

REFERENCE: U-5796

PROJECT: 54039

SEE SHEET 3 FOR PLAN SHEET LAYOUT
AT TIME OF INVESTIGATION

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

ROADWAY
SUBSURFACE INVESTIGATION

COUNTY WAYNE
PROJECT DESCRIPTION DIVISION 4 - US 117 AND
SR 1120 (O'BERRY ROAD) INTERCHANGE

INVENTORY

CONTENTS

LINE	STATION	PLAN	PROFILE
-L-	175+47 TO 219+92	4-7	-
-RAMPA-	0+00 TO 12+66	6-7	10
-RAMPB-	0+00 TO 14+17	5-6	10
-RAMPC-	0+00 TO 16+09	5-6	11
-RAMPD-	0+00 TO 12+84	6-7	12
-Y8-	13+00 TO 39+35	6,8-9	13-15
-Y10-	10+00 TO 14+11	9	15
-Y12-	10+00 TO 12+00	8	15

CROSS SECTIONS

LINE	STATION	SHEETS
-L-	175+00 TO 212+00	16-52
-L-	213+00, 216+00, 219+00	53-54
-RAMPA-	0+00 TO 4+00	55-59
-RAMPB-	0+00 TO 7+00	60-64
-RAMPC-	0+00 TO 9+50	65-71
-RAMPD-	0+00 TO 7+50	72-79
-Y8-	17+00 TO 18+50	80-81
-Y8-	35+00 TO 40+00	82-85
-Y10-	10+00 TO 13+50	86-89

APPENDICES

APPENDIX	TITLE	SHEETS
A	LAB SUMMARY SHEET	91
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C	PROCTOR AND CBR TESTING RESULTS	96-97

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-5796	1	97

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 T07-6850. 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.

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SUBMITTED BY TERRACON CONSULTANTS

DATE MARCH 2017

Terracon
Consulting Engineers & Scientists



SIGNATURE

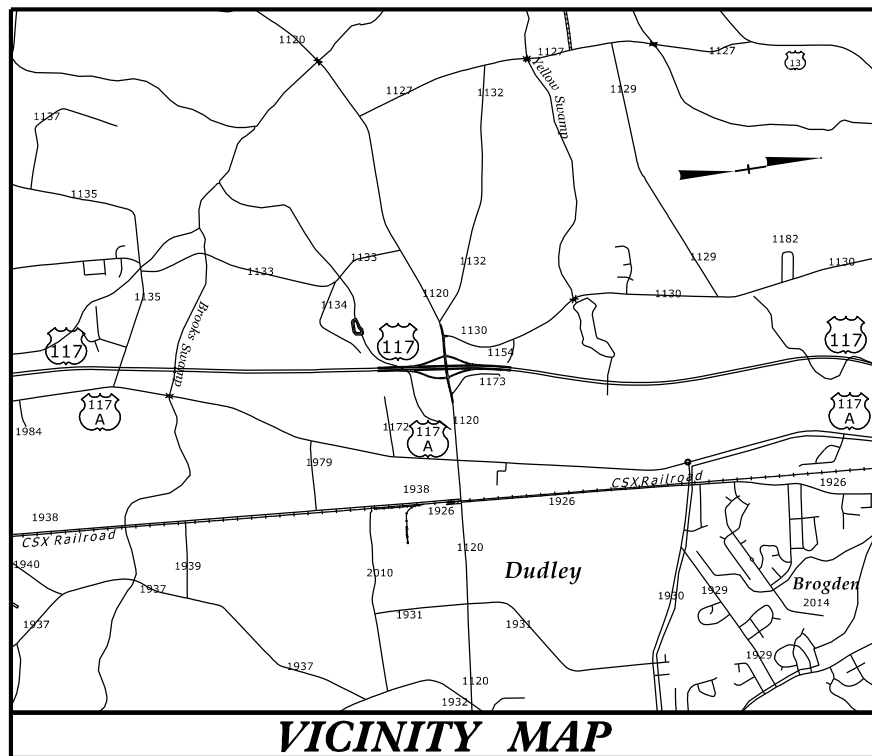
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**DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED**

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 DISLOADED 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)									
<p>GENERAL CLASS. GRANULAR MATERIALS (<= 35% PASSING #200) SILT-CLAY MATERIALS (> 35% PASSING #200) ORGANIC MATERIALS</p>										<p>THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.</p>										<p>NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.</p>										<p>FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.</p>									
MINERALOGICAL COMPOSITION										COMPRESSION										NON-CRYSTALLINE ROCK (NCR)										COASTAL PLAIN SEDIMENTARY ROCK (CP)									
<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>									
PERCENTAGE OF MATERIAL										GROUND WATER										WEATHERING										MISCELLANEOUS SYMBOLS									
<p>ORGANIC MATERIAL GRANULAR SOILS SILT - CLAY SOILS OTHER MATERIAL</p> <p>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</p>										<p>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</p>										<p>FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE. VERY SLIGHT (IV SLI) 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 (SLI) 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. IF TESTED, WOULD YIELD SPT REFUSAL 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. IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF VERY SEVERE (IV 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. IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.</p>										<p>ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION SOIL SYMBOL ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT INFERRED SOIL BOUNDARY INFERRED ROCK LINE ALLUVIAL SOIL BOUNDARY</p> <p>DIP & DIP DIRECTION OF ROCK STRUCTURES SPT DMT TEST BORING AUGER BORING CORE BORING MONITORING WELL PIEZOMETER INSTALLATION</p> <p>SLOPE INDICATOR INSTALLATION CONE PENETROMETER TEST SOUNDING ROD TEST BORING WITH CORE SPT N-VALUE</p>									
TEXTURE OR GRAIN SIZE										RECOMMENDATION SYMBOLS										ROCK HARDNESS										ABBREVIATIONS									
<p>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</p>										<p>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 DEGRADABLE ROCK</p>										<p>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.</p>										<p>AR - AUGER REFUSAL MED. - MEDIUM VST - VANE SHEAR TEST BT - BORING TERMINATED MICA - MICACEOUS WEA. - WEATHERED CL. - CLAY MOD. - MODERATELY NP - NON PLASTIC U - UNIT WEIGHT CPT - CONE PENETRATION TEST ORG. - ORGANIC PMT - PRESSUREMETER TEST W - DRY UNIT WEIGHT CSE. - COARSE SAP. - SAPROLITIC SD. - SAND, SANDY SL. - SILT, SILTY SLI. - SLIGHTLY TCR - TRICONE REFUSAL W - MOISTURE CONTENT V - VERY DMT - DILATOMETER TEST DPT - DYNAMIC PENETRATION TEST e - VOID RATIO F - FINE FOSS. - FOSSILIFEROUS FRAC. - FRACTURED, FRACTURES FRAGS. - FRAGMENTS HI. - HIGHLY</p>									
SOIL MOISTURE - CORRELATION OF TERMS										TEXTURE OR GRAIN SIZE										FRACATURE SPACING										BEDDING									
<p>SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION</p> <p>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 - - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE</p>										<p>BOULDER (BLDR.) COBBLE (COB.) GRAVEL (GR.) COARSE SAND (CSE. SD.) FINE SAND (F SD.) SILT (SL.) CLAY (CL.)</p>										<p>TERM SPACING VERY WIDE MORE THAN 10 FEET WIDE 3 TO 10 FEET MODERATELY CLOSE 1 TO 3 FEET CLOSE 0.16 TO 1 FOOT VERY CLOSE LESS THAN 0.16 FEET</p>										<p>TERM THICKNESS VERY THICKLY BEDDED 4 FEET THICKLY BEDDED 1.5 - 4 FEET THINLY BEDDED 0.16 - 1.5 FEET VERY THINLY BEDDED 0.03 - 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET THINLY LAMINATED < 0.008 FEET</p>									
PLASTICITY										EQUIPMENT USED ON SUBJECT PROJECT										INDURATION										NOTES:									
<p>NON PLASTIC PLASTICITY INDEX (PI) 0-5 VERY LOW SLIGHTLY PLASTIC 6-15 SLIGHT MODERATELY PLASTIC 16-25 MEDIUM HIGHLY PLASTIC 26 OR MORE HIGH</p>										<p>DRILL UNITS: CME-45C CME-55 CME-550 VANE SHEAR TEST PORTABLE HOIST ACKER RENEGADE D-50 (TER346)</p> <p>ADVANCING TOOLS: CLAY BITS 6" CONTINUOUS FLIGHT AUGER 8" HOLLOW AUGERS HARD FACED FINGER BITS TUNG-CARBIDE INSERTS CASING w/ ADVANCER TRICONE 2% * STEEL TEETH TRICONE * TUNG-CARB. 3/4" HSA TRICONE 3/8" STEEL TEETH</p> <p>HAMMER TYPE: AUTOMATIC MANUAL CORE SIZE: B H N HAND TOOLS: POST HOLE DIGGER HAND AUGER SOUNDING ROD VANE SHEAR TEST</p>										<p>FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC. 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.</p>										<p>BENCH MARK: SEE NOTE ELEVATION: N/A FEET FIAD - FILLED IMMEDIATELY AFTER DRILLING PROJECT WAS DRAFTED USING NCDOT PROVIDED TIN FILE FILE: W5204-A-LS.tn (DATED 02/05/2013)</p>									
COLOR										RECOMMENDATION SYMBOLS										ROCK HARDNESS										ABBREVIATIONS									
<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>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 DEGRADABLE ROCK</p>										<p>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.</p>										<p>AR - AUGER REFUSAL MED. - MEDIUM VST - VANE SHEAR TEST BT - BORING TERMINATED MICA - MICACEOUS WEA. - WEATHERED CL. - CLAY MOD. - MODERATELY NP - NON PLASTIC U - UNIT WEIGHT CPT - CONE PENETRATION TEST ORG. - ORGANIC PMT - PRESSUREMETER TEST W - DRY UNIT WEIGHT CSE. - COARSE SAP. - SAPROLITIC SD. - SAND, SANDY SL. - SILT, SILTY SLI. - SLIGHTLY TCR - TRICONE REFUSAL W - MOISTURE CONTENT V - VERY DMT - DILATOMETER TEST DPT - DYNAMIC PENETRATION TEST e - VOID RATIO F - FINE FOSS. - FOSSILIFEROUS FRAC. - FRACTURED, FRACTURES FRAGS. - FRAGMENTS HI. - HIGHLY</p>									

TIP PROJECT: U-5796



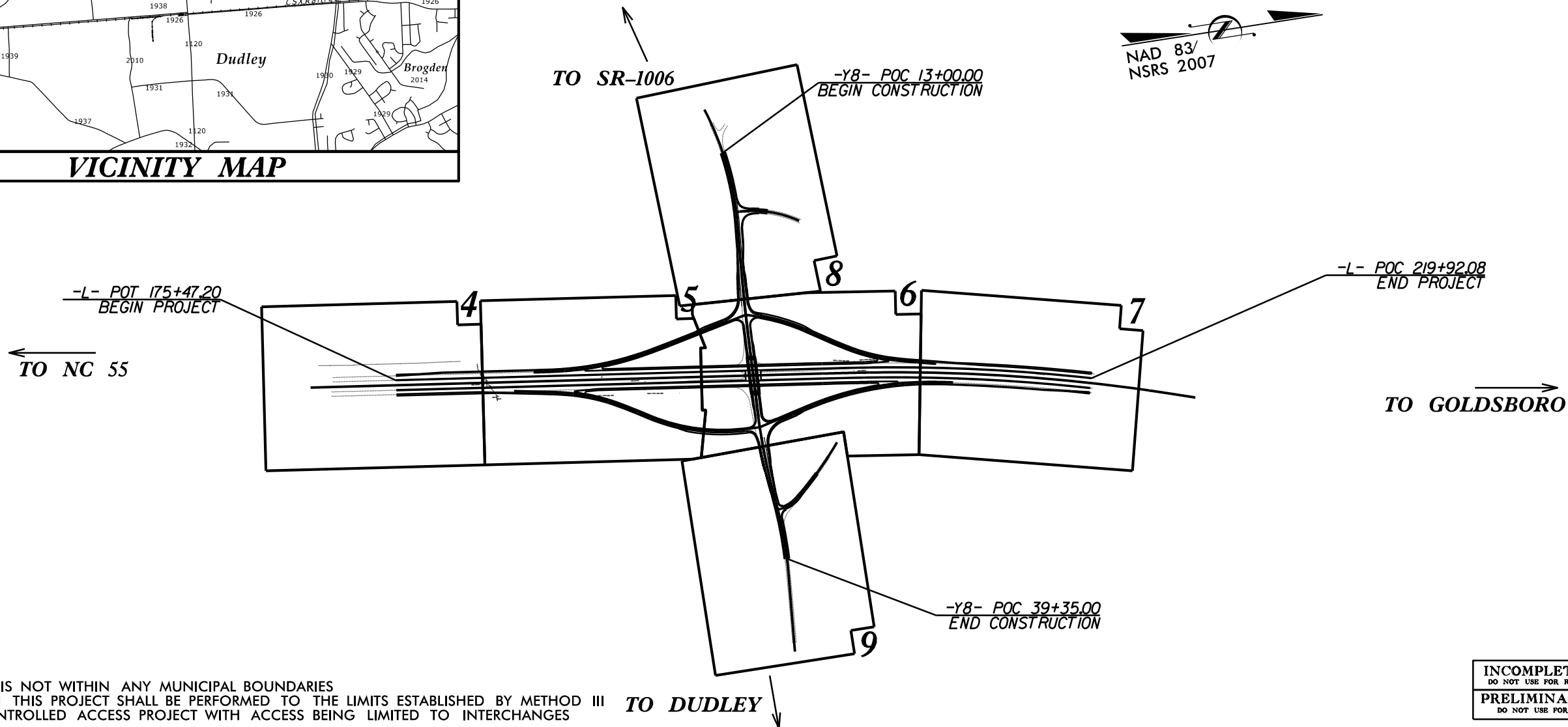
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

WAYNE COUNTY

LOCATION: US-117 & SR-1120 INTERCHANGE

TYPE OF WORK: GRADING, DRAINAGE, PAVING, AND STRUCTURE.

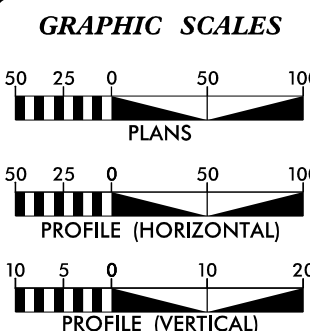
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-5796	3	97
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
54039.1.FD1		PE	



THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III TO DUDLEY
THIS IS A CONTROLLED ACCESS PROJECT WITH ACCESS BEING LIMITED TO INTERCHANGES

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONTRACT:



DESIGN DATA

ADT 2012 =	12,600
ADT 2035 =	24,700
K =	8 %
D =	55 %
T =	13 % *
V =	70 MPH
* TTST	8% DUAL 5%

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT U-5796 =	0.842
TOTAL LENGTH TIP PROJECT U-5796 =	0.842

Prepared in the Office of:
DIVISION OF HIGHWAYS
Division 4 DDC
509 Ward Blvd., Wilson NC, 27895

2012 STANDARD SPECIFICATIONS	
RIGHT OF WAY DATE: APRIL 2016	TIM LITTLE, PE PROJECT ENGINEER
LETTING DATE: June 20, 2017	D. R. ETHRIDGE PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: _____ P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: _____ P.E.

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

STATE HIGHWAY DESIGN ENGINEER P.E.

Date: March 2017
 WBS Number: 54039
 TIP Number: U-5796
 County: Wayne
 Description: US 117 and SR 1120 (O' Berry Road) Interchange Improvements

Subject: Roadway Geotechnical Report - Inventory

Project Description

The project is located along the existing US 117 corridor between Goldsboro and Mt. Olive in Wayne County. On US 117 (-L-), the project begins approximately 0.4 miles south of the existing at-grade intersection and continues north along US 117 for approximately 0.9 miles. On SR 1120 (-Y8-), the project begins approximately 0.25 miles east of the existing intersection and continues east for approximately 0.5 miles. The -Y8- alignment will pass over the -L- alignment on a new proposed two span bridge. The -L- alignment will stay at existing grades and pavements will be widened on the inside and outside shoulders. The project corridor is in a rural setting and much of the surrounding land is undeveloped.

The geotechnical subsurface investigation was performed from February through March of 2016. Standard penetration test (SPT) borings were advanced using a Diedrich D-50 and an Acker Renegade rotary drill rig equipped with recently calibrated automatic hammers. Borings were advanced utilizing wash boring and hollow stem auger drilling techniques to the necessary depths. In addition to soil test borings performed along the corridor, a Pagani TG73-200 rig was utilized to perform four cone penetrometer (CPT) soundings. Supplemental hand auger borings were performed along the -L-, -Y8-, -Y10- and -Y12- alignments during October 2016. Two Shelby tube samples were taken near the proposed bridge structures for consolidation testing. Representative soil samples were collected in the field for visual classification and selected samples were submitted for laboratory analysis by Terracon's soil testing laboratory. Laboratory testing was performed in accordance with the AASHTO Soil Classification System.

The following alignments were investigated by soil testing and visual reconnaissance:

<u>Alignment</u>	<u>Stations</u>
-L-	174+47 to 219+92
-RAMP A-	0+00 to 12+66
-RAMP B-	0+00 to 14+17
-RAMP C-	0+00 to 16+09
-RAMP D-	0+00 to 12+84
-Y8-	13+00 to 39+35
-Y10-	10+00 to 14+11
-Y12-	10+00 to 12+00

Physiography and Geology

The site is located within the Inner Coastal Plain Physiographic and Geologic Province of North Carolina in Wayne County. The Coastal Plain Province is characterized by subdued topographic features. The existing elevations along the investigated corridor range from approximately 162 feet to 171 feet. In general, the topography at this site is slightly rolling with gentle slopes.

The project is located in the Inner Coastal Plain Physiographic Province with geology consisting of a wedge of unconsolidated sands, silt, marl, and other clays interbedded with occasional limestone strata, which rests atop crystalline basement rocks. Based on previous mapping (N.C. Geologic Map 1985) and our knowledge of the local geology, the site falls within the Cretaceous age Black Creek Formation. However, based on our site visit and subsurface conditions encountered, the near surface soils appear to be recent Coastal Plain deposits of alluvial origin and are consistent with interbedded sands, clayey sands and clays typical of Undivided Coastal Plain soils. These near surface soils overlie the denser, darker soils belonging to the Black Creek Formation. The Black Creek Formation soils are described as gray to black lignitic clay with thin beds and laminae of fine-grained micaceous sand and thick lenses of cross-bedded sand. Glauconitic, fossiliferous clayey sand lenses are common in the upper part.

Soil Properties

Soils encountered during this investigation are separated into three categories based on their origin. The soils encountered consist of roadway embankment fill, Undivided Coastal Plain deposited soils and Formational soils.

Roadway Embankment soils were encountered at the following approximate locations:

<u>Alignment</u>	<u>Stations</u>
-L-	176+50 to 184+70
-L-	207+00 to 209+20
-RAMP A-	0+90 to 3+00
-RAMP C-	0+00 to 1+75
-Y8-	13+00 to 17+50
-Y10-	11+00 to 14+11
-Y12-	10+00 to 12+00

Roadway embankment soils were encountered along the -L- alignment at the beginning of the project, along the -Y8- alignment near the intersections of -Y10- and -Y12- and at proposed -RAMP A- and -RAMP C- alignments adjacent to the existing US 117 corridor. The roadway embankment soils on -RAMP A- appear to be reworked in-place Undivided Coastal Plain soils measuring less than a foot thick beneath the existing asphalt pavement sections. The remaining fill depths extend to at least 3 to 4 feet beneath the ground surface or to termination depths of the borings. The roadway embankment soils consist of slightly to



moderately plastic medium stiff, dry to moist, silty clay (A-7-6), sandy clay (A-6), sandy silt (A-4) and loose, moist, silty to clayey sands (A-2-4 and A-2-6).

Undivided Coastal Plain deposits are present at the surface and beneath the roadway embankment soils and asphalt pavement sections. The Undivided Coastal Plain soils can be generalized as alternating layers of clay and sand extending to the maximum depths of exploration or to the surface of the underlying Black Creek Formation. The near surface layer of soil deposits along -Y8- and -Y10- consists of 8 to 38 feet of very soft to hard, moist to saturated, sandy clays (A-6), high plasticity silty clays (A-7-6) and sandy silts (A-4). These soils were underlain by alternating layers of very loose to medium dense, moist to saturated, silty sand (A-2-4), clayey sand (A-2-6) and very soft to hard, wet, sandy clays (A-6) and high plasticity silty clays (A-7-6).

The Undivided Coastal Plain deposits along the -L- and -RAMP- alignments consists of soft to stiff, dry to saturated, sandy to silty clay (A-6 and A-7-6), very loose to loose, moist to saturated, fine sand (A-3) and silty to clayey sand (A-2-4 and A-2-6) extending to the maximum depths of exploration. Very loose, moist to saturated, silty to clayey sands (A-2-4, A-2-6) and soft, wet, sandy clays (A-6) were encountered between approximately Stations 3+50 and 12+66 along -RAMP A- extending to depths 1.5 to 2.5 feet beneath the ground surface. Very loose, moist to saturated, silty to clayey sands (A-2-4, A-2-6) and very soft to soft, wet, sandy to silty clays (A-6 and A-7-6) were encountered between approximately Stations 4+00 and 14+17 along -RAMP B- extending to depths 2.5 to 6 feet beneath the ground surface. The near surface layer of deposits along the -RAMP C- alignment between approximately Stations 5+00 and 16+09 consists of soft, wet, sandy to silty clay (A-6 and A-7-6) extending to depths of about 2.5 to 5.0 feet. The near surface deposits along the -RAMP D- alignment between approximately Stations 5+00 and 12+84 consists of soft, moist to wet, highly plastic silty clay (A-7-6) with areas of very loose, moist to wet, clayey sands (A-2-6) to depths of about 2.5 to 8.5 feet beneath the surface. The clayey sand (A-2-6), sandy silt (A-4), sandy clay (A-6) and silty clay (A-7-6) soils, encountered within the upper 6 feet of existing grade along the -L- and -RAMP- alignments, were tested in our laboratory. These soils exhibited plastic indices of 8 to 36 percent and are considered to be slightly to highly plastic soils. These soils also had between 21 and 63 percent fines passing the No. 200 sieve.

Formational soils of the Black Creek Formation were encountered in the deep borings along the -Y8- alignment as high as elevation 114 feet. These soils are characterized by their black to gray color and consist of layers of loose to very dense, saturated, silty to clayey sands (A-2-4 and A-2-6) and very stiff to hard, wet, sandy to silty clays (A-6 and A-7-6).

Groundwater

In general, the corridor drains to unnamed jurisdictional streams that run south out of the corridor. Groundwater was encountered during drilling and sampling along the -Y8- and -Y10- alignments at depths of 2 to 18 feet below the existing ground surface. Groundwater was encountered at depths 2.0 to 2.5 feet beneath the ground surface on the -Y8- alignment at Stations 21+00 and 34+50 and at 3 feet at Station 13+00 on the -Y10- alignment. Groundwater was encountered along the -RAMP A- alignment at depths of 5 to 5.1 feet below the existing ground surface. Groundwater was encountered along the -RAMP B- alignment

at depths of 6 to 11.7 feet and along the -RAMP C- alignment at depths of 8 to 14.5 feet below the existing ground surface. Groundwater was encountered along the -RAMP D- alignment at depths of 4 to 8 feet below the existing ground surface. Groundwater was encountered along the -L- alignment at depths of 3 to 8 feet below the ground surface. No groundwater was encountered within the 4 feet of the boring termination depth on the -Y12- alignment. The depth of groundwater, beneath the ground surface, will fluctuate with seasonal precipitation and may occur a higher levels at other times of the year above less permeable clayey soils.

Areas of Special Geotechnical Interest

- 1) Plastic Soils - Moderate to high plasticity soils with plastic indices (PI) of 16 and greater were encountered near the existing ground surface and may impact subgrade construction at the following locations:

<u>Alignment</u>	<u>Stations</u>
-L-	175+47 to 188+75
-L-	192+75 to 200+25
-L-	204+25 to 211+75
-RAMP A-	0+00 to 3+45
-RAMP B-	0+00 to 4+25
-RAMP B-	4+90 to 5+90
-RAMP C-	0+00 to 6+50
-RAMP D-	0+00 to 7+25
-Y8-	17+50 to 18+00
-Y8-	35+40 to 39+35
-Y10-	10+00 to 13+50

A discussion of these plastic soils is located above in the section titled "Soil Properties".

- 2) Soft Wet Soils- Soft wet near surface soils that may impact subgrade or embankment construction were encountered at the following locations:

<u>Alignment</u>	<u>Stations</u>
-RAMP A-	3+50 to 12+66
-RAMP B-	4+00 to 14+17
-RAMP C-	4+90 to 16+09
-RAMP D-	5+00 to 12+84

A discussion of these soft wet near surface soils is located above in the section titled "Soil Properties".

BULK SAMPLES

The following bulk samples were taken for tests to determine the engineering properties of the soil.

<u>Sample No.</u>	<u>Location</u>	<u>Depth (ft.)</u>	<u>Test</u>
S-1	9+50 -RAMP B- CL	1.0-6.0	Proctor and CBR
S-2	10+00 -RAMP D- CL	1.0-6.0	Proctor and CBR

UNDISTRUBED SAMPLES

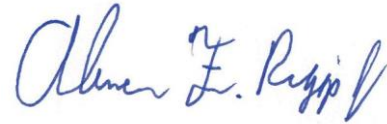
The following "Shelby" tube samples were taken to provide data for the in-situ strength of the soil.

<u>Sample No.</u>	<u>Location</u>	<u>Depth (ft.)</u>	<u>Test</u>
ST-1	23+50 -Y8- CL	15.0-17.4	Consolidation
ST-2	28+50 -Y8- CL	10.0-12.4	Consolidation

Sincerely,
Terracon Consultants, Inc.



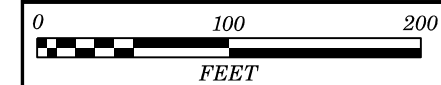
Matthew J. Alexander, PE
Project Geotechnical Engineer



Abner F. Riggs, Jr., PE
Senior Geotechnical Engineer



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NAD 83/NSRS 2007

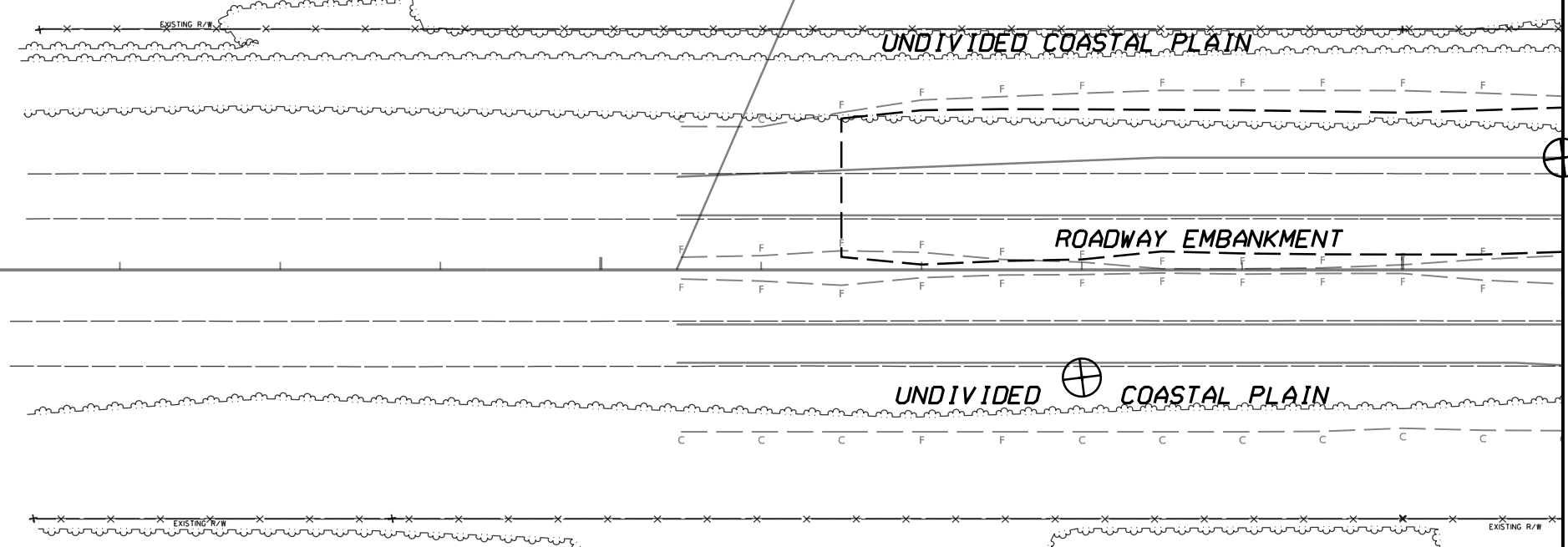
170+00 -L-

175+00 -L-

180+00 -L-

BURL J. MITCHELL
DB 126/PG 577

BEGIN PROJECT (U-5796)
-L- POT 175+47.20



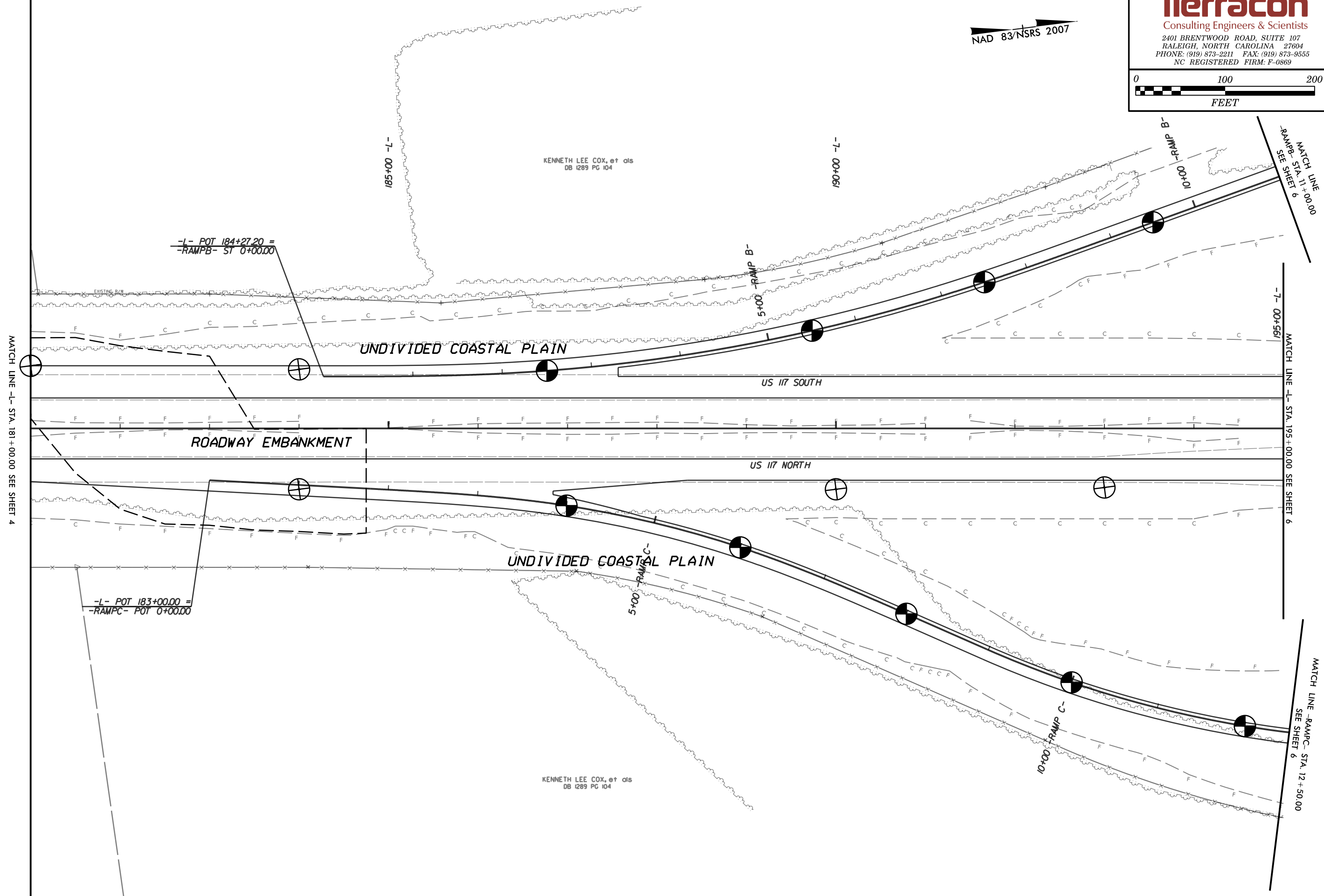
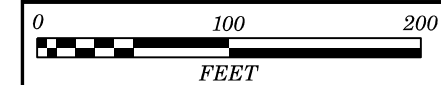
UNDIVIDED COASTAL PLAIN



DEBORAH KAY WILLIAMS
DB 264/PG #2

MATCH LINE -L- STA. 181+00.00 SEE SHEET 5

NAD 83/NSRS 2007



KENNETH LEE COX, et als
DB 1289 PG 104

KENNETH LEE COX, et als
DB 1289 PG 104

MATCH LINE -L- STA. 181+00.00 SEE SHEET 4

MATCH LINE -L- STA. 195+00.00 SEE SHEET 6

MATCH LINE -RAMP C- STA. 12+50.00
SEE SHEET 6

-L- POT 184+27.20 =
-RAMP B- ST 0+00.00

-L- POT 183+00.00 =
-RAMP C- POT 0+00.00

UNDIVIDED COASTAL PLAIN

UNDIVIDED COASTAL PLAIN

ROADWAY EMBANKMENT

US 117 SOUTH

US 117 NORTH

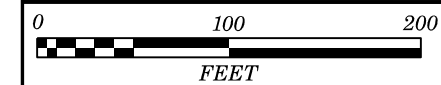
5+00 -RAMP B-

5+00 -RAMP C-

-RAMP B- STA. 11+00.00

10+00 -RAMP C-

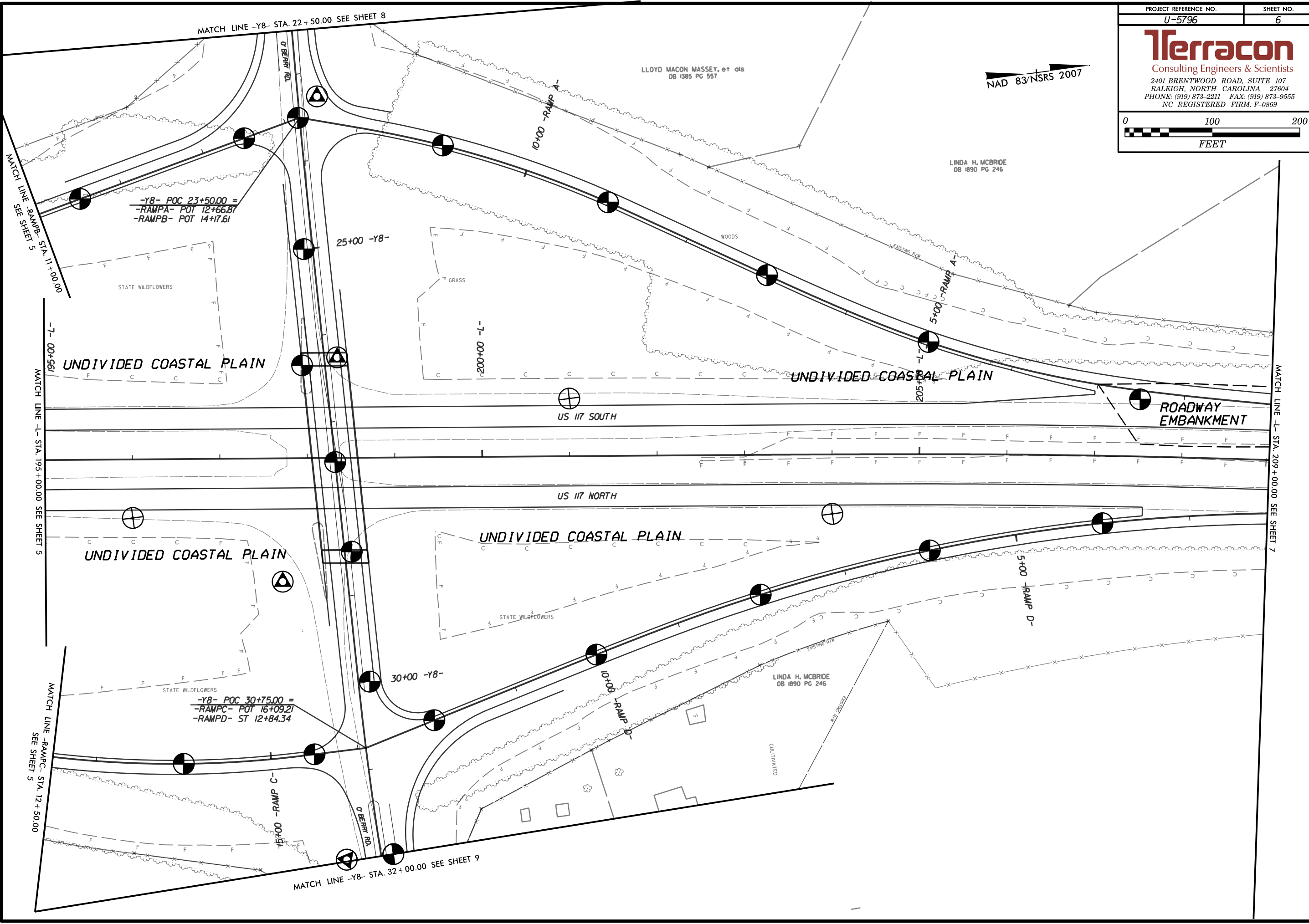
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NAD 83/NSRS 2007

LLOYD MACON MASSEY, et als
DB 1385 PG 557

LINDA H. MCBRIDE
DB 1890 PG 246



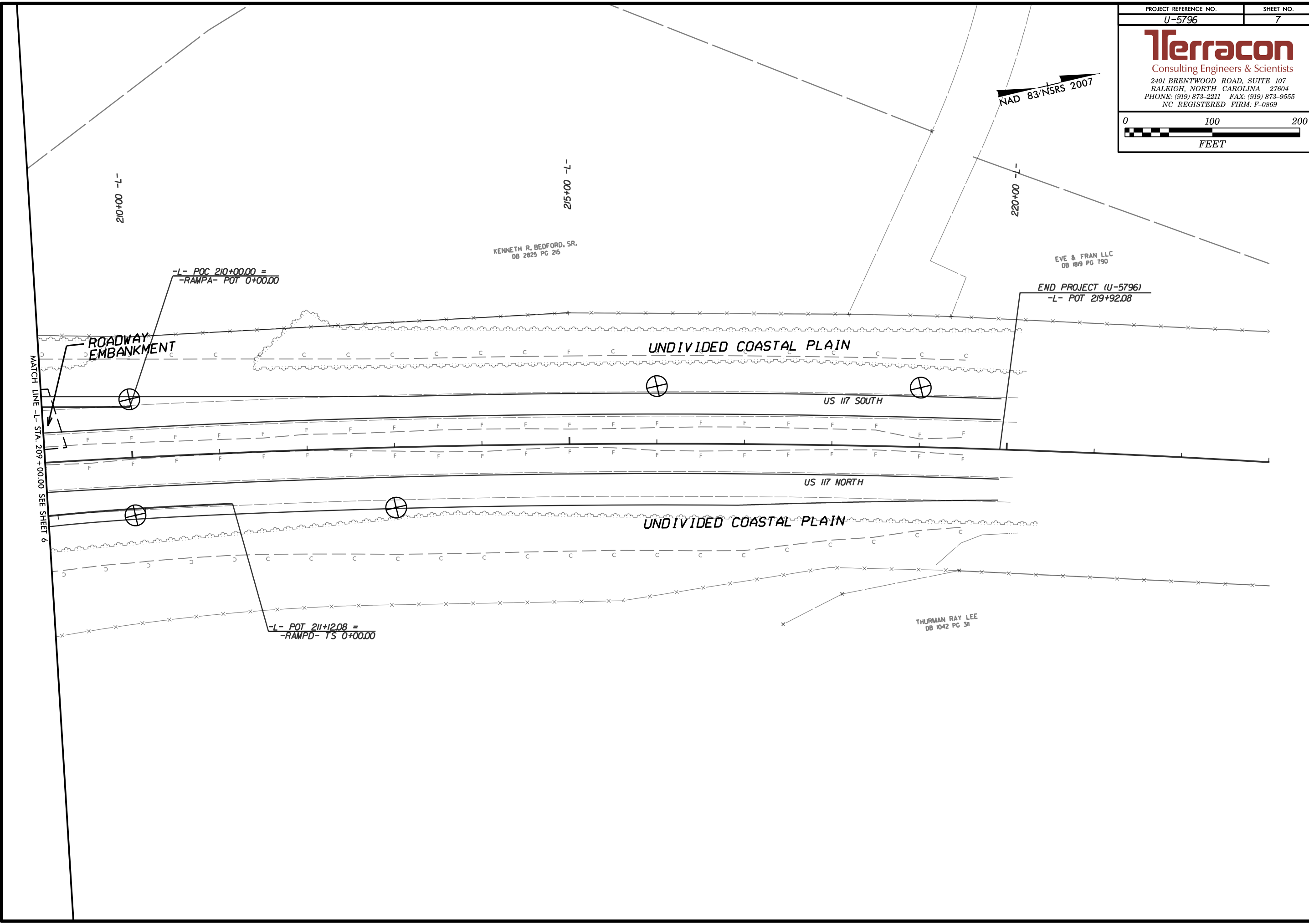
MATCH LINE -RAMPB- STA. 11+00.00
SEE SHEET 5

MATCH LINE -L- STA. 195+00.00
SEE SHEET 5

MATCH LINE -RAMPC- STA. 12+50.00
SEE SHEET 5

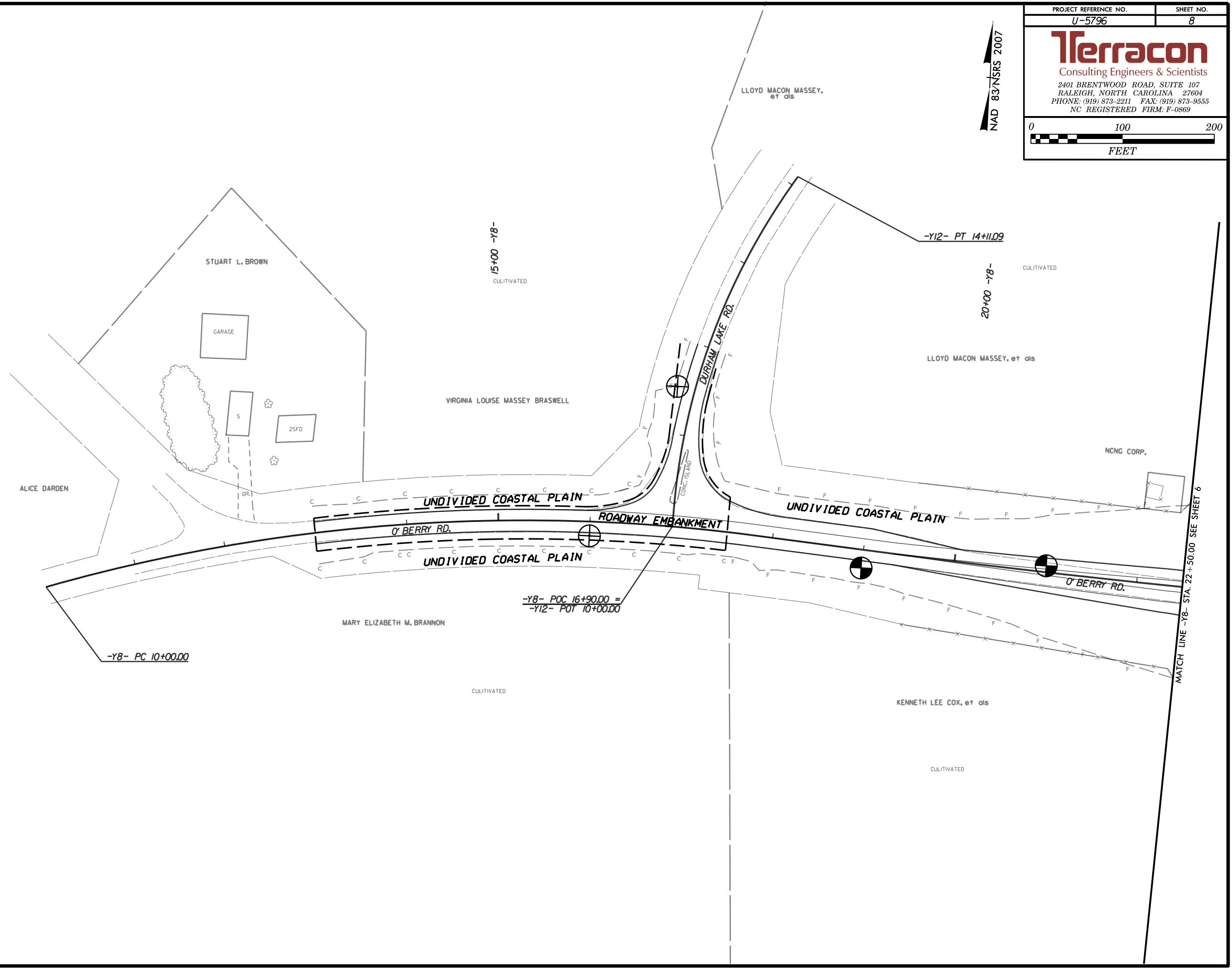
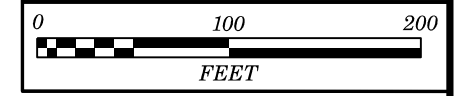
MATCH LINE -L- STA. 209+00.00
SEE SHEET 7

PROJECT REFERENCE NO. U-5796	SHEET NO. 7
Terracon	
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0 100 200 FEET	



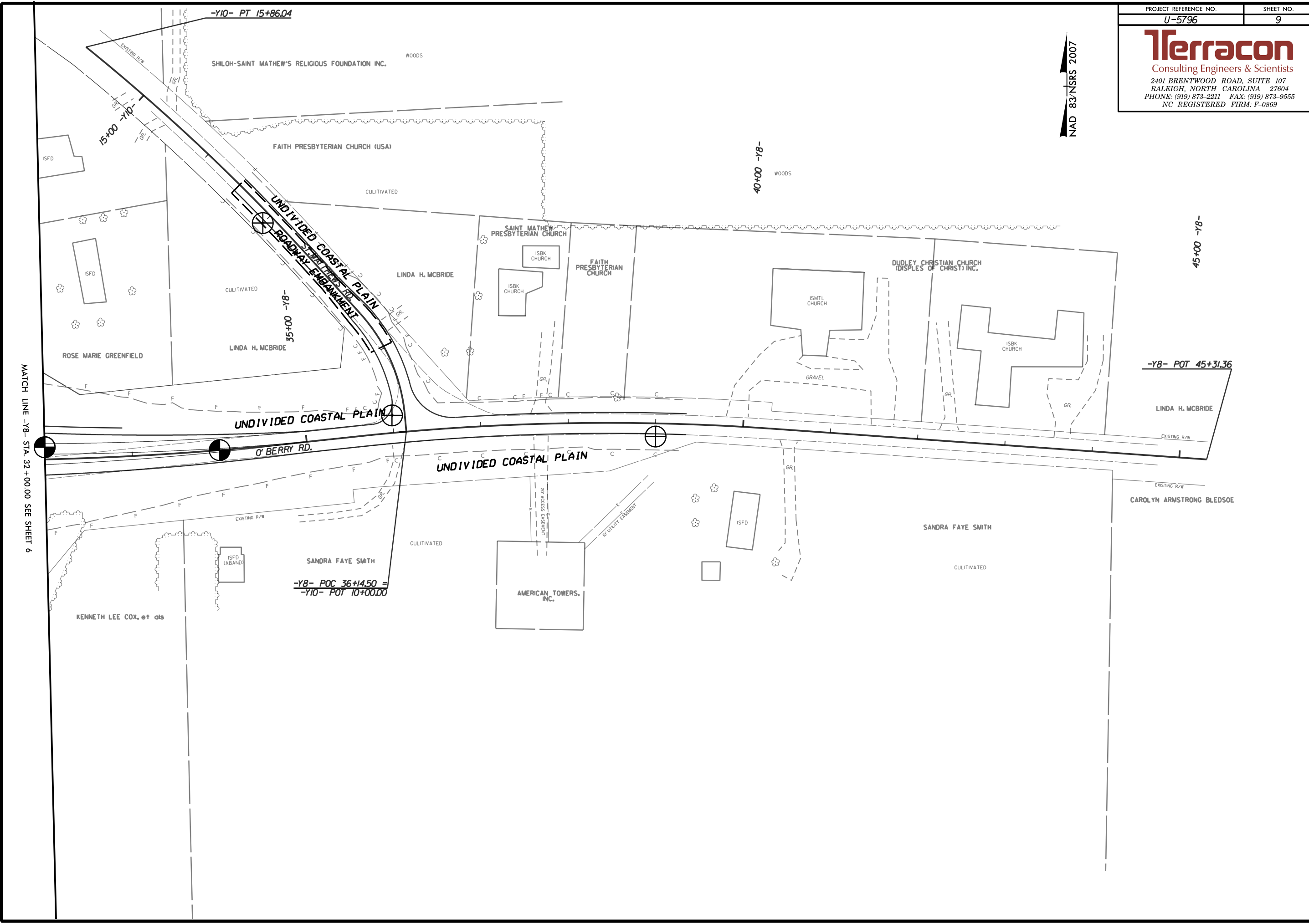
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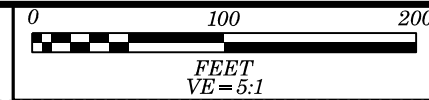
NAD 83/NSRS 2007



MATCH LINE -Y8- STA. 32+00.00 SEE SHEET 6

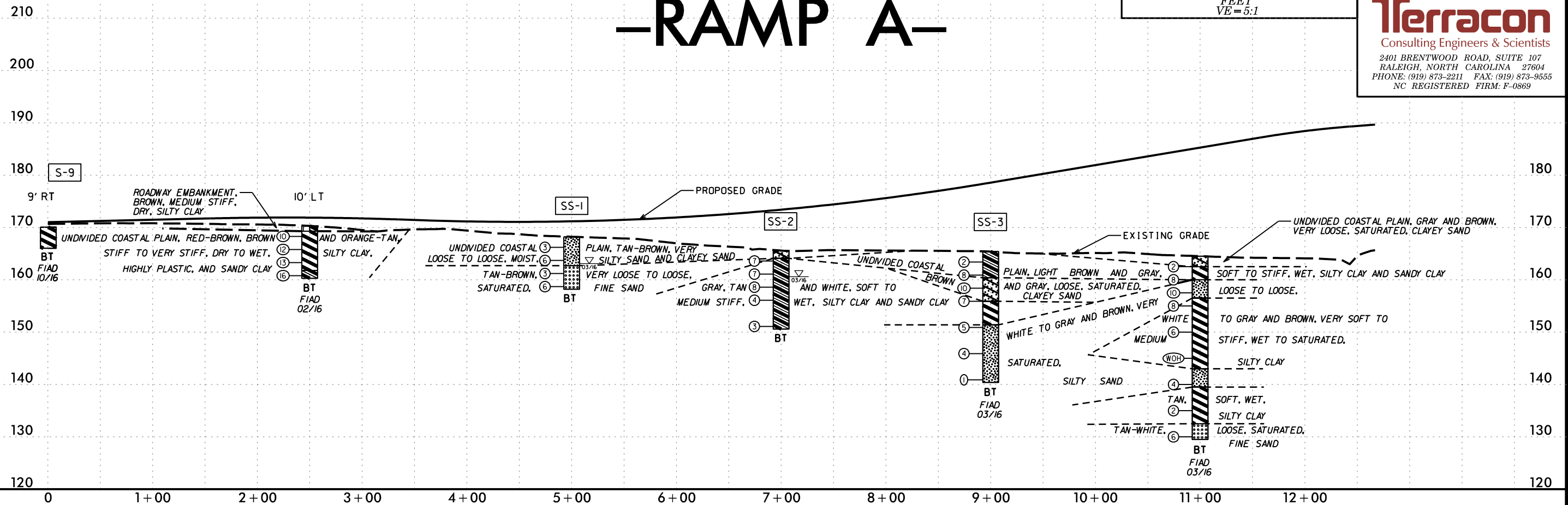
-Y8- POC 36+14.50 =
-Y10- POT 10+00.00

-RAMP A-

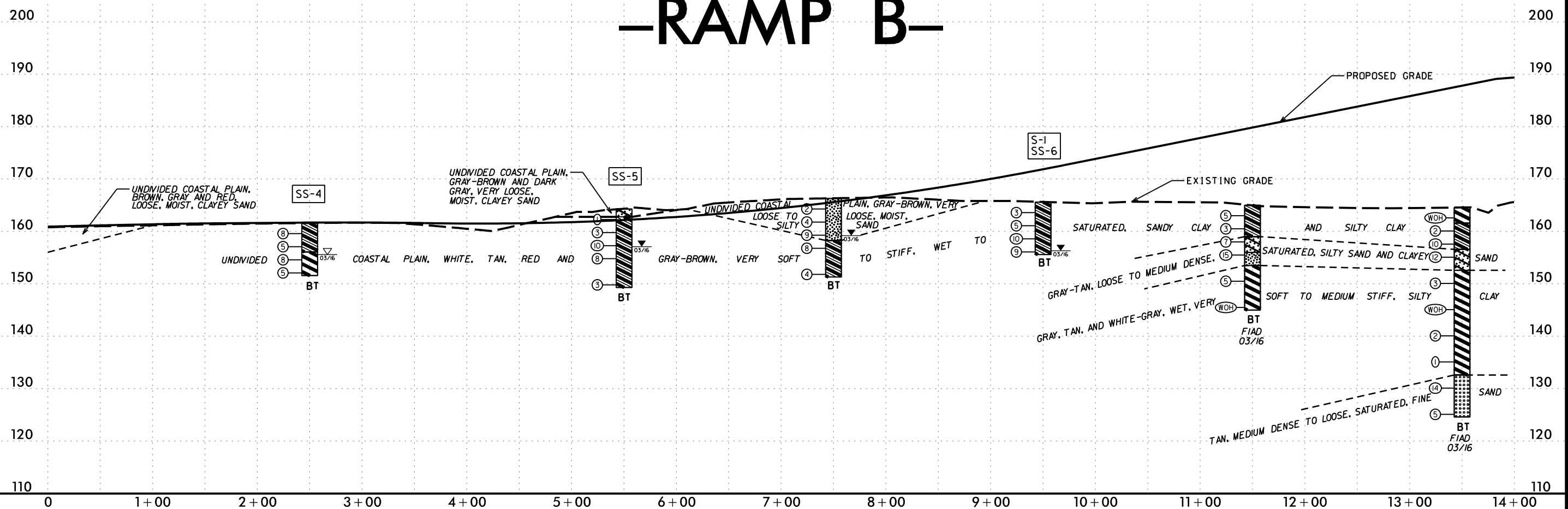


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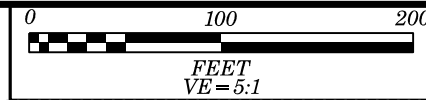
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-RAMP B-

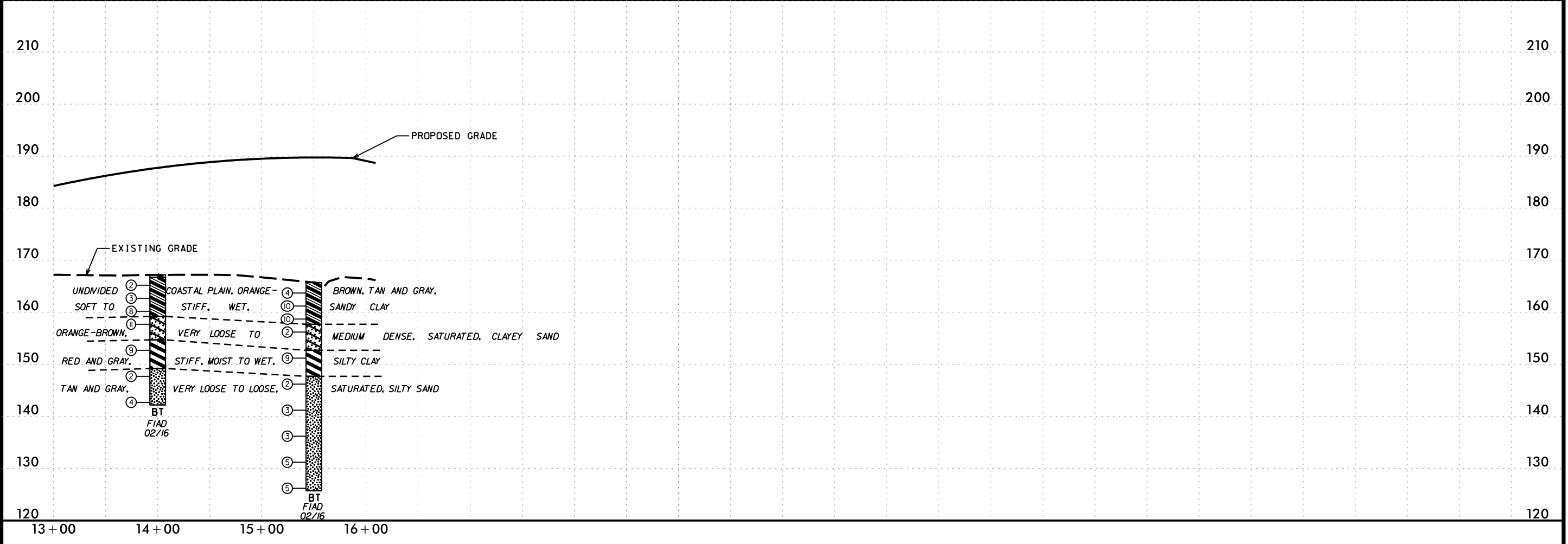
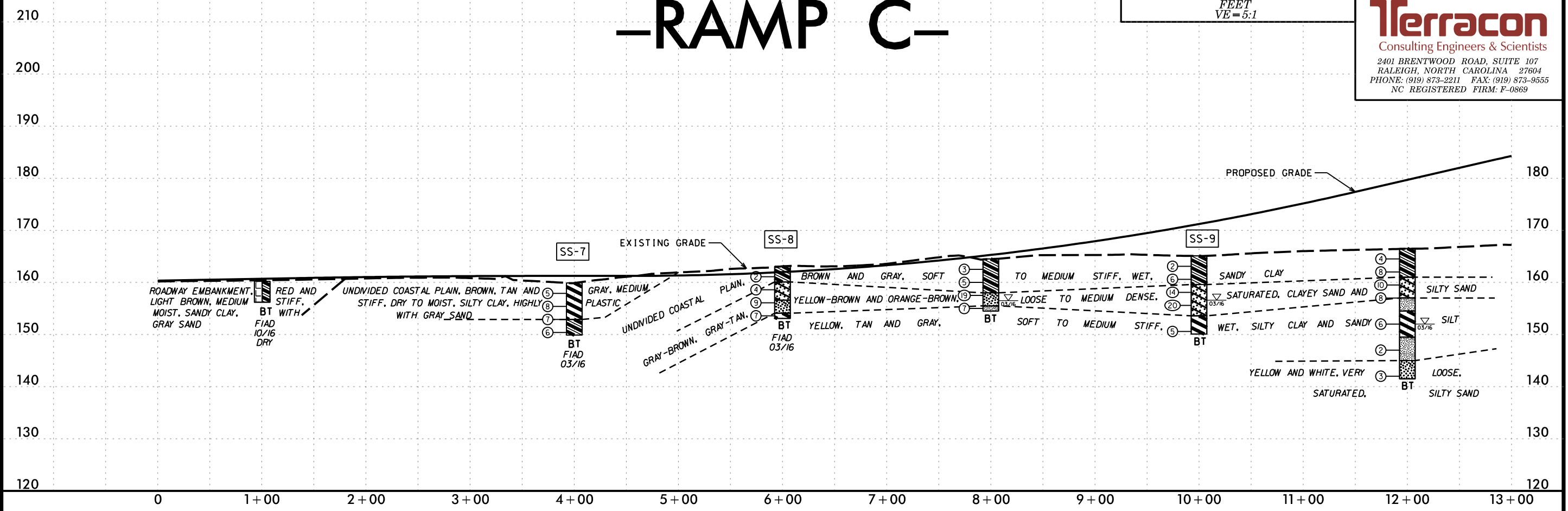


-RAMP C-

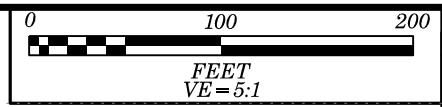


PROJECT REFERENCE NO.	SHEET NO.
U-5796	11

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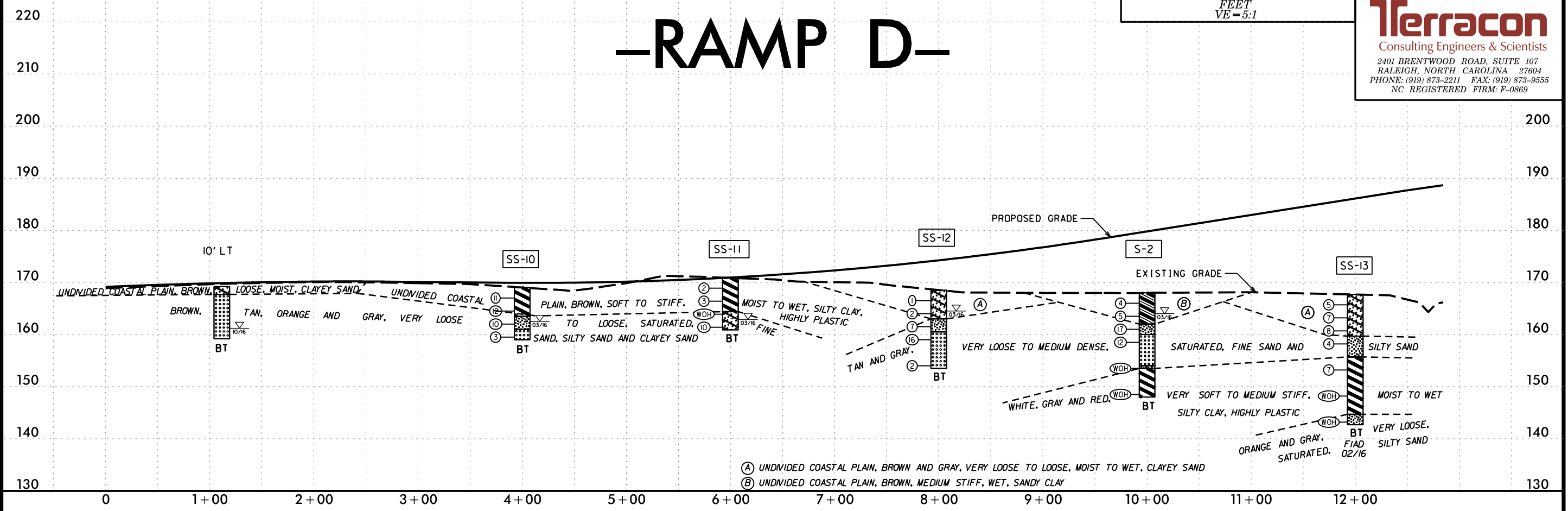


-RAMP D-

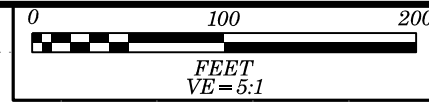


PROJECT REFERENCE NO.	SHEET NO.
U-5796	12

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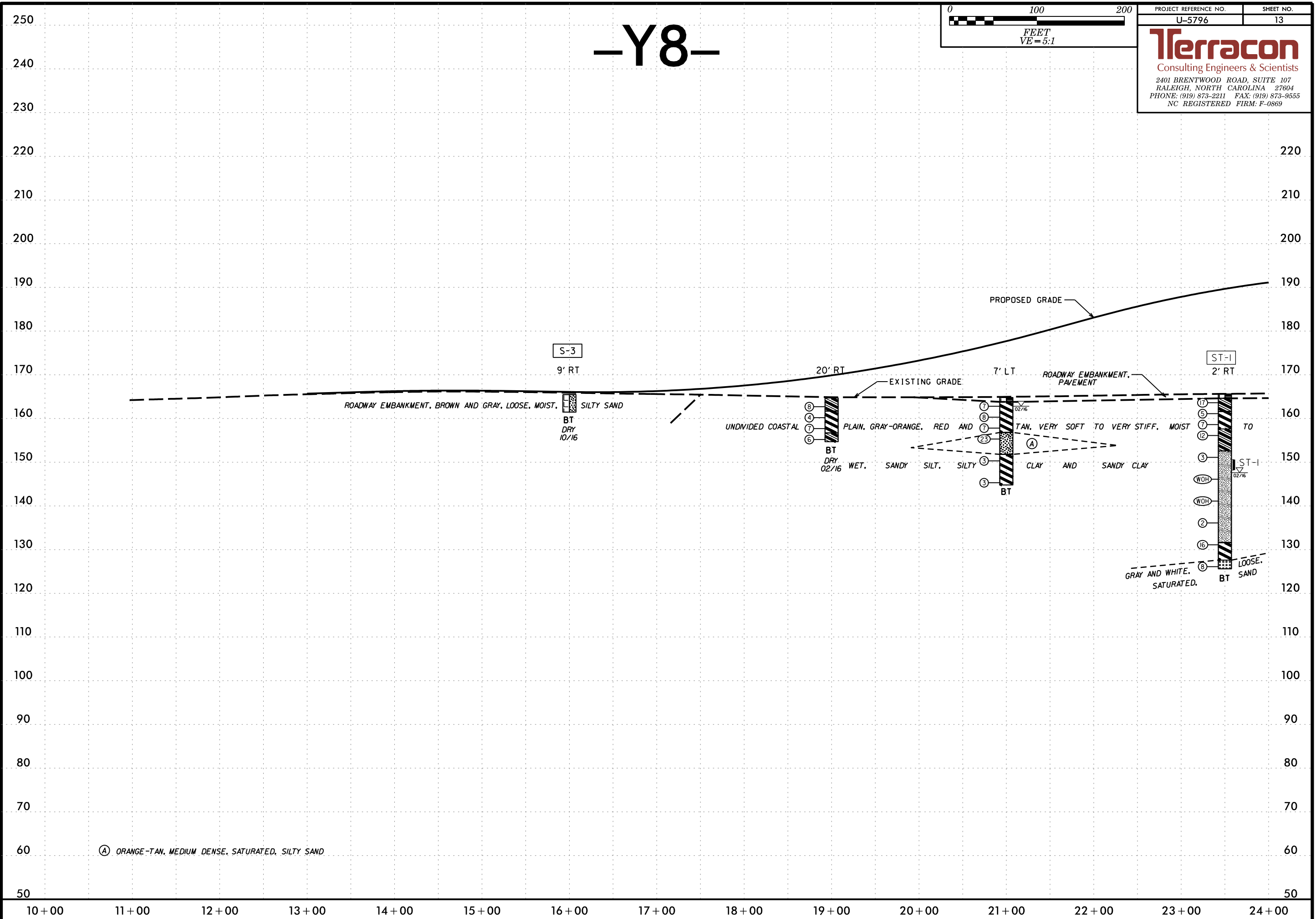


-Y8-



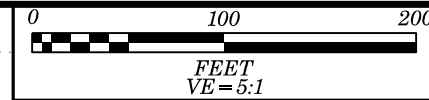
PROJECT REFERENCE NO. U-5796	SHEET NO. 13
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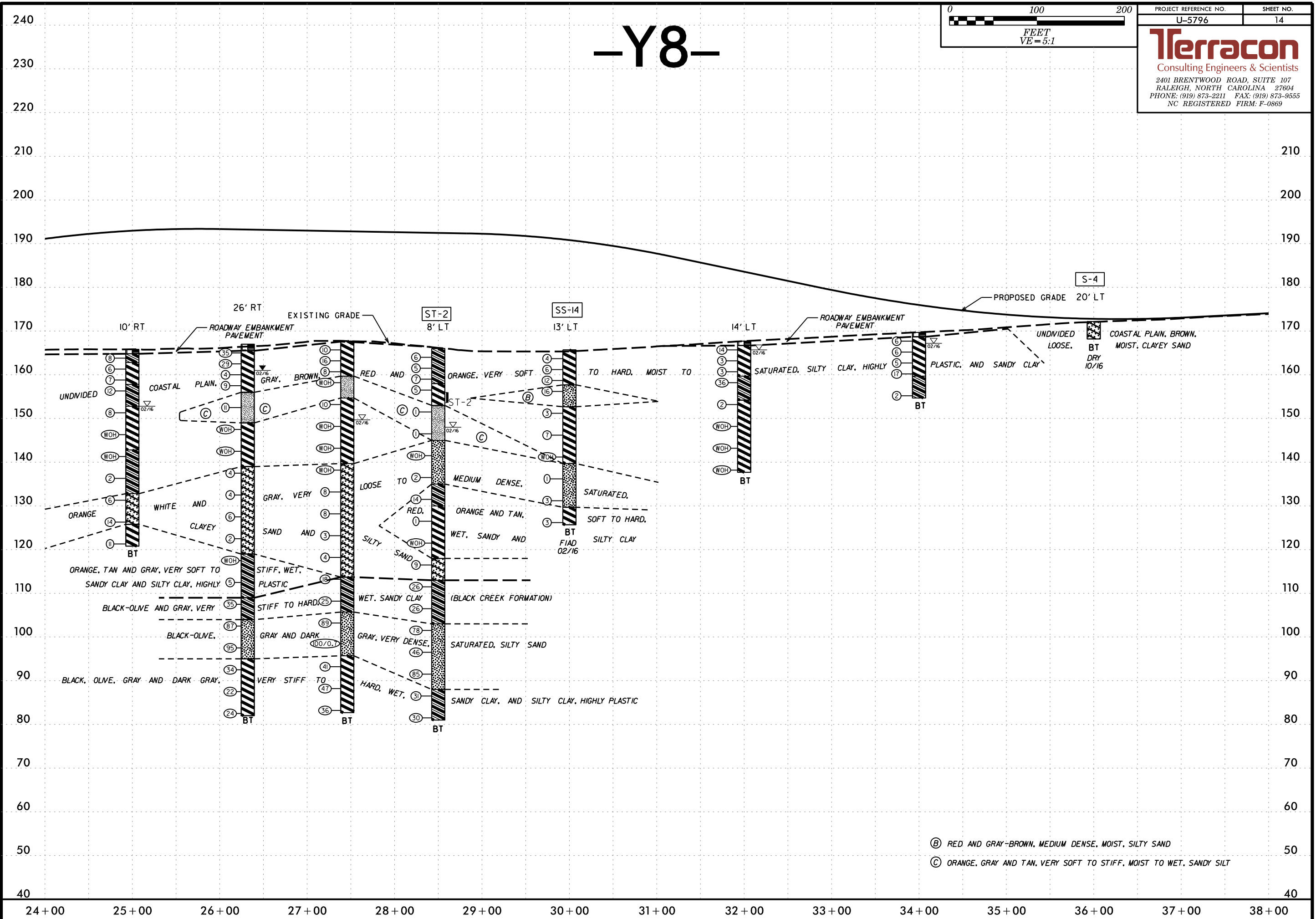
(A) ORANGE-TAN, MEDIUM DENSE, SATURATED, SILTY SAND

-Y8-

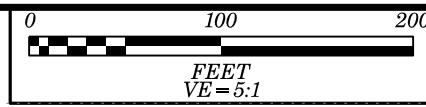


PROJECT REFERENCE NO.	SHEET NO.
U-5796	14

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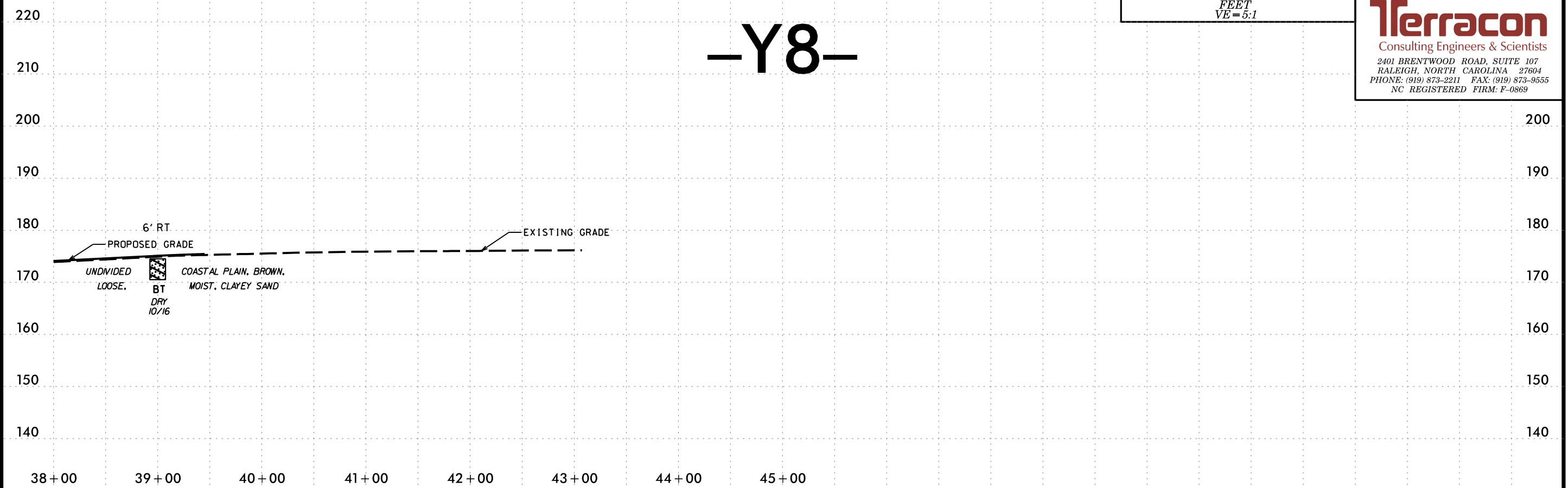
- (B) RED AND GRAY-BROWN, MEDIUM DENSE, MOIST, SILTY SAND
- (C) ORANGE, GRAY AND TAN, VERY SOFT TO STIFF, MOIST TO WET, SANDY SILT



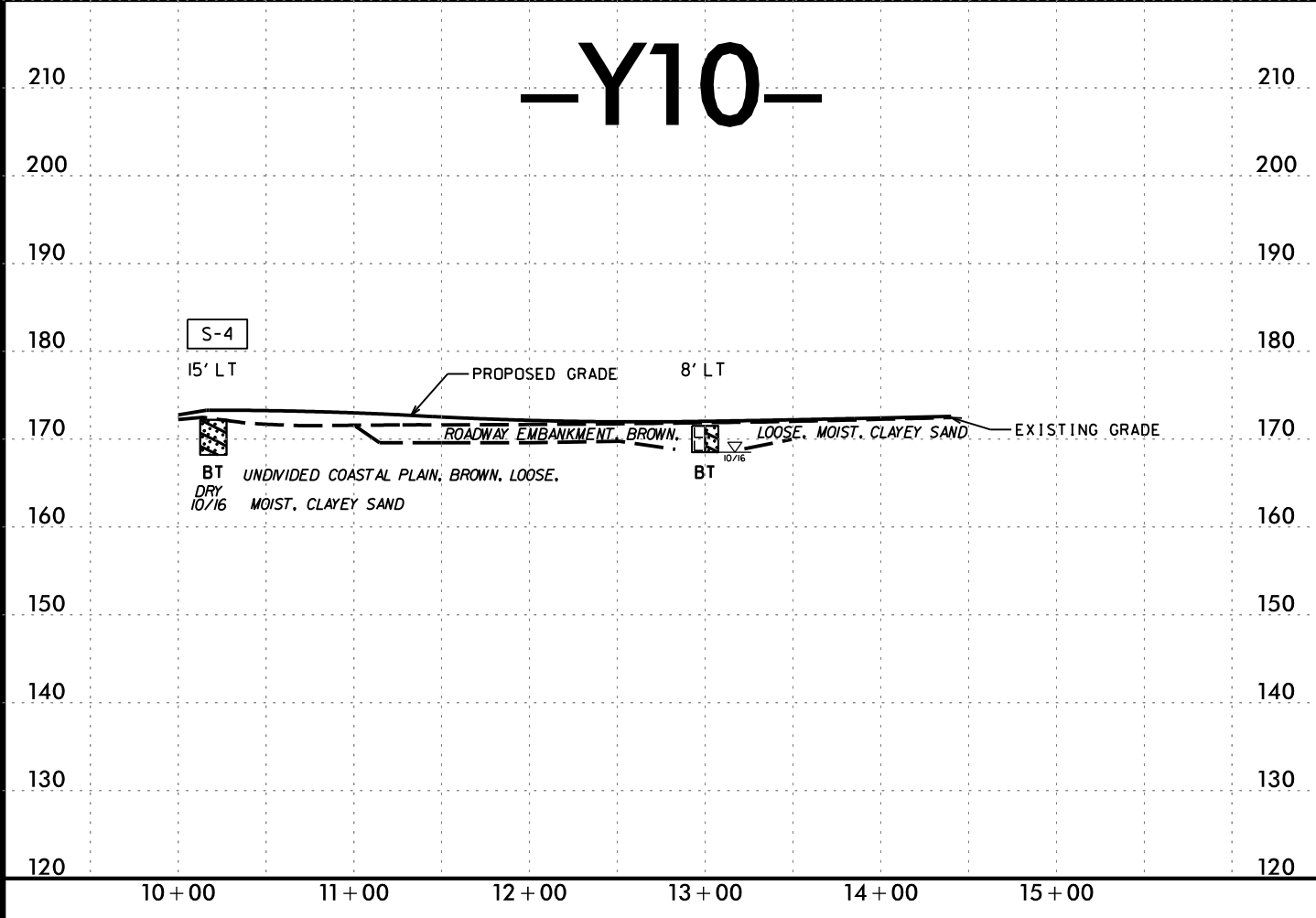
PROJECT REFERENCE NO.	SHEET NO.
U-5796	15

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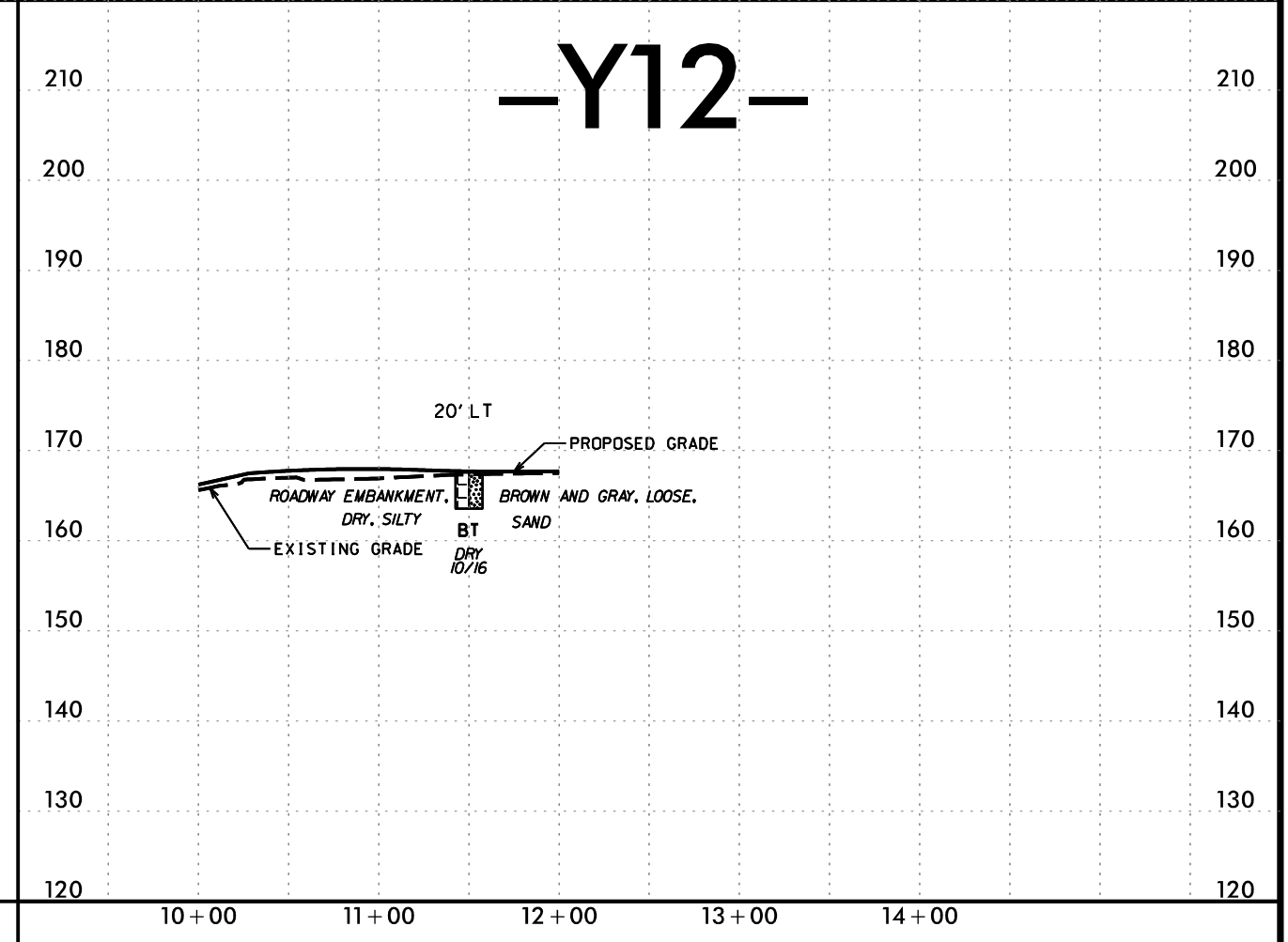
-Y8-



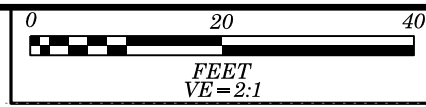
-Y10-



-Y12-

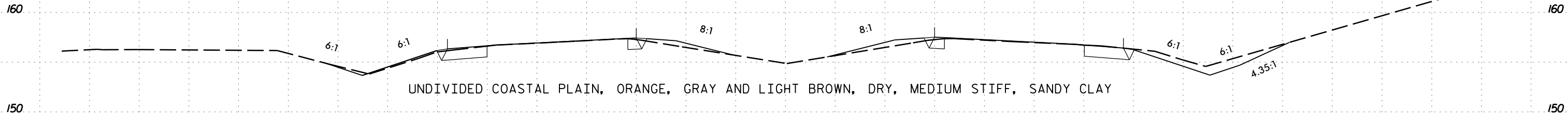


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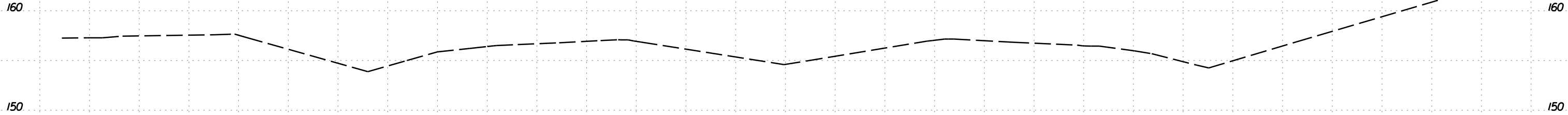


PROJECT REFERENCE NO.	SHEET NO.
U-5796	16

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175+50

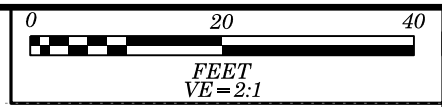


175+00

-L-

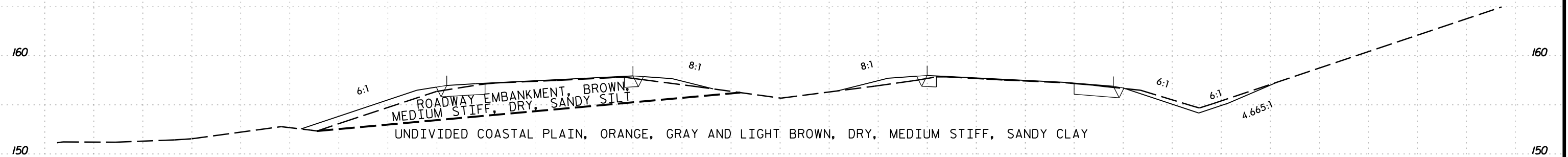
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150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70

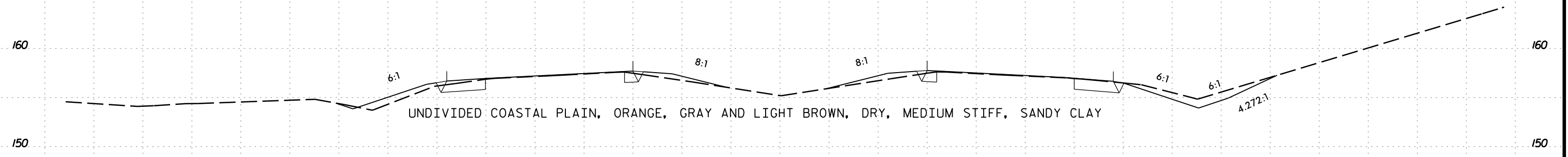


PROJECT REFERENCE NO.	SHEET NO.
U-5796	17

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176+50

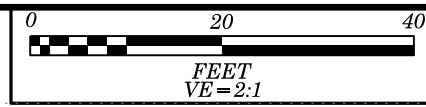


176+00

-L-

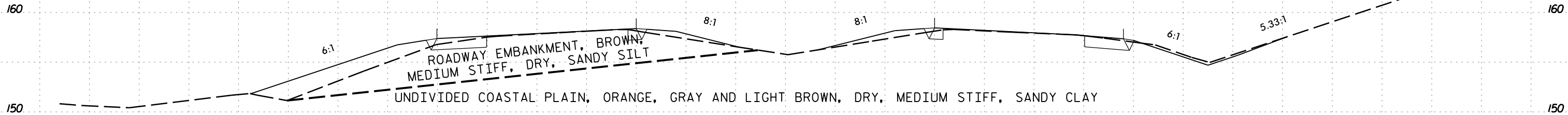
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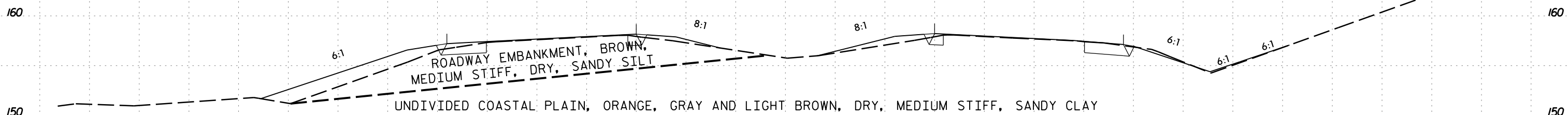


PROJECT REFERENCE NO.	SHEET NO.
U-5796	18

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177+50

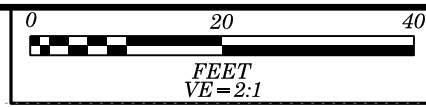


177+00

-L-

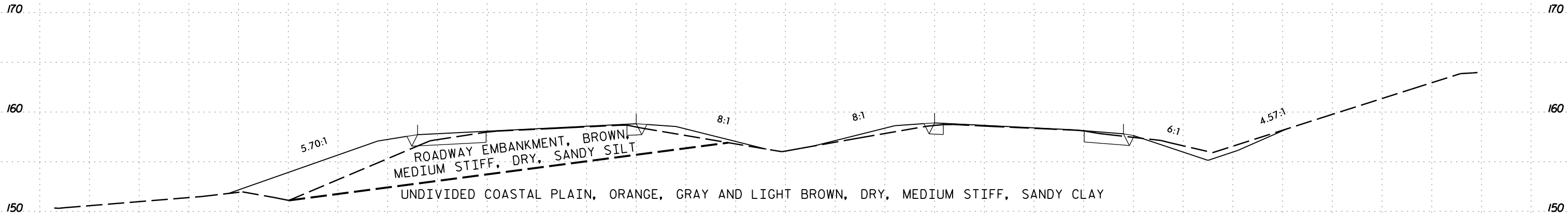
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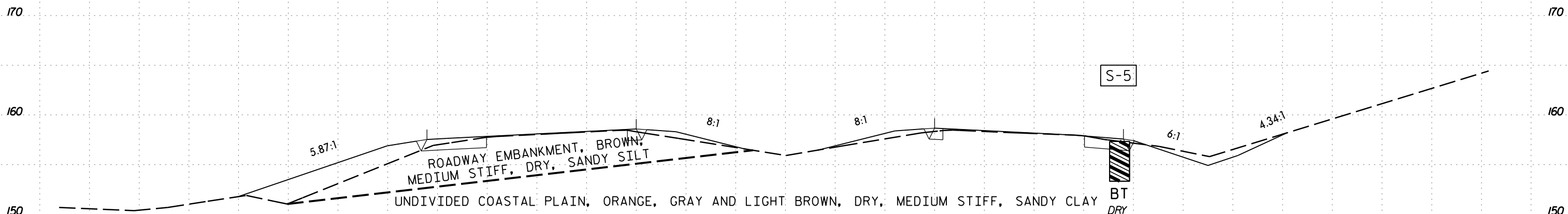


PROJECT REFERENCE NO.	SHEET NO.
U-5796	19

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178+50

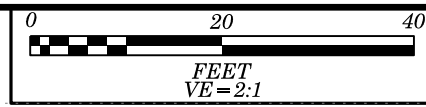


178+00

-L-

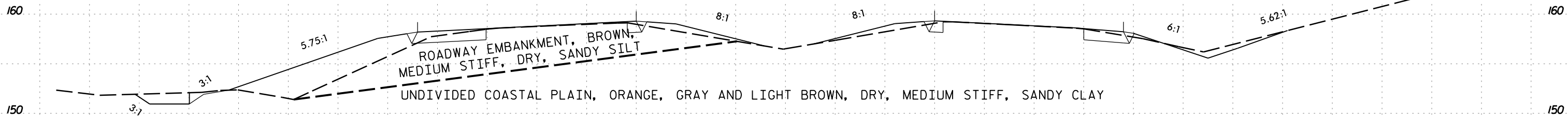
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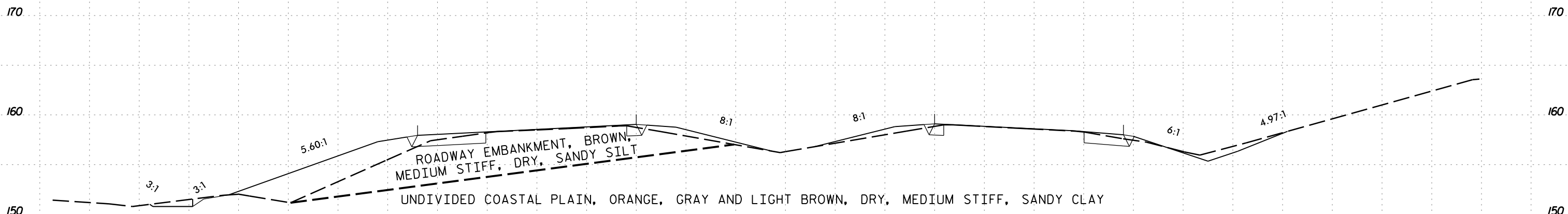


PROJECT REFERENCE NO.	SHEET NO.
U-5796	20

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179+50

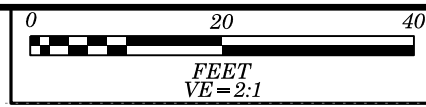


179+00

-L-

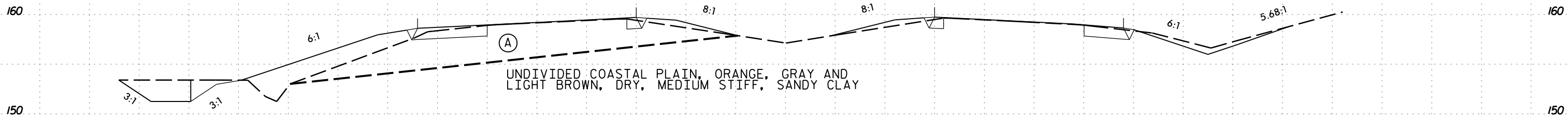
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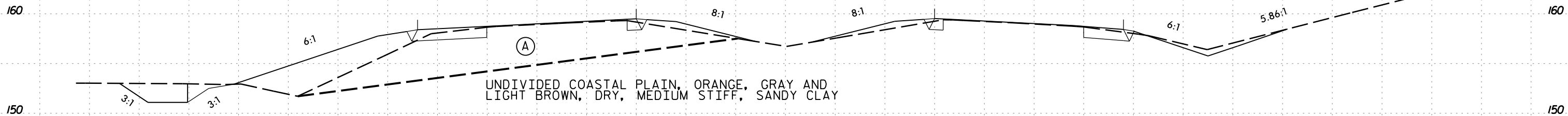


PROJECT REFERENCE NO.	SHEET NO.
U-5796	21

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180+50

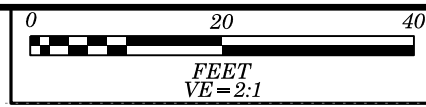


180+00

-L-

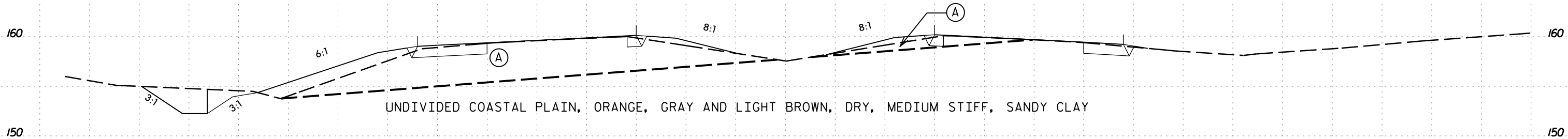
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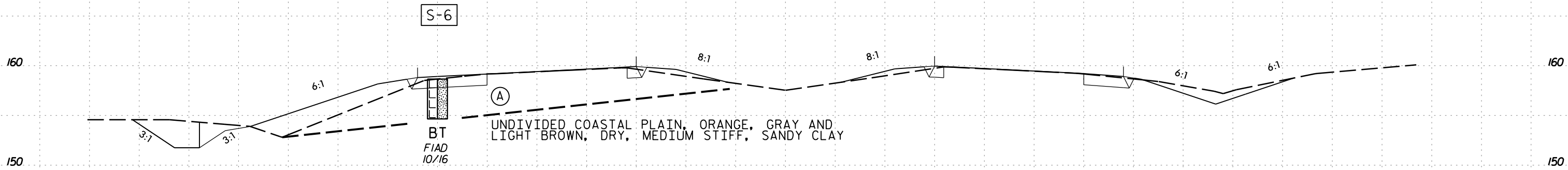
PROJECT REFERENCE NO.	SHEET NO.
U-5796	22

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(A) ROADWAY EMBANKMENT, BROWN, MEDIUM STIFF, DRY, SANDY SILT

181+50



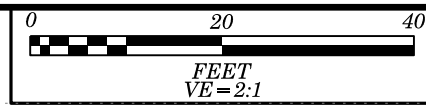
(A) ROADWAY EMBANKMENT, BROWN, MEDIUM STIFF, DRY, SANDY SILT

181+00

-L-

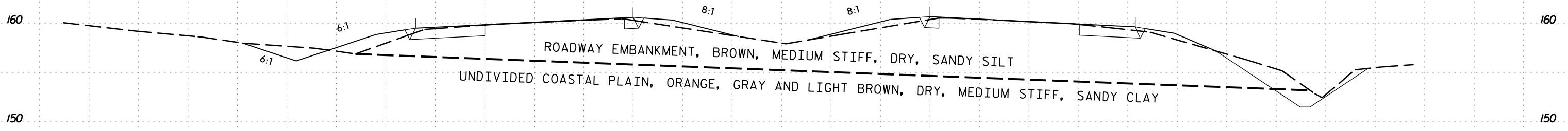
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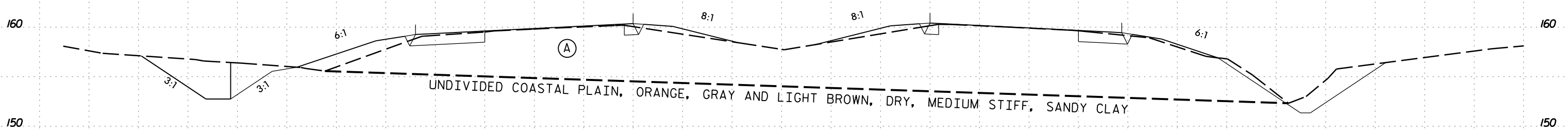


PROJECT REFERENCE NO.	SHEET NO.
U-5796	23

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182 + 50

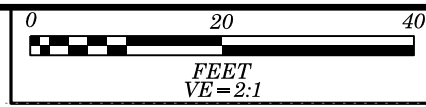


182 + 00

-L-

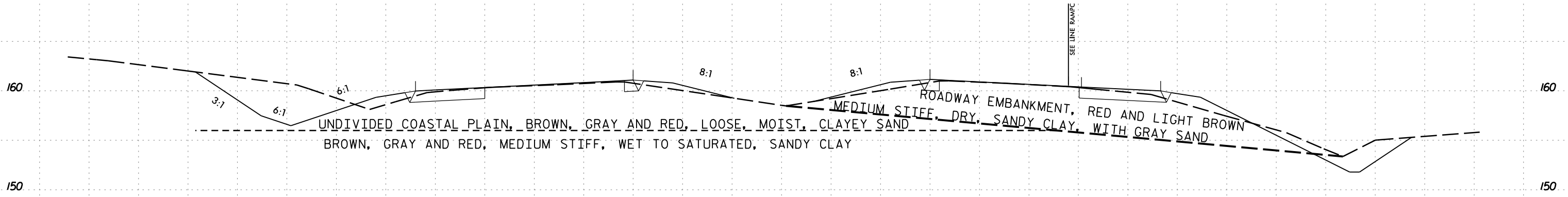
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150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70

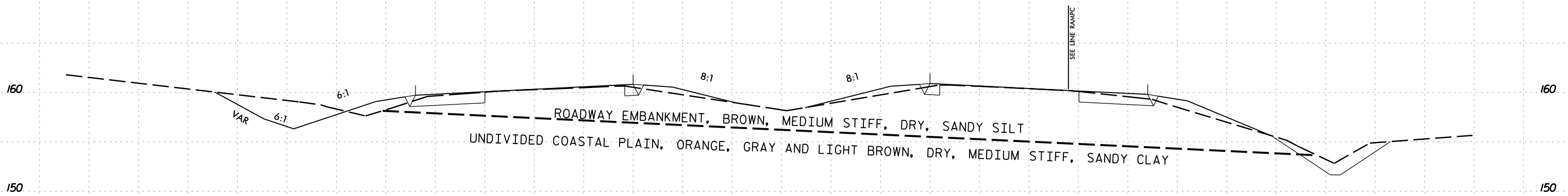


PROJECT REFERENCE NO.	SHEET NO.
U-5796	24

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183+50

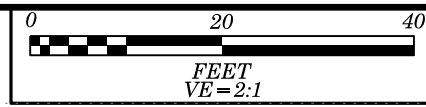


183+00

-L-

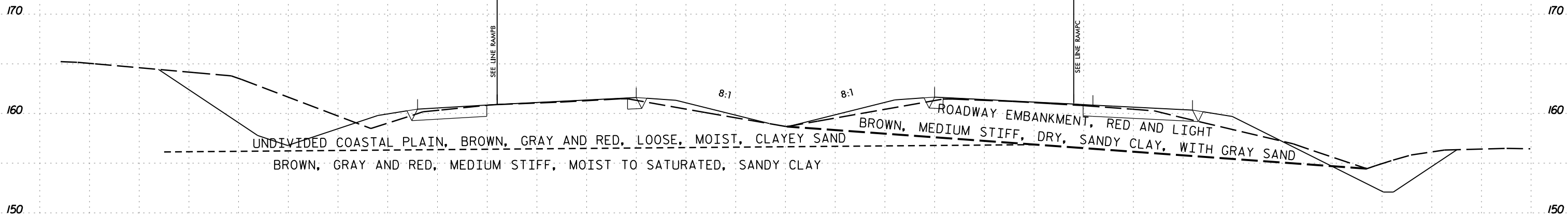
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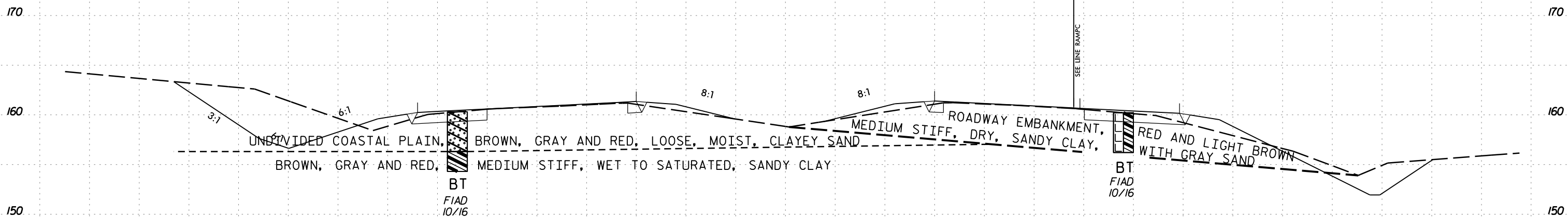


PROJECT REFERENCE NO.	SHEET NO.
U-5796	25

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184+50

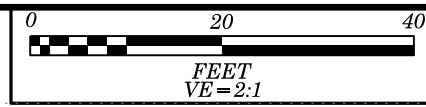


184+00

-L-

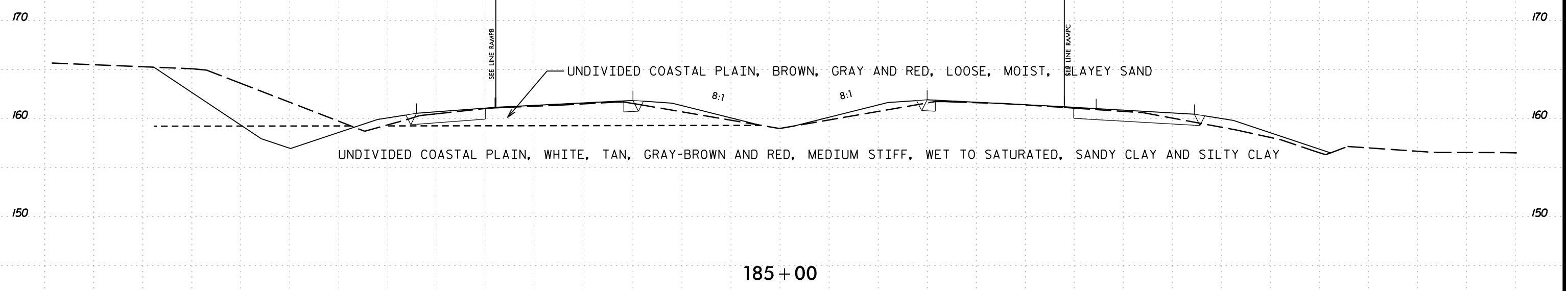
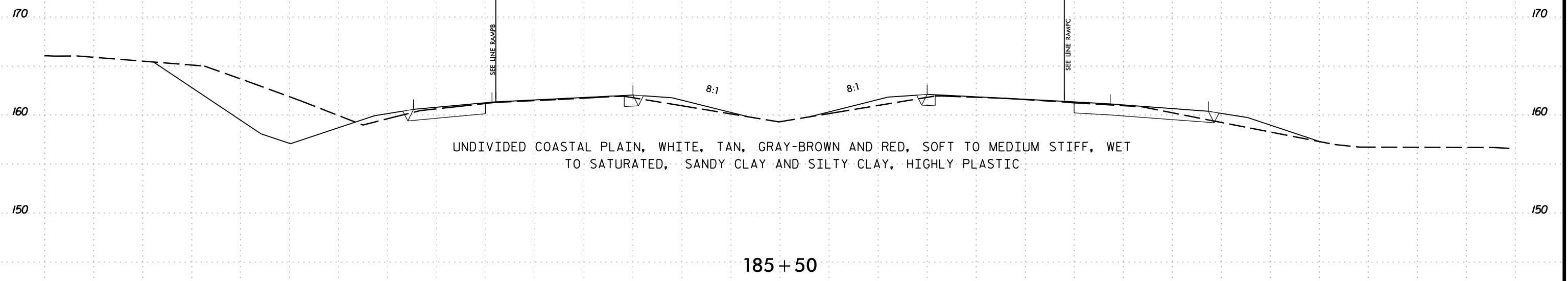
150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

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



PROJECT REFERENCE NO. U-5796	SHEET NO. 26
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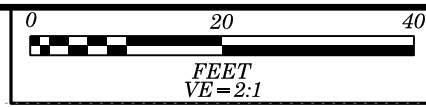
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-L-

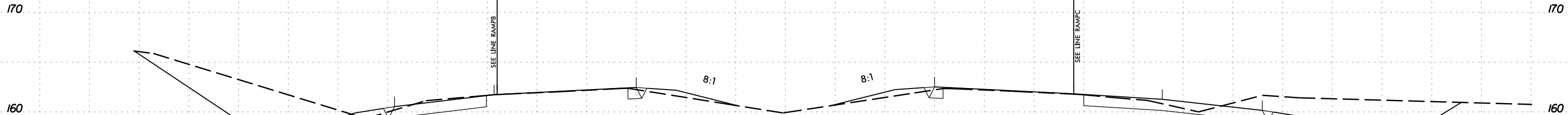
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150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70



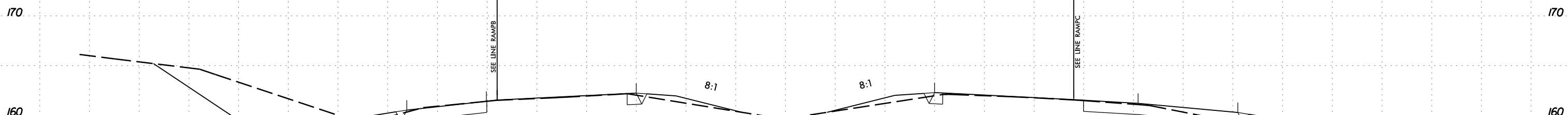
PROJECT REFERENCE NO.	SHEET NO.
U-5796	27

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UNDIVIDED COASTAL PLAIN, WHITE, TAN, GRAY-BROWN AND RED, SOFT TO MEDIUM STIFF,
 WET TO SATURATED, SANDY CLAY AND SILTY CLAY, HIGHLY PLASTIC

186+50



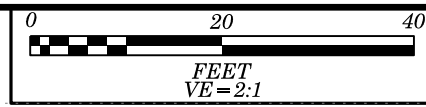
UNDIVIDED COASTAL PLAIN, WHITE, TAN, GRAY-BROWN AND RED, SOFT TO MEDIUM STIFF,
 WET TO SATURATED, SANDY CLAY AND SILTY CLAY, HIGHLY PLASTIC

186+00

-L-

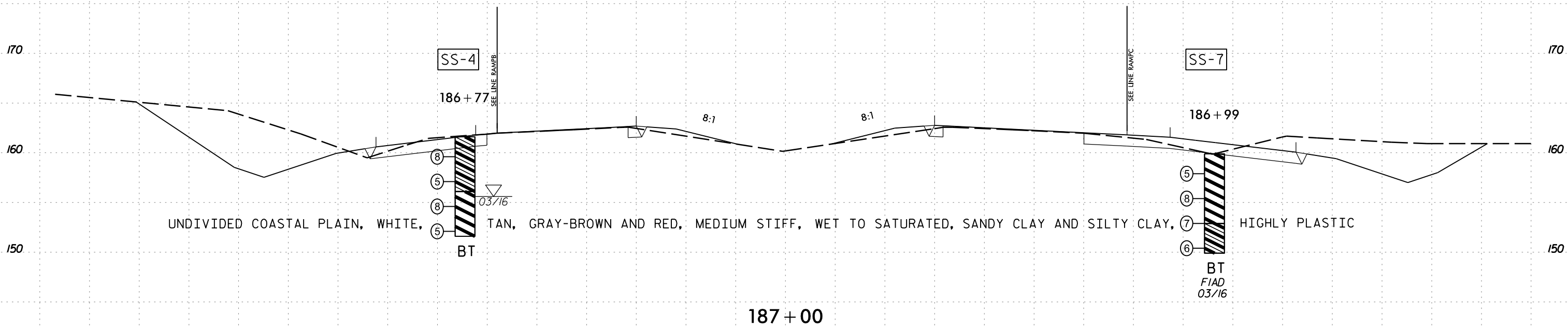
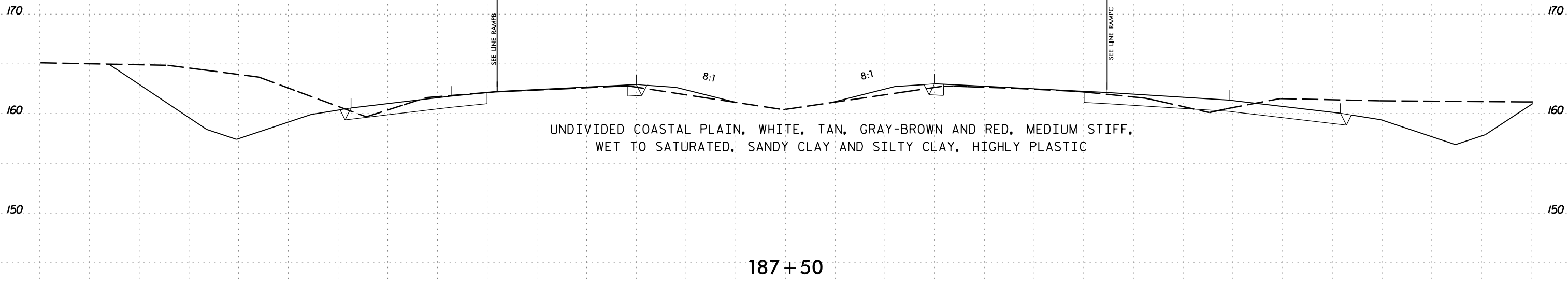
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150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70



PROJECT REFERENCE NO.	SHEET NO.
U-5796	28

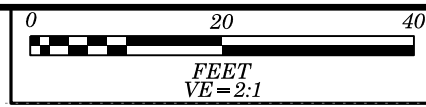
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150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

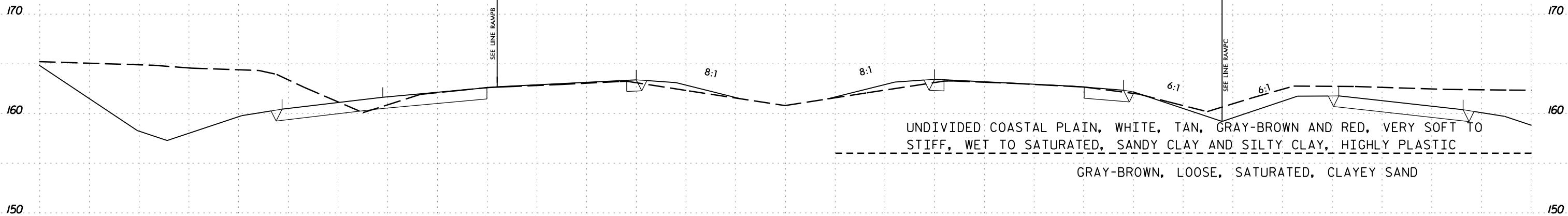
-L-

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

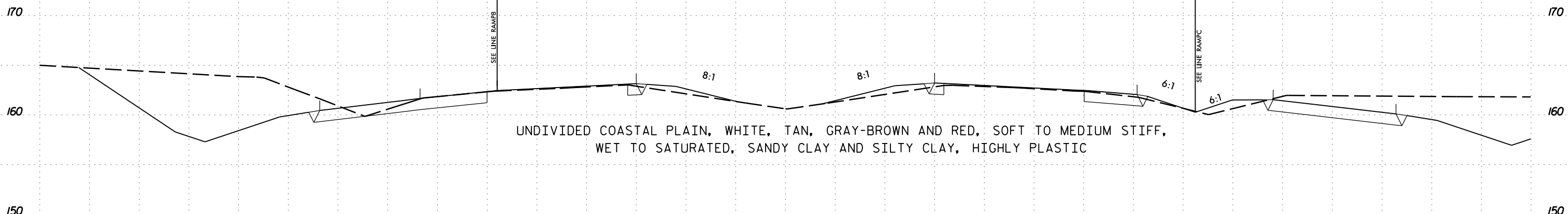


PROJECT REFERENCE NO.	SHEET NO.
U-5796	29

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188+50

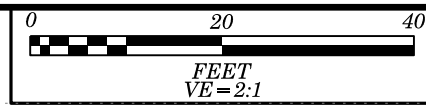


188+00

-L-

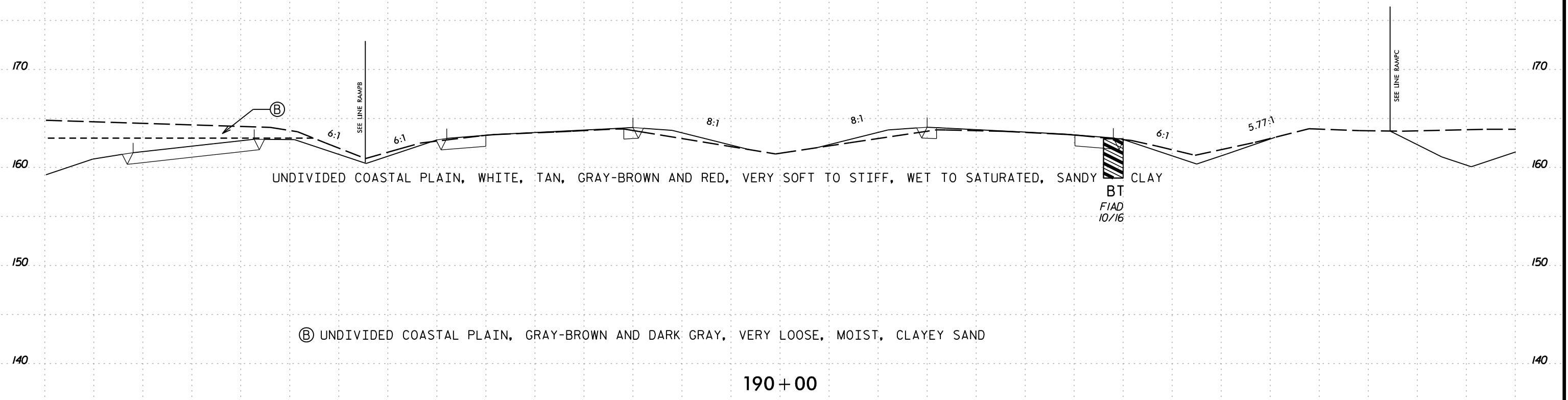
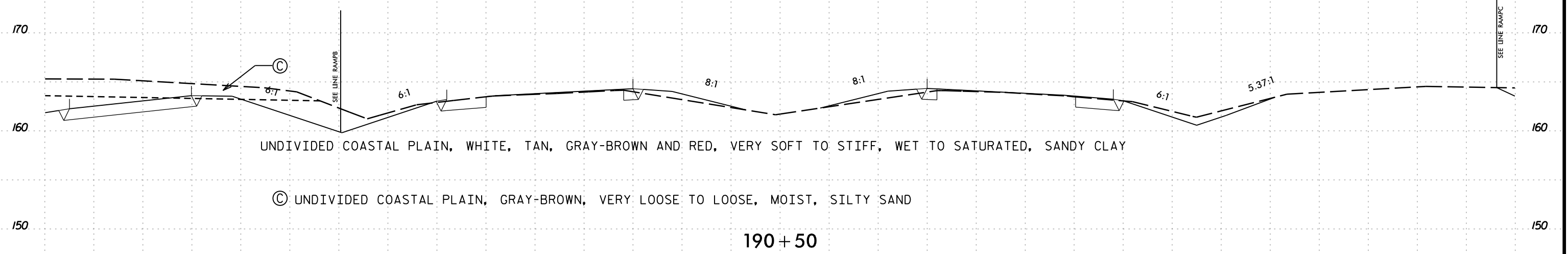
150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

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



PROJECT REFERENCE NO.	SHEET NO.
U-5796	31

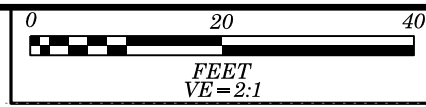
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-L-

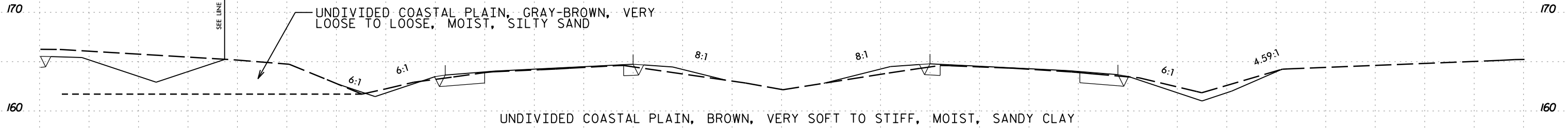
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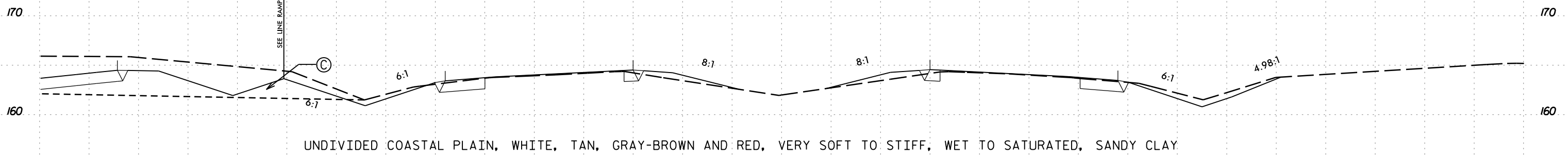


PROJECT REFERENCE NO.	SHEET NO.
U-5796	32

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191+50



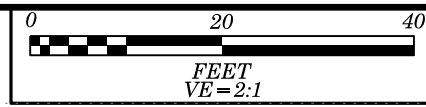
© UNDIVIDED COASTAL PLAIN, GRAY-BROWN, VERY LOOSE TO LOOSE, MOIST, SILTY SAND

191+00

-L-

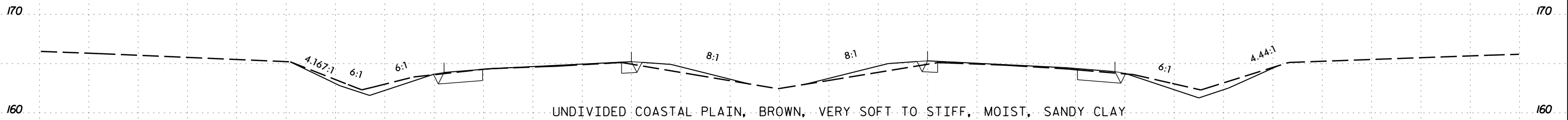
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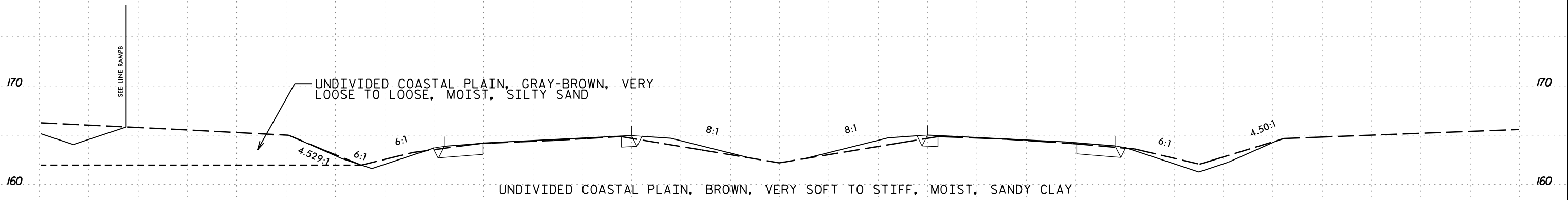


PROJECT REFERENCE NO.	SHEET NO.
U-5796	33

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192+50

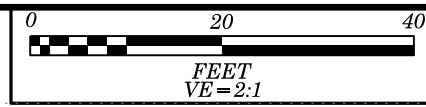


192+00

-L-

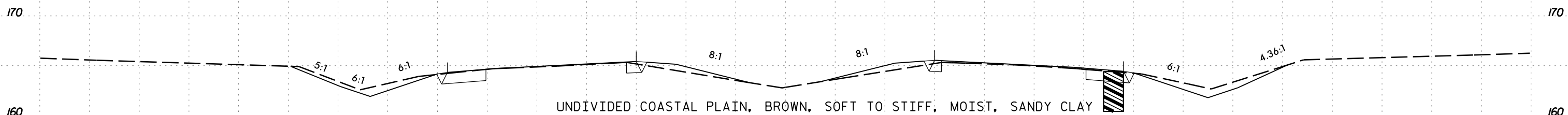
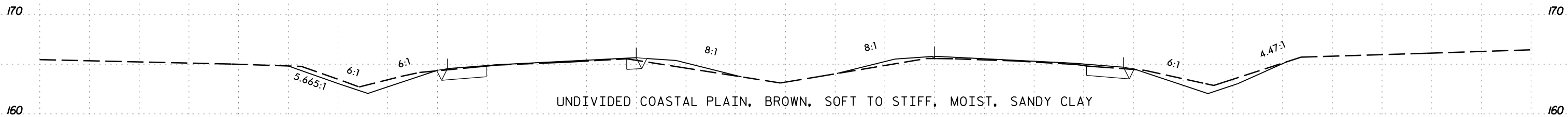
150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

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



PROJECT REFERENCE NO.	SHEET NO.
U-5796	34

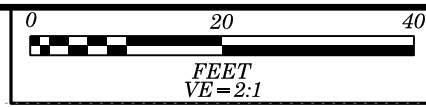
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150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

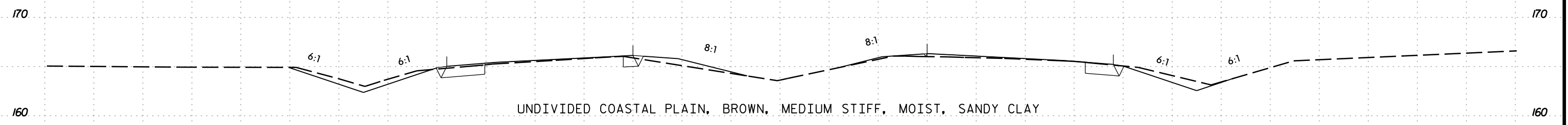
-L-

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

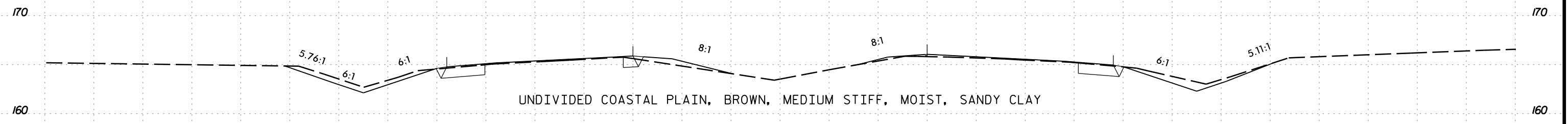


PROJECT REFERENCE NO.	SHEET NO.
U-5796	35

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194+50

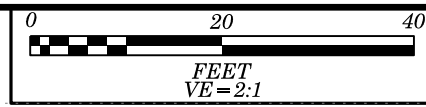


194+00

-L-

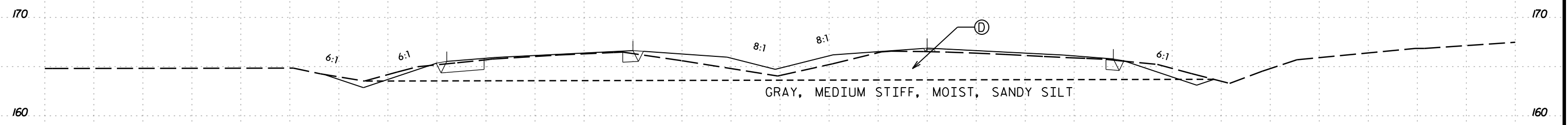
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150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70

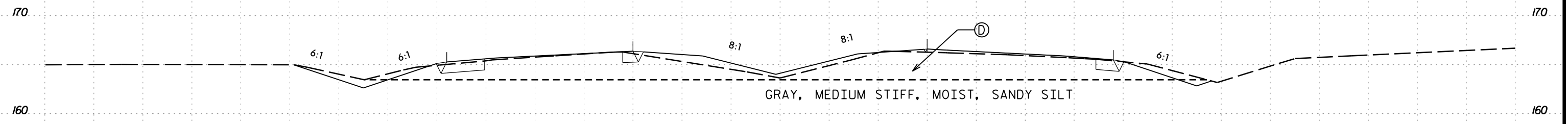


PROJECT REFERENCE NO.	SHEET NO.
U-5796	36

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 PHONE: (919) 873-2211 FAX: (919) 873-9555
 NC REGISTERED FIRM: P-0869



195+50

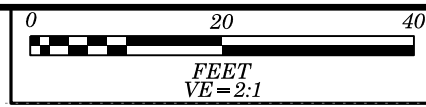


195+00

-L-

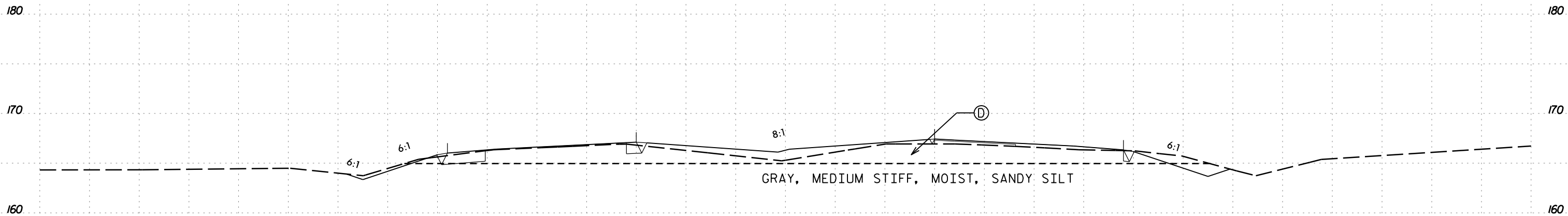
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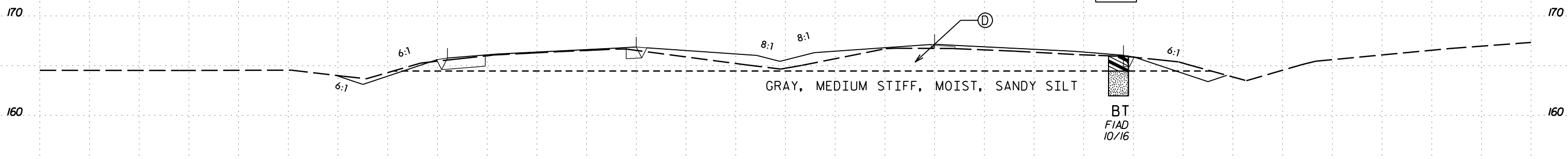


PROJECT REFERENCE NO.	SHEET NO.
U-5796	37

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196+50

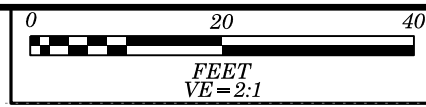


196+00

-L-

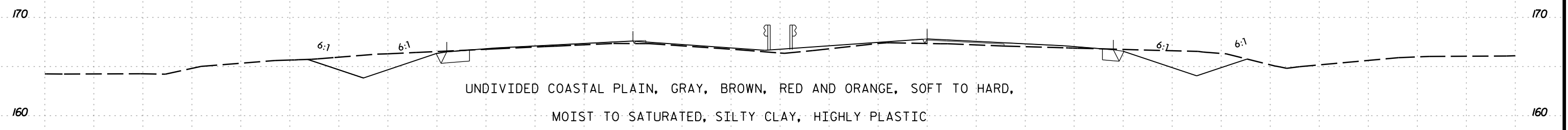
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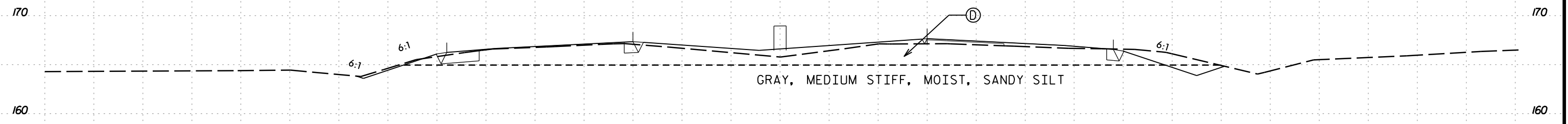


PROJECT REFERENCE NO.	SHEET NO.
U-5796	38

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197+50

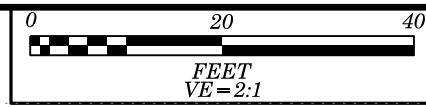


ⓓ UNDIVIDED COASTAL PLAIN, BROWN, MEDIUM STIFF, MOIST, SANDY CLAY

197+00

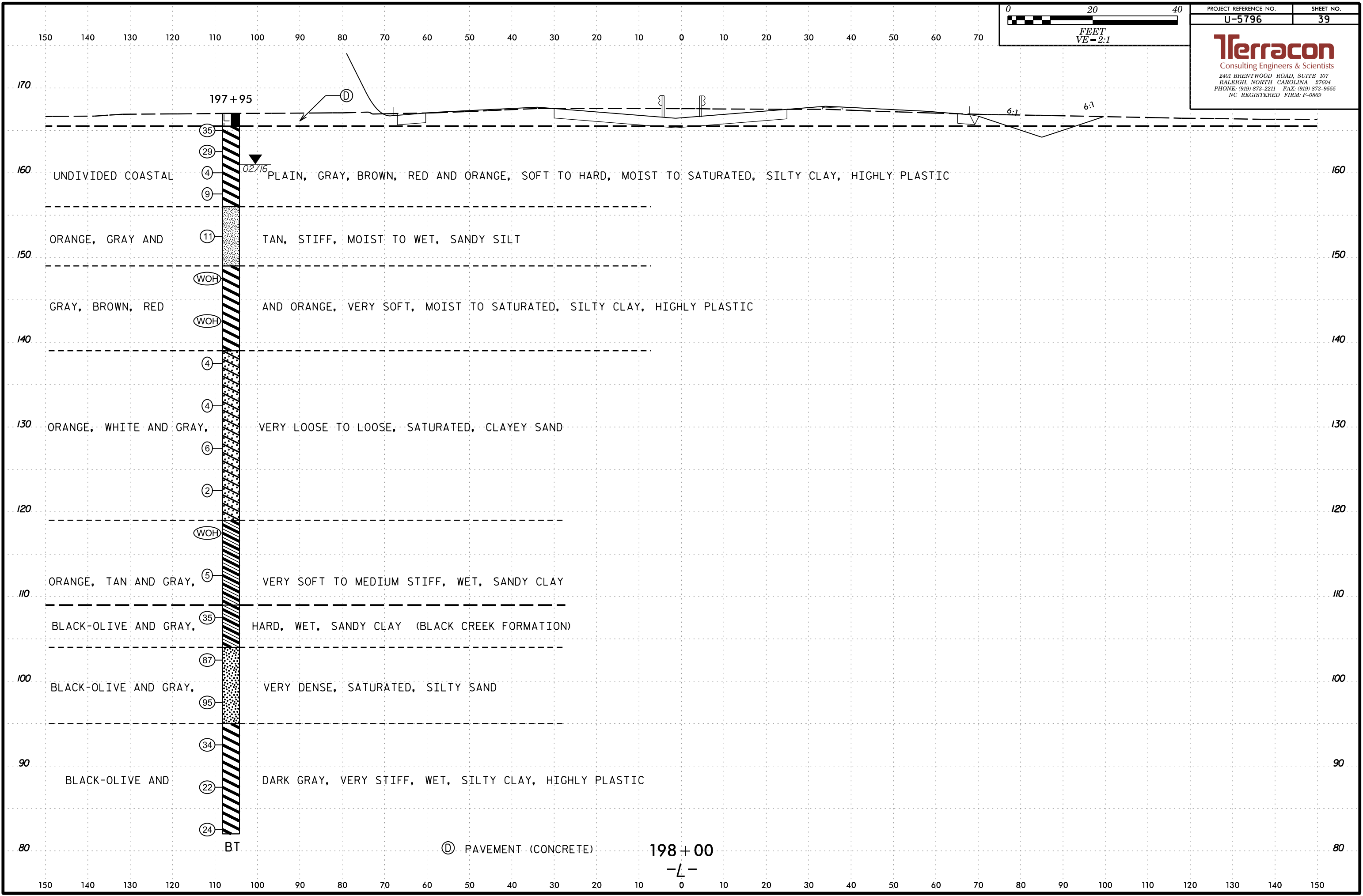
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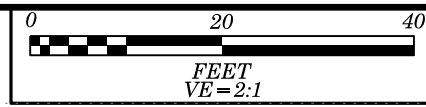


PROJECT REFERENCE NO.	SHEET NO.
U-5796	39

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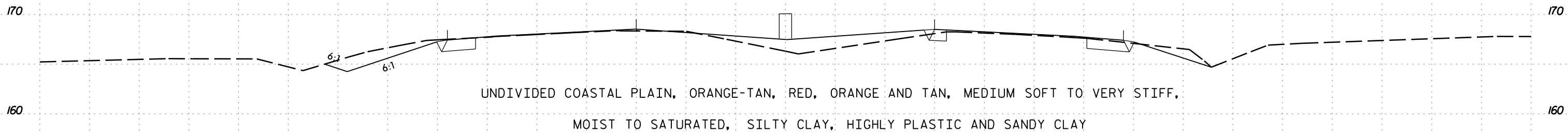


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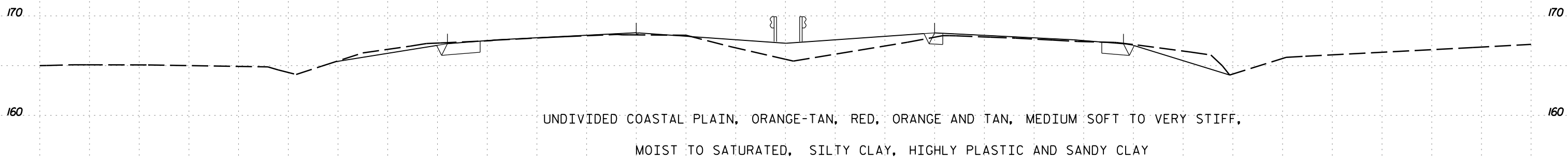


PROJECT REFERENCE NO.	SHEET NO.
U-5796	41

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199 + 50

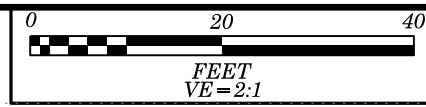


199 + 00

-L-

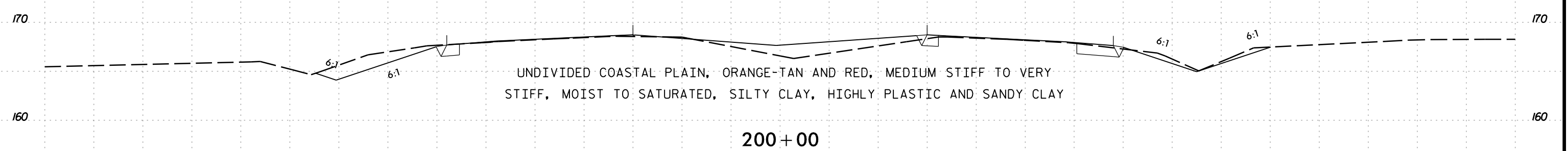
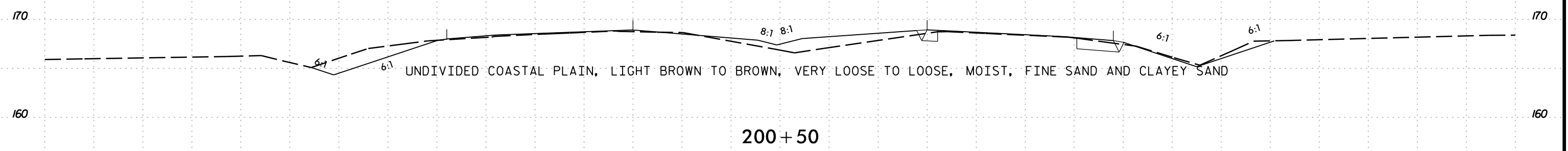
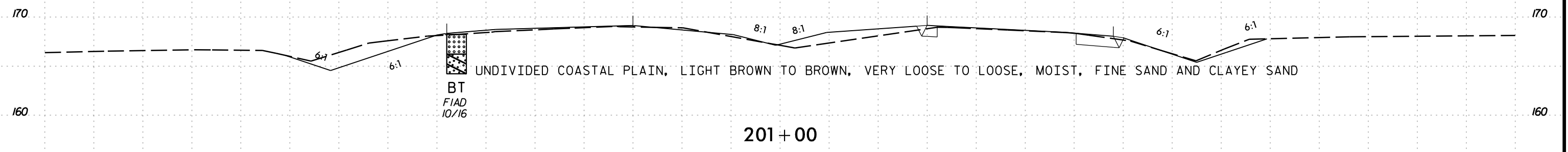
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PROJECT REFERENCE NO.	SHEET NO.
U-5796	42

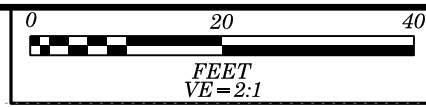
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150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

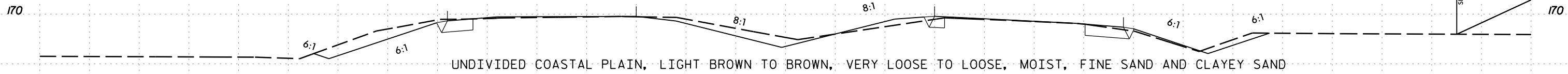
-L-

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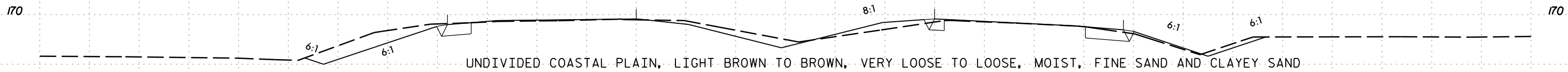
PROJECT REFERENCE NO.	SHEET NO.
U-5796	43

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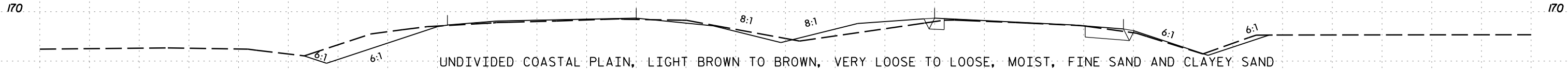
UNDIVIDED COASTAL PLAIN, LIGHT BROWN TO BROWN, VERY LOOSE TO LOOSE, MOIST, FINE SAND AND CLAYEY SAND

202 + 50



UNDIVIDED COASTAL PLAIN, LIGHT BROWN TO BROWN, VERY LOOSE TO LOOSE, MOIST, FINE SAND AND CLAYEY SAND

202 + 00



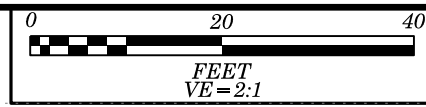
UNDIVIDED COASTAL PLAIN, LIGHT BROWN TO BROWN, VERY LOOSE TO LOOSE, MOIST, FINE SAND AND CLAYEY SAND

201 + 50

-L-

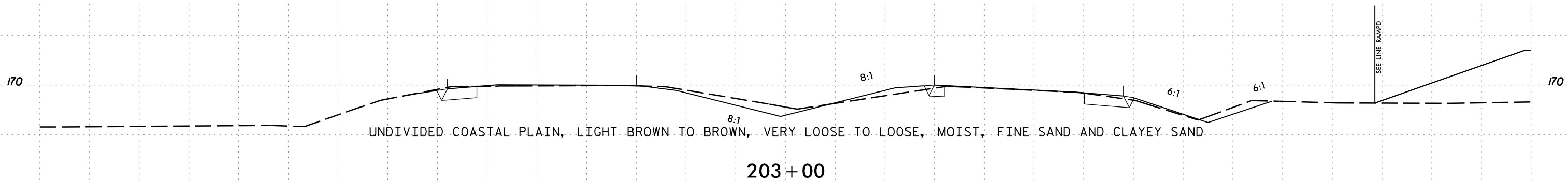
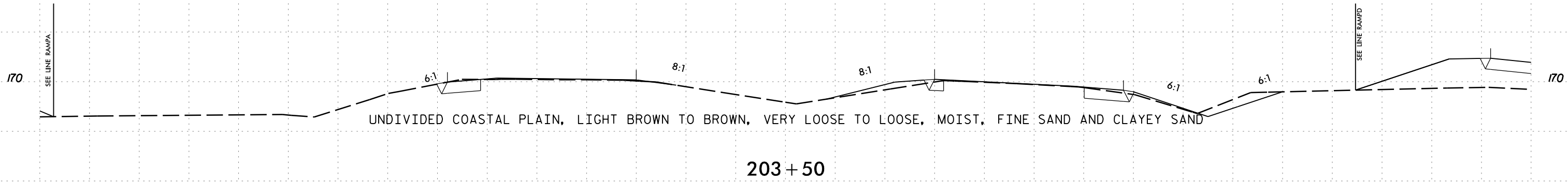
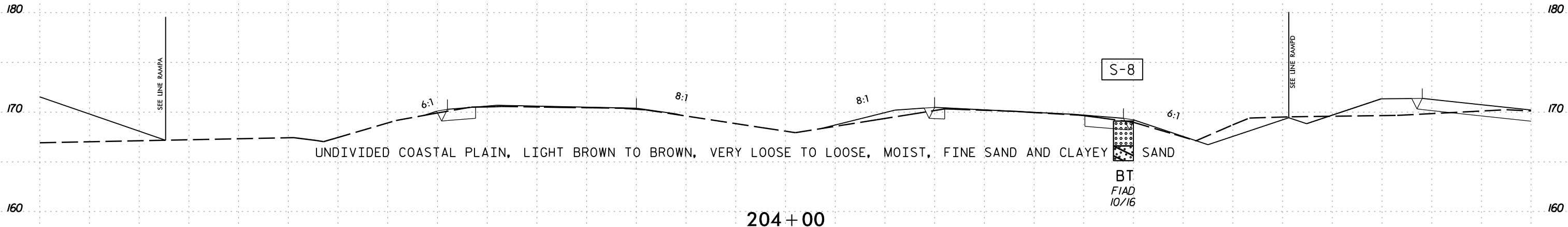
150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

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PROJECT REFERENCE NO.	SHEET NO.
U-5796	44

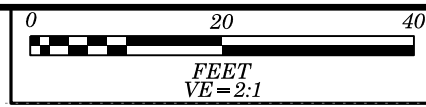
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150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

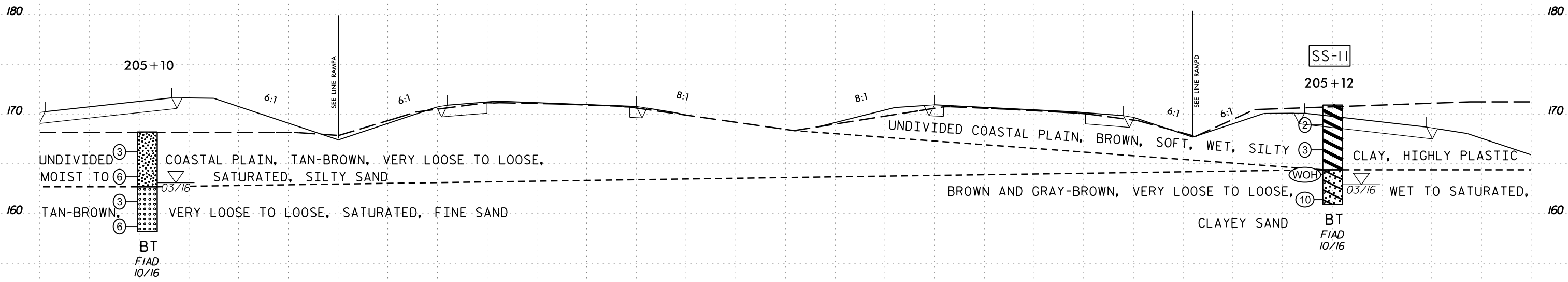
-L-

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

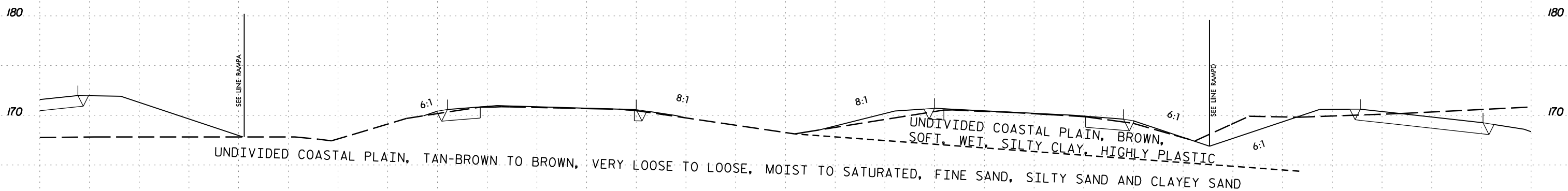


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205+00

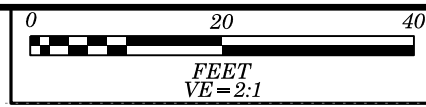


204+50

-L-

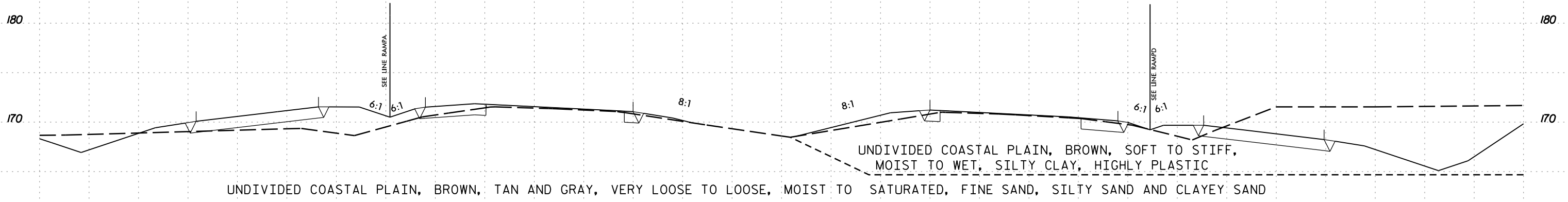
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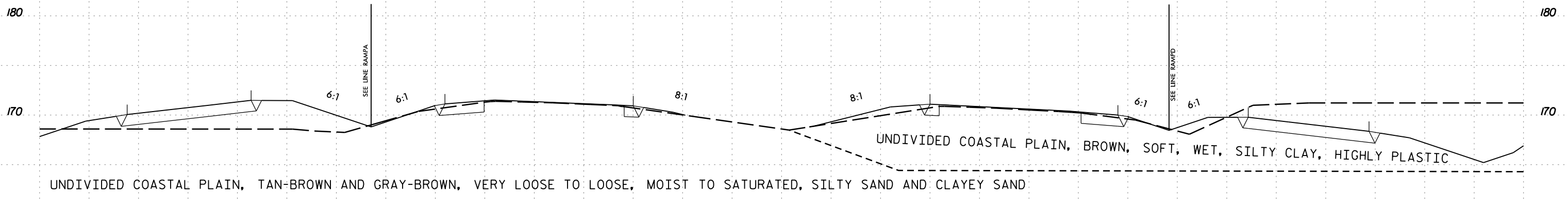


PROJECT REFERENCE NO.	SHEET NO.
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206+00

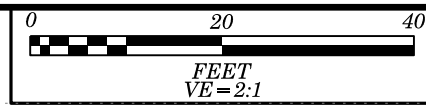


205+50

-L-

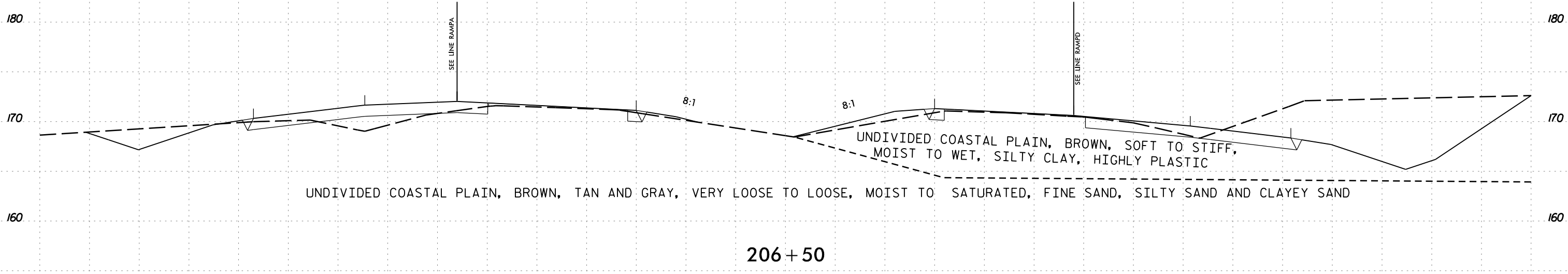
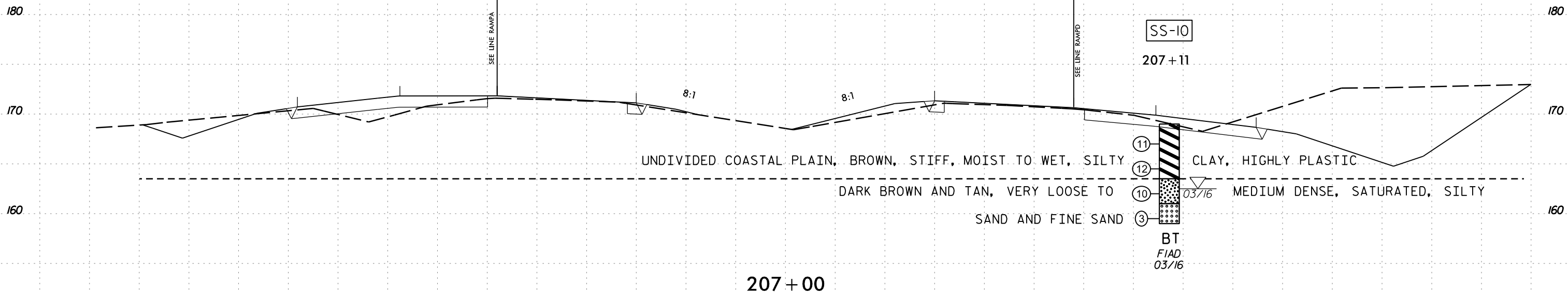
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150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70



PROJECT REFERENCE NO.	SHEET NO.
U-5796	47

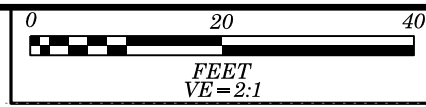
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150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

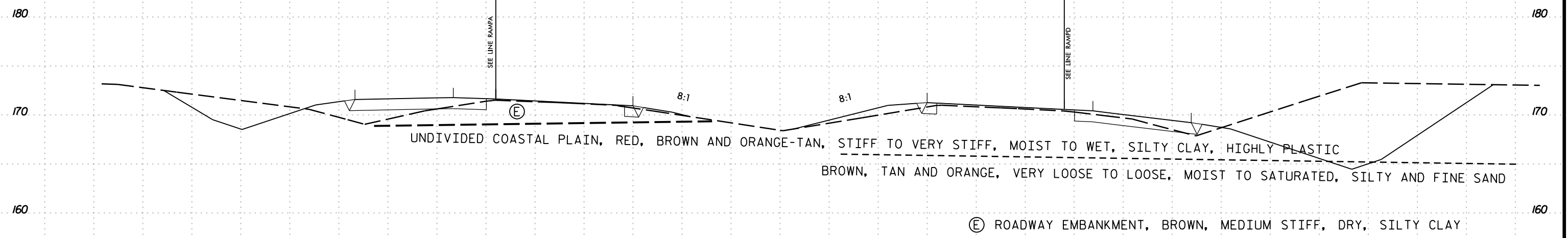
-L-

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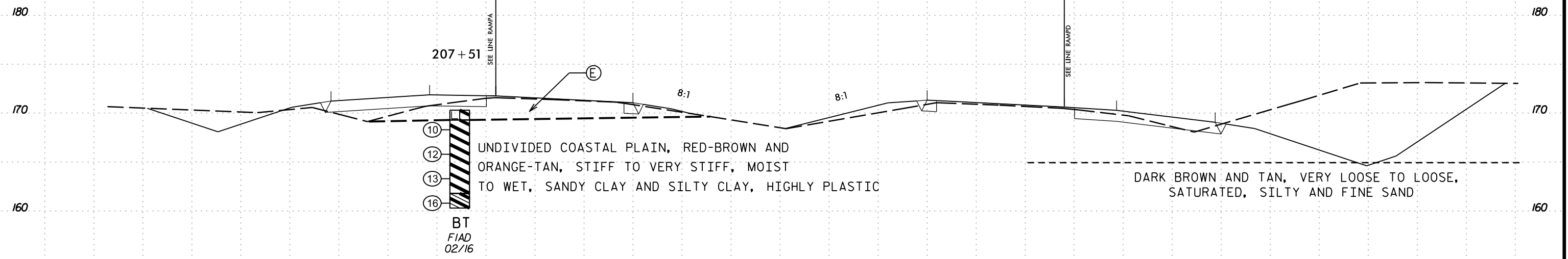


PROJECT REFERENCE NO.	SHEET NO.
U-5796	48

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208+00

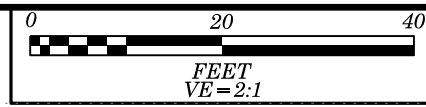


207+50

-L-

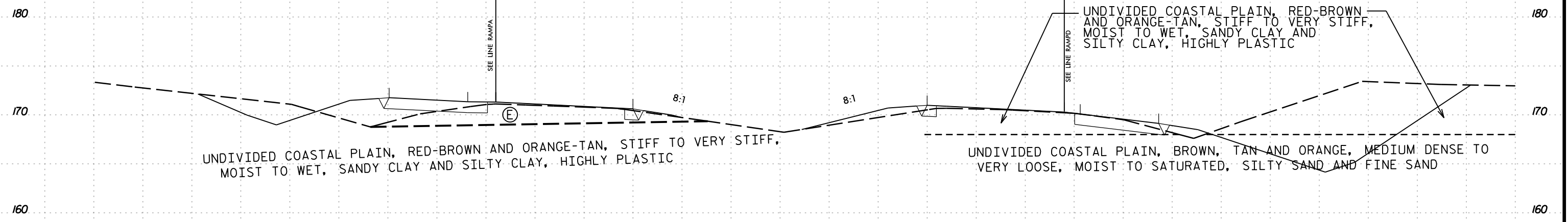
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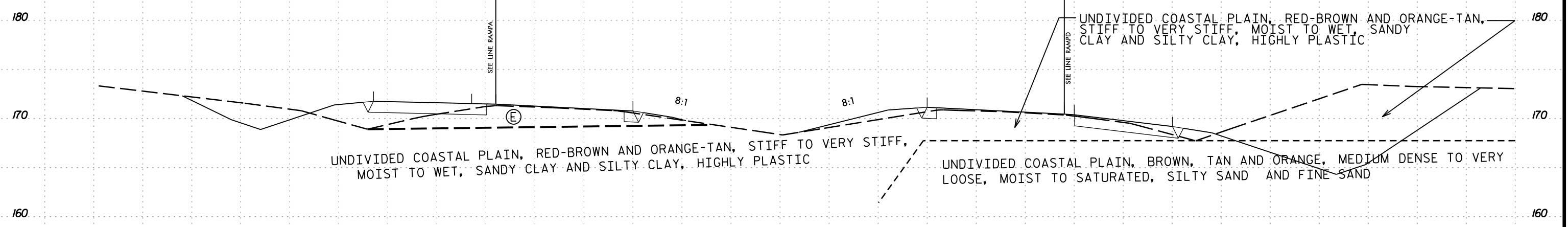


PROJECT REFERENCE NO.	SHEET NO.
U-5796	49

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209+00

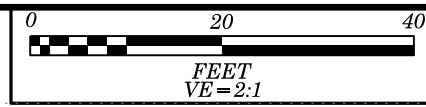


208+50

-L-

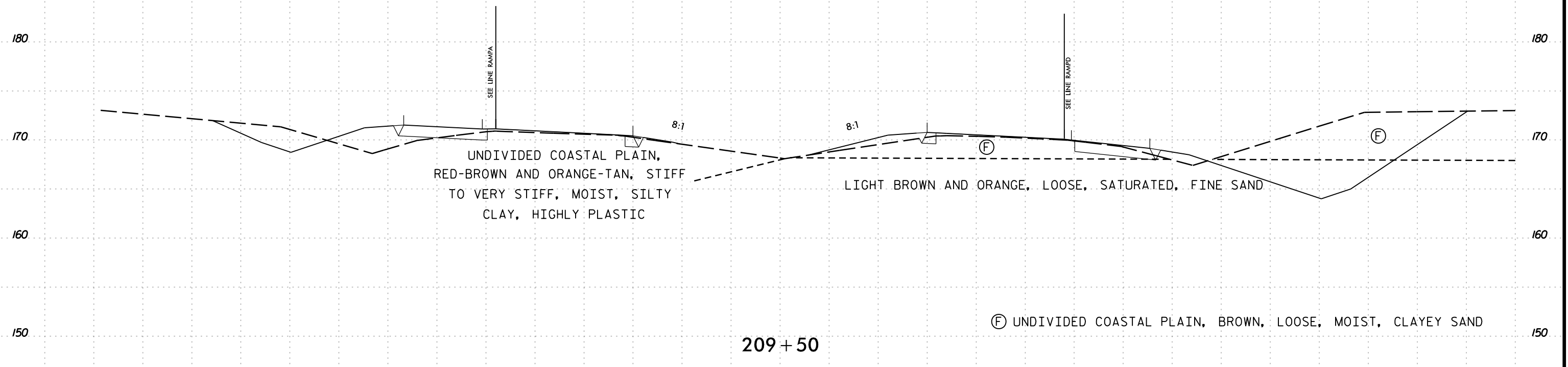
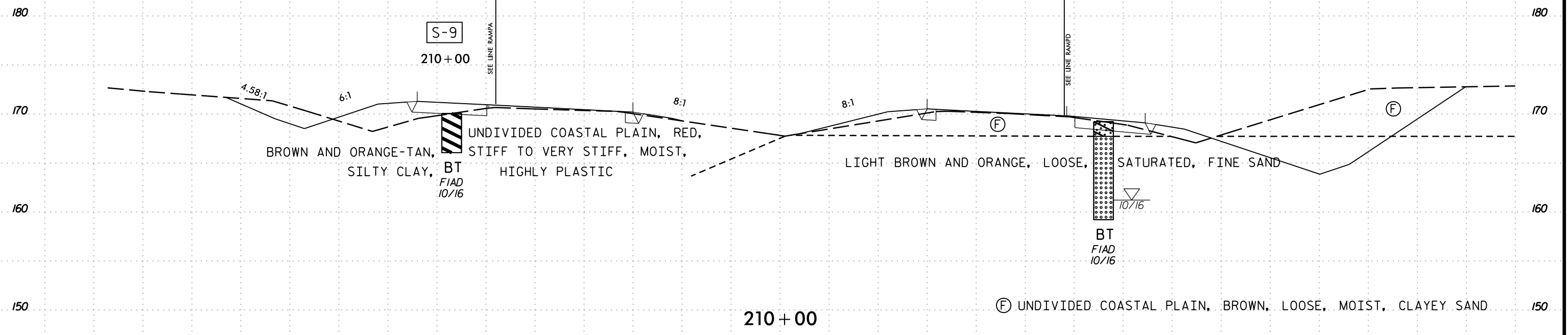
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PROJECT REFERENCE NO.	SHEET NO.
U-5796	50

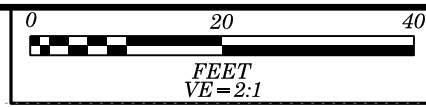
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150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

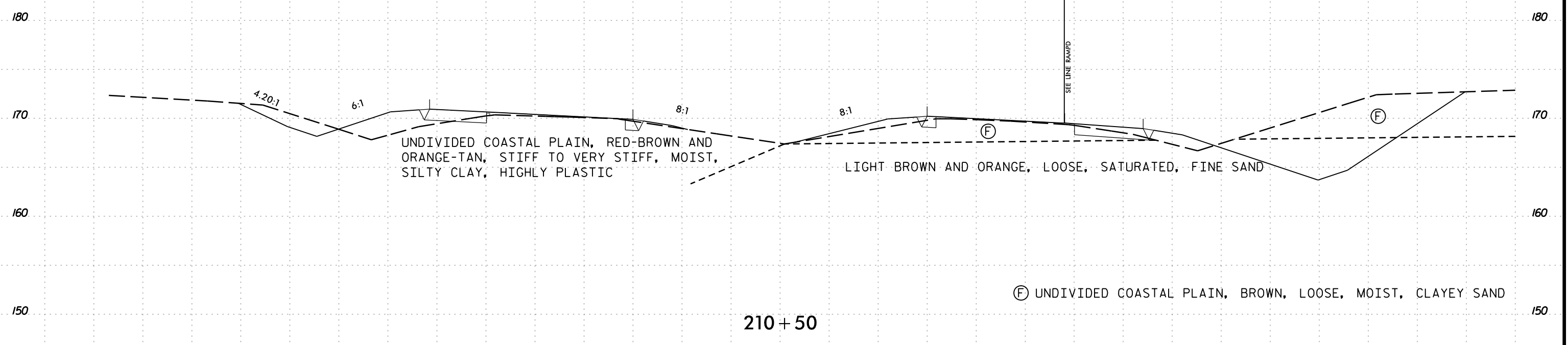
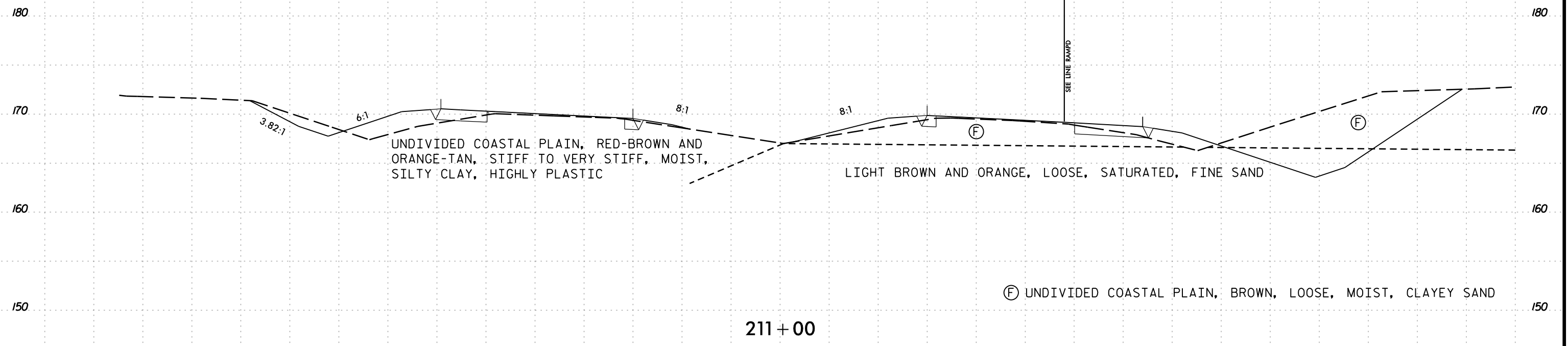
-L-

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U-5796	51

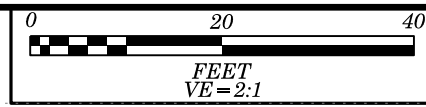
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150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

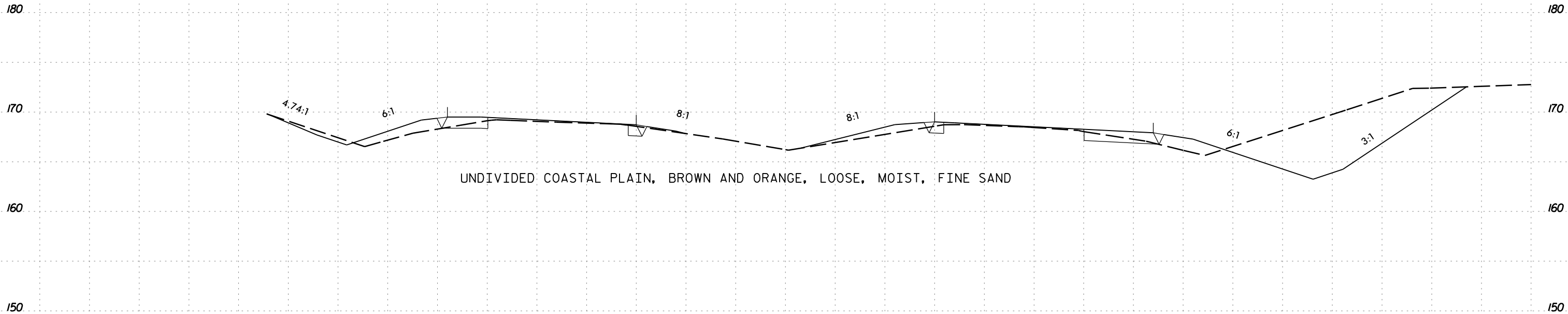
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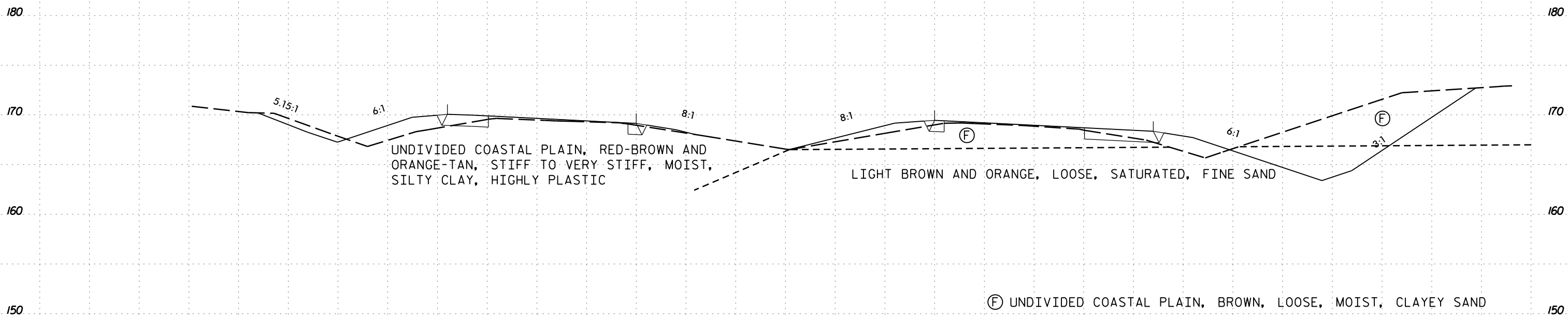


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U-5796	52

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212 + 00



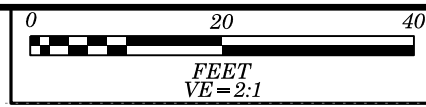
211 + 50

ⓕ UNDIVIDED COASTAL PLAIN, BROWN, LOOSE, MOIST, CLAYEY SAND

-L-

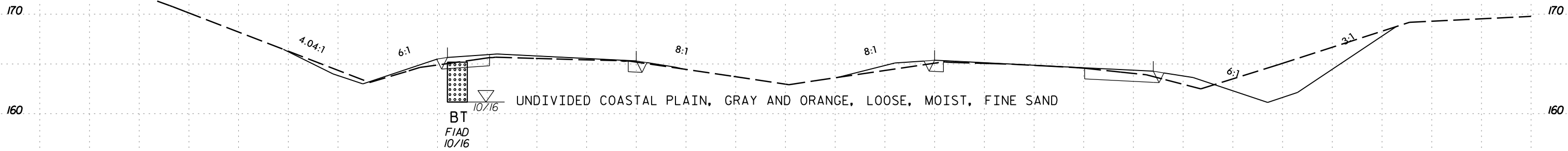
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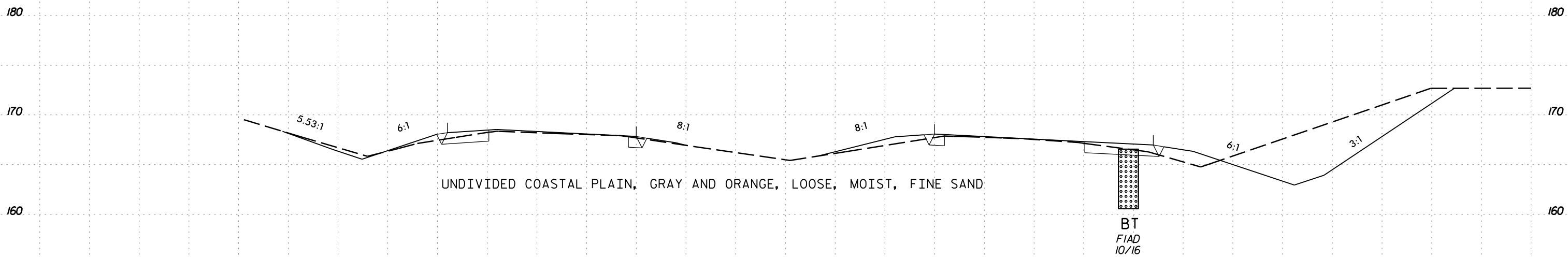


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216+00

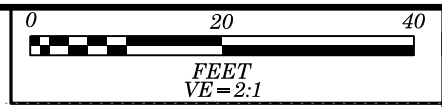


213+00

-L-

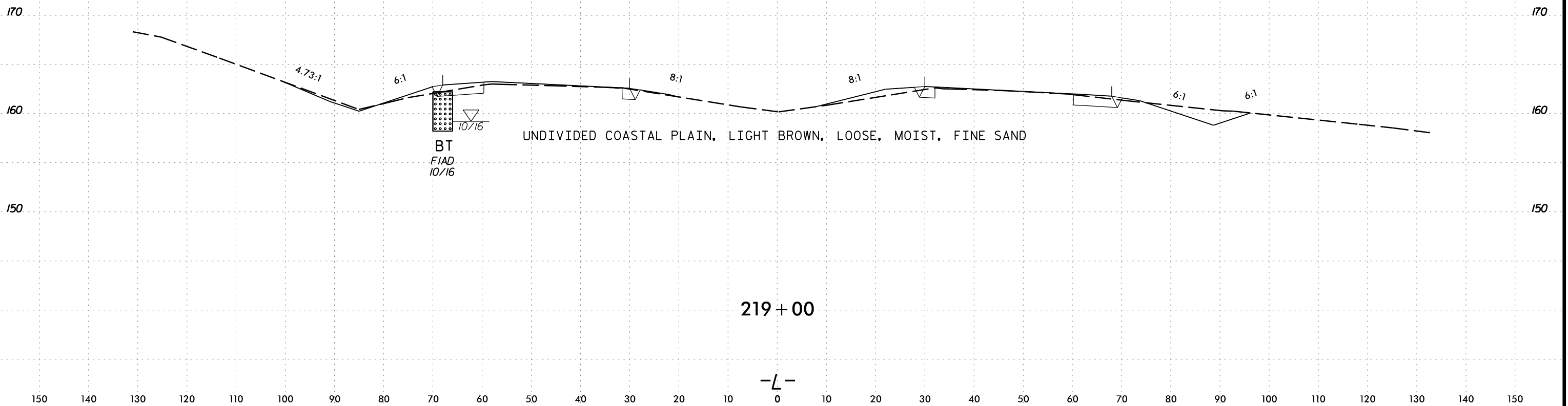
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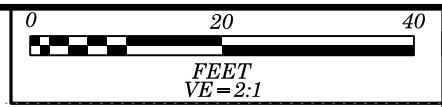


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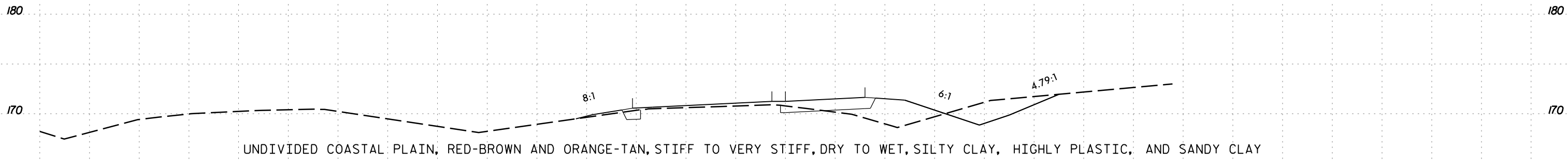


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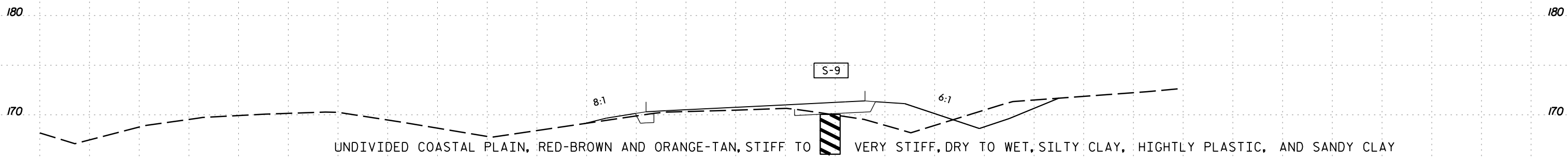


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0+50

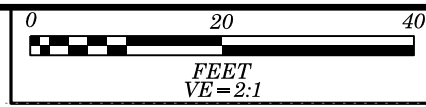


0+00

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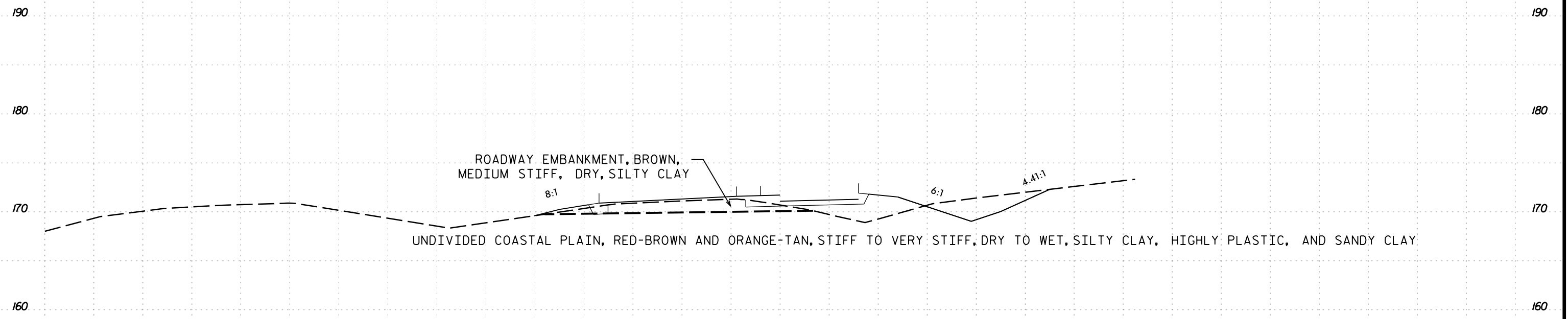
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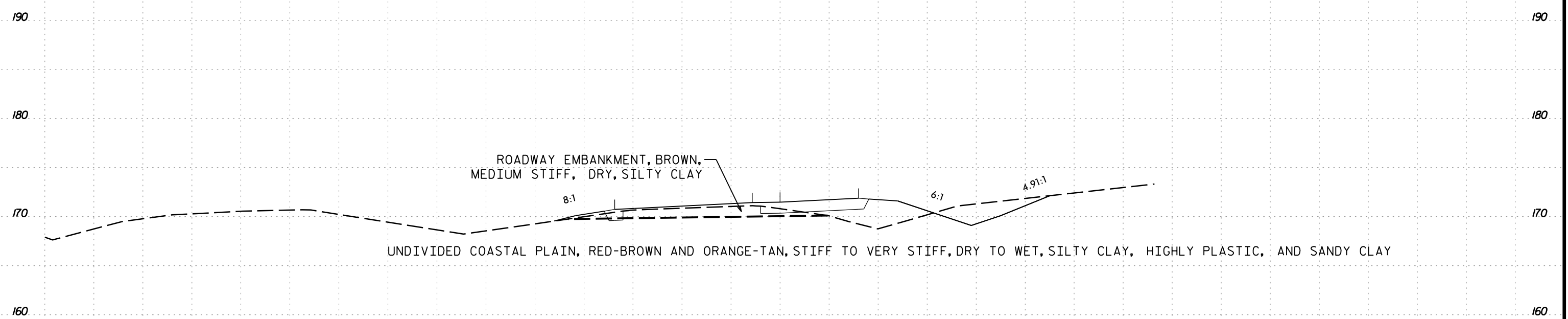


PROJECT REFERENCE NO.	SHEET NO.
U-5796	56

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 Consulting Engineers & Scientists
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1+50

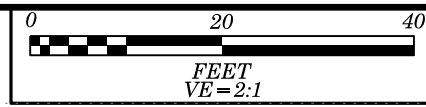


1+00

-RAMP A-

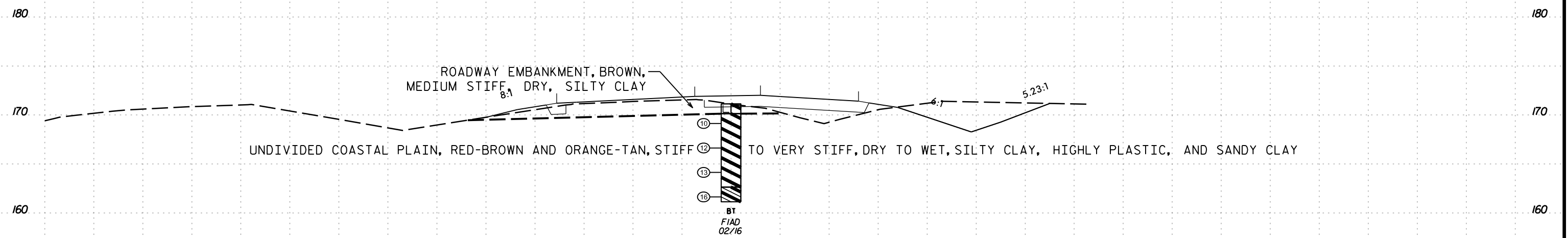
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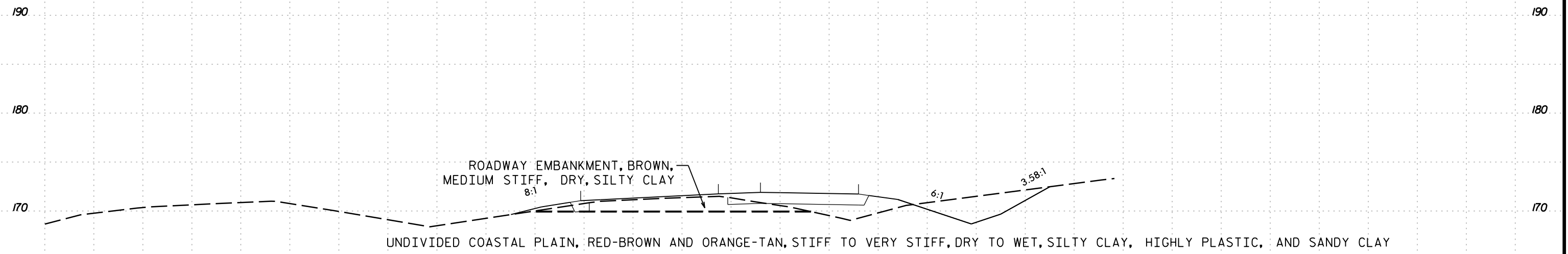


PROJECT REFERENCE NO.	SHEET NO.
U-5796	57

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2 + 50

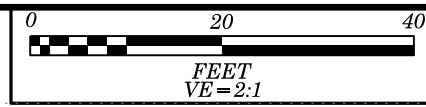


2 + 00

-RAMP A-

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



PROJECT REFERENCE NO.	SHEET NO.
U-5796	58

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190 190

180 180

170 170

UNDIVIDED COASTAL PLAIN, TAN-BROWN, VERY LOOSE TO LOOSE, MOIST TO SATURATED, SILTY SAND AND FINE SAND

160 160

3 + 50

190 190

180 180

170 170

ROADWAY EMBANKMENT, BROWN, MEDIUM STIFF, DRY, SILTY CLAY

UNDIVIDED COASTAL PLAIN, RED-BROWN AND ORANGE-TAN, STIFF TO VERY STIFF, DRY TO WET, SILTY CLAY, HIGHLY PLASTIC, AND SANDY CLAY

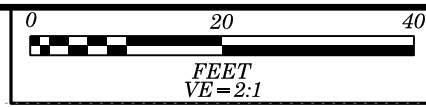
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3 + 00

-RAMP A-

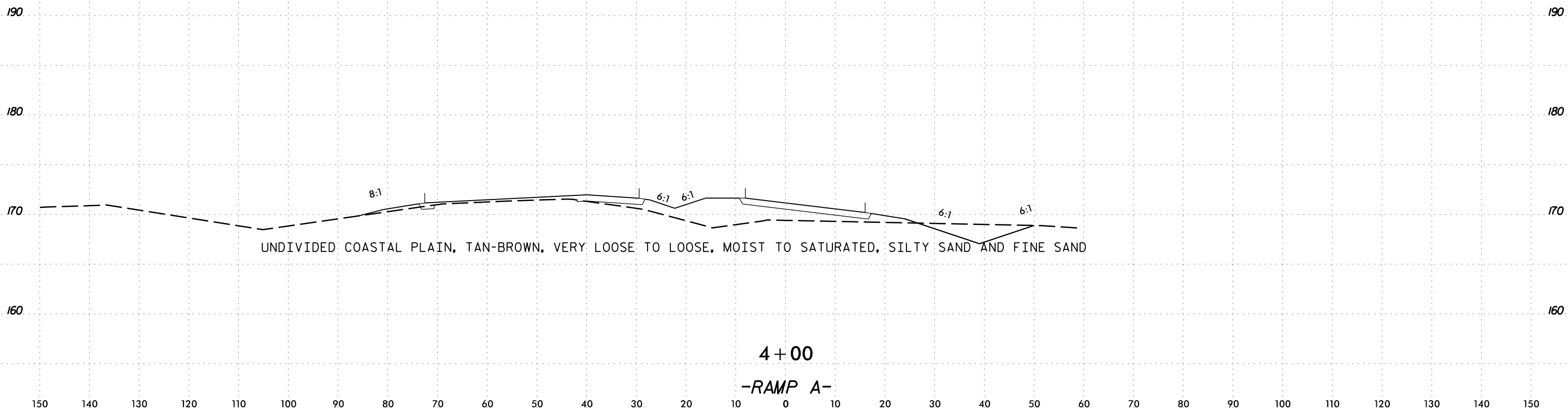
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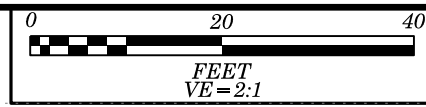


PROJECT REFERENCE NO.	SHEET NO.
U-5796	59

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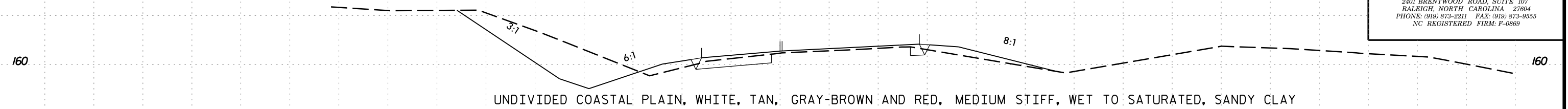


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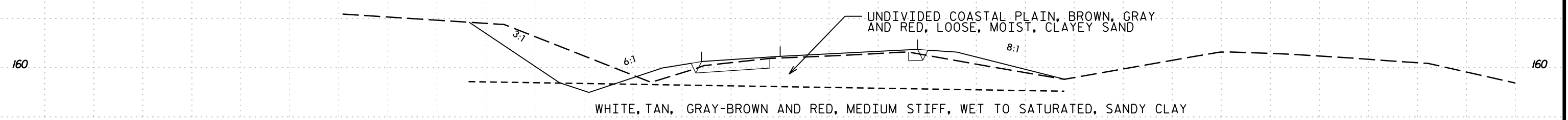


PROJECT REFERENCE NO.	SHEET NO.
U-5796	60

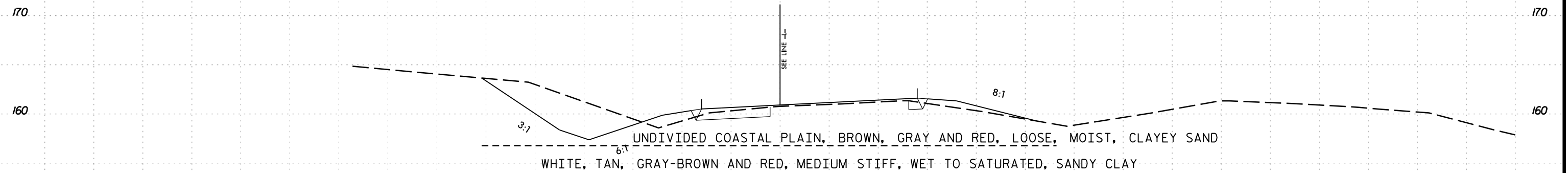
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1+00



0+50

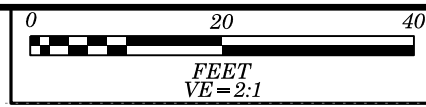


0+00

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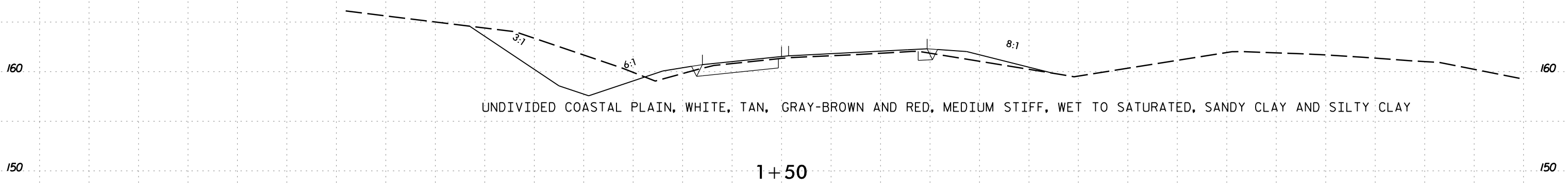
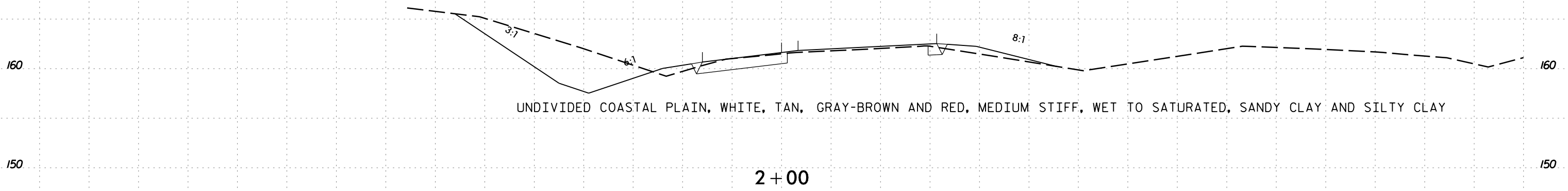
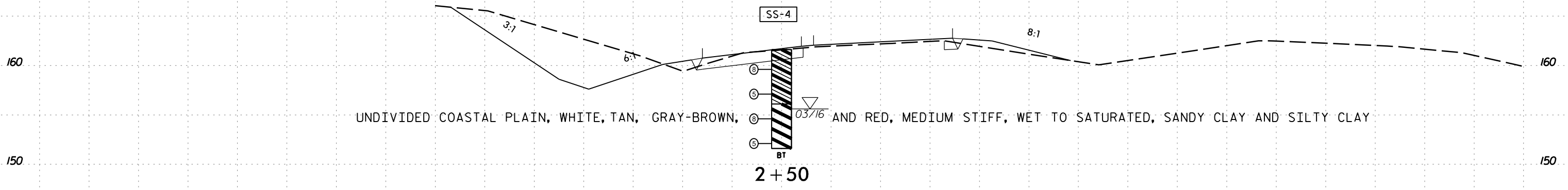
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PROJECT REFERENCE NO.	SHEET NO.
U-5796	61

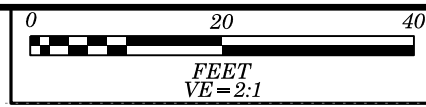
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-RAMP B-

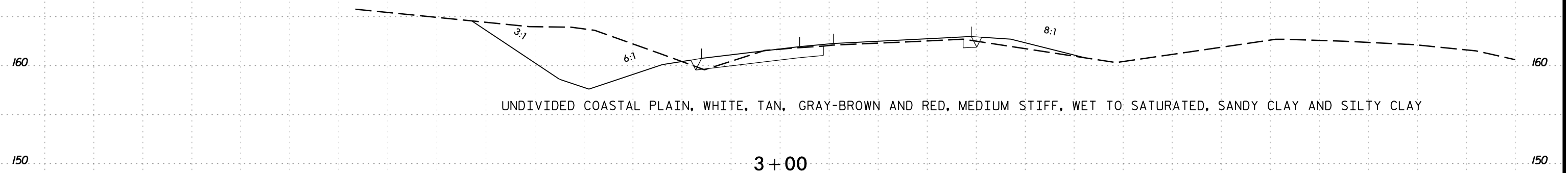
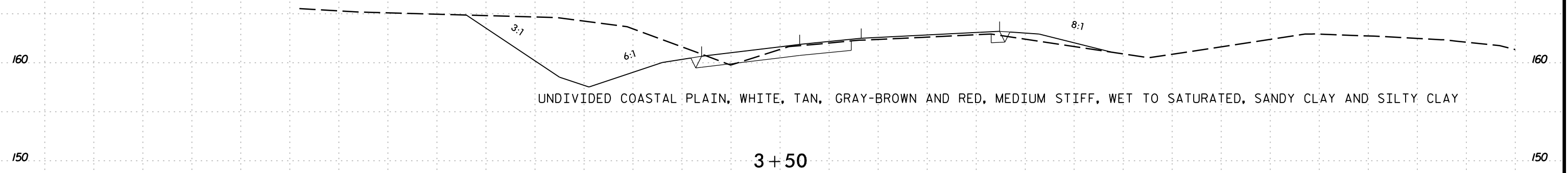
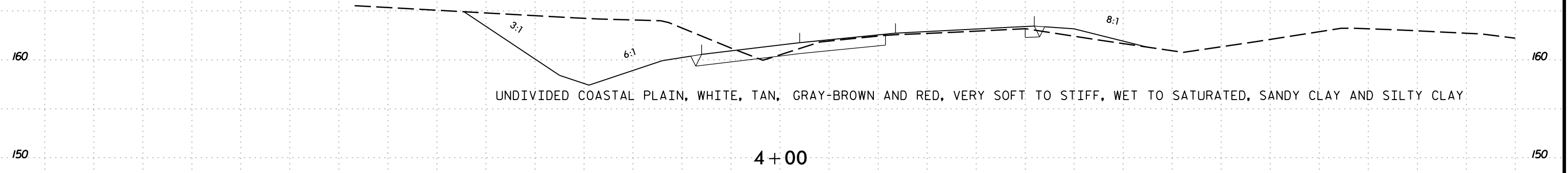
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PROJECT REFERENCE NO.	SHEET NO.
U-5796	62

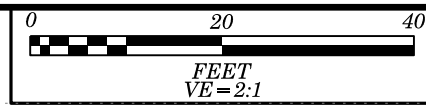
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-RAMP B-

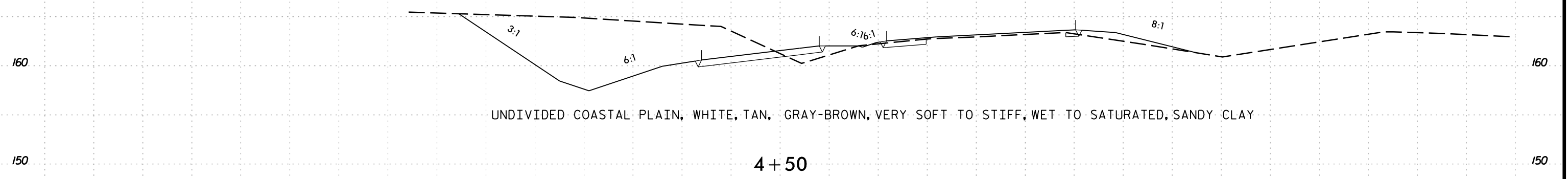
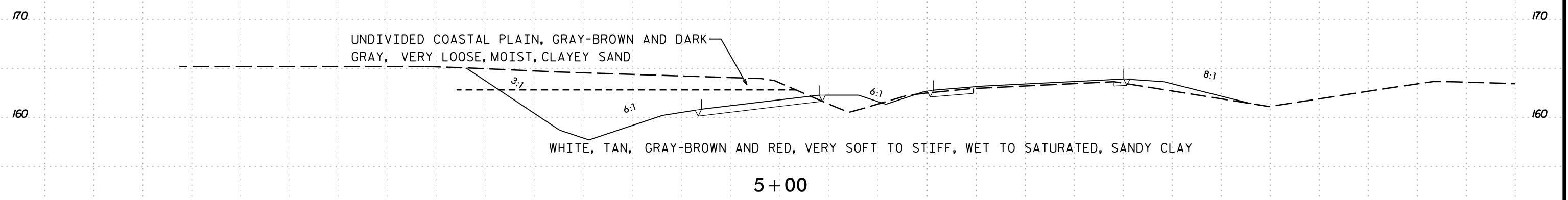
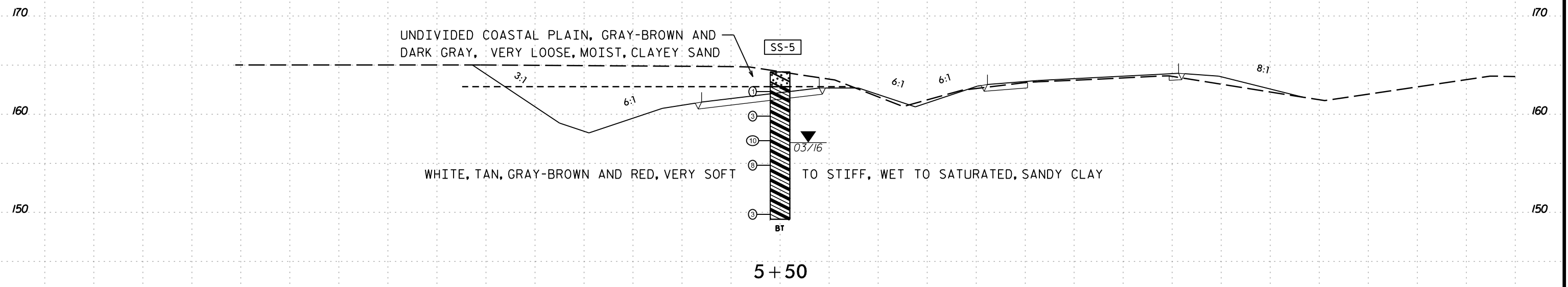
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PROJECT REFERENCE NO. U-5796	SHEET NO. 63
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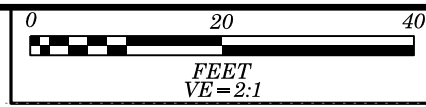
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-RAMP B-

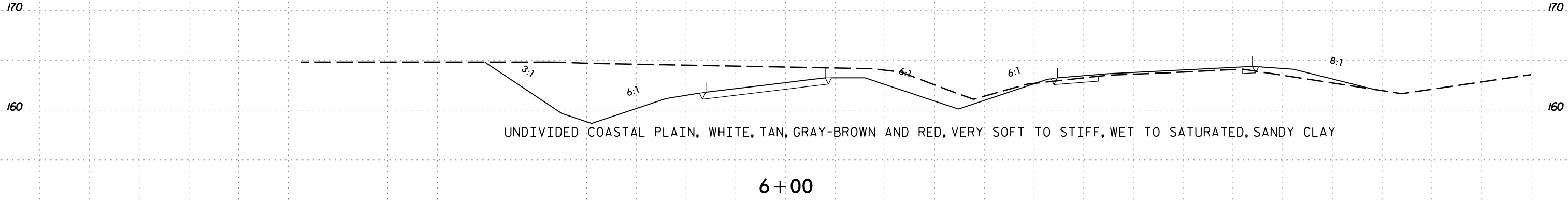
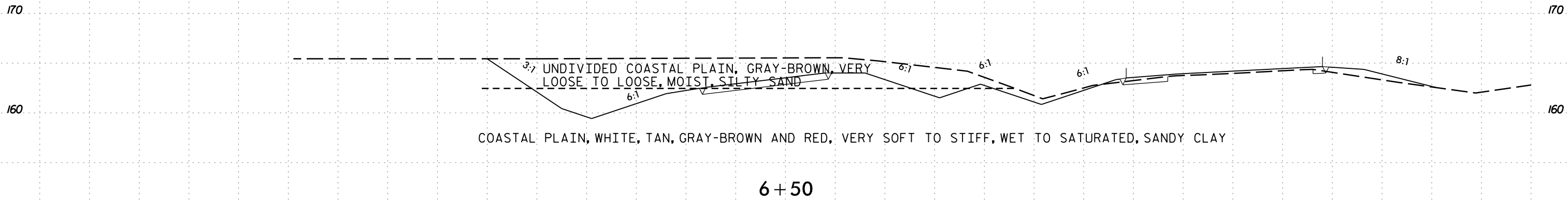
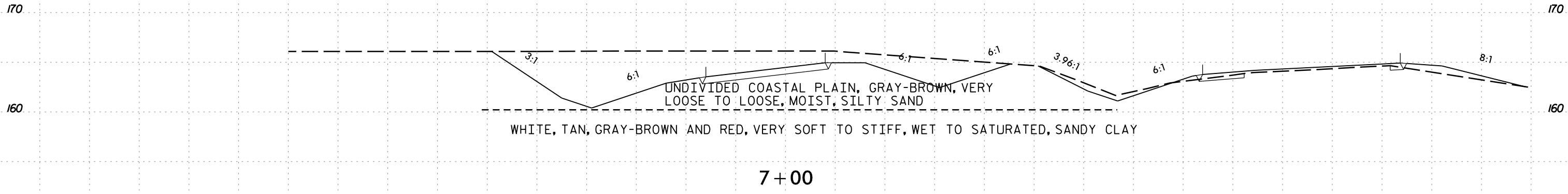
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PROJECT REFERENCE NO.	SHEET NO.
U-5796	64

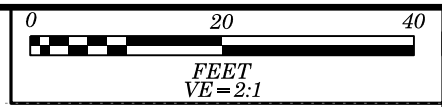
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-RAMP B-

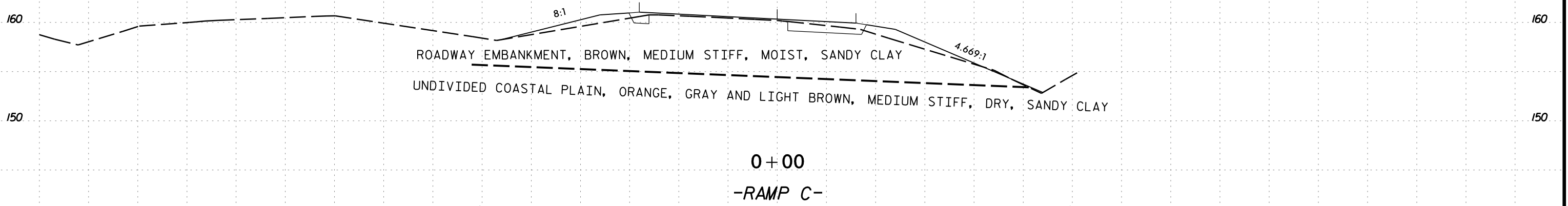
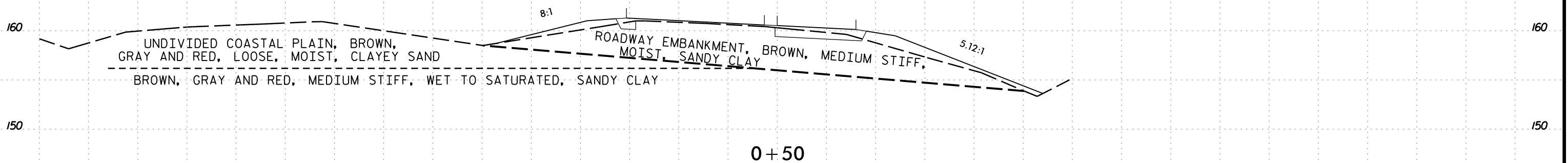
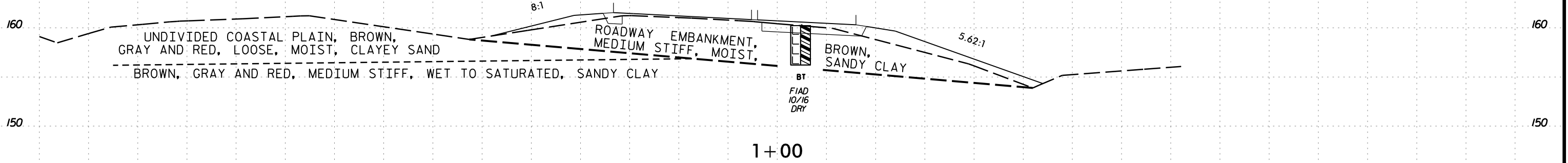
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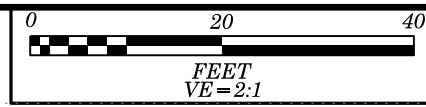
PROJECT REFERENCE NO.	SHEET NO.
U-5796	65

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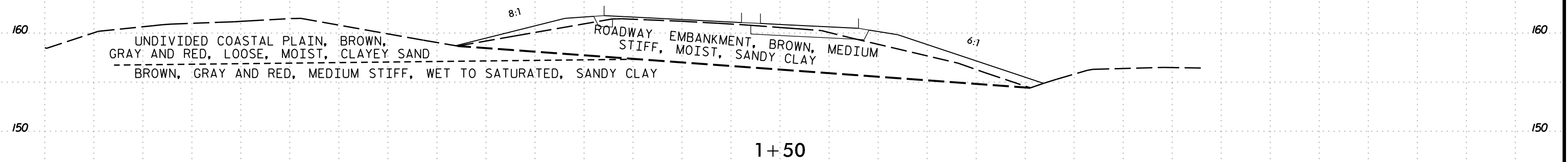
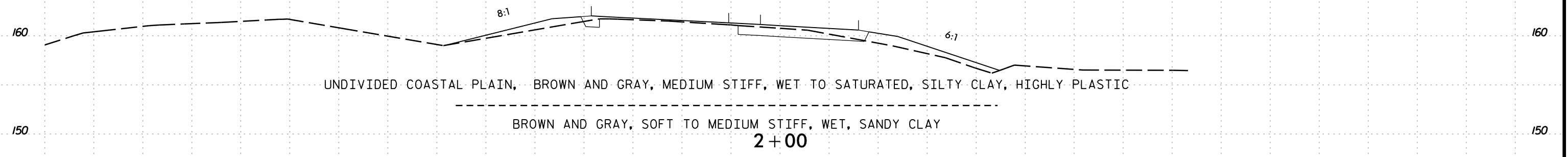
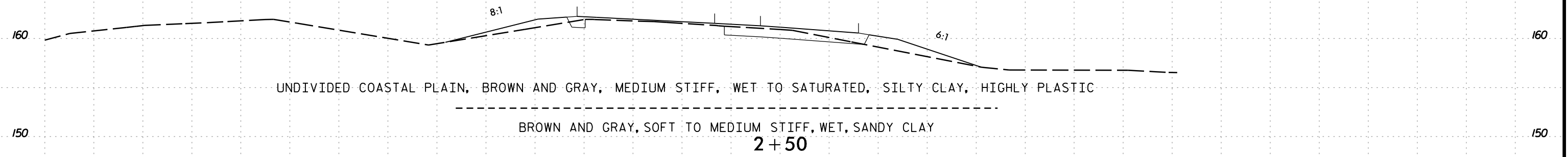
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PROJECT REFERENCE NO.	SHEET NO.
U-5796	66

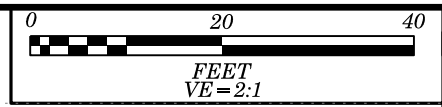
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-RAMP C-

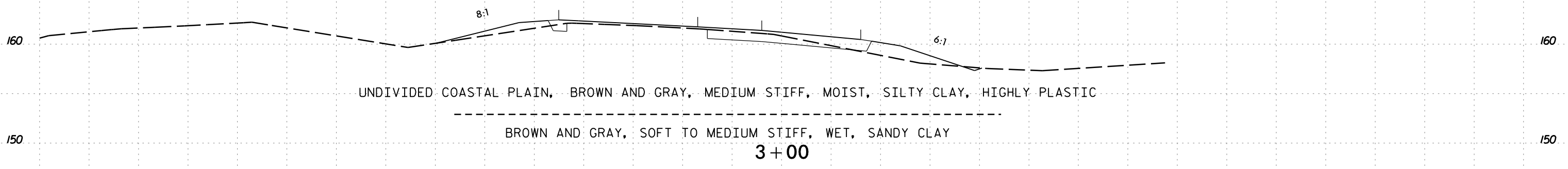
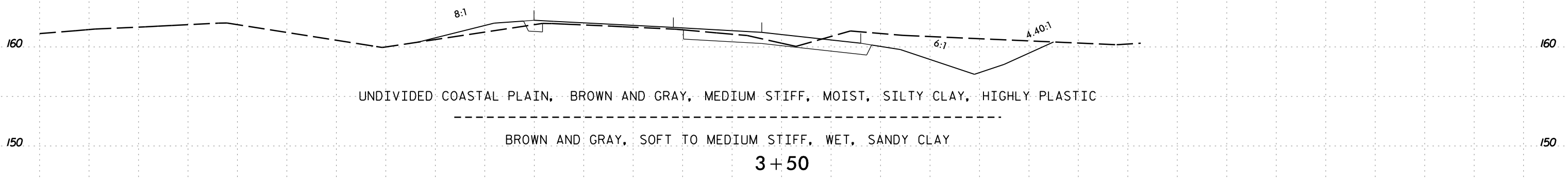
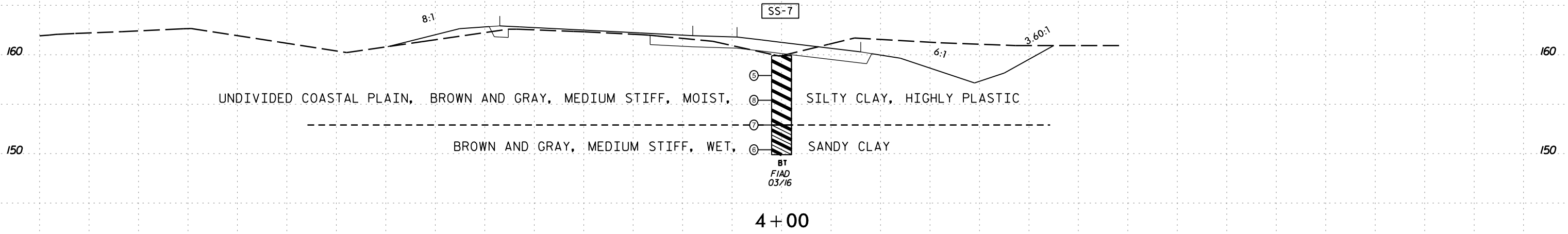
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PROJECT REFERENCE NO.	SHEET NO.
U-5796	67

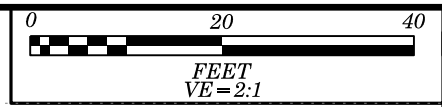
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-RAMP C-

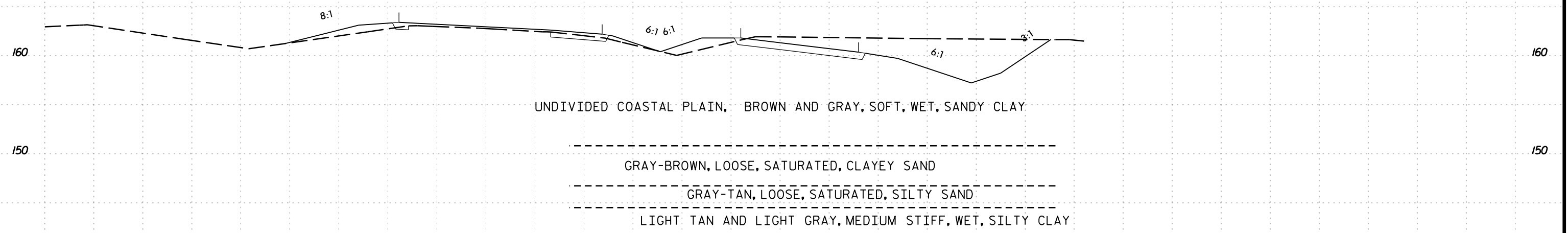
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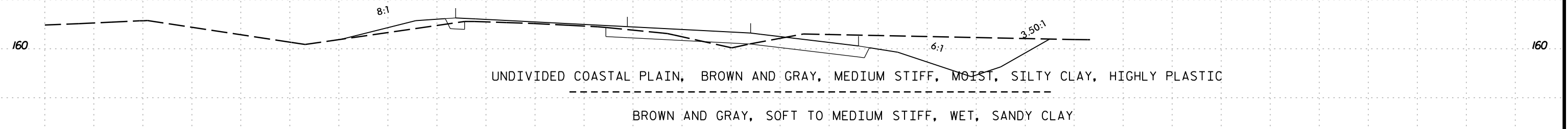


PROJECT REFERENCE NO.	SHEET NO.
U-5796	68

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5 + 00

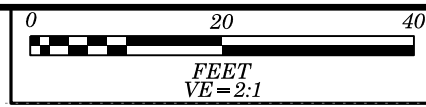


4 + 50

-RAMP C-

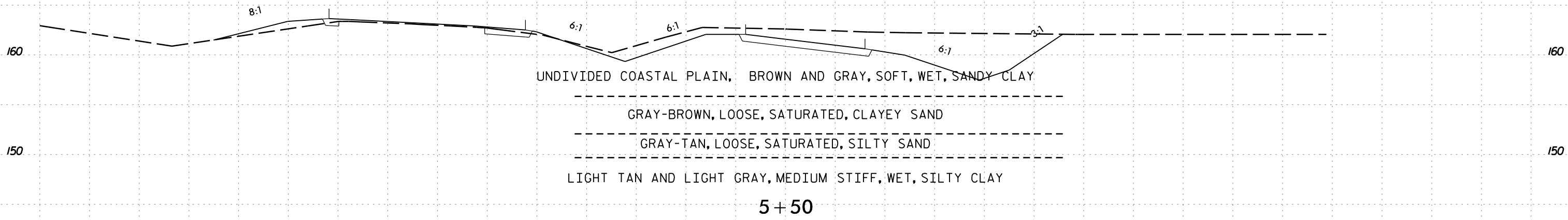
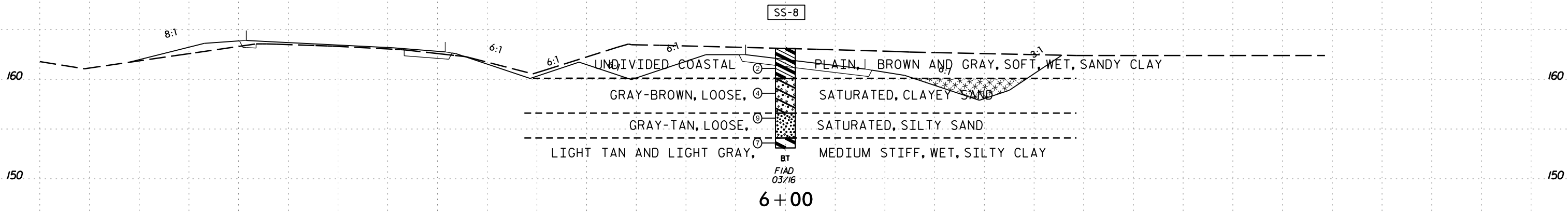
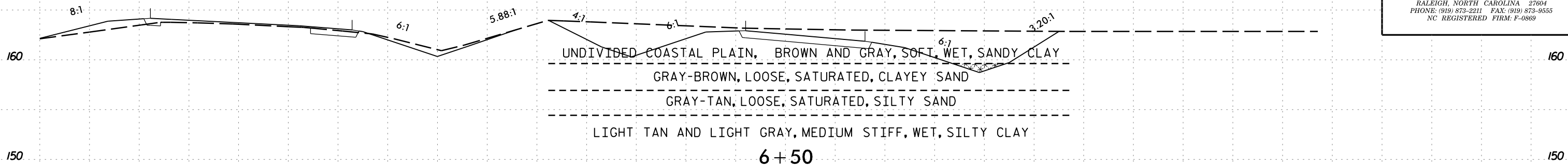
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PROJECT REFERENCE NO.	SHEET NO.
U-5796	69

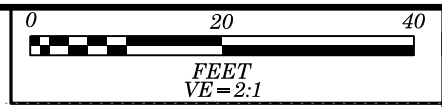
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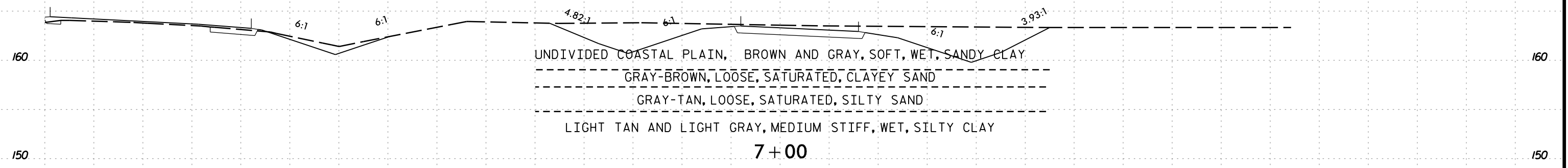
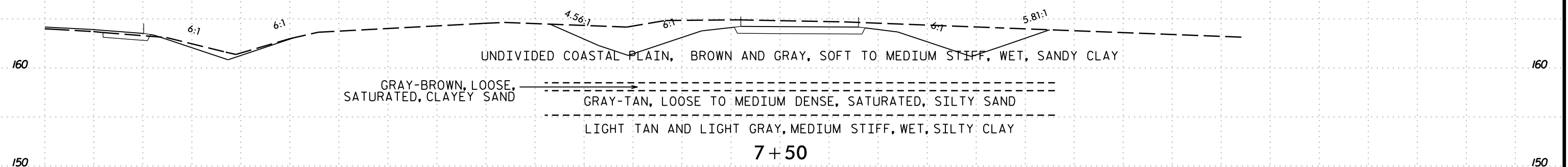
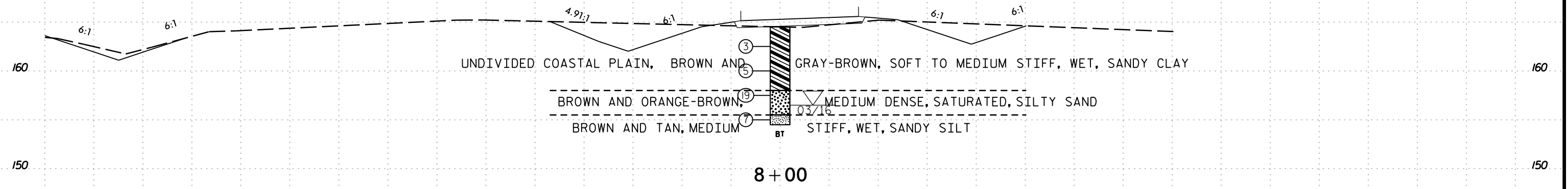
-RAMP C-

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PROJECT REFERENCE NO.	SHEET NO.
U-5796	70

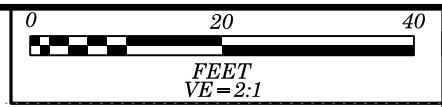
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 NC REGISTERED FIRM: P-0869



-RAMP C-

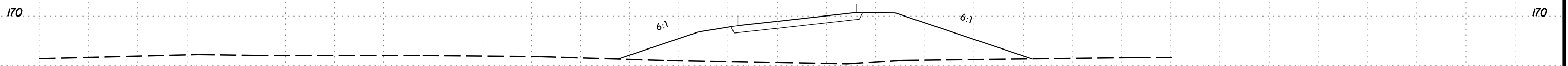
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PROJECT REFERENCE NO. U-5796	SHEET NO. 71
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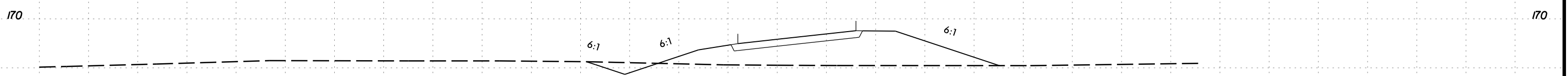


UNDIVIDED COASTAL PLAIN, BROWN AND GRAY-BROWN, SOFT, WET, SANDY CLAY

 BROWN AND ORANGE-BROWN, MEDIUM DENSE, SATURATED, SILTY SAND

 BROWN AND TAN, MEDIUM STIFF, WET, SANDY SILT

9 + 50

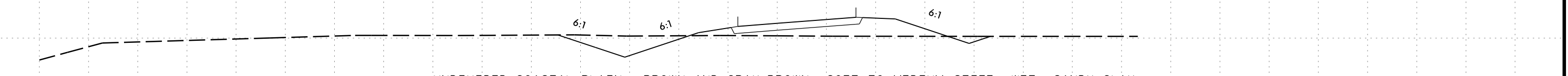


UNDIVIDED COASTAL PLAIN, BROWN AND GRAY-BROWN, SOFT, WET, SANDY CLAY

 BROWN AND ORANGE-BROWN, MEDIUM DENSE, SATURATED, SILTY SAND

 BROWN AND TAN, MEDIUM STIFF, WET, SANDY SILT

9 + 00



UNDIVIDED COASTAL PLAIN, BROWN AND GRAY-BROWN, SOFT TO MEDIUM STIFF, WET, SANDY CLAY

 BROWN AND ORANGE-BROWN, MEDIUM DENSE, SATURATED, SILTY SAND

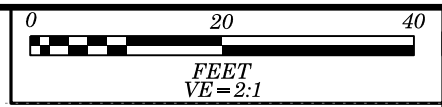
 BROWN AND TAN, MEDIUM STIFF, WET, SANDY SILT

8 + 50

-RAMP C-

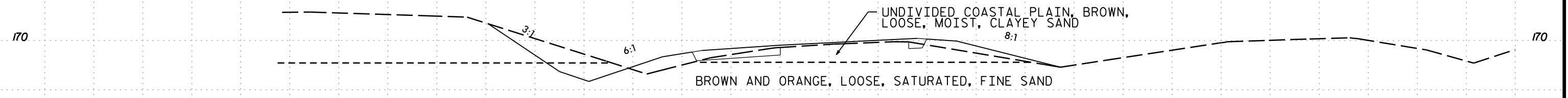
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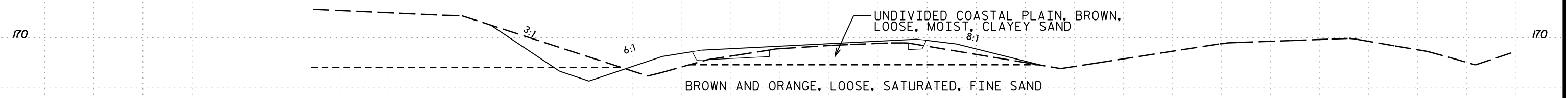


PROJECT REFERENCE NO.	SHEET NO.
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0+50

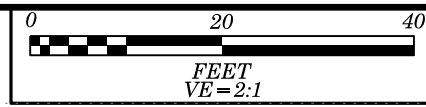


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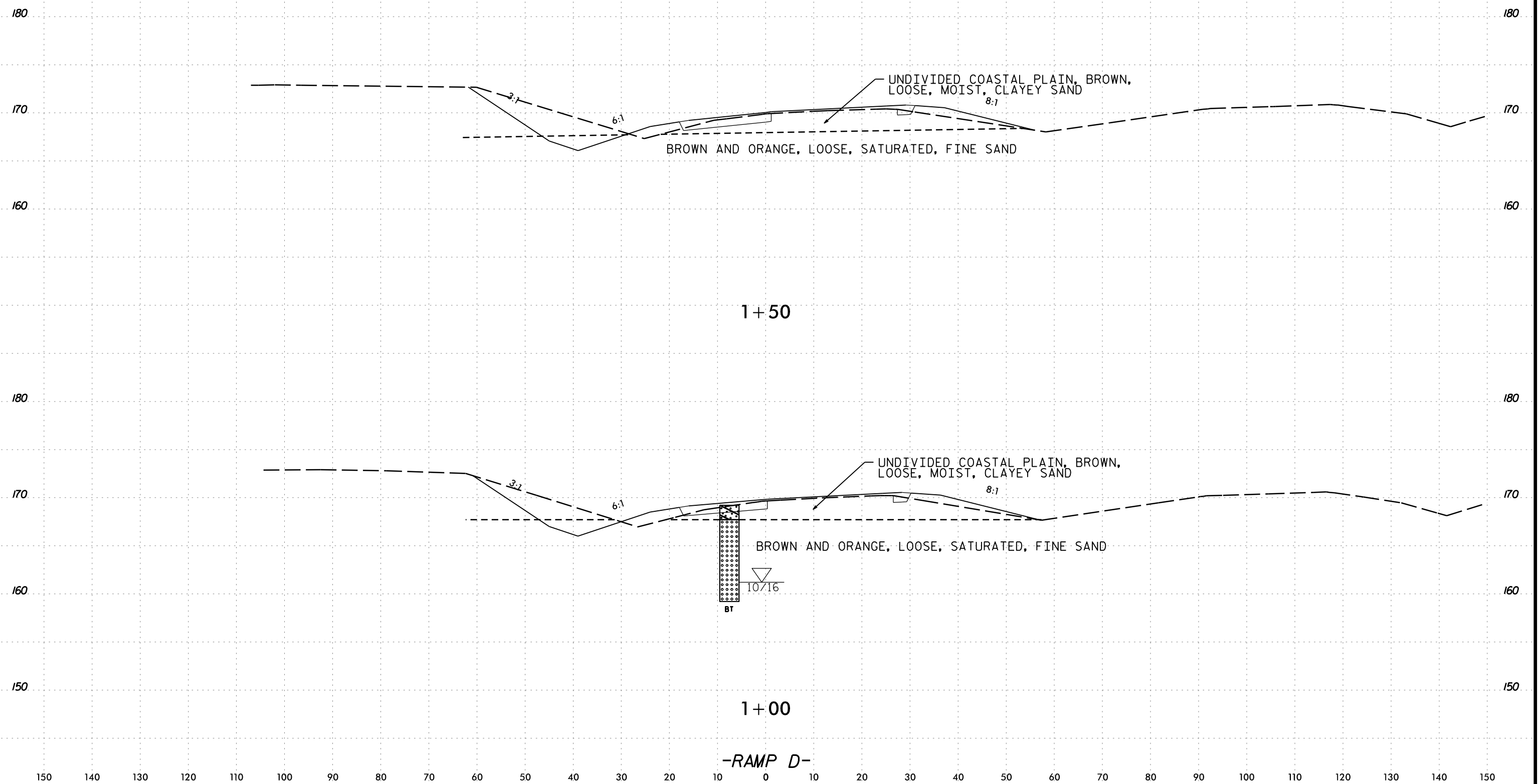
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PROJECT REFERENCE NO.	SHEET NO.
U-5796	73

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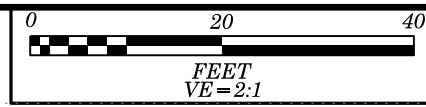
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1+00

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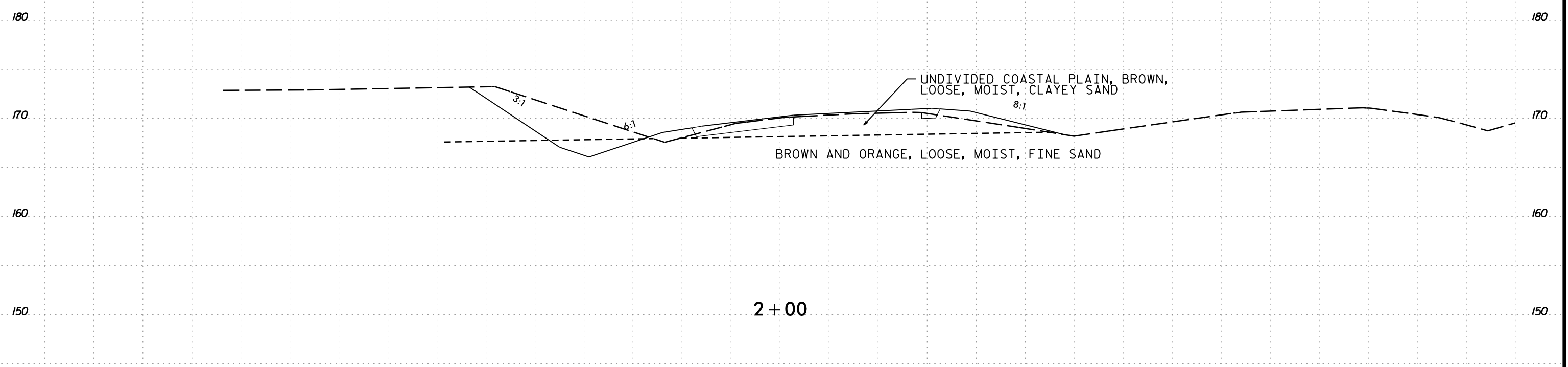
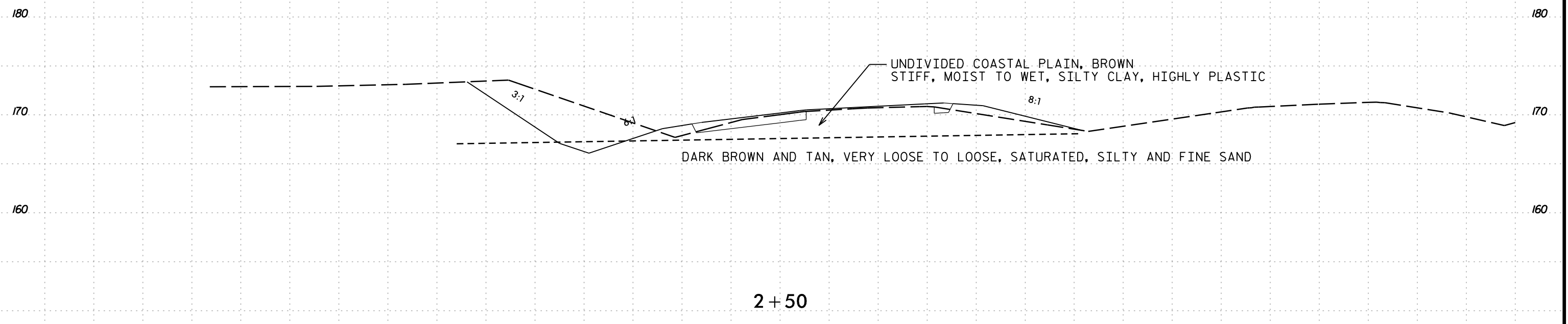
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PROJECT REFERENCE NO.	SHEET NO.
U-5796	74

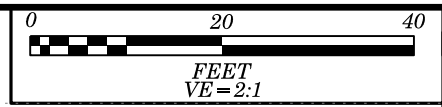
Terracon
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-RAMP D-

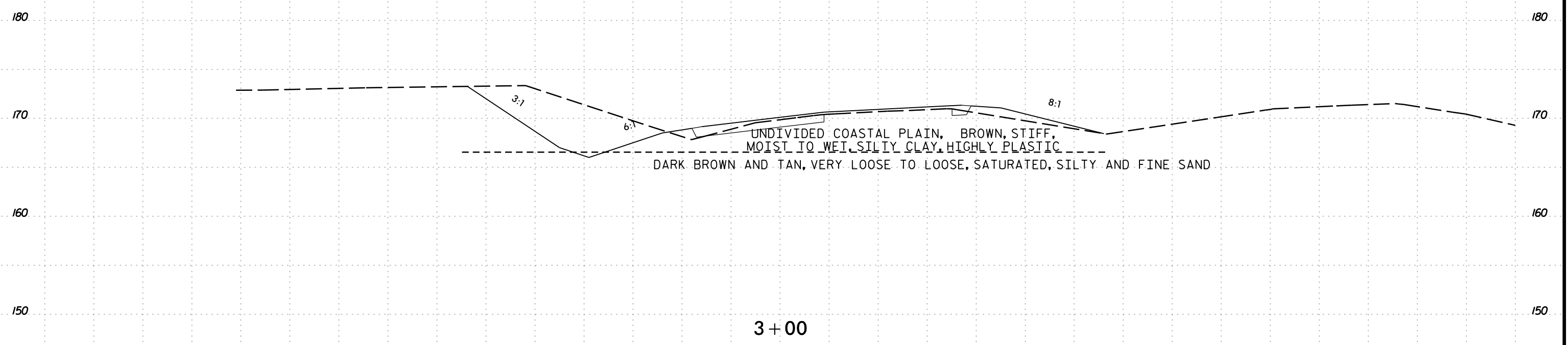
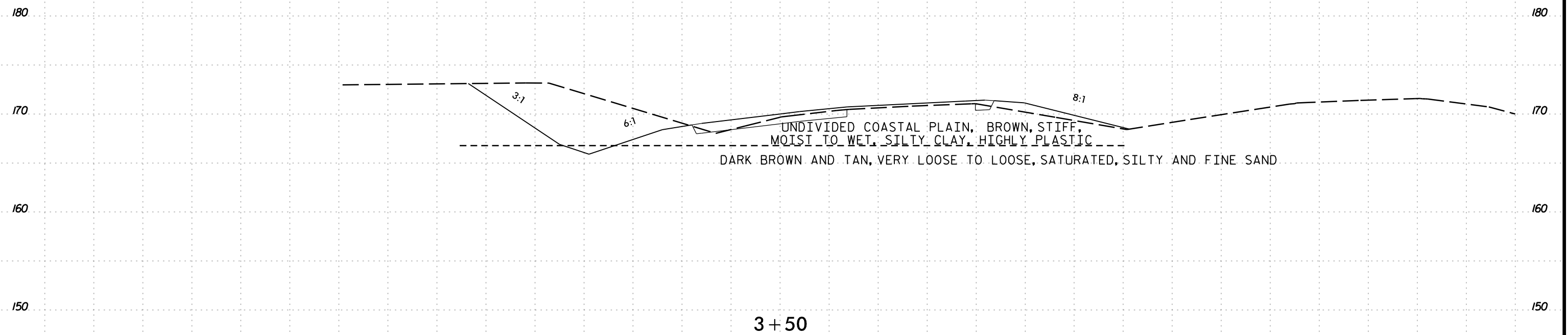
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PROJECT REFERENCE NO.	SHEET NO.
U-5796	75

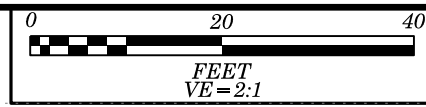
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-RAMP D-

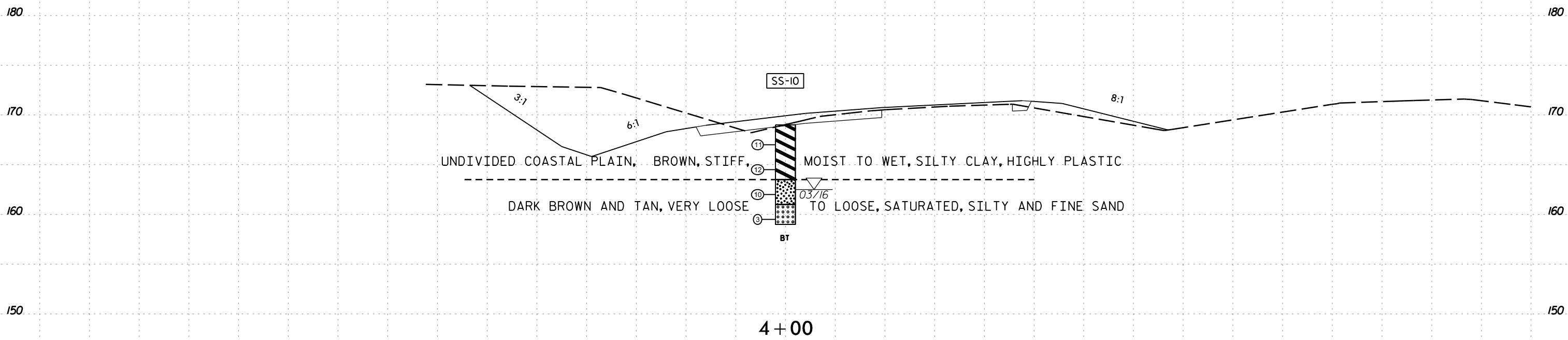
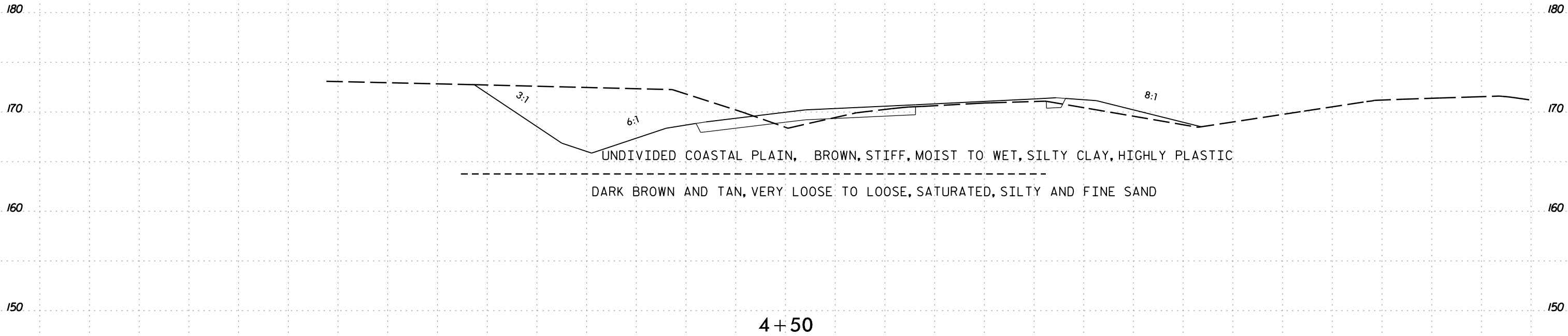
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PROJECT REFERENCE NO.	SHEET NO.
U-5796	76

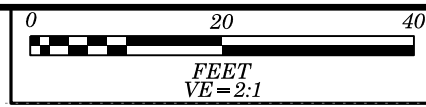
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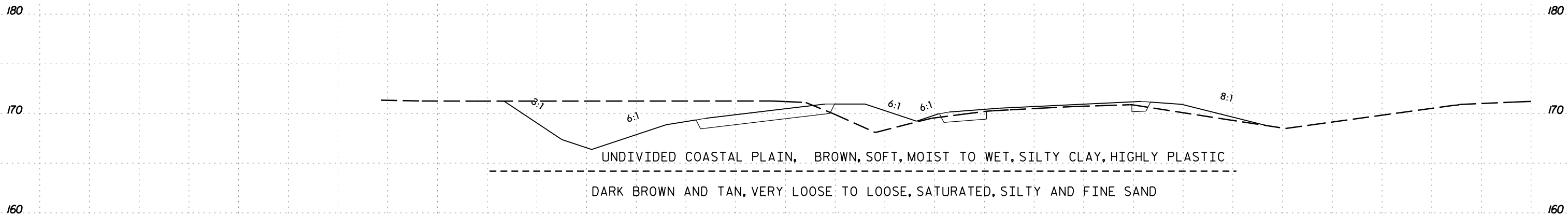
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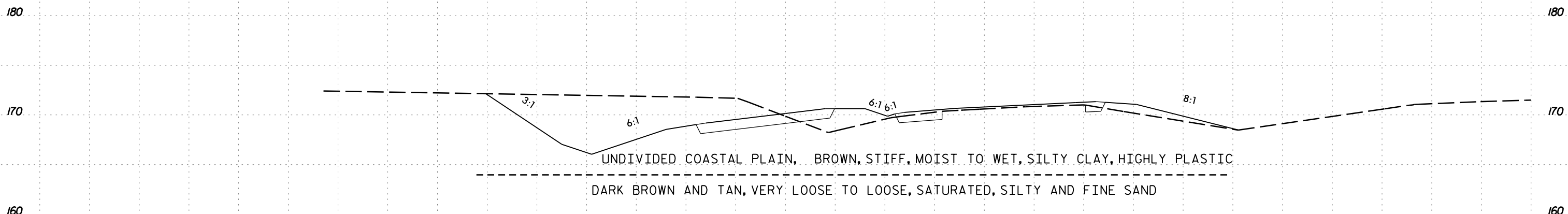


PROJECT REFERENCE NO.	SHEET NO.
U-5796	77

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5 + 50

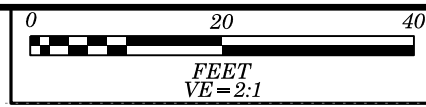


5 + 00

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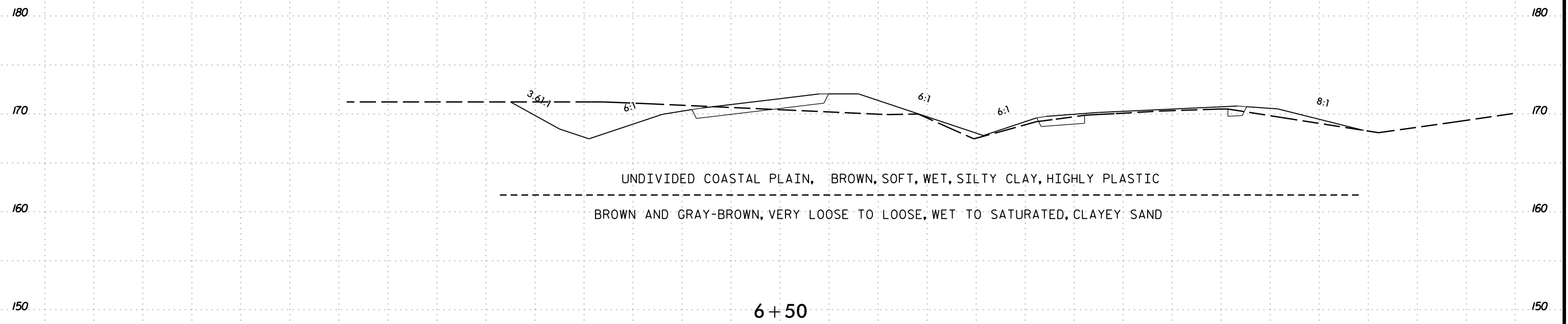
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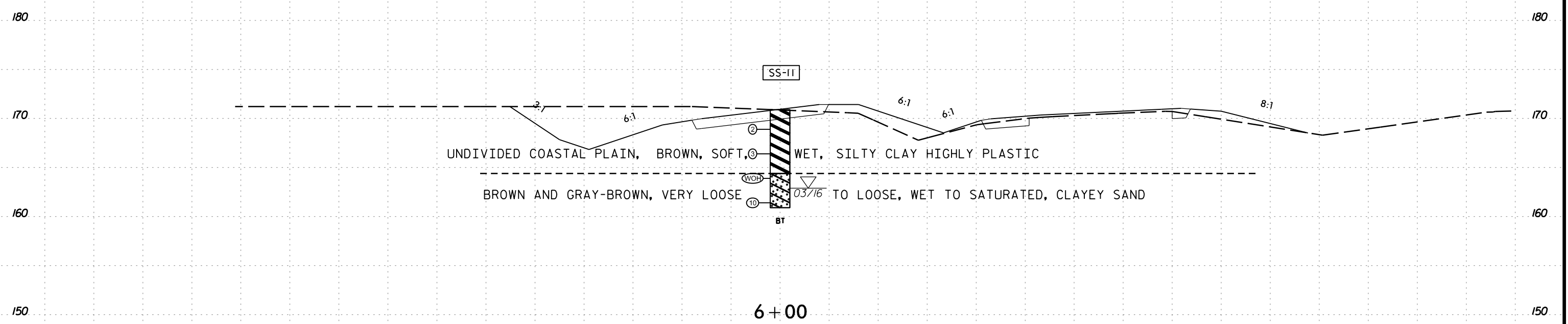


PROJECT REFERENCE NO.	SHEET NO.
U-5796	78

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6 + 50

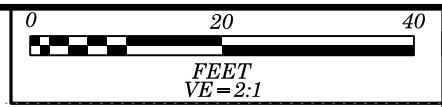


6 + 00

-RAMP D-

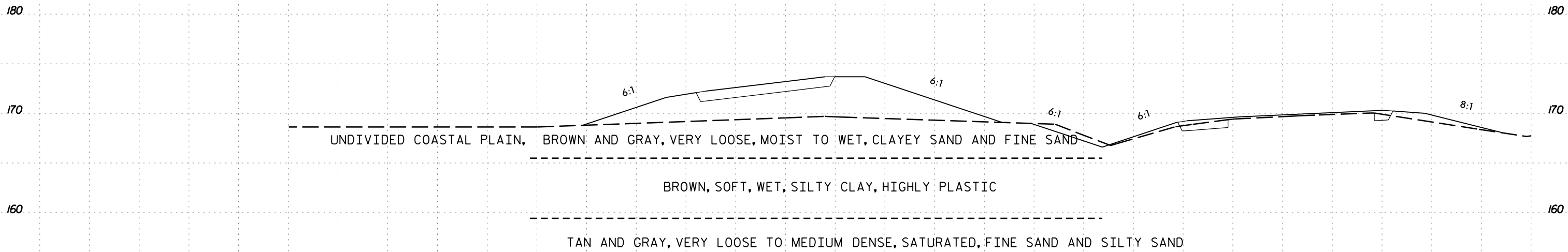
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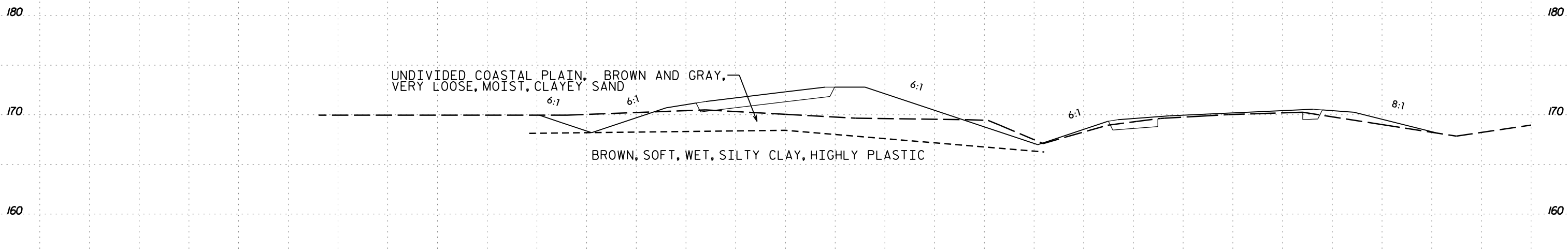


PROJECT REFERENCE NO.	SHEET NO.
U-5796	79

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7 + 50

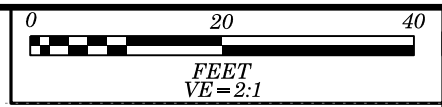


7 + 00

-RAMP D-

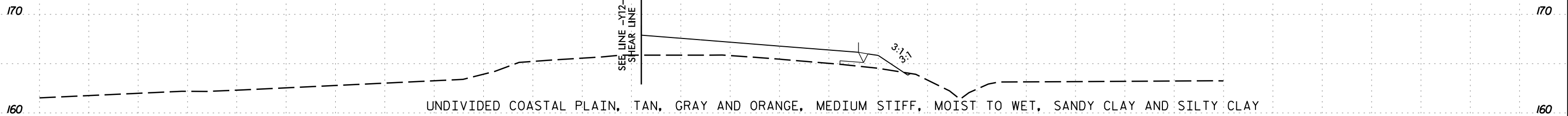
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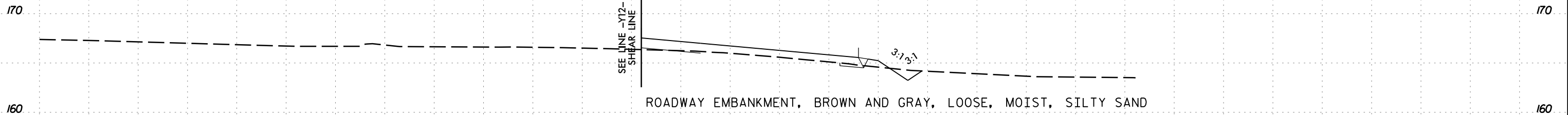


PROJECT REFERENCE NO.	SHEET NO.
U-5796	80

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17+50

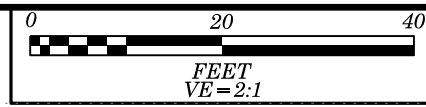


17+00

-Y8-

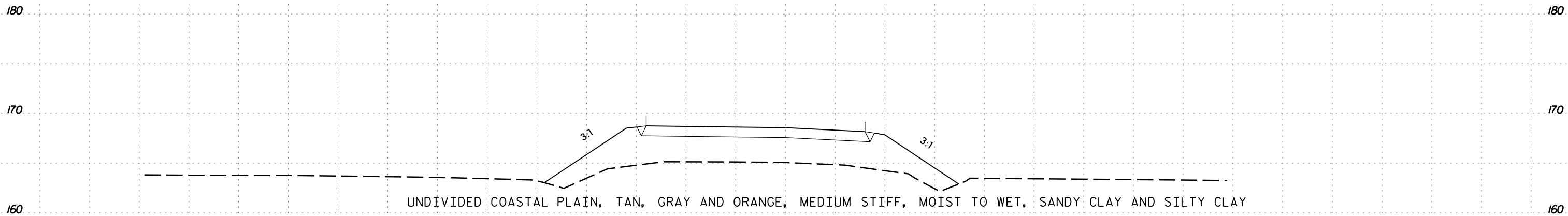
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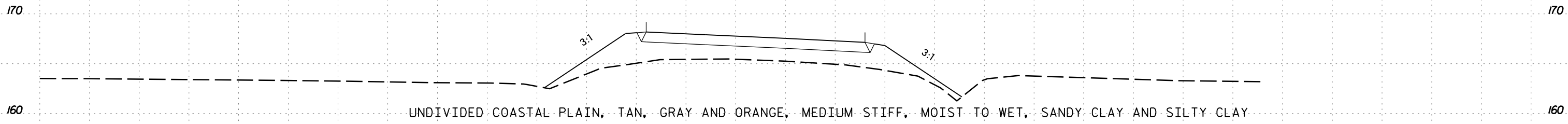


PROJECT REFERENCE NO.	SHEET NO.
U-5796	81

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18+50

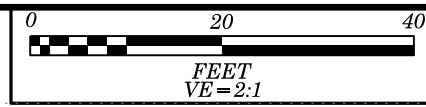


18+00

-Y8-

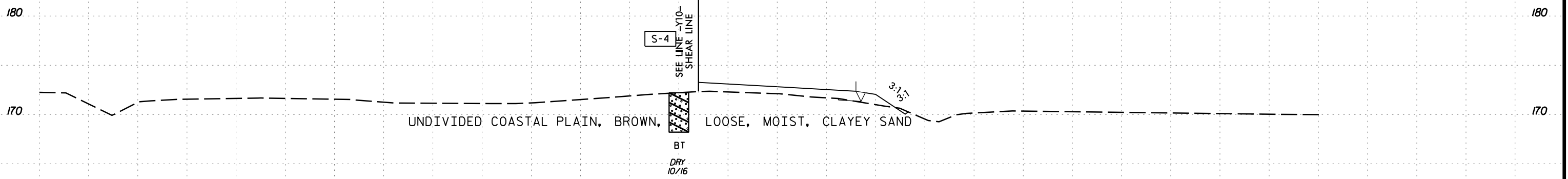
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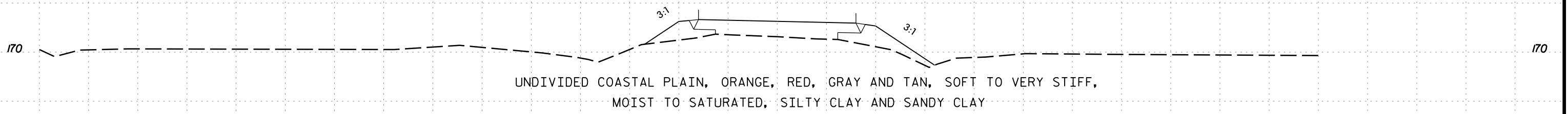


PROJECT REFERENCE NO.	SHEET NO.
U-5796	82

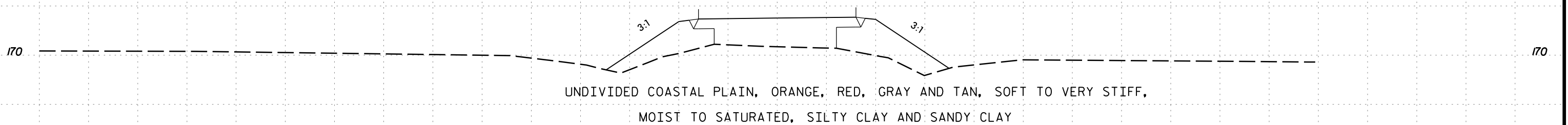
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36 + 00



35 + 50

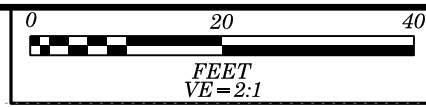


35 + 00

-Y8-

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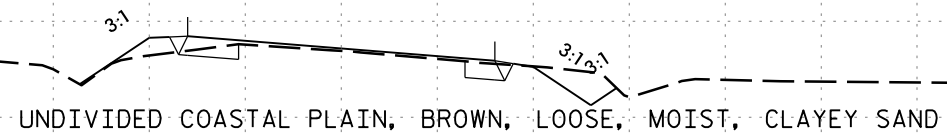


PROJECT REFERENCE NO.	SHEET NO.
U-5796	83

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180 180

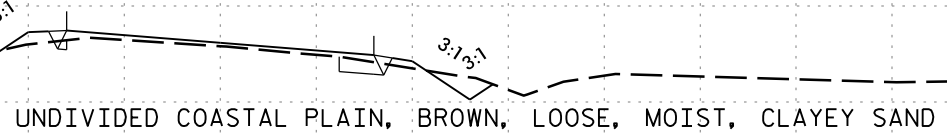
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37+50

180 180

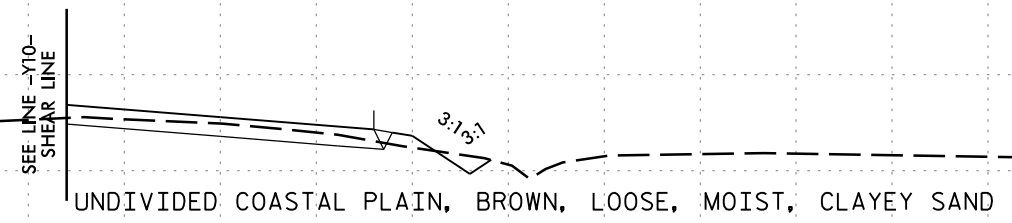
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37+00

180 180

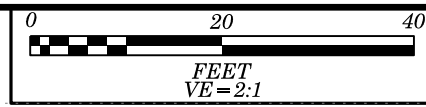
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36+50

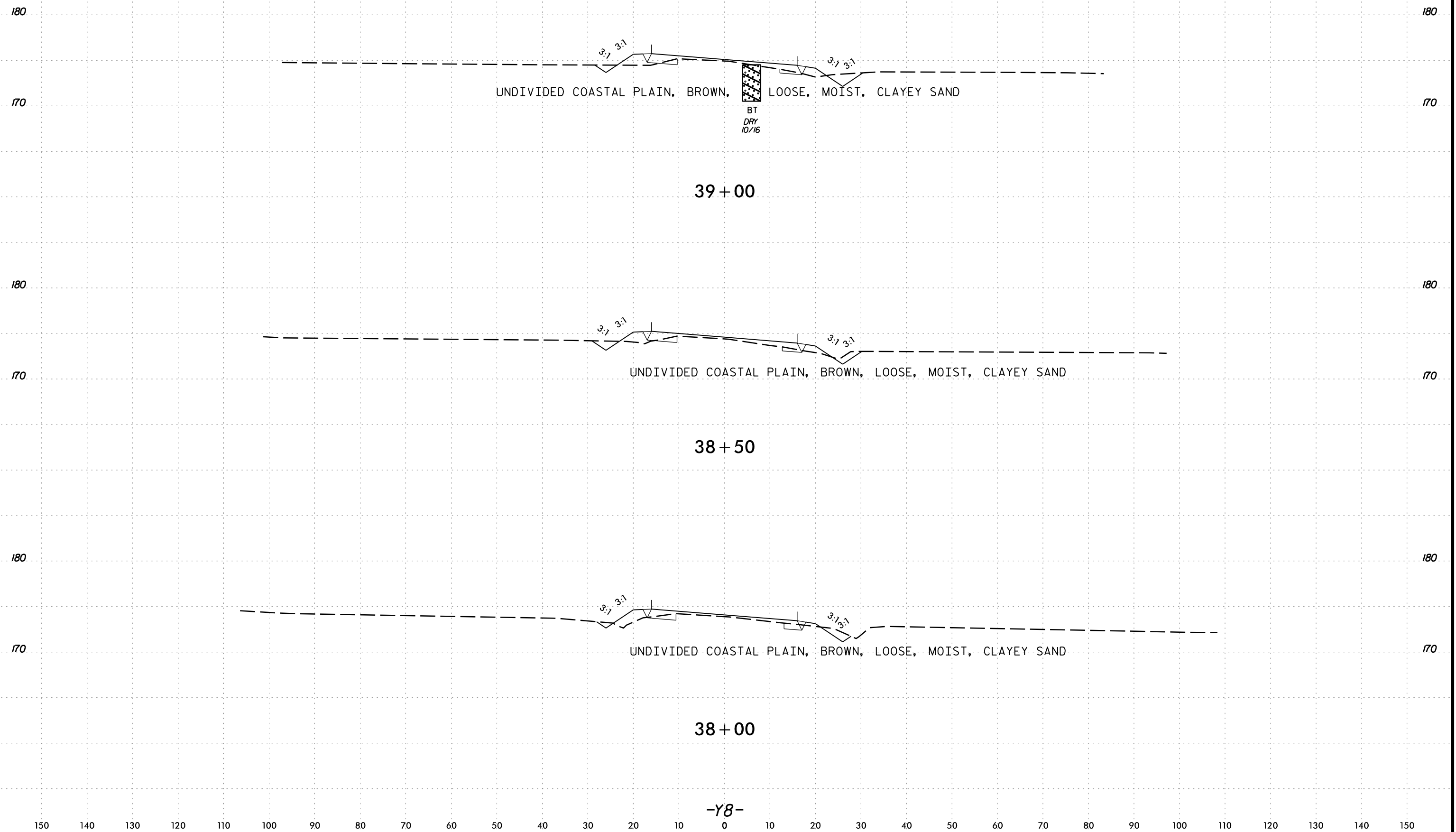
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PROJECT REFERENCE NO.	SHEET NO.
U-5796	84

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UNDIVIDED COASTAL PLAIN, BROWN, LOOSE, MOIST, CLAYEY SAND

BT
DRY
10/16

39 + 00

UNDIVIDED COASTAL PLAIN, BROWN, LOOSE, MOIST, CLAYEY SAND

38 + 50

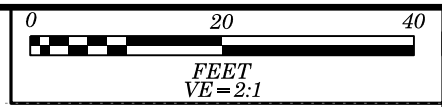
UNDIVIDED COASTAL PLAIN, BROWN, LOOSE, MOIST, CLAYEY SAND

38 + 00

-Y8-

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



PROJECT REFERENCE NO.	SHEET NO.
U-5796	85

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180

180

170

170

UNDIVIDED COASTAL PLAIN, BROWN, LOOSE, MOIST, CLAYEY SAND

40 + 00

180

180

170

170

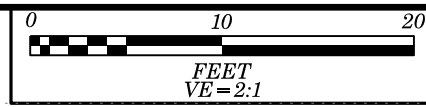
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39 + 50

-Y8-

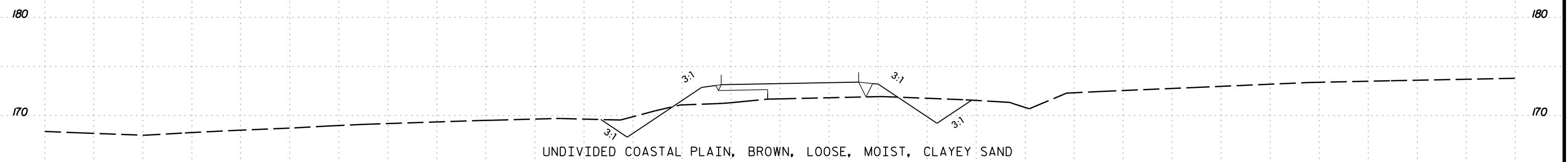
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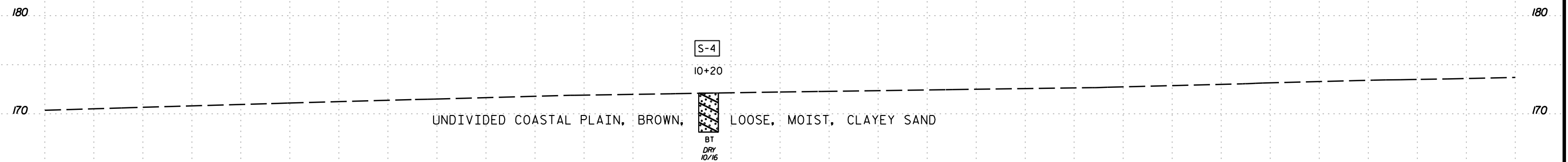


PROJECT REFERENCE NO.	SHEET NO.
U-5796	86

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10 + 50



S-4

10+20

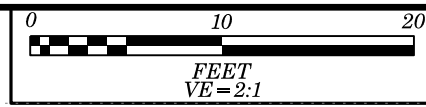
BT
DRY
10/16

10 + 00

-Y10-

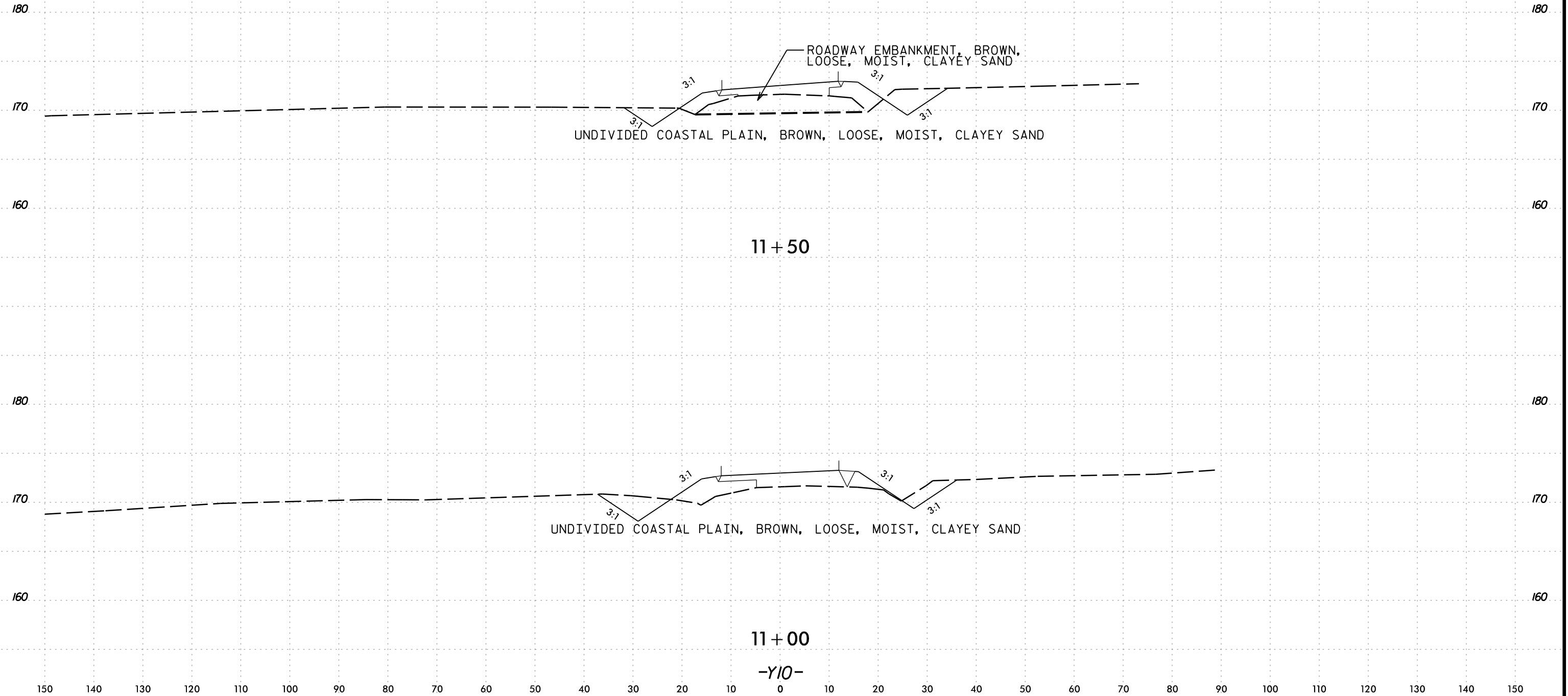
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PROJECT REFERENCE NO.	SHEET NO.
U-5796	87

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ROADWAY EMBANKMENT, BROWN,
LOOSE, MOIST, CLAYEY SAND

UNDIVIDED COASTAL PLAIN, BROWN, LOOSE, MOIST, CLAYEY SAND

11+50

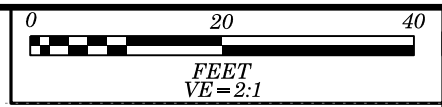
UNDIVIDED COASTAL PLAIN, BROWN, LOOSE, MOIST, CLAYEY SAND

11+00

-Y10-

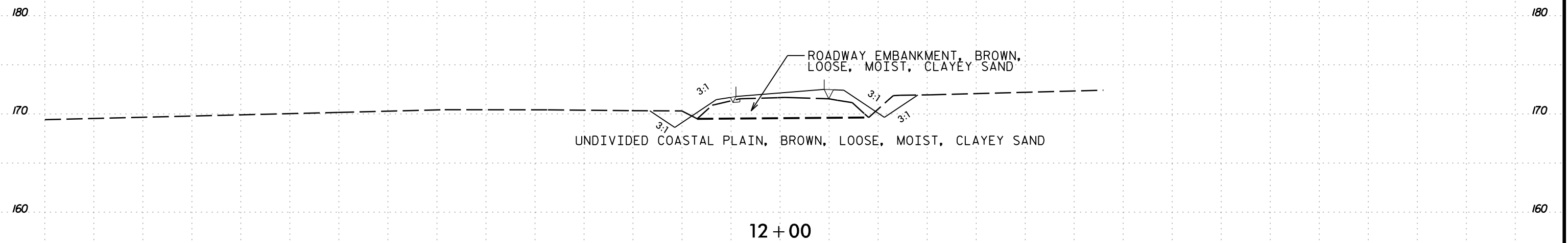
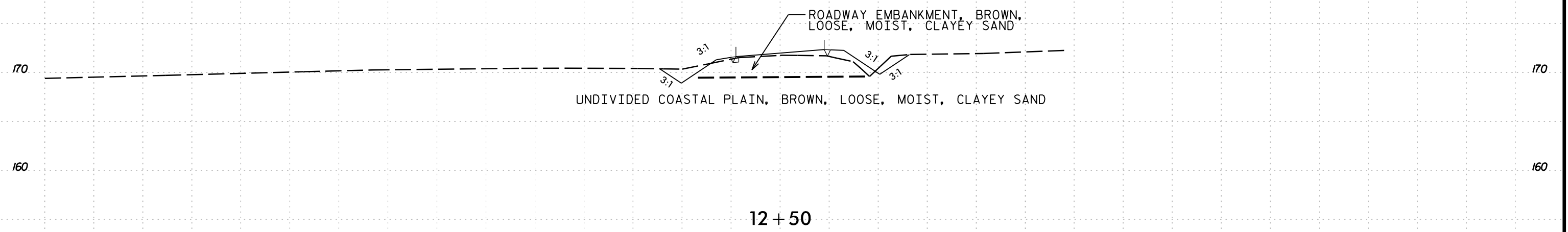
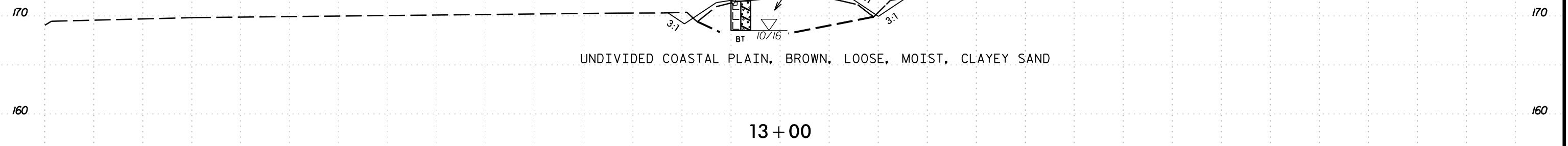
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PROJECT REFERENCE NO.	SHEET NO.
U-5796	88

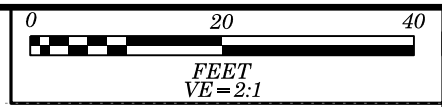
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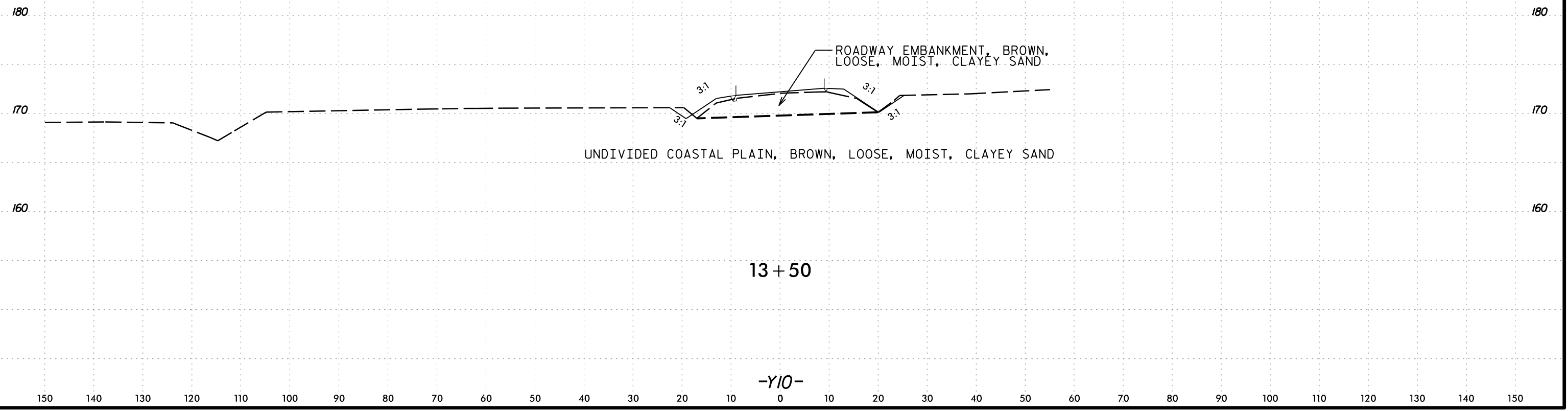
-Y10-

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PROJECT REFERENCE NO.	SHEET NO.
U-5796	89

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Consulting Engineers & Scientists
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RALEIGH, NORTH CAROLINA 27604
PHONE: (919) 873-2211 FAX: (919) 873-9555
NC REGISTERED FIRM: P-0869



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT
SUBSURFACE INVESTIGATION

APPENDIX A
LABORATORY SUMMARY SHEET

REFERENCE: U-5796

PROJECT: 54039

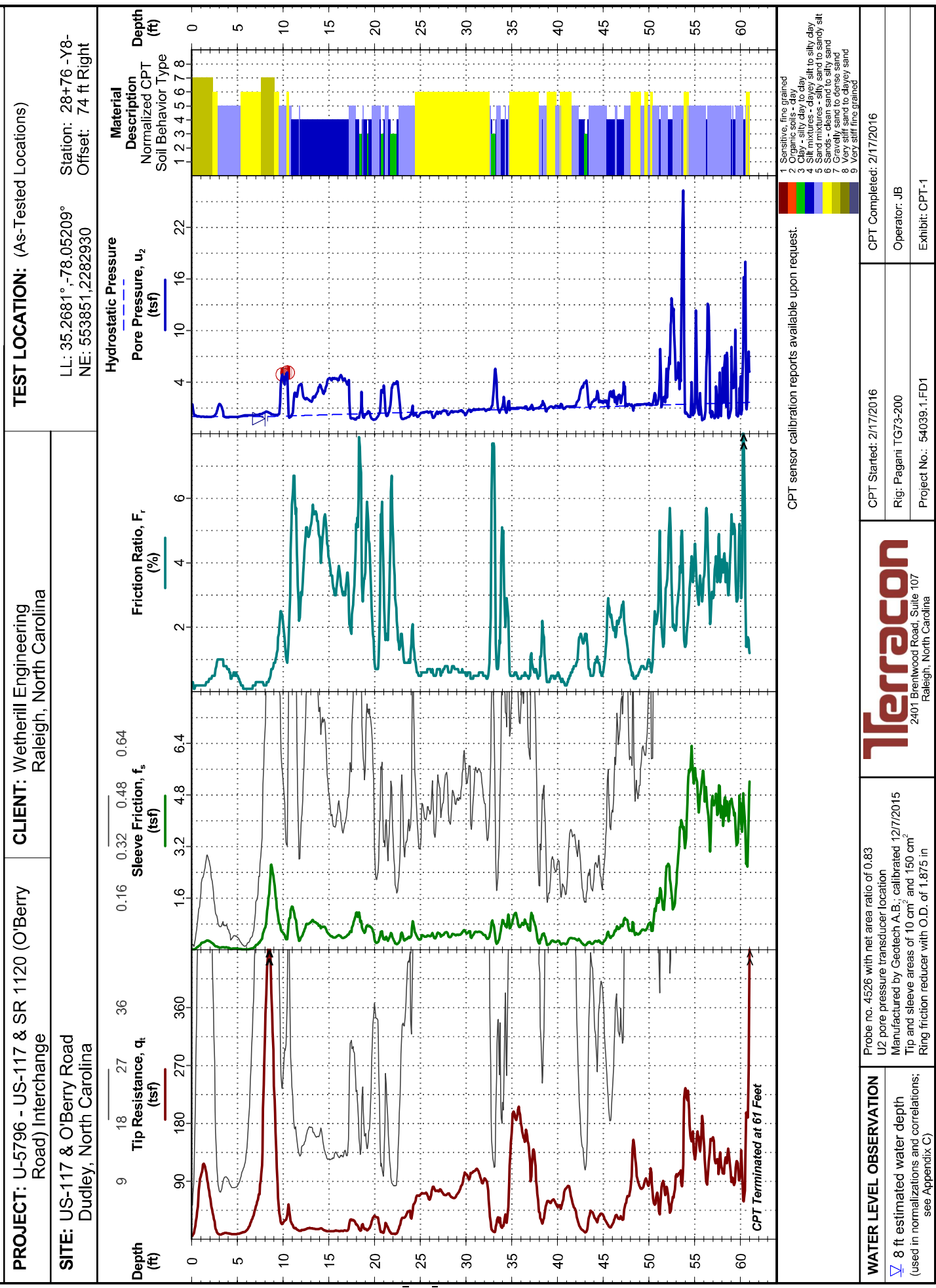
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT
SUBSURFACE INVESTIGATION

APPENDIX B
IN-SITU TESTING RESULTS

REFERENCE: U-5796

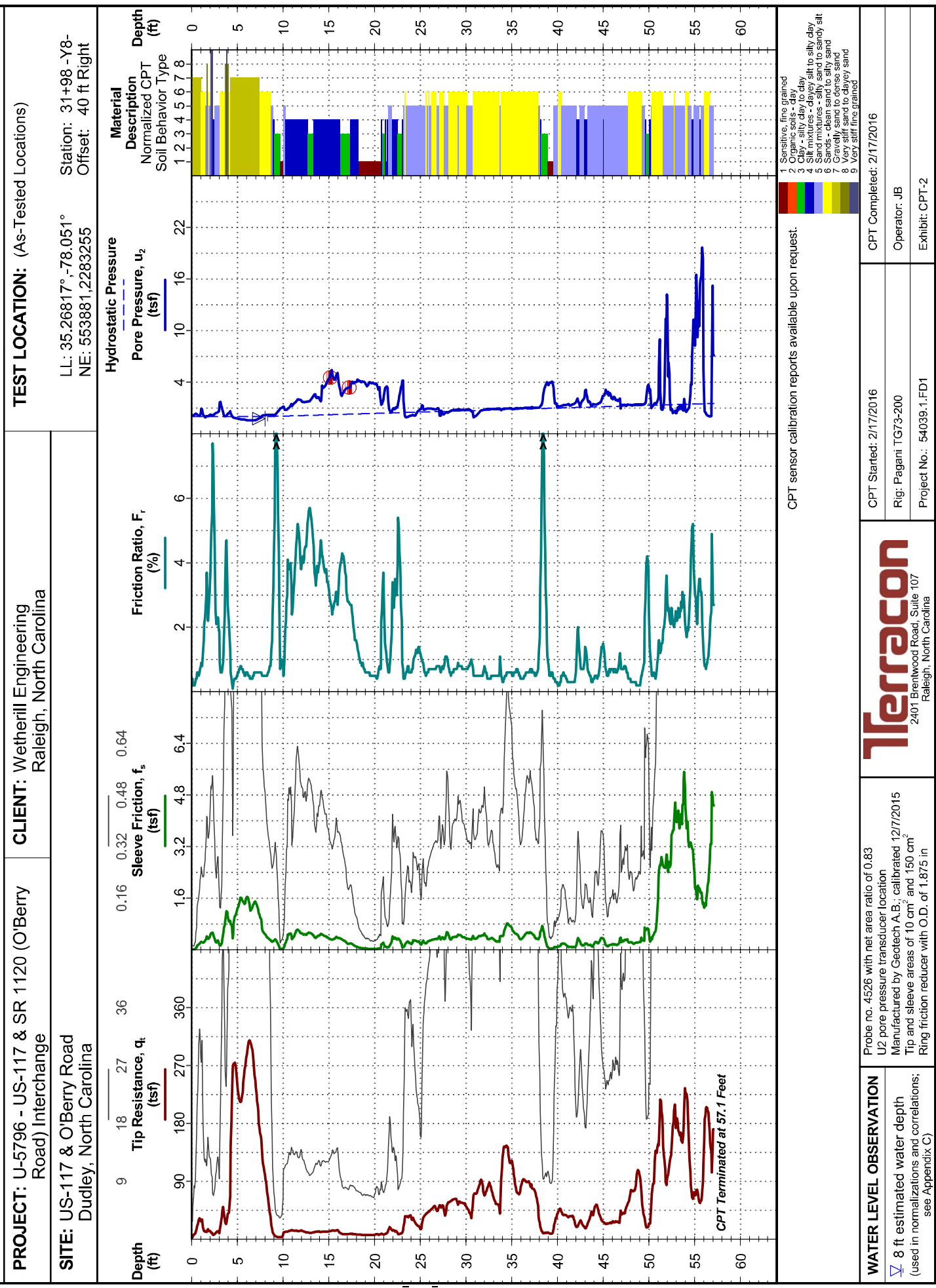
PROJECT: 54039

CPT LOG NO. C1



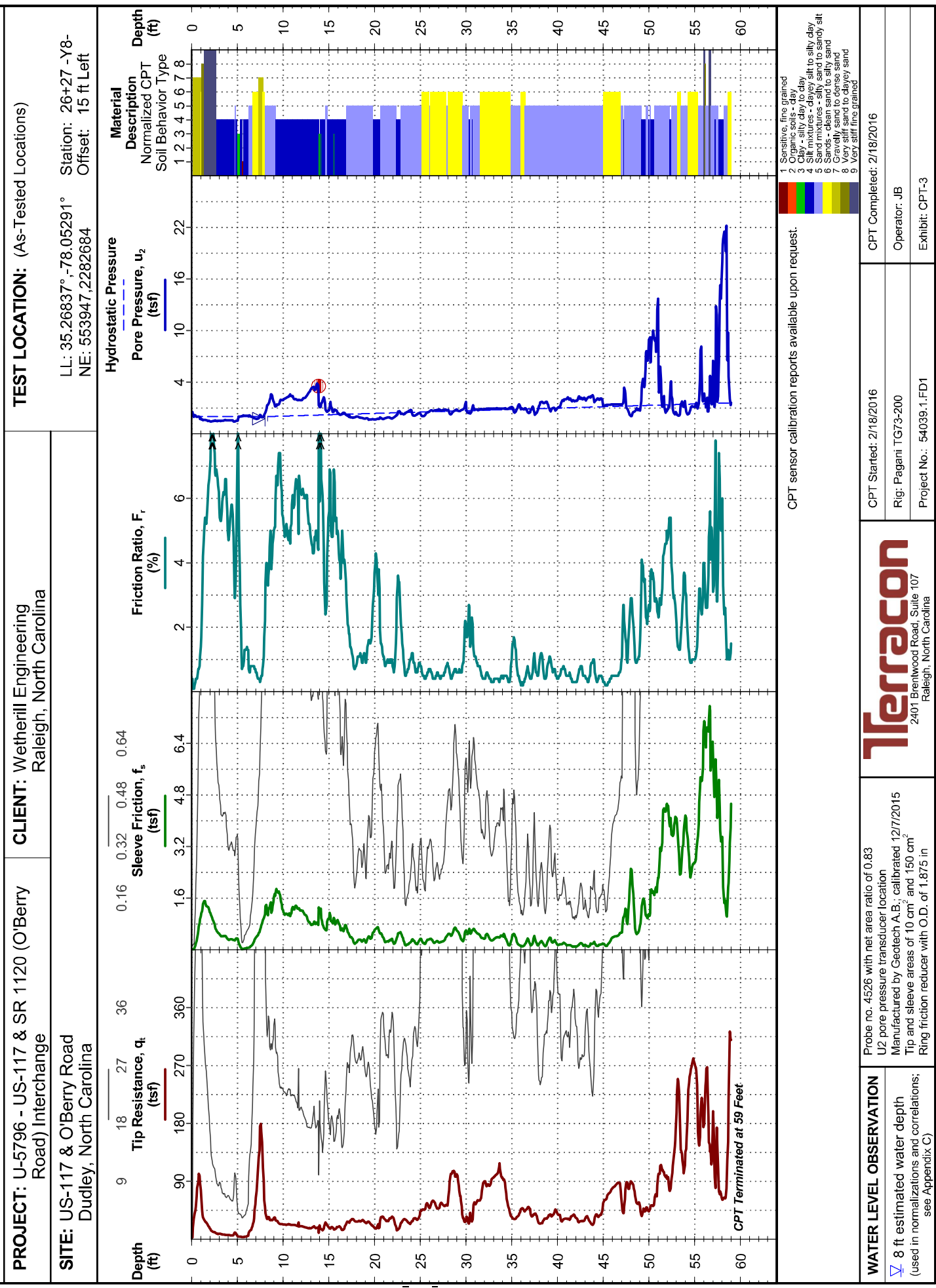
THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. CPT REPORT US796_GEO_CPT.GPJ TERRACON2015.GDT 3/2/16

CPT LOG NO. C2



THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. CPT REPORT US796_GEO_CPT.GPJ TERRACON2015.GDT 3/2/16

CPT LOG NO. C3



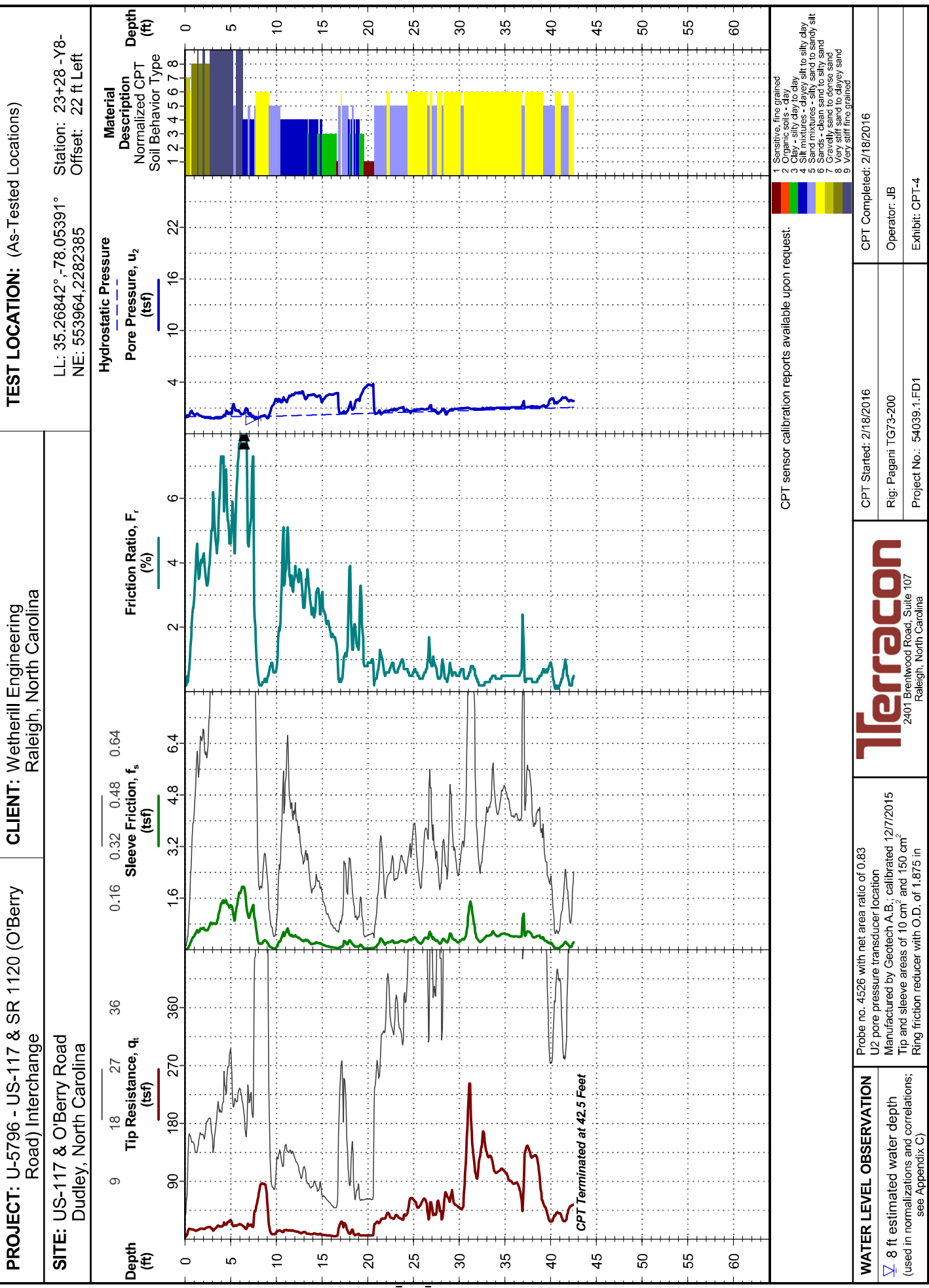
CPT sensor calibration reports available upon request.



- 1 Sensitive, fine grained
- 2 Organic soils - clay
- 3 Silty clays
- 4 Silty mixtures - clayey silt to silty clay
- 5 Sand mixtures - silty sand to sandy silt
- 6 Sands - clean sand to silty sand
- 7 Gravely sand to coarse sand
- 8 Silty sand to silty clay
- 9 Very stiff fine grained

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. CPT REPORT US796_GEO_CPT.GPJ TERRACON2015.GDT 3/2/16

CPT LOG NO. C4



CPT sensor calibration reports available upon request.



- 1 Sensitive, fine grained
- 2 Organic soils - clay
- 3 Silty clays
- 4 Silty mixtures - clayey silt to silty clay
- 5 Sand mixtures - silty sand to sandy silt
- 6 Sands - clean sand to silty sand
- 7 Gravely sand to coarse sand
- 8 Silty sand to silty clay
- 9 Very stiff fine grained

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. CPT REPORT US796_GEO_CPT.GPJ TERRACON2015.GDT 3/2/16

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT
SUBSURFACE INVESTIGATION

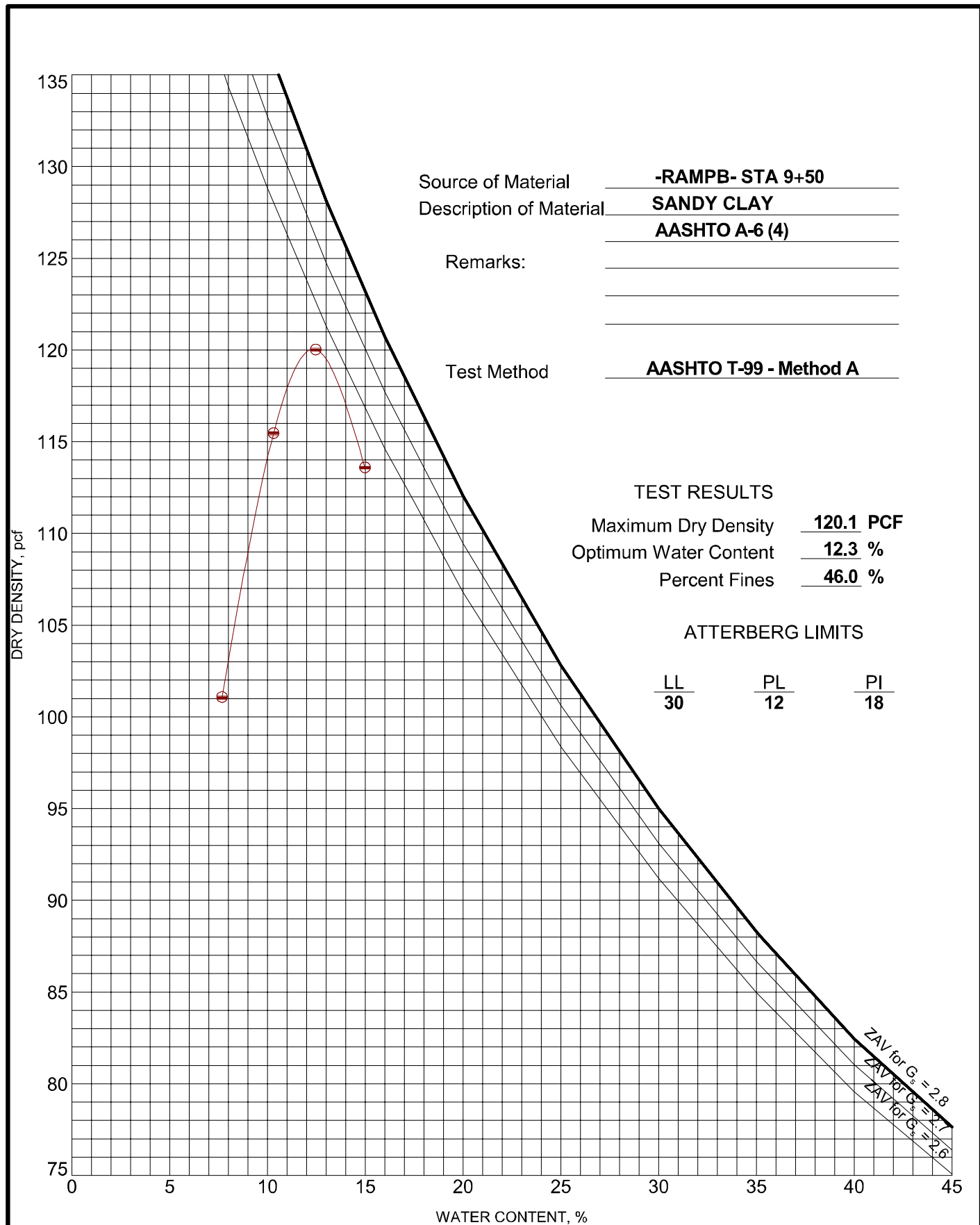
APPENDIX C
PROCTOR AND CBR TEST RESULTS

REFERENCE: U-5796

PROJECT: 54039

MOISTURE-DENSITY RELATIONSHIP

AASHTO T-99



LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. COMPACTION - V2 70155190 LOGS.GPJ TERRACON2012.GDT 4/5/16

PROJECT: U-5796 - US-117 & O'Berry Road Interchange	<p>2401 Brentwood Rd Ste 107 Raleigh, NC</p>	PROJECT NUMBER: 70155190
SITE: US-117 & O'Berry Road Mount Olive, North Carolina		CLIENT: Wetherill Engineering Raleigh, North Carolina
		EXHIBIT: B-1

REPORT FOR CALIFORNIA BEARING RATIO

SHEET 96 OF 97



2401 Brentwood Road, Suite 107
 Raleigh, NC 27604
 919-873-2211

Service Date: 03/28/16
 Report Date: 04/05/16

Client

Wetherill Engineering
 Attn: Eddie Wetherill
 1223 Jones Franklin Road
 Raleigh, North Carolina

Project

U-5796 - US-117 & O'Berry Road Interchange
 US-117 & O'Berry Road
 Mount Olive, North Carolina

Project No. 70155190

SAMPLE INFORMATION

Sample Number:	<u>S-1</u>	Proctor Method:	<u>AASHTO T99 - Method A</u>
Boring Number:	<u>RPB-950</u>	Maximum Dry Density (pcf):	<u>120.1</u>
Sample Location:	<u>Bulk Sample</u>	Optimum Moisture:	<u>12.3</u>
Depth:	<u>1-6'</u>	Liquid Limit:	<u>30</u>
Material Description:	<u>Sandy Clay - AASHTO A-6 (4)</u>	Plasticity Index:	<u>18</u>

CBR TEST DATA

CBR Value at 0.100 inch: 7.9
 CBR Value at 0.200 inch: 8.6

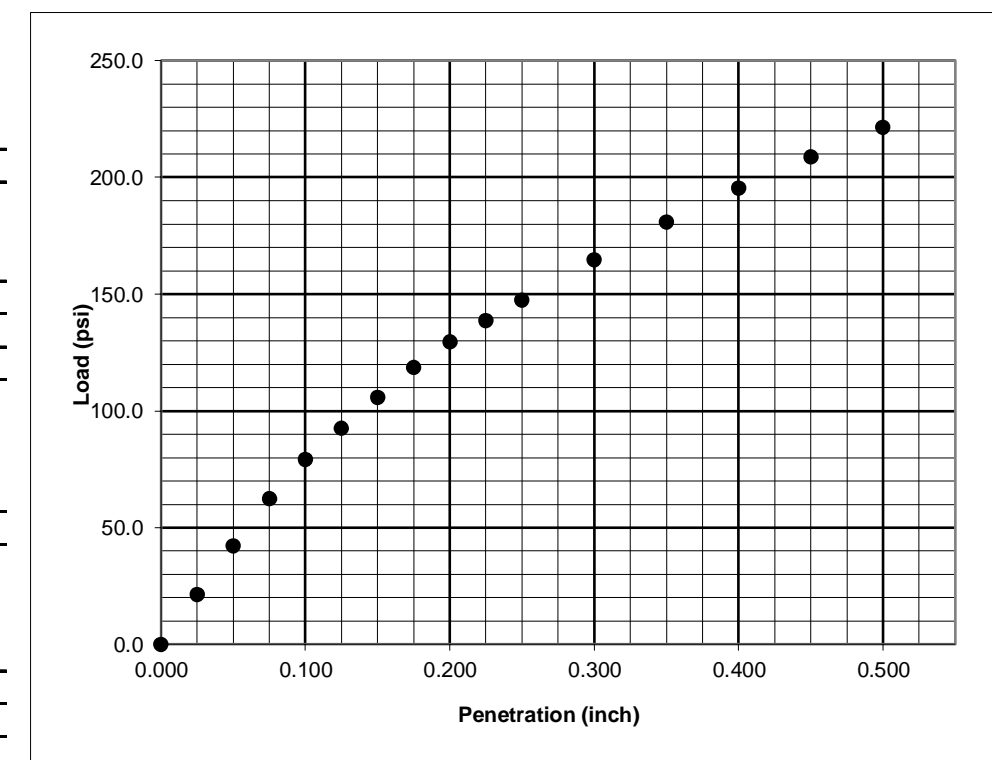
Surcharge Weight (lbs): 10
 Soaking Condition: Soaked
 Length of Soaking (hours): 96
 Swell (%): 0.0

DENSITY DATA

Dry Density Before Soaking (pcf): 118.9
 Compaction of Proctor (%): 99.0

MOISTURE DATA

Before Compaction (%): 12.9
 After Compaction (%): 12.2
 Top 1" After Soaking (%): 14.7
 Average After Soaking (%): 13.9



Comments:

Services: Obtain soil sample and test for California Bearing Ratio

Terracon Rep: Stephanie Huffman
 Reported To: Matthew J. Alexander
 Contractor:
 Report Distribution

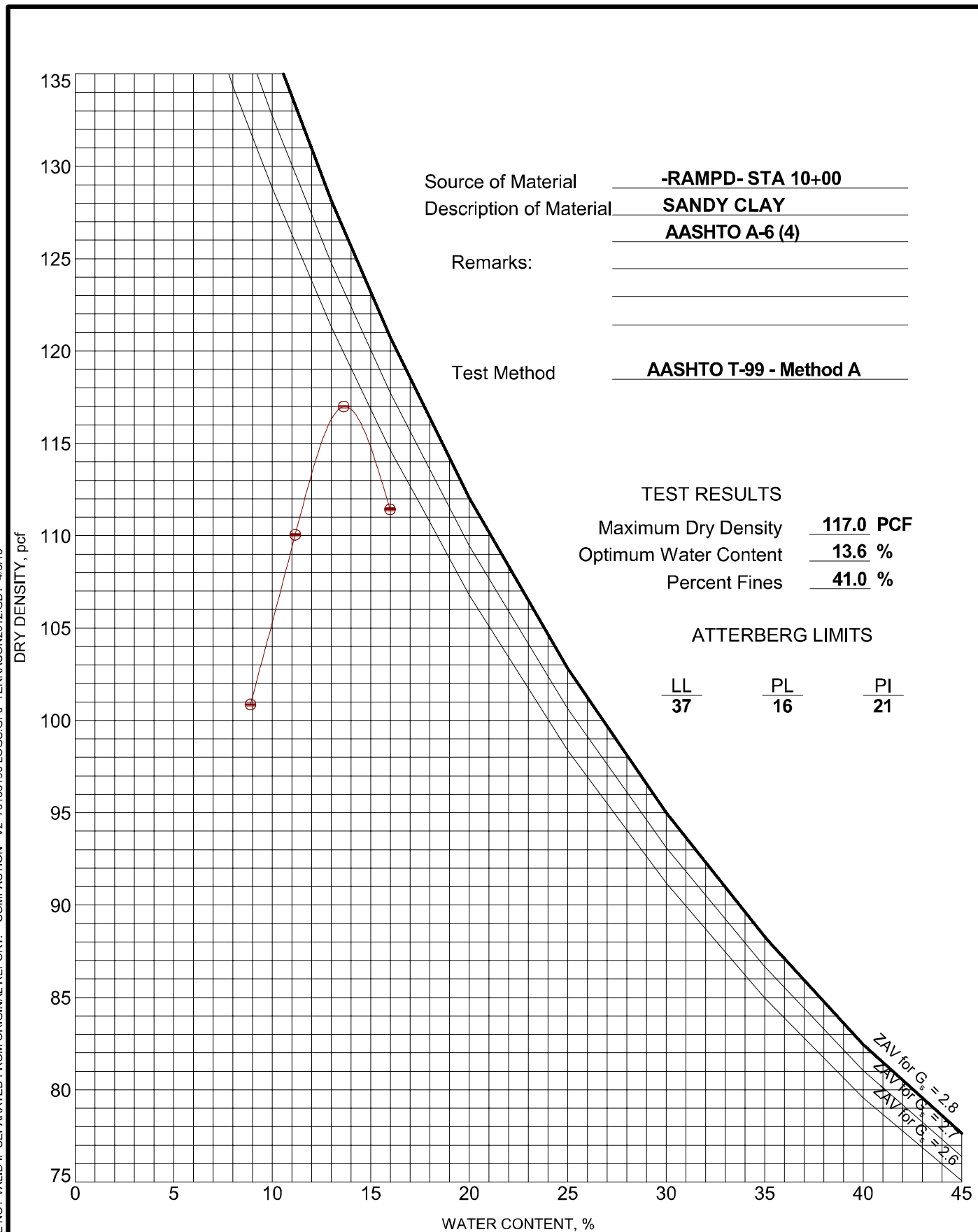
Reviewed by: Matthew J. Alexander, PE
 Geotechnical Project Manager

Test Methods: AASHTO T-193

The tests were performed in general accordance with applicable ASTM, AASHTO, or DOT test methods. This report is exclusively for the use of the client indicated above and shall not be reproduced except in full without the written approval of Terracon. Test results transmitted herein are only applicable to the actual samples tested at the location(s) referenced and are not necessarily indicative of the properties of other apparently similar or identical materials.

MOISTURE-DENSITY RELATIONSHIP

AASHTO T-99



LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. COMPACTION - V2 70155190 LOGS.GPJ TERRACON2012.GDT 4/5/16

PROJECT: U-5796 - US-117 & O'Berry Road Interchange	<p>2401 Brentwood Rd Ste 107 Raleigh, NC</p>	PROJECT NUMBER: 70155190
SITE: US-117 & O'Berry Road Mount Olive, North Carolina		CLIENT: Wetherill Engineering Raleigh, North Carolina
		EXHIBIT: B-1

REPORT FOR CALIFORNIA BEARING RATIO

SHEET 97 OF 97



2401 Brentwood Road, Suite 107
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 919-873-2211

Service Date: 03/28/16
 Report Date: 04/05/16

Client

Wetherill Engineering
 Attn: Eddie Wetherill
 1223 Jones Franklin Road
 Raleigh, North Carolina

Project

U-5796 - US-117 & O'Berry Road Interchange
 US-117 & O'Berry Road
 Mount Olive, North Carolina

Project No. 70155190

SAMPLE INFORMATION

Sample Number:	<u>S-2</u>	Proctor Method:	<u>AASHTO T99 - Method A</u>
Boring Number:	<u>-RAMPD- STA</u>	Maximum Dry Density (pcf):	<u>117.1</u>
Sample Location:	<u>10+00 Bulk Sample</u>	Optimum Moisture:	<u>13.6</u>
Depth:	<u>1-6'</u>	Liquid Limit:	<u>37</u>
Material Description:	<u>Sandy Clay - AASHTO A-6 (4)</u>	Plasticity Index:	<u>21</u>

CBR TEST DATA

CBR Value at 0.100 inch: 6.5
 CBR Value at 0.200 inch: 7.3

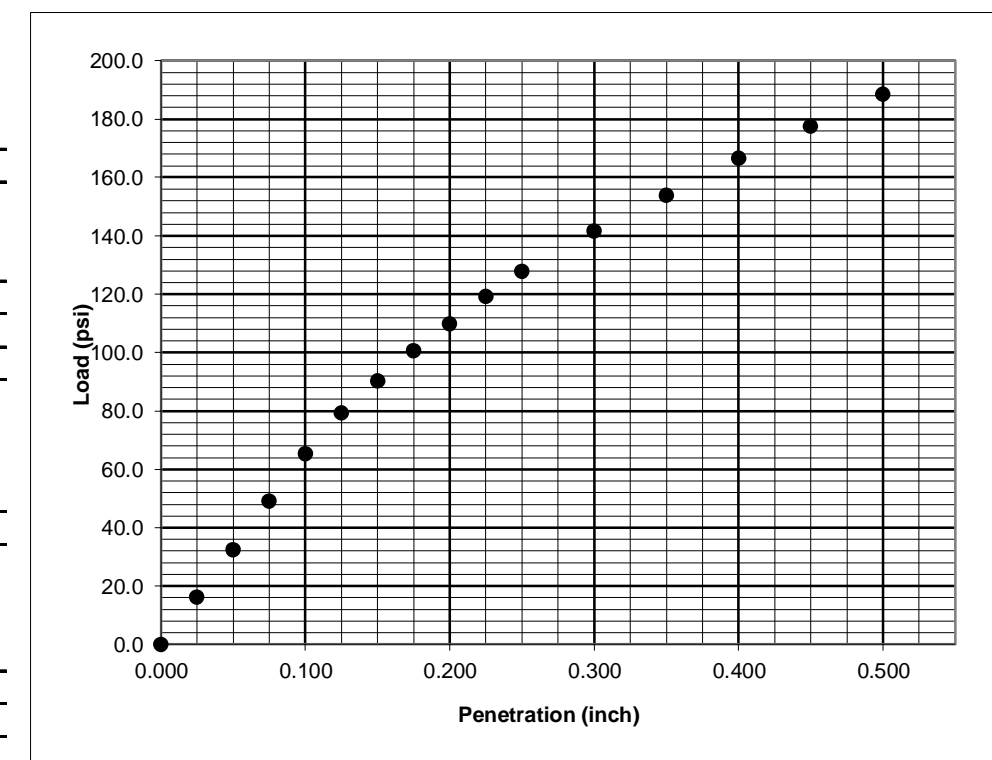
Surcharge Weight (lbs): 10
 Soaking Condition: Soaked
 Length of Soaking (hours): 96
 Swell (%): 0.1

DENSITY DATA

Dry Density Before Soaking (pcf): 115.2
 Compaction of Proctor (%): 98.4

MOISTURE DATA

Before Compaction (%): 14.4
 After Compaction (%): 14.3
 Top 1" After Soaking (%): 15.6
 Average After Soaking (%): 15.2



Comments:

Services: Obtain soil sample and test for California Bearing Ratio

Terracon Rep: Stephanie Huffman
 Reported To: Matthew J. Alexander
 Contractor:
 Report Distribution

Reviewed by: Matthew J. Alexander, PE
 Geotechnical Project Manager

Test Methods: AASHTO T-193

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