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REFERENCE: R-3830

PROJECT: 38887

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-3830	1	282

**ROADWAY**  
**SUBSURFACE INVESTIGATION**

COUNTY LEE  
PROJECT DESCRIPTION NC42 FROM US421 TO SRI579  
(MAIN STREET) IN SANFORD AND ALONG SRI579  
FROM NC42 TO SRI538 (BUCKHORN AVE) IN BROADWAY  
**INVENTORY**

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LINE	STATION	PLAN	PROFILE
-L-	13+25 TO 304+91	4 - 25	28 - 30
-Y3-	17+21 TO 19+69	5	--
-Y5-	10+00 TO 16+40	6, 26	--
-Y8-	10+60 TO 11+95	8	--
-Y13-	10+00 TO 16+25	12, 27	31
-Y16-	10+90 TO 15+01	16	--
-Y20-	11+00 TO 13+47	23	--

**CROSS SECTIONS**

LINE	STATION	SHEETS
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-Y3-	17+00 TO 19+25	255 - 257
-Y5-	10+50 TO 16+40	258 - 263
-Y8-	10+60 TO 12+25	264 - 266
-Y13-	12+25 TO 15+25	267 - 269
-Y16-	10+90 TO 14+68	270 - 276
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**APPENDICES**

APPENDIX	TITLE	SHEETS
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**CAUTION NOTICE**

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

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

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- BY HAVING REQUESTED THIS INFORMATION, THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

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DATE MAY 2017

Prepared in the Office of:



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7DA5D2D0518168 SIGNATURE DATE

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

**SOIL DESCRIPTION**

SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 208, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, *VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6*

**SOIL LEGEND AND AASHTO CLASSIFICATION**

GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)							SILT-CLAY MATERIALS (> 35% PASSING #200)							ORGANIC MATERIALS		
	A-1	A-1-b	A-1-c	A-2	A-2-4	A-2-5	A-2-6	A-2-7	A-4	A-5	A-6	A-7	A-1, A-2	A-3	A-4, A-5	A-6, A-7	
GROUP CLASS.	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7					A-7-5, A-7-6	A-3	A-4, A-5	A-6, A-7		
SYMBOL																	
% PASSING #10 #40 #200	50 MX 30 MX 15 MX	50 MX 25 MX		40 MX 10 MX	41 MX 10 MX	40 MX 11 MN	41 MN 11 MN	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN		
MATERIAL PASSING #40 LL PI	-	-		NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP		
GROUP INDEX	0	0		0	0	0	0	0	0	0	0	0	0	0	0		
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL, AND SAND	FINE SAND		SILTY OR CLAYEY GRAVEL AND SAND				SILTY SOILS				CLAYEY SOILS					
GEN. RATING AS SUBGRADE	EXCELLENT TO GOOD							FAIR TO POOR							FAIR TO POOR	POOR	UNSATURABLE

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

**CONSISTENCY OR DENSENESS**

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

**TEXTURE OR GRAIN SIZE**

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

**SOIL MOISTURE - CORRELATION OF TERMS**

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

**PLASTICITY**

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

**COLOR**

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

**GRADATION**

**WELL GRADED** - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.  
**UNIFORMLY GRADED** - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE.  
**GAP-GRADED** - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.

**ANGULARITY OF GRAINS**

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

**MINERALOGICAL COMPOSITION**

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

**COMPRESSIBILITY**

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

**PERCENTAGE OF MATERIAL**

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

**GROUND WATER**

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

**MISCELLANEOUS SYMBOLS**

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

**RECOMMENDATION SYMBOLS**

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

**ABBREVIATIONS**

- AR - AUGER REFUSAL
- BT - BORING TERMINATED
- CL - CLAY
- CPT - COARSE PENETRATION TEST
- CSE - COARSE
- DMT - DILATOMETER TEST
- DPT - DYNAMIC PENETRATION TEST
- e - VOID RATIO
- F - FINE
- FOSS. - FOSSILIFEROUS
- FRAC. - FRACTURED, FRACTURES
- FRAGS. - FRAGMENTS
- HI. - HIGHLY
- MED. - MEDIUM
- MICA - MICACEOUS
- MOD. - MODERATELY
- NP - NON PLASTIC
- ORG. - ORGANIC
- PMT - PRESSUREMETER TEST
- SAP. - SAPROLITIC
- SD. - SAND, SANDY
- SL. - SILT, SILTY
- SLI. - SLIGHTLY
- TCR - TRICONE REFUSAL
- w - MOISTURE CONTENT
- V - VERY
- VST - VANE SHEAR TEST
- WEA. - WEATHERED
- W - UNIT WEIGHT
- W<sub>d</sub> - DRY UNIT WEIGHT
- S - BULK
- SS - SPLIT SPOON
- ST - SHELBY TUBE
- RS - ROCK
- RT - RECOMPACTED TRIAXIAL
- CBR - CALIFORNIA BEARING RATIO

**EQUIPMENT USED ON SUBJECT PROJECT**

- DRILL UNITS:
  - CME-45C
  - CME-55
  - CME-550
  - VANE SHEAR TEST
  - PORTABLE HOIST
  - B-57 MOBILE
- ADVANCING TOOLS:
  - CLAY BITS
  - 6" CONTINUOUS FLIGHT AUGER
  - 8" HOLLOW AUGERS
  - HARD FACED FINGER BITS
  - TUNG-CARBIDE INSERTS
  - CASING  W/ ADVANCER
  - TRICONE 2-15/16" STEEL TEETH
  - TRICONE " TUNG-CARB.
  - CORE BIT
- HAMMER TYPE:
  - AUTOMATIC  MANUAL
- CORE SIZE:
  - B
  - H
  - N
- HAND TOOLS:
  - POST HOLE DIGGER
  - HAND AUGER
  - SOUNDING ROD
  - VANE SHEAR TEST

**ROCK DESCRIPTION**

HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:

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

**WEATHERING**

- FRESH** - ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.
- VERY SLIGHT (V SL.)** - ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN. CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.
- SLIGHT (SL.)** - ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.
- MODERATE (MOD.)** - SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.
- MODERATELY SEVERE (MOD. SEV.)** - ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. *IF TESTED, WOULD YIELD SPT REFUSAL*
- SEVERE (SEV.)** - ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. *IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF*
- VERY SEVERE (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*
- COMPLETE** - ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. FABRIC MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.

**ROCK HARDNESS**

- VERY HARD** - CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.
- HARD** - CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.
- MODERATELY HARD** - CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.
- MEDIUM HARD** - CAN BE 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.
- 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.
- VERY SOFT** - CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGER NAIL.

**FRACTURE SPACING**

TERM	SPACING
VERY WIDE	MORE THAN 10 FEET
WIDE	3 TO 10 FEET
MODERATELY CLOSE	1 TO 3 FEET
CLOSE	0.16 TO 1 FOOT
VERY CLOSE	LESS THAN 0.16 FEET

**BEDDING**

TERM	THICKNESS
VERY THICKLY BEDDED	4 FEET
THICKLY BEDDED	1.5 - 4 FEET
THINLY BEDDED	0.16 - 1.5 FEET
VERY THINLY BEDDED	0.03 - 0.16 FEET
THICKLY LAMINATED	0.008 - 0.03 FEET
THINLY LAMINATED	< 0.008 FEET

**INDURATION**

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

**TERMS AND DEFINITIONS**

- ALLUVIUM (ALLUV.)** - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
- AQUIFER** - A WATER BEARING FORMATION OR STRATA.
- ARENACEOUS** - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
- ARGILLACEOUS** - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.
- ARTESIAN** - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.
- CALCAREOUS (CALC.)** - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
- COLLUVIUM** - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.
- CORE RECOVERY (REC.)** - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
- DIKE** - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.
- DIP** - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.
- DIP DIRECTION (DIP AZIMUTH)** - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
- FAULT** - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
- FISSILE** - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
- FLOAT** - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOADED FROM PARENT MATERIAL.
- FLOOD PLAIN (FP)** - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.
- FORMATION (FM)** - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.
- JOINT** - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
- LEDGE** - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.
- LENS** - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.
- MOTTLED (MOT.)** - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
- PERCHED WATER** - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.
- RESIDUAL (RES.) SOIL** - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
- ROCK QUALITY DESIGNATION (ROD)** - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
- SAPROLITE (SAP.)** - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.
- SILL** - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
- SLICKENSIDE** - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.
- STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT)** - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.
- STRATA CORE RECOVERY (SREC.)** - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
- STRATA ROCK QUALITY DESIGNATION (SROD)** - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
- TOPSOIL (TS.)** - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.

**BENCH MARK: SEE BELOW**

ELEVATION: N/A FEET

**NOTES:**

TOP OF BORING ELEVATIONS OBTAINED FROM PROJECT TIN FILE (R3830\_LS.TIN, MODIFIED 12/23/2016)

FIAD - FILLED IMMEDIATELY AFTER DRILLING

CP - COASTAL PLAIN







May 12, 2017

STATE PROJECT: 38887.1.1 (R-3830)  
 FEDERAL PROJECT: STP-0042 (49)  
 COUNTY: Lee  
 DESCRIPTION: NC 42 from US 421 to SR 1579 (Main Street) in Sanford and along SR 1579 from NC 42 to SR 1538 (E. Harrington Ave) in Broadway

**SUBJECT: GEOTECHNICAL REPORT - INVENTORY**

**PROJECT DESCRIPTION**

This project consists of the widening of SR 1579 (-L-) in Sanford and from NC 42 to SR 1538 in Broadway. The project also includes the widening of NC 42 (-Y1-), Dogwood Street (-Y2-), Nash Street (-Y3-), Rosser Road (-Y5-) Lane widening is proposed for Rosser Road (-Y5-), Oriole Circle (-Y6-), Whipoorwill Lane (-Y7-), Rice Road (-Y8-), US 421 Bypass SB Ramp (-Y9-), US 421 NB Ramp (-Y11-), Rice Road (-Y12-), Thornwood Drive (-Y14-), Char-Lin Drive (-Y15-), Woodlawn Trails Road (-Y17-), Dixie Farm Road (-Y18-), Dalrymple Road (-Y19-), Gilbert Lett Drive (-Y21-), and Johnson Street (-Y22-) as well as the realignment and widening of Nash Street (-Y3-), Cox Mill Road (-Y13-), Avents Ferry Road (-Y16-), and Hunter Road (-Y20-).

The geotechnical investigation was conducted between February and March of 2017. Standard Penetration Test borings were advanced with a B-57 Mobile drill rig with an automatic hammer. Hand auger borings were also completed. Representative soil samples were collected for visual classification in the field and selected samples were submitted for laboratory analysis by Geotechnics.

The following alignments, totaling 5.97 miles, were investigated. Plan sheets, subsurface profiles and cross sections of these alignments are included in this report.

<u>LINE</u>	<u>STATIONS</u>
-L-	13+00 to 305+00
-Y3-	17+21 to 19+69
-Y5-	10+00 to 16+40
-Y8-	10+60 to 11+95
-Y13-	10+00 to 16+25
-Y16-	10+90 to 15+01
-Y20-	11+00 to 13+47

**AREAS OF SPECIAL GEOTECHNICAL INTEREST**

1) Moderately to Highly Plastic Clays: Moderate to Highly plastic clays (PI > 15) were encountered on the project at the following locations:

<u>LINE</u>	<u>STATIONS</u>	<u>OFFSETS</u>
-L-	13+00 to 305+00	LT to RT
-Y3-	17+21 to 19+29	LT to RT
-Y5-	10+40 to 16+40	LT to RT
-Y8-	10+60 to 11+95	LT to RT
-Y13-	10+15 to 16+25	LT to RT
-Y16-	10+90 to 14+68	LT to RT
-Y20-	11+00 to 13+28	LT to RT

A discussion of these moderate to highly plastic clay soils is located below in the section titled "Soil Properties".

2) Groundwater: The following areas exhibit a high water table, seasonal high groundwater or the potential for groundwater related construction problems:

<u>LINE</u>	<u>STATIONS</u>
-L-	17+00 to 19+50
-L-	23+50 to 29+50
-L-	33+50 to 37+00
-L-	42+50 to 44+50
-L-	125+50 to 140+50
-L-	150+50 to 152+50
-L-	170+00 to 172+00
-L-	182+50 to 192+50
-L-	202+00 to 250+00
-L-	258+00 to 260+00
-L-	272+00 to 274+00
-L-	284+00 to 286+00
-Y3-	17+00 to 19+29
-Y5-	10+40 to 16+50
-Y8-	10+50 to 12+39
-Y16-	10+75 to 14+68

3) Artificial Fill: Artificial fill is present in the following areas:

<u>LINE</u>	<u>STATIONS</u>
-L-	13+00 to 46+00
-L-	121+00 to 128+50
-L-	135+80 to 142+20
-L-	109+30 to 110+20

## PHYSIOGRAPHY AND GEOLOGY

The project is located in the Coastal Plain Physiographic Province. The project corridor is comprised primarily of residential to urban properties and cultivated farmlands. The general topography along the project is generally flat to gently sloping.

Geologically, the soils in the project area generally consist of the Middendorf Formation.

## SOIL PROPERTIES

Soils encountered during this investigation are separated into three categories based on origin. They consist of roadway embankment, artificial fill, and coastal plain soils belonging to the Middendorf Formation.

Roadway Embankment soils are present along the existing roadways on the project. These soils consist of moist, loose to medium dense, non-plastic to slightly plastic, silty, fine to coarse sands, clayey, fine to coarse sands with varying amounts of gravel (A-3, A-2-4, A-2-6) and moist, medium stiff, slightly to highly plastic, fine to coarse sandy clays, coarse to fine sandy, and silty clays with varying amounts of gravel (A-6, A-7-6). The plasticity index of the roadway embankment soils tested ranged from 20 to 31.

Soil identified as artificial fill are present adjacent to the existing roadway. The artificial fill encountered generally consists of moist, loose to very dense, non-plastic to moderately plastic, coarse sandy gravels, silty, fine to coarse sands, and clayey, fine to coarse sands with varying amounts of gravel (A-1, A-2-4, A-2-6) and moist, medium stiff, slightly plastic, silty, fine to coarse sandy clays and fine to coarse sandy, silty clays with varying amounts of gravel (A-6, A-7-6). The plasticity index of the artificial fill tested ranged from 7 to 12.

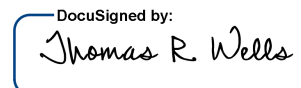
Soils generally identified as Coastal Plain - Middendorf Formation consist of moist to wet, loose to medium dense, non-plastic to highly plastic, gravelly, silty fine to coarse sands with varying amounts of gravel and organic matter, silty, clayey, fine to coarse sands with varying amounts of gravel (A-3, A-2-4, A-2-6, A-2-7). Soft to very stiff, slightly plastic, fine to coarse sandy, clayey silts and coarse to fine sandy silts with varying amounts of gravel (A-4, A-5) as well as silty, coarse to fine sandy clays and coarse to fine sandy, silty clays with varying amounts of gravel and organic matter (A-6, A-7-5, A-7-6). The plasticity index of the coastal plain soils tested ranged from non-plastic to 55.

## GROUNDWATER

Groundwater was encountered at elevations ranging from 391.8 to 488.6 feet MSL along the proposed roadways of the project.

Prepared by,

DocuSigned by:  
  
AB2F7FFB796A411...  
Daniel Kubinski, EI  
Staff Professional

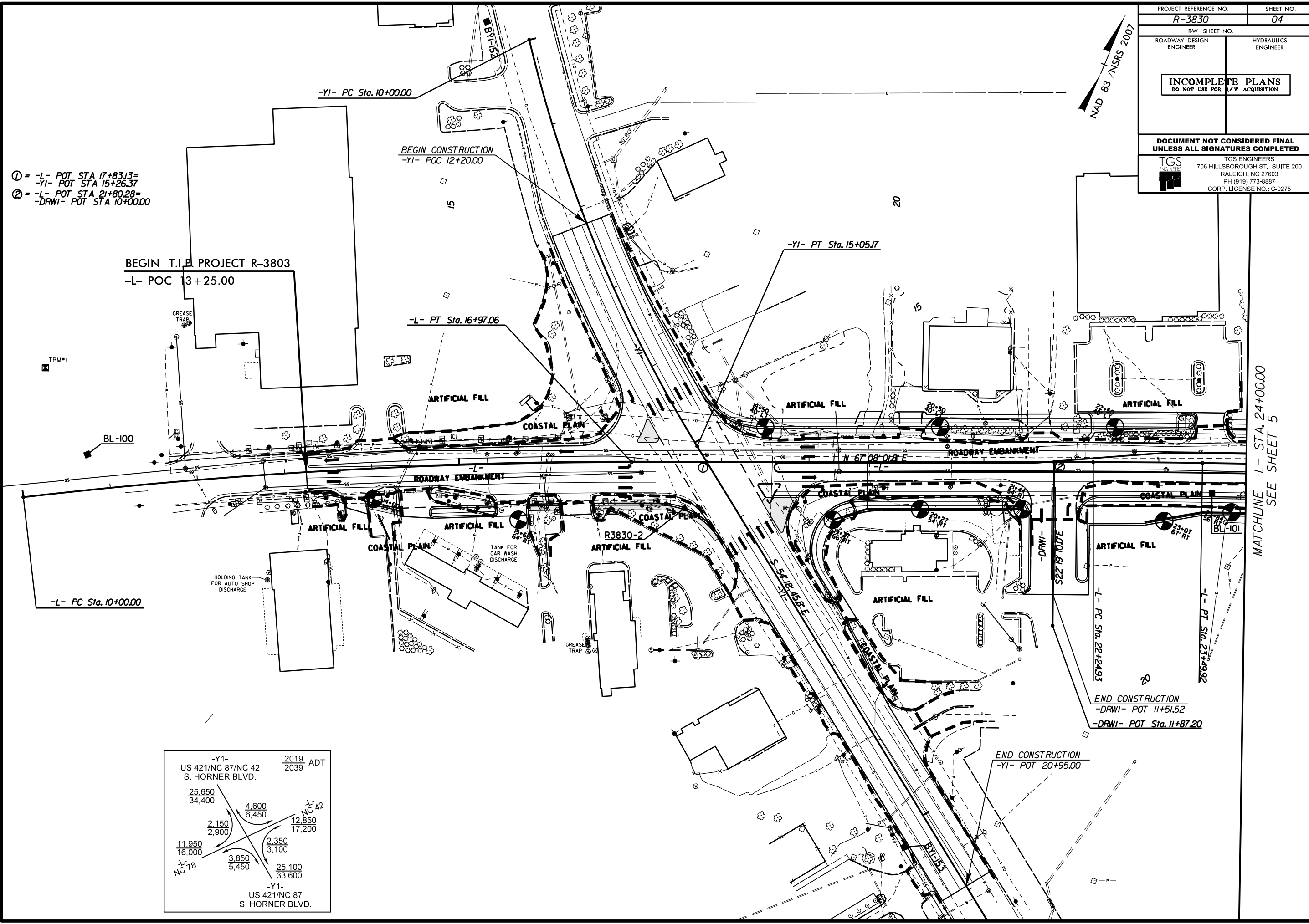
DocuSigned by:  
  
7DA5D2D0518F4B0...  
Thomas R. Wells, PE  
Senior Professional

DK/TRW:cas

5/14/99

PROJECT REFERENCE NO. <b>R-3830</b>		SHEET NO. <b>04</b>	
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ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
<b>INCOMPLETE PLANS</b> DO NOT USE FOR A/W ACQUISITION			
<b>DOCUMENT NOT CONSIDERED FINAL</b> UNLESS ALL SIGNATURES COMPLETED			
TGS ENGINEERS		TGS ENGINEERS	
706 HILLSBOROUGH ST., SUITE 200		706 HILLSBOROUGH ST., SUITE 200	
RALEIGH, NC 27603		RALEIGH, NC 27603	
PH (919) 773-8887		PH (919) 773-8887	
CORP. LICENSE NO.: C-0275		CORP. LICENSE NO.: C-0275	

- ① = -L- POT STA 17+83.13 =  
-Y1- POT STA 15+26.37
- ② = -L- POT STA 21+80.28 =  
-DRWI- POT STA 10+00.00



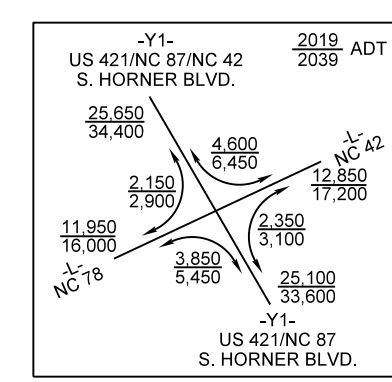
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BEGIN CONSTRUCTION  
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-L- PC Sta. 10+00.00

END CONSTRUCTION  
-DRWI- POT 11+51.52  
-DRWI- POT Sta. 11+87.20


END CONSTRUCTION  
-Y1- POT 20+95.00



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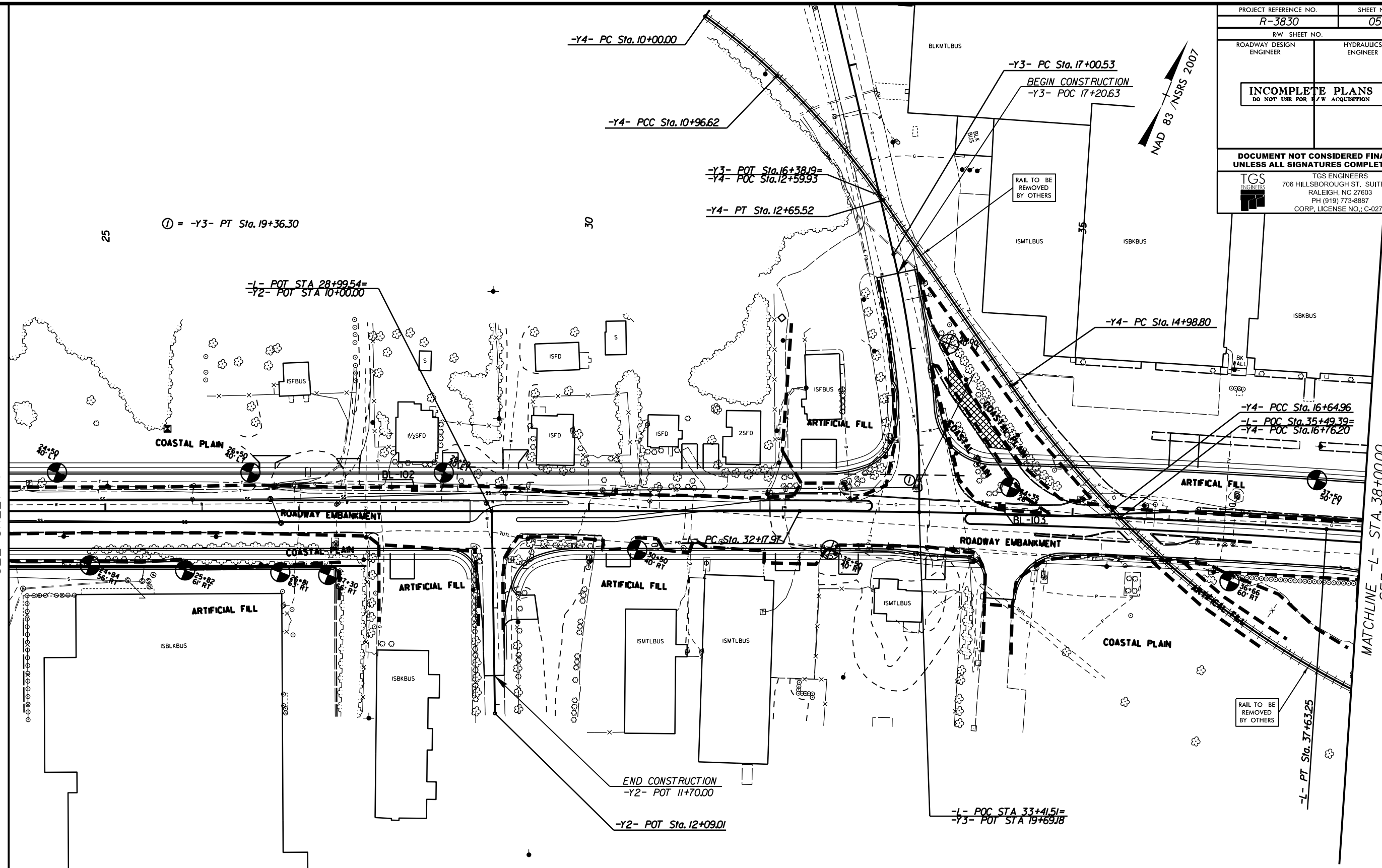
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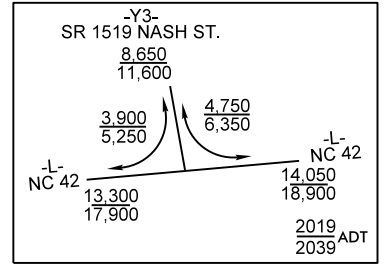
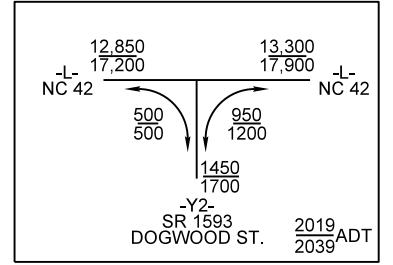
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<b>DOCUMENT NOT CONSIDERED FINAL</b> UNLESS ALL SIGNATURES COMPLETED	
 <b>TGS ENGINEERS</b> 706 HILLSBOROUGH ST., SUITE 200 RALEIGH, NC 27603 PH (919) 773-8887 CORP. LICENSE NO.: C-0275	

MATCHLINE -L- STA. 24+00.00  
SEE SHEET 4


MATCHLINE -L- STA. 38+00.00  
SEE SHEET 6

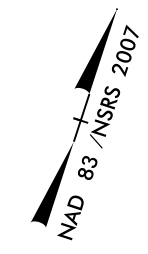
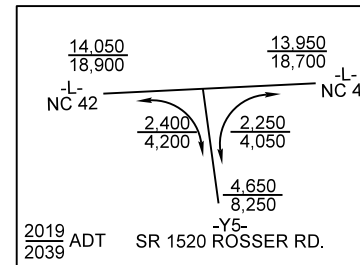


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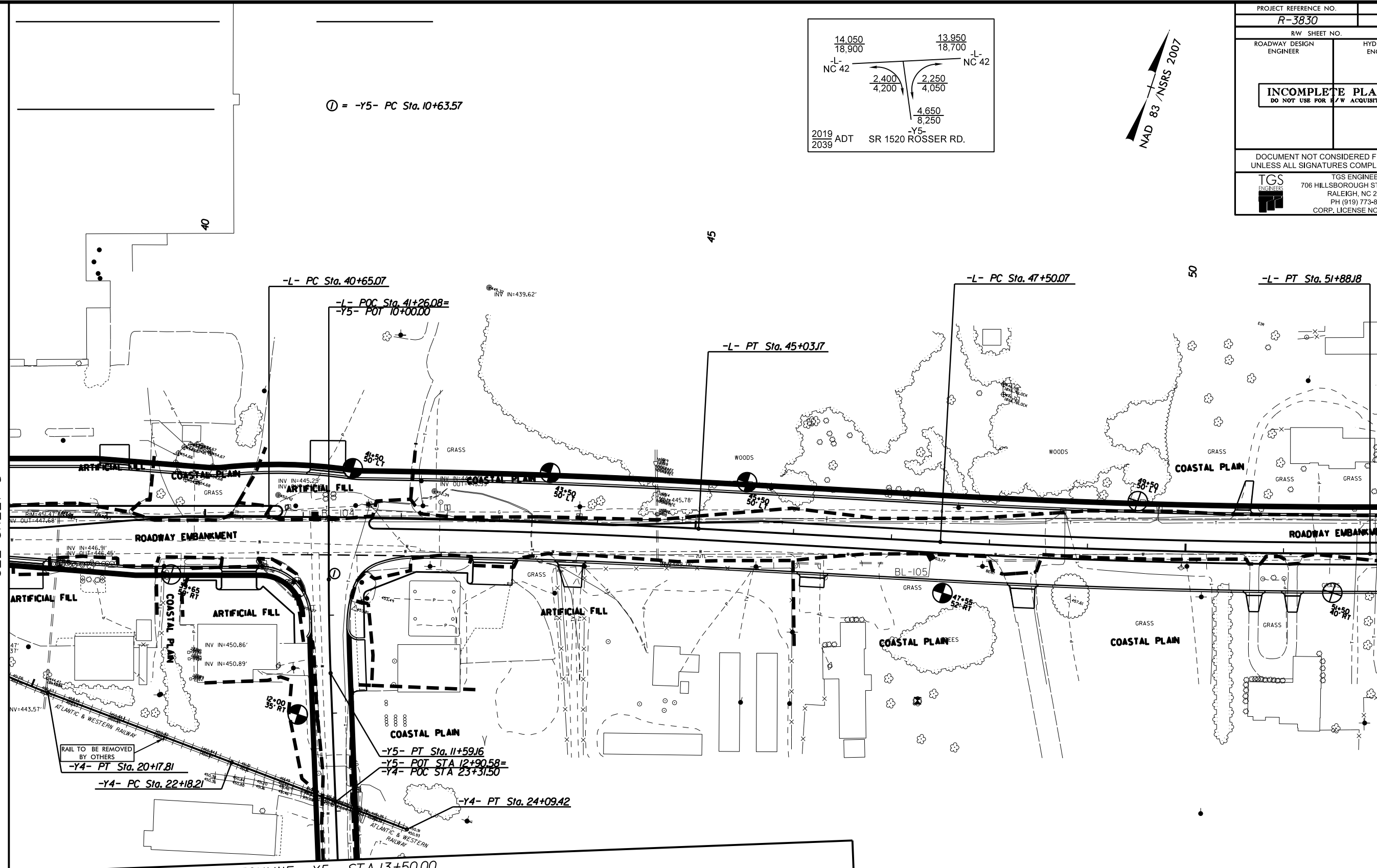
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DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
 <b>TGS ENGINEERS</b> 706 HILLSBOROUGH ST. SUITE 200 RALEIGH, NC 27603 PH (919) 773-8887 CORP. LICENSE NO.: C-0275	



① = -Y5- PC Sta. 10+63.57

MATCHLINE -L- STA. 38+00.00  
SEE SHEET 5



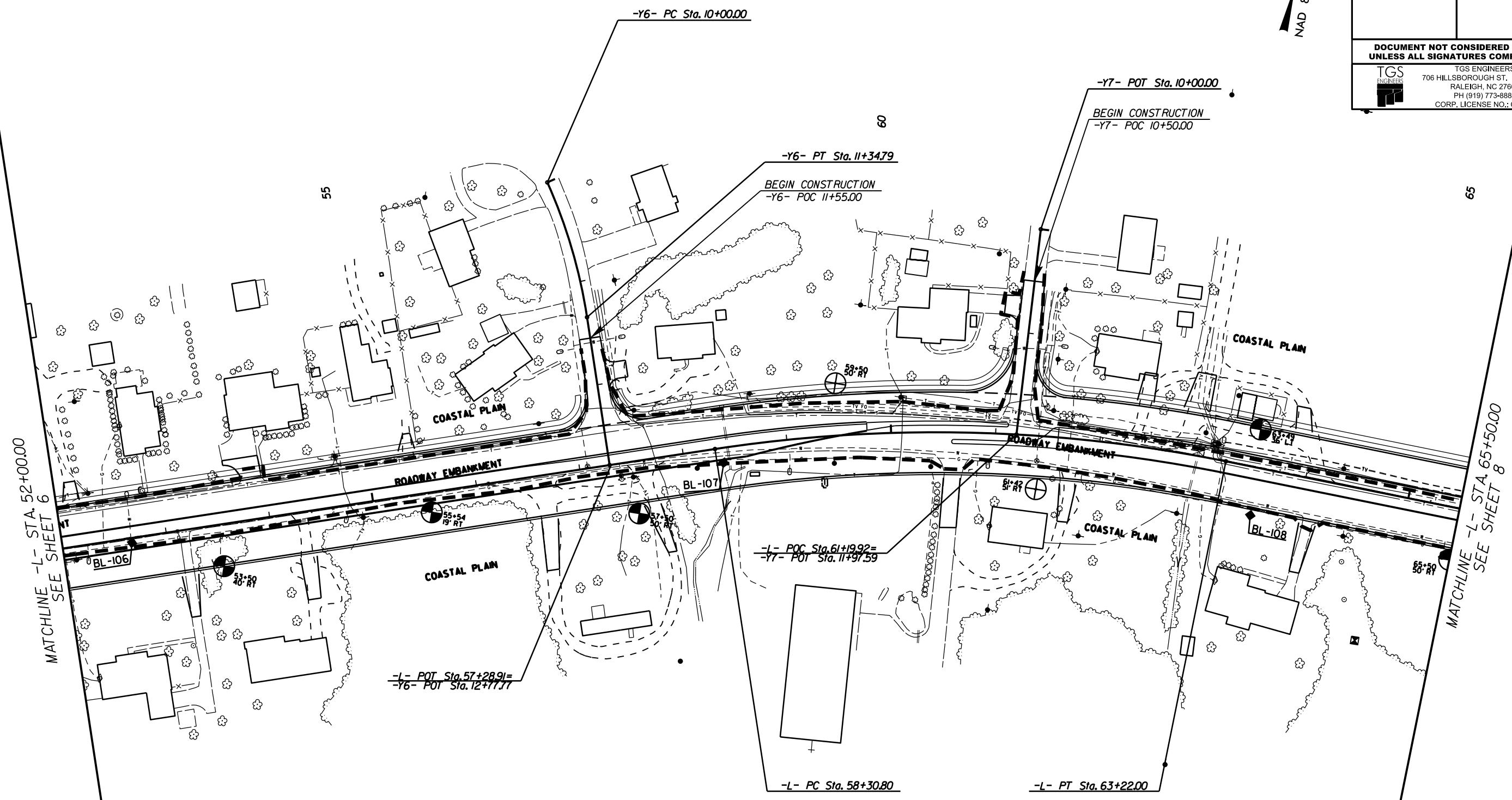
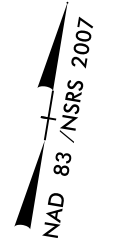
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MATCHLINE -L- STA. 52+00.00  
SEE SHEET 7

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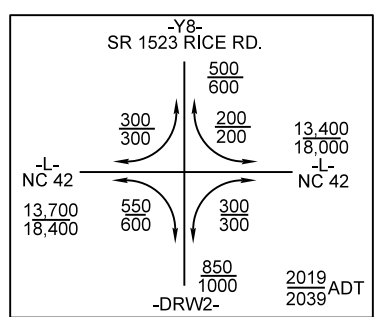
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<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>			
TGS ENGINEERS		TGS ENGINEERS	
706 HILLSBOROUGH ST., SUITE 200		706 HILLSBOROUGH ST., SUITE 200	
RALEIGH, NC 27603		RALEIGH, NC 27603	
PH (919) 773-8887		PH (919) 773-8887	
CORP. LICENSE NO.: C-0275		CORP. LICENSE NO.: C-0275	





PROJECT REFERENCE NO. <b>R-3830</b>		SHEET NO. <b>08</b>	
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<b>INCOMPLETE PLANS</b> DO NOT USE FOR P/W ACQUISITION			
<b>DOCUMENT NOT CONSIDERED FINAL</b> UNLESS ALL SIGNATURES COMPLETED			
TGS ENGINEERS		TGS ENGINEERS	
706 HILLSBOROUGH ST. SUITE 200		706 HILLSBOROUGH ST. SUITE 200	
RALEIGH, NC 27603		RALEIGH, NC 27603	
PH (919) 773-8887		PH (919) 773-8887	
CORP. LICENSE NO.: C-0275		CORP. LICENSE NO.: C-0275	

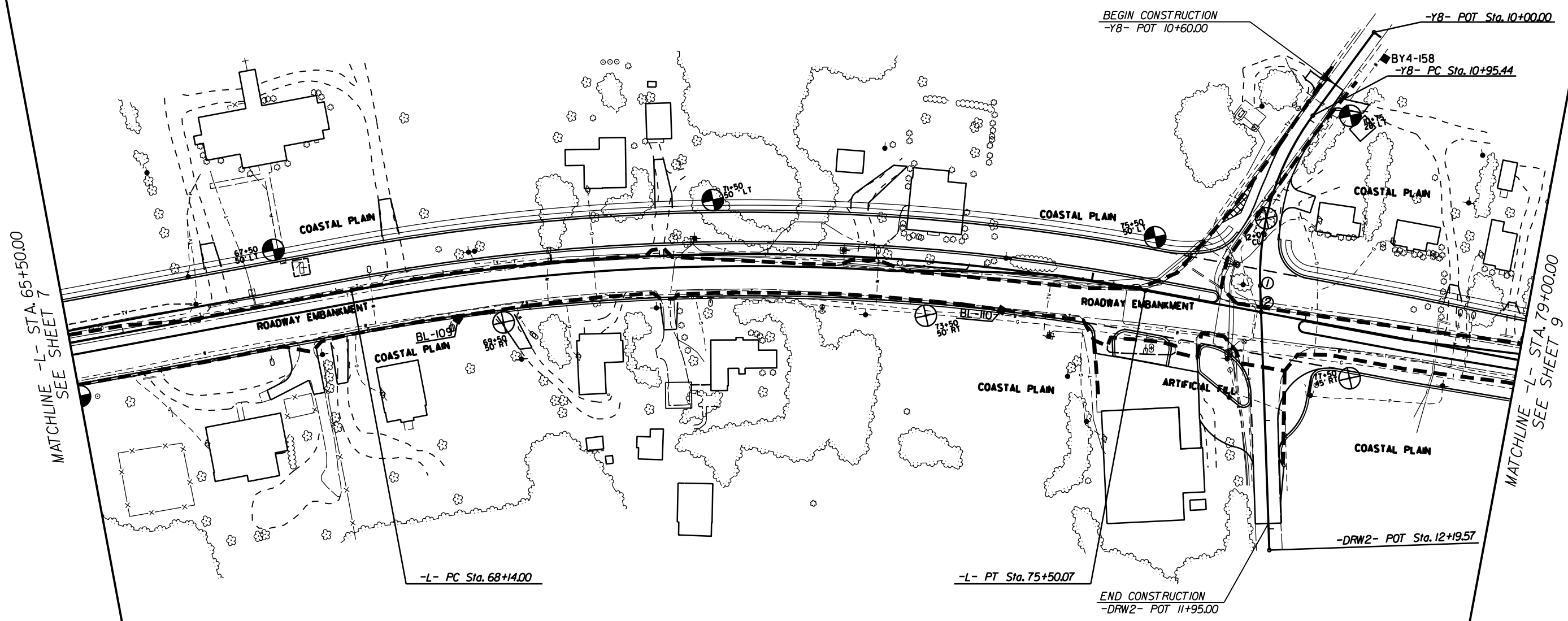
NAD 83 / NSRS 2007



- ① = -Y8- PT Sta. 12+62.64
- ② = -L- POT Sta. 76+58.63 =  
-Y8- POT Sta. 12+87.00 =  
-DRW2- POT Sta. 10+00.00

70

75



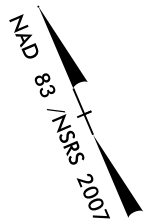
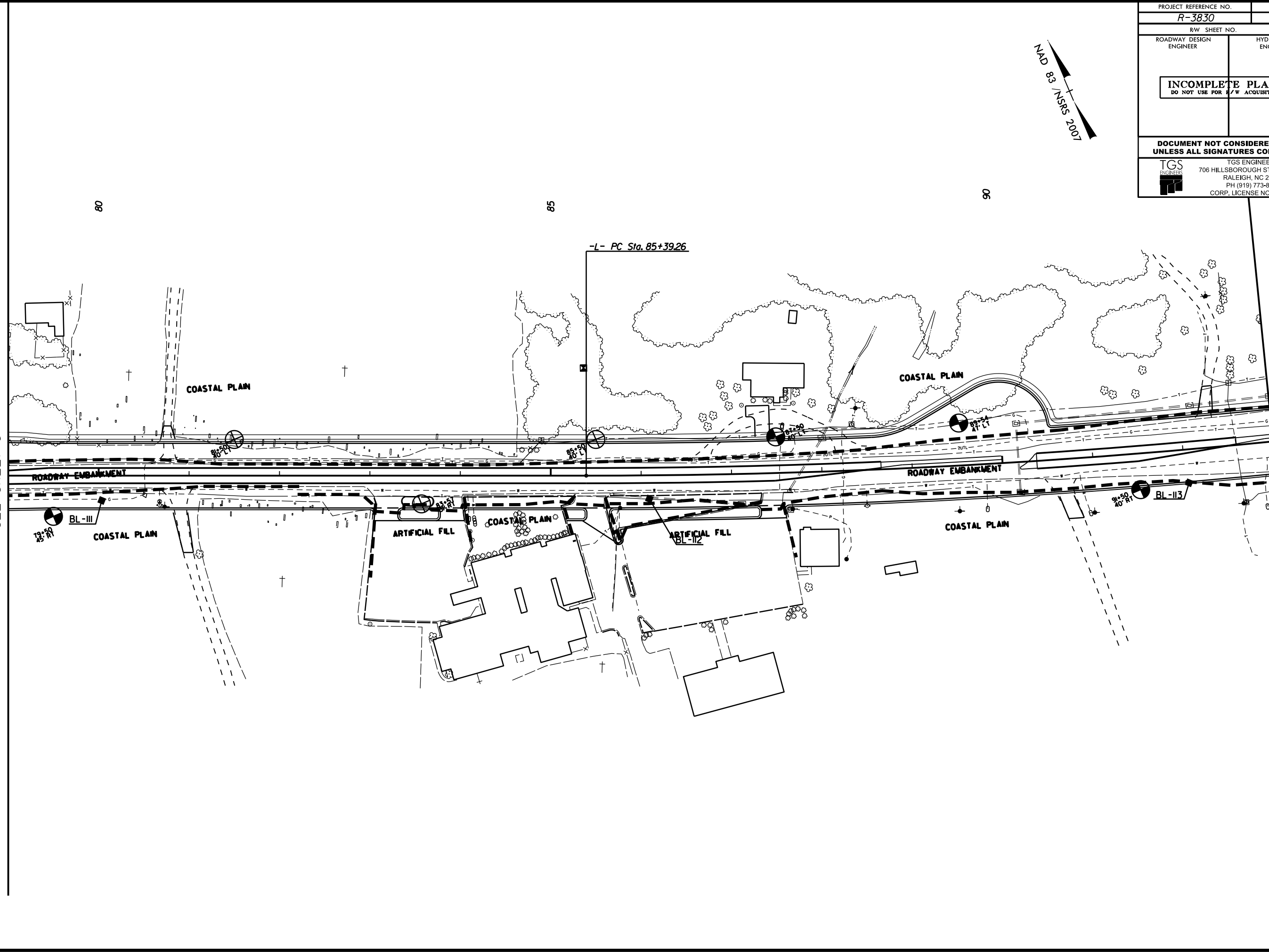
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MATCHLINE -L- STA. 79+00.00  
SEE SHEET 8

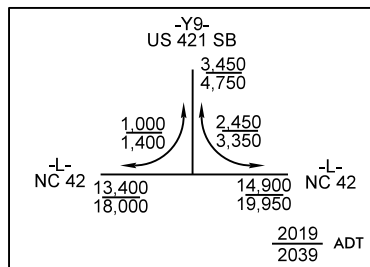


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 <b>TGS ENGINEERS</b> 706 HILLSBOROUGH ST., SUITE 200 RALEIGH, NC 27603 PH (919) 773-8887 CORP. LICENSE NO.: C-0275		<b>TGS ENGINEERS</b> 706 HILLSBOROUGH ST., SUITE 200 RALEIGH, NC 27603 PH (919) 773-8887 CORP. LICENSE NO.: C-0275	

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SEE SHEET 10

5/14/2017

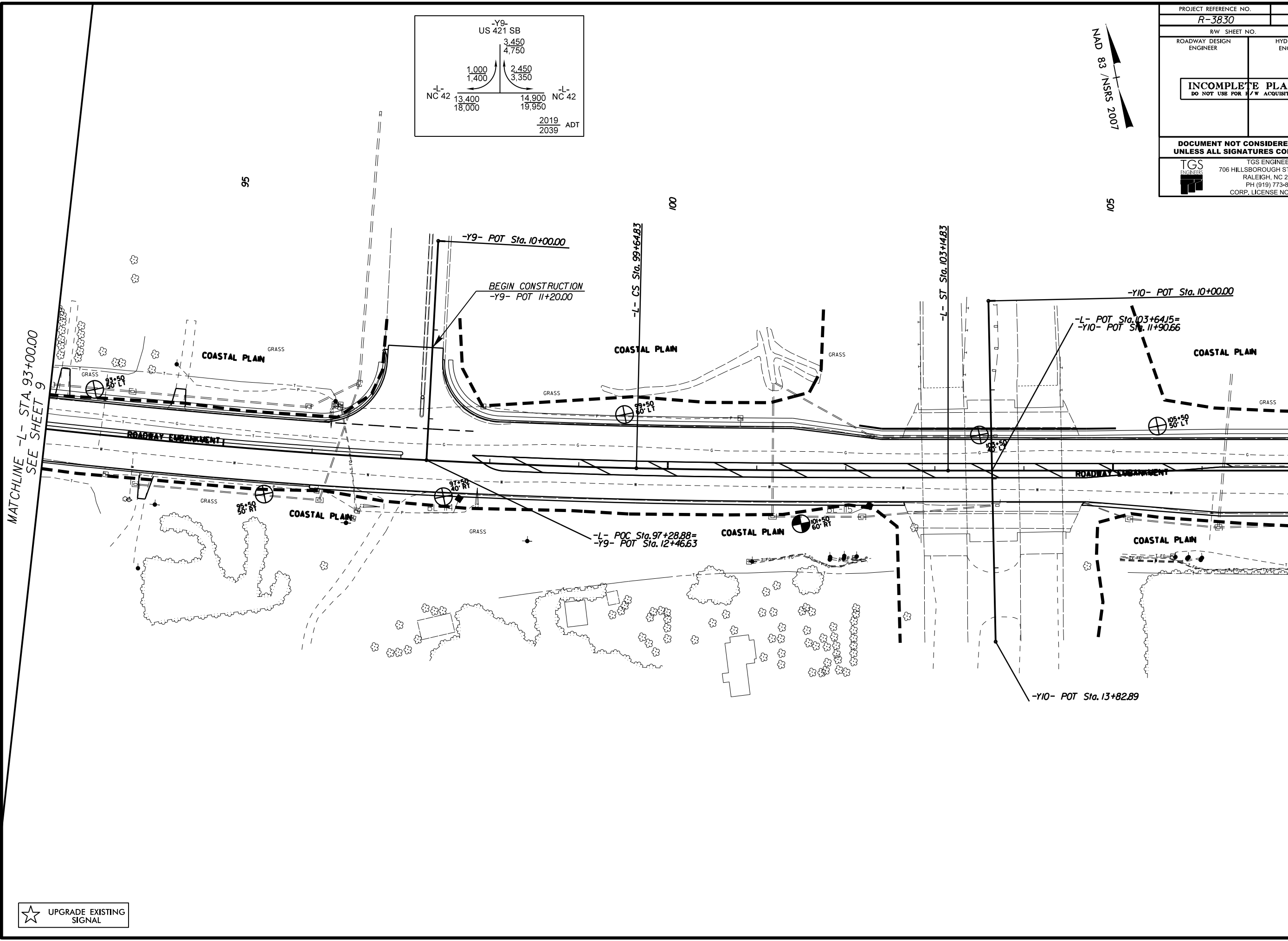
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		TGS ENGINEERS 706 HILLSBOROUGH ST. SUITE 200 RALEIGH, NC 27603 PH (919) 773-8887 CORP. LICENSE NO.: C-0275	

MATCHLINE -L- STA. 93+00.00  
SEE SHEET 9


MATCHLINE -L- STA. 107+00.00  
SEE SHEET 11

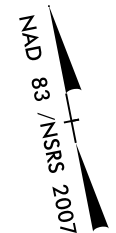


★ UPGRADE EXISTING SIGNAL

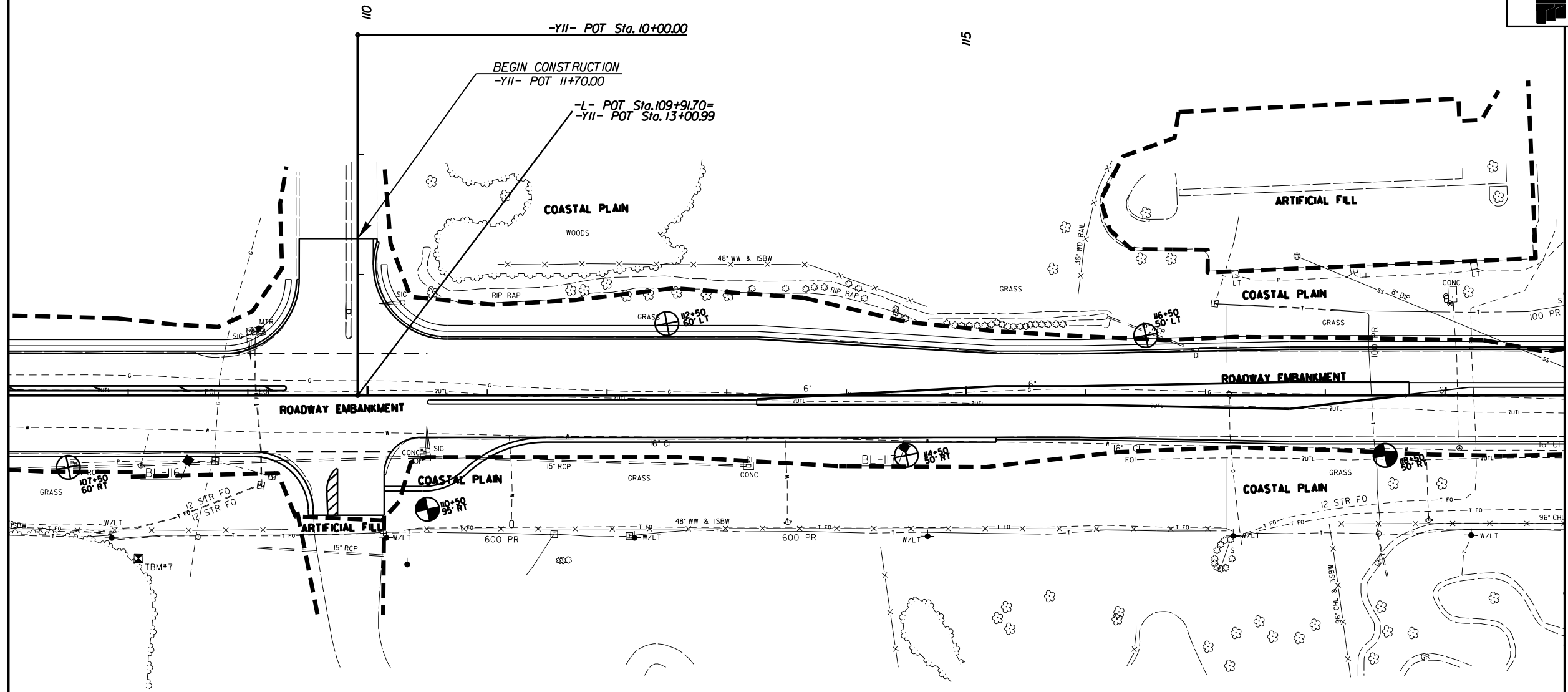
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KARL

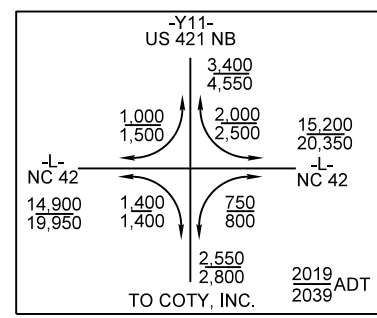
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 <b>TGS ENGINEERS</b> 706 HILLSBOROUGH ST. SUITE 200 RALEIGH, NC 27603 PH (919) 773-8887 CORP. LICENSE NO.: C-0275	



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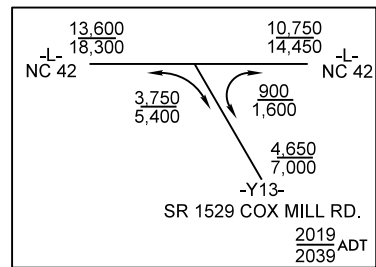
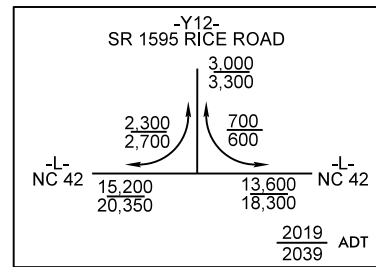


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5/14/20

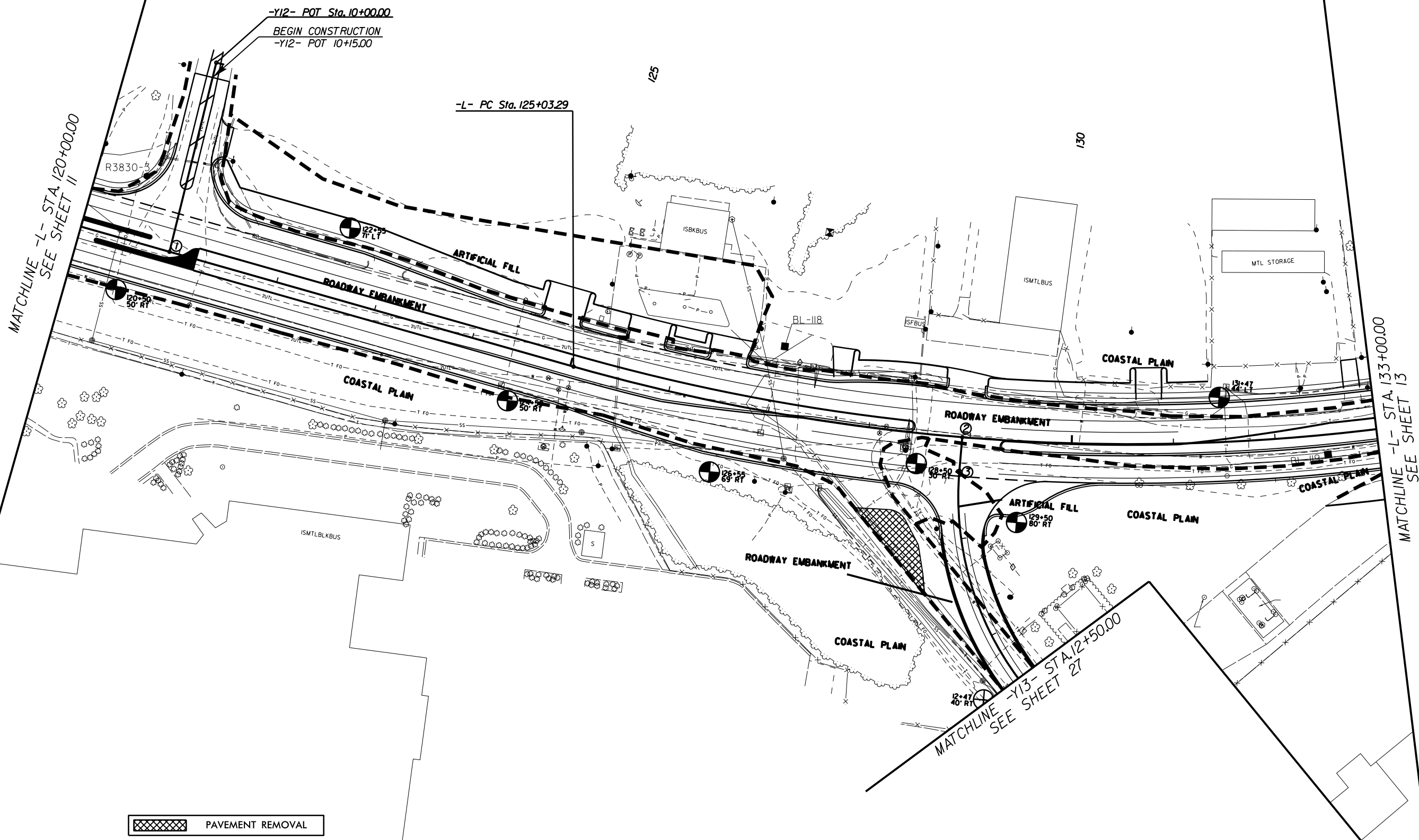
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KAD/SL/SL



NAD 83 / NSRS 2007


PROJECT REFERENCE NO. <b>R-3830</b>	SHEET NO. <b>12</b>
RW SHEET NO.	
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<b>INCOMPLETE PLANS</b> DO NOT USE FOR R/W ACQUISITION	
<b>DOCUMENT NOT CONSIDERED FINAL</b> UNLESS ALL SIGNATURES COMPLETED	
<b>TGS ENGINEERS</b> 706 HILLSBOROUGH ST., SUITE 200 RALEIGH, NC 27603 PH (919) 773-8887 CORP. LICENSE NO.: C-0275	

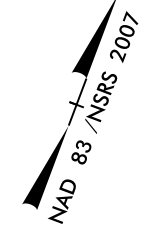
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-Y12- POT Sta. 11+91.50
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-Y13- POT Sta. 10+00.00
- ③ = -Y13- PC Sta. 10+32.98



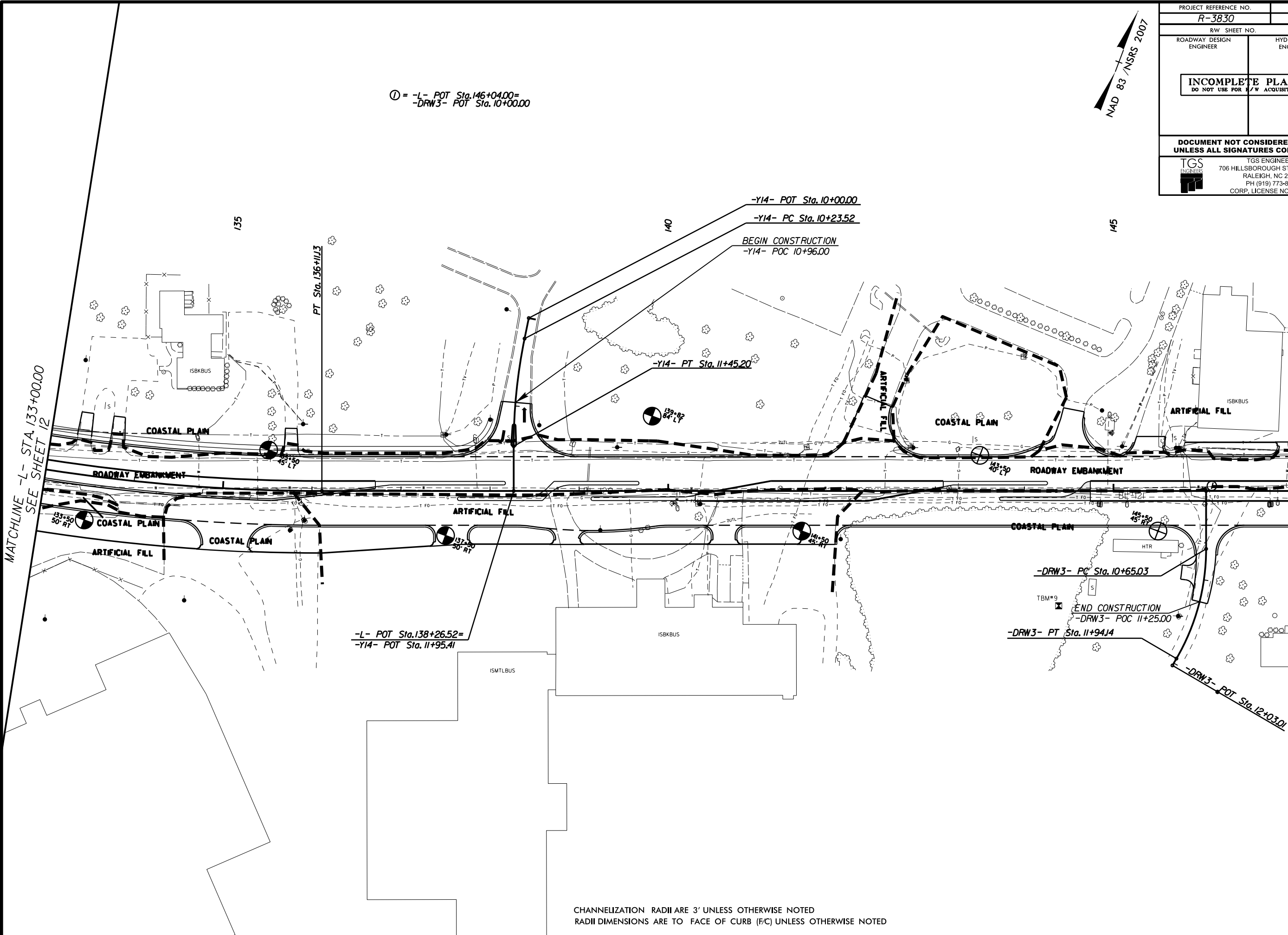
PAVEMENT REMOVAL

5/14/09

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<b>INCOMPLETE PLANS</b> DO NOT USE FOR I/W ACQUISITION	
<b>DOCUMENT NOT CONSIDERED FINAL</b> UNLESS ALL SIGNATURES COMPLETED	
 <b>TGS ENGINEERS</b> 706 HILLSBOROUGH ST. SUITE 200 RALEIGH, NC 27603 PH (919) 773-8887 CORP. LICENSE NO.: C-0275	



① = -L- POT Sta. 146+04.00=  
 -DRW3- POT Sta. 10+00.00



CHANNELIZATION RADII ARE 3' UNLESS OTHERWISE NOTED  
 RADII DIMENSIONS ARE TO FACE OF CURB (FC) UNLESS OTHERWISE NOTED

08-MAY-2007 15:53  
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MATCHLINE -L- STA. 133+00.00  
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MATCHLINE -L- STA. 147+00.00  
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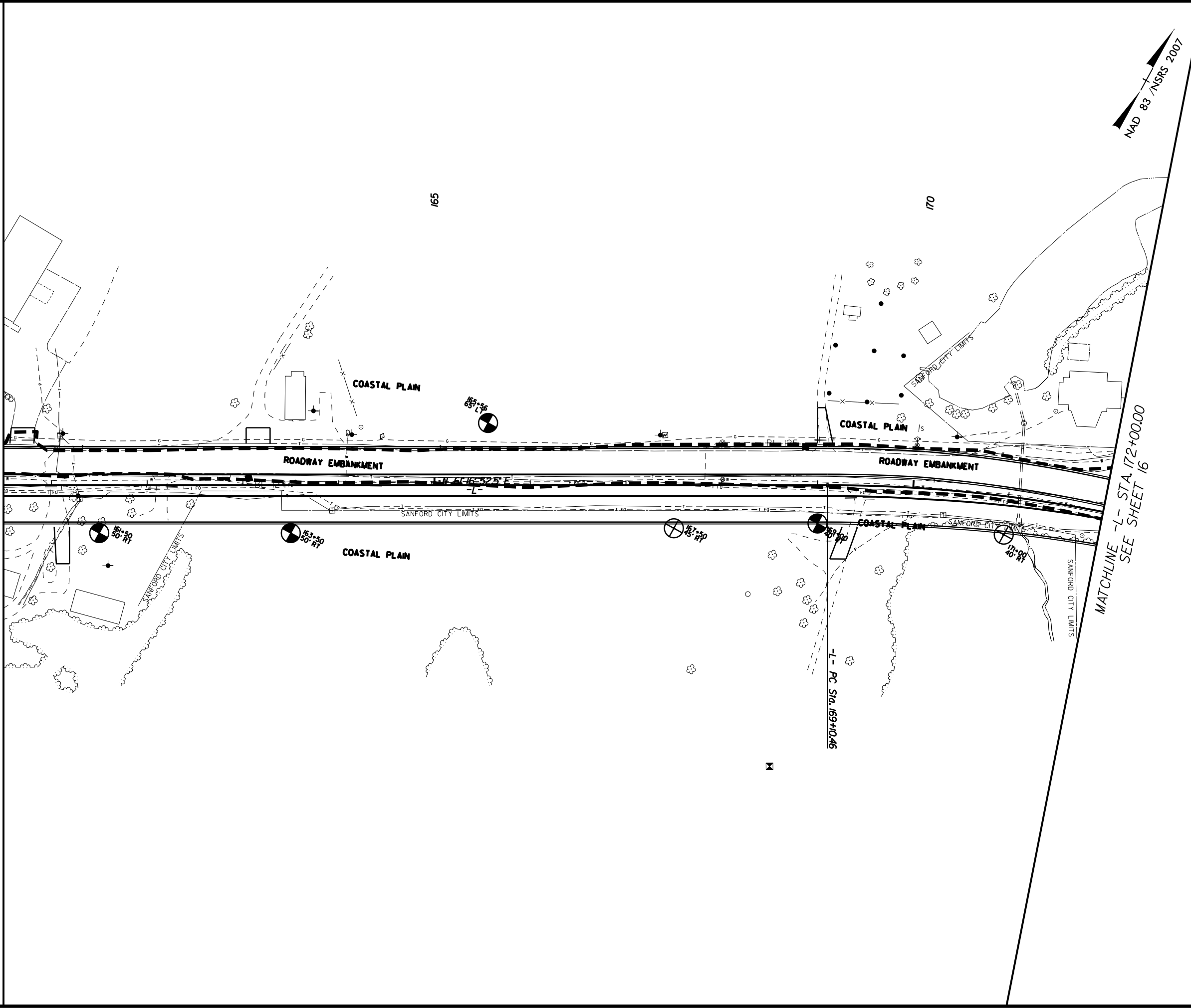




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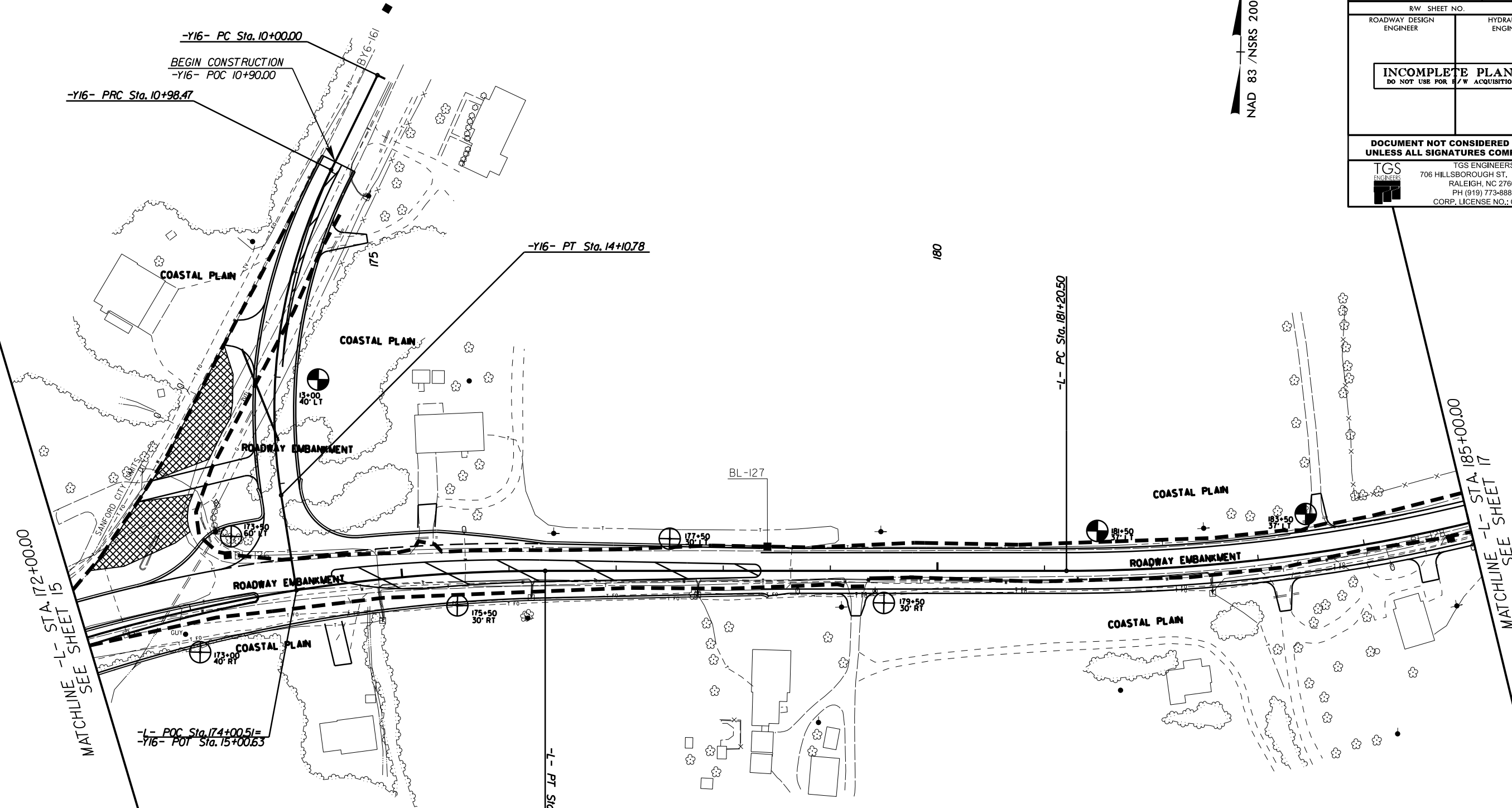
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Revision AT 4/24/09

MATCHLINE -L- STA. 160+50.00  
SEE SHEET 14

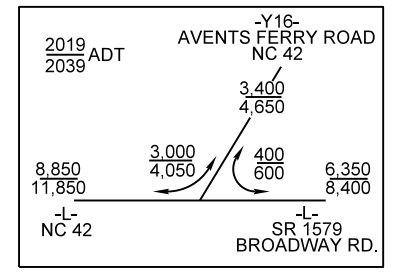


PROJECT REFERENCE NO. <b>R-3830</b>	SHEET NO. <b>15</b>
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR R/W ACQUISITION	
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	
<b>TGS ENGINEERS</b>	TGS ENGINEERS 706 HILLSBOROUGH ST., SUITE 200 RALEIGH, NC 27603 PH (919) 773-8887 CORP. LICENSE NO.: C-0275

5/14/2017 15:54  
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 20151548.037A R-3830\_Roadway\_NR3830\_GEO\_RDWY\_CADD\_GEDTECHNPlanPofV-3830\_GEO\_mv\_16.dgn



PROJECT REFERENCE NO. <b>R-3830</b>	SHEET NO. <b>16</b>
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR #/W ACQUISITION	
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	
TGS ENGINEERS 706 HILLSBOROUGH ST., SUITE 200 RALEIGH, NC 27603 PH (919) 773-8887 CORP. LICENSE NO.: C-0275	

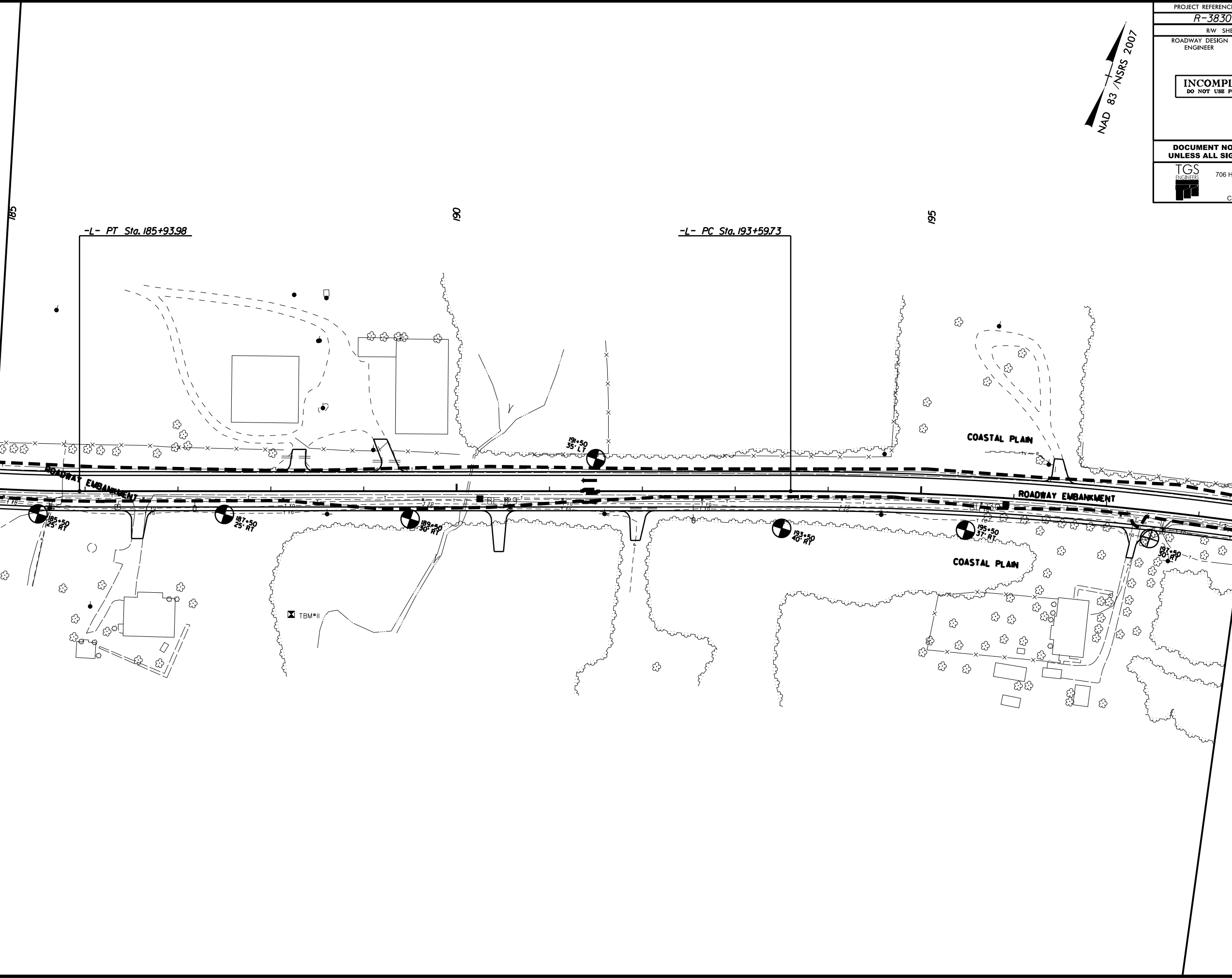


PAVEMENT REMOVAL

5/14/99

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K2426560

MATCHLINE -L- STA. 185+00.00  
SEE SHEET 16



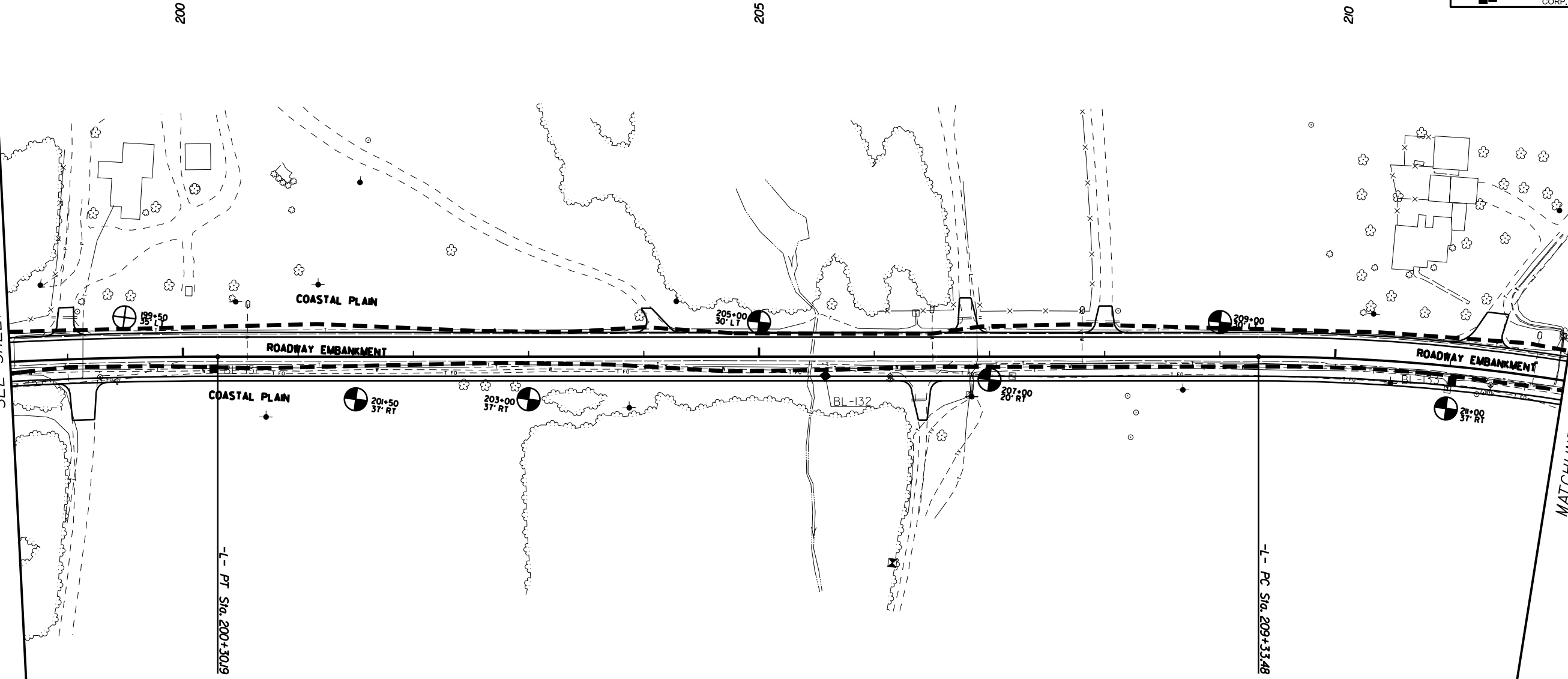
MATCHLINE -L- STA. 198+50.00  
SEE SHEET 18

PROJECT REFERENCE NO. <b>R-3830</b>		SHEET NO. <b>17</b>	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
<b>INCOMPLETE PLANS</b> DO NOT USE FOR R/W ACQUISITION			
<b>DOCUMENT NOT CONSIDERED FINAL</b> UNLESS ALL SIGNATURES COMPLETED			
		TGS ENGINEERS 706 HILLSBOROUGH ST. SUITE 200 RALEIGH, NC 27603 PH (919) 773-8887 CORP. LICENSE NO.: C-0275	

5/14/99

08-MAY-2017 16:25  
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KAS

MATCHLINE -L- STA. 198+50.00  
SEE SHEET 17



200

205

210

-L- PT Sta. 200+30.19

-L- PC Sta. 209+33.48


NAD 83 / NSRS 2007

PROJECT REFERENCE NO. <b>R-3830</b>		SHEET NO. <b>18</b>	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
<b>INCOMPLETE PLANS</b> DO NOT USE FOR E/W ACQUISITION			
<b>DOCUMENT NOT CONSIDERED FINAL</b> UNLESS ALL SIGNATURES COMPLETED			
		TGS ENGINEERS 706 HILLSBOROUGH ST., SUITE 200 RALEIGH, NC 27603 PH (919) 773-8887 CORP. LICENSE NO.: C-0275	

MATCHLINE -L- STA. 212+00.00  
SEE SHEET 19

5/14/09

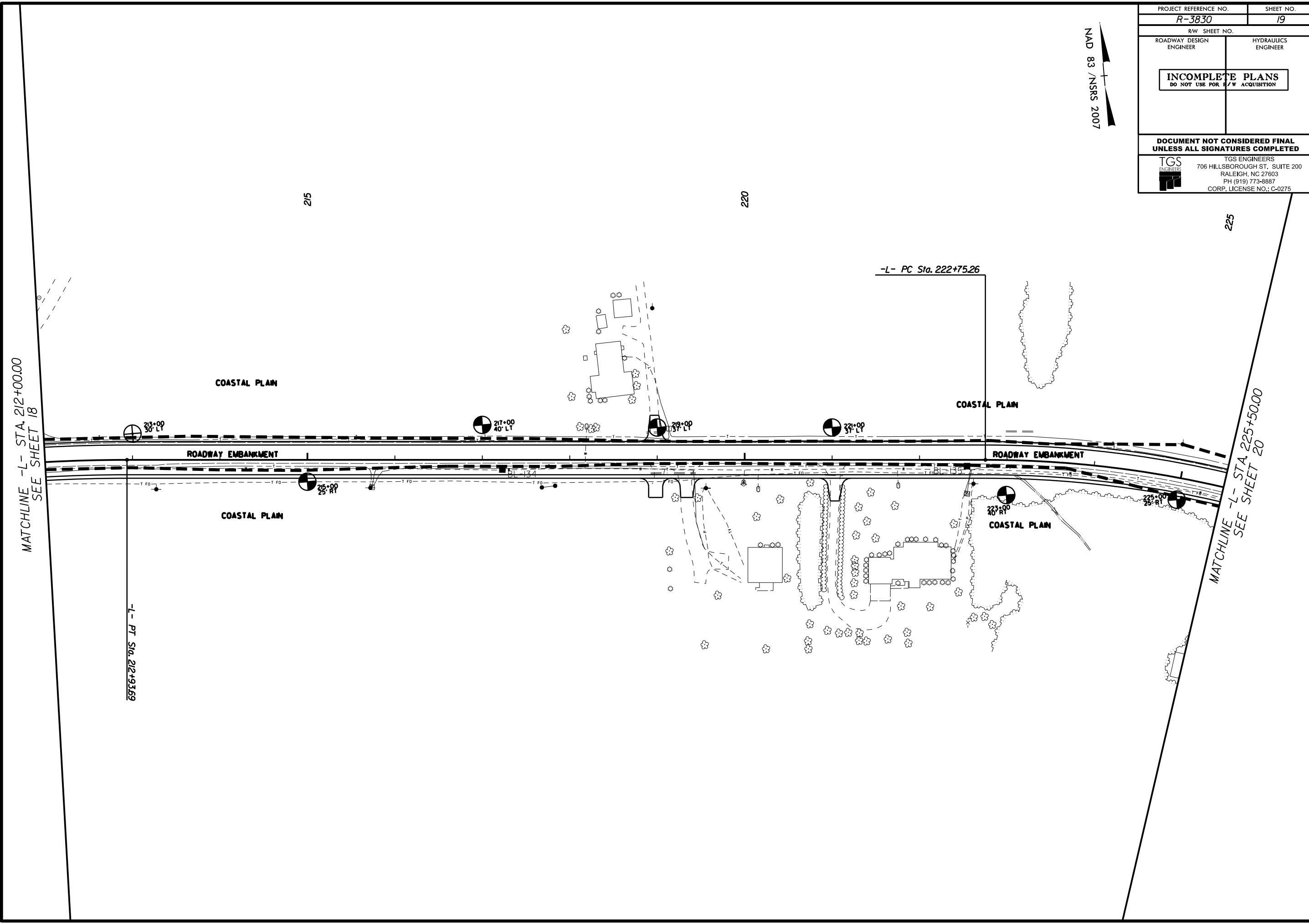
NAD 83 / NSRS 2007

PROJECT REFERENCE NO. <b>R-3830</b>		SHEET NO. <b>19</b>	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
<b>INCOMPLETE PLANS</b> DO NOT USE FOR R/W ACQUISITION			
<b>DOCUMENT NOT CONSIDERED FINAL</b> UNLESS ALL SIGNATURES COMPLETED			
		TGS ENGINEERS 706 HILLSBOROUGH ST. SUITE 200 RALEIGH, NC 27603 PH (919) 773-8887 CORP. LICENSE NO.: C-0275	

MATCHLINE -L- STA. 212+00.00  
SEE SHEET 18

-L- PT Sta. 212+93.69


MATCHLINE -L- STA. 225+50.00  
SEE SHEET 20

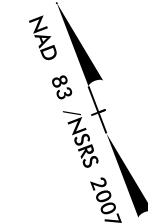


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User: AT\_KA215550



5/14/20

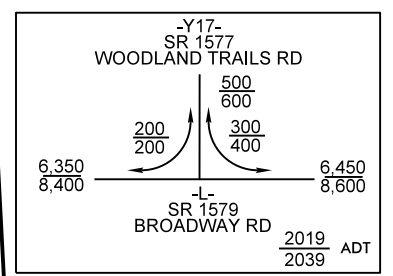
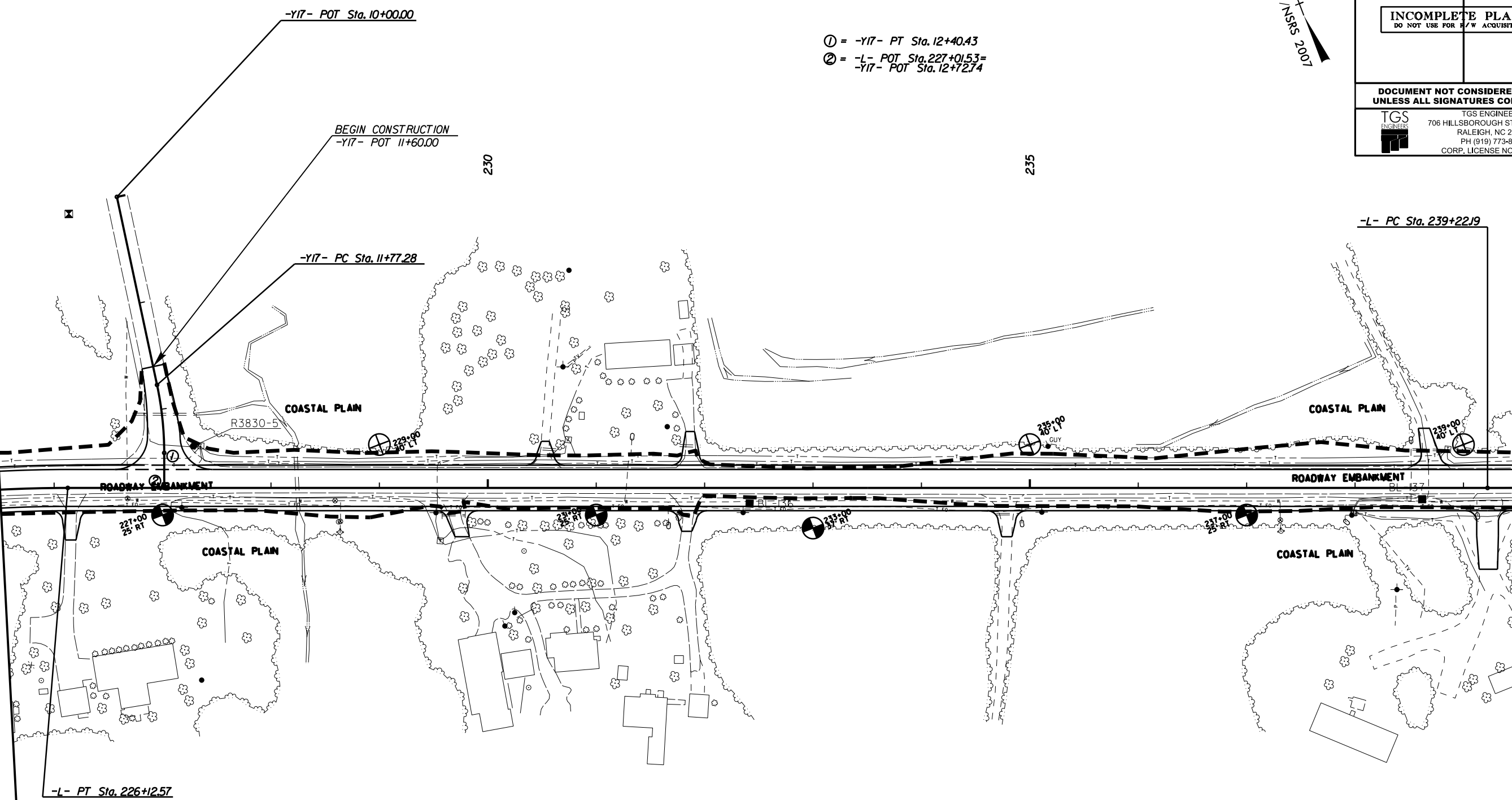
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RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR ACQUISITION	
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	
 <b>TGS ENGINEERS</b> 706 HILLSBOROUGH ST. SUITE 200 RALEIGH, NC 27603 PH (919) 773-8887 CORP. LICENSE NO.: C-0275	



- ① = -Y17- PT Sta. 12+40.43
- ② = -L- POT Sta. 227+01.53 =  
-Y17- POT Sta. 12+72.74

MATCHLINE -L- STA. 225+50.00  
SEE SHEET 19


MATCHLINE -L- STA. 239+50.00  
SEE SHEET 21

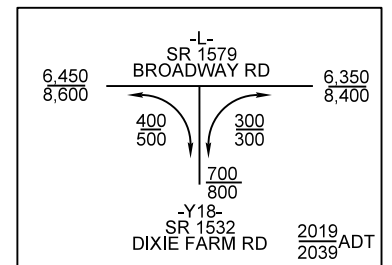
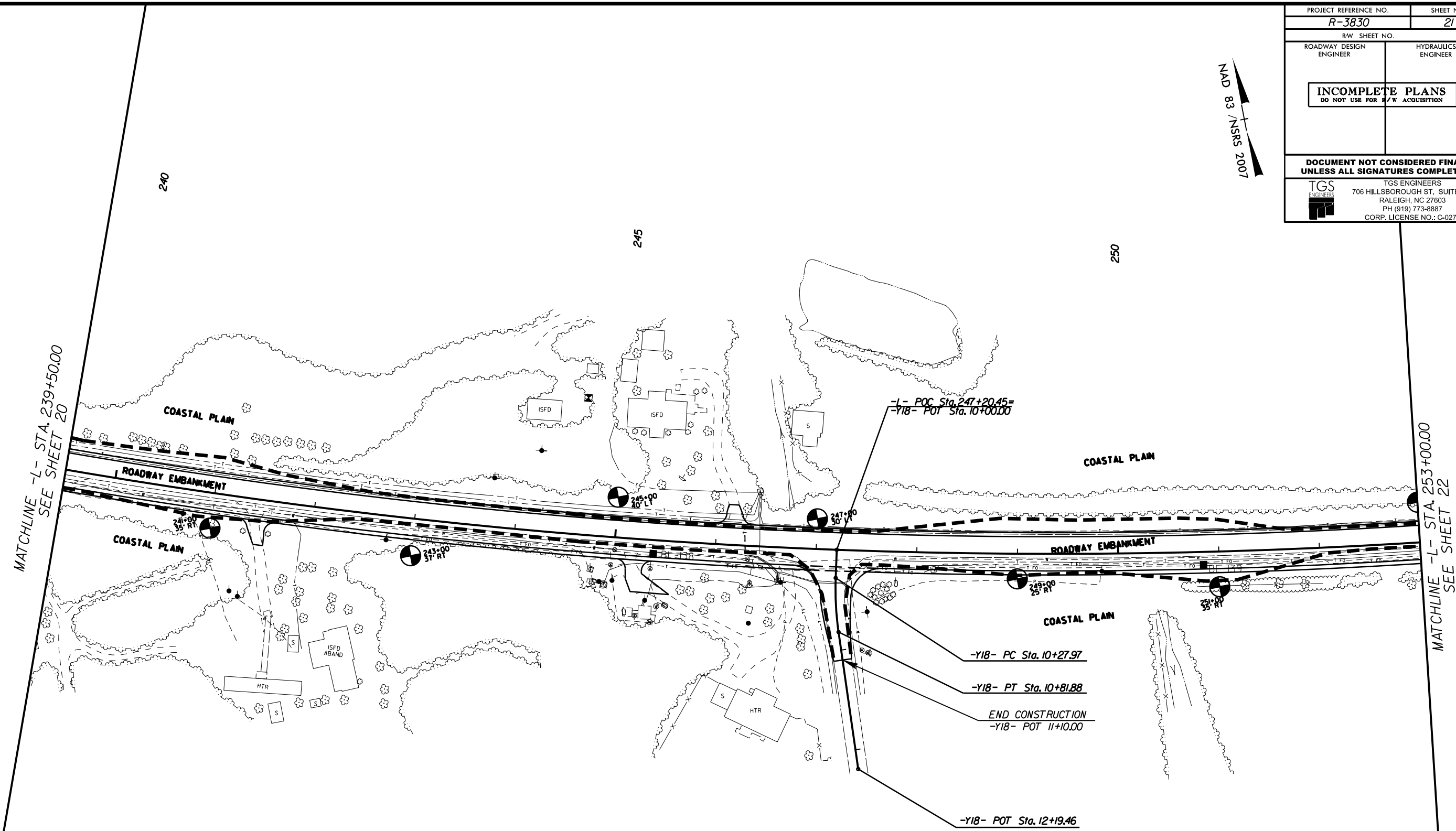


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Revision AT 4/24/2016

5/14/09


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KAS/STW

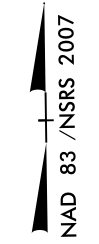
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RW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
<b>INCOMPLETE PLANS</b> DO NOT USE FOR R/W ACQUISITION			
<b>DOCUMENT NOT CONSIDERED FINAL</b> UNLESS ALL SIGNATURES COMPLETED			
 <b>TGS ENGINEERS</b> 706 HILLSBOROUGH ST. SUITE 200 RALEIGH, NC 27603 PH (919) 773-8887 CORP. LICENSE NO.: C-0275			



5/14/2019

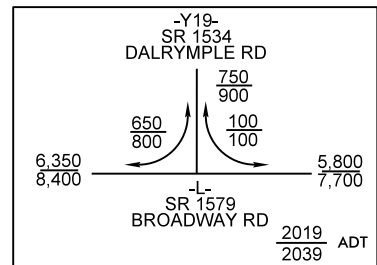
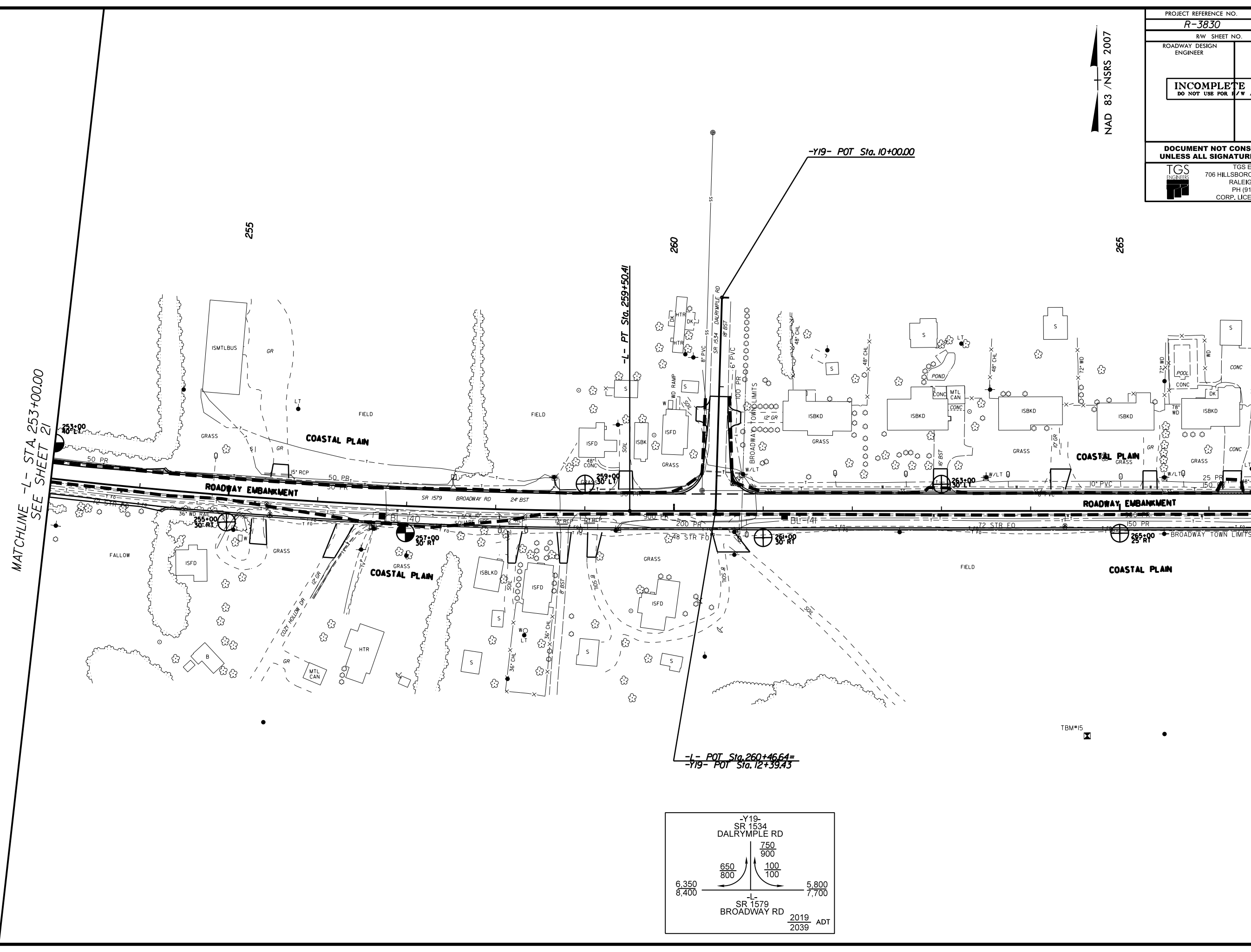
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Revision 1 15/05/2019

PROJECT REFERENCE NO. <b>R-3830</b>		SHEET NO. <b>22</b>	
RW SHEET NO.		HYDRAULICS ENGINEER	
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
<b>INCOMPLETE PLANS</b> DO NOT USE FOR ACQUISITION			
<b>DOCUMENT NOT CONSIDERED FINAL</b> UNLESS ALL SIGNATURES COMPLETED			
		TGS ENGINEERS 706 HILLSBOROUGH ST. SUITE 200 RALEIGH, NC 27603 PH (919) 773-8887 CORP. LICENSE NO.: C-0275	



MATCHLINE -L- STA. 253+00.00  
SEE SHEET 21

MATCHLINE -L- STA. 266+50.00  
SEE SHEET 23




5/14/20

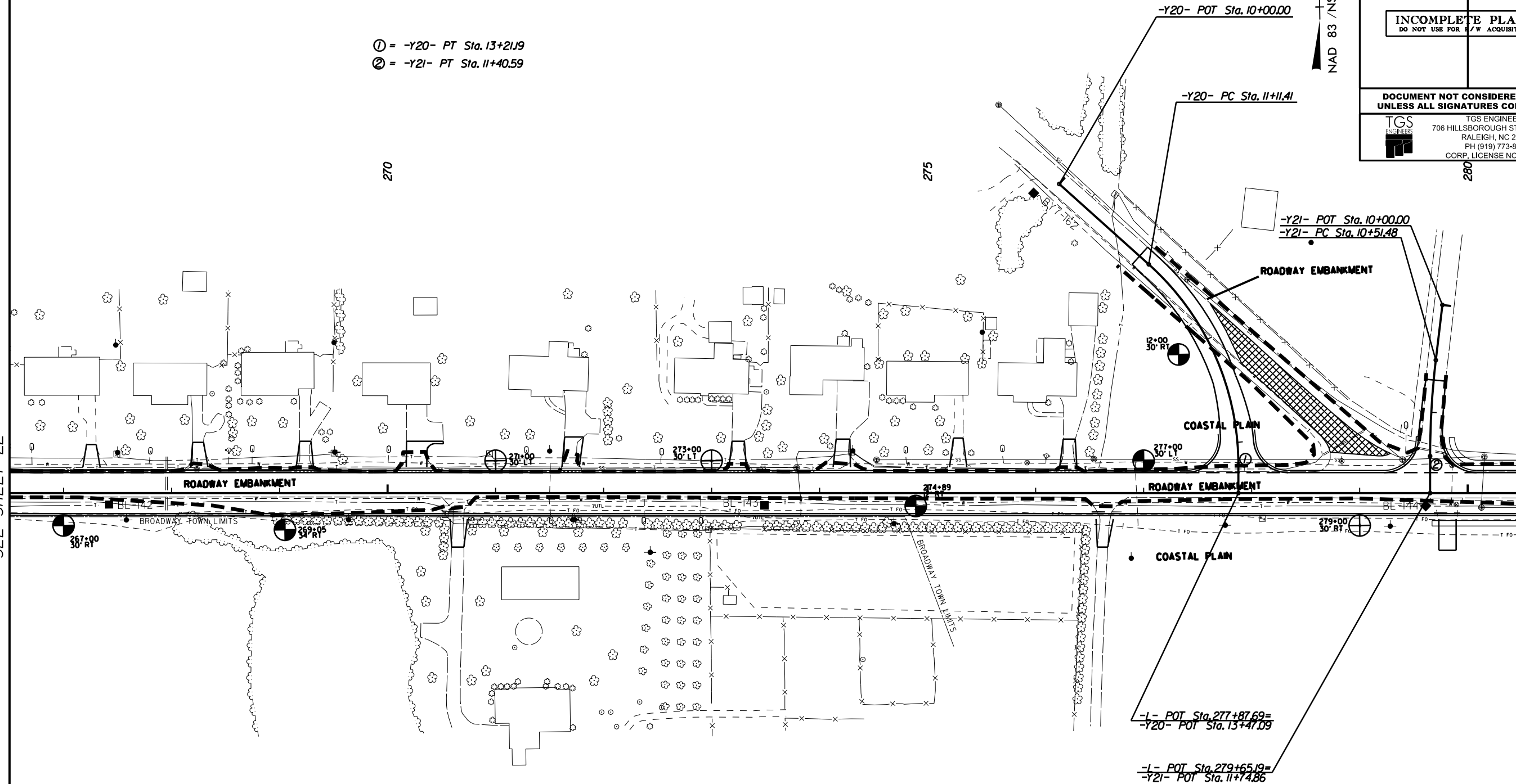
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TGS

MATCHLINE -L- STA. 266+50.00  
SEE SHEET 22

- ① = -Y20- PT Sta. 13+21.19
- ② = -Y21- PT Sta. 11+40.59

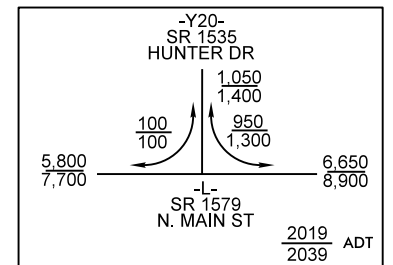
NAD 83 / NSRS 2007

PROJECT REFERENCE NO. <b>R-3830</b>	SHEET NO. <b>23</b>
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR I/W ACQUISITION	
<b>DOCUMENT NOT CONSIDERED FINAL</b> UNLESS ALL SIGNATURES COMPLETED	
 <b>TGS ENGINEERS</b> 706 HILLSBOROUGH ST. SUITE 200 RALEIGH, NC 27603 PH (919) 773-8887 CORP. LICENSE NO.: C-0275	



MATCHLINE -L- STA. 280+50.00  
SEE SHEET 24

 PAVEMENT REMOVAL






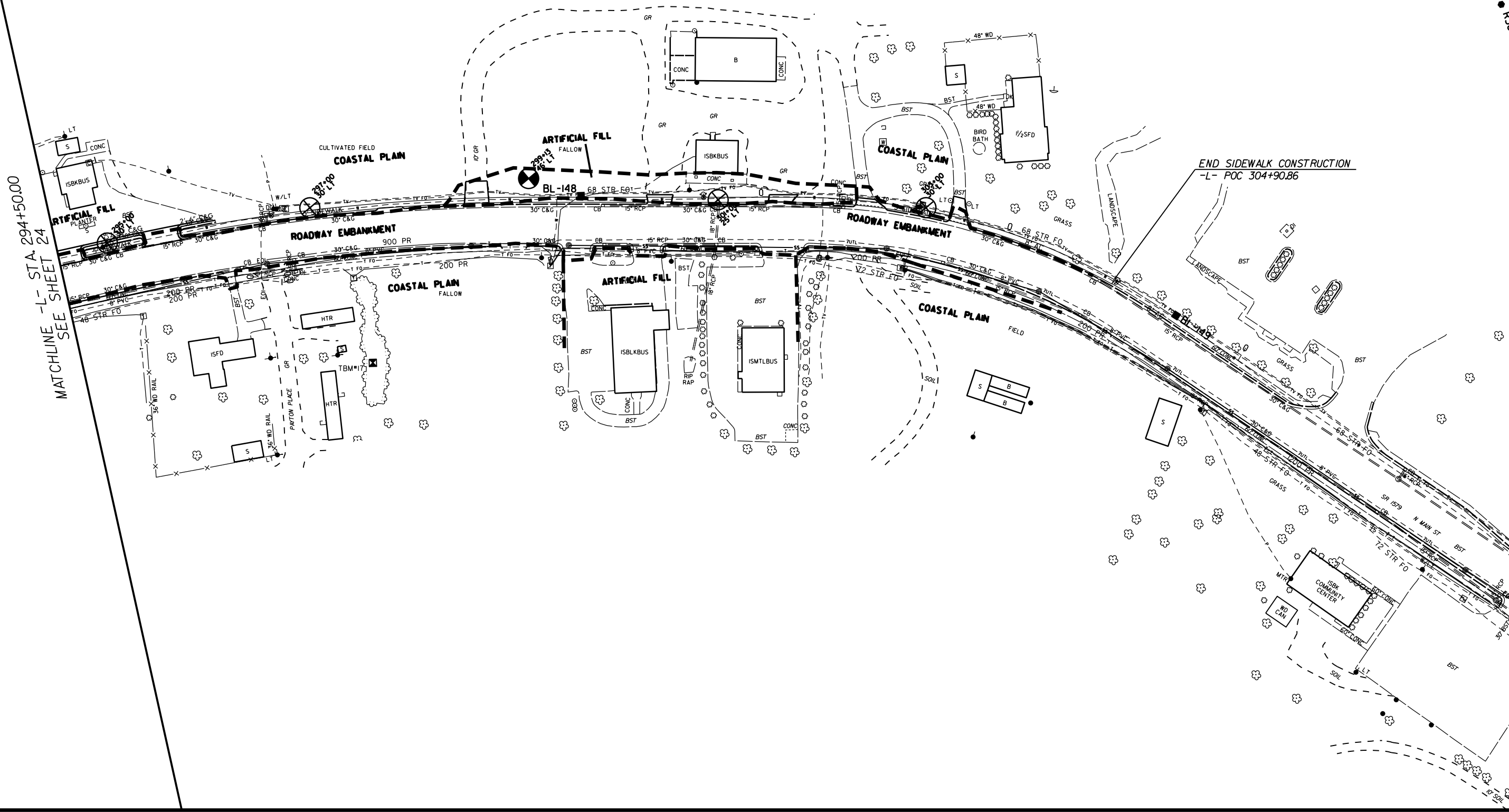
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K4245650

MATCHLINE -L- STA. 294+50.00  
SEE SHEET 24

NAD 83 / NSRS 2007

PROJECT REFERENCE NO. <b>R-3830</b>		SHEET NO. <b>25</b>	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
<b>INCOMPLETE PLANS</b> DO NOT USE FOR A/W ACQUISITION			
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>			
		TGS ENGINEERS 706 HILLSBOROUGH ST. SUITE 200 RALEIGH, NC 27603 PH (919) 773-8887 CORP. LICENSE NO.: C-0275	



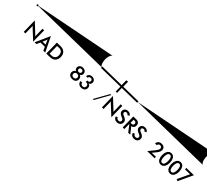
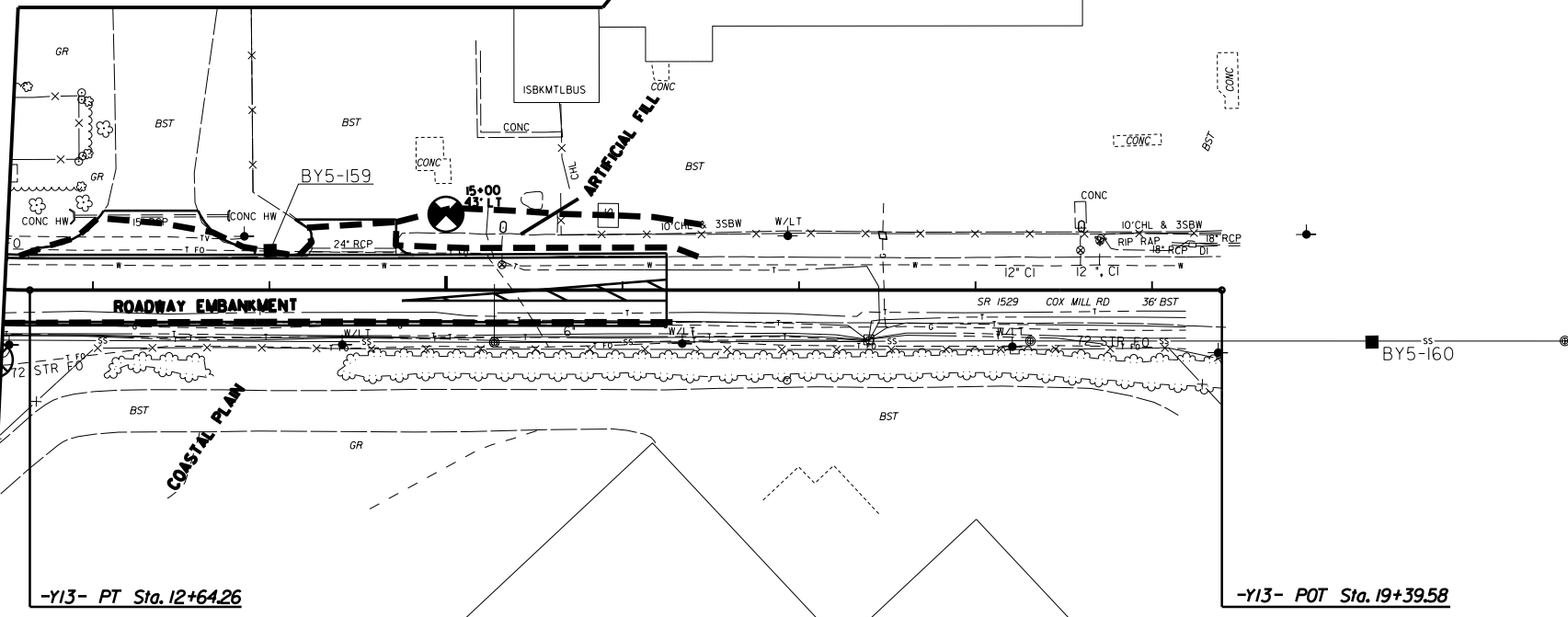





5/14/09

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MATCHLINE -Y13- STA.12+50.00  
SEE SHEET 12



PROJECT REFERENCE NO. <b>R-3830</b>	SHEET NO. <b>27</b>
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR R/W ACQUISITION	
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	
 <b>TGS ENGINEERS</b> 706 HILLSBOROUGH ST. SUITE 200 RALEIGH, NC 27603 PH (919) 773-8887 CORP. LICENSE NO.: C-0275	

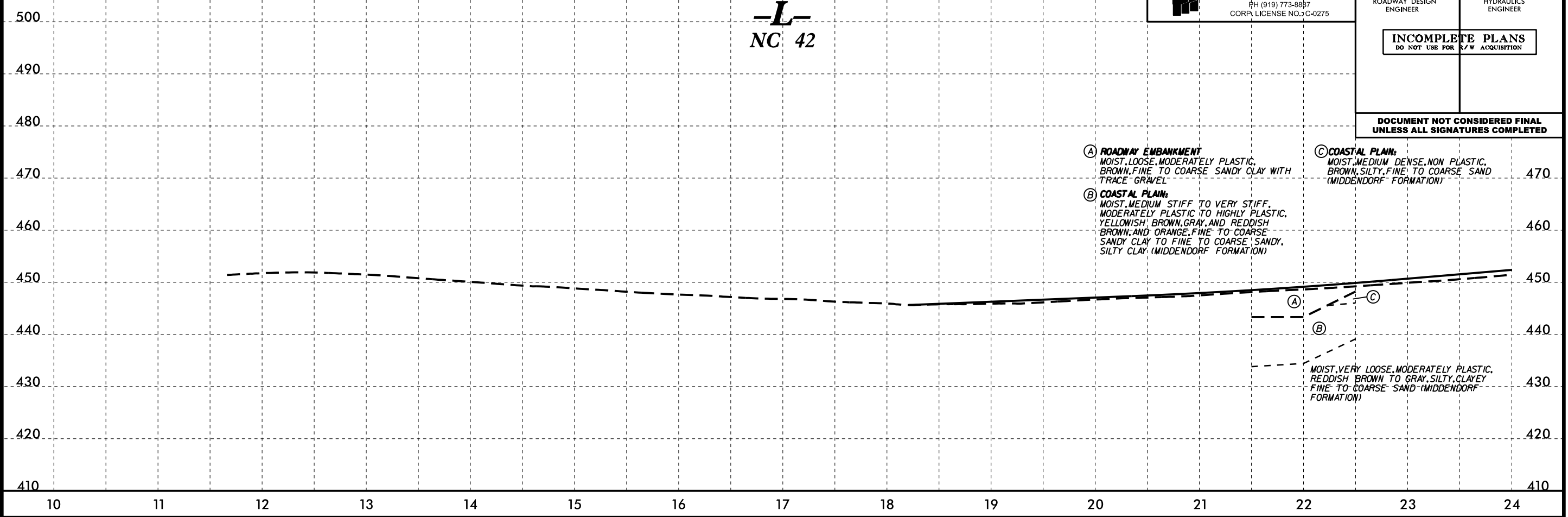
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TGS ENGINEERS  
706 HILLSBOROUGH ST., SUITE 200  
RALEIGH, NC 27603  
PH (919) 773-8887  
CORP. LICENSE NO.: C-0275

PROJECT REFERENCE NO. <b>R-3830</b>	SHEET NO. <b>28</b>
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR R/W ACQUISITION	
<b>DOCUMENT NOT CONSIDERED FINAL</b> UNLESS ALL SIGNATURES COMPLETED	

**-L-**  
NC 42



**PROFILES ARE SHOWN FOR THE FOLLOWING ALIGNMENTS & STATIONS:**

- L- 10+00 TO 24+00**
- L- 79+00 TO 93+00**
- L- 107+00 TO 120+00**
- Y16- 10+00 TO 16+00**

**ALL OTHER PROFILES HAVE BEEN OMITTED**



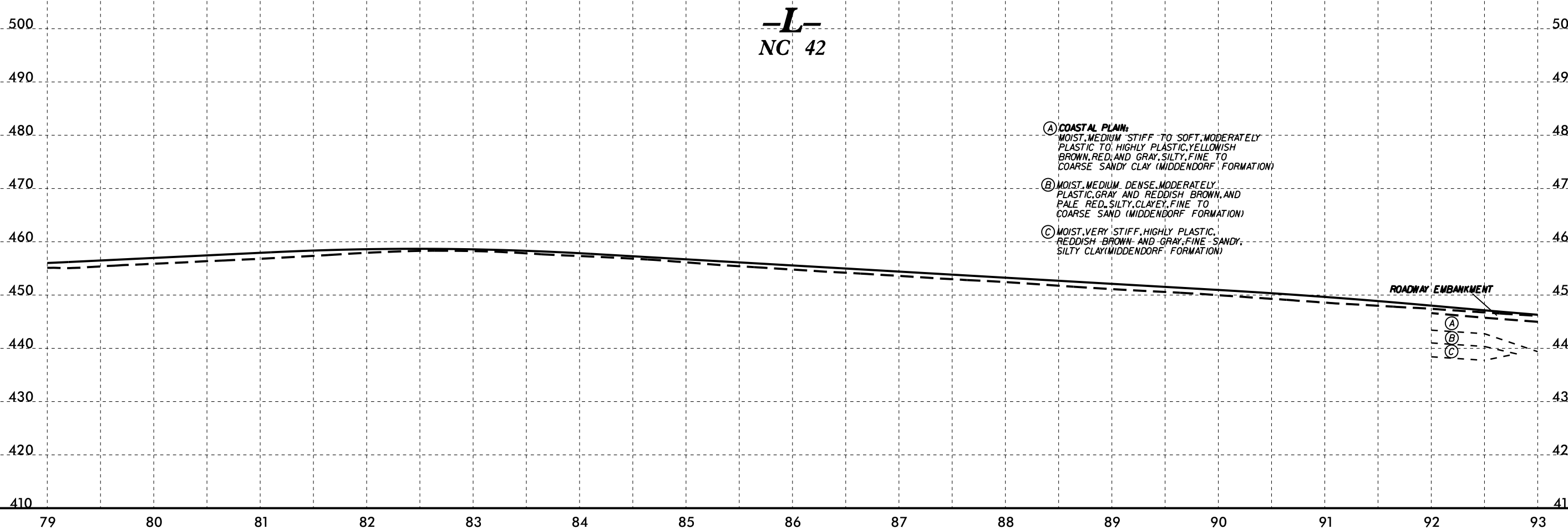
**INCOMPLETE PLANS**  
DO NOT USE FOR R/W ACQUISITION

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

# PROFILES ARE SHOWN FOR THE FOLLOWING ALIGNMENTS & STATIONS:

- L- 10+00 TO 24+00
- L- 79+00 TO 93+00
- L- 107+00 TO 120+00
- Y16- 10+00 TO 16+00

## ALL OTHER PROFILES HAVE BEEN OMITTED



5/28/99



TGS ENGINEERS  
706 HILLSBOROUGH ST., SUITE 200  
RALEIGH, NC 27603  
PH (919) 773-8887  
CORP. LICENSE NO.: C-0275

PROJECT REFERENCE NO.

R-3830

SHEET NO.

30

ROADWAY DESIGN  
ENGINEER

HYDRAULICS  
ENGINEER

**INCOMPLETE PLANS**  
DO NOT USE FOR R/W ACQUISITION

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

# PROFILES ARE SHOWN FOR THE FOLLOWING ALIGNMENTS & STATIONS:

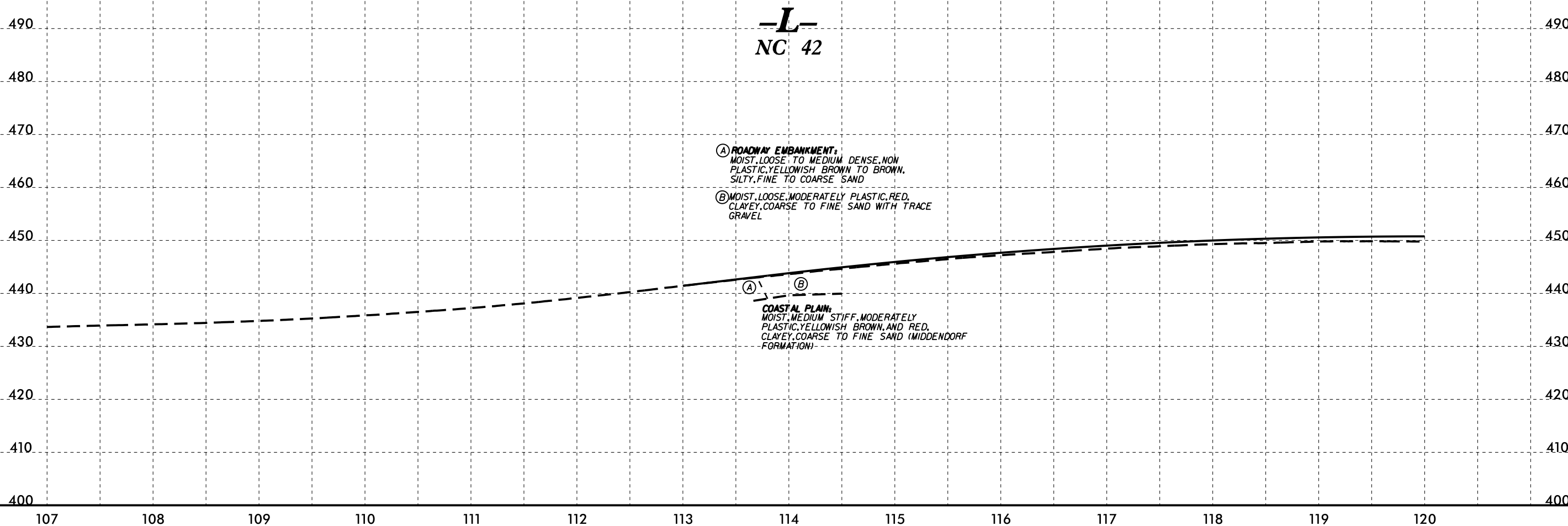
**-L- 10+00 TO 24+00**

**-L- 79+00 TO 93+00**

**-L- 107+00 TO 120+00**

**-Y16- 10+00 TO 16+00**

## ALL OTHER PROFILES HAVE BEEN OMITTED



08-MAY-2017 16:30  
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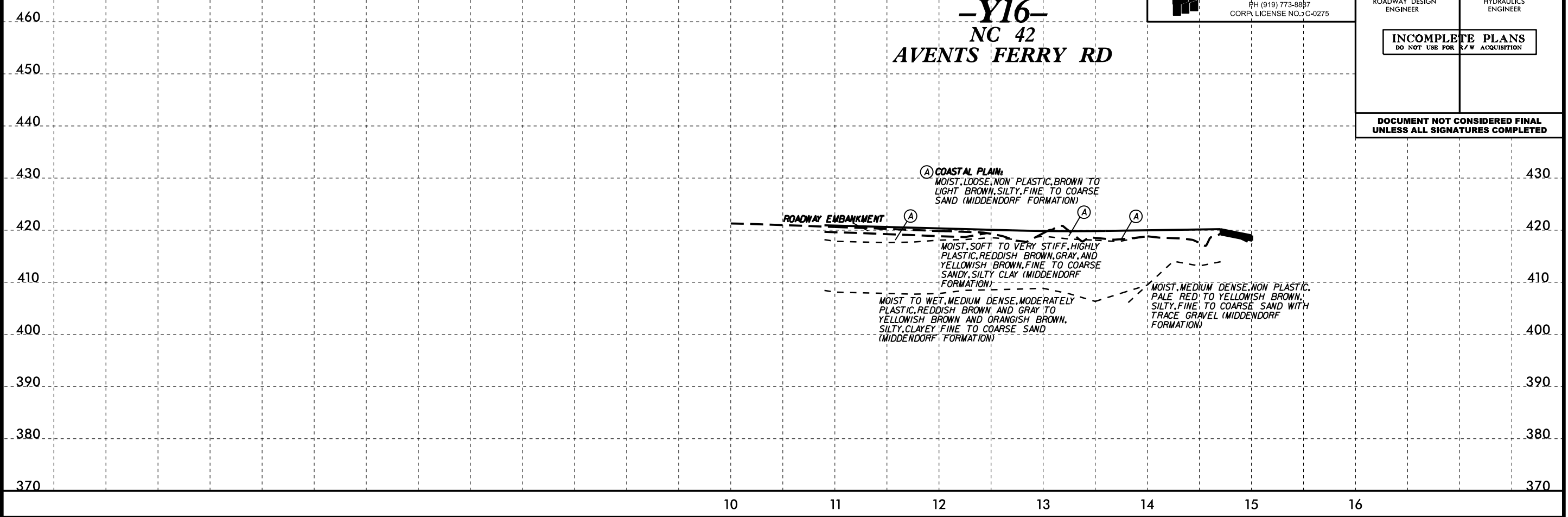
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TGS ENGINEERS  
706 HILLSBOROUGH ST., SUITE 200  
RALEIGH, NC 27603  
PH (919) 773-8887  
CORP. LICENSE NO.: C-0275

PROJECT REFERENCE NO. <b>R-3830</b>	SHEET NO. <b>31</b>
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR R/W ACQUISITION	
<b>DOCUMENT NOT CONSIDERED FINAL</b> UNLESS ALL SIGNATURES COMPLETED	

# -Y16- NC 42 AVENTS FERRY RD



## PROFILES ARE SHOWN FOR THE FOLLOWING ALIGNMENTS & STATIONS:

- L- 10+00 TO 24+00
- L- 79+00 TO 93+00
- L- 107+00 TO 120+00
- Y16- 10+00 TO 16+00

## ALL OTHER PROFILES HAVE BEEN OMITTED

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

470  
460  
450  
440

470  
460  
450  
440

Ⓐ COASTAL PLAIN; MOIST, LOOSE, NON PLASTIC, BROWN AND YELLOWISH BROWN, SILTY, FINE TO COARSE SAND (MIDDENDORF FORMATION)

Ⓐ

ROADWAY EMBANKMENT

4:1

MOIST, VERY STIFF, MODERATELY PLASTIC, REDDISH BROWN, GRAY, AND ORANGE, FINE TO COARSE SANDY, SILTY CLAY (MIDDENDORF FORMATION)

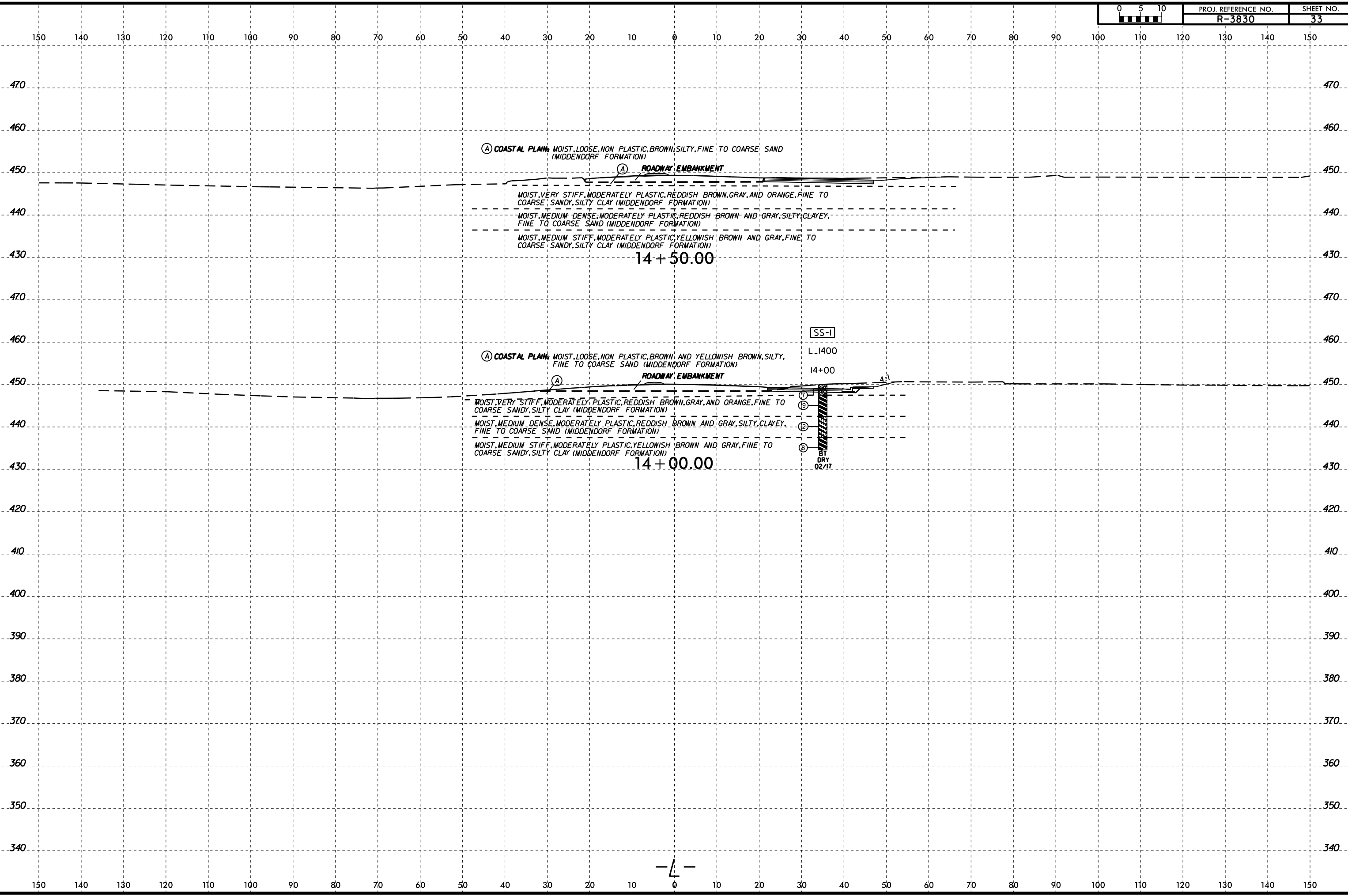
MOIST, MEDIUM DENSE, MODERATELY PLASTIC, REDDISH BROWN AND GRAY, SILTY, CLAYEY, FINE TO COARSE SAND (MIDDENDORF FORMATION)

MOIST, MEDIUM STIFF, MODERATELY PLASTIC, YELLOWISH BROWN AND GRAY, FINE TO COARSE SANDY, SILTY CLAY (MIDDENDORF FORMATION)

13 + 50.00



08-MAY-2017 15:02  
W:\shober\GEO\TECHNICAL\Projects\Active Projects\2015\1548\037A R-3830 Roadway\VR3830\_GEO\_ROW\CADD\_GEO\TECH\ssc\VR3830\_GEO\_xsl\_L\_1.dgn  
A1 KA206660  
Bo Johnson



(A) COASTAL PLAIN: MOIST, LOOSE, NON PLASTIC, BROWN, SILTY, FINE TO COARSE SAND (MIDDENDORF FORMATION)

(A) ROADWAY EMBANKMENT

MOIST, VERY STIFF, MODERATELY PLASTIC, REDDISH BROWN, GRAY, AND ORANGE, FINE TO COARSE SANDY, SILTY CLAY (MIDDENDORF FORMATION)

MOIST, MEDIUM DENSE, MODERATELY PLASTIC, REDDISH BROWN AND GRAY, SILTY, CLAYEY, FINE TO COARSE SAND (MIDDENDORF FORMATION)

MOIST, MEDIUM STIFF, MODERATELY PLASTIC, YELLOWISH BROWN AND GRAY, FINE TO COARSE SANDY, SILTY CLAY (MIDDENDORF FORMATION)

14+50.00

(A) COASTAL PLAIN: MOIST, LOOSE, NON PLASTIC, BROWN AND YELLOWISH BROWN, SILTY, FINE TO COARSE SAND (MIDDENDORF FORMATION)

(A) ROADWAY EMBANKMENT

MOIST, VERY STIFF, MODERATELY PLASTIC, REDDISH BROWN, GRAY, AND ORANGE, FINE TO COARSE SANDY, SILTY CLAY (MIDDENDORF FORMATION)

MOIST, MEDIUM DENSE, MODERATELY PLASTIC, REDDISH BROWN AND GRAY, SILTY, CLAYEY, FINE TO COARSE SAND (MIDDENDORF FORMATION)

MOIST, MEDIUM STIFF, MODERATELY PLASTIC, YELLOWISH BROWN AND GRAY, FINE TO COARSE SANDY, SILTY CLAY (MIDDENDORF FORMATION)

14+00.00

SS-1

L.1400

14+00

1

19

12

8

BT

DRY

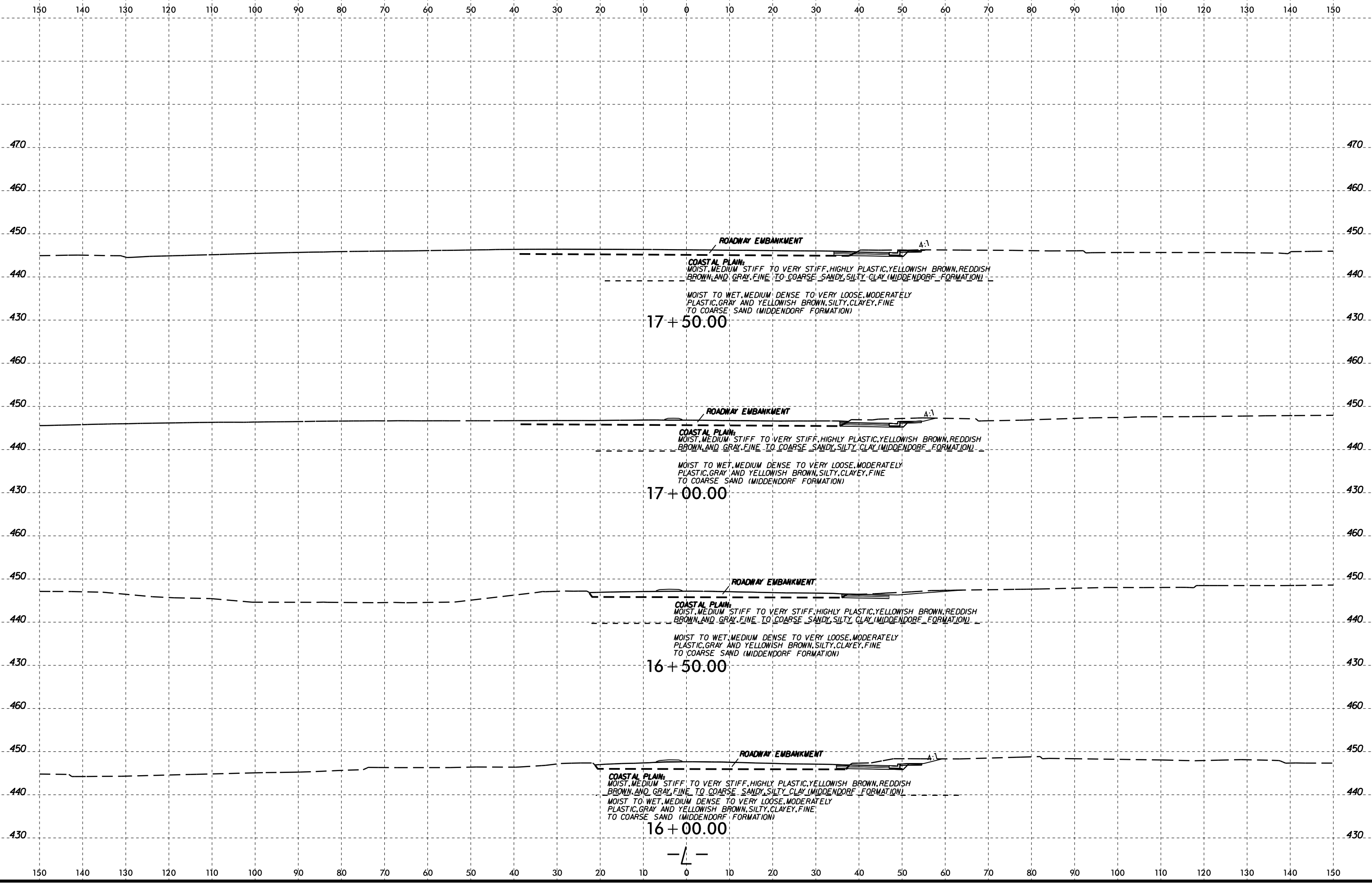
02/17

4:1

-L-

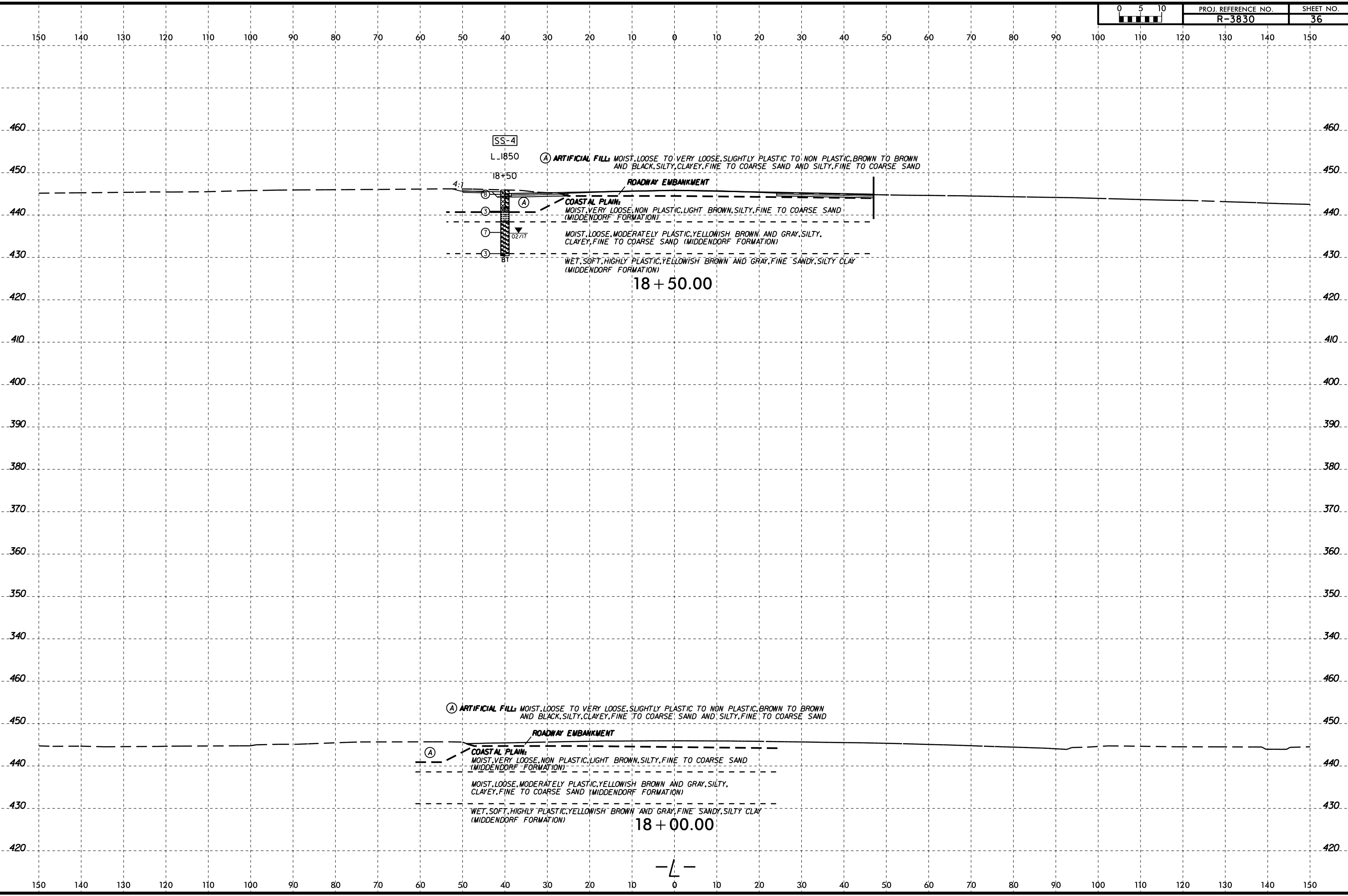






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D:\Johnson



SS-4

L-1850

18+50

(A) ARTIFICIAL FILL; MOIST, LOOSE TO VERY LOOSE, SLIGHTLY PLASTIC TO NON PLASTIC, BROWN TO BROWN AND BLACK, SILTY, CLAYEY, FINE TO COARSE SAND AND SILTY, FINE TO COARSE SAND

ROADWAY EMBANKMENT

COASTAL PLAIN; MOIST, VERY LOOSE, NON PLASTIC, LIGHT BROWN, SILTY, FINE TO COARSE SAND (MIDDENDORF FORMATION)

MOIST, LOOSE, MODERATELY PLASTIC, YELLOWISH BROWN AND GRAY, SILTY, CLAYEY, FINE TO COARSE SAND (MIDDENDORF FORMATION)

WET, SOFT, HIGHLY PLASTIC, YELLOWISH BROWN AND GRAY, FINE SANDY, SILTY CLAY (MIDDENDORF FORMATION)

18 + 50.00

(A) ARTIFICIAL FILL; MOIST, LOOSE TO VERY LOOSE, SLIGHTLY PLASTIC TO NON PLASTIC, BROWN TO BROWN AND BLACK, SILTY, CLAYEY, FINE TO COARSE SAND AND SILTY, FINE TO COARSE SAND

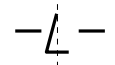
ROADWAY EMBANKMENT

COASTAL PLAIN; MOIST, VERY LOOSE, NON PLASTIC, LIGHT BROWN, SILTY, FINE TO COARSE SAND (MIDDENDORF FORMATION)

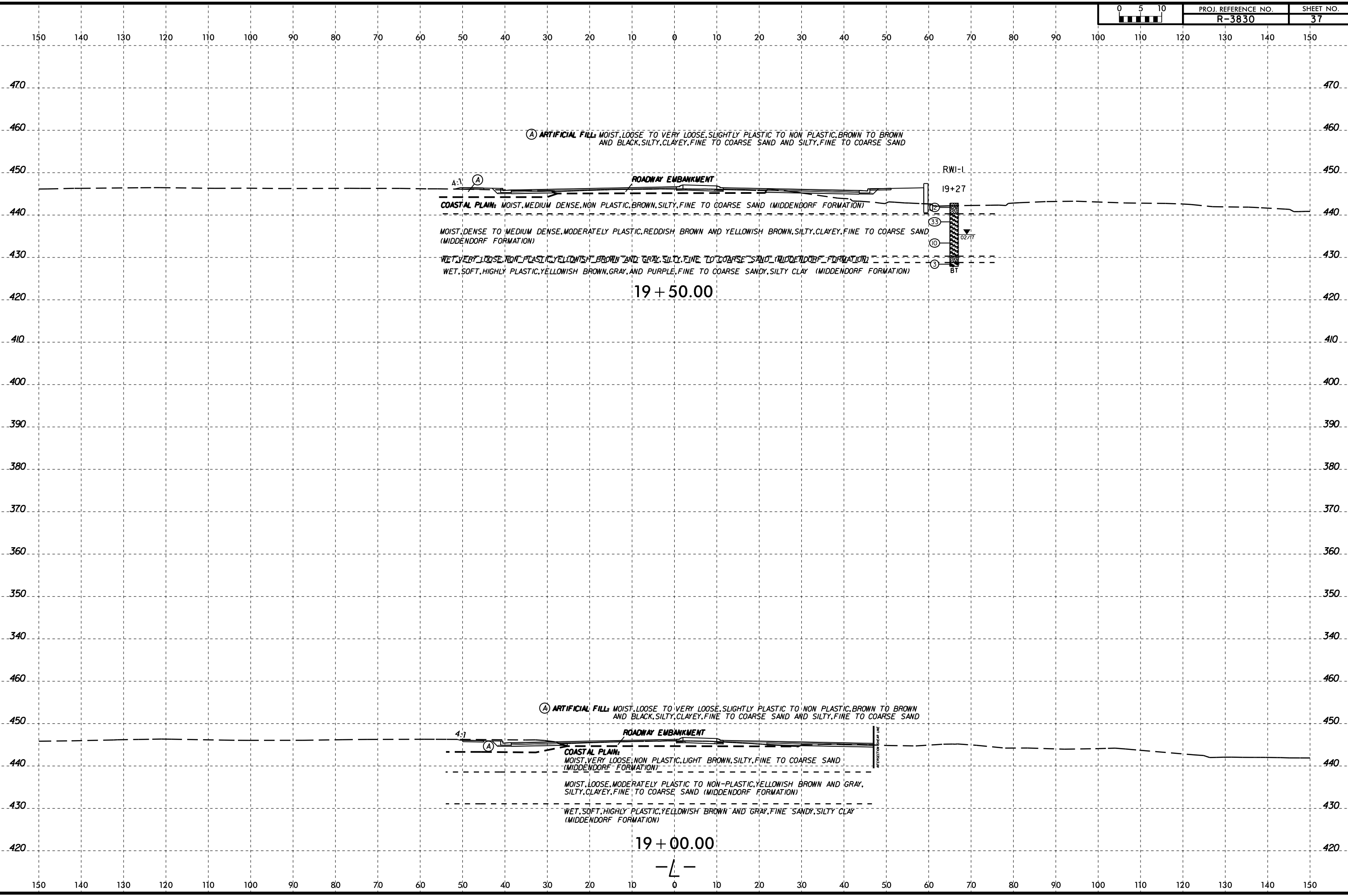
MOIST, LOOSE, MODERATELY PLASTIC, YELLOWISH BROWN AND GRAY, SILTY, CLAYEY, FINE TO COARSE SAND (MIDDENDORF FORMATION)

WET, SOFT, HIGHLY PLASTIC, YELLOWISH BROWN AND GRAY, FINE SANDY, SILTY CLAY (MIDDENDORF FORMATION)

18 + 00.00



08-MAY-2017 15:02  
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A1 KA26660  
Bo Johnson



(A) ARTIFICIAL FILL: MOIST, LOOSE TO VERY LOOSE, SLIGHTLY PLASTIC TO NON PLASTIC, BROWN TO BROWN AND BLACK, SILTY, CLAYEY, FINE TO COARSE SAND AND SILTY, FINE TO COARSE SAND

ROADWAY EMBANKMENT  
COASTAL PLAIN: MOIST, MEDIUM DENSE, NON PLASTIC, BROWN, SILTY, FINE TO COARSE SAND (MIDDENDORF FORMATION)

MOIST, DENSE TO MEDIUM DENSE, MODERATELY PLASTIC, REDDISH BROWN AND YELLOWISH BROWN, SILTY, CLAYEY, FINE TO COARSE SAND (MIDDENDORF FORMATION)

WET, VERY LOOSE, NON PLASTIC, YELLOWISH BROWN AND GRAY, SILTY, FINE TO COARSE SAND (MIDDENDORF FORMATION)  
WET, SOFT, HIGHLY PLASTIC, YELLOWISH BROWN, GRAY, AND PURPLE, FINE TO COARSE SANDY, SILTY CLAY (MIDDENDORF FORMATION)

RWI-L

19+27

33

10

5

BT

19 + 50.00

(A) ARTIFICIAL FILL: MOIST, LOOSE TO VERY LOOSE, SLIGHTLY PLASTIC TO NON PLASTIC, BROWN TO BROWN AND BLACK, SILTY, CLAYEY, FINE TO COARSE SAND AND SILTY, FINE TO COARSE SAND

ROADWAY EMBANKMENT  
COASTAL PLAIN: MOIST, VERY LOOSE, NON PLASTIC, LIGHT BROWN, SILTY, FINE TO COARSE SAND (MIDDENDORF FORMATION)

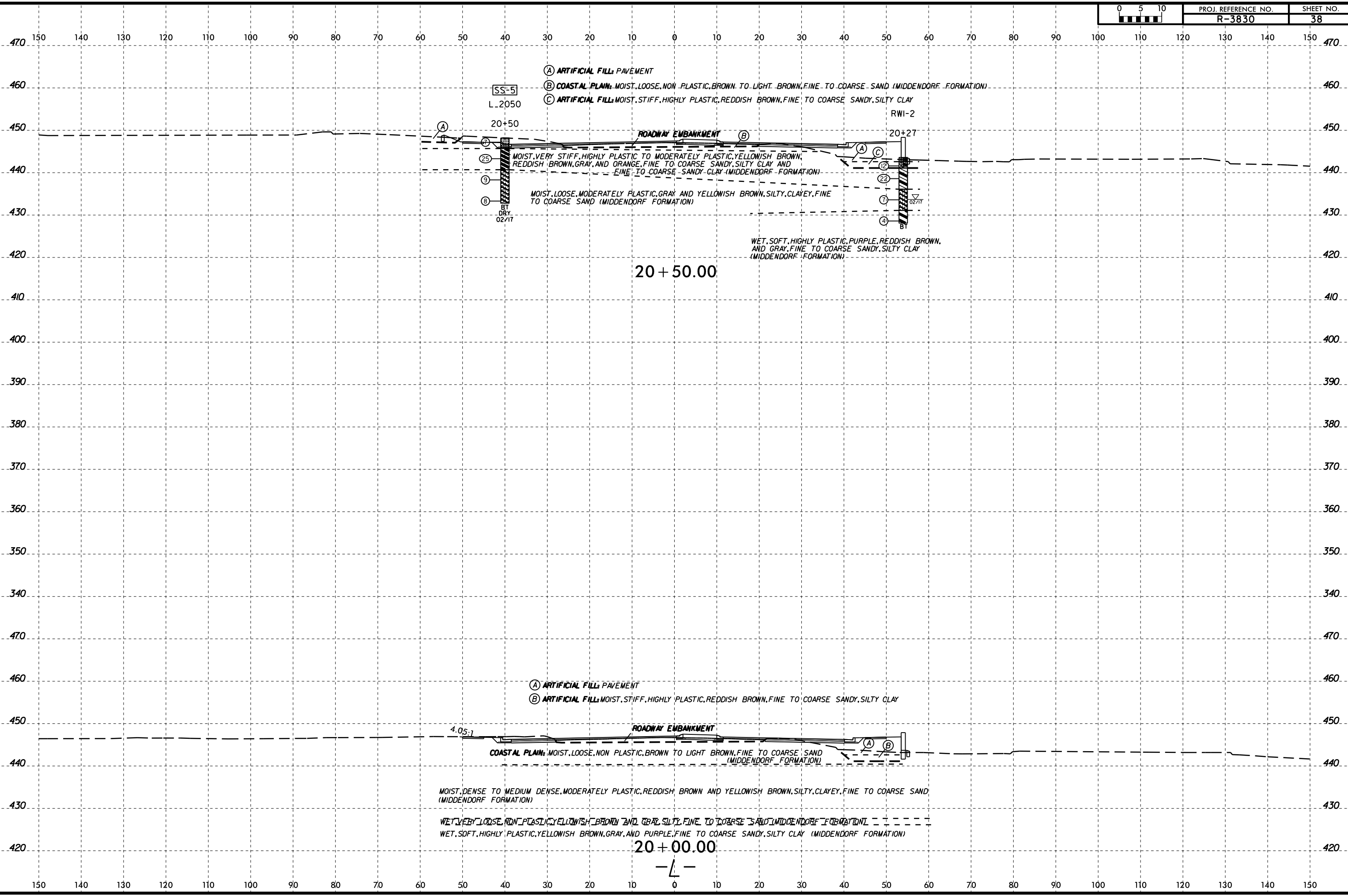
MOIST, LOOSE, MODERATELY PLASTIC TO NON-PLASTIC, YELLOWISH BROWN AND GRAY, SILTY, CLAYEY, FINE TO COARSE SAND (MIDDENDORF FORMATION)

WET, SOFT, HIGHLY PLASTIC, YELLOWISH BROWN AND GRAY, FINE SANDY, SILTY CLAY (MIDDENDORF FORMATION)

19 + 00.00

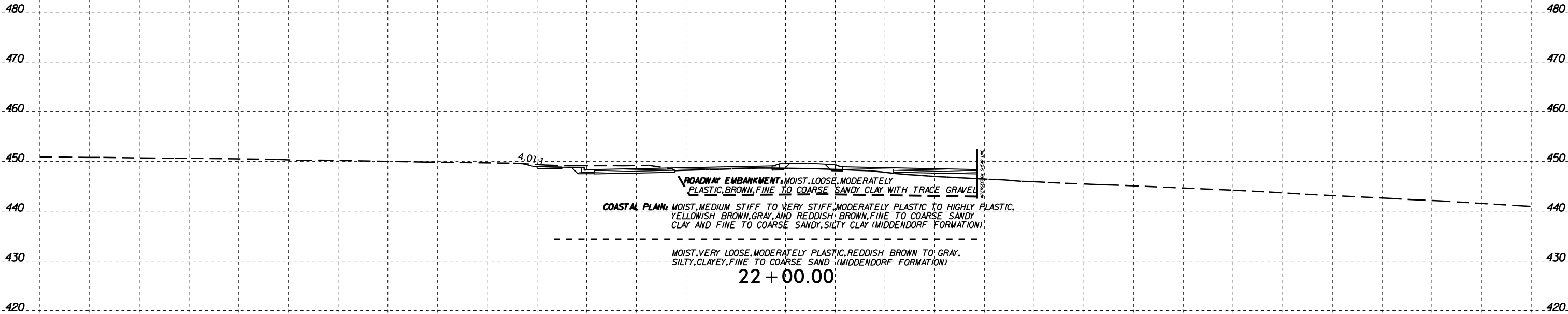
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Bohannon





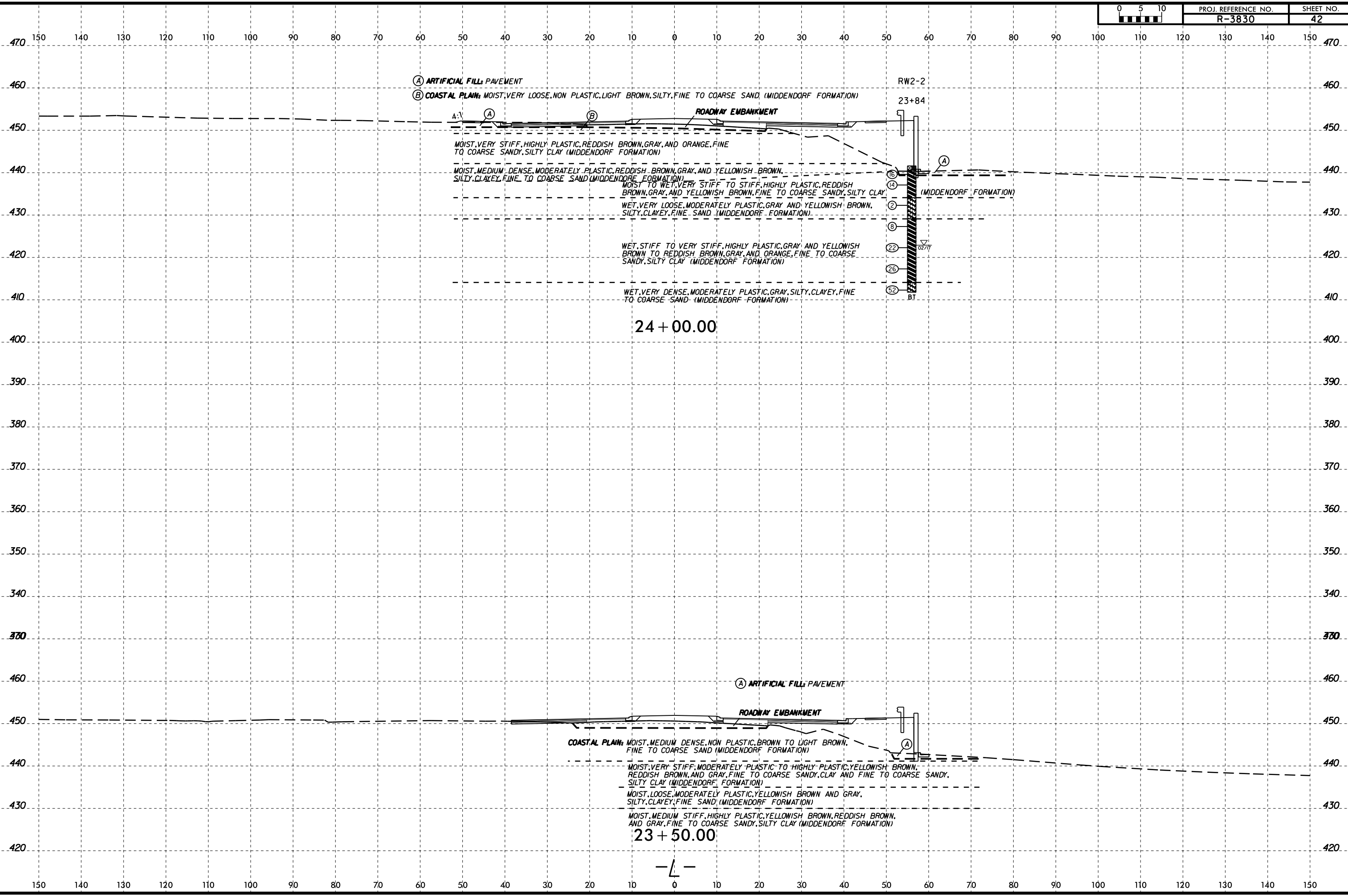
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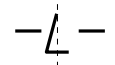


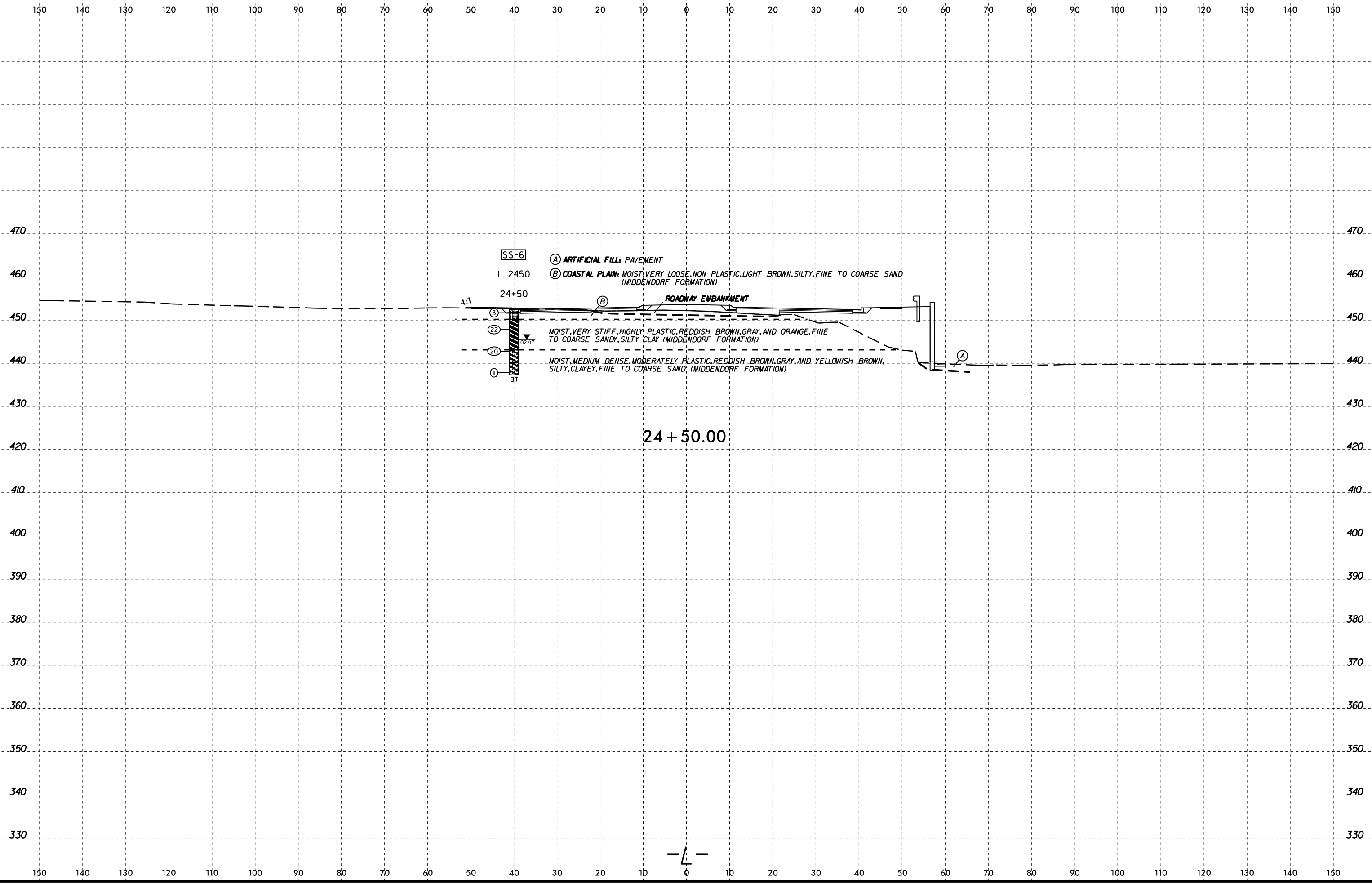
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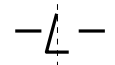
24 + 00.00

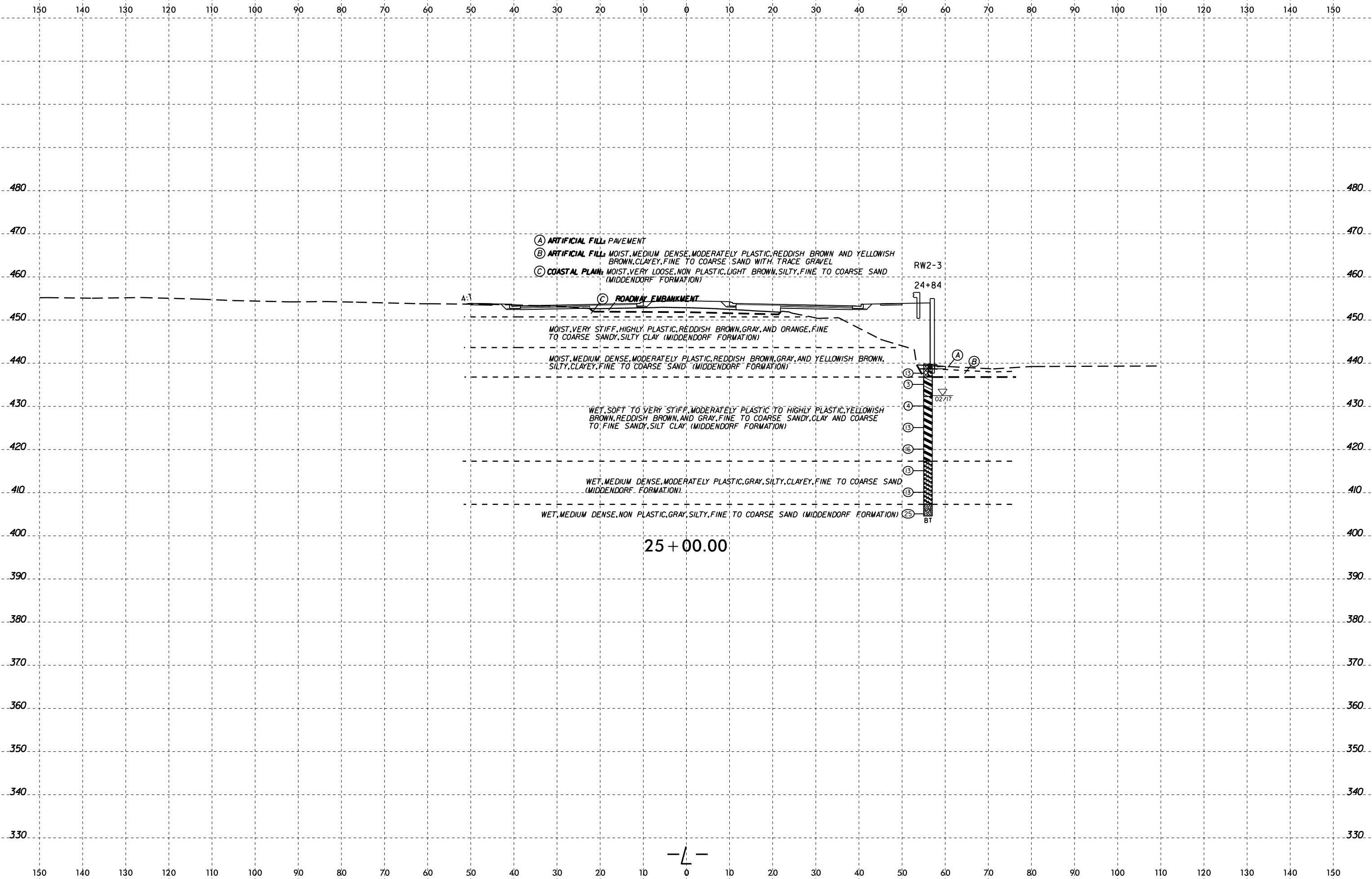
23 + 50.00





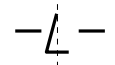
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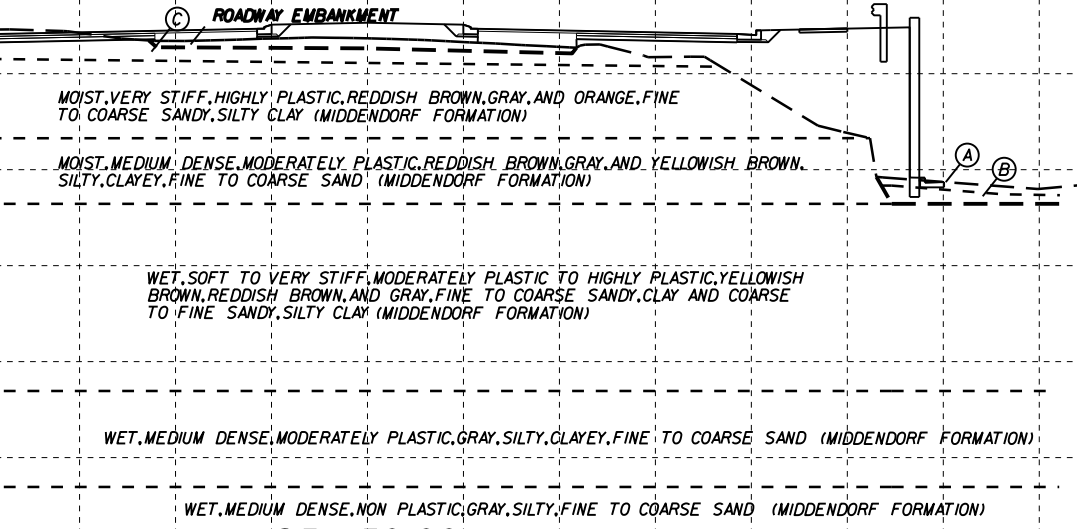
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25 + 00.00

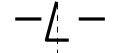


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- (A) ARTIFICIAL FILL: PAVEMENT
- (B) ARTIFICIAL FILL: MOIST, MEDIUM DENSE, MODERATELY PLASTIC, REDDISH BROWN AND YELLOWISH BROWN, CLAYEY, FINE TO COARSE SAND WITH TRACE GRAVEL
- (C) COASTAL PLAIN: MOIST, VERY LOOSE, NON PLASTIC, LIGHT BROWN, SILTY, FINE TO COARSE SAND (MIDDENDORF FORMATION)

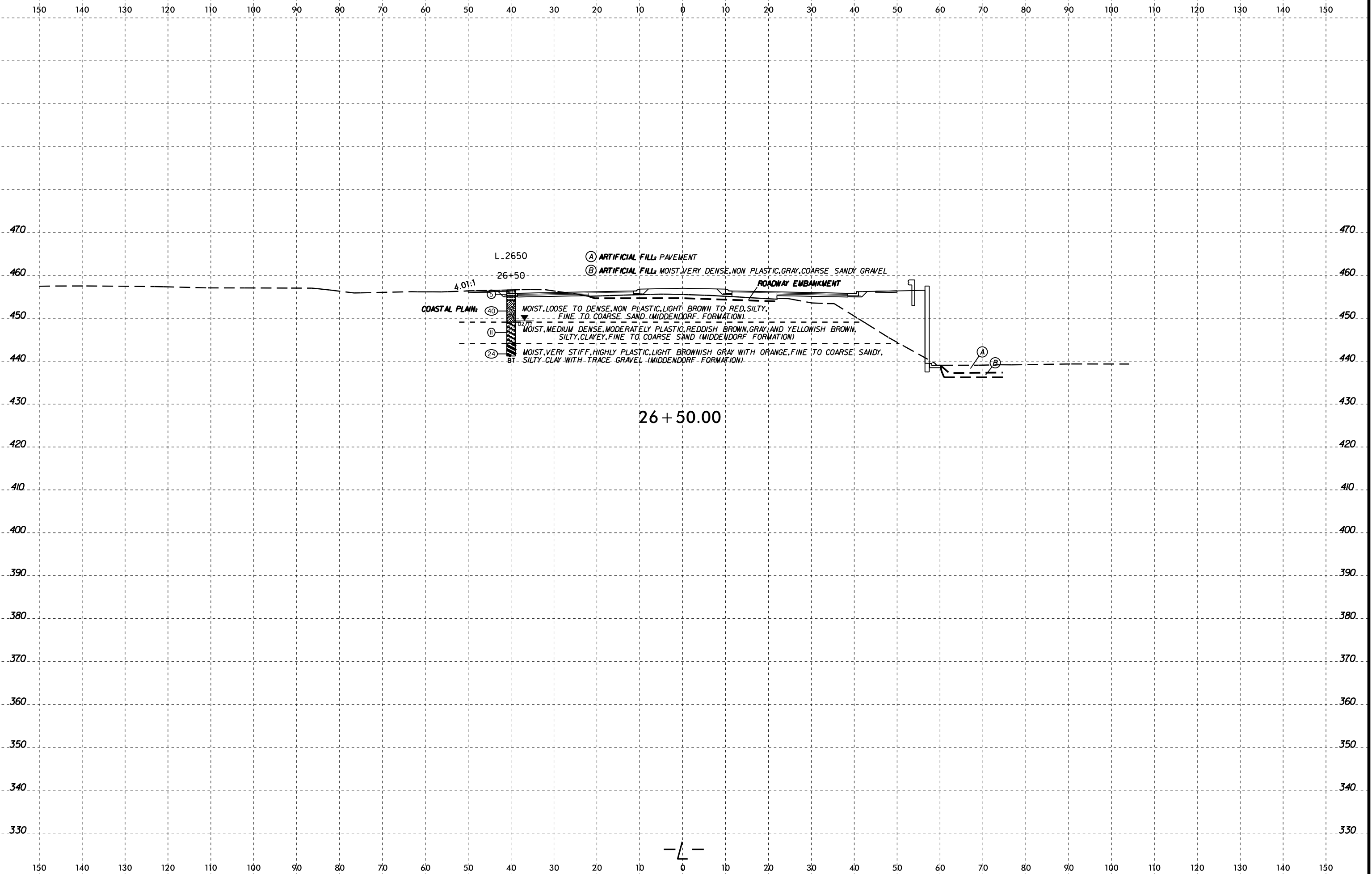


25 + 50.00

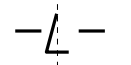


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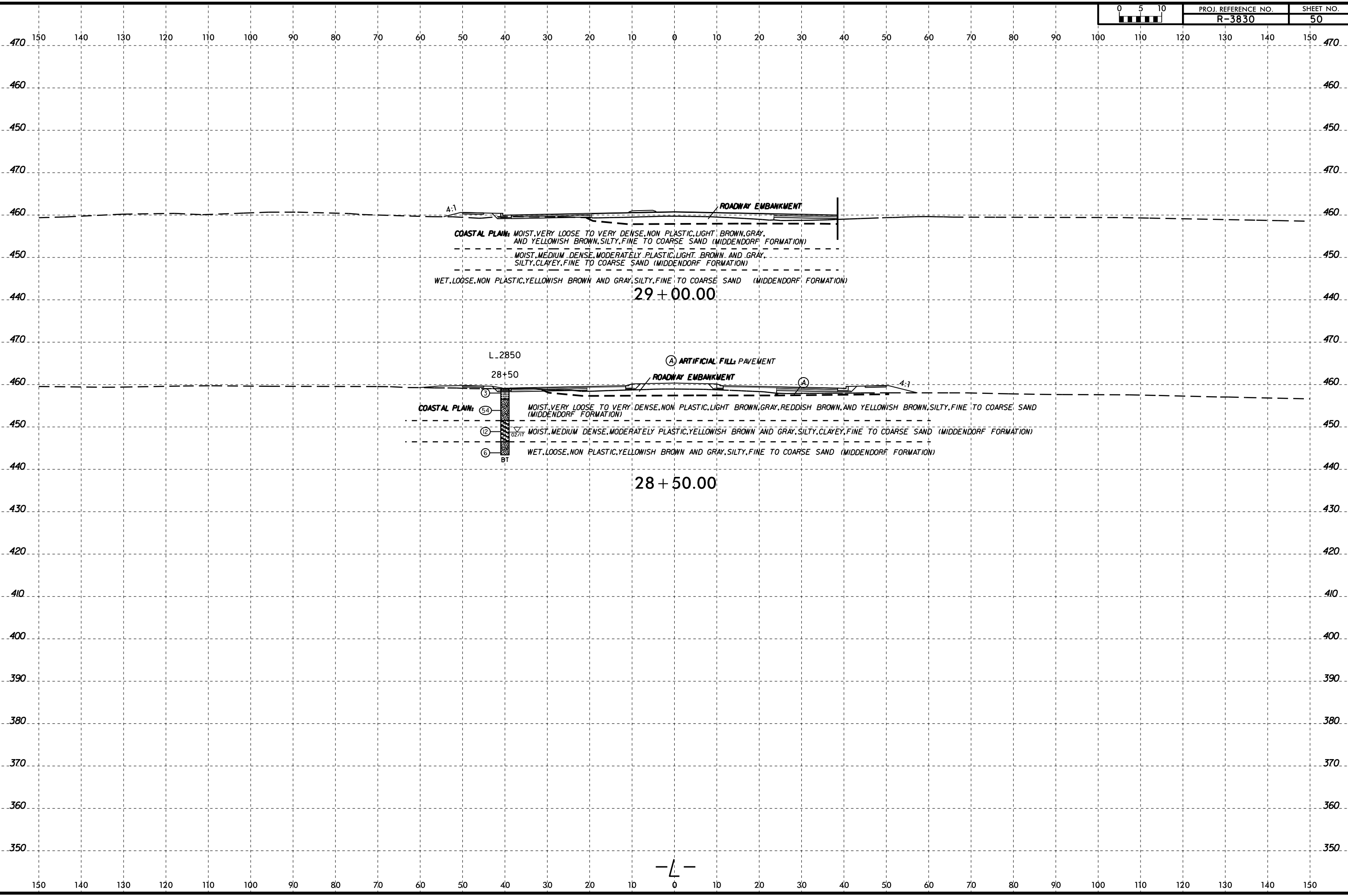




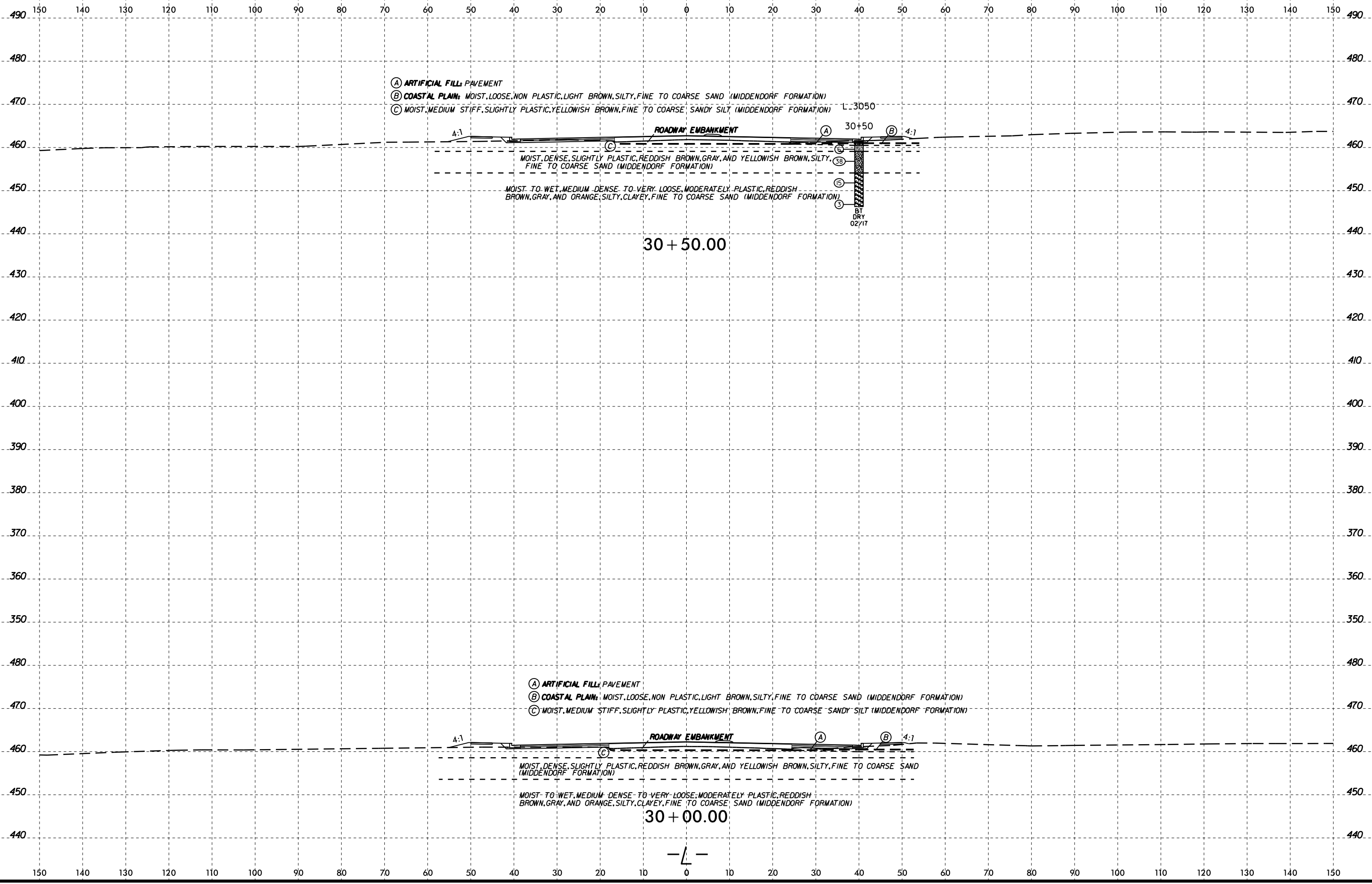




6/23/16  
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D:\Johnson

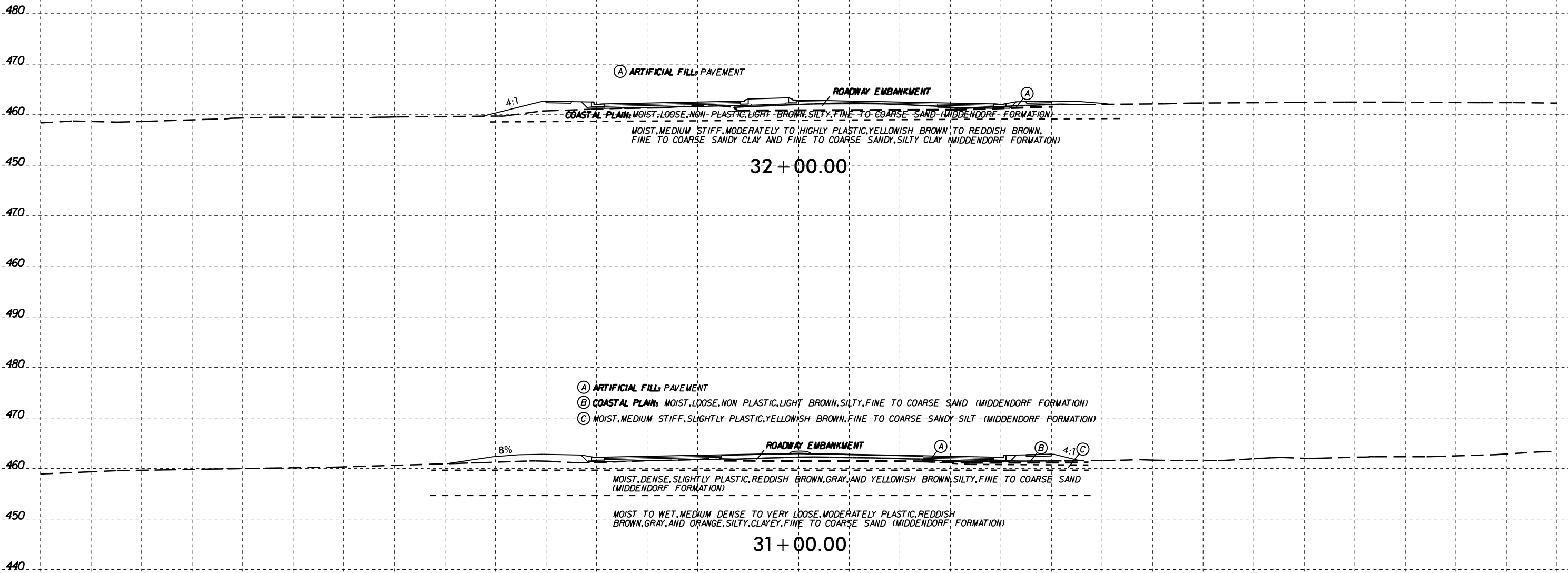


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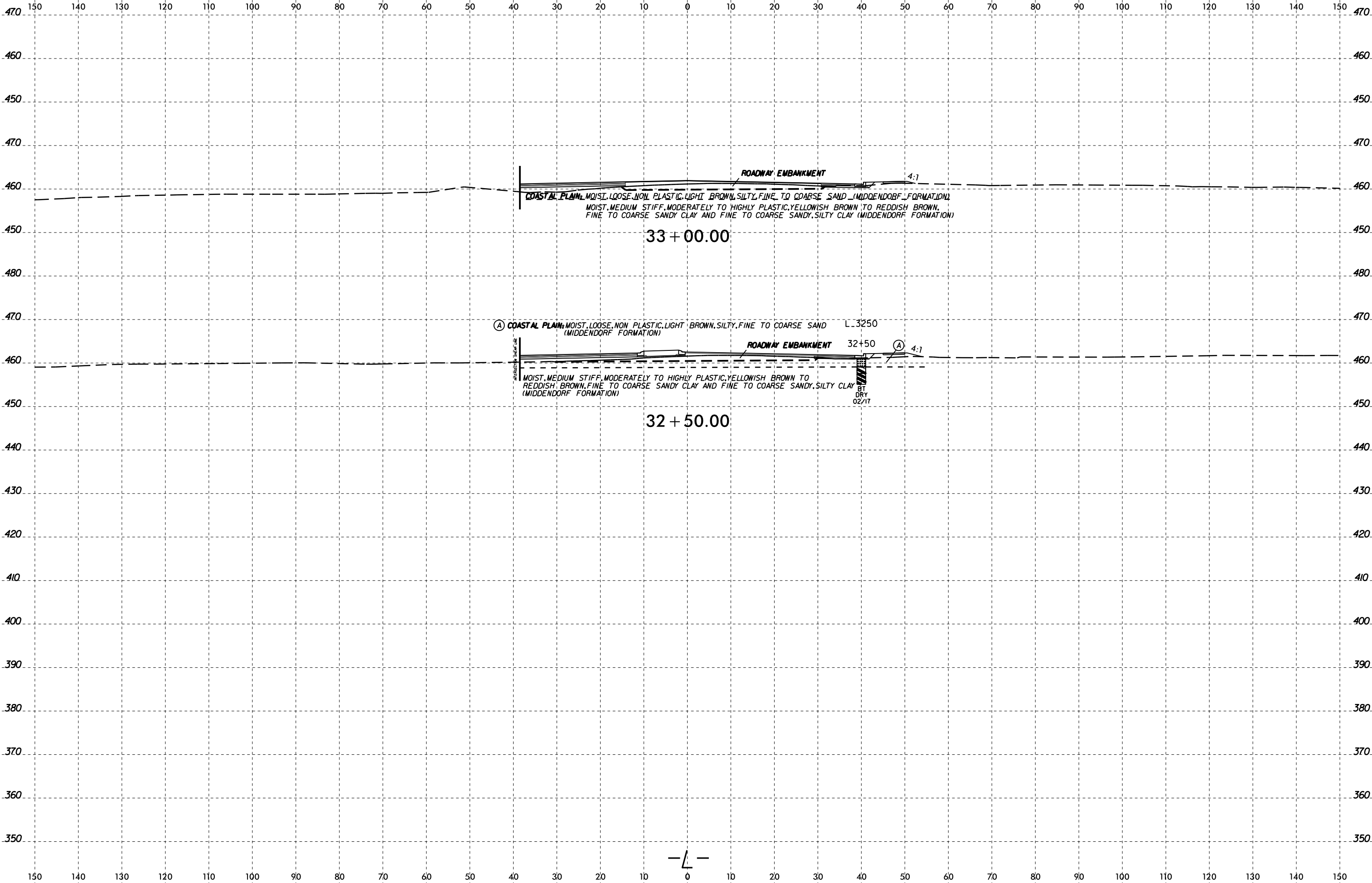




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ROADWAY EMBANKMENT 4:1  
COASTAL PLAIN, MOIST, LOOSE, NON PLASTIC, LIGHT BROWN, SILTY, FINE TO COARSE SAND (MIDDENDORF FORMATION)  
MOIST, MEDIUM STIFF, MODERATELY TO HIGHLY PLASTIC, YELLOWISH BROWN TO REDDISH BROWN,  
FINE TO COARSE SANDY CLAY AND FINE TO COARSE SANDY, SILTY CLAY (MIDDENDORF FORMATION)

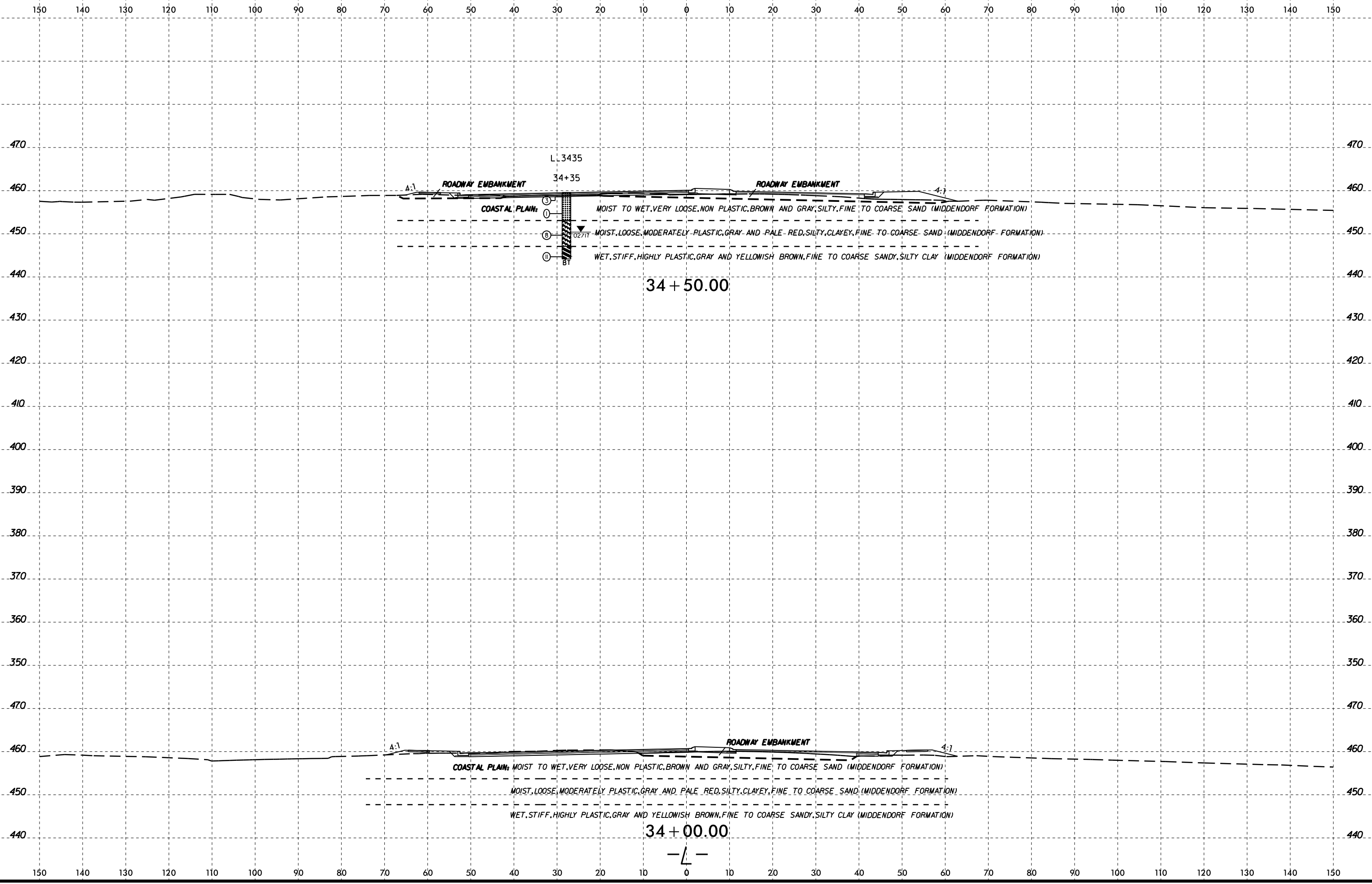
33 + 00.00

(A) COASTAL PLAIN, MOIST, LOOSE, NON PLASTIC, LIGHT BROWN, SILTY, FINE TO COARSE SAND (MIDDENDORF FORMATION) L-3250

ROADWAY EMBANKMENT 4:1  
MOIST, MEDIUM STIFF, MODERATELY TO HIGHLY PLASTIC, YELLOWISH BROWN TO REDDISH BROWN, FINE TO COARSE SANDY CLAY AND FINE TO COARSE SANDY, SILTY CLAY (MIDDENDORF FORMATION)  
BT  
DRY  
02/17

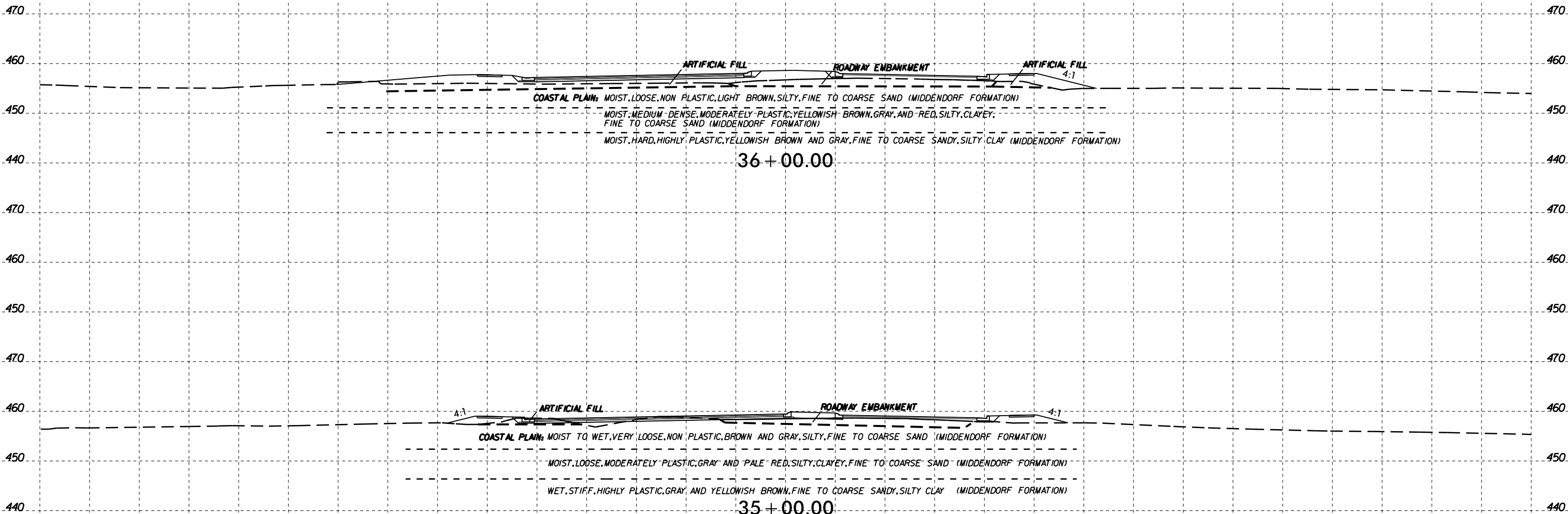
32 + 50.00





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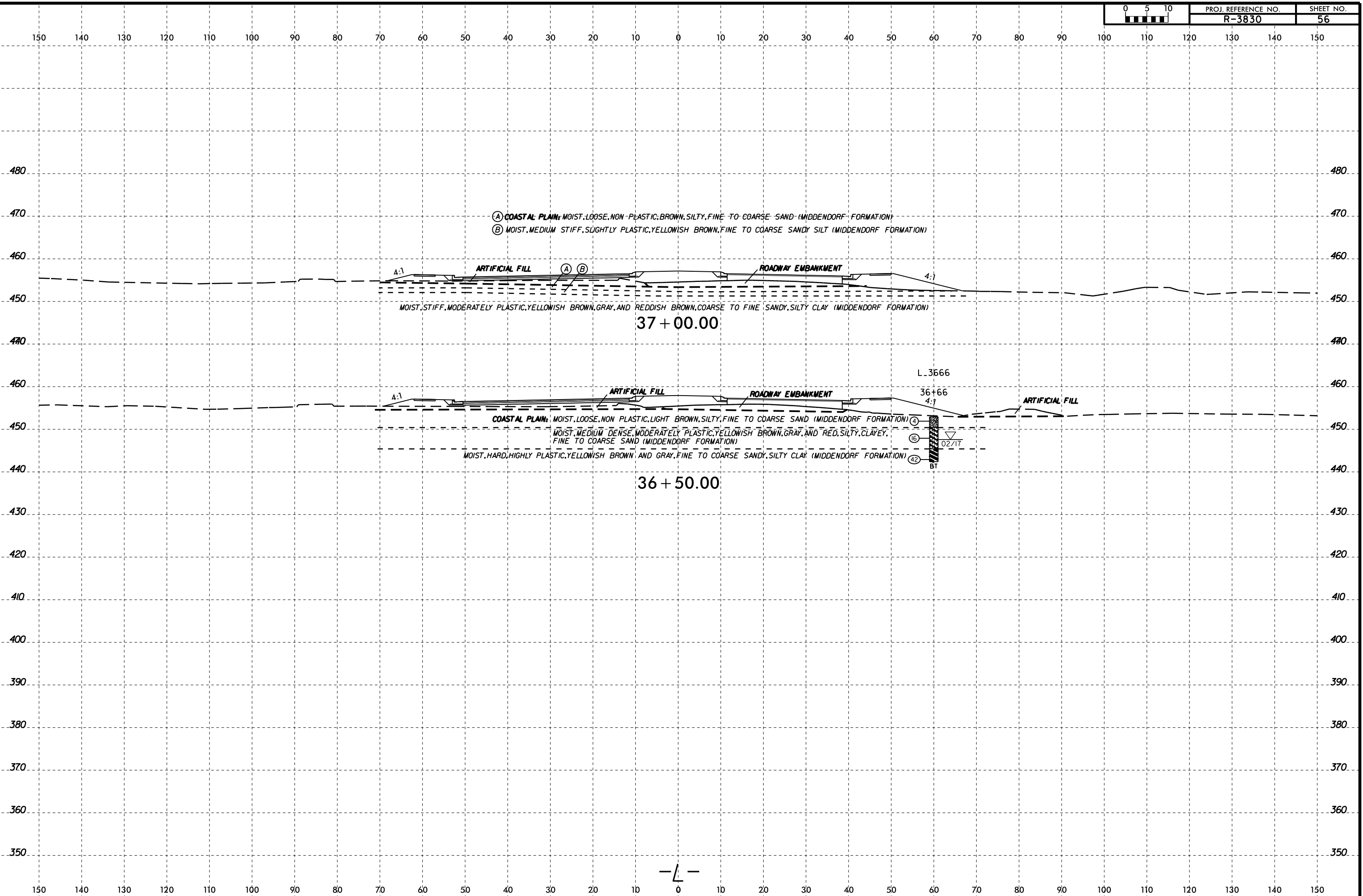
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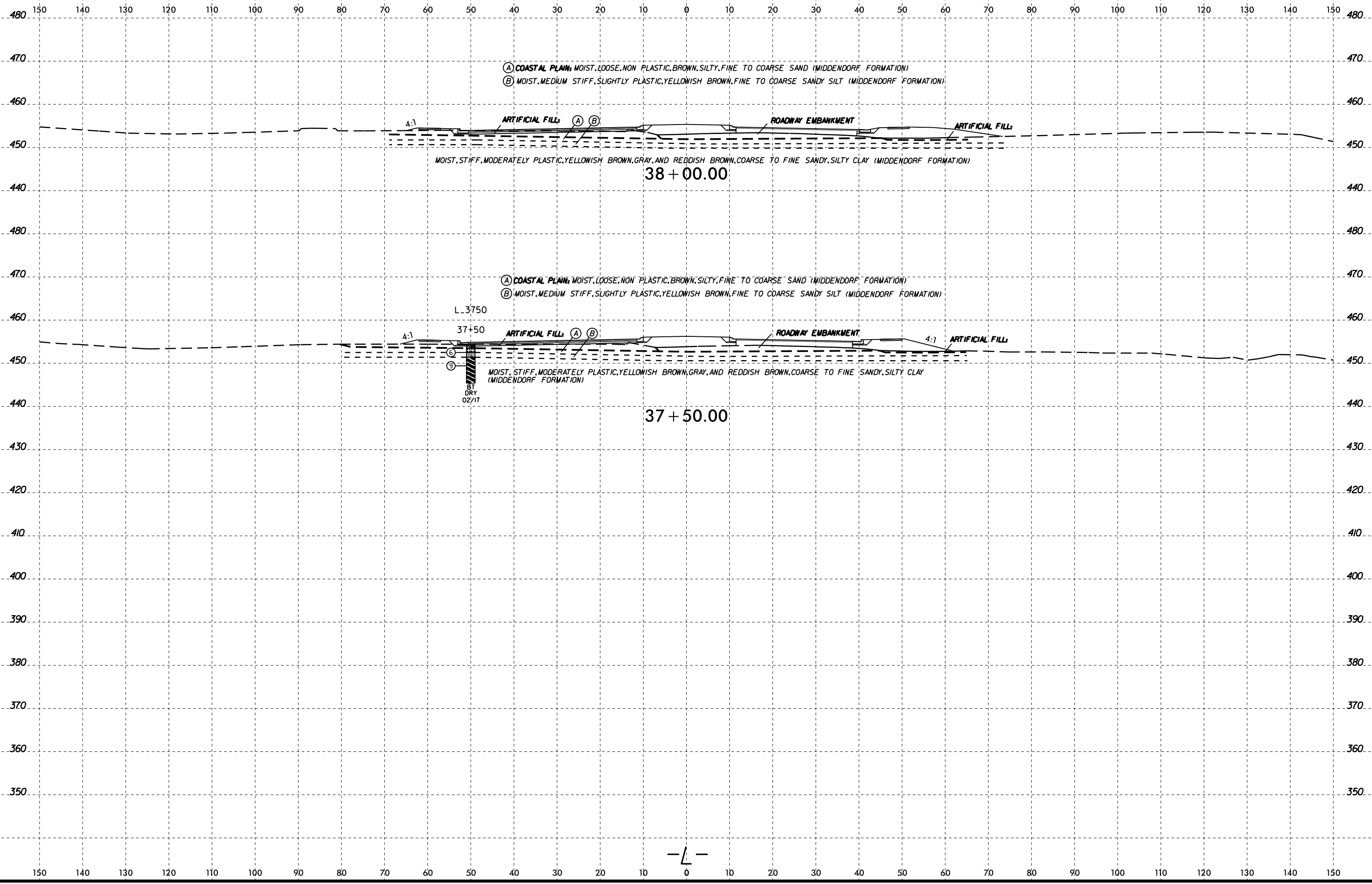
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6/23/16

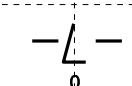


(A) COASTAL PLAIN; MOIST, LOOSE, NON PLASTIC, BROWN, SILTY, FINE TO COARSE SAND (MIDDENDORF FORMATION)  
(B) MOIST, MEDIUM STIFF, SLIGHTLY PLASTIC, YELLOWISH BROWN, FINE TO COARSE SANDY SILT (MIDDENDORF FORMATION)

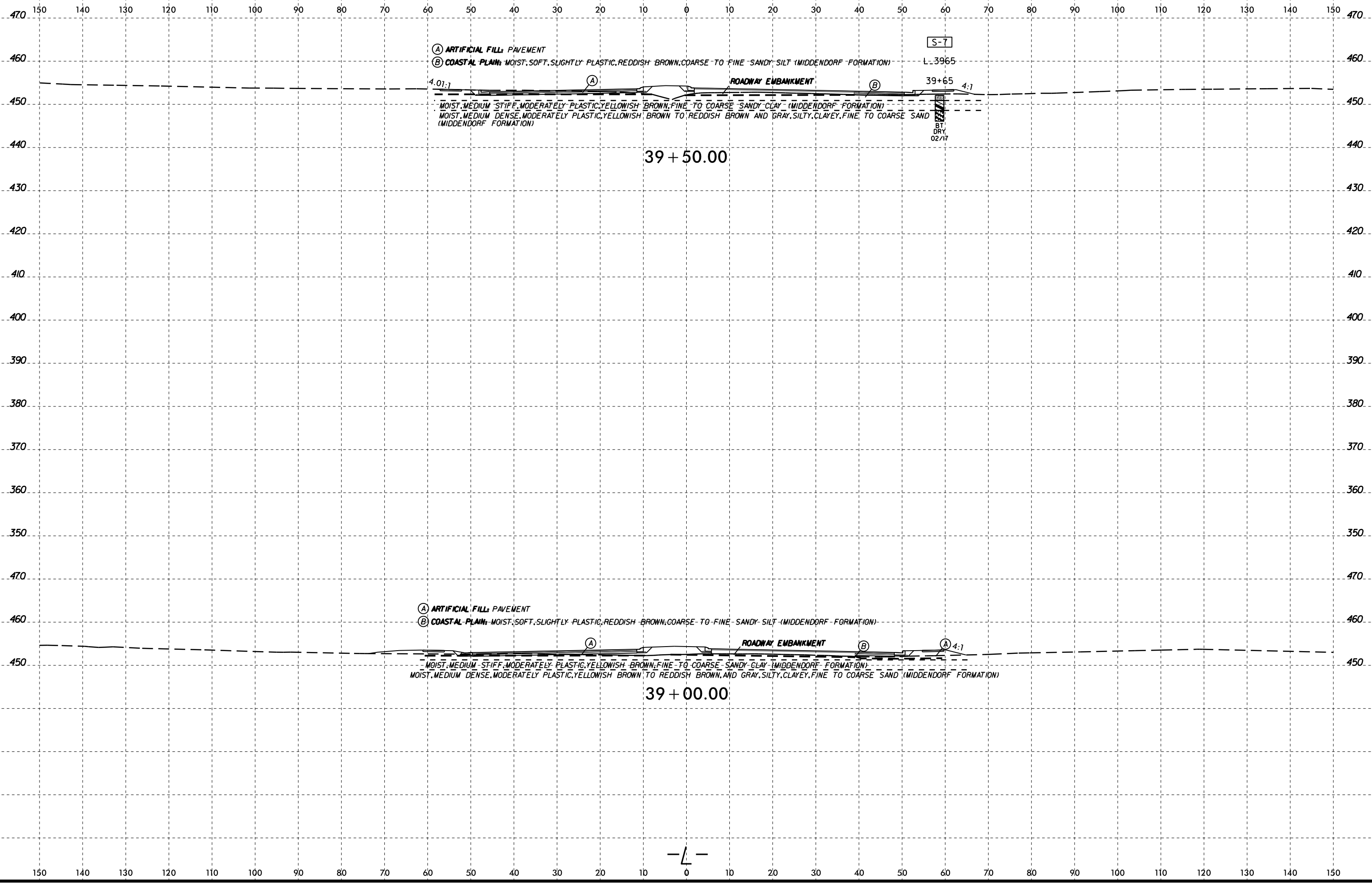
ARTIFICIAL FILL (A) (B)  
ROADWAY EMBANKMENT  
MOIST, STIFF, MODERATELY PLASTIC, YELLOWISH BROWN, GRAY, AND REDDISH BROWN, COARSE TO FINE SANDY, SILTY CLAY (MIDDENDORF FORMATION)  
38 + 00.00

(A) COASTAL PLAIN; MOIST, LOOSE, NON PLASTIC, BROWN, SILTY, FINE TO COARSE SAND (MIDDENDORF FORMATION)  
(B) MOIST, MEDIUM STIFF, SLIGHTLY PLASTIC, YELLOWISH BROWN, FINE TO COARSE SANDY SILT (MIDDENDORF FORMATION)

L=3750  
37+50  
ARTIFICIAL FILL (A) (B)  
ROADWAY EMBANKMENT  
4:1  
ARTIFICIAL FILL  
MOIST, STIFF, MODERATELY PLASTIC, YELLOWISH BROWN, GRAY, AND REDDISH BROWN, COARSE TO FINE SANDY, SILTY CLAY (MIDDENDORF FORMATION)  
BT DRY 02/17  
37 + 50.00





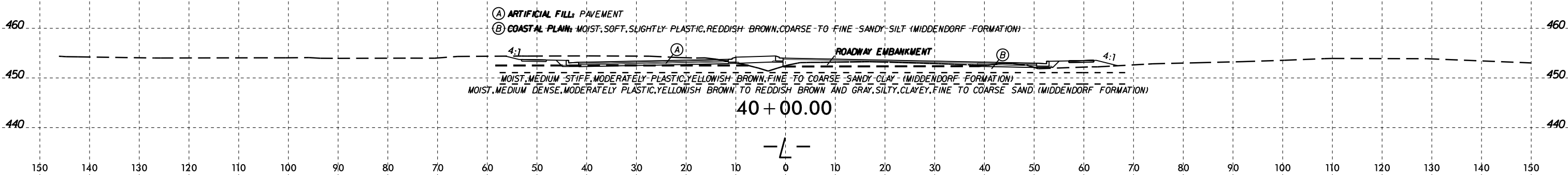
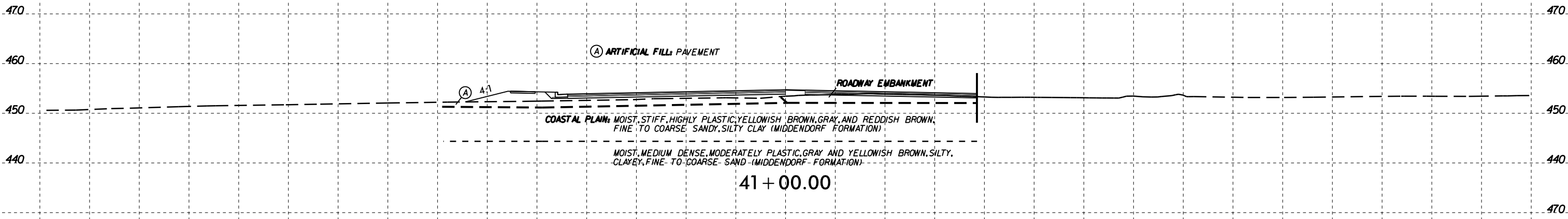


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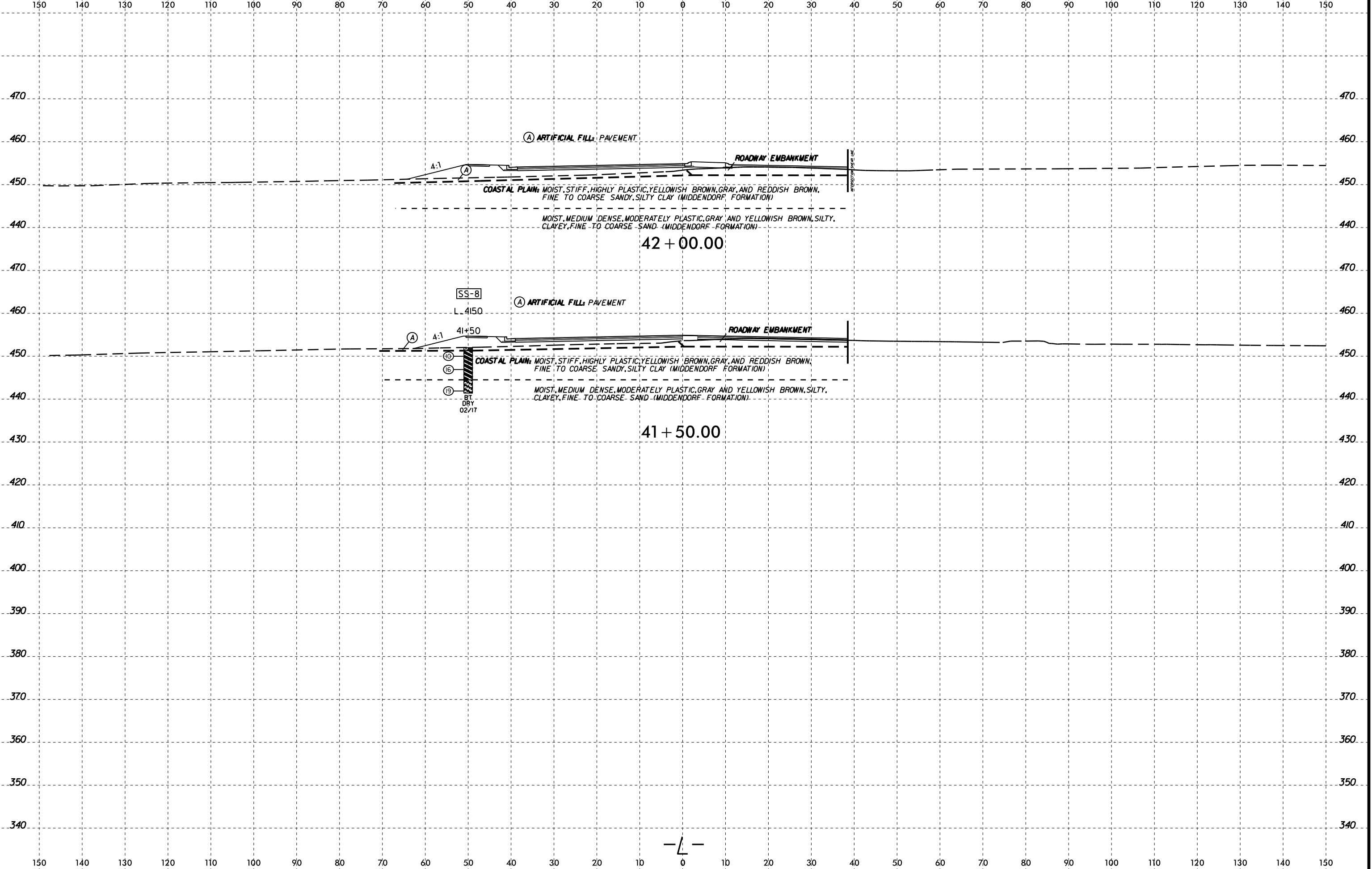




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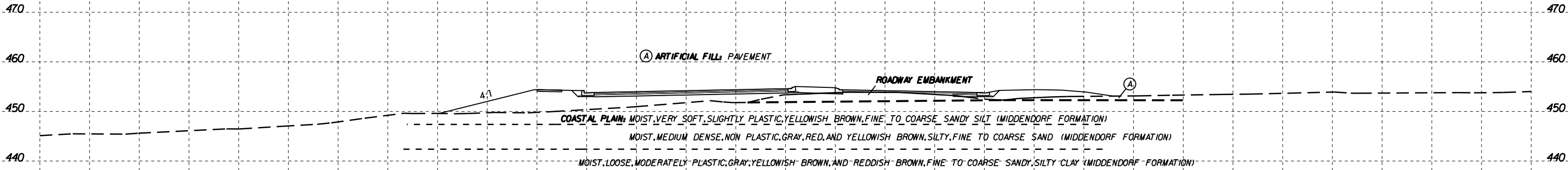


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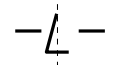


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 J. Johnson

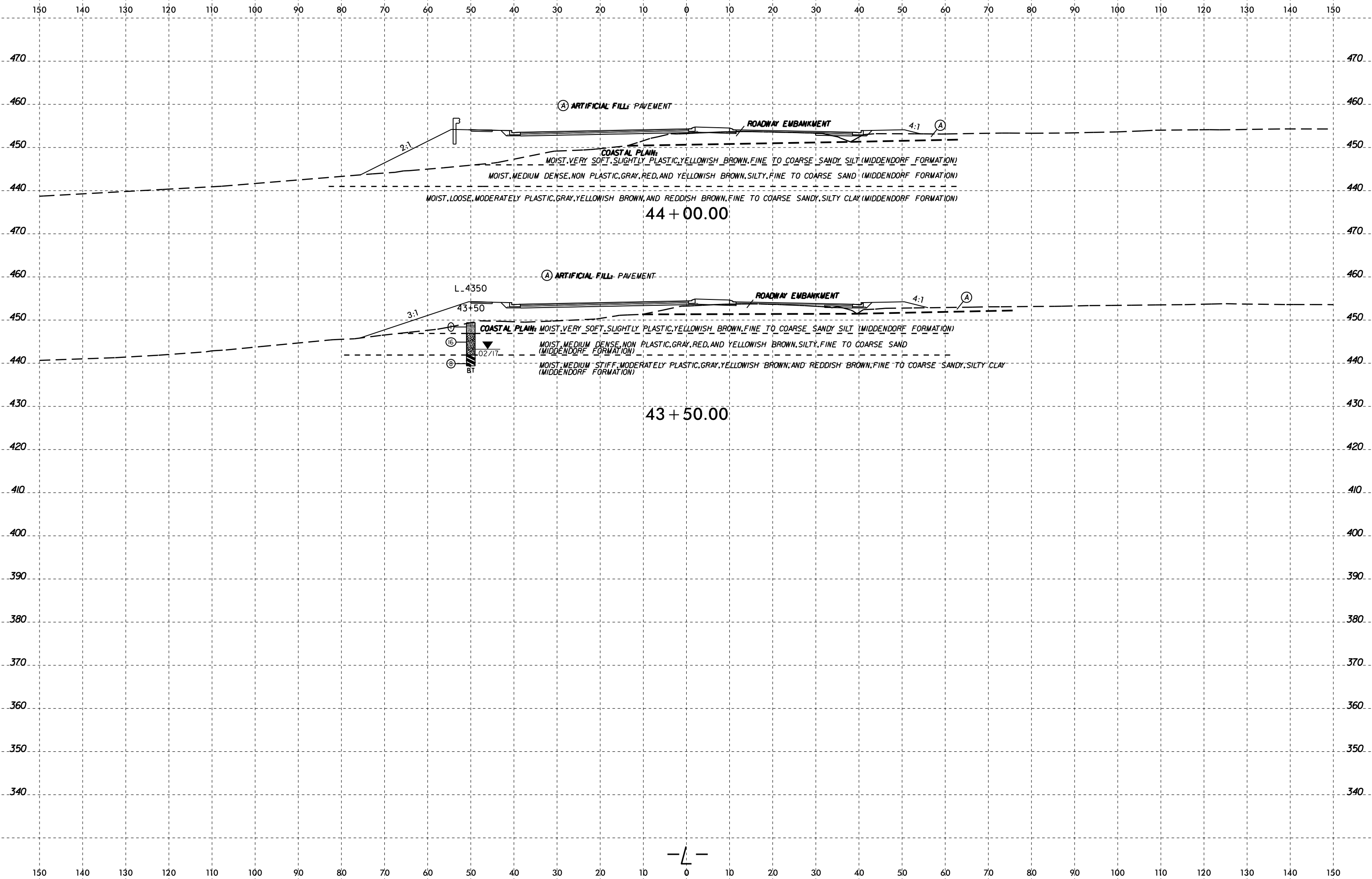
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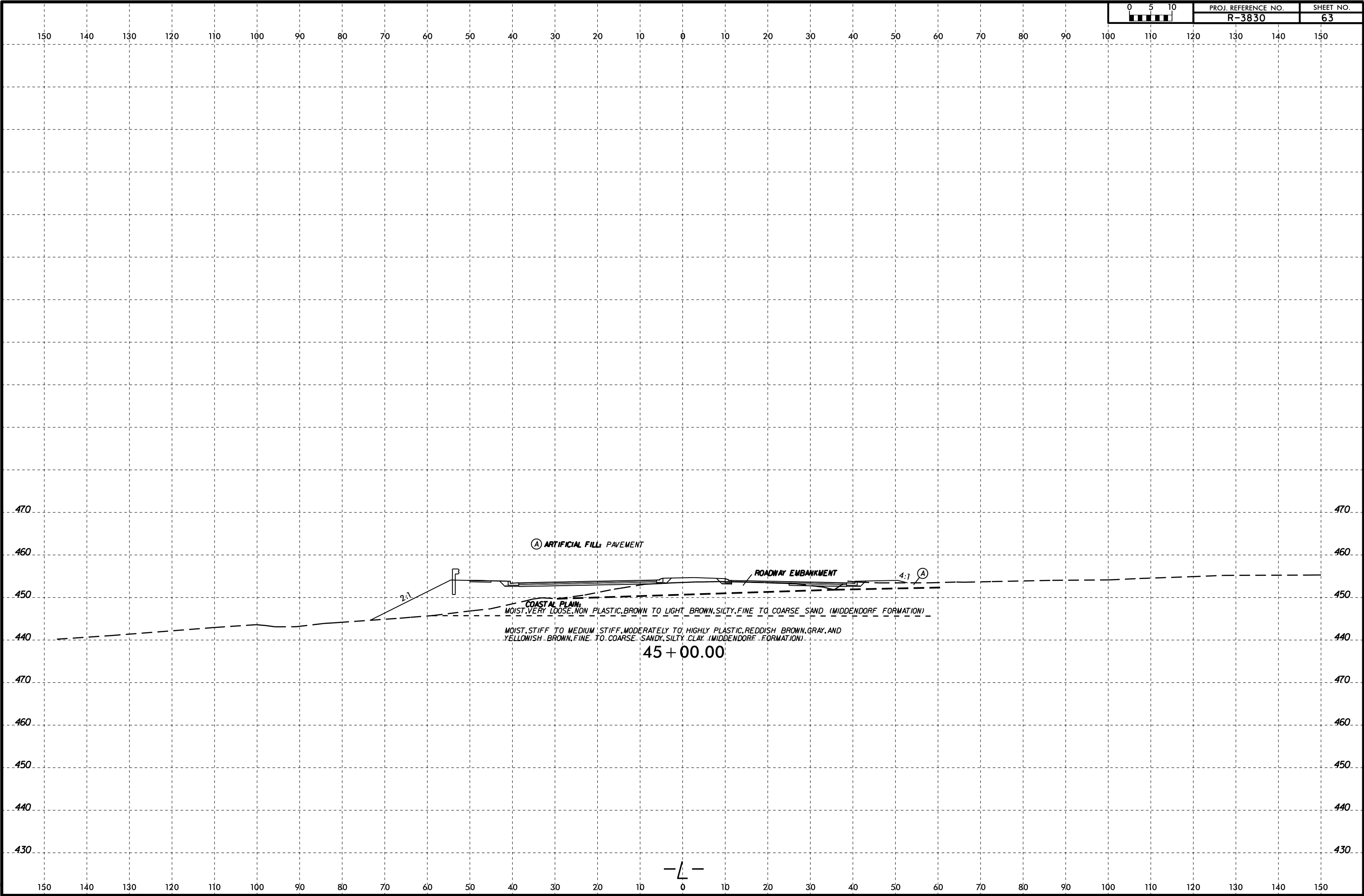
43 + 00.00



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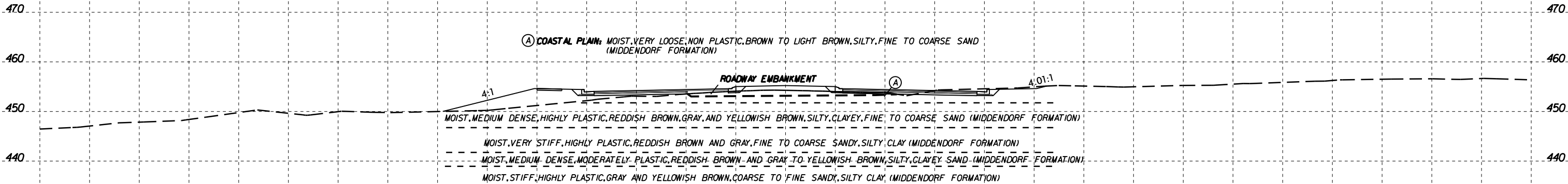
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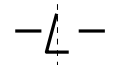
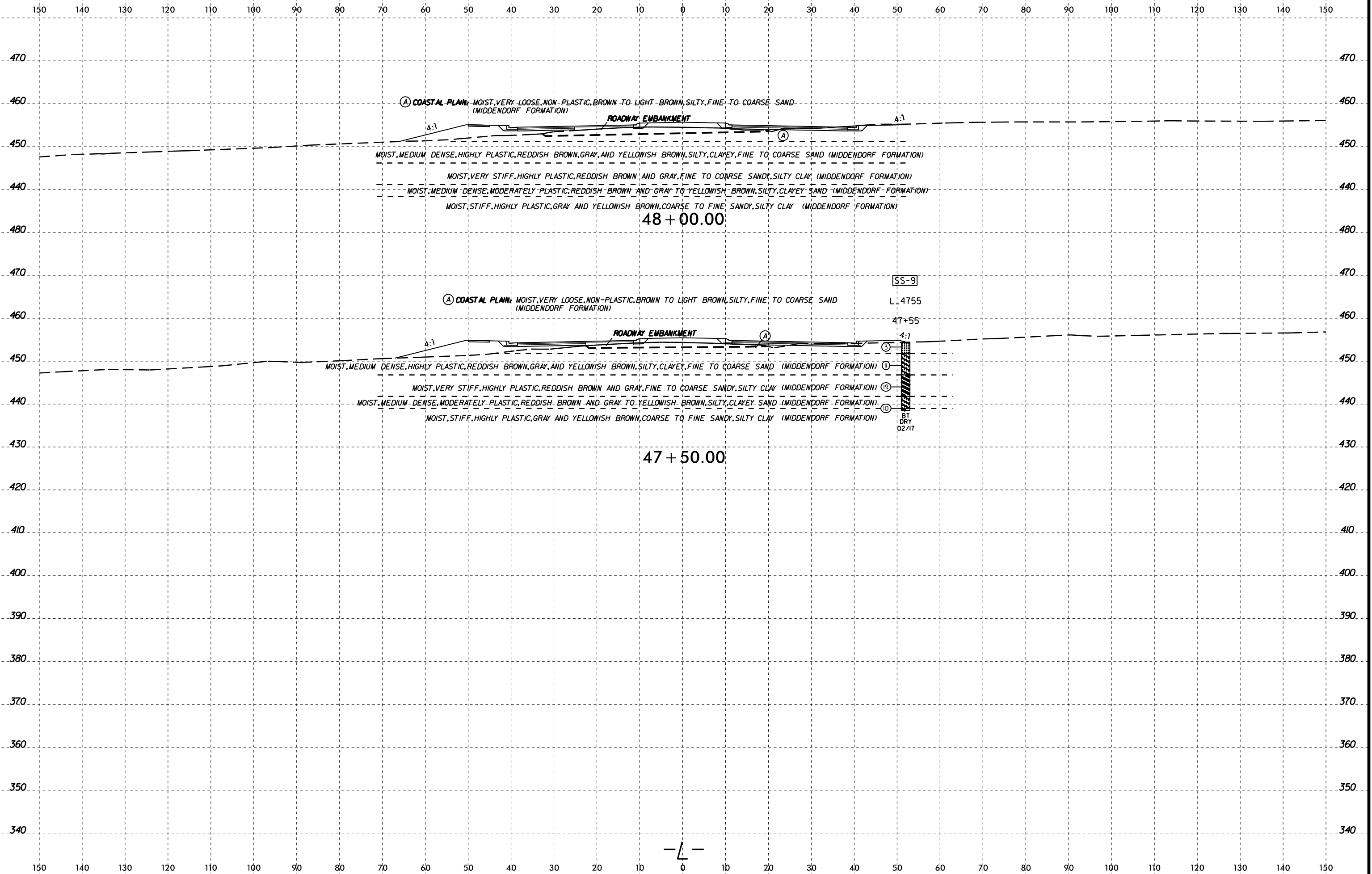
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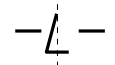
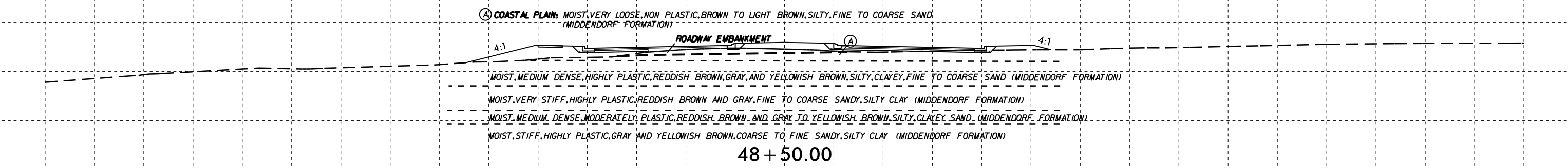
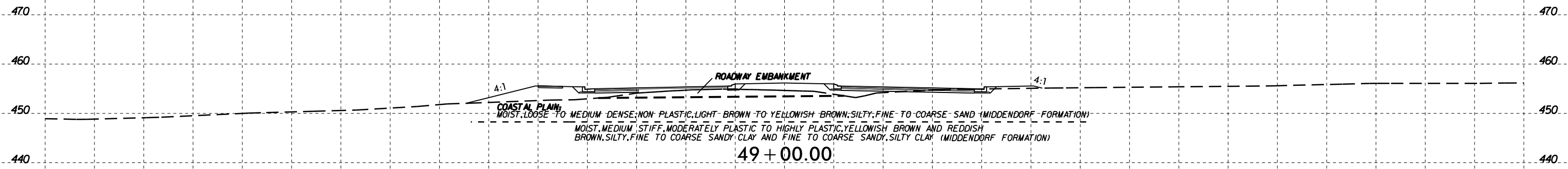
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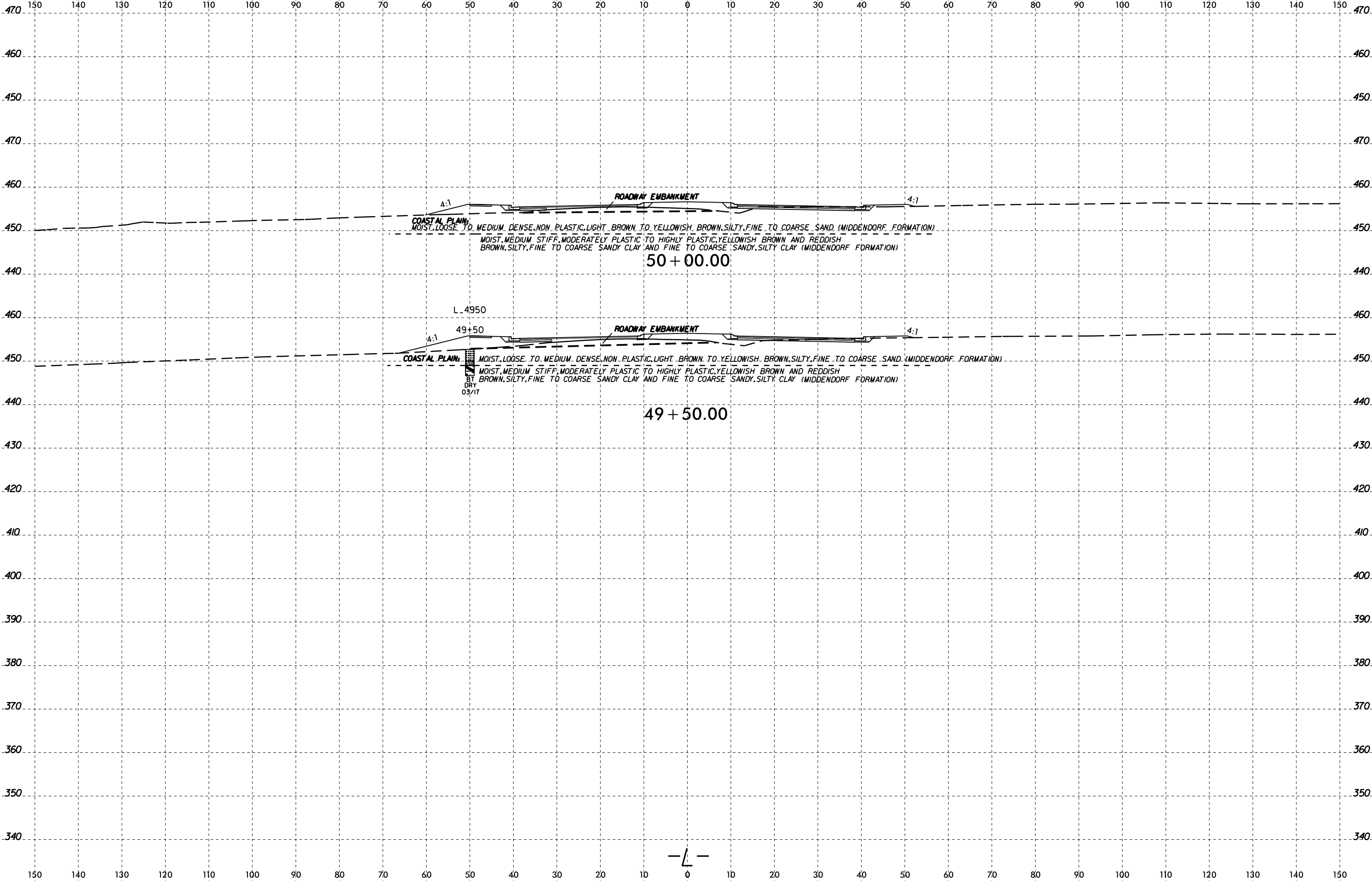


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A1 KA26660

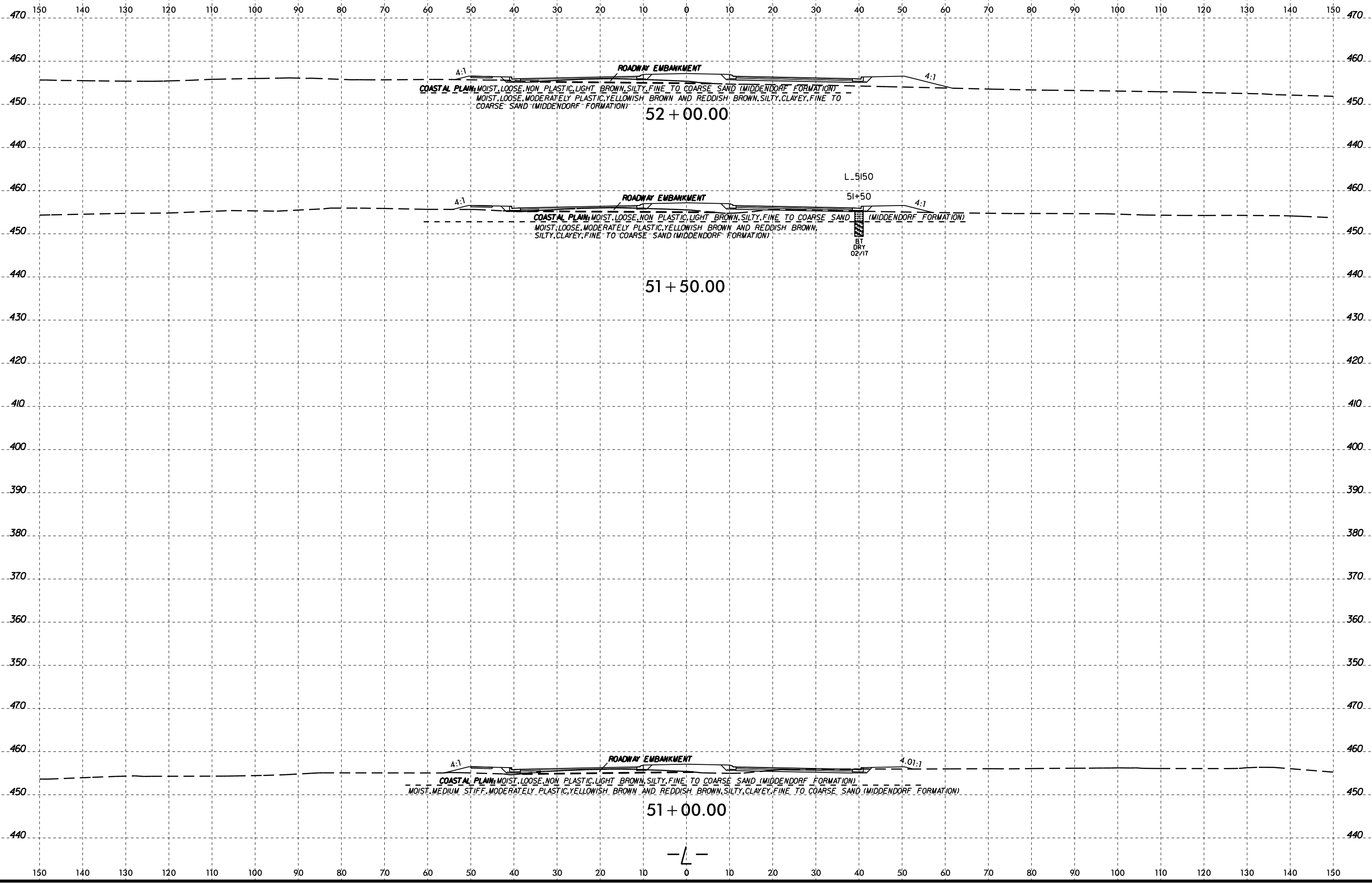


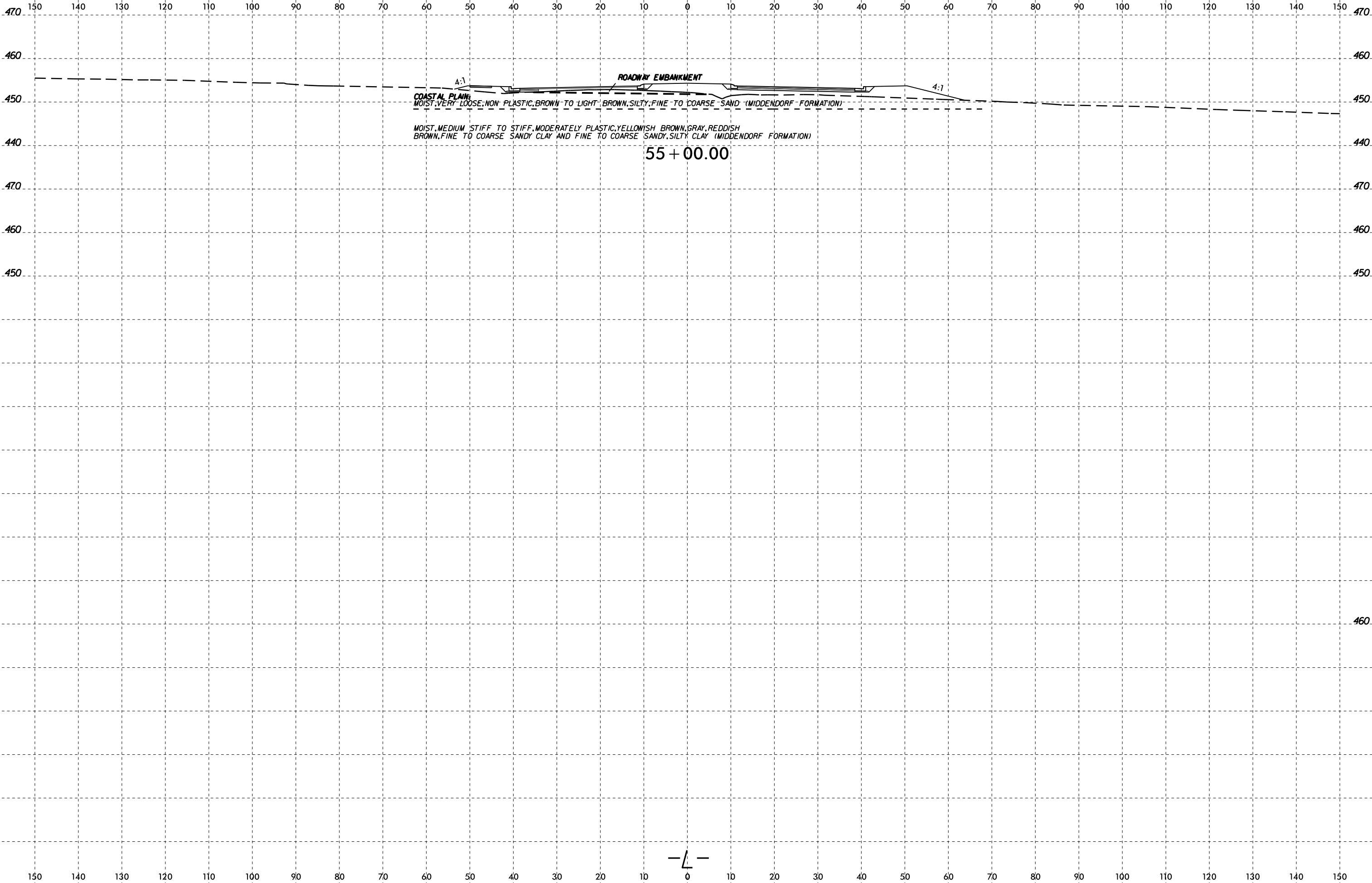
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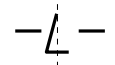
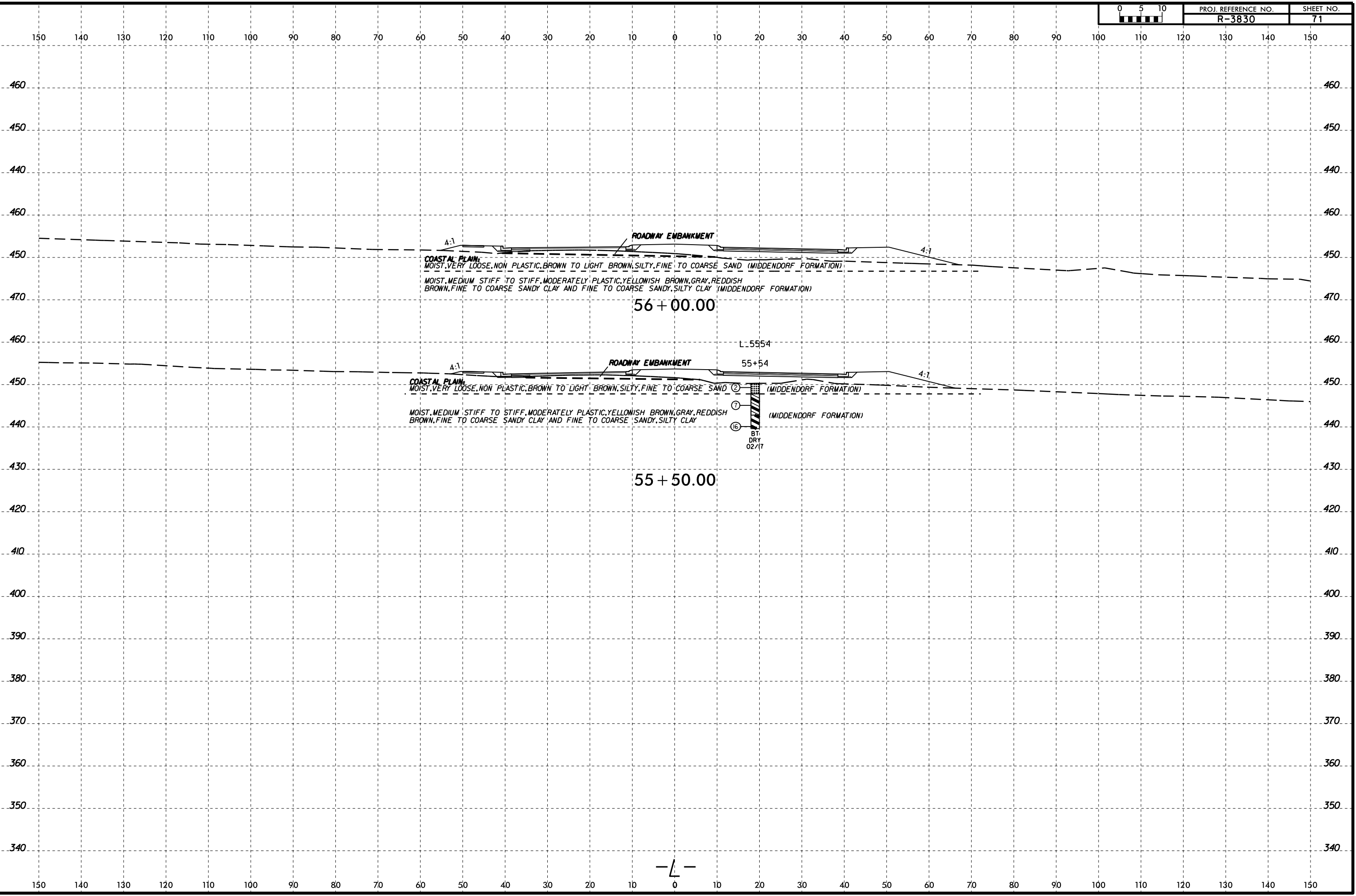


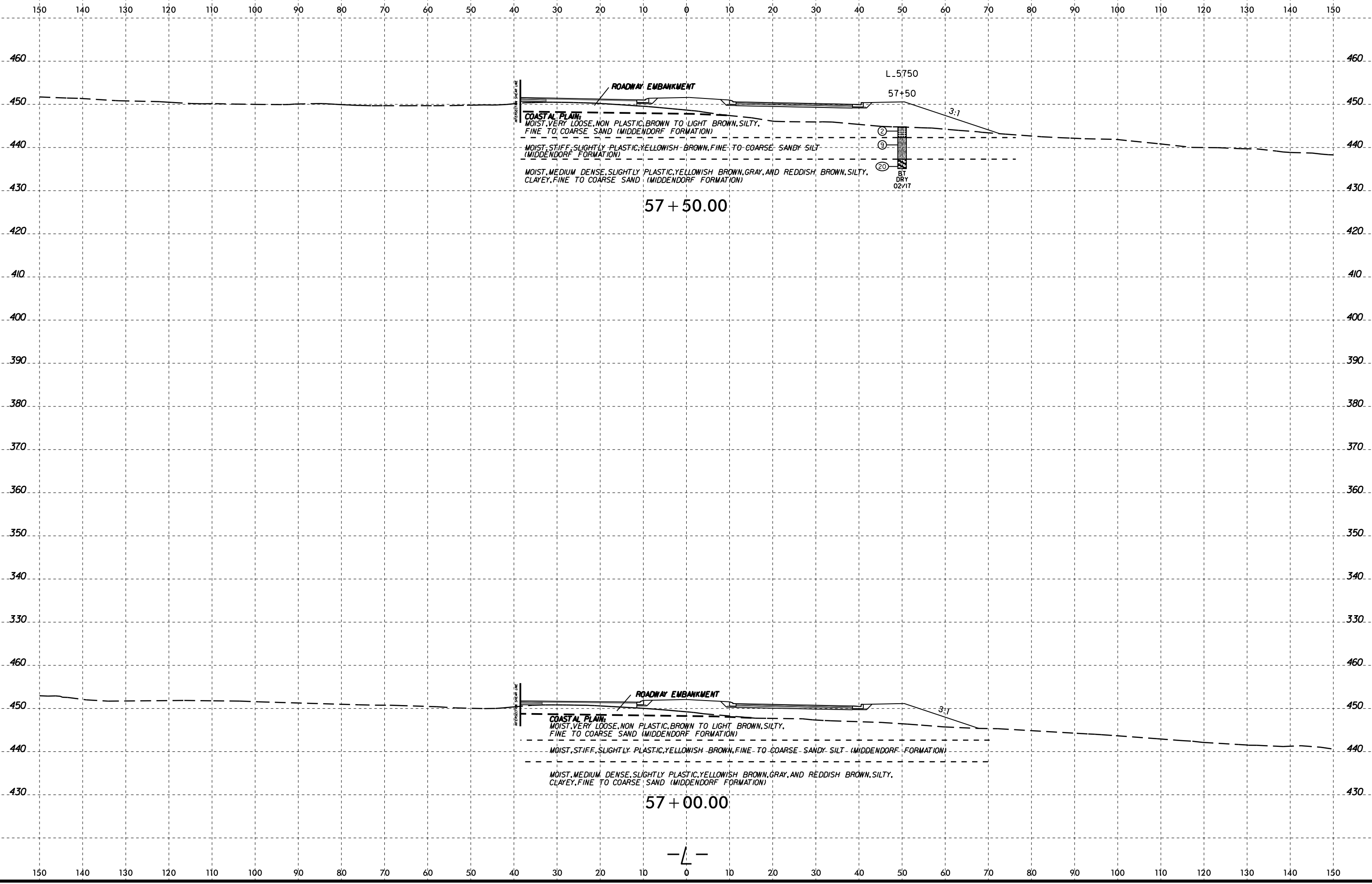
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A1 KA26660



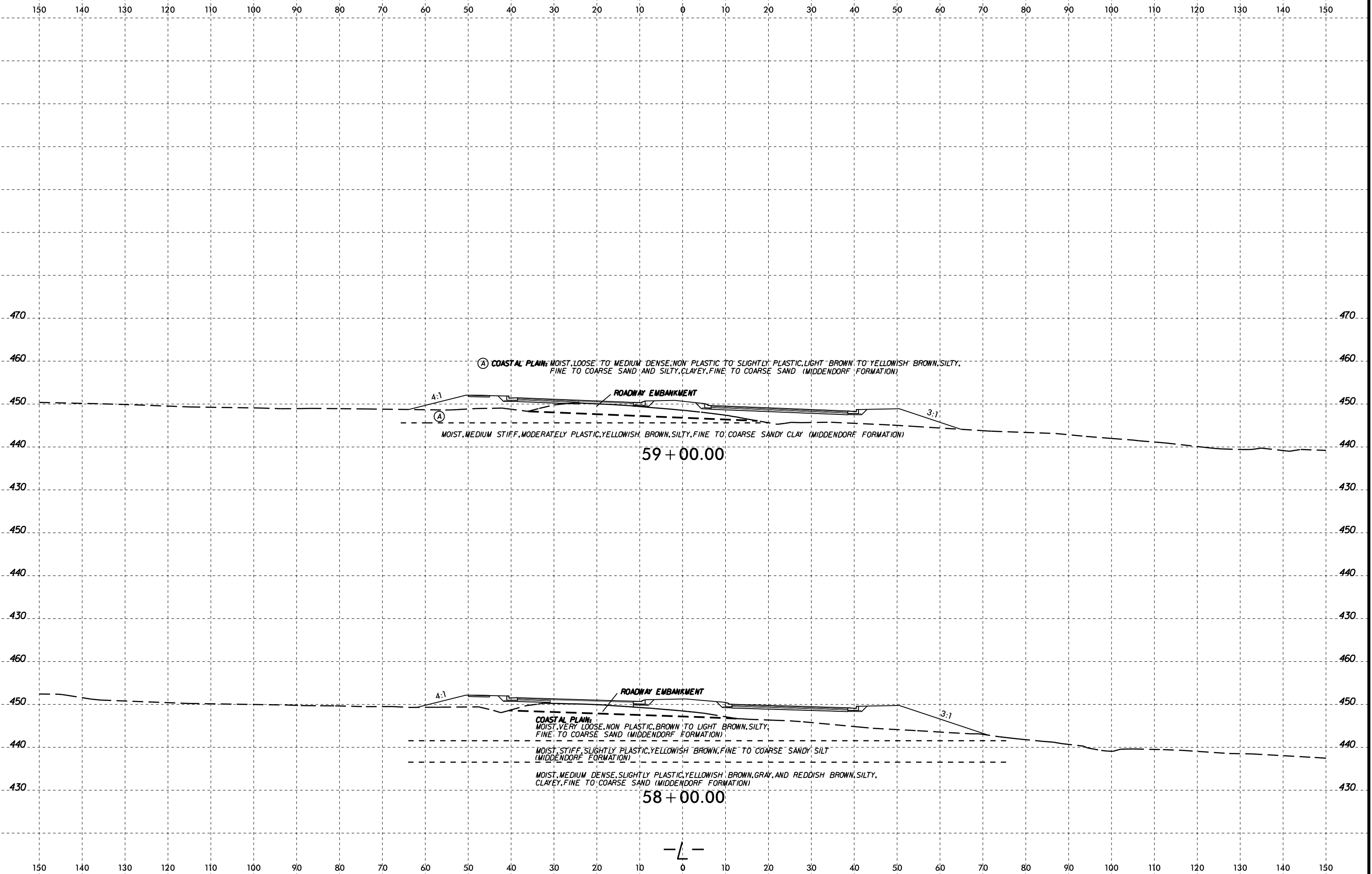


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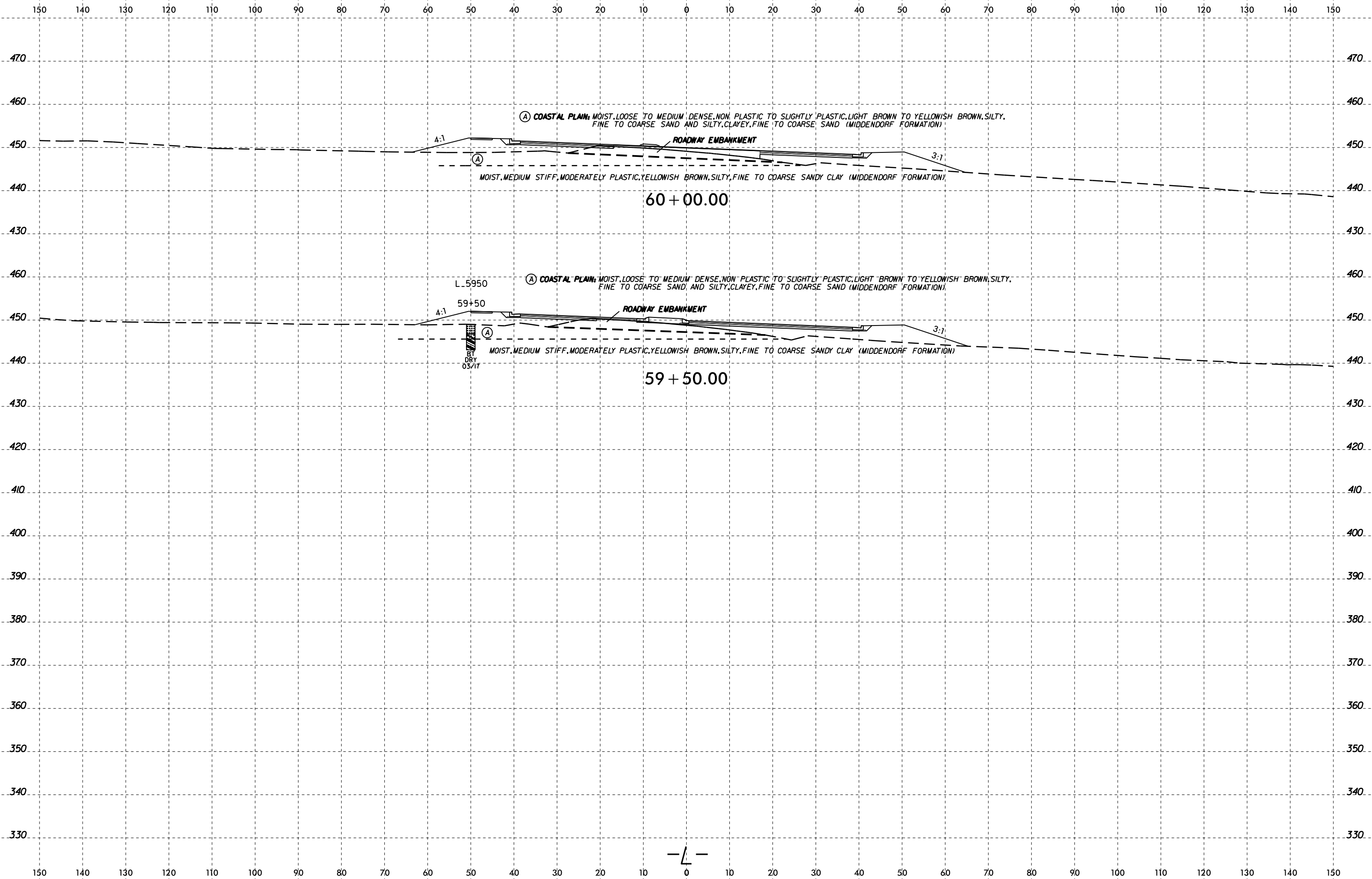


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08-MAY-2017 14:37  
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 A: KA206660  
 B: Johnson



460 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 460



COASTAL PLAIN: MOIST, LOOSE, NON PLASTIC, LIGHT BROWN, SILTY, FINE TO COARSE SAND (MIDDENDORF FORMATION)  
MOIST, MEDIUM STIFF, MODERATELY PLASTIC, YELLOWISH BROWN, SILTY, FINE TO COARSE SANDY CLAY (MIDDENDORF FORMATION)

61 + 50.00

430 420 410 400 390 380 370 360 350 340

460 450 440 430 420 410 400 390 380 370 360 350 340

460 450 440 430 420 410 400 390 380 370 360 350 340

460 450 440 430 420 410 400 390 380 370 360 350 340

460 450 440 430 420 410 400 390 380 370 360 350 340

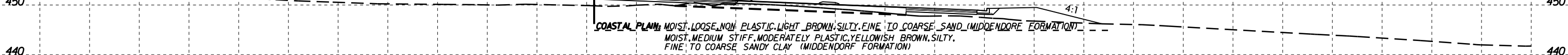
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460 450 440 430 420 410 400 390 380 370 360 350 340

460 450 440 430 420 410 400 390 380 370 360 350 340

460 450 440 430 420 410 400 390 380 370 360 350 340

460 450 440 430 420 410 400 390 380 370 360 350 340



61 + 00.00

460 450 440 430 420 410 400 390 380 370 360 350 340

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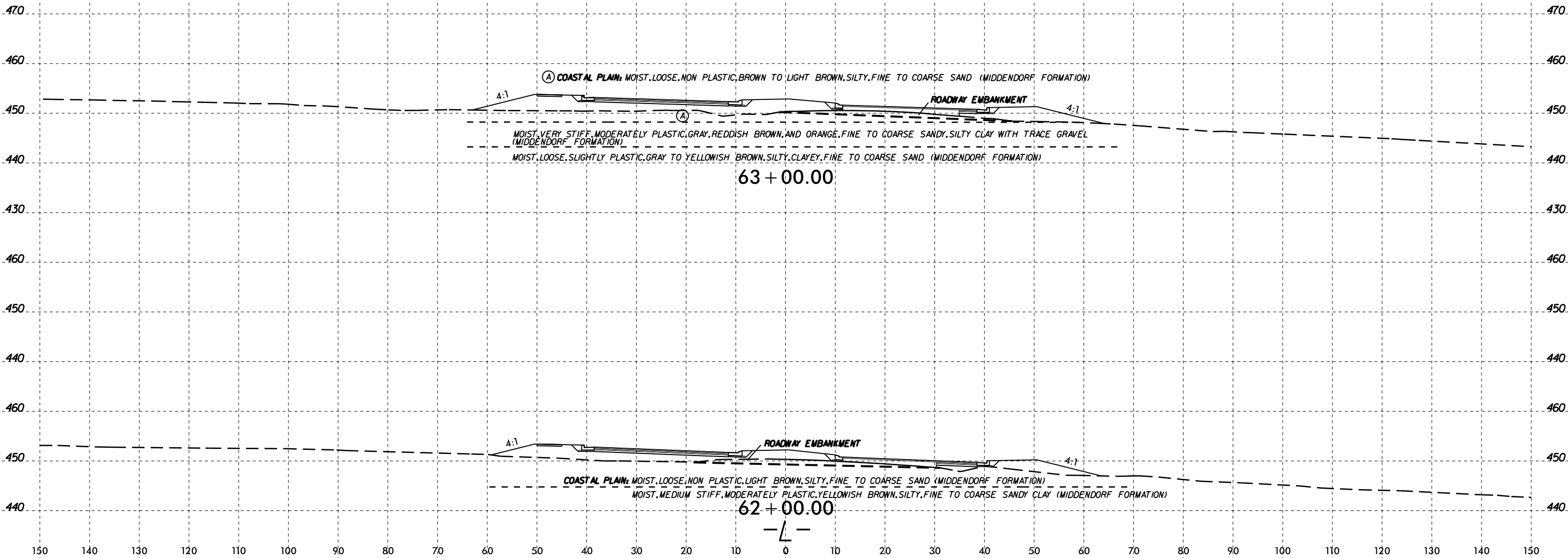
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A: KAS/6660





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



① COASTAL PLAIN; MOIST, LOOSE, NON PLASTIC, BROWN TO LIGHT BROWN, SILTY, FINE TO COARSE SAND (MIDDENDORF FORMATION)

ROADWAY EMBANKMENT

MOIST, VERY STIFF, MODERATELY PLASTIC, GRAY, REDDISH BROWN, AND ORANGE, FINE TO COARSE SANDY, SILTY CLAY WITH TRACE GRAVEL (MIDDENDORF FORMATION)

MOIST, LOOSE, SLIGHTLY PLASTIC, GRAY TO YELLOWISH BROWN, SILTY, CLAYEY, FINE TO COARSE SAND (MIDDENDORF FORMATION)

63 + 00.00

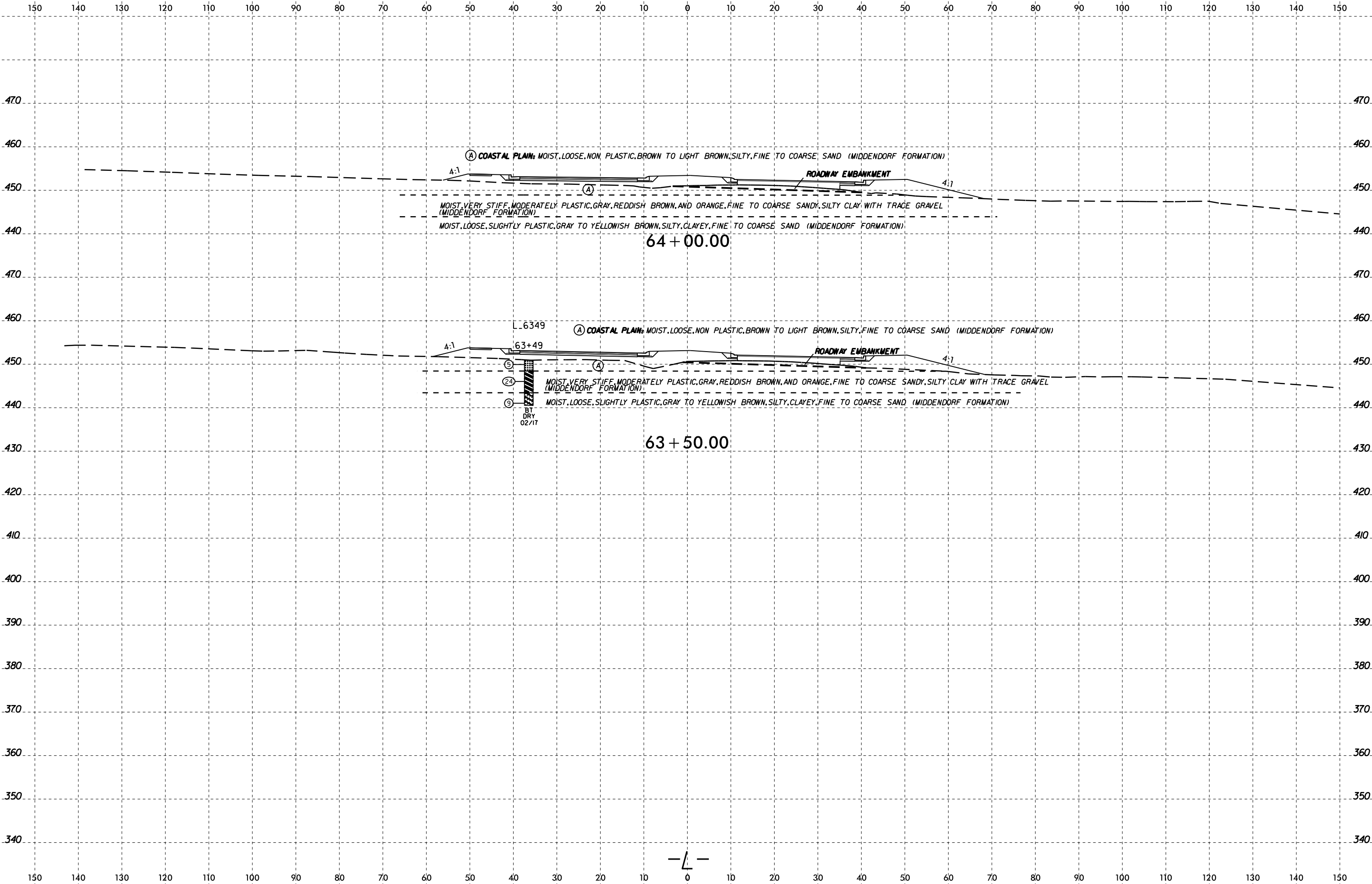
COASTAL PLAIN; MOIST, LOOSE, NON PLASTIC, LIGHT BROWN, SILTY, FINE TO COARSE SAND (MIDDENDORF FORMATION)

ROADWAY EMBANKMENT

MOIST, MEDIUM STIFF, MODERATELY PLASTIC, YELLOWISH BROWN, SILTY, FINE TO COARSE SANDY CLAY (MIDDENDORF FORMATION)

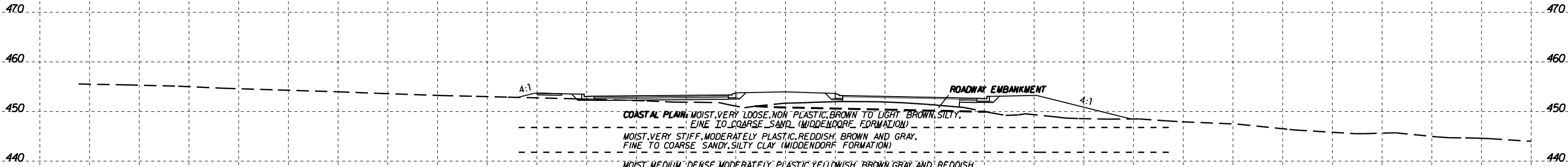
62 + 00.00

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65 + 00.00

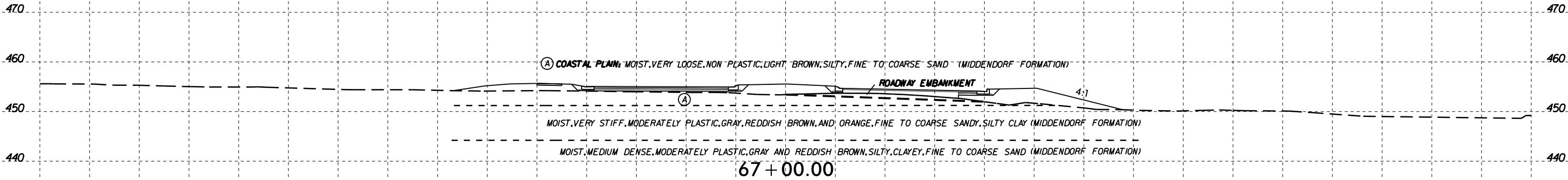


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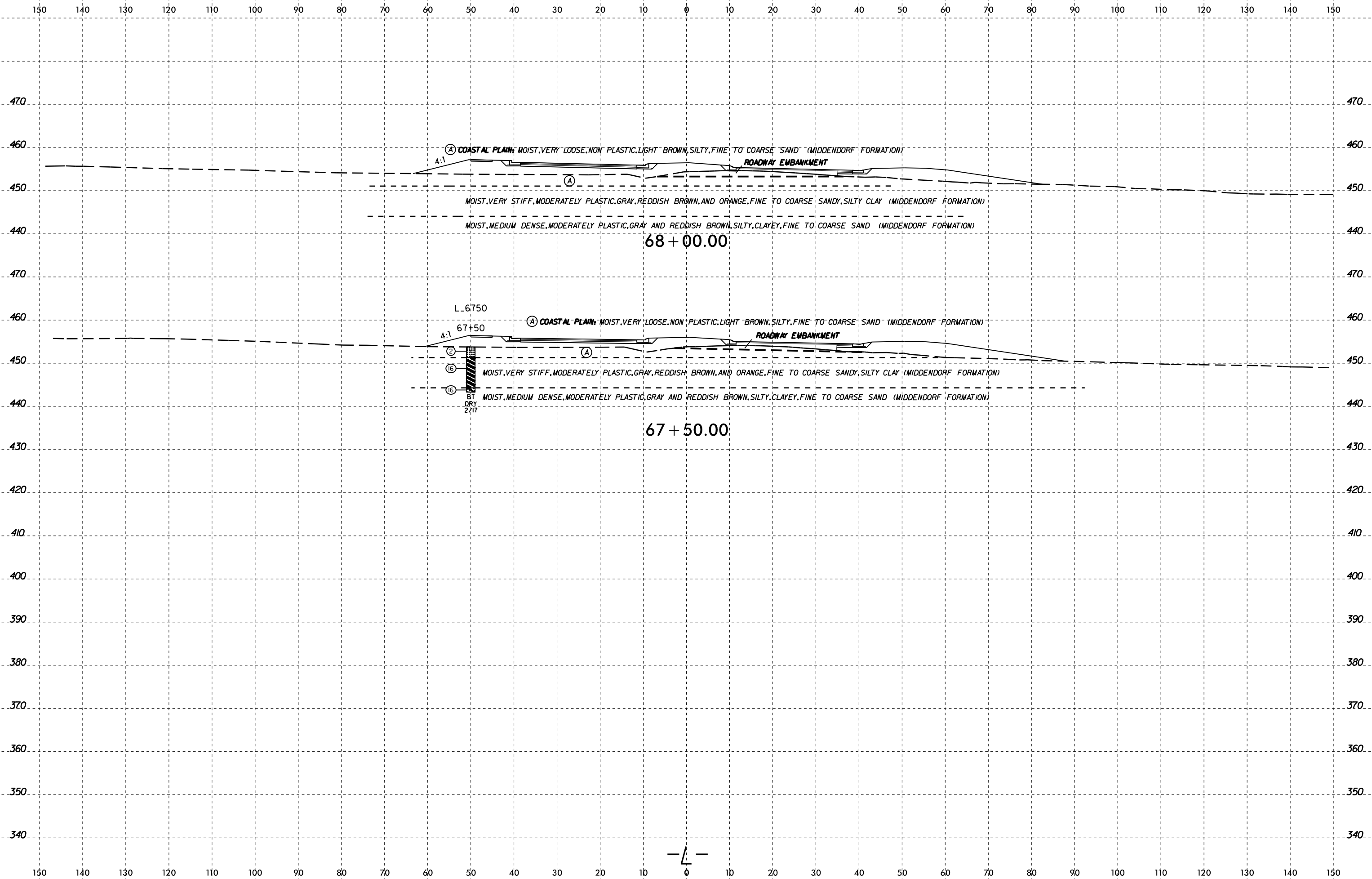




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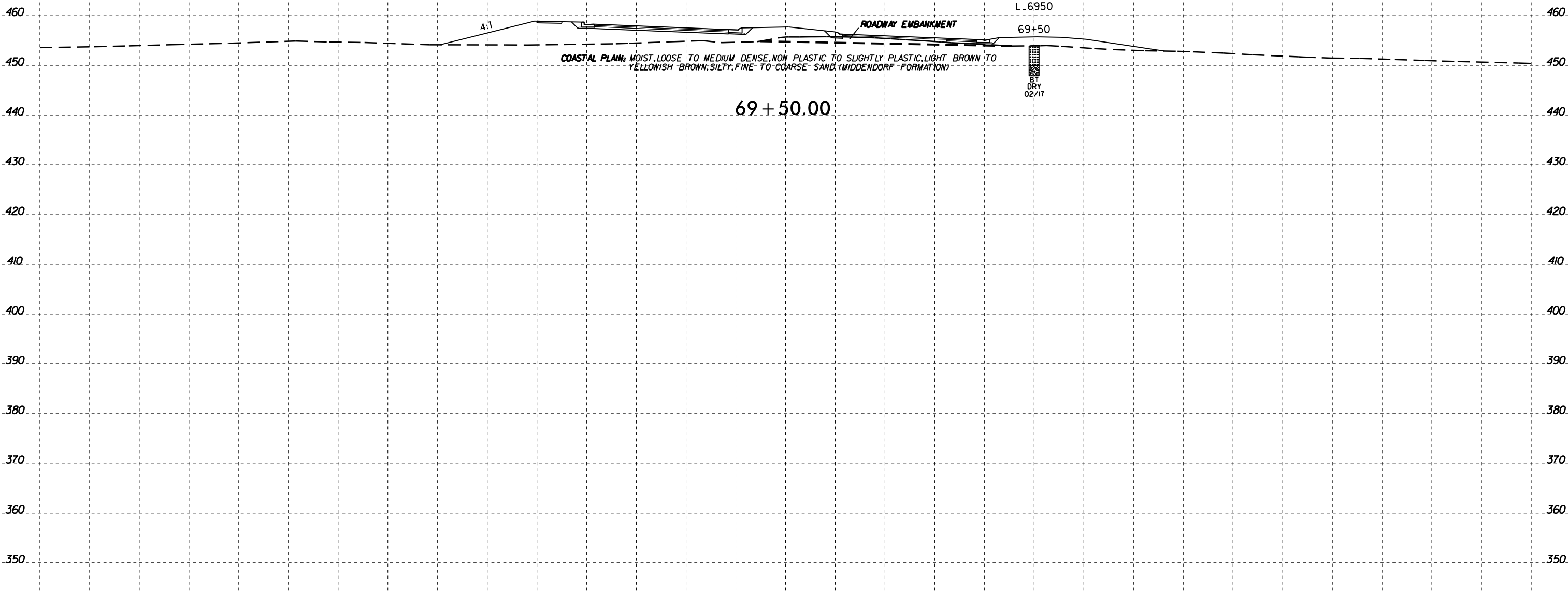
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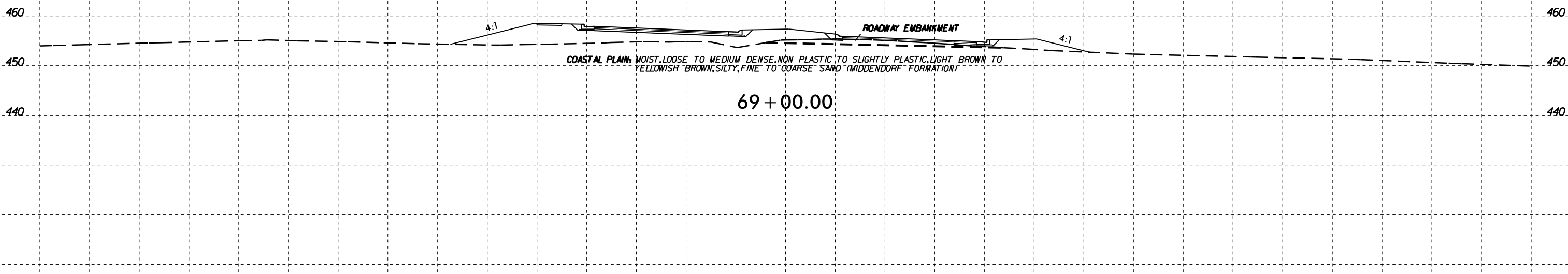
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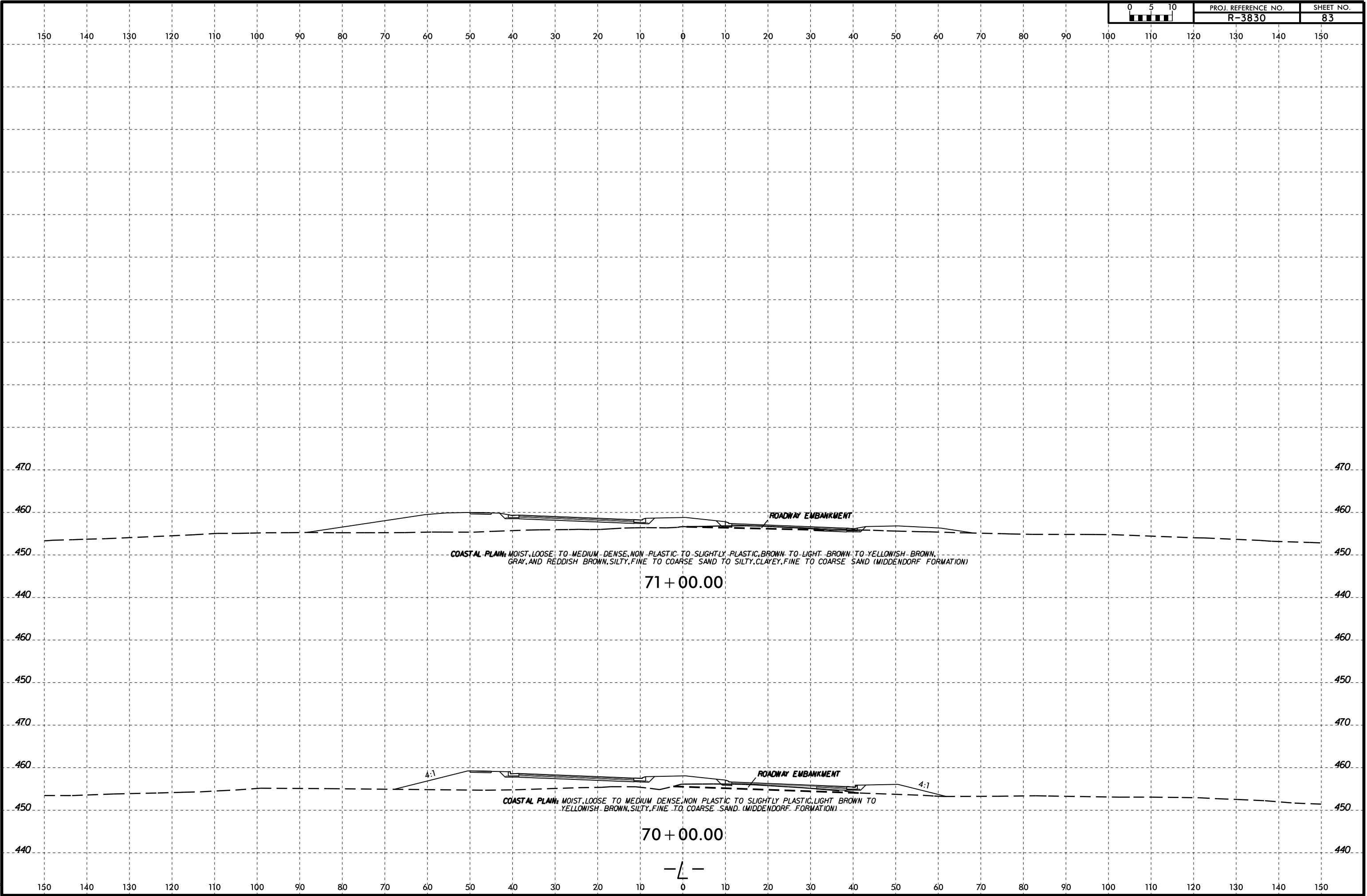
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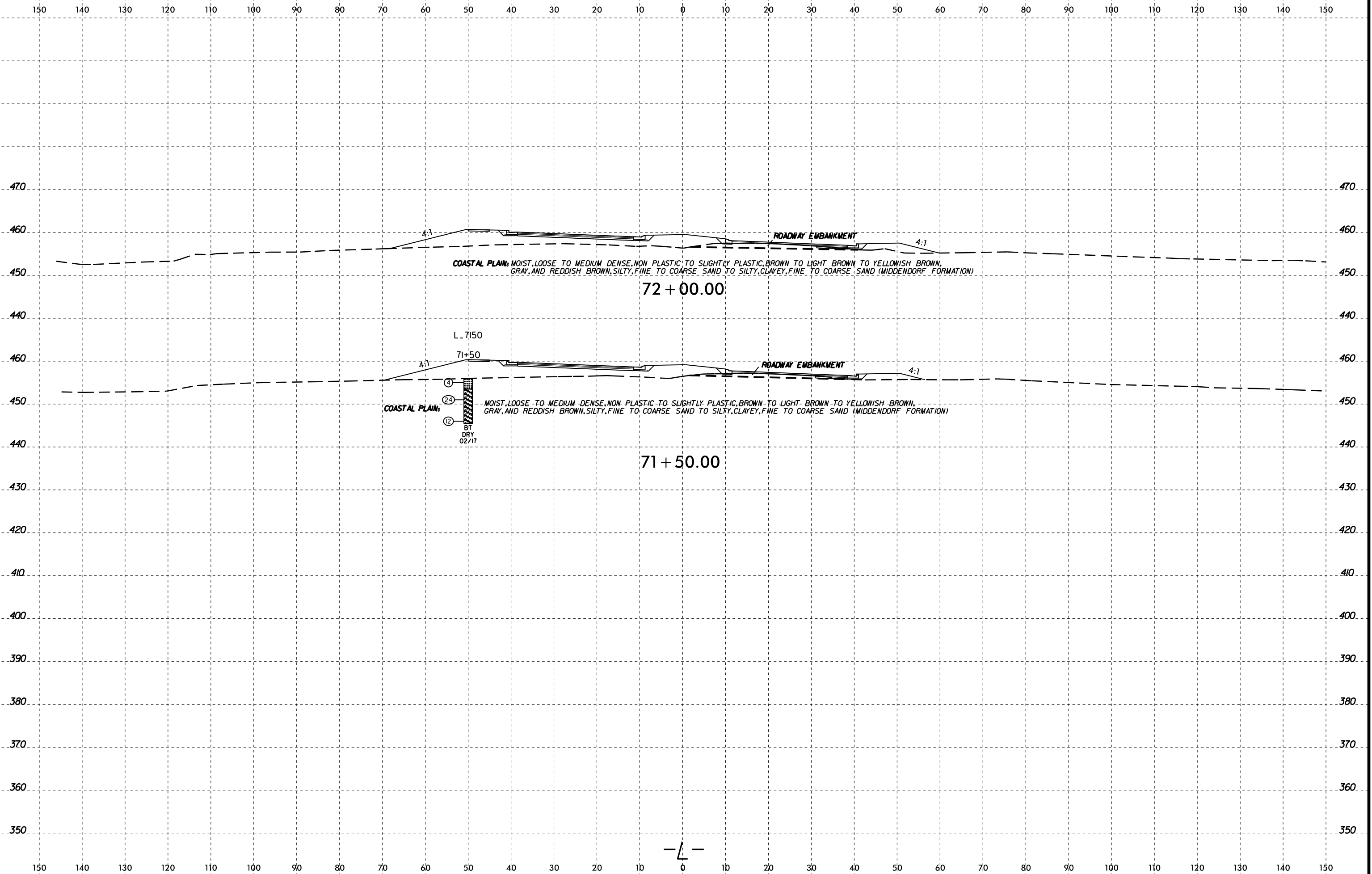


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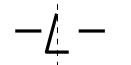
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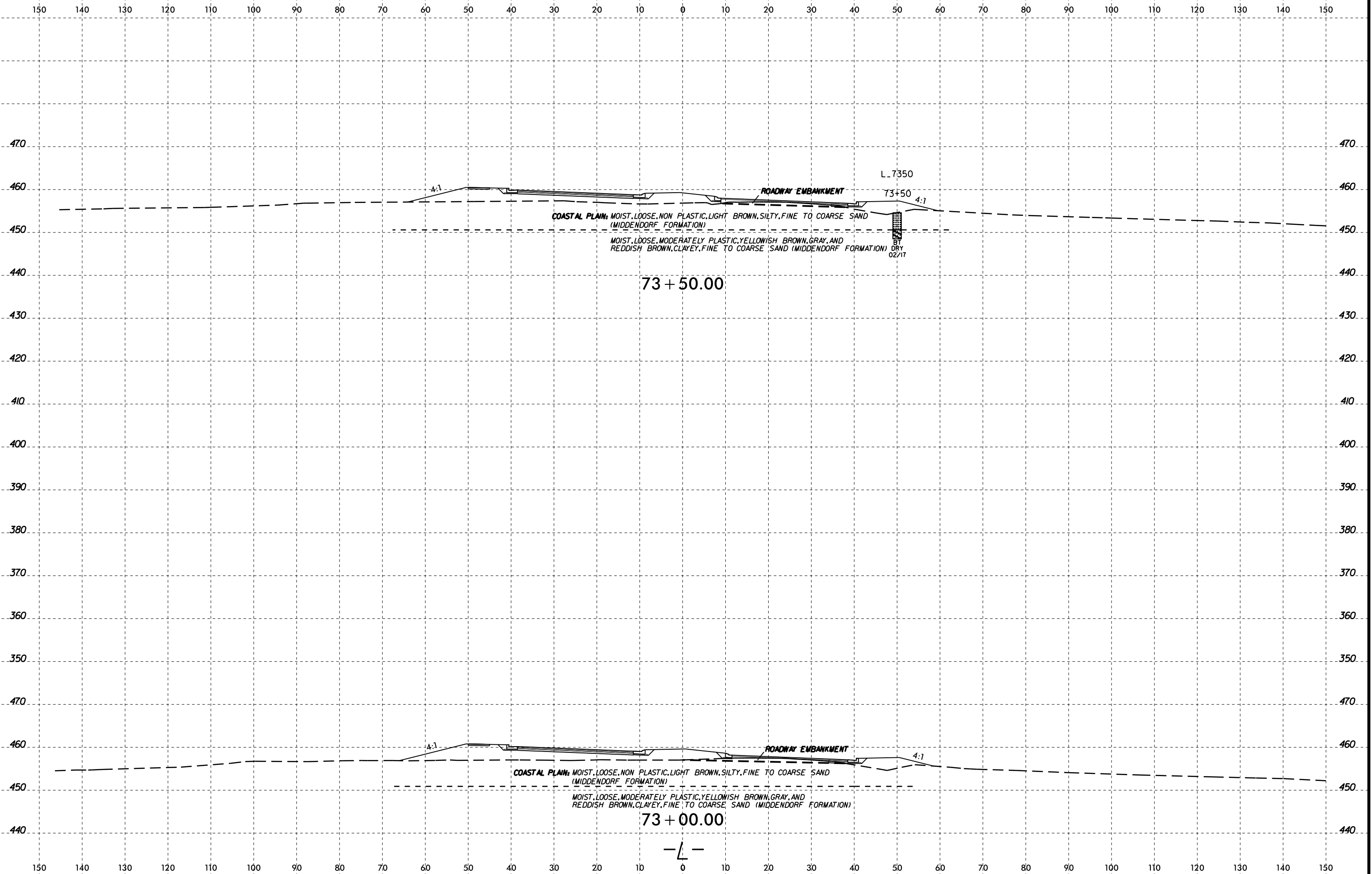






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 K.A. Johnson

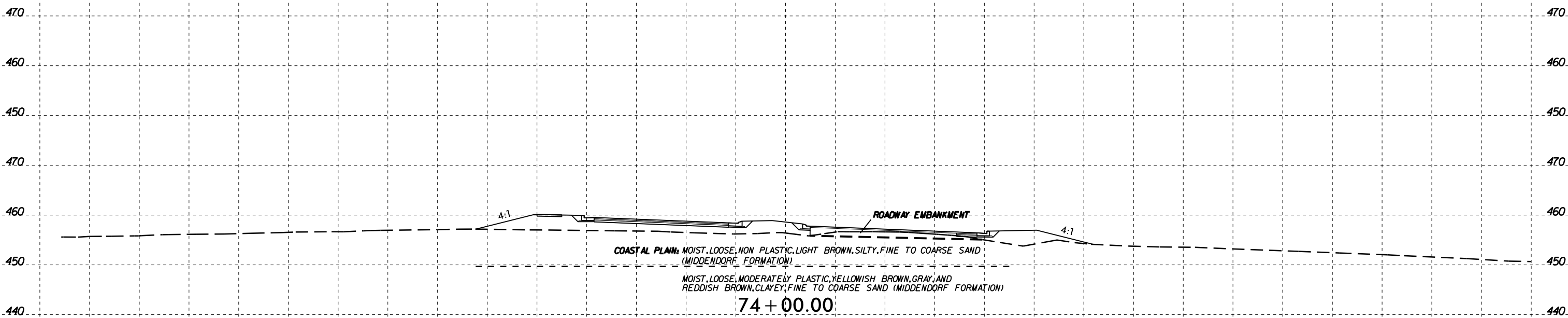
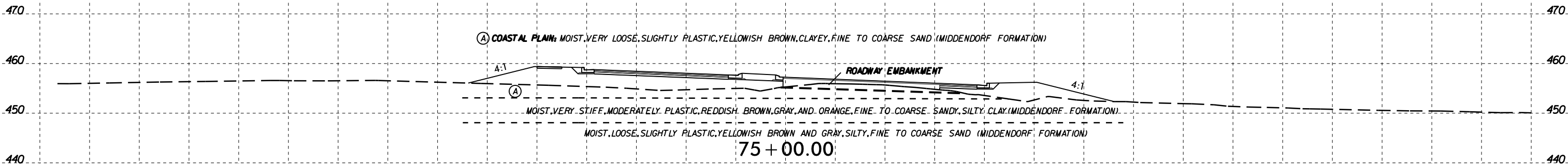




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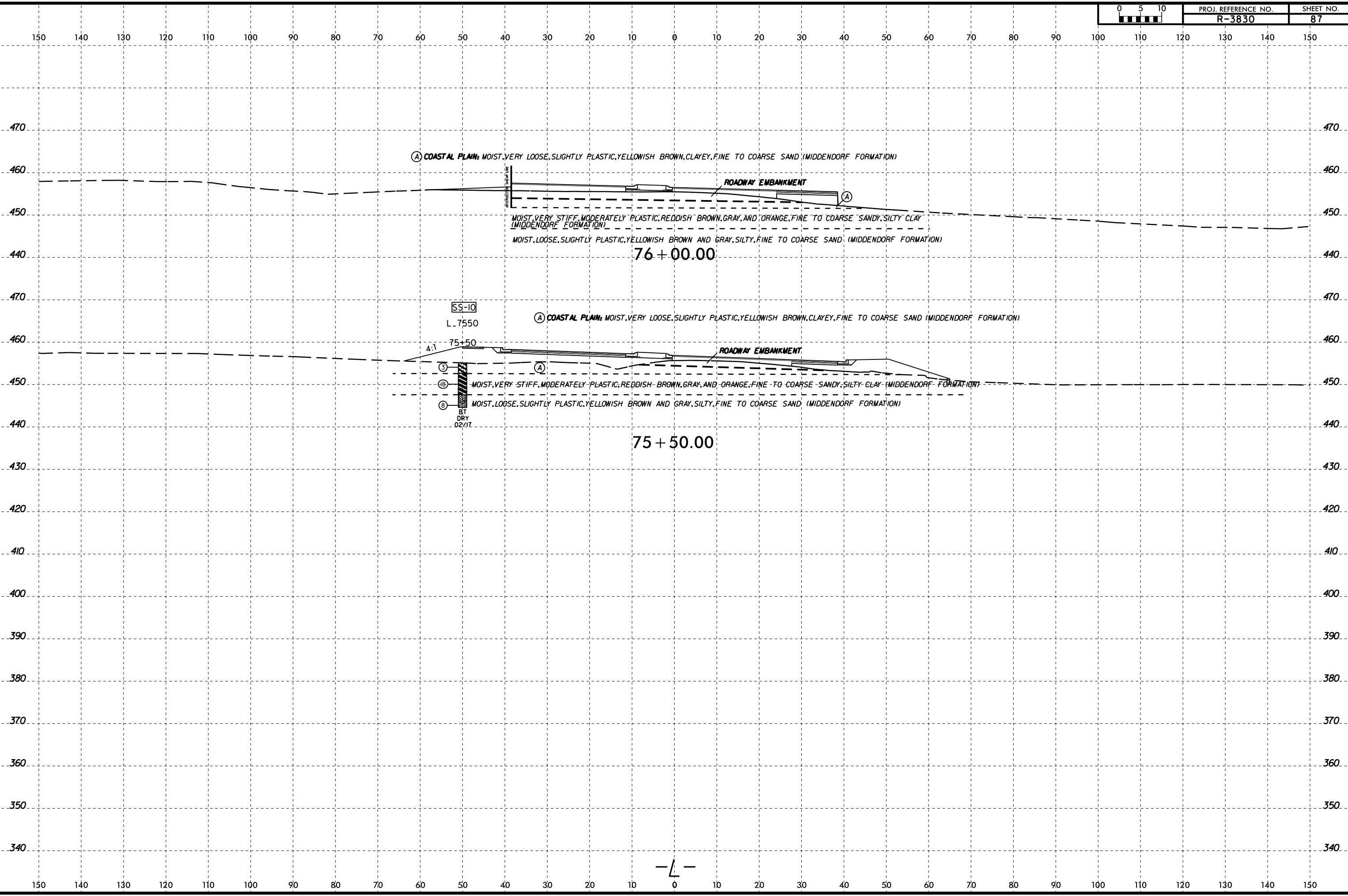
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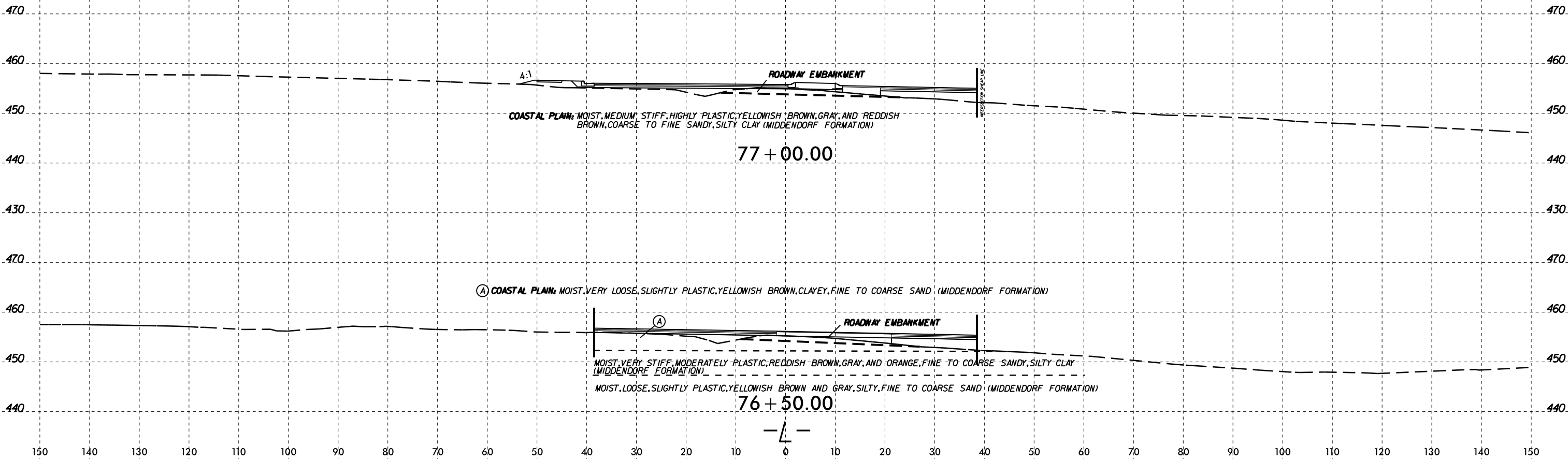
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A1 KA26660  
Bo Johnson

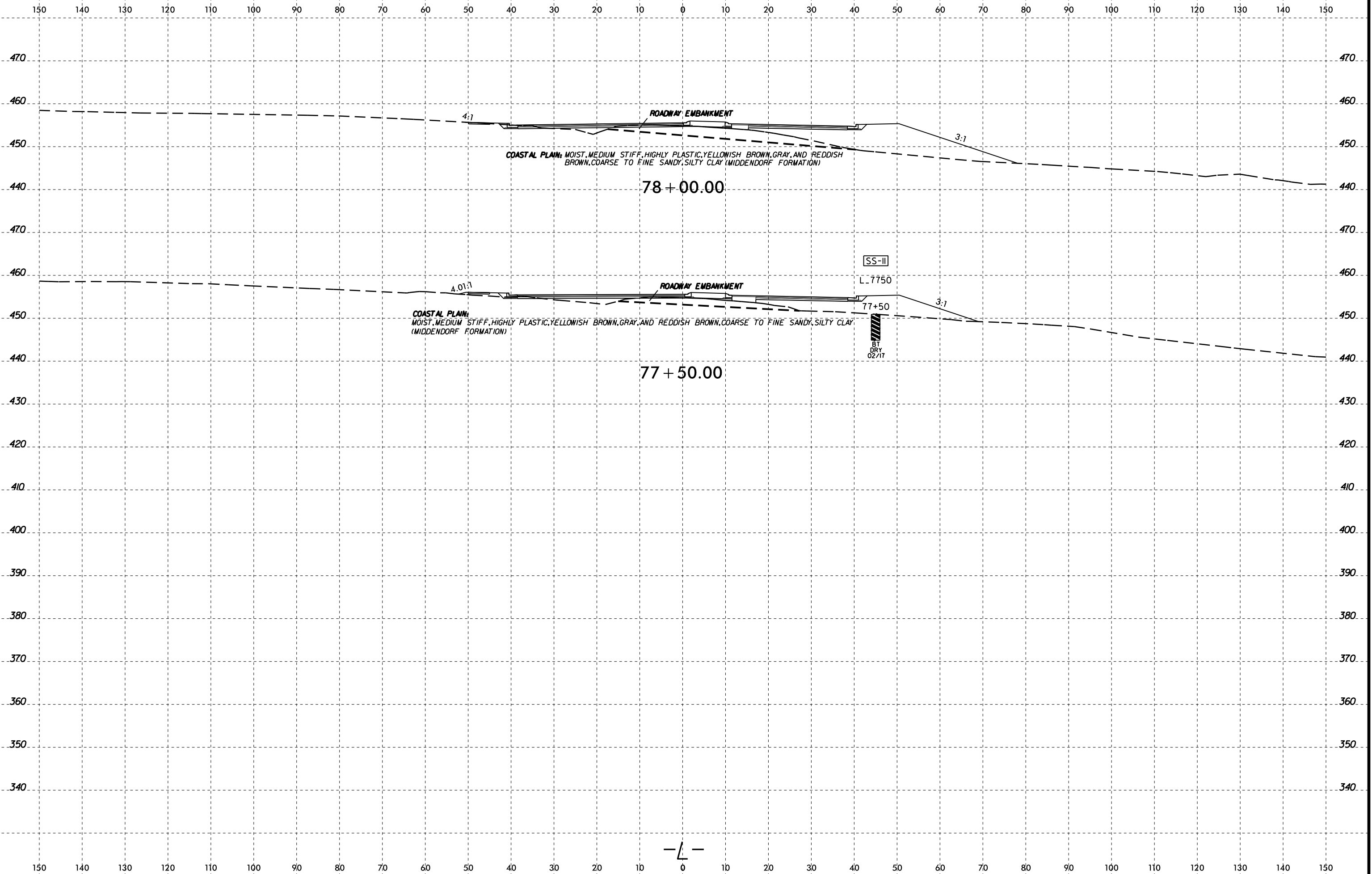


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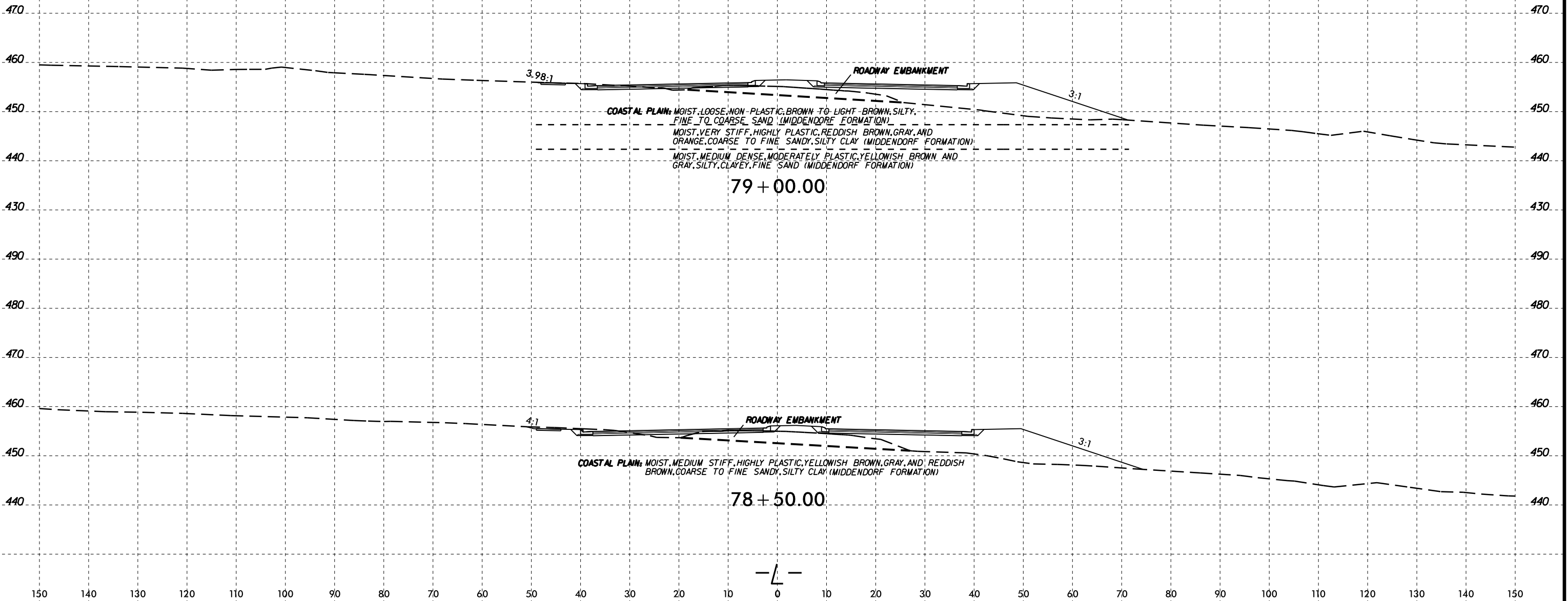


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 J. Johnson



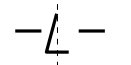


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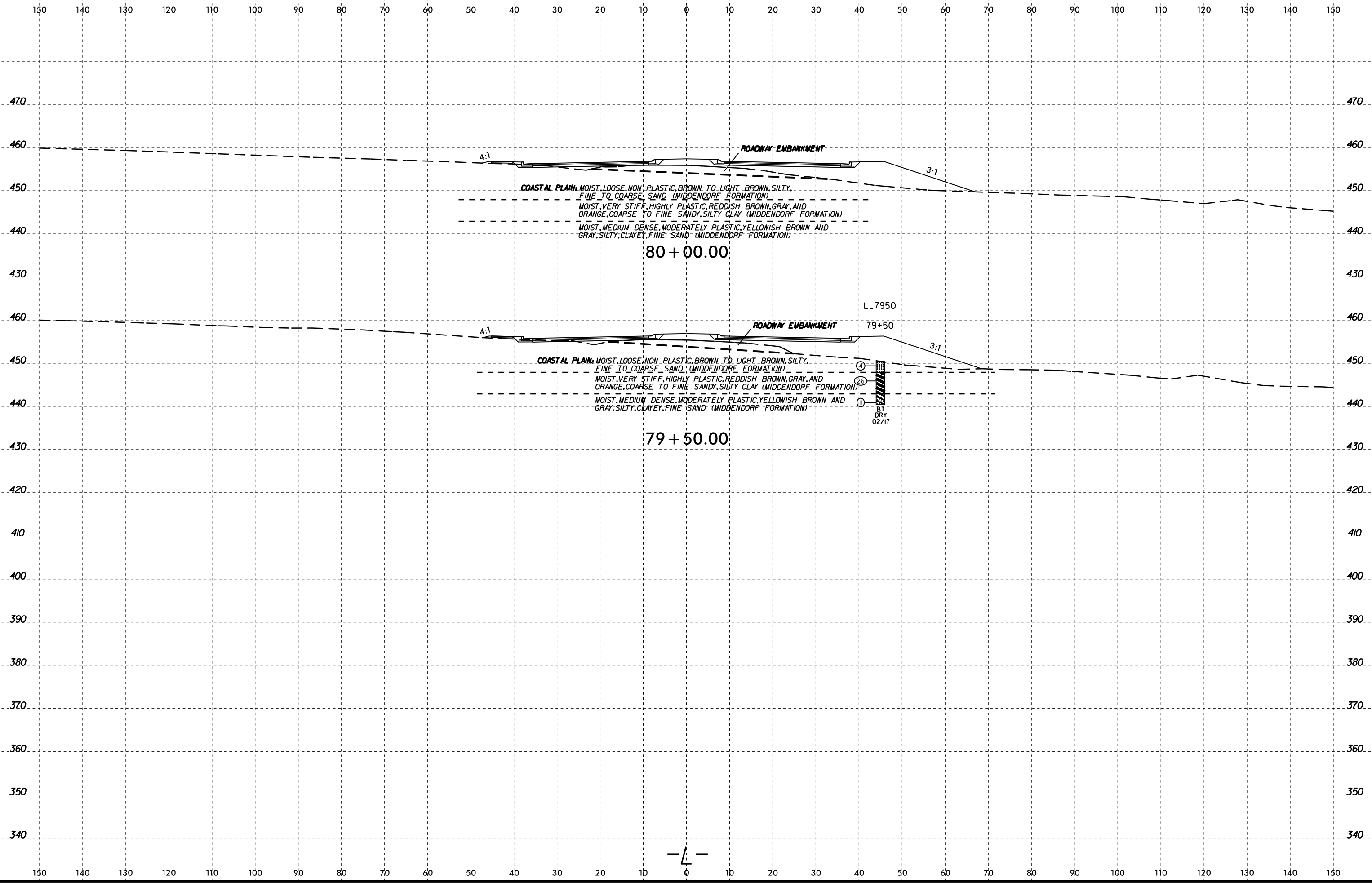


79 + 00.00

78 + 50.00



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08-MAY-2017 14:39  
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 02/26/16  
 J. Johnson





480 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 480

470 470

(A) COASTAL PLAIN: MOIST, LOOSE, NON PLASTIC, BROWN, SILTY, FINE TO COARSE SAND (MIDDENDORF FORMATION)

460 460

4:1

ROADWAY EMBANKMENT

(A)

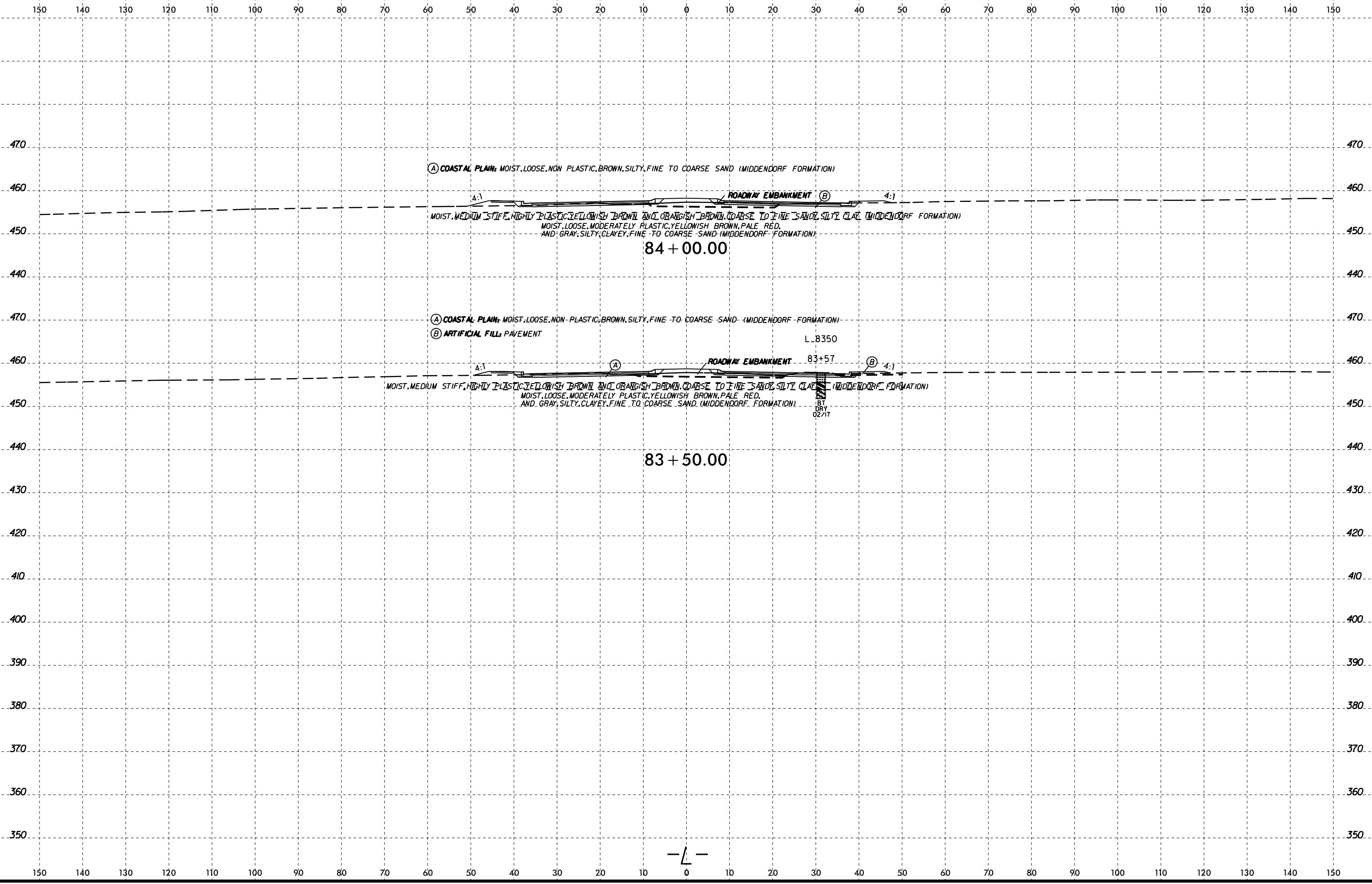
4:1

MOIST, MEDIUM STIFF, HIGHLY PLASTIC, YELLOWISH BROWN AND ORANGISH BROWN, COARSE TO FINE SANDY SILTY CLAY (MIDDENDORF FORMATION)  
MOIST, LOOSE, MODERATELY PLASTIC, YELLOWISH BROWN, PALE RED,  
AND GRAY, SILTY, CLAYEY, FINE TO COARSE SAND (MIDDENDORF FORMATION)

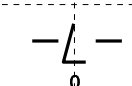
450 450

83 + 00.00

440 440



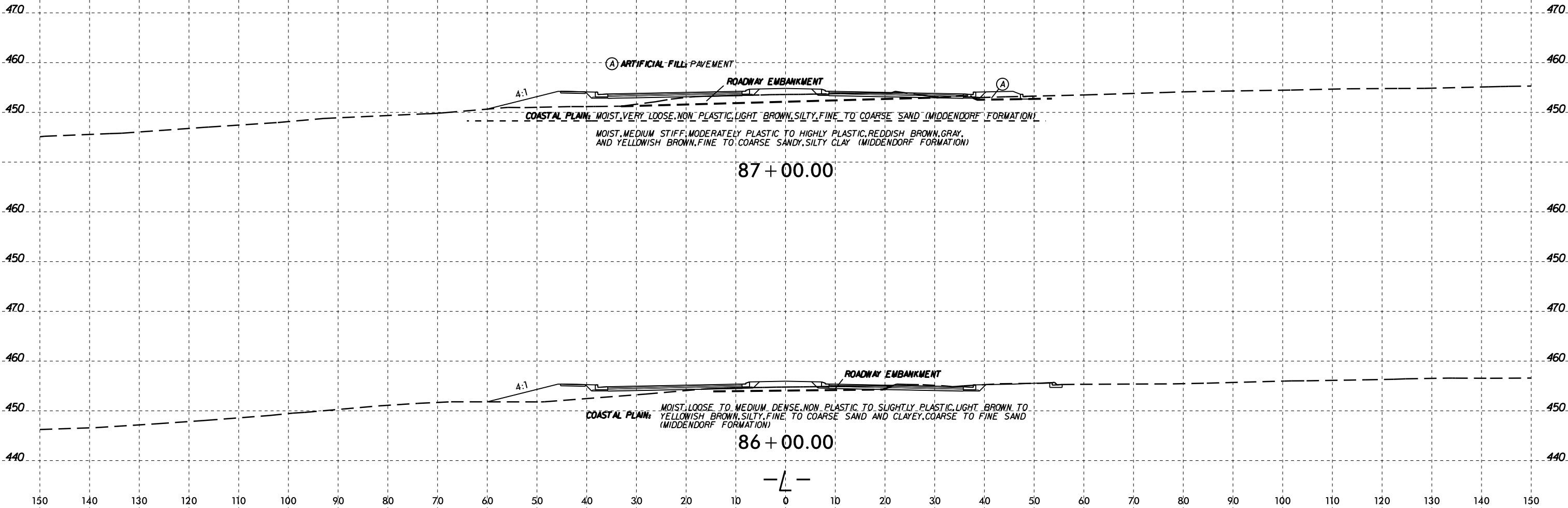
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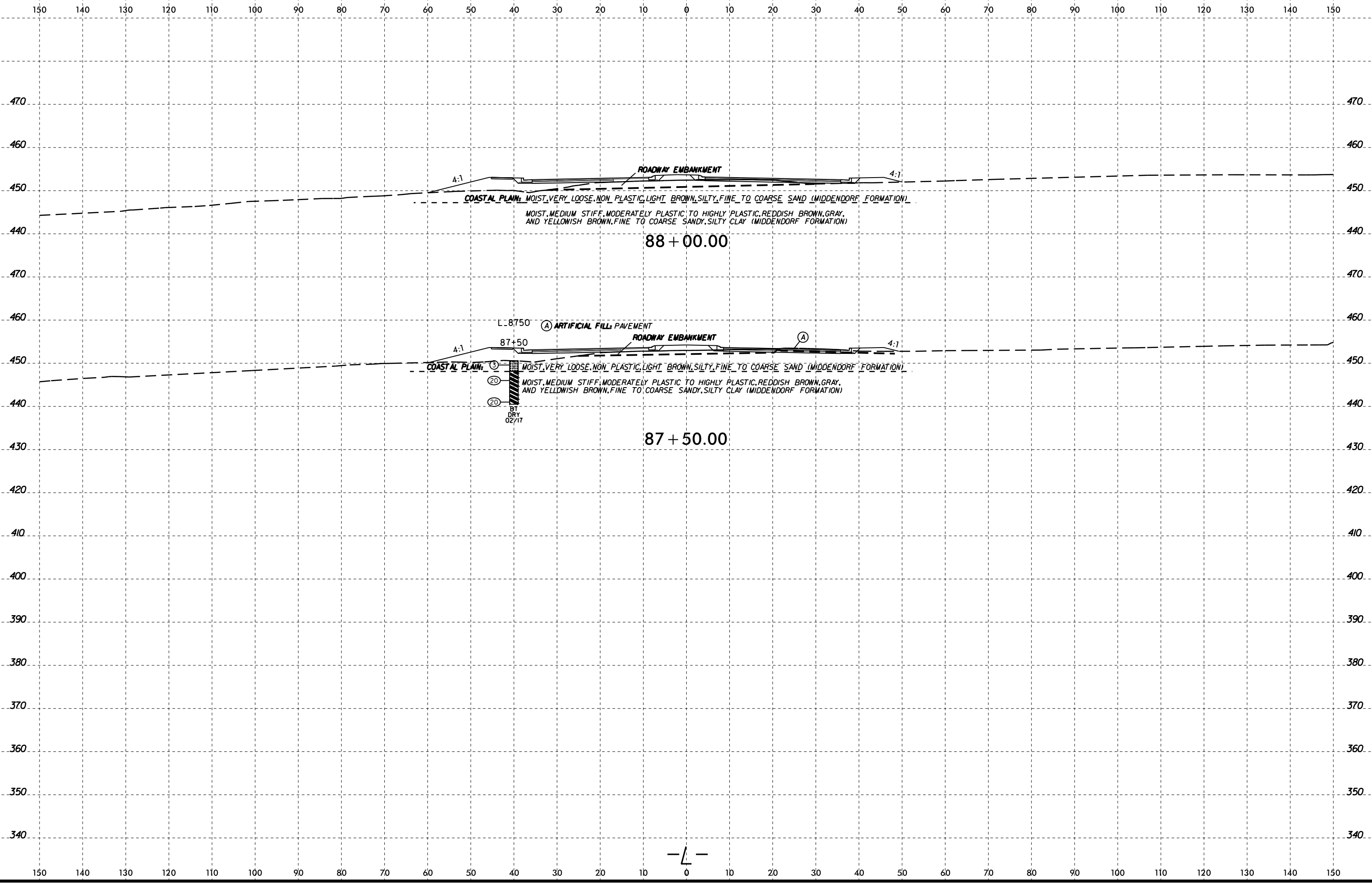




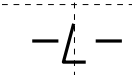


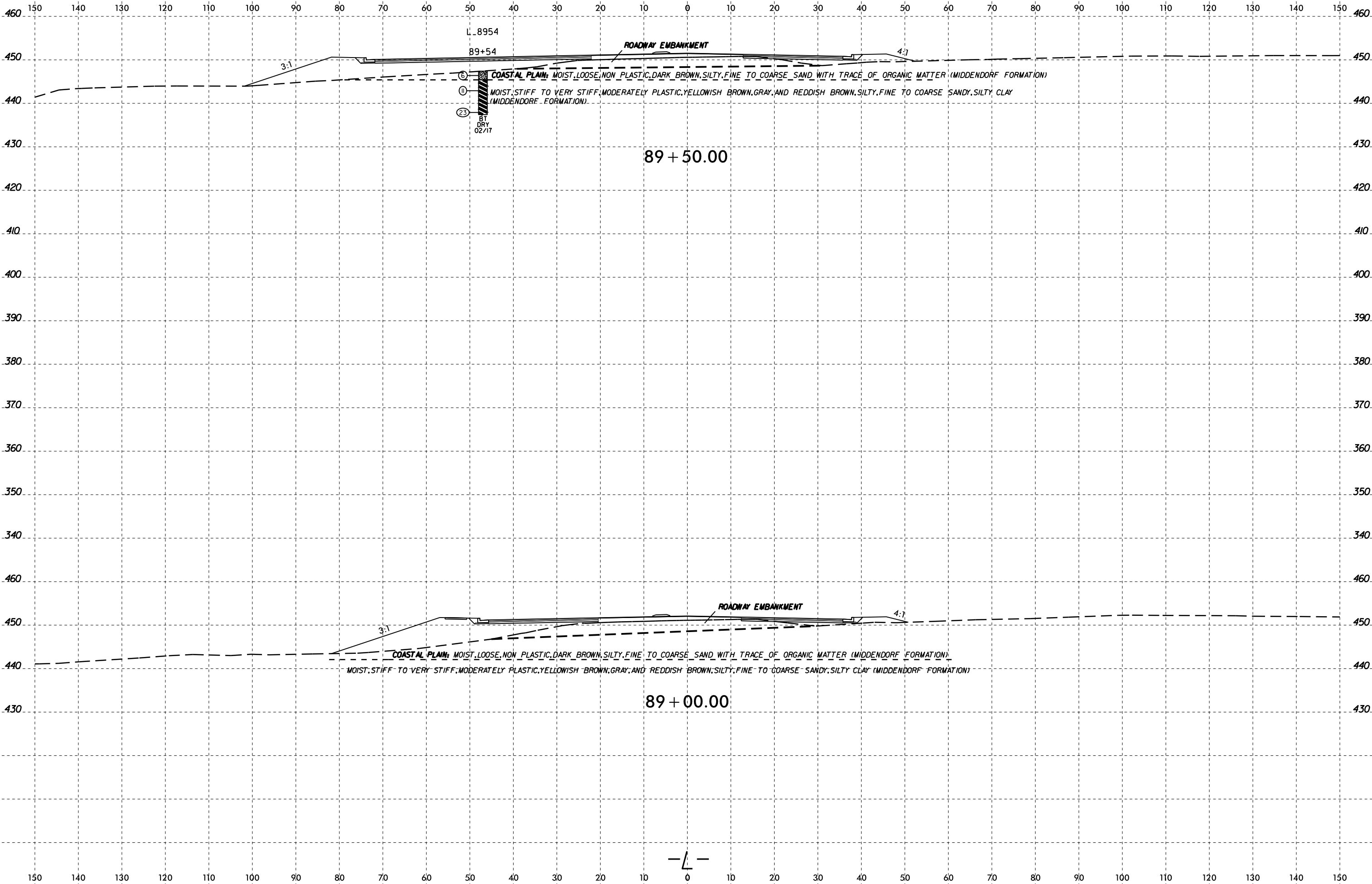
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 J. Johnson

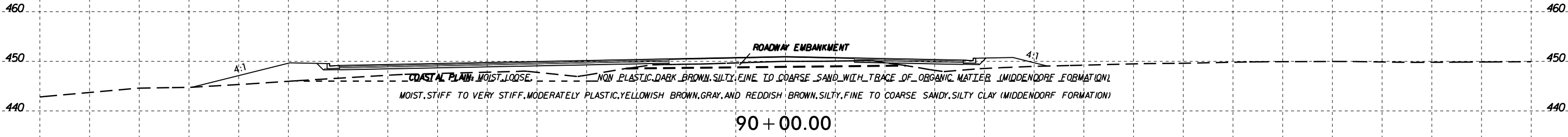
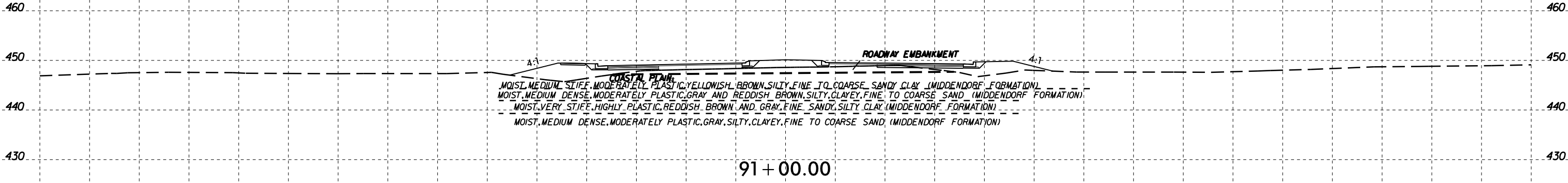




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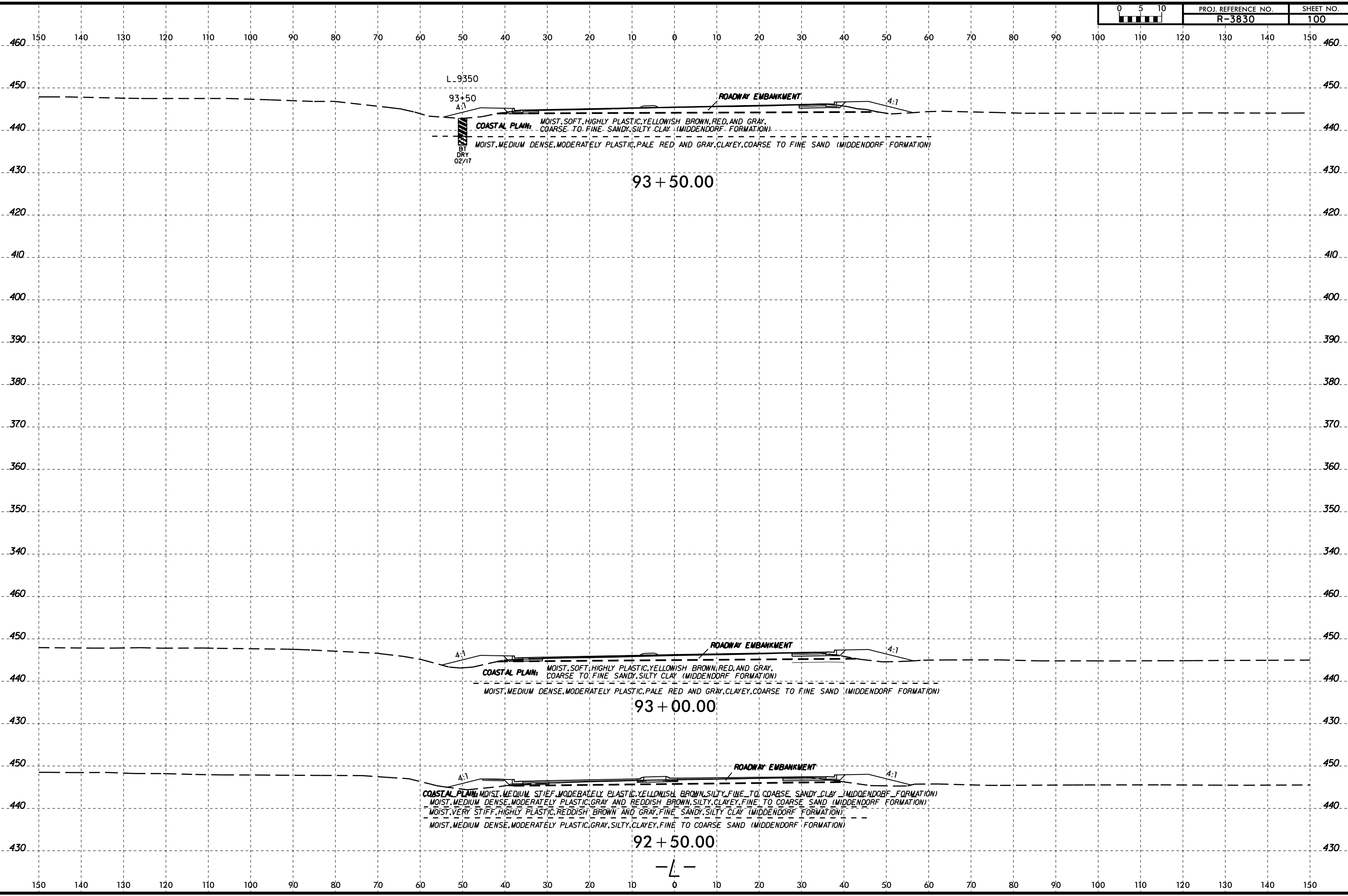


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03-MAY-2017 10:58  
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L:\K2\6666



L\_9350  
93+50  
4:1  
ROADWAY EMBANKMENT  
4:1  
COASTAL PLAIN: MOIST, SOFT, HIGHLY PLASTIC, YELLOWISH BROWN, RED, AND GRAY, COARSE TO FINE SANDY, SILTY CLAY (MIDDENDORF FORMATION)  
MOIST, MEDIUM DENSE, MODERATELY PLASTIC, PALE RED AND GRAY, CLAYEY, COARSE TO FINE SAND (MIDDENDORF FORMATION)

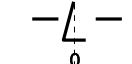
93 + 50.00

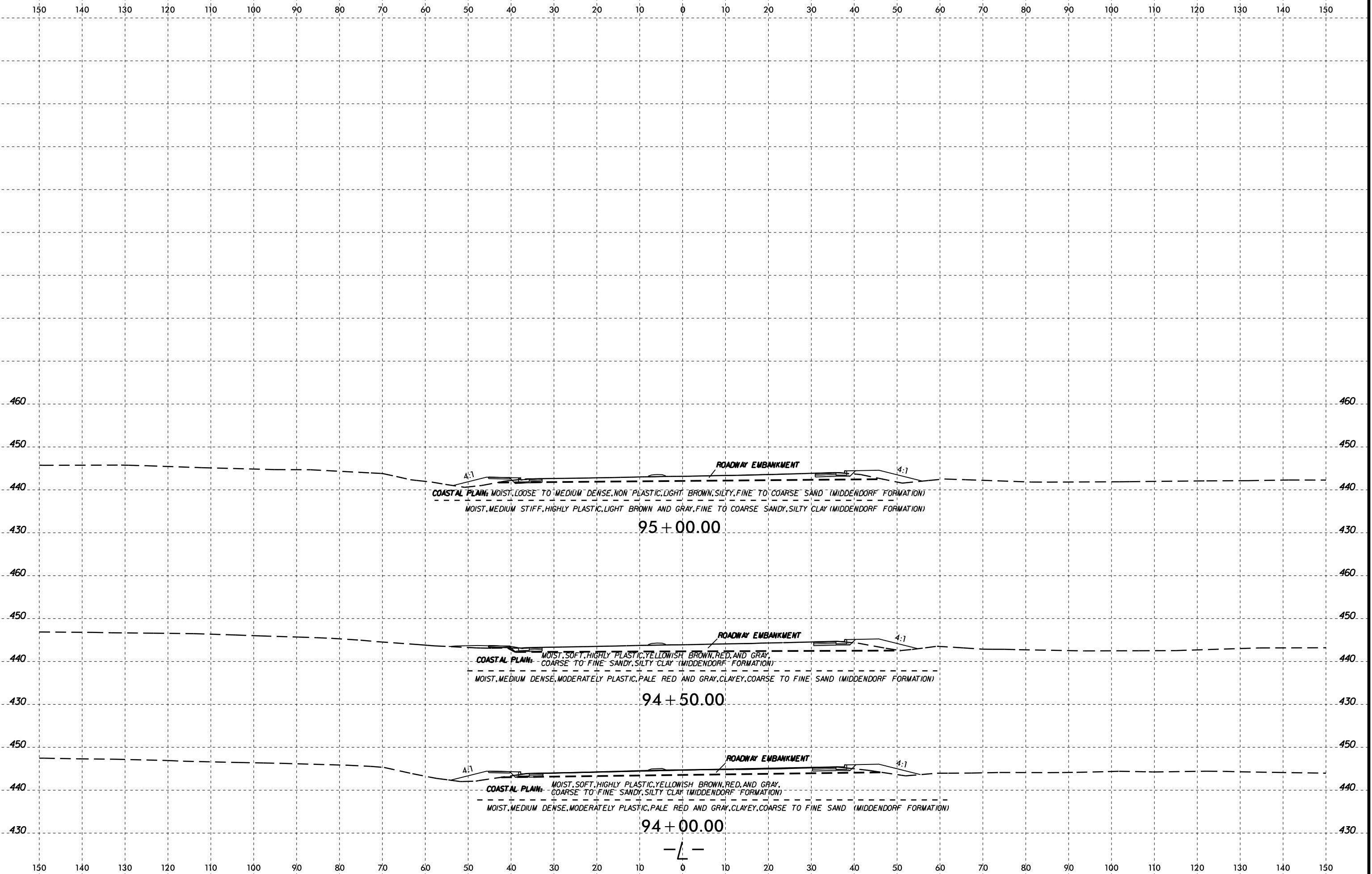
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ROADWAY EMBANKMENT  
4:1  
COASTAL PLAIN: MOIST, SOFT, HIGHLY PLASTIC, YELLOWISH BROWN, RED, AND GRAY, COARSE TO FINE SANDY, SILTY CLAY (MIDDENDORF FORMATION)  
MOIST, MEDIUM DENSE, MODERATELY PLASTIC, PALE RED AND GRAY, CLAYEY, COARSE TO FINE SAND (MIDDENDORF FORMATION)

93 + 00.00

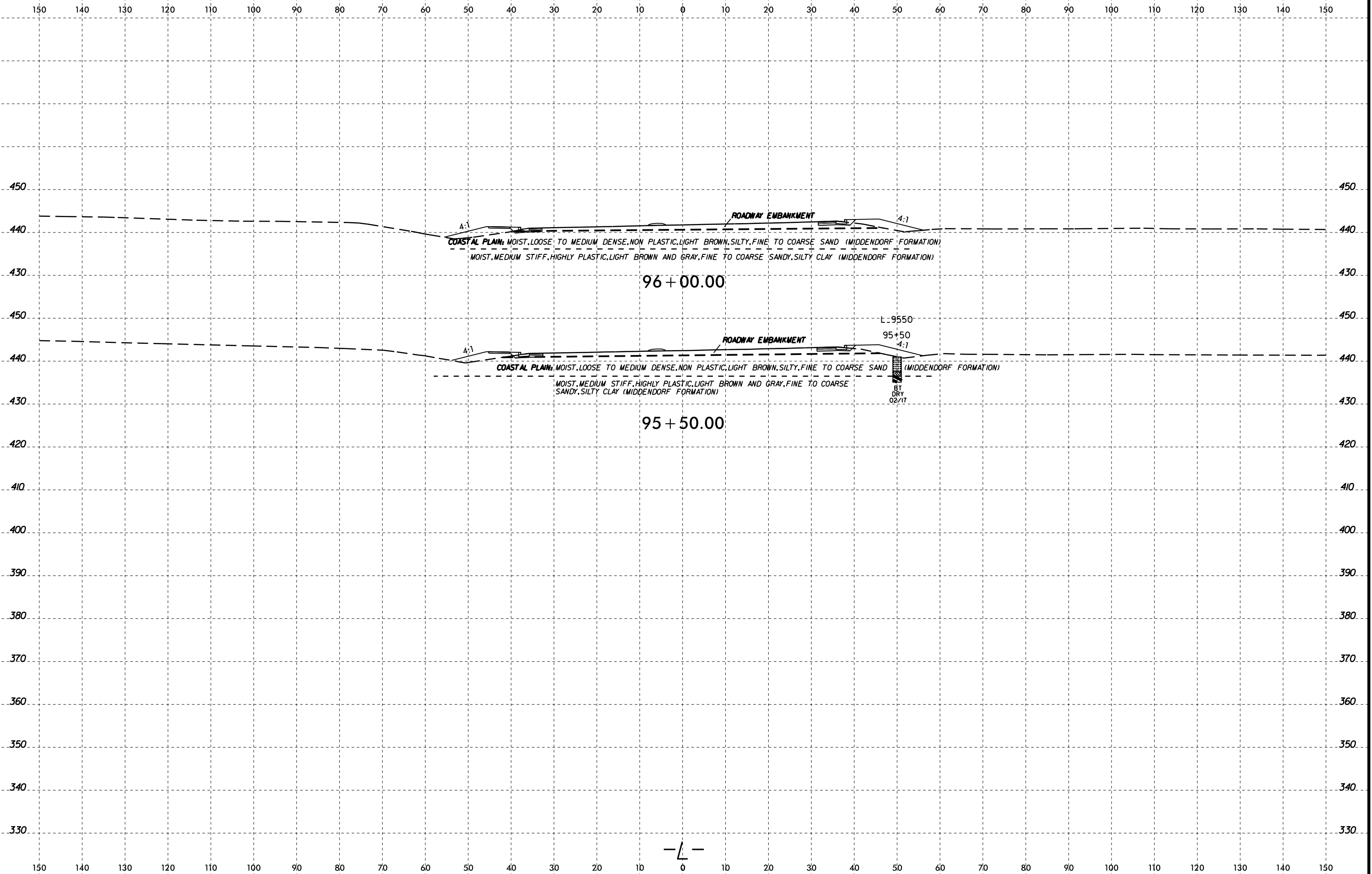
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ROADWAY EMBANKMENT  
4:1  
COASTAL PLAIN: MOIST, MEDIUM STIFF, MODERATELY PLASTIC, YELLOWISH BROWN, SILTY, FINE TO COARSE SANDY CLAY (MIDDENDORF FORMATION)  
MOIST, MEDIUM DENSE, MODERATELY PLASTIC, GRAY AND REDDISH BROWN, SILTY, CLAYEY, FINE TO COARSE SAND (MIDDENDORF FORMATION)  
MOIST, VERY STIFF, HIGHLY PLASTIC, REDDISH BROWN AND GRAY, FINE SANDY, SILTY CLAY (MIDDENDORF FORMATION)  
MOIST, MEDIUM DENSE, MODERATELY PLASTIC, GRAY, SILTY, CLAYEY, FINE TO COARSE SAND (MIDDENDORF FORMATION)

92 + 50.00



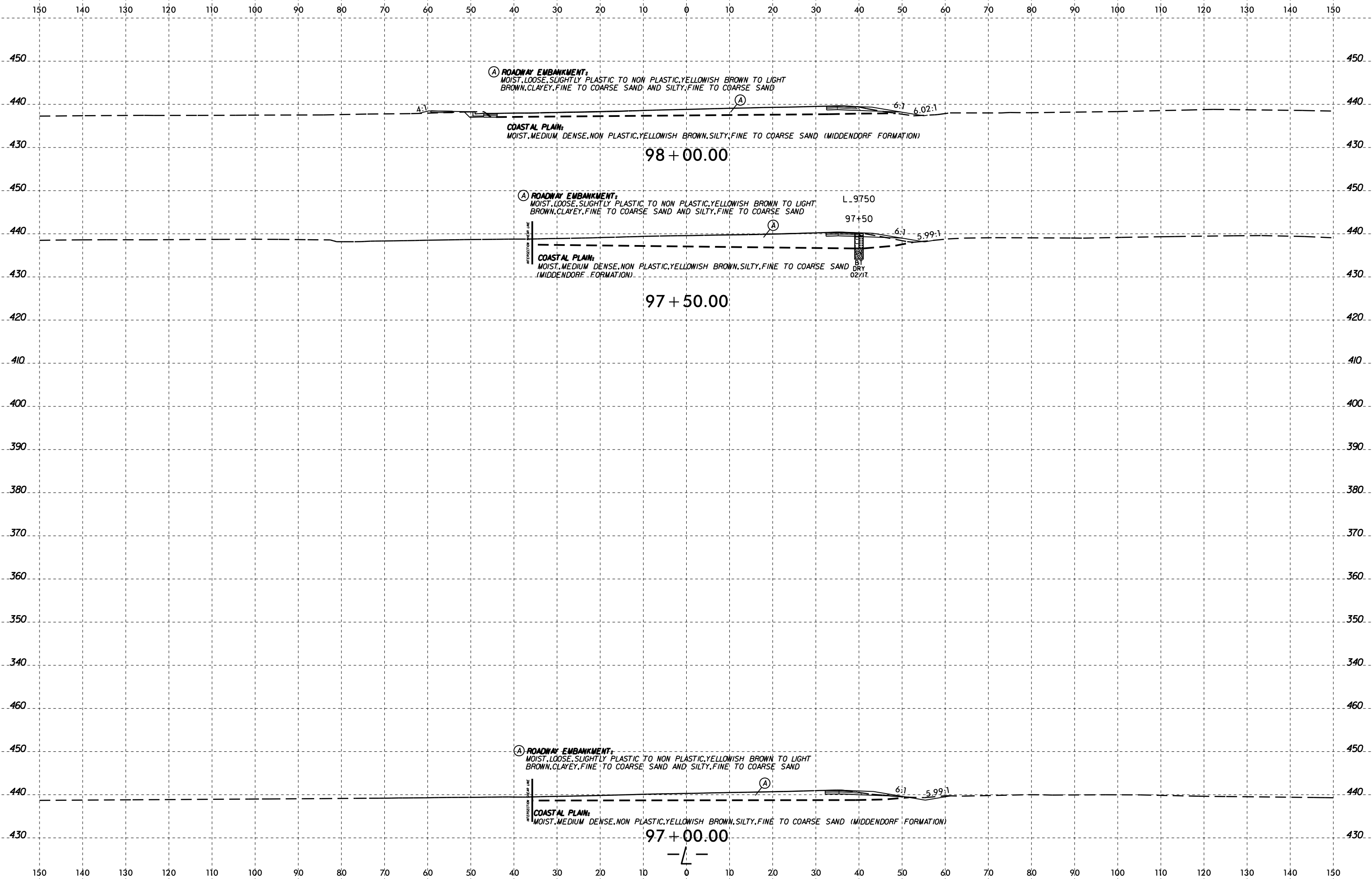


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 ba, johnson



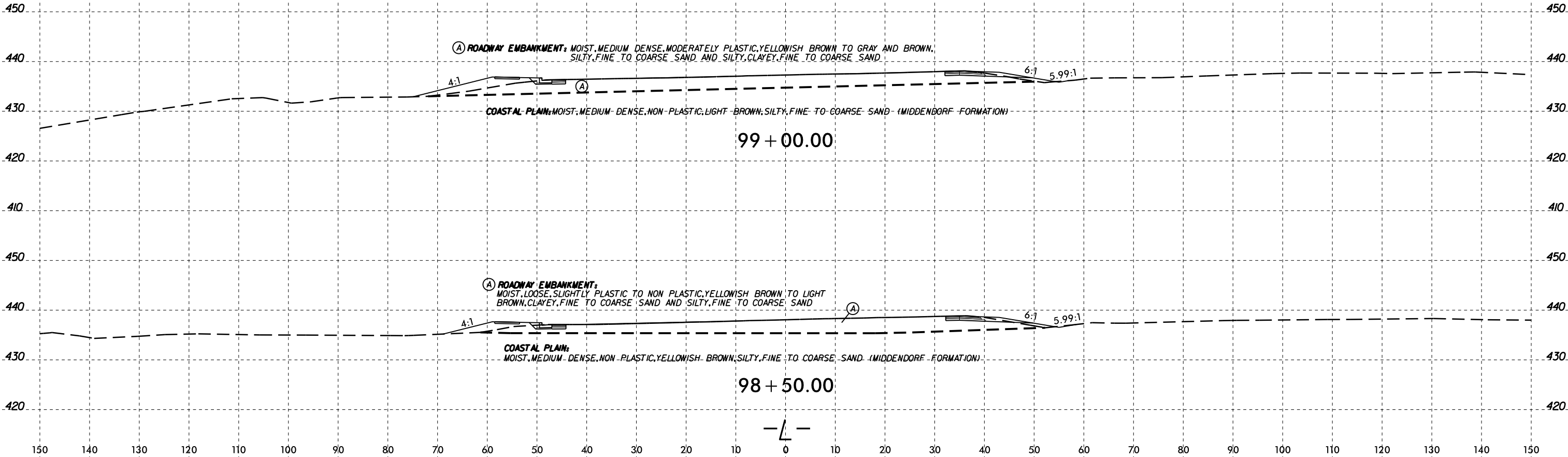
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 ba, johnson



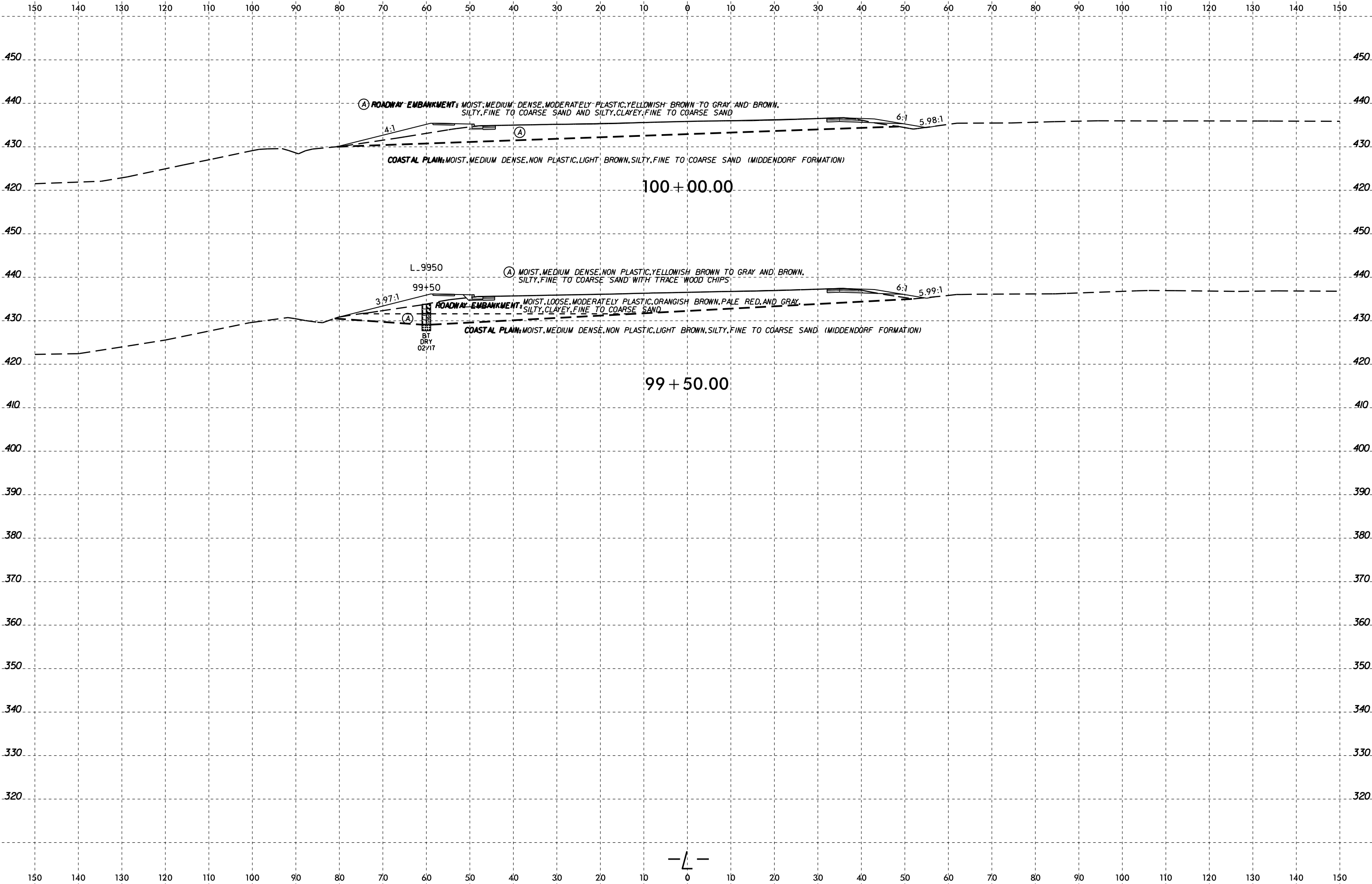




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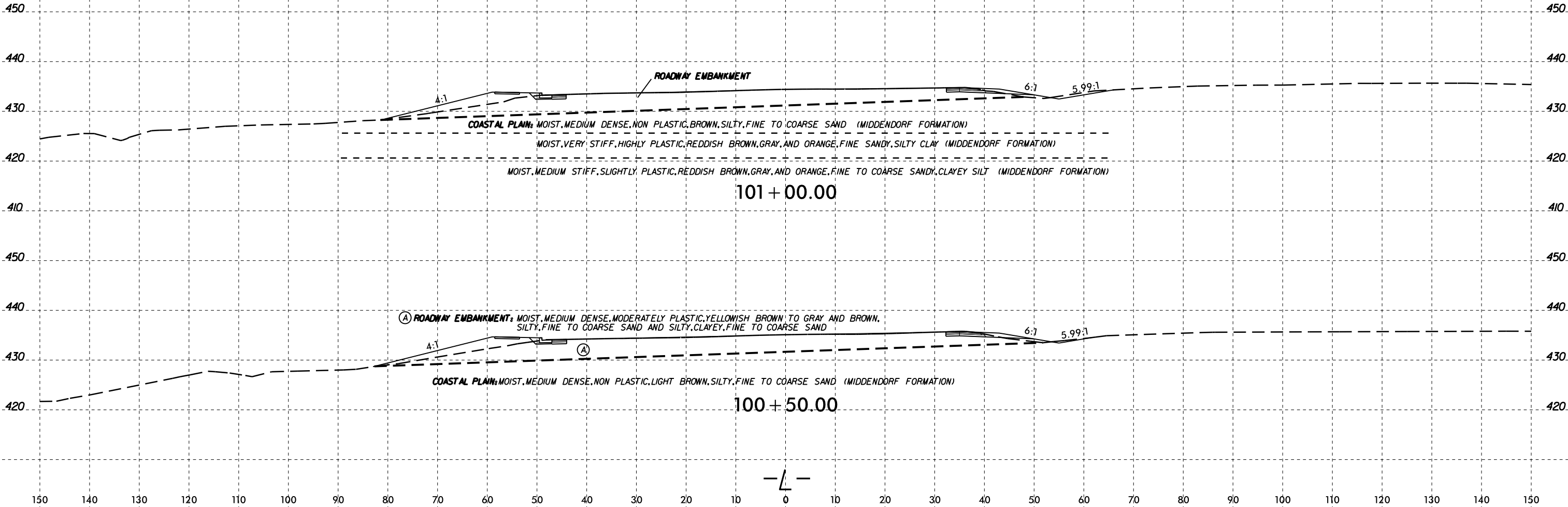
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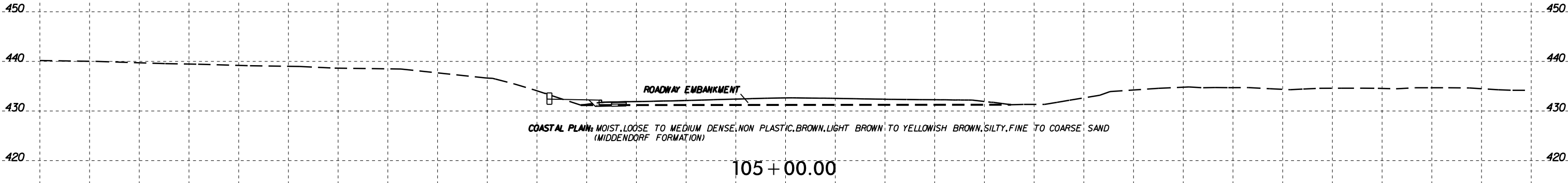
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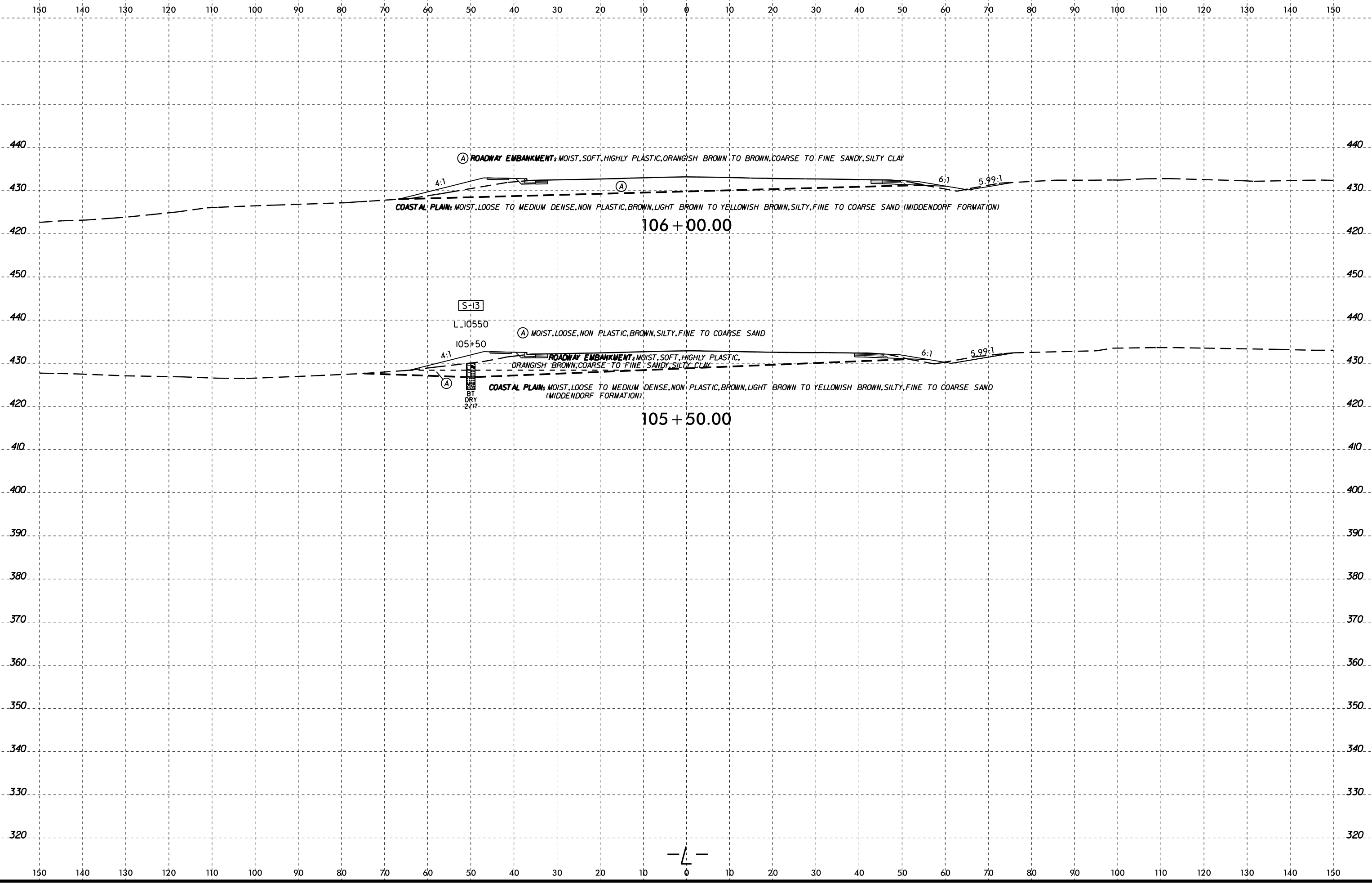


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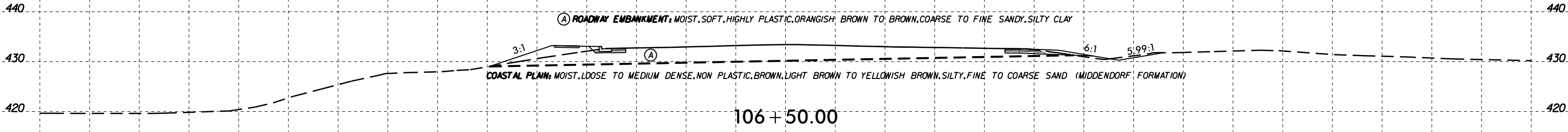
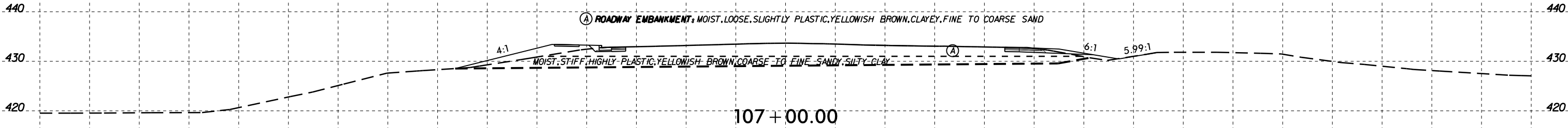




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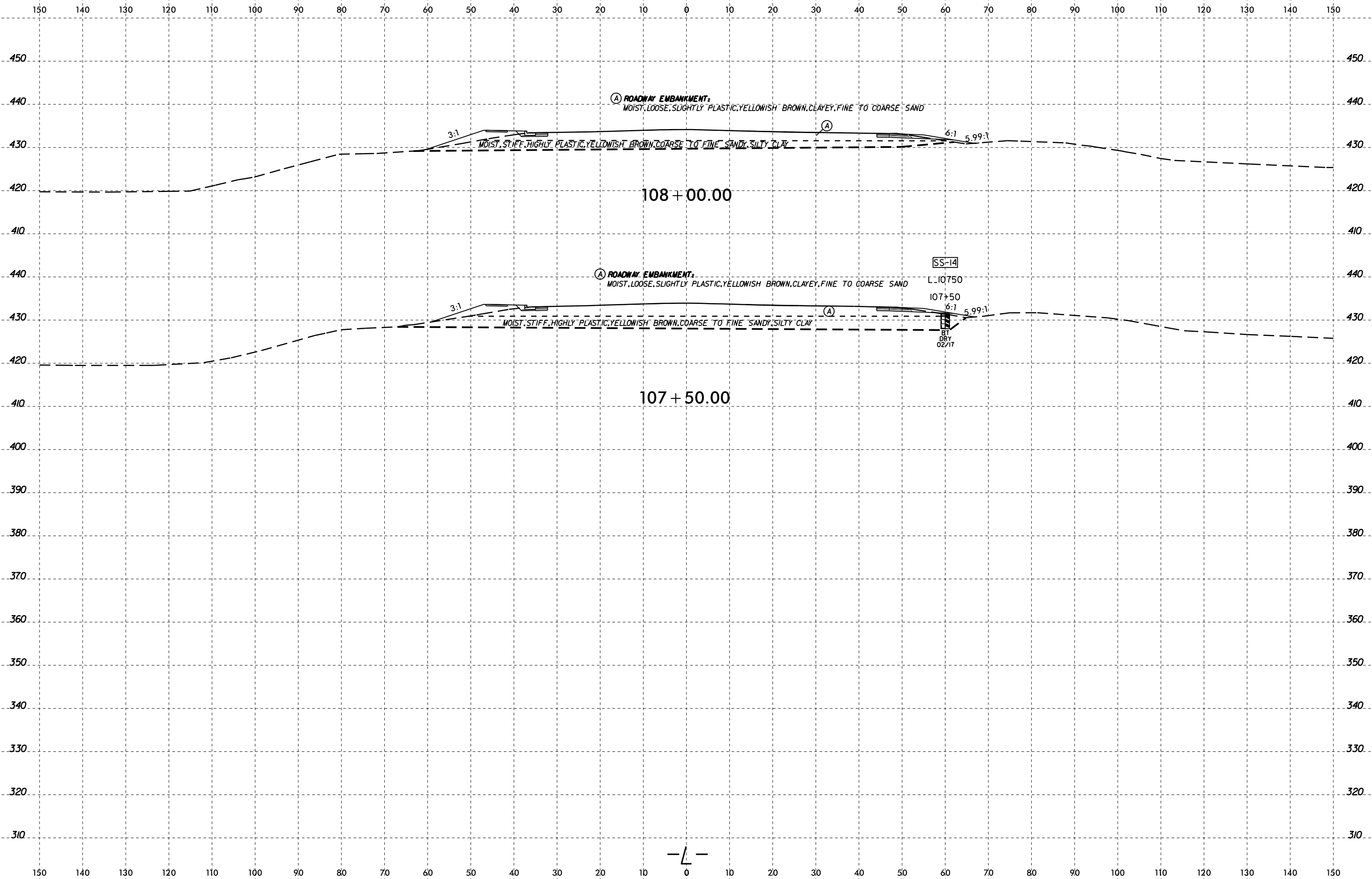


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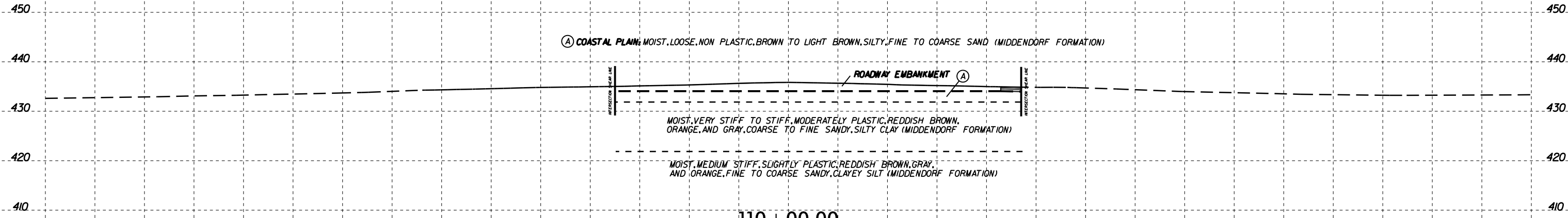
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A: KA206660  
D:\Johnson

03-MAY-2017 11:04  
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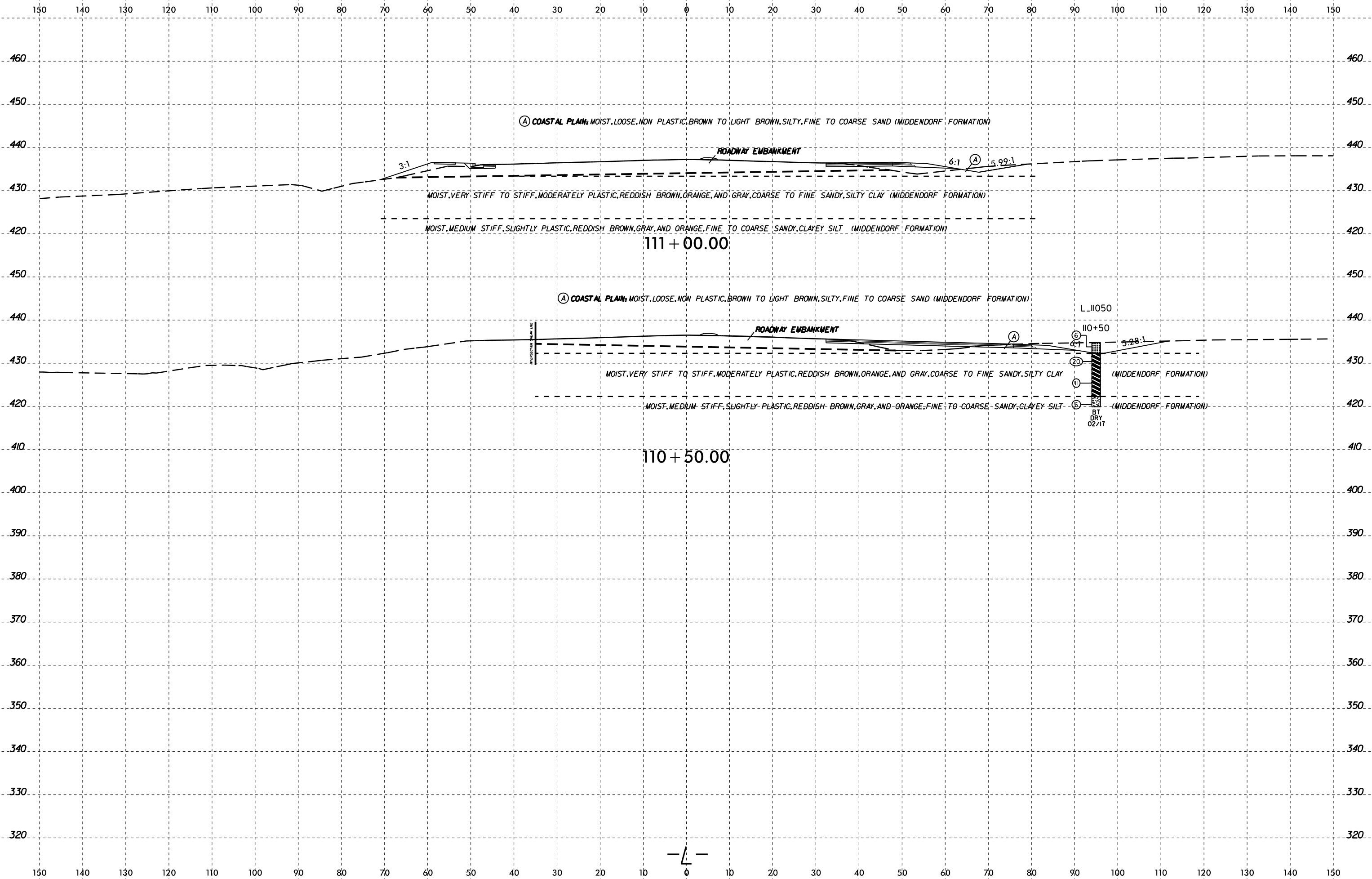
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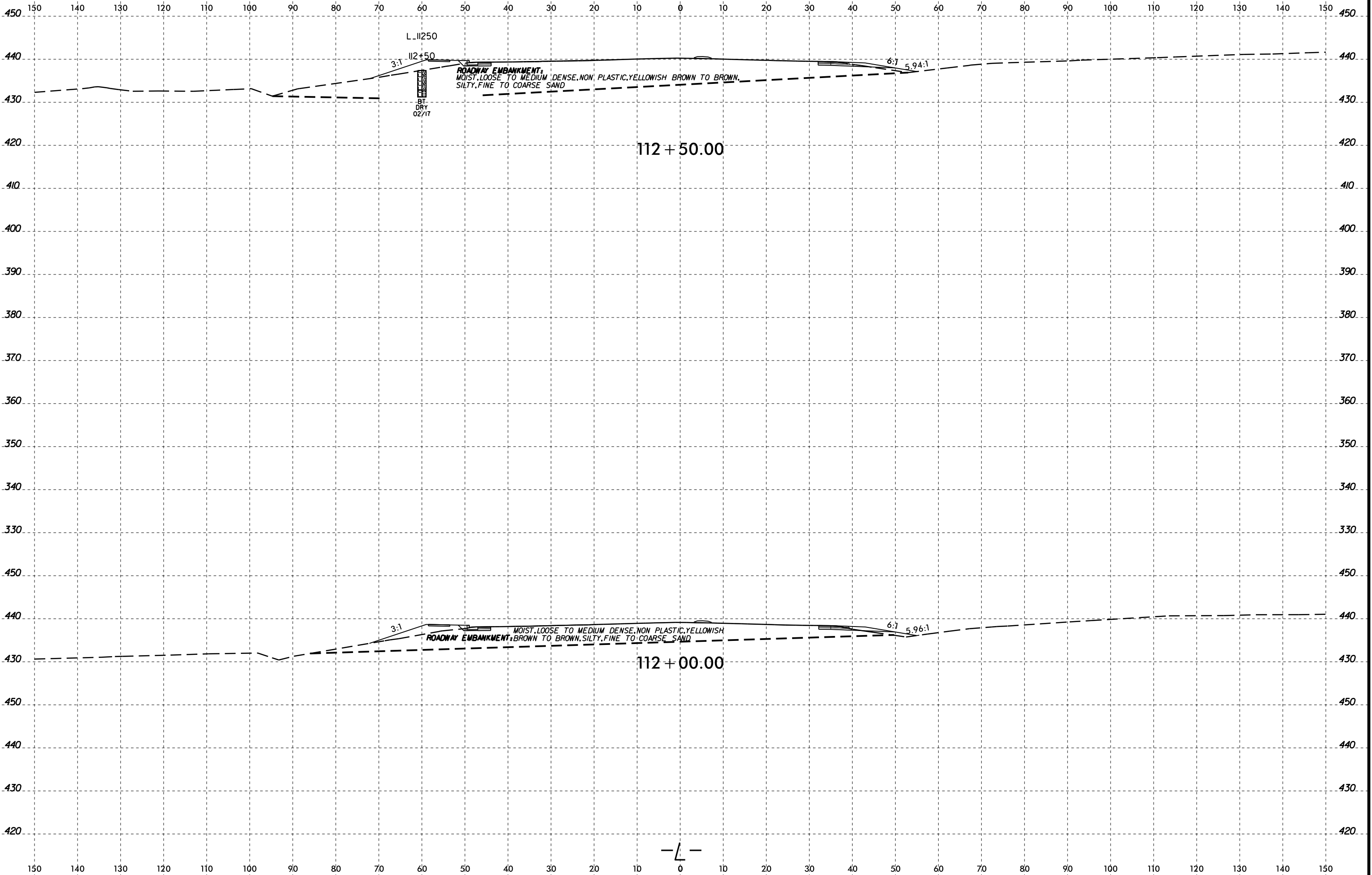
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A1 KA206660

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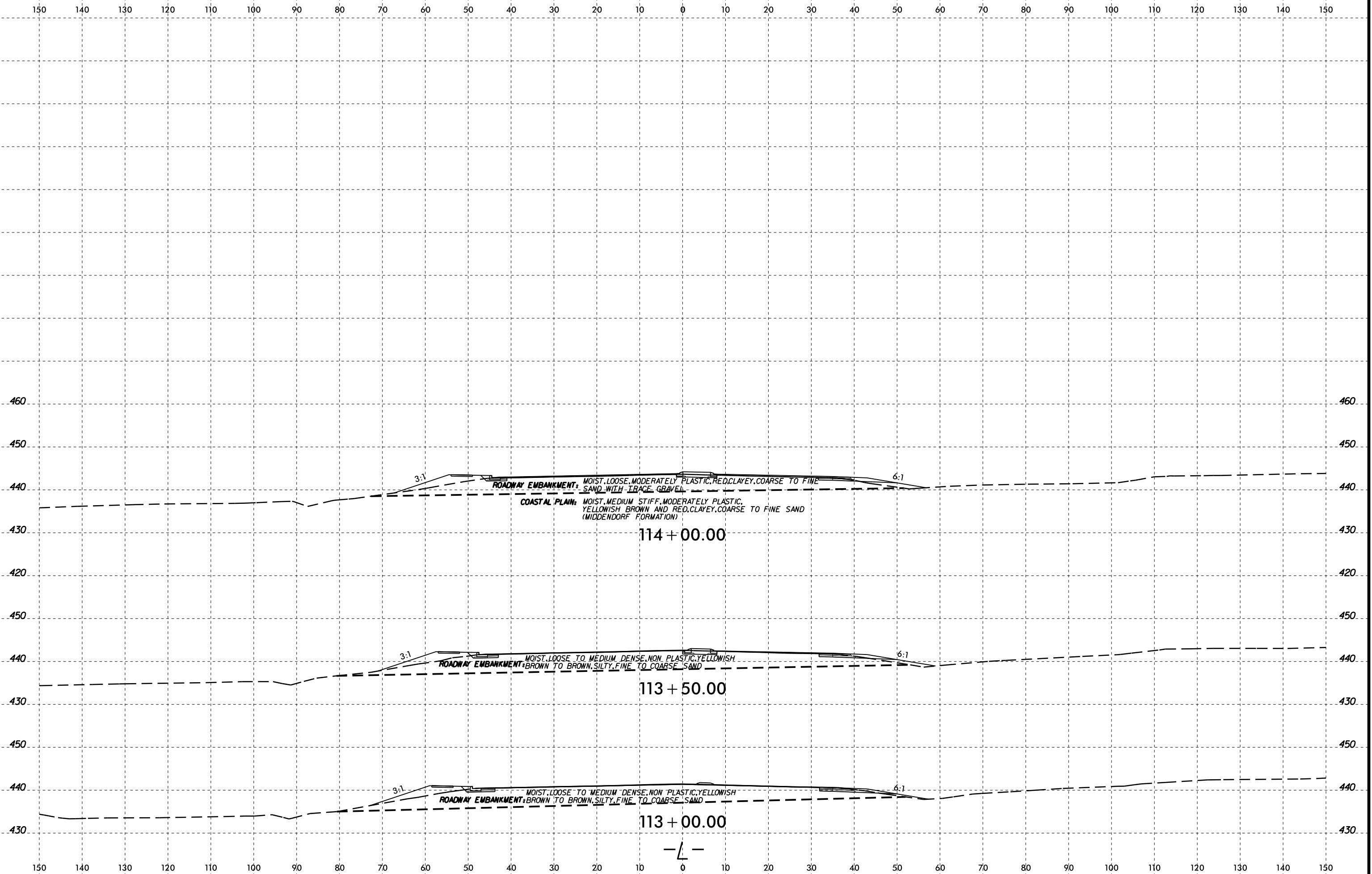




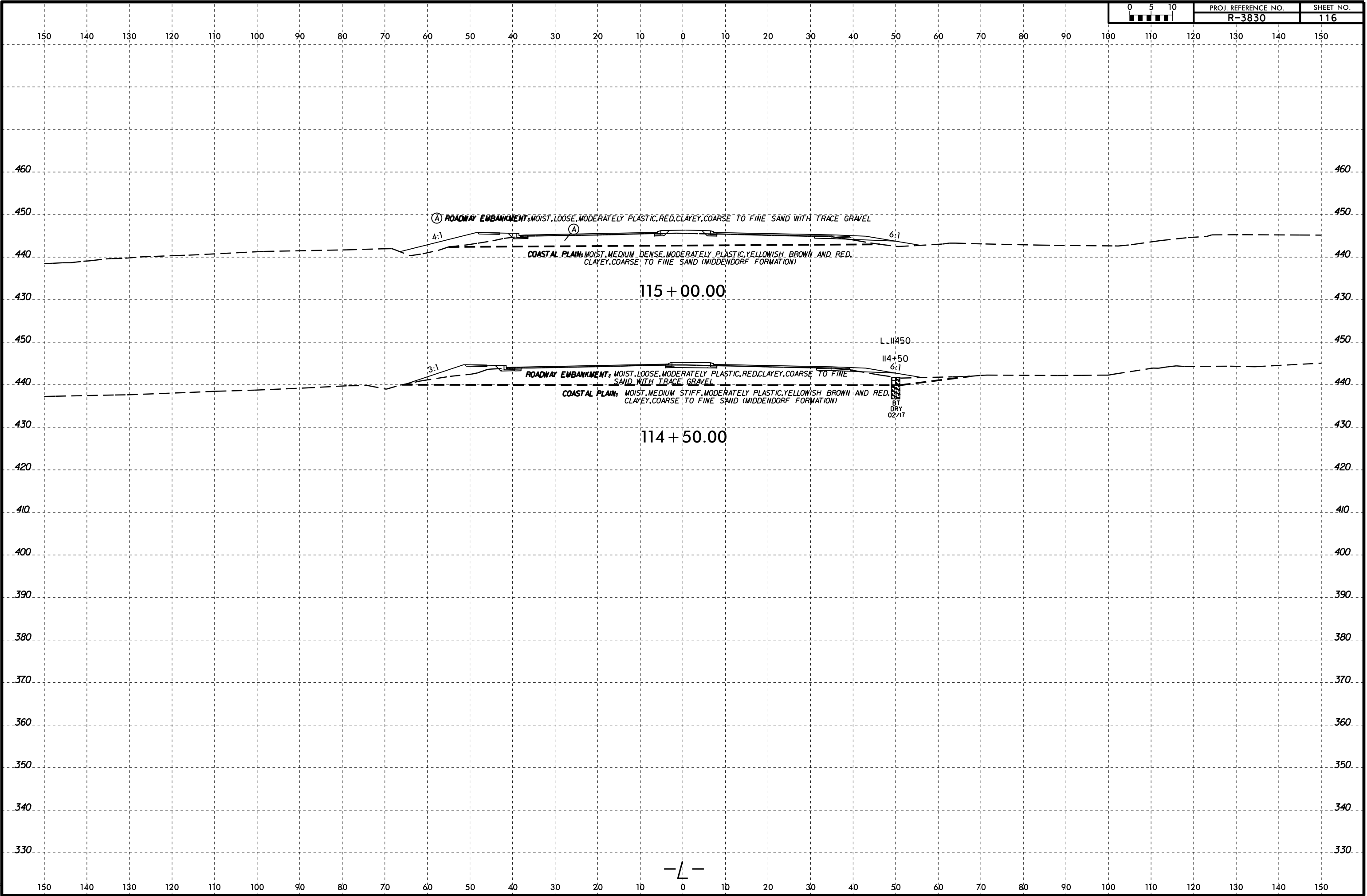


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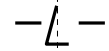
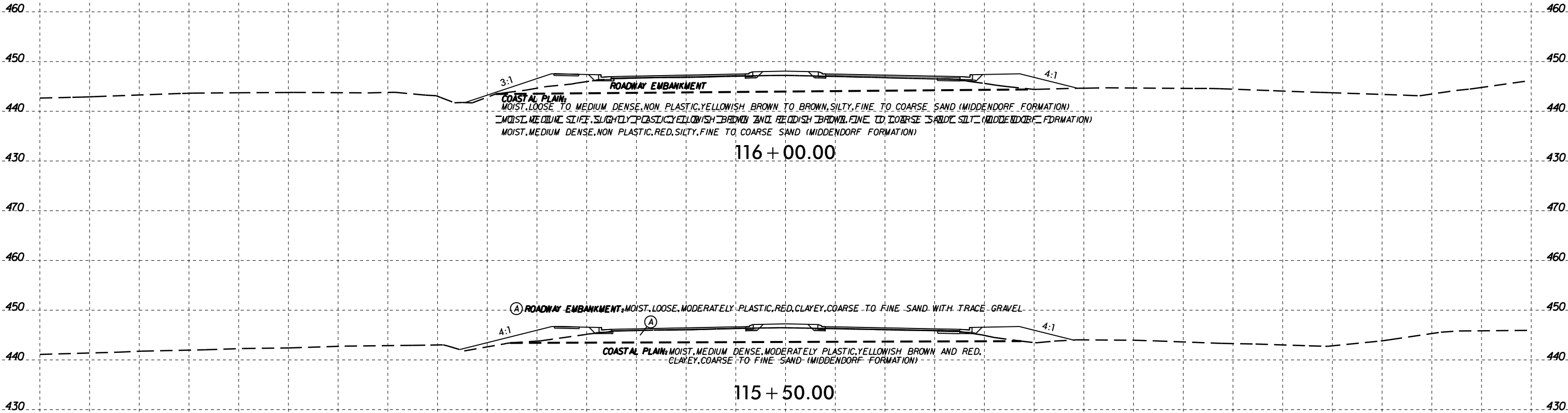


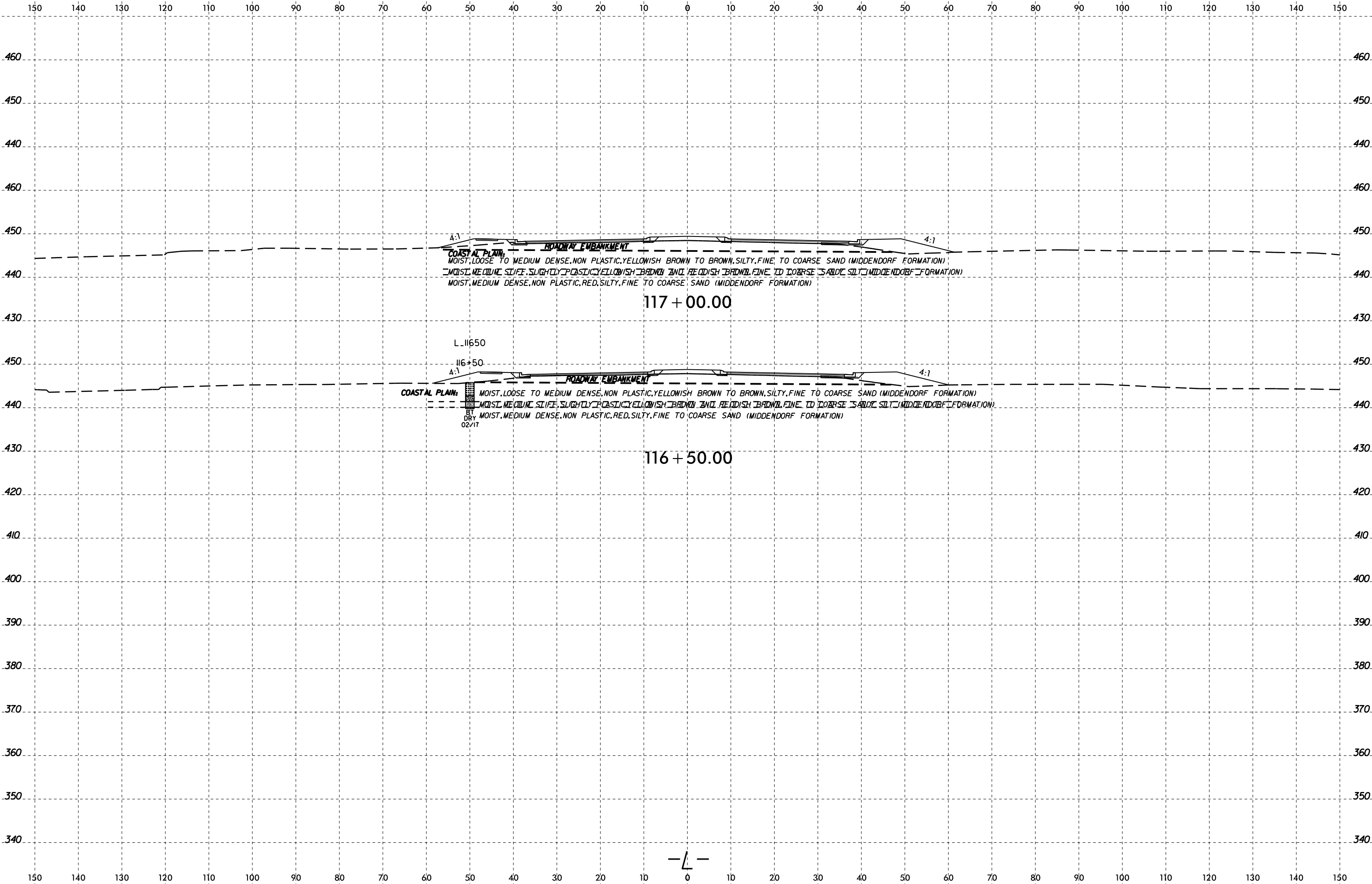


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 J. Johnson

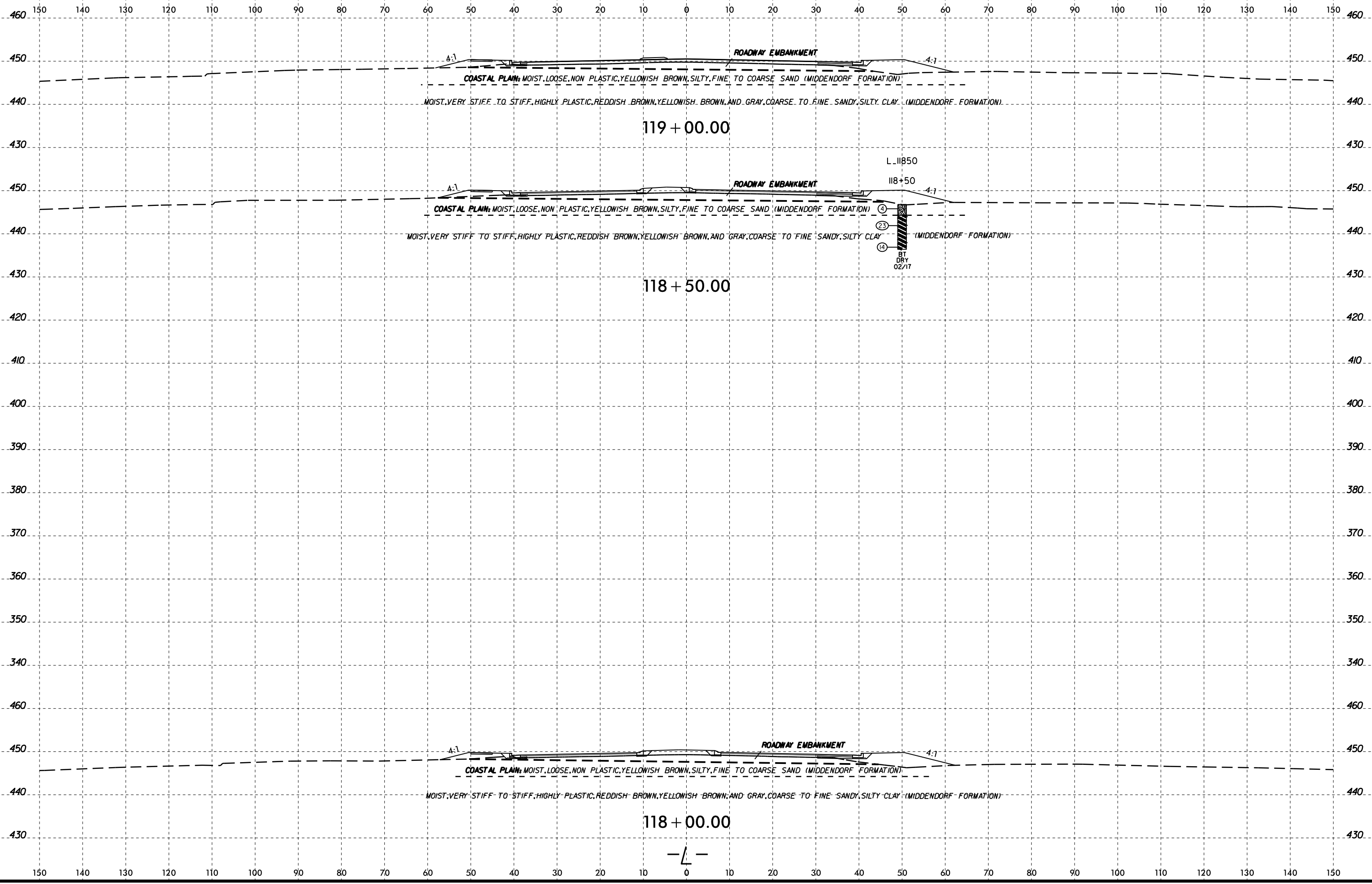


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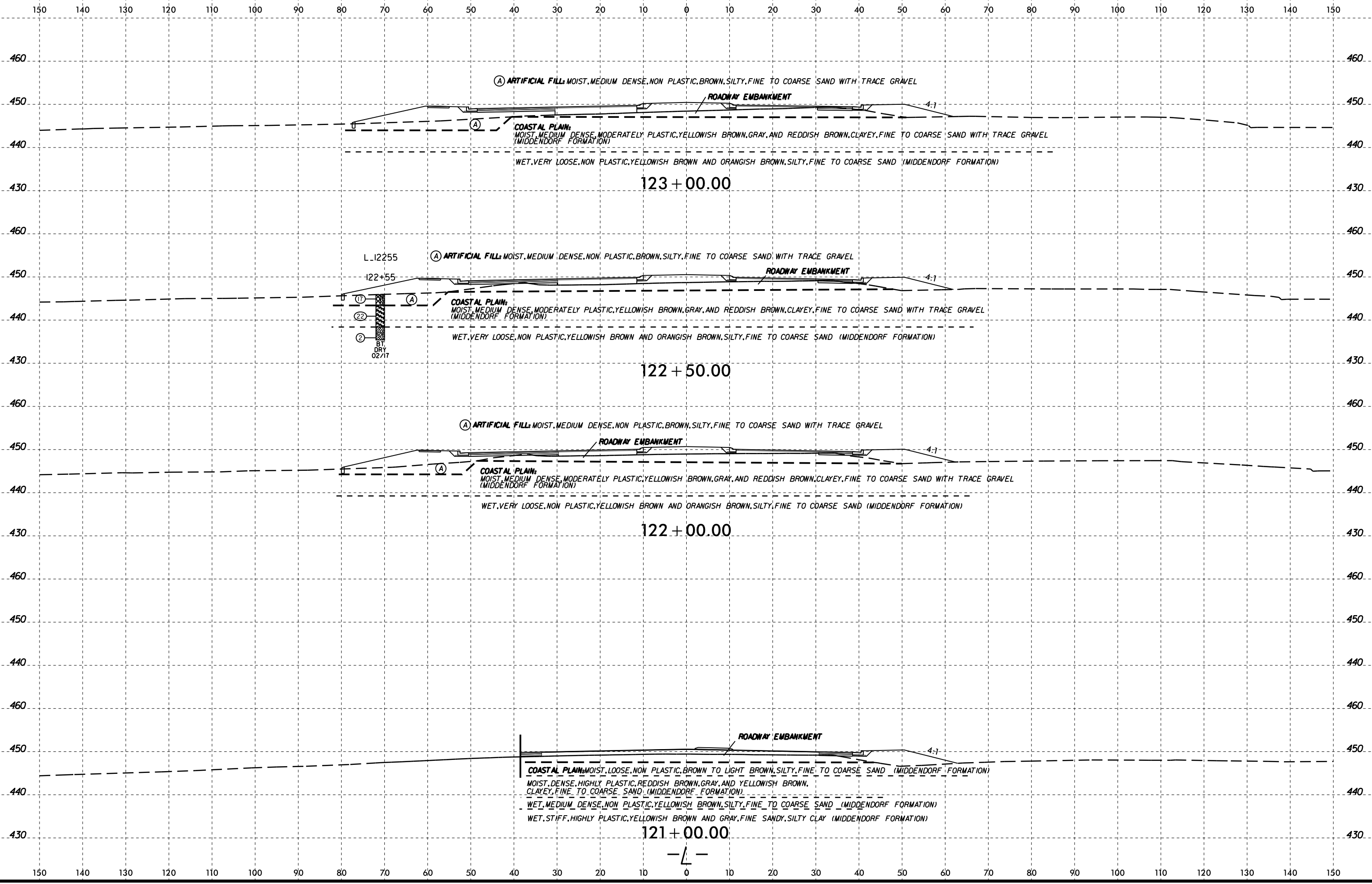
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6/23/16  
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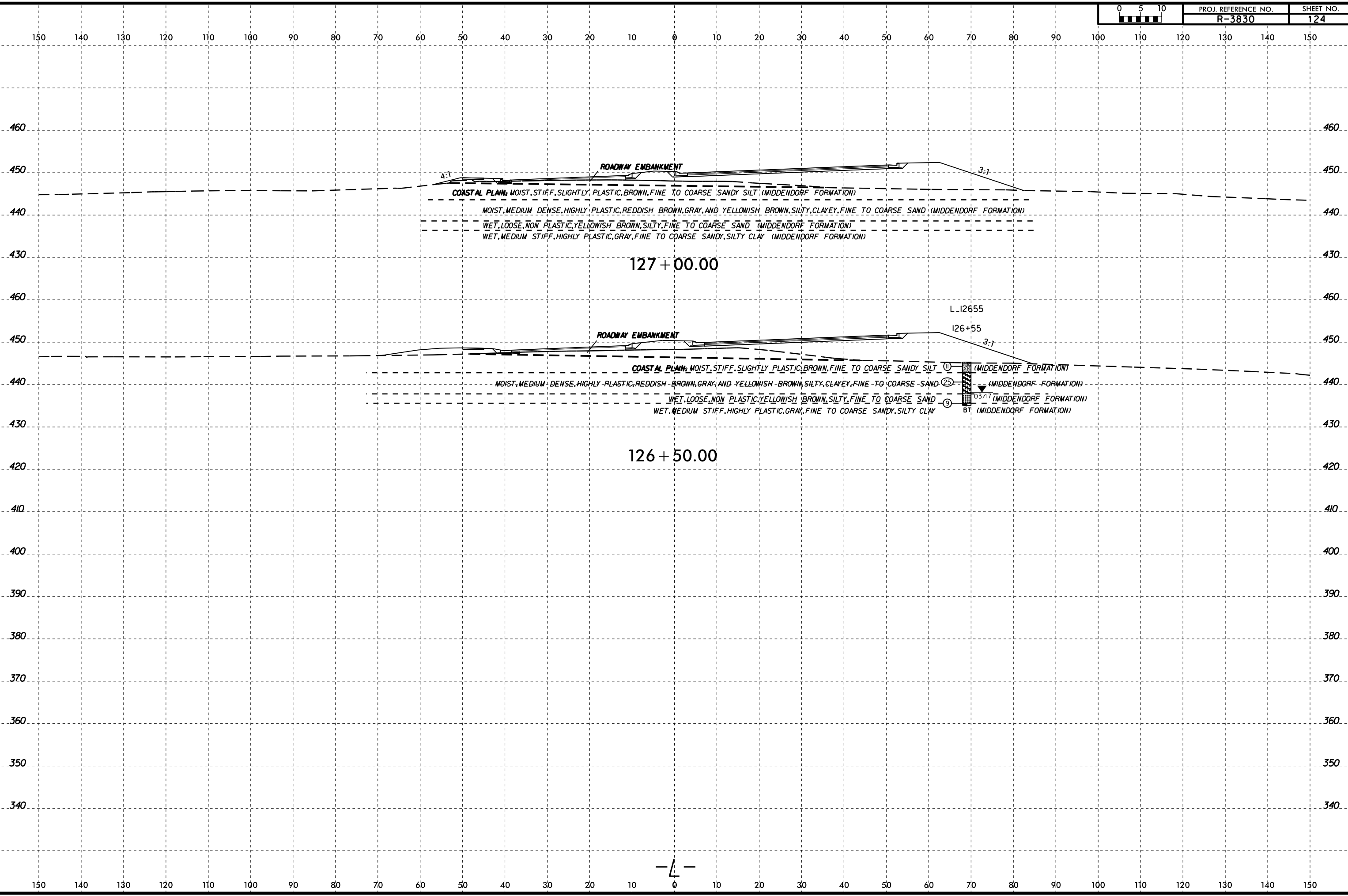






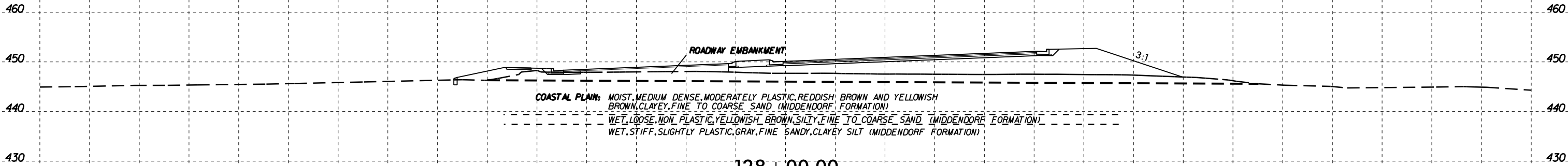


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Bo Johnson

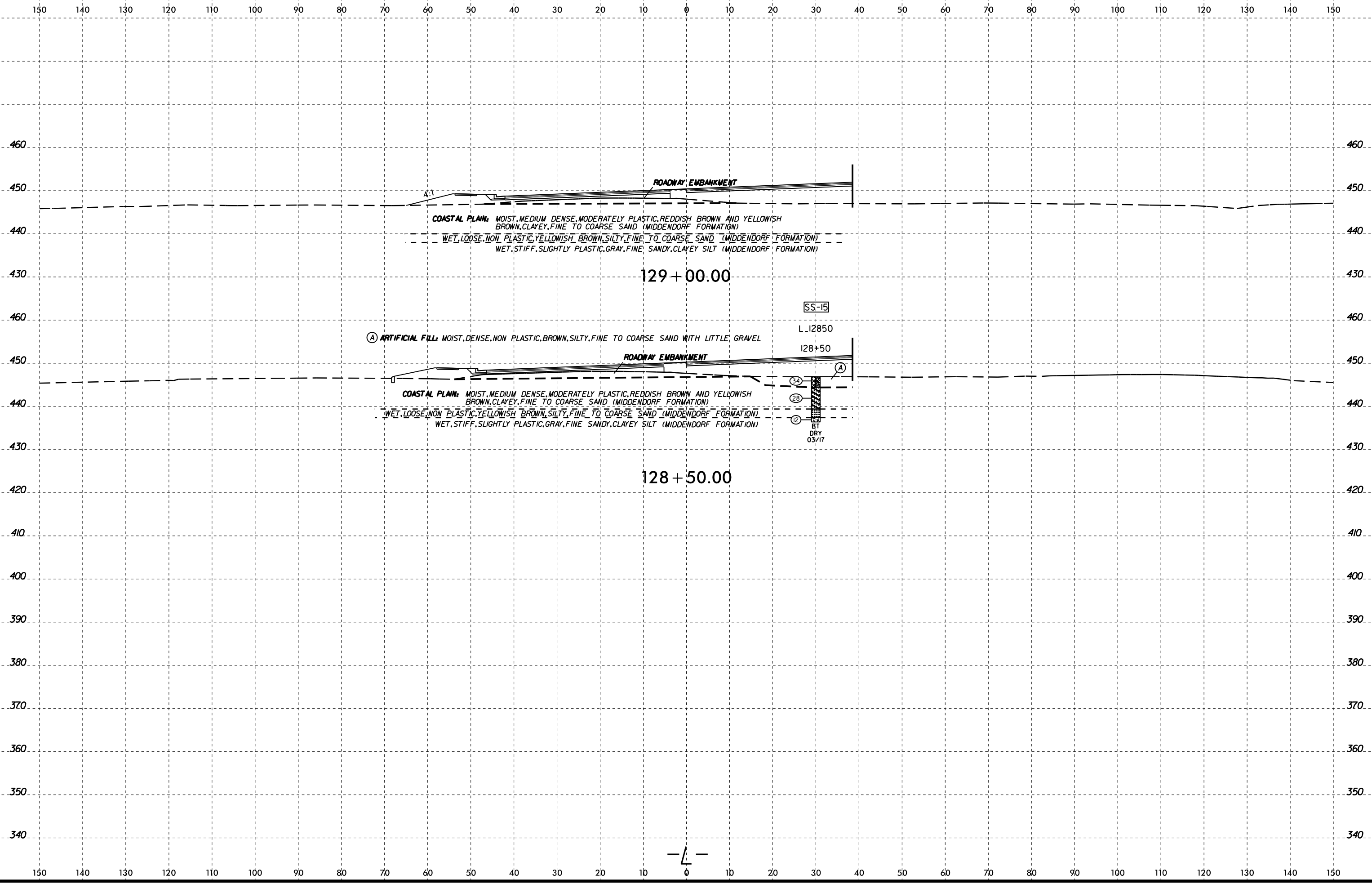




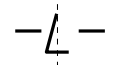
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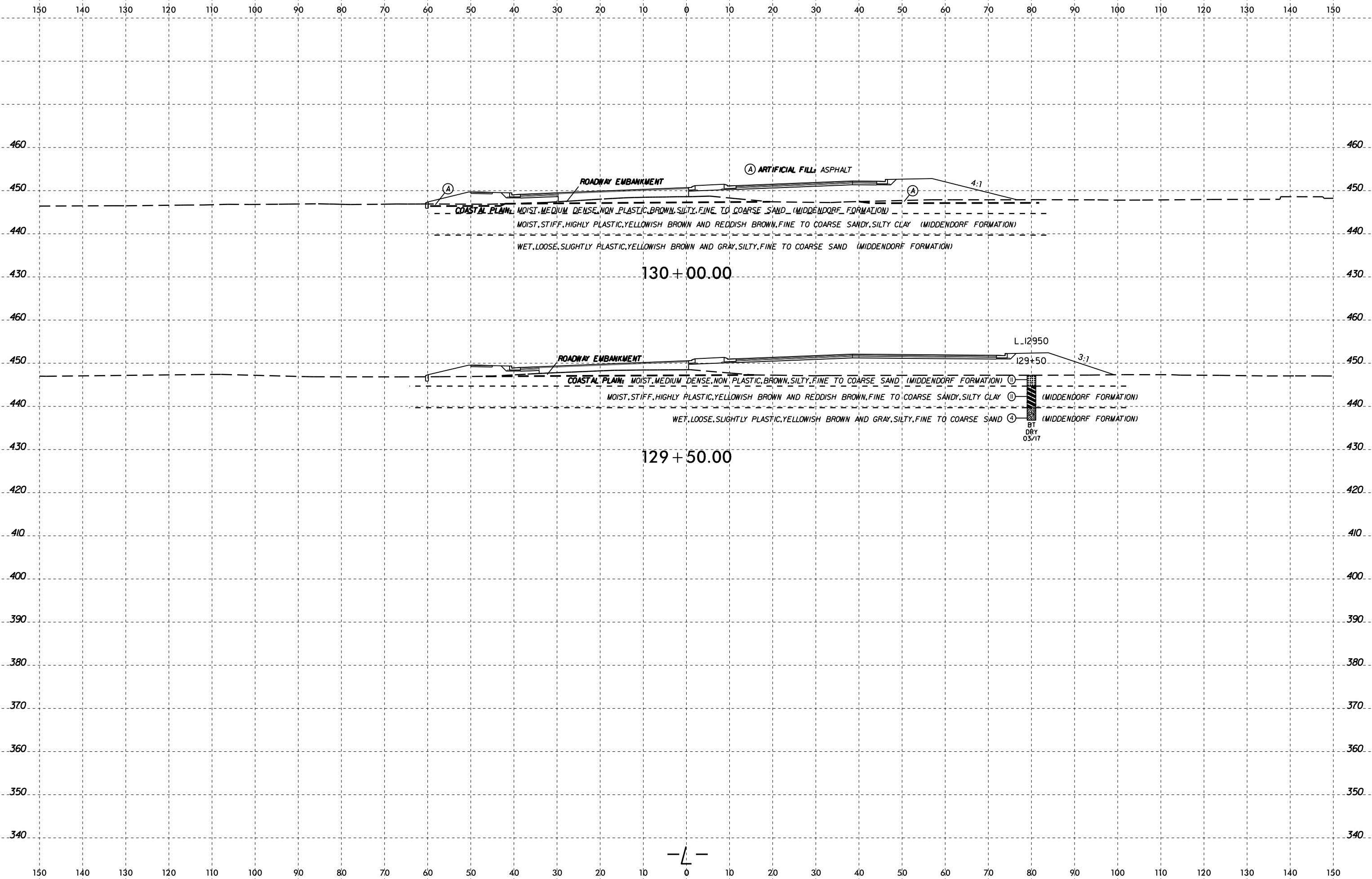


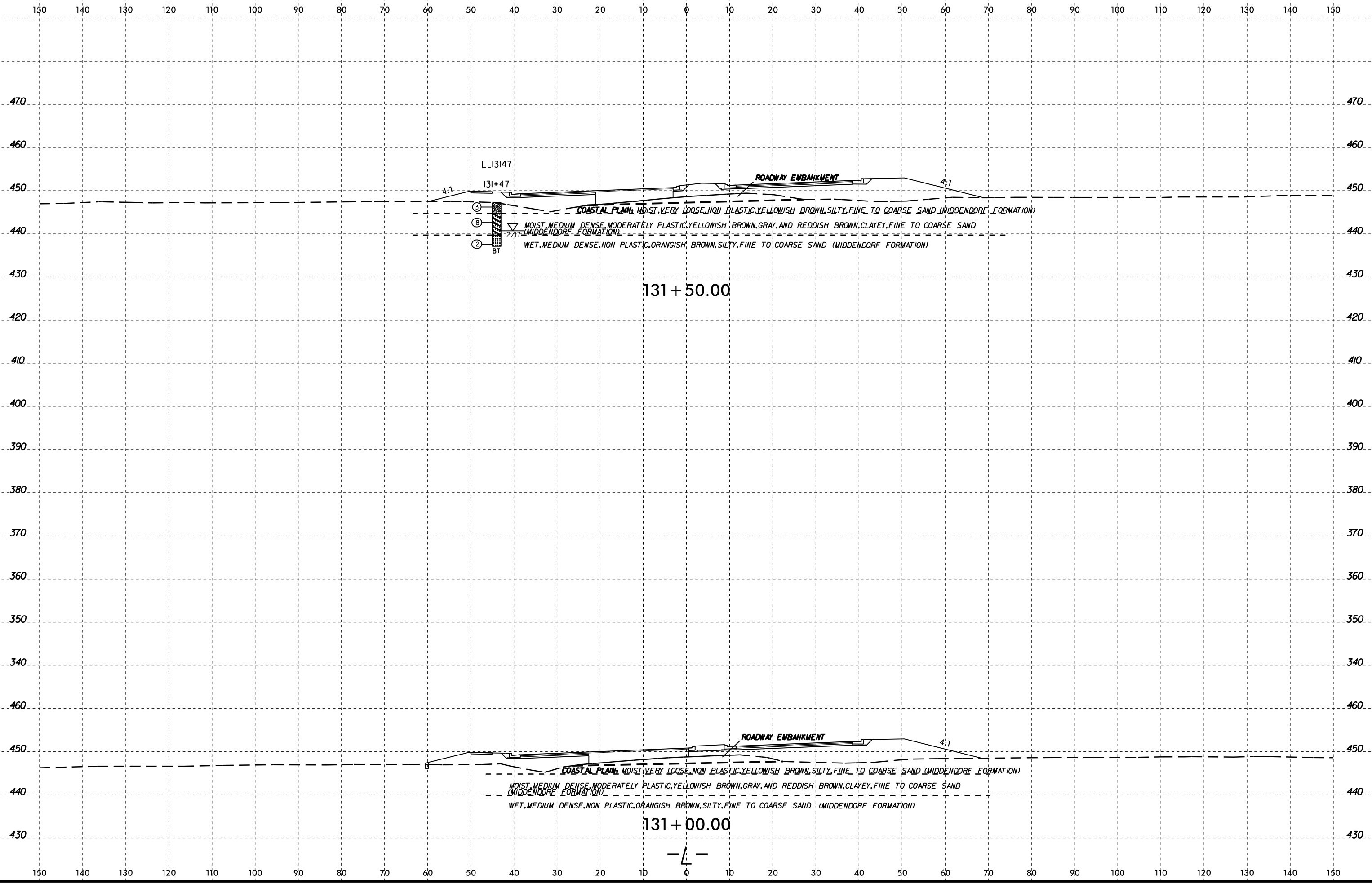
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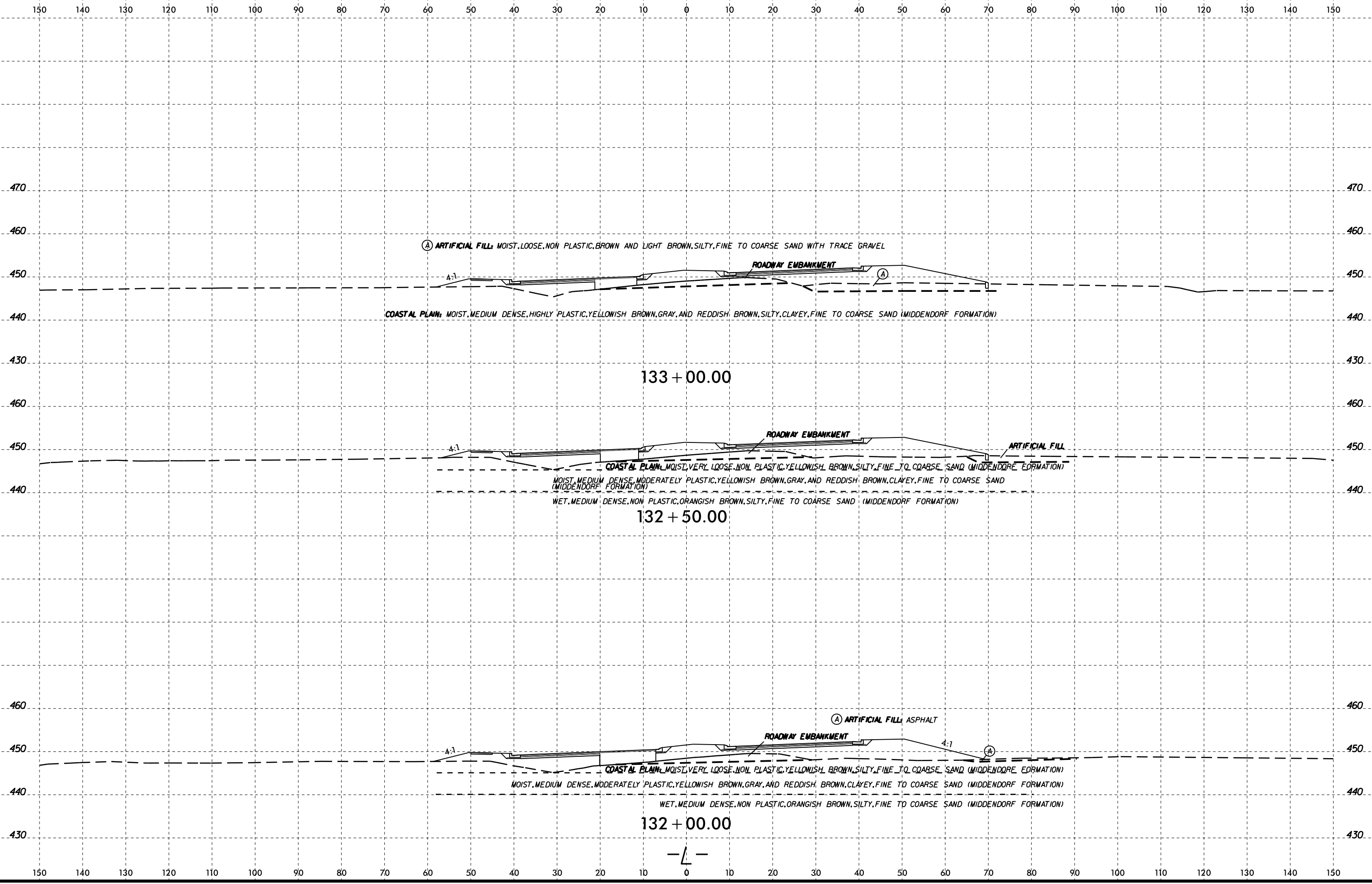
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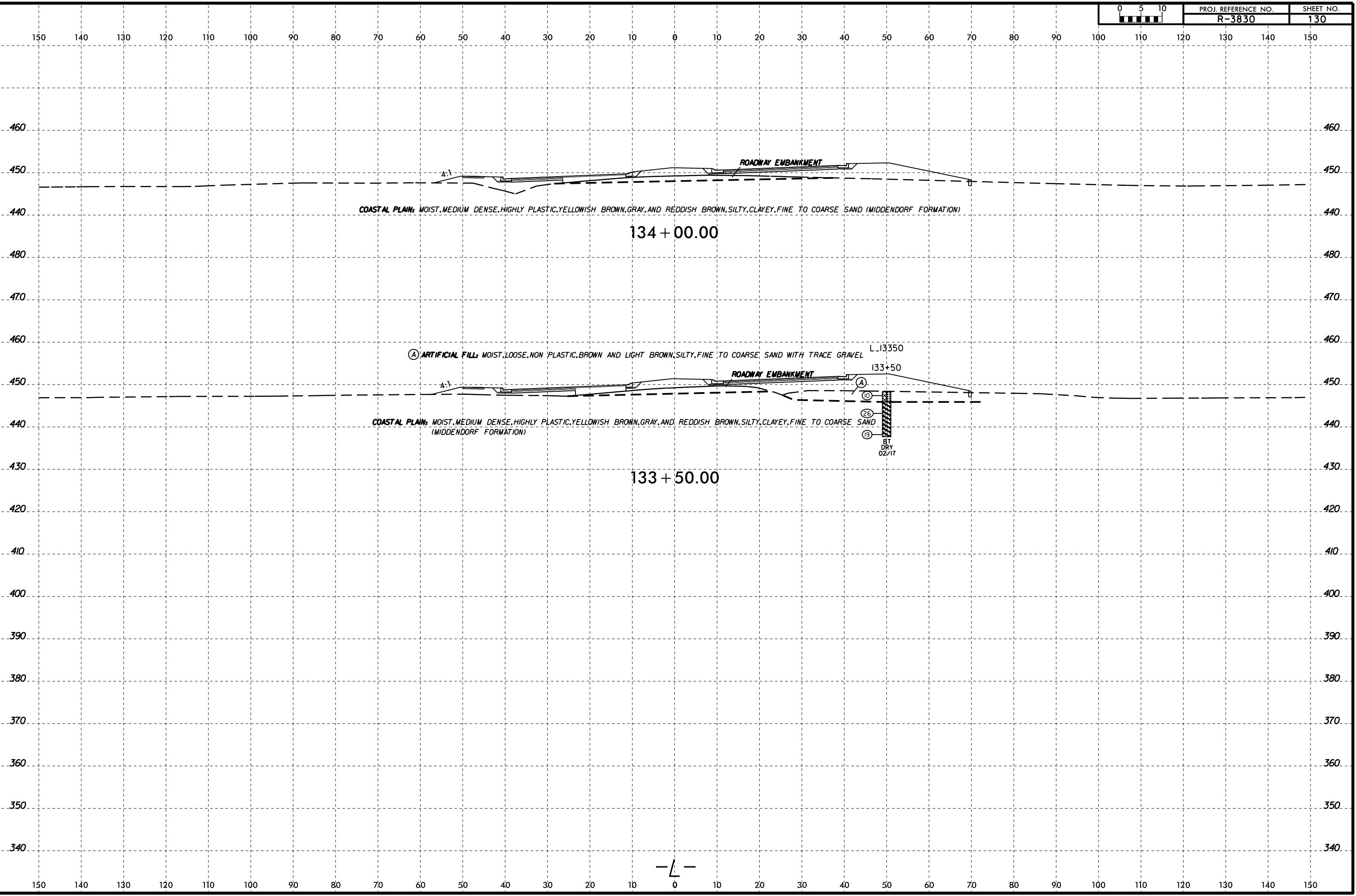
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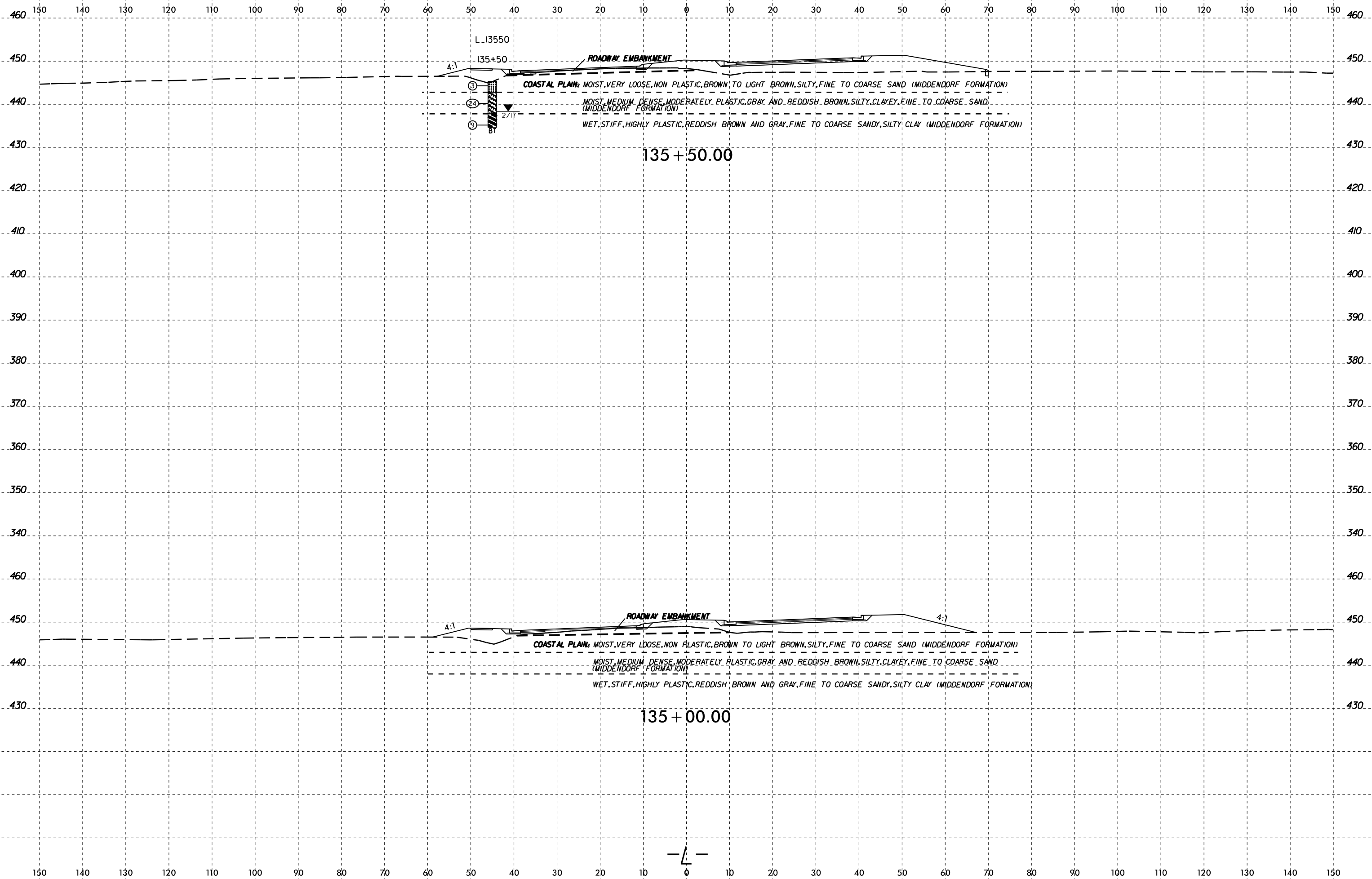


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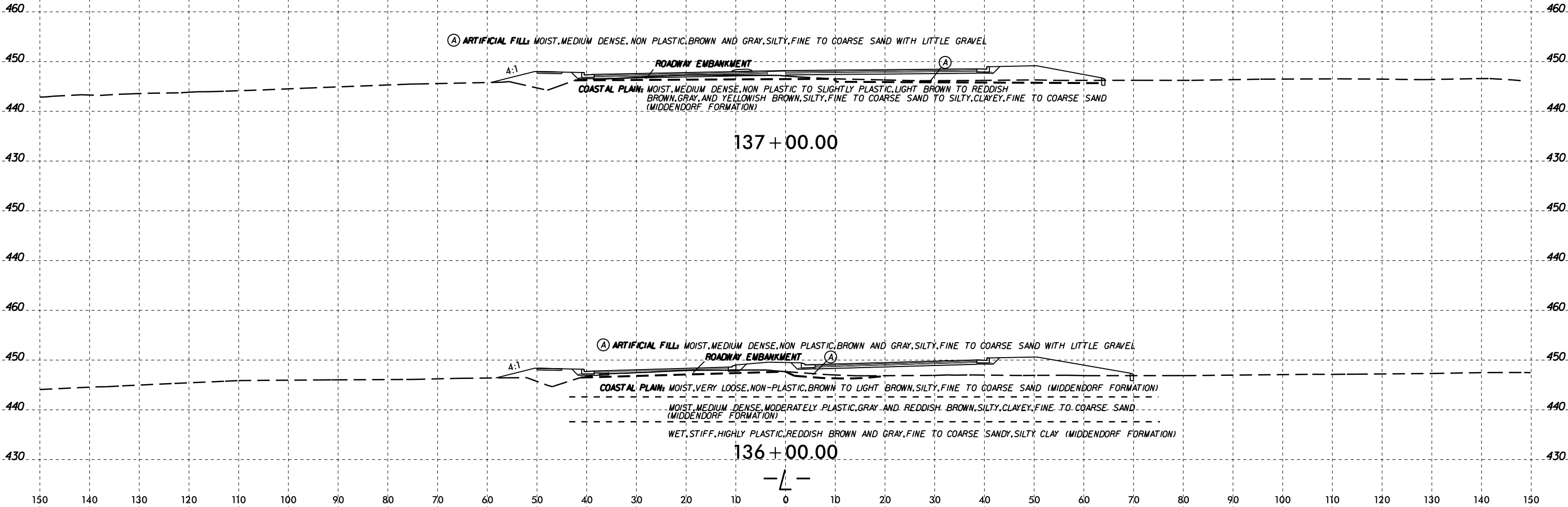
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150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150



(A) ARTIFICIAL FILL: MOIST, MEDIUM DENSE, NON PLASTIC, BROWN AND GRAY, SILTY, FINE TO COARSE SAND WITH LITTLE GRAVEL

ROADWAY EMBANKMENT

COASTAL PLAIN: MOIST, MEDIUM DENSE, NON PLASTIC TO SLIGHTLY PLASTIC, LIGHT BROWN TO REDDISH BROWN, GRAY, AND YELLOWISH BROWN, SILTY, FINE TO COARSE SAND TO SILTY, CLAYEY, FINE TO COARSE SAND (MIDDENDORF FORMATION)

137 + 00.00

(A) ARTIFICIAL FILL: MOIST, MEDIUM DENSE, NON PLASTIC, BROWN AND GRAY, SILTY, FINE TO COARSE SAND WITH LITTLE GRAVEL

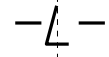
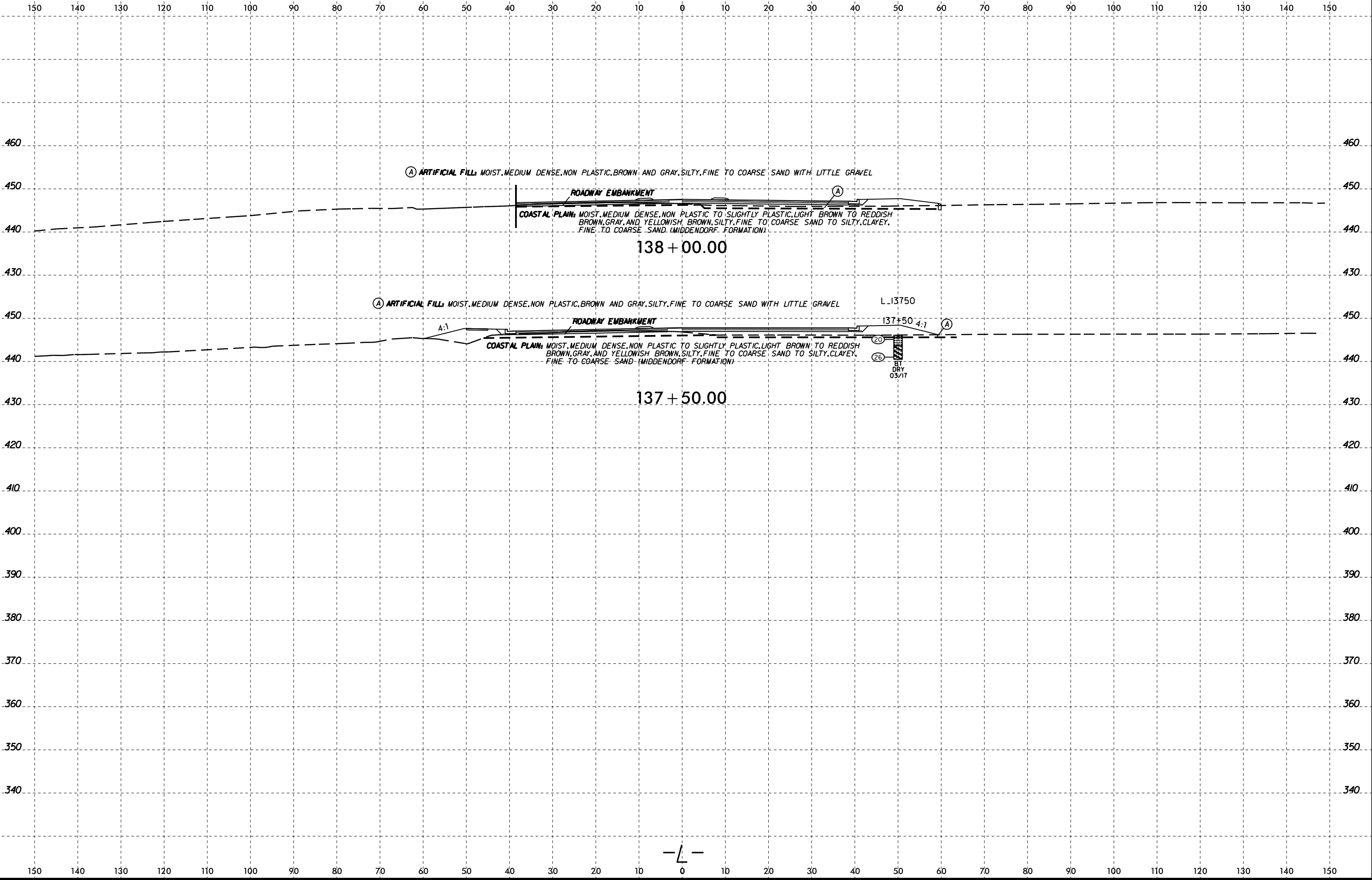
ROADWAY EMBANKMENT

COASTAL PLAIN: MOIST, VERY LOOSE, NON-PLASTIC, BROWN TO LIGHT BROWN, SILTY, FINE TO COARSE SAND (MIDDENDORF FORMATION)

MOIST, MEDIUM DENSE, MODERATELY PLASTIC, GRAY AND REDDISH BROWN, SILTY, CLAYEY, FINE TO COARSE SAND (MIDDENDORF FORMATION)

WET, STIFF, HIGHLY PLASTIC, REDDISH BROWN AND GRAY, FINE TO COARSE SANDY, SILTY CLAY (MIDDENDORF FORMATION)

136 + 00.00





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

460

460

450

450

440

440

430

430

Ⓐ ARTIFICIAL FILL: MOIST, MEDIUM DENSE, NON PLASTIC, BROWN AND GRAY, SILTY, FINE TO COARSE SAND WITH LITTLE GRAVEL

ROADWAY EMBANKMENT

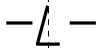
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COASTAL PLAIN: MOIST, MEDIUM STIFF, SLIGHTLY PLASTIC, YELLOWISH BROWN, FINE TO COARSE SANDY SILT (MIDDENDORF FORMATION)

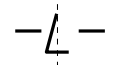
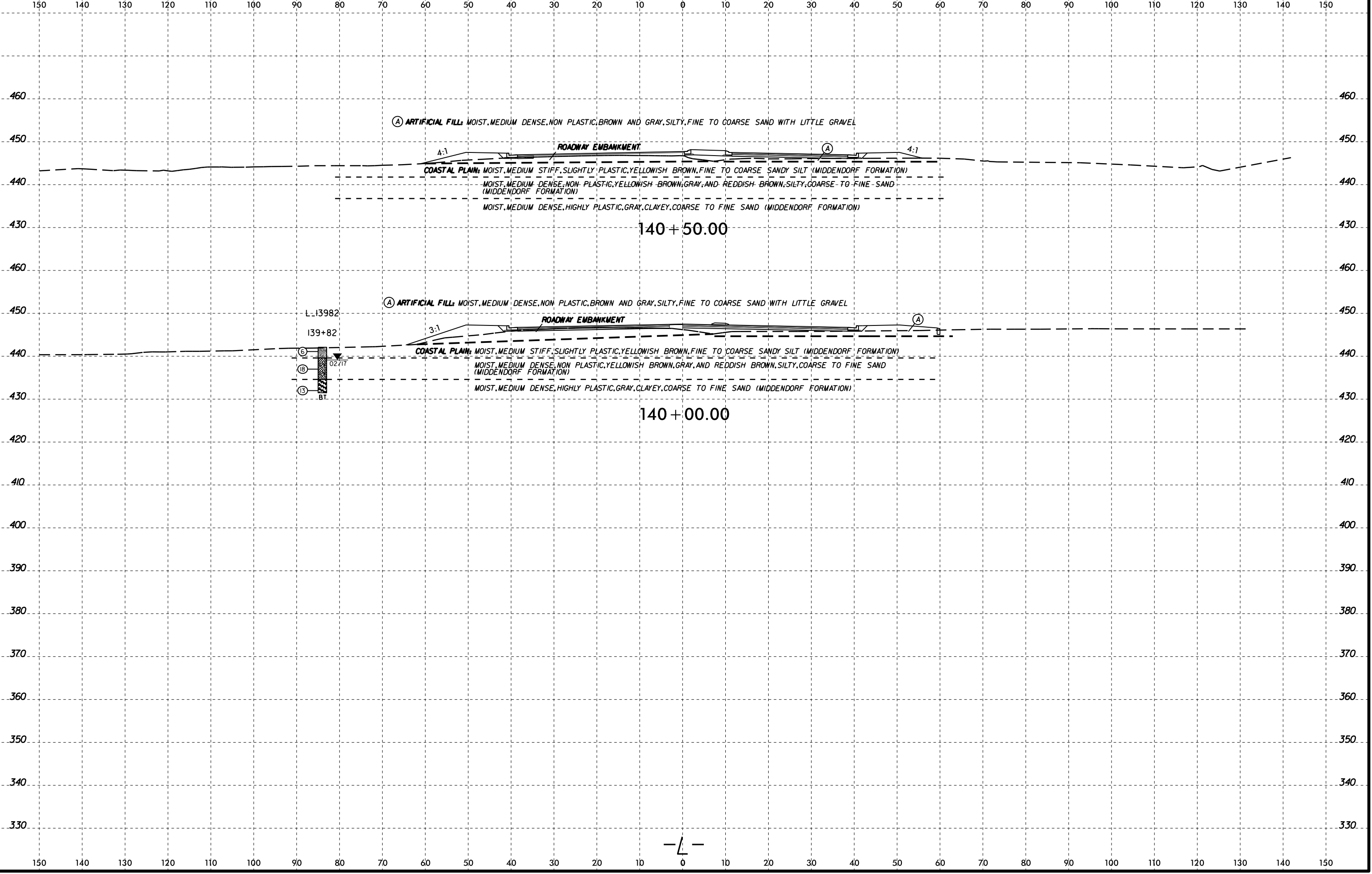
MOIST, MEDIUM DENSE, NON PLASTIC, YELLOWISH BROWN, GRAY, AND REDDISH BROWN, SILTY, COARSE TO FINE SAND (MIDDENDORF FORMATION)

MOIST, MEDIUM DENSE, HIGHLY PLASTIC, GRAY, CLAYEY, COARSE TO FINE SAND (MIDDENDORF FORMATION)

139 + 50.00



04-MAY-2017 07:49  
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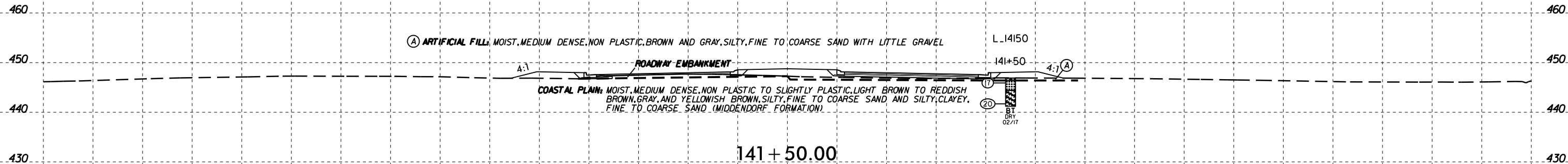


6/23/16



PROJ. REFERENCE NO.	SHEET NO.
R-3830	136

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141 + 50.00



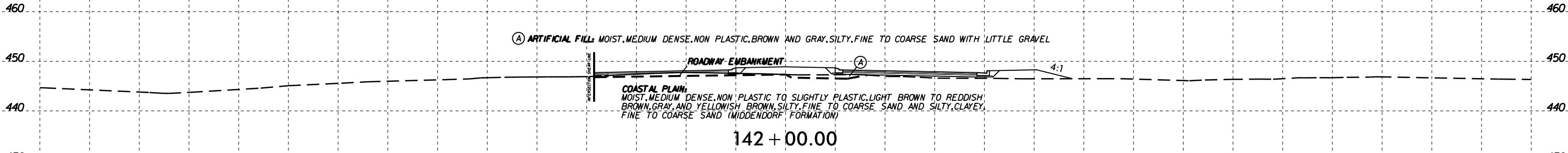
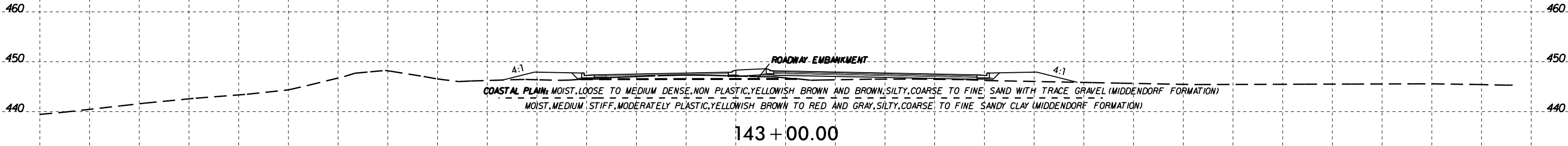
141 + 00.00



04-MAY-2017 07:50  
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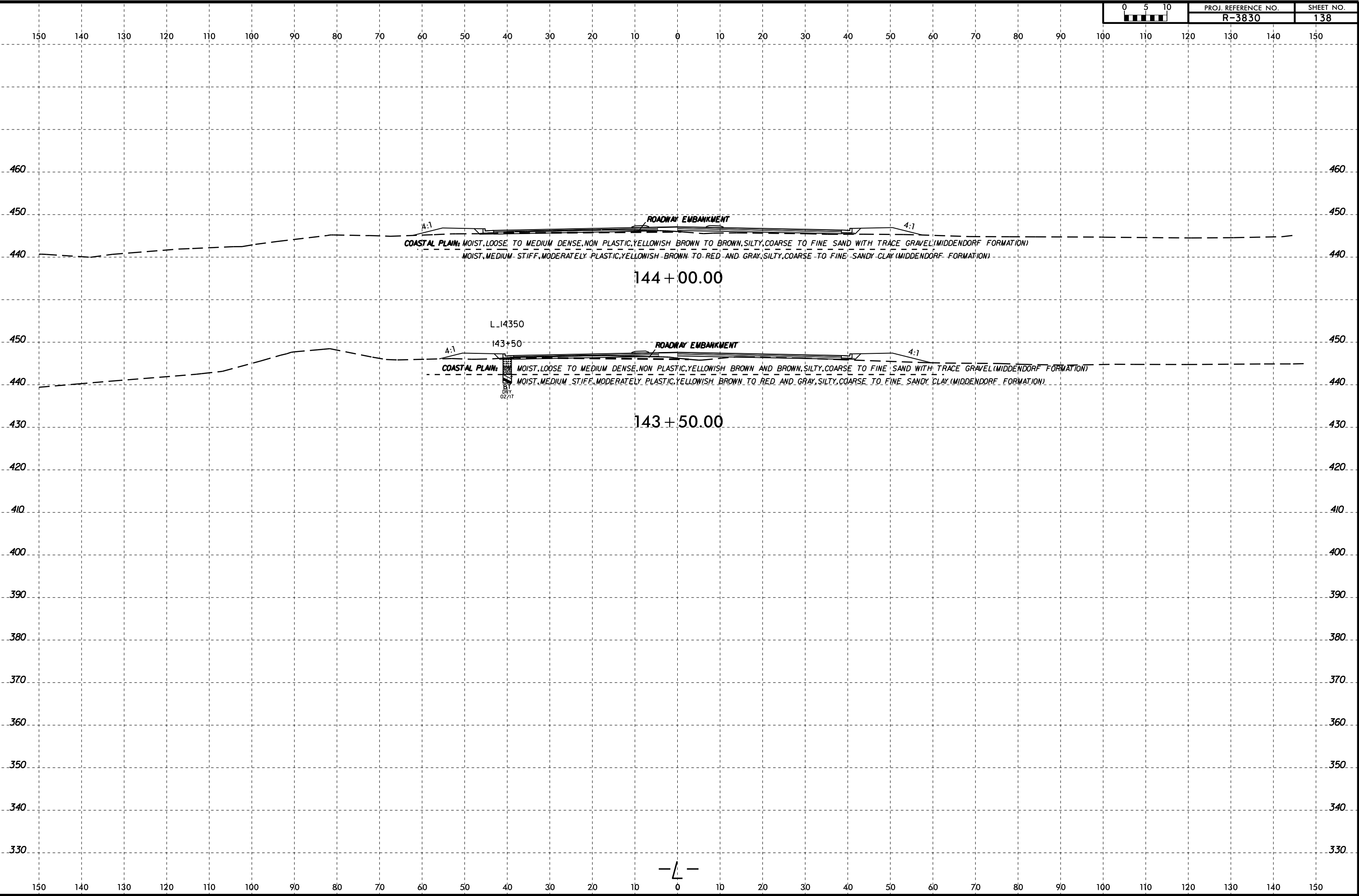


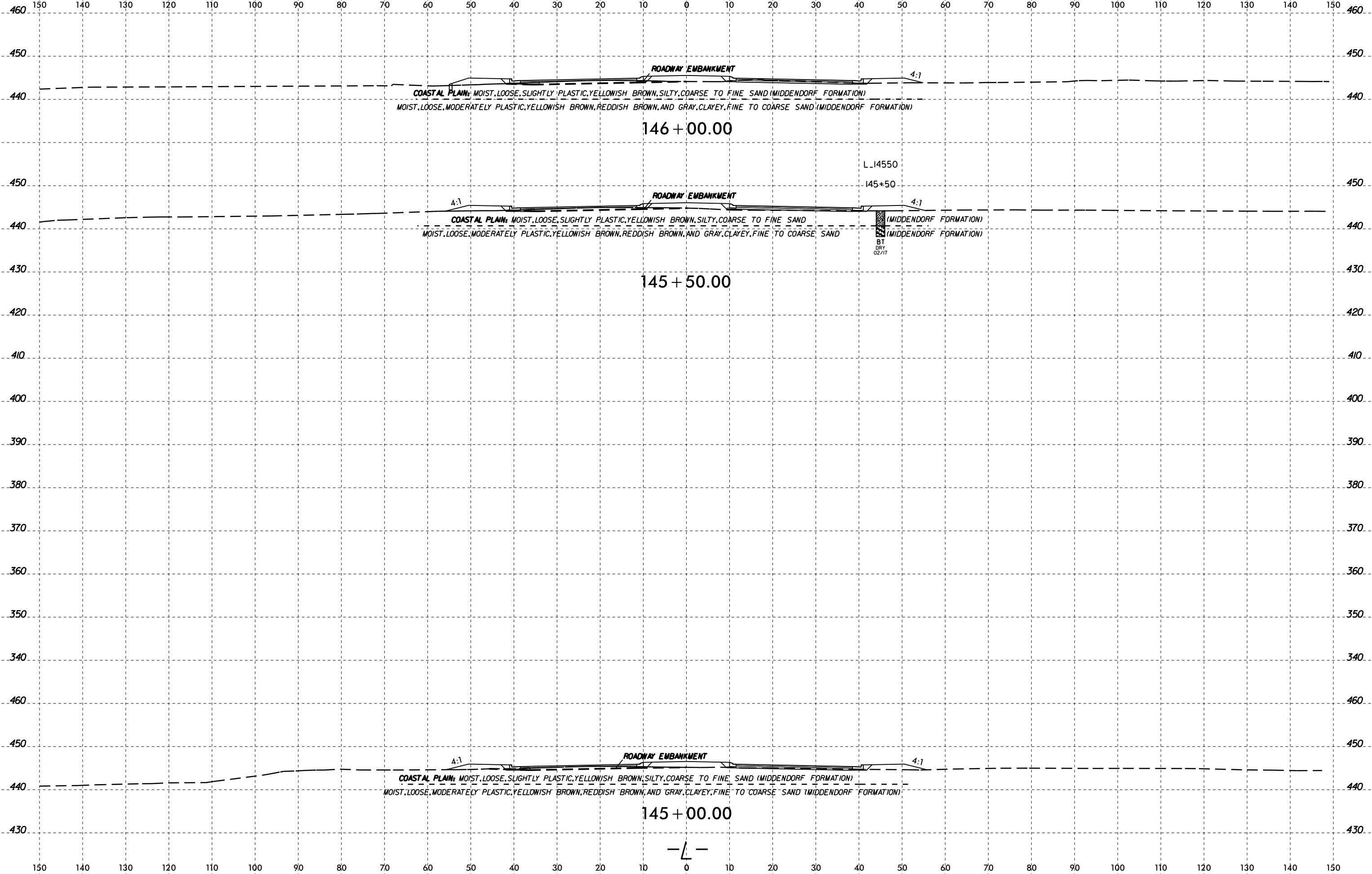
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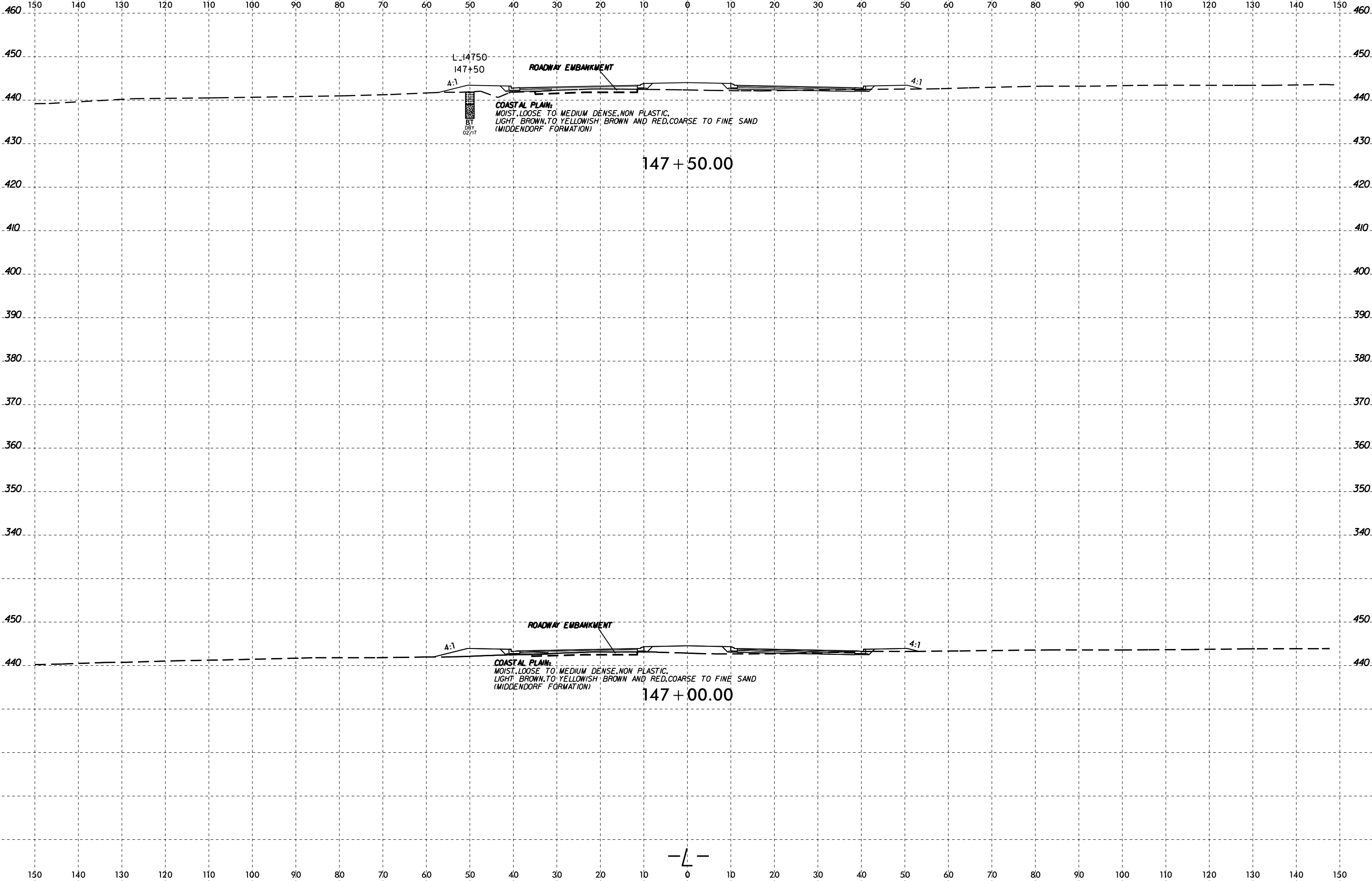


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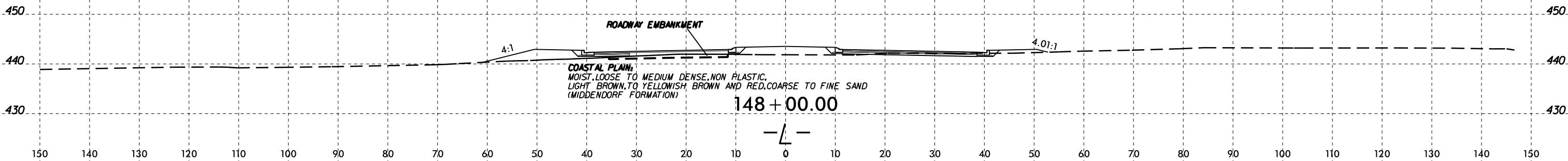
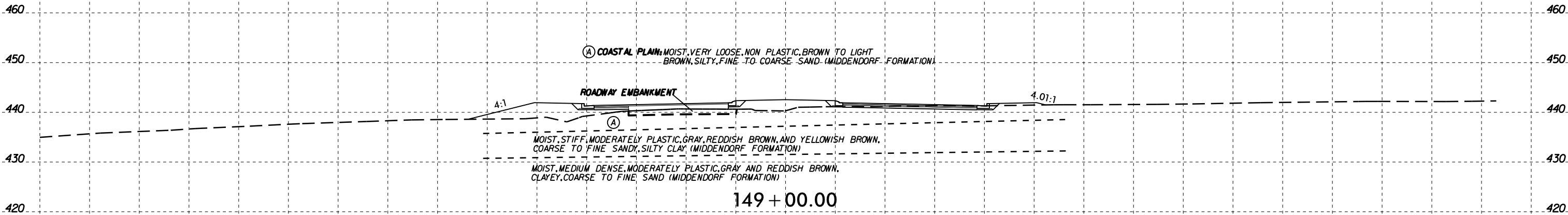


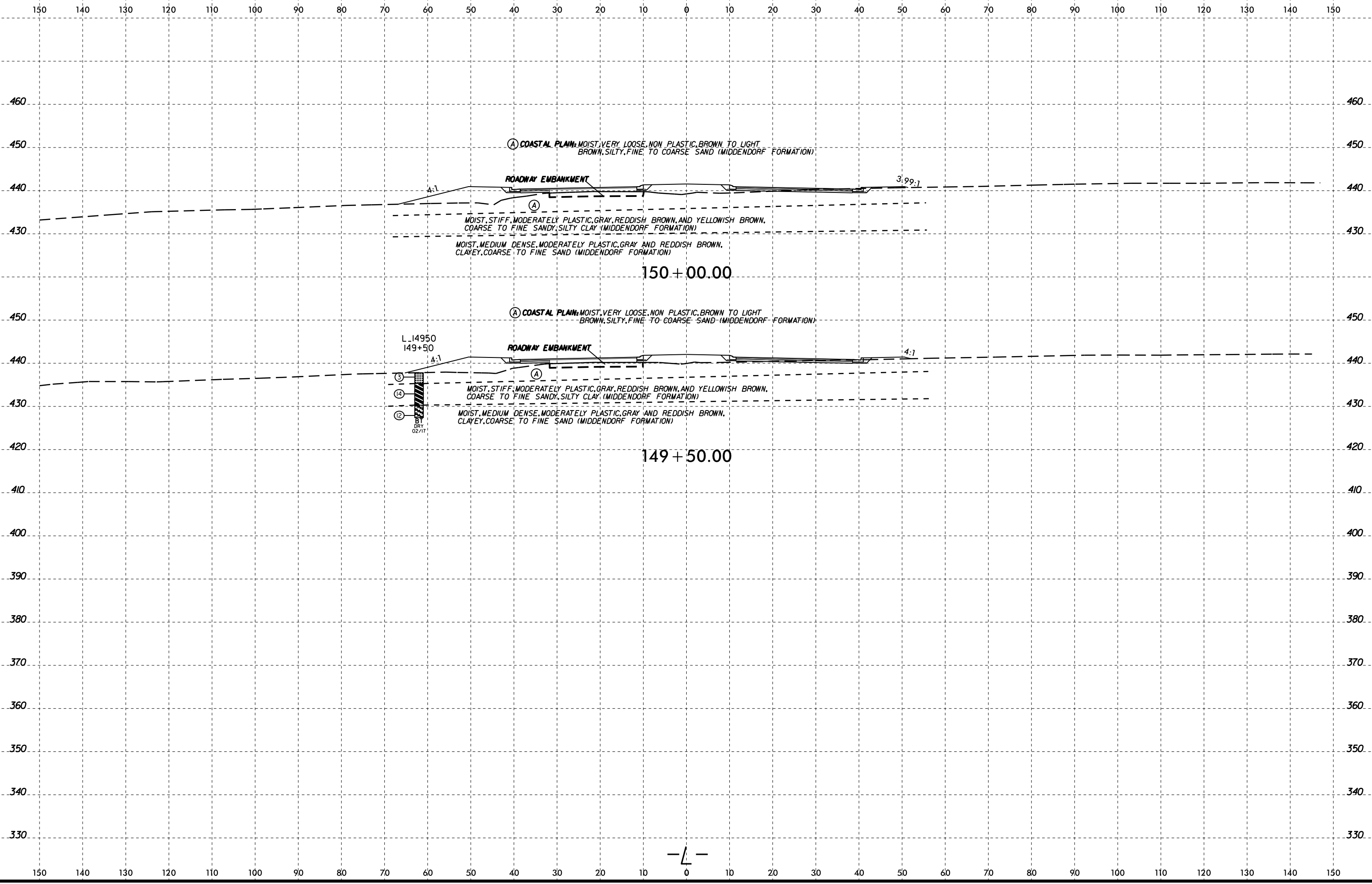
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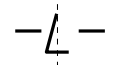


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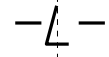
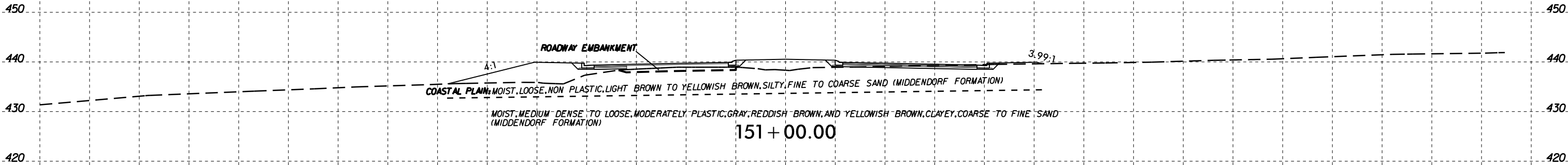




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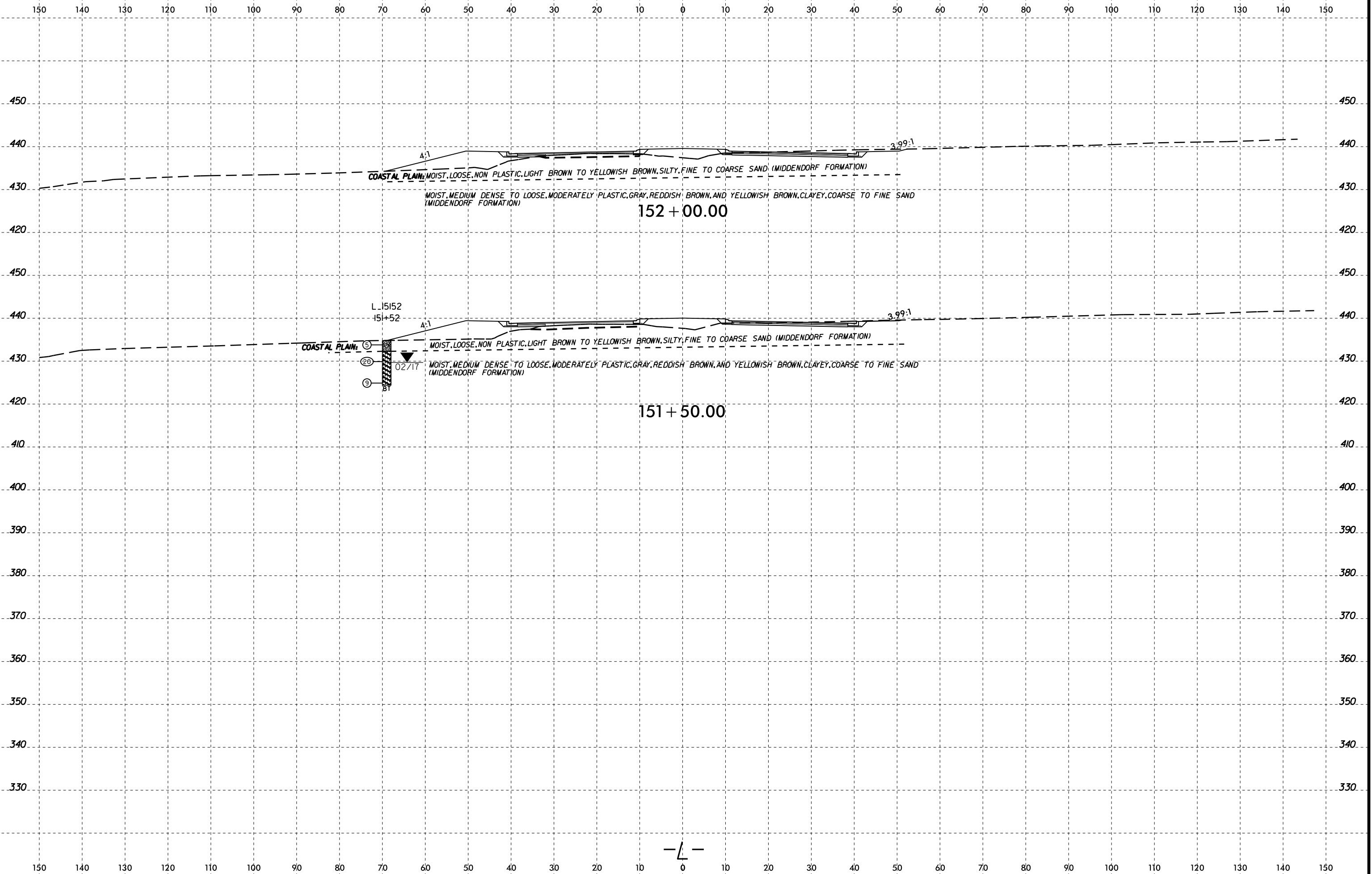


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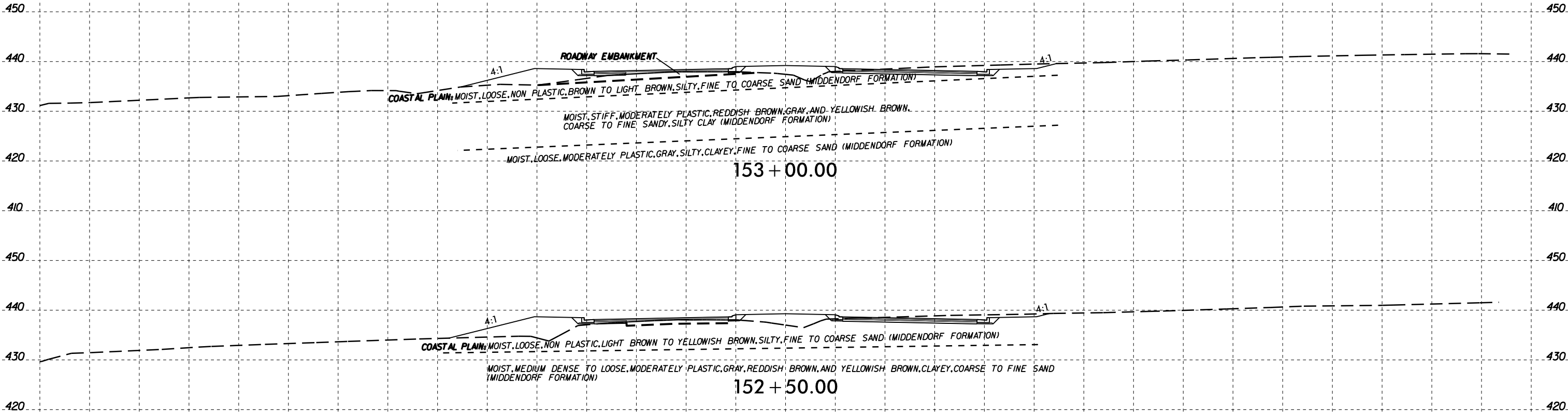
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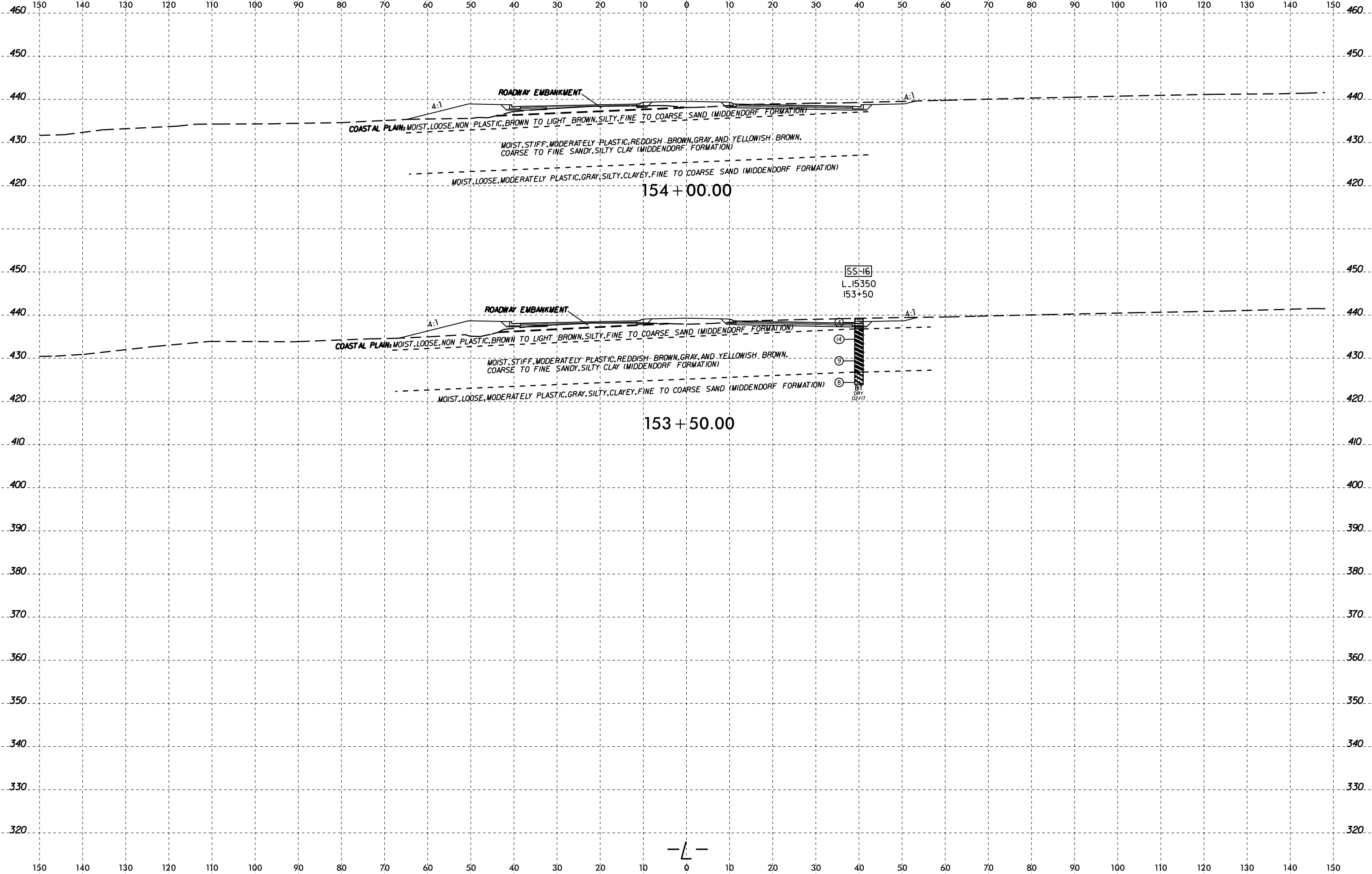


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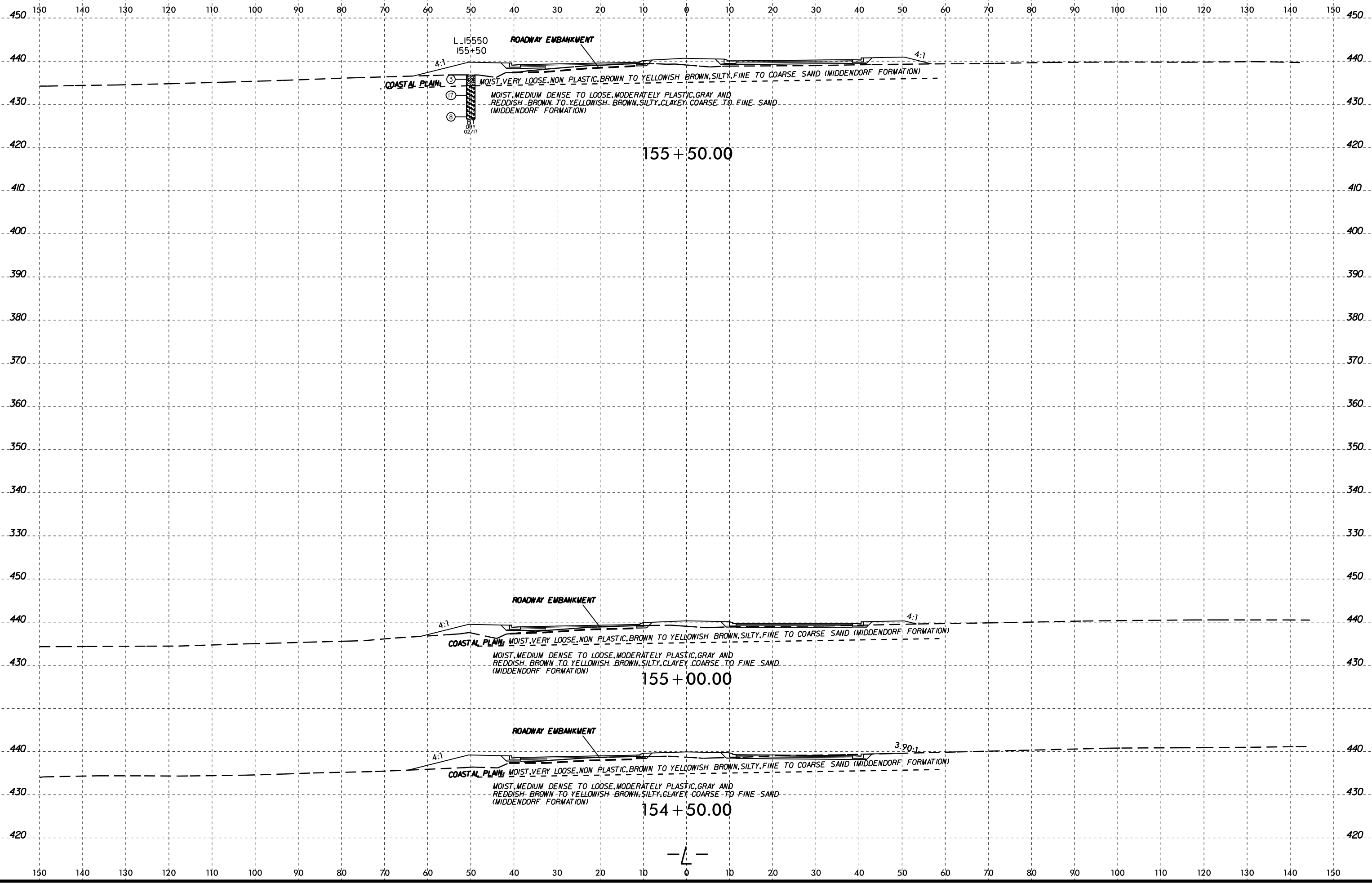


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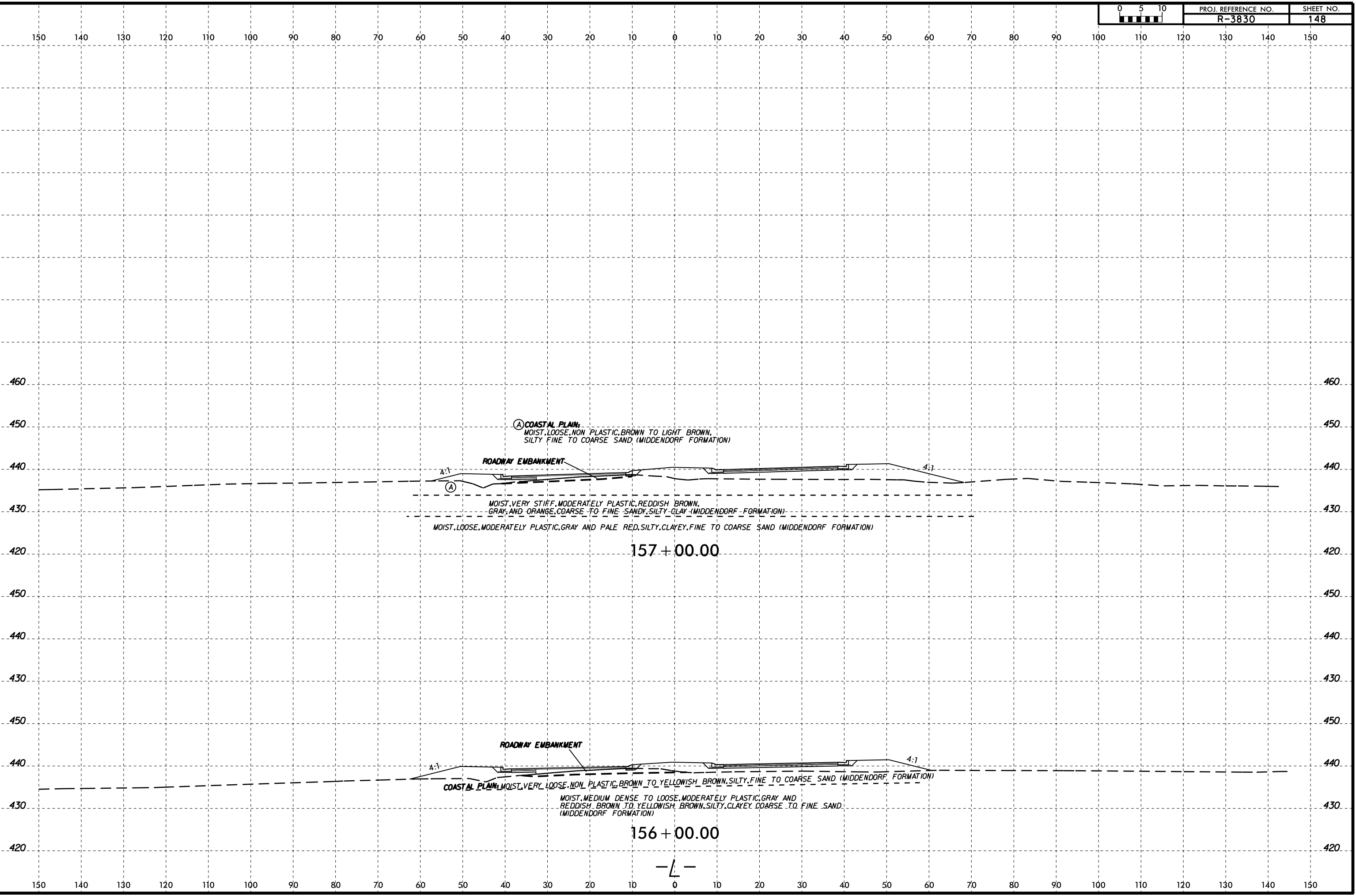


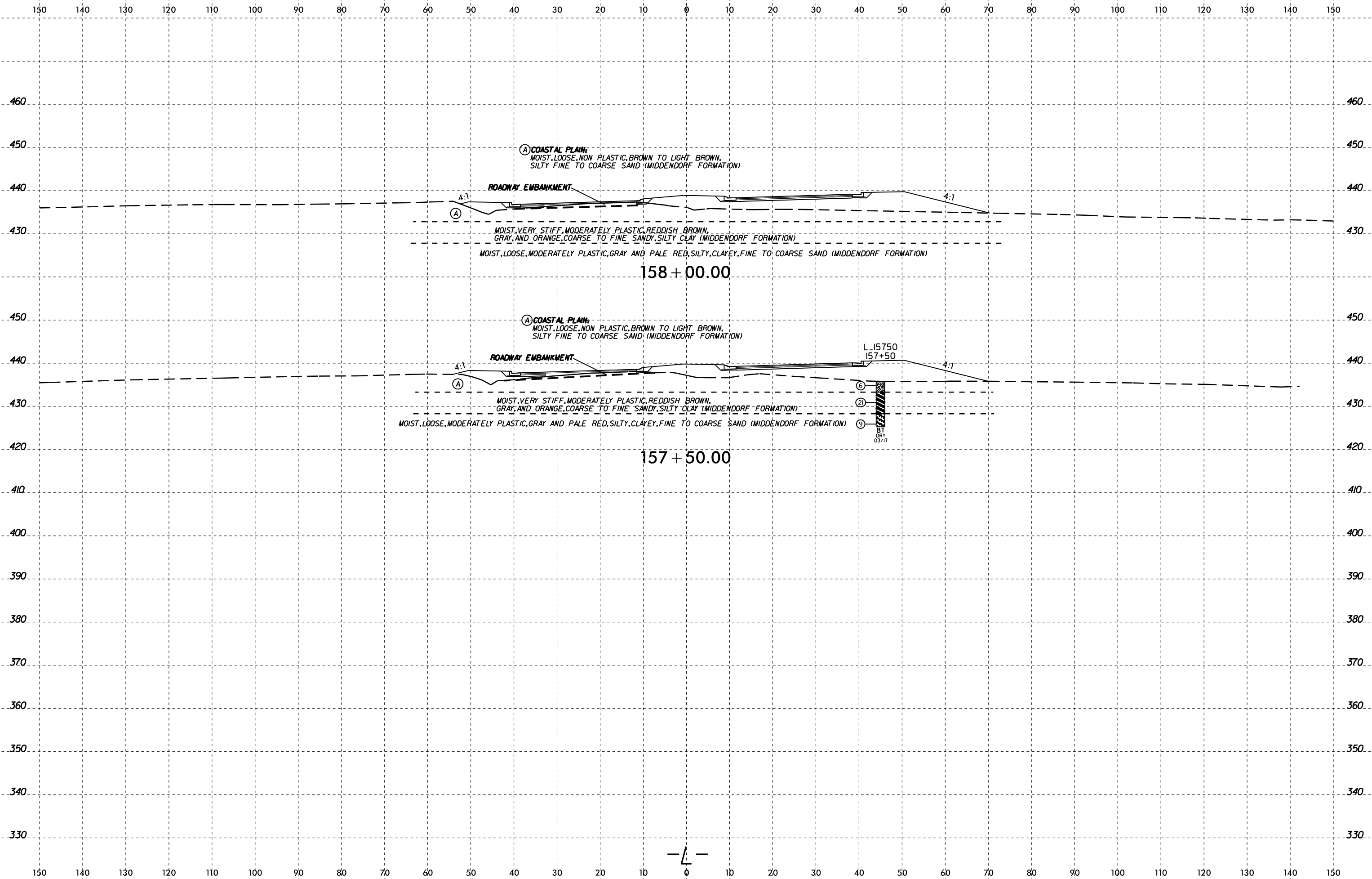


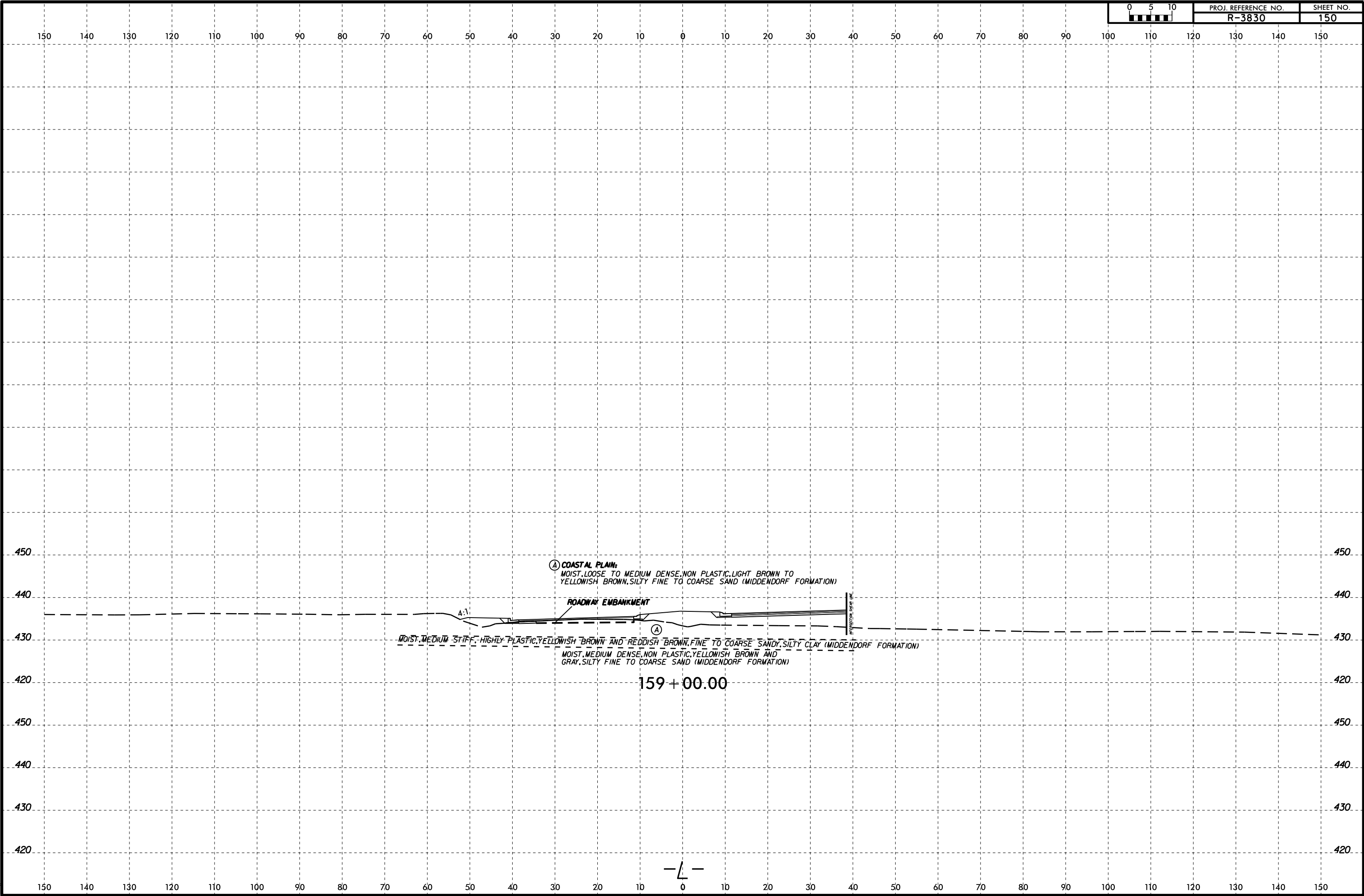
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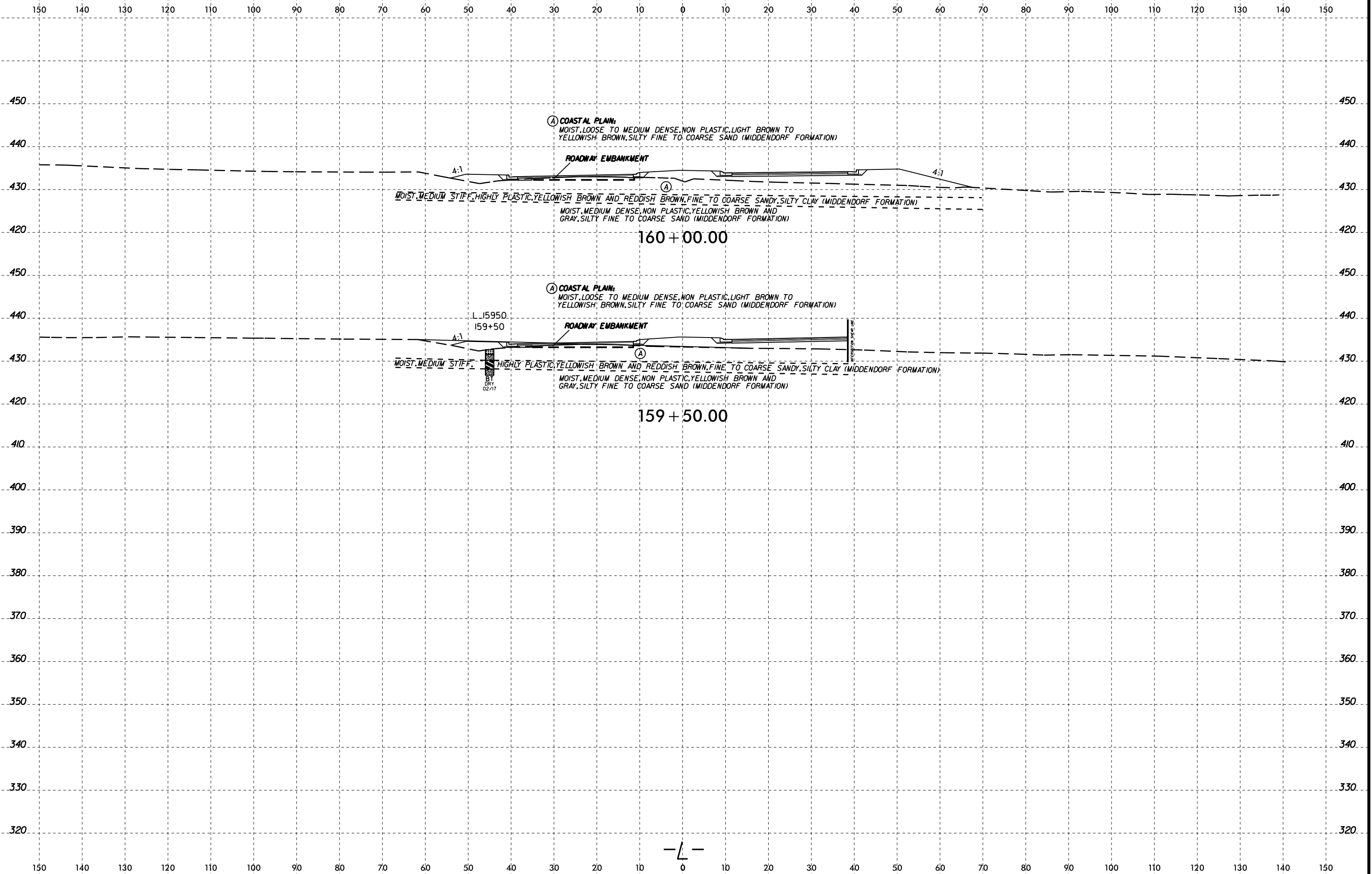


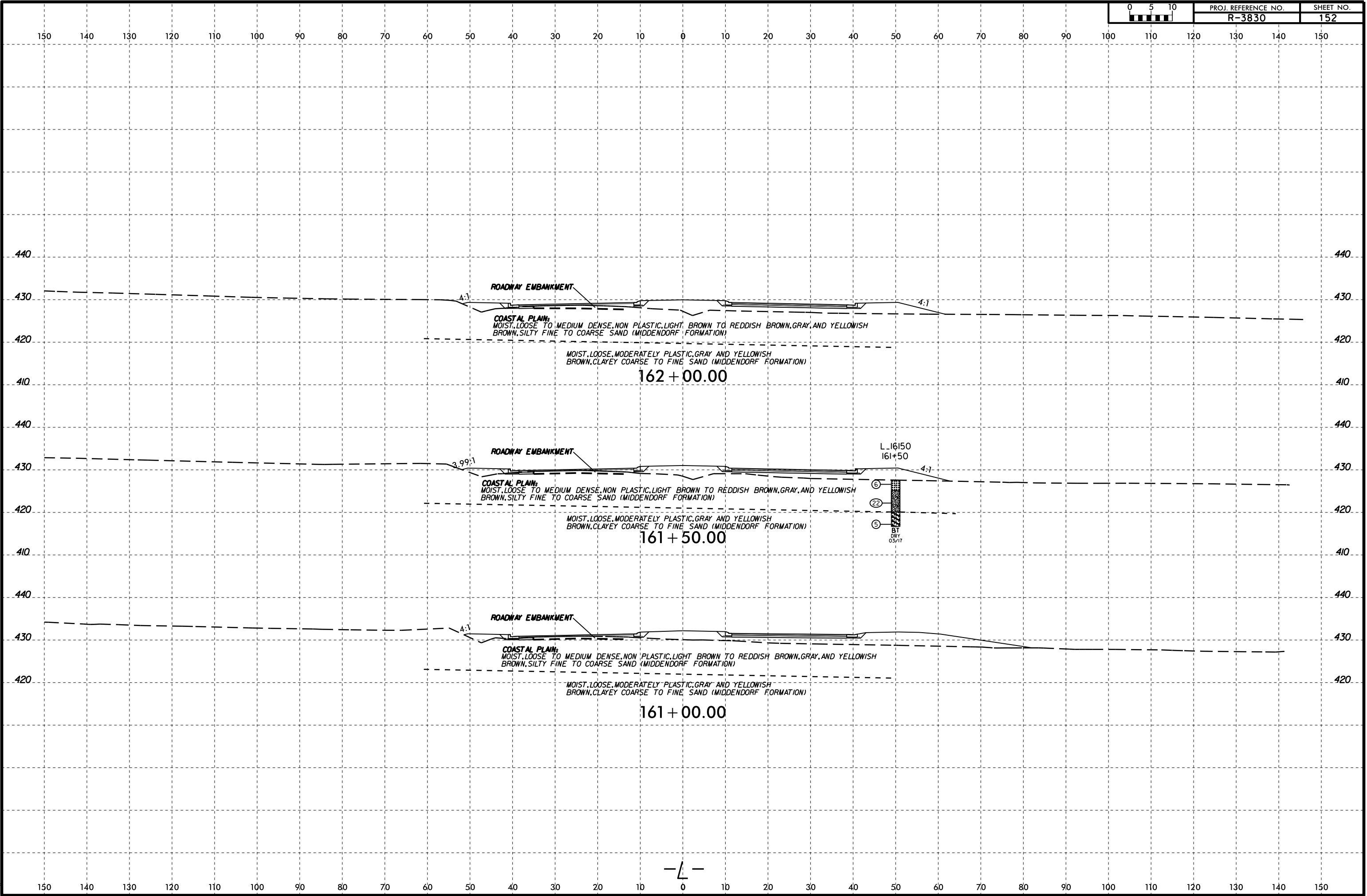
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Bo Johnson





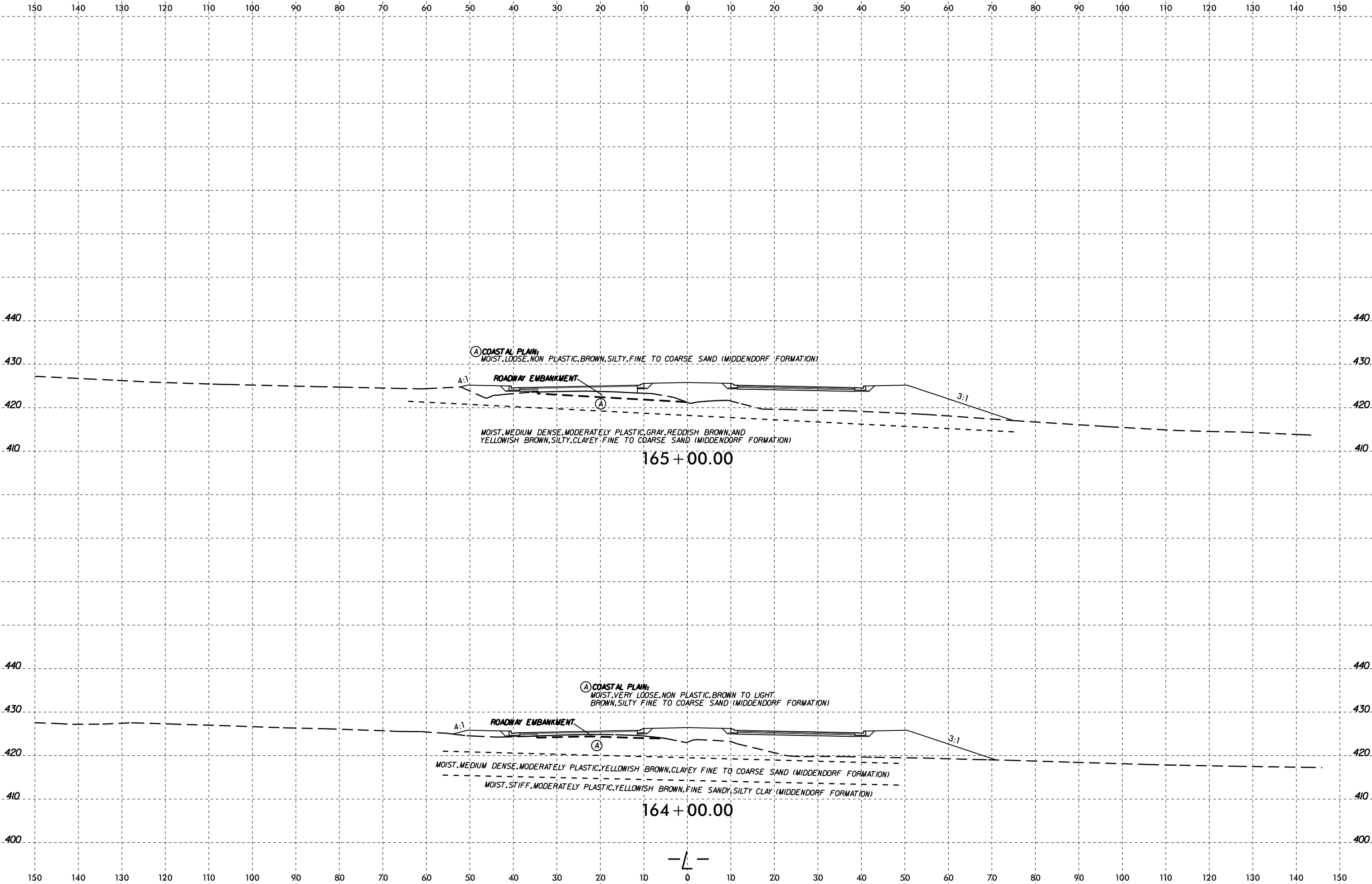




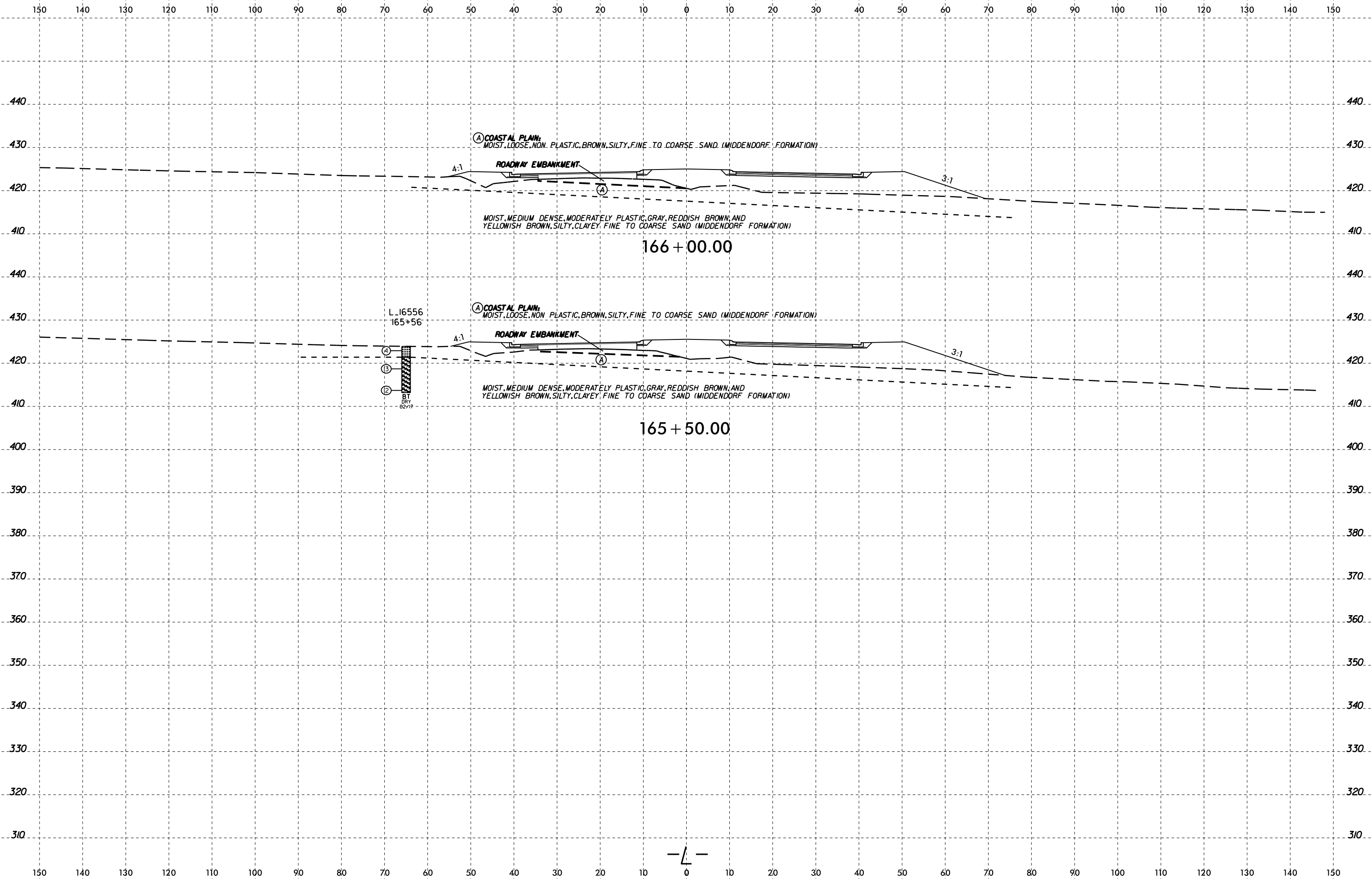


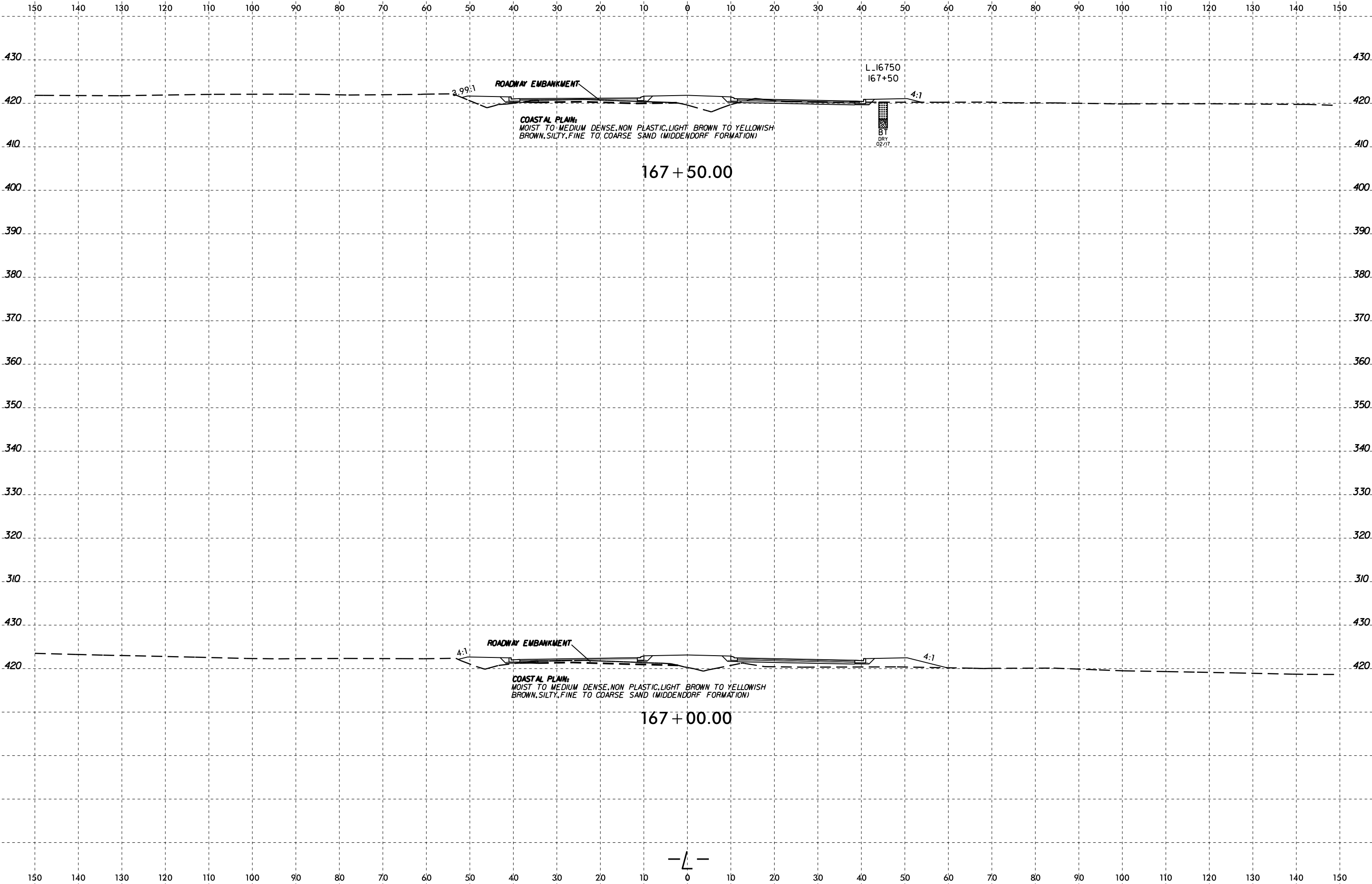




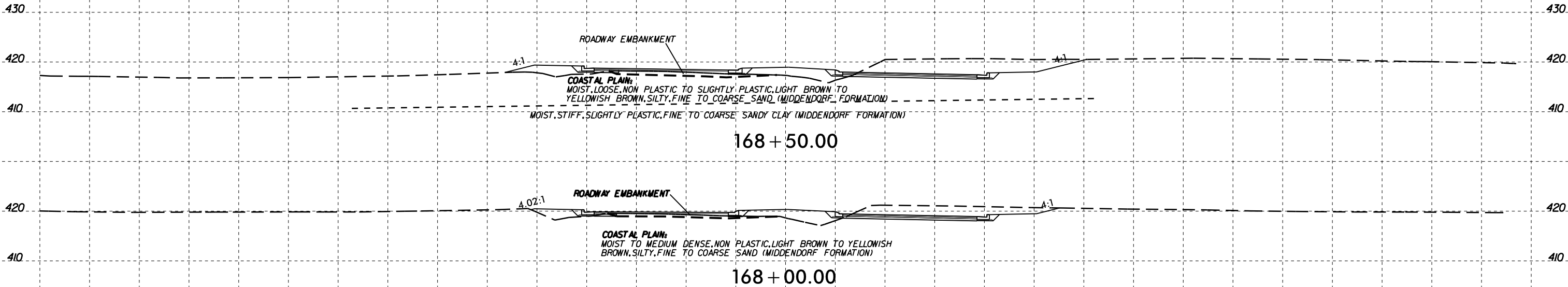


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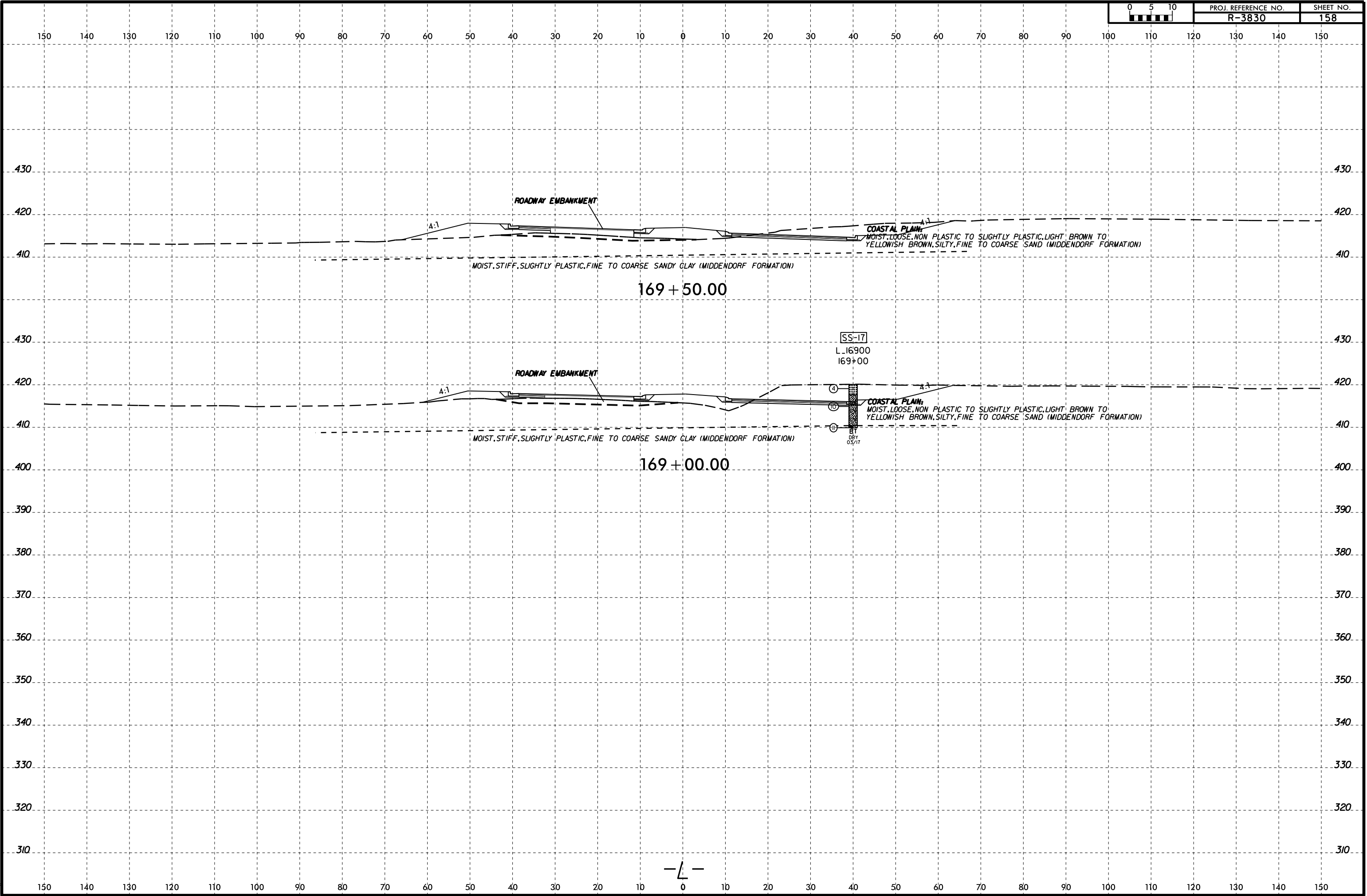


— L —

6/23/16

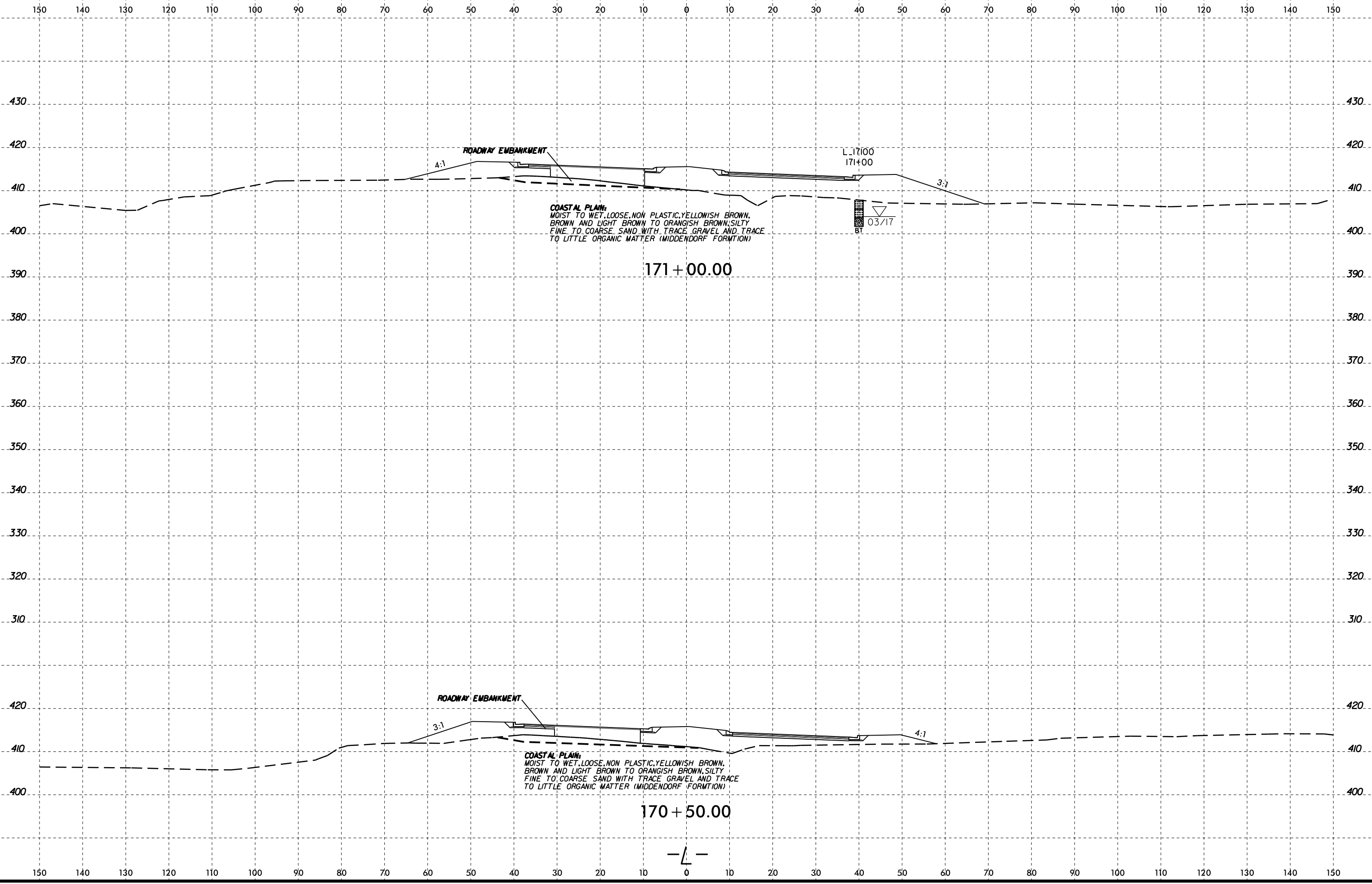


PROJ. REFERENCE NO.	SHEET NO.
R-3830	158



03-MAY-2017 13:32  
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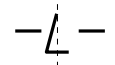
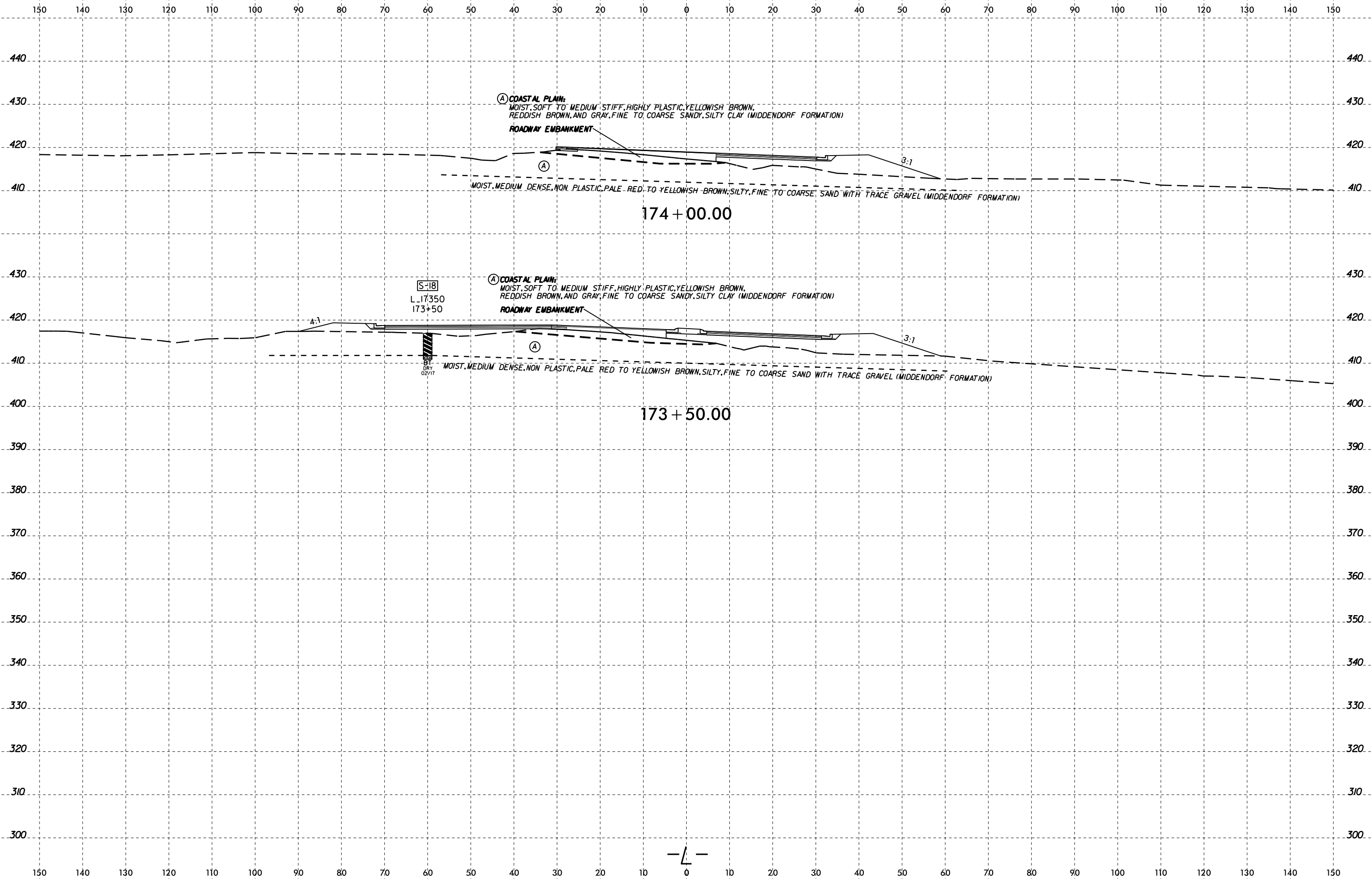




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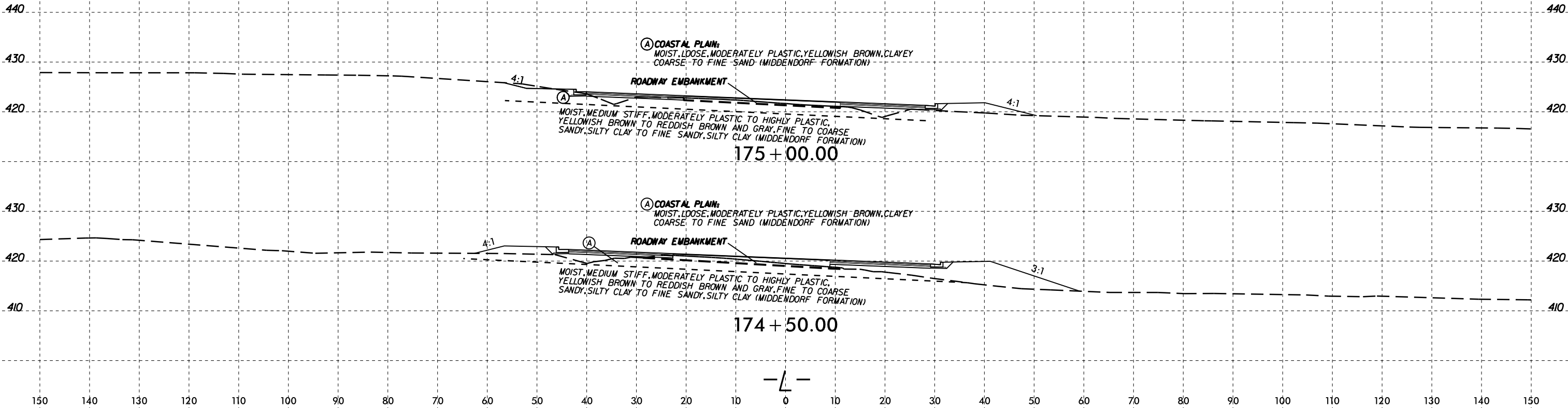
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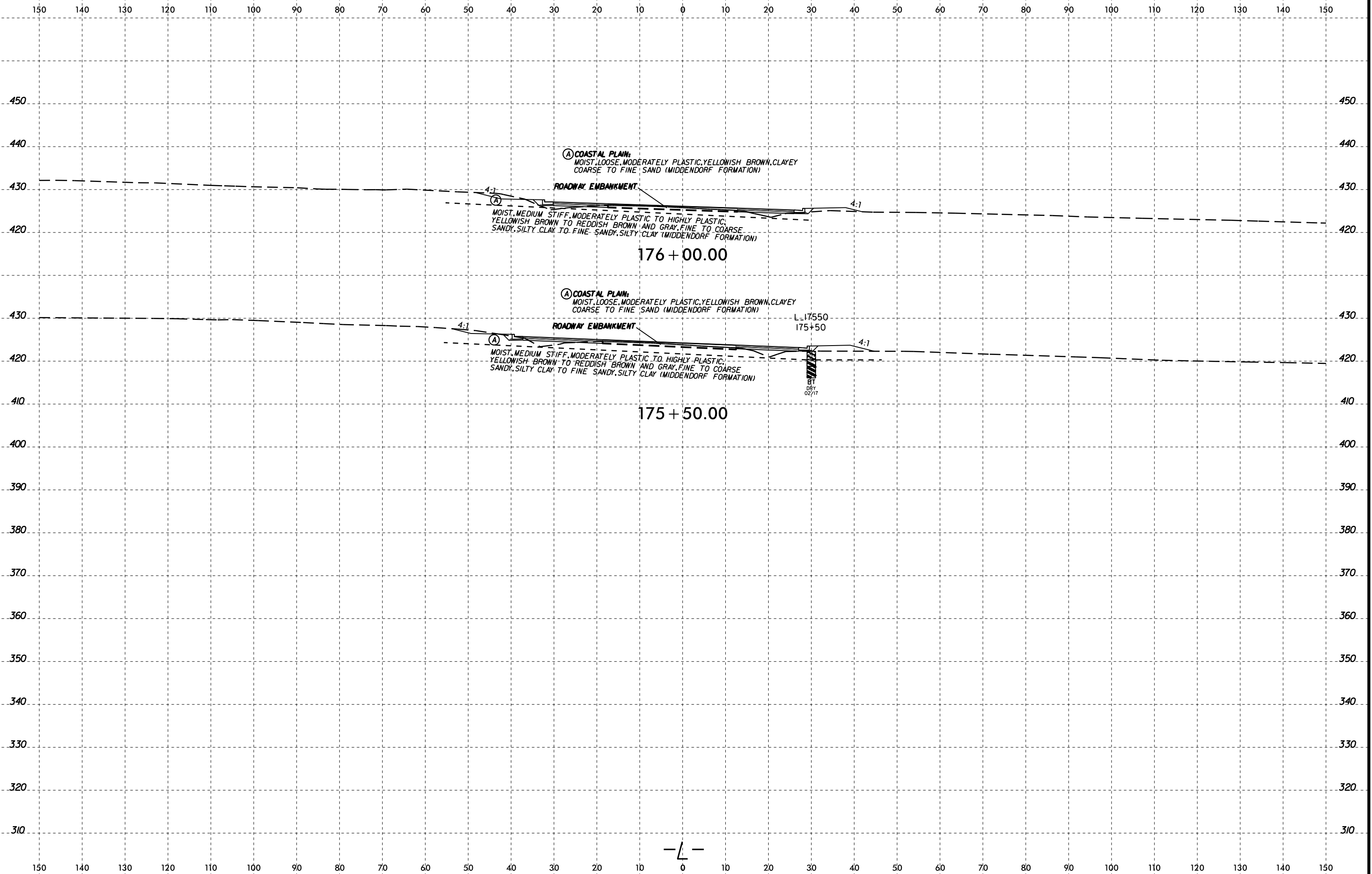


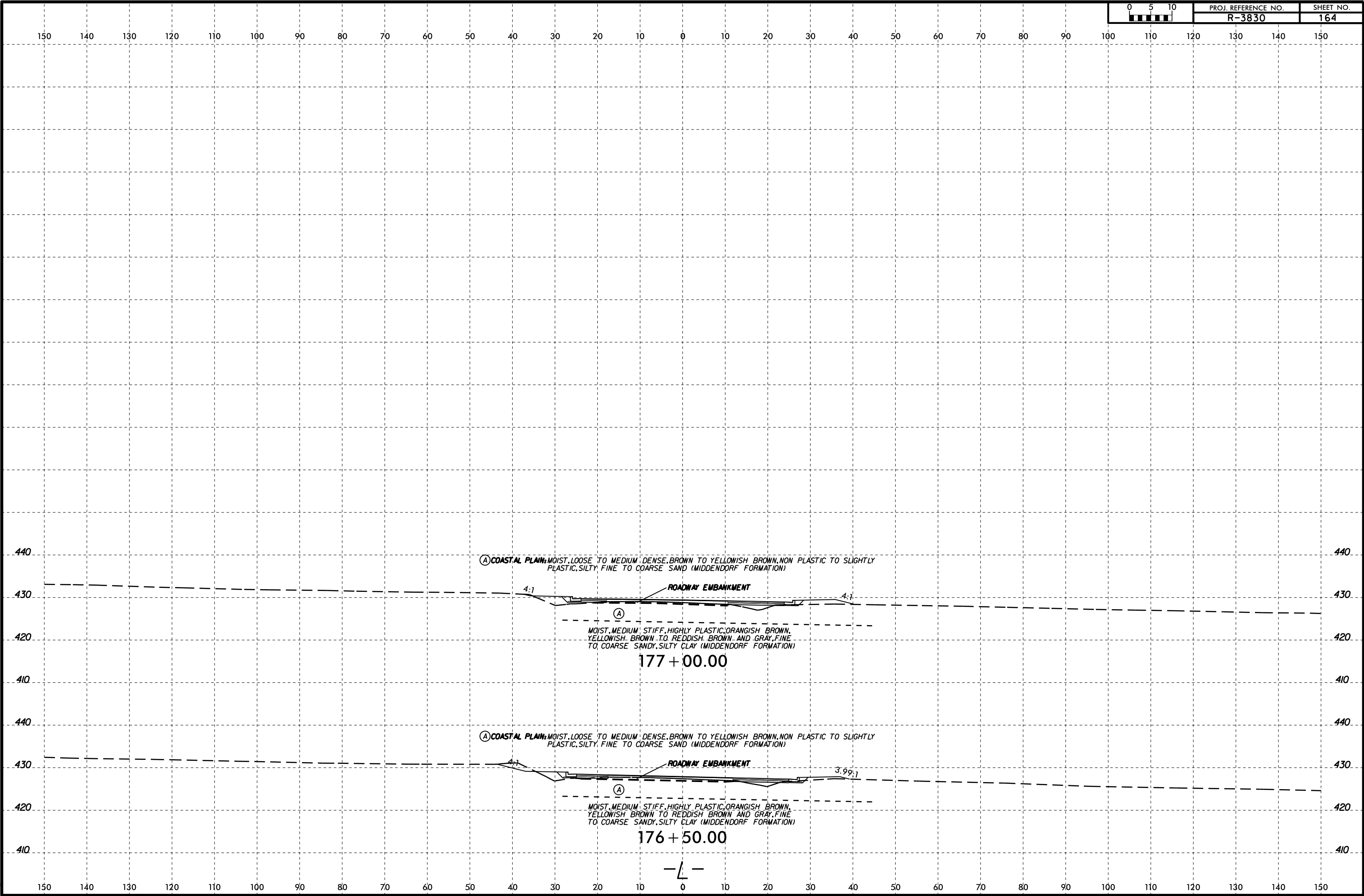


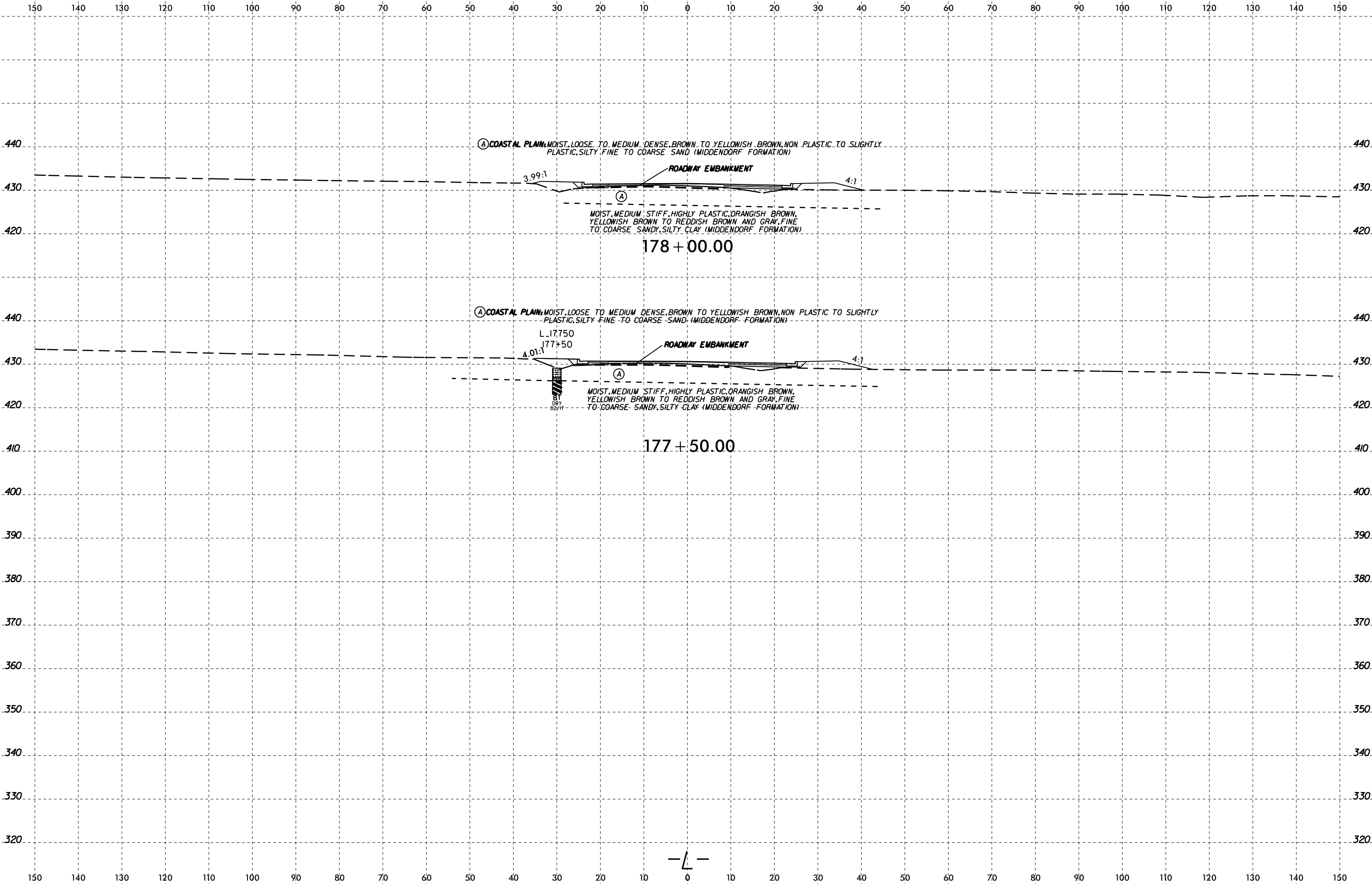


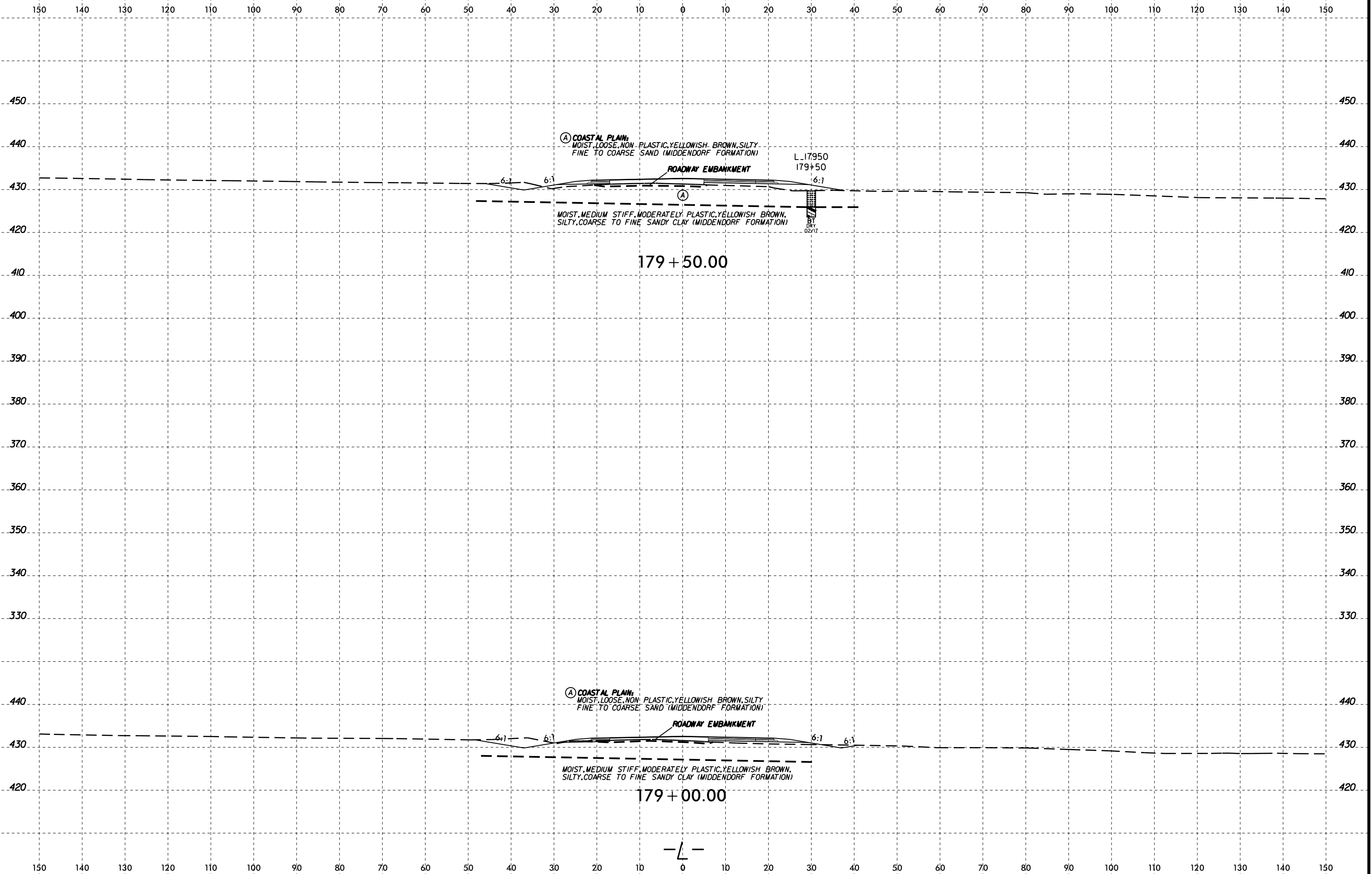
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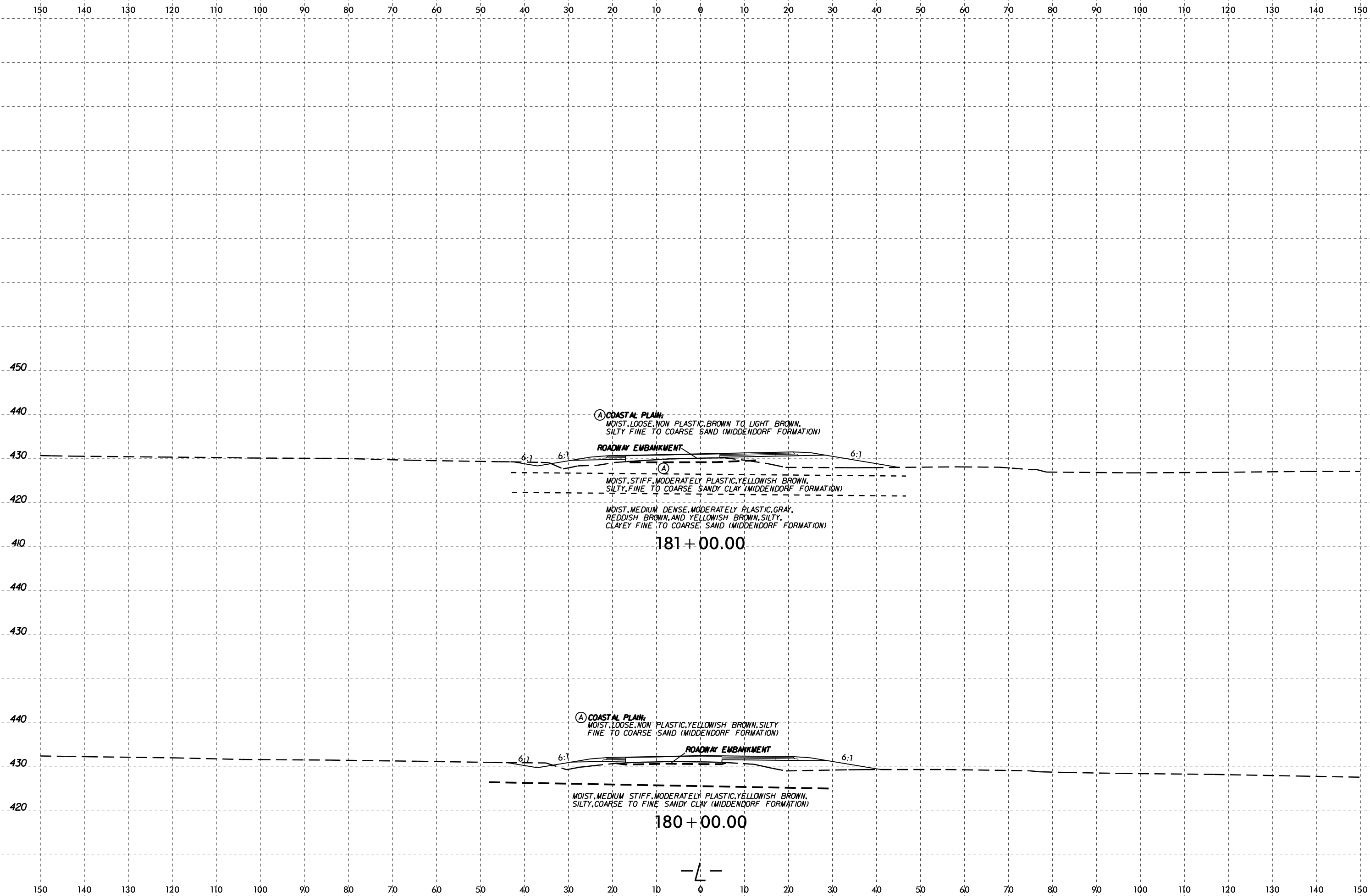




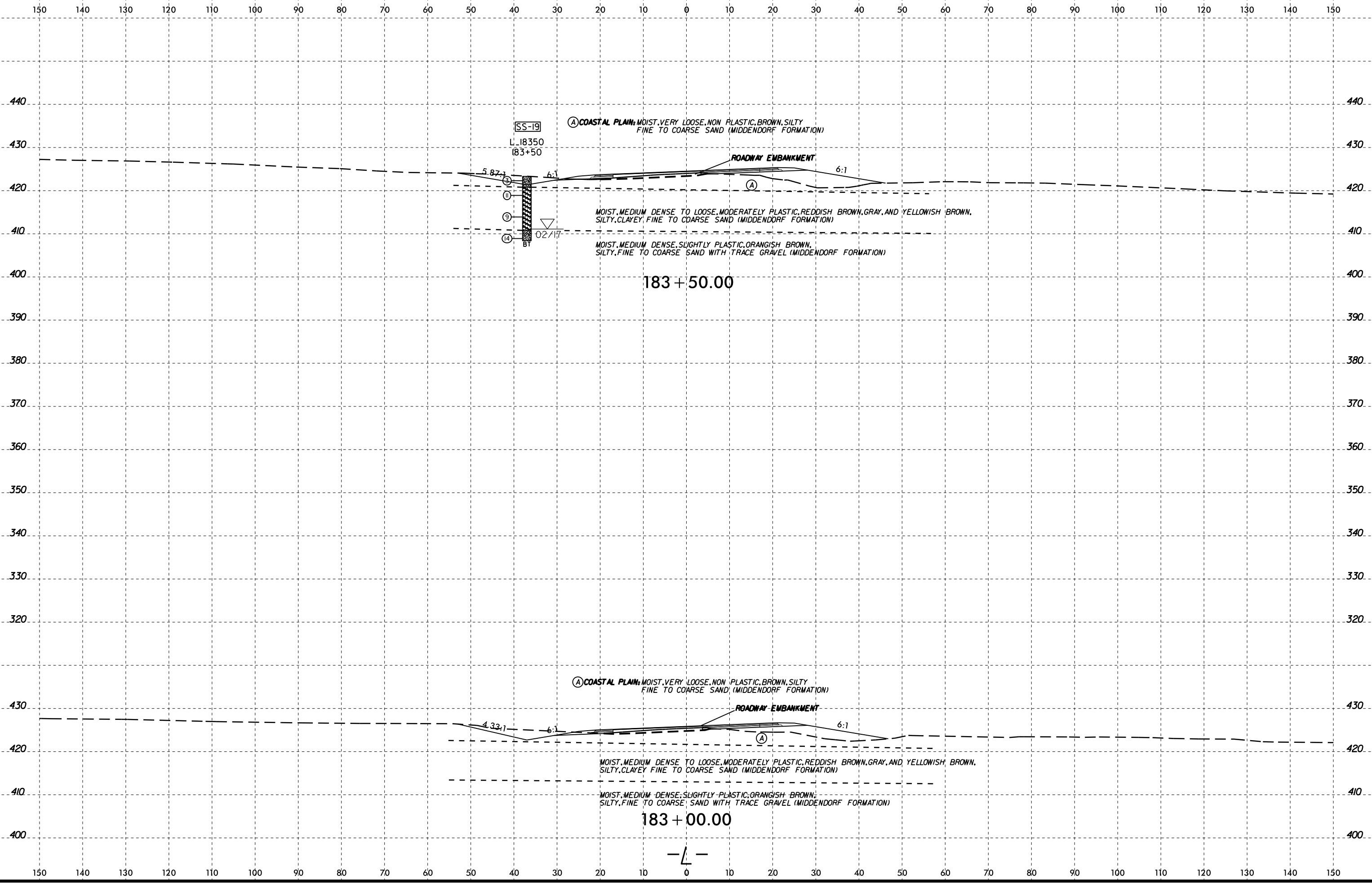






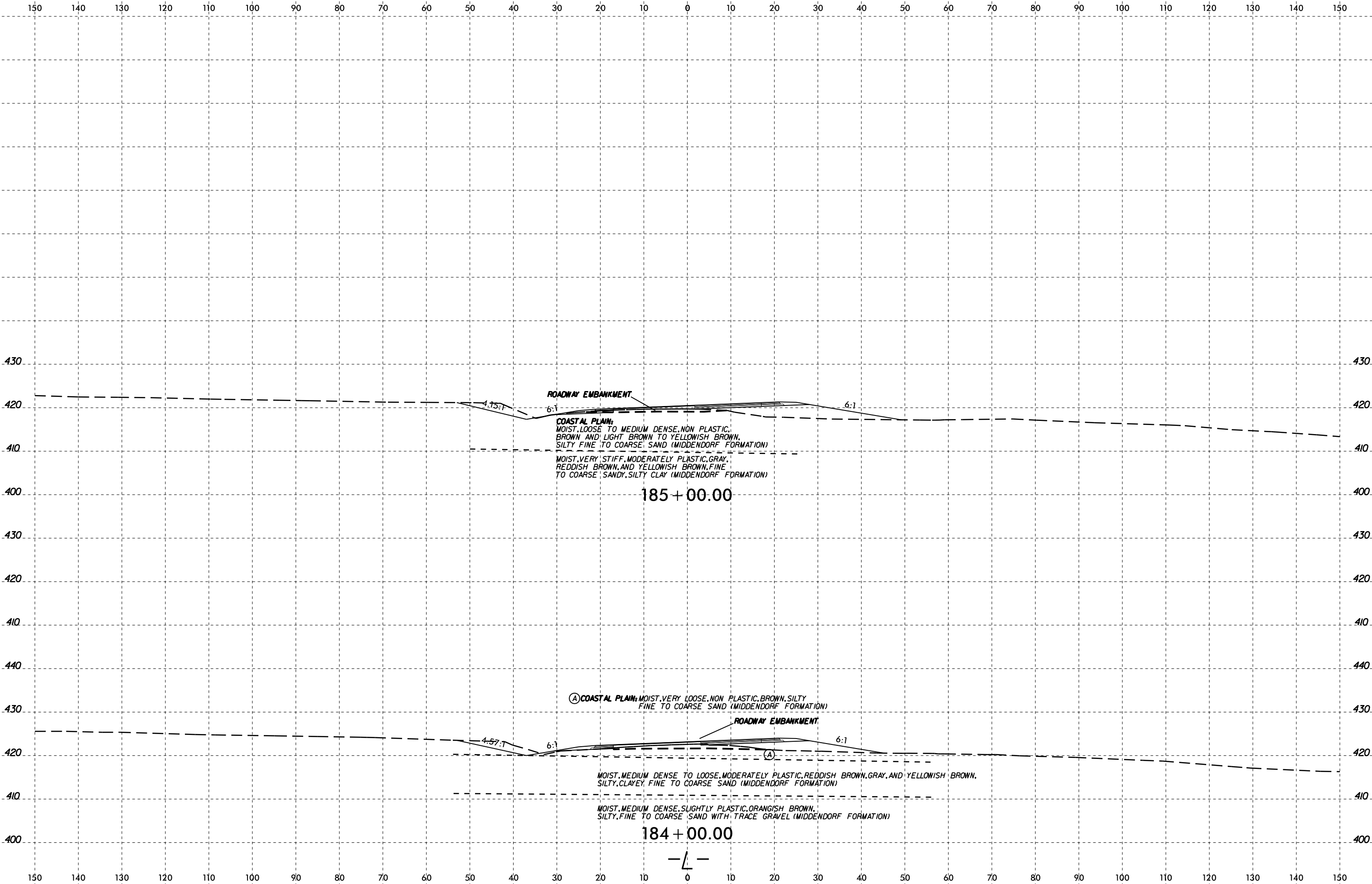


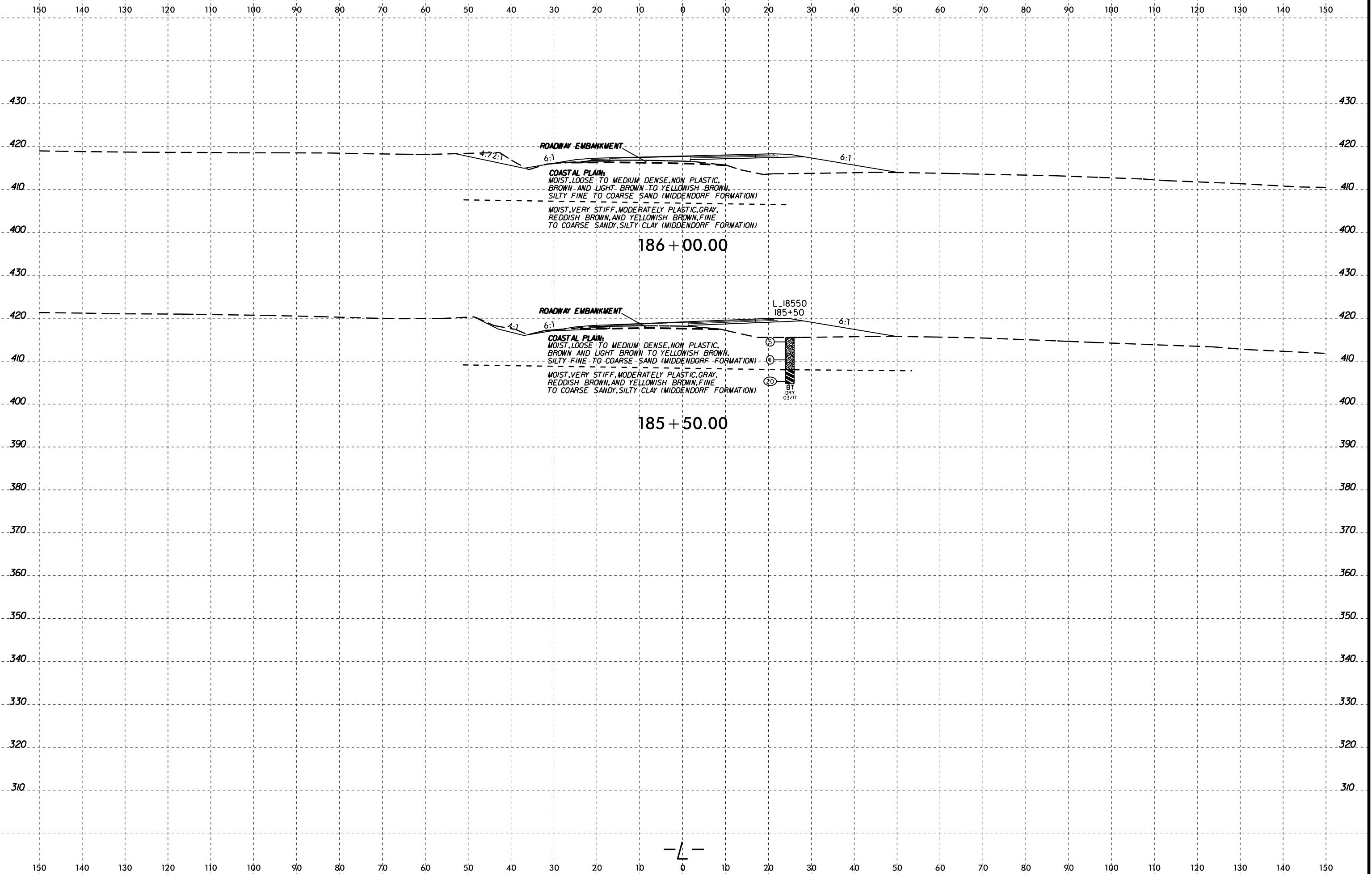




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 1548\_037A\_R-3830\_VR3830\_GEO\_ROW.dwg  
 K206660

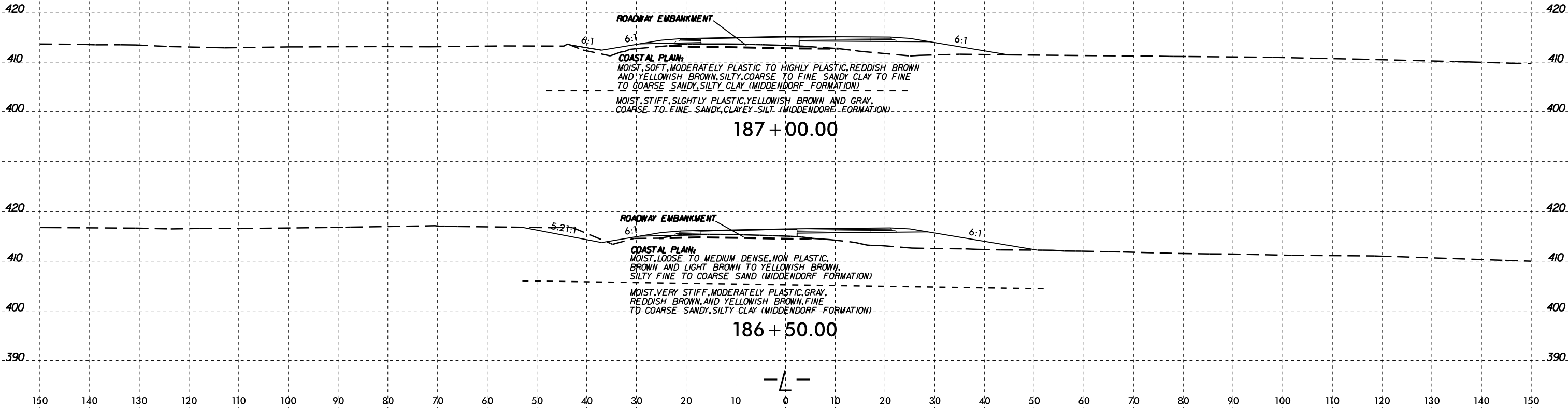


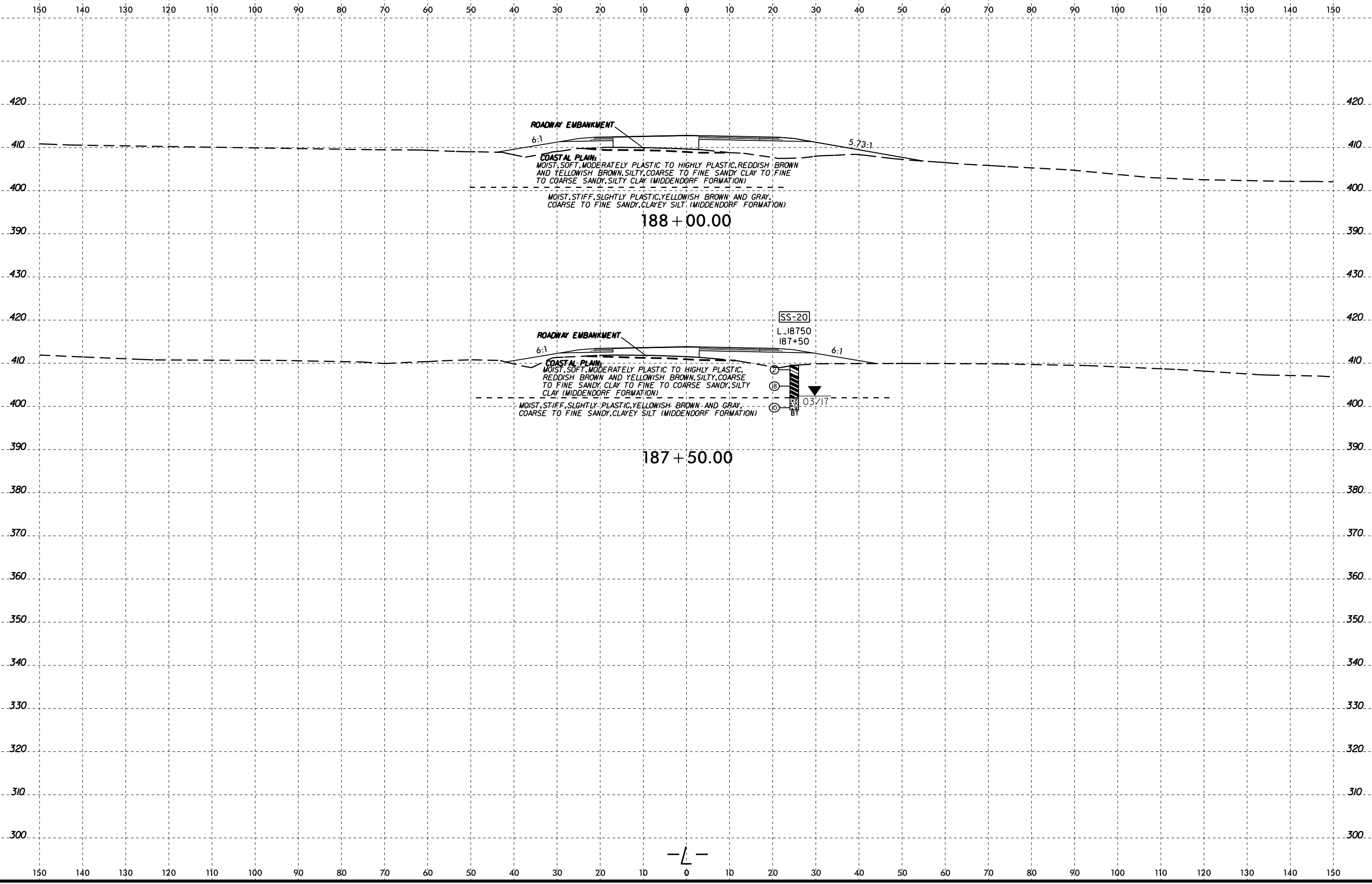




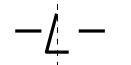


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420

420

410

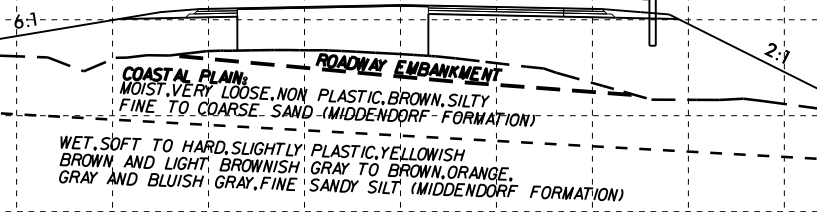
410

400

400

390

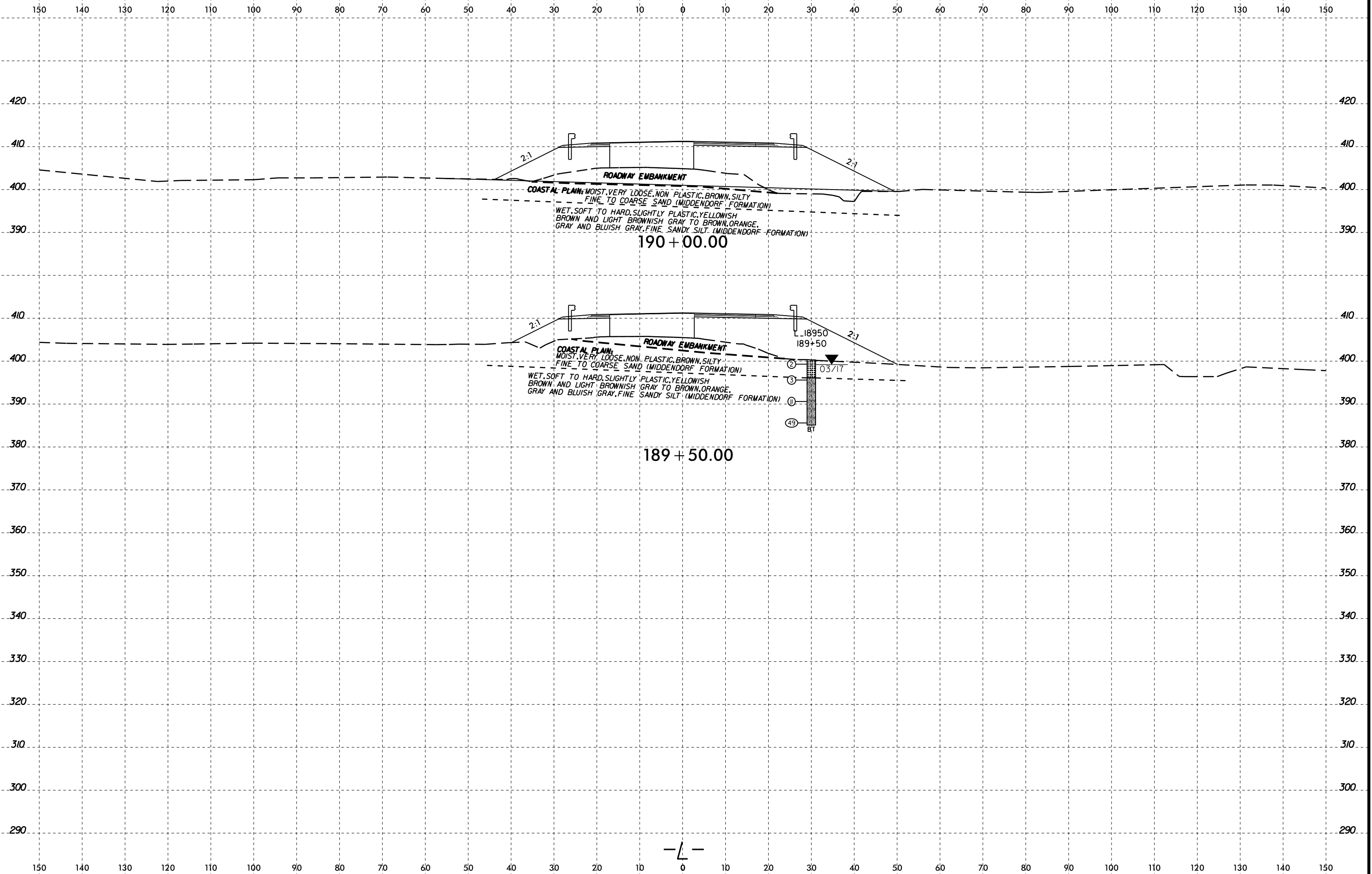
390



**ROADWAY EMBANKMENT**  
COASTAL PLAIN  
MOIST, VERY LOOSE, NON-PLASTIC, BROWN, SILTY  
FINE TO COARSE SAND (MIDDENDORF FORMATION)  
WET, SOFT TO HARD, SLIGHTLY PLASTIC, YELLOWISH  
BROWN AND LIGHT BROWNISH GRAY TO BROWN, ORANGE,  
GRAY AND BLuish GRAY, FINE SANDY SILT (MIDDENDORF FORMATION)

189 + 00.00

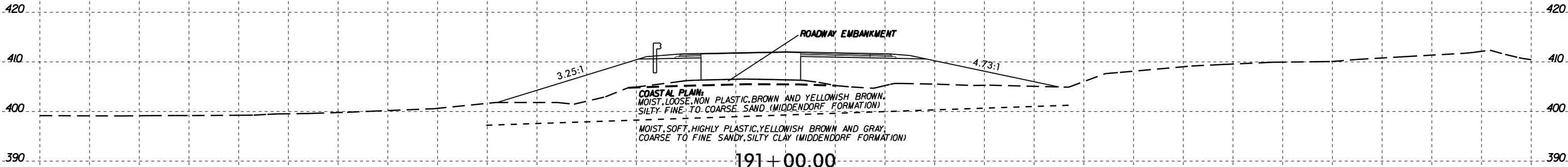




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 A: KAZ@6660

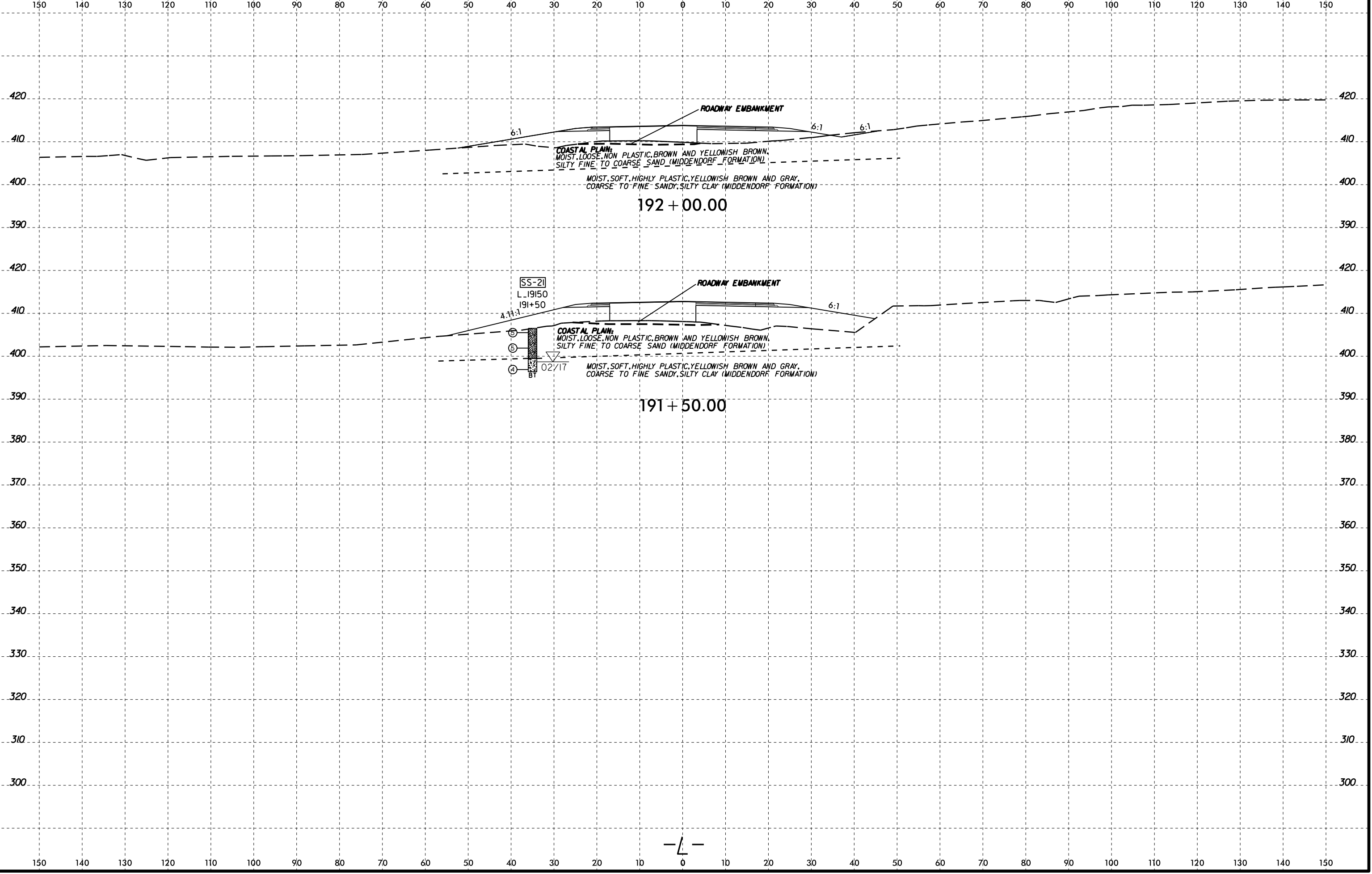


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150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

03-MAY-2017 13:47  
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Bo Johnson



ROADWAY EMBANKMENT

6:1

6:1

6:1

COASTAL PLAIN:  
MOIST, LOOSE, NON PLASTIC, BROWN AND YELLOWISH BROWN,  
SILTY FINE TO COARSE SAND (MIDDENDORF FORMATION)

MOIST, SOFT, HIGHLY PLASTIC, YELLOWISH BROWN AND GRAY,  
COARSE TO FINE SANDY, SILTY CLAY (MIDDENDORF FORMATION)

192 + 00.00

SS-21  
L 19150  
191+50

4.11:1

⑥

⑤

④

BT

02/17

ROADWAY EMBANKMENT

6:1

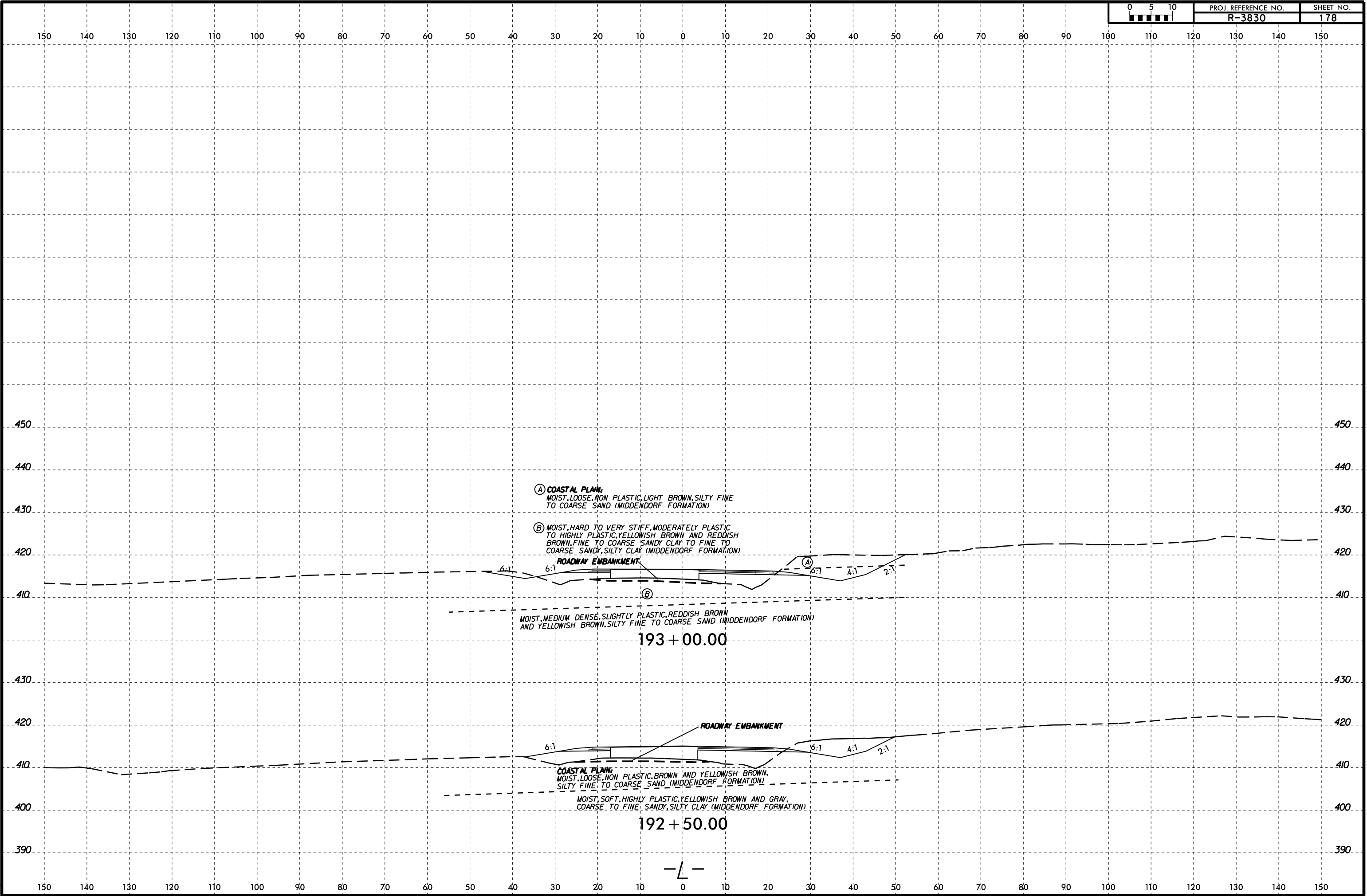
COASTAL PLAIN:  
MOIST, LOOSE, NON PLASTIC, BROWN AND YELLOWISH BROWN,  
SILTY FINE TO COARSE SAND (MIDDENDORF FORMATION)

MOIST, SOFT, HIGHLY PLASTIC, YELLOWISH BROWN AND GRAY,  
COARSE TO FINE SANDY, SILTY CLAY (MIDDENDORF FORMATION)

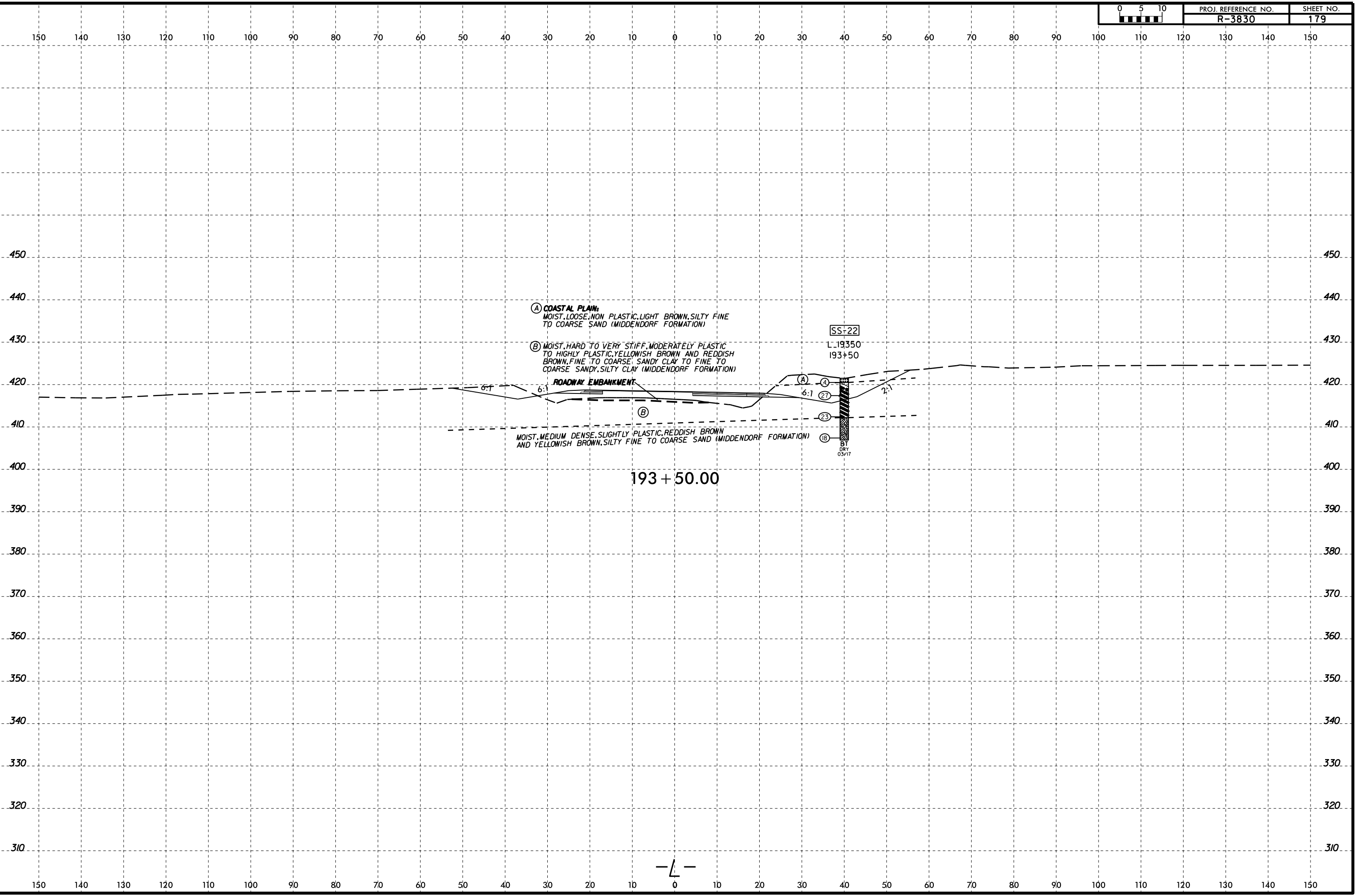
191 + 50.00

-L-



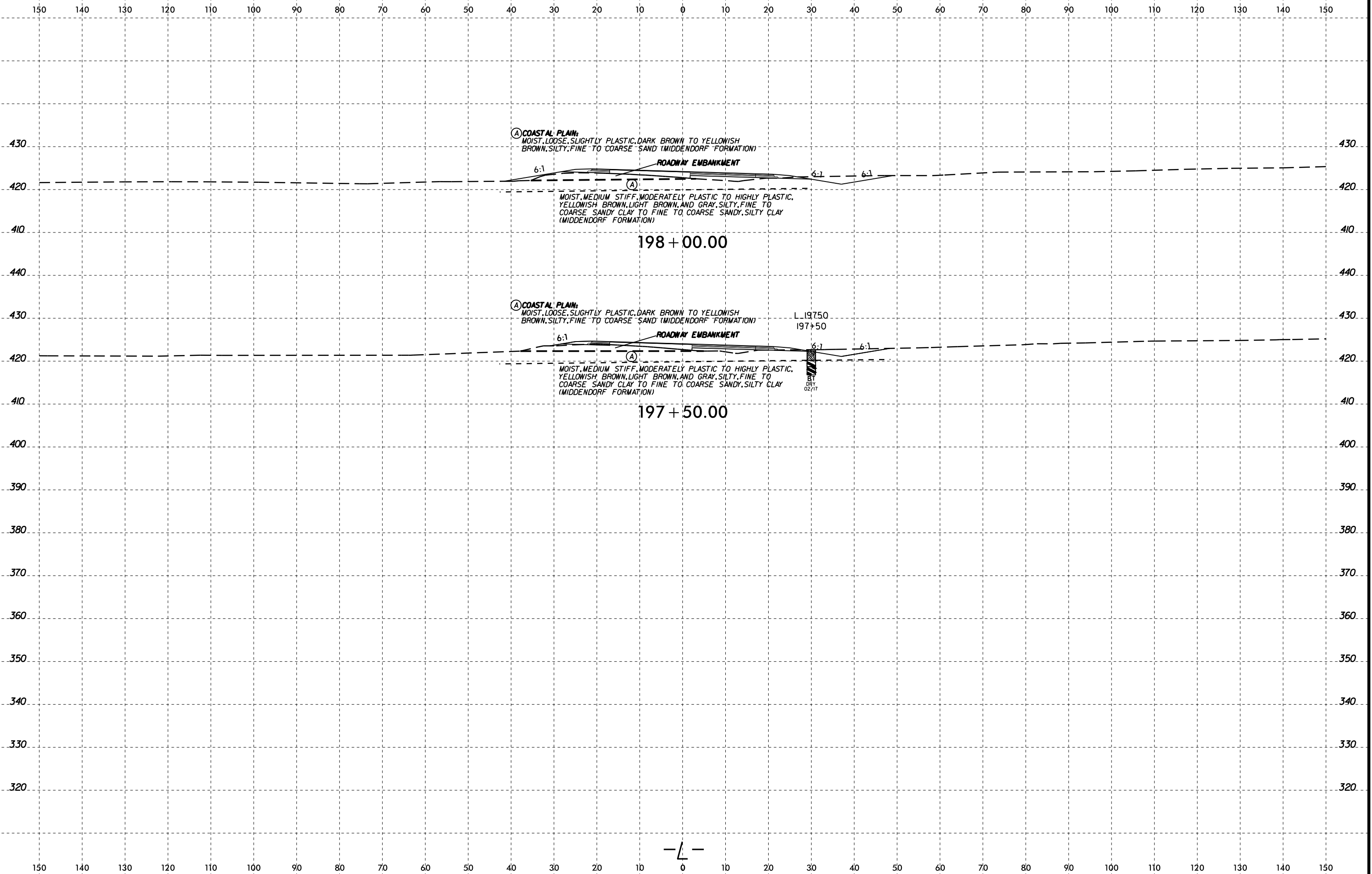


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A1 KA206660  
Bo Johnson



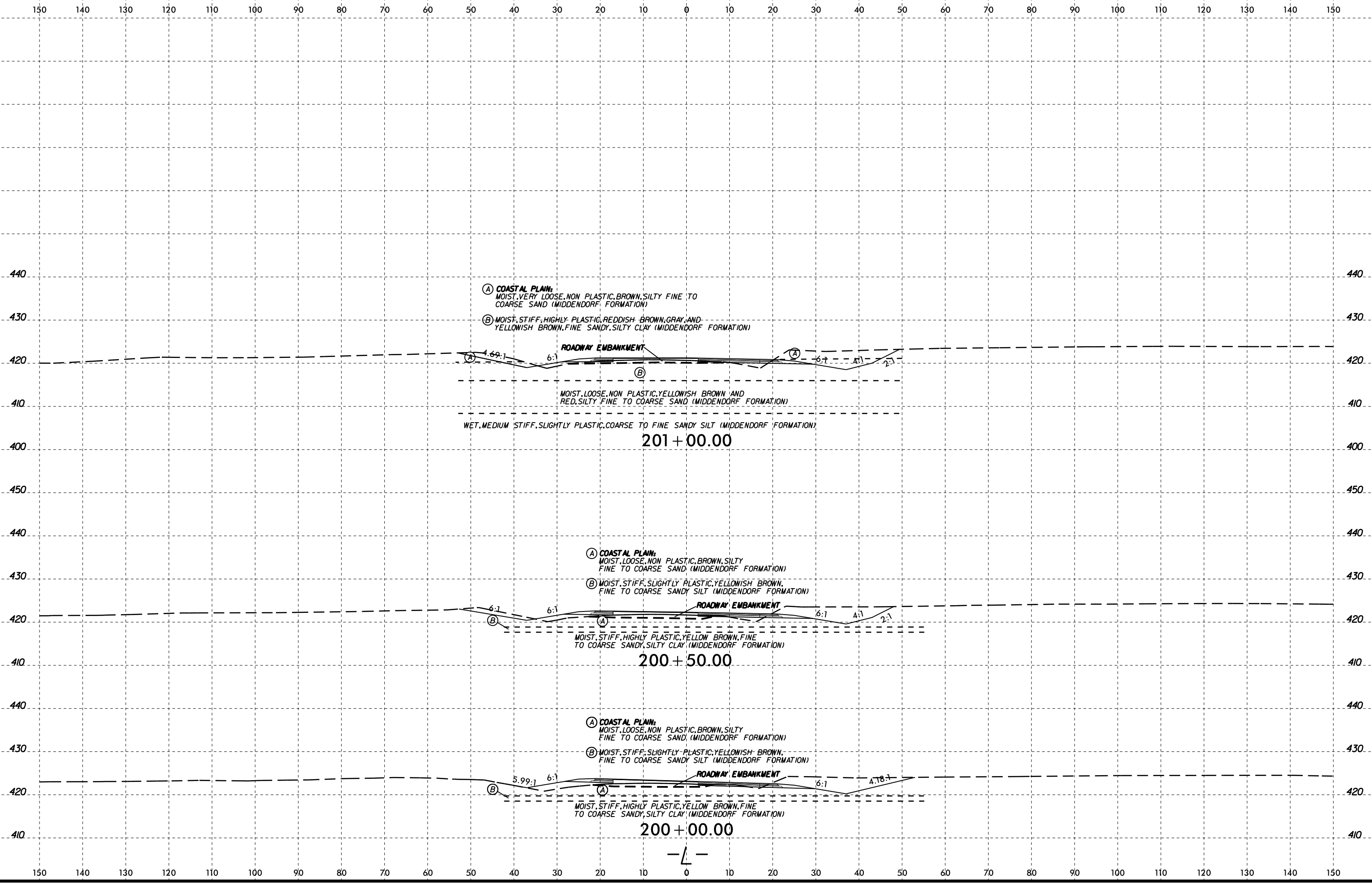




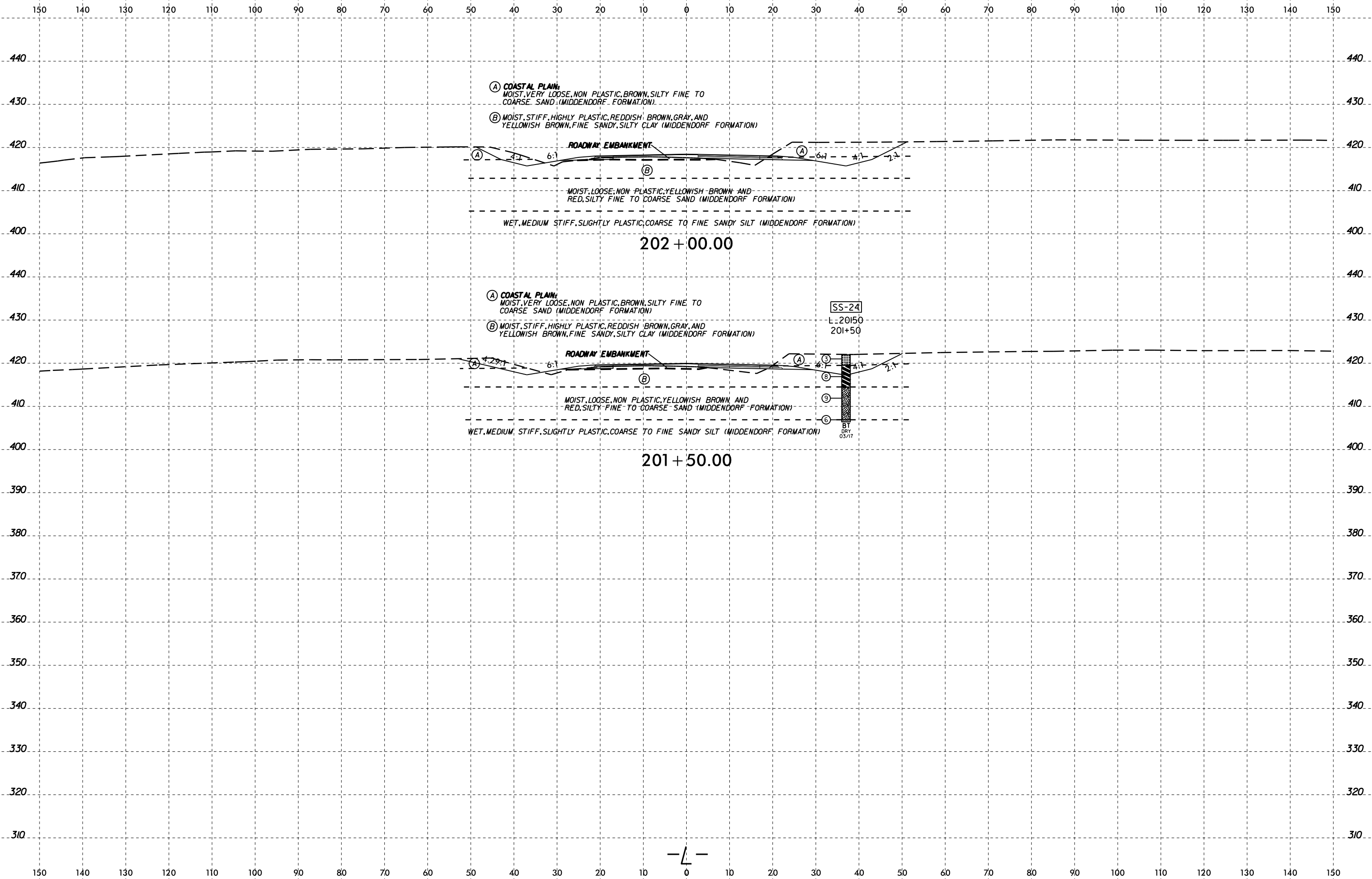


04-MAY-2017 08:09  
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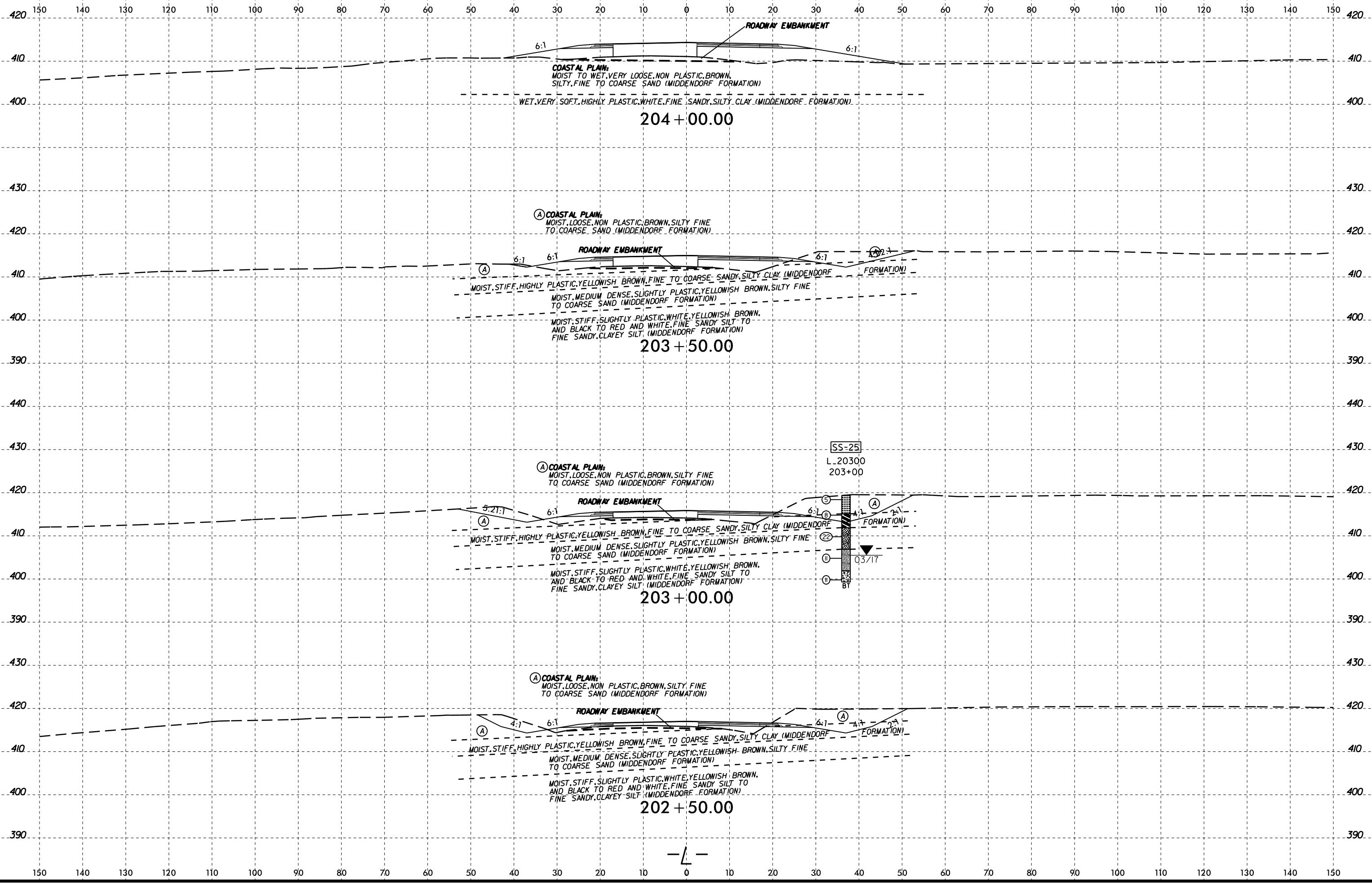


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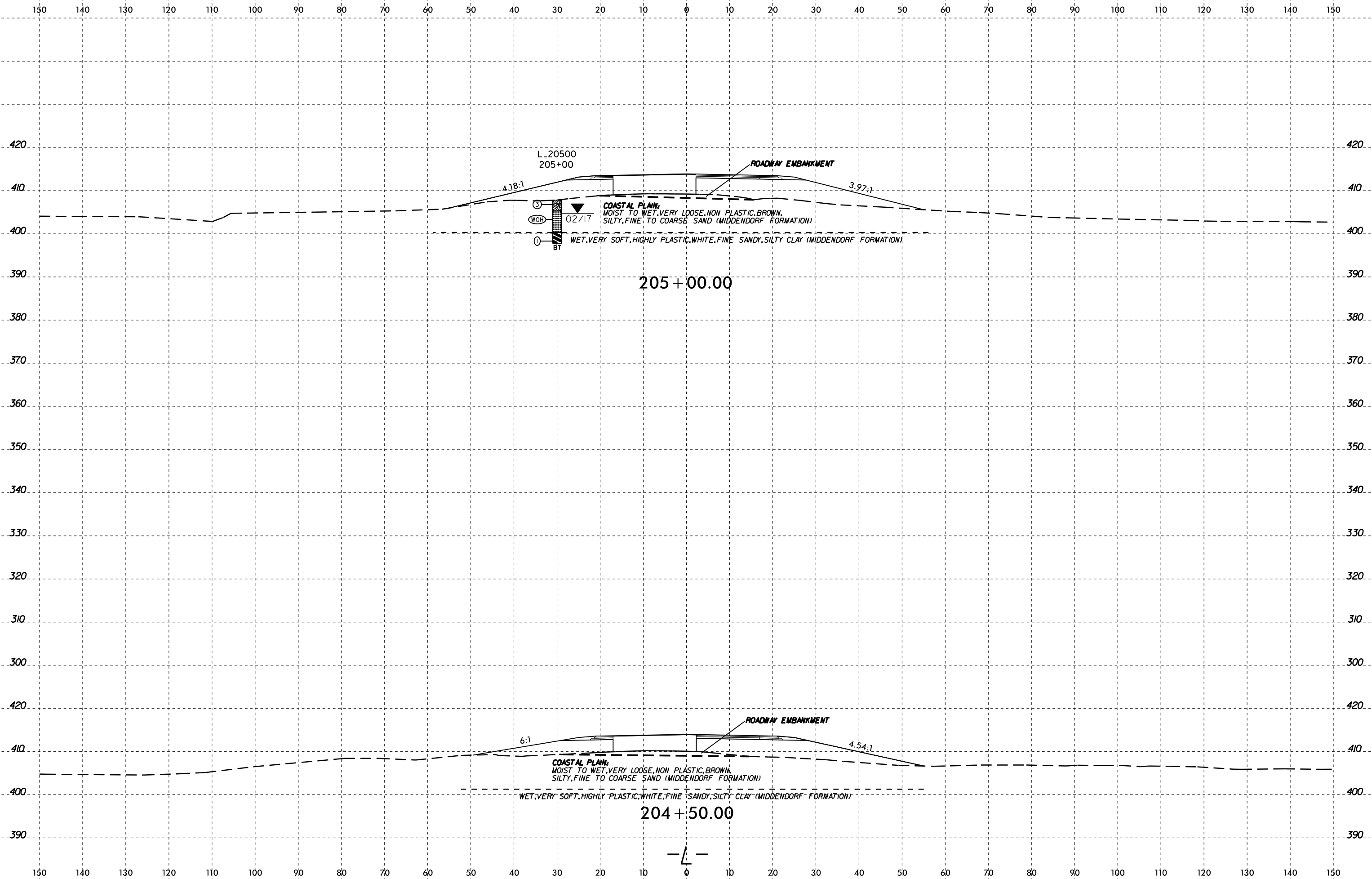


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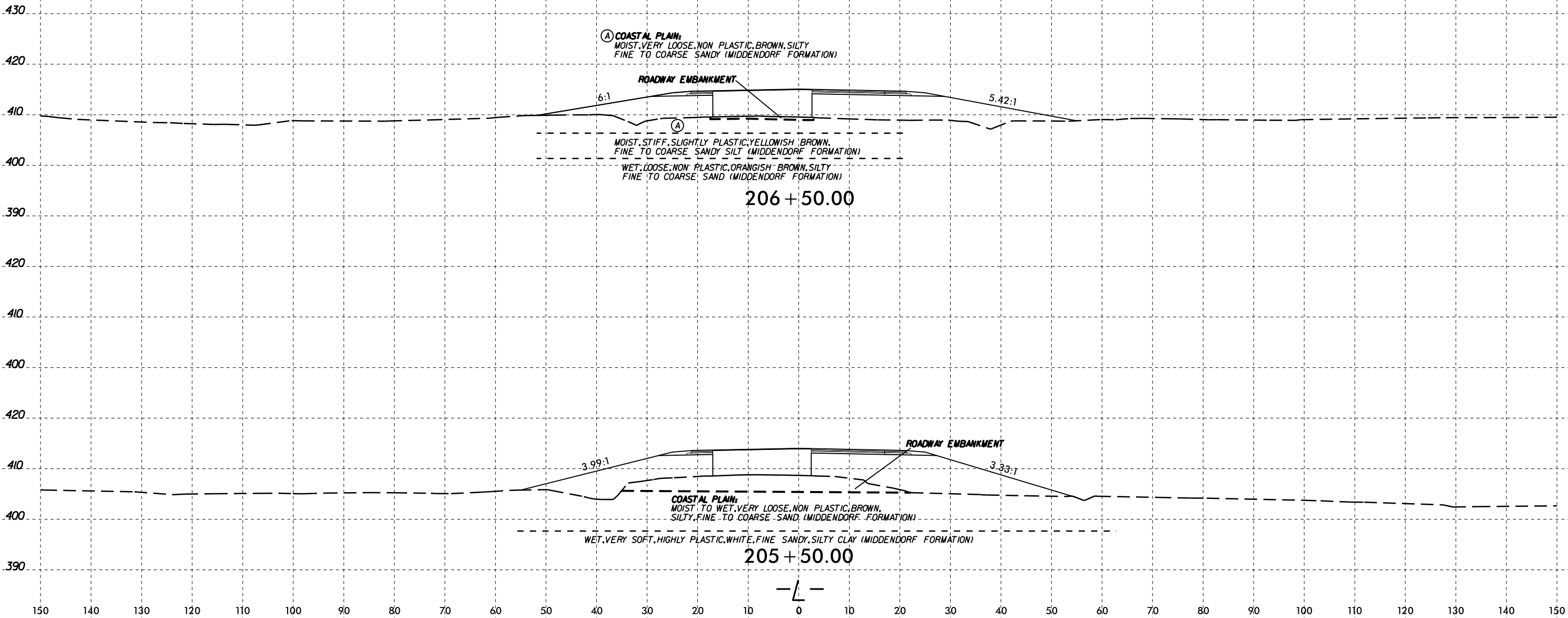
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 J. Johnson



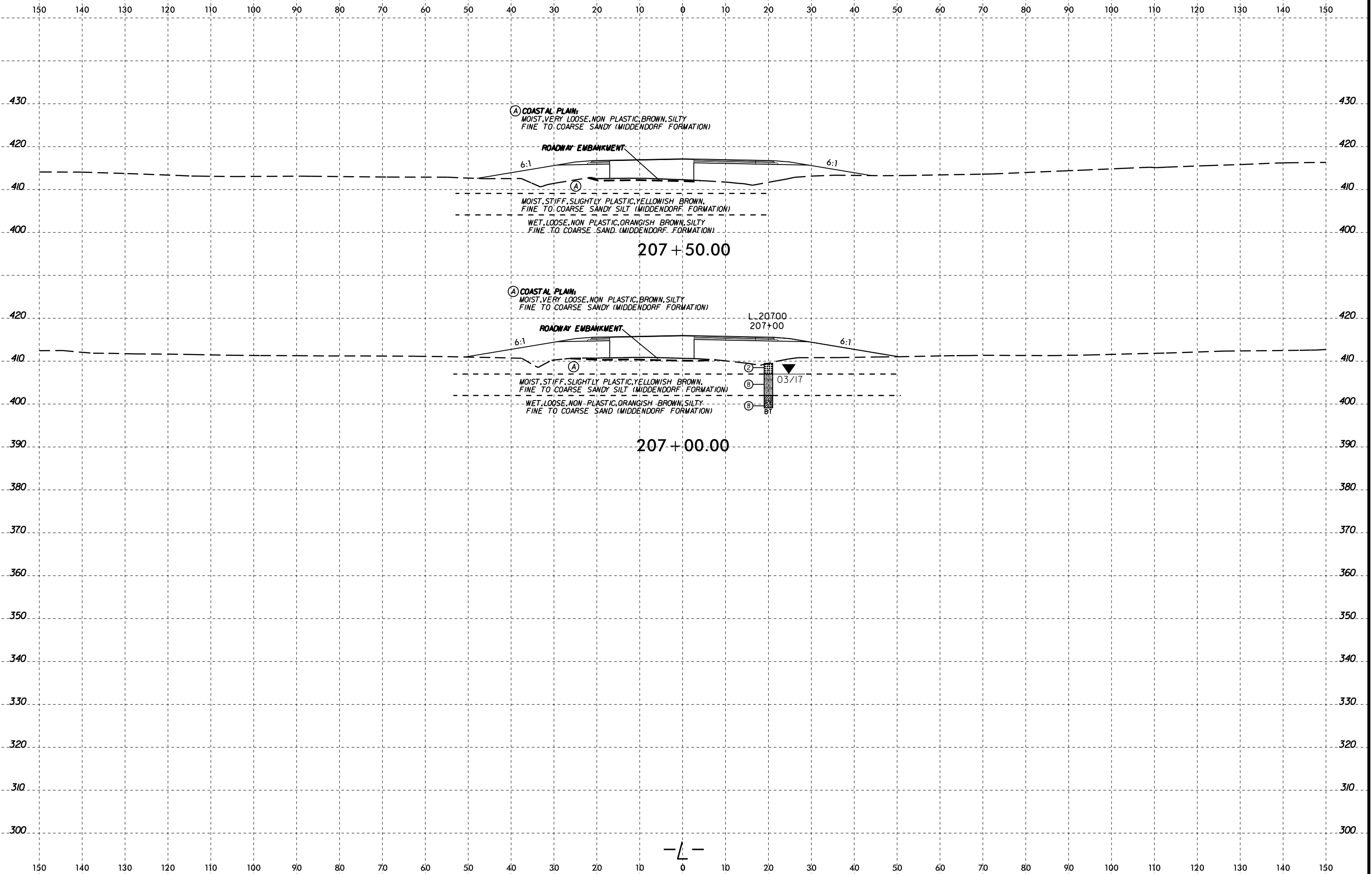
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04-MAY-2017 08:10  
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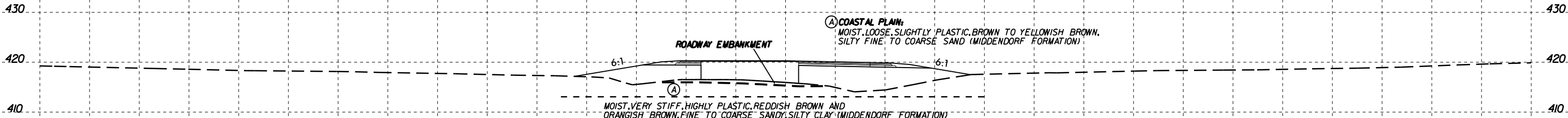


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150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150



ROADWAY EMBANKMENT

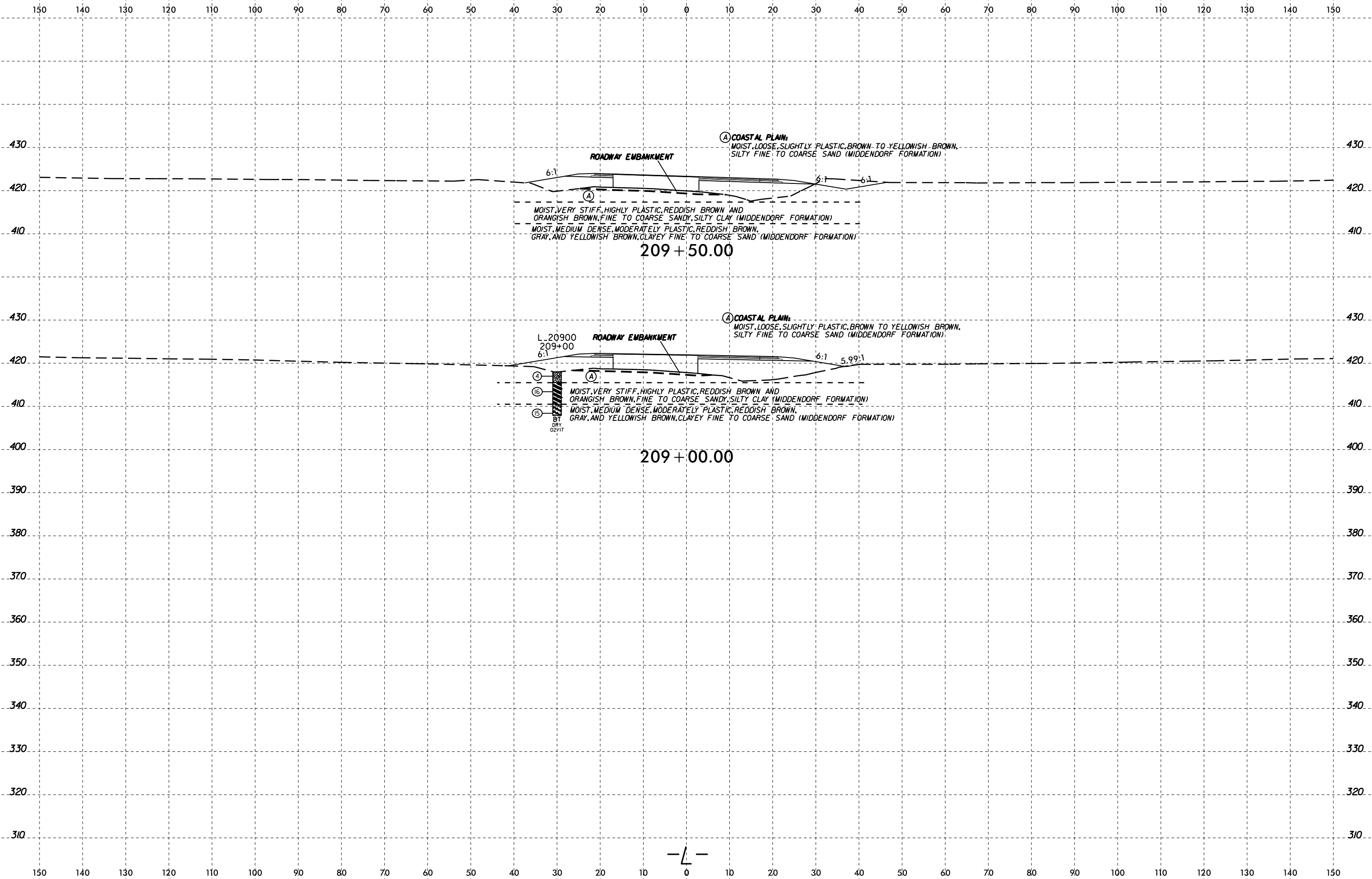
Ⓐ COASTAL PLAIN  
MOIST, LOOSE, SLIGHTLY PLASTIC, BROWN TO YELLOWISH BROWN,  
SILTY FINE TO COARSE SAND (MIDDENDORF FORMATION)

Ⓐ  
MOIST, VERY STIFF, HIGHLY PLASTIC, REDDISH BROWN AND  
ORANGISH BROWN, FINE TO COARSE SANDY SILTY CLAY (MIDDENDORF FORMATION)  
MOIST, MEDIUM DENSE, MODERATELY PLASTIC, REDDISH BROWN,  
GRAY AND YELLOWISH BROWN, CLAYEY FINE TO COARSE SAND (MIDDENDORF FORMATION)

208 + 50.00

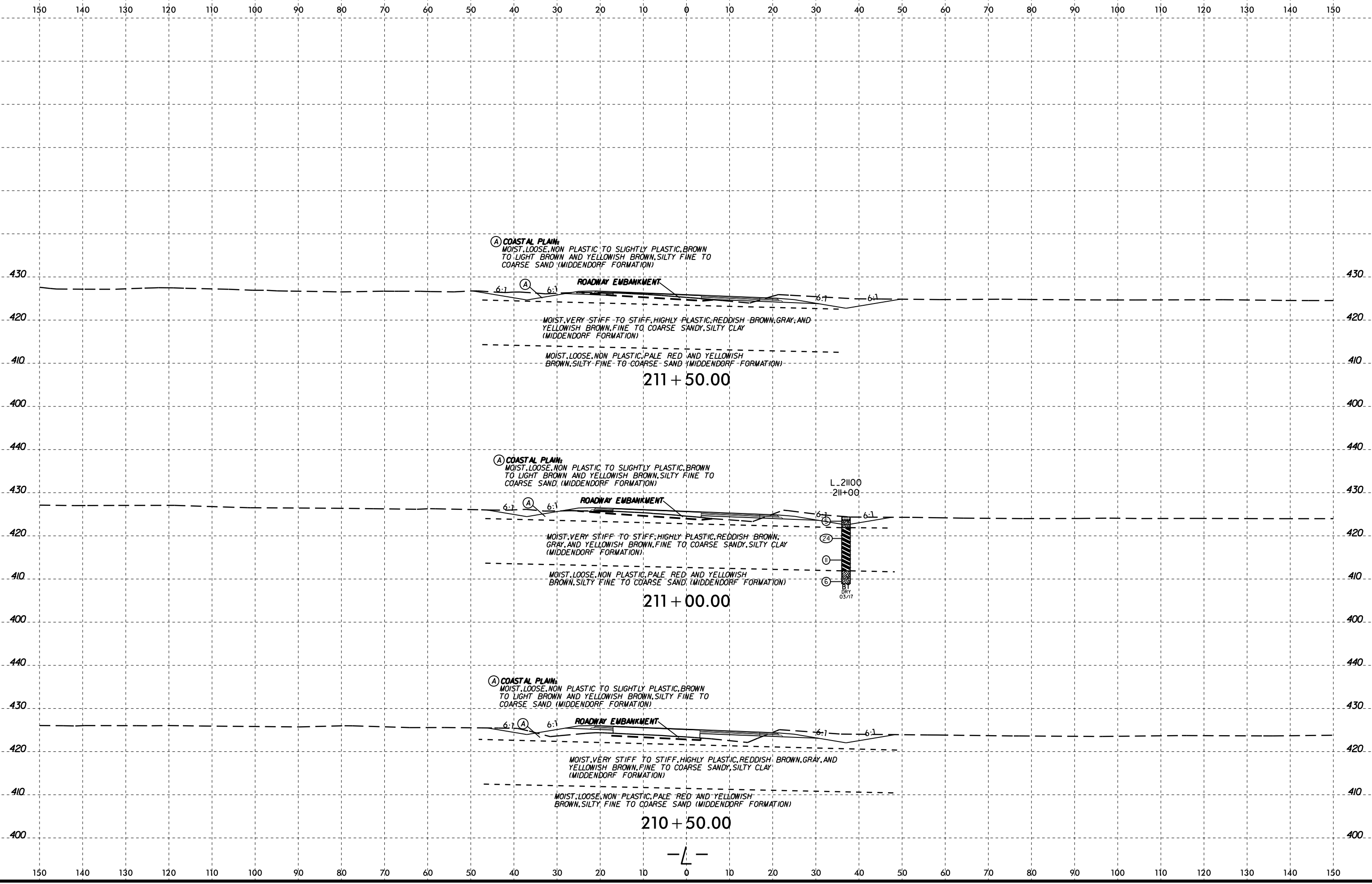


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04-MAY-2017 08:10  
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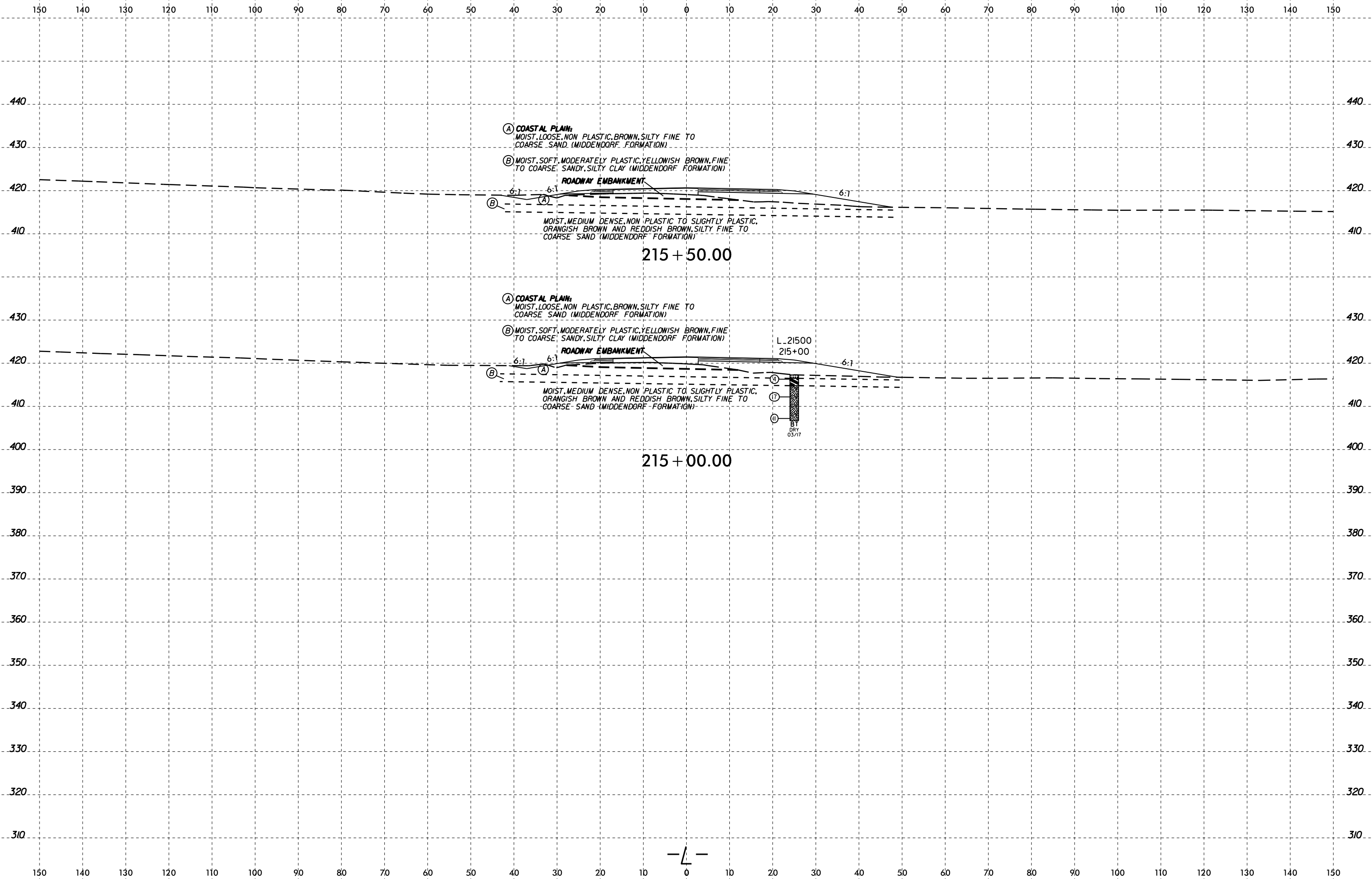




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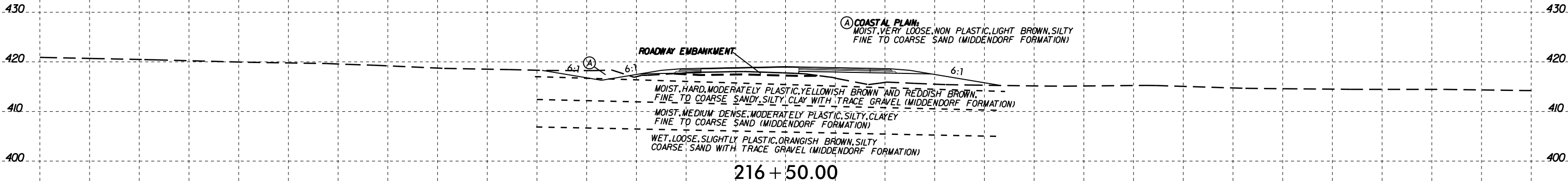




04-MAY-2017 08:11  
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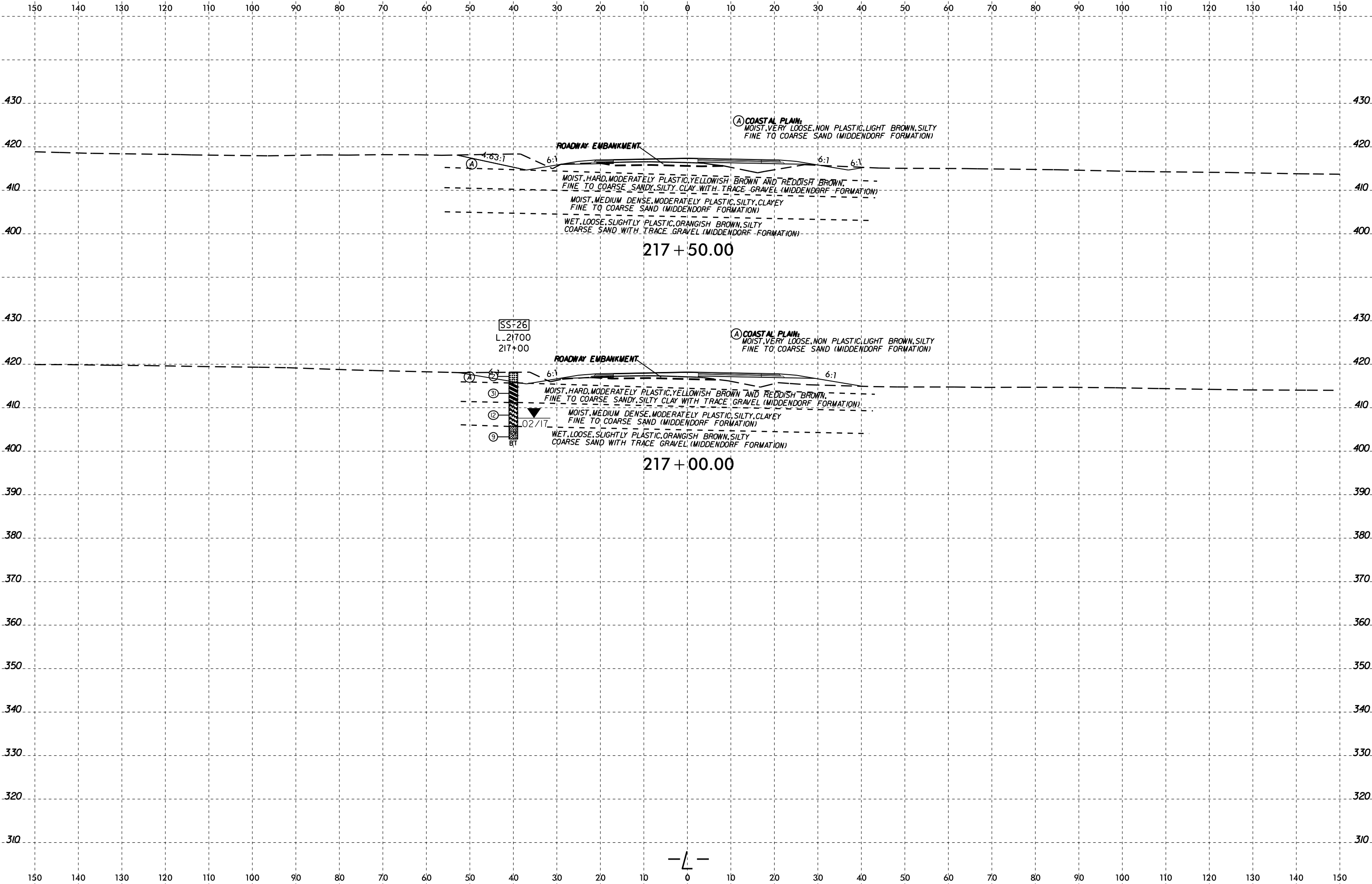


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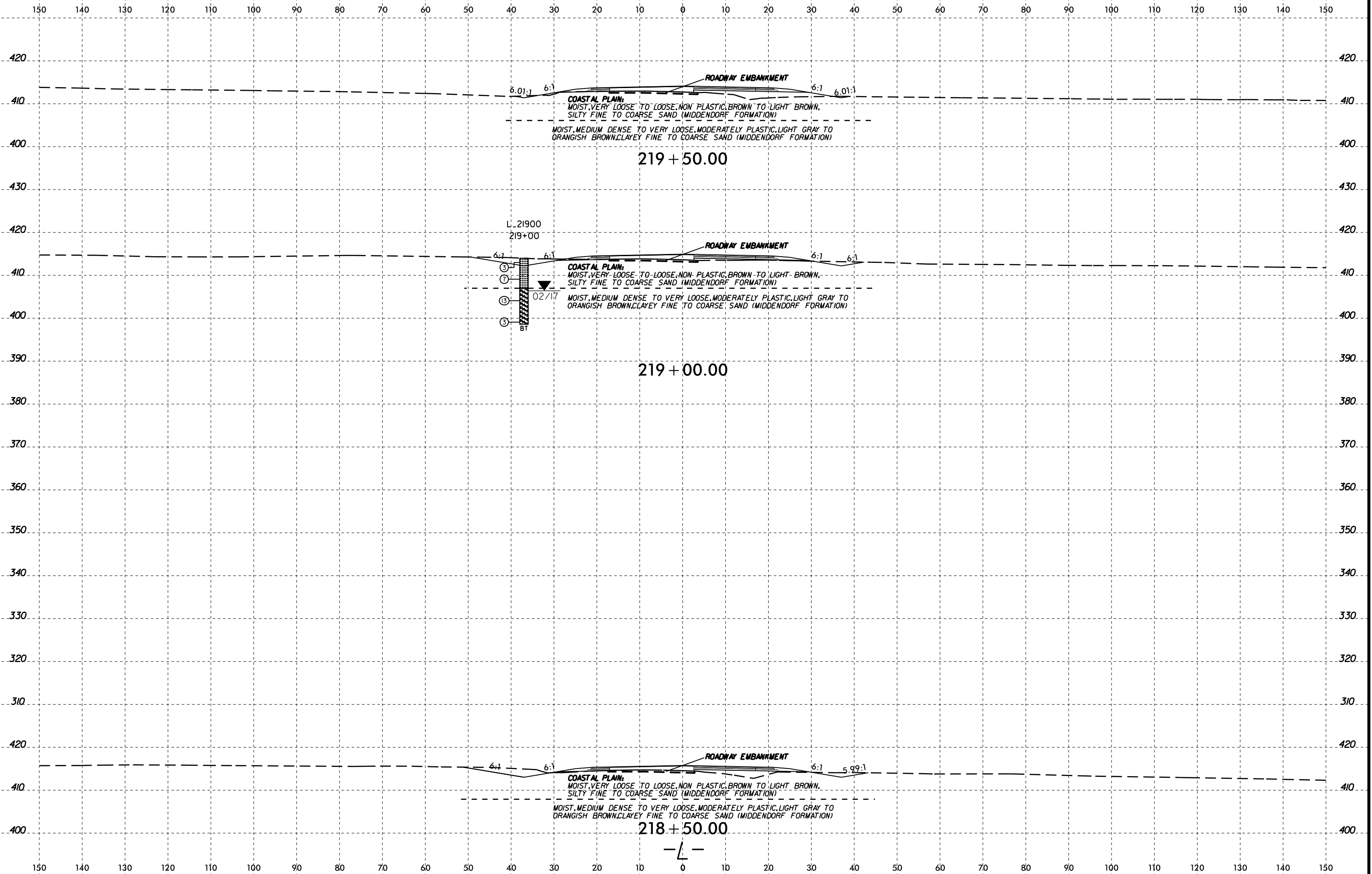
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 A1 KA26660

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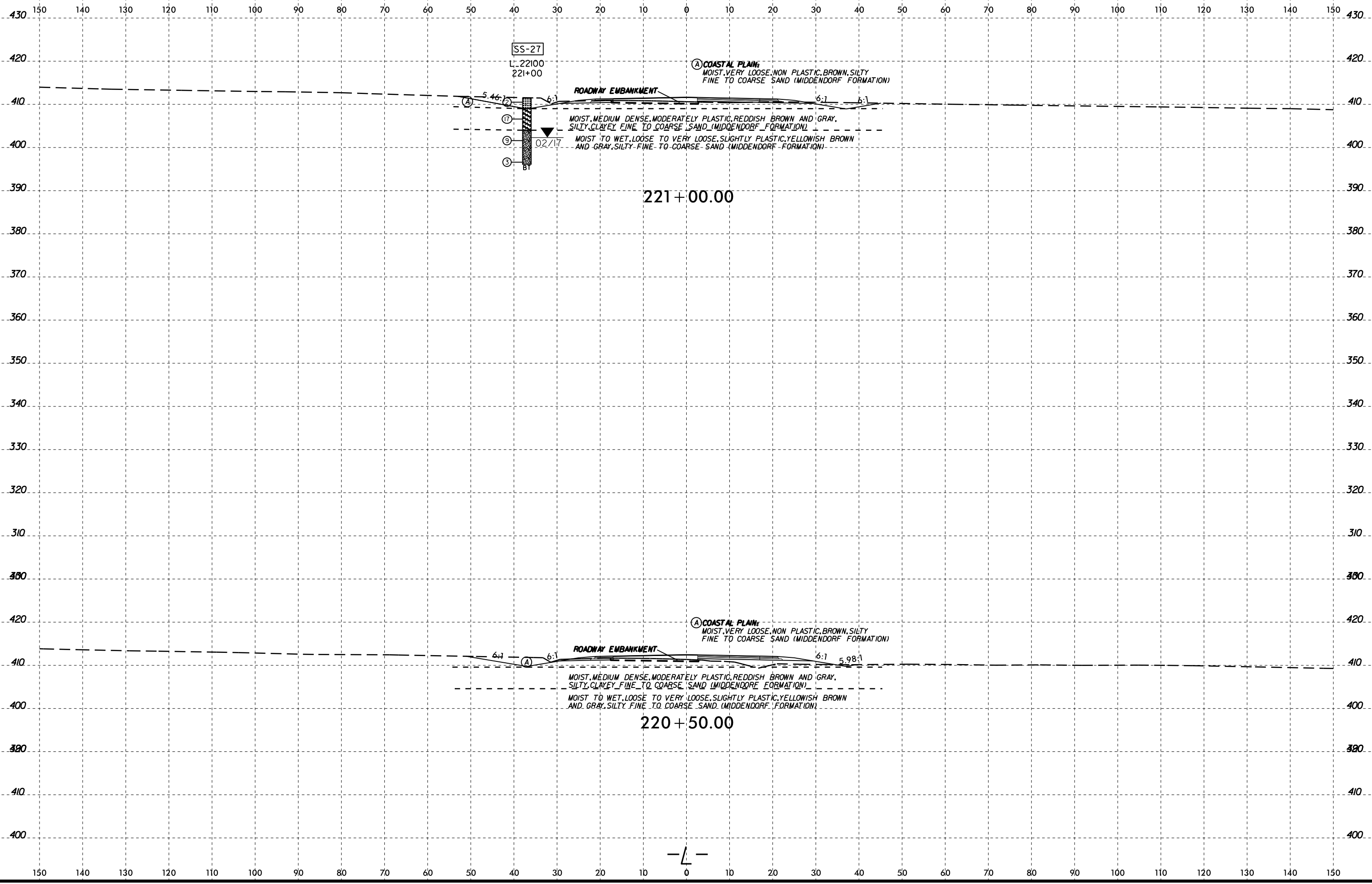


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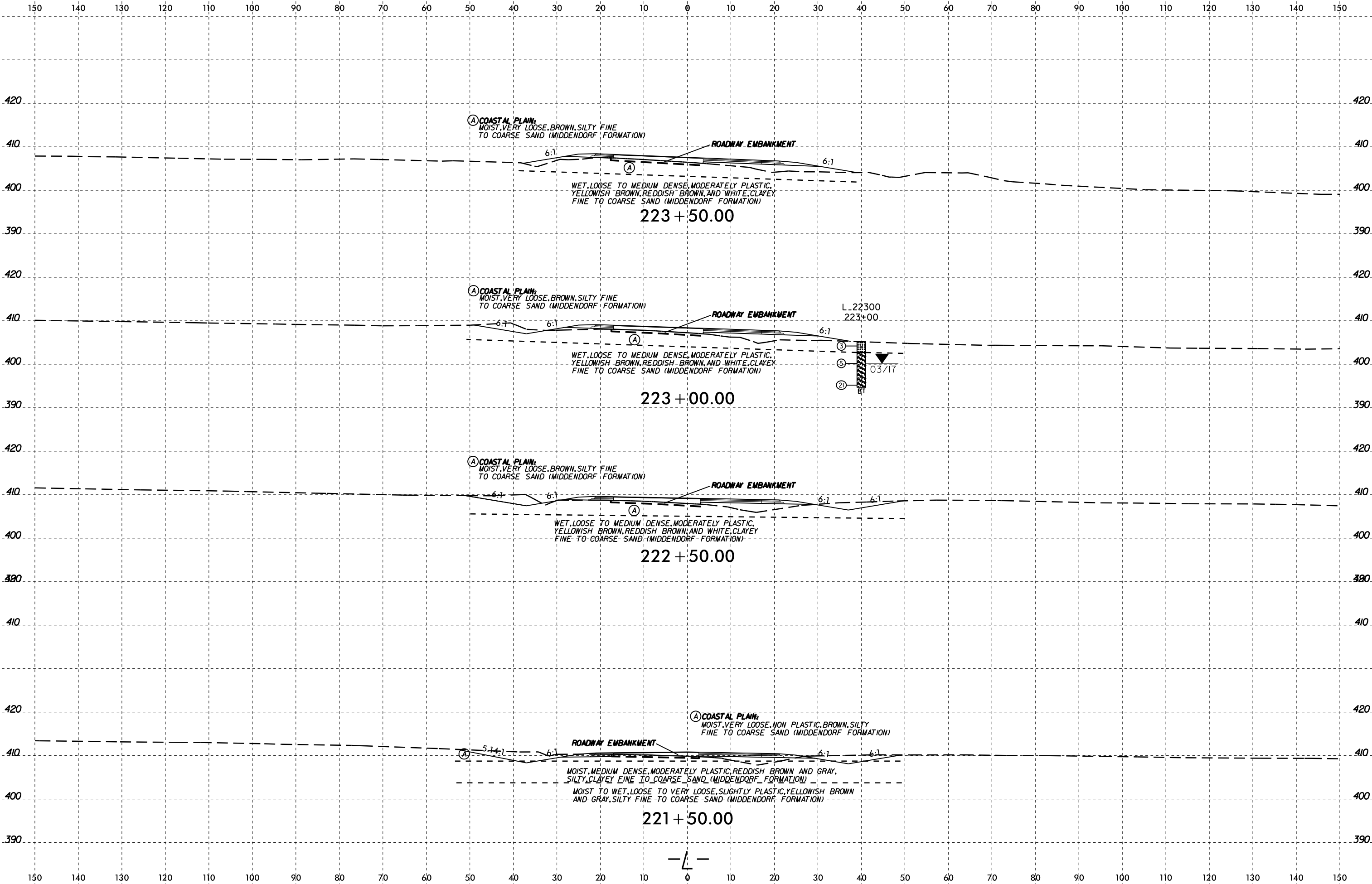


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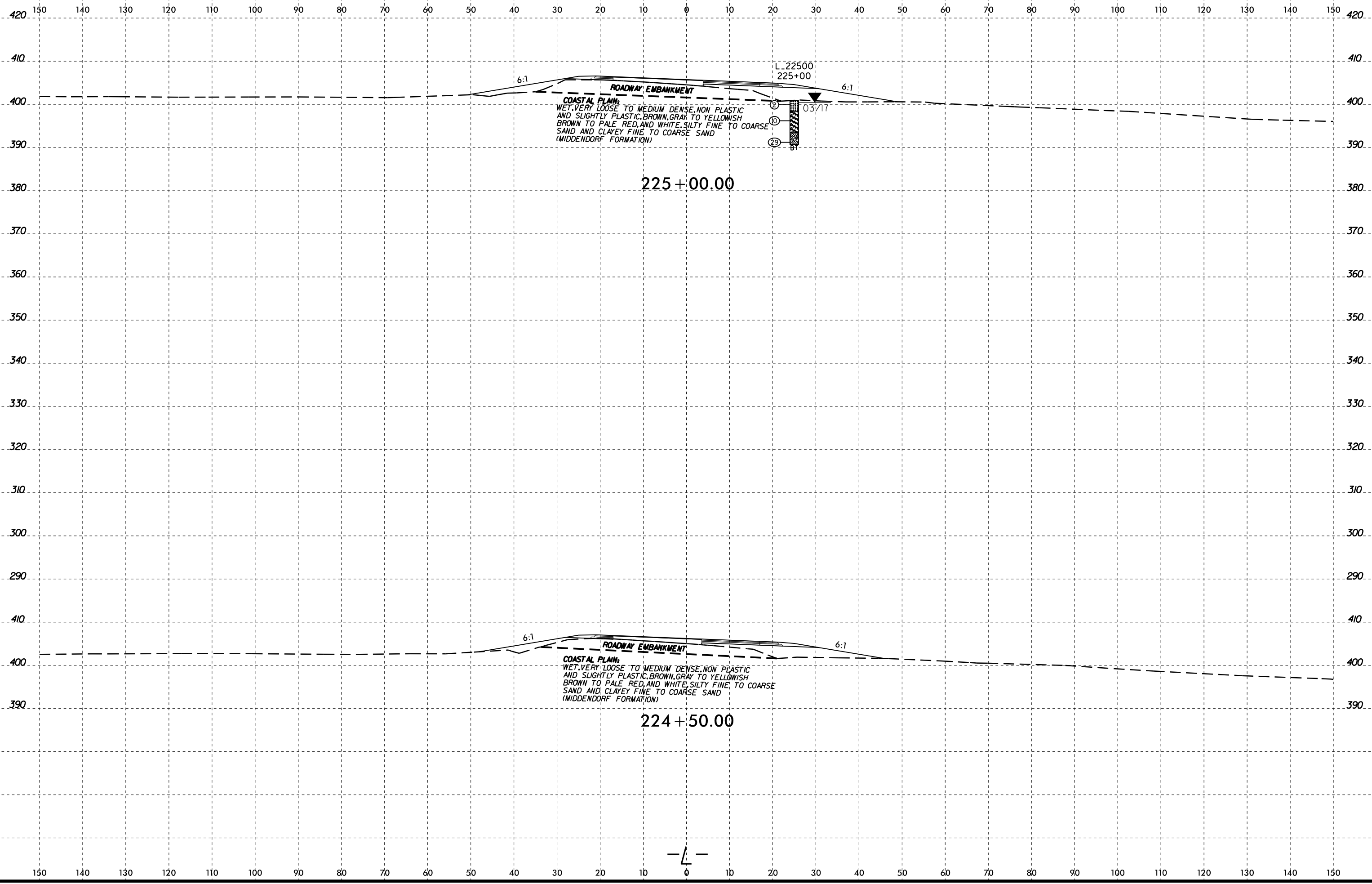


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 A: KA206660  
 B: Johnson





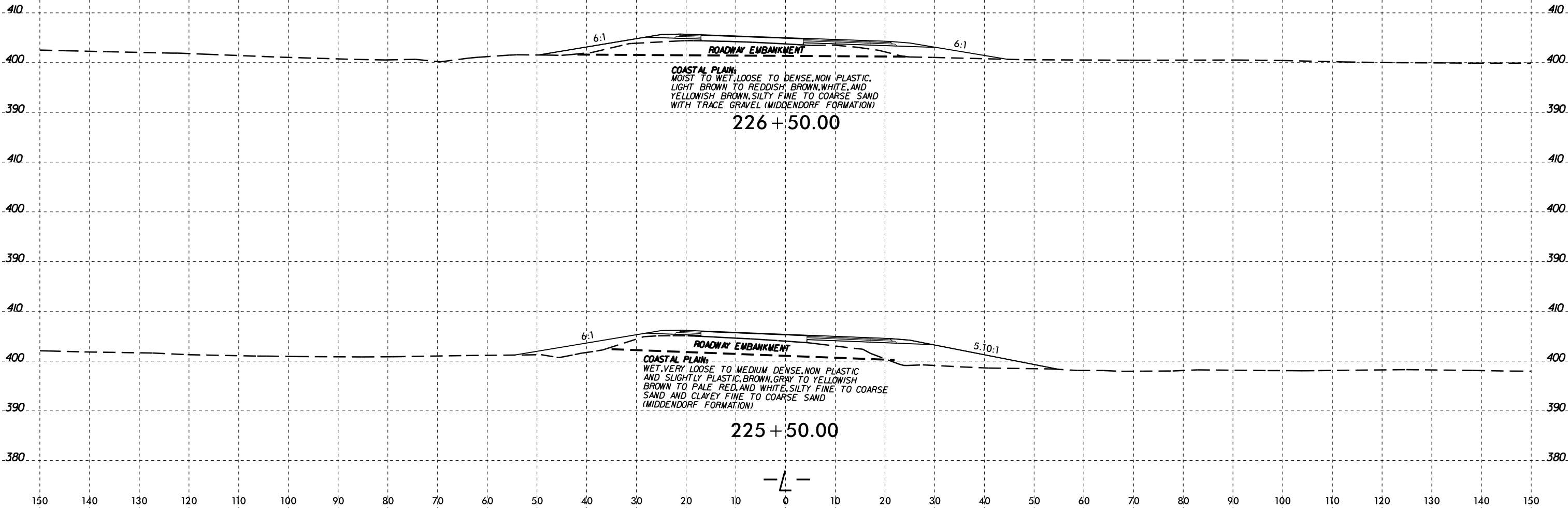
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 A: KA206660



04-MAY-2017 08:11  
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 A1 KA26660



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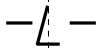


COASTAL PLAIN:  
MOIST TO WET, LOOSE TO DENSE, NON PLASTIC,  
LIGHT BROWN TO REDDISH BROWN, WHITE, AND  
YELLOWISH BROWN, SILTY FINE TO COARSE SAND  
WITH TRACE GRAVEL (MIDDENDORF FORMATION)

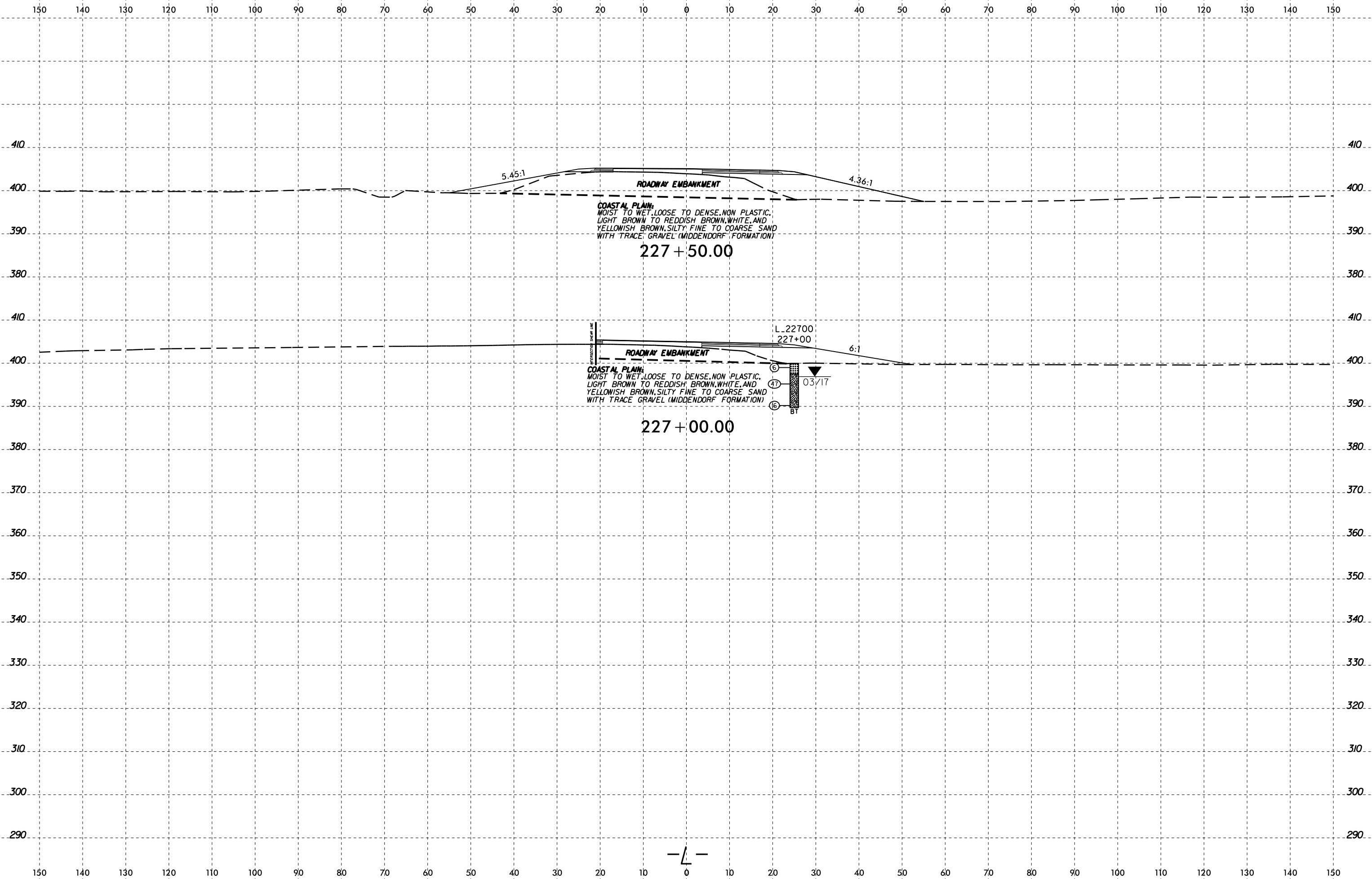
226 + 50.00

COASTAL PLAIN:  
WET, VERY LOOSE TO MEDIUM DENSE, NON PLASTIC  
AND SLIGHTLY PLASTIC, BROWN, GRAY TO YELLOWISH  
BROWN TO PALE RED, AND WHITE, SILTY FINE TO COARSE  
SAND AND CLAYEY FINE TO COARSE SAND  
(MIDDENDORF FORMATION)

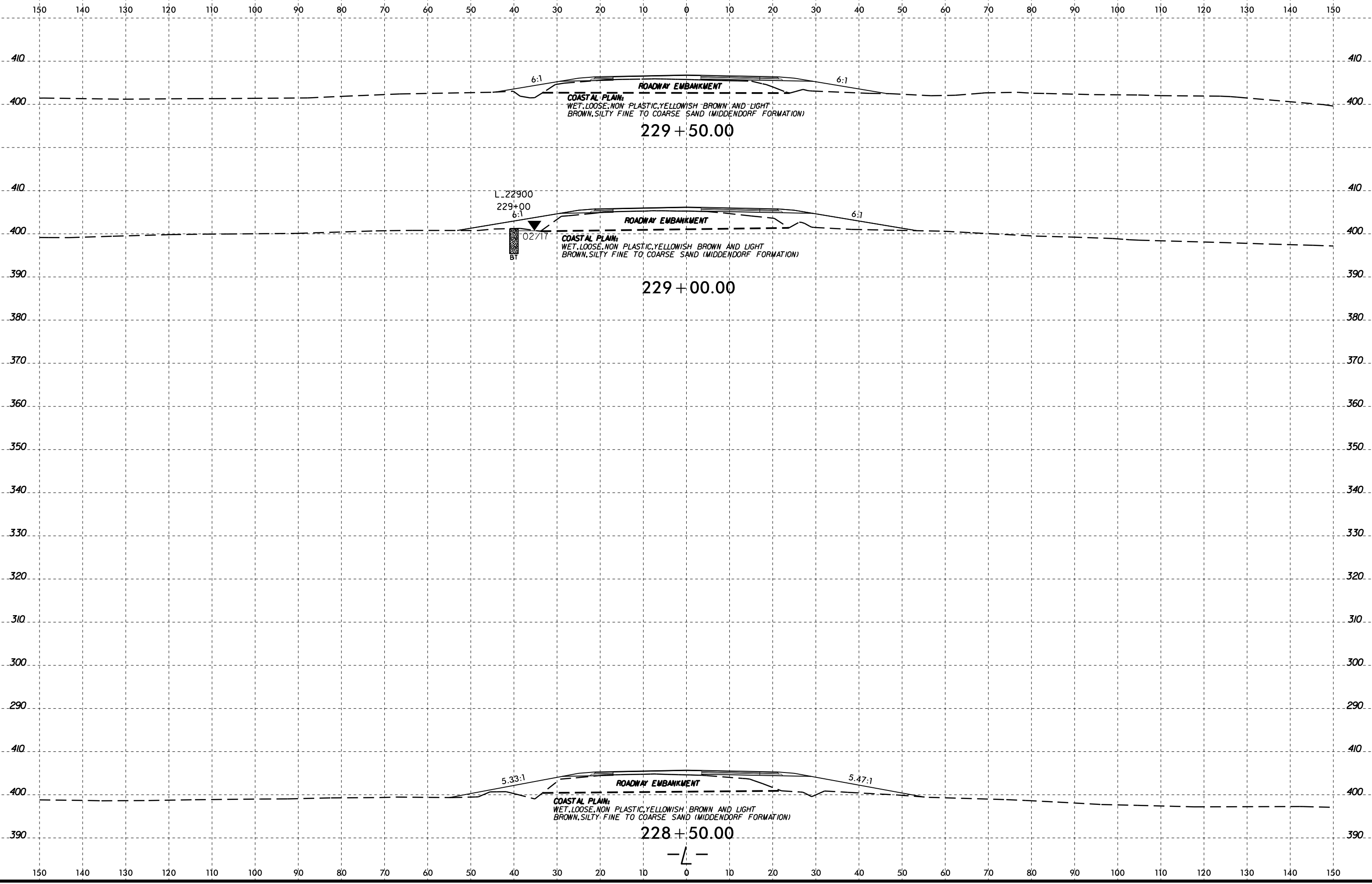
225 + 50.00







04-MAY-2017 08:12  
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04-MAY-2017 08:12  
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 027'17"  
 BT

COASTAL PLAIN:  
 WET, LOOSE, NON PLASTIC, YELLOWISH BROWN AND LIGHT  
 BROWN, SILTY FINE TO COARSE SAND (MIDDENDORF FORMATION)

229 + 50.00

COASTAL PLAIN:  
 WET, LOOSE, NON PLASTIC, YELLOWISH BROWN AND LIGHT  
 BROWN, SILTY FINE TO COARSE SAND (MIDDENDORF FORMATION)

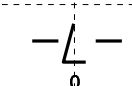
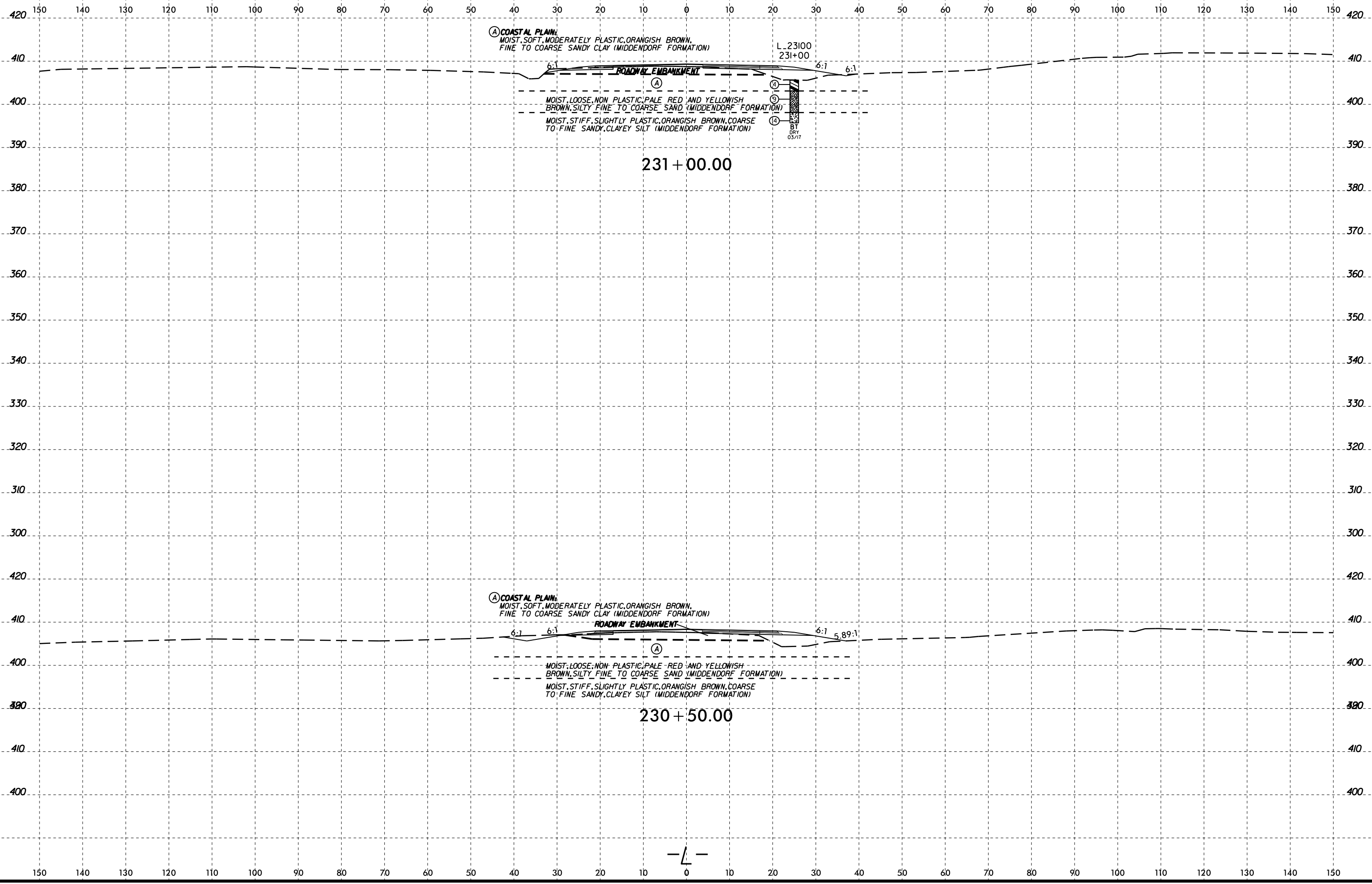
229 + 00.00

COASTAL PLAIN:  
 WET, LOOSE, NON PLASTIC, YELLOWISH BROWN AND LIGHT  
 BROWN, SILTY FINE TO COARSE SAND (MIDDENDORF FORMATION)

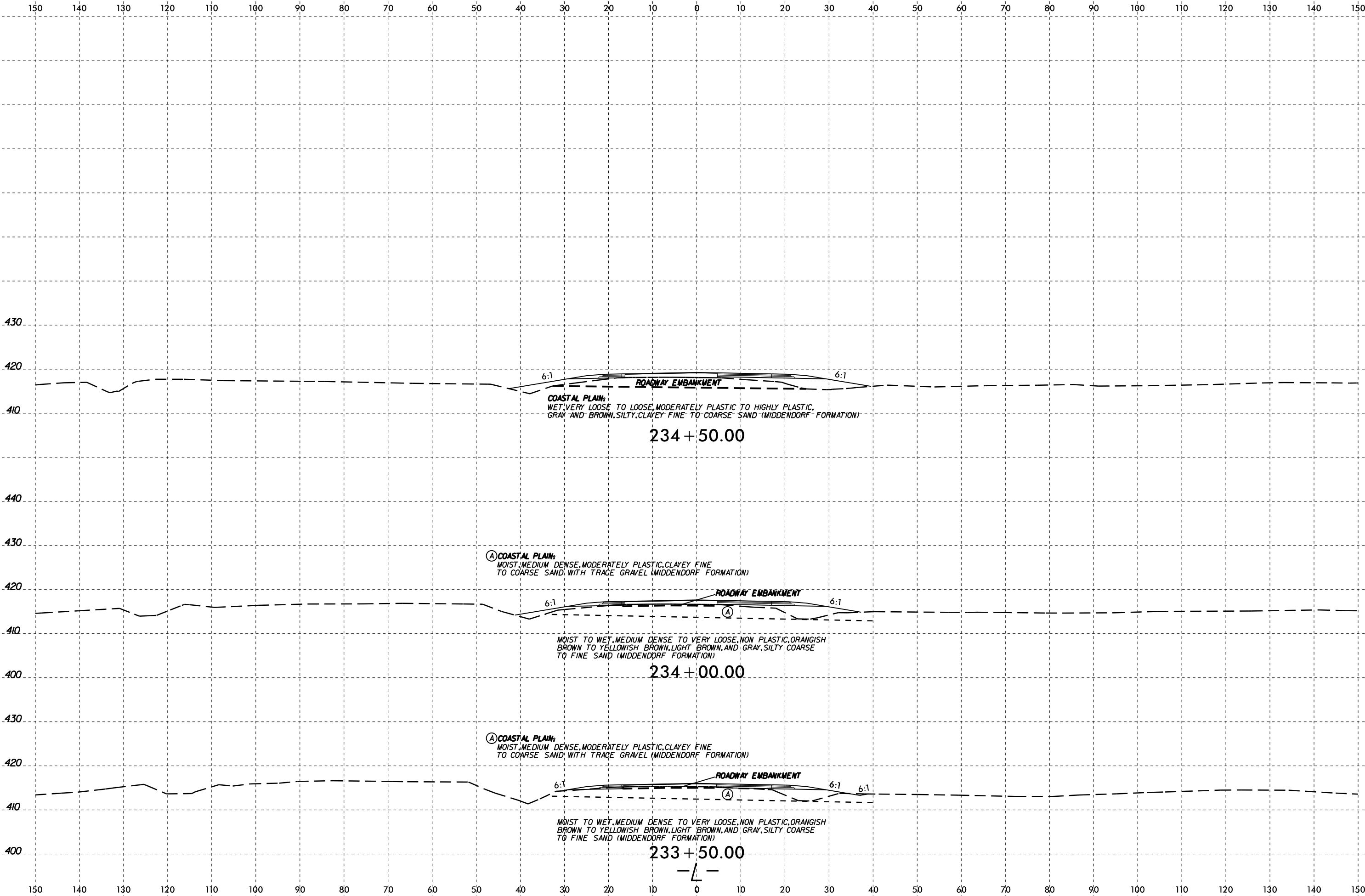
228 + 50.00

— L —

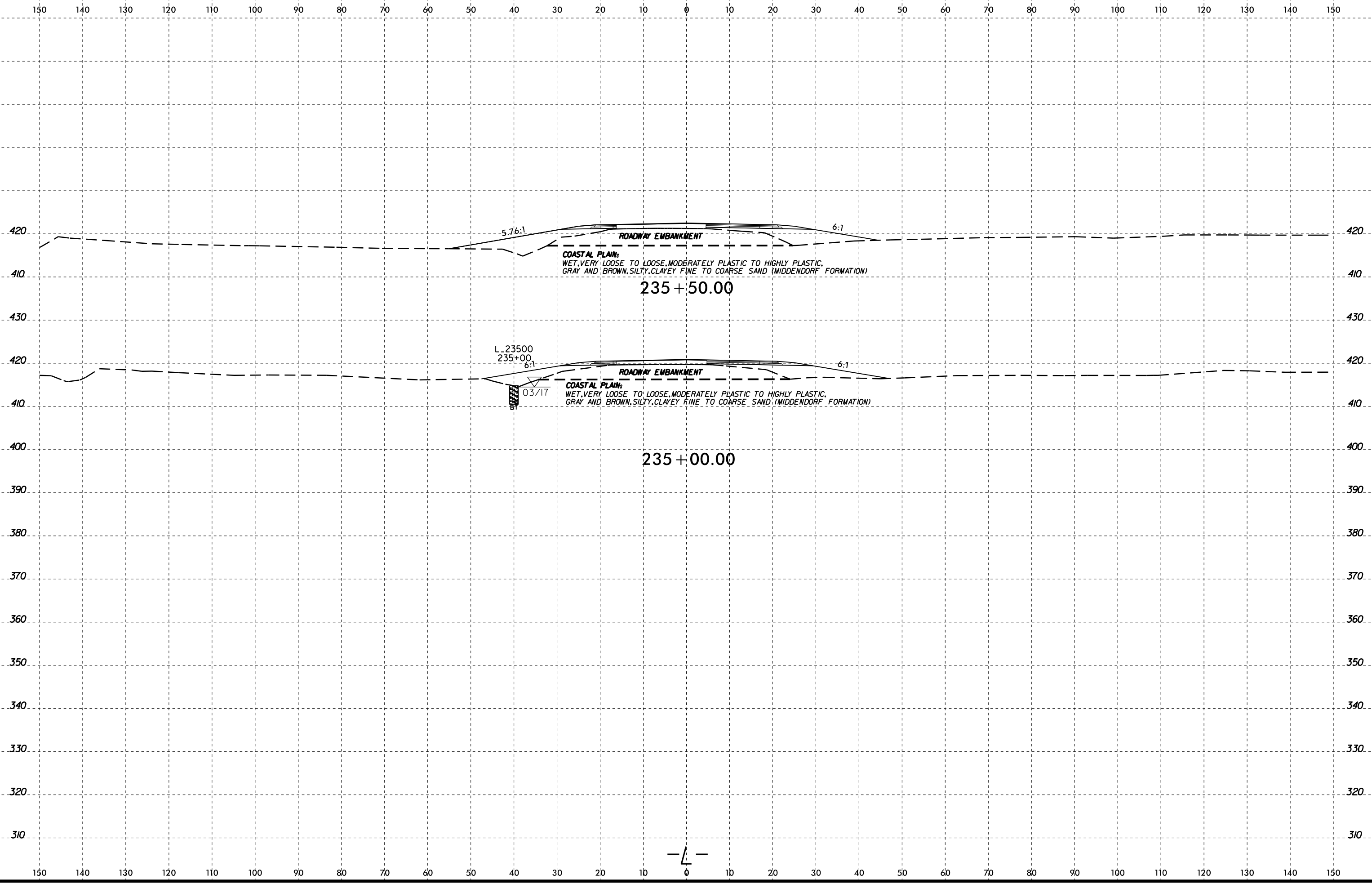
6/23/16  
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A1 KA26660  
Bo Johnson



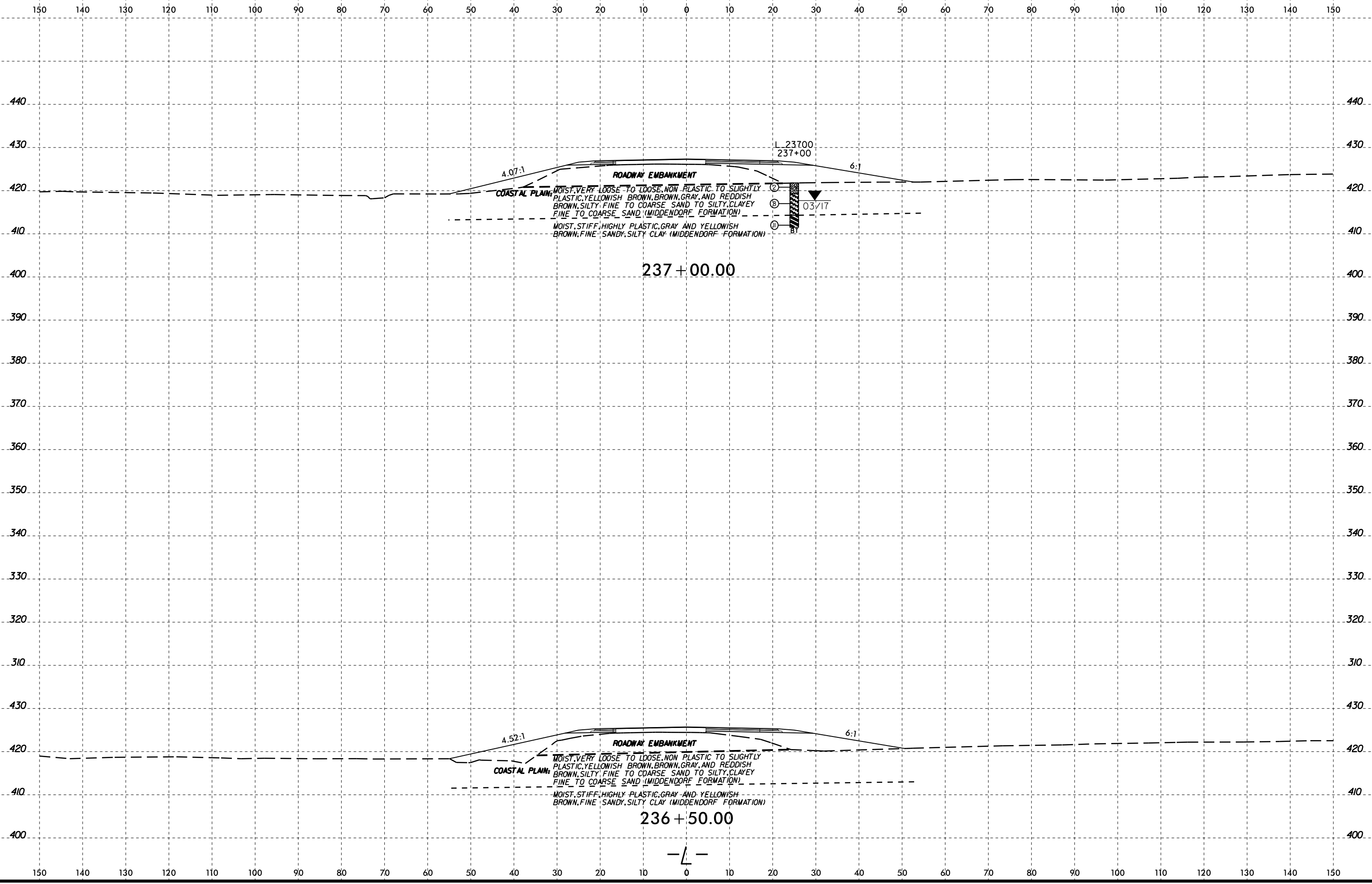




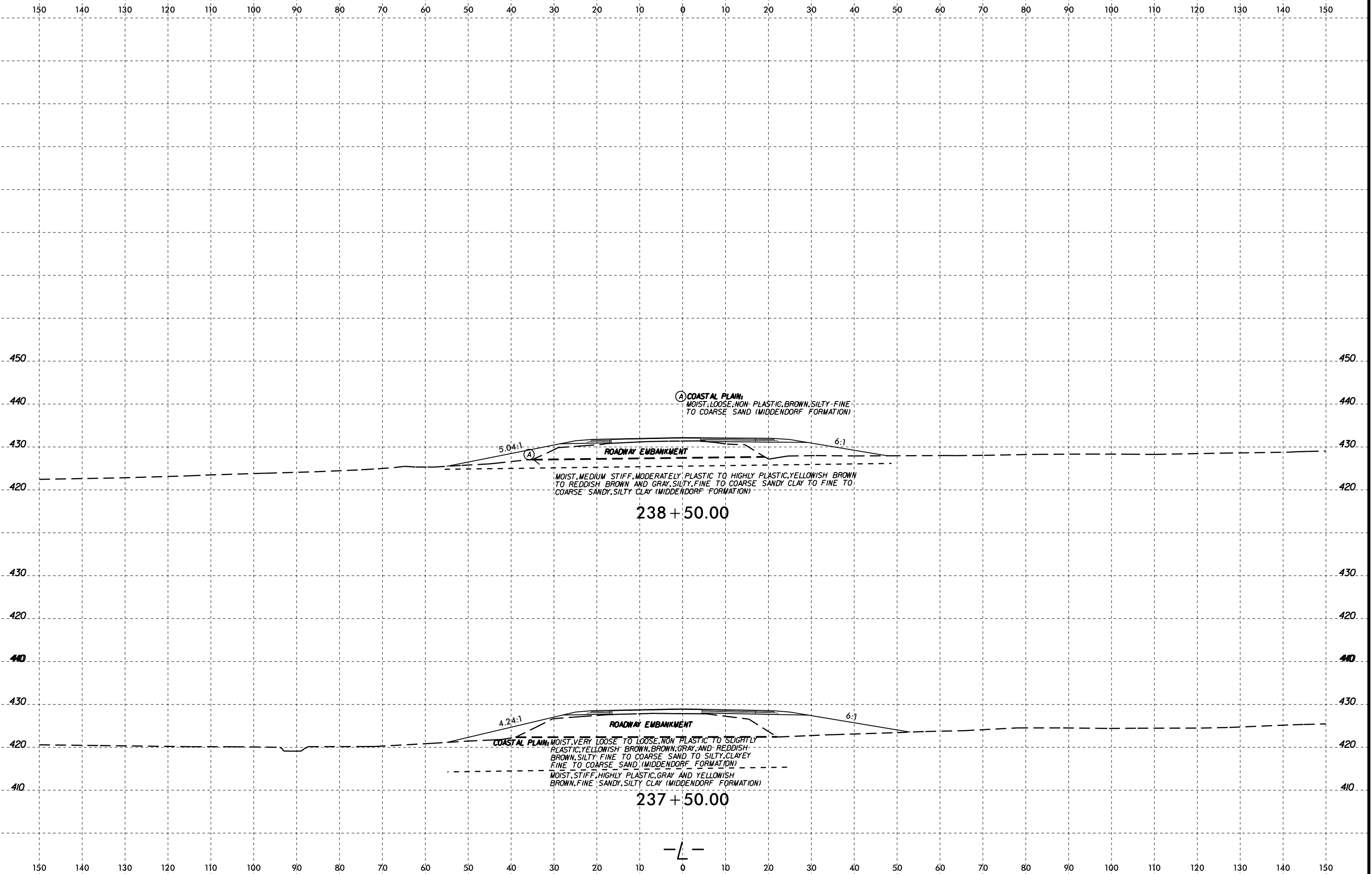
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04-MAY-2017 08:12  
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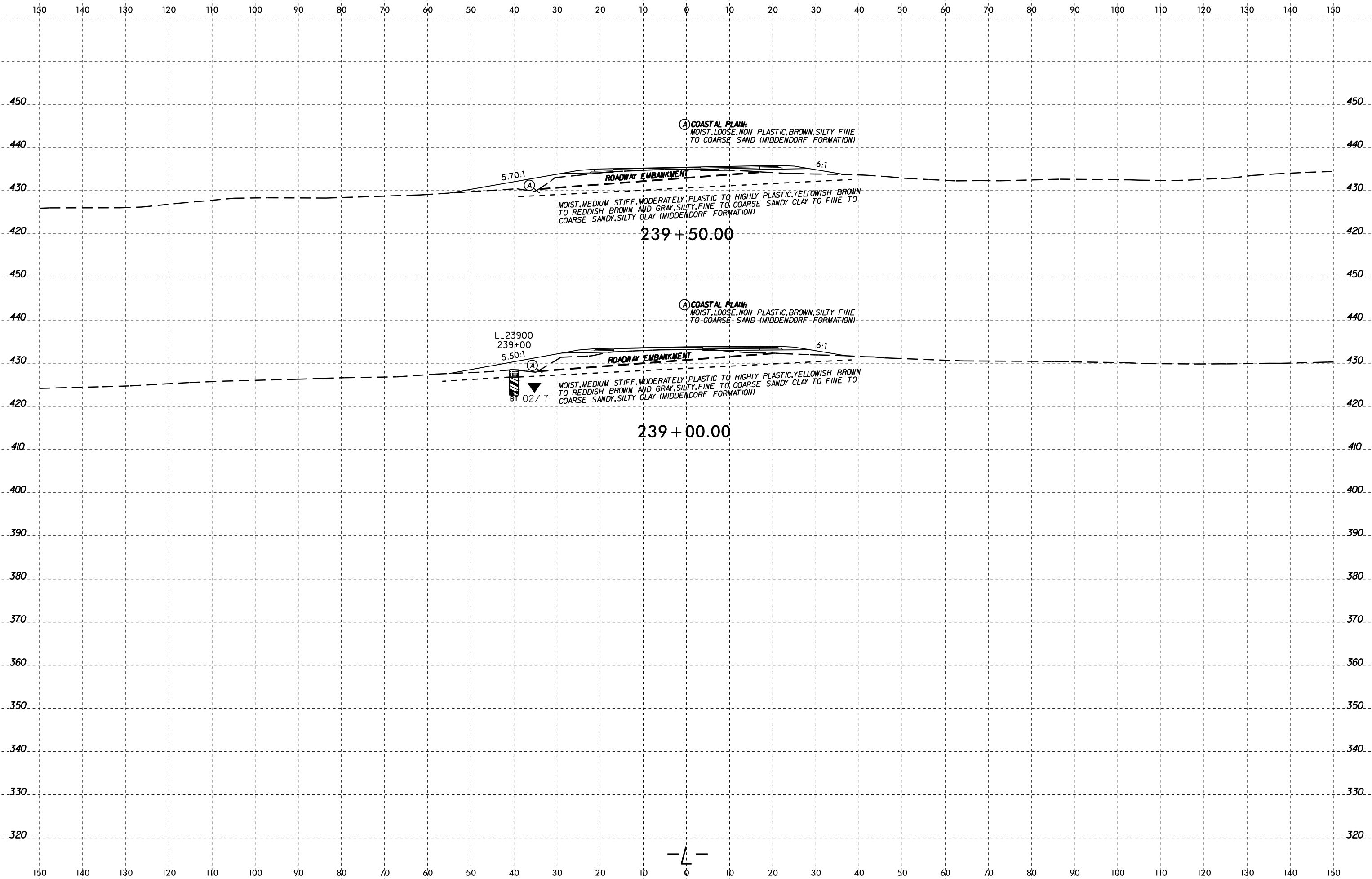


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04-MAY-2017 08:12  
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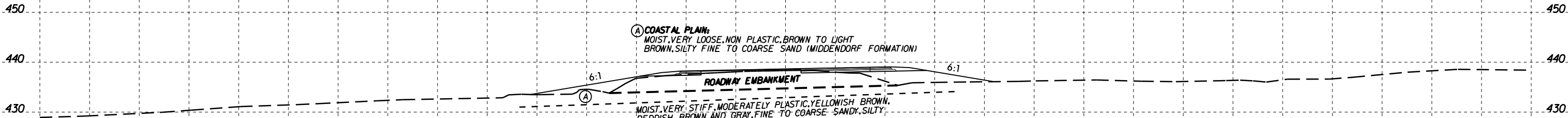




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 A: KA206660  
 B. Johnson



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



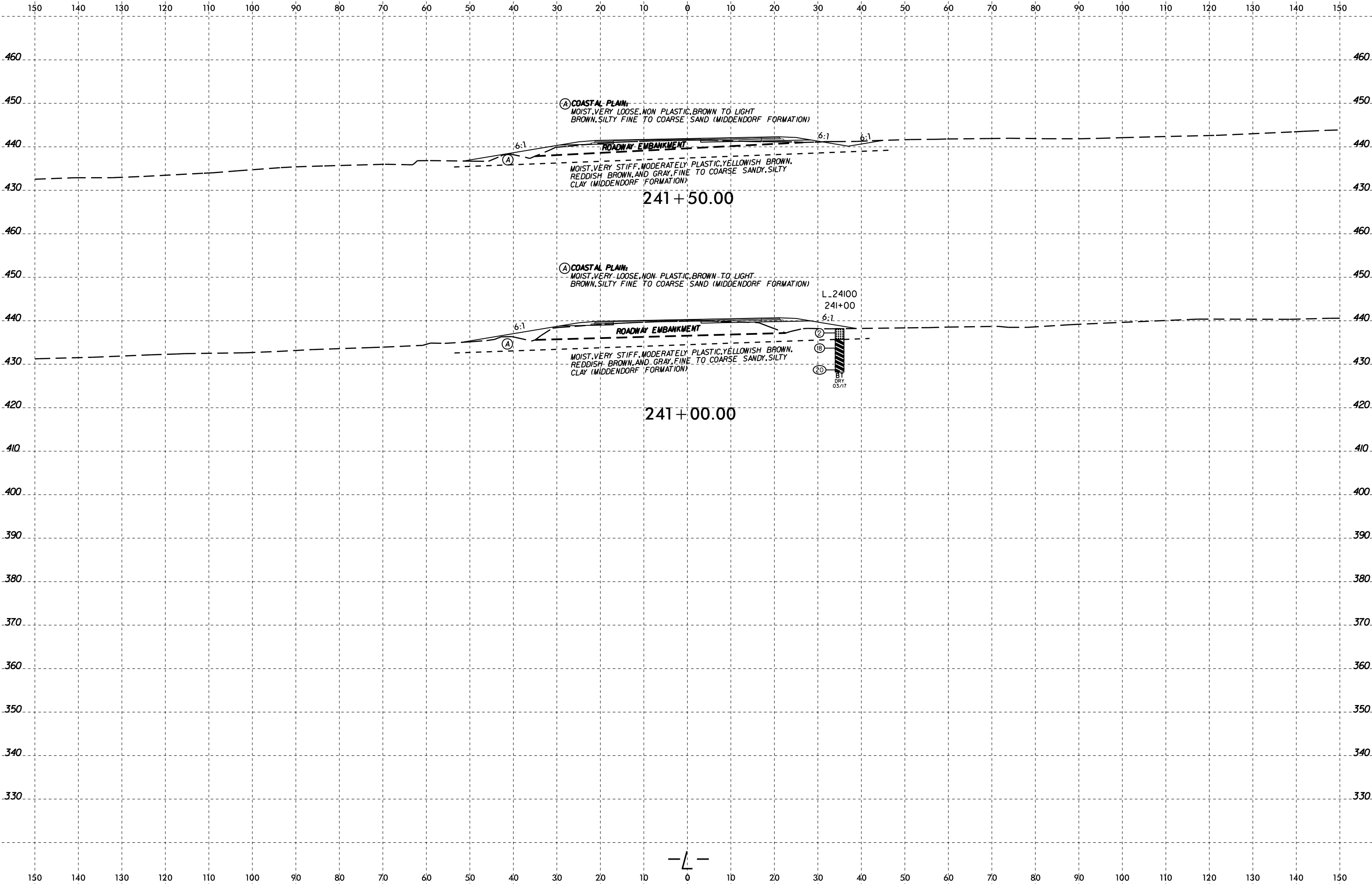
(A) COASTAL PLAIN  
 MOIST, VERY LOOSE, NON PLASTIC, BROWN TO LIGHT BROWN, SILTY FINE TO COARSE SAND (MIDDENDORF FORMATION)

(A)  
 MOIST, VERY STIFF, MODERATELY PLASTIC, YELLOWISH BROWN, REDDISH BROWN, AND GRAY, FINE TO COARSE SANDY, SILTY CLAY (MIDDENDORF FORMATION)

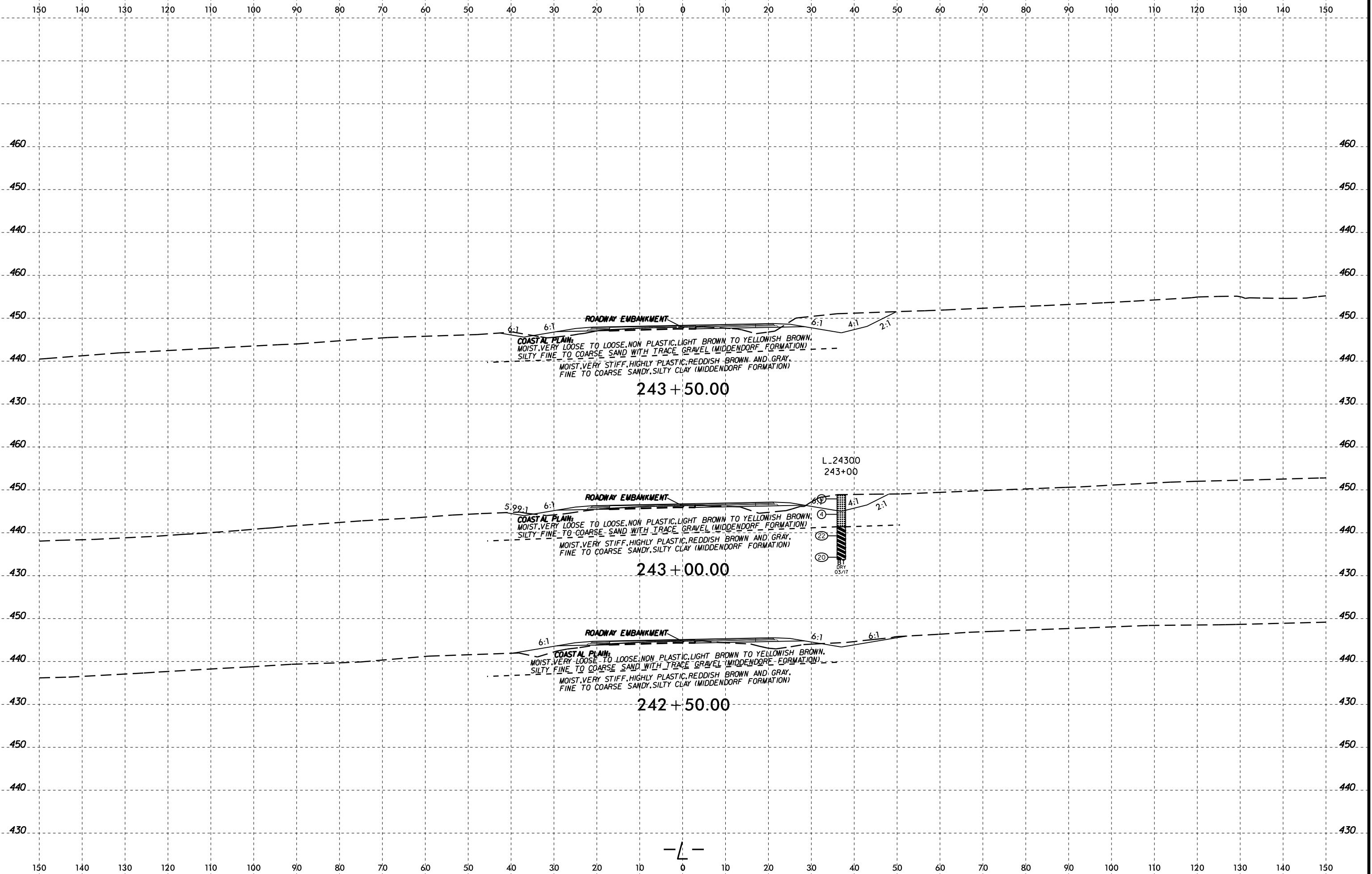
ROADWAY EMBANKMENT

240 + 50.00

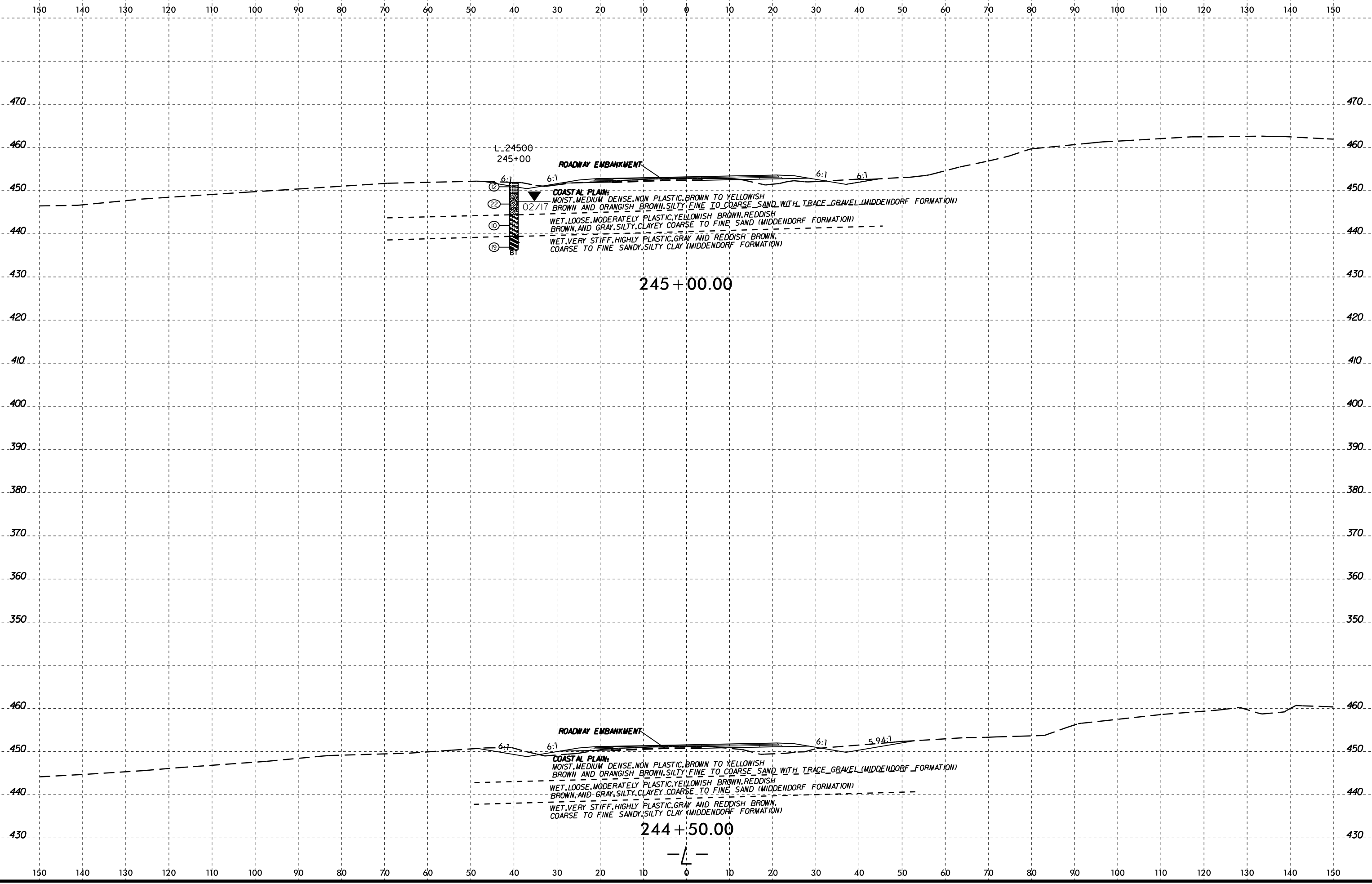




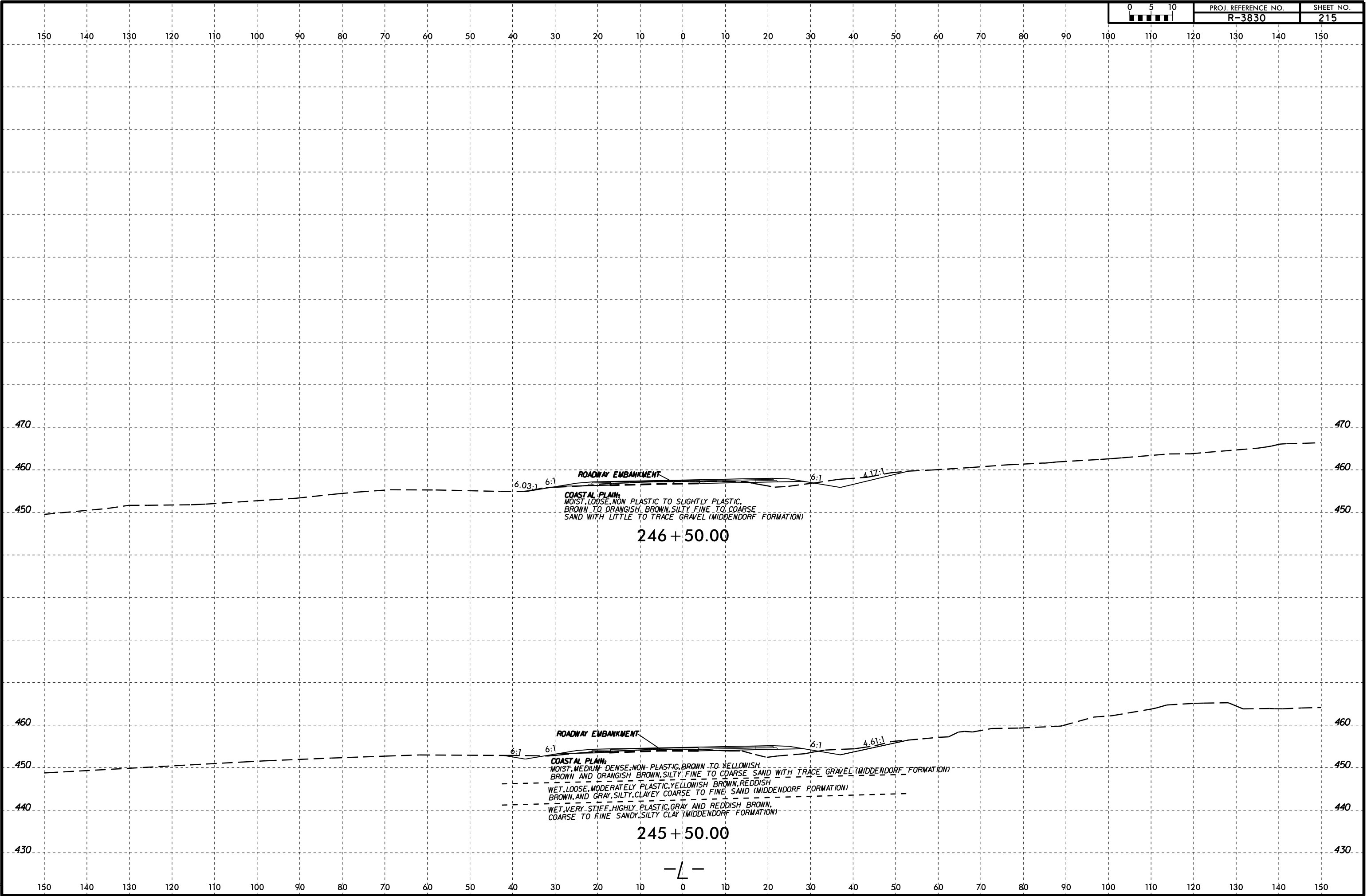
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 B: Johnson



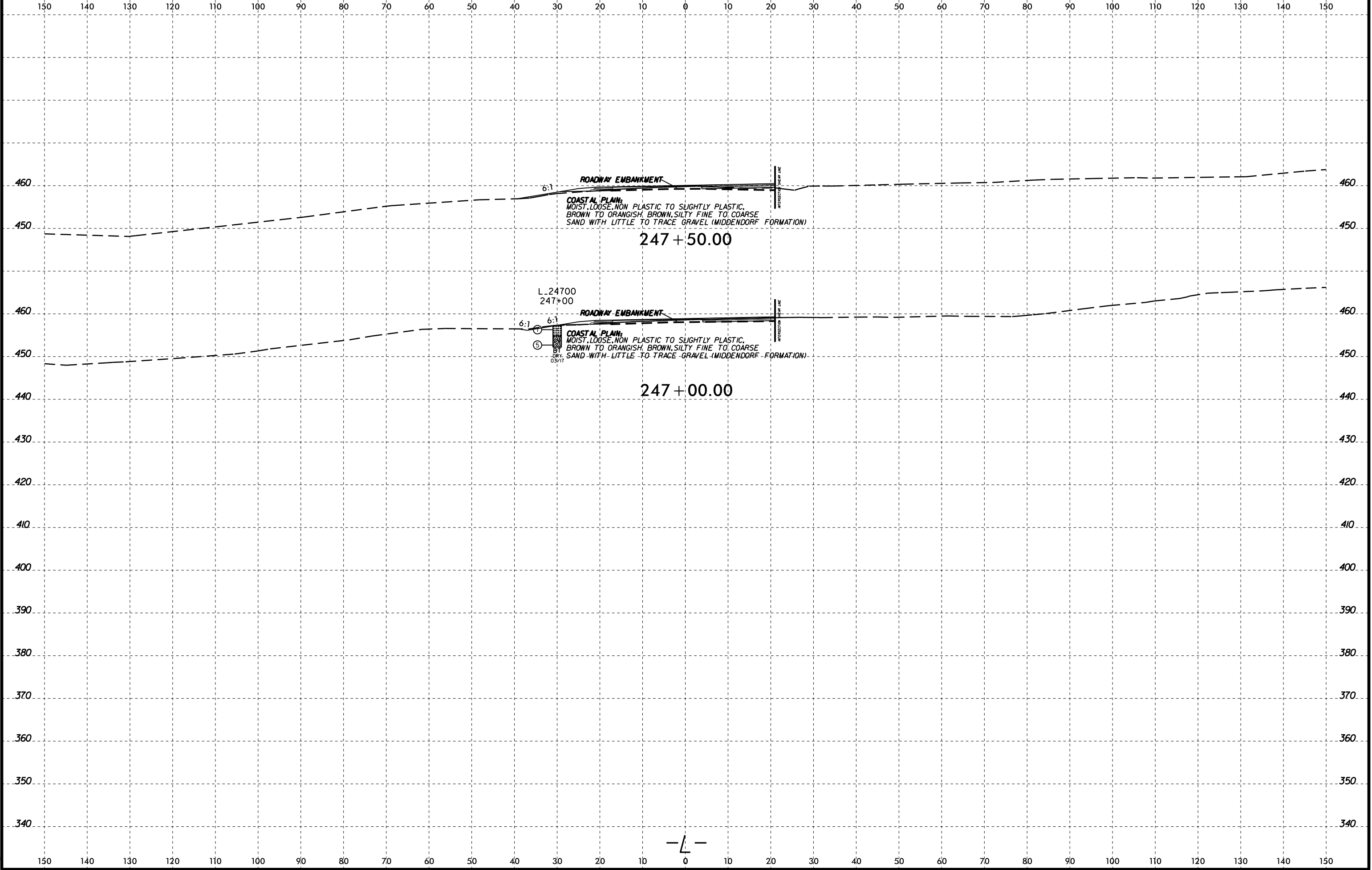
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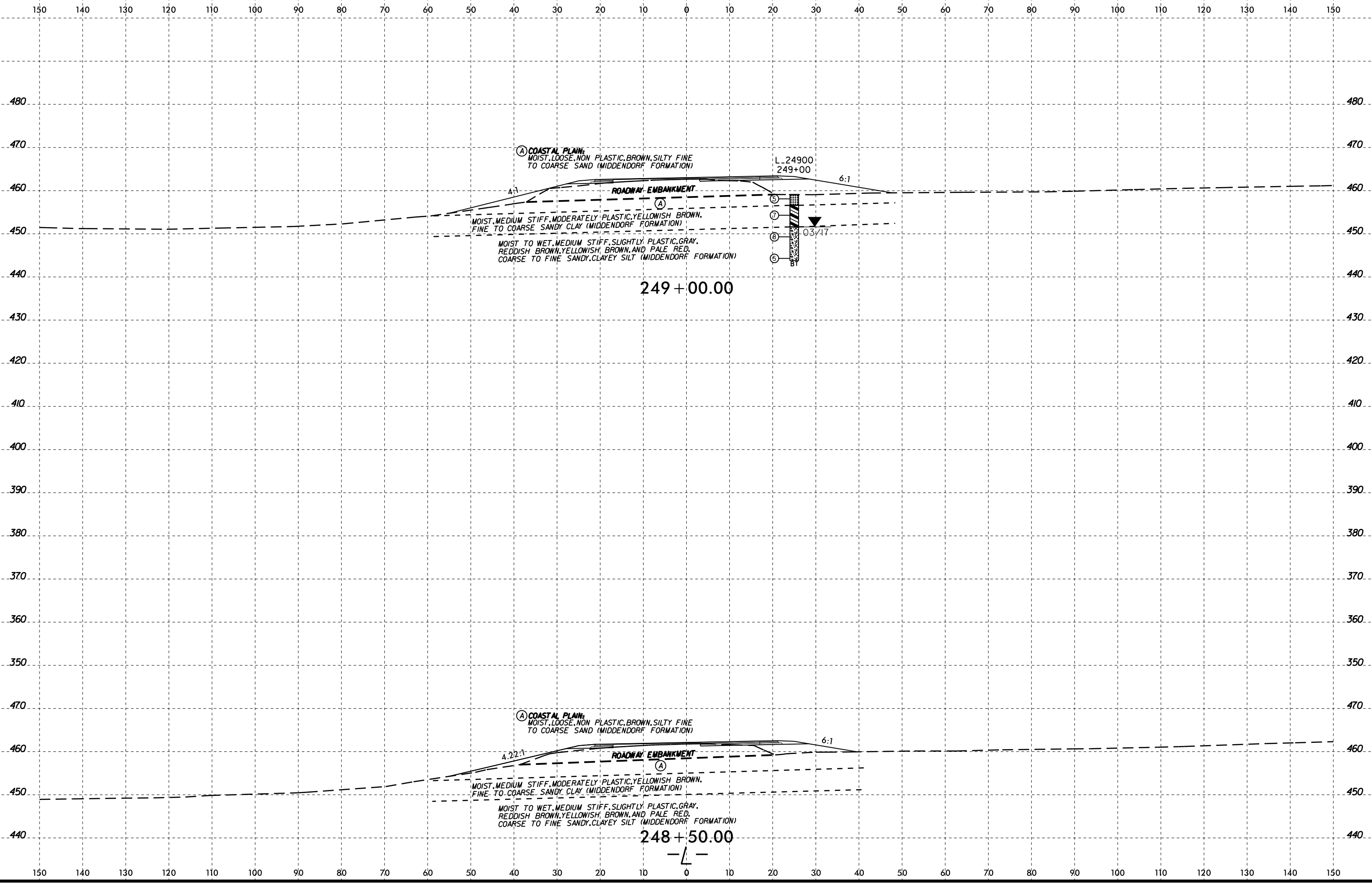


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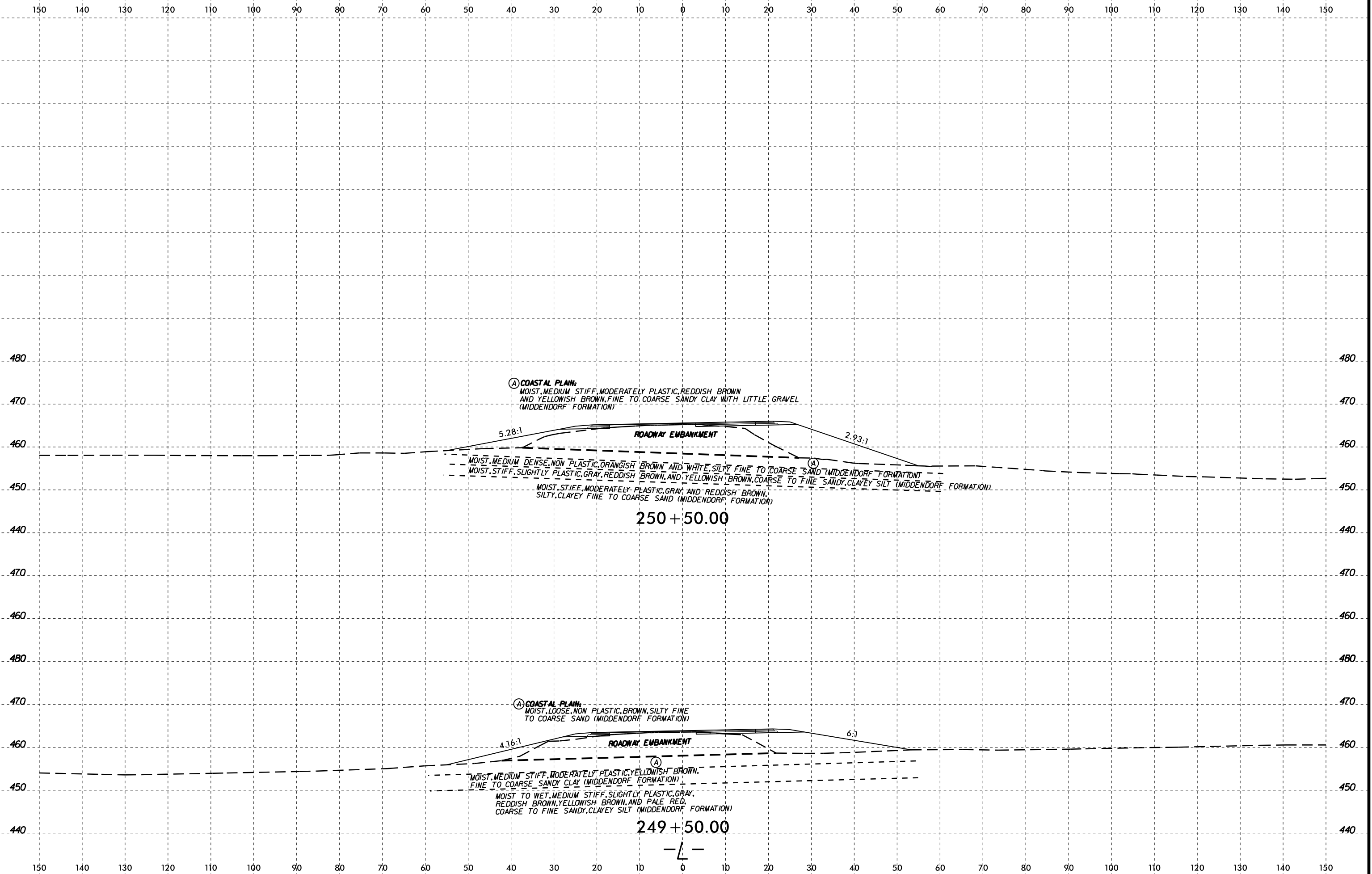
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 J. Johnson



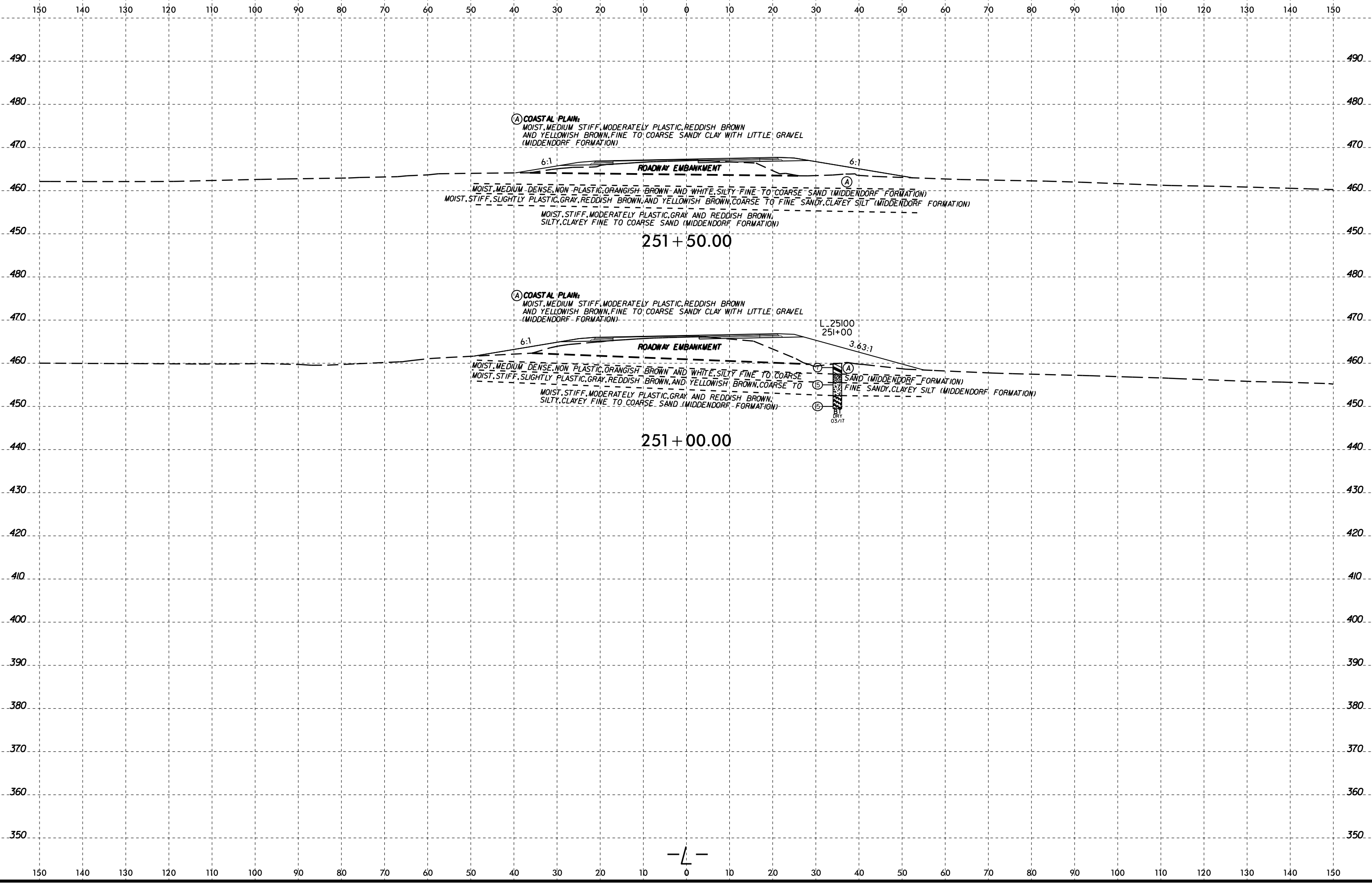


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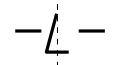


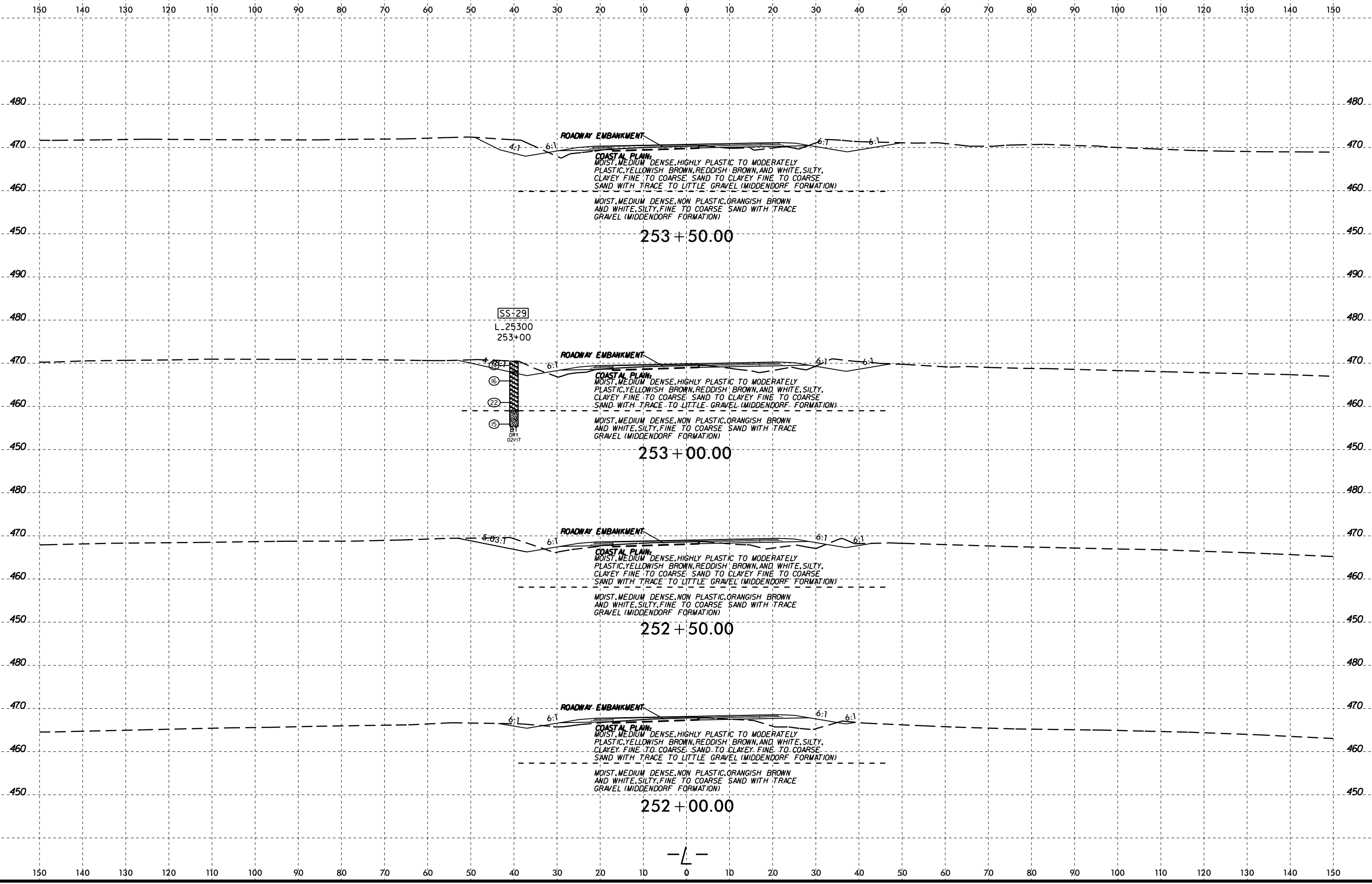


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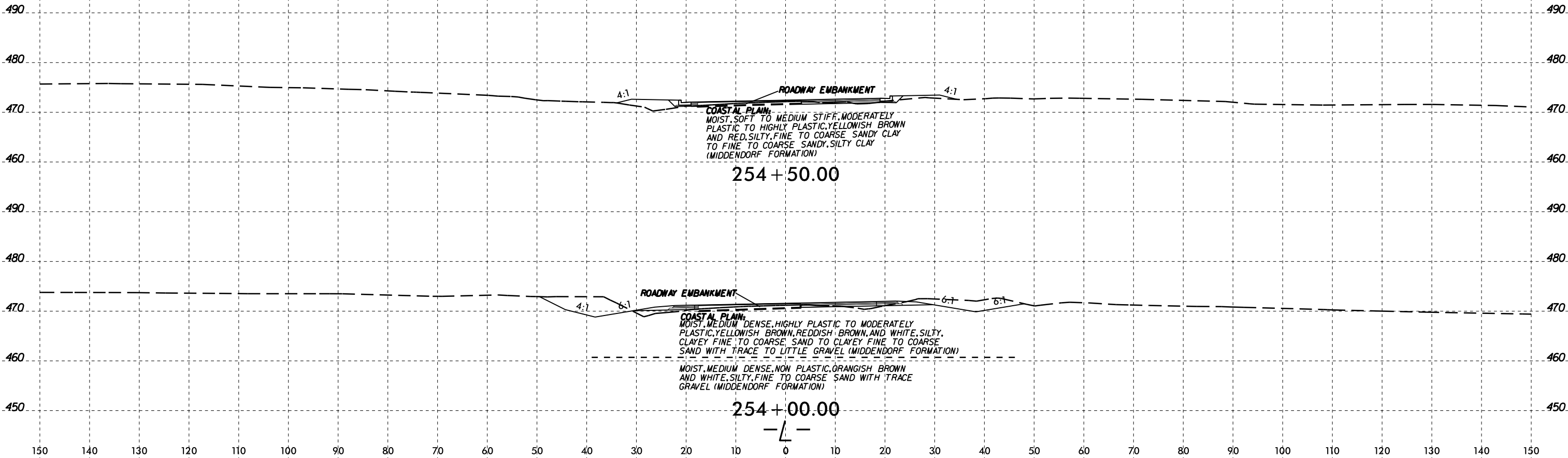
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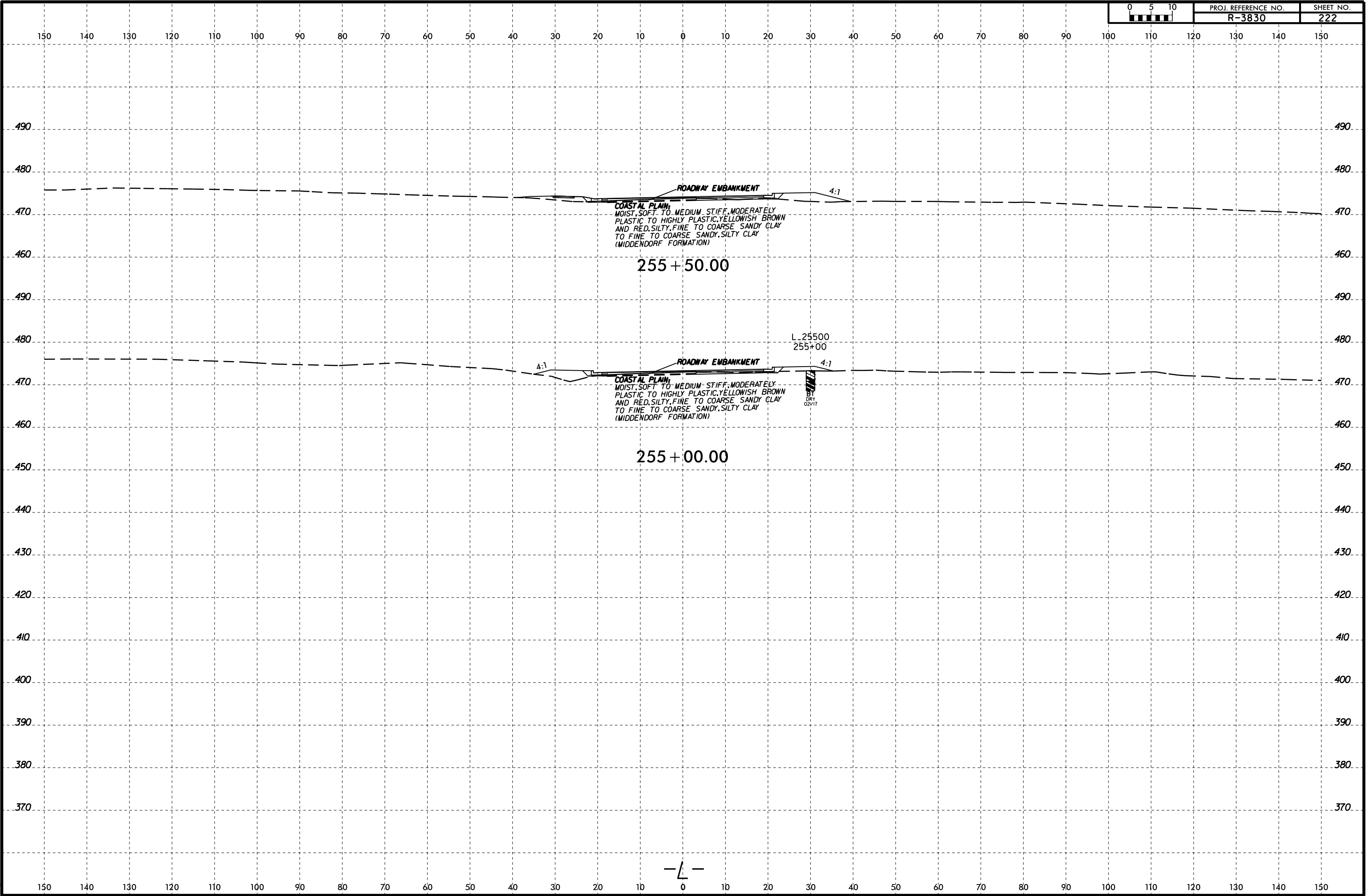


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 J. Johnson

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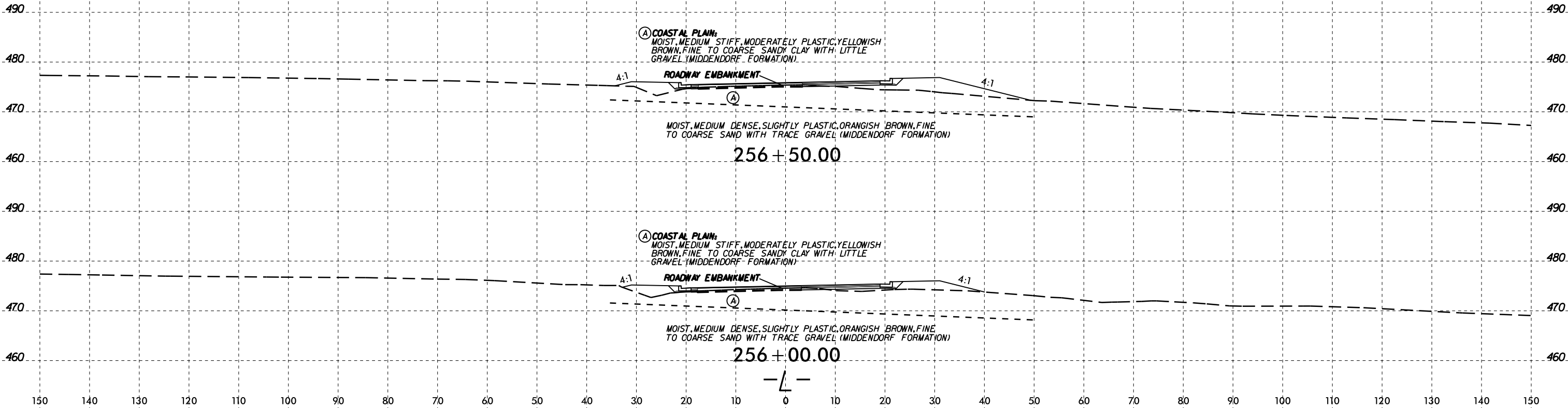


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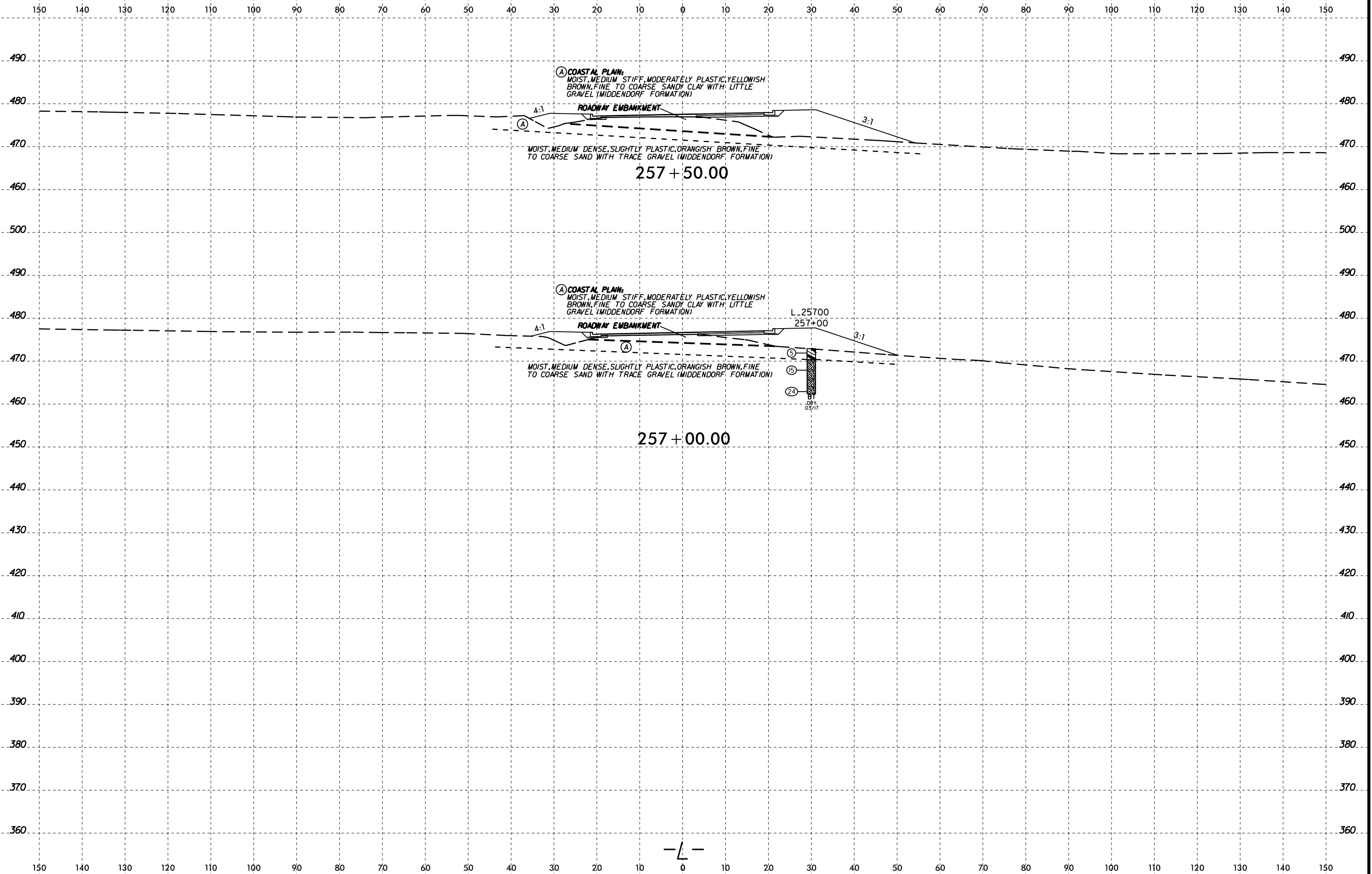




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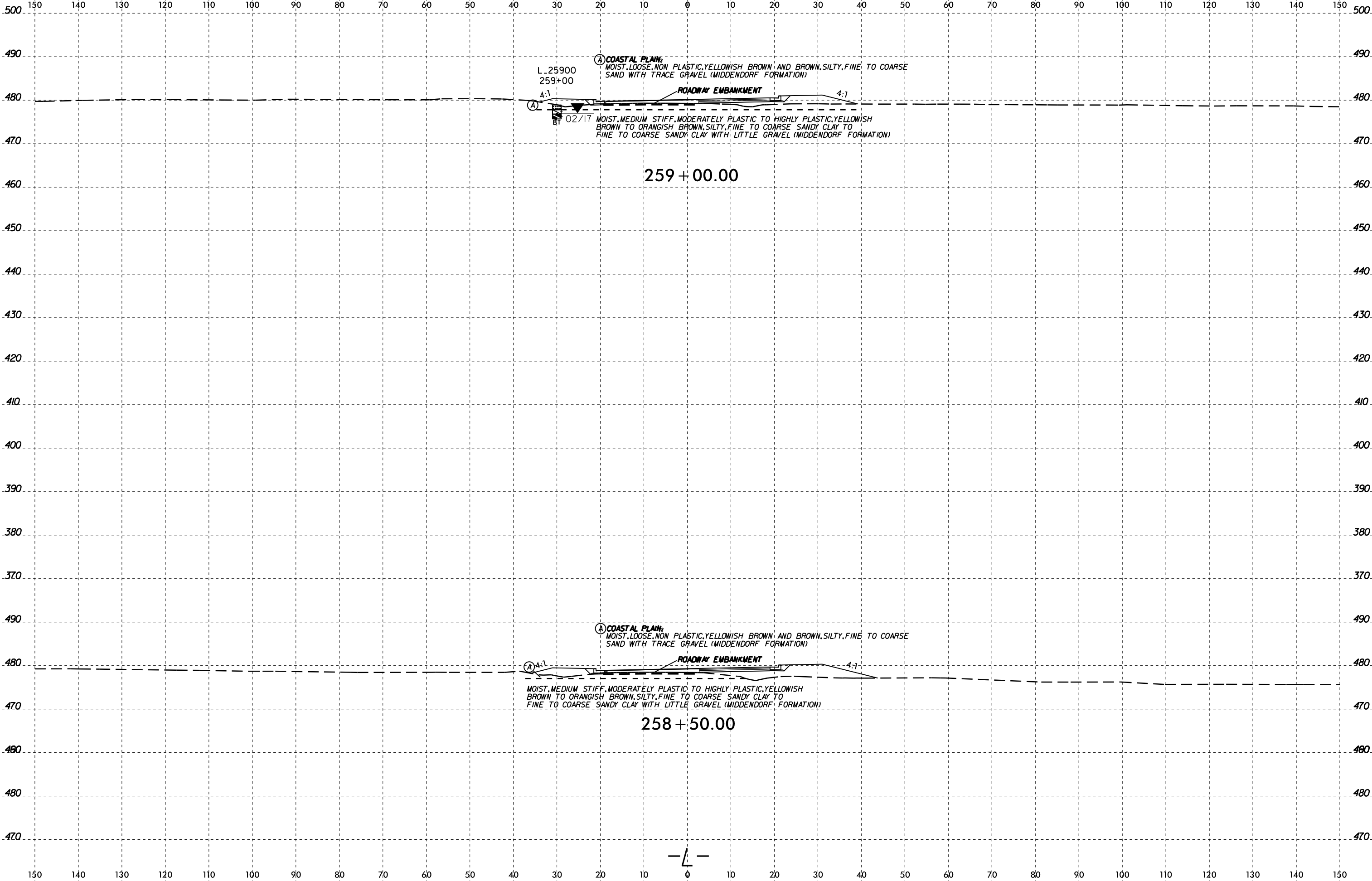


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A1 KA206660  
Bo Johnson



04-MAY-2017 08:14  
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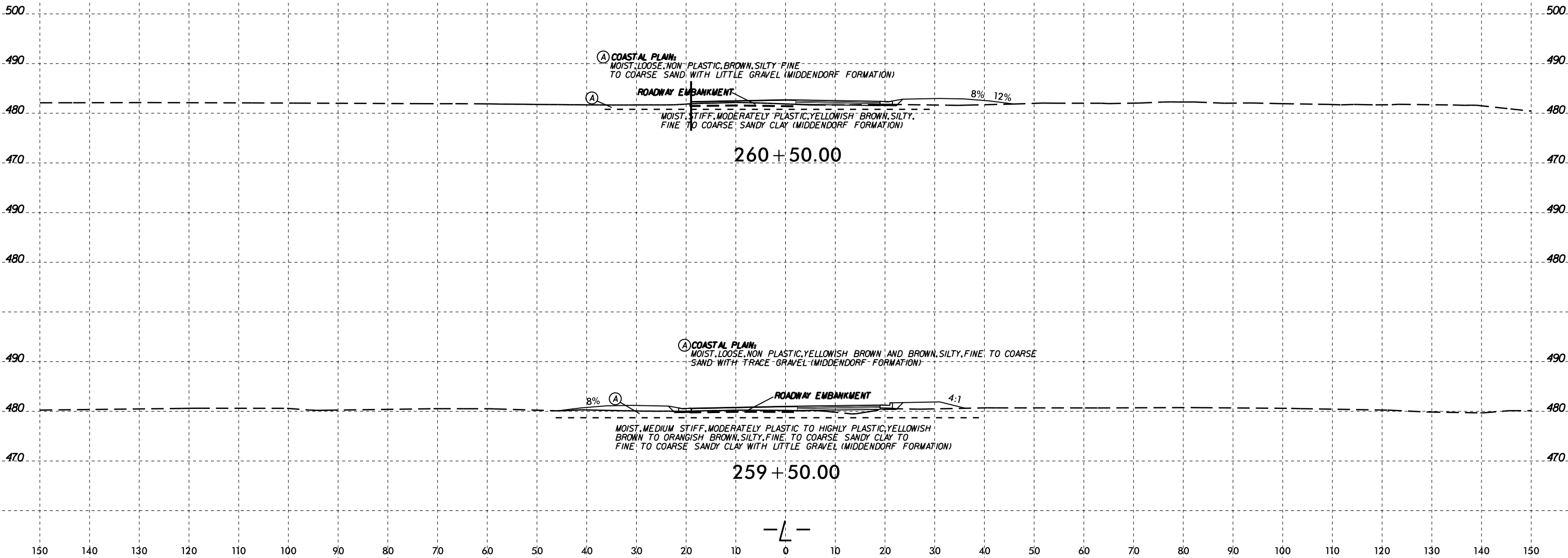
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 A: KAZ@6660







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



(A) COASTAL PLAIN  
MOIST, LOOSE, NON PLASTIC, BROWN, SILTY FINE  
TO COARSE SAND WITH LITTLE GRAVEL (MIDDENDORF FORMATION)

ROADWAY EMBANKMENT

MOIST, STIFF, MODERATELY PLASTIC, YELLOWISH BROWN, SILTY,  
FINE TO COARSE SANDY CLAY (MIDDENDORF FORMATION)

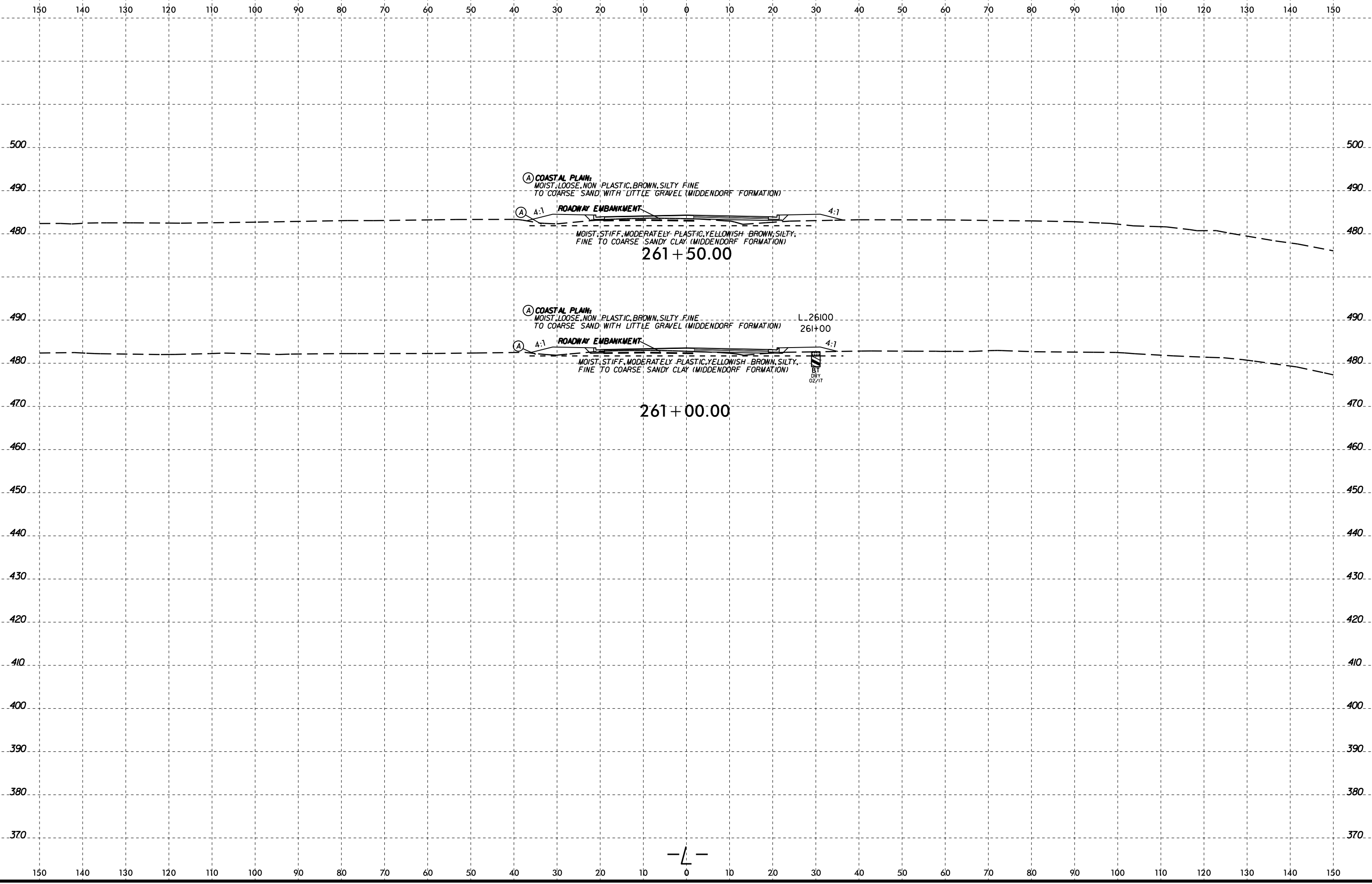
260 + 50.00

(A) COASTAL PLAIN  
MOIST, LOOSE, NON PLASTIC, YELLOWISH BROWN AND BROWN, SILTY, FINE TO COARSE  
SAND WITH TRACE GRAVEL (MIDDENDORF FORMATION)

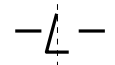
ROADWAY EMBANKMENT

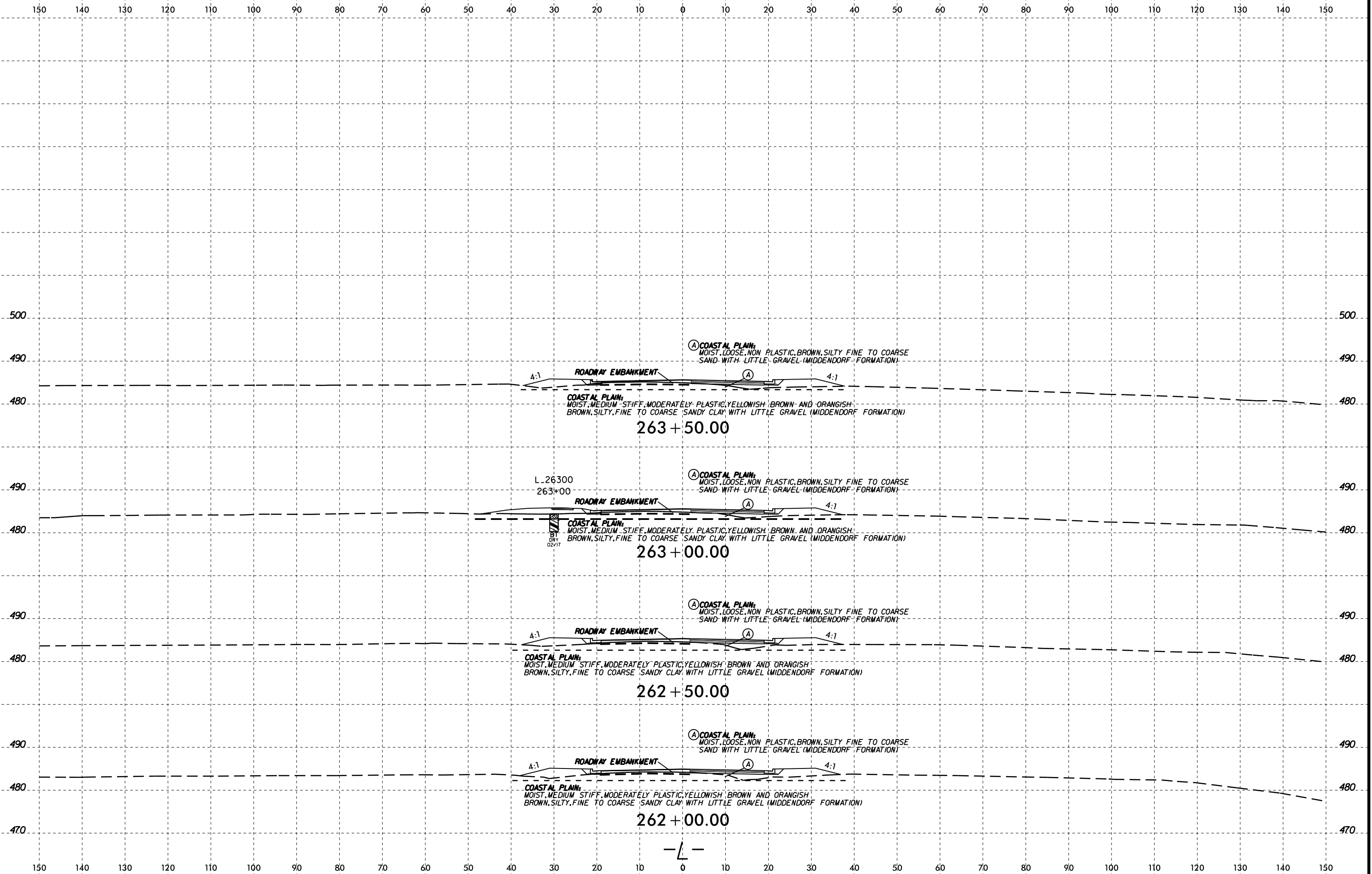
MOIST MEDIUM STIFF, MODERATELY PLASTIC TO HIGHLY PLASTIC, YELLOWISH  
BROWN TO ORANGISH BROWN, SILTY, FINE TO COARSE SANDY CLAY TO  
FINE TO COARSE SANDY CLAY WITH LITTLE GRAVEL (MIDDENDORF FORMATION)

259 + 50.00

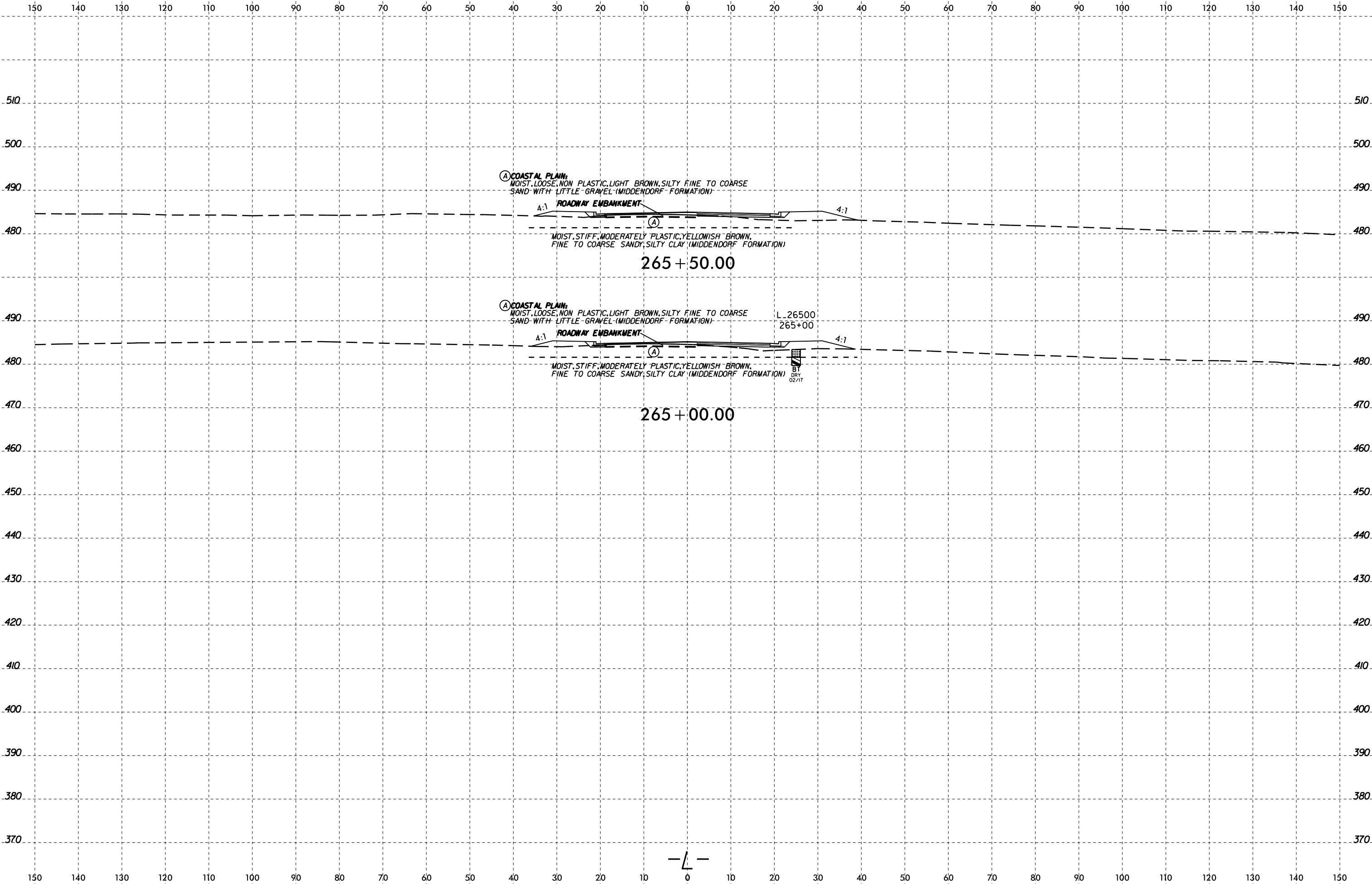


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 J. Johnson

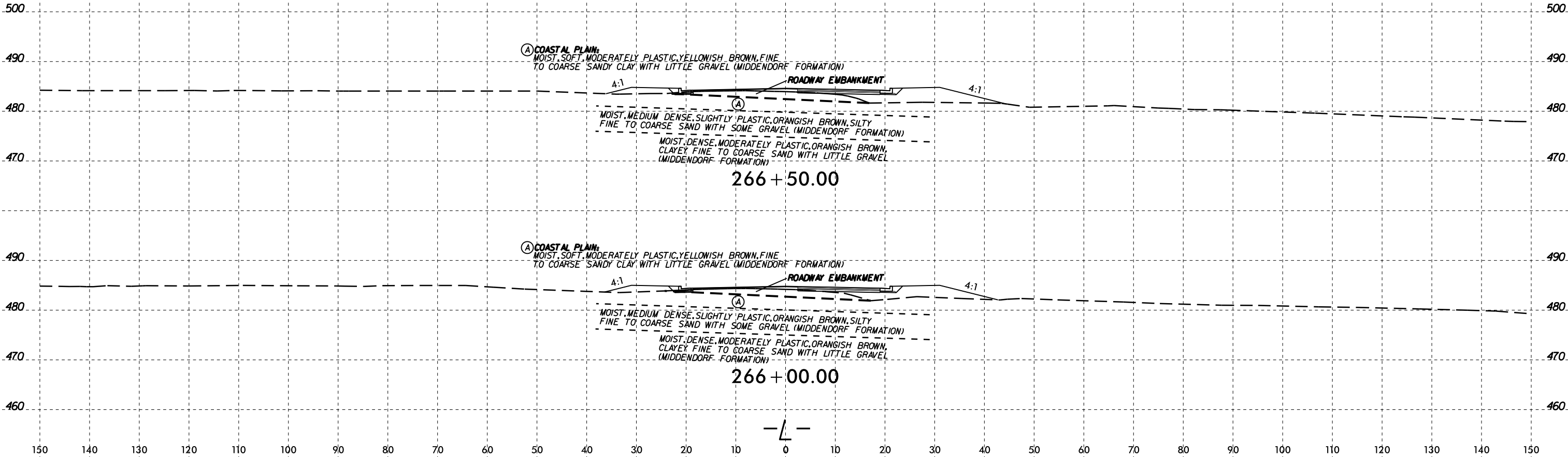


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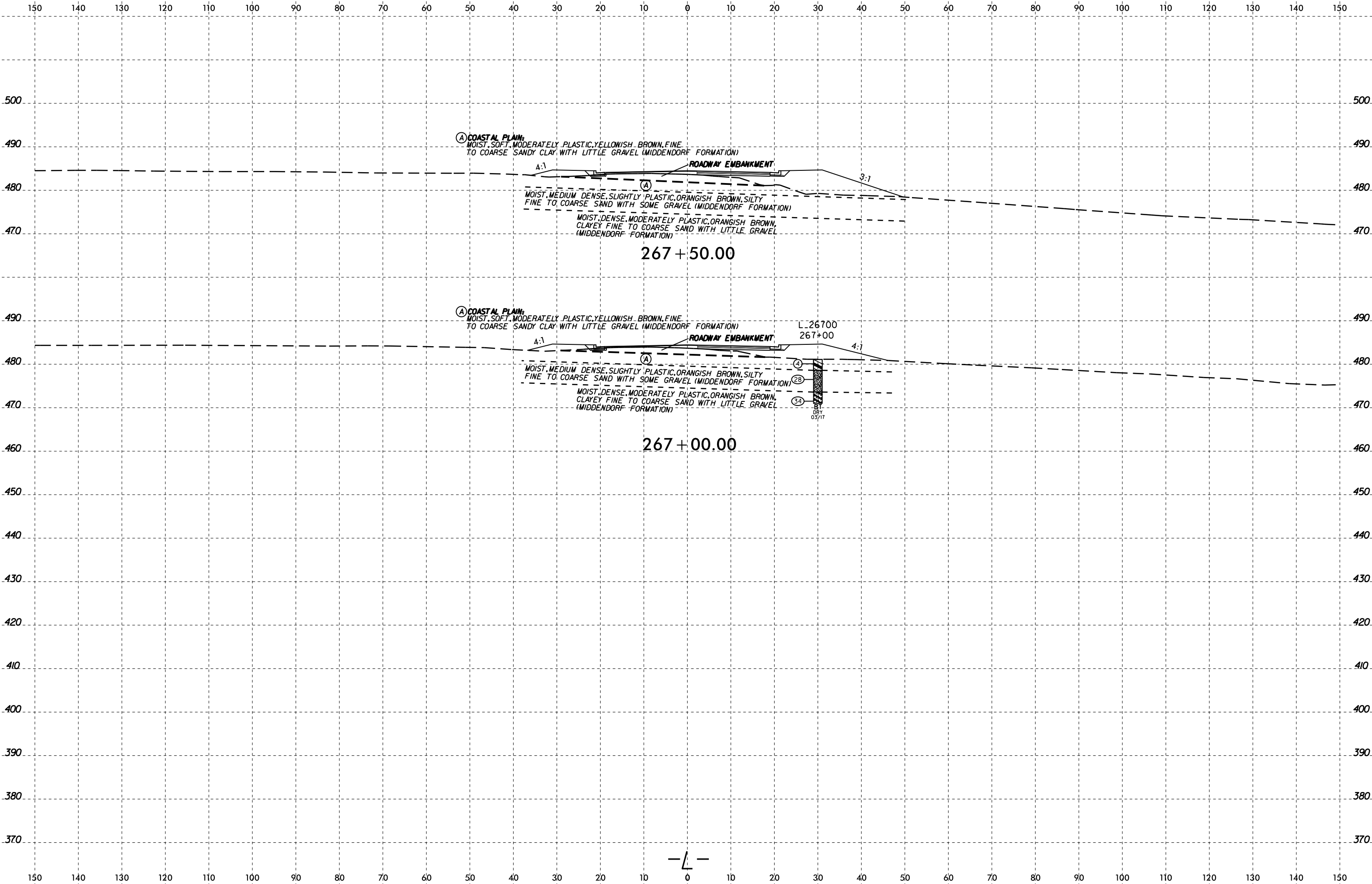




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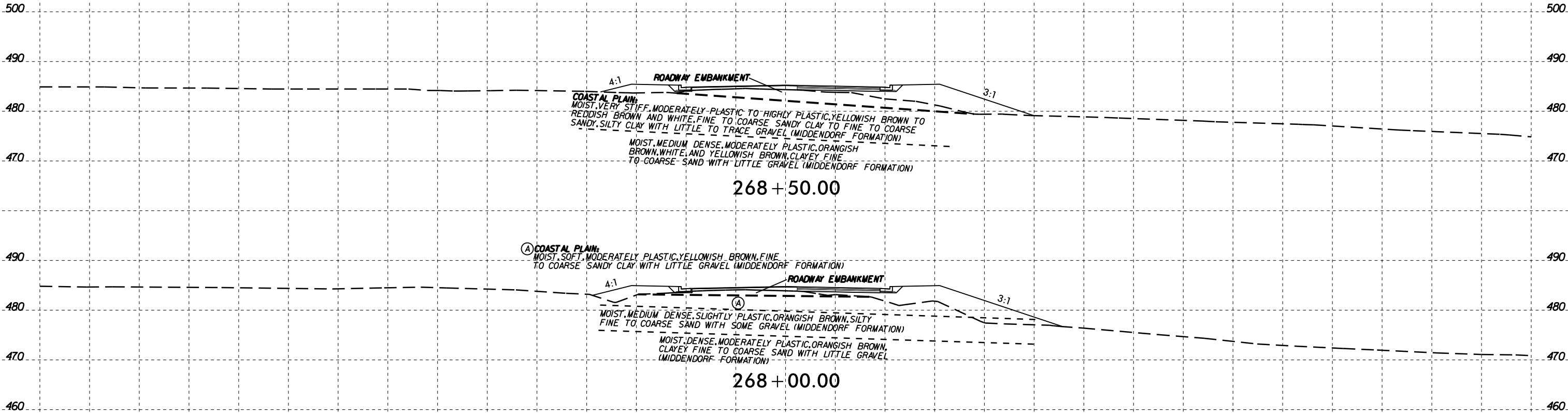


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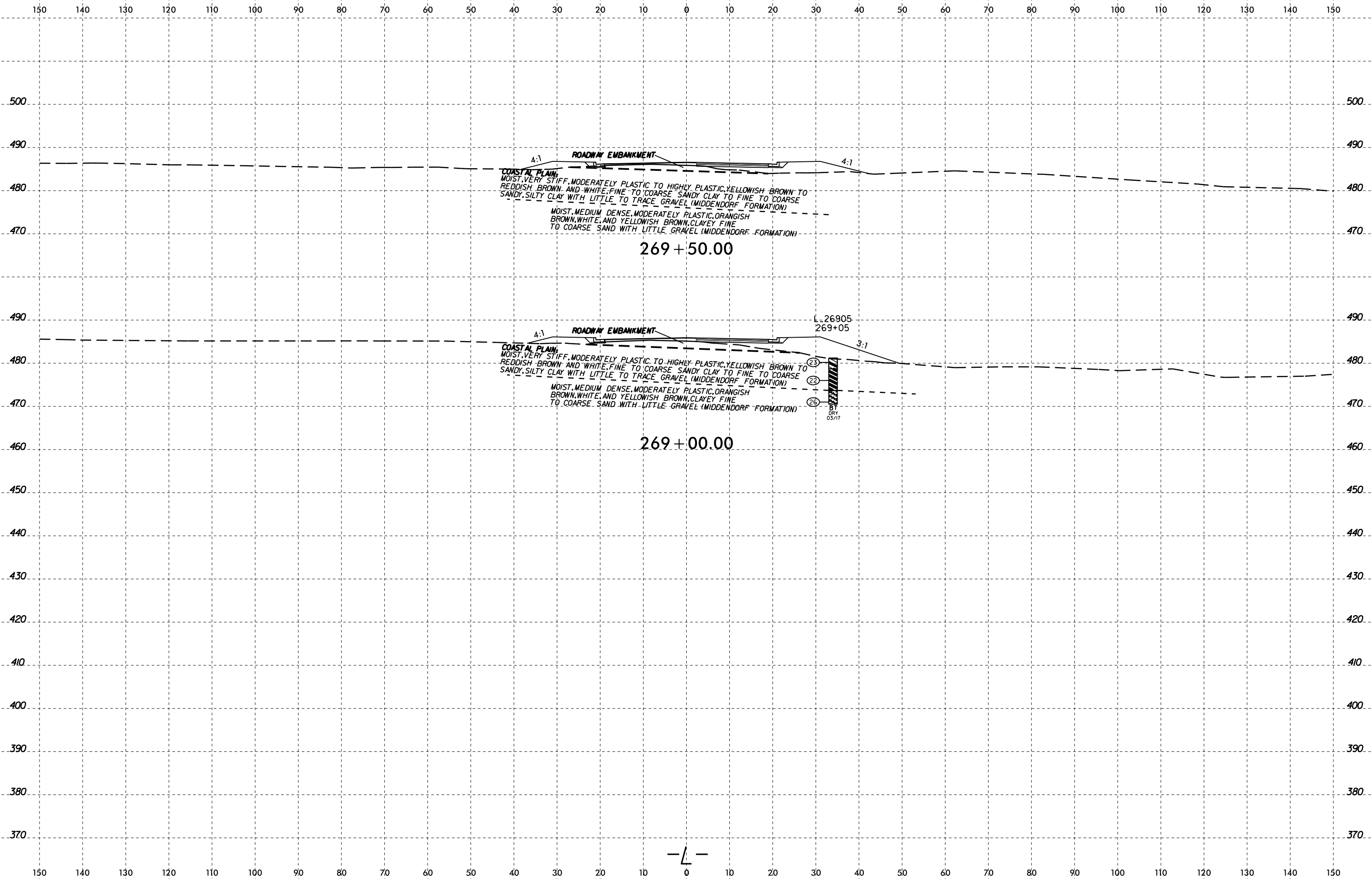
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Bo Johnson



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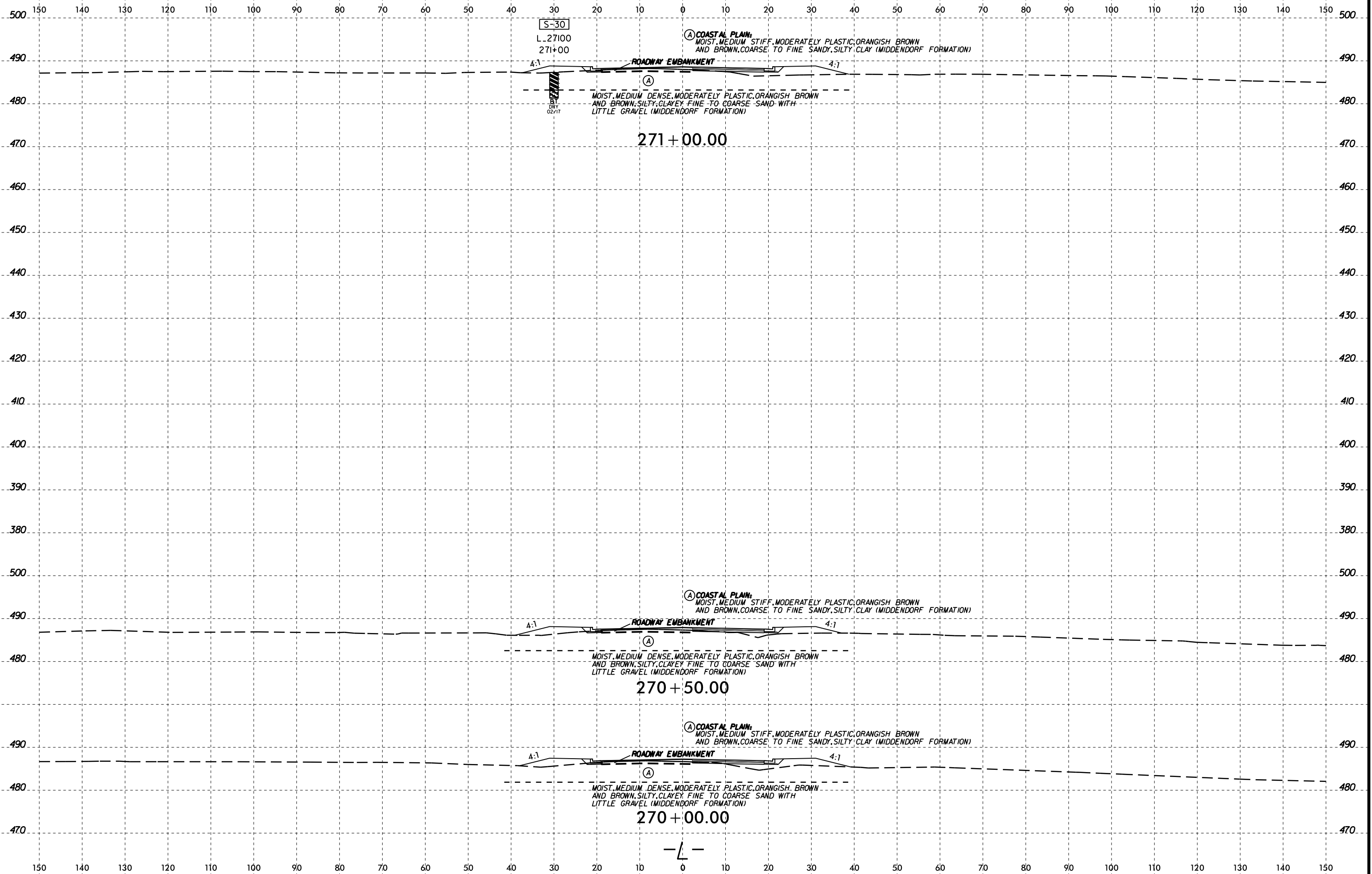


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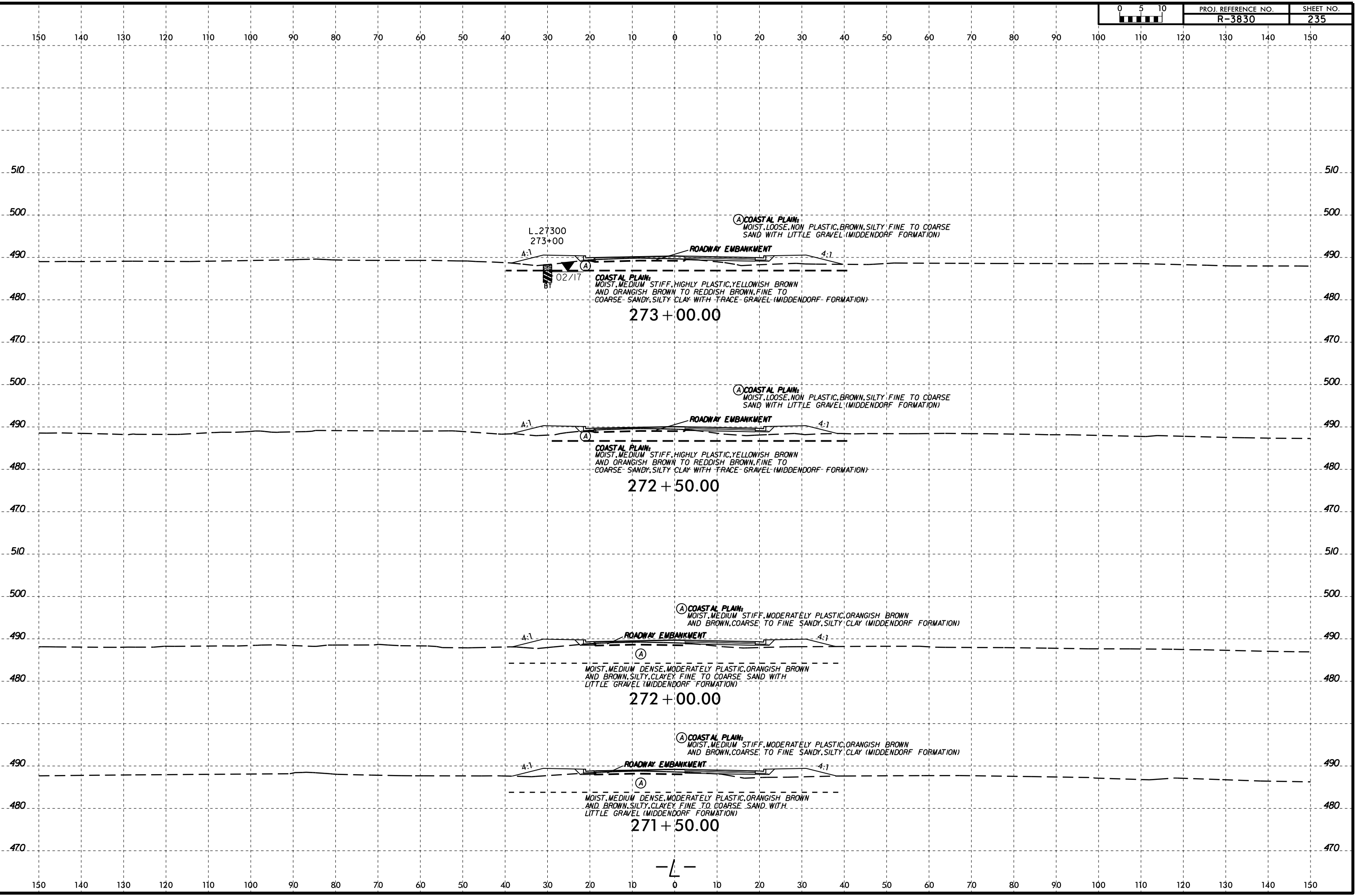




6/23/16  
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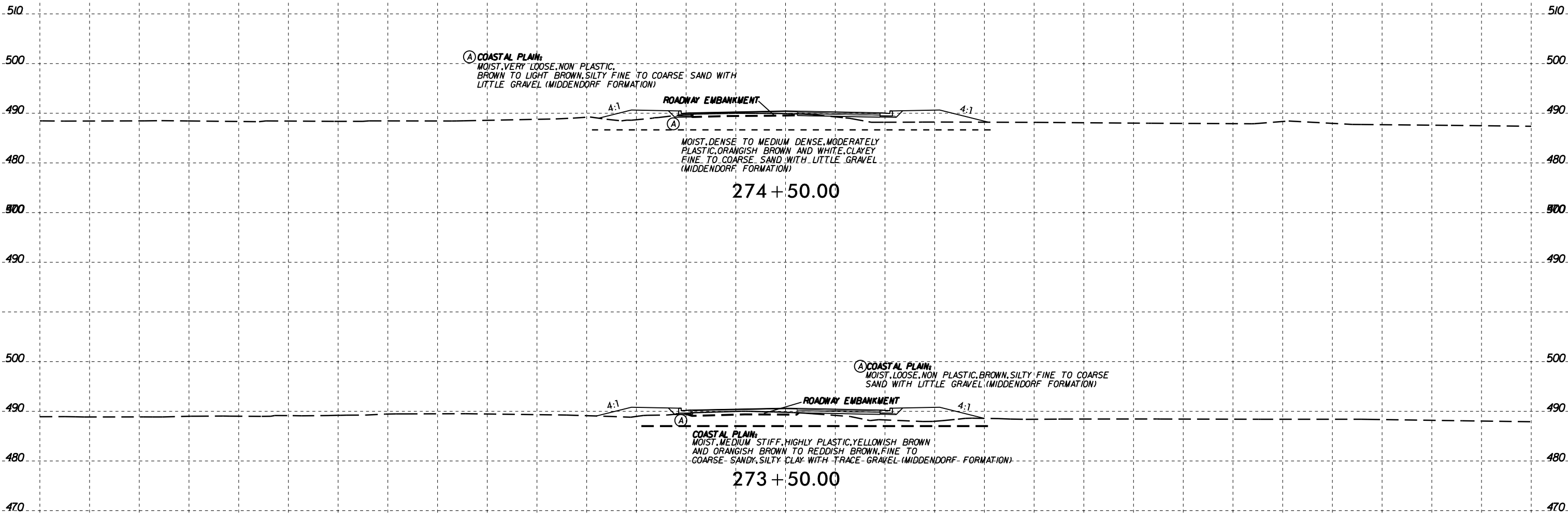


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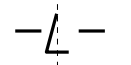




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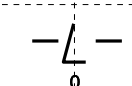
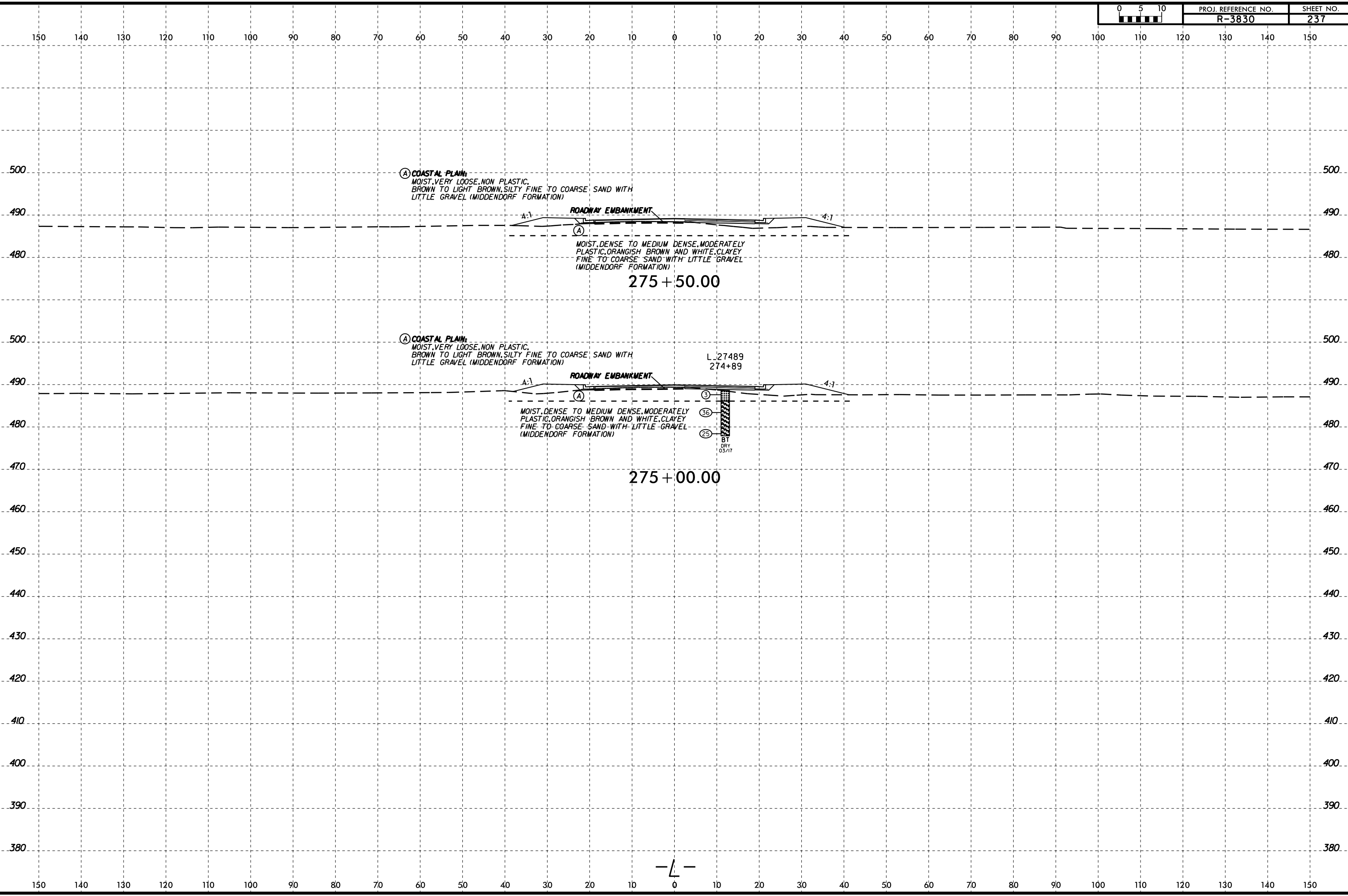


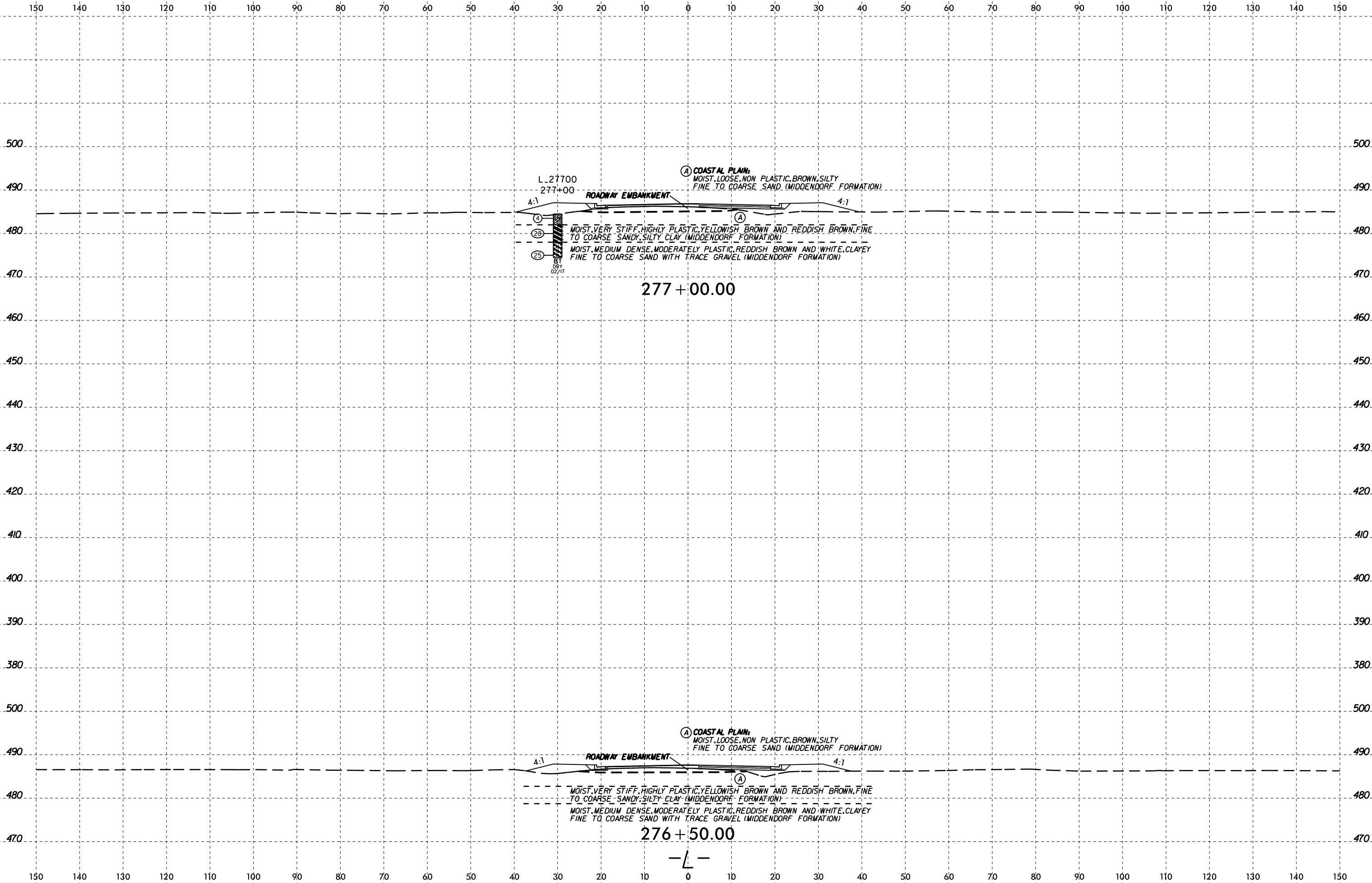
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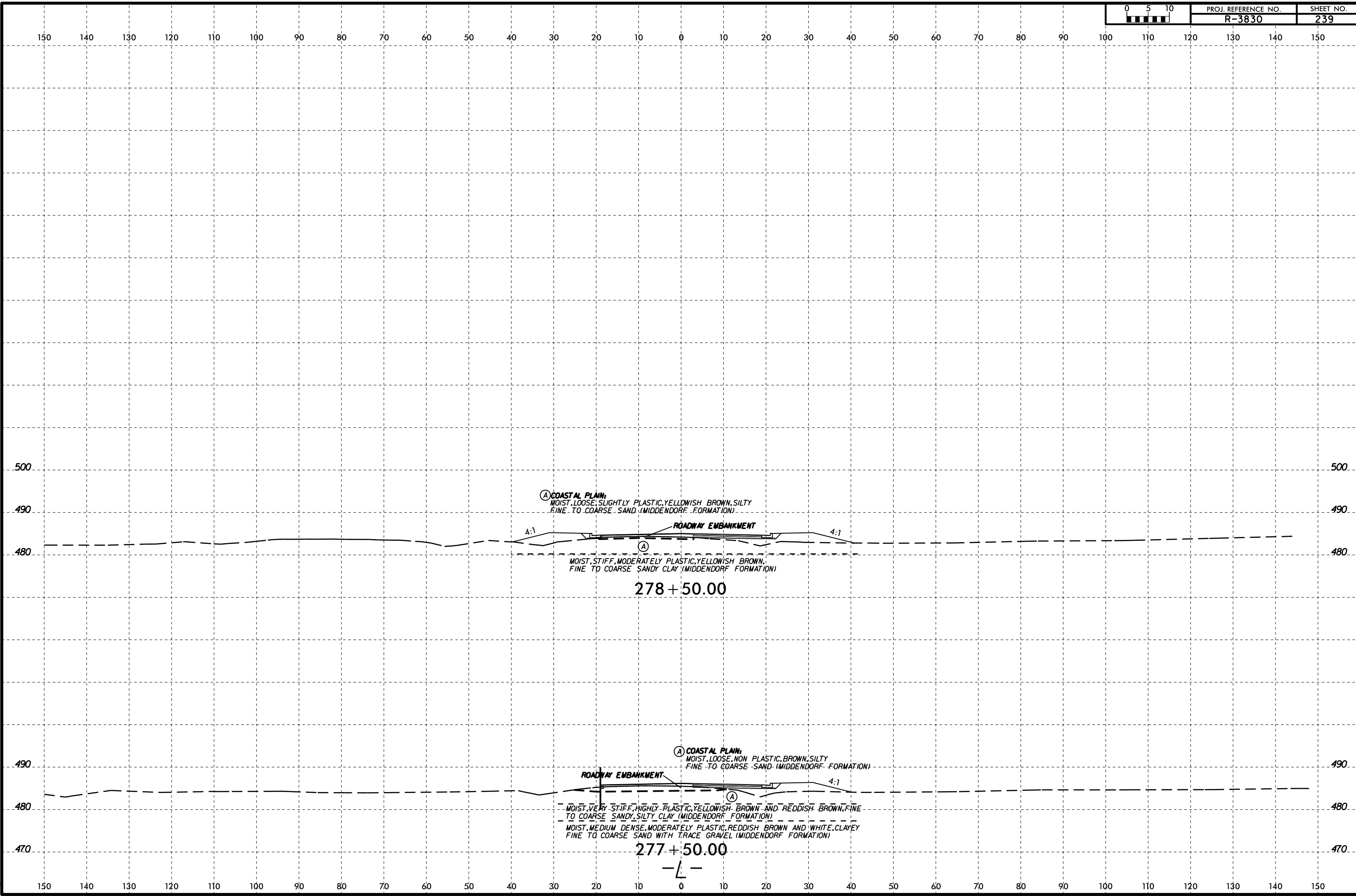
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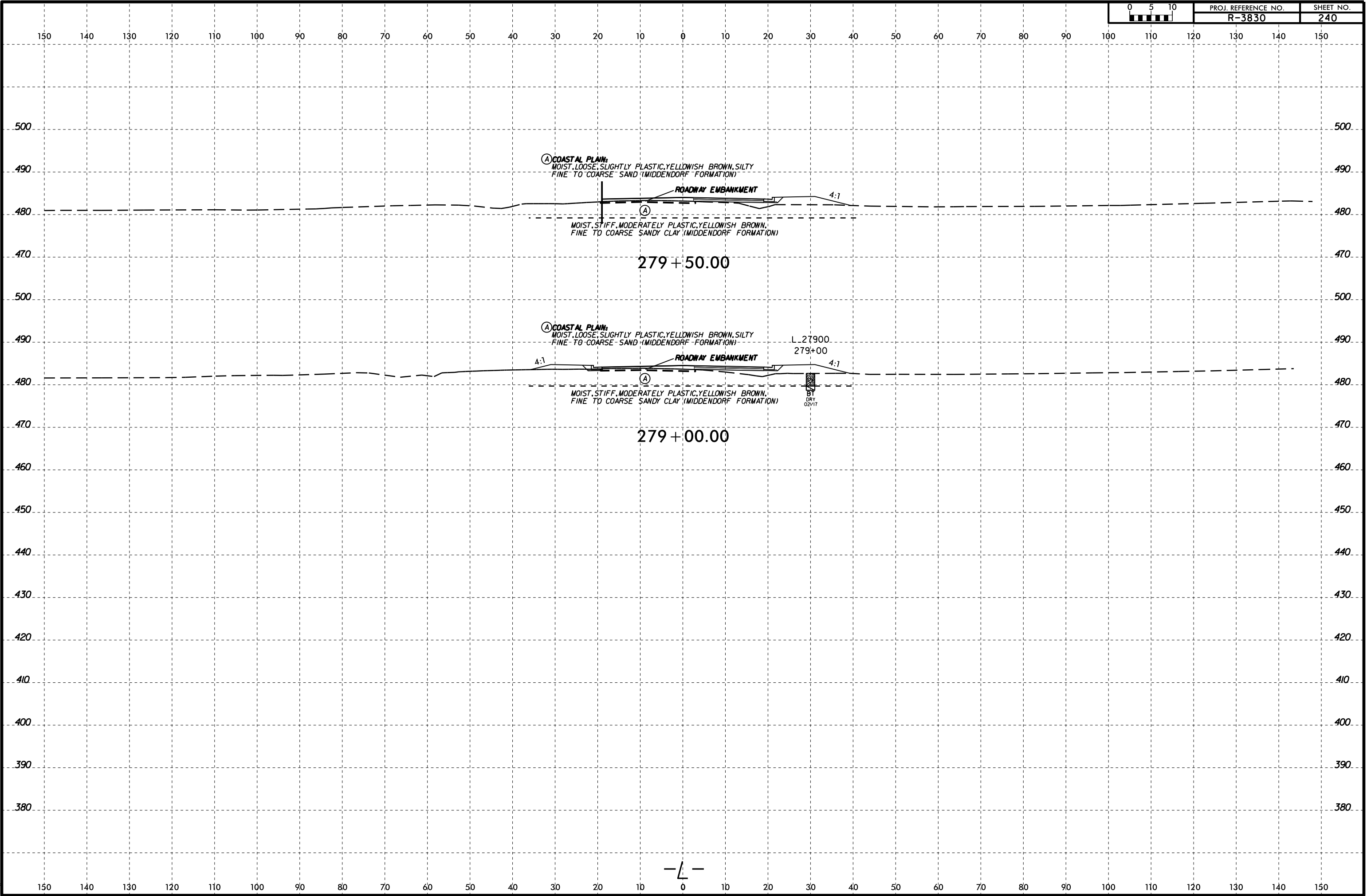
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510  
500  
490  
480  
470

510  
500  
490  
480  
470

(A) COASTAL PLAIN  
MOIST, LOOSE, NON-PLASTIC, BROWN TO YELLOWISH  
BROWN, SILTY FINE TO COARSE SAND  
(MIDDENDORF FORMATION)

(B) MOIST, VERY STIFF, MODERATELY PLASTIC, YELLOWISH  
BROWN, SILTY, FINE TO COARSE SANDY CLAY WITH  
TRACE GRAVEL (MIDDENDORF FORMATION)

ROADWAY EMBANKMENT

4:1

4:1

(A)

(B)

MOIST, DENSE, MODERATELY PLASTIC, REDDISH BROWN AND WHITE, CLAYEY COARSE  
TO FINE SAND WITH LITTLE GRAVEL (MIDDENDORF FORMATION)

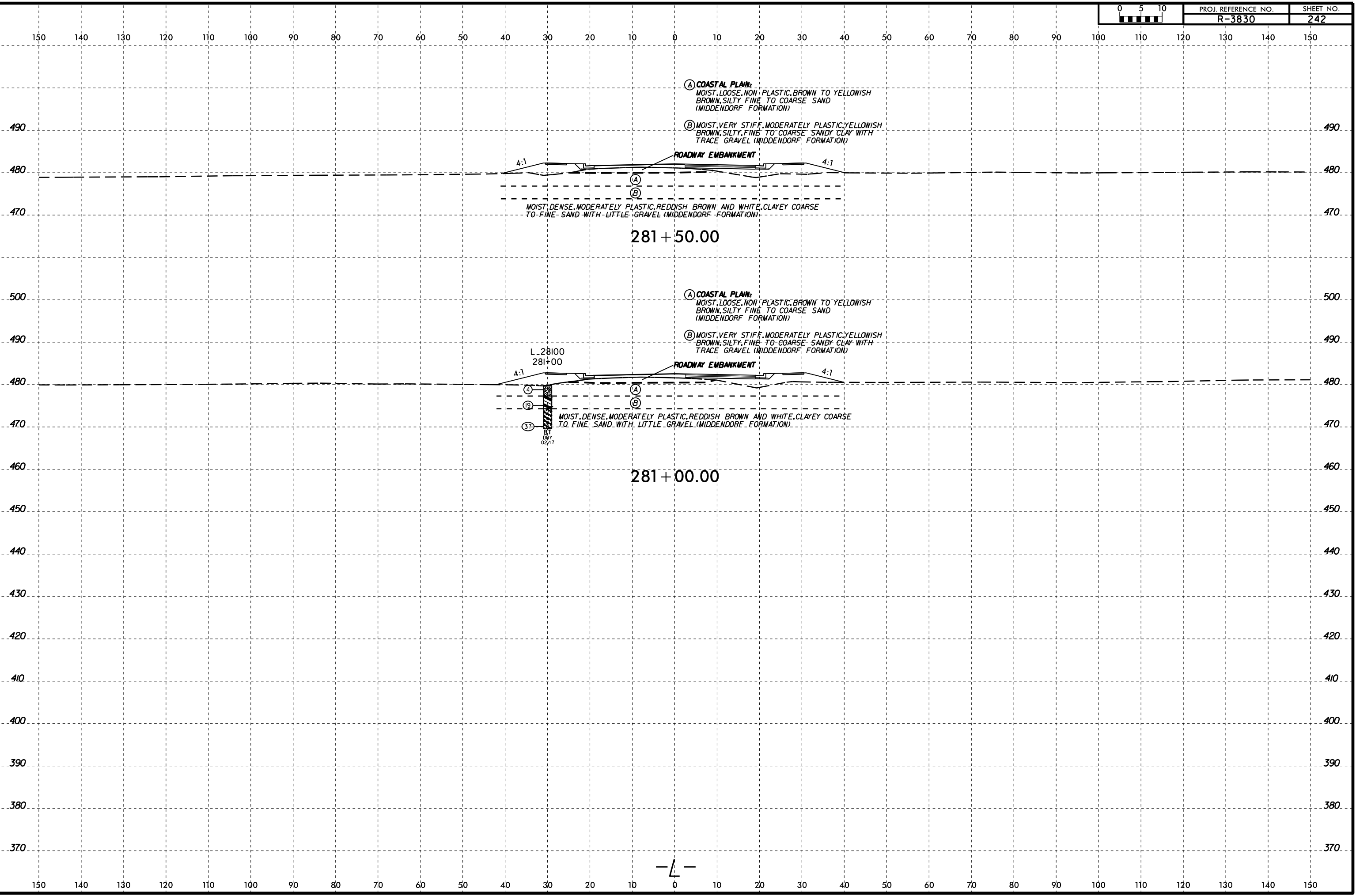
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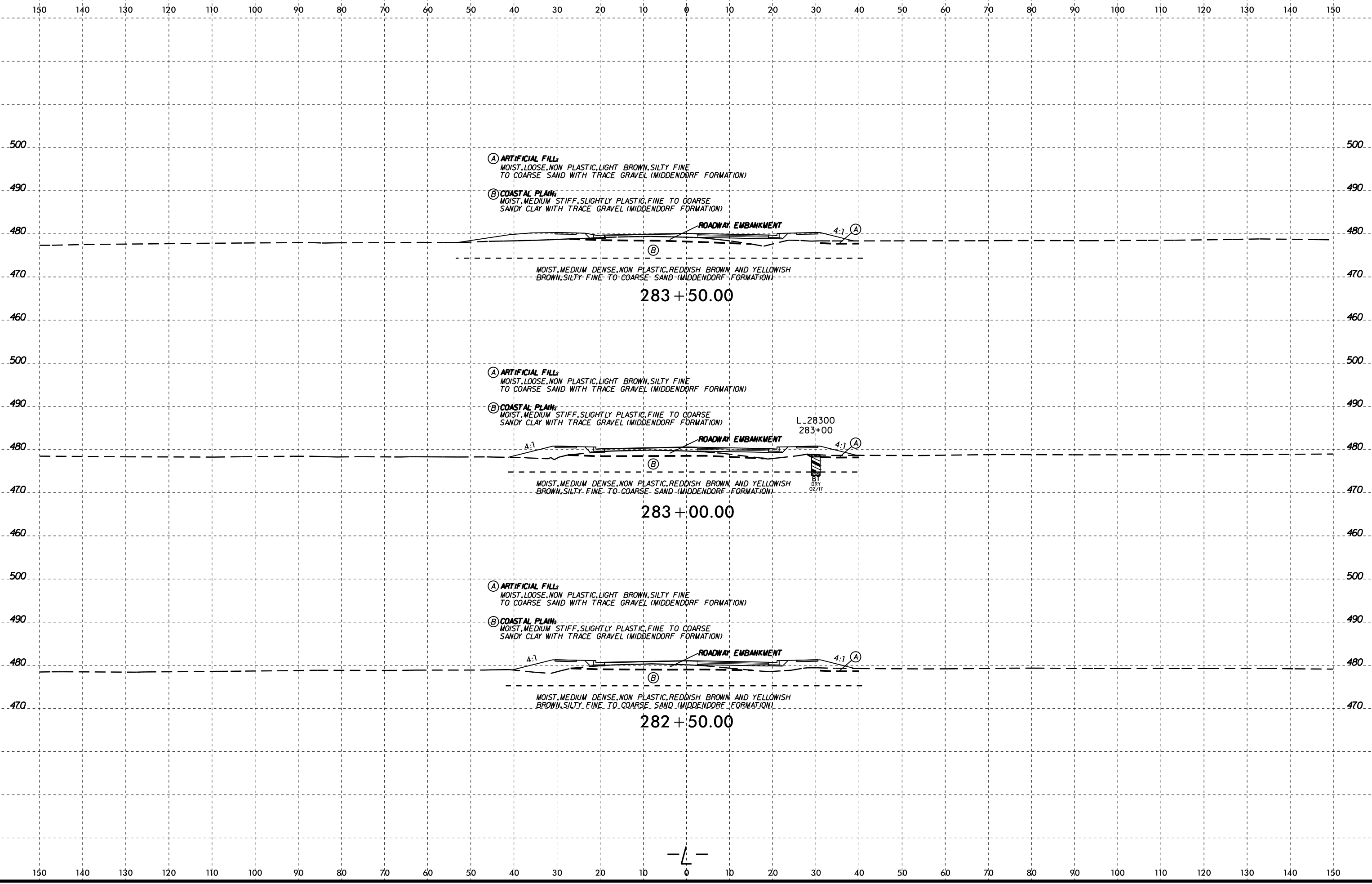


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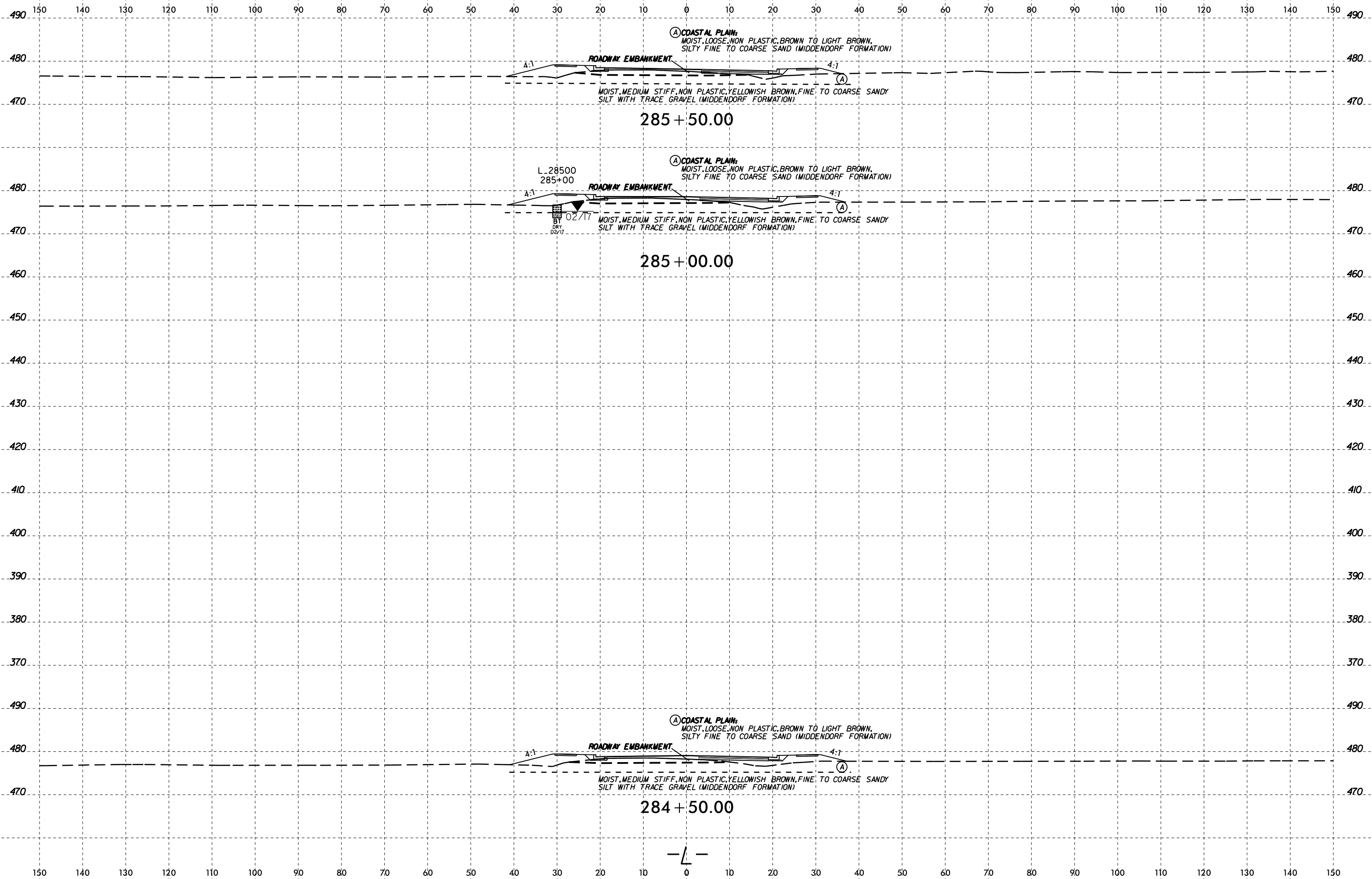
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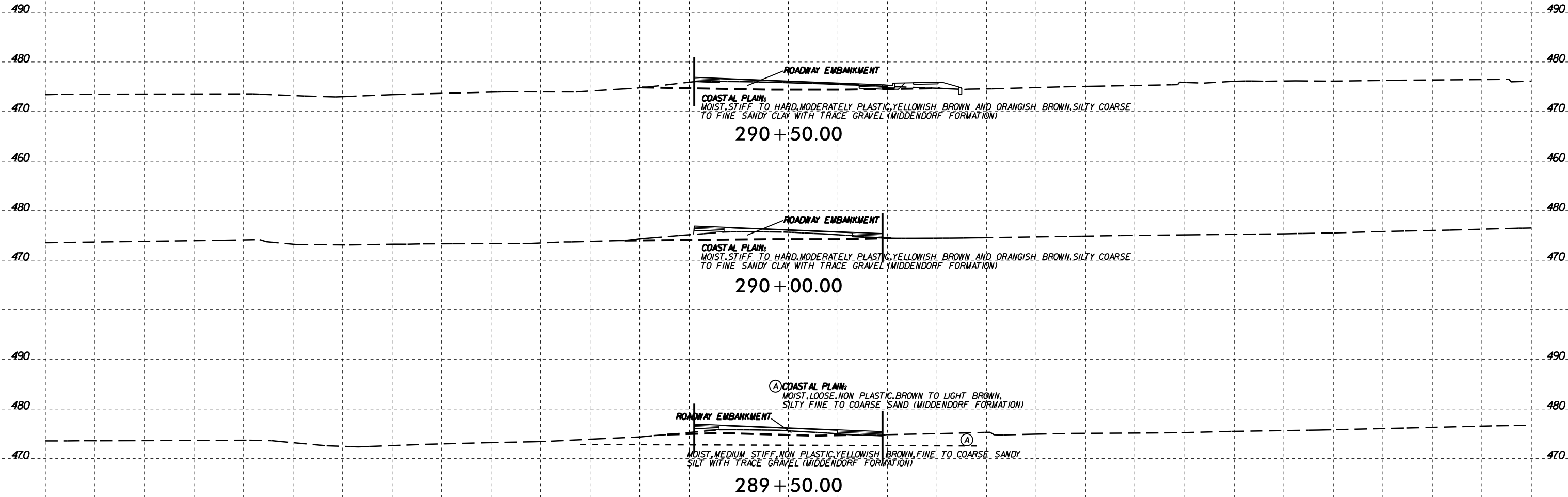




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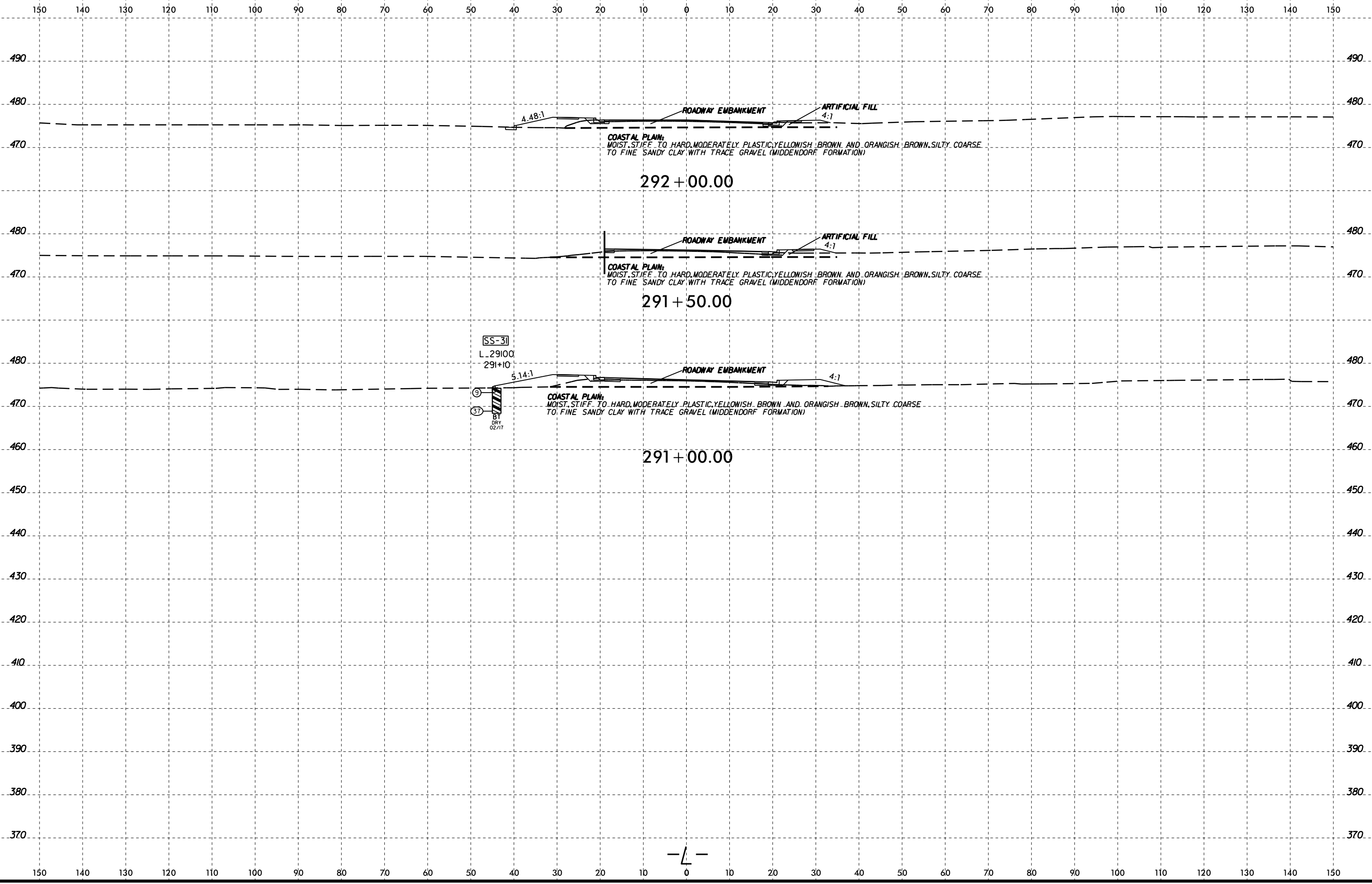
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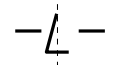
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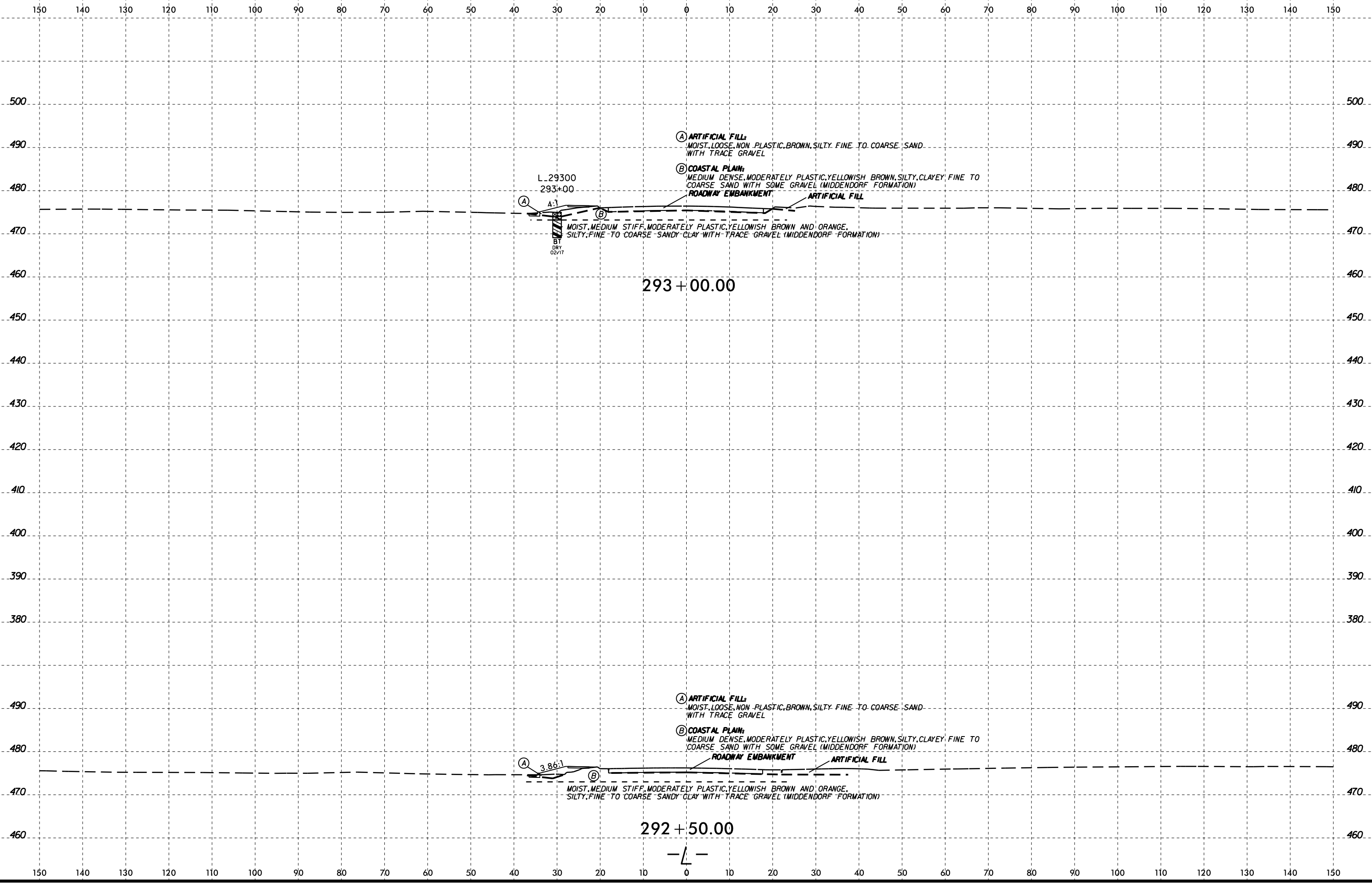


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L\_29300  
293+00  
A:  
A:1  
BT  
DRY  
02/17

293 + 00.00

- (A) **ARTIFICIAL FILL:**  
MOIST, LOOSE, NON-PLASTIC, BROWN, SILTY, FINE TO COARSE SAND WITH TRACE GRAVEL
- (B) **COASTAL PLAIN:**  
MEDIUM DENSE, MODERATELY PLASTIC, YELLOWISH BROWN, SILTY, CLAYEY, FINE TO COARSE SAND WITH SOME GRAVEL (MIDDENDORF FORMATION)

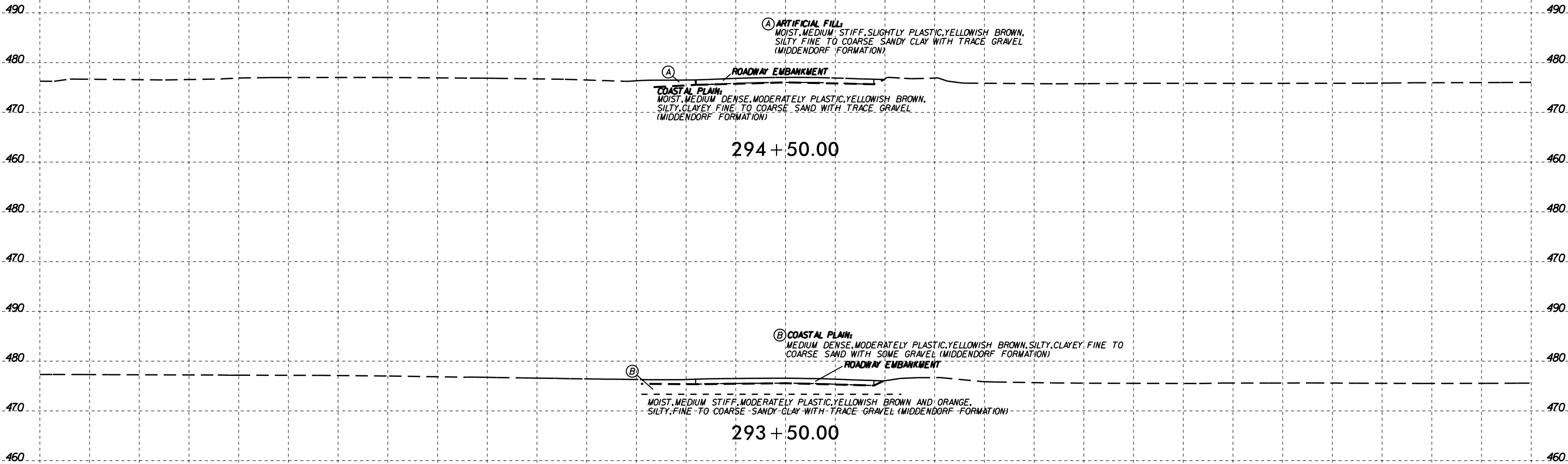
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3.86:1  
B:

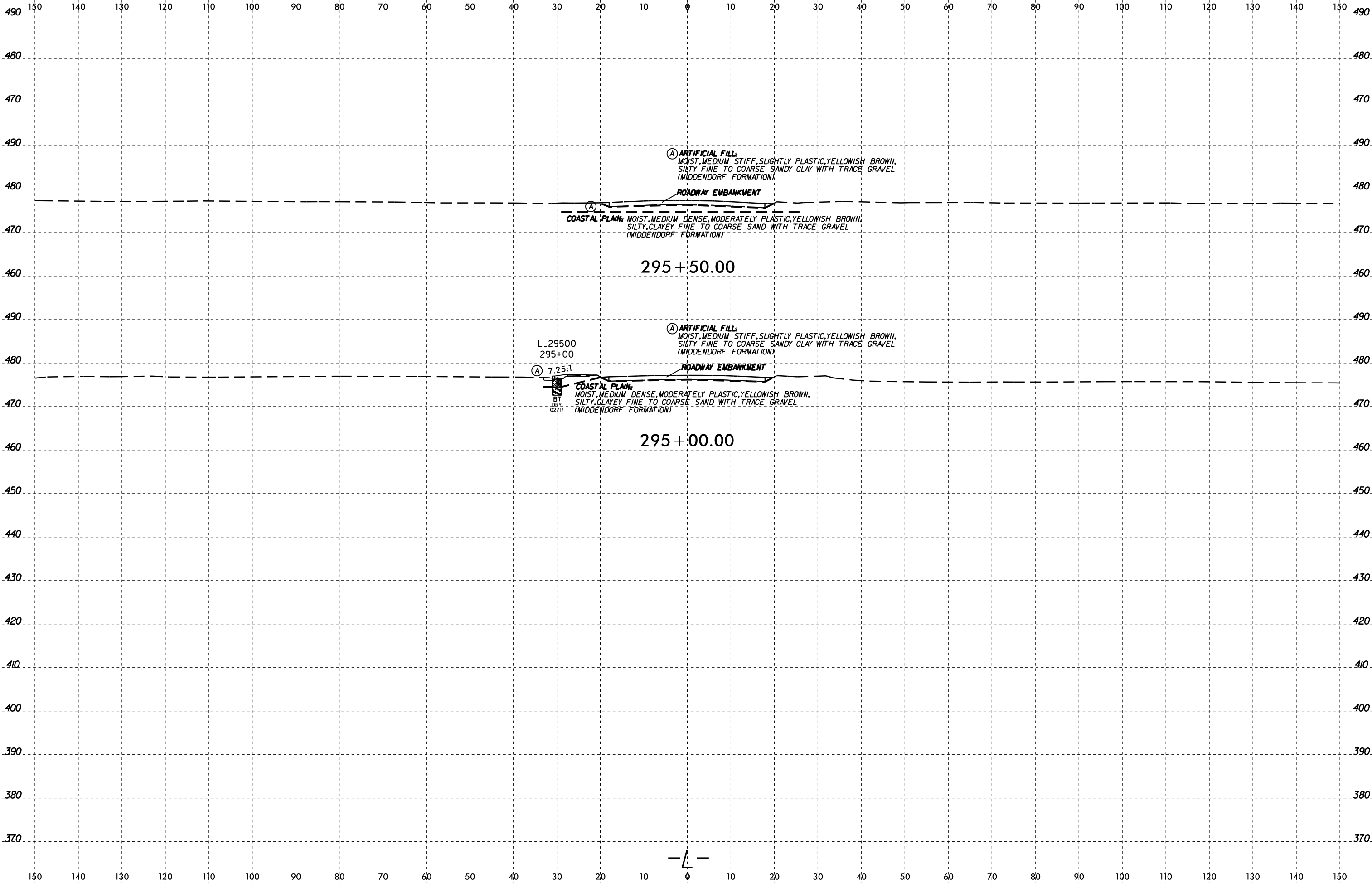
292 + 50.00

- (A) **ARTIFICIAL FILL:**  
MOIST, LOOSE, NON-PLASTIC, BROWN, SILTY, FINE TO COARSE SAND WITH TRACE GRAVEL
- (B) **COASTAL PLAIN:**  
MEDIUM DENSE, MODERATELY PLASTIC, YELLOWISH BROWN, SILTY, CLAYEY, FINE TO COARSE SAND WITH SOME GRAVEL (MIDDENDORF FORMATION)



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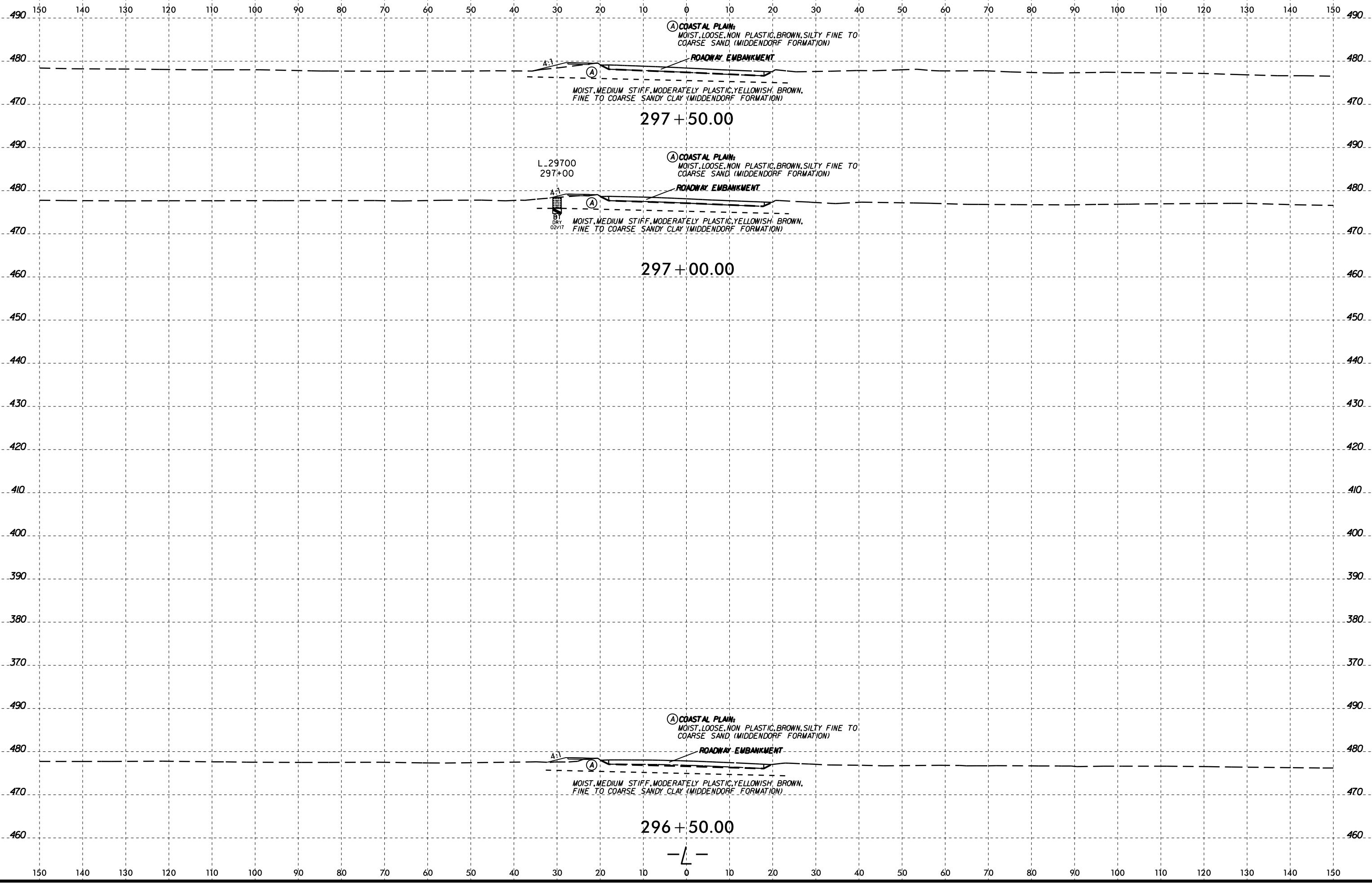




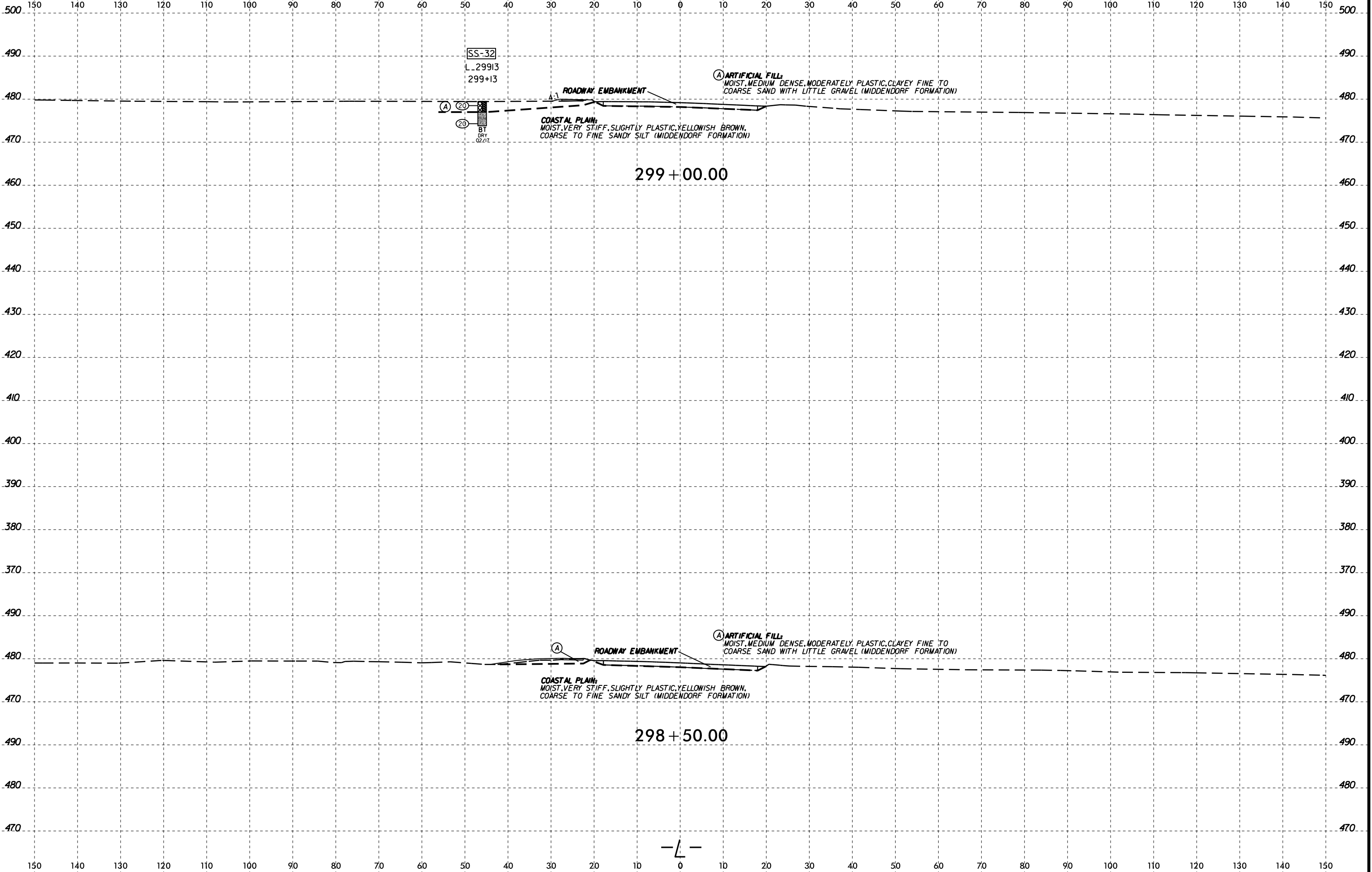
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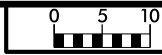


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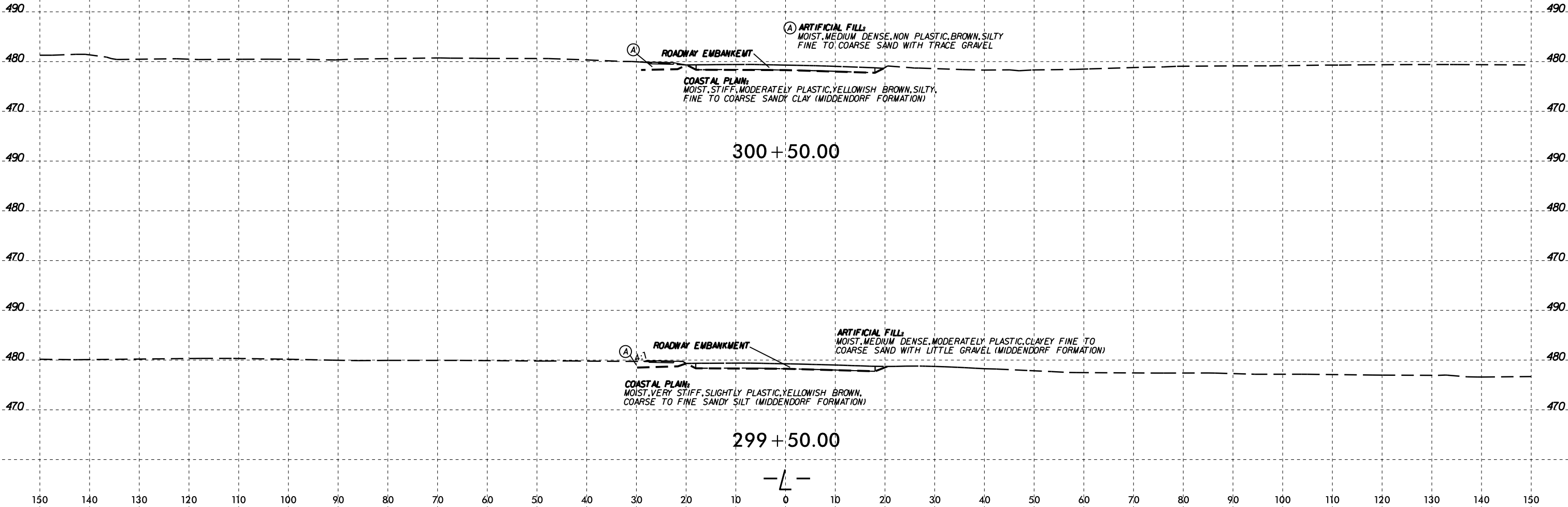


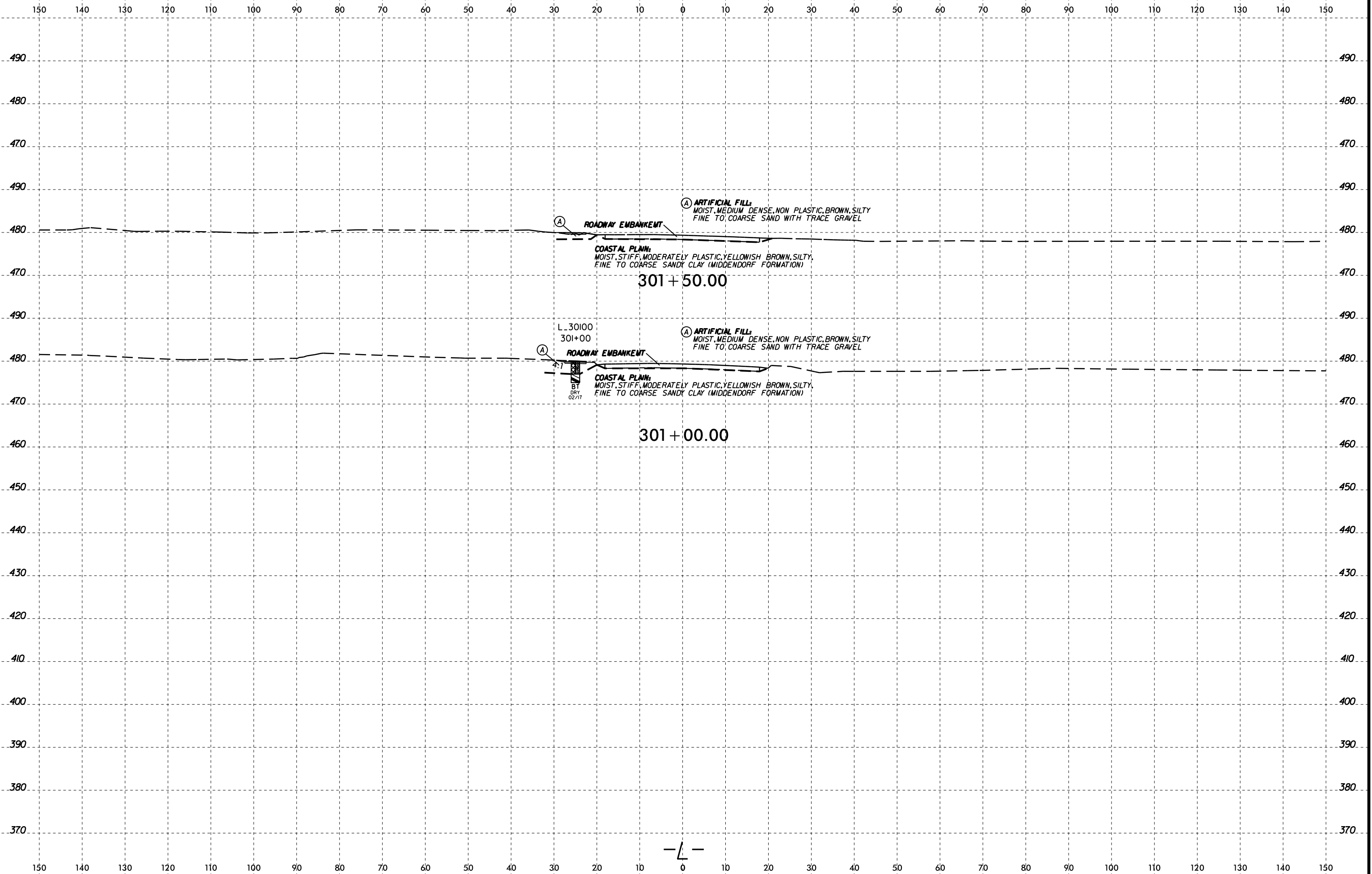
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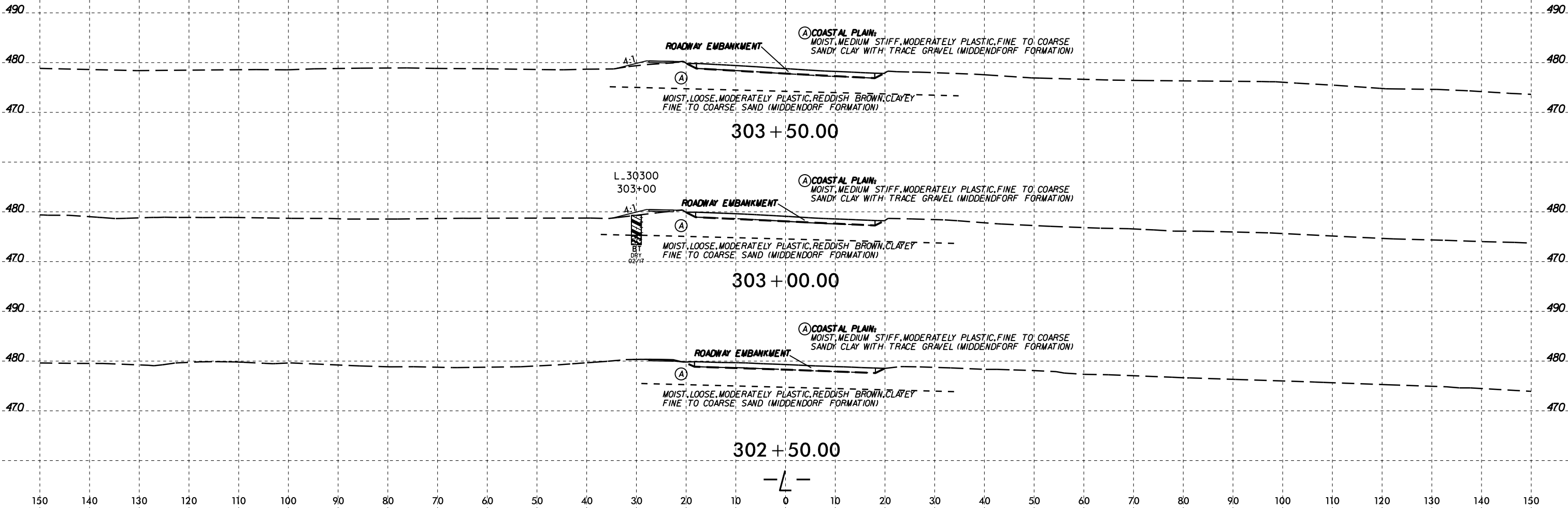


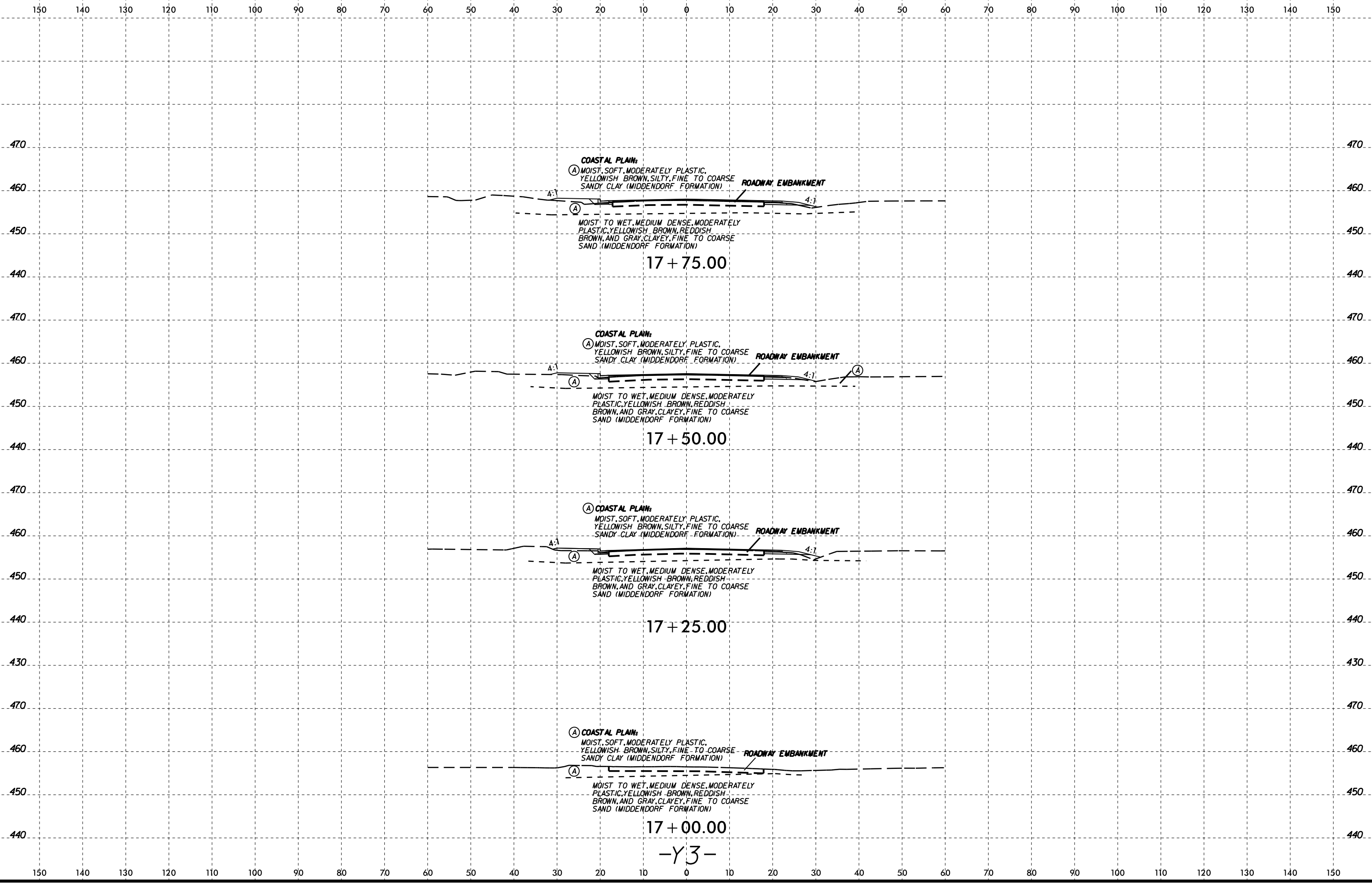


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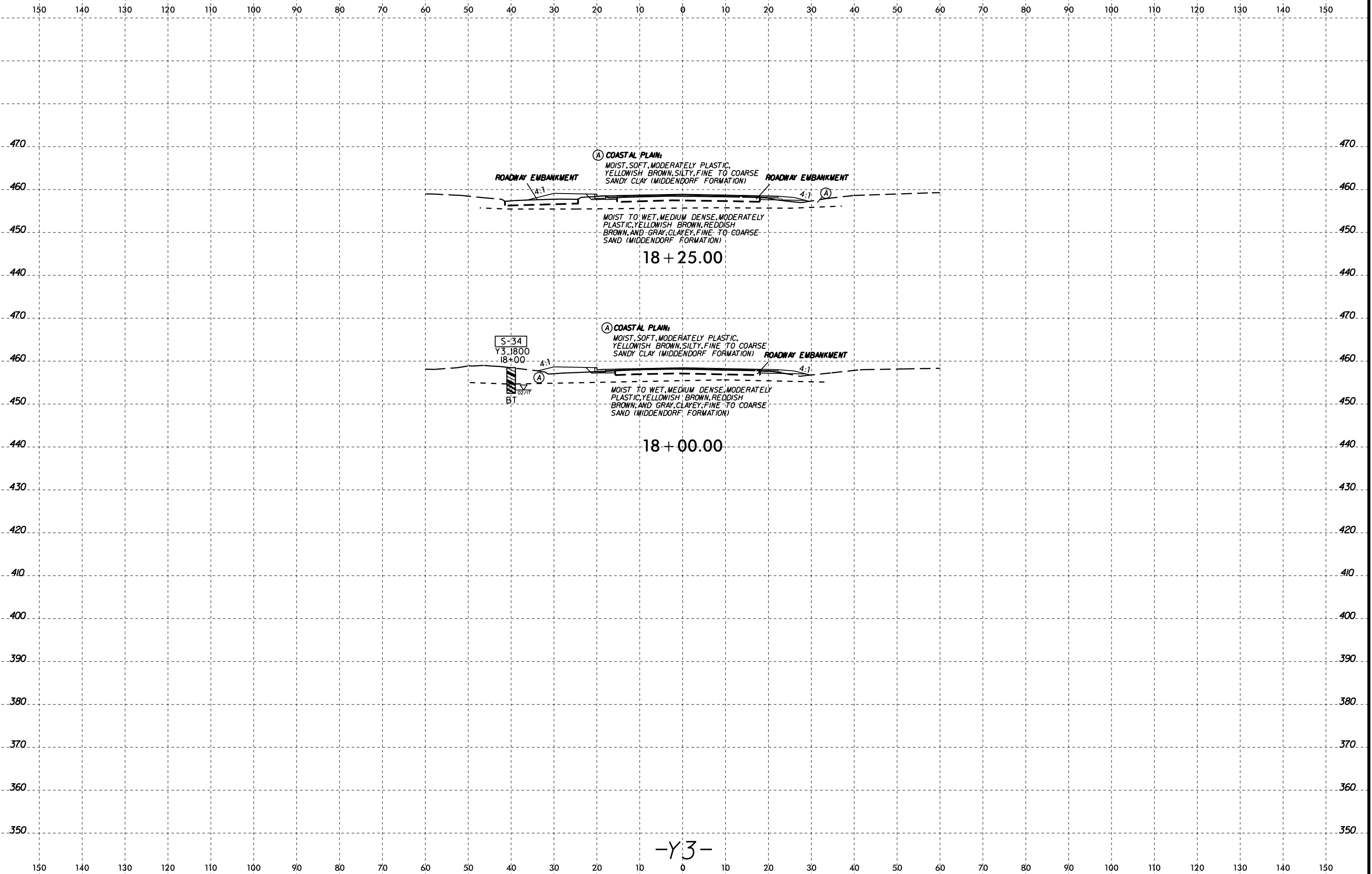
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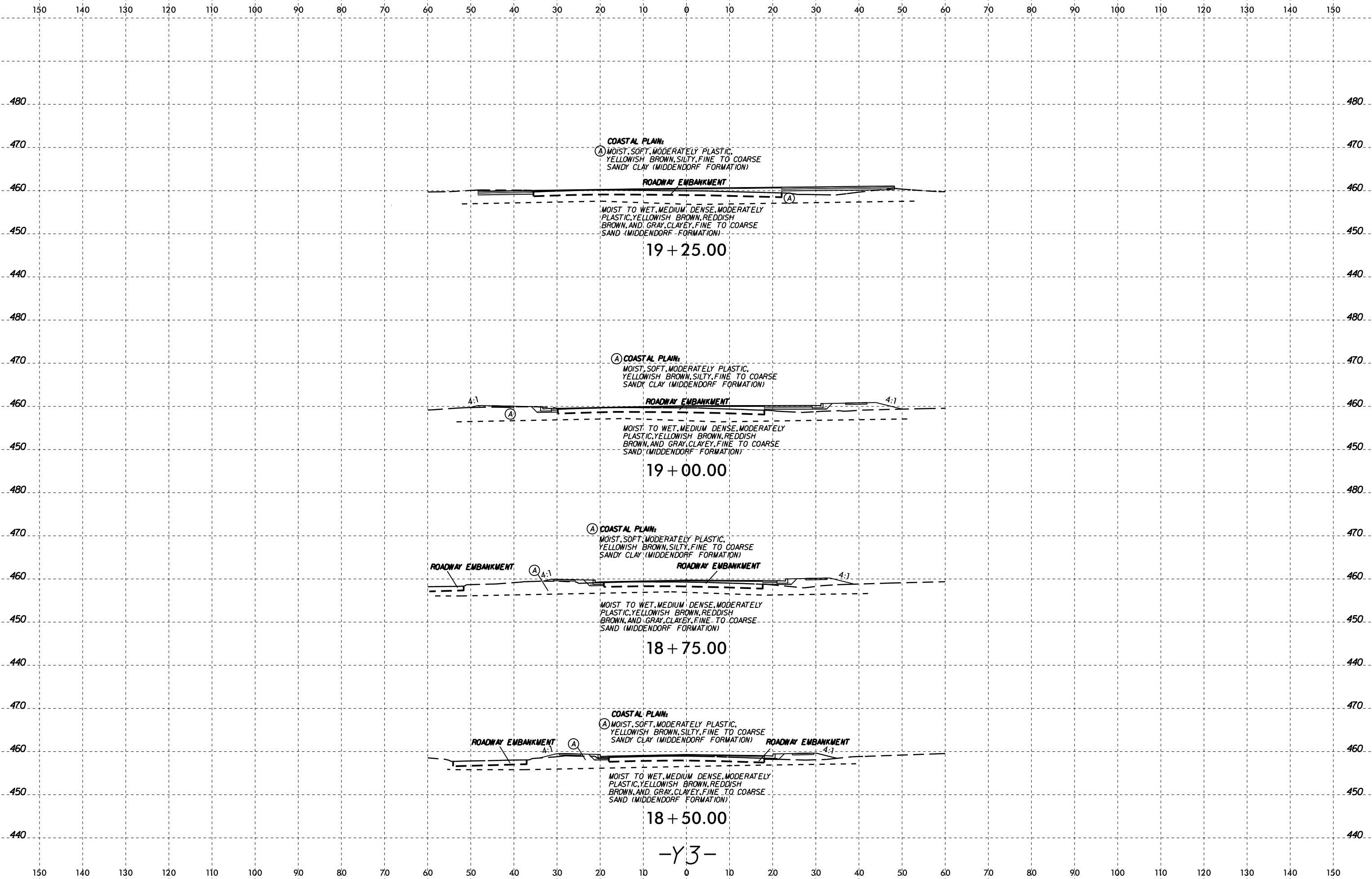


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17+00.00  
-Y3-

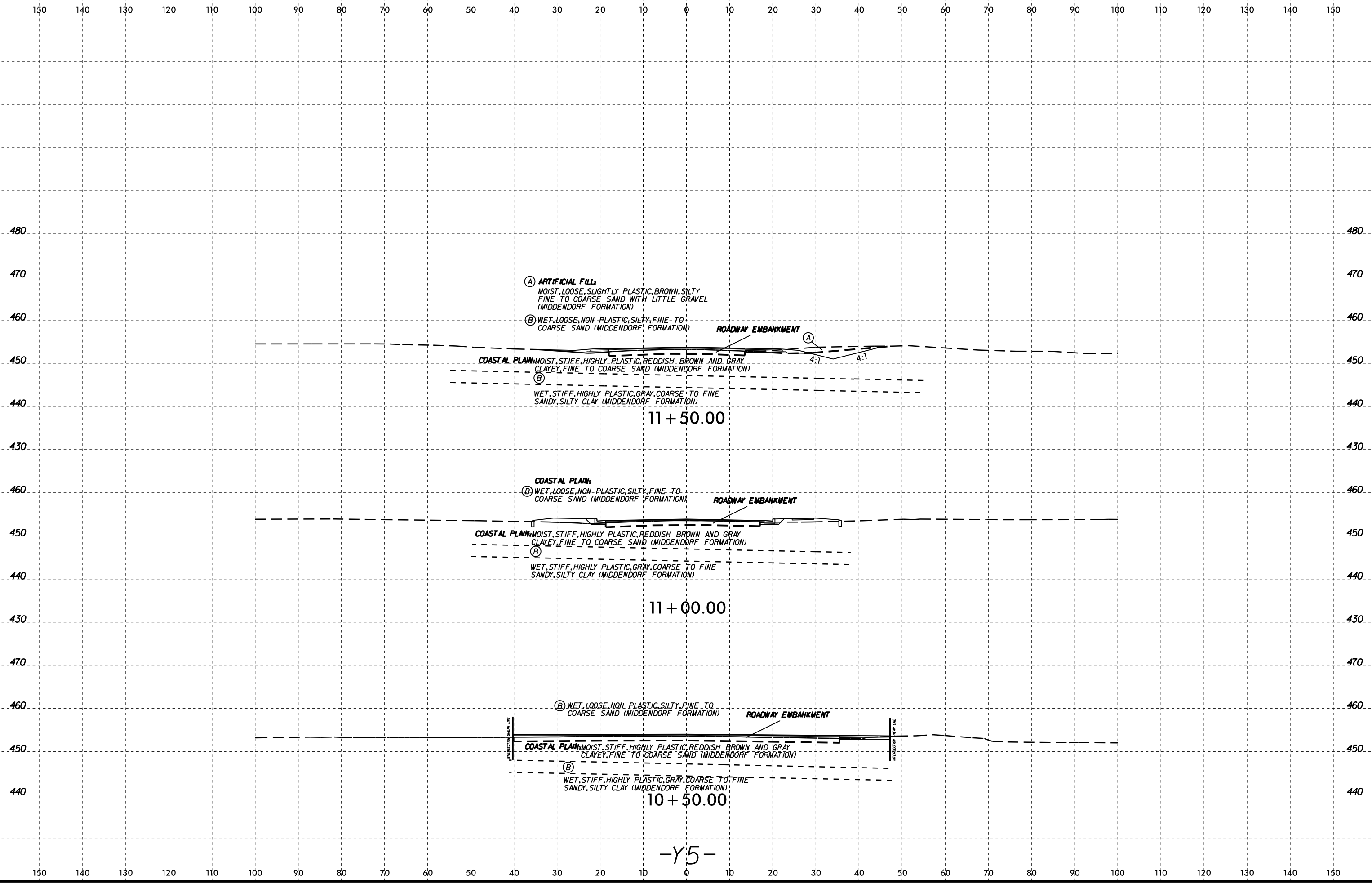


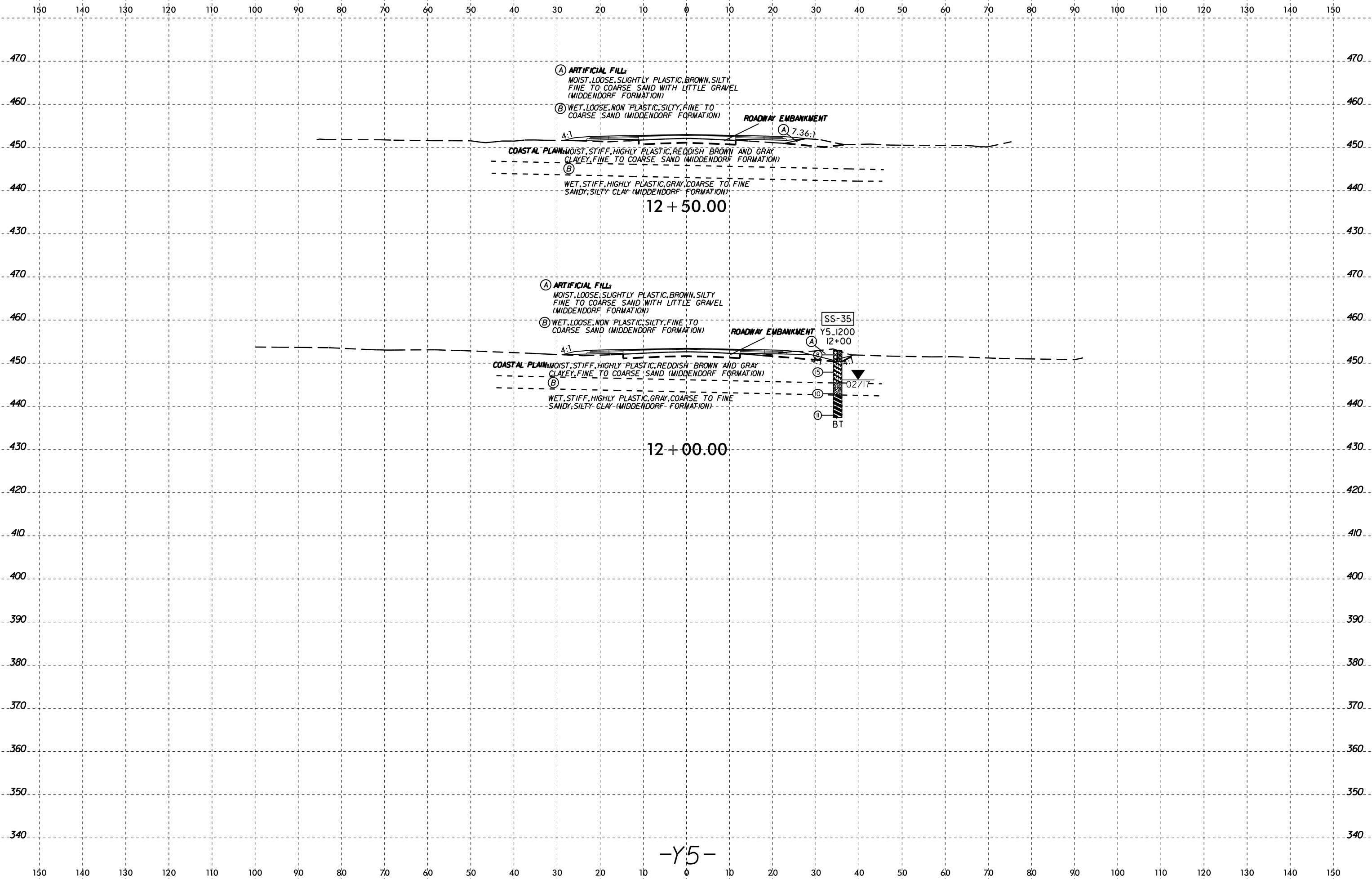
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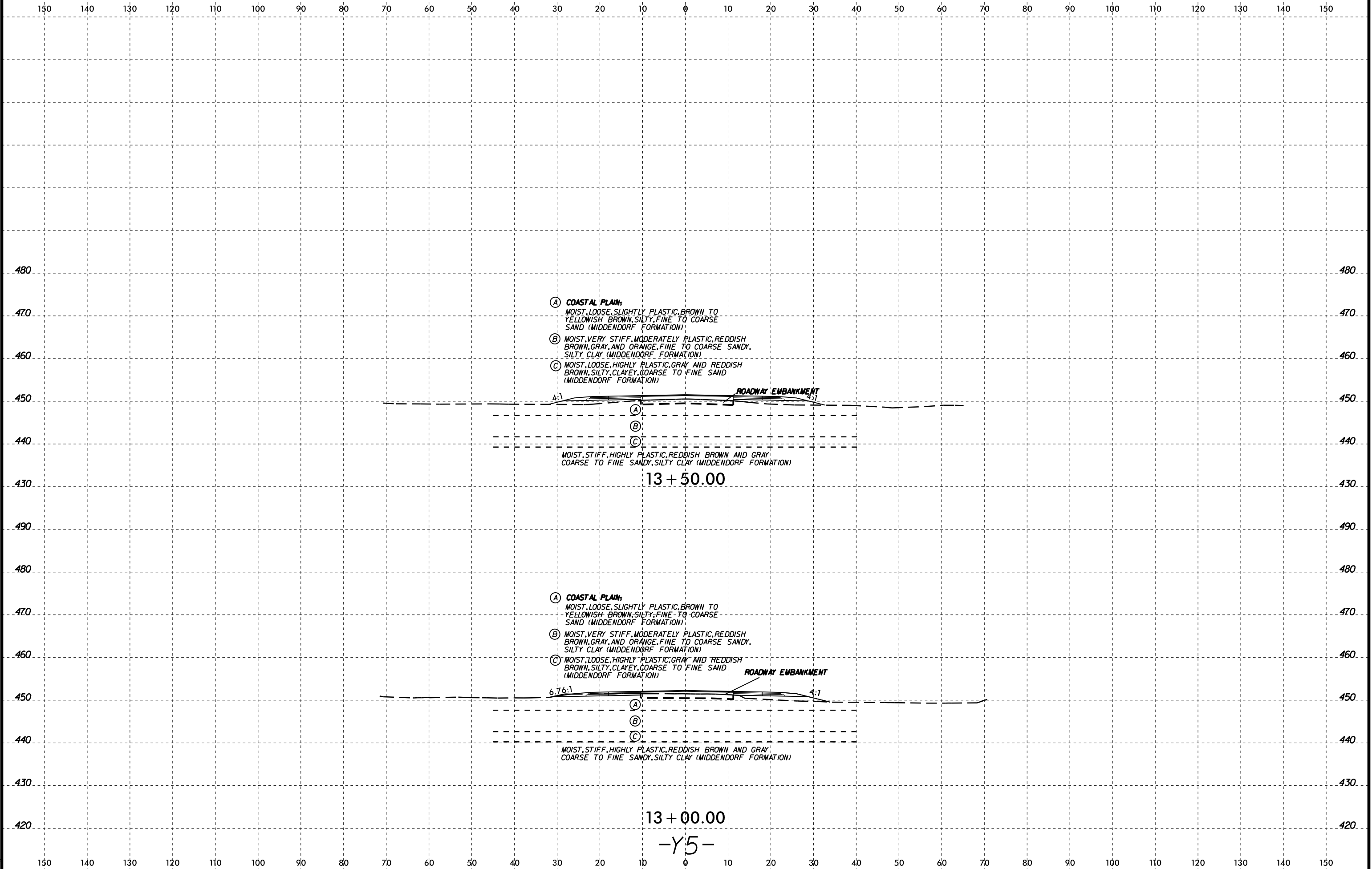






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- (A) **COASTAL PLAIN:**  
MOIST, LOOSE, SLIGHTLY PLASTIC, BROWN TO YELLOWISH BROWN, SILTY, FINE TO COARSE SAND (MIDDENDORF FORMATION)
- (B) MOIST, VERY STIFF, MODERATELY PLASTIC, REDDISH BROWN, GRAY, AND ORANGE, FINE TO COARSE SANDY, SILTY CLAY (MIDDENDORF FORMATION)
- (C) MOIST, LOOSE, HIGHLY PLASTIC, GRAY AND REDDISH BROWN, SILTY, CLAYEY, COARSE TO FINE SAND (MIDDENDORF FORMATION)

MOIST, STIFF, HIGHLY PLASTIC, REDDISH BROWN AND GRAY, COARSE TO FINE SANDY, SILTY CLAY (MIDDENDORF FORMATION)

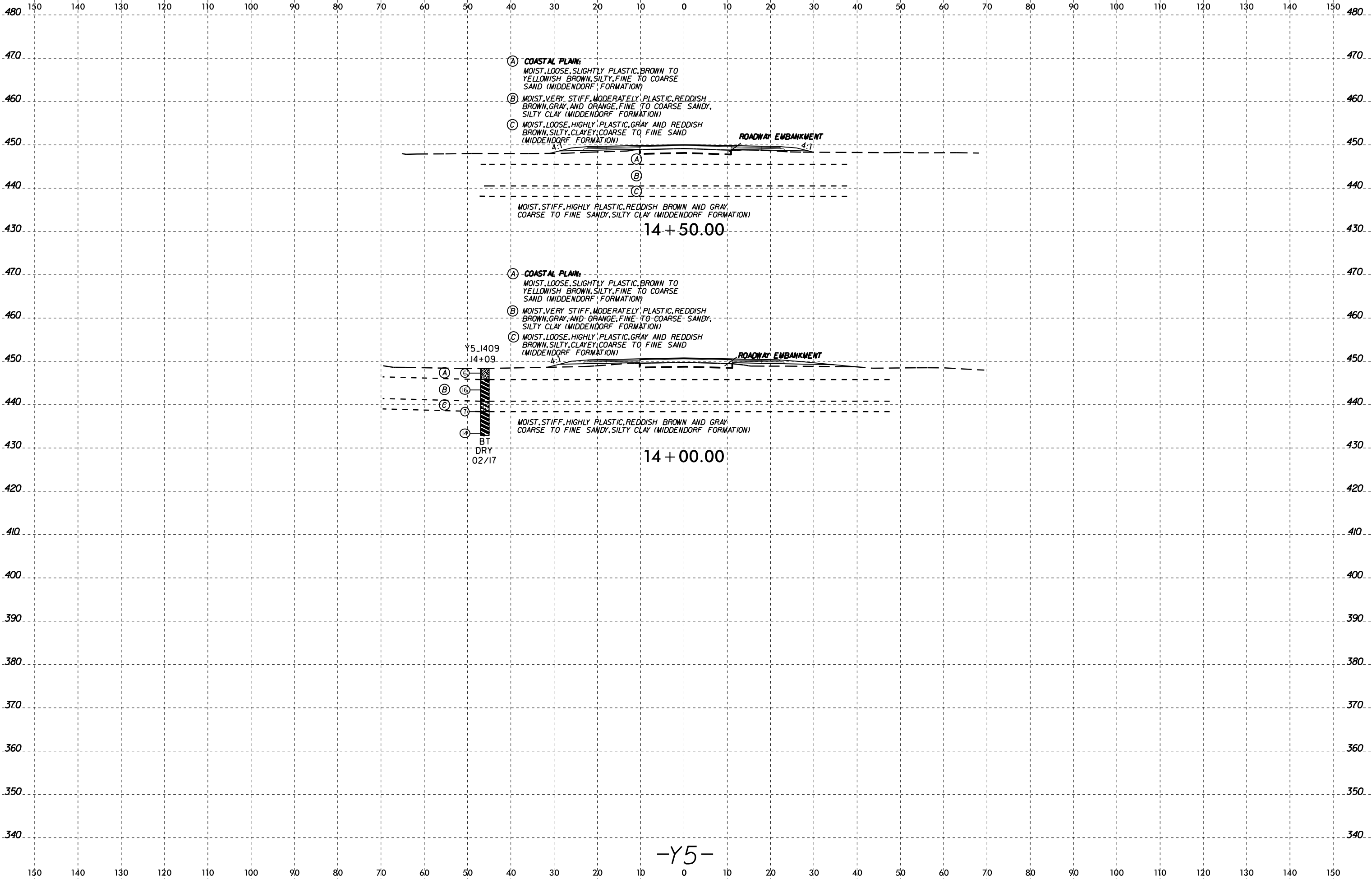
13 + 50.00

- (A) **COASTAL PLAIN:**  
MOIST, LOOSE, SLIGHTLY PLASTIC, BROWN TO YELLOWISH BROWN, SILTY, FINE TO COARSE SAND (MIDDENDORF FORMATION)
- (B) MOIST, VERY STIFF, MODERATELY PLASTIC, REDDISH BROWN, GRAY, AND ORANGE, FINE TO COARSE SANDY, SILTY CLAY (MIDDENDORF FORMATION)
- (C) MOIST, LOOSE, HIGHLY PLASTIC, GRAY AND REDDISH BROWN, SILTY, CLAYEY, COARSE TO FINE SAND (MIDDENDORF FORMATION)

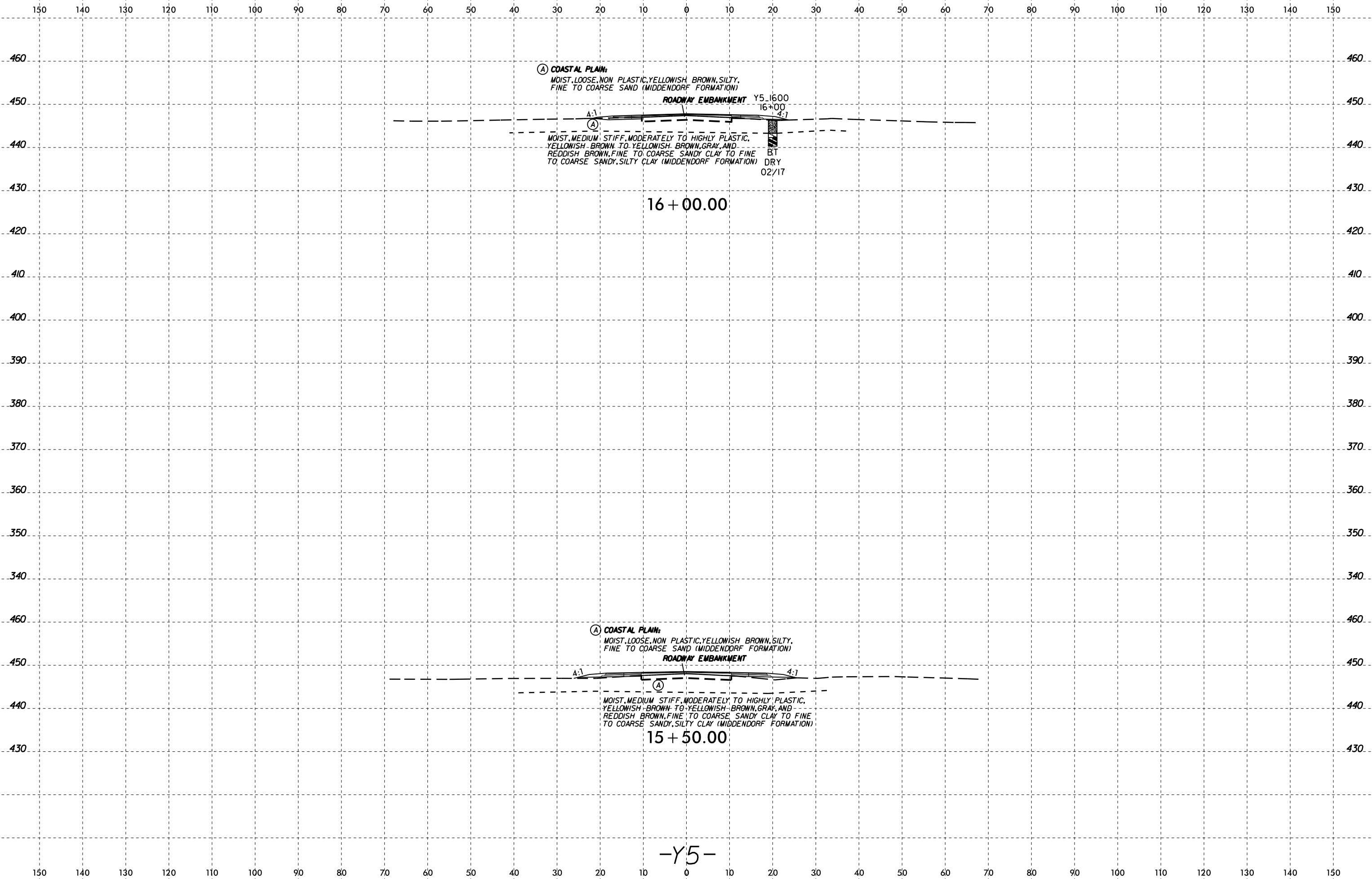
MOIST, STIFF, HIGHLY PLASTIC, REDDISH BROWN AND GRAY, COARSE TO FINE SANDY, SILTY CLAY (MIDDENDORF FORMATION)

13 + 00.00

-Y5-



-Y5-



(A) **COASTAL PLAIN:**  
 MOIST, LOOSE, NON PLASTIC, YELLOWISH BROWN, SILTY,  
 FINE TO COARSE SAND (MIDDENDORF FORMATION)  
 ROADWAY EMBANKMENT  
 Y5 1600  
 16+00  
 4:1  
 (A)  
 MOIST, MEDIUM STIFF, MODERATELY TO HIGHLY PLASTIC,  
 YELLOWISH BROWN TO YELLOWISH BROWN, GRAY, AND  
 REDDISH BROWN, FINE TO COARSE SANDY CLAY TO FINE  
 TO COARSE SANDY, SILTY CLAY (MIDDENDORF FORMATION)  
 BT  
 DRY  
 02/17

16 + 00.00

(A) **COASTAL PLAIN:**  
 MOIST, LOOSE, NON PLASTIC, YELLOWISH BROWN, SILTY,  
 FINE TO COARSE SAND (MIDDENDORF FORMATION)  
 ROADWAY EMBANKMENT  
 4:1  
 (A)  
 MOIST, MEDIUM STIFF, MODERATELY TO HIGHLY PLASTIC,  
 YELLOWISH BROWN TO YELLOWISH BROWN, GRAY, AND  
 REDDISH BROWN, FINE TO COARSE SANDY CLAY TO FINE  
 TO COARSE SANDY, SILTY CLAY (MIDDENDORF FORMATION)

15 + 50.00

-Y5-

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450  
440  
430

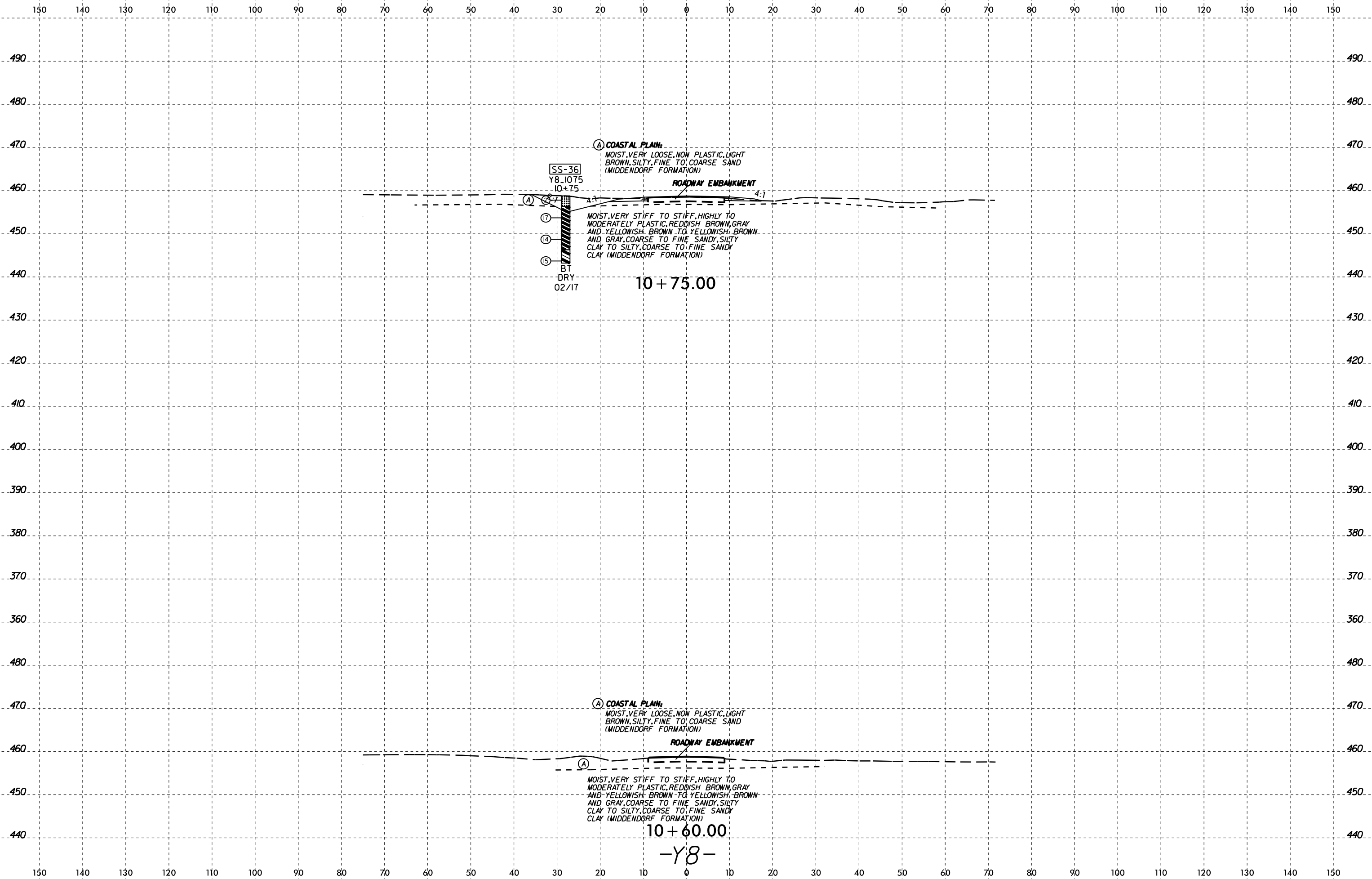
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Ⓐ **COASTAL PLAIN:**  
 MOIST, LOOSE, NON PLASTIC, YELLOWISH BROWN, SILTY,  
 FINE TO COARSE SAND (MIDDENDORF FORMATION)  
 ROADWAY EMBANKMENT

Ⓐ  
 MOIST, MEDIUM STIFF, MODERATELY TO HIGHLY PLASTIC,  
 YELLOWISH BROWN TO YELLOWISH BROWN, GRAY AND  
 REDDISH BROWN, FINE TO COARSE SANDY CLAY TO FINE  
 TO COARSE SANDY, SILTY CLAY (MIDDENDORF FORMATION)

16 + 40.00  
 -Y5-

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SS-36  
Y8\_1075  
10+75

(A) COASTAL PLAIN:  
MOIST, VERY LOOSE, NON PLASTIC, LIGHT  
BROWN, SILTY, FINE TO COARSE SAND  
(MIDDENDORF FORMATION)

MOIST, VERY STIFF TO STIFF, HIGHLY TO  
MODERATELY PLASTIC, REDDISH BROWN, GRAY  
AND YELLOWISH BROWN TO YELLOWISH BROWN  
AND GRAY, COARSE TO FINE SANDY, SILTY  
CLAY TO SILTY, COARSE TO FINE SANDY  
CLAY (MIDDENDORF FORMATION)

(A)  
17  
14  
15  
BT  
DRY  
02/17

10+75.00

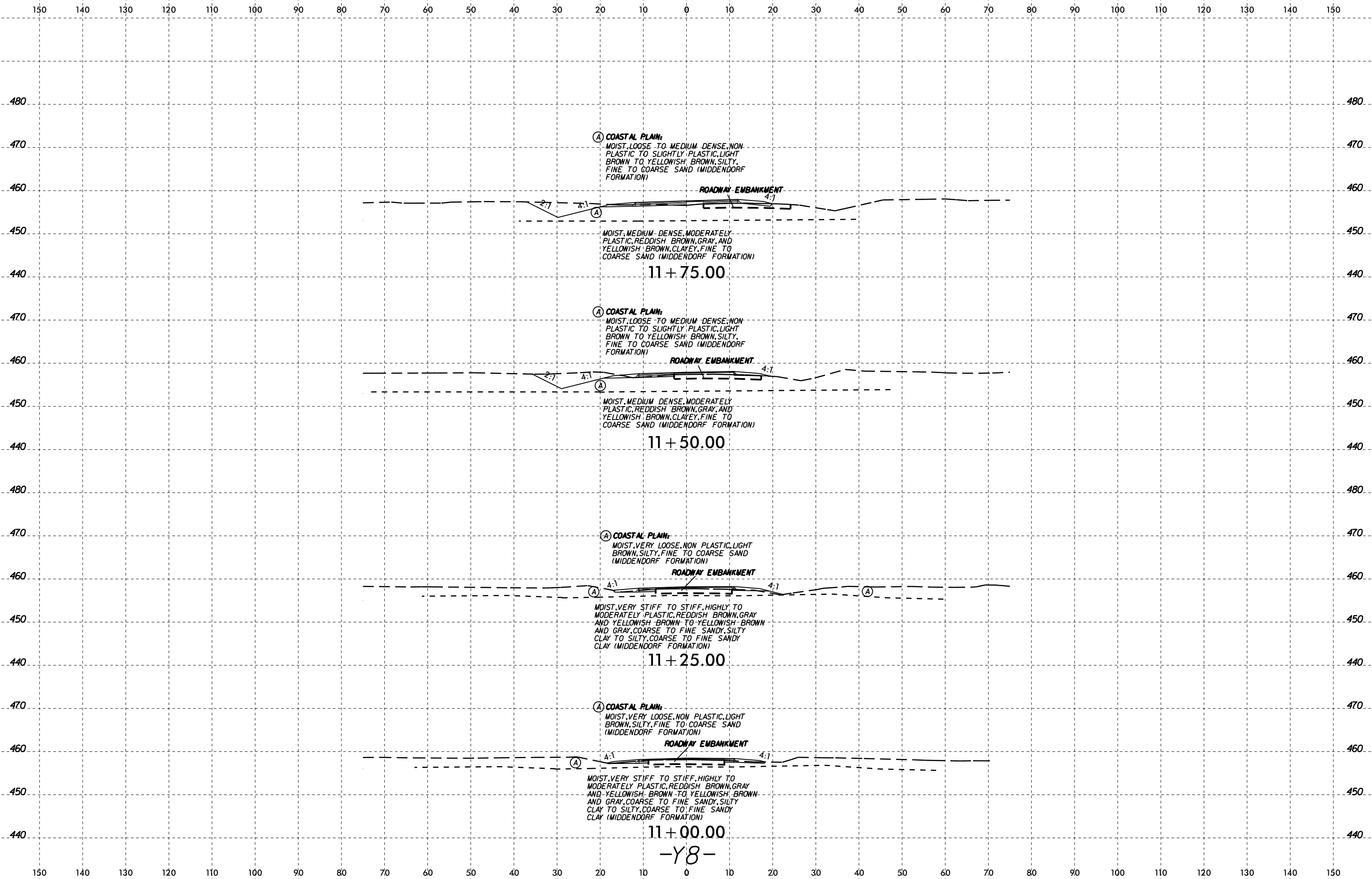
(A) COASTAL PLAIN:  
MOIST, VERY LOOSE, NON PLASTIC, LIGHT  
BROWN, SILTY, FINE TO COARSE SAND  
(MIDDENDORF FORMATION)

MOIST, VERY STIFF TO STIFF, HIGHLY TO  
MODERATELY PLASTIC, REDDISH BROWN, GRAY  
AND YELLOWISH BROWN TO YELLOWISH BROWN  
AND GRAY, COARSE TO FINE SANDY, SILTY  
CLAY TO SILTY, COARSE TO FINE SANDY  
CLAY (MIDDENDORF FORMATION)

(A)

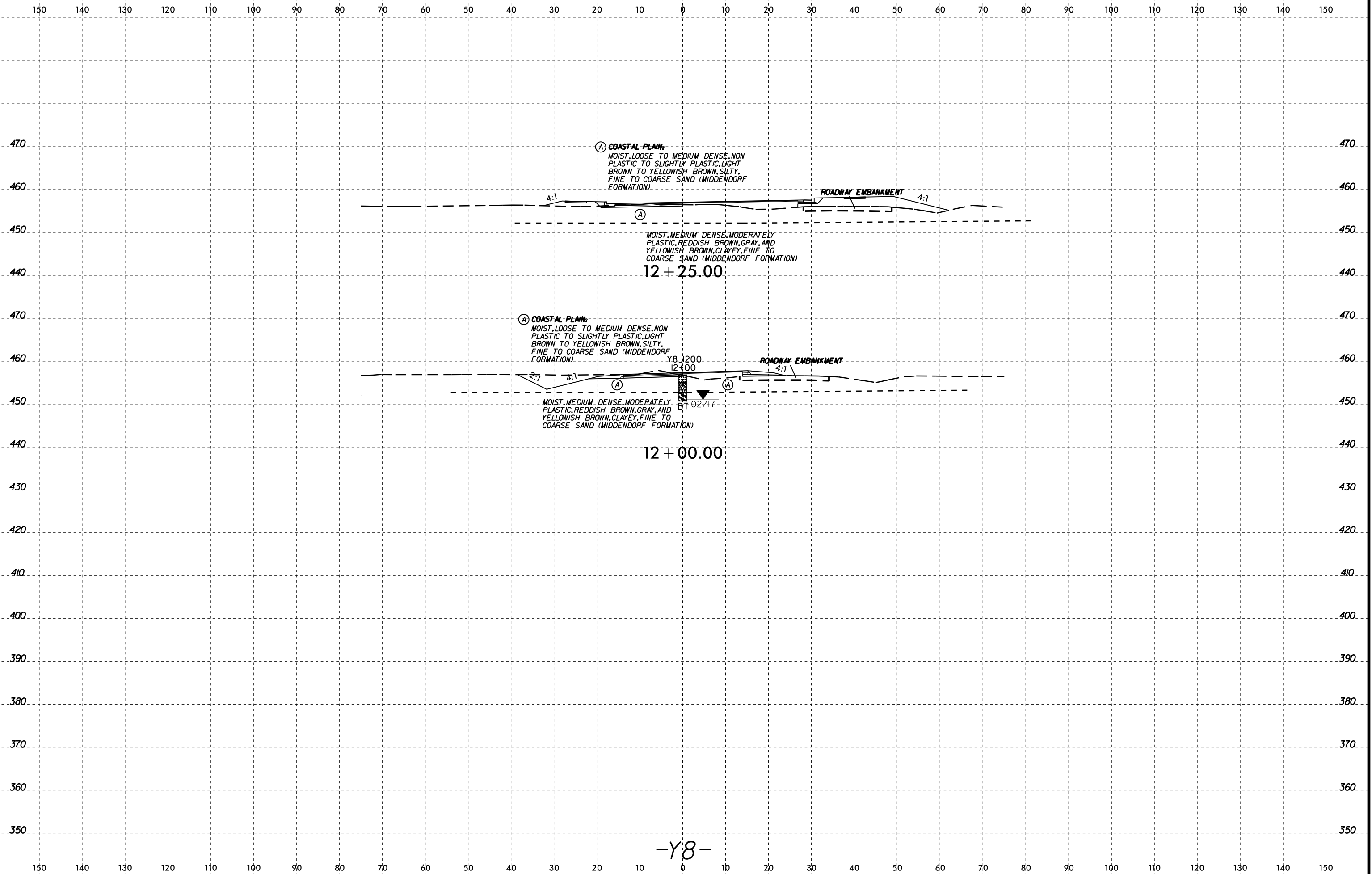
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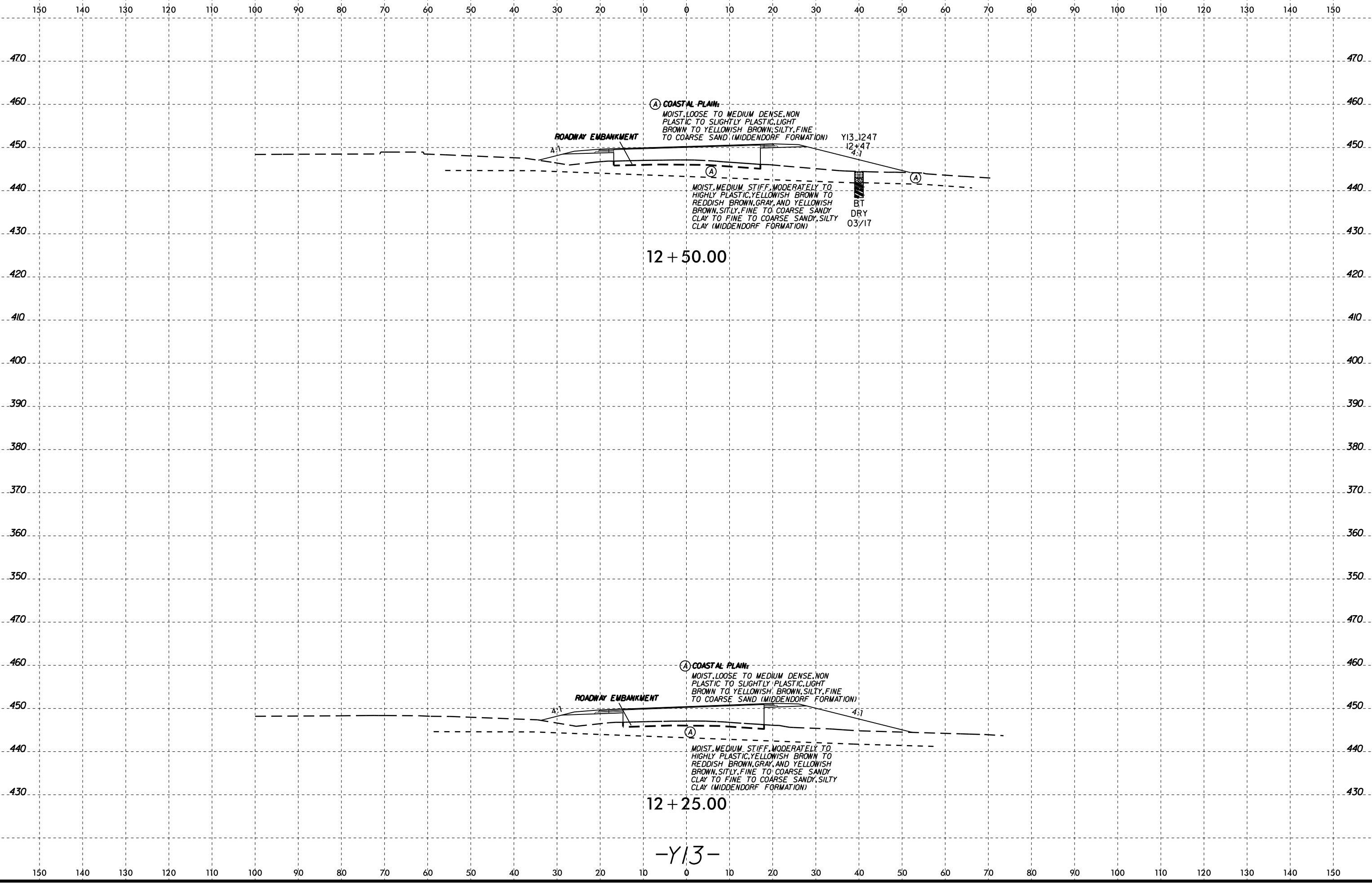


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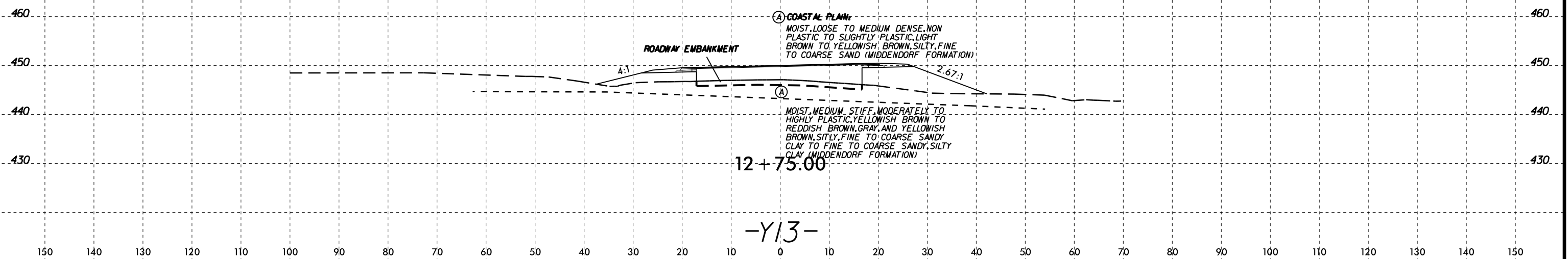


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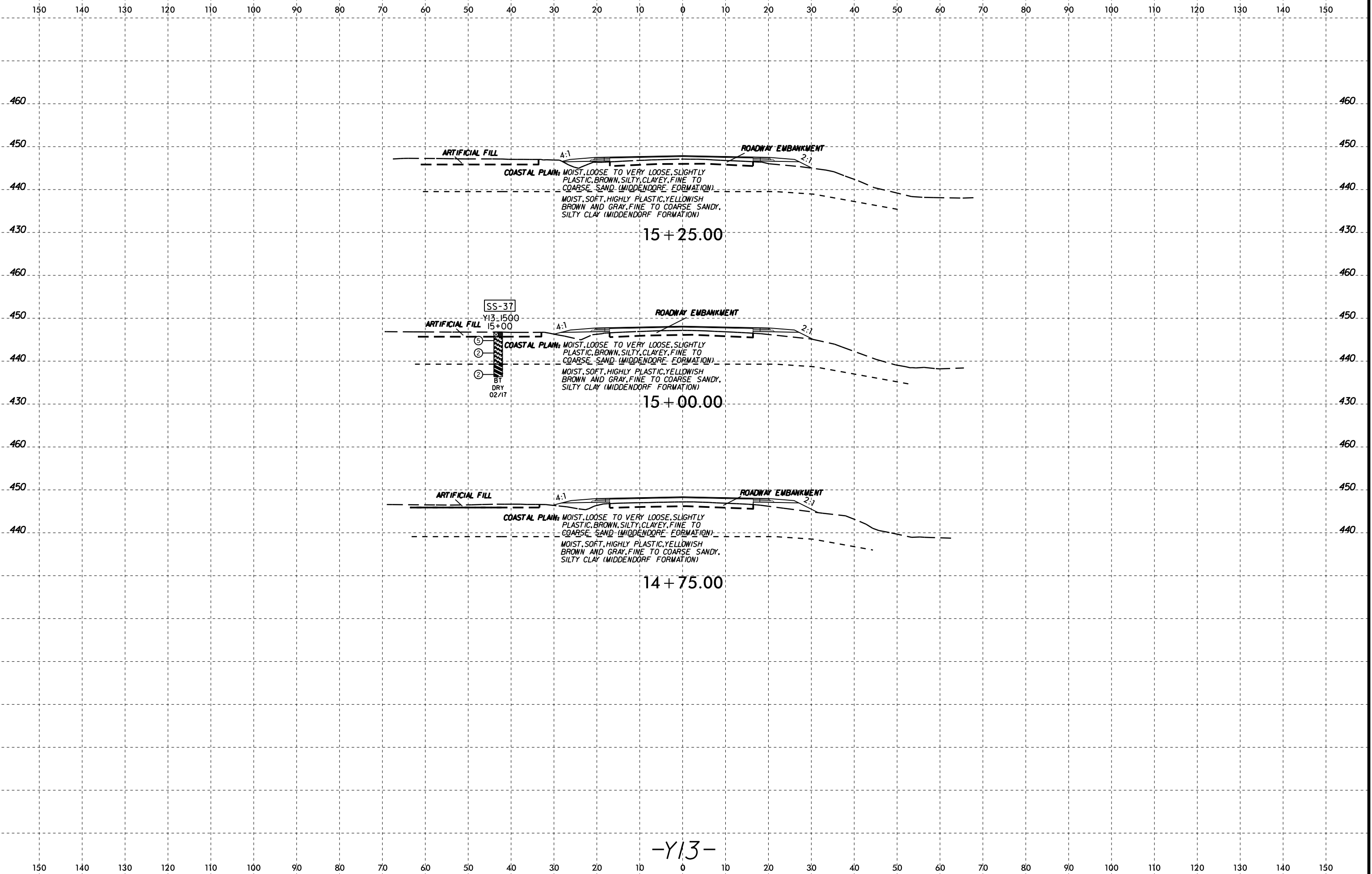


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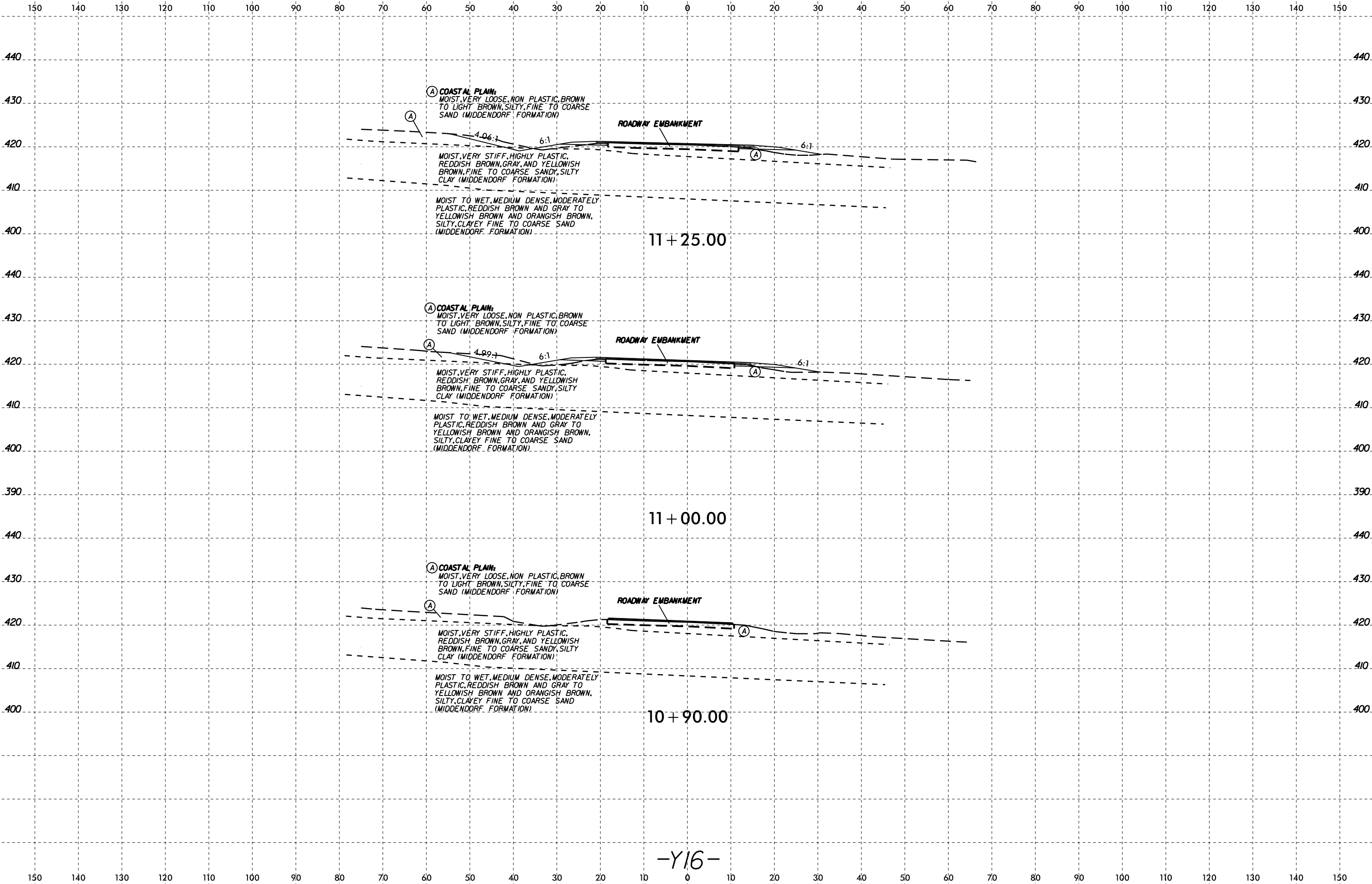
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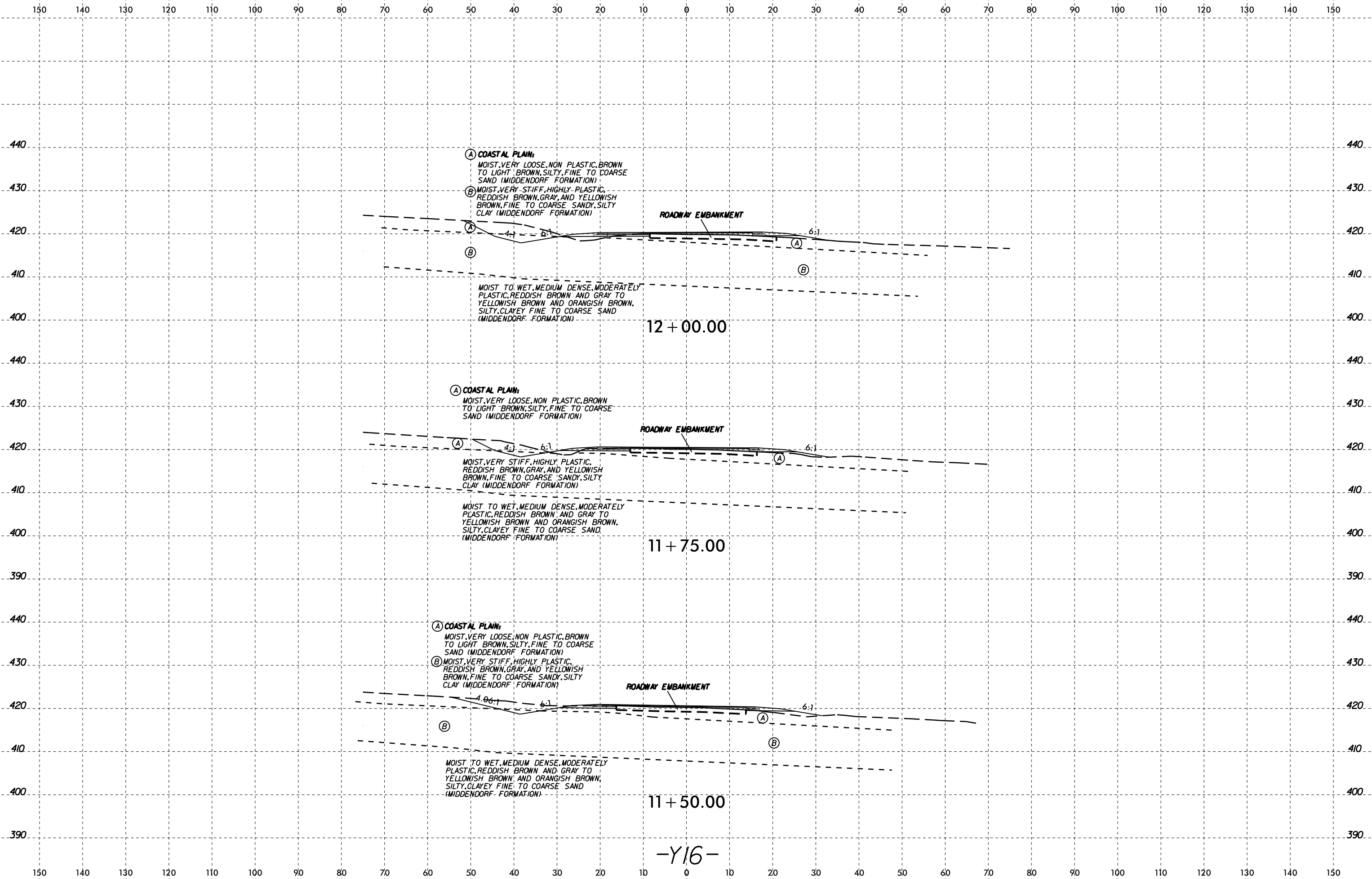
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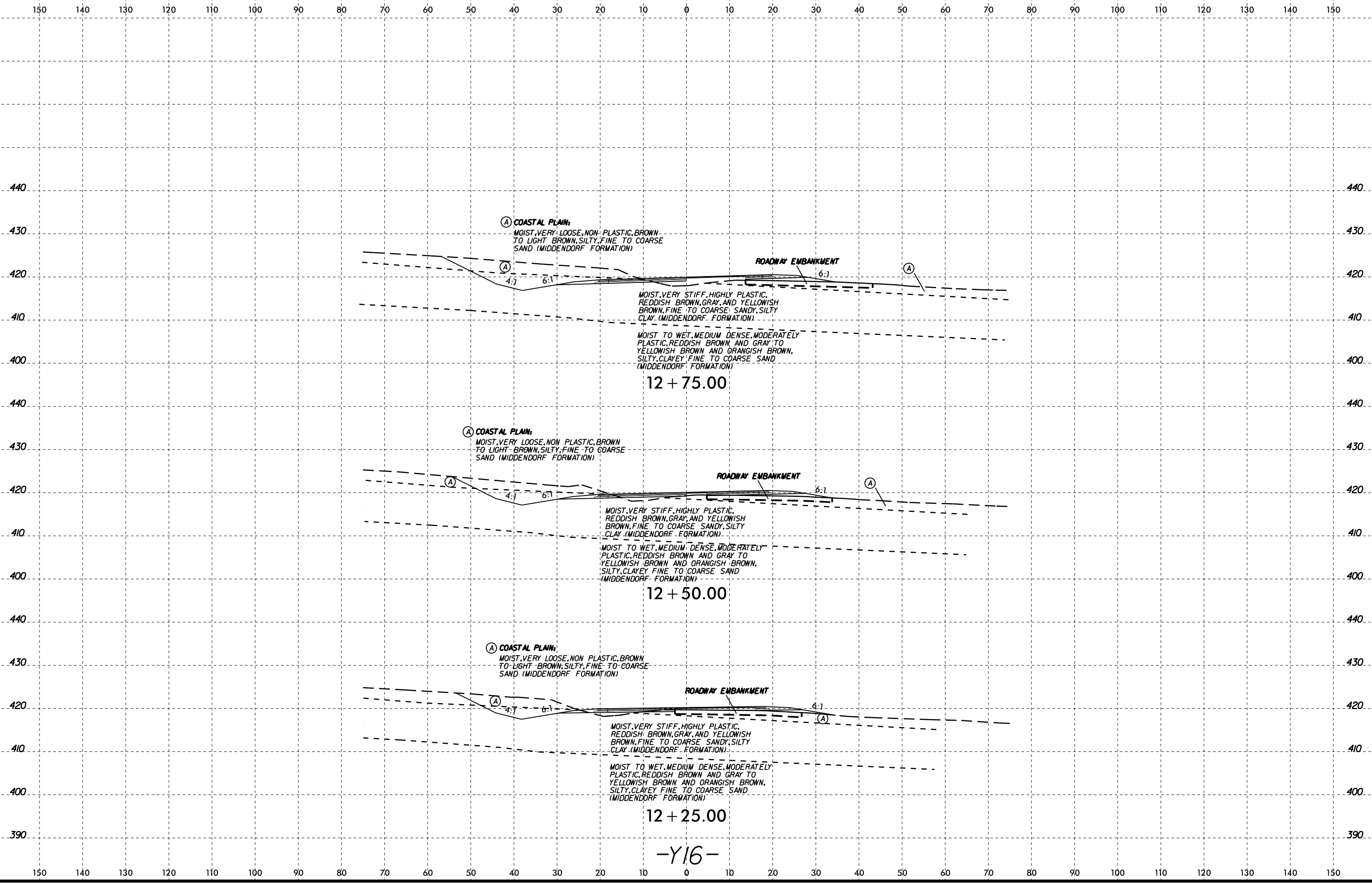
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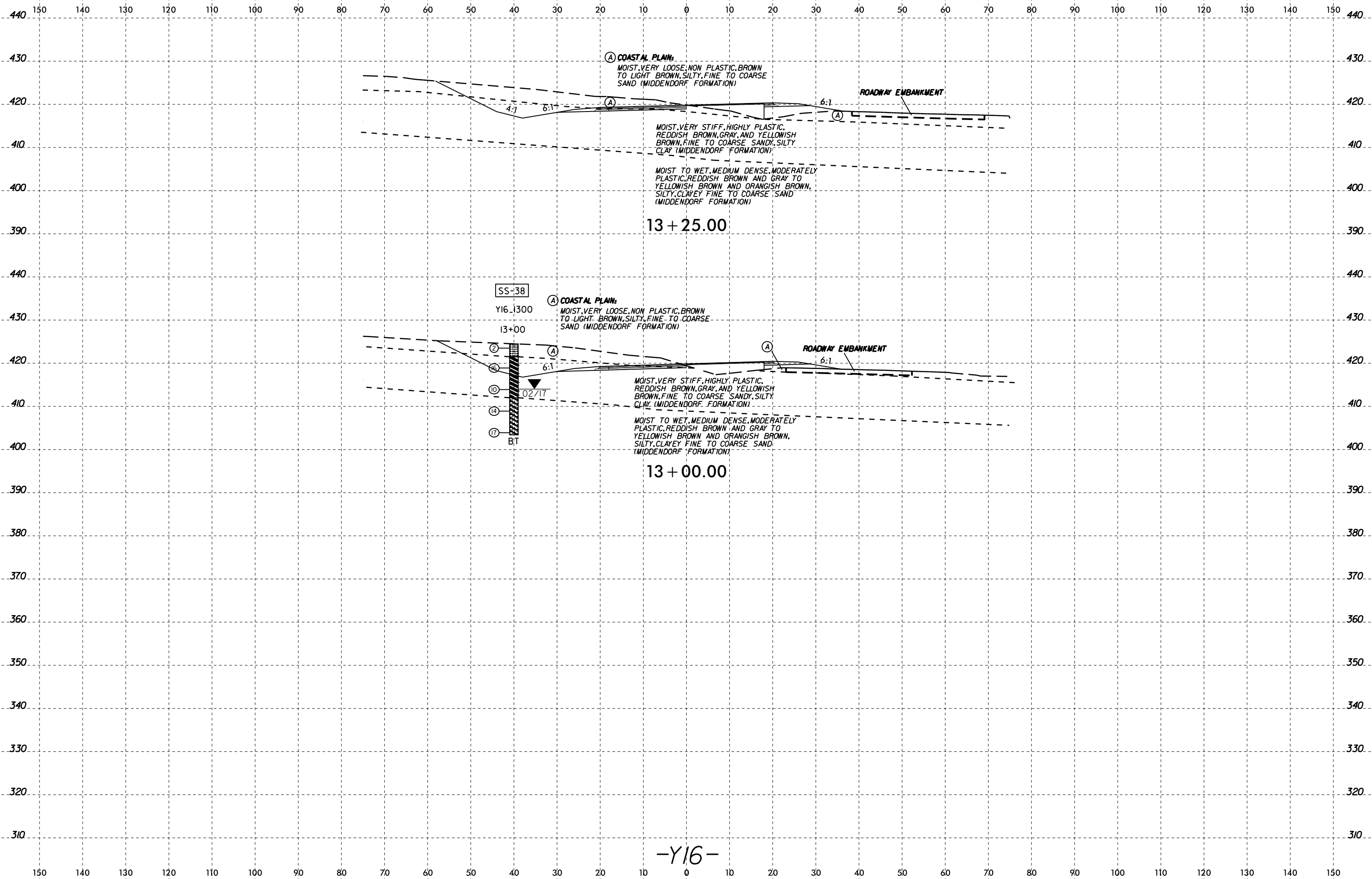


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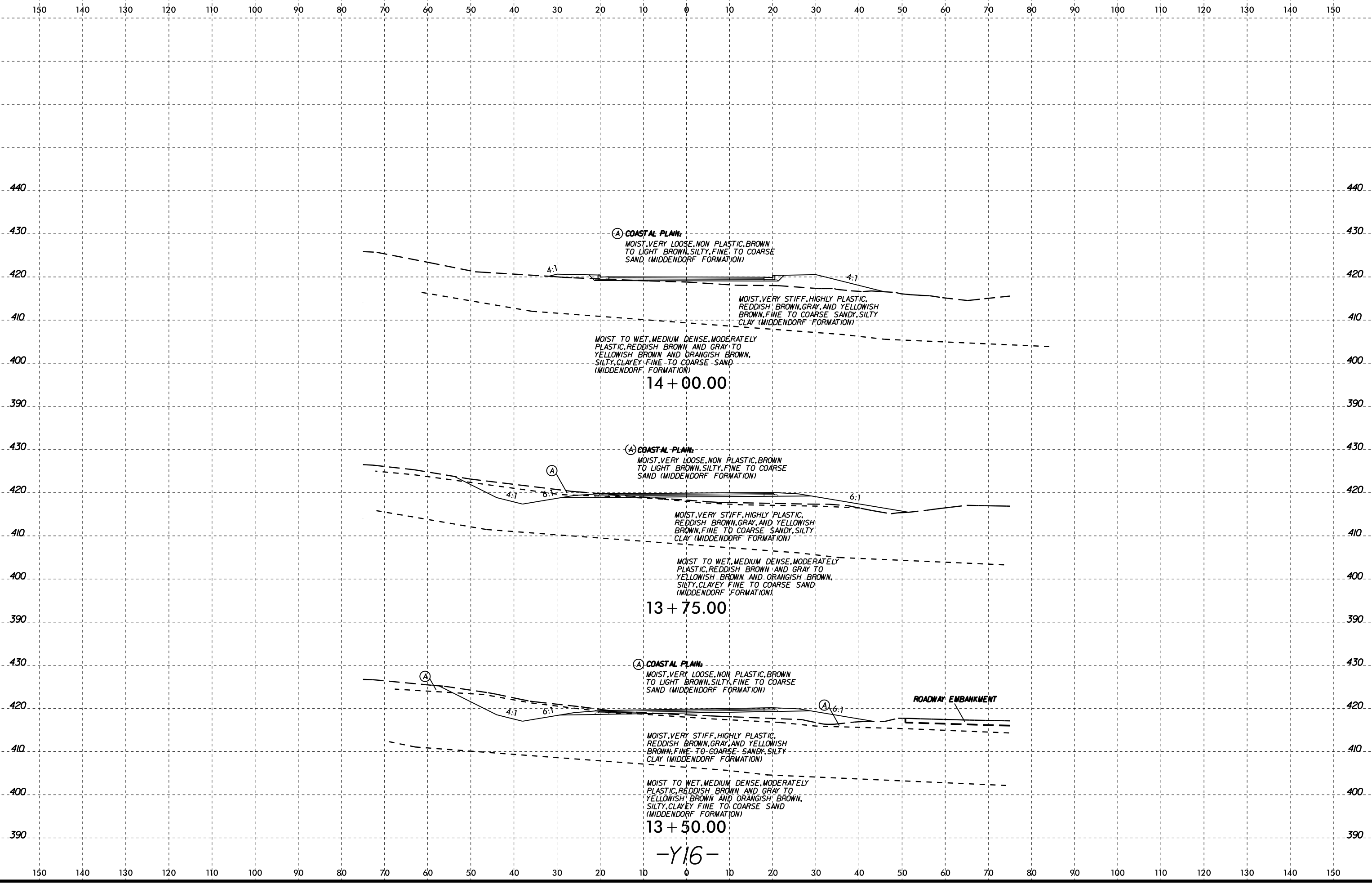
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-Y16-



-Y16-





(A) COASTAL PLAIN:  
 MOIST, VERY LOOSE, NON PLASTIC, BROWN  
 TO LIGHT BROWN, SILTY, FINE TO COARSE  
 SAND (MIDDENDORF FORMATION)

MOIST, VERY STIFF, HIGHLY PLASTIC,  
 REDDISH BROWN, GRAY, AND YELLOWISH  
 BROWN, FINE TO COARSE SANDY, SILTY  
 CLAY (MIDDENDORF FORMATION)

MOIST TO WET, MEDIUM DENSE, MODERATELY  
 PLASTIC, REDDISH BROWN AND GRAY TO  
 YELLOWISH BROWN AND ORANGISH BROWN,  
 SILTY, CLAYEY FINE TO COARSE SAND  
 (MIDDENDORF FORMATION)

14 + 00.00

(A) COASTAL PLAIN:  
 MOIST, VERY LOOSE, NON PLASTIC, BROWN  
 TO LIGHT BROWN, SILTY, FINE TO COARSE  
 SAND (MIDDENDORF FORMATION)

MOIST, VERY STIFF, HIGHLY PLASTIC,  
 REDDISH BROWN, GRAY, AND YELLOWISH  
 BROWN, FINE TO COARSE SANDY, SILTY  
 CLAY (MIDDENDORF FORMATION)

MOIST TO WET, MEDIUM DENSE, MODERATELY  
 PLASTIC, REDDISH BROWN AND GRAY TO  
 YELLOWISH BROWN AND ORANGISH BROWN,  
 SILTY, CLAYEY FINE TO COARSE SAND  
 (MIDDENDORF FORMATION)

13 + 75.00

(A) COASTAL PLAIN:  
 MOIST, VERY LOOSE, NON PLASTIC, BROWN  
 TO LIGHT BROWN, SILTY, FINE TO COARSE  
 SAND (MIDDENDORF FORMATION)

MOIST, VERY STIFF, HIGHLY PLASTIC,  
 REDDISH BROWN, GRAY, AND YELLOWISH  
 BROWN, FINE TO COARSE SANDY, SILTY  
 CLAY (MIDDENDORF FORMATION)

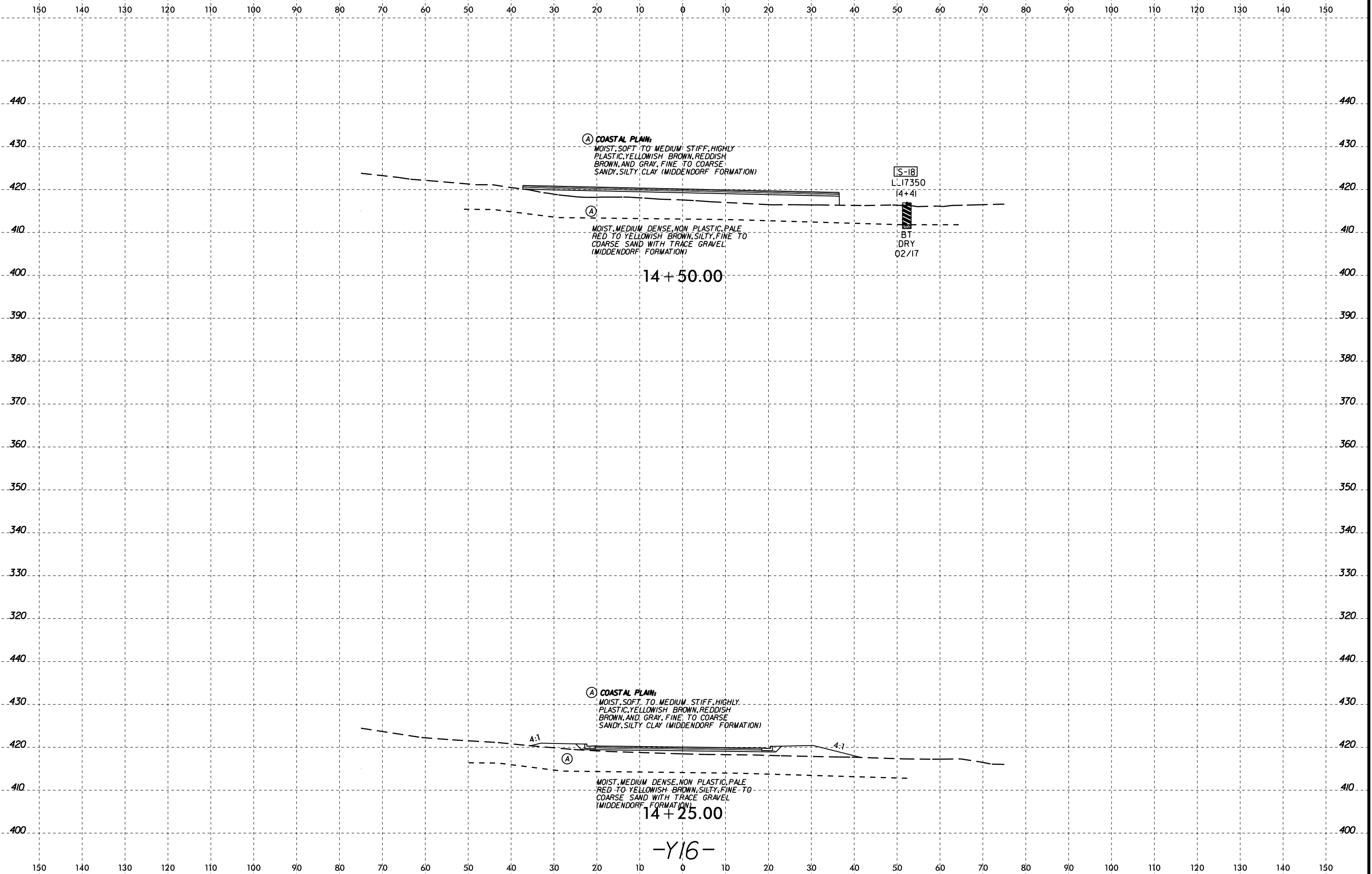
MOIST TO WET, MEDIUM DENSE, MODERATELY  
 PLASTIC, REDDISH BROWN AND GRAY TO  
 YELLOWISH BROWN AND ORANGISH BROWN,  
 SILTY, CLAYEY FINE TO COARSE SAND  
 (MIDDENDORF FORMATION)

13 + 50.00

ROADWAY EMBANKMENT

-Y16-

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Ⓐ **COASTAL PLAIN:**  
 MOIST, SOFT TO MEDIUM STIFF, HIGHLY  
 PLASTIC, YELLOWISH-BROWN, REDDISH  
 BROWN, AND GRAY, FINE TO COARSE  
 SANDY, SILTY CLAY (MIDDENDORF FORMATION)

Ⓐ  
 MOIST, MEDIUM DENSE, NON PLASTIC, PALE  
 RED TO YELLOWISH BROWN, SILTY, FINE TO  
 COARSE SAND WITH TRACE GRAVEL  
 (MIDDENDORF FORMATION)

S-18  
 LL17350  
 14+41  
 BT  
 DRY  
 02/17

14 + 50.00

Ⓐ **COASTAL PLAIN:**  
 MOIST, SOFT TO MEDIUM STIFF, HIGHLY  
 PLASTIC, YELLOWISH-BROWN, REDDISH  
 BROWN, AND GRAY, FINE TO COARSE  
 SANDY, SILTY CLAY (MIDDENDORF FORMATION)

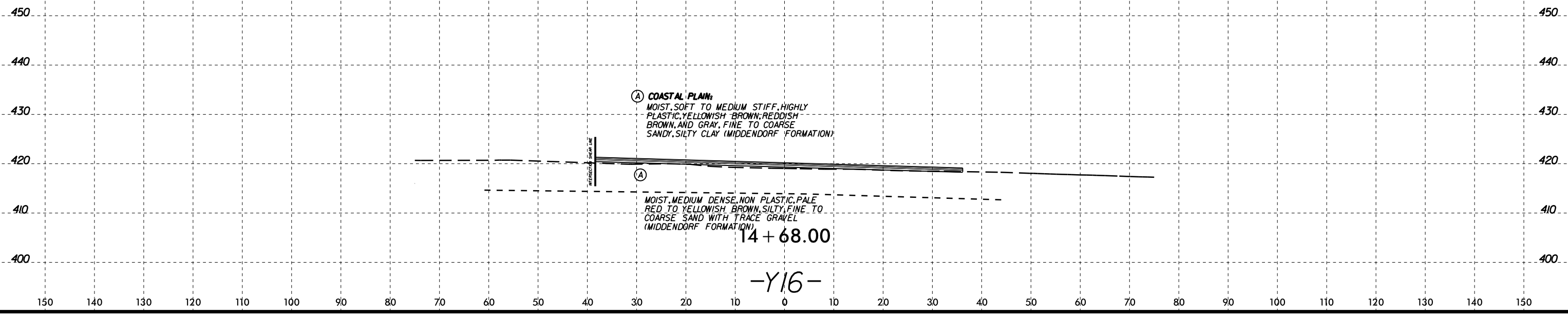
Ⓐ  
 MOIST, MEDIUM DENSE, NON PLASTIC, PALE  
 RED TO YELLOWISH BROWN, SILTY, FINE TO  
 COARSE SAND WITH TRACE GRAVEL  
 (MIDDENDORF FORMATION)

14 + 25.00

-Y16-

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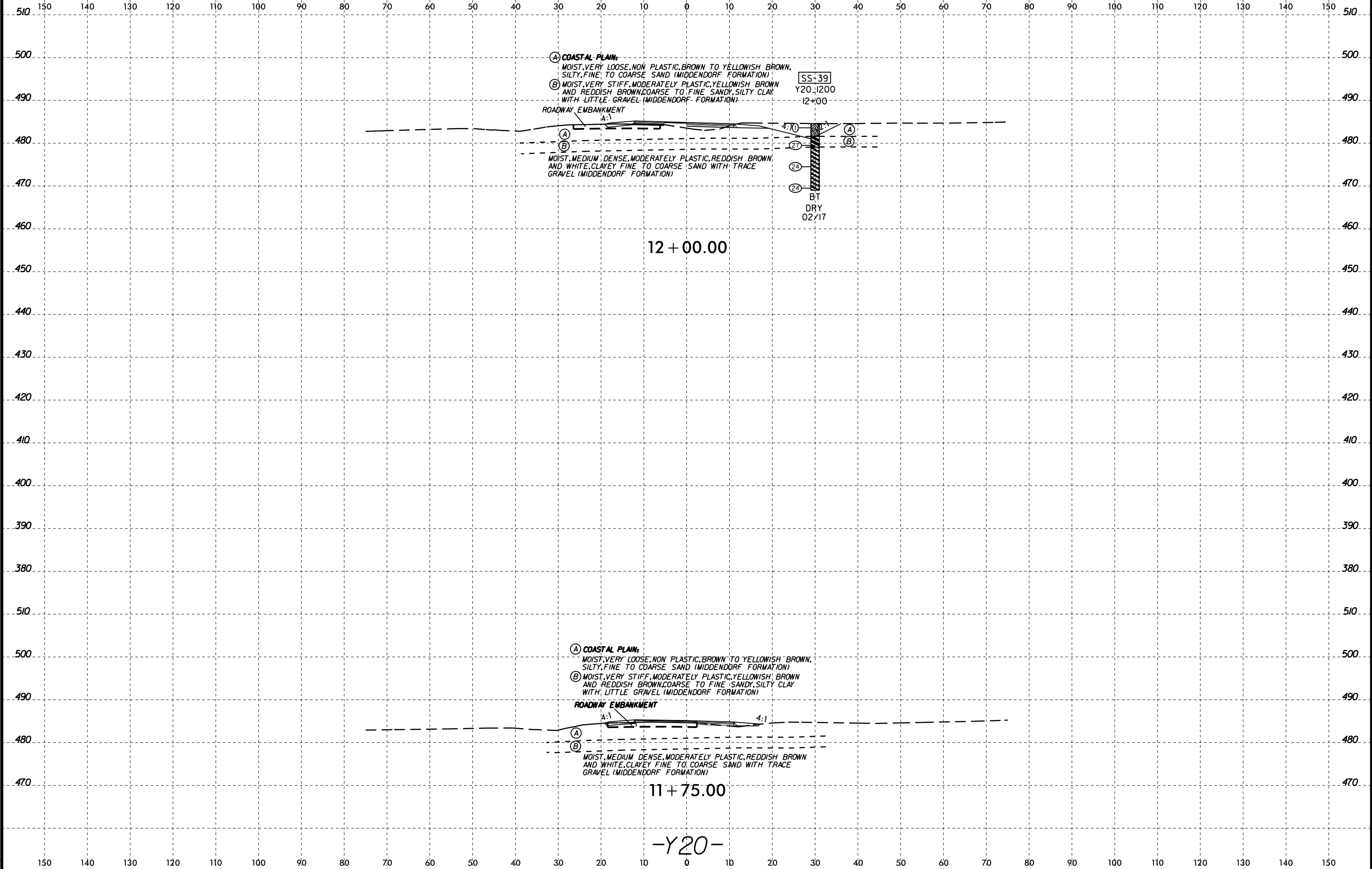
Ⓐ **COASTAL PLAIN**  
 MOIST, SOFT TO MEDIUM STIFF, HIGHLY  
 PLASTIC, YELLOWISH BROWN, REDDISH  
 BROWN, AND GRAY, FINE TO COARSE  
 SANDY, SILTY CLAY (MIDDENDORF FORMATION)

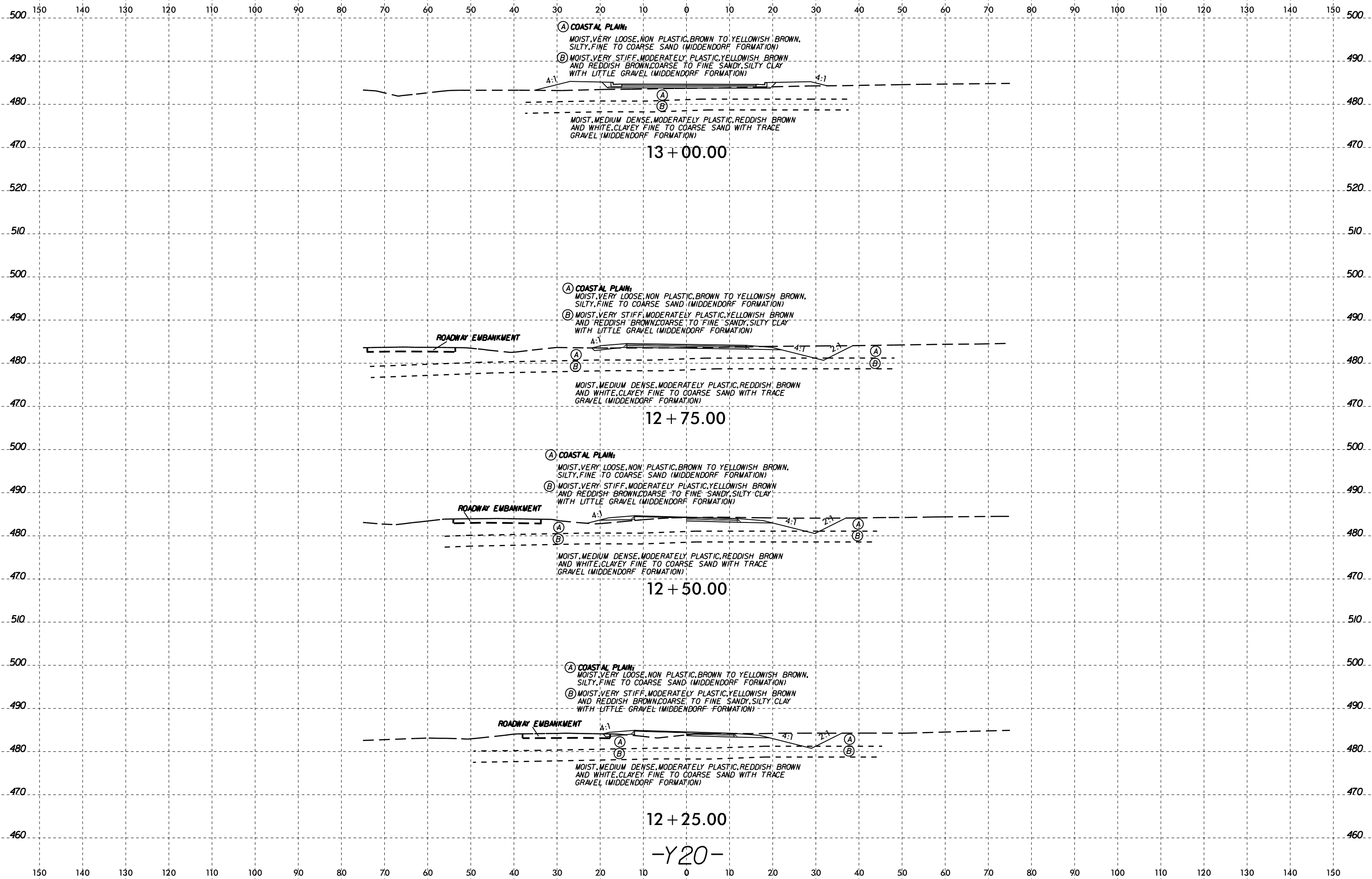
Ⓐ  
 MOIST, MEDIUM DENSE, NON PLASTIC, PALE  
 RED TO YELLOWISH BROWN, SILTY, FINE TO  
 COARSE SAND WITH TRACE GRAVEL  
 (MIDDENDORF FORMATION)

14 + 68.00

-Y16-

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-Y20-

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
GEOTECHNICAL ENGINEERING UNIT  
SUBSURFACE INVESTIGATION  
APPENDIX A  
LABORATORY RESULTS

REFERENCE: R-3830

PROJECT: 38887

TRW 5/12/17  
INITIALS DATE

SUMMARY OF LABORATORY TEST DATA

TIP NO. R-3830  
 COUNTY: Lee  
 NC-42 from US-421 to SR-1579 (Main Street) in Sanford and along SR-1579 from NC-42 to SR-1538 (E. Harrington Avenue) in Broadway

Sample No.	Boring Number	Station	Offset	Alignment	Sample Depth (ft.)	Natural Moisture Content (%)	AASHTO Class.	N-Value (blows/ ft.)	Atterberg Limits			Gradation Results							
									L.L.	P.L.	P.I.	Retained #4 Sieve	Pass #10 Sieve	Pass #40 Sieve	Pass #200 Sieve	Coarse Sand (%)	Fine Sand (%)	Silt (%)	Clay (%)
SS-1	L_1400	14+00	35' RT	-L-	3.9 - 5.4	--	A-7-6 (4)	19	41	16	25	0.1	99.0	68.8	37.2	42.7	22.0	7.4	28.0
SS-2	L_1566	15+66	64' RT	-L-	1.4 - 2.4	16.9	A-7-6 (6)	6	43	18	25	0.4	97.7	76.9	41.9	35.6	23.8	7.4	33.2
SS-3	L_1566	15+66	64' RT	-L-	3.9 - 5.4	--	A-7-6 (7)	22	44	17	27	0.5	98.3	76.2	45.1	36.3	20.1	9.4	34.2
SS-4	L_1850	18+50	40' LT	-L-	0.0 - 1.5	9.3	A-2-6 (0)	8	24	12	12	8.2	89.0	60.4	25.5	50.4	22.8	7.2	19.5
SS-5	L_2050	20+50	40' LT	-L-	3.9 - 5.4	15.0	A-7-6 (4)	25	44	17	27	0.1	99.4	79.5	35.5	39.2	26.7	3.4	30.7
SS-6	L_2450	24+50	40' LT	-L-	3.9 - 5.4	18.3	A-7-6 (15)	22	62	26	36	0.1	98.5	78.9	51.6	35.9	12.9	7.5	43.7
S-7	L_3965	39+65	59' RT	-L-	0.7 - 1.2	--	A-4 (4)	--	32	24	8	1.2	95.8	84.7	63.5	17.8	20.0	33.6	28.6
SS-8	L_4150	41+50	50' LT	-L-	1.0 - 2.5	--	A-7-6 (10)	10	55	26	29	0.1	98.5	78.7	48.8	33.4	18.7	7.0	40.9
SS-9	L_4755	47+55	52' RT	-L-	4.3 - 5.8	13.5	A-2-7 (1)	11	41	17	24	2.3	95.4	67.4	29.9	46.9	22.1	4.7	26.3
SS-10	L_7550	75+50	50' LT	-L-	0.0 - 1.5	--	A-2-6 (0)	3	23	12	11	8.0	87.9	68.8	30.7	36.3	31.3	8.5	24.0
S-11	L_7750	77+50	45' RT	-L-	1.5 - 2.0	--	A-7-5 (36)	--	77	47	30	0.0	99.8	97.9	89.3	3.4	10.0	35.8	50.8
SS-12	L_9150	91+50	40' RT	-L-	0.0 - 1.5	14.9	A-6 (4)	6	38	16	22	1.3	96.8	73.7	39.8	36.7	22.5	9.4	31.4
S-13	L_10550	105+50	50' LT	-L-	0.5 - 0.9	--	A-7-6 (9)	--	51	21	30	0.0	99.8	96.1	46.9	9.9	45.5	10.5	34.1
S-14	L_10750	107+50	60' RT	-L-	1.5 - 2.0	--	A-7-6 (16)	--	52	21	31	0.4	99.3	88.9	59.3	18.0	23.7	12.0	46.3
SS-15	L_12850	128+50	30' RT	-L-	4.0 - 5.5	18.9	A-2-7 (4)	28	61	31	30	2.0	95.2	53.2	35.1	54.4	8.7	5.9	31.0
SS-16	L_15350	153+50	40' RT	-L-	3.9 - 5.4	18.2	A-7-6 (4)	14	41	18	23	0.0	99.9	92.9	39.7	26.9	33.5	3.2	36.4
SS-17	L_16900	169+00	40' RT	-L-	4.2 - 5.7	8.5	A-2-4 (0)	10	24	14	10	0.3	95.9	56.4	27.1	53.3	18.8	9.6	18.3
S-18	L_17350	173+50	60' LT	-L-	0.5 - 0.9	--	A-7-5 (20)	--	63	32	31	0.0	99.8	88.6	64.8	20.3	17.7	14.3	47.7
SS-19	L_18350	183+50	37' LT	-L-	0.0 - 1.5	--	A-2-4 (0)	3	14	NP	NP	0.1	99.6	76.0	15.3	48.4	38.6	7.1	5.9
SS-20	L_18750	187+50	25' RT	-L-	0.0 - 1.5	20.8	A-6 (15)	2	37	20	17	0.3	98.8	96.7	87.3	2.5	9.5	59.1	29.0
SS-21	L_19150	191+50	35' LT	-L-	0.0 - 1.5	--	A-2-4 (0)	5	15	NP	NP	1.5	95.5	67.2	26.4	46.1	29.6	9.2	15.1
SS-22	L_19350	193+50	40' RT	-L-	3.1 - 4.6	12.9	A-7-6 (6)	27	55	21	34	0.4	97.6	63.3	38.1	45.5	15.7	8.6	30.2
SS-23	L_19550	195+50	37' RT	-L-	3.9 - 5.4	16.3	A-7-6 (6)	21	51	27	24	1.4	97.7	73.7	43.8	34.8	20.7	10.1	34.4
SS-24	L_20150	201+50	37' RT	-L-	4.1 - 5.6	29.3	A-7-6 (48)	8	83	28	55	0.0	100.0	96.3	79.8	4.7	15.6	18.9	60.9
SS-25	L_20300	203+00	37' RT	-L-	4.3 - 5.1	18.1	A-7-6 (8)	8	54	25	29	4.9	91.5	68.4	44.5	34.1	17.4	11.1	37.4
SS-26	L_21700	217+00	40' LT	-L-	3.9 - 5.4	19.2	A-7-6 (5)	31	48	25	23	0.6	96.6	68.1	41.0	42.8	17.1	10.8	29.3
SS-27	L_22100	221+00	37' LT	-L-	3.9 - 5.4	10.2	A-2-6 (3)	17	40	16	24	0.0	98.7	76.0	34.4	38.6	28.9	5.2	27.4
SS-28	L_23300	233+00	37' RT	-L-	0.0 - 1.5	8.8	A-2-6 (0)	13	38	20	18	28.1	61.8	37.0	19.5	50.1	18.4	6.6	24.9
SS-29	L_25300	253+00	40' LT	-L-	0.0 - 1.5	10.9	A-2-7 (4)	14	50	21	29	13.0	80.3	54.9	35.1	42.0	16.1	4.5	37.4
S-30	L_27100	271+00	30' LT	-L-	0.2 - 0.6	--	A-7-6 (12)	--	57	25	32	11.1	85.9	71.9	49.7	28.2	15.6	6.7	49.5
SS-31	L_29100	291+10	44' LT	-L-	0.0 - 1.5	--	A-6 (4)	9	36	15	21	6.8	91.3	74.1	40.4	32.8	25.0	6.7	35.5
SS-32	L_29913	299+13	46' LT	-L-	0.0 - 1.5	6.4	A-2-4 (0)	20	22	15	7	25.7	65.8	42.8	20.6	45.9	23.7	11.7	18.7
S-33	L_30300	303+00	30' LT	-L-	1.0 - 1.5	--	A-6 (6)	--	37	17	20	4.7	93.6	77.6	49.4	28.8	20.5	10.4	40.3
S-34	Y3_1800	18+00	40' LT	-Y3-	0.8 - 1.2	--	A-6 (5)	--	36	16	20	0.4	97.6	78.5	46.1	32.3	22.8	7.3	37.6
SS-35	Y5_1200	12+00	35' RT	-Y5-	4.0 - 5.5	17.2	A-2-7 (3)	15	48	20	28	0.0	99.8	67.5	34.5	54.2	11.3	3.1	31.4
SS-36	Y8_1075	10+75	28' LT	-Y8-	4.1 - 5.6	13.4	A-7-6 (9)	17	49	23	26	0.5	98.3	82.5	50.4	23.3	28.1	7.7	41.0
SS-37	Y13_1500	15+00	43' LT	-Y13-	1.0 - 2.5	10.9	A-2-6 (0)	5	31	16	15	1.3	94.2	53.2	25.1	54.7	18.9	6.0	20.5
SS-38	Y16_1300	13+00	40' LT	-Y16-	4.6 - 6.1	33.6	A-7-5 (35)	16	92	32	60	0.1	99.7	76.9	61.5	30.2	9.2	9.1	51.4
SS-39	Y20_1200	12+00	30' RT	-Y20-	4.1 - 5.6	--	A-7-5 (3)	27	49	31	18	9.6	81.0	61.8	39.5	34.9	18.2	8.5	38.4
SS-40	RW1-3	21+44	54' RT	-L-	0.0 - 1.5	--	A-6 (2)	7	34	14	20	4.1	93.6	68.6	35.8	42.7	20.9	4.7	31.7