

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

STRUCTURE
SUBSURFACE INVESTIGATION

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PROJ. REFERENCE NO. 34915.1.1(U-3308) F.A. PROJ. STP-55(20)
COUNTY DURHAM
PROJECT DESCRIPTION NC 55 (ALSTON AVE.) FROM NC 147
(BUCK DEAN FREEWAY) TO NORTH OF US 70 BUS/NC 98
(HOLLOWAY ST.)
SITE DESCRIPTION BRIDGE NO. 12 ON -L- (NC 55) OVER NC 147
INVENTORY

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, 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.

PROJECT: 34915.1.1 ID: U-3308

PERSONNEL

J.L. PEDRO

TIERRA ENG. INC.

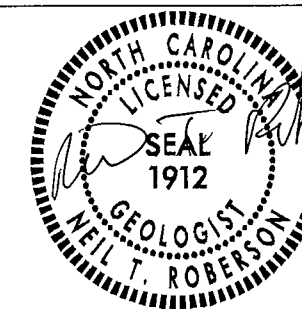
MIDATLANTIC INC.

INVESTIGATED BY J.L. PEDRO

CHECKED BY N.T. ROBERSON

SUBMITTED BY N.T. ROBERSON

DATE NOVEMBER 2007



11/20/07

DRAWN BY: T.T. WALKER

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.

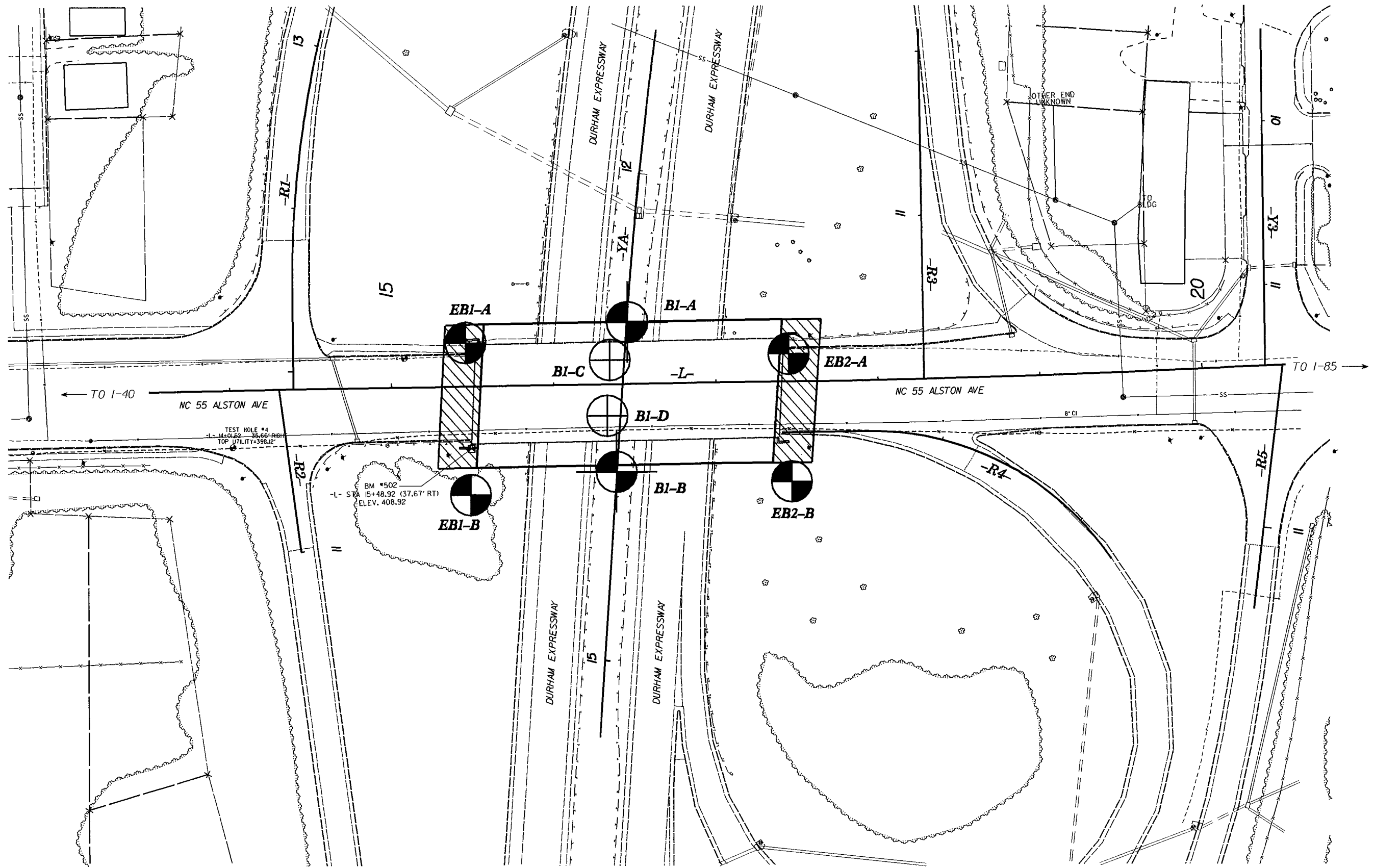
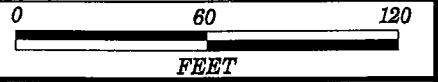
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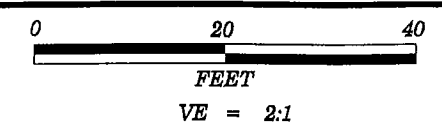
SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

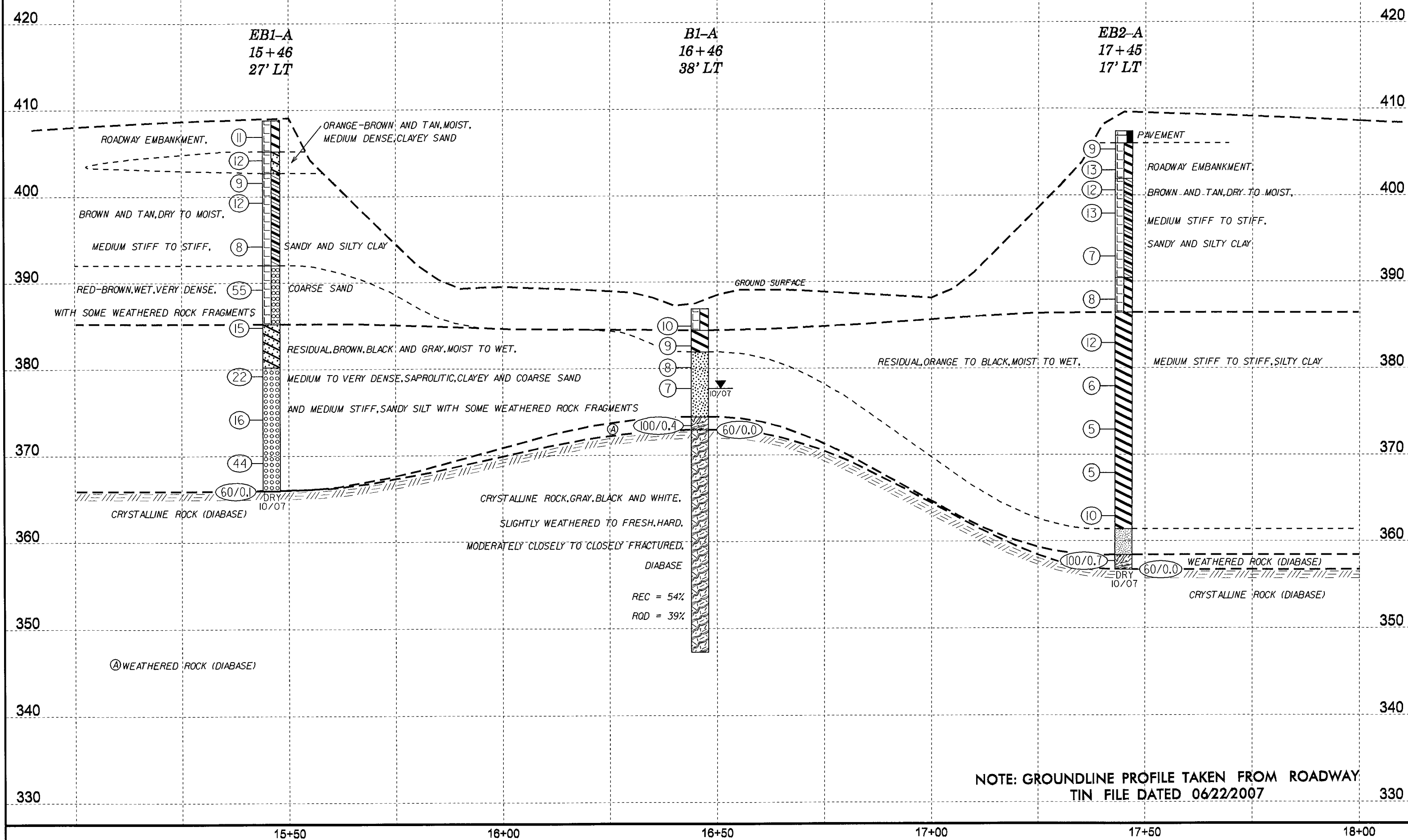
SOIL DESCRIPTION		GRADATION		ROCK DESCRIPTION		TERMS AND DEFINITIONS																																																																											
<p>SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, 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, SAT. CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, MEDIUM 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 style="text-align: center;">ANGULARITY OF GRAINS</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>ALLUVIUM (ALLUV.) - SOILS THAT 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 IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.</p> <p>CALCAREOUS (CALC.) - SOILS THAT 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 (FP) - 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 (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.</p> <p>ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.</p> <p>SAPROLITE (SAP.) - RESIDUAL SOIL THAT 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, THAT 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 (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.</p> <p>STRATA CORE RECOVERY (SCREC) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.</p> <p>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.</p> <p>TOPSOIL (TS) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p>																																																																											
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ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.</p> <p style="text-align: center;">COMPRESSIBILITY</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;">PERCENTAGE OF MATERIAL</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>>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	<p>FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.</p> <p>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.</p> <p>SLIGHT (SL.) ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1/2 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>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.</p> <p>MODERATELY SEVERE (MOD. SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. <i>IF TESTED, WOULD YIELD SPT REFUSAL</i></p> <p>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. <i>IF TESTED, YIELDS SPT N VALUES > 100 BPF</i></p> <p>VERY SEVERE (V SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. <i>IF TESTED, YIELDS SPT N VALUES < 100 BPF</i></p> <p>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.</p>	
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COLOR																																																																																	
<p>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.</p>																																																																																	

SITE PLAN

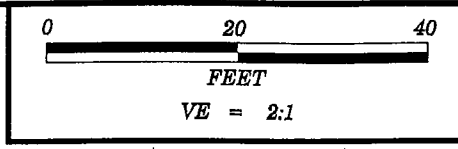




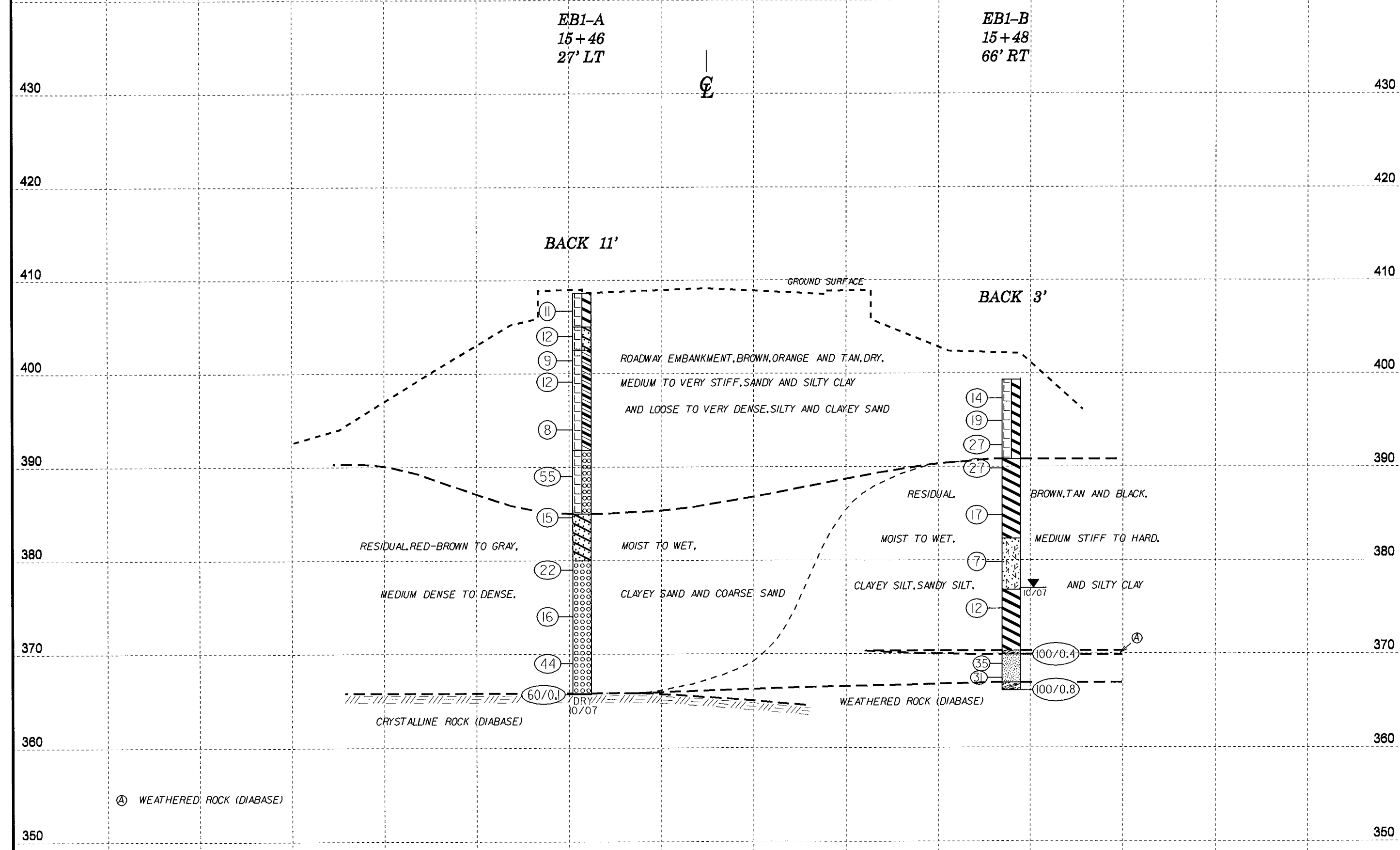
PROJECT REFERENCE NO.	SHEET
34915.1.1(U-3308)	4
FENCE DIAGRAM OF BORINGS PROJECTED ALONG -L-	

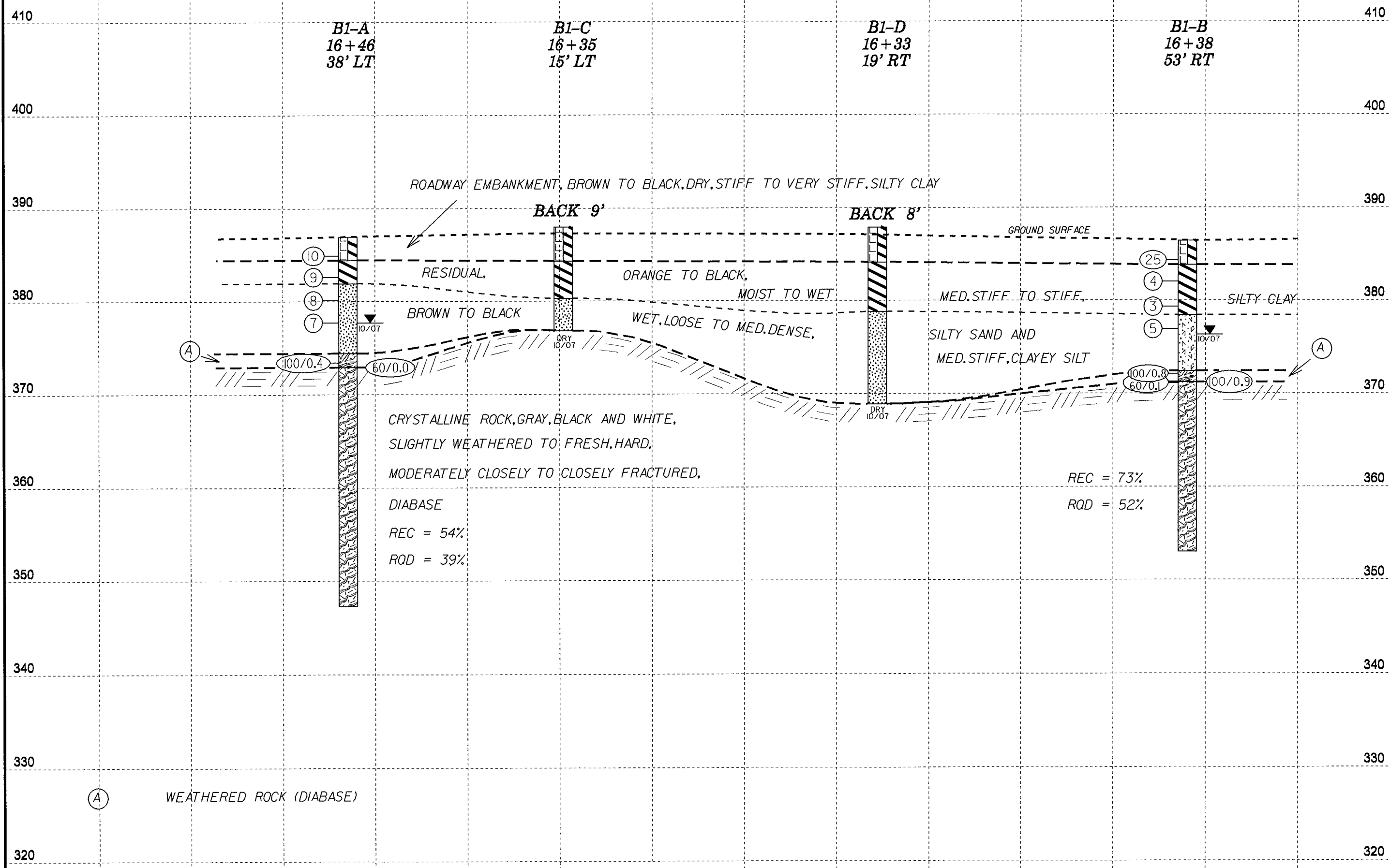


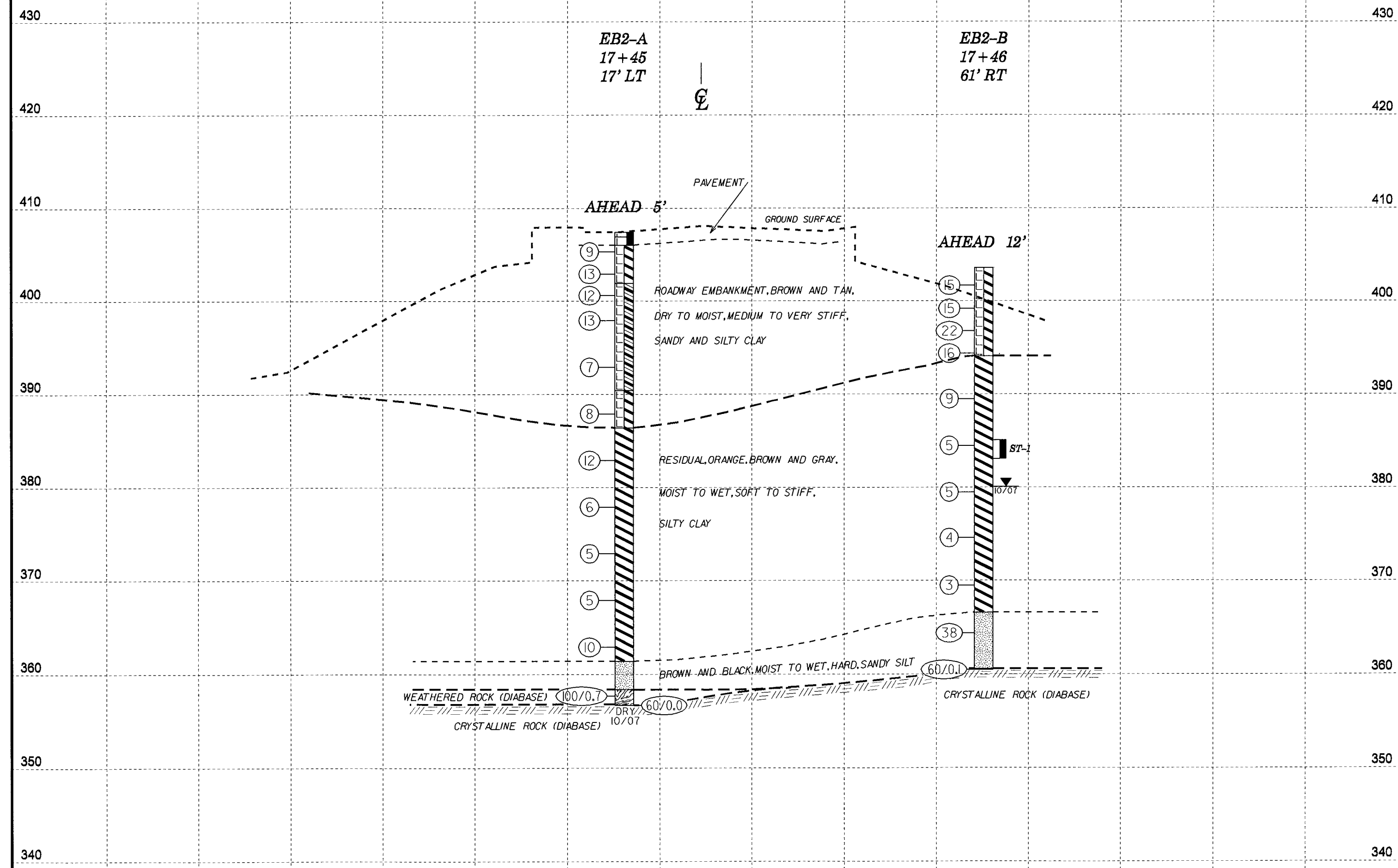
NOTE: GROUNDLINE PROFILE TAKEN FROM ROADWAY TIN FILE DATED 06/22/2007



PROJECT REFERENCE NO.	SHEET
34915.1.1(U-3308)	5
CROSS SECTION THROUGH END BENT 1	

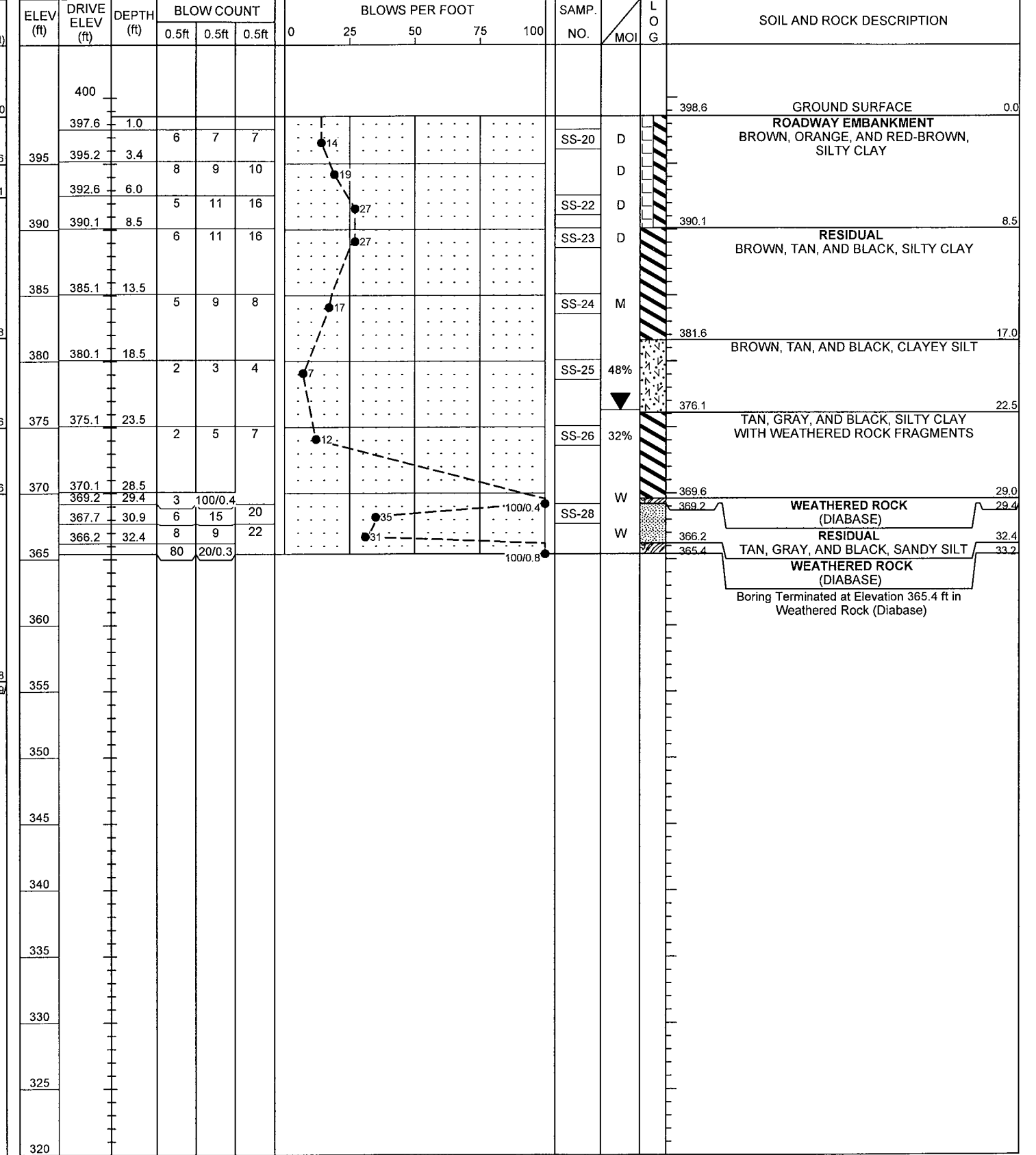
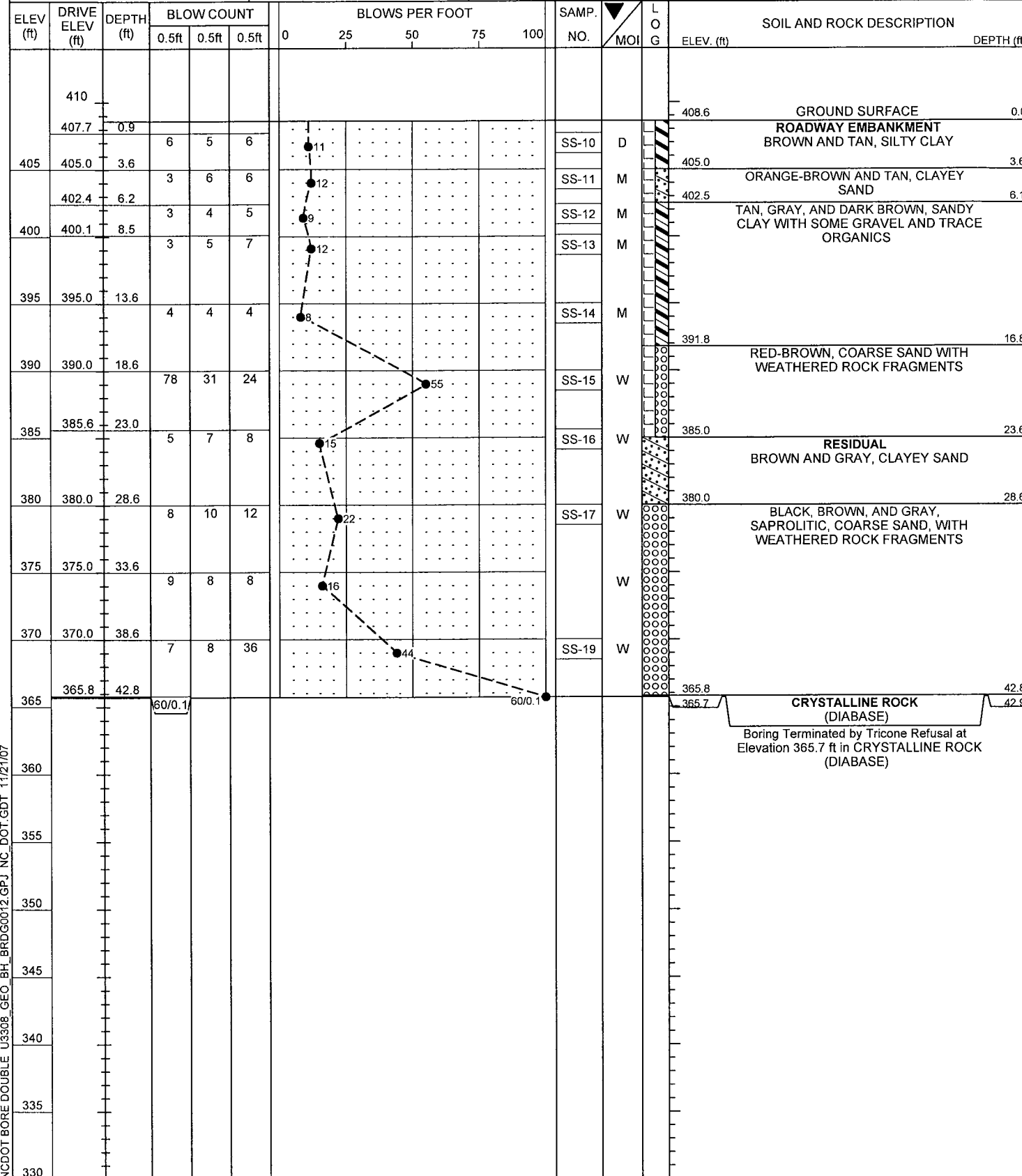






PROJECT NO. 34915.1.1	ID. U-3308	COUNTY DURHAM	GEOLOGIST FELA, D.
SITE DESCRIPTION BRIDGE NO. 12 ON -L- (NC 55) OVER NC 147			GROUND WTR (ft)
BORING NO. EB1-A	STATION 15+46	OFFSET 27ft LT	ALIGNMENT -L-
COLLAR ELEV. 408.6 ft	TOTAL DEPTH 42.9 ft	NORTHING 812,367	EASTING 2,032,356
DRILL MACHINE CME-45B	DRILL METHOD Mud Rotary	HAMMER TYPE Manual	
START DATE 10/12/07	COMP. DATE 10/12/07	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 42.8 ft

PROJECT NO. 34915.1.1	ID. U-3308	COUNTY DURHAM	GEOLOGIST FELA, D.
SITE DESCRIPTION BRIDGE NO. 12 ON -L- (NC 55) OVER NC 147			GROUND WTR (ft)
BORING NO. EB1-B	STATION 15+48	OFFSET 66ft RT	ALIGNMENT -L-
COLLAR ELEV. 398.6 ft	TOTAL DEPTH 33.2 ft	NORTHING 812,334	EASTING 2,032,443
DRILL MACHINE CME-45B	DRILL METHOD H.S. Augers	HAMMER TYPE Manual	
START DATE 10/15/07	COMP. DATE 10/15/07	SURFACE WATER DEPTH N/A	DEPTH TO ROCK N/A



NCDOT BORE DOUBLE U3308_GEO_BH_BRD0012.GPJ NC_DOT_GDT_11/21/07

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

PROJECT NO. 34915.1.1	ID. U-3308	COUNTY DURHAM	GEOLOGIST FELA, D.
SITE DESCRIPTION BRIDGE NO. 12 ON -L- (NC 55) OVER NC 147			GROUND WTR (ft)
BORING NO. B1-A	STATION 16+46	OFFSET 38ft LT	ALIGNMENT -L-
COLLAR ELEV. 386.9 ft	TOTAL DEPTH 39.6 ft	NORTHING 812,464	EASTING 2,032,382
DRILL MACHINE CME-45B	DRILL METHOD SPT Core Boring	HAMMER TYPE Manual	
START DATE 10/17/07	COMP. DATE 10/17/07	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 14.0 ft

PROJECT NO. 34915.1.1	ID. U-3308	COUNTY DURHAM	GEOLOGIST FELA, D.
SITE DESCRIPTION BRIDGE NO. 12 ON -L- (NC 55) OVER NC 147			GROUND WTR (ft)
BORING NO. B1-A	STATION 16+46	OFFSET 38ft LT	ALIGNMENT -L-
COLLAR ELEV. 386.9 ft	TOTAL DEPTH 39.6 ft	NORTHING 812,464	EASTING 2,032,382
DRILL MACHINE CME-45B	DRILL METHOD SPT Core Boring	HAMMER TYPE Manual	
START DATE 10/17/07	COMP. DATE 10/17/07	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 14.0 ft

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
390															
385.9	385.9	1.0	4	5	5										
383.6	383.6	3.3	3	4	5										
381.1	381.1	5.8	2	4	4										
378.7	378.7	8.2	2	2	5										
373.8	373.8	13.1													
372.9	372.9	14.0	100/0.4												
370			60/0.0												
365															
360															
355															
350															
345															
340															
335															
330															
325															
320															
315															
310															

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 (%)			
372.9	372.9	14.0	0.8	2:50/0.8	(0.7)	(0.7)		(13.8)	(10.0)		Begin Coring @ 14.0 ft	14.0
370	372.1	14.8	5.0	W=60/0.0	88%	88%		54%	39%		CRYSTALLINE ROCK	
365	367.1	19.8	4.8	1:05/1.0	(1.7)	(1.5)	RS-1				GRAY, BLACK, AND WHITE, SLIGHTLY WEATHERED TO FRESH, HARD, MODERATELY TO CLOSELY FRACTURED, DIABASE	
360	362.3	24.6	5.0	1:19/1.0	(1.7)	(1.4)						
355	357.3	29.6	5.0	1:36/1.0	(3.0)	(1.4)						
350	352.3	34.6	5.0	1:38/1.0	34%	29%						
345	347.3	39.6		4:49/1.0	(5.0)	(3.3)						
340				6:28/1.0	100%	86%						
335				4:31/1.0								
330				5:32/1.0								
325				4:05/1.0								
320				4:55/1.0								
315				7:27/1.0								
310				9:45/1.0								
295												

NCDOT BORE DOUBLE U3308_GEO_BH_BRD0012.GPJ NC_DOT_GDT_11/21/07

Boring Terminated at Elevation 347.3 ft in CRYSTALLINE ROCK (DIABASE)

Boring Terminated at Elevation 347.3 ft in CRYSTALLINE ROCK (DIABASE)

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 34915.1.1	ID. U-3308	COUNTY DURHAM	GEOLOGIST FELA, D.
SITE DESCRIPTION BRIDGE NO. 12 ON -L- (NC 55) OVER NC 147			GROUND WTR (ft)
BORING NO. B1-C	STATION 16+35	OFFSET 15ft LT	ALIGNMENT -L-
COLLAR ELEV. 388.0 ft	TOTAL DEPTH 11.2 ft	NORTHING 812,445	EASTING 2,032,400
DRILL MACHINE CME-45B	DRILL METHOD Mud Rotary	HAMMER TYPE N/A	
START DATE 10/18/07	COMP. DATE 10/18/07	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 11.2 ft

PROJECT NO. 34915.1.1	ID. U-3308	COUNTY DURHAM	GEOLOGIST FELA, D.
SITE DESCRIPTION BRIDGE NO. 12 ON -L- (NC 55) OVER NC 147			GROUND WTR (ft)
BORING NO. B1-D	STATION 16+33	OFFSET 19ft RT	ALIGNMENT -L-
COLLAR ELEV. 387.9 ft	TOTAL DEPTH 19.0 ft	NORTHING 812,431	EASTING 2,032,431
DRILL MACHINE CME-45B	DRILL METHOD Mud Rotary	HAMMER TYPE N/A	
START DATE 10/18/07	COMP. DATE 10/18/07	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 19.0 ft

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT				SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75				
390												GROUND SURFACE	0.0
385											M	ROADWAY EMBANKMENT BROWN, SILTY CLAY	3.7
380											M	RESIDUAL BROWN AND GRAY, SILTY CLAY	7.7
375											M	BROWN AND GRAY, COARSE SAND	11.2
370												Boring Terminated by Tricone Refusal at Elevation 376.8 ft on	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT				SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75				
390												GROUND SURFACE	0.0
385											M	ROADWAY EMBANKMENT BROWN, SILTY CLAY	3.8
380											M	RESIDUAL BROWN, SILTY CLAY	9.1
375											W	BROWN AND GRAY, COARSE SAND	19.0
370												Boring Terminated by Tricone Refusal at Elevation 368.9 ft on	

NCDOT BORE DOUBLE U3308_GEO_BH_BRD0012.GPJ NC_DOT_GDT_11/20/07

PROJECT NO. 34915.1.1	ID. U-3308	COUNTY DURHAM	GEOLOGIST FELA, D.
SITE DESCRIPTION BRIDGE NO. 12 ON -L- (NC 55) OVER NC 147			GROUND WTR (ft)
BORING NO. B1-B	STATION 16+38	OFFSET 53ft RT	ALIGNMENT -L- 0 HR. N/A
COLLAR ELEV. 386.4 ft	TOTAL DEPTH 33.4 ft	NORTHING 812,423	EASTING 2,032,464 24 HR. 10.1
DRILL MACHINE CME-45B	DRILL METHOD SPT Core Boring	HAMMER TYPE Manual	
START DATE 10/16/07	COMP. DATE 10/16/07	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 15.2 ft

PROJECT NO. 34915.1.1	ID. U-3308	COUNTY DURHAM	GEOLOGIST FELA, D.
SITE DESCRIPTION BRIDGE NO. 12 ON -L- (NC 55) OVER NC 147			GROUND WTR (ft)
BORING NO. B1-B	STATION 16+38	OFFSET 53ft RT	ALIGNMENT -L- 0 HR. N/A
COLLAR ELEV. 386.4 ft	TOTAL DEPTH 33.4 ft	NORTHING 812,423	EASTING 2,032,464 24 HR. 10.1
DRILL MACHINE CME-45B	DRILL METHOD SPT Core Boring	HAMMER TYPE Manual	
START DATE 10/16/07	COMP. DATE 10/16/07	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 15.2 ft

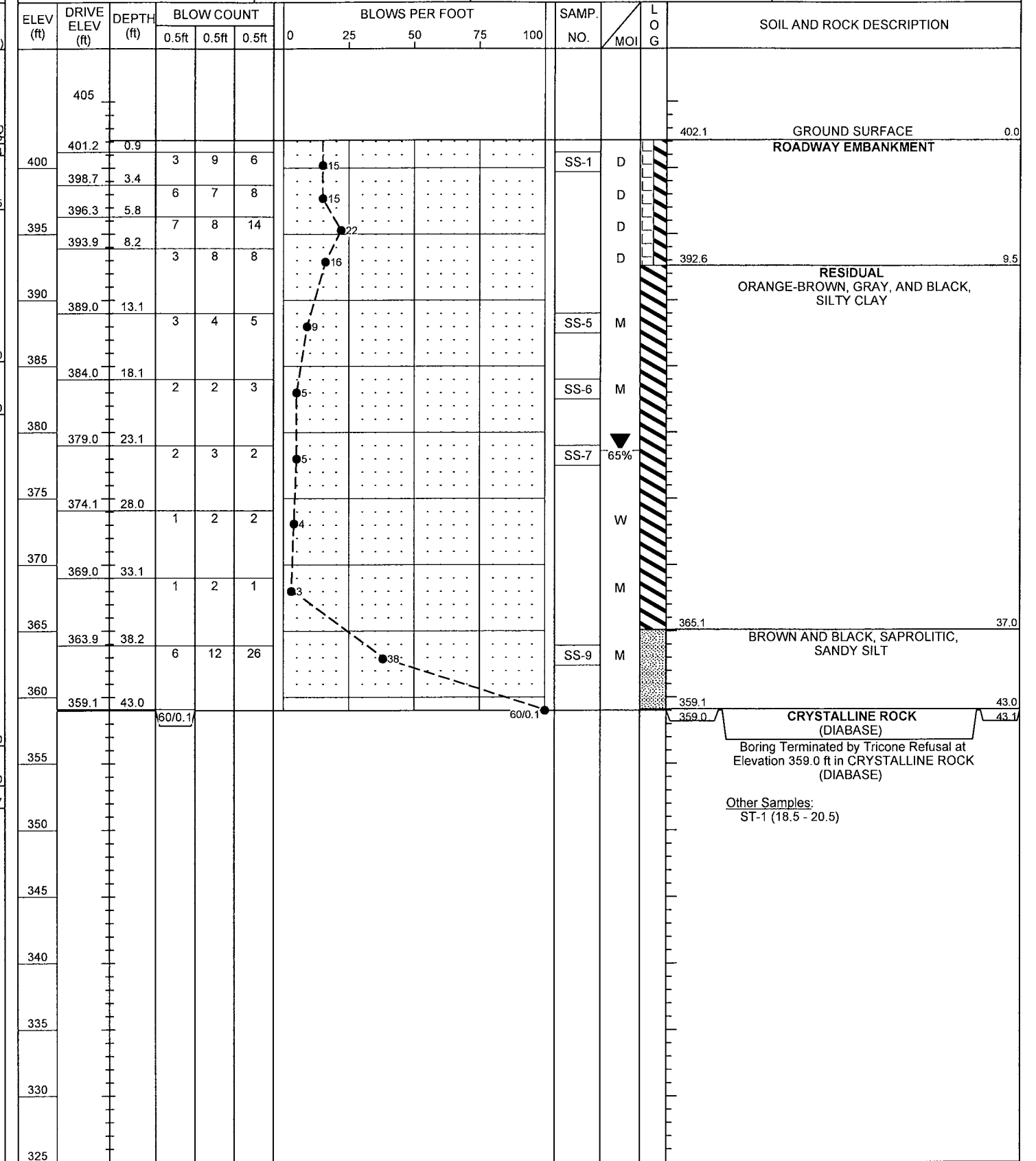
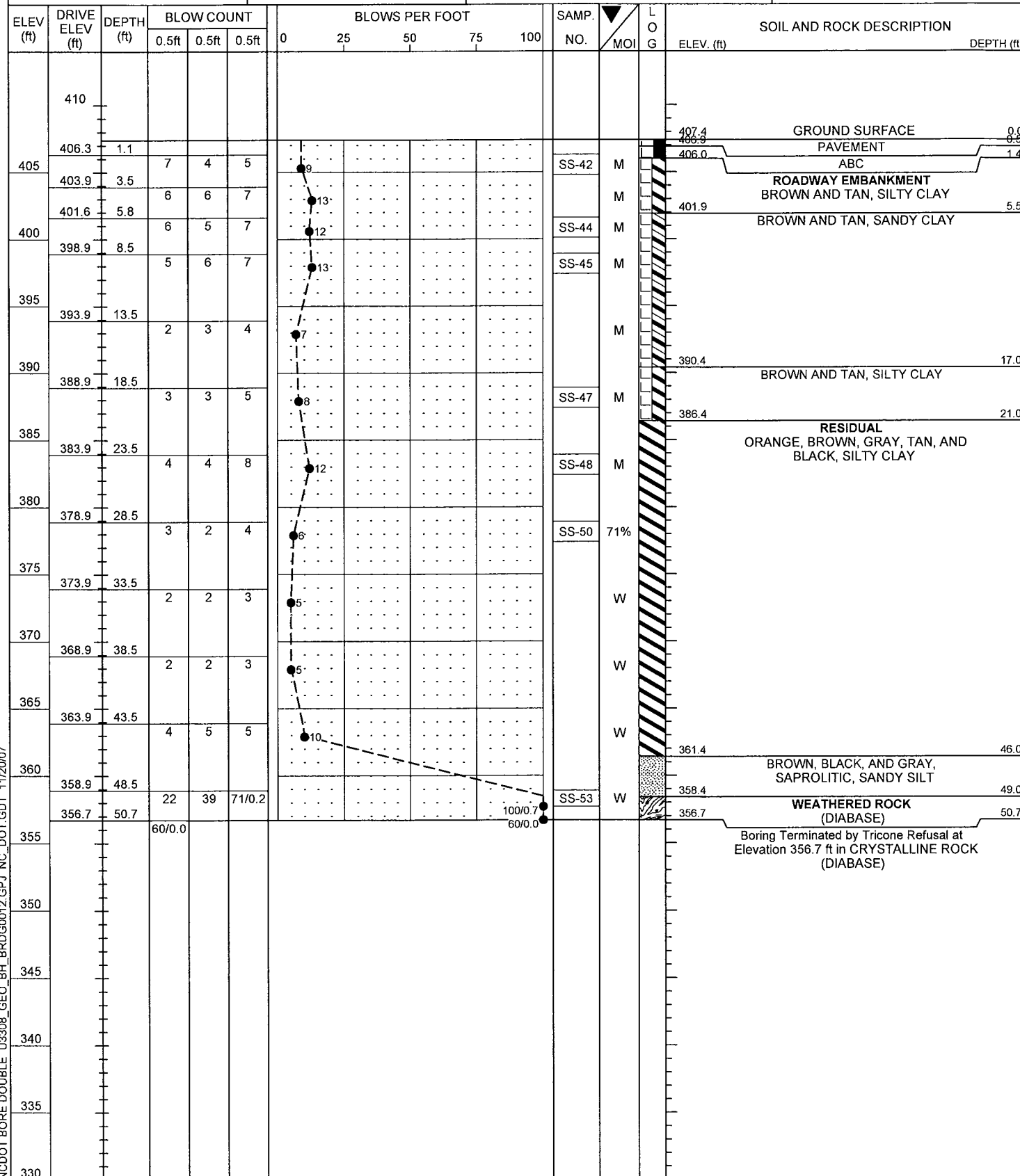
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
390															
385.3	385.3	1.1													
383.0	383.0	3.4	9	12	13										
380.3	380.3	6.1	2	2	2										
377.9	377.9	8.5	1	1	2										
375			1	2	3										
372.9	372.9	13.5													
372.1	372.1	14.3	4	96/0.3											
371.2	371.2	15.2	34	66/0.4											
370															
365															
360															
355															
350															
345															
340															
335															
330															
325															
320															
315															
310															

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 (%)			
371.2												
370	371.2	15.2	0.6	N=60/0.1	(0.6)	(0.6)	RS-2	(13.2)	(9.4)		Begin Coring @ 15.2 ft	15.2
	370.6	15.8	4.0	13:54/0.6	100%	100%					CRYSTALLINE ROCK	
	370.5	15.9		22:40/1.0	(3.3)	(2.7)					GRAY, BLACK AND WHITE, SLIGHTLY WEATHERED TO FRESH, HARD, MODERATELY CLOSELY TO CLOSELY FRACTURED, DIABASE	
365	366.5	19.9	5.0	1:25/1.0	83%	68%						
				1:21/1.0	(3.4)	(2.6)						
				5:30/1.0	68%	52%						
				4:56/1.0								
				7:34/1.0								
360	361.5	24.9	4.2	3:39/1.0								
				1:05/1.0	(1.8)	(0.5)						
				2:03/1.0	43%	12%						
				5:50/1.0								
				6:06/1.0								
355	357.3	29.1	4.3	6:50/0.2	(4.1)	(3.0)						
				2:31/1.0	95%	70%						
				2:34/1.0								
350	353.0	33.4		3:55/1.0							Boring Terminated at Elevation 353.0 ft in CRYSTALLINE ROCK (DIABASE)	33.4
				3:34/0.3								
345												
340												
335												
330												
325												
320												
315												
310												
305												
300												
295												

NCDOT BORE DOUBLE U3308_GEO_BH_BRD0012.GPJ NC_DOT.GDT 11/21/07

PROJECT NO. 34915.1.1	ID. U-3308	COUNTY DURHAM	GEOLOGIST FELA, D.
SITE DESCRIPTION BRIDGE NO. 12 ON -L- (NC 55) OVER NC 147			GROUND WTR (ft)
BORING NO. EB2-A	STATION 17+45	OFFSET 17ft LT	ALIGNMENT -L-
COLLAR ELEV. 407.4 ft	TOTAL DEPTH 50.7 ft	NORTHING 812,548	EASTING 2,032,438
DRILL MACHINE CME-45B	DRILL METHOD Mud Rotary	HAMMER TYPE Manual	
START DATE 10/18/07	COMP. DATE 10/18/07	SURFACE WATER DEPTH N/A	DEPTH TO ROCK N/A

PROJECT NO. 34915.1.1	ID. U-3308	COUNTY DURHAM	GEOLOGIST FELA, D.
SITE DESCRIPTION BRIDGE NO. 12 ON -L- (NC 55) OVER NC 147			GROUND WTR (ft)
BORING NO. EB2-B	STATION 17+46	OFFSET 61ft RT	ALIGNMENT -L-
COLLAR ELEV. 402.1 ft	TOTAL DEPTH 43.1 ft	NORTHING 812,520	EASTING 2,032,511
DRILL MACHINE CME-45B	DRILL METHOD H.S. Augers	HAMMER TYPE Manual	
START DATE 10/11/07	COMP. DATE 10/11/07	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 43.0 ft



NCDOT BORE DOUBLE U3308_GEO_BH_BRD0012.GPJ NC_DOT_GDT 11/20/07

Other Samples:
ST-1 (18.5 - 20.5)

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-10	27' LT	15+46	0.9-2.4	A-7-6(12)	47	20	23.2	16.4	20.2	40.1	100	84	64	-	-
SS-11	27' LT	15+46	3.6-5.1	A-2-6(1)	32	14	43.3	21.0	12.8	22.9	89	60	35	-	-
SS-12	27' LT	15+46	6.2-7.7	A-6(5)	38	14	23.9	23.5	19.3	33.3	96	82	55	-	-
SS-13	27' LT	15+46	8.5-10.0	A-6(3)	30	11	26.2	22.9	23.8	27.1	93	76	52	-	-
SS-14	27' LT	15+46	13.6-15.1	A-6(2)	32	11	31.2	23.7	15.9	29.1	95	80	47	-	-
SS-15	27' LT	15+46	18.6-20.1	A-1-a(0)	30	3	55.8	20.8	6.8	16.6	40	24	11	-	-
SS-16	27' LT	15+46	23.6-25.1	A-2-7(1)	42	16	38.7	25.2	23.6	12.5	75	51	31	-	-
SS-17	27' LT	15+46	28.6-30.1	A-1-b(0)	34	5	47.9	22.5	19.3	10.4	62	37	22	-	-
SS-19	27' LT	15+46	38.6-40.1	A-1-b(0)	34	5	49.3	22.5	17.8	10.4	74	44	24	-	-

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-20	66' RT	15+48	1.0-2.5	A-7-6(9)	42	18	22.5	19.4	18.6	39.5	96	82	60	-	-
SS-22	66' RT	15+48	6.0-7.5	A-7-5(18)	55	25	16.2	14.2	19.7	49.9	98	87	71	-	-
SS-23	66' RT	15+48	8.5-10.0	A-7-6(23)	57	29	12.9	16.2	25.1	45.8	100	90	75	-	-
SS-24	66' RT	15+48	13.5-15.0	A-7-6(8)	48	21	28.7	18.9	23.2	29.1	92	70	52	-	-
SS-25	66' RT	15+48	18.5-20.0	A-5(1)	42	9	36.2	24.3	27.0	12.5	89	63	41	48.1	-
SS-26	66' RT	15+48	23.5-25.0	A-7-5(5)	44	13	27.9	23.3	30.1	18.7	97	76	52	31.9	-
SS-28	66' RT	15+48	29.4-30.9	A-4(0)	40	6	40.2	27.3	20.1	12.5	100	69	39	-	-

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-37	38' LT	16+46	1.0-2.5	A-7-5(23)	59	27	10.4	16.2	23.4	49.9	99	92	77	-	-
SS-38	38' LT	16+46	3.3-4.8	A-7-6(5)	43	14	30.4	21.9	24.9	22.9	97	72	51	-	-
SS-39	38' LT	16+46	5.8-7.3	A-2-4(0)	34	NP	47.7	21.9	18.0	12.5	91	54	32	-	-

B1-B

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-31	53' RT	16+38	1.1-2.6	A-7-5(16)	52	21	15.4	15.6	29.4	39.5	100	89	73	-	-
SS-32	53' RT	16+38	3.4-4.9	A-7-5(13)	51	18	16.2	19.8	30.7	33.3	100	91	69	49.5	-
SS-34	53' RT	16+38	8.5-10.0	A-5(0)	42	6	46.2	20.0	23.4	10.4	95	57	37	-	-

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		
SS-42	17' LT	17+45	1.1-2.6	A-7-6(7)	43	21	34.5	16.6	15.5	33.3	95	71	49	-	-
SS-44	17' LT	17+45	5.8-7.3	A-6(3)	33	12	30.6	18.7	23.6	27.1	89	68	50	-	-
SS-45	17' LT	17+45	8.5-10.0	A-6(3)	34	12	34.5	16.2	18.0	31.2	92	65	49	-	-
SS-47	17' LT	17+45	18.5-20.0	A-7-6(9)	44	25	27.5	25.8	11.3	35.4	99	84	50	-	-
SS-48	17' LT	17+45	23.5-25.0	A-7-5(54)	82	48	3.1	4.4	17.6	74.9	100	98	94	-	-
SS-50	17' LT	17+45	28.5-30.0	A-7-5(27)	66	28	6.2	15.4	38.8	39.5	100	98	81	71.4	-
SS-53	17' LT	17+45	48.5-50.0	A-4(0)	36	5	36.4	31.6	21.5	10.4	98	75	37	-	-

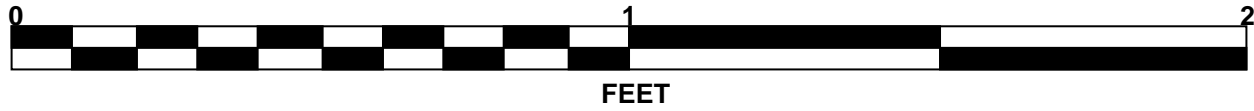
EB2-B

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	61' RT	17+46	0.9-2.4	A-7-6(7)	48	20	29.5	13.8	22.6	34.1	83	64	49	-	-
SS-5	61' RT	17+46	13.1-14.6	A-7-5(26)	63	22	3.6	11.0	35.3	50.1	100	98	90	-	-
SS-6	61' RT	17+46	18.1-19.6	A-7-5(42)	75	37	1.4	8.4	44.1	46.1	100	100	92	-	-
SS-7	61' RT	17+46	23.1-24.6	A-7-5(21)	61	20	10.8	9.0	52.1	28.1	100	92	83	65.2	-
SS-9	61' RT	17+46	38.2-39.7	A-4(0)	30	5	37.7	31.3	23.0	8.0	100	75	37	-	-

CORE PHOTOGRAPHS

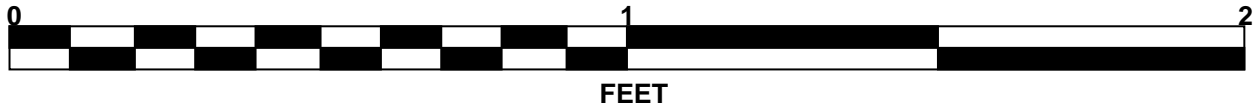
B1-A

BOXES 1 & 2: 14.0 - 39.6 FEET



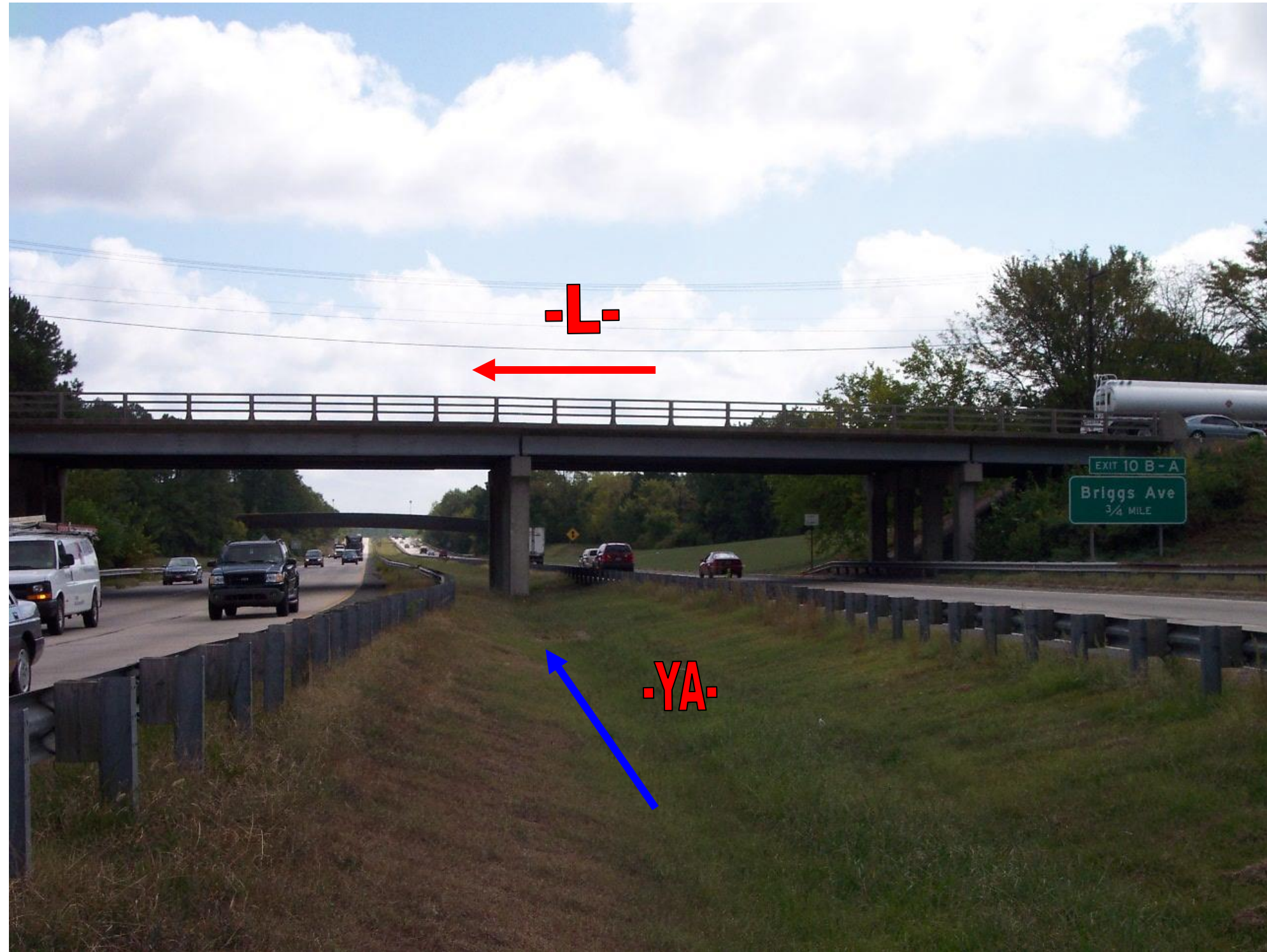
B1-B

BOXES 1 & 2: 15.2 - 33.4 FEET



SITE PHOTOGRAPH

Bridge No. 12 on -L- (NC 55) over NC 147



Looking West