

LETTING DATE
 Dec 20 2022
 Bridge Replacement-PPCB
 BRF-005-1(74)--38-04

Appanoose COUNTY



Highway Division

PLANS OF PROPOSED IMPROVEMENT ON THE

PRIMARY ROAD SYSTEM Appanoose COUNTY Bridge Replacement-PPCB

Cooper Creek 1.5 mi N of IA 5

SCALES: As Noted

Refer to the Proposal Form for list of applicable specifications.

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

PROJECT LOCATION

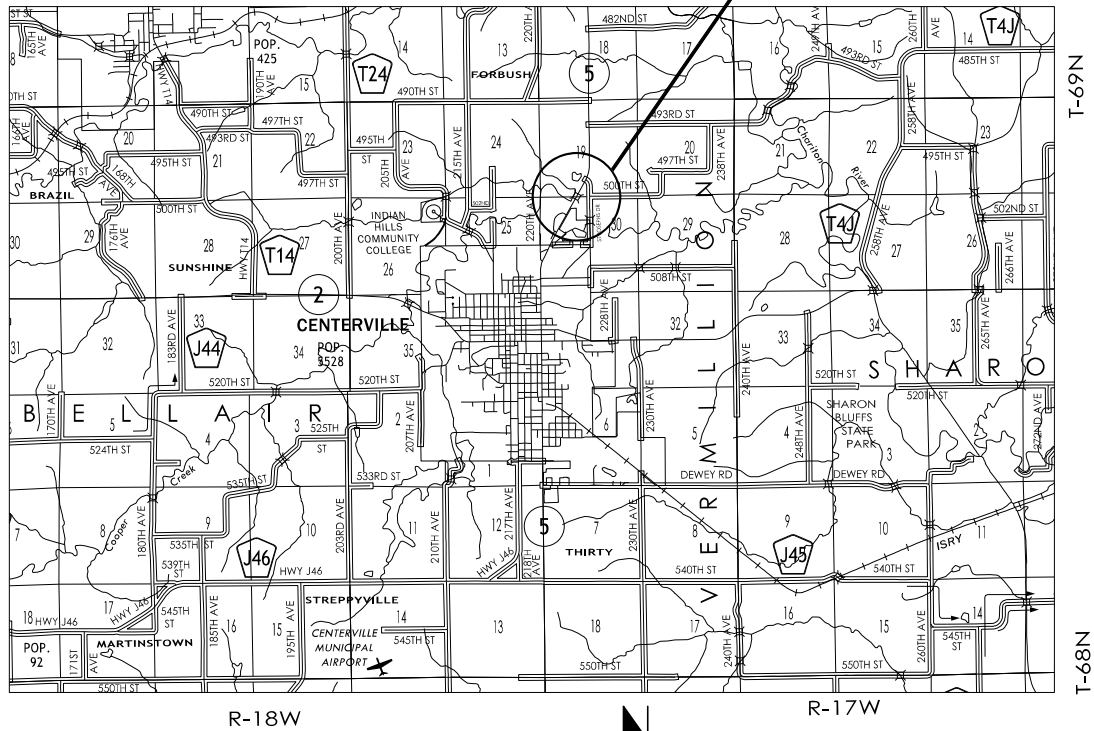
STA. 941+25.00

Ref. Loc. 15.20

FHWA #13930

No.	DESCRIPTION
A Sheets	Title Sheets
A.1	Title Sheet
B Sheets	Typical Cross Sections and Details
B.1	Typical Cross Sections and Details
B.2 - 3	Standards
D Sheets	Mainline Plan and Profile Sheets
* D.1	Plan & Profile Legend & Symbol Information Sheet
* D.2	IA 5 Plan and Profile
G Sheets	Survey Sheets
G.1	Reference Ties and Bench Marks
G.2	Horizontal Control Tab. & Super for all Alignments
J Sheets	Traffic Control and Staging Sheets
* J.1	Traffic Control Plan
V Sheets	Bridge and Culvert Situation Plans
V.1	Bridge and Culvert Situation Plans
W Sheets	Mainline Cross Sections
W.1	Cross Sections Legend & Symbol Information Sheet
W.2 - 12	Mainline Cross Sections
	* Color Plan Sheets

H Sheets



DESIGN DATA RURAL

2021	AADT	6000	V.P.D.
2041	AADT	6650	V.P.D.
20 --	DHV	--	V.P.H.
	TRUCKS	7	%
	Total		
	Design ESALs	--	

INDEX OF SEALS		
SHEET NO.	NAME	TYPE
A.1	X	Primary Signature Block
X	X	X

REVISIONS	TOTAL
	..
PROJECT IDENTIFICATION NUMBER	
18-04-005-010	
PROJECT NUMBER	
BRF-005-1(74)--38-04	
R.O.W. PROJECT NUMBER	
NHSN-005-1(75)--2R-004	



Schedule:
D5- 09-27-2021
D4- 08-23-2022
B3- 10-04-2022

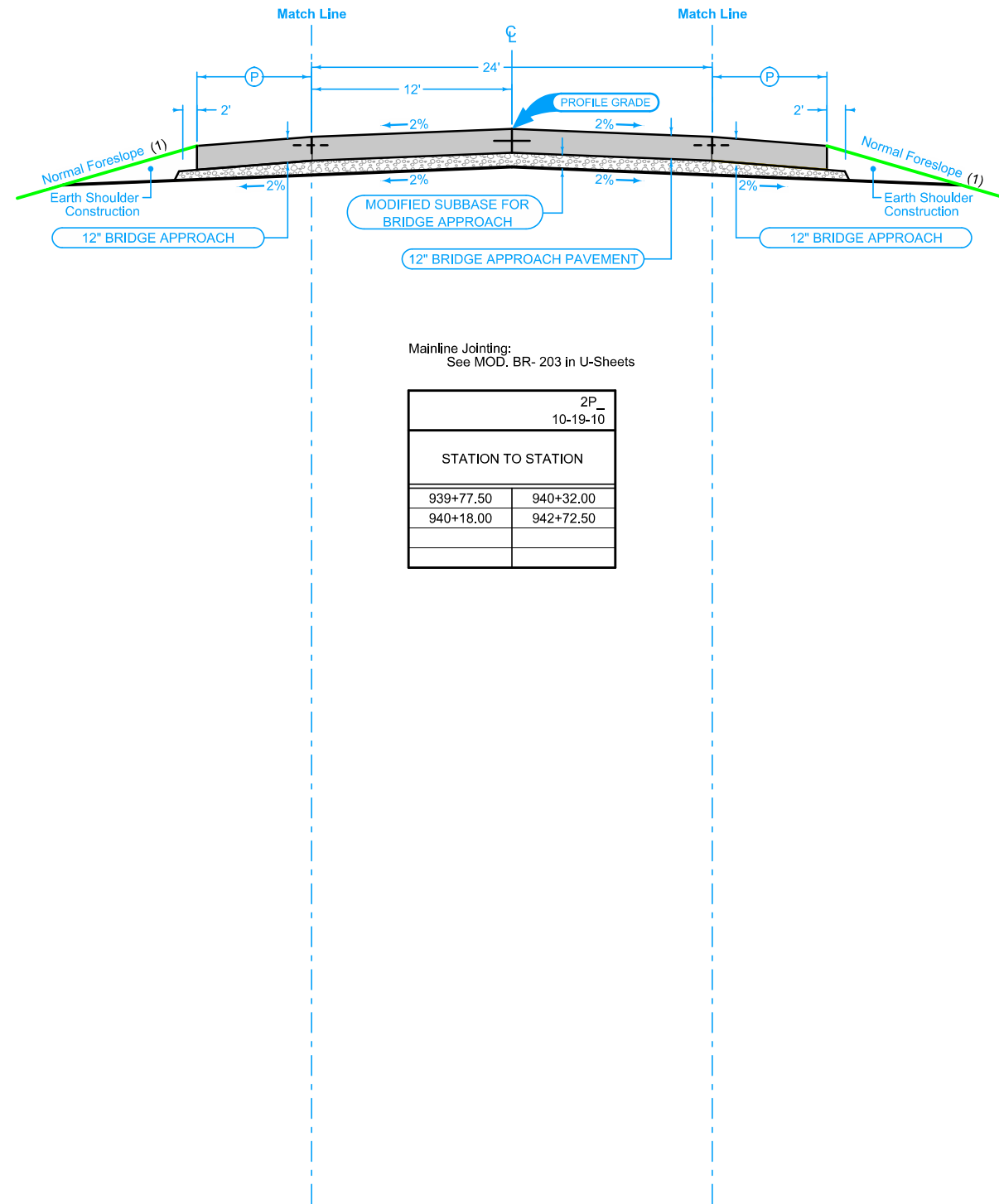
PRELIMINARY PLANS

Subject to change by final design.

D5 PLAN - Date: 09-27-21

Shoulder at Bridge Approach

2_P_Guard_10-17-17		
STATION TO STATION		(P) Feet
939+77.50	940+32.00	10
940+18.00	942+72.50	10



Mainline Jointing:
See MOD. BR- 203 in U-Sheets

2P_10-19-10		
STATION TO STATION		
939+77.50	940+32.00	
940+18.00	942+72.50	

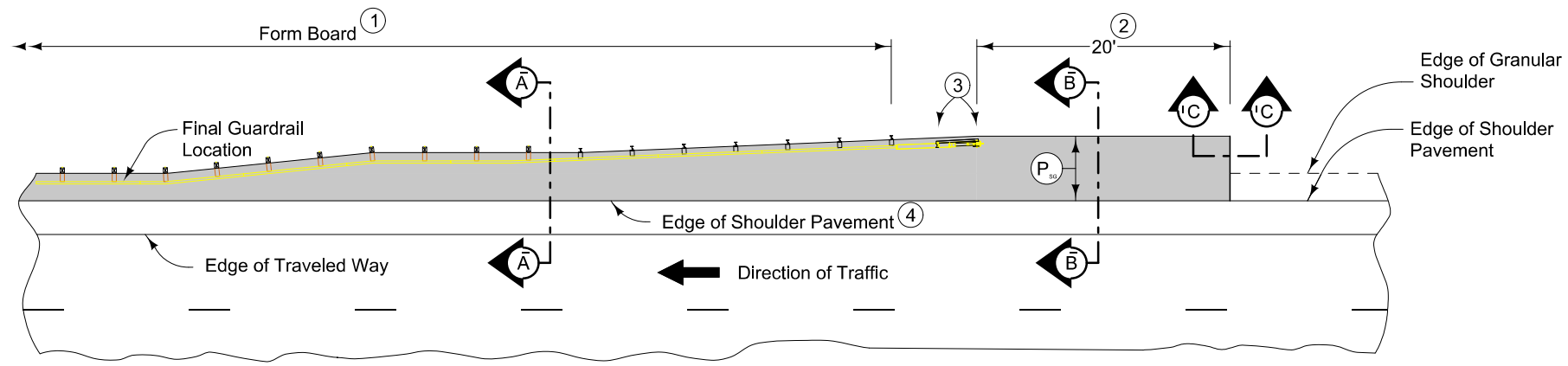
Shoulder at Bridge Approach

2_P_Guard_10-17-17		
STATION TO STATION		(P) Feet
939+77.50	940+32.00	10
940+18.00	942+72.50	10

(1) Refer Standard Road Plan EW 202 and X-sections for additional details

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

IA 5



PLAN VIEW

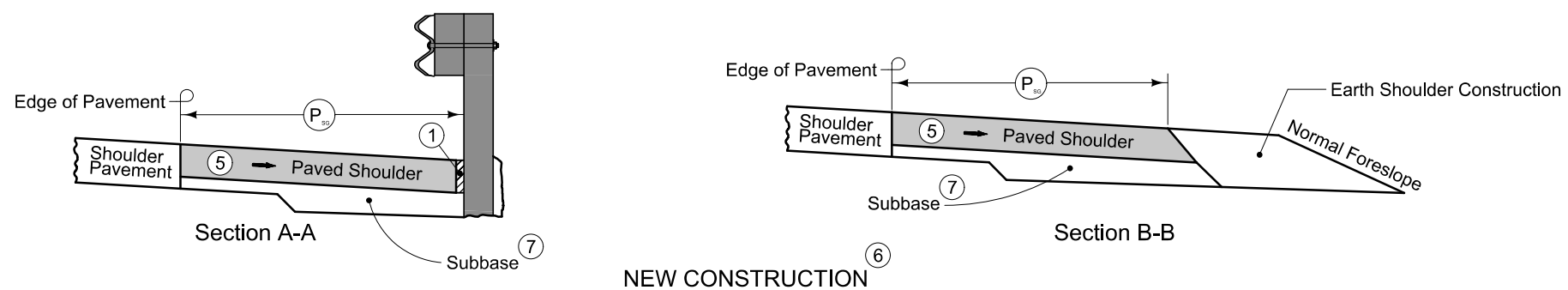
9" HMA Paved Shoulder at guardrail. 8" PCC may be substituted with the following jointing layout:

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.

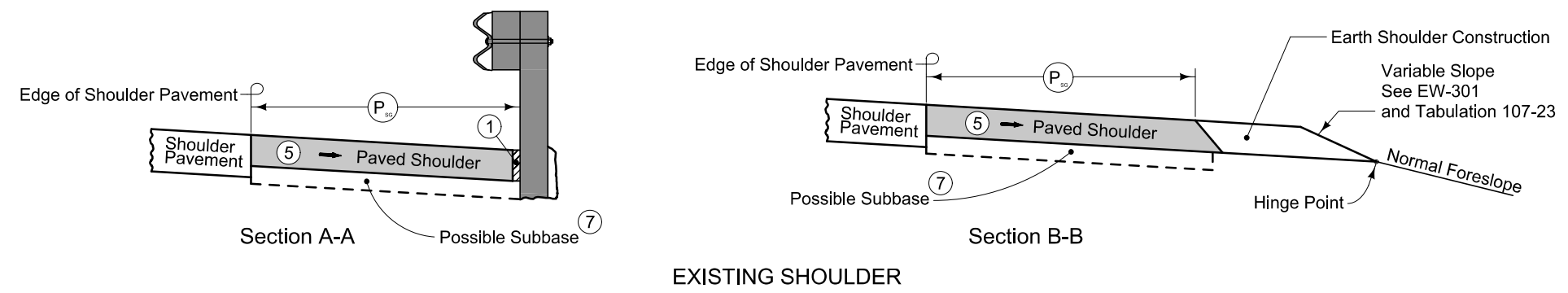
Compaction of HMA is required to face of guardrail post. Hand compaction will be allowed under guardrail. Removal and reinstallation of guardrail will be allowed with no additional payment.

Refer to Tabulation 112-9 for shoulder quantities.

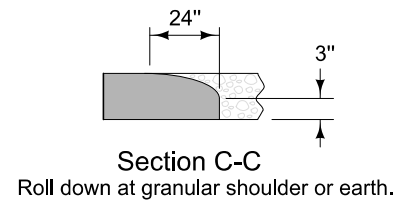
- ① PCC option only: When guardrail posts are installed prior to construction of PCC paved shoulder, fasten form board to the face of guardrail posts for the length shown.
- ② Continue paved shoulder 20 feet beyond the center of the first post.
- ③ Shoulder may be notched for first 2 posts or post sleeves may be installed through pavement. Do not drive posts through pavement.
- ④ 'KT-1 joint for PCC shoulder. 'B' joint for HMA shoulder.
- ⑤ Match shoulder slope.
- ⑥ The Contractor has the option to pave the paved shoulder at guardrail and the partial width paved shoulder as one operation.
- ⑦ Refer to other details in the plan.



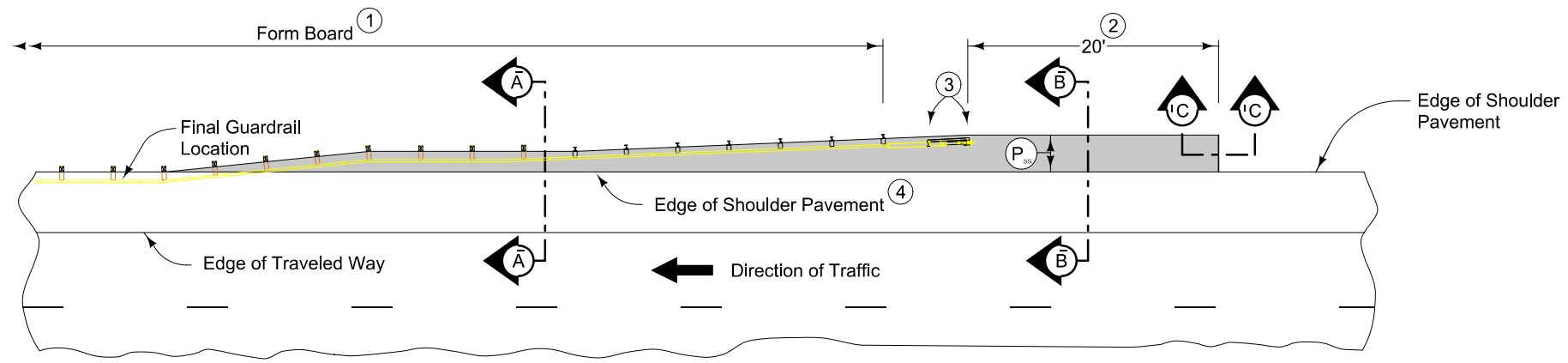
NEW CONSTRUCTION



EXISTING SHOULDER



PAVED SHOULDER AT GUARDRAIL (ADJACENT TO PARTIAL WIDTH PAVED SHOULDER)



PLAN VIEW

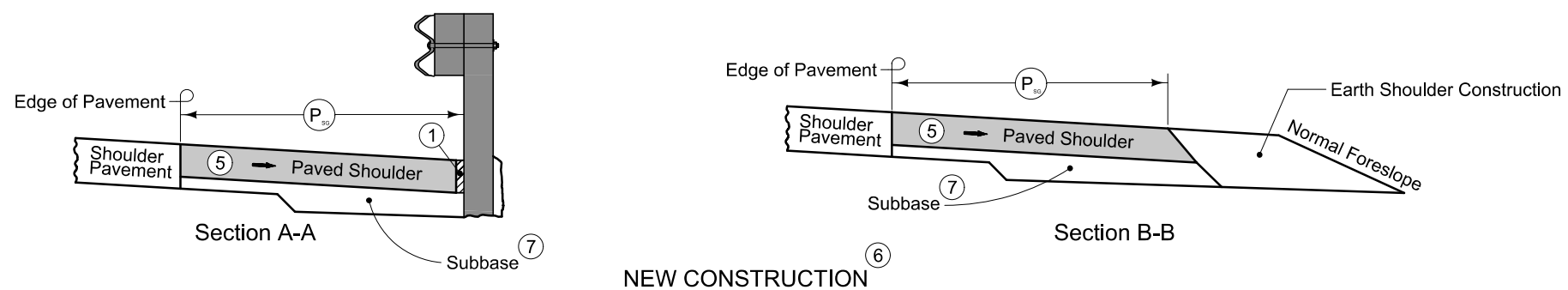
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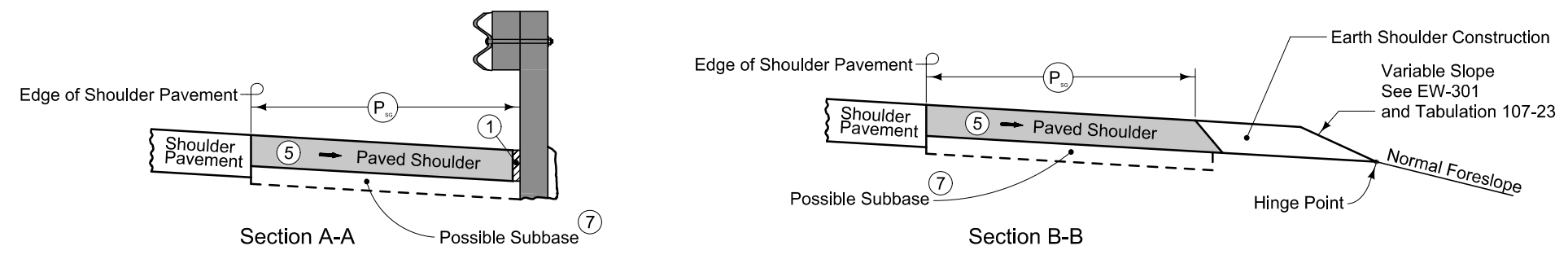
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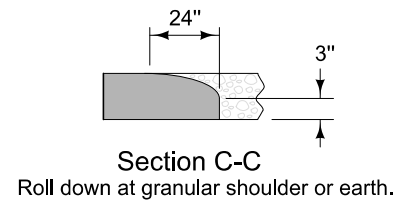
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- ② Continue paved shoulder 20 feet beyond the center of the first post.
- ③ Shoulder may be notched for first 2 posts or post sleeves may be installed through pavement. Do not drive posts through pavement.
- ④ 'KT-1 joint for PCC shoulder. 'B' joint for HMA shoulder.
- ⑤ Match shoulder slope.
- ⑥ The Contractor has the option to pave the paved shoulder at guardrail and the full width paved shoulder as one operation.
- ⑦ Refer to other details in the plan.



NEW CONSTRUCTION



EXISTING SHOULDER



PAVED SHOULDER AT GUARDRAIL (ADJACENT TO FULL WIDTH PAVED SHOULDER)

SURVEY SYMBOLS

- POT Tangent Point
- SP Stream Profile
- CP Control Point
- WC Wlki Card (Misc. Field Shot)
- SNP Unpaved Shoulder
- BL Topo Breakline
- DU Centerline Draw or Stream (Up)
- D Centerline Draw or Stream (Down)
- ENP Edge Paved Entrance & Park Lot
- ENT Centerline BL of Entrance
- GR Ground Shot
- BNK Stream Bank
- RIP Rip-Rap
- ENU Edge Unpaved Entrance & Parking
- GDL Guard Rail Steel
- GU Gutter In Front of Curb
- CU Back of Curb
- EP Edge of Paved Roads (ML or SR)
- SH Paved Shoulder
- C Centerline BL of Road (ML or SR)
- PPA Power Pole Mkt/American Energy
- ROW Right of Way Mark
- PIP Pipe Culvert
- SOP Size of Pipe or Culvert
- CON Concrete or A/C Slab
- BRG Bridge
- BD Bridge Deck
- BCL Bridge Centerline
- SBR Size of Bridge
- RET Retaining Walls
- T1 TL1D Frontier Communications - Quality D
- F0 FO1D Windstream Communications - Quality D
- F02 FO2D ICN - Quality D
- V WL1D West Central Iowa Rural Water - Quality D
- PLG Location of General Photo
- CUL Culvert
- TP Telephone Pedestal
- PRO Profile Shot
- TLNR Tree Line Right
- TW Top of Water
- EW Edge of Water
- DIK Centerline of Dike or Dam
- INB Storm Sewer Beehive Intake
- TIL Tile Line
- TDC Tree Deciduous
- BLS Bridge Low Steel

UTILITY LEGEND

- PPA Alliant Energy
- T1 TL1D Windstream
- F0 FO1D Iowa Communications Network
- F02 FO2D Aureon Network Services
- V WL1D Rathbun Regional Water

Alliant Energy an aet cos
 Alliant Energy Field Engineer
 (800) 255-4268
rlt@alliantenergy.com

Windstream Communications
 Locate Desk
 (800) 289-1901
LOCATE_DESK@WINDSTREAM.COM

Iowa Communications Network
 Shannon Marlow
 (800) 572-1940
locust@iowanet.com

Aureon Network Services
 Jeff Klocko
 (515) 830-0445
jeff.klocko@areon.com

Rathbun Regional Water
 Scott Jackson
 (641) 647-1086
onecall@rrwa.net

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

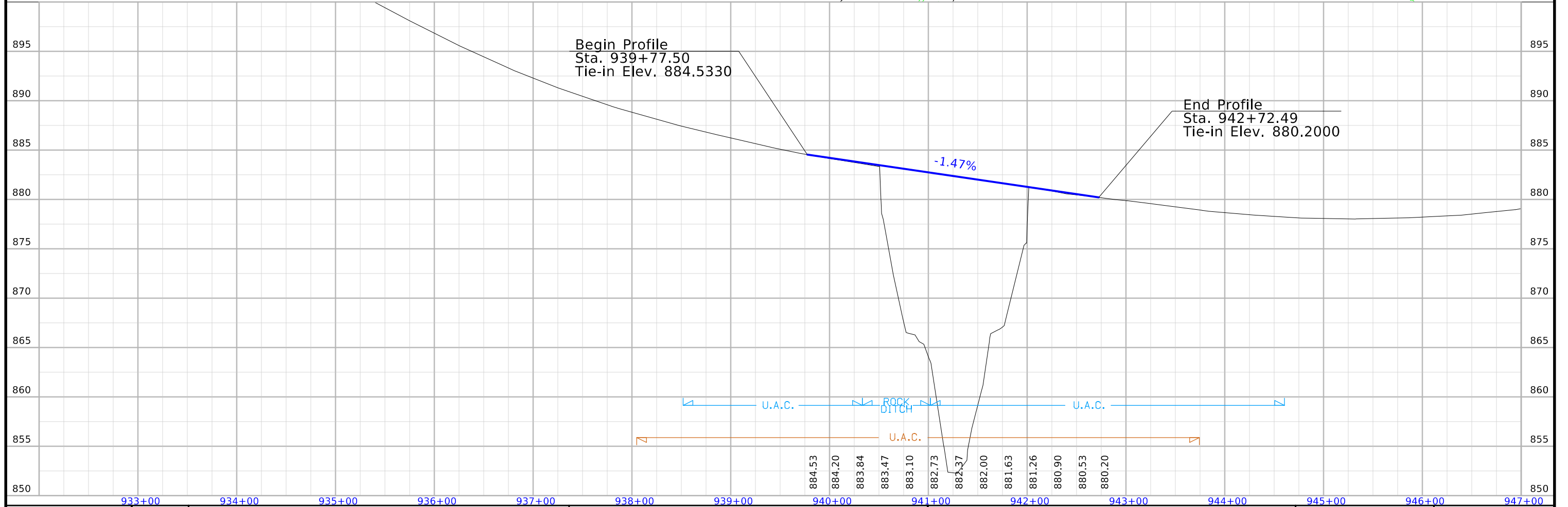
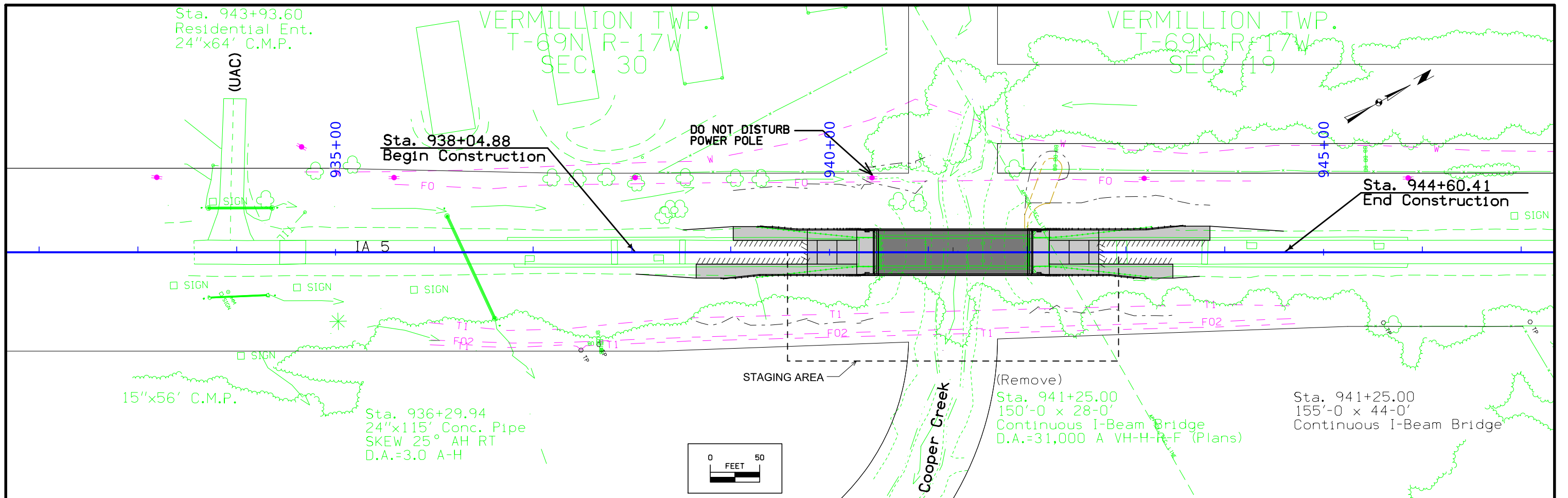
LINEWORK	Design Color No.	
Green	(2)	Existing Ground Line Profile
Blue	(1)	Proposed Profile and Annotation
Magenta	(5)	Existing Utilities
Blue, Light	(230)	Proposed Ditch Grades, Left
Black	(0)	Proposed Ditch Grades, Median
Rust	(14)	Proposed Ditch Grades, Right

- #### Reference Point
- Station
 - Section Corner
 - Ground Line Intercept
 - Saw Cut
 - Guardrail
 - Trench Drain
 - High Tension 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
 - C/A Access Control
 - Property Line

PLAN AND PROFILE LEGEND AND SYMBOL INFORMATION SHEET

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



FILE NO. 98765	ENGLISH	DESIGN TEAM Holst / Finch	Appanoose COUNTY	PROJECT NUMBER BRF-005-1(74)--38-04	SHEET NUMBER D2
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Survey Information

Appanoose County
BRF-005-1(74)--38-04
PIN 18-04-005-010
IA 5 – Partial Survey of IA 5 1.5 Miles North of IA 2,
Approx. 1,400'X475'
SAP 0922.3

General Information

Measurement units for this survey are US survey feet. Project datum and control was established using 2 Hour Long static sessions that were processed in OPUS. This is a partial survey of IA 5. Starting 1.5 Miles north of IA 2 and ending 1.7 Miles north of IA 2

Vertical Control

Vertical datum for this survey is relative to NAVD88. Geoid 12B was used in this survey. 2 Hour long static sessions were processed in OPUS and used to establish 4 control points surrounding the perimeter of the project. CP101-CP104 were then calibrated from CP100. Additional benchmarks were placed throughout the project using RTK GPS.

BM #500 EL= 882.819' this survey
BM #501 EL=868.614' this survey

Horizontal Control

The project coordinate system for this survey is IaRCS Zone 12(U.S. Survey Feet). This survey control is relative to 2-hour static sessions that were processed using OPUS. We establish 4 control points surrounding the perimeter of the project limits, observing each for 180 epochs. CP101-CP104 were then calibrated from CP100. Additional control points were placed throughout the project using GNSS Base-Rover setup relative to CP100.

Alignment Information

The horizontal alignment for this survey is a retrace of As-Built Grading Plans No. 24371388. Survey stationing was equated to the plan PC at STA 955+14.5 at point #JP4003, Found Iron Pin Flush in Pavement, and run back without equation to the beginning of the survey.

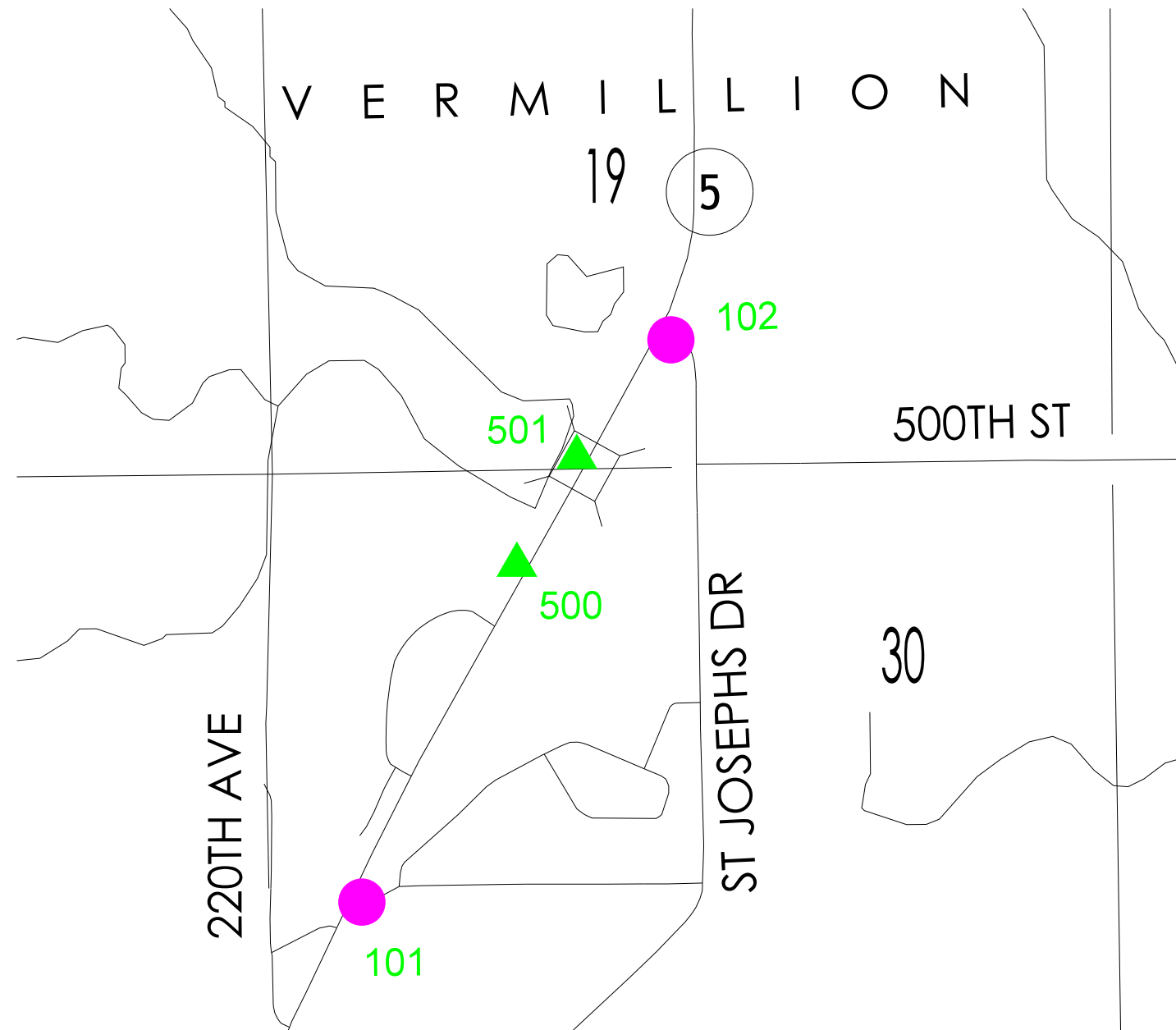
Survey stationing relates to as-built plan stationing as follows:

PT Sta. 923+48.6 Project No. 24371388
Survey POT Sta. 923+48.60

PC Sta 955+14.5 Project No. 24371388
Survey PC STA 955+14.50

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 2010.00

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 2010.00

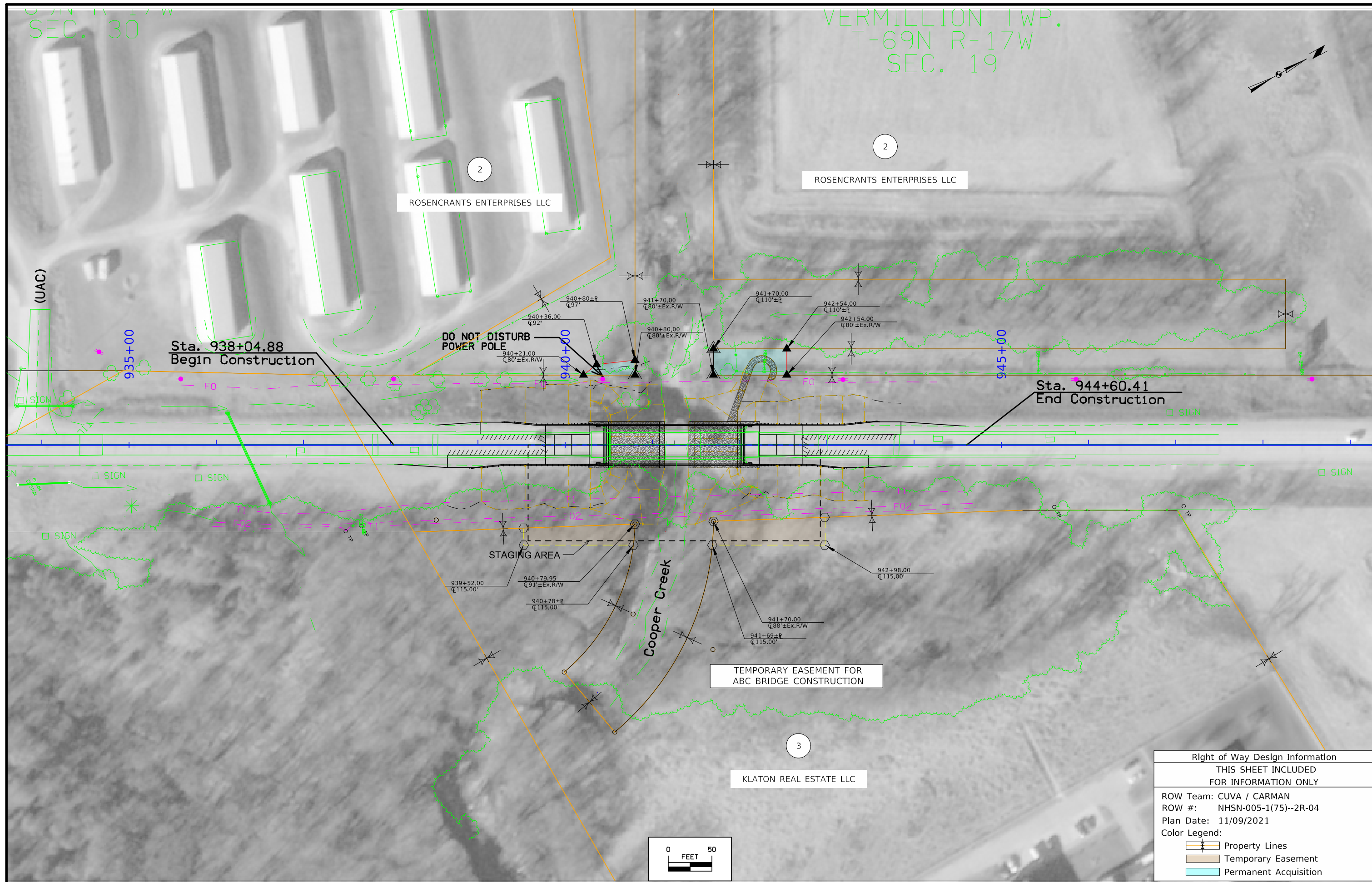
VERT. DATUM: NAVD88

Ia. Regional Coordinate System Zone 12

Point Name	Northing	Easting	Elevation	Feature	Description
101	6139338.56	22744962.04	980.78	CP	SET FENO MONUMENT FLUSH W/ GROUND
102	6142907.59	22746923.32	916.67	CP	SET FENO MONUMENT FLUSH W/ GROUND
500	6141477.86	22745945.65	882.82	BM	SET RR SPIKE NORTH SIDE OF POWER POLE
501	6142162.17	22746326.17	868.61	BM	SET RR SPIKE EAST SIDE OF POWER POLE

ALIGNMENT COORDINATES

Name	Location	Point on Tangent			Begin Spiral			Begin Curve			Simple Curve PI or Master PI of SCS			End Curve			End Spiral		
		Station	Coordinates		Station	Coordinates		Station	Coordinates		Station	Coordinates		Station	Coordinates		Station	Coordinates	
			Y (Northing)	X (Easting)		Y (Northing)	X (Easting)		Y (Northing)	X (Easting)		Y (Northing)	X (Easting)		Y (Northing)	X (Easting)		Y (Northing)	X (Easting)
IA 5	ML005	923+48.60	6139338.56	22744962.04															
	ML005	955+14.50	6142907.59	22746923.32															



SEC. 30

VERMILION TWP.
T-69N R-17W
SEC. 19

ROSENCRANTS ENTERPRISES LLC

ROSENCRANTS ENTERPRISES LLC

TEMPORARY EASEMENT FOR
ABC BRIDGE CONSTRUCTION

KLATON REAL ESTATE LLC

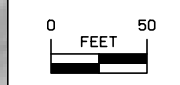
Sta. 938+04.88
Begin Construction

Sta. 944+60.41
End Construction

DO NOT DISTURB
POWER POLE

STAGING AREA

Cooper Creek



Right of Way Design Information	
THIS SHEET INCLUDED FOR INFORMATION ONLY	
ROW Team: CUVA / CARMAN	
ROW #: NHSN-005-1(75)--2R-04	
Plan Date: 11/09/2021	
Color Legend:	
	Property Lines
	Temporary Easement
	Permanent Acquisition

TRAFFIC CONTROL PLAN

Access to all properties shall be maintained at all times.

Thru traffic on IA 5 shall be maintained at all times except for Stage 2.

Off-Site Detour:
-All signing for detour shall be provided, installed, maintained, and removed by the Contractor as detailed on the J-sheets. This is incidental to the Traffic Control bid item.
-Signs will become property of Contractor.

STAGING NOTES

Stage 1:
Traffic:
-Maintain traffic on IA 5 at all times.
-TC-202 and TC-213 shall be utilized for work adjacent to IA 5 roadway.
Construction:
-Construct superstructure of proposed bridge just east of existing bridge.
-Perform grading adjacent to IA 5 and existing bridge while maintaining traffic on IA 5 at all times.

Stage 2:
Traffic:
-Detour traffic on IA 5 using off-site detour.
Construction:
-Remove existing bridge.
-Finish grading for proposed structure.
-Install precast abutments.
-Place superstructure in position.
-Construct bridge approach.
-Pave proposed shoulders.
-Install guardrail.

Stage 3:
Traffic:
-Open and maintain traffic on IA at all times.
-TC-202 and TC-213 shall be utilized for work adjacent to IA 5 roadway.
Construction:
-Seeding.

511 TRAVEL RESTRICTIONS

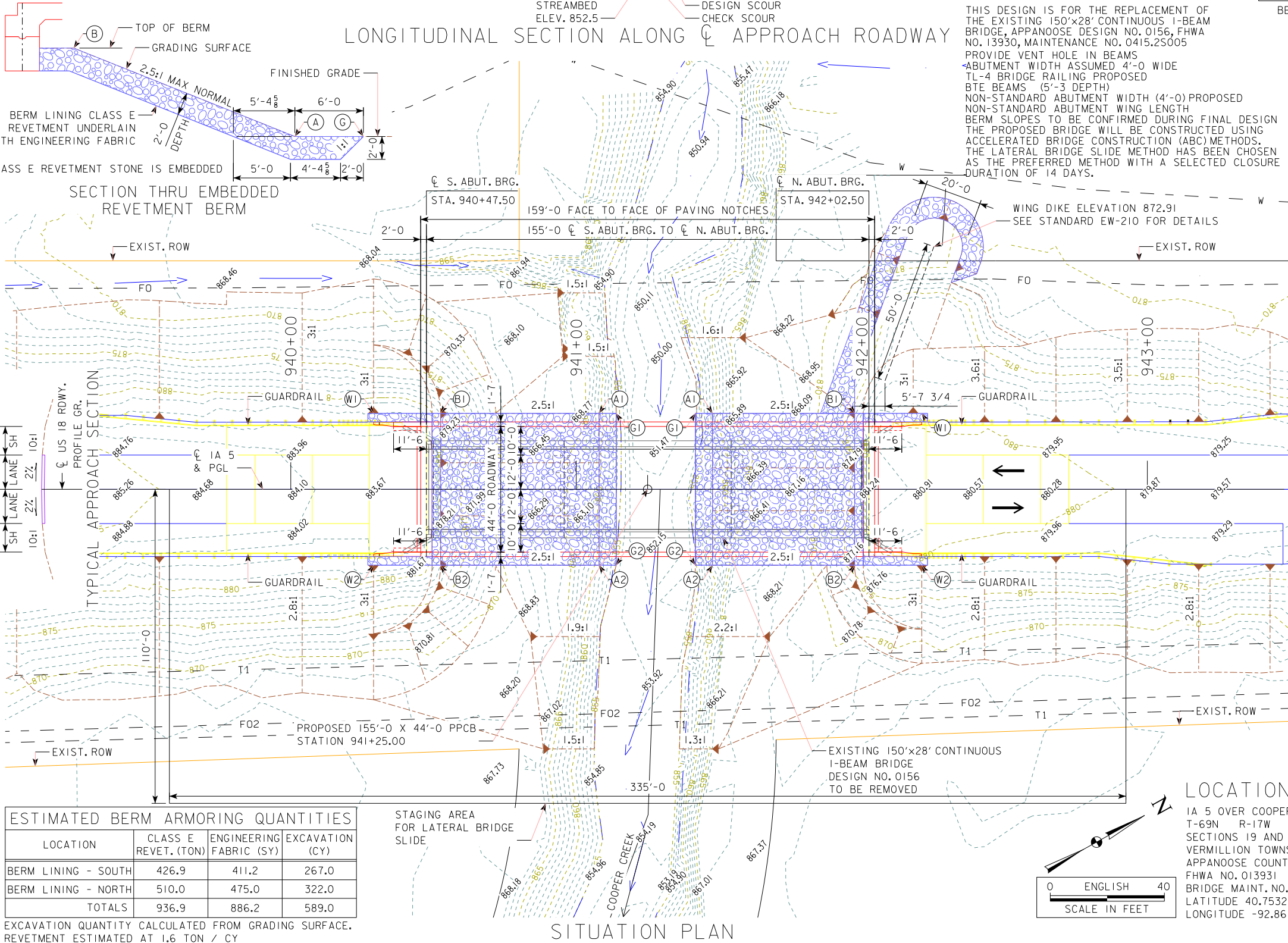
Route	Direction	County	Location Description	Feature Crossed	Object Type	Maint. Bridge No., Structure ID, or FHWA No.	Type of Restriction	Existing Measurement	Construction Measurement	Construction Measurement as Signed	Projected As Built Measurement	Remarks
IA 5		Appanoose		Closed for Stage 2 Only								

890	PROPOSED GRADE	CL S. ABUT. BRG. ELEV. 883.47	TOP OF BERM ELEV. 875.19	DESIGN HW REGULATORY LOW BEAM	CL N. ABUT. BRG. ELEV. 881.20	890
880	EXIST. GROUND			OPERATIONAL LOW BEAM		880
870						870
860		BOTT. FTG. ELEV. 873.19			BOTT. FTG. ELEV. 870.91	860
850	TOP OF BRIDGE DECK AT CENTERLINE ROADWAY IS 0.03' BELOW THE PROFILE GRADE TO ACCOUNT FOR DECK CROSS SLOPE AND PARABOLIC CROWN.	10' PREBORE ELEV. 863.19			10' PREBORE ELEV. 860.91	850
840		2' THICK BERM REVET.	TOP OF BERM ELEV. 872.91			840

BERM SLOPE LOCATION TABLE

POINTS	SOUTH ABUTMENT			NORTH ABUTMENT		
	STATION	OFFSET	ELEV.	STATION	OFFSET	ELEV.
A1	941+07.97	26.58' LT.	853.00	941+47.93	26.58' RT.	853.00
A2	941+07.97	26.58' RT.	853.00	941+47.93	26.58' LT.	853.00
B1	940+52.50	26.58' LT.	875.19	941+97.50	26.58' LT.	872.91
B2	940+52.50	26.58' RT.	875.19	941+97.50	26.58' RT.	872.91
G1	941+13.97	28.58' LT.	853.00	941+41.93	28.58' LT.	853.00
G2	941+13.97	28.58' RT.	853.00	941+41.93	28.58' RT.	853.00
W1	940+29.00	26.58' LT.	883.19	942+21.00	26.58' LT.	880.36
W2	940+29.00	26.58' RT.	883.19	942+21.00	26.58' RT.	880.36

BERM SLOPE ELEVATIONS REFLECT THE GRADING SURFACE



THIS DESIGN IS FOR THE REPLACEMENT OF THE EXISTING 150'x28' CONTINUOUS I-BEAM BRIDGE, APPANOOSE DESIGN NO. 0156, FHWA NO. 13930, MAINTENANCE NO. 0415.2S005

PROVIDE VENT HOLE IN BEAMS

ABUTMENT WIDTH ASSUMED 4'-0" WIDE

TL-4 BRIDGE RAILING PROPOSED

BTE BEAMS (5'-3" DEPTH)

NON-STANDARD ABUTMENT WIDTH (4'-0") PROPOSED

NON-STANDARD ABUTMENT WING LENGTH

BERM SLOPES TO BE CONFIRMED DURING FINAL DESIGN

THE PROPOSED BRIDGE WILL BE CONSTRUCTED USING ACCELERATED BRIDGE CONSTRUCTION (ABC) METHODS. THE LATERAL BRIDGE SLIDE METHOD HAS BEEN CHOSEN AS THE PREFERRED METHOD WITH A SELECTED CLOSURE DURATION OF 14 DAYS.

HYDRAULIC DESIGN

Matthew J. Erickson
26479

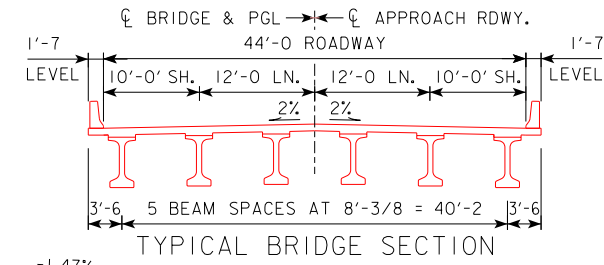
I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

Matthew Erickson 08/24/2021
Signature Date

Matthew J. Erickson
Printed or Typed Name

My license renewal date is December 31, 2022.

Pages or sheets covered by this seal: V.1



VPI STA. = 939+77.50
VPI ELEV. = 884.533

VPI STA. = 942+72.49
VPI ELEV. = 880.200

PROPOSED PROFILE GRADE IA 5

TRAFFIC ESTIMATE

2021 AADT	6,000	V.P.D.
2041 AADT	6,650	V.P.D.
202. DHV		V.P.H.
TRUCKS	7.0	%
TOTAL DESIGN ESALS		

UTILITIES LEGEND:

- - PPA - ALLIANT ENERGY
- TI - WINDSTREAM
- FI - IOWA COMMUNICATIONS NETWORK
- F2 - AUREON NETWORK SERVICES
- W - RATHBUN REGIONAL WATER

UTILITIES SHOWN ON THIS SHEET ARE FOR INFORMATION ONLY, SEE ROAD DESIGN SHEETS FOR FINAL UTILITY INFORMATION.

HYDRAULIC DATA

DRAINAGE AREA = 47.5 SQ. MI.

STREAM SLOPE = 1.6 FT./MI.

AVG. LOW WATER STAGE = 855.0

Q₅₀ = 9,275 CFS
STAGE = 875.96

REGULATORY LOW BEAM = 875.8

BACKWATER = 0.39 FT.

AVG. BRIDGE VELOCITY = 5.6 FPS

Q₁₀₀ = 11,000 CFS
STAGE = 876.97

OPERATIONAL LOW BEAM = 874.7

BACKWATER = 0.49 FT.

AVG. BRIDGE VELOCITY = 6.2 FPS

Q₂₀₀ = 12,800 CFS
STAGE = 877.98

CALCULATED DESIGN SCOUR = 843.0

Q₅₀₀ = 14,900 CFS
STAGE = 879.05

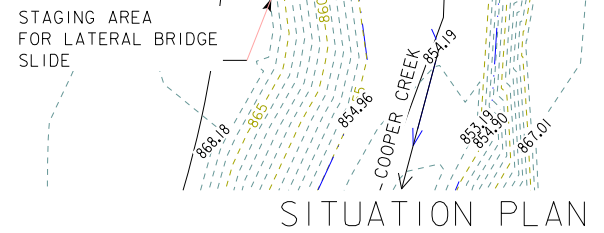
CALCULATED CHECK SCOUR = 842.3

PRELIMINARY

ESTIMATED BERM ARMORING QUANTITIES

LOCATION	CLASS E REVET. (TON)	ENGINEERING FABRIC (SY)	EXCAVATION (CY)
BERM LINING - SOUTH	426.9	411.2	267.0
BERM LINING - NORTH	510.0	475.0	322.0
TOTALS	936.9	886.2	589.0

EXCAVATION QUANTITY CALCULATED FROM GRADING SURFACE. REVETMENT ESTIMATED AT 1.6 TON / CY



LOCATION

IA 5 OVER COOPER CREEK

T-69N R-17W

SECTIONS 19 AND 30

VERMILION TOWNSHIP

APPANOOSE COUNTY

FHWA NO. 013931

BRIDGE MAINT. NO. 0415.2S005

LATITUDE 40.753292°

LONGITUDE -92.861525°

DESIGN FOR 0° SKEW

155'-0" X 44'-0" PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGE

155'-0" SINGLE SPAN

SITUATION PLAN

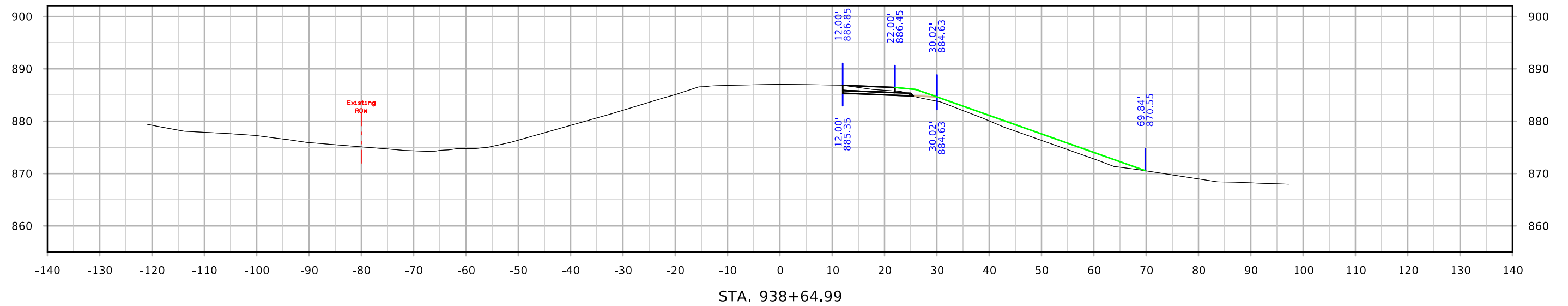
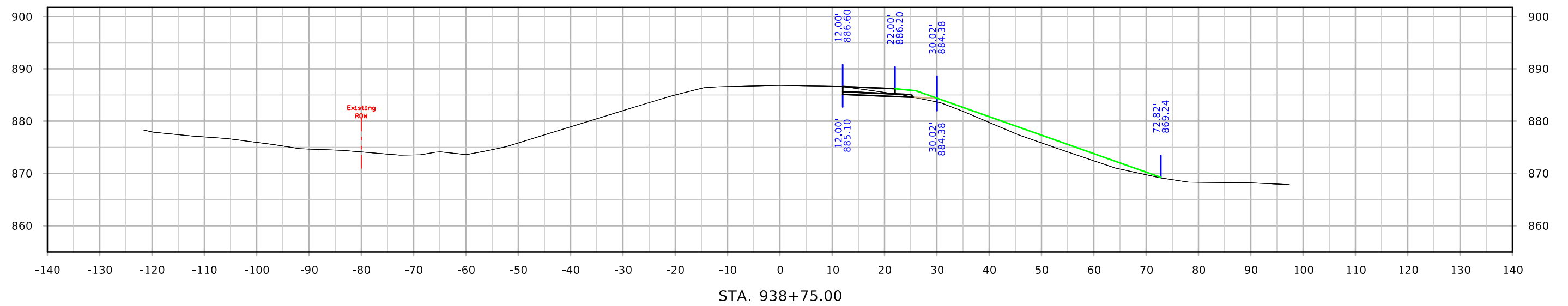
STATION 941+25.00 (CL IA 5)

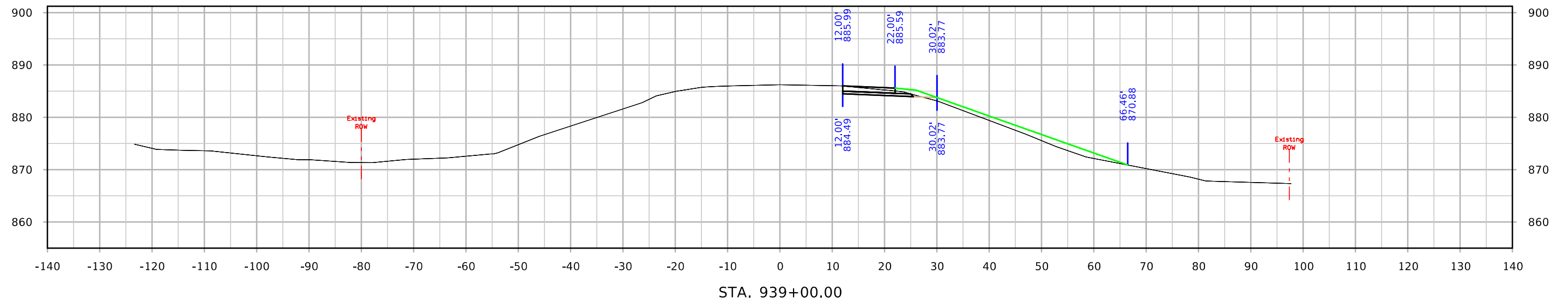
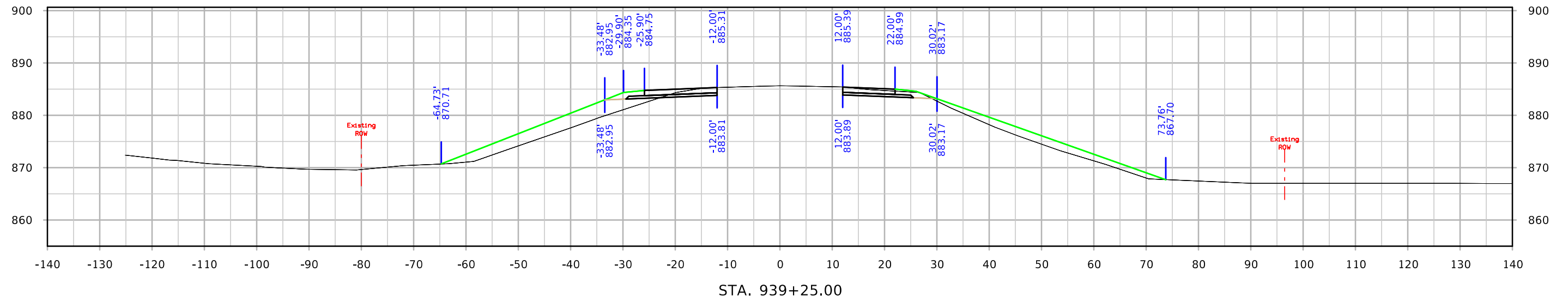
AUGUST, 2021

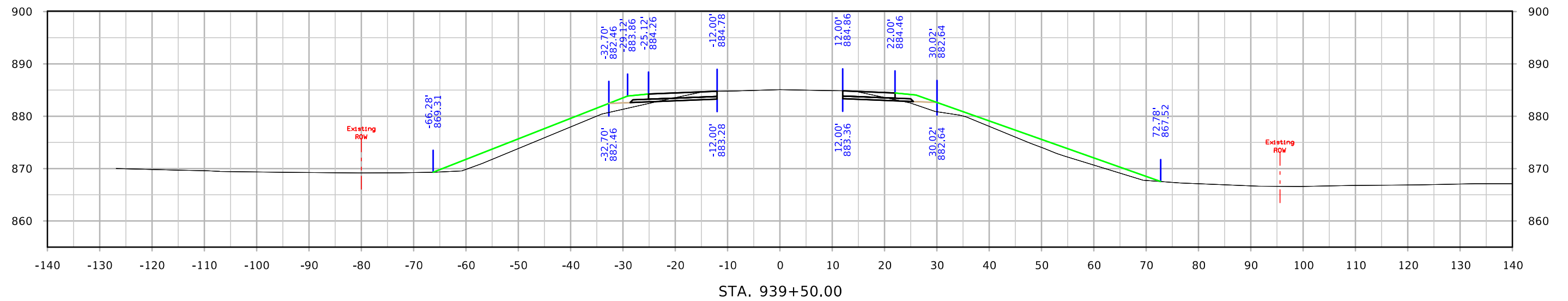
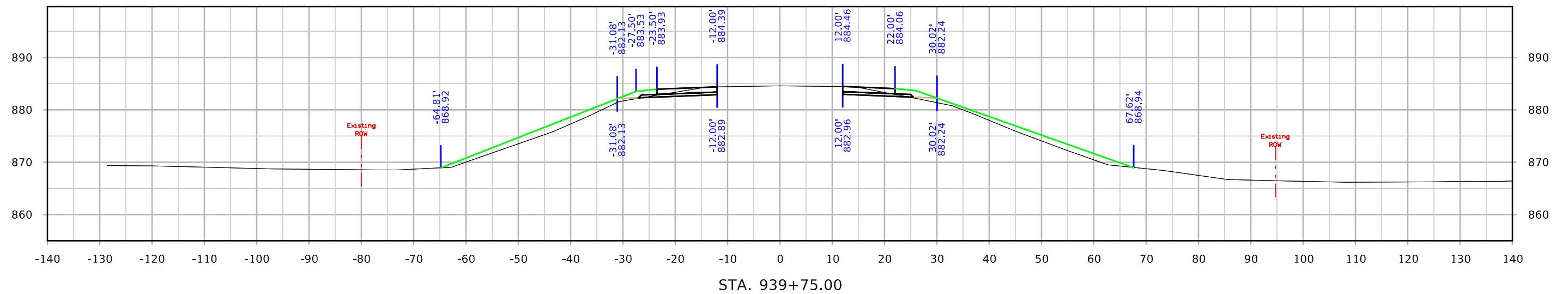
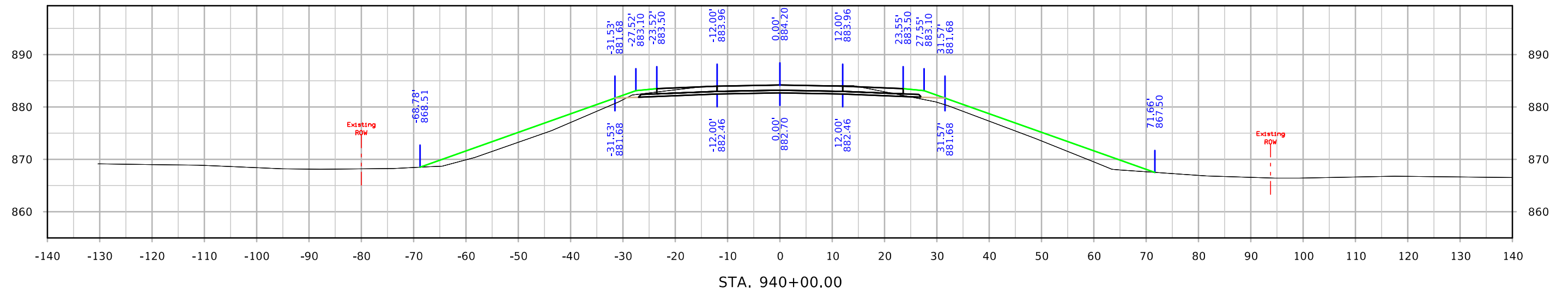
APPANOOSE COUNTY

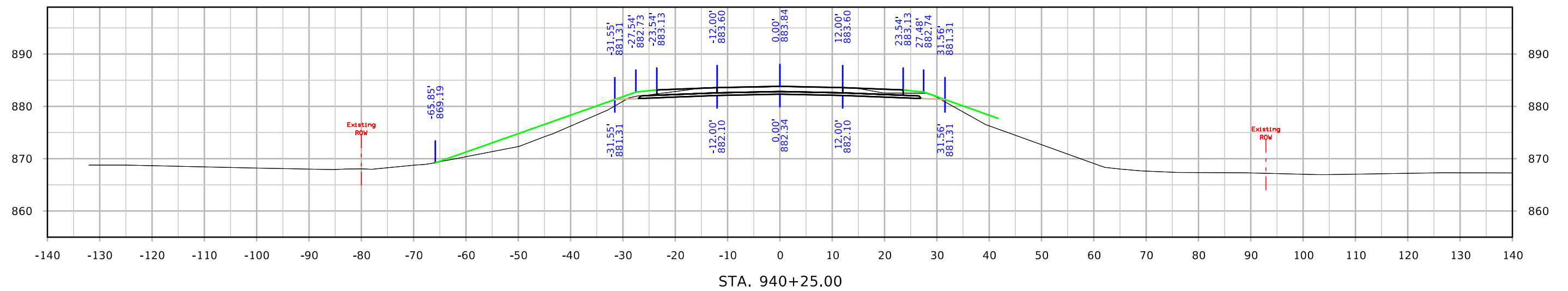
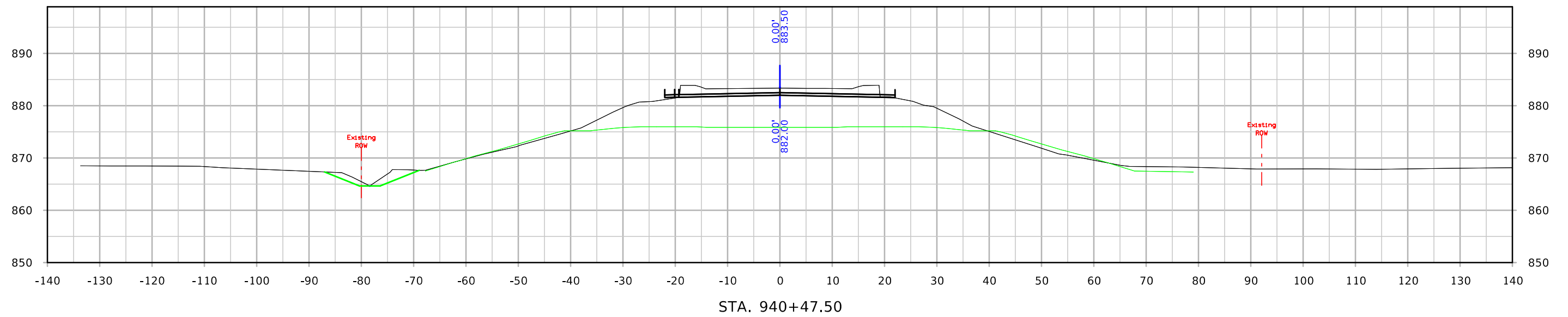
IOWA DOT - TRANSPORTATION DEVELOPMENT DIVISION

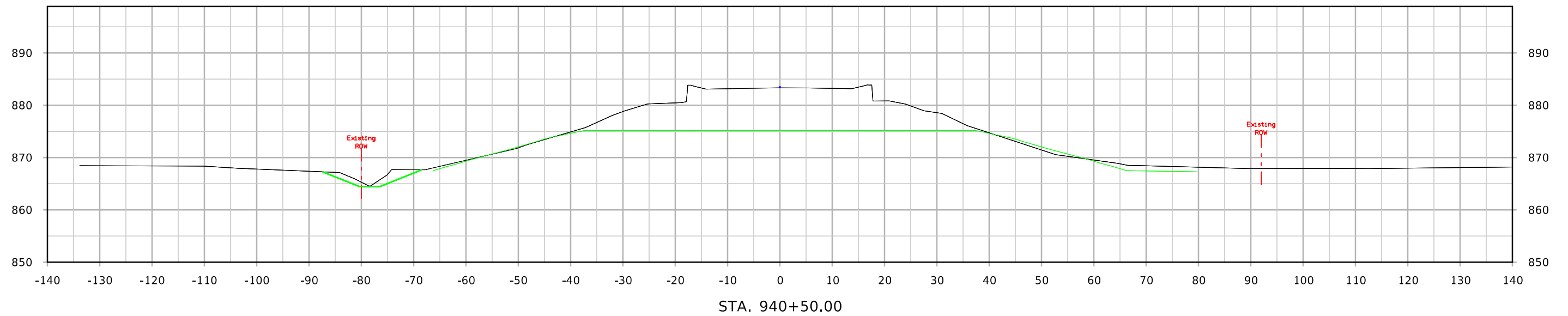
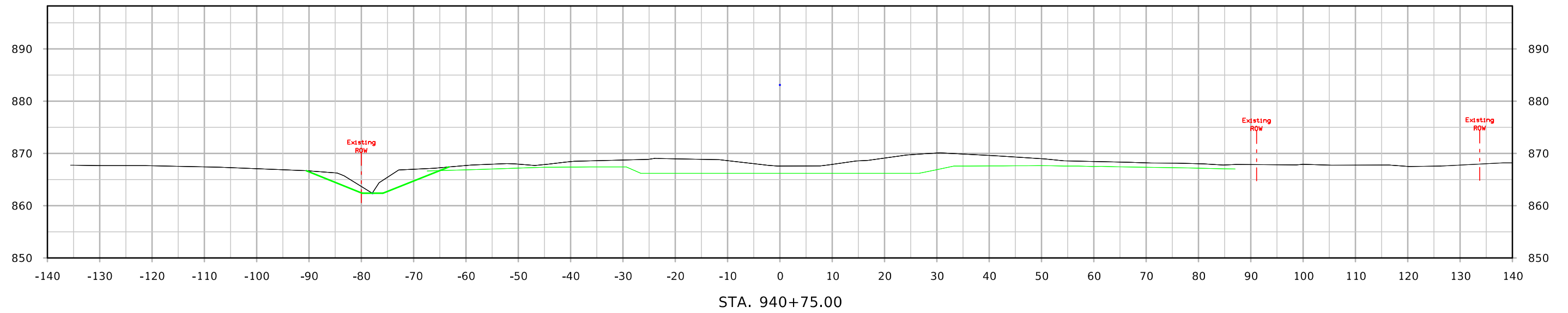
DESIGN SHEET NO. 1 OF 1 FILE NO. 31851 DESIGN NO. 0123

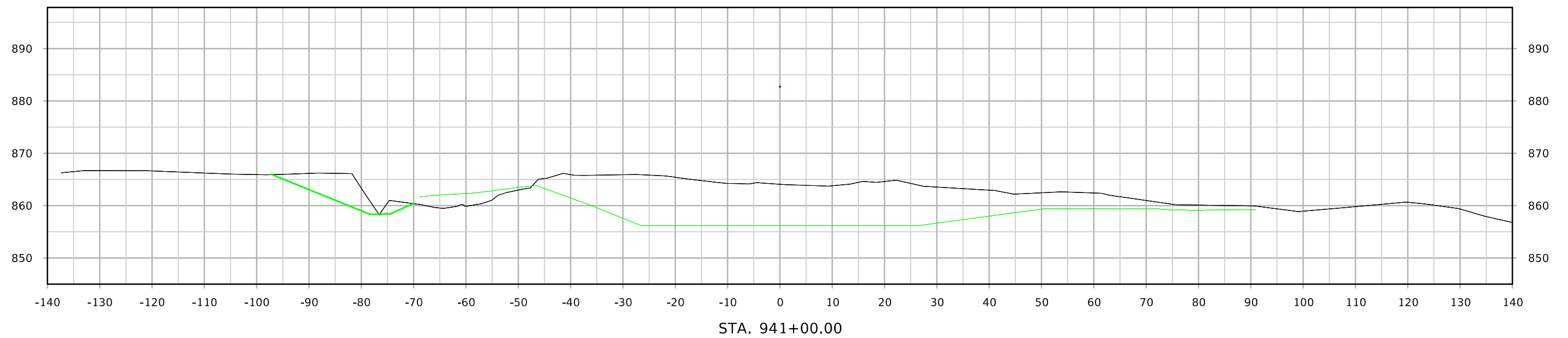
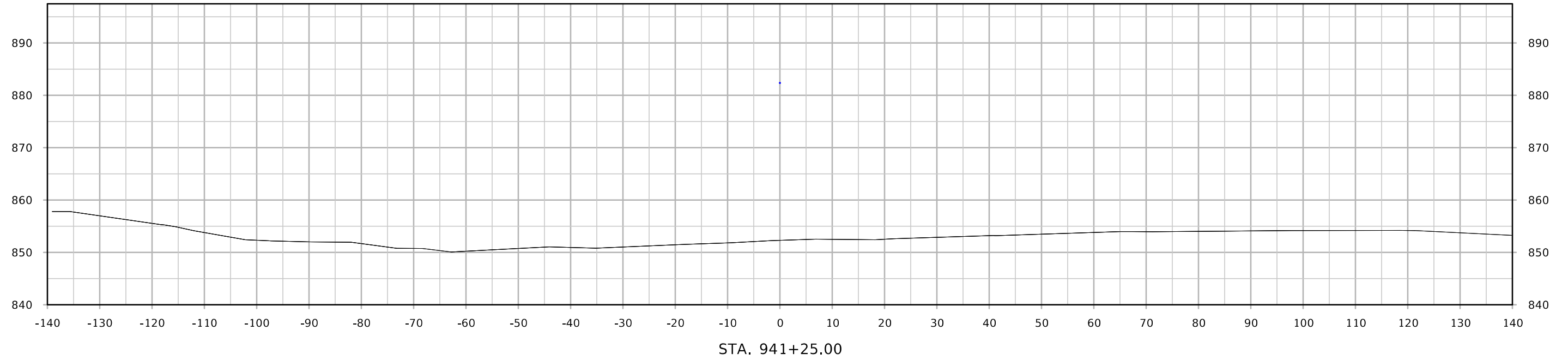


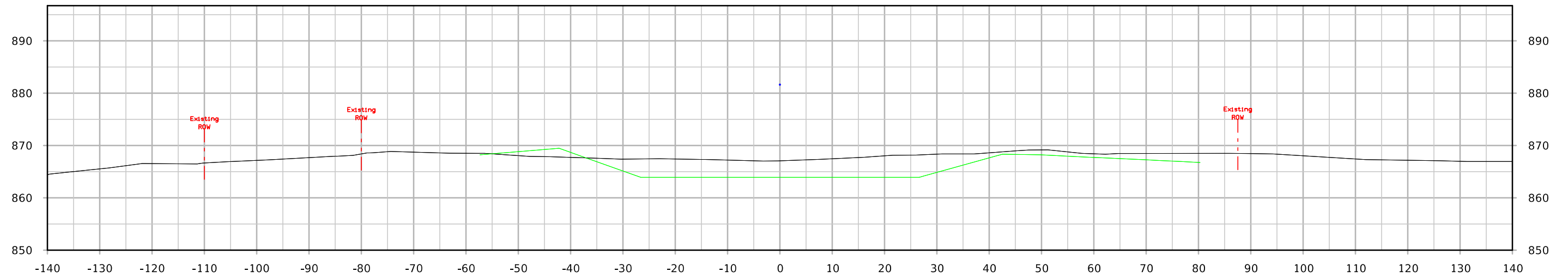




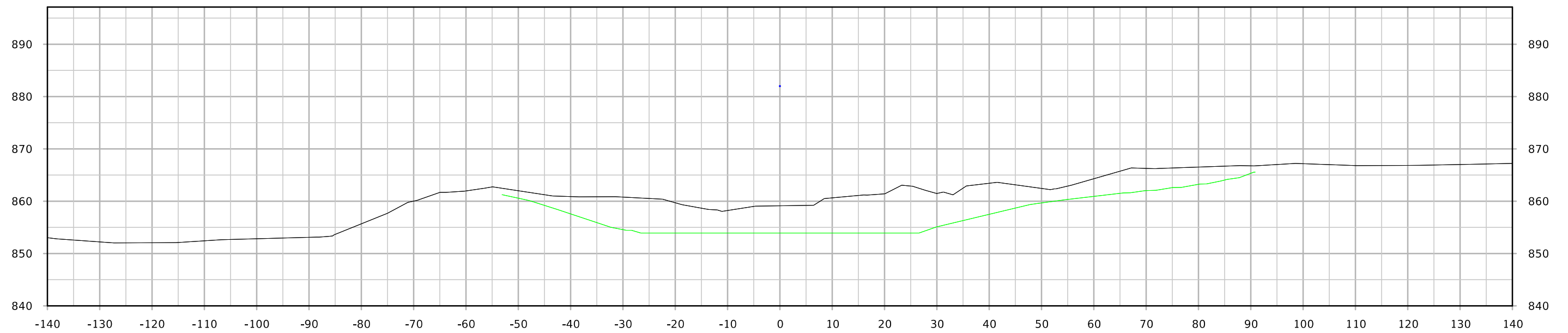




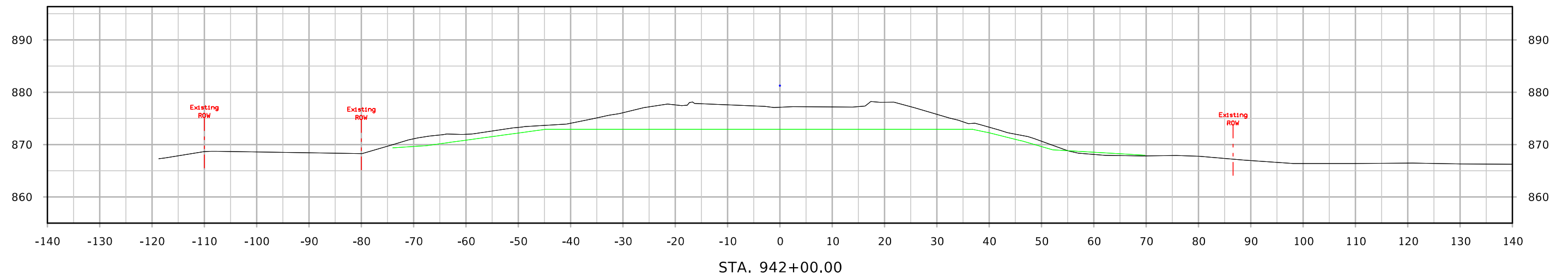
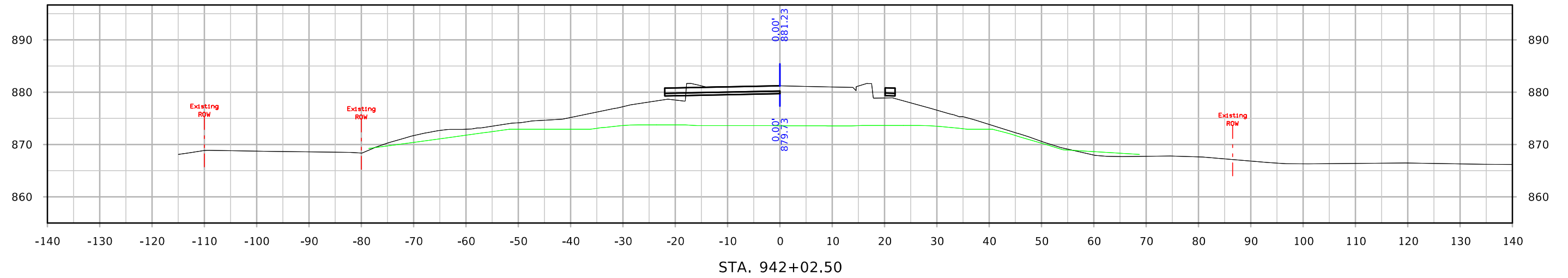
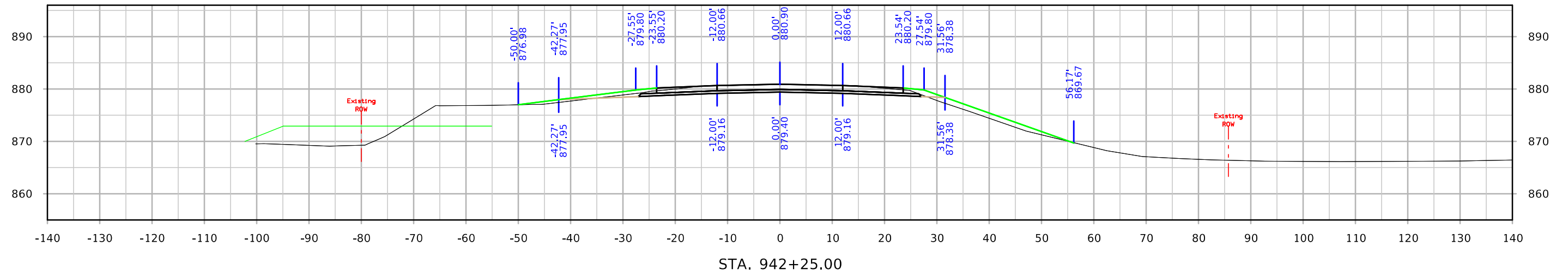


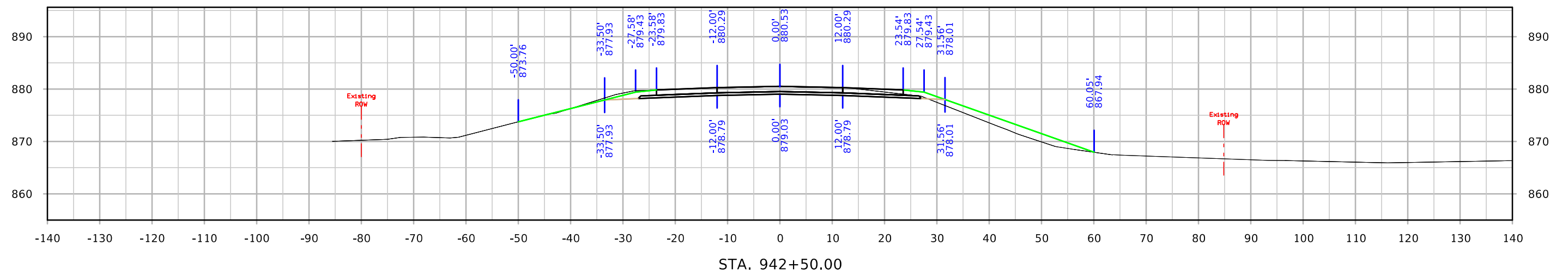
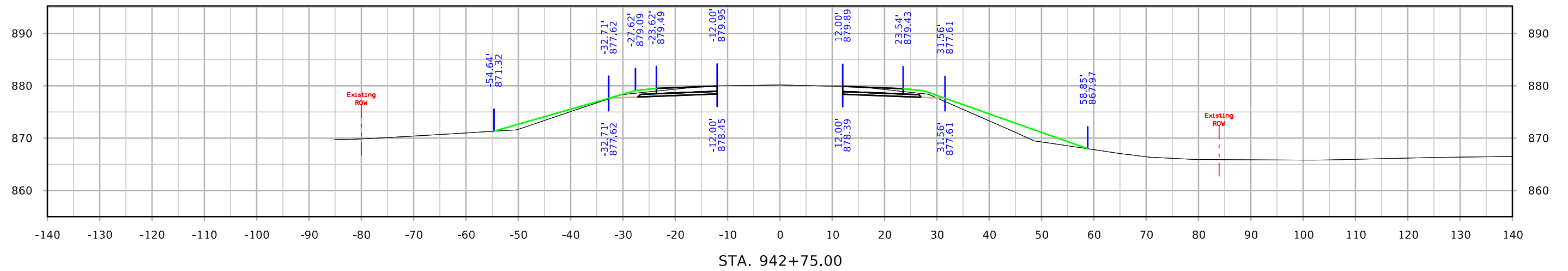
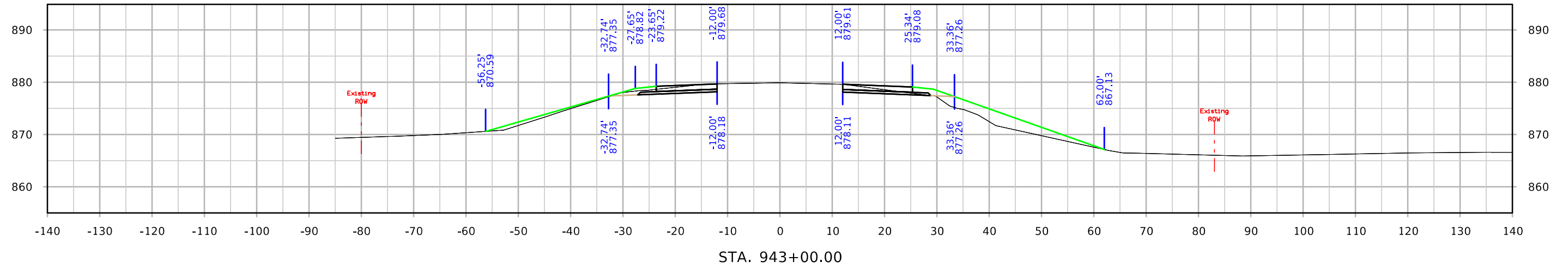


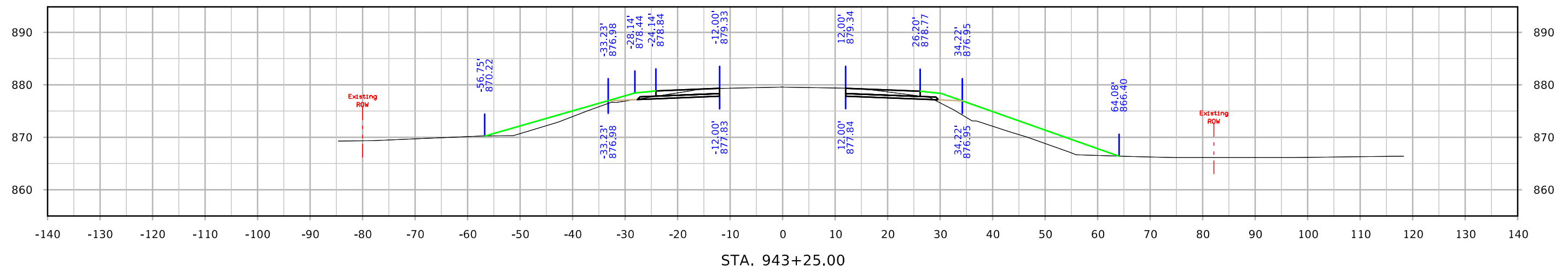
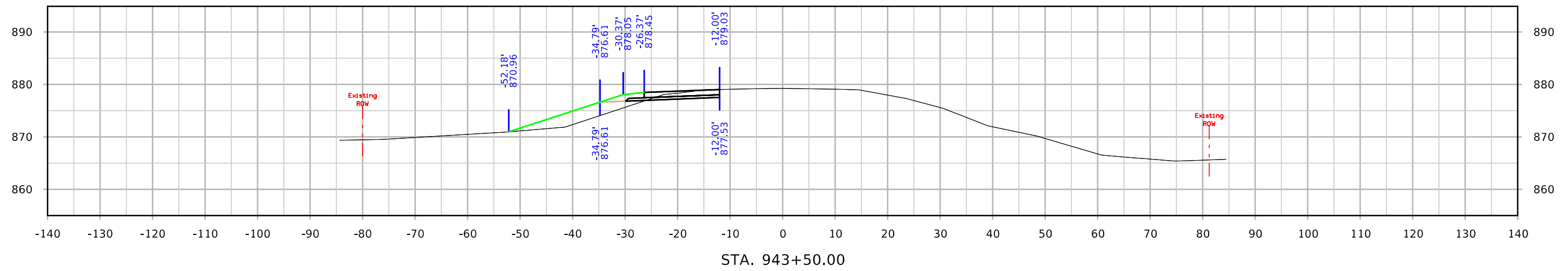
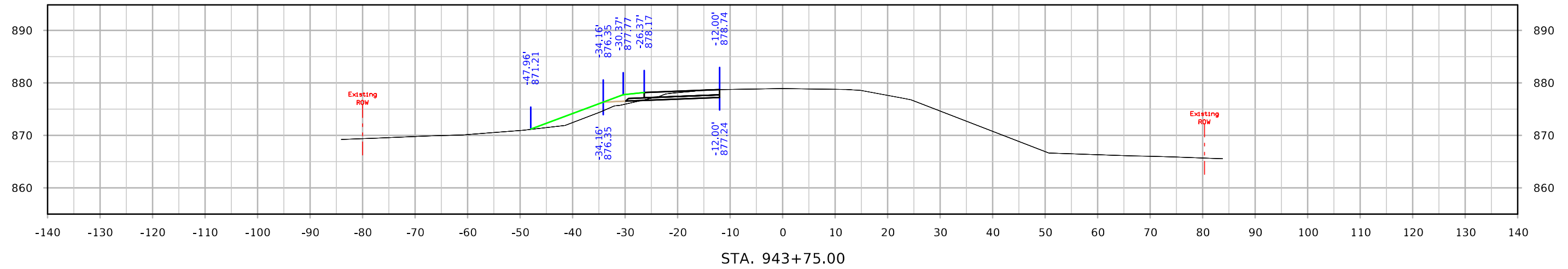
STA. 941+75.00

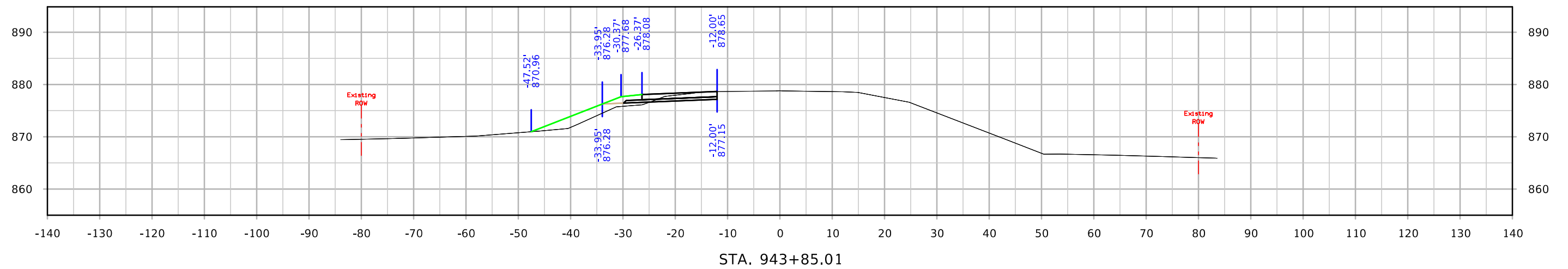


STA. 941+50.00









STA. 943+85.01