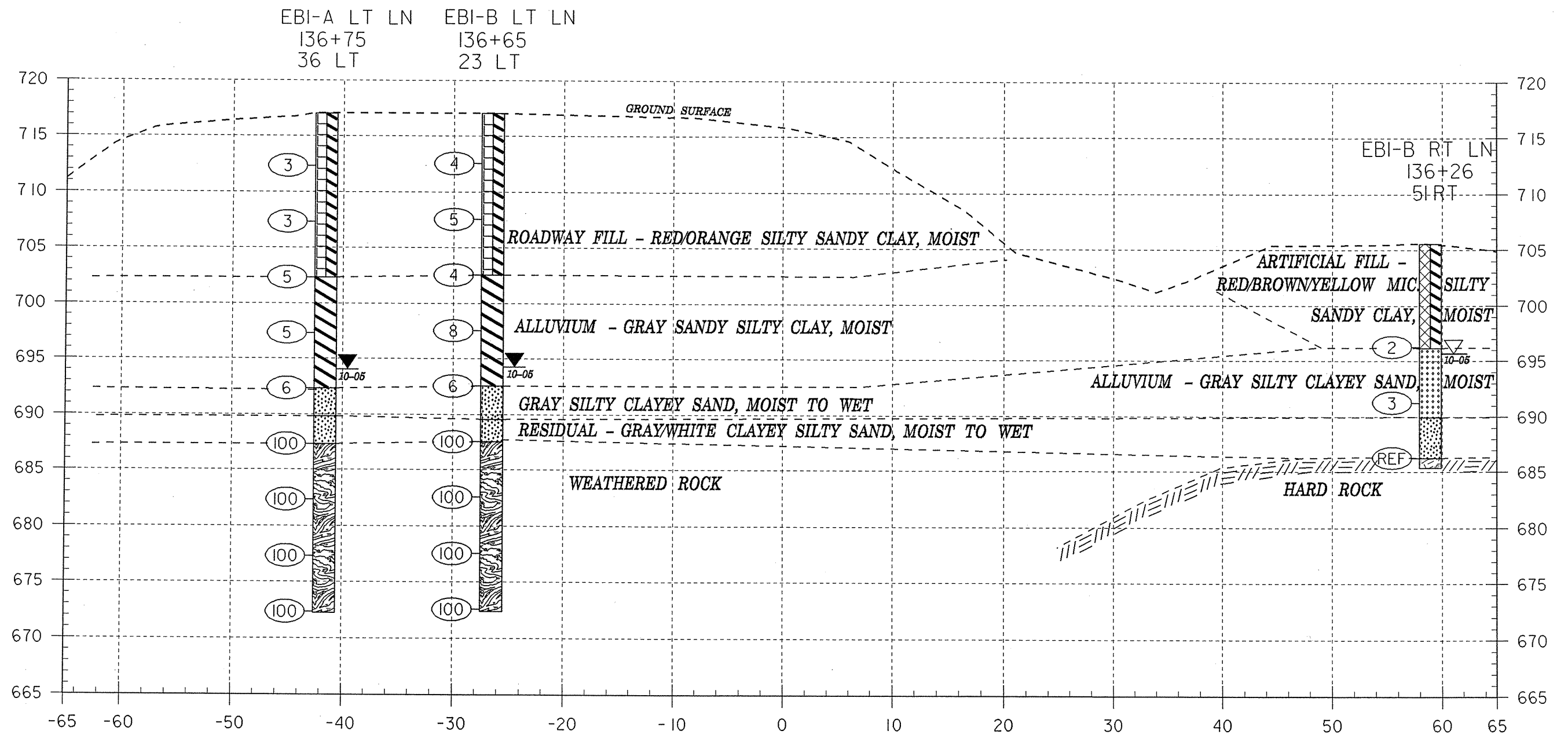
Groundwater measurements taken more than 24 hours after each boring was performed indicate the static groundwater table lies at approximate elevation 695 feet.

Respectfully submitted,

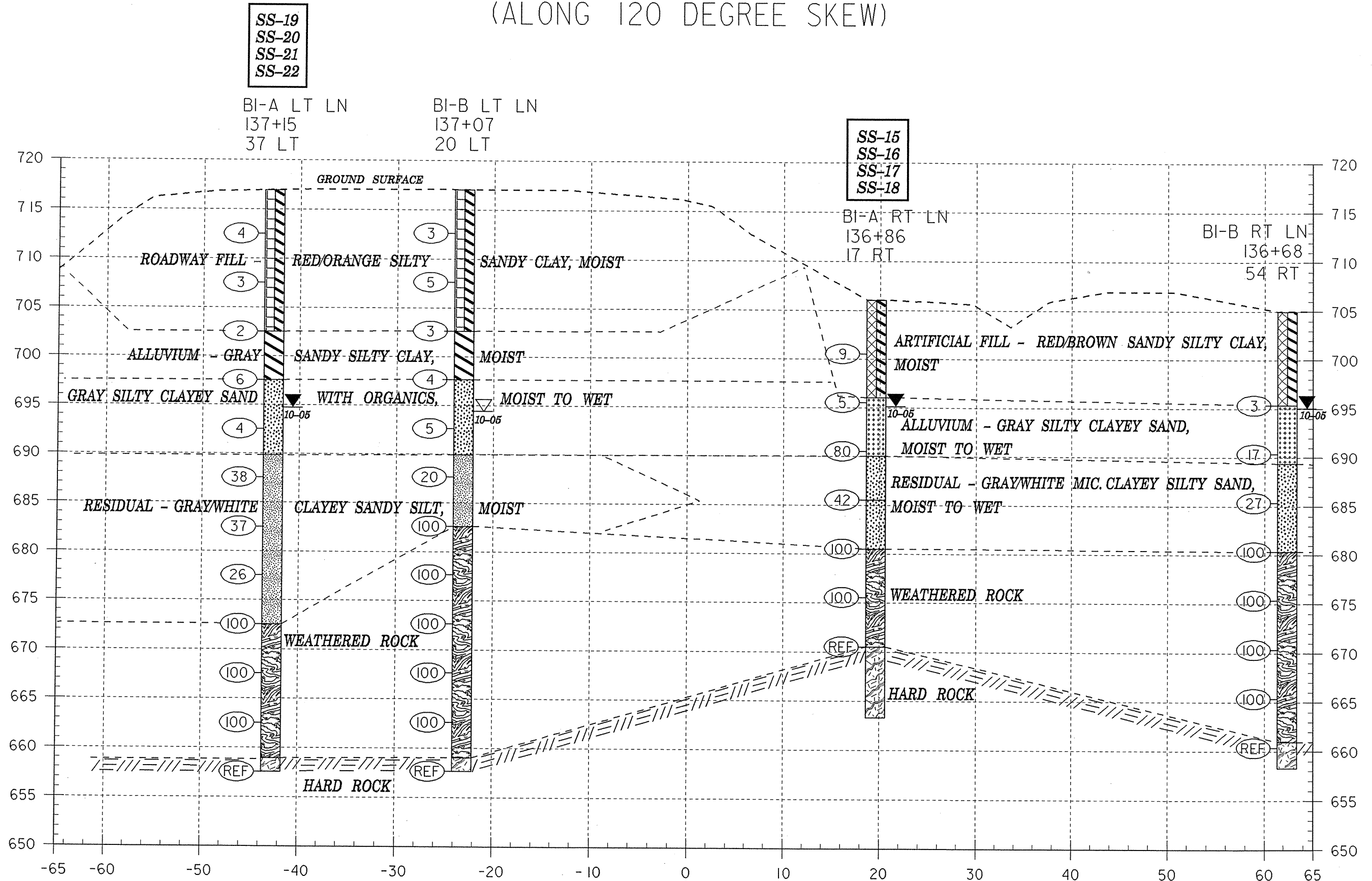
J.E. Beverly, Project Geologist



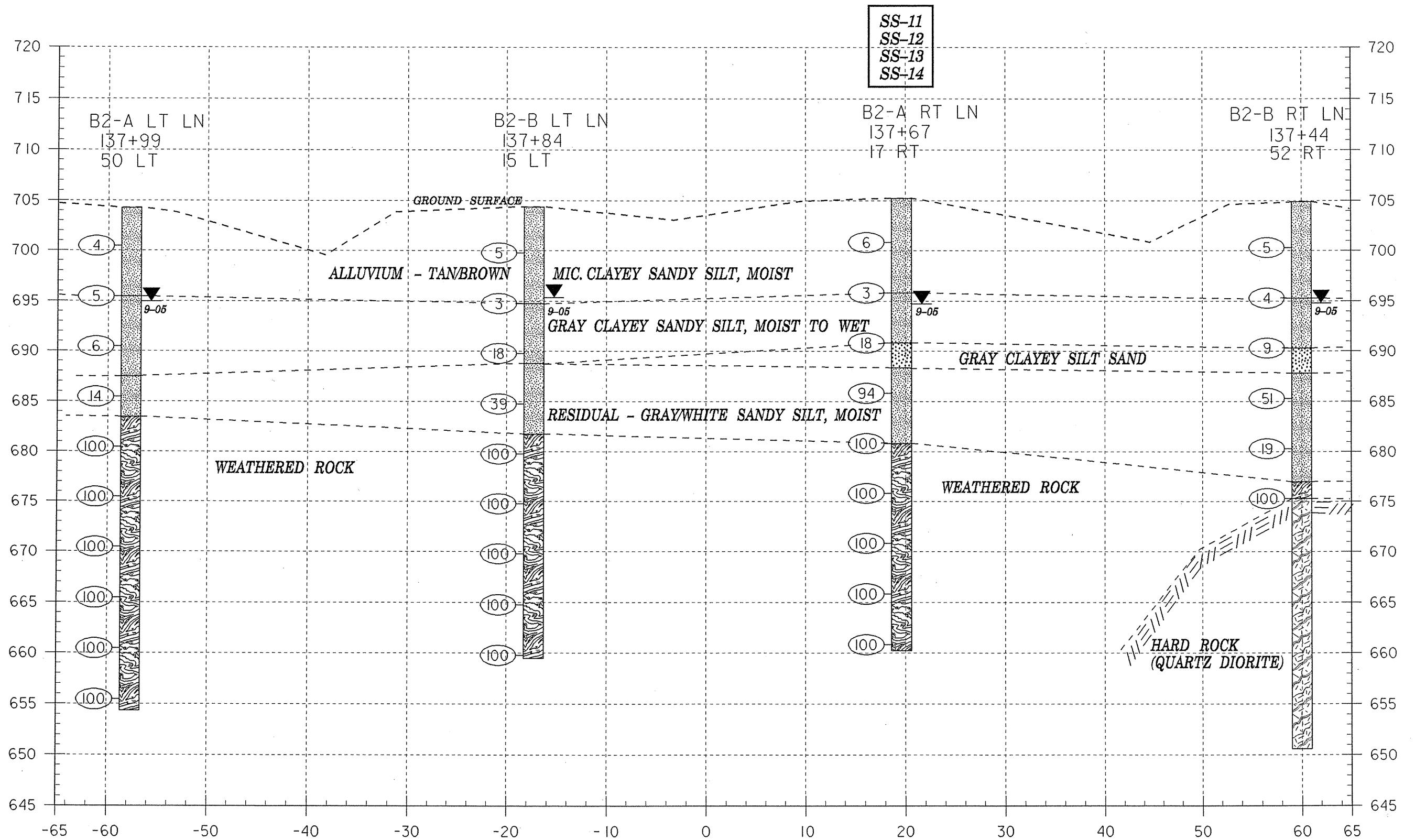
SECTION THRU EBI-A LT LN, EBI-B LT LN, & EBI-B RT LN (ALONG 120 DEGREE SKEW)



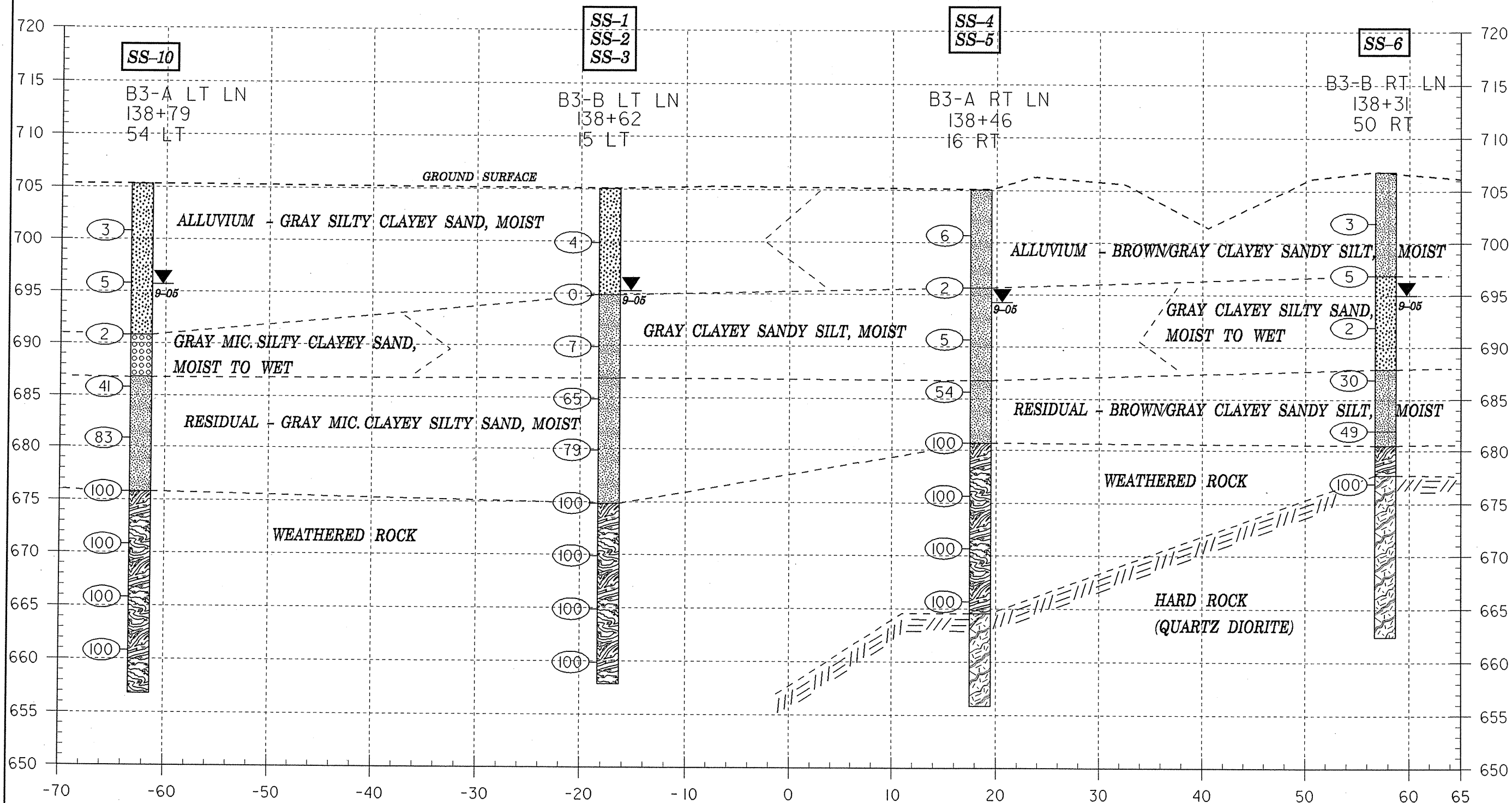
SECTION THRU BI-A LT LN, BI-B LT LN, BI-A RT LN, & BI-B RT LN (ALONG 120 DEGREE SKEW)



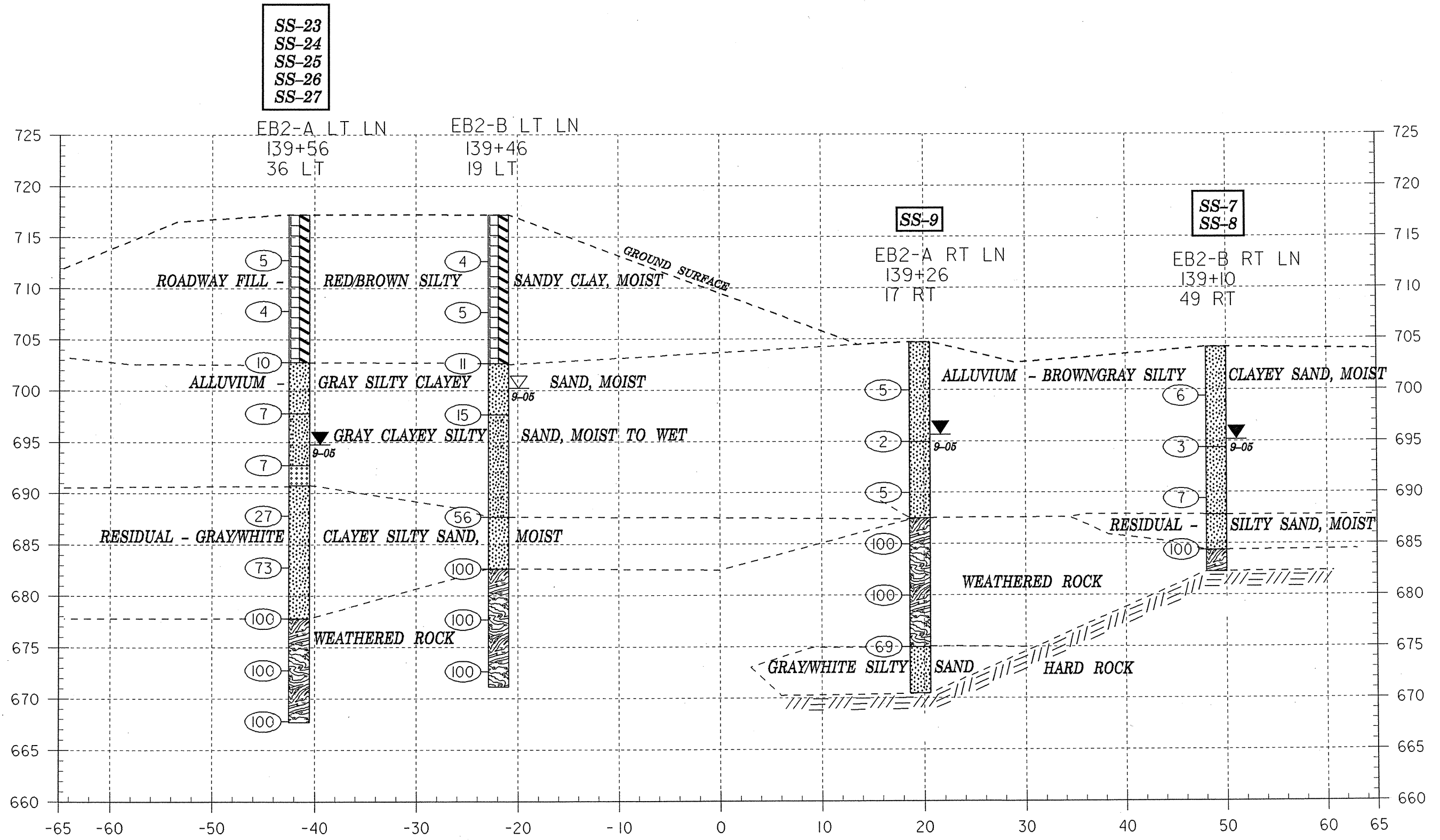
SECTION THRU B2-A LT LN, B2-B LT LN, B2-A RT LN & B2-B RT LN
(ALONG 120 DEGREE SKEW)



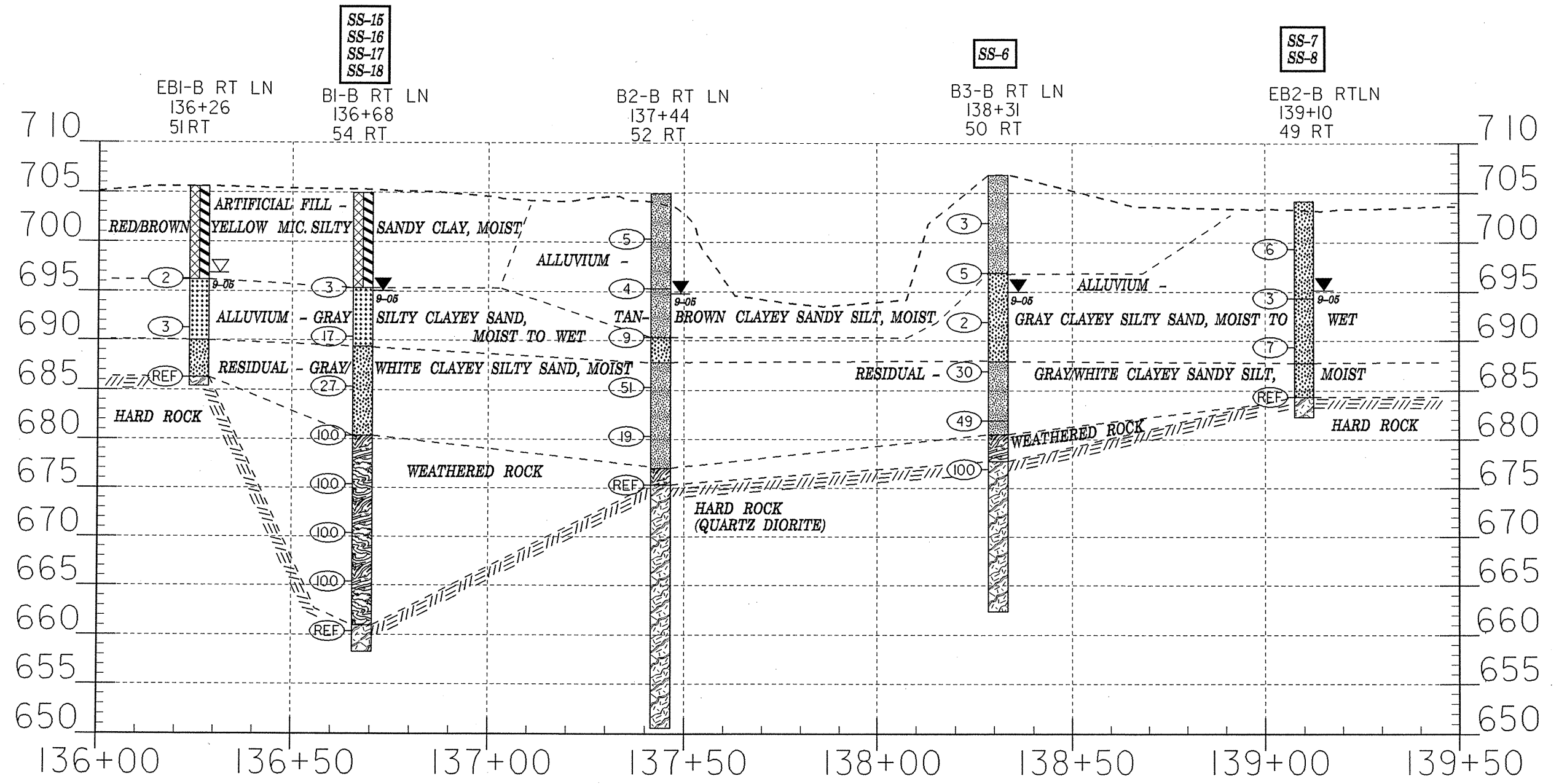
SECTION THRU B3-A LT LN, B3-B LT LN, B3-A RT LN, & B3-B RT LN
(ALONG 120 DEGREE SKEW)



SECTION THRU EB2-1 LT LN, EB2-B LT LN, EB2-A RT LN, & EB2-B RT LN (ALONG 120 DEGREE SKEW)



PROFILE 50' RT



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

PROJECT NO 34517.1.1		ID R-2911B		COUNTY ROWAN		GEOLOGIST JAY STICKNEY						
SITE DESCRIPTION DUAL BRIDGES OVER THIRD CREEK ON US 70							GND WATER					
BORING NO EB1-A LT LN		NORTHING 0.00		EASTING 0.00		0 HR 22.60ft						
ALIGNMENT L		BORING LOCATION 136+75.000		OFFSET 36.00ft LT		24 HR 23.00ft						
COLLAR ELEV 717.04ft		TOTAL DEPTH 44.80ft		START DATE 9/29/05		COMPLETION DATE 09/29/05						
DRILL MACHINE CME-550X			DRILL METHOD NW CASING			HAMMER TYPE AUTOMATIC						
SURFACE WATER DEPTH			DEPTH TO ROCK N/A			Log EB1-A LT LN, Page 1 of 1						
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT				SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION
		6in	6in	6in		0	25	50	75			
717.04												Ground Surface
	4.70	1	1	2	1.5							ROADWAY FILL- RED/ORANGE SILTY SANDY CLAY
710.00												
	9.70	1	2	1	1.5							ROADWAY FILL- RED/ORANGE SILTY SANDY CLAY
	14.70	1	3	2	1.5							
700.00												
	19.70	1	3	2	1.5							ALLUVIUM- GRAY SANDY SILTY CLAY
	24.70	1	2	4	1.5							
690.00												
	29.70	100			0.3				100			GRAY SILTY CLAYEY SAND
	34.70	100			0.1				100			RESIDUAL- GRAY/WHITE CLAYEY SILTY SAND
680.00												WEATHERED ROCK
	39.70	100			0.3				100			
672.24	44.70	100			0.1				100			
BORING TERMINATED IN WEATHERED ROCK AT ELEVATION 672.24'												

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

PROJECT NO 34517.1.1		ID R-2911B		COUNTY ROWAN		GEOLOGIST JAY STICKNEY						
SITE DESCRIPTION DUAL BRIDGES OVER THIRD CREEK ON US 70							GND WATER					
BORING NO EB1-B LT LN		NORTHING 0.00		EASTING 0.00		0 HR 20.00ft						
ALIGNMENT L		BORING LOCATION 136+65.000		OFFSET 23.00ft LT		24 HR 22.80ft						
COLLAR ELEV 717.05ft		TOTAL DEPTH 44.70ft		START DATE 10/03/05		COMPLETION DATE 10/03/05						
DRILL MACHINE CME-550X			DRILL METHOD NW CASING			HAMMER TYPE AUTOMATIC						
SURFACE WATER DEPTH N/A			DEPTH TO ROCK N/A			Log EB1-B LT LN, Page 1 of 1						
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT				SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION
		6in	6in	6in		0	25	50	75			
717.05												Ground Surface
	4.50	1	2	2	1.5							ROADWAY FILL- RED/ORANGE SILTY SANDY CLAY
710.00												
	9.50	1	2	3	1.5							ROADWAY FILL- RED/ORANGE SILTY SANDY CLAY
	14.50	1	2	2	1.5							
700.00												
	19.50	3	4	4	1.5							ALLUVIUM- GRAY SANDY SILTY CLAY
	24.50	1	2	4	1.5							
690.00												
	29.50	100			0.1				100			GRAY SILTY CLAY SAND
	34.50	100			0.4				100			RESIDUAL - GRAY/WHITE CLAYEY SILTY SAND
680.00												WEATHERED ROCK
	39.50	100			0.4				100			
672.35	44.50	100			0.2				100			
BORING TERMINATED IN WEATHERED ROCK AT ELEVATION 672.35'												

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

Sheet 12

PROJECT NO 34517.1.1		ID R-2911B		COUNTY ROWAN		GEOLOGIST JAY STICKNEY								
SITE DESCRIPTION DUAL BRIDGES OVER THIRD CREEK ON US 70							GND WATER							
BORING NO EB1-B RT LN		NORTHING 0.00		EASTING 0.00		0 HR 9.90ft								
ALIGNMENT L		BORING LOCATION 136+26.000		OFFSET 51.00ft RT		24 HR N/A								
COLLAR ELEV 705.58ft		TOTAL DEPTH 20.20ft		START DATE 10/04/05		COMPLETION DATE 10/04/05								
DRILL MACHINE CME-550X			DRILL METHOD NW CASING			HAMMER TYPE AUTOMATIC								
SURFACE WATER DEPTH			DEPTH TO ROCK 19.30ft			Log EB1-B RT LN, Page 1 of 1								
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT					SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION	
		6in	6in	6in		0	25	50	75	100				
705.58														Ground Surface
700.00	9.30	1	1	1	1.5							M		ROADWAY FILL - RED/BROWN/YELLOW MIC. SILTY SANDY CLAY
690.00	14.30	1	1	2	1.5							M		ALLUVIUM - GRAY SILTY CLAYEY SAND
685.38	19.30	100			0.0							M/W		RESIDUAL - GRAY/WHITE CLAYEY SILTY SAND
														HARD ROCK (SPT REFUSAL)
														BORING REFUSAL ON HARD ROCK AT ELEVATION 685.38'

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

PROJECT NO 34517.1.1		ID R-2911B		COUNTY ROWAN		GEOLOGIST JAY STICKNEY								
SITE DESCRIPTION DUAL BRIDGES OVER THIRD CREEK ON US 70							GND WATER							
BORING NO B1-A LT LN		NORTHING 0.00		EASTING 0.00		0 HR 22.20ft								
ALIGNMENT L		BORING LOCATION 137+15.000		OFFSET 37.00ft LT		24 HR 22.20ft								
COLLAR ELEV 716.94ft		TOTAL DEPTH 59.40ft		START DATE 9/29/05		COMPLETION DATE 09/29/05								
DRILL MACHINE CME-550X			DRILL METHOD NW CASING			HAMMER TYPE AUTOMATIC								
SURFACE WATER DEPTH			DEPTH TO ROCK 58.00ft			Log B1-A LT LN, Page 1 of 2								
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT				SAMPLE NO	MOI	LOG	SOIL AND ROCK DESCRIPTION	
		6in	6in	6in		0	25	50	75					100
716.94														Ground Surface
	4.40	2	2	2	1.5	4							SS-19	ROADWAY FILL - RED/ORANGE SILTY SANDY CLAY
	9.40	1	1	2	1.5	3								
	14.40	1	1	1	1.5	2							SS-20	ALLUVIUM - GRAY SANDY SILTY CLAY
	19.40	1	3	3	1.5	6							SS-21	GRAY SILTY CLAYEY SAND WITH ORGANICS
	24.40	1	2	2	1.5	4								
	29.40	8	15	23	1.5	38							SS-22	GRAY/WHITE CLAYEY SANDY SILT
	34.40	13	15	22	1.5	37								
	39.40	26	12	14	1.5	26								
	44.40	100			0.1	100								WEATHERED ROCK
														Continued on the next page

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

Sheet 15

PROJECT NO 34517.1.1		ID R-2911B		COUNTY ROWAN		GEOLOGIST JAY STICKNEY								
SITE DESCRIPTION DUAL BRIDGES OVER THIRD CREEK ON US 70							GND WATER							
BORING NO B1-A LT LN		NORTHING 0.00		EASTING 0.00		0 HR 22.20ft								
ALIGNMENT L		BORING LOCATION 137+15.000		OFFSET 37.00ft LT		24 HR 22.20ft								
COLLAR ELEV 716.94ft		TOTAL DEPTH 59.40ft		START DATE 9/29/05		COMPLETION DATE 09/29/05								
DRILL MACHINE CME-550X			DRILL METHOD NW CASING			HAMMER TYPE AUTOMATIC								
SURFACE WATER DEPTH			DEPTH TO ROCK 58.00ft			Log B1-A LT LN, Page 2 of 2								
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT				SAMPLE NO	MOI	LOG	SOIL AND ROCK DESCRIPTION	
		6in	6in	6in		0	25	50	75					100
	49.40				0.5	100								WEATHERED ROCK
	54.40				0.1	100								
	59.40				0.0	100								HARD ROCK (SPT REFUSAL)
														BORING TERMINATED IN HARD ROCK AT ELEVATION 657.54'

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

PROJECT NO 34517.1.1		ID R-2911B		COUNTY ROWAN		GEOLOGIST JAY STICKNEY								
SITE DESCRIPTION DUAL BRIDGES OVER THIRD CREEK ON US 70							GND WATER							
BORING NO B1-B LT LN		NORTHING 0.00		EASTING 0.00		0 HR 22.60ft								
ALIGNMENT L		BORING LOCATION 137+07.000		OFFSET 20.00ft LT		24 HR N/A								
COLLAR ELEV 717.04ft		TOTAL DEPTH 59.40ft		START DATE 10/03/05		COMPLETION DATE 10/03/05								
DRILL MACHINE CME-550X			DRILL METHOD NW CASING			HAMMER TYPE AUTOMATIC								
SURFACE WATER DEPTH			DEPTH TO ROCK 58.00ft			Log B1-B LT LN, Page 1 of 2								
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT					SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION	
		6in	6in	6in		0	25	50	75	100				
717.04														Ground Surface
	4.40	1	1	2	1.5								M	ROADWAY FILL - RED/ORANGE SILTY SANDY CLAY
710.00														
	9.40	1	2	3	1.5									
	14.40	1	2	1	1.5								M	ALLUVIUM - GRAY SANDY SILTY CLAY
700.00														
	19.40	2	2	2	1.5									
	24.40	1	2	3	1.5								M/W	GRAY SILTY CLAYEY SAND
690.00														
	29.40	15	10	10	1.5								M	RESIDUAL - GRAY/WHITE CLAYEY SANDY SILT
	34.40	48	52		0.8									
680.00														
	39.40	92	8		0.6									
	44.40	100			0.3									
670.00														
Continued on the next page.														

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

PROJECT NO 34517.1.1		ID R-2911B		COUNTY ROWAN		GEOLOGIST JAY STICKNEY								
SITE DESCRIPTION DUAL BRIDGES OVER THIRD CREEK ON US 70							GND WATER							
BORING NO B1-B LT LN		NORTHING 0.00		EASTING 0.00		0 HR 22.60ft								
ALIGNMENT L		BORING LOCATION 137+07.000		OFFSET 20.00ft LT		24 HR N/A								
COLLAR ELEV 717.04ft		TOTAL DEPTH 59.40ft		START DATE 10/03/05		COMPLETION DATE 10/03/05								
DRILL MACHINE CME-550X			DRILL METHOD NW CASING			HAMMER TYPE AUTOMATIC								
SURFACE WATER DEPTH			DEPTH TO ROCK 58.00ft			Log B1-B LT LN, Page 2 of 2								
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT					SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION	
		6in	6in	6in		0	25	50	75	100				
670.00														
	49.40	100			0.1									WEATHERED ROCK
	54.40	100			0.2									
660.00														
657.64	59.40	100			0.0									HARD ROCK (SPT REFUSAL)
BORING TERMINATED IN HARD ROCK AT ELEVATION 657.64'														

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 GEOTECHNICAL UNIT CORE BORING REPORT

PROJECT NO 34517.1.1		ID R-2911B	COUNTY ROWAN	GEOLOGIST JAY STICKNEY									
SITE DESCRIPTION DUAL BRIDGES OVER THIRD CREEK ON US 70				GND WATER									
BORING NO B1-A RT LN		NORTHING 0.00		EASTING 0.00									
ALIGNMENT L		BORING LOCATION 136+86.000		OFFSET 17.00ft RT									
COLLAR ELEV 706.04ft		TOTAL DEPTH 42.70ft		START DATE 9/23/05									
DRILL MACHINE CME-550X		DRILL METHOD SPT CORE BORING		COMPLETION DATE 09/23/05									
SURFACE WATER DEPTH		DEPTH TO ROCK 35.50ft		HAMMER TYPE AUTOMATIC									
				Log B1-A RT LN, Page 1 of 1									
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT					SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION
		6in	6in	6in		0	25	50	75	100			
706.04						Ground Surface							
700.00	5.50	3	4	5	1.5						SS-15	M	ROADWAY FILL - RED/BROWN SANDY SILTY CLAY
	10.50	1	2	3	1.5						SS-16	M/W	ALLUVIUM - GRAY SILTY CLAYEY SAND
690.00	15.50	1	35	45	1.5						SS-17	M/W	RESIDUAL - GRAY/WHITE MIC. CLAYEY SILTY SAND
	20.50	12	24	18	1.5						SS-18	M/W	GRAY/WHITE CLAYEY SILTY SAND
680.00	25.50	100			0.1								WEATHERED ROCK
	30.50	100			0.3								
670.00	35.50	100			0.0						RUN # 1		HARD ROCK - QUARTZ DIORITE, REC=91% RQD=68%
663.34											RUN # 2		QUARTZ DIORITE, REC=85% RQD=30%
						CORE BORING TERMINATED IN HARD ROCK AT ELEVATION 663.34'							

PROJECT NO: 34517.1.1 PROJECT ID: R2911B COUNTY: Rowan GEOLOGIST: J.K. STICKNEY
 SITE DESCRIPTION: Dual Bridges over Third Creek on US 70 DRILLER: C.L. SMITH
 BORING NO: B1-A RT LN BORING LOCATION (STA): 136+86 OFFSET: 17RT
 COLLAR ELEV: PERSONNEL: HKW CORE SIZE: NXWL
 TOTAL DEPTH: 42.7 DRILL MACHINE: CME-550 DATE STARTED: 09/23/05
 TOTAL RUN: 7.2 DRILL EQUIP: NX-CASING, TRICONE DATE COMPLETED: 09/23/05

ELEV. (FT)	DEPTH (FT)	DRILL RATE (MIN/1.0 FT)	RUN NO.	REC % (FT)	RQD % (FT)	SAMPLE NO.	FIELD CLASSIFICATION AND REMARKS
670.54	35.5	NM	1	91	68	RS-1	Gray/white very slight to slightly weathered, moderately hard, closely fractured, thickly bedded quartz diorite.
665.84	40.2	NM	2	84	30		As above, with slight to moderate weathering.
663.34	42.7						

NOTES

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

Sheet 16

PROJECT NO 34517.1.1		ID R-2911B		COUNTY ROWAN		GEOLOGIST JAY STICKNEY							
SITE DESCRIPTION DUAL BRIDGES OVER THIRD CREEK ON US 70							GND WATER						
BORING NO B1-B RT LN		NORTHING 0.00		EASTING 0.00		0 HR 6.00ft							
ALIGNMENT L		BORING LOCATION 136+68.000		OFFSET 54.00ft RT		24 HR 9.90ft							
COLLAR ELEV 704.96ft		TOTAL DEPTH 46.70ft		START DATE 10/04/05		COMPLETION DATE 10/04/05							
DRILL MACHINE CME-550X			DRILL METHOD NW CASING			HAMMER TYPE AUTOMATIC							
SURFACE WATER DEPTH N/A			DEPTH TO ROCK 44.00ft			Log B1-B RT LN, Page 1 of 1							
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT				SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION	
		6in	6in	6in		0	25	50	75				100
704.96													Ground Surface
700.00	9.60	1	1	2	1.5	3					M		ROADWAY FILL - RED/BROWN SANDY SILTY CLAY
690.00	14.60	1	2	15	1.5	7					M/W		ALLUVIUM - GRAY SILTY CLAYEY SAND
	19.60	5	13	14	1.5	27					M/W		RESIDUAL - GRAY/WHITE CLAYEY SILTY SAND
680.00	24.60	100			0.3				100		M		WEATHERED ROCK
	29.60	69	31		0.6				100		M		
670.00	34.60	100			0.3				100				
	39.60	100			0.1				100				
660.00	44.60	100			0.0				100				
658.26													HARD ROCK (SPT REFUSAL)
						BORING TERMINATED IN HARD ROCK AT ELEVATION 658.26'							

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

PROJECT NO 34517.1.1		ID R-2911B		COUNTY ROWAN		GEOLOGIST JAY STICKNEY								
SITE DESCRIPTION DUAL BRIDGES OVER THIRD CREEK ON US 70							GND WATER							
BORING NO B2-A RT LN		NORTHING 0.00		EASTING 0.00		0 HR N/A								
ALIGNMENT L		BORING LOCATION 137+67.000		OFFSET 17.00ft RT		24 HR 10.50ft								
COLLAR ELEV 705.23ft		TOTAL DEPTH 45.00ft		START DATE 9/21/05		COMPLETION DATE 09/21/05								
DRILL MACHINE CME-550X			DRILL METHOD NW CASING			HAMMER TYPE AUTOMATIC								
SURFACE WATER DEPTH			DEPTH TO ROCK N/A			Log B2-A RT LN, Page 1 of 1								
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT				SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION		
		6in	6in	6in		0	25	50	75				100	
705.23													Ground Surface	
700.00	4.40	2	2	4	1.5							SS-11	D	ALLUVIUM - TAN/BROWN MIC. CLAYEY SANDY SILT
	9.40	2	2	1	1.5							SS-12	M	GRAY CLAYEY SANDY SILT
690.00	14.40	7	9	9	1.5							SS-13	M/W	GRAY CLAYEY SILT SAND
	19.40	18	20	74	1.5							SS-14	M	RESIDUAL - GRAY/WHITE CLAYEY SANDY SILT
680.00	24.40	100			0.3									WEATHERED ROCK
	29.40	100			0.3									
670.00	34.40	100			0.4									
	39.40	100			0.4									
660.23	44.40	91	9		0.5									
BORING TERMINATED IN WEATHERED ROCK AT ELEVATION 660.23														

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

PROJECT NO 34517.1.1		ID R-2911B		COUNTY ROWAN		GEOLOGIST JAY STICKNEY								
SITE DESCRIPTION DUAL BRIDGES OVER THIRD CREEK ON US 70							GND WATER							
BORING NO B2-B RT LN		NORTHING 0.00		EASTING 0.00		0 HR N/A								
ALIGNMENT L		BORING LOCATION 137+44.000		OFFSET 52.00ft RT		24 HR 10.10ft								
COLLAR ELEV 704.90ft		TOTAL DEPTH 54.30ft		START DATE 9/22/05		COMPLETION DATE 09/22/05								
DRILL MACHINE CME-550X			DRILL METHOD SPT CORE BORING			HAMMER TYPE AUTOMATIC								
SURFACE WATER DEPTH			DEPTH TO ROCK 29.60ft			Log B2-B RT LN, Page 1 of 2								
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT				SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION		
		6in	6in	6in		0	25	50	75				100	
704.90													Ground Surface	
700.00	4.60	1	2	3	1.5								D	ALLUVIUM - TAN/BROWN CLAYEY SANDY SILT
	9.60	1	2	2	1.5								M	GRAY CLAYEY SANDY SILT
690.00	14.60	2	3	6	1.5								M/W	GRAY CLAYEY SILTY SAND
	19.60	3	15	36	1.5								M	RESIDUAL - GRAY/WHITE CLAYEY SANDY SILT
680.00	24.60	18	12	7	1.5									WEATHERED ROCK
	29.60	100			0.1									WEATHERED ROCK
														HARD ROCK - QUARTZ DIORITE, REC=17% RQD=0%
670.00														QUARTZ DIORITE, REC=62% RQD=14%
														QUARTZ DIORITE, REC=42% RQD=0%
660.00														QUARTZ DIORITE, REC=90% RQD=28%
														QUARTZ DIORITE, REC=89% RQD=55%
650.60														
Continued on the next page														

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL UNIT CORE BORING REPORT

PROJECT NO 34517.1.1		ID R-2911B	COUNTY ROWAN	GEOLOGIST JAY STICKNEY
SITE DESCRIPTION DUAL BRIDGES OVER THIRD CREEK ON US 70				GND WATER
BORING NO B2-B RT LN		NORTHING 0.00	EASTING 0.00	0 HR N/A
ALIGNMENT L		BORING LOCATION 137+44.000	OFFSET 52.00ft RT	24 HR 10.10ft
COLLAR ELEV 704.90ft		TOTAL DEPTH 54.30ft	START DATE 9/22/05	COMPLETION DATE 09/22/05
DRILL MACHINE CME-550X			DRILL METHOD SPT CORE BORING	HAMMER TYPE AUTOMATIC
SURFACE WATER DEPTH		DEPTH TO ROCK 29.60ft		
Log B2-B RT LN, Page 2 of 2				

PROJECT NO: 34517.1.1 PROJECT ID: R2911B COUNTY: Rowan GEOLOGIST: J.K. STICKNEY
 SITE DESCRIPTION: Dual Bridges over Third Creek on US 70 DRILLER: C.L. SMITH
 BORING NO: B2-B RT LN BORING LOCATION (STA): 137+44 OFFSET: 52RT
 COLLAR ELEV: PERSONNEL: HKW CORE SIZE: NXWL
 TOTAL DEPTH: 54.3' DRILL MACHINE: CME-550 DATE STARTED: 09/24/05
 TOTAL RUN: 24.7' DRILL EQUIP: NX-CASING, TRICONE DATE COMPLETED: 09/24/05

ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT				SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION
		6in	6in	6in		0	25	50	75			
650.60												

CORING TERMINATED IN HARD ROCK AT ELEVATION 650.6'

ELEV. (FT)	DEPTH (FT)	DRILL RATE (MIN/1.0 FT)	RUN NO.	REC % (FT)	RQD % (FT)	SAMPLE NO.	FIELD CLASSIFICATION AND REMARKS
675.3	29.6	NM	1	17	0		Brown/Gray severely weathered, soft, very closely fractured, quartz diorite.
670.6	34.3	NM	2	62	14		As above
665.6	39.3	NM	3	42	0		As above, but very severely weathered.
660.6	44.3	NM	4	90	28	RS-2	Top 1.7' is as above, change to black/white, gray/white very slight to slightly weathered, moderately hard to hard, quartz diorite.
655.6	49.3	NM	5	89	55		Black/white very slight to slightly weathered, moderately hard to hard quartz diorite.
650.6	54.3						

NOTES

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

PROJECT NO 34517.1.1		ID R-2911B		COUNTY ROWAN		GEOLOGIST JAY STICKNEY							
SITE DESCRIPTION DUAL BRIDGES OVER THIRD CREEK ON US 70							GND WATER						
BORING NO B3-A LT LN		NORTHING 0.00		EASTING 0.00		0 HR N/A							
ALIGNMENT L		BORING LOCATION 138+79.000		OFFSET 54.00ft LT		24 HR 9.60ft							
COLLAR ELEV 705.29ft		TOTAL DEPTH 48.50ft		START DATE 9/21/05		COMPLETION DATE 09/21/05							
DRILL MACHINE CME-550X			DRILL METHOD NW CASING			HAMMER TYPE AUTOMATIC							
SURFACE WATER DEPTH N/A			DEPTH TO ROCK 29.50ft			Log B3-A LT LN, Page 1 of 1							
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT				SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION	
		6in	6in	6in		0	25	50	75				100
705.29													Ground Surface
700.00	4.50	1	1	2	1.5								ALLUVIUM - GRAY SILTY CLAYEY SAND
	9.50	1	3	2	1.5								
690.00	14.50	0	1	1	1.5					SS-10	M/W		GRAY MIC. SILTY CLAYEY SAND
	19.50	10	18	23	1.5						M		RESIDUAL - GRAY MIC. CLAYEY SILTY SAND
680.00	24.50	19	51	32	1.5								
	29.50	52	48		0.7						M		WEATHERED ROCK
670.00	34.50	100			0.5						D		
	39.50	100			0.3								
660.00	44.50	100			0.1								
656.79													BORING TERMINATED IN WEATHERED ROCK AT ELEVATION 656.79

PROJECT NO 34517.1.1		ID R-2911B		COUNTY ROWAN		GEOLOGIST JAY STICKNEY							
SITE DESCRIPTION DUAL BRIDGES OVER THIRD CREEK ON US 70							GND WATER						
BORING NO B3-B LT LN		NORTHING 0.00		EASTING 0.00		0 HR N/A							
ALIGNMENT L		BORING LOCATION 138+62.000		OFFSET 15.00ft LT		24 HR 9.80ft							
COLLAR ELEV 705.08ft		TOTAL DEPTH 47.20ft		START DATE 9/19/05		COMPLETION DATE 09/19/05							
DRILL MACHINE CME-550X			DRILL METHOD NW CASING			HAMMER TYPE AUTOMATIC							
SURFACE WATER DEPTH			DEPTH TO ROCK 30.20ft			Log B3-B LT LN, Page 1 of 1							
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT				SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION	
		6in	6in	6in		0	25	50	75				100
705.08													Ground Surface
700.00	5.20	1	2	2	1.5								ALLUVIUM - GRAY SILTY CLAYEY SAND
	10.20	0	0	0	1.5								
690.00	15.20	2	4	3	1.5					SS-1	M		GRAY CLAYEY SANDY SILT
	20.20	42	35	30	1.5								
680.00	25.20	13	23	56	1.5					SS-2	M		RESIDUAL - GRAY MIC. CLAYEY SANDY SILT
	30.20	39	61		0.9								
670.00	35.20	69	31		0.7					SS-3	M		WEATHERED ROCK
	40.20	100			0.4								
660.00	45.20	100			0.4								
657.88													BORING TERMINATED IN WEATHERED ROCK AT ELEVATION 657.88

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 GEOTECHNICAL UNIT CORE BORING REPORT

PROJECT NO 34517.1.1		ID R-2911B		COUNTY ROWAN		GEOLOGIST JAY STICKNEY								
SITE DESCRIPTION DUAL BRIDGES OVER THIRD CREEK ON US 70							GND WATER							
BORING NO B3-A RT LN		NORTHING 0.00		EASTING 0.00		0 HR N/A								
ALIGNMENT L		BORING LOCATION 138+46.000		OFFSET 16.00ft RT		24 HR 10.80ft								
COLLAR ELEV 705.08ft		TOTAL DEPTH 49.20ft		START DATE 9/19/05		COMPLETION DATE 09/19/05								
DRILL MACHINE CME-550X			DRILL METHOD NW CASING			HAMMER TYPE AUTOMATIC								
SURFACE WATER DEPTH			DEPTH TO ROCK 40.50ft			Log B3-A RT LN, Page 1 of 1								
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT					SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION	
		6in	6in	6in		0	25	50	75	100				
705.08														
														Ground Surface
700.00	4.40	2	3	3	1.5							SS-4	M	ALLUVIUM - BROWN/GRAY CLAYEY SANDY SILT
	9.40	2	1	1	1.5									GRAY MIC. CLAYEY SANDY SILT
690.00	14.40	1	2	3	1.5									
	19.40	15	29	25	1.5							SS-5	M	RESIDUAL - BROWN/GRAY CLAYEY SANDY SILT
680.00	24.40	59	41		0.9									WEATHERED ROCK
	29.40	100			0.3									
670.00	34.40	100			0.4									
	39.40	100			0.1									
660.00												RUN # 1		HARD ROCK - META-DIORITE, REC=89% RQD=35%
												RUN # 2		META-DIORITE, REC=88% RQD=32%
655.88														CORE BORING TERMINATED IN HARD ROCK AT ELEVATION 655.88'

PROJECT NO: 34517.1.1 PROJECT ID: R2911B COUNTY: Rowan GEOLOGIST: J.K. STICKNEY
 SITE DESCRIPTION: Dual Bridges over Third Creek on US 70 DRILLER: C.L. SMITH
 BORING NO: B3-A RT LN BORING LOCATION (STA): 138+46 OFFSET: 16RT
 COLLAR ELEV: PERSONNEL: HKW CORE SIZE: NXWL
 TOTAL DEPTH: 49.2' DRILL MACHINE: CME-550 DATE STARTED: 09/19/05
 TOTAL RUN: 8.7' DRILL EQUIP: NX-CASING, TRICONE DATE COMPLETED: 09/19/05

ELEV. (FT)	DEPTH (FT)	DRILL RATE (MIN/1.0 FT)	RUN NO.	REC % (FT)	RQD % (FT)	SAMPLE NO.	FIELD CLASSIFICATION AND REMARKS
664.58	40.5	NM	1	89	35		Gray/white slightly weathered, hard, closely fractured, meta-diorite.
660.88	44.2	NM	2	88	32		As above
655.88	49.2						
NOTES							

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 GEOTECHNICAL UNIT CORE BORING REPORT

PROJECT NO 34517.1.1	ID R-2911B	COUNTY ROWAN	GEOLOGIST JAY STICKNEY
SITE DESCRIPTION DUAL BRIDGES OVER THIRD CREEK ON US 70			GND WATER
BORING NO B3-B RT LN	NORTHING 0.00	EASTING 0.00	0 HR N/A
ALIGNMENT L	BORING LOCATION 138+31.000	OFFSET 50.00ft RT	24 HR 11.80ft
COLLAR ELEV 706.80ft	TOTAL DEPTH 44.40ft	START DATE 9/20/05	COMPLETION DATE 09/20/05
DRILL MACHINE CME-550X	DRILL METHOD SPT CORE BORING	HAMMER TYPE AUTOMATIC	
SURFACE WATER DEPTH	DEPTH TO ROCK 29.10ft	Log B3-B RT LN, Page 1 of 1	

PROJECT NO: 34517.1.1 PROJECT ID: R2911B COUNTY: Rowan GEOLOGIST: J.K. STICKNEY
 SITE DESCRIPTION: Dual Bridges over Third Creek on US 70 DRILLER: C.L. SMITH
 BORING NO: B3-B RT LN BORING LOCATION (STA): 138+31 OFFSET: 50RT
 COLLAR ELEV: PERSONNEL: HKW CORE SIZE: NXWL
 TOTAL DEPTH: 44.4' DRILL MACHINE: CME-550 DATE STARTED: 09/20/05
 TOTAL RUN: 15.3' DRILL EQUIP: NX-CASING, TRICONE DATE COMPLETED: 09/20/05

ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT				SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION
		6in	6in	6in		0	25	50	75			
706.80												Ground Surface
700.00	4.90	1	1	2	1.5							ALLUVIUM - BROWN/GRAY CLAYEY SANDY SILT
	9.90	1	2	3	1.5							GRAY CLAYEY SILTY SAND
690.00	14.90	1	1	1	1.5							RESIDUAL - GRAY/WHITE CLAYEY SANDY SILT
	19.90	15	17	13	1.5							BROWN/GRAY CLAYEY SANDY SILT
680.00	24.90	30	9	40	1.5							WEATHERED ROCK
	29.90	100			0.1							HARD ROCK - QUARTZ DIORITE, REC=85% RQD=58%
												QUARTZ DIORITE, REC=81% RQD=31%
670.00												QUARTZ DIORITE, REC=98% RQD=94%
662.40												CORE BORING TERMINATED IN HARD ROCK AT ELEVATION 662.4'

ELEV. (FT)	DEPTH (FT)	DRILL RATE (MIN/1.0 FT)	RUN NO.	REC % (FT)	RQD % (FT)	SAMPLE NO.	FIELD CLASSIFICATION AND REMARKS
677.7	29.1	NM	1	85	58	RS-4	Gray/white very slightly weathered, hard, closely fractured, quartz diorite.
672.3	34.5	NM	2	81	31		As above, with severely weathered layer from 671.4' to 670.5'
667.3	39.5	NM	3	98	94		Gray/white fresh, hard, closely fractured quartz diorite.
662.4	44.4						
NOTES							

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

PROJECT NO 34517.1.1		ID R-2911B		COUNTY ROWAN		GEOLOGIST JAY STICKNEY								
SITE DESCRIPTION DUAL BRIDGES OVER THIRD CREEK ON US 70							GND WATER							
BORING NO EB2-A LT LN		NORTHING 0.00		EASTING 0.00		0 HR 16.30ft								
ALIGNMENT L		BORING LOCATION 139+56.000		OFFSET 36.00ft LT		24 HR 22.40ft								
COLLAR ELEV 717.15ft		TOTAL DEPTH 49.50ft		START DATE 9/29/05		COMPLETION DATE 09/29/05								
DRILL MACHINE CME-550X			DRILL METHOD NW CASING			HAMMER TYPE AUTOMATIC								
SURFACE WATER DEPTH			DEPTH TO ROCK 39.40ft			Log EB2-A LT LN, Page 1 of 1								
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT					SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION	
		6in	6in	6in		0	25	50	75	100				
717.15														Ground Surface
	4.40	2	2	3	1.5							SS-23	M	ROADWAY FILL - RED/BROWN SILTY SANDY CLAY
	9.40	2	2	2	1.5									
	14.40	4	5	5	1.5							SS-24	M	ALLUVIUM - GRAY SILTY CLAYEY SAND
	19.40	1	3	4	1.5							SS-25	M	GRAY CLAYEY SILTY SAND
	24.40	1	3	4	1.5							SS-26	M/W	GRAY SILTY CLAYEY SAND
	29.40	10	13	14	1.5							SS-27	M	RESIDUAL - GRAY/WHITE CLAYEY SILTY SAND
	34.40	13	20	53	1.5									
	39.40	65	35		0.8									WEATHERED ROCK
	44.40	47	53		0.7									
	49.40	100			0.1									
BORING TERMINATED IN WEATHERED ROCK AT ELEVATION 667.65														

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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

PROJECT NO 34517.1.1		ID R-2911B		COUNTY ROWAN		GEOLOGIST JAY STICKNEY								
SITE DESCRIPTION DUAL BRIDGES OVER THIRD CREEK ON US 70							GND WATER							
BORING NO EB2-B LT LN		NORTHING 0.00		EASTING 0.00		0 HR 16.90ft								
ALIGNMENT L		BORING LOCATION 139+46.000		OFFSET 19.00ft LT		24 HR N/A								
COLLAR ELEV 717.14ft		TOTAL DEPTH 46.00ft		START DATE 10/03/05		COMPLETION DATE 10/03/05								
DRILL MACHINE CME-550X			DRILL METHOD NW CASING			HAMMER TYPE AUTOMATIC								
SURFACE WATER DEPTH N/A			DEPTH TO ROCK 34.50ft			Log EB2-B LT LN, Page 1 of 1								
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT					SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION	
		6in	6in	6in		0	25	50	75	100				
717.14														Ground Surface
	4.50	1	2	2	1.5								M	ROADWAY FILL - RED/BROWN/YELLOW MIC. SILTY SANDY CLAY
	9.50	2	2	3	1.5									
	14.50	4	5	6	1.5								M	ALLUVIUM - GRAY SILTY CLAYEY SAND
	19.50	5	8	7	1.5								M/W	GRAY CLAYEY SANDY SILT
	24.50	3	3	6	1.5								M/W	GRAY SILTY CLAYEY SAND
	29.50	18	22	34	1.5								M	RESIDUAL - GRAY/WHITE CLAYEY SILTY SAND
	34.50	22	44	56	1.4								D	WEATHERED ROCK
	39.50	58	42		0.8									
	44.50	18	66	34	1.4									
	671.14													
BORING TERMINATED IN WEATHERED ROCK AT ELEVATION 670.24														

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

PROJECT NO 34517.1.1		ID R-2911B		COUNTY ROWAN		GEOLOGIST JAY STICKNEY							
SITE DESCRIPTION DUAL BRIDGES OVER THIRD CREEK ON US 70							GND WATER						
BORING NO EB2-A RT LN		NORTHING 0.00		EASTING 0.00		0 HR N/A							
ALIGNMENT L		BORING LOCATION 139+26.000		OFFSET 17.00ft RT		24 HR 9.00ft							
COLLAR ELEV 704.67ft		TOTAL DEPTH 34.20ft		START DATE 9/20/05		COMPLETION DATE 09/20/05							
DRILL MACHINE CME-550X			DRILL METHOD NW CASING			HAMMER TYPE AUTOMATIC							
SURFACE WATER DEPTH			DEPTH TO ROCK 34.20ft			Log EB2-A RT LN, Page 1 of 1							
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT				SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION	
		6in	6in	6in		0	25	50	75				100
704.67													Ground Surface
700.00	4.70	2	2	3	1.5								ALLUVIUM - BROWN/GRAY SILTY CLAYEY SAND
9.70		0	1	1	1.5								GRAY SILTY CLAYEY SAND
690.00	14.70	1	2	3	1.5								GRAY SILTY CLAYEY SAND
19.70		87	13		0.6								WEATHERED ROCK
680.00	24.70	69	31		0.7								WEATHERED ROCK
29.70		9	15	54	1.5								RESIDUAL - GRAY/WHITE/TAN/YELLOW CLAYEY SILTY SAND
670.47													BORING REFUSAL ON HARD ROCK AT ELEVATION 670.47'

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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

PROJECT NO 34517.1.1		ID R-2911B		COUNTY ROWAN		GEOLOGIST JAY STICKNEY							
SITE DESCRIPTION DUAL BRIDGES OVER THIRD CREEK ON US 70							GND WATER						
BORING NO EB2-B RT LN		NORTHING 0.00		EASTING 0.00		0 HR N/A							
ALIGNMENT L		BORING LOCATION 139+10.000		OFFSET 49.00ft RT		24 HR 9.00ft							
COLLAR ELEV 704.17ft		TOTAL DEPTH 21.90ft		START DATE 9/20/05		COMPLETION DATE 09/20/05							
DRILL MACHINE CME-550X			DRILL METHOD NW CASING			HAMMER TYPE AUTOMATIC							
SURFACE WATER DEPTH N/A			DEPTH TO ROCK 21.90ft			Log EB2-B RT LN, Page 1 of 1							
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT				SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION	
		6in	6in	6in		0	25	50	75				100
704.17													Ground Surface
700.00	4.80	2	3	3	1.5								ALLUVIUM - BROWN/GRAY SILTY CLAYEY SAND
9.80		2	1	2	1.5								GRAY SILTY CLAYEY SAND
690.00	14.80	2	3	4	1.5								GRAY SILTY CLAYEY SAND
19.80		9	91		0.9								RESIDUAL - GRAY/WHITE/TAN/YELLOW CLAYEY SILTY SAND
682.27													WEATHERED ROCK
													BORING REFUSAL ON HARD ROCK AT ELEVATION 682.27'

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
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 SOILS LABORATORY

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 MATERIALS & TESTS UNIT
 SOILS LABORATORY

T. I. P. No. R-2911B

T. I. P. No. R-2911B

REPORT ON SAMPLES OF SOILS FOR QUALITY

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Project 34517.1.1 County ROWAN Owner _____
 Date: Sampled _____ Received 10/11/05 Reported 10/13/2005
 Sampled from BRIDGE By J E BEVERLY
 Submitted by N WAINAINA 1995 Standard Specifications

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726513 TO 726539
 11/2/05

726513 TO 726539
 11/2/05

TEST RESULTS

TEST RESULTS

Proj. Sample No.	SS-1	SS-2	SS-3	SS-4	SS-5	SS-6
Lab. Sample No.	726513	726514	726515	726516	726517	726518
Retained #4 Sieve %	-	-	-	-	-	-
Passing #10 Sieve %	100	100	100	100	100	100
Passing #40 Sieve %	100	96	98	98	97	100
Passing #200 Sieve %	31	37	39	45	42	21

Proj. Sample No.	SS-7	SS-8	SS-9	SS-10	SS-11	SS-12
Lab. Sample No.	726519	726520	726521	726522	726523	726524
Retained #4 Sieve %	-	-	4	4	-	-
Passing #10 Sieve %	100	99	87	87	100	100
Passing #40 Sieve %	100	87	57	41	100	89
Passing #200 Sieve %	21	12	18	7	72	48

MINUS NO. 10 FRACTION

MINUS NO. 10 FRACTION

SOIL MORTAR - 100%						
Coarse Sand Ret - #60 %	4.5	11.4	9.9	13.6	9.8	10.8
Fine Sand Ret - #270 %	76.8	60.1	66.7	49.1	64.7	76.8
Silt 0.05 - 0.005 mm %	6.6	12.3	17.3	12.9	20.4	6.4
Clay < 0.005 mm %	12.2	16.2	6.1	24.4	5.1	6.1
Passing #40 Sieve %	-	-	-	-	-	-
LOCATION %	B3B LLN	B3BLLN	B3BLLN	B3ARLN	B3ARLN	B3BRLN

SOIL MORTAR - 100%						
Coarse Sand Ret - #60 %	4.3	45.3	50.1	72.1	0.6	22.9
Fine Sand Ret - #270 %	82.2	45.1	34.9	22.2	42.8	35.1
Silt 0.05 - 0.005 mm %	5.4	3.6	11.0	1.6	28.1	15.5
Clay < 0.005 mm %	8.1	6.1	4.1	4.1	28.4	26.4
Passing #40 Sieve %	-	-	-	-	-	-
LOCATION %	EB2BRLN	EB2BRLN	EB2ARLN	B3ALLN	B2ARLN	B2ARLN

L. L.	23	34	24	28	25	25
P. I.	NP	NP	NP	9	NP	NP
AASHTO Classification	A-2-4(0)	A-4(0)	A-4(0)	A-4(1)	A-4(0)	A-2-4(0)
Station	138+62	138+62	138+62	138+46	138+46	138+31
OFFSET	15 LT	15 LT	15 LT	16 RT	16 RT	50 RT
ALIGNMENT	L	L	L	L	L	L
Depth (Ft)	5.70	10.70	20.70	4.90	19.90	10.40
to	6.70	11.70	21.70	5.90	20.90	11.40

L. L.	24	25	24	23	37	33
P. I.	NP	NP	NP	NP	8	10
AASHTO Classification	A-2-4(0)	A-2-4(0)	A-2-4(0)	A-1-b(0)	A-4(6)	A-4(2)
Station	139+16	139+16	139+46	138+79	137+67	137+67
OFFSET	49 RT	49 RT	17 RT	54 LT	17 RT	17 RT
ALIGNMENT	L	L	L	L	L	L
Depth (Ft)	5.30	10.30	30.20	1.50	4.90	9.90
to	6.30	11.30	31.20	1.60	5.90	10.90

cc: J E BEVERLY
 Soils File

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
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T. I. P. No. R-2911B

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726513 TO 726539
11/2/05

726513 TO 726539
11/2/05

TEST RESULTS

TEST RESULTS

Proj. Sample No.	SS-13	SS-14	SS-15	SS-16	SS-17	SS-18
Lab. Sample No.	726525	726526	726527	726528	726529	726530
Retained #4 Sieve %	1	-	-	-	20	-
Passing #10 Sieve %	94	100	100	100	70	100
Passing #40 Sieve %	59	98	99	91	56	84
Passing #200 Sieve %	12	40	94	8	18	24

Proj. Sample No.	SS-19	SS-20	SS-21	SS-22	SS-23	SS-24
Lab. Sample No.	726531	726532	726533	726534	726535	726536
Retained #4 Sieve %	-	-	-	-	-	-
Passing #10 Sieve %	100	100	100	100	98	100
Passing #40 Sieve %	97	98	100	98	81	88
Passing #200 Sieve %	66	93	22	40	50	34

MINUS NO. 10 FRACTION

MINUS NO. 10 FRACTION

SOIL MORTAR - 100%						
Coarse Sand Ret - #60 %	56.3	6.9	1.0	39.3	32.5	33.3
Fine Sand Ret - #270 %	34.7	69.7	7.9	55.3	50.6	52.0
Silt 0.05 - 0.005 mm %	4.9	18.3	26.1	2.3	10.9	10.7
Clay < 0.005 mm %	4.1	5.1	65.0	3.0	6.1	4.1
Passing #40 Sieve %	-	-	-	-	-	-
LOCATION %	B2ARLN	B2ARLN	B1ARLN	B1-ARLN	B1ARLN	B1ARLN

SOIL MORTAR - 100%						
Coarse Sand Ret - #60 %	7.3	3.5	4.5	8.8	26.0	29.4
Fine Sand Ret - #270 %	35.9	5.5	82.2	68.7	30.5	41.8
Silt 0.05 - 0.005 mm %	34.4	30.2	5.2	18.4	21.2	10.5
Clay < 0.005 mm %	22.3	60.9	8.1	4.1	22.3	18.3
Passing #40 Sieve %	-	-	-	-	-	-
LOCATION %	B1ALLN	B1ALLN	B1ALLN	B1ALLN	EB2ALLN	EB2ALLN

L. L.	22	25	61	26	23	30
P. I.	NP	NP	25	NP	NP	NP
AASHTO Classification	A-2-4(0)	A-4(0)	A-7-5(30)	A-3(0)	A-2-4(0)	A-2-4(0)
Station	137+67	137+67	136+86	136+86	136+86	136+86
OFFSET	17 RT	17 RT	17 RT	17 RT	17 RT	17 RT
ALIGNMENT	L	L	L	L	L	L
Depth (Ft)	14.90	19.90	6.00	11.00	16.00	21.00
to	15.90	20.90	7.00	12.00	17.00	22.00

L. L.	54	59	24	28	42	24
P. I.	14	28	NP	NP	14	NP
AASHTO Classification	A-7-5(10)	A-7-5(31)	A-2-4(0)	A-4(0)	A-7-6(5)	A-2-4(0)
Station	137+15	137+15	137+15	137+15	139+56	139+56
OFFSET	37 LT	37 LT	37 LT	37 LT	36 LT	36 LT
ALIGNMENT	L	L	L	L	L	L
Depth (Ft)	4.90	14.90	24.90	29.90	4.90	14.90
to	5.90	15.90	25.90	30.90	5.90	15.90

**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
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T. I. P. No. R-2911B

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726513 TO 726539
11/2/05

TEST RESULTS

Proj. Sample No.	SS-25	SS-26	SS-27			
Lab. Sample No.	726537	726538	726539			
Retained #4 Sieve	%	-	-	-		
Passing #10 Sieve	%	100	99	98		
Passing #40 Sieve	%	99	77	90		
Passing #200 Sieve	%	57	8	35		

MINUS NO. 10 FRACTION

SOIL MORTAR - 100%						
Coarse Sand Ret - #60	%	5.1	51.7	14.6		
Fine Sand Ret - #270	%	54.0	42.7	63.5		
Silt 0.05 - 0.005 mm	%	20.6	1.5	16.9		
Clay < 0.005 mm	%	20.3	4.1	5.1		
Passing #40 Sieve	%	-	-	-		
LOCATION	%	EB2ALLN	EB2ALLN	EB2ALLN		

L. L.	26	25	24			
P. I.	5	NP	NP			
AASHTO Classification	A-4(1)	A-3(0)	A-2-4(0)			
Station	139+56	139+56	139+56			
OFFSET	36 LT	36 LT	36 LT			
ALIGNMENT	L	L	L			
Depth (Ft)	19.90	24.90	29.90			
to	20.90	25.90	30.90			

GEOTECHNICAL UNIT FIELD SCOUR REPORT

PROJECT: 34517.1.1 TIP NO.: R-2911B COUNTY: Rowan

DESCRIPTION(1): Dual bridges over Third Creek on US 70

◆ **INFORMATION ON EXISTING BRIDGES** Information obtained from Field Inspection
 Microfilm (Reel: Position:)
 Other

COUNTY BRIDGE NO. 9 BRIDGE LENGTH 225' NO. BENTS 6 NO. BENTS IN: CHANNEL 2 FLOODPLAIN 6

FOUNDATION TYPE: Two foot wide concrete piers, concrete abutments

EVIDENCE OF SCOUR(2):

ABUTMENTS OR END BENT SLOPES: None

INTERIOR BENTS: B-1 and B-2

CHANNEL BED: None

CHANNEL BANKS: Bank at B-2 is eroding back to B-1

◆ **EXISTING SCOUR PROTECTION:**

TYPE(3): Concrete slope protection at the abutments. Rip rap between B-1 and B-2.

EXTENT(4): Slope protection extends back @ 30' at each end bent. Rip rap entire distance between B-1 and B-2

EFFECTIVENESS(5): Good

OBSTRUCTIONS(6) (DAMS, DEBRIS, ETC.): Tree limbs

◆ **DESIGN INFORMATION**

CHANNEL BED MATERIAL(7) (Sample Results Attached):

CHANNEL BANK MATERIAL(8) (Sample Results Attached):

CHANNEL BANK COVER(10): Mature trees and shrubs

FLOOD PLAIN WIDTH(11): >1000'

FLOOD PLAIN COVER(12): Mature trees and shrubs

STREAM IS: DEGRADING AGGRADING (13)

OTHER OBSERVATIONS AND COMMENTS: Bridge Maint. crew stated area around toe of slope at existing EB1-A side and in between B1 and B2 had completely washed out several years ago. Farmer replaced washout with mostly rip rap and fill dirt.

◆ **DESIGN INFORMATION CONT.**

CHANNEL MIGRATION TENDENCY(14): Slight

GEOTECHNICAL ADJUSTED SCOUR ELEVATIONS (15):

NCDOT Hydro theoretical scour elevations are as follows:

Location: 100 Year Overtopping Scour

Bent 1 695' 692'

Bent 2 653' 645'

Bent 3 653' 645'

Based on analysis of soil layer data obtained from borings at each bent location the Geotechnical Engineering Unit recommends the following Geotechnical Adjusted Scour Elevations

Bent 1 - Recommend that scour prediction not be adjusted here. Use 100 year @ 695' and Overtopping @ 692'.

Bent 2 - Recommend that scour be raised to elevation 682' for 100 year and 681' for Overtopping.

Bent 3 - Recommend that scour be raised to elevation 683' for 100 year and 681' for Overtopping.

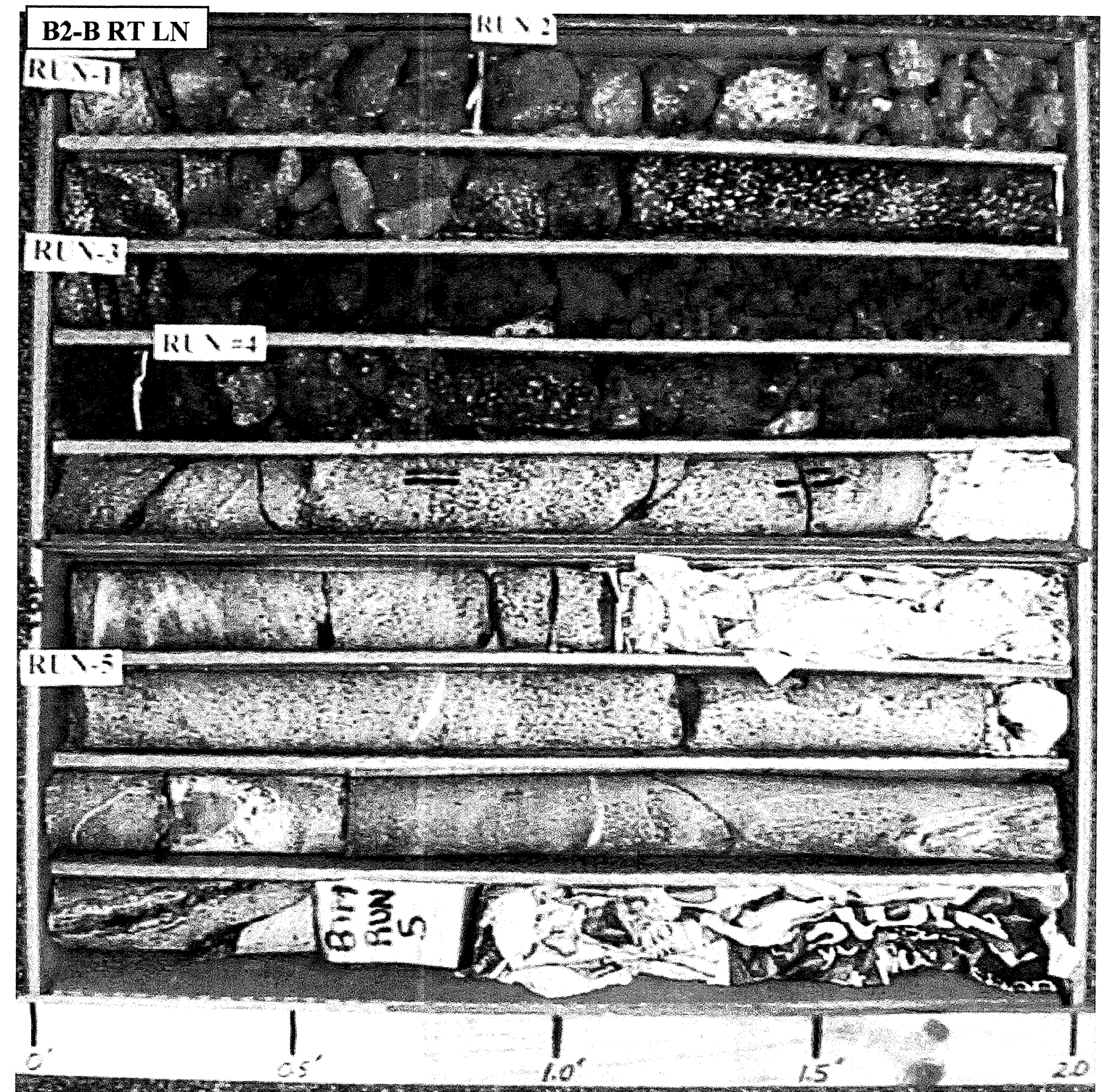
REPORTED BY: JKS/JEB DATE: December 2005

INSTRUCTIONS

- (1) GIVE THE DESCRIPTION OF THE SPECIFIC SITE GIVING ROUTE NUMBER AND BODY OF WATER CROSSED.
- (2) NOTE ANY EVIDENCE OF SCOUR AT THE EXISTING END BENTS OR ABUTMENTS (UNDERMINING, SLOUGHING, SCOUR LOCATIONS DEGRADATIONS, ETC.)
- (3) NOTE ANY EXISTING SCOUR PROTECTION (RIPRAP, ETC.)
- (4) DESCRIBE THE EXTENT OF ANY EXISTING SCOUR PROTECTION.
- (5) DESCRIBE WHETHER OR NOT THE SCOUR PROTECTION APPEARS TO BE WORKING.
- (6) NOTE ANY DAMS, FALLEN TREES, DEBRIS AT BENTS, ETC.
- (7) DESCRIBE THE CHANNEL BED MATERIAL; A SAMPLE SHOULD BE TAKEN FOR GRAIN SIZE DISTRIBUTION, ATTACH LAB RESULTS.
- (8) DESCRIBE THE CHANNEL BANK MATERIAL; A SAMPLE SHOULD BE TAKEN FOR GRAIN SIZE DISTRIBUTION, ATTACH LAB RESULTS.
- (9) DESCRIBE THE FOUNDATION BEARING MATERIAL
- (10) DESCRIBE THE BANK COVERING (GRASS, TREES, RIPRAP, NONE, ETC.)
- (11) GIVE THE APPROXIMATE FLOOD PLAIN WIDTH (ESTIMATE).
- (12) DESCRIBE THE FLOOD PLAIN COVERING (GRASS, TREES, CROPS, ETC.)
- (13) CHECK THE APPROPRIATE SPACE AS TO WHETHER THE STREAM IS DEGRADING OR AGGRADING.
- (14) DESCRIBE THE POTENTIAL OF THE BODY OF WATER TO MIGRATE Laterally DURING THE LIFE OF THE BRIDGE (APPROXIMATELY 100 YEARS).
- (15) GIVE THE GEOTECHNICAL ADJUSTED SCOUR ELEVATION EXPECTED OVER THE LIFE OF THE BRIDGE (APPROXIMATELY 100 YEARS). THIS CAN BE GIVEN AS AN ELEVATION RANGE ACROSS THE SITE, OR ON A BENT BY BENT BASIS WHERE VARIATIONS EXIST. DISCUSS RELATIONSHIP BETWEEN THE HYDRAULICS THEORETICAL SCOUR AND THE GEOTECHNICAL ADJUSTED SCOUR ELEVATION. IF THE GEOTECHNICAL ADJUSTED SCOUR ELEVATION IS DEPENDENT ON SCOUR COUNTER MEASURES, EXPLAIN. (RIPRAP ARMORING ON SLOPES, ETC.) THE GEOTECHNICAL ADJUSTED SCOUR ELEVATION IS BASED ON THE ERODABILITY OF MATERIALS WITH CONSIDERATION FOR JOINTING, FOLIATION, BEDDING ORIENTATION AND FREQUENCY; CORE RECOVERY PERCENTAGE; PERCENT RQD; DIFFERENTIAL WEATHERING; SHEAR STRENGTH; OBSERVATIONS AT EXISTING STRUCTURES; OTHER TESTS DEEMED APPROPRIATE; AND OVERALL GEOLOGIC CONDITIONS AT THE SITE.

34517.1.1 (R-2911B)
ROWAN COUNTY
DUAL BRIDGES ON US 70 OVER THIRD CREEK

CORE PHOTOS



34517.1.1 (R-2911B)
ROWAN COUNTY
DUAL BRIDGES ON US 70 OVER THIRD CREEK

CORE PHOTOS

