

REFERENCE: SF-840286

PROJECT: 17BP.9.R.83

SEE SHEET 3 FOR PLAN SHEET LAYOUT  
AT TIME OF INVESTIGATION

**CONTENTS**

| <u>LINE</u> | <u>STATION</u> | <u>PLAN</u> | <u>X-SECT</u> |
|-------------|----------------|-------------|---------------|
| -L-         | 10+50 - 36+00  | 4 - 5       | 6-25          |
| -Y-         | 10=00 - 13+50  | 4           | 26            |

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

**ROADWAY**  
**SUBSURFACE INVESTIGATION**

COUNTY STOKES  
PROJECT DESCRIPTION BRIDGE NO. 286 ON SR 1236  
(NORTH OLD US 52) OVER LITTLE YADKIN RIVER

**SUBSURFACE INVENTORY**

| STATE | STATE PROJECT REFERENCE NO. | SHEET NO. | TOTAL SHEETS |
|-------|-----------------------------|-----------|--------------|
| N.C.  | 17BP.9.R.83                 | 1         | 26           |

**CAUTION NOTICE**

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

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

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

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

PERSONNEL

J.K. STICKNEY  
C.L. SMITH  
B.E. FOSTER

INVESTIGATED BY J.E. BEVERLY  
DRAWN BY J.E. BEVERLY  
CHECKED BY C.R. LAVENDER, III  
SUBMITTED BY K.B. MILLER  
DATE APRIL 2020



DocuSigned by:  
Kevin B. Miller 5/27/2020  
957A789AED704CB SIGNATURE DATE

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

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

Table with 4 columns: SOIL DESCRIPTION, GRADATION, ROCK DESCRIPTION, and TERMS AND DEFINITIONS. Contains detailed technical information including soil classification, gradation, rock hardness, and various symbols used in geotechnical engineering.

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**PROJECT: 17BP.9.R.83**

**CONTRACT:**

STATE OF NORTH CAROLINA  
 DIVISION OF HIGHWAYS  


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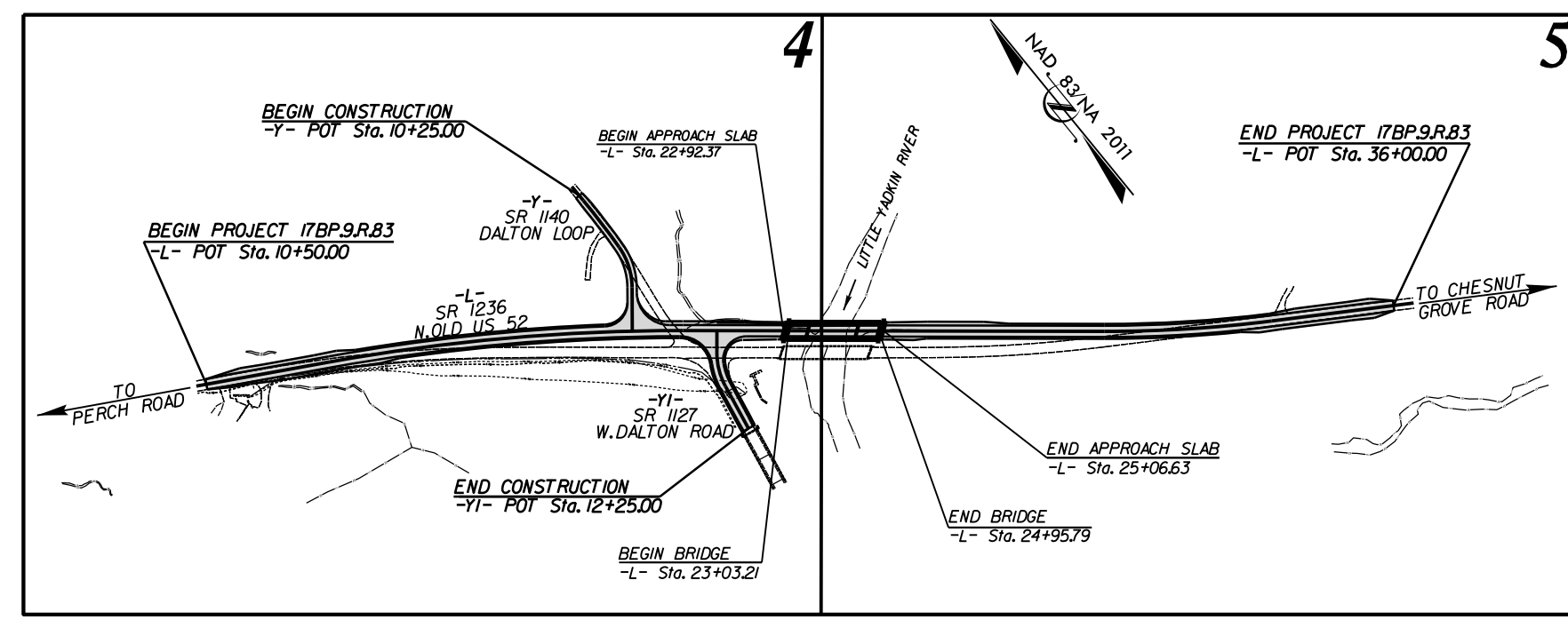
**STOKES COUNTY**

**LOCATION: BRIDGE NO. 286 OVER LITTLE YADKIN RIVER  
 ON SR 1236 (NORTH OLD US 52)**

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

**R / W PLANS**

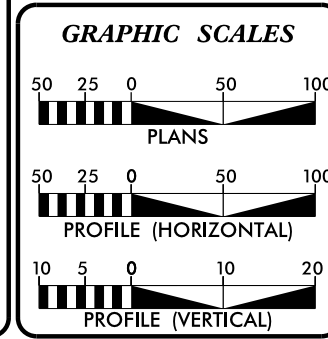
| STATE           | STATE PROJECT REFERENCE NO. | SHEET NO.   | TOTAL SHEETS |
|-----------------|-----------------------------|-------------|--------------|
| N.C.            | 17BP.9.R.83                 | 3           | 26           |
| STATE PROJ. NO. | F.A. PROJ. NO.              | DESCRIPTION |              |
| 17BP.9.R.83     | N/A                         | PE          |              |
| 17BP.9.R.83     | N/A                         | RW, UTL     |              |
| 17BP.9.R.83     | N/A                         | CONST       |              |
|                 |                             |             |              |
|                 |                             |             |              |



\*DESIGN EXCEPTION:  
SAG VERTICAL CURVE K  
VERTICAL SSD

CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III.

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED



**DESIGN DATA**

|              |                 |
|--------------|-----------------|
| ADT (2015) = | 5,000           |
| ADT (2025) = | 9,000           |
| V =          | 55 MPH          |
| FUNC CLASS = | MAJOR COLLECTOR |

**PROJECT LENGTH**

|                              |   |             |
|------------------------------|---|-------------|
| LENGTH ROADWAY TIP PROJECT   | = | 0.447 MILES |
| LENGTH STRUCTURE TIP PROJECT | = | 0.036 MILES |
| TOTAL LENGTH TIP PROJECT     | = | 0.483 MILES |

Prepared In the Office of Simpson Engineers & Associates for  
**DIVISION 9**  
 NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

|                                       |   |
|---------------------------------------|---|
| 2018 STANDARD SPECIFICATIONS          | DAVID SIMPSON, PE<br>PROJECT ENGINEER               |
| RIGHT OF WAY DATE:<br>OCTOBER 8, 2019 | REID B. ROBOL, PE<br>HYDRAULIC ENGINEER             |
| LETTING DATE:<br>NOVEMBER 13, 2020    | DANIEL DAGENHART<br>DIVISION BRIDGE PROGRAM MANAGER |
| NCDOT CONTACT:                        |   |

**ROADWAY DESIGN ENGINEER**

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

**HYDRAULICS ENGINEER**

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

**PLANS PREPARED BY:**

SIMPSON ENGINEERS & ASSOCIATES  
 5640 Dilard Drive  
 Suite 200  
 Cary, NC 27518  
 (919) 852-0468  
 (919) 852-0598 (Fax)  
 www.simpsonengr.com

LICENSE NO. C-2521

VHB Engineering NC, P.C. (C-3705)  
 940 Main Campus Drive, Suite 500  
 Raleigh, NC 27606



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

ROY COOPER  
GOVERNOR

J. ERIC BOYETTE  
SECRETARY

SHEET 3A

May 26, 2020

WBS NO: 17BP.9.R.83  
TIP NO: SF-840286  
COUNTY: Stokes

DESCRIPTION: Bridge No. 286 on SR 1236 (North Old US 52) over Little Yadkin River

SUBJECT: Geotechnical Inventory Report

**Soil Properties**

1. Residual Soils:

These soils are derived from in place weathering of parent materials. They occur in a variety of consistencies, classifications, and stratigraphic sequences. Residual soils are further subdivided into clays, silts, and sands. In most instances residual soils in this area are micaceous with mica amounts ranging from trace to some.

Predominant residual soils encountered were sandy clayey silt, clayey silty sand, and sandy silty clay. Generally residual soils seem to contain a fair amount of sand with fair to good consistency and denseness.

2. Alluvial Soils:

Alluvial soils originate from water transportation and deposition in a floodplain environment. Alluvial deposits along the project corridor are confined to the floodplain of Little Yadkin River and an area of wetlands at the end of the project. Alluvial soils were noted to extend to depths up to 13.9 feet. Soils are wet to saturated and are comprised of very loose to loose clayey silty sand with quartz gravel and very soft to very stiff sandy silty clay.

3. Roadway Embankment:

Roadway embankment fill soils are present beneath existing Old US 52 and its connectors. Roadway embankment soils will be close in composition to the local residual soil it was sourced from.

**Project Description**

This report presents our findings for proposed roadway revisions due to relocation of Bridge No. 286 to the North of the existing structure. The roadway project trends west to east along Old US 52 and lies in the southwest corner of Stokes County. Beginning and ending station limits along -L- are between 10+50 – 36+00. Total traversed distance is 0.48 miles.

The geotechnical field investigation was conducted during the months of February 2019 and March of 2020. An ATV mounted CME 550X drill machine equipped with automatic drop hammer was utilized to perform test borings along the proposed corridor. The following survey lines are addressed in this report.

| <u>Line</u> | <u>Station</u> |
|-------------|----------------|
| -L-         | 10+50 – 36+00  |
| -Y-         | 10+00 – 13+50  |

**Physiography and Geography**

The project area lies in rural southwestern Stokes County along the Old US 52 highway corridor, between the cities of King and Pinnacle. Topography is flat to rolling and traverses along woods and some open fields. Elevation ranges from approximately 830 to 945 feet.

Geologically, the project area falls within the Sauratown Mountains Anticlinorium and is underlain by Cenezoic age rock types (CZmg) comprised of metagraywacke, biotite schist, and biotite gneiss.

**Rock Properties**

Crystalline rock and weathered crystalline rock were encountered in a few locations during this investigation. Rock core data collected during the bridge investigation associated with this project was determined to be hard biotite gneiss with good recovery values and RQD values that averaged in the intermediate range.

**Areas of Special Geotechnical Interest**

1. Groundwater:

There were a few instances in which groundwater was encountered during this investigation. Predominantly, groundwater was present in borings adjacent to Little Yadkin River and its associated floodplain. The following boring locations encountered groundwater:

| <b><u>Line</u></b> | <b><u>Station</u></b> | <b><u>Note</u></b>   |
|--------------------|-----------------------|----------------------|
| -L-                | 15+45, 30' LT         | at grade             |
| -L-                | 24+80, 15' LT         | below proposed grade |

2. Crystalline Rock:

Rock was encountered in various boring locations along the project corridor. The only instances in which rock may be within 6 feet of proposed grade would be in the ditch points left of -L- stations 10+75 to 12+00.

3. Alluvial Soils:

The creek and floodplain areas adjacent to Little Yadkin River contain various alluvial deposits that range up to 13.9 feet in thickness. Alluvium in this area is comprised of very loose to loose clayey silty sand with quartz gravel and very soft to medium stiff sandy silty clay. At the end of the project corridor there is a wetlands feature left of -L- stations 34+00 – 36+00 which has alluvial deposits down to 11.5 feet. Alluvium in this location consists of medium stiff to very stiff silty clay overlying very loose clayey silty sand.

**Bridge**

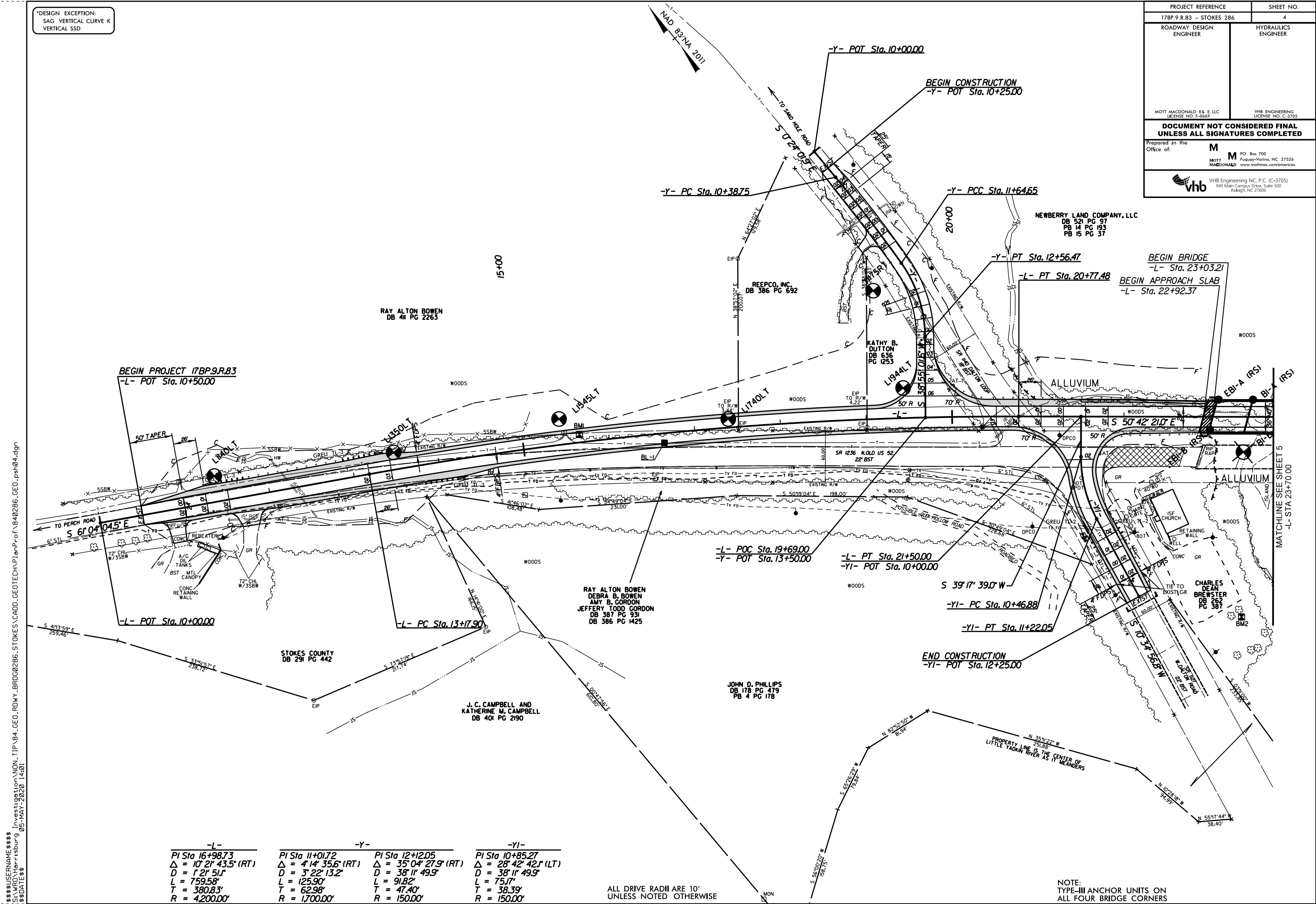
There is a proposed 3 span bridge replacement between -L- stations 23+03 and 24+96. The bridge will be relocated to the north of the existing structure. A combination of boring and rod sounding data was implemented to investigate for the bridge foundation. The bridge will be addressed under a separate report.

Respectfully Submitted,

Eddie Beverly  
Project Geologic Engineer

\*DESIGN EXCEPTION:  
SAG VERTICAL CURVE K  
VERTICAL SSD

|  |  |
|--|--|
| PROJECT REFERENCE<br>17BP.9.R.83 - STOKES 286                            | SHEET NO.<br>4   |
| ROADWAY DESIGN<br>ENGINEER   | HYDRAULICS<br>ENGINEER   |
| MOTT MACDONALD & E. LLC<br>LICENSE NO. F-0669                            | VHB ENGINEERING<br>LICENSE NO. C-3705  |
| <b>DOCUMENT NOT CONSIDERED FINAL<br/>UNLESS ALL SIGNATURES COMPLETED</b> |  |
| Prepared in the<br>Office of:  | <b>M</b><br>MOTT<br>MACDONALD  |
|  | <b>M</b><br>VHB Engineering NC, P.C. (C-3705)<br>940 Main Campus Drive, Suite 500<br>Raleigh, NC 27606 |



BEGIN PROJECT 17BP.9.R.83  
-L- POT Sta. 10+50.00

BEGIN CONSTRUCTION  
-Y- POT Sta. 10+25.00

BEGIN BRIDGE  
-L- Sta. 23+03.21  
BEGIN APPROACH SLAB  
-L- Sta. 22+92.37

END CONSTRUCTION  
-YI- POT Sta. 12+25.00


| -L-                            | -Y-                           | -YI-                           |
|--------------------------------|-------------------------------|--------------------------------|
| PI Sta 16+98.73                | PI Sta 11+01.72               | PI Sta 12+12.05                |
| $\Delta = 10' 21' 43.5''$ (RT) | $\Delta = 4' 14' 35.6''$ (RT) | $\Delta = 35' 04' 27.9''$ (RT) |
| D = 1' 21' 51.1"               | D = 3' 22' 13.2"              | D = 38' 11' 49.9"              |
| L = 759.58'                    | L = 125.90'                   | L = 91.82'                     |
| T = 380.83'                    | T = 62.98'                    | T = 47.40'                     |
| R = 4200.00'                   | R = 1700.00'                  | R = 150.00'                    |

ALL DRIVE RADII ARE 10'  
UNLESS NOTED OTHERWISE

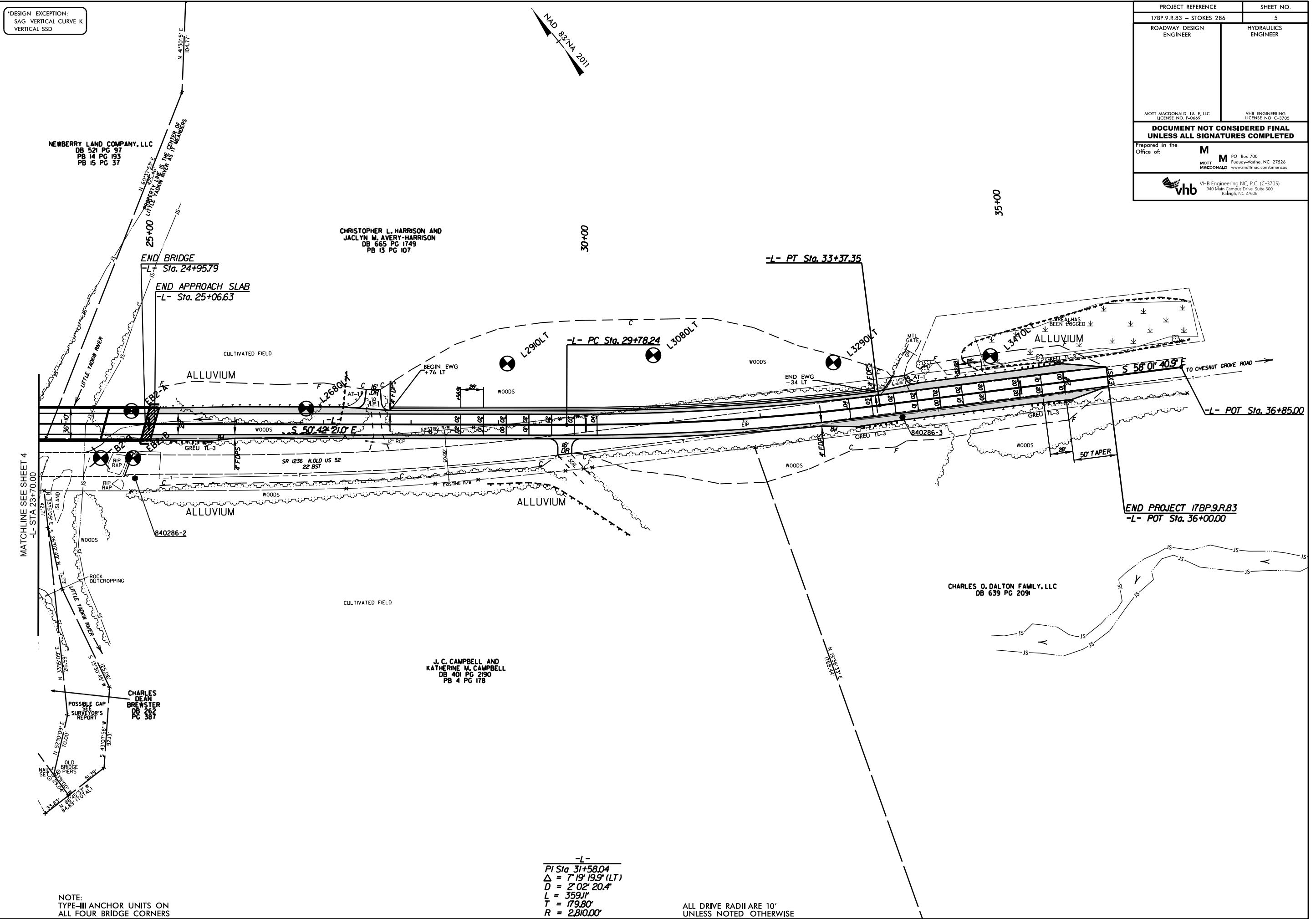
NOTE:  
TYPE-III ANCHOR UNITS ON  
ALL FOUR BRIDGE CORNERS

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 \$\$\$\$DATE\$\$\$

MATCHLINE SEE SHEET 5  
-L- STA 23+70.00

|   |  |
|---|--|
| PROJECT REFERENCE   | SHEET NO.  |
| 17BP.9.R.83 - STOKES 286  | 5  |
| ROADWAY DESIGN ENGINEER   | HYDRAULICS ENGINEER  |
| MOTT MACDONALD 14 E. LLC<br>LICENSE NO. F-0669                                      | VHB ENGINEERING<br>LICENSE NO. C-3705  |
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| Prepared in the Office of:  | <b>M</b> MOTT MACDONALD<br>PO Box 700<br>Fuquay-Varina, NC 27526<br>www.motmac.com/america |
|  | VHB Engineering NC, P.C. (C-3705)<br>940 Main Campus Drive, Suite 500<br>Raleigh, NC 27606 |

\*DESIGN EXCEPTION:  
SAG VERTICAL CURVE K  
VERTICAL SSD

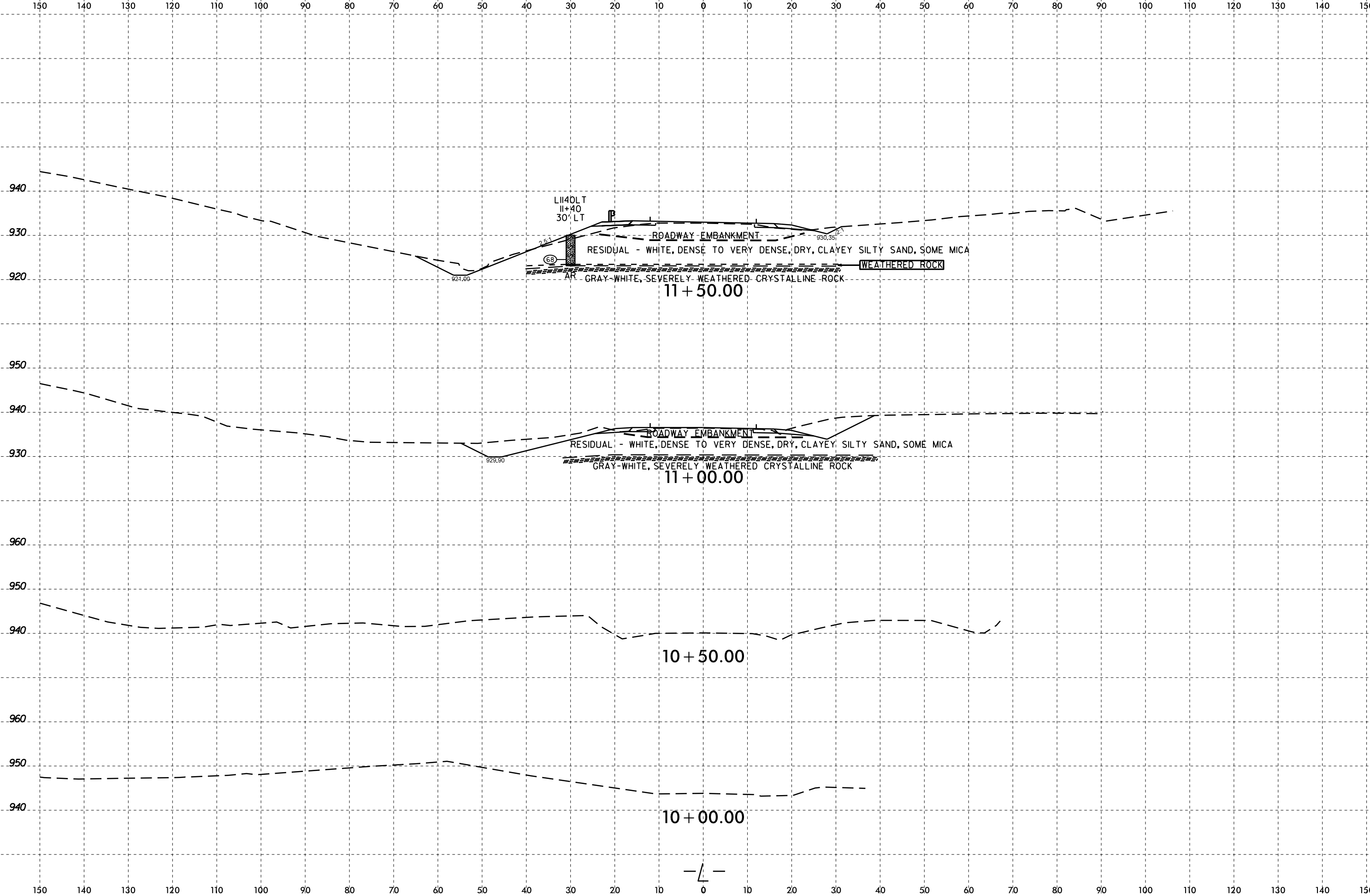


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NOTE:  
TYPE-III ANCHOR UNITS ON  
ALL FOUR BRIDGE CORNERS

-L-  
 PI Sta 31+58.04  
 $\Delta = 7^{\circ} 19' 19.9" (LT)$   
 $D = 2^{\circ} 02' 20.4"$   
 $L = 359.11'$   
 $T = 179.80'$   
 $R = 2,810.00'$

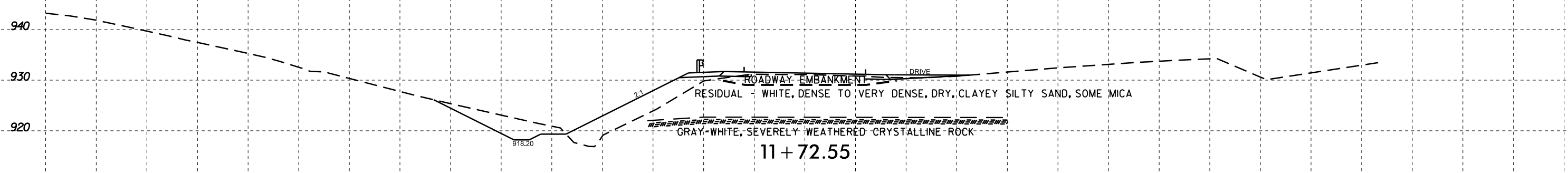
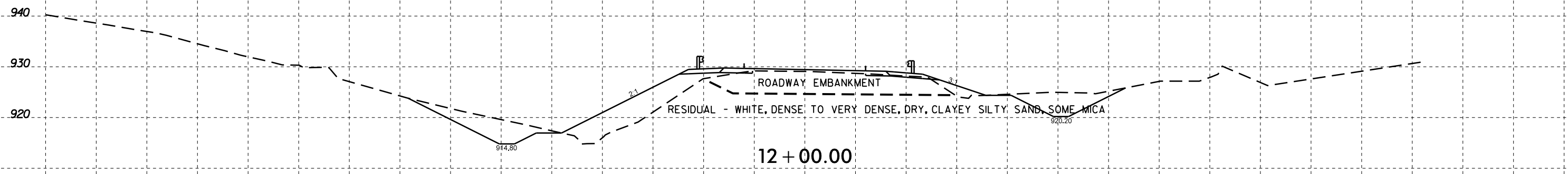
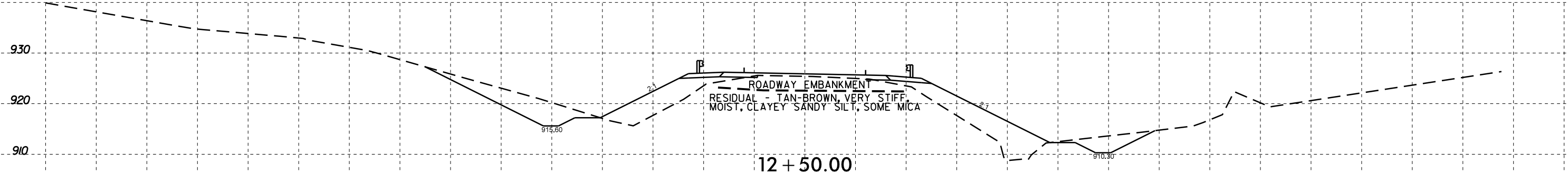
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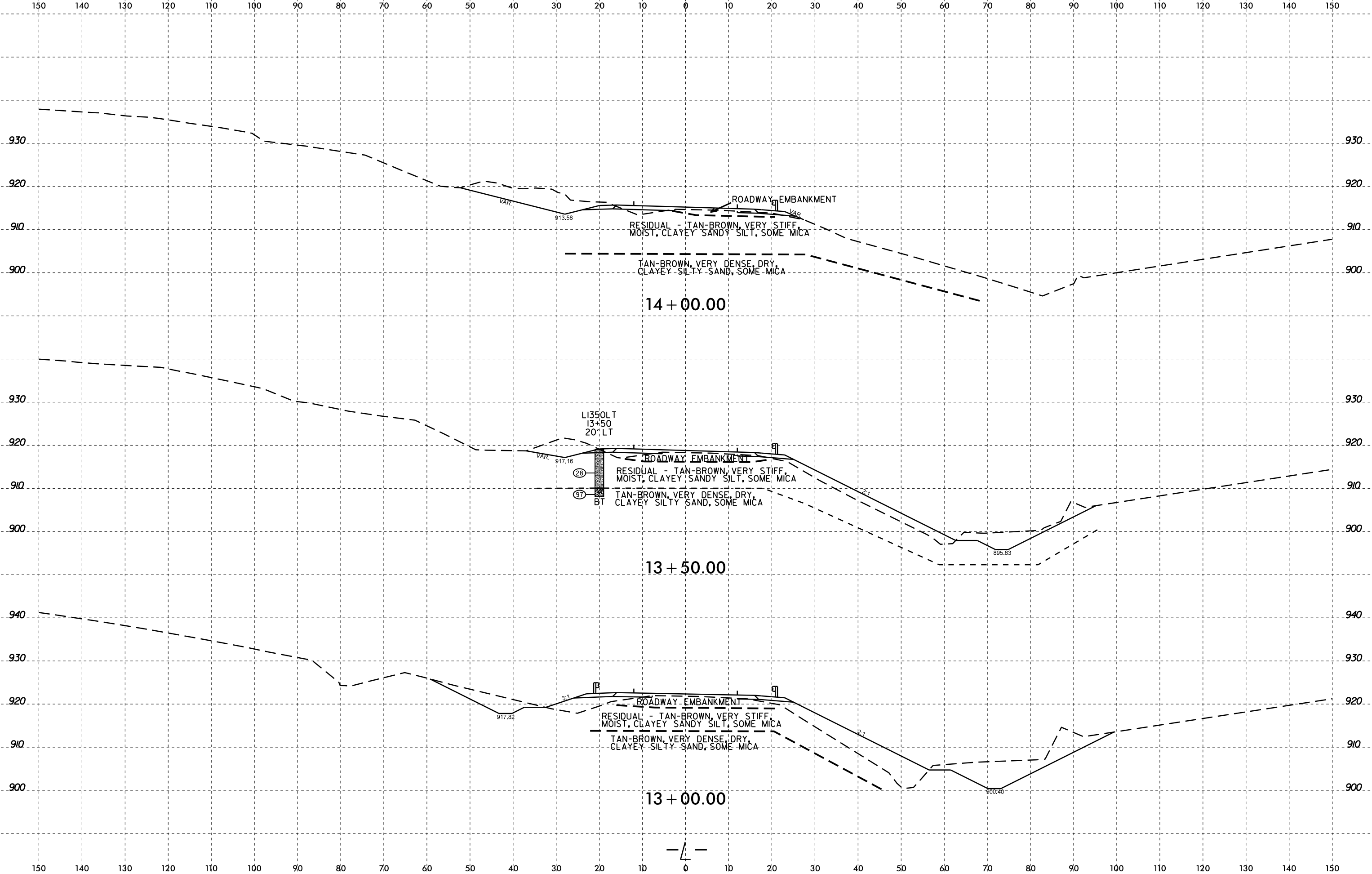


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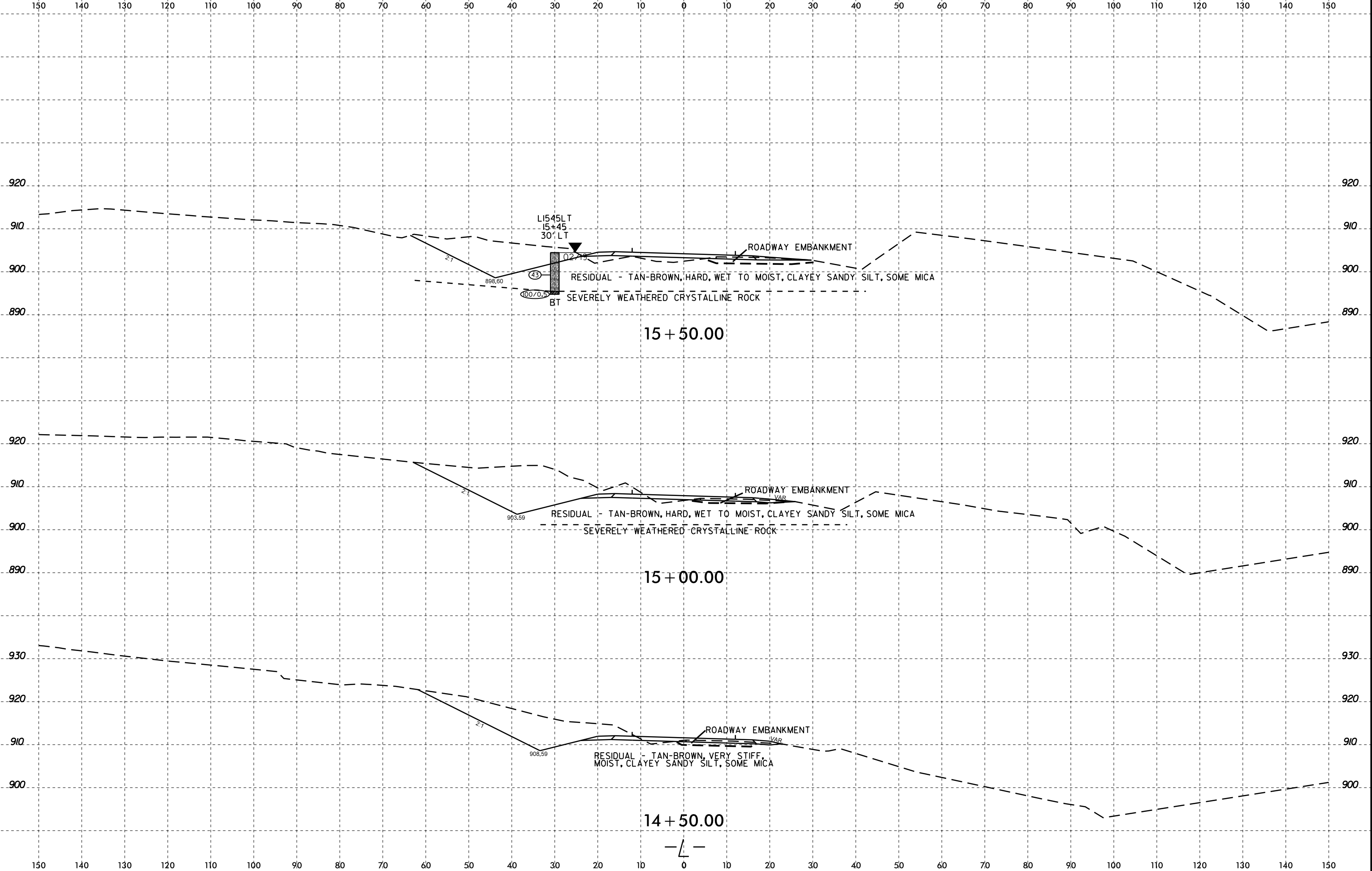
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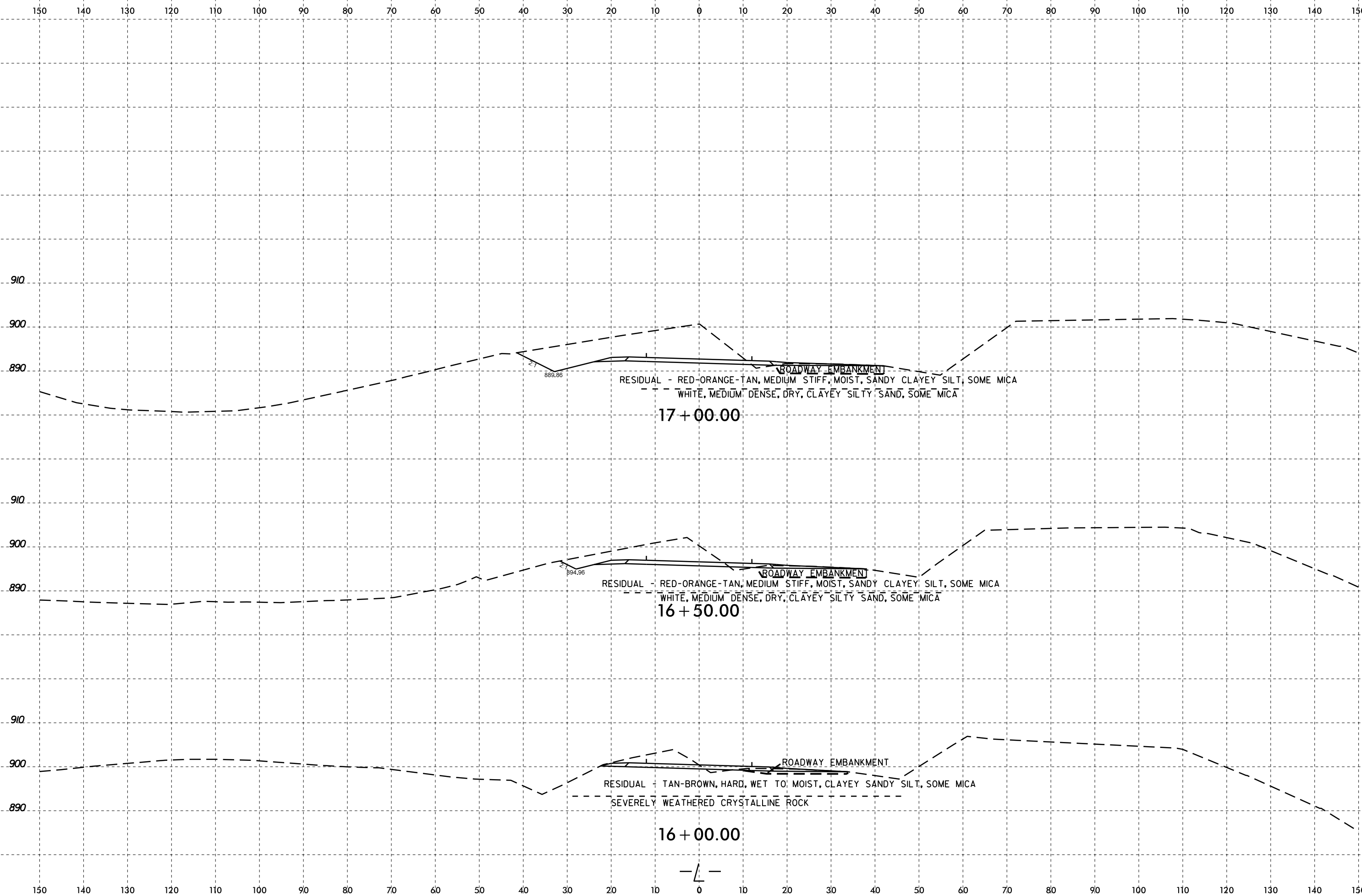
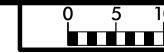
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ROADWAY EMBANKMENT  
 RESIDUAL - RED-ORANGE-TAN, MEDIUM STIFF, MOIST, SANDY CLAYEY SILT, SOME MICA  
 WHITE, MEDIUM DENSE, DRY, CLAYEY SILTY SAND, SOME MICA

17 + 00.00

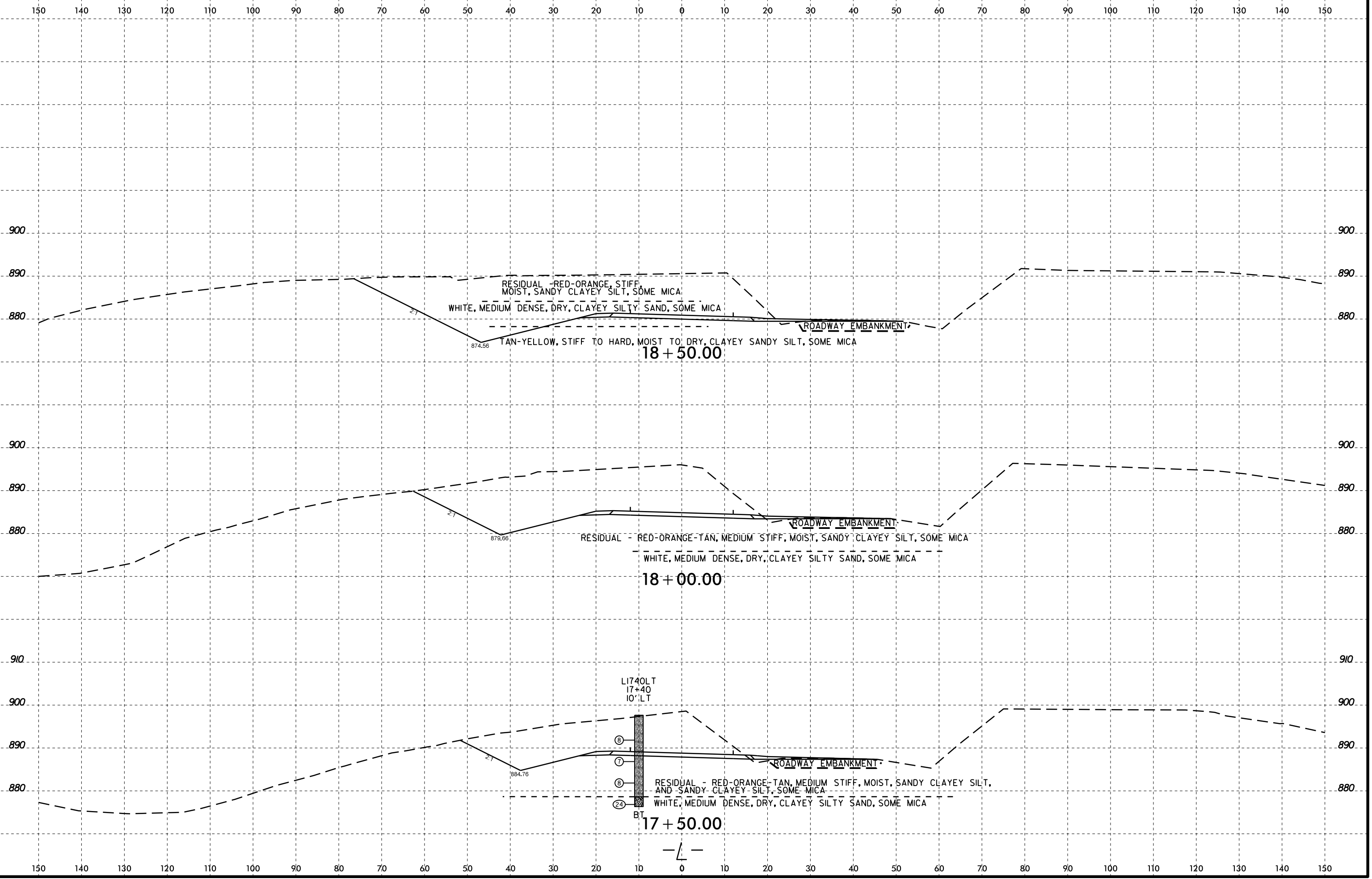
ROADWAY EMBANKMENT  
 RESIDUAL - RED-ORANGE-TAN, MEDIUM STIFF, MOIST, SANDY CLAYEY SILT, SOME MICA  
 WHITE, MEDIUM DENSE, DRY, CLAYEY SILTY SAND, SOME MICA

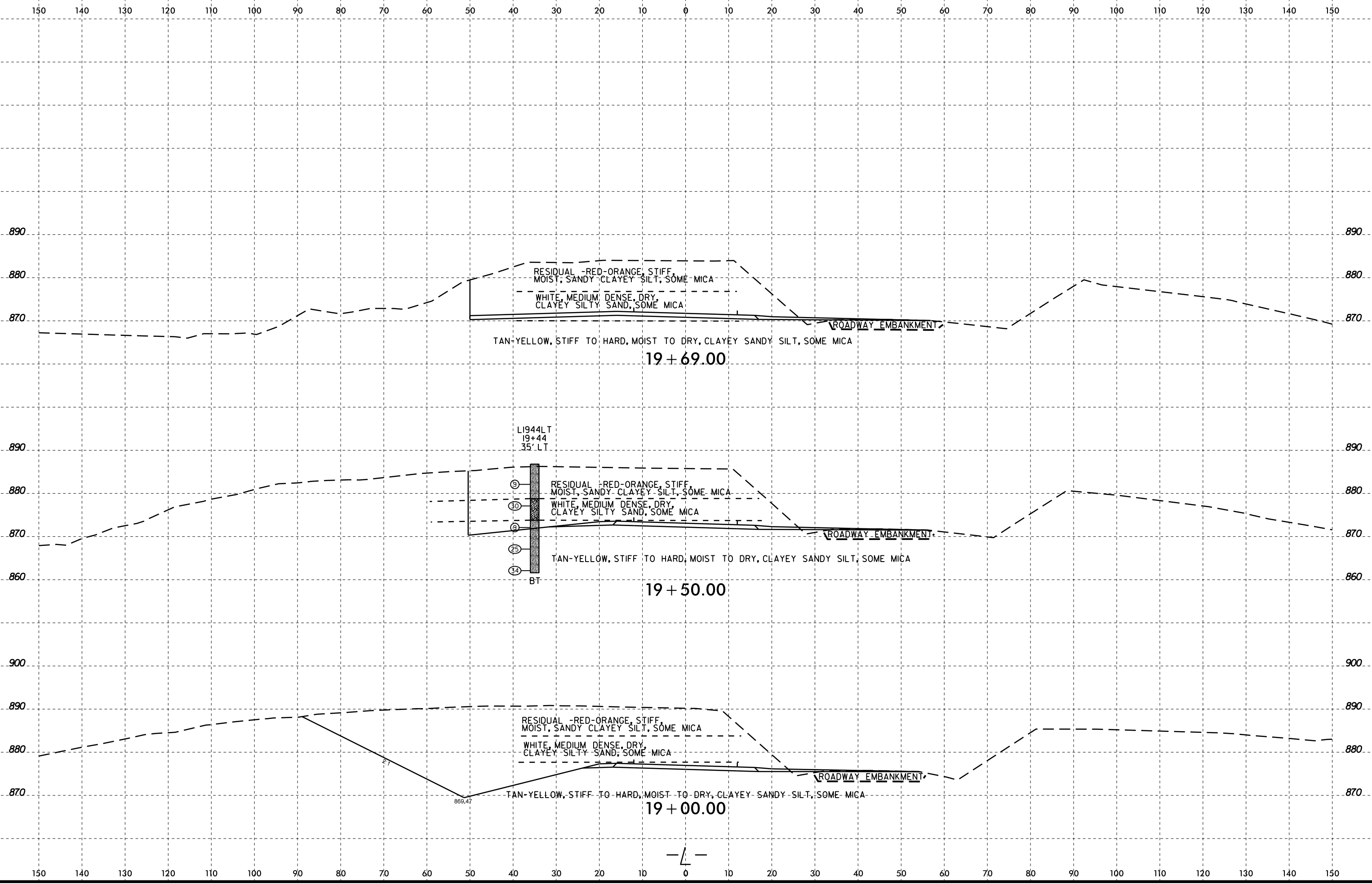
16 + 50.00

ROADWAY EMBANKMENT  
 RESIDUAL - TAN-BROWN, HARD, WET TO MOIST, CLAYEY SANDY SILT, SOME MICA  
 SEVERELY WEATHERED CRYSTALLINE ROCK

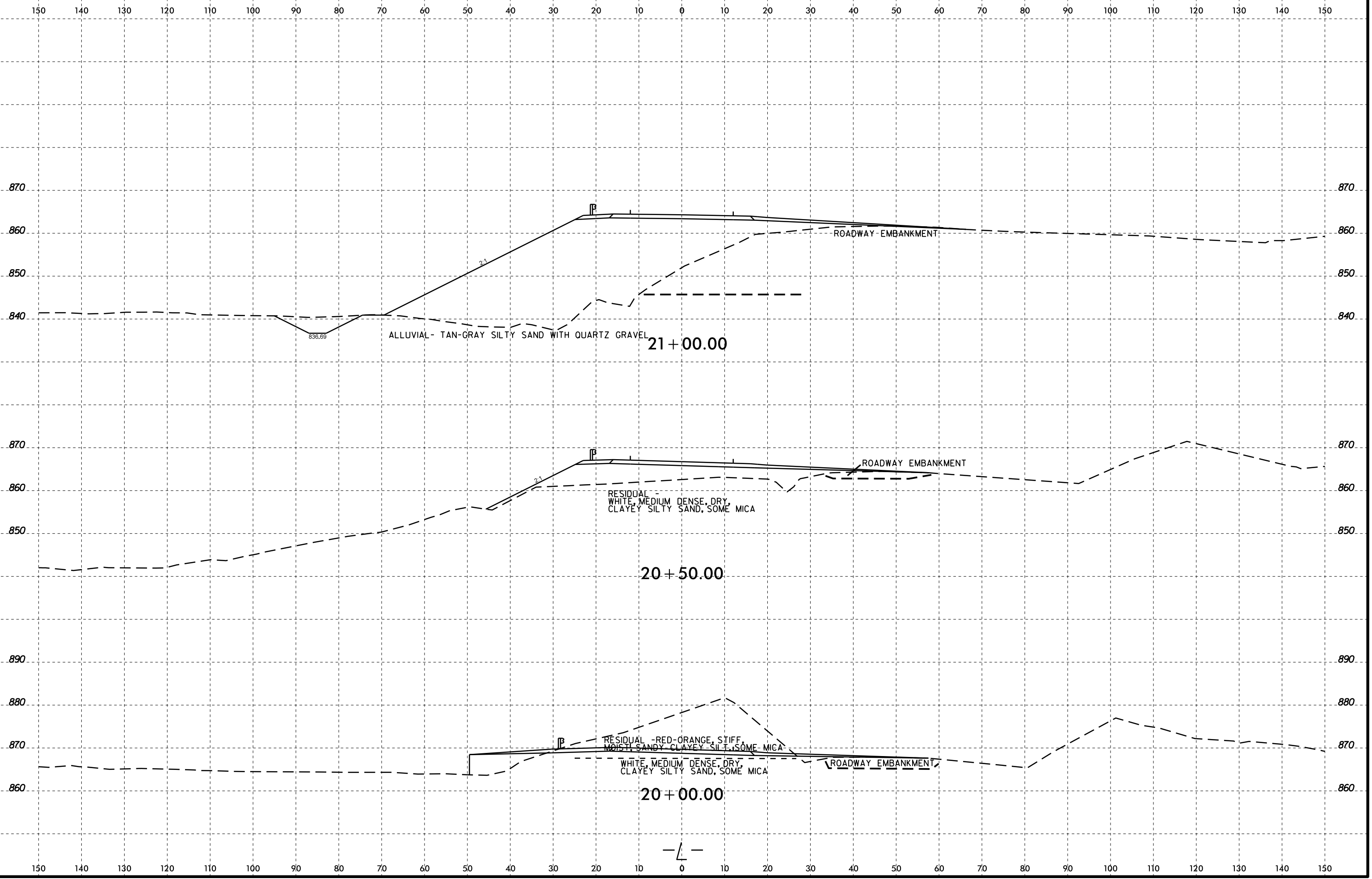
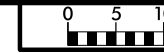
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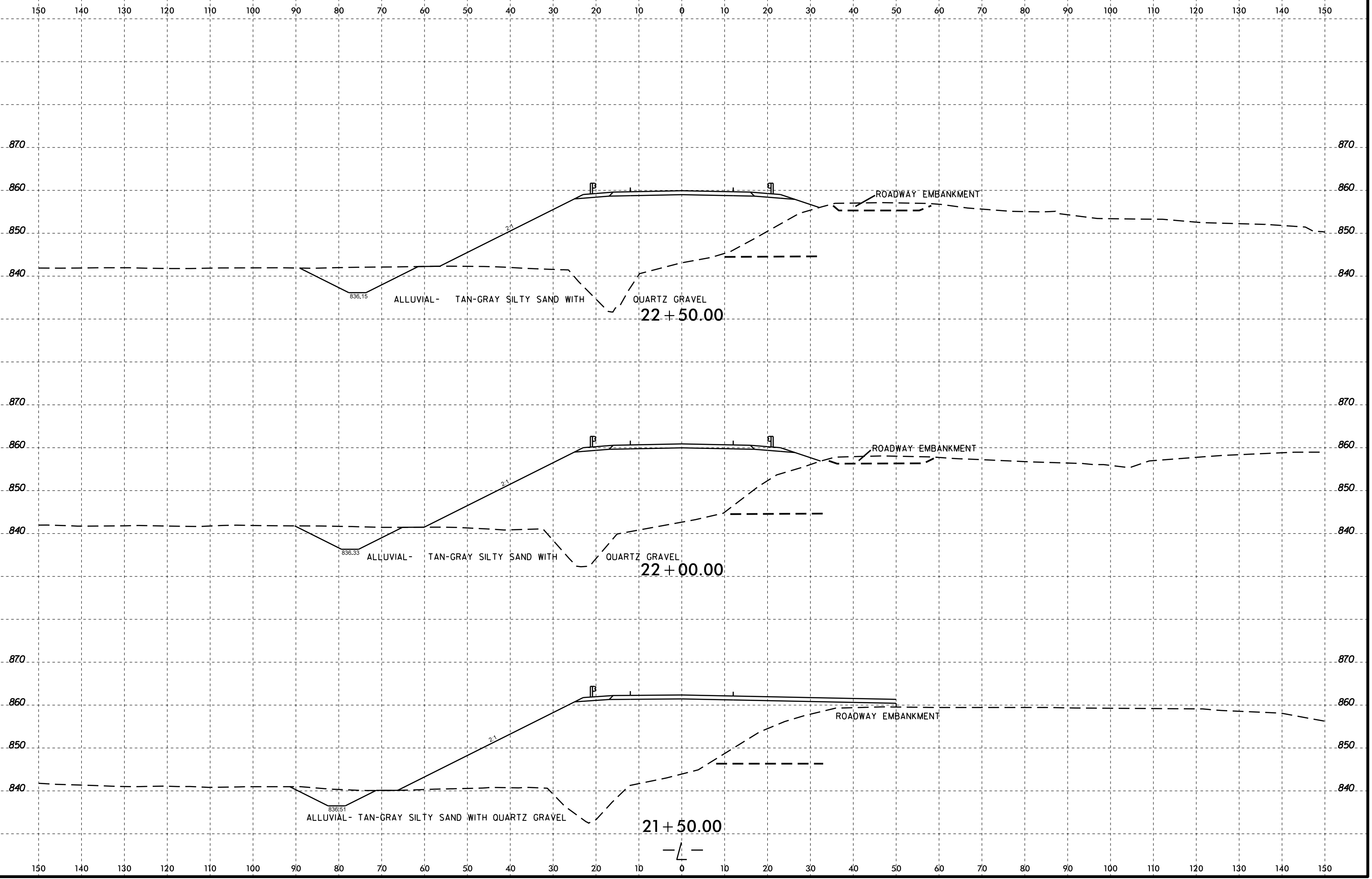


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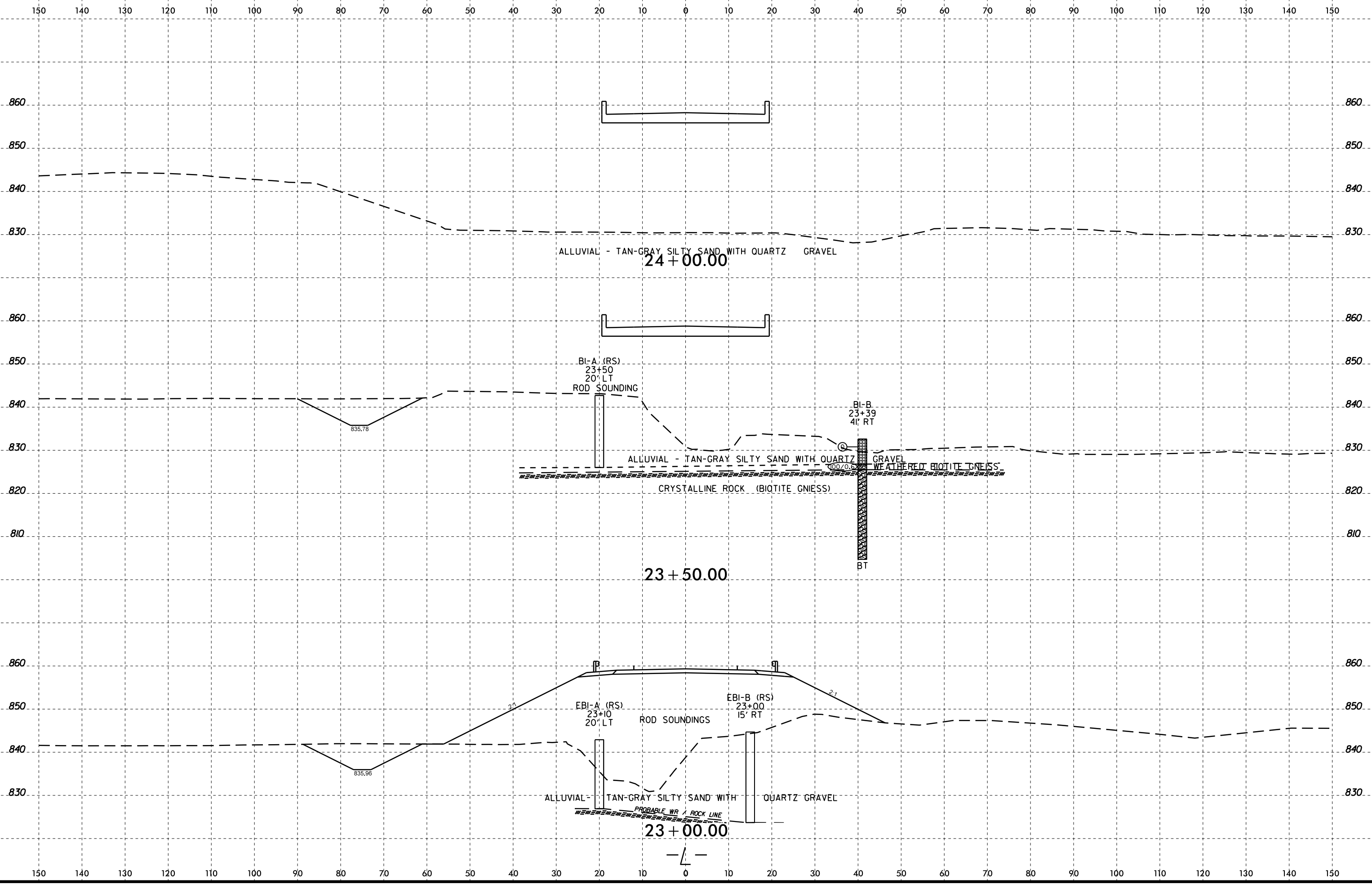
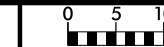


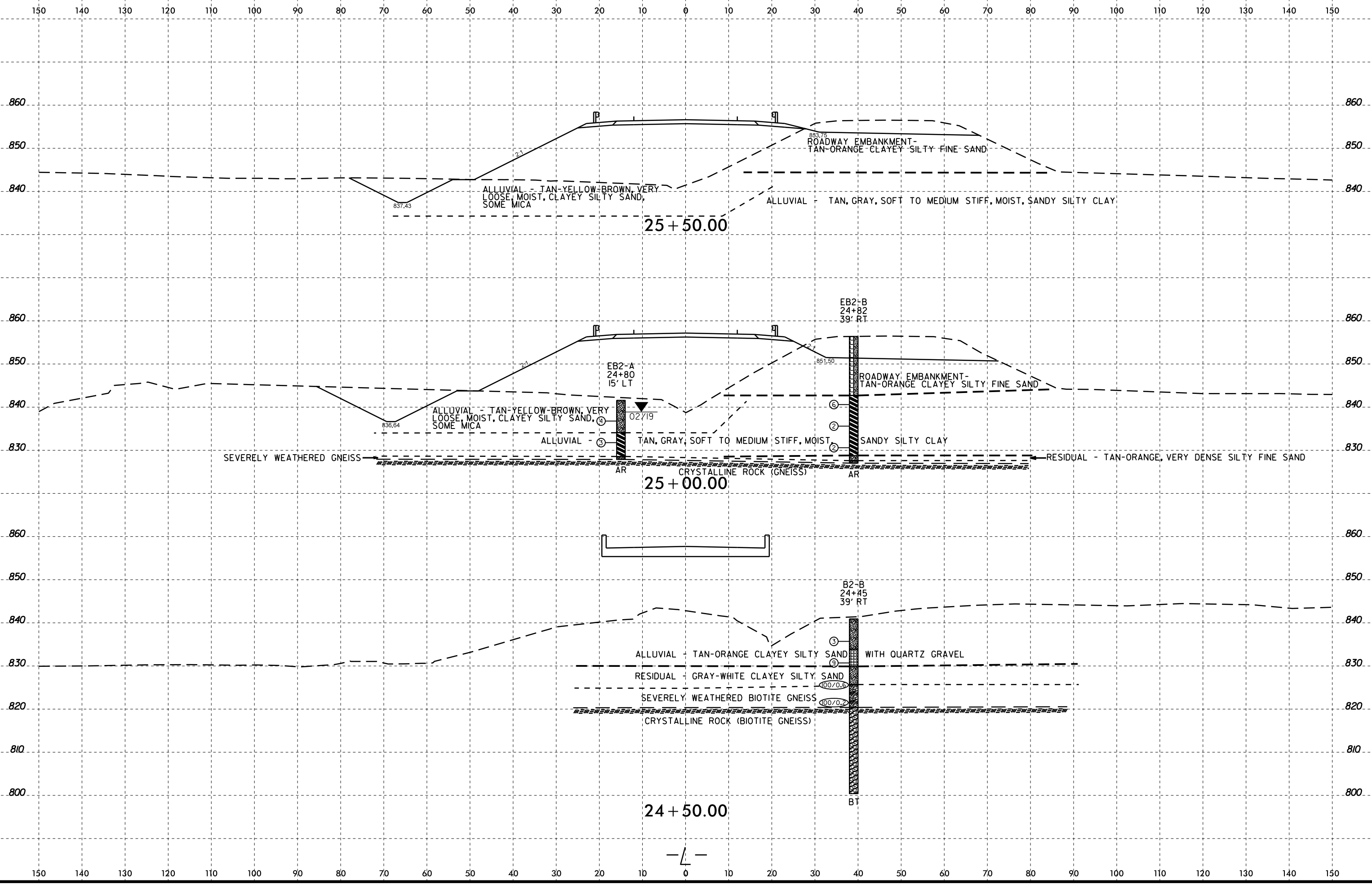
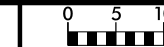
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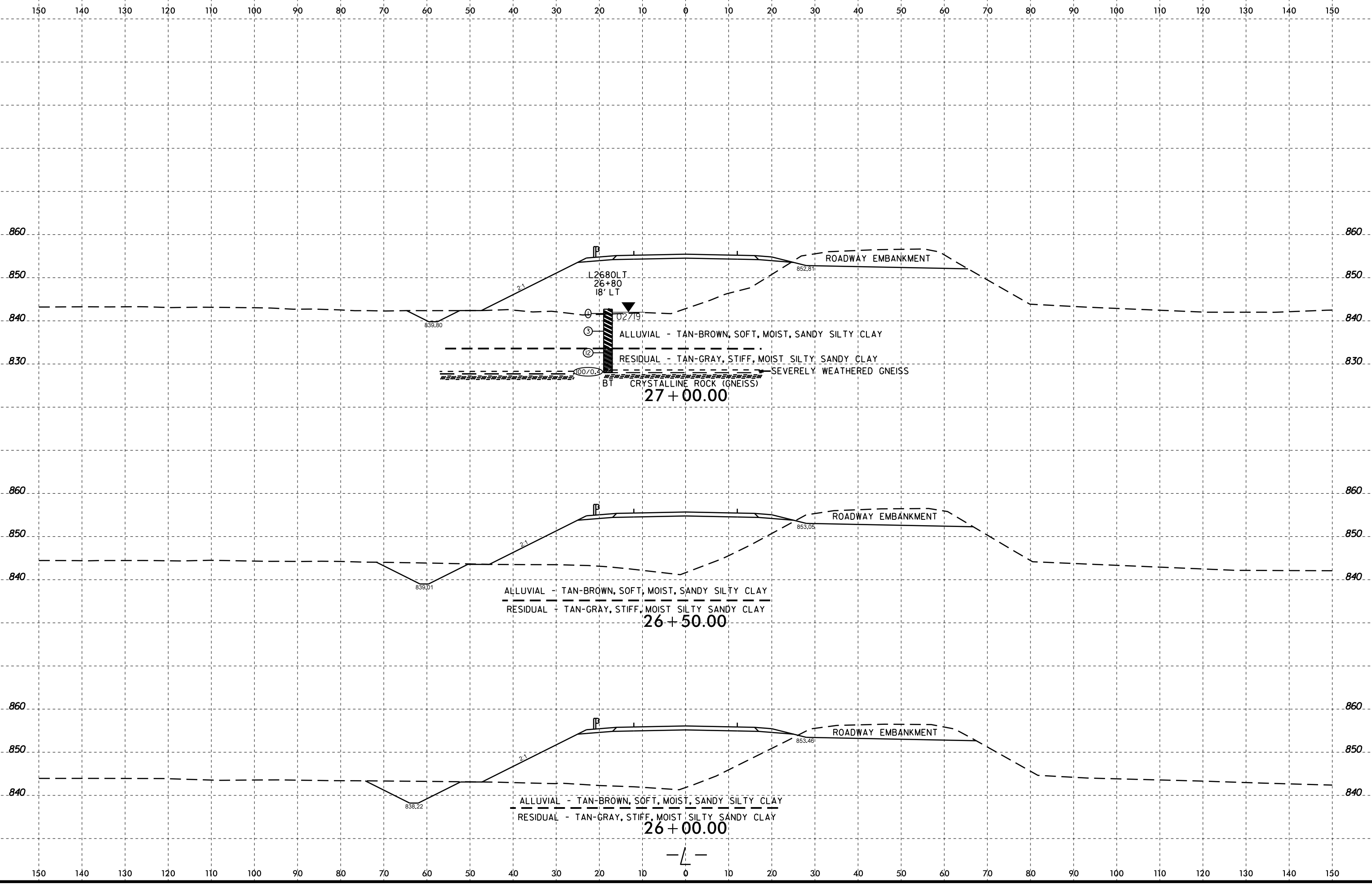






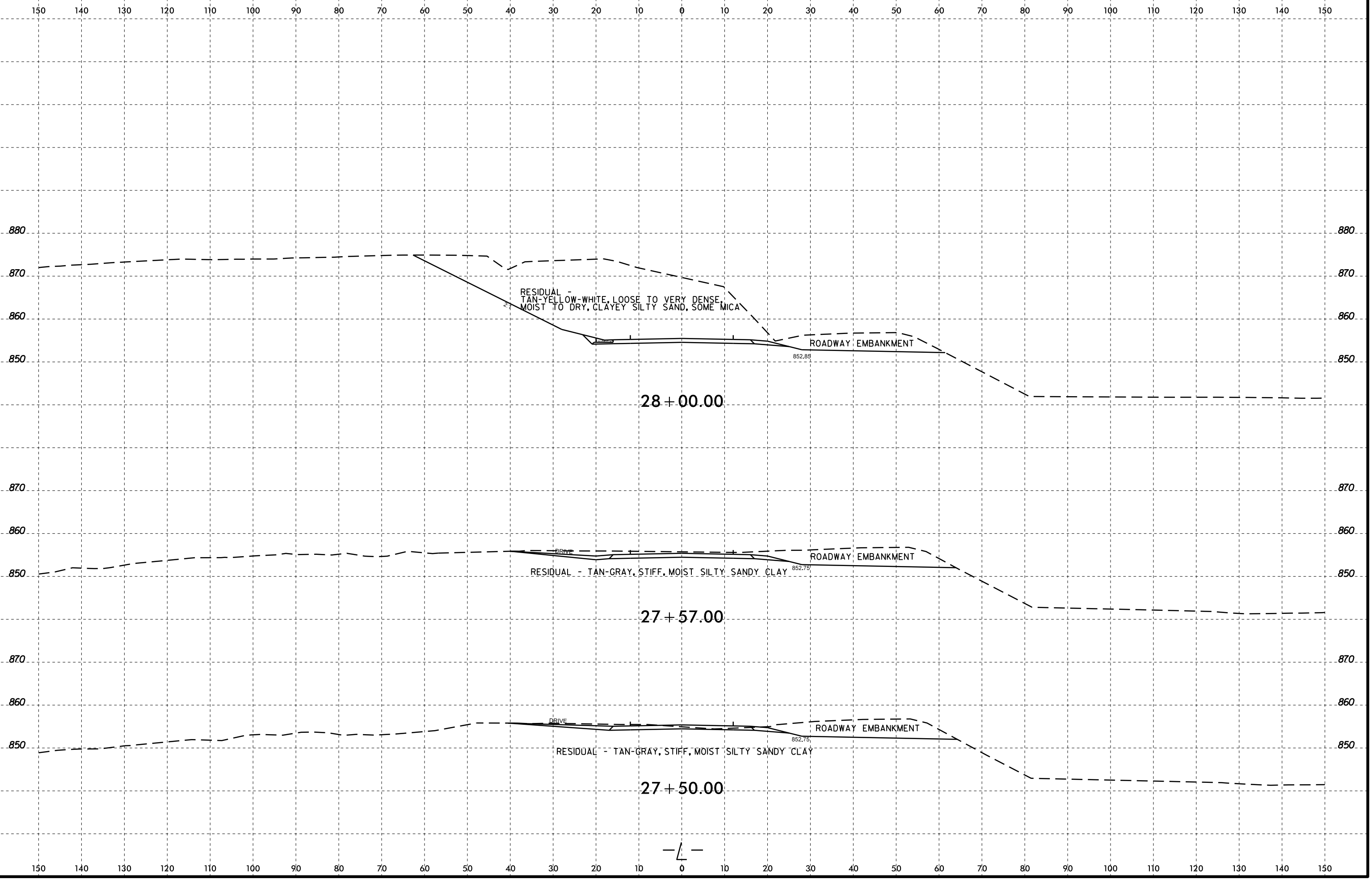
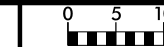


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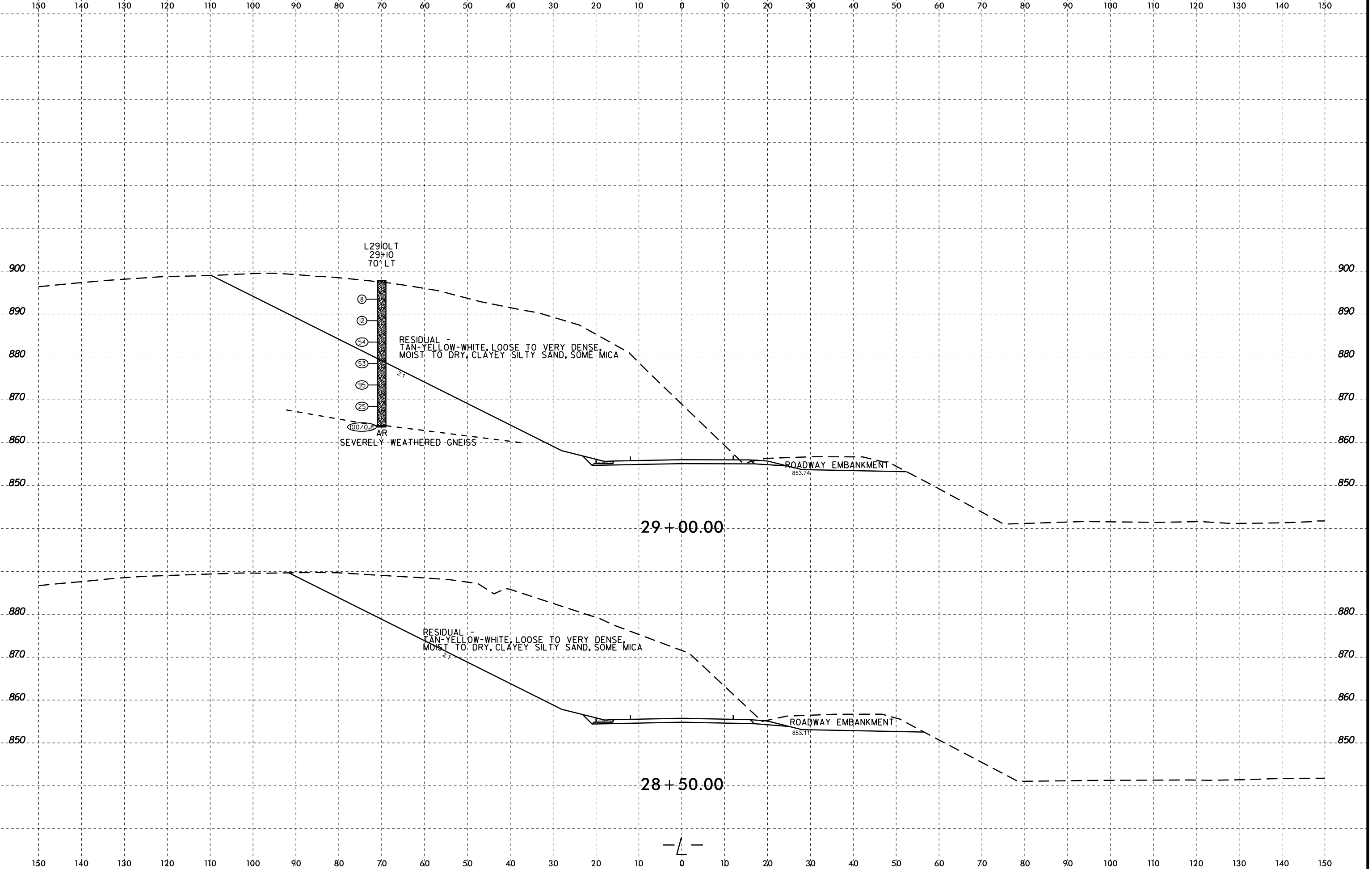
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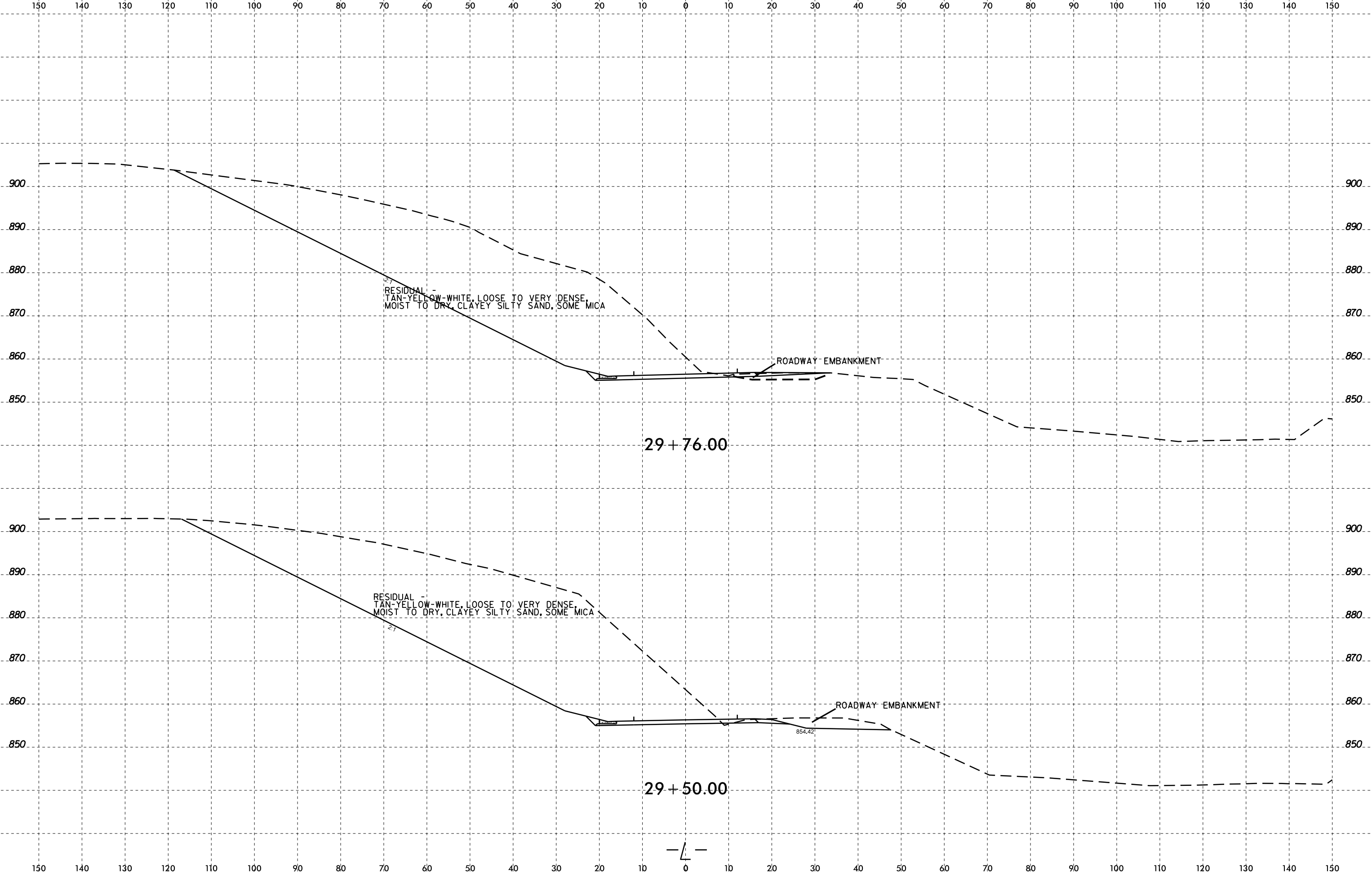


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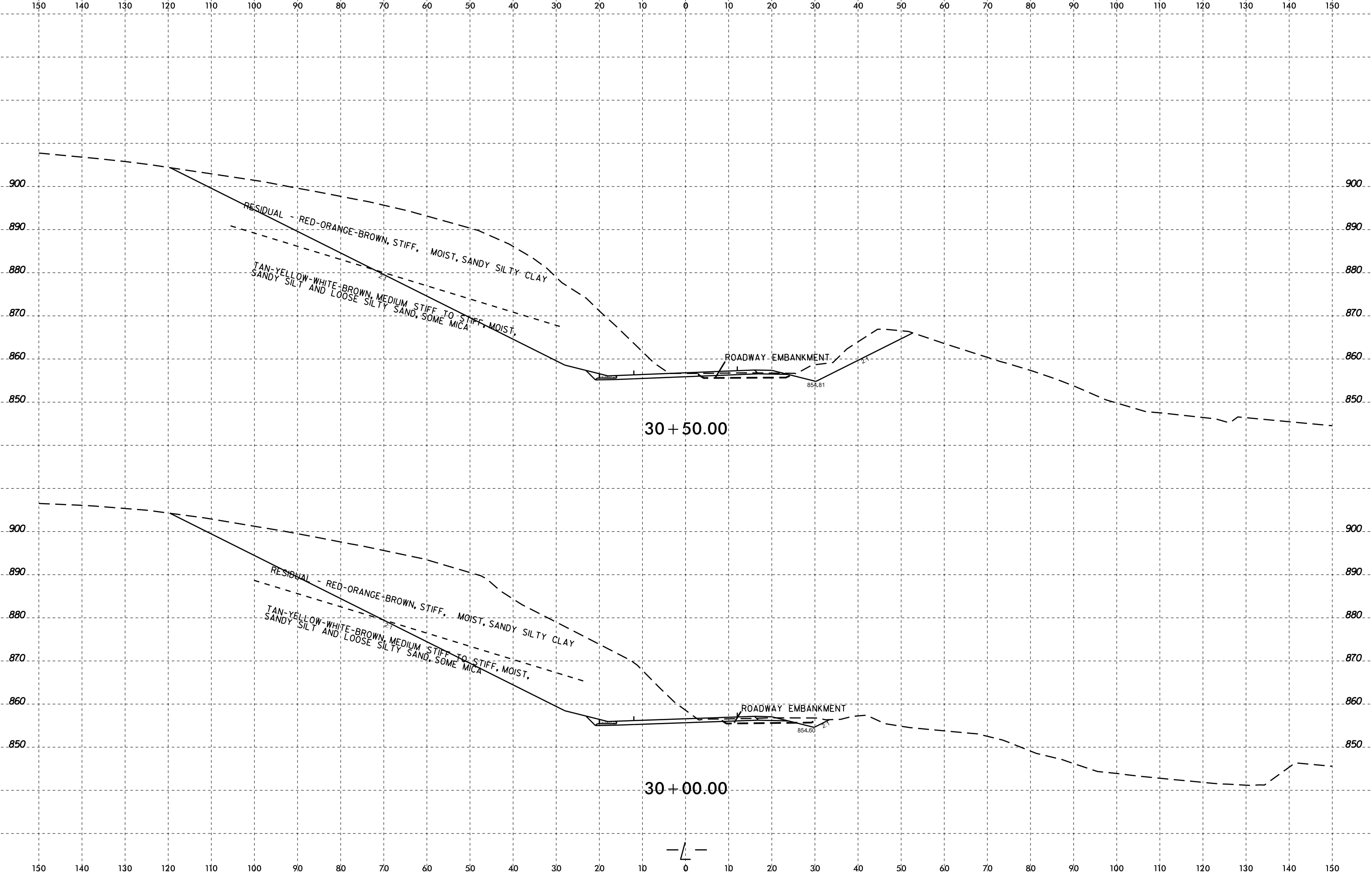




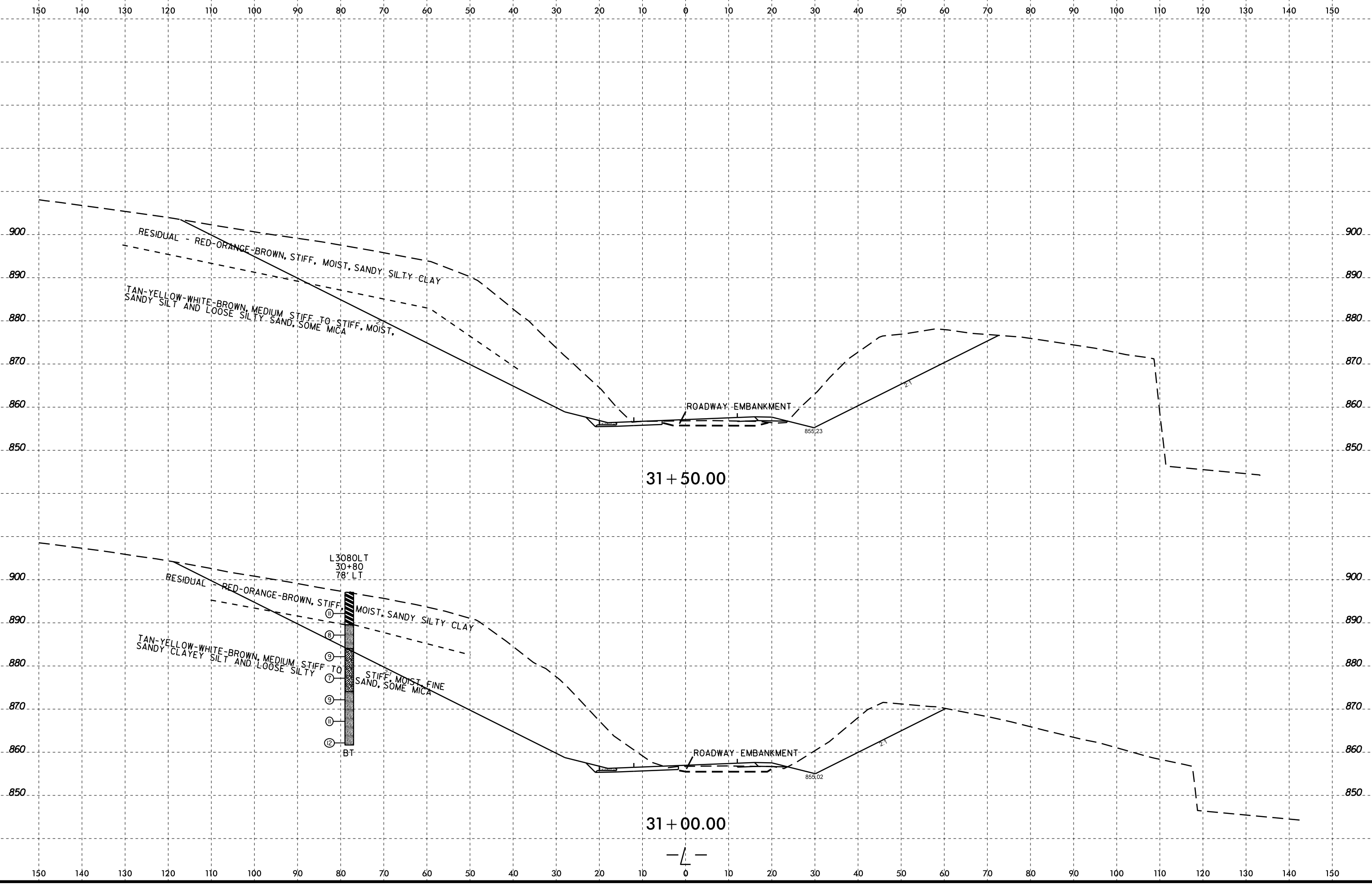
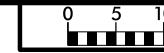
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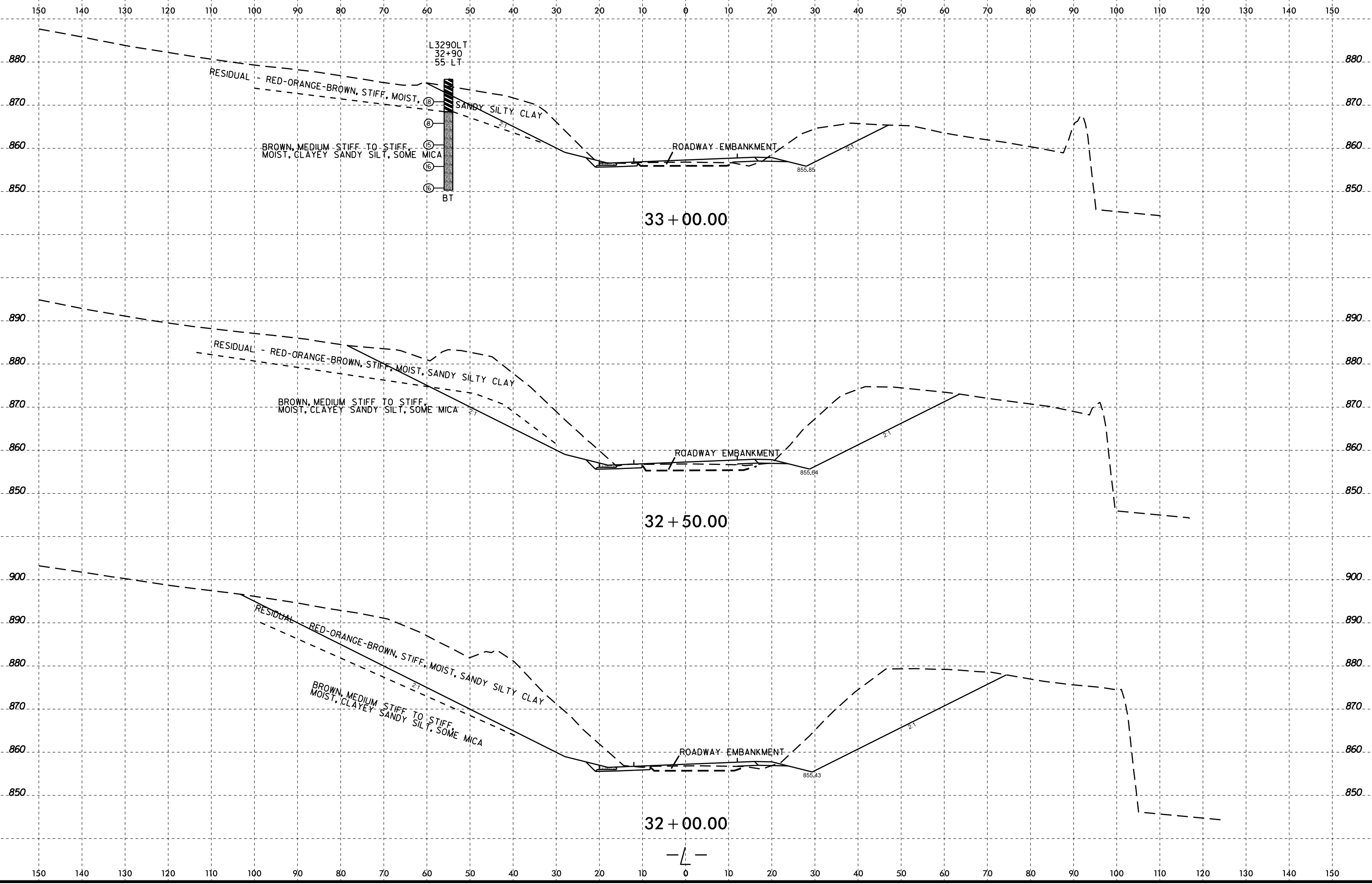


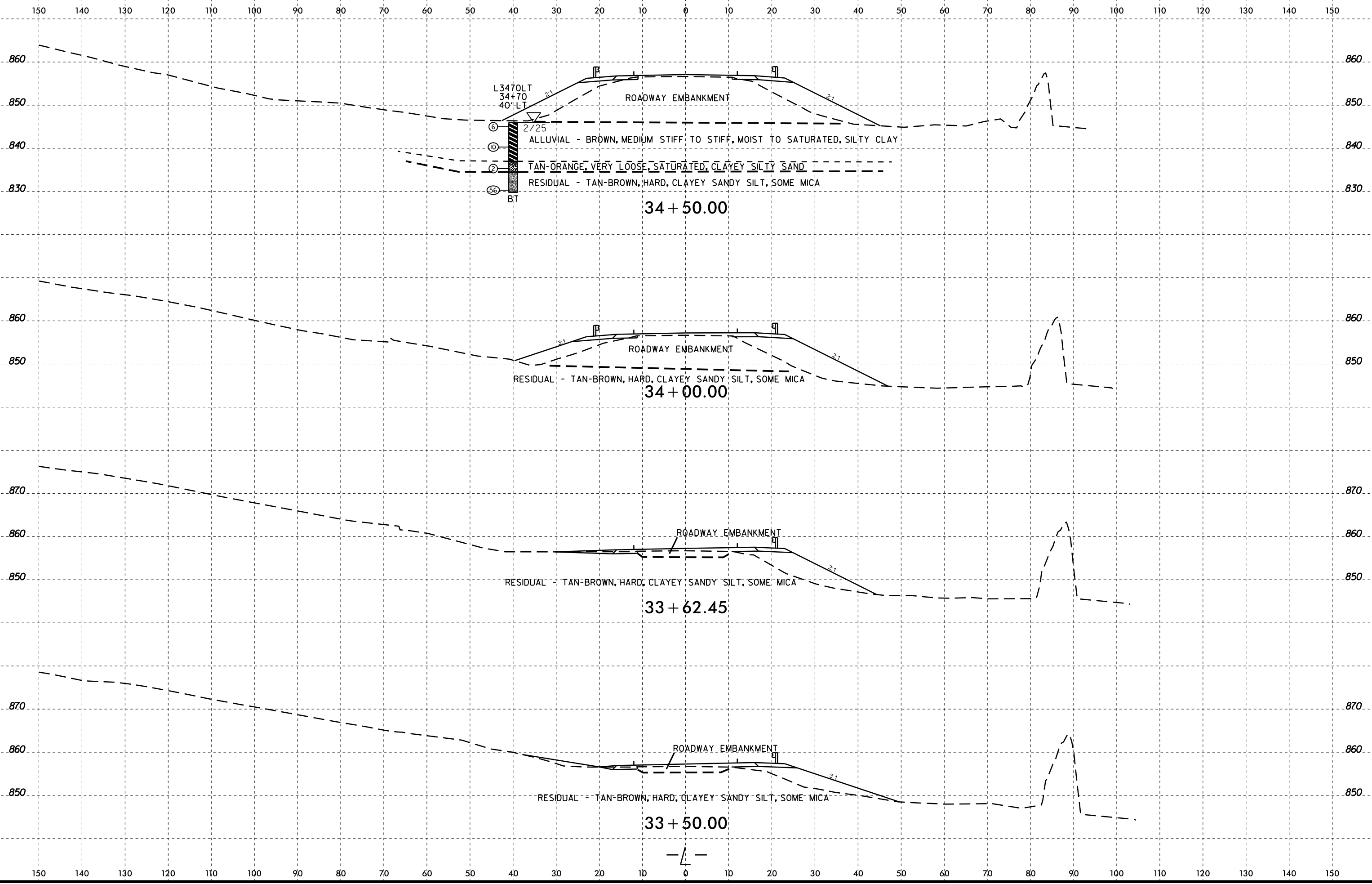
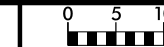
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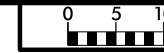
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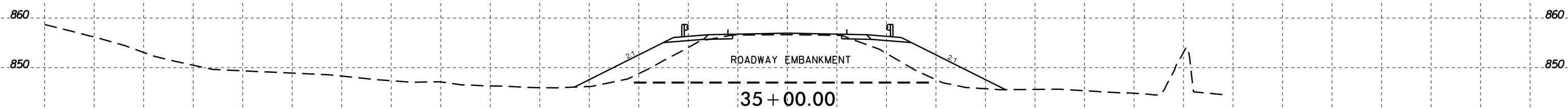
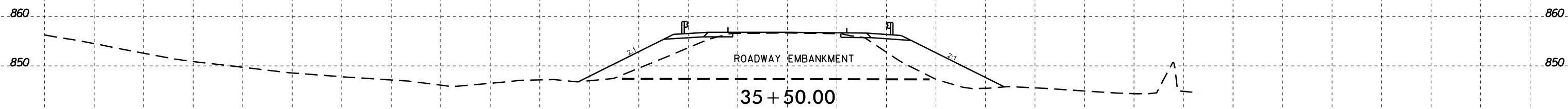
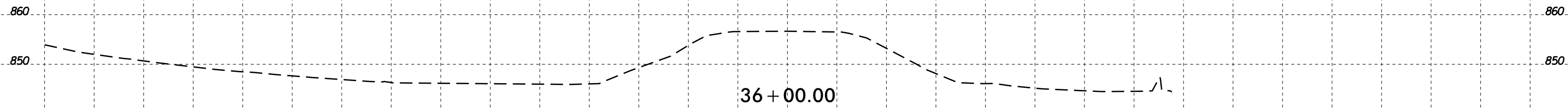
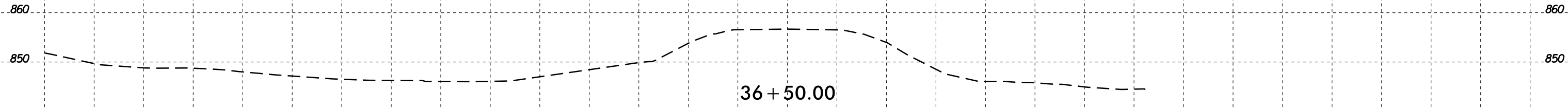




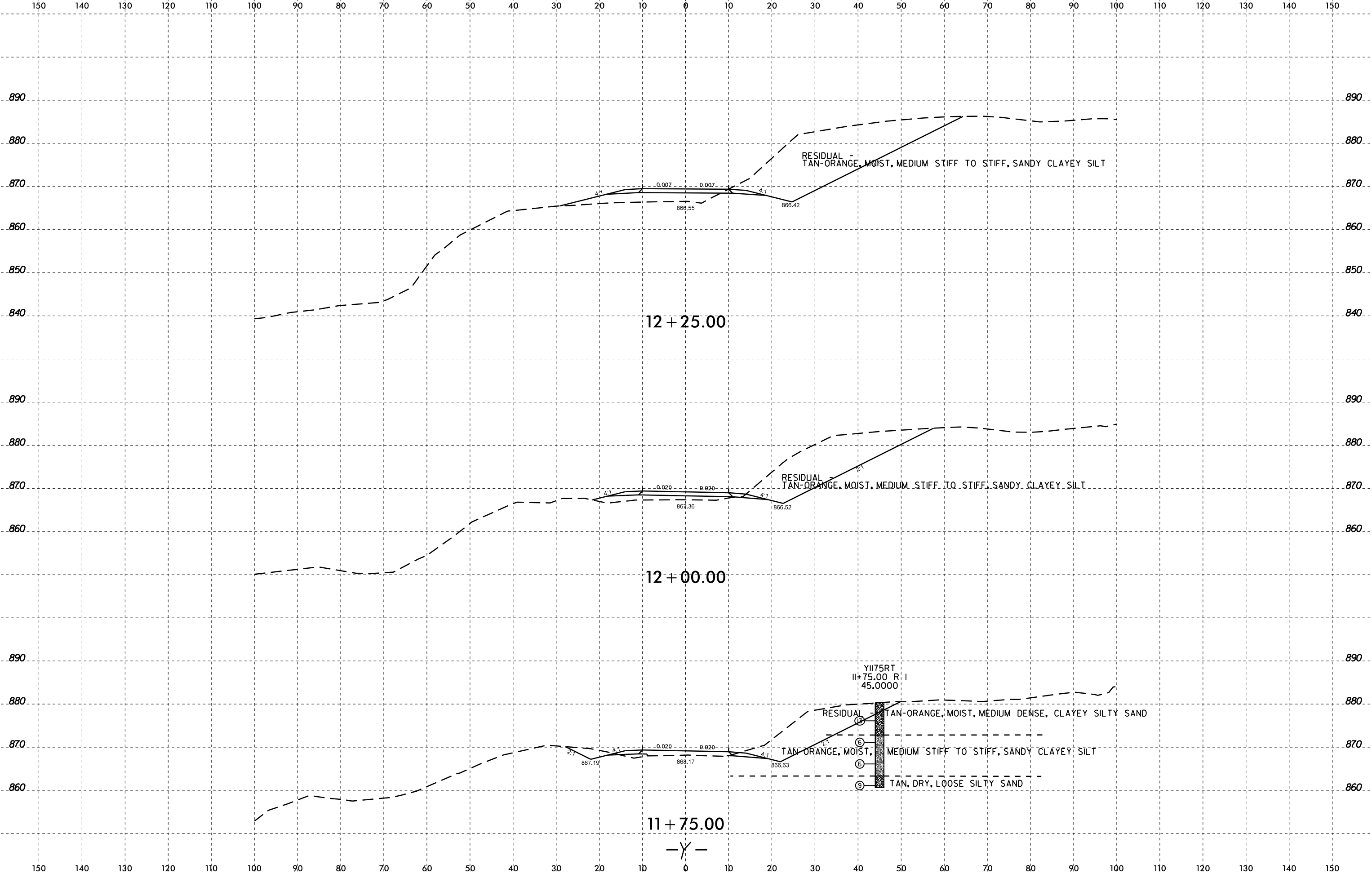
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