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REFERENCE: U-4405

PROJECT: 39049

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-4405	1	7

CONTENTS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	LEGEND (SOIL & ROCK)
3	SITE PLAN
4	PROFILE
5-6	BORE LOG(S)
7	SITE PHOTOGRAPH(S)

STRUCTURE
SUBSURFACE INVESTIGATION

COUNTY CUMBERLAND
 PROJECT DESCRIPTION US 401 (RAEFORD RD.) FROM WEST OF HAMPTON OAKS DR. TO EAST OF FAIRWAY DR.
 SITE DESCRIPTION BRIDGE NO. 440 ON -RPB- (ALL AMERICAN FREEWAY) OVER ABERDEEN AND ROCKFISH RAILROAD AT STA. 26 + 78

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 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:
- 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.
 - 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

CONSULTANT:

S&ME
 INVESTIGATED BY S&ME
 DRAWN BY J. L. PEDRO
 CHECKED BY N. T. ROBERSON
 SUBMITTED BY N. T. ROBERSON
 DATE NOVEMBER 2016



DocuSigned by:
Jaime Love Pedro 12/8/2016
 B93574039B884B5
 SIGNATURE DATE

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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT
SUBSURFACE INVESTIGATION
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION

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, *VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6*

SOIL LEGEND AND AASHTO CLASSIFICATION

GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)						SILT-CLAY MATERIALS (> 35% PASSING #200)						ORGANIC MATERIALS			
	A-1	A-3	A-2	A-2-4	A-2-5	A-2-6	A-4	A-5	A-6	A-7	A-1, A-2	A-4, A-5	A-6, A-7	A-1, A-2	A-3	A-4, A-5
GROUP CLASS.	A-1-a	A-1-b	A-2-4	A-2-5	A-2-6	A-2-7	A-4	A-5	A-6	A-7	A-1, A-2	A-4, A-5	A-6, A-7	A-1, A-2	A-3	A-4, A-5
SYMBOL																
% PASSING #10 #40 #200	50 MX 30 MX 15 MX	50 MX 25 MX	51 MN 10 MX	35 MX 35 MX	35 MX 35 MX	35 MX 35 MX	36 MN 36 MN	36 MN 36 MN	36 MN 36 MN	36 MN 36 MN	GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT			
MATERIAL PASSING #40 LL PI	- 6 MX	- NP	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER			HIGHLY ORGANIC SOILS		
GROUP INDEX	0	0	0	4 MX	8 MX	12 MX	16 MX	NO MX								
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL, AND SAND	FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND	SILTY SOILS	CLAYEY SOILS											
GEN. RATING AS SUBGRADE	EXCELLENT TO GOOD			FAIR TO POOR			FAIR TO POOR	POOR	UNSATURABLE							

PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30

CONSISTENCY OR DENSENESS

PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²)
GENERALLY GRANULAR MATERIAL (NON-COHESIVE)	VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE	< 4 4 TO 10 10 TO 30 30 TO 50 > 50	N/A
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD	< 2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 > 30	< 0.25 0.25 TO 0.5 0.5 TO 1.0 1 TO 2 2 TO 4 > 4

TEXTURE OR GRAIN SIZE

U.S. STD. SIEVE SIZE OPENING (MM)	4	10	40	60	200	270
	4.76	2.00	0.42	0.25	0.075	0.053
BOULDER (BLDR.)						
COBBLE (COB.)						
GRAVEL (GR.)						
COARSE SAND (CS.E. SD.)						
FINE SAND (F SD.)						
SILT (SL.)						
CLAY (CL.)						
GRAIN SIZE	305	75	2.0	0.25	0.05	0.005
MM						
IN.	12	3				

SOIL MOISTURE - CORRELATION OF TERMS

SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION
LL - LIQUID LIMIT	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE
PL - PLASTIC LIMIT	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
OM - OPTIMUM MOISTURE SHRINKAGE LIMIT	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE
SL - SHRINKAGE LIMIT	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE

PLASTICITY

NON PLASTIC	PLASTICITY INDEX (PI)	DRY STRENGTH
SLIGHTLY PLASTIC	0-5	VERY LOW
MODERATELY PLASTIC	6-15	SLIGHT
HIGHLY PLASTIC	16-25	MEDIUM
	26 OR MORE	HIGH

COLOR

DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-BROWN). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.

GRADATION

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.

ANGULARITY OF GRAINS
THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: **ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.**

MINERALOGICAL COMPOSITION
MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.

COMPRESSIBILITY
SLIGHTLY COMPRESSIBLE LL < 31
MODERATELY COMPRESSIBLE LL = 31 - 50
HIGHLY COMPRESSIBLE LL > 50

PERCENTAGE OF MATERIAL

ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE 1 - 10%
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE 10 - 20%
MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME 20 - 35%
HIGHLY ORGANIC	> 10%	> 20%	HIGHLY 35% AND ABOVE

GROUND WATER

- WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING
- STATIC WATER LEVEL AFTER 24 HOURS
- PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA
- SPRING OR SEEP

MISCELLANEOUS SYMBOLS

	ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION		DIP & DIP DIRECTION OF ROCK STRUCTURES
	SOIL SYMBOL		TEST BORING
	ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT		AUGER BORING
	INFERRED SOIL BOUNDARY		CORE BORING
	INFERRED ROCK LINE		MONITORING WELL
	ALLUVIAL SOIL BOUNDARY		PIEZOMETER INSTALLATION
	SLOPE INDICATOR INSTALLATION		CONE PENETROMETER TEST
	SOUNDING ROD		TEST BORING WITH CORE
	SPT N-VALUE		

RECOMMENDATION SYMBOLS

	UNDERCUT		UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE		UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL
	SHALLOW UNDERCUT		UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADED ROCK		

ABBREVIATIONS

AR - AUGER REFUSAL	CL. - CLAY	CPT - COARSE PENETRATION TEST	CSE. - COARSE	DMT - DILATOMETER TEST	DPT - DYNAMIC PENETRATION TEST	e - VOID RATIO	F - FINE	FOSS. - FOSSILIFEROUS	FRAC. - FRACTURED, FRACTURES	FRAGS. - FRAGMENTS	HI. - HIGHLY	MED. - MEDIUM	MICA. - MICACEOUS	MOD. - MODERATELY	NP - NON PLASTIC	ORG. - ORGANIC	PMT - PRESSUREMETER TEST	SAP. - SAPROLITIC	SD. - SAND, SANDY	SL. - SILTY, SILTY	SLI. - SLIGHTLY	TCR - TRICONE REFUSAL	w - MOISTURE CONTENT	V - VERY	VST - VANE SHEAR TEST	WEA. - WEATHERED	UNIT WEIGHT	DRY UNIT WEIGHT		

EQUIPMENT USED ON SUBJECT PROJECT

<input checked="" type="checkbox"/> CME-45C	<input checked="" type="checkbox"/> CLAY BITS	<input checked="" type="checkbox"/> AUTOMATIC	<input type="checkbox"/> MANUAL
<input type="checkbox"/> CME-55	<input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER	<input type="checkbox"/> CORE SIZE:	<input type="checkbox"/> -B
<input type="checkbox"/> CME-550	<input type="checkbox"/> 8" HOLLOW AUGERS	<input type="checkbox"/> -H	<input type="checkbox"/> -N
<input type="checkbox"/> VANE SHEAR TEST	<input type="checkbox"/> HARD FACED FINGER BITS	<input type="checkbox"/> HAND TOOLS:	<input type="checkbox"/> POST HOLE DIGGER
<input type="checkbox"/> PORTABLE HOIST	<input type="checkbox"/> TUNG-CARBIDE INSERTS	<input type="checkbox"/> HAND AUGER	<input type="checkbox"/> SOUNDING ROD
<input type="checkbox"/>	<input type="checkbox"/> CASING <input type="checkbox"/> W/ ADVANCER	<input type="checkbox"/> VANE SHEAR TEST	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/> TRICONE * STEEL TEETH		
<input type="checkbox"/>	<input type="checkbox"/> TRICONE * TUNG-CARB.		
<input type="checkbox"/>	<input type="checkbox"/> CORE BIT		
<input type="checkbox"/>			

ROCK DESCRIPTION

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:

	WEATHERED ROCK (WR)		NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.
	CRYSTALLINE ROCK (CR)		FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.
	NON-CRYSTALLINE ROCK (NCR)		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.
	COASTAL PLAIN SEDIMENTARY ROCK (CP)		COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.

WEATHERING

FRESH	ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.
VERY SLIGHT (V SL.)	ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN. CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.
SLIGHT (SL.)	ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.
MODERATE (MOD.)	SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.
MODERATELY SEVERE (MOD. SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. <i>IF TESTED, WOULD YIELD SPT REFUSAL</i>
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, WOULD YIELD SPT N VALUES > 100 BPF</i>
VERY SEVERE (V SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <i>IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF</i>
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.

ROCK HARDNESS

VERY HARD	CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.
HARD	CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.
MODERATELY HARD	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.
MEDIUM HARD	CAN BE GROUDED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.
SOFT	CAN BE GROUDED 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.
VERY SOFT	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.

FRACTURE SPACING

TERM	SPACING	TERM	THICKNESS
VERY WIDE	MORE THAN 10 FEET	VERY THICKLY BEDDED	4 FEET
WIDE	3 TO 10 FEET	THICKLY BEDDED	1.5 - 4 FEET
MODERATELY CLOSE	1 TO 3 FEET	THINLY BEDDED	0.16 - 1.5 FEET
CLOSE	0.16 TO 1 FOOT	VERY THINLY BEDDED	0.03 - 0.16 FEET
VERY CLOSE	LESS THAN 0.16 FEET	THICKLY LAMINATED	0.008 - 0.03 FEET
		THINLY LAMINATED	< 0.008 FEET

INDURATION

FRIABLE	RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.
MODERATELY INDURATED	GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.
INDURATED	GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.
EXTREMELY INDURATED	SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.

TERMS AND DEFINITIONS

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 (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.
STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
STRATA ROCK QUALITY DESIGNATION (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.

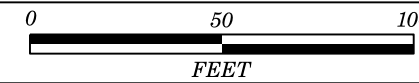
BENCH MARK:

ELEVATION: FEET

NOTES:

BORINGS ELEVATIONS AND PROFILE GROUNDLINE TAKEN FROM ROADWAY TIN FILE DATED 7/27/2016.

SITE PLAN



SKEW ANGLE = 131°

-AA- TS Sta. 53+25.18

NBL ALL AMERICAN EXPRESSWAY BST

SBL ALL AMERICAN EXPRESSWAY BST

BEGIN BRIDGE
-RPB- STA. 26+36

END BRIDGE
-RPB- STA. 27+20

EBI-A

EB2-A

TO SR 1400

TO RAEFORD RD.

END NOISE WALL

NWI- STA 28+30.00 =
-RPB- STA 25+81.07
OFF 26.00' RT

BEGIN RETAINING WALL 2

WALL2- STA 10+00.00 =
-RPB- STA 27+39.19
OFF 18.00' RT

END RETAINING WALL 2

WALL2- STA 12+75.85 =
-RPB- STA 30+07.92
OFF 34.00' RT

END RETAINING WALL 1

WALL1- STA 14+87.28 =
-RPB- STA 25+90.87
OFF 18.00' RT

2SBK BUS

2SBK BUS

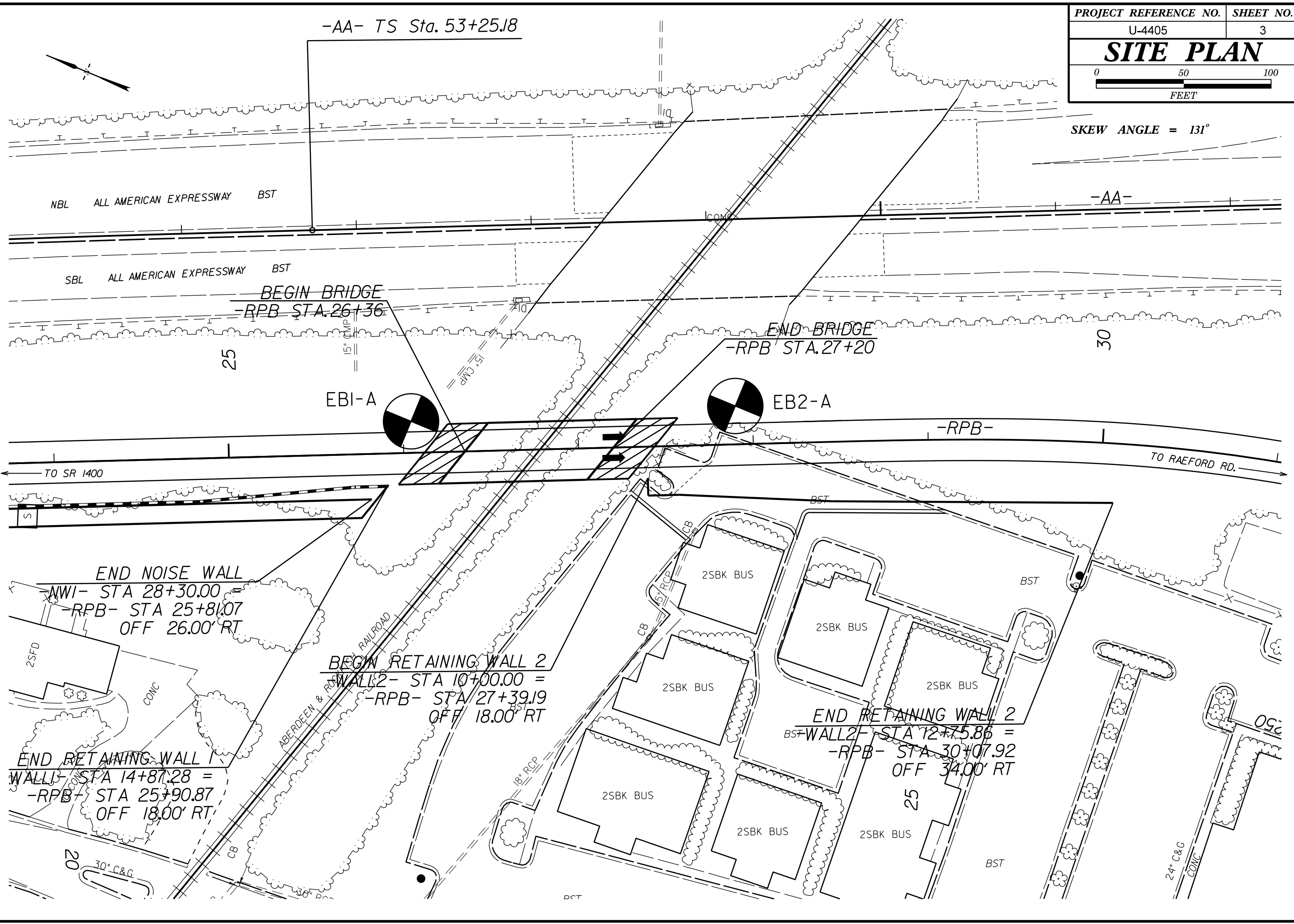
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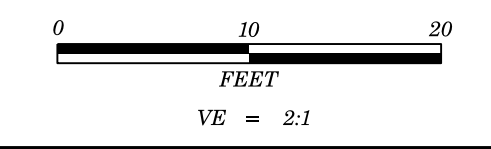
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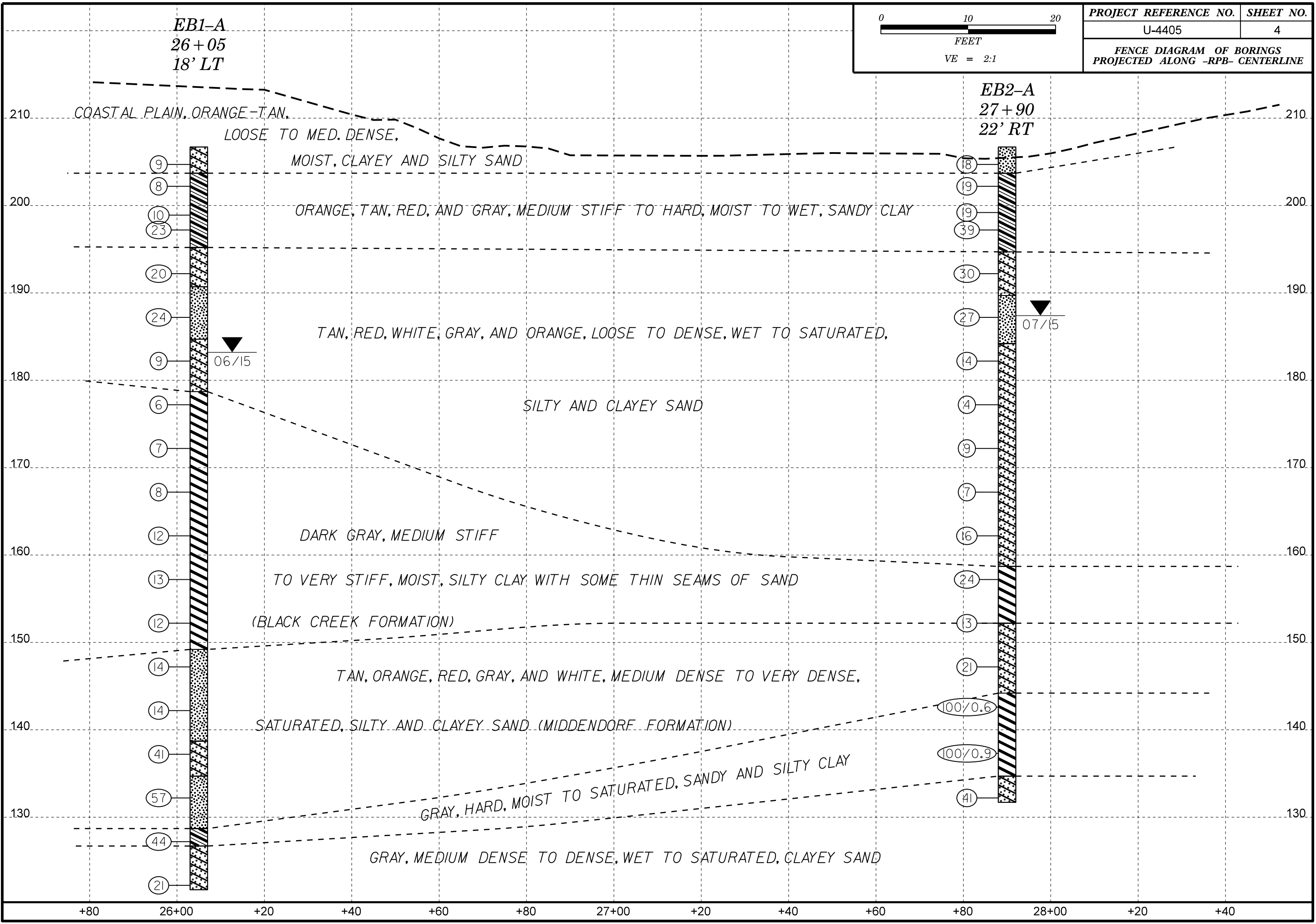
2SBK BUS

BST





PROJECT REFERENCE NO.	SHEET NO.
U-4405	4
FENCE DIAGRAM OF BORINGS PROJECTED ALONG -RPB- CENTERLINE	



SITE PHOTOGRAPH

Bridge No. 440 on -RPB- (All American Expressway) over Aberdeen & Rockfish Railroad



Looking West towards Proposed New Location

REFERENCE: U-4405

PROJECT: 39049

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

STRUCTURE
SUBSURFACE INVESTIGATION

COUNTY CUMBERLAND
 PROJECT DESCRIPTION US 401 (RAEFORD ROAD) FROM
WEST OF HAMPTON OAK DRIVE TO EAST OF
FAIRWAY DRIVE IN FAYETTEVILLE
 SITE DESCRIPTION NOISE WALLS 1 AND 2 AND
RETAINING WALLS 1 AND 2 ALONG -RPB-
AND RETAINING WALL 3 AT -L- STATION 257+70

CONTENTS

<u>SHEET NO.</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2	LEGEND (SOIL & ROCK)
3-5	SITE PLAN
6-7	PROFILE - SOUND BARRIER WALL 1
8-10	PROFILE - RETAINING WALL 1
11-12	PROFILE - RETAINING WALL 2
13	PROFILE - RETAINING WALL 3
14-18	PROFILE - SOUND BARRIER WALL 2
19-21	BORING LOGS (NW1-1 TO NW1-6)
22-23	LABORATORY TESTING SUMMARY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-4405	1	23

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:

- 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.
- 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

<u>SCHLEMM, T. S.</u>	<u>BUNCH, C. M.</u>
<u>RIGGS, Jr., A. F. (S&ME)</u>	<u>TURNAGE, J. R.</u>
<u>ROUSH, J. K.</u>	<u>COOGAN, M. (MAD)</u>
<u>KINTER, A. N. (NCDOT)</u>	<u>PINTER, D. G. (NCDOT)</u>

INVESTIGATED BY TERRACON CONSULTANTS
 DRAWN BY FIELDS, W. D.
 CHECKED BY NASH, A. A.
 SUBMITTED BY RIGGS, Jr., A. F.
 DATE APRIL 2018

Prepared in the Office of:

Terracon
 Consulting Engineers and Scientists

2401 BRENTWOOD ROAD, SUITE 107
 RALEIGH, NORTH CAROLINA 27604
 NC REGISTERED ENGINEERING FIRM: F-0869
 NC REGISTERED GEOLOGIC FIRM: C-367



DocuSigned by:

Abner F. Riggs Jr. 4/30/2018

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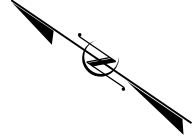
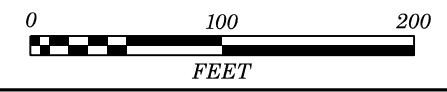
SIGNATURE

DATE

**DOCUMENT NOT CONSIDERED FINAL
 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 (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 INTRUDED ROCKS. SLICKENISE - 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>																																																																																																																																											
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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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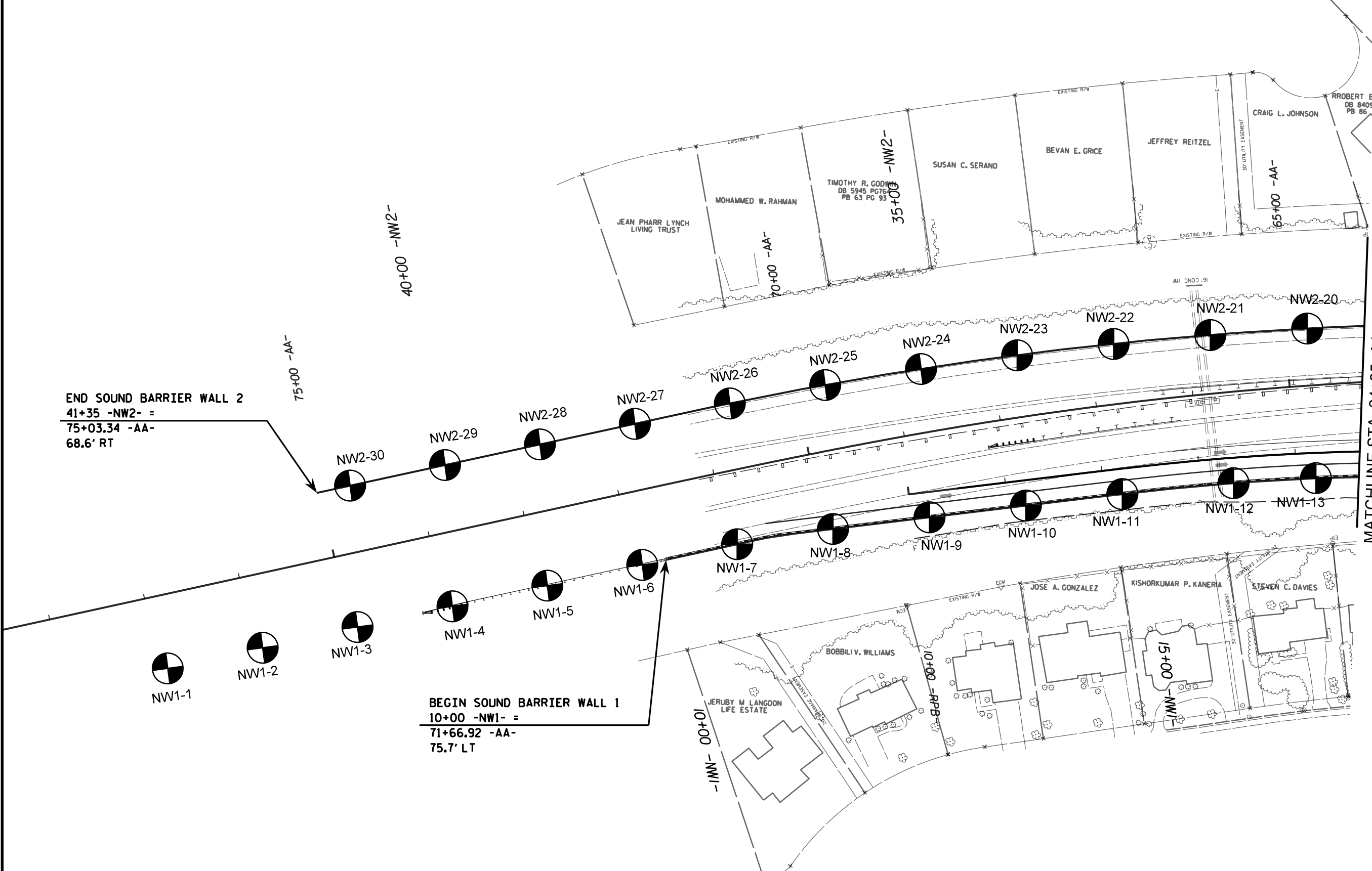


PROJECT REFERENCE NO. SHEET NO.

U-4405 3

Terracon
 Consulting Engineers and Scientists

2401 BRENTWOOD ROAD, SUITE 107
 RALEIGH, NORTH CAROLINA 27604
 NC REGISTERED ENGINEERING FIRM: F-0869
 NC REGISTERED GEOLOGIC FIRM: C-367



END SOUND BARRIER WALL 2
 41+35 -NW2- =
 75+03.34 -AA-
 68.6' RT

BEGIN SOUND BARRIER WALL 1
 10+00 -NW1- =
 71+66.92 -AA-
 75.7' LT

MATCHLINE STA. 64+25 -AA- SEE SHEET 4

NW1-1

NW1-2

NW1-3

NW1-4

NW1-5

NW1-6

NW1-7

NW1-8

NW1-9

NW1-10

NW1-11

NW1-12

NW1-13

NW2-30

NW2-29

NW2-28

NW2-27

NW2-26

NW2-25

NW2-24

NW2-23

NW2-22

NW2-21

NW2-20

40+00 -NW2-

70+00 -AA-

35+00 -NW2-

65+00 -AA-

10+00 -NW1-

15+00 -NW1-

JEAN PHARR LYNCH LIVING TRUST

MOHAMMED W. RAHMAN

TIMOTHY R. GODWIN
 DB 5945 PG76
 PB 63 PG 93

SUSAN C. SERANO

BEVAN E. GRICE

JEFFREY REITZEL

CRAIG L. JOHNSON

ROBERT B
 DB 8405
 PB 86

JERUBY M LANGDON LIFE ESTATE

BOBBIL V. WILLIAMS

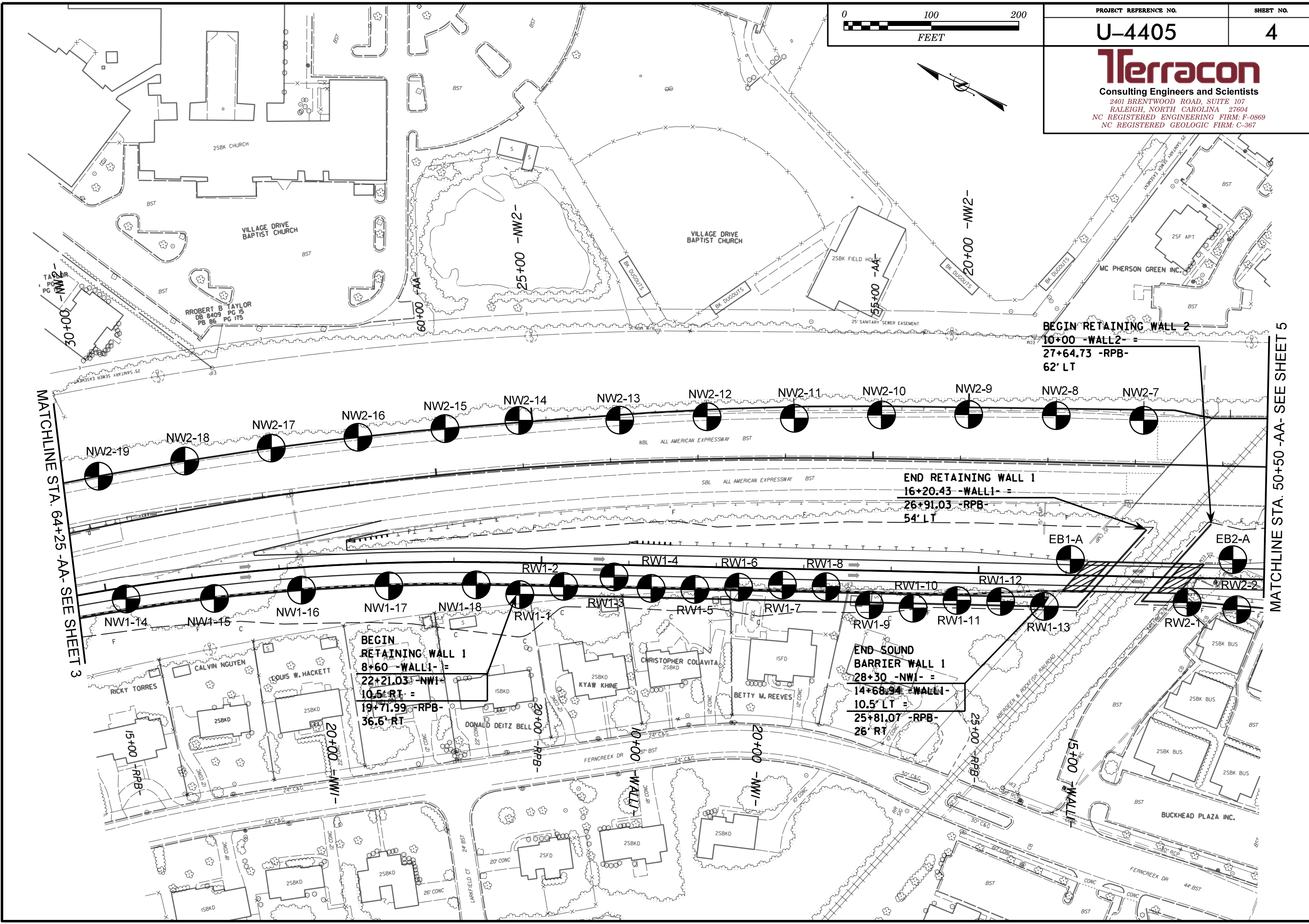
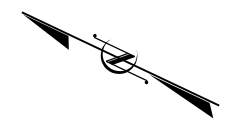
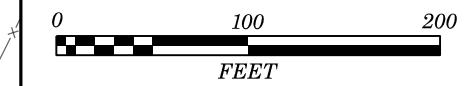
JOSE A. GONZALEZ

KISHORKUMAR P. KANERIA

STEVEN C. DAVIES



Consulting Engineers and Scientists
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RALEIGH, NORTH CAROLINA 27604
NC REGISTERED ENGINEERING FIRM: F-0869
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MATCHLINE STA. 64+25 -AA- SEE SHEET 3

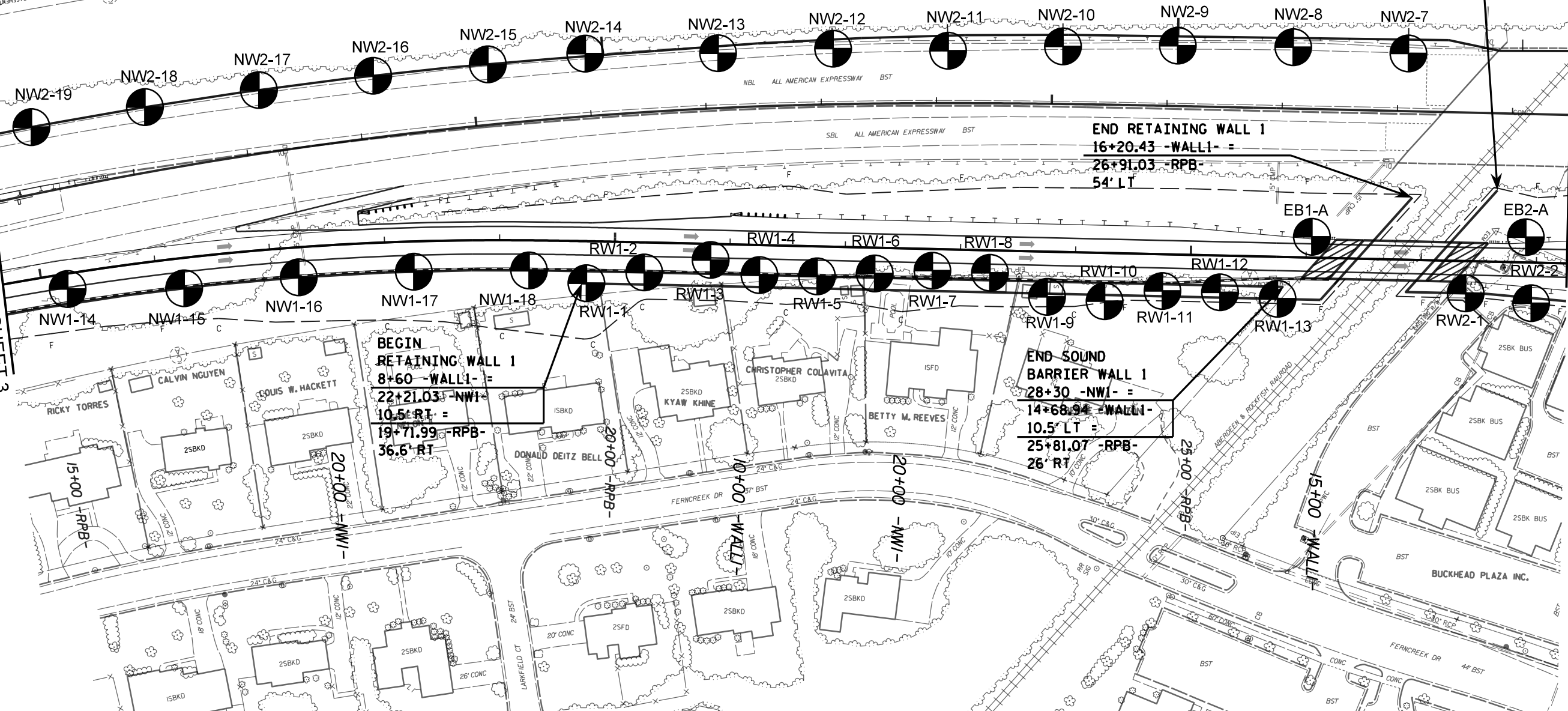
MATCHLINE STA. 50+50 -AA- SEE SHEET 5

BEGIN RETAINING WALL 2
10+00 -WALL2- =
27+64.73 -RPB-
62' LT

END RETAINING WALL 1
16+20.43 -WALL1- =
26+91.03 -RPB-
54' LT

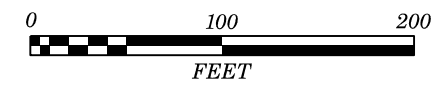
BEGIN RETAINING WALL 1
8+60 -WALL1- =
22+21.03 -NW1- =
10.5' RT =
19+71.99 -RPB-
36.6' RT

END SOUND BARRIER WALL 1
28+30 -NW1- =
14+68.94 -WALL1- =
10.5' LT =
25+81.07 -RPB-
26' RT





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2401 BRENTWOOD ROAD, SUITE 107
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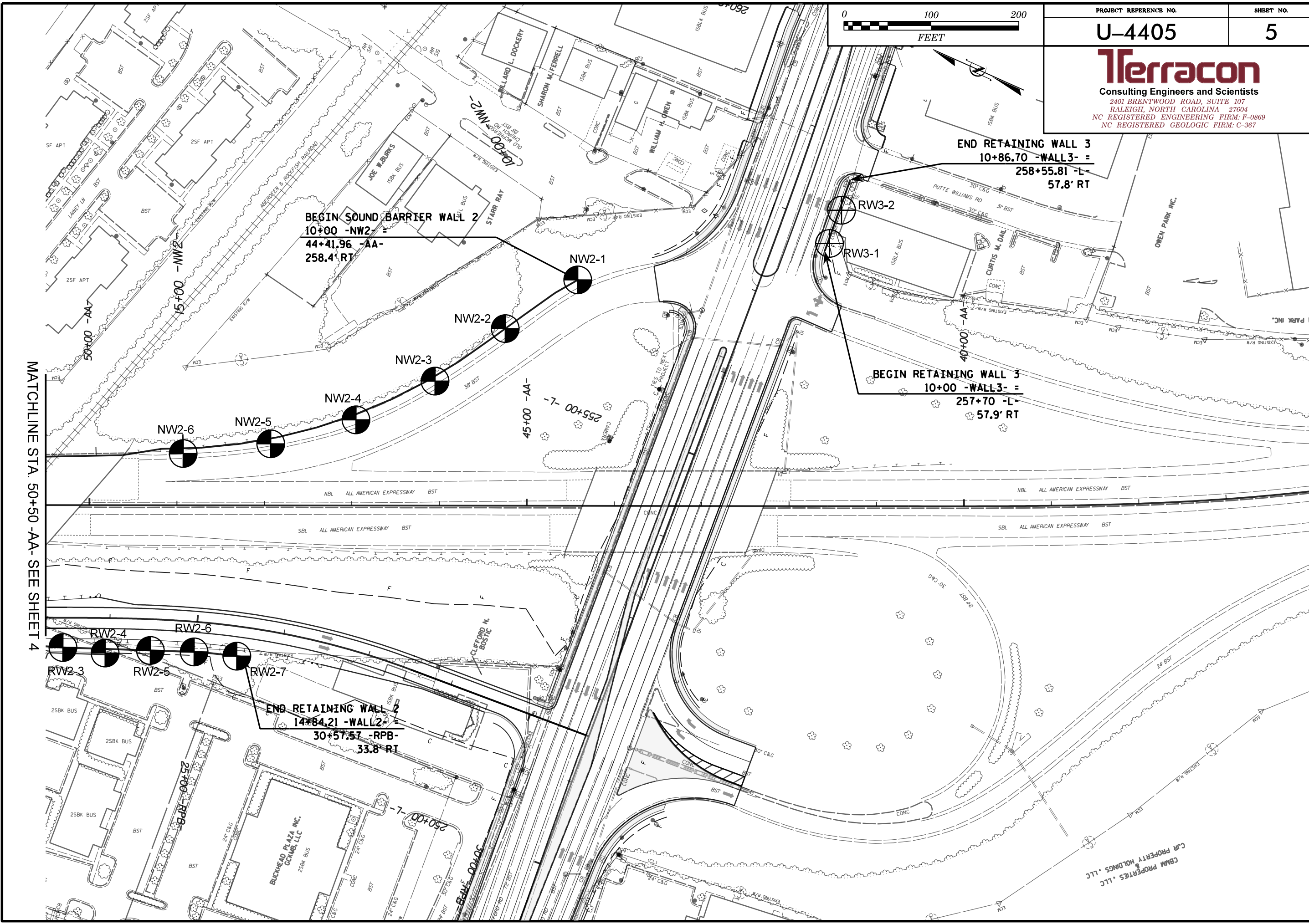
END RETAINING WALL 3
10+86.70 -WALL3- =
258+55.81 -L-
57.8' RT

BEGIN RETAINING WALL 3
10+00 -WALL3- =
257+70 -L-
57.9' RT

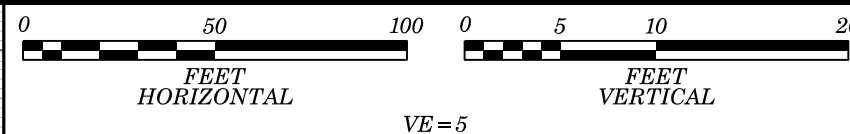
BEGIN SOUND BARRIER WALL 2
10+00 -NW2- =
44+41.96 -AA-
258.4' RT

END RETAINING WALL 2
14+84.21 -WALL2- =
30+57.57 -RPB-
33.8' RT

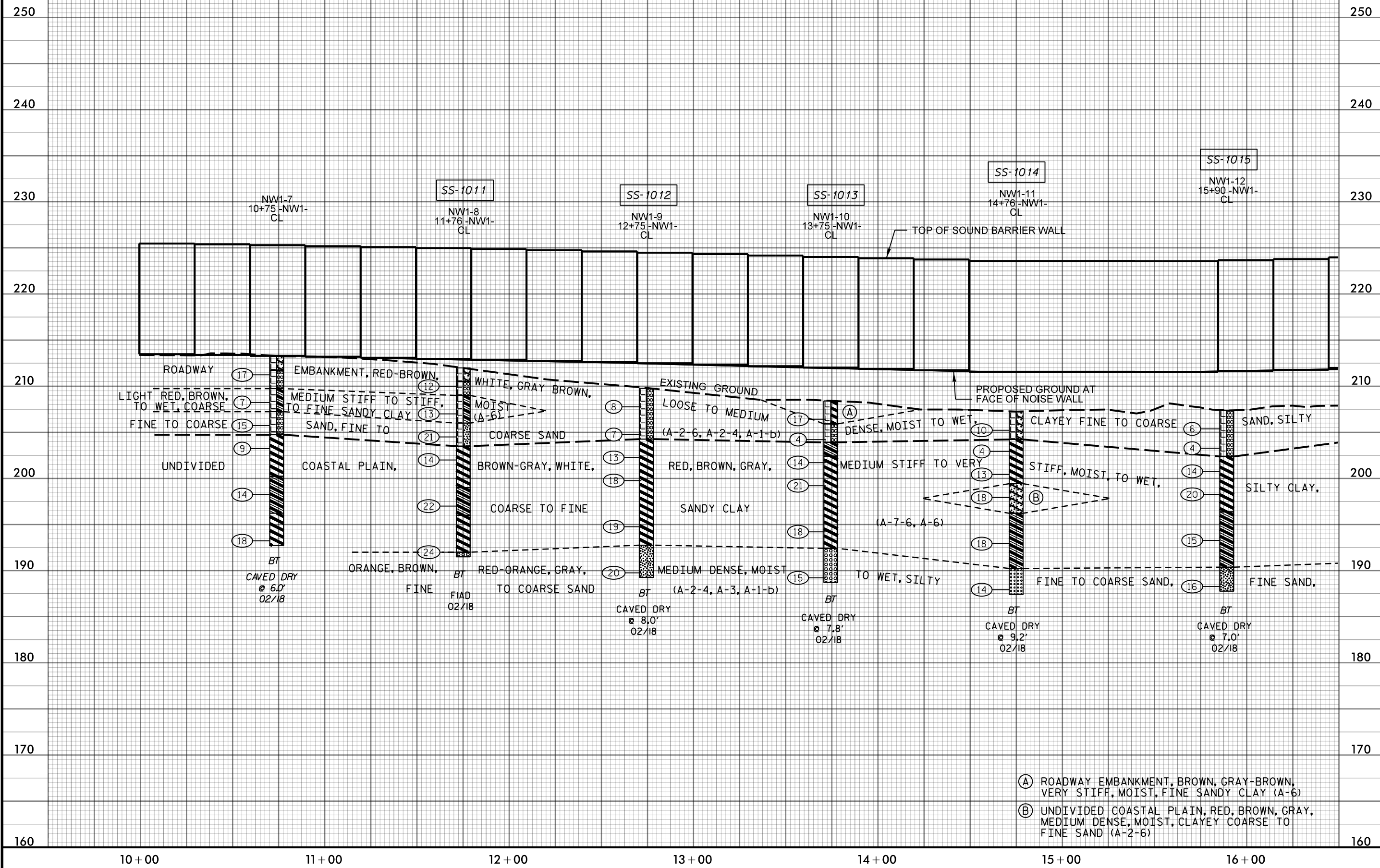
MATCHLINE STA. 50+50 -AA- SEE SHEET 4



NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ON TO THE EXISTING GROUND PROFILE ALONG THE CENTERLINE OF -NW1- TAKEN FROM THE PROJECT TIN FILE (u4405 ls tin.tin) DATED 10/03/2017.

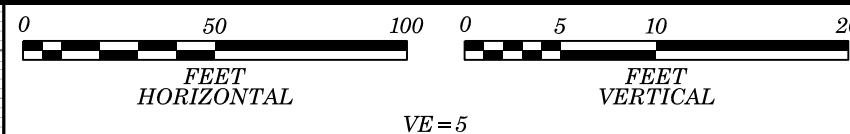


PROJECT REFERENCE NO. U-4405 SHEET NO. 6
PROFILE ALONG SOUND BARRIER WALL 1

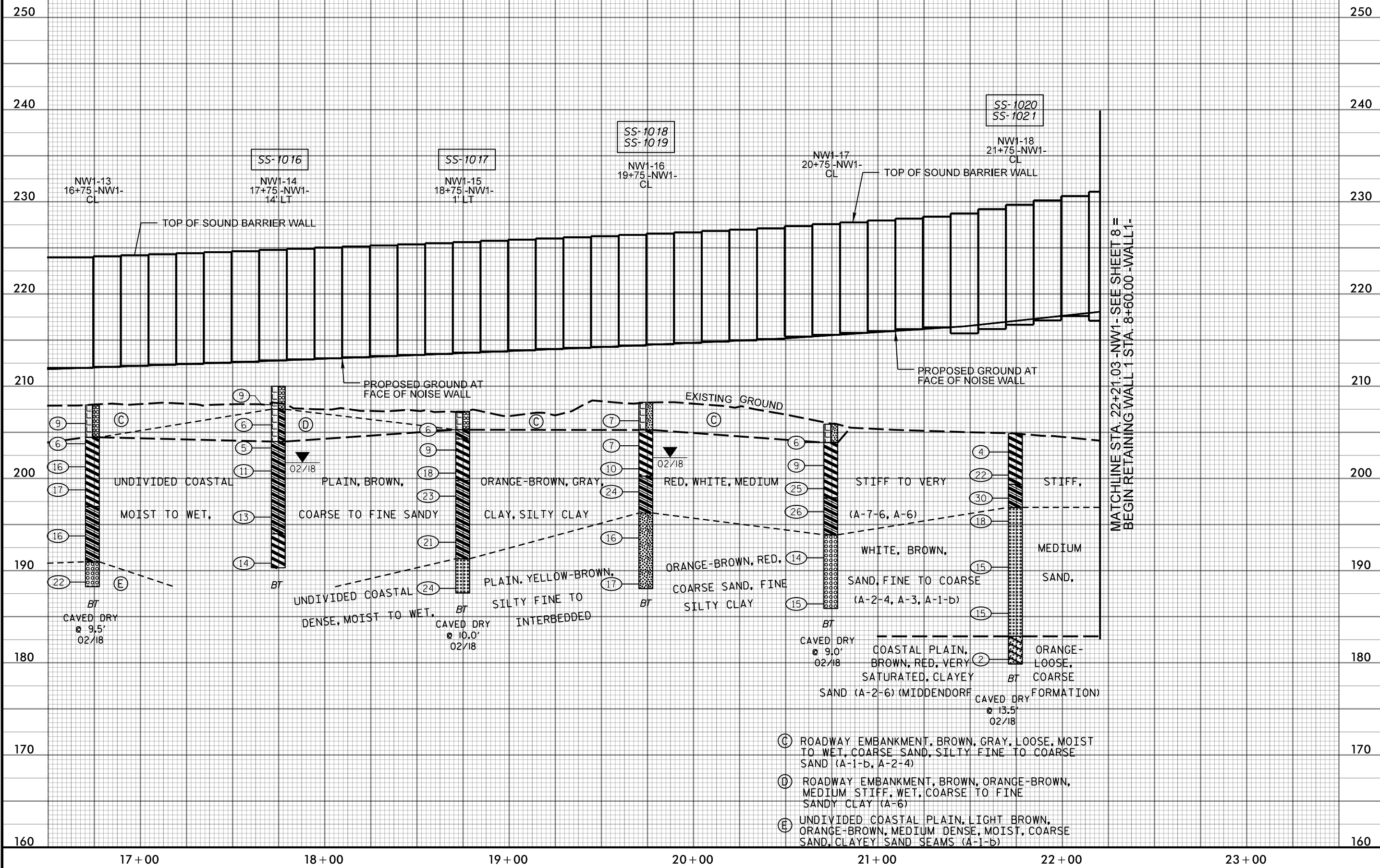


- (A) ROADWAY EMBANKMENT, BROWN, GRAY-BROWN, VERY STIFF, MOIST, FINE SANDY CLAY (A-6)
- (B) UNDIVIDED COASTAL PLAIN, RED, BROWN, GRAY, MEDIUM DENSE, MOIST, CLAYEY COARSE TO FINE SAND (A-2-6)

NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ON TO THE EXISTING GROUND PROFILE ALONG THE CENTERLINE OF -NW1- TAKEN FROM THE PROJECT TIN FILE (u4405 ls tin.tin) DATED 10/03/2017.

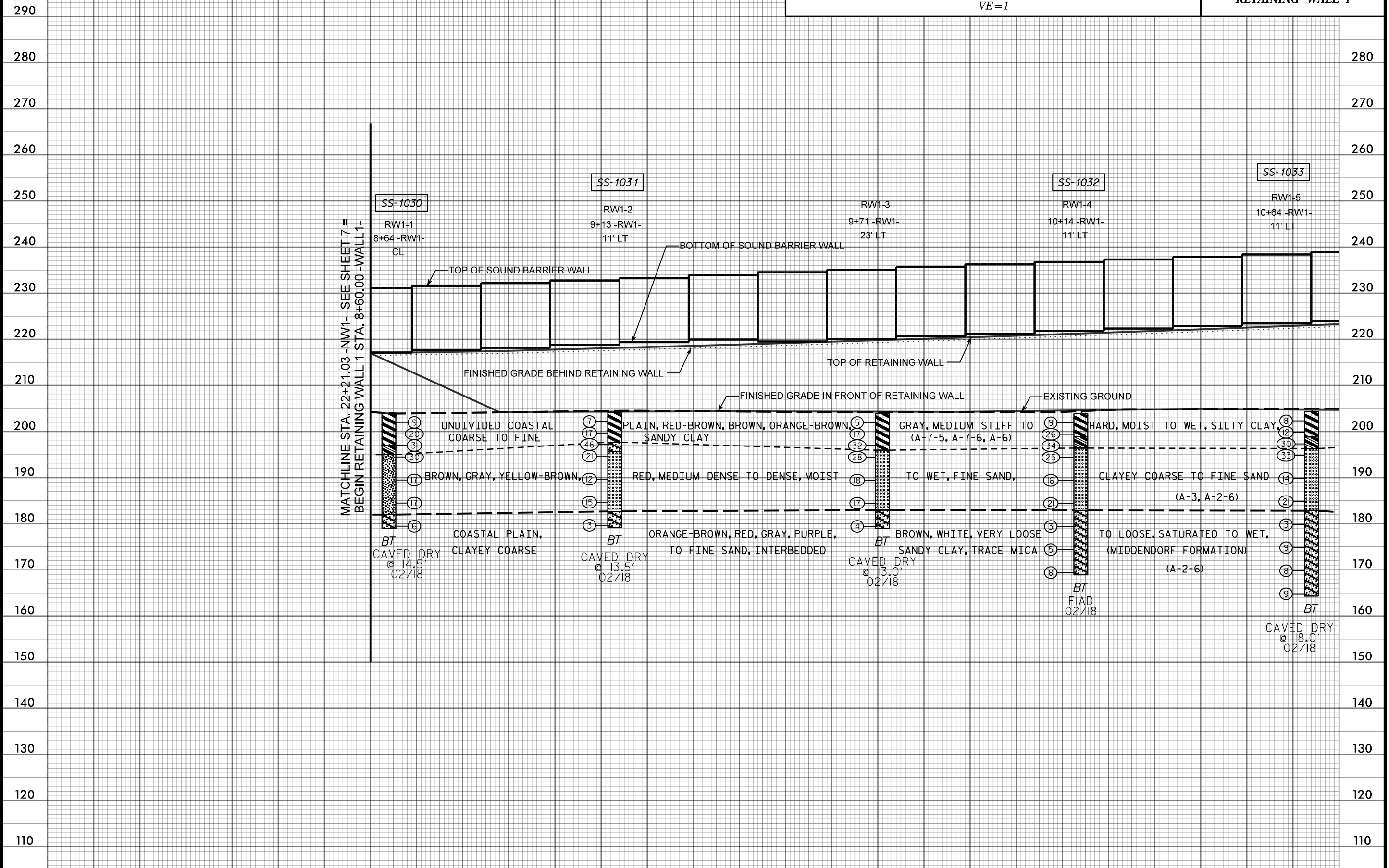
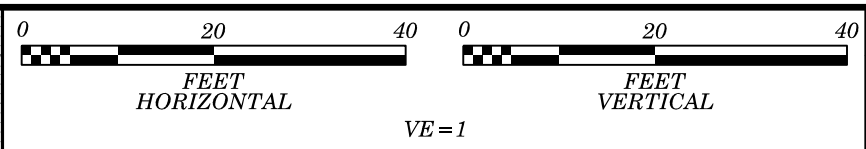


PROJECT REFERENCE NO. U-4405 SHEET NO. 7
PROFILE ALONG SOUND BARRIER WALL 1

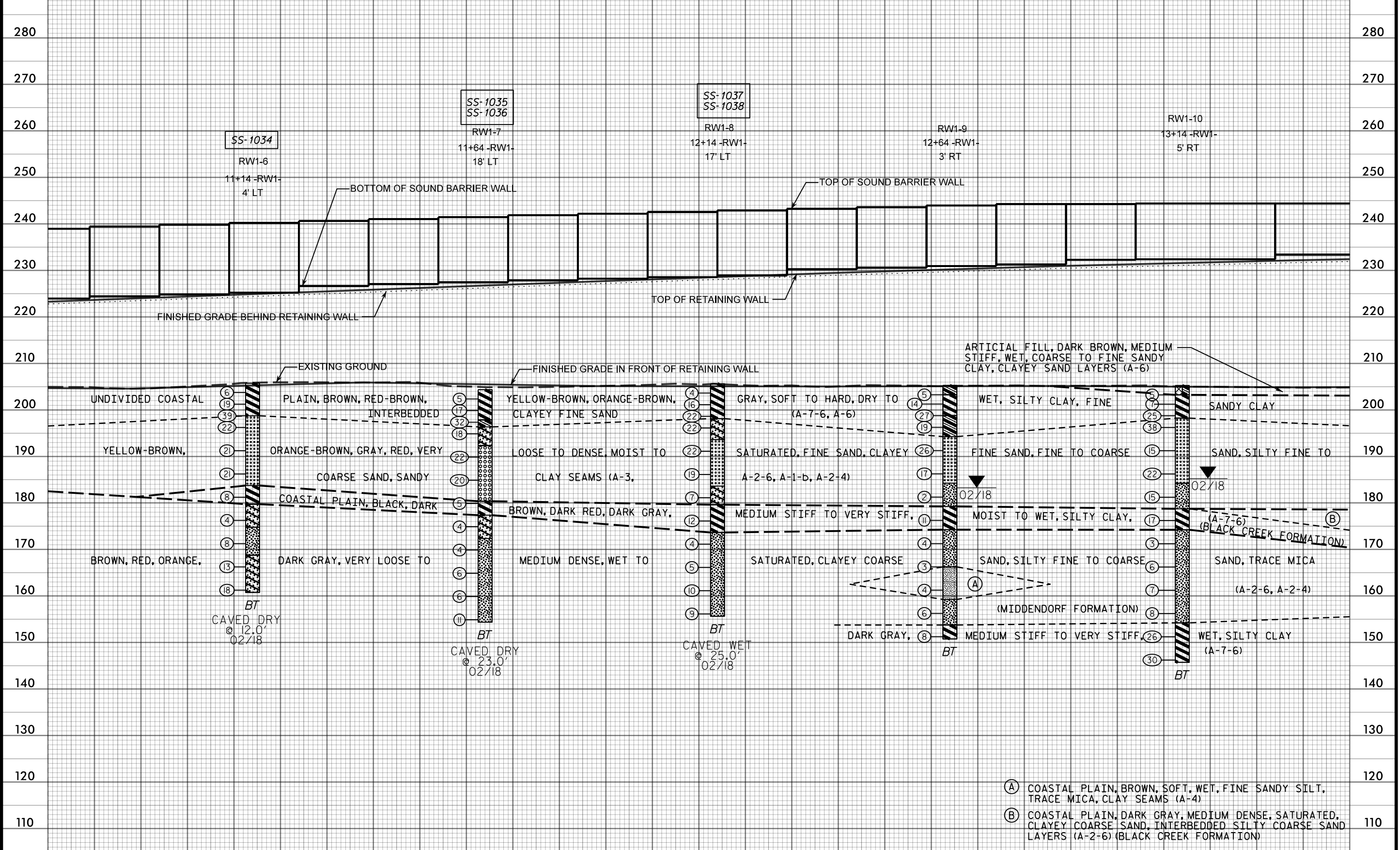
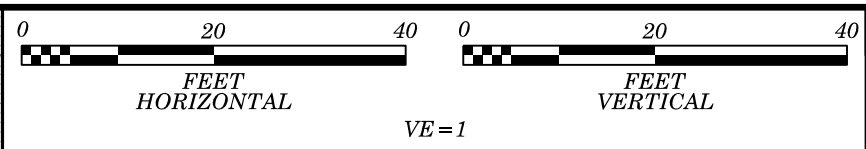


- Ⓒ ROADWAY EMBANKMENT, BROWN, GRAY, LOOSE, MOIST TO WET, COARSE SAND, SILTY FINE TO COARSE SAND (A-1-b, A-2-4)
- Ⓓ ROADWAY EMBANKMENT, BROWN, ORANGE-BROWN, MEDIUM STIFF, WET, COARSE TO FINE SANDY CLAY (A-6)
- Ⓔ UNDIVIDED COASTAL PLAIN, LIGHT BROWN, ORANGE-BROWN, MEDIUM DENSE, MOIST, COARSE SAND, CLAYEY SAND SEAMS (A-1-b)

NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ON TO THE EXISTING GROUND PROFILE ALONG THE CENTERLINE OF -WALL1- TAKEN FROM THE PROJECT TIN FILE (u4405 Is tin.tin) DATED 10/03/2017.

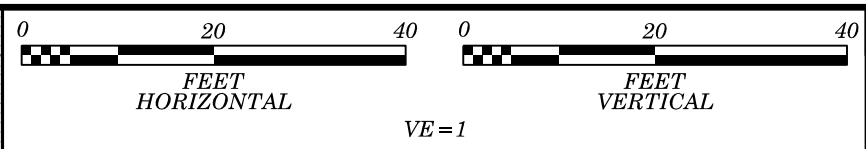


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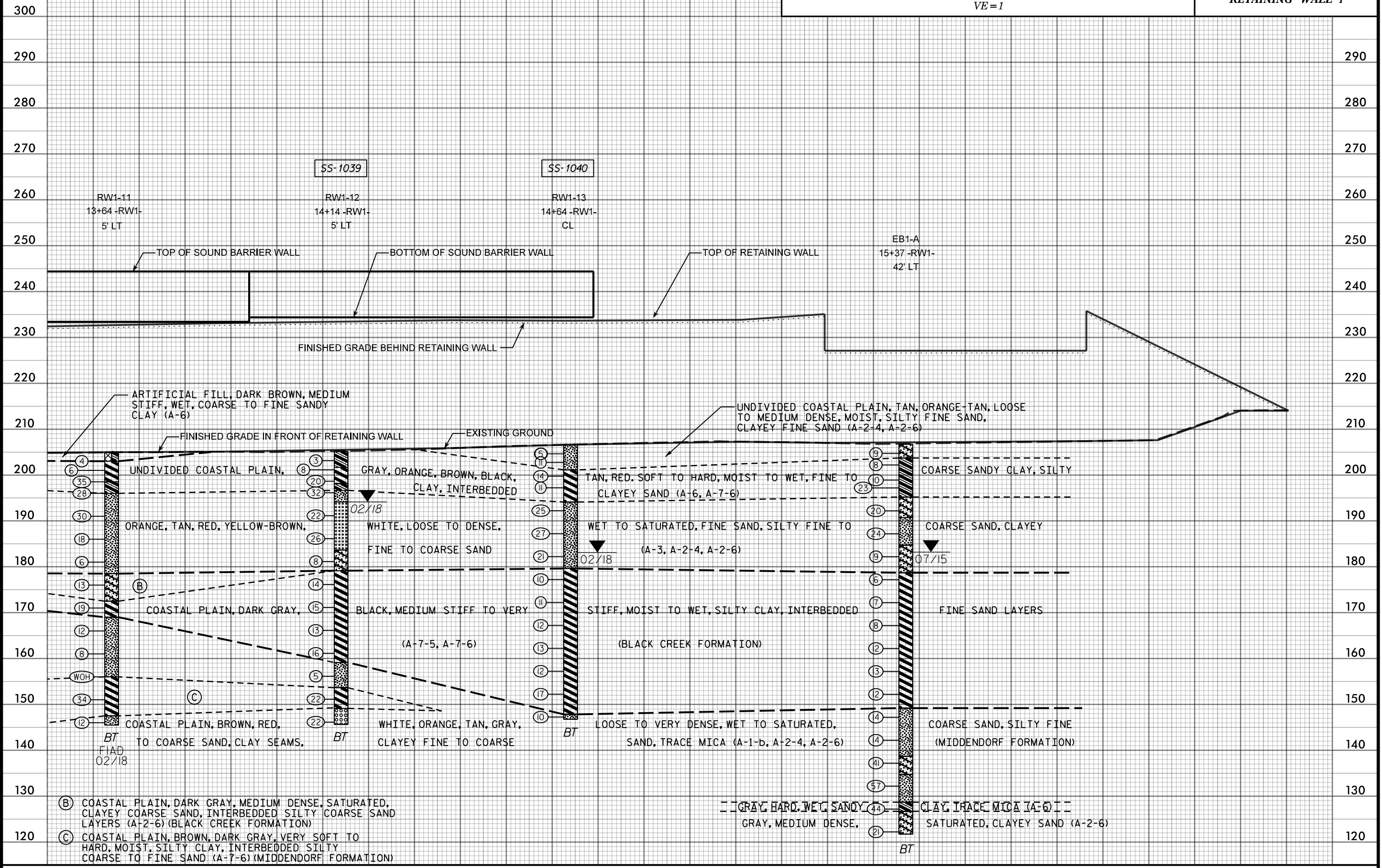


- (A) COASTAL PLAIN, BROWN, SOFT, WET, FINE SANDY SILT, TRACE MICA, CLAY SEAMS (A-4)
- (B) COASTAL PLAIN, DARK GRAY, MEDIUM DENSE, SATURATED, CLAYEY COARSE SAND, INTERBEDDED SILTY COARSE SAND LAYERS (A-2-6) (BLACK CREEK FORMATION)

NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ON TO THE EXISTING GROUND PROFILE ALONG THE CENTERLINE OF -WALL1- TAKEN FROM THE PROJECT TIN FILE (u4405 Is tin.tin) DATED 10/03/2017.

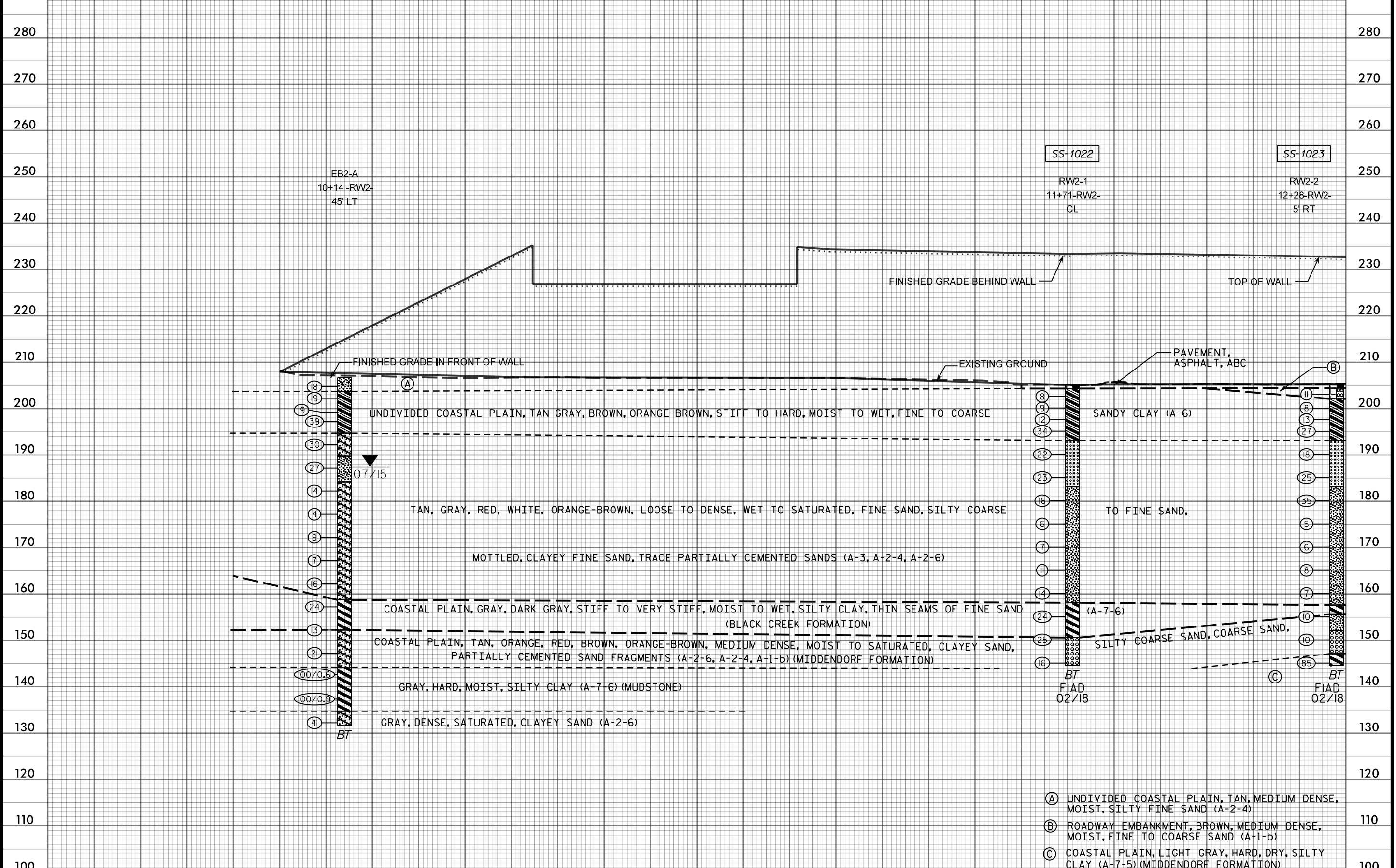
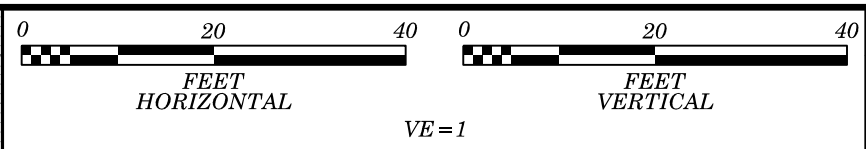


PROJECT REFERENCE NO. U-4405 SHEET NO. 10
PROFILE ALONG RETAINING WALL 1



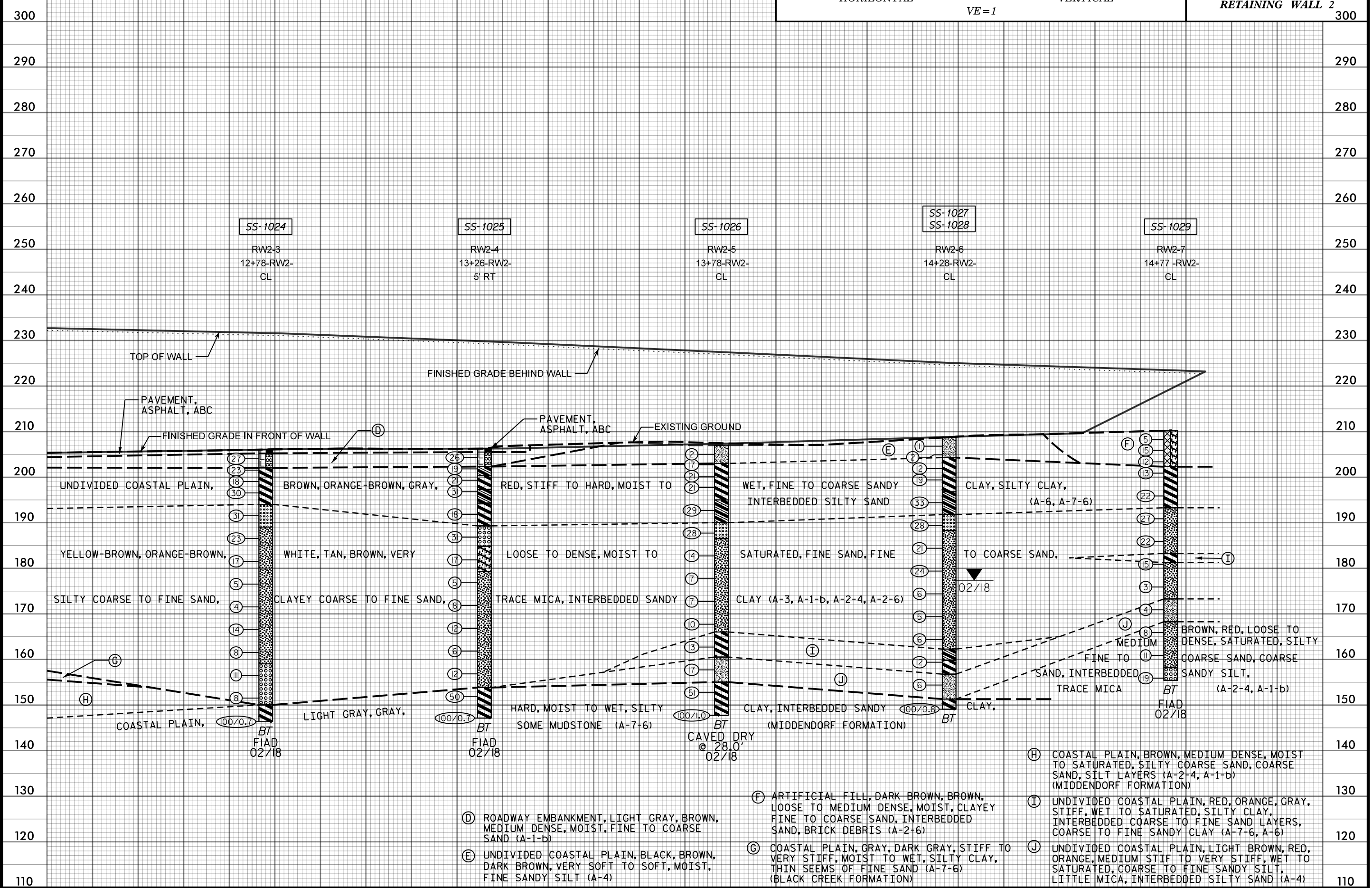
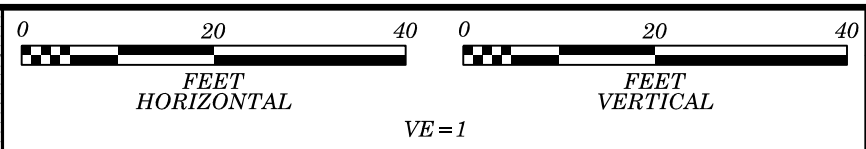
-RW1- 14+00 28+00 28+30 END SOUND BARRIER WALL 1 16+00
 -NW1-

NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ON TO THE EXISTING GROUND PROFILE ALONG THE CENTERLINE OF -WALL2- TAKEN FROM THE PROJECT TIN FILE (u4405 Is tin.tin) DATED 10/03/2017.



- (A) UNDIVIDED COASTAL PLAIN, TAN, MEDIUM DENSE, MOIST, SILTY FINE SAND (A-2-4)
- (B) ROADWAY EMBANKMENT, BROWN, MEDIUM DENSE, MOIST, FINE TO COARSE SAND (A-1-b)
- (C) COASTAL PLAIN, LIGHT GRAY, HARD, DRY, SILTY CLAY (A-7-5) (MIDDENDORF FORMATION)

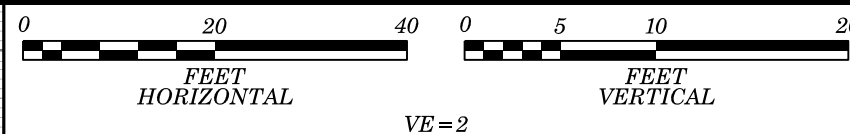
NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ON TO THE EXISTING GROUND PROFILE ALONG THE CENTERLINE OF -WALL2- TAKEN FROM THE PROJECT TIN FILE (u4405 Is tin.tin) DATED 10/03/2017.



13+00

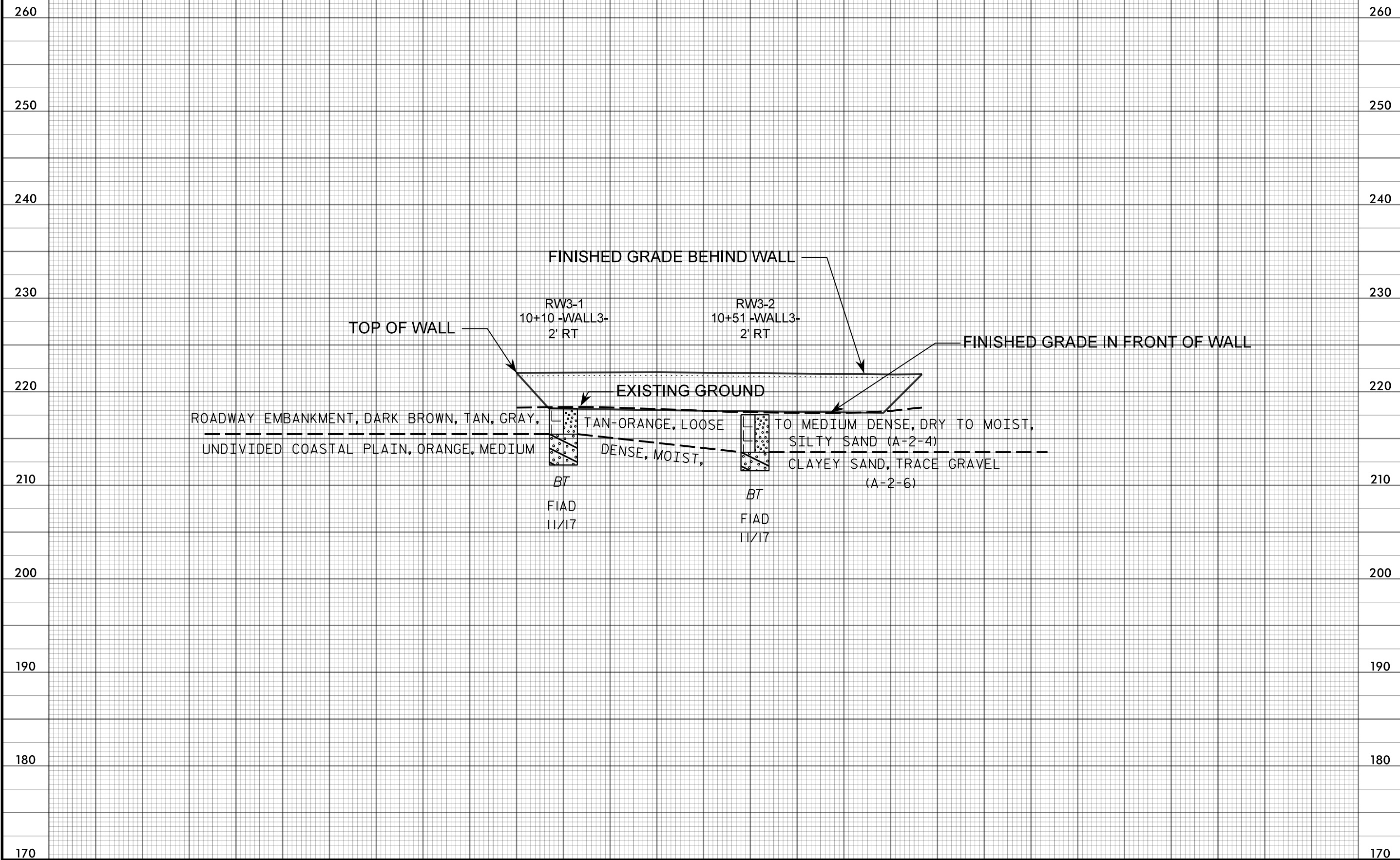
14+00

NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ON TO THE EXISTING GROUND PROFILE ALONG THE CENTERLINE OF -RW3- TAKEN FROM THE PROJECT TIN FILE (u4405_ls_tin.tin) DATED 10/03/2017.

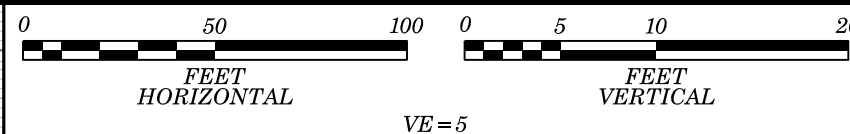


PROJECT REFERENCE NO. U-4405	SHEET NO. 13
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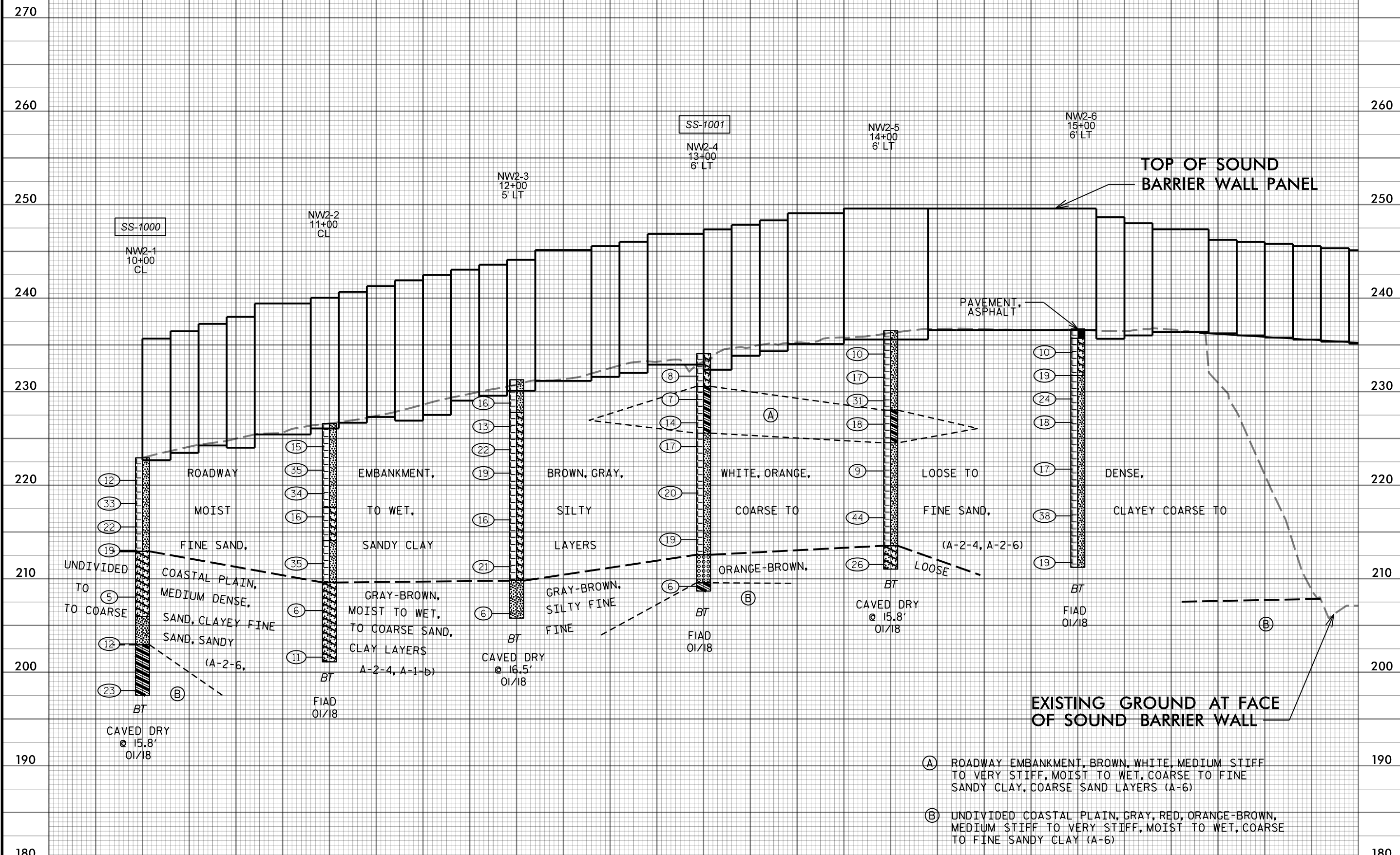
**PROFILE ALONG
RETAINING WALL 3**



NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ON TO THE EXISTING GROUND PROFILE ALONG THE CENTERLINE OF -NW2- TAKEN FROM THE PROJECT TIN FILE (u4405 ls tin.tin) DATED 10/03/2017.



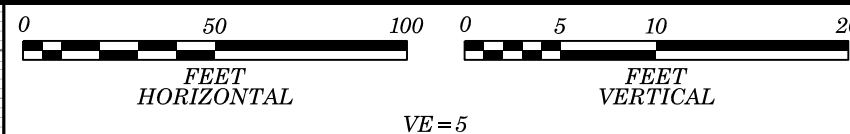
PROJECT REFERENCE NO. U-4405 SHEET NO. 14
PROFILE ALONG SOUND BARRIER WALL 2



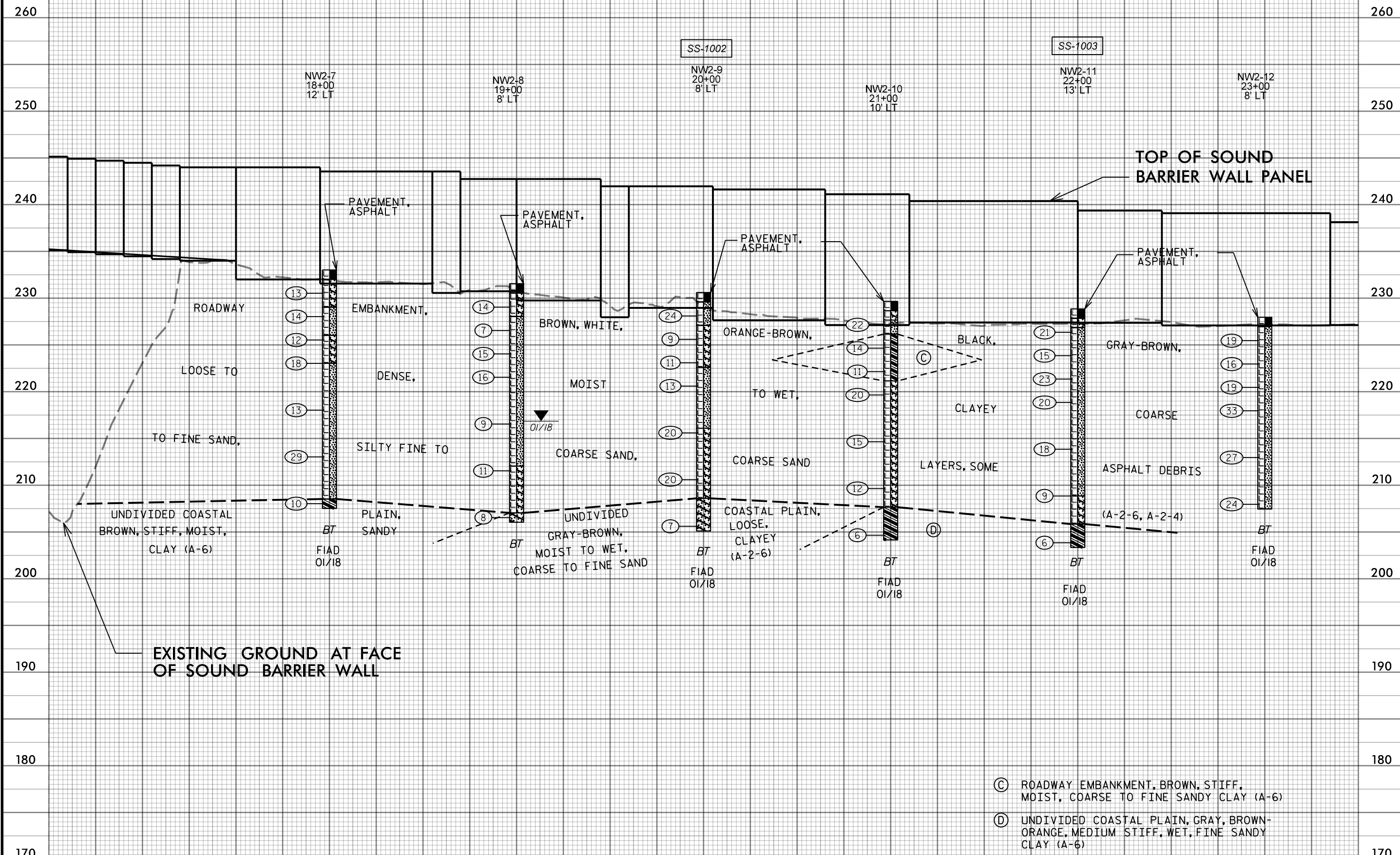
- (A) ROADWAY EMBANKMENT, BROWN, WHITE, MEDIUM STIFF TO VERY STIFF, MOIST TO WET, COARSE TO FINE SANDY CLAY, COARSE SAND LAYERS (A-6)
- (B) UNDIVIDED COASTAL PLAIN, GRAY, RED, ORANGE-BROWN, MEDIUM STIFF TO VERY STIFF, MOIST TO WET, COARSE TO FINE SANDY CLAY (A-6)

-SWAL2- 10+00 11+00 12+00 13+00 14+00 15+00 16+00 180

NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ON TO THE EXISTING GROUND PROFILE ALONG THE CENTERLINE OF -NW2- TAKEN FROM THE PROJECT TIN FILE (u4405 ls tin.tin) DATED 10/03/2017.

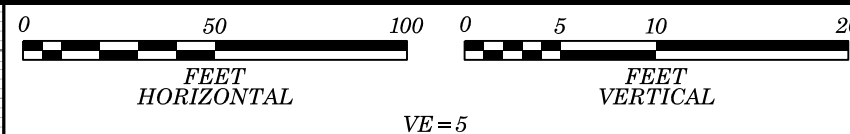


PROJECT REFERENCE NO. U-4405 SHEET NO. 15
PROFILE ALONG SOUND BARRIER WALL 2

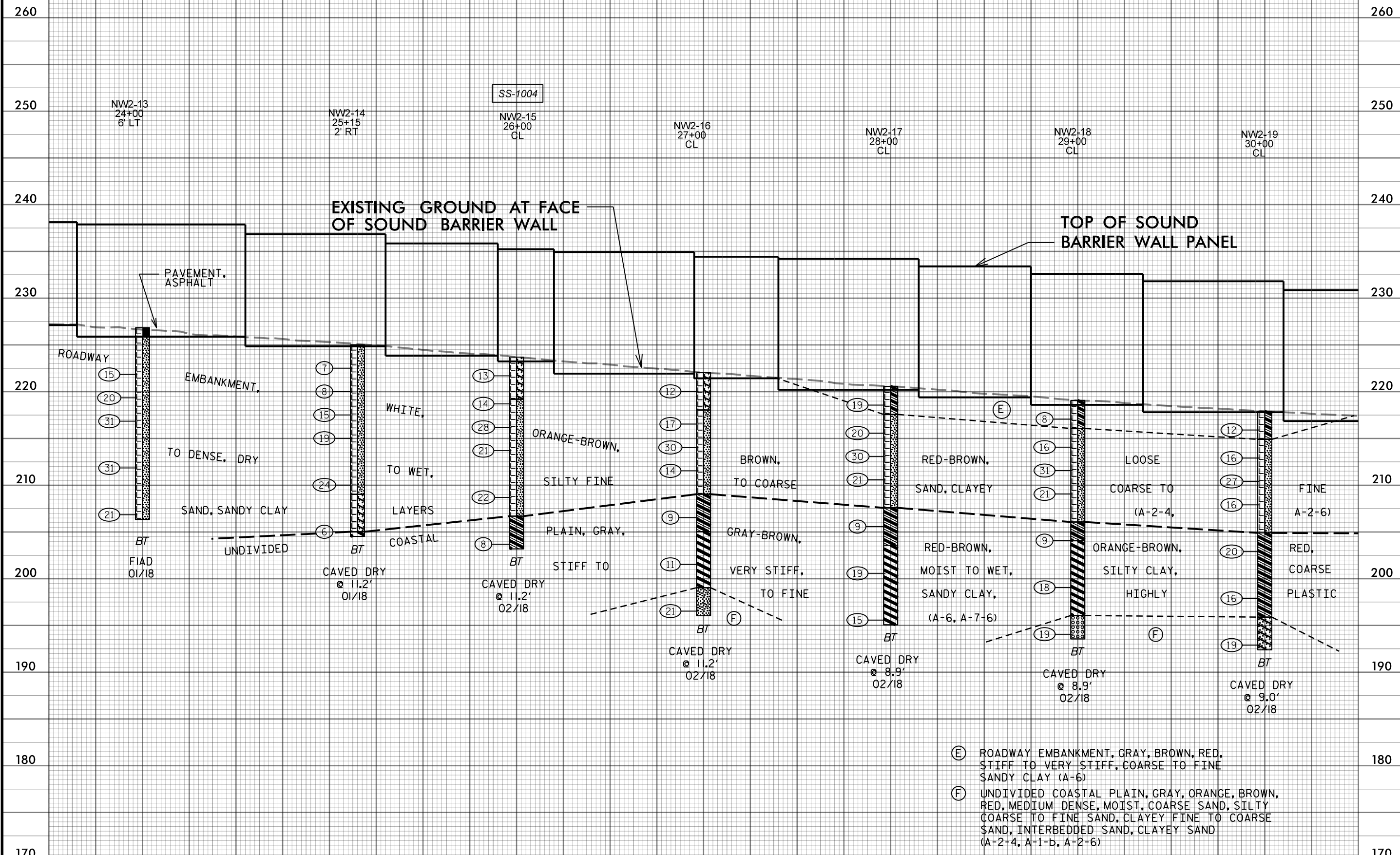


- (C) ROADWAY EMBANKMENT, BROWN, STIFF, MOIST, COARSE TO FINE SANDY CLAY (A-6)
- (D) UNDIVIDED COASTAL PLAIN, GRAY, BROWN-ORANGE, MEDIUM STIFF, WET, FINE SANDY CLAY (A-6)

NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ON TO THE EXISTING GROUND PROFILE ALONG THE CENTERLINE OF -NW2- TAKEN FROM THE PROJECT TIN FILE (u4405 ls tin.tin) DATED 10/03/2017.



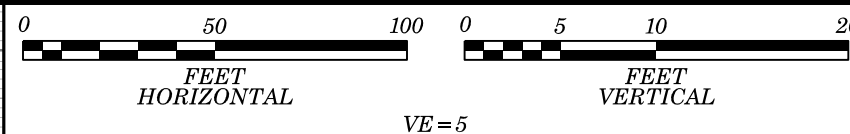
PROJECT REFERENCE NO. U-4405 SHEET NO. 16
PROFILE ALONG SOUND BARRIER WALL 2



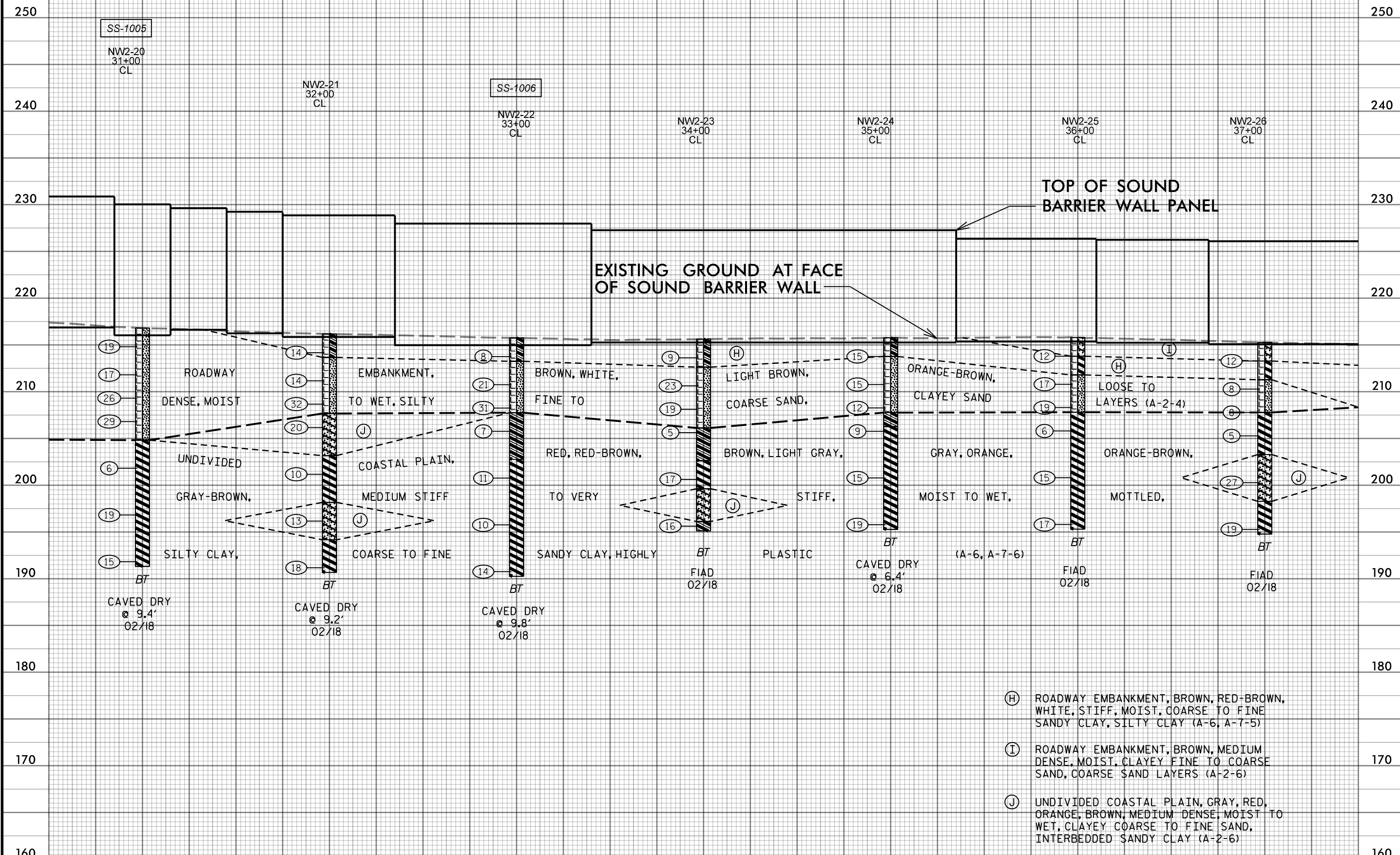
- (E) ROADWAY EMBANKMENT, GRAY, BROWN, RED, STIFF TO VERY STIFF, COARSE TO FINE SANDY CLAY (A-6)
- (F) UNDIVIDED COASTAL PLAIN, GRAY, ORANGE, BROWN, RED, MEDIUM DENSE, MOIST, COARSE SAND, SILTY COARSE TO FINE SAND, CLAYEY FINE TO COARSE SAND, INTERBEDDED SAND, CLAYEY SAND (A-2-4, A-1-b, A-2-6)

-SWAL2- 24+00 25+00 26+00 27+00 28+00 29+00 30+00 170 180 190 200 210 220 230 240 250 260

NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ON TO THE EXISTING GROUND PROFILE ALONG THE CENTERLINE OF -NW2- TAKEN FROM THE PROJECT TIN FILE (u4405 ls tin.tin) DATED 10/03/2017.

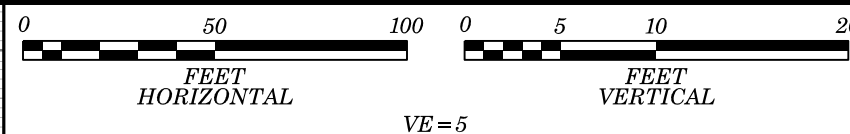


PROJECT REFERENCE NO. U-4405 SHEET NO. 17
PROFILE ALONG SOUND BARRIER WALL 2

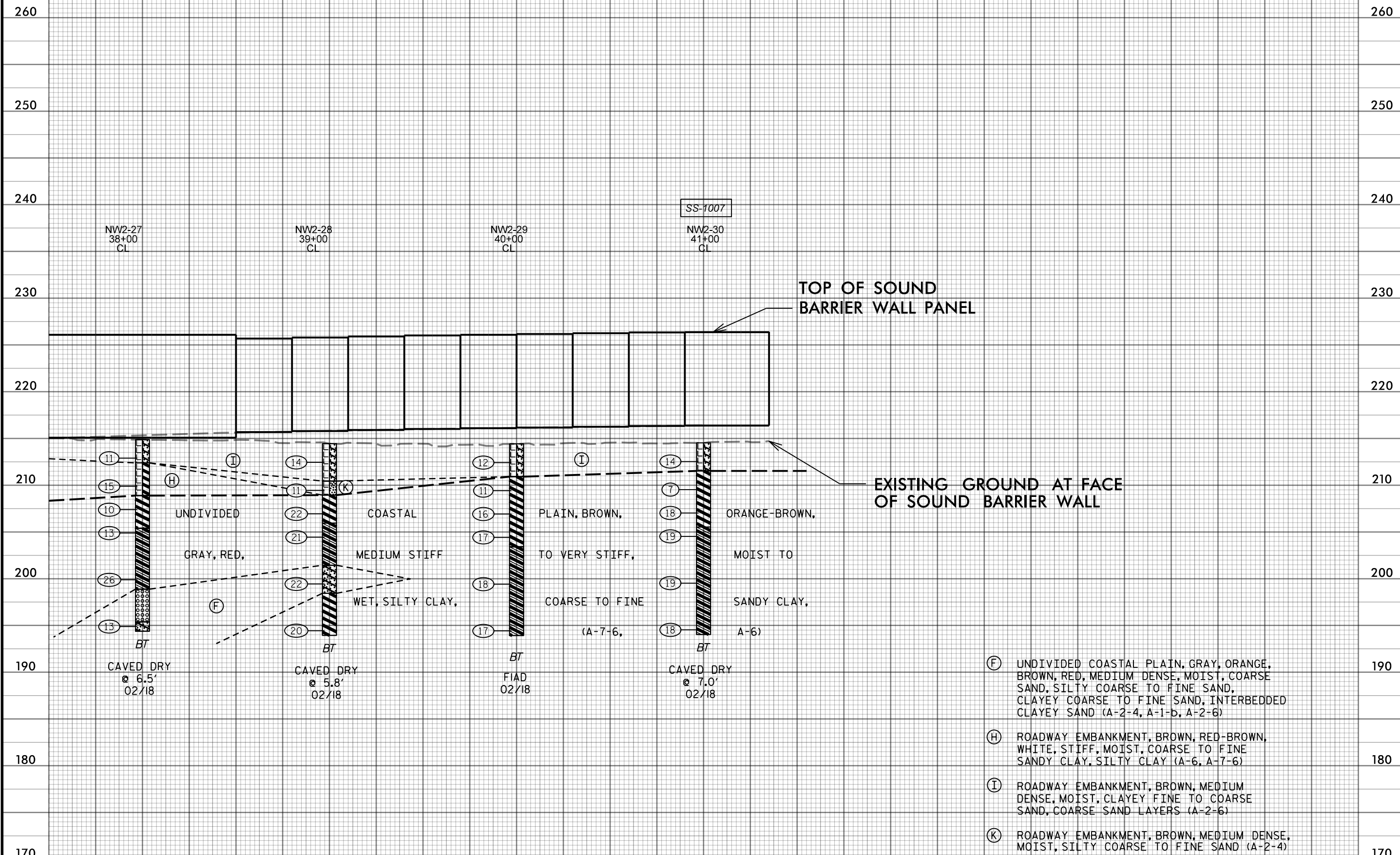


-SWAL2- 31+00 32+00 33+00 34+00 35+00 36+00 37+00

NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ON TO THE EXISTING GROUND PROFILE ALONG THE CENTERLINE OF -NW2- TAKEN FROM THE PROJECT TIN FILE (u4405 ls tin.tin) DATED 10/03/2017.



PROJECT REFERENCE NO. U-4405 SHEET NO. 18
PROFILE ALONG SOUND BARRIER WALL 2



WBS 39049.1.1		TIP U-4405		COUNTY CUMBERLAND		GEOLOGIST Schlemm, T. S.										
SITE DESCRIPTION NOISE WALLS 1 AND 2, RETAINING WALLS 1 AND 2 ALONG -RPB- AND RETAINING WALL 3							GROUND WTR (ft)									
BORING NO. NW1-1		STATION 76+92		OFFSET 75 ft LT		ALIGNMENT -AA-										
COLLAR ELEV. 215.0 ft		TOTAL DEPTH 20.5 ft		NORTHING 473,705		EASTING 2,016,312										
DRILL RIG/HAMMER EFF./DATE TER1974 CME45B		DRILL METHOD H.S. Augers		HAMMER TYPE Automatic												
DRILLER TURNAGE, J. R.		START DATE 02/08/18		COMP. DATE 02/08/18		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						
215														215.0	GROUND SURFACE	0.0
	214.0	1.0	4	6	6									212.0	ROADWAY EMBANKMENT BROWN AND ORANGE-BROWN, CLAYEY COARSE TO FINE SAND	3.0
	211.0	4.0	2	5	7									212.0	UNDIVIDED COASTAL PLAIN GRAY-BROWN AND ORANGE-BROWN, SILTY CLAY, INTERBEDDED SANDY CLAY LAYERS	
	208.5	6.5	2	5	10									203.0	GRAY AND LIGHT BROWN, COARSE TO FINE SANDY CLAY, INTERBEDDED SILTY CLAY LAYERS	12.0
	206.0	9.0	8	10	12									198.0	RED, ORANGE, AND GRAY, SILTY CLAY, INTERBEDDED COARSE SAND, CLAYEY SAND, AND SANDY CLAY LAYERS	17.0
	201.0	14.0	5	6	10									194.5	Boring Terminated at Elevation 194.5 ft IN UNDIVIDED COASTAL PLAIN SILTY CLAY	20.5
	196.0	19.0	7	10	10											

WBS 39049.1.1		TIP U-4405		COUNTY CUMBERLAND		GEOLOGIST Schlemm, T. S.										
SITE DESCRIPTION NOISE WALLS 1 AND 2, RETAINING WALLS 1 AND 2 ALONG -RPB- AND RETAINING WALL 3							GROUND WTR (ft)									
BORING NO. NW1-2		STATION 75+92		OFFSET 75 ft LT		ALIGNMENT -AA-										
COLLAR ELEV. 214.9 ft		TOTAL DEPTH 20.5 ft		NORTHING 473,636		EASTING 2,016,385										
DRILL RIG/HAMMER EFF./DATE TER1974 CME45B		DRILL METHOD H.S. Augers		HAMMER TYPE Automatic												
DRILLER TURNAGE, J. R.		START DATE 02/08/18		COMP. DATE 02/08/18		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						
215														214.9	GROUND SURFACE	0.0
	213.9	1.0	4	2	2									213.4	ROADWAY EMBANKMENT BROWN AND GRAY, COARSE TO FINE SANDY CLAY	1.5
	210.9	4.0	3	4	5									211.4	UNDIVIDED COASTAL PLAIN BROWN AND DARK GRAY, SILTY COARSE TO FINE SAND, INTERBEDDED CLAYEY SAND	3.5
	208.4	6.5	5	6	7									205.4	BROWN, SILTY CLAY, INTERBEDDED SANDY CLAY LAYERS	9.5
	205.9	9.0	8	10	12									201.9	ORANGE-BROWN AND GRAY, COARSE TO FINE SANDY CLAY, INTERBEDDED CLAYEY SAND LAYERS	13.0
	200.9	14.0	5	6	6									194.4	LIGHT TO DARK GRAY, LIGHT RED TO RED, AND ORANGE-BROWN, SILTY CLAY, INTERBEDDED SANDY CLAY LAYERS	20.5
	195.9	19.0	8	9	11											

NCDOT BORE DOUBLE U4405_GEO_SWAL1_BH.GPJ NC_DOT.GDT 4/4/18

WBS 39049.1.1		TIP U-4405		COUNTY CUMBERLAND		GEOLOGIST Schlemm, T. S.										
SITE DESCRIPTION NOISE WALLS 1 AND 2, RETAINING WALLS 1 AND 2 ALONG -RPB- AND RETAINING WALL 3							GROUND WTR (ft)									
BORING NO. NW1-3		STATION 74+92		OFFSET 75 ft LT		ALIGNMENT -AA-										
COLLAR ELEV. 214.6 ft		TOTAL DEPTH 20.5 ft		NORTHING 473,567		EASTING 2,016,458										
DRILL RIG/HAMMER EFF./DATE TER1974 CME45B			DRILL METHOD H.S. Augers			HAMMER TYPE Automatic										
DRILLER TURNAGE, J. R.		START DATE 02/08/18		COMP. DATE 02/08/18		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						
215	213.6	1.0	4	5	2									214.6	0.0	GROUND SURFACE
	213.1	1.5												213.1	1.5	ROADWAY EMBANKMENT
	211.1	3.5												211.1	3.5	BROWN AND GRAY, COARSE TO FINE SANDY CLAY
210	210.6	4.0	5	7	10									210.6	4.0	UNDIVIDED COASTAL PLAIN
	208.1	6.5	10	12	12									208.1	6.5	BROWN AND DARK GRAY, SILTY COARSE TO FINE SAND, INTERBEDDED COARSE SAND AND CLAYEY SAND LAYERS
205	205.6	9.0	7	8	9									205.6	9.0	BROWN AND RED-BROWN, SILTY CLAY, INTERBEDDED SANDY CLAY LAYERS
	200.6	14.0	7	9	10									200.6	14.0	BROWN, GRAY, RED, AND ORANGE-BROWN, COARSE TO FINE SANDY CLAY, INTERBEDDED SILTY CLAY, CLAYEY SAND, AND COARSE SAND LAYERS
195	195.6	19.0	4	6	7									195.6	19.0	RED, DARK GRAY, AND YELLOW-BROWN, SILTY CLAY
Boring Terminated at Elevation 194.1 ft IN UNDIVIDED COASTAL PLAIN SILTY CLAY															20.5	
0 Hr. Water Level Caved Dry At 7.3'																

WBS 39049.1.1		TIP U-4405		COUNTY CUMBERLAND		GEOLOGIST Schlemm, T. S.										
SITE DESCRIPTION NOISE WALLS 1 AND 2, RETAINING WALLS 1 AND 2 ALONG -RPB- AND RETAINING WALL 3							GROUND WTR (ft)									
BORING NO. NW1-4		STATION 73+92		OFFSET 76 ft LT		ALIGNMENT -AA-										
COLLAR ELEV. 214.1 ft		TOTAL DEPTH 20.5 ft		NORTHING 473,498		EASTING 2,016,530										
DRILL RIG/HAMMER EFF./DATE TER1974 CME45B			DRILL METHOD H.S. Augers			HAMMER TYPE Automatic										
DRILLER TURNAGE, J. R.		START DATE 02/08/18		COMP. DATE 02/08/18		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						
215	214.1	0.0												214.1	0.0	GROUND SURFACE
	213.1	1.0	5	5	6									213.1	1.0	ROADWAY EMBANKMENT
	210.6	3.5												210.6	3.5	BROWN AND RED-BROWN, CLAYEY COARSE TO FINE SAND, SANDY CLAY LAYERS
210	210.1	4.0	3	4	5									210.1	4.0	UNDIVIDED COASTAL PLAIN
	207.6	6.5	7	10	12									207.6	6.5	BROWN, RED, AND RED-BROWN, SILTY CLAY, INTERBEDDED SANDY CLAY LAYERS
205	205.1	9.0	7	8	8									205.1	9.0	BROWN AND RED-BROWN, SILTY CLAY, INTERBEDDED SANDY CLAY LAYERS
	202.1	12.0												202.1	12.0	RED, SILTY COARSE TO FINE SAND
200	200.1	14.0	10	15	15									200.1	14.0	RED, GRAY, AND YELLOW-BROWN, SILTY CLAY, INTERBEDDED SANDY CLAY AND CLAYEY SAND LAYERS
195	195.1	19.0	4	5	7									195.1	19.0	RED, GRAY, AND YELLOW-BROWN, SILTY CLAY, INTERBEDDED SANDY CLAY AND CLAYEY SAND LAYERS
Boring Terminated at Elevation 193.6 ft IN UNDIVIDED COASTAL PLAIN SILTY CLAY															20.5	
24 Hr. Water Level Caved Dry At 7.0'																

NCDOT BORE DOUBLE U4405_GEO_SWAL1_BH.GPJ NC_DOT.GDT 4/4/18

WBS 39049.1.1		TIP U-4405		COUNTY CUMBERLAND		GEOLOGIST Schlemm, T. S.										
SITE DESCRIPTION NOISE WALLS 1 AND 2, RETAINING WALLS 1 AND 2 ALONG -RPB- AND RETAINING WALL 3							GROUND WTR (ft)									
BORING NO. NW1-5		STATION 72+92		OFFSET 76 ft LT		ALIGNMENT -AA-										
COLLAR ELEV. 213.5 ft		TOTAL DEPTH 20.5 ft		NORTHING 473,429		EASTING 2,016,603										
DRILL RIG/HAMMER EFF./DATE TER1974 CME45B			DRILL METHOD H.S. Augers			HAMMER TYPE Automatic										
DRILLER TURNAGE, J. R.		START DATE 02/08/18		COMP. DATE 02/08/18		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						
215														213.5	0.0	GROUND SURFACE
	212.5	1.0	6	6	6									212.0	1.5	ROADWAY EMBANKMENT BROWN, CLAYEY COARSE TO FINE SAND
210	209.5	4.0	7	17	15									207.5	6.0	RED-BROWN AND BROWN, SILTY COARSE TO FINE SAND, COARSE SAND LAYERS
	207.0	6.5	7	9	10									201.5	12.0	UNDIVIDED COASTAL PLAIN BROWN AND RED, SILTY CLAY, INTERBEDDED SANDY CLAY
205	204.5	9.0	5	6	9									201.5	12.0	RED, SILTY FINE TO COARSE SAND
	199.5	14.0	9	12	16									197.5	16.0	RED, GRAY, AND YELLOW-BROWN, SILTY CLAY, INTERBEDDED CLAYEY SAND AND SANDY CLAY LAYERS
200	194.5	19.0	6	10	15									193.0	20.5	Boring Terminated at Elevation 193.0 ft IN UNDIVIDED COASTAL PLAIN SILTY CLAY
																0 Hr. Water Level Caved Dry At 7.0'

WBS 39049.1.1		TIP U-4405		COUNTY CUMBERLAND		GEOLOGIST Schlemm, T. S.										
SITE DESCRIPTION NOISE WALLS 1 AND 2, RETAINING WALLS 1 AND 2 ALONG -RPB- AND RETAINING WALL 3							GROUND WTR (ft)									
BORING NO. NW1-6		STATION 71+92		OFFSET 76 ft LT		ALIGNMENT -AA-										
COLLAR ELEV. 213.4 ft		TOTAL DEPTH 20.5 ft		NORTHING 473,361		EASTING 2,016,675										
DRILL RIG/HAMMER EFF./DATE TER1974 CME45B			DRILL METHOD H.S. Augers			HAMMER TYPE Automatic										
DRILLER TURNAGE, J. R.		START DATE 02/08/18		COMP. DATE 02/08/18		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						
215														213.4	0.0	GROUND SURFACE
	212.4	1.0	5	8	9									211.9	1.5	ROADWAY EMBANKMENT RED-BROWN, SILTY CLAY
210	209.4	4.0	4	6	9									209.9	3.5	LIGHT GRAY, COARSE SAND BROWN, RED-BROWN, AND DARK GRAY, COARSE TO FINE SANDY CLAY, SILTY CLAY AND COARSE SAND LAYERS
	206.9	6.5	4	5	9									204.9	8.5	UNDIVIDED COASTAL PLAIN LIGHT TO DARK GRAY, COARSE TO FINE SAND
205	204.4	9.0	4	5	9									200.4	13.0	BROWN, COARSE TO FINE SANDY CLAY
	199.4	14.0	6	7	8									195.4	18.0	RED, YELLOW-BROWN, AND GRAY, SILTY CLAY
200	194.4	19.0	5	7	10									192.9	20.5	Boring Terminated at Elevation 192.9 ft IN UNDIVIDED COASTAL PLAIN SILTY CLAY
																0 Hr. Water Level Caved Dry At 5.0'

NCDOT BORE DOUBLE U4405_SWAL1_BH.GPJ NC_DOT.GDT 4/4/18

LABORATORY TESTING SUMMARY

PROJECT NUMBER: 39049.1.1

TIP: U-4405

COUNTY: CUMBERLAND

DESCRIPTION: NOISE WALLS 1 & 2 AND RETAINING WALLS 1 & 2 ALONG -RPB- AND RETAINING WALL 3 AT -L- STATION 257+70

Sample No.	Alignment	Station	Offset (feet)	Depth Interval (feet)	-AA-SHTO Class.	L.L.	P.I.	% by Weight				% Retained #4 Sieve	% Passing (sieves)			% Moisture	% Organic
								Coarse Sand	Fine Sand	Silt	Clay		#10	#40	#200		
SS-1008	-AA-	75+92	75' LT	6.5'-8.0'	A-7-6 (14)	56	37	30.9	21.1	3.8	44.2	0	100	82	51	17.7	ND
SS-1009	-AA-	72+92	76' LT	1.5'-2.5'	A-2-4 (0)	23	9	40.9	33.8	1.6	23.9	0	99	77	28	ND	ND
SS-1010	-AA-	71+92	76' LT	4.0'-5.5'	A-6 (2)	31	18	38.3	28.7	5.7	27.3	0	100	78	38	12.2	ND
SS-1011	-NW1-	11+76	CL	6.5'-8.0'	A-2-4 (0)	17	NP	44.2	35.8	2.8	17.2	0	100	77	24	ND	ND
SS-1012	-NW1-	12+75	CL	19.0'-20.5'	A-2-4 (0)	19	NP	4.4	81.3	1.1	13.2	0	100	99	15	ND	ND
SS-1013	-NW1-	13+75	CL	5.7'-7.2'	A-7-6 (11)	51	34	28.8	26.9	5.2	39.1	0	100	84	48	17.8	ND
SS-1014	-NW1-	14+76	CL	1.0'-2.5'	A-2-6 (1)	30	19	41.2	31.6	4.0	23.2	0	100	78	30	ND	ND
SS-1015	-NW1-	15+90	CL	18.1'-19.6'	A-2-4 (0)	20	NP	24.1	58.1	0.9	16.9	0	100	91	19	ND	ND
SS-1016	-NW1-	17+75	14' LT	8.2'-9.7'	A-6 (4)	37	25	37.2	28.9	9.7	24.2	0	100	78	39	16.1	ND
SS-1017	-NW1-	18+75	1' LT	18.2'-19.7'	A-3 (0)	19	NP	14.9	78.4	2.8	3.9	0	100	93	8	ND	ND
SS-1018	-NW1-	19+75	CL	3.7'-5.2'	A-7-5 (31)	64	34	8.9	13.0	17.8	60.3	0	100	94	82	33.9	ND
SS-1019	-NW1-	19+75	CL	13.7'-15.2'	A-2-4 (0)	19	NP	15.3	75.0	1.2	8.5	0	100	94	11	ND	ND
SS-1020	-NW1-	21+75	CL	3.5'-5.0'	A-7-6 (36)	66	38	7.0	8.7	8.9	75.4	0	100	95	85	30.4	ND
SS-1021	-NW1-	21+75	CL	13.5'-15.0'	A-3 (0)	18	NP	6.8	85.8	0.5	6.9	0	100	98	8	ND	ND
SS-1030	-RW1-	8+64	CL	13.5'-15.0'	A-2-4 (0)	20	NP	1.3	85.6	5.8	7.3	0	100	100	14	ND	ND
SS-1031	-RW1-	9+13	11' LT	3.5'-5.0'	A-7-5 (35)	68	37	8.1	9.3	16.0	66.6	0	100	95	84	30.1	ND
SS-1032	-RW1-	10+14	11' LT	13.5'-15.0'	A-3 (0)	20	NP	7.7	85.7	1.5	5.1	0	100	97	8	ND	ND
SS-1033	-RW1-	10+64	11' LT	1.0'-2.5'	A-7-6 (20)	47	29	12.7	16.5	16.1	54.7	0	100	93	74	24.0	ND
SS-1034	-RW1-	11+14	4' LT	33.5'-35.0'	A-2-4 (0)	29	4	41.7	39.5	4.4	14.4	0	100	92	20	ND	ND
SS-1035	-RW1-	11+64	18' LT	1.0'-2.5'	A-7-6 (23)	56	32	14.3	15.0	14.9	55.8	0	100	91	73	30.6	ND
SS-1036	-RW1-	11+64	18' LT	8.5'-10.0'	A-2-6 (2)	39	23	0.0	68.1	6.1	25.8	0	100	100	34	ND	ND
SS-1037	-RW1-	12+14	17' LT	6.0'-7.5'	A-7-6 (26)	66	43	15.0	23.0	8.0	54.0	0	100	92	64	27.4	ND
SS-1038	-RW1-	12+14	17' LT	13.5'-15.0'	A-3 (0)	21	NP	6.3	85.8	1.9	6.0	0	100	98	9	ND	ND
SS-1039	-RW1-	14+14	5' LT	18.0'-19.5'	A-3 (0)	20	NP	33.8	59.9	0.2	6.1	0	100	84	7	ND	ND
SS-1040	-RW1-	14+64	CL	28.4'-29.9'	A-7-6 (45)	66	39	1.3	2.7	28.2	67.8	0	100	100	98	38.9	ND
SS-1022	-RW2-	11+71	CL	4.0'-5.5'	A-6 (7)	37	25	16.1	40.4	9.6	33.9	0	100	94	48	12.0	ND
SS-1023	-RW2-	12+28	5' RT	14.0'-15.5'	A-3 (0)	18	NP	6.8	86.4	0.4	6.4	0	100	99	8	ND	ND
SS-1024	-RW2-	12+78	CL	8.5'-10.0'	A-7-6 (9)	50	33	35.5	21.7	6.3	36.5	0	100	79	45	20.6	ND
SS-1025	-RW2-	13+26	5' RT	13.5'-15.0'	A-7-6 (8)	42	29	9.7	47.7	7.5	35.1	0	100	94	46	19.3	ND
SS-1026	-RW2-	13+78	CL	5.8'-7.3'	A-7-6 (20)	50	27	9.2	20.7	19.3	50.8	0	100	95	74	22.3	ND
SS-1027	-RW2-	14+28	CL	5.9'-7.4'	A-7-6 (17)	44	29	8.7	30.1	13.2	48.0	0	100	96	68	20.2	ND
SS-1028	-RW2-	14+28	CL	33.4'-34.9'	A-2-4 (0)	22	NP	57.9	27.6	4.3	10.2	0	100	73	16	ND	ND
SS-1029	-RW2-	14+77	CL	8.4'-9.9'	A-7-6 (25)	51	32	7.5	19.8	19.8	52.9	0	100	96	78	28.4	ND

NP - NON-PLASTIC
ND - NOT DETERMINED

Stephanie H. Huffman

Certified Lab Technician Signature

114-01-1203

Certification Number

