

CONTRACT: C202165 ID: B-1037

NOTE: SEE SHEET 2A FOR PLAN SHEET LAYOUT AT TIME OF INVESTIGATION

CONTENTS:

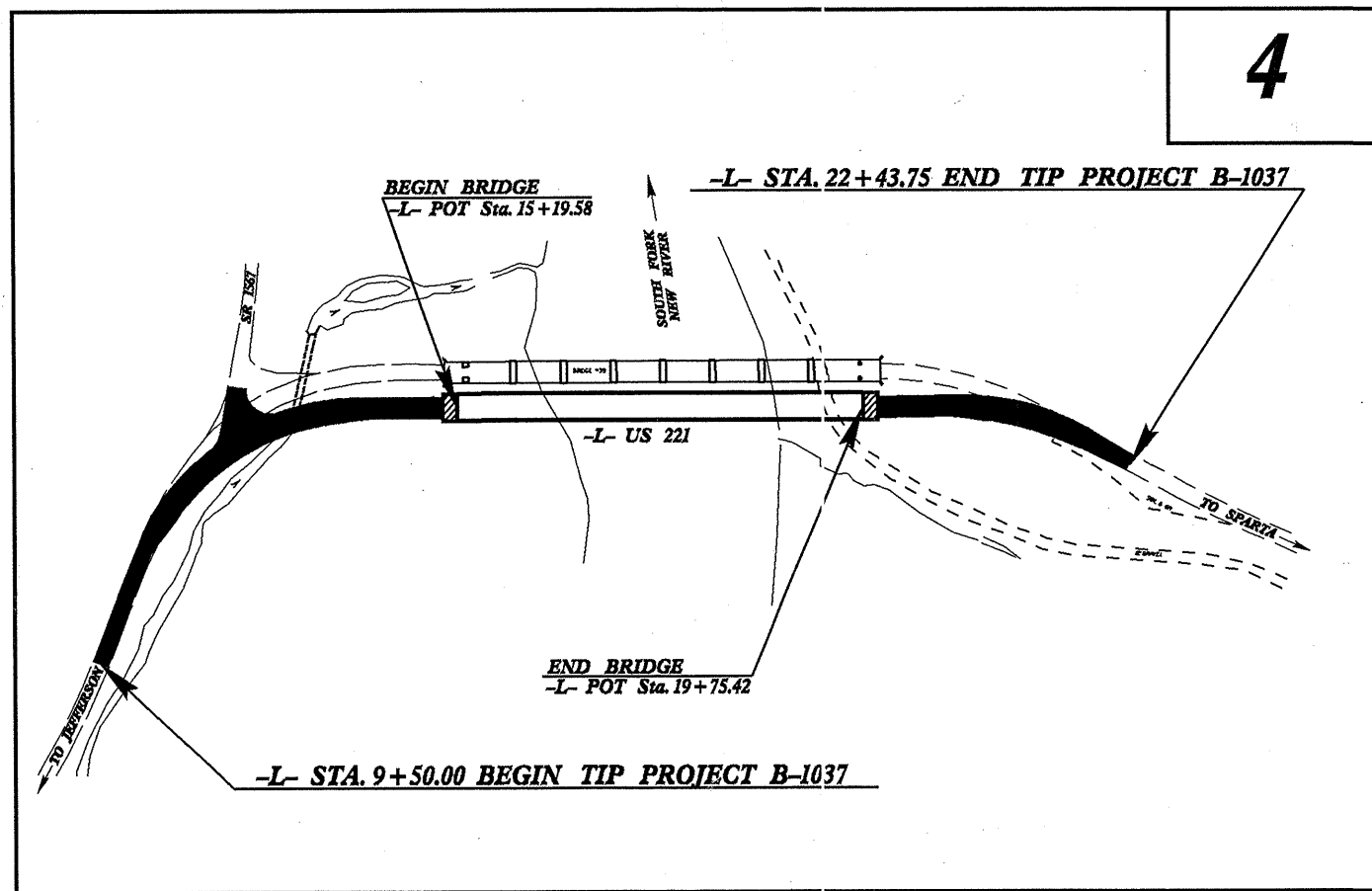
| LINE | STATION | PLAN | PROFILE | XSECTS |
|-------------------------|---------------------|------|---------|---------|
| -L- | 10+00.00 - 23+19.10 | 4 | 5 | 6 - 9 |
| SUBJECT | | | | |
| LEGEND | | | | 2 |
| ROADWAY TITLE SHEET | | | | 2A |
| INVENTORY REPORT | | | | 3A - 3C |
| EARTHWORK BALANCE SHEET | | | | 3D |
| TEST BORING LOGS | | | | 10 - 21 |
| CORE BORING REPORTS | | | | |
| CORE BORING PHOTOGRAPHS | | | | |
| SITE PHOTOGRAPHS | | | | 22 - 24 |

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

ROADWAY
SUBSURFACE INVESTIGATION

STATE PROJECT NO. 32579.1.1 I.D. NO. B-1037
 F.A. PROJECT BRSTP-221(6)
 COUNTY ASHE
 PROJECT DESCRIPTION APPROACHES TO BRIDGE No. 39
OVER THE SOUTH FORK NEW RIVER ON US 221 IN JEFFERSON

REVISED INVENTORY REPORT



4

| STATE | STATE PROJECT REFERENCE NO. | SHEET NO. | TOTAL SHEETS |
|-----------------|-----------------------------|-------------|--------------|
| N.C. | B-1037 | 1 | 24 |
| STATE PROJ. NO. | F.A. PROJ. NO. | DESCRIPTION | |
| 32579.1.1 | BRSTP-221(6) | P.E. | |
| 32579.3.1 | BRSTP-0221(20) | R/W & UTIL | |
| 32579.2.3 | BRSTP-221(29) | CONST. | |

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.



PERSONNEL

J.S. JOHNSON

J. MILLWOOD

J. CANTRELL

T. COSTELLO

P. PHELPS

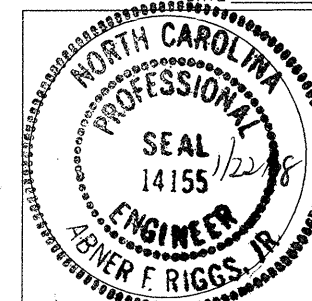
T. PEREZ

INVESTIGATED BY S&ME, INC.

CHECKED BY A.F. RIGGS, JR.

SUBMITTED BY S&ME, INC.

DATE NOVEMBER 16, 2007



Abner F. Riggs, Jr.
SIGNATURE

DRAWN BY: T. PEREZ

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.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

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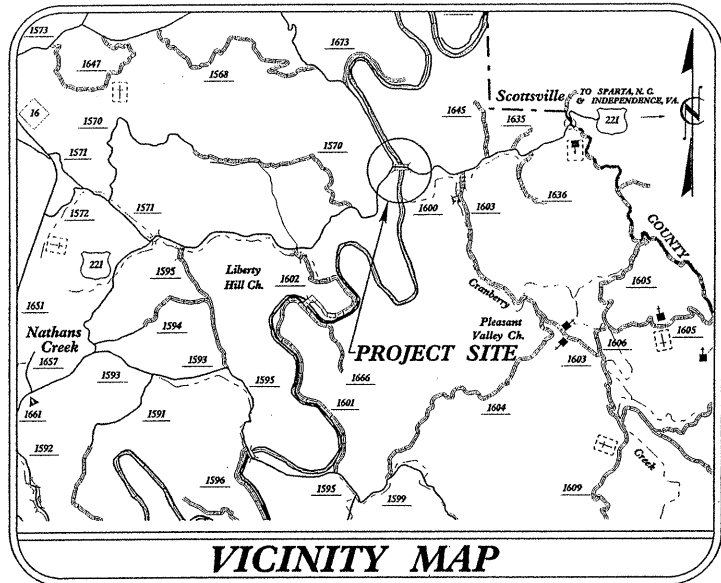
SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

| SOIL DESCRIPTION | | | GRADATION | | | ROCK DESCRIPTION | | | TERMS AND DEFINITIONS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| <p>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 (AASHTO T206, 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:</p> <p align="center"><i>VERY STIFF, GRM SLY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6</i></p> | | | <p>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)</p> <p>GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.</p> <p align="center">ANGULARITY OF GRAINS</p> <p>THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS ARE DESIGNATED BY THE TERMS: <u>ANGULAR</u>, <u>SUBANGULAR</u>, <u>SUBROUNDED</u>, OR <u>ROUNDED</u>.</p> | | | <p>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 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:</p> <p>WEATHERED ROCK (WR) NON-COASTAL PLAIN MATERIAL THAT YIELDS SPT N VALUES > 100 BLOWS PER FOOT.</p> <p>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.</p> <p>NON-CRYSTALLINE ROCK (NCR) 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.</p> <p>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.</p> | | | <p>ALLUVIUM (ALLUV.) - SOILS WHICH HAVE BEEN TRANSPORTED BY WATER.</p> <p>AQUIFER - A WATER BEARING FORMATION OR STRATA.</p> <p>ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.</p> <p>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.</p> <p>ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.</p> <p>CALCAREOUS (CALC.) - SOILS WHICH CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.</p> <p>COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.</p> <p>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.</p> <p>DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.</p> <p>DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.</p> <p>DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.</p> <p>FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.</p> <p>FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.</p> <p>FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOGGED FROM PARENT MATERIAL.</p> <p>FLOOD PLAIN (F.P.) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.</p> <p>FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.</p> <p>JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.</p> <p>LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.</p> <p>LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.</p> <p>MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.</p> <p>PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.</p> <p>RESIDUAL SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.</p> <p>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.</p> <p>SAPROLITE (SAP.) - RESIDUAL SOIL WHICH RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.</p> <p>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.</p> <p>SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.</p> <p>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.</p> <p>STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.</p> <p>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 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.</p> <p>TOPSOIL (T.S.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p align="center">SOIL LEGEND AND AASHTO CLASSIFICATION</p> <table border="1"> <tr> <th>GENERAL CLASS.</th> <th colspan="3">GRANULAR MATERIALS (>95% PASSING #200)</th> <th colspan="3">SILT-CLAY MATERIALS (>95% PASSING #200)</th> <th colspan="3">ORGANIC MATERIALS</th> </tr> <tr> <td>GROUP CLASS.</td> <td>A-1</td> <td>A-3</td> <td>A-2</td> <td>A-4</td> <td>A-5</td> <td>A-6</td> <td>A-7</td> <td>A-1, A-2</td> <td>A-4, A-5</td> <td>A-6, A-7</td> </tr> <tr> <td>SYMBOL</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>% PASSING</td> <td>50 MX</td> <td>30 MX</td> <td>10 MX</td> <td>10 MX</td> <td>10 MX</td> <td>10 MX</td> <td>10 MX</td> <td>10 MX</td> <td>10 MX</td> <td>10 MX</td> </tr> <tr> <td>LIQUID LIMIT</td> <td>6 MX</td> <td>N.P.</td> <td>40 MX</td> <td>40 MX</td> <td>40 MX</td> <td>40 MX</td> <td>40 MX</td> <td>40 MX</td> <td>40 MX</td> <td>40 MX</td> </tr> <tr> <td>PLASTIC INDEX</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>GROUP INDEX</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>USUAL TYPES OF MAJOR MATERIALS</td> <td>STONE FRAGS. GRAVEL AND SAND</td> <td>FINE SAND</td> <td>SILTY OR CLAYEY GRAVEL AND SAND</td> <td>SILTY SOILS</td> <td>CLAYEY SOILS</td> <td colspan="4">SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER</td> <td>HIGHLY ORGANIC SOILS</td> </tr> <tr> <td>GEN. RATING AS A SUBGRADE</td> <td colspan="3">EXCELLENT TO GOOD</td> <td colspan="3">FAIR TO POOR</td> <td>FAIR TO POOR</td> <td>POOR</td> <td colspan="2">UNSATURABLE</td> </tr> </table> <p align="center">P.I. OF A-7-5 ≤ L.L. - 30 ; P.I. OF A-7-6 > L.L. - 30</p> | | | GENERAL CLASS. | GRANULAR MATERIALS (>95% PASSING #200) | | | SILT-CLAY MATERIALS (>95% 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-4, A-5 | A-6, A-7 | SYMBOL | | | | | | | | | | | % PASSING | 50 MX | 30 MX | 10 MX | 10 MX | 10 MX | 10 MX | 10 MX | 10 MX | 10 MX | 10 MX | LIQUID LIMIT | 6 MX | N.P. | 40 MX | 40 MX | 40 MX | 40 MX | 40 MX | 40 MX | 40 MX | 40 MX | PLASTIC INDEX | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | GROUP INDEX | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | USUAL TYPES OF MAJOR MATERIALS | STONE FRAGS. GRAVEL AND SAND | FINE SAND | SILTY OR CLAYEY GRAVEL AND SAND | SILTY SOILS | CLAYEY SOILS | SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER | | | | HIGHLY ORGANIC SOILS | GEN. RATING AS A SUBGRADE | EXCELLENT TO GOOD | | | FAIR TO POOR | | | FAIR TO POOR | POOR | UNSATURABLE | | <p align="center">MINERALOGICAL COMPOSITION</p> <p>MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.</p> | | | <p align="center">COMPRESSION</p> <p>SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN 30 MODERATELY COMPRESSIBLE LIQUID LIMIT 31-50 HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THAN 50</p> | | | <p align="center">PERCENTAGE OF MATERIAL</p> <table border="1"> <tr> <th>ORGANIC MATERIAL</th> <th>GRANULAR SOILS</th> <th>SILT-CLAY SOILS</th> <th>OTHER MATERIAL</th> </tr> <tr> <td>TRACE OF ORGANIC MATTER</td> <td>2 - 3%</td> <td>3 - 5%</td> <td>TRACE</td> </tr> <tr> <td>LITTLE ORGANIC MATTER</td> <td>3 - 5%</td> <td>5 - 12%</td> <td>LITTLE</td> </tr> <tr> <td>MODERATELY ORGANIC</td> <td>5 - 10%</td> <td>12 - 20%</td> <td>SOME</td> </tr> <tr> <td>HIGHLY ORGANIC</td> <td>>10%</td> <td>>20%</td> <td>HIGHLY</td> </tr> </table> | | | ORGANIC MATERIAL | GRANULAR SOILS | SILT-CLAY SOILS | OTHER MATERIAL | TRACE OF ORGANIC MATTER | 2 - 3% | 3 - 5% | TRACE | LITTLE ORGANIC MATTER | 3 - 5% | 5 - 12% | LITTLE | MODERATELY ORGANIC | 5 - 10% | 12 - 20% | SOME | HIGHLY ORGANIC | >10% | >20% | HIGHLY |
| GENERAL CLASS. | GRANULAR MATERIALS (>95% PASSING #200) | | | SILT-CLAY MATERIALS (>95% 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-4, A-5 | A-6, A-7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SYMBOL | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| % PASSING | 50 MX | 30 MX | 10 MX | 10 MX | 10 MX | 10 MX | 10 MX | 10 MX | 10 MX | 10 MX | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| LIQUID LIMIT | 6 MX | N.P. | 40 MX | 40 MX | 40 MX | 40 MX | 40 MX | 40 MX | 40 MX | 40 MX | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PLASTIC INDEX | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GROUP INDEX | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| USUAL TYPES OF MAJOR MATERIALS | STONE FRAGS. GRAVEL AND SAND | FINE SAND | SILTY OR CLAYEY GRAVEL AND SAND | SILTY SOILS | CLAYEY SOILS | SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER | | | | HIGHLY ORGANIC SOILS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GEN. RATING AS A SUBGRADE | EXCELLENT TO GOOD | | | FAIR TO POOR | | | FAIR TO POOR | POOR | UNSATURABLE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ORGANIC MATERIAL | GRANULAR SOILS | SILT-CLAY SOILS | OTHER MATERIAL | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| TRACE OF ORGANIC MATTER | 2 - 3% | 3 - 5% | TRACE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| LITTLE ORGANIC MATTER | 3 - 5% | 5 - 12% | LITTLE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MODERATELY ORGANIC | 5 - 10% | 12 - 20% | SOME | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HIGHLY ORGANIC | >10% | >20% | HIGHLY | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p align="center">GROUND WATER</p> <p> WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING.</p> <p> STATIC WATER LEVEL AFTER 24 HOURS.</p> <p> PERCHED WATER, SATURATED ZONE OR WATER BEARING STRATA</p> <p> SPRING OR SEEPAGE</p> <p> HOLE CAVED</p> | | | <p align="center">MISCELLANEOUS SYMBOLS</p> <p> ROADWAY EMBANKMENT WITH SOIL DESCRIPTION</p> <p> SOIL SYMBOL</p> <p> ARTIFICIAL FILL OTHER THAN ROADWAY EMBANKMENTS</p> <p> INFERRED SOIL BOUNDARIES</p> <p> INFERRED ROCK LINE</p> <p> ALLUVIAL SOIL BOUNDARY</p> <p> DIP/DIP DIRECTION OF ROCK STRUCTURES</p> <p> SOUNDING ROD</p> <p> SPT TEST BORING</p> <p> CPT TEST BORING</p> <p> GEO-PROBE</p> <p> AUGER BORING</p> <p> CORE BORING</p> <p> MONITORING WELL</p> <p> PIEZOMETER INSTALLATION</p> <p> SLOPE INDICATOR INSTALLATION</p> <p> SPT N-VALUE EQUIVALENT</p> | | | <p align="center">ROCK HARDNESS</p> <p>VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.</p> <p>HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.</p> <p>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.</p> <p>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.</p> <p>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 PICES CAN BE BROKEN BY FINGER PRESSURE.</p> <p>VERY SOFT CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PICES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGER NAIL.</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p align="center">TEXTURE OR GRAIN SIZE</p> <table border="1"> <tr> <th>U.S. STD. SIEVE SIZE OPENING (MM)</th> <th>4</th> <th>10</th> <th>40</th> <th>60</th> <th>200</th> <th>270</th> </tr> <tr> <td></td> <td>4.76</td> <td>2.0</td> <td>0.42</td> <td>0.25</td> <td>0.075</td> <td>0.053</td> </tr> </table> | | | U.S. STD. SIEVE SIZE OPENING (MM) | 4 | 10 | 40 | 60 | 200 | 270 | | 4.76 | 2.0 | 0.42 | 0.25 | 0.075 | 0.053 | <p align="center">ABBREVIATIONS</p> <table border="1"> <tr> <td>AR - AUGER REFUSAL</td> <td>PMT - PRESSUREMETER TEST</td> </tr> <tr> <td>BT - BORING TERMINATED</td> <td>SD. - SAND, SANDY</td> </tr> <tr> <td>CL. - CLAY</td> <td>SL. - SILT, SILTY</td> </tr> <tr> <td>CPT - CONE PENETRATION TEST</td> <td>SLI. - SLIGHTLY</td> </tr> <tr> <td>CSE. - COARSE</td> <td>TCR - TRICONE REFUSAL</td> </tr> <tr> <td>DMT - DILATOMETER TEST</td> <td>U - UNIT WEIGHT</td> </tr> <tr> <td>DPT - DYNAMIC PENETRATION TEST</td> <td>U_d - DRY UNIT WEIGHT</td> </tr> <tr> <td>e - VOID RATIO</td> <td>W - MOISTURE CONTENT</td> </tr> <tr> <td>F. - FINE</td> <td>V. - VERY</td> </tr> <tr> <td>FOSS. - FOSSILIFEROUS</td> <td>VST - VANE SHEAR TEST</td> </tr> <tr> <td>FRAC. - FRACTURED</td> <td></td> </tr> <tr> <td>FRAGS. - FRAGMENTS</td> <td></td> </tr> <tr> <td>MED. - MEDIUM</td> <td></td> </tr> </table> | | | AR - AUGER REFUSAL | PMT - PRESSUREMETER TEST | BT - BORING TERMINATED | SD. - SAND, SANDY | CL. - CLAY | SL. - SILT, SILTY | CPT - CONE PENETRATION TEST | SLI. - SLIGHTLY | CSE. - COARSE | TCR - TRICONE REFUSAL | DMT - DILATOMETER TEST | U - UNIT WEIGHT | DPT - DYNAMIC PENETRATION TEST | U _d - DRY UNIT WEIGHT | e - VOID RATIO | W - MOISTURE CONTENT | F. - FINE | V. - VERY | FOSS. - FOSSILIFEROUS | VST - VANE SHEAR TEST | FRAC. - FRACTURED | | FRAGS. - FRAGMENTS | | MED. - MEDIUM | | <p align="center">EQUIPMENT USED ON SUBJECT PROJECT</p> <table border="1"> <tr> <td>DRILL UNITS:</td> <td>ADVANCING TOOLS:</td> <td>HAMMER TYPE:</td> </tr> <tr> <td><input type="checkbox"/> MOBILE B-</td> <td><input type="checkbox"/> CLAY BITS</td> <td><input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL</td> </tr> <tr> <td><input checked="" type="checkbox"/> DIERICH D-50</td> <td><input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER</td> <td>CORE SIZE:</td> </tr> <tr> <td><input type="checkbox"/> CME-550x</td> <td><input type="checkbox"/> 8" HOLLOW AUGERS</td> <td><input type="checkbox"/> B</td> </tr> <tr> <td><input type="checkbox"/> CME-750</td> <td><input type="checkbox"/> HARD FACED FINGER BITS</td> <td><input checked="" type="checkbox"/> N O-2</td> </tr> <tr> <td><input type="checkbox"/> PORTABLE HOIST</td> <td><input type="checkbox"/> TUNG-CARBIDE INSERTS</td> <td><input type="checkbox"/> H</td> </tr> <tr> <td><input type="checkbox"/> OTHER _____</td> <td><input checked="" type="checkbox"/> CASING <input checked="" type="checkbox"/> W/ ADVANCER</td> <td>HAND TOOLS:</td> </tr> <tr> <td><input type="checkbox"/> OTHER _____</td> <td><input type="checkbox"/> TRICONE _____ * STEEL TEETH</td> <td><input type="checkbox"/> POST HOLE DIGGER</td> </tr> <tr> <td><input type="checkbox"/> OTHER _____</td> <td><input type="checkbox"/> TRICONE _____ * TUNG-CARB.</td> <td><input type="checkbox"/> HAND AUGER</td> </tr> <tr> <td><input type="checkbox"/> OTHER _____</td> <td><input type="checkbox"/> CORE BIT</td> <td><input checked="" type="checkbox"/> SOUNDING ROD</td> </tr> <tr> <td><input type="checkbox"/> OTHER _____</td> <td><input checked="" type="checkbox"/> OTHER 2-1/4" H.S.A.</td> <td><input type="checkbox"/> VANE SHEAR TEST</td> </tr> <tr> <td><input type="checkbox"/> OTHER _____</td> <td><input type="checkbox"/> OTHER _____</td> <td><input type="checkbox"/> OTHER _____</td> </tr> </table> | | | DRILL UNITS: | ADVANCING TOOLS: | HAMMER TYPE: | <input type="checkbox"/> MOBILE B- | <input type="checkbox"/> CLAY BITS | <input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL | <input checked="" type="checkbox"/> DIERICH D-50 | <input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER | CORE SIZE: | <input type="checkbox"/> CME-550x | <input type="checkbox"/> 8" HOLLOW AUGERS | <input type="checkbox"/> B | <input type="checkbox"/> CME-750 | <input type="checkbox"/> HARD FACED FINGER BITS | <input checked="" type="checkbox"/> N O-2 | <input type="checkbox"/> PORTABLE HOIST | <input type="checkbox"/> TUNG-CARBIDE INSERTS | <input type="checkbox"/> H | <input type="checkbox"/> OTHER _____ | <input checked="" type="checkbox"/> CASING <input checked="" type="checkbox"/> W/ ADVANCER | HAND TOOLS: | <input type="checkbox"/> OTHER _____ | <input type="checkbox"/> TRICONE _____ * STEEL TEETH | <input type="checkbox"/> POST HOLE DIGGER | <input type="checkbox"/> OTHER _____ | <input type="checkbox"/> TRICONE _____ * TUNG-CARB. | <input type="checkbox"/> HAND AUGER | <input type="checkbox"/> OTHER _____ | <input type="checkbox"/> CORE BIT | <input checked="" type="checkbox"/> SOUNDING ROD | <input type="checkbox"/> OTHER _____ | <input checked="" type="checkbox"/> OTHER 2-1/4" H.S.A. | <input type="checkbox"/> VANE SHEAR TEST | <input type="checkbox"/> OTHER _____ | <input type="checkbox"/> OTHER _____ | <input type="checkbox"/> OTHER _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| U.S. STD. SIEVE SIZE OPENING (MM) | 4 | 10 | 40 | 60 | 200 | 270 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 4.76 | 2.0 | 0.42 | 0.25 | 0.075 | 0.053 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AR - AUGER REFUSAL | PMT - PRESSUREMETER TEST | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| BT - BORING TERMINATED | SD. - SAND, SANDY | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CL. - CLAY | SL. - SILT, SILTY | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CPT - CONE PENETRATION TEST | SLI. - SLIGHTLY | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CSE. - COARSE | TCR - TRICONE REFUSAL | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DMT - DILATOMETER TEST | U - UNIT WEIGHT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DPT - DYNAMIC PENETRATION TEST | U _d - DRY UNIT WEIGHT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| e - VOID RATIO | W - MOISTURE CONTENT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| F. - FINE | V. - VERY | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FOSS. - FOSSILIFEROUS | VST - VANE SHEAR TEST | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FRAC. - FRACTURED | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FRAGS. - FRAGMENTS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MED. - MEDIUM | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DRILL UNITS: | ADVANCING TOOLS: | HAMMER TYPE: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> MOBILE B- | <input type="checkbox"/> CLAY BITS | <input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <input checked="" type="checkbox"/> DIERICH D-50 | <input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER | CORE SIZE: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> CME-550x | <input type="checkbox"/> 8" HOLLOW AUGERS | <input type="checkbox"/> B | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> CME-750 | <input type="checkbox"/> HARD FACED FINGER BITS | <input checked="" type="checkbox"/> N O-2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> PORTABLE HOIST | <input type="checkbox"/> TUNG-CARBIDE INSERTS | <input type="checkbox"/> H | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> OTHER _____ | <input checked="" type="checkbox"/> CASING <input checked="" type="checkbox"/> W/ ADVANCER | HAND TOOLS: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> OTHER _____ | <input type="checkbox"/> TRICONE _____ * STEEL TEETH | <input type="checkbox"/> POST HOLE DIGGER | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> OTHER _____ | <input type="checkbox"/> TRICONE _____ * TUNG-CARB. | <input type="checkbox"/> HAND AUGER | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> OTHER _____ | <input type="checkbox"/> CORE BIT | <input checked="" type="checkbox"/> SOUNDING ROD | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> OTHER _____ | <input checked="" type="checkbox"/> OTHER 2-1/4" H.S.A. | <input type="checkbox"/> VANE SHEAR TEST | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> OTHER _____ | <input type="checkbox"/> OTHER _____ | <input type="checkbox"/> OTHER _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p align="center">SOIL MOISTURE - CORRELATION OF TERMS</p> <table border="1"> <tr> <th>SOIL MOISTURE SCALE (ATTERBERG LIMITS)</th> <th>FIELD MOISTURE DESCRIPTION</th> <th>GUIDE FOR FIELD MOISTURE DESCRIPTION</th> </tr> <tr> <td>LL</td> <td>- SATURATED - (SAT.)</td> <td>USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE</td> </tr> <tr> <td>PL</td> <td>- WET - (W)</td> <td>SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE</td> </tr> <tr> <td>OM</td> <td>- MOIST - (M)</td> <td>SOLID; AT OR NEAR OPTIMUM MOISTURE</td> </tr> <tr> <td>SL</td> <td>- DRY - (D)</td> <td>REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE</td> </tr> </table> | | | SOIL MOISTURE SCALE (ATTERBERG LIMITS) | FIELD MOISTURE DESCRIPTION | GUIDE FOR FIELD MOISTURE DESCRIPTION | LL | - SATURATED - (SAT.) | USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE | PL | - WET - (W) | SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE | OM | - MOIST - (M) | SOLID; AT OR NEAR OPTIMUM MOISTURE | SL | - DRY - (D) | REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE | <p align="center">FRACTURE SPACING</p> <table border="1"> <tr> <th>TERM</th> <th>SPACING</th> </tr> <tr> <td>VERY WIDE</td> <td>MORE THAN 10 FEET</td> </tr> <tr> <td>WIDE</td> <td>3 TO 10 FEET</td> </tr> <tr> <td>MODERATELY CLOSE</td> <td>1 TO 3 FEET</td> </tr> <tr> <td>CLOSE</td> <td>0.16 TO 1 FEET</td> </tr> <tr> <td>VERY CLOSE</td> <td>LESS THAN 0.16 FEET</td> </tr> </table> | | | 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 | <p align="center">BEDDING</p> <table border="1"> <tr> <th>TERM</th> <th>THICKNESS</th> </tr> <tr> <td>VERY THICKLY BEDDED</td> <td>> 4 FEET</td> </tr> <tr> <td>THICKLY BEDDED</td> <td>1.5 - 4 FEET</td> </tr> <tr> <td>THINLY BEDDED</td> <td>0.16 - 1.5 FEET</td> </tr> <tr> <td>VERY THINLY BEDDED</td> <td>0.03 - 0.16 FEET</td> </tr> <tr> <td>THICKLY LAMINATED</td> <td>0.008 - 0.03 FEET</td> </tr> <tr> <td>THINLY LAMINATED</td> <td>< 0.008 FEET</td> </tr> </table> | | | 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 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL MOISTURE SCALE (ATTERBERG LIMITS) | FIELD MOISTURE DESCRIPTION | GUIDE FOR FIELD MOISTURE DESCRIPTION | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| LL | - SATURATED - (SAT.) | USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PL | - WET - (W) | SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| OM | - MOIST - (M) | SOLID; AT OR NEAR OPTIMUM MOISTURE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SL | - DRY - (D) | REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 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 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 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 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p align="center">PLASTICITY</p> <table border="1"> <tr> <th>NONPLASTIC</th> <th>PLASTICITY INDEX (PI)</th> <th>DRY STRENGTH</th> </tr> <tr> <td>LOW PLASTICITY</td> <td>0-5</td> <td>VERY LOW</td> </tr> <tr> <td>MED. PLASTICITY</td> <td>6-15</td> <td>SLIGHT</td> </tr> <tr> <td>HIGH PLASTICITY</td> <td>16-25</td> <td>MEDIUM</td> </tr> <tr> <td></td> <td>26 OR MORE</td> <td>HIGH</td> </tr> </table> | | | NONPLASTIC | PLASTICITY INDEX (PI) | DRY STRENGTH | LOW PLASTICITY | 0-5 | VERY LOW | MED. PLASTICITY | 6-15 | SLIGHT | HIGH PLASTICITY | 16-25 | MEDIUM | | 26 OR MORE | HIGH | <p align="center">INDURATION</p> <p>FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.</p> <table border="1"> <tr> <td>FRIABLE:</td> <td>RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.</td> </tr> <tr> <td>MODERATELY INDURATED</td> <td>GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.</td> </tr> <tr> <td>INDURATED</td> <td>GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.</td> </tr> <tr> <td>EXTREMELY INDURATED</td> <td>SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.</td> </tr> </table> | | | 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. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| NONPLASTIC | PLASTICITY INDEX (PI) | DRY STRENGTH | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| LOW PLASTICITY | 0-5 | VERY LOW | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MED. PLASTICITY | 6-15 | SLIGHT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HIGH PLASTICITY | 16-25 | MEDIUM | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 26 OR MORE | HIGH | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 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. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>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.</p> | | | <p align="center">FRAC. SPACING</p> <p align="center">BEDDING</p> <p align="center">INDURATION</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p align="center">COLOR</p> | | | <p align="center">NOTES:</p> <p align="center">BENCH MARK: NCDOT TRAVERSE STATION REBAR & CAP STAMPED "BL-3"</p> <p align="center">LOCATED AT 12+08.31</p> <p align="center">ELEVATION: 2623.78'</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

0% 08/99
 CONTRACT: TIP PROJECT: B-1037
 SYSTEM TIME: 11:55:55
 USER: JG
 USERNAME: JG

See Sheet 1-A For Index of Sheets
See Sheet 1-B For Conventional Symbols



VICINITY MAP

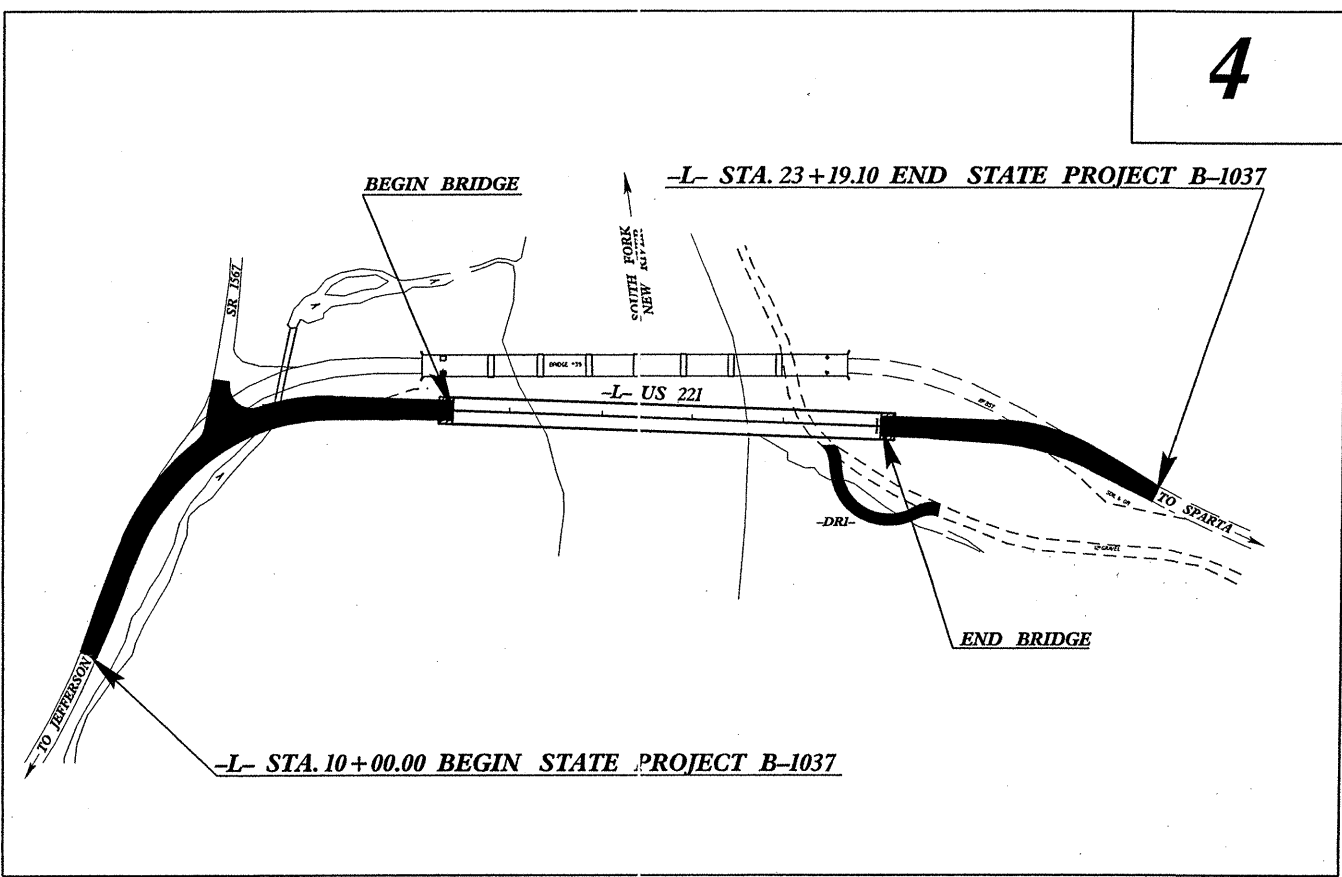
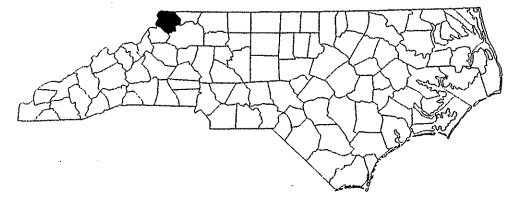
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

ASHE COUNTY

LOCATION: BRIDGE NO. 39 OVER SOUTH FORK NEW RIVER
ON US 221 NORTHEAST OF JEFFERSON.

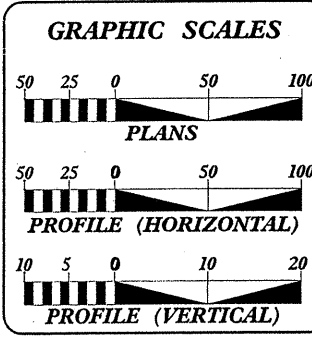
TYPE OF WORK: GRADING, DRAINAGE, PAVING AND STRUCTURE.

| | | | |
|-----------------|-----------------------------|-------------|--------------|
| STATE | STATE PROJECT REFERENCE NO. | SHEET NO. | TOTAL SHEETS |
| N.C. | B-1037 | 2A | 24 |
| STATE PROJ. NO. | F.A. PROJ. NO. | DESCRIPTION | |
| 32579.1I | BRSTP-221(6) | P.E. | |
| | | | |
| | | | |
| | | | |
| | | | |



THERE IS NO CONTROL OF ACCESS ON THIS PROJECT.
CLEARING ON THIS PROJECT SHALL BE PERFORMED
TO THE LIMITS ESTABLISHED BY METHOD ____
THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES.

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



DESIGN DATA

| | |
|-------------------|-----------|
| ADT 2009 = | 800 |
| ADT 2030 = | 1300 |
| DHV = | 14 % |
| D = | 55 % |
| T = | 4 % * |
| V = | 30 MPH |
| FUNC CLASS = | COLLECTOR |
| * TTST 1% DUAL 3% | |

PROJECT LENGTH

| | |
|--|-----------|
| LENGTH ROADWAY F.A. PROJECT BRSTP-221 (6) = | |
| LENGTH STRUCTURES F.A. PROJECT BRSTP-221 (6) = | |
| TOTAL LENGTH STATE PROJECT 8.1710602 = | 0.250 mi. |

Prepared In the Office of:
DIVISION OF HIGHWAYS
1000 Birch Ridge Dr., Raleigh NC, 27610

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: **JIMMY GOODNIGHT, P.E.**
FEBRUARY 15, 2008
PROJECT ENGINEER

LETTING DATE: **MARK HUSSEY**
FEBRUARY 17, 2009
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: _____ P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: _____ P.E.

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

STATE HIGHWAY DESIGN ENGINEER

STATE PROJECT: 32579.1.1
 FEDERAL PROJECT: BRSTP-221(6)
 TIP NUMBER: B-1037
 COUNTY: Ashe

DESCRIPTION: Approaches to Bridge No. 39 on U.S. 221
 Over the South Fork New River

SUBJECT: Roadway Subsurface Investigation – Inventory Report

Project Description

This project is located in eastern Ashe County where U.S. 221 crosses the South Fork of the New River. The site is located approximately 2.2 miles west of Scottville, North Carolina and about 10 miles northeast of Jefferson, North Carolina near the intersection of Chestnut Hill Road (S.R. 1567) and U.S. 221. The project will include the demolition and replacement of Bridge No. 39 approximately 50 feet south (upstream) of the existing bridge and realignment of the west and east approaches.

The proposed west approach will begin on U.S. 221 approximately 300 feet south of S.R. 1567 at station 10+00-L- and extends north and east to the proposed new bridge at approximately station 15+40 -L-. The east approach will extend from the proposed bridge at approximately station 20+05 -L- and merge back with U.S. 221 at station 23+19.10 -L-.

The west approach consists of a roadway that was cut into a steep hill side to the left and constructed on roadway embankment fill extending to a stream bed that parallels the road on the right side before crossing beneath the road at an existing 6 feet x 6 feet concrete box culvert at approximately station 13+50 -L-. A smaller pipe culvert crosses beneath the road at about station 11+60 -L- collecting water along the left side of the road and directing it into the stream along the right side of the road. A sliver cut extending about 130 feet from the center of the existing road into the existing hill side is proposed along the left side of the road between approximately stations 10+00 -L- and 11+50 -L-. Exposed rock outcrops were visible along the cut hill side. A pipe or culvert will be constructed along the right side along with up to about 20 feet of roadway embankment fill to approximately station 13+75 -L-.

The New River General Store, a wood framed historic structure, built in the 1930's is located in the northeast quadrant of the intersections of Chestnut Hill Road (S.R. 1657) and U.S. 221. The building has been determined to be eligible for the National Register of Historic Places. The building appears to be constructed on artificial fill along the north side of U.S. 221. At about station 13+60 -L- extending to the new bridge, the roadway is constructed on roadway embankment fill, cut from the relatively steep hill side along the right side of the road. The hill side is thickly vegetated with hard woods and rhodendrums and numerous rock outcrops were observed. Significant cut will occur along the right side of the road between approximately stations 13+75 -L- and 15+25 -L- extending up the hill approximately 120 feet from the proposed new center line.

The east approach consists of a roadway cut into a steep hill side with exposed rock left of the alignment constructed of roadway embankment fill adjacent to the flood plain of the South Fork New River. A rental house and vacant service station exists approximately 75 feet and 145 feet, respectively from the proposed end bent.

Vent caps to possible UST's were observed in front of the vacant service station. A gravel road and cultivated field are located at the base of the roadway embankment fill and hill side.

A geotechnical investigation was conducted between October 9, 2007 and October 16, 2007 by performing soil test boring and rock coring. Drilling consisted of advancing 2-1/4 inch diameter hollow stem augers with standard penetration tests (SPT) performed at selected intervals. Wash boring techniques were utilized to advance a NW casing advancer and NQ-2 core barrel into rock. All soil test borings were drilled with a Diedrich D-50 rubber track-mounted rig. Additionally, 1/4 inch diameter steel sounding rods were driven at fifteen (15) locations into the ground with an inverted hammer to verify the surface of refusal material. Five additional borings (one by S&ME and four by NCDOT) performed between July and August in 1998 during previous investigations are incorporated in this report to better define the subsurface conditions and rock surface profile.

The following survey line was investigated:

| <u>Line</u> | <u>Station</u> |
|-------------|-------------------|
| -L- | 10+00 to 23+19.10 |

Areas of Special Geotechnical Interest

- 1) Roadway Embankment Fill Soils: The following areas contain soft silts and very loose to loose sands. In addition, these soils may contain boulders and rock fragments.

| <u>Line</u> | <u>Station</u> |
|-------------|-------------------|
| -L- | 10+00 to 13+60 |
| -L- | 20+05 to 23+19.10 |

- 2) Crystalline Rock: Crystalline rock was encountered at or above proposed grades in the following areas.

| <u>Line</u> | <u>Station</u> |
|-------------|-------------------------------|
| -L- | 10+00 to 11+50 Left |
| -L- | 13+75 to 15+25 Left and Right |

- 3) Rock Containing Iron Sulfides: The muscovite-biotite gneiss at this site can contain iron sulfide which may result in acid run off during drainage when exposed during excavations.

Physigraphy and Geology

The proposed project site is located in the northwestern portion of the Blue Ridge Physiographic Province of North Carolina as part of the Appalachian Mountain system. The Blue Ridge Province is characterized by high mountain ridges with broad and rounded summits, with steep slopes, dissected by alluvial valleys and swiftly

flowing streams. More specifically, the project is located in the Ashe Metamorphic Suite. A subunit of the Ashe Metamorphic Suite consists of muscovite-biotite gneiss such as encountered at the referenced site. This unit consists of gray to dark gray, fine to medium grained, thin to thick layered muscovite-biotite gneiss inter-layered with mica schist and amphibolite. The muscovite-biotite gneiss can contain iron sulfides which may result in acid runoff during drainage when exposed during excavations. This unit is competent and relatively resistant to weathering.

Soil Properties

The borings performed during this exploration were advanced to depths of 6.1 to 80.7 feet (elevations 2606.5 to 2575.9 feet) at collar elevations ranging from 2660.3 to 2587.6 feet.

Artificial fill material was observed beneath the New River General Store. The fill materials consist of very loose to medium dense brown to brown-orange silty fine sand (A-2-4) with trace of mica and medium stiff to stiff dark brown fine sandy silt (A-4).

Colluvium was encountered in the boring at station 15+29 -L- (10 Feet Right) performed by NCDOT at End Bent No. 1. Colluvium exists along the steep slopes facing northeast at the west approach to End Bent No. 1. The colluvium consists of loose brown silty sand to a depth of about 4.6 feet (elevation 2590.6 feet) beneath the collar elevation. The colluvium is adjacent to large rock outcrops with boulders at the base of these rock outcrops.

Roadway embankment fill is present beneath the existing roadway at both approaches. The roadway embankment consists of at-grade cut sections along the uphill side to thicker fill sections of up to about 25 feet along the downhill side tapering off at the toe of slope. Borings along the west approach encountered fill materials to depths of 3.5 to 25.1 feet (elevations 2609.1 to 2563.5 feet) below the collar elevations. The Roadway embankment fill along the west approach consists of soft to medium stiff red-brown fine to coarse sandy clay and silt (A-4, A-6 and A-7-6) with rock fragments and very loose to loose brown clayey silty coarse to fine sand (A-2-4 and A-1-b) with boulders. Borings along the east approach encountered fill materials to depths of 5.3 to 17.5 feet (elevations 2583.1 to 2568.2 feet) below the collar elevations. The roadway embankment fill along the east approach consists of medium stiff brown fine sandy silt (A-4) and loose brown silty sand with boulders and cobbles. The typical standard penetration test (SPT) values in the Roadway Embankment Fill ranged from 2 to 25 bpf with blow counts as high as 60 blows with 0.5 feet of penetration. The higher blow counts are inflated due to boulders and cobbles and are not representative of the actual consistency of the fill materials.

Residual soils were encountered beneath the artificial fill, roadway embankment fill, colluvium and at the ground surface in natural areas along the hill sides. The residual soils encountered ranged from less than one foot thick to about 8.7 feet thick. The residual soils consist of very stiff to hard brown and gray fine sandy silt (A-4) with trace of mica and loose to very dense brown-tan clayey silty coarse to fine sand (A-2-4) with trace of mica and rock fragments. The SPT N-values in the residual soils ranged from 9 to 68 blows per foot (bpf.) The residual soils transition to a relatively thin layer of weathered rock (gneiss and schist) above hard rock. Standard penetration test (SPT) N-values in the weathered rock ranged from 100 blows per foot of penetration to 100 blows with 0.4 feet of penetration. All borings were terminated in or on crystalline rock, hard gneiss or schist with the exception of the boring at station 11+50 -L- which was terminated in weathered rock (gneiss).

Hard crystalline rock consisting of interbedded layers of biotite gneiss and mica/staurolite schist with schist predominate in some areas at the top of the mountain and east approach and gneiss at the base of the mountain and west approach. Based on numerous rock outcrops, the rock appears to dip at a 57° to 81° angle in a south-southeast direction.

Crystalline rock was encountered ranging from exposed at the surface to a depth of about 26 feet beneath the surface (elevations 2654.6 to 2562.6 feet) beneath the collar elevations. The rock was evaluated utilizing coring techniques by advancing a NQ-2 core barrel. The recovered core samples were classified as soft to very hard moderately severe to fresh gneiss and schist with very close to wide fracture spacing with extremely weathered soil seams. Coring activities recovered 48 to 100 percent of the rock cored. Rock Quality Designation (RQD) values ranged from 0 to 100 percent. Typically, RQD values were greater than 61 percent.

Groundwater

Groundwater was not encountered in augered boreholes at time of drilling and were backfilled at completion of drilling. Groundwater was not measured in the cored borings at the time of drilling due to wash boring techniques being used which introduce water in the boreholes. The water level in the core boring performed at the top of the mountain was measured to be at 70.7 feet (elevation 2589.6 feet) below the ground surface after a period of 24 hours from completion of drilling. A previous boring performed by S&ME in 1998 encountered water at a depth of 19.5 feet (elevation 2569.1 feet) below the ground surface at the road bed level adjacent to the store. A previous boring performed by NCDOT in 1998 encountered water at a depth of 21.3 feet (elevation 2597.7 feet) below the ground surface along the slope of the mountain (southeast) across from the store. The river level at the time of our investigation was below the bottom of any of the borings performed. Water was observed running in the stream bed along the right side of the road between approximately stations 10+00 to 13+50 -L-. Water seepage was also observed along the rock cut face left of the roadway at about station 10+00 -L-. It should be noted that our investigation was performed during an extremely dry period.

Geotechnical Descriptive Analysis

For descriptive purposes, the project has been divided into two segments. The division of the alignments into two segments is based on the near surface and subsurface materials.

Segment I

- L- 10+00 to 13+75 Right
- L- 20+05 to 23+19.10

Segment I consists of areas near grade or to receive fill where existing soils consist of soft to loose roadway embankment fill. Approximately 69 percent of the investigation falls within Section I.

Segment II

- L- 10+00 to 11+50 Left
- L- 13+75 to 15+40

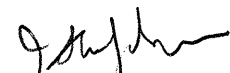
Segment II consists of cut areas along the left side of the alignment and cut sections on the center and right side of the alignment which will require excavation of about 1 to 8 feet of residual soils and up to about 20 feet of weathered rock and hard rock excavation. The majority of this section consists of loose to very dense sands and



stiff to hard residual soils above weathered rock and hard crystalline rock as described in the Soil Properties section of this report. These sections consist of widening existing roadways and new alignments with blasting and rock removal methods. Segment II makes up approximately 21 percent of the investigated alignment.

S&ME appreciates the opportunity to be your geotechnical consultant on this project. If you have any questions or need additional information in regard to this report, please contact us.

Very truly yours,

S&ME, Inc.


J. Shane Johnson, P.G.
Project Geologist
N.C. Registration No. 1753


Abner F. Riggs, Jr., P.E.
Senior Geotechnical Engineer
N.C. Registration No. 14155


Attachments

Appendix A

The following rock core samples were obtained to be tested for Unconfined Compressive Strength.

| <u>Line</u> | <u>Station</u> | <u>Offset</u> | <u>Depth (feet)</u> | <u>Test Performed</u> |
|-------------|----------------|---------------|---------------------|---------------------------------|
| -L- | 14+00 | 19' Left | 4.0-5.0 | Unconfined Compressive Strength |
| -L- | 14+12 | 81' Right | 43.5-44.3 | Unconfined Compressive Strength |
| -L- | 15+00 | 120' Right | 21.3-22.1 | Unconfined Compressive Strength |
| -L- | 15+00 | 120' Right | 49.3-50.3 | Unconfined Compressive Strength |

EARTHWORK BALANCE SHEET

PROJECT B-1037

COUNTY ASHE

COMPUTED BY: BCF
CHECKED BY: GJL

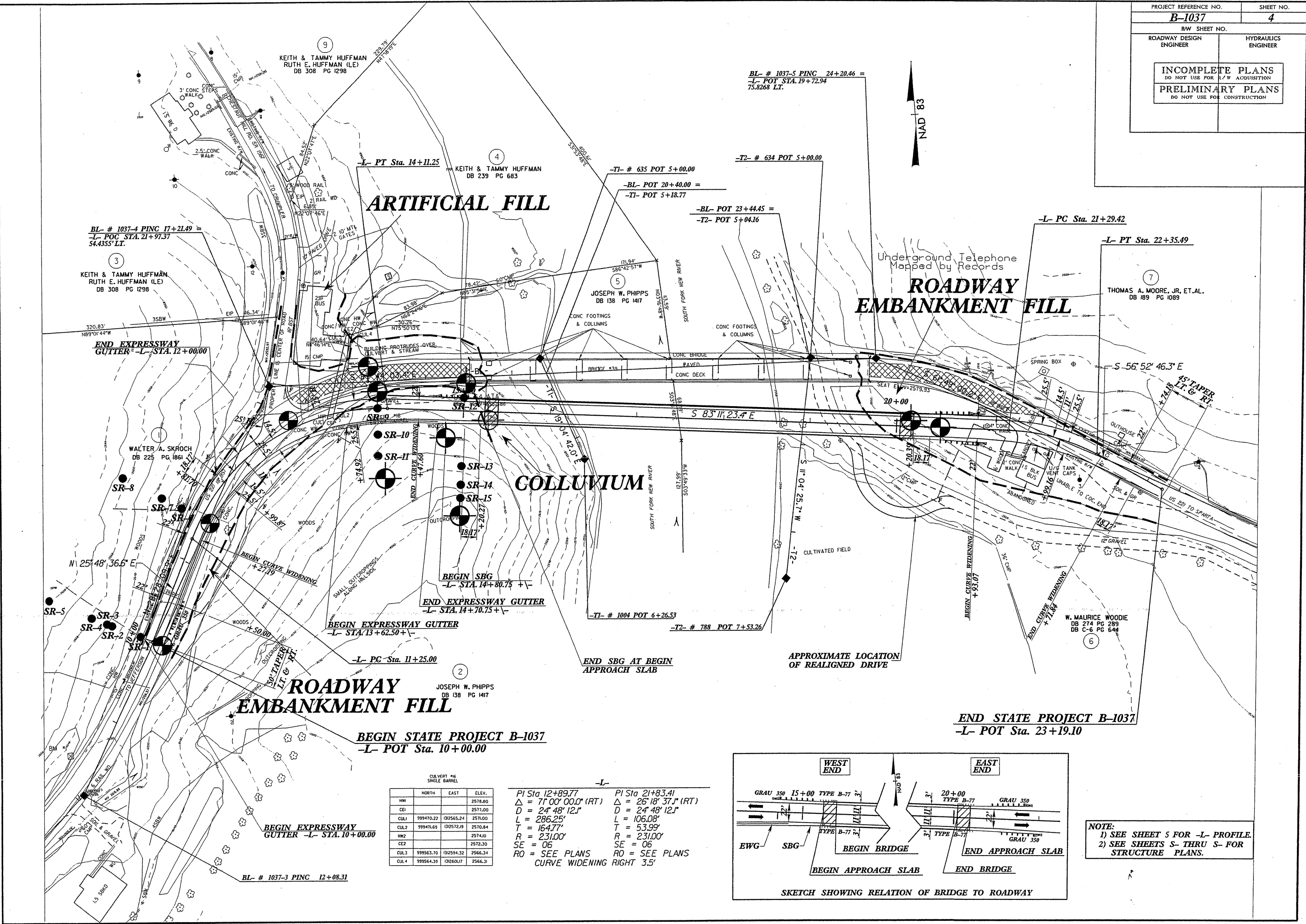
SHEET 1 OF 1

| STATION | STATION | TOTAL EXCAV. (UNCL.) | ROCK EXCAV. | UNDERCUT EXCAV. | UNSUIT. EXCAV. | SUITABLE EARTH EXCAV. | TOTAL EMB. | ROCK EMB. | EARTH EMB. | EMB. + 15 % | BORROW | SUITABLE WASTE | UNSUIT. WASTE | TOTAL WASTE |
|---------------------------------|----------------------------|----------------------|-------------|-----------------|----------------|-----------------------|------------|-----------|------------|-------------|--------|----------------|---------------|-------------|
| | -L- | | | | | | | | | | | | | |
| 9+50.00 | (BEGIN BRIDGE) 15+19.58 | 6,658 | 4,050 | 0 | 0 | 2,608 | 4,433 | 4,050 | 383 | 4,490 | 1,882 | 0 | 0 | 0 |
| | -L- | | | | | | | | | | | | | |
| (END BRIDGE) 19+89.42 | 22+43.75 | 680 | 0 | 0 | 0 | 680 | 151 | 0 | 151 | 174 | 0 | 506 | 0 | 506 |
| PROJECT SUBTOTAL: | | 7,338 | 4,050 | 0 | 0 | 3,288 | 4,584 | 4,050 | 534 | 4,664 | 1,882 | 506 | 0 | 506 |
| LOSS DUE TO CLEARING & GRUBBING | | -500 | 0 | 0 | 0 | -500 | 0 | 0 | 0 | 0 | +500 | 0 | 0 | 0 |
| WASTE IN LIEU OF BORROW | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -506 | -506 | 0 | -506 |
| PROJECT TOTAL: | | 6,838 | 4,050 | 0 | 0 | 2,788 | 4,584 | 4,050 | 534 | 4,664 | 1,876 | 0 | 0 | 0 |
| GRAND TOTAL: | | 6,838 | | | | | | | | | 1,876 | | | |
| SAY: | | 6,900 | | | | | | | | | 1,950 | | | |
| | | | | | | | | | | | | | | |

Note: Approximate quantities only. Borrow, Fine Grading, Clearing and Grubbing, and Removal of Existing Pavement will be paid for at the contract lump sum price for "Grading."

"Earthwork quantities are calculated by the Roadway Design Unit. These earthwork quantities are based in part on subsurface data provided by the Geotechnical Engineering Unit".

GEOTECH. REC'S CONTINGENCY ITEMS
GRADE POINT UNDERCUT = 50cy
UNDERDRAINS = 200ft



BL- # 1037-4 PINC 17+21.49 =
 -L- POC STA. 21+97.37
 54.4355' LT.

KEITH & TAMMY HUFFMAN
 RUTH E. HUFFMAN (LE)
 DB 308 PG 1298

ARTIFICIAL FILL

-T1- # 635 POT 5+00.00
 -BL- POT 20+40.00 =
 -T1- POT 5+18.77

-T2- # 634 POT 5+00.00

-BL- POT 23+44.45 =
 -T2- POT 5+04.16

ROADWAY EMBANKMENT FILL

-L- PC Sta. 21+29.42

-L- PT Sta. 22+35.49

THOMAS A. MOORE, JR. ET.AL.
 DB 189 PG 1089

COLLUVIUM

BEGIN SBG
 -L- STA. 14+80.75 +
 END EXPRESSWAY GUTTER
 -L- STA. 14+70.75 +

-T1- # 1004 POT 6+26.53
 -T2- # 788 POT 7+53.26

END SBG AT BEGIN
 APPROACH SLAB

APPROXIMATE LOCATION
 OF REALIGNED DRIVE

ROADWAY EMBANKMENT FILL

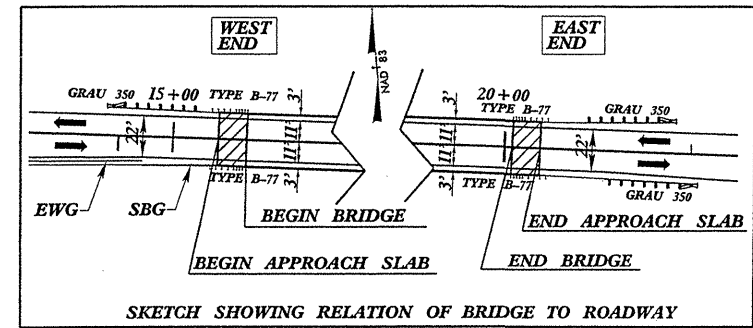
JOSEPH W. PHIPPS
 DB 138 PG 1417

BEGIN STATE PROJECT B-1037
 -L- POT Sta. 10+00.00

END STATE PROJECT B-1037
 -L- POT Sta. 23+19.10

| CULVERT #16 SINGLE BARREL | CULVERT #16 SINGLE BARREL | | ELEV. |
|------------------------------|------------------------------|-----------|---------|
| | NORTH | EAST | |
| HW1 | | | 2578.80 |
| CE1 | | | 2571.00 |
| CUL1 | 999470.22 | 132565.24 | 2571.00 |
| CUL2 | 999471.69 | 132572.19 | 2570.84 |
| HW2 | | | 2574.10 |
| CE2 | | | 2572.30 |
| CUL3 | 999563.70 | 132594.32 | 2566.34 |
| CUL4 | 999564.35 | 132601.17 | 2566.31 |

-L-
 PI Sta 12+89.77 PI Sta 21+83.41
 $\Delta = 71^{\circ}00'00.0''$ (RT) $\Delta = 26^{\circ}18'37.1''$ (RT)
 $D = 24'48''12.1''$ $D = 24'48''12.1''$
 $L = 286.25'$ $L = 106.08'$
 $T = 164.77'$ $T = 53.99'$
 $R = 231.00'$ $R = 231.00'$
 $SE = 06$ $SE = 06$
 $RO = \text{SEE PLANS}$ $RO = \text{SEE PLANS}$
 CURVE WIDENING RIGHT 3.5'



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

END EXPRESSWAY
 GUTTER -L- STA. 12+00.00

WALTER A. SKROCH
 DB 225 PG 1861

SR-8
 SR-7
 SR-6
 SR-5
 SR-4
 SR-3
 SR-2
 SR-1

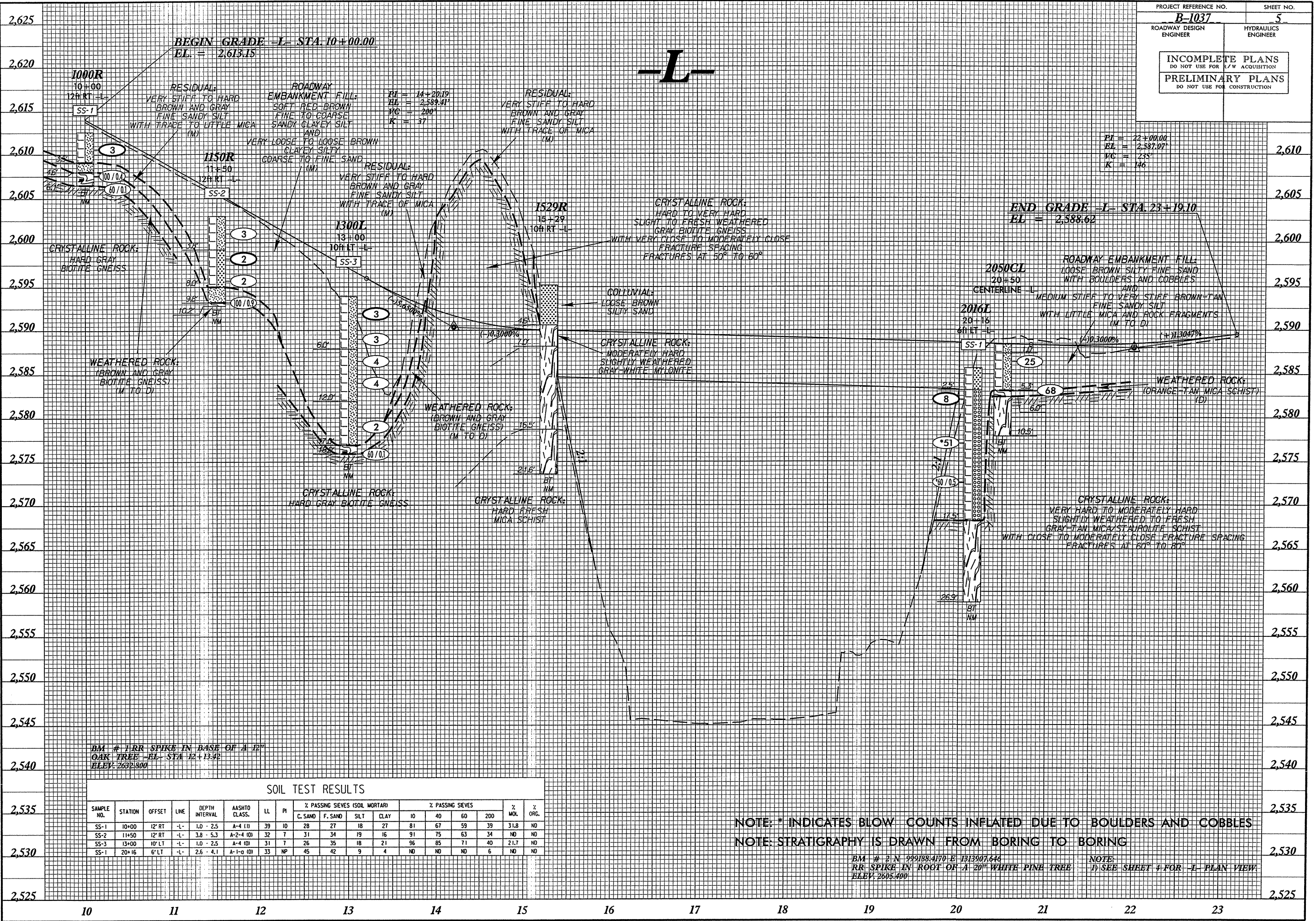
BEGIN CURVE WIDENING
 +27.19

BEGIN EXPRESSWAY GUTTER
 -L- STA. 13+62.50 +

-L- PC Sta. 11+25.00

BEGIN EXPRESSWAY
 GUTTER -L- STA. 10+00.00

BL- # 1037-3 PINC 12+08.31



BM # 1 RR SPIKE IN BASE OF A 12"
 OAK TREE - EL. STA. 12+13.42
 ELEV. 2632.800

NOTE: * INDICATES BLOW COUNTS INFLATED DUE TO BOULDERS AND COBBLES
 NOTE: STRATIGRAPHY IS DRAWN FROM BORING TO BORING

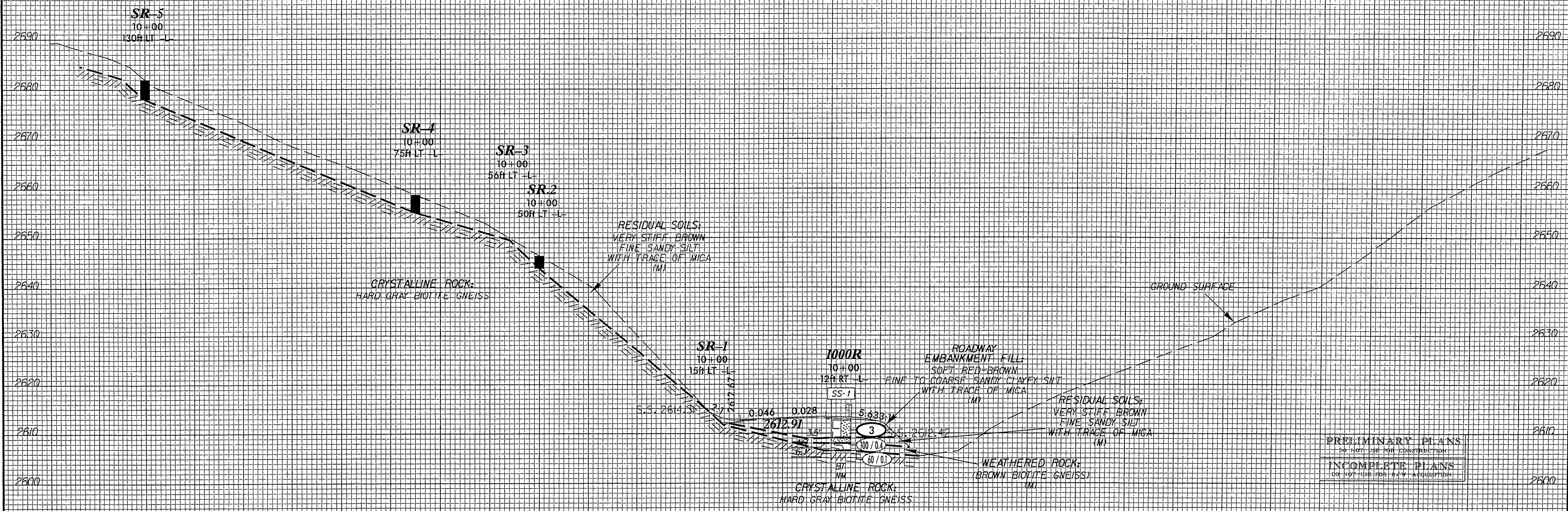
BM # 2 N 999189.4170 E 1313907.646
 RR SPIKE IN ROOT OF A 20" WHITE PINE TREE
 ELEV. 2605.400

NOTE:
 1) SEE SHEET 4 FOR -L- PLAN VIEW

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

SOIL TEST RESULTS

| SAMPLE NO. | STATION | OFFSET | LINE | DEPTH INTERVAL | AASHTO CLASS. | LL | PI | % PASSING SIEVES (SOIL MORTAR) | | | | % PASSING SIEVES | | | | % MOL. | % ORG. |
|------------|---------|--------|------|----------------|---------------|----|----|--------------------------------|---------|------|------|------------------|----|----|-----|--------|--------|
| | | | | | | | | C. SAND | F. SAND | SILT | CLAY | 10 | 40 | 60 | 200 | | |
| SS-1 | 10+00 | 12' RT | -L- | 1.0 - 2.5 | A-4 (1) | 39 | 10 | 28 | 27 | 18 | 27 | 81 | 67 | 59 | 39 | 31.8 | ND |



PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
INCOMPLETE PLANS
DO NOT USE FOR Bidding

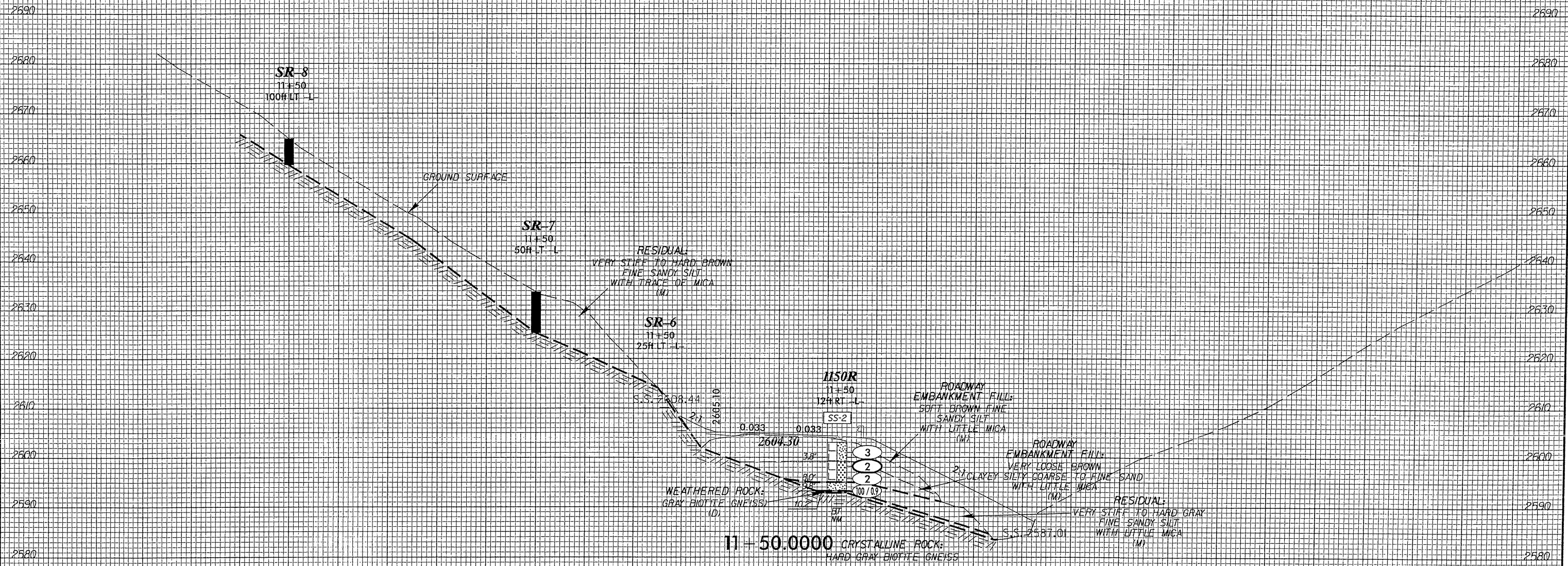
10+00.0000
BEGIN CONSTRUCTION
-L- POT STA 10+00.00

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

SOIL TEST RESULTS

| SAMPLE NO. | STATION | OFFSET | LINE | DEPTH INTERVAL | AASHTO CLASS. | LL | PI | % PASSING SIEVES (SOIL MORTAR) | | | | % PASSING SIEVES | | | | % MOI. | % ORG. |
|------------|---------|--------|------|----------------|---------------|----|----|--------------------------------|---------|------|------|------------------|----|----|-----|--------|--------|
| | | | | | | | | C. SAND | F. SAND | SILT | CLAY | 10 | 40 | 60 | 200 | | |
| SS-2 | 11+50 | 12' RT | -L- | 3.8 - 5.3 | A-2-4 (M) | 32 | 7 | 31 | 34 | 19 | 16 | 91 | 75 | 63 | 34 | ND | ND |



150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

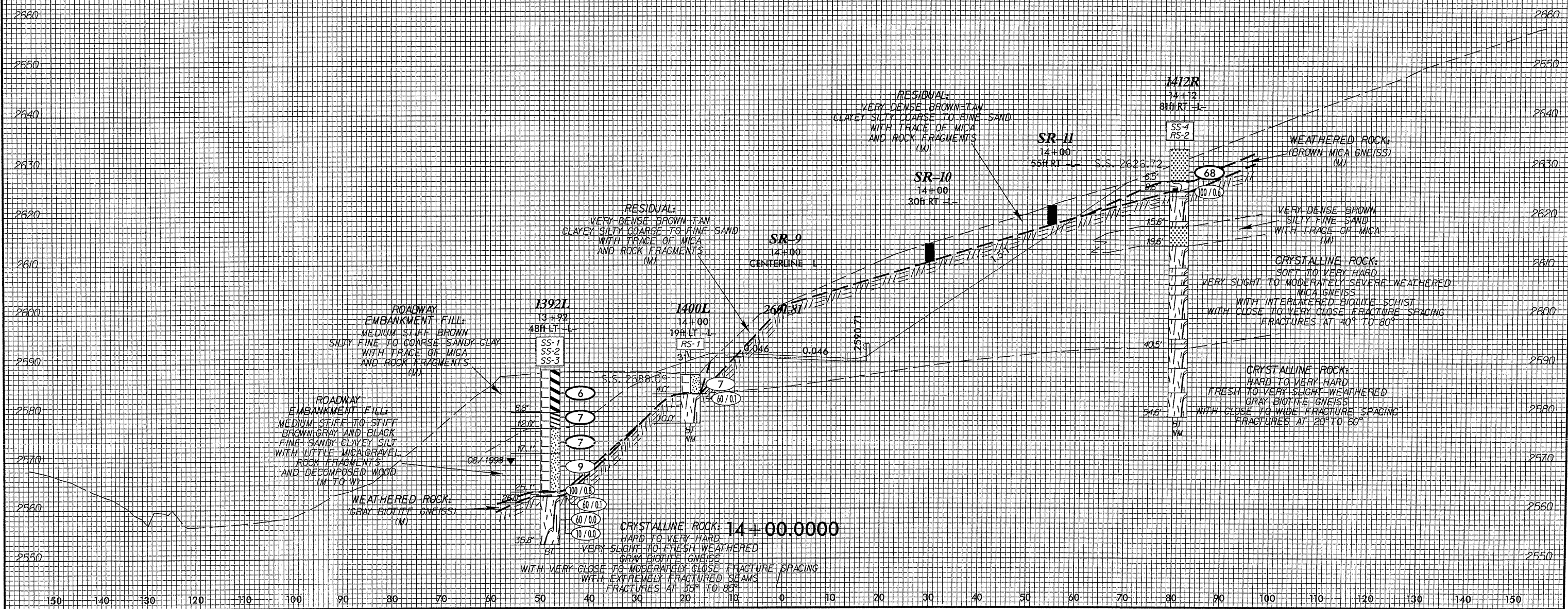
150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

SOIL TEST RESULTS

| SAMPLE NO. | STATION | OFFSET | LINE | DEPTH INTERVAL | AASHTO CLASS. | LL | PI | % PASSING SIEVES (SOIL MORTAR) | | | | % PASSING SIEVES | | | | % MOL. | % ORG. |
|------------|---------|--------|------|----------------|---------------|----|----|--------------------------------|---------|------|------|------------------|----|----|-----|--------|--------|
| | | | | | | | | C. SAND | F. SAND | SILT | CLAY | 10 | 40 | 60 | 200 | | |
| SS-1 | 13+92 | 48' LT | -L- | 3.8 - 5.3 | A-7-6 (9) | 41 | 16 | 26 | 22 | 9 | 43 | 92 | 82 | 74 | 64 | 23.0 | ND |
| SS-2 | 13+92 | 48' LT | -L- | 8.8 - 10.3 | A-6 (6) | 40 | 15 | 21 | 27 | 13 | 39 | 96 | 88 | 79 | 55 | 20.6 | ND |
| SS-3 | 13+92 | 48' LT | -L- | 13.8 - 15.3 | A-4 (0) | 25 | 4 | 28 | 29 | 14 | 29 | 97 | 84 | 72 | 46 | 18.1 | ND |
| SS-4 | 14+00 | 81' RT | -L- | 3.7 - 5.2 | A-2-4 (0) | 25 | NP | 48 | 29 | 15 | 8 | 96 | 65 | 49 | 23 | ND | ND |

ROCK TEST RESULTS

| SAMPLE NO. | STATION | OFFSET | LINE | DEPTH INTERVAL | ROCK | UNIT WEIGHT (pcf) | STRENGTH (psf) | % MOISTURE |
|------------|---------|--------|------|----------------|--------|-------------------|----------------|------------|
| RS-1 | 14+00 | 19' LT | -L- | 4.0 - 5.0 | GNEISS | 168.0 | 6131 | 0.09 |
| RS-2 | 14+12 | 81' RT | -L- | 43.5 - 44.3 | GNEISS | 168.5 | 6646 | 0.07 |

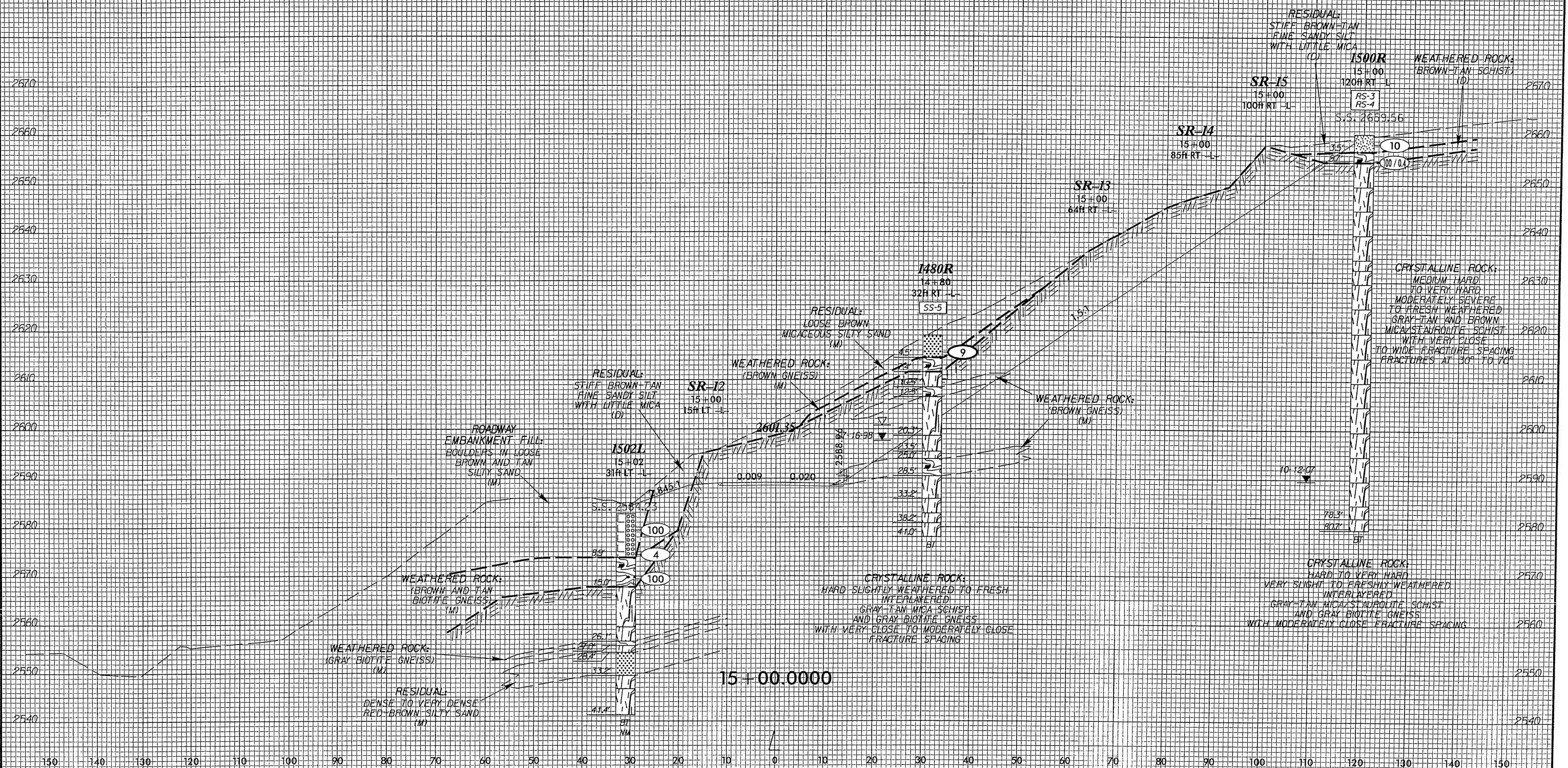


SOIL TEST RESULTS

| SAMPLE NO. | STATION | OFFSET | LINE | DEPTH INTERVAL | AASHTO CLASS. | LL | PI | % PASSING SIEVES (SOIL MORTAR) | | | | % PASSING SIEVES | | | | % MOL. | % ORG. |
|------------|---------|--------|------|----------------|---------------|----|----|--------------------------------|---------|------|------|------------------|----|----|-----|--------|--------|
| | | | | | | | | C. SAND | F. SAND | SILT | CLAY | 10 | 40 | 60 | 200 | | |
| SS-5 | 14+80 | 32' RT | -L- | 2.4 - 3.9 | A-2-4 (U) | 32 | NP | 33 | 48 | 7 | 12 | ND | ND | ND | 24 | ND | ND |

ROCK TEST RESULTS

| SAMPLE NO. | STATION | OFFSET | LINE | DEPTH INTERVAL | ROCK | UNIT WEIGHT (pcf) | STRENGTH (psi) | % MOISTURE |
|------------|---------|---------|------|----------------|-------|-------------------|----------------|------------|
| RS-3 | 15+00 | 120' RT | -L- | 21.3 - 22.1 | SCHST | 186.8 | 2646 | 0.41 |
| RS-4 | 15+00 | 120' RT | -L- | 49.3 - 50.8 | SCHST | 185.7 | 3305 | 0.07 |





| PROJECT NO. 32579.1.1 | | ID. B-1037 | | COUNTY Ashe | | GEOLOGIST A. RIGGS | | | | | | | | | |
|--|---------------|-----------------------------|---------|-------------------------|----------------|-----------------------|-------------------|----|----|--------------|-------------|---------------------------|--|---------|------|
| SITE DESCRIPTION Roadway Approaches to Bridge No. 39 Over South Fork New River on US 221 | | | | | | | GROUND WATER (ft) | | | | | | | | |
| BORING NO. 1000R | | BORING LOCATION 10+00 | | OFFSET 12.0 ft RT | | ALIGNMENT -L- | 0 HR. Dry | | | | | | | | |
| COLLAR ELEV. 2,612.6 ft | | NORTHING 999,230.1 | | EASTING 1,312,355.1 | | | 24 HR. N/M | | | | | | | | |
| TOTAL DEPTH 6.1 ft | | DRILL MACHINE Diedrich D-50 | | DRILL METHOD 2-1/4" HSA | | HAMMER TYPE AUTOMATIC | | | | | | | | | |
| DATE STARTED 10/16/07 | | COMPLETED 10/16/07 | | SURFACE WATER DEPTH N/A | | | | | | | | | | | |
| ELEV. (ft) | DEPTH (ft) | BLOW COUNT | | | BLOWS PER FOOT | | | | | SAMP. NO. | L O G | SOIL AND ROCK DESCRIPTION | | | |
| | | 0.5ft | 0.5ft | 0.5ft | 0 | 20 | 40 | 60 | 80 | | | | 100 | | |
| 2,612.6 | | | | | | | | | | | | | GROUND SURFACE | 2,612.6 | 0.00 |
| 2,611.6 | 1.0 | | | | | | | | | | | | ROADWAY EMBANKMENT FILL: SOFT RED-BROWN FINE TO COARSE SANDY CLAYEY SILT (A-4) WITH TRACE OF MICA | 2,609.1 | 3.5 |
| 2,608.5 | 4.1 | 3 | 2 | 1 | | | | | | | | | RESIDUAL: VERY STIFF BROWN FINE SANDY SILT (A-4) WITH TRACE OF MICA | 2,608.0 | 4.6 |
| 2,606.6 | 6.0 | 10 | 100/0.4 | | | | | | | | | | WEATHERED ROCK: (BROWN BIOTITE GNEISS) | 2,606.5 | 6.1 |
| | | 60/0.1 | | | | | | | | | | | BORING TERMINATED WITH STANDARD PENETRATION TEST REFUSAL AT ELEV. 2606.5 FEET ON CRYSTALLINE ROCK: HARD GRAY BIOTITE GNEISS. | | |

NCDOT BORE SINGLE 07-419.GPJ NCDOT.GDT 11/7/07



| PROJECT NO. 32579.1.1 | | ID. B-1037 | | COUNTY Ashe | | GEOLOGIST A. RIGGS | | | | | | | | | |
|--|---------------|-----------------------------|-------|-------------------------|----------------|-----------------------|-------------------|----|----|--------------|-------------|---------------------------|---|---------|------|
| SITE DESCRIPTION Roadway Approaches to Bridge No. 39 Over South Fork New River on US 221 | | | | | | | GROUND WATER (ft) | | | | | | | | |
| BORING NO. 1150R | | BORING LOCATION 11+50 | | OFFSET 12.0 ft RT | | ALIGNMENT -L- | 0 HR. Dry | | | | | | | | |
| COLLAR ELEV. 2,603.0 ft | | NORTHING 999,363.4 | | EASTING 1,312,421.0 | | | 24 HR. N/M | | | | | | | | |
| TOTAL DEPTH 10.2 ft | | DRILL MACHINE Diedrich D-50 | | DRILL METHOD 2-1/4" HSA | | HAMMER TYPE AUTOMATIC | | | | | | | | | |
| DATE STARTED 10/16/07 | | COMPLETED 10/16/07 | | SURFACE WATER DEPTH N/A | | | | | | | | | | | |
| ELEV. (ft) | DEPTH (ft) | BLOW COUNT | | | BLOWS PER FOOT | | | | | SAMP. NO. | L O G | SOIL AND ROCK DESCRIPTION | | | |
| | | 0.5ft | 0.5ft | 0.5ft | 0 | 20 | 40 | 60 | 80 | | | | 100 | | |
| 2,603.0 | | | | | | | | | | | | | GROUND SURFACE | 2,603.0 | 0.00 |
| 2,602.0 | 1.0 | | | | | | | | | | | | ROADWAY EMBANKMENT FILL: SOFT BROWN FINE SANDY SILT (A-4) WITH LITTLE MICA | 2,599.2 | 3.8 |
| 2,599.2 | 3.8 | 3 | 1 | 2 | | | | | | | | | ROADWAY EMBANKMENT FILL: VERY LOOSE BROWN CLAYEY SILTY COARSE TO FINE SAND (A-2-4) WITH LITTLE MICA | 2,595.0 | 8.0 |
| 2,596.7 | 6.3 | 2 | 1 | 1 | | | | | | | | | RESIDUAL: VERY STIFF TO HARD GRAY FINE SANDY SILT (A-4) WITH LITTLE MICA | 2,593.2 | 9.8 |
| 2,594.2 | 8.8 | 7 | 45 | 55/0.4 | | | | | | | | | WEATHERED ROCK: (GRAY BIOTITE GNEISS) | 2,592.8 | 10.2 |
| | | | | | | | | | | | | | BORING TERMINATED AT ELEV. 2592.8 FEET IN WEATHERED ROCK: (GRAY BIOTITE GNEISS). | | |

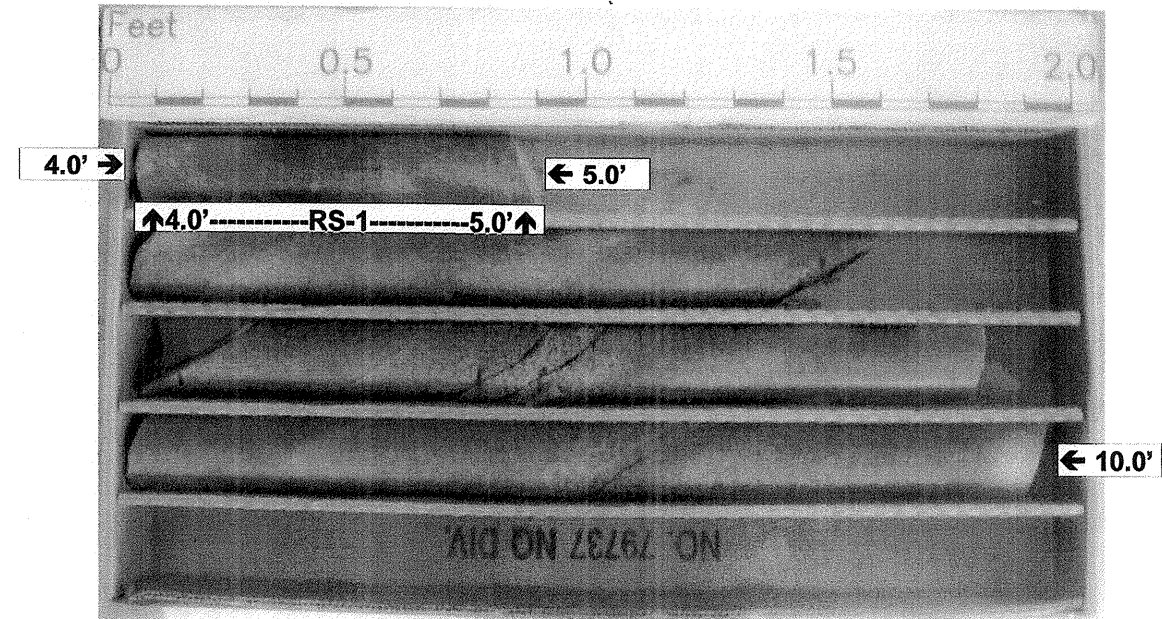
NCDOT BORE SINGLE 07-419.GPJ NCDOT.GDT 11/7/07

| PROJECT NO. 32579.1.1 | | ID. B-1037 | | COUNTY Ashe | | GEOLOGIST A. RIGGS | | | | |
|--|------------|-----------------------------|---------------------|---|---------|-----------------------|-----------------|---------|-----|---|
| SITE DESCRIPTION Roadway Approaches to Bridge No. 39 Over South Fork New River on US 221 | | | | | | GROUND WATER (ft) | | | | |
| BORING NO. 1400L | | BORING LOCATION 14+00 | | OFFSET 19.0 ft LT | | ALIGNMENT -L- | | | | |
| COLLAR ELEV. 2,587.6 ft | | NORTHING 999,496.6 | | EASTING 1,312,624.2 | | 0 HR. N/A | | | | |
| TOTAL DEPTH 10.0 ft | | DRILL MACHINE Diedrich D-50 | | DRILL METHOD 2-1/4" HSA, Wash Boring w/NQ-2 Core Barrel | | HAMMER TYPE AUTOMATIC | | | | |
| DATE STARTED 10/10/07 | | COMPLETED 10/10/07 | | SURFACE WATER DEPTH N/A | | | | | | |
| CORE SIZE NQ-2 | | TOTAL RUN 6.0 ft | | DRILLER J.MILLWOOD | | | | | | |
| ELEV. (ft) | DEPTH (ft) | RUN (ft) | DRILL RATE (Min/ft) | REC. (%) | RQD (%) | SAMP. NO. | STRATA REC. (%) | RQD (%) | LOG | DESCRIPTION AND REMARKS |
| | | | | | | | | | | 2,583.6 Begin Coring @ 4.0 ft 4.0 |
| 2,583.6 | 4.0 | 1.0 | 1:50 | (0.9) | (0.9) | RS-1 | (5.8) | (5.7) | | <p>CRYSTALLINE ROCK: HARD TO VERY HARD VERY SLIGHT TO FRESH WEATHERED GRAY BIOTITE GNEISS WITH VERY CLOSE TO MODERATELY CLOSE FRACTURE SPACING-3 FRACTURES @ 50°-60° -ROCK SAMPLE RS-1 4.0-5.0'</p> <p>BORING TERMINATED AT ELEV. 2577.6 FEET IN CRYSTALLINE ROCK: VERY HARD GRAY BIOTITE GNEISS</p> |
| | | 5.0 | 2:20 | 90% | 90% | | | | | |
| 2,582.6 | 5.0 | | 1:30 | (4.9) | (4.8) | | | | | |
| | | | 1:50 | 98% | 96% | | | | | |
| 2,577.6 | 10.0 | | 2:10 | | | | | | | 2,577.6 10.0 |
| | | | 2:00 | | | | | | | |

NCDOT CORE SINGLE 07-419.GPJ NCDOT.GDT 11/15/07

CORE PHOTOS

| | | | |
|--|-----------------------|--------------------------|----------------------|
| WBS No: 32579.1.1 | Project No: B-1037 | County: Ashe | Boring No.: 1400L |
| Site Description: Rdwy. Approaches Bridge No. 39 over South Fork New River on US 221 | | | Driller: J. Millwood |
| Collar Elev.: 2587.6 ft. | Core Size: NQ-2 | Equipment: Diedrich D-50 | Geologist: A. Riggs |
| Elev. at T.D.: 2577.6 ft. | Total Depth: 10.0 ft. | Total Run: 6.0 ft. | Date: 10/10/2007 |



Box 1 of 1
Top of Box @ 4.0 feet; Bottom of Box @ 10.0 feet

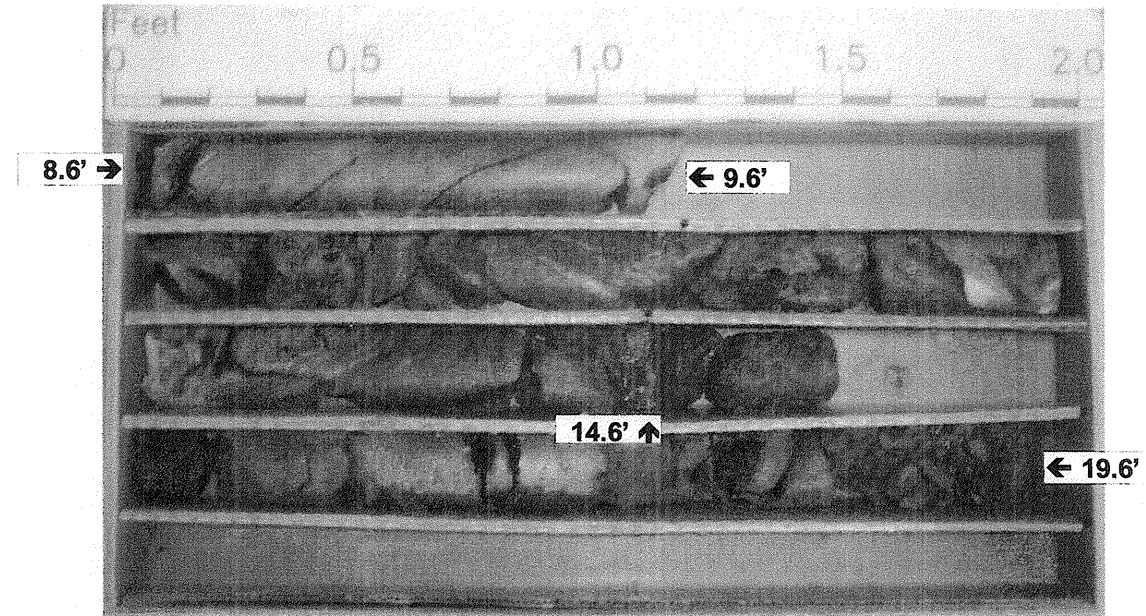
| | | | |
|--|-----------------------------|---|--------------------|
| PROJECT NO. 32579.1.1 | ID. B-1037 | COUNTY Ashe | GEOLOGIST A. RIGGS |
| SITE DESCRIPTION Roadway Approaches to Bridge No. 39 Over South Fork New River on US 221 | | | GROUND WATER (ft) |
| BORING NO. 1412RT | BORING LOCATION 14+12 | OFFSET 81.0 ft RT | ALIGNMENT -L- |
| COLLAR ELEV. 2,633.4 ft | NORTHING 999,396.1 | EASTING 1,312,625.2 | 0 HR. N/A |
| TOTAL DEPTH 54.6 ft | DRILL MACHINE Diedrich D-50 | DRILL METHOD 2-1/4" HSA, Wash Boring w/NQ-2 Core Barrel | 24 HR. N/M |
| DATE STARTED 10/12/07 | COMPLETED 10/15/07 | SURFACE WATER DEPTH N/A | |
| CORE SIZE NQ-2 | TOTAL RUN 46.0 ft | DRILLER J.MILLWOOD | |

| ELEV. (ft) | DEPTH (ft) | RUN (ft) | DRILL RATE (Min/ft) | REC. (%) | RQD (%) | SAMP. NO. | STRATA REC. (%) | RQD (%) | LOG | DESCRIPTION AND REMARKS |
|------------|------------|----------|---------------------|----------|---------|-----------|-----------------|---------|-----|--|
| | | | | | | | | | | Continued from previous page |
| | | | | | | | | | | 5 FRACTURES @ 40°, 1 FRACTURE @ 50° (38.6) |
| | | | | | | | | | | CRYSTALLINE ROCK SOFT TO MEDIUM HARD MODERATELY SEVERE WEATHERED BROWN MICA GNEISS WITH VERY CLOSE FRACTURE SPACING 3 FRACTURES @ 40°-50° (39.6) |
| | | | | | | | | | | CRYSTALLINE ROCK SOFT TO MEDIUM HARD MODERATELY SEVERE WEATHERED BROWN MICA GNEISS WITH VERY CLOSE FRACTURE SPACING 1 FRACTURE @ 40° (40.5) |
| | | | | | | | | | | CRYSTALLINE ROCK HARD TO VERY HARD VERY SLIGHT TO FRESH WEATHERED GRAY BIOTITE GNEISS WITH MODERATELY WIDE TO WIDE FRACTURE SPACING NO FRACTURES ROCK SAMPLE RS-2 - 43.5-44.3 (44.6) |
| | | | | | | | | | | CRYSTALLINE ROCK HARD TO VERY HARD FRESH GRAY BIOTITE GNEISS WITH WIDE FRACTURE SPACING-NO FRACTURES (49.6) |
| | | | | | | | | | | CRYSTALLINE ROCK HARD TO VERY HARD FRESH TO VERY SLIGHTLY WEATHERED GRAY BIOTITE GNEISS WITH WIDE TO CLOSE FRACTURE SPACING 2 FRACTURES @ 20° QUARTZ VEIN @ 52.9 FEET TO 53.1 FEET. (54.6) |
| | | | | | | | | | | BORING TERMINATED AT ELEV. 2578.8 FEET IN CRYSTALLINE ROCK: HARD GRAY BIOTITE GNEISS. |

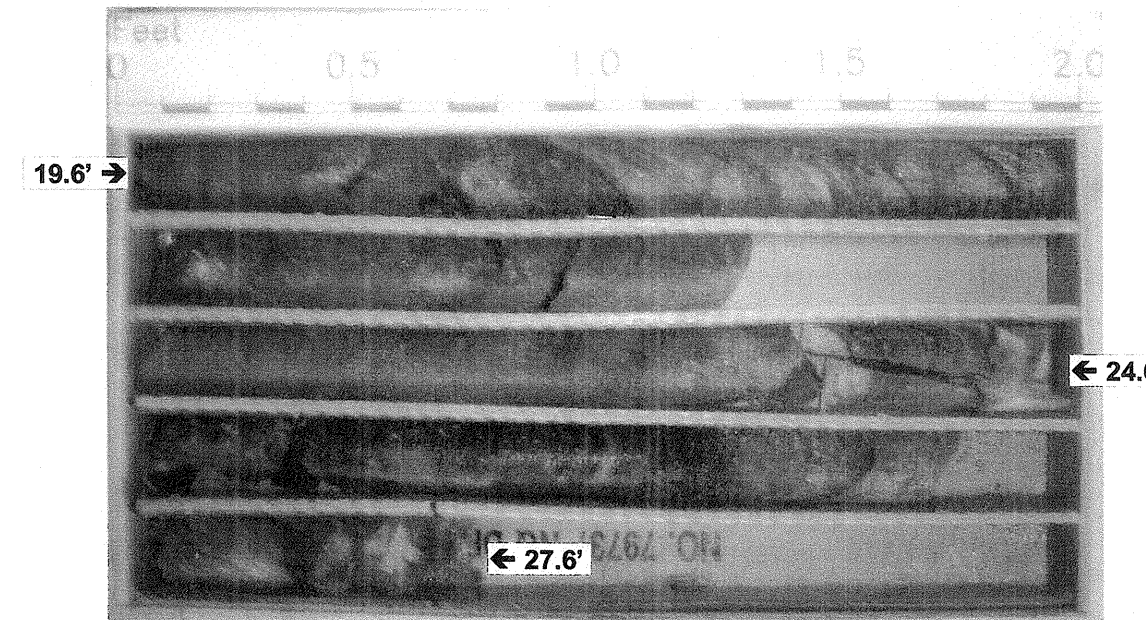
NCDOT CORE SINGLE 07-419.GPJ NCDOT.GDT 11/16/07

CORE PHOTOS

| | | | |
|--|-----------------------|--------------------------|----------------------|
| WBS No: 32579.1.1 | Project No: B-1037 | County: Ashe | Boring No.: 1412R |
| Site Description: Rdwy. Approaches Bridge No. 39 over South Fork New River on US 221 | | | Driller: J. Millwood |
| Collar Elev.: 2633.4 ft. | Core Size: NQ-2 | Equipment: Diedrich D-50 | Geologist: A. Riggs |
| Elev. at T.D.: 2578.8 ft. | Total Depth: 54.6 ft. | Total Run: 46.0 ft. | Date: 10/15/2007 |



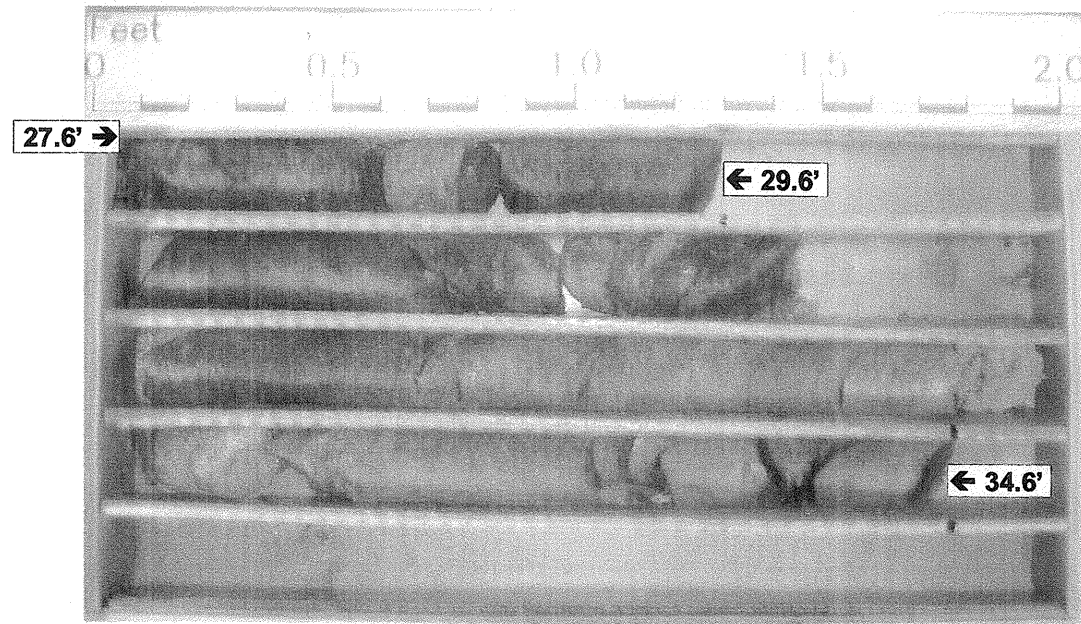
Box 1 of 6
Top of Box @ 8.6 feet; Bottom of Box @ 19.6 feet



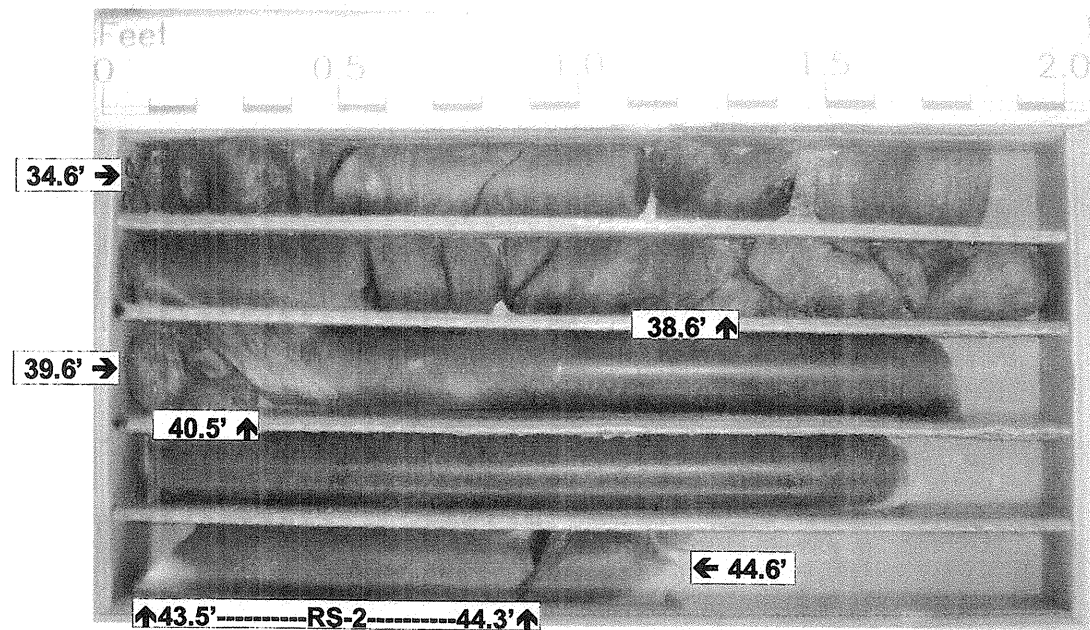
Box 2 of 6
Top of Box @ 19.6 feet; Bottom of Box @ 27.6 feet

CORE PHOTOS

| | | | |
|--|-----------------------|--------------------------|---------------------|
| WBS No: 32579.1.1 | Project No: B-1037 | County: Ashe | Boring No.: 1412R |
| Site Description: Rdwy. Approaches Bridge No. 39 over South Fork New River on US 221 | | Driller: J. Millwood | |
| Collar Elev.: 2633.4 ft. | Core Size: NQ-2 | Equipment: Diedrich D-50 | Geologist: A. Riggs |
| Elev. at T.D.: 2578.8 ft. | Total Depth: 54.6 ft. | Total Run: 46.0 ft. | Date: 10/15/2007 |



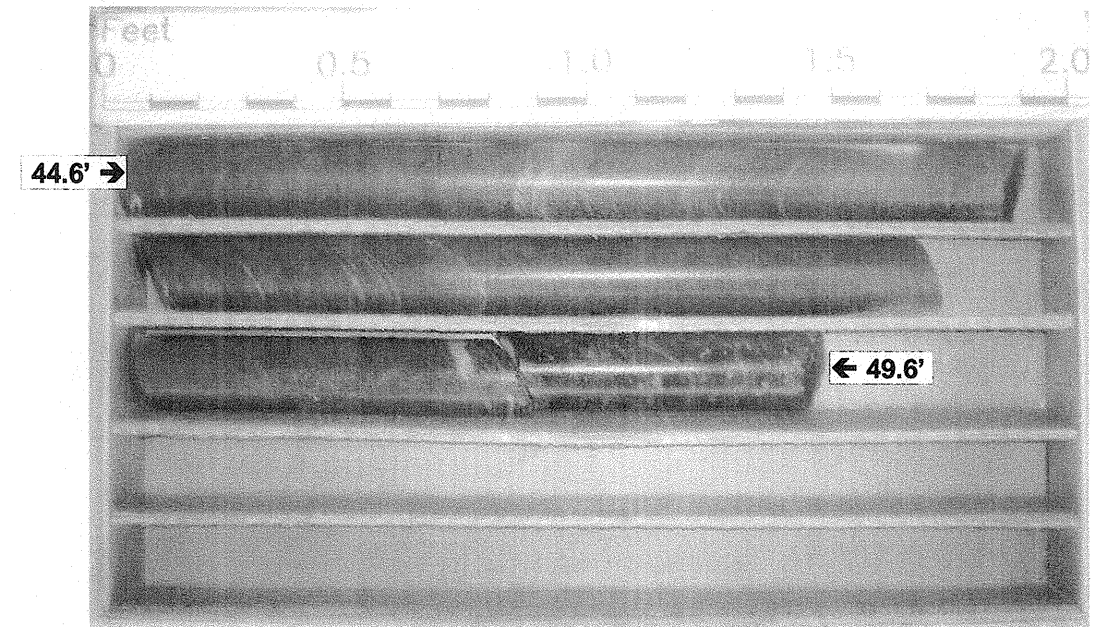
Box 3 of 6
Top of Box @ 27.6 feet; Bottom of Box @ 34.6 feet



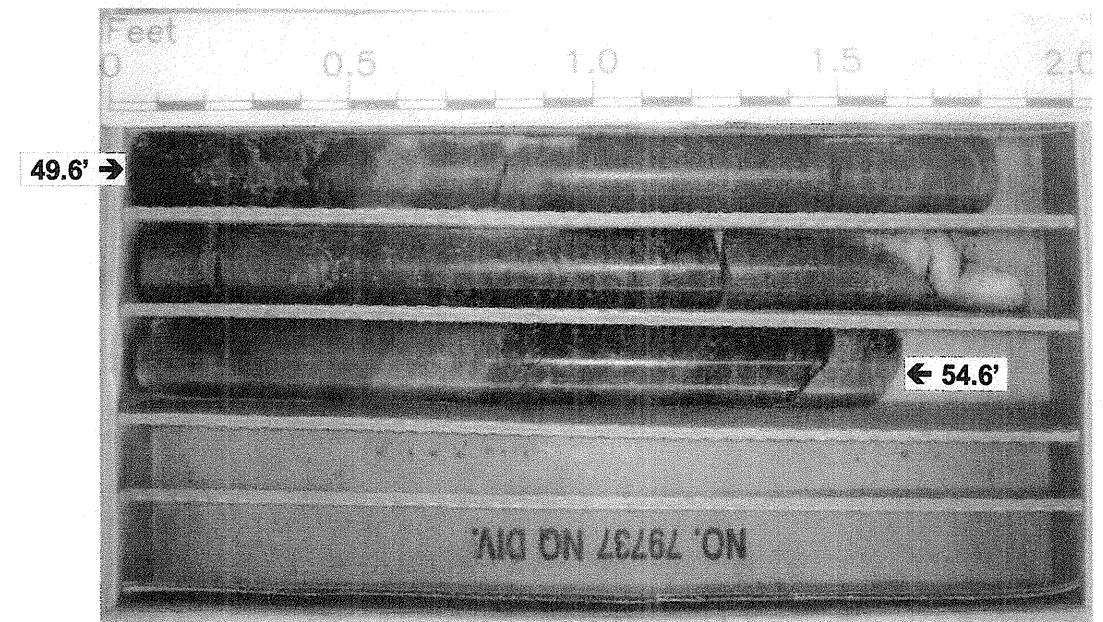
Box 4 of 6
Top of Box @ 34.6 feet; Bottom of Box @ 44.6 feet

CORE PHOTOS

| | | | |
|--|-----------------------|--------------------------|---------------------|
| WBS No: 32579.1.1 | Project No: B-1037 | County: Ashe | Boring No.: 1412R |
| Site Description: Rdwy. Approaches Bridge No. 39 over South Fork New River on US 221 | | Driller: J. Millwood | |
| Collar Elev.: 2633.4 ft. | Core Size: NQ-2 | Equipment: Diedrich D-50 | Geologist: A. Riggs |
| Elev. at T.D.: 2578.8 ft. | Total Depth: 54.6 ft. | Total Run: 46.0 ft. | Date: 10/15/2007 |



Box 5 of 6
Top of Box @ 44.6 feet; Bottom of Box @ 49.6 feet



Box 6 of 6
Top of Box @ 49.6 feet; Bottom of Box @ 54.6 feet



| PROJECT NO. 32579.1.1 | | ID. B-1037 | | COUNTY Ashe | | GEOLOGIST A. RIGGS | |
|--|------------|-----------------------------|--|---|---------------|-----------------------|---|
| SITE DESCRIPTION Roadway Approaches to Bridge No. 39 Over South Fork New River on US 221 | | | | | | GROUND WATER (ft) | |
| BORING NO. 1500RT | | BORING LOCATION 15+00 | | OFFSET 120.0 ft RT | | ALIGNMENT -L- | |
| COLLAR ELEV. 2,660.3 ft | | NORTHING 999,346.9 | | EASTING 1,312,708.0 | | 0 HR. N/A | |
| TOTAL DEPTH 80.7 ft | | DRILL MACHINE Diedrich D-50 | | DRILL METHOD 2-1/4" HSA, Wash Boring w/NQ-2 Core Barrel | | HAMMER TYPE AUTOMATIC | |
| DATE STARTED 10/10/07 | | COMPLETED 10/11/07 | | SURFACE WATER DEPTH N/A | | | |
| CORE SIZE NQ-2 | | TOTAL RUN 75.0 ft | | DRILLER J.MILLWOOD | | | |
| ELEV. (ft) | DEPTH (ft) | RUN (ft) | DRILL RATE (Min/ft) | REC. (%) | RQD (%) | SAMP. NO. | DESCRIPTION AND REMARKS |
| | | | | | | | 2,654.6 Begin Coring @ 5.7 ft 5.7 |
| 2,654.6 | 5.7 | 5.0 | 2:10 1:40 1:20 1:20 1:30 | (4.8) 96% | (4.4) 88% | | CRYSTALLINE ROCK HARD SLIGHT TO VERY SLIGHTLY WEATHERED GRAY-BROWN MICA/STAUROLITE SCHIST WITH VERY CLOSE TO MODERATELY CLOSE FRACTURE SPACING-5 FRACTURES @ 60°-70° 10.7 |
| 2,849.6 | 10.7 | 5.0 | 1:10 1:10 1:10 1:10 | (5.0) 100% | (4.6) 92% | | CRYSTALLINE ROCK HARD SLIGHT TO VERY SLIGHTLY WEATHERED GRAY-BROWN MICA/STAUROLITE SCHIST WITH CLOSE TO MODERATELY CLOSE FRACTURE SPACING-4 FRACTURES @ 60°-70°, 1 FRACTURE @ 50°-60° 15.7 |
| 2,644.6 | 15.7 | 5.0 | 1:05 1:30 1:15 1:15 1:30 | (3.8) 76% | (3.0) 60% | | CRYSTALLINE ROCK HARD SLIGHT TO VERY SLIGHTLY WEATHERED GRAY-BROWN MICA/STAUROLITE SCHIST WITH CLOSE TO MODERATELY CLOSE FRACTURE SPACING COMPLETELY WEATHERED SOIL SEAMS BETWEEN THE DEPTHS OF 17.0 TO 17.6 FEET AND 18.2 TO 18.8 FEET-2 FRACTURES @ 60° 20.7 |
| 2,639.6 | 20.7 | 5.0 | 1:40 1:30 1:35 1:30 | (5.0) 100% | (5.0) 100% | RS-3 | CRYSTALLINE ROCK HARD MODERATE TO VERY SLIGHTLY WEATHERED GRAY-BROWN MICA/STAUROLITE SCHIST WITH CLOSE TO MODERATELY CLOSE FRACTURE SPACING-3 FRACTURES @ 50°-60°-ROCK SAMPLE RS-3 21.3'-22.1' (25.7) |
| 2,634.6 | 25.7 | 5.0 | 1:30 1:40 1:30 1:40 | (3.4) 68% | (2.5) 50% | | CRYSTALLINE ROCK HARD TO VERY HARD VERY SLIGHT TO FRESHLY WEATHERED GRAY-TAN MICA/STAUROLITE SCHIST WITH CLOSE TO MODERATELY CLOSE FRACTURE SPACING-2 FRACTURES @ 40°-50° (27.8) |
| 2,629.6 | 30.7 | 5.0 | 1:30 1:30 0:40 1:10 1:30 | (4.7) 94% | (4.7) 94% | (68.0) 94% | CRYSTALLINE ROCK HARD TO VERY HARD VERY SLIGHT TO FRESHLY WEATHERED GRAY AND TAN MICA/STAUROLITE SCHIST WITH CLOSE TO MODERATELY CLOSE FRACTURE SPACING-1 FRACTURE @ 70°, 1 FRACTURE @ 50° (78.3) |
| 2,624.6 | 35.7 | 5.0 | 1:40 1:25 1:30 1:25 1:30 | (4.9) 98% | (4.9) 98% | (64.5) 89% | CRYSTALLINE ROCK HARD TO VERY HARD VERY SLIGHT TO FRESHLY WEATHERED GRAY AND TAN MICA/STAUROLITE SCHIST INTERLAYERED WITH GRAY BIOTITE GNEISS, MODERATELY CLOSE FRACTURE SPACING-1 FRACTURE @ 50° (continued) (80.7) |
| 2,619.6 | 40.7 | 5.0 | 1:40 1:30 1:40 1:35 1:35 | (4.7) 94% | (4.6) 92% | | CRYSTALLINE ROCK HARD TO VERY HARD VERY SLIGHT TO FRESHLY WEATHERED GRAY-TAN MICA/STAUROLITE SCHIST WITH CLOSE TO MODERATELY CLOSE FRACTURE SPACING-1 FRACTURE @ 40°, 1 FRACTURE @ 60° (35.7) |
| 2,614.6 | 45.7 | 5.0 | 1:20 1:00 1:20 2:00 3:00 | (5.0) 100% | (5.0) 100% | | CRYSTALLINE ROCK HARD TO VERY HARD VERY SLIGHT TO FRESHLY WEATHERED GRAY-TAN MICA/STAUROLITE SCHIST WITH CLOSE TO MODERATELY WIDE FRACTURE SPACING-2 FRACTURES @ 30°-40° (45.7) |
| 2,609.6 | 50.7 | 5.0 | 1:35 1:20 1:35 1:10 1:50 | (5.0) 100% | (5.0) 100% | RS-4 | CRYSTALLINE ROCK HARD TO VERY HARD VERY SLIGHT TO FRESHLY WEATHERED GRAY-TAN MICA/STAUROLITE SCHIST WITH WIDE FRACTURE SPACING-NO FRACTURES (40.7) |
| 2,604.6 | 55.7 | 5.0 | 1:10 1:20 1:20 1:30 1:20 | (4.9) 98% | (4.9) 98% | | CRYSTALLINE ROCK HARD TO VERY HARD VERY SLIGHT TO FRESHLY WEATHERED GRAY-TAN MICA/STAUROLITE SCHIST WITH WIDE FRACTURE SPACING-NO FRACTURES-ROCK SAMPLE RS-4 49.3-50.3' (50.7) |
| 2,599.6 | 60.7 | 5.0 | 1:30 1:20 1:20 1:35 1:40 | (5.0) 100% | (5.0) 100% | | CRYSTALLINE ROCK HARD TO VERY HARD VERY SLIGHT TO FRESHLY WEATHERED GRAY-TAN MICA/STAUROLITE SCHIST WITH WIDE FRACTURE SPACING-NO FRACTURES (55.7) |
| 2,594.6 | 65.7 | 5.0 | 1:00 1:15 1:20 1:25 1:40 | (4.6) 92% | (4.1) 82% | | CRYSTALLINE ROCK HARD TO VERY HARD VERY SLIGHT TO FRESHLY WEATHERED GRAY-TAN MICA/STAUROLITE SCHIST WITH WIDE FRACTURE SPACING NO FRACTURES (60.7) |
| 2,589.6 | 70.7 | 5.0 | 1:15 1:15 1:25 1:40 1:10 1:15 1:10 | (4.7) 94% | (4.6) 92% | | CRYSTALLINE ROCK HARD TO VERY HARD VERY SLIGHT TO FRESHLY WEATHERED GRAY, BLACK AND TAN MICA/STAUROLITE SCHIST WITH WIDE FRACTURE SPACING (60.7) |
| 2,584.6 | 75.7 | 5.0 | 1:15 1:10 1:15 1:10 | (4.9) 98% | (4.6) 92% | | |
| 2,579.6 | 80.7 | | 1:30 1:35 | (2.4) 100% | (2.4) 100% | | |

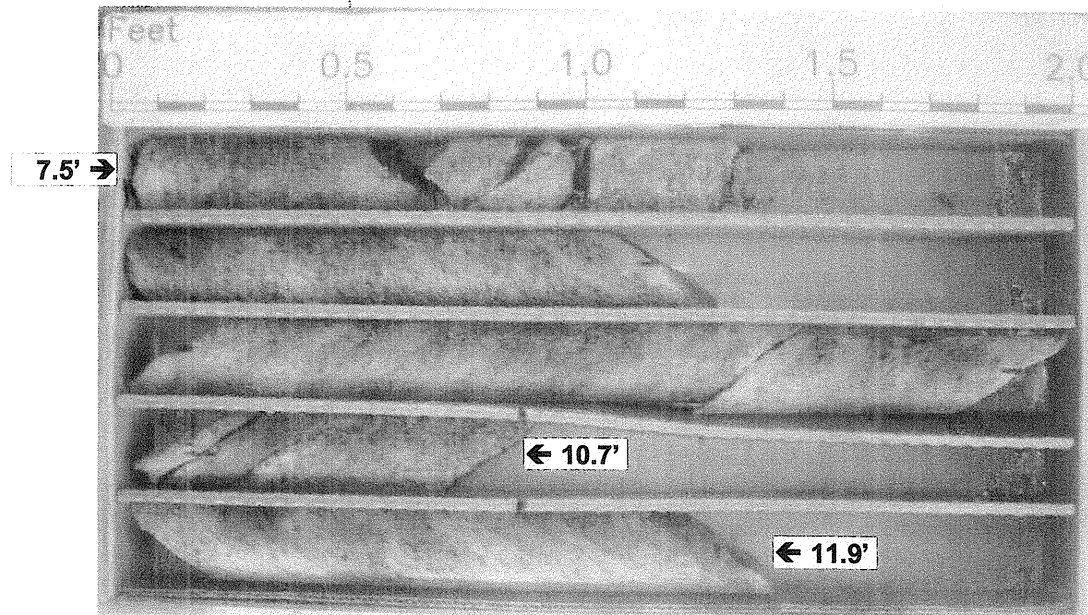
| PROJECT NO. 32579.1.1 | | ID. B-1037 | | COUNTY Ashe | | GEOLOGIST A. RIGGS | |
|--|------------|-----------------------------|--|---|---------|-----------------------|---|
| SITE DESCRIPTION Roadway Approaches to Bridge No. 39 Over South Fork New River on US 221 | | | | | | GROUND WATER (ft) | |
| BORING NO. 1500RT | | BORING LOCATION 15+00 | | OFFSET 120.0 ft RT | | ALIGNMENT -L- | |
| COLLAR ELEV. 2,660.3 ft | | NORTHING 999,346.9 | | EASTING 1,312,708.0 | | 0 HR. N/A | |
| TOTAL DEPTH 80.7 ft | | DRILL MACHINE Diedrich D-50 | | DRILL METHOD 2-1/4" HSA, Wash Boring w/NQ-2 Core Barrel | | HAMMER TYPE AUTOMATIC | |
| DATE STARTED 10/10/07 | | COMPLETED 10/11/07 | | SURFACE WATER DEPTH N/A | | | |
| CORE SIZE NQ-2 | | TOTAL RUN 75.0 ft | | DRILLER J.MILLWOOD | | | |
| ELEV. (ft) | DEPTH (ft) | RUN (ft) | DRILL RATE (Min/ft) | REC. (%) | RQD (%) | SAMP. NO. | DESCRIPTION AND REMARKS |
| | | | | | | | Continued from previous page |
| | | | 1:40 1:45 1:40 1:10 1:40 1:30 1:45 | | | | CRYSTALLINE ROCK HARD TO VERY HARD VERY SLIGHT TO FRESHLY WEATHERED GRAY, BLACK AND TAN MICA/STAUROLITE SCHIST WITH CLOSE TO MODERATELY CLOSE FRACTURE SPACING 1 FRACTURE @ 60°, 1 FRACTURE @ 40° (65.7) |
| | | | | | | | CRYSTALLINE ROCK HARD TO VERY HARD VERY SLIGHT TO FRESHLY WEATHERED GRAY AND TAN MICA/STAUROLITE SCHIST WITH VERY CLOSE TO MODERATELY CLOSE FRACTURE SPACING, MODERATELY HARD MODERATELY WEATHERED SEAM BETWEEN 68.6 TO 69.5 FEET-3 FRACTURES @ 30°-40° (70.7) |
| | | | | | | | CRYSTALLINE ROCK HARD TO VERY HARD VERY SLIGHT TO FRESHLY WEATHERED GRAY AND TAN MICA/STAUROLITE SCHIST WITH CLOSE TO WIDE FRACTURE SPACING 1 FRACTURE @ 50° (75.7) |
| | | | | | | | CRYSTALLINE ROCK HARD TO VERY HARD VERY SLIGHT TO FRESHLY WEATHERED GRAY AND TAN MICA/STAUROLITE SCHIST WITH CLOSE TO WIDE FRACTURE SPACING-1 FRACTURE @ 70°, 1 FRACTURE @ 50° (78.3) |
| | | | | | | | CRYSTALLINE ROCK HARD TO VERY HARD VERY SLIGHT TO FRESHLY WEATHERED GRAY AND TAN MICA/STAUROLITE SCHIST INTERLAYERED WITH GRAY BIOTITE GNEISS, MODERATELY CLOSE FRACTURE SPACING-1 FRACTURE @ 50° (continued) (80.7) |
| | | | | | | | BORING TERMINATED AT ELEV. 2579.6 FEET IN CRYSTALLINE ROCK: VERY HARD GRAY BIOTITE GNEISS. |

NCDOT CORE SINGLE 07-419.GPJ NCDOT.GDT 11/15/07

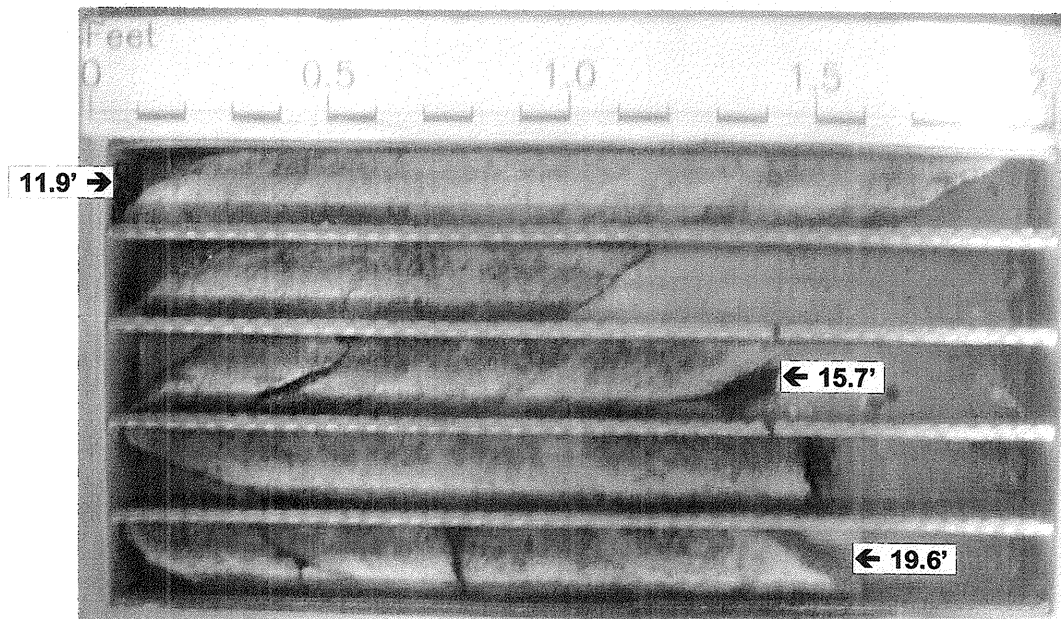
NCDOT CORE SINGLE 07-419.GPJ NCDOT.GDT 11/15/07

CORE PHOTOS

| | | | |
|--|-----------------------|--------------------------|---------------------|
| WBS No: 32579.1.1 | Project No: B-1037 | County: Ashe | Boring No.: 1500R |
| Site Description: Rdwy. Approaches Bridge No. 39 over South Fork New River on US 221 | | Driller: J. Millwood | |
| Collar Elev.: 2660.3 ft. | Core Size: NQ-2 | Equipment: Diedrich D-50 | Geologist: A. Riggs |
| Elev. at T.D.: 2579.6 ft. | Total Depth: 80.7 ft. | Total Run: 75.0 ft. | Date: 10/11/2007 |



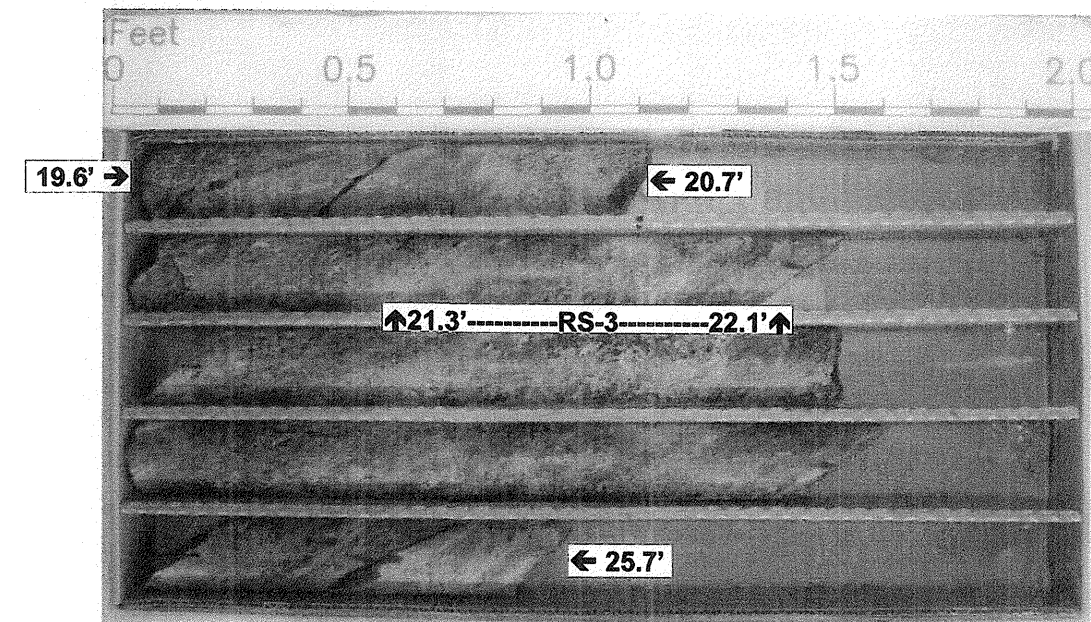
Box 1 of 10
Top of Box @ 7.5 feet; Bottom of Box @ 11.9 feet



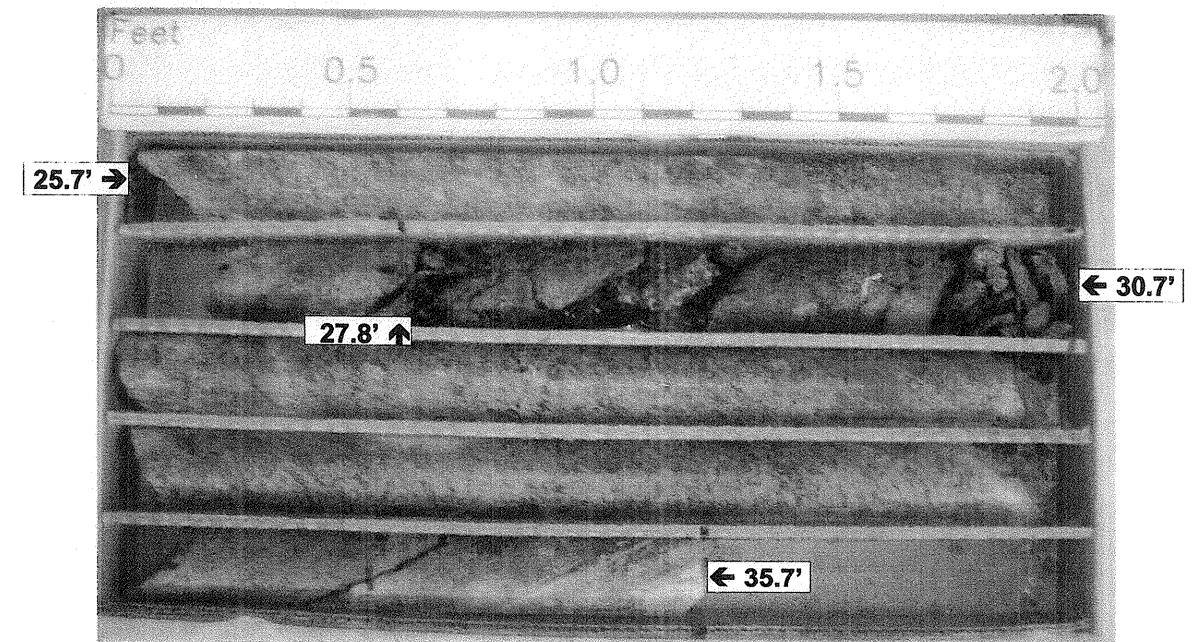
Box 2 of 10
Top of Box @ 11.9 feet; Bottom of Box @ 19.6 feet

CORE PHOTOS

| | | | |
|--|-----------------------|--------------------------|---------------------|
| WBS No: 32579.1.1 | Project No: B-1037 | County: Ashe | Boring No.: 1500R |
| Site Description: Rdwy. Approaches Bridge No. 39 over South Fork New River on US 221 | | Driller: J. Millwood | |
| Collar Elev.: 2660.3 ft. | Core Size: NQ-2 | Equipment: Diedrich D-50 | Geologist: A. Riggs |
| Elev. at T.D.: 2579.6 ft. | Total Depth: 80.7 ft. | Total Run: 75.0 ft. | Date: 10/11/2007 |



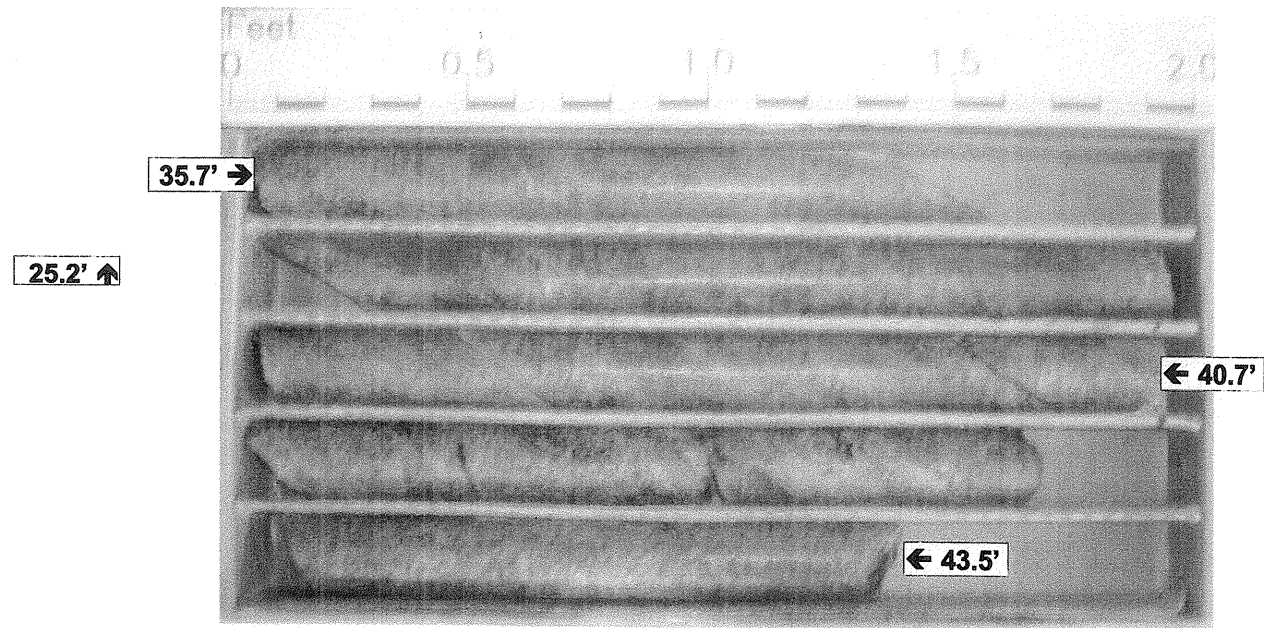
Box 3 of 10
Top of Box @ 19.6 feet; Bottom of Box @ 25.7 feet



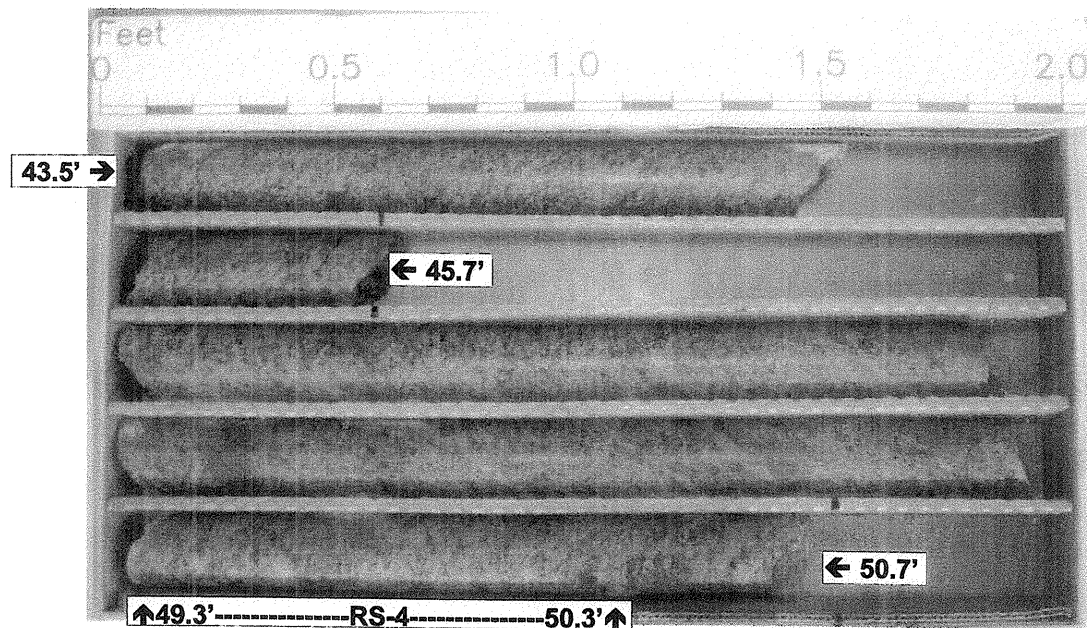
Box 4 of 10
Top of Box @ 25.7 feet; Bottom of Box @ 35.7 feet

CORE PHOTOS

| | | | |
|--|-----------------------|--------------------------|---------------------|
| WBS No: 32579.1.1 | Project No: B-1037 | County: Ashe | Boring No.: 1500R |
| Site Description: Rdwy. Approaches Bridge No. 39 over South Fork New River on US 221 | | Driller: J. Millwood | |
| Collar Elev.: 2660.3 ft. | Core Size: NQ-2 | Equipment: Diedrich D-50 | Geologist: A. Riggs |
| Elev. at T.D.: 2579.6 ft. | Total Depth: 80.7 ft. | Total Run: 75.0 ft. | Date: 10/11/2007 |



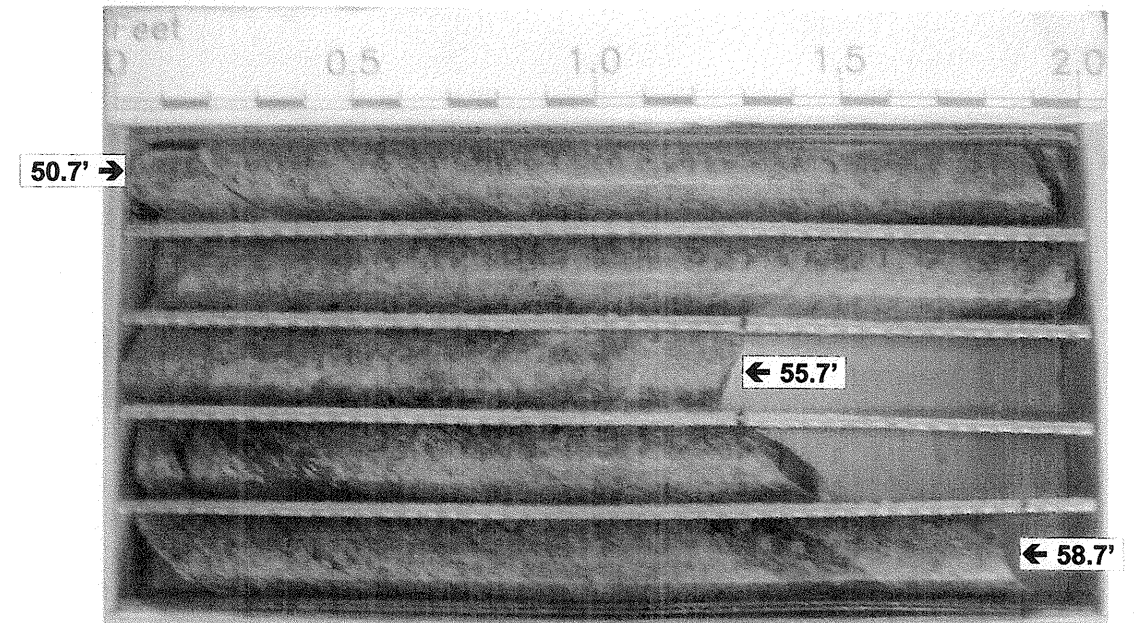
Box 5 of 10
Top of Box @ 35.7 feet; Bottom of Box @ 43.5 feet



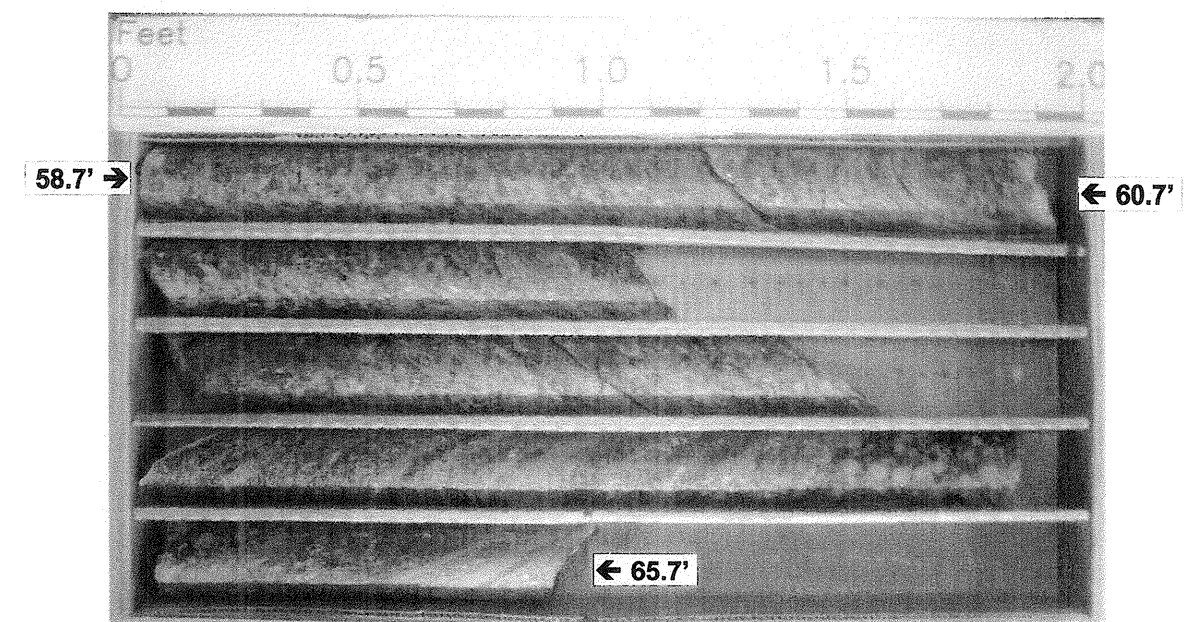
Box 6 of 10
Top of Box @ 43.5 feet; Bottom of Box @ 50.7 feet

CORE PHOTOS

| | | | |
|--|-----------------------|--------------------------|---------------------|
| WBS No: 32579.1.1 | Project No: B-1037 | County: Ashe | Boring No.: 1500R |
| Site Description: Rdwy. Approaches Bridge No. 39 over South Fork New River on US 221 | | Driller: J. Millwood | |
| Collar Elev.: 2660.3 ft. | Core Size: NQ-2 | Equipment: Diedrich D-50 | Geologist: A. Riggs |
| Elev. at T.D.: 2579.6 ft. | Total Depth: 80.7 ft. | Total Run: 75.0 ft. | Date: 10/11/2007 |



Box 7 of 10
Top of Box @ 50.7 feet; Bottom of Box @ 58.7 feet

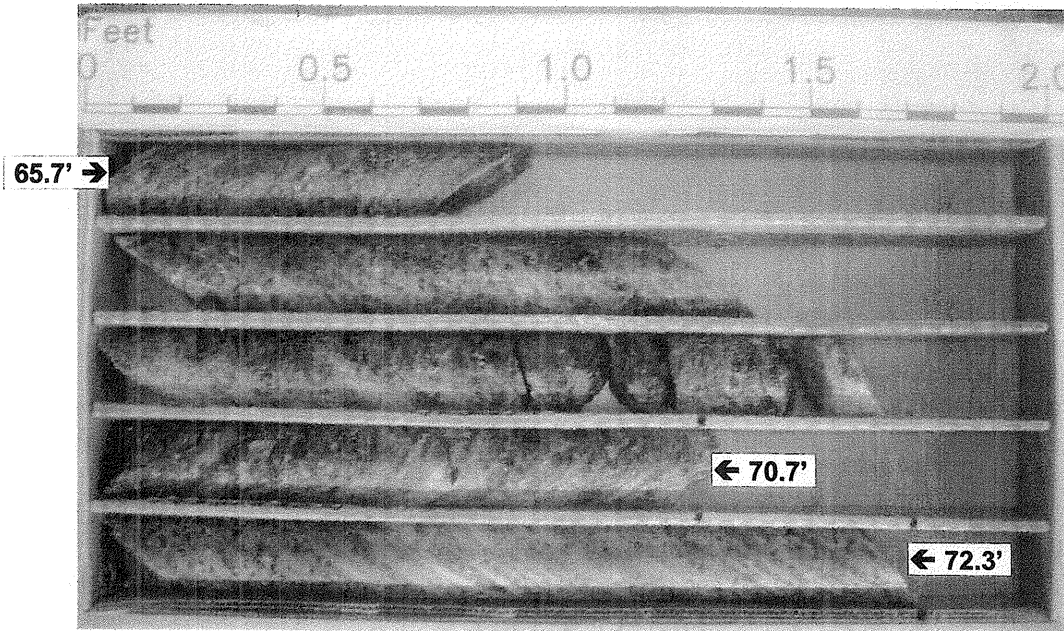


Box 8 of 10
Top of Box @ 58.7 feet; Bottom of Box @ 65.7 feet



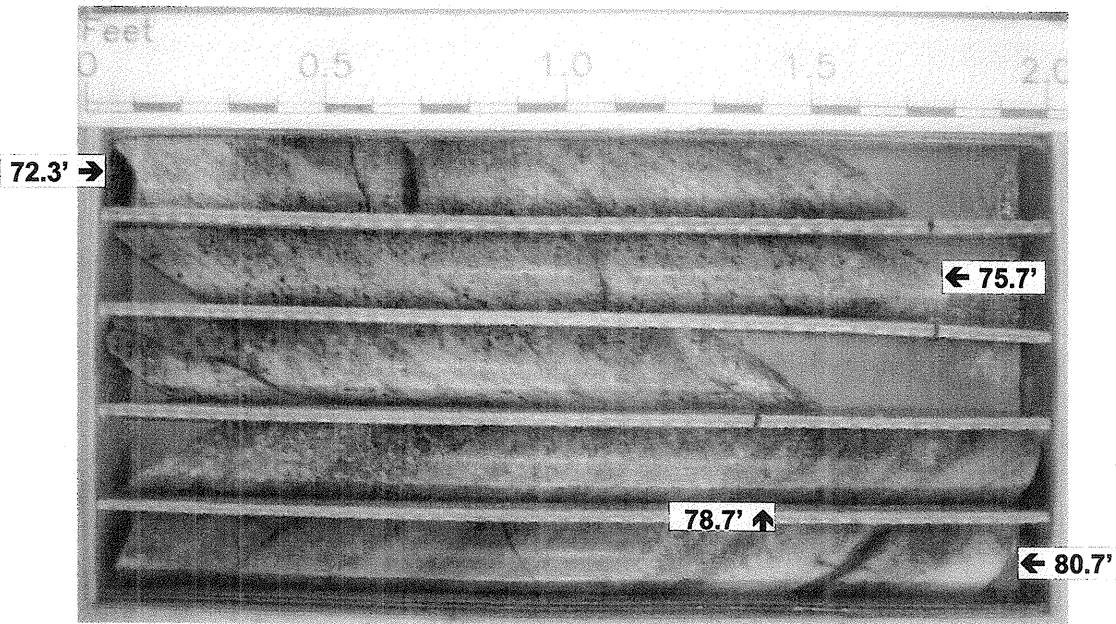
CORE PHOTOS

| | | | |
|--|-----------------------|--------------------------|---------------------|
| WBS No: 32579.1.1 | Project No: B-1037 | County: Ashe | Boring No.: 1500R |
| Site Description: Rdwy. Approaches Bridge No. 39 over South Fork New River on US 221 | | Driller: J. Millwood | |
| Collar Elev.: 2660.3 ft. | Core Size: NQ-2 | Equipment: Diedrich D-50 | Geologist: A. Riggs |
| Elev. at T.D.: 2579.6 ft. | Total Depth: 80.7 ft. | Total Run: 75.0 ft. | Date: 10/11/2007 |



Box 9 of 10

Top of Box @ 65.7 feet; Bottom of Box @ 72.3 feet



Box 10 of 10

Top of Box @ 72.3 feet; Bottom of Box @ 80.7 feet



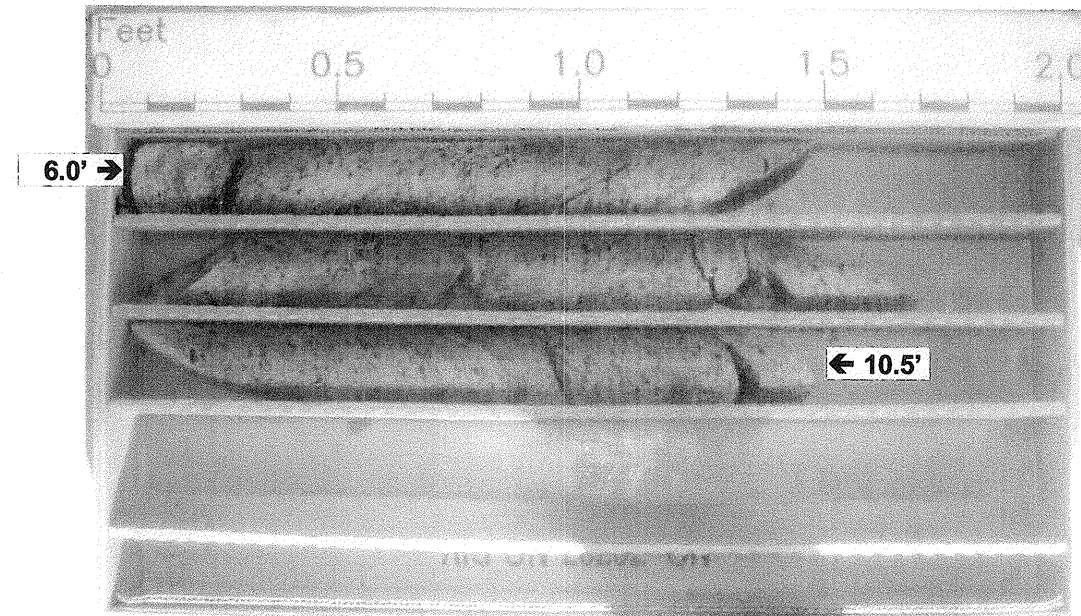
| PROJECT NO. 32579.1.1 | | ID. B-1037 | | COUNTY Ashe | | GEOLOGIST A. RIGGS | | | | | | |
|--|------------|-----------------------------|-------|---|---|-----------------------|-------------------|----|----|-----------|-----|--|
| SITE DESCRIPTION Roadway Approaches to Bridge No. 39 Over South Fork New River on US 221 | | | | | | | GROUND WATER (ft) | | | | | |
| BORING NO. 2050CL | | BORING LOCATION 20+50 | | OFFSET 0.0 ft CL | | ALIGNMENT -L- | | | | | | |
| COLLAR ELEV. 2,588.4 ft | | NORTHING 999,400.9 | | EASTING 1,313,268.3 | | 0 HR. N/A | | | | | | |
| TOTAL DEPTH 10.5 ft | | DRILL MACHINE Diedrich D-50 | | DRILL METHOD 2-1/4" HSA, Wash Boring w/NQ-2 Core Barrel | | 24 HR. Caved Dry 5.5' | | | | | | |
| DATE STARTED 10/9/07 | | COMPLETED 10/10/07 | | SURFACE WATER DEPTH N/A | | HAMMER TYPE AUTOMATIC | | | | | | |
| ELEV. (ft) | DEPTH (ft) | BLOW COUNT | | | BLOWS PER FOOT | | | | | SAMP. NO. | LOG | SOIL AND ROCK DESCRIPTION |
| | | 0.5ft | 0.5ft | 0.5ft | 0 | 20 | 40 | 60 | 80 | | | |
| 2,588.4 | | | | | GROUND SURFACE | | | | | | | |
| 2,587.4 | 1.0 | 5 | 19 | 6 | 25 | | | | | M | | ROADWAY EMBANKMENT FILL: MEDIUM STIFF BROWN FINE SANDY SILT (A-4) 0100 |
| 2,584.1 | 4.3 | 4 | 5 | 63 | 68 | | | | | D | | ROADWAY EMBANKMENT FILL: VERY STIFF BROWN-TAN FINE SANDY SILT (A-4) 5.3 |
| | | | | | | | | | | D | | WITH LITTLE MICA AND ROCK FRAGMENTS 6.0 |
| | | | | | | | | | | | | WEATHERED ROCK: (ORANGE-TAN MICA SCHIST) 10.5 |
| | | | | | | | | | | | | CRYSTALLINE ROCK: HARD VERY SLIGHT TO SLIGHTLY WEATHERED GRAY-TAN STAUROLITE SCHIST WITH CLOSE TO MODERATELY CLOSE FRACTURE SPACING 3 FRACTURES @ 60°-70°, 1 FRACTURE @ 80° |
| | | | | | BORING TERMINATED AT ELEV. 2577.9 FEET IN CRYSTALLINE ROCK: HARD GRAY-TAN STAUROLITE SCHIST. | | | | | | | 1) ADVANCED 2-1/4" HSA TO 4.3 FEET. 2) ADVANCED NW CASING TO 6.0 FEET WITH CASING ADVANCER. 3) RIVER WATER USED AS DRILLING FLUID. 4) APPROXIMATE DRILLING FLUID DENSITY 62.4 PCF. 5) ADVANCED NQ-2 CORE BARREL FROM 6.0 TO 10.5 FEET. |

NCDOT BORE SINGLE 07-419.GPJ NCDOT.GDT 11/15/07

| PROJECT NO. 32579.1.1 | | ID. B-1037 | | COUNTY Ashe | | GEOLOGIST A. RIGGS | | | | |
|--|------------|-----------------------------|---------------------|---|---------|-----------------------|-----------------|---------|-----|--|
| SITE DESCRIPTION Roadway Approaches to Bridge No. 39 Over South Fork New River on US 221 | | | | | | GROUND WATER (ft) | | | | |
| BORING NO. 2050CL | | BORING LOCATION 20+50 | | OFFSET 0.0 ft CL | | ALIGNMENT -L- | | | | |
| COLLAR ELEV. 2,588.4 ft | | NORTHING 999,400.9 | | EASTING 1,313,268.3 | | 0 HR. N/A | | | | |
| TOTAL DEPTH 10.5 ft | | DRILL MACHINE Diedrich D-50 | | DRILL METHOD 2-1/4" HSA, Wash Boring w/NQ-2 Core Barrel | | HAMMER TYPE AUTOMATIC | | | | |
| DATE STARTED 10/9/07 | | COMPLETED 10/10/07 | | SURFACE WATER DEPTH N/A | | | | | | |
| CORE SIZE NQ-2 | | TOTAL RUN 4.5 ft | | DRILLER J.MILLWOOD | | | | | | |
| ELEV. (ft) | DEPTH (ft) | RUN (ft) | DRILL RATE (Min/ft) | REC. (%) | RQD (%) | SAMP. NO. | STRATA REC. (%) | RQD (%) | LOG | DESCRIPTION AND REMARKS |
| | | | | | | | | | | |
| | | | | | | | | | | 2,582.4 Begin Coring @ 6.0 ft 6.0 |
| 2,582.4 | 6.0 | 4.5 | 2:40 | (4.0) | (2.2) | | (4.0) | (2.2) | | <p>CRYSTALLINE ROCK: HARD VERY SLIGHT TO SLIGHTLY WEATHERED GRAY-TAN STAUROLITE SCHIST WITH CLOSE TO MODERATELY CLOSE FRACTURE SPACING 3 FRACTURES @ 60°-70°, 1 FRACTURE @ 80°</p> <p>BORING TERMINATED AT ELEV. 2577.9 FEET IN CRYSTALLINE ROCK: HARD GRAY-TAN STAUROLITE SCHIST.</p> |
| | | | 2:20 | 89% | 49% | | 89% | 49% | | |
| | | | 2:15 | | | | | | | |
| 2,577.9 | 10.5 | | 2:20 | | | | | | | |
| | | | 1:15/0.5 | | | | | | | 2,577.9 10.5 |

CORE PHOTOS

| | | | |
|--|-----------------------|--------------------------|----------------------|
| WBS No: 32579.1.1 | Project No: B-1037 | County: Ashe | Boring No.: 2050CL |
| Site Description: Rdwy. Approaches Bridge No. 39 over South Fork New River on US 221 | | | Driller: J. Millwood |
| Collar Elev.: 2588.4 ft. | Core Size: NQ-2 | Equipment: Diedrich D-50 | Geologist: A. Riggs |
| Elev. at T.D.: 2577.9 ft. | Total Depth: 10.5 ft. | Total Run: 6.0 ft. | Date: 10/09/2007 |



Box 1 of 1
Top of Box @ 6.0 feet; Bottom of Box @ 10.5 feet



Photograph No. 1:
This photograph was taken from the west approach at approximately Station 11+00, looking northeast at the slope to be cut relative to the New River General Store.



Photograph No. 3:
This photograph was taken at approximately Station 11+50, looking west-northwest (left) at the existing slope.



Photograph No. 2:
This photograph was taken at approximately Station 10+00, looking west-northwest (left) at the existing slope.



Photograph No. 4:
This photograph was taken at approximately Station 13+00, looking southeast (right) at the existing stream bed south of existing 6'X6' concrete box culvert headwall.



Photograph No. 5:
This photograph was taken from the existing New River General Store, looking southeast at the existing hillside and the west approach to Bridge No. 39.



Photograph No. 7:
This photograph was taken at approximately Station 15+00, looking south (right) at the existing slope with rock outcrops.



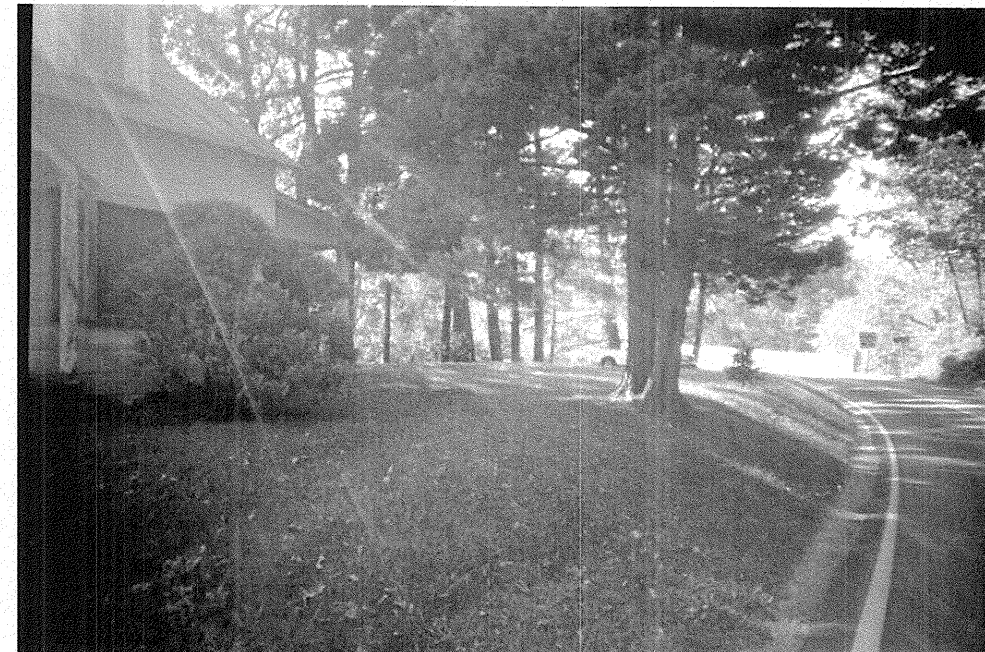
Photograph No. 6:
This photograph was taken at approximately Station 14+00, looking south (right) at the existing slope with rock outcrops.



Photograph No. 8:
This photograph was taken at approximately Station 15+00, 100' Right, looking north at the existing rock outcrop at top of the hill.



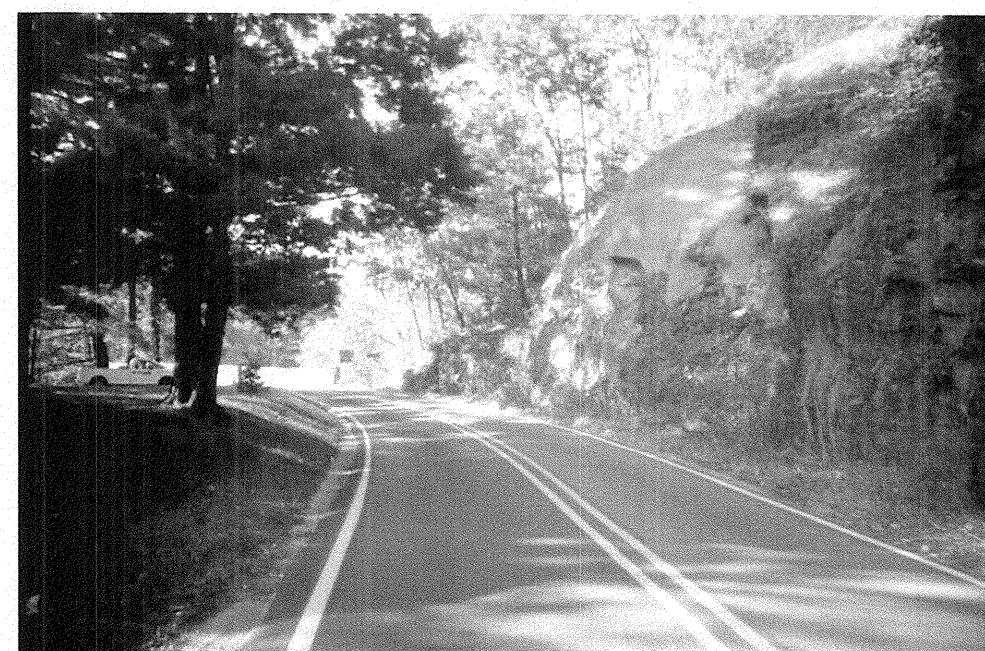
Photograph No. 9:
This photograph was taken at approximately Station 15+00, 90' Right, looking east at the base of the rock outcrop at the top of the hill.



Photograph No. 11:
This photograph was taken at approximately Station 22+00, looking northwest at the east approach.



Photograph No. 10:
This photograph was taken from the east approach, looking west at the existing slope to be cut relative to the New River General Store.



Photograph No. 12:
This photograph was taken at approximately Station 22+00, looking north-northwest at the existing rock slope, right of the new alignment.