

**BRIDGE REPLACEMENT-CCS**  
**BRFN-005-1(67)--39-04**

**APPANOOSE CO.**

LETTING DATE  
 11/17/2020



**Highway Division**

PLANS OF PROPOSED IMPROVEMENT ON THE

PRIMARY ROAD SYSTEM  
**APPANOOSE COUNTY**  
 BRIDGE REPLACEMENT-CCS

Ditch 0.6 mi S of Co Rd T30

SCALES: As Noted

Refer to the Proposal Form for list of applicable specifications.

Value Engineering Saves. Refer to Article 1105.14 of the Specifications.



REVISIONS

TOTAL

35

PROJECT IDENTIFICATION NUMBER

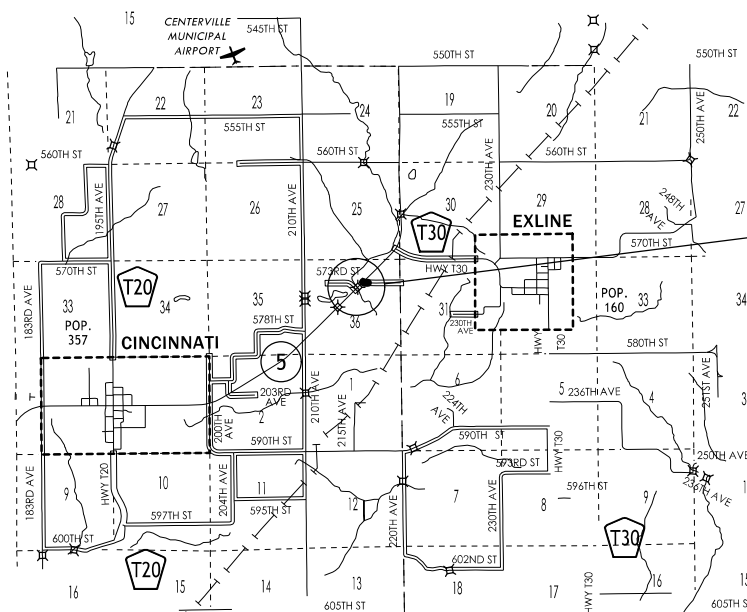
16-04-005-020

PROJECT NUMBER

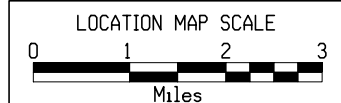
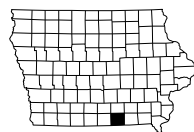
BRFN-005-1(67)--39-04

R.O.W. PROJECT NUMBER

STPN-005-1(68)--2J-04



Project Location  
 Sta. 545+86.96  
 FHWA No. 13901  
 Maint No. 0407.6S005  
 Ref. Loc. 7.64



**DESIGN DATA RURAL**

2017	AADT	2000	V.P.D.
2037	AADT	2200	V.P.D.
20--	DHV	--	V.P.H.
	TRUCKS	8	%
	Total		
	Design ESALs	--	

**INDEX OF SEALS**

SHEET NO.	NAME	TYPE
A.1	X	Primary Signature Block
X	X	X

**PRELIMINARY PLANS**

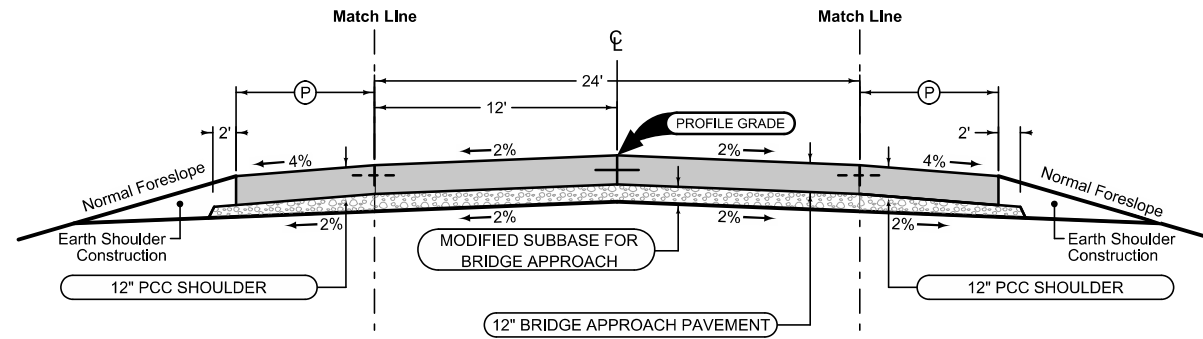
Subject to change by final design.

D5 PLAN - Date: XXXX/2019

**Shoulder at Bridge Approach**

PCC Shoulder Jointing:  
 Longitudinal joint: BT-1 or BT-5  
 Transverse joints: C at mainline spacing  
 HMA Shoulder Jointing:  
 Longitudinal joint: B

2_P_Guard_ 10-17-17		
STATION TO STATION		(P) Feet
544+38.20	545+11.53	10
546+62.39	547+35.73	10



Mainline Jointing:  
 See BR- 203

2P 10-19-10		
STATION TO STATION		
544+38.20	545+11.53	
546+62.39	547+35.73	

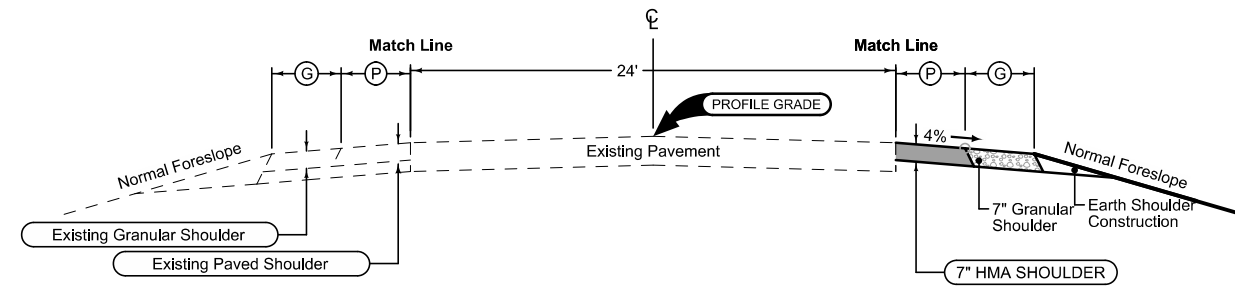
**Shoulder at Bridge Approach**

PCC Shoulder Jointing:  
 Longitudinal joint: BT-1 or BT-5  
 Transverse joints: C at mainline spacing  
 HMA Shoulder Jointing:  
 Longitudinal joint: B

2_P_Guard_ 10-17-17		
STATION TO STATION		(P) Feet
544+38.20	545+11.53	10
546+62.39	547+35.73	10

Refer to sheet U.1 for additional information.  
 See Tab 100-24 or 100-25 for pavement quantities.  
 See Tab 112-9 for shoulder quantities.

IA 5



**Combination Shoulder**

Shoulder Jointing:  
Longitudinal joint: B

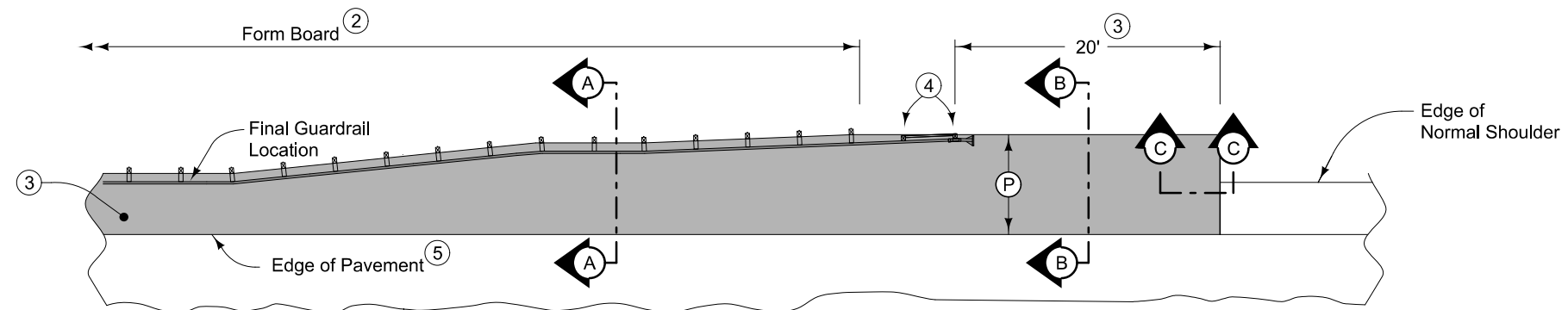
		2_C_10-15-13	
STATION TO STATION		(P) Feet	(G) Feet
539+15.00	542+30.96	4	6
548+57.34	551+21.59	4	6

See Tab 100-24 or 100-25 for pavement quantities.  
See Tab 112-9 for shoulder quantities.

IA 5







PLAN VIEW

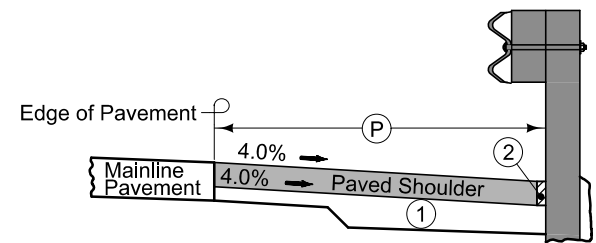
9" HMA Paved Shoulder at guardrail. 8" PCC may be substituted with the following jointing layout:

Match mainline pavement joint spacing. When mainline pavement is 8" or greater in thickness, place additional transverse 'C' joints in shoulder at mid-panel of the mainline pavement. Place longitudinal 'C' joint at P/2 from edge of mainline pavement when P is greater than 10' wide. Terminate longitudinal joint at transverse joint less than 10' in length.

Compaction of HMA is required to face of guardrail post. Hand compaction will be allowed under guardrail. Removal and reinstallation of guardrail will be allowed with no additional payment.

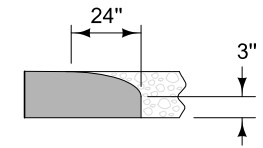
Refer to Tabulation 112-9 for shoulder quantities.

- ① 6" Special Backfill.
- ② PCC option only: When guardrail posts are installed prior to construction of PCC paved shoulder, fasten form board to the face of guardrail posts for the length shown. Refer to note 4 for final 2 posts.
- ③ Continue paved shoulder to existing paved shoulder or 20 feet beyond the center of the first post.
- ④ Shoulder may be notched for final 2 posts or post sleeves may be installed through pavement. Do not drive posts through pavement.
- ⑤ 'KT-1 joint for PCC shoulder. 'B' joint for HMA shoulder.



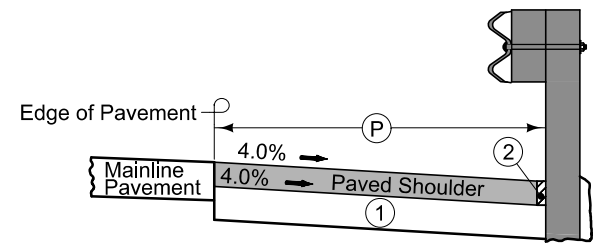
Section A-A

NEW CONSTRUCTION

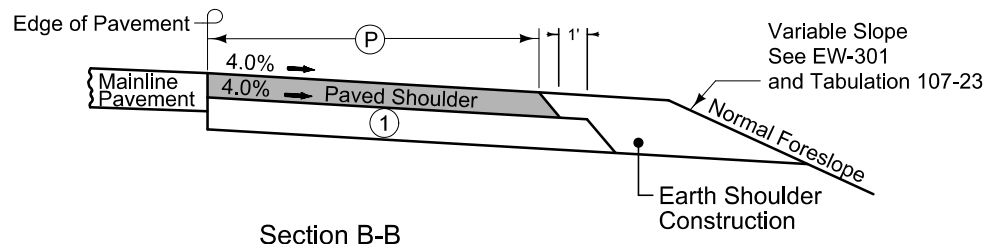


Section C-C  
Roll down at granular shoulder or earth.

PAVED SHOULDER AT GUARDRAIL



Section A-A



Section B-B

EXISTING SHOULDER

**SURVEY SYMBOLS**

- PC Curve Point
- PT Curve Point
- POT Tangent Point
- PI Tangent Point
- CP Control Point
- BM Bench Mark
- WC Wild Card (Misc. Field Shot)
- REF Reference Tie Point
- C Centerline BL of Road (ML or SR)
- SNP Unpaved Shoulder
- SH Paved Shoulder
- EP Edge of Paved Roads (ML or SR)
- ENU Edge Unpaved Entrance & Parking
- ENT Centerline BL of Entrance
- EG Edge of Gravel Road
- FO --- FO1D Fiber Optic Co. 1 - Quality D
- TP TPD Telephone Pedestal
- W --- WL1D Water Line Co. 1 - Quality D
- PPA Power Pole Co. 1
- DTM Photogrammetry Elv Control Check
- D Centerline Draw or Stream (Down)
- x FW Wire Fence
- TLNR Tree Line Right
- ← DU Centerline Draw or Stream (Up)
- OUT Tile Outlet
- Tile --- TIL Tile Line
- BL Topo Breakline
- GR Ground Shot
- BNK Stream Bank
- TLNL Tree Line Left
- EW Edge of Water
- ~~~~~ RIP Rip-Rap
- PLG Location of General Photo
- INB Storm Sewer Beehive Intake
- UE Utility Elevation
- PIP Pipe Culvert
- SOP Size of Pipe or Culvert
- PRO Profile Shot
- GDL Guard Rail Steel
- LIN Miscellaneous Line
- CON Concrete or A/C Slab
- BD Bridge Deck
- BCL Bridge Centerline
- BRG Bridge
- TOP Top of Bridge Pier
- BLS Bridge Low Steel
- BBL Profile Under Bridge
- SP Stream Profile
- TW Top of Water
- VS Channel Cross Section
- SBR Size of Bridge

**UTILITY LEGEND**

Sub-Surface Utility Mapping Quality Level is in accordance with CI/ASCE 38-02 Standard Guidelines for the Collection and Depiction of Existing Subsurface Utility Data.

Remark Abbreviations  
 QLA Quality Level A Highest guideline quality level  
 QLD Quality Level D Lowest guideline quality level

- FO --- FO1D Windstream Fiber Optic - Quality D
- TP TPD Telephone Pedestal Windstream
- W --- WL1D Rathbun Regional Water Line - Quality D

**PLAN VIEW COLOR LEGEND OF PLAN AND PROFILE SHEETS**

LINEWORK	Design Color No.	
Green	(2)	Existing Topographic Features and Labels
Blue	(1)	Proposed Alignment, Stationing, Tic Marks, and Alignment Annotation
Magenta	(5)	Existing Utilities
SHADING	Design Color No.	
Yellow	(4)	Highlight for Critical Notes or Features
Red	(3)	Delineates Restricted Areas
Lavender	(9)	Temporary Pavement Shading
Gray, Light	(48)	Proposed Pavement Shading
Gray, Med	(80)	Proposed Granular Shading
Gray, Dark	(112)	Proposed Grade and Pave Shading "In conjunction with a paving project"
Brown, Light	(236)	Grading Shading
Tan	(8)	Proposed Sidewalk Shading
Blue, Light	(230)	Proposed Sidewalk Landing Shading
Pink	(11)	Proposed Sidewalk Ramp Shading

**PROFILE VIEW COLOR LEGEND OF PLAN AND PROFILE SHEETS**

LINEWORK	Design Color No.	
Green	(2)	Existing Ground Line Profile
Blue	(1)	Proposed Profile and Annotation
Magenta	(5)	Existing Utilities
Blue, Light	(230)	Proposed Ditch Grades, Left
Black	(0)	Proposed Ditch Grades, Median
Rust	(14)	Proposed Ditch Grades, Right

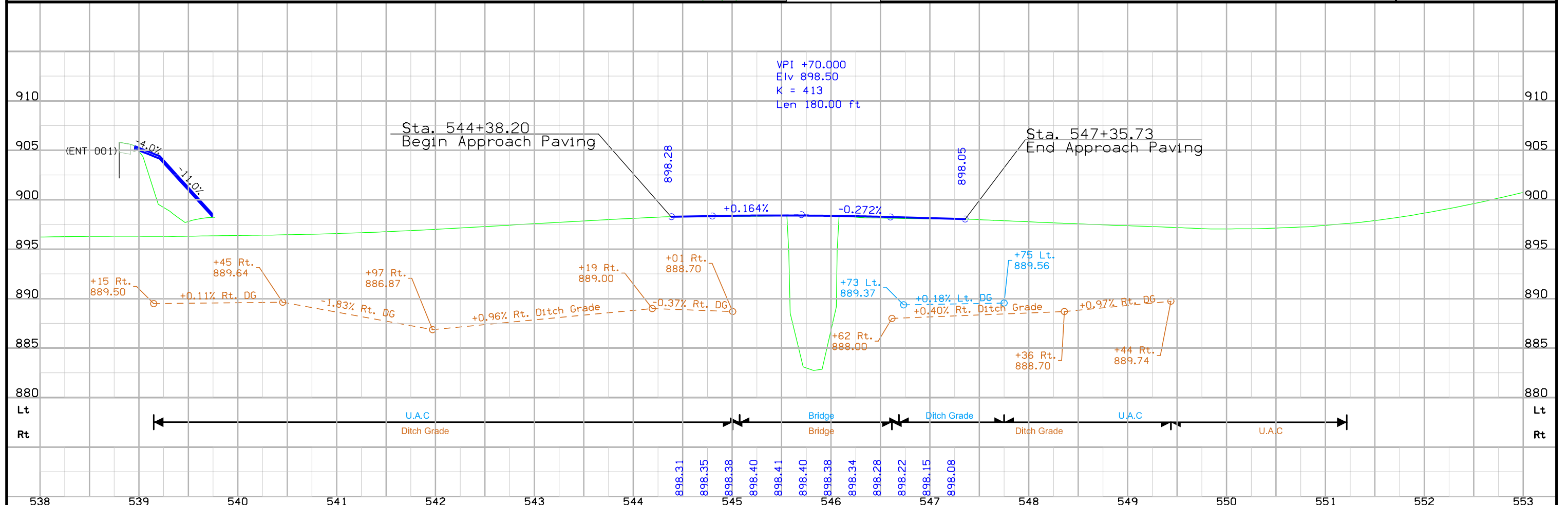
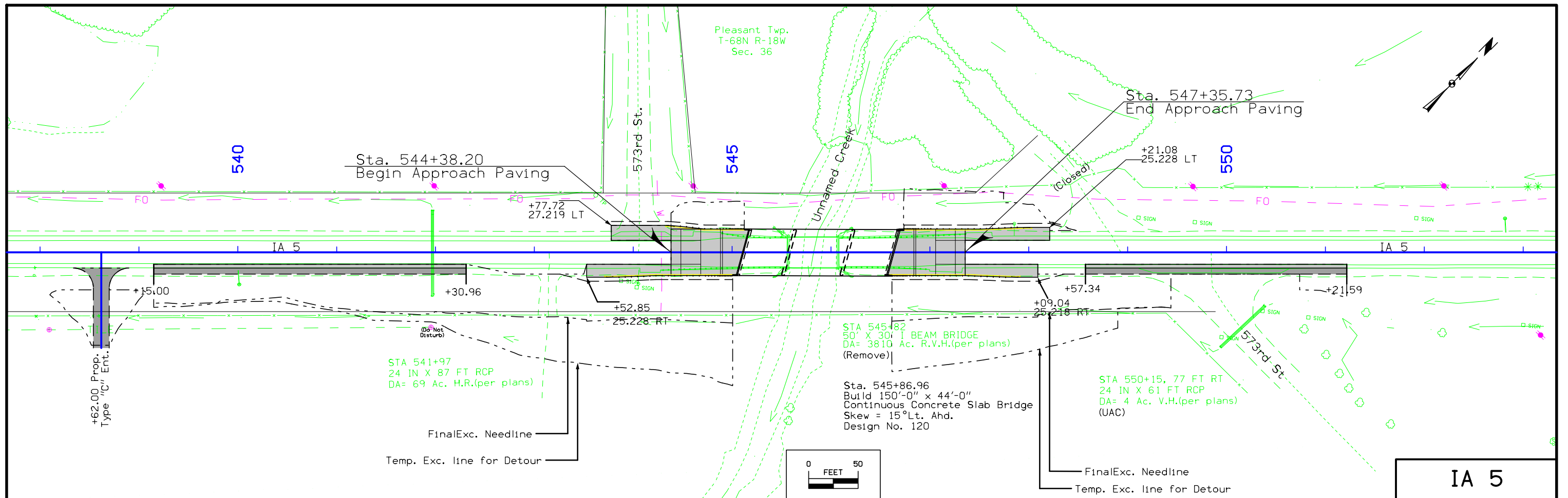
- Reference Point
- Station
- Survey Line
- Section Corner
- Ground Line Intercept
- Saw Cut
- Guardrail
- Trench Drain
- HighTension Cable Guardrail
- Sheet Pile
- Pavement Removal
- Clearing & Grubbing Area

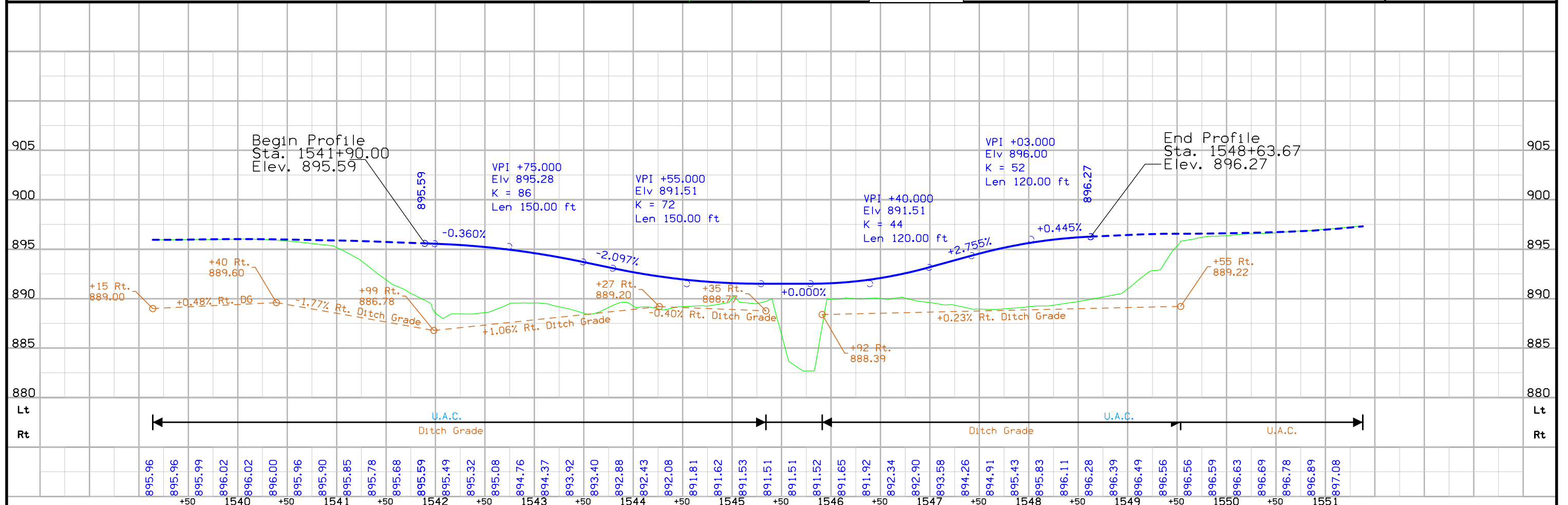
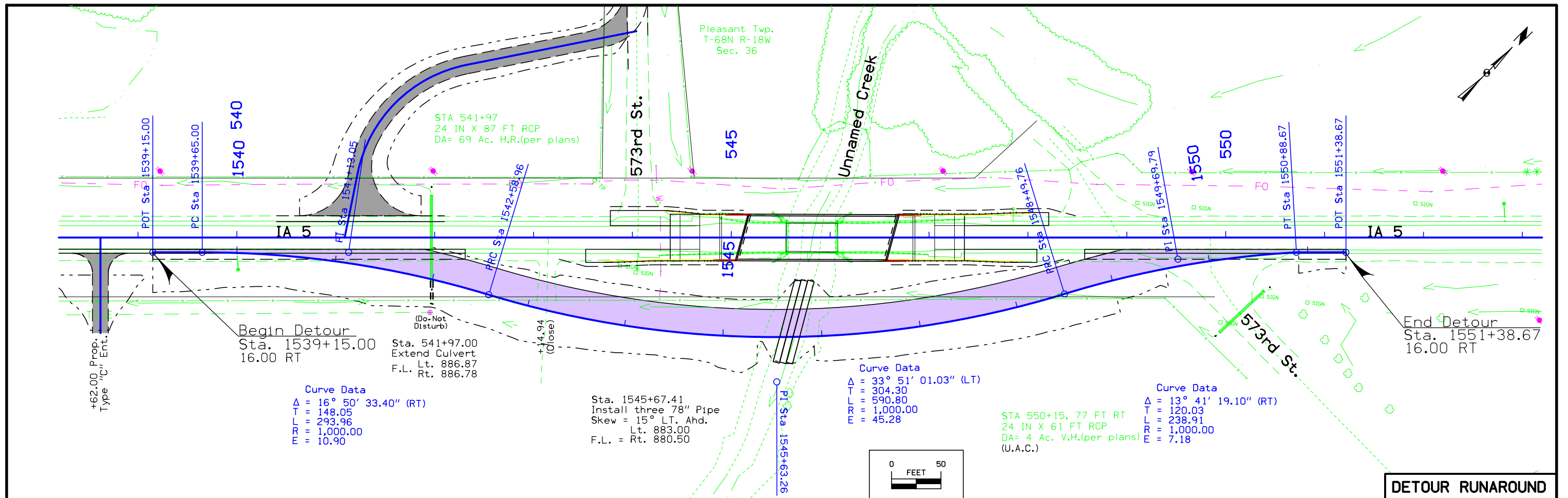
**RIGHT-OF-WAY LEGEND**

- Proposed Right-of-Way
- Existing Right of Way
- Existing and Proposed Right-of-Way
- Easement and Existing Right-of-Way
- Easement (Temporary)
- Easement
- Access Control
- Property Line

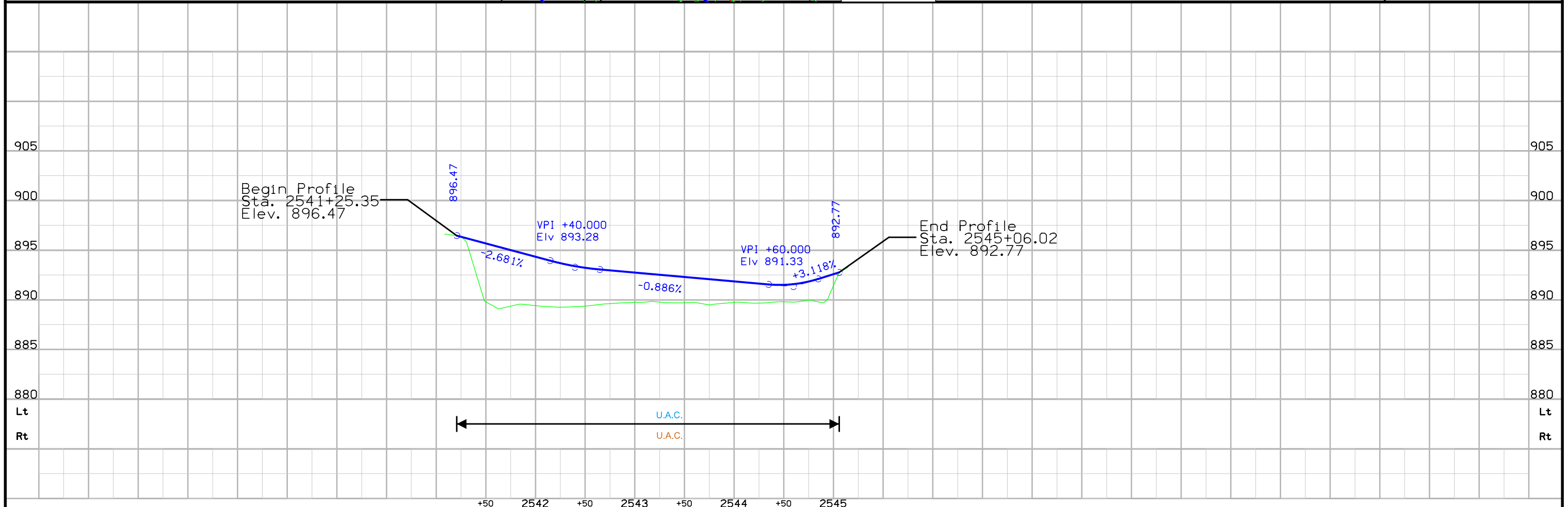
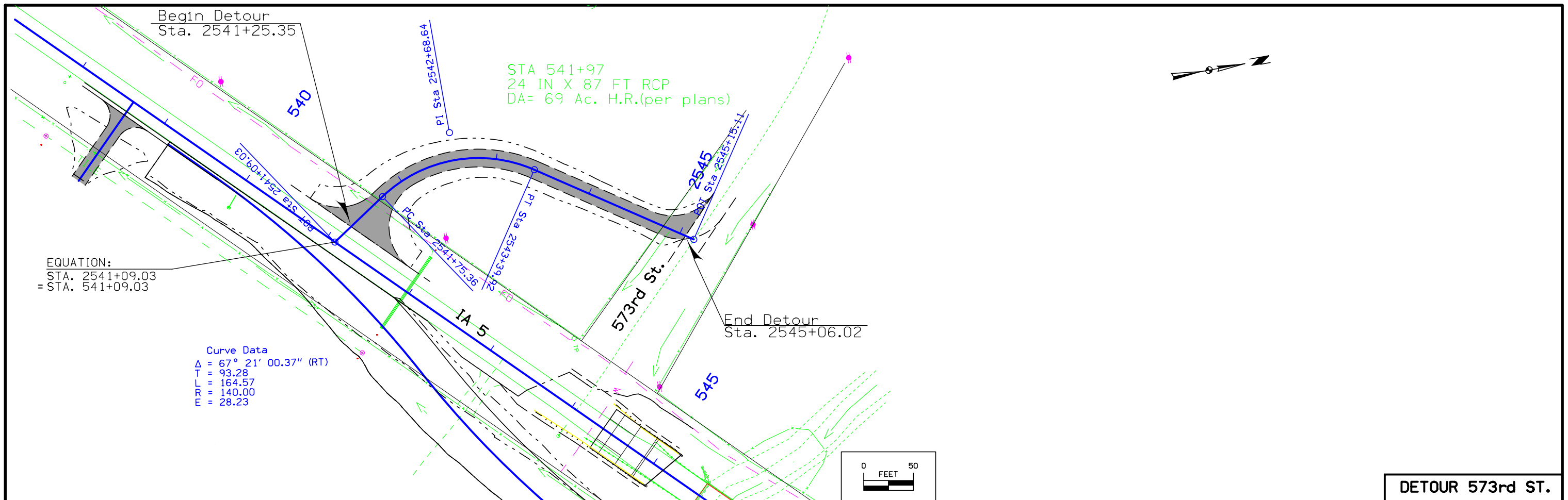
**PLAN AND PROFILE LEGEND AND SYMBOL INFORMATION SHEET**

(COVERS SHEET SERIES D, E, F, & K)





FILE NO. 31644	ENGLISH	DESIGN TEAM HOLST \ TAMRAKAR	APPANOOSE COUNTY	PROJECT NUMBER BRFN-005-1(67)--39-04	SHEET NUMBER F.1
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## Survey Information

Appanoose County  
BRFN-005-1(69)--39-04  
Shoal Creek 2.8 mi N of Co Rd T20  
PIN 16-04-005-030  
Sap-0922

### General Information

Measurement units for this survey are US survey feet. This survey is for proposed bridge replacements on Iowa Hwy 5. Bridge over Shoal Creek 2.8 mi N of Co Rd T20 and bridge on a Ditch 0.6 mi S of Co Rd T30. Project datum and control information is provided by Design Survey Office. This is a partial terrain field survey with aerial image acquired terrain added in the Photogrammetry section of the Design Office.

### Vertical Control

Vertical datum for this survey is NAVD88 (Computed using Geoid12A). GRS80 Ellipsoidal Height was computed at project Pt. CP001 by doing 6-hour static observations. The project control is relative to nearby Iowa RTN and Missouri RTN Base Stations.

This survey observed 1 NGS Control Monument with published NAVD88 heights to compare to local ground control:

NGS 1st. order class II mark designated X 7 has a published Elev. Of 1032.06  
Survey Elev. = 1032.15

This survey observed 2 local area county Control Monuments with published NAVD88 heights to compare to local ground control:

Appanoose County Control mark GPS 8035 has a published Elev. of 1008.47  
Survey Elev. = 1008.53

Appanoose County Control mark GPS 8036 has a published Elev. of 999.82  
Survey Elev. = 999.98

This survey observed 2 As-Built plan benchmarks to compare to local ground control:

BM 500 This Survey Elev. = 900.134 = Project F781(3) BM Sta 549+41(sheet no. 15) Elev. 89.87

BM 501 This Survey Elev. = 898.603 = Project F781(3) BM Sta 5445+51(sheet no. 16) Elev. 88.39

### Horizontal Control

The project coordinate system for this survey is Iowa RCS Zone 12 (U.S. Survey Feet). This survey control is relative to IaRTN reference stations. IaRTN Reference Station coordinates are relative to the National Reference Station network datum: NAD83 (2011) for Epoch 2010.00. Coordinates were determined by conducting a six-hour static observation. Additional control points were placed throughout the project using a GNSS Base-Rover setup relative to point CP001.

### Alignment Information

The horizontal alignment for this survey is a retrace of As-built Plans No FN-5-1(31)--21-04. Survey stationing was equated to the plan POT at STA 515+15.10 and run ahead without equation throughout the survey.

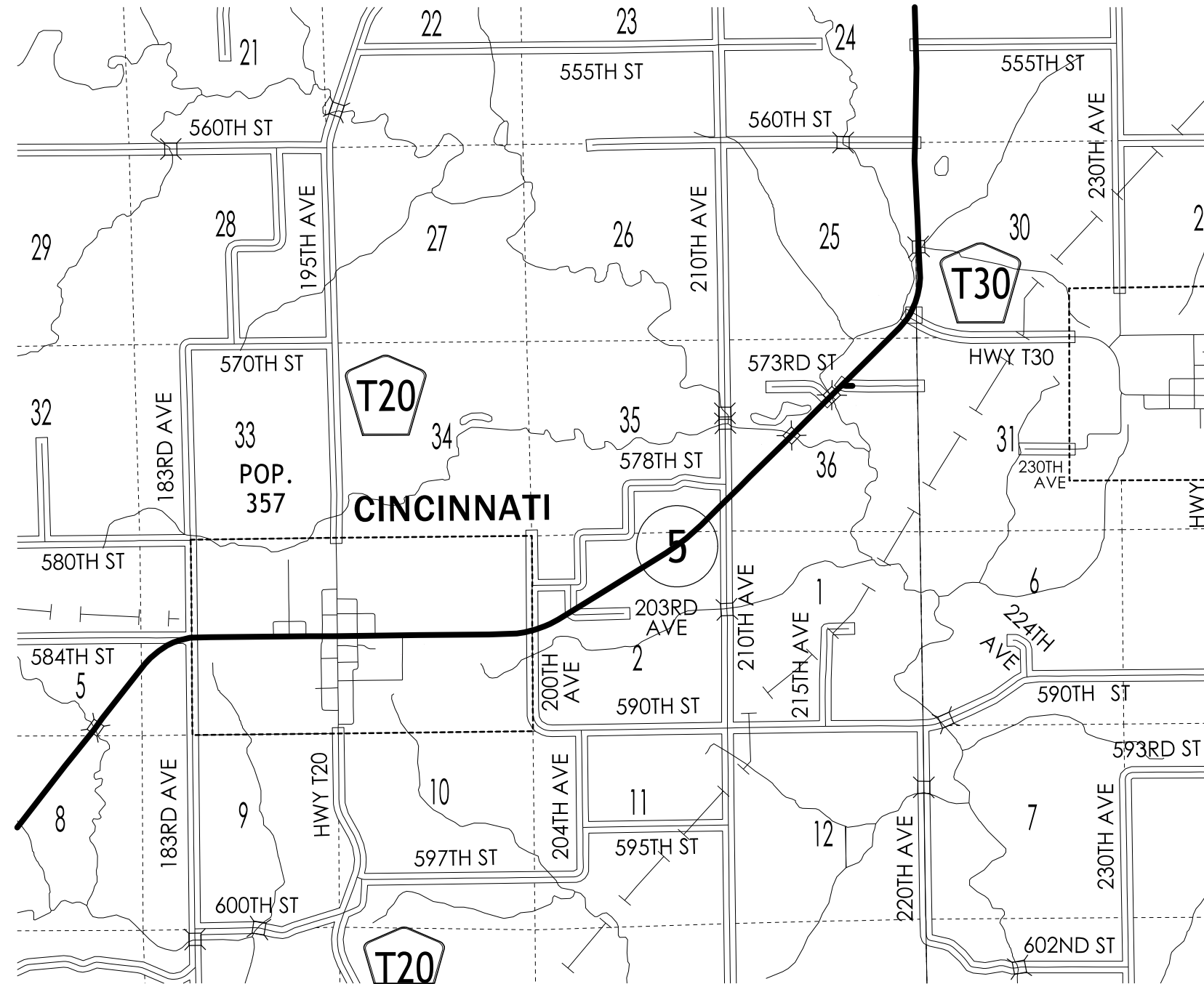
Survey stationing relates to as built plan stationing as follows:

POT Sta. 515+15.10 As-built Plans Project No. FN-5-1(31)--21-04  
Survey POT Sta. 515+15.10

PC Sta. 570+76.20 Project No. FN-5-1(31)--21-04  
Survey PC STA 570+69.76

## CONTROL POINT VICINITY MAP

This map is a guide to the vicinity of the primary project control points.  
 Primary control is for use with RTK base stations and for RTN validation.  
 Future surveys will use primary project control to establish temporary control as needed for construction or other surveying applications.



HORIZ. DATUM: NAD83(2011) EPOCH 2013.00

VERT. DATUM: NAVD88

1a. Regional Coordinate System Zone 12  
 Coordinate listing from next sheet will be used with 1aRTN for monument recovery. No other reference ties are given.

# HORIZONTAL AND VERTICAL PROJECT CONTROL COORDINATE LISTING

HORIZ. DATUM: NAD83(2011) EPOCH 2013.00

VERT. DATUM: NAVD88

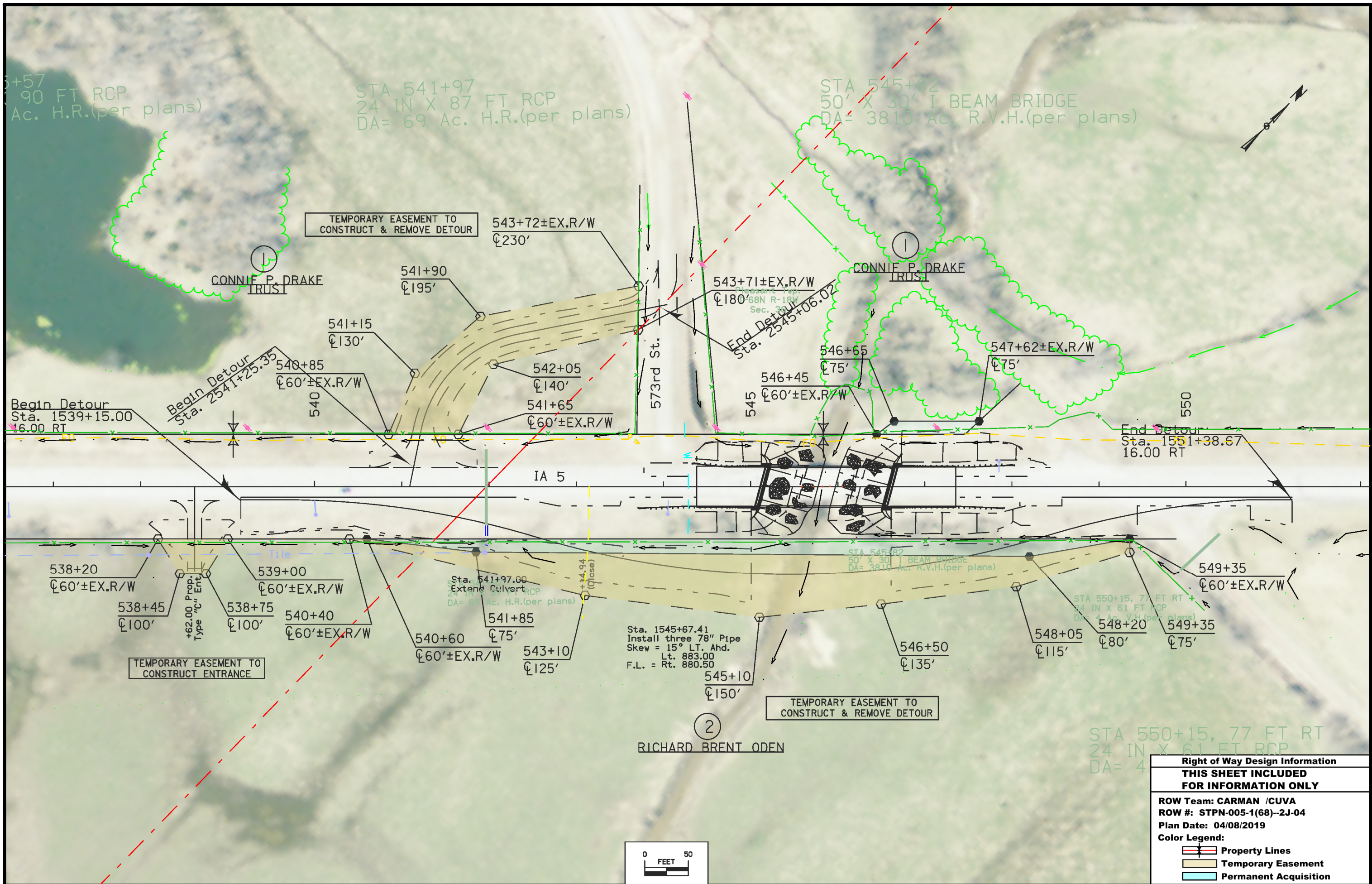
## Ia. Regional Coordinate System Zone 12

Point Name	Northing	Easting	Elevation	Feature Definition	Description
500	6102361.195	22741342.084	900.130	BM	500 FND IDOT BUTON SW WING BRIDGE
501	6103495.595	22742484.407	898.600	BM	501 FND IDOT BUTON SW WING BRIDGE
CP001	6105669.998	22744730.910	917.400	FENO	SET FENO TYPE MONUMENT EAST OF INTERSECTION OF IOWA HIGHWAY 5 & COUNTY ROAD T-30, 114 FEET NE OF CL OF COUNTY ROAD T-30, 104 FEET SOUTH EAST OF CL OF IOWA HIGHWAY 5, 71.5 FEET NORTH EAST OF THE TOP OF A 24 INCH RCP APRON INLET, 183.5 FEET NORTH OF A WOOD FENCE CORNER POST. ( <a href="https://www.ngs.noaa.gov/OPUS/getDatasheet.jsp?PID=BBFV81">https://www.ngs.noaa.gov/OPUS/getDatasheet.jsp?PID=BBFV81</a> )
X7	6096470.646	22730836.652	1032.150	CP	FND NGS MONUMENT PID LE0188 ( <a href="https://www.ngs.noaa.gov/OPUS/getDatasheet.jsp?PID=LE0188">https://www.ngs.noaa.gov/OPUS/getDatasheet.jsp?PID=LE0188</a> )

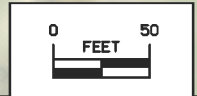


NO ACCESS RIGHTS ARE TO BE ACQUIRED ON THIS PROJECT.





Right of Way Design Information	
<b>THIS SHEET INCLUDED FOR INFORMATION ONLY</b>	
ROW Team: CARMAN /CUVA	
ROW #: STPN-005-1(68)--2J-04	
Plan Date: 04/08/2019	
Color Legend:	
	Property Lines
	Temporary Easement
	Permanent Acquisition





108-23A  
08-01-08

**TRAFFIC CONTROL PLAN**

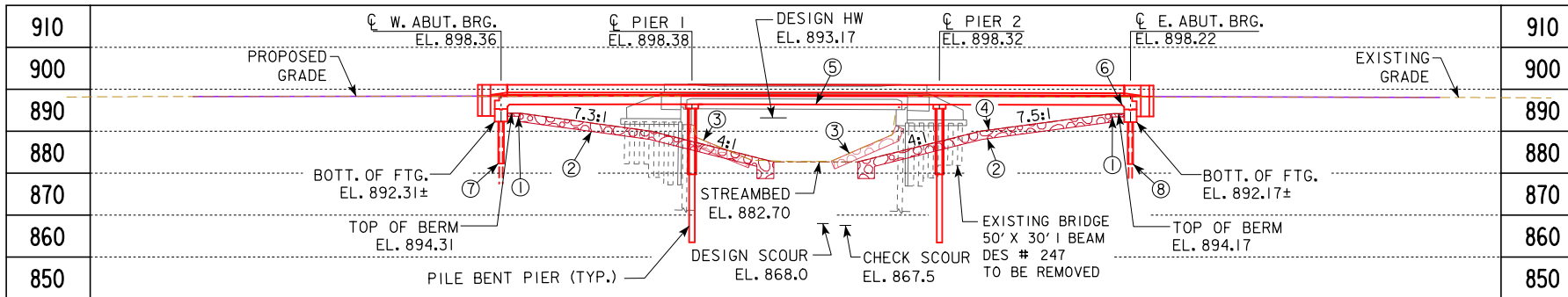
IA 005 traffic will be maintained at all times with a temporary runaround.  
573rd Street West will be maintained by runaround.  
573rd Street East will U.A.C.

108-25  
10-21-14

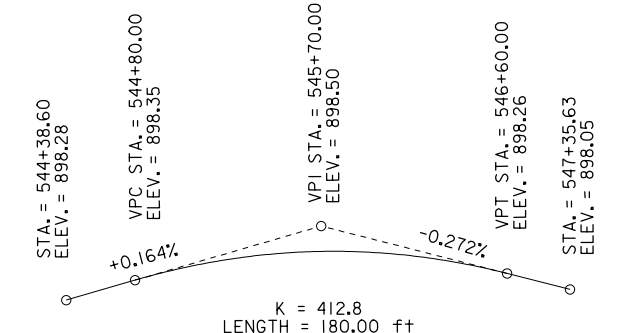
**511 TRAVEL RESTRICTIONS**

Route	Direction	County	Location Description	Feature Crossed	Object Type	Maint. Bridge No., Structure ID, or FHWA No.	Type of Restriction	Existing Measurement	Construction Measurement	Construction Measurement as Signed	Projected As Built Measurement	Remarks
IA 5	NB/SB	Appanoose	Ditch 0.6 mi S of Co Rd T30									

BENCH MARK NO. 501, 6103495.595N, 22742484.407E, FND IDOT BUTTON SW WING BRIDGE, EL. 898.600



- ① BERM PROTECTION EROSION STONE (0-9 THICK. MIN.) UNDERLAIN W/ ENGR. FABRIC
- ② BERM PROTECTION CLASS E REVET. (2' THICK. MIN.) UNDERLAIN W/ ENGR. FABRIC
- ③ EXISTING CLASS E REVETMENT
- ④ GRADING SURFACE
- ⑤ REGULATORY LOW BEAM
- ⑥ OPERATIONAL LOW BEAM
- ⑦ PRE BORE HOLES, 1'-4 DIA., BOTTOM EL. 882.31
- ⑧ PRE BORE HOLES, 1'-4 DIA., BOTTOM EL. 882.17



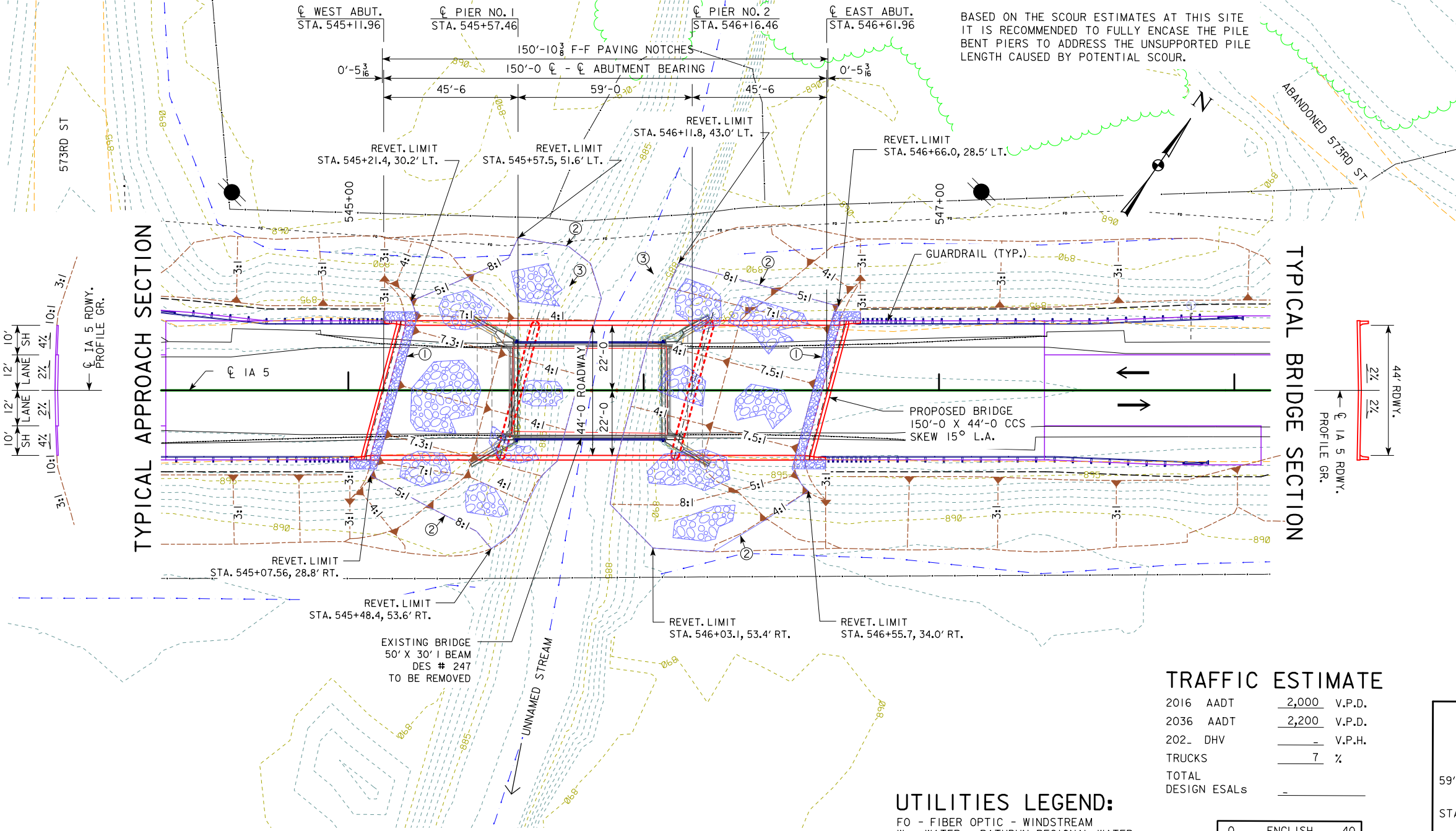
PROPOSED PROFILE GRADE IA 5

TOP OF BRIDGE DECK AT CENTERLINE ROADWAY IS 0.03' BELOW PROFILE GRADE TO ACCOUNT FOR PARABOLIC CROWN.

LONGITUDINAL SECTION ALONG  $\bar{C}$  APPROACH ROADWAY

NOTE TO FINAL DESIGNER:

BASED ON THE SCOUR ESTIMATES AT THIS SITE IT IS RECOMMENDED TO FULLY ENCASE THE PILE BENT PIERS TO ADDRESS THE UNSUPPORTED PILE LENGTH CAUSED BY POTENTIAL SCOUR.



HYDRAULIC DATA

DRAINAGE AREA = 6.2 SQ. MI.  
 STREAM SLOPE = 10.6 FT./MI.  
 AVG. LOW WATER STAGE = 883.7

$Q_{50}$  = 4,510 CFS  
 STAGE = 893.17  
 REGULATORY LOW BEAM = 895.98  
 BACKWATER = 1.36 FT.  
 AVG. BRIDGE VELOCITY = 6.9 FPS

$Q_{100}$  = 5,550 CFS  
 STAGE = 893.70  
 OPERATIONAL LOW BEAM = 895.83  
 BACKWATER = 1.79 FT.  
 AVG. BRIDGE VELOCITY = 7.7 FPS

$Q_{200}$  = 6,680 CFS  
 STAGE = 894.23  
 CALCULATED DESIGN SCOUR = 868.0

$Q_{500}$  = 8,040 CFS  
 STAGE = 894.79  
 AVG. BRIDGE VELOCITY = 9.2 FPS  
 CALCULATED CHECK SCOUR = 867.5

ROADWAY OVERTOP 896.0  
 STA. 537+88

EXTREME HW STAGE = UNKNOWN  
 DATE = UNKNOWN

LOCATION

IA 5 OVER DRAINAGE DITCH  
 T-68N R-18W  
 SECTION 36  
 PLEASANT TOWNSHIP  
 APPANOOSE COUNTY  
 FHWA NO. 13901  
 BRIDGE MAINT. NO. 0407.6S005  
 LATITUDE 40.648507°  
 LONGITUDE 92.876049°

TRAFFIC ESTIMATE

2016 AADT	2,000	V.P.D.
2036 AADT	2,200	V.P.D.
202. DHV		V.P.H.
TRUCKS	7	%
TOTAL DESIGN ESALS		

UTILITIES LEGEND:

FO - FIBER OPTIC - WINDSTREAM  
 W - WATER - RATHBUN REGIONAL WATER



SITUATION PLAN

PRELIMINARY

DESIGN FOR 15° SKEW L.A.

**150'-0 X 44'-0**  
**CONTINUOUS CONCRETE STAB BRIDGE**

59'-0 CENTER SPAN 45'-6 END SPANS

**SITUATION PLAN**

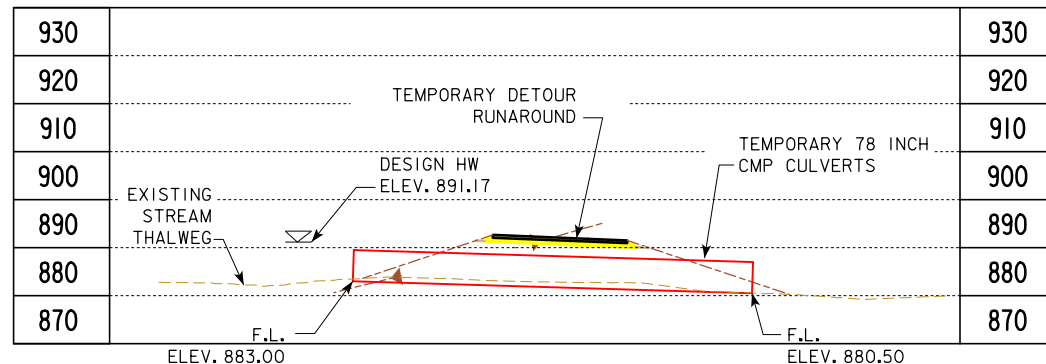
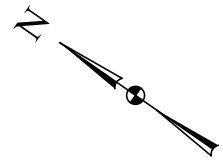
STATION 545+86.96 SEPTEMBER 2018

**APPANOOSE COUNTY**

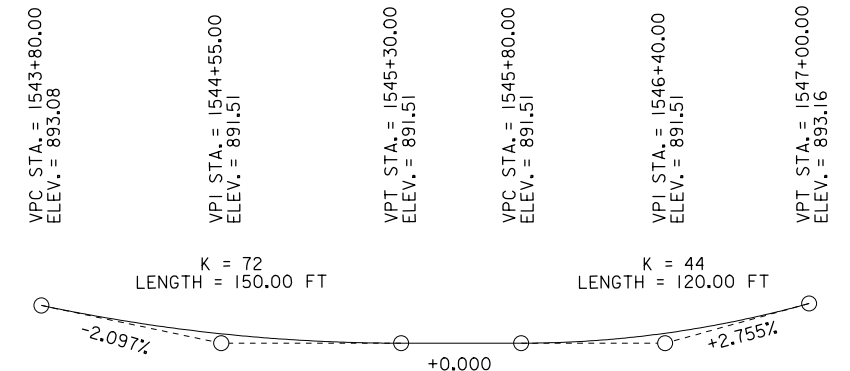
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 1 OF 3 FILE NO. 31644 DESIGN NO. 120



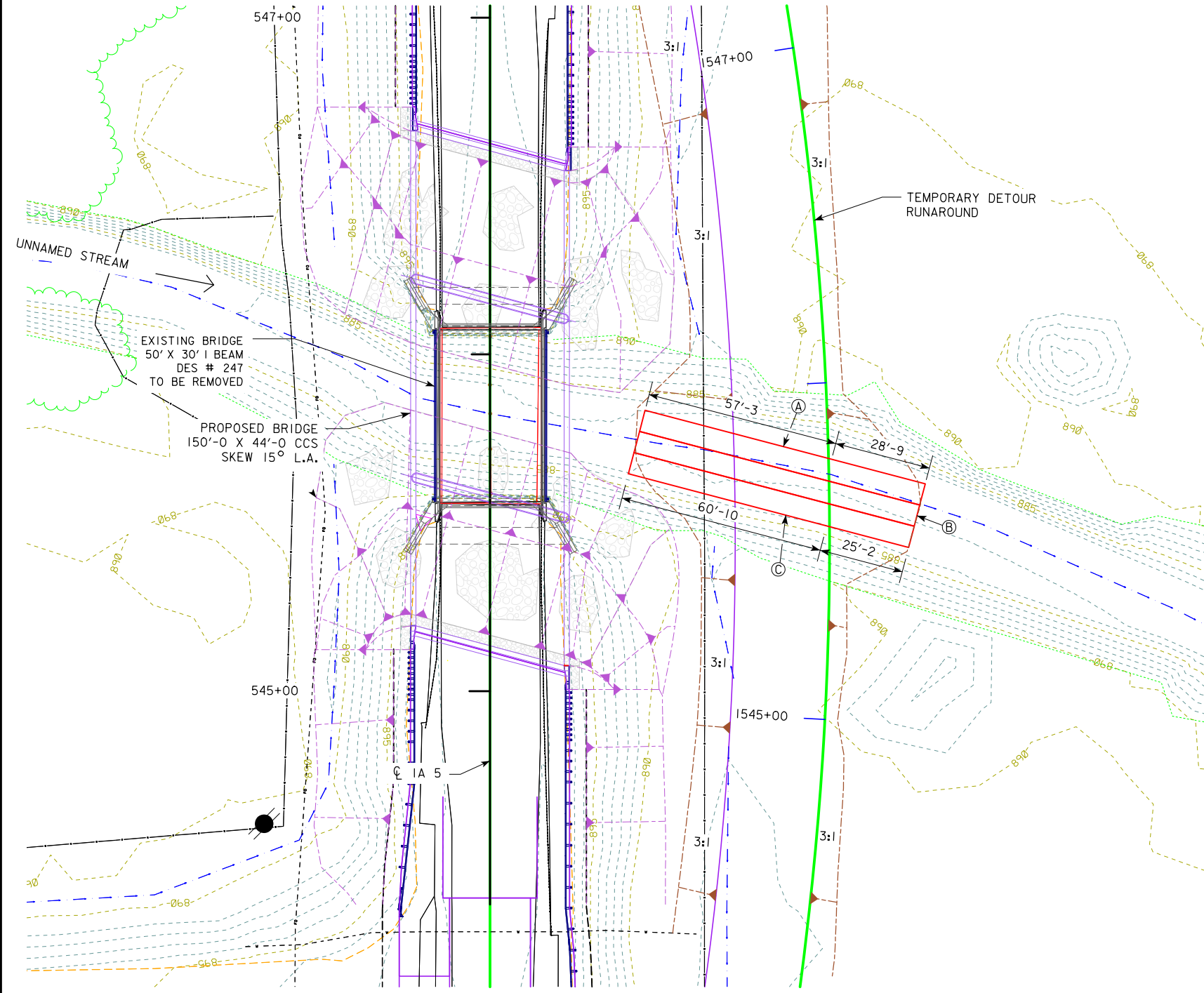




LONGITUDINAL SECTION ALONG CL CULVERTS



PROPOSED PROFILE DETOUR RUNAROUND



SITUATION PLAN

- Ⓐ 78" X 86'-0" CMP CULVERT  
STA. 1545+74.16  
SKEW 15° LT AHEAD  
F.L. LT. 883.00  
F.L. RT. 880.50
- Ⓑ 78" X 86'-0" CMP CULVERT  
STA. 1545+67.41  
SKEW 15° LT AHEAD  
F.L. LT. 883.00  
F.L. RT. 880.50
- Ⓒ 78" X 86'-0" CMP CULVERT  
STA. 1545+60.67  
SKEW 15° LT AHEAD  
F.L. LT. 883.00  
F.L. RT. 880.50

LOCATION

IA 5 DETOUR RUNAROUND  
OVER DRAINAGE DITCH  
T-68N R-18W  
SECTION 36  
PLEASANT TOWNSHIP  
APPANOOSE COUNTY  
LATITUDE 40.648255°  
LONGITUDE 92.875868°

HYDRAULIC DATA

DRAINAGE AREA = 6.2 SQ. MI.  
Q<sub>5</sub> = 1,000 CFS  
HW ELEV. = 891.17  
STREAM SLOPE = 10.6 FT./MI.

TRAFFIC ESTIMATE-IA 5

2016 AADT	2,000	V.P.D.
2036 AADT	2,200	V.P.D.
202_ DHV		V.P.H.
TRUCKS	7	%
TOTAL DESIGN ESALs		

UTILITIES LEGEND:

FO - FIBER OPTIC - WINDSTREAM  
W - WATER - RATHBUN REGIONAL WATER

NOTE: THIS DRAWING SHOWS INTERIM CONDITION DURING CONSTRUCTION. SEE SHEETS V.1 AND V.2 FOR FINAL GRADING AND BRIDGE PLAN.

PRELIMINARY

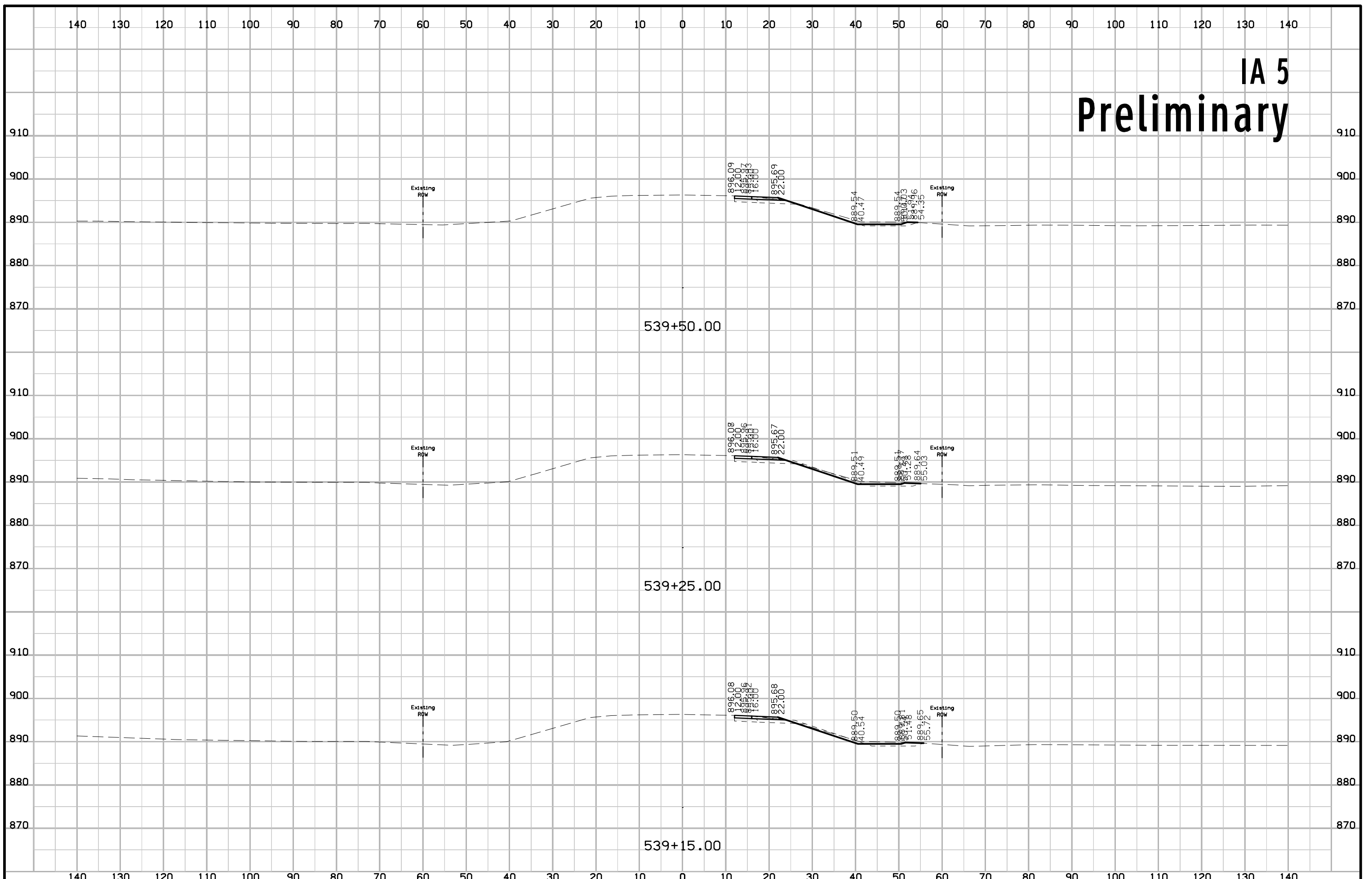
DESIGN FOR 15° SKEW L.A.  
**TEMPORARY 78 INCH  
CORRUGATED METAL PIPE  
CULVERTS  
SITUATION PLAN**

STATION 1545+67.41      SEPTEMBER 2018  
**APPANOOSE COUNTY**

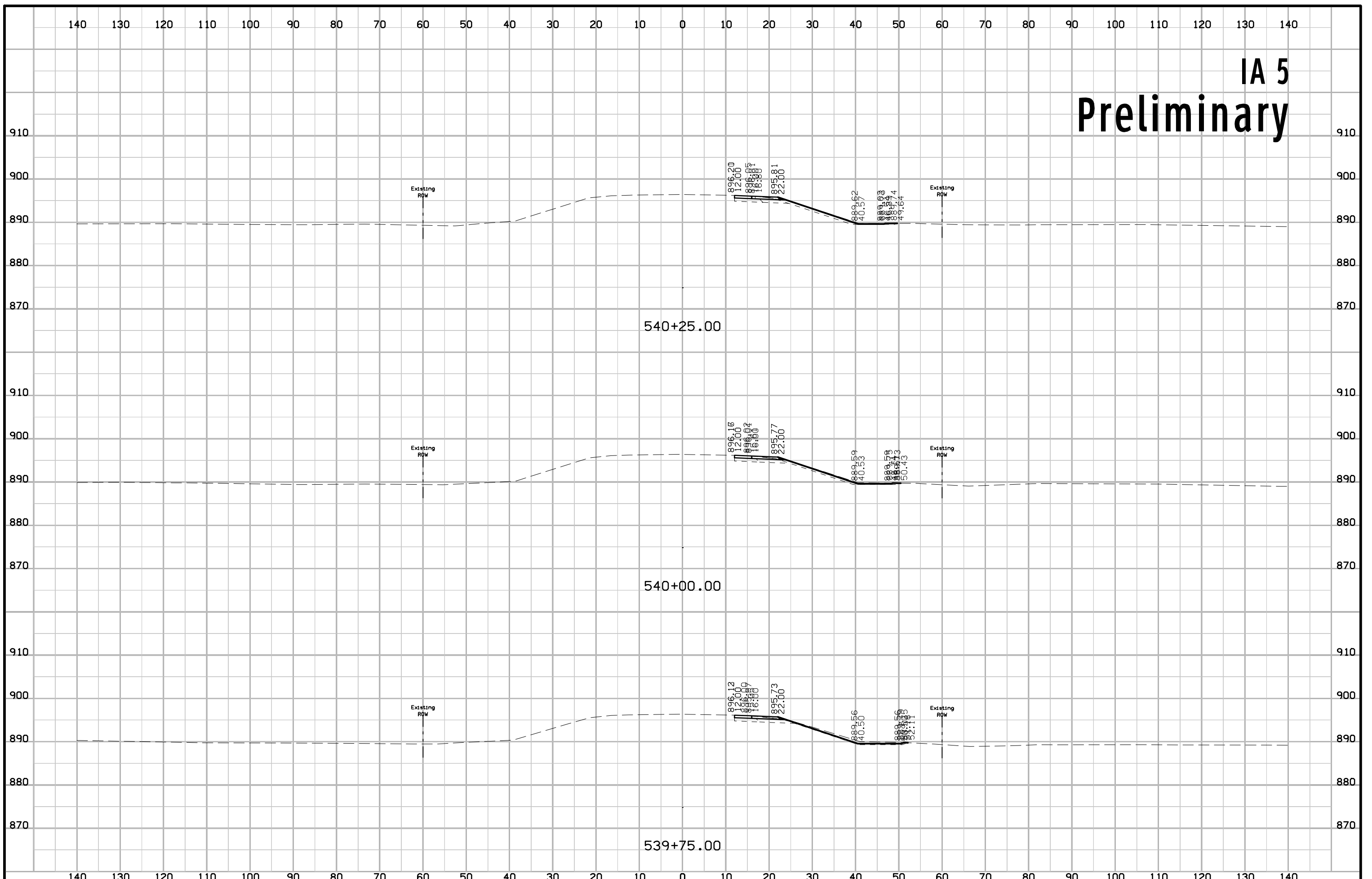
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
DESIGN SHEET NO. 3 OF 3    FILE NO. 31644    DESIGN NO. 120



# IA 5 Preliminary



# IA 5 Preliminary



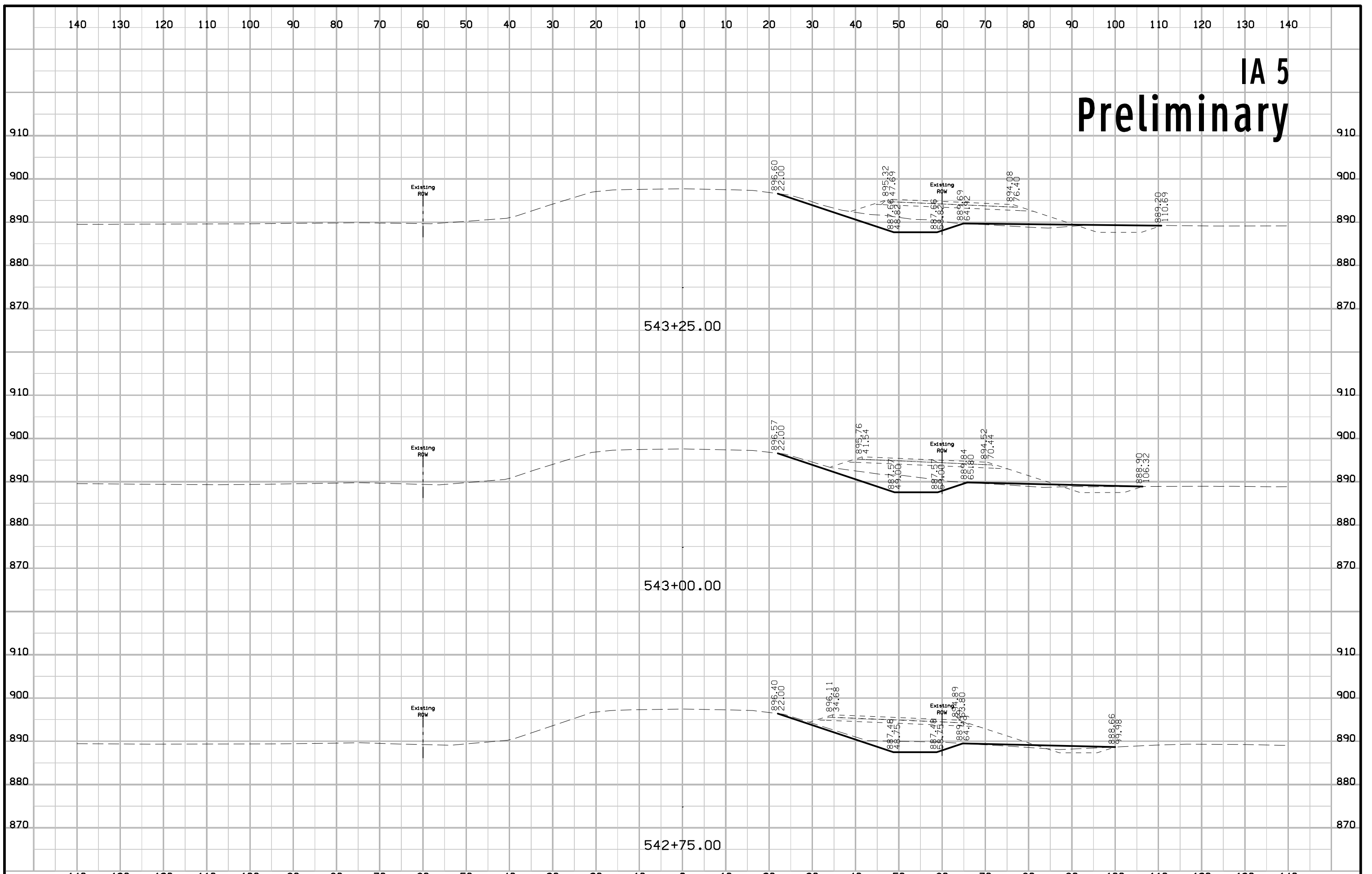






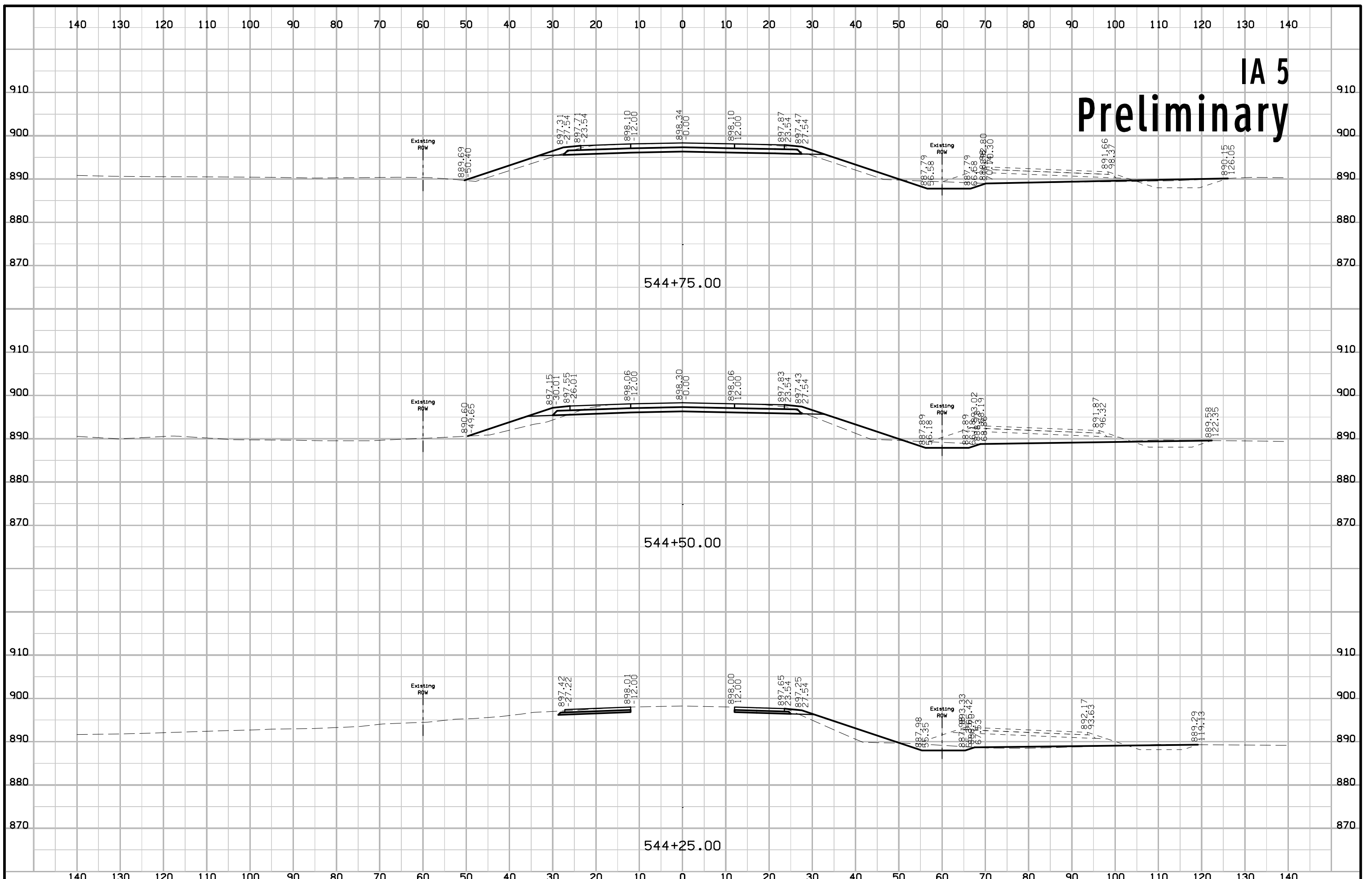


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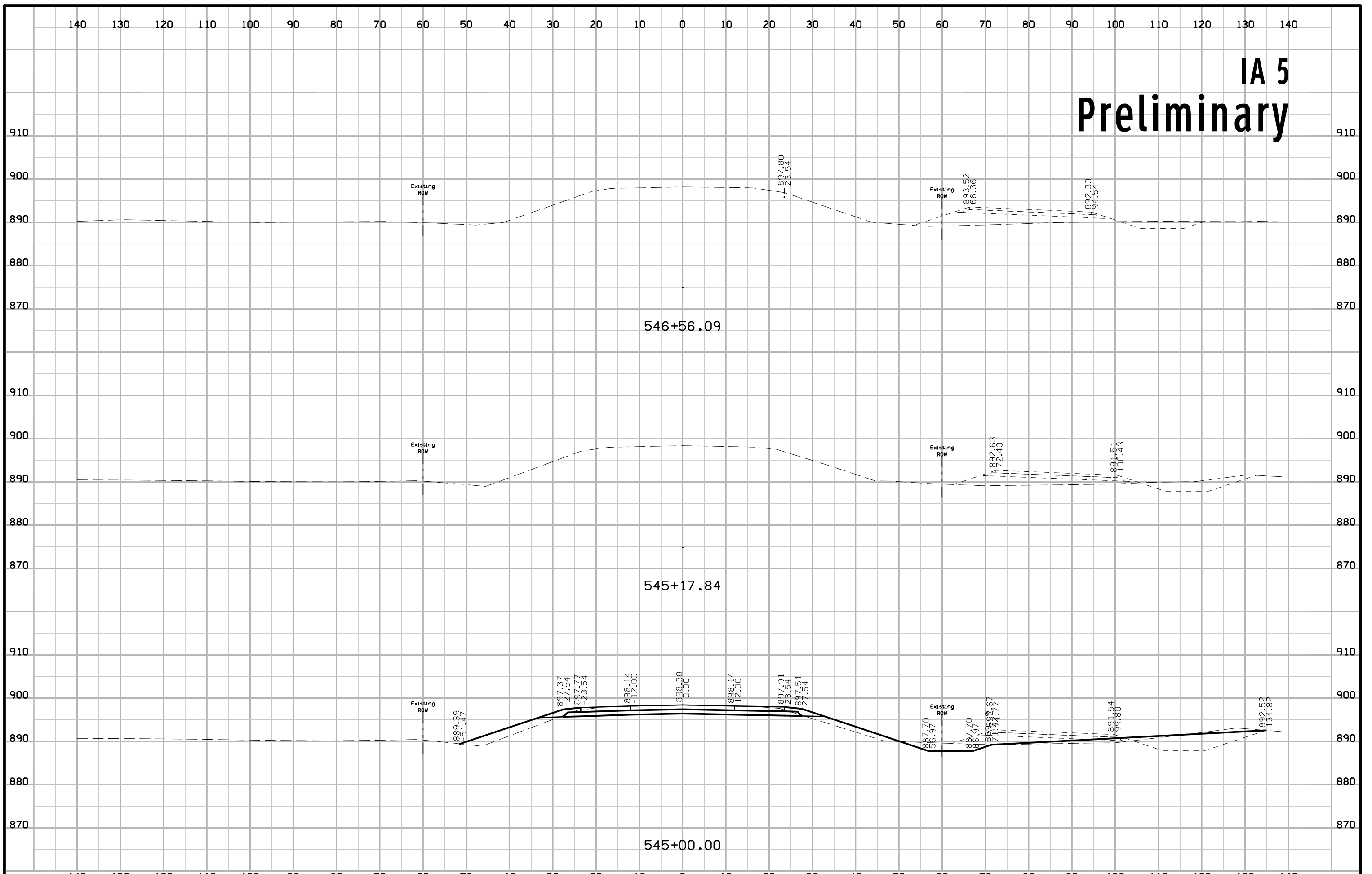




# IA 5 Preliminary



# IA 5 Preliminary

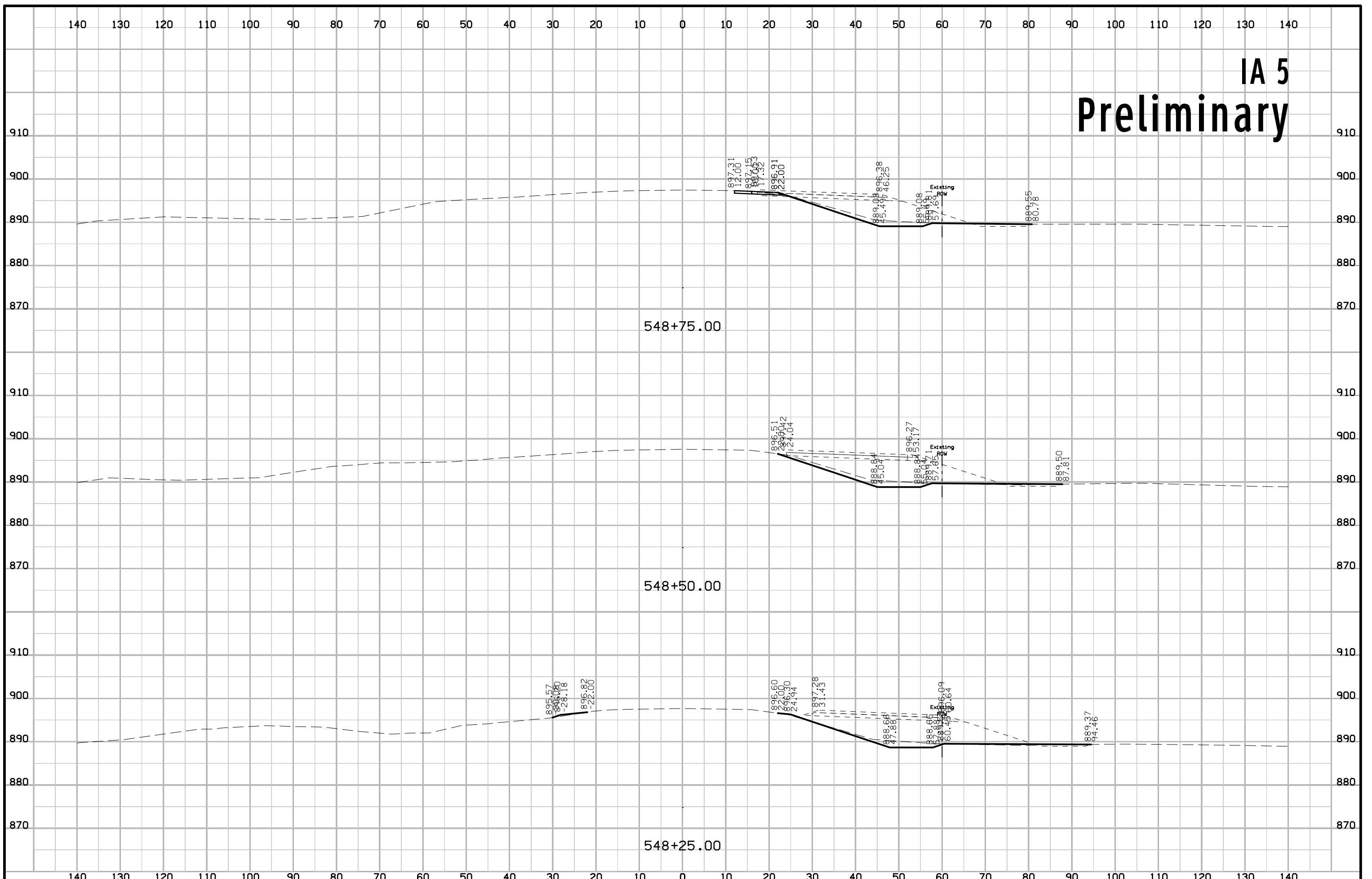




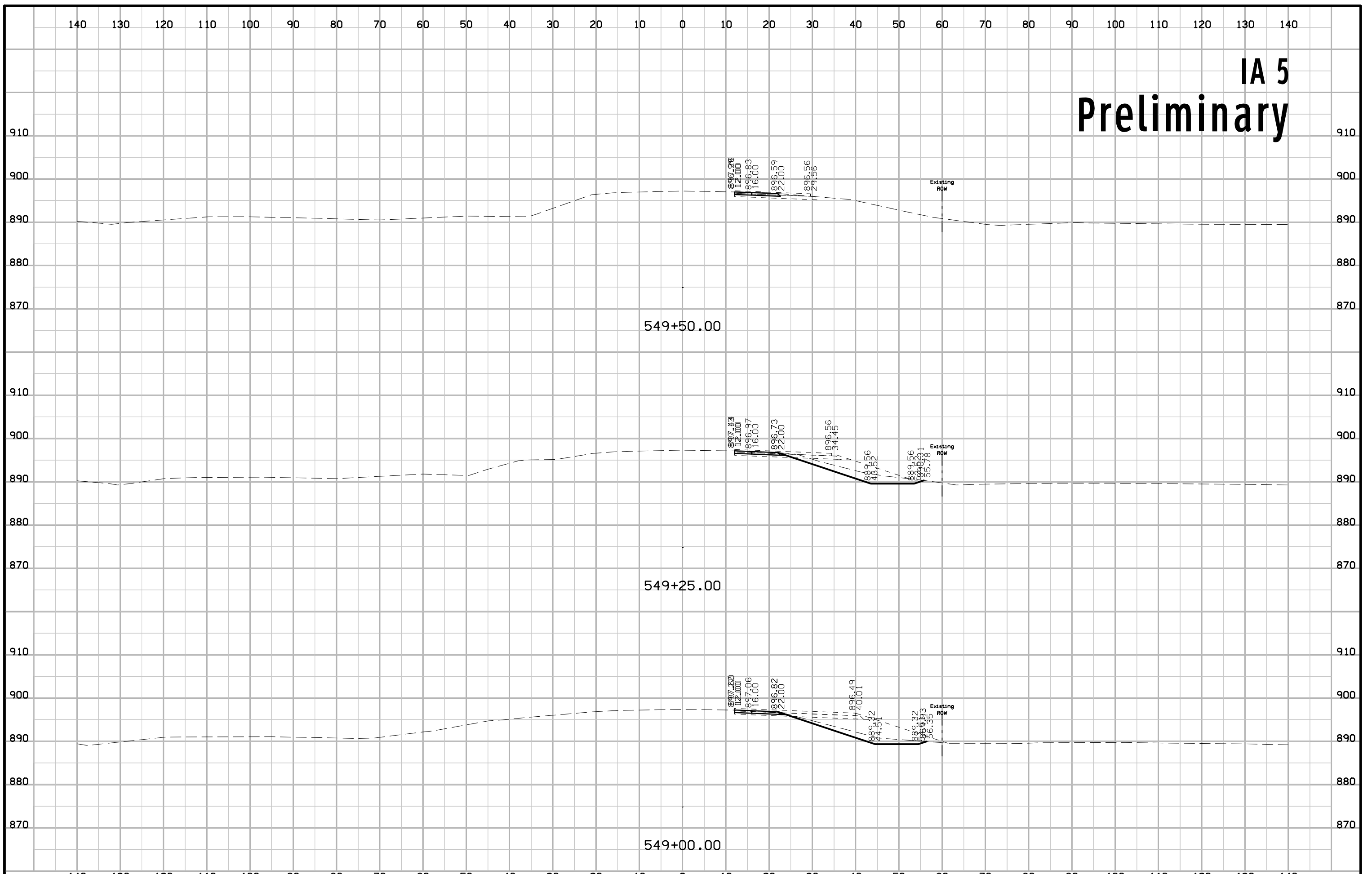




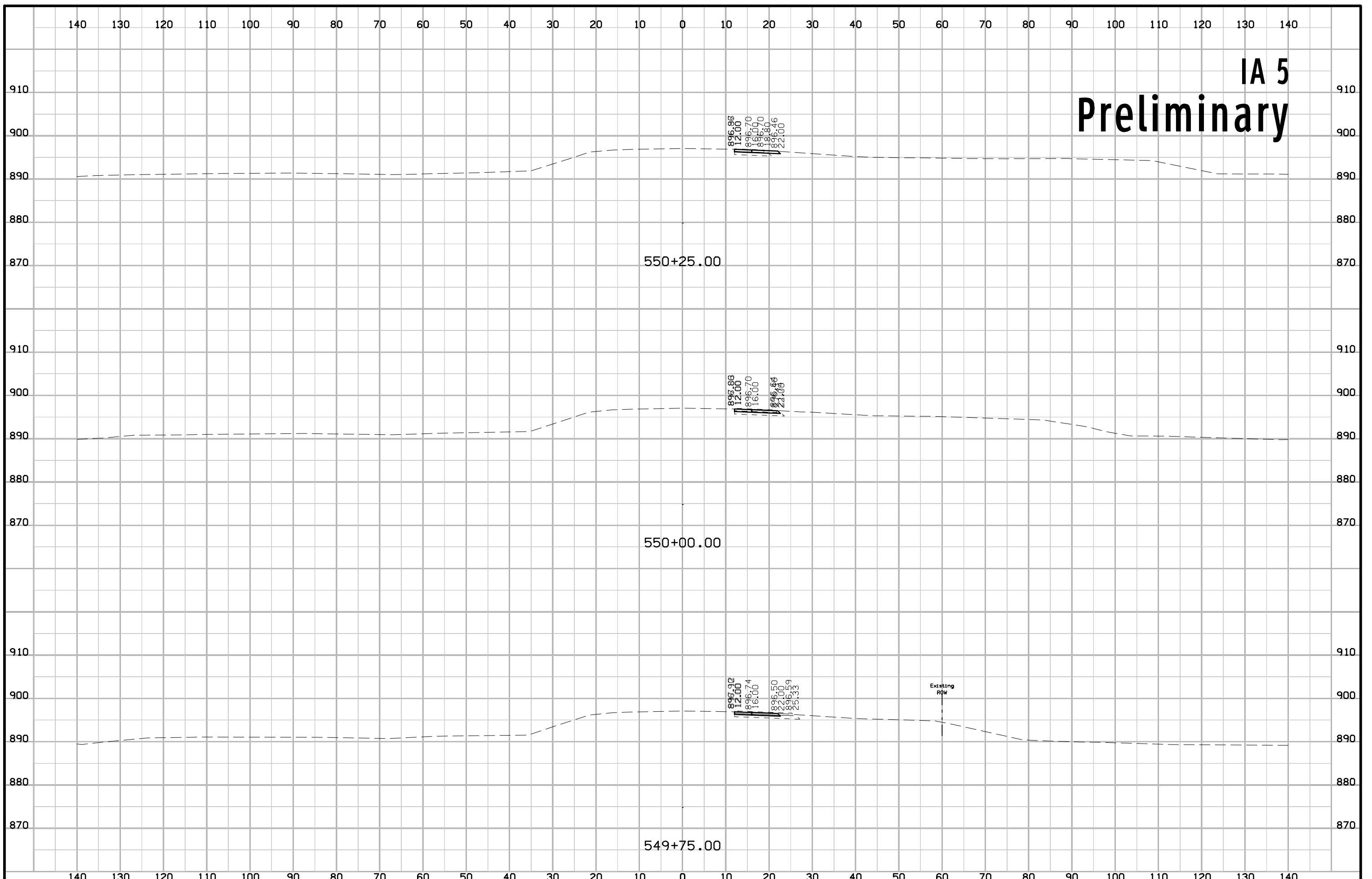
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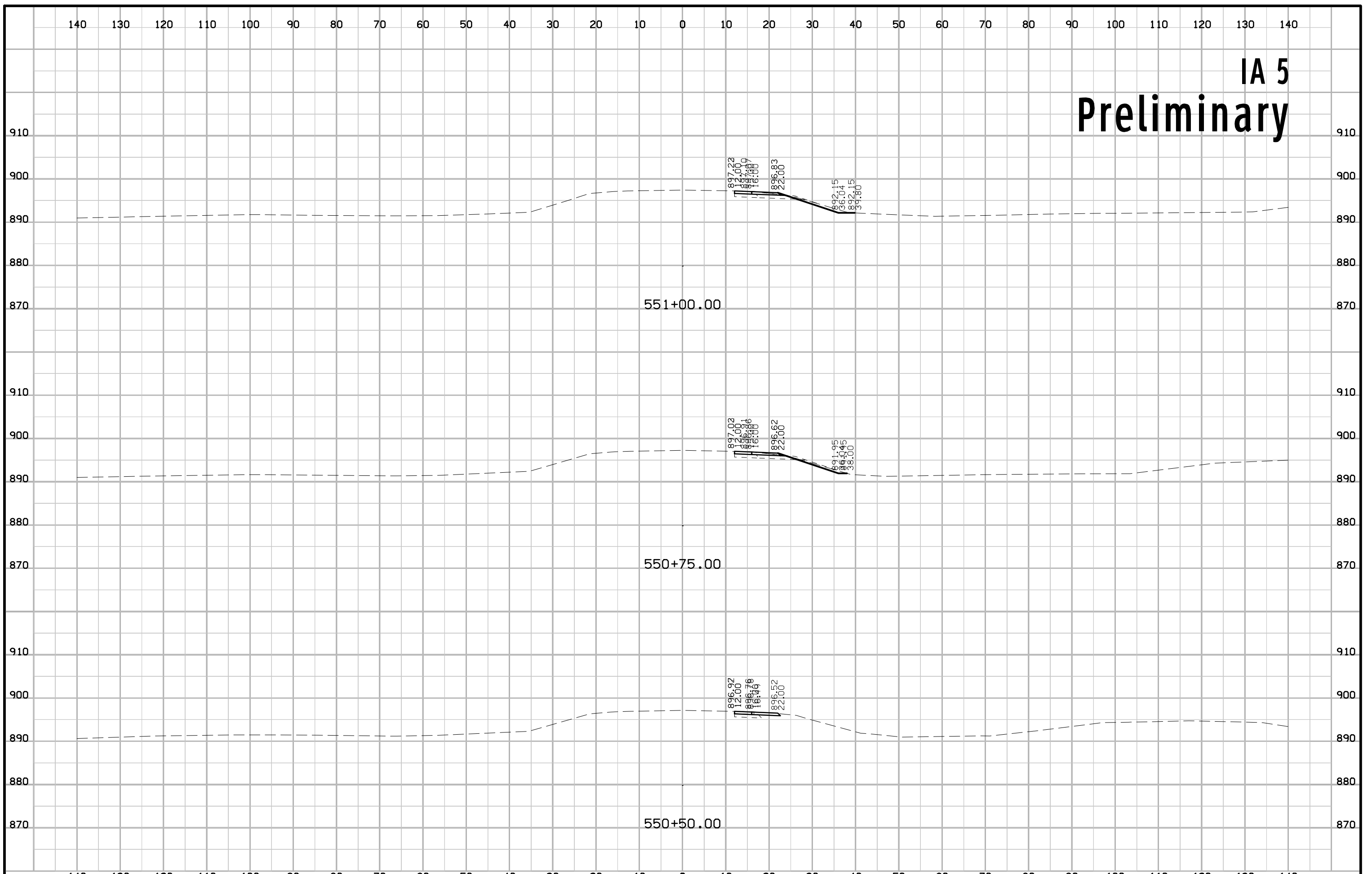
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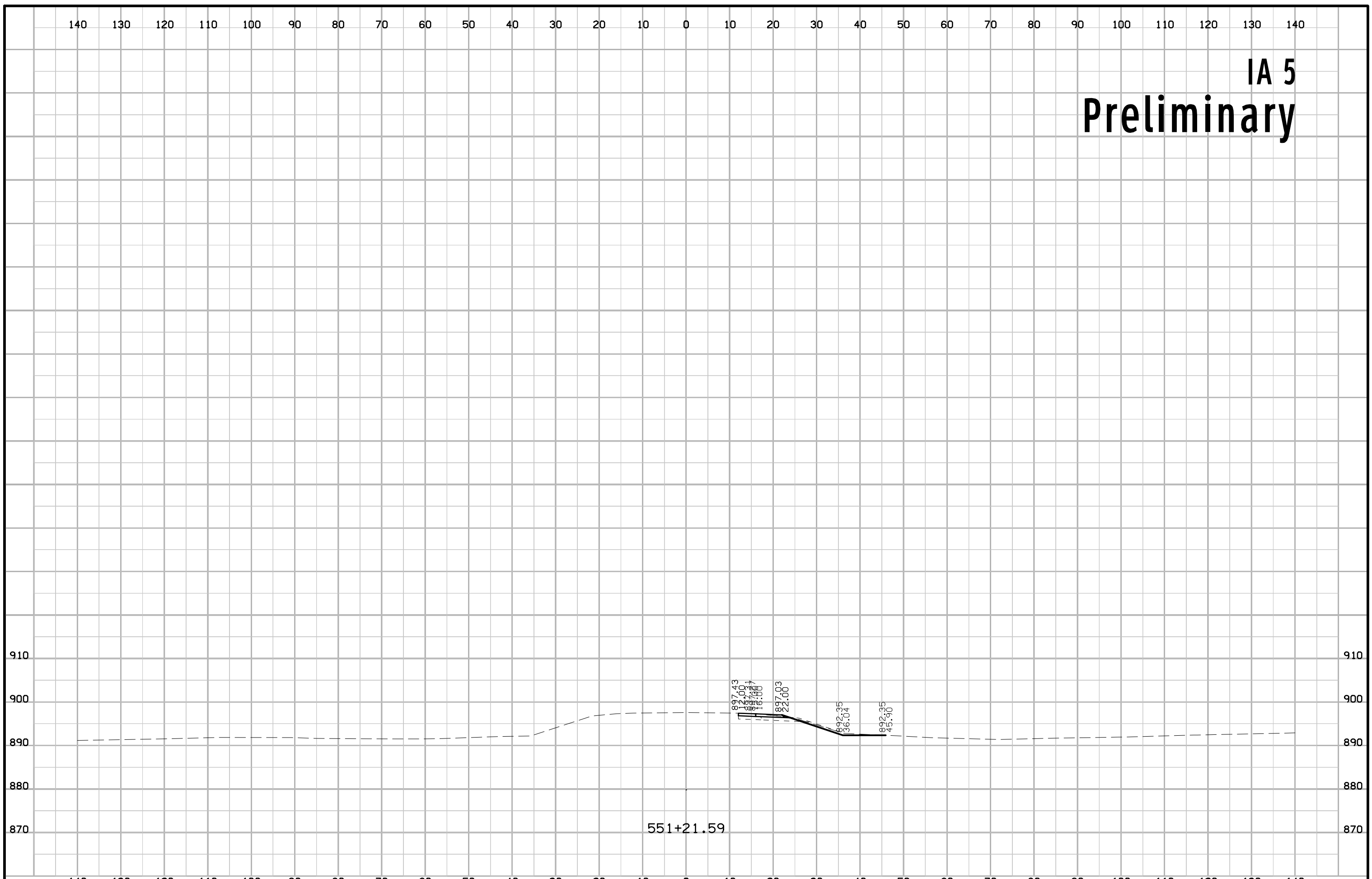
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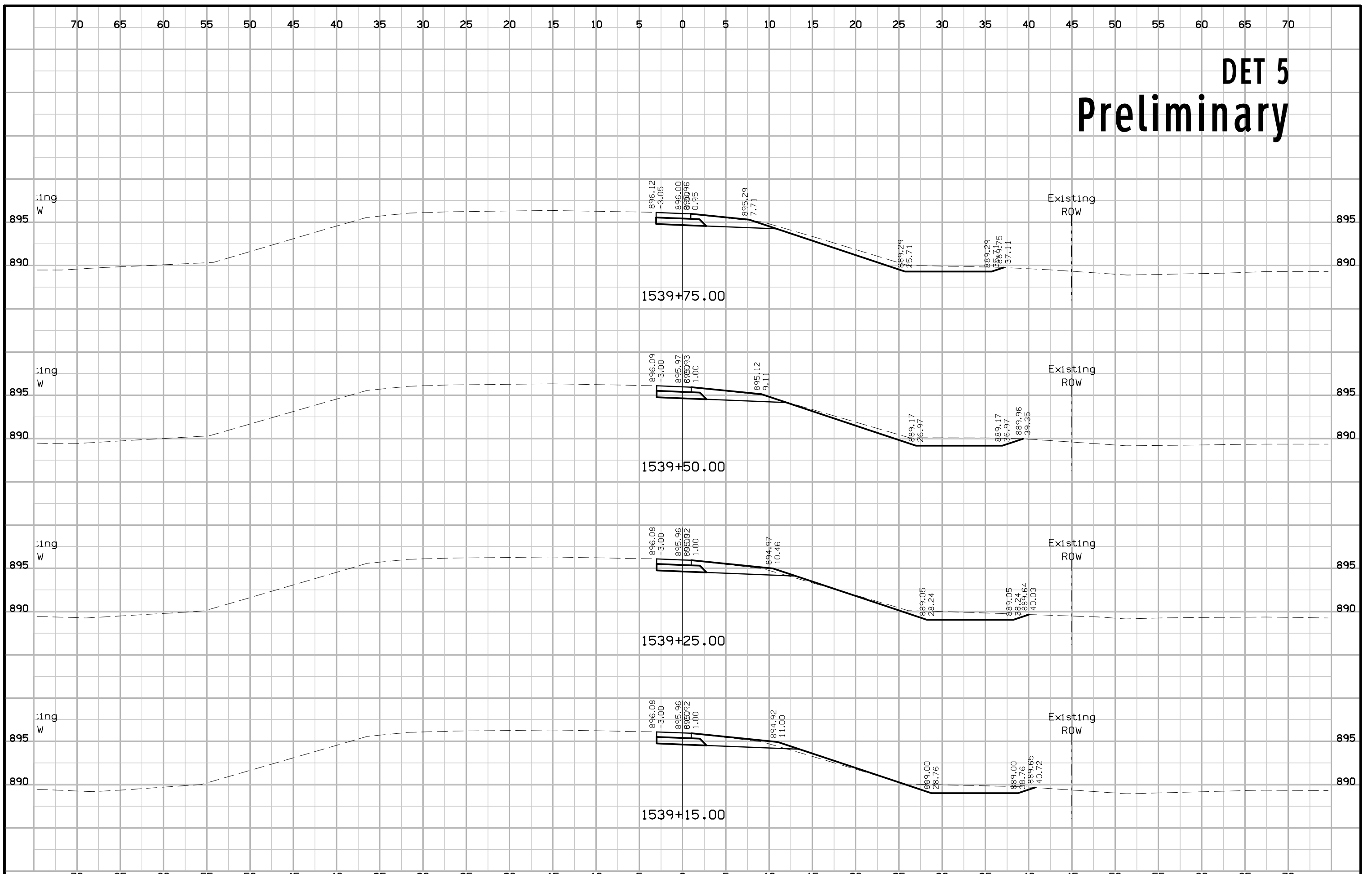
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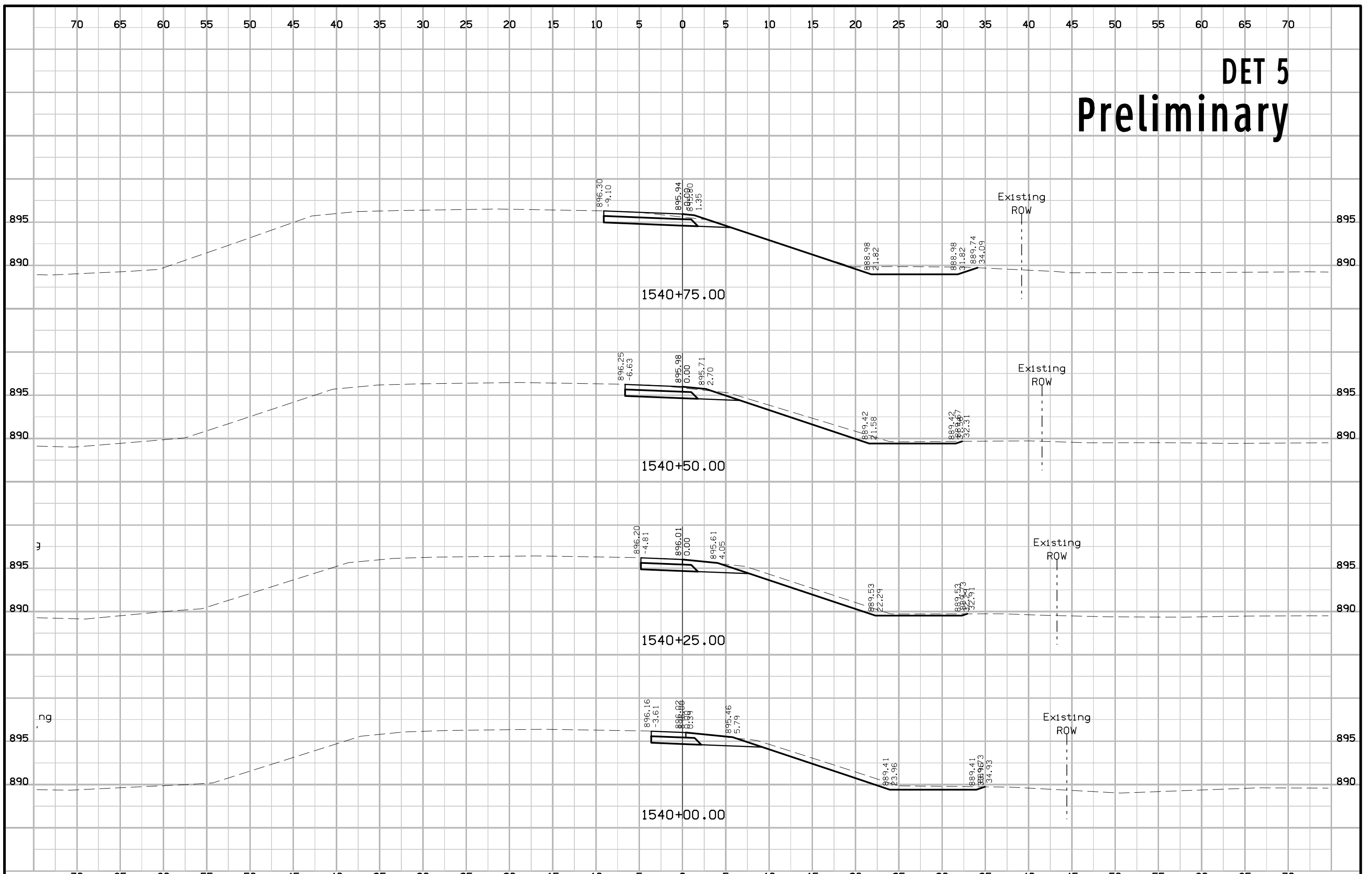
# IA 5 Preliminary



# DET 5 Preliminary

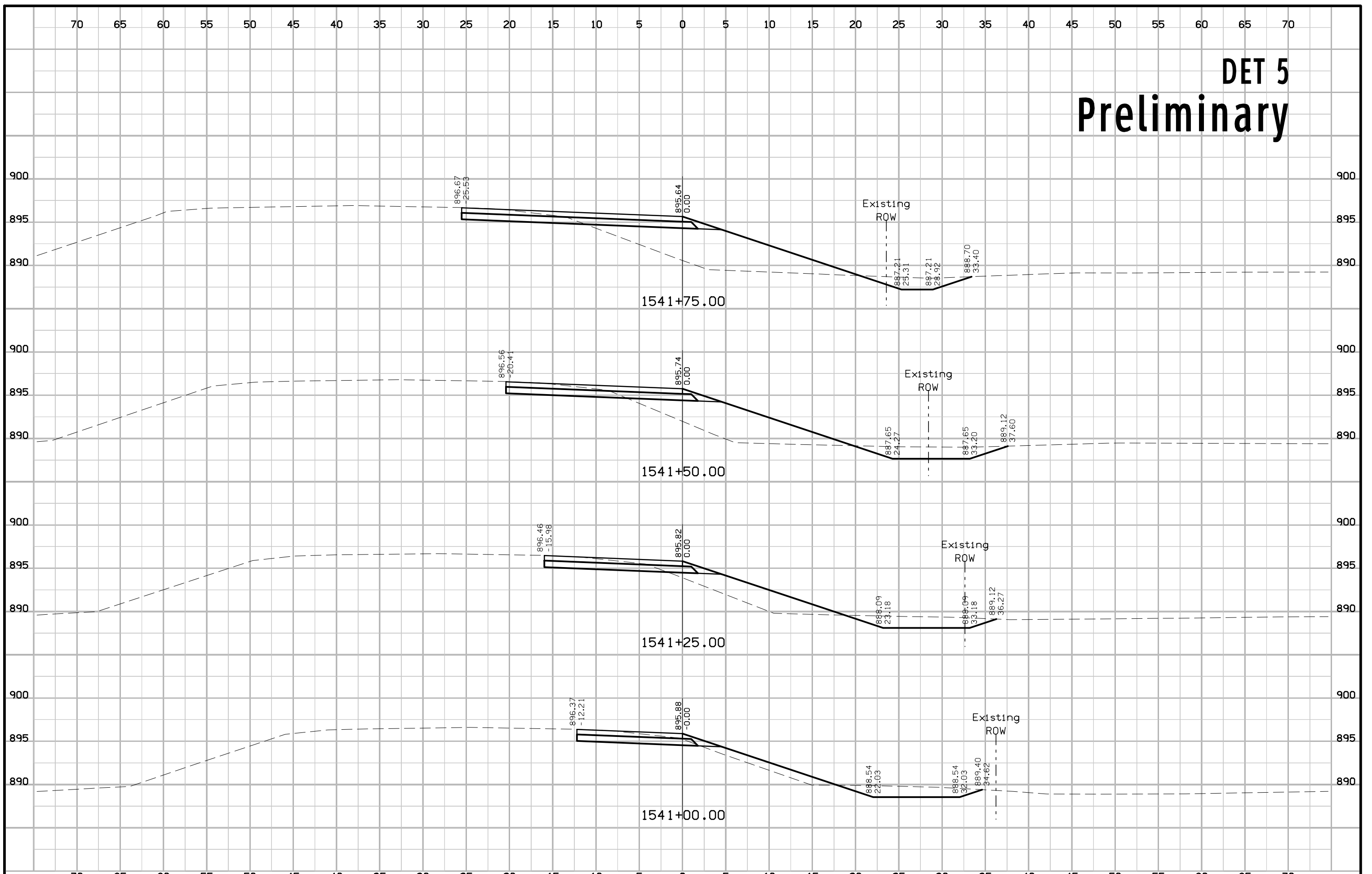


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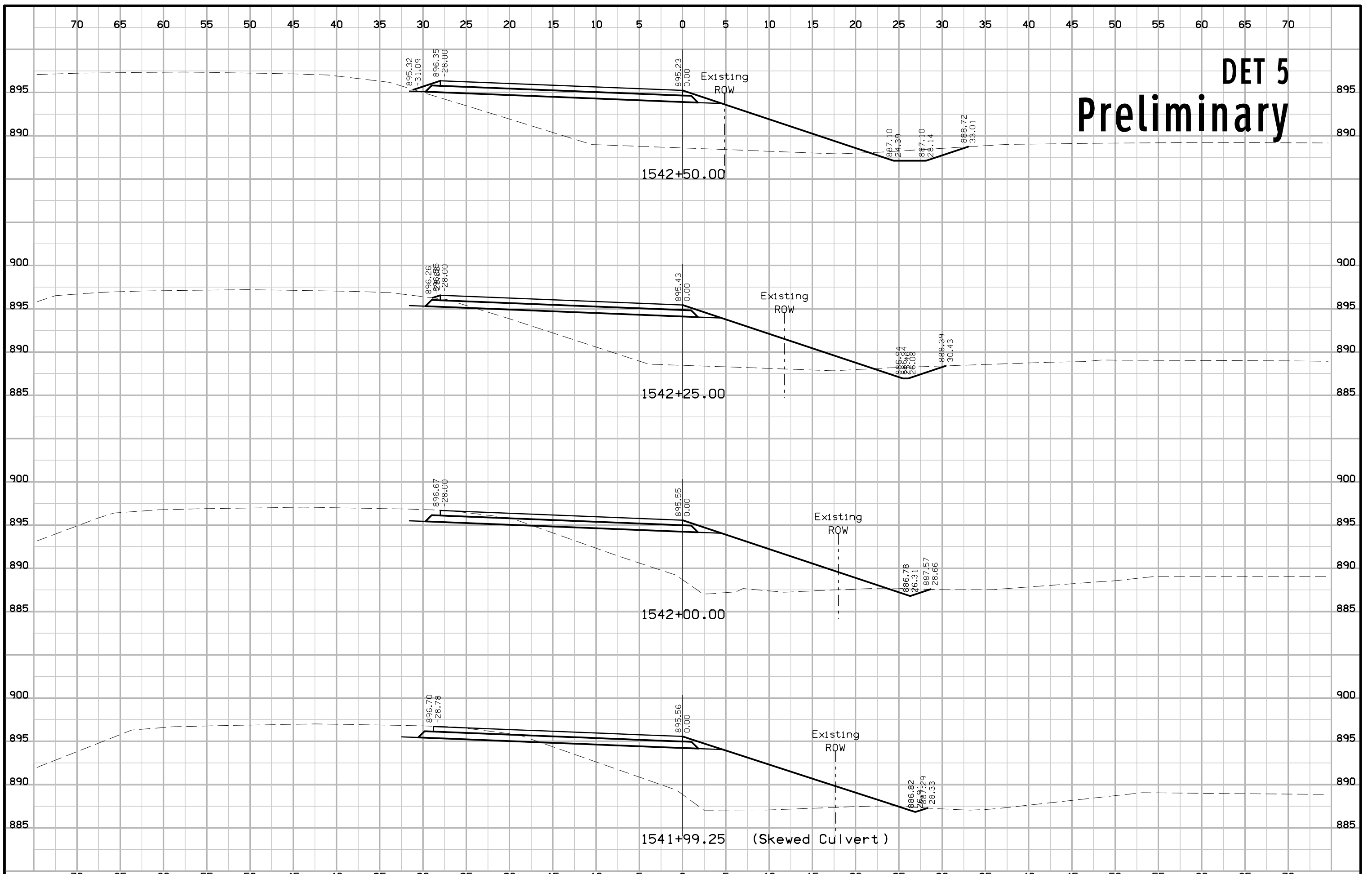




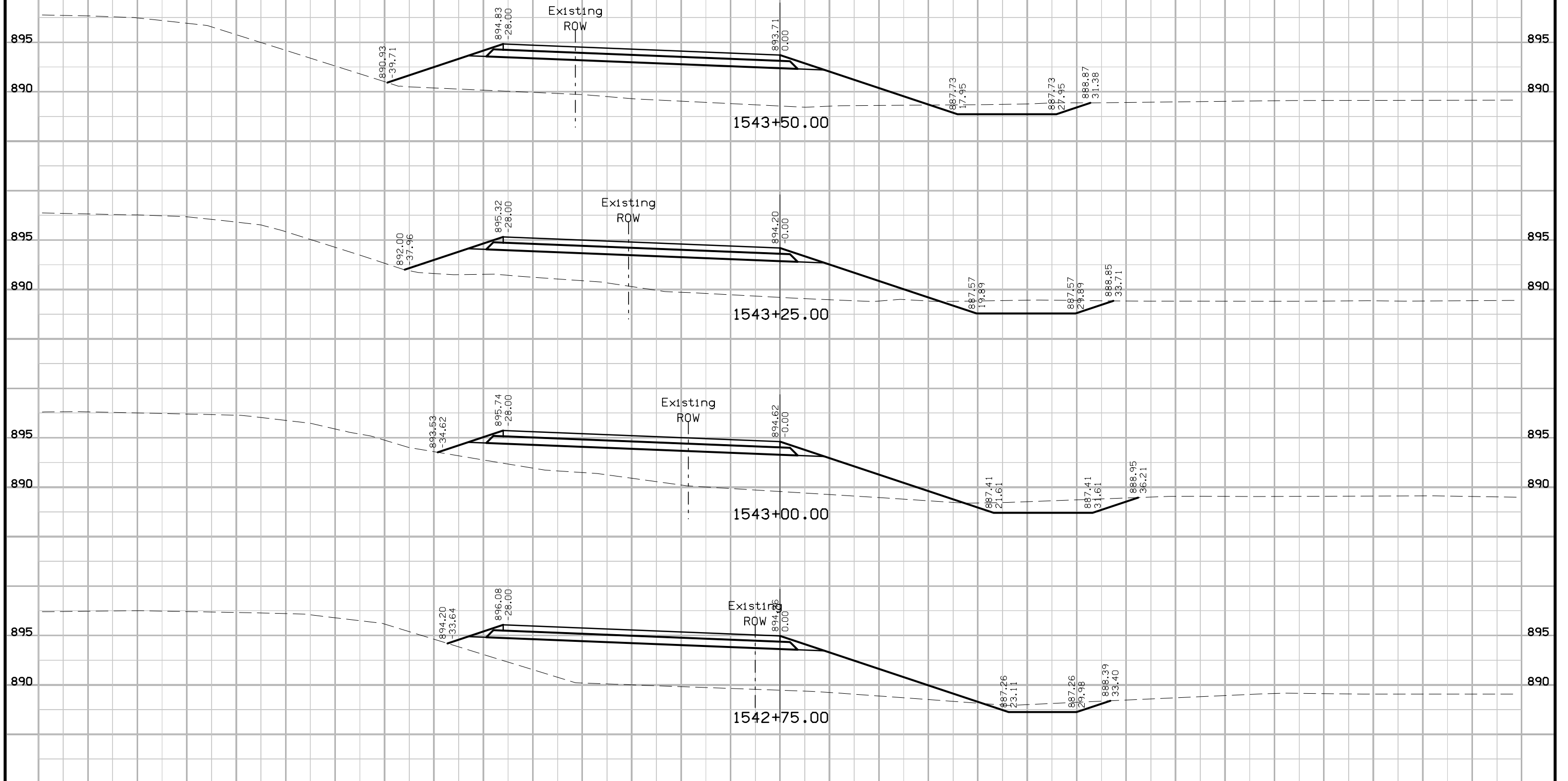
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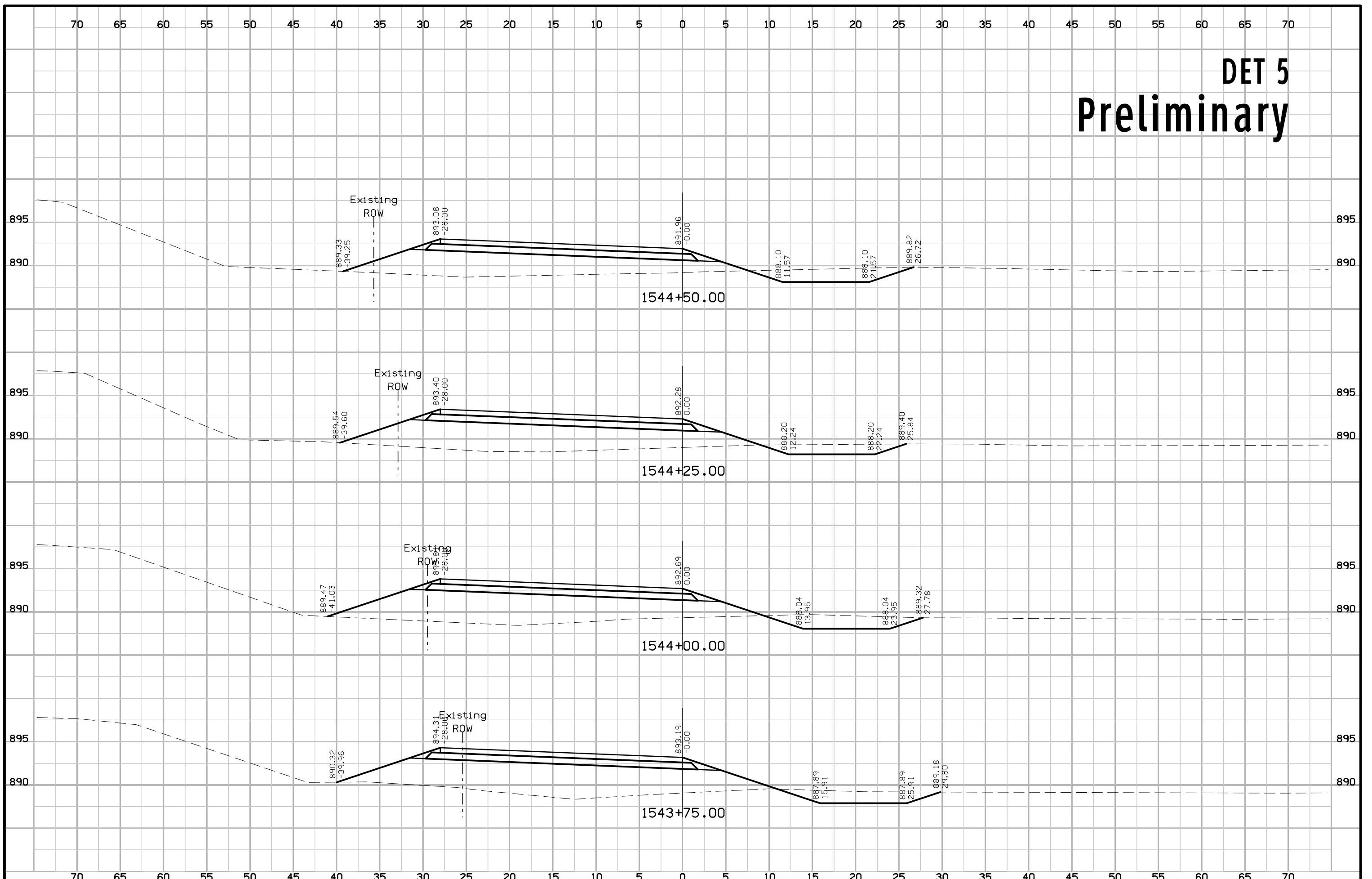
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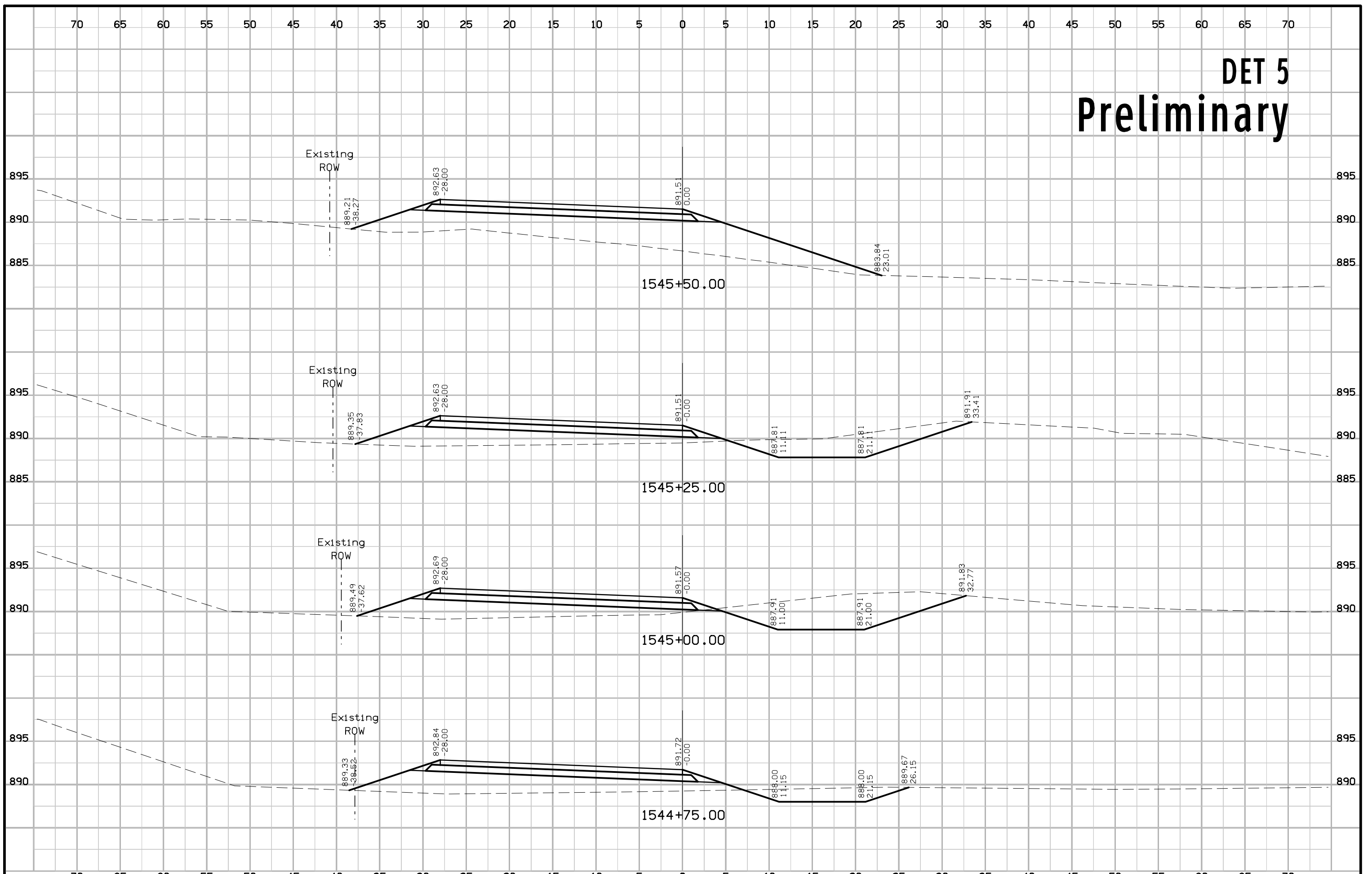
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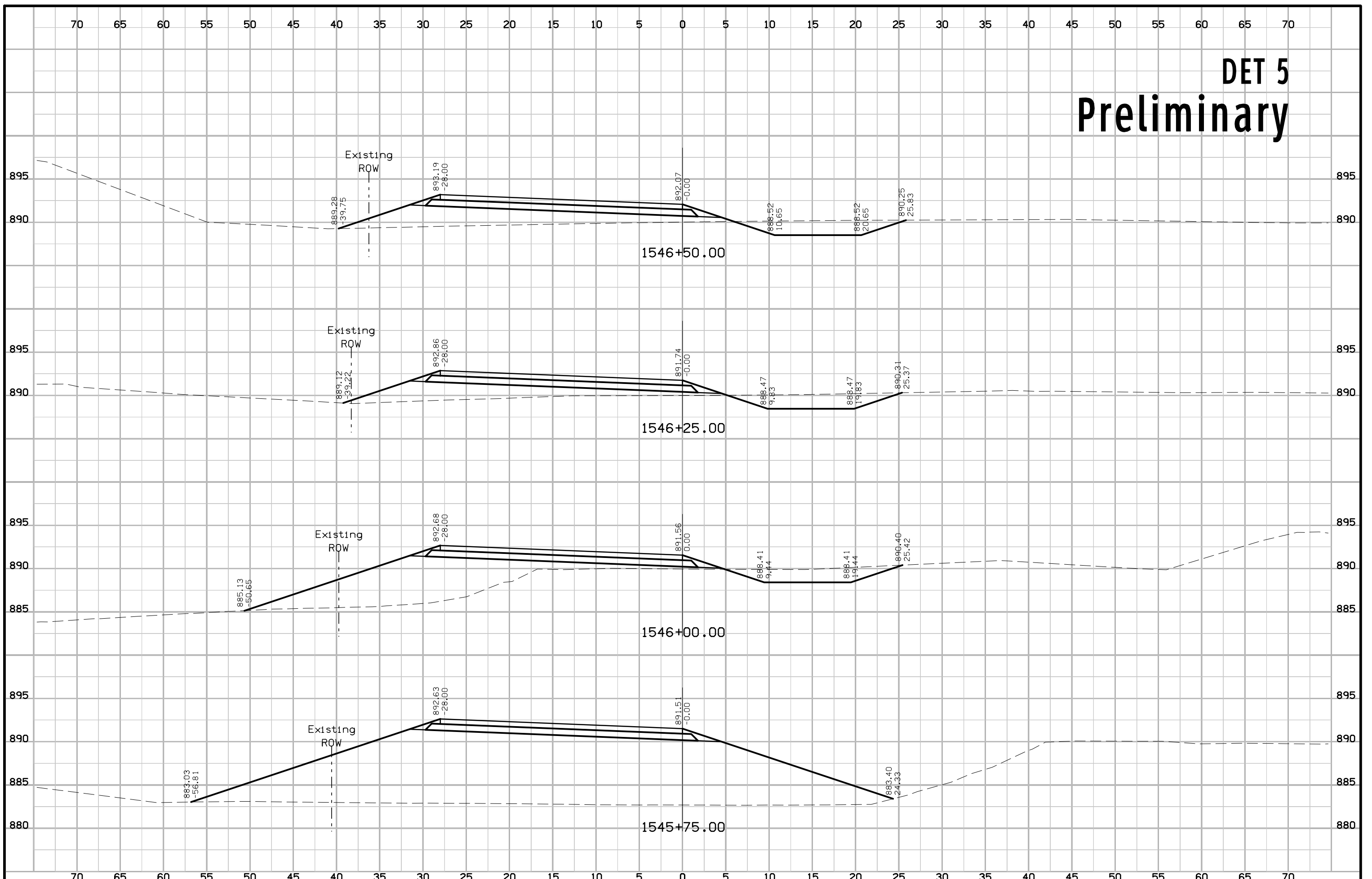
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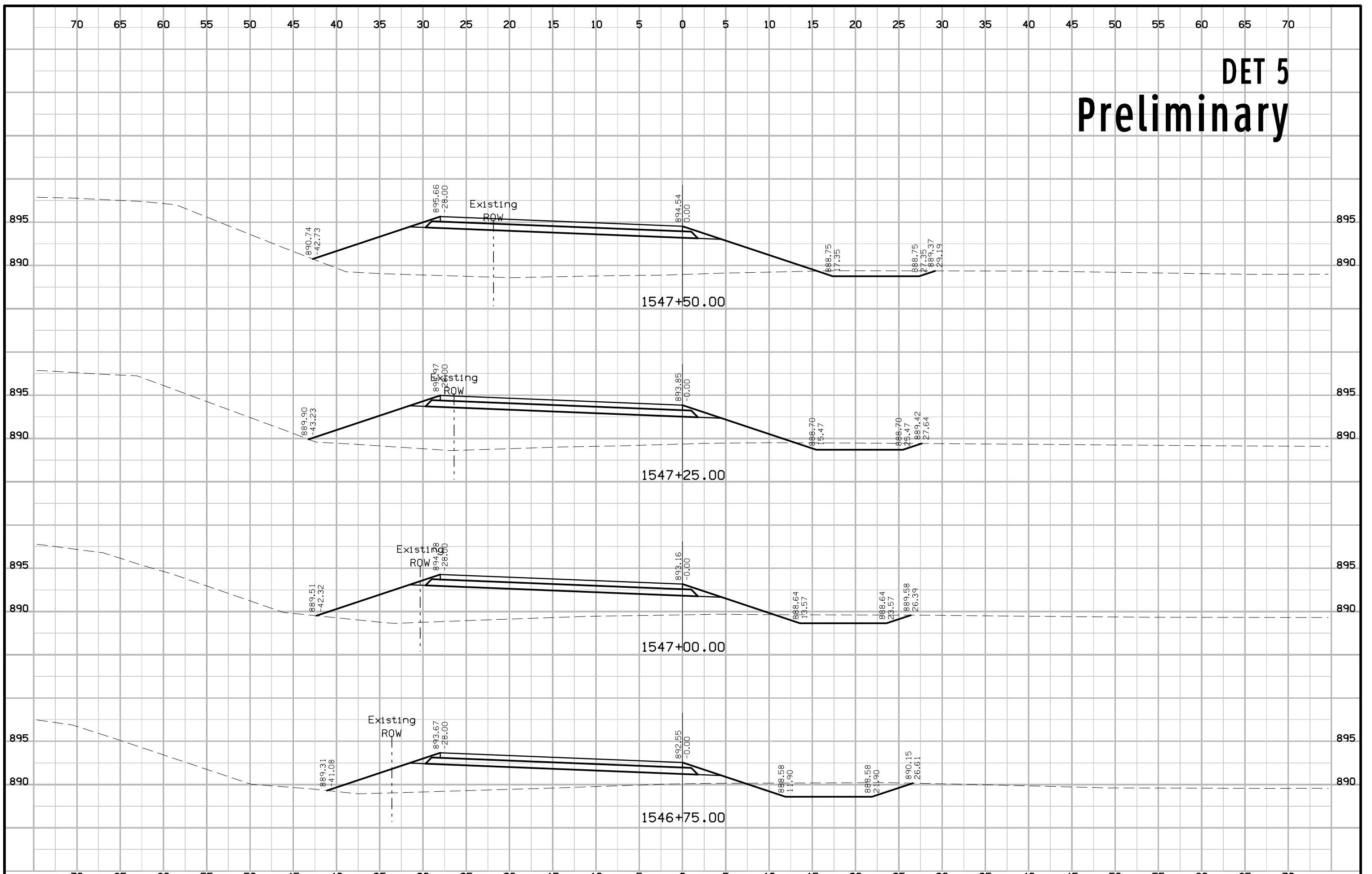
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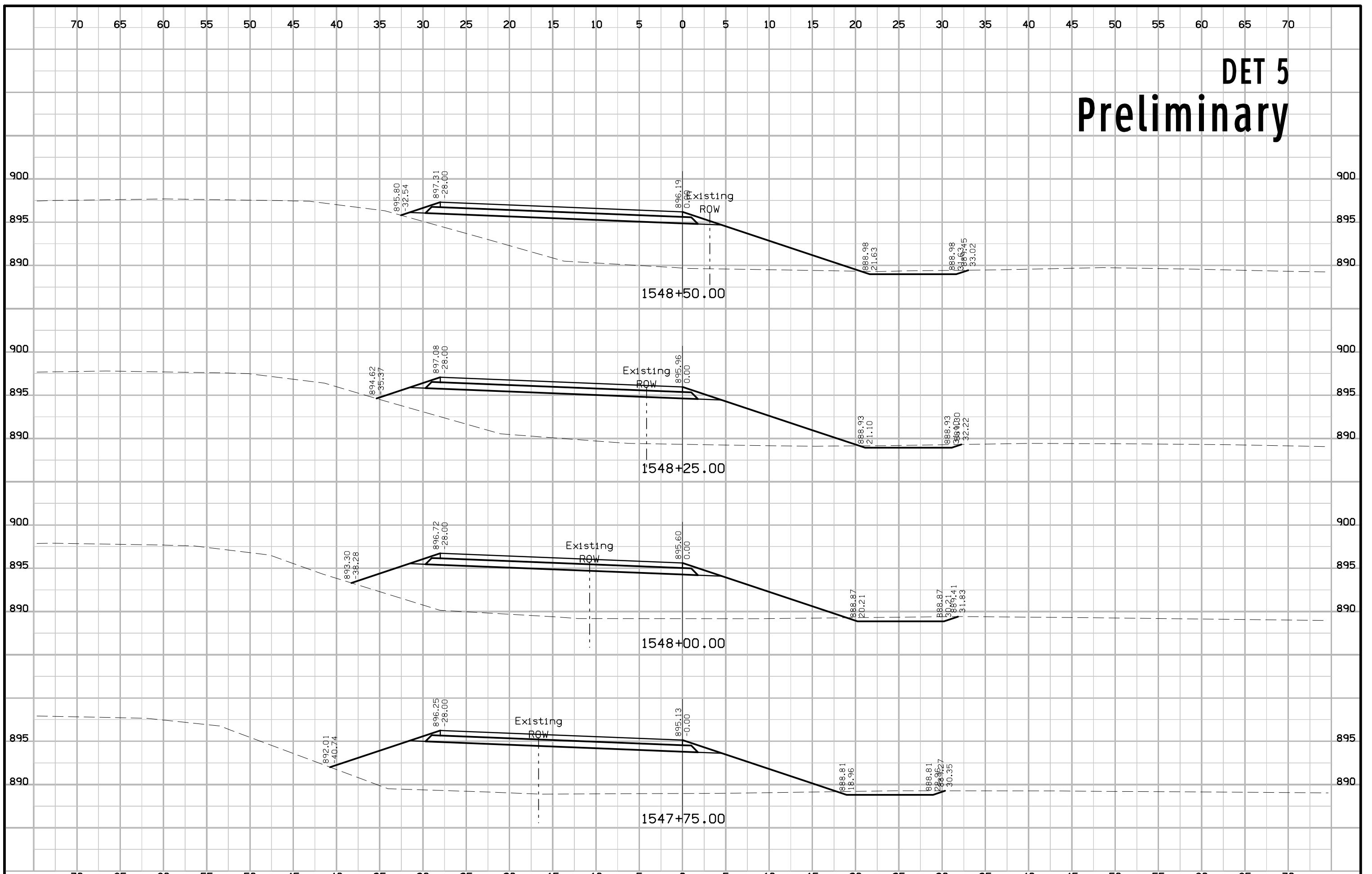
# DET 5 Preliminary



# DET 5 Preliminary

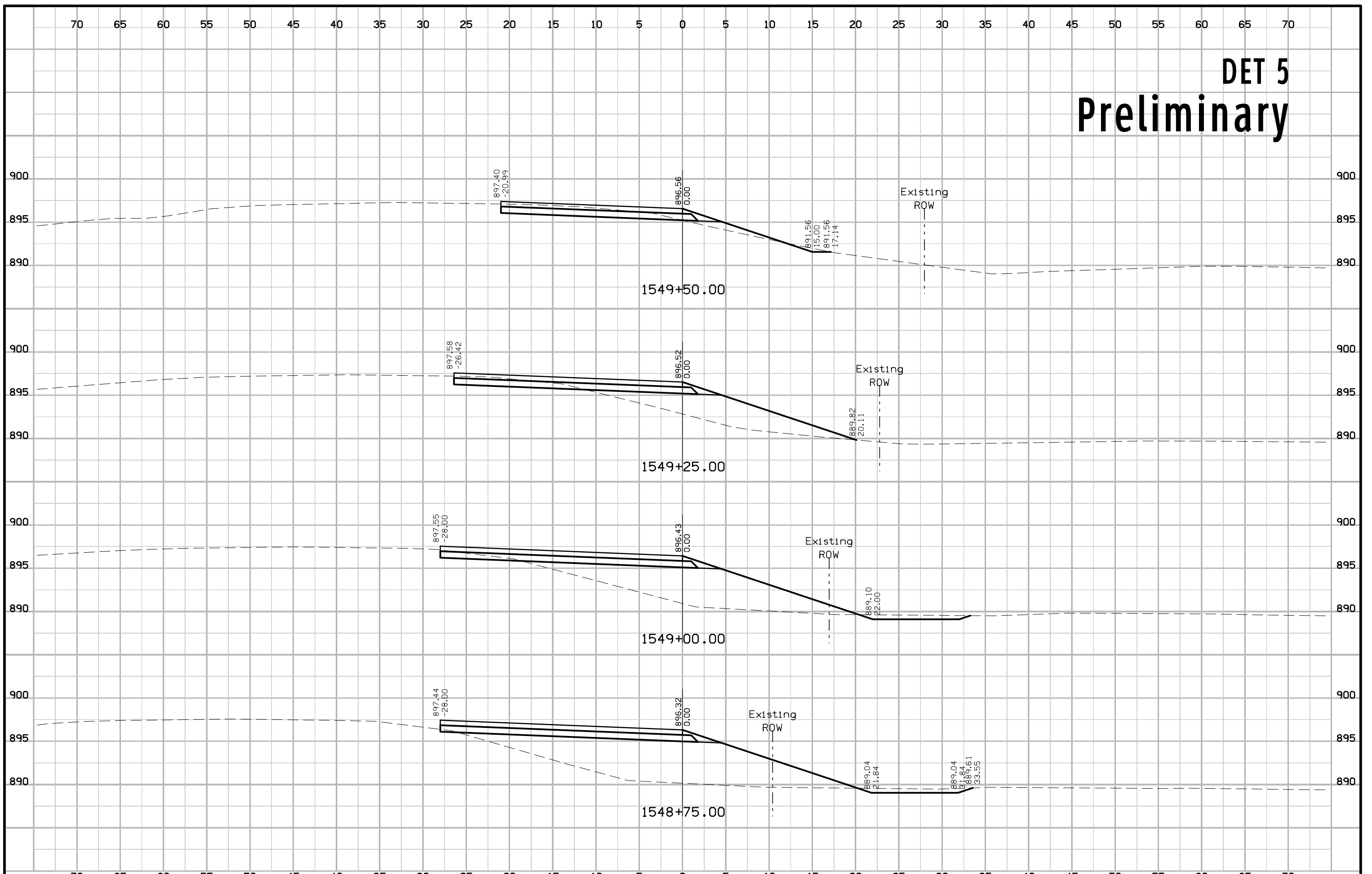


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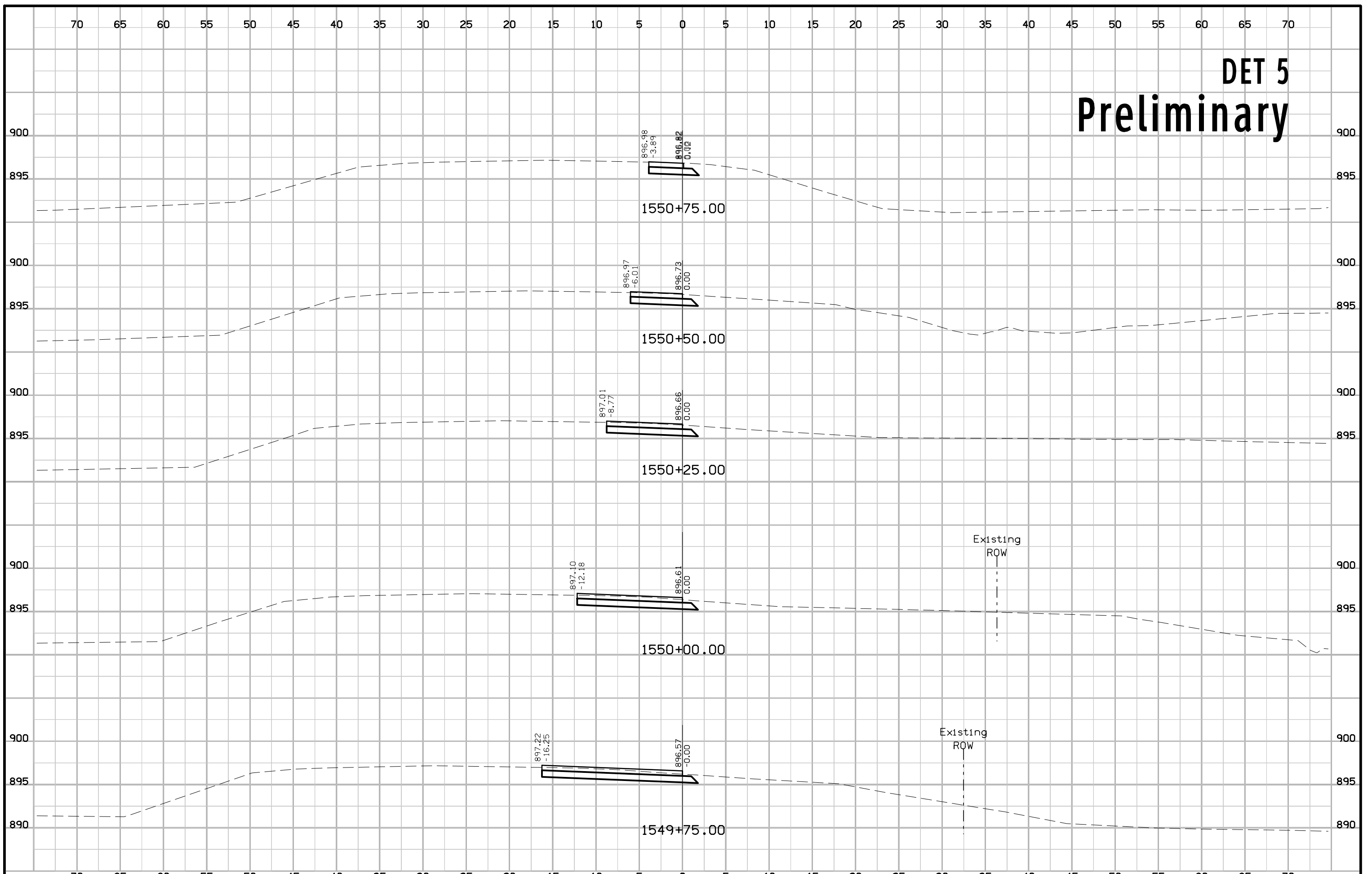




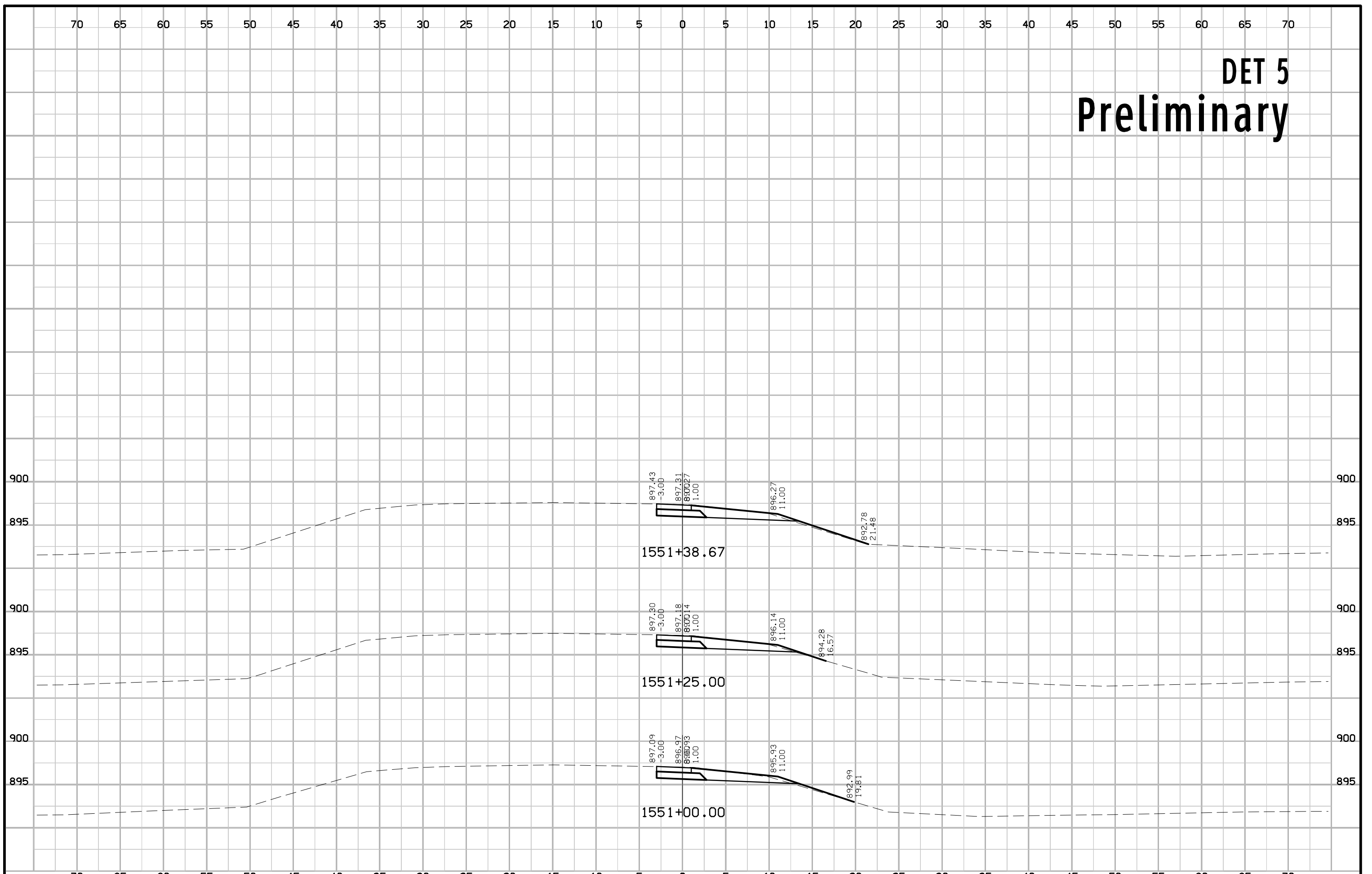
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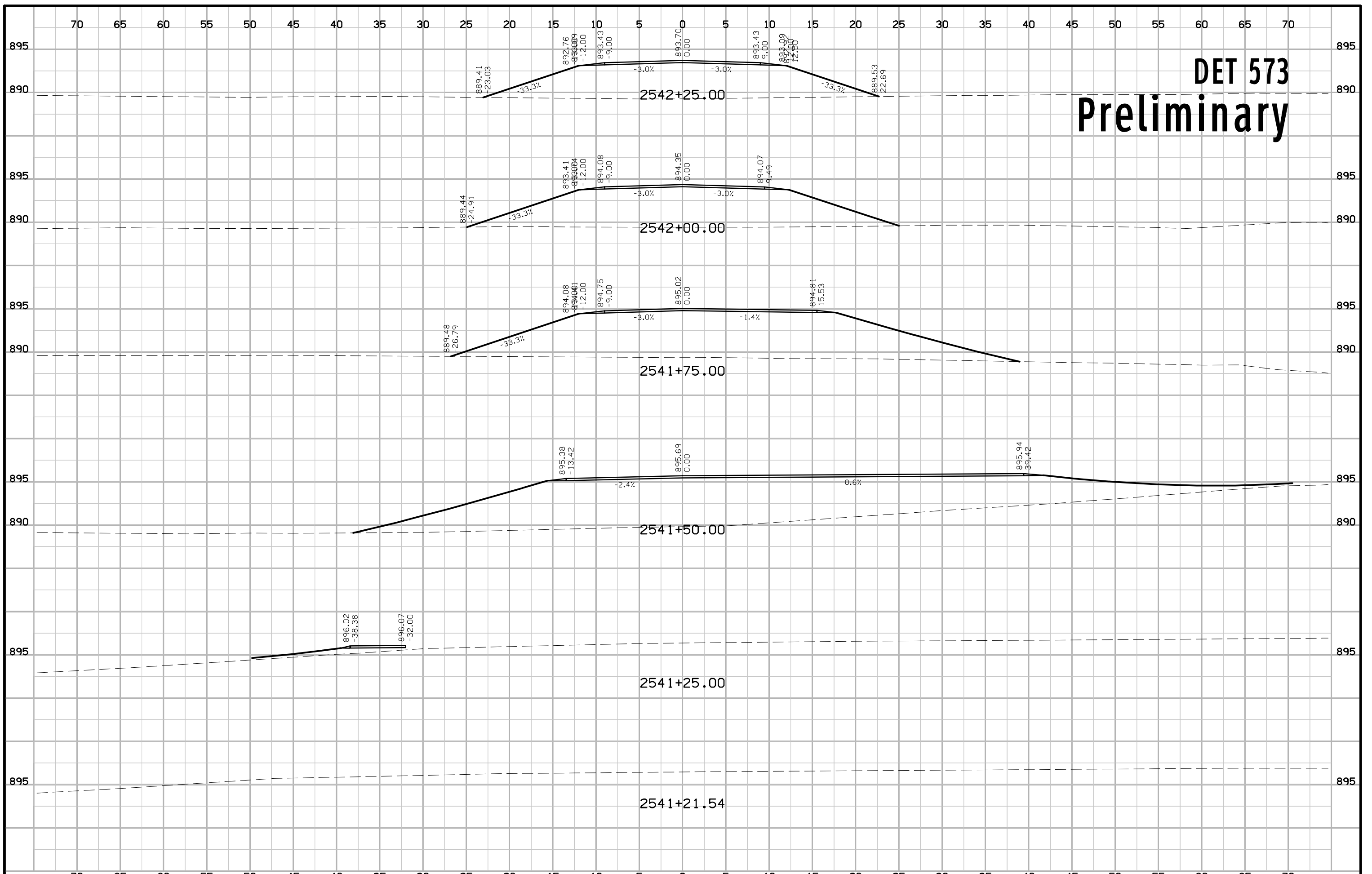
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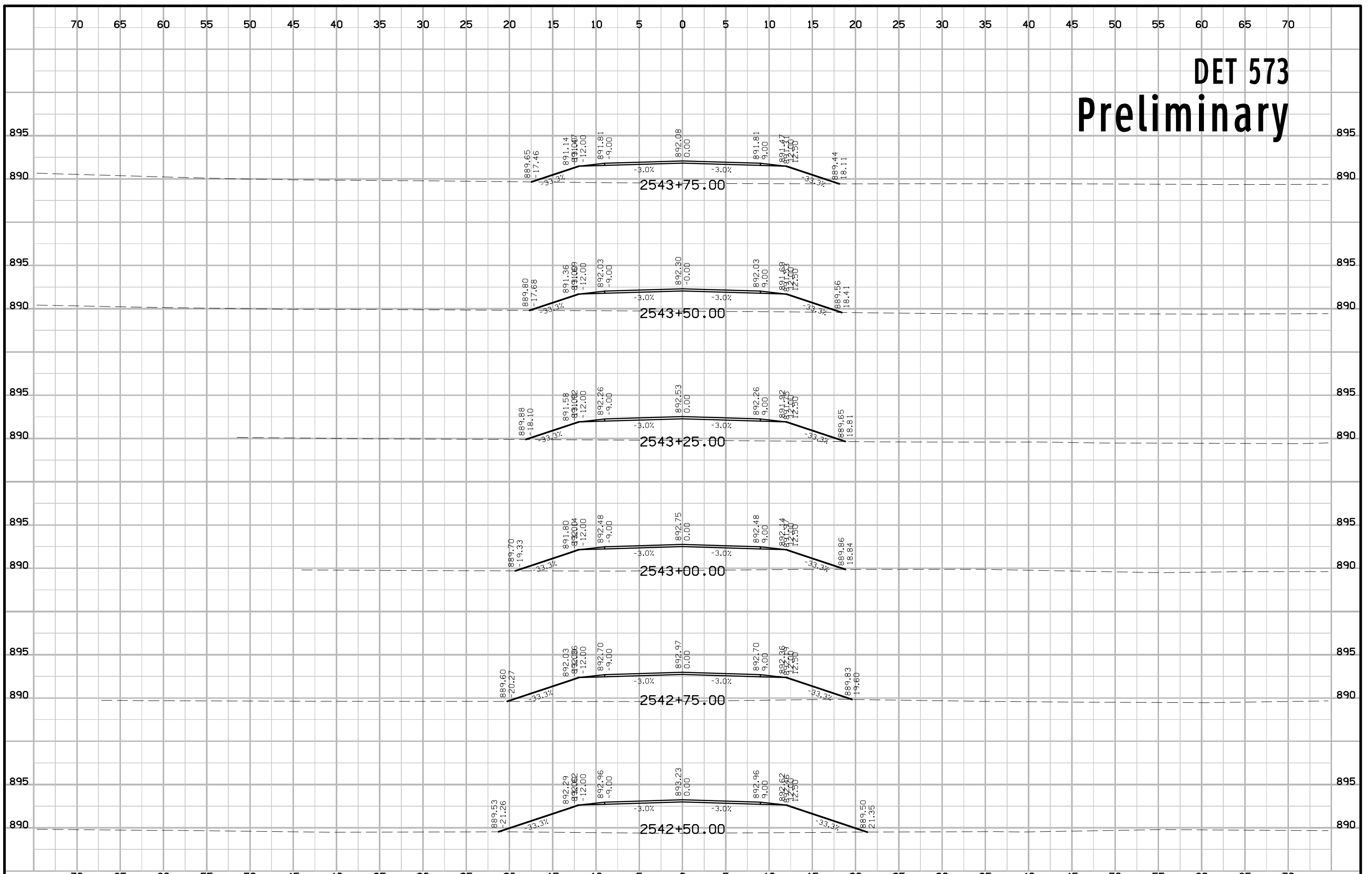
# DET 5 Preliminary



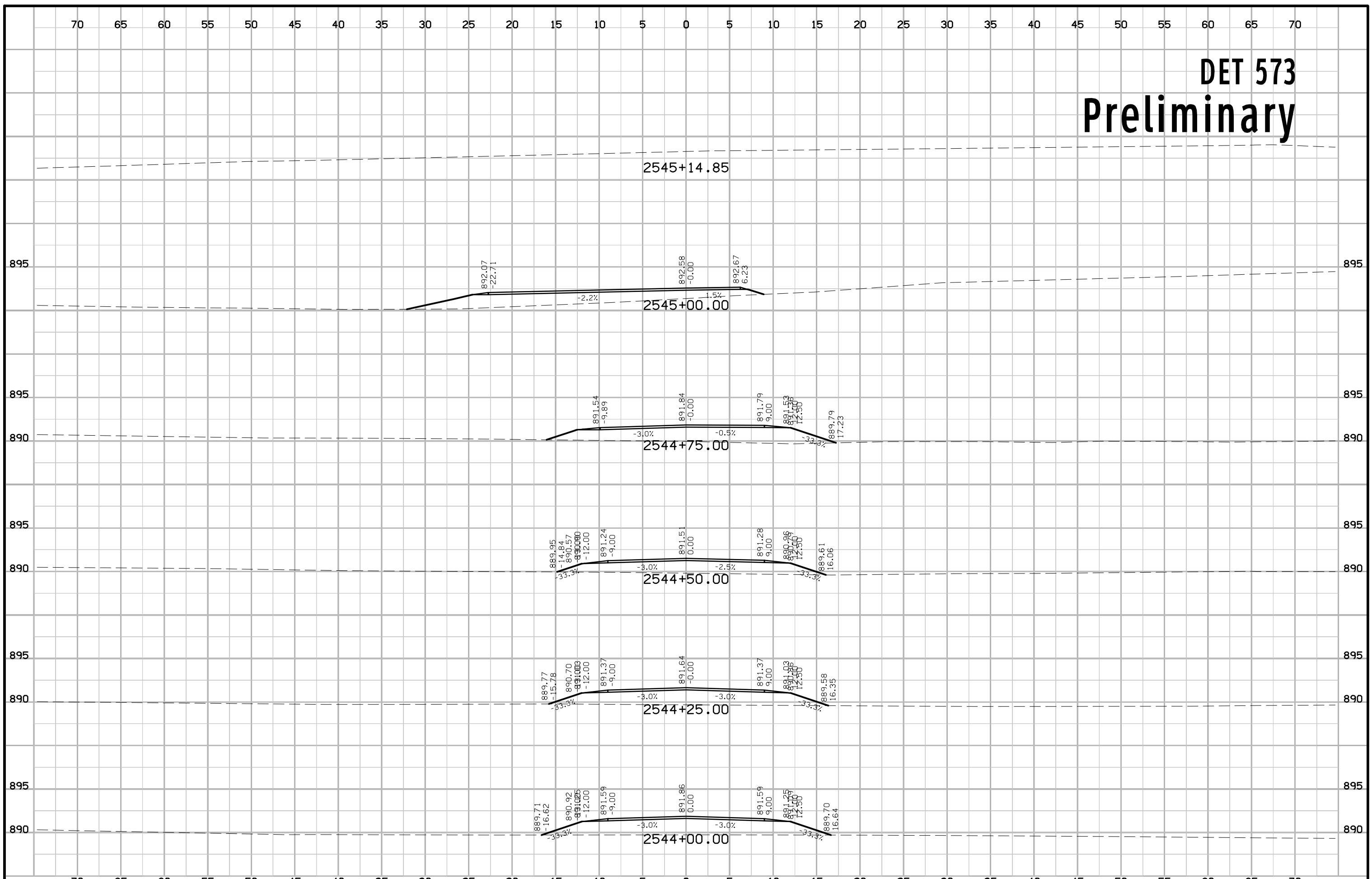
# DET 573 Preliminary



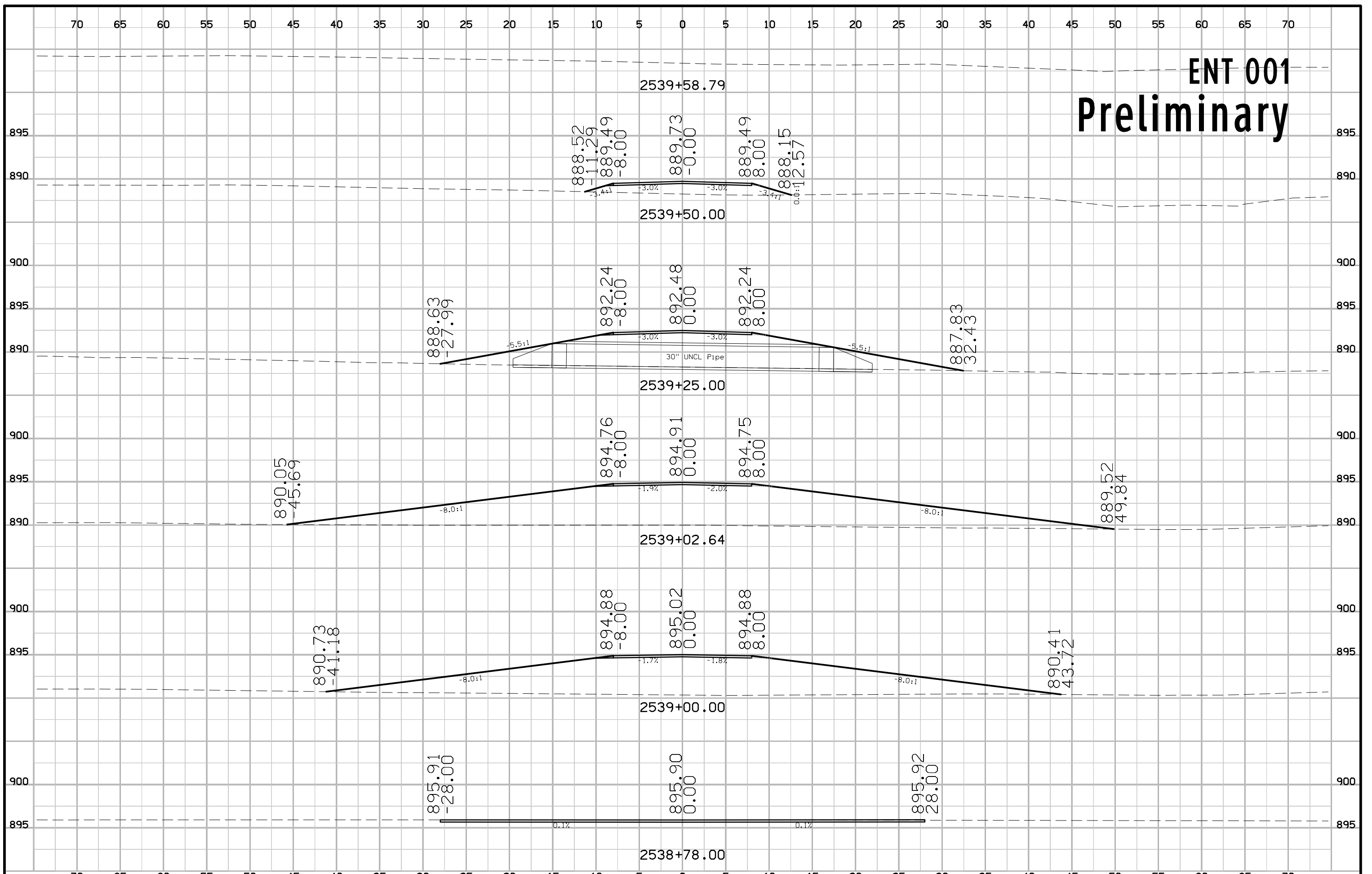
# DET 573 Preliminary



# DET 573 Preliminary



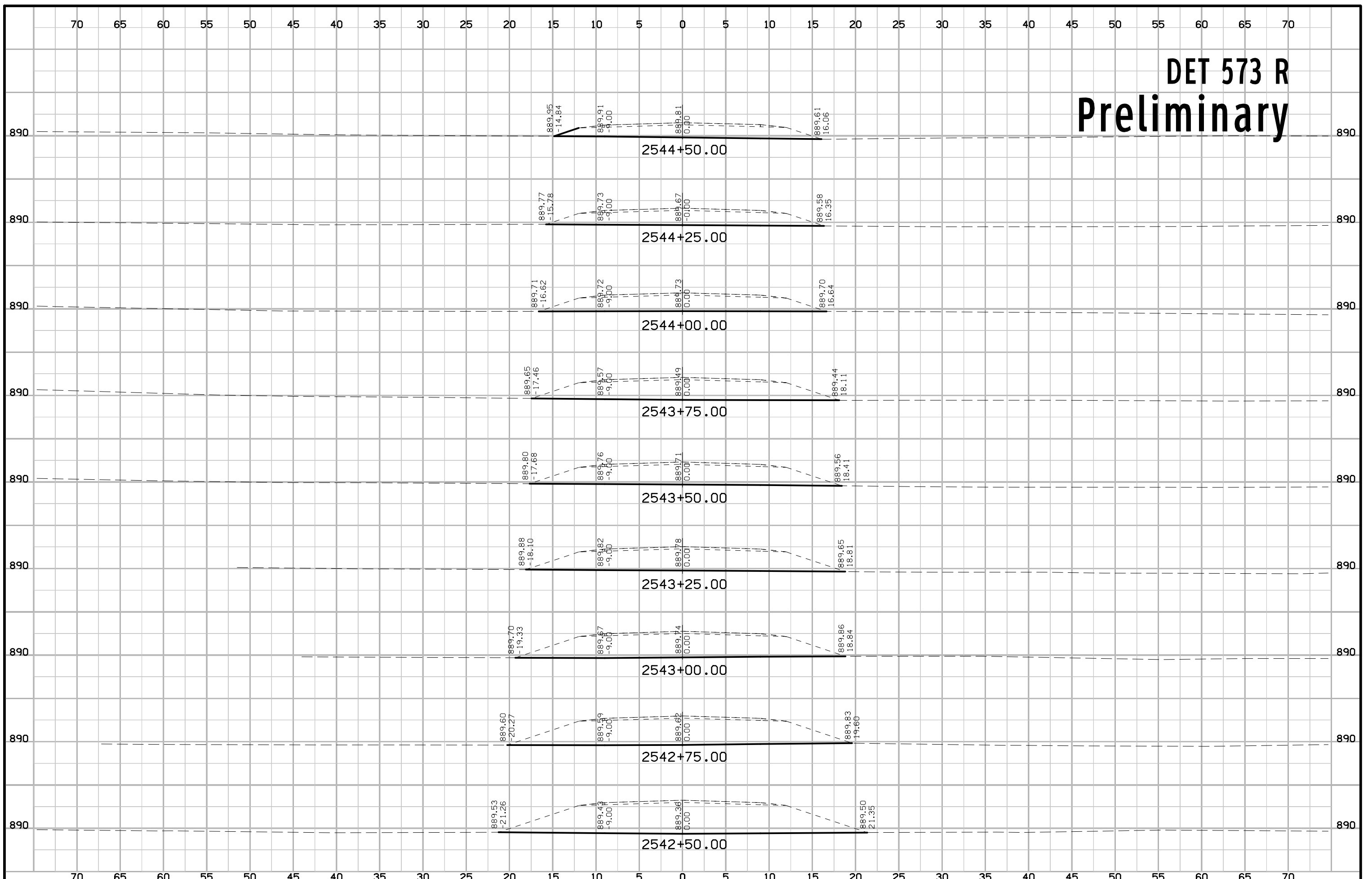
# ENT 001 Preliminary







# DET 573 R Preliminary



# DET 573 R Preliminary

