



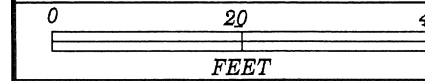
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
GEOTECHNICAL ENGINEERING UNIT

## SUBSURFACE INVESTIGATION

### SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

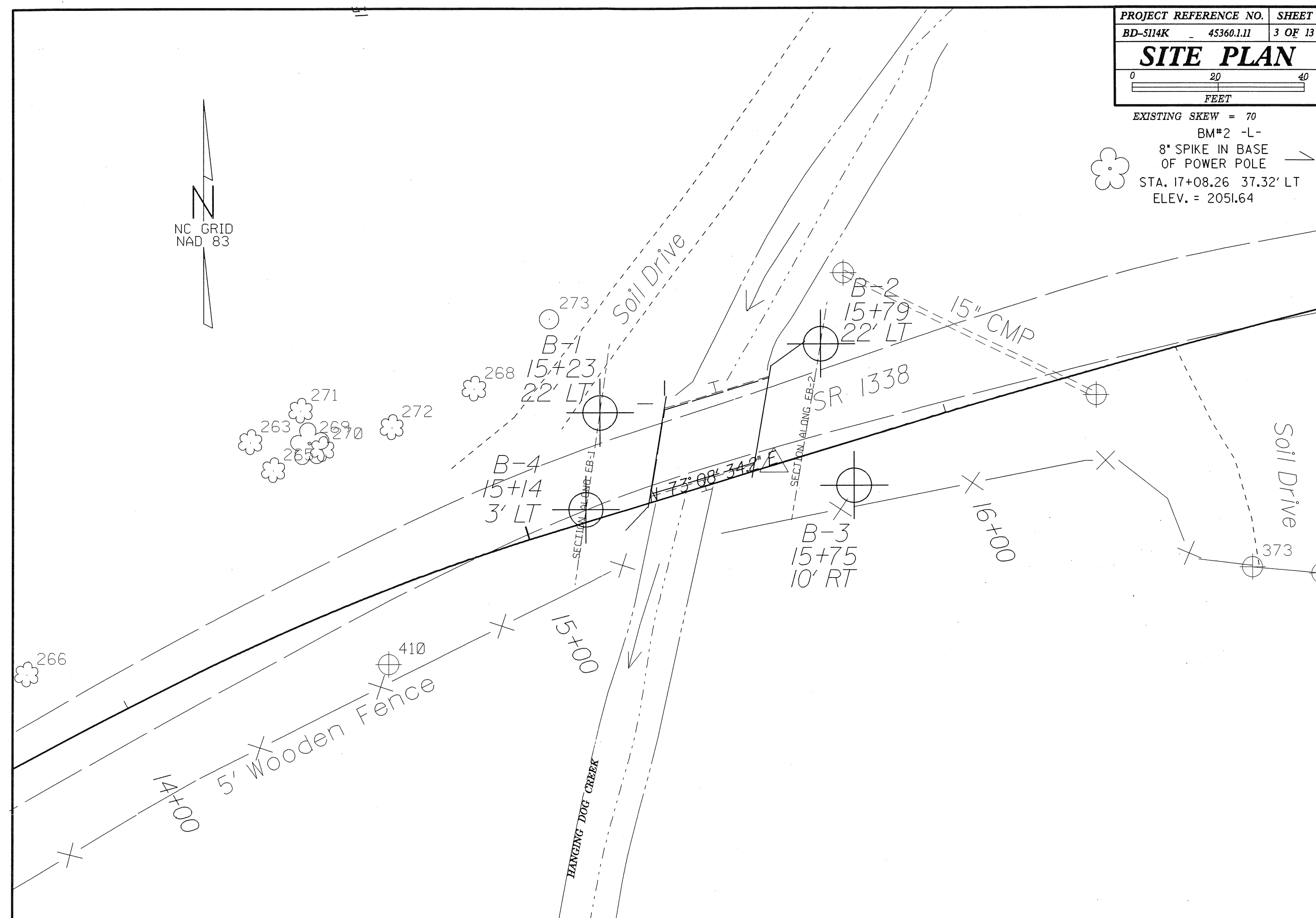
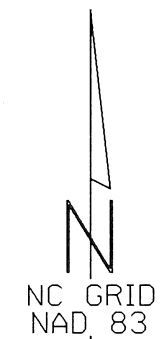
SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS																																																																																																																													
<p>SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED 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:</p> <p style="text-align: center;"><i>VERY STIFF, GRAY, SILTY CLAY, MOST WITH INTERBEDDED FINE SAND LAKERS/HARD PLASTIC, A-7-6</i></p>	<p><b>WELL GRADED</b> - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. <b>UNIFORM</b> - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED)</p> <p><b>GAP-GRADED</b> - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.</p> <p style="text-align: center;"><b>ANGULARITY OF GRAINS</b></p> <p>THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.</p>	<p>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.</p> <p>ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:</p>	<p><b>ALLUVIUM (ALLUV.)</b> - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.</p> <p><b>AQUIFER</b> - A WATER BEARING FORMATION OR STRATA.</p> <p><b>ARENACEOUS</b> - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.</p> <p><b>ARGILLACEOUS</b> - 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><b>ARTESIAN</b> - 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.</p> <p><b>CALCAREOUS (CALC.)</b> - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.</p> <p><b>COLLUVIUM</b> - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.</p> <p><b>CORE RECOVERY (REC.)</b> - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.</p> <p><b>DIKE</b> - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.</p> <p><b>DIP</b> - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.</p> <p><b>DIP DIRECTION (DIP AZIMUTH)</b> - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.</p> <p><b>FAULT</b> - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.</p> <p><b>FISSILE</b> - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.</p> <p><b>FLOAT</b> - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOGGED FROM PARENT MATERIAL.</p> <p><b>FLOOD PLAIN (FP)</b> - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.</p> <p><b>FORMATION (FM)</b> - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.</p> <p><b>JOINT</b> - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.</p> <p><b>LEDGE</b> - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.</p> <p><b>LENS</b> - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.</p> <p><b>MOTTLED (MOT.)</b> - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.</p> <p><b>PERCHED WATER</b> - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.</p> <p><b>RESIDUAL (RES.) SOIL</b> - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.</p> <p><b>ROCK QUALITY DESIGNATION (RQD)</b> - 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><b>SAPROLITE (SAP.)</b> - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.</p> <p><b>SILL</b> - 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 INTRUSING ROCKS.</p> <p><b>SLICKENSIDE</b> - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.</p> <p><b>STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT)</b> - NUMBER OF BLOWS (IN 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.</p> <p><b>STRATA CORE RECOVERY (SREC)</b> - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.</p> <p><b>STRATA ROCK QUALITY DESIGNATION (SRQD)</b> - 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><b>TOPSOIL (TS)</b> - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p>																																																																																																																													
<p style="text-align: center;"><b>SOIL LEGEND AND AASHTO CLASSIFICATION</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>GENERAL CLASS.</th> <th colspan="2">GRANULAR MATERIALS (&lt;= 35% PASSING #200)</th> <th colspan="4">SILT-CLAY MATERIALS (&gt; 35% PASSING #200)</th> <th colspan="3">ORGANIC MATERIALS</th> </tr> <tr> <th>GROUP CLASS.</th> <th>A-1</th> <th>A-3</th> <th colspan="2">A-2</th> <th>A-4</th> <th>A-5</th> <th>A-6</th> <th>A-7</th> <th>A-1, A-2</th> <th>A-4, A-5</th> <th>A-6, A-7</th> </tr> <tr> <th>SYMBOL</th> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <th>% PASSING</th> <td># 10 # 40 # 200</td> <td>50 MX 30 MX 50 MX 15 MX 25 MX</td> <td>51 MN 10 MX</td> <td>35 MX 35 MX 10 MX</td> <td>35 MX 35 MX 11 MN</td> <td>35 MX 35 MX 11 MN</td> <td>36 MN 36 MN 10 MX</td> <td>36 MN 36 MN 11 MN</td> <td>36 MN 36 MN 11 MN</td> <td>36 MN 36 MN 11 MN</td> <td>36 MN 36 MN 11 MN</td> </tr> <tr> <th>LIQUID LIMIT</th> <td colspan="11">6 MX</td> </tr> <tr> <th>PLASTIC INDEX</th> <td colspan="11">NP</td> </tr> <tr> <th>GROUP INDEX</th> <td colspan="11">0</td> </tr> <tr> <th>USUAL TYPES OF MAJOR MATERIALS</th> <td colspan="2">STONE FRAGS. 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ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.</p> <p style="text-align: center;"><b>COMPRESSIBILITY</b></p> <p>SLIGHTLY COMPRESSIBLE      LIQUID LIMIT LESS THAN 31 MODERATELY COMPRESSIBLE      LIQUID LIMIT EQUAL TO 31-50 HIGHLY COMPRESSIBLE      LIQUID LIMIT GREATER THAN 50</p> <p style="text-align: center;"><b>PERCENTAGE OF MATERIAL</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <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>&gt;10%</td> <td>&gt;20%</td> <td>HIGHLY</td> </tr> </table> <p style="text-align: center;"><b>GROUND WATER</b></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 SEEP</p>	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 style="text-align: center;"><b>WEATHERING</b></p> <p><b>FRESH</b> - ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER HAMMER IF CRYSTALLINE.</p> <p><b>VERY SLIGHT (V SL.)</b> - 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.</p> <p><b>SLIGHT (SL.)</b> - 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.</p> <p><b>MODERATE (MOD.)</b> - 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.</p> <p><b>MODERATELY SEVERE (MOD. SEV.)</b> - ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. <i>IF TESTED, WOULD YIELD SPT REFUSAL</i></p> <p><b>SEVERE (SEV.)</b> - 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. <i>IF TESTED, YIELDS SPT N VALUES &gt; 100 BPF</i></p> <p><b>VERY SEVERE (V SEV.)</b> - ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. <i>IF TESTED, YIELDS SPT N VALUES &lt; 100 BPF</i></p> <p><b>COMPLETE</b> - 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.</p> <p style="text-align: center;"><b>ROCK HARDNESS</b></p> <p><b>VERY HARD</b> - CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.</p> <p><b>HARD</b> - CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.</p> <p><b>MODERATELY HARD</b> - 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><b>MEDIUM HARD</b> - 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><b>SOFT</b> - CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.</p> <p><b>VERY SOFT</b> - CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGER NAIL.</p>
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		<p style="text-align: center;"><b>FRAC. SPACING</b></p> <p> ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION</p> <p> SOIL SYMBOL</p> <p> ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT</p> <p> INFERRED SOIL BOUNDARY</p> <p> INFERRED ROCK LINE</p> <p> ALLUVIAL SOIL BOUNDARY</p> <p> DIP &amp; DIP DIRECTION OF ROCK STRUCTURES</p> <p> SOUNDING ROD</p>	<p style="text-align: center;"><b>TERMS AND DEFINITIONS</b></p> <p><b>ALLUVIUM (ALLUV.)</b> - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.</p> <p><b>AQUIFER</b> - A WATER BEARING FORMATION OR STRATA.</p> <p><b>ARENACEOUS</b> - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.</p> <p><b>ARGILLACEOUS</b> - 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><b>ARTESIAN</b> - 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.</p> <p><b>CALCAREOUS (CALC.)</b> - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.</p> <p><b>COLLUVIUM</b> - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.</p> <p><b>CORE RECOVERY (REC.)</b> - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.</p> <p><b>DIKE</b> - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.</p> <p><b>DIP</b> - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.</p> <p><b>DIP DIRECTION (DIP AZIMUTH)</b> - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.</p> <p><b>FAULT</b> - A FRACTURE OR FRACTURE ZONE ALONG</p>																																																																																																																													

# SITE PLAN

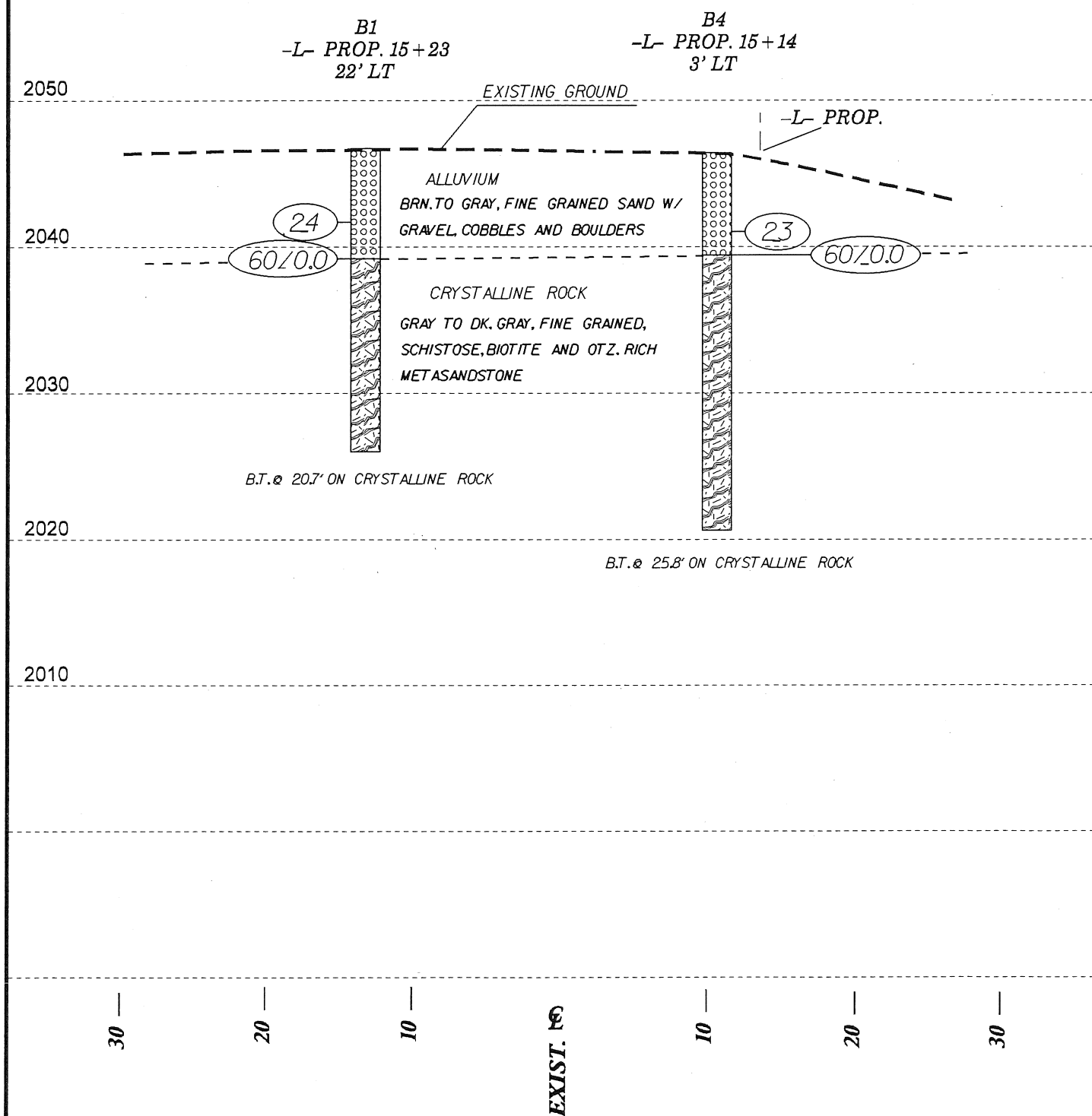


EXISTING SKEW = 70

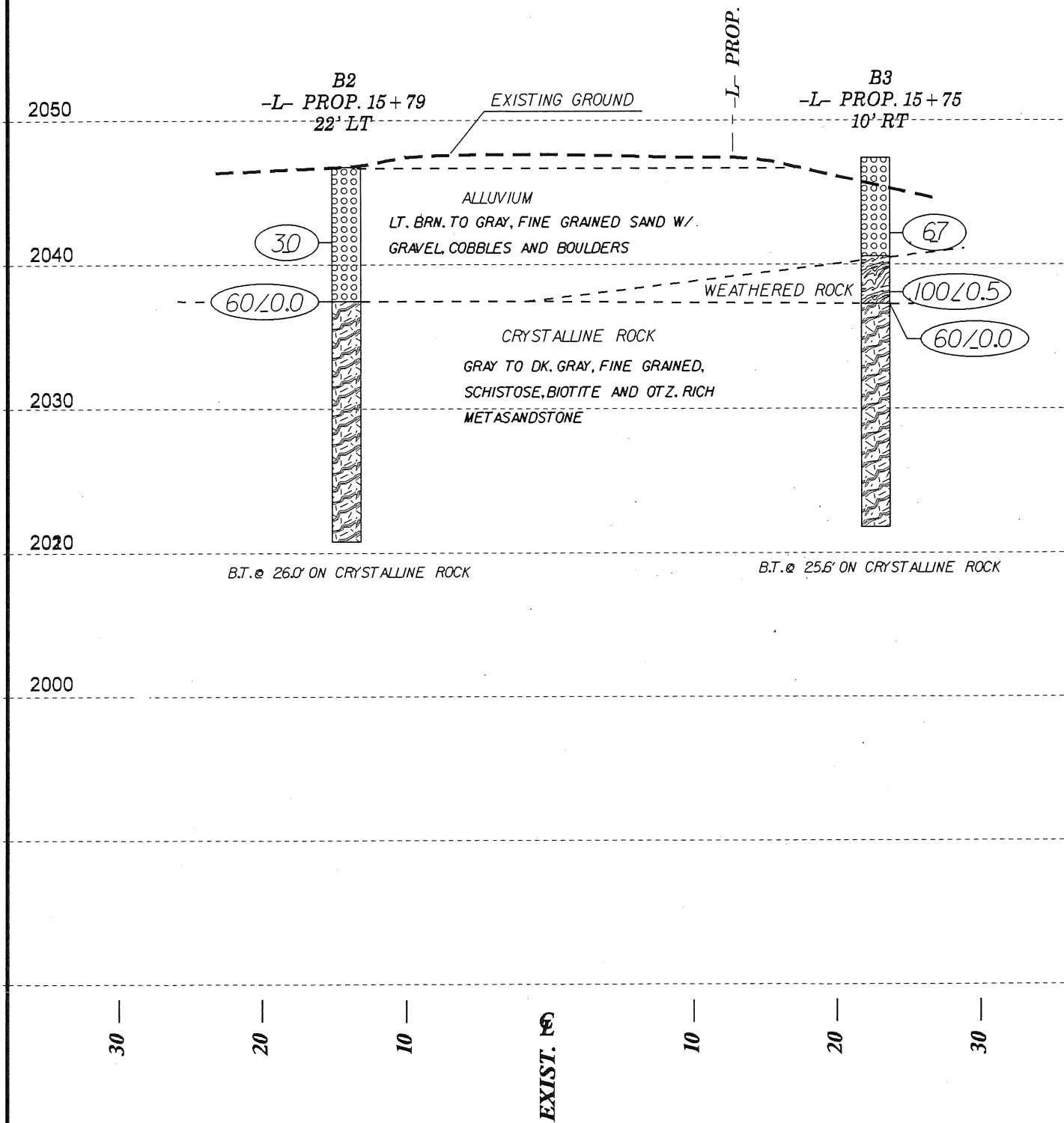
BM#2 -L-  
8" SPIKE IN BASE  
OF POWER POLE  
STA. 17+08.26 37.32' LT  
ELEV. = 2051.64



SKEW = 70°



HORIZ. SCALE 0 10 20 (FEET) VE = 1 SECTION THROUGH EB-1 ON SKEW



HORIZ. SCALE 0 10 20 (FEET) VE = 1 SECTION THROUGH EB-2 ON SKEW



WBS 45360.1.11		TIP BD-5114K		COUNTY CHEROKEE		GEOLOGIST Kuhne, J. C.										
SITE DESCRIPTION BR. NO. 42 ON SR 1338 OVER HANGING DOG CREEK							GROUND WTR (ft)									
BORING NO. B-1		STATION 15+23		OFFSET 23 ft LT		ALIGNMENT -L- PROP.										
COLLAR ELEV. 2,046.7 ft		TOTAL DEPTH 20.7 ft		NORTHING 568,247		EASTING 505,382										
DRILL RIG/HAMMER EFF./DATE F&H9274 CME-45C 85% 10/06/2010			DRILL METHOD SPT Core Boring			HAMMER TYPE Automatic										
DRILLER Contract Driller		START DATE 06/22/11		COMP. DATE 06/22/11		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION			
			0.5ft	0.5ft	0.5ft	0	25	50	75	100			ELEV. (ft)	DEPTH (ft)		
2050																
														2,046.7		GROUND SURFACE
2045																ALLUVIAL BRN. TO GRAY, FINE GRAINED SAND W/ GRAVEL, COBBLES, BOULDERS
2040	2,041.7	5.0	25	12	12											
2035	2,039.2	7.5	60/0.0													CRYSTALLINE ROCK GRAY TO DK. GRAY, FINE GRAINED, SCHISTOSE, BIOTITE AND QTZ. RICH METASANDSTONE
2030																
2025																Boring Terminated BY AUGER REFUSAL at Elevation 2,026.0 ft IN CRYSTALLINE ROCK, METASANDSTONE
2020																
2015																
2010																
2005																
2000																
1995																
1990																
1985																
1980																
1975																
1970																

NCDOT BORE SINGLE BD-5114K\_BORELOGS.GPJ\_NC\_DOT.GDT 8/3/11



WBS 45360.1.11		TIP BD-5114K		COUNTY CHEROKEE		GEOLOGIST Kuhne, J. C.						
SITE DESCRIPTION BR. NO. 42 ON SR 1338 OVER HANGING DOG CREEK							GROUND WTR (ft)					
BORING NO. B-1		STATION 15+23		OFFSET 23 ft LT		ALIGNMENT -L- PROP.						
COLLAR ELEV. 2,046.7 ft		TOTAL DEPTH 20.7 ft		NORTHING 568,247		EASTING 505,382						
DRILL RIG/HAMMER EFF./DATE F&H9274 CME-45C 85% 10/06/2010			DRILL METHOD SPT Core Boring			HAMMER TYPE Automatic						
DRILLER Contract Driller		START DATE 06/22/11		COMP. DATE 06/22/11		SURFACE WATER DEPTH N/A						
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (%)	RQD (%)		REC. (%)	RQD (%)			
2039.19												
	2,039.2	7.5	3.2	N=60/0.0 3:39/1.0 2:00/1.0 1:43/1.0 0:25/0.2	(3.2) 100%	(2.6) 81%					Begin Coring @ 7.5 ft CRYSTALLINE ROCK	7.5
2035	2,036.0	10.7	5.0	3:23/1.0 4:00/1.0 5:09/1.0 3:32/1.0 2:20/1.0	(4.6) 92%	(4.6) 92%						
2030	2,031.0	15.7	5.0	2:18/1.0 2:29/1.0 1:59/1.0 3:23/1.0 3:07/1.0	(5.0) 100%	(5.0) 100%						
2025	2,026.0	20.7									Boring Terminated BY AUGER REFUSAL at Elevation 2,026.0 ft IN CRYSTALLINE ROCK, METASANDSTONE	20.7
2020												
2015												
2010												
2005												
2000												
1995												
1990												
1985												
1980												
1975												
1970												
1965												
1960												

NCDOT CORE SINGLE BD-5114K\_BORELOGS.GPJ\_NC\_DOT.GDT 8/3/11

WBS 45360.1.11		TIP BD-5114K		COUNTY CHEROKEE		GEOLOGIST Kuhne, J. C.										
SITE DESCRIPTION BR. NO. 42 ON SR 1338 OVER HANGING DOG CREEK							GROUND WTR (ft)									
BORING NO. B-2 <i>EB26</i>		STATION 15+79		OFFSET 22 ft LT		ALIGNMENT -L- PROP.										
COLLAR ELEV. 2,046.8 ft		TOTAL DEPTH 26.0 ft		NORTHING 568,263		EASTING 505,433										
DRILL RIG/HAMMER EFF/DATE F&H9274 CME-45C 85% 10/06/2010			DRILL METHOD SPT Core Boring			HAMMER TYPE Automatic										
DRILLER Contract Driller		START DATE 06/22/11		COMP. DATE 06/22/11		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	ELEV. (ft)	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
2050																
2045														2,046.8	0.0	GROUND SURFACE
2040	2,042.1	4.7	3	14	16											ALLUVIAL LT. TO DK. BROWN, FINE GRAINED SAND W/ RK FRAGS, COBBLES AND BOULDERS
2035	2,037.5	9.3												2,037.5	9.3	CRYSTALLINE ROCK DK. GRAY, FINE GRAINED, SCHISTOSE, BIOTITE AND QTZ. RICH METASANDSTONE
2030																
2025																
														2,020.8	26.0	Boring Terminated BY AUGER REFUSAL at Elevation 2,020.8 ft IN CRYSTALLINE ROCK, METASANDSTONE

NCDOT BORE SINGLE BD-5114K\_BORELOGS.GPJ NC\_DOT.GDT 8/3/11

WBS 45360.1.11		TIP BD-5114K		COUNTY CHEROKEE		GEOLOGIST Kuhne, J. C.							
SITE DESCRIPTION BR. NO. 42 ON SR 1338 OVER HANGING DOG CREEK							GROUND WTR (ft)						
BORING NO. B-2		STATION 15+79		OFFSET 22 ft LT		ALIGNMENT -L- PROP.							
COLLAR ELEV. 2,046.8 ft		TOTAL DEPTH 26.0 ft		NORTHING 568,263		EASTING 505,433							
DRILL RIG/HAMMER EFF/DATE F&H9274 CME-45C 85% 10/06/2010			DRILL METHOD SPT Core Boring			HAMMER TYPE Automatic							
DRILLER Contract Driller		START DATE 06/22/11		COMP. DATE 06/22/11		SURFACE WATER DEPTH N/A							
CORE SIZE NQ2		TOTAL RUN 16.7 ft											
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS	ELEV. (ft)	DEPTH (ft)
					REC. (%)	RQD (%)		REC. (%)	RQD (%)				
2037.46													
2035	2,037.5 2,035.8	9.3 11.0	1.7	N=60/0.0 1:36/0.7 3:24/1.0	(1.7) 100%	(1.2) 71%					2,037.5	9.3	Begin Coring @ 9.3 ft CRYSTALLINE ROCK
2030	2,030.8	16.0	5.0	1:44/1.0 1:31/1.0 1:32/1.0 1:34/1.0 1:50/1.0	(4.8) 96%	(4.8) 96%							
2025	2,025.8	21.0	5.0	1:57/1.0 2:00/1.0 2:00/1.0 2:00/1.0 2:27/1.0	(5.0) 100%	(5.0) 100%							
	2,020.8	26.0		2:20/1.0 2:00/1.0 2:05/1.0 2:00/1.0	(4.9) 98%	(4.9) 98%					2,020.8	26.0	Boring Terminated BY AUGER REFUSAL at Elevation 2,020.8 ft IN CRYSTALLINE ROCK, METASANDSTONE

NCDOT CORE SINGLE BD-5114K\_BORELOGS.GPJ NC\_DOT.GDT 8/3/11

WBS 45360.1.11		TIP BD-5114K		COUNTY CHEROKEE		GEOLOGIST Kuhne, J. C.										
SITE DESCRIPTION BR. NO. 42 ON SR 1338 OVER HANGING DOG CREEK							GROUND WTR (ft)									
BORING NO. B-3		STATION 15+75		OFFSET 10 ft RT		ALIGNMENT -L- PROP.										
COLLAR ELEV. 2,047.4 ft		TOTAL DEPTH 25.6 ft		NORTHING 568,230		EASTING 505,441										
DRILL RIG/HAMMER EFF./DATE F&H9274 CME-45C 85% 10/06/2010		DRILL METHOD SPT Core Boring		HAMMER TYPE Automatic												
DRILLER Contract Driller		START DATE 06/22/11		COMP. DATE 06/22/11		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	ELEV. (ft)	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
2050														2,047.4	0.0	GROUND SURFACE
2045														2,040.6	6.8	WEATHERED ROCK BRN., FINE TO COARSE GRAINED SAND W/ RK FRAGS.
2040	2,042.7	4.7	16	48	19									2,037.3	10.1	CRYSTALLINE ROCK GRAY TO DK. GRAY/BLACK, FINE GRAINED, SCHISTOSE, QTZ. AND BIOTITE RICH METASANDSTONE
2035	2,038.1 2,037.3	9.3 10.1	100/5 60/0.0											2,021.8	25.6	Boring Terminated BY AUGER REFUSAL at Elevation 2,021.8 ft IN CRYSTALLINE ROCK, METASANDSTONE

NCDOT BORE SINGLE BD-5114K\_BORELOGS.GPJ NC\_DOT\_GDT\_8/3/11

WBS 45360.1.11		TIP BD-5114K		COUNTY CHEROKEE		GEOLOGIST Kuhne, J. C.								
SITE DESCRIPTION BR. NO. 42 ON SR 1338 OVER HANGING DOG CREEK							GROUND WTR (ft)							
BORING NO. B-3		STATION 15+75		OFFSET 10 ft RT		ALIGNMENT -L- PROP.								
COLLAR ELEV. 2,047.4 ft		TOTAL DEPTH 25.6 ft		NORTHING 568,230		EASTING 505,441								
DRILL RIG/HAMMER EFF./DATE F&H9274 CME-45C 85% 10/06/2010		DRILL METHOD SPT Core Boring		HAMMER TYPE Automatic										
DRILLER Contract Driller		START DATE 06/22/11		COMP. DATE 06/22/11		SURFACE WATER DEPTH N/A								
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	TOTAL RUN 15.5 ft		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS	ELEV. (ft)	DEPTH (ft)	
					REC. (%)	RQD (%)		REC. (ft)	RQD (ft)					
2037.34	2,037.34	10.1	0.5	N=60/0.0 1:24/0.5	(0.5)	(0.0)					2,037.3	10.1	Begin Coring @ 10.1 ft CRYSTALLINE ROCK	
2035	2,036.8	10.6	5.0	1:37/1.0 2:35/1.0 2:42/1.0 2:34/1.0 3:37/1.0	(4.6)	(3.3)								
2030	2,031.8	15.6	5.0	3:15/1.0 3:03/1.0 3:27/1.0 3:38/1.0 3:22/1.0	(5.0)	(4.2)								
2025	2,026.8	20.6	5.0	3:30/1.0 4:00/1.0 3:20/1.0 3:27/1.0 3:36/1.0	(5.0)	(3.8)								
	2,021.8	25.6										2,021.8	25.6	Boring Terminated BY AUGER REFUSAL at Elevation 2,021.8 ft IN CRYSTALLINE ROCK, METASANDSTONE

NCDOT CORE SINGLE BD-5114K\_BORELOGS.GPJ NC\_DOT\_GDT\_8/3/11

WBS 45360.1.11		TIP BD-5114K		COUNTY CHEROKEE		GEOLOGIST Kuhne, J. C.										
SITE DESCRIPTION BR. NO. 42 ON SR 1338 OVER HANGING DOG CREEK						GROUND WTR (ft)										
BORING NO. B-4		STATION 15+14		OFFSET 3 ft LT		ALIGNMENT -L- PROP.										
COLLAR ELEV. 2,046.5 ft		TOTAL DEPTH 25.8 ft		NORTHING 568,225		EASTING 505,379										
DRILL RIG/HAMMER EFF./DATE F&H9274 CME-45C 85% 10/06/2010		DRILL METHOD SPT Core Boring		HAMMER TYPE Automatic												
DRILLER Contract Driller		START DATE 06/25/11		COMP. DATE 06/25/11		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	ELEV. (ft)	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
2050																
2045														2,046.5		GROUND SURFACE
2040	2,041.6	4.9	11	14	9											ALLUVIAL BRN/GRAY, FINE GRAINED SAND W/ RK FRAGS., COBBLES, BOULDERS
2035	2,039.5	7.0	60/0.0													CRYSTALLINE ROCK GRAY TO DK. GRAY, FINE GRAINED, SEMI-SCHISTOSE, QTZ. AND BIOTITE RICH METASANDSTONE
2030																
2025																
														2,020.7		Boring Terminated BY AUGER REFUSAL at Elevation 2,020.7 ft IN CRYSTALLINE ROCK, METASANDSTONE

NCDOT BORE SINGLE BD-5114K\_BORELOGS.GPJ NC\_DOT.GDT 8/3/11

WBS 45360.1.11		TIP BD-5114K		COUNTY CHEROKEE		GEOLOGIST Kuhne, J. C.						
SITE DESCRIPTION BR. NO. 42 ON SR 1338 OVER HANGING DOG CREEK						GROUND WTR (ft)						
BORING NO. B-4		STATION 15+14		OFFSET 3 ft LT		ALIGNMENT -L- PROP.						
COLLAR ELEV. 2,046.5 ft		TOTAL DEPTH 25.8 ft		NORTHING 568,225		EASTING 505,379						
DRILL RIG/HAMMER EFF./DATE F&H9274 CME-45C 85% 10/06/2010		DRILL METHOD SPT Core Boring		HAMMER TYPE Automatic								
DRILLER Contract Driller		START DATE 06/25/11		COMP. DATE 06/25/11		SURFACE WATER DEPTH N/A						
CORE SIZE NQ2		TOTAL RUN 18.8 ft										
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (ft)	ROD (ft)		REC. (ft)	ROD (ft)			
2039.45												
	2,039.5	7.0	3.8	N=60/0.0 2:45/1.0 2:08/1.0 4:22/1.0 1:27/0.8	(3.8) 100%	(3.6) 95%					Begin Coring @ 7.0 ft CRYSTALLINE ROCK	7.0
2035	2,035.7	10.8	5.0	3:29/1.0 4:14/1.0 3:34/1.0 3:26/1.0 4:14/1.0	(4.9) 98%	(4.8) 96%						
2030	2,030.7	15.8	5.0	5:01/1.0 6:01/1.0 8:36/1.0 6:20/1.0 5:39/1.0	(4.9) 98%	(4.9) 98%						
2025	2,025.7	20.8	5.0	5:10/1.0 4:37/1.0 3:50/1.0 3:52/1.0 3:57/1.0	(5.0) 100%	(4.7) 94%						
	2,020.7	25.8									Boring Terminated BY AUGER REFUSAL at Elevation 2,020.7 ft IN CRYSTALLINE ROCK, METASANDSTONE	25.8

NCDOT CORE SINGLE BD-5114K\_BORELOGS.GPJ NC\_DOT.GDT 8/3/11

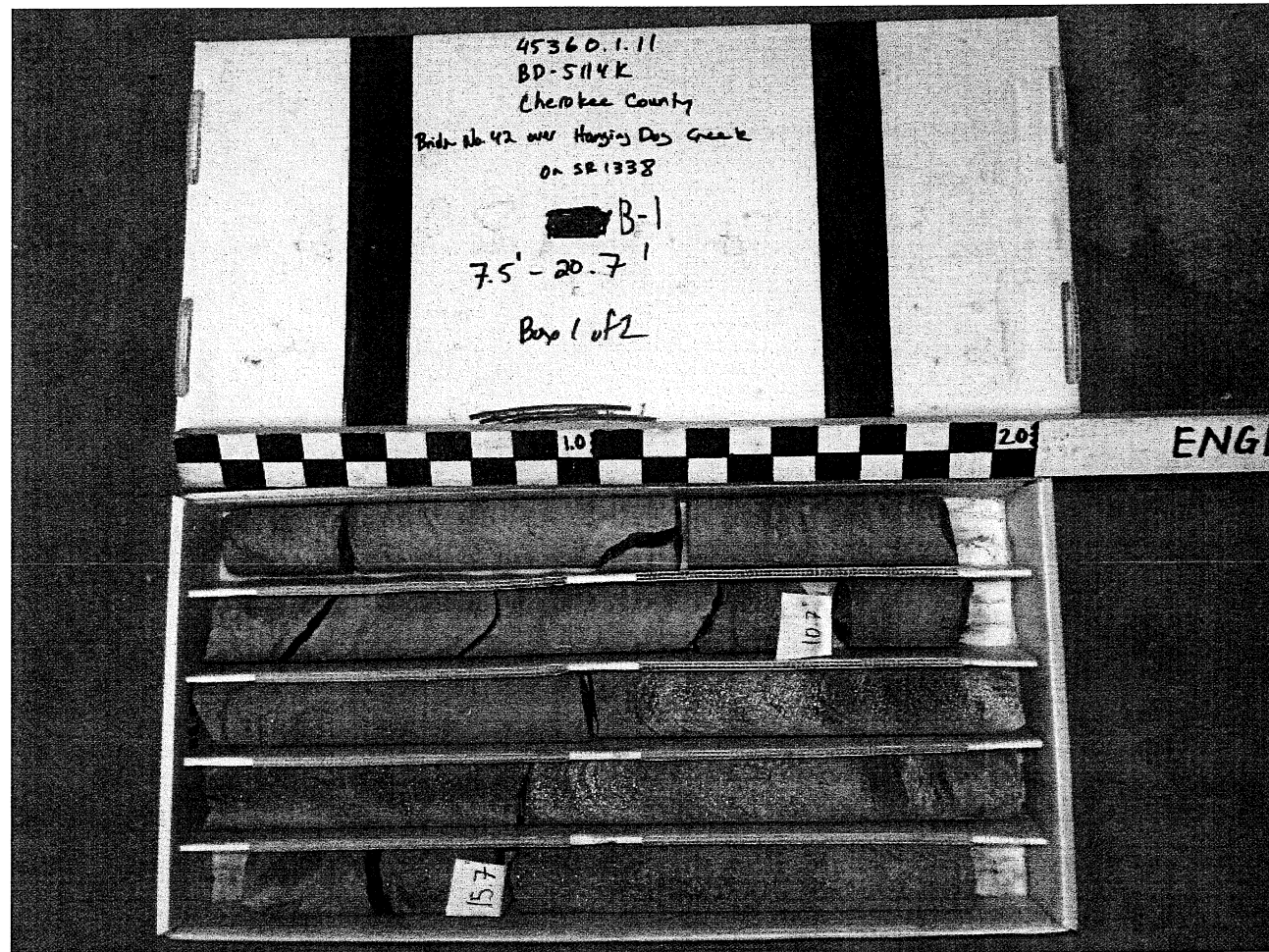




BD-5114K, 45360.1.11

BORING B1  
BOX 1 OF 2

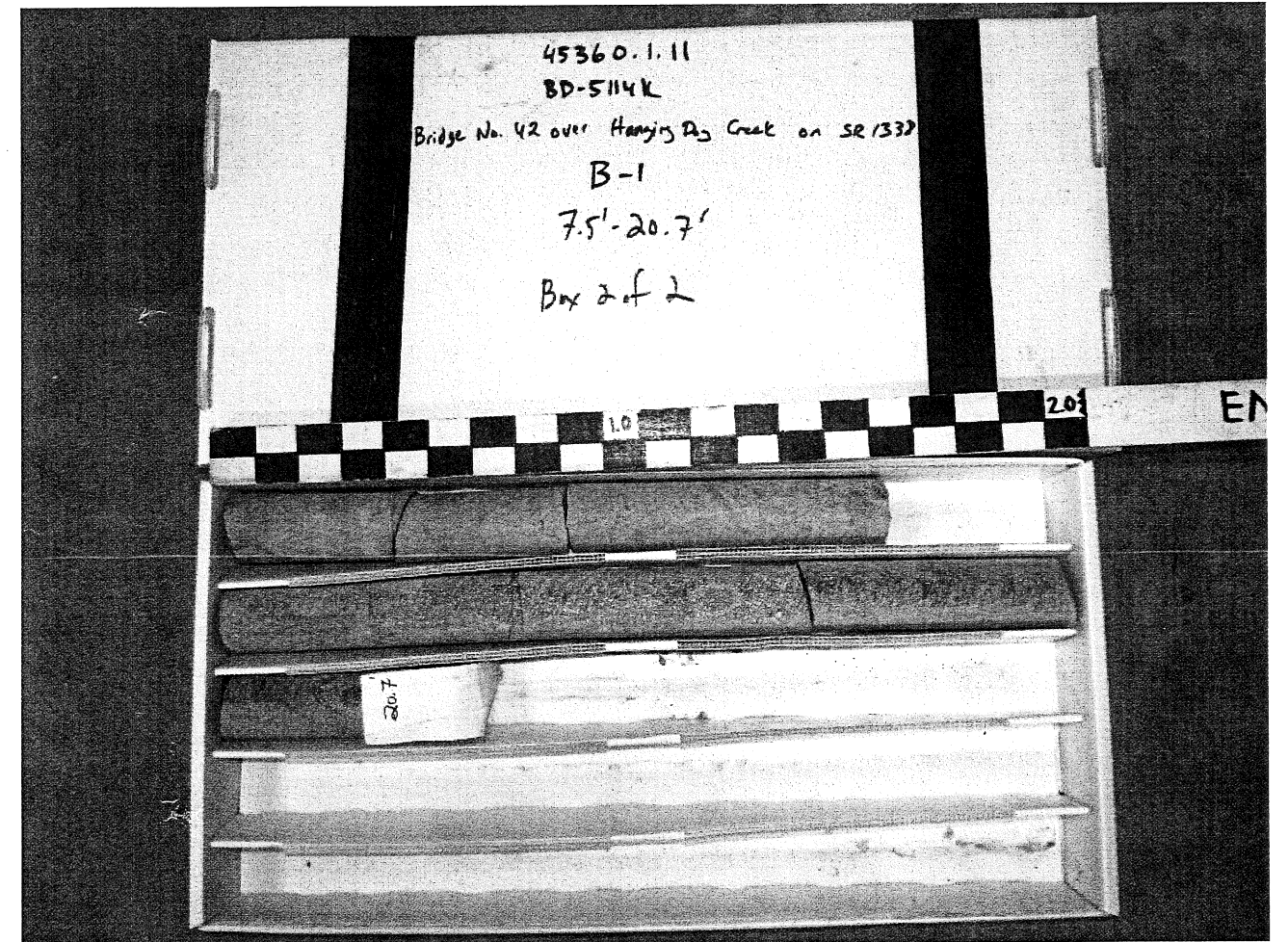
DEPTH: 7.5' - 16.7'



BD-5114K, 45360.1.11

BORING B1  
BOX 2 OF 2

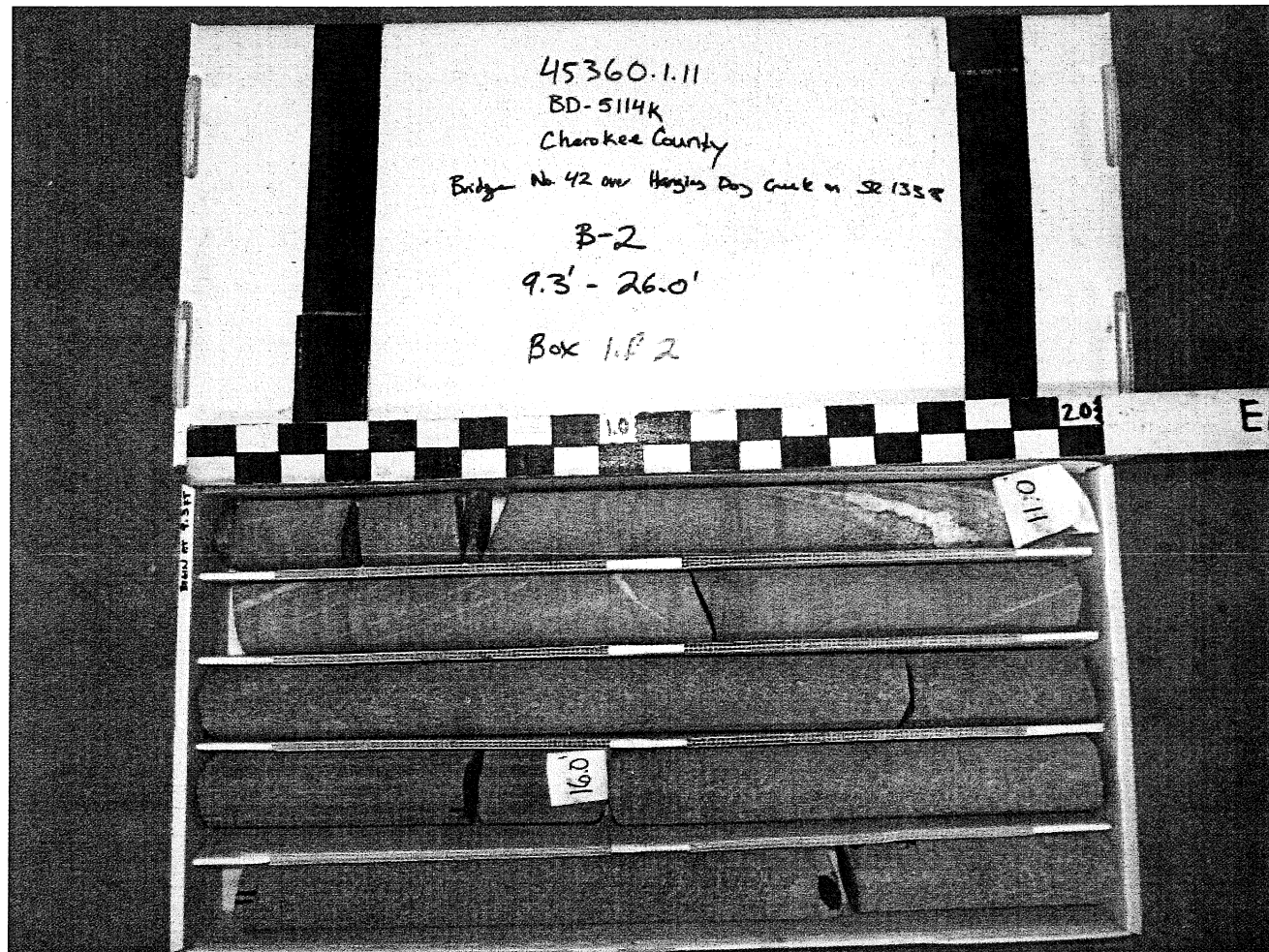
DEPTH: 16.7' - 20.7'



BD-5114K, 45360.1.11

BORING B2  
BOX 1 OF 2

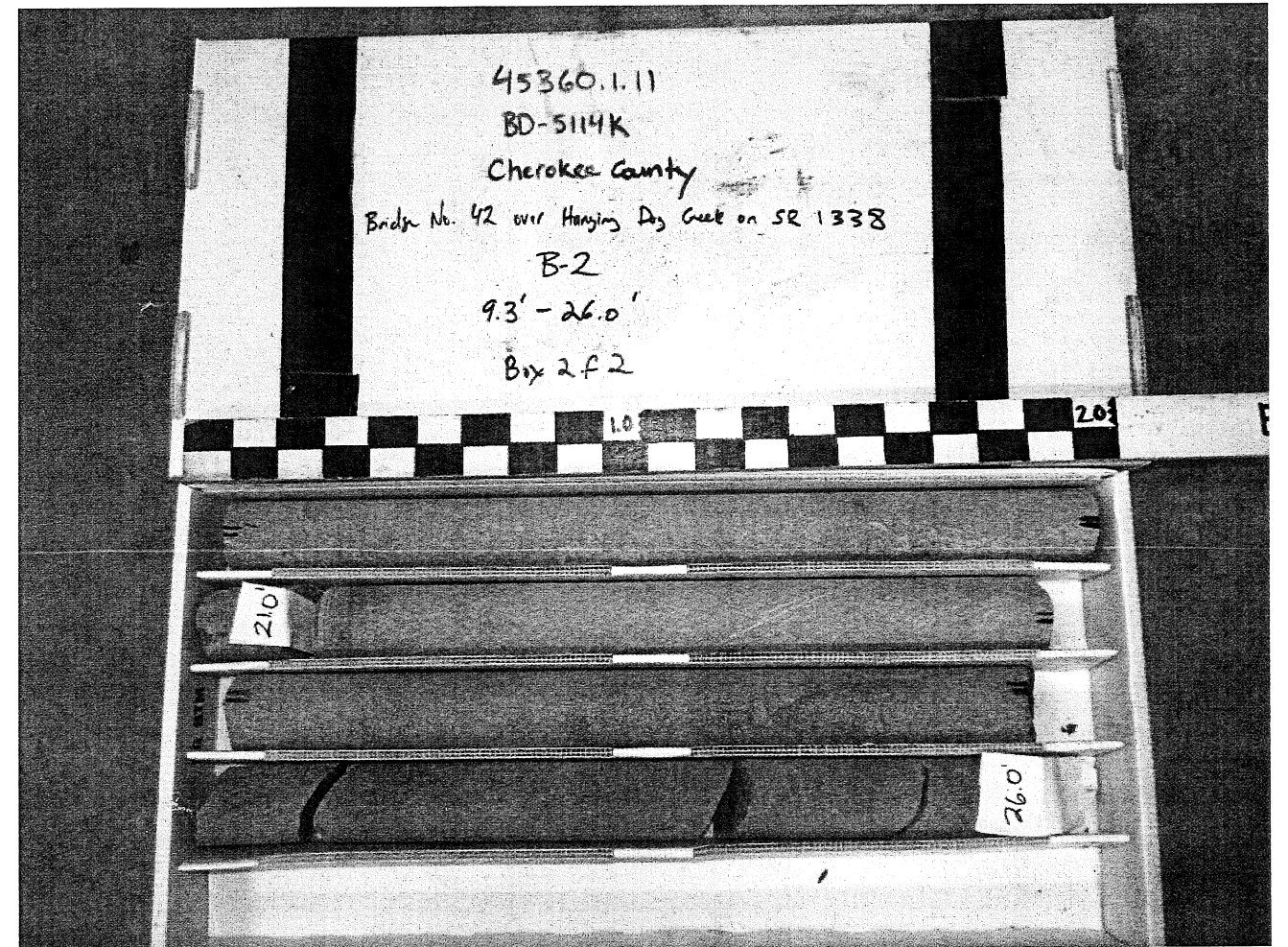
DEPTH: 9.3' - 19.2'



BD-5114K, 45360.1.11

BORING B2  
BOX 2 OF 2

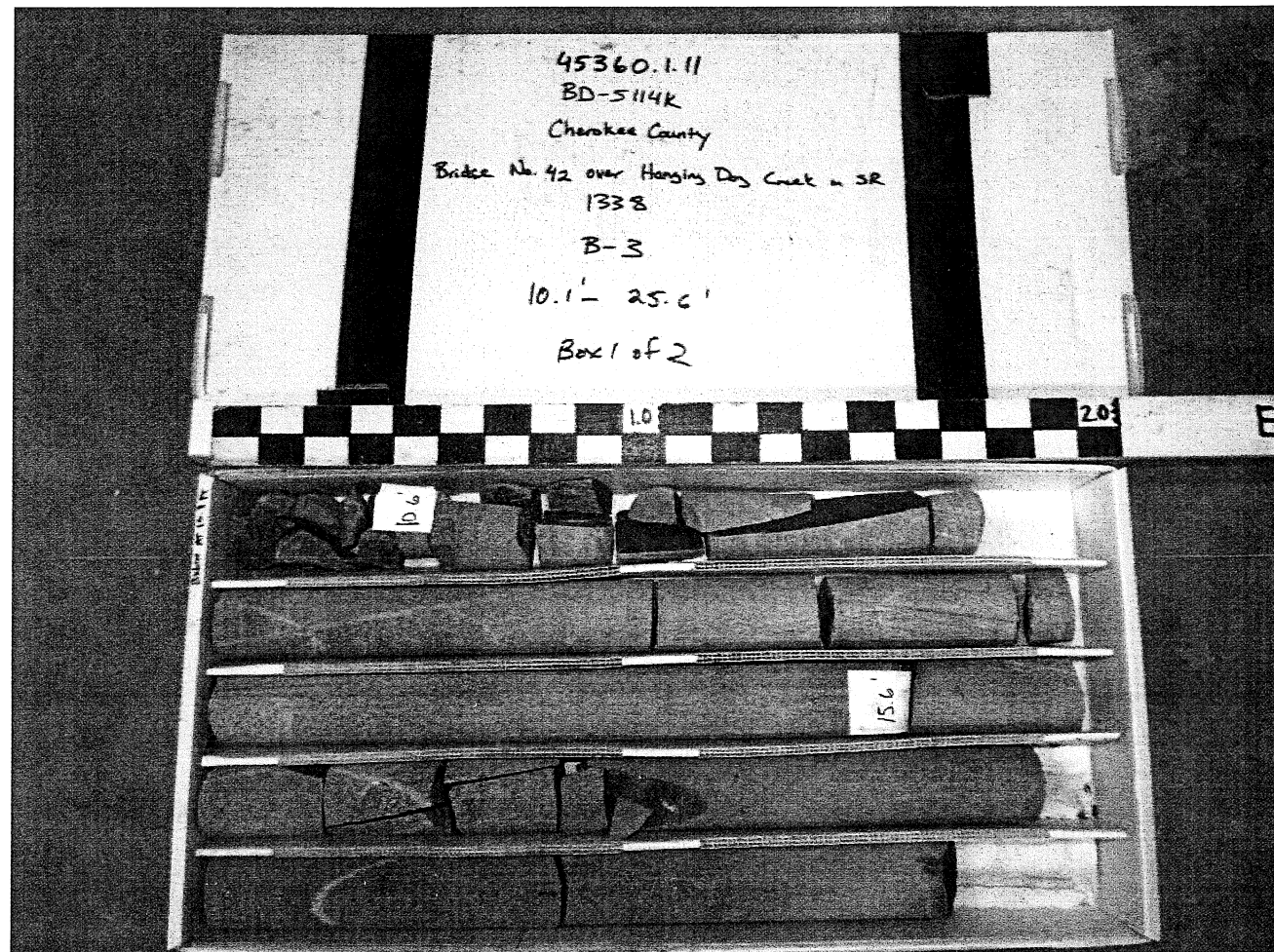
DEPTH: 19.2' - 26.0'



BD-5114K, 45360.1.11

BORING B3  
BOX 1 OF 2

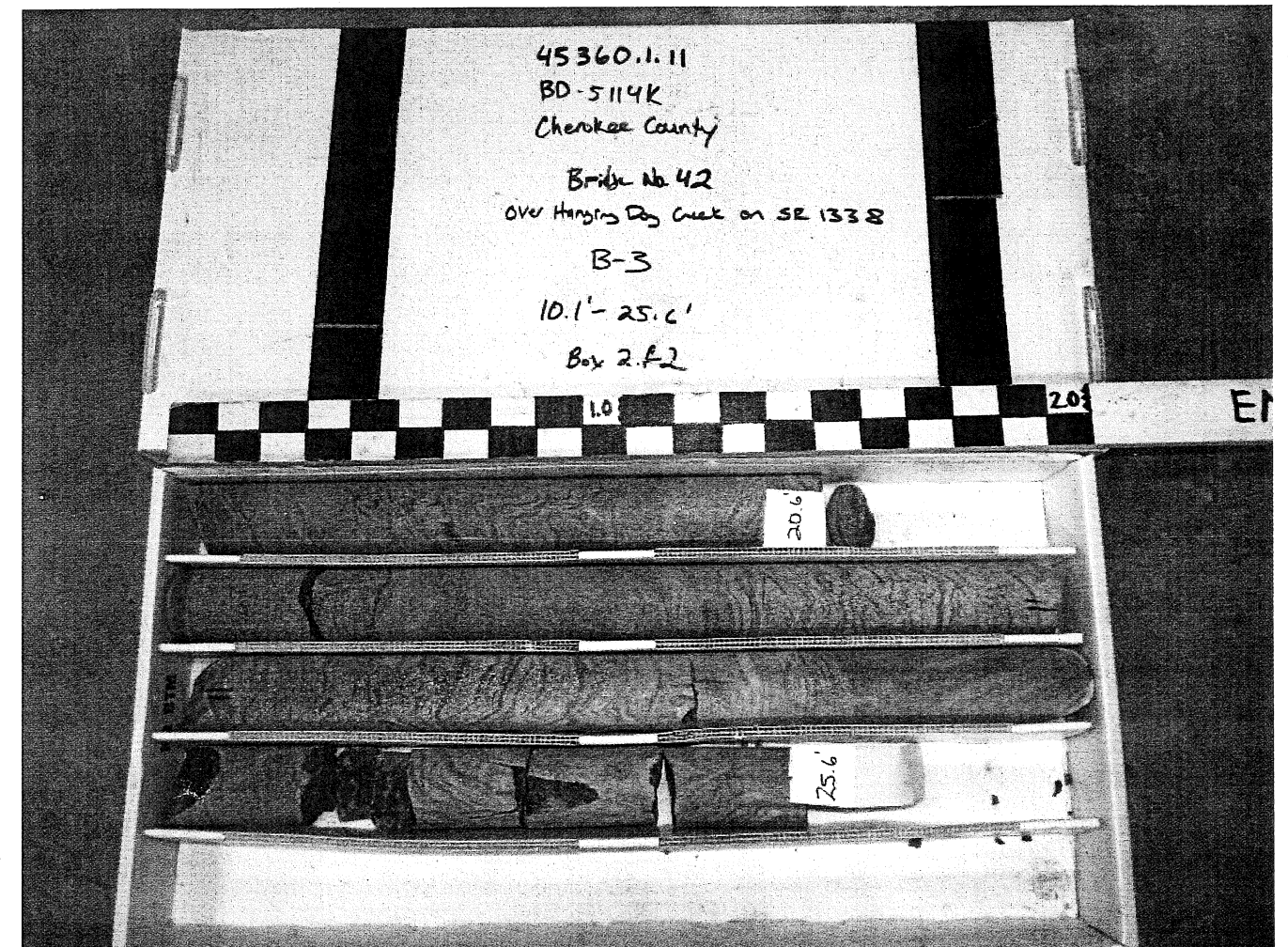
DEPTH: 10.1' - 19.4'



BD-5114K, 45360.1.11

BORING B3  
BOX 2 OF 2

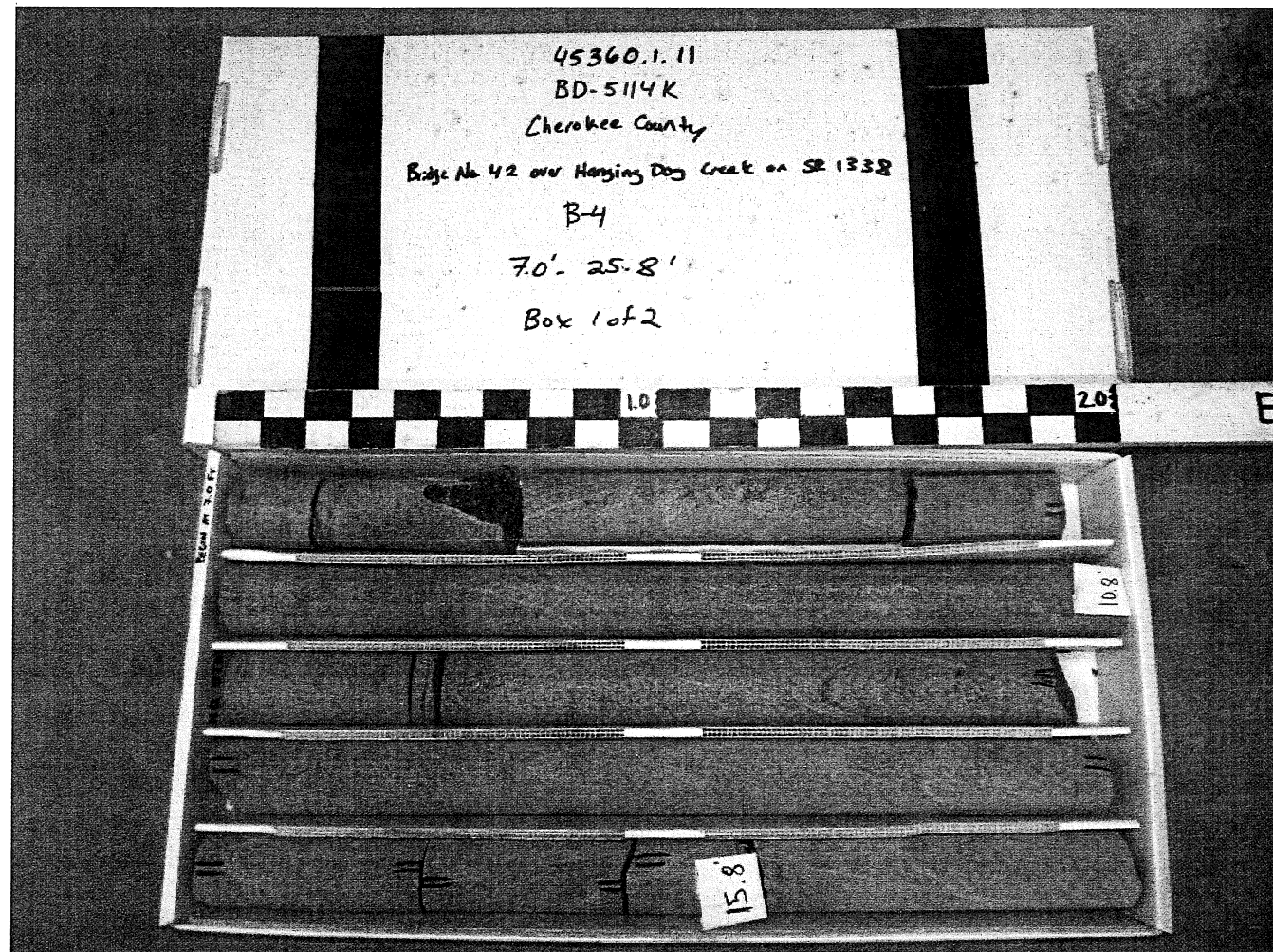
DEPTH: 19.4' - 25.6'



BD-5114K, 45360.1.11

BORING B4  
BOX 1 OF 2

DEPTH: 7.0' - 16.7'



BD-5114K, 45360.1.11

BORING B4  
BOX 2 OF 2

DEPTH: 16.7' - 25.8'

