

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

STRUCTURE
SUBSURFACE INVESTIGATION

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PROJ. REFERENCE NO. 33732.1.1 F.A. PROJ. BRZ-1792(2)

COUNTY DAVIDSON

PROJECT DESCRIPTION BRIDGE #158 ON SR 1792 OVER US 2970/
I-85 BUSINESS

SITE DESCRIPTION BRIDGE #158 ON SR 1792 OVER US 2970/
I-85 BUSINESS

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 1919 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.

For Letting

PROJECT: 33732.1.1 ID: B-4499

PERSONNEL

D. RACEY

C. PRICE

S. DAVIS

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D. JENKS

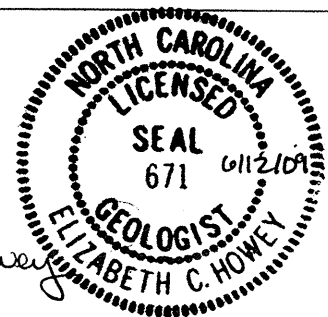
INVESTIGATED BY F&R, INC.

CHECKED BY E.C. HOWEY, P.G., P.E.

SUBMITTED BY E.C. HOWEY, P.G., P.E.

DATE JUNE 2009

DRAWN BY: D. RACEY



Elizabeth C. Howey

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
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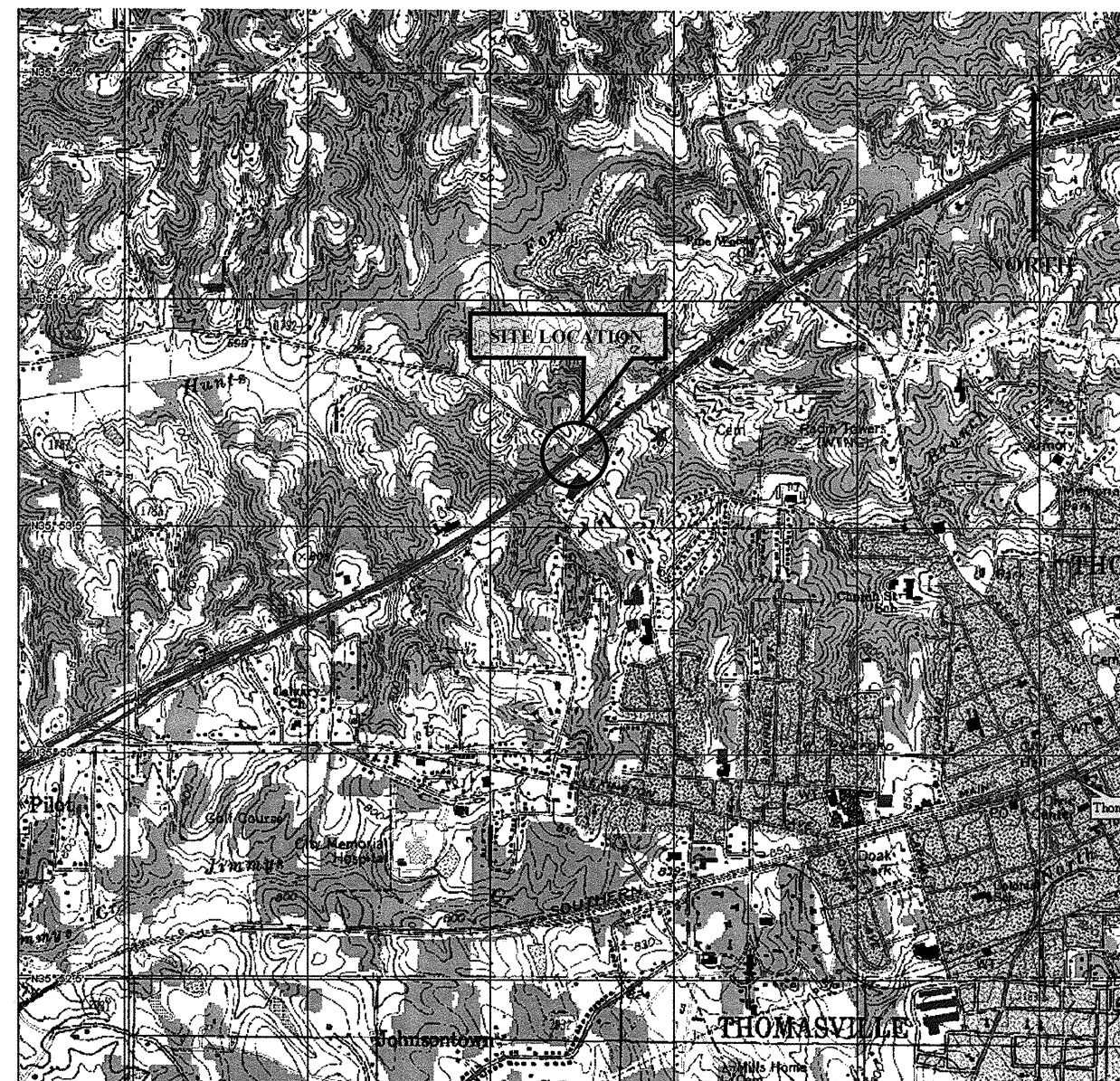
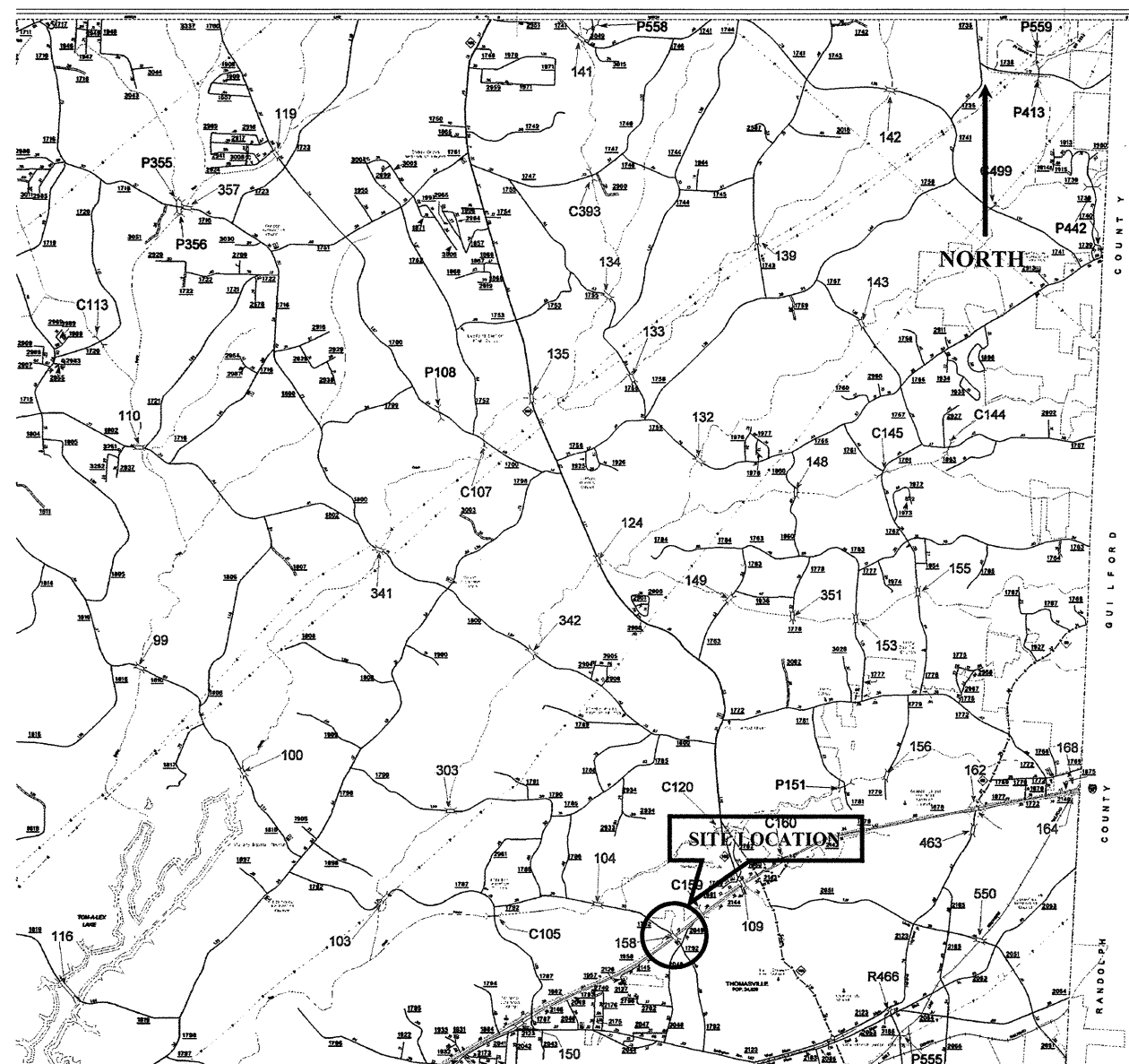
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

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 (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 SILT CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, MUCKY 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) GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.</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. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:</p>		<p>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 DISLOOED FROM PARENT MATERIAL. FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRODUCED 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 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. 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.</p>																																																																																																																																																																																								
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PL - PLASTIC LIMIT	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE																																																																																																																																																																																												
OM - OPTIMUM MOISTURE	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE																																																																																																																																																																																												
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<p>COLOR</p> <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>		<p>INDURATION</p> <p>FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.</p> <p>FRIABLE MODERATELY INDURATED INDURATED EXTREMELY INDURATED</p>		<p>NOTES:</p> <p>BENCH MARK: BM #2: -BL - STA. 21+46.84 54.21' RT.: RR SPIKE IN PP ELEVATION: 799.24 FT.</p>																																																																																																																																																																																										



FIGURE 1

FIGURE 2

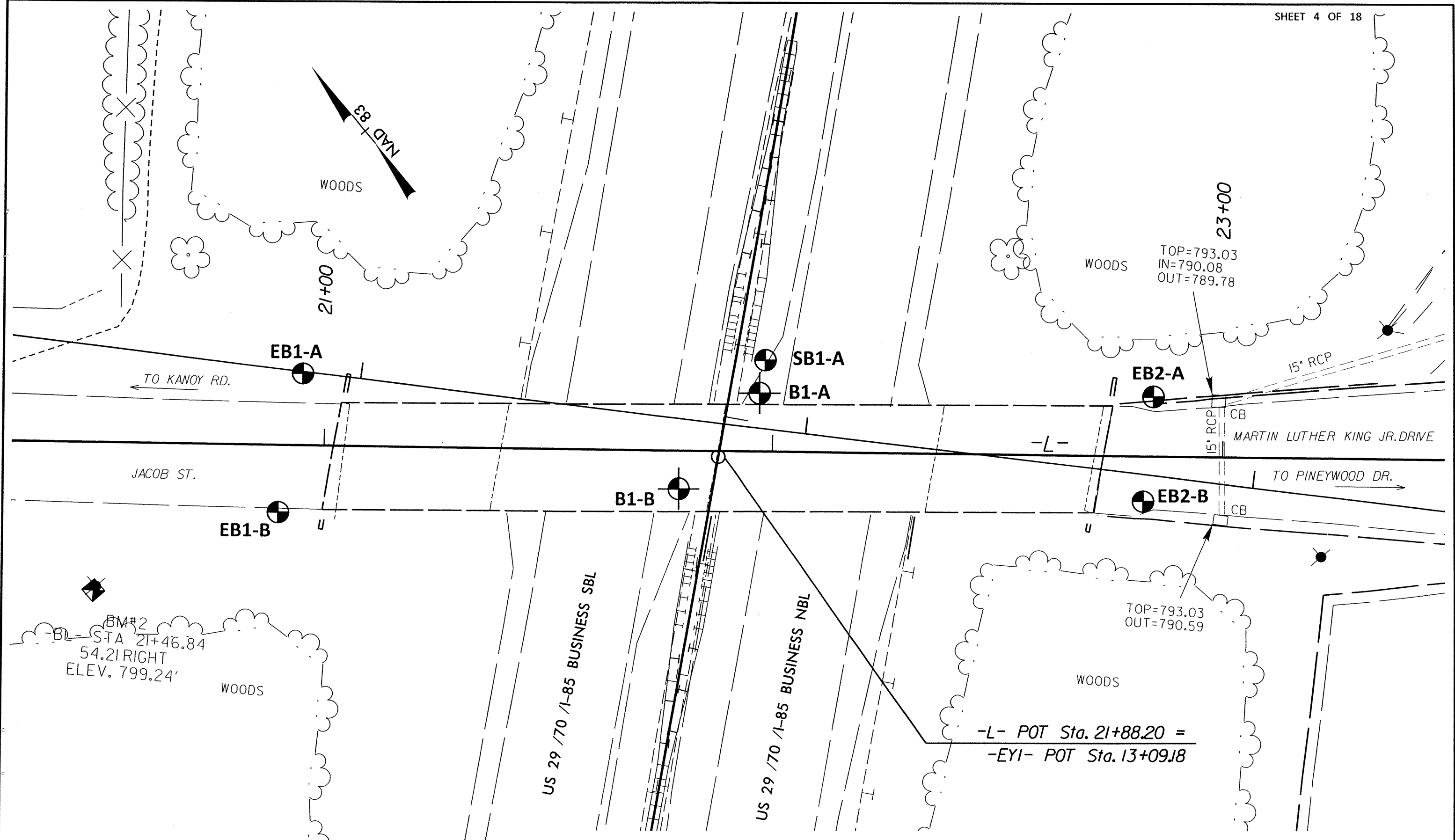


SITE VICINITY MAP

SITE LOCATION PLAN

Adapted from an NCDOT Bridge Location Map of Davidson County, North Carolina, dated January 1, 1990.
Not to Scale

Adapted from a USGS Quadrangle 7.5 min. Topographic Map Of Thomasville, North Carolina.
Not to Scale


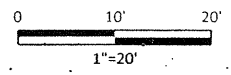


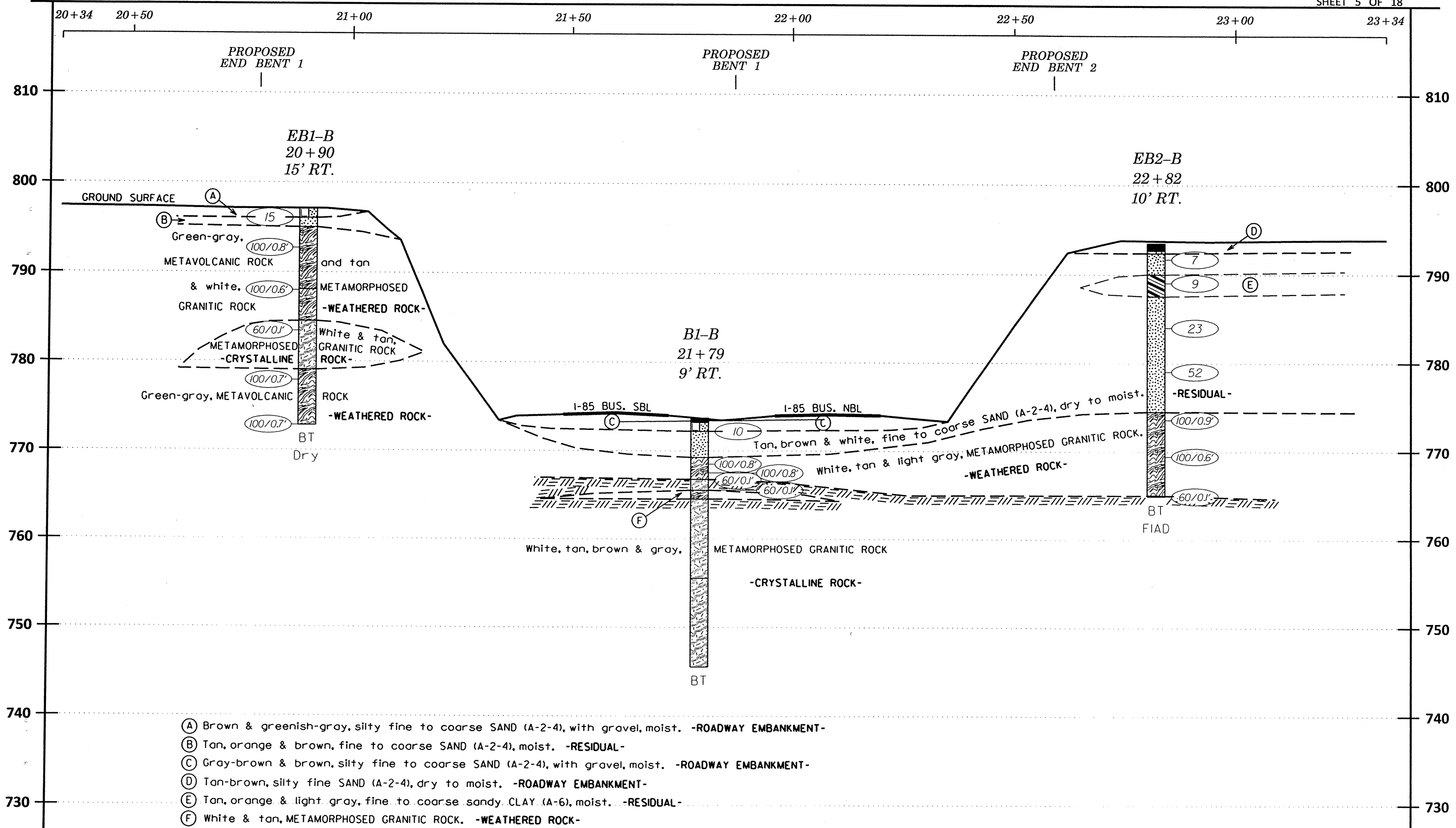
BM#2
 STA 21+46.84
 54.21 RIGHT
 ELEV. 799.24'

TOP=793.03
 OUT=790.59

TOP=793.03
 IN=790.08
 OUT=789.78

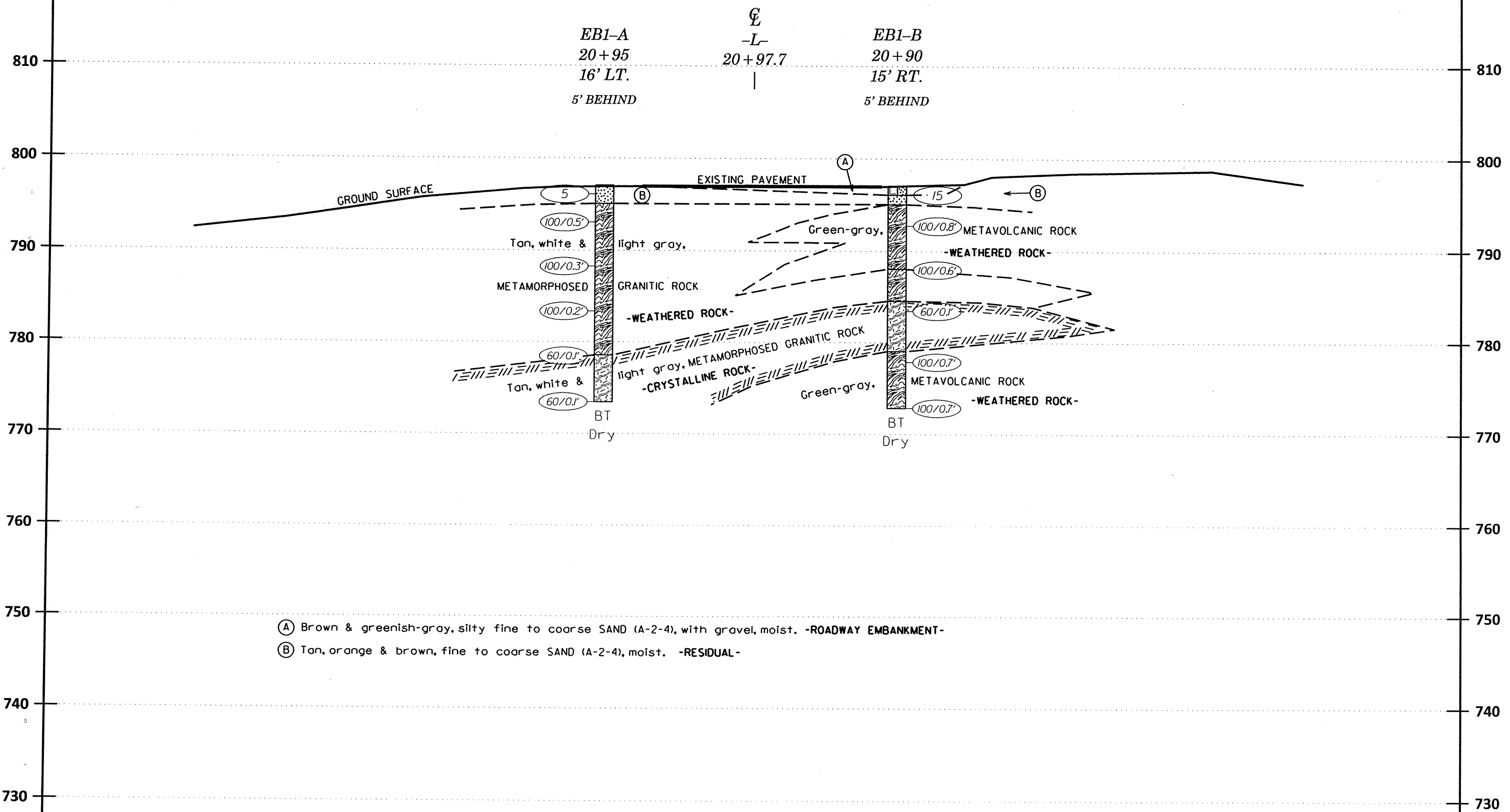
-L- POT Sta. 21+88.20 =
 -EYI- POT Sta. 13+09.18

<p>SINCE 1881</p>  <p>FROEHLING & ROBERTSON, INC. Engineering • Environmental • Geotechnical 310 Hubert Street Raleigh, North Carolina 27603-2302 USA T 919.828.3441 F 919.828.5751 www.fandr.com</p>	<p>SCALE (FEET)</p>  <p>1"=20'</p>		<p>TEST SITE PLAN</p>		
	PROJECT REFERENCE NO.: 33732.1.1		F&R PROJECT NO.: 66K-0182		<p>DRAWING No.: 1</p>
	I.D. NO.: B-4499		F.A. PROJECT NO.: BRZ-1792(2)		
	COUNTY: Davidson PROJECT DESCRIPTION: Bridge #158 on SR 1792 over US 29/70/I-85 Business SITE DESCRIPTION: Bridge #158 on SR 1792 over US 29/70/I-85 Business				
DRAWN BY: D. Racey		CHECKED BY: E. Howey, P.G., P.E.			
DATE: June 2009		SCALE: 1"=20'			



NOTE: Groundline profile surveyed by F&R, Inc. 20' right of -L- on 5/6/09.
 NOTE: Inferred stratigraphy is drawn through the borings with both projected onto the profile.

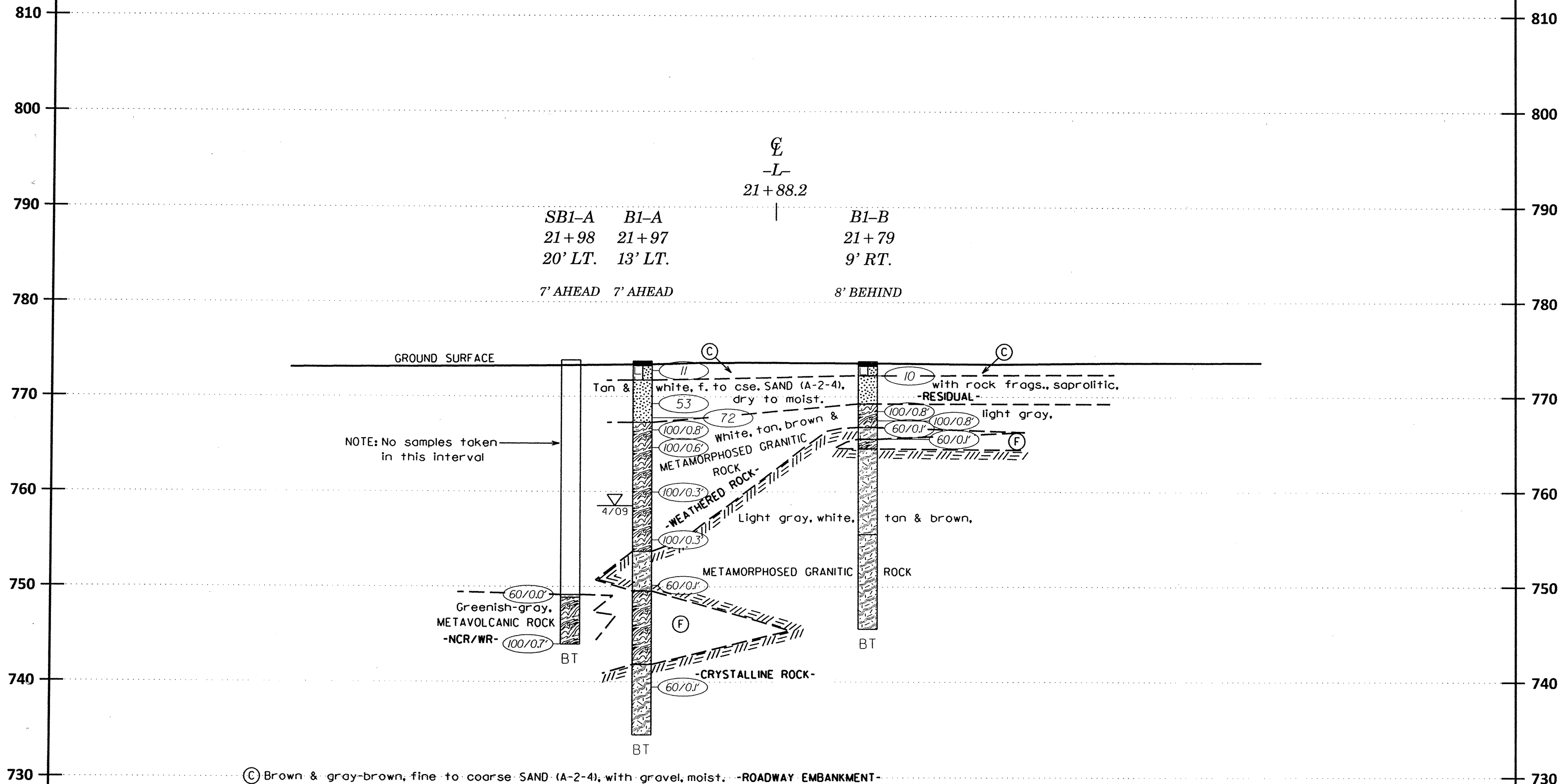
<p>SINCE 1881</p> <p>FROEHLING & ROBERTSON, INC. Engineering • Environmental • Geotechnical 310 Hubert Street Raleigh, North Carolina 27603-2302 USA T 919.828.3441 F 919.828.5751 www.fandr.com</p>	<p>SCALE (FEET)</p> <p>HORIZONTAL: 0 10' 20' 1"=20'</p> <p>VERTICAL: 0 5' 10' 1"=10'</p>		<p>PROFILE 20' RIGHT OF -L-</p>		
	<p>PROJECT REFERENCE NO.: 33732.1.1</p>		<p>F&R PROJECT NO.: 66K-0182</p>		
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<p>SITE DESCRIPTION: Bridge #158 on SR 1792 over US 29/70/I-85 Business</p>					
<p>DRAWN BY: D. Racey</p>		<p>CHECKED BY: E. Howey, P.G., P.E.</p>		<p>DRAWING No.: 2</p>	
<p>DATE: June 2009</p>		<p>SCALE: 1"=20' HORIZ.; 1"=10' VERT.</p>			



- (A) Brown & greenish-gray, silty fine to coarse SAND (A-2-4), with gravel, moist. -ROADWAY EMBANKMENT-
- (B) Tan, orange & brown, fine to coarse SAND (A-2-4), moist. -RESIDUAL-

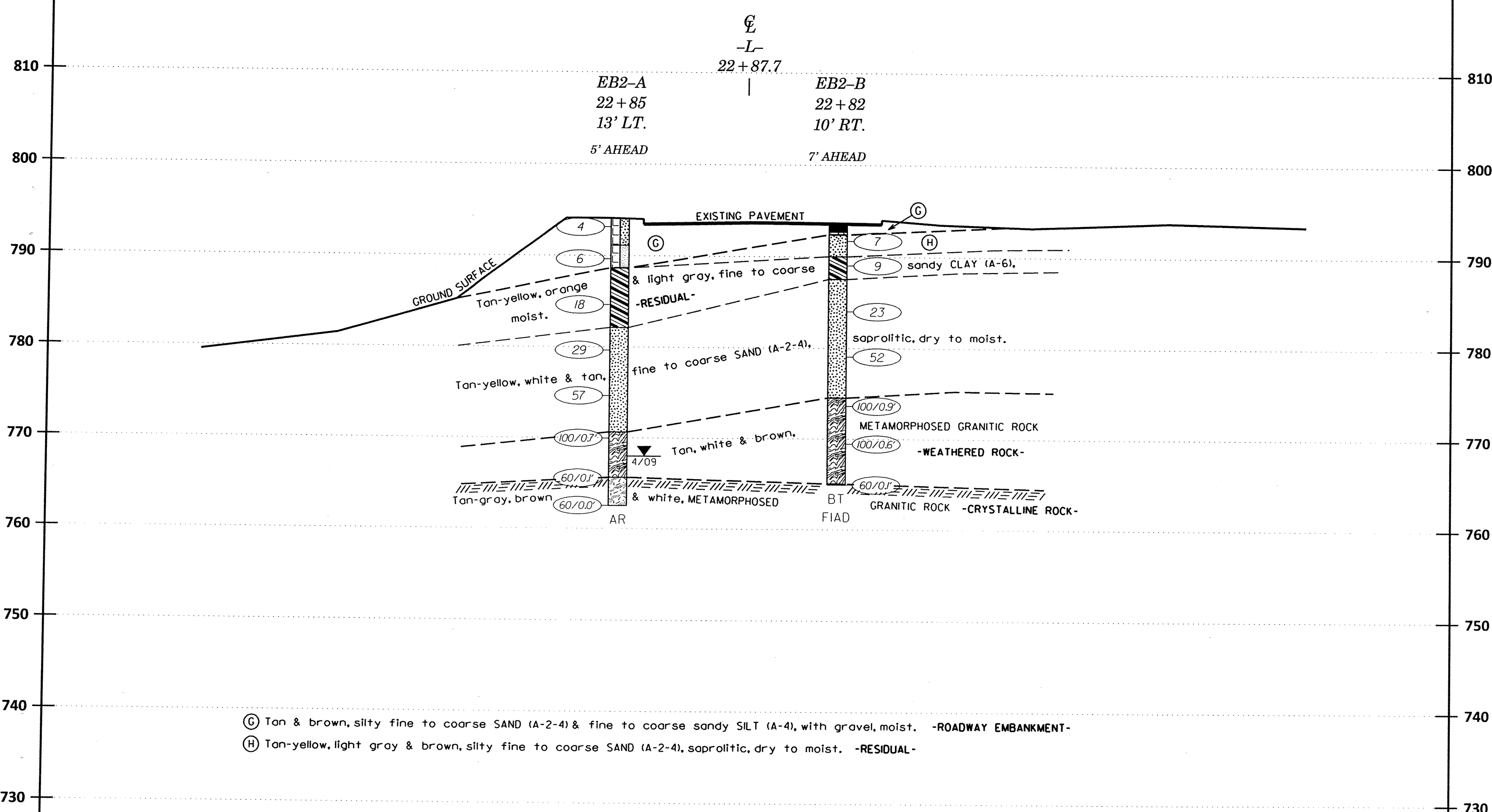
NOTE: Groundline section surveyed along the skew by F&R, Inc. on 5/5/09.
 NOTE: Inferred stratigraphy is drawn through the borings and projected onto the section.

SINCE F&R 1881	FROEHLING & ROBERTSON, INC. Engineering • Environmental • Geotechnical 310 Hubert Street Raleigh, North Carolina 27603-2302 USA T 919.828.3441 F 919.828.5751 www.fandr.com	SCALE (FEET) HORIZONTAL 0 5' 10' 1"=10' VERTICAL 0 5' 10' 1"=10'	SECTION THROUGH END BENT 1		
	PROJECT REFERENCE NO.: 33732.1.1 I.D. NO.: B-4499 F.A. PROJECT NO.: BRZ-1792(2) COUNTY: Davidson PROJECT DESCRIPTION: Bridge #158 on SR 1792 over US 29/70/I-85 Business SITE DESCRIPTION: Bridge #158 on SR 1792 over US 29/70/I-85 Business		DRAWN BY: D. Racey CHECKED BY: E. Howey, P.G., P.E. DATE: June 2009 SCALE: 1"=10'		DRAWING No.: 3



NOTE: Groundline section surveyed along the skew by F&R, Inc. on 5/6/09.
 NOTE: Inferred stratigraphy is drawn through the borings and projected onto the section.

SINCE 1881 FROEHLING & ROBERTSON, INC. Engineering • Environmental • Geotechnical 310 Hubert Street Raleigh, North Carolina 27603-2302 USA T 919.828.3441 F 919.828.5751 www.fandr.com	SCALE (FEET)	SECTION THROUGH BENT 1	
	HORIZONTAL 	PROJECT REFERENCE NO.: 33732.1.1 I.D. NO.: B-4499 F.A. PROJECT NO.: BRZ-1792(2) F&R PROJECT NO.: 66K-0182 COUNTY: Davidson	
	VERTICAL 	PROJECT DESCRIPTION: Bridge #158 on SR 1792 over US 29/70/I-85 Business SITE DESCRIPTION: Bridge #158 on SR 1792 over US 29/70/I-85 Business	
		DRAWN BY: D. Racey DATE: June 2009	CHECKED BY: E. Howey, P.G., P.E. SCALE: 1"=10'



NOTE: Groundline section surveyed along the skew by F&R, Inc. on 5/5/09.
 NOTE: Inferred stratigraphy is drawn through the borings and projected onto the section.

<p>SINCE 1881</p> <p>FROEHLING & ROBERTSON, INC. Engineering • Environmental • Geotechnical 310 Hubert Street Raleigh, North Carolina 27603-2302 USA T 919.828.3441 F 919.828.5751 www.fandr.com</p>	<p>SCALE (FEET)</p> <p>HORIZONTAL </p> <p>VERTICAL </p>		<p>SECTION THROUGH END BENT 2</p>		
	<p>PROJECT REFERENCE NO.: 33732.1.1</p>		<p>F&R PROJECT NO.: 66K-0182</p>		
	<p>I.D. NO.: B-4499</p>		<p>F.A. PROJECT NO.: BRZ-1792(2)</p>		<p>COUNTY: Davidson</p>
	<p>PROJECT DESCRIPTION: Bridge #158 on SR 1792 over US 29/70/I-85 Business</p>				
<p>SITE DESCRIPTION: Bridge #158 on SR 1792 over US 29/70/I-85 Business</p>					
<p>DRAWN BY: D. Racey</p>		<p>CHECKED BY: E. Howey, P.G., P.E.</p>		<p>DRAWING No.: 5</p>	
<p>DATE: June 2009</p>		<p>SCALE: 1"=10'</p>			

PROJECT NO. 33732.1.1	ID. B-4499	COUNTY Davidson	GEOLOGIST D. Racey
SITE DESCRIPTION Bridge #158 on SR 1792 over US 29/70/1-85 Business			GROUND WTR (ft)
BORING NO. EB1-A	STATION 20+95	OFFSET 16ft LT	ALIGNMENT -L-
COLLAR ELEV. 797.1 ft	TOTAL DEPTH 23.6 ft	NORTHING 782,364	EASTING 1,672,839
DRILL MACHINE CME 55 Track	DRILL METHOD 2.25" ID HSA	HAMMER TYPE Automatic	
START DATE 04/06/09	COMP. DATE 04/06/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 18.5 ft

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	L O G	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				
800														
795	797.1	0.0	1	1	4	5						M	797.1 GROUND SURFACE 0.0	
790	793.6	3.5	100/0.5									D	795.1 RESIDUAL Tan, fine to coarse SAND (A-2-4), with little silt, trace clay & fine roots, saprolitic. WEATHERED ROCK White & tan, METAMORPHOSED GRANITIC ROCK. 2.0	
785	788.6	8.5	100/0.3									M		
780	783.6	13.5	100/0.2									D		
775	778.6	18.5	60/0.1									D	778.6 CRYSTALLINE ROCK Light gray, METAMORPHOSED GRANITIC ROCK. 18.5	
770	773.6	23.5	60/0.1									D	773.5 Boring Terminated at Elevation 773.5 ft in CRYSTALLINE ROCK (METAMORPHOSED GRANITIC ROCK) 23.6	
765													NOTES: 1) Driller indicates harder drilling at a depth of 2.0'.	
760														
755														
750														
745														
740														
735														
730														
725														
720														

PROJECT NO. 33732.1.1	ID. B-4499	COUNTY Davidson	GEOLOGIST D. Racey
SITE DESCRIPTION Bridge #158 on SR 1792 over US 29/70/1-85 Business			GROUND WTR (ft)
BORING NO. EB1-B	STATION 20+90	OFFSET 15ft RT	ALIGNMENT -L-
COLLAR ELEV. 797.0 ft	TOTAL DEPTH 24.2 ft	NORTHING 782,344	EASTING 1,672,815
DRILL MACHINE CME 550	DRILL METHOD 2.25" ID HSA	HAMMER TYPE Automatic	
START DATE 04/09/09	COMP. DATE 04/09/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 12.5 ft

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	L O G	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				
800														
795	797.0	0.0	2	3	12	15						M	797.0 GROUND SURFACE 0.0 796.0 ROADWAY EMBANKMENT 1.0 795.0 Brown & greenish-gray, silty fine to coarse SAND (A-2-4), with gravel, trace roots. 2.0	
790	793.5	3.5	55	45/0.3								D	RESIDUAL Tan, orange & brown, fine to coarse SAND (A-2-4), with little silt. WEATHERED ROCK Green-gray, METAVOLCANIC ROCK. 9.0	
785	788.5	8.5	82	18/0.1								D	788.0 Tan & white, METAMORPHOSED GRANITIC ROCK. 12.5	
780	783.5	13.5	60/0.1									D	784.5 CRYSTALLINE ROCK Tan & light gray, METAMORPHOSED GRANITIC ROCK. 18.0	
775	778.5	18.5	31	69/0.2								D	779.0 WEATHERED ROCK Green-gray, METAVOLCANIC ROCK. 18.0	
770	773.5	23.5	26	74/0.2								D	772.8 Boring Terminated at Elevation 772.8 ft in WEATHERED ROCK (METAVOLCANIC ROCK) 24.2	
765													NOTES: 1) Geologist indicates strata break in split spoon at depths of 1.0' & 9.0'. 2) Driller indicates harder drilling at depths of 2.0' & 12.5'. 3) Driller indicates softer drilling at a depth of 18.0'. 4) Driller indicates zones of softer & harder drilling from 13.6'-18.0'.	
760														
755														
750														
745														
740														
735														
730														
725														
720														

NCDOT BORE SINGLE K66-182.GPJ NC_DOT.GDT 6/5/09

NCDOT BORE SINGLE K66-182.GPJ NC_DOT.GDT 6/5/09

PROJECT NO. 33732.1.1	ID. B-4499	COUNTY Davidson	GEOLOGIST D. Racey
SITE DESCRIPTION Bridge #158 on SR 1792 over US 29/70/I-85 Business			GROUND WTR (ft)
BORING NO. B1-A	STATION 21+97	OFFSET 13ft LT	ALIGNMENT -L-
COLLAR ELEV. 773.7 ft	TOTAL DEPTH 39.3 ft	NORTHING 782,295	EASTING 1,672,914
DRILL MACHINE CME 55 Track	DRILL METHOD 2.25" ID HSA/NQ-3 Core	HAMMER TYPE Automatic	
START DATE 04/08/09	COMP. DATE 04/08/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 20.0 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				
775	773.7	0.0											GROUND SURFACE	0.0
			12	5	6								ROADWAY EMBANKMENT ASPHALT/GRAVEL Mix	2.0
770	770.2	3.5											Brown, fine to coarse SAND (A-2-4), with gravel.	
	768.7	5.0	14	22	31								RESIDUAL	
	767.2	6.5	16	25	47								Tan & white, fine to coarse SAND (A-2-4(0)) with little silt, trace clay, rock fragments, saprolitic.	6.5
765	765.2	8.5	47	53/0.3									WEATHERED ROCK	
			76	24/0.1									White, tan & brown, METAMORPHOSED GRANITIC ROCK.	
760	760.2	13.5												
			100/0.3											
755	755.2	18.5												
			100/0.3											
750	750.2	23.5											CRYSTALLINE ROCK	20.0
			60/0.1										Light gray, METAMORPHOSED GRANITIC ROCK.	
745													WEATHERED ROCK	24.2
													Light gray, METAMORPHOSED GRANITIC ROCK.	
740	739.5	34.2											CRYSTALLINE ROCK	31.9
			60/0.1										Light gray-white with black, METAMORPHOSED GRANITIC ROCK.	
735														
730														
725														
720														
715														
710														
705														
700														
695														

NOTES:
 1) Driller indicates harder drilling at a depth of 20.0'.
 2) Began coring at a depth of 24.2'.
 3) 0 hr. water level measured prior to coring.
 4) 24 hr. water level not measured due to water introduced for coring.

PROJECT NO. 33732.1.1	ID. B-4499	COUNTY Davidson	GEOLOGIST D. Racey
SITE DESCRIPTION Bridge #158 on SR 1792 over US 29/70/I-85 Business			GROUND WTR (ft)
BORING NO. B1-A	STATION 21+97	OFFSET 13ft LT	ALIGNMENT -L-
COLLAR ELEV. 773.7 ft	TOTAL DEPTH 39.3 ft	NORTHING 782,295	EASTING 1,672,914
DRILL MACHINE CME 55 Track	DRILL METHOD 2.25" ID HSA/NQ-3 Core	HAMMER TYPE Automatic	
START DATE 04/08/09	COMP. DATE 04/08/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 20.0 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. (%)	ROD (%)		REC. (%)	ROD (%)			
749.5	749.5	24.2	5.0	1:31/1.0 1:28/1.0 2:12/1.0 2:18/1.0 3:05/1.0	(0.0)	(0.0)		(0.0)	N/A		Begin Coring @ 24.2 ft	24.2
745	744.5	29.2	5.0	3:23/1.0 2:41/1.0 2:00/1.0 5:00/1.0 5:50/1.0	(2.3)	(0.0)		(6.7)	(2.6)		WEATHERED ROCK Light gray, METAMORPHOSED GRANITIC ROCK.	31.9
740	739.5	34.2	5.0	2:37/1.0 2:55/1.0 6:40/1.0 2:45/1.0 3:40/1.0	(4.4)	(2.6)	RS-1	92%	36%		CRYSTALLINE ROCK Light gray-white with black, fresh to slightly weathered, hard to very hard METAMORPHOSED GRANITIC ROCK, very close to moderately close fracture spacing. 1 joint @ 70°, 6 joints @ 40°-45°. RS-1: 35.6'-35.9' qu=4,655 psi	39.3
735	734.4	39.3									Boring Terminated at Elevation 734.4 ft in CRYSTALLINE ROCK (METAMORPHOSED GRANITIC ROCK)	
730												
725												
720												
715												
710												
705												
700												
695												
690												
685												
680												
675												
670												

NOTES:
 1) Driller indicates harder drilling at a depth of 20.0'.
 2) Began coring at a depth of 24.2'.
 3) 0 hr. water level measured prior to coring.
 4) 24 hr. water level not measured due to water introduced for coring.

NCDOT BORE SINGLE K66-182.GPJ NC_DOT_GDT 6/5/09

NCDOT BORE SINGLE K66-182.GPJ NC_DOT_GDT 6/5/09



PROJECT NO. 33732.1.1		ID. B-4499		COUNTY Davidson		GEOLOGIST D. Racey										
SITE DESCRIPTION Bridge #158 on SR 1792 over US 29/70/I-85 Business							GROUND WTR (ft)									
BORING NO. SB1-A		STATION 21+98		OFFSET 20ft LT		ALIGNMENT -L-	0 HR. N/A									
COLLAR ELEV. 773.8 ft		TOTAL DEPTH 29.9 ft		NORTHING 782,299		EASTING 1,672,920	24 HR. N/A									
DRILL MACHINE CME 55 Track		DRILL METHOD 2.25" ID HSA/Casing/Rollercone Bit				HAMMER TYPE Automatic										
START DATE 04/08/09		COMP. DATE 04/08/09		SURFACE WATER DEPTH N/A		DEPTH TO ROCK 24.7 ft										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	L O G ELEV (ft)	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
775														773.8	GROUND SURFACE	0.0
770															Augered to a depth of 24.7', no samples taken in this interval.	
765																
760																
755																
750																
749.1	749.1	24.7												749.1	NON-CRYSTALLINE ROCK	24.7
748.8														748.8	Green-gray, METAVOLCANIC ROCK.	25.0
745	744.6	29.2													WEATHERED ROCK	
															Green-gray, METAVOLCANIC ROCK.	
743.9			31											743.9	Boring Terminated at Elevation 743.9 ft in WEATHERED ROCK (METAVOLCANIC ROCK)	29.9
740																
735																
730																
725																
720																
715																
710																
705																
700																
695																

NCDOT BORE SINGLE K66-182.GPJ NC_DOT.GDT 6/12/09

NOTES:
 1) Augered to a depth of 24.7', began split spoon sampling.
 2) Auger refusal at a depth of 24.7'.
 3) Used casing/rollercone bit to advance below auger refusal depth.

 Boring SB1-A was advanced to take split spoon samples in the zones of B1-A where material was not recovered.

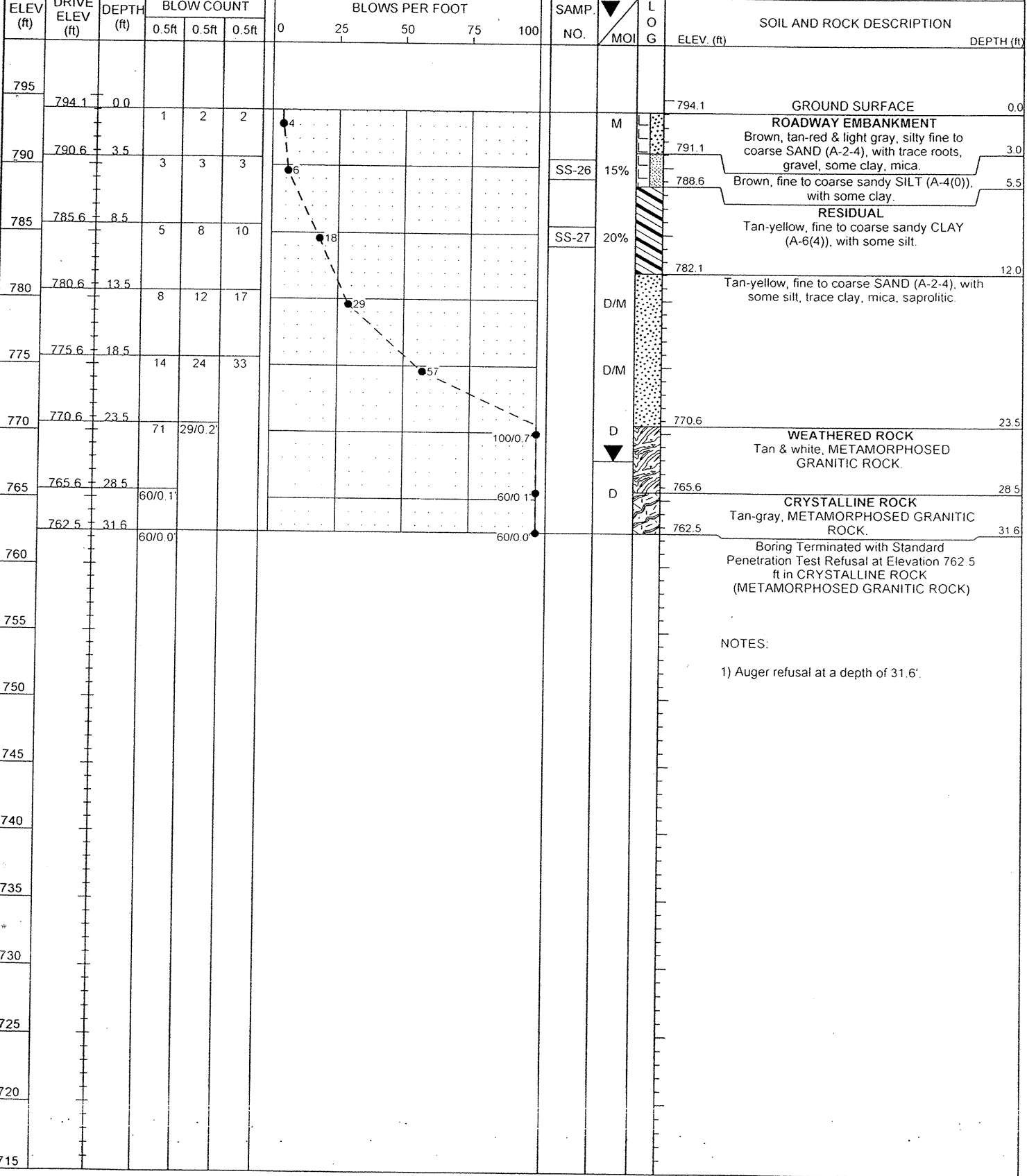
PROJECT NO. 33732.1.1		ID. B-4499		COUNTY Davidson		GEOLOGIST D. Racey									
SITE DESCRIPTION Bridge #158 on SR 1792 over US 29/70/I-85 Business							GROUND WTR (ft)								
BORING NO. B1-B		STATION 21+79		OFFSET 9ft RT		ALIGNMENT -L-									
COLLAR ELEV. 773.7 ft		TOTAL DEPTH 28.2 ft		NORTHING 782,290		EASTING 1,672,886									
DRILL MACHINE CME 55 Track		DRILL METHOD 2.25" ID HSA/NQ-3 Core			HAMMER TYPE Automatic										
START DATE 04/07/09		COMP. DATE 04/07/09		SURFACE WATER DEPTH N/A		DEPTH TO ROCK 7.0 ft									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	L O G	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
775															
	773.2	0.5	5	5	5									773.2	0.0
														772.2	1.5
770	769.7	4.0													
	768.2	5.5	35	64	36/0.3									769.2	4.5
	766.7	7.0	15		85/0.3									766.7	7.0
	765.6	8.1			60/0.1					100/0.8				765.5	8.2
765					60/0.1					60/0.1				764.5	9.2
760															
755															
750															
745															
740															
735															
730															
725															
720															
715															
710															
705															
700															
695															

NOTES:
 1) Geologist indicates strata break in split spoon at a depth of 1.5'.
 2) Began coring at a depth of 8.2'.
 3) Water levels not measured due to water introduced for coring.

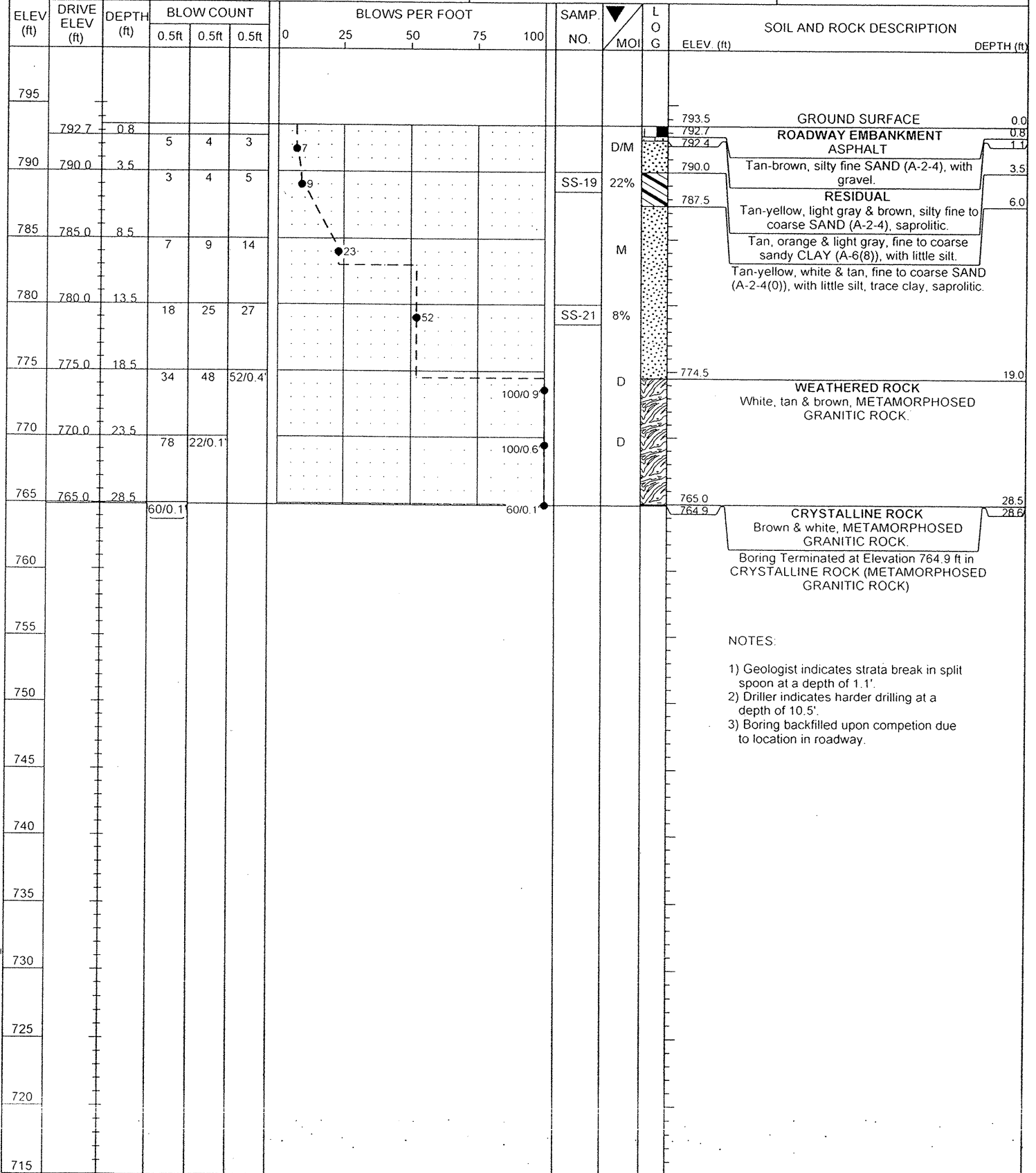
PROJECT NO. 33732.1.1		ID. B-4499		COUNTY Davidson		GEOLOGIST D. Racey					
SITE DESCRIPTION Bridge #158 on SR 1792 over US 29/70/I-85 Business							GROUND WTR (ft)				
BORING NO. B1-B		STATION 21+79		OFFSET 9ft RT		ALIGNMENT -L-					
COLLAR ELEV. 773.7 ft		TOTAL DEPTH 28.2 ft		NORTHING 782,290		EASTING 1,672,886					
DRILL MACHINE CME 55 Track		DRILL METHOD 2.25" ID HSA/NQ-3 Core			HAMMER TYPE Automatic						
START DATE 04/07/09		COMP. DATE 04/07/09		SURFACE WATER DEPTH N/A		DEPTH TO ROCK 7.0 ft					
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		STRATA		L O G	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC (ft) %	RQD (ft) %	REC (ft) %	RQD (ft) %			
765.5	765.5	8.2	5.0	1:21/1.0 1:17/1.0 1:29/1.0 1:29/1.0 1:38/1.0	(4.0) 80%	(0.8) 16%	(0.0) 0%	N/A (3.4) 38%		Begin Coring @ 8.2 ft WEATHERED ROCK White & tan, METAMORPHOSED GRANITIC ROCK.	8.2 9.2
760	760.5	13.2	5.0	1:34/1.0 1:35/1.0 1:35/1.0 3:25/1.0 3:28/1.0	(4.4) 88%	(2.6) 52%	(8.4) 93%			CRYSTALLINE ROCK White, tan & brown, moderately weathered, moderately hard METAMORPHOSED GRANITIC ROCK, very close to moderately close fracture spacing. 3 joints @ 65°-70°, 2 joints @ 40°. RS-2: 13.3'-13.6' qu=993 psi RS-3: 16.7'-17.0' qu=5,200 psi	13.2 18.2
755	755.5	18.2	5.0	2:20/1.0 3:44/1.0 3:23/1.0 9:29/1.0	(4.8) 96%	(2.0) 40%	(9.4) 94%	(6.6) 66%		WEATHERED ROCK White & tan, METAMORPHOSED GRANITIC ROCK. CRYSTALLINE ROCK White & tan, METAMORPHOSED GRANITIC ROCK. WEATHERED ROCK White & tan, METAMORPHOSED GRANITIC ROCK. CRYSTALLINE ROCK White, tan & brown, METAMORPHOSED GRANITIC ROCK. Light gray/white with black, METAMORPHOSED GRANITIC ROCK.	18.2 23.2 28.2
750	750.5	23.2	5.0	4:50/1.0 4:12/1.0 4:01/1.0 4:45/1.0 15:00/1.0	(4.6) 92%	(4.6) 92%				Boring Terminated at Elevation 745.5 ft in CRYSTALLINE ROCK (METAMORPHOSED GRANITIC ROCK)	23.2 28.2
745	745.5	28.2									28.2
740											
735											
730											
725											
720											
715											
710											
705											
700											
695											
690											

NOTES:
 1) Geologist indicates strata break in split spoon at a depth of 1.5'.
 2) Began coring at a depth of 8.2'.
 3) Water levels not measured due to water introduced for coring.

PROJECT NO. 33732.1.1	ID. B-4499	COUNTY Davidson	GEOLOGIST D. Racey
SITE DESCRIPTION Bridge #158 on SR 1792 over US 29/70/I-85 Business			
BORING NO. EB2-A	STATION 22+85	OFFSET 13ft LT	ALIGNMENT -L-
COLLAR ELEV. 794.1 ft	TOTAL DEPTH 31.6 ft	NORTHING 782,237	EASTING 1,672,980
DRILL MACHINE CME 55 Track	DRILL METHOD 2.25" ID HSA	HAMMER TYPE Automatic	
START DATE 04/09/09	COMP. DATE 04/09/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 28.5 ft



PROJECT NO. 33732.1.1	ID. B-4499	COUNTY Davidson	GEOLOGIST D. Racey
SITE DESCRIPTION Bridge #158 on SR 1792 over US 29/70/I-85 Business			
BORING NO. EB2-B	STATION 22+82	OFFSET 10ft RT	ALIGNMENT -L-
COLLAR ELEV. 793.5 ft	TOTAL DEPTH 28.6 ft	NORTHING 782,221	EASTING 1,672,963
DRILL MACHINE CME 55 Track	DRILL METHOD 2.25" ID HSA	HAMMER TYPE Automatic	
START DATE 04/09/09	COMP. DATE 04/09/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 28.5 ft



NCDOT BORE SINGLE K66-182.GPJ NC_DOT.GDT 6/5/09

NCDOT BORE SINGLE K66-182.GPJ NC_DOT.GDT 6/5/09

North Carolina Department of Transportation
 Division of Highways
 Materials and Test Unit
 Soils Laboratory

T.I.P. ID NO.: B-4499
 DESCRIPTION: Bridge No. 158 on SR 1792 over US 29/70/I-85 Business

REPORT ON SAMPLES OF: SOIL FOR QUALITY

PROJECT: 33732.1.1
 DATE SAMPLED: 4/09
 SAMPLED FROM: -L-
 SUBMITTED BY: E.C. Howey, P.G., P.E.

COUNTY: Davidson
 RECEIVED: 4/23/09
 REPORTED: 4/30/09
 BY: D. Jenks *D. Jenks/ECH*
 Cert No. 101-02-0603

TEST RESULTS

PROJ. SAMPLE NO.	B1-A	EB2-A	EB2-A	EB2-B	EB2-B										
BORING NO.	SS-12	SS-26	SS-27	SS-19	SS-21										
Retained #4 Sieve %	0.0	0.7	0.0	0.0	0.0										
Passing #10 Sieve %	96.9	96.0	99.2	99.0	98.4										
Passing #40 Sieve %	63.8	75.6	80.1	87.5	75.2										
Passing #200 Sieve %	26.4	48.5	53.2	63.0	32.5										

MINUS #10 FRACTION

SOIL MORTAR - 100%															
Coarse Sand Ret - #60 %	48.1	31.4	27.6	18.4	38.5										
Fine Sand Ret - #270 %	30.6	24.0	24.7	23.6	35.7										
Silt 0.053 - 0.010 mm %	13.1	24.0	20.0	14.8	16.2										
Clay < 0.010 mm %	8.2	20.6	27.7	43.2	9.6										
L.L.	23	27	35	39	24										
P.L.	NP	22	24	24	NP										
P.I.	NP	5	11	15	NP										
AASHTO Classification	A-2-4 (0)	A-4 (0)	A-6 (4)	A-6 (8)	A-2-4 (0)										
Station (-L-)	21+97	22+85	22+85	22+80	22+80										
Offset	13' LT	15' LT	15' LT	10' RT	10' RT										
Depth (ft)	5.0	3.5	8.5	3.5	13.5										
to	6.5	5.0	10.0	5.0	15.0										
Moisture Content (%)	7.3	14.9	20.3	22.0	8.4										

NP=Not plastic

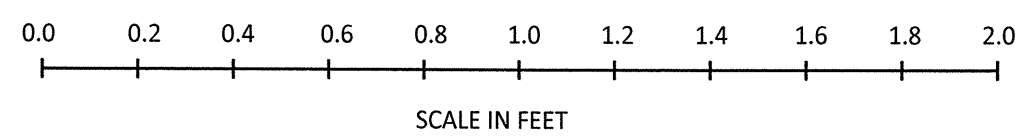
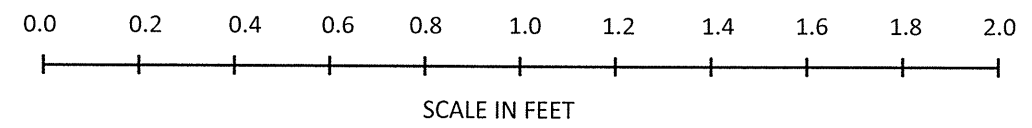
E.C. Howey, P.G., P.E.
 Soils Engineer



CORE PHOTOGRAPHS: B1-A: Station 21+97, 13 Feet Left

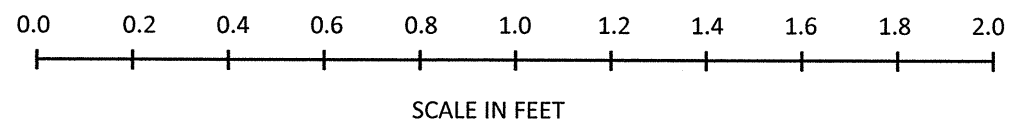
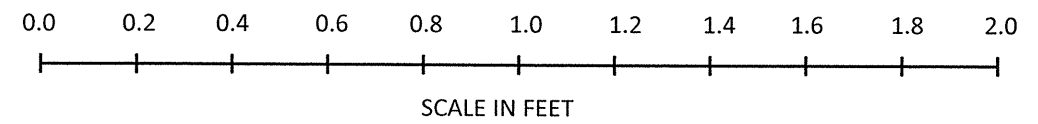
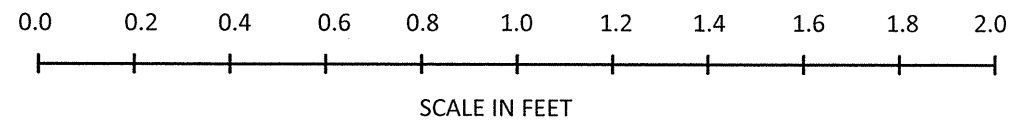


SPT at 34.2 feet, N=60/0.1





CORE PHOTOGRAPHS: B1-B: Station 21+79, 9 Feet Right





SITE PHOTOGRAPHS



Photograph No. 1: View of Profile looking southeast.



Photograph No. 3: View of Bent 1 Section looking northeast.



Photograph No. 2: View of End Bent 1 Section looking northeast.



Photograph No. 4: View of End Bent 2 Section looking northeast.