

REFERENCE: U-2525C

PROJECT: 34821

CONTENTS

<u>SHEET NO.</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2	LEGEND (SOIL & ROCK)
3	SITE PLAN
4-5	WALL ENVELOPES
6-9	BORING LOGS

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

RETAINING WALL
SUBSURFACE INVESTIGATION

COUNTY GUILFORD
 PROJECT DESCRIPTION STRUCTURE NO.1 ON SR2526
(SUMMIT AVE.) OVER GREENSBORO EASTERN
LOOP I-86 BYPASS (-L-)
 SITE DESCRIPTION RETAINING WALLS AT
END BENT NO.1 AND NO.2

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-2525C	1	9

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) 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT 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 THE 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.

- NOTES:
1. THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS ACCURATE NOR IS IT CONSIDERED PART OF THE PLANS, SPECIFICATIONS OR CONTRACT FOR THE PROJECT.
 2. 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.

PERSONNEL

C. TANG, EI

CAROLINA DRILLING

J. ANDERSON

J. COLLINS

INVESTIGATED BY C. TANG, EI

DRAWN BY D. BROWN, PE

CHECKED BY E. MAYR, PE

SUBMITTED BY D. BROWN, PE

DATE OCTOBER 2017



DocuSigned by:

Donald W. Brown Jr.

10/9/2017

SIGNATURE

DATE

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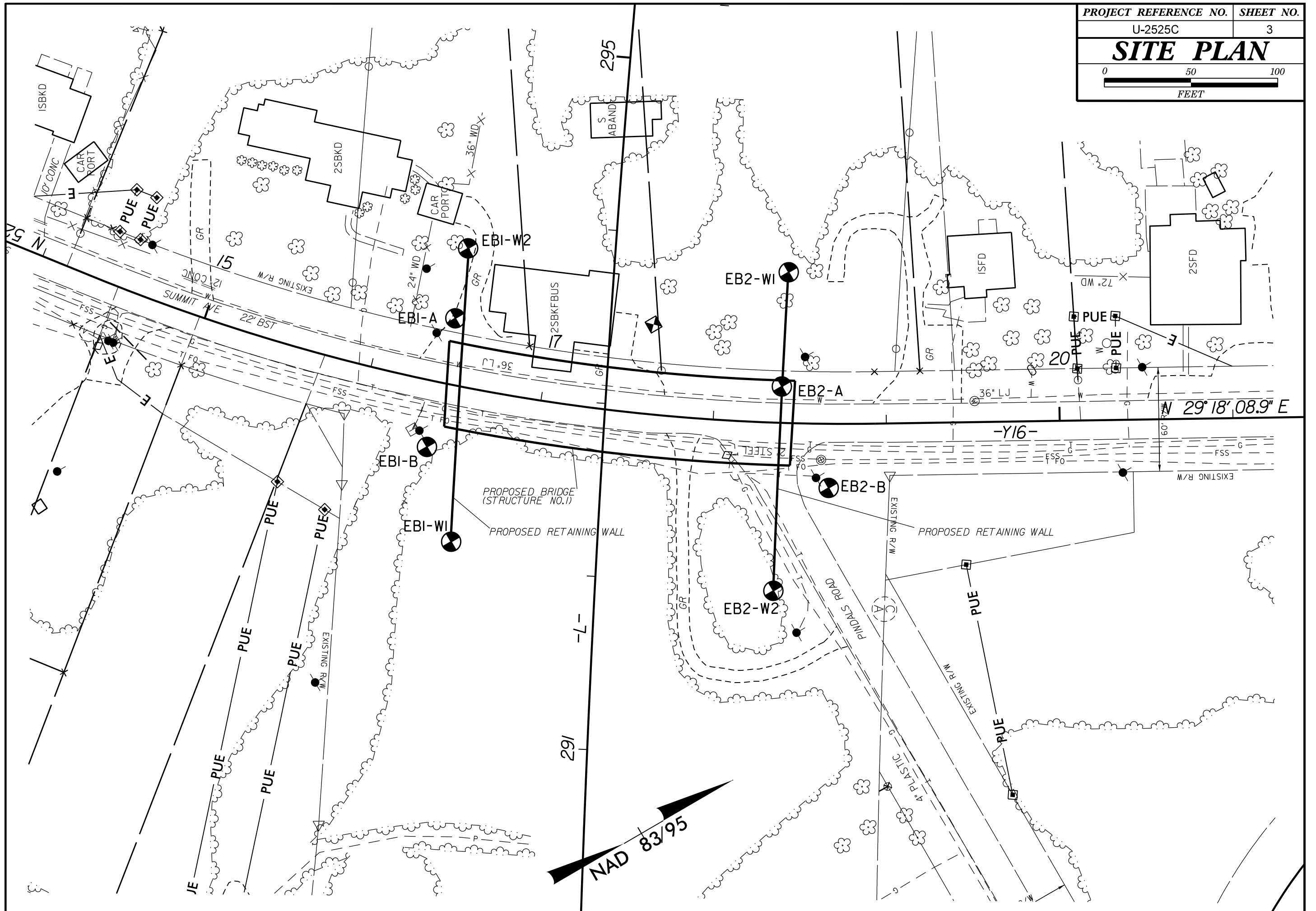
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UNLESS ALL SIGNATURES COMPLETED**

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

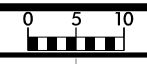
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION										GRADATION										ROCK DESCRIPTION										TERMS AND DEFINITIONS																																																												
<p>SOIL IS CONSIDERED 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 THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, <i>VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6</i></p>										<p>WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.</p>										<p>HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED, 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, SUCH 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 DISLOGGED FROM PARENT MATERIAL. FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (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 (SROD) - 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>																																																												
SOIL LEGEND AND AASHTO CLASSIFICATION										ANGULARITY OF GRAINS										WEATHERED ROCK (WR)										CRYSTALLINE ROCK (CR)																																																												
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<p>MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.</p>										<p>SLIGHTLY COMPRESSIBLE LL < 31 MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL > 50</p>										<p>FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.</p>										<p>COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.</p>																																																												
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6/23/16

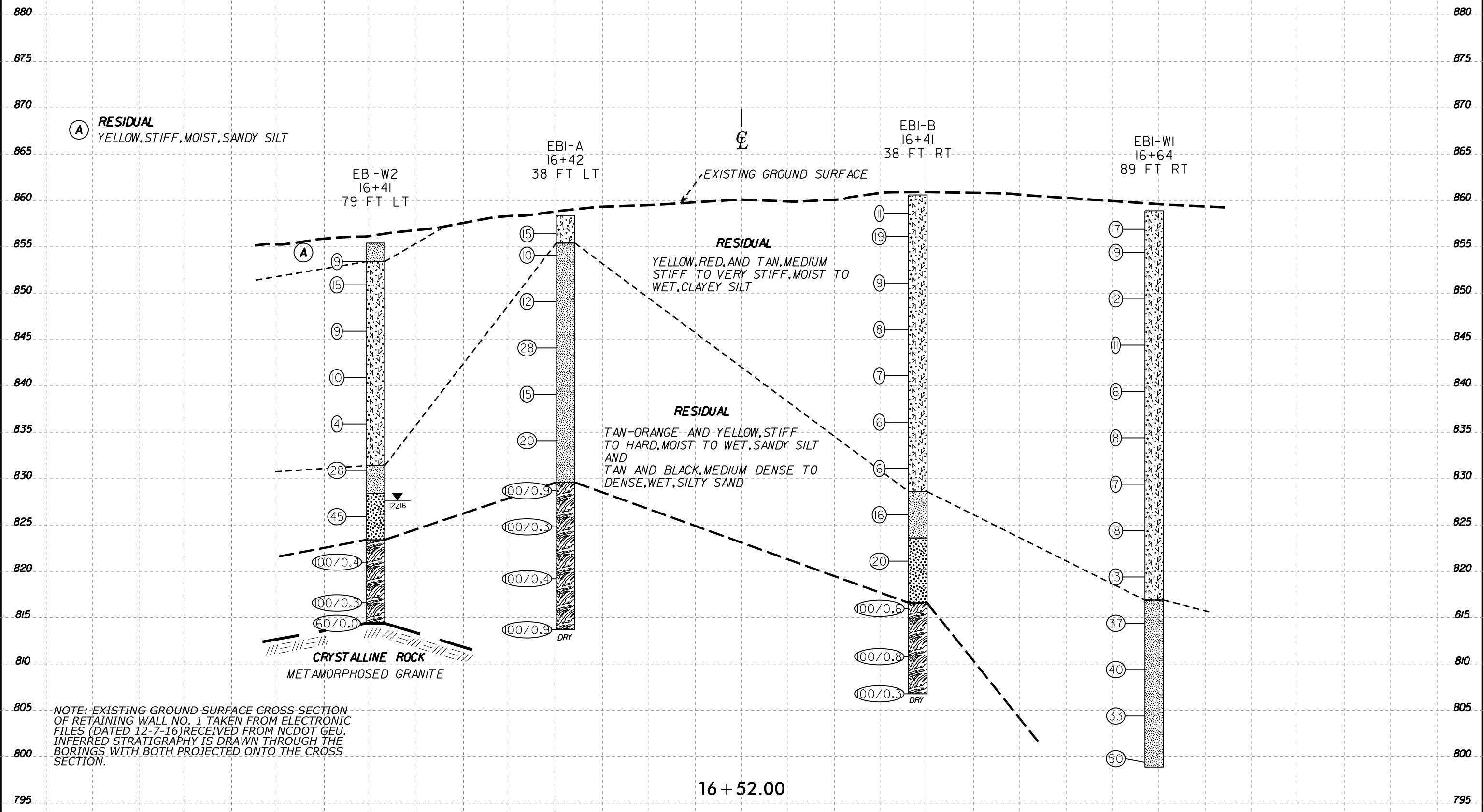
VE = 2:1



PROJ. REFERENCE NO.	SHEET NO.
U-2525C	4

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

CROSS SECTION ALONG RETAINING WALL AT END BENT NO. 1

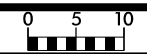


NOTE: EXISTING GROUND SURFACE CROSS SECTION OF RETAINING WALL NO. 1 TAKEN FROM ELECTRONIC FILES (DATED 12-7-16) RECEIVED FROM NCDOT GEU. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION.

16 + 52.00
-Y16-

6/23/16

VE = 2:1



PROJ. REFERENCE NO.	SHEET NO.
U-2525C	5

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

CROSS SECTION ALONG RETAINING WALL AT END BENT NO. 2

NOTE: EXISTING GROUND SURFACE CROSS SECTION OF RETAINING WALL NO. 2 TAKEN FROM ELECTRONIC FILES (DATED 12-7-16) RECEIVED FROM NCDOT GEU. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION.

(A) BROWN, VERY STIFF TO HARD, MOIST, CLAYEY SILT

EB2-W1
18+41
87 FT LT

EB2-A
18+39
21 FT LT

EB2-B
18+67
37 FT RT

EB2-W2
18+38
97 FT RT

EXISTING GROUND SURFACE

RESIDUAL
RED, YELLOW, AND TAN, MEDIUM STIFF TO VERY STIFF, MOIST, CLAYEY SILT

RESIDUAL
TAN, ORANGE, AND PINK, MEDIUM STIFF TO HARD, MOIST TO WET, SANDY SILT AND TAN-ORANGE, MEDIUM DENSE, WET, CLAYEY SAND

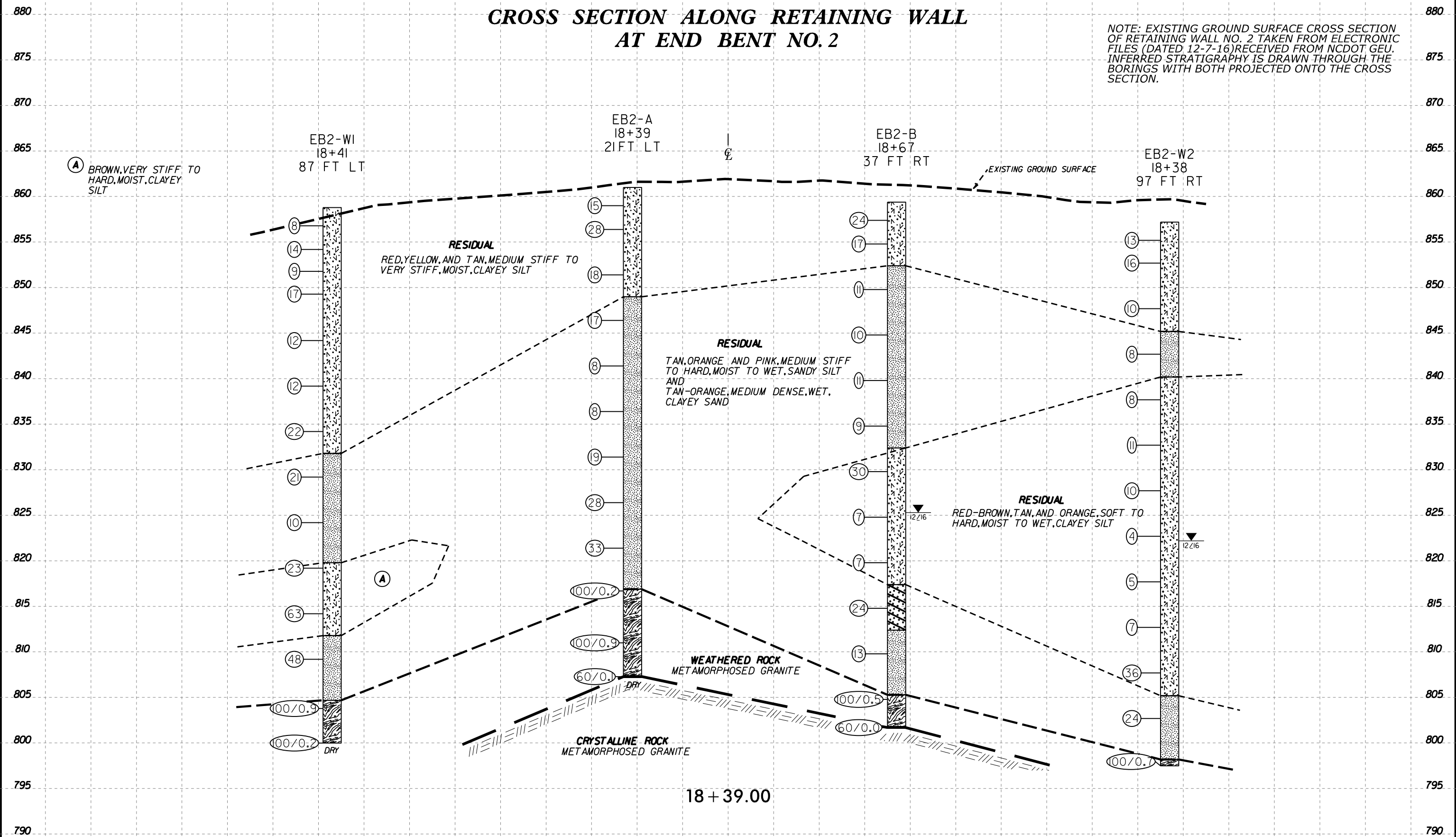
RESIDUAL
RED-BROWN, TAN, AND ORANGE, SOFT TO HARD, MOIST TO WET, CLAYEY SILT

WEATHERED ROCK
METAMORPHOSED GRANITE

CRYSTALLINE ROCK
METAMORPHOSED GRANITE

18 + 39.00

-Y16-



GEOTECHNICAL BORING REPORT

BORE LOG

WBS 34821.1.1		TIP U-2525C		COUNTY GUILFORD		GEOLOGIST C.T. Tang, EI										
SITE DESCRIPTION End Bent No. 2 Retaining Wall on SR2526 (Summit Ave.) over Greensboro Eastern Loop I-85 Bypass							GROUND WTR (ft)									
BORING NO. EB2-W1		STATION 18+41		OFFSET 87 ft LT		ALIGNMENT -Y16-										
COLLAR ELEV. 858.8 ft		TOTAL DEPTH 58.8 ft		NORTHING 873,048		EASTING 1,780,695										
DRILL RIG/HAMMER EFF./DATE BRI8284 45 Track 89% 02/26/2016			DRILL METHOD H.S. Augers			HAMMER TYPE Automatic										
DRILLER J. Anderson		START DATE 12/12/16		COMP. DATE 12/12/16		SURFACE WATER DEPTH N/A										
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						
860														858.8	GROUND SURFACE	0.0
	857.8	1.0	1	4	4								M	RESIDUAL Brown and Red, Clayey Silt, with Trace to Some Mica		
855	855.2	3.6	3	6	8								M			
	852.8	6.0	4	4	5								M			
850	850.3	8.5	5	8	9								M			
	848.7	8.5	3	4	6								M			
845	845.2	13.6	4	6	6								M			
	843.7	13.5	2	4	4								M			
840	840.2	18.6	3	6	6								M			
	838.7	18.5	2	3	5								M			
835	835.2	23.6	3	8	14								M			
	833.7	23.5	3	4	7								M			
830	830.2	28.6	6	10	11								M	831.8	Tan, Sandy Silt	27.0
	828.7	28.5	3	5	5								M			
825	825.2	33.6	2	4	6								W			
	823.7	33.5	1	2	2								W			
820	820.2	38.6	5	10	13								M	819.8	Brown, Clayey Silt	39.0
	818.7	38.5	1	2	3								M			
815	815.2	43.6	12	21	42								M			
	813.7	43.5	2	3	4								M			
810	810.2	48.6	9	19	29								W	811.8	Tan, Sandy Silt	47.0
	808.7	48.5	8	15	21								W			
805	805.2	53.6	27	52	48/0.4								W	804.7	WEATHERED ROCK (Metamorphosed Granite)	54.1
	803.7	53.5	6	10	14								W			
800	800.2	58.6												800.0	Boring Terminated at Elevation 800.0 ft in Weathered Rock (Metamorphosed Granite)	58.8
		100/0.2														

WBS 34821.1.1		TIP U-2525C		COUNTY GUILFORD		GEOLOGIST C.T. Tang, EI											
SITE DESCRIPTION End Bent No. 2 Retaining Wall on SR2526 (Summit Ave.) over Greensboro Eastern Loop I-85 Bypass							GROUND WTR (ft)										
BORING NO. EB2-W2		STATION 18+38		OFFSET 97 ft RT		ALIGNMENT -Y16-											
COLLAR ELEV. 857.2 ft		TOTAL DEPTH 59.7 ft		NORTHING 872,949		EASTING 1,780,849											
DRILL RIG/HAMMER EFF./DATE BRI8284 45 Track 89% 02/26/2016			DRILL METHOD H.S. Augers			HAMMER TYPE Automatic											
DRILLER J. Anderson		START DATE 12/12/16		COMP. DATE 12/12/16		SURFACE WATER DEPTH N/A											
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							
860														857.2	GROUND SURFACE	0.0	
	856.2	1.0	3	6	7								M	RESIDUAL Red, Clayey Silt			
855	853.7	3.5	4	8	8								M				
	848.7	8.5	3	4	6								M				
850	848.7	8.5	3	4	6								M				
	845.2	12.0											M		845.2	Pink-Red, Sandy Silt	12.0
845	843.7	13.5	2	4	4								M				
	840.2	17.0											M		840.2	Red, Red-Pink, Orange and Brown, Clayey Silt	17.0
840	838.7	18.5	2	3	5								M				
	833.7	23.5	3	4	7								M				
835	833.7	23.5	3	4	7								M				
	828.7	28.5	3	5	5								M				
830	828.7	28.5	3	5	5								M				
	823.7	33.5	1	2	2								W				
825	823.7	33.5	1	2	2								W				
	818.7	38.5	1	2	3								W				
820	818.7	38.5	1	2	3								W				
	813.7	43.5	2	3	4								W				
815	813.7	43.5	2	3	4								W				
	808.7	48.5	8	15	21								W				
810	808.7	48.5	8	15	21								W				
	805.2	52.0											W	805.2	Tan-Brown, Sandy Silt	52.0	
805	803.7	53.5	6	10	14								W				
	798.2	59.0											W	798.2	WEATHERED ROCK (Metamorphosed Granite)	59.0	
800	798.2	59.0	19	49	51/0.2								W	797.5	Boring Terminated at Elevation 797.5 ft in Weathered Rock (Metamorphosed Granite)	59.7	
		100/0.7															

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