

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

STRUCTURE
SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 33749.1.1 (B-4525) F.A. PROJ. BRZ-1412(4)
COUNTY GRANVILLE
PROJECT DESCRIPTION BRIDGE NO. 133 ON -L- (SR 1412) OVER
GRASSY CREEK AT STATION 13+64

CONTENTS

<u>SHEET</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2	LEGEND
3	GEOTECHNICAL REPORT
4	SITE PLAN
5	PROFILE
6-7	CROSS SECTIONS
8-12	BORING LOGS & CORE REPORTS
13	SOIL TEST RESULTS
14	SCOUR REPORT
15	CORE PHOTOGRAPH(S)
16	SITE PHOTOGRAPH

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING, AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE, THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION, AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, OR 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.

PROJECT: 33749.1.1 ID: B-4525

PERSONNEL

J. L. PEDRO

H. R. CONLEY

D. W. DIXON

L. W. DAIL

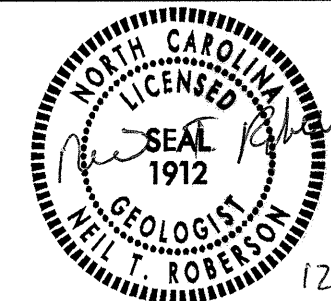
M. L. REEDER

INVESTIGATED BY J.L. PEDRO

CHECKED BY N.T. ROBERSON

SUBMITTED BY N.T. ROBERSON

DATE DECEMBER 2006



DRAWN BY: T. T. WALKER/J. L. PEDRO

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

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

12-1-06

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

PROJECT REFERENCE NO.
33749.11(B-4525) SHEET NO.
2

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS																																																																																											
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE: <i>VERY STIFF, GRN. SETTY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HARD PLASTIC, A-7-6</i>	WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED) GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES. ANGULARITY OF GRAINS THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.	HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS: WEATHERED ROCK (WR) CRYSTALLINE ROCK (CR) NON-CRYSTALLINE ROCK (NCR) COASTAL PLAIN SEDIMENTARY ROCK (CP)	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA. ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC. ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE. CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL. FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.																																																																																											
SOIL LEGEND AND AASHTO CLASSIFICATION	MINERALOGICAL COMPOSITION	WEATHERING																																																																																												
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>GENERAL CLASS.</th> <th>GRANULAR MATERIALS (≤ 35% PASSING #200)</th> <th>SILT-CLAY MATERIALS (> 35% PASSING #200)</th> <th>ORGANIC MATERIALS</th> </tr> <tr> <td>GROUP CLASS.</td> <td>A-1, A-1-b, A-3</td> <td>A-2, A-2-4, A-2-5, A-2-6, A-2-7</td> <td>A-4, A-5, A-6, A-7</td> </tr> <tr> <td>SYMBOL</td> <td></td> <td></td> <td></td> </tr> <tr> <td>% PASSING</td> <td>10, 40, 200</td> <td>10, 40, 200</td> <td>10, 40, 200</td> </tr> <tr> <td>LIQUID LIMIT PLASTIC INDEX</td> <td>6, NP</td> <td>10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100</td> <td>SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER</td> </tr> <tr> <td>USUAL TYPES OF MAJOR MATERIALS</td> <td>STONE FRAGS, GRAVEL, AND SAND</td> <td>FINE SAND, SILTY OR CLAYEY GRAVEL AND SAND, SILTY SOILS, CLAYEY SOILS</td> <td>GRANULAR SOILS, SILT-CLAY SOILS, MUCK, PEAT</td> </tr> <tr> <td>GENERAL RATING AS A SUBGRADE</td> <td>EXCELLENT TO GOOD</td> <td>FAIR TO POOR</td> <td>FAIR TO POOR, POOR, UNSUITABLE</td> </tr> </table>	GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)	SILT-CLAY MATERIALS (> 35% PASSING #200)	ORGANIC MATERIALS	GROUP CLASS.	A-1, A-1-b, A-3	A-2, A-2-4, A-2-5, A-2-6, A-2-7	A-4, A-5, A-6, A-7	SYMBOL				% PASSING	10, 40, 200	10, 40, 200	10, 40, 200	LIQUID LIMIT PLASTIC INDEX	6, NP	10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER	USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS, GRAVEL, AND SAND	FINE SAND, SILTY OR CLAYEY GRAVEL AND SAND, SILTY SOILS, CLAYEY SOILS	GRANULAR SOILS, SILT-CLAY SOILS, MUCK, PEAT	GENERAL RATING AS A SUBGRADE	EXCELLENT TO GOOD	FAIR TO POOR	FAIR TO POOR, POOR, UNSUITABLE	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE. COMPRESSIBILITY SLIGHTLY COMPRESSIBLE MODERATELY COMPRESSIBLE HIGHLY COMPRESSIBLE PERCENTAGE OF MATERIAL ORGANIC MATERIAL TRACE OF ORGANIC MATTER LITTLE ORGANIC MATTER MODERATELY ORGANIC HIGHLY ORGANIC GRANULAR SOILS SILT-CLAY SOILS OTHER MATERIAL TRACE LITTLE SOME HIGHLY	FRESH - ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER HAMMER IF CRYSTALLINE. VERY SLIGHT (V SL.) - ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY, ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE. SLIGHT (SL.) - ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH, OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED, CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS. MODERATE (MOD.) - SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK. MODERATELY SEVERE (MOD. SEV.) - ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION, ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK, ROCK GIVES "CLUNK" SOUND WHEN STRUCK, IF TESTED, WOULD YIELD SPT REFUSAL. SEVERE (SEV.) - ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT, SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN, IF TESTED, YIELDS SPT N VALUES > 100 BPF. VERY SEVERE (V SEV.) - ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING, SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN, IF TESTED, YIELDS SPT N VALUES < 100 BPF. COMPLETE - ROCK REDUCED TO SOIL, ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS, QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS, SAPROLITE IS ALSO AN EXAMPLE.																																																																
GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)	SILT-CLAY MATERIALS (> 35% PASSING #200)	ORGANIC MATERIALS																																																																																											
GROUP CLASS.	A-1, A-1-b, A-3	A-2, A-2-4, A-2-5, A-2-6, A-2-7	A-4, A-5, A-6, A-7																																																																																											
SYMBOL																																																																																														
% PASSING	10, 40, 200	10, 40, 200	10, 40, 200																																																																																											
LIQUID LIMIT PLASTIC INDEX	6, NP	10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER																																																																																											
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS, GRAVEL, AND SAND	FINE SAND, SILTY OR CLAYEY GRAVEL AND SAND, SILTY SOILS, CLAYEY SOILS	GRANULAR SOILS, SILT-CLAY SOILS, MUCK, PEAT																																																																																											
GENERAL RATING AS A SUBGRADE	EXCELLENT TO GOOD	FAIR TO POOR	FAIR TO POOR, POOR, UNSUITABLE																																																																																											
CONSISTENCY OR DENSENESS	GROUND WATER	MISCELLANEOUS SYMBOLS																																																																																												
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>PRIMARY SOIL TYPE</th> <th>COMPACTNESS OR CONSISTENCY</th> <th>RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)</th> <th>RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT²)</th> </tr> <tr> <td>GENERALLY GRANULAR MATERIAL (NON-COHESIVE)</td> <td>VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE</td> <td>< 4 4 TO 10 10 TO 30 30 TO 50 > 50</td> <td>N/A</td> </tr> <tr> <td>GENERALLY SILT-CLAY MATERIAL (COHESIVE)</td> <td>VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD</td> <td>< 2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 > 30</td> <td>< 0.25 0.25 TO 0.50 0.5 TO 1.0 1 TO 2 2 TO 4 > 4</td> </tr> </table>	PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²)	GENERALLY GRANULAR MATERIAL (NON-COHESIVE)	VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE	< 4 4 TO 10 10 TO 30 30 TO 50 > 50	N/A	GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD	< 2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 > 30	< 0.25 0.25 TO 0.50 0.5 TO 1.0 1 TO 2 2 TO 4 > 4	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>SYMBOL</th> <th>DESCRIPTION</th> </tr> <tr> <td></td> <td>WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING STATIC WATER LEVEL AFTER 24 HOURS PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA SPRING OR SEEP</td> </tr> <tr> <td></td> <td>ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION SOIL SYMBOL ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT INFERRED SOIL BOUNDARY INFERRED ROCK LINE ALLUVIAL SOIL BOUNDARY DIP & DIP DIRECTION OF ROCK STRUCTURES SOUNDING ROD</td> </tr> <tr> <td></td> <td>SPT TEST BORING AUGER BORING CORE BORING MONITORING WELL PIEZOMETER INSTALLATION SLOPE INDICATOR INSTALLATION SPT N-VALUE SPT REFUSAL</td> </tr> </table>	SYMBOL	DESCRIPTION		WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING STATIC WATER LEVEL AFTER 24 HOURS PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA SPRING OR SEEP		ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION SOIL SYMBOL ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT INFERRED SOIL BOUNDARY INFERRED ROCK LINE ALLUVIAL SOIL BOUNDARY DIP & DIP DIRECTION OF ROCK STRUCTURES SOUNDING ROD		SPT TEST BORING AUGER BORING CORE BORING MONITORING WELL PIEZOMETER INSTALLATION SLOPE INDICATOR INSTALLATION SPT N-VALUE SPT REFUSAL																																																																									
PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²)																																																																																											
GENERALLY GRANULAR MATERIAL (NON-COHESIVE)	VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE	< 4 4 TO 10 10 TO 30 30 TO 50 > 50	N/A																																																																																											
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD	< 2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 > 30	< 0.25 0.25 TO 0.50 0.5 TO 1.0 1 TO 2 2 TO 4 > 4																																																																																											
SYMBOL	DESCRIPTION																																																																																													
	WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING STATIC WATER LEVEL AFTER 24 HOURS PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA SPRING OR SEEP																																																																																													
	ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION SOIL SYMBOL ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT INFERRED SOIL BOUNDARY INFERRED ROCK LINE ALLUVIAL SOIL BOUNDARY DIP & DIP DIRECTION OF ROCK STRUCTURES SOUNDING ROD																																																																																													
	SPT TEST BORING AUGER BORING CORE BORING MONITORING WELL PIEZOMETER INSTALLATION SLOPE INDICATOR INSTALLATION SPT N-VALUE SPT REFUSAL																																																																																													
TEXTURE OR GRAIN SIZE	ABBREVIATIONS	ROCK HARDNESS																																																																																												
<table border="1" style="width: 100%; border-collapse: collapse;"> <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>4.75</td> <td>2.00</td> <td>0.42</td> <td>0.25</td> <td>0.075</td> <td>0.053</td> </tr> <tr> <th>BOULDER (BLDR.)</th> <th>COBBLE (COB.)</th> <th>GRAVEL (GR.)</th> <th>COARSE SAND (CSE, SD.)</th> <th>FINE SAND (F SD.)</th> <th>SILT (SL.)</th> <th>CLAY (CL.)</th> </tr> <tr> <td>GRAIN SIZE</td> <td>MM 305 IN 12</td> <td>75 3</td> <td>2.0</td> <td>0.25</td> <td>0.05</td> <td>0.005</td> </tr> </table>	U.S. STD. SIEVE SIZE OPENING (MM)	4	10	40	60	200	270		4.75	2.00	0.42	0.25	0.075	0.053	BOULDER (BLDR.)	COBBLE (COB.)	GRAVEL (GR.)	COARSE SAND (CSE, SD.)	FINE SAND (F SD.)	SILT (SL.)	CLAY (CL.)	GRAIN SIZE	MM 305 IN 12	75 3	2.0	0.25	0.05	0.005	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>AR - AUGER REFUSAL</td> <td>HL - HIGHLY</td> <td>W - MOISTURE CONTENT</td> </tr> <tr> <td>BT - BORING TERMINATED</td> <td>MED. - MEDIUM</td> <td>V - VERY</td> </tr> <tr> <td>CL - CLAY</td> <td>MICA. - MICACEOUS</td> <td>VST - VANE SHEAR TEST</td> </tr> <tr> <td>CPT - CONE PENETRATION TEST</td> <td>MOD. - MODERATELY</td> <td>WEA. - WEATHERED</td> </tr> <tr> <td>CSE - COARSE</td> <td>NP - NON PLASTIC</td> <td>W_d - UNIT WEIGHT</td> </tr> <tr> <td>DMT - DILATOMETER TEST</td> <td>ORG. - ORGANIC</td> <td></td> </tr> <tr> <td>DPT - DYNAMIC PENETRATION TEST</td> <td>PMT - PRESSUREMETER TEST</td> <td></td> </tr> <tr> <td>e - VOID RATIO</td> <td>SAP. - SAPROLITIC</td> <td></td> </tr> <tr> <td>f - FINE</td> <td>SD. - SAND, SANDY</td> <td></td> </tr> <tr> <td>FOSS. - FOSSILIFEROUS</td> <td>SL. - SILT, SILTY</td> <td></td> </tr> <tr> <td>FRAC. - FRACTURED, FRACTURES</td> <td>SLI. - SLIGHTLY</td> <td></td> </tr> <tr> <td>FRAGS. - FRAGMENTS</td> <td>TCR - TRICONE REFUSAL</td> <td></td> </tr> </table>	AR - AUGER REFUSAL	HL - HIGHLY	W - MOISTURE CONTENT	BT - BORING TERMINATED	MED. - MEDIUM	V - VERY	CL - CLAY	MICA. - MICACEOUS	VST - VANE SHEAR TEST	CPT - CONE PENETRATION TEST	MOD. - MODERATELY	WEA. - WEATHERED	CSE - COARSE	NP - NON PLASTIC	W _d - UNIT WEIGHT	DMT - DILATOMETER TEST	ORG. - ORGANIC		DPT - DYNAMIC PENETRATION TEST	PMT - PRESSUREMETER TEST		e - VOID RATIO	SAP. - SAPROLITIC		f - FINE	SD. - SAND, SANDY		FOSS. - FOSSILIFEROUS	SL. - SILT, SILTY		FRAC. - FRACTURED, FRACTURES	SLI. - SLIGHTLY		FRAGS. - FRAGMENTS	TCR - TRICONE REFUSAL		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>TERM</th> <th>SPACING</th> <th>TERM</th> <th>THICKNESS</th> </tr> <tr> <td>VERY WIDE</td> <td>MORE THAN 10 FEET</td> <td>VERY THICKLY BEDDED</td> <td>> 4 FEET</td> </tr> <tr> <td>WIDE</td> <td>3 TO 10 FEET</td> <td>THICKLY BEDDED</td> <td>1.5 - 4 FEET</td> </tr> <tr> <td>MODERATELY CLOSE</td> <td>1 TO 3 FEET</td> <td>THINLY BEDDED</td> <td>0.16 - 1.5 FEET</td> </tr> <tr> <td>CLOSE</td> <td>0.16 TO 1 FEET</td> <td>VERY THINLY BEDDED</td> <td>0.03 - 0.16 FEET</td> </tr> <tr> <td>VERY CLOSE</td> <td>LESS THAN 0.16 FEET</td> <td>THICKLY LAMINATED</td> <td>0.008 - 0.03 FEET</td> </tr> <tr> <td></td> <td></td> <td>THINLY LAMINATED</td> <td>< 0.008 FEET</td> </tr> </table>	TERM	SPACING	TERM	THICKNESS	VERY WIDE	MORE THAN 10 FEET	VERY THICKLY BEDDED	> 4 FEET	WIDE	3 TO 10 FEET	THICKLY BEDDED	1.5 - 4 FEET	MODERATELY CLOSE	1 TO 3 FEET	THINLY BEDDED	0.16 - 1.5 FEET	CLOSE	0.16 TO 1 FEET	VERY THINLY BEDDED	0.03 - 0.16 FEET	VERY CLOSE	LESS THAN 0.16 FEET	THICKLY LAMINATED	0.008 - 0.03 FEET			THINLY LAMINATED	< 0.008 FEET
U.S. STD. SIEVE SIZE OPENING (MM)	4	10	40	60	200	270																																																																																								
	4.75	2.00	0.42	0.25	0.075	0.053																																																																																								
BOULDER (BLDR.)	COBBLE (COB.)	GRAVEL (GR.)	COARSE SAND (CSE, SD.)	FINE SAND (F SD.)	SILT (SL.)	CLAY (CL.)																																																																																								
GRAIN SIZE	MM 305 IN 12	75 3	2.0	0.25	0.05	0.005																																																																																								
AR - AUGER REFUSAL	HL - HIGHLY	W - MOISTURE CONTENT																																																																																												
BT - BORING TERMINATED	MED. - MEDIUM	V - VERY																																																																																												
CL - CLAY	MICA. - MICACEOUS	VST - VANE SHEAR TEST																																																																																												
CPT - CONE PENETRATION TEST	MOD. - MODERATELY	WEA. - WEATHERED																																																																																												
CSE - COARSE	NP - NON PLASTIC	W _d - UNIT WEIGHT																																																																																												
DMT - DILATOMETER TEST	ORG. - ORGANIC																																																																																													
DPT - DYNAMIC PENETRATION TEST	PMT - PRESSUREMETER TEST																																																																																													
e - VOID RATIO	SAP. - SAPROLITIC																																																																																													
f - FINE	SD. - SAND, SANDY																																																																																													
FOSS. - FOSSILIFEROUS	SL. - SILT, SILTY																																																																																													
FRAC. - FRACTURED, FRACTURES	SLI. - SLIGHTLY																																																																																													
FRAGS. - FRAGMENTS	TCR - TRICONE REFUSAL																																																																																													
TERM	SPACING	TERM	THICKNESS																																																																																											
VERY WIDE	MORE THAN 10 FEET	VERY THICKLY BEDDED	> 4 FEET																																																																																											
WIDE	3 TO 10 FEET	THICKLY BEDDED	1.5 - 4 FEET																																																																																											
MODERATELY CLOSE	1 TO 3 FEET	THINLY BEDDED	0.16 - 1.5 FEET																																																																																											
CLOSE	0.16 TO 1 FEET	VERY THINLY BEDDED	0.03 - 0.16 FEET																																																																																											
VERY CLOSE	LESS THAN 0.16 FEET	THICKLY LAMINATED	0.008 - 0.03 FEET																																																																																											
		THINLY LAMINATED	< 0.008 FEET																																																																																											
SOIL MOISTURE - CORRELATION OF TERMS	EQUIPMENT USED ON SUBJECT PROJECT	INDURATION																																																																																												
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>SOIL MOISTURE SCALE (ATTERBERG LIMITS)</th> <th>FIELD MOISTURE DESCRIPTION</th> <th>GUIDE FOR FIELD MOISTURE DESCRIPTION</th> </tr> <tr> <td>LL - LIQUID LIMIT</td> <td>- SATURATED - (SAT.)</td> <td>USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE</td> </tr> <tr> <td>PL - PLASTIC LIMIT</td> <td>- WET - (W)</td> <td>SEMI-SOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE</td> </tr> <tr> <td>OM - OPTIMUM MOISTURE</td> <td>- MOIST - (M)</td> <td>SOLID; AT OR NEAR OPTIMUM MOISTURE</td> </tr> <tr> <td>SL - SHRINKAGE LIMIT</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 - LIQUID LIMIT	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE	PL - PLASTIC LIMIT	- WET - (W)	SEMI-SOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE	OM - OPTIMUM MOISTURE	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE	SL - SHRINKAGE LIMIT	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>DRILL UNITS:</th> <th>ADVANCING TOOLS:</th> <th>HAMMER TYPE:</th> </tr> <tr> <td><input type="checkbox"/> MOBILE B- <input type="checkbox"/> BK-51 <input type="checkbox"/> CME-45C <input type="checkbox"/> CME-550 <input type="checkbox"/> PORTABLE HOIST <input checked="" type="checkbox"/> CME-550X</td> <td><input type="checkbox"/> CLAY BITS <input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER <input type="checkbox"/> 8" HOLLOW AUGERS <input type="checkbox"/> HARD FACED FINGER BITS <input type="checkbox"/> TUNG-CARBIDE INSERTS <input type="checkbox"/> CASING <input type="checkbox"/> W/ ADVANCER <input type="checkbox"/> TRICONE _____ STEEL TEETH <input type="checkbox"/> TRICONE _____ TUNG-CARB.</td> <td><input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL <input type="checkbox"/> CORE SIZE: <input type="checkbox"/> -B <input checked="" type="checkbox"/> -N_XWL <input type="checkbox"/> -H <input type="checkbox"/> HAND TOOLS: <input type="checkbox"/> POST HOLE DIGGER <input type="checkbox"/> HAND AUGER <input type="checkbox"/> SOUNDING ROD <input type="checkbox"/> VANE SHEAR TEST</td> </tr> </table>	DRILL UNITS:	ADVANCING TOOLS:	HAMMER TYPE:	<input type="checkbox"/> MOBILE B- <input type="checkbox"/> BK-51 <input type="checkbox"/> CME-45C <input type="checkbox"/> CME-550 <input type="checkbox"/> PORTABLE HOIST <input checked="" type="checkbox"/> CME-550X	<input type="checkbox"/> CLAY BITS <input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER <input type="checkbox"/> 8" HOLLOW AUGERS <input type="checkbox"/> HARD FACED FINGER BITS <input type="checkbox"/> TUNG-CARBIDE INSERTS <input type="checkbox"/> CASING <input type="checkbox"/> W/ ADVANCER <input type="checkbox"/> TRICONE _____ STEEL TEETH <input type="checkbox"/> TRICONE _____ TUNG-CARB.	<input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL <input type="checkbox"/> CORE SIZE: <input type="checkbox"/> -B <input checked="" type="checkbox"/> -N_XWL <input type="checkbox"/> -H <input type="checkbox"/> HAND TOOLS: <input type="checkbox"/> POST HOLE DIGGER <input type="checkbox"/> HAND AUGER <input type="checkbox"/> SOUNDING ROD <input type="checkbox"/> VANE SHEAR TEST	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>TERM</th> <th>THICKNESS</th> </tr> <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>	TERM	THICKNESS	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.																																																													
SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION																																																																																												
LL - LIQUID LIMIT	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE																																																																																												
PL - PLASTIC LIMIT	- WET - (W)	SEMI-SOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE																																																																																												
OM - OPTIMUM MOISTURE	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE																																																																																												
SL - SHRINKAGE LIMIT	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE																																																																																												
DRILL UNITS:	ADVANCING TOOLS:	HAMMER TYPE:																																																																																												
<input type="checkbox"/> MOBILE B- <input type="checkbox"/> BK-51 <input type="checkbox"/> CME-45C <input type="checkbox"/> CME-550 <input type="checkbox"/> PORTABLE HOIST <input checked="" type="checkbox"/> CME-550X	<input type="checkbox"/> CLAY BITS <input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER <input type="checkbox"/> 8" HOLLOW AUGERS <input type="checkbox"/> HARD FACED FINGER BITS <input type="checkbox"/> TUNG-CARBIDE INSERTS <input type="checkbox"/> CASING <input type="checkbox"/> W/ ADVANCER <input type="checkbox"/> TRICONE _____ STEEL TEETH <input type="checkbox"/> TRICONE _____ TUNG-CARB.	<input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL <input type="checkbox"/> CORE SIZE: <input type="checkbox"/> -B <input checked="" type="checkbox"/> -N_XWL <input type="checkbox"/> -H <input type="checkbox"/> HAND TOOLS: <input type="checkbox"/> POST HOLE DIGGER <input type="checkbox"/> HAND AUGER <input type="checkbox"/> SOUNDING ROD <input type="checkbox"/> VANE SHEAR TEST																																																																																												
TERM	THICKNESS																																																																																													
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.																																																																																													
PLASTICITY																																																																																														
<table border="1" style="width: 100%; border-collapse: collapse;"> <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																																																																															
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																																																																																												
COLOR																																																																																														
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.																																																																																														
			NOTES:																																																																																											
			BENCH MARK: BL-102 AT -L- STATION 14+23.7, OFFSET 13.96' LT ELEVATION: 395.16 FT.																																																																																											



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

December 1, 2006

STATE PROJECT: 33749.1.1 (B-4525)
F.A. PROJECT: BRZ-1412 (4)
COUNTY: Granville
DESCRIPTION: Bridge No. 133 on -L- (SR 1412) over Grassy Creek at Station 13+64
SUBJECT: Geotechnical Report – Structure Inventory

Project Description

A three-span bridge, 144-feet in length with a 65° skew, is proposed on -L- (SR 1412) over Grassy Creek. The project is located in north central Granville County about 2 miles southwest of Cornwall.

The subsurface investigation was conducted during November of 2006 using an ATV-mounted CME-550X drill machine. Standard Penetration Test borings were performed at each of the proposed bent locations. In addition, one location at each interior bent was cored using NXWL core equipment. All borings were advanced to crystalline rock using hollow stem augers or N-casing with advancer. Representative soil samples were obtained for visual classification in the field and selected samples were sent to the Materials and Tests Unit for laboratory analysis. Two rock core samples were submitted to the Materials and Tests Unit to determine Unit Weight and Compressive Strength.

Physiography and Geology

The project is located in the gently rolling terrain of the Piedmont Physiographic province. Geologically, the site is underlain by felsic metavolcanic rock from the Carolina Slate Belt. The area consists of a mixture of woods and pastures with scattered homes.

Soil Properties

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

Roadway embankment soils were encountered at both End Bent locations. The embankment soils range in thickness from 3.0 to 6.0 feet. These soils consist of red, brown, and orange, medium stiff to stiff, dry to moist, silty clay (A-7-6) and sandy clay (A-6). Alluvial soils underlie roadway embankment soils.

Alluvial soils range from 1.5 to 9.9 feet in thickness. These soils predominantly consist of brown, tan, and gray, soft to hard, moist to wet, sandy silt (A-4), sandy clay (A-6) and silty clay (A-7-6). Lessor amounts of brown and tan, loose to medium dense, coarse sand (A-1-b) with some quartz gravel are also present. The alluvial soils were deposited on residual soils and weathered rock.

Residual soils were present at all bent locations and range in thickness from 2.5 to 9.1 feet. These soils consist of tan-brown and green-gray, medium stiff to hard, dry to moist, saprolitic, clayey silt (A-5), sandy silt (A-4), and silty sand (A-1-b). Residual soils are underlain by weathered rock.

Rock Properties

Weathered rock was derived from the underlying metavolcanic rock, and ranges in thickness from 0.7 feet at EB1-B, to 4.5 feet at B1-B. Weathered rock was encountered in all of the borings. The top of weathered rock ranges in elevation from 374.1 feet at EB1-B to 383.1 feet at B2-A.

Crystalline rock was encountered at all bent locations and is present downstream in Grassy Creek. Rock present at the site consists of green, fresh, hard, moderately close to close fractured, thickly bedded, metavolcanic rock. Core Recovery (REC) values range from 96% to 100%, and Rock Quality Designation (RQD) values range from 44% to 94%. Laboratory tests show compressive strengths of 12.5 ksi for both samples and unit weights ranging from 171.0 lb/ft³ to 174.4 lb/ft³. More detailed rock descriptions can be found in the Core Boring Reports. The top of crystalline rock ranges in elevation from 373.4 feet at EB1-B to 380.7 feet at B2-A.

Groundwater

Groundwater was encountered at all bent locations. The groundwater elevations range from 385.7 feet at B2-B to 391.3 feet at EB1-A. The water in Grassy Creek was at an elevation of 385.5 feet (11-15-06).

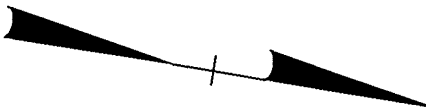
Notice

This Geotechnical foundation report is based on the Preliminary General Drawing dated September, 2006 and the Hydraulics Bridge Report dated August 28, 2006. If significant changes are made in the design or location of the proposed structure, the subsurface information should be reviewed and modified as necessary.

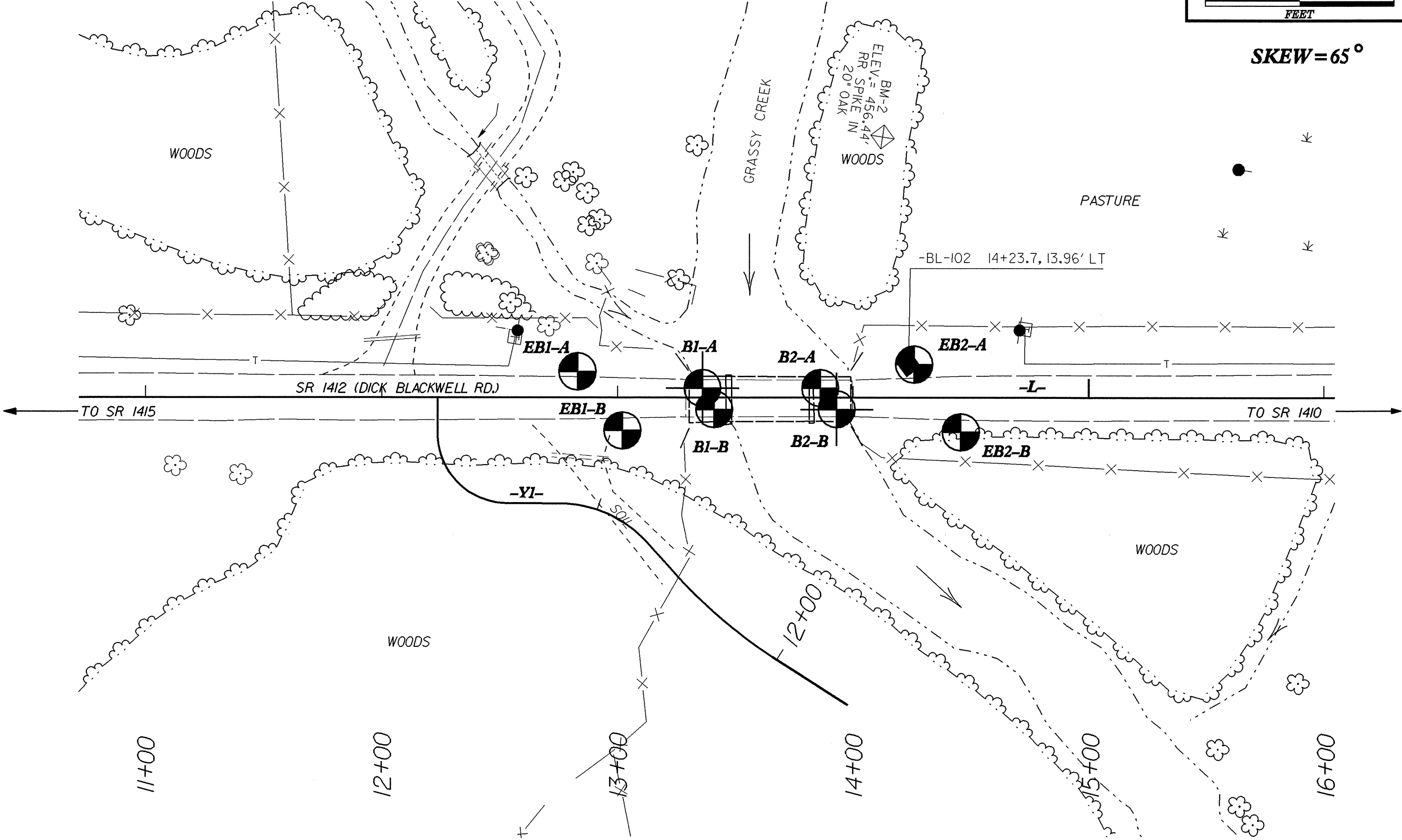
Prepared by,

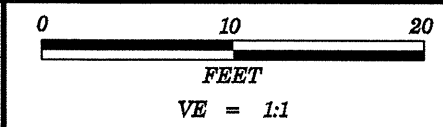
Jaime Love Pedro
Jaime Love Pedro
Engineering Geologist

PROJECT REFERENCE NO.	SHEET
33749.1.1 (B-4525)	4
SITE PLAN	

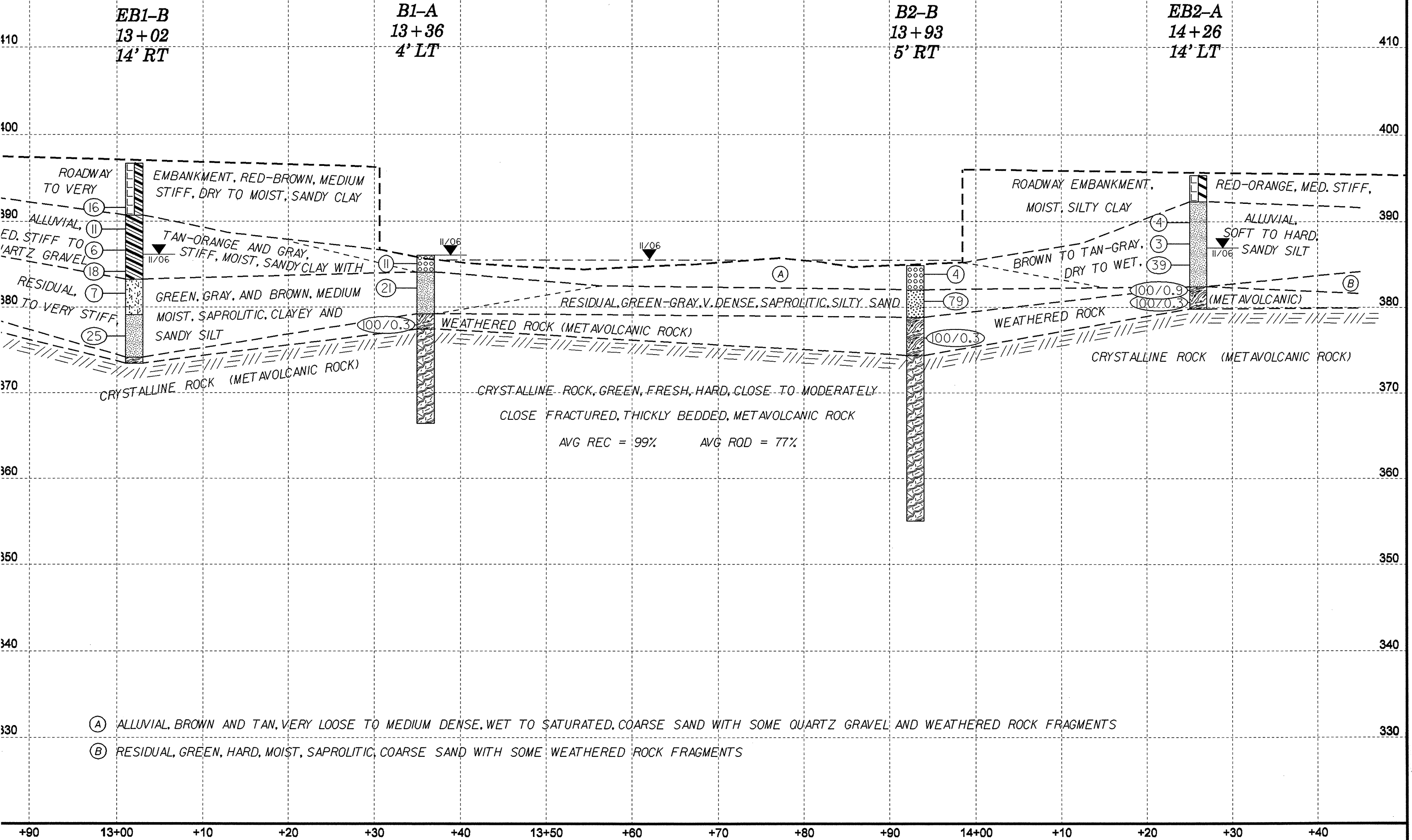


SKEW = 65°





PROJECT REFERENCE NO.	SHEET
33749.1.1 (B-4525)	5
PROFILE BORINGS PROJECTED ALONG -L-	

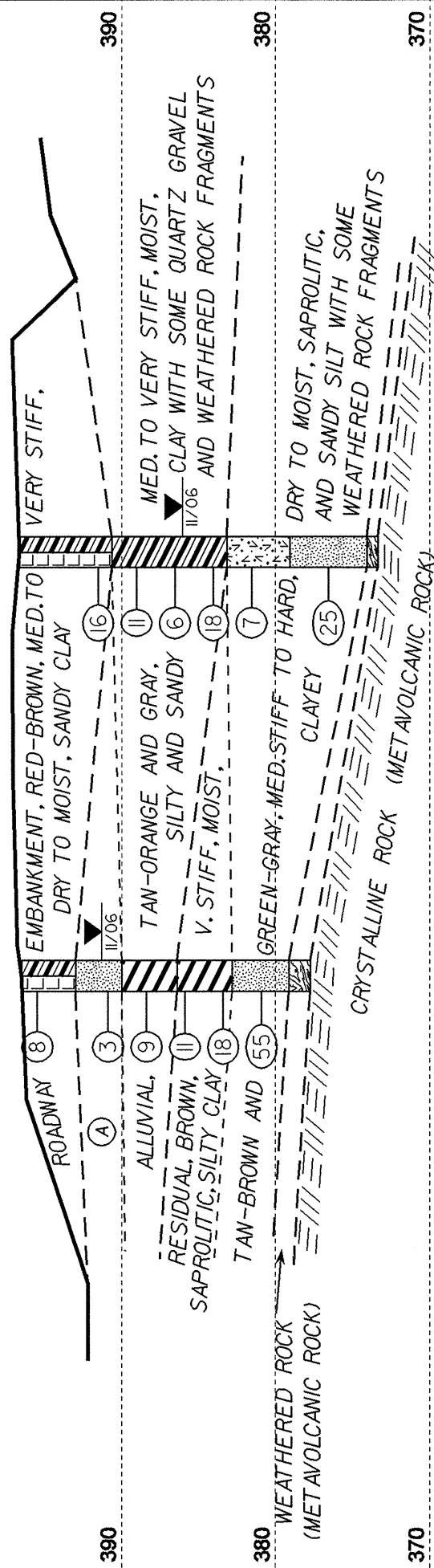


EBI-B
13+02
14' RT

BACK 3'

EBI-A
12+83
11' LT

BACK 4'



(A) ALLUVIAL, BROWN, SOFT, MOIST, SANDY SILT WITH TRACE ORGANICS

HORIZ. SCALE 0 10 20 (FEET)

VE = 1:1

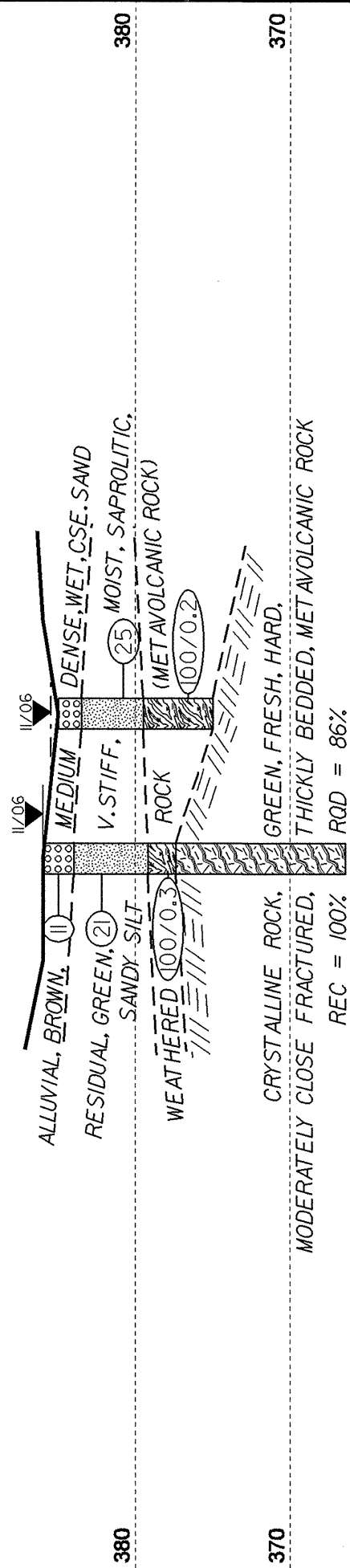
CROSS SECTION THROUGH END BENT 1

BI-A
13+36
4' LT

BACK 1'

BI-B
13+41
5' RT

390



CRYSTALLINE ROCK,
MODERATELY CLOSE FRACTURED,
THICKLY BEDDED, METAVOLCANIC ROCK
REC = 100%
RQD = 86%

HORIZ. SCALE 0 10 20 (FEET)

VE = 1:1

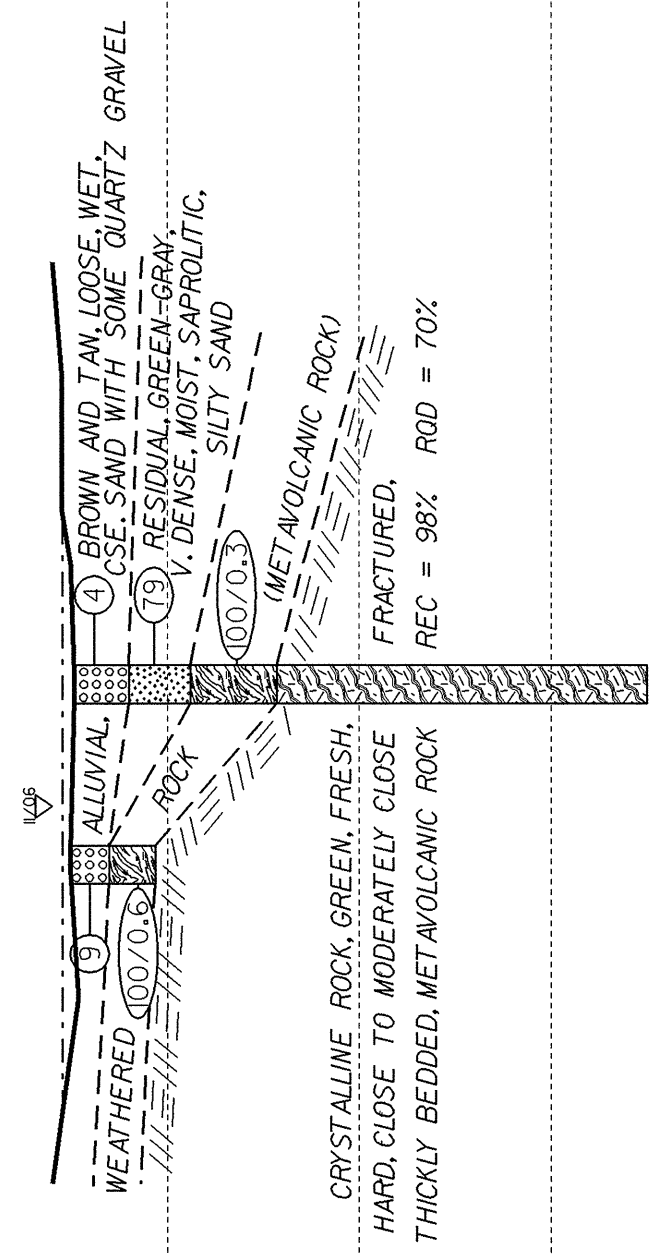
CROSS SECTION THROUGH BENT 1

B2-A
13+86
4' LT

B2-B
13+93
5' RT

BACK 1' AHEAD 2'

390



390

380

370

360

350

340

HORIZ. SCALE 0 10 20 (FEET)

VE = 1:1

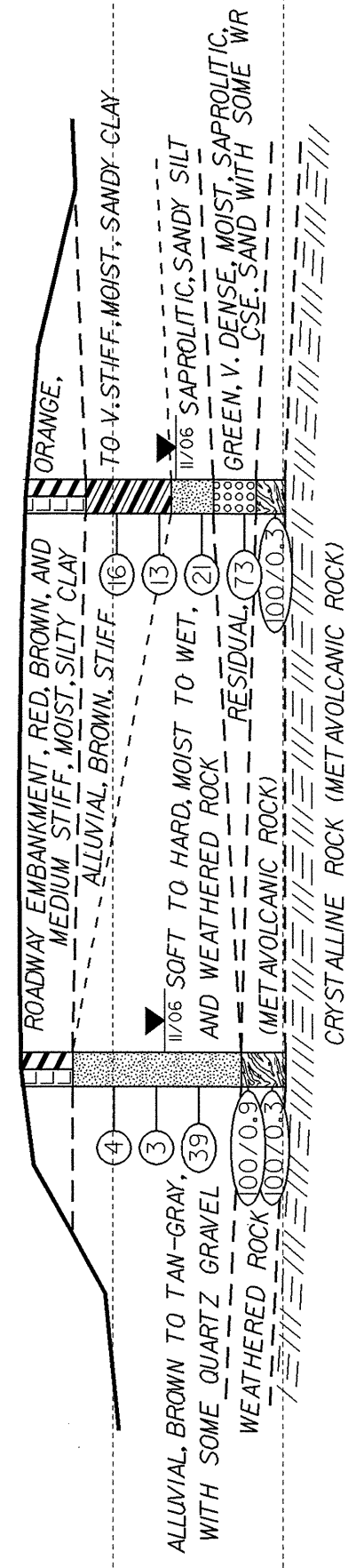
CROSS SECTION THROUGH BENT 2

EB2-A
14+26
14' LT

EB2-B
14+46
15' RT

BACK 3' AHEAD 3'

400



400

390

380

370

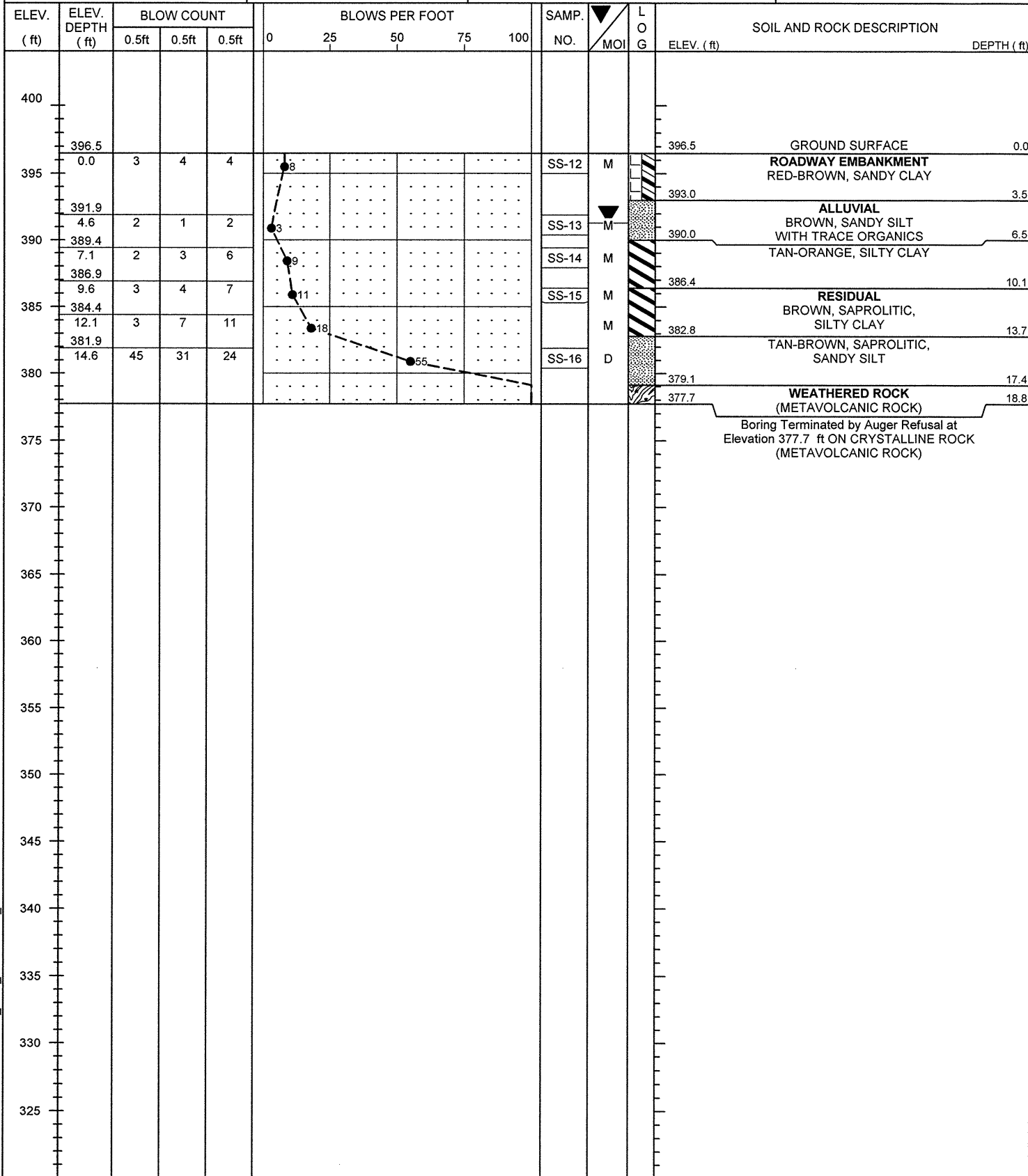
HORIZ. SCALE 0 10 20 (FEET)

VE = 1:1

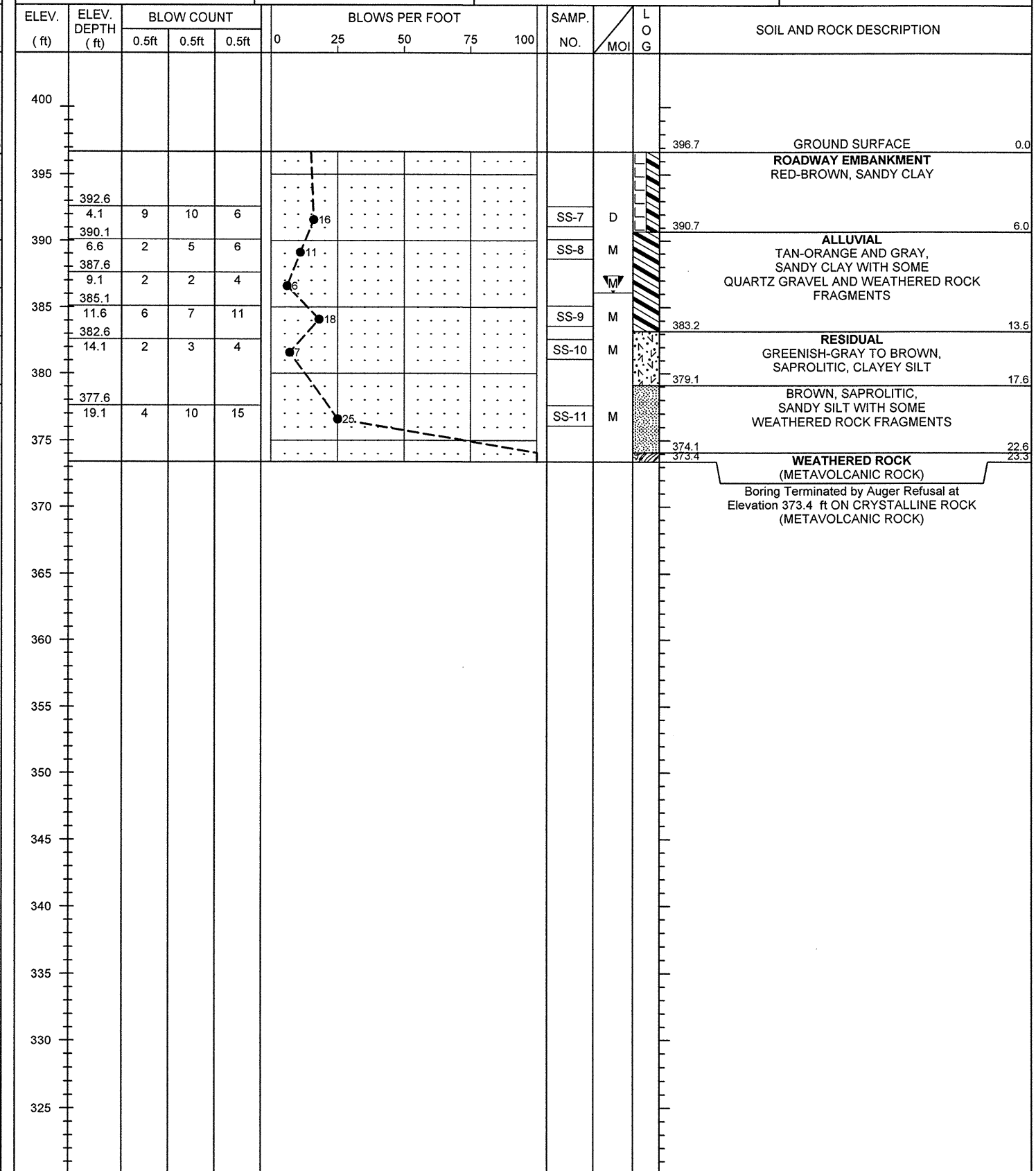
CROSS SECTION THROUGH END BENT 2



PROJECT NO. 33749.1.1	ID. B-4525	COUNTY GRANVILLE	GEOLOGIST Pedro, J. L.
SITE DESCRIPTION BRIDGE NO.133 ON -L- (SR 1412) OVER GRASSY CREEK			GROUND WTR (ft)
BORING NO. EB1-A	STATION 12+83	OFFSET 11 ft LT	ALIGNMENT -L- 0 HR. 16.2
COLLAR ELEV. 396.5 ft	TOTAL DEPTH 18.8 ft	NORTHING 985,038	EASTING 2,094,129 24 HR. 5.2
DRILL MACHINE CME-550X	DRILL METHOD H.S. Augers	HAMMER TYPE Automatic	
START DATE 11/09/06	COMP. DATE 11/09/06	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 18.8 ft



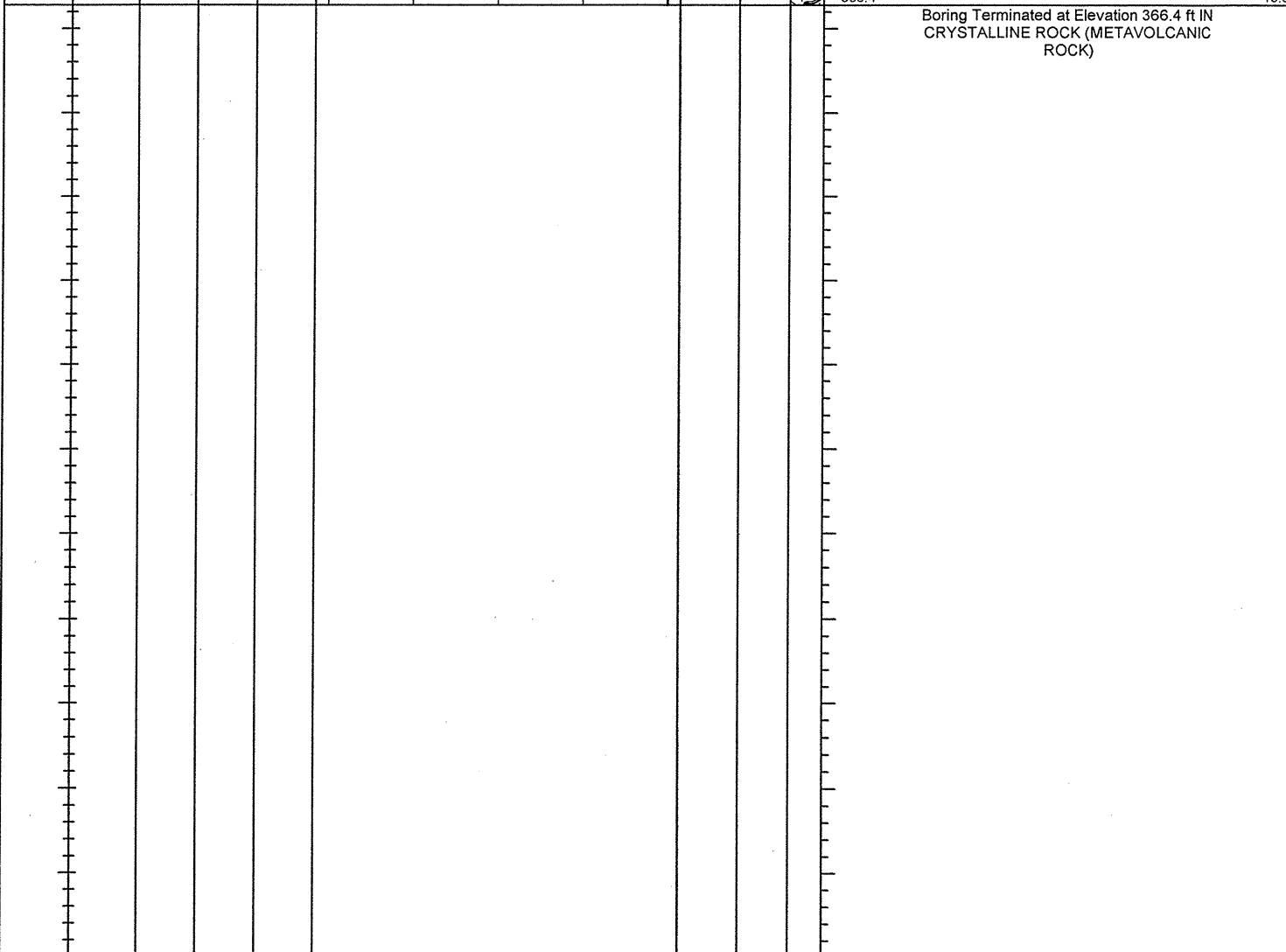
PROJECT NO. 33749.1.1	ID. B-4525	COUNTY GRANVILLE	GEOLOGIST Pedro, J. L.
SITE DESCRIPTION BRIDGE NO.133 ON -L- (SR 1412) OVER GRASSY CREEK			GROUND WTR (ft)
BORING NO. EB1-B	STATION 13+02	OFFSET 14 ft RT	ALIGNMENT -L- 0 HR. 16.0
COLLAR ELEV. 396.7 ft	TOTAL DEPTH 23.3 ft	NORTHING 985,060	EASTING 2,094,150 24 HR. 10.6
DRILL MACHINE CME-550X	DRILL METHOD H.S. Augers	HAMMER TYPE Automatic	
START DATE 11/08/06	COMP. DATE 11/08/06	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 23.3 ft



NCDOT BORE DOUBLE B4525_GEO_BH.GPJ NC_DOT.GDT 11/28/06

PROJECT NO. 33749.1.1	ID. B-4525	COUNTY GRANVILLE	GEOLOGIST Pedro, J. L.
SITE DESCRIPTION BRIDGE NO.133 ON -L- (SR 1412) OVER GRASSY CREEK			GROUND WTR (ft)
BORING NO. B1-A	STATION 13+36	OFFSET 4ft LT	ALIGNMENT -L-
COLLAR ELEV. 386.0 ft	TOTAL DEPTH 19.6 ft	NORTHING 985,091	EASTING 2,094,127
DRILL MACHINE CME-550X	DRILL METHOD NW Casing w/ Core	HAMMER TYPE Automatic	
START DATE 11/15/06	COMP. DATE 11/15/06	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 8.6 ft

ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
		0.5ft	0.5ft	0.5ft	0	25	50	75	100					
390														
386.0	0.0												GROUND SURFACE	0.0
383.2	2.8	6	5	6									ALLUVIAL BROWN, COARSE SAND WITH SOME WEATHERED ROCK FRAGMENTS	2.0
		6	7	14									RESIDUAL GREEN, SAPROLITIC, SANDY SILT	6.8
378.2	7.8												WEATHERED ROCK (METAVOLCANIC ROCK)	8.6
		100/0.3											CRYSTALLINE ROCK GREEN, FRESH, HARD. MODERATELY CLOSE FRACTURED, THICKLY BEDDED, METAVOLCANIC ROCK REC = 100% RQD = 86%	



CORE BORING REPORT

PROJECT: 33749.1.1 ID: B-4525 COUNTY: Granville BORING NO: B1-A

DESCRIPTION: Bridge No. 133 on -L- (SR 1412) over Grassy Creek

LOCATION OF BORING: -L- Sta. 13+36, Offset - 4' LT COMPLETION DATE: 11/15/06

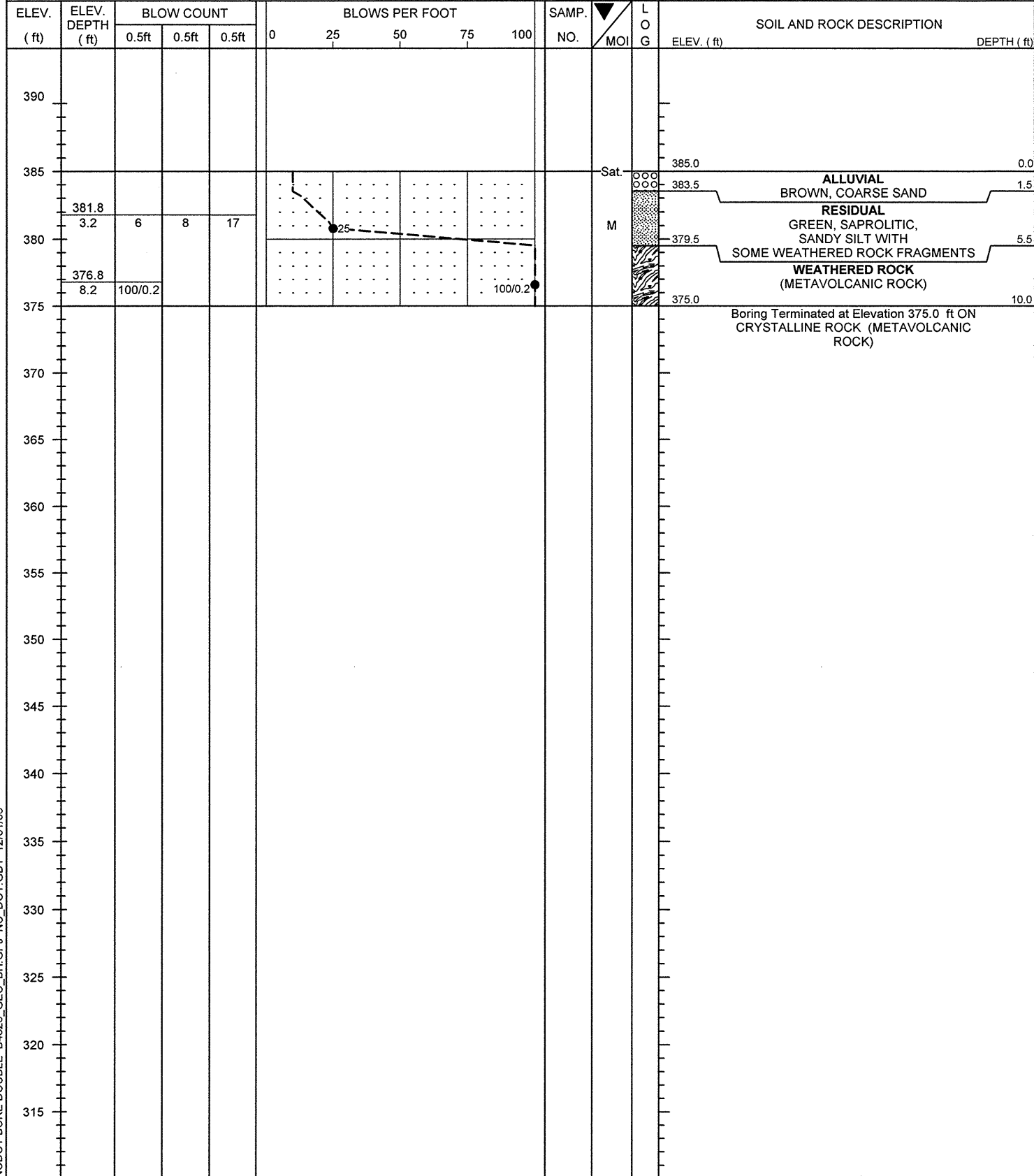
COLLAR or GROUND ELEVATION: 386.0 ft CORE SIZE: NXWL GEOLOGIST: J. L. Pedro

CORE EQUIPMENT: CME-550X, N-Casing, NXWL DRILLER: H. R. Conley

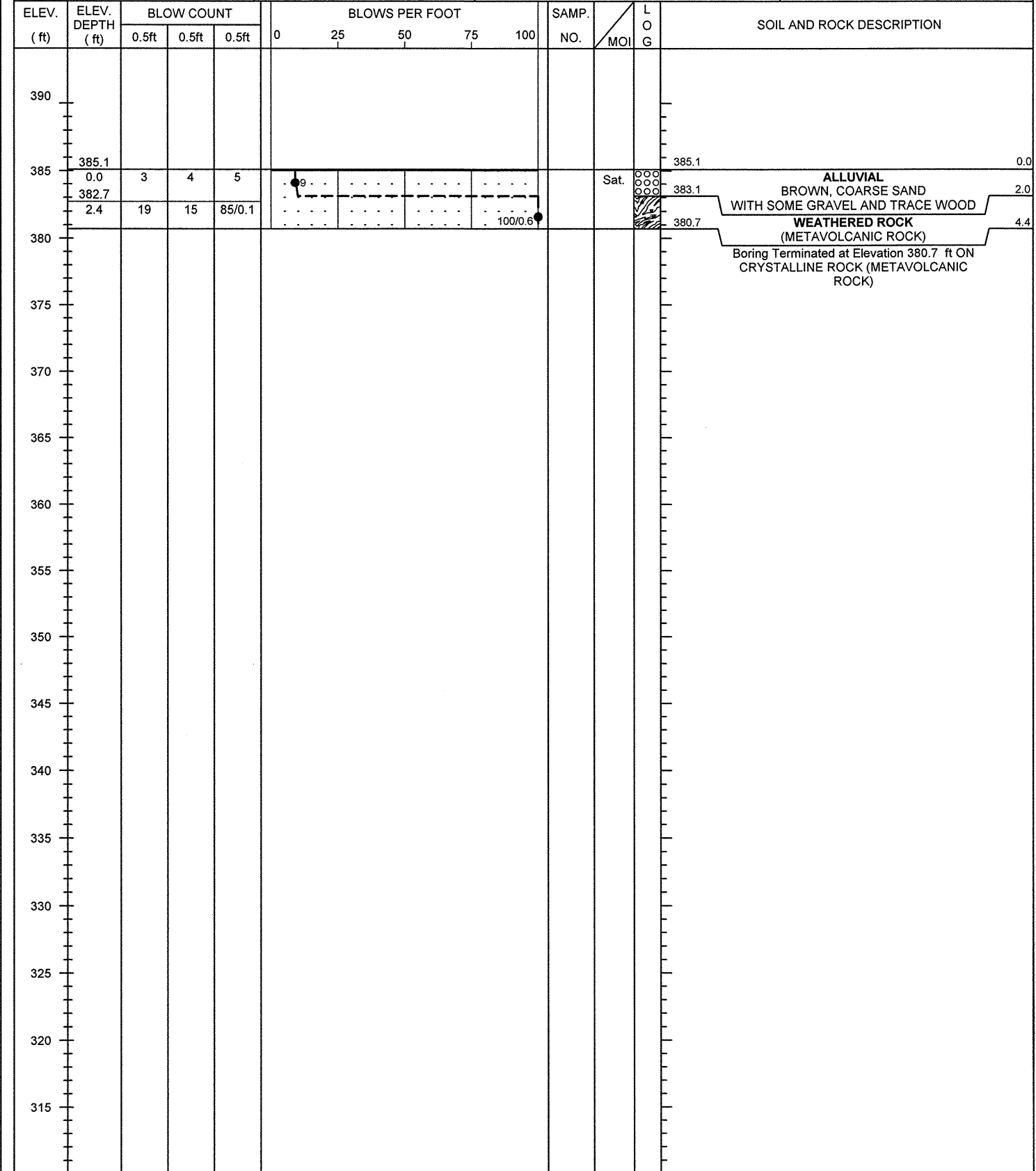
ELEV (ft)	DEPTH (ft)	DRILL RATE (min/ft)	RUN (ft)	REC (ft) (%)	RQD (ft) (%)	SAMPLE NUMBER	FIELD CLASSIFICATION and REMARKS
377.4	8.6	1:05		1.0 (100%)	1.0 (100%)		Green, fresh, hard, moderately close fractured, thickly bedded, metavolcanic rock
		-	1.0				
376.4	9.6	-					
376.4	9.6	0:58		5.0 (100%)	3.8 (76%)		Green, fresh, hard, moderately close fractured, thickly bedded, metavolcanic rock (9.6'-10.2') severely fractured zone
		0:52	5.0				
		0:51					
		0:57					
371.4	14.6	0:59					
371.4	14.6	1:01		5.0 (100%)	4.7 (94%)	RS-1	Green, fresh, hard, moderately close fractured, thickly bedded, metavolcanic rock
		0:57	5.0			16.1'-16.5'	
		1:00					
		0:59					
366.4	19.6	1:02					

BOREHOLE TERMINATED AT ELEVATION OF 366.4 FEET, IN METAVOLCANIC ROCK.

PROJECT NO. 33749.1.1	ID. B-4525	COUNTY GRANVILLE	GEOLOGIST Pedro, J. L.
SITE DESCRIPTION BRIDGE NO.133 ON -L- (SR 1412) OVER GRASSY CREEK			GROUND WTR (ft)
BORING NO. B1-B	STATION 13+41	OFFSET 5 ft RT	ALIGNMENT -L- 0 HR. N/A
COLLAR ELEV. 385.0 ft	TOTAL DEPTH 10.0 ft	NORTHING 985,097	EASTING 2,094,136 24 HR. N/A
DRILL MACHINE CME-550X	DRILL METHOD NW Casing w/ SPT	HAMMER TYPE Automatic	
START DATE 11/16/06	COMP. DATE 11/16/06	SURFACE WATER DEPTH 1.0 ft	DEPTH TO ROCK 10.0 ft



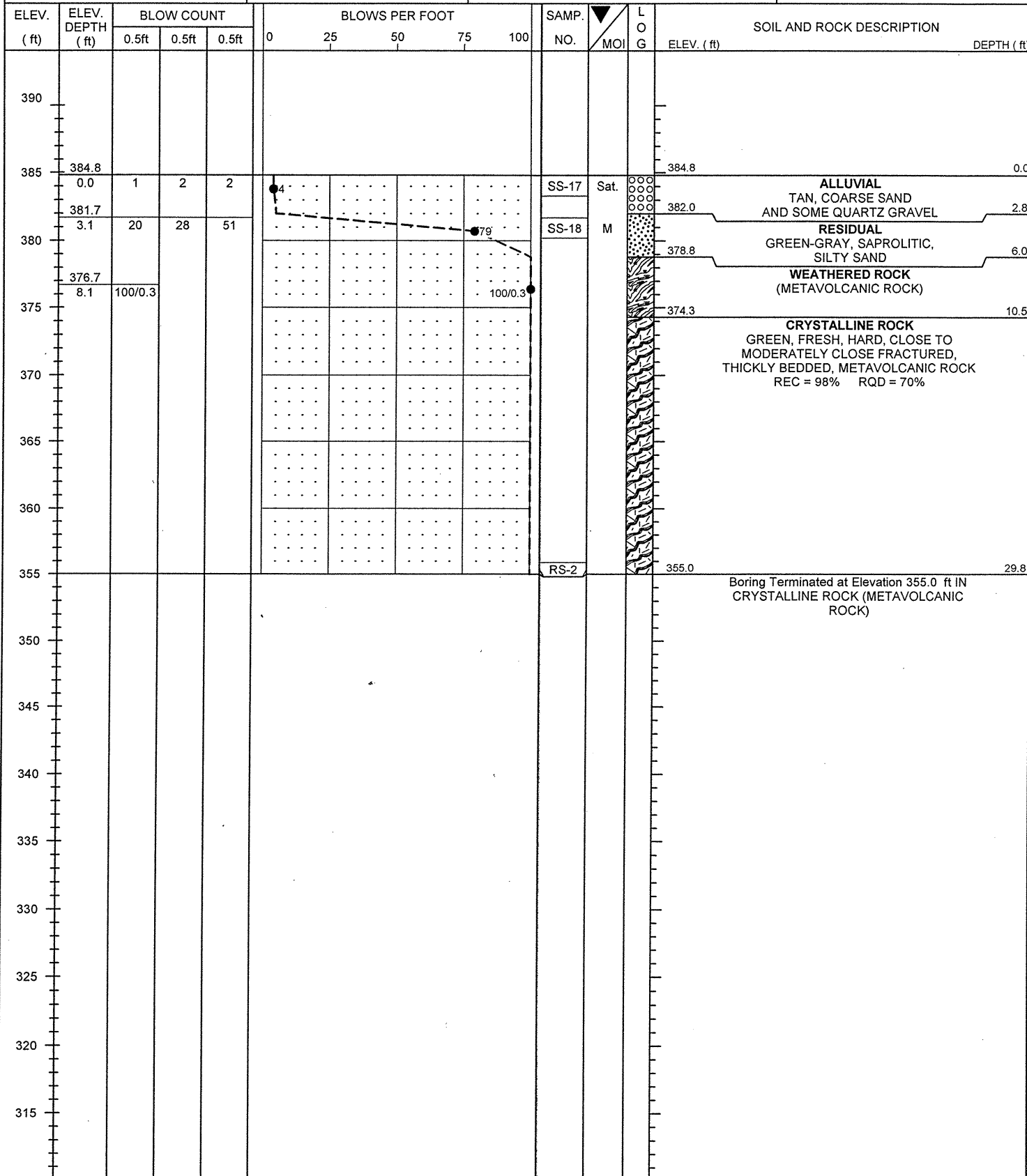
PROJECT NO. 33749.1.1	ID. B-4525	COUNTY GRANVILLE	GEOLOGIST Pedro, J. L.
SITE DESCRIPTION BRIDGE NO.133 ON -L- (SR 1412) OVER GRASSY CREEK			GROUND WTR (ft)
BORING NO. B2-A	STATION 13+86	OFFSET 4 ft LT	ALIGNMENT -L- 0 HR. N/A
COLLAR ELEV. 385.1 ft	TOTAL DEPTH 4.4 ft	NORTHING 985,141	EASTING 2,094,120 24 HR. N/A
DRILL MACHINE CME-550X	DRILL METHOD NW Casing w/ SPT	HAMMER TYPE Automatic	
START DATE 11/14/06	COMP. DATE 11/14/06	SURFACE WATER DEPTH 0.6 ft	DEPTH TO ROCK 4.4 ft



NC DOT BORE DOUBLE B4525_GEO_BH.GPJ NC_DOT.GDT 12/01/06



PROJECT NO. 33749.1.1	ID. B-4525	COUNTY GRANVILLE	GEOLOGIST Pedro, J. L.
SITE DESCRIPTION BRIDGE NO.133 ON -L- (SR 1412) OVER GRASSY CREEK			GROUND WTR (ft)
BORING NO. B2-B	STATION 13+93	OFFSET 5 ft RT	ALIGNMENT -L-
COLLAR ELEV. 384.8 ft	TOTAL DEPTH 29.8 ft	NORTHING 985,149	EASTING 2,094,128
DRILL MACHINE CME-550X	DRILL METHOD NW Casing w/ Core	HAMMER TYPE Automatic	
START DATE 11/13/06	COMP. DATE 11/14/06	SURFACE WATER DEPTH 0.9 ft	DEPTH TO ROCK 10.5 ft



CORE BORING REPORT

PROJECT: 33749.1.1 ID: B-4525 COUNTY: Granville BORING NO: B2-B

DESCRIPTION: Bridge No. 133 on -L- (SR 1412) over Grassy Creek

LOCATION OF BORING: -L- Sta. 13+93, Offset - 5' RT COMPLETION DATE: 11/14/06

COLLAR or GROUND ELEVATION: 384.8 ft CORE SIZE: NXWL GEOLOGIST: J. L. Pedro

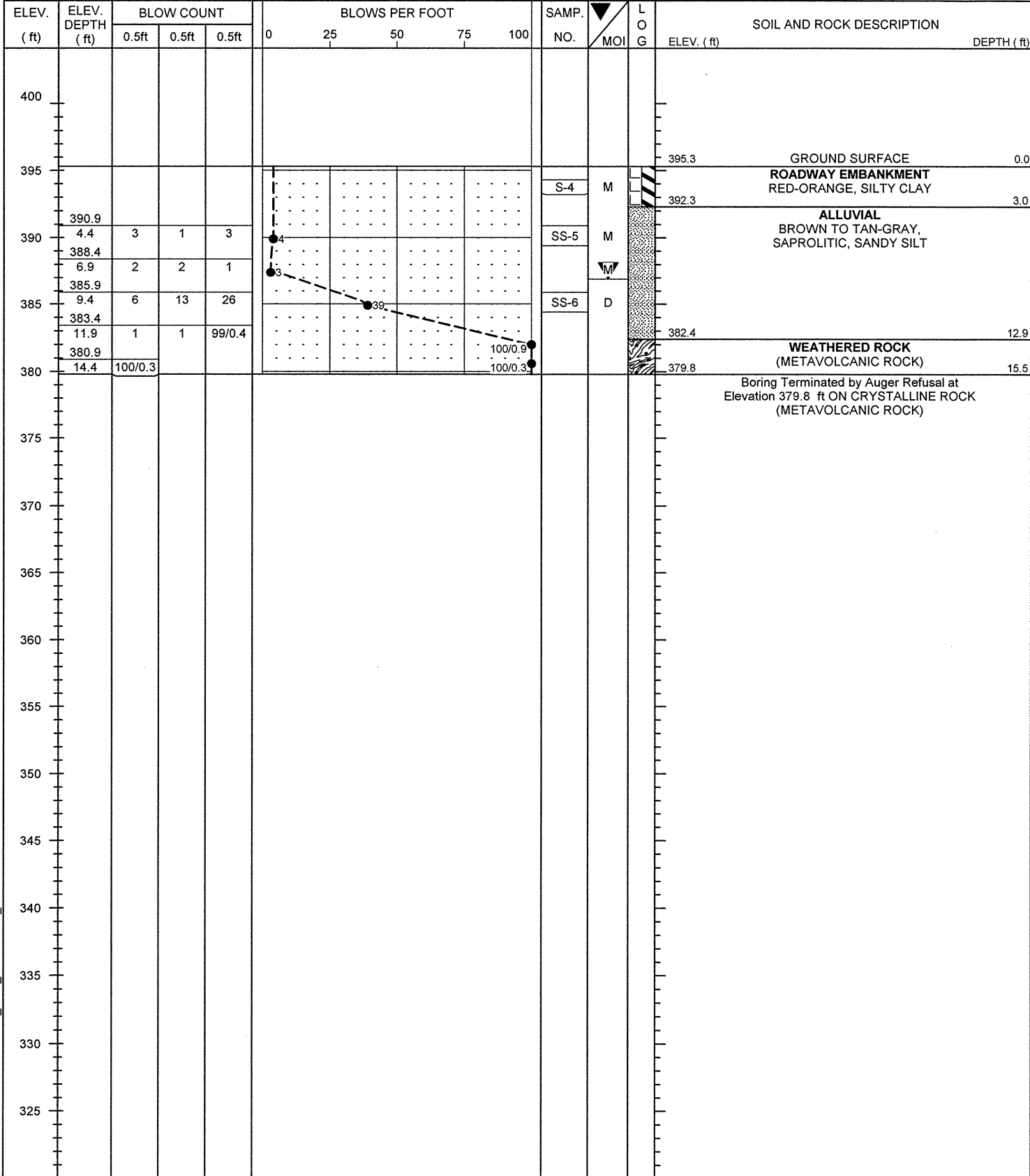
CORE EQUIPMENT: CME-550X, N-Casing, NXWL DRILLER: H. R. Conley

ELEV (ft)	DEPTH (ft)	DRILL RATE (min/ft)	RUN (ft)	REC (%)	RQD (%)	SAMPLE NUMBER	FIELD CLASSIFICATION and REMARKS
374.3	10.5	1:09	4.3	4.3	3.0		Green, fresh, hard, moderately close fractured, thickly bedded, metavolcanic rock 80-degree fractures at 11.4', 12.4', 13.6', 14.6', and 14.8'
		0:53					
		0:59					
		0:52					
370.0	14.8	0:28/0.3'		(100%)	(70%)		
370.0	14.8	1:02	5.0	4.9	2.2		Green, fresh, hard, close fractured, thickly bedded, metavolcanic rock near horizontal fracture at 15.8', and 70-degree fracture at 16.0', 16.5', and 16.8' (18.5'-19.8') severely fractured zone
		0:57					
		1:04					
		1:05					
365.0	19.8	1:09		(98%)	(44%)		
365.0	19.8	1:14	5.0	4.8	4.4		Green, fresh, hard, moderately close fractured, thickly bedded, metavolcanic rock 80-degree fracture at 21.2'
		1:13					
		1:12					
		1:13					
360.0	24.8	1:15		(96%)	(88%)		
360.0	24.8	1:14	5.0	4.9	4.0		Green, fresh, hard, moderately close fractured, thickly bedded, metavolcanic rock 70-degree fractures at 26.4' and 27.5'
		1:13					
		1:13					
		1:18					
355.0	29.8	1:12		(98%)	(80%)	RS-2 28.9'-29.4'	

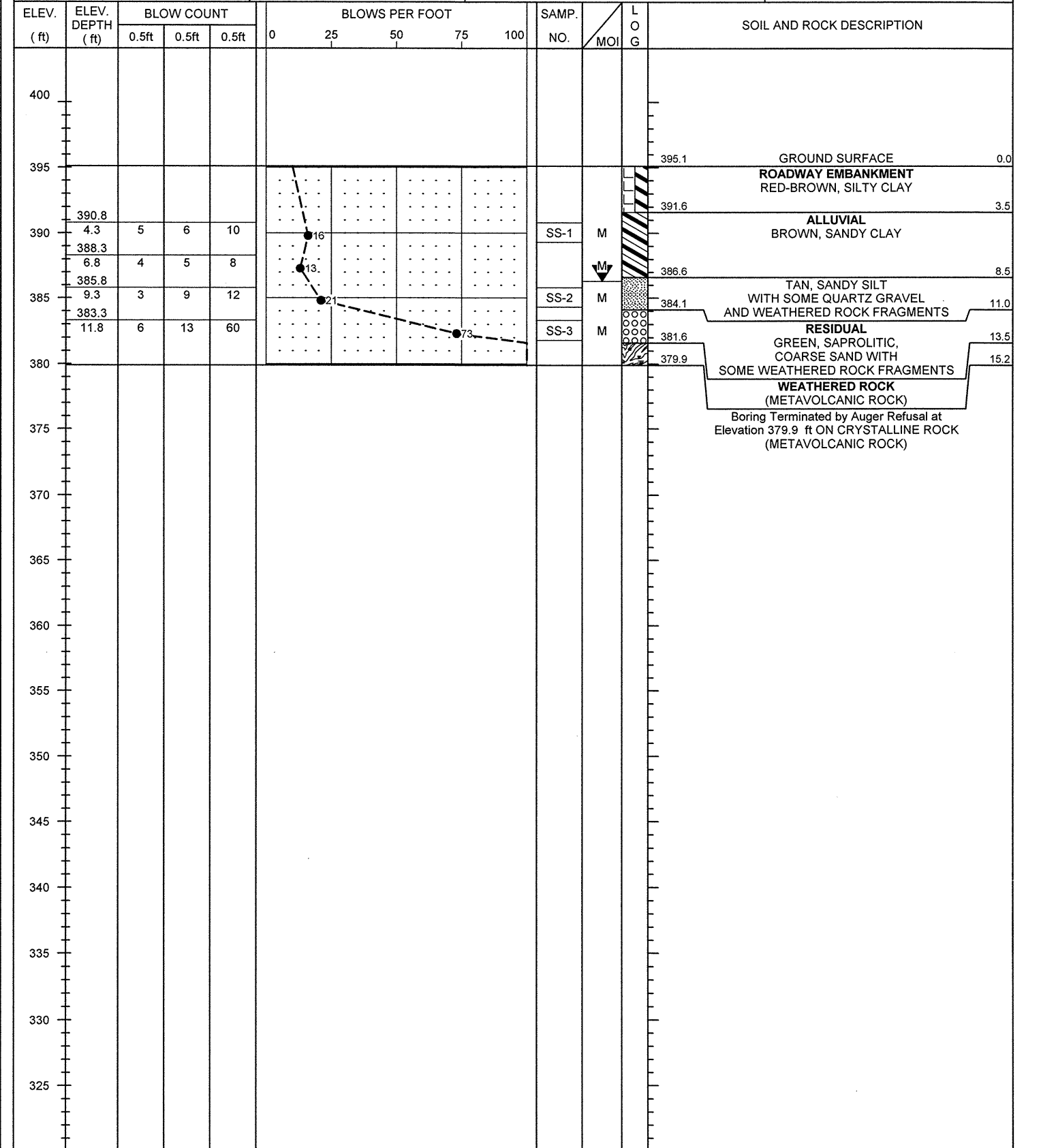
BOREHOLE TERMINATED AT ELEVATION OF 355.0 FEET, IN METAVOLCANIC ROCK.

NCDOT BORE DOUBLE B4525_GEO_BH.GPJ NC_DOT.GDT 12/01/06

PROJECT NO. 33749.1.1	ID. B-4525	COUNTY GRANVILLE	GEOLOGIST Pedro, J. L.
SITE DESCRIPTION BRIDGE NO.133 ON -L- (SR 1412) OVER GRASSY CREEK			GROUND WTR (ft)
BORING NO. EB2-A	STATION 14+26	OFFSET 14 ft LT	ALIGNMENT -L-
COLLAR ELEV. 395.3 ft	TOTAL DEPTH 15.5 ft	NORTHING 985,179	EASTING 2,094,104
DRILL MACHINE CME-550X	DRILL METHOD H.S. Augers	HAMMER TYPE Automatic	
START DATE 11/08/06	COMP. DATE 11/08/06	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 15.5 ft



PROJECT NO. 33749.1.1	ID. B-4525	COUNTY GRANVILLE	GEOLOGIST Pedro, J. L.
SITE DESCRIPTION BRIDGE NO.133 ON -L- (SR 1412) OVER GRASSY CREEK			GROUND WTR (ft)
BORING NO. EB2-B	STATION 14+46	OFFSET 15 ft RT	ALIGNMENT -L-
COLLAR ELEV. 395.1 ft	TOTAL DEPTH 15.2 ft	NORTHING 985,203	EASTING 2,094,129
DRILL MACHINE CME-550X	DRILL METHOD H.S. Augers	HAMMER TYPE Automatic	
START DATE 11/03/06	COMP. DATE 11/03/06	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 15.2 ft



NCDOT BORE DOUBLE B4525_GEO_BH.GPJ NC_DOT.GDT 11/28/06

EB1-A

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-12	11' LT	12+83	0.0-1.5	A-6(8)	35	14	15.2	12.5	37.9	34.4	89	79	67	-	-
SS-13	11' LT	12+83	4.6-6.1	A-4(9)	33	9	1.4	6.9	61.4	30.3	100	99	95	-	-
SS-14	11' LT	12+83	7.1-8.6	A-7-6(21)	44	20	0.2	6.1	53.3	40.4	100	100	94	-	-
SS-15	11' LT	12+83	10.1-11.1	A-7-6(10)	42	14	11.9	22.9	34.9	30.3	100	94	71	-	-
SS-16	11' LT	12+83	14.6-16.1	A-4(0)	28	2	25.3	18.6	42.0	14.2	98	84	58	-	-

EB1-B

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-7	14' RT	13+02	4.1-5.6	A-6(3)	32	11	19.2	13.0	37.4	30.4	73	62	52	-	-
SS-8	14' RT	13+02	6.6-8.1	A-6(13)	38	17	0.4	10.1	51.1	38.4	85	85	80	-	-
SS-9	14' RT	13+02	11.6-13.1	A-6(8)	36	13	19.2	16.6	37.9	26.3	100	86	69	-	-
SS-10	14' RT	13+02	14.1-15.6	A-5(8)	43	6	6.3	15.0	54.5	24.3	100	98	83	-	-
SS-11	14' RT	13+02	19.1-20.6	A-4(2)	40	6	23.7	32.2	36.1	8.1	95	81	50	-	-

B1-A

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-19	4' LT	13+36	2.8-4.3	A-4(0)	30	NP	33.2	20.8	37.9	8.1	98	89	53	-	-

B1-A

ROCK TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	ROCK TYPE	UNIT WT LB/FT ³	UNCONFINED COMP. STRENGTH, KSI	SECTION MOD. @ 40% MPSI
RS-1	4' LT	13+36	16.1-16.5	METAVOLCANIC	174.4	12.48	14.88

B2-B

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-17	5' RT	13+93	0.0-1.5	A-1-b(0)	32	6	65.1	12.1	14.7	8.1	59	26	15	-	-
SS-18	5' RT	13+93	3.1-4.6	A-2-4(0)	23	NP	42.7	25.3	24.0	8.1	96	72	35	-	-

B2-B

ROCK TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	ROCK TYPE	UNIT WT LB/FT ³	UNCONFINED COMP. STRENGTH, KSI	SECTION MOD. @ 40% MPSI
RS-2	5' RT	13+93	28.9-29.4	METAVOLCANIC	171.0	12.47	12.82

EB2-A

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
S-4	14' LT	14+26	1.0-2.0	A-7-6(19)	50	24	11.1	9.5	30.8	48.6	93	85	77	-	-
SS-5	14' LT	14+26	4.4-5.9	A-4(2)	24	5	3.2	26.3	46.2	24.3	100	99	75	-	-
SS-6	14' LT	14+26	9.4-10.9	A-4(0)	21	3	6.7	32.0	45.1	16.2	100	98	68	-	-

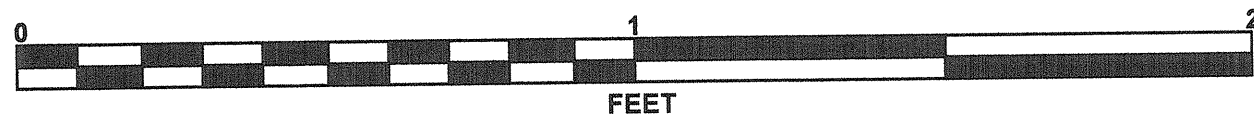
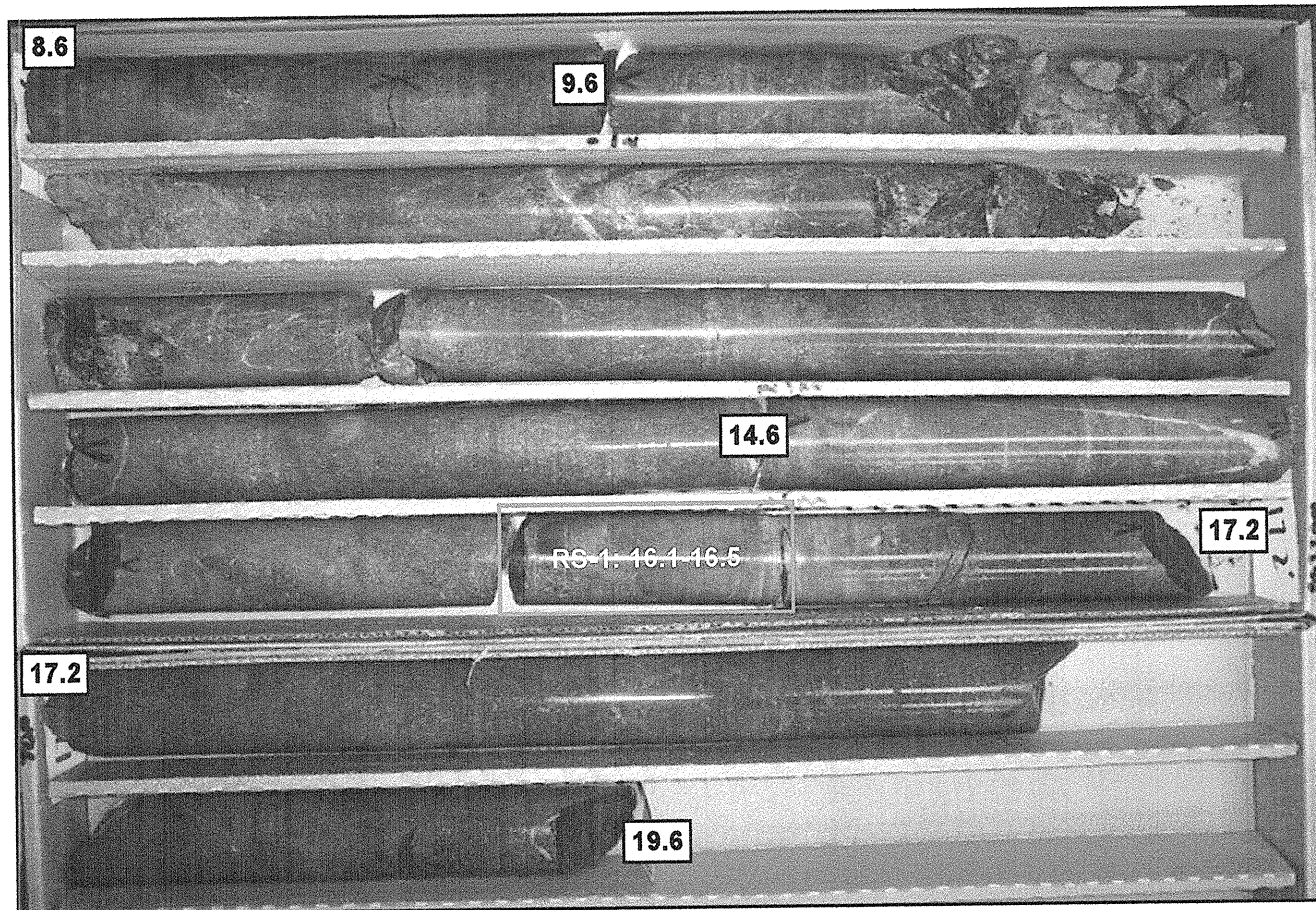
EB2-B

SOIL TEST RESULTS

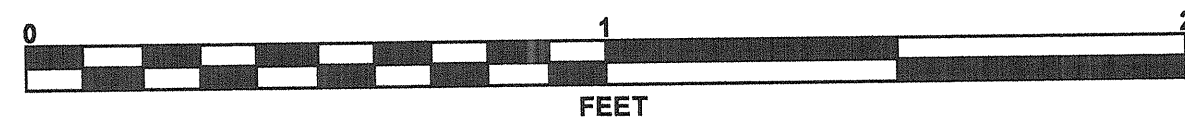
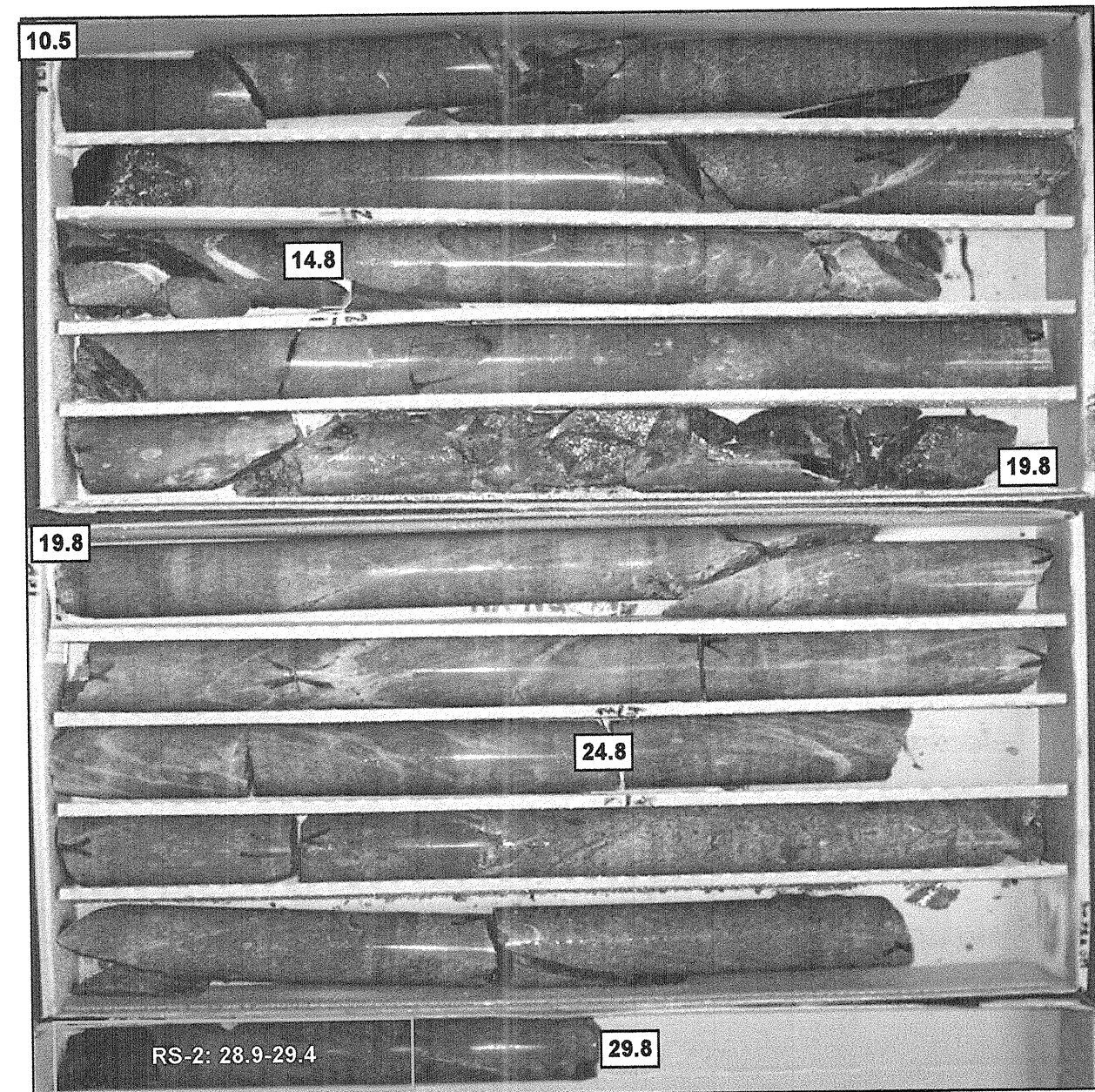
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-1	15' RT	14+46	4.3-5.8	A-6(7)	32	13	4.9	26.7	36.0	32.4	94	92	69	-	-
SS-2	15' RT	14+46	9.3-10.8	A-4(0)	22	2	27.1	29.8	28.9	14.2	92	80	44	-	-
SS-3	15' RT	14+46	11.8-13.3	A-1-b(0)	27	4	47.0	15.8	27.1	10.1	48	30	19	-	-

CORE PHOTOGRAPHS

B1-A
BOXES 1 & 2: 8.6 - 19.6 FEET



B2-B
BOXES 1 & 2: 10.5 - 29.8 FEET



SITE PHOTOGRAPH

Bridge No. 133 on -L- (SR 1412) over Grassy Creek

