STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	32579.1.1 (B-1037)	1	39

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

STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 32579.1.1 (B-1037) F.A. PROJ. BRSTP-0221(20)

COUNTY ASHE

PROJECT DESCRIPTION BRIDGE 39 OVER SOUTH FORK NEW RIVER ON US 221 NORTHEAST OF JEFFERSON

SITE DESCRIPTION

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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.

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INVESTIGATED BY B.D. WORLEY

CHECKED BY K.B. MILLER

SUBMITTED BY K.B. MILLER

DATE APRIL, 2009

For Letting

NORTH CAROLINA LICENSED 4-3-09 SEAL 1926 GEOLOGIST BRADLEY D. WORLEY

Signature

DRAWN BY: B.D. WORLEY and W. D. FIELDS

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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: 32579.1.1

ID: B-1037

PROJECT REFERENCE NO.	SHEET NO.
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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, SETY 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 LOOSE MEDIUM DENSE DENSE VERY DENSE	<4 4 TO 10 10 TO 30 30 TO 50 >50	N/A
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD	<2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 >30	<0.25 0.25 TO 0.50 0.5 TO 1.0 1 TO 2 2 TO 4 >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
GRAIN SIZE 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) PL - PLASTIC LIMIT	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
OM - OPTIMUM MOISTURE SL - SHRINKAGE LIMIT	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE
	- 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 VST PMT 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
w - 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
- [X] CME-550
- [ ] PORTABLE HOIST
- [X] LONGYEAR 65
- [ ] _____

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.
- [X] CORE BIT
- [ ] _____

HAMMER TYPE:
- [X] AUTOMATIC
- [ ] MANUAL

CORE SIZE:
- [X] -B XWL
- [X] -N XWL
- [ ] -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.

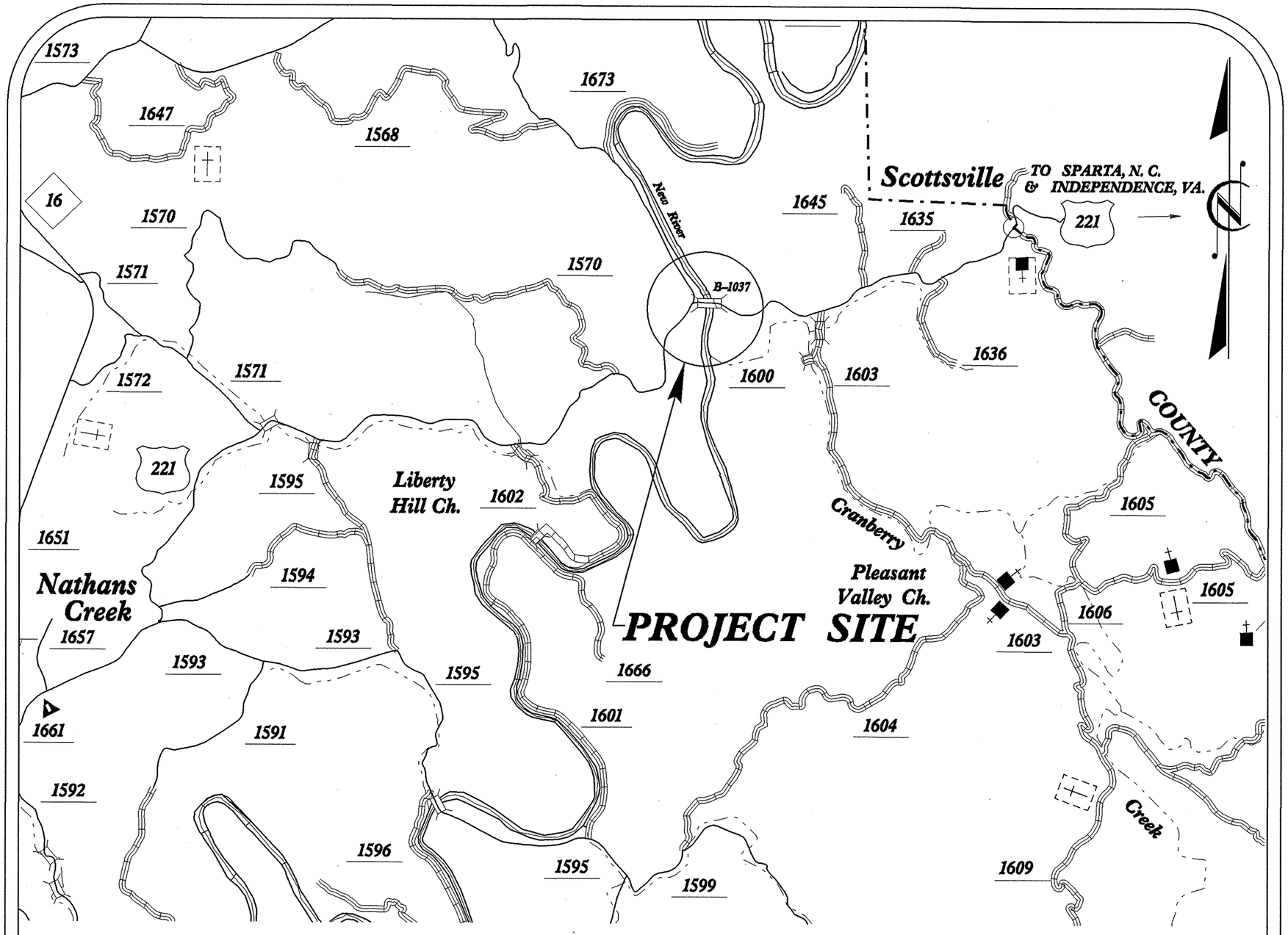
STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.

TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.

BENCH MARK: A R/R SPIKE IN BASE OF A 12" OAK TREE,
LT. OF -BL- STA. 12+13.42
ELEVATION: 2632.800 FT.

NOTES:

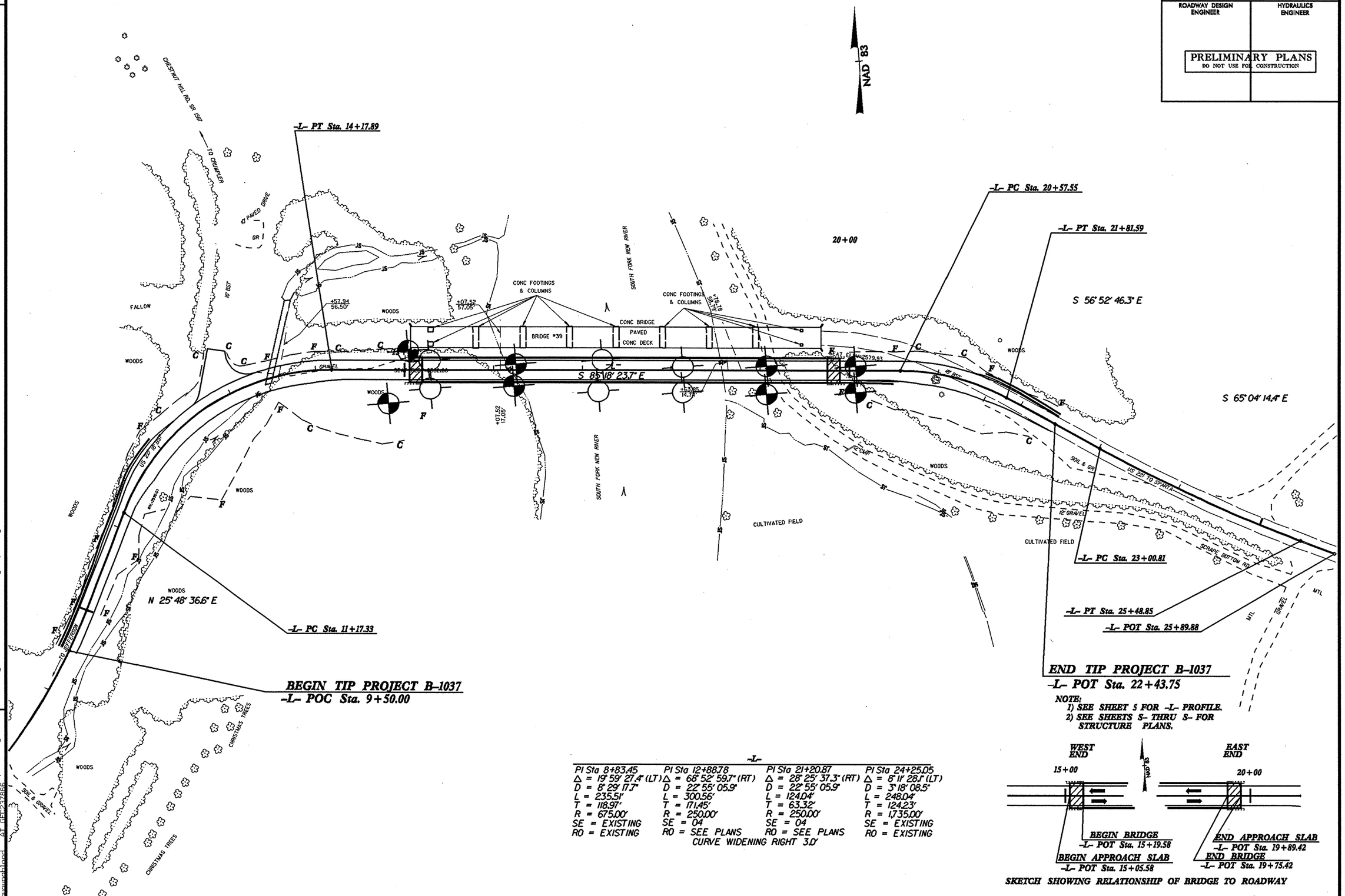
PROJECT REFERENCE NO.	SHEET NO.
32579.1.1 (B-1037)	3



SITE VICINITY MAP

PROJECT REFERENCE NO.	SHEET NO.
B-1037	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



NOTE:
1) SEE SHEET 5 FOR -L- PROFILE.
2) SEE SHEETS S- THRU S- FOR STRUCTURE PLANS.

-L-

PI Sta 8+83.45	PI Sta 12+88.78	PI Sta 21+20.87	PI Sta 24+25.05
Δ = 19° 59' 27.4" (LT)	Δ = 68° 52' 59.7" (RT)	Δ = 28° 25' 37.3" (RT)	Δ = 8° 11' 28.1" (LT)
D = 8° 29' 17.7"	D = 22° 55' 05.9"	D = 22° 55' 05.9"	D = 3° 18' 08.5"
L = 235.51'	L = 300.56'	L = 124.04'	L = 248.04'
T = 118.97'	T = 171.45'	T = 63.32'	T = 124.23'
R = 675.00'	R = 250.00'	R = 250.00'	R = 1,735.00'
SE = EXISTING	SE = 04	SE = 04	SE = EXISTING
RO = EXISTING	RO = SEE PLANS	RO = SEE PLANS	RO = EXISTING

CURVE WIDENING RIGHT 3.0'

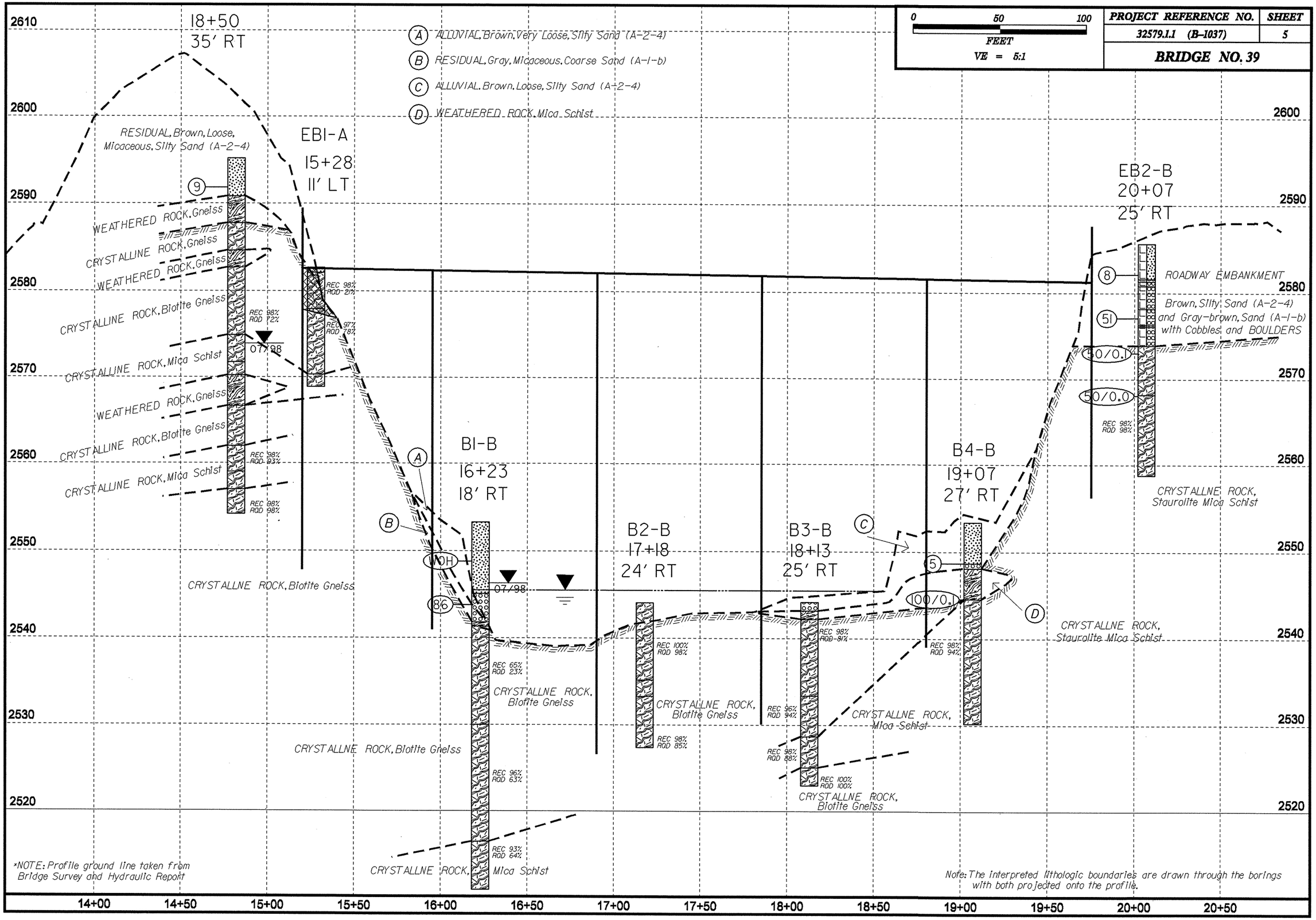
SKETCH SHOWING RELATIONSHIP OF BRIDGE TO ROADWAY

REVISIONS

8/17/99

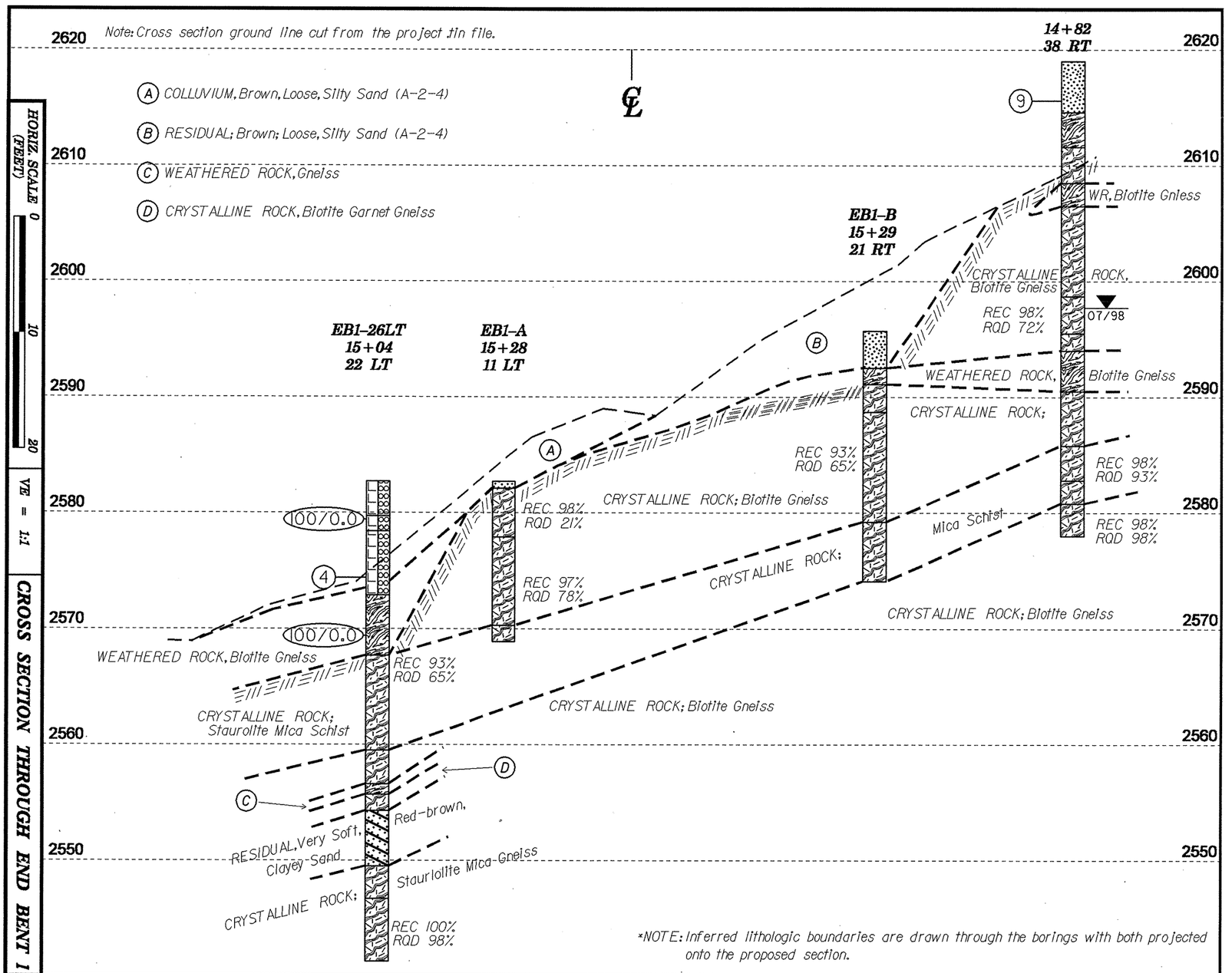
31-MAR-2009 14:47
s:\contracts\investigations\tip\b1037_geo_br0039\cadd_geotech\site&sub\b1037_geo_plan.dgn
pinnacleland

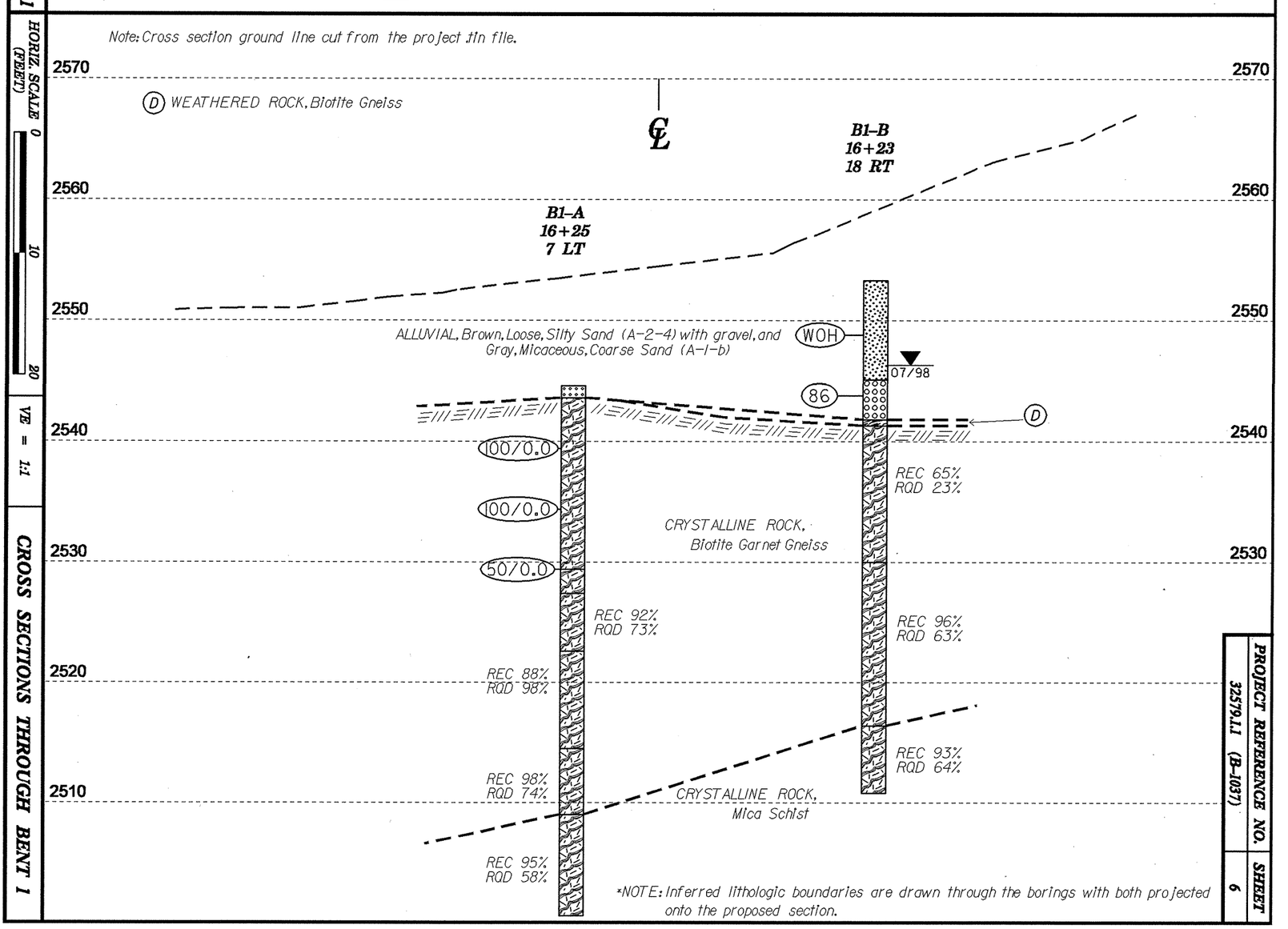
PROJECT REFERENCE NO.	SHEET
32579.1.1 (B-1037)	5
BRIDGE NO. 39	



*NOTE: Profile ground line taken from Bridge Survey and Hydraulic Report

Note: The interpreted lithologic boundaries are drawn through the borings with both projected onto the profile.



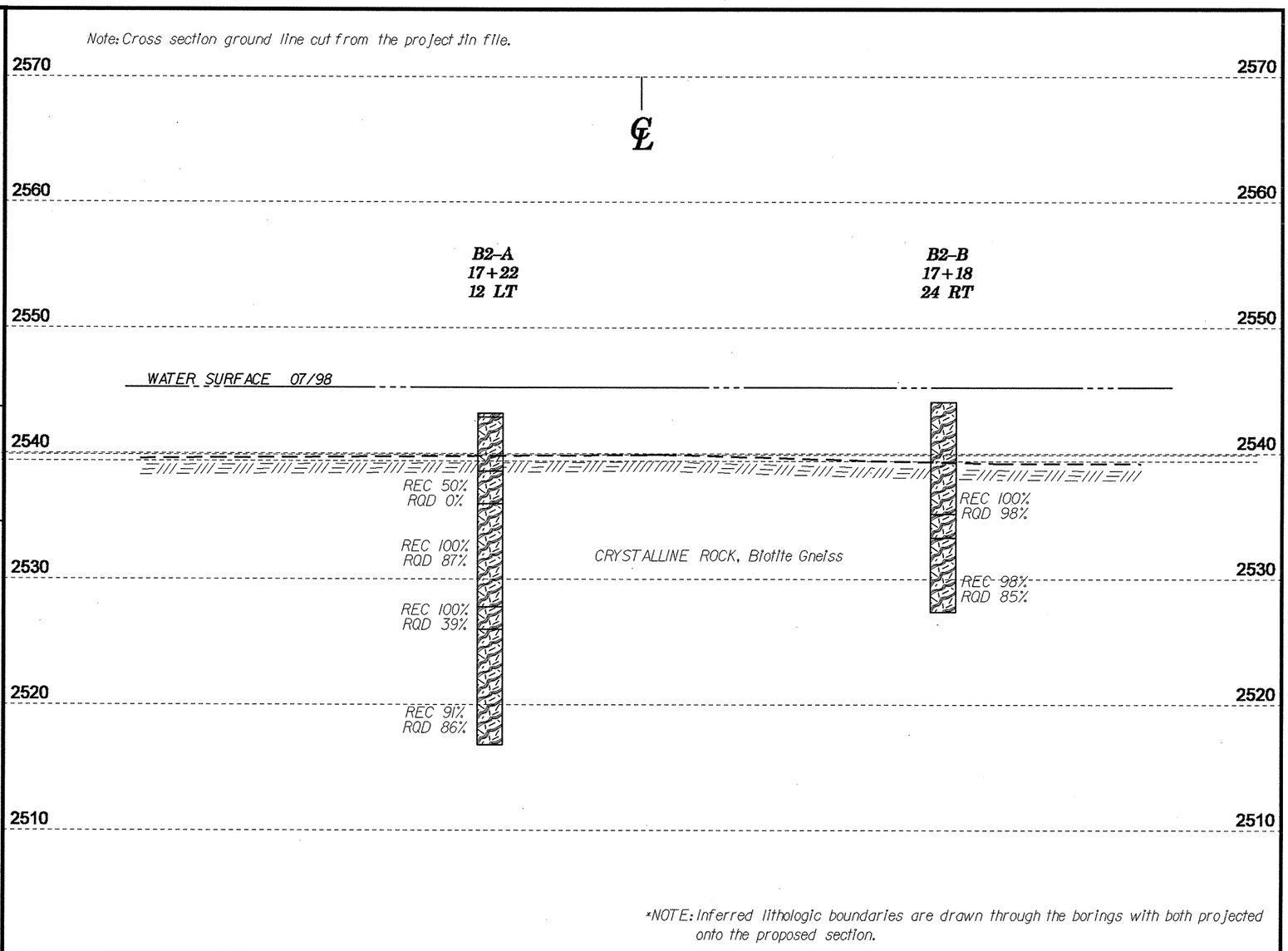


PROJECT REFERENCE NO.	SHEET
32579.1.1 (B-1037)	6

HORIZ. SCALE (FEET) 0 10 20

VE = 1:1

CROSS SECTION THROUGH BENT 2

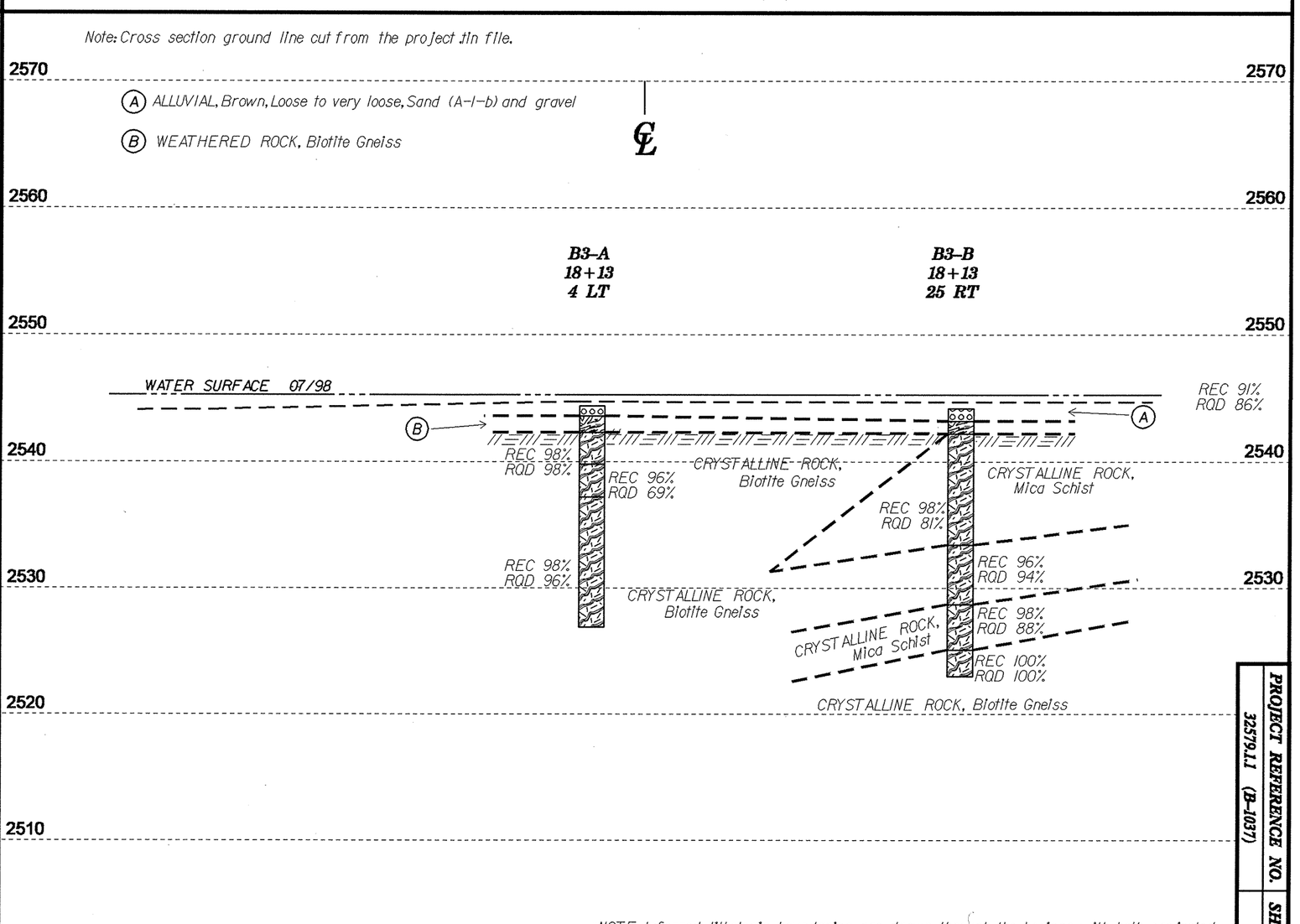


*NOTE: Inferred lithologic boundaries are drawn through the borings with both projected onto the proposed section.

HORIZ. SCALE (FEET) 0 10 20

VE = 1:1

CROSS SECTION THROUGH BENT 3



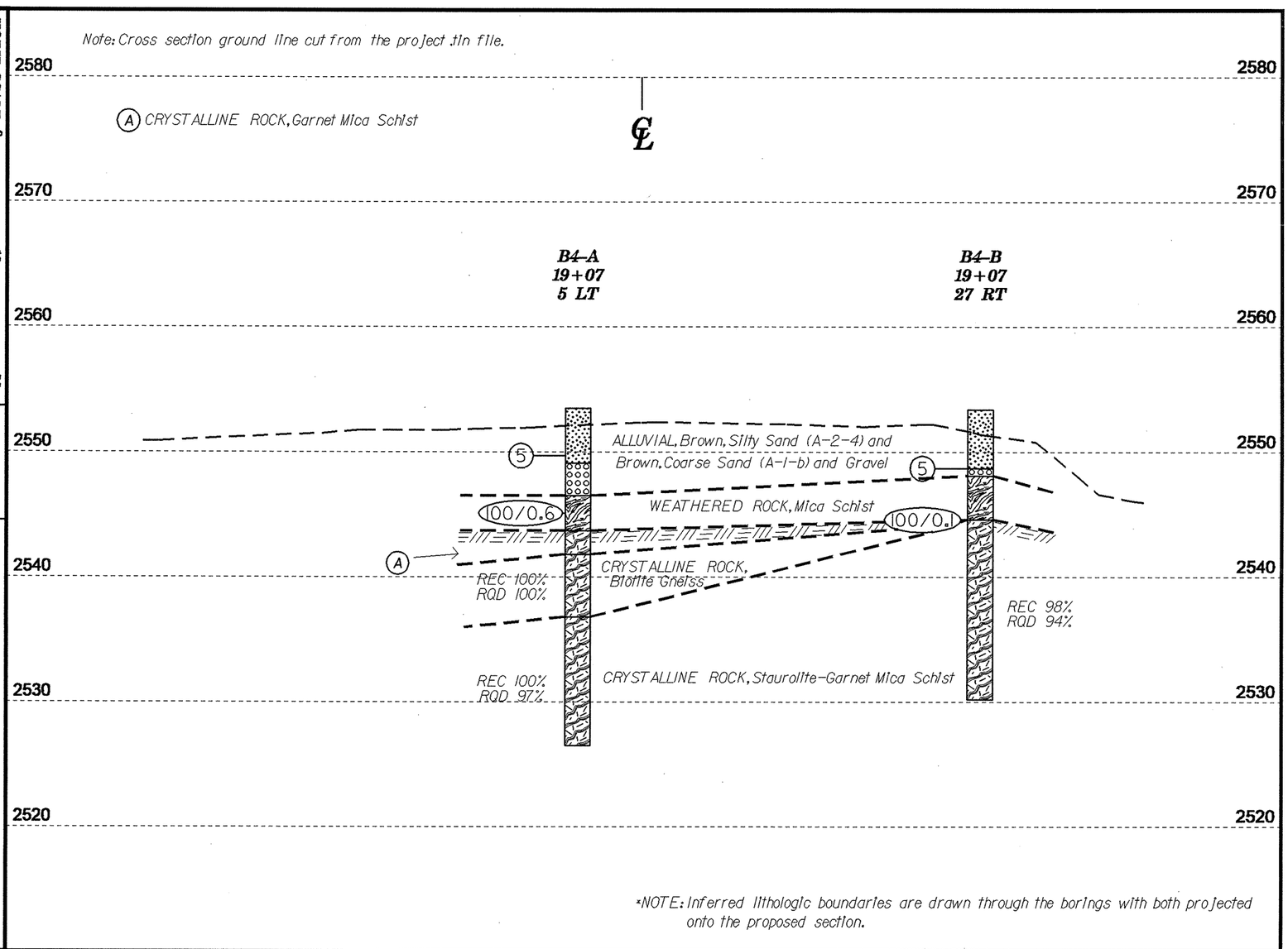
*NOTE: Inferred lithologic boundaries are drawn through the borings with both projected onto the proposed section.

PROJECT REFERENCE NO.	SHEET
32579.1.1 (B-1037)	7

HORIZ. SCALE (FEET) 0 10 20

VE = 1:1

CROSS SECTIONS THROUGH BENT 4

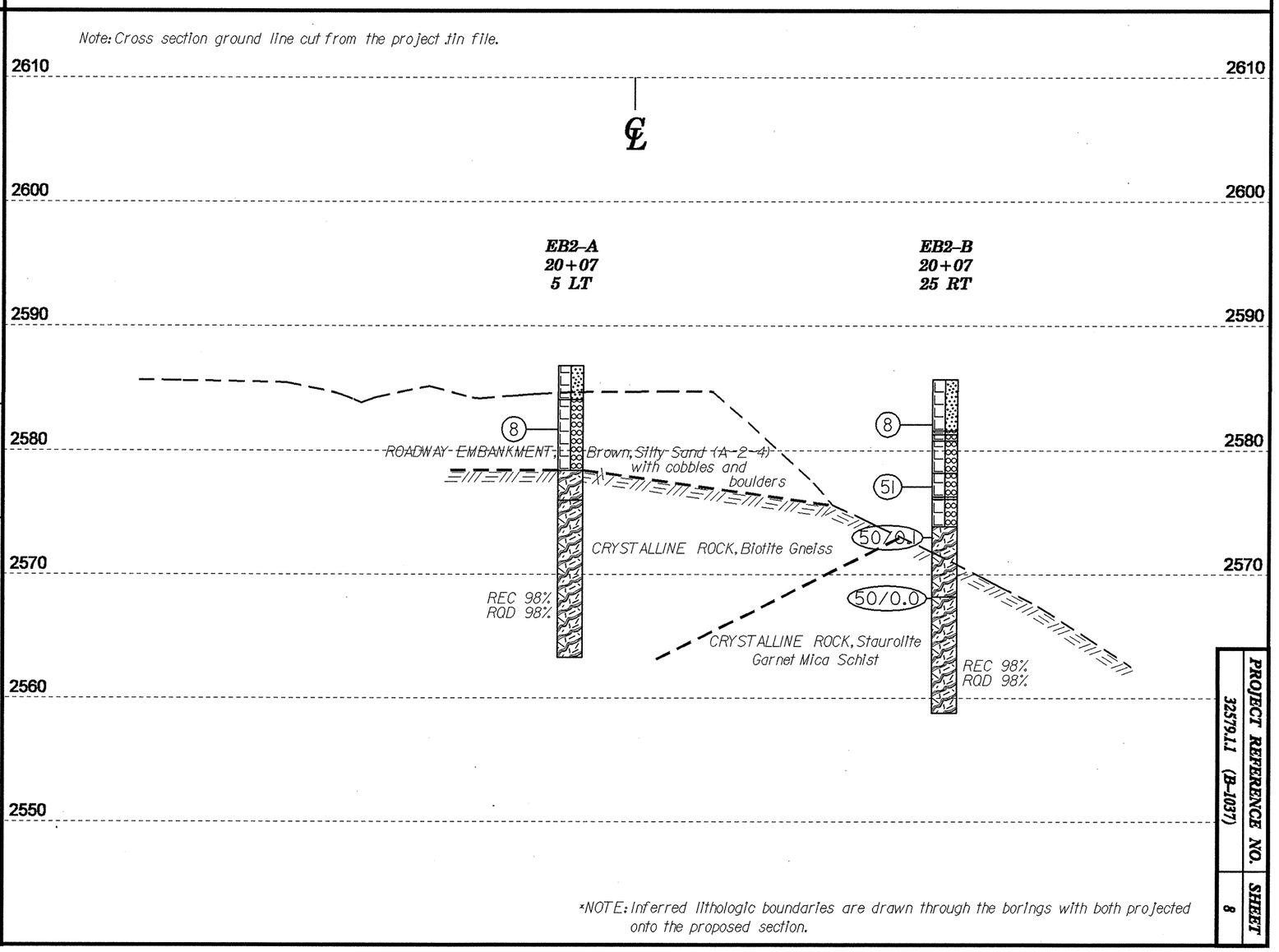


*NOTE: Inferred lithologic boundaries are drawn through the borings with both projected onto the proposed section.

HORIZ. SCALE (FEET) 0 10 20

VE = 1:1

CROSS SECTIONS THROUGH END BENT 2



*NOTE: Inferred lithologic boundaries are drawn through the borings with both projected onto the proposed section.

PROJECT REFERENCE NO.	SHEET
32579.1.1 (B-1037)	8

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 32579.1.1	**ID.** B-1037	**COUNTY** Ashe	**GEOLOGIST** T.P. Shelton
SITE DESCRIPTION Bridge No. 39 on US 221 over South Fork New River			**GROUND WTR (ft)**
BORING NO. EB1-26LT	**STATION** 15+04	**OFFSET** 22ft LT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 2,582.7 ft	**TOTAL DEPTH** 41.4 ft	**NORTHING** 999,496	**EASTING** 1,312,729 / **24 HR.** N/A
DRILL MACHINE CME-550	**DRILL METHOD** SPT Core Boring		**HAMMER TYPE** Automatic
START DATE 07/14/98	**COMP. DATE** 07/14/98	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** 15.0 ft

ELEV (ft)	DRIVE 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)
2585											
										2,582.7 GROUND SURFACE	0.0
2580	2,580.4	2.3	10	54	100	100/0.0		M		**ROADWAY EMBANKMENT** Boulders in tan-borwn, loose silty sand — 2,579.7	3.0
										2,578.4	4.3
2575	2,575.4	7.3	1	2	2	4		M			
										2,572.9 **WEATHERED ROCK** (Gneiss with residual soil seams)	9.8
2570	2,570.4	12.3	31	70	30	100/0.0					
										2,567.7 **CRYSTALLINE ROCK** (Garnet Mica Schist)	15.0
2565											
2560										2,559.5 **CRYSTALLINE ROCK** (Biotite Garnet Gneiss)	23.2
										2,556.6	26.1
2555										2,555.7 **WEATHERED ROCK** (Gneiss) No Recovery	27.0
										2,554.3 **CRYSTALLINE ROCK** (Biotite Garnet Gneiss)	28.4
2550										2,549.5 **RESIDUAL** Very soft, red brown, clayey sand	33.2
2545										2,546.7 **CRYSTALLINE ROCK** (Staurolite Garnet Mica Schist)	36.0
										CRYSTALLINE ROCK (Staurolite Mica Gneiss)	
2540										2,541.3 Boring Terminated at Elevation 2,541.3 ft In Crystalline Rock (Gneiss)	41.4
2535										Drill Rate is Min/Run	
2530											
2525											
2520											
2515											
2510											
2505											

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

PROJECT NO. 32579.1.1	**ID.** B-1037	**COUNTY** Ashe	**GEOLOGIST** T.P. Shelton
SITE DESCRIPTION Bridge No. 39 on US 221 over South Fork New River			**GROUND WTR (ft)**
BORING NO. EB1-26LT	**STATION** 15+04	**OFFSET** 22ft LT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 2,582.7 ft	**TOTAL DEPTH** 41.4 ft	**NORTHING** 999,496	**EASTING** 1,312,729 / **24 HR.** N/A
DRILL MACHINE CME-550	**DRILL METHOD** SPT Core Boring		**HAMMER TYPE** Automatic
START DATE 07/14/98	**COMP. DATE** 07/14/98	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** 15.0 ft
CORE SIZE NXWL	**TOTAL RUN** 26.4 ft	**DRILLER** N/A	

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS ELEV. (ft)	DEPTH (ft)
2567.7											Begin Coring @ 15.0 ft	
	2,567.7	15.0	2.4	3:31	(2.1) 88%	(1.6) 67%		(8.2) 100%	(5.4) 66%		2,567.7 **CRYSTALLINE ROCK** Moderately hard, slightly weathered, closely fractured, gray Garnet Mica Schist, 3 joints at 70°, 2 joints between 30-50° with Fe oxide coating and 5 joints between 0-10° with Fe staining	15.0
2565	2,565.3	17.4	4.8	6:40	(3.9) 81%	(3.3) 69%						
2560	2,560.5	22.2	4.8	6:24	(3.9) 81%	(2.1) 44%		(2.9) 100%	(1.4) 48%		2,559.5 **CRYSTALLINE ROCK** Moderately hard, slightly hard, slightly to moderately weathered, closely fractured, gray to tan, Biotite Garnet Gneiss, 4 joints between 0-10°.	23.2
2555	2,555.7	27.0	4.8	9:34	(2.1) 43%	(0.9) 19%		(1.4) 100%			2,556.6 / 2,555.7 **WEATHERED ROCK** No Recovery	26.1 / 27.0
											2,554.3 **CRYSTALLINE ROCK** Moderately hard, slightly hard, slightly to moderately weathered, closely fractured, gray to tan, Biotite Garnet Gneiss	28.4
2550	2,550.9	31.8	4.8	8:24	(4.3) 90%	(3.0) 63%		(2.8) 100%	(1.3) 46%		2,549.5 **RESIDUAL** Very soft, red brown, clayey sand	33.2
2545	2,546.1	36.6	4.8	N/A	(3.9) 81%	(3.9) 81%		(5.4) 100%	(5.3) 98%		2,546.7 **CRYSTALLINE ROCK** Moderately hard, slightly weathered, closely fractured, gray, Staurolite, Garnet, Mica Schist, 2 joints at 70° with Fe and Mn oxide coating, 2 joints at 10° with Fe oxide stain	36.0
2540	2,541.3	41.4									2,541.3 **CRYSTALLINE ROCK** Moderately hard, fresh, wide to very wide fractured, Staurolite, Mica Gneiss, 3 joints at 45° coated with Fe oxide	41.4
											Boring Terminated at Elevation 2,541.3 ft In Crystalline Rock (Gneiss)	
2535											Drill Rate is Min/Run	
2530												
2525												
2520												
2515												
2510												
2505												
2500												
2495												
2490												

CORE PHOTOGRAPHS
EB1-26LT
BOXES 1, 2 & 3 15.0 - 41.1 FEET

0 1 2

FEET

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 32579.1.1	**ID.** B-1037	**COUNTY** Ashe	**GEOLOGIST** T.P. Shelton
SITE DESCRIPTION Bridge No. 39 on US 221 over South Fork New River			**GROUND WTR (ft)**
BORING NO. EB1-A	**STATION** 15+28	**OFFSET** 11ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 2,582.7 ft	**TOTAL DEPTH** 13.8 ft	**NORTHING** 999,483	**EASTING** 1,312,752	**24 HR.** N/A
DRILL MACHINE LONGYEAR 65	**DRILL METHOD** Core Boring		**HAMMER TYPE** Automatic
START DATE 07/21/98	**COMP. DATE** 07/21/98	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** 0.6 ft

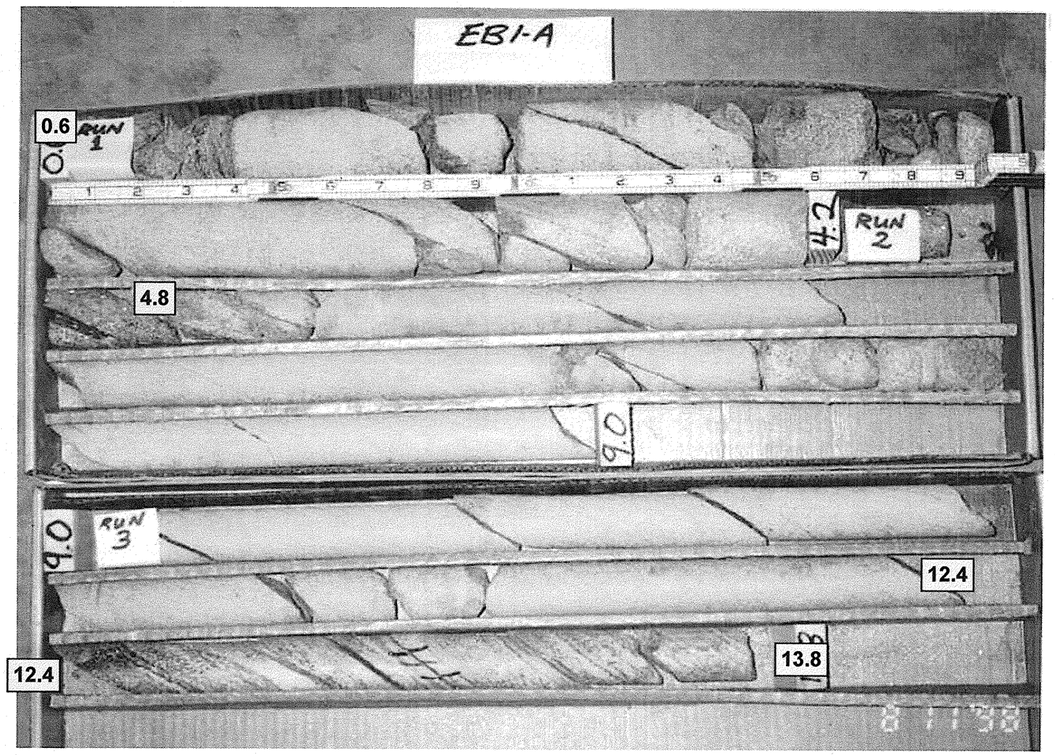
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
2585											
										2,582.7 GROUND SURFACE	0.0
										2,582.1 COLLUVIUM Brown, loose, silty sand	0.6
2580										CRYSTALLINE ROCK (Biotite Gneiss)	
										2,577.9	4.8
2575										CRYSTALLINE ROCK (Biotite Gneiss)	
2570										2,570.3	12.4
										2,568.9 CRYSTALLINE ROCK (Mica Schist)	13.8
2565										Boring Terminated at Elevation 2,568.9 ft In Crystalline Rock (Schist)	
2560										Core Runs were not timed.	
2555											
2550											
2545											
2540											
2535											
2530											
2525											
2520											
2515											
2510											
2505											

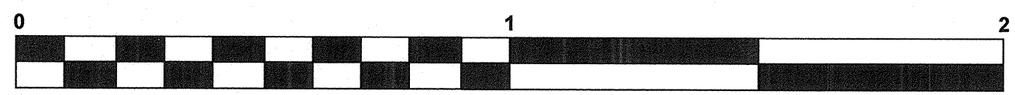
NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

PROJECT NO. 32579.1.1	**ID.** B-1037	**COUNTY** Ashe	**GEOLOGIST** T.P. Shelton
SITE DESCRIPTION Bridge No. 39 on US 221 over South Fork New River			**GROUND WTR (ft)**
BORING NO. EB1-A	**STATION** 15+28	**OFFSET** 11ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 2,582.7 ft	**TOTAL DEPTH** 13.8 ft	**NORTHING** 999,483	**EASTING** 1,312,752	**24 HR.** N/A
DRILL MACHINE LONGYEAR 65	**DRILL METHOD** Core Boring		**HAMMER TYPE** Automatic
START DATE 07/21/98	**COMP. DATE** 07/21/98	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** 0.6 ft
CORE SIZE BXWL	**TOTAL RUN** 13.2 ft	**DRILLER** N/A	

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS ELEV. (ft)	DEPTH (ft)
2582.1											Begin Coring @ 0.6 ft	
2580	2,582.1	0.6	3.6		(3.5) 97%	(1.1) 31%		(4.1) 98%	(0.9) 21%		2,582.1 CRYSTALLINE ROCK Hard to moderately hard, fresh to slightly weathered, moderately close fractured, light gray, Biotite Gneiss, very severe weathered zones from 0.6-0.9 and 2.2-2.6.	0.6
	2,578.5	4.2									2,577.9	4.8
2575			4.8		(4.7) 98%	(3.3) 69%		(7.4) 97%	(5.9) 78%		CRYSTALLINE ROCK Hard, fresh, moderately close fractured, light gray, Biotite Gneiss, 2 joints at 30° with slight Fe-oxide and clay staining, 2 joints at 20° with slight clay coating	
	2,573.7	9.0										
2570			4.8		(4.7) 98%	(3.3) 69%					2,570.3	12.4
	2,568.9	13.8						(1.4) 98%	(0.4) 25%		2,568.9 CRYSTALLINE ROCK Moderately hard, fresh, closely fractured, gray Mica Schist	13.8
2565											Boring Terminated at Elevation 2,568.9 ft In Crystalline Rock (Schist)	
2560											Core Runs were not timed.	
2555												
2550												
2545												
2540												
2535												
2530												
2525												
2520												
2515												
2510												
2505												

CORE PHOTOGRAPHS
EB1-A
BOXES 1 & 2 0.6 - 13.8 FEET





FEET

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 32579.1.1	**ID.** B-1037	**COUNTY** Ashe	**GEOLOGIST** T.P. Shelton
SITE DESCRIPTION Bridge No. 39 on US 221 over South Fork New River			**GROUND WTR (ft)**
BORING NO. EB1-B	**STATION** 15+29	**OFFSET** 21ft RT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 2,595.7 ft	**TOTAL DEPTH** 21.6 ft	**NORTHING** 999,451	**EASTING** 1,312,750 / **24 HR.** N/A
DRILL MACHINE LONGYEAR 65	**DRILL METHOD** Core Boring		**HAMMER TYPE** Automatic
START DATE 07/22/98	**COMP. DATE** 07/22/98	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** 4.6 ft

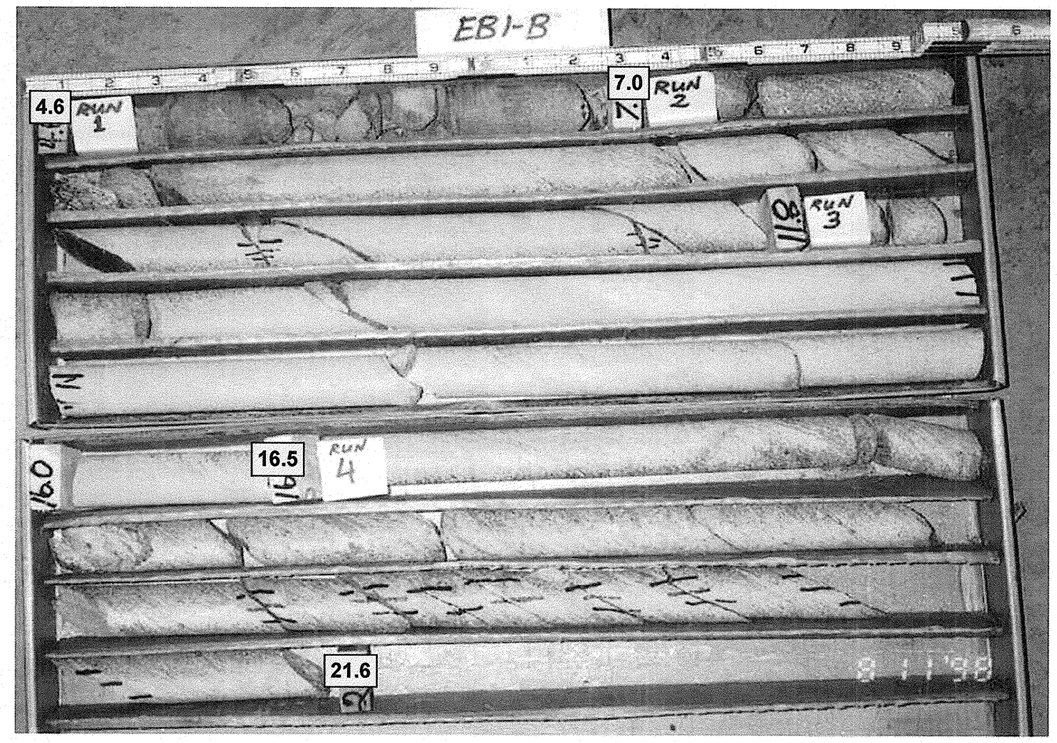
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
2600											
2595										2,595.7 GROUND SURFACE	0.0
										COLLUVIUM Brown, Loose, Silty Sand	
										2,592.5	3.2
2590										2,591.1 **WEATHERED ROCK** (Mylonite)	4.6
										2,588.7 **CRYSTALLINE ROCK** (Mylonite)	7.0
2585										**CRYSTALLINE ROCK** (Biotite Gniess)	
2580										2,579.2	16.5
2575										**CRYSTALLINE ROCK** (Garnet-Mica Schist)	
										2,574.1	21.6
2570										Boring Terminated at Elevation 2,574.1 ft In Crystalline Rock (Schist)	
2565										Core Runs were not timed.	
2560											
2555											
2550											
2545											
2540											
2535											
2530											
2525											
2520											

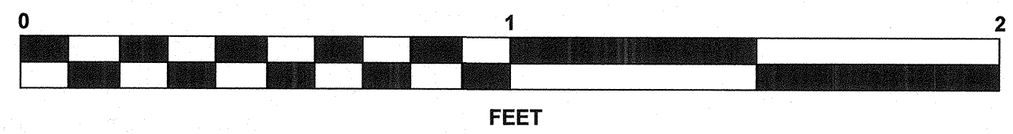
NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

PROJECT NO. 32579.1.1	**ID.** B-1037	**COUNTY** Ashe	**GEOLOGIST** T.P. Shelton
SITE DESCRIPTION Bridge No. 39 on US 221 over South Fork New River			**GROUND WTR (ft)**
BORING NO. EB1-B	**STATION** 15+29	**OFFSET** 21ft RT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 2,595.7 ft	**TOTAL DEPTH** 21.6 ft	**NORTHING** 999,451	**EASTING** 1,312,750 / **24 HR.** N/A
DRILL MACHINE LONGYEAR 65	**DRILL METHOD** Core Boring		**HAMMER TYPE** Automatic
START DATE 07/22/98	**COMP. DATE** 07/22/98	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** 4.6 ft
CORE SIZE BXWL	**TOTAL RUN** 17.0 ft	**DRILLER** N/A	

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS ELEV. (ft)	DEPTH (ft)
2591.1											Begin Coring @ 4.6 ft	
2590	2,591.1	4.6	2.4		(1.2) 50%	(0.0) 0%		(1.2) 50%	(0.0) 0%		2,591.1 **CRYSTALLINE ROCK**	4.6
	2,588.7	7.0									2,588.7 Soft to hard, slightly to severly weathered, very close fractured, very close fractured, dark gray, Mylonite.	7.0
			4.8		(4.1) 85%	(2.3) 48%		(8.8) 93%	(6.2) 65%		**CRYSTALLINE ROCK** Hard, fresh to slightly weathered, very close to moderately close fracture spacing, Biotite Gneiss, 8 joints at 30° with Fe-oxide coating.	
2585	2,583.9	11.8										
			4.8		(4.8) 100%	(4.1) 85%						
2580	2,579.1	16.6									2,579.2	16.5
			5.0		(4.9) 98%	(4.5) 90%		(4.9) 96%	(4.5) 88%		**CRYSTALLINE ROCK** Moderately hard, fresh, moderately close to wide fracture spacing, Garnet-Mica Schist, 4 joints at 20° and 2 joints at 65° with clay infilling.	
2575	2,574.1	21.6									2,574.1	21.6
2570											Boring Terminated at Elevation 2,574.1 ft In Crystalline Rock (Schist)	
											Core Runs were not timed.	
2565												
2560												
2555												
2550												
2545												
2540												
2535												
2530												
2525												
2520												
2515												

CORE PHOTOGRAPHS
EB1-B
BOXES 1 & 2 4.6 - 21.6 FEET





NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

PROJECT NO. 32579.1.1	**ID.** B-1037	**COUNTY** Ashe	**GEOLOGIST** T.P. Shelton
SITE DESCRIPTION Bridge No. 39 on US 221 over South Fork New River			**GROUND WTR (ft)**
BORING NO. 18+50-35RT	**STATION** 14+82	**OFFSET** 38ft RT	**ALIGNMENT** -L- / **0 HR.** 18.3
COLLAR ELEV. 2,619.0 ft	**TOTAL DEPTH** 41.0 ft	**NORTHING** 999,438	**EASTING** 1,312,702 / **24 HR.** 21.3
DRILL MACHINE LONGYEAR 65	**DRILL METHOD** SPT Core Boring		**HAMMER TYPE** Automatic
START DATE 07/22/98	**COMP. DATE** 07/22/98	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** 7.4 ft

ELEV (ft)	DRIVE 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)
2620										2,619.0 GROUND SURFACE	0.0
	2,616.6	2.4								**RESIDUAL** Brown, loose, micaeous, silty sand	
2615			2	4	5	9	SS-5	M		2,614.6	4.4
										WEATHERED ROCK (Gneiss)	
										2,611.6	7.4
2610										**CRYSTALLINE ROCK** (Biotite Gneiss)	
										2,608.5	10.5
										WEATHERED ROCK (Biotite Gneiss)	
										2,606.5	12.5
2605										**CRYSTALLINE ROCK** (Biotite Gneiss)	
2600											
										2,598.7	20.3
										CRYSTALLINE ROCK (Mica Schist)	
2595										2,595.5	23.5
										CRYSTALLINE ROCK (Quartz Vein)	
										2,594.0	25.0
										WEATHERED ROCK (Biotite Gneiss)	
2590										2,590.5	28.5
										CRYSTALLINE ROCK (Biotite Gneiss)	
2585										2,585.8	33.2
										CRYSTALLINE ROCK (Mica Schist)	
										2,582.8	36.2
2580										**CRYSTALLINE ROCK** (Mica Schist)	
										2,580.8	38.2
										CRYSTALLINE ROCK (Biotite Gneiss)	
										2,578.0	41.0
2575										Boring Terminated at Elevation 2,578.0 ft In Crystalline Rock (Gneiss)	
2570										Drill Rate is Min/Run	
2565											
2560											
2555											
2550											
2545											
2540											

NCDOT GEOTECHNICAL ENGINEERING UNIT CORE BORING REPORT

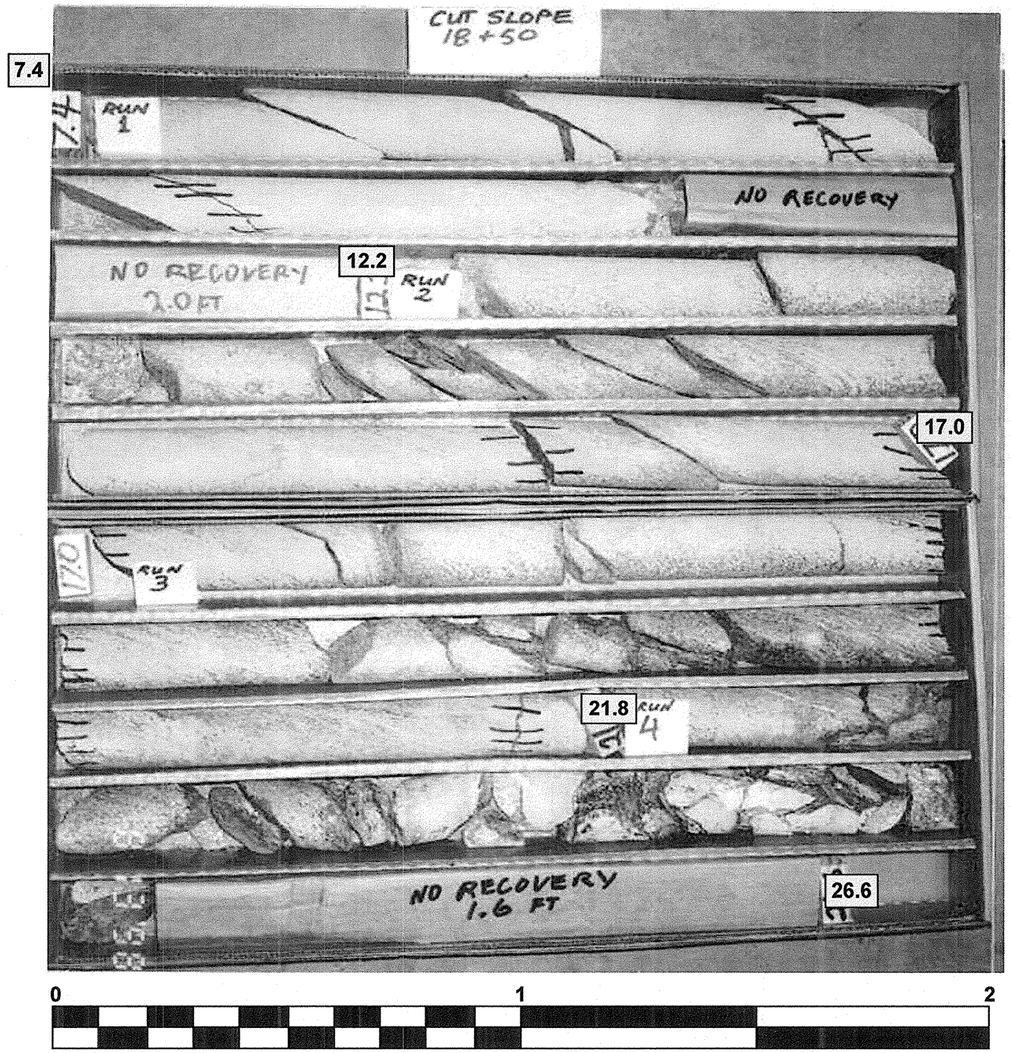
PROJECT NO. 32579.1.1	**ID.** B-1037	**COUNTY** Ashe	**GEOLOGIST** T.P. Shelton
SITE DESCRIPTION Bridge No. 39 on US 221 over South Fork New River			**GROUND WTR (ft)**
BORING NO. 18+50-35RT	**STATION** 14+82	**OFFSET** 38ft RT	**ALIGNMENT** -L- / **0 HR.** 18.3
COLLAR ELEV. 2,619.0 ft	**TOTAL DEPTH** 41.0 ft	**NORTHING** 999,438	**EASTING** 1,312,702 / **24 HR.** 21.3
DRILL MACHINE LONGYEAR 65	**DRILL METHOD** SPT Core Boring		**HAMMER TYPE** Automatic
START DATE 07/22/98	**COMP. DATE** 07/22/98	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** 7.4 ft
CORE SIZE NXWL	**TOTAL RUN** 33.6 ft	**DRILLER** N/A	

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS ELEV. (ft)	DEPTH (ft)
2611.6											Begin Coring @ 7.4 ft	
2610	2,611.6	7.4	4.8	8:48	(3.1) 65%	(2.8) 58%		(3.1) 100%	(3.1) 100%		2,611.6 **CRYSTALLINE ROCK** Hard, fresh, moderately close to closely fractured, light gray, Gneiss.	7.4
											2,608.5	10.5
	2,606.8	12.2						(0.0) 0%	N/A		2,606.5 **WEATHERED ROCK**	12.5
2605			4.8	7:41	(4.7) 97%	(3.7) 77%		(7.6) 98%	(5.6) 72%		**CRYSTALLINE ROCK** Moderately hard to hard, fresh to slightly weathered, moderately close to closely fractured, Biotite Gneiss, 8 joints from 20° to 30° and 4 joints between 0-10°	
	2,602.0	17.0									2,598.7	20.3
2600			4.8	8:16	(4.7) 98%	(3.7) 77%						
	2,597.2	21.8						(2.9) 91%	(2.0) 63%		**CRYSTALLINE ROCK** Moderately hard, fresh to slightly weathered, moderately close to closely fractured, brown-gray, Mica Schist.	
2595			4.8	12:14	(2.9) 60%	(0.5) 10%					2,595.5	23.5
								(1.3) 87%	(0.0) 0%		2,594.0 **CRYSTALLINE ROCK** Very hard, fresh, closely fractured, white, quartz vein	25.0
	2,592.4	26.6						(0.6) 17%	N/A		**WEATHERED ROCK** (Biotite Gneiss)	
2590			4.8	7:21	(3.6) 75%	(2.6) 54%					2,590.5	28.5
	2,587.6	31.4						(4.6) 98%	(4.6) 98%		**CRYSTALLINE ROCK** Hard, fresh, moderately close fractured, light gray, Biotite Gneiss, 1 joint at 80° with Fe-oxide stain.	
2585			4.8	4:17	(4.7) 98%	(4.6) 96%					2,585.8	33.2
	2,582.8	36.2						(2.9) 98%	(2.8) 93%		**CRYSTALLINE ROCK** Soft to moderately hard, fresh to slightly weathered, closely fractured, Mica Schist, 1 joint at 80° with Fe-oxide stain.	
			4.8	8:01	(4.3) 90%	(2.9) 60%					2,582.8	36.2
2580								(1.4) 70%	(0.4) 20%		2,580.8 **CRYSTALLINE ROCK** Medium hard to soft, slightly weathered, closely fractured, brown, Mica Schist, 1 joint at 30° with Fe-oxide stain and 1 joint at 80° with Fe-oxide stain.	38.2
	2,578.0	41.0						(2.7) 98%	(2.7) 98%		2,578.0 **CRYSTALLINE ROCK** Hard, fresh, wide fractured, light gray, Biotite Gneiss, 2 quartz veins 0.1 feet thick.	41.0
2575											Boring Terminated at Elevation 2,578.0 ft In Crystalline Rock (Gneiss)	
2570											Drill Rate is Min/Run	
2565												
2560												
2555												
2550												
2545												
2540												
2535												

CORE PHOTOGRAPHS

-L- 18+50 35' RT

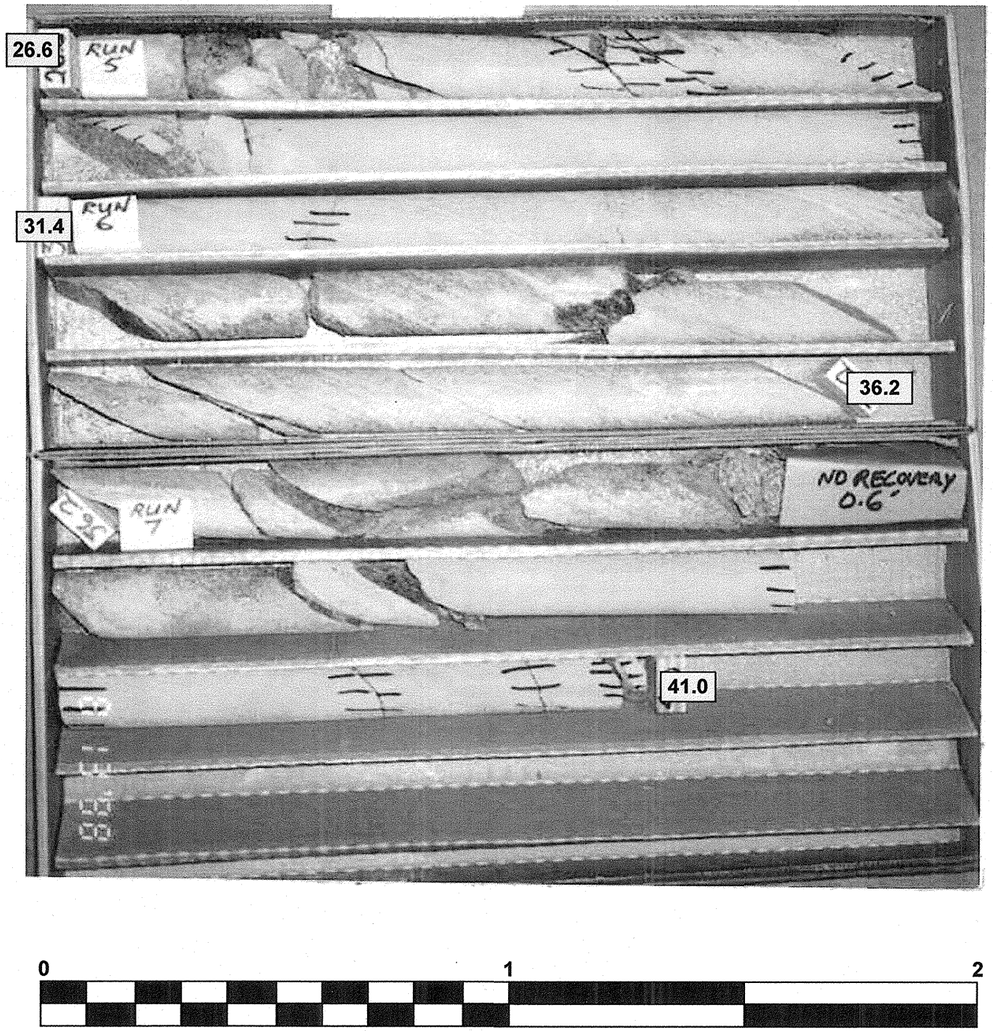
BOXES 1 & 2: 7.4 - 26.6 FEET



CORE PHOTOGRAPHS

-L- 18+50 35' RT

BOXES 3 & 4: 26.6 - 41.0 FEET



NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 32579.1.1	**ID.** B-1037	**COUNTY** Ashe	**GEOLOGIST** T.P. Shelton
SITE DESCRIPTION Bridge No. 39 on US 221 over South Fork New River			**GROUND WTR (ft)**
BORING NO. B1-A	**STATION** 16+25	**OFFSET** 7ft LT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 2,544.6 ft	**TOTAL DEPTH** 44.0 ft	**NORTHING** 999,471	**EASTING** 1,312,848 / **24 HR.** N/A
DRILL MACHINE CME-550	**DRILL METHOD** SPT Core Boring		**HAMMER TYPE** Automatic
START DATE 07/13/98	**COMP. DATE** 07/13/98	**SURFACE WATER DEPTH** 1.1ft	**DEPTH TO ROCK** 1.0 ft

ELEV (ft)	DRIVE 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)
2545										WATER SURFACE (07/13/98)	
										2,544.6 GROUND SURFACE	0.0
										2,543.6 **ALLUVIAL** Brown, loose, silty sand and gravel	1.0
										CRYSTALLINE ROCK (Gneiss)	
2540	2,539.4	5.2	100/0.0			100/0.0					
2535	2,534.4	10.2	100/0.0			100/0.0					
2530	2,529.4	15.2	50/0.0			50/0.0				2,529.4	15.2
										CRYSTALLINE ROCK (Biotite Gneiss)	
										2,527.4	17.2
										CRYSTALLINE ROCK (Biotite Gneiss)	
2525							RS-17			2,522.6	22.0
										CRYSTALLINE ROCK (Hornblende-Garnet-Mica Gneiss interlayered with Biotite Gneiss)	
2520											
2515							RS-18			2,514.5	30.1
										CRYSTALLINE ROCK (Biotite Gneiss)	
2510							RS-19			2,509.0	35.6
										CRYSTALLINE ROCK (Mica Schist)	
2505											
							RS-20				
2500										2,500.6	44.0
										Boring Terminated at Elevation 2,500.6 ft In Crystalline Rock (Schist)	
										Core Runs were not timed.	
2495											
2490											
2485											
2480											
2475											
2470											
2465											

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

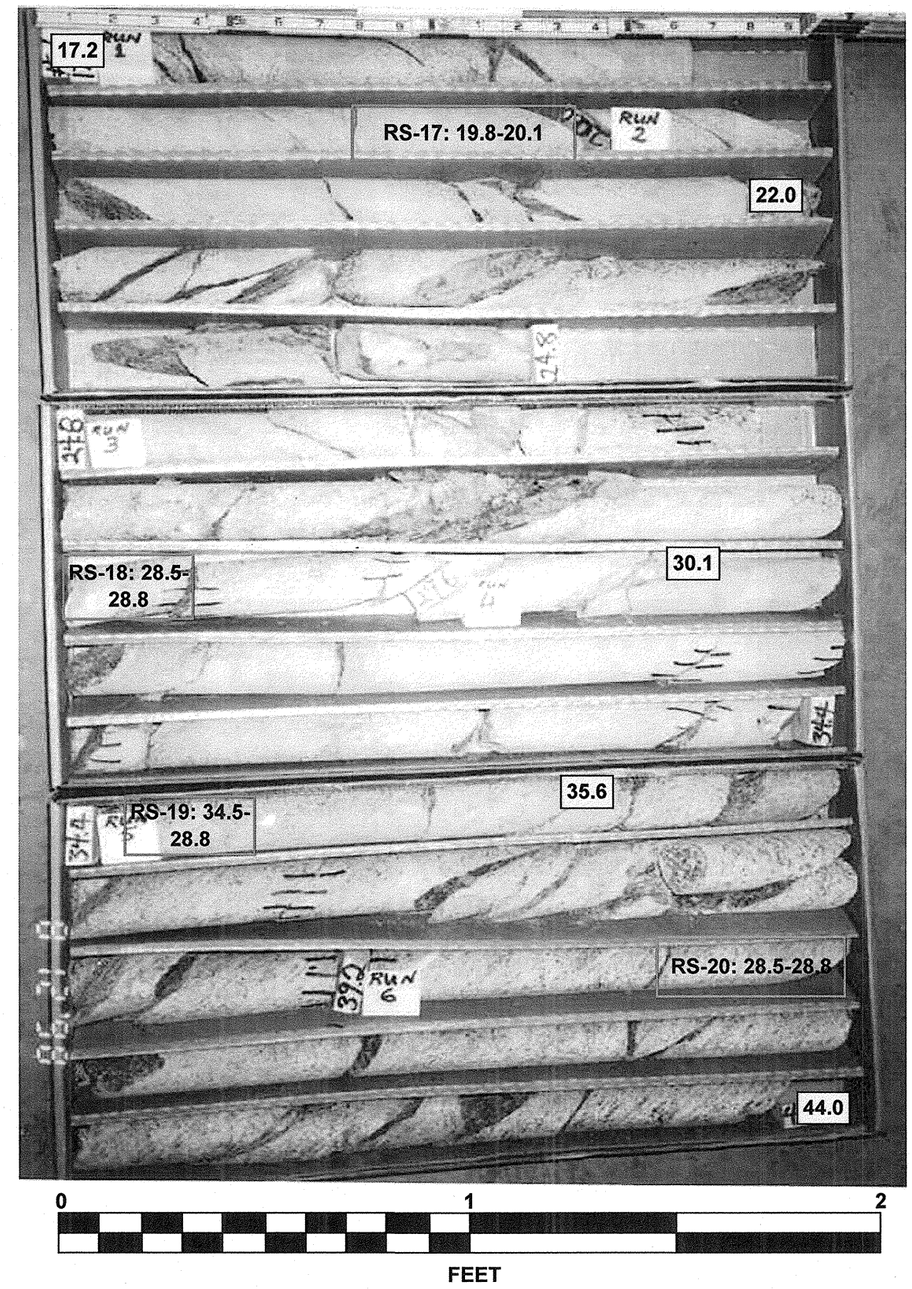
PROJECT NO. 32579.1.1	**ID.** B-1037	**COUNTY** Ashe	**GEOLOGIST** T.P. Shelton
SITE DESCRIPTION Bridge No. 39 on US 221 over South Fork New River			**GROUND WTR (ft)**
BORING NO. B1-A	**STATION** 16+25	**OFFSET** 7ft LT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 2,544.6 ft	**TOTAL DEPTH** 44.0 ft	**NORTHING** 999,471	**EASTING** 1,312,848 / **24 HR.** N/A
DRILL MACHINE CME-550	**DRILL METHOD** SPT Core Boring		**HAMMER TYPE** Automatic
START DATE 07/13/98	**COMP. DATE** 07/13/98	**SURFACE WATER DEPTH** 1.1ft	**DEPTH TO ROCK** 1.0 ft
CORE SIZE NXWL	**TOTAL RUN** 26.8 ft	**DRILLER** N/A	

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS ELEV. (ft)	DEPTH (ft)
2527.4											Begin Coring @ 17.2 ft	
	2,527.4	17.2	2.8		(2.8) 100%	(2.0) 71%		(4.4) 92%	(3.2) 67%		2,527.4 **CRYSTALLINE ROCK** Hard, fresh, closely fractured, light gray, Biotite Gneiss, 5 joints between 0 to 20°.	17.2
2525	2,524.6	20.0	4.8		(4.7) 98%	(2.8) 58%	RS-17	(7.1) 88%	(5.9) 73%		2,522.6 KSF Axial=1440 R1=7, R2=13, R3=10, R4=20, R5=7 RMR=57 Rock Type E	22.0
2520	2,519.8	24.8	4.8		(4.4) 92%	(3.3) 69%					**CRYSTALLINE ROCK** Moderately hard, fresh to slightly weathered, closely fractured, gray to dark gray, Hornblende-Garnet-Mica Gneiss interlayered with Biotite Gneiss, 7 joints at 0 to 20°.	
2515	2,515.0	29.6	4.8		(4.5) 94%	(4.1) 85%	RS-18	(5.4) 98%	(4.1) 74%		2,514.5 KSF Axial=331.2 R1=2, R2=13, R3=10, R4=12, R5=7 RMR=44 Rock Type E	30.1
2510	2,510.2	34.4	4.8		(4.5) 94%	(2.3) 47%	RS-19	(8.0) 95%	(4.9) 58%		2,509.0 **CRYSTALLINE ROCK** Hard, fresh, moderately close to closely fractured, light gray, Biotite Gneiss, 3 joints between 0 to 20°.	35.6
2505	2,505.4	39.2	4.8		(4.6) 96%	(3.7) 77%	RS-20				KSF Axial=417.6 R1=2, R2=13, R3=10, R4=20, R5=7 RMR=52 Rock Type E	
2500	2,500.6	44.0									2,500.6 **CRYSTALLINE ROCK** Moderately hard, fresh, moderately close to closely fractured, gray, Mica Schist, 9 joints between 60 to 70° coated with chlorite and gouge. KSF Axial=259.2 R1=2, R2=13, R3=10, R4=20, R5=7 RMR=52 Rock Type E	44.0
2495											Boring Terminated at Elevation 2,500.6 ft In Crystalline Rock (Schist)	
2490											Core Runs were not timed.	
2485												
2480												
2475												
2470												
2465												
2460												
2455												
2450												

CORE PHOTOGRAPHS

B1-A

BOXES 1, 2 & 3 17.2 - 44.0 FEET



NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 32579.1.1	**ID.** B-1037	**COUNTY** Ashe	**GEOLOGIST** L.L. Acker
SITE DESCRIPTION Bridge No. 39 on US 221 over South Fork New River			**GROUND WTR (ft)**
BORING NO. B1-B	**STATION** 16+23	**OFFSET** 18ft RT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 2,553.3 ft	**TOTAL DEPTH** 42.5 ft	**NORTHING** 999,447	**EASTING** 1,312,844 / **24 HR.** 7.0
DRILL MACHINE CME-550	**DRILL METHOD** SPT Core Boring		**HAMMER TYPE** Automatic
START DATE 07/09/98	**COMP. DATE** 07/09/98	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** 12.0 ft

ELEV (ft)	DRIVE 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)
2555											
										2,553.3 GROUND SURFACE	0.0
										ALLUVIAL Brown, silty sand	
2550	2,549.8	3.5									
			WOH	WOH	WOH	0	SS-3				
2545	2,544.8	8.5								2,545.1	8.2
			30	52	34	86	SS-4			**RESIDUAL** Gray, coarse sand, micaeous with rock fragments	
										2,541.8	11.5
										2,541.3 **WEATHERED ROCK** (Gneiss)	12.0
2540										**CRYSTALLINE ROCK** (Biotite Gneiss)	
2535											
2530										2,530.0	23.3
										CRYSTALLINE ROCK (Biotite Gneiss)	
							RS-1				
2525											
2520											
										2,516.4	36.9
2515										**CRYSTALLINE ROCK** (Mica Schist)	
							RS-2				
2510										2,510.8	42.5
										Boring Terminated at Elevation 2,510.8 ft In Crystalline Rock (Schist)	
										Drill Rate is Min/Run where indicated	
2505											
2500											
2495											
2490											
2485											
2480											
2475											

NCDOT BORE DOUBLE B1037_GEO_BH.GPJ NC_DOT.GDT 04/01/09

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

PROJECT NO. 32579.1.1	**ID.** B-1037	**COUNTY** Ashe	**GEOLOGIST** L.L. Acker
SITE DESCRIPTION Bridge No. 39 on US 221 over South Fork New River			**GROUND WTR (ft)**
BORING NO. B1-B	**STATION** 16+23	**OFFSET** 18ft RT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 2,553.3 ft	**TOTAL DEPTH** 42.5 ft	**NORTHING** 999,447	**EASTING** 1,312,844 / **24 HR.** 7.0
DRILL MACHINE CME-550	**DRILL METHOD** SPT Core Boring		**HAMMER TYPE** Automatic
START DATE 07/09/98	**COMP. DATE** 07/09/98	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** 12.0 ft
CORE SIZE NXWL	**TOTAL RUN** 30.5 ft	**DRILLER** N/A	

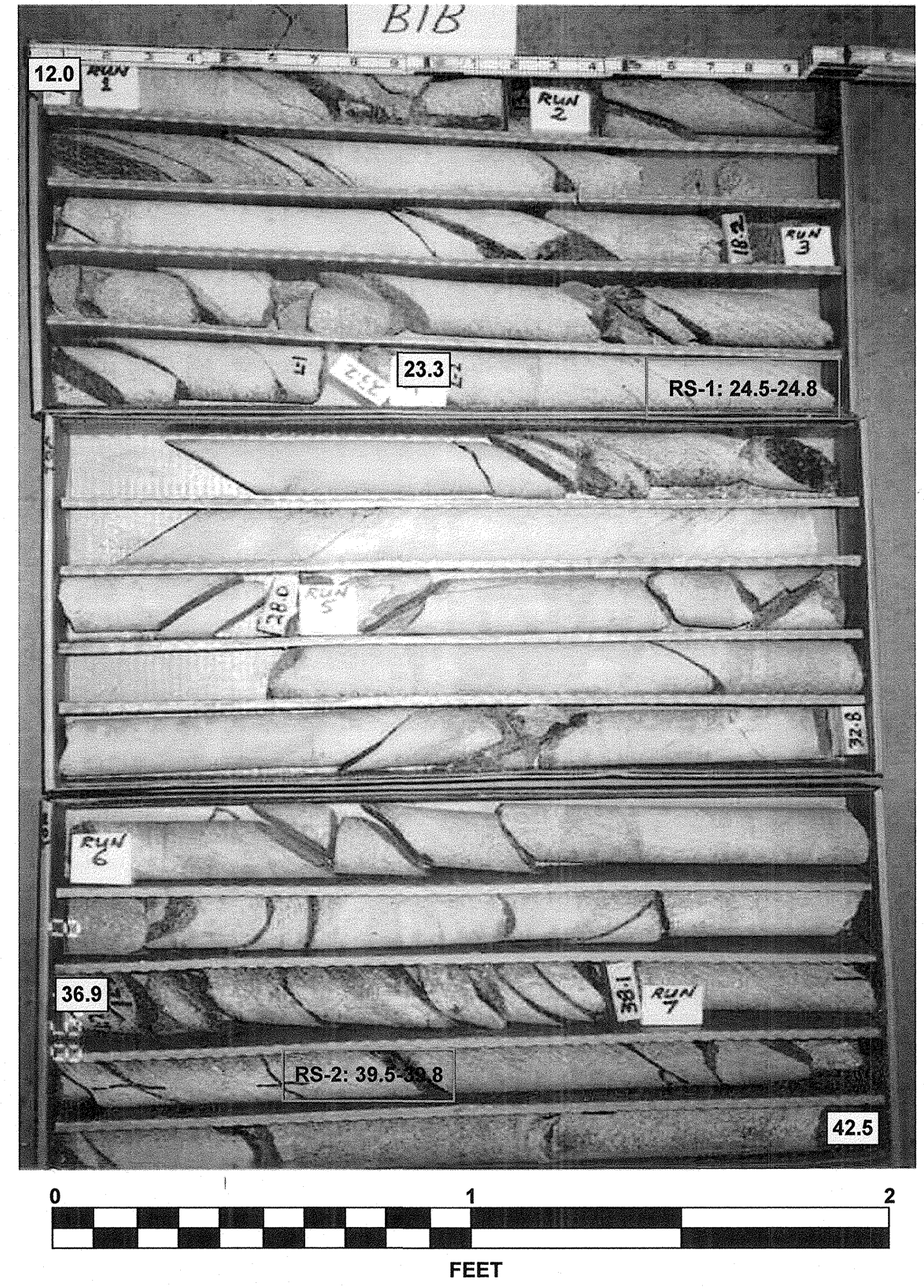
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS ELEV. (ft)	DEPTH (ft)
2541.3											Begin Coring @ 12.0 ft	
2540	2,541.3 / 2,540.1	12.0 / 13.2	1.2		(1.0) 83%	(0.4) 33%		(7.3) 65%	(2.6) 23%		2,541.3 **CRYSTALLINE ROCK** Moderately hard to hard, fresh to slightly weathered, closely fractured, brown-gray, Biotite Gneiss, 3 joints between 0-10°, 1 joint at 20° and 3 joints at 30°	12.0
			5.0	5:30	(3.6) 72%	(1.4) 28%						
2535	2,535.1	18.2									KSF Axial=331.2 R1=2, R2=3, R3=10, R4=12, R5=7 RMR=34 Rock Type E	
			5.0		(2.6) 52%	(0.8) 16%						
2530	2,530.1	23.2									2,530.0	23.3
			4.8	6:15	(4.6) 96%	(3.2) 66%	RS-1	(13.1) 96%	(8.6) 63%		**CRYSTALLINE ROCK** Hard, fresh, closely to widely fractured, Biotite Gneiss, 5 joints between 0-10° with slight Fe-oxide staining and 3 joints at 20°with slight Fe-oxide staining.	
2525	2,525.3	28.0										
			4.8		(4.6) 96%	(3.2) 67%					KSF Axial=763.2 R1=4, R2=13, R3=10, R4=20, R5=7 RMR=54 Rock Type E	
2520	2,520.5	32.8										
			2.4	4:25	(2.4) 100%	(1.4) 58%						
	2,518.1	35.2									2,516.4	36.9
			2.9	4:28	(2.9) 98%	(1.0) 33%						
2515	2,515.2	38.1						(5.2) 93%	(3.6) 64%		**CRYSTALLINE ROCK** Moderately hard, fresh, moderately close to closely fractured, gray Mica Schist	
			4.4		(4.1) 93%	(3.6) 82%	RS-2					
2510	2,510.8	42.5									2,510.8	42.5
											Boring Terminated at Elevation 2,510.8 ft In Crystalline Rock (Schist)	
											Drill Rate is Min/Run where indicated	
2505												
2500												
2495												
2490												
2485												
2480												
2475												
2470												
2465												

NCDOT CORE DOUBLE B1037_GEO_BH.GPJ NC_DOT.GDT 04/01/09

CORE PHOTOGRAPHS

B1-B

BOXES 1, 2 & 3 12.0 - 42.5 FEET



NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 32579.1.1	**ID.** B-1037	**COUNTY** Ashe	**GEOLOGIST** L.L. Acker
SITE DESCRIPTION Bridge No. 39 on US 221 over South Fork New River			**GROUND WTR (ft)**
BORING NO. B2-A	**STATION** 17+22	**OFFSET** 12ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 2,543.2 ft	**TOTAL DEPTH** 26.4 ft	**NORTHING** 999,468	**EASTING** 1,312,945	**24 HR.** N/A
DRILL MACHINE CME-550	**DRILL METHOD** Core Boring		**HAMMER TYPE** Automatic
START DATE 07/09/98	**COMP. DATE** 07/09/98	**SURFACE WATER DEPTH** 2.9ft	**DEPTH TO ROCK** 0.0 ft

ELEV (ft)	DRIVE 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)
								▼		WATER SURFACE (07/09/98)	
2545										2,543.2 GROUND SURFACE	0.0
										2,542.9 **CRYSTALLINE ROCK** Quartz boulders and gravel	0.3
2540										**CRYSTALLINE ROCK** (Biotite Gneiss) 2,538.6	4.6
										CRYSTALLINE ROCK (Mica Gneiss) 2,536.0	7.2
2535										**CRYSTALLINE ROCK** (Biotite Gneiss)	
2530							RS-3				
										2,527.8	15.4
										CRYSTALLINE ROCK (Mica Gneiss) 2,526.0	17.2
2525										**CRYSTALLINE ROCK** (Biotite Gneiss)	
2520											
							RS-4			2,516.8	26.4
2515										Boring Terminated at Elevation 2,516.8 ft In Crystalline Rock (Gneiss)	
2510										Drill Rate is Min/Run where indicated	
2505											
2500											
2495											
2490											
2485											
2480											
2475											
2470											
2465											

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

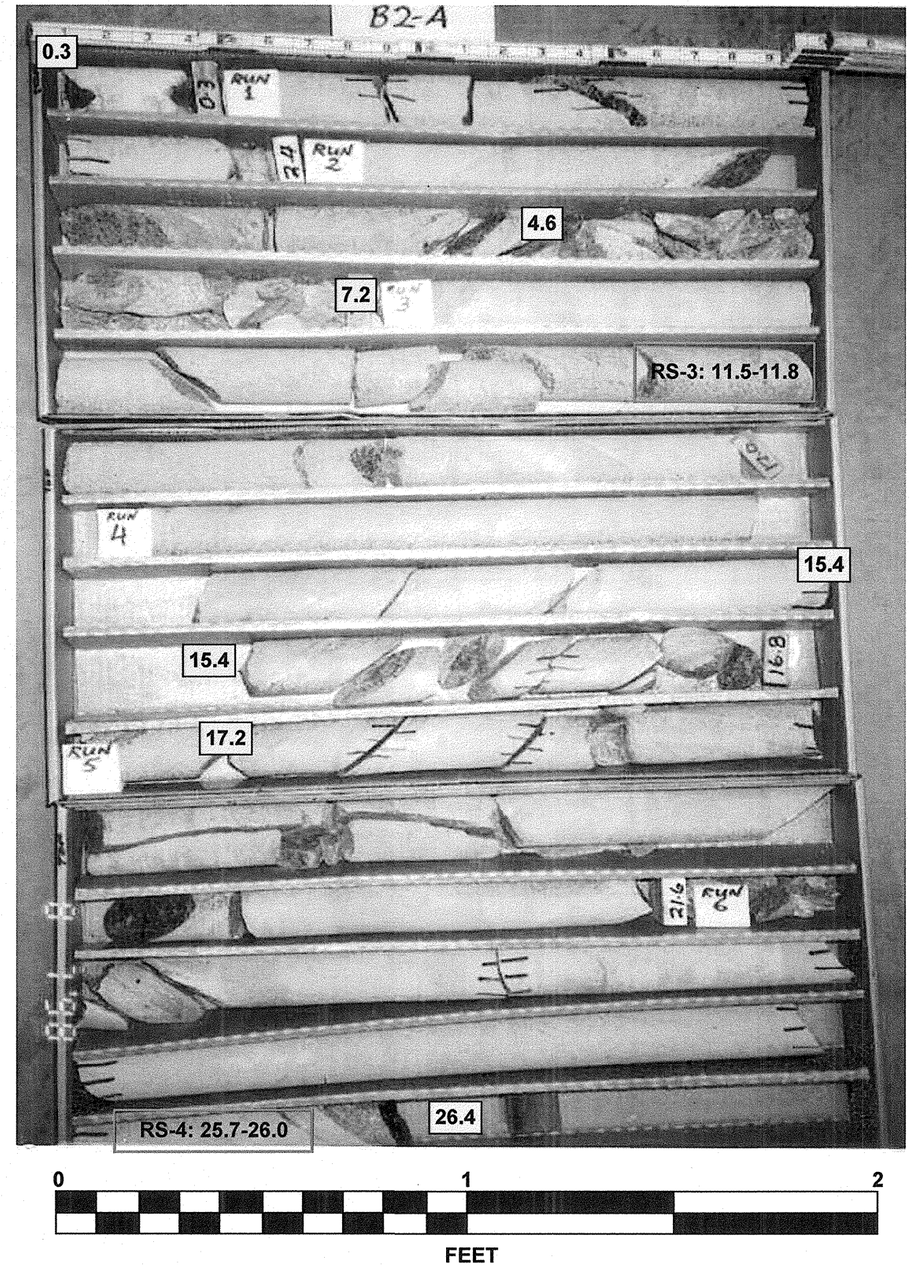
PROJECT NO. 32579.1.1	**ID.** B-1037	**COUNTY** Ashe	**GEOLOGIST** L.L. Acker
SITE DESCRIPTION Bridge No. 39 on US 221 over South Fork New River			**GROUND WTR (ft)**
BORING NO. B2-A	**STATION** 17+22	**OFFSET** 12ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 2,543.2 ft	**TOTAL DEPTH** 26.4 ft	**NORTHING** 999,468	**EASTING** 1,312,945	**24 HR.** N/A
DRILL MACHINE CME-550	**DRILL METHOD** Core Boring		**HAMMER TYPE** Automatic
START DATE 07/09/98	**COMP. DATE** 07/09/98	**SURFACE WATER DEPTH** 2.9ft	**DEPTH TO ROCK** 0.0 ft
CORE SIZE NXWL	**TOTAL RUN** 26.1 ft	**DRILLER** N/A	

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS ELEV. (ft)	DEPTH (ft)
2542.9											Begin Coring @ 0.3 ft	
	2,542.9	0.3	2.1		(2.1) 100%	(2.0) 95%		(4.2) 98%	(3.8) 88%		2,542.9 **CRYSTALLINE ROCK** Hard, fresh, closely fractured, gray, Biotite Gneiss, 3 joints between 0-10° with slight Fe-oxide staining and 2 joints at 60° with slight Fe-oxide staining	0.3
2540	2,540.8	2.4	4.8		(3.6) 75%	(2.0) 42%					2,538.6	4.6
	2,536.0	7.2						(1.3) 50%	(0.0) 0%		2,536.0 **CRYSTALLINE ROCK** Soft to moderately hard, slightly to severly weathered, close to very close fractured, brown, Mica Gneiss	7.2
2535			4.8		(4.8) 100%	(3.7) 77%		(8.2) 100%	(7.1) 87%		**CRYSTALLINE ROCK** Hard, fresh, moderately close to wide fracture spacing, gray, Biotite Gneiss, 4 joints at 10°	
	2,531.2	12.0										
2530			4.8		(4.7) 98%	(4.0) 83%	RS-3				KSF Axial=1440 R1=7. R2=17, R3=10, R4=25, R5=7 RMR=66	
											2,527.8	15.4
	2,526.4	16.8						(1.8) 100%	(0.7) 39%		2,526.0 **CRYSTALLINE ROCK** Rock Type E	17.2
2525			4.8		(4.6) 96%	(3.9) 81%		(8.4) 91%	(7.9) 86%		Moderately hard, fresh, close to very closely fractured, gray, Mica Schist, 4 joints at 0-30°	
	2,521.6	21.6										
2520			4.8		(4.8) 100%	(4.1) 86%					KSF Axail=259.2 R1=2, R2=8, R3=10, R4=20, R5=7 RMR=47 Rock Type E	
	2,516.8	26.4									2,516.8 **CRYSTALLINE ROCK** Hard, fresh, wide fracture spacing, gray, Biotite Gneiss, 4 joints at 0-20° with little pyrite	26.4
2515							RS-4					
2510											KSF Axial=1195.2 R1=7, R2=17, R3=10, R4=20, R5=7 RMR=61 Rock Type E	
2505											Boring Terminated at Elevation 2,516.8 ft In Crystalline Rock (Gneiss)	
2500											Drill Rate is Min/Run where indicated	
2495												
2490												
2485												
2480												
2475												
2470												
2465												

CORE PHOTOGRAPHS

B2-A

BOXES 1, 2 & 3 0.3 - 26.4 FEET



NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 32579.1.1	**ID.** B-1037	**COUNTY** Ashe	**GEOLOGIST** L.L. Acker
SITE DESCRIPTION Bridge No. 39 on US 221 over South Fork New River			**GROUND WTR (ft)**
BORING NO. B2-B	**STATION** 17+18	**OFFSET** 24ft RT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 2,544.1 ft	**TOTAL DEPTH** 16.7 ft	**NORTHING** 999,433	**EASTING** 1,312,938 / **24 HR.** N/A
DRILL MACHINE CME-550	**DRILL METHOD** Core Boring		**HAMMER TYPE** Automatic
START DATE 07/09/98	**COMP. DATE** 07/09/98	**SURFACE WATER DEPTH** 2.1ft	**DEPTH TO ROCK** 0.0 ft

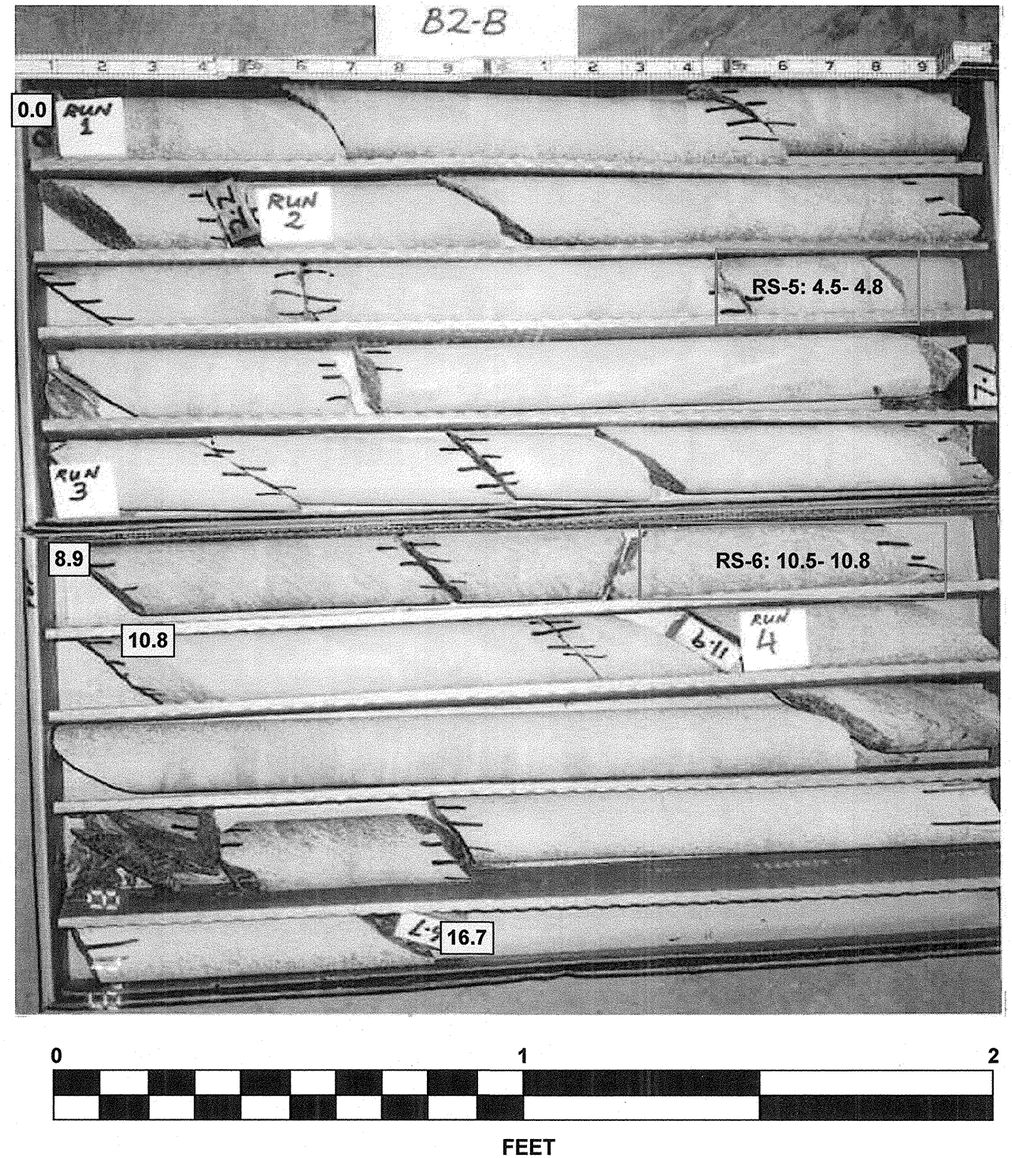
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
								▼		WATER SURFACE (07/09/98)	
2545										2,544.1 GROUND SURFACE	0.0
2540										**CRYSTALLINE ROCK** (Biotite Gneiss)	
							RS-5				
2535										2,535.2	8.9
							RS-6			2,533.3 **CRYSTALLINE ROCK** (Garnet Amphibolite)	10.8
2530										**CRYSTALLINE ROCK** (Biotite Gneiss)	
										2,527.4	16.7
2525										Boring Terminated at Elevation 2,527.4 ft In Crystalline Rock (Gneiss)	
2520										Drill Rate is Min/Run where indicated	
2515											
2510											
2505											
2500											
2495											
2490											
2485											
2480											
2475											
2470											
2465											

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

PROJECT NO. 32579.1.1	**ID.** B-1037	**COUNTY** Ashe	**GEOLOGIST** L.L. Acker
SITE DESCRIPTION Bridge No. 39 on US 221 over South Fork New River			**GROUND WTR (ft)**
BORING NO. B2-B	**STATION** 17+18	**OFFSET** 24ft RT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 2,544.1 ft	**TOTAL DEPTH** 16.7 ft	**NORTHING** 999,433	**EASTING** 1,312,938 / **24 HR.** N/A
DRILL MACHINE CME-550	**DRILL METHOD** Core Boring		**HAMMER TYPE** Automatic
START DATE 07/09/98	**COMP. DATE** 07/09/98	**SURFACE WATER DEPTH** 2.1ft	**DEPTH TO ROCK** 0.0 ft
CORE SIZE NXWL	**TOTAL RUN** 16.7 ft	**DRILLER** N/A	

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS ELEV. (ft)	DEPTH (ft)
2544.1											2,544.1 Ground Surface	0.0
	2,544.1	0.0	2.2		(2.1) 95%	(2.1) 95%		(8.7) 98%	(8.7) 98%		**CRYSTALLINE ROCK** Hard, fresh, moderately close fracture spacing, gray, Biotite Gneiss	
	2,541.9	2.2										
2540			4.9	7:28	(4.9) 100%	(4.8) 98%						
							RS-5					
	2,537.0	7.1										
2535			4.8	8:27	(4.7) 98%	(4.7) 98%					2,535.2	8.9
								(1.9) 100%	(1.9) 100%		2,533.3 **CRYSTALLINE ROCK** Hard, fresh, moderately close fracture spacing, dark green black, Garnet Amphibolite, 1 joint at 40°	10.8
	2,532.2	11.9					RS-6					
2530			4.8	8:16	(4.7) 98%	(4.1) 85%		(5.8) 98%	(5.3) 90%		**CRYSTALLINE ROCK** Hard, fresh, moderately close fracture spacing, gray, Biotite Gneiss	
	2,527.4	16.7									2,527.4 KSF Axial=1555.2 R1=7, R2=20, R3=20, R4=20, R5=7 RMR=74 Rock Type E	16.7
2525											Boring Terminated at Elevation 2,527.4 ft In Crystalline Rock (Gneiss)	
2520											Drill Rate is Min/Run where indicated	
2515												
2510												
2505												
2500												
2495												
2490												
2485												
2480												
2475												
2470												
2465												

CORE PHOTOGRAPHS
B2-B
BOXES 1 & 2 0.0 - 16.7 FEET



NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 32579.1.1	**ID.** B-1037	**COUNTY** Ashe	**GEOLOGIST** L.L. Acker
SITE DESCRIPTION Bridge No. 39 on US 221 over South Fork New River			**GROUND WTR (ft)**
BORING NO. B3-A	**STATION** 18+13	**OFFSET** 4ft LT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 2,544.4 ft	**TOTAL DEPTH** 17.5 ft	**NORTHING** 999,453	**EASTING** 1,313,035 / **24 HR.** N/A
DRILL MACHINE CME-550	**DRILL METHOD** Core Boring		**HAMMER TYPE** Automatic
START DATE 07/08/98	**COMP. DATE** 07/08/98	**SURFACE WATER DEPTH** 1.7ft	**DEPTH TO ROCK** 2.1 ft

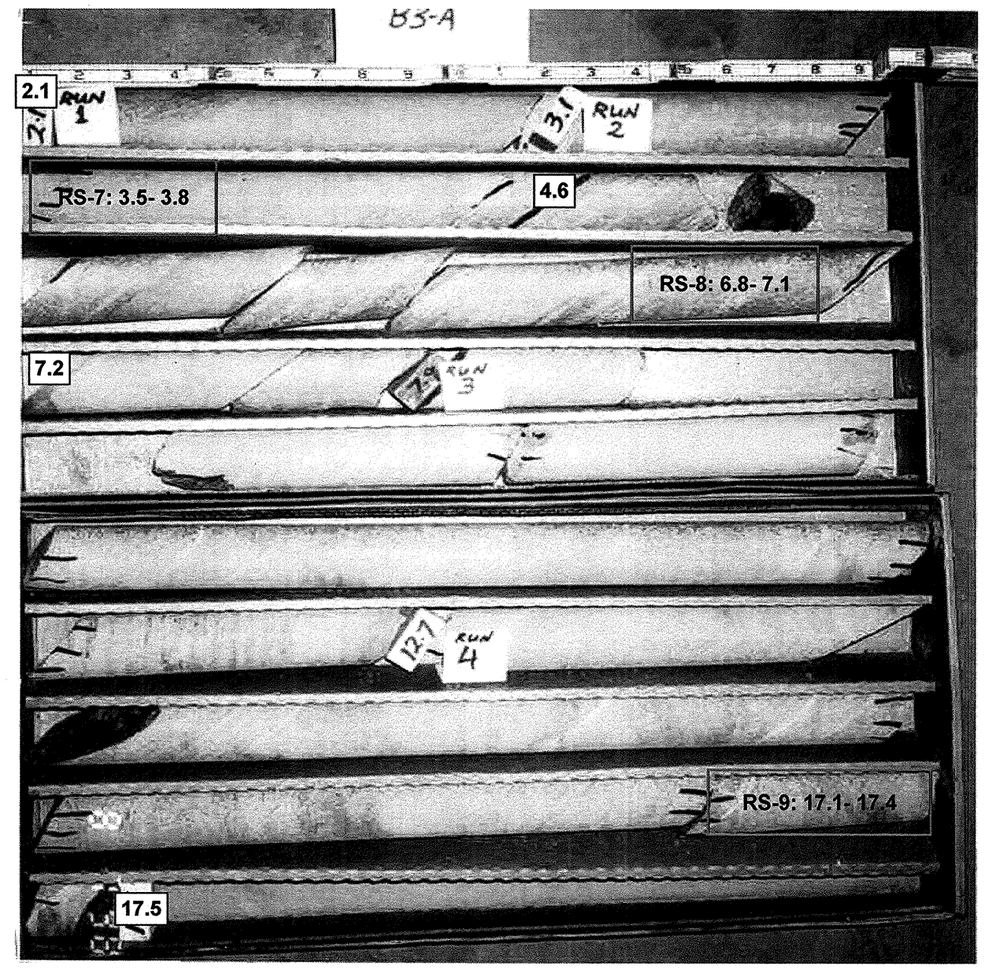
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
								▼		WATER SURFACE (07/08/98)	
2545										2,544.4 GROUND SURFACE	0.0
										2,543.6 **ALLUVIAL**	0.8
										2,542.3 Brown, loose, sand and gravel	2.1
2540							RS-7			2,539.8 **WEATHERED ROCK** (Biotite Gneiss)	4.6
										2,537.2 **CRYSTALLINE ROCK** (Biotite Gneiss)	7.2
2535							RS-8			**CRYSTALLINE ROCK** (Mica Gneiss)	
										CRYSTALLINE ROCK (Biotite Gneiss)	
2530											
							RS-9			2,526.9	17.5
2525										Boring Terminated at Elevation 2,526.9 ft In Crystalline Rock (Gneiss)	
2520										Drill Rate is Min/Run where indicated	
2515											
2510											
2505											
2500											
2495											
2490											
2485											
2480											
2475											
2470											
2465											

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

PROJECT NO. 32579.1.1	**ID.** B-1037	**COUNTY** Ashe	**GEOLOGIST** L.L. Acker
SITE DESCRIPTION Bridge No. 39 on US 221 over South Fork New River			**GROUND WTR (ft)**
BORING NO. B3-A	**STATION** 18+13	**OFFSET** 4ft LT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 2,544.4 ft	**TOTAL DEPTH** 17.5 ft	**NORTHING** 999,453	**EASTING** 1,313,035 / **24 HR.** N/A
DRILL MACHINE CME-550	**DRILL METHOD** Core Boring		**HAMMER TYPE** Automatic
START DATE 07/08/98	**COMP. DATE** 07/08/98	**SURFACE WATER DEPTH** 1.7ft	**DEPTH TO ROCK** 2.1 ft
CORE SIZE NXWL	**TOTAL RUN** 15.4 ft	**DRILLER** N/A	

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS ELEV. (ft)	DEPTH (ft)
2542.3											Begin Coring @ 2.1 ft	
	2,542.3 / 2,541.3	2.1 / 3.1	1.0		(1.0) 98%	(1.0) 98%		(2.5) 98%	(2.5) 98%		2,542.3 **CRYSTALLINE ROCK**	2.1
2540			4.8	6:10			RS-7				2,539.8 Hard, fresh, moderately close fracture spacing, gray, Biotite Gneiss	4.6
					(4.6) 96%	(3.9) 81%		(2.5) 96%	(1.8) 69%		**CRYSTALLINE ROCK**	
	2,536.5	7.9					RS-8				2,537.2 Moderately hard, fresh, moderately close to closely fractured, gray, Mica Gneiss, 1 joint at 25° with slight Fe-oxide staining	7.2
2535			4.8	5:35	(4.6) 96%	(4.6) 96%		(10.1) 98%	(9.9) 96%		**CRYSTALLINE ROCK** Hard, fresh, very wide fracture spacing, gray, Biotite Gniess, 1 joint at 40° and 1 joint at 65°	
	2,531.7	12.7										
2530			4.8		(4.8) 100%	(4.8) 100%					KSF Axial=705.6 R1=4, R2=20, R3=20, R4=20, R5=7 RMR=71 Rock Type E	
	2,526.9	17.5										
2525							RS-9				2,526.9	17.5
											Boring Terminated at Elevation 2,526.9 ft In Crystalline Rock (Gneiss)	
2520											Drill Rate is Min/Run where indicated	
2515												
2510												
2505												
2500												
2495												
2490												
2485												
2480												
2475												
2470												
2465												

CORE PHOTOGRAPHS
B3-A
BOXES 1 & 2 2.1 - 17.5 FEET



0 1 2

FEET

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 32579.1.1	**ID.** B-1037	**COUNTY** Ashe	**GEOLOGIST** L.L. Acker
SITE DESCRIPTION Bridge No. 39 on US 221 over South Fork New River			**GROUND WTR (ft)**
BORING NO. B3-B	**STATION** 18+13	**OFFSET** 25ft RT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 2,544.2 ft	**TOTAL DEPTH** 21.2 ft	**NORTHING** 999,424	**EASTING** 1,313,033 / **24 HR.** N/A
DRILL MACHINE CME-550	**DRILL METHOD** Core Boring		**HAMMER TYPE** Automatic
START DATE 07/08/98	**COMP. DATE** 07/08/98	**SURFACE WATER DEPTH** 1.5ft	**DEPTH TO ROCK** 2.0 ft

ELEV (ft)	DRIVE 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)
2545								▼		WATER SURFACE (07/08/98)	
										2,544.2 GROUND SURFACE	0.0
										2,543.2 **ALLUVIAL**	1.0
										2,542.2 Brown, very loose, sand and gravel	2.0
2540										**WEATHERED ROCK** (Mica Schist)	
										CRYSTALLINE ROCK (Mica Schist)	
2535							RS-11				
										2,533.4	10.8
										CRYSTALLINE ROCK (Biotite Gneiss)	
2530											
										2,528.7	15.5
										CRYSTALLINE ROCK (Mica Schist)	
2525										2,525.1	19.1
							RS-12			**CRYSTALLINE ROCK** (Biotite Gneiss)	
										2,523.0	21.2
2520										Boring Terminated at Elevation 2,523.0 ft In Crystalline Rock (Gneiss)	
2515										Drill Rate is Min/Run	
2510											
2505											
2500											
2495											
2490											
2485											
2480											
2475											
2470											
2465											

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

PROJECT NO. 32579.1.1	**ID.** B-1037	**COUNTY** Ashe	**GEOLOGIST** L.L. Acker
SITE DESCRIPTION Bridge No. 39 on US 221 over South Fork New River			**GROUND WTR (ft)**
BORING NO. B3-B	**STATION** 18+13	**OFFSET** 25ft RT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 2,544.2 ft	**TOTAL DEPTH** 21.2 ft	**NORTHING** 999,424	**EASTING** 1,313,033 / **24 HR.** N/A
DRILL MACHINE CME-550	**DRILL METHOD** Core Boring		**HAMMER TYPE** Automatic
START DATE 07/08/98	**COMP. DATE** 07/08/98	**SURFACE WATER DEPTH** 1.5ft	**DEPTH TO ROCK** 2.0 ft
CORE SIZE NXWL	**TOTAL RUN** 19.2 ft	**DRILLER** N/A	

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS ELEV. (ft)	DEPTH (ft)
2542.2											Begin Coring @ 2.0 ft	
	2,542.2	2.0	5.0	6:40	(4.9) 98%	(3.6) 72%		(8.6) 98%	(7.1) 81%		2,542.2 **CRYSTALLINE ROCK** Moderately hard, fresh, moderately close to wide fracture spacing, gray, Staurolite Mica Schist, 3 joints at 20°	2.0
2540												
	2,537.2	7.0	4.8	5:35	(4.7) 98%	(4.2) 87%	RS-11					
2535											2,533.4	10.8
	2,532.4	11.8	4.6	5:70	(4.4) 96%	(4.4) 96%		(4.5) 96%	(4.4) 94%		**CRYSTALLINE ROCK** Hard, fresh, moderately close fracture spacing, light gray, Biotite Gneiss, 1 joint at 20° and 1 joint at 50°	
2530											2,528.7 KSF Axial=720 R1=4, R2=20, R3=10, R4=12, R5=7 RMR=53 Rock Type E	15.5
	2,527.8	16.4	4.8	5:40	(4.7) 98%	(4.1) 86%		(3.5) 98%	(3.2) 88%			
2525											2,525.1	19.1
	2,523.0	21.2					RS-12	(2.1) 100%	(2.1) 100%		2,523.0 **CRYSTALLINE ROCK** Moderately hard, fresh, moderately close fracture spacing, light gray, Mica Schist, 1 joint at 10° KSF Axial=1209.6 R1=7, R2=17, R3=10, R4=12, R5=7 RMR=53 Rock Type E	21.2
2520											**CRYSTALLINE ROCK** Hard, fresh, moderately close fracture spacing, light gray, Biotite Gneiss, 1 joint at 20° KSF Axial=720 R1=4, R2=20, R3=10, R4=20, R5=7 RMR=61 Rock Type 61	
2515											Boring Terminated at Elevation 2,523.0 ft In Crystalline Rock (Gneiss)	
2510											Drill Rate is Min/Run	
2505												
2500												
2495												
2490												
2485												
2480												
2475												
2470												
2465												

CORE PHOTOGRAPHS

B3-B

BOXES 1 & 2 2.10- 21.2 FEET

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 32579.1.1	**ID.** B-1037	**COUNTY** Ashe	**GEOLOGIST** L.L. Acker
SITE DESCRIPTION Bridge No. 39 on US 221 over South Fork New River			**GROUND WTR (ft)**
BORING NO. B4-A	**STATION** 19+07	**OFFSET** 5ft LT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 2,553.5 ft	**TOTAL DEPTH** 27.0 ft	**NORTHING** 999,446	**EASTING** 1,313,129 / **24 HR.** 6.3
DRILL MACHINE CME-550	**DRILL METHOD** SPT Core Boring		**HAMMER TYPE** Automatic
START DATE 07/07/98	**COMP. DATE** 07/07/98	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** 9.8 ft

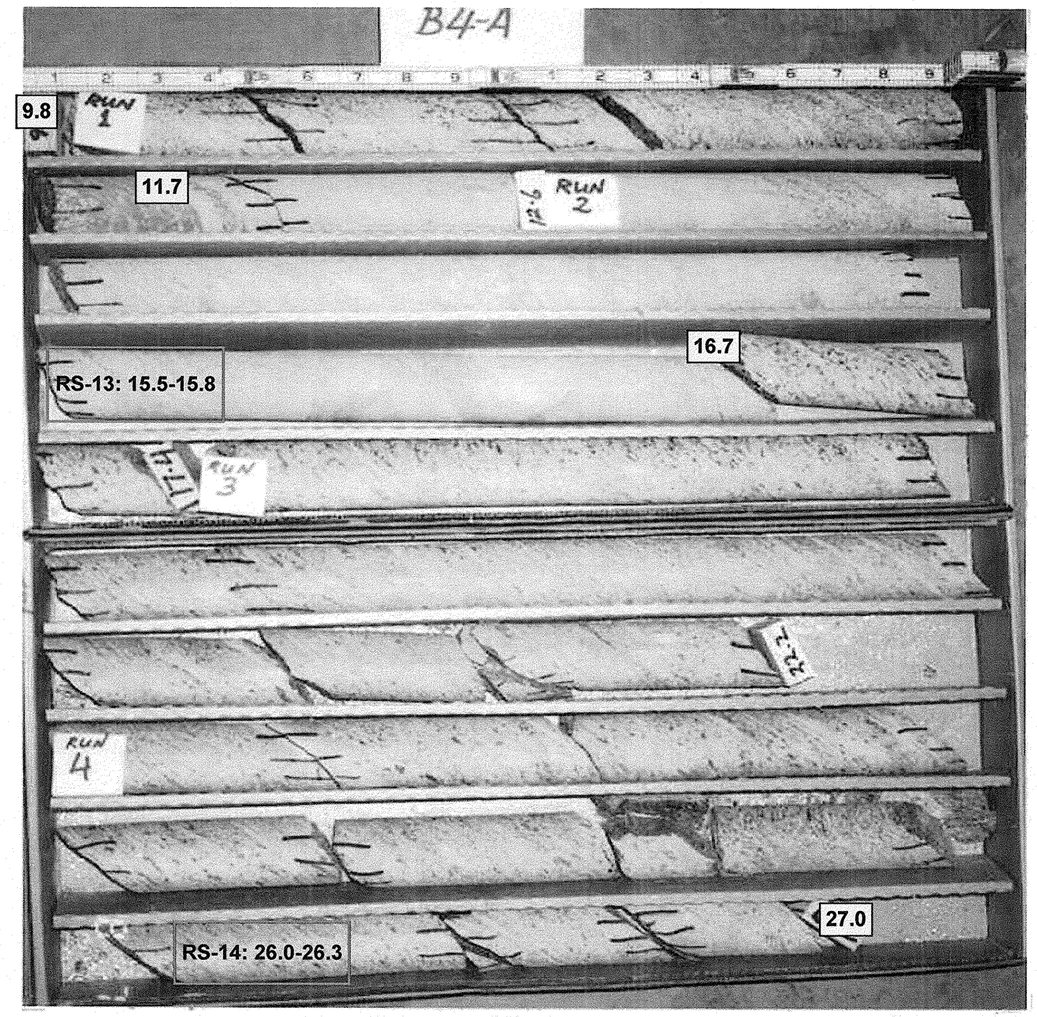
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
2555										2,553.5 GROUND SURFACE	0.0
										ALLUVIAL Brown, silty sand	
2550	2,550.7	2.8	2	2	3	5	SS-2			2,549.1	4.4
										ALLUVIAL Brown, coarse sand and gravel	
2545	2,545.7	7.8	85	15/0.1		100/0.6				2,546.5	7.0
										WEATHERED ROCK (Schist)	
										2,543.7	9.8
										CRYSTALLINE ROCK (Garnet, Mica Schist)	
2540										2,541.8	11.7
										CRYSTALLINE ROCK (Biotite Gneiss)	
							RS-13			2,536.8	16.7
2535										**CRYSTALLINE ROCK** (Staurolite Mica Schist)	
2530											
							RS-14			2,526.5	27.0
2525										Boring Terminated at Elevation 2,526.5 ft In Crystalline Rock (Schist)	
										Drill Rate is Min/Run where indicated	
2520											
2515											
2510											
2505											
2500											
2495											
2490											
2485											
2480											
2475											

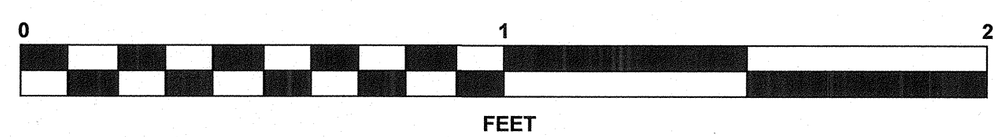
NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

PROJECT NO. 32579.1.1	**ID.** B-1037	**COUNTY** Ashe	**GEOLOGIST** L.L. Acker
SITE DESCRIPTION Bridge No. 39 on US 221 over South Fork New River			**GROUND WTR (ft)**
BORING NO. B4-A	**STATION** 19+07	**OFFSET** 5ft LT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 2,553.5 ft	**TOTAL DEPTH** 27.0 ft	**NORTHING** 999,446	**EASTING** 1,313,129 / **24 HR.** 6.3
DRILL MACHINE CME-550	**DRILL METHOD** SPT Core Boring		**HAMMER TYPE** Automatic
START DATE 07/07/98	**COMP. DATE** 07/07/98	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** 9.8 ft
CORE SIZE NXWL	**TOTAL RUN** 17.4 ft		**DRILLER** N/A

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS ELEV. (ft)	DEPTH (ft)
2543.7											Begin Coring @ 9.8 ft	
	2,543.7	9.8	2.8		(2.8) 100%	(2.8) 100%		(1.9) 100%	(1.9) 100%		2,543.7 **CRYSTALLINE ROCK**	9.8
	2,540.9	12.6									2,541.8 Moderately hard, fresh, moderately close fracture spacing, gray, Garnet Mica Schist	11.7
2540			4.8	6:10	(4.8) 100%	(4.8) 100%		(5.0) 100%	(5.0) 100%		**CRYSTALLINE ROCK** Hard, fresh, wide fracture spacing, light gray, Biotite Gneiss	
							RS-13				2,536.8	16.7
	2,536.1	17.4									**CRYSTALLINE ROCK** Moderately hard, fresh, wide fracture spacing, gray, Staurolite Mica Schist, 1 vertical joint ranging 24.9' to 25.2'	
2535			4.8	8:16	(4.8) 100%	(4.8) 100%		(10.3) 100%	(10.0) 97%		KSF Axial=244.8 R1=2, R2=20, R3=20, R4=20, R5=7 RMR=69 Rock Type E	
	2,531.3	22.2										
2530			5.0		(5.0) 100%	(4.8) 96%						
	2,526.3	27.2					RS-14				2,526.5	27.0
2525											Boring Terminated at Elevation 2,526.5 ft In Crystalline Rock (Schist)	
											Drill Rate is Min/Run where indicated	
2520												
2515												
2510												
2505												
2500												
2495												
2490												
2485												
2480												
2475												
2470												
2465												

CORE PHOTOGRAPHS
B4-A
BOXES 1 & 2 9.8- 27.0 FEET





NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 32579.1.1	**ID.** B-1037	**COUNTY** Ashe	**GEOLOGIST** L.L. Acker
SITE DESCRIPTION Bridge No. 39 on US 221 over South Fork New River			**GROUND WTR (ft)**
BORING NO. B4-B	**STATION** 19+07	**OFFSET** 27ft RT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 2,553.4 ft	**TOTAL DEPTH** 23.2 ft	**NORTHING** 999,414	**EASTING** 1,313,126 / **24 HR.** 6.8
DRILL MACHINE CME-550	**DRILL METHOD** SPT Core Boring		**HAMMER TYPE** Automatic
START DATE 07/08/98	**COMP. DATE** 07/08/98	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** 8.8 ft

ELEV (ft)	DRIVE 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)
2555											
										2,553.4 GROUND SURFACE	0.0
										ALLUVIAL Brown, silty sand	
2550	2,549.7	3.7									
			1	2	3	5		M		2,548.7	4.7
										2,548.1 **ALLUVIAL** Brown, sand and gravel	5.3
2545	2,544.7	8.7								2,544.6 **WEATHERED ROCK** (Schist)	8.8
			100/0.1			100/0.1				**CRYSTALLINE ROCK** (Mica Schist)	
2540							RS-15				
2535											
2530							RS-16			2,530.2	23.2
										Boring Terminated at Elevation 2,530.2 ft In Crystalline Rock (Schist)	
										Drill Rate is Min/Run where indicated	
2525											
2520											
2515											
2510											
2505											
2500											
2495											
2490											
2485											
2480											
2475											

NCDOT BORE DOUBLE B1037_GEO_BH.GPJ NC_DOT.GDT 04/01/09

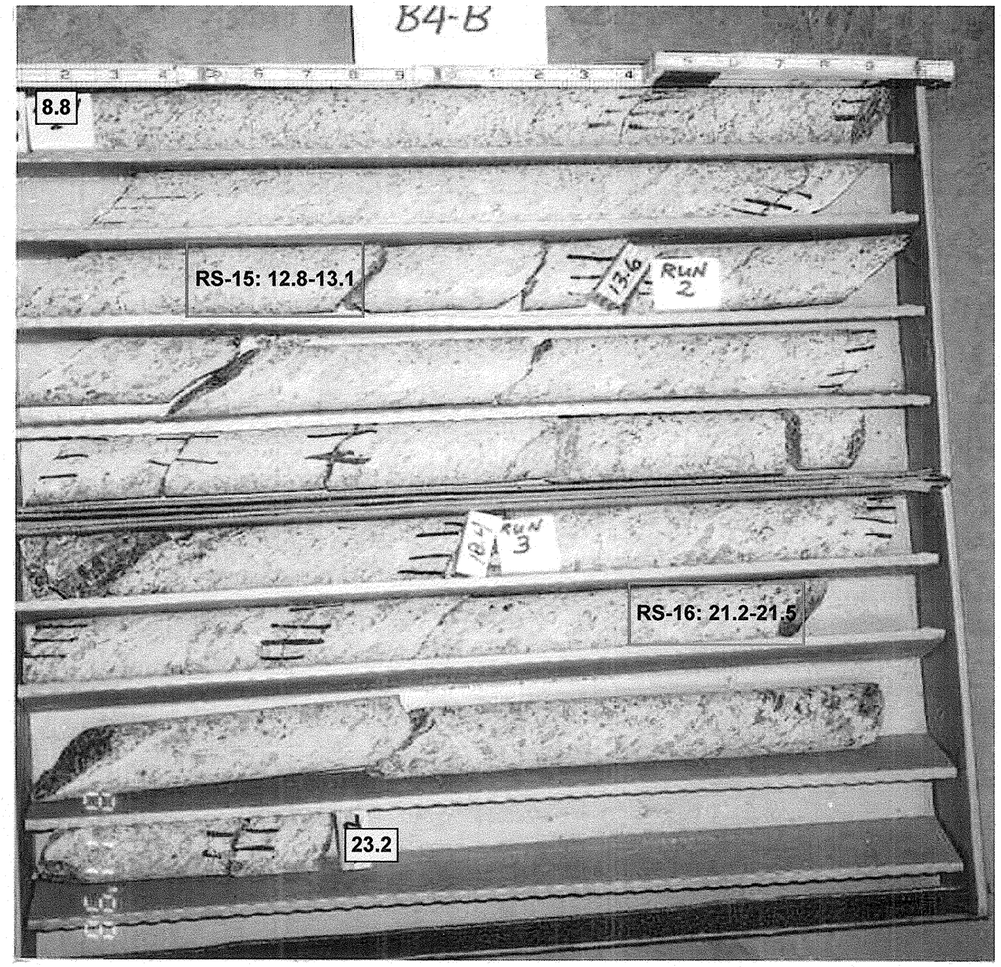
NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

PROJECT NO. 32579.1.1	**ID.** B-1037	**COUNTY** Ashe	**GEOLOGIST** L.L. Acker
SITE DESCRIPTION Bridge No. 39 on US 221 over South Fork New River			**GROUND WTR (ft)**
BORING NO. B4-B	**STATION** 19+07	**OFFSET** 27ft RT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 2,553.4 ft	**TOTAL DEPTH** 23.2 ft	**NORTHING** 999,414	**EASTING** 1,313,126 / **24 HR.** 6.8
DRILL MACHINE CME-550	**DRILL METHOD** SPT Core Boring		**HAMMER TYPE** Automatic
START DATE 07/08/98	**COMP. DATE** 07/08/98	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** 8.8 ft
CORE SIZE NXWL	**TOTAL RUN** 14.4 ft	**DRILLER** N/A	

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS ELEV. (ft)	DEPTH (ft)
2544.6											Begin Coring @ 8.8 ft	
	2,544.6	8.8	4.8	7:50	(4.7) 98%	(4.7) 98%		(14.1) 98%	(13.5) 94%		2,544.6 **CRYSTALLINE ROCK**	8.8
2540	2,539.8	13.6					RS-15				Moderately hard, fresh, wide fracture spacing, gray with brown spots, Staurolite, Garnet, Mica Schist, 4 joints at 30° with little Fe-oxide staining, 1 joint at 20 ° with pyrite coating	
			4.8	5:50	(4.7) 98%	(4.0) 83%					KSF Axial=388.8	
2535	2,535.0	18.4									R1=2, R2=20, R3=20, R4=25, R5=7	
			4.8		(4.7) 98%	(4.7) 98%					RMR=74	
											Rock Type E	
2530	2,530.2	23.2					RS-16				2,530.2	23.2
											Boring Terminated at Elevation 2,530.2 ft In Crystalline Rock (Schist)	
											Drill Rate is Min/Run where indicated	
2525												
2520												
2515												
2510												
2505												
2500												
2495												
2490												
2485												
2480												
2475												
2470												
2465												

NCDOT CORE DOUBLE B1037_GEO_BH.GPJ NC_DOT.GDT 04/01/09

CORE PHOTOGRAPHS
B4-B
BOXES 1 & 2 8.8- 23.2 FEET



0 1 2

FEET

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 32579.1.1	**ID.** B-1037	**COUNTY** Ashe	**GEOLOGIST** L.L. Acker
SITE DESCRIPTION Bridge No. 39 on US 221 over South Fork New River			**GROUND WTR (ft)**
BORING NO. EB2-A	**STATION** 20+07	**OFFSET** 5ft LT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 2,586.8 ft	**TOTAL DEPTH** 23.5 ft	**NORTHING** 999,438	**EASTING** 1,313,228 / **24 HR.** N/A
DRILL MACHINE CME-550	**DRILL METHOD** SPT Core Boring		**HAMMER TYPE** Automatic
START DATE 07/08/98	**COMP. DATE** 07/08/98	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** 8.4 ft

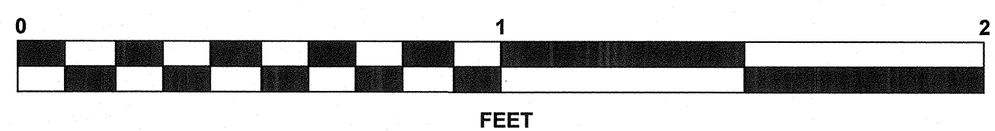
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
2590											
										2,586.8 GROUND SURFACE	0.0
2585								M		**ROADWAY EMBANKMENT** Brown, silty sand	
	2,582.7	4.1	5	5	3					2,584.1	2.7
2580								D		**ROADWAY EMBANKMENT** Gray, silty sand, cobbles and boulders	
										2,578.4	8.4
2575										**CRYSTALLINE ROCK** (Mica Gneiss) 2,576.0	10.8
										CRYSTALLINE ROCK (Staurolite, Garnet, Mica Gneiss)	
2570							RS-10				
2565											
										2,563.3	23.5
2560										Boring Terminated at Elevation 2,563.3 ft In Crystalline Rock (Gneiss)	
2555										Drill Rate is Min/Run where indicated	
2550											
2545											
2540											
2535											
2530											
2525											
2520											
2515											
2510											

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

PROJECT NO. 32579.1.1	**ID.** B-1037	**COUNTY** Ashe	**GEOLOGIST** L.L. Acker
SITE DESCRIPTION Bridge No. 39 on US 221 over South Fork New River			**GROUND WTR (ft)**
BORING NO. EB2-A	**STATION** 20+07	**OFFSET** 5ft LT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 2,586.8 ft	**TOTAL DEPTH** 23.5 ft	**NORTHING** 999,438	**EASTING** 1,313,228 / **24 HR.** N/A
DRILL MACHINE CME-550	**DRILL METHOD** SPT Core Boring		**HAMMER TYPE** Automatic
START DATE 07/08/98	**COMP. DATE** 07/08/98	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** 8.4 ft
CORE SIZE NXWL	**TOTAL RUN** 12.7 ft	**DRILLER** N/A	

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS ELEV. (ft)	DEPTH (ft)
2576											Begin Coring @ 10.8 ft	
2575	2,576.0	10.8	3.1		(2.9) 94%	(2.9) 94%		(12.4) 98%	(12.4) 98%		2,576.0 **CRYSTALLINE ROCK** Moderately hard, fresh, very widely fractured, gray with brown spots, Staurolite, Garnet, Mica Gneiss, Quartz vien from 22.0' to 22.3', 2 joints at 20°	10.8
	2,572.9	13.9	4.8		(4.7) 98%	(4.7) 98%						
2570							RS-10					
	2,568.1	18.7	4.8		(4.8) 100%	(4.8) 100%						
2565												
	2,563.3	23.5									2,563.3	23.5
2560											Boring Terminated at Elevation 2,563.3 ft In Crystalline Rock (Gneiss)	
2555											Drill Rate is Min/Run where indicated	
2550												
2545												
2540												
2535												
2530												
2525												
2520												
2515												
2510												
2505												
2500												

CORE PHOTOGRAPHS
EB2-A
BOXES 1 & 2 10.8- 23.5 FEET



NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 32579.1.1	**ID.** B-1037	**COUNTY** Ashe	**GEOLOGIST** L.L. Acker
SITE DESCRIPTION Bridge No. 39 on US 221 over South Fork New River			**GROUND WTR (ft)**
BORING NO. EB2-B	**STATION** 20+07	**OFFSET** 25ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 2,585.7 ft	**TOTAL DEPTH** 26.9 ft	**NORTHING** 999,408	**EASTING** 1,313,226	**24 HR.** N/A
DRILL MACHINE CME-550	**DRILL METHOD** SPT Core Boring		**HAMMER TYPE** Automatic
START DATE 07/07/98	**COMP. DATE** 07/07/98	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** 11.8 ft

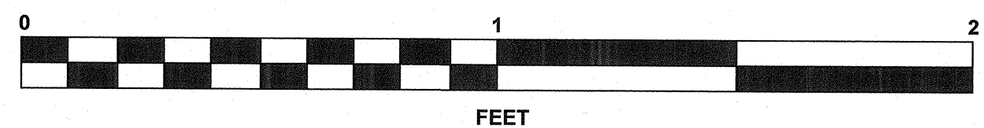
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
2590											
2585										2,585.7 GROUND SURFACE	0.0
	2,583.1	2.6								**ROADWAY EMBANKMENT** Brown, silty sand	
			13	5	3	8	SS-1	D		2,581.6	4.1
2580										2,581.3 **ROADWAY EMBANKMENT** Gray-brown, silty sand, cobbles and boulders	4.4
										2,580.8	4.9
	2,578.1	7.6								2,578.2	7.5
			3	7	44	51		D		2,576.3	9.4
2575										2,576.1	9.6
	2,573.1	12.6								2,573.9	11.8
			50/0.1			50/0.1				**CRYSTALLINE ROCK** (Mica Schist)	
2570											
	2,568.1	17.6								2,568.2	17.5
			50/0.0			50/0.0				**CRYSTALLINE ROCK** (Staurolite, Garnet, Mica Schist)	
2565							RS-21				
2560											
							RS-22			2,558.8	26.9
2555										Boring Terminated at Elevation 2,558.8 ft In Crystalline Rock (Schist)	
										Drill Rate is Min/Run	
2550											
2545											
2540											
2535											
2530											
2525											
2520											
2515											
2510											

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

PROJECT NO. 32579.1.1	**ID.** B-1037	**COUNTY** Ashe	**GEOLOGIST** L.L. Acker
SITE DESCRIPTION Bridge No. 39 on US 221 over South Fork New River			**GROUND WTR (ft)**
BORING NO. EB2-B	**STATION** 20+07	**OFFSET** 25ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 2,585.7 ft	**TOTAL DEPTH** 26.9 ft	**NORTHING** 999,408	**EASTING** 1,313,226	**24 HR.** N/A
DRILL MACHINE CME-550	**DRILL METHOD** SPT Core Boring		**HAMMER TYPE** Automatic
START DATE 07/07/98	**COMP. DATE** 07/07/98	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** 11.8 ft
CORE SIZE NXWL	**TOTAL RUN** 9.4 ft	**DRILLER** N/A	

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS ELEV. (ft)	DEPTH (ft)
2568.2											Begin Coring @ 17.5 ft	
	2,568.2	17.5	4.6	7:00 *N=50/0.0*	(4.6) 100%	(4.6) 100%	RS-21	(9.2) 98%	(9.2) 98%		2,568.2 **CRYSTALLINE ROCK** Moderately hard, fresh, very widely fractured, Staurolite, Garnet, Mica Schist	17.5
2565												
	2,563.6	22.1										
			4.8	5:34	(4.7) 98%	(4.7) 98%						
2560												
	2,558.8	26.9					RS-22				2,558.8	26.9
											Boring Terminated at Elevation 2,558.8 ft In Crystalline Rock (Schist)	
2555											Drill Rate is Min/Run	
2550												
2545												
2540												
2535												
2530												
2525												
2520												
2515												
2510												
2505												
2500												
2495												
2490												

CORE PHOTOGRAPHS
EB2-B
BOXES 1 & 2 17.5- 26.9 FEET



B1-B

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-3	18' RT	16+23	3.5-5.0	A-2-4(0)	33	NP	9	75	10	6			25	-	-
SS-4	18' RT	16+23	8.5-10.0	A-1-B(0)	27	NP	33	99	8	4			12	-	-

B4-A

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-2	5' LT	19+07	2.8-4.4	A-2-4(0)	27	NP	7	69	12	12			35	-	-

EB2-B

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	25' RT	20+07	2.6-4.1	A-1-A(0)	33	NP	45	42	9	4			6	-	-

18+50, 35 RT

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-5	36' RT	14+82	2.4-3.9	A-2-4(0)	32	NP	33	48	7	12			24	-	-

STREAM BANK AND CHANNEL

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	8' RT	17+29	SURFACE	A-1-A(0)	18	NP	66	34	0	0			1	-	-
SS-6	11' RT	18+69	SURFACE	A-2-4(0)	31	NP	24	69	3	4			13	-	-

ROCK TEST RESULTS

SAMPLE NO.	BORING NO.	STATION	OFFSET	DEPTH INTERVAL	UNIT WT. lbs/cf	UNCONFINED COMPRESSIVE STRENGTH KSI
RS-1	B1-B	16+23	18' RT	24.5	171	5.3
RS-1	B1-B	16+23	18' RT	24.5	171	6.7
RS-2	B1-B	16+23	18' RT	39.5	175.9	2.5
RS-3	B2-A	17+22	12' LT	11.5	171.2	3.8
RS-4	B2-A	17+22	12' LT	26.0	168.9	8.3
RS-5	B2-B	17+18	24'RT	4.5	168.4	10.2
RS-6	B2-B	17+18	24'RT	10.5	185.2	10.8
RS-7	B3-A	18+13	4'LT	3.5	171.5	8.4
RS-8	B3-A	18+13	4'LT	6.8	177.6	4.7
RS-9	B3-A	18+13	4'LT	17.1	169.8	4.9
RS-10	EB2-A	20+07	5'LT	15.8	188.6	4.0
RS-11	B3-B	18+13	25'RT	7.2	181.4	1.8
RS-12	B3-B	18+13	25'RT	19.5	173.3	5.0
RS-13	B4-A	19+07	5' LT	15.5	172.7	8.7
RS-14	B4-A	19+07	5' LT	26.0	184.6	1.7
RS-15	B4-B	19+07	27'RT	12.8	187.8	2.7
RS-16	B4-B	19+07	27'RT	21.2	188.7	3.1
RS-17	B1-A	16+25	7'LT	19.8	171.5	10.0
RS-18	B1-A	16+25	7'LT	28.5	174.3	2.3
RS-19	B1-A	16+25	7'LT	34.5	173.3	2.9
RS-20	B1-A	16+25	7'LT	41.0	182	1.8
RS-21	EB2-B	20+07	25' RT	19.0	187.5	4.0
RS-22	EB2-B	20+07	25' RT	25.7	190.3	7.9

SPLIT TENSILE TESTING RESULTS

RS-3	B2-A	17+22	12' LT			.8
RS-3	B2-A	17+22	12' LT			.8
RS-3	B2-A	17+22	12' LT			1.1
RS-3	B2-A	17+22	12' LT			1.1
RS-5	B2-B	17+18	24'RT			1.0
RS-5	B2-B	17+18	24'RT			1.1
RS-5	B2-B	17+18	24'RT			1.1
RS-5	B2-B	17+18	24'RT			1.4
RS-10	EB2-A	20+07	5'LT			.8
RS-10	EB2-A	20+07	5'LT			.8
RS-12	B3-B	18+13	25'RT			1.1
RS-12	B3-B	18+13	25'RT			.4
RS-12	B3-B	18+13	25'RT			.9
RS-21	EB2-B	20+07	25' RT			.5
RS-21	EB2-B	20+07	25' RT			.8

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL ENGINEERING UNIT

FIELD SCOUR REPORT

WBS: 32579.1.1 TIP: B-1037 COUNTY: Ashe

DESCRIPTION(1): Bridge No. 39 on US 221 over South Fork New River

EXISTING BRIDGE

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

Bridge No.: 39 Length: 455 Total Bents: 11 Bents in Channel: 5 Bents in Floodplain: 2
Foundation Type: ____

EVIDENCE OF SCOUR(2)

Abutments or End Bent Slopes: none

Interior Bents: In channel, scour as much as 4 to 5 feet in alluvium down to rock. No scour in rock. About 2 foot of scour at existing Bent 9 in loose alluvial sand of the floodplain.

Channel Bed: Channel clut about 6 feet deep in rock on west side of river.

Channel Bank: Scour in loose alluvial sand, especially on the east bank of the river.

EXISTING SCOUR PROTECTION

Type(3): Non. EB-1, B-1 and B-2 are on rock with shallow soil. B-9, B-10 and EB-2 are on rock.

Extent(4): n/a

Effectiveness(5): n/a

Obstructions(6): No visible obstructions.

DESIGN INFORMATION

Channel Bed Material(7): Sand, pebbles, and cobbles to 3 feet in discontinuous veneer with rock exposed above alluvium in many places.

Channel Bank Material(8): Brown, loose, micaceous, silty sand.

Channel Bank Cover(9): Weeds, grass, brush

Floodplain Width(10): 350 feet

Floodplain Cover(11): Grass, weeds, and trees.

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

Channel Migration Tendency(13): Toward east bank.

Observations and Other Comments: Existing structure has 11 bents. Four of the existing bents do not fall in either the flood plain or the channel.

Reported by: B.D. Worley (original by L.L. Acker, 1998) **Date:** 12/17/2008

DESIGN SCOUR ELEVATIONS(14) Feet X Meters ____

BENTS B1	B2	B3	B4							
2550.7	2539.9	2544.3	2548.9							

Comparison of DSE to Hydraulics Unit theoretical scour:
The DSE is raised compared to the Hydraulic Unit theoretical scour due to the elevation of the weathered rock and crystalline rock. Both material are resistant to scour.

DSE determined by: Bradley D Worley **Date:** 3-19-09

SOIL ANALYSIS RESULTS FROM CHANNEL BED AND BANK MATERIAL

Bed or Bank							
Sample No.	See	Soil	Test	Results	Page		
Retained #4							
Passed #10							
Passed #40							
Passed #200							
Coarse Sand							
Fine Sand							
Silt							
Clay							
LL							
PI							
AASHTO							
Station							
Offset							
Depth							

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 Photo

Existing Bridge No. 39 on US 221 over the New River. View facing south.