

REFERENCE: BR-0035

PROJECT: 67035

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.	BR-0035	1	21

**CAUTION NOTICE**

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

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

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

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

PERSONNEL

C. DRISCOLL

HPC LAND SERVICES

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\_\_\_\_\_  
\_\_\_\_\_

INVESTIGATED BY C. DRISCOLL  
DRAWN BY S. PAPKE/C. DRISCOLL  
CHECKED BY T. WELLS  
SUBMITTED BY KLEINFELDER, INC.  
DATE JULY 2019

**CONTENTS**

LINE	STATION	PLAN	PROFILE
-L-	11+80.00 - 29+00.00	4-5	N/A
-DR1-	10+40.00 - 11+62.52	4	N/A
-DR2-	10+00.00 - 11+30.29	4	N/A
-DR3-	10+00.00 - 12+12.40	5	N/A

**CROSS SECTIONS**

LINE	STATION	SHEETS
-L-	13+00.00 - 28+50.00	6-17

**APPENDICES**

APPENDIX	TITLE	SHEETS
A	LABORATORY RESULTS	18-19

# ROADWAY SUBSURFACE INVESTIGATION

COUNTY MOORE  
PROJECT DESCRIPTION BRIDGE NO. 24 ON NC 22  
OVER NICKS CREEK

## INVENTORY

Prepared in the Office of:



DocuSigned by:  
Thomas R. Wells 8/13/2019

7DA5D2D0518E4F0 SIGNATURE DATE

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



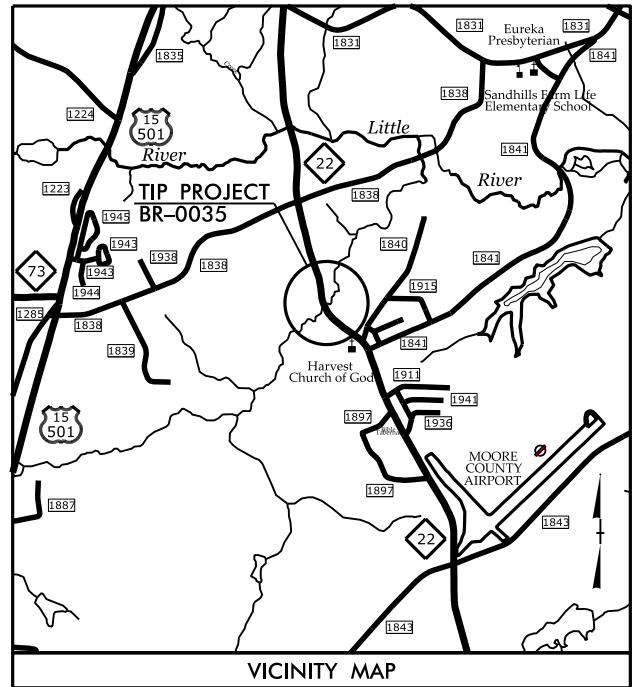
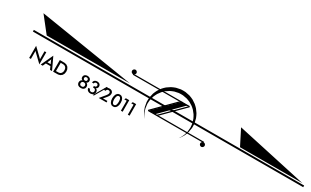
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BR-0035	3	21
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
67035.1.1		P.E.	

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**MOORE COUNTY**

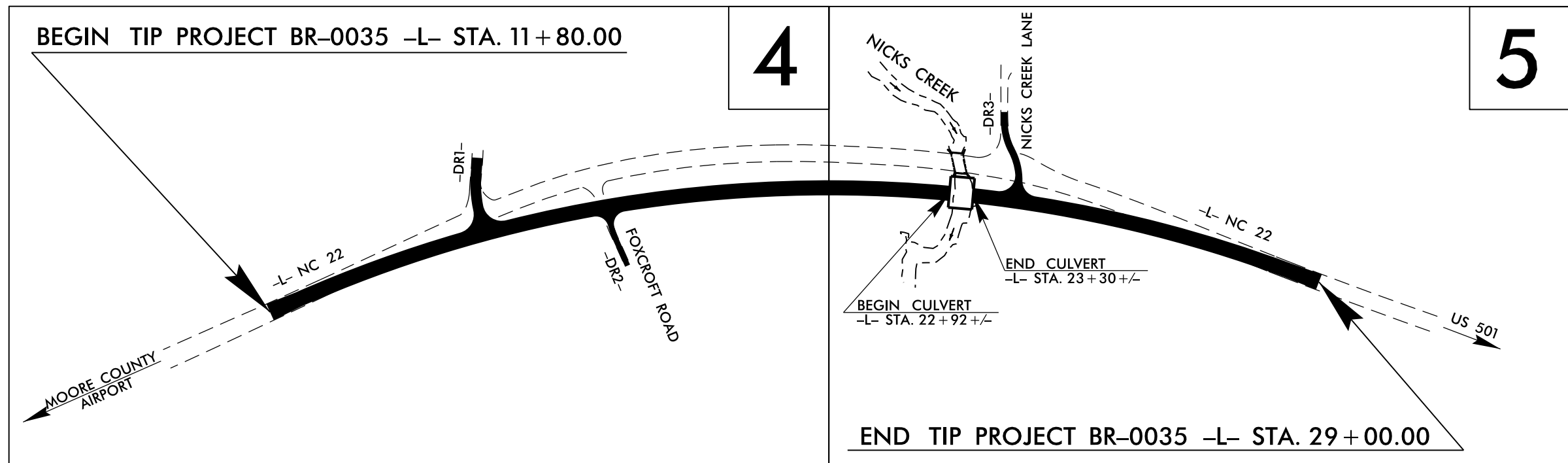
LOCATION: BRIDGE NO. 24 ON NC 22 OVER NICKS CREEK

TYPE OF WORK: GRADING, DRAINAGE, PAVING AND CULVERT



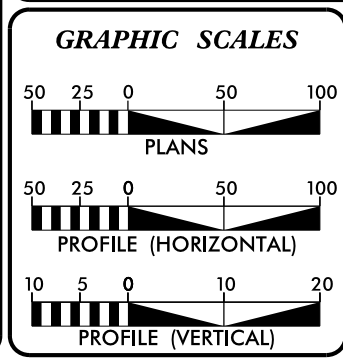
**TIP PROJECT: BR-0035**

**CONTRACT: 67035**



THIS PROJECT HAS NO CONTROLLED-ACCESS.  
THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES.  
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD

**INCOMPLETE PLANS**  
DO NOT USE FOR R/W ACQUISITION  
DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED



**DESIGN DATA**

ADT 2020 =	6650
ADT 2040 =	8000
K =	11 %
D =	60 %
T =	4 % *
V =	60 MPH
* TTST=1% DUAL=3%	
FUNC CLASS =	MINOR ARTERIAL
	STATEWIDE TIER

**PROJECT LENGTH**

LENGTH OF ROADWAY TIP PROJECT BR-0035	=	0.319 MI
LENGTH OF STRUCTURE TIP PROJECT BR-0035	=	0.007 MI
TOTAL LENGTH OF TIP PROJECT BR-0035	=	0.326 MI

Prepared in the Office of:  
**DIVISION OF HIGHWAYS**  
1000 Birch Ridge Dr., Raleigh NC, 27610

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: AUGUST 30, 2019

LETTING DATE: JULY 21, 2020

TATIA L. WHITE, PE, PLS

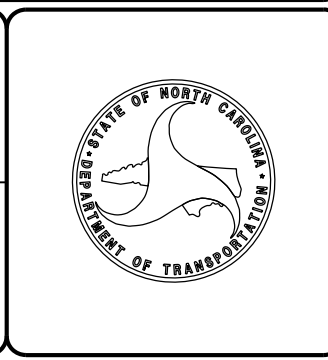
PIOTR J. STOJDA  
PROJECT TEAM LEAD

HYDRAULICS ENGINEER

SIGNATURE: \_\_\_\_\_ P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: \_\_\_\_\_ P.E.



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July 15, 2019

STATE PROJECT: 67035.1.1 (BR-0035)  
 COUNTY: Moore  
 DESCRIPTION: Bridge No. 24 on NC 22 over Nicks Creek

**SUBJECT: GEOTECHNICAL REPORT - INVENTORY**

**PROJECT DESCRIPTION**

This project consists of a realignment of existing NC 22 (-L-) and replacement of a culvert structure for Nicks Creek.

The geotechnical investigation was conducted in May 2019. Standard Penetration Test borings were advanced with a Diedrich D50 drill rig with an automatic hammer. Hand Augers were also performed in areas where the use of a drill rig was restricted due to the presence of underground or overhead utilities. 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 0.32 miles, were investigated. Plan sheets and cross sections of these alignments are included in this report.

<u>LINE</u>	<u>STATIONS</u>
-L-	11+80 to 29+00

**PHYSIOGRAPHY AND GEOLOGY**

The project extends from the Piedmont Physiographic Province in the north to the Coastal Plain Physiographic Province in the south. The project corridor is comprised primarily of rural or countryside settings. The general topography along the project is generally sloping with rolling hills.

Geologically, the soils in the northern project area are located within the Eastern Slate Belt. Soils are derived from the underlying bedrock which consists of phyllite. The southern project corridor consists of Coastal Plain soils belonging to the Middendorf Formation consisting of sand, sandstone, and mudstone with clay balls and iron-cemented concretions.

The project site generally drains from the north and south towards Nicks Creek which extends from the east to west and bisects NC 22. A lake is also present upstream of NC 22 which drains into Nicks Creek. Surface water is drained from the corridor along the existing roadway ditches.

**SOIL PROPERTIES**

Soils encountered during this investigation are separated into five categories based on origin. They consist of roadway embankment, artificial fill, alluvial soil, Coastal Plain soil, and residual soil.

Roadway Embankment soils are present along the existing roadways on the project. The roadway embankment encountered generally consists of moist, medium dense, silty sands (A-2-4). The roadway embankment soils have a maximum thickness of 6 feet in the areas investigated.

Artificial fill is present along the existing drives. These soils were not sampled as part of our investigation. Alluvial soils are present along the existing creeks on the project. The alluvial soils encountered generally consists of moist to wet, very loose to loose, silty sands (A-2-4, A-2-5) and moist to saturated, soft, sandy silts (A-4).

Coastal Plain soils are derived from the Middendorf formation. The Coastal Plain soils generally consist of moist to wet, very loose to medium dense, silty sands and clayey sands (A-2-4, A-2-6), saturated, hard, silty clay (A-7), and moist, stiff, sandy silt (A-4). The Coastal Plain soil thickness ranges from 2 feet to greater than 20 feet in the areas investigated. The plasticity index of the Coastal Plain soil tested ranged from 17 to 21.

Residual soils are derived from the weathering of underlying phyllite. The majority of the residual soils encountered consist of saturated to moist, medium stiff to hard, sandy silts, sandy clays, and silty clays (A-4, A-6, A-7), and moist, very loose to loose, silty sands (A-2-4, A-2-5). The plasticity index of the residual clay tested is 17.

**ROCK PROPERTIES**

Weathered rock was encountered along the existing roadways (-L-) at elevations ranging from 301.0 to 329.5 feet (MSL). Crystalline bedrock was encountered along the existing roadways (-L-) at elevations ranging from 298.3 to 309.1 feet (MSL). The weathered rock and crystalline bedrock consist of phyllite.

**GROUNDWATER**

Groundwater was encountered at elevations ranging from 307.2 to 353.1 feet and typically ranges from 2 to 6 feet below the existing ground surface.

**AREAS OF SPECIAL GEOTECHNICAL INTEREST**

- 1) Moderately to Highly Plastic Soils: Moderate to Highly Plastic soils (PI > 15) were encountered on the project at the following locations:

<u>LINE</u>	<u>STATIONS</u>	<u>OFFSETS</u>
-L-	13+75 to 15+75	RT
-L-	27+25 to 28+25	LT

A discussion of these moderately to highly plastic soils is located 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>	<u>OFFSETS</u>
-L-	11+80 to 13+50	LT, RT
-L-	18+50 to 26+50	LT, RT

3) Alluvial Soil: Soft and very loose to loose alluvial soils were encountered on the project at the following locations:

<u>LINE</u>	<u>STATIONS</u>	<u>OFFSETS</u>
-L-	11+80 to 12+50	LT, RT
-L-	18+25 to 23+75	LT, RT
-L-	28+50 to 29+00	LT, RT

Prepared by,  
**KLEINFELDER, INC.**  
NC License No. F-1312



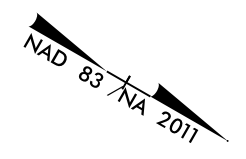
F. Christopher Driscoll, GIT  
Staff Professional



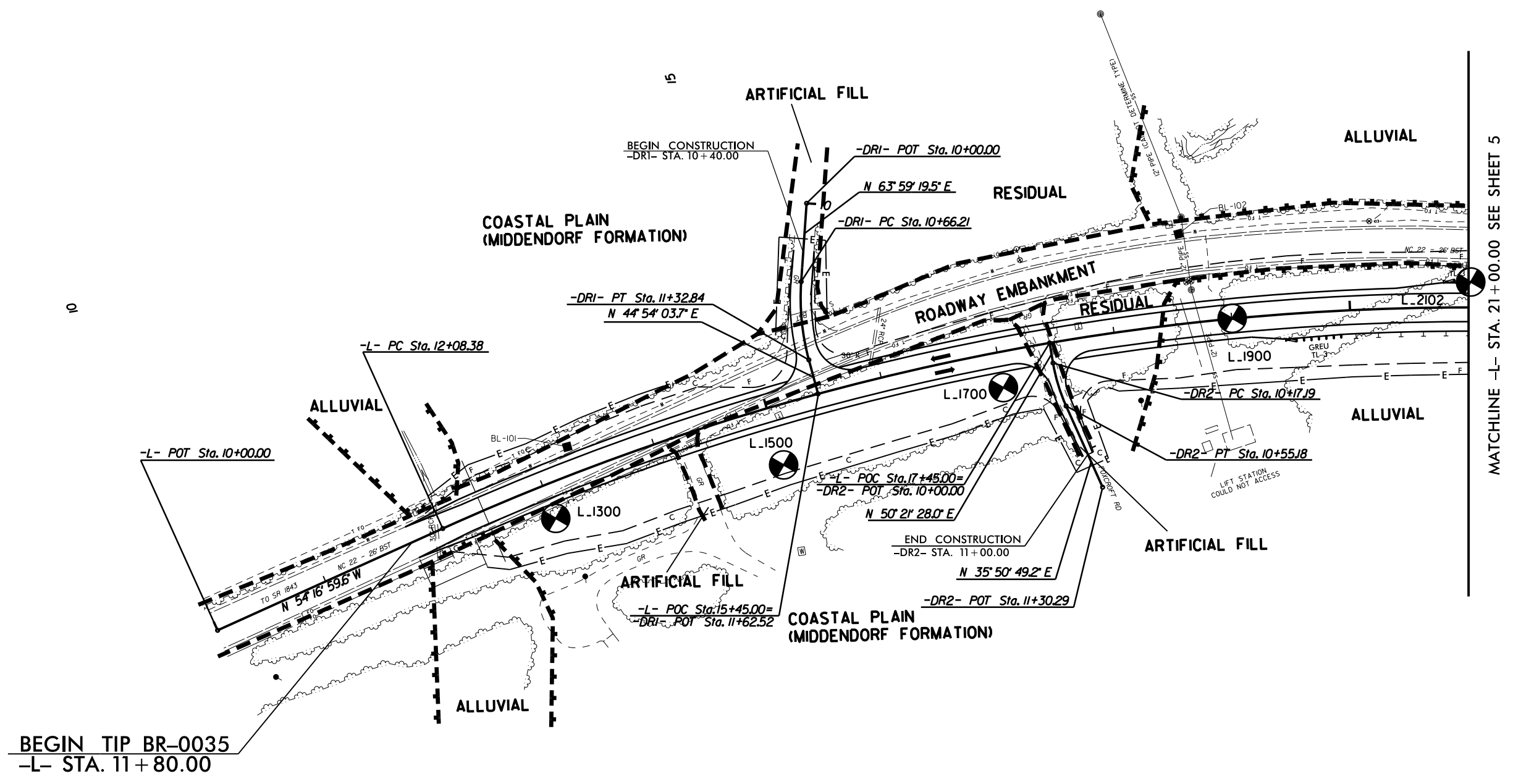
Thomas R. Wells, PE  
Senior Professional

FCD/TRW:cas

PROJECT REFERENCE NO.	SHEET NO.
BR-0035	4
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR A/W ACQUISITION	
<b>DOCUMENT NOT CONSIDERED FINAL</b> <b>UNLESS ALL SIGNATURES COMPLETED</b>	



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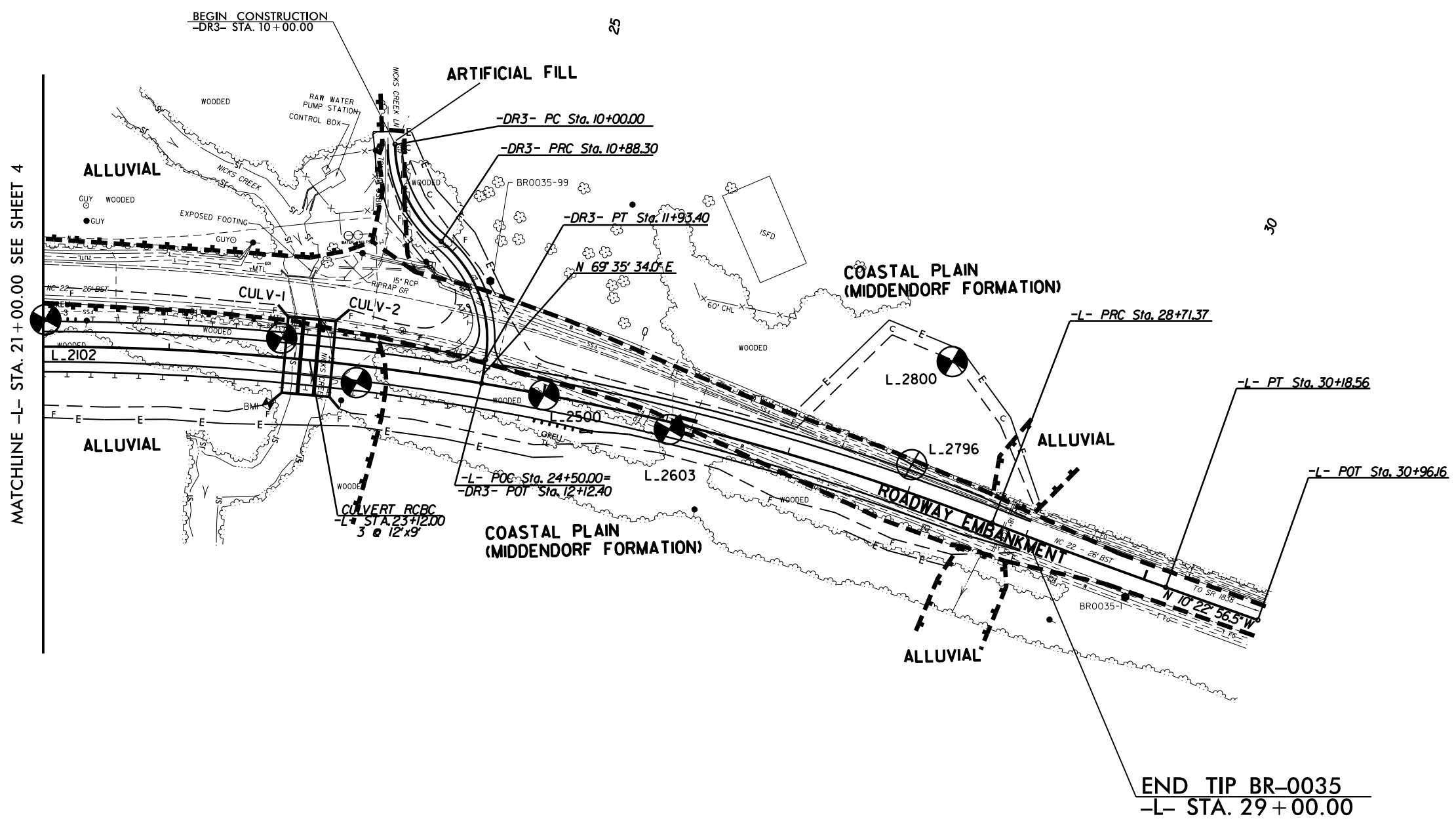
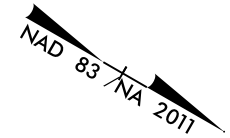
MATCHLINE -L- STA. 21 + 00.00 SEE SHEET 5

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BEGIN TIP BR-0035  
-L- STA. 11+80.00

PROJECT REFERENCE NO.	SHEET NO.
BR-0035	5
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR A/W ACQUISITION	
<b>DOCUMENT NOT CONSIDERED FINAL</b> <b>UNLESS ALL SIGNATURES COMPLETED</b>	



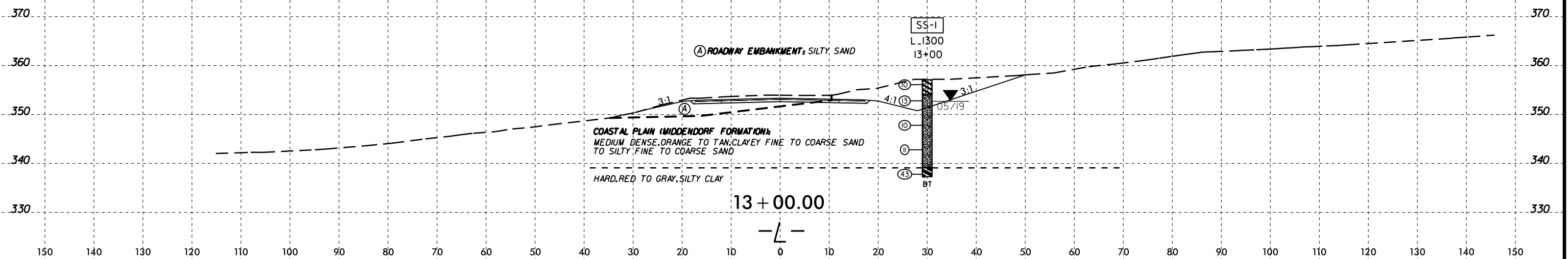
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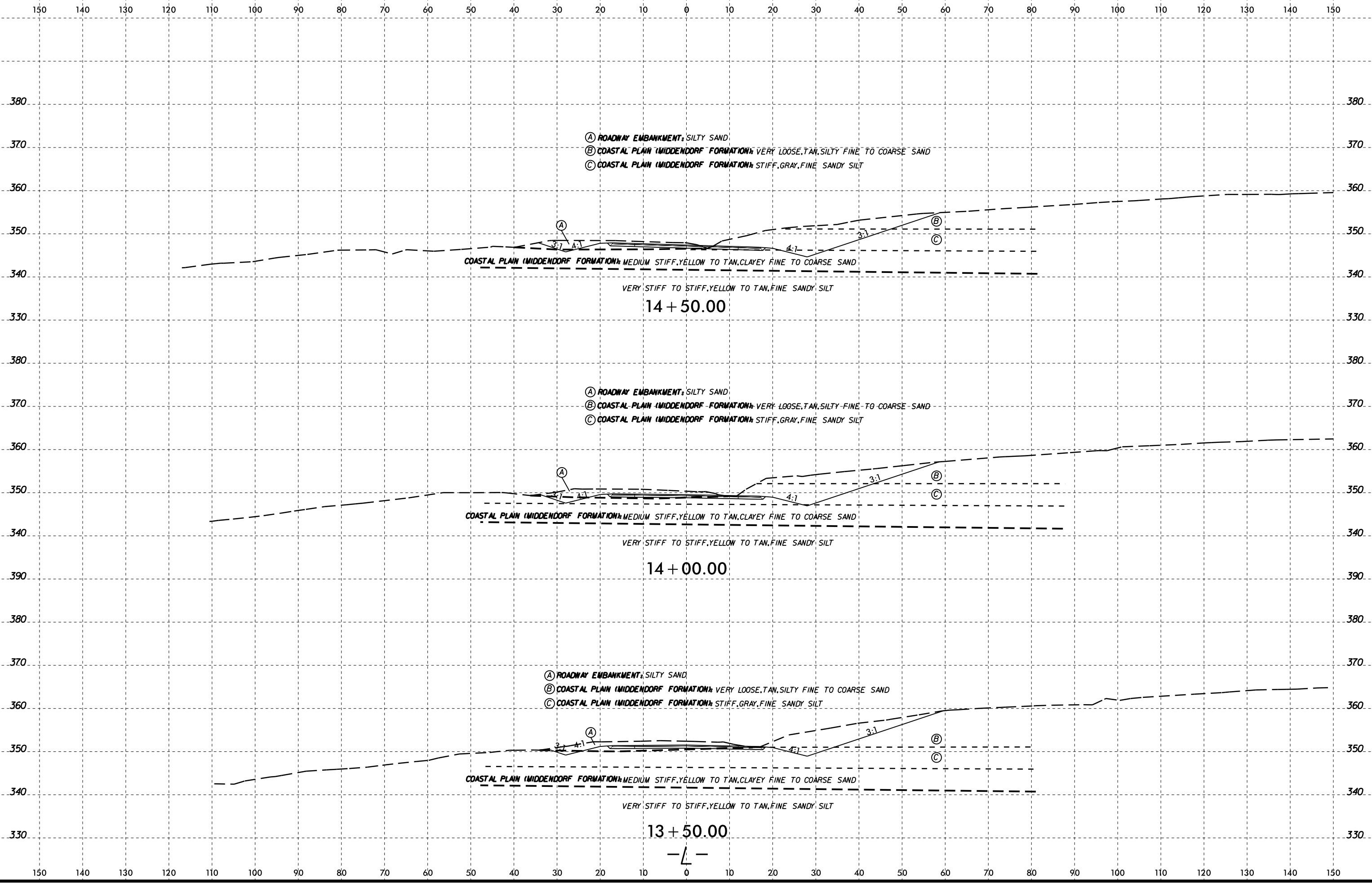


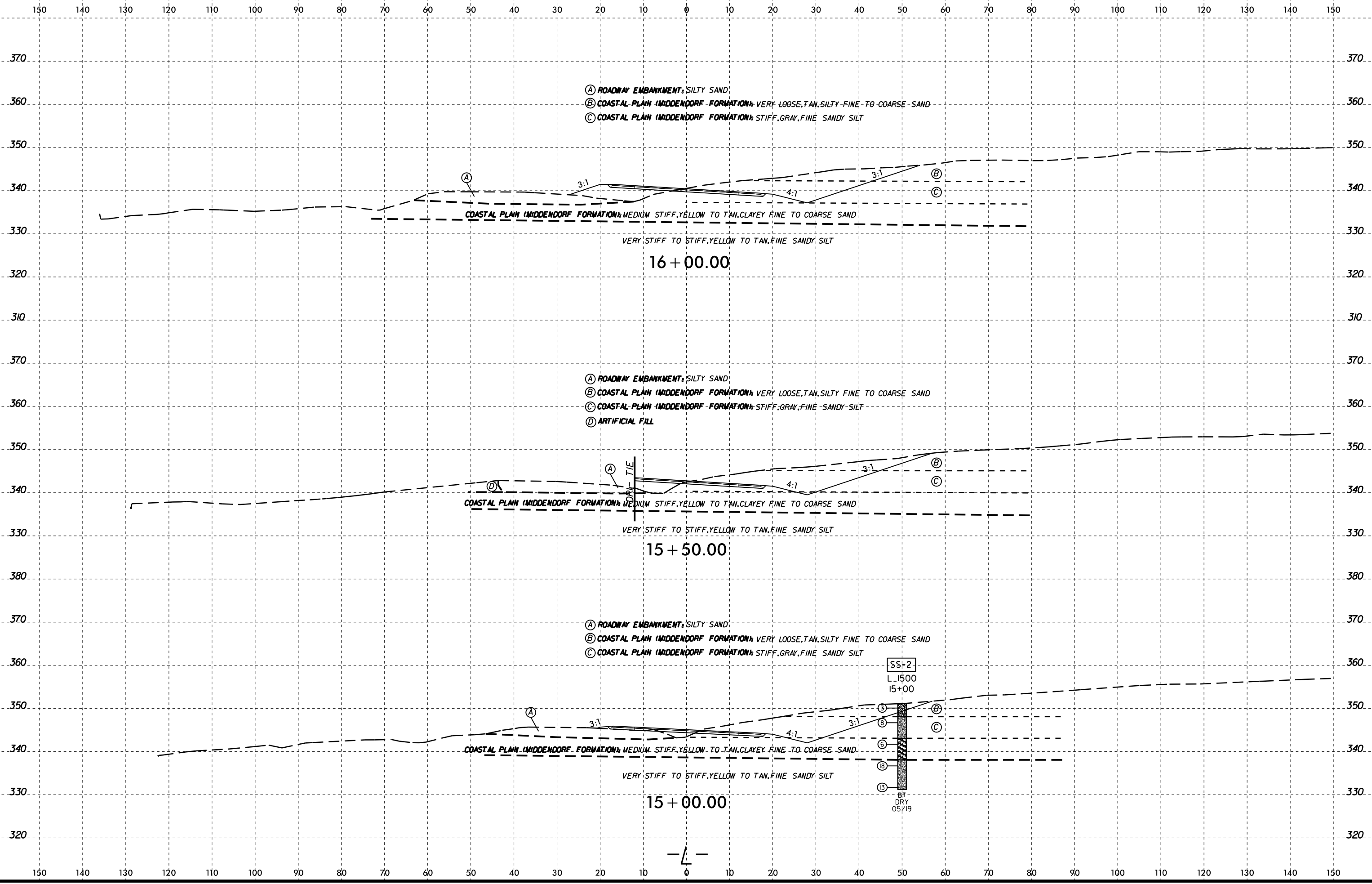
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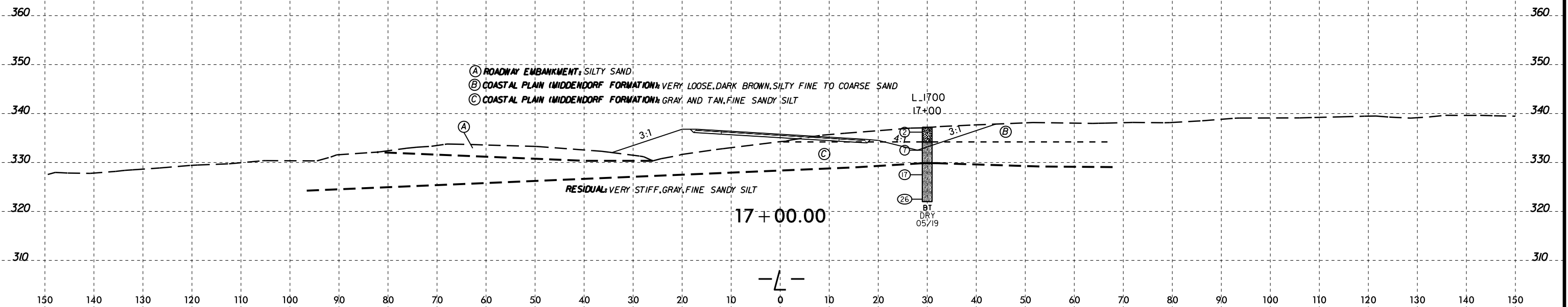




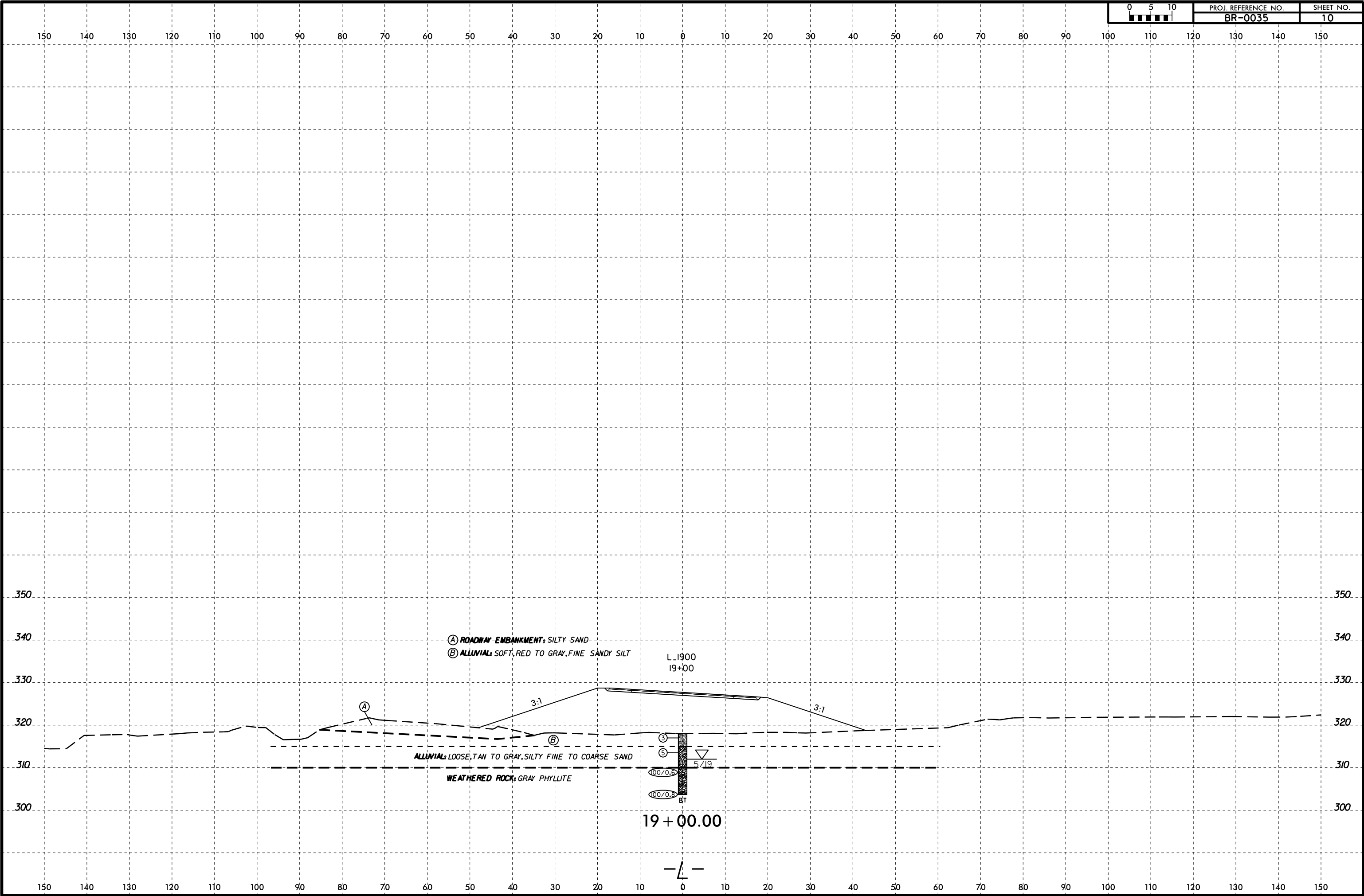
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 Wells - At KA211387



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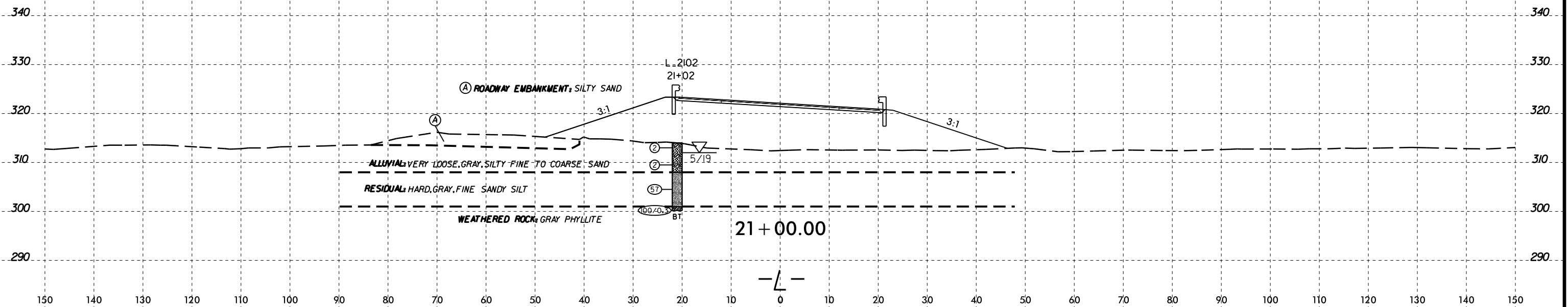
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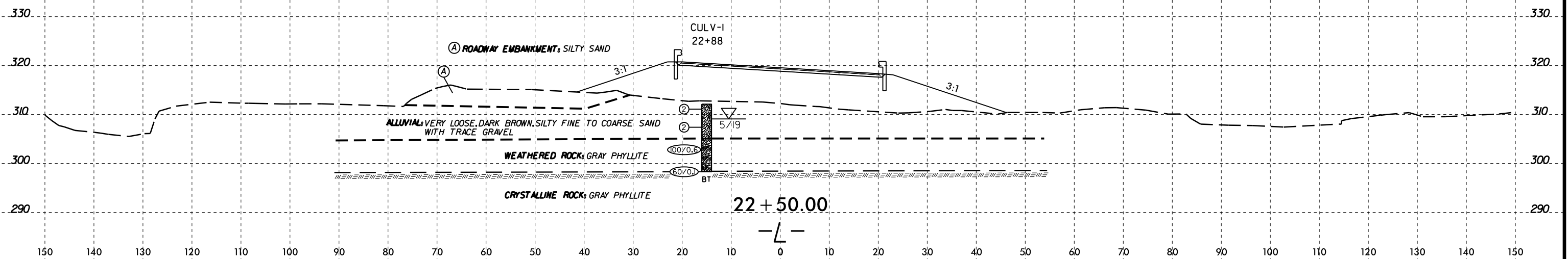


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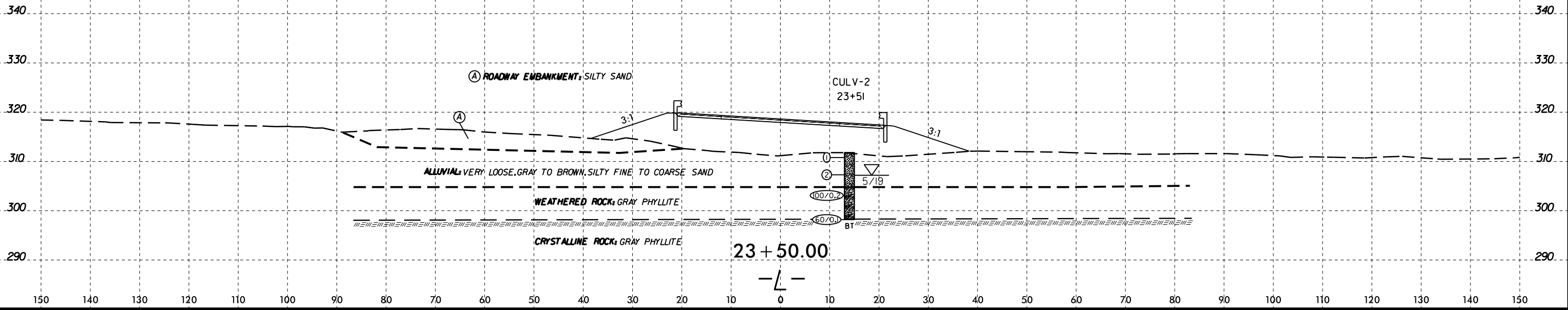
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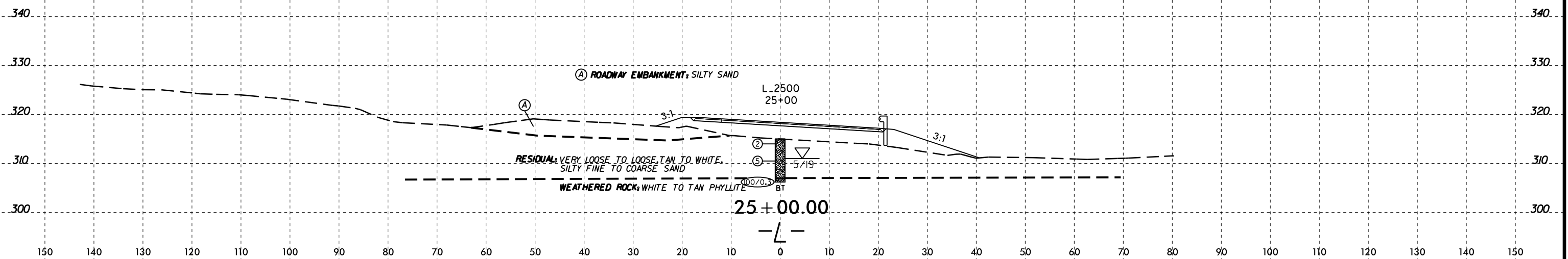
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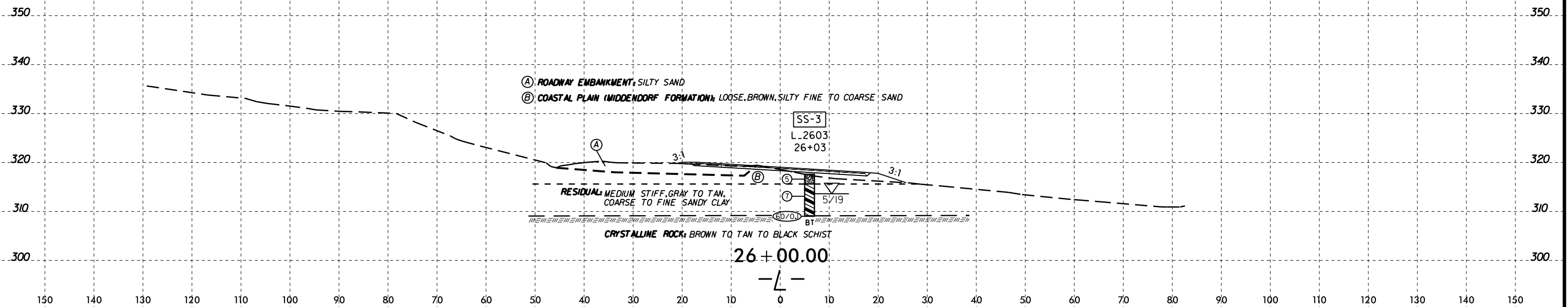
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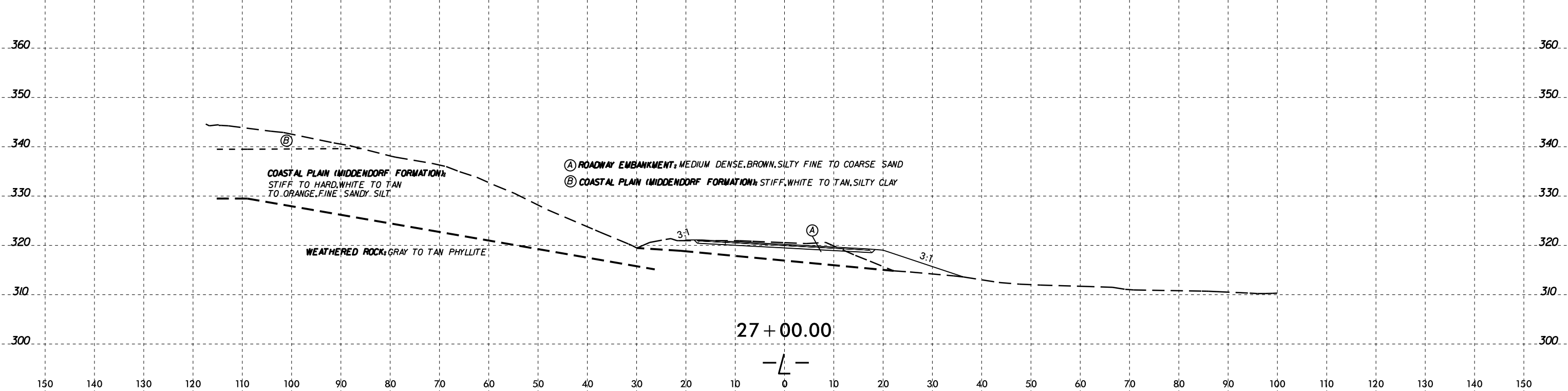
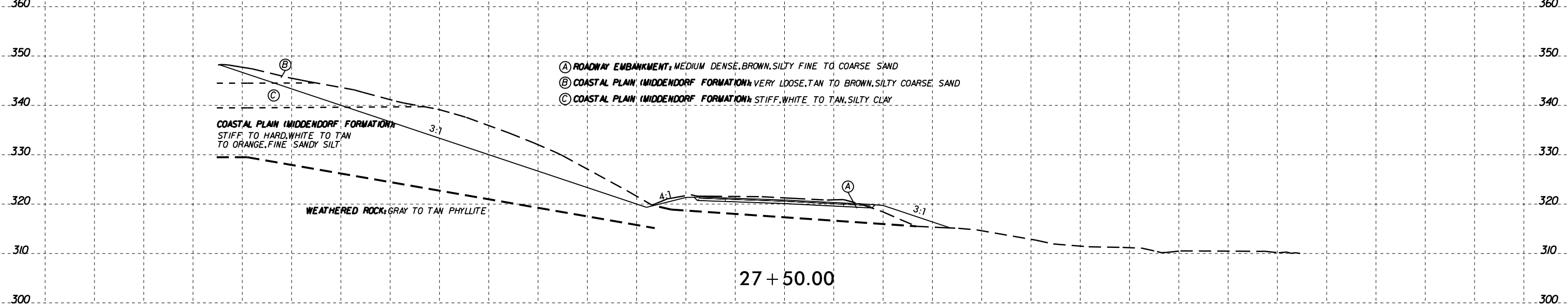
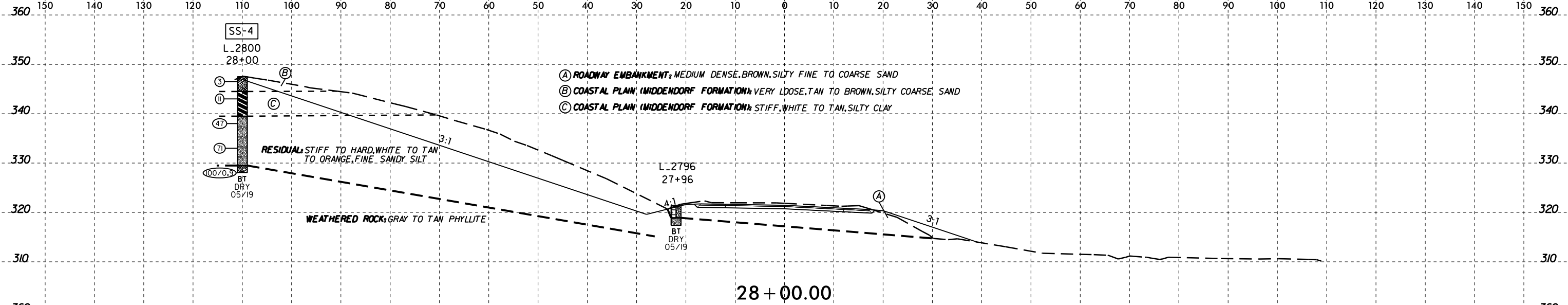


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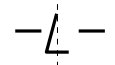
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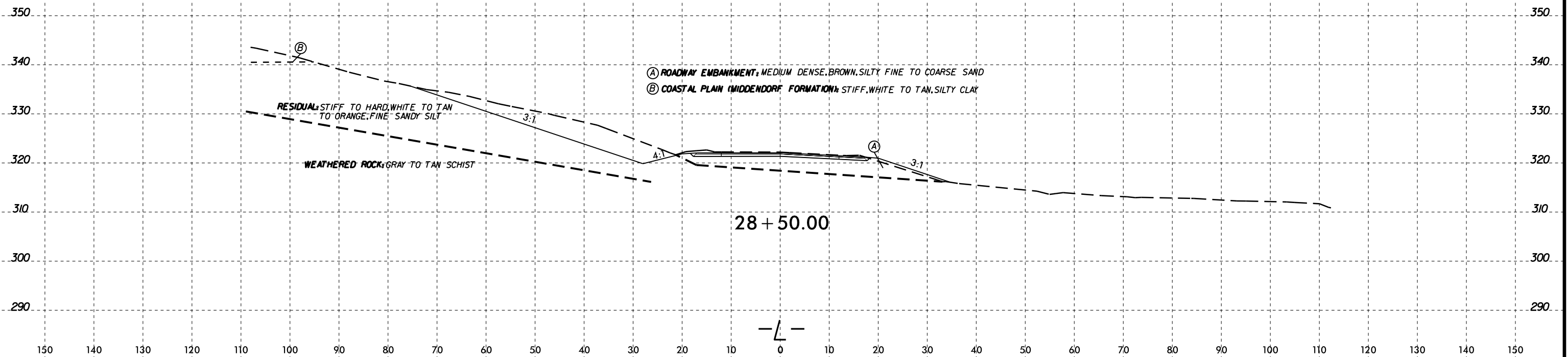
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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
 DIVISION OF HIGHWAYS  
 GEOTECHNICAL ENGINEERING UNIT  
SUBSURFACE INVESTIGATION  
 APPENDIX A  
 LABORATORY RESULTS

REFERENCE: BR-0035

PROJECT: 67035

<sup>DS</sup>  
JRW

TRW  
INITIALS

7/19  
DATE

**LABORATORY SUMMARY SHEET FOR SOIL SAMPLES**

**SHEET 19**

**PROJECT NO.: 67035.1.1 (BR-0035)**

**COUNTY: MOORE**

**BRIDGE NO. 24 ON NC 22 OVER NICKS CREEK**

Sample No.	Boring Number	Alignment	Station	Offset	Sample Depth (ft.)	Natural Moisture Content (%)	AASHTO Class.	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_1300	-L-	13+00	30' RT	0.0 - 1.5	--	A-2-6	31	18	13	0.3	98.0	54.9	21.5	63.1	16.0	1.9	19.0
SS-2	L_1500	-L-	15+00	50' RT	8.4 - 9.9	--	A-2-6	38	20	18	5.0	90.5	59.2	27.3	51.0	21.0	7.6	20.4
SS-3	L_2603	-L-	26+03	6' RT	3.5 - 5.0	--	A-6	36	19	17	0.1	99.5	84.4	54.6	25.5	23.7	19.2	31.7
SS-4	L_2800	-L-	28+00	110' LT	3.5 - 5.0	--	A-7-6	47	26	21	0.1	99.9	99.0	83.4	1.8	24.4	46.2	27.5