

REFERENCE: R-5020B

PROJECT: 41499

SEE SHEET 3 FOR PLAN SHEET LAYOUT  
AT TIME OF INVESTIGATION

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

|       |                             |           |              |
|-------|-----------------------------|-----------|--------------|
| STATE | STATE PROJECT REFERENCE NO. | SHEET NO. | TOTAL SHEETS |
| N.C.  | R-5020B                     | 1         | 102          |

**ROADWAY**  
**SUBSURFACE INVESTIGATION**

COUNTY COLUMBUS  
PROJECT DESCRIPTION US 701 BYPASS (MADISON  
STREET - JK POWELL BLVD.) FROM SR 1437  
(VIRGIL AVENUE) TO US 7476

**INVENTORY**

**CONTENTS**

| LINE  | STATION          | PLAN  |
|-------|------------------|-------|
| -L-   | 174+79 TO 289+75 | 4-12  |
| -RPA- | 13+47 TO 19+50   | 11,13 |
| -RPB- | 11+30 TO 13+50   | 11    |
| -RPC- | 15+00 TO 23+00   | 11,14 |
| -RPD- | 12+20 TO 14+50   | 11    |
| -Y3I- | 12+25 TO 17+00   | 9     |

**CROSS SECTIONS**

| LINE  | STATION          | SHEETS |
|-------|------------------|--------|
| -L-   | 175+00 TO 263+50 | 15-66  |
| -L-   | 266+00 TO 271+50 | 67-71  |
| -L-   | 273+50 TO 289+75 | 72-82  |
| -RPA- | 13+47 TO 19+50   | 83-87  |
| -RPB- | 11+30 TO 13+50   | 88-89  |
| -RPC- | 15+00 TO 23+00   | 90-95  |
| -RPD- | 12+20 TO 14+50   | 96-98  |
| -Y3I- | 12+25 TO 17+00   | 99-102 |

**CAUTION NOTICE**

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT 1919 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THE PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

- NOTES:
1. THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS ACCURATE NOR IS IT CONSIDERED PART OF THE PLANS, SPECIFICATIONS OR CONTRACT FOR THE PROJECT.
  2. BY HAVING REQUESTED THIS INFORMATION, THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

PERSONNEL

N.O. MOORE

C.L. SMITH

D.G. PINTER

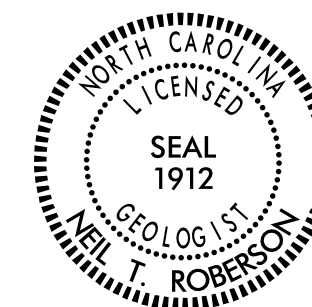
INVESTIGATED BY N.O. MOORE

DRAWN BY N.O.M./J.L.L.

CHECKED BY J.L. LOVE

SUBMITTED BY N. T. ROBERSON

DATE FEBRUARY 2018



DocuSigned by:

*Neil T. Roberson*

2/15/2018

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SIGNATURE

DATE

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

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

| SOIL DESCRIPTION  |  |  |  |  |  |  |  |  |  | GRADATION   |  |  |  |  |  |  |  |  |  | ROCK DESCRIPTION   |  |  |  |  |  |  |  |  |  | TERMS AND DEFINITIONS   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|---|--|--|--|--|--|--|--|--|--|---|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|---|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| 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> |  |  |  |  |  |  |  |  |  | WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.<br>UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE.<br>GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES. |  |  |  |  |  |  |  |  |  | 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:  |  |  |  |  |  |  |  |  |  | ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.<br>AQUIFER - A WATER BEARING FORMATION OR STRATA.<br>ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.<br>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.<br>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.<br>CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.<br>COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.<br>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.<br>DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.<br>DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.<br>DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.<br>FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.<br>FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.<br>FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOGGED FROM PARENT MATERIAL.<br>FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.<br>FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.<br>JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.<br>LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.<br>LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.<br>MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.<br>PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.<br>RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.<br>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.<br>SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.<br>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.<br>SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.<br>STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.<br>STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.<br>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.<br>TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>SOIL LEGEND AND AASHTO CLASSIFICATION</b>  |  |  |  |  |  |  |  |  |  | <b>ANGULARITY OF GRAINS</b>   |  |  |  |  |  |  |  |  |  | <b>WEATHERED ROCK (WR)</b>   |  |  |  |  |  |  |  |  |  | <b>CRYSTALLINE ROCK (CR)</b>  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| GENERAL CLASS. GRANULAR MATERIALS (<= 35% PASSING #200) SILT-CLAY MATERIALS (> 35% PASSING #200) ORGANIC MATERIALS  |  |  |  |  |  |  |  |  |  | THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.   |  |  |  |  |  |  |  |  |  | NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.   |  |  |  |  |  |  |  |  |  | FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>MINERALOGICAL COMPOSITION</b>  |  |  |  |  |  |  |  |  |  | <b>COMPRESSION</b>  |  |  |  |  |  |  |  |  |  | <b>NON-CRYSTALLINE ROCK (NCR)</b>  |  |  |  |  |  |  |  |  |  | <b>COASTAL PLAIN SEDIMENTARY ROCK (CP)</b>  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.   |  |  |  |  |  |  |  |  |  | SLIGHTLY COMPRESSIBLE LL < 31<br>MODERATELY COMPRESSIBLE LL = 31 - 50<br>HIGHLY COMPRESSIBLE LL > 50  |  |  |  |  |  |  |  |  |  | FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.  |  |  |  |  |  |  |  |  |  | COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>PERCENTAGE OF MATERIAL</b>   |  |  |  |  |  |  |  |  |  | <b>GROUND WATER</b>   |  |  |  |  |  |  |  |  |  | <b>WEATHERING</b>  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| ORGANIC MATERIAL GRANULAR SOILS SILT - CLAY SOILS OTHER MATERIAL  |  |  |  |  |  |  |  |  |  | WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING<br>STATIC WATER LEVEL AFTER 24 HOURS<br>PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA<br>SPRING OR SEEP  |  |  |  |  |  |  |  |  |  | FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.<br>VERY SLIGHT (V SL.) ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN. CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.<br>SLIGHT (SL.) ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.<br>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.<br>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<br>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<br>VERY SEVERE (V SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF<br>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. |  |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>CONSISTENCY OR DENSENESS</b>   |  |  |  |  |  |  |  |  |  | <b>MISCELLANEOUS SYMBOLS</b>  |  |  |  |  |  |  |  |  |  | <b>ROCK HARDNESS</b>   |  |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT <sup>2</sup> )  |  |  |  |  |  |  |  |  |  | ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION<br>SOIL SYMBOL<br>ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT<br>INFERRED SOIL BOUNDARY<br>INFERRED ROCK LINE<br>ALLUVIAL SOIL BOUNDARY  |  |  |  |  |  |  |  |  |  | DIP & DIP DIRECTION OF ROCK STRUCTURES<br>SPT DMT TEST BORE<br>AUGER BORING<br>CORE BORING<br>MONITORING WELL<br>PIEZOMETER INSTALLATION<br>SLOPE INDICATOR INSTALLATION<br>CONE PENETROMETER TEST<br>SOUNDING ROD<br>TEST BORING WITH CORE<br>SPT N-VALUE   |  |  |  |  |  |  |  |  |  | VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.<br>HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.<br>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.<br>MEDIUM HARD CAN BE GROOVED 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.<br>SOFT CAN BE GROOVED 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.<br>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.  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>TEXTURE OR GRAIN SIZE</b>  |  |  |  |  |  |  |  |  |  | <b>RECOMMENDATION SYMBOLS</b>   |  |  |  |  |  |  |  |  |  | <b>ABBREVIATIONS</b>   |  |  |  |  |  |  |  |  |  | <b>FRACTURE SPACING</b>   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| U.S. STD. SIEVE SIZE OPENING (MM) 4 10 40 60 200 270<br>4.76 2.00 0.42 0.25 0.075 0.053   |  |  |  |  |  |  |  |  |  | UNDERCUT UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL<br>SHALLOW UNDERCUT UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK                                 |  |  |  |  |  |  |  |  |  | AR - AUGER REFUSAL<br>BT - BORING TERMINATED<br>CL - CLAY<br>CPT - COARSE PENETRATION TEST<br>CSE - COARSE<br>DMT - DILATOMETER TEST<br>DPT - DYNAMIC PENETRATION TEST<br>e - VOID RATIO<br>F - FINE<br>FOSS. - FOSSILIFEROUS<br>FRAC. - FRACTURED, FRACTURES<br>FRAGS. - FRAGMENTS<br>HI. - HIGHLY<br>MED. - MEDIUM<br>MICA - MICACEOUS<br>MOD. - MODERATELY<br>NP - NON PLASTIC<br>ORG. - ORGANIC<br>PMT - PRESSUREMETER TEST<br>SAP. - SAPROLITIC<br>SD. - SAND, SANDY<br>SL. - SILT, SILTY<br>SLI. - SLIGHTLY<br>TCR - TRICONE REFUSAL<br>w - MOISTURE CONTENT<br>V - VERY<br>VST - VANE SHEAR TEST<br>WEA. - WEATHERED<br>UNIT WEIGHT<br>DRY UNIT WEIGHT<br>SAMPLE ABBREVIATIONS<br>S - BULK<br>SS - SPLIT SPOON<br>ST - SHELBY TUBE<br>RS - ROCK<br>RT - RECOMPACTED TRIAXIAL<br>CBR - CALIFORNIA BEARING RATIO  |  |  |  |  |  |  |  |  |  | TERM SPACING<br>VERY WIDE MORE THAN 10 FEET<br>WIDE 3 TO 10 FEET<br>MODERATELY CLOSE 1 TO 3 FEET<br>CLOSE 0.16 TO 1 FOOT<br>VERY CLOSE LESS THAN 0.16 FEET  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>SOIL MOISTURE - CORRELATION OF TERMS</b>   |  |  |  |  |  |  |  |  |  | <b>SOIL MOISTURE SCALE (ATTERBERG LIMITS)</b>   |  |  |  |  |  |  |  |  |  | <b>BEDDING</b>   |  |  |  |  |  |  |  |  |  | <b>INDURATION</b>   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION  |  |  |  |  |  |  |  |  |  | LL - LIQUID LIMIT<br>PL - PLASTIC LIMIT<br>OM - OPTIMUM MOISTURE SHRINKAGE LIMIT  |  |  |  |  |  |  |  |  |  | VERY THICKLY BEDDED 4 FEET<br>THICKLY BEDDED 1.5 - 4 FEET<br>THINLY BEDDED 0.16 - 1.5 FEET<br>VERY THINLY BEDDED 0.03 - 0.16 FEET<br>THICKLY LAMINATED 0.008 - 0.03 FEET<br>THINLY LAMINATED < 0.008 FEET  |  |  |  |  |  |  |  |  |  | FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.<br>FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.<br>MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.<br>INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.<br>EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>PLASTICITY</b>   |  |  |  |  |  |  |  |  |  | <b>EQUIPMENT USED ON SUBJECT PROJECT</b>  |  |  |  |  |  |  |  |  |  | <b>DRILL UNITS:</b>  |  |  |  |  |  |  |  |  |  | <b>NOTES:</b>   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| NON PLASTIC SLIGHTLY PLASTIC MODERATELY PLASTIC HIGHLY PLASTIC  |  |  |  |  |  |  |  |  |  | ADVANCING TOOLS: CLAY BITS, 6" CONTINUOUS FLIGHT AUGER, 8" HOLLOW AUGERS, HARD FACED FINGER BITS, TUNG-CARBIDE INSERTS, CASING w/ ADVANCER, TRICONE * STEEL TEETH, TRICONE * TUNG-CARB., CORE BIT   |  |  |  |  |  |  |  |  |  | CME-45C, CME-55, CME-550, VANE SHEAR TEST, PORTABLE HOIST  |  |  |  |  |  |  |  |  |  | BORINGS LOCATED USING GPK FILED DATED 5/25/17 AND ELEVATIONS FROM TIN FILE DATED 5/30/17.   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>COLOR</b>  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-BROWN). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.   |  |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

See Sheet 1A for Index of Sheets  
See Sheet 1B for Conventional Symbols

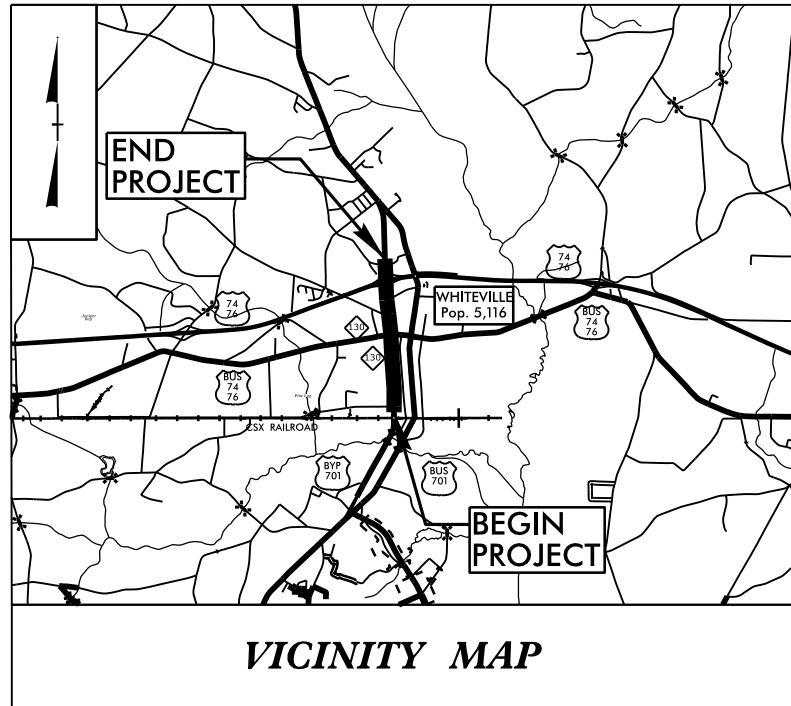
STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**COLUMBUS COUNTY**

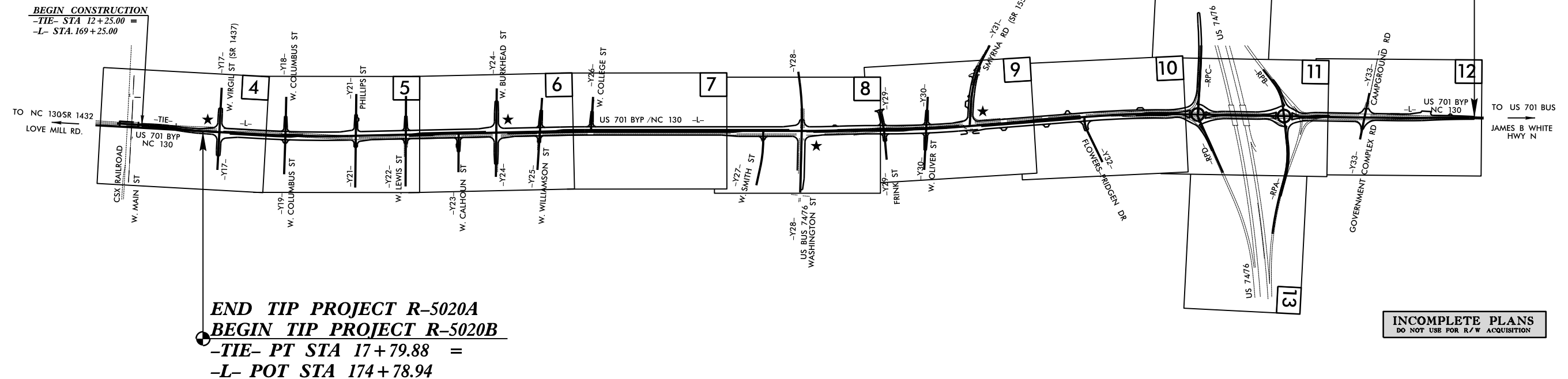
LOCATION: US 701 BYPASS (MADISON STREET - JK POWELL BOULEVARD)  
FROM SR 1437 (VIRGIL AVENUE) TO US 7476

TYPE OF WORK: GRADING, DRAINAGE, PAVING, AND SIGNALS

|                         |                             |             |              |
|-------------------------|-----------------------------|-------------|--------------|
| STATE                   | STATE PROJECT REFERENCE NO. | SHEET NO.   | TOTAL SHEETS |
| N.C.                    | R-5020B                     | 3           | 102          |
| STATE PROJ. NO.         | F.A. PROJ. NO.              | DESCRIPTION |              |
| 41499.1.3               | NHP-701(33)                 | P.E.        |              |
| <b>25% REVIEW PLANS</b> |                             |             |              |



END TIP PROJECT R-5020B  
-L- POT STA 289 + 75.00

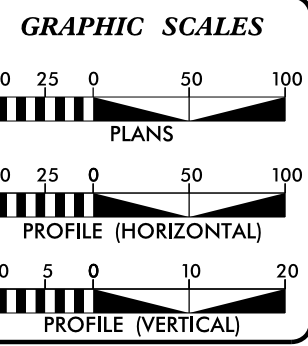


INCOMPLETE PLANS  
DO NOT USE FOR R/W ACQUISITION



NOTE:

- THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF THE CITY OF WHITEVILLE.
- CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD     .



**DESIGN DATA**

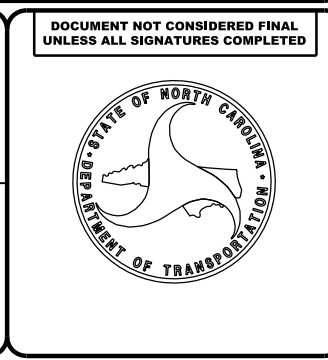
|                             |        |
|-----------------------------|--------|
| ADT 2020 =                  | 21,417 |
| ADT 2040 =                  | 26,000 |
| K =                         | 8 %    |
| D =                         | 55 %   |
| T =                         | 6 % *  |
| V =                         | 50 MPH |
| *(TTST = 3% DUAL 3%)        |        |
| FUNC CLASS = URBAN ARTERIAL |        |

**PROJECT LENGTH**

|                                       |   |             |
|---------------------------------------|---|-------------|
| LENGTH OF ROADWAY TIP PROJECT R-5020B | = | 2.282 MILES |
| TOTAL LENGTH OF TIP PROJECT R-5020B   | = | 2.282 MILES |

|   |  |
|---|--|
| Prepared In the Office of:<br><br>KCI Associates of N.C., P.A.<br>4505 Falls of Neuse Road, Suite 400<br>Raleigh, NC 27609<br>Phone (919) 783-9214<br>Fax (919) 783-9266<br>www.kci.com | Plans Prepared For:<br>DIVISION OF HIGHWAYS<br>558 Gillespie St.<br>Fayetteville NC, 28302 |
| 2012 STANDARD SPECIFICATIONS  | CHARLES L. FLOWE, P.E.<br>PROJECT ENGINEER   |
| RIGHT OF WAY DATE:<br>FEBRUARY 16, 2018   | BARRY C. SMITH, P.E.<br>PROJECT DESIGN ENGINEER  |
| LETTING DATE:<br>FEBRUARY 18, 2020  |  |
| NCDOT CONTACT:  | STEVEN KENDALL, P.E.<br>PROJECT ENGINEER - DIVISION 6                                      |

|                         |               |
|-------------------------|---------------|
| HYDRAULICS ENGINEER     | _____<br>P.E. |
| ROADWAY DESIGN ENGINEER | _____<br>P.E. |



TIP PROJECT: R-5020B

CONTRACT:

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STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

ROY COOPER  
GOVERNOR

JAMES H. TROGDON, III  
SECRETARY

February 8, 2018

STATE PROJECT: 41499.1.3 (R-5020B)  
 FEDERAL PROJECT: NHP-701(33)  
 COUNTY: COLUMBUS  
 DESCRIPTION: US 701 Bypass (Madison Street - JK Powell Boulevard) from SR 1437 (Virgil Avenue) to US 74/76  
 SUBJECT: Geotechnical Report – Inventory

The Geotechnical Engineering Unit has completed a subsurface investigation for this project and presents the following inventory.

**Project Description**

This project consists of widening existing US 701 Bypass (-L-) from approximately 200 feet south of West Virgil Street (-Y17-) to approximately 1000 feet north of Government Complex Road/Campground Road (-Y33-).

A geotechnical investigation was conducted during May of 2017. Hand augers were performed by the Geotechnical Engineering Unit. Representative soil samples were collected for visual classification in the field and selected samples were submitted for laboratory analysis by the Materials and Tests Unit.

The following alignments, totaling 2.98 miles, were investigated. Subsurface plans and cross sections of these alignments are included in this report.

| <u>Line</u> | <u>Stations</u>  |
|-------------|------------------|
| -L-         | 174+79 to 289+75 |
| -RPA-       | 13+47 to 20+80   |
| -RPB-       | 11+30 to 14+75   |
| -RPC-       | 15+00 to 24+23   |
| -RPD-       | 12+20 to 15+76   |
| -Y31-       | 12+25 to 17+73   |

**Physiography and Geology**

The project is located within the city limits of the town of Whiteville, and within the Coastal Plain Province. Clays and sands of the Tertiary Yorktown Formation overlay clays and sands of the Cretaceous Peedee Formation. The terrain is relatively flat with some low-lying wetland areas towards the north of the project. The widening project is a mixture of small businesses, school facilities, single-family homes, woods, and wetlands.

**Soils Properties**

Soils encountered during this investigation are roadway embankment, alluvial, and Undivided Coastal Plain.

Roadway Embankment soils are present along all existing roads within the project limits such as US 701 Bypass (-L-), New Smyrna Road (-Y31-), and along exit ramps (-RPA-, -RPB-, -RPC-, -RPD-). These soils primarily consist of orange, tan, and brown, moist, loose to medium dense, silty sand (A-2-4).

Alluvial soils are present along the northern portion of US 701 (-L-) where low-lying wetlands are located on both sides of the road. These soils primarily consist of light to dark gray, moist to wet, very soft to soft, silty sand (A-2-4) and soft to medium stiff, sandy silt with trace organics and wood fragments (A-4).

Undivided Coastal Plain soils are also present along the entire project corridor. These soils are characterized by gray, orange, red, moist, medium stiff to stiff, mottled, sandy silt (A-4), sandy clay (A-6), and highly plastic, silty clay (A-7-6). Plastic indices for these soils range from 31 to 64.

**Groundwater**

Groundwater measurements were taken in May 2017 during average rainfall conditions. Groundwater was absent in most borings; however, groundwater was present in 9 borings and ranged from 3.0 to 4.5 feet from the ground surface.

**Areas of Special Geotechnical Interest**

- 1) Highly Plastic Clays: Highly plastic clays (PI > 25) were encountered on the project at the following locations:

| <u>Line</u> | <u>Stations</u>  | <u>Offsets</u> |
|-------------|------------------|----------------|
| -L-         | 181+50 to 198+50 | LT to RT       |
| -L-         | 201+00 to 207+50 | LT to RT       |
| -L-         | 211+00 to 213+50 | LT to RT       |
| -L-         | 225+00 to 232+00 | LT to RT       |
| -L-         | 234+50 to 239+50 | LT to RT       |
| -L-         | 262+50 to 278+50 | LT to RT       |
| -L-         | 286+00 to 290+50 | LT to RT       |
| -RPB-       | 10+00 to 14+50   | LT to RT       |
| -Y31-       | 10+00 to 17+00   | LT to RT       |





2) High Groundwater: The following areas exhibit groundwater within 6.0 feet of proposed grade:

| <u>Line</u> | <u>Stations</u> | <u>Offsets</u> |
|-------------|-----------------|----------------|
| -L-         | 179+00          | 20' RT         |
| -L-         | 220+00          | 25' LT         |
| -L-         | 229+50          | 60' RT         |
| -L-         | 243+00          | 40' RT         |
| -L-         | 245+00          | 40' RT         |

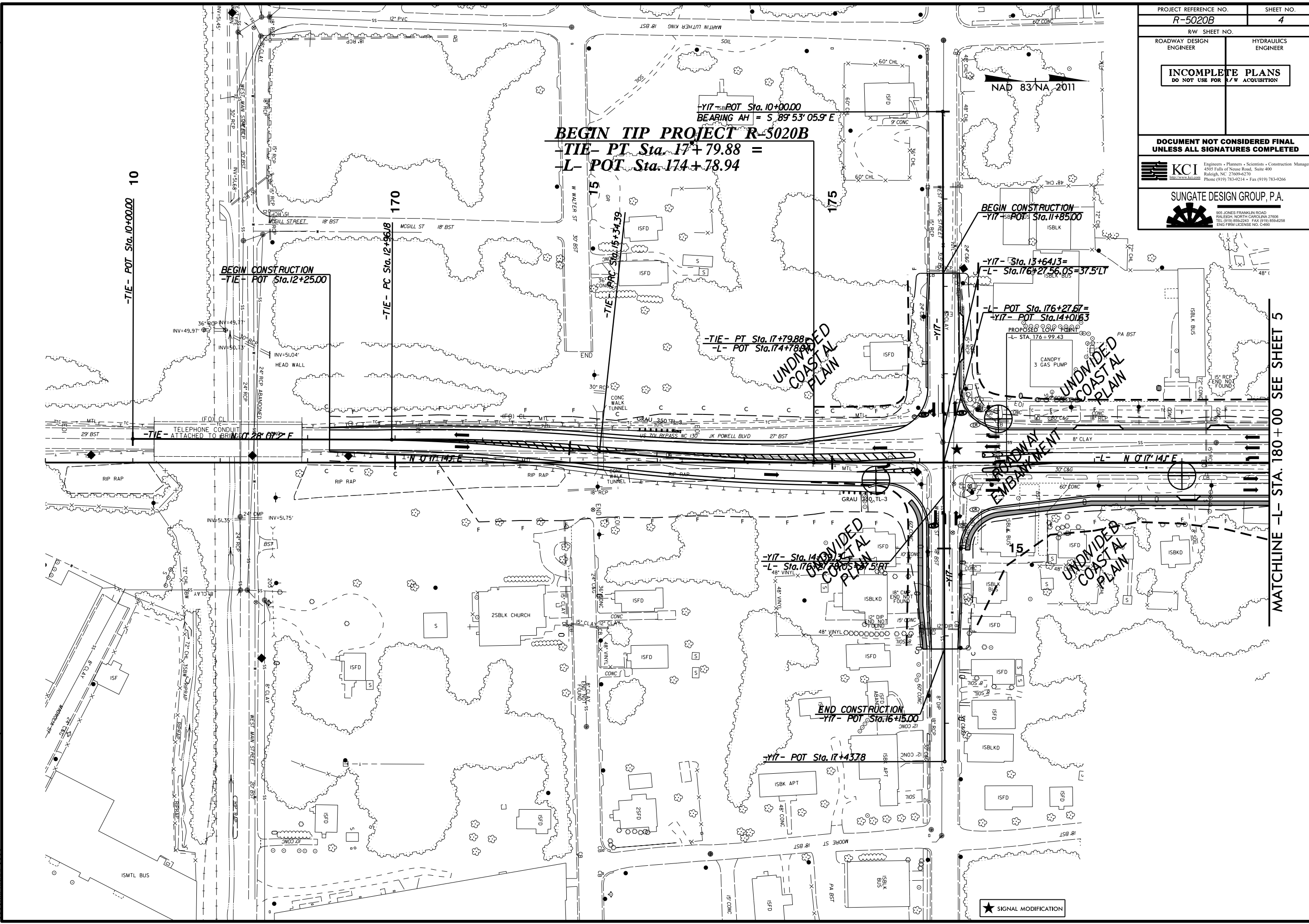
3) Water Wells: Water wells were noted within or in close proximity to the construction limits at the following locations:

| <u>Line</u> | <u>Stations</u> | <u>Offsets</u> |
|-------------|-----------------|----------------|
| -L-         | 220+00          | 100' RT        |
| -L-         | 289+33          | 85' LT         |

|   |                       |
|---|-----------------------|
| PROJECT REFERENCE NO.<br><b>R-5020B</b>   | SHEET NO.<br><b>4</b> |
| RW SHEET NO.  |                       |
| ROADWAY DESIGN ENGINEER   | HYDRAULICS ENGINEER   |
| <b>INCOMPLETE PLANS</b><br>DO NOT USE FOR R/W ACQUISITION   |                       |
| <b>DOCUMENT NOT CONSIDERED FINAL</b><br>UNLESS ALL SIGNATURES COMPLETED   |                       |
|  <b>KCI</b><br><small>Engineers • Planners • Scientists • Construction Managers</small><br><small>4505 Falls of Neuse Road, Suite 400</small><br><small>Raleigh, NC 27609-6270</small><br><small>Phone (919) 783-9214 • Fax (919) 783-9266</small> |                       |
|  <b>SUNGATE DESIGN GROUP, P.A.</b><br><small>805 JONES FRANKLIN ROAD</small><br><small>RALEIGH, NORTH CAROLINA 27608</small><br><small>TEL (919) 859-2243 FAX (919) 859-4258</small><br><small>ENG. FIRM LICENSE NO. C-995</small>                 |                       |

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 \$\$\$\$LSRNAME\$\$\$\$

REVISIONS



-TIE- POT Sta. 10+00.00 10

**BEGIN TIP PROJECT R-5020B**  
 -Y17- SB POT Sta. 10+00.00  
 BEARING AH = S 89° 53' 05.9" E  
 -TIE- PT Sta. 17+79.88 =  
 -L- POT Sta. 174+78.94

BEGIN CONSTRUCTION  
 -Y17- SB POT Sta. 11+85.00

BEGIN CONSTRUCTION  
 -TIE- POT Sta. 12+25.00

-TIE- PC Sta. 12+96.18

-TIE- PC Sta. 15+34.39

-Y17- Sta. 13+64.13 =  
 -L- Sta. 176+27.56, OS=37.5' LT

-TIE- PT Sta. 17+79.88 =  
 -L- POT Sta. 174+78.94

-L- POT Sta. 176+27.67 =  
 -Y17- POT Sta. 14+01.63

-TIE- ATTACHED TO BRIDGE

EMBANKMENT

UNDIVIDED COASTAL PLAIN

UNDIVIDED COASTAL PLAIN

END CONSTRUCTION  
 -Y17- POT Sta. 16+15.00

-Y17- POT Sta. 17+43.78

★ SIGNAL MODIFICATION

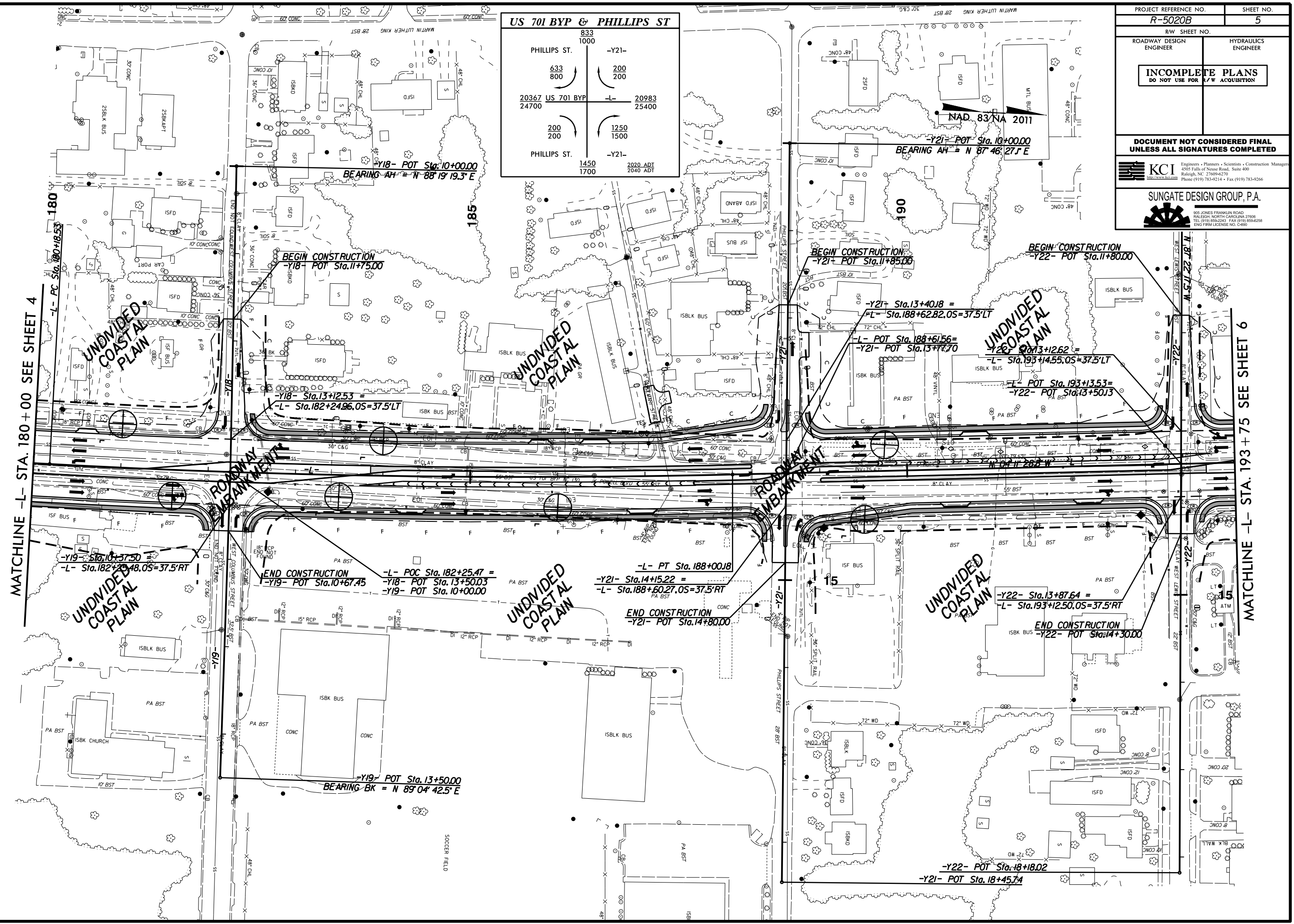
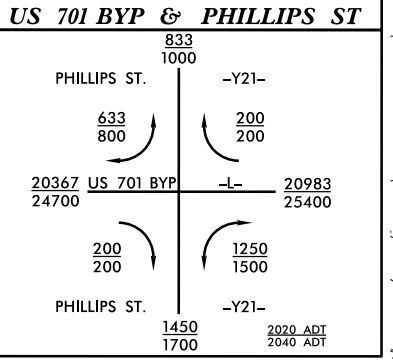
MATCHLINE -L- STA. 180+00 SEE SHEET 5

**INCOMPLETE PLANS**  
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DOCUMENT NOT CONSIDERED FINAL  
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**KCI**  
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905 JONES FRANKLIN ROAD  
RALEIGH, NORTH CAROLINA 27608  
TEL: (919) 859-2243 FAX: (919) 859-4258  
ENG. FROM LICENSE NO. C-969



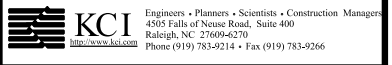

MATCHLINE -L- STA. 180+00 SEE SHEET 4

MATCHLINE -L- STA. 193+75 SEE SHEET 6

REVISIONS

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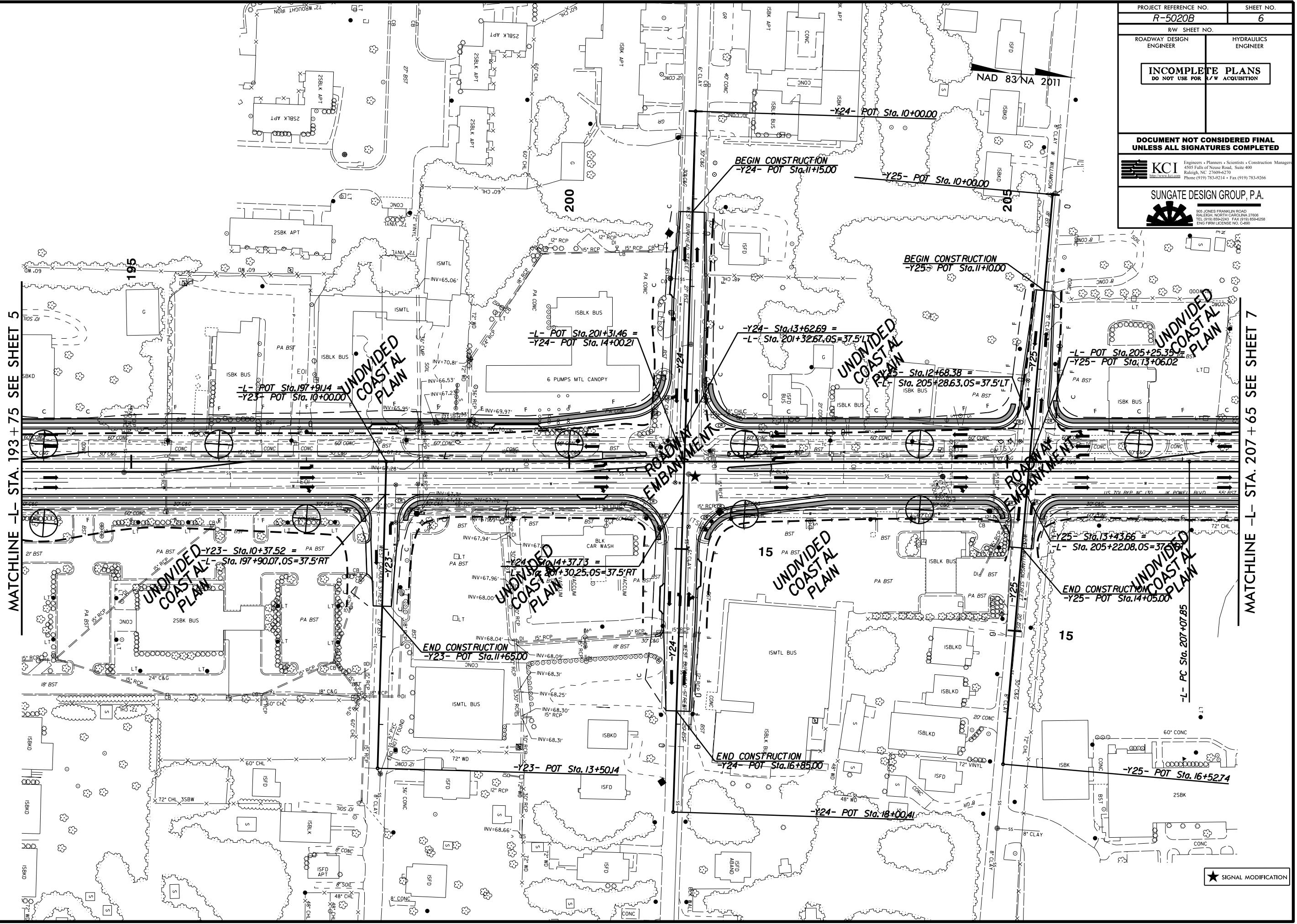
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|  |                       |
|--|-----------------------|
| PROJECT REFERENCE NO.<br><b>R-5020B</b>  | SHEET NO.<br><b>6</b> |
| R/W SHEET NO.<br>ROADWAY DESIGN ENGINEER   | HYDRAULICS ENGINEER   |
| <b>INCOMPLETE PLANS</b><br>DO NOT USE FOR R/W ACQUISITION  |                       |
| <b>DOCUMENT NOT CONSIDERED FINAL</b><br>UNLESS ALL SIGNATURES COMPLETED  |                       |
| <br><small>Engineers • Planners • Scientists • Construction Managers<br/>4505 Falls of Neuse Road, Suite 400<br/>Raleigh, NC 27609-6270<br/>Phone (919) 783-9214 • Fax (919) 783-9266</small> |                       |
| <br><small>SUNGATE DESIGN GROUP, P.A.<br/>800 JONES FRANKLIN ROAD<br/>RALEIGH, NORTH CAROLINA 27606<br/>TEL (919) 859-2243 FAX (919) 859-6258<br/>ENG. FIRM LICENSE NO. C-997</small>         |                       |

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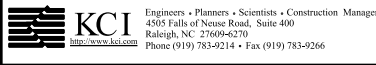



MATCHLINE -L- STA. 193 + 75 SEE SHEET 5

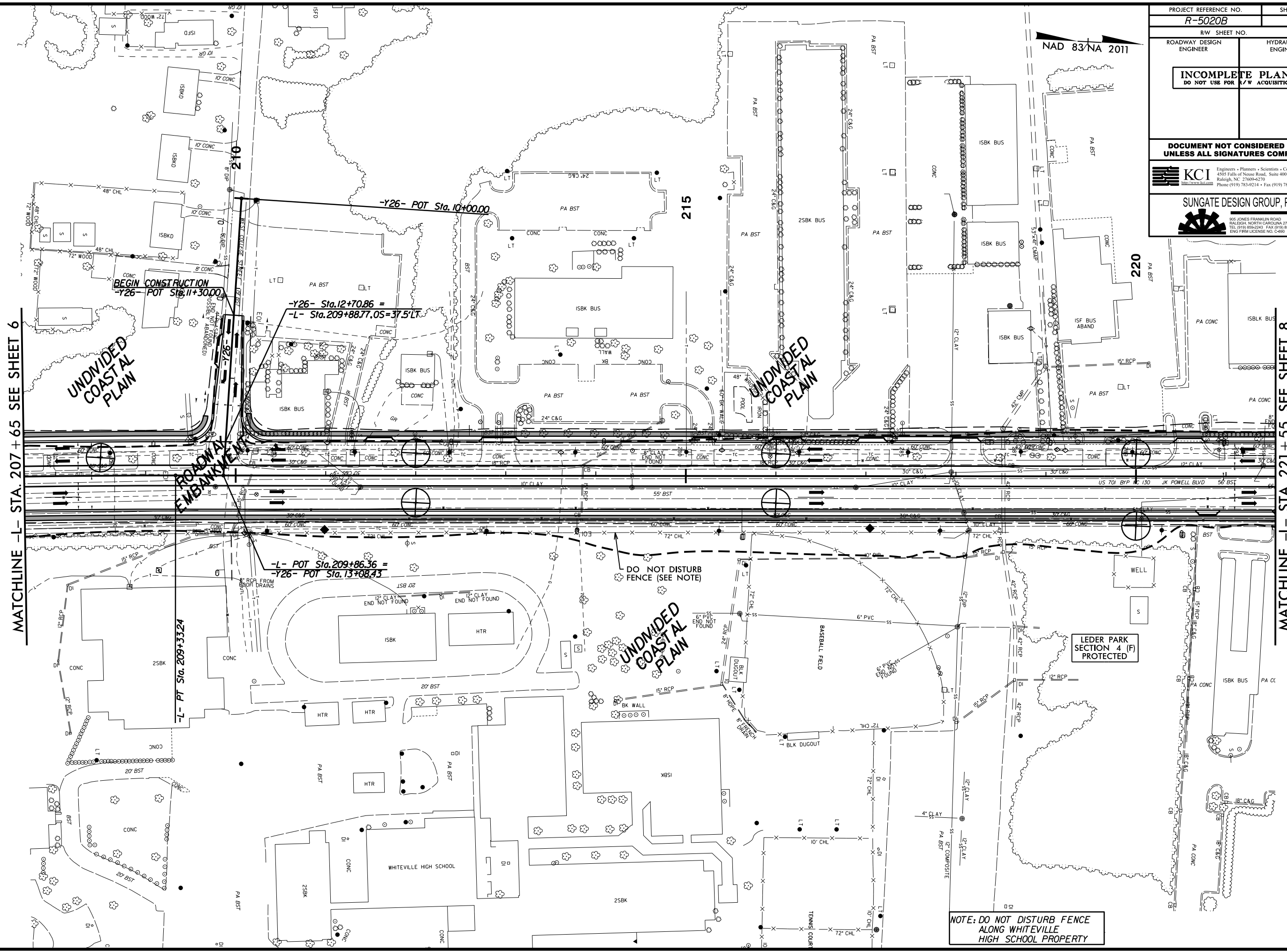
MATCHLINE -L- STA. 207 + 65 SEE SHEET 7

-L- PC Sta. 207+07.85

★ SIGNAL MODIFICATION

|  |                       |
|--|-----------------------|
| PROJECT REFERENCE NO.<br><b>R-5020B</b>  | SHEET NO.<br><b>7</b> |
| R/W SHEET NO.  | HYDRAULICS ENGINEER   |
| ROADWAY DESIGN ENGINEER  | HYDRAULICS ENGINEER   |
| <b>INCOMPLETE PLANS</b><br>DO NOT USE FOR R/W ACQUISITION  |                       |
| <b>DOCUMENT NOT CONSIDERED FINAL</b><br>UNLESS ALL SIGNATURES COMPLETED  |                       |
| <br><small>Engineers • Planners • Scientists • Construction Managers</small><br><small>4505 Falls of Neuse Road, Suite 400</small><br><small>Raleigh, NC 27609-6270</small><br><small>Phone (919) 783-9214 • Fax (919) 783-9266</small> |                       |
| <br><small>905 JONES FRANKLIN ROAD</small><br><small>RALEIGH, NORTH CAROLINA 27608</small><br><small>TEL (919) 859-2243 FAX (919) 859-4258</small><br><small>ENG FROM LICENSE NO. C-995</small>   |                       |

NAD 83/NA 2011



MATCHLINE -L- STA. 207 + 65 SEE SHEET 6

MATCHLINE -L- STA. 221 + 55 SEE SHEET 8

UNDIVIDED COASTAL PLAIN

UNDIVIDED COASTAL PLAIN

UNDIVIDED COASTAL PLAIN



LEDER PARK SECTION 4 (F) PROTECTED

NOTE: DO NOT DISTURB FENCE ALONG WHITEVILLE HIGH SCHOOL PROPERTY

REVISIONS

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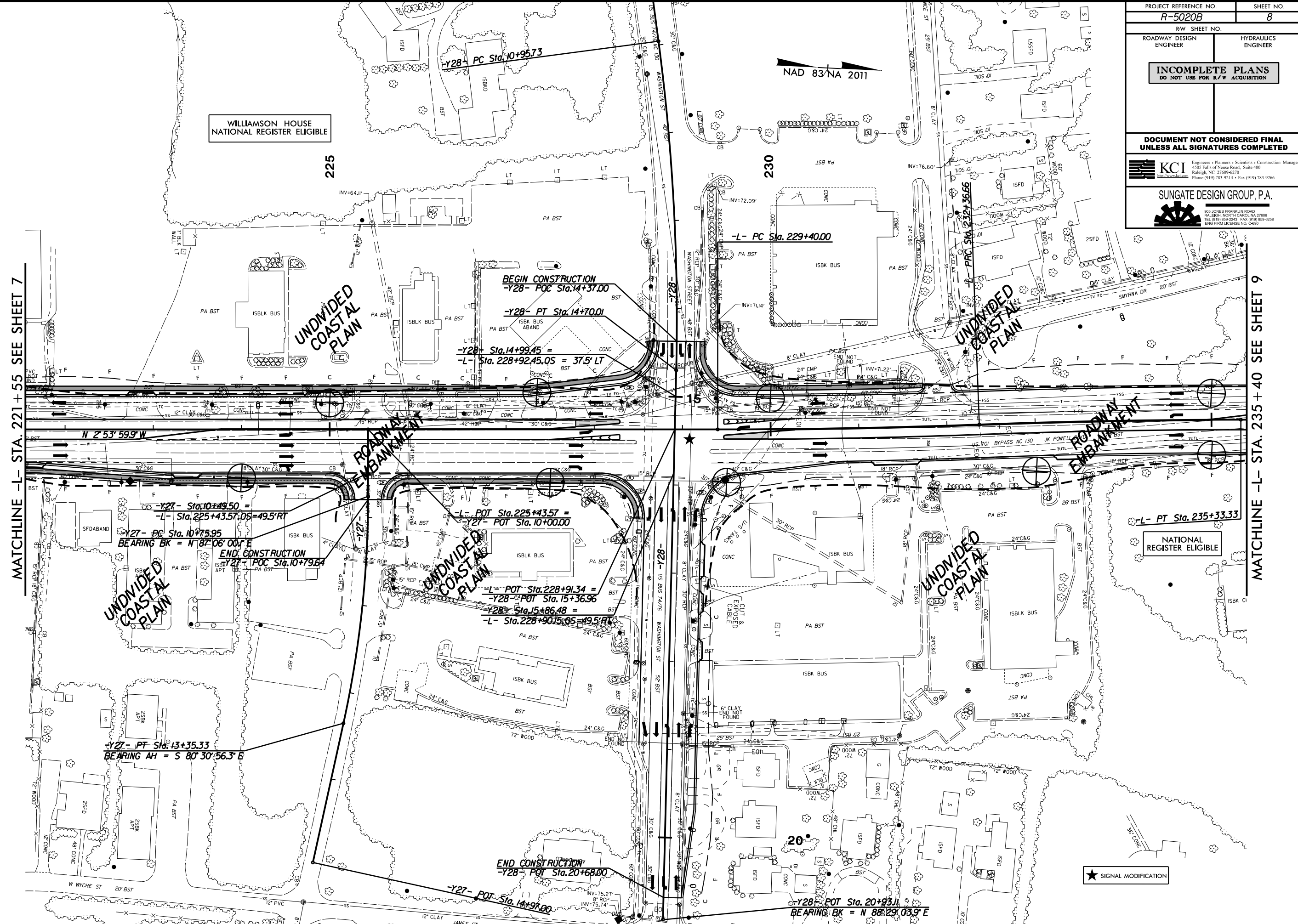
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| PROJECT REFERENCE NO.<br><b>R-5020B</b>   | SHEET NO.<br><b>8</b> |
| RW SHEET NO.  |                       |
| ROADWAY DESIGN ENGINEER   | HYDRAULICS ENGINEER   |
| <b>INCOMPLETE PLANS</b><br>DO NOT USE FOR R/W ACQUISITION   |                       |
| <b>DOCUMENT NOT CONSIDERED FINAL</b><br>UNLESS ALL SIGNATURES COMPLETED   |                       |
|  <b>KCI</b><br><small>Engineers • Planners • Scientists • Construction Managers</small><br><small>4505 Falls of Neuse Road, Suite 400</small><br><small>Raleigh, NC 27609-6270</small><br><small>Phone (919) 783-9214 • Fax (919) 783-9266</small> |                       |
|  <b>SUNGATE DESIGN GROUP, P.A.</b><br><small>805 JONES FRANKLIN ROAD</small><br><small>RALEIGH, NORTH CAROLINA 27608</small><br><small>TEL (919) 859-2243 FAX (919) 859-4258</small><br><small>ENG. FIRM LICENSE NO. C-909</small>                 |                       |

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8/17/99

MATCHLINE -L- STA. 221 + 55 SEE SHEET 7

MATCHLINE -L- STA. 235 + 40 SEE SHEET 9



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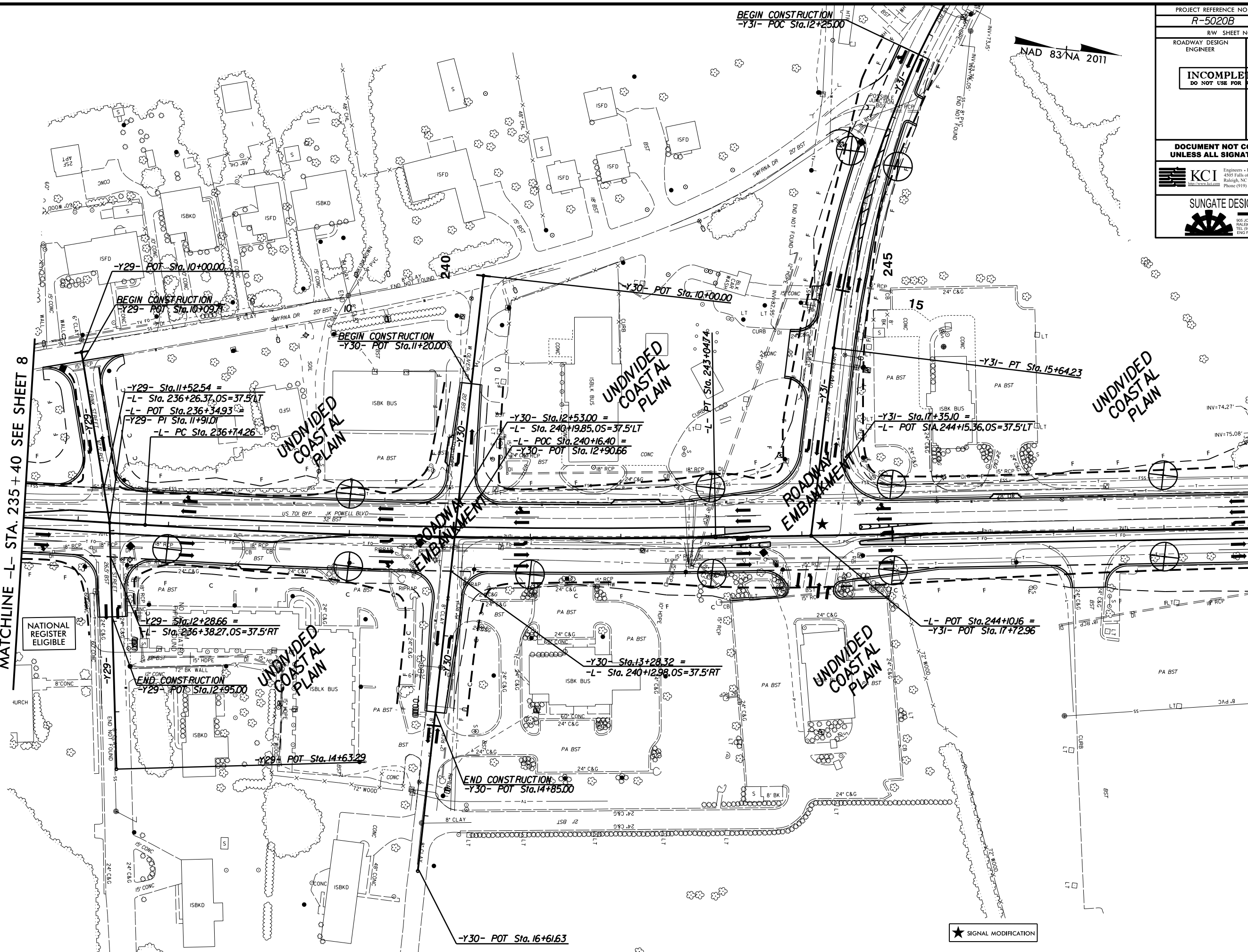
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REVISIONS

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MATCHLINE -L- STA. 235 + 40 SEE SHEET 8

MATCHLINE -L- STA. 249 + 00 SEE SHEET 10



BEGIN CONSTRUCTION  
-Y31- POC Sta.12+25.00

-Y29- POT Sta.10+00.00

BEGIN CONSTRUCTION  
-Y29- POT Sta.10+09.71

BEGIN CONSTRUCTION  
-Y30- POT Sta.11+20.00

-Y29- Sta.11+52.54 =  
-L- Sta. 236+26.37,05=37.5'LT  
-L- POT Sta.236+34.93 =  
-Y29- PI Sta.11+91.01  
-L- PC Sta.236+74.26

-Y30- Sta.12+53.00 =  
-L- Sta. 240+19.85,05=37.5'LT  
-L- POC Sta.240+16.40 =  
-Y30- POT Sta.12+90.66

-Y31- PT Sta.15+64.23  
-Y31- Sta.17+35.10 =  
-L- POT Sta.244+15.36,05=37.5'LT

-Y29- Sta.12+28.66 =  
-L- Sta. 236+38.27,05=37.5'RT

END CONSTRUCTION  
-Y29- POT Sta.12+95.00

-Y30- Sta.13+28.32 =  
-L- Sta. 240+12.98,05=37.5'RT

-L- POT Sta.244+10.16 =  
-Y31- POT Sta.17+72.96



-Y29- POT Sta.14+63.29

END CONSTRUCTION  
-Y30- POT Sta.14+85.00

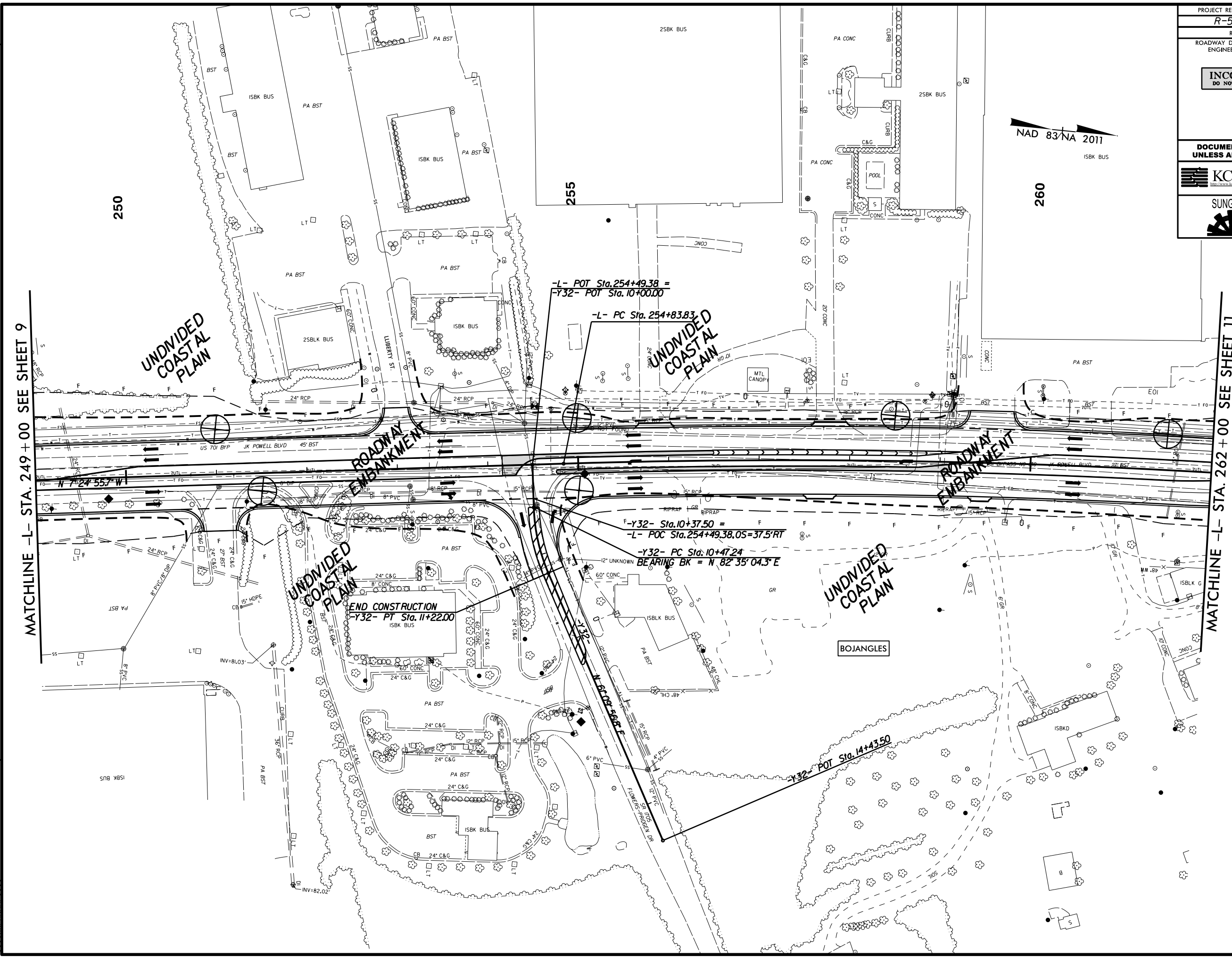
-Y30- POT Sta.16+61.63

★ SIGNAL MODIFICATION

|   |                       |
|---|-----------------------|
| PROJECT REFERENCE NO.<br><b>R-5020B</b>   | SHEET NO.<br><b>9</b> |
| RW SHEET NO.  |                       |
| ROADWAY DESIGN ENGINEER   | HYDRAULICS ENGINEER   |
| <b>INCOMPLETE PLANS</b><br>DO NOT USE FOR R/W ACQUISITION   |                       |
| <b>DOCUMENT NOT CONSIDERED FINAL</b><br>UNLESS ALL SIGNATURES COMPLETED   |                       |
|   |                       |
| <b>SUNGATE DESIGN GROUP, P.A.</b><br><small>Engineers • Planners • Scientists • Construction Managers<br/>         4505 Falls of Neuse Road, Suite 400<br/>         Raleigh, NC 27609-6270<br/>         Phone (919) 783-9214 • Fax (919) 783-9266</small> |                       |
| <small>905 JONES FRANKLIN ROAD<br/>         RALEIGH, NORTH CAROLINA 27608<br/>         TEL: (919) 859-2243 FAX: (919) 859-4258<br/>         ENG. FROM LICENSE NO. C-995</small>   |                       |

|   |  |   |  |
|---|--|---|--|
| PROJECT REFERENCE NO.<br><b>R-5020B</b>   |  | SHEET NO.<br><b>10</b>  |  |
| RW SHEET NO.  |  | HYDRAULICS ENGINEER   |  |
| ROADWAY DESIGN ENGINEER   |  | HYDRAULICS ENGINEER   |  |
| <b>INCOMPLETE PLANS</b><br>DO NOT USE FOR R/W ACQUISITION   |  |   |  |
| <b>DOCUMENT NOT CONSIDERED FINAL</b><br>UNLESS ALL SIGNATURES COMPLETED   |  |   |  |
|  <b>KCI</b>                        |  | Engineers • Planners • Scientists • Construction Managers<br>4505 Falls of Neuse Road, Suite 400<br>Raleigh, NC 27609-6270<br>Phone (919) 783-9214 • Fax (919) 783-9266 |  |
|  <b>SUNGATE DESIGN GROUP, P.A.</b> |  | 200 JONES FRANKLIN ROAD<br>RALEIGH, NORTH CAROLINA 27606<br>TEL (919) 859-2243 FAX (919) 859-4256<br>ENG. FIRM LICENSE NO. C-499  |  |

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250

255

260

MATCHLINE -L- STA. 249 + 00 SEE SHEET 9

MATCHLINE -L- STA. 262 + 00 SEE SHEET 11

UNDIVIDED COASTAL PLAIN

UNDIVIDED COASTAL PLAIN

UNDIVIDED COASTAL PLAIN

UNDIVIDED COASTAL PLAIN



REVISIONS

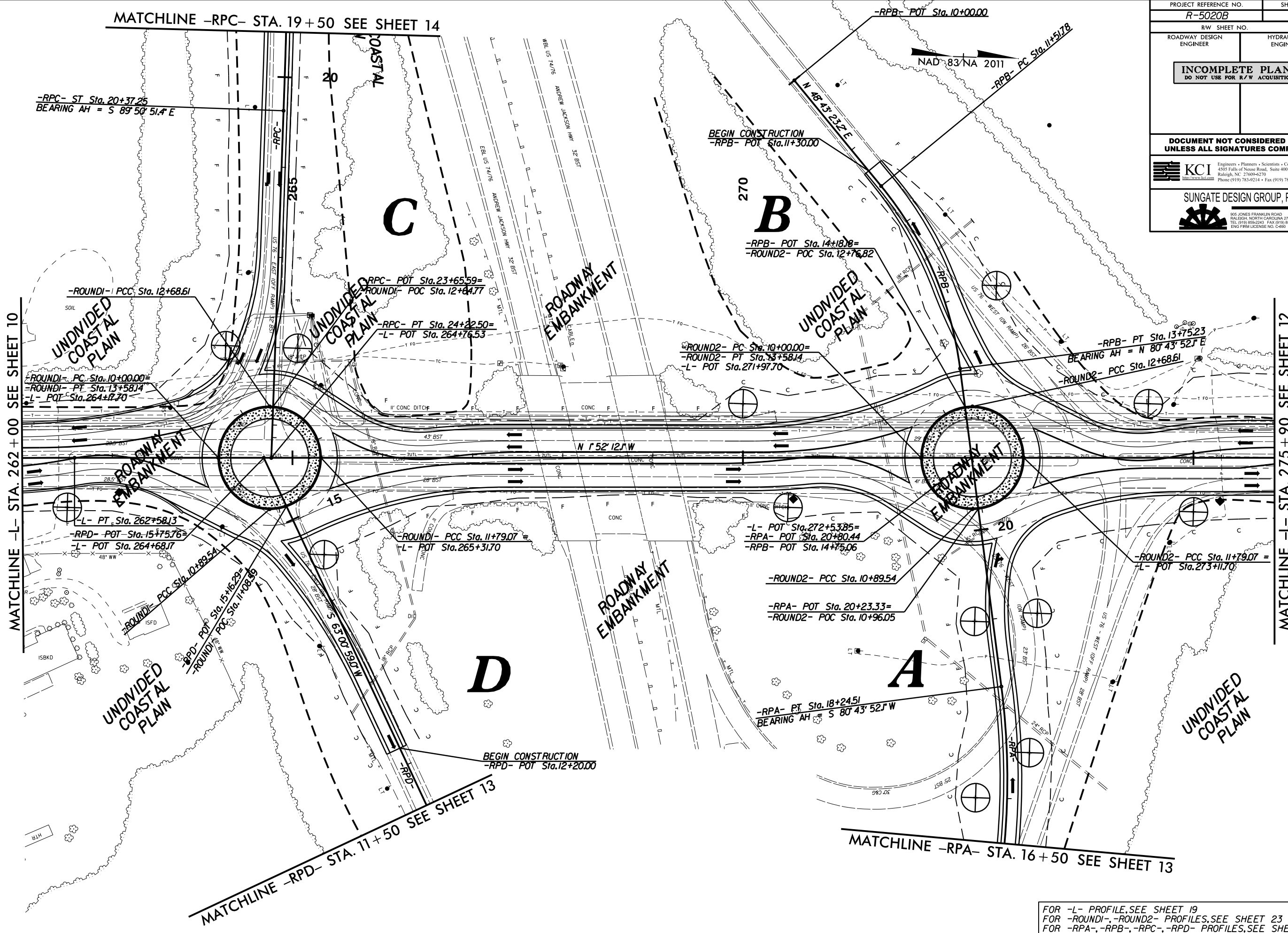
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MATCHLINE -RPC- STA. 19+50 SEE SHEET 14

|   |                        |
|---|------------------------|
| PROJECT REFERENCE NO.<br><b>R-5020B</b>   | SHEET NO.<br><b>11</b> |
| RW SHEET NO.  |                        |
| ROADWAY DESIGN ENGINEER   | HYDRAULICS ENGINEER    |
| <b>INCOMPLETE PLANS</b><br>DO NOT USE FOR R/W ACQUISITION   |                        |
| <b>DOCUMENT NOT CONSIDERED FINAL</b><br>UNLESS ALL SIGNATURES COMPLETED   |                        |
|  <b>KCI</b><br><small>Engineers • Planners • Scientists • Construction Managers</small><br><small>4505 Falls of Neuse Road, Suite 400</small><br><small>Raleigh, NC 27609-6270</small><br><small>Phone (919) 783-9214 • Fax (919) 783-9266</small> |                        |
|  <b>SUNGATE DESIGN GROUP, P.A.</b><br><small>805 JONES FRANKLIN ROAD</small><br><small>RALEIGH, NORTH CAROLINA 27608</small><br><small>TEL (919) 859-2243 FAX (919) 859-4258</small><br><small>ENCL FROM LICENSE NO. C-995</small>                 |                        |



REVISIONS

MATCHLINE -L- STA. 262+00 SEE SHEET 10

MATCHLINE -L- STA. 275+90 SEE SHEET 12


MATCHLINE -RPD- STA. 11+50 SEE SHEET 13

MATCHLINE -RPA- STA. 16+50 SEE SHEET 13

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FOR -L- PROFILE, SEE SHEET 19  
FOR -ROUND1-, -ROUND2- PROFILES, SEE SHEET 23  
FOR -RPA-, -RPB-, -RPC-, -RPD- PROFILES, SEE SHEET 24

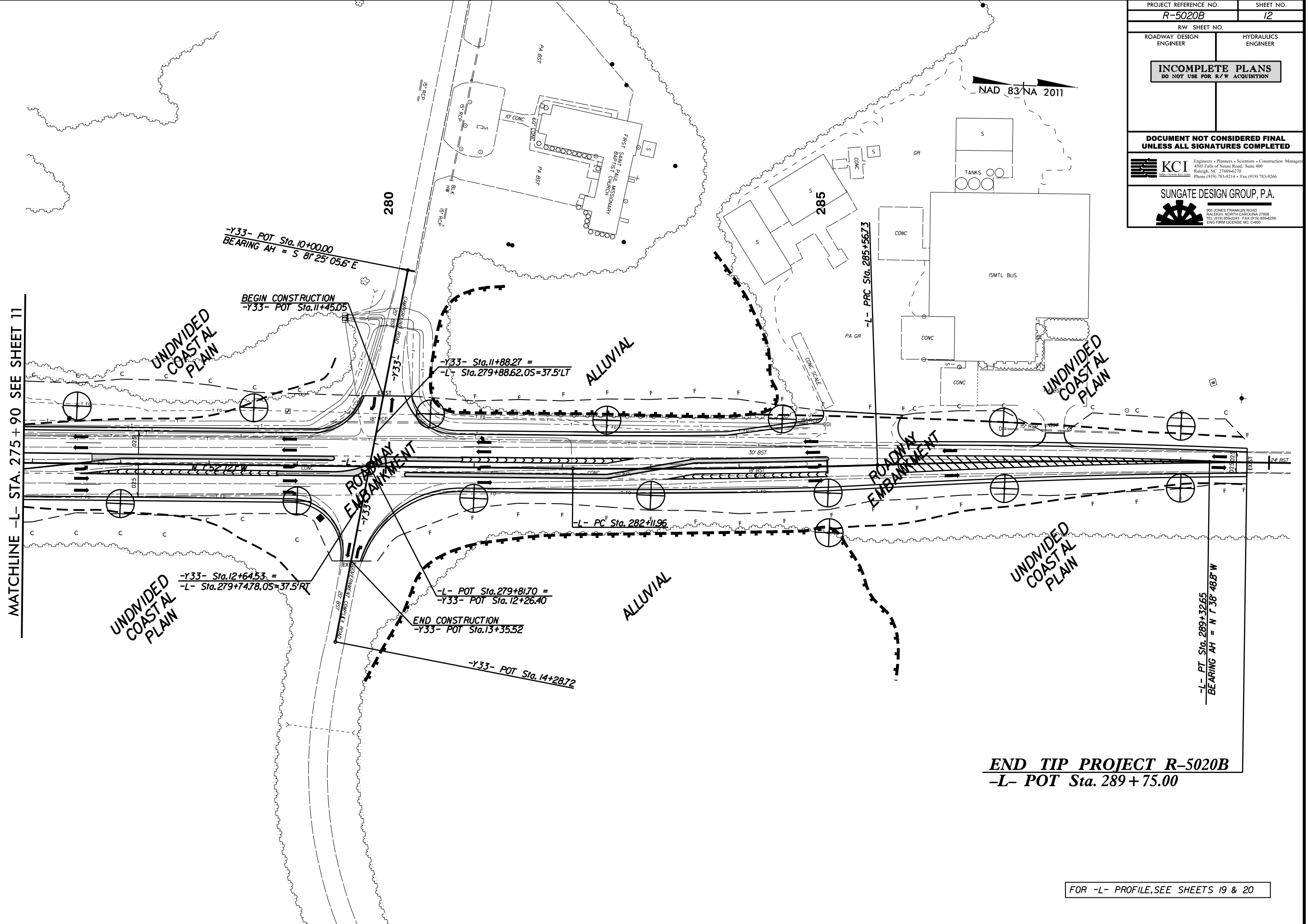
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|  |                        |
|--|------------------------|
| PROJECT REFERENCE NO.<br><b>R-5020B</b>  | SHEET NO.<br><b>12</b> |
| RW SHEET NO.   |                        |
| ROADWAY DESIGN ENGINEER  | HYDRAULICS ENGINEER    |
| <b>INCOMPLETE PLANS</b><br>DO NOT USE FOR R/W ACQUISITION  |                        |
| <b>DOCUMENT NOT CONSIDERED FINAL</b><br>UNLESS ALL SIGNATURES COMPLETED  |                        |
|  <small>Engineers • Planners • Scientists • Construction Managers</small><br>4505 Falls of Neuse Road, Suite 400<br>Raleigh, NC 27609-6270<br>Phone (919) 783-9214 • Fax (919) 783-9256 |                        |
| <b>SUNGATE DESIGN GROUP, P.A.</b><br><small>200 JONES FRANKLIN ROAD<br/>         RALEIGH, NORTH CAROLINA 27606<br/>         TEL (919) 859-2243 FAX (919) 859-6258<br/>         ENG FROM LICENSE NO. C-909</small>  |                        |

REVISIONS

MATCHLINE -L- STA. 275 + 90 SEE SHEET 11

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**END TIP PROJECT R-5020B**  
**-L- POT Sta. 289 + 75.00**

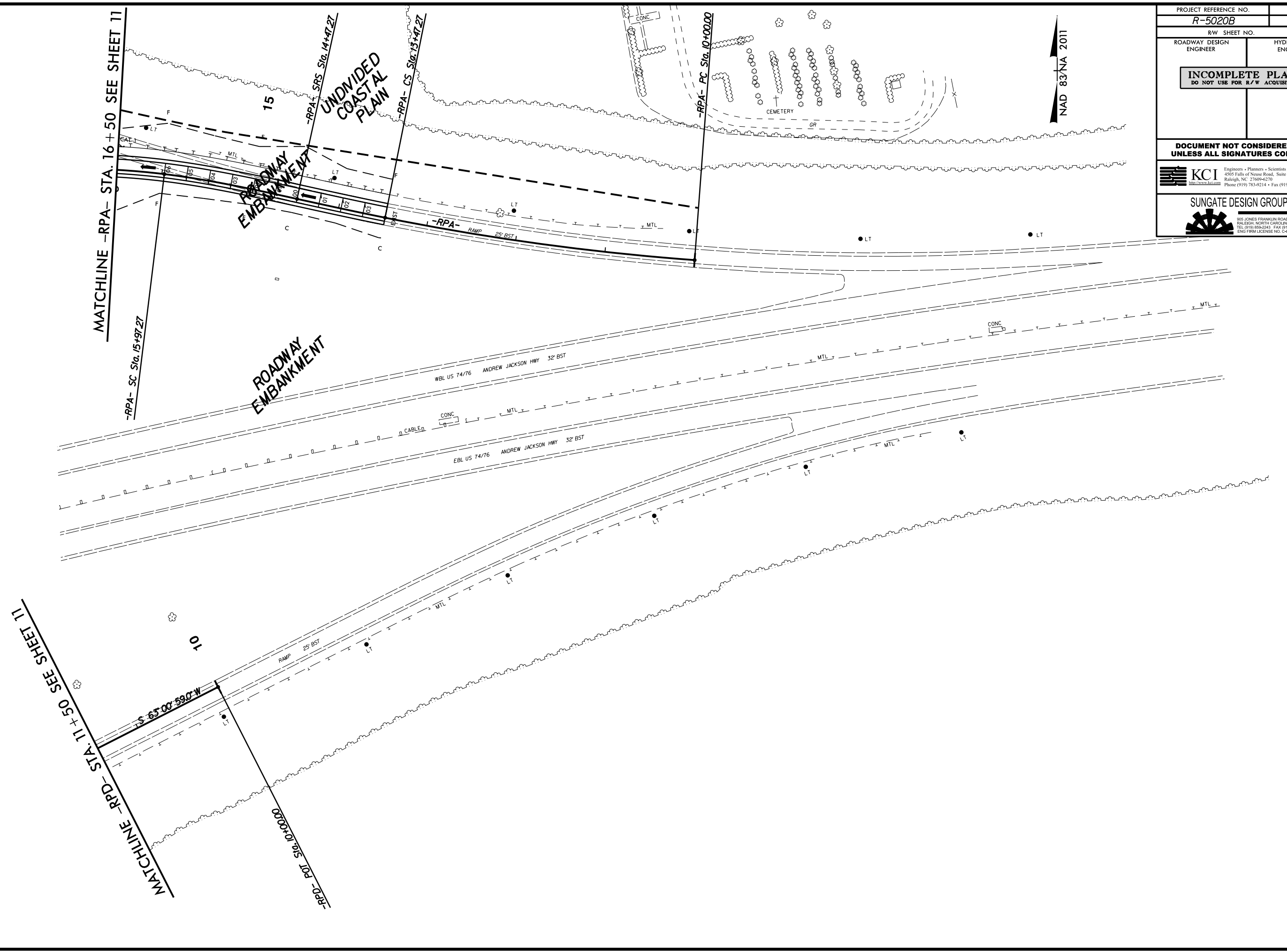
FOR -L- PROFILE, SEE SHEETS 19 & 20





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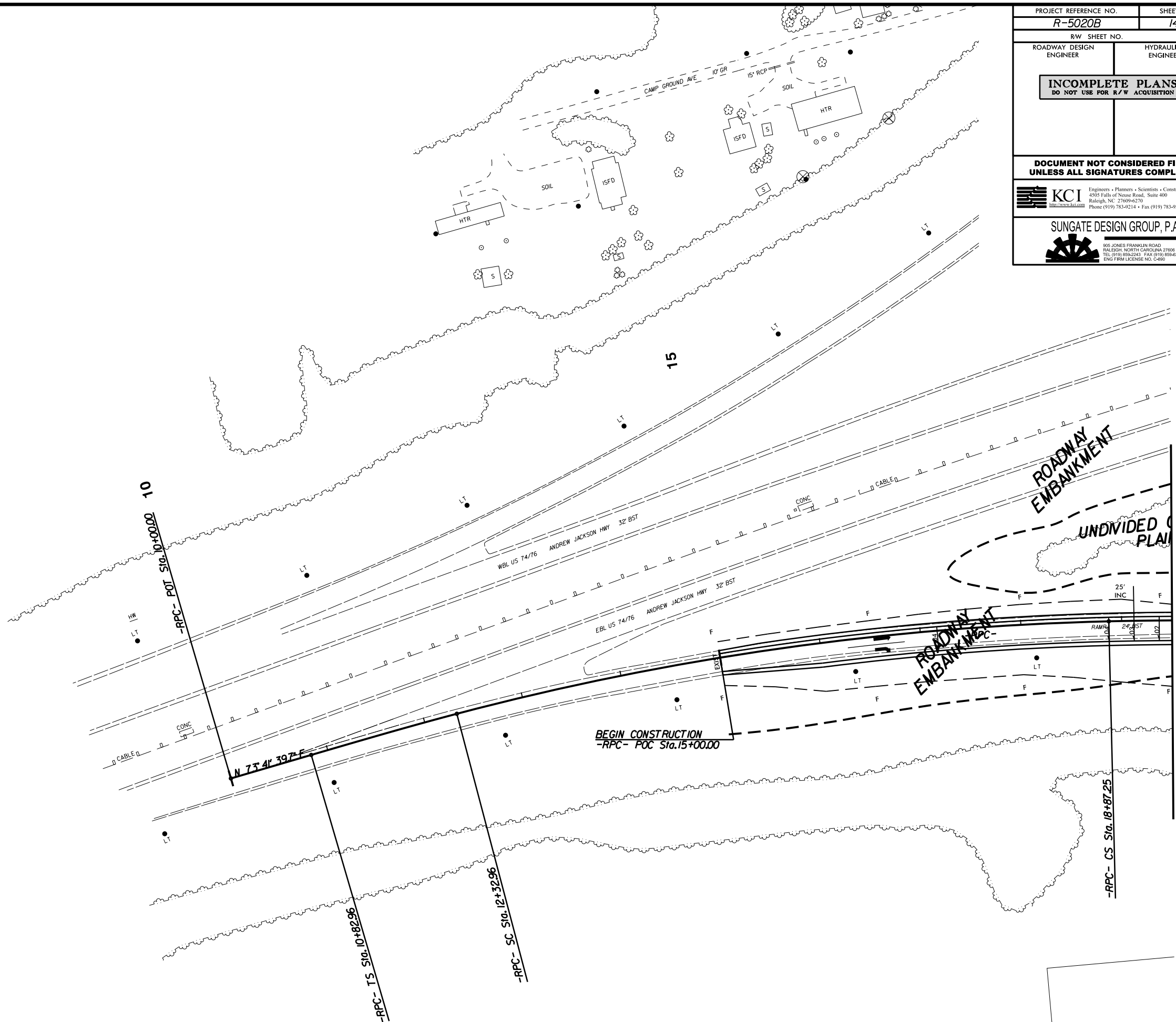
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| PROJECT REFERENCE NO.<br><b>R-5020B</b>   |  | SHEET NO.<br><b>13</b>  |  |
| RW SHEET NO.  |  |   |  |
| ROADWAY DESIGN ENGINEER   |  | HYDRAULICS ENGINEER   |  |
| <b>INCOMPLETE PLANS</b><br>DO NOT USE FOR R/W ACQUISITION   |  |   |  |
| <b>DOCUMENT NOT CONSIDERED FINAL</b><br>UNLESS ALL SIGNATURES COMPLETED   |  |   |  |
|  <b>KCI</b><br><small>Engineers • Planners • Scientists • Construction Managers</small><br><small>4505 Falls of Neuse Road, Suite 400</small><br><small>Raleigh, NC 27609-6270</small><br><small>Phone (919) 783-9214 • Fax (919) 783-9266</small> |  | <br><b>SUNGATE DESIGN GROUP, P.A.</b><br><small>805 JONES FRANKLIN ROAD</small><br><small>RALEIGH, NORTH CAROLINA 27608</small><br><small>TEL (919) 858-2243 FAX (919) 859-4258</small><br><small>ENG FROM LICENSE NO. C-695</small> |  |



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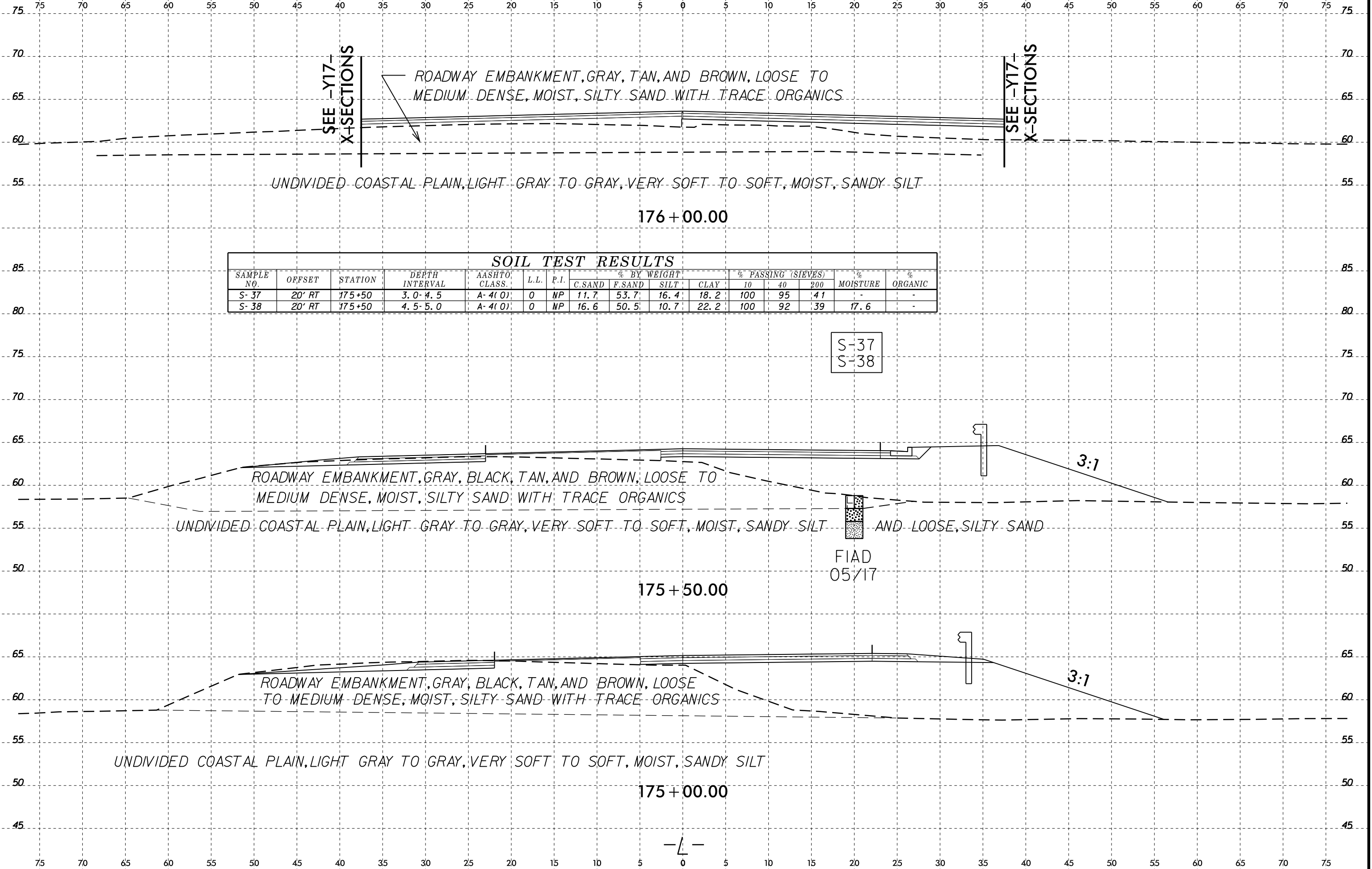
REVISIONS

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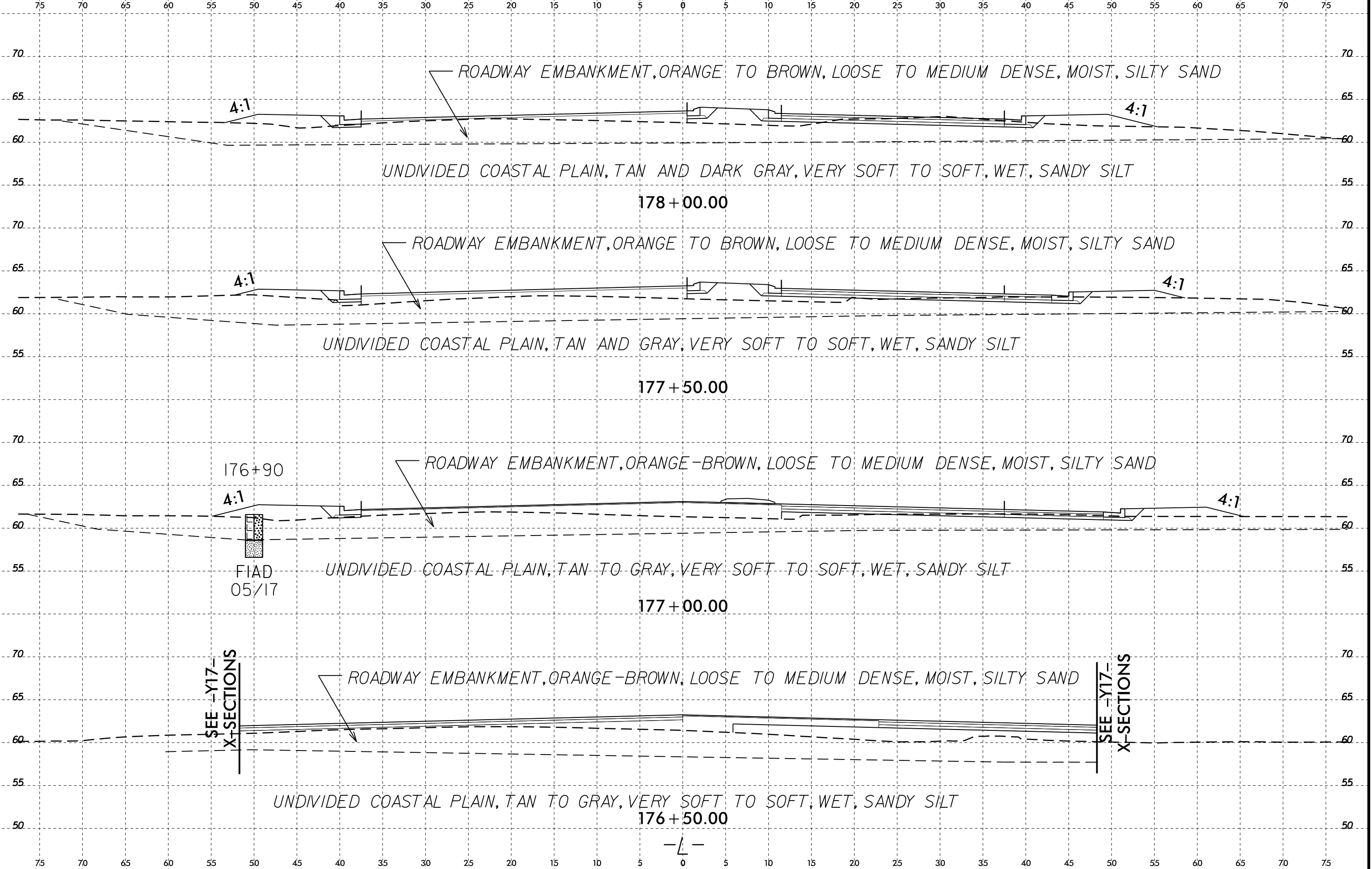


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|--|------------------------|
| PROJECT REFERENCE NO.<br><b>R-5020B</b>  | SHEET NO.<br><b>14</b> |
| RW SHEET NO.   |                        |
| ROADWAY DESIGN ENGINEER  | HYDRAULICS ENGINEER    |
| <b>INCOMPLETE PLANS</b><br>DO NOT USE FOR R/W ACQUISITION  |                        |
| <b>DOCUMENT NOT CONSIDERED FINAL</b><br>UNLESS ALL SIGNATURES COMPLETED  |                        |
|  KCI<br><small>Engineers • Planners • Scientists • Construction Managers<br/>4505 Falls of Neuse Road, Suite 400<br/>Raleigh, NC 27609-6270<br/>Phone (919) 783-9214 • Fax (919) 783-9266</small> |                        |
|  <b>SUNGATE DESIGN GROUP, P.A.</b><br><small>805 JONES FRANKLIN ROAD<br/>RALEIGH, NORTH CAROLINA 27608<br/>TEL (919) 858-2243 FAX (919) 858-4258<br/>ENG FROM LICENSE NO. C-490</small>           |                        |

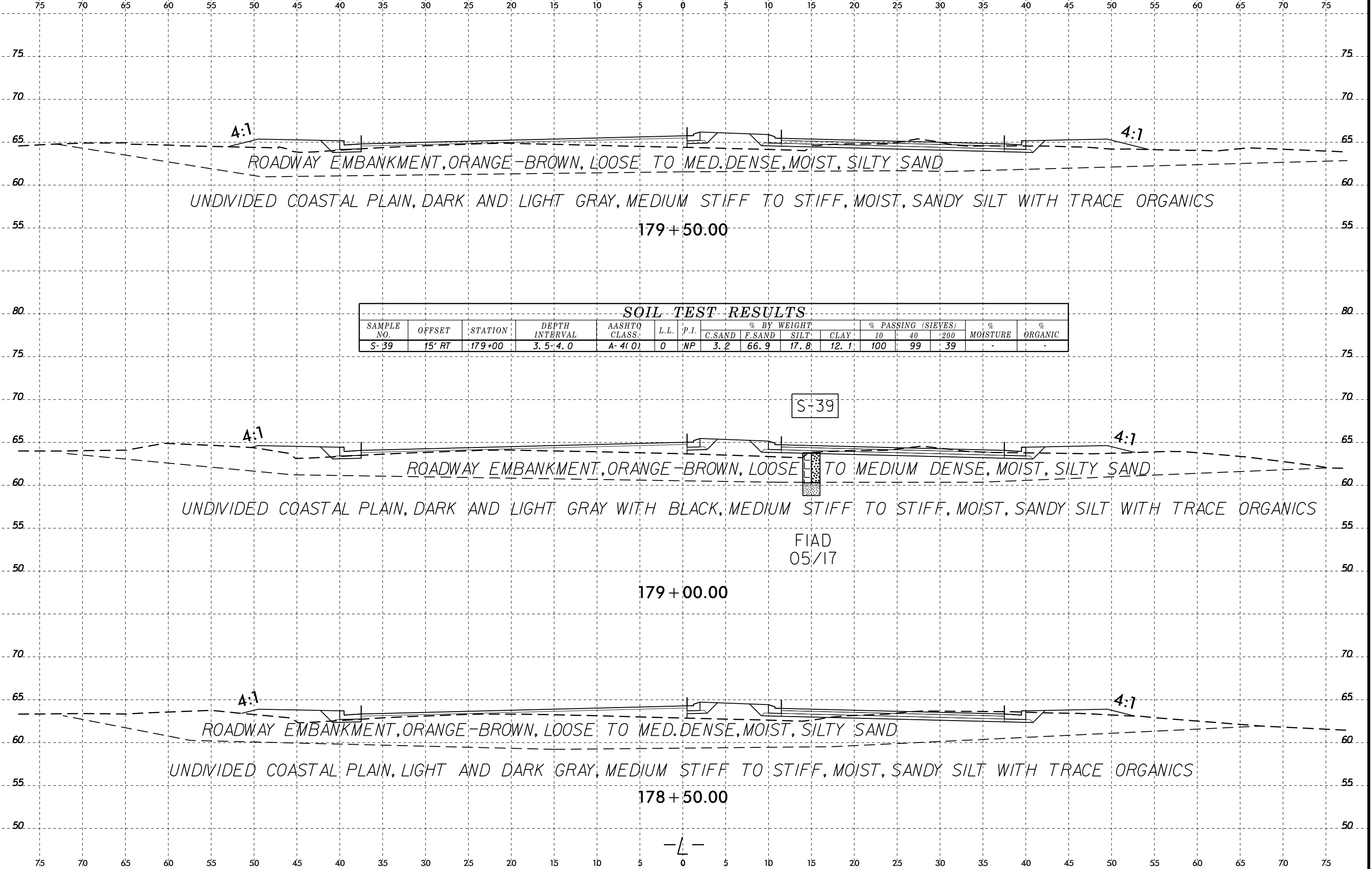
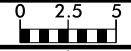
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6/23/16



**SOIL TEST RESULTS**

| SAMPLE NO. | OFFSET | STATION | DEPTH INTERVAL | AASHTO CLASS. | L.L. | P.I. | % BY WEIGHT |        |      |      | % PASSING (SIEVES) |    |     | % MOISTURE | % ORGANIC |
|------------|--------|---------|----------------|---------------|------|------|-------------|--------|------|------|--------------------|----|-----|------------|-----------|
|            |        |         |                |               |      |      | C.SAND      | F.SAND | SILT | CLAY | 10                 | 40 | 200 |            |           |
| S-39       | 15' RT | 179+00  | 3.5'-4.0'      | A-4(0)        | 0    | NP   | 3.2         | 66.9   | 17.8 | 12.1 | 100                | 99 | 39  | -          | -         |

S-39

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05/17

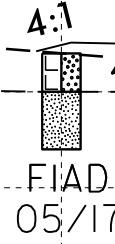
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| SOIL TEST RESULTS |        |         |                |              |      |      |             |        |      |      |                    |    |     |            |           |
|-------------------|--------|---------|----------------|--------------|------|------|-------------|--------|------|------|--------------------|----|-----|------------|-----------|
| SAMPLE NO.        | OFFSET | STATION | DEPTH INTERVAL | AASHTO CLASS | L.L. | P.L. | % BY WEIGHT |        |      |      | % PASSING (SIEVES) |    |     | % MOISTURE | % ORGANIC |
|                   |        |         |                |              |      |      | C.SAND      | F.SAND | SILT | CLAY | 10                 | 40 | 200 |            |           |
| S-48              | 50' LT | 181+00  | 2.5-3.0        | A-4(0)       | 20   | 5    | 2.4         | 57.6   | 19.8 | 20.2 | 100                | 99 | 50  | -          | -         |

S-48



ROADWAY EMBANKMENT, TAN TO BROWN, LOOSE TO MEDIUM DENSE, MOIST, SILTY SAND

UNDIVIDED COASTAL PLAIN, ORANGE TO BROWN, SOFT TO MEDIUM STIFF, MOIST, SANDY SILT

181+00.00

ROADWAY EMBANKMENT, TAN TO BROWN, LOOSE TO MEDIUM DENSE, MOIST, SILTY SAND

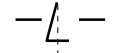
UNDIVIDED COASTAL PLAIN, ORANGE TO BROWN, SOFT TO MEDIUM STIFF, MOIST, SANDY SILT

180+50.00

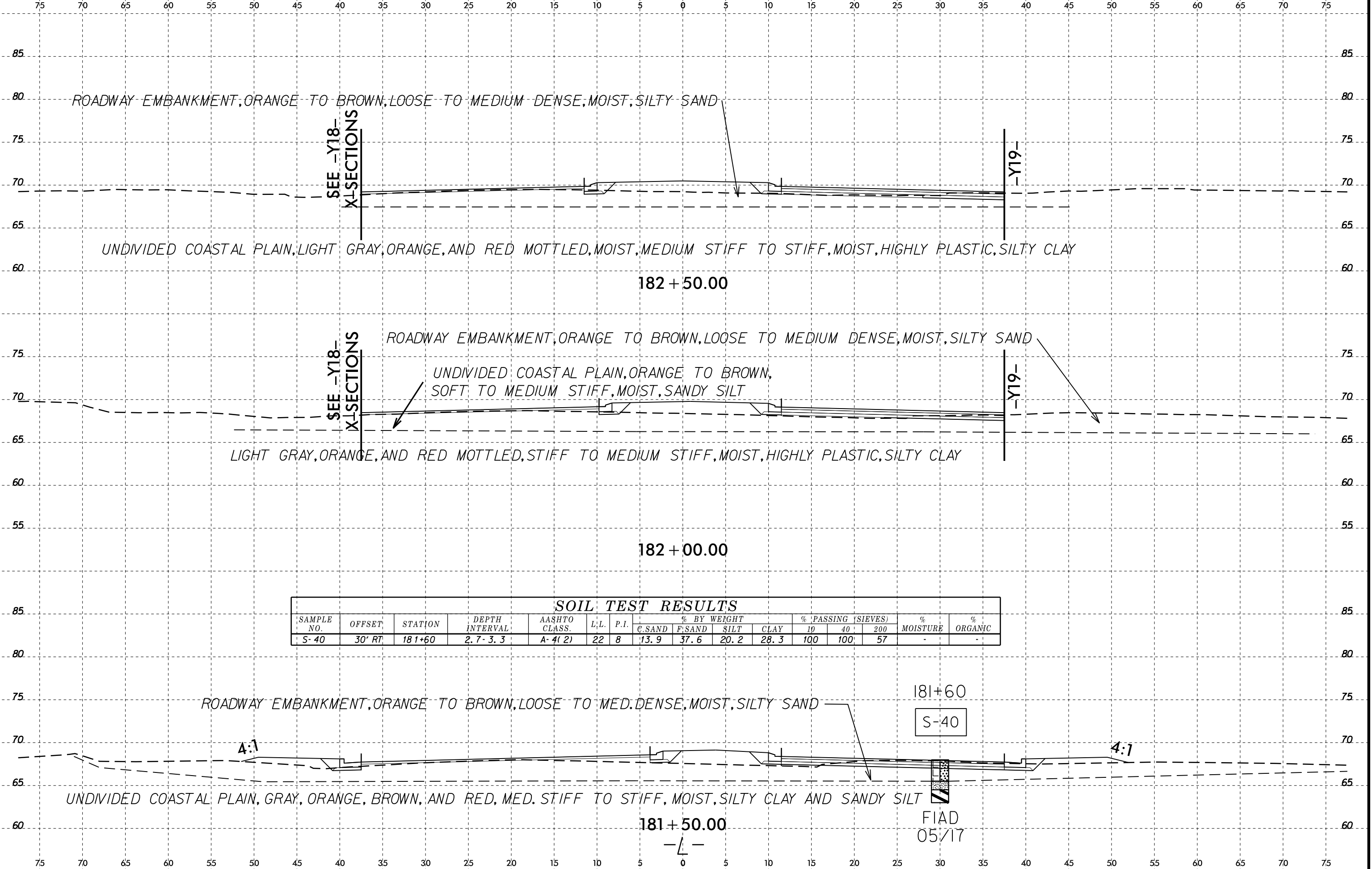
ROADWAY EMBANKMENT, TAN-ORANGE, LOOSE TO MED. DENSE, MOIST, SILTY SAND

UNDIVIDED COASTAL PLAIN, ORANGE-BROWN AND GRAY, SOFT TO MEDIUM STIFF, MOIST, SANDY SILT

180+00.00

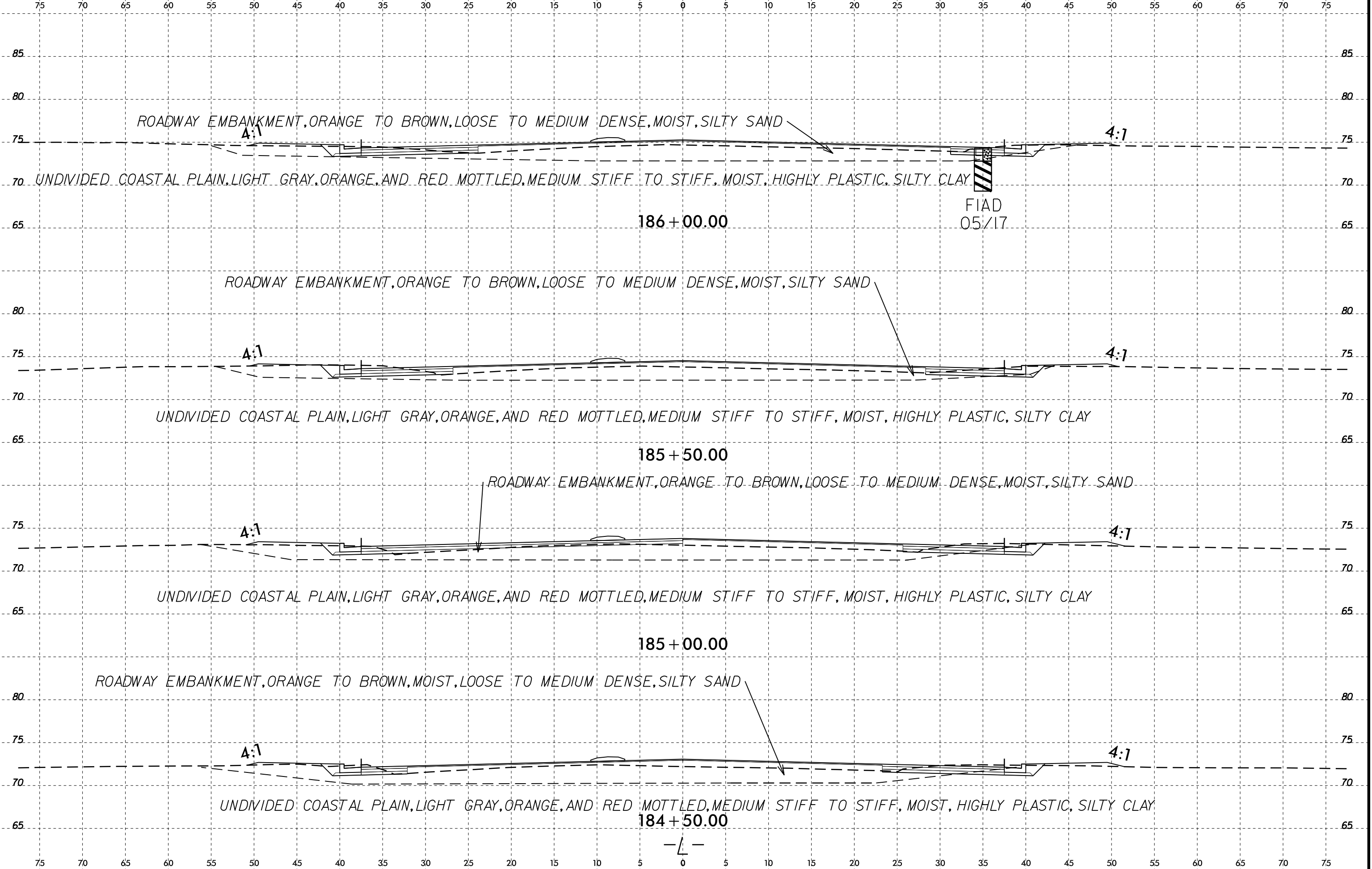


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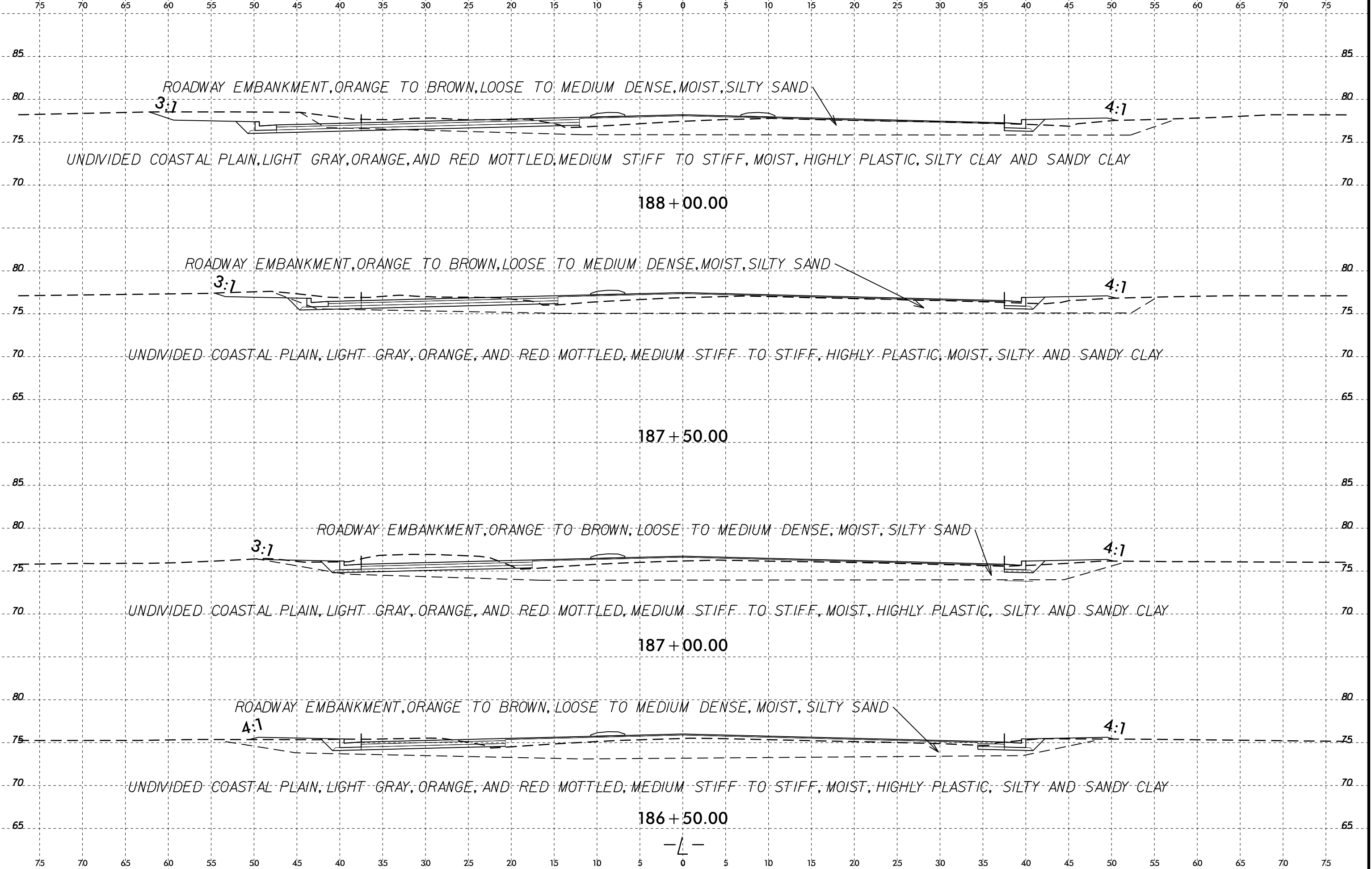




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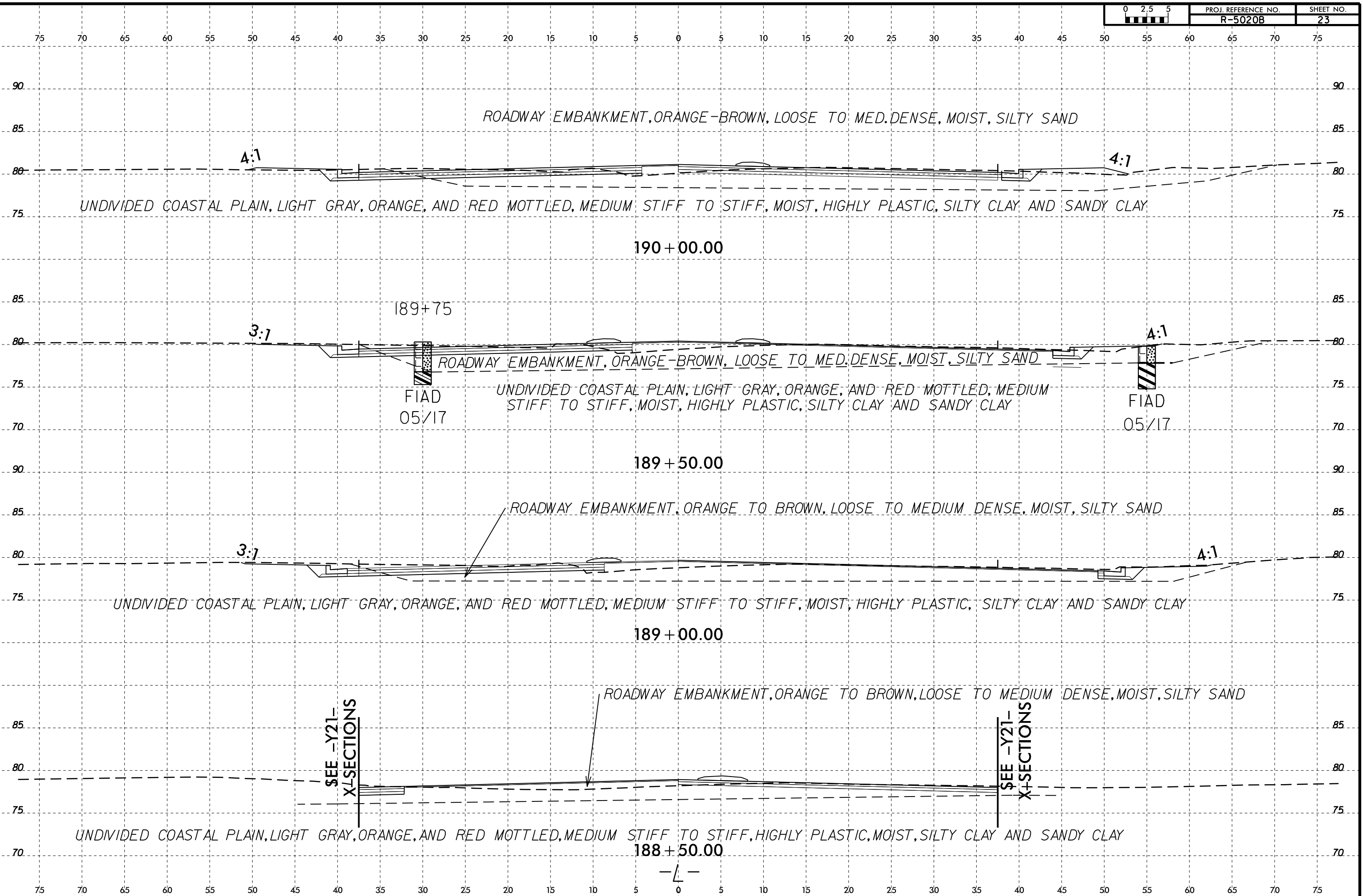
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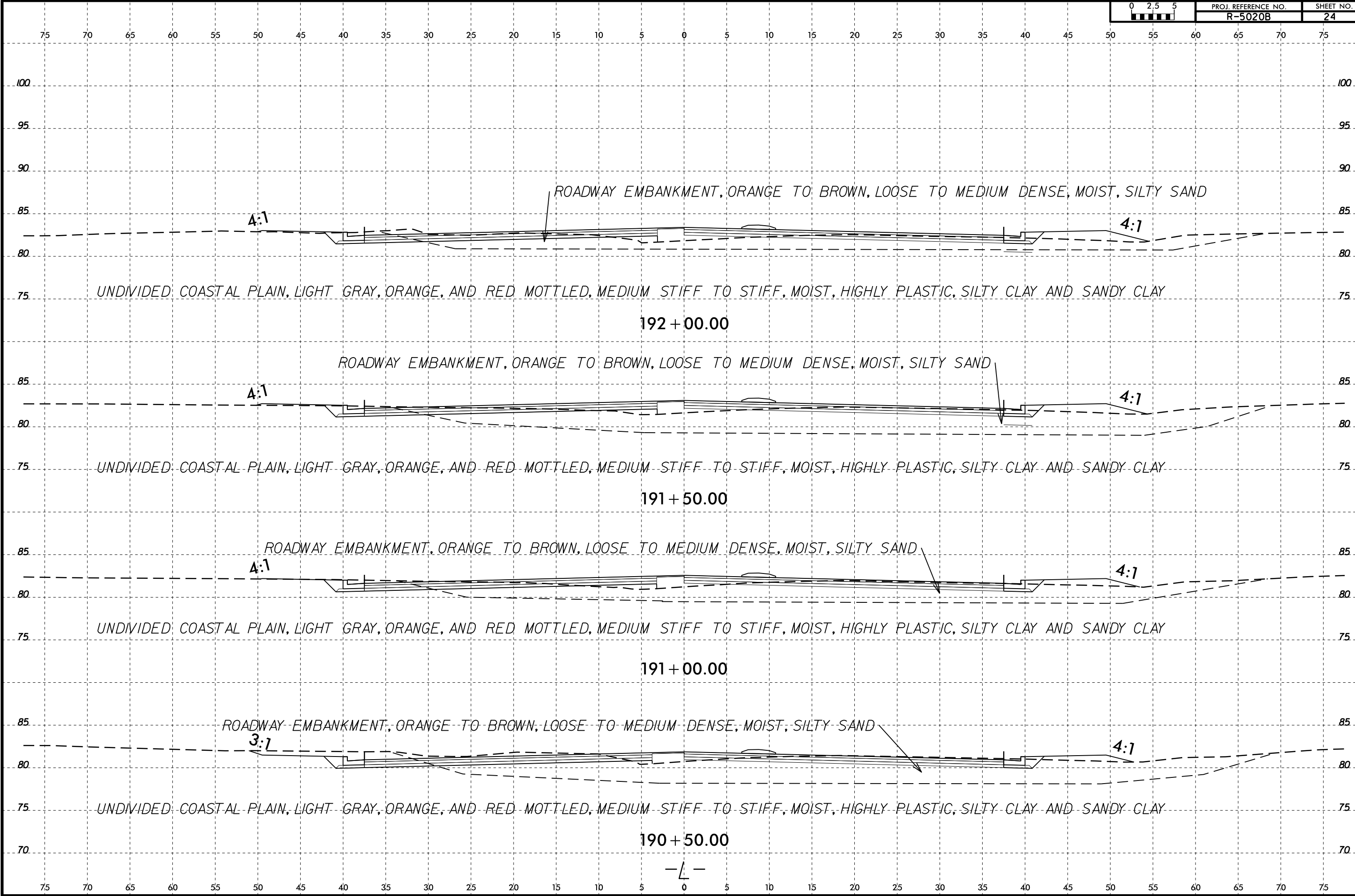
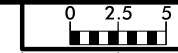




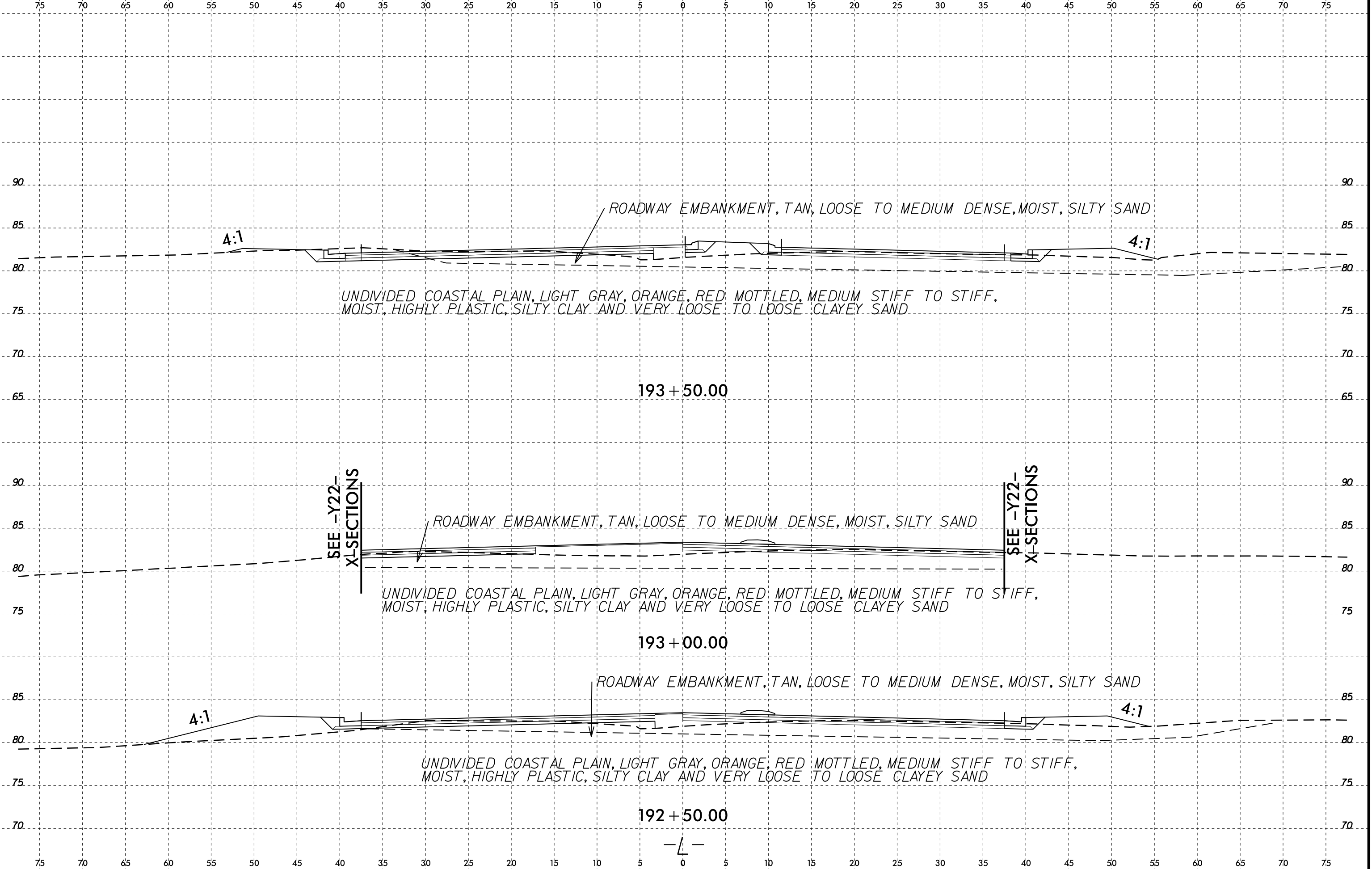
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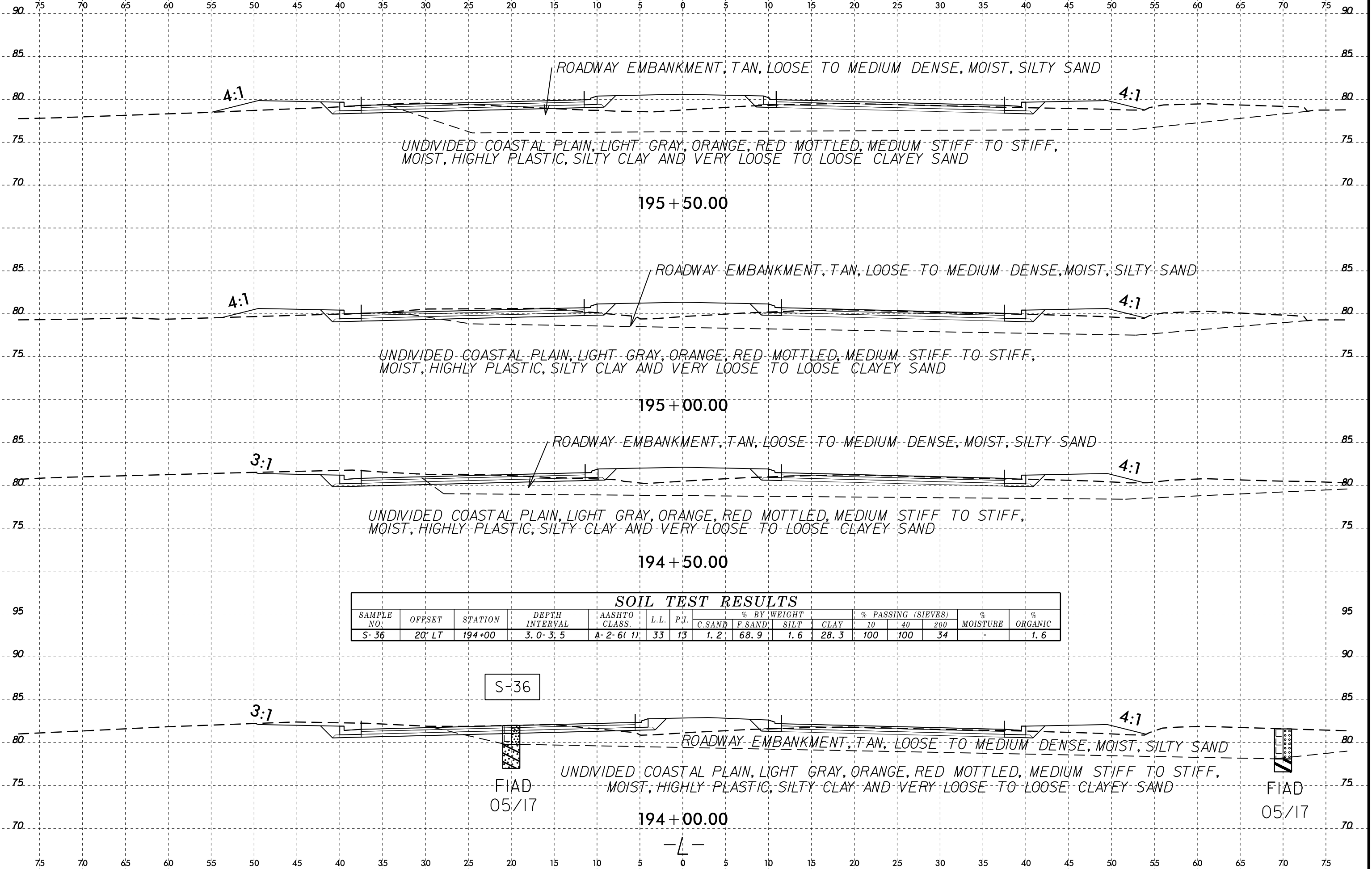




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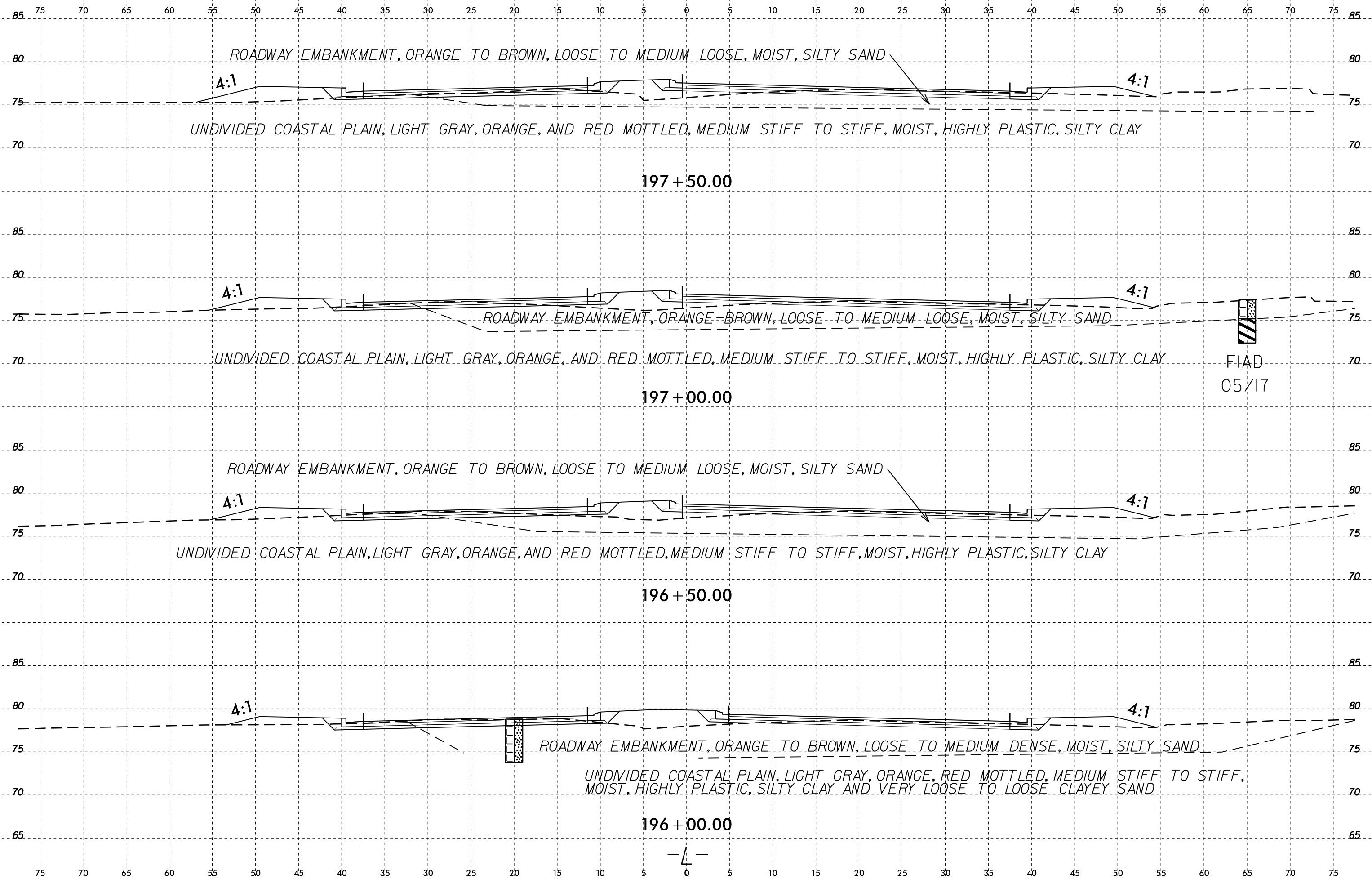
| SOIL TEST RESULTS |        |         |                |               |      |      |             |        |      |      |                    |     |     |            |           |
|-------------------|--------|---------|----------------|---------------|------|------|-------------|--------|------|------|--------------------|-----|-----|------------|-----------|
| SAMPLE NO.        | OFFSET | STATION | DEPTH INTERVAL | AASHTO CLASS. | L.L. | P.I. | % BY WEIGHT |        |      |      | % PASSING (SIEVES) |     |     | % MOISTURE | % ORGANIC |
|                   |        |         |                |               |      |      | C.SAND      | F.SAND | SILT | CLAY | 10                 | 40  | 200 |            |           |
| S-36              | 20' LT | 194+00  | 3.0-3.5        | A-2-6(1)      | 33   | 13   | 1.2         | 68.9   | 1.6  | 28.3 | 100                | 100 | 34  |            | 1.6       |

S-36

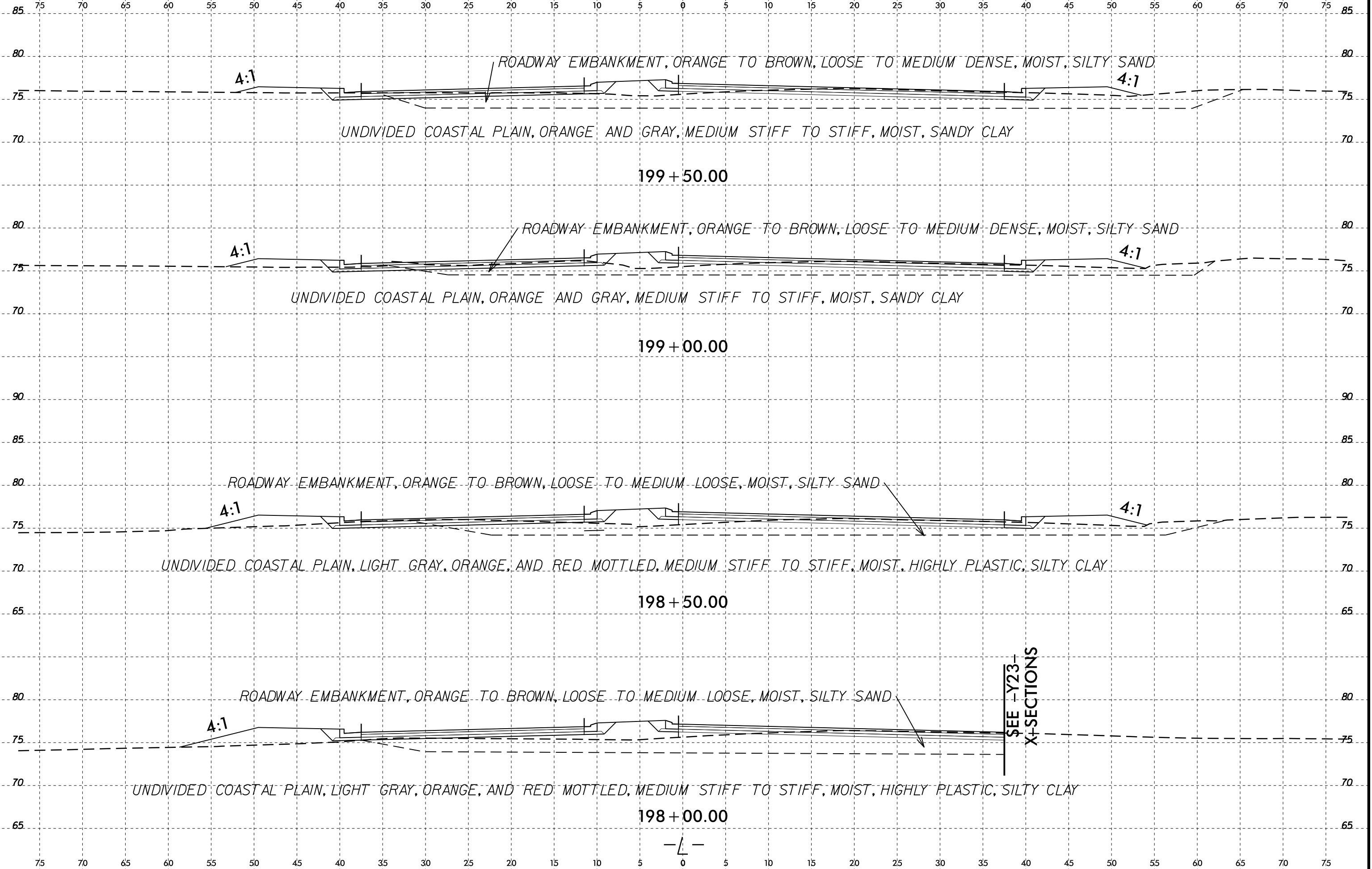
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05/17

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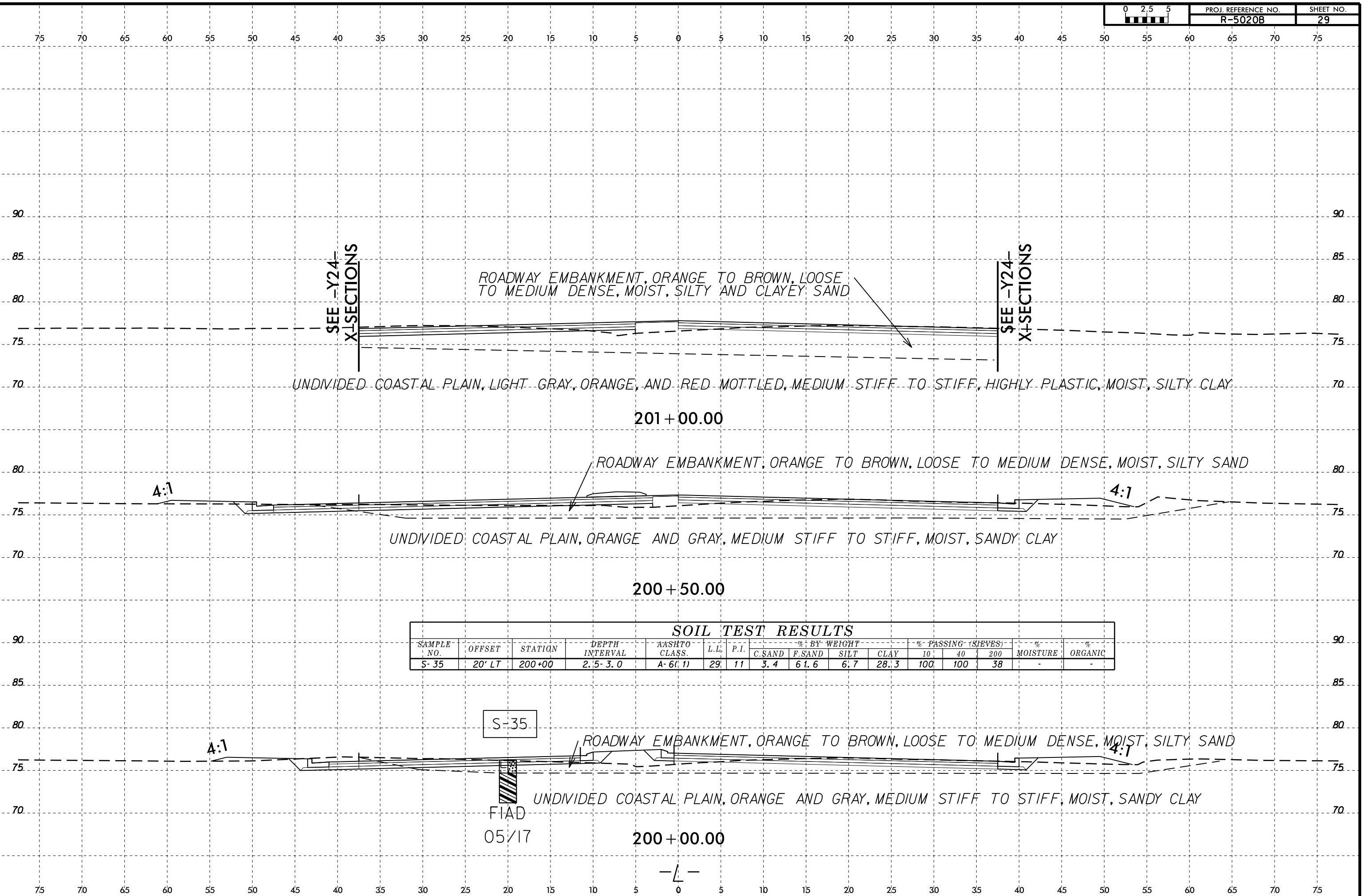
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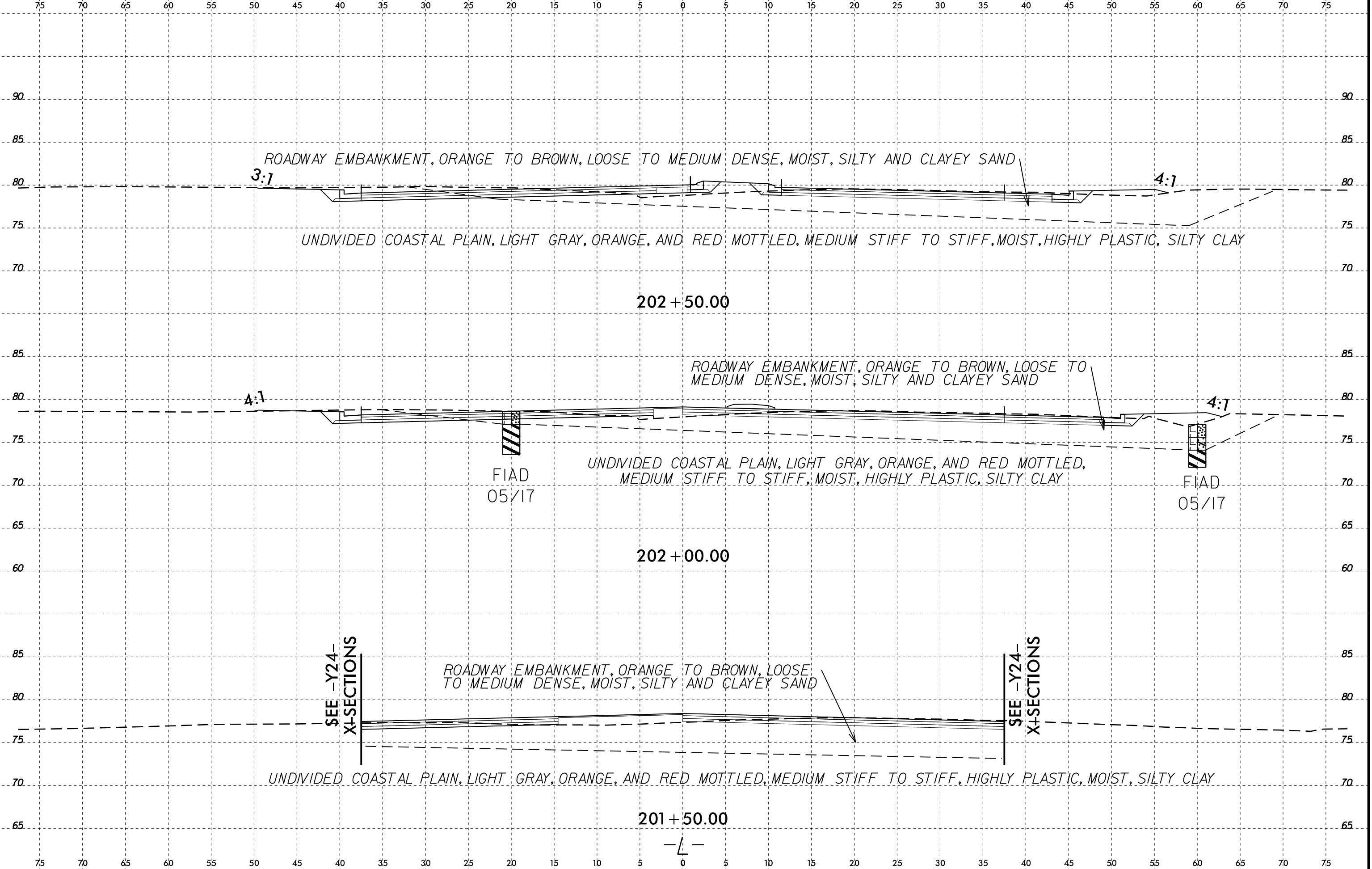


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| SOIL TEST RESULTS |        |         |                |               |      |      |             |         |      |      |                    |     |     |            |           |
|-------------------|--------|---------|----------------|---------------|------|------|-------------|---------|------|------|--------------------|-----|-----|------------|-----------|
| SAMPLE NO.        | OFFSET | STATION | DEPTH INTERVAL | AASHTO CLASS. | L.L. | P.I. | % BY WEIGHT |         |      |      | % PASSING (SIEVES) |     |     | % MOISTURE | % ORGANIC |
|                   |        |         |                |               |      |      | C. SAND     | F. SAND | SILT | CLAY | 10                 | 40  | 200 |            |           |
| S-35              | 20' LT | 200+00  | 2.5-3.0        | A-6(1)        | 29   | 11   | 3.4         | 61.6    | 6.7  | 28.3 | 100                | 100 | 38  | -          | -         |

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ROADWAY EMBANKMENT, ORANGE TO BROWN, LOOSE TO MEDIUM DENSE, MOIST, SILTY AND CLAYEY SAND

3:1

4:1

UNDIVIDED COASTAL PLAIN, LIGHT GRAY, ORANGE, AND RED MOTTLED, MEDIUM STIFF TO STIFF, MOIST, HIGHLY PLASTIC, SILTY CLAY

202 + 50.00

ROADWAY EMBANKMENT, ORANGE TO BROWN, LOOSE TO MEDIUM DENSE, MOIST, SILTY AND CLAYEY SAND

4:1

4:1

UNDIVIDED COASTAL PLAIN, LIGHT GRAY, ORANGE, AND RED MOTTLED, MEDIUM STIFF TO STIFF, MOIST, HIGHLY PLASTIC, SILTY CLAY

FIAD  
05/17

FIAD  
05/17

202 + 00.00

ROADWAY EMBANKMENT, ORANGE TO BROWN, LOOSE TO MEDIUM DENSE, MOIST, SILTY AND CLAYEY SAND

SEE -Y24-  
X-SECTIONS

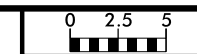
SEE -Y24-  
X-SECTIONS

UNDIVIDED COASTAL PLAIN, LIGHT GRAY, ORANGE, AND RED MOTTLED, MEDIUM STIFF TO STIFF, HIGHLY PLASTIC, MOIST, SILTY CLAY

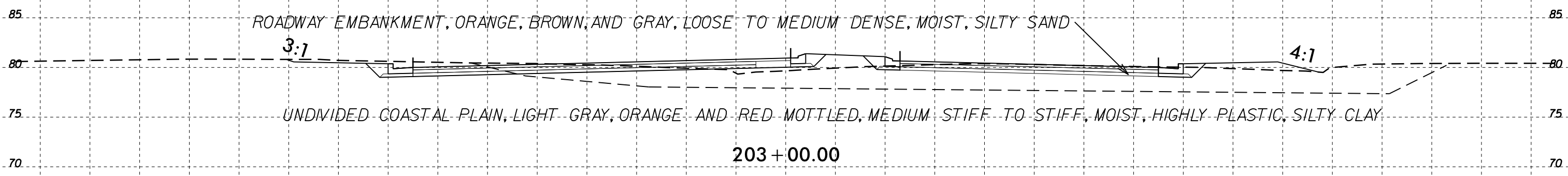
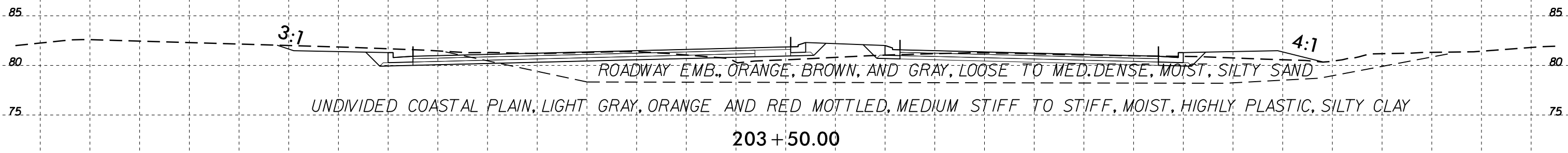
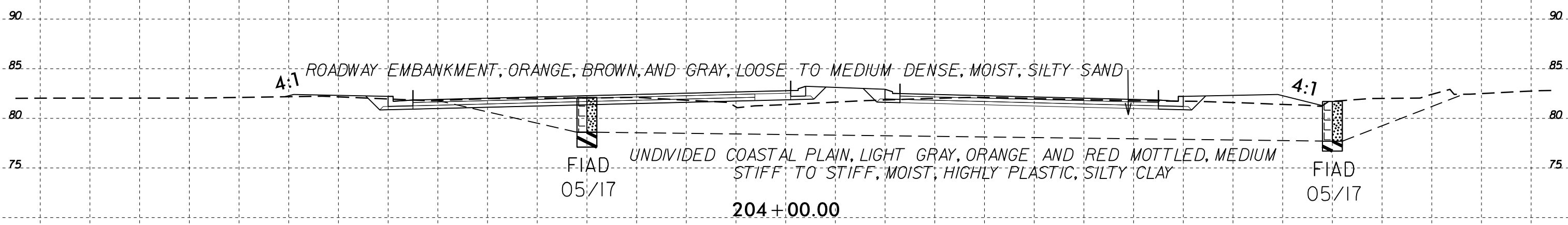
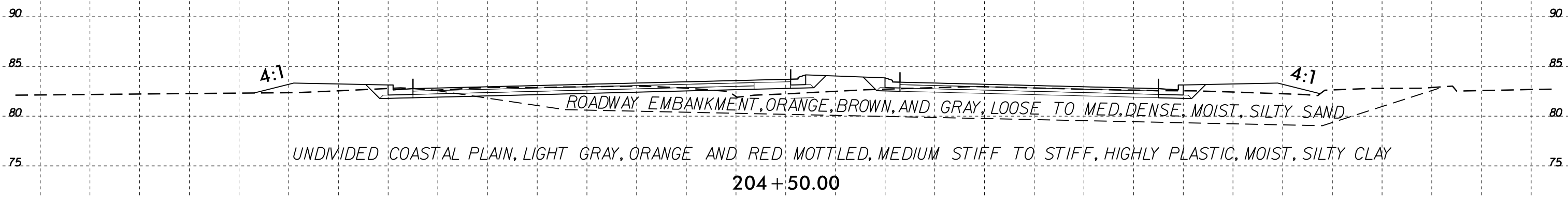
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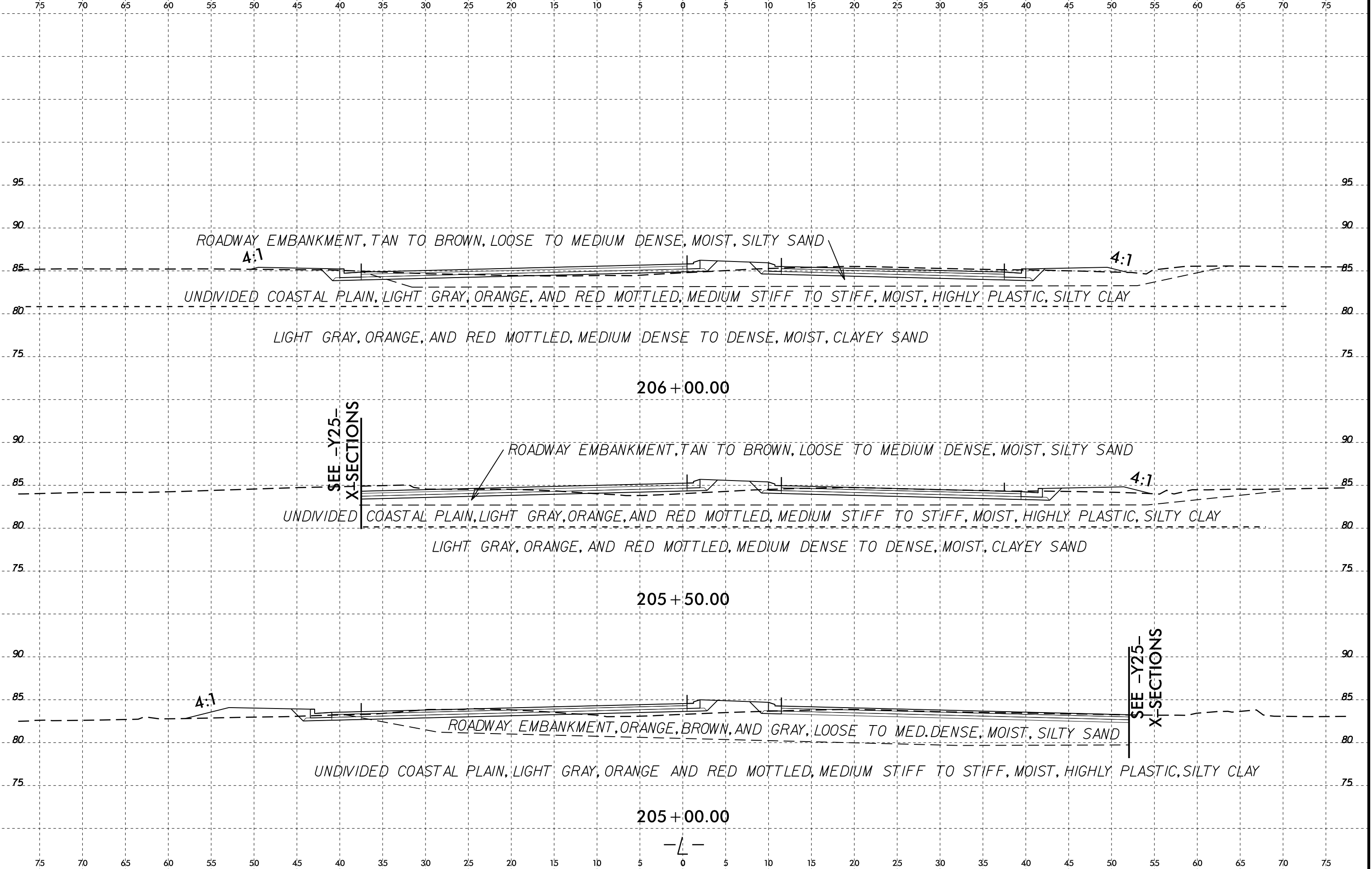
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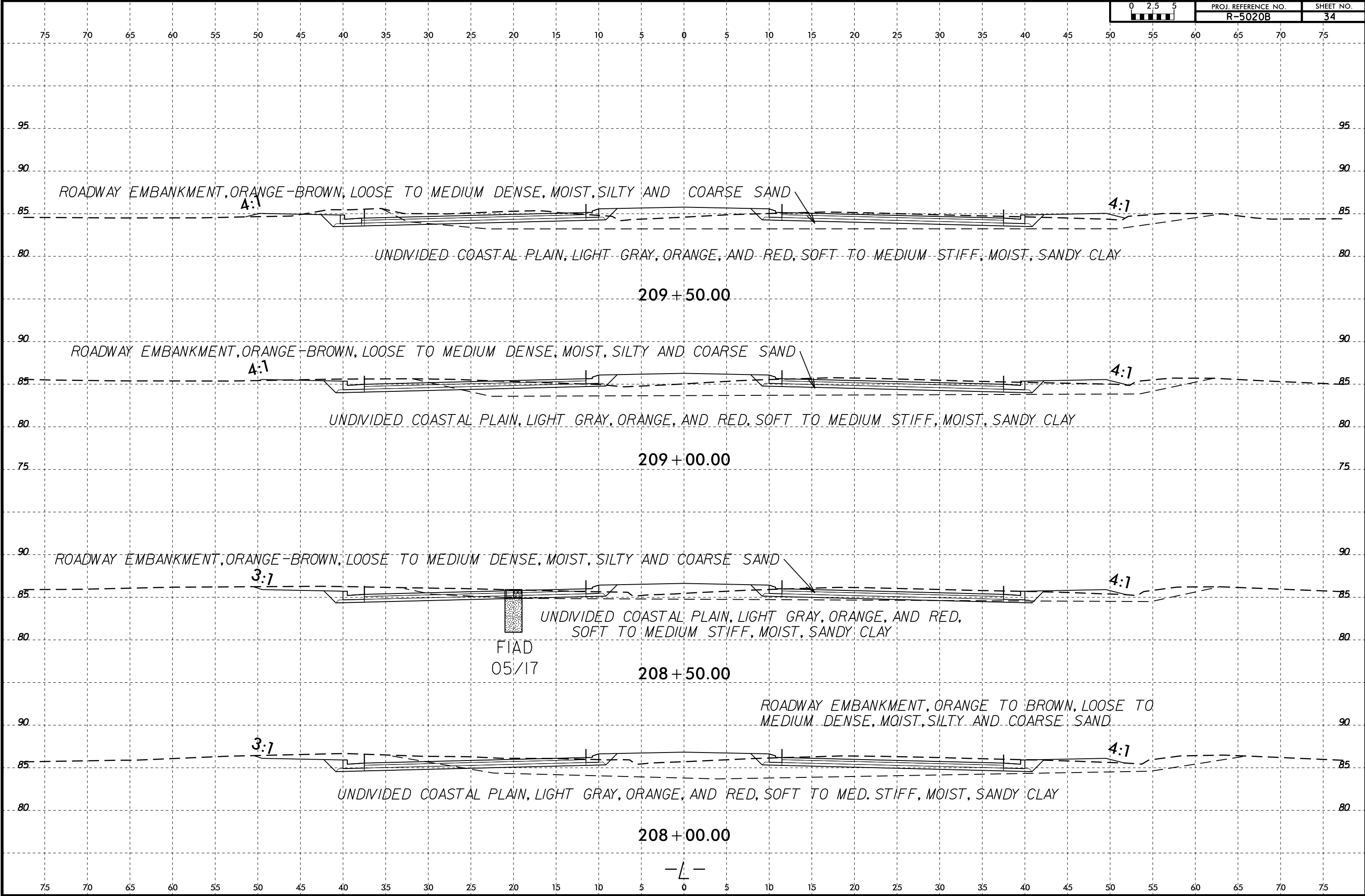
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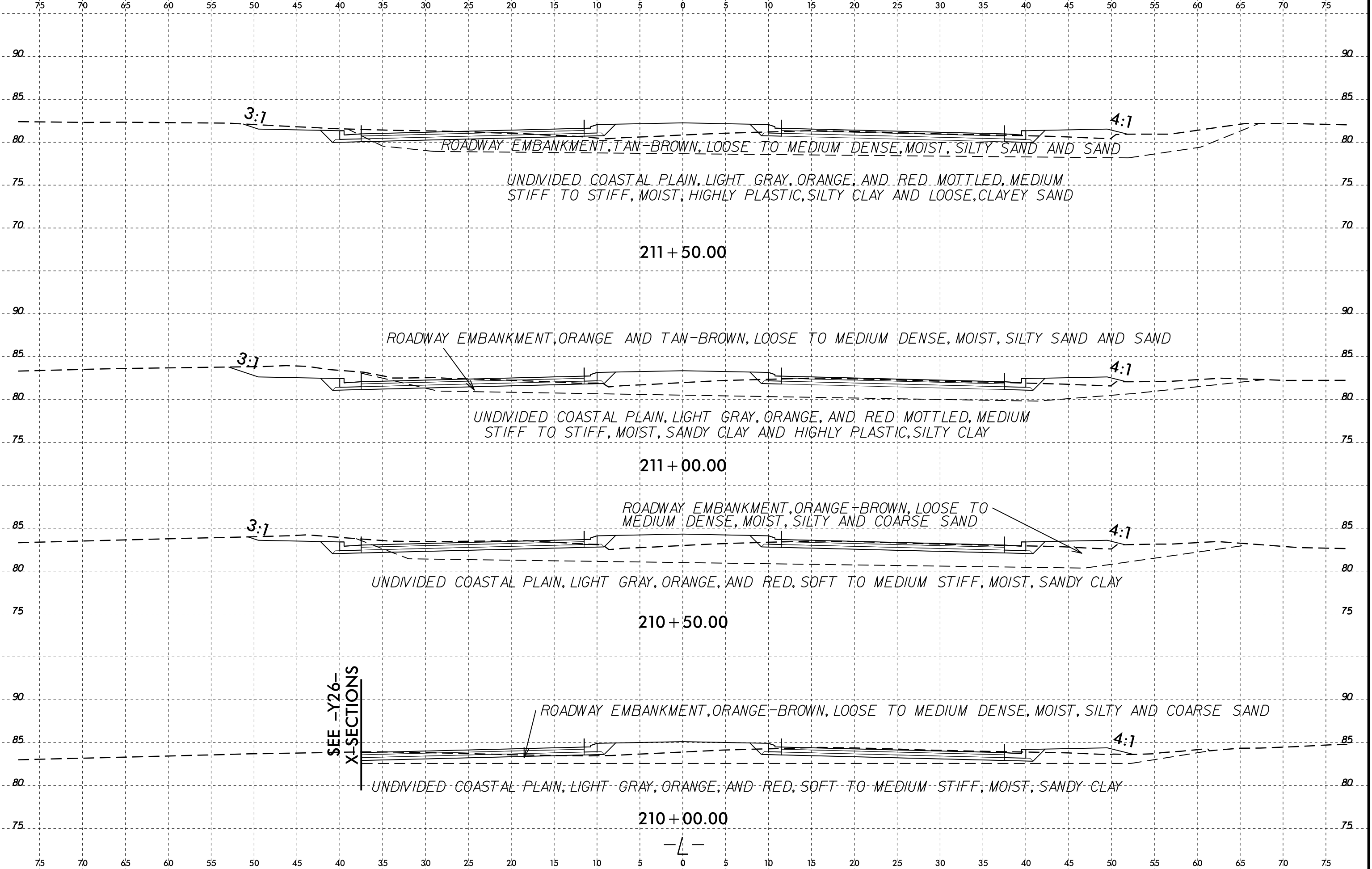




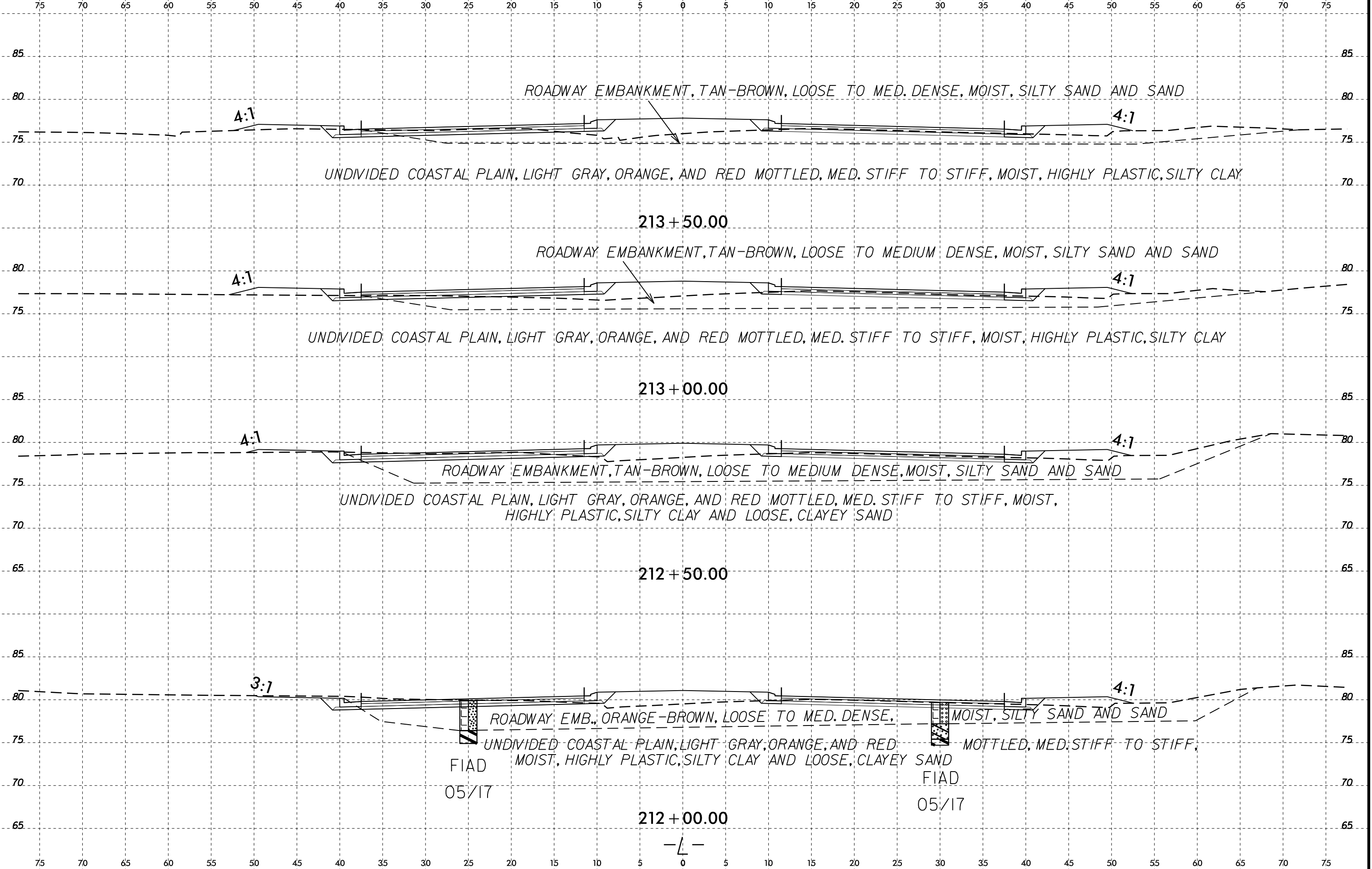
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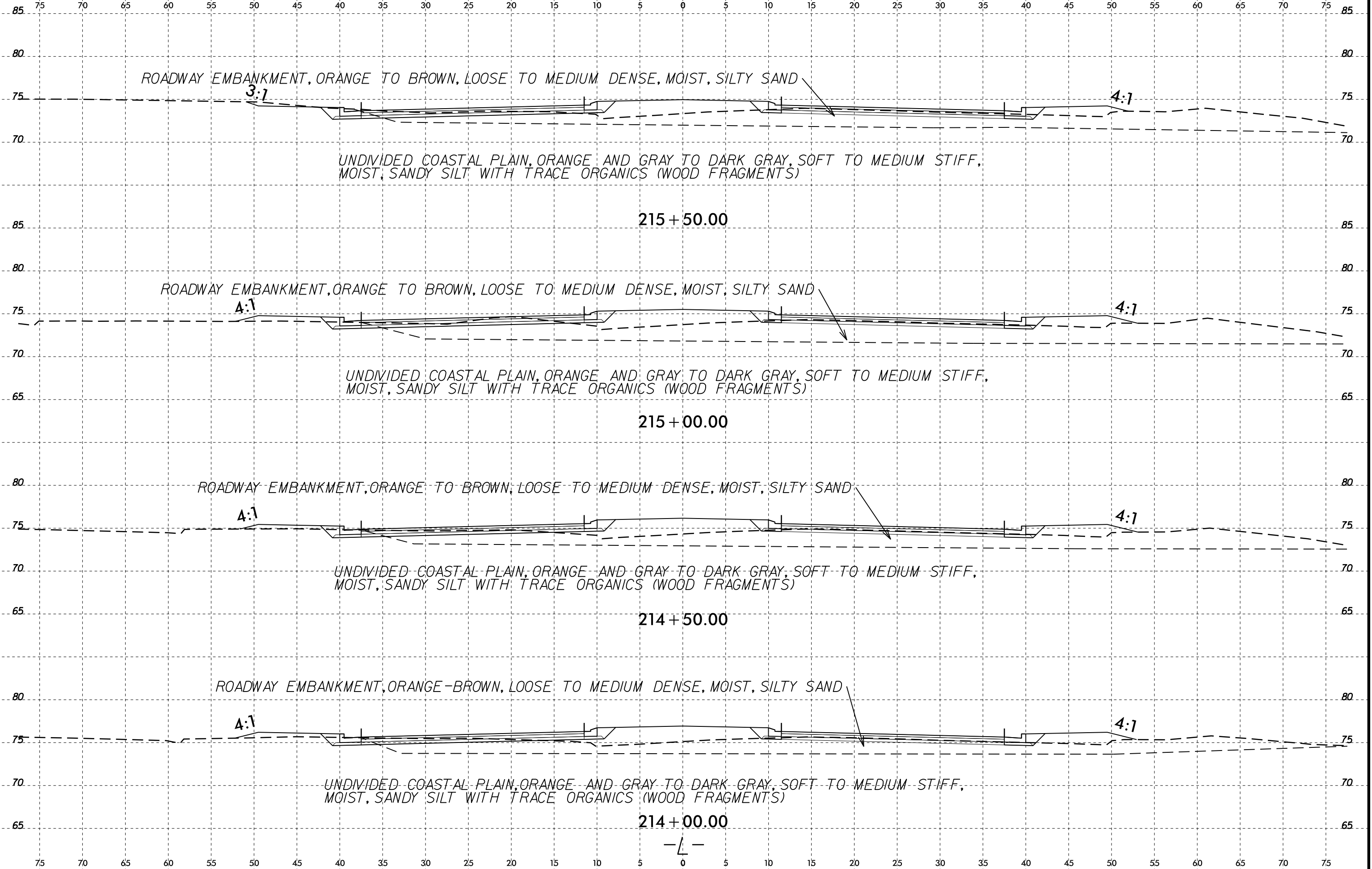
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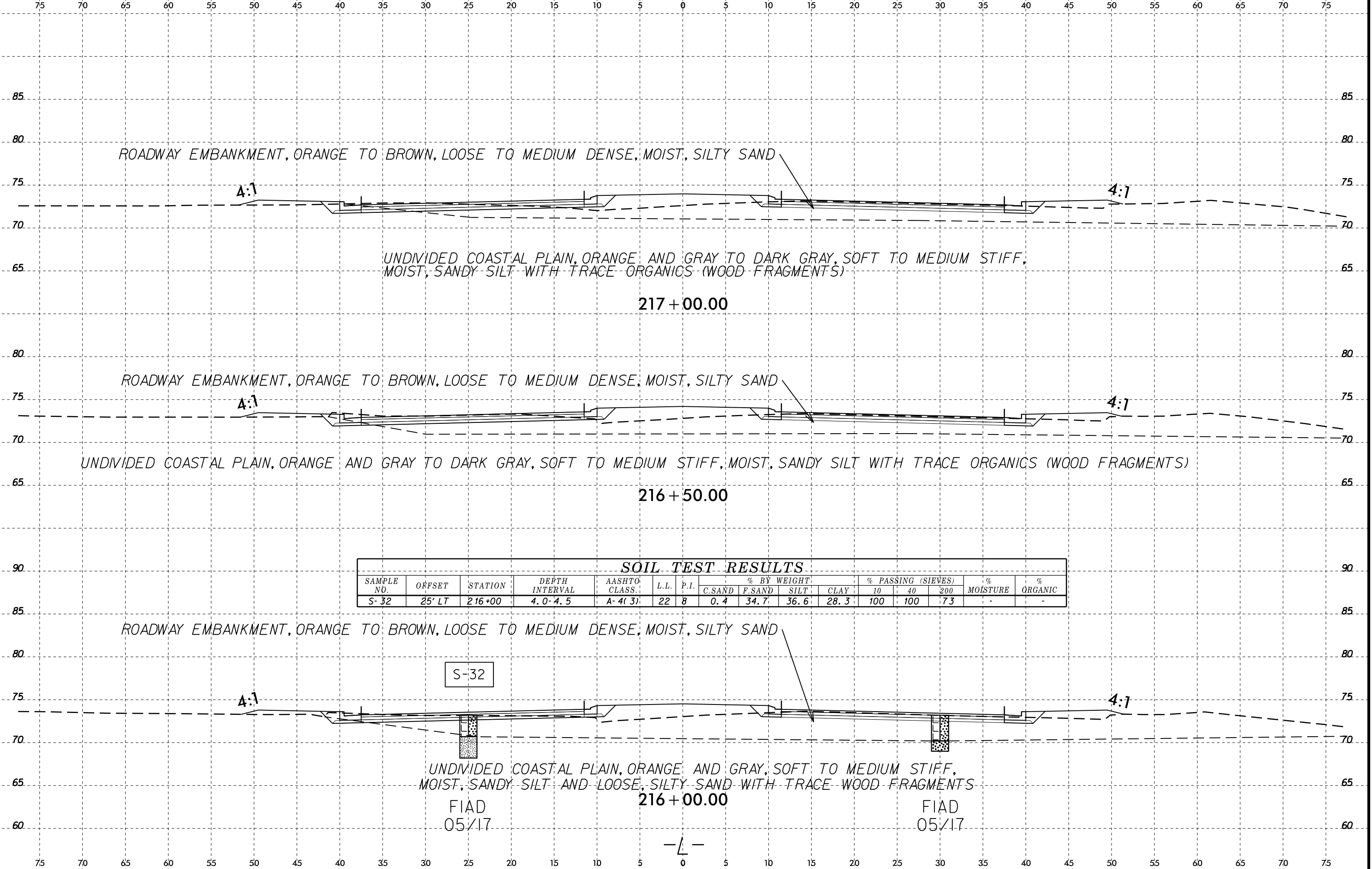
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ROADWAY EMBANKMENT, ORANGE TO BROWN, LOOSE TO MEDIUM DENSE, MOIST, SILTY SAND

UNDIVIDED COASTAL PLAIN, ORANGE AND GRAY TO DARK GRAY, SOFT TO MEDIUM STIFF, MOIST, SANDY SILT WITH TRACE ORGANICS (WOOD FRAGMENTS)

217 + 00.00

ROADWAY EMBANKMENT, ORANGE TO BROWN, LOOSE TO MEDIUM DENSE, MOIST, SILTY SAND

UNDIVIDED COASTAL PLAIN, ORANGE AND GRAY TO DARK GRAY, SOFT TO MEDIUM STIFF, MOIST, SANDY SILT WITH TRACE ORGANICS (WOOD FRAGMENTS)

216 + 50.00

| SOIL TEST RESULTS |        |         |                |               |      |      |             |         |      |      |                    |     |     |            |           |
|-------------------|--------|---------|----------------|---------------|------|------|-------------|---------|------|------|--------------------|-----|-----|------------|-----------|
| SAMPLE NO.        | OFFSET | STATION | DEPTH INTERVAL | AASHTO CLASS. | L.L. | P.I. | % BY WEIGHT |         |      |      | % PASSING (SIEVES) |     |     | % MOISTURE | % ORGANIC |
|                   |        |         |                |               |      |      | C. SAND     | F. SAND | SILT | CLAY | 10                 | 40  | 200 |            |           |
| S-32              | 25' LT | 216+00  | 4.0-4.5        | A-4(3)        | 22   | 8    | 0.4         | 34.7    | 36.6 | 28.3 | 100                | 100 | 73  | -          | -         |

ROADWAY EMBANKMENT, ORANGE TO BROWN, LOOSE TO MEDIUM DENSE, MOIST, SILTY SAND

UNDIVIDED COASTAL PLAIN, ORANGE AND GRAY, SOFT TO MEDIUM STIFF, MOIST, SANDY SILT AND LOOSE, SILTY SAND WITH TRACE WOOD FRAGMENTS

216 + 00.00

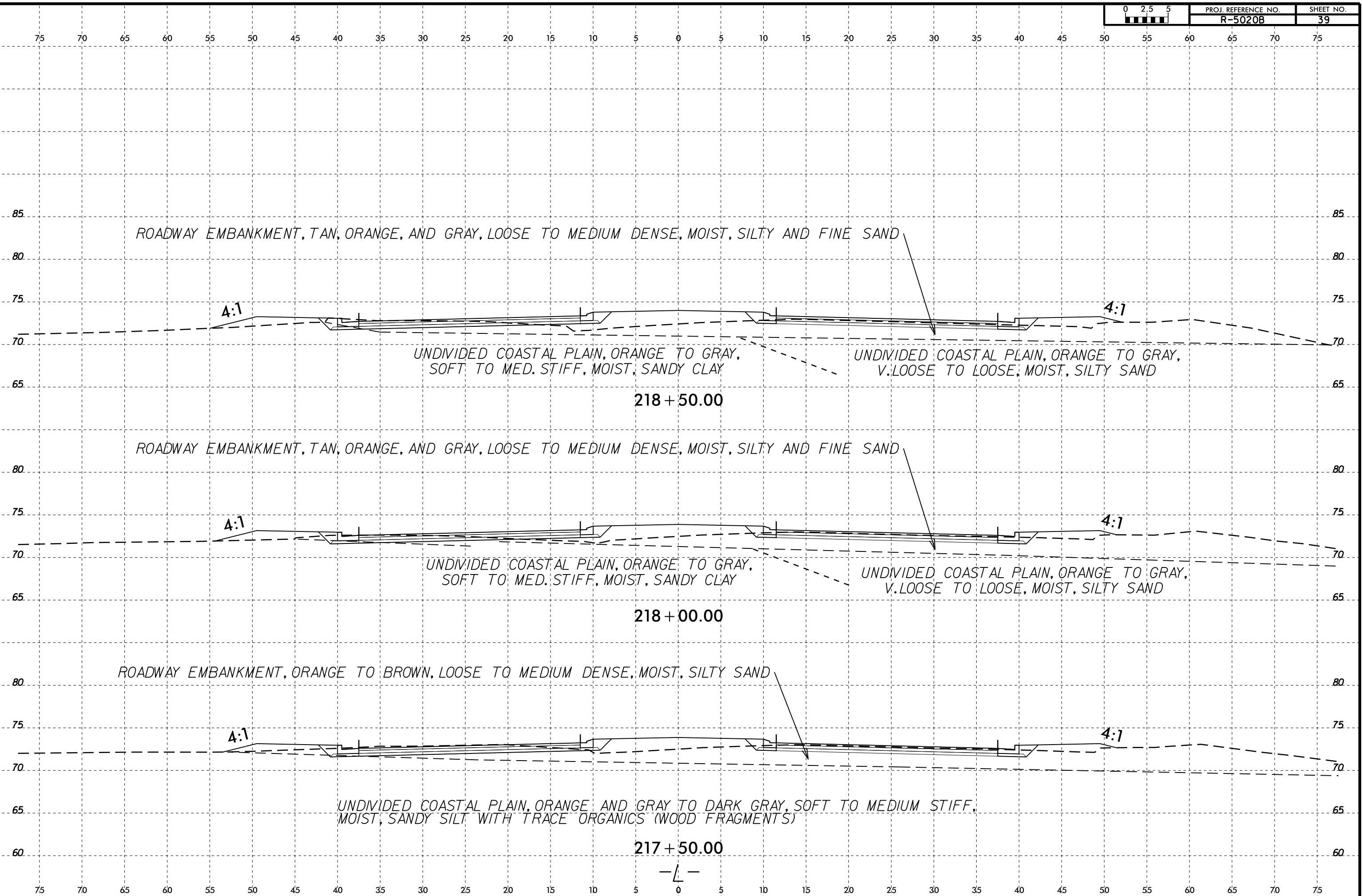
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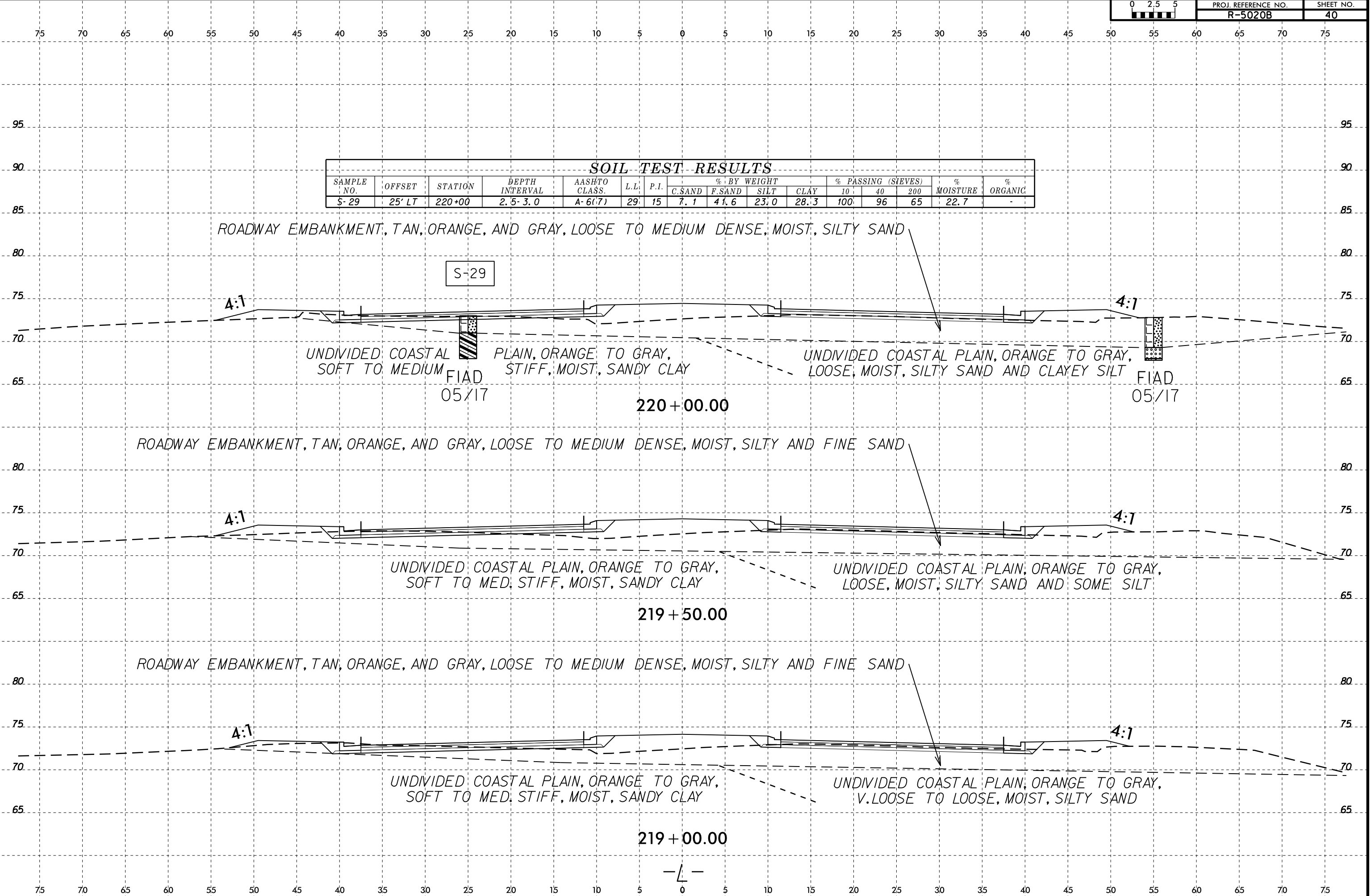


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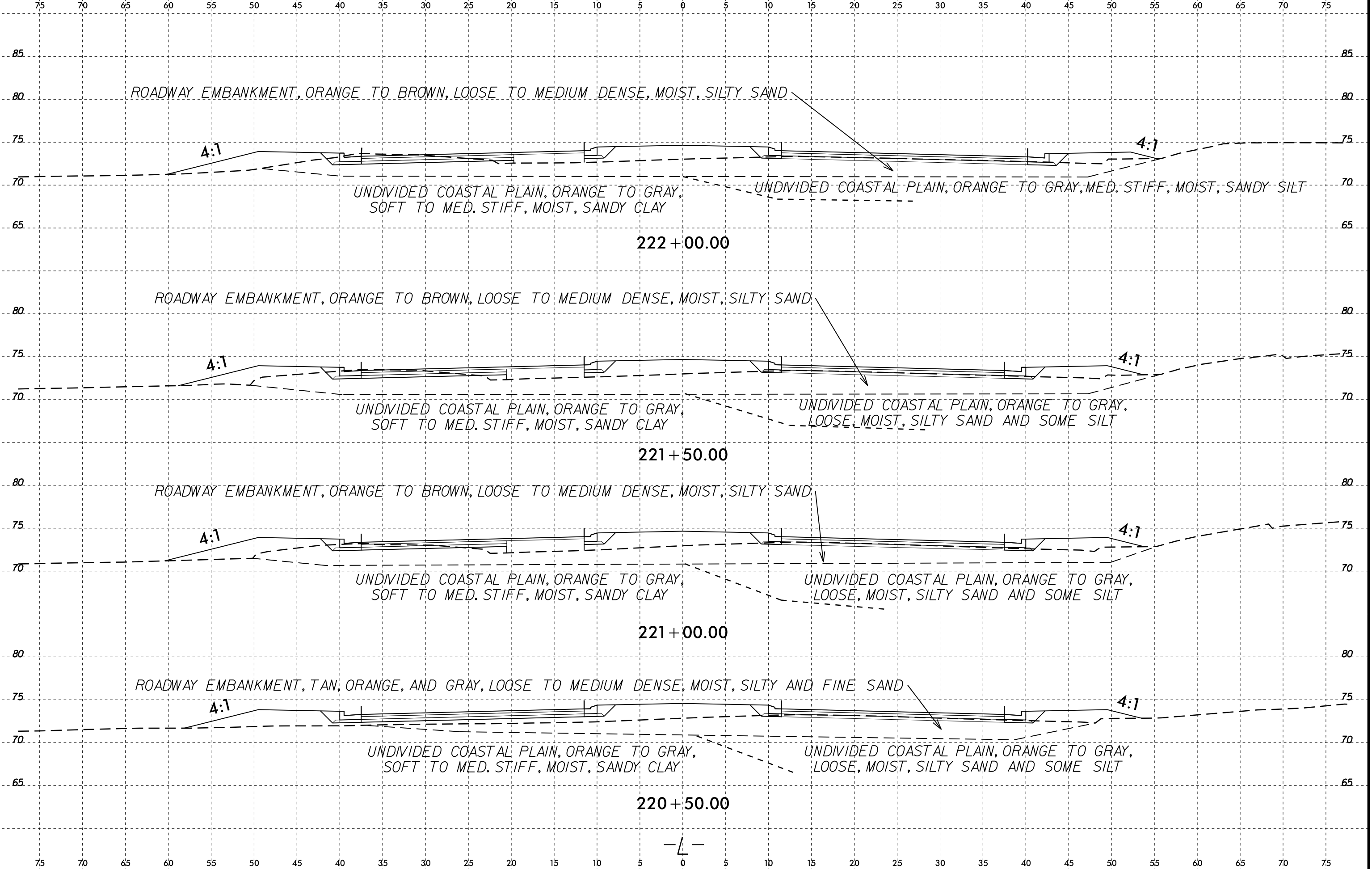
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| SOIL TEST RESULTS |        |         |                |               |      |      |             |        |      |      |                    |    |     |            |           |
|-------------------|--------|---------|----------------|---------------|------|------|-------------|--------|------|------|--------------------|----|-----|------------|-----------|
| SAMPLE NO.        | OFFSET | STATION | DEPTH INTERVAL | AASHTO CLASS. | L.L. | P.I. | % BY WEIGHT |        |      |      | % PASSING (SIEVES) |    |     | % MOISTURE | % ORGANIC |
|                   |        |         |                |               |      |      | C.SAND      | F.SAND | SILT | CLAY | 10                 | 40 | 200 |            |           |
| S-29              | 25' LT | 220+00  | 2.5-3.0        | A-6(7)        | 29   | 15   | 7.1         | 41.6   | 23.0 | 28.3 | 100                | 96 | 65  | 22.7       | -         |

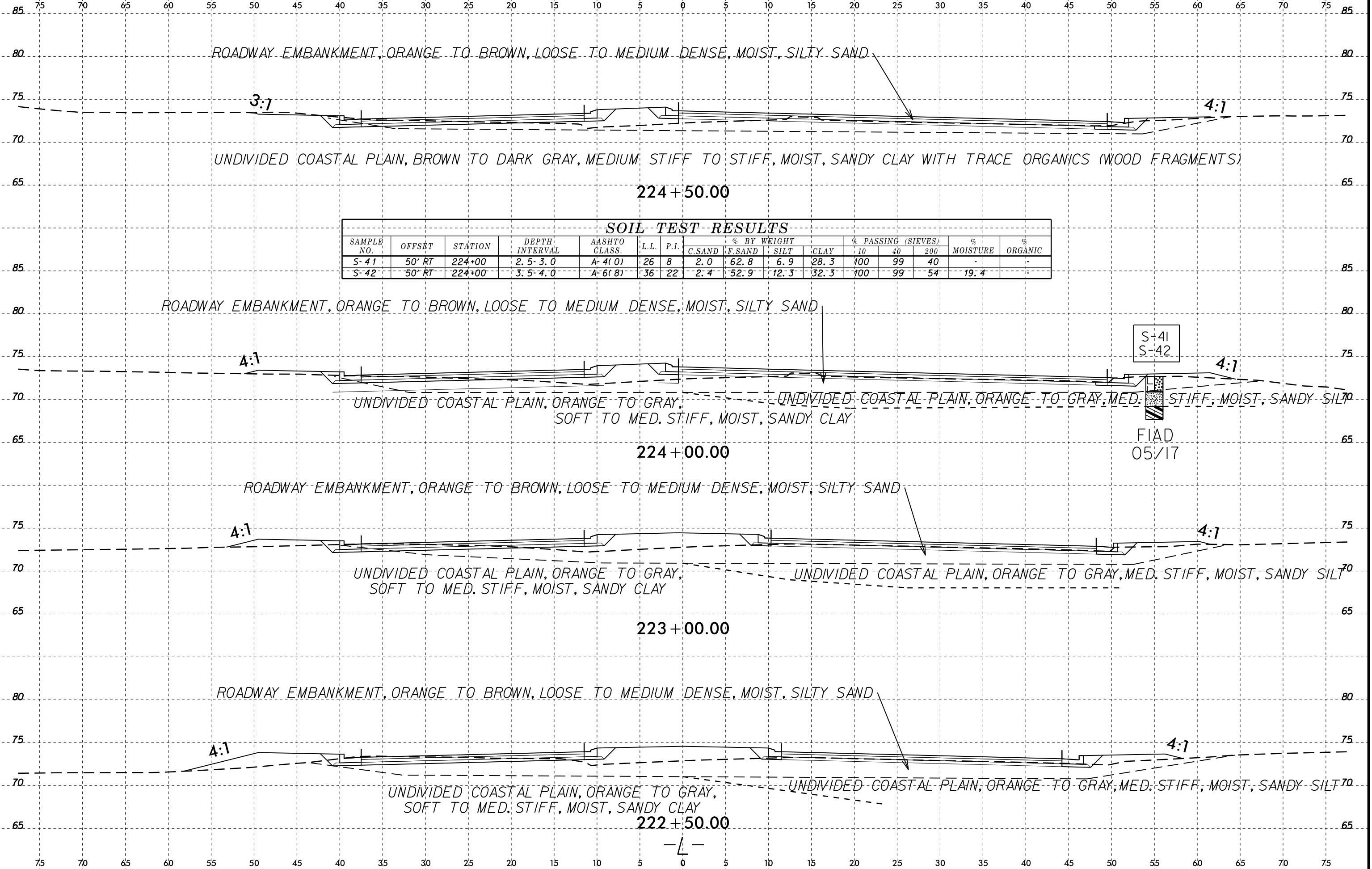


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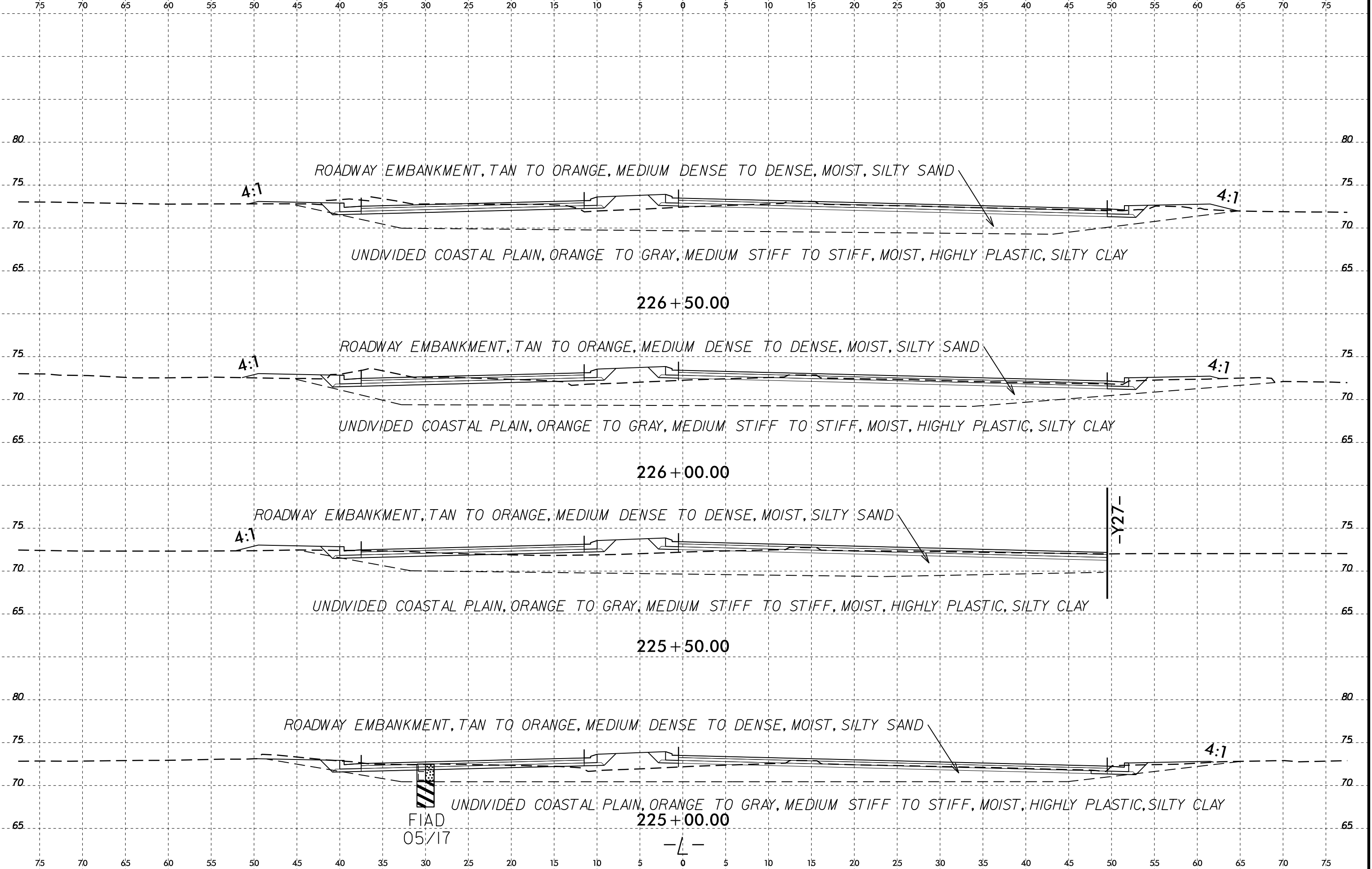
**SOIL TEST RESULTS**

| SAMPLE NO. | OFFSET | STATION | DEPTH INTERVAL | AASHTO CLASS. | L.L. | P.I. | % BY WEIGHT |         |      |      | % PASSING (SIEVES) |    |     | % MOISTURE | % ORGANIC |
|------------|--------|---------|----------------|---------------|------|------|-------------|---------|------|------|--------------------|----|-----|------------|-----------|
|            |        |         |                |               |      |      | C. SAND     | F. SAND | SILT | CLAY | 10                 | 40 | 200 |            |           |
| S-41       | 50' RT | 224+00  | 2.5-3.0        | A-4(0)        | 26   | 8    | 2.0         | 62.8    | 6.9  | 28.3 | 100                | 99 | 40  | -          | -         |
| S-42       | 50' RT | 224+00  | 3.5-4.0        | A-6(8)        | 36   | 22   | 2.4         | 52.9    | 12.3 | 32.3 | 100                | 99 | 54  | 19.4       | -         |

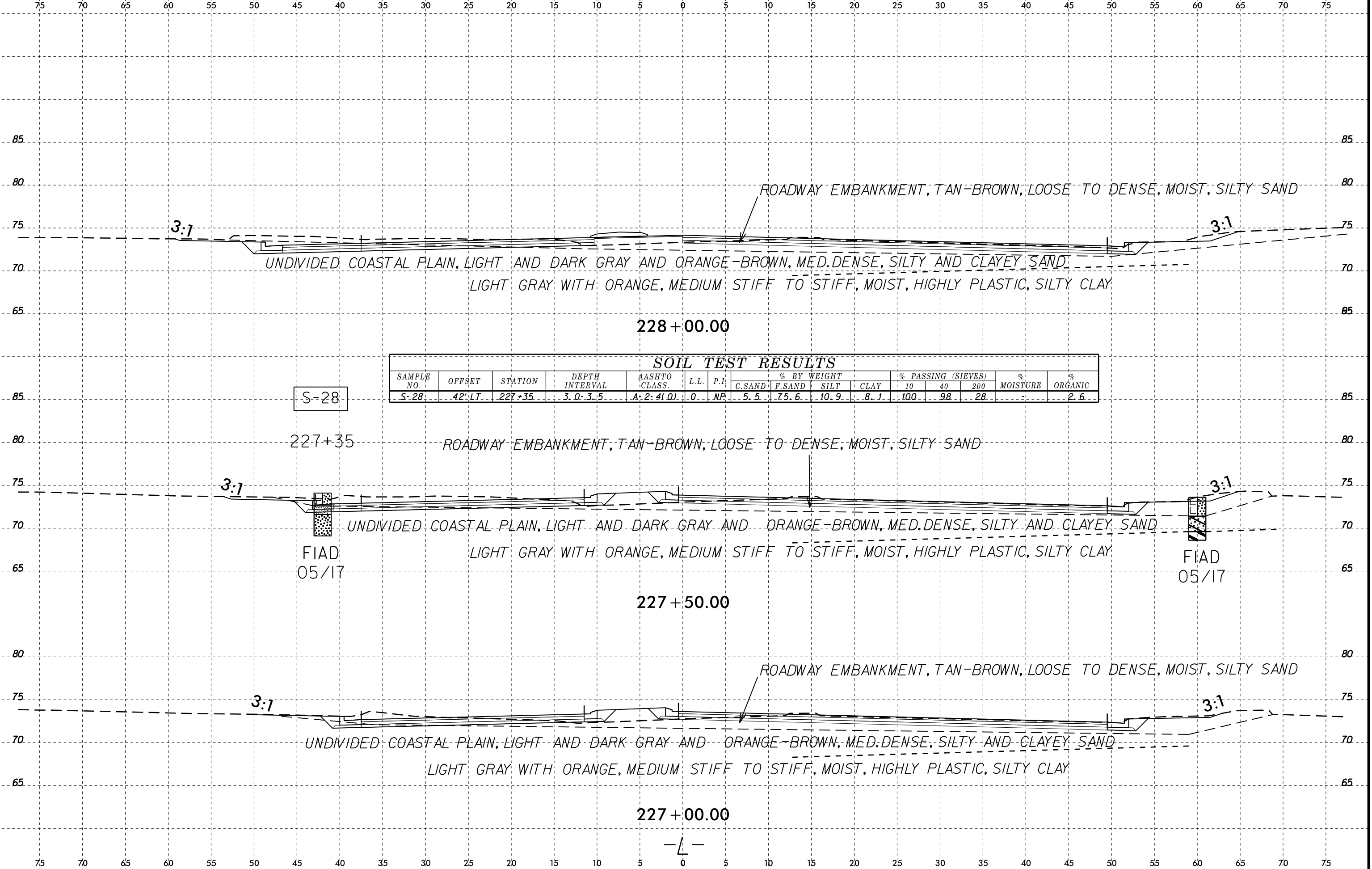
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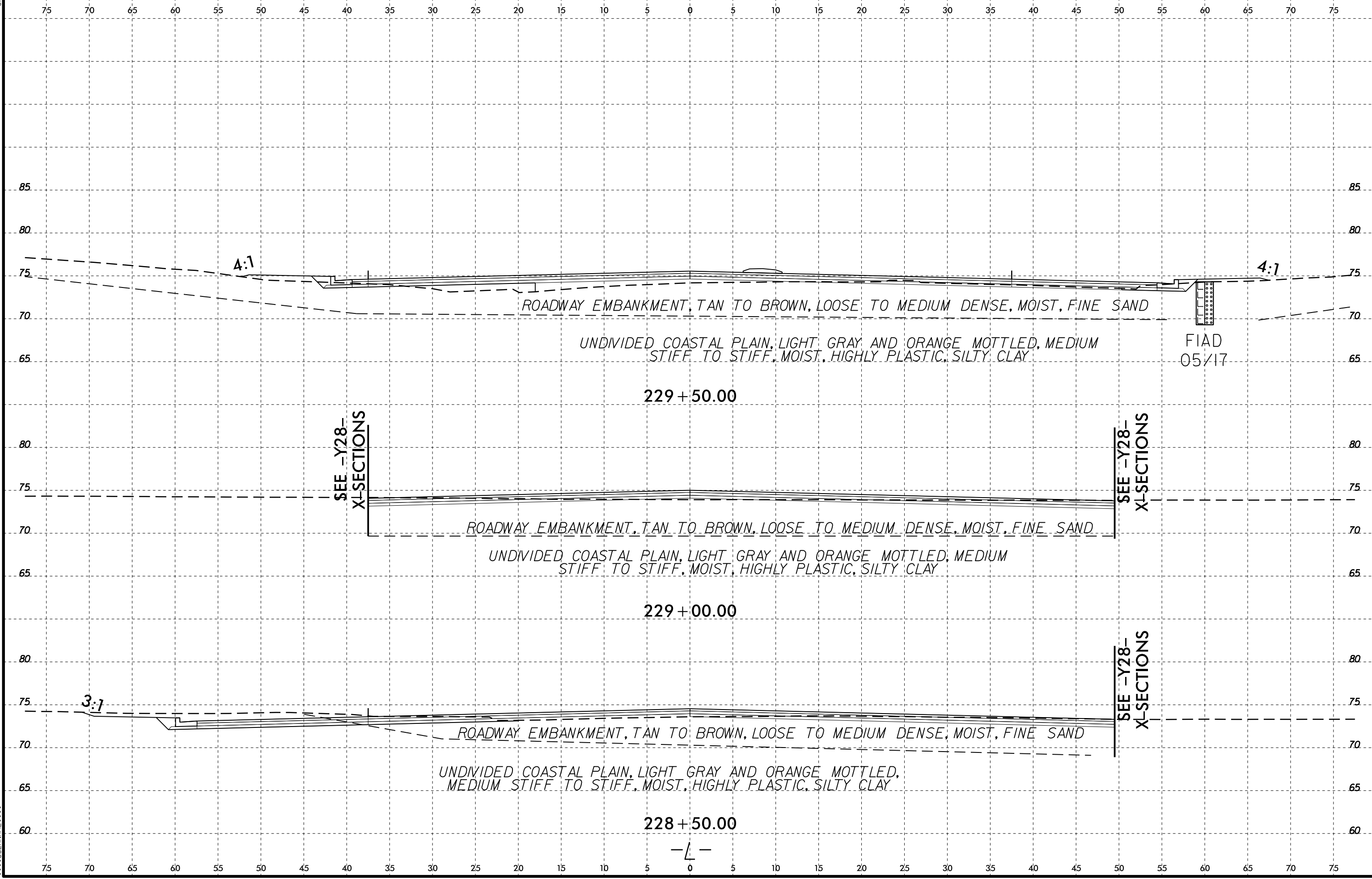
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|-------------------|--------|---------|----------------|---------------|------|------|-------------|---------|------|------|--------------------|----|-----|------------|-----------|
| SAMPLE NO.        | OFFSET | STATION | DEPTH INTERVAL | AASHTO CLASS. | L.L. | P.I. | % BY WEIGHT |         |      |      | % PASSING (SIEVES) |    |     | % MOISTURE | % ORGANIC |
|                   |        |         |                |               |      |      | C. SAND     | F. SAND | SILT | CLAY | 10                 | 40 | 200 |            |           |
| S-28              | 42' LT | 227+35  | 3.0-3.5        | A-2-4(0)      | 0    | NP   | 5.5         | 75.6    | 10.9 | 8.1  | 100                | 98 | 28  |            | 2.6       |

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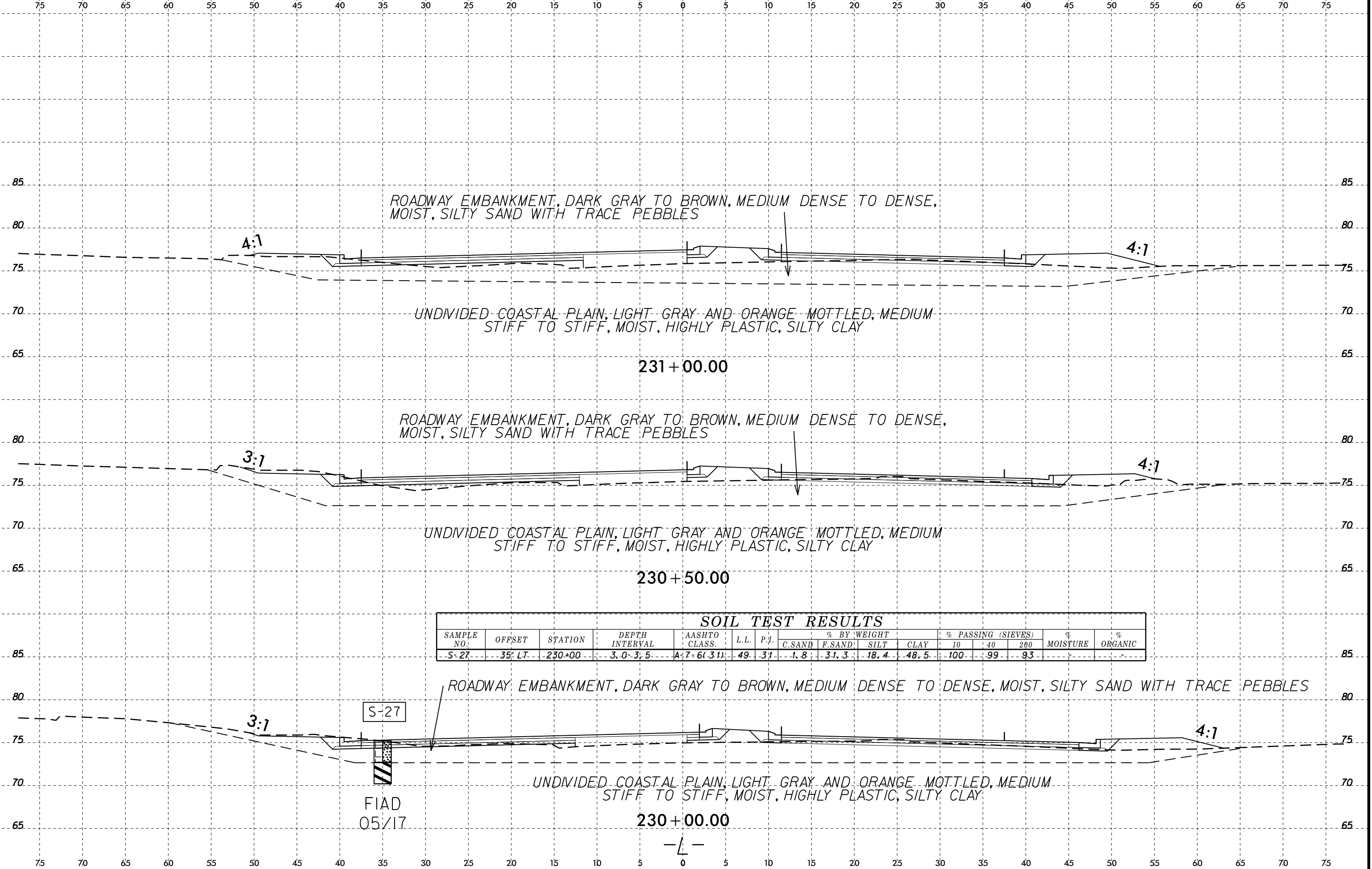
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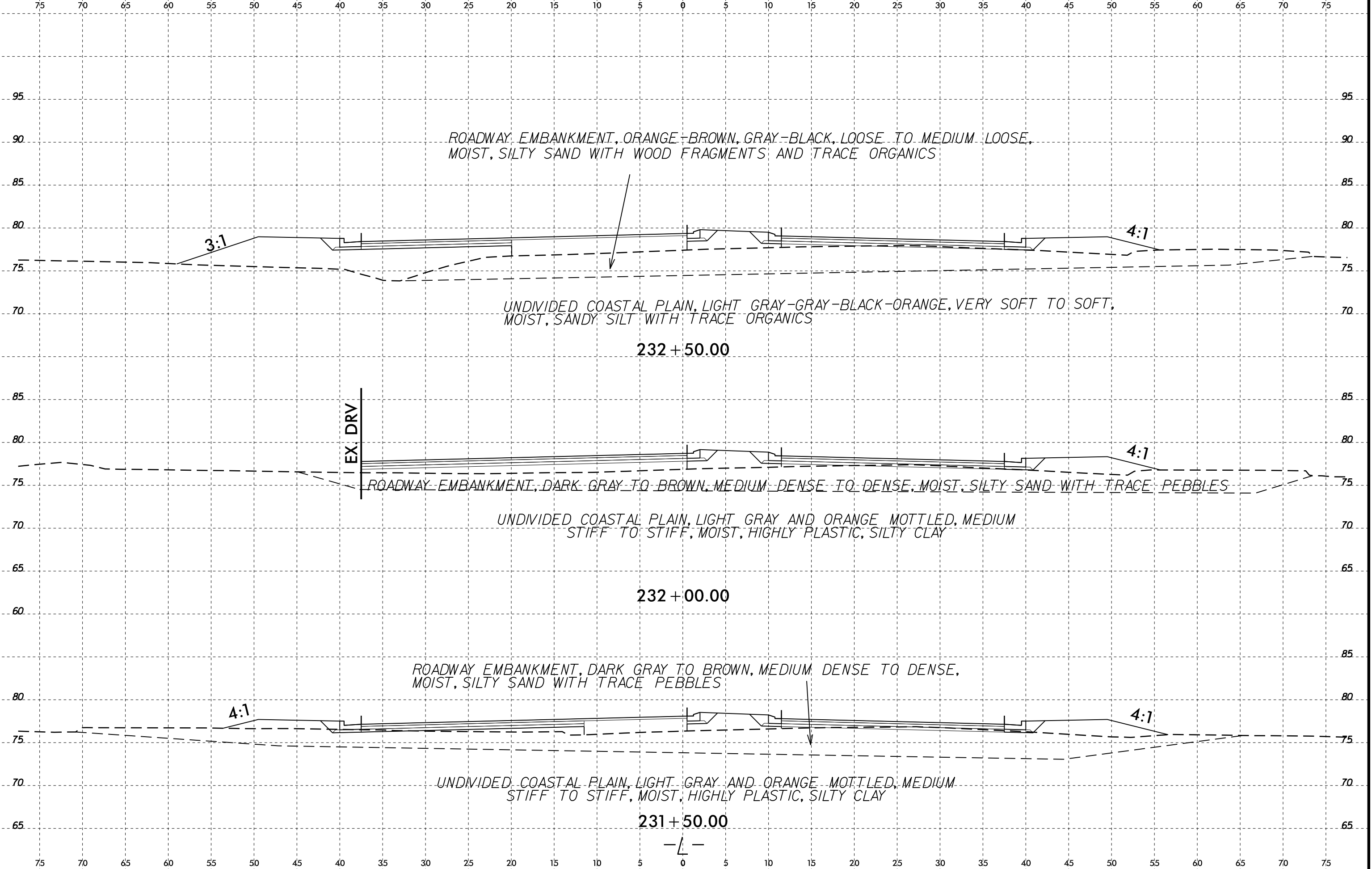




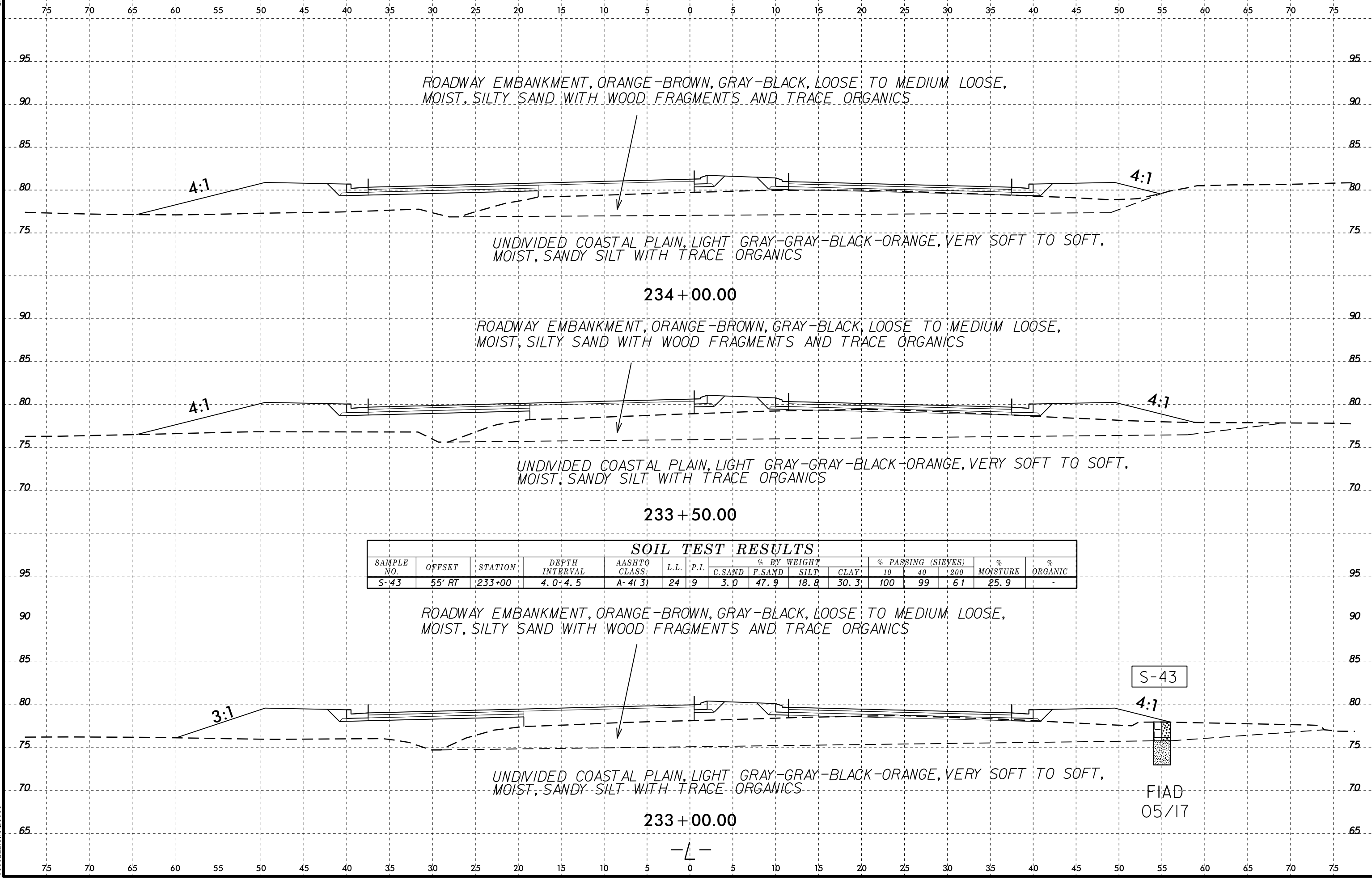
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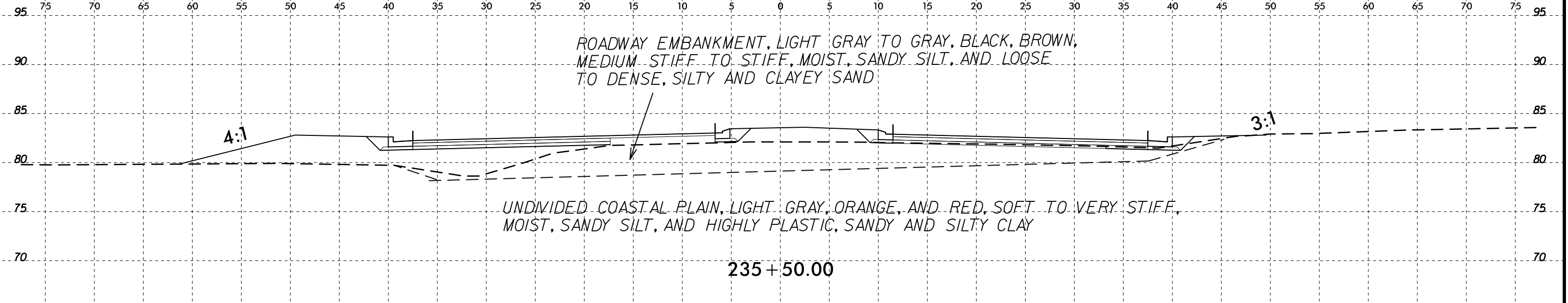
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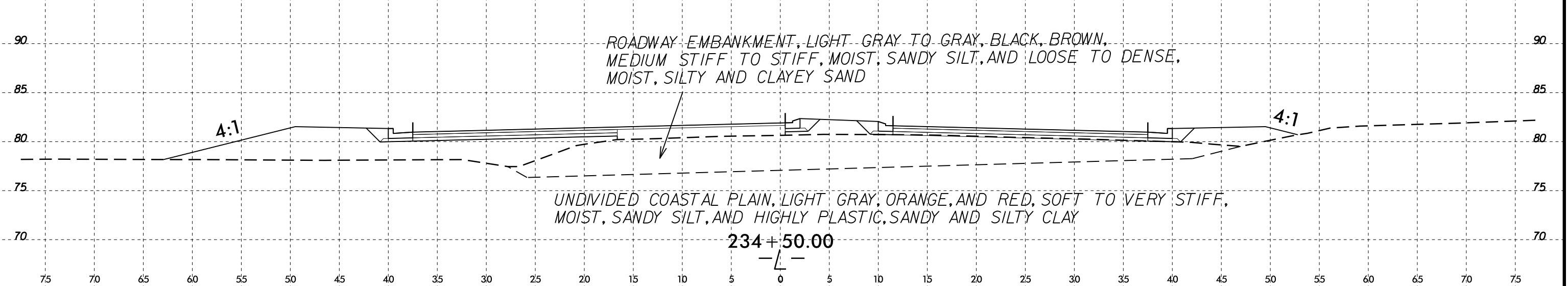
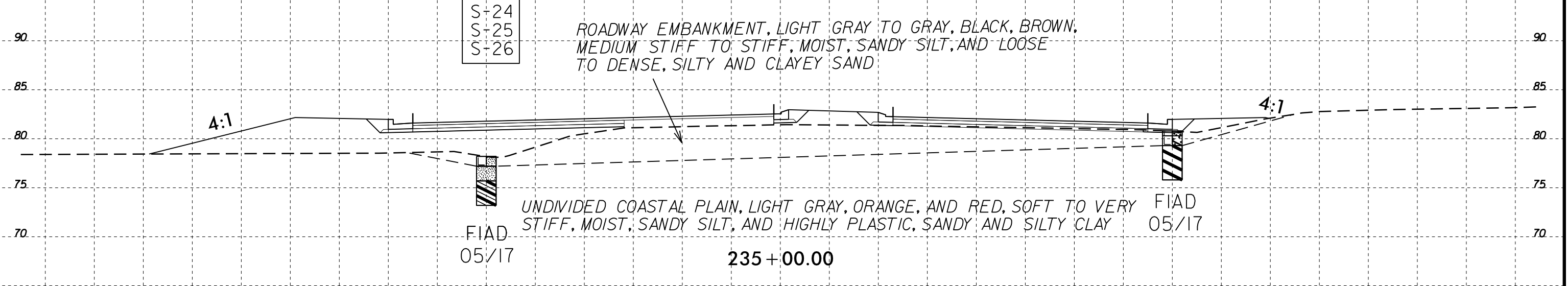


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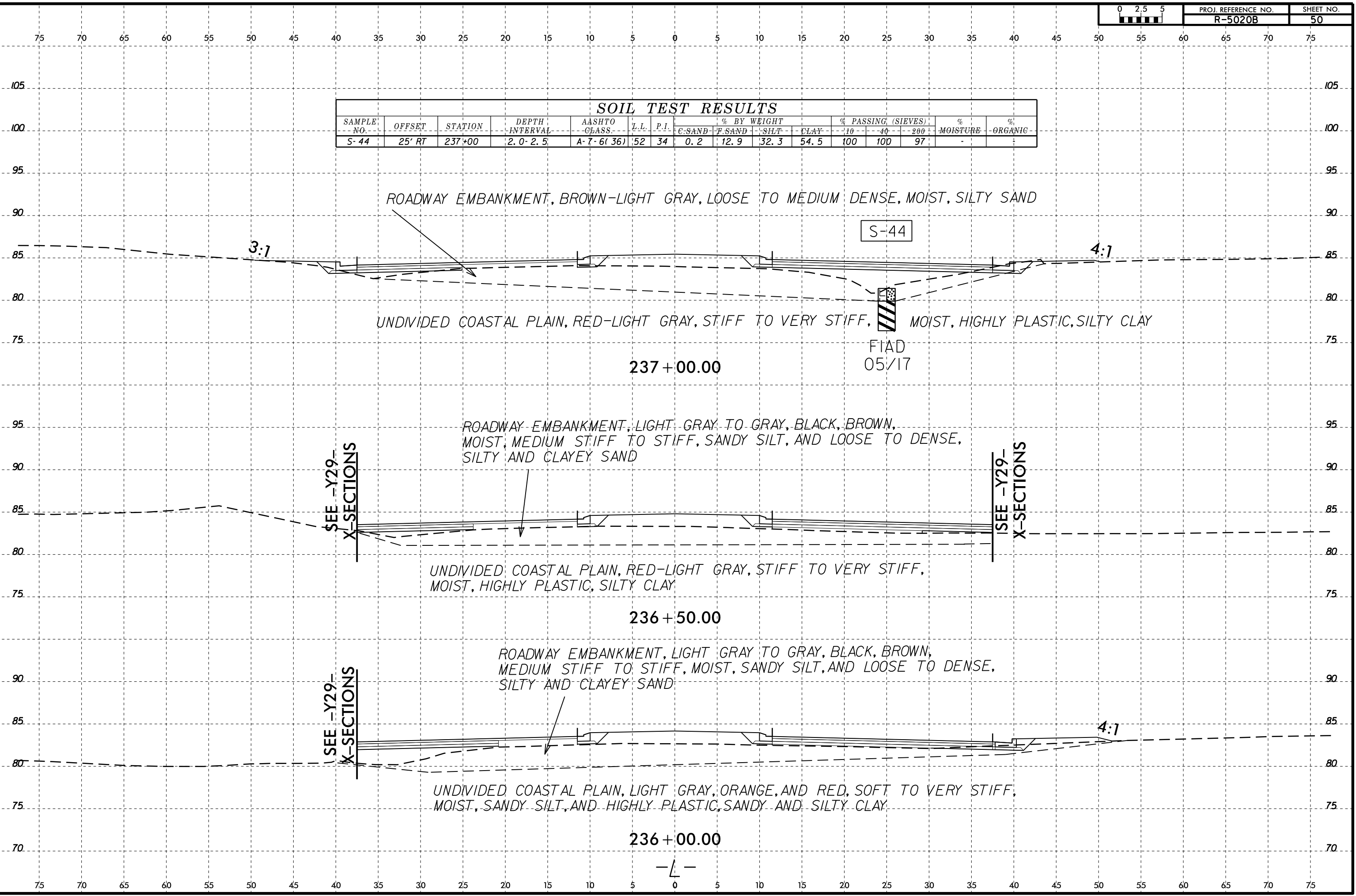
| SAMPLE NO. | OFFSET | STATION | DEPTH INTERVAL | AASHTO CLASS. | L.L. | P.I. | % BY WEIGHT |        |      |      | % PASSING (SIEVES) |     |      | % MOISTURE | % ORGANIC |
|------------|--------|---------|----------------|---------------|------|------|-------------|--------|------|------|--------------------|-----|------|------------|-----------|
|            |        |         |                |               |      |      | C-SAND      | F-SAND | SILT | CLAY | #10                | #40 | #200 |            |           |
| S-24       | 30' LT | 235+00  | 0.5-1.0        | A-4(0)        | 22   | 3    | 3.4         | 54.9   | 27.5 | 14.1 | 100                | 99  | 50   | -          | 4.3       |
| S-25       | 30' LT | 235+00  | 1.5-2.0        | A-4(0)        | 17   | 2    | 2.2         | 55.4   | 22.2 | 20.2 | 100                | 99  | 52   | -          | -         |
| S-26       | 30' LT | 235+00  | 3.0-3.5        | A-6(3)        | 25   | 11   | 1.8         | 50.5   | 23.4 | 24.2 | 100                | 99  | 57   | 22.0       | -         |

S-24  
S-25  
S-26

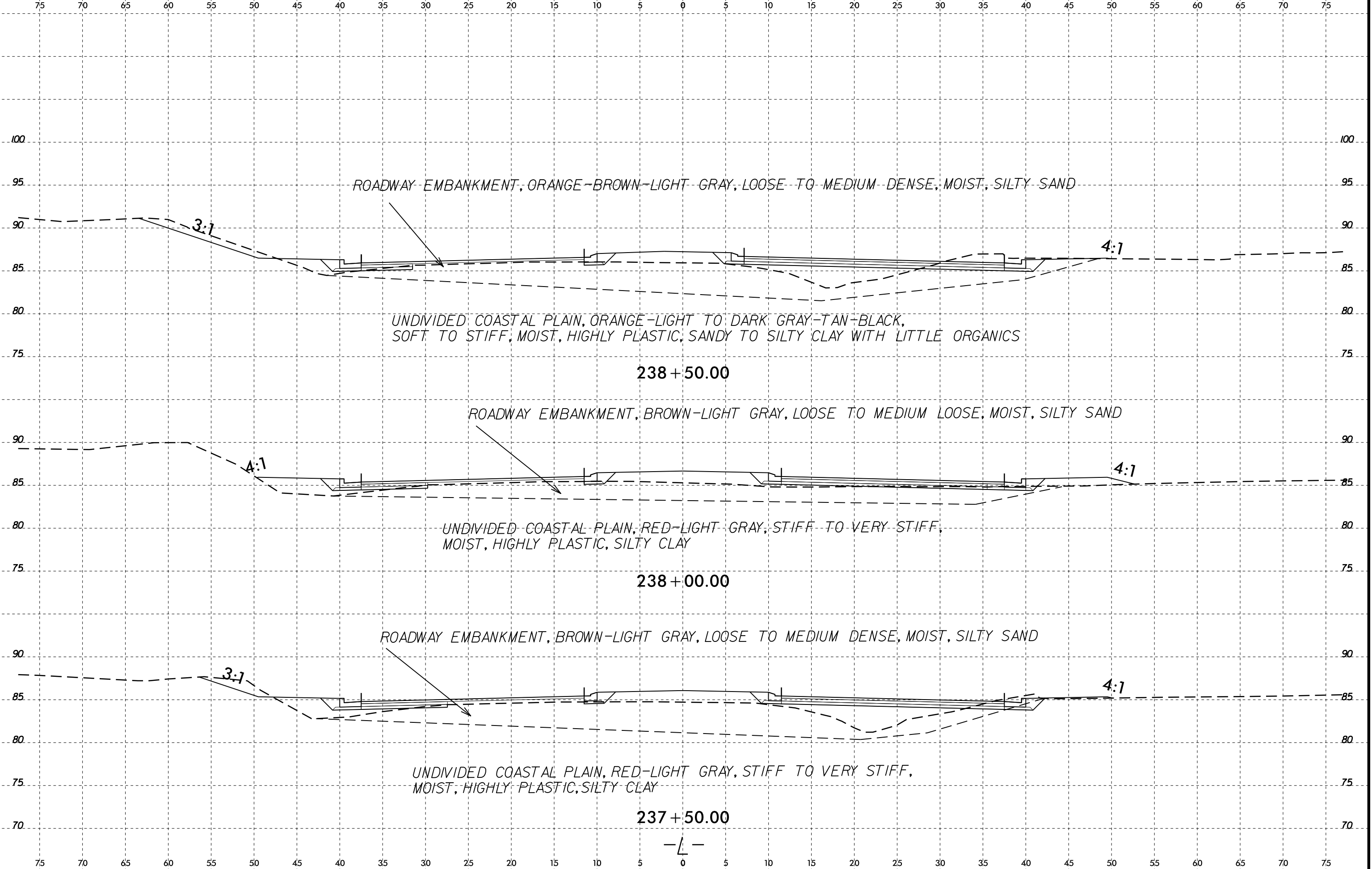


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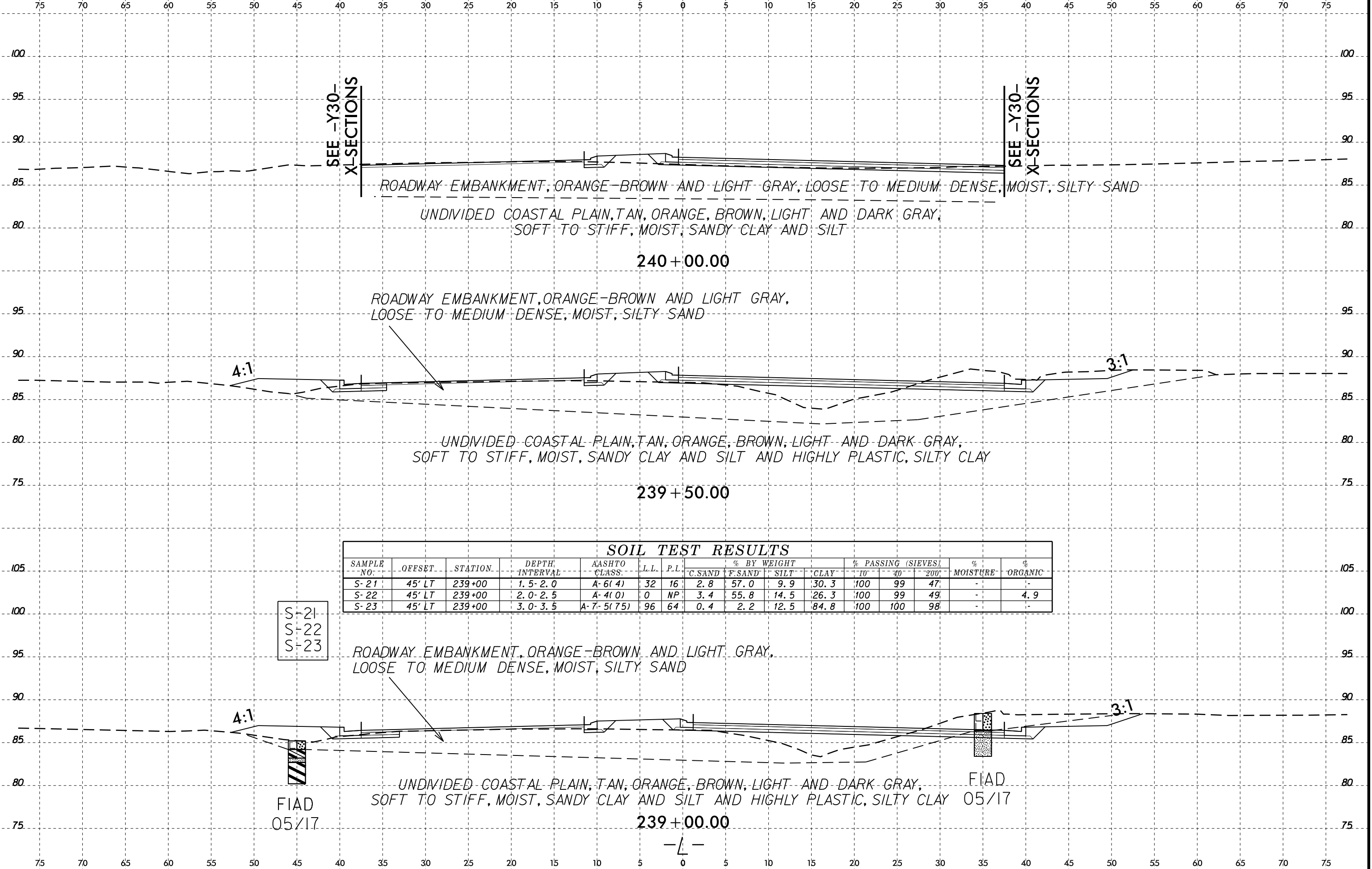
| SOIL TEST RESULTS |        |         |                |               |      |      |             |         |      |      |                    |     |      |            |           |
|-------------------|--------|---------|----------------|---------------|------|------|-------------|---------|------|------|--------------------|-----|------|------------|-----------|
| SAMPLE NO.        | OFFSET | STATION | DEPTH INTERVAL | AASHTO CLASS. | L.L. | P.I. | % BY WEIGHT |         |      |      | % PASSING (SIEVES) |     |      | % MOISTURE | % ORGANIC |
|                   |        |         |                |               |      |      | C. SAND     | F. SAND | SILT | CLAY | #10                | #40 | #200 |            |           |
| S-44              | 25' RT | 237+00  | 2.0-2.5        | A-7-6(36)     | 52   | 34   | 0.2         | 12.9    | 32.3 | 54.5 | 100                | 100 | 97   | -          | -         |



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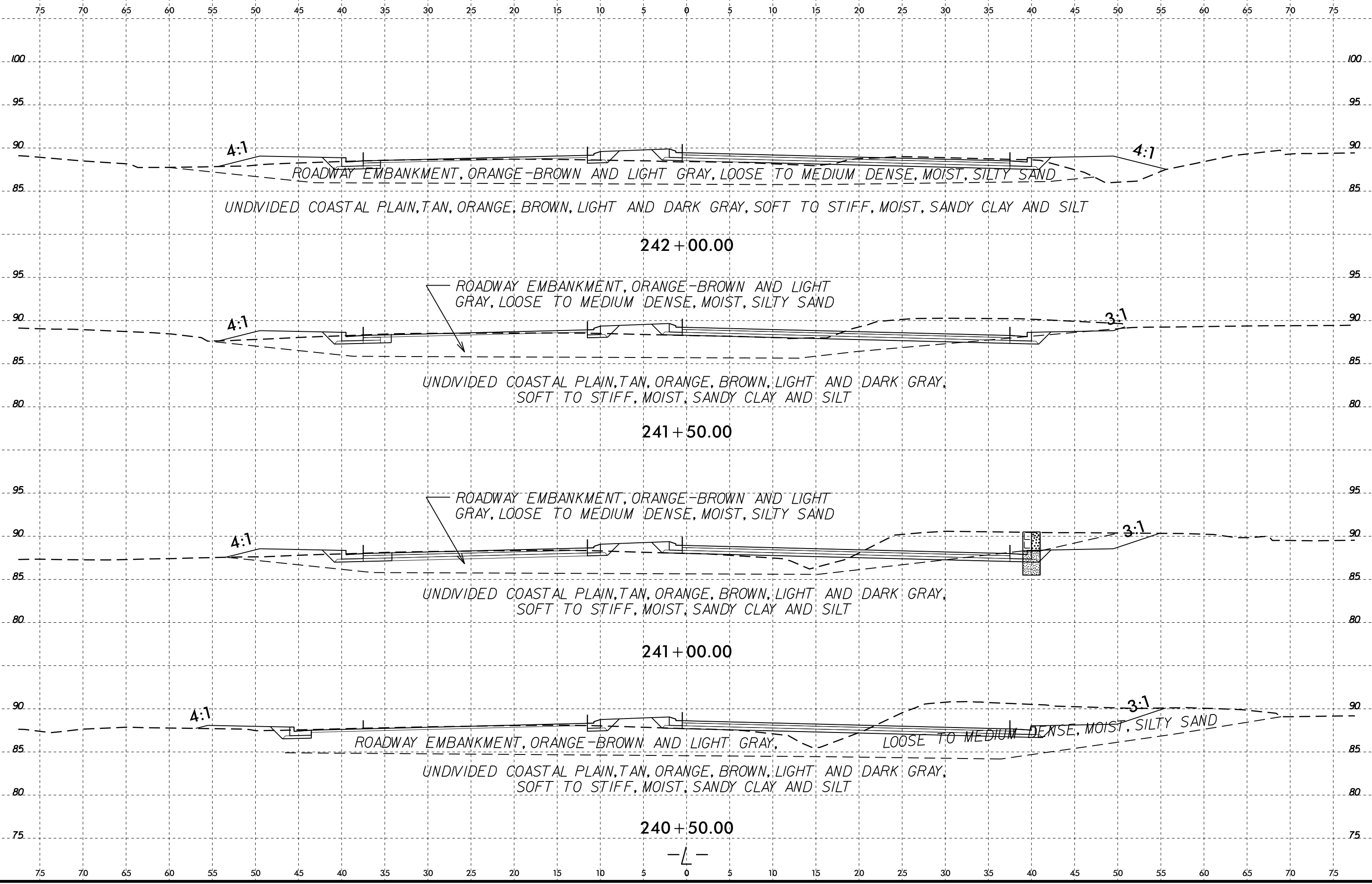
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|-------------------|--------|---------|----------------|---------------|------|------|-------------|---------|------|------|--------------------|-----|-----|------------|-----------|
| SAMPLE NO.        | OFFSET | STATION | DEPTH INTERVAL | AASHTO CLASS. | L.L. | P.L. | % BY WEIGHT |         |      |      | % PASSING (SIEVES) |     |     | % MOISTURE | % ORGANIC |
|                   |        |         |                |               |      |      | C. SAND     | F. SAND | SILT | CLAY | 10                 | 40  | 200 |            |           |
| S-21              | 45' LT | 239+00  | 1.5-2.0        | A-6(4)        | 32   | 16   | 2.8         | 57.0    | 9.9  | 30.3 | 100                | 99  | 47  | -          | -         |
| S-22              | 45' LT | 239+00  | 2.0-2.5        | A-4(0)        | 0    | NP   | 3.4         | 55.8    | 14.5 | 26.3 | 100                | 99  | 49  | -          | 4.9       |
| S-23              | 45' LT | 239+00  | 3.0-3.5        | A-7-5(75)     | 96   | 64   | 0.4         | 2.2     | 12.5 | 84.8 | 100                | 100 | 98  | -          | -         |

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S-23

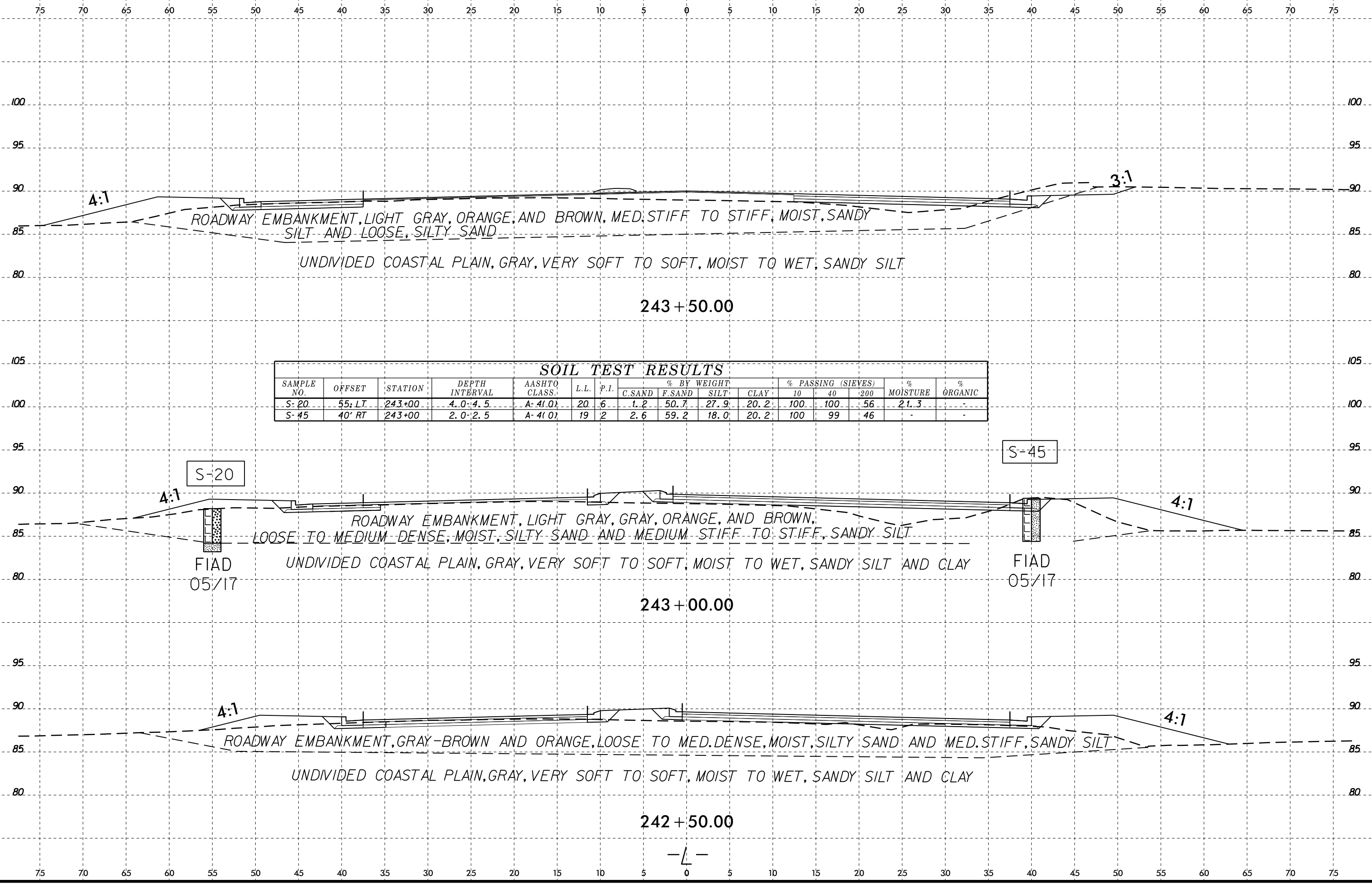
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**SOIL TEST RESULTS**

| SAMPLE NO. | OFFSET | STATION | DEPTH INTERVAL | AASHTO CLASS. | L.L. | P.I. | % BY WEIGHT |         |      |      | % PASSING (SIEVES) |     |     | % MOISTURE | % ORGANIC |
|------------|--------|---------|----------------|---------------|------|------|-------------|---------|------|------|--------------------|-----|-----|------------|-----------|
|            |        |         |                |               |      |      | C. SAND     | F. SAND | SILT | CLAY | 10                 | 40  | 200 |            |           |
| S-20       | 55' LT | 243+00  | 4.0-4.5        | A-4(0)        | 20   | 6    | 1.2         | 50.7    | 27.9 | 20.2 | 100                | 100 | 56  | 21.3       | -         |
| S-45       | 40' RT | 243+00  | 2.0-2.5        | A-4(0)        | 19   | 2    | 2.6         | 59.2    | 18.0 | 20.2 | 100                | 99  | 46  | -          |           |

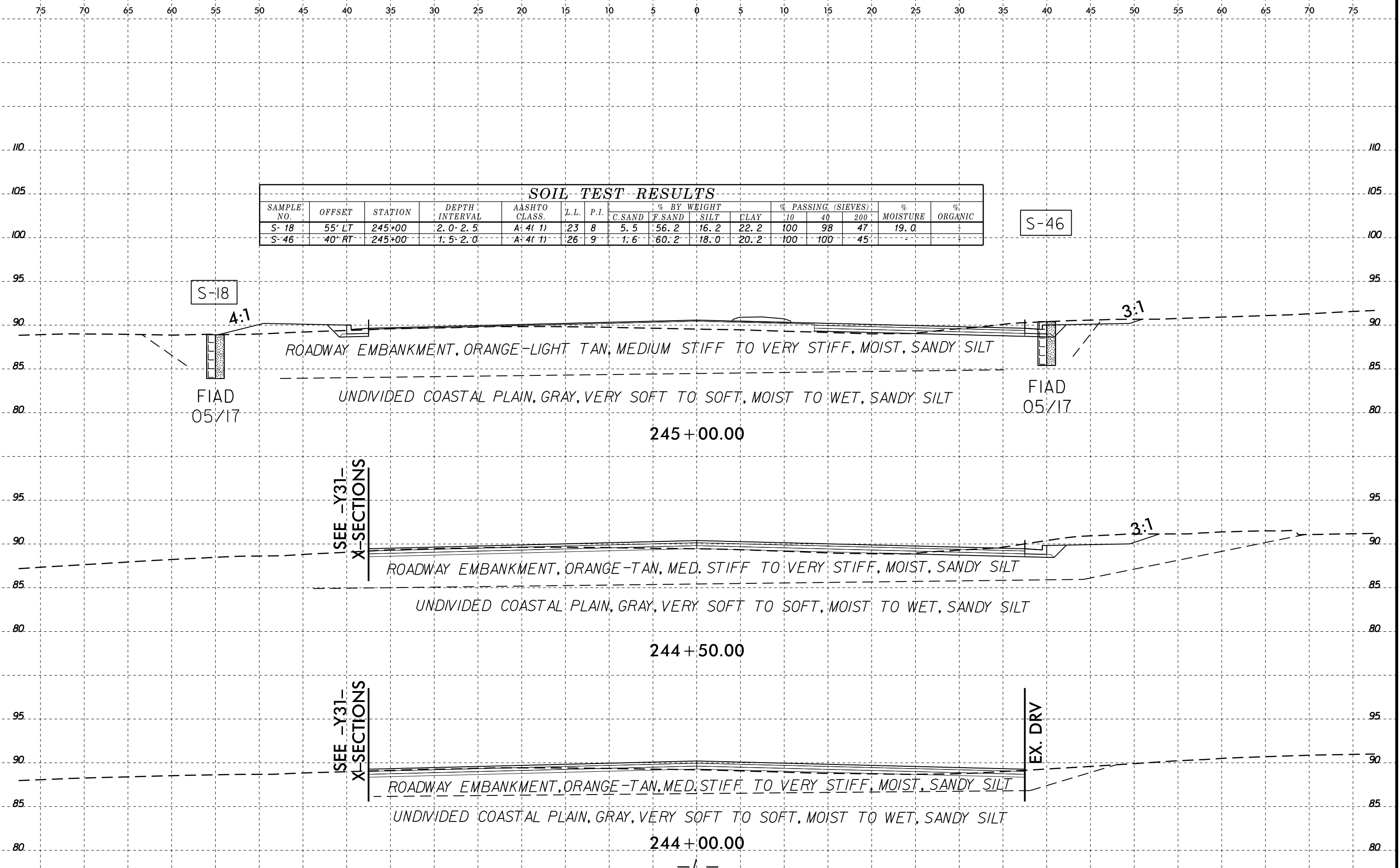
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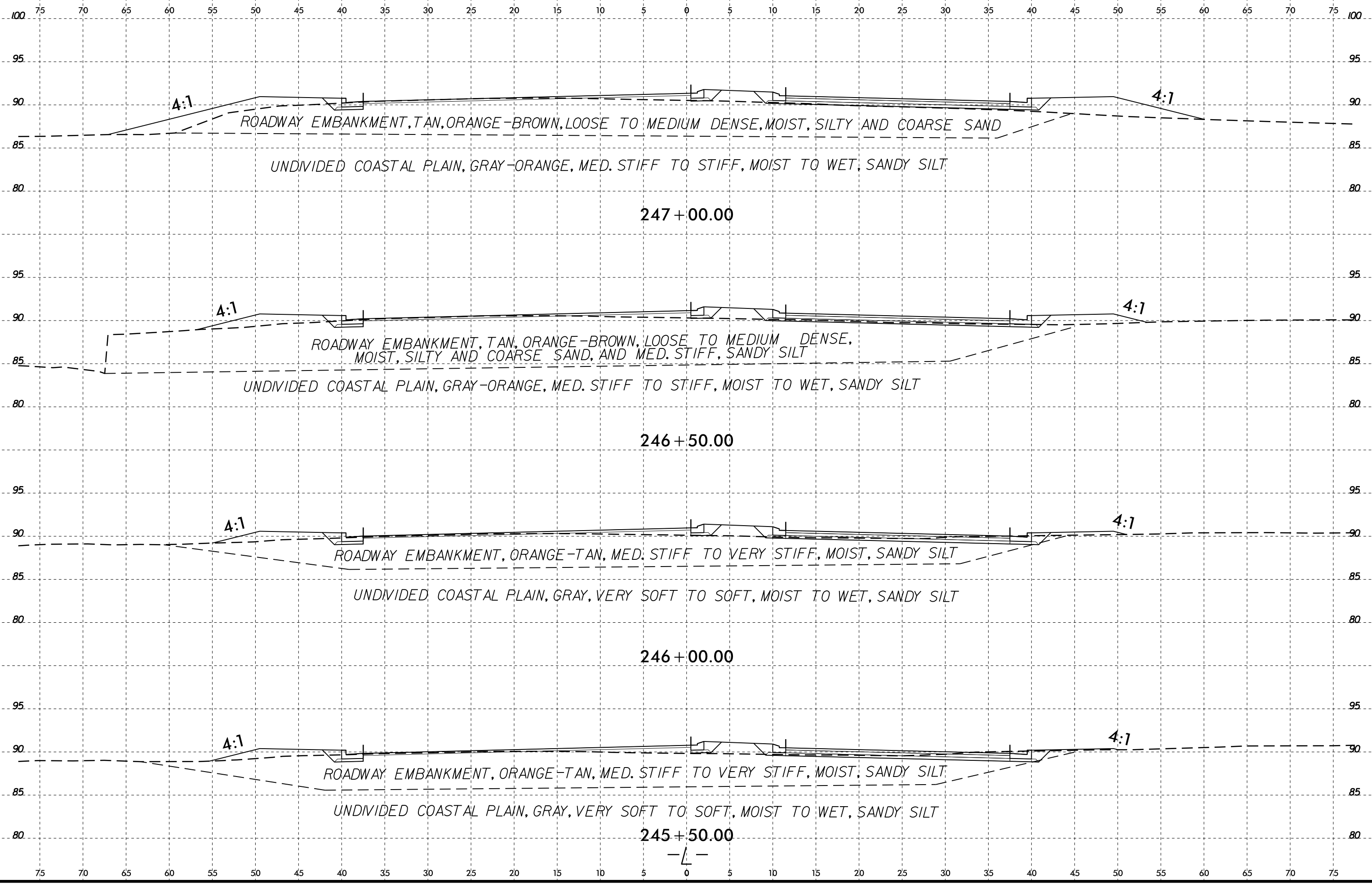


### SOIL TEST RESULTS

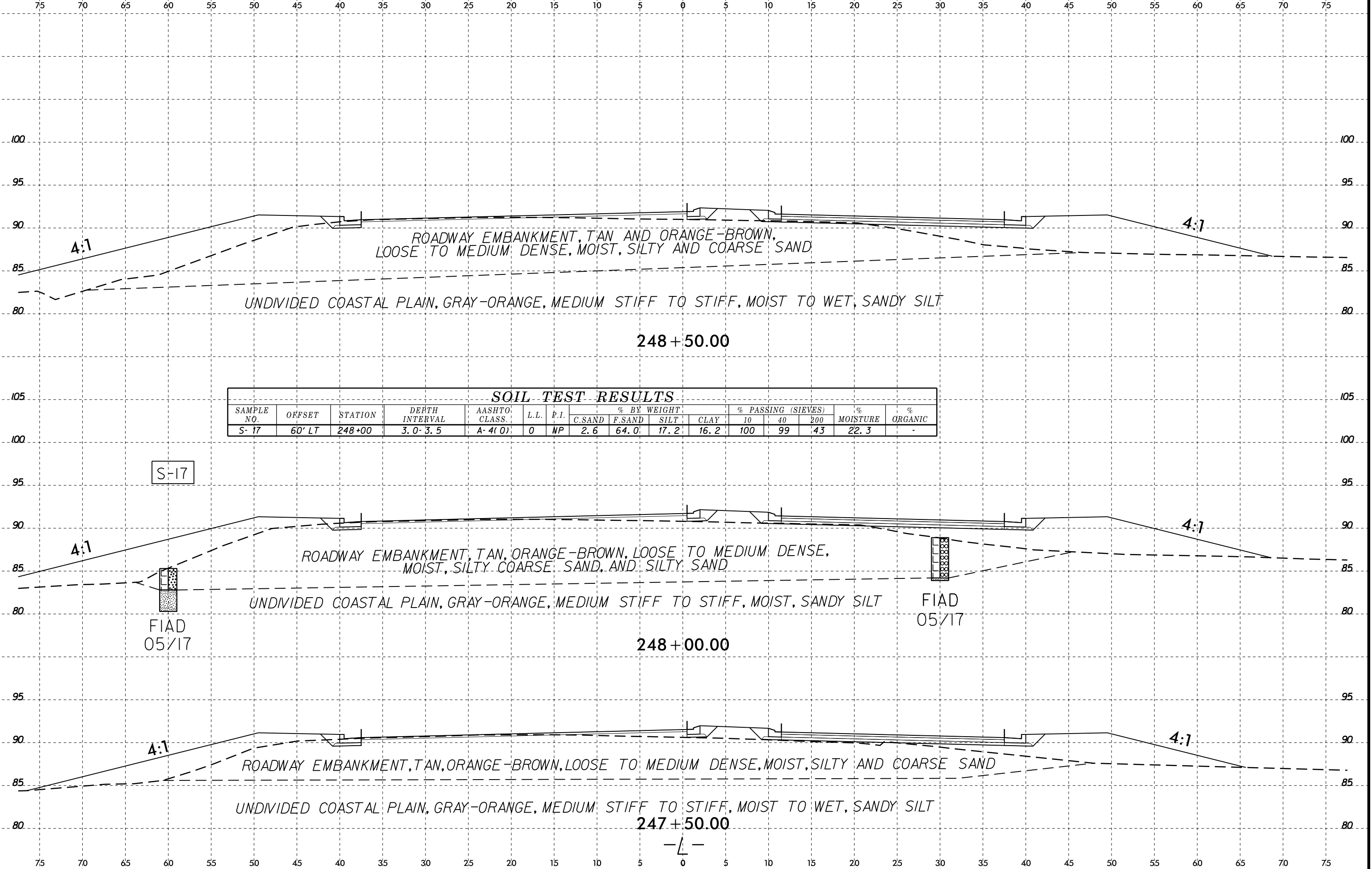
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|------------|--------|---------|----------------|---------------|------|------|-------------|--------|------|------|--------------------|-----|-----|------------|-----------|
|            |        |         |                |               |      |      | C.SAND      | F.SAND | SILT | CLAY | 10                 | 40  | 200 |            |           |
| S-18       | 55' LT | 245+00  | 2.0-2.5        | A-4(1)        | 23   | 8    | 5.5         | 56.2   | 16.2 | 22.2 | 100                | 98  | 47  | 19.0       |           |
| S-46       | 40' RT | 245+00  | 1.5-2.0        | A-4(1)        | 26   | 9    | 1.6         | 60.2   | 18.0 | 20.2 | 100                | 100 | 45  |            |           |



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**SOIL TEST RESULTS**

| SAMPLE NO. | OFFSET | STATION | DEPTH INTERVAL | AASHTO CLASS. | L.L. | P.I. | % BY WEIGHT |        |      |      | % PASSING (SIEVES) |    |     | % MOISTURE | % ORGANIC |
|------------|--------|---------|----------------|---------------|------|------|-------------|--------|------|------|--------------------|----|-----|------------|-----------|
|            |        |         |                |               |      |      | C.SAND      | F.SAND | SILT | CLAY | 10                 | 40 | 200 |            |           |
| S-17       | 60' LT | 248+00  | 3.0-3.5        | A-4(0)        | 0    | NP   | 2.6         | 64.0   | 17.2 | 16.2 | 100                | 99 | 43  | 22.3       | -         |

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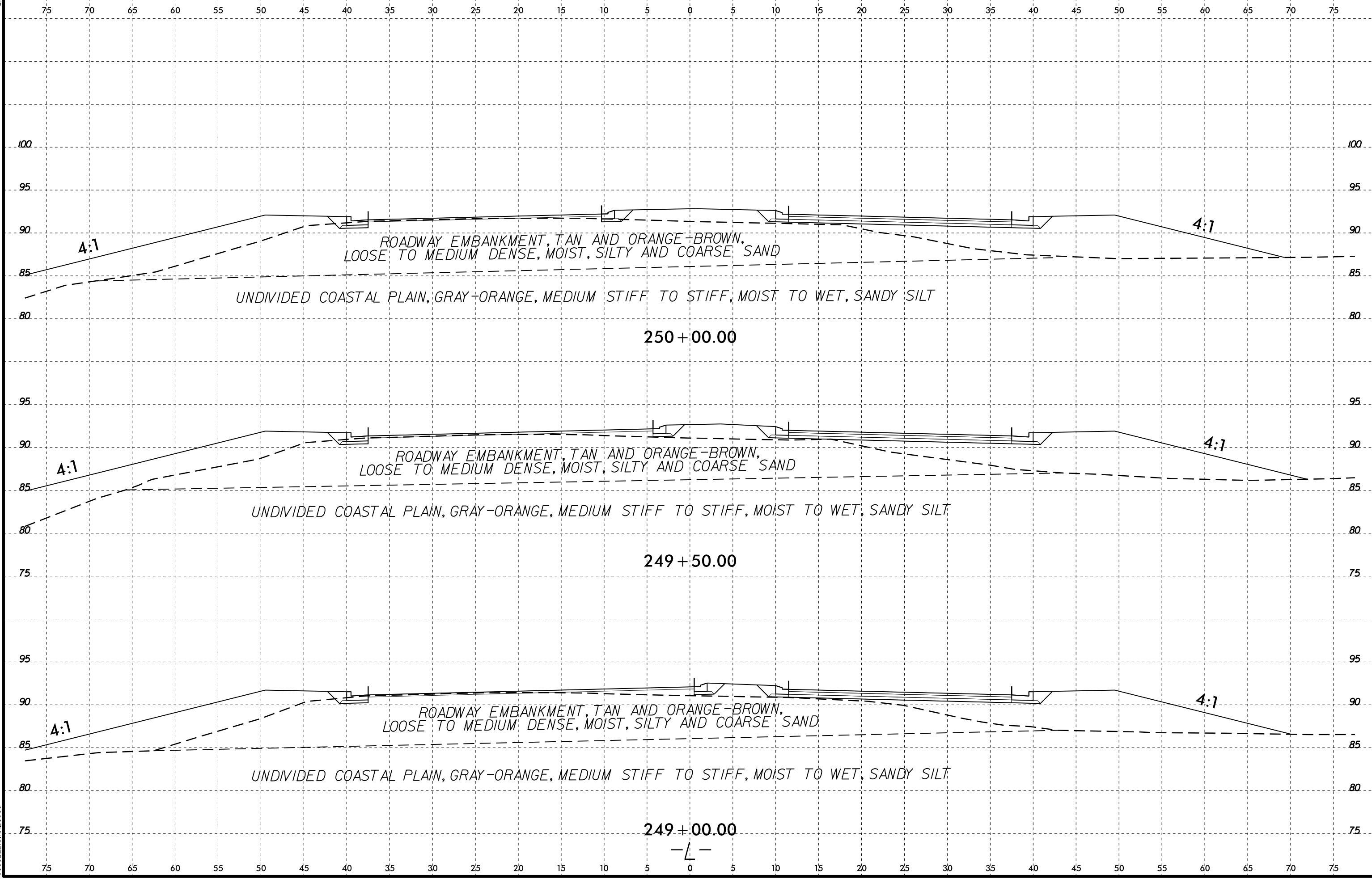
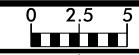
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247 + 50.00

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ROADWAY EMBANKMENT, TAN AND ORANGE-BROWN, LOOSE TO MEDIUM DENSE, MOIST, SILTY AND COARSE SAND

UNDIVIDED COASTAL PLAIN, GRAY-ORANGE, MEDIUM STIFF TO STIFF, MOIST TO WET, SANDY SILT

250+00.00

ROADWAY EMBANKMENT, TAN AND ORANGE-BROWN, LOOSE TO MEDIUM DENSE, MOIST, SILTY AND COARSE SAND

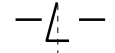
UNDIVIDED COASTAL PLAIN, GRAY-ORANGE, MEDIUM STIFF TO STIFF, MOIST TO WET, SANDY SILT

249+50.00

ROADWAY EMBANKMENT, TAN AND ORANGE-BROWN, LOOSE TO MEDIUM DENSE, MOIST, SILTY AND COARSE SAND

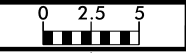
UNDIVIDED COASTAL PLAIN, GRAY-ORANGE, MEDIUM STIFF TO STIFF, MOIST TO WET, SANDY SILT

249+00.00

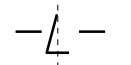
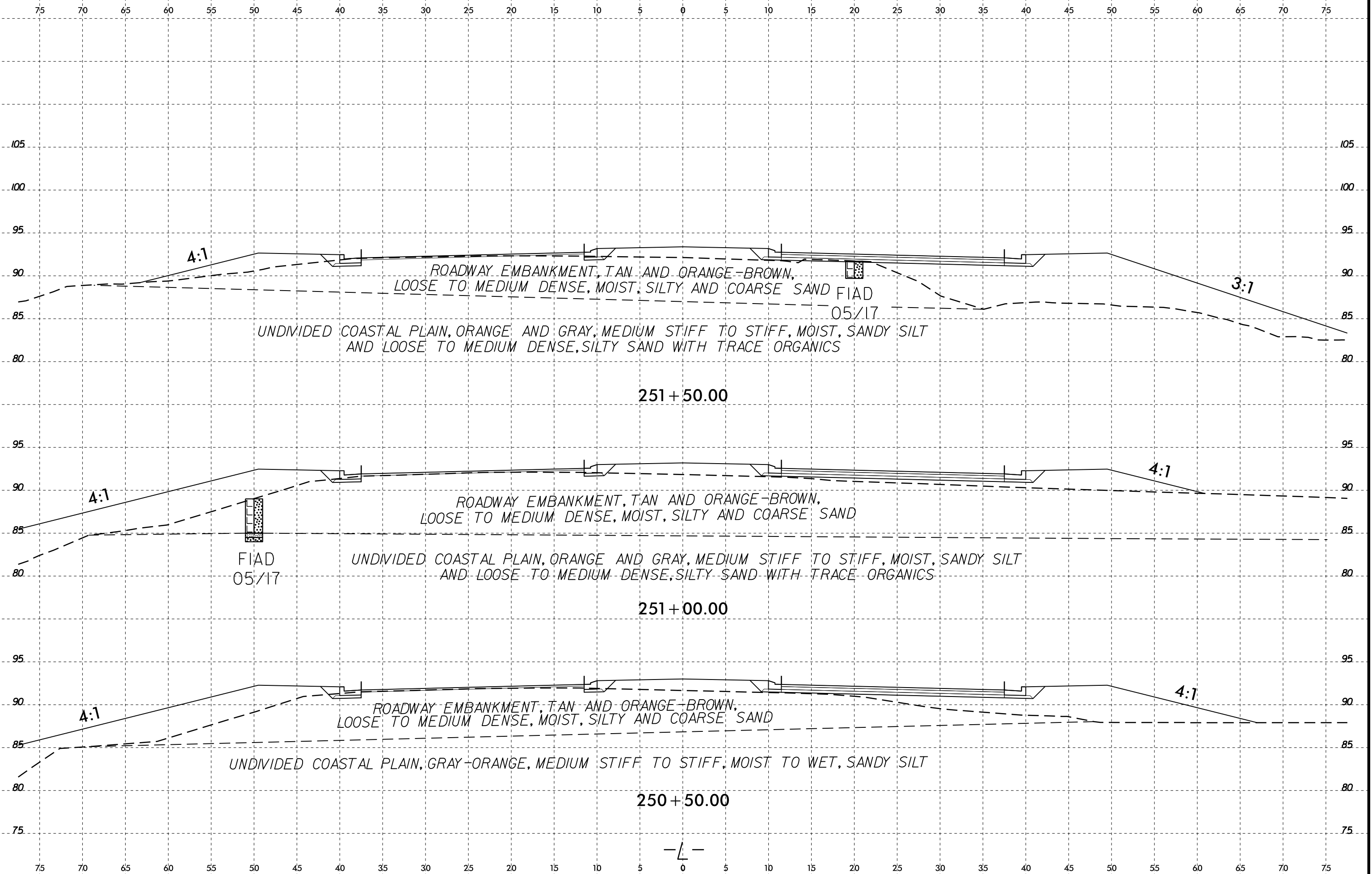


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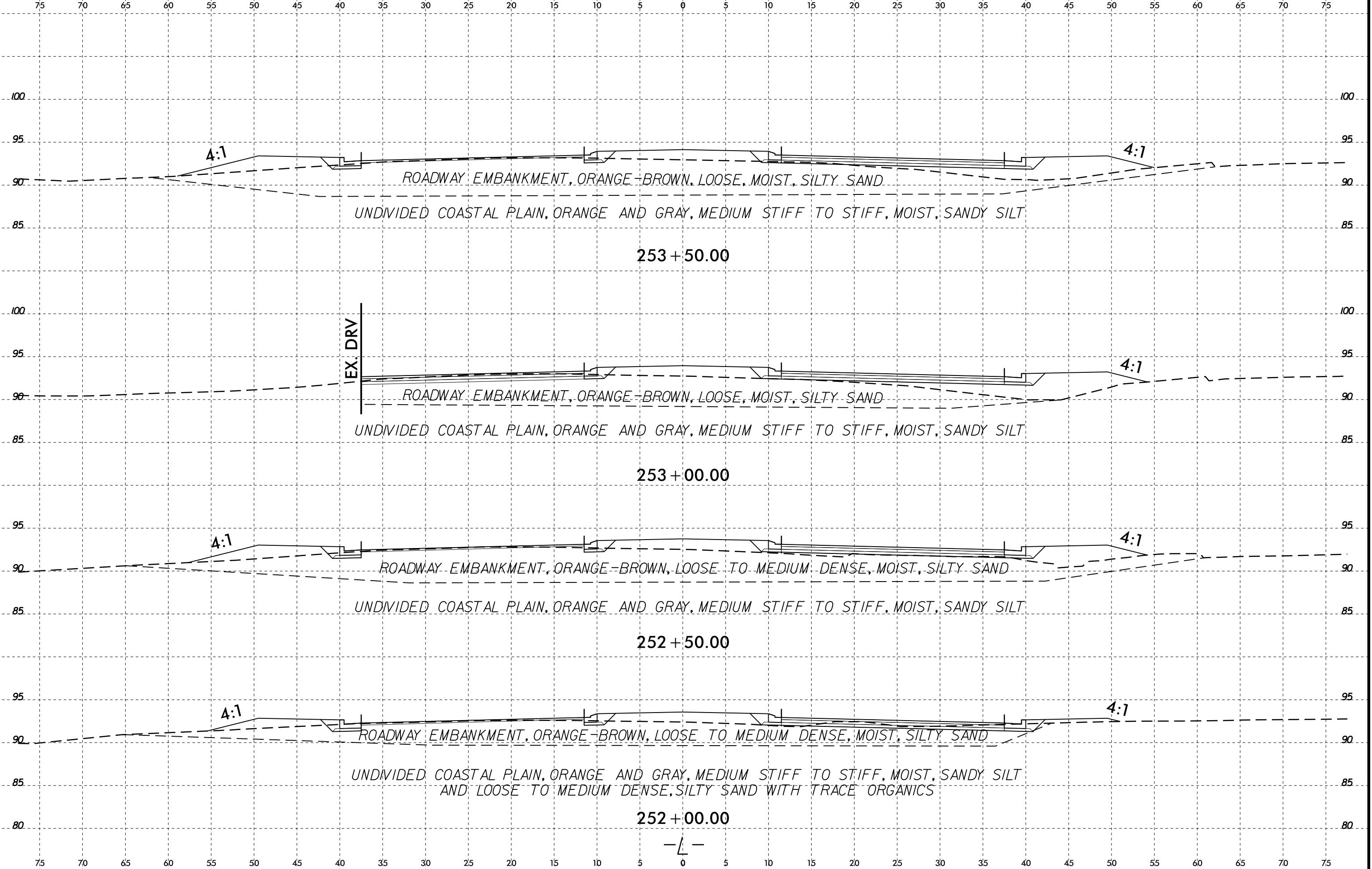
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| R-5020B             | 59        |



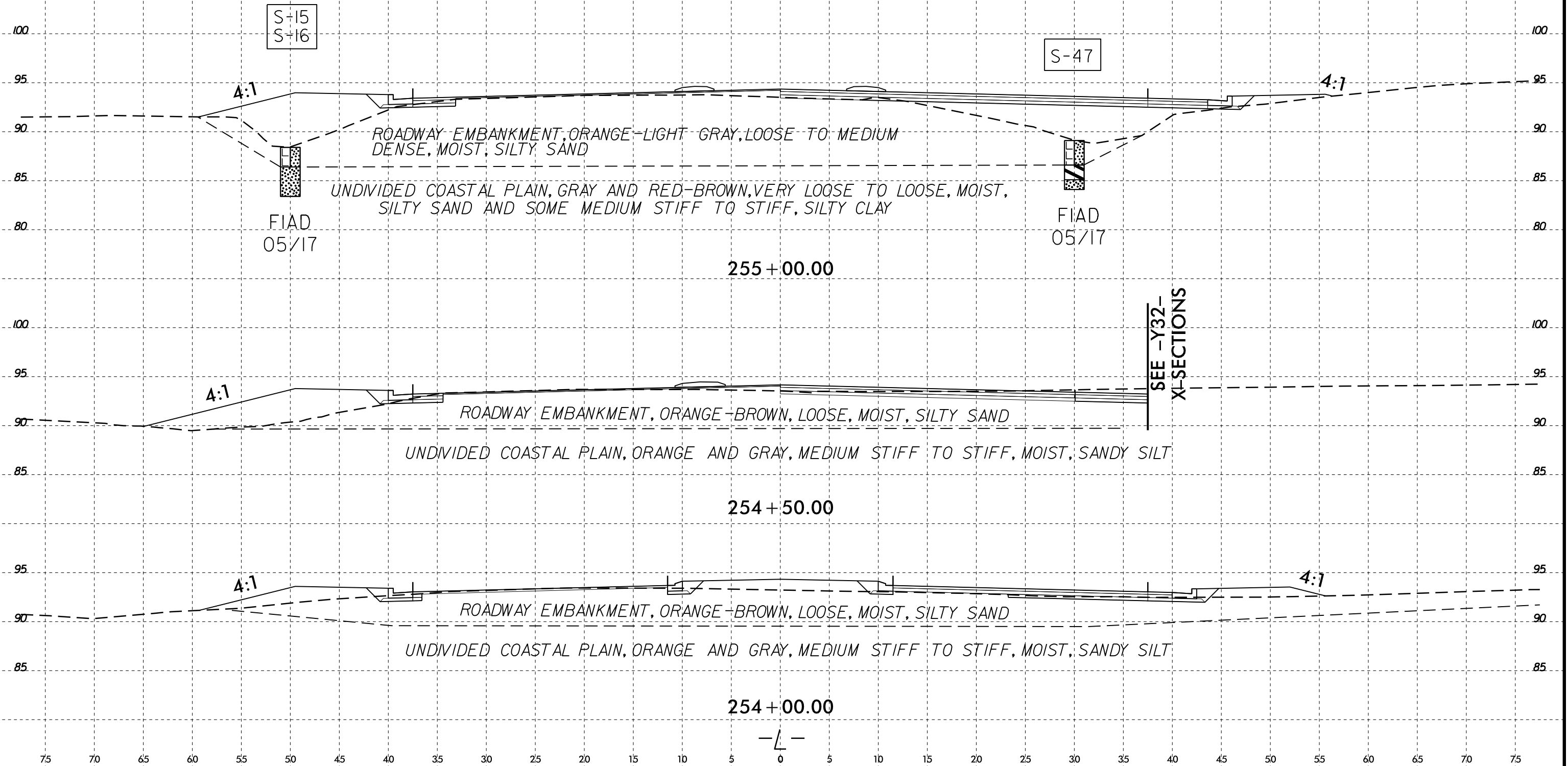
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| SAMPLE NO. | OFFSET | STATION | DEPTH INTERVAL | AASHTO CLASS. | L.L. | P.I. | % BY WEIGHT |        |      |      | % PASSING (SIEVES) |     |     | % MOISTURE | % ORGANIC |
|------------|--------|---------|----------------|---------------|------|------|-------------|--------|------|------|--------------------|-----|-----|------------|-----------|
|            |        |         |                |               |      |      | C.SAND      | F.SAND | SILT | CLAY | 10                 | 40  | 200 |            |           |
|            |        |         |                |               |      |      |             |        |      |      |                    |     |     |            |           |
| S-15       | 50' LT | 255+00  | 1.5-2.0        | A-2-4(0)      | 0    | NP   | 2.0         | 76.4   | 9.5  | 12.1 | 100                | 99  | 29  | -          | -         |
| S-16       | 50' LT | 255+00  | 2.5-3.0        | A-2-4(0)      | 0    | NP   | 1.0         | 86.5   | 6.5  | 6.1  | 100                | 100 | 19  | -          | -         |
| S-47       | 30' RT | 255+00  | 4.5-5.0        | A-2-5(0)      | 0    | NP   | 1.6         | 78.6   | 11.7 | 8.1  | 100                | 100 | 26  | -          | -         |



S+15  
S+16

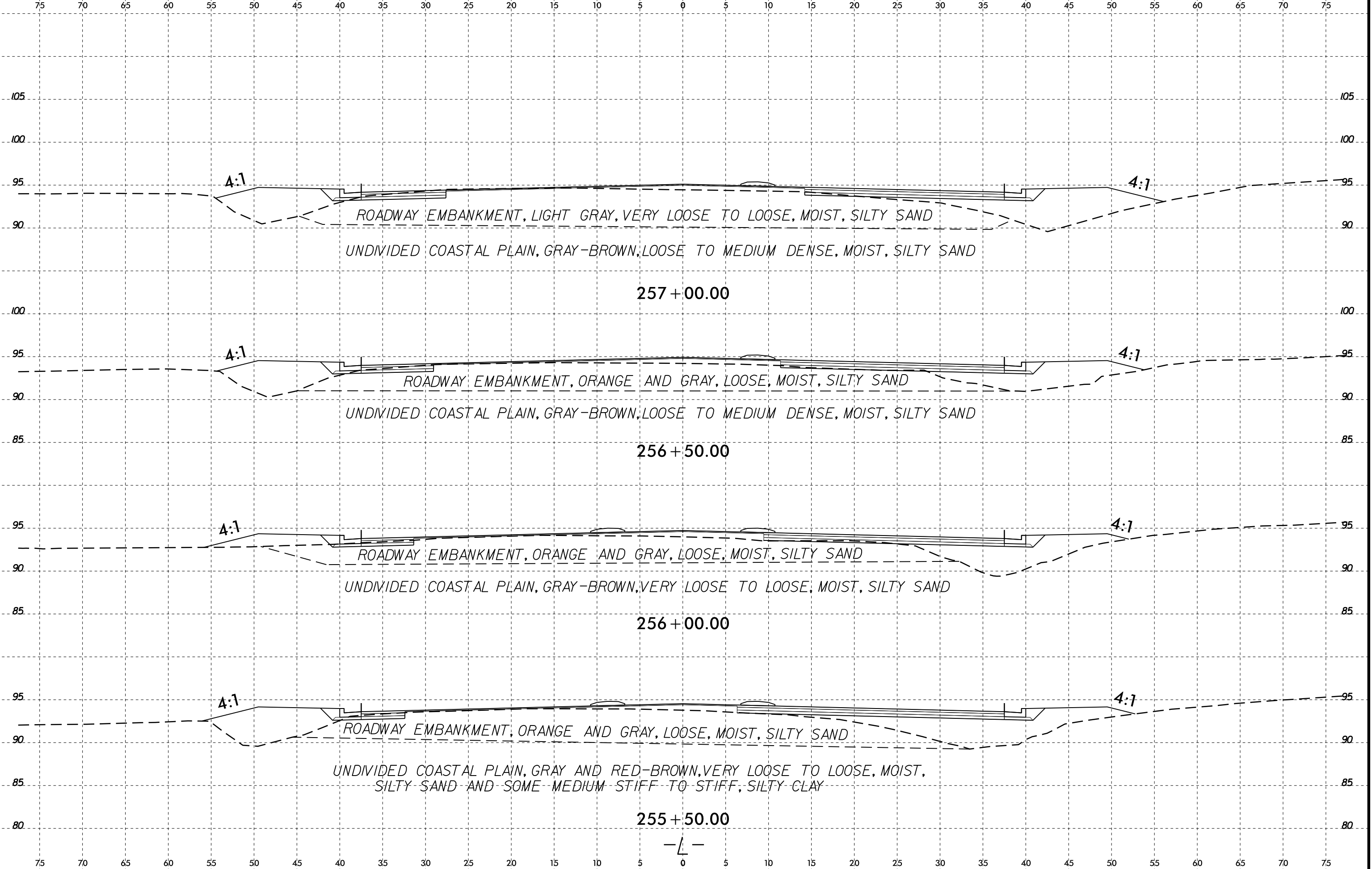
S-47

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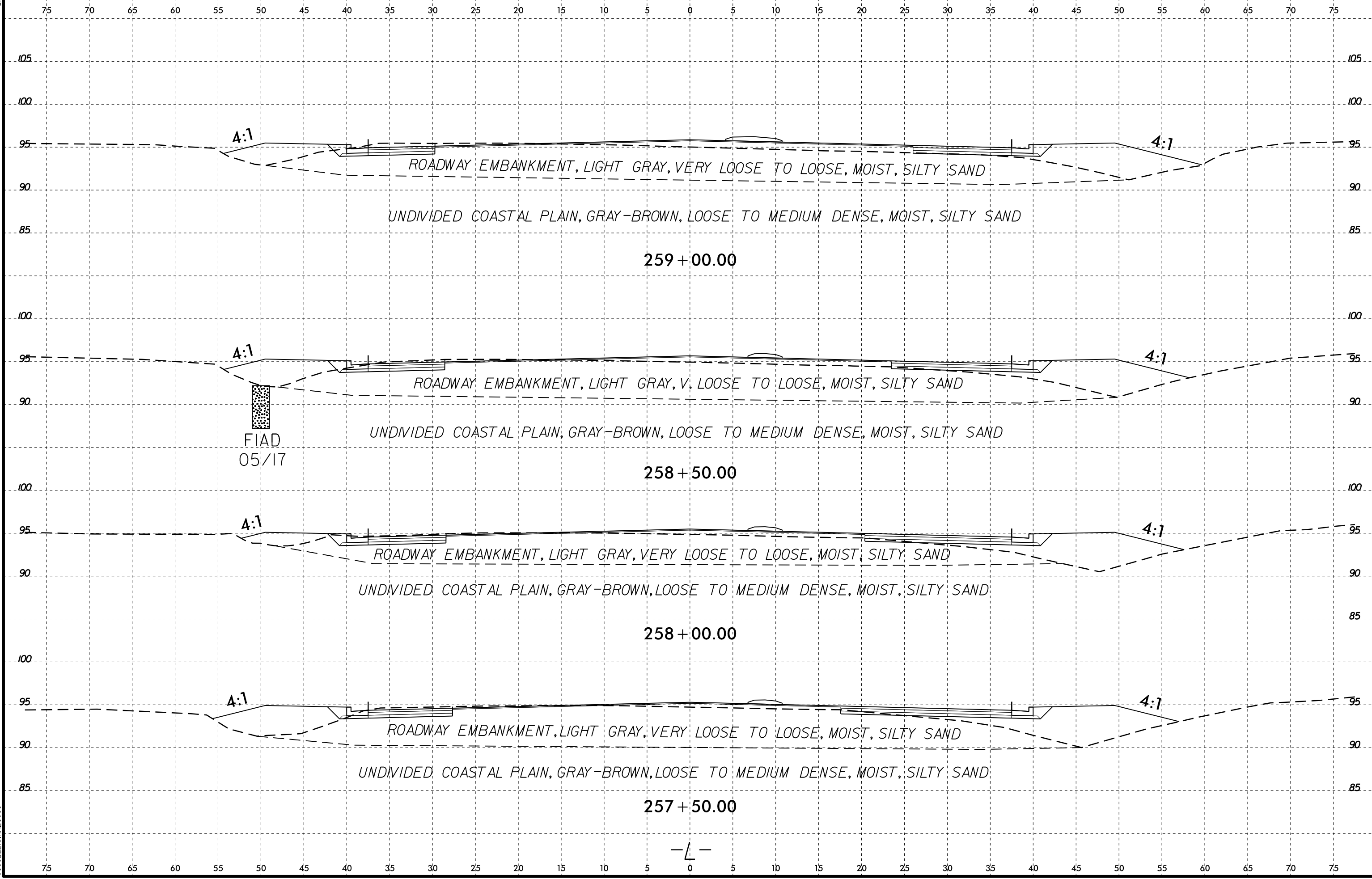
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X-SECTIONS

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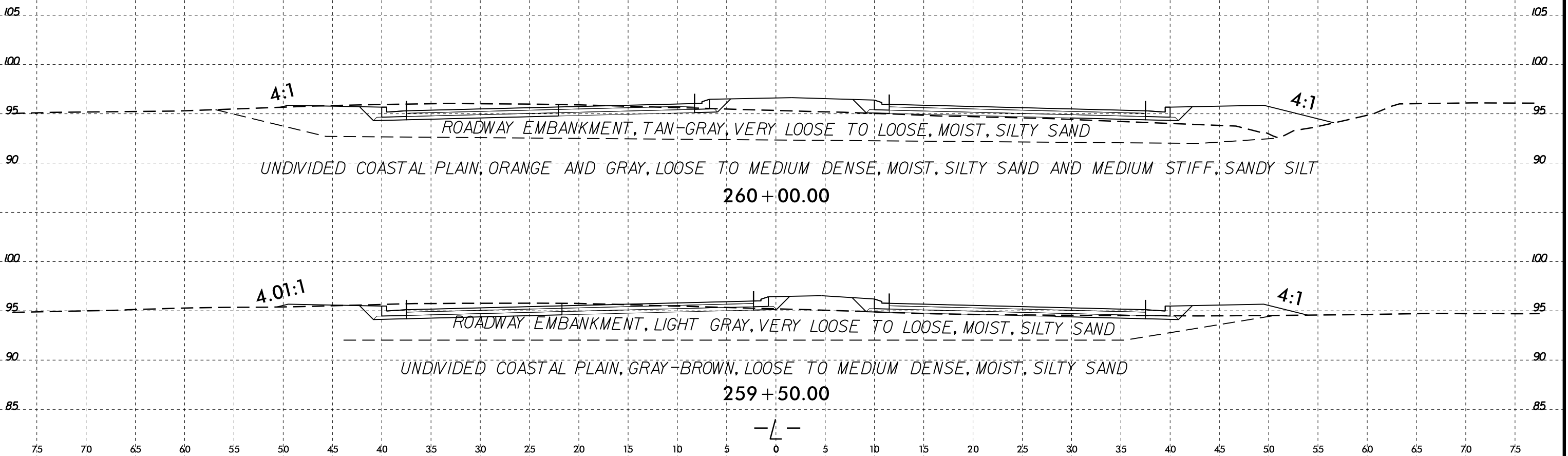


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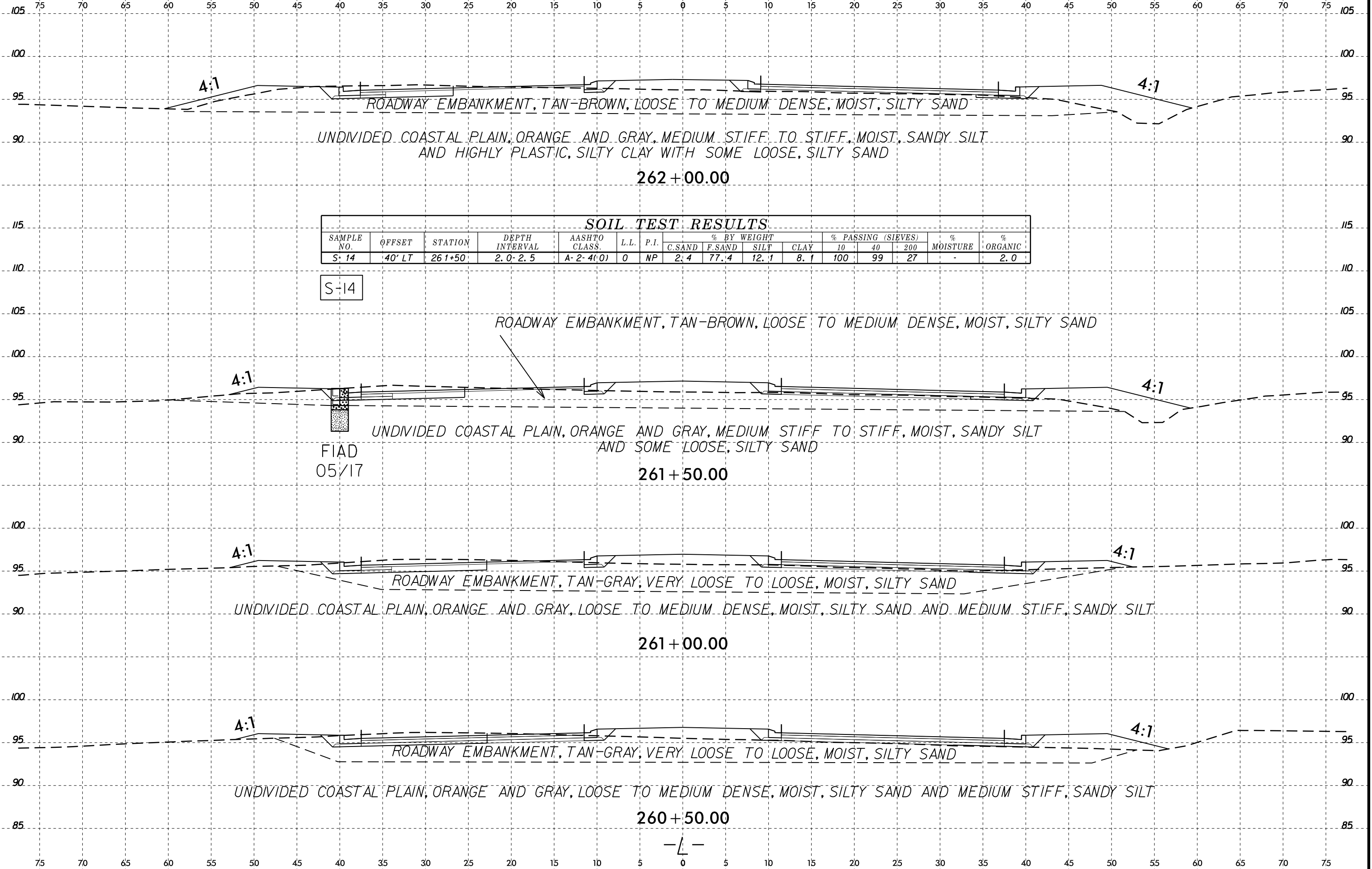
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75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75



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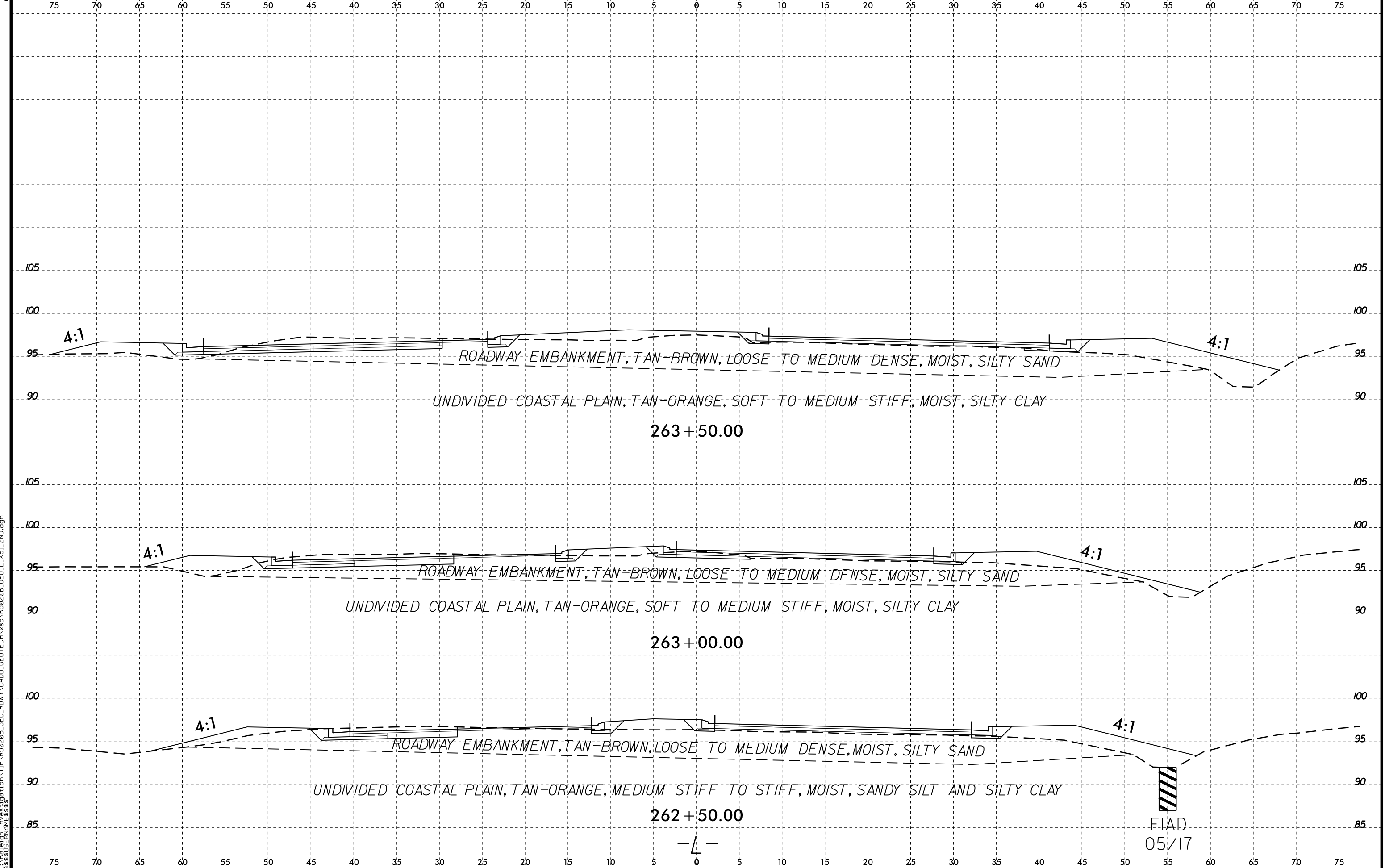


| SOIL TEST RESULTS |        |         |                |               |      |      |             |        |      |      |                    |    |     |            |           |
|-------------------|--------|---------|----------------|---------------|------|------|-------------|--------|------|------|--------------------|----|-----|------------|-----------|
| SAMPLE NO.        | OFFSET | STATION | DEPTH INTERVAL | AASHTO CLASS. | L.L. | P.I. | % BY WEIGHT |        |      |      | % PASSING (SIEVES) |    |     | % MOISTURE | % ORGANIC |
|                   |        |         |                |               |      |      | C.SAND      | F.SAND | SILT | CLAY | 10                 | 40 | 200 |            |           |
| S-14              | 40' LT | 261+50  | 2.0-2.5        | A-2-4(0)      | 0    | NP   | 2.4         | 77.4   | 12.1 | 8.1  | 100                | 99 | 27  | -          | 2.0       |

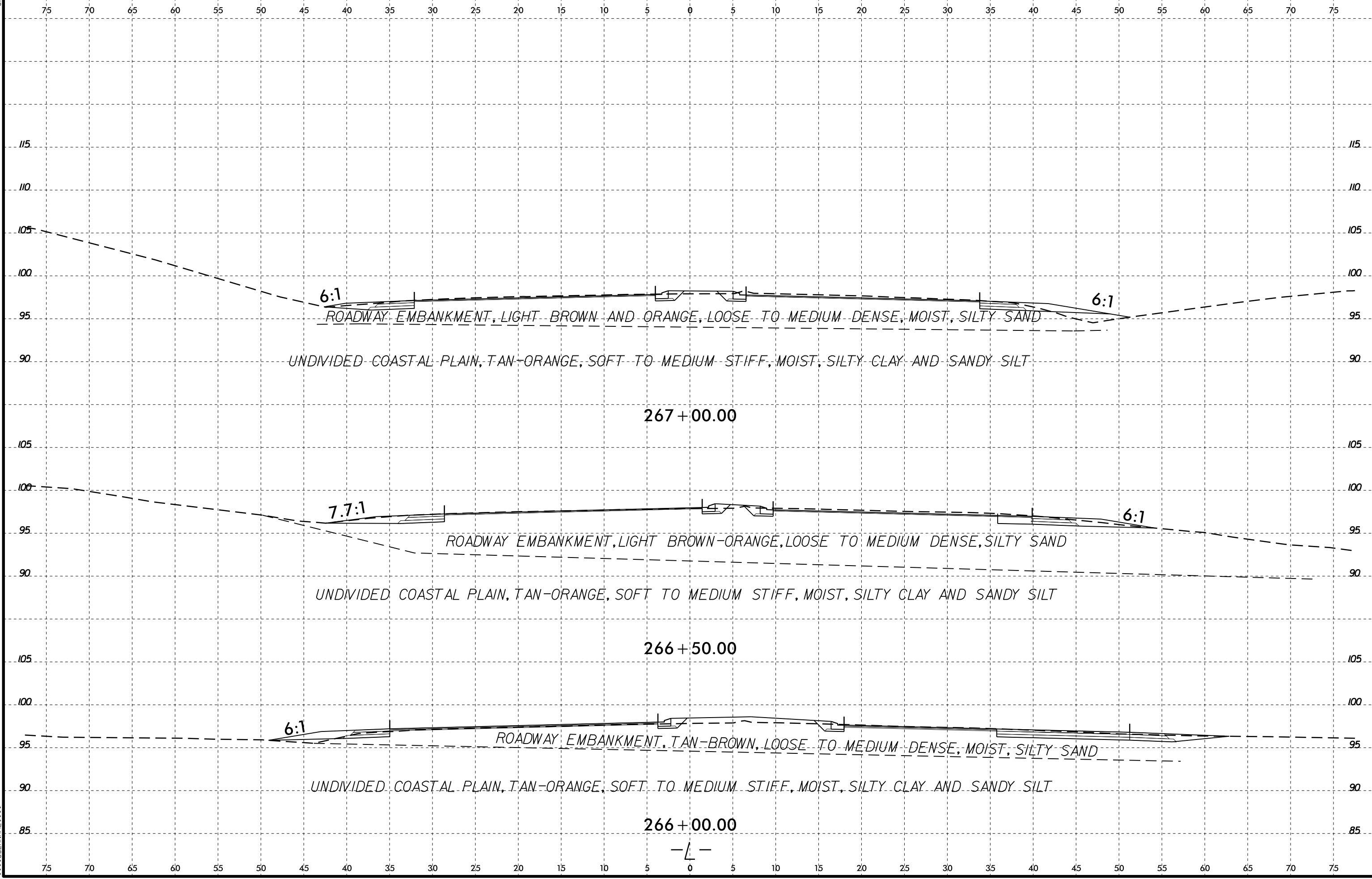
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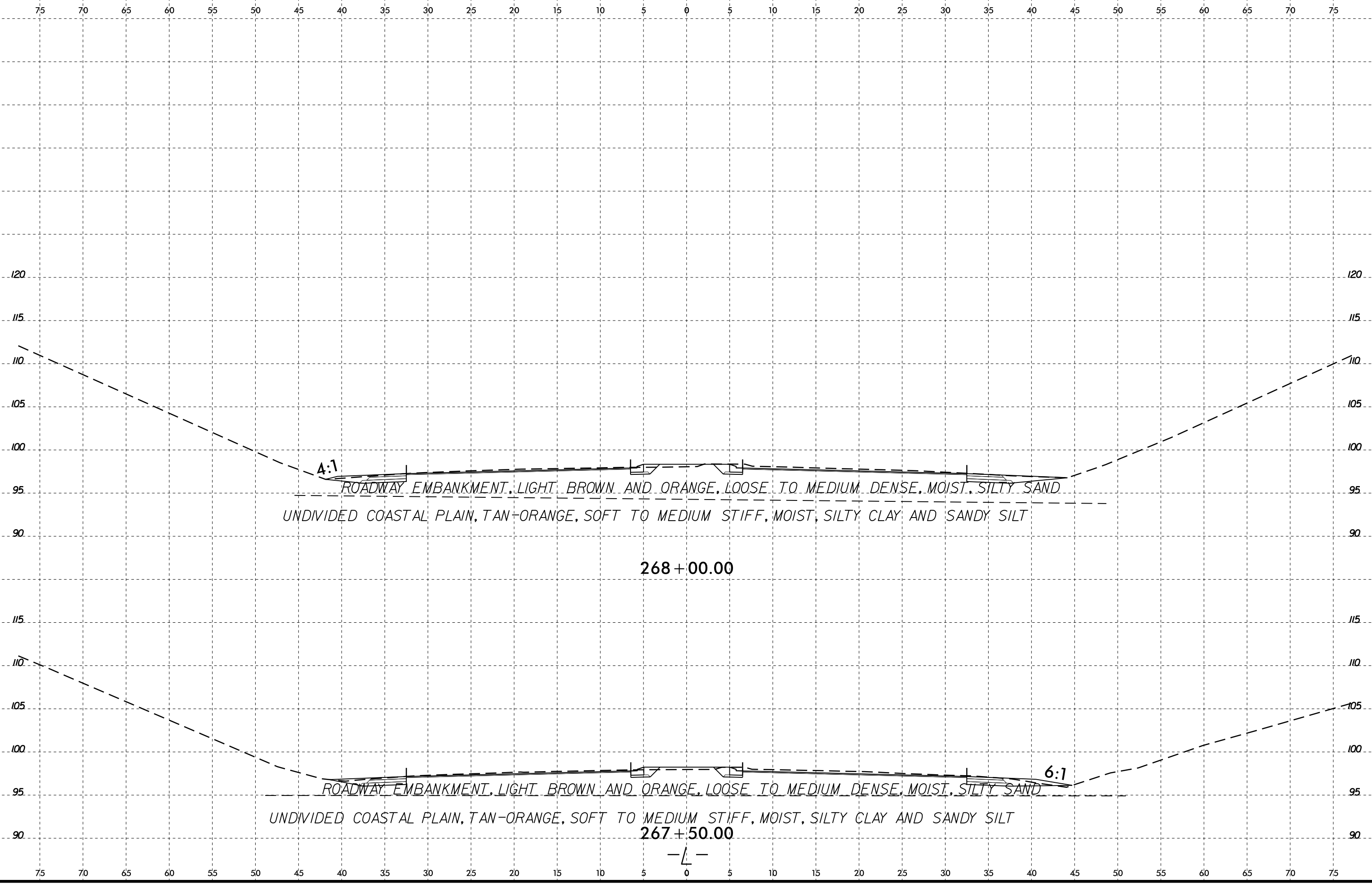
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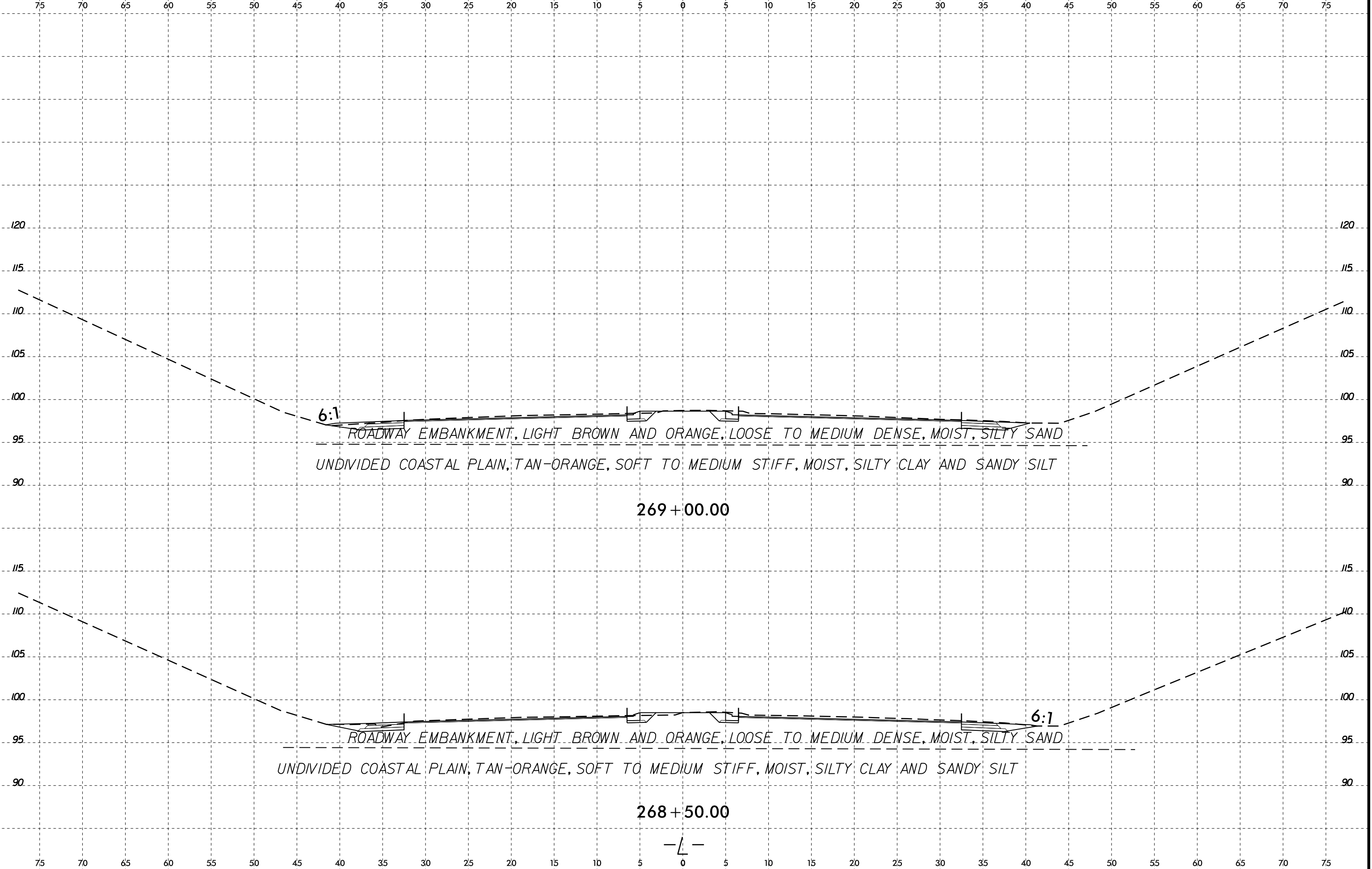


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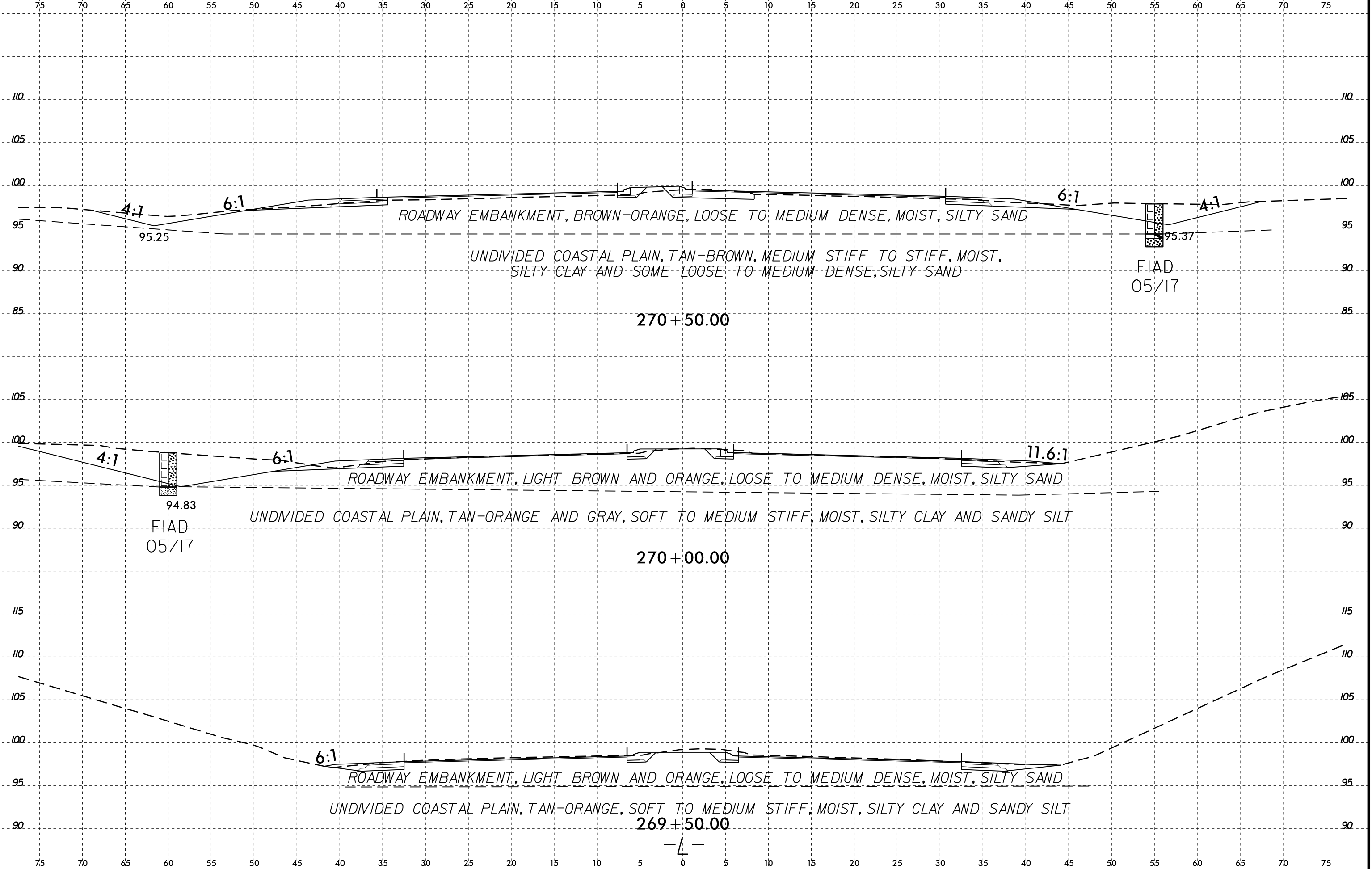
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75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

110 110

105 105

100 100

95 95

90 90

85 85

105 105

100 100

95 95

90 90

115 115

110 110

105 105

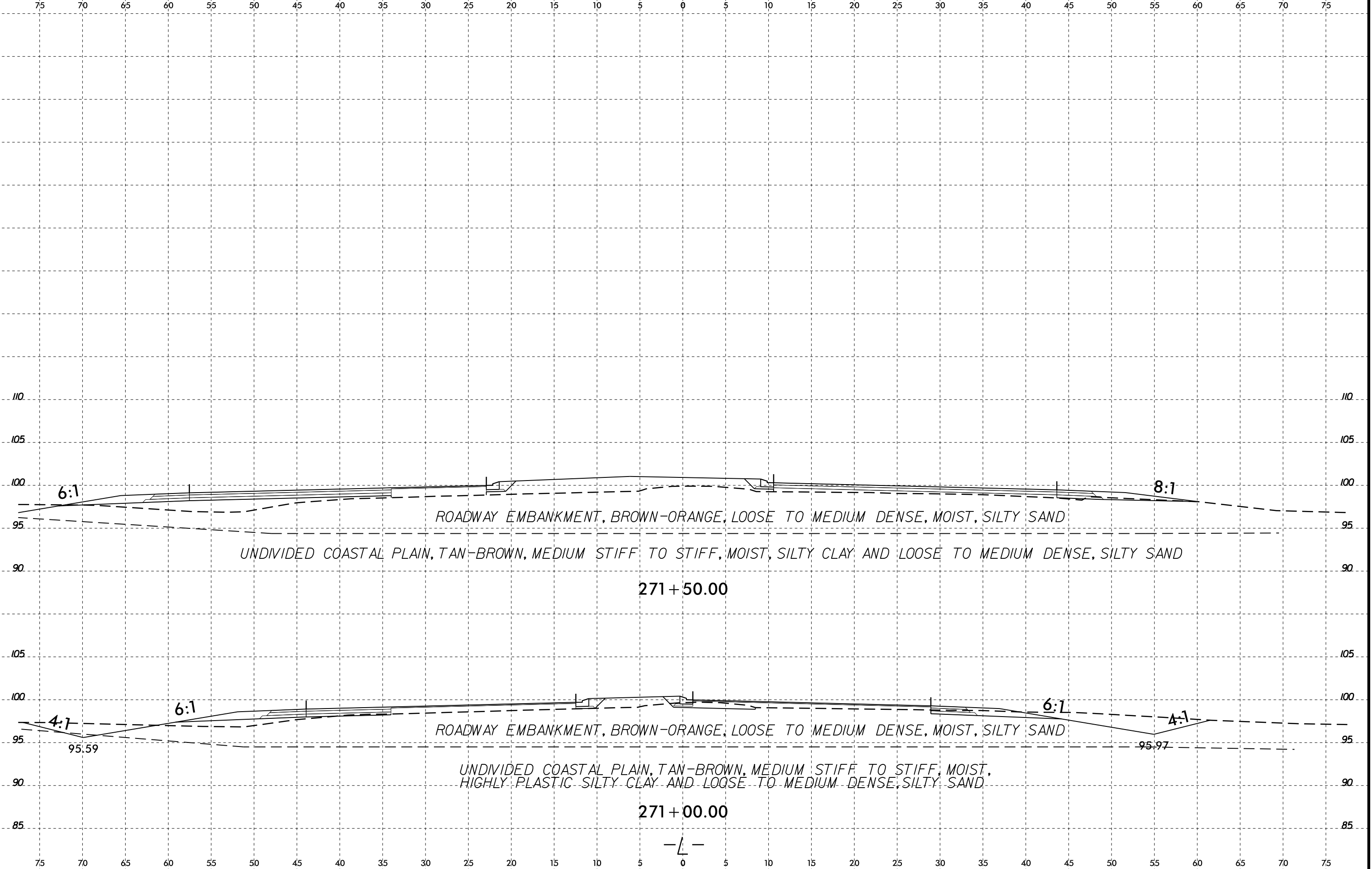
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95 95

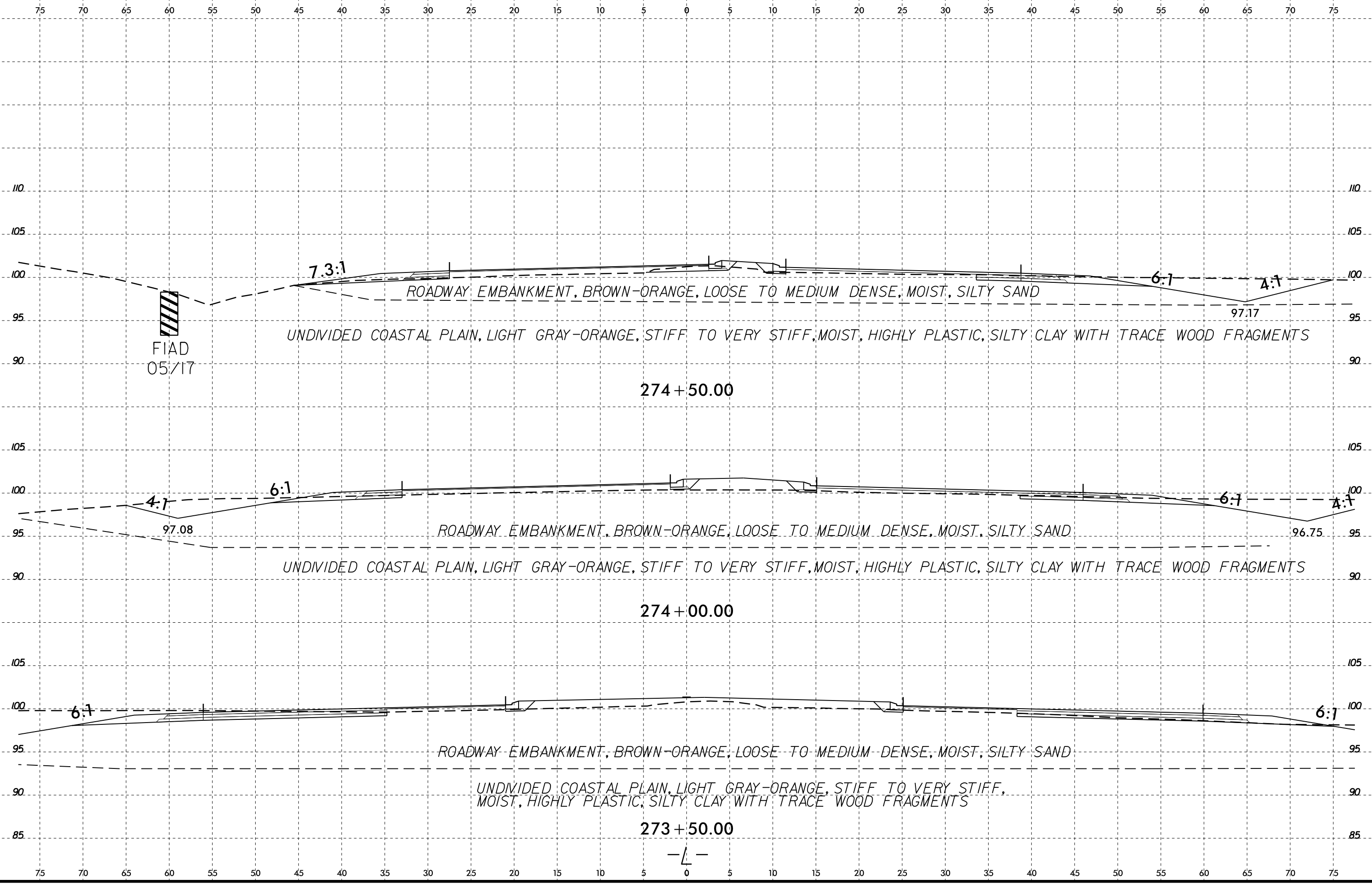
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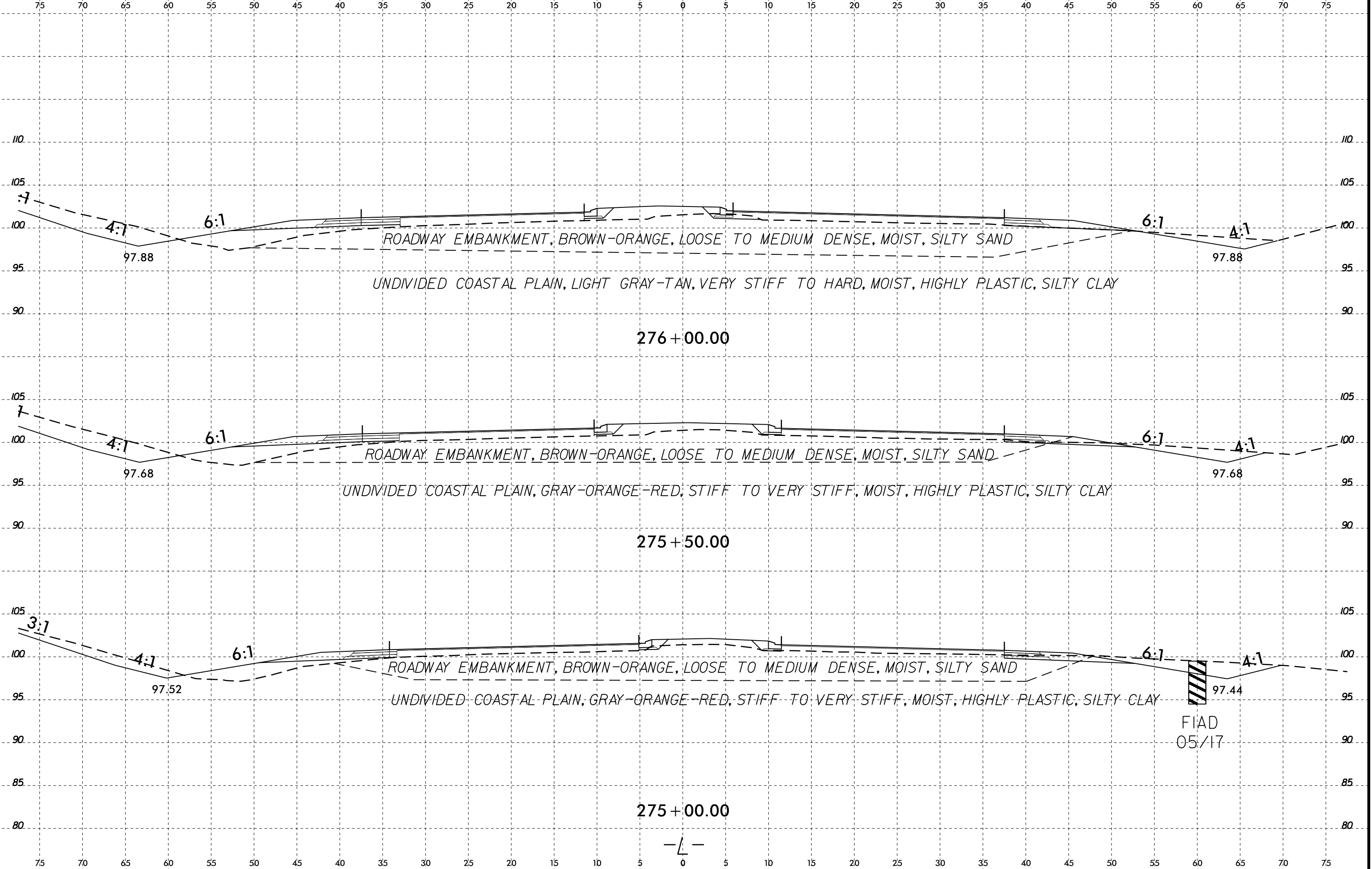
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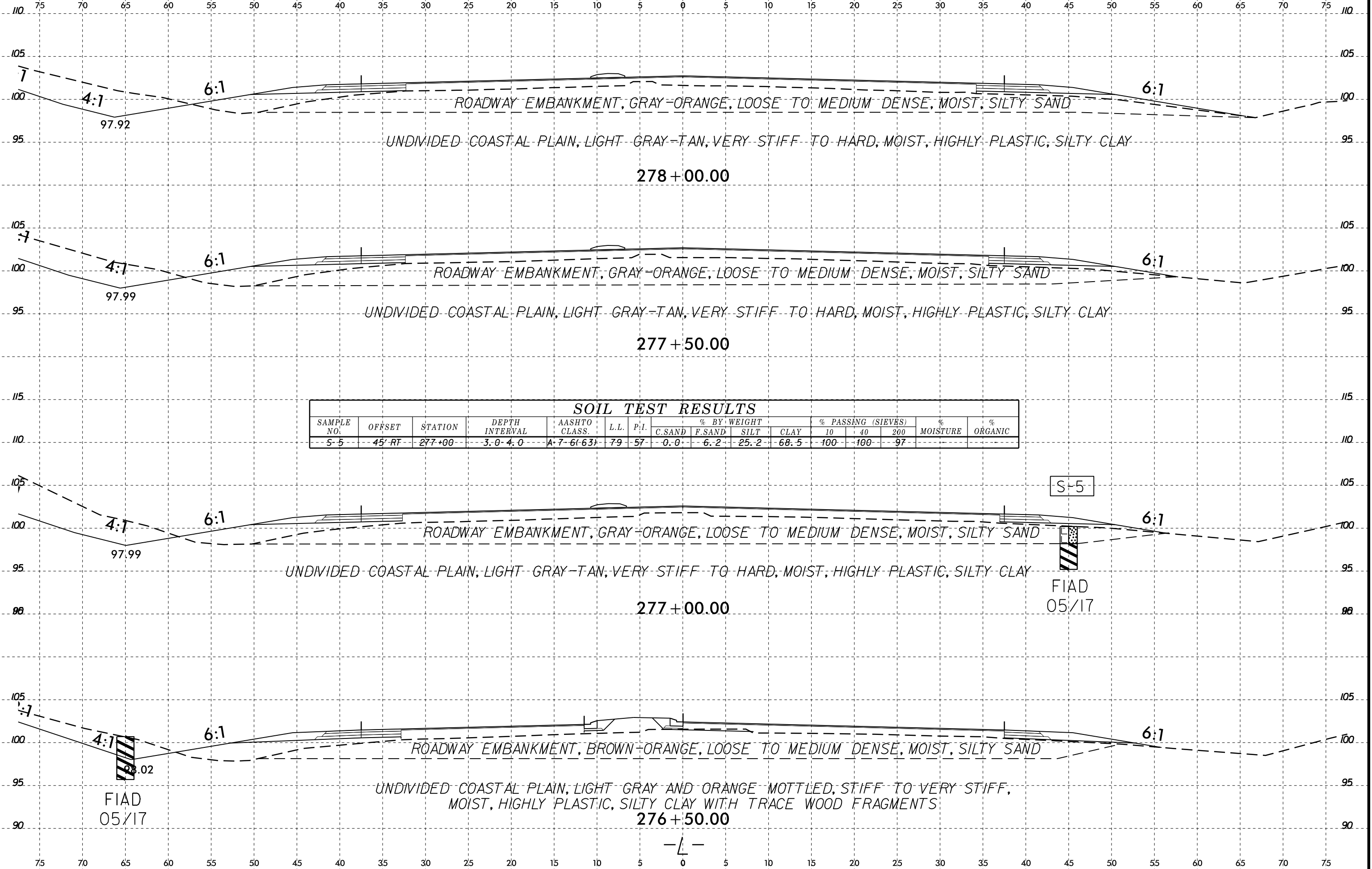


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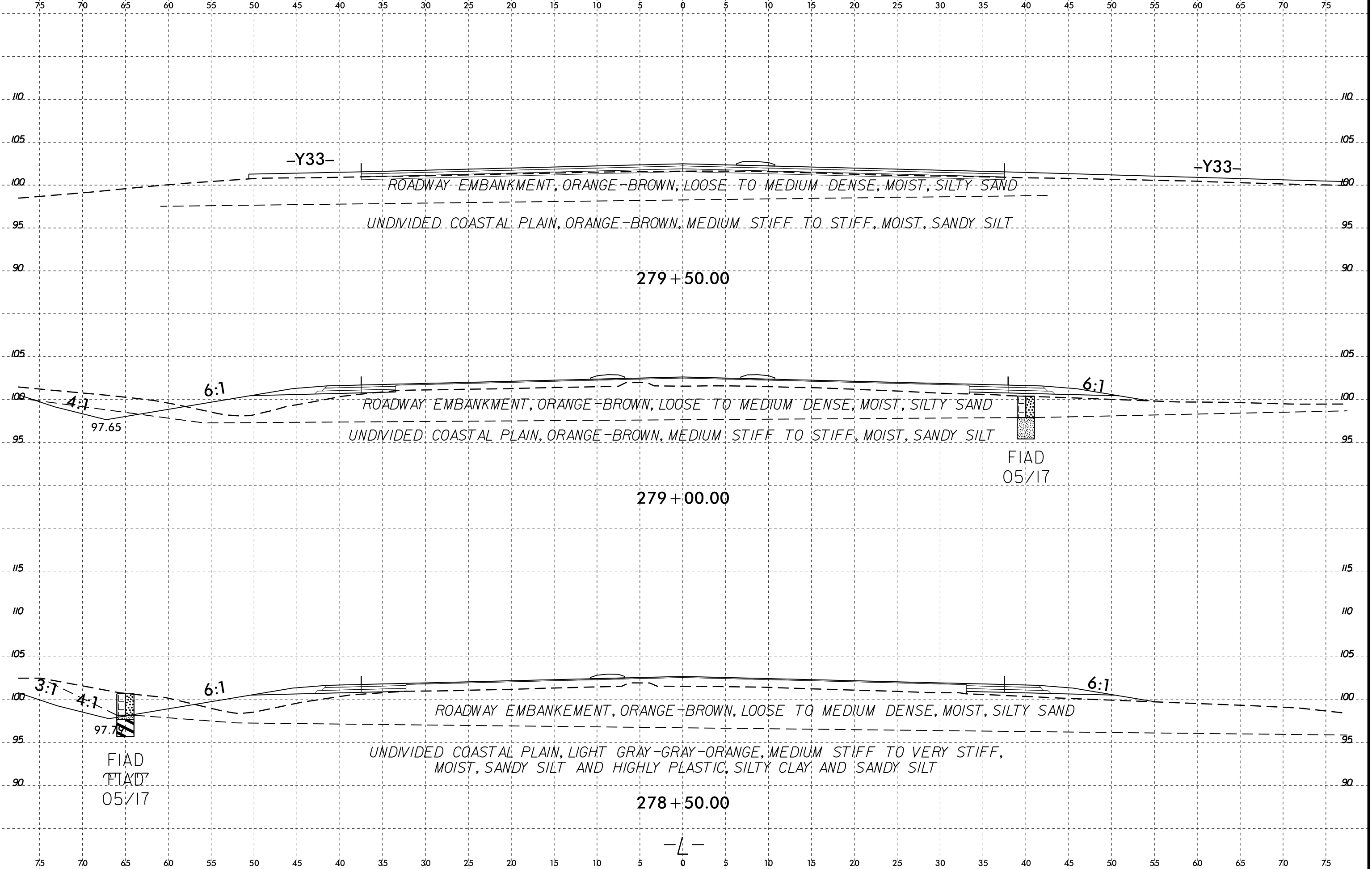
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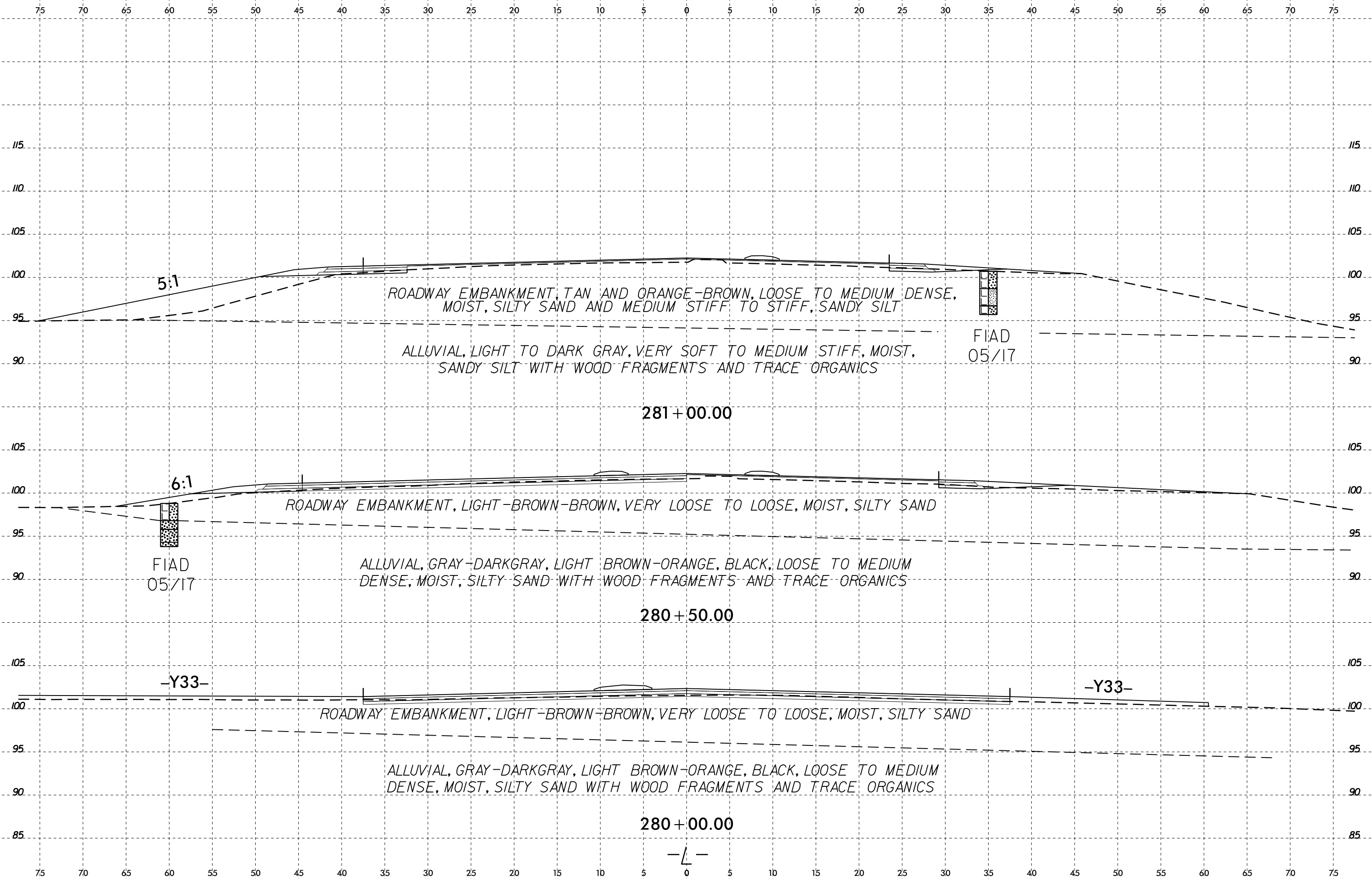


| SOIL TEST RESULTS |        |         |                |               |      |      |             |        |      |      |                    |     |     |            |           |
|-------------------|--------|---------|----------------|---------------|------|------|-------------|--------|------|------|--------------------|-----|-----|------------|-----------|
| SAMPLE NO.        | OFFSET | STATION | DEPTH INTERVAL | AASHTO CLASS. | L.L. | P.I. | % BY WEIGHT |        |      |      | % PASSING (SIEVES) |     |     | % MOISTURE | % ORGANIC |
|                   |        |         |                |               |      |      | C.SAND      | F.SAND | SILT | CLAY | 10                 | 40  | 200 |            |           |
| S-5               | 45' RT | 277+00  | 3.0-4.0        | A-7-6(63)     | 79   | 57   | 0.0         | 6.2    | 25.2 | 68.5 | 100                | 100 | 97  |            |           |

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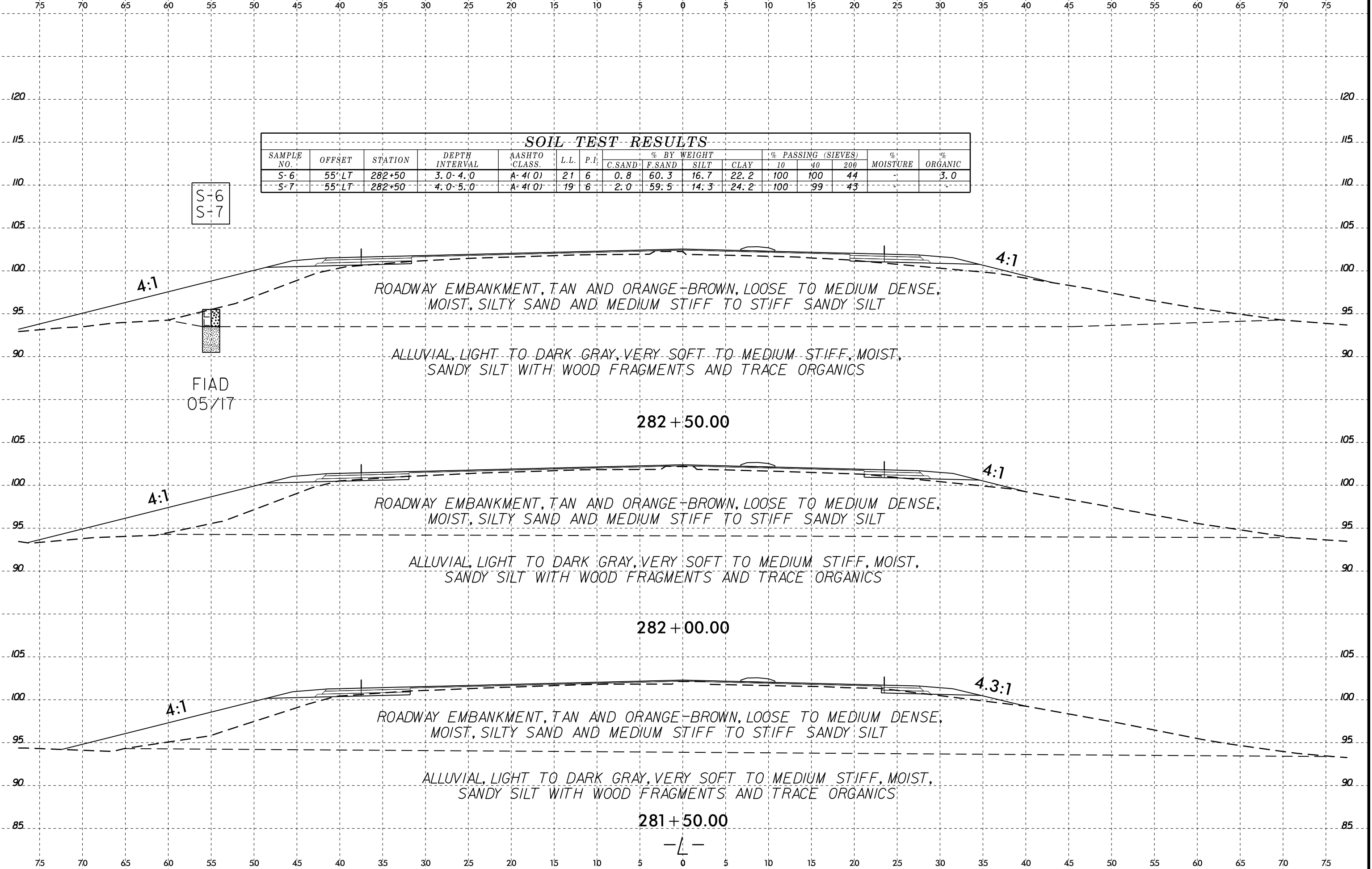
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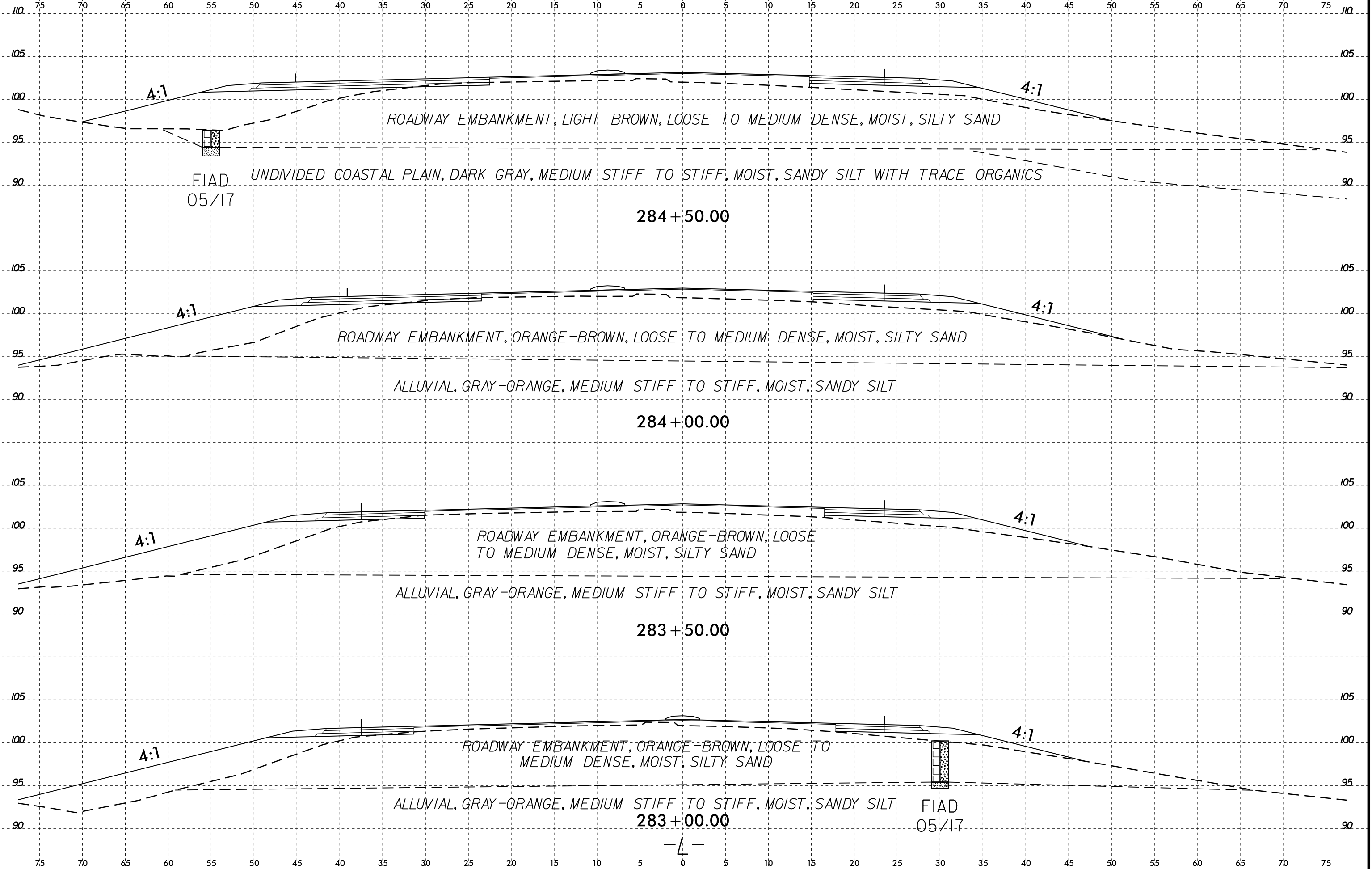


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| SAMPLE NO. | OFFSET | STATION | DEPTH INTERVAL | AASHTO CLASS. | L.L. | P.I. | % BY WEIGHT |        |        |         | % PASSING (SIEVES) |    |     | % MOISTURE | % ORGANIC |
|------------|--------|---------|----------------|---------------|------|------|-------------|--------|--------|---------|--------------------|----|-----|------------|-----------|
|            |        |         |                |               |      |      | C.SAND      | F.SAND | SILT   | CLAY    | 10                 | 40 | 200 |            |           |
|            |        |         |                |               |      |      | S-6         | 55' LT | 282+50 | 3.0-4.0 | A-4(0)             | 21 | 6   |            |           |
| S-7        | 55' LT | 282+50  | 4.0-5.0        | A-4(0)        | 19   | 6    | 2.0         | 59.5   | 14.3   | 24.2    | 100                | 99 | 43  | -          | -         |



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284+50.00

284+00.00

283+50.00

283+00.00

4:1

4:1

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4:1

4:1

4:1

4:1

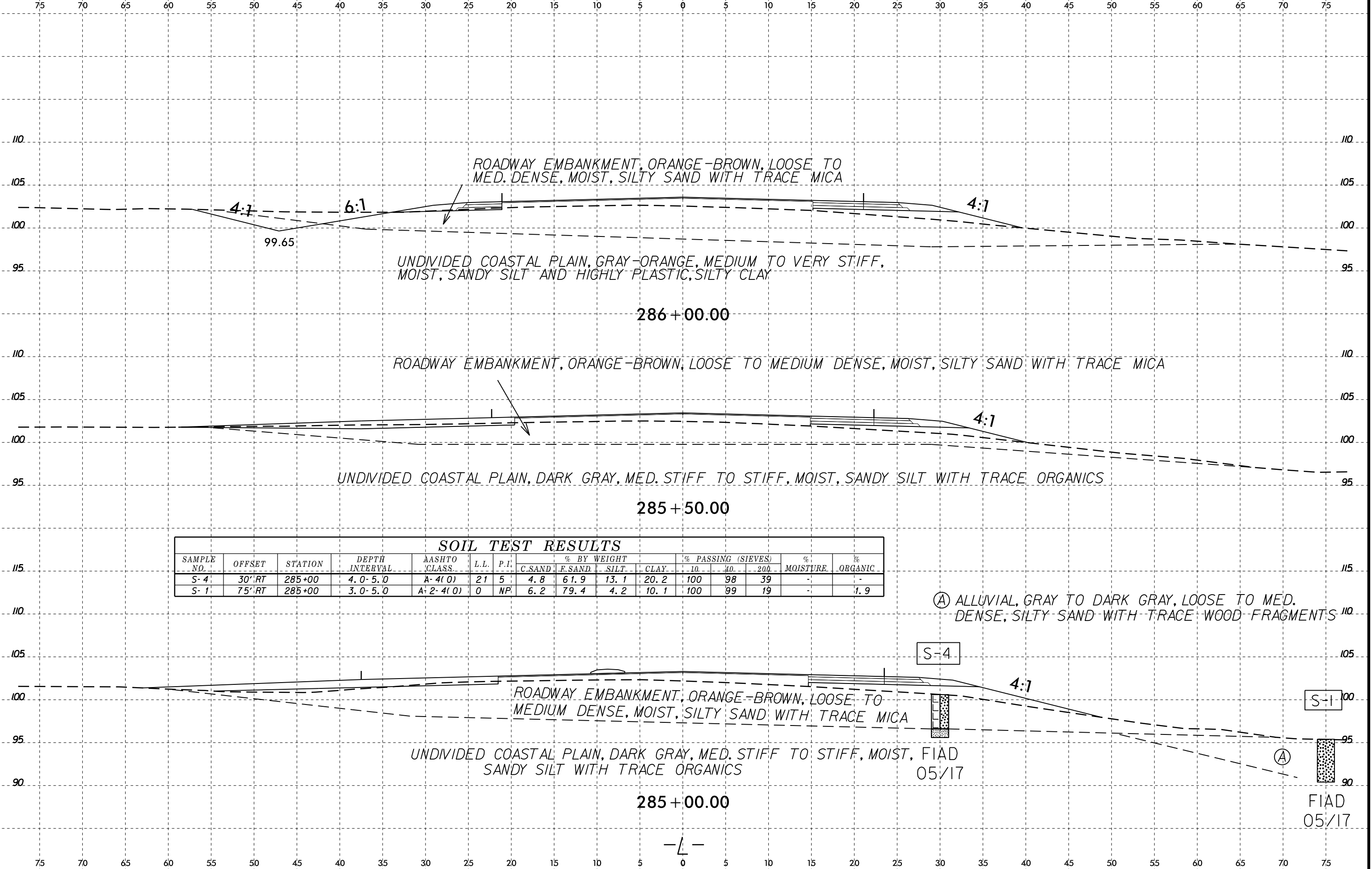
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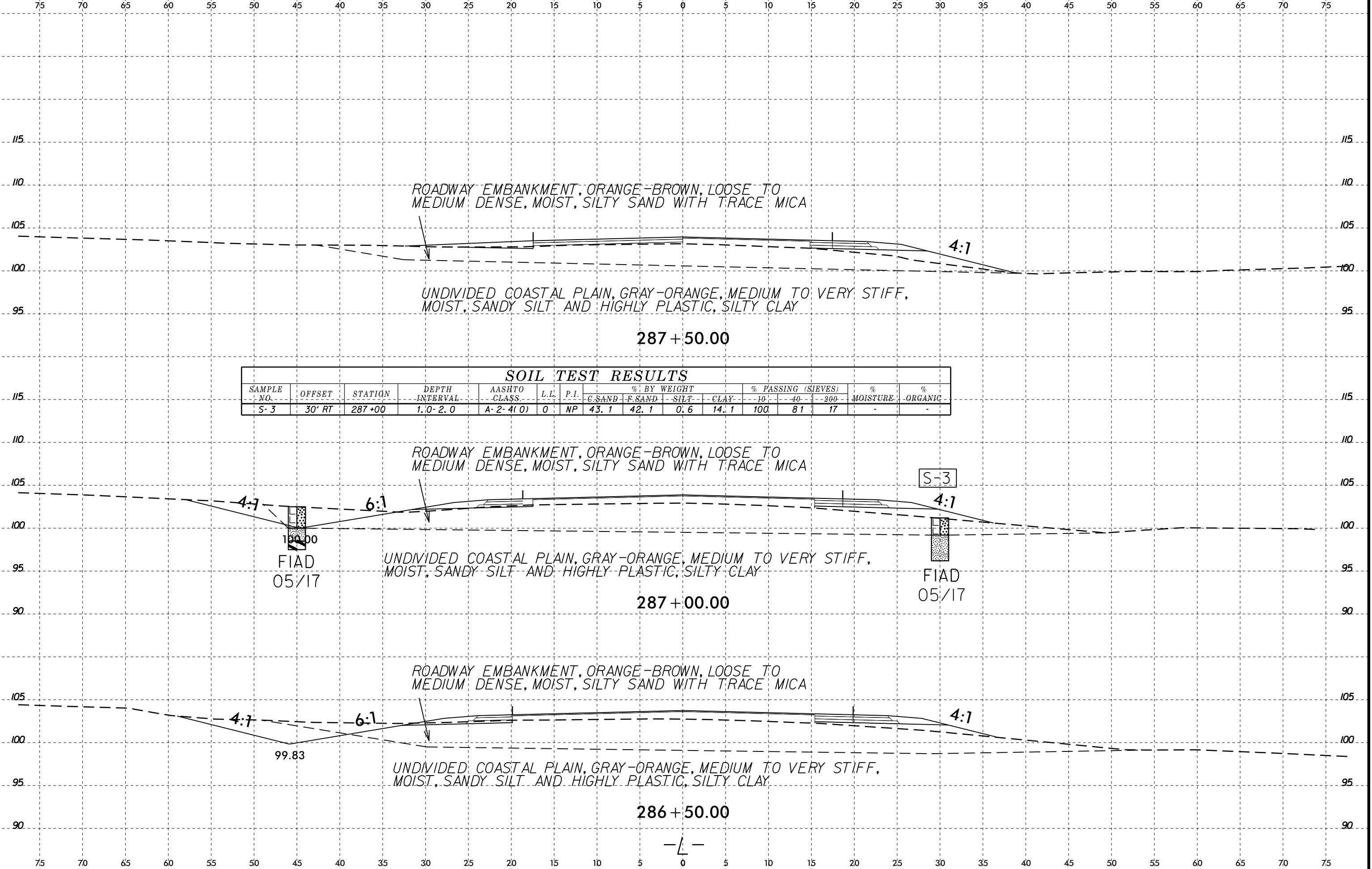
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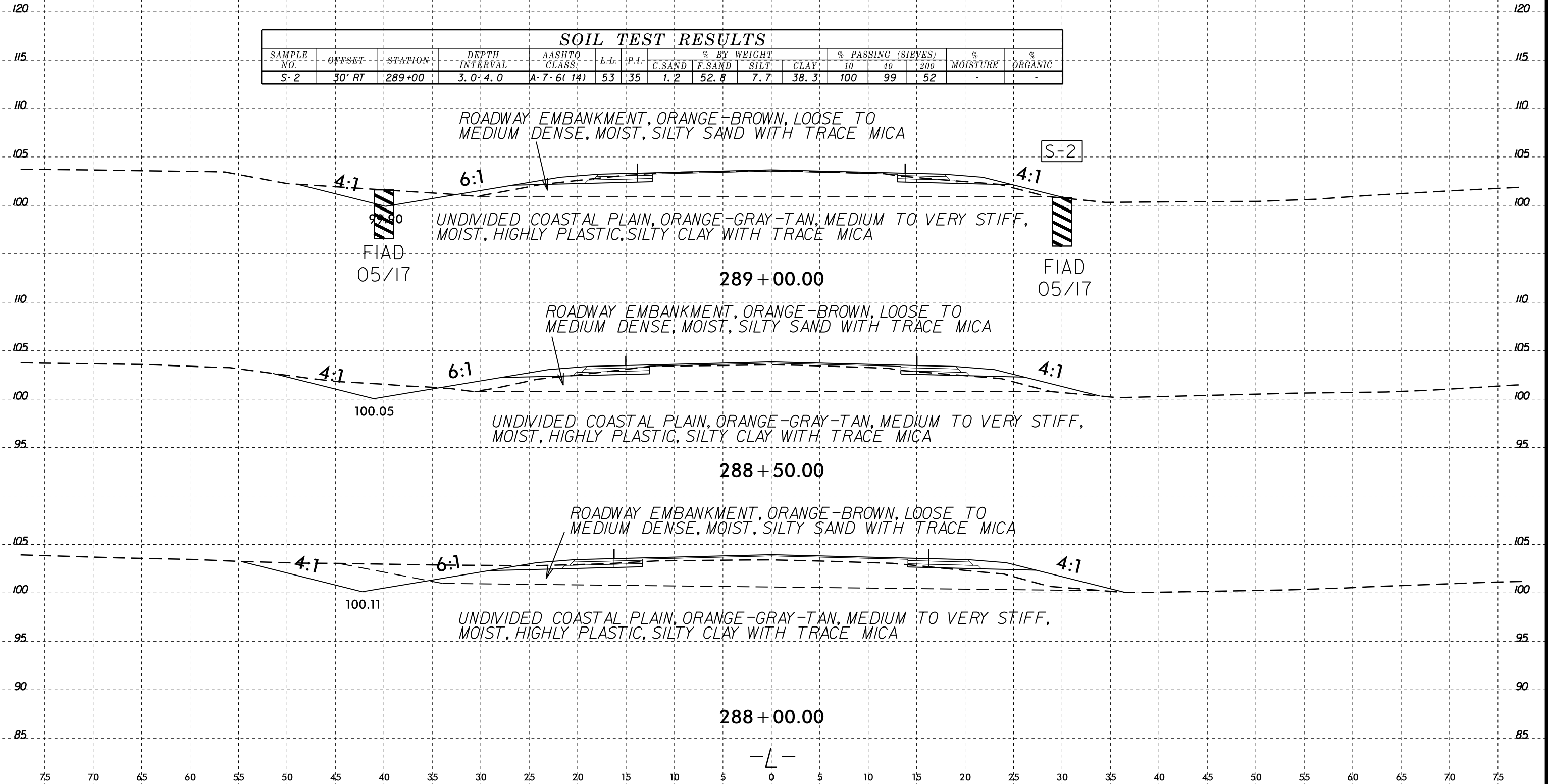


**SOIL TEST RESULTS**

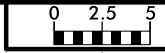
| SAMPLE NO. | OFFSET | STATION | DEPTH INTERVAL | AASHTO CLASS. | L.L. | P.I. | % BY WEIGHT |         |      |      | % PASSING (SIEVES) |      |       | % MOISTURE | % ORGANIC |
|------------|--------|---------|----------------|---------------|------|------|-------------|---------|------|------|--------------------|------|-------|------------|-----------|
|            |        |         |                |               |      |      | C. SAND     | F. SAND | SILT | CLAY | -10-               | -40- | -200- |            |           |
| S-3        | 30' RT | 287+00  | 1.0-2.0        | A-2-4(0)      | 0    | NP   | 43.1        | 42.1    | 0.6  | 14.1 | 100                | 81   | 17    | -          | -         |

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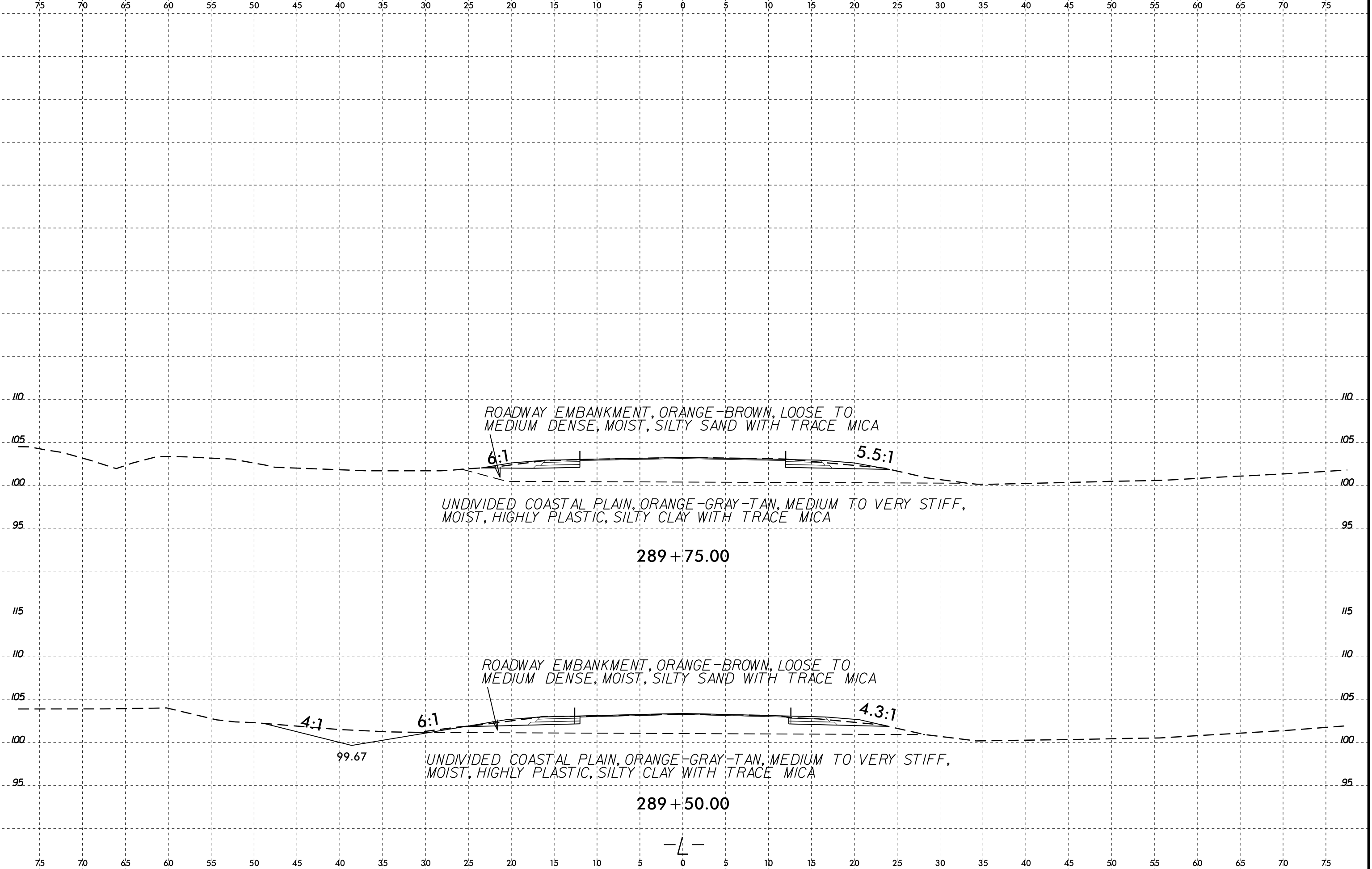
| SOIL TEST RESULTS |        |         |                |              |      |      |             |         |      |      |                    |    |     |            |           |
|-------------------|--------|---------|----------------|--------------|------|------|-------------|---------|------|------|--------------------|----|-----|------------|-----------|
| SAMPLE NO.        | OFFSET | STATION | DEPTH INTERVAL | AASHTO CLASS | L.L. | P.I. | % BY WEIGHT |         |      |      | % PASSING (SIEVES) |    |     | % MOISTURE | % ORGANIC |
|                   |        |         |                |              |      |      | C. SAND     | F. SAND | SILT | CLAY | 10                 | 40 | 200 |            |           |
| S-2               | 30' RT | 289+00  | 3.0-4.0        | A-7-6(14)    | 53   | 35   | 1.2         | 52.8    | 7.7  | 38.3 | 100                | 99 | 52  | -          | -         |



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| R-5020B             | 82        |



ROADWAY EMBANKMENT, ORANGE-BROWN, LOOSE TO MEDIUM DENSE, MOIST, SILTY SAND WITH TRACE MICA

6:1

5.5:1

UNDIVIDED COASTAL PLAIN, ORANGE-GRAY-TAN, MEDIUM TO VERY STIFF, MOIST, HIGHLY PLASTIC, SILTY CLAY WITH TRACE MICA

289 + 75.00

ROADWAY EMBANKMENT, ORANGE-BROWN, LOOSE TO MEDIUM DENSE, MOIST, SILTY SAND WITH TRACE MICA

4:1

6:1

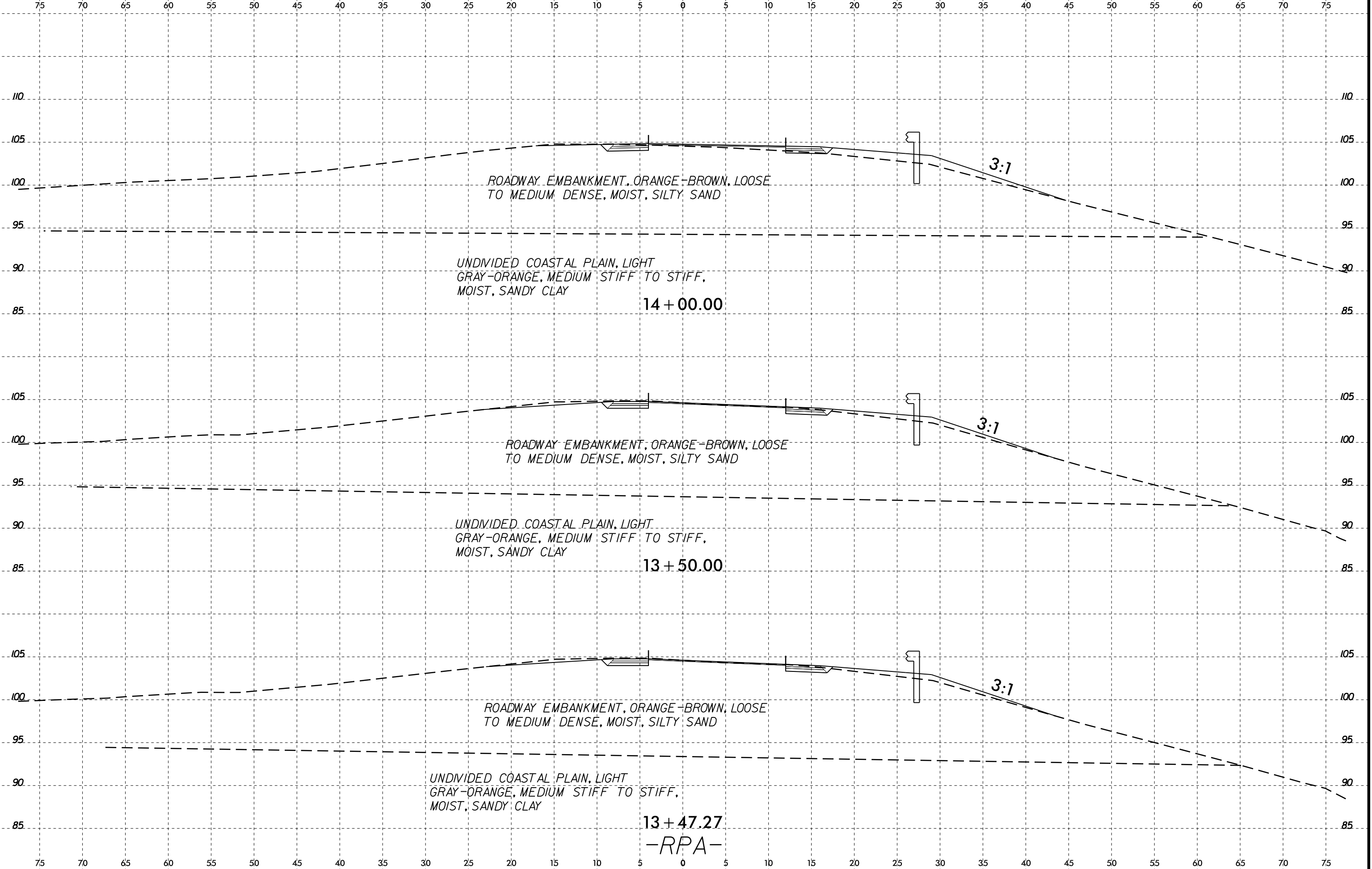
4.3:1

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UNDIVIDED COASTAL PLAIN, ORANGE-GRAY-TAN, MEDIUM TO VERY STIFF, MOIST, HIGHLY PLASTIC, SILTY CLAY WITH TRACE MICA

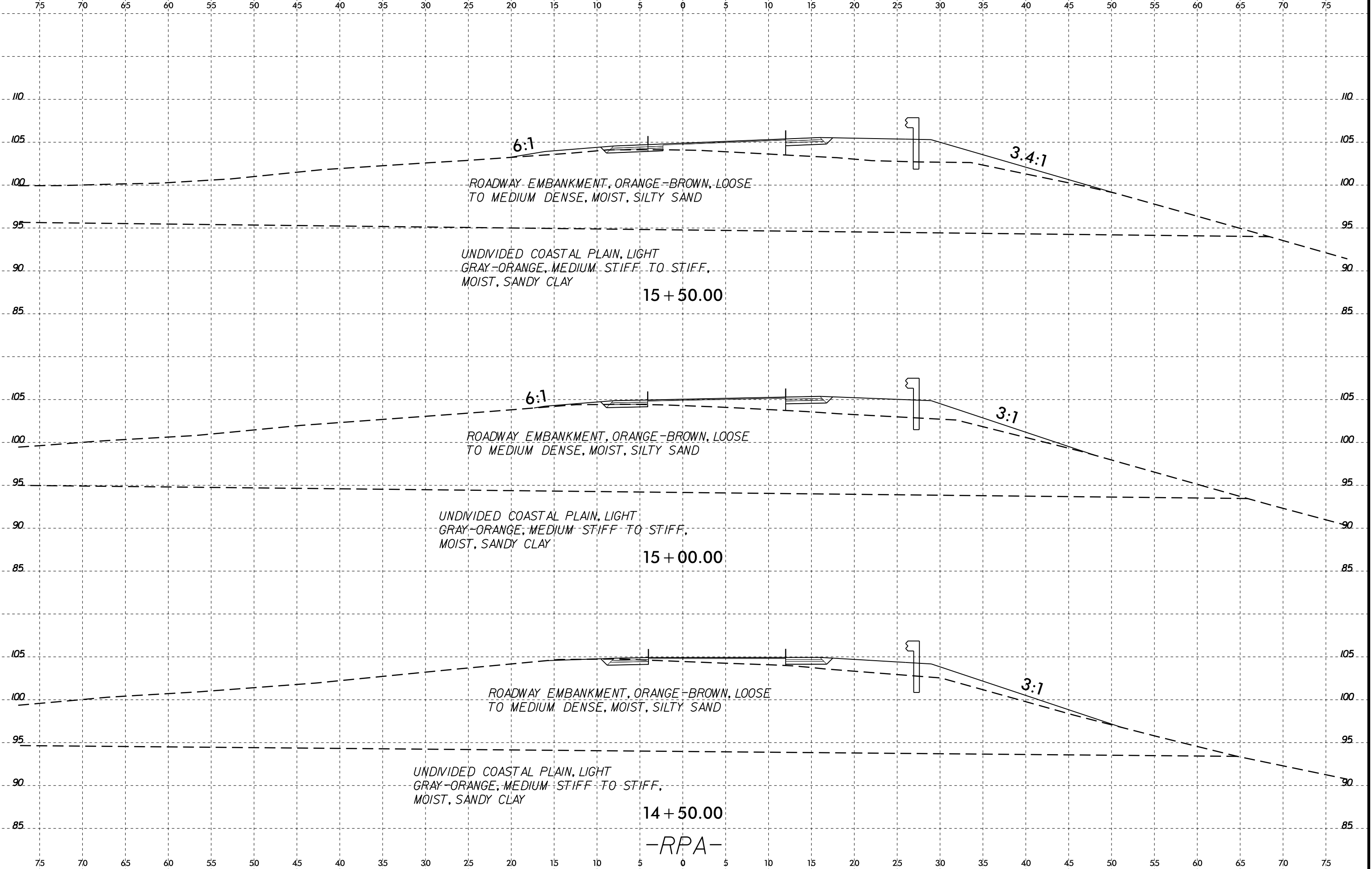
289 + 50.00





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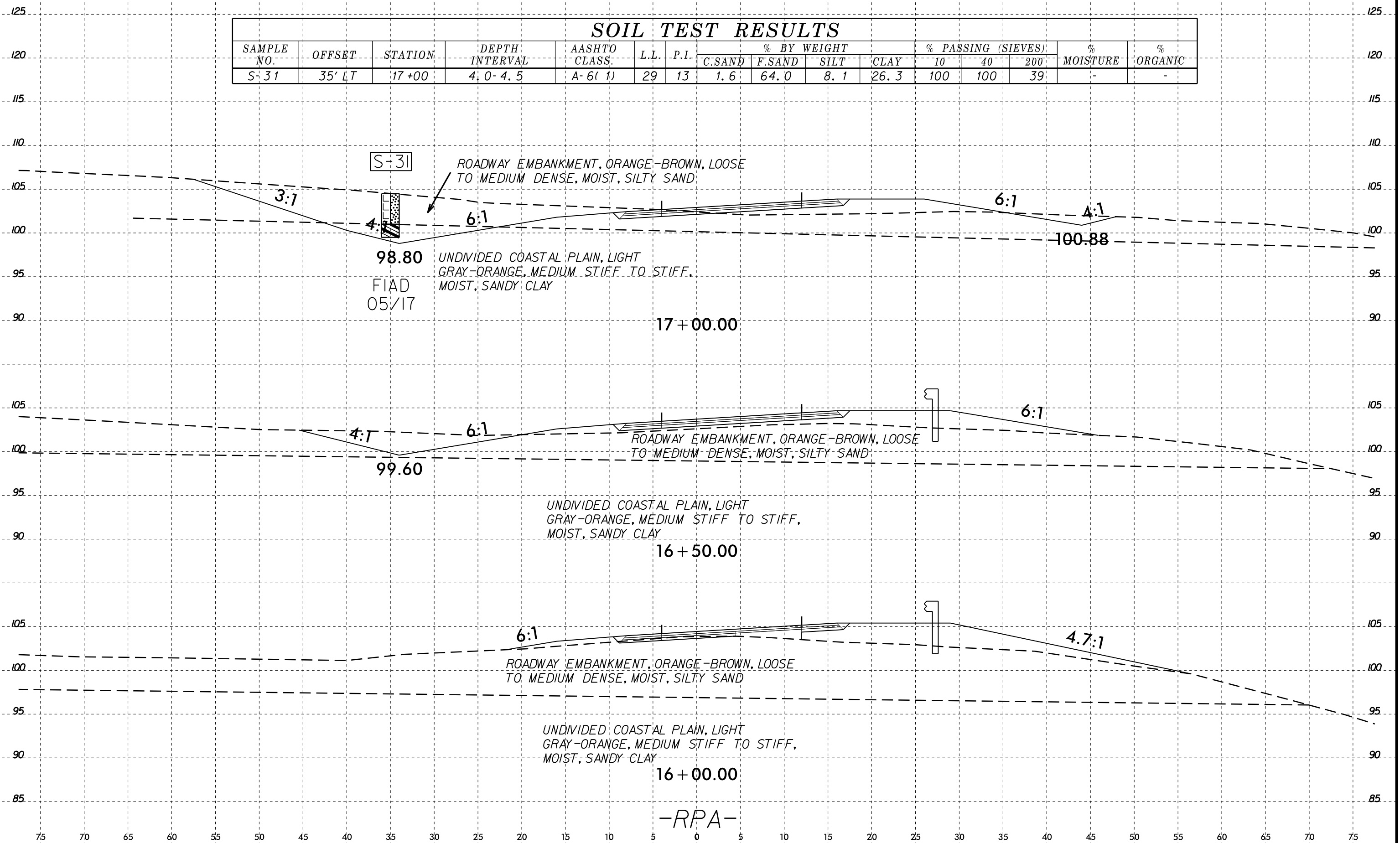


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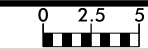
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| <b>SOIL TEST RESULTS</b> |        |         |                |               |      |      |             |        |      |      |                    |     |     |            |           |
|--------------------------|--------|---------|----------------|---------------|------|------|-------------|--------|------|------|--------------------|-----|-----|------------|-----------|
| SAMPLE NO.               | OFFSET | STATION | DEPTH INTERVAL | AASHTO CLASS. | L.L. | P.I. | % BY WEIGHT |        |      |      | % PASSING (SIEVES) |     |     | % MOISTURE | % ORGANIC |
|                          |        |         |                |               |      |      | C.SAND      | F.SAND | SILT | CLAY | 10                 | 40  | 200 |            |           |
| S-31                     | 35' LT | 17+00   | 4.0-4.5        | A-6(1)        | 29   | 13   | 1.6         | 64.0   | 8.1  | 26.3 | 100                | 100 | 39  | -          | -         |



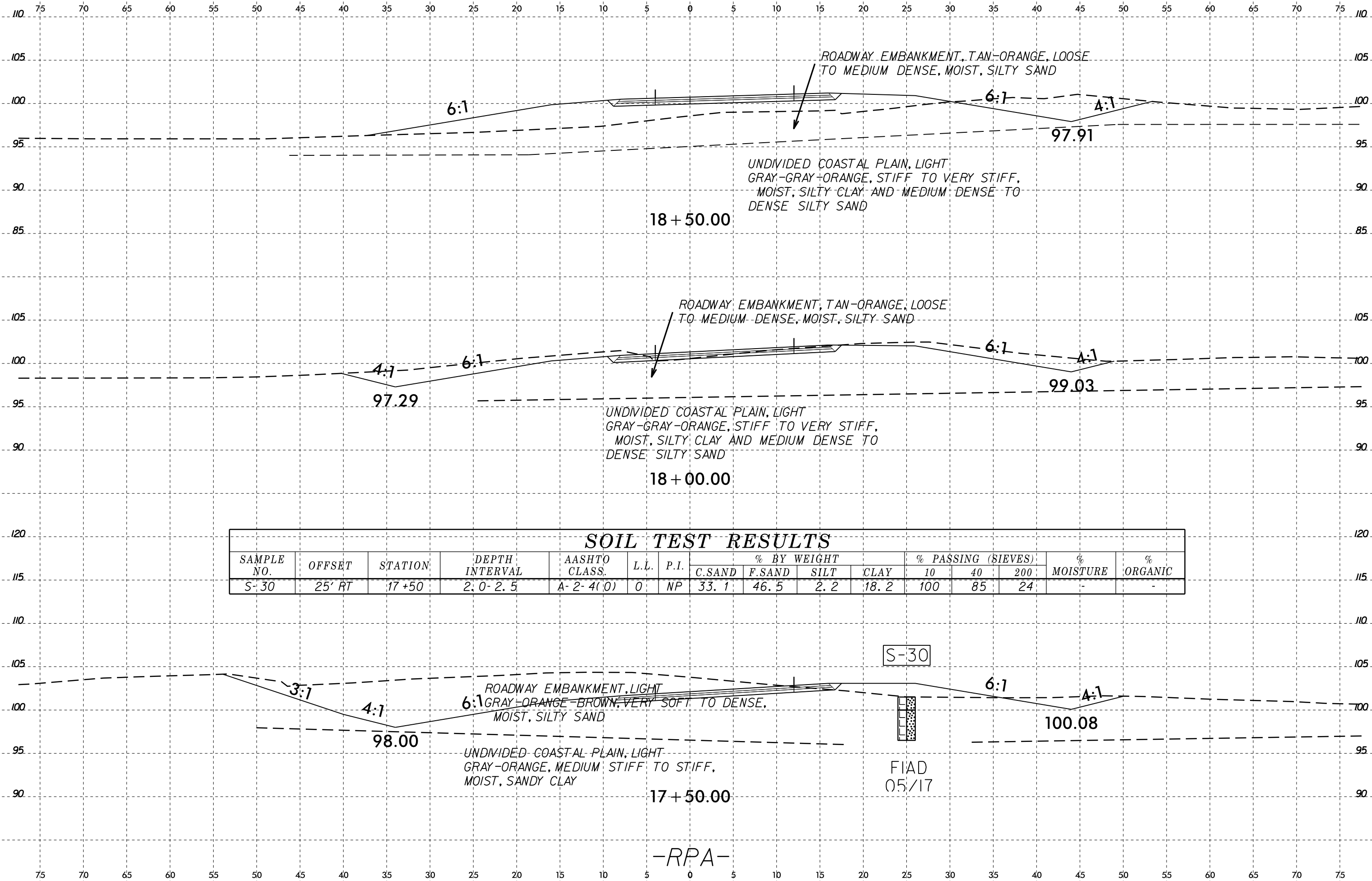
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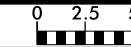


**SOIL TEST RESULTS**

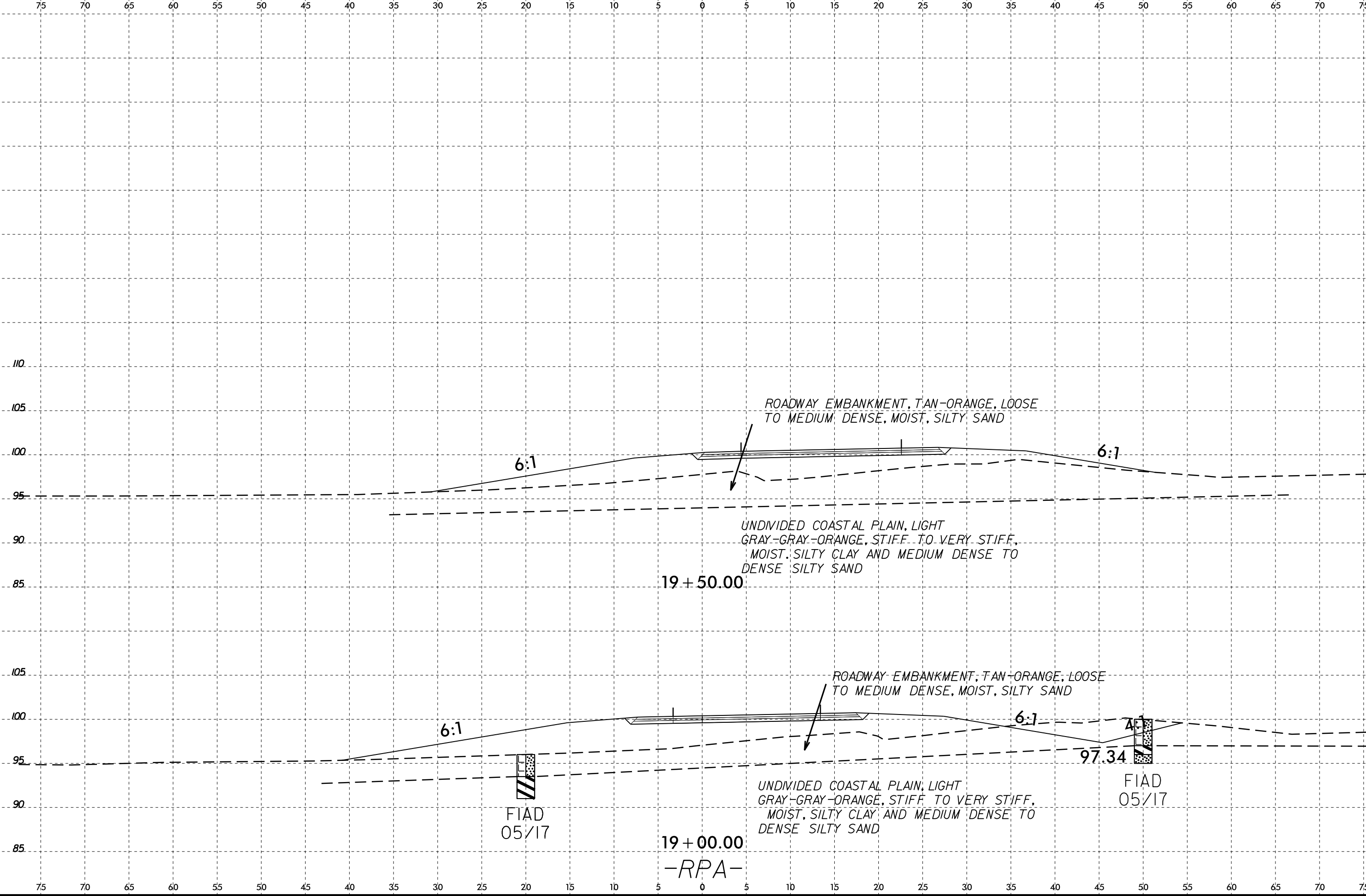
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|------------|--------|---------|----------------|---------------|------|------|-------------|--------|------|------|--------------------|----|-----|------------|-----------|
|            |        |         |                |               |      |      | C.SAND      | F.SAND | SILT | CLAY | 10                 | 40 | 200 |            |           |
| S-30       | 25' RT | 17+50   | 2'-0" - 2'-5"  | A-2-4(0)      | 0    | NP   | 33.1        | 46.5   | 2.2  | 18.2 | 100                | 85 | 24  | -          | -         |

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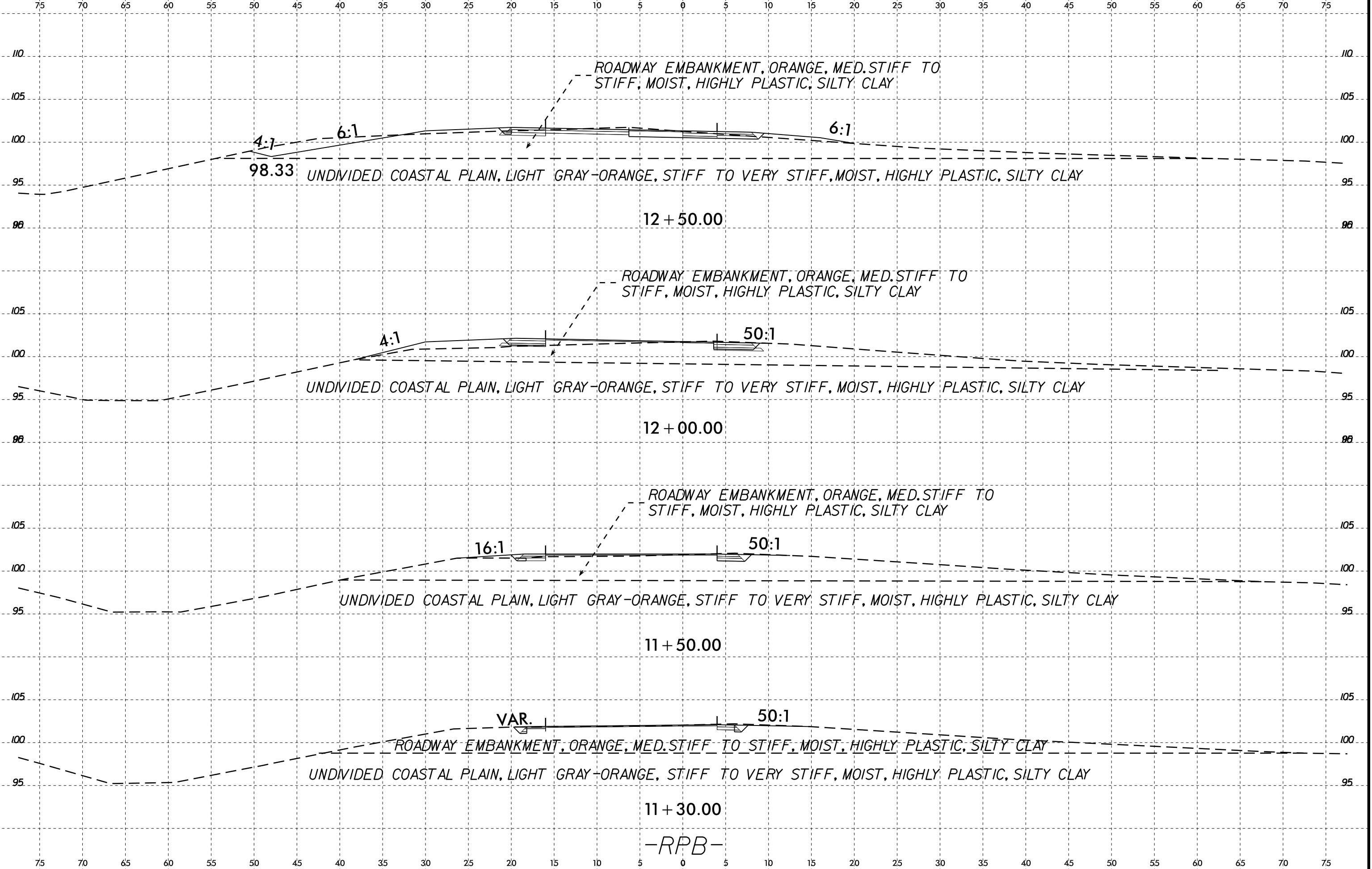
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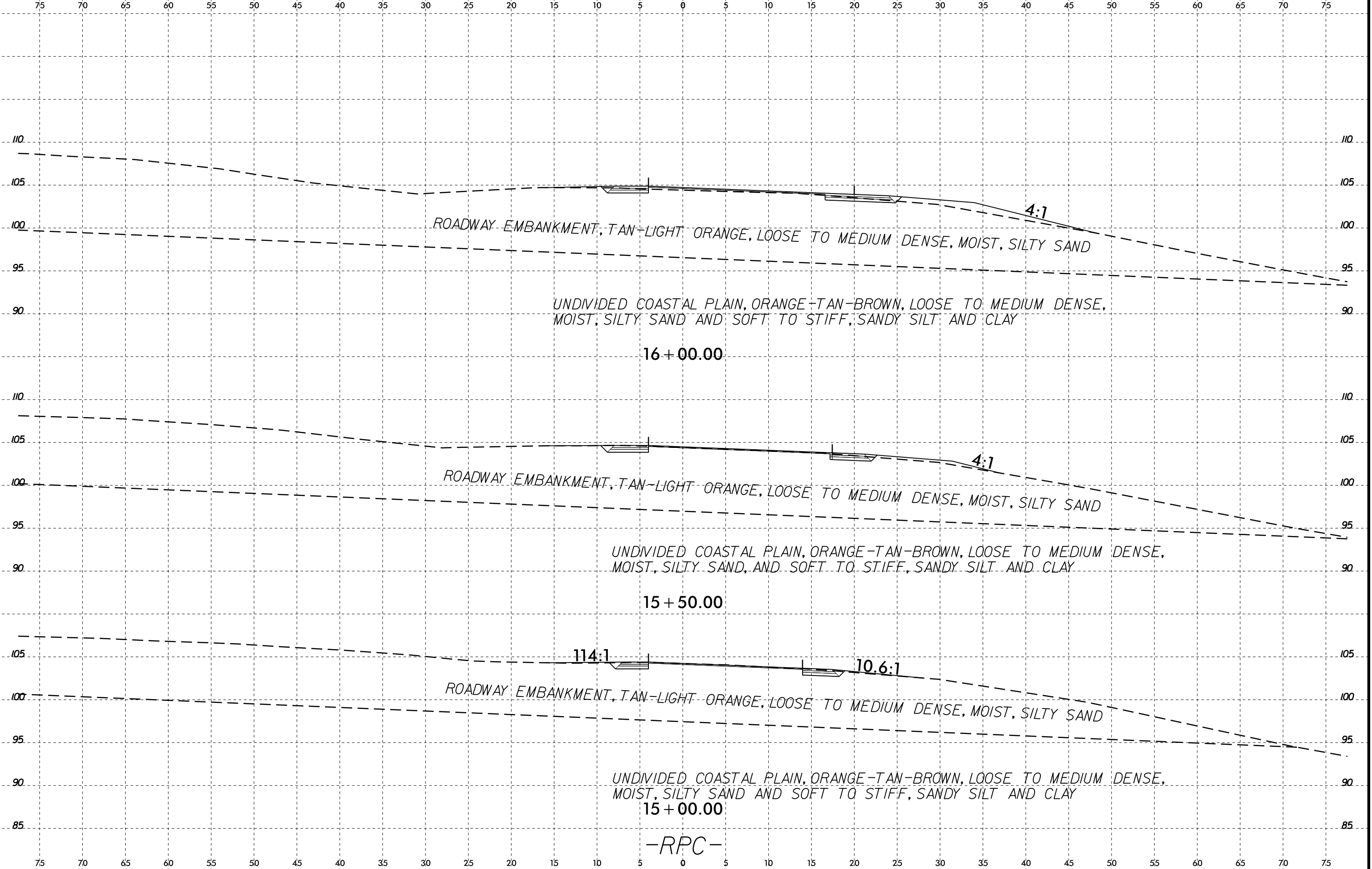
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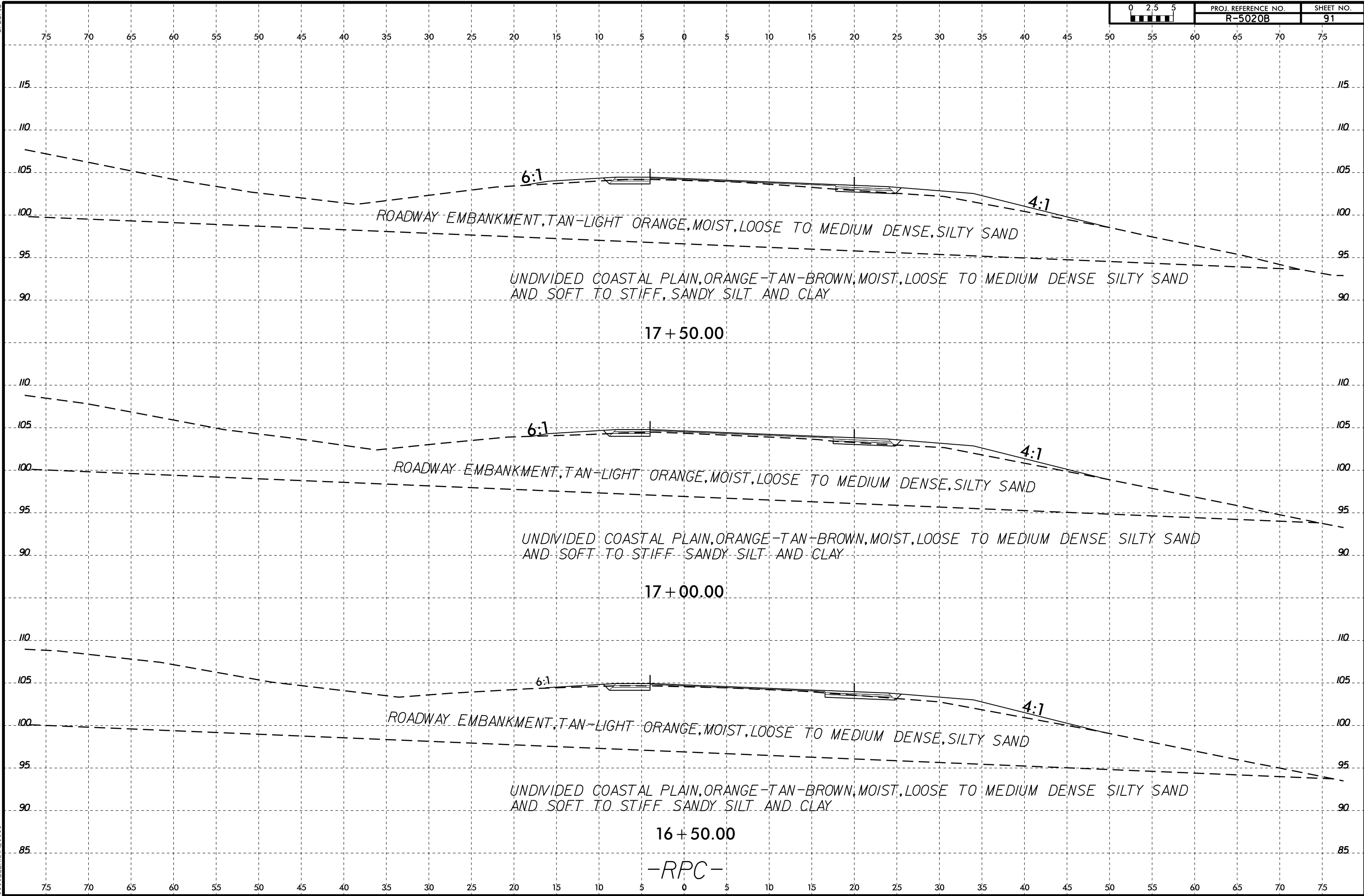


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6:1

ROADWAY EMBANKMENT, TAN-LIGHT ORANGE, MOIST, LOOSE TO MEDIUM DENSE, SILTY SAND

UNDIVIDED COASTAL PLAIN, ORANGE-TAN-BROWN, MOIST, LOOSE TO MEDIUM DENSE SILTY SAND  
 AND SOFT TO STIFF, SANDY SILT AND CLAY

17 + 50.00

6:1

ROADWAY EMBANKMENT, TAN-LIGHT ORANGE, MOIST, LOOSE TO MEDIUM DENSE, SILTY SAND

UNDIVIDED COASTAL PLAIN, ORANGE-TAN-BROWN, MOIST, LOOSE TO MEDIUM DENSE SILTY SAND  
 AND SOFT TO STIFF SANDY SILT AND CLAY

17 + 00.00

6:1

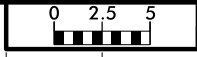
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UNDIVIDED COASTAL PLAIN, ORANGE-TAN-BROWN, MOIST, LOOSE TO MEDIUM DENSE SILTY SAND  
 AND SOFT TO STIFF SANDY SILT AND CLAY

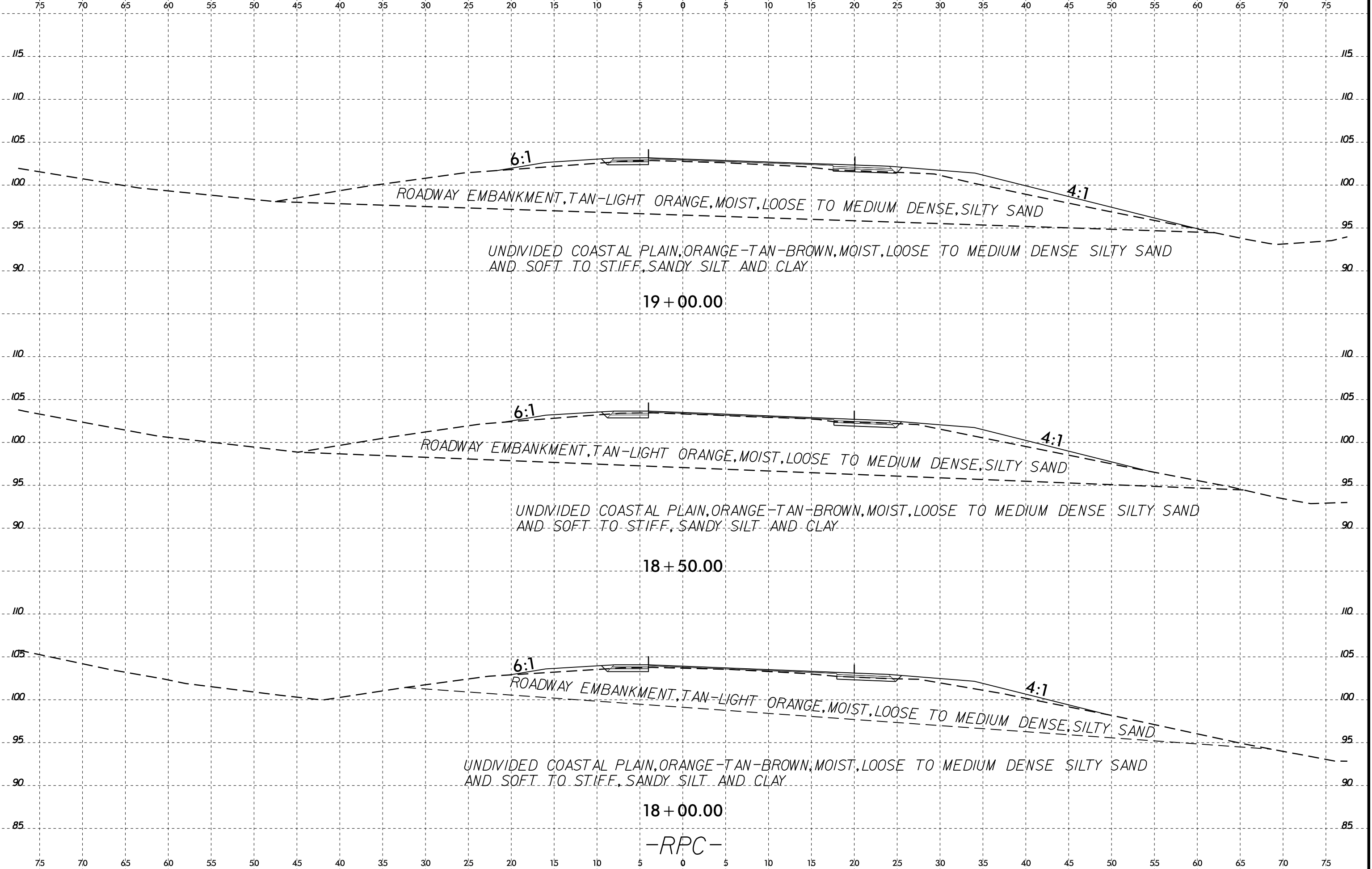
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-RPC-

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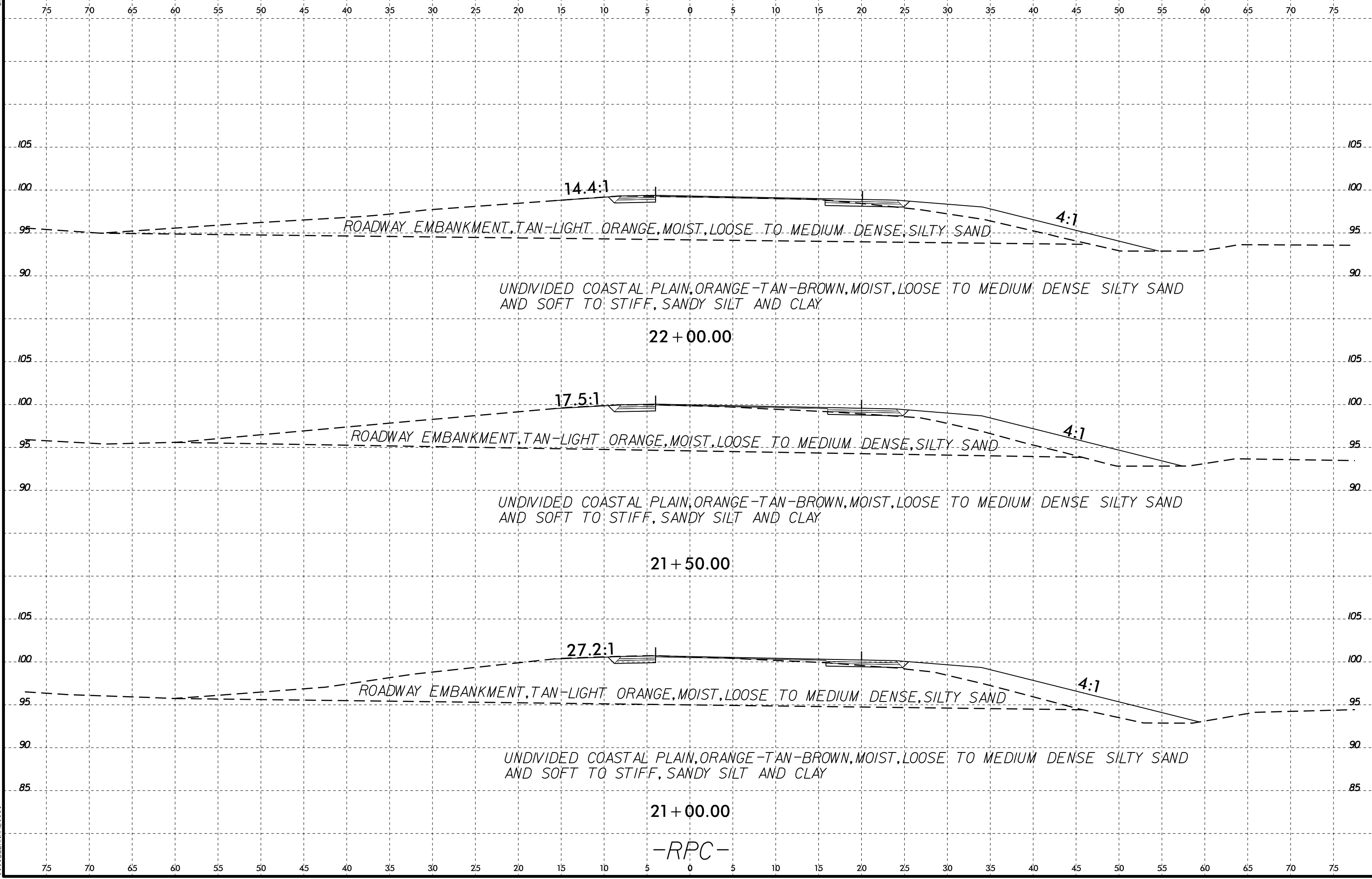
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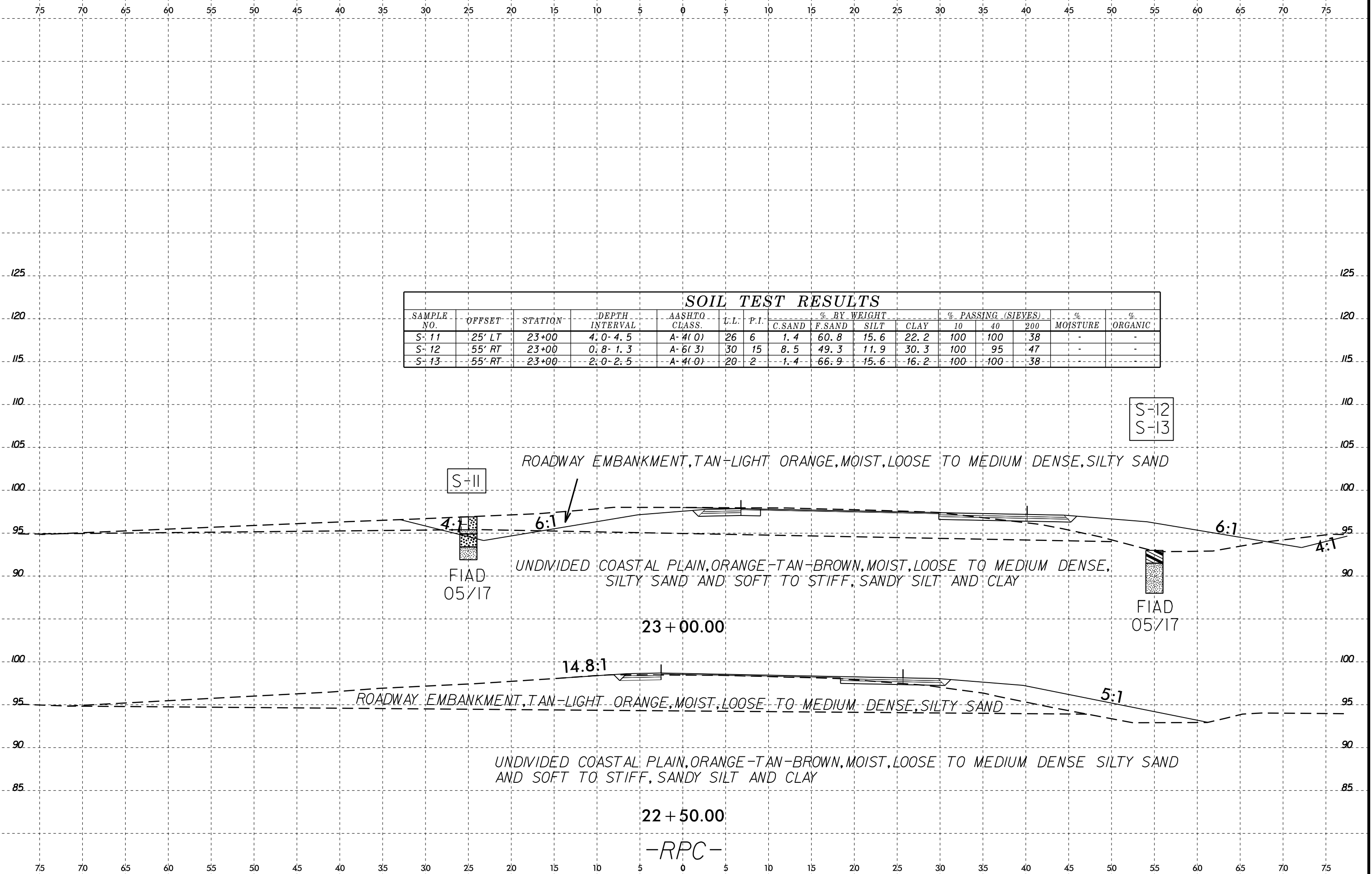


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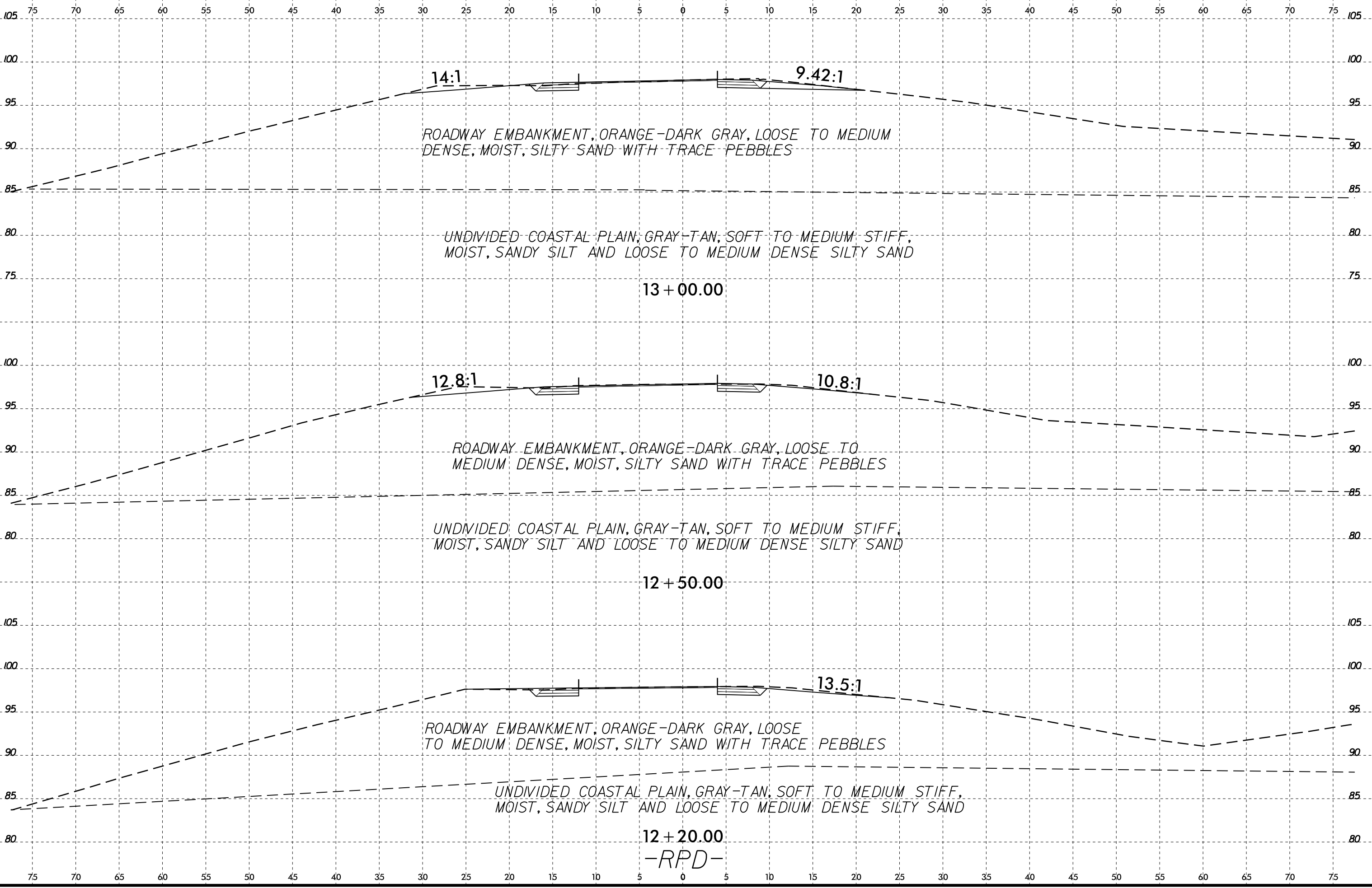


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| SOIL TEST RESULTS |        |         |                |               |      |      |             |        |      |      |                    |     |     |            |           |
|-------------------|--------|---------|----------------|---------------|------|------|-------------|--------|------|------|--------------------|-----|-----|------------|-----------|
| SAMPLE NO.        | OFFSET | STATION | DEPTH INTERVAL | AASHTO CLASS. | L.L. | P.I. | % BY WEIGHT |        |      |      | % PASSING (SIEVES) |     |     | % MOISTURE | % ORGANIC |
|                   |        |         |                |               |      |      | C.SAND      | F.SAND | SILT | CLAY | 10                 | 40  | 200 |            |           |
| S-11              | 25' LT | 23+00   | 4.0-4.5        | A-4(0)        | 26   | 6    | 1.4         | 60.8   | 15.6 | 22.2 | 100                | 100 | 38  | -          | -         |
| S-12              | 55' RT | 23+00   | 0.8-1.3        | A-6(3)        | 30   | 15   | 8.5         | 49.3   | 11.9 | 30.3 | 100                | 95  | 47  | -          | -         |
| S-13              | 55' RT | 23+00   | 2.0-2.5        | A-4(0)        | 20   | 2    | 1.4         | 66.9   | 15.6 | 16.2 | 100                | 100 | 38  | -          | -         |

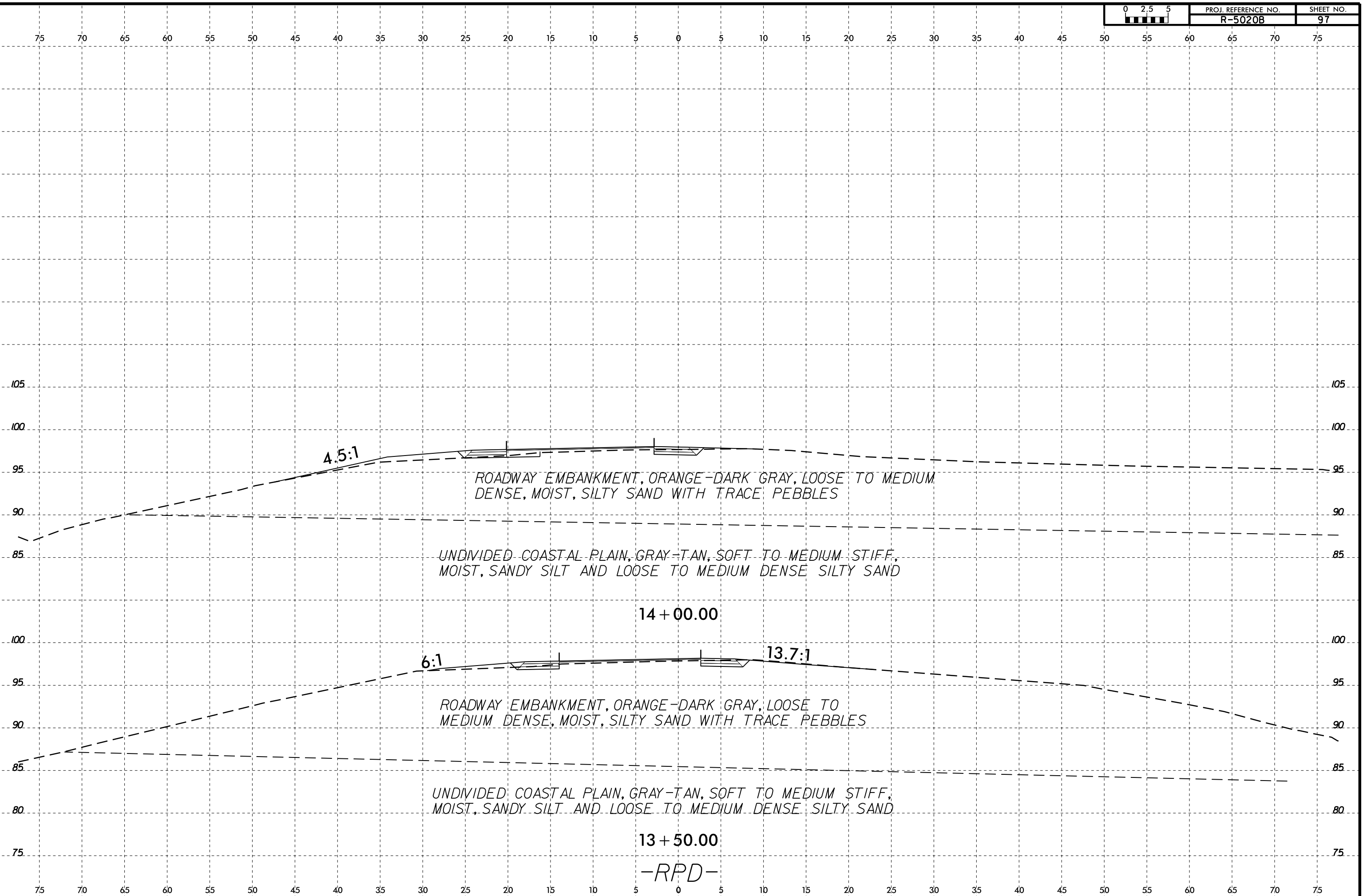


22 + 50.00  
-RPC-



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4.5:1

ROADWAY EMBANKMENT, ORANGE-DARK GRAY, LOOSE TO MEDIUM DENSE, MOIST, SILTY SAND WITH TRACE PEBBLES

UNDIVIDED COASTAL PLAIN, GRAY-TAN, SOFT TO MEDIUM STIFF, MOIST, SANDY SILT AND LOOSE TO MEDIUM DENSE SILTY SAND

14 + 00.00

6:1

13.7:1

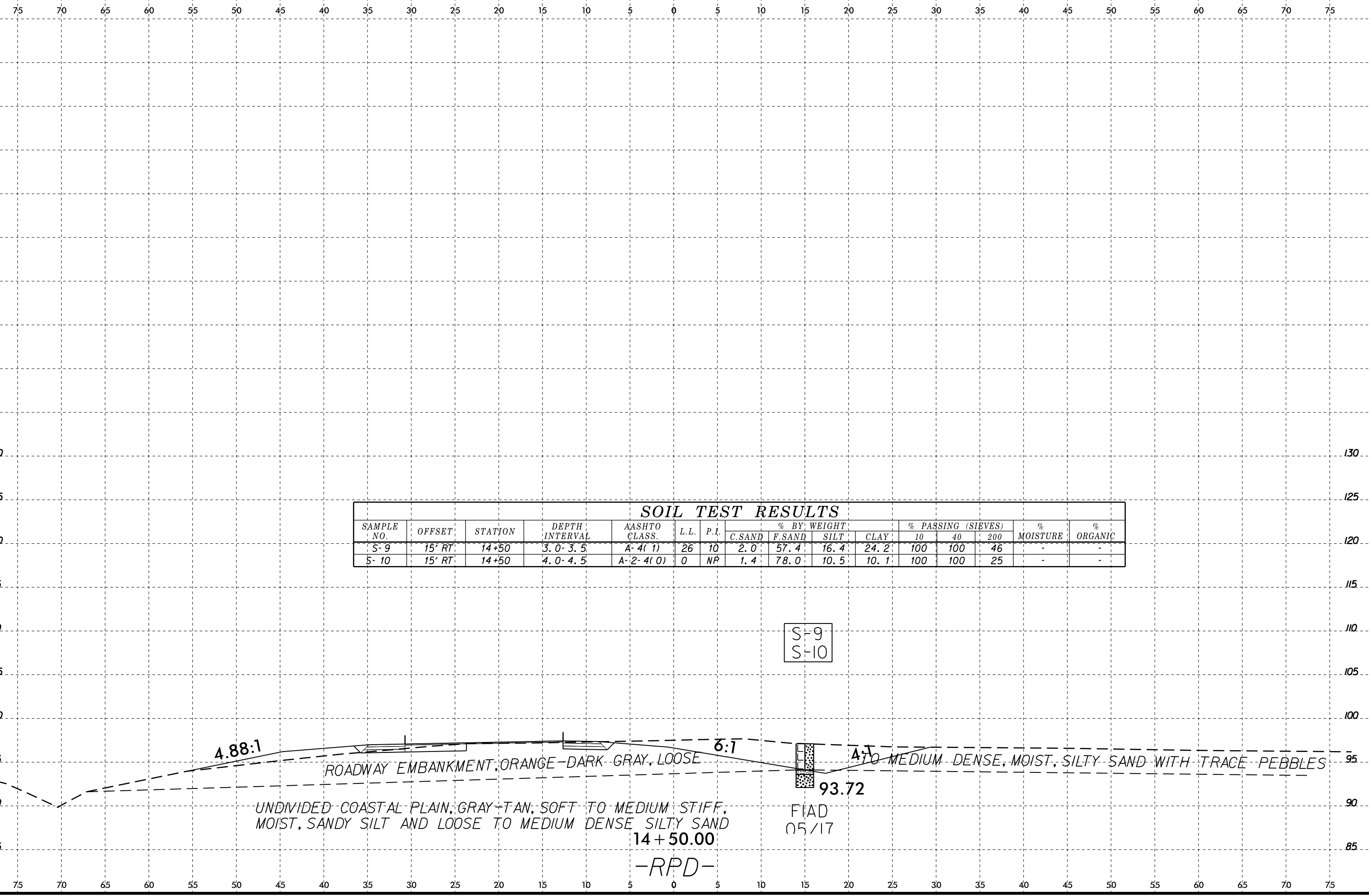
ROADWAY EMBANKMENT, ORANGE-DARK GRAY, LOOSE TO MEDIUM DENSE, MOIST, SILTY SAND WITH TRACE PEBBLES

UNDIVIDED COASTAL PLAIN, GRAY-TAN, SOFT TO MEDIUM STIFF, MOIST, SANDY SILT AND LOOSE TO MEDIUM DENSE SILTY SAND

13 + 50.00

-RPD-

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| SOIL TEST RESULTS |        |         |                |               |      |      |             |         |      |      |                    |     |     |            |           |
|-------------------|--------|---------|----------------|---------------|------|------|-------------|---------|------|------|--------------------|-----|-----|------------|-----------|
| SAMPLE NO.        | OFFSET | STATION | DEPTH INTERVAL | AASHTO CLASS. | L.L. | P.I. | % BY WEIGHT |         |      |      | % PASSING (SIEVES) |     |     | % MOISTURE | % ORGANIC |
|                   |        |         |                |               |      |      | C. SAND     | F. SAND | SILT | CLAY | 10                 | 40  | 200 |            |           |
| S-9               | 15' RT | 14+50   | 3.0-3.5        | A-4(1)        | 26   | 10   | 2.0         | 57.4    | 16.4 | 24.2 | 100                | 100 | 46  | -          | -         |
| S-10              | 15' RT | 14+50   | 4.0-4.5        | A-2-4(0)      | 0    | NP   | 1.4         | 78.0    | 10.5 | 10.1 | 100                | 100 | 25  | -          | -         |

S-9  
S-10

4.88:1

6:1

A-4

ROADWAY EMBANKMENT, ORANGE-DARK GRAY, LOOSE

UNDIVIDED COASTAL PLAIN, GRAY-TAN, SOFT TO MEDIUM STIFF, MOIST, SANDY SILT AND LOOSE TO MEDIUM DENSE SILTY SAND

TO MEDIUM DENSE, MOIST, SILTY SAND WITH TRACE PEBBLES

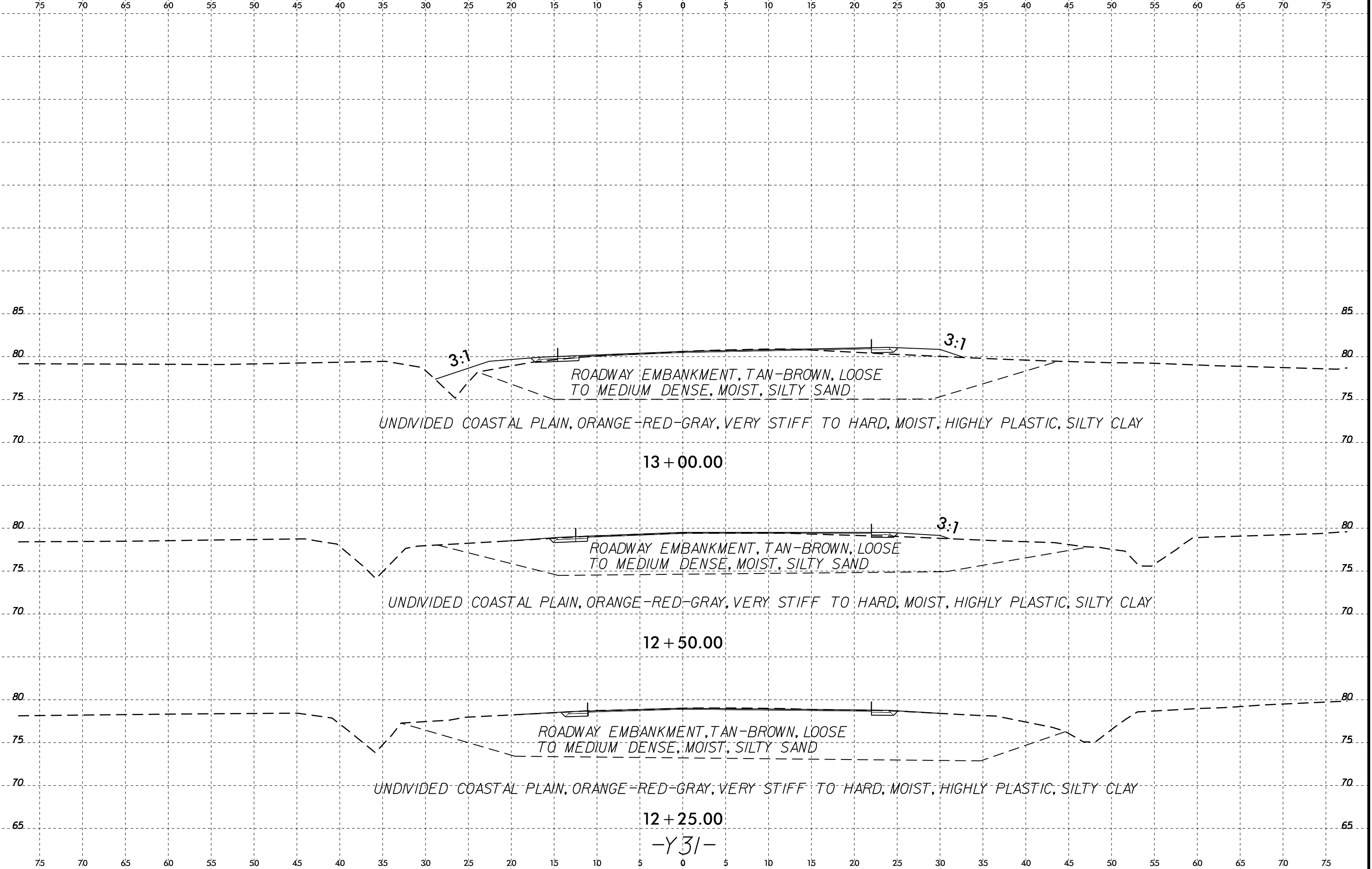
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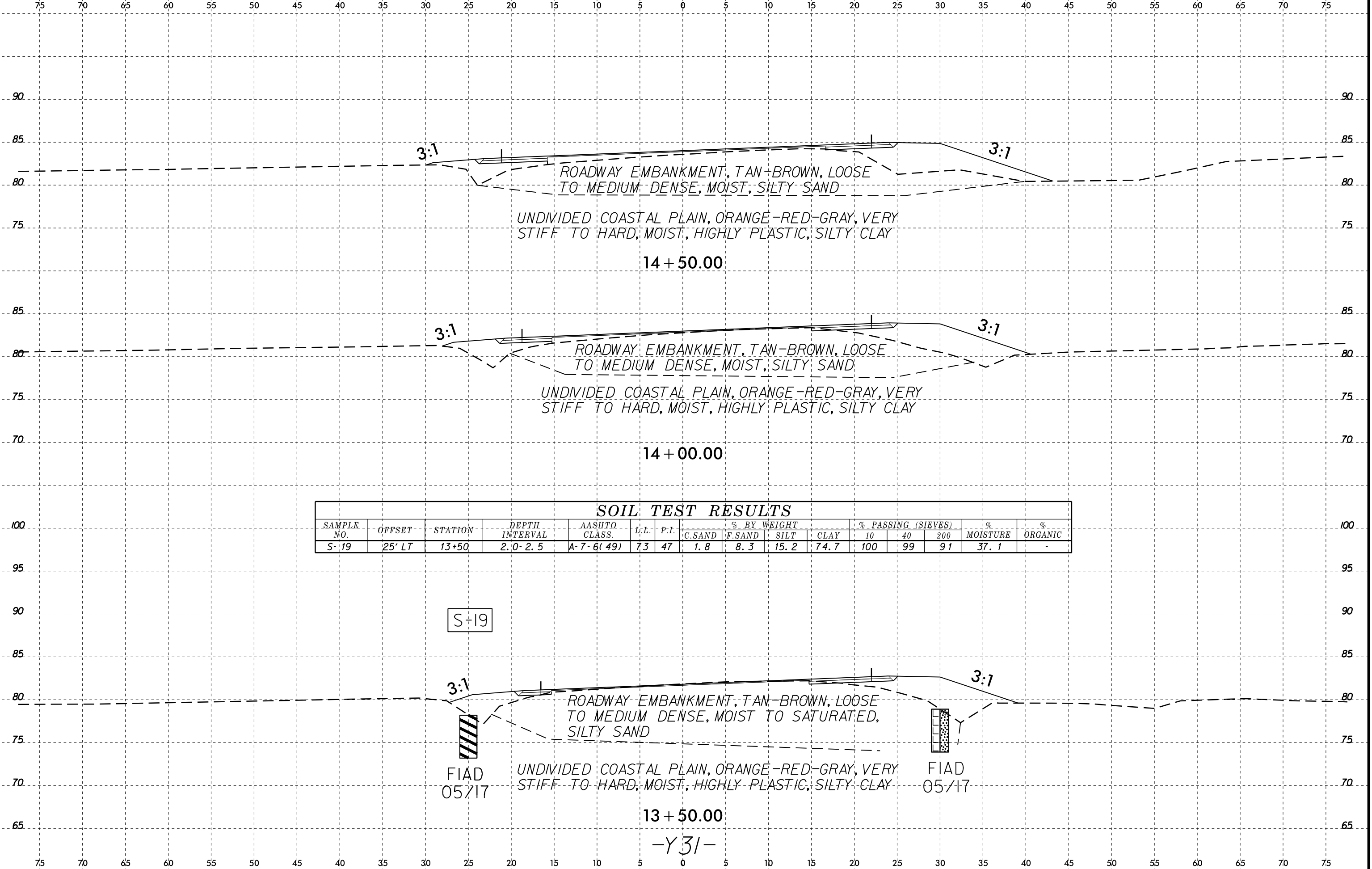
14+50.00

-RPD-

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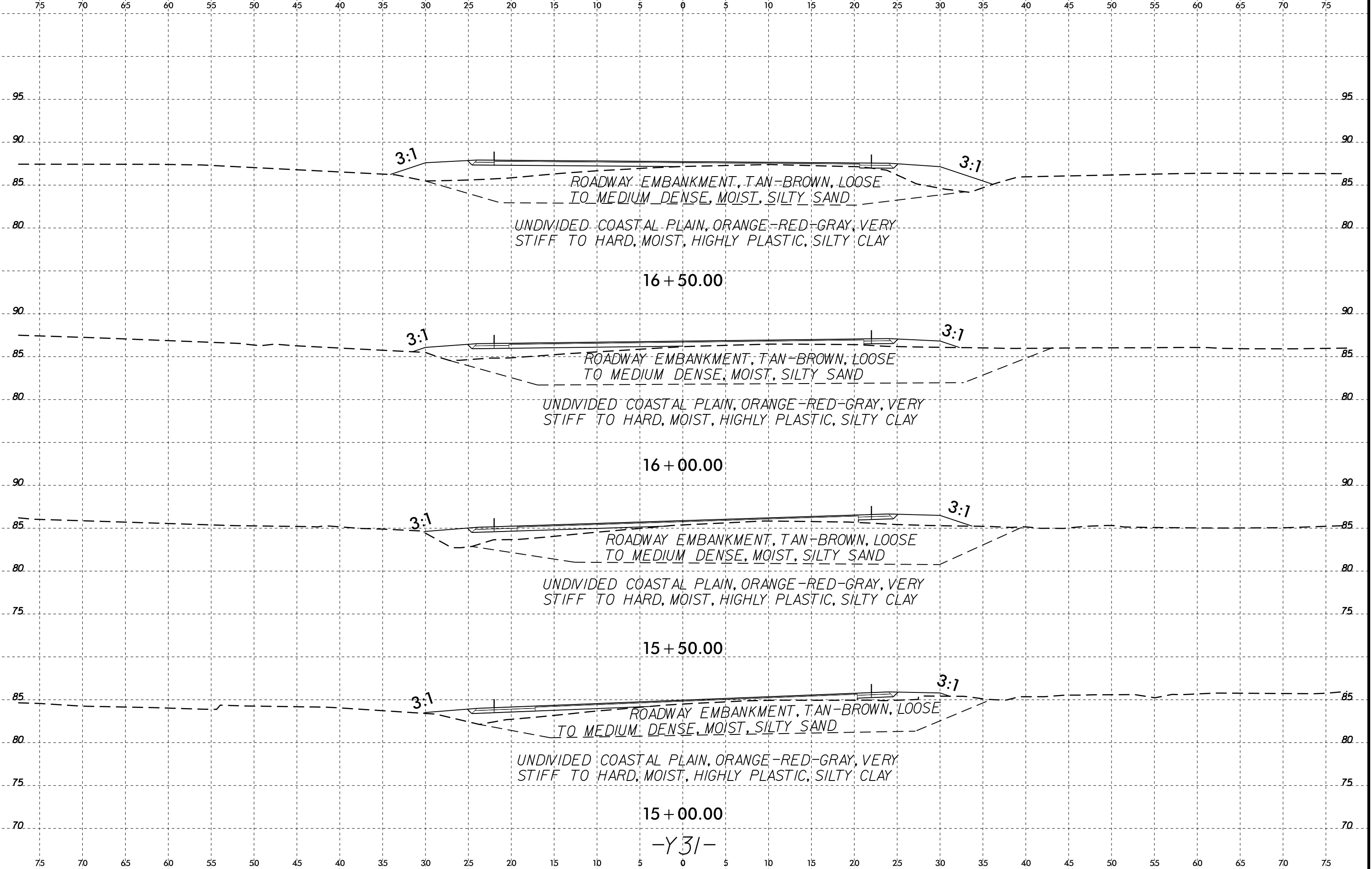


| SOIL TEST RESULTS |        |         |                |               |      |      |             |         |      |      |                    |    |     |            |           |
|-------------------|--------|---------|----------------|---------------|------|------|-------------|---------|------|------|--------------------|----|-----|------------|-----------|
| SAMPLE NO.        | OFFSET | STATION | DEPTH INTERVAL | AASHTO CLASS. | L.L. | P.I. | % BY WEIGHT |         |      |      | % PASSING (SIEVES) |    |     | % MOISTURE | % ORGANIC |
|                   |        |         |                |               |      |      | C. SAND     | F. SAND | SILT | CLAY | 10                 | 40 | 300 |            |           |
| S-19              | 25' LT | 13+50   | 2.0-2.5        | A-7-6(49)     | 73   | 47   | 1.8         | 8.3     | 15.2 | 74.7 | 100                | 99 | 91  | 37.1       | -         |

13+50.00  
 -Y31-



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