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B Sheets	Typical Cross Sections and Details
B.1 - 7	Typical Cross Sections and Details
C Sheets	Quantities and General Information
C.1	Access Points and Safety Ramps
D Sheets	Mainline Plan and Profile Sheets
D.1	Plan & Profile Legend & Symbol Information Sheet
D.2 - 10	IA 21 Plan and Profile
E Sheets	Side Road Plan and Profile Sheets
E.1	1st Street Plan and Profile
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G.2	Control Point Vicinity Map
G.3	Horizontal and Vertical Control Tab.
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X.4 - 7	Mainline Entrance Profiles
X.8	1st Street Entrance Profiles



PLANS OF PROPOSED IMPROVEMENT ON THE

PRIMARY ROAD SYSTEM

Iowa \ Benton COUNTY

Grade and Pave

0.3 mi N of IA 212 to
3rd St in Belle Plaine

SCALES: As Noted

Refer to the Proposal Form for list of applicable specifications.

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



DESIGN DATA RURAL			
2029	AADT	2,790	V.P.D.
2049	AADT	2,930	V.P.D.
20 -	DHV	-	V.P.H.
TRUCKS		12	%
Total Design ESALs		-	

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

PRELIMINARY PLANS

Subject to change by final design.

D5 PLAN - Date: 12/10/2025

REVISIONS

TOTAL

116

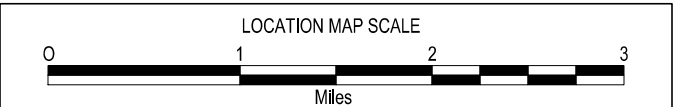
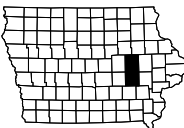
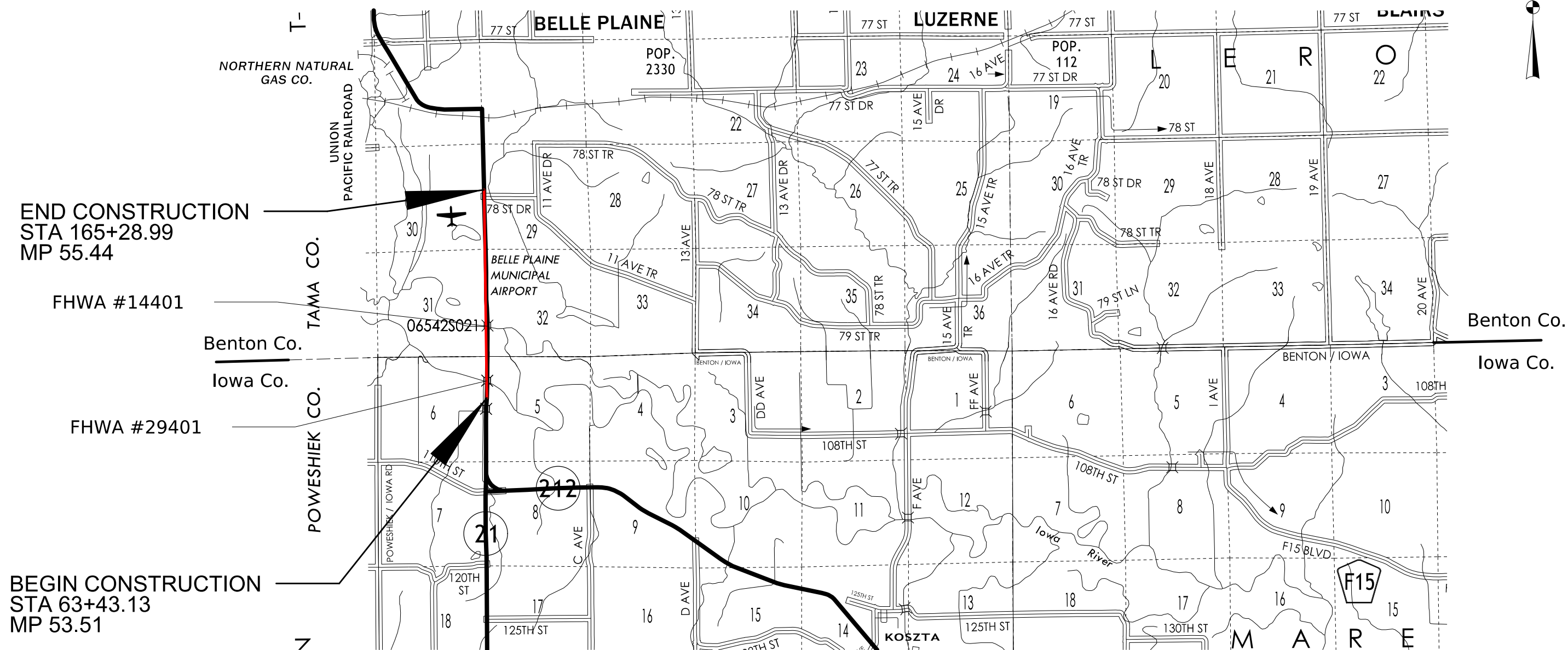
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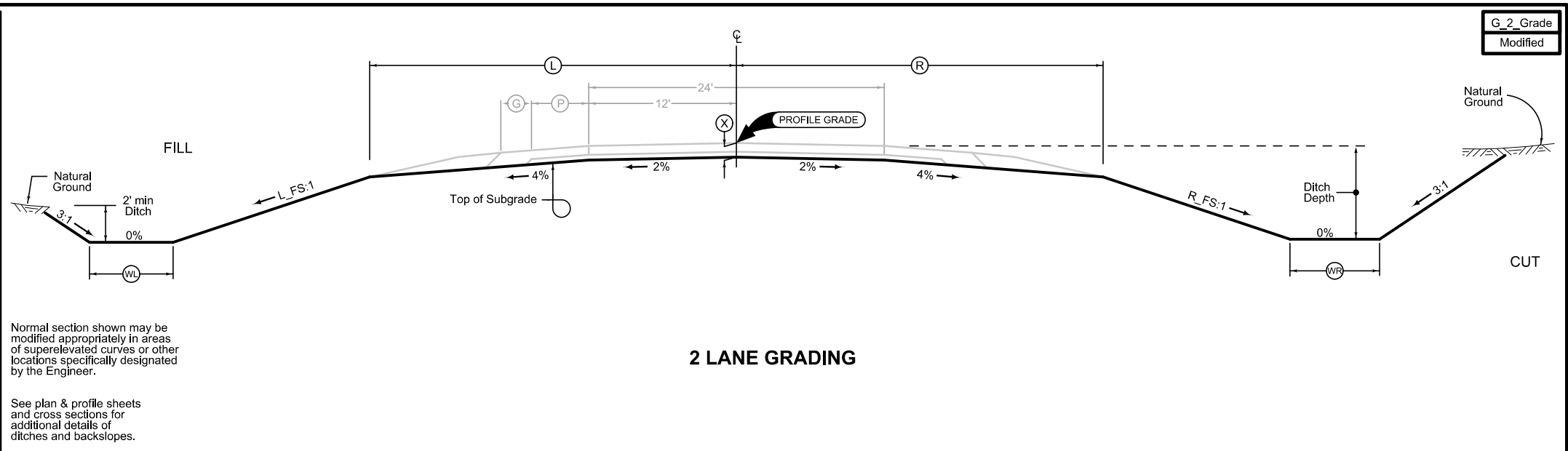
23-48-021-030

PROJECT NUMBER

STP-021-3(018)--2C-48

R.O.W. PROJECT NUMBER



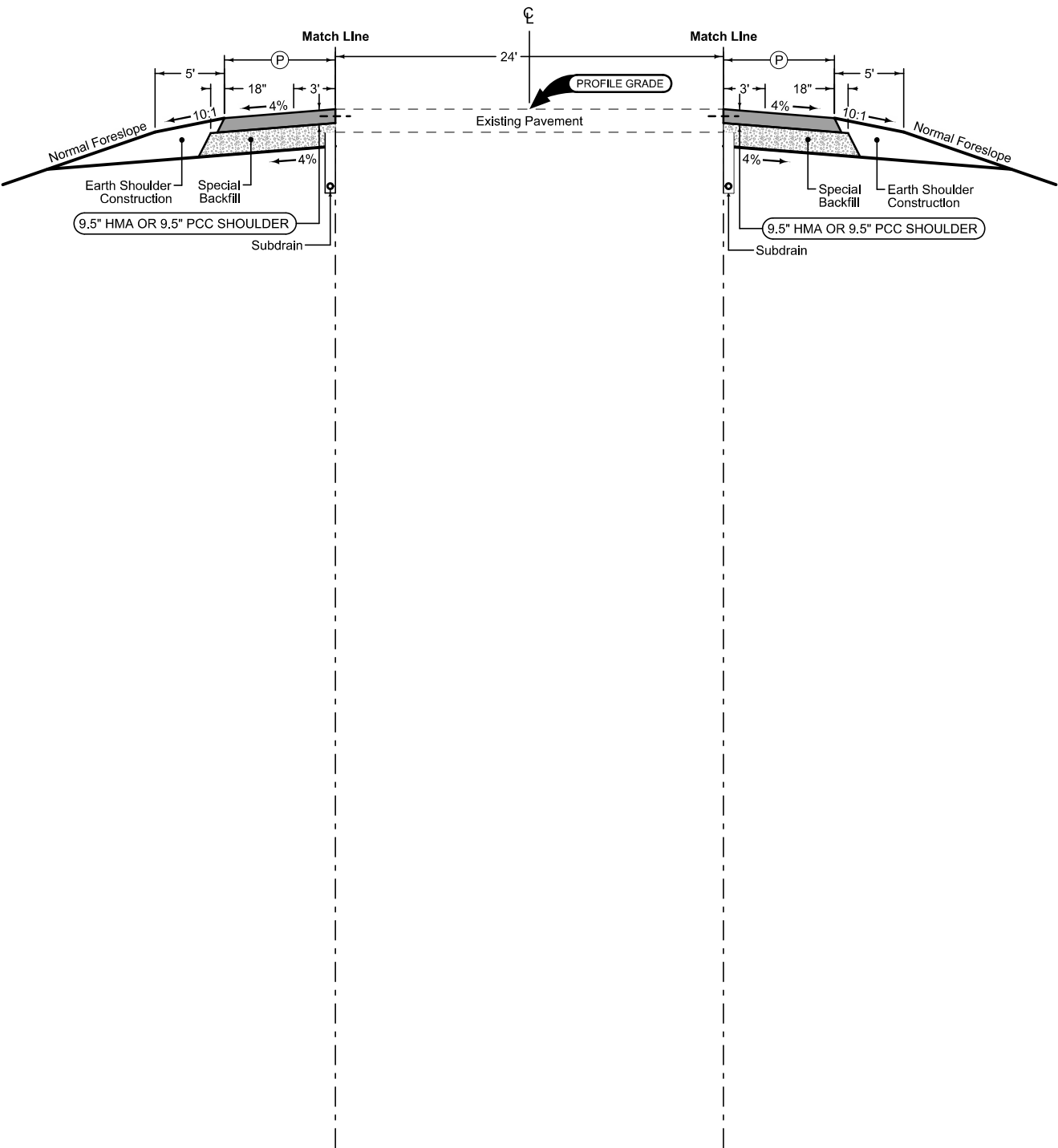
[illegible]

Paved Shoulder at Guardrail

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_ 04-21-20		
STATION TO STATION		(P) Feet
63+83.68	64+52.44	Var.
72+18.66	73+30.54	Var.

① Typical follows Detail 7156



Paved Shoulder at Guardrail

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

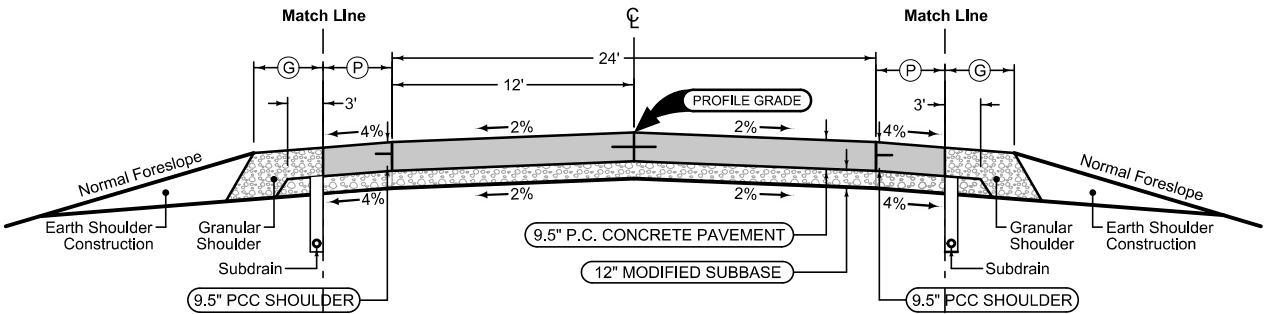
2_P_Guard_ 04-21-20		
STATION TO STATION		(P) Feet
63+30.14	64+52.44	Var.
72+18.66	72+87.59	Var.

① Typical follows Detail 7156

Full Depth PCC Combination Shoulder

Shoulder Jointing:
Longitudinal joint: BT-2, or L-2
Transverse joints: C at 17' spacing

2_C_FullPCC_ Modified			
STATION TO STATION		(P) Feet	(G) Feet
80+38.12	81+22.50	4	6
86+44.99	93+64.96	4	6
99+03.23	120+59.31	4	6
132+07.78	156+99.76	4	6



Mainline Jointing:
Transverse joints: CD at 17' spacing
Longitudinal joint: L-2

2P_ 04-21-20	
STATION TO STATION	
80+38.12	81+88.06
85+41.94	94+53.07
98+00.61	121+37.36
124+33.35	128+08.31
131+04.27	156+99.76

Full Depth PCC Combination Shoulder

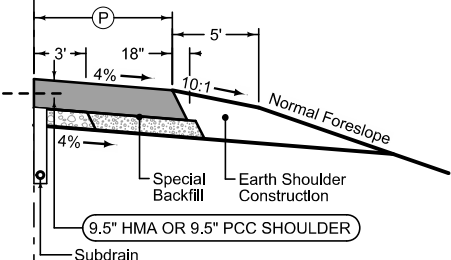
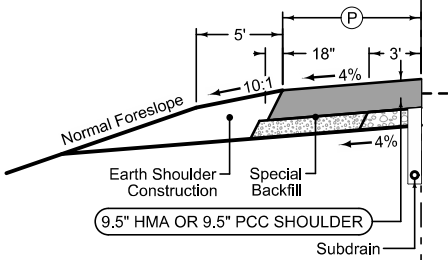
Shoulder Jointing:
Longitudinal joint: BT-2, or L-2
Transverse joints: C at 17' spacing

2_C_FullPCC_ Modified			
STATION TO STATION		(P) Feet	(G) Feet
80+38.12	80+85.01	4	6
86+07.50	93+50.64	4	6
98+65.44	120+34.31	4	6
131+56.85	156+99.76	4	6

Paved Shoulder at Guardrail

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_ 04-21-20		
STATION TO STATION		(P) Feet
81+22.50	81+88.06	Var.
85+41.94	86+44.99	Var.
93+64.96	94+53.07	Var.
98+00.61	99+03.23	Var.
120+59.31	121+37.36	Var.
124+32.24	128+09.39	7.6'
131+04.27	132+07.78	Var.



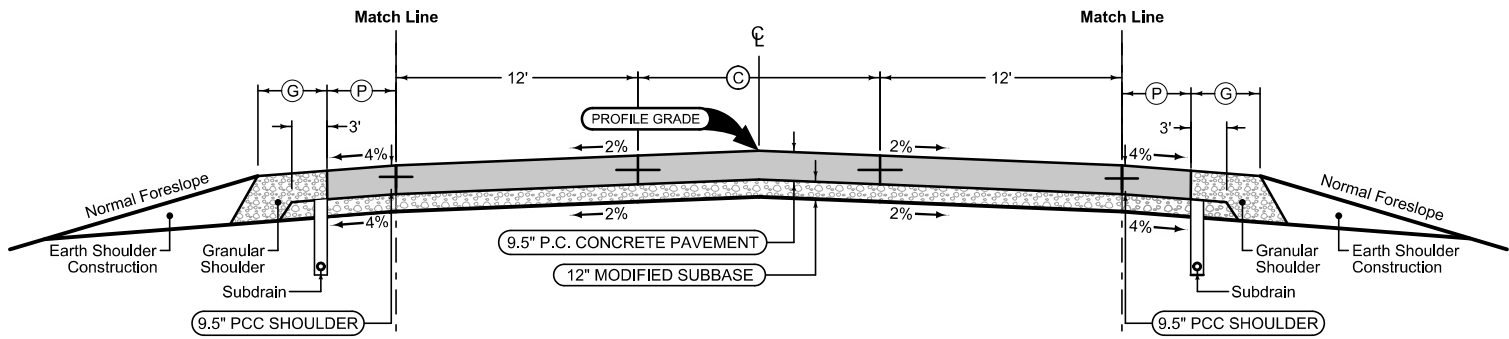
Paved Shoulder at Guardrail

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_ 04-21-20		
STATION TO STATION		(P) Feet
80+85.01	81+88.06	Var.
85+41.94	86+07.50	Var.
93+50.64	94+53.07	Var.
98+00.61	98+65.44	Var.
120+34.31	121+37.36	Var.
124+32.24	128+09.39	7.6'
131+04.27	131+56.85	Var.

① Typical follows Detail 7157

① Typical follows Detail 7157



Full Depth PCC Combination Shoulder

Shoulder Jointing:
Longitudinal joint: BT-2, or L-2
Transverse joints: C at 17' spacing

2_C_FullPCC_04-15-25			
STATION TO STATION		(P) Feet	(G) Feet
156+99.76	158+00.00	4	6
158+00.00	158+50.00	4	6-4
158+50.00	160+50.76	4	4

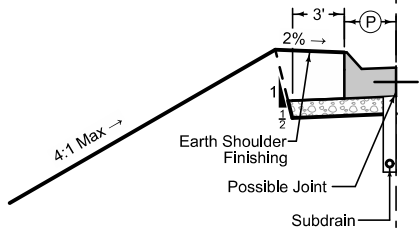
Mainline Jointing:
Transverse joints: CD at 17' spacing
Longitudinal joint: L-2

2P_TWLT_04-21-20		
STATION TO STATION		(C) Feet
156+99.76	160+49.76	0-12
160+49.76	165+28.99	12

Full Depth PCC Combination Shoulder

Shoulder Jointing:
Longitudinal joint: BT-2, or L-2
Transverse joints: C at 17' spacing

2_C_FullPCC_04-15-25			
STATION TO STATION		(P) Feet	(G) Feet
156+99.76	158+00.00	4	6
158+00.00	158+50.00	4	6-4
158+50.00	165+28.99	4	4

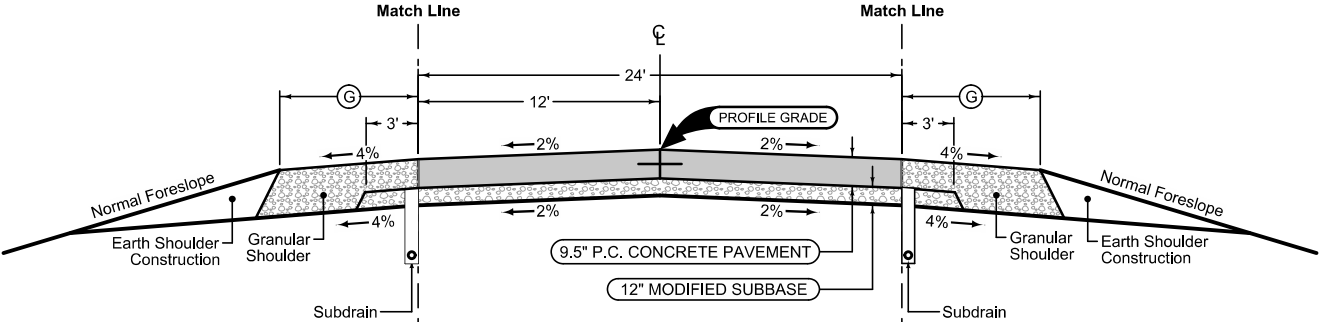


Curbed Shoulder

Shoulder Jointing:
Longitudinal joint not required when distance from back of curb to nearest joint is less than 15'

Single pour: L-2
Staged : BT-2
Transverse: C at 17' spacing

2_Curb_04-15-25			
STATION TO STATION		(P) Feet	Curb Type See PV-102
164+41.84	165+51.84	4-3	6" STD
165+51.84	165+28.99	3	6" STD



Granular Shoulder

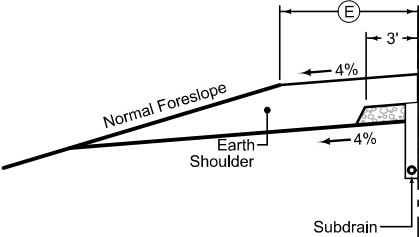
2_G_SR_04-21-20		
STATION TO STATION		ⓖ Feet
100+17.00	100+72.89	4

Mainline Jointing:
Transverse joints: CD at 17' spacing
Longitudinal joint: L-2

2P_04-21-20	
STATION TO STATION	
100+17.00	101+25.50

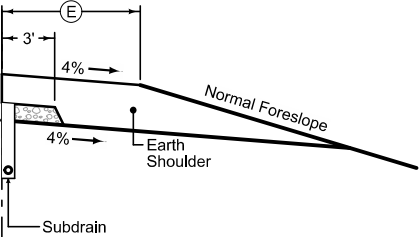
Granular Shoulder

2_G_SR_04-21-20		
STATION TO STATION		ⓖ Feet
100+17.00	100+72.89	4



Earth Shoulder

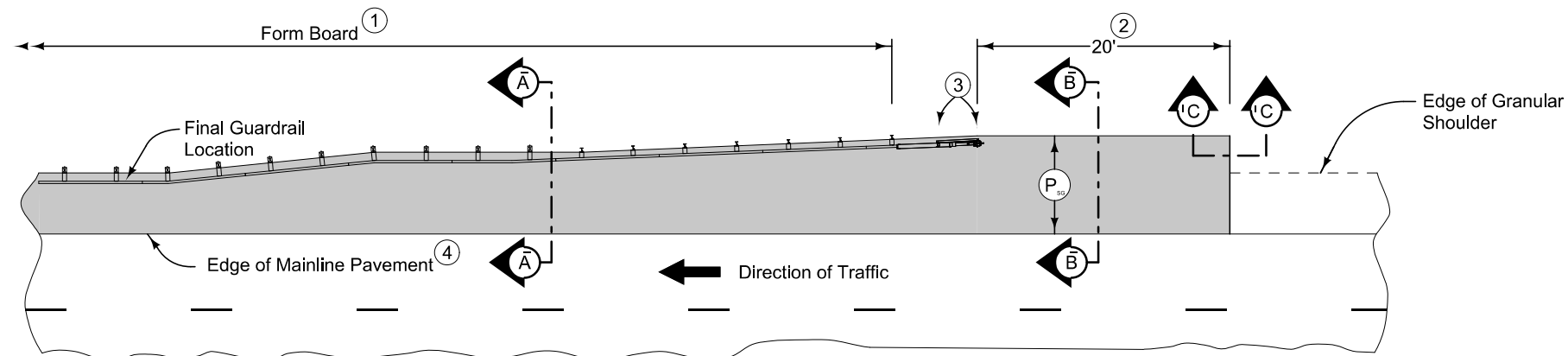
2_E_04-21-20		
STATION TO STATION		ⓔ Feet
100+72.89	101+25.50	4



Earth Shoulder

2_E_04-21-20		
STATION TO STATION		ⓔ Feet
100+72.89	101+25.50	4

1st St



PLAN VIEW

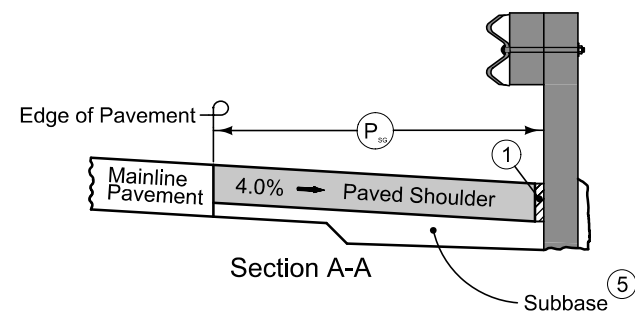
9.5" HMA Paved Shoulder at guardrail. 9.5" PCC may be substituted with the following jointing layout:

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.

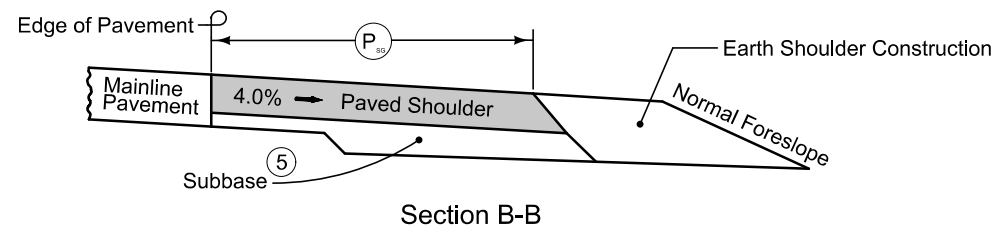
Compaction of HMA is required to face of guardrail post. Hand compaction will be allowed under guardrail. Removal and reinstallation of guardrail will be allowed with no additional payment.

Refer to Tabulation 112-9 for shoulder quantities.

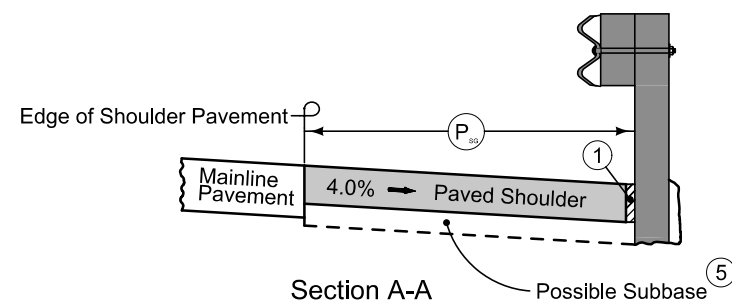
- ① PCC option only: When guardrail posts are installed prior to construction of PCC paved shoulder, fasten form board to the face of guardrail posts for the length shown.
- ② Continue paved shoulder 20 feet beyond the center of the first post.
- ③ Shoulder may be notched for first 2 posts or post sleeves may be installed through pavement. Do not drive posts through pavement.
- ④ 'BT' joint (per PV-101) for PCC shoulder. 'B' joint (per PV-101) for HMA shoulder.
- ⑤ Refer to other details in the plan.



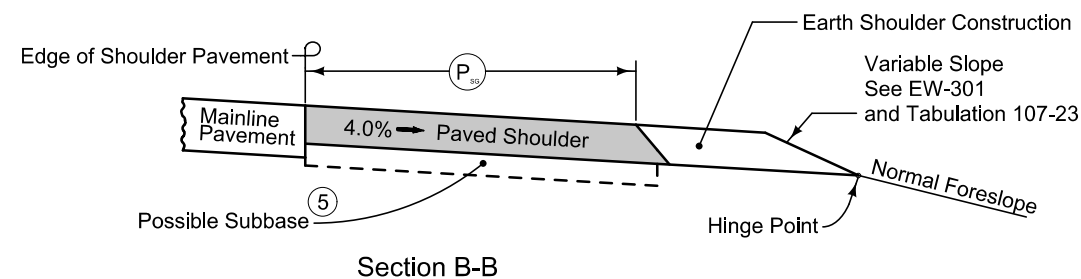
NEW CONSTRUCTION



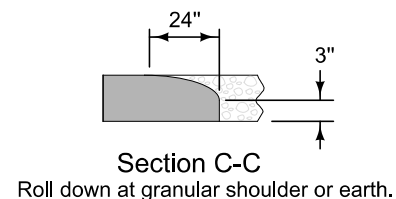
Section B-B

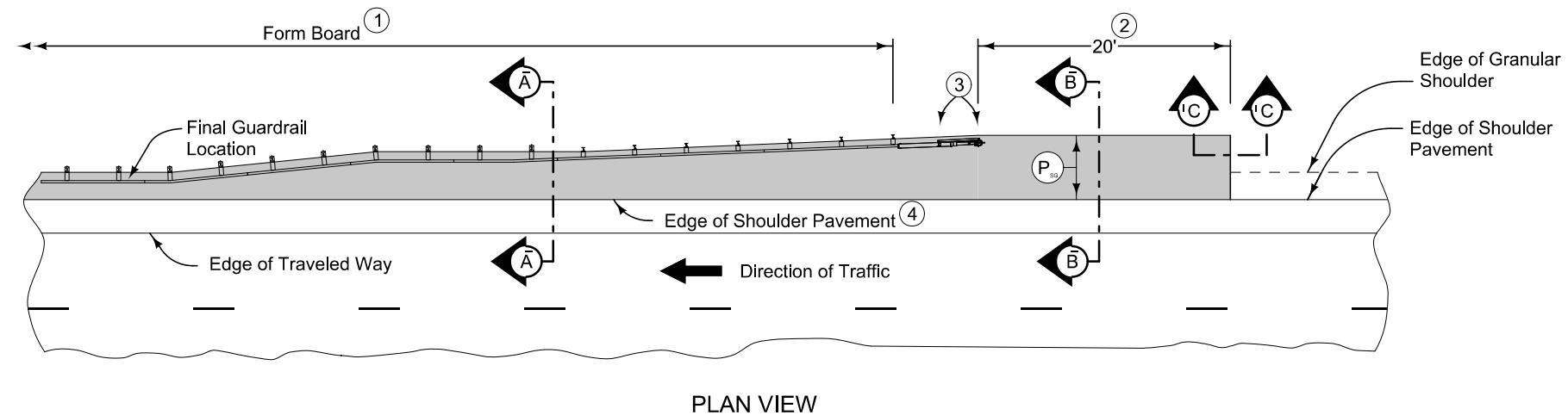


EXISTING SHOULDER



Section B-B

PAVED SHOULDER AT GUARDRAIL
(GRANULAR SHOULDER ADJACENT TO MAINLINE)



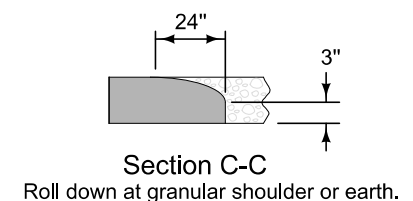
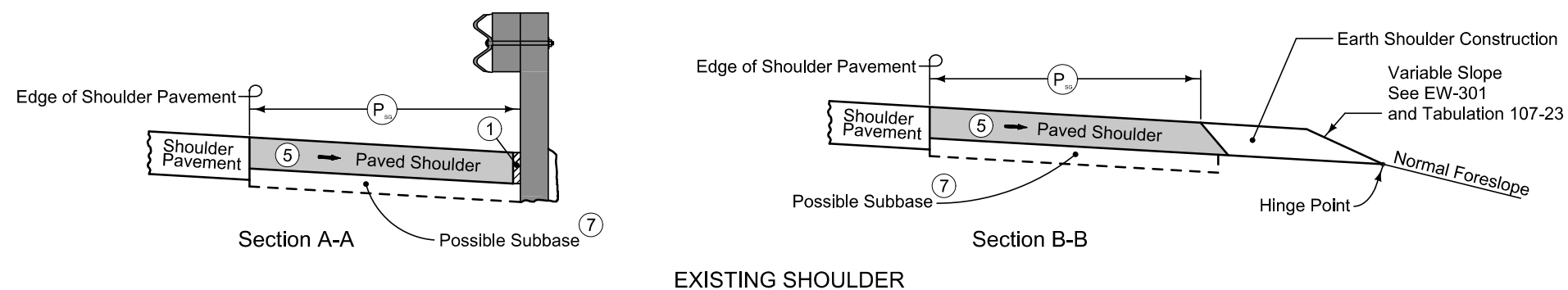
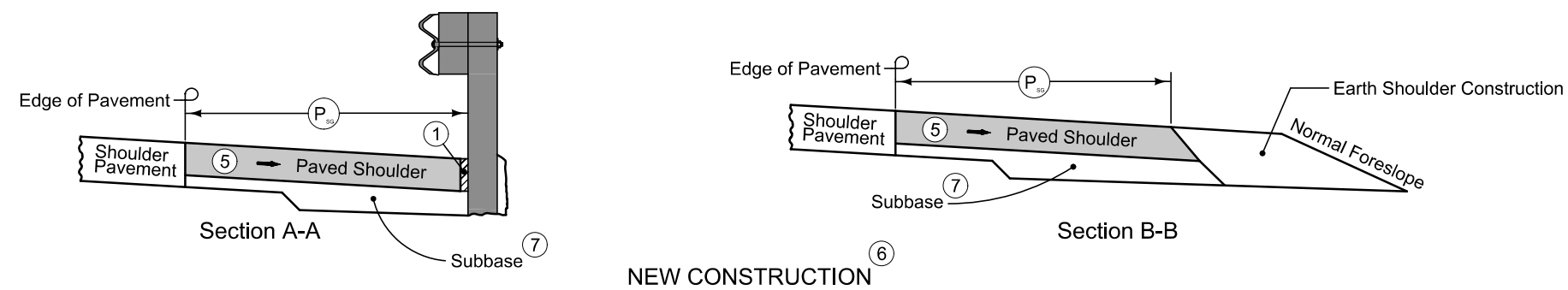
9.5" HMA Paved Shoulder at guardrail. 9.5" PCC may be substituted with the following jointing layout:

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 'BT' (per PV-101) joint for PCC shoulder.
'B' (per PV-101) 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.



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

ACCESS POINTS AND SAFETY RAMPS

Refer to Cross-Sections

102_03
10/15/24

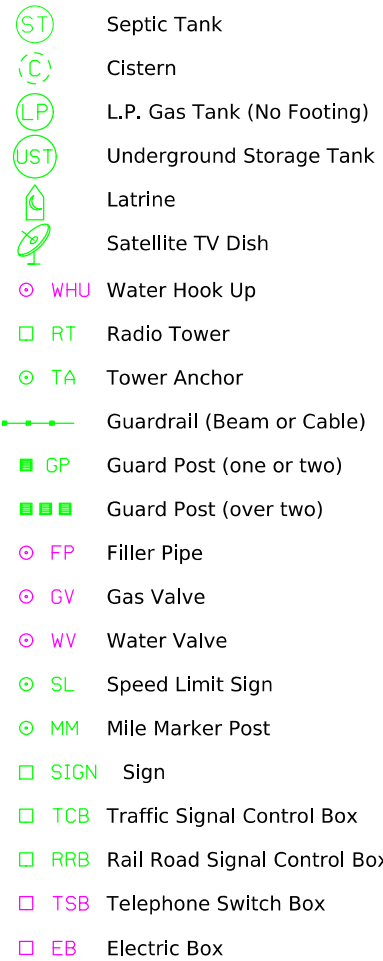
Length of Unclassified Pipe calculated is based on using Corrugated Metal Pipe.

- (1) Refer to MI-210.
- (2) Refer to EW-501.
- (3) Refer to EW-501 or EW-502.

*Predetermined for access point not constructed with this project.

Station	Side	Access Type	Descriptor	Case	Curb Type	Curb Length (1) (LF)	Width (FT)	PR (1) (2) (FT)	SR (2) (FT)	Pipe Culvert (H) (3) (FT)	Pipe Culvert Size (3) (IN)	Culvert Length (3) (LF)	Pipe Culvert Lt. (3) (LF)	Pipe Culvert Rt. (3) (LF)	Culvert Aprons (3) (No.)	Driveway Surface Type	Driveway Surface Area (SY)	Driveway Surfacing Material (TON)	Remarks
63+55.00	Right	C		1			20.0		15.0	8.1	24.0	85.0	29.60	55.40	2	Granular		27.533	
93+90.00	Left	C		1			20.0		15.0							Granular		28.072	
109+72.50	Right	C		1			20.0		20.0	1.2	48.0	47.0	26.00	21.00	2	Granular		15.877	Arch Pipe
110+05.40	Left	C		1			20.0		20.0	4.2	30.0	83.0	40.80	42.20	2	Granular		15.927	
138+61.70	Left	D	Joint	1			30.0		30.0	2.5	30.0	68.0	33.70	34.30	2	Granular		37.504	
145+27.35	Right	C		1			20.0		15.0	1.5	30.0	52.0	26.10	25.90	2	Granular		14.648	Arch Pipe
148+55.09	Right	C		1			20.0		15.0	1.8	30.0	53.0	27.20	25.80	2	Granular		13.521	
150+24.24	Right	D		1			30.0		15.0	59.0	30.0	59.0	27.40	31.60	2	Granular		20.590	
154+80.00	Right	Other										28.0	13.50	14.50	2				Type "G" Dike
159+13.55	Left	C		1			20.0		15.0	1.3	36.0	41.0	21.30	19.70	2	Granular		12.098	Arch Pipe
162+93.92	Left	B		1			35.0	15.0		1.1	30.0	54.0	25.50	28.50	2	PCC	175.5		RCP Low Clearance Pipe
1162+26.19	Right	D		1			30.0		30.0										1st St. Loc. TBD

	Interstate Highway Symbol
	U.S. Highway Symbol
	Iowa Highway Symbol
	County Road Highway Symbol
	Evergreen Tree
	Deciduous Tree
	Fruit Tree
	Shrub (Bushes)
	Timber
	Hedge
	Stump
	Swamp
	Rock Outcrop
	Broken Concrete
	Revetment (Rip Rap)
	Cemetery
	Grave
	Cave
	Sink Hole
	Board Fence
	Chain Link or Security Fence
	Wire Fence
	Terrace
	Earth Dam or Dike (Existing)
	Tile Outlet
	Edge of Water
	Existing Drainage
	Right of Way Rail or Lot Corner
	Concrete Monument
	Well
	Windmill
	Beehive Intake
	Existing Intake
	Existing Utility Access (Manhole)
	Fire Hydrant
	Water Hydrant (Rural)



E1 — EL1D, Electric Line Alliant Energy - Quality D
F0 — FO1D, Fiber Optic USA Communications - Quality D
F02 — FO2D, Fiber Optic Windstream - Quality D
G — GL1D, Gas Line Alliant Energy - Quality D
G2 — GL2D, Gas Line MidAmerican - Quality D
SAN. — SA1D, Sanitary Sewer City of Belle Plaine- Quality D
ST S — ST1D, Storm Sewer City of Belle Plaine - Quality D
T1 — TL1D, Telephone Line Windstream Communications - Quality D
T2 — TL2D, Telephone Line USA Communications - Quality D
TV — TV1D, TV Cable Mediacom - Quality D
W — WL1D, Water Line City of Belle Plaine - Quality D

Jason Dale
ITS Maintenance Engineer
Iowa DOT Fiber Distribution
Jason.Dale@iowadot.us

F02 — Steve Kness
T1 — Engineer OSP
Windstream Communications
Fiber Transmission
(319) 538-1985
stephen.kness@windstream.com

TV — Carl Norton
Construction Manager
Mediacom Communications
Corporation Fiber Transmission
(319) 594-6201
cnorton@mediacomcc.com

Warren McKenna
Manager
Farmers Electric Cooperative
(Kalona) (Electric Distribution)
wmckenna@feckalona.com

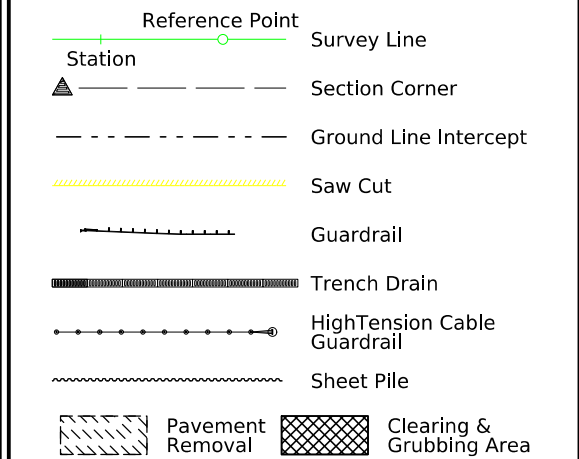
G — Billie Reid
Real Estate and
ROW Representative II
Alliant Energy Gas Distribution
billiereid@alliantenergy.com

E1 — Billie Reid
Real Estate and
ROW Representative II
Alliant Energy Electric Distribution
billiereid@alliantenergy.com

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

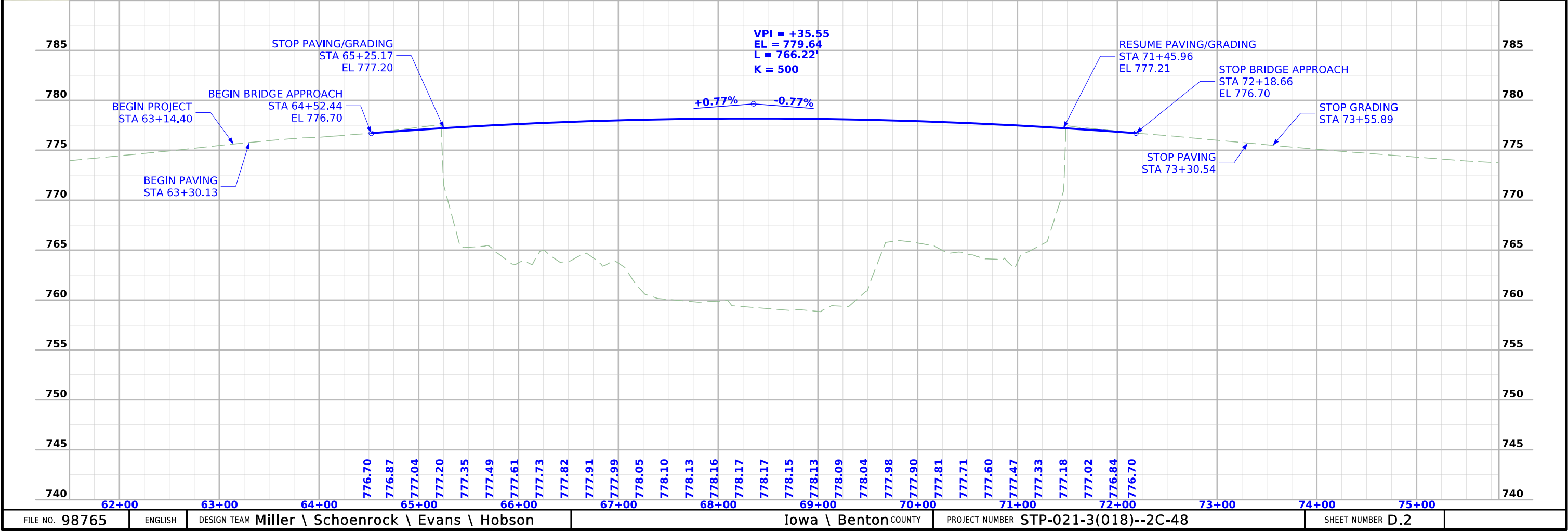
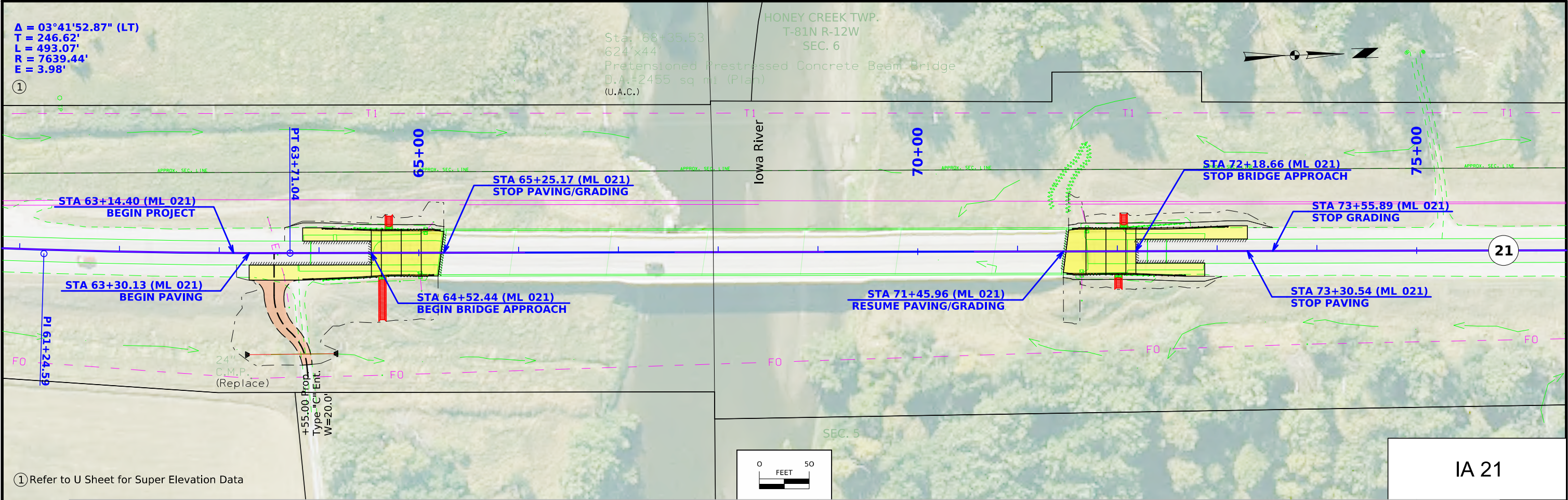
SHADING		Design Color No.		Transparency
Pink, Dark	(13)		Temporary Pavement Shading	50%
Yellow	(4)		Proposed Pavement Shading	50%
Orange	(6)		Proposed Granular Shading	50%
Orange	(70)		Proposed Shoulder Granular Shading	50%
Yellow	(68)		Proposed Shoulder Paved Full Depth Shading	50%
Yellow	(132)		Proposed Shoulder Paved Partial Depth Shading	50%
Brown, Light	(236)		Grading Shading	50%
Orange, Light	(134)		Proposed Granular Entrance Shading	50%
Yellow	(220)		Proposed Paved Entrance Shading	50%
Tan	(8)		Proposed Sidewalk Shading	50%
Blue, Light	(230)		Proposed Sidewalk Landing Shading	50%
Pink	(11)		Proposed Sidewalk Ramp Shading	50%
Red	(3)		Proposed Structure Shading	50%
Red	(3)		Delineates Restricted Areas	0%

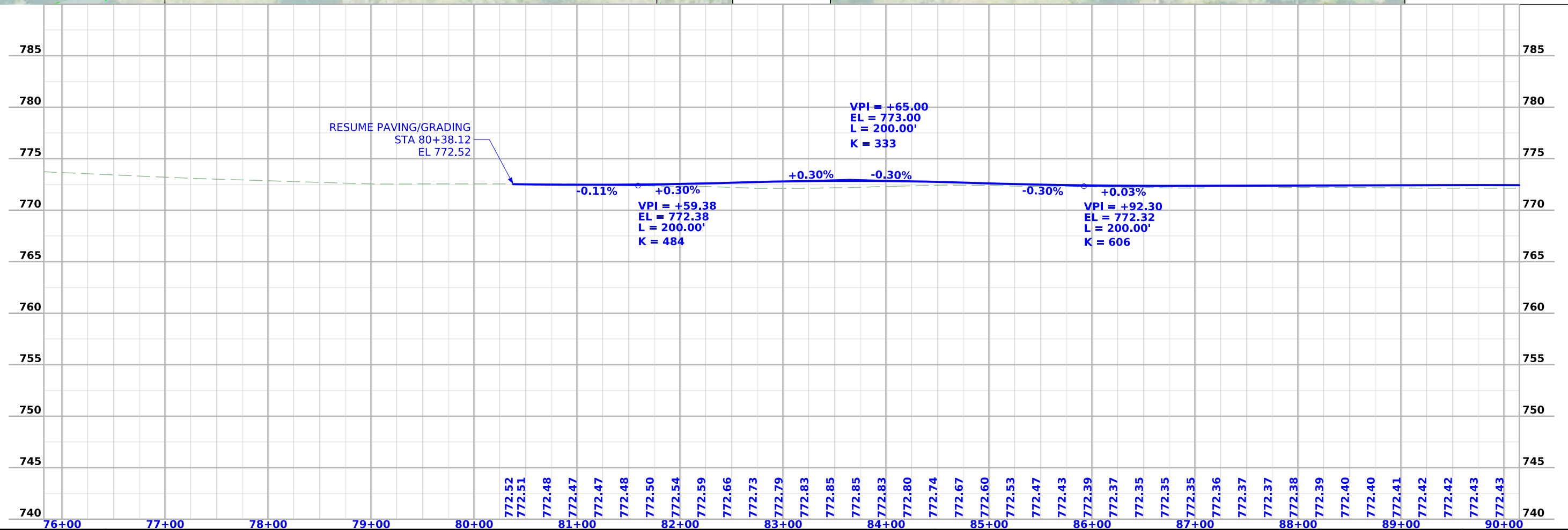
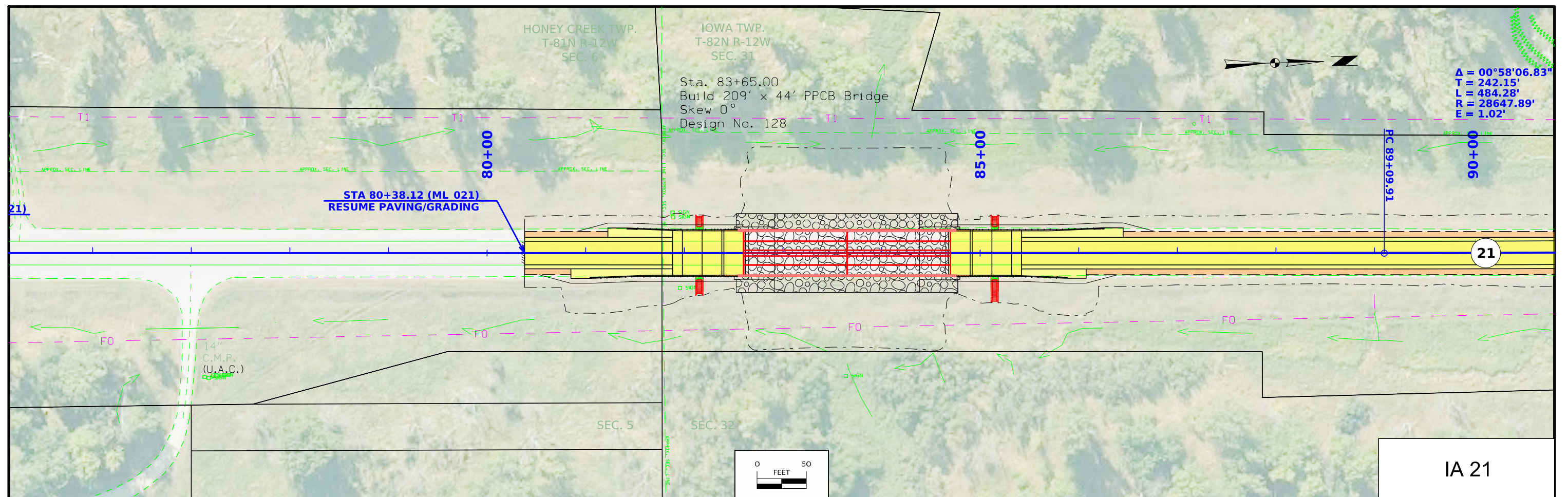
LINEWORK	Design Color No.	
Green	(10)	Existing Ground Line Profile
Blue	(1)	Proposed Profile and Annotation
Magenta	(5)	Existing Utilities
Blue, Light	(230)	Proposed Ditch Grades, Left
Black	(0)	Proposed Ditch Grades, Median
Rust	(14)	Proposed Ditch Grades, Right

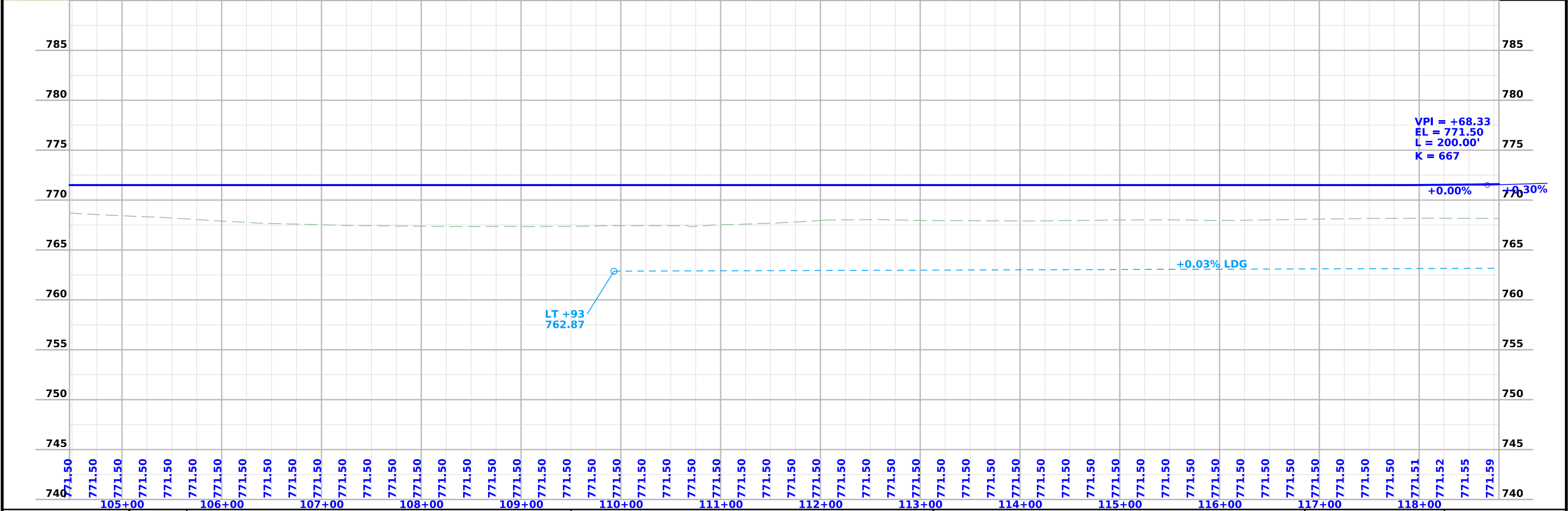
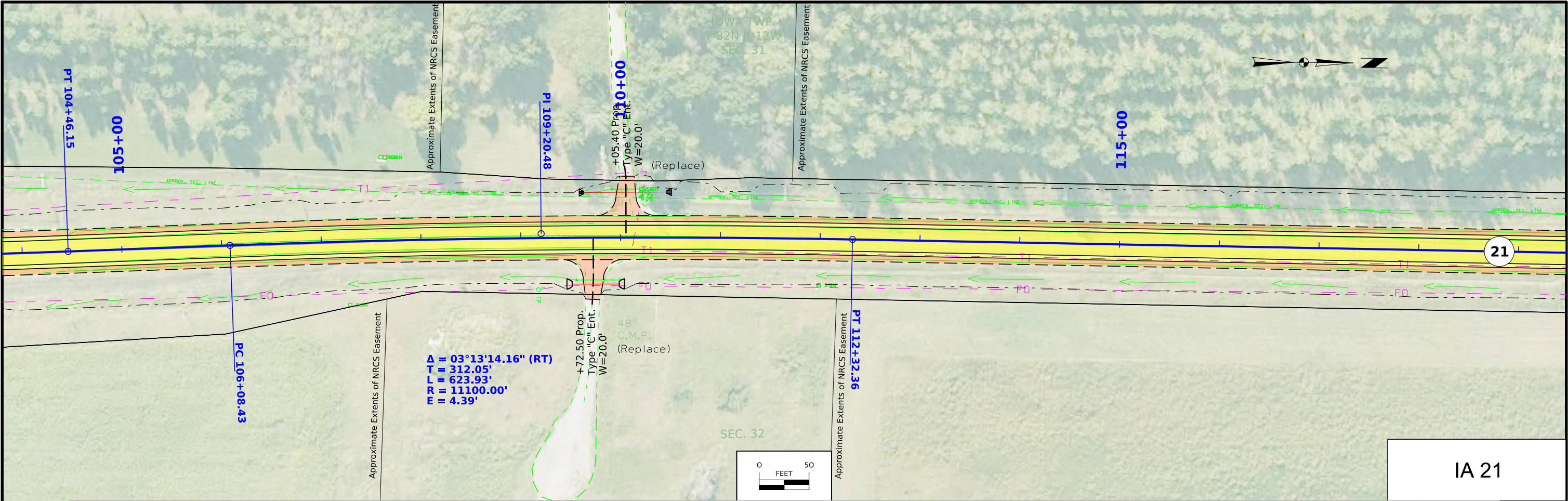


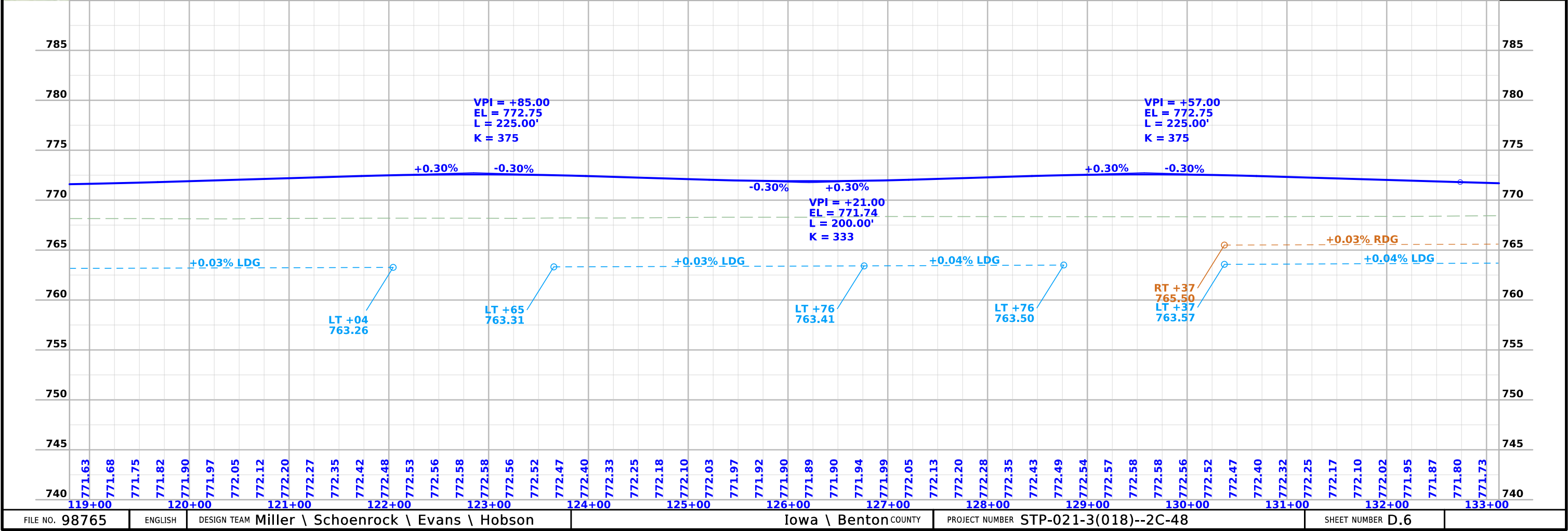
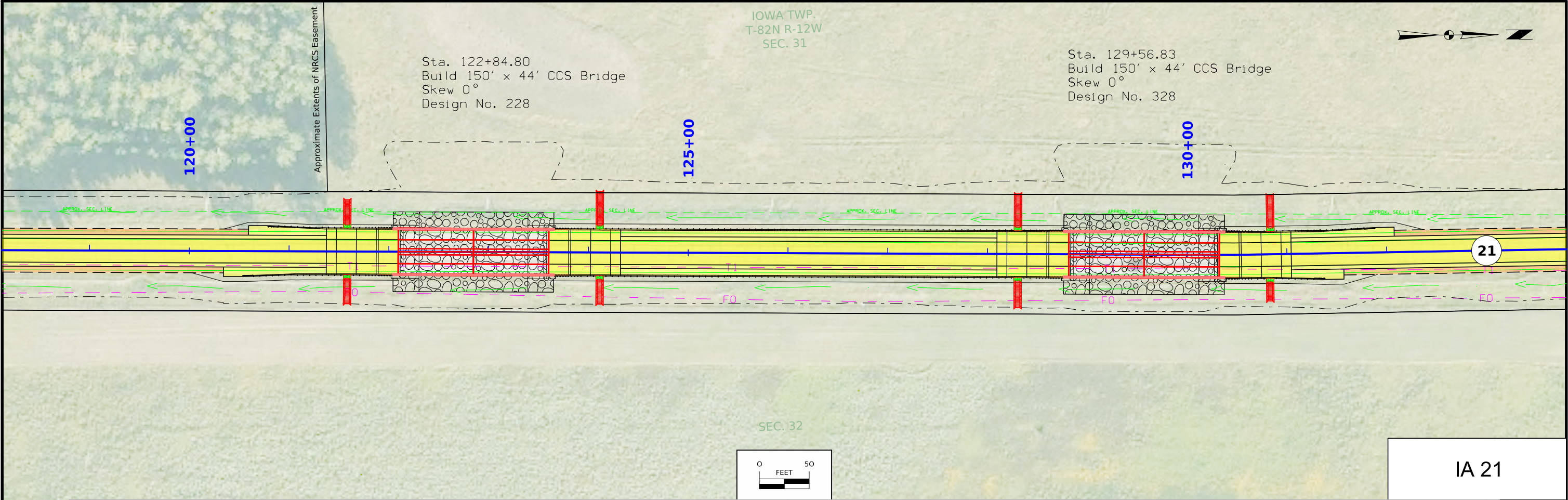
	Proposed Right-of-Way Symbol
	Proposed Right-of-Way Line
	Existing Right of Way
	Existing and Proposed Right-of-Way
	Easement and Existing Right-of-Way
	Easement (Temporary) Symbol
	Easement (Temporary) Line
	Easement
	Access Control
	Property Line Symbol
	Property Line

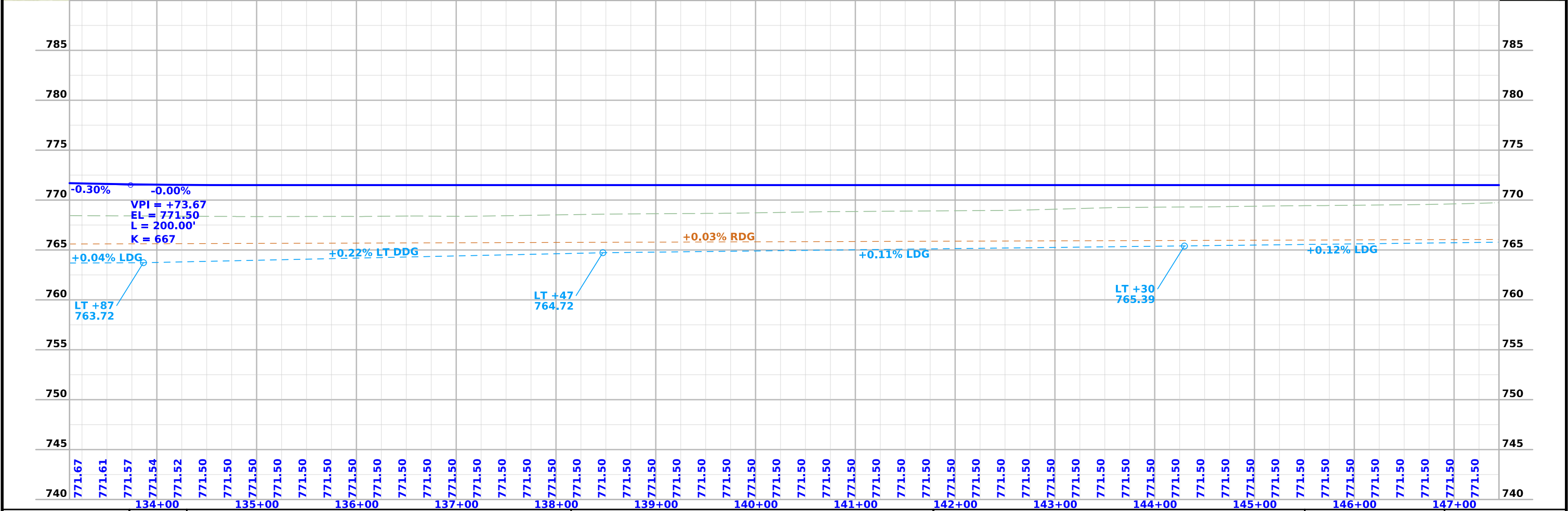
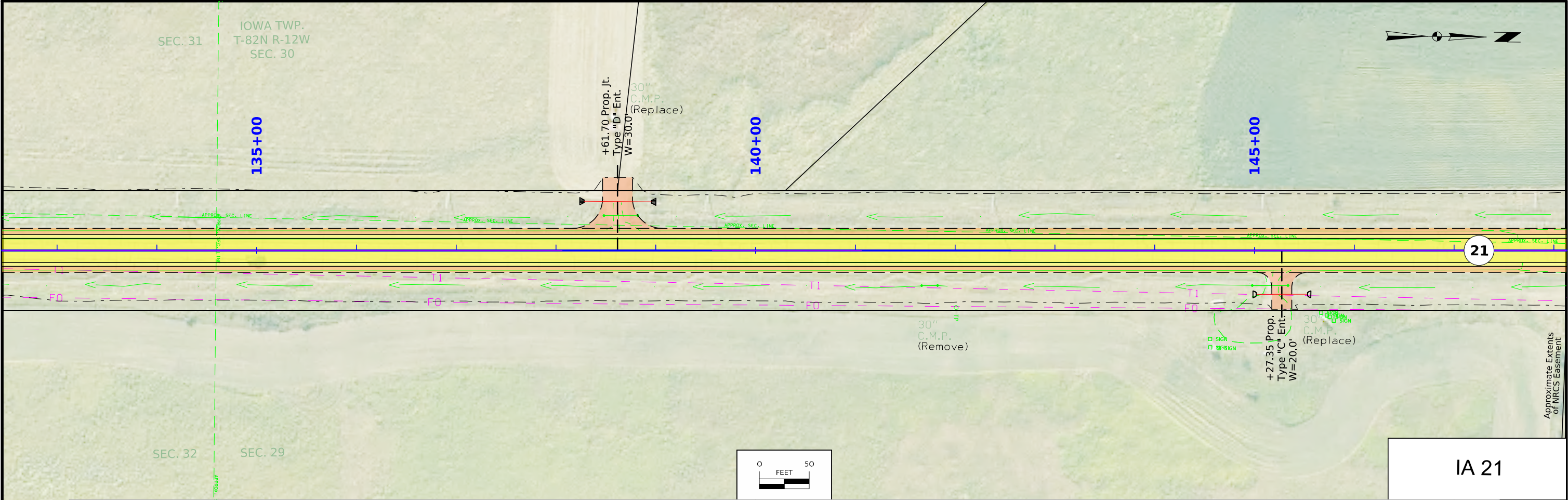
(COVERS SHEET SERIES D, E, F, & K)



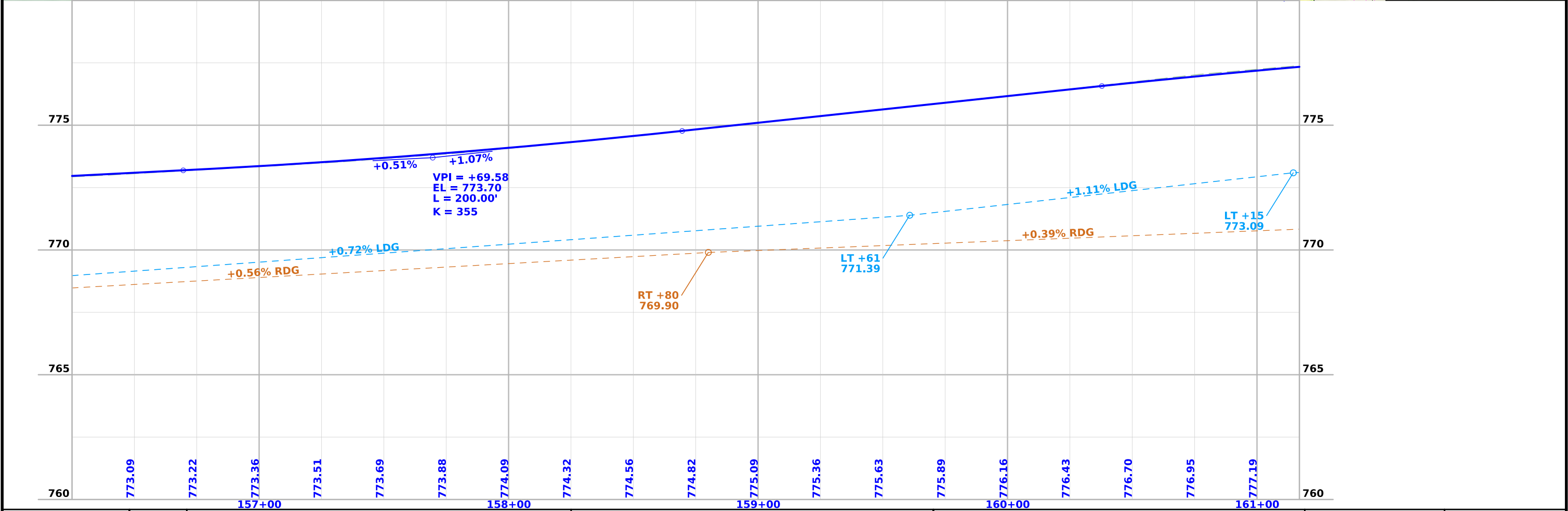
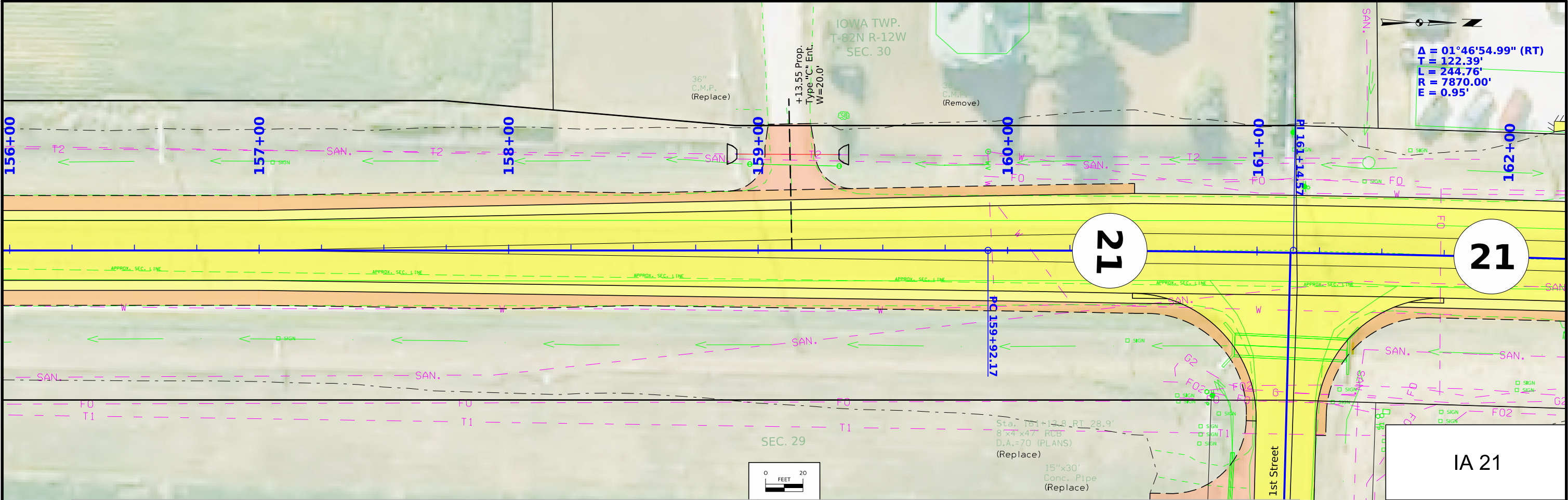


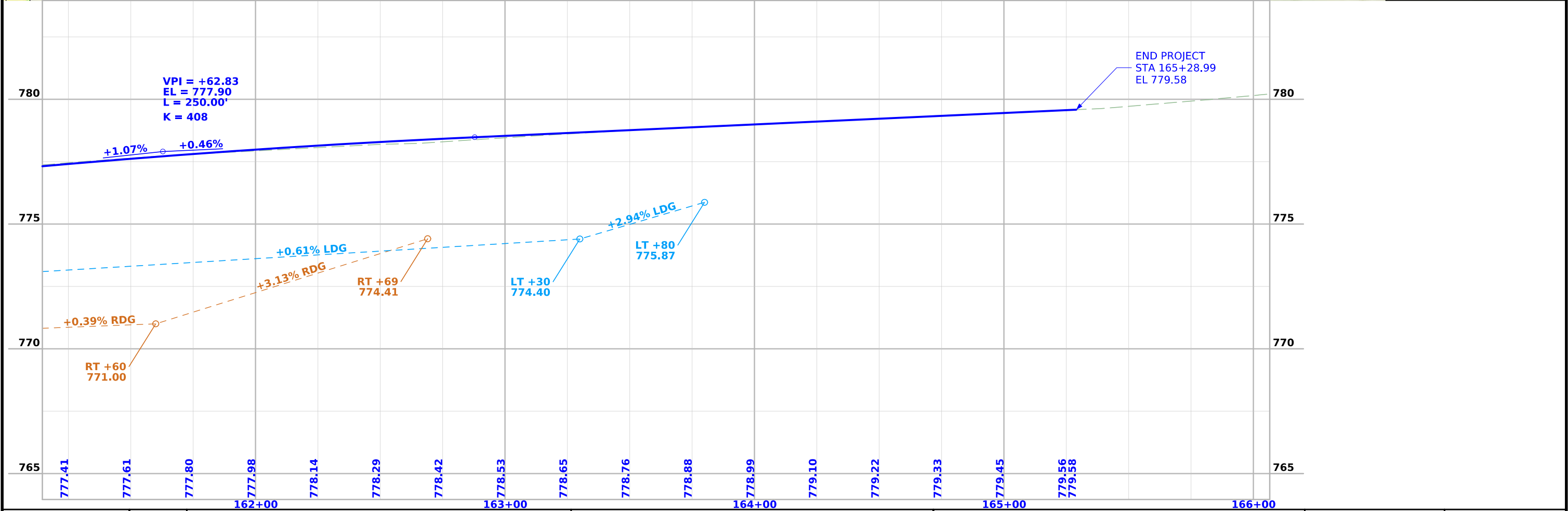
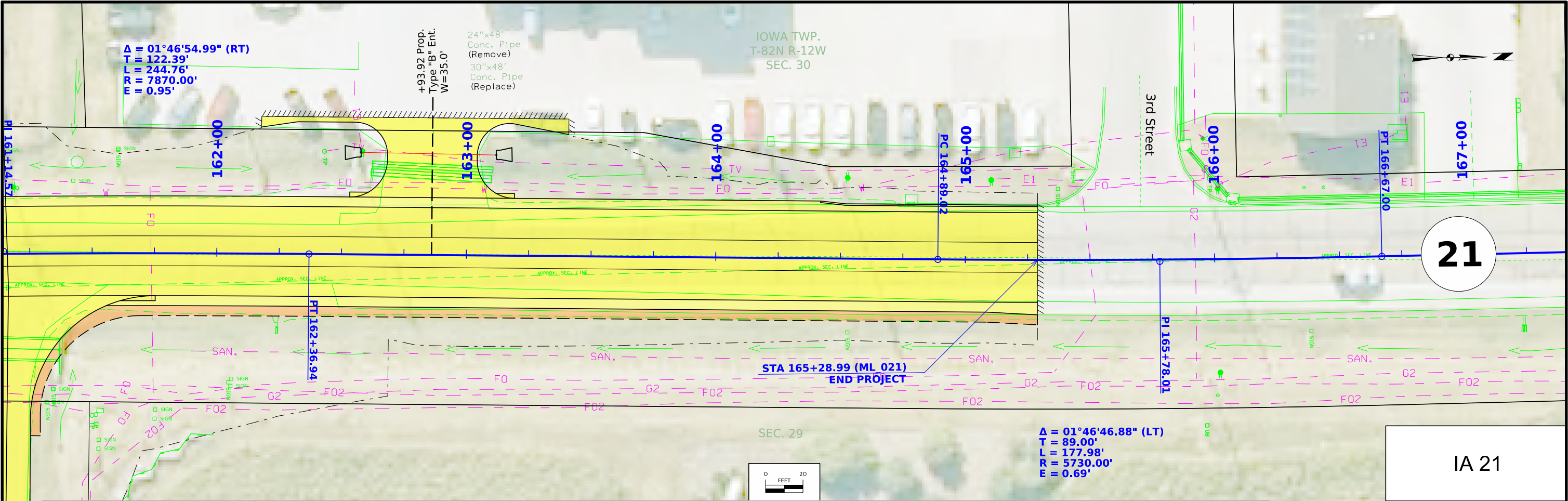


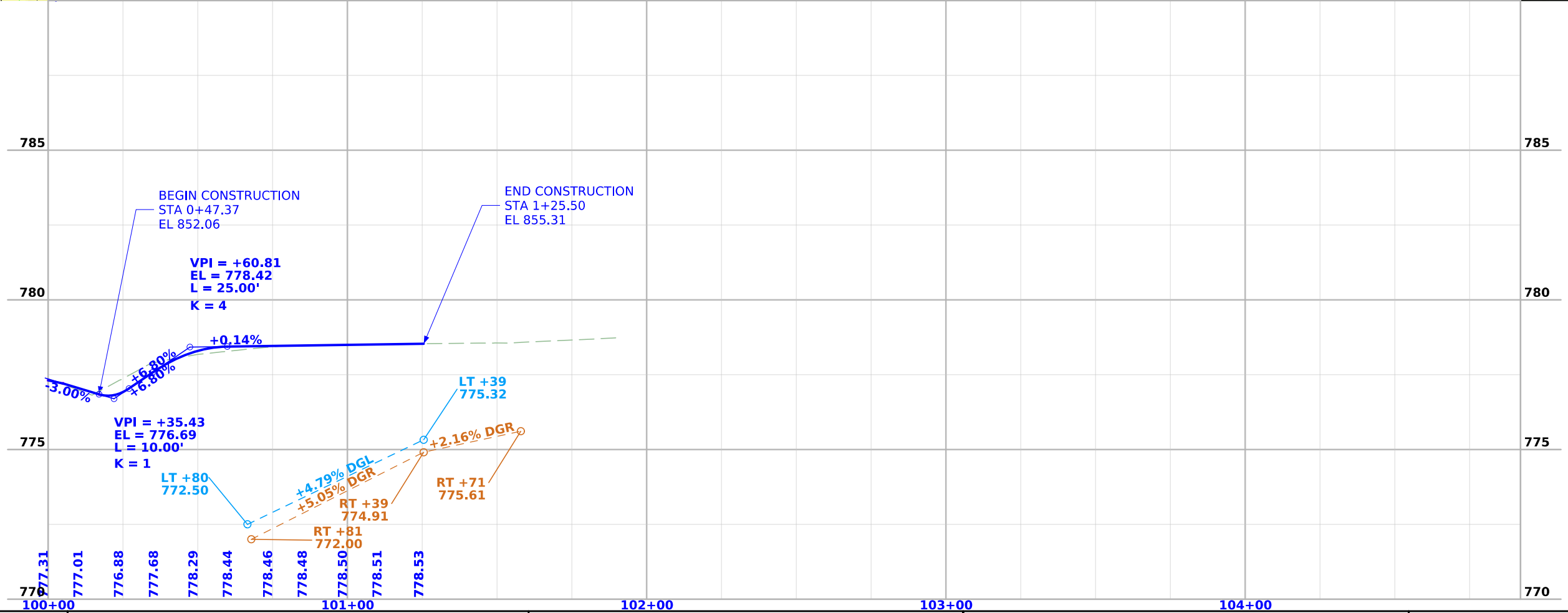
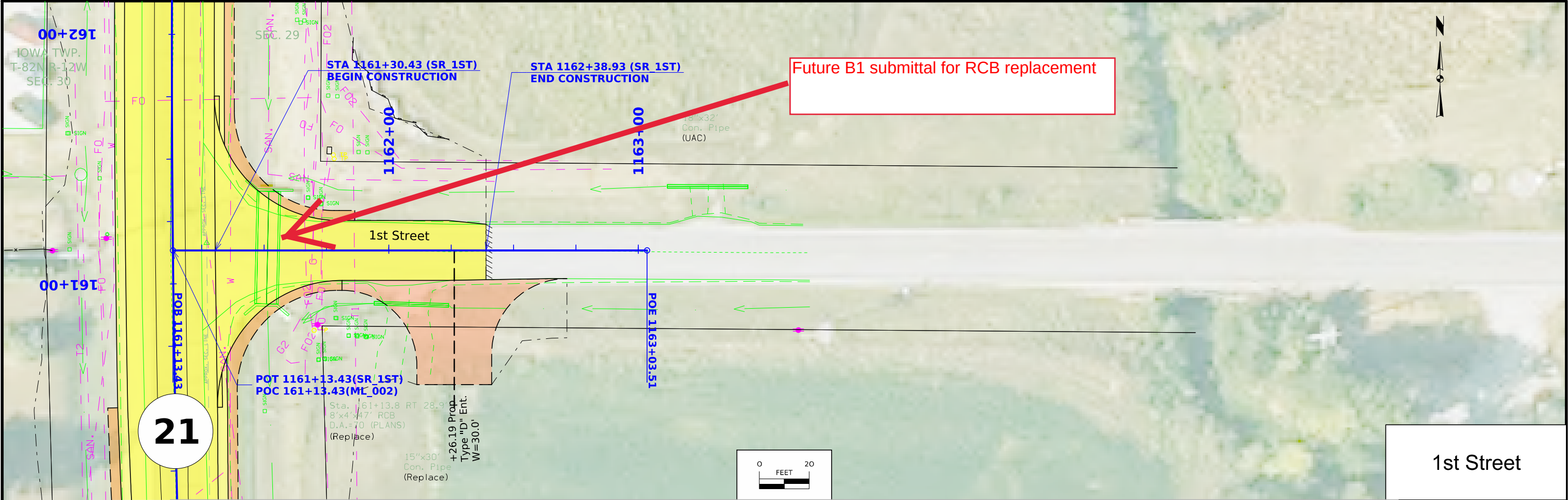




FILE NO. 98765	ENGLISH	DESIGN TEAM Miller \ Schoenrock \ Evans \ Hobson	Iowa \ Benton COUNTY	PROJECT NUMBER STP-021-3(018)--2C-48	SHEET NUMBER D.7
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Survey Information

SURVEY INDEX

County: Iowa
PIN: 23-48-021-030
Project Number: STP-021-3(017)--2C-48
Location: 0.3 mi N of IA 212 to 0.5 mi S of SCL/1st St of Belle Plaine
Type of Work: Grade and Pave
Project Directory: 4802103023

Survey Personnel

John Hahn – Survey Party Chief
Dan Duncan – Survey Party Chief

Date(s) of Survey

Begin Date 06/06/2024
End Date 01/07/2025

General Information

This survey is for IA Hwy 21 Grade and Pave 0.3 mi N of IA 212 to 0.5 mi S of SCL/1st St of Belle Plaine. This survey request was for the IA Hwy 21 corridor only. This project is a Partial Field DTM with Photo control.

Utility Information

For logging data and other utility details see Utility Survey and Ownership Report in the Utility folder of the PrelimSurvey project directory.

Project Control

Coordinates were determined for primary project control points by conducting concurrent six-hour static observations (Benton County GPS Control Point 4001, Iowa County GPS Control Points 4087,4106; as well as CP1 and CP4). Post processing is constrained to nearby Iowa Real Time Network reference stations. Two additional control points, CP2 and CP3, were established using a base-rover setup relative to Bremer County GPS Control Point 4087. Two 5 minute observations were made with appropriate time span between and used in a weighted average to determine final coordinates. For additional details of the control survey, contact the Preliminary Survey department.

PROJECT DATUM: NAD83(2011) for EPOCH 2010.00 (IaRTN 2019 ADJUSTMENT)
COORDINATE SYSTEM: IOWA REGIONAL COORDINATE SYSTEM ZONE 10
(U.S. SURVEY FOOT)
VERTICAL DATUM: NAVD88
GEOID MODEL: 2018u3

Alignment Information

The horizontal alignment for Iowa Hwy 21 this survey is a retrace of As-built Plans No. FN-58, FN-505(7) and BRF-21-3(6)—38-48. Survey stationing was equated to the plan PI at Sta. 46+56.40 (BRF-21-3(6)—38-48 stationing) and carried back and ahead without equation throughout the survey.

Survey stationing relates to as built plan stationing as follows:

PI Sta. 2704+50.0 As-built Plans Project No. FN-505(7)
Survey PI Sta. 11+06.40 (BRF-21-3(6)—38-48 stationing)

PI Sta. 2711+34.9 As-built Plans Project No. FN-505(7)
Survey PI Sta. 17+91.50 (BRF-21-3(6)—38-48 stationing)

PI Sta. 46+56.40 As-built Plans Project No. BRF-21-3(6)—38-48
Survey PI Sta. 46+56.40

PI Sta. 53+74.24 As-built Plans Project No. BRF-21-3(6)—38-48
Survey PI Sta. 53+74.24

PI Sta. 61+24.02 As-built Plans Project No. BRF-21-3(6)—38-48
Survey PI Sta. 61+24.58

PI Sta. 91+51.61 As-built Plans Project No. BRF-21-3(6)—38-48
Survey PI Sta. 91+52.05

PI Sta. 101+58.54 As-built Plans Project No. BRF-21-3(6)—38-48
Survey PI Sta. 101+58.01

PI Sta. 108+58.35 As-built Plans Project No. BRF-21-3(6)—38-48
Survey PI Sta. 108+58.25

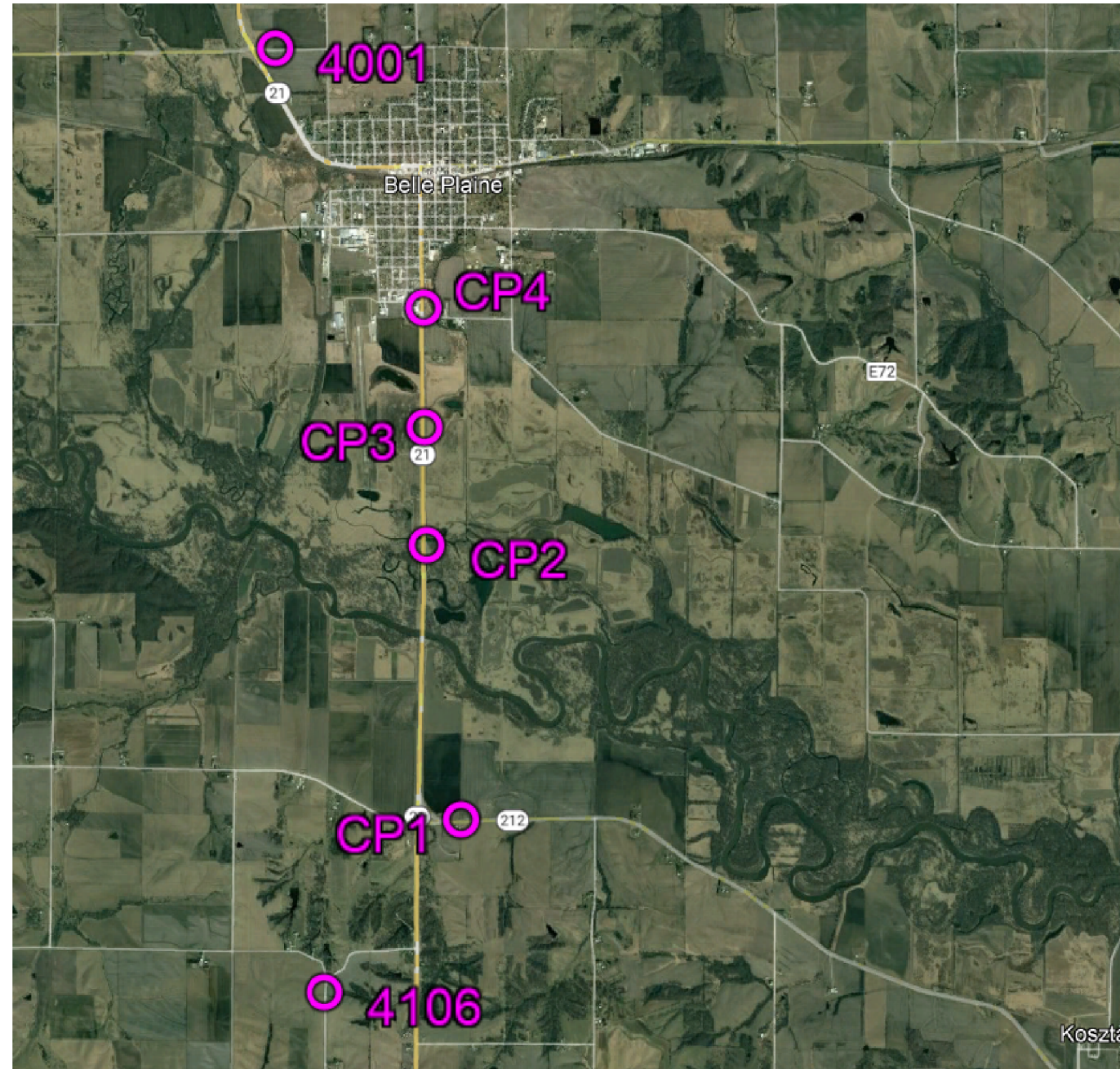
PI Sta. 130+45.02 As-built Plans Project No. BRF-21-3(6)—38-48
Survey PI Sta. 130+47.72

PI Sta. 1072+59.8 As-built Plans Project No. FN-58
Survey PI Sta. 154+33.93 (BRF-21-3(6)—38-48 stationing)

PI Sta. 1079+40.6 As-built Plans Project No. FN-58
Survey PI Sta. 161+14.73 (BRF-21-3(6)—38-48 stationing)

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) for EPOCH 2010.00 (IaRTN 2019 Adjustment) - Iowa RCS Zone 10 (U.S. Survey Foot)

VERT. DATUM: NAVD88 - Geoid Model: 2018u3

Coordinate listing from next sheet will be used with IaRTN for monument recovery. No other reference ties are given.

HORIZONTAL AND VERTICAL PROJECT CONTROL COORDINATE LISTING
HORIZ. DATUM: NAD83(2011) for EPOCH 2010.00 (IaRTN 2019 Adjustment)
Ia. Regional Coordinate System Zone 10 (U.S. Survey Foot)
VERT. DATUM: NAVD88
Geoid Model: 2018u3

POINT NAME	NORTHING	EASTING	ELEVATION	DESCRIPTION/CODE
4001	8027296.35	20329243.67	786.62	CP FND IOWA COUNTY GPS CONTROL POINT AS DESCRIBED IN GOOD CONDITION
4087	8009773.44	20333486.57	775.77	CP FND IOWA COUNTY GPS CONTROL POINT AS DESCRIBED IN GOOD CONDITION
4106	7999647.28	20330521.11	935.67	CP FND NGS CBN HORIZONTAL CONTROL STATION HARTWICK AS DESCRIBED IN GOOD CONDITION
CP1	8004643.92	20334568.52	805.36	CP FND IDOT ROW RAIL IN GOOD CONDITION EAST SIDE FIELD ENT NORTH ROW IA HWY 21
CP2	8012721.29	20333633.24	765.40	CP SET FENO MONUMENT 71FT SE OF END OF SOUTHEAST GUARDRAIL IA HWY 21 OVERFLOW BRIDGE
CP3	8016366.88	20333582.74	765.79	CP SET FENO MONUMENT .6 MILES SOUTH OF INTERSECTION OF IA HWY 21 AND 1ST ST TOP OF EAST BACK SLOPE
CP4	8019675.43	20333569.60	779.36	CP SET FENO MONUMENT EAST ROW IA HWY 21 NEAR WELCOME TO BELLE PLAINE SIGN

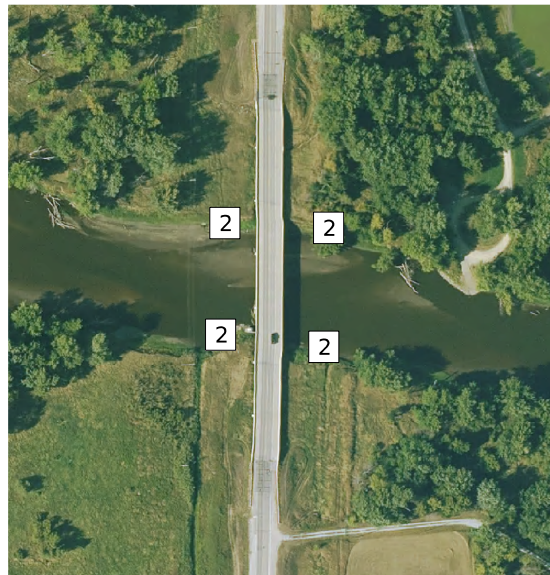
TRAFFIC CONTROL PLAN				108-23A 08-01-08
1. IA 21 will be closed during construction. A detour route will be utilized. Refer to J sheet for more infortmation. 2. The contractor shall provide, install, maintain, and remove all paddle route signs. 3. The contractor shall contact the Iowa DNR water trails coordinator prior to starting and finishing project construction so the appropriate information can be entered into the DNR’s interactive river mapping system. The current contact is John Wenck with email being John.Wenck@dnr.iowa.gov. 4. The contractor is to contact the Iowa DNR no later than one week in advance of the beginning or ending of construction activities. 5. Refer to sheet J.2 for aerial and waterway map showing required waterway(s) signage locations as well as fabrication and installation information. 6. Sign mounting methods used to install temporary signs shall be at the discretion of applicants and/or their contractors, and are not to be construed as limited to Iowa DNR methods listed in Chapter 6 of Developing Water Trails in Iowa found at https://www.iowadnr.gov/places-go/water-trails/water-trail-development#developingwater-trails-in-iowa. 7. Contractor shall coordinate sign placement and installation with Conservation Officer Brad Baker via phone #319-430-1630 or email brad.baker@dnr.iowa.gov 8. Contractor shall coordinate sign placement and management for Chelsea Boat Ramp Accesses with Tama CCB via phone #641-481-3153 or email curtis.behrens@tamacounty.org 9. Maintenance of paddle route signage is the same as the roadway traffic control following Articles 2528.01C, 2528.02, and 2528.03A of the Standard Specifications. 10. Signs shall be maintained by applicants and/or their contractor so as to be visible throughout the period the channel is obstructed. When obstructions to the channel are not needed for a period of 30 days or greater, signage should be temporarily removed. 11. Where a river may have temporary obstructions or anticipated falling debris from bridge work or other similar cases, extra consideration should be taken to properly shield waterway users from entering the work area and have any notes that would ensure the contractor provides appropriate protection.				
FILE NO.	ENGLISH	DESIGN TEAM	Miller\Schoenrock\Evans\Hobson	Iowa \ Benton COUNTY PROJECT NUMBER
			STP-021-3(018)--2C-48	SHEET NUMBER
		J.1		

6/19/2025 7:44:17 AM bhobson c:\pw_work\pwmain\idotcentral_bhobson\d1981737\SHI_48021018_301.xlsm



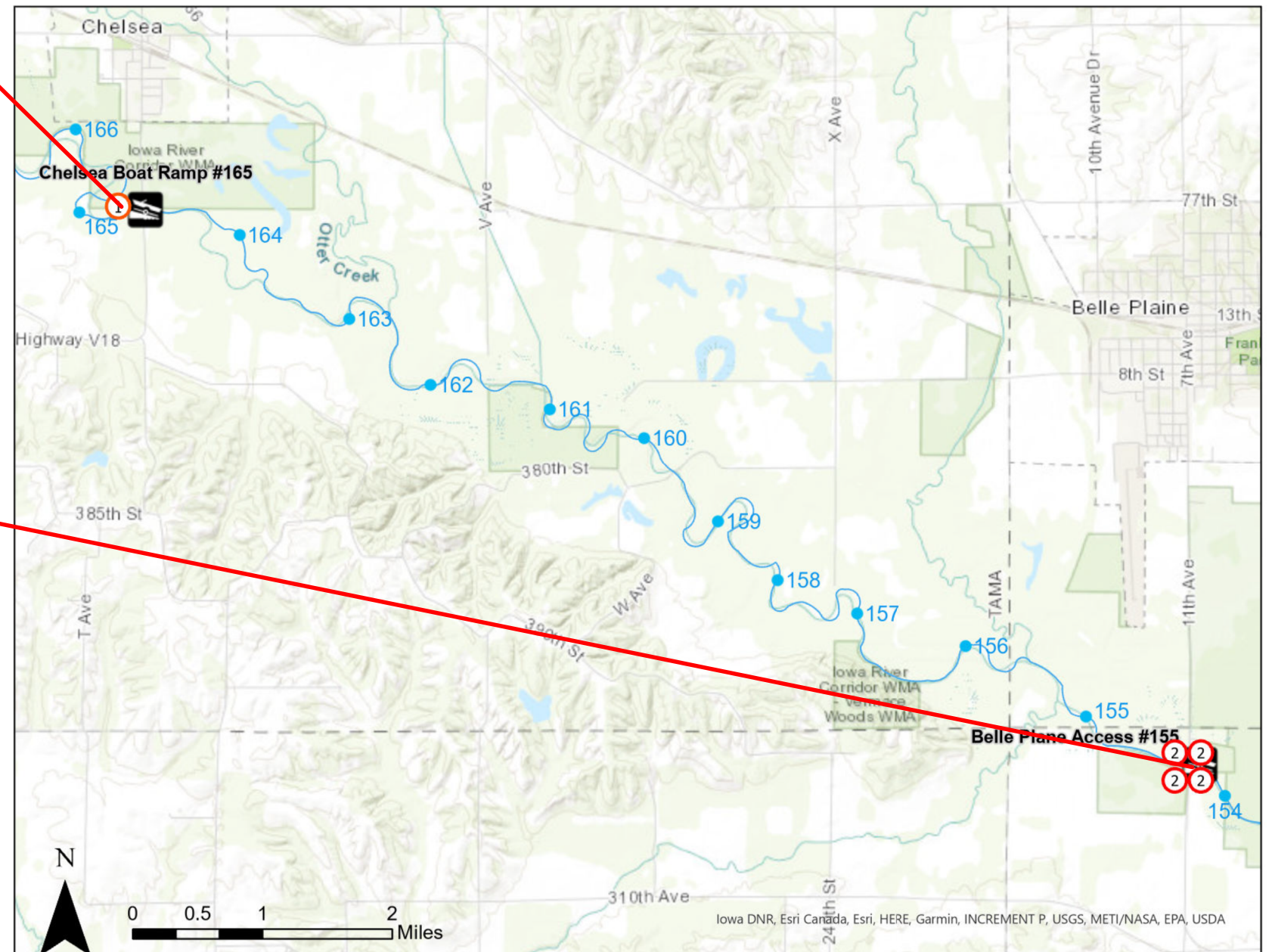
Chelsea Boat Ramp

- 1 Locate sign at the top of the boat ramp or carry-down access, facing parking area.



IA 21 Iowa River Bridge South of Belle Plaine

- 2 Locate signs at bridge site, opposite sides of the river, 1 pair facing upstream, 1 pair facing downstream; OR, 2 signs placed near center of channel 12 feet above regular water level, one facing upstream, one facing downstream.





No border, White on White;

No border, White on Fluorescent Orange;

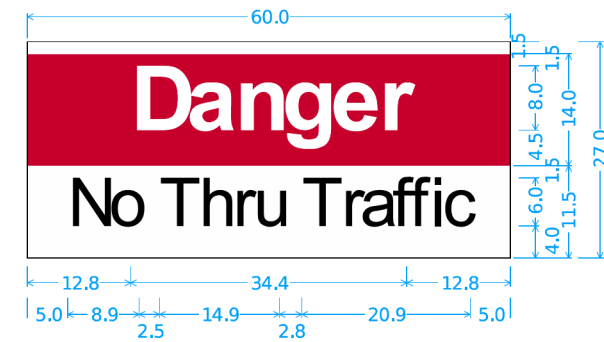
"Warning" Black, Arial, Bold;

No border, Black on White;

"Construction Hazard", Arial; "at Hwy 21 Bridge", Arial;

"Do Not Launch Here", Arial; "for Downstream Trip", Arial;

Sign #1



No border, White on White;

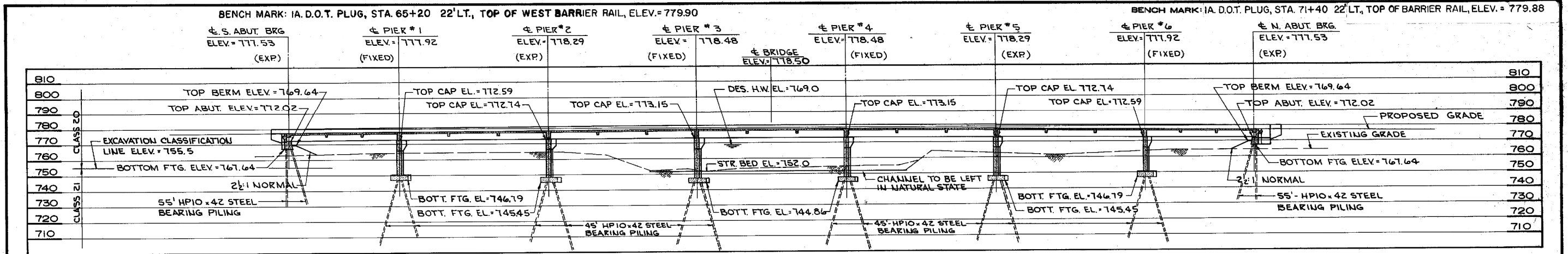
No border, White on Red;

"Danger", Arial, Bold;

No border, Black on White;

"No Thru Traffic", Arial;

Sign #2



Hydraulic Data

Main Channel Bridge Des. 179

Drainage Area = 2,455 Sq. Mi.
Stream Slope = 1.40 ft./Mi.
Avg. Low Water Stage = El. 755.1

Q₂₅ = 16,010 cfs (31,180 cfs)
Stage = El. 768.7

Q₅₀ = 17,870 cfs (36,050 cfs)
Stage = El. 769.0
Regulatory Low Beam = El. 772.9
Avg. Bridge Velocity = 4.0 fps

Q₁₀₀ = 19,680 cfs (40,790 cfs)
Stage = El. 769.3
Operational Low Beam = El. 771.9
Backwater = 0.51 / 0.96 Ft.
Avg. Bridge Velocity = 4.3 fps

Q₂₀₀ = 22,160 cfs (47,680 cfs)
Stage = El. 769.8
Avg. Bridge Velocity = 4.5 fps

Q₅₀₀ = 23,670 cfs (52,230 cfs)
Stage = El. 770.0
Avg. Bridge Velocity = 4.7 fps

Q₂₀₀ Proj. = 24,760 cfs (56,700 cfs)
Stage = El. 770.2
Avg. Bridge Velocity = 4.8 fps
Calculated Design Scour = El. 738.3

Q₅₀₀ Proj. = 25,875 cfs (62,200 cfs)
Stage = El. 770.5
Avg. Bridge Velocity = 4.9 fps
Calculated Check Scour = El. 737.9

Roadway Overtop = 47,200 cfs
Roadway Overtop El. 771.3 (ETW)
Sta. 151+60 MP 55.20

Discharge in parenthesis represents total streamflow.

Backwater references change from existing/pre-development condition near first high-damage potential development upstream of project site (North floodplain near airport industrial area).

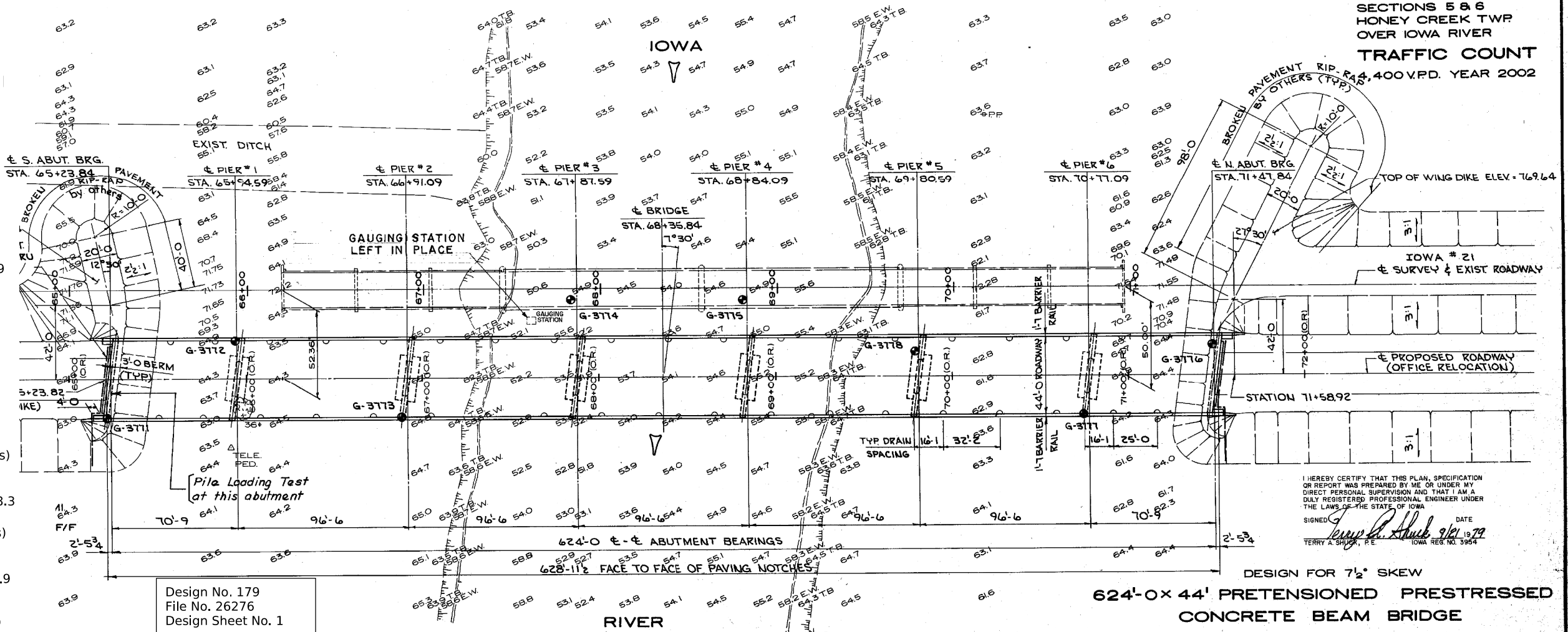
TERRY A. SHUCK STRUCTURAL ENGINEERS, INC.
DES MOINES, IOWA

LONGITUDINAL SECTION ALONG PROPOSED ROADWAY

I.N.R.C. Approval No. 80-161; Dated 6-20-80

LOCATION
IOWA 21
IOWA COUNTY
T-8IN, R-12W
SECTIONS 5 & 6
HONEY CREEK TWP
OVER IOWA RIVER

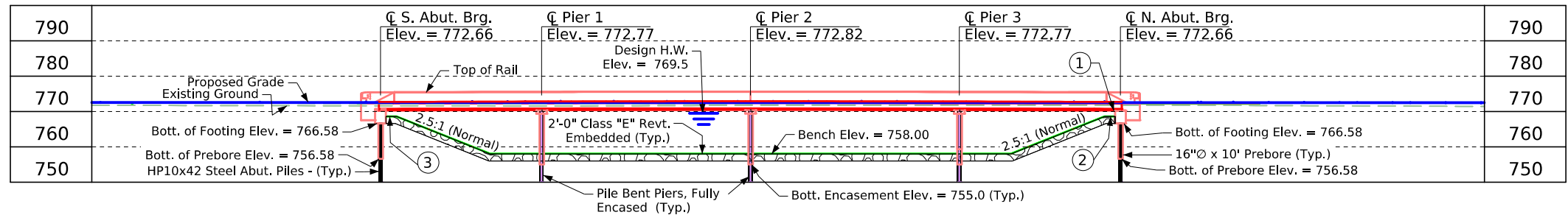
TRAFFIC COUNT
4,400 V.P.D. YEAR 2002



This Sheet from Original Design Plans is Included to Show Proposed Hydraulic Data and Existing Bridge For Information Only.

SITUATION PLAN
SCALE: 1" = 30'-0"

A line graph showing a peak. The left side of the peak is labeled "0.30 %" and the right side is labeled "-0.30 %".



Proposed Profile

Grade 4 IA 21

Longitudinal Section Along CL Approach Roadway

- ① Operational Low slab = See Hydraulic Data
- ② Top of North Berm Elev. = 768.58
- ③ Top of South Berm Elev. = 768.58

Hydraulic Data

Drainage Area = 2,455 Sq. Mi. (Overflow)

Q₅₀ = 7,250 cfs (36,050 cfs)
Stage = El. 769.2
Avg. Bridge Velocity = 3.7 fps

$Q_{100} = 8,195 \text{ cfs (40,790 cfs)}$
 Stage = El. 769.5
 Operational Low Slab = El. 770.2
 Avg. Bridge Velocity = 4.1 fps

Q₂₀₀ = 9,600 cfs (47,680 cfs)
Stage = El. 770.0
Avg. Bridge Velocity = 4.6 fps

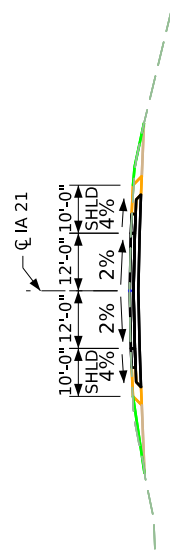
Q₅₀₀ = 10,380 cfs (52,230 cfs)
Stage = El. 770.2
Avg. Bridge Velocity = 4.9 fps

Q₂₀₀ Proj. = 10,990 cfs (56,700 cfs)
 Stage = El. 770.4
 Avg. Bridge Velocity = 5.1 fps
 Calculated Design Scour = El. 740.1

Q₅₀₀ Proj. = 11,570 cfs (62,200 cfs)
Stage = El. 770.7
Avg. Bridge Velocity = 5.3 fps
Calculated Check Scour = El. 739.2

Discharge in paranthesis represents total streamflow.

Refer to Design No. 179, Main Channel Bridge Data, for general IA 21 crossing hydraulic data.



General Notes:

--This design is for a new 209'-0" x 44'-0" Continuous Concrete Slab Bridge, Iowa County. Design 128, FHWA No. 701345

Designer Notes:

- TL-4 Single Slope Bridge Railing Proposed
- Pier Type - P10L Pile Bent Fully Encased
- An Iowa DNR Flood Plain Permit is required. Preliminary Design will submit the application and place the permit in the PW Regulatory_Permits subdirectory folder upon receipt.
- The bridge does not meet Iowa DOT's desired operational or channel freeboard per BDM 3.2.2.4 (reason: overflow structure). Final design aspects in the BDM related to inundation required.
- Density used for Class E quantity calculations is 1.5 T/cy
- Review need for FAA notification due to proximity to Belle Plaine Airport.

Plan Notes:

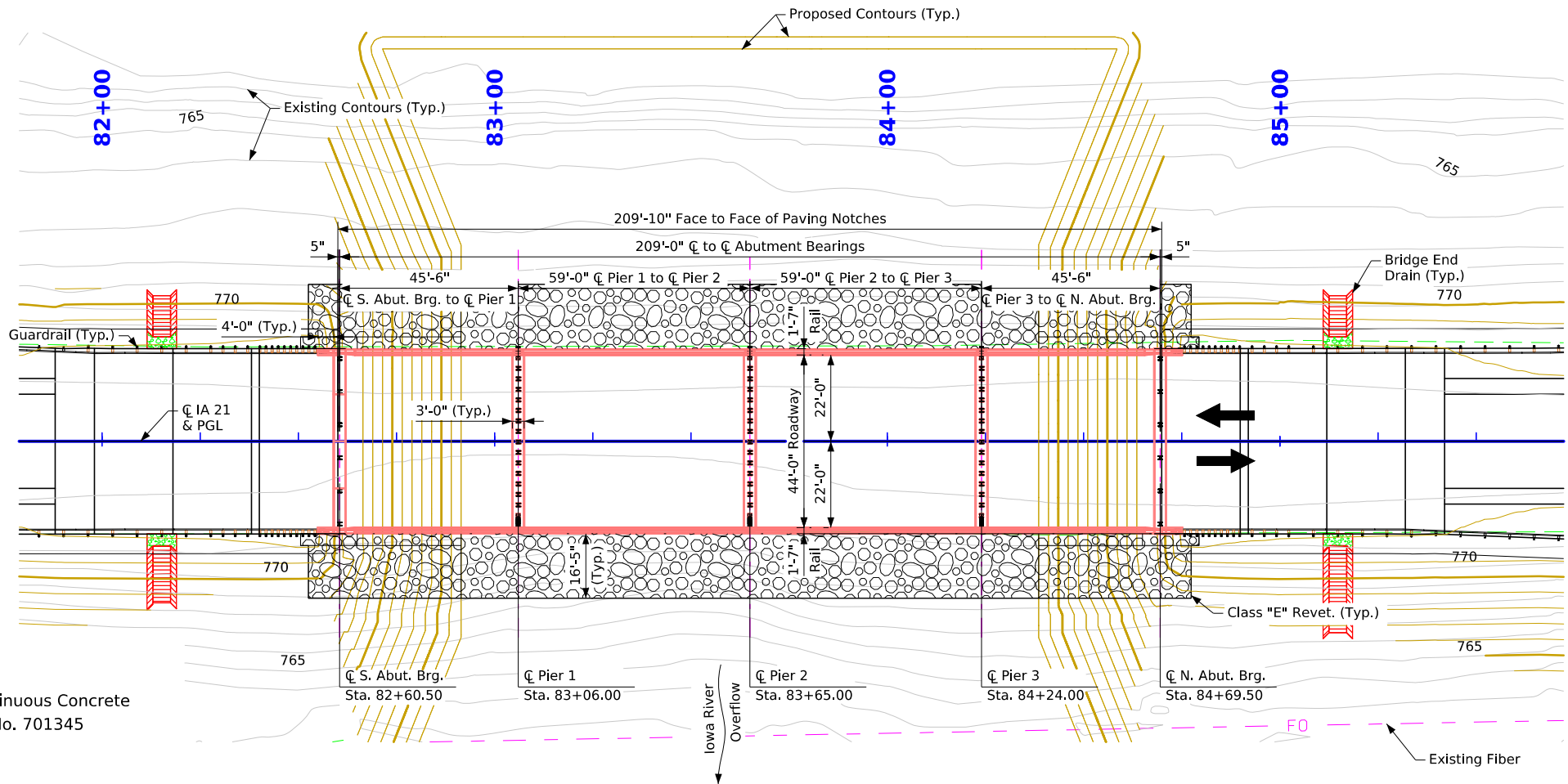
- Top of bridge deck at centerline roadway is 0.03' below the profile grade to account for deck cross slope and parabolic crown.
- Class E revetment stone is embedded.
- The bridge will be designed to withstand the applicable effects of ice and the horizontal stream loads and uplift forces associated with the Q_{100} flood.
- Faint lines indicate existing contours.

Utilities Note:

Utilities shown on this sheet are for information only. See Road Design sheets for utility information.

General Utility Symbols:

FO - Fiber Optic Line T - Telephone Line



Situation Plan



Traffic Data

2029 AADT	2,787 V.P.D.
TRUCKS	12 %

Location

IA 21 over Iowa River Overflow (NOF-A)
T-82N R-12W
Section 32
Iowa Township
Benton County
FHWA No. 701345 (Proposed)
Latitude 41.863694°
Longitude -92.277853°

Preliminary

Design For 0 Degree Skew

209'-0" x 44'-0" Continuous Concrete Slab Bridge

45'-6" End Spans Two 59'-0" Interior Spans

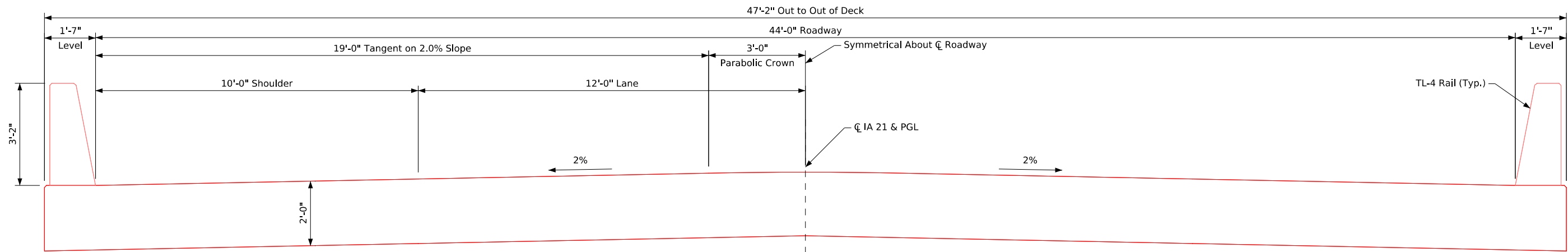
Situation Plan

STA. 83+65.00 (IA 21) Turn-in Date: Dec. 2025

Benton (Iowa) County

IOWA DEPARTMENT OF TRANSPORTATION

Design No. 128 Design Sheet No. 1 of 3 FHWA No. 701345



Transverse Section
(Looking North)

Preliminary

Design For 0 Degree Skew

209'-0" x 44'-0" Continuous Concrete Slab Bridge

45'-6" End Spans Two 59'-0" Interior Spans

Situation Plan - Misc.

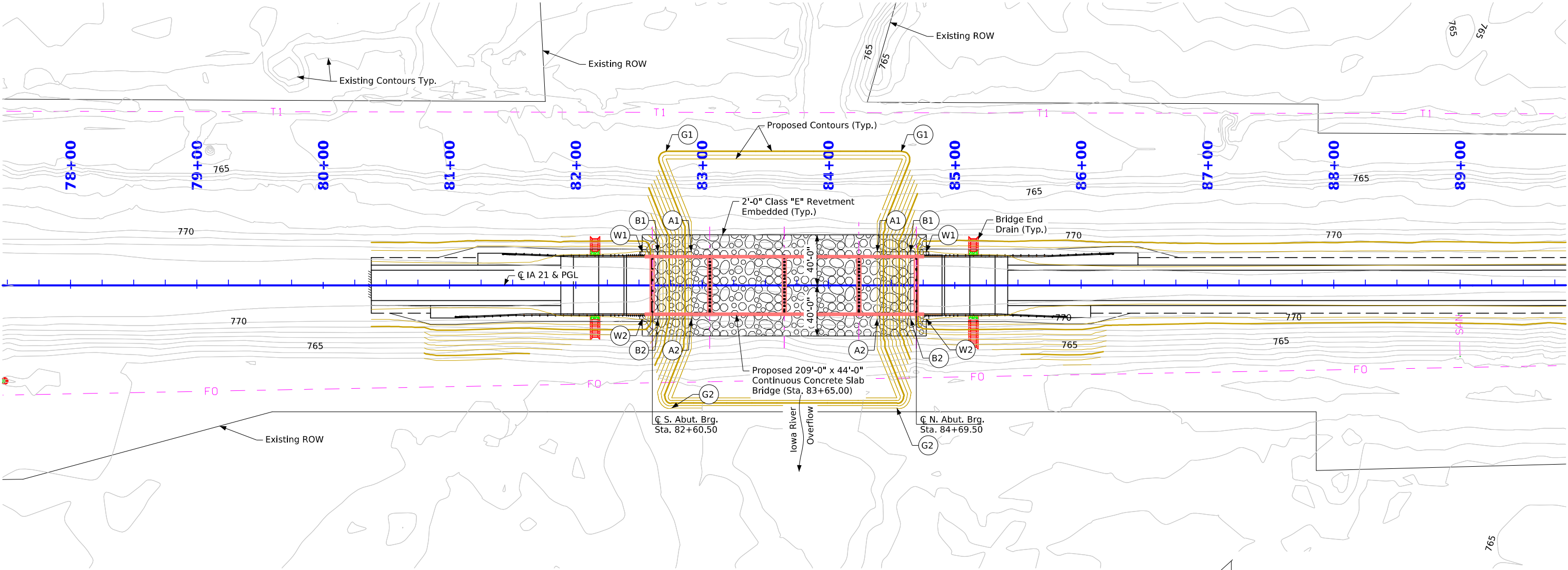
STA. 83+65.00 (IA 21) Turn-In Date: Dec. 2025

Benton (Iowa) County

IOWA DEPARTMENT OF TRANSPORTATION

Design No. 128 Design Sheet No. 2 of 3 FHWA No. 701345

Control Point: CP2 SET FENO MONUMENT 71FT SE OF END OF SOUTHEAST GUARDRAIL IA HWY 21 OVERFLOW BRIDGE, N=8012721.29, E=20333633.24, EL.=765.40
CP3 SET FENO MONUMENT 0.6 MILES SOUTH OF INTERSECTION OF IA HWY 21 AND 1ST ST TOP OF EAST BACKSLOPE, N = 8016366.88, E=20333582.74, EL.=765.79



Site Plan

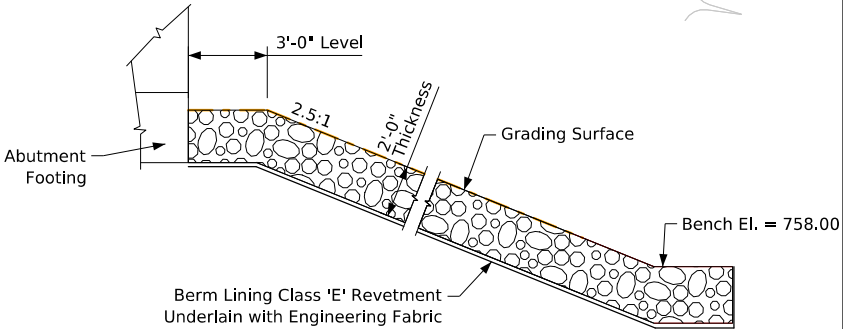


Berm Slope Location Table						
Points	South Abutment			North Abutment		
	Station	Offset	Elev.	Station	Offset	Elev.
A1	82+91.43	26.58' Lt.	758.00	84+38.57	26.58' Lt.	758.00
A2	82+91.43	26.58' Rt.	758.00	84+38.57	26.58' Rt.	758.00
B1	82+65.00	26.58' Lt.	768.58	84+65.00	26.58' Lt.	768.58
B2	82+65.00	26.58' Rt.	768.58	84+65.00	26.58' Rt.	768.58
G1	82+71.45	106.06' Lt.	760.00	84+57.69	106.06' Lt.	760.00
G2	82+75.93	97.00' Rt.	762.00	84+53.75	97.00' Rt.	762.00
W1	82+55.00	26.58' Lt.	772.08	84+75.00	26.58' Lt.	772.08
W2	82+55.00	26.58' Rt.	772.08	84+75.00	26.58' Rt.	772.08

Berm slope elevations reflect the grading surface.

Estimated Berm Armoring Quantities			
Location	Revetment CL. E (Ton)	Engineering Fabric (SY)	CL. 10 Channel Excavation (CY)
South Abutment Berm	308.3	347.5	205.5
North Abutment Berm	308.3	347.5	205.5
Channel	1307.8	1373.2	871.9
Total	1924.4	2068.2	1282.9

Excavation quantity calculated from grading surface. Excavation quantity is for embedded revetment core out only, and does not include excavation to the grading surface. Excavation quantity to the grading surface is determined by Road Design and included in the Road Plans.



Section Thru Embedded Berm Lining

Normal to Berm Slope
Preliminary

Design For 0 Degree Skew

209'-0" x 44'-0" Continuous Concrete Slab Bridge

45'-6" End SpansTwo 59'-0" Interior Spans

Situation Plan - Site

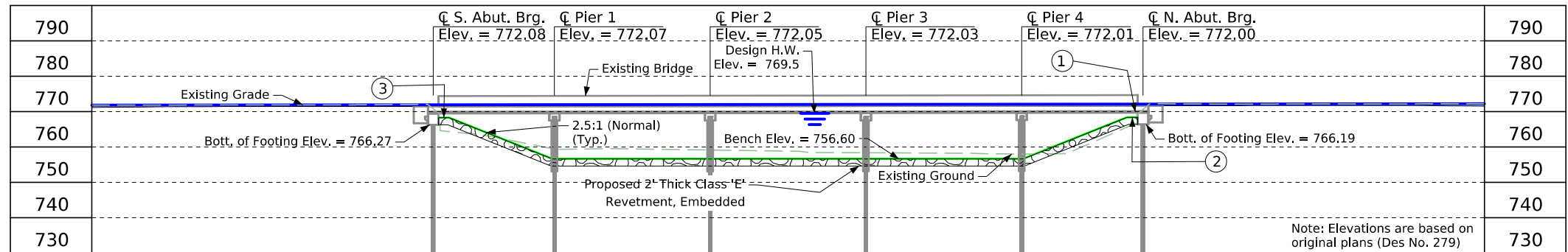
STA. 83+65.00 (IA 21)Turn-In Date: Dec. 2025

Benton (Iowa) County

IOWA DEPARTMENT OF TRANSPORTATION

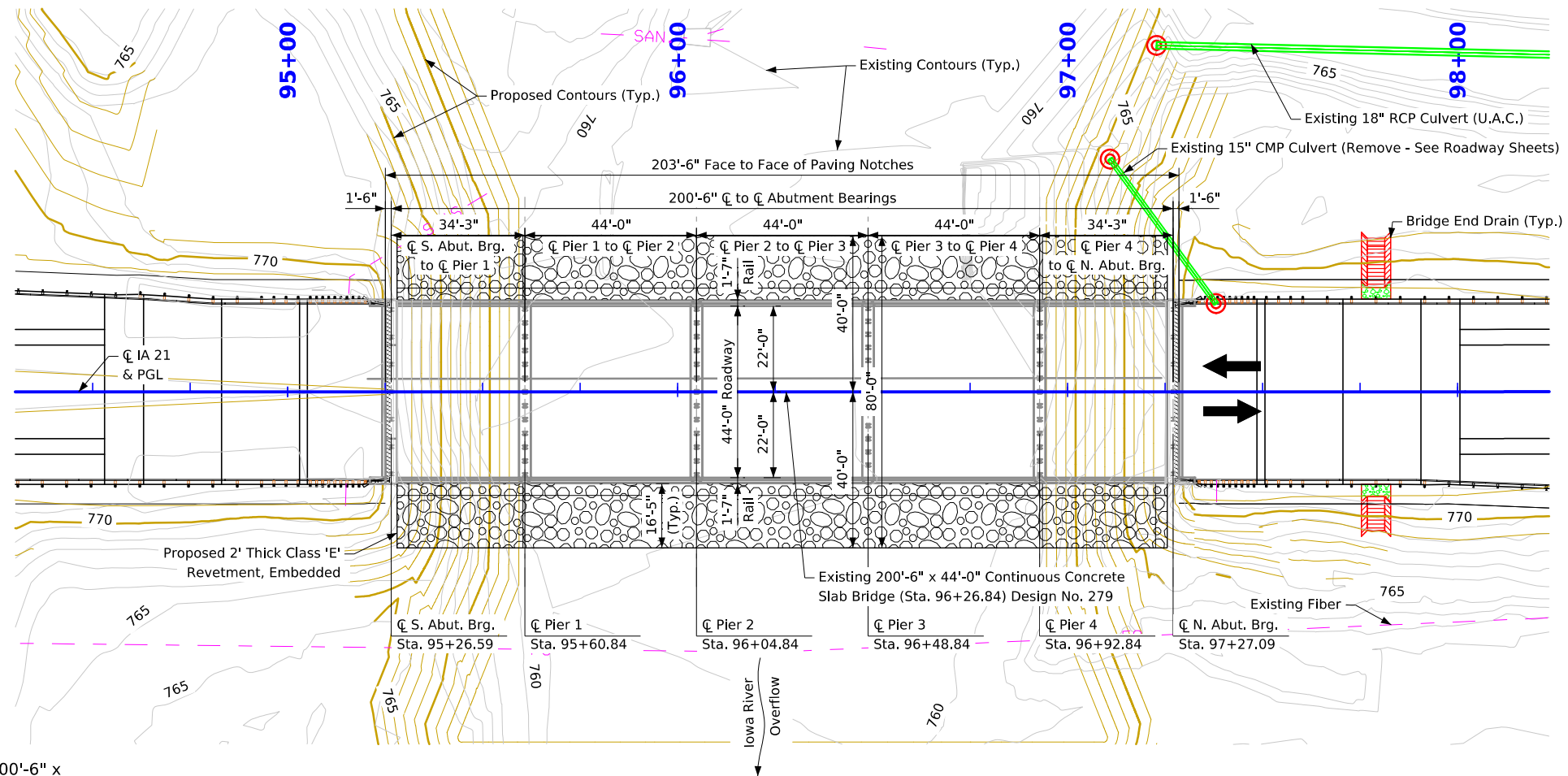
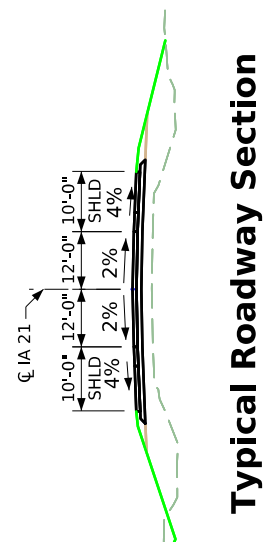
Design No. 128Design Sheet No. 3 of 3FHWA No. 701345

Control Point: CP2 SET FENO MONUMENT 71FT SE OF END OF SOUTHEAST GUARDRAIL IA HWY 21 OVERFLOW BRIDGE, N+8012721.29, E=20333633.24, EL.=765.40
CP3 SET FENO MONUMENT 0.6 MILES SOUTH OF INTERSECTION OF IA HWY 21 AND 1ST ST TOP OF EAST BACKSLOPE, N = 8016366.88, E=20333582.74, EL.=765.79

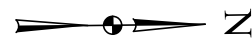


- ① Operational Low slab = See Hydraulic Data
- ② Top of North Berm Elev. = 768.2
- ③ Top of South Berm Elev. = 768.3

Longitudinal Section Along $\mathbb{C}$ Approach Roadway



Situation Plan



General Notes:

--This design is for placing revetment at the existing 200'-6" x 44' Continuous Concrete Slab Bridge, Benton County. Design 279, FHWA No. 14401.

Designer Notes:

- Density used for Class E quantity calculations is 1.5 T/cy
- Review need for FAA notification due to proximity to Belle Plaine Airport.

Plan Notes:

- Class E revetment stone is embedded.
- The bridge will be designed to withstand the applicable effects of ice and the horizontal stream loads and uplift forces associated with the Q_{100} flood.
- Faint lines indicate existing contours.

Utilities Note:

Utilities shown on this sheet are for information only. See Road Design sheets for utility information.

General Utility Symbols:

FO - Fiber Optic Line San. - Sanitary Sewer

Traffic Data

2029 AADT	2,787 V.P.D.
TRUCKS	12 %

Location

IA 21 over Iowa River Overflow (NOF-B)
T-82N R-12W
Section 32
Iowa Township
Benton County
FHWA No. 14401 (Existing)
Latitude 41.867159°
Longitude -92.277780°

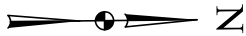
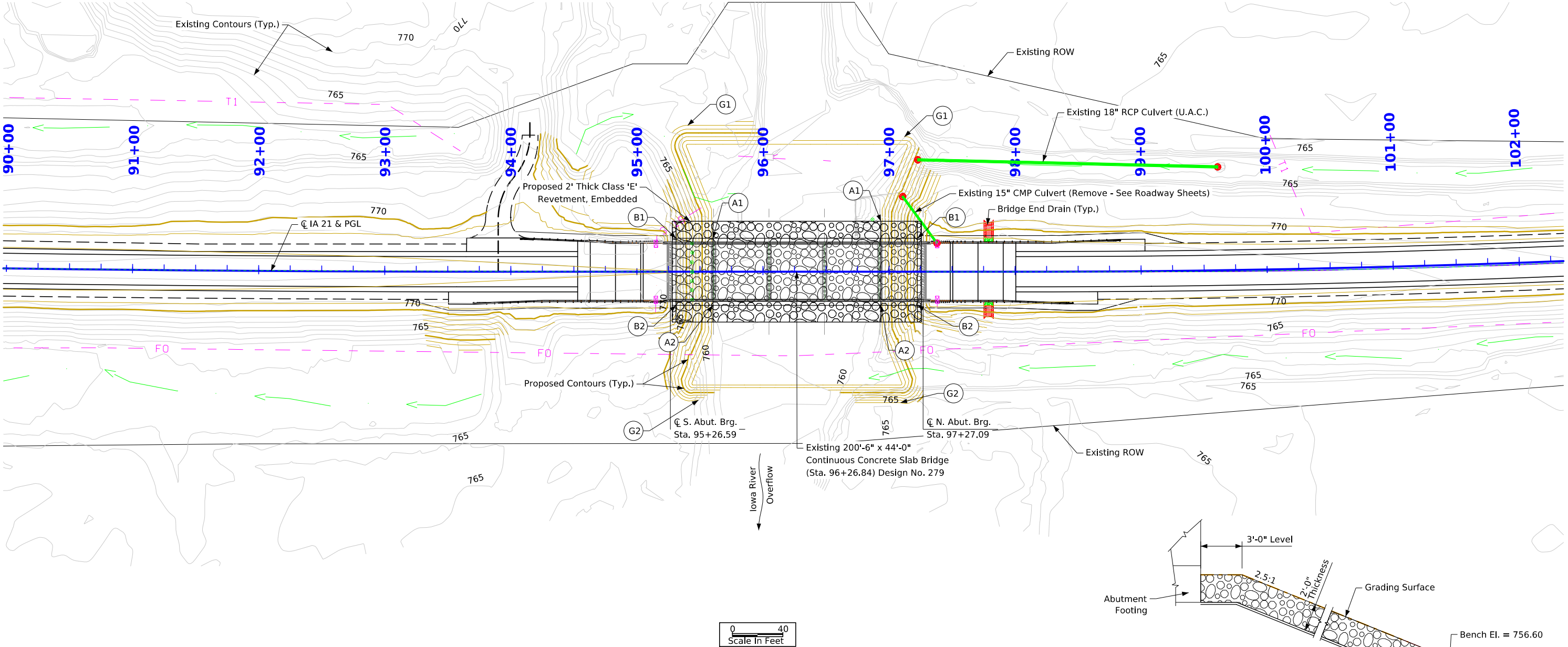
Preliminary

Design For Repairs to 0 Degree Skew
200'-6" x 44'-0" Continuous
Concrete Slab Bridge

Situation Plan

STA. 96+26.84 (IA 21)	Benton (Iowa) County	Turn-In Date: Dec. 2025
IOWA DEPARTMENT OF TRANSPORTATION		
Design No. 428	Design Sheet No. 1 of 2	FHWA No. 14401

Control Point: CP2 SET FENO MONUMENT 71FT SE OF END OF SOUTHEAST GUARDRAIL IA HWY 21 OVERFLOW BRIDGE, N=8012721.29, E=20333633.24, EL.=765.40
CP3 SET FENO MONUMENT 0.6 MILES SOUTH OF INTERSECTION OF IA HWY 21 AND 1ST ST TOP OF EAST BACKSLOPE, N = 8016366.88, E=20333582.74, EL.=765.79

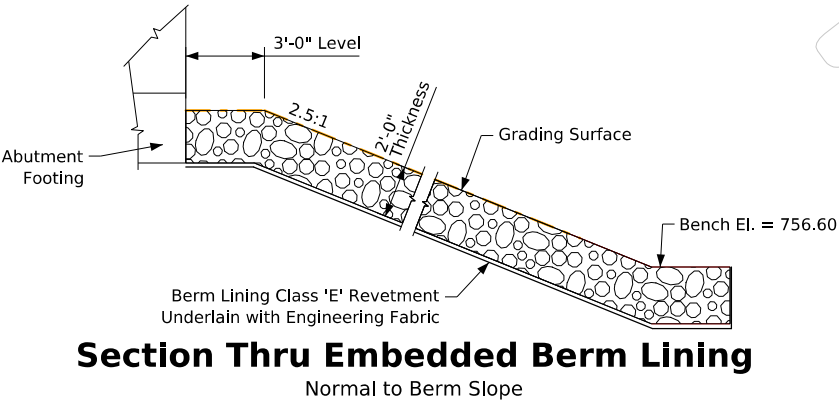


Estimated Berm Armoring Quantities			
Location	Revetment CL, E (Ton)	Engineering Fabric (SY)	CL, 10 Channel Excavation (CY)
South Abutment Berm	306.7	338.8	204.5
North Abutment Berm	304.3	336.3	202.9
Channel	1184.4	1243.6	789.6
Total	1795.4	1918.7	1197.0

Excavation quantity calculated from grading surface. Excavation quantity is for embedded revetment core out only, and does not include excavation to the grading surface. Excavation quantity to the grading surface is determined by Road Design and included in the Road Plans.

Berm Slope Location Table						
Points	South Abutment			North Abutment		
	Station	Offset	Elev.	Station	Offset	Elev.
A1	95+60.34	26.58' Lt.	756.60	96+93.59	26.58' Lt.	756.60
A2	95+60.34	26.58' Rt.	756.60	96+93.59	26.58' Rt.	756.60
B1	95+31.09	26.58' Lt.	768.30	97+22.59	26.58' Lt.	768.20
B2	95+31.09	26.58' Rt.	768.30	97+22.59	26.58' Rt.	768.20
G1	95+40.42	116.20' Lt.	762.00	97+12.30	107.20' Lt.	759.00
G2	95+48.85	101.80' Rt.	763.00	97+40.40	109.98' Rt.	764.00

Berm slope elevations reflect the grading surface.



Preliminary

Design For Repairs to 0 Degree Skew

200'-6" x 44'-0" Continuous Concrete Slab Bridge

34'-3" End Spans Three 44'-0" Interior Span

Situation Plan - Site

STA. 96+26.84 (IA 21) Turn-In Date: Dec. 2025

Benton (Iowa) County

IOWA DEPARTMENT OF TRANSPORTATION

Design No. 428 Design Sheet No. 2 of 2 FHWA No. 14401

A line graph showing a peak. The left side of the peak is labeled "0.30 %" and the right side is labeled "-0.30 %".

790			790
780			780
770			770
760			760
750			750
740			740

Proposed Profile

Grade 4 IA 21

Longitudinal Section Along CL Approach Roadway

- ① Operational Low slab = See Hydraulic Data
- ② Top of North Berm Elev. = 768.40
- ③ Top of South Berm Elev. = 768.40

Hydraulic Data

Drainage Area = 2,455 Sq. Mi. (Overflow)

Q₅₀ = 2,605 cfs (36,050 cfs)
Stage = El. 769.9
Avg. Bridge Velocity = 2.5 fps

Q₁₀₀ = 3,170 cfs (40,790 cfs)
 Stage = El. 770.2
 Operational Low Slab = El. 770.0
 Avg. Bridge Velocity = 3.0 fps

Q₂₀₀ = 4,110 cfs (47,680 cfs)
Stage = El. 770.7
Avg. Bridge Velocity = 3.9 fps

Q₅₀₀ = 4,670 cfs (52,230 cfs)
Stage = El. 770.9
Avg. Bridge Velocity = 4.4 fps

Q₂₀₀ Proj. = 4,985 cfs (56,700 cfs)
 Stage = El. 771.1
 Avg. Bridge Velocity = 4.7 fps
 Calculated Design Scour = El. 749.8

Q₅₀₀ Proj.= 5,265 cfs (62,200 cfs)
Stage = El. 771.4
Avg. Bridge Velocity = 5.0 fps
Calculated Check Scour = El. 749.2

Discharge in parenthesis represents total streamflow.

Refer to Design No. 179, Main Channel Bridge Data, for general IA 21 crossing hydraulic data.

General Notes:

--This design is for a new 150'-0" x 44'-0" Continuous Concrete Slab Bridge, Iowa County. Design 228, FHWA No. 701350

Designer Notes:

- TL-4 Single Slope Bridge Railing Proposed
- Standard Bridge No. J44
- Pier Type - P10L Pile Bent (Type 1, 2 or 3) Individually Encased
- An Iowa DNR Flood Plain Permit is required. Preliminary Design will submit the application and place the permit in the PW Regulatory_Permits subdirectory folder upon receipt.
- The bridge does not meet Iowa DOT's desired operational or channel freeboard per BDM 3.2.2.4 (reason: overflow structure). Final design aspects in the BDM related to inundation required.
- Density used for Class E quantity calculations is 1.5 T/cy
- Review need for FAA notification due to proximity to Belle Plaine Airport.

Plan Notes:

- Top of bridge deck at centerline roadway is 0.03' below the profile grade to account for deck cross slope and parabolic crown.
- Class E revetment stone is embedded.
- The bridge will be designed to withstand the applicable effects of ice and the horizontal stream loads and uplift forces associated with the Q_{100} flood.
- Faint lines indicate existing contours.

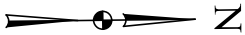
Utilities Note:

Utilities shown on this sheet are for information only. See Road Design sheets for utility information.

General Utility Symbols:

FO - Fiber Optic Line T - Telephone Line

Situation Plan



Traffic Data

2029 AADT	2,787 V.P.D.
TRUCKS	12 %

Location

IA 21 over Iowa River Overflow (NOF-C)
T-82N R-12W
Section 32
Iowa Township
Benton County
FHWA No. 701350 (Proposed)
Latitude 41.874450°
Longitude -92.277912°

Preliminary

Design For 0 Degree Skew

150'-0" x 44'-0" Continuous Concrete Slab Bridge

45'-6" End Spans 59'-0" Interior Span

Situation Plan

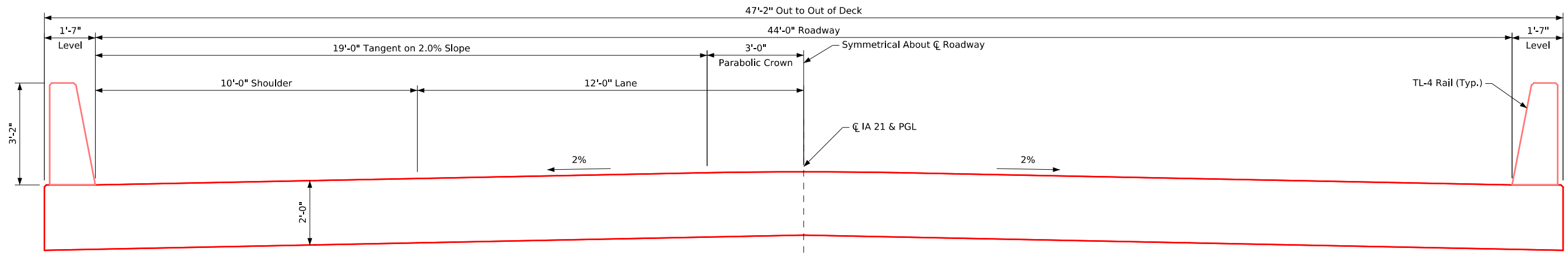
STA. 122+84.80 (IA 21) Turn-in Date: Dec. 2025

Benton (Iowa) County

IOWA DEPARTMENT OF TRANSPORTATION

Design No. 228 Design Sheet No. 1 of 3 FHWA No. 701350

FILE NO. 32862	ENGLISH	DESIGN TEAM WHKS & Co.	Benton (Iowa) COUNTY	PROJECT NUMBER STP-021-3(019)--2C-48	SHEET NUMBER V.6
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Transverse Section
(Looking North)

Preliminary

Design For 0 Degree Skew

150'-0" x 44'-0" Continuous Concrete Slab Bridge

45'-6" End Spans 59'-0" Interior Span

Situation Plan - Misc.

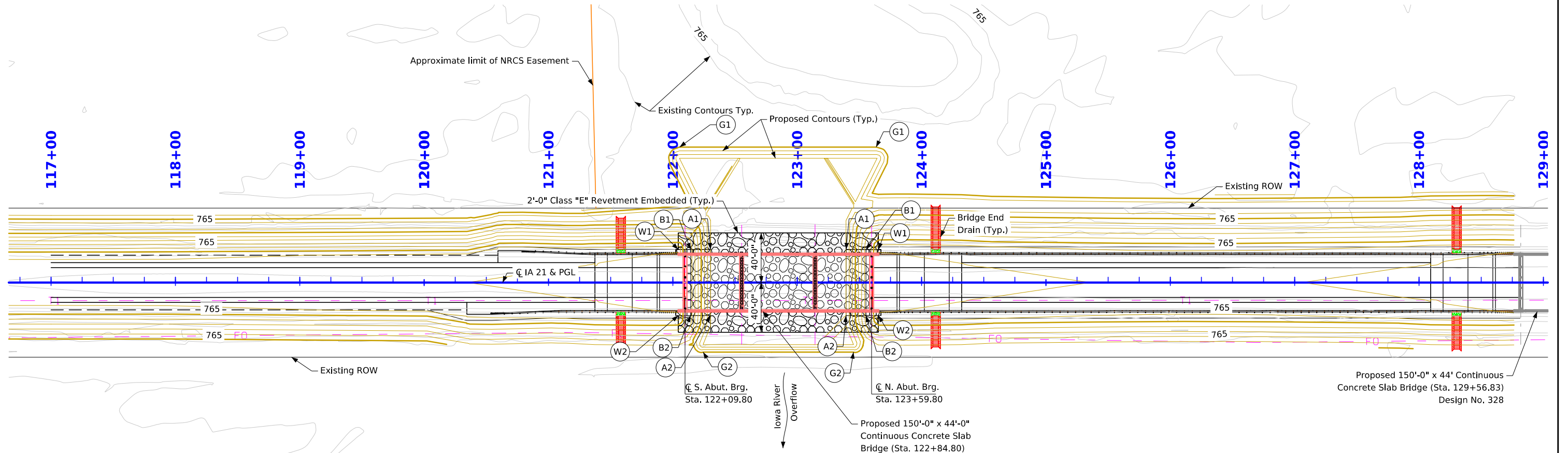
STA. 122+84.80 (IA 21) Turn-In Date: Dec. 2025

Benton (Iowa) County

IOWA DEPARTMENT OF TRANSPORTATION

Design No. 228 Design Sheet No. 2 of 3 FHWA No. 701350

Control Point: CP2 SET FENO MONUMENT 71FF SE OF END OF SOUTHEAST GUARDRAIL IA HWY 21 OVERFLOW BRIDGE, N+8012721.29, E=20333633.24, EL.=765.40
CP3 SET FENO MONUMENT 0.6 MILES SOUTH OF INTERSECTION OF IA HWY 21 AND 1ST ST TOP OF EAST BACKSLOPE, N = 8016366.88, E=20333582.74, EL.=765.79



Site Plan

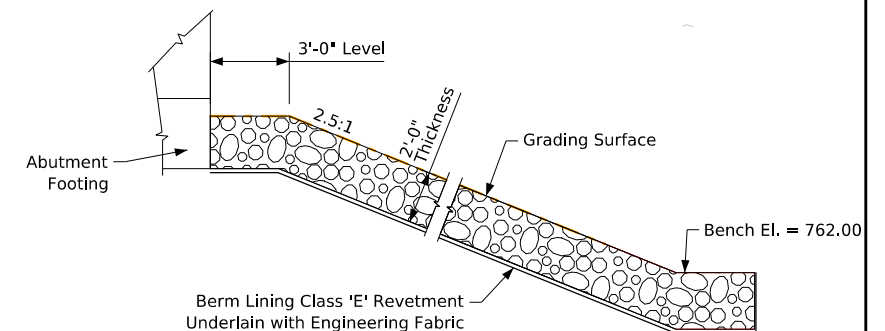


Berm Slope Location Table						
Points	South Abutment			North Abutment		
	Station	Offset	Elev.	Station	Offset	Elev.
A1	122+30.30	26.58' Lt.	762.00	123+39.30	26.58' Lt.	762.00
A2	122+30.30	26.58' Rt.	762.00	123+39.30	26.58' Rt.	762.00
B1	122+14.30	26.58' Lt.	768.40	123+55.30	26.58' Lt.	768.40
B2	122+14.30	26.58' Rt.	768.40	123+55.30	26.58' Rt.	768.40
G1	122+05.30	109.00' Lt.	765.00	123+63.48	109.00' Lt.	765.00
G2	122+24.38	56.00' Rt.	765.00	123+45.21	56.00' Rt.	765.00
W1	122+04.30	26.58' Lt.	771.90	123+65.30	26.58' Lt.	771.90
W2	122+04.30	26.58' Rt.	771.90	123+65.30	26.58' Rt.	771.90

Berm slope elevations reflect the grading surface.

Estimated Berm Armoring Quantities			
Location	Revetment CL, E (Ton)	Engineering Fabric (SY)	CL, 10 Channel Excavation (CY)
South Abutment Berm	201.1	233.5	134.1
North Abutment Berm	201.1	233.5	134.1
Channel	968.9	1017.3	645.9
Total	1371.1	1484.3	914.1

Excavation quantity calculated from grading surface. Excavation quantity is for embedded revetment core out only, and does not include excavation to the grading surface. Excavation quantity to the grading surface is determined by Road Design and included in the Road Plans.



Section Thru Embedded Berm Lining

Normal to Berm Slope

Preliminary

Design For 0 Degree Skew
150'-0" x 44'-0" Continuous
Concrete Slab Bridge

45'-6" End Spans

59'-0" Interior Span

Situation Plan - Site

STA. 122+84.80 (IA 21)

Turn-in Date: Dec. 2025

Benton (Iowa) County

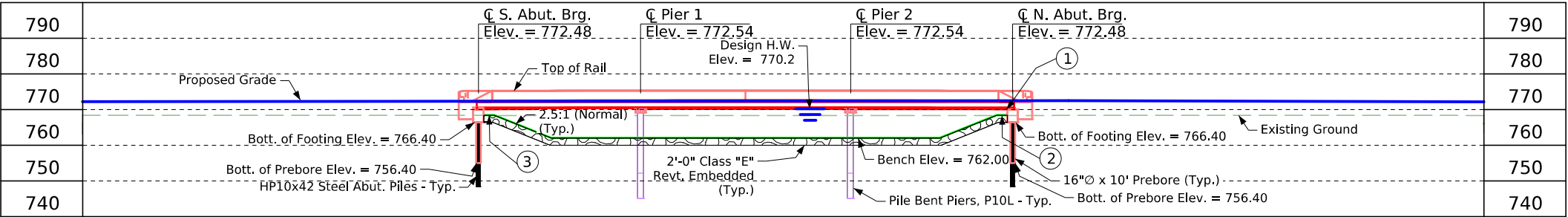
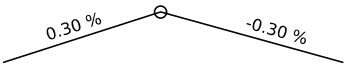
IOWA DEPARTMENT OF TRANSPORTATION

Design No. 228

Design Sheet No. 3 of 3

FHWA No. 701350

Control Point: CP2 SET FENO MONUMENT 71FT SE OF END OF SOUTHEAST GUARDRAIL IA HWY 21 OVERFLOW BRIDGE, N=8012721.29, E=20333633.24, EL.=765.40
CP3 SET FENO MONUMENT 0.6 MILES SOUTH OF INTERSECTION OF IA HWY 21 AND 1ST ST TOP OF EAST BACKSLOPE, N = 8016366.88, E=20333582.74, EL.=765.79



VPI Sta. = 129+57.00 VC = 225'
VPI Elev. = 772.750

**Proposed Profile
Grade $\mathcal{C}$ IA 21**

Longitudinal Section Along $\mathcal{C}$ Approach Roadway

- ① Operational Low slab = See Hydraulic Data
② Top of North Berm Elev. = 768.40
③ Top of South Berm Elev. = 768.40

Hydraulic Data

North Overflow Bridge D Des. 328

Drainage Area = 2,455 Sq. Mi. (Overflow)

Q_{50} = 2,295 cfs (36,050 cfs)
Stage = El. 769.9
Avg. Bridge Velocity = 2.2 fps

Q_{100} = 2,850 cfs (40,790 cfs)
Stage = El. 770.2
Operational Low Slab = El. 770.0
Avg. Bridge Velocity = 2.7 fps

Q_{200} = 3,685 cfs (47,680 cfs)
Stage = El. 770.8
Avg. Bridge Velocity = 3.5 fps

Q_{500} = 4,285 cfs (52,230 cfs)
Stage = El. 771.0
Avg. Bridge Velocity = 4.1 fps

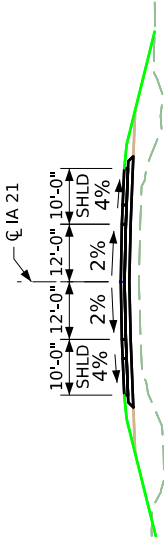
Q_{200} Proj. = 4,650 cfs (56,700 cfs)
Stage = El. 771.2
Avg. Bridge Velocity = 4.4 fps
Calculated Design Scour = El. 751.0

Q_{500} Proj. = 5,025 cfs (62,200 cfs)
Stage = El. 771.5
Avg. Bridge Velocity = 4.8 fps
Calculated Check Scour = El. 750.0

Discharge in paranthesis represents total streamflow.

Refer to Design No. 179, Main Channel Bridge Data, for general IA 21 crossing hydraulic data.

Typical Roadway Section



General Notes:

--This design is for a new 150'-0" x 44'-0" Continuous Concrete Slab Bridge, Iowa County, Design 328, FHWA No. 701355

Designer Notes:

--TL-4 Single Slope Bridge Railing Proposed
--Standard Bridge No. J44
--Pier Type - P10L Pile Bent (Type 1, 2 or 3) Individually Encased
--An Iowa DNR Flood Plain Permit is required. Preliminary Design will submit the application and place the permit in the PW Regulatory Permits subdirectory folder upon receipt.
--The bridge does not meet Iowa DOT's desired operational or channel freeboard per BDM 3.2.2.4 (reason: overflow structure). Final design aspects in the BDM related to inundation required.
--Density used for Class E quantity calculations is 1.5 T/cy
--Review need for FAA notification due to proximity to Belle Plaine Airport.

Plan Notes:

--Top of bridge deck at centerline roadway is 0.03' below the profile grade to account for deck cross slope and parabolic crown.
--Class E revetment stone is embedded.
--The bridge will be designed to withstand the applicable effects of ice and the horizontal stream loads and uplift forces associated with the Q_{100} flood.
--Faint lines indicate existing contours.

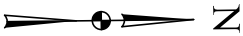
Utilities Note:

Utilities shown on this sheet are for information only. See Road Design sheets for utility information.

General Utility Symbols:

FO - Fiber Optic Line T - Telephone Line

Situation Plan



Traffic Data

2029 AADT 2,787 V.P.D.
TRUCKS 12 %

Location

IA 21 over Iowa River Overflow (NOF-D)
T-82N R-12W
Section 32
Iowa Township
Benton County
FHWA No. 701355 (Proposed)
Latitude 41.876295°
Longitude -92.277904°

Preliminary

Design For 0 Degree Skew
**150'-0" x 44'-0" Continuous
Concrete Slab Bridge**

45'-6" End Spans 59'-0" Interior Span

Situation Plan

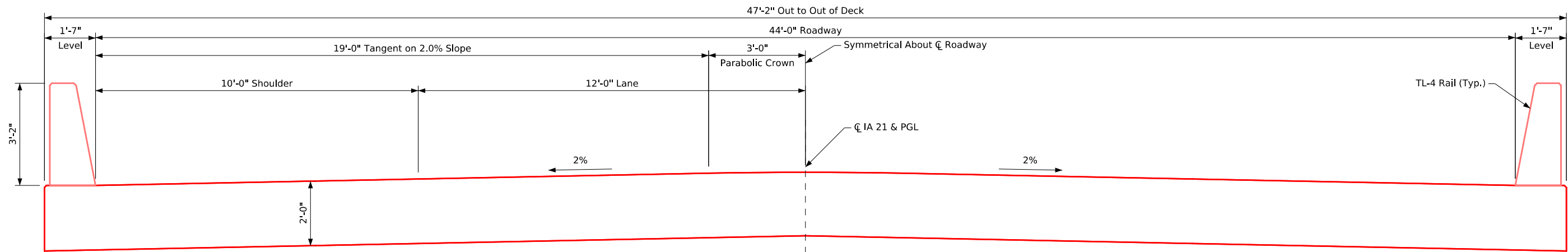
STA. 129+56.83 (IA 21) Turn-In Date: Dec. 2025

Benton (Iowa) County

IOWA DEPARTMENT OF TRANSPORTATION

Design No. 328 Design Sheet No. 1 of 3 FHWA No. 701355

FILE NO. 32862	ENGLISH	DESIGN TEAM WHKS & Co.	Benton (Iowa) COUNTY	PROJECT NUMBER STP-021-3(019)--2C-48	SHEET NUMBER V.9
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Transverse Section
(Looking North)

Preliminary

Design For 0 Degree Skew

150'-0" x 44'-0" Continuous Concrete Slab Bridge

45'-6" End Spans59'-0" Interior Span

Situation Plan - Misc.

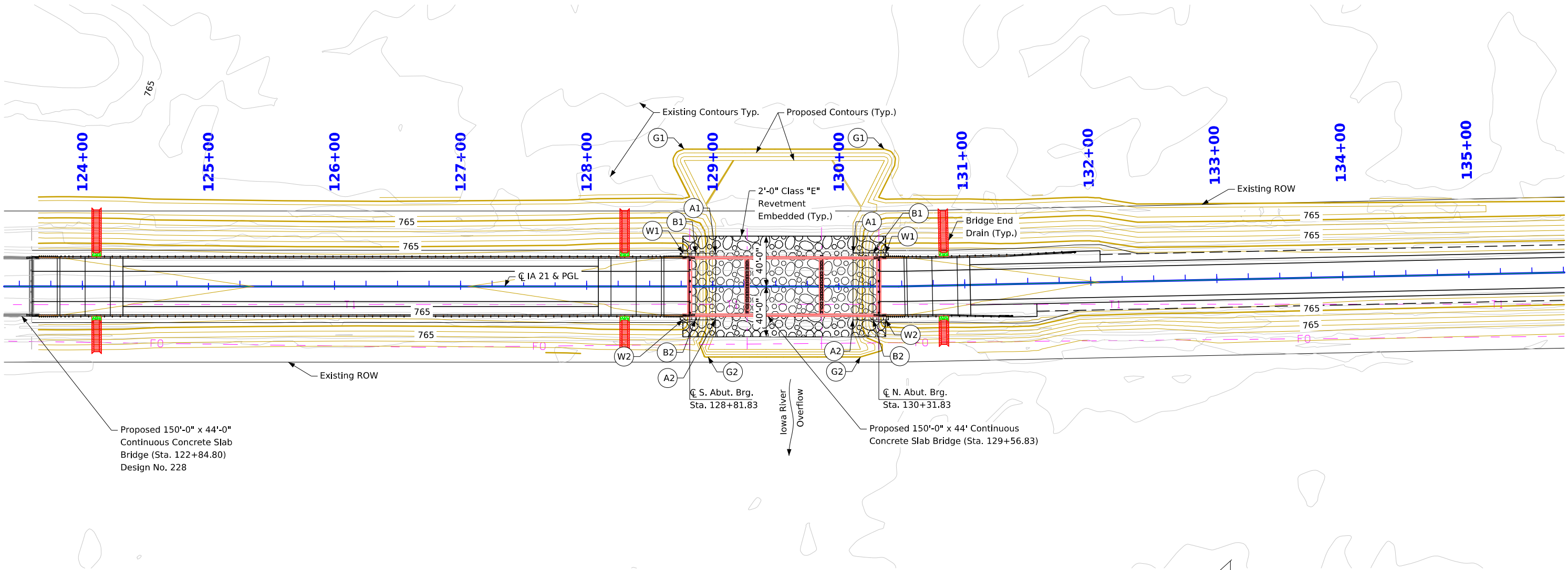
STA. 129+56.83 (IA 21)Turn-In Date: Dec. 2025

Benton (Iowa) County

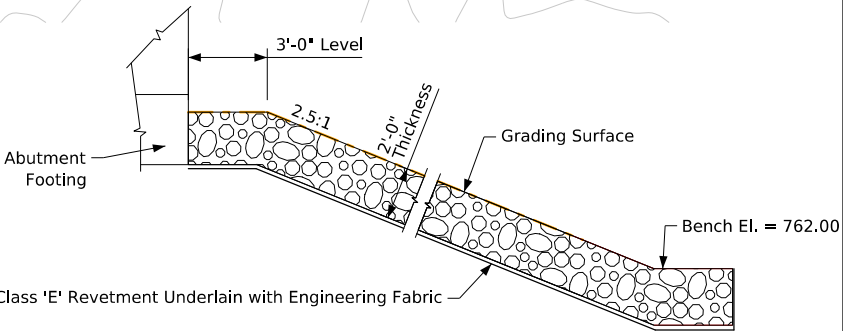
IOWA DEPARTMENT OF TRANSPORTATION

Design No. 328Design Sheet No. 2 of 3FHWA No. 701355

Control Point: CP2 SET FENO MONUMENT 71FT SE OF END OF SOUTHEAST GUARDRAIL IA HWY 21 OVERFLOW BRIDGE, N=8012721.29, E=20333633.24, EL.=765.40
CP3 SET FENO MONUMENT 0.6 MILES SOUTH OF INTERSECTION OF IA HWY 21 AND 1ST ST TOP OF EAST BACKSLOPE, N = 8016366.88, E=20333582.74, EL.=765.79



Site Plan



Section Thru Embedded Berm Lining

Normal to Berm Slope
Preliminary

Berm Slope Location Table						
Points	South Abutment			North Abutment		
	Station	Offset	Elev.	Station	Offset	Elev.
A1	129+02.33	26.58' Lt.	762.00	130+11.33	26.58' Lt.	762.00
A2	129+02.33	26.58' Rt.	762.00	130+11.33	26.58' Rt.	762.00
B1	128+86.33	26.58' Lt.	768.40	130+27.33	26.58' Lt.	768.40
B2	128+86.33	26.58' Rt.	768.40	130+27.33	26.58' Rt.	768.40
G1	128+77.33	109.00' Lt.	765.00	130+36.02	109.00' Lt.	765.00
G2	128+96.41	56.00' Rt.	765.00	130+17.22	56.00' Rt.	765.00
W1	128+76.33	26.58' Lt.	771.90	130+37.33	26.58' Lt.	771.90
W2	128+76.33	26.58' Rt.	771.90	130+37.33	26.58' Rt.	771.90

Berm slope elevations reflect the grading surface.

Estimated Berm Armoring Quantities			
Location	Revetment CL. E (Ton)	Engineering Fabric (SY)	CL. 10 Channel Excavation (CY)
South Abutment Berm	201.1	233.5	134.1
North Abutment Berm	201.1	233.5	134.1
Channel	968.9	1017.3	645.9
Total	1371.1	1484.3	914.1

Excavation quantity calculated from grading surface. Excavation quantity is for embedded revetment core out only, and does not include excavation to the grading surface. Excavation quantity to the grading surface is determined by Road Design and included in the Road Plans.

Design For 0 Degree Skew

150'-0" x 44'-0" Continuous Concrete Slab Bridge

45'-6" End Spans59'-0" Interior Span

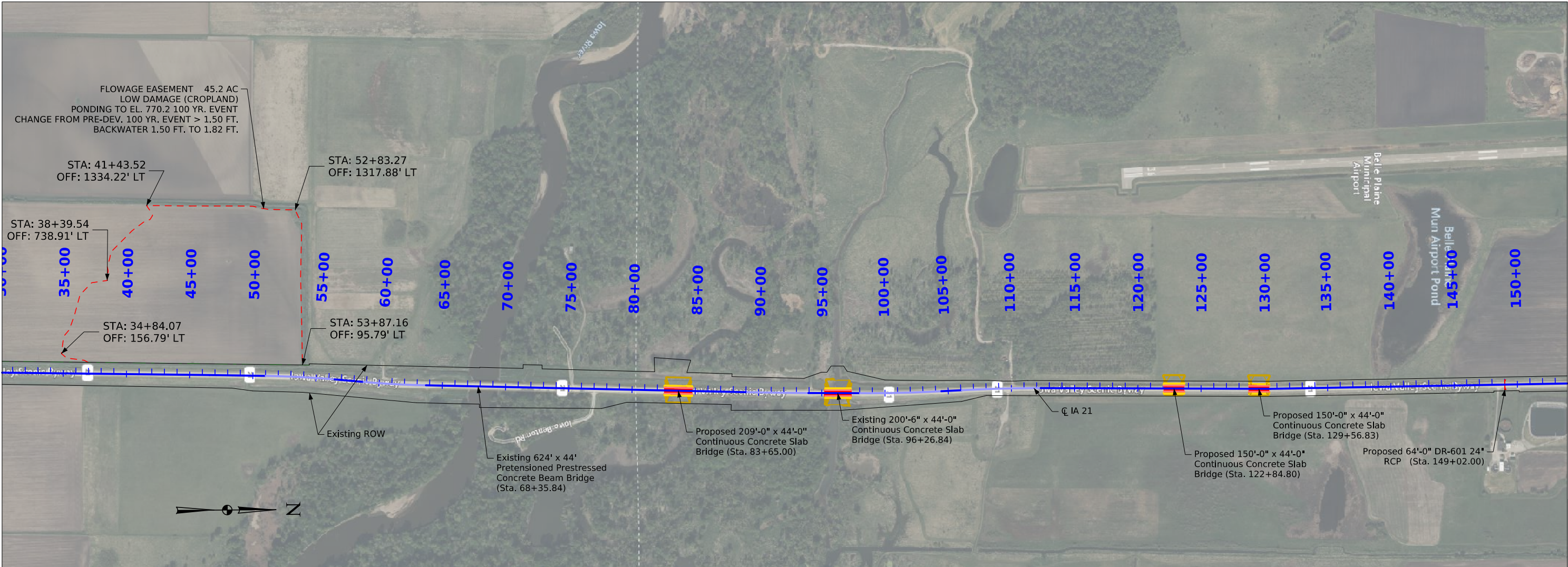
Situation Plan - Site

STA. 129+56.83 (IA 21)Turn-In Date: Dec. 2025

Benton (Iowa) County

IOWA DEPARTMENT OF TRANSPORTATION

Design No. 328Design Sheet No. 3 of 3FHWA No. 701355



Flowage Easement Plan



IA 21 over Iowa River Flood Mitigation

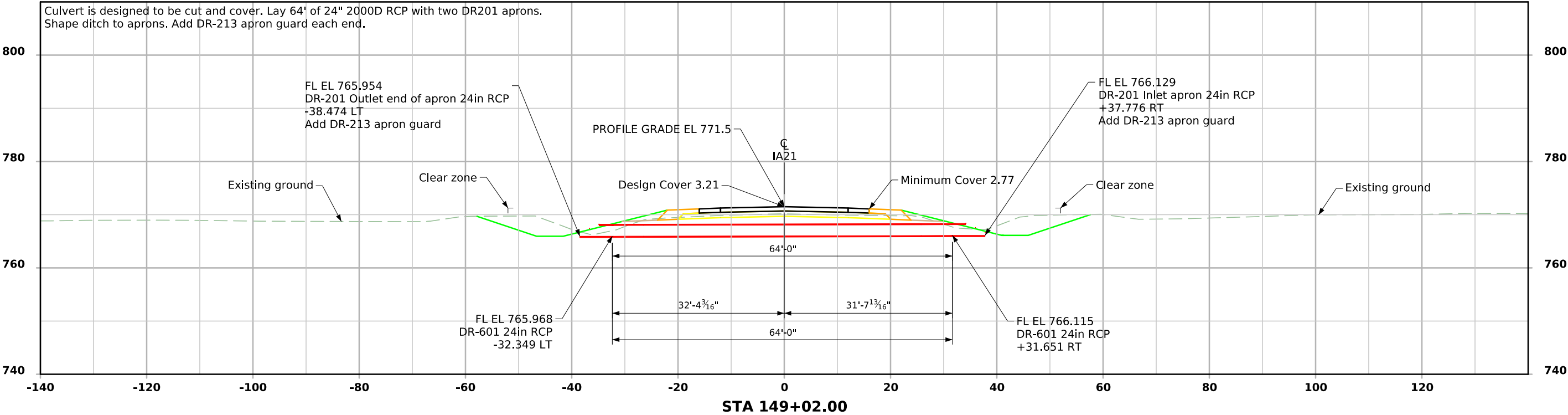
Flowage Easement Plan

Turn-In Date: Dec. 2025

Benton (Iowa) County

IOWA DEPARTMENT OF TRANSPORTATION

Design Sheet No. 1 of 1



CROSS SECTION VIEW COLOR LEGEND			
Design Color No.	Feature	Design Color No.	Feature
Aggregate		Grading	
(64)	Choke Stone	(8)	Behind Curb Cut
(42)	Engineering Fabric	(6)	Granular
(8)	Flooded Backfill	(13)	Granular Back Fill
(92)	Macadam Stone	(48)	Rock Undercut
(20)	Modified	(8)	Shoulder Earth Fill
(12)	Plowing Shaping	(2)	Side Slopes
(14)	Porous Backfill	(226)	Side Slopes Dressing
(8)	Revetment Class A	Substrata	
(6)	Revetment Class B	(128)	Boulder
(62)	Revetment Class C	(209)	Boulder Removed
(188)	Revetment Class D	(48)	Broken Weathered
(28)	Revetment Class E	(210)	Broken Weathered Removed
(12)	Shoulder Special Backfill	(3)	Core Out
(12)	Special Backfill	(115)	Core Out Remove Only
(20)	Subbase	(195)	Core Out Remove and Replace
(20)	Subbase Lower	(203)	Existing Pavement
(20)	Subbase Upper	(184)	Existing Pavement Remove Only
(118)	Subgrade Treatment	(200)	Existing Pavement Remove and Replace
Asphalt		(6)	Loam
(207)	HMA Base Course	(211)	Loam Removed
(207)	HMA Interim Course	(80)	Rock
(207)	HMA Surface Course	(212)	Rock Removed
Bridge		(4)	Select Sand
(0)	Bridge	(214)	Select Sand Removed
Concrete		(3)	Shale
(0)	Barrier Concrete	(215)	Shale Removed
(0)	Barrier Concrete Footing	(10)	Topsoil
(0)	Curb Gutter	(2)	Topsoil Remove Only
(48)	Flowable Mortar	(4)	Topsoil Remove and Replace
(0)	Median Concrete	Unsuitable / Waste	
(0)	PCC Pavement	(3)	Unsuitable Type A
(0)	Sidewalk	(216)	Unsuitable Type A Removed
Existing		(13)	Unsuitable Type B
(0)	Existing Pavement	(217)	Unsuitable Type B Removed
Shoulder		(11)	Unsuitable Type C
(209)	Shoulder HMA	(218)	Unsuitable Type C Removed
(0)	Shoulder PCC	(3)	Waste
(6)	Shoulder Granular	(219)	Waste Removed
Structural			
(112)	Noise Wall		
(112)	Noise Wall Footing		
(112)	Retaining Wall Back		
(112)	Retaining Wall Back Excavate		
(112)	Retaining Wall Face		
(112)	Retaining Wall Front Excavate		
(112)	Retaining Wall Front Footing		
(112)	Retaining Wall MSE Gutter		
(112)	Retaining Wall Reinforced Earth		

NOTES:

Text

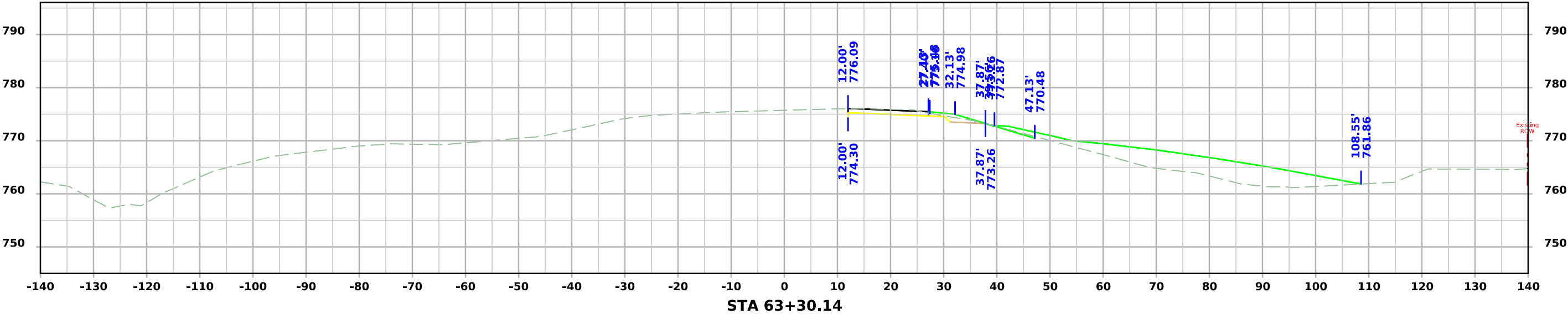
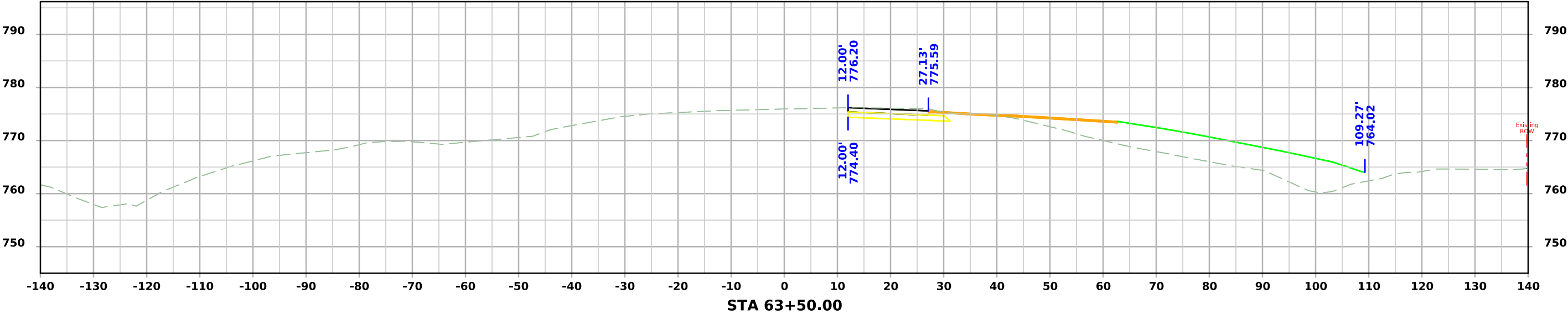
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Text

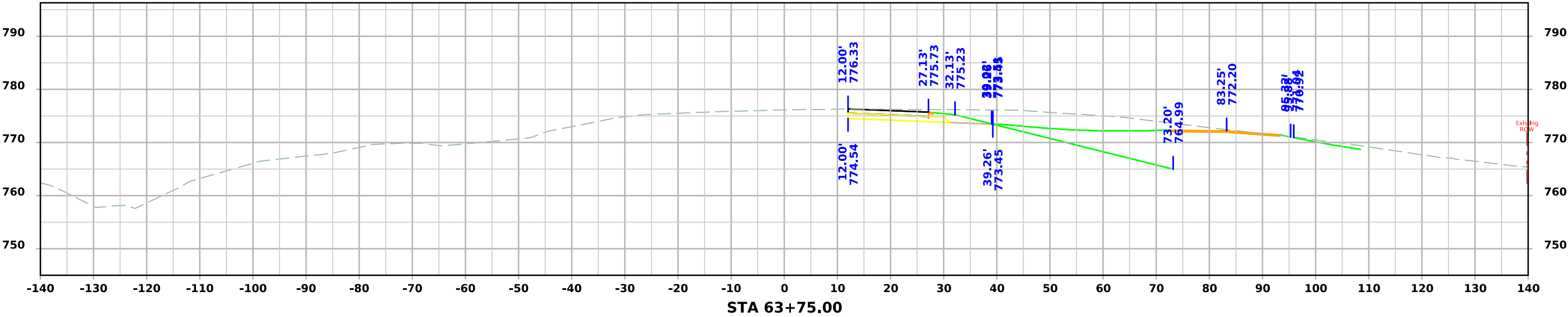
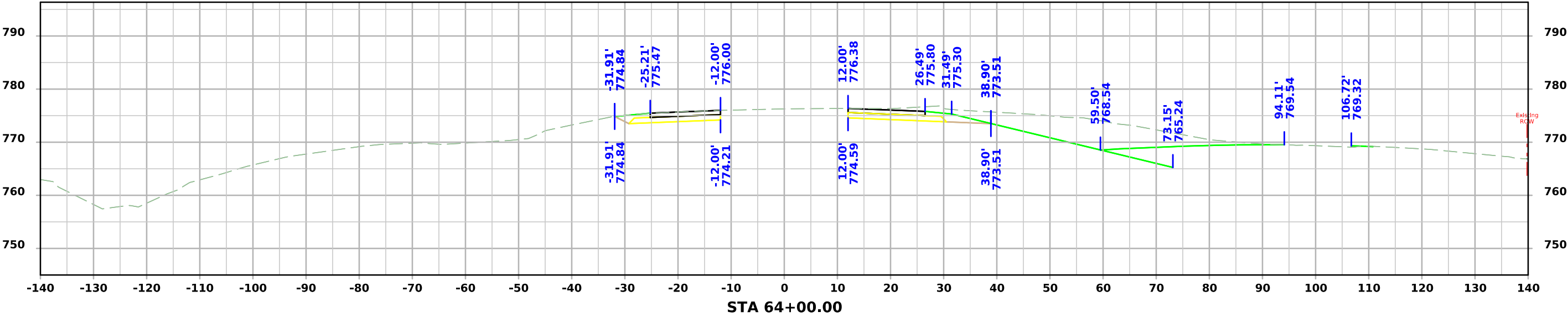
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LEGEND AND INFORMATION SHEET

(COVERS SHEET SERIES W, X, Y, & Z)

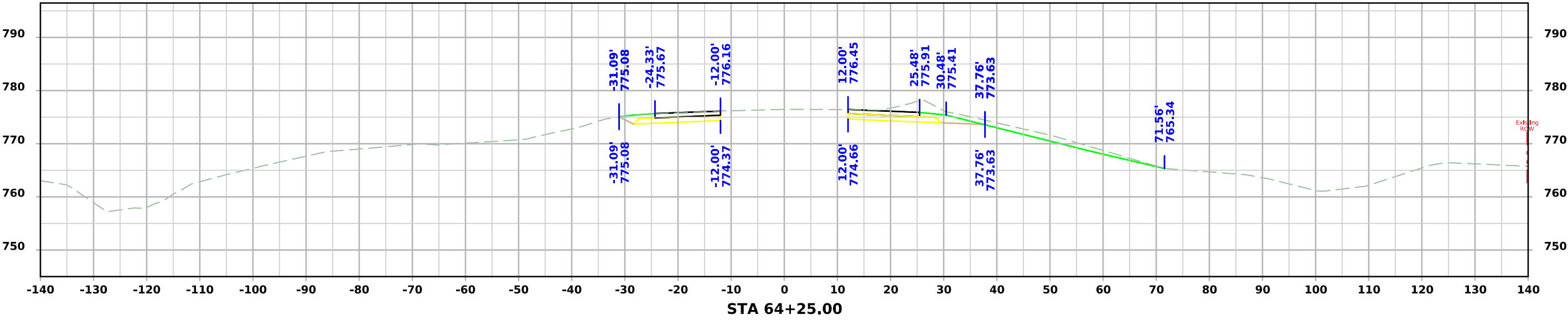
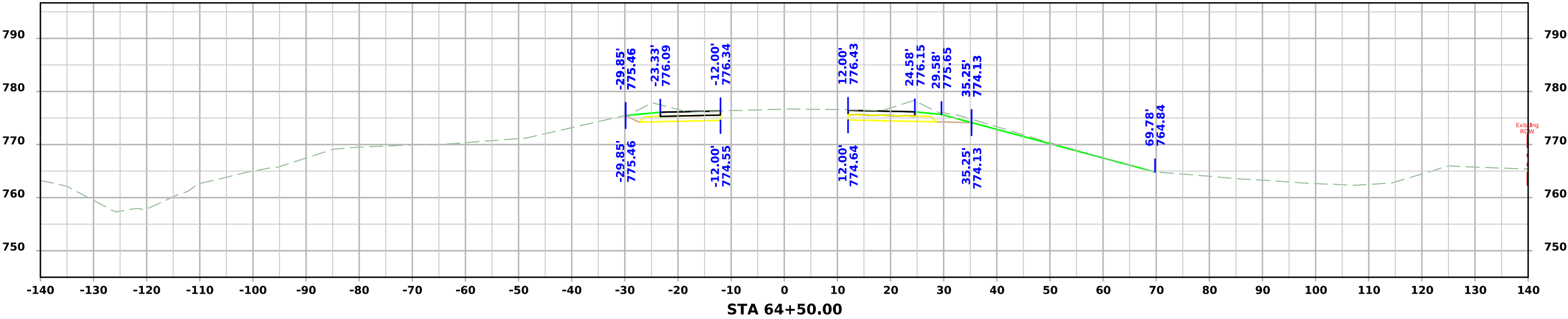
ML - IA 21



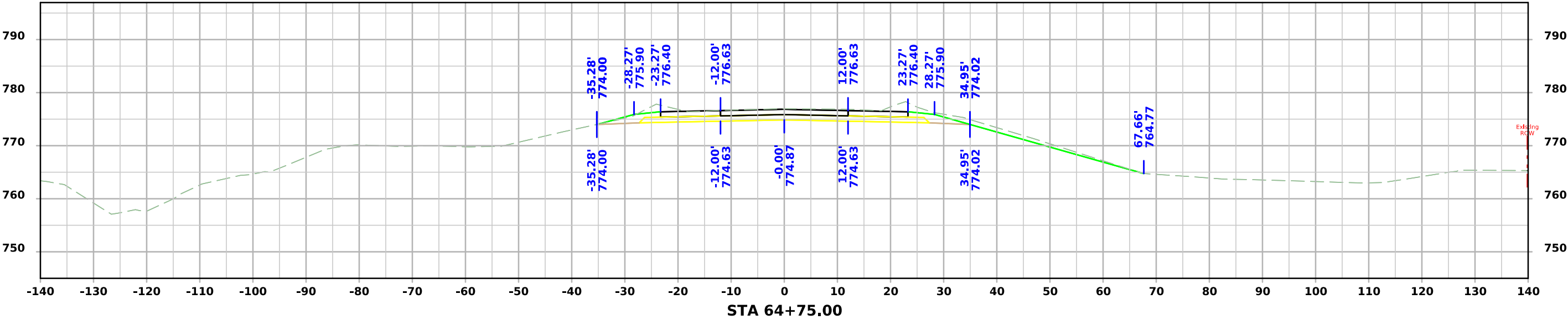
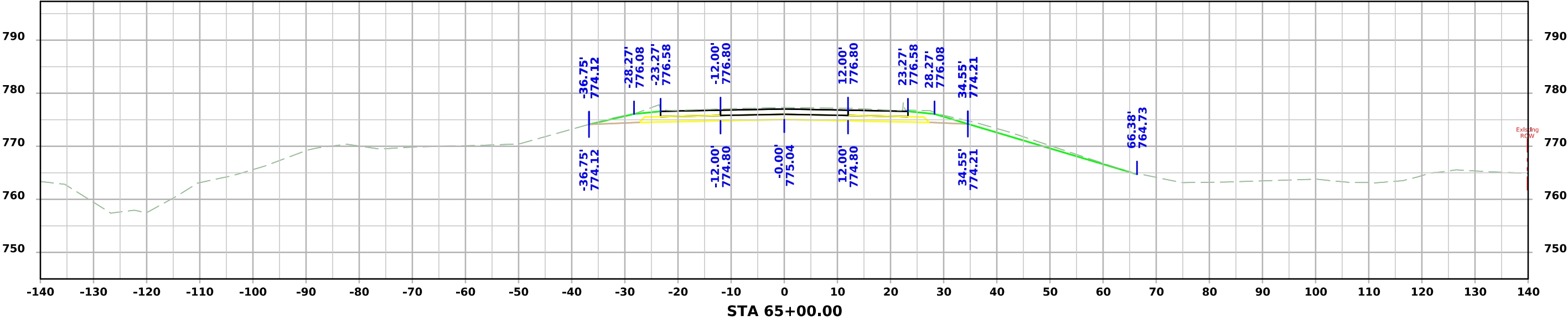
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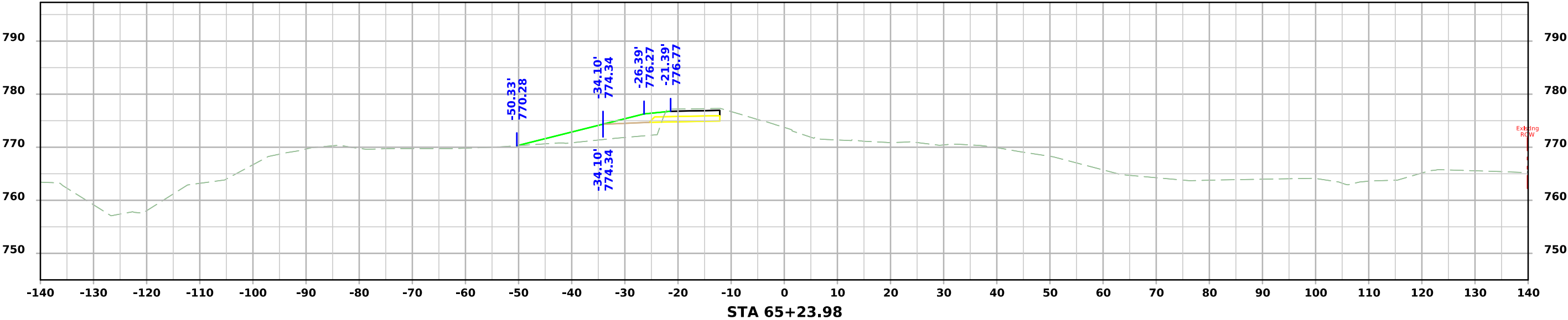
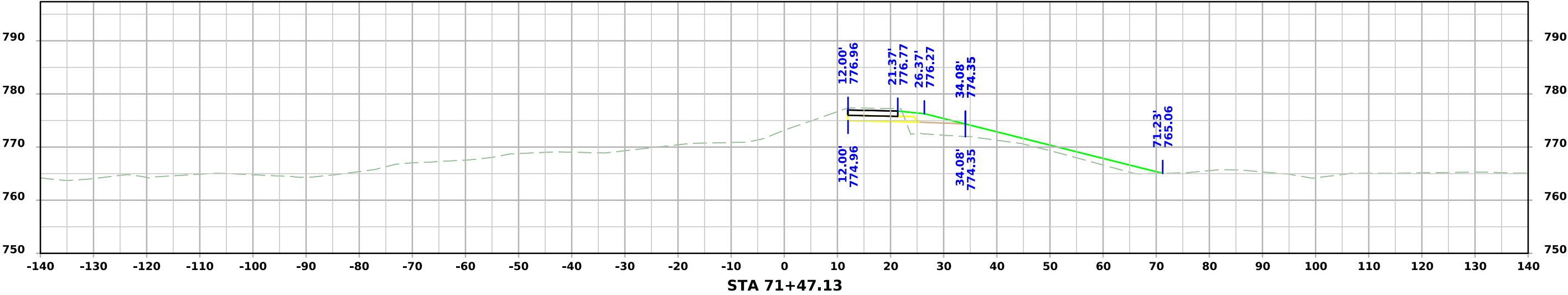
ML - IA 21



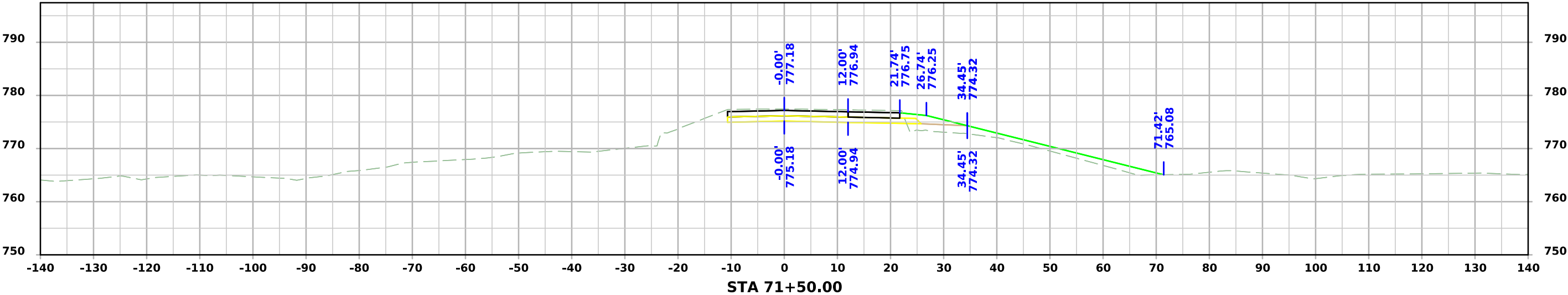
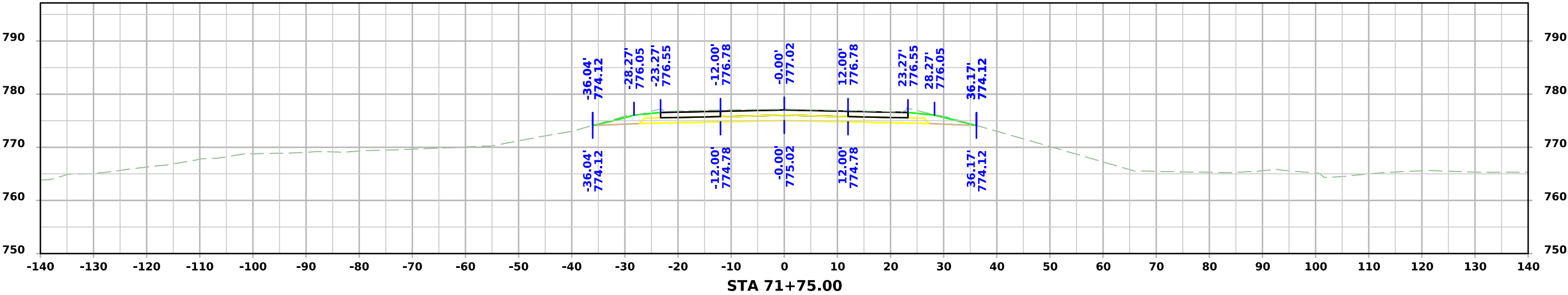
ML - IA 21



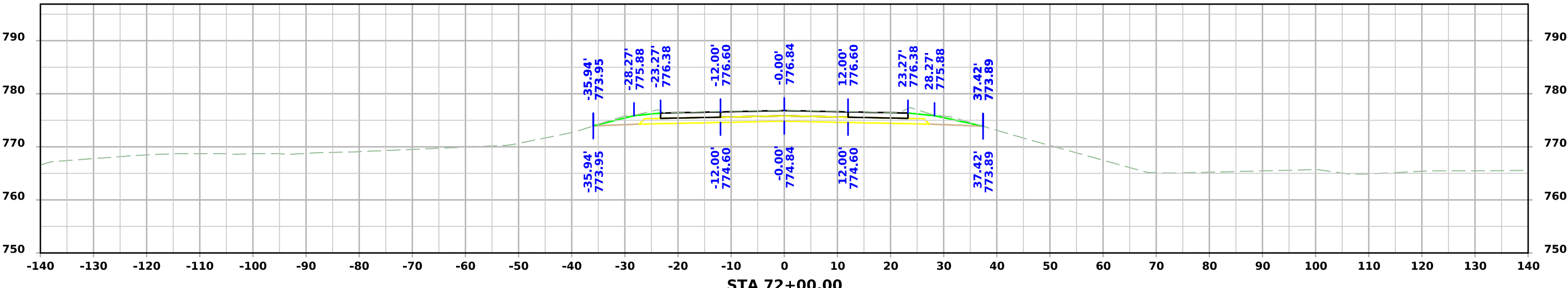
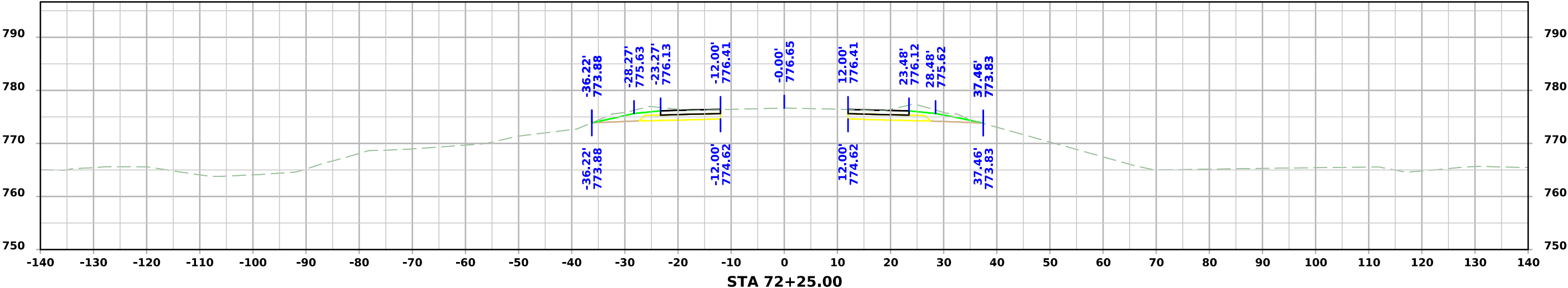
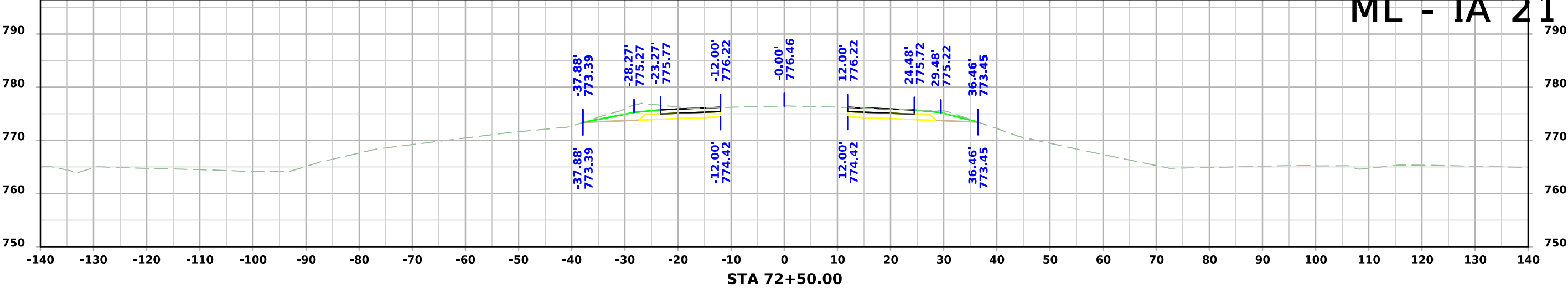
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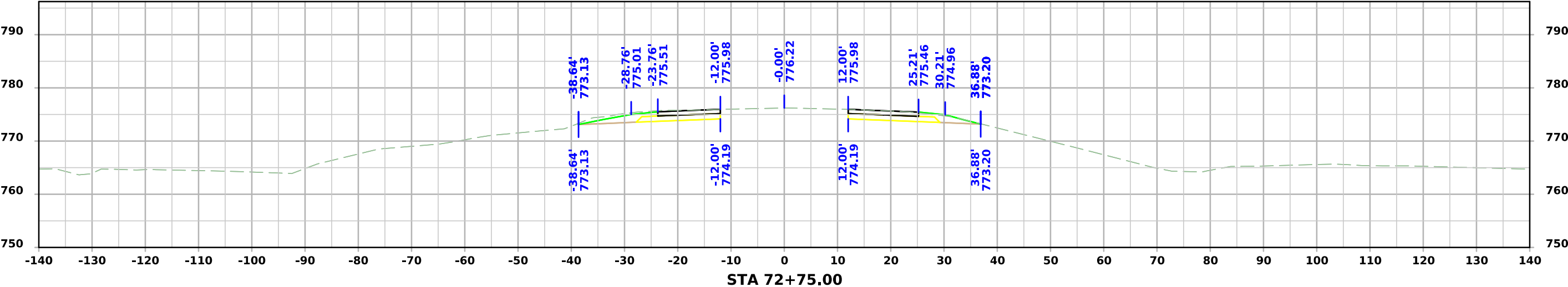
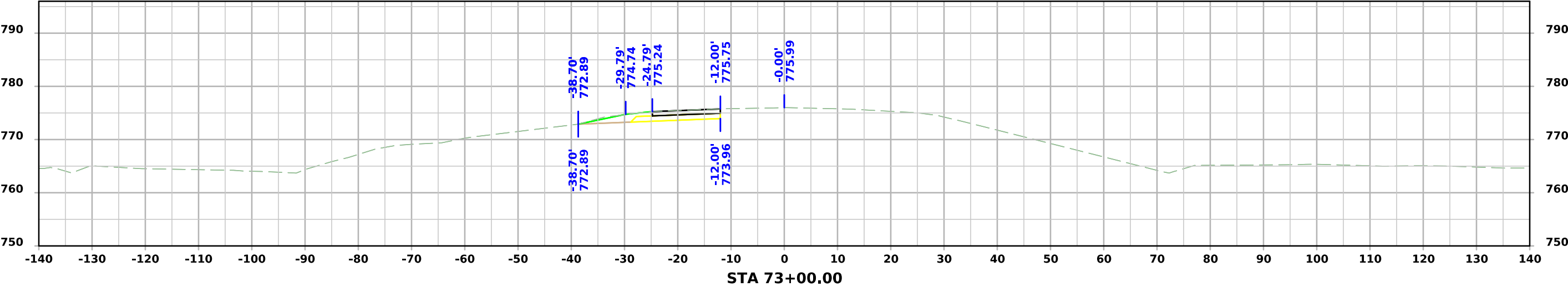
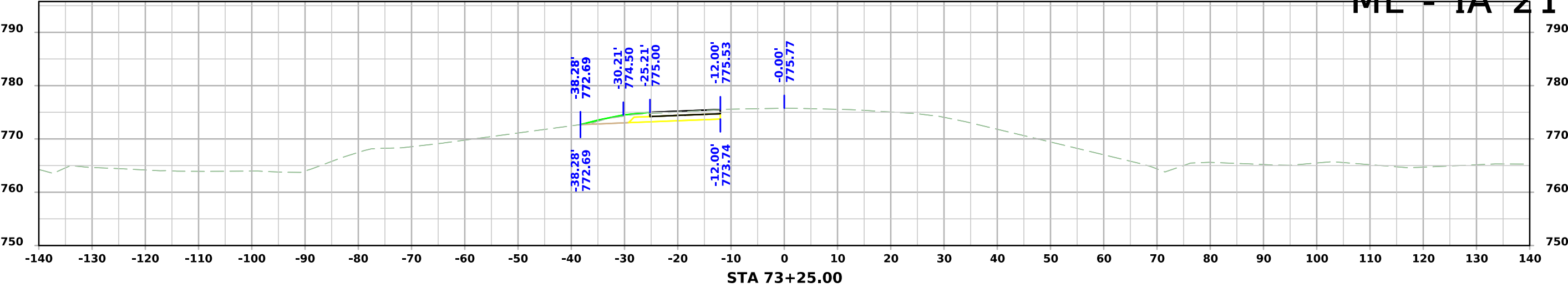
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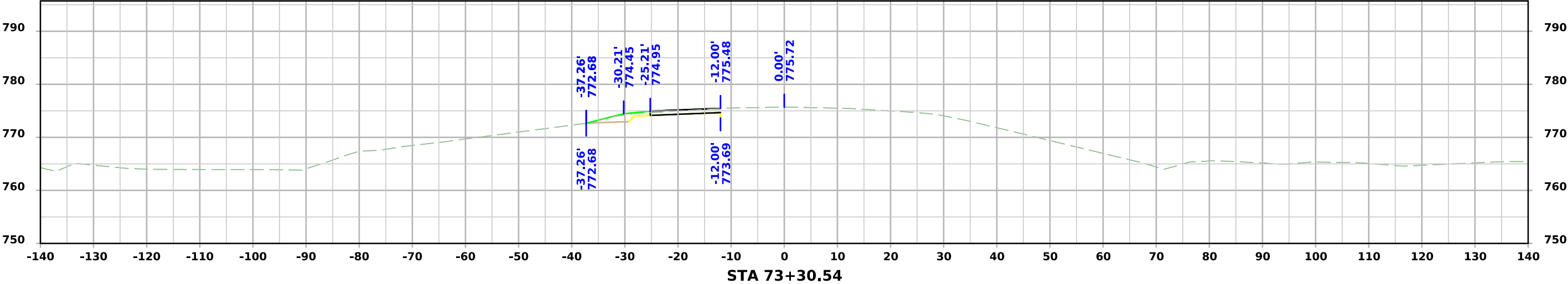
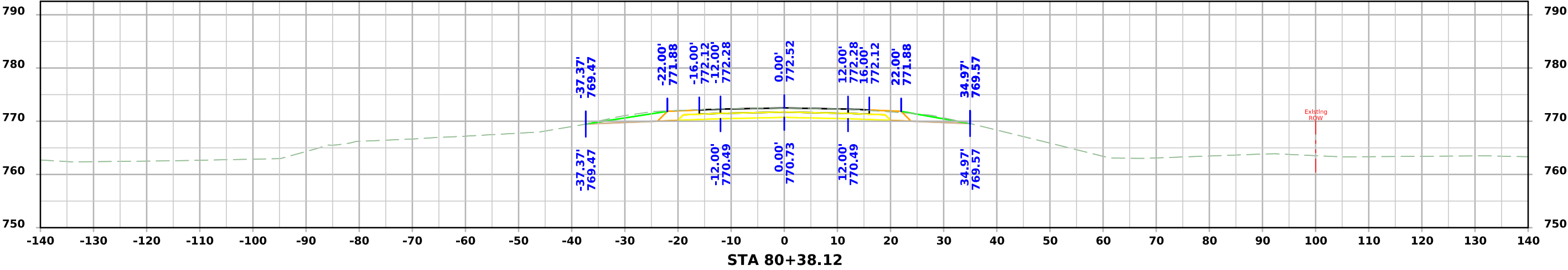
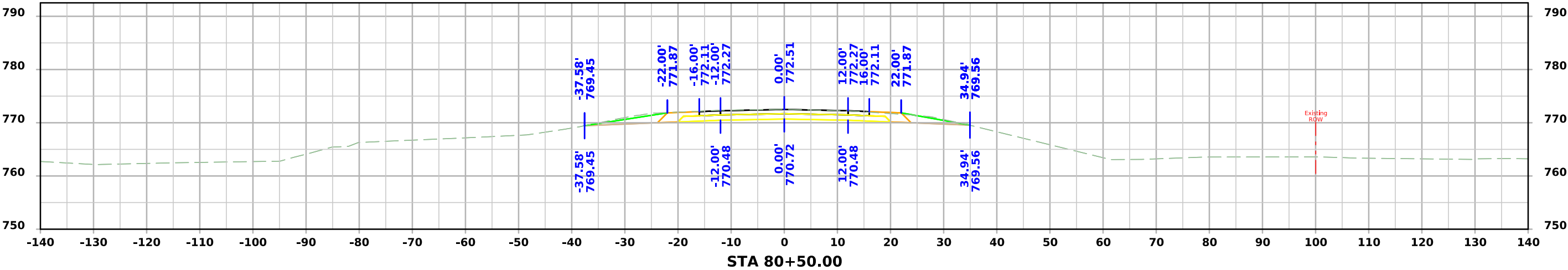
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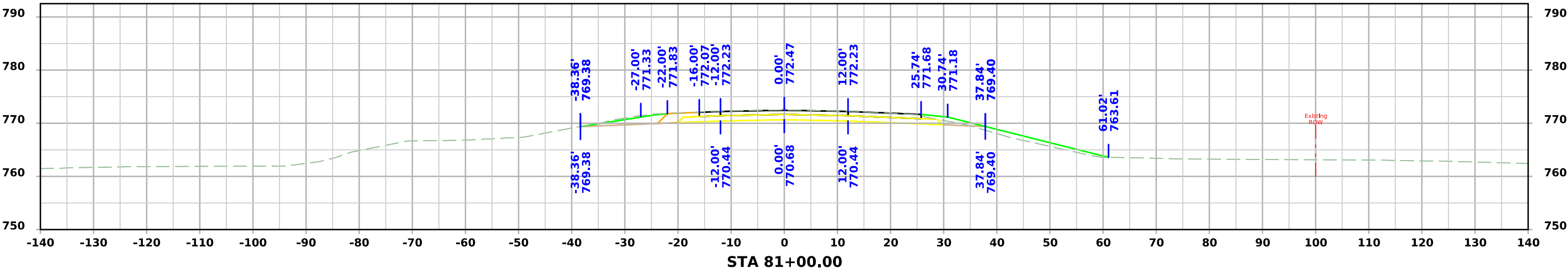
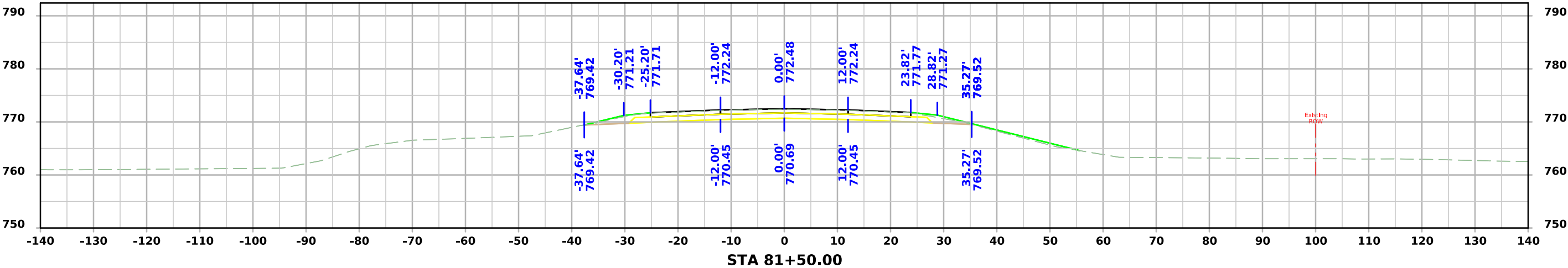
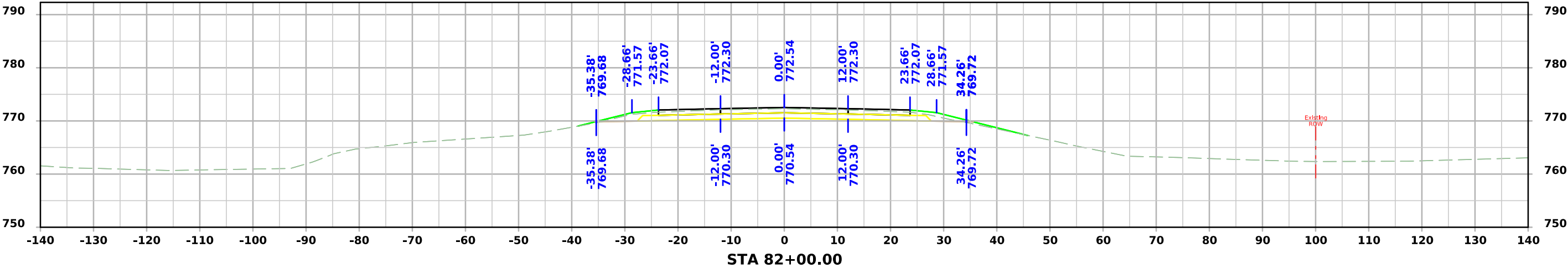
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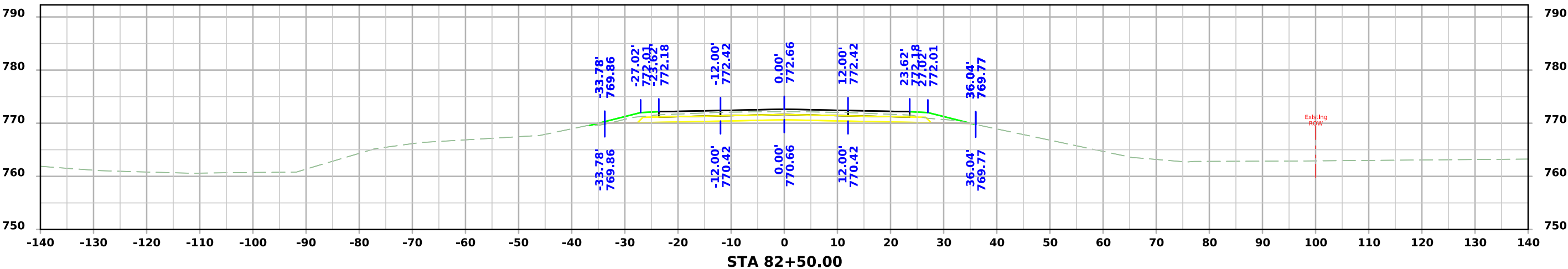
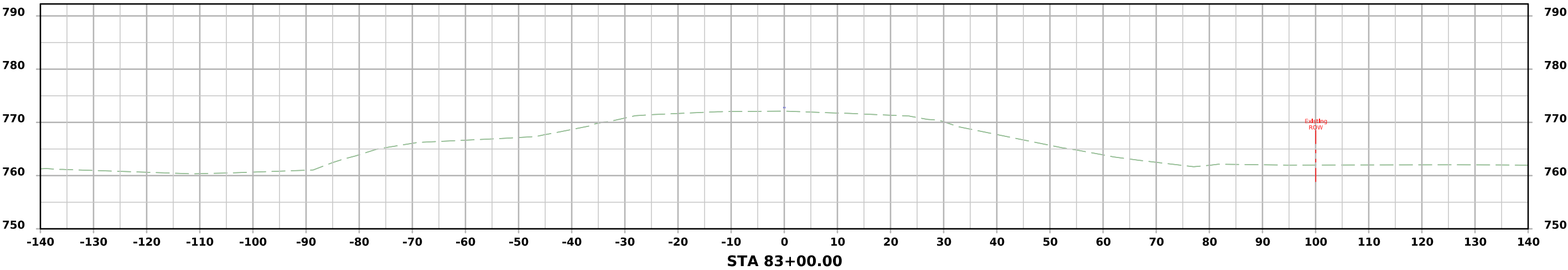
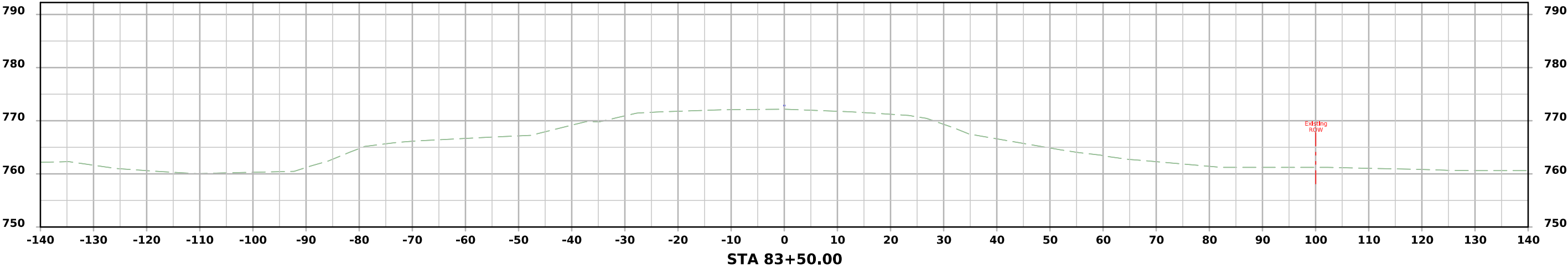
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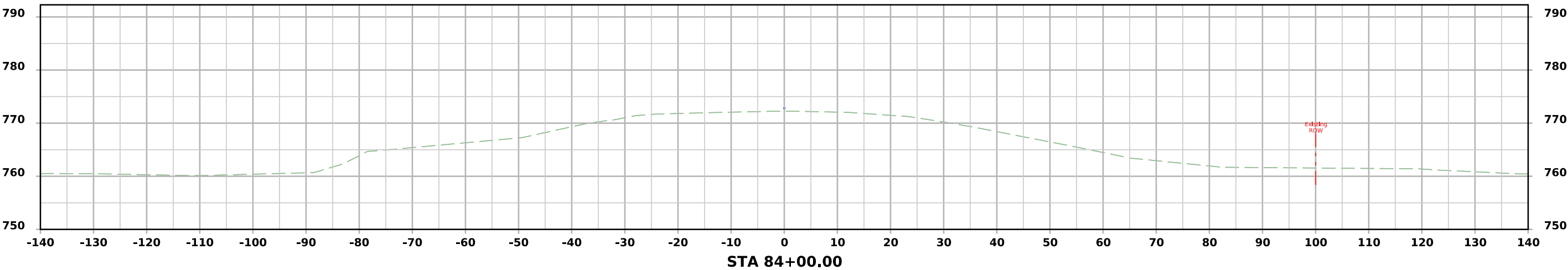
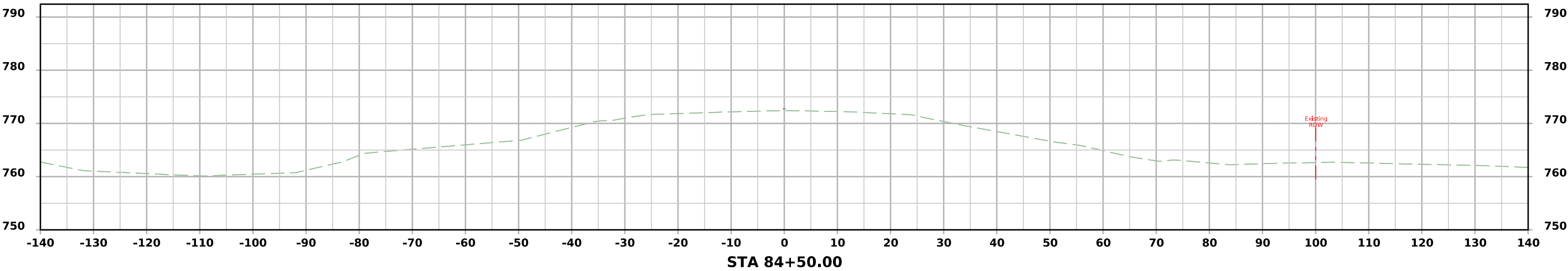
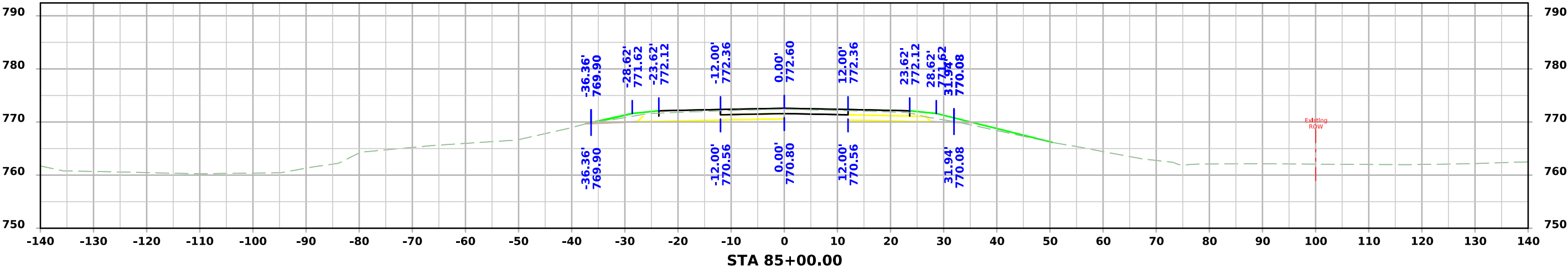
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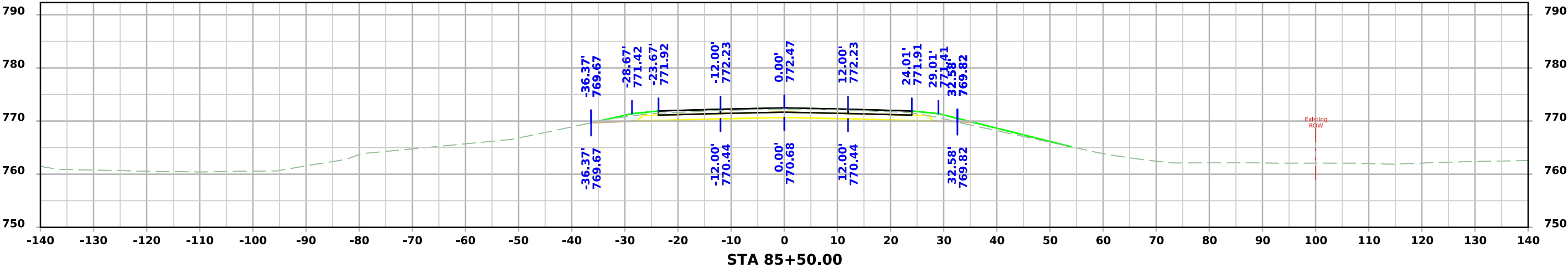
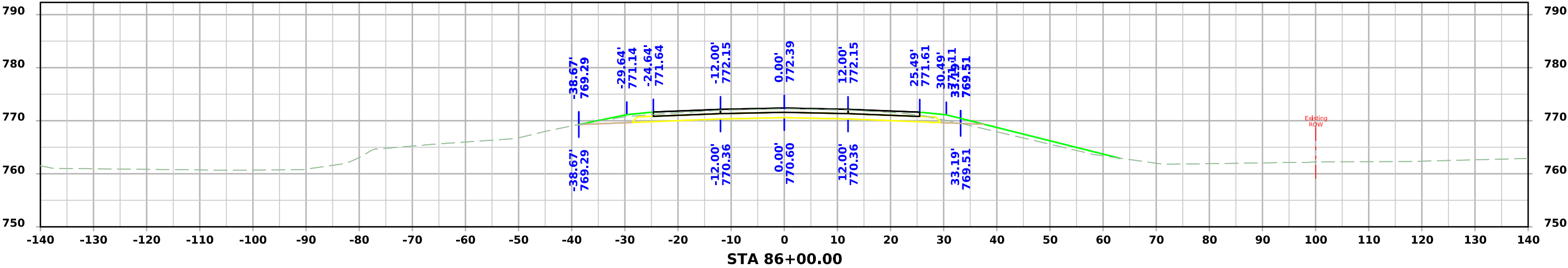
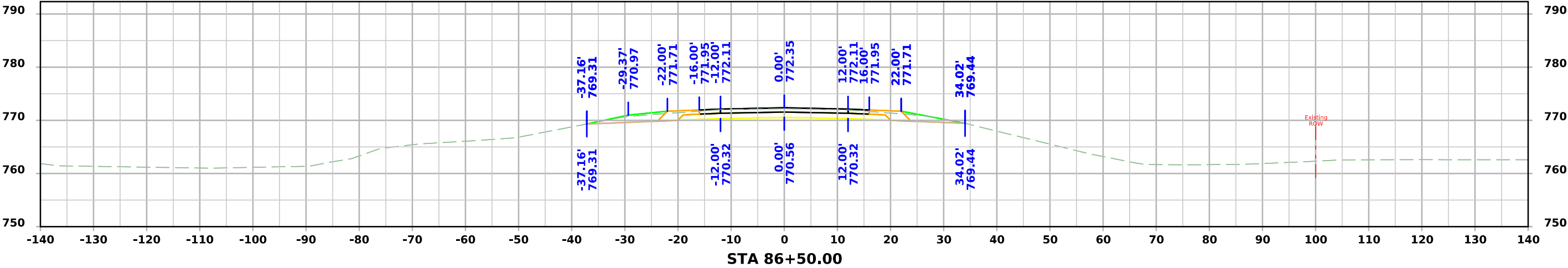
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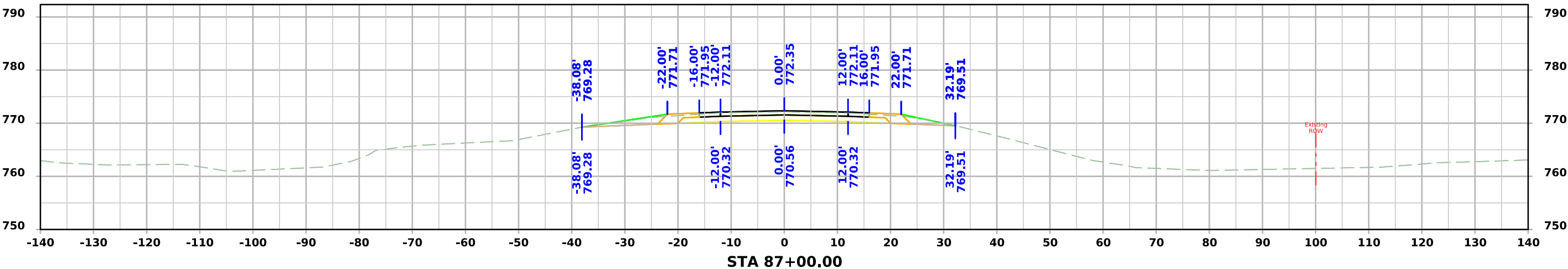
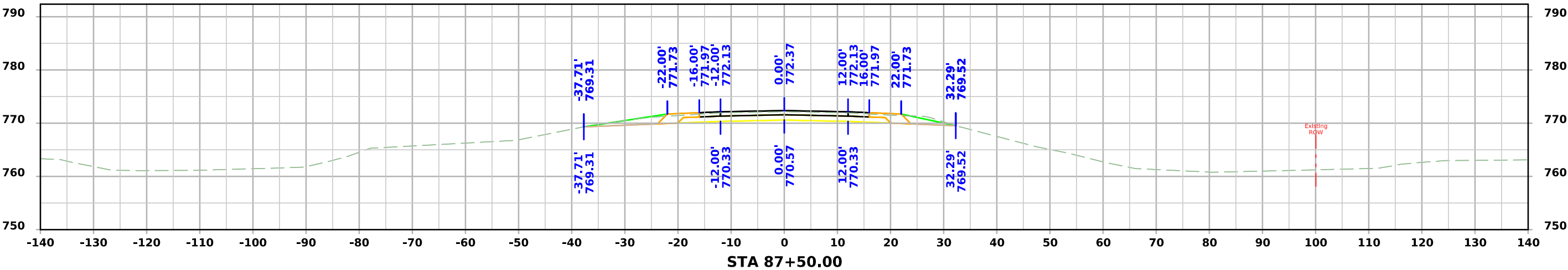
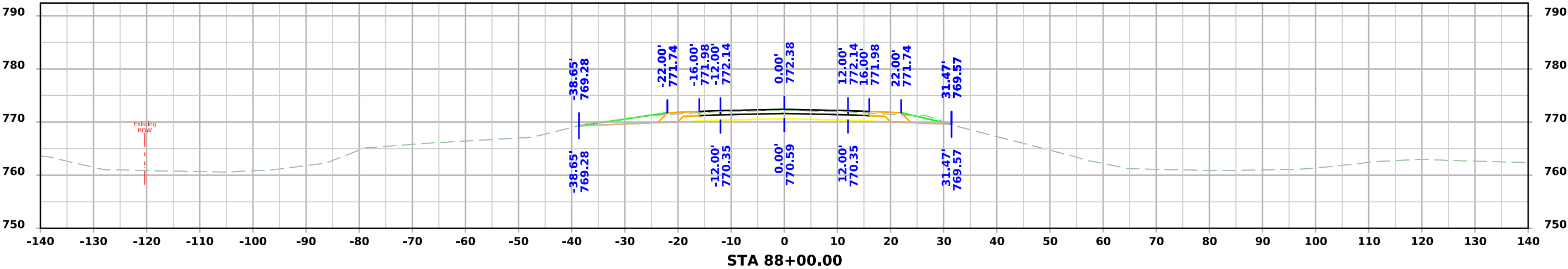
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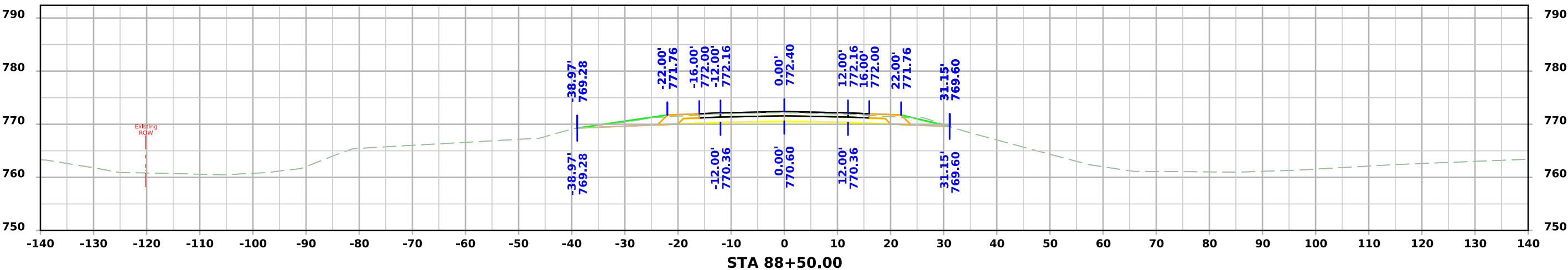
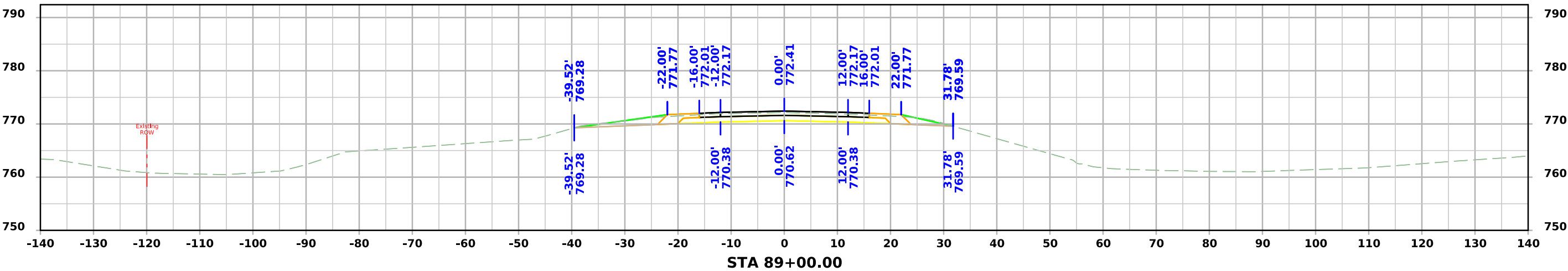
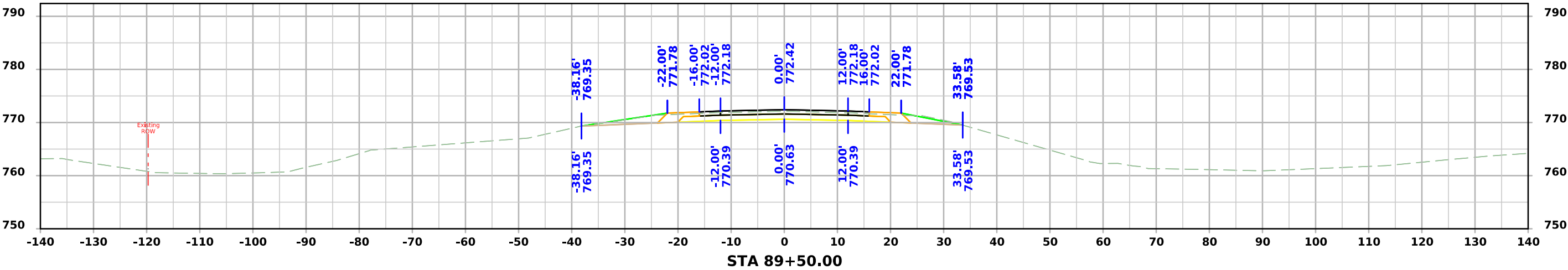
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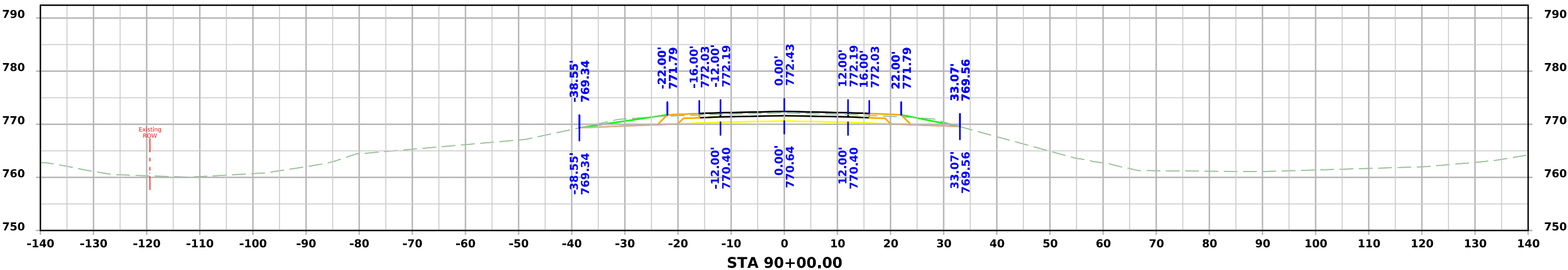
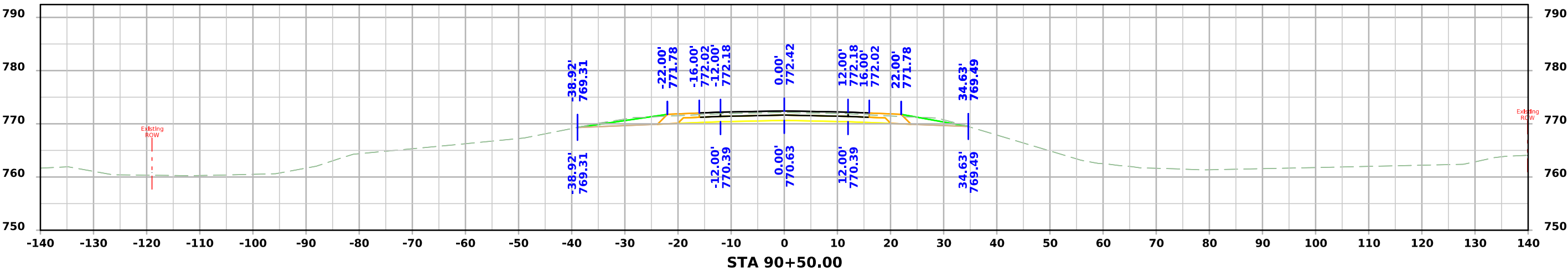
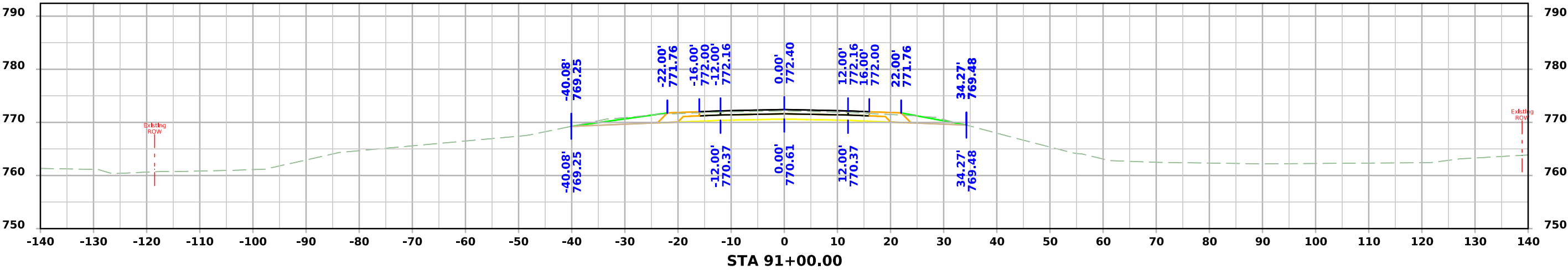
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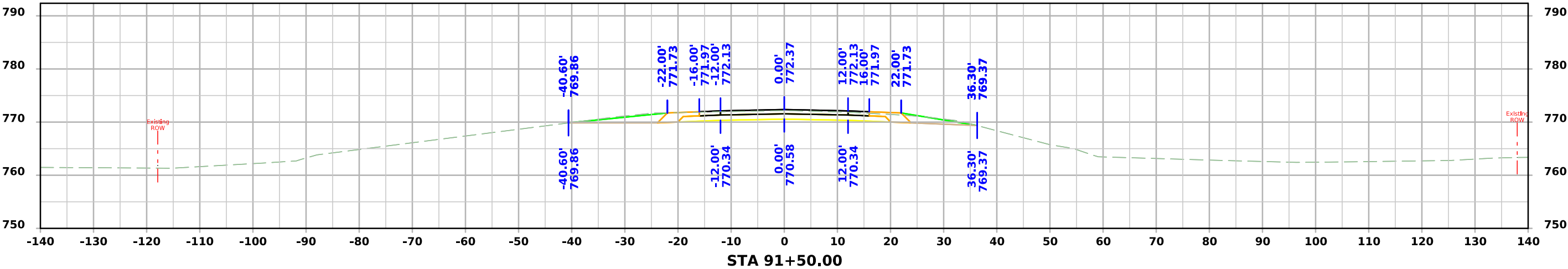
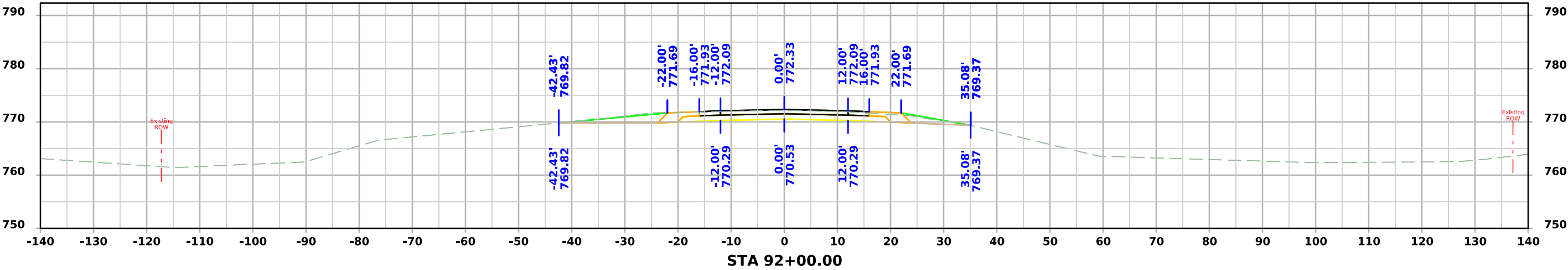
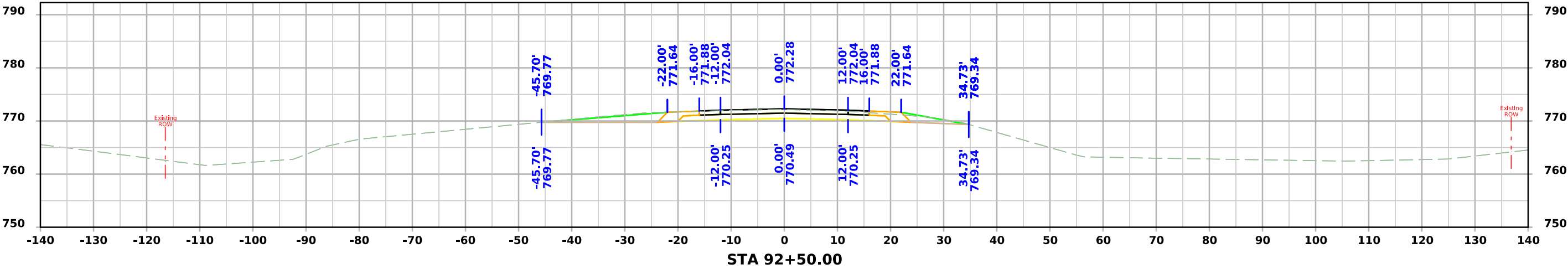
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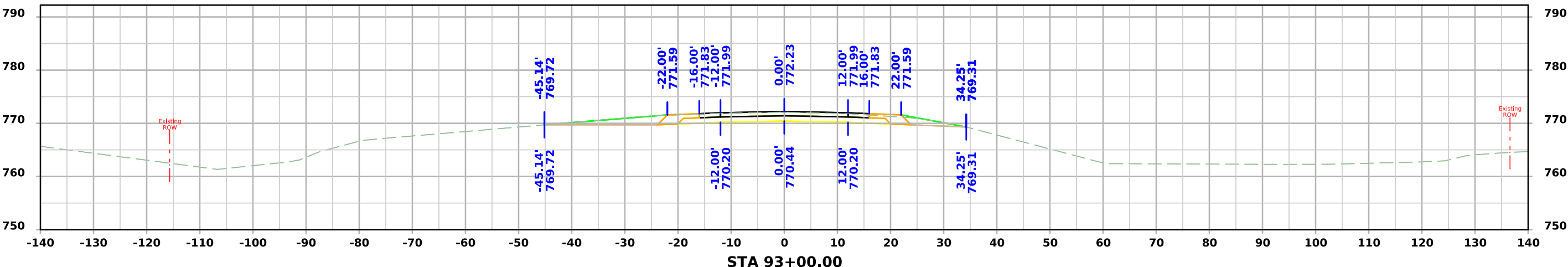
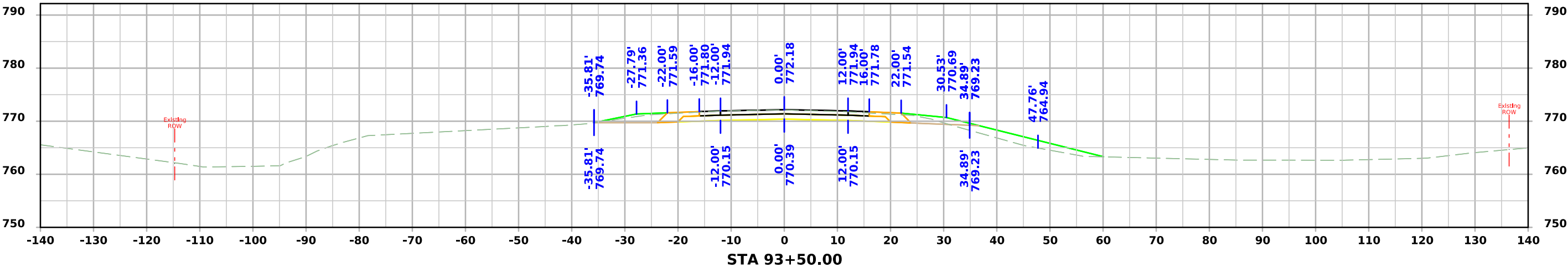
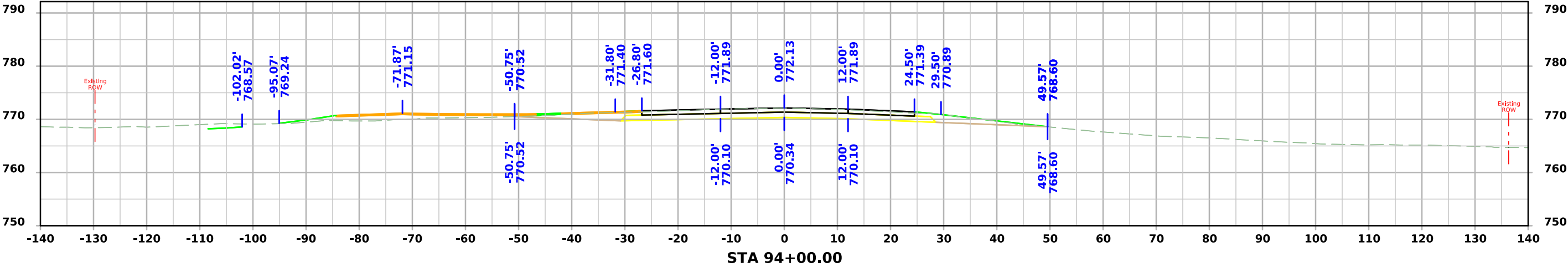
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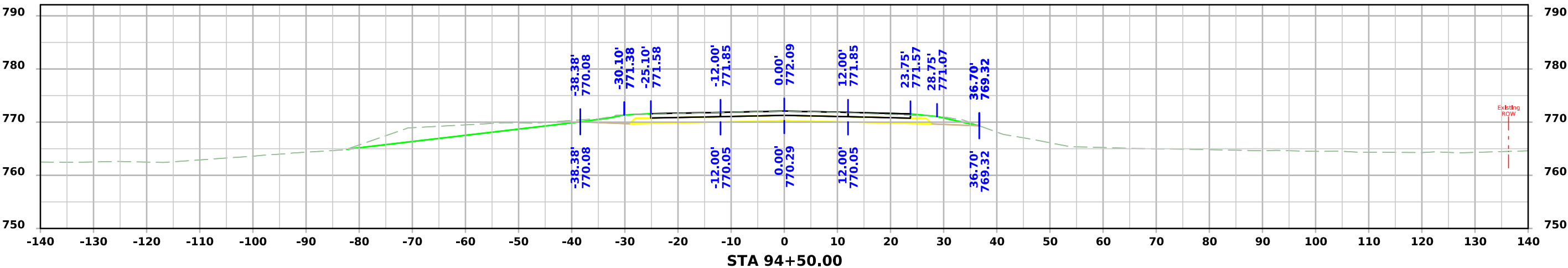
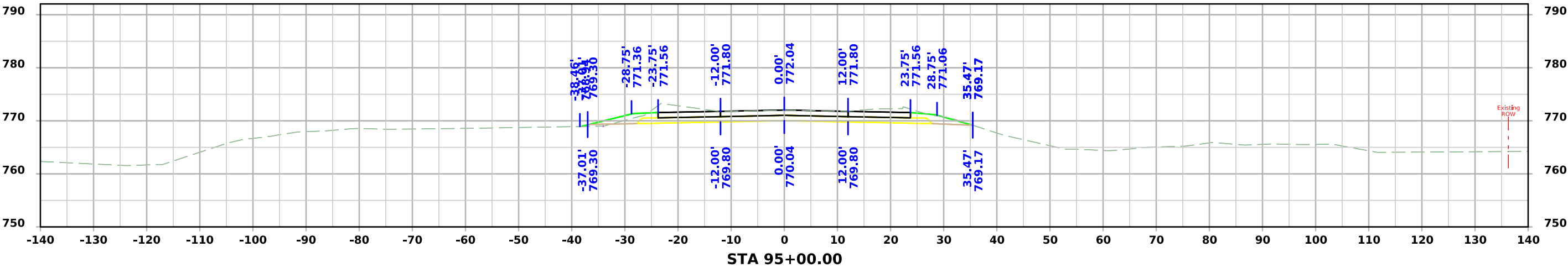
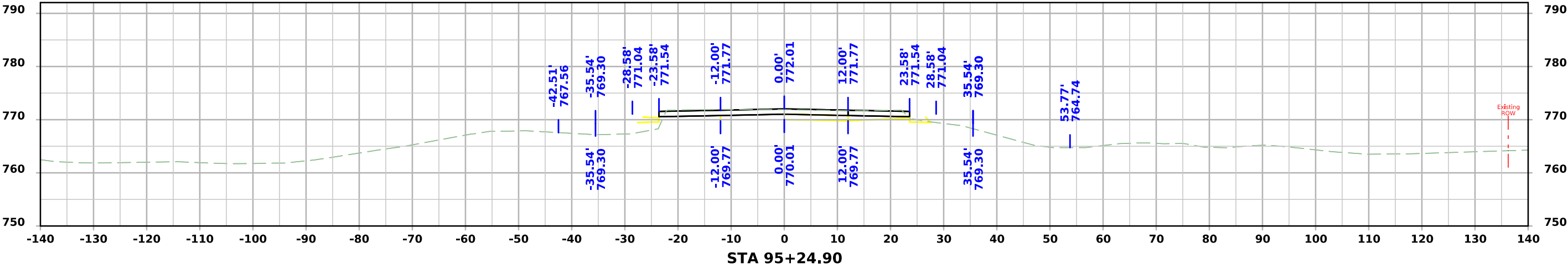
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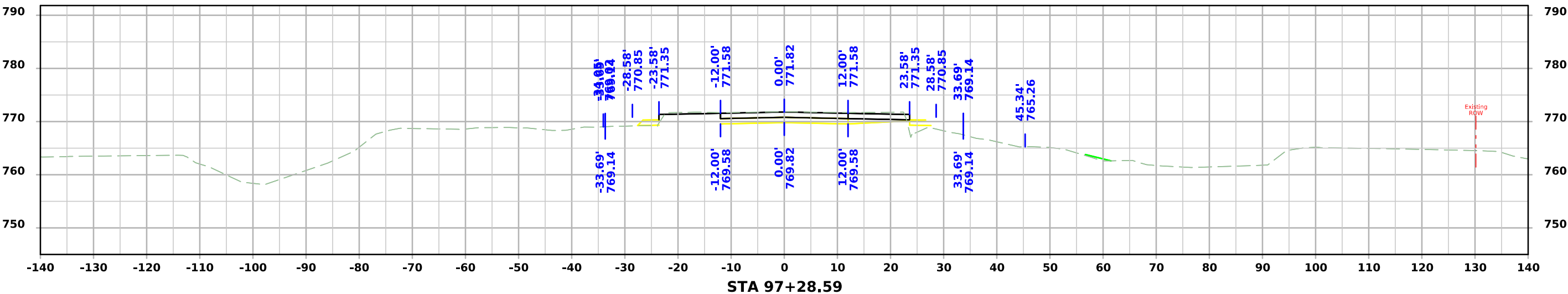
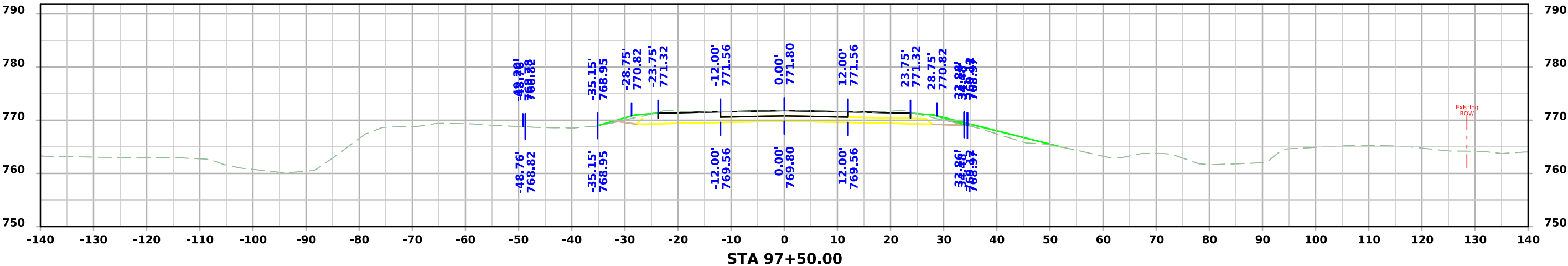
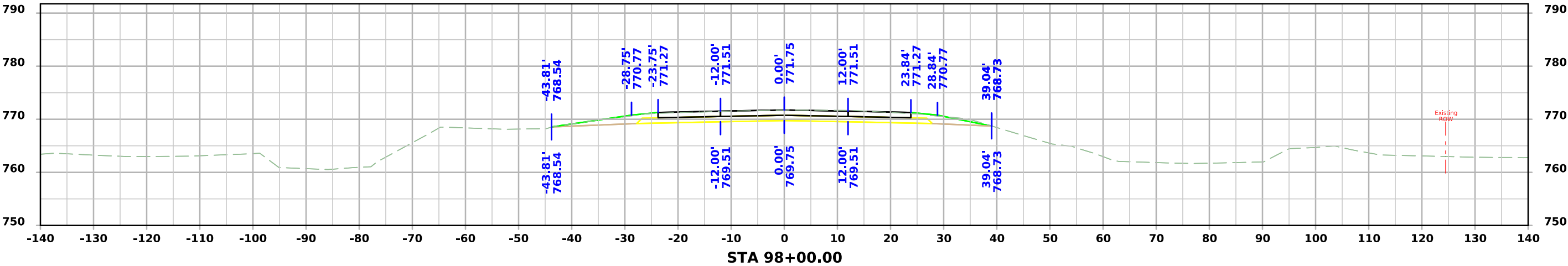
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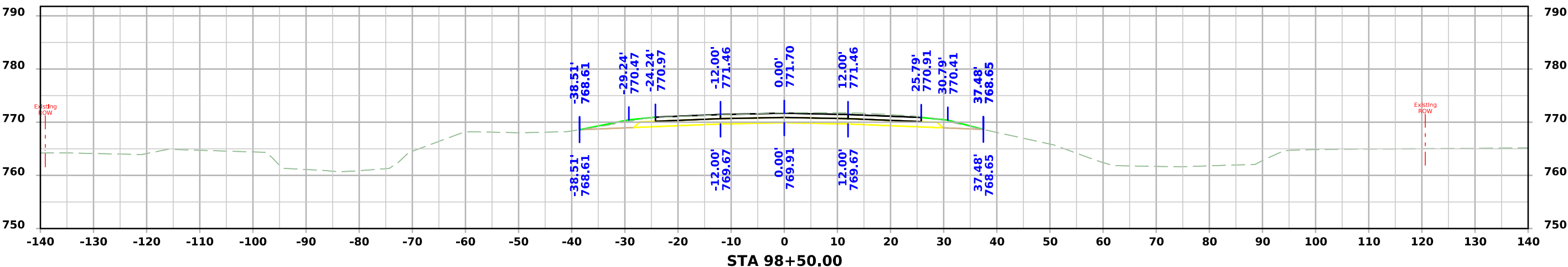
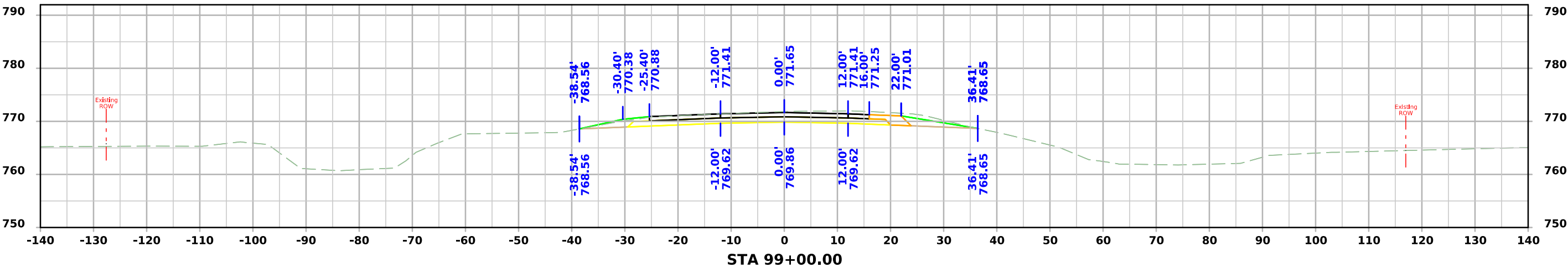
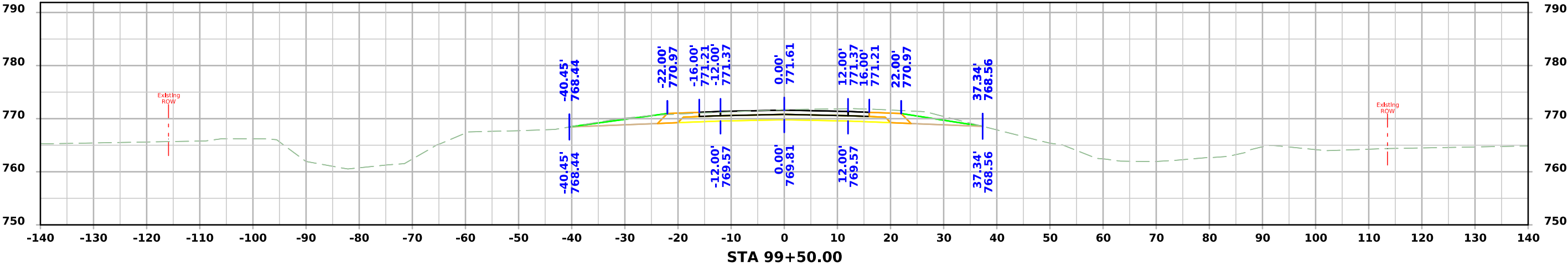
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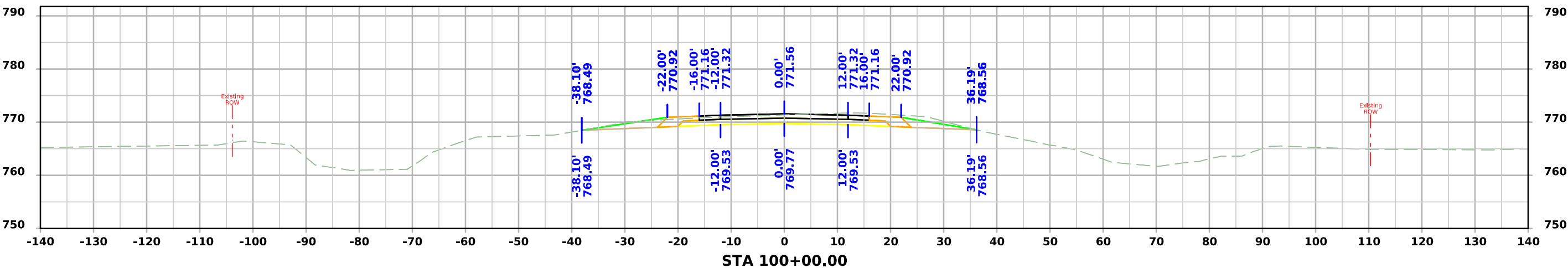
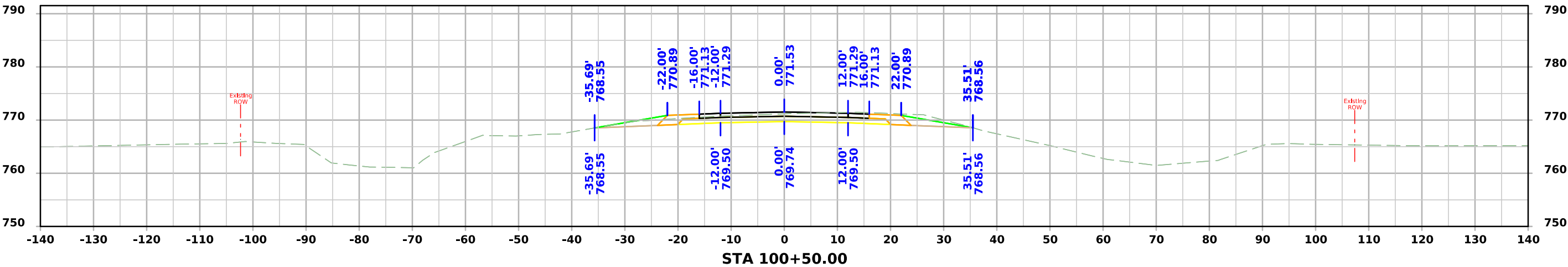
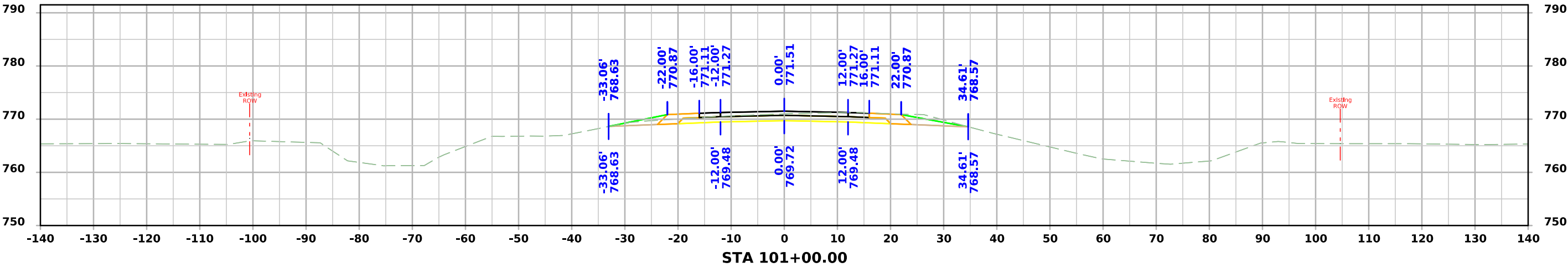
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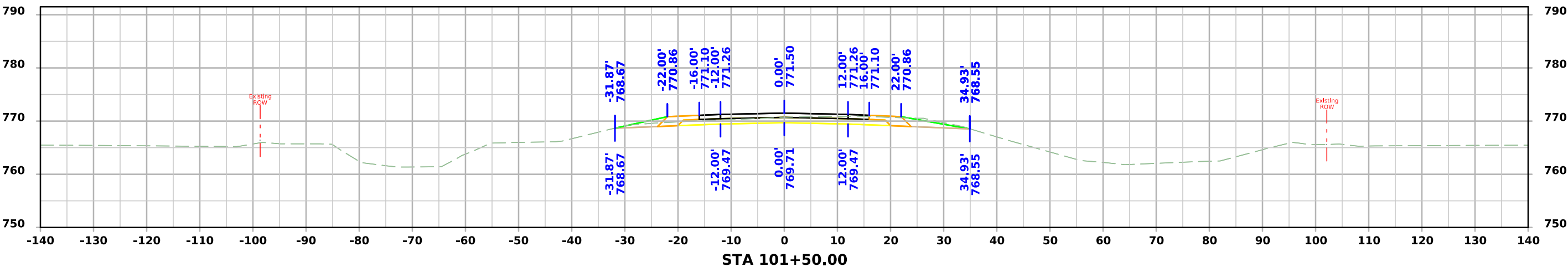
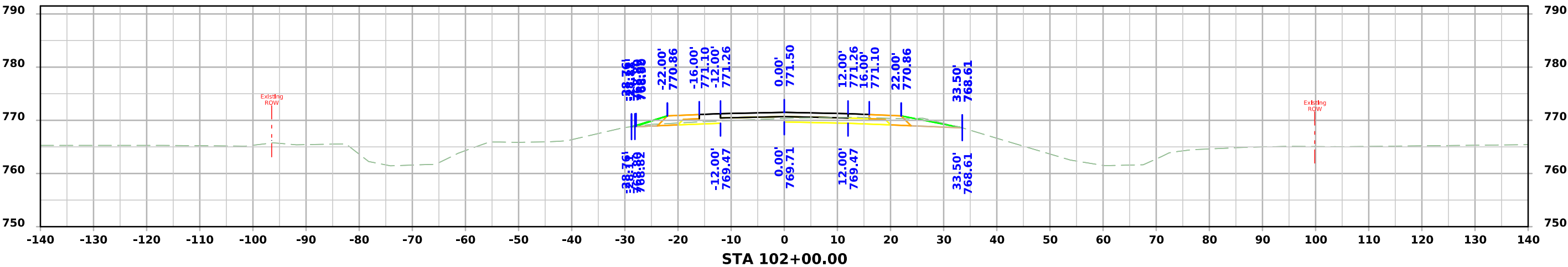
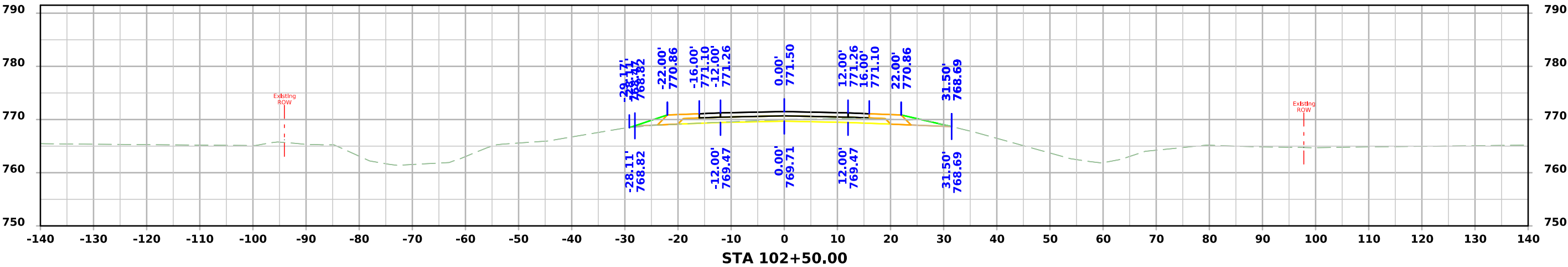
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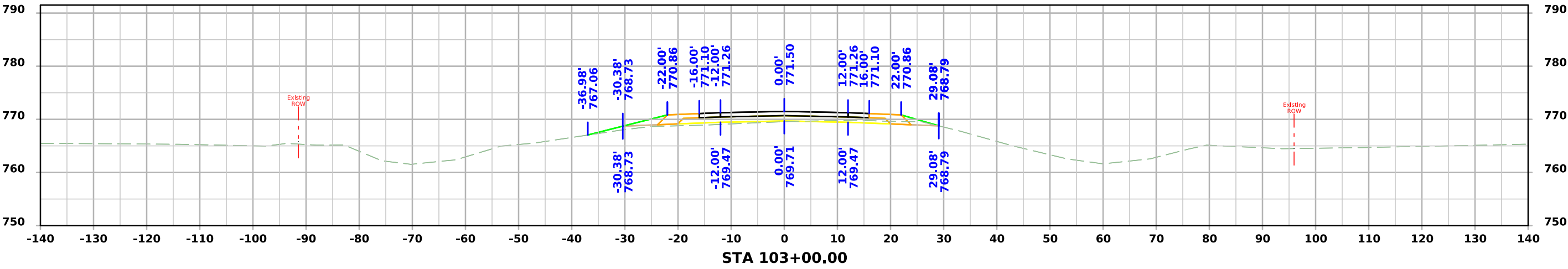
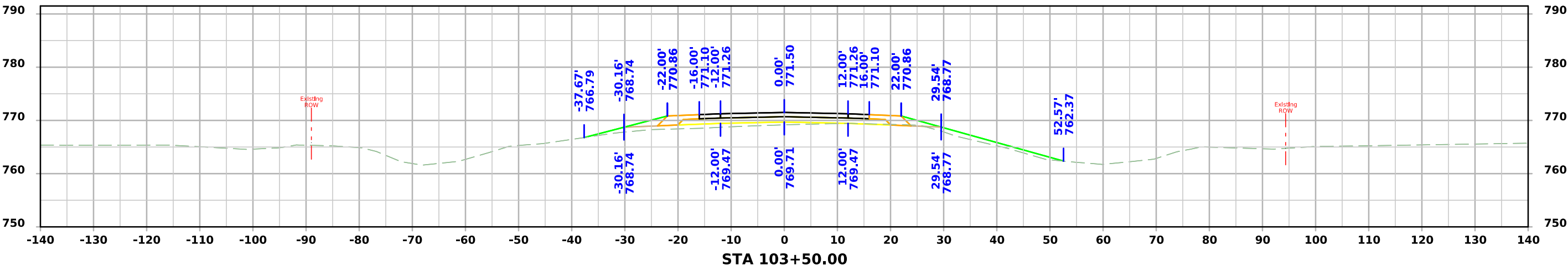
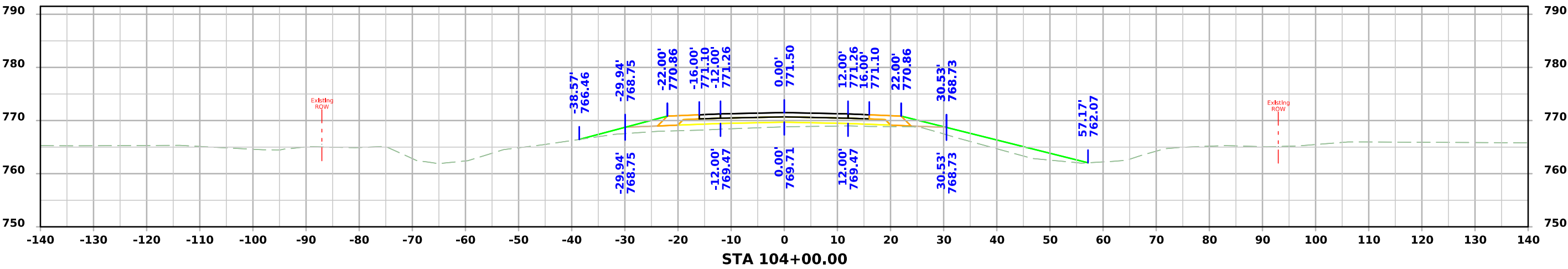
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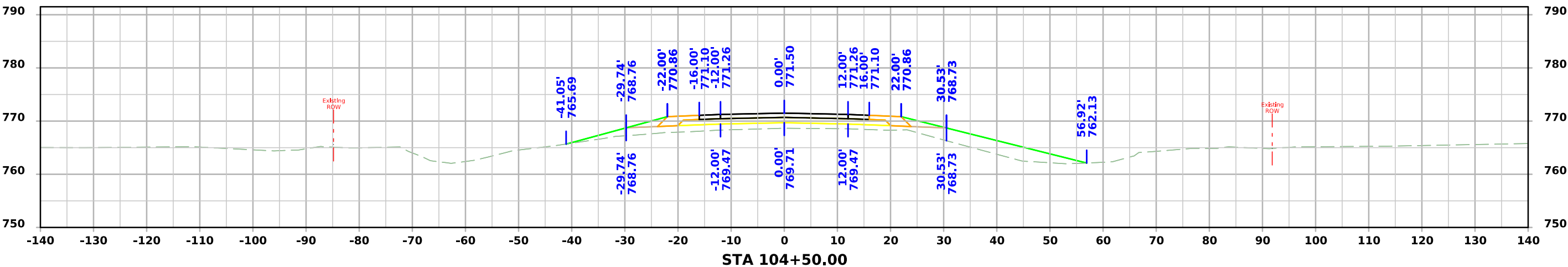
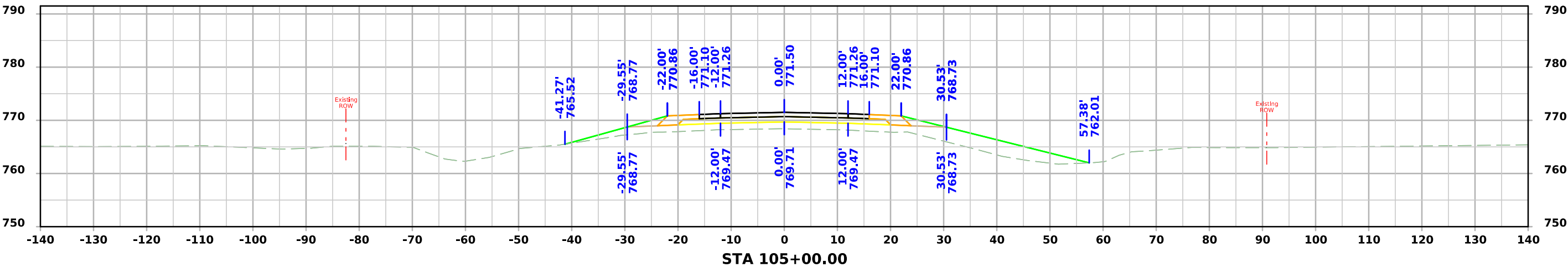
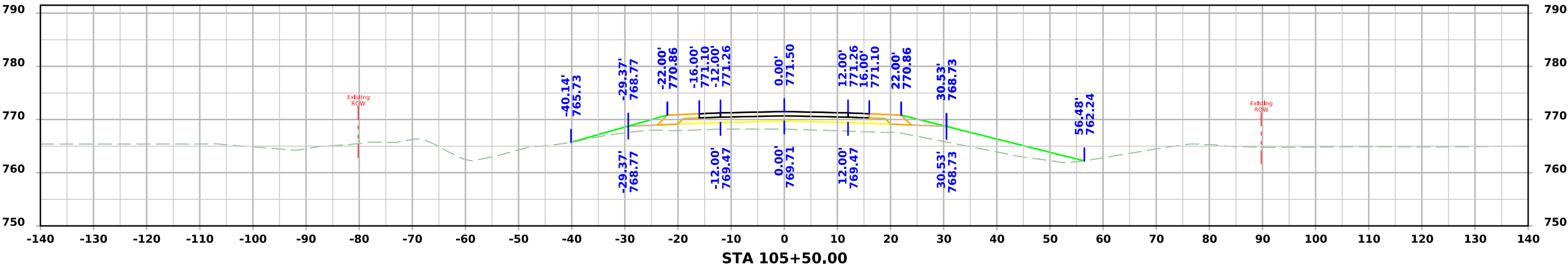
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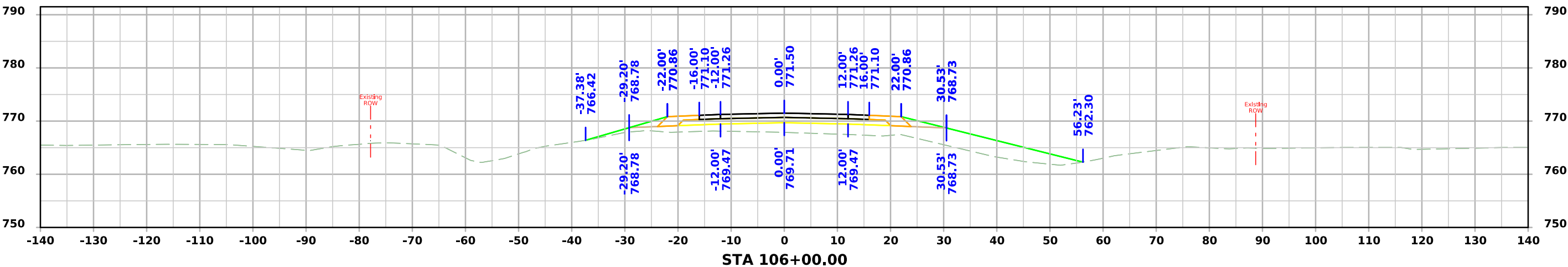
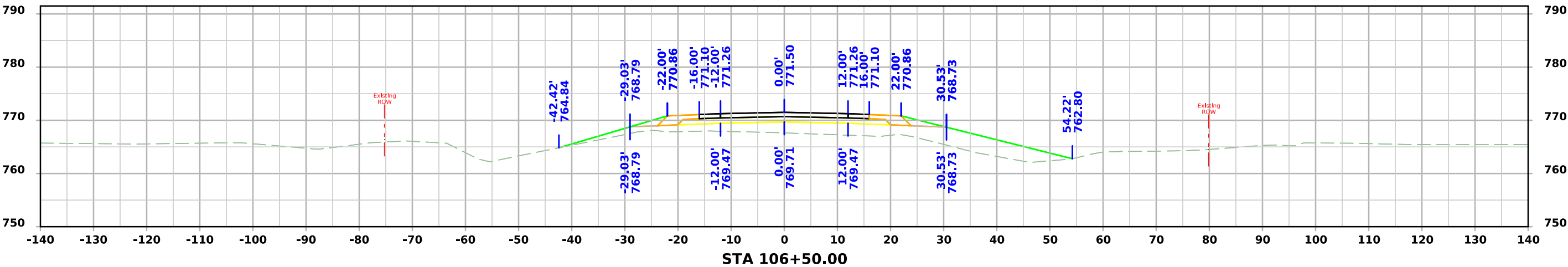
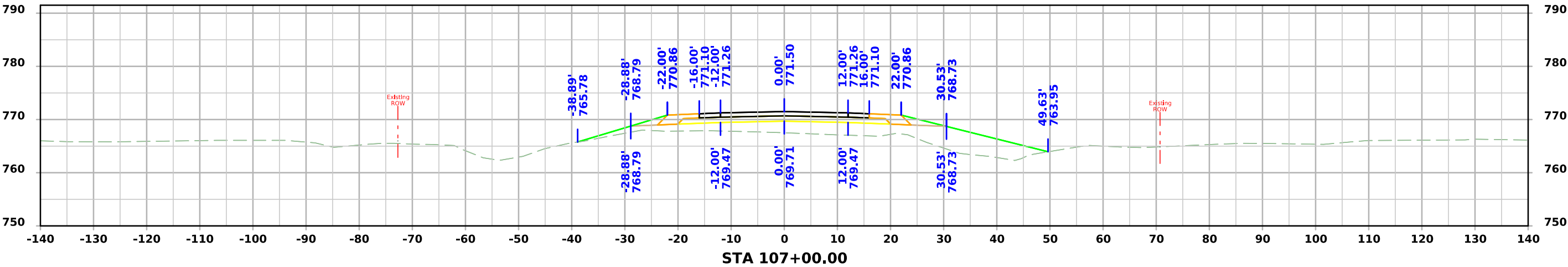
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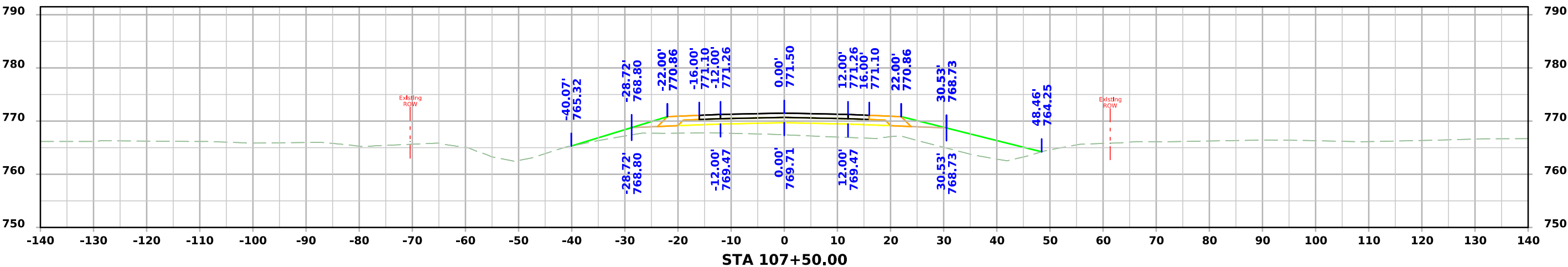
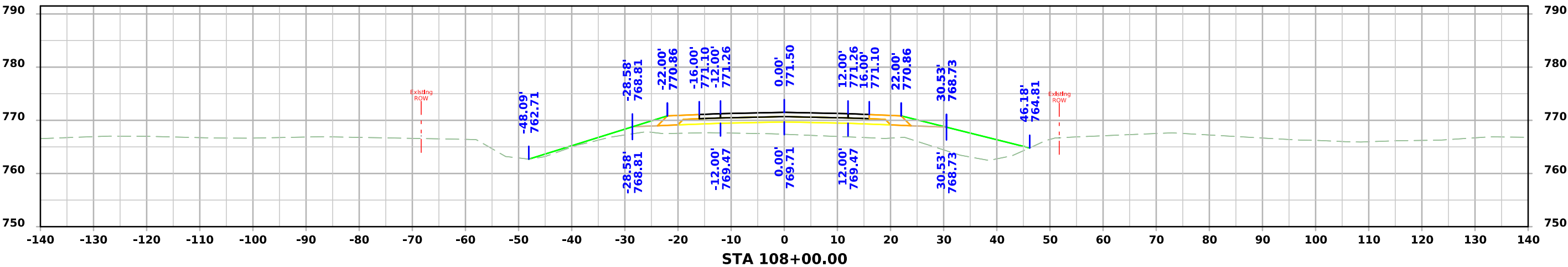
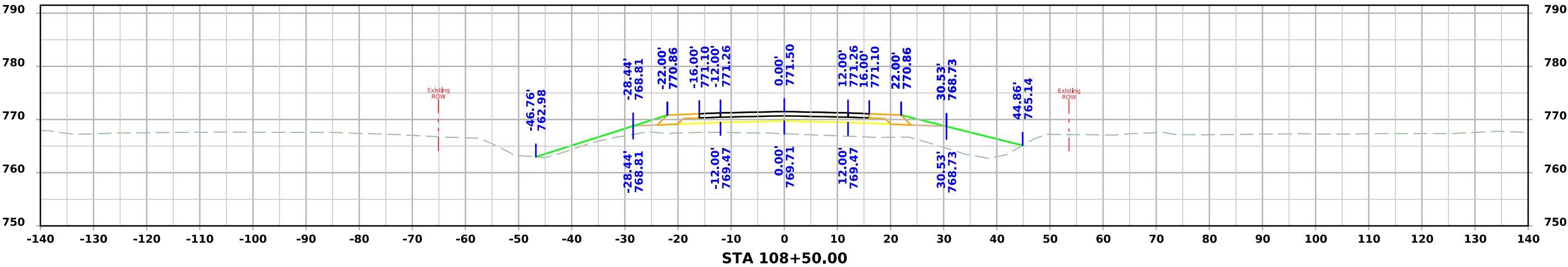
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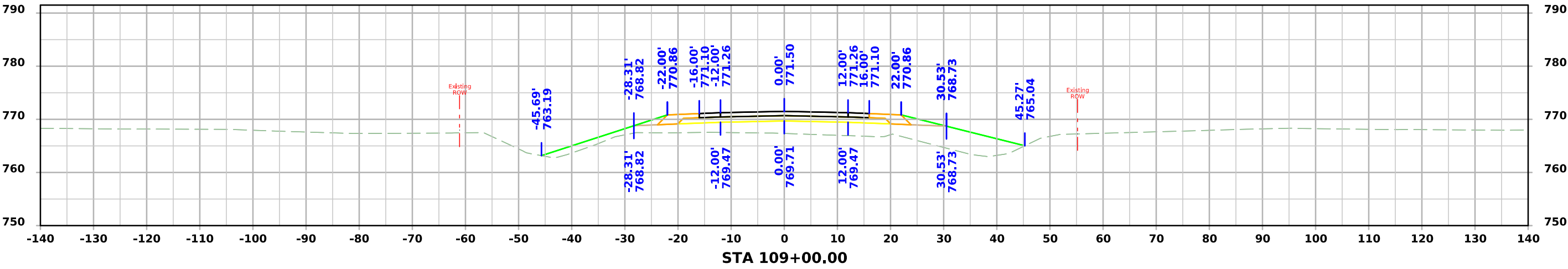
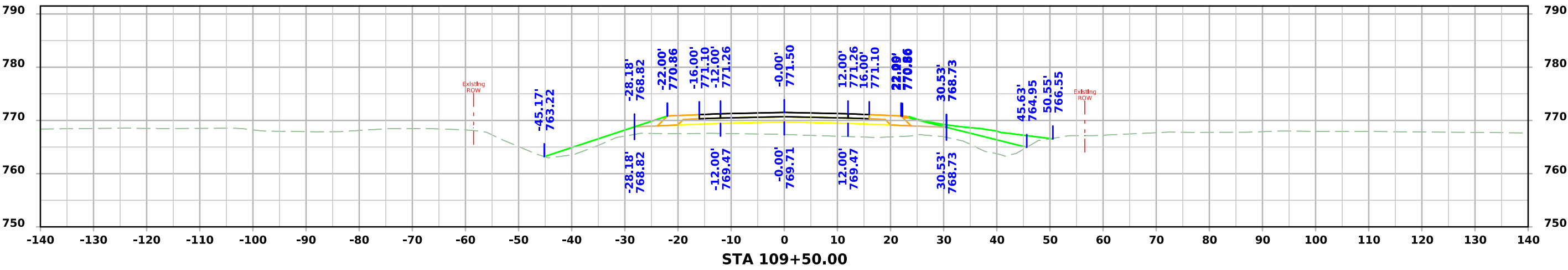
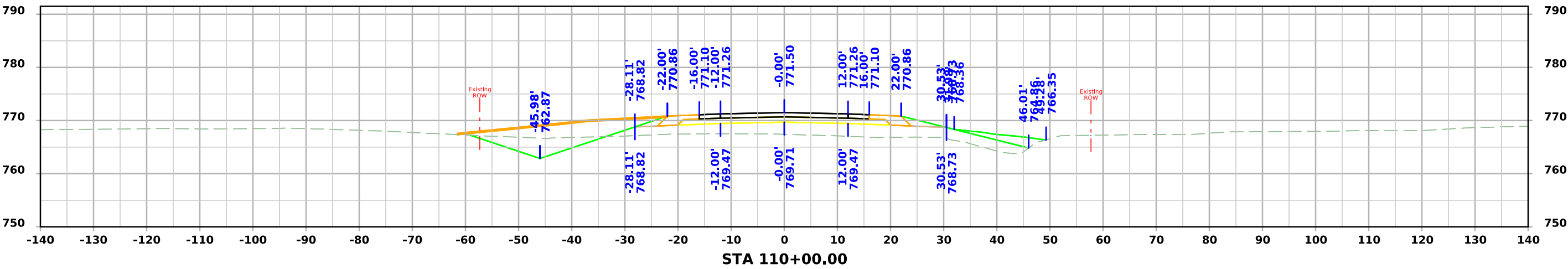
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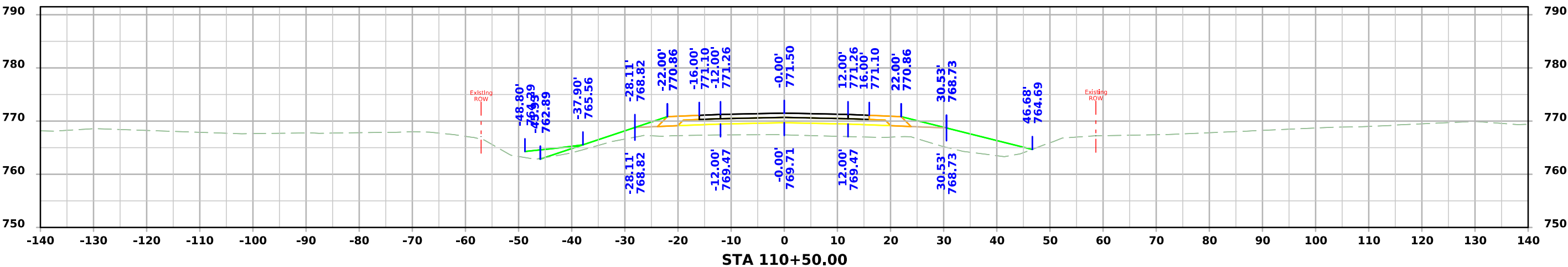
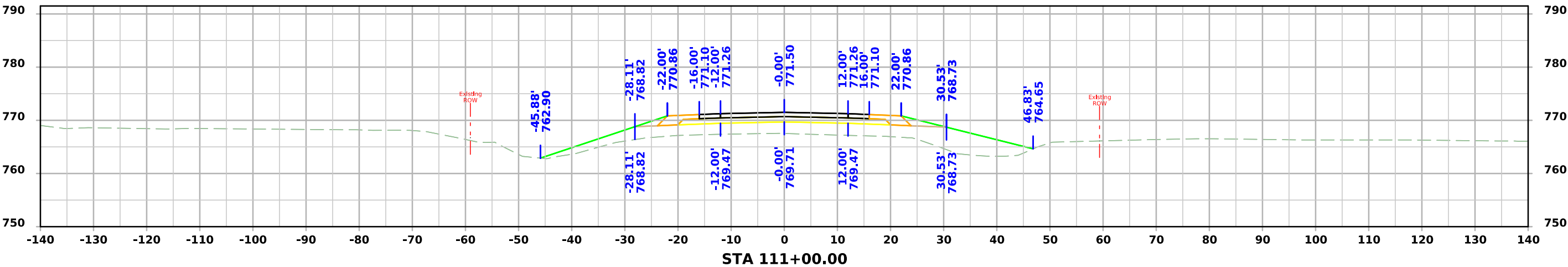
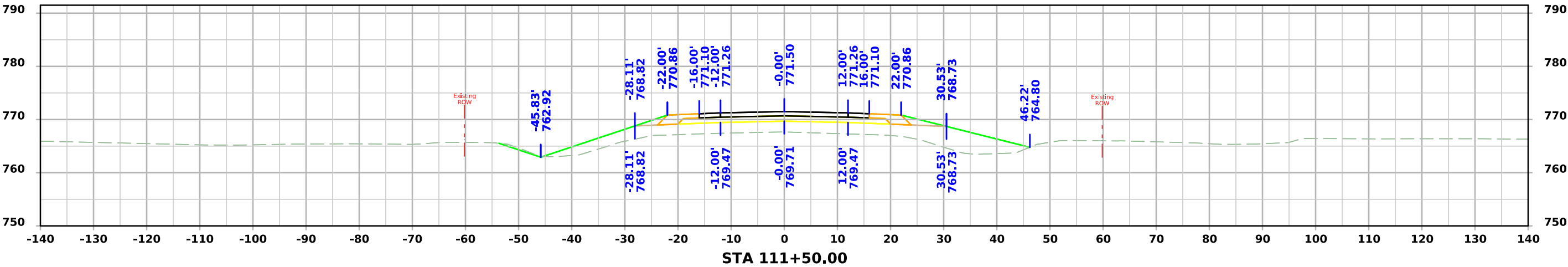
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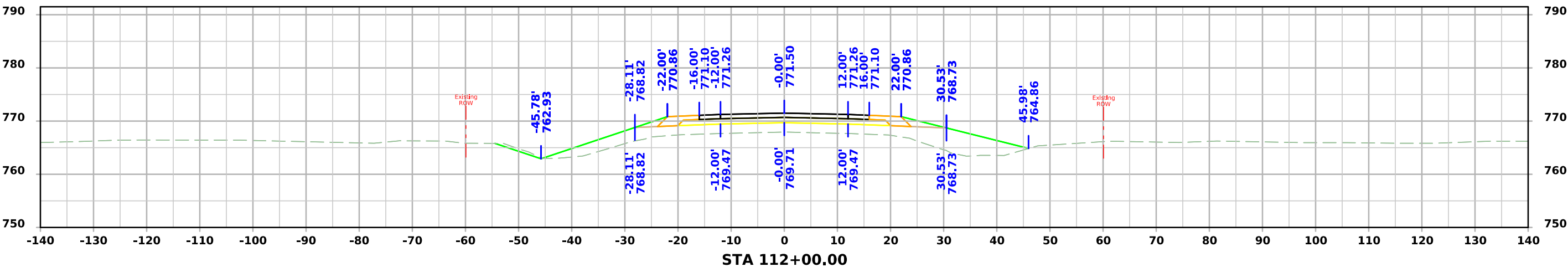
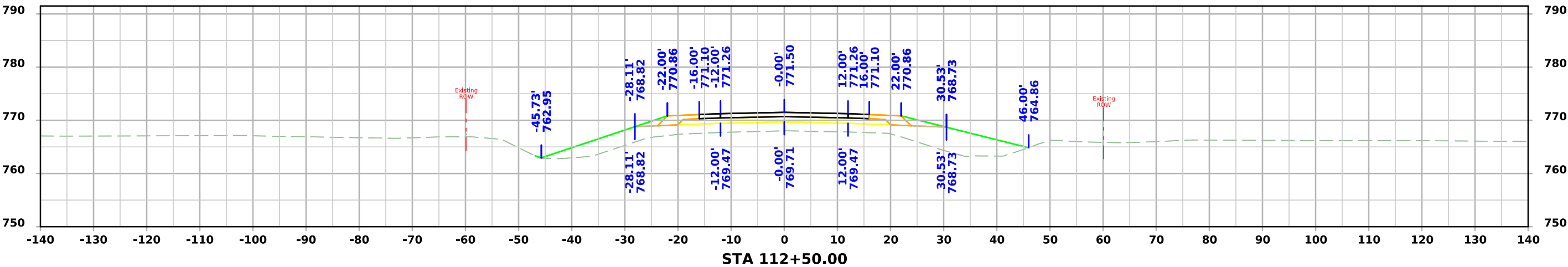
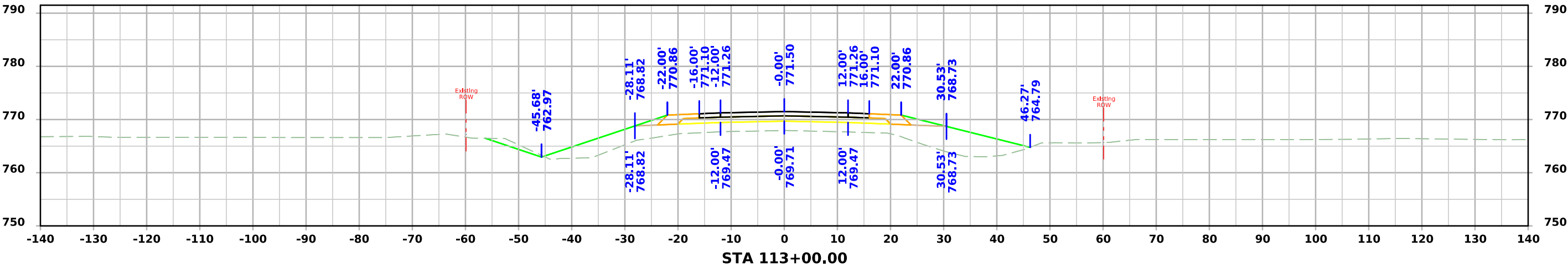
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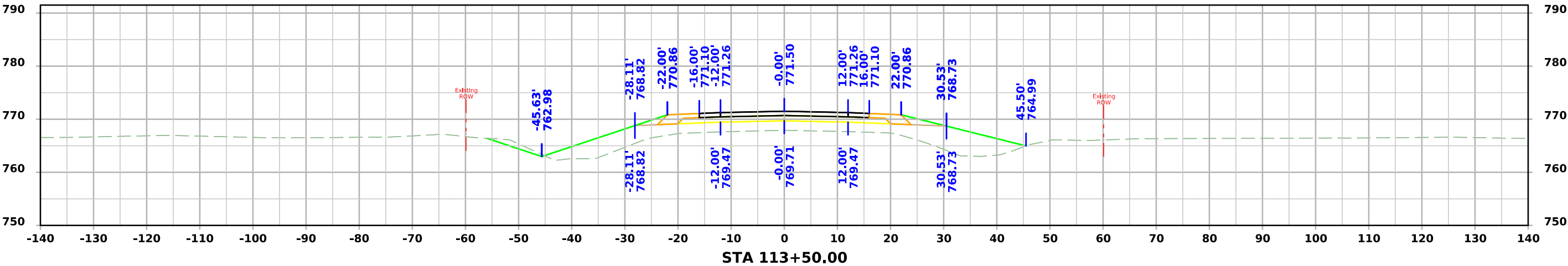
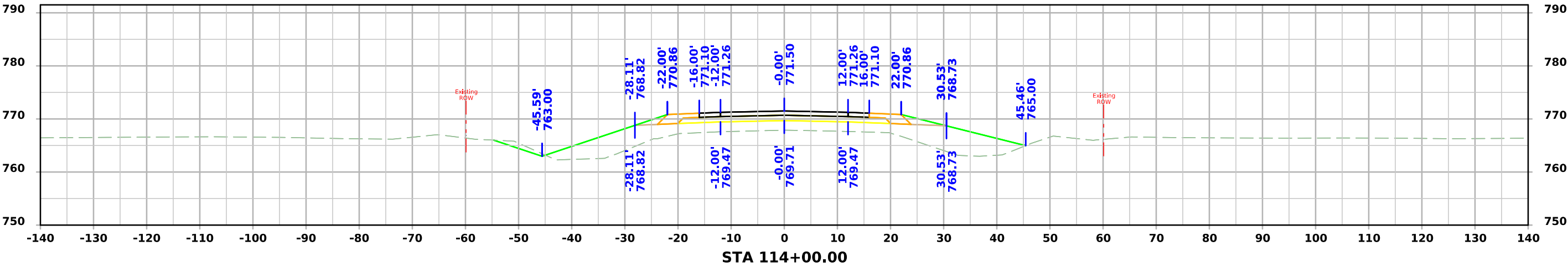
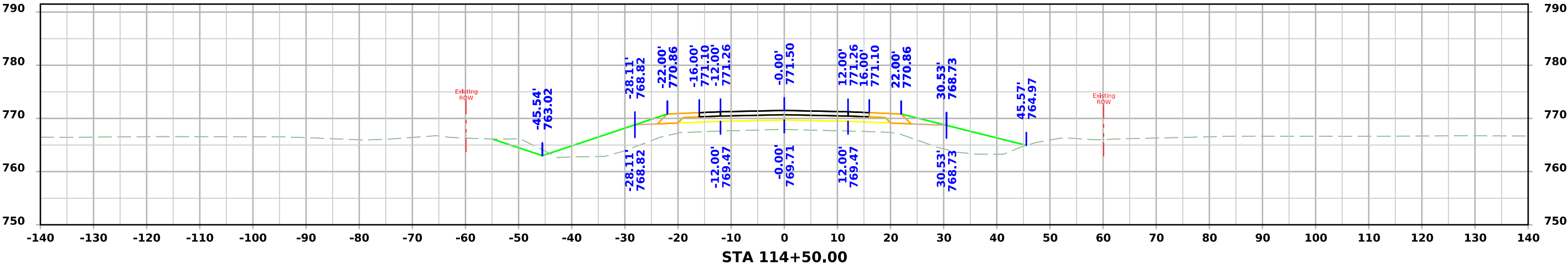
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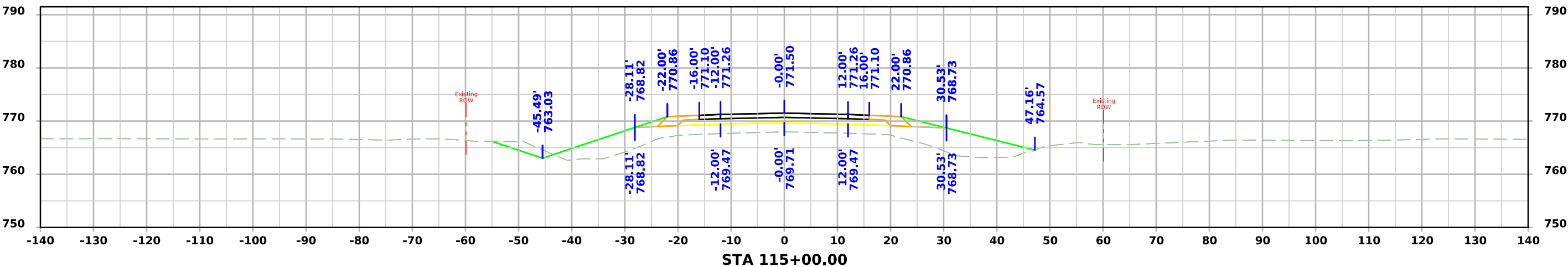
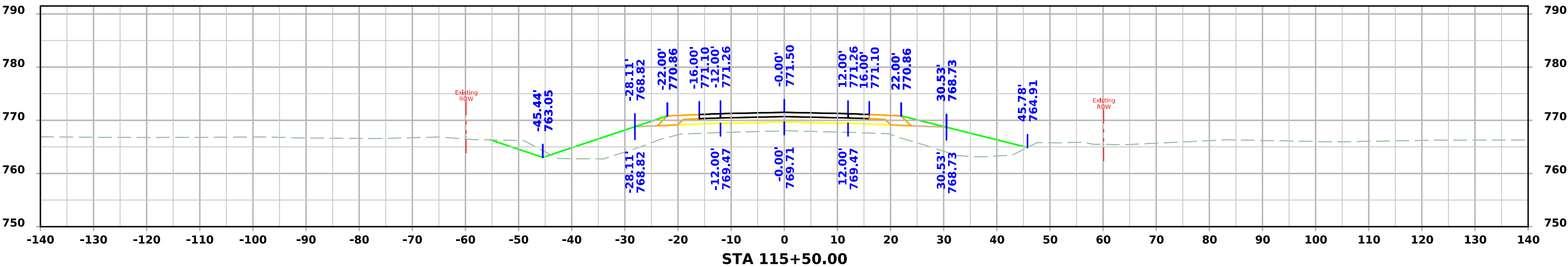
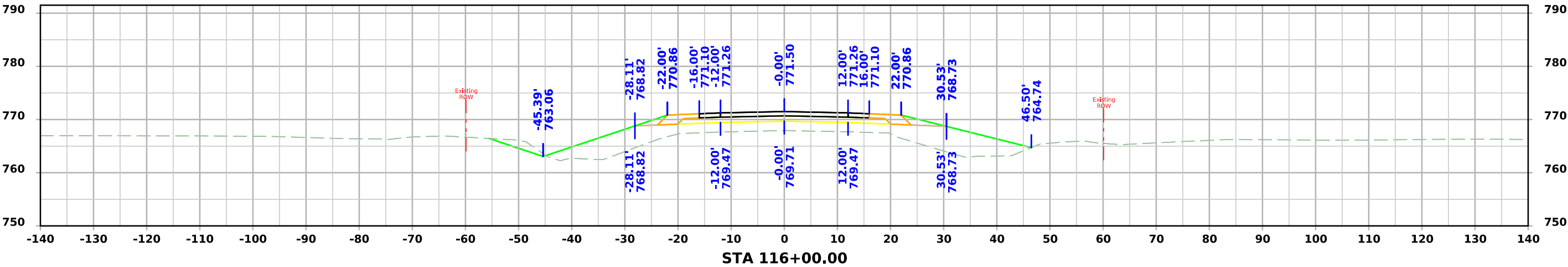
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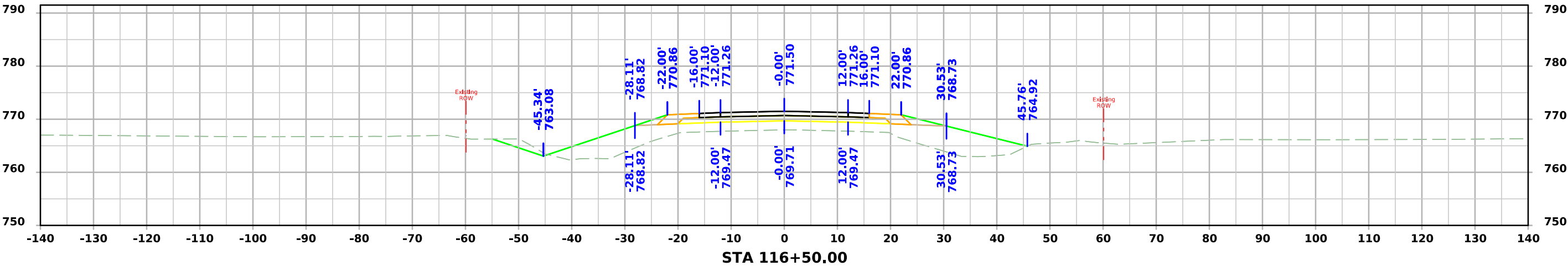
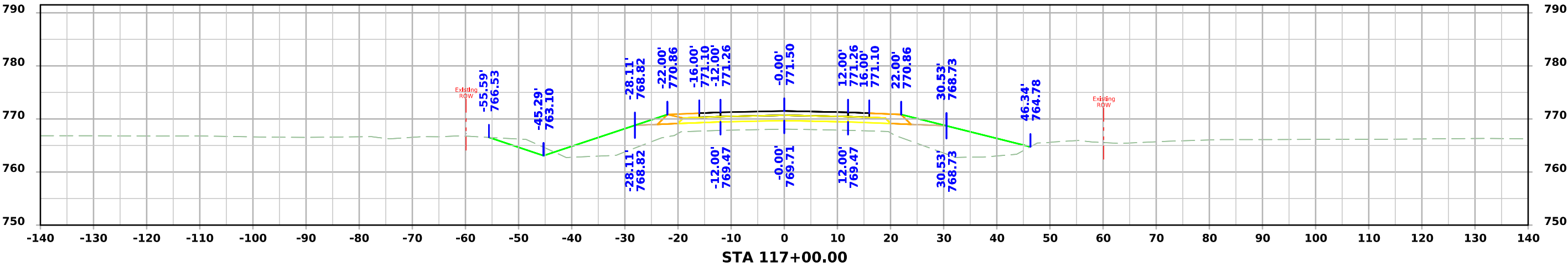
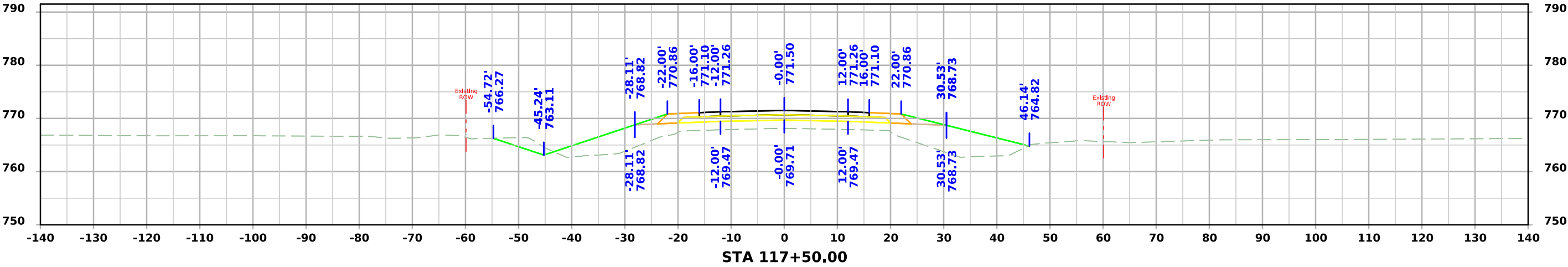
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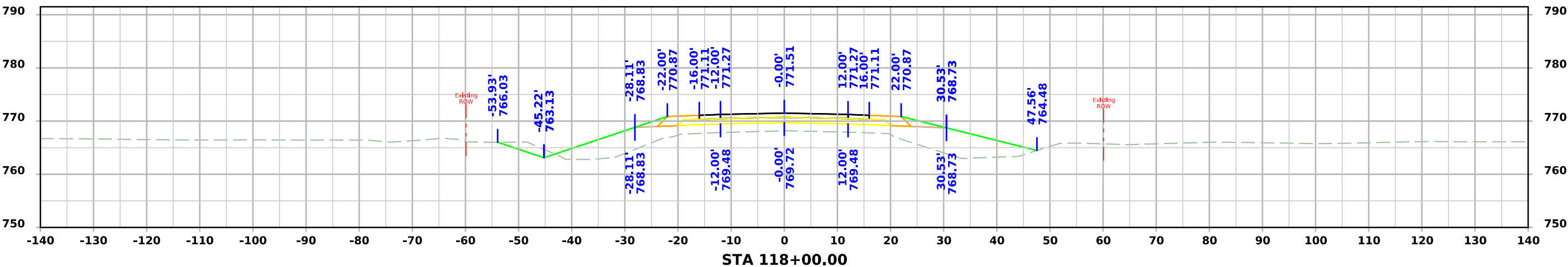
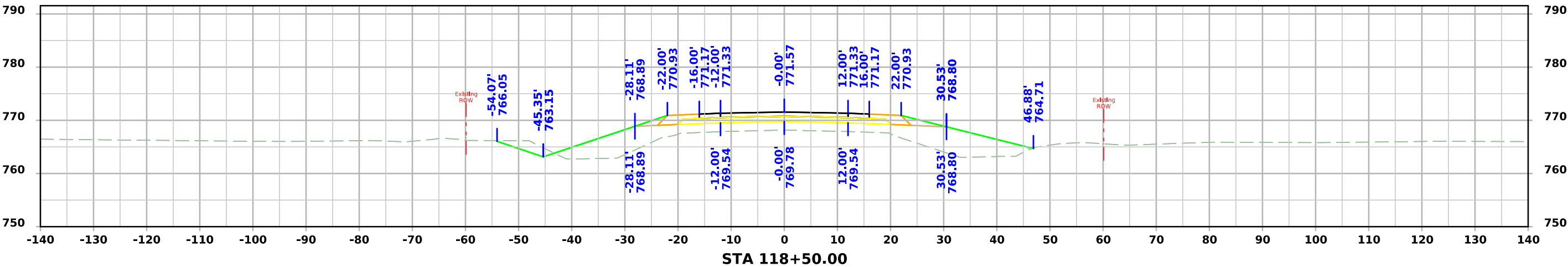
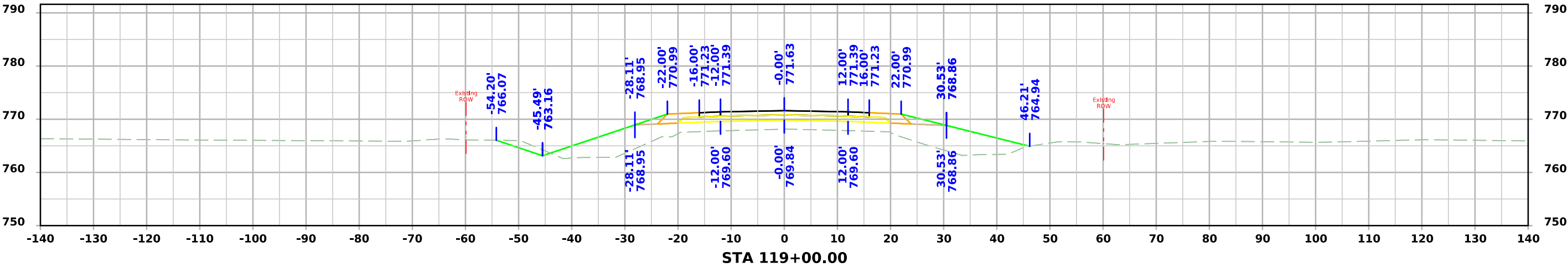
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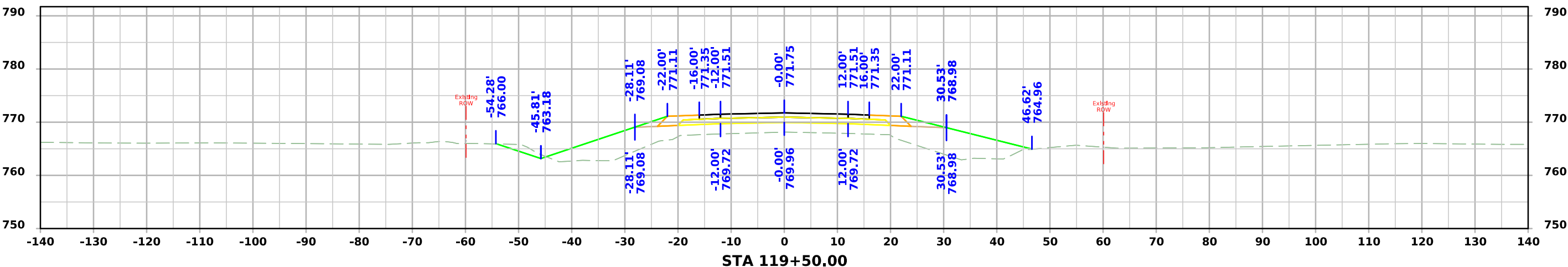
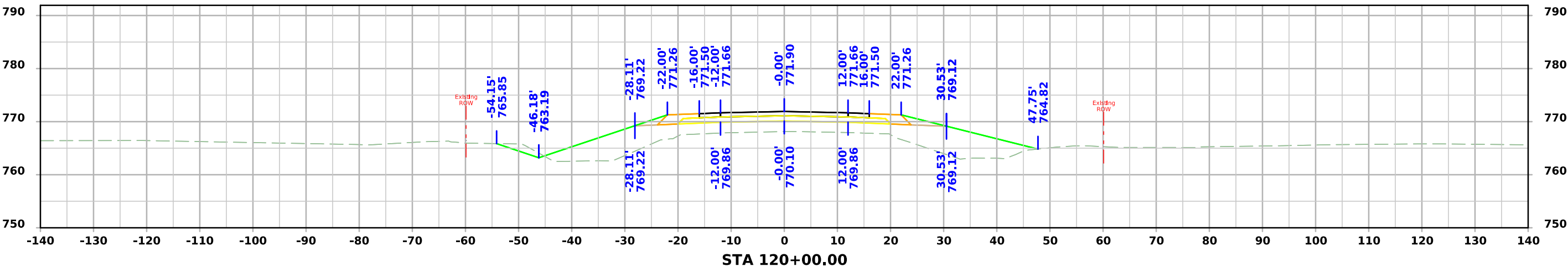
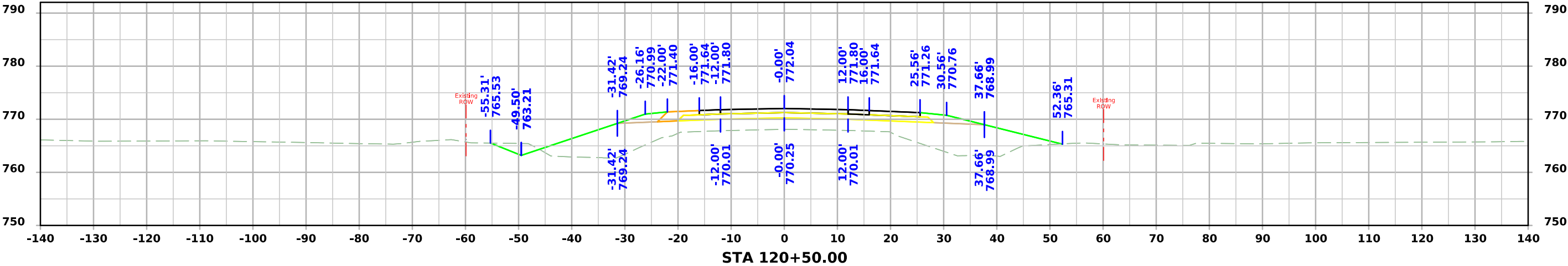
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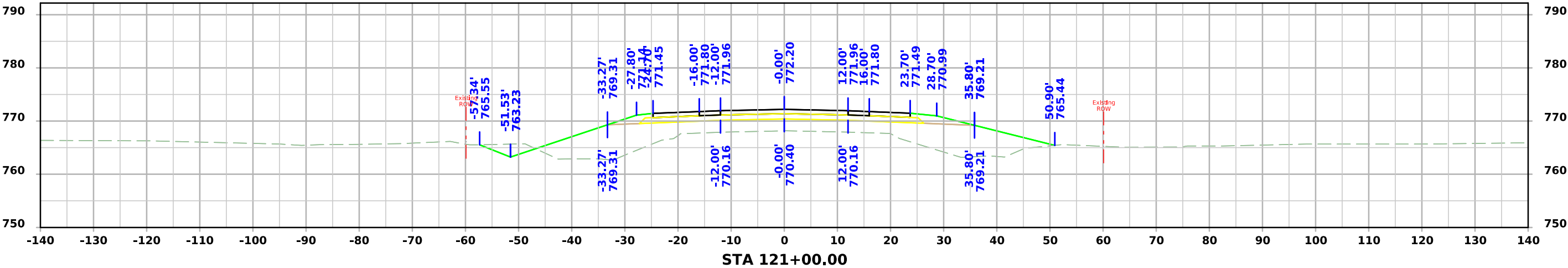
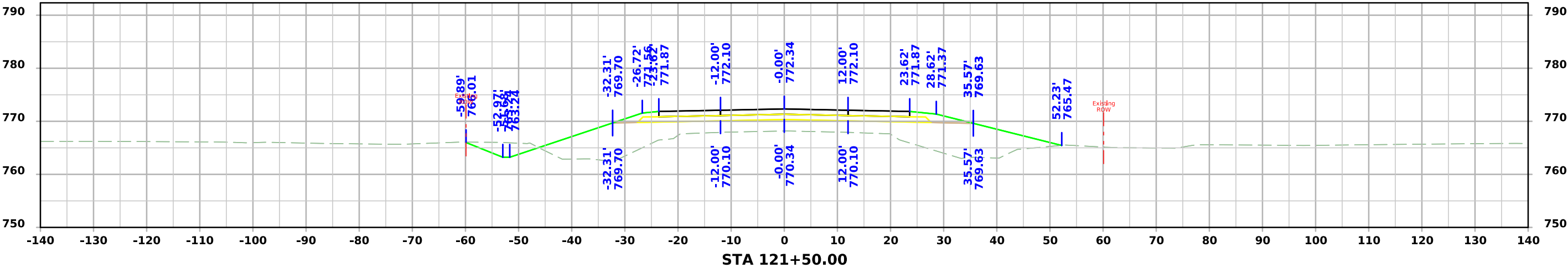
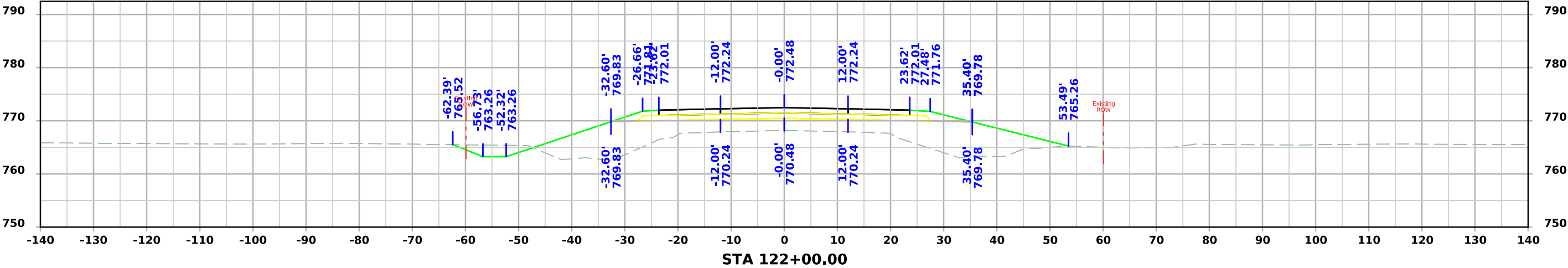
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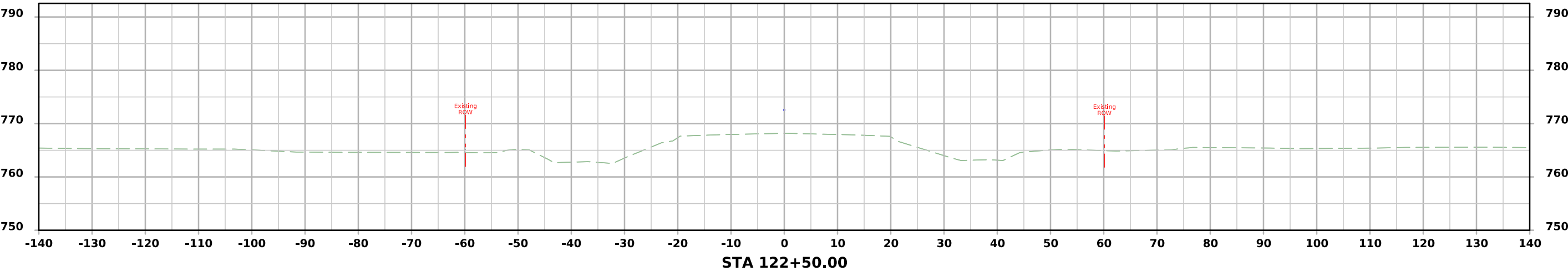
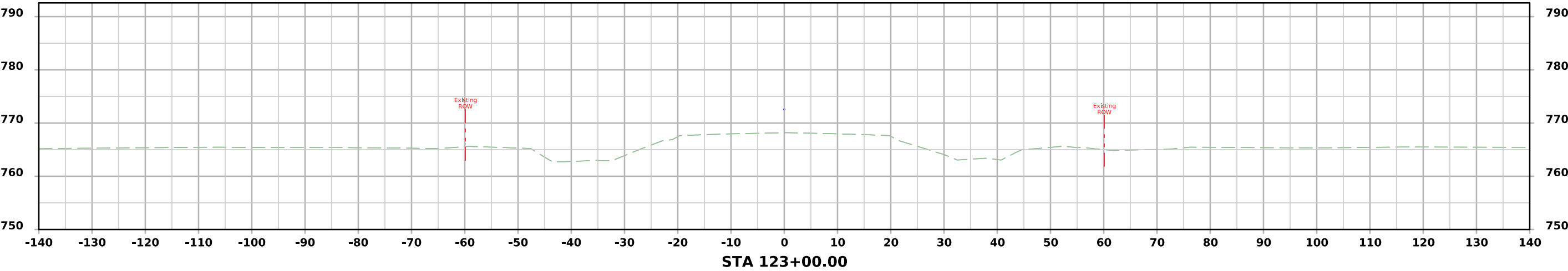
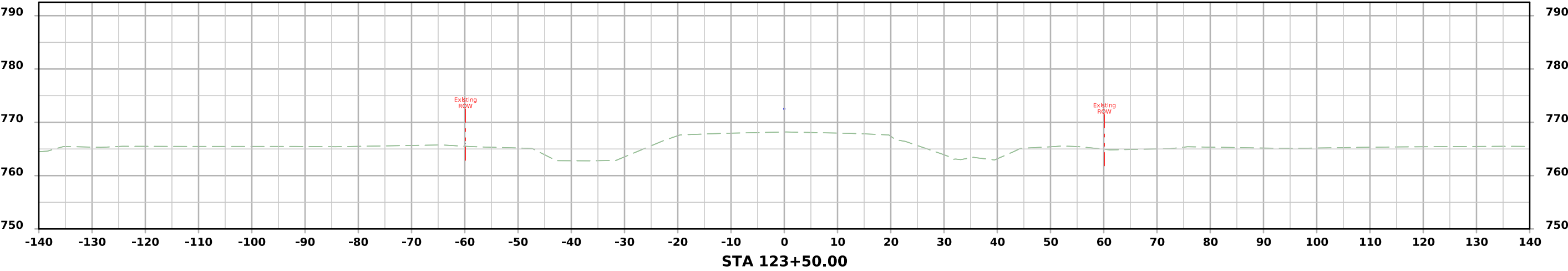
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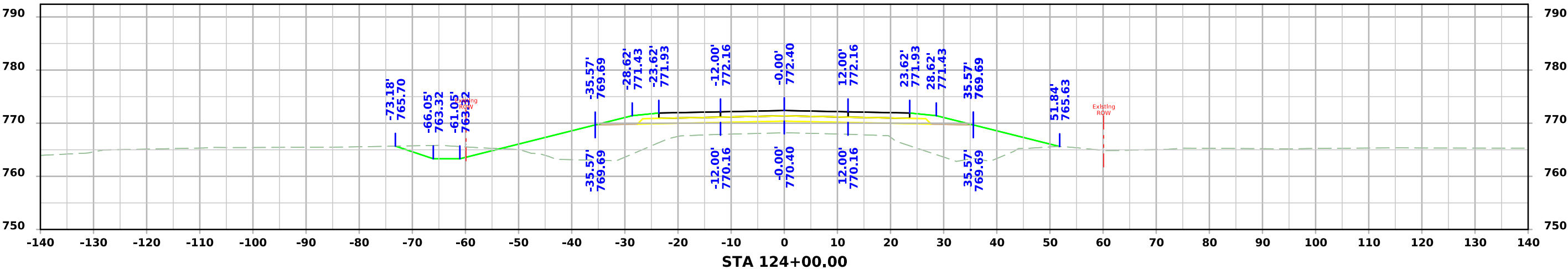
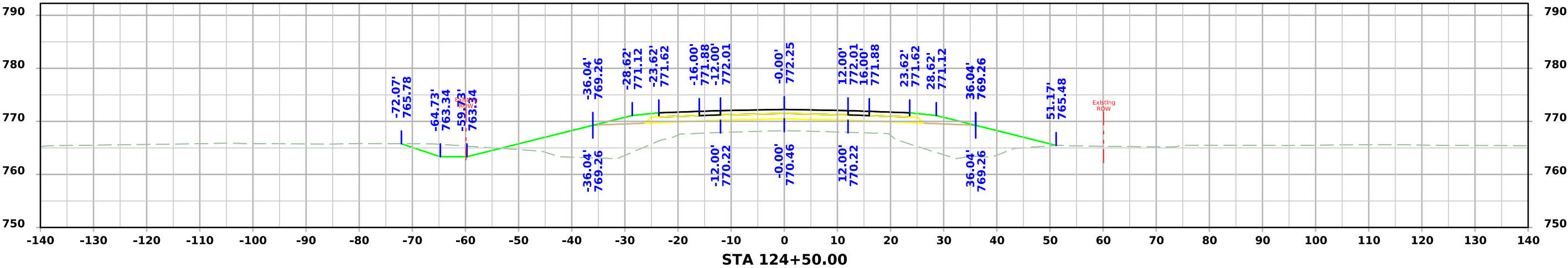
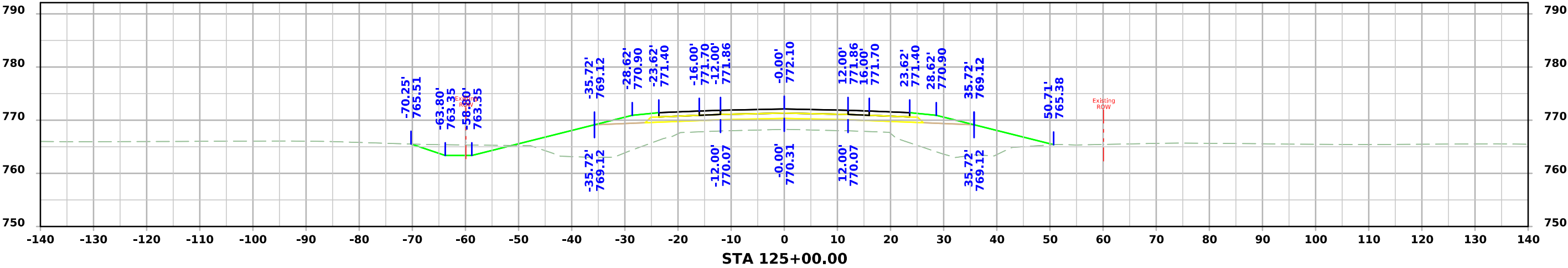
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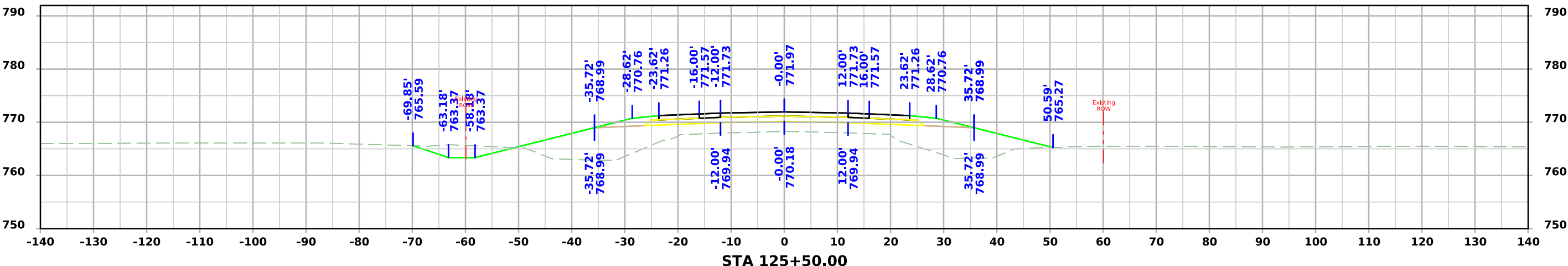
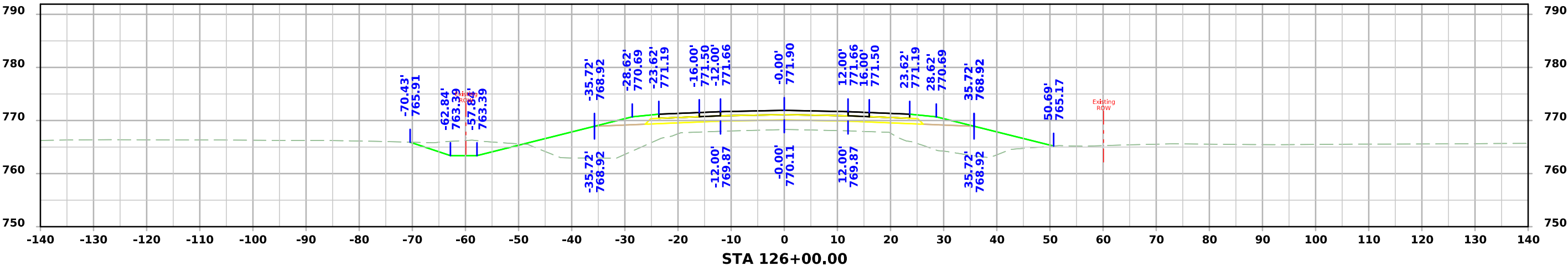
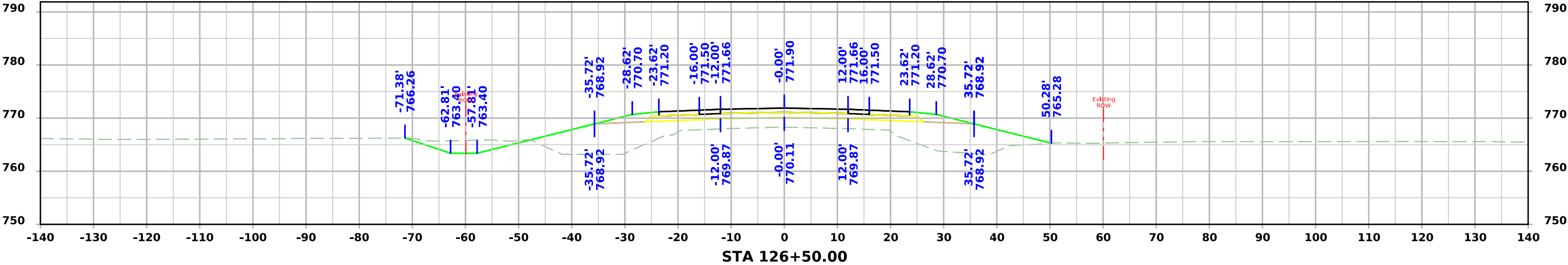
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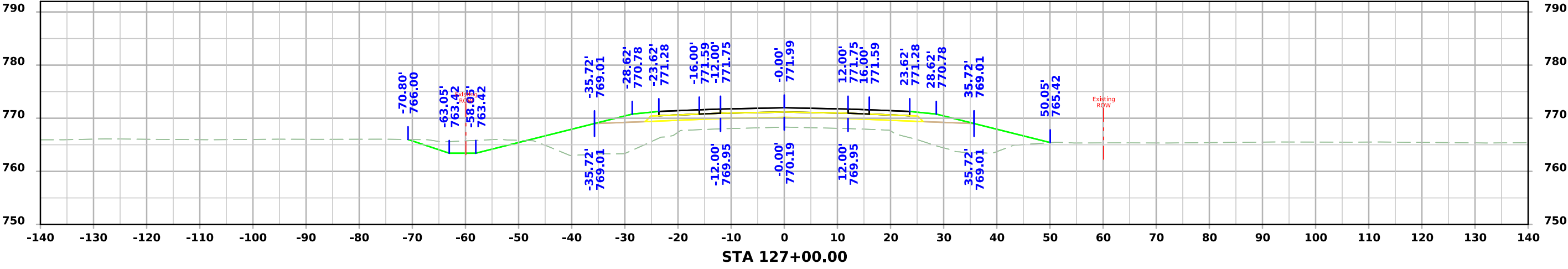
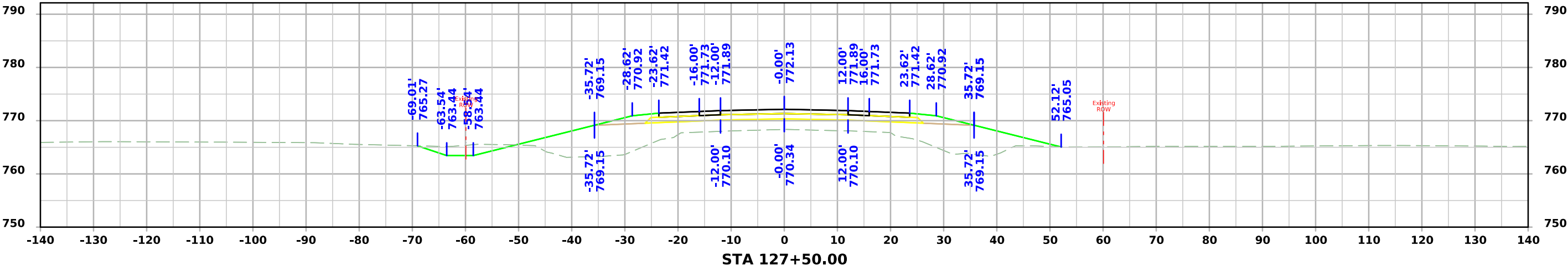
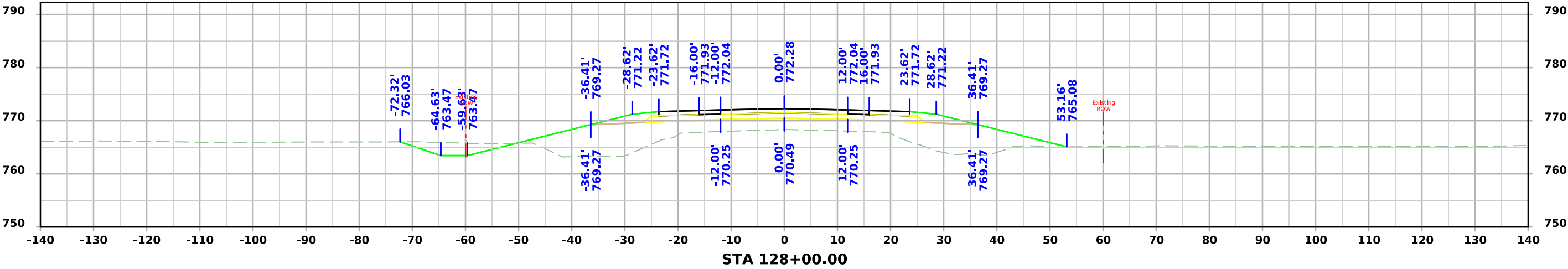
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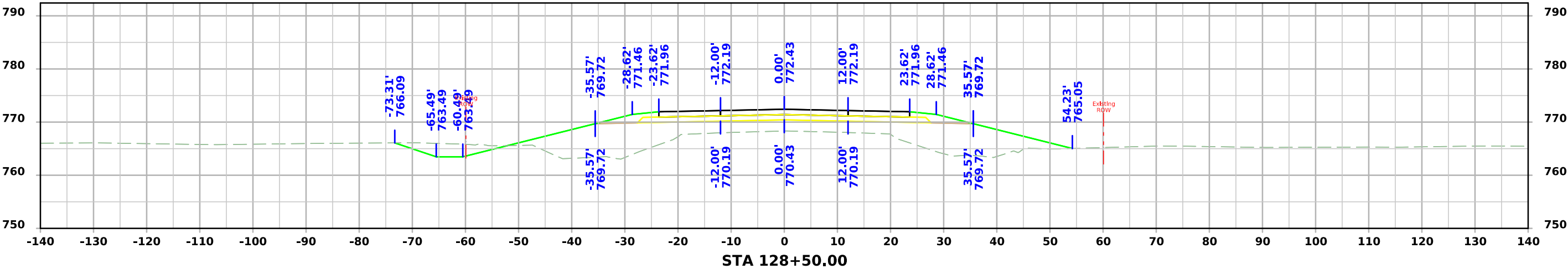
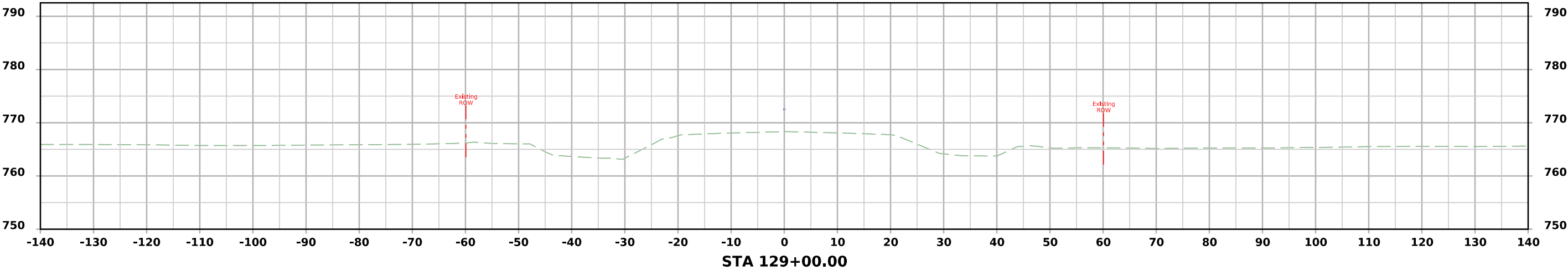
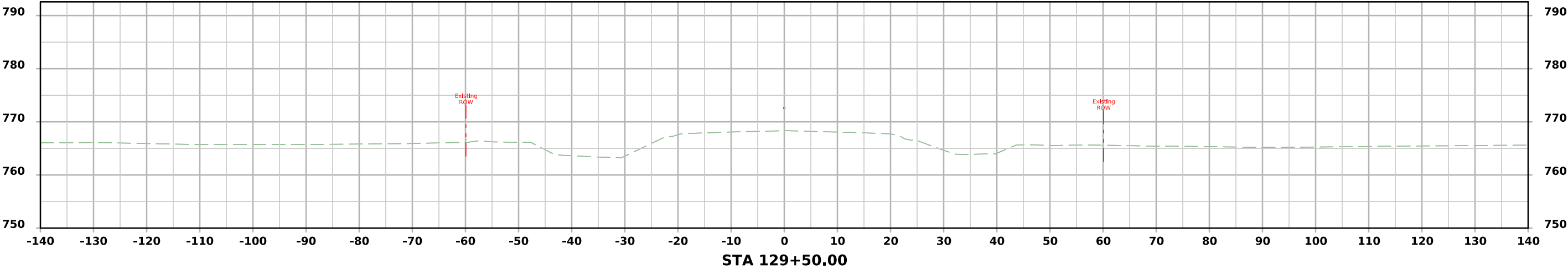
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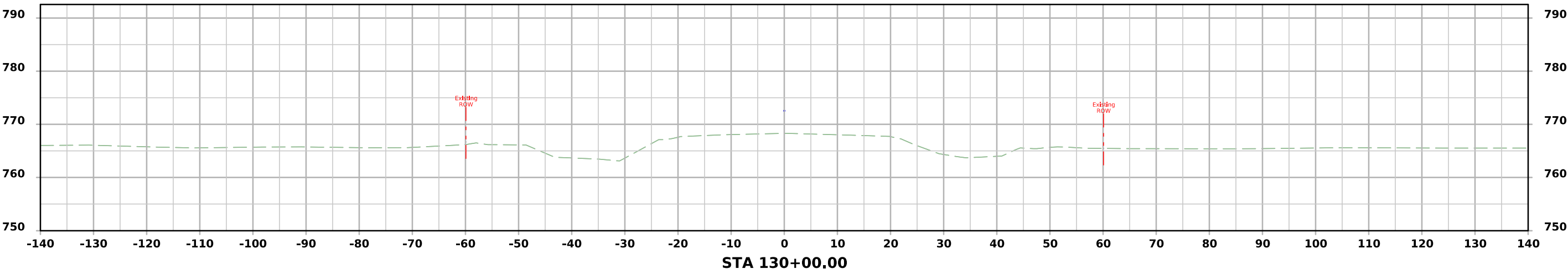
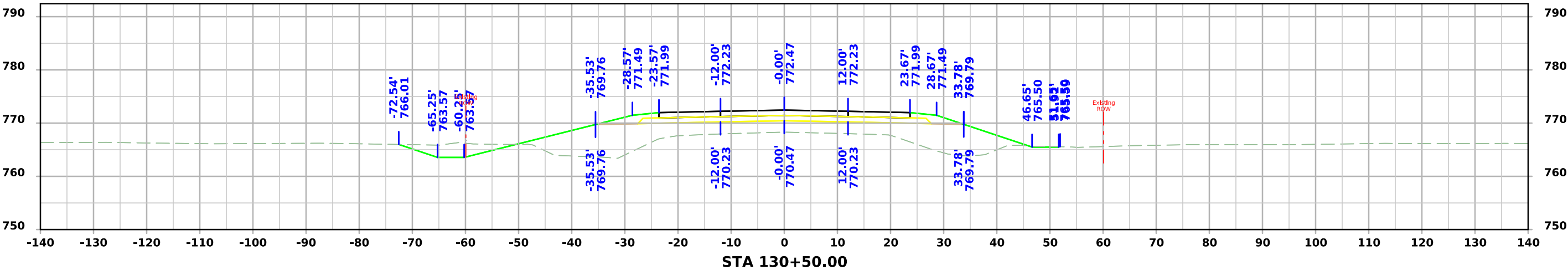
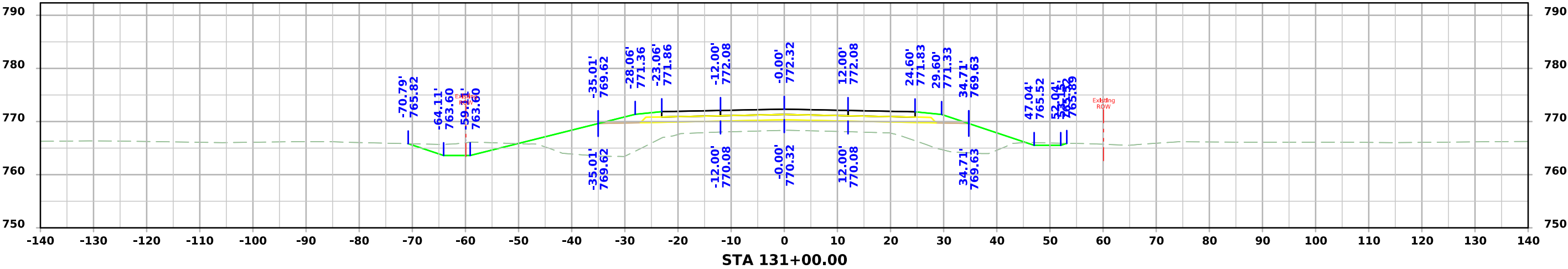
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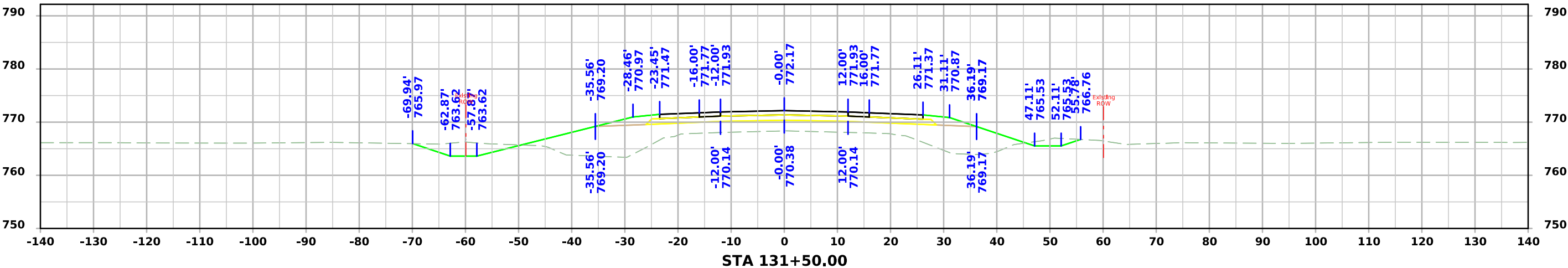
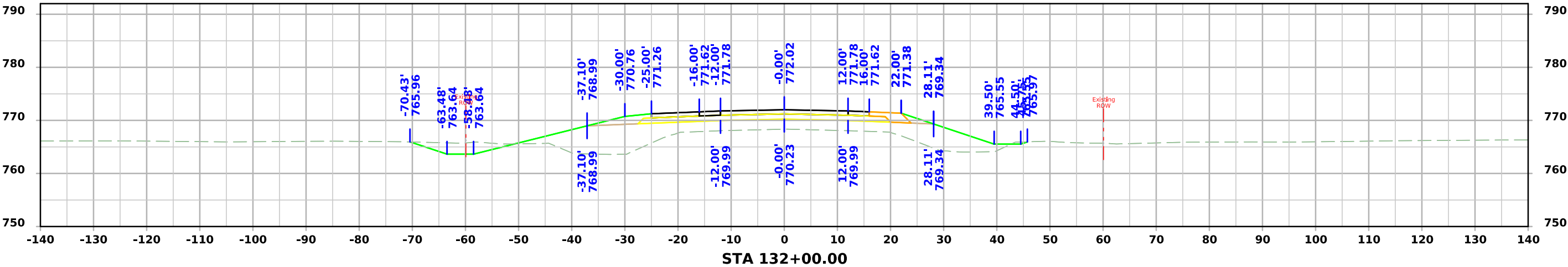
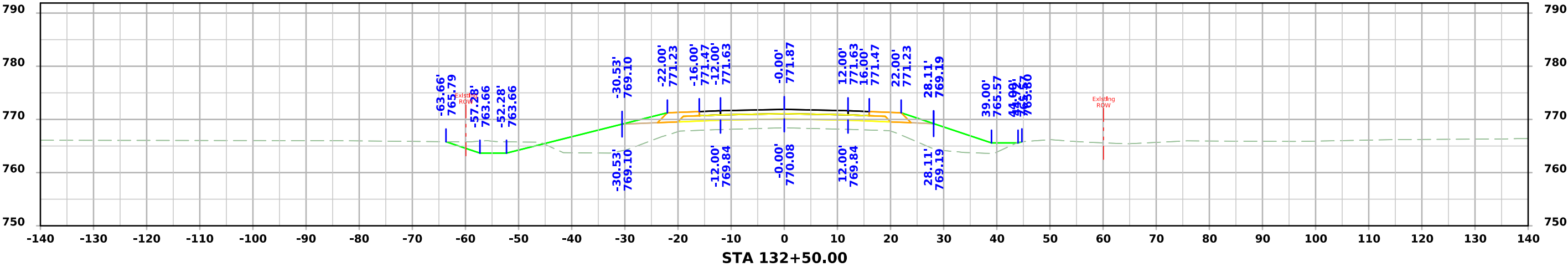
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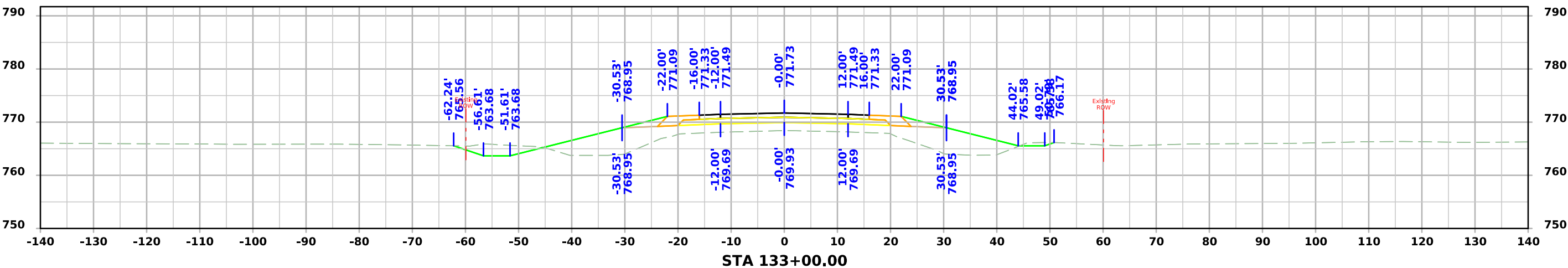
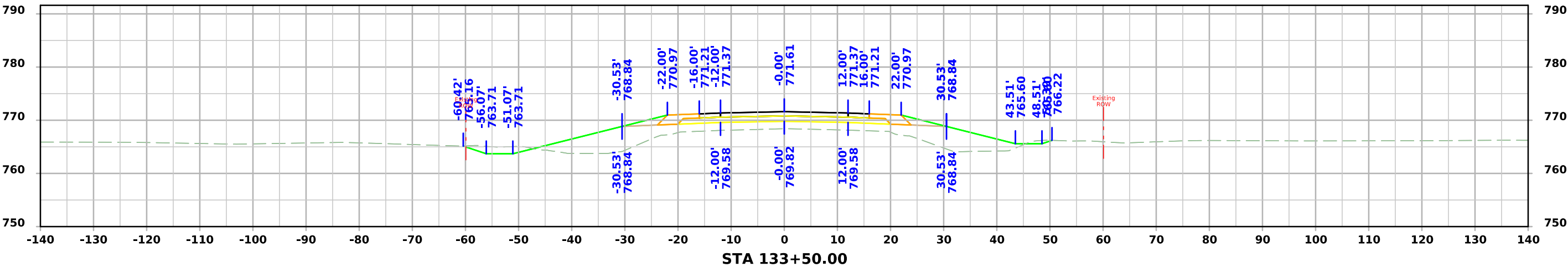
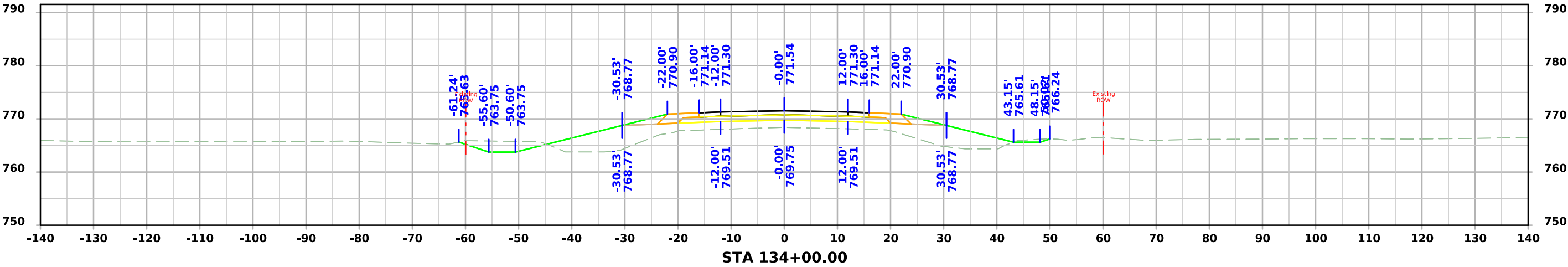
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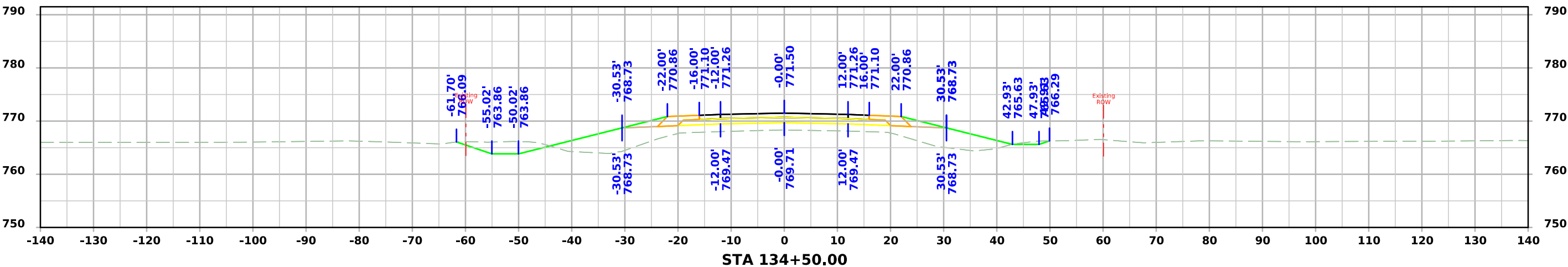
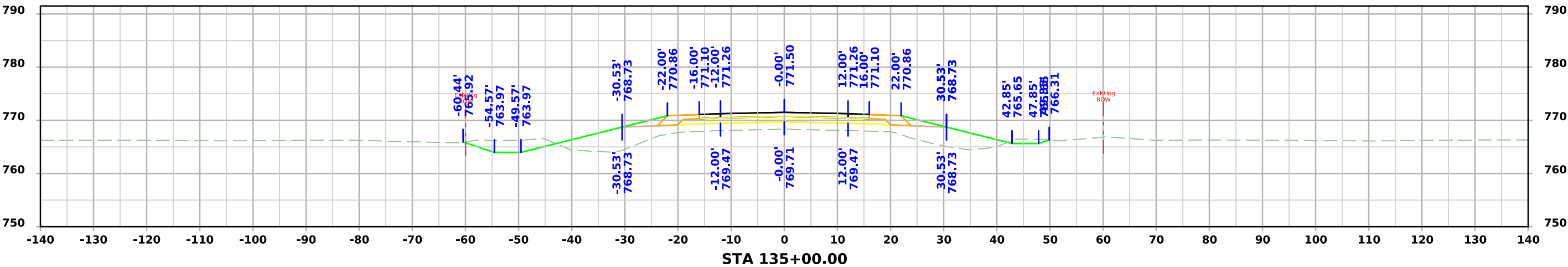
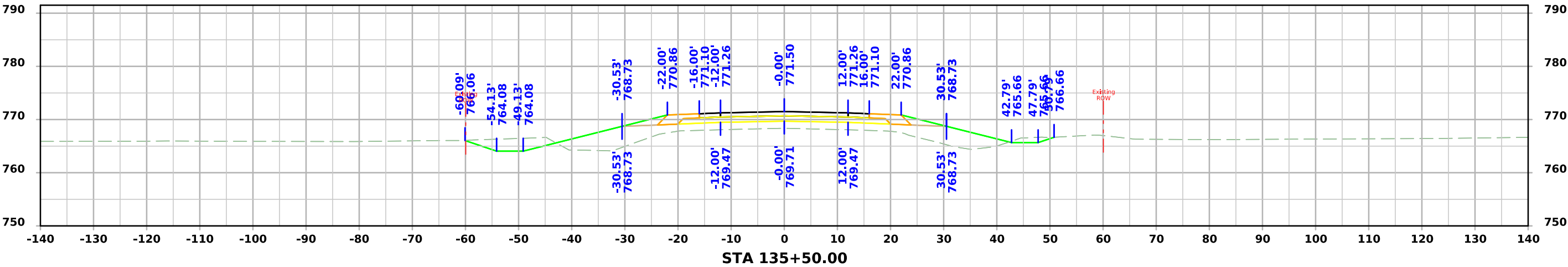
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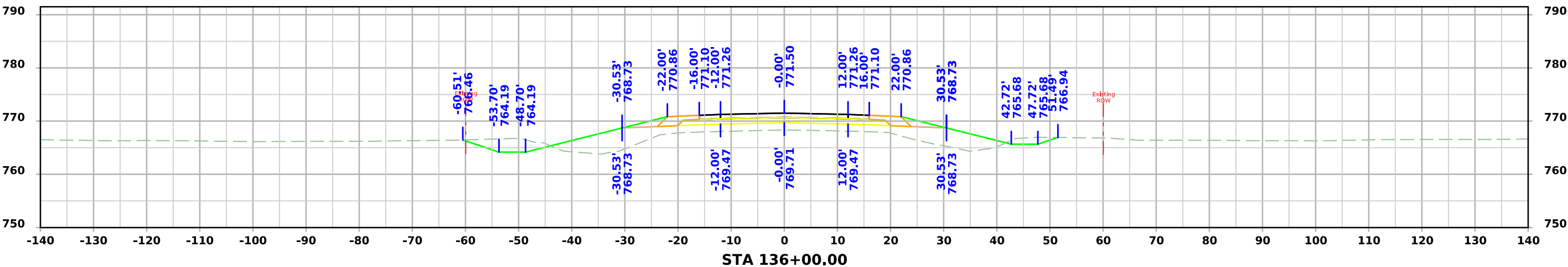
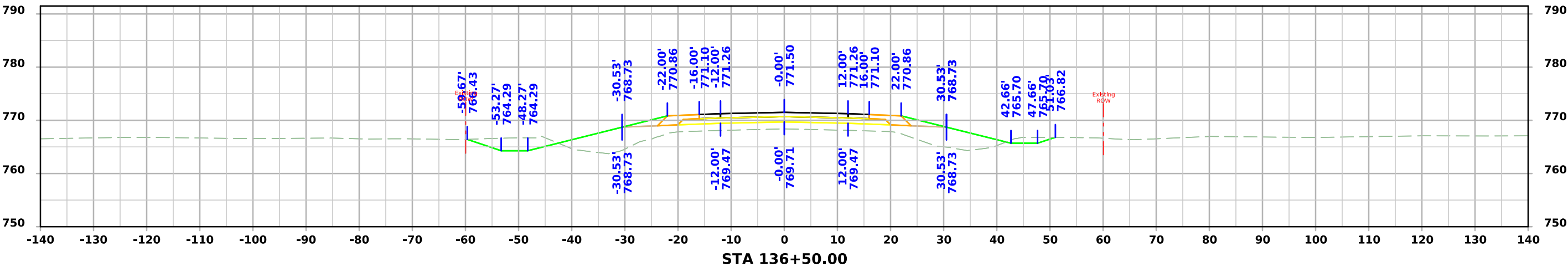
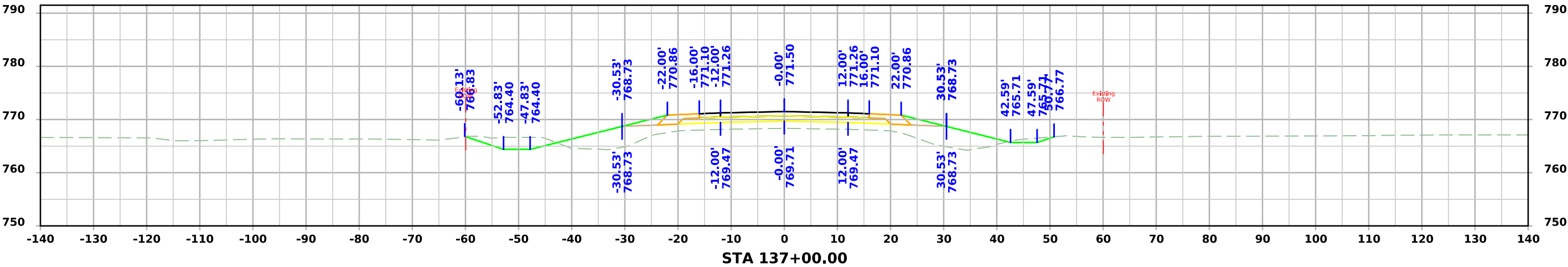
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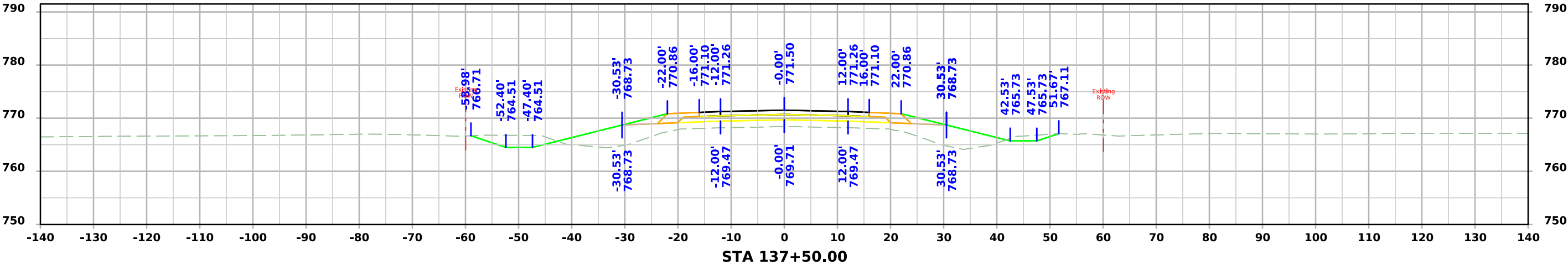
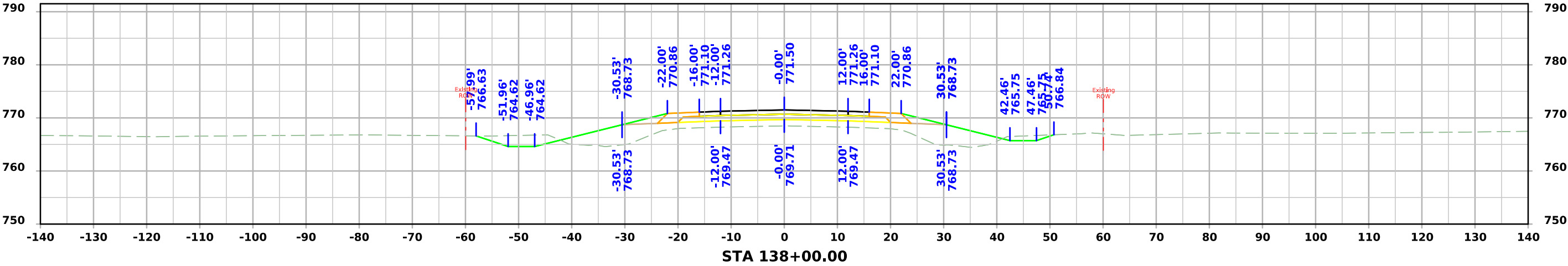
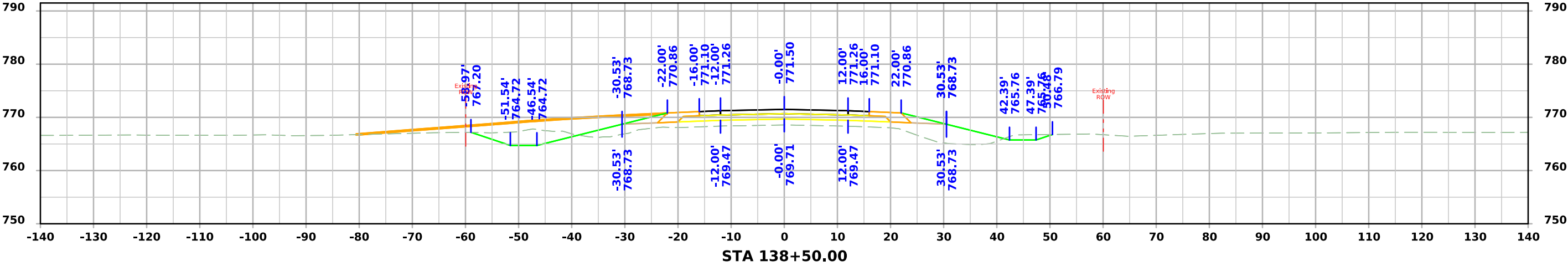
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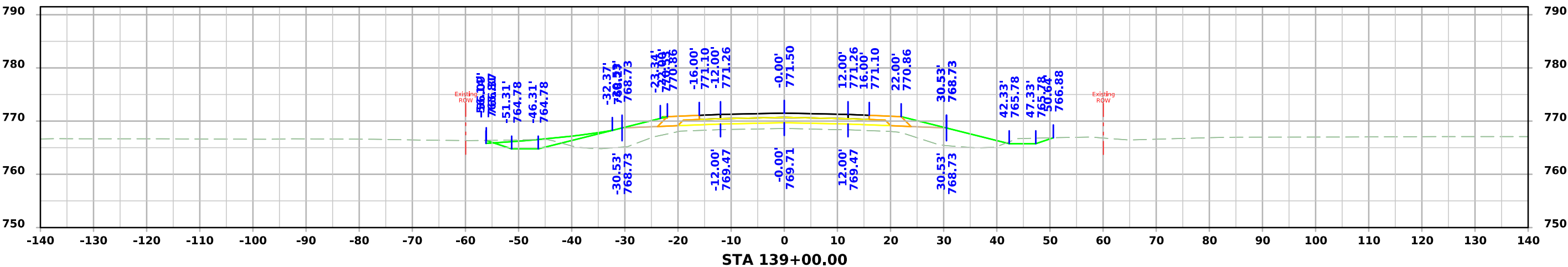
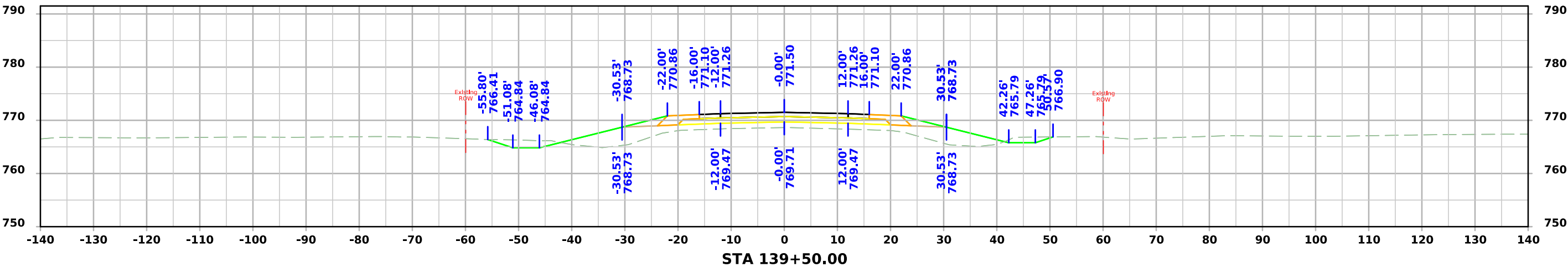
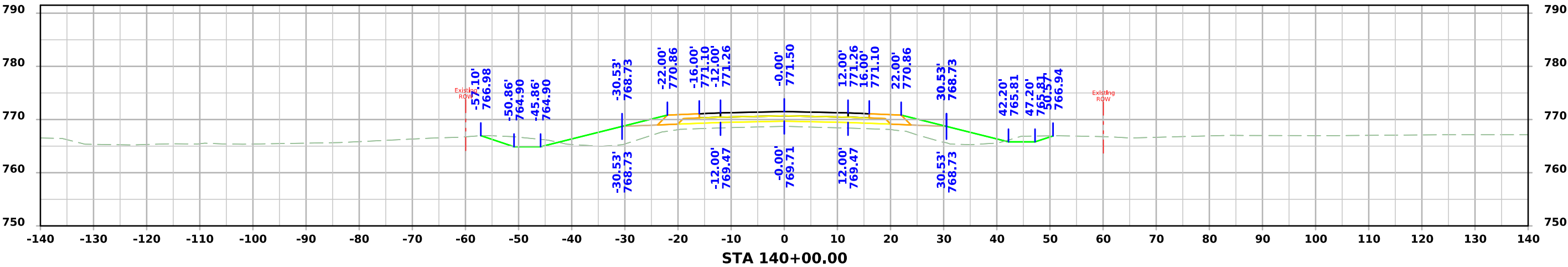
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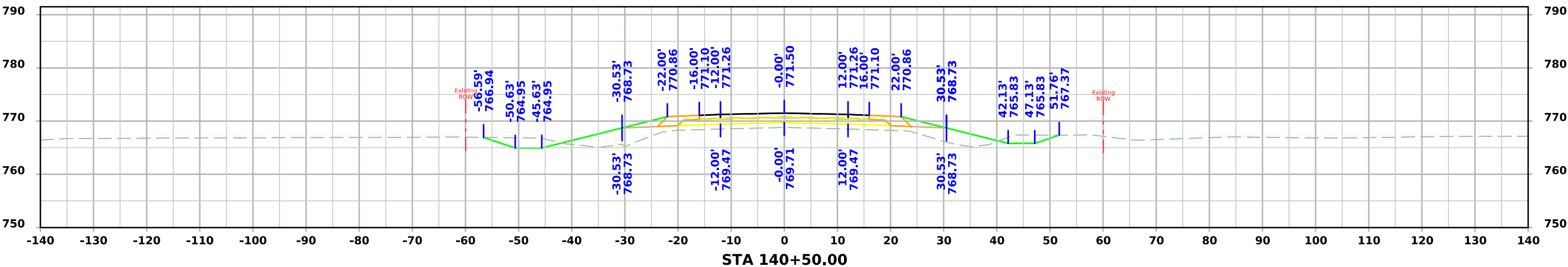
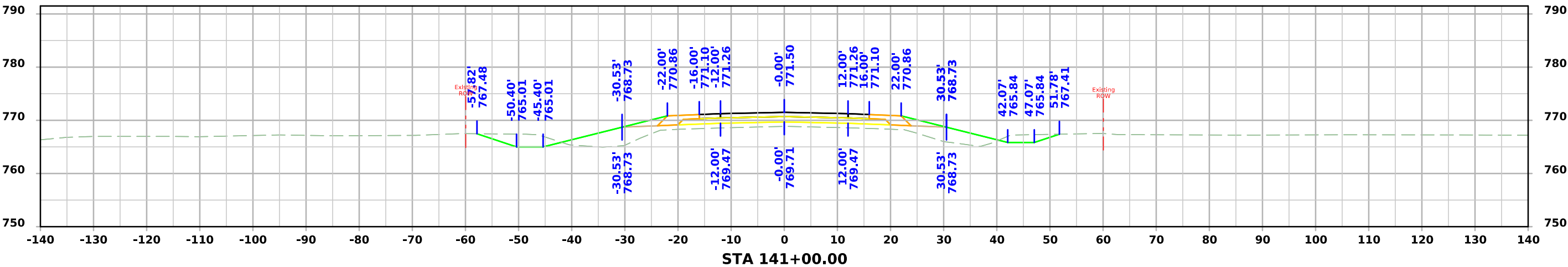
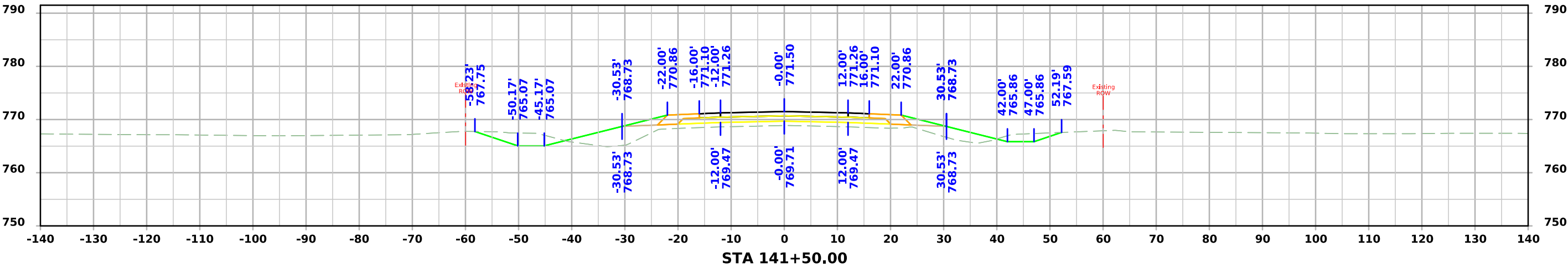
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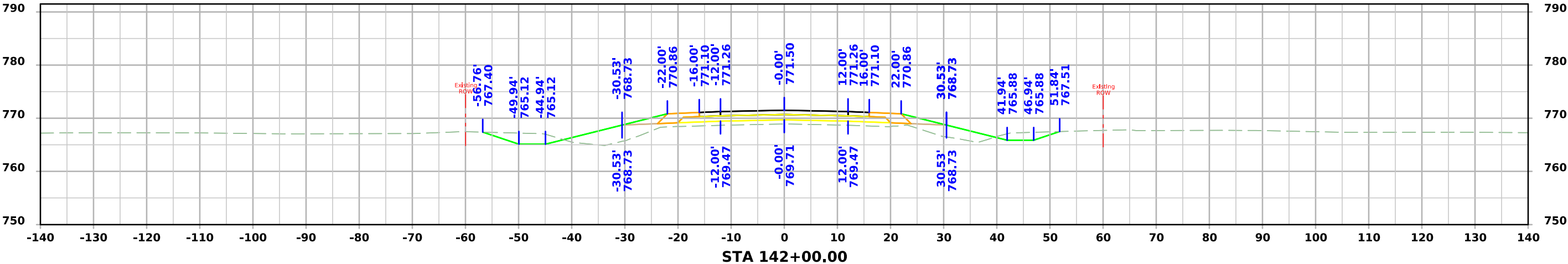
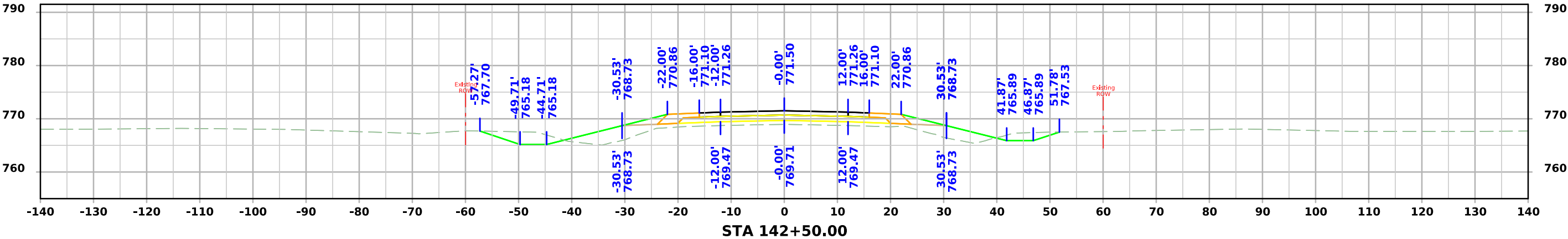
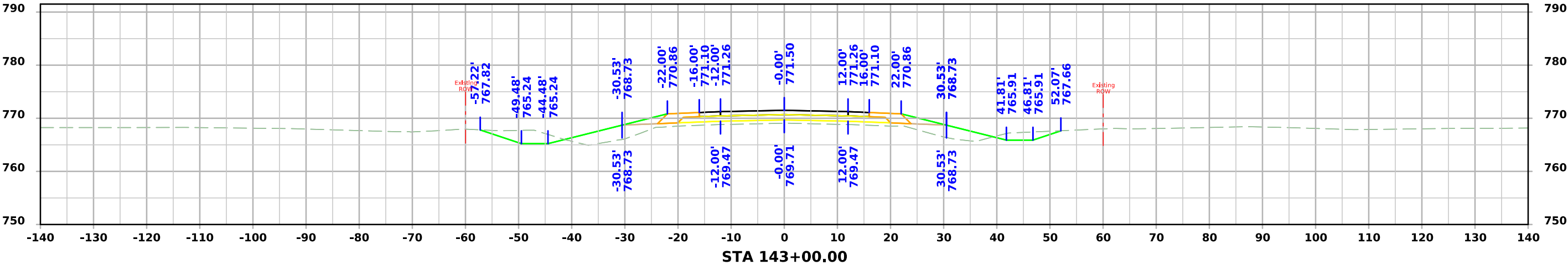
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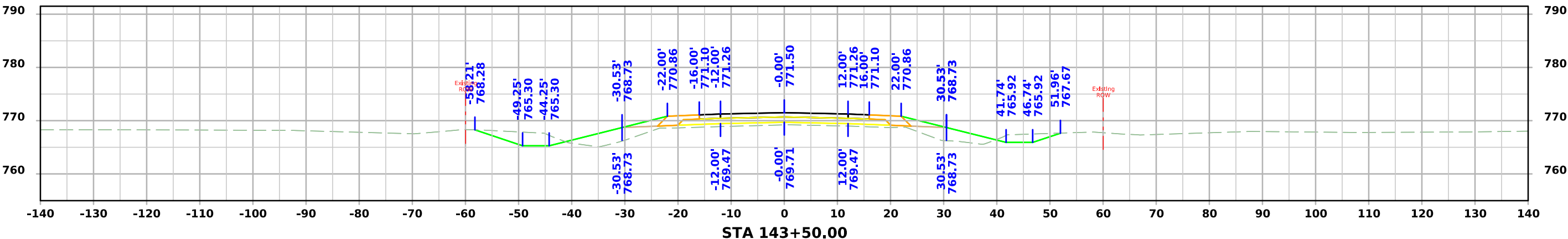
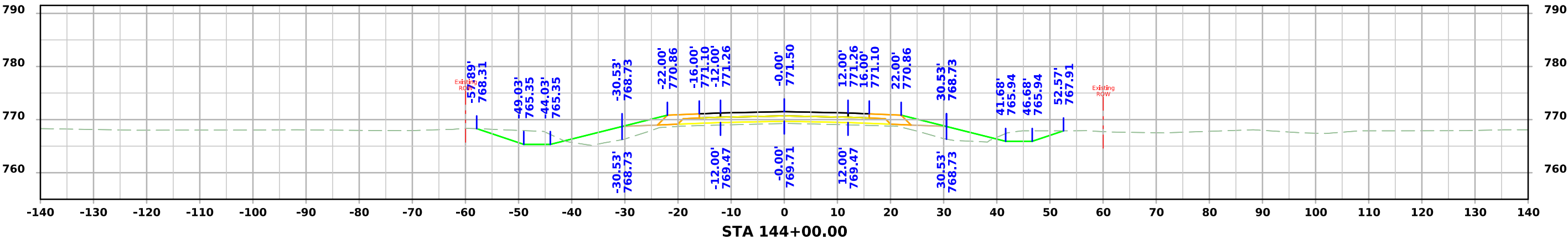
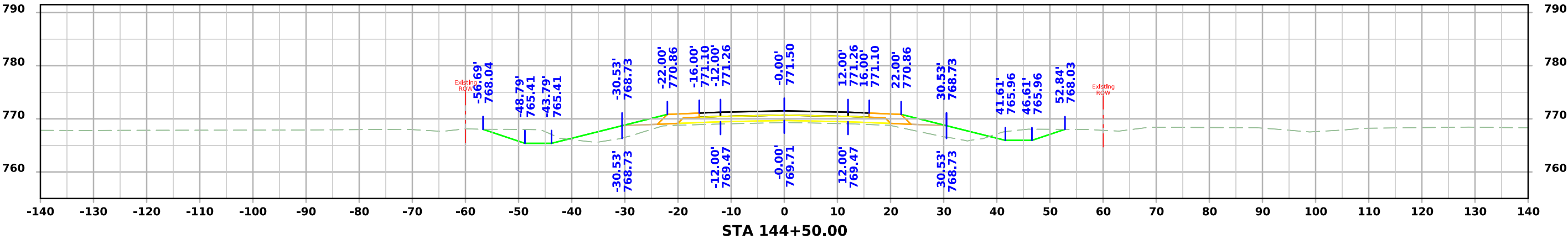
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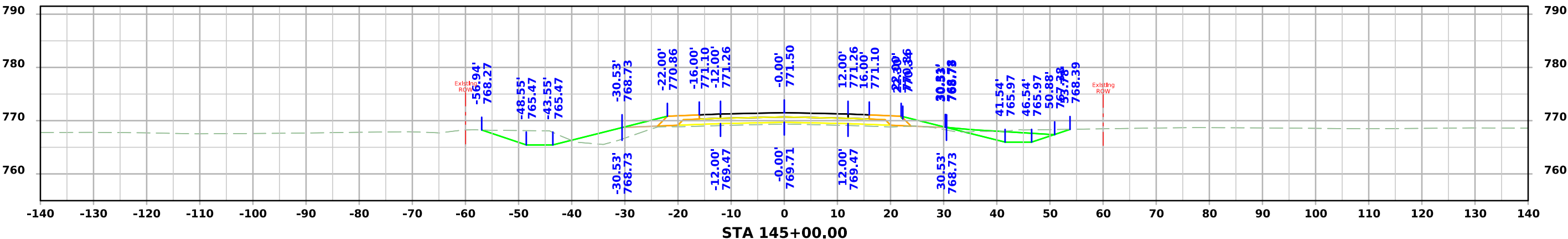
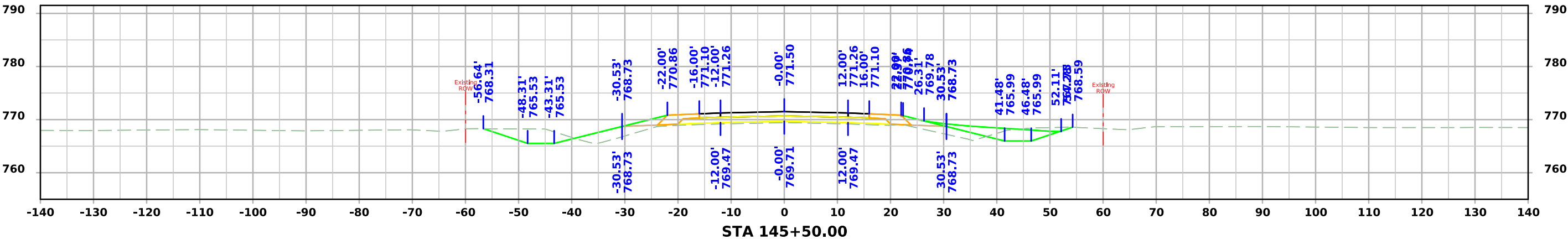
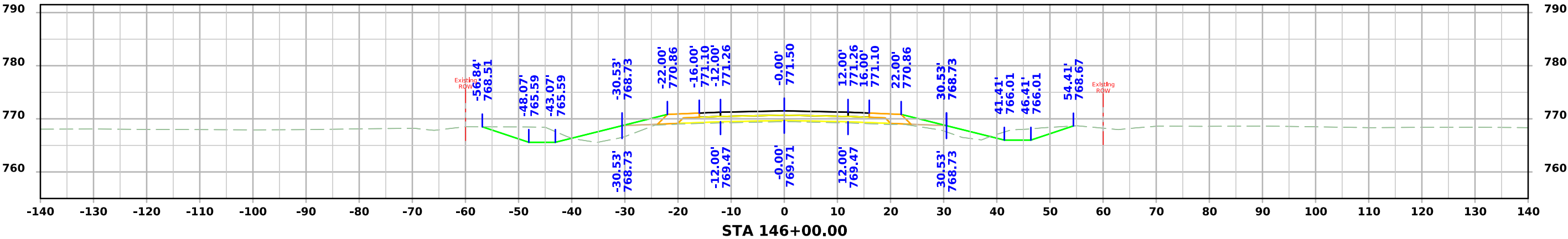
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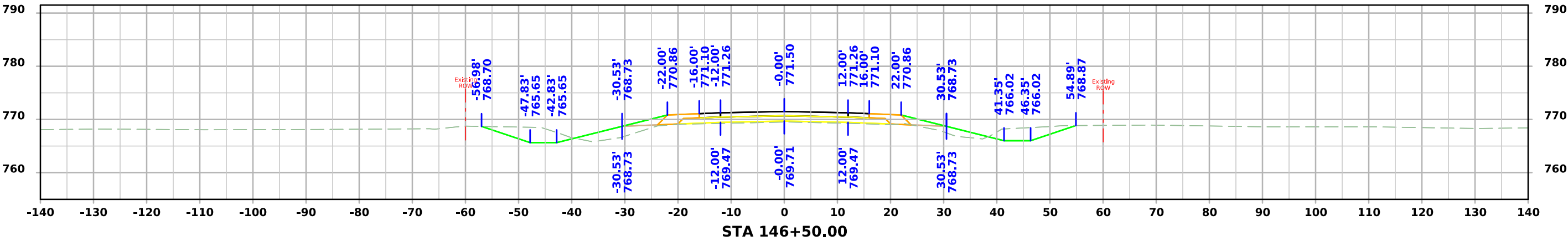
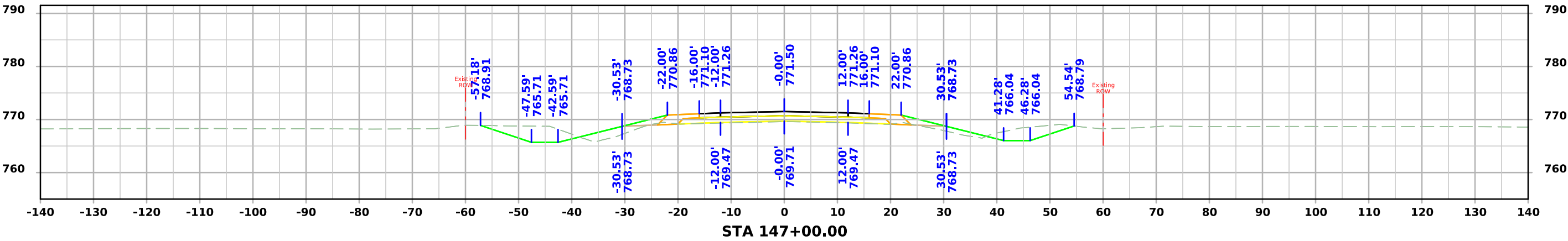
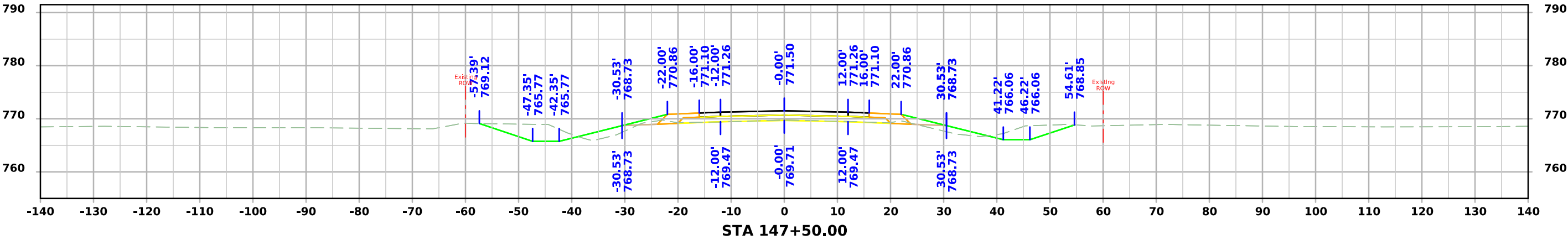
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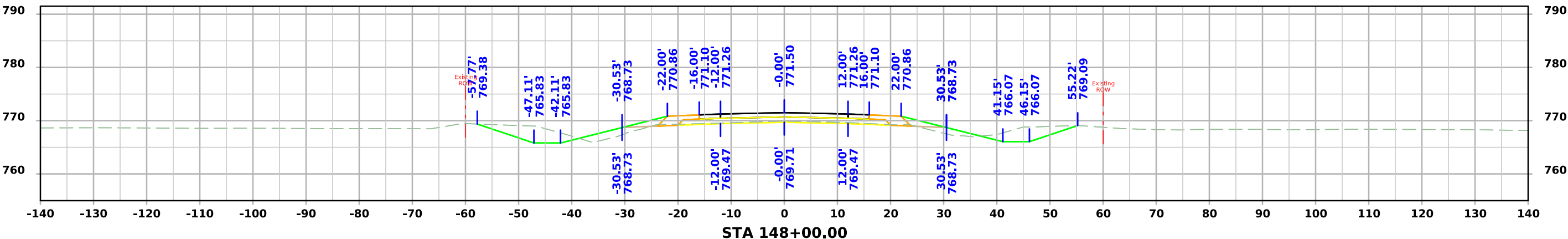
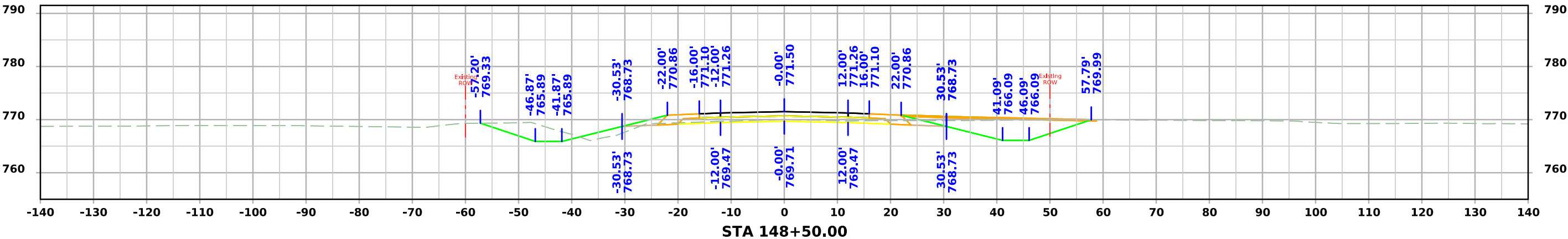
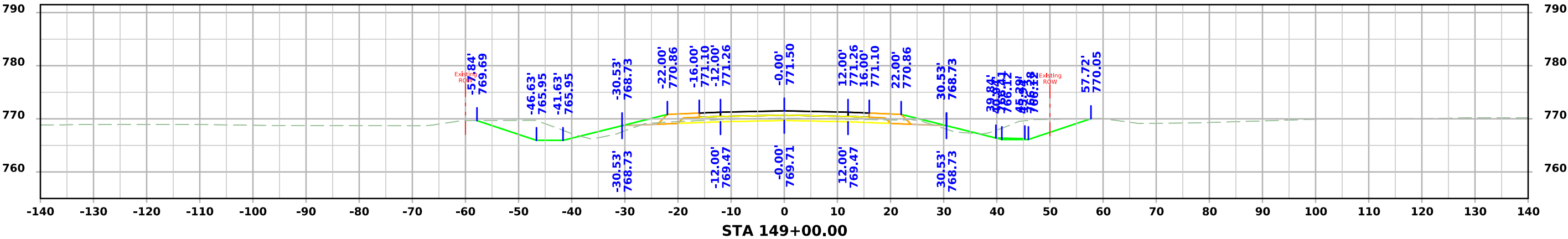
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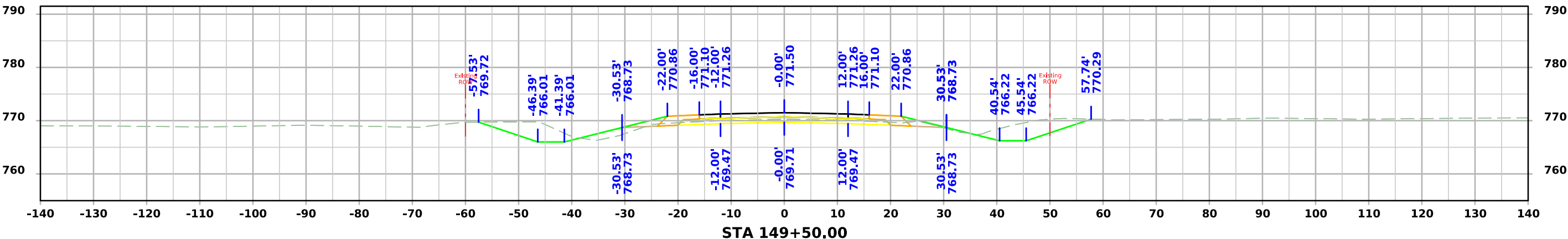
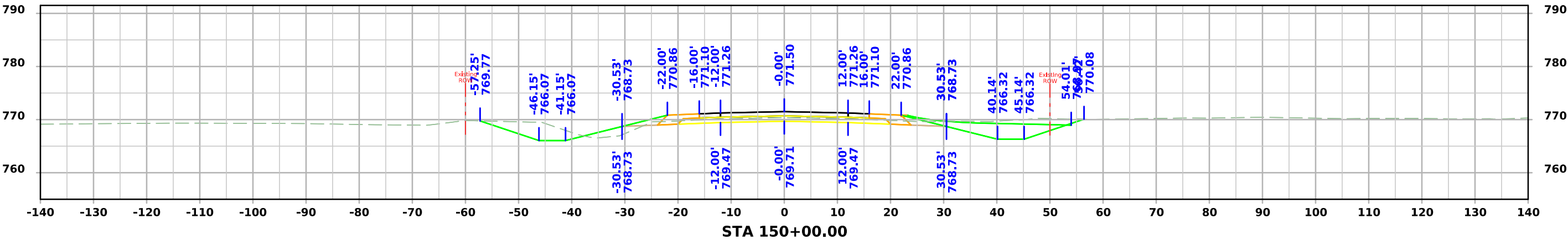
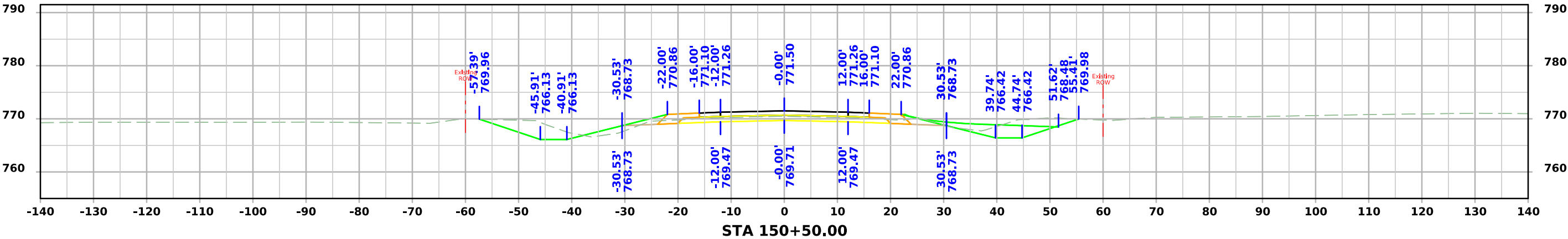
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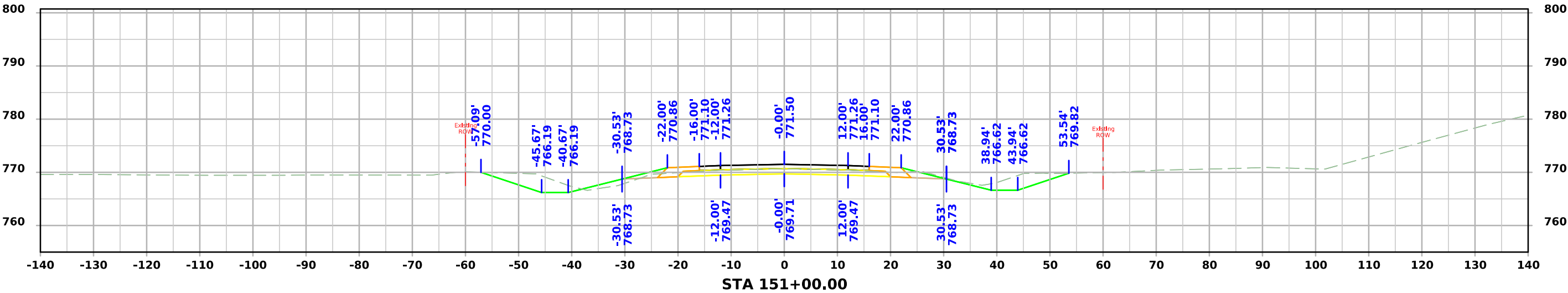
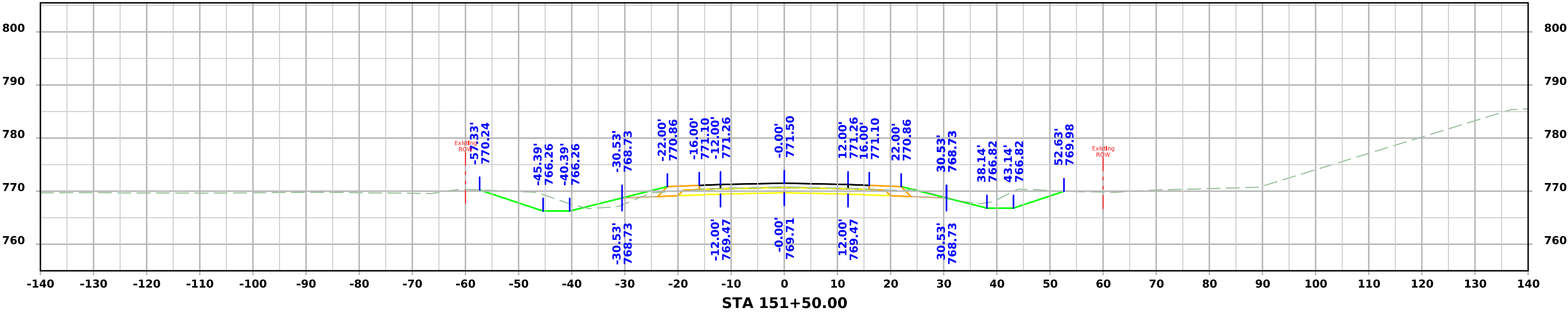
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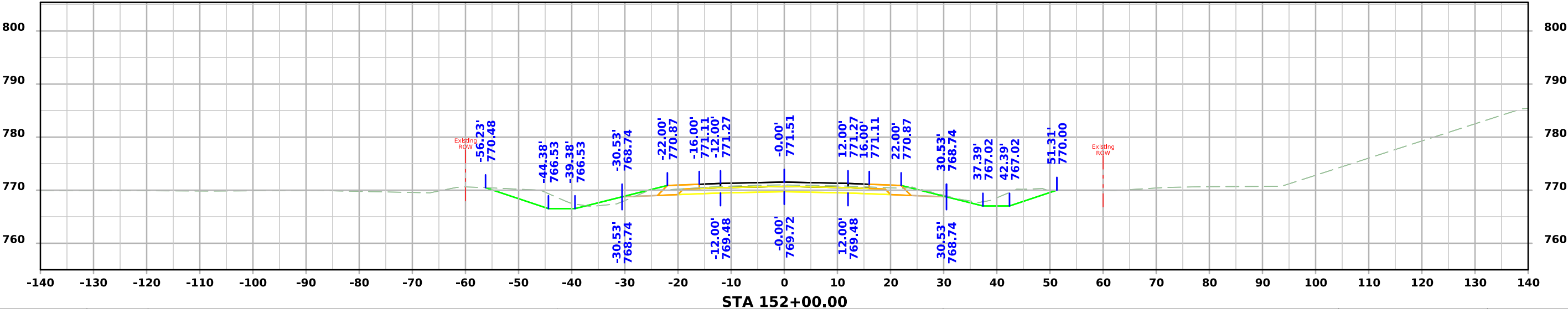
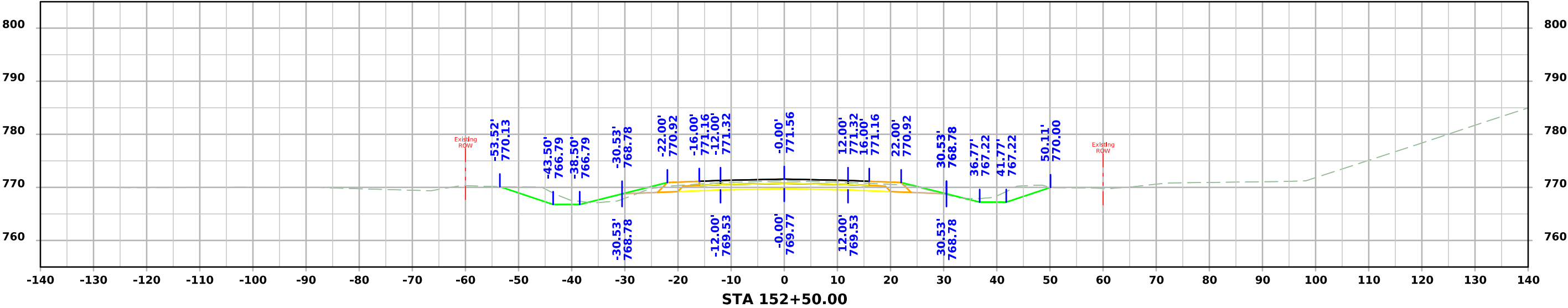
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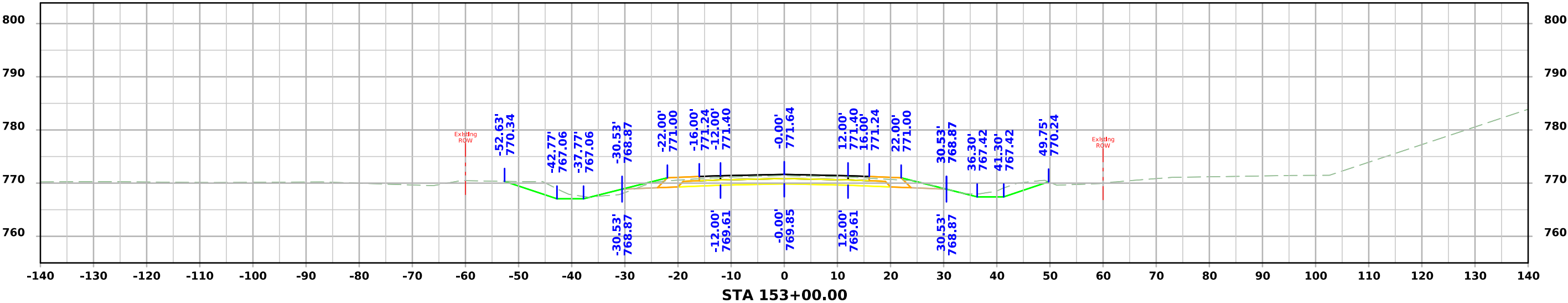
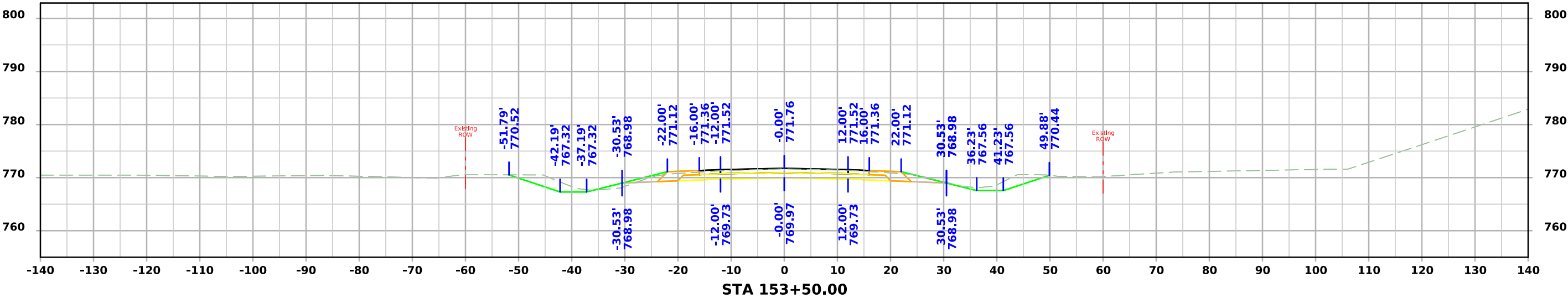
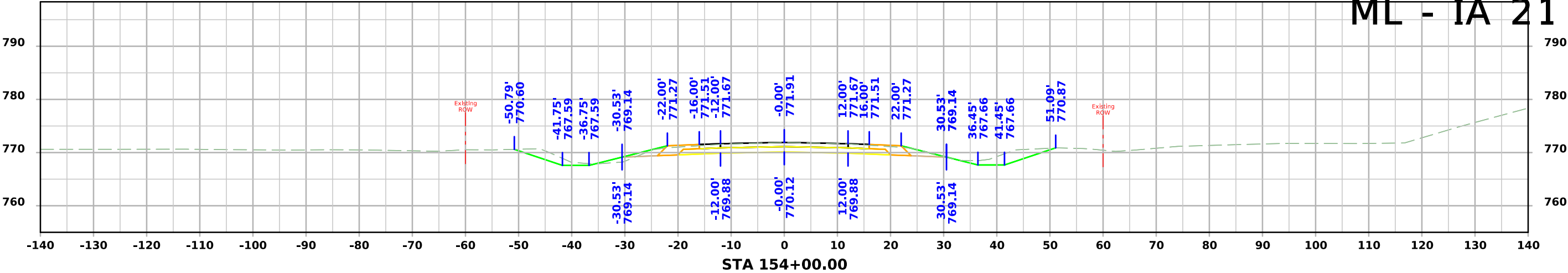
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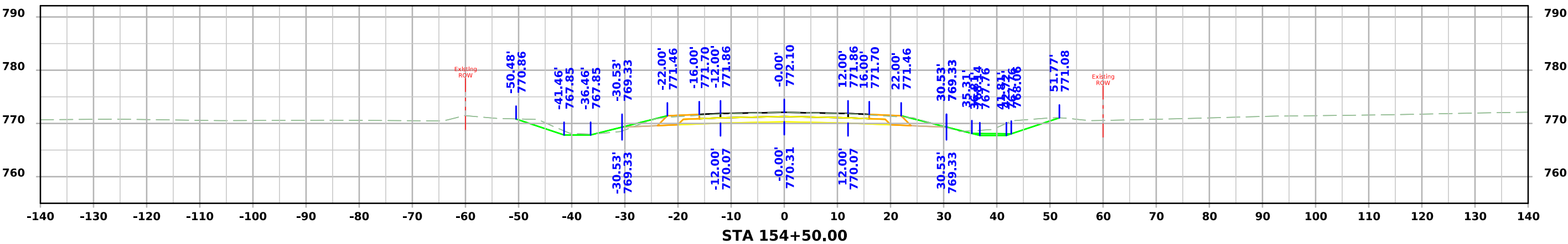
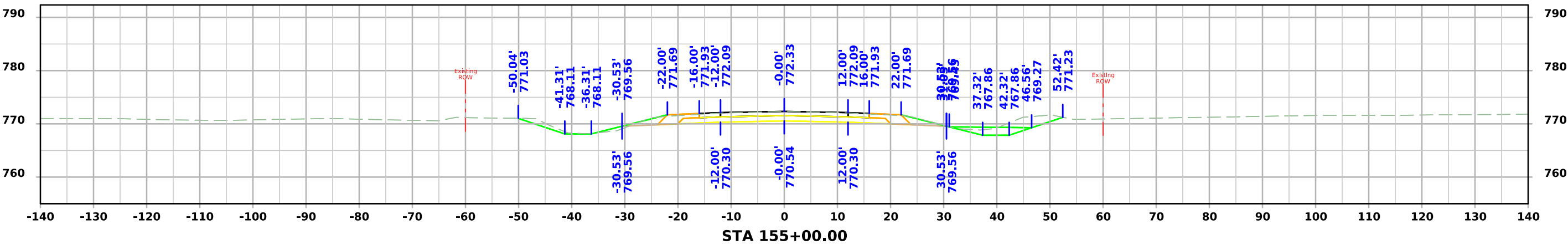
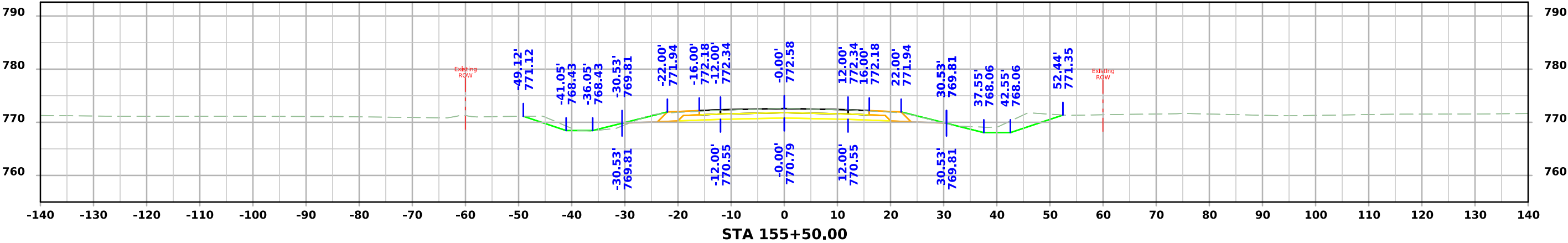
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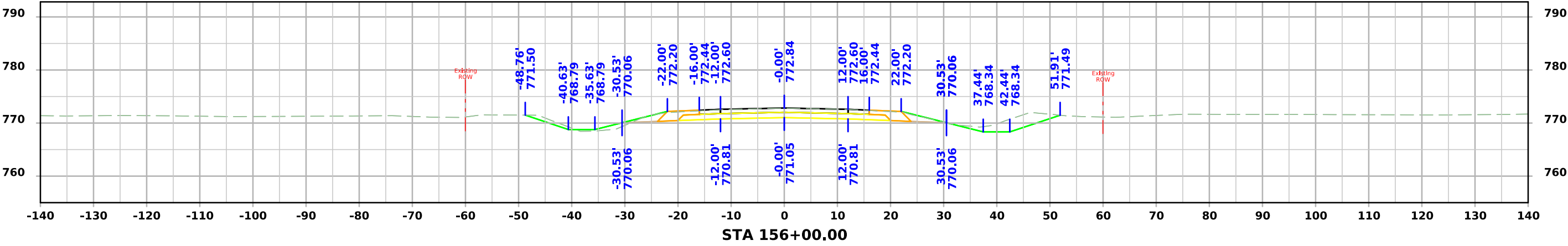
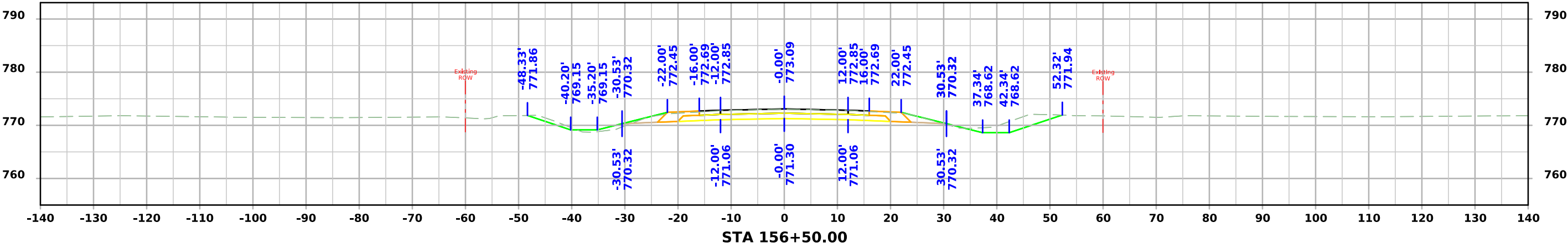
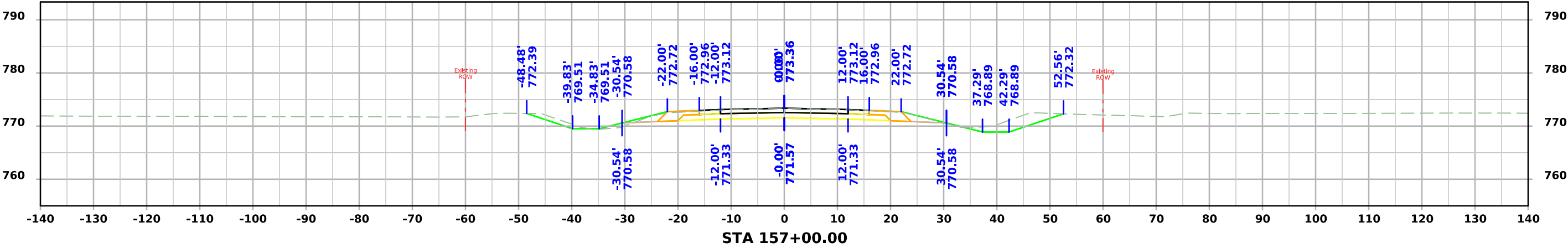
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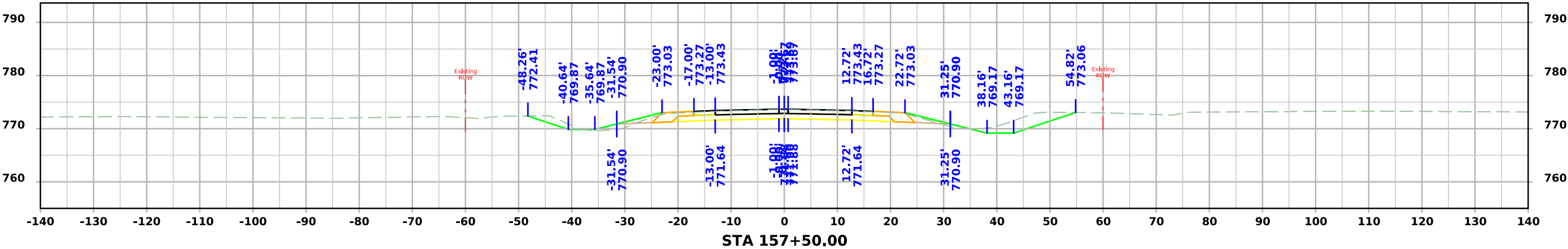
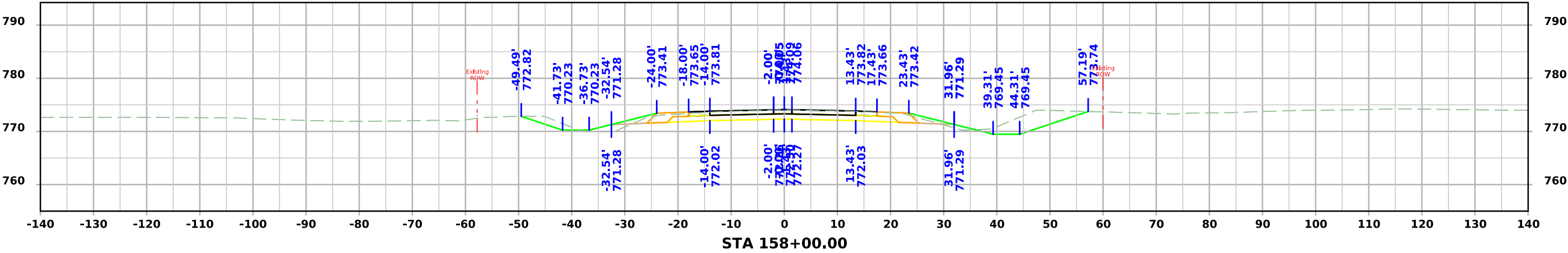
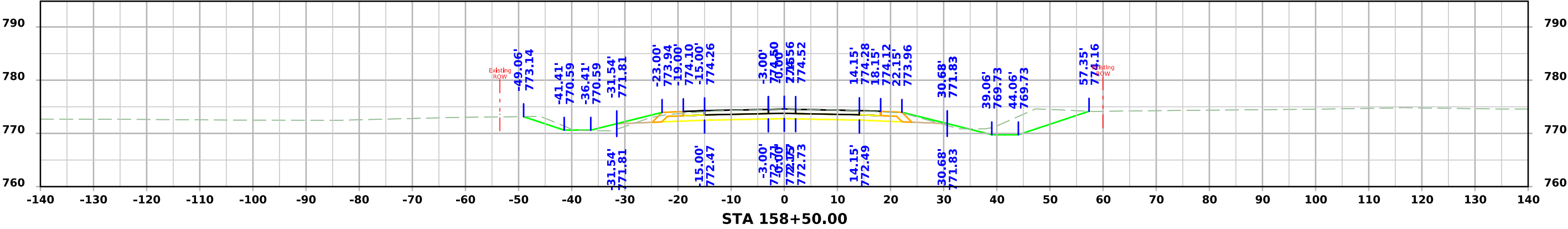
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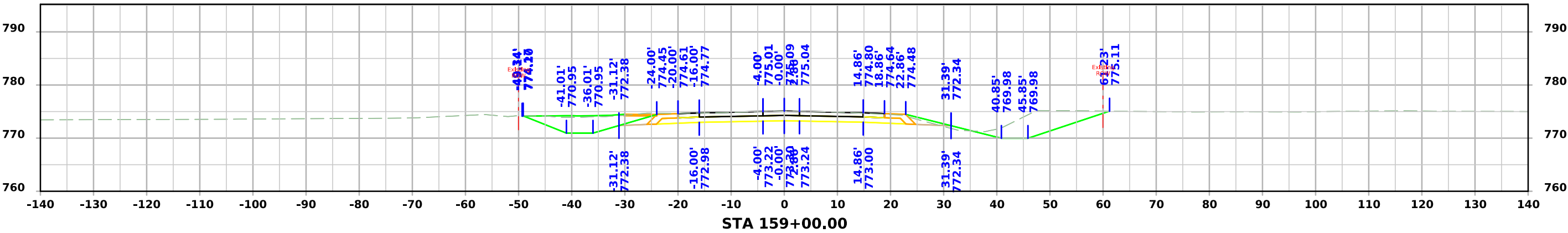
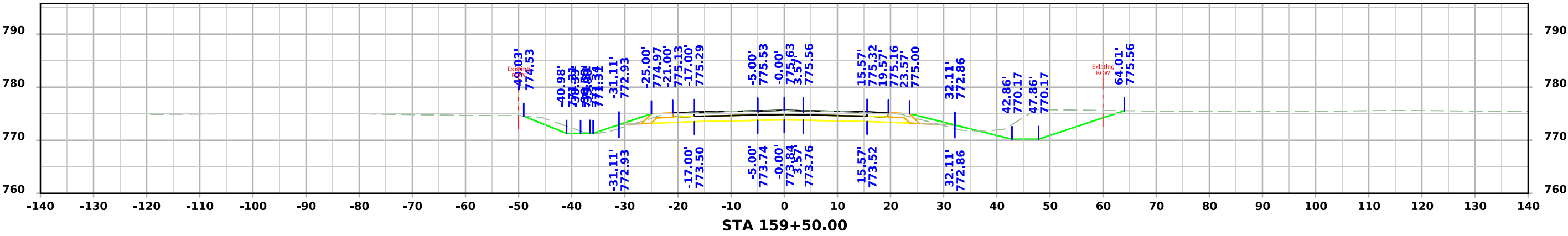
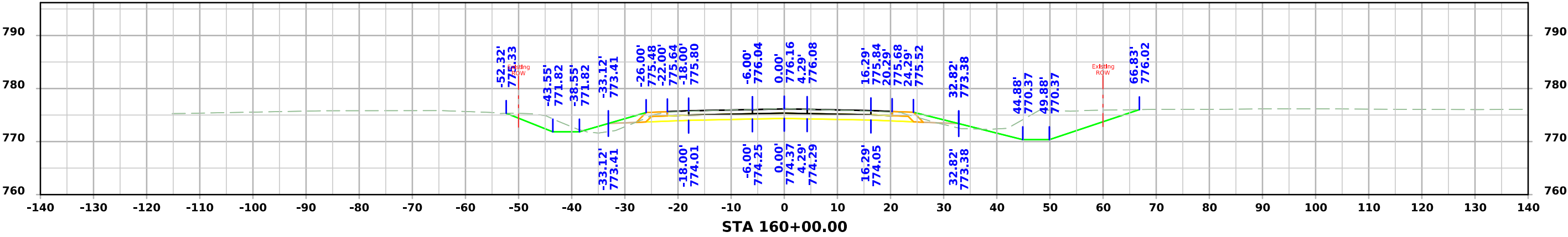
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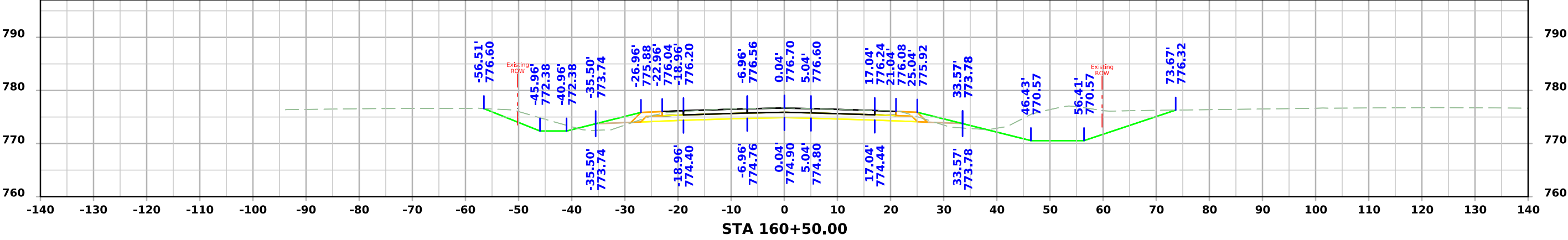
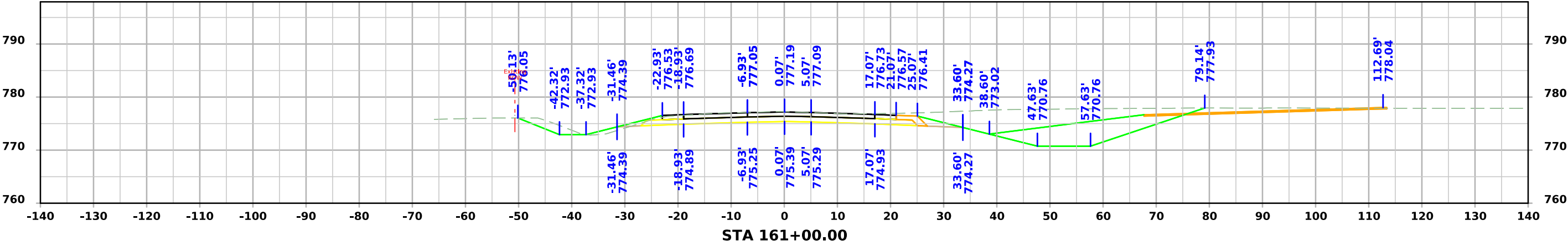
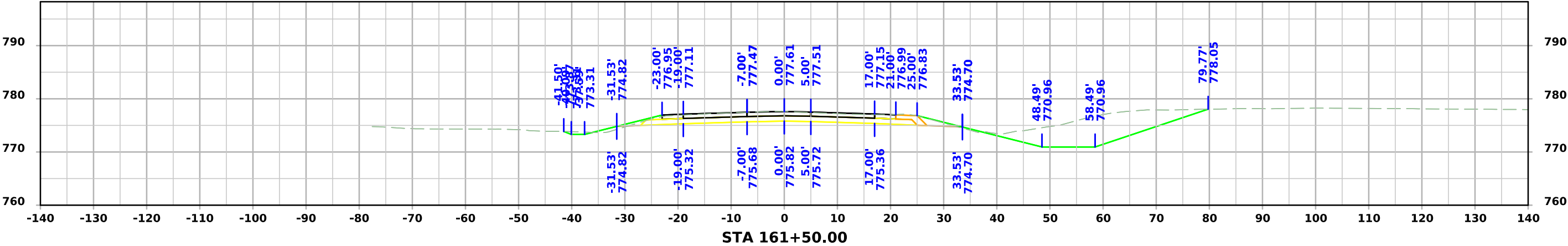
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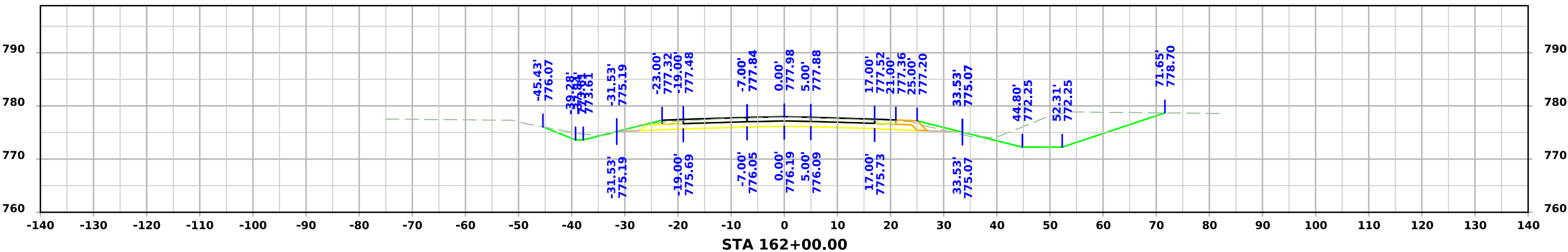
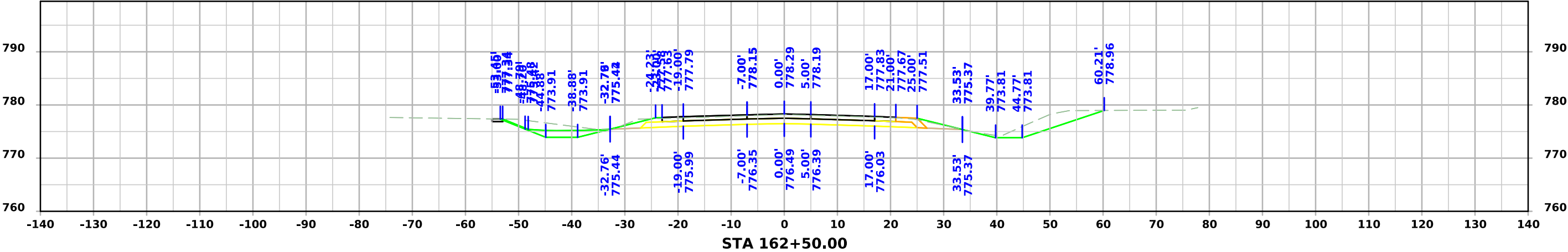
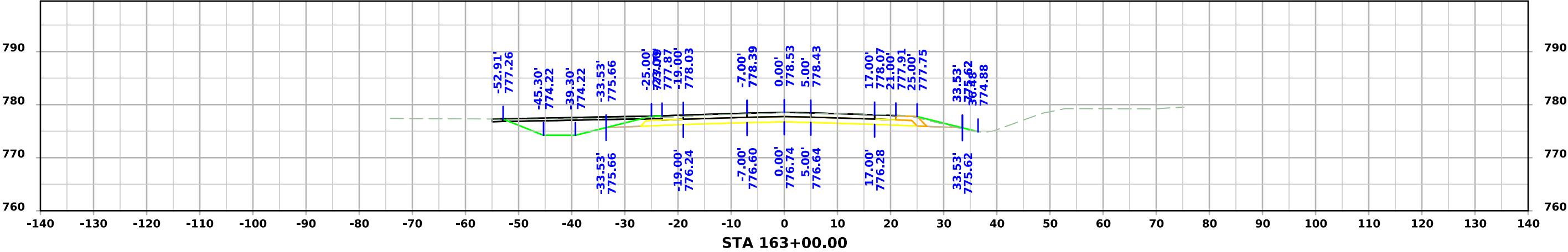
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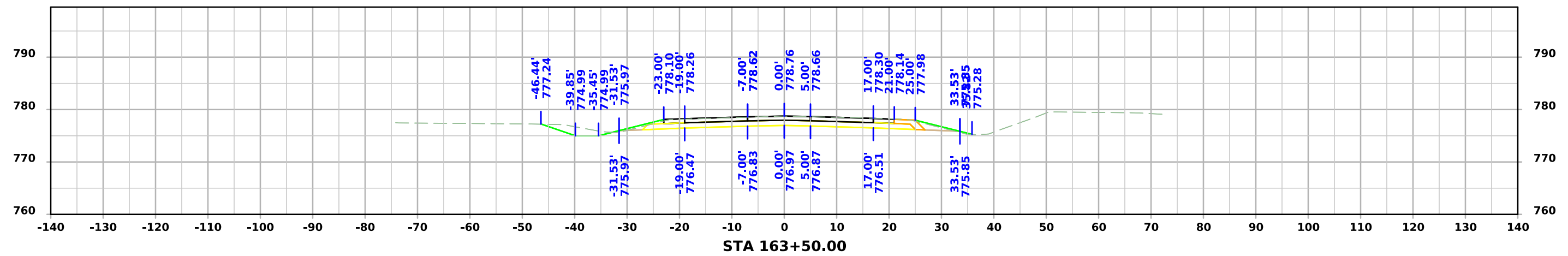
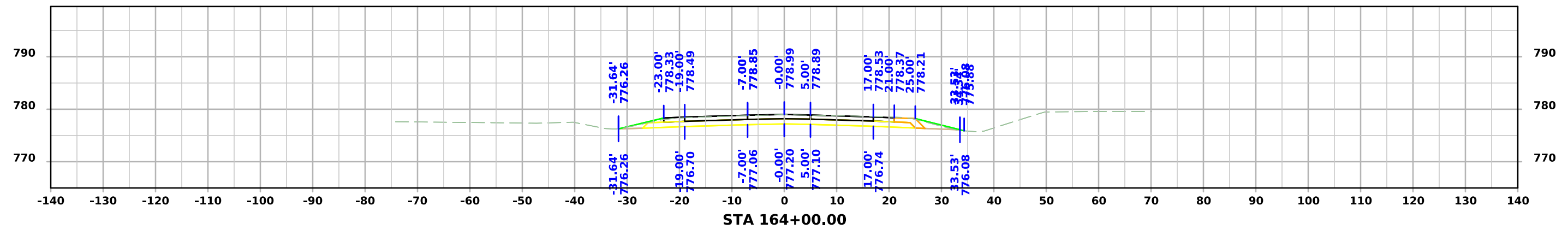
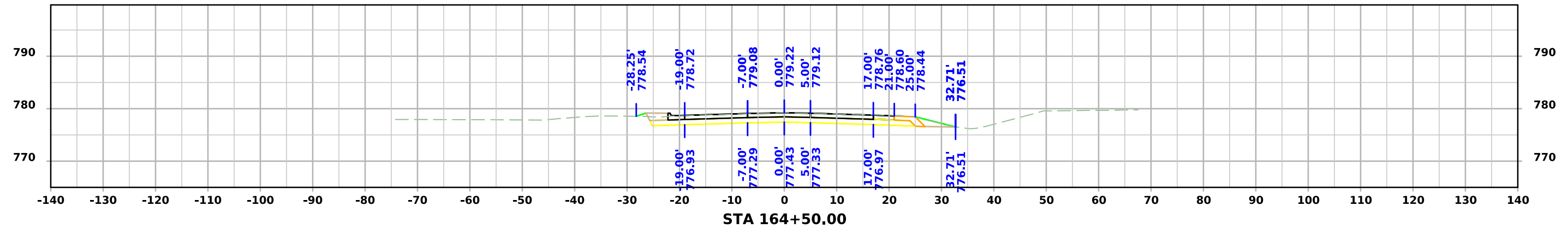
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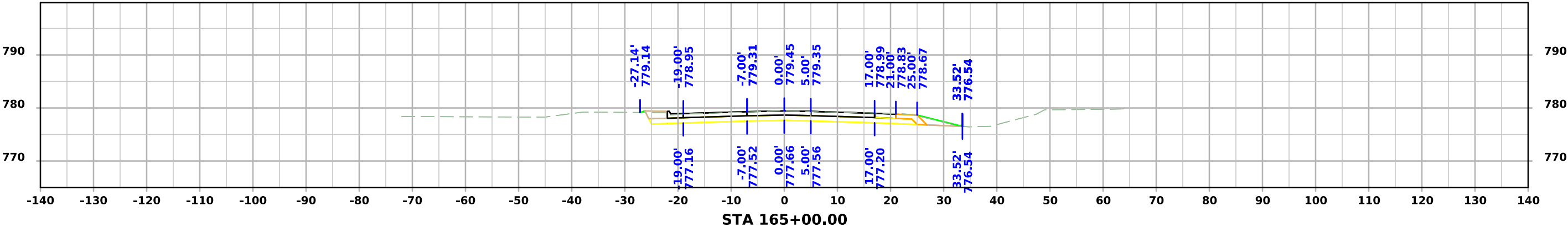
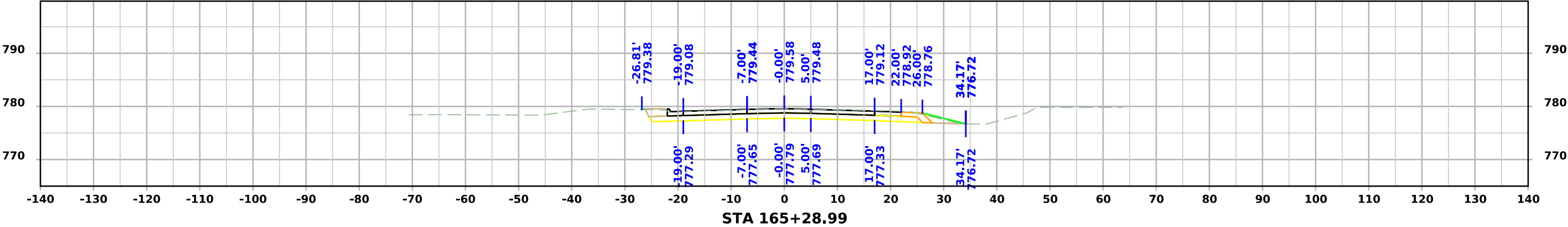


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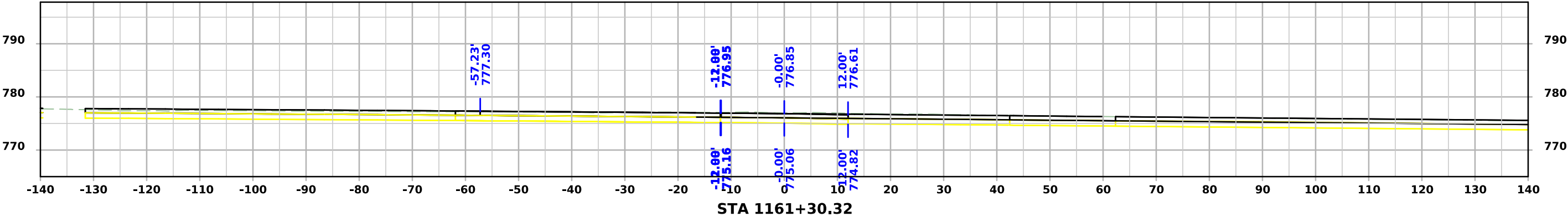
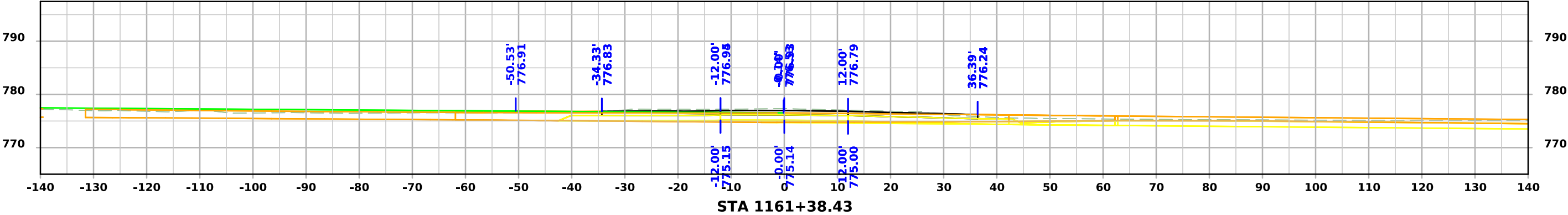
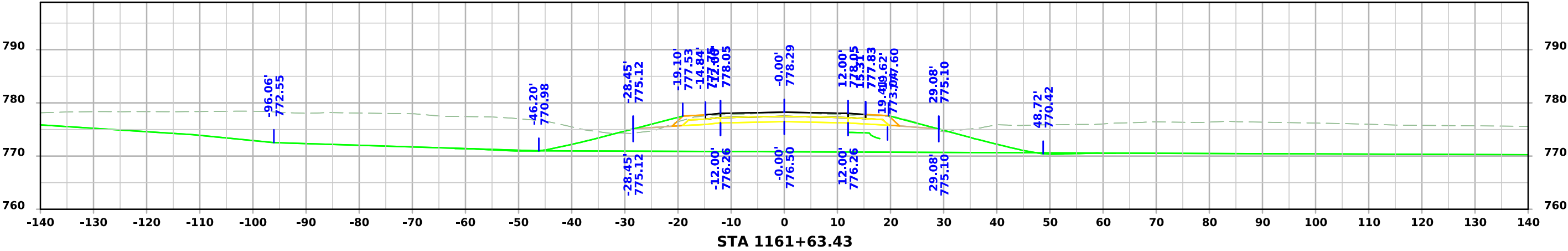


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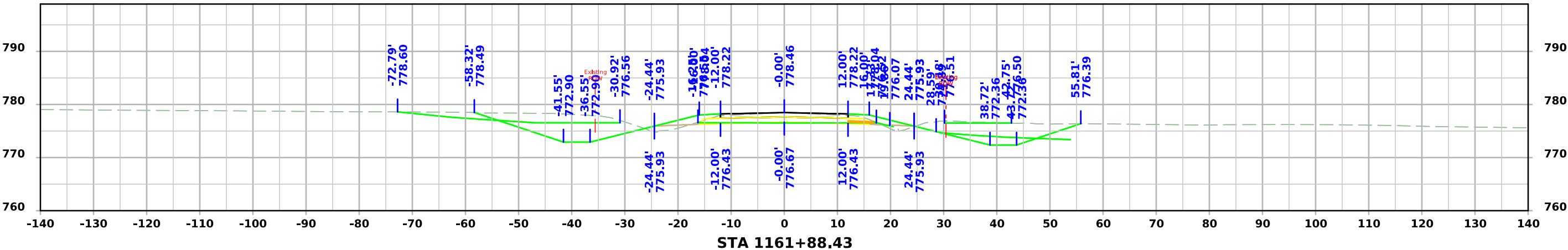
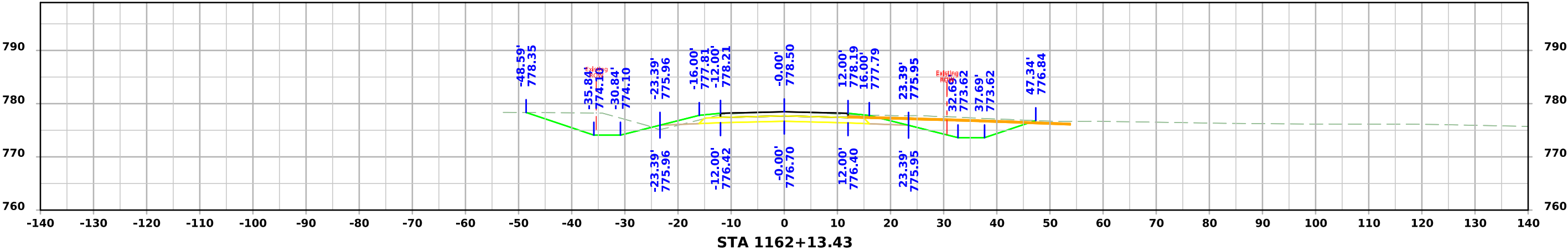
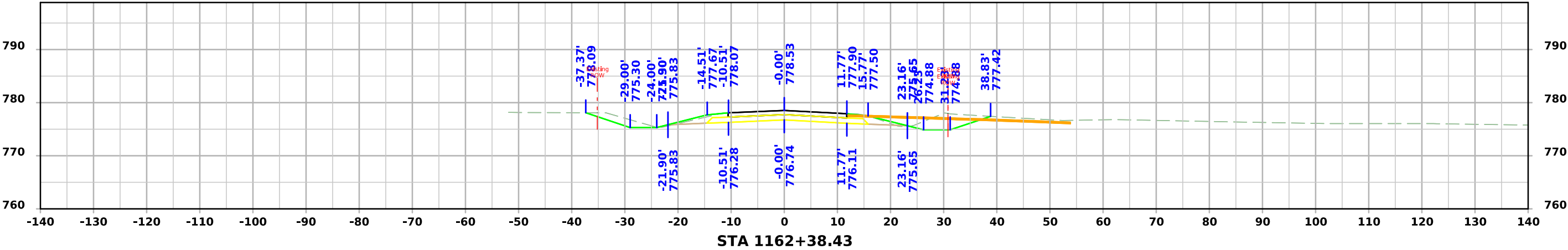




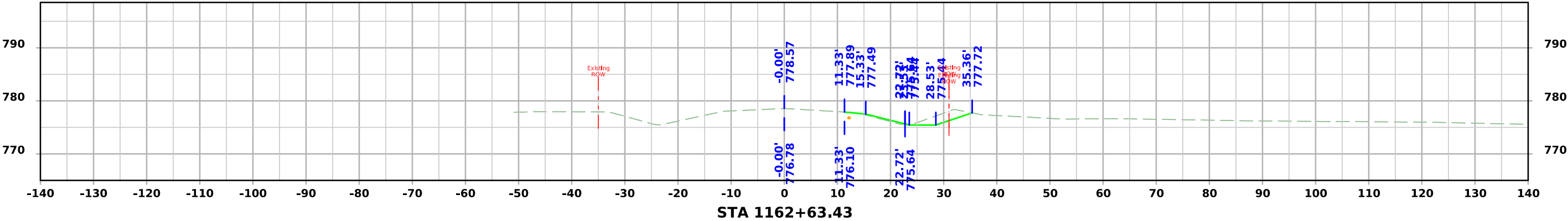
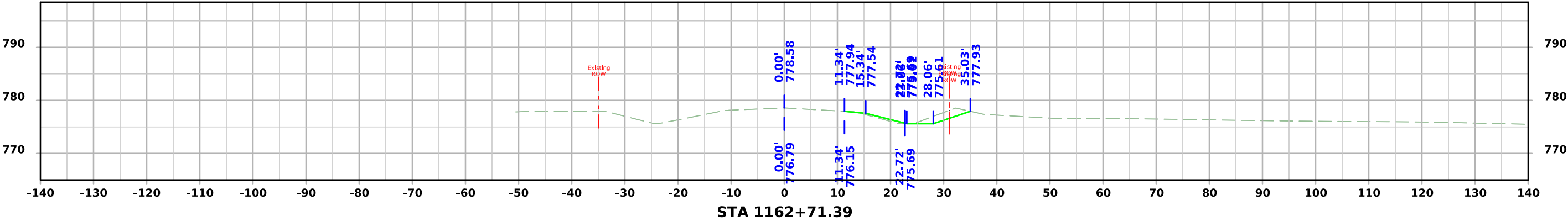
SR - 1st



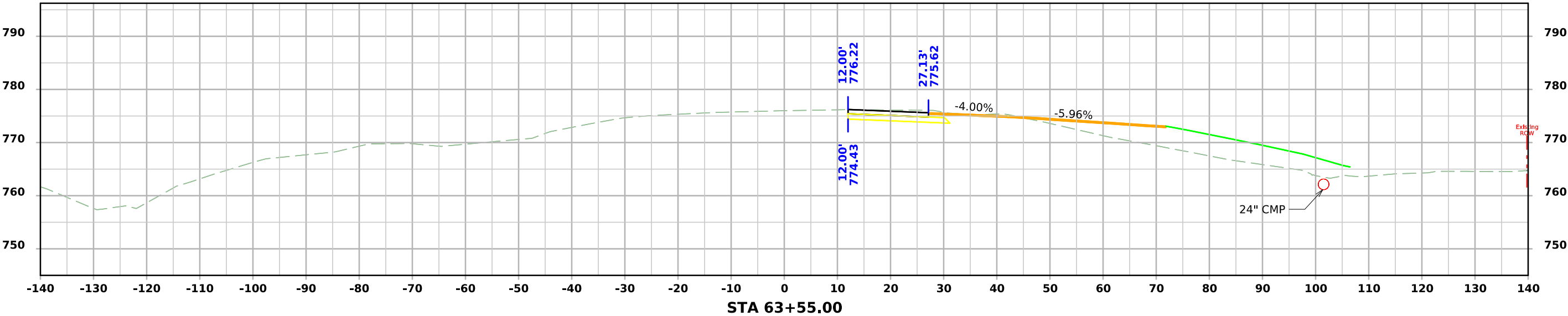
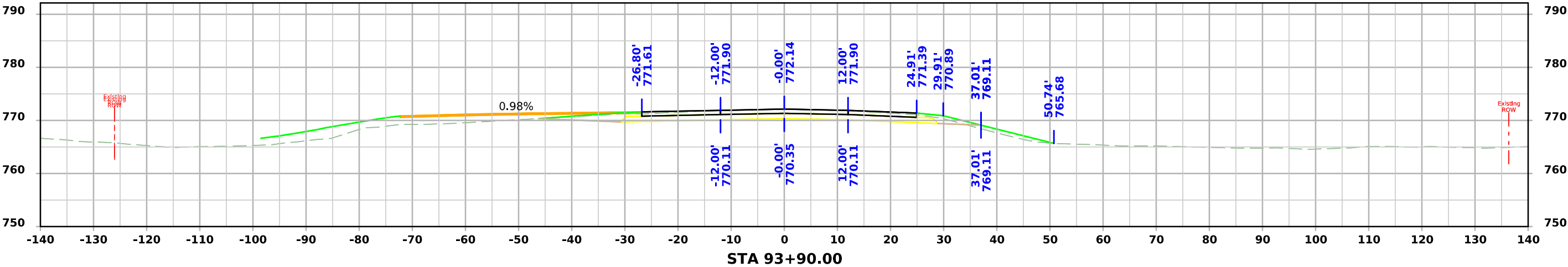
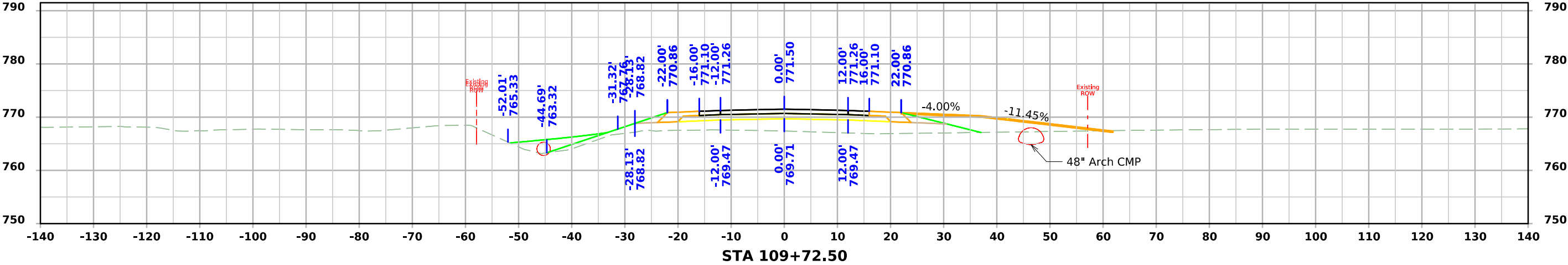
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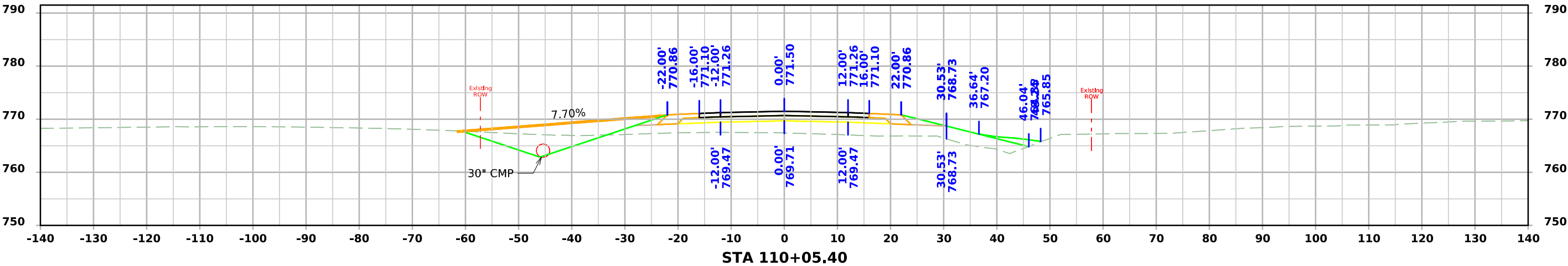
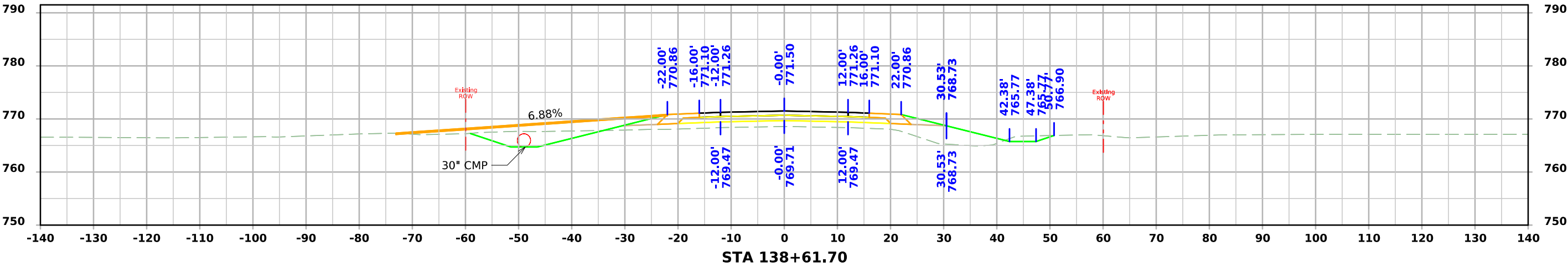
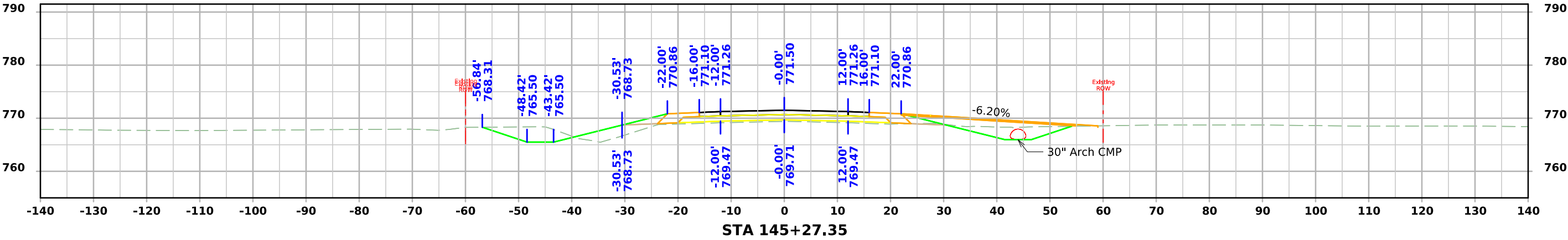
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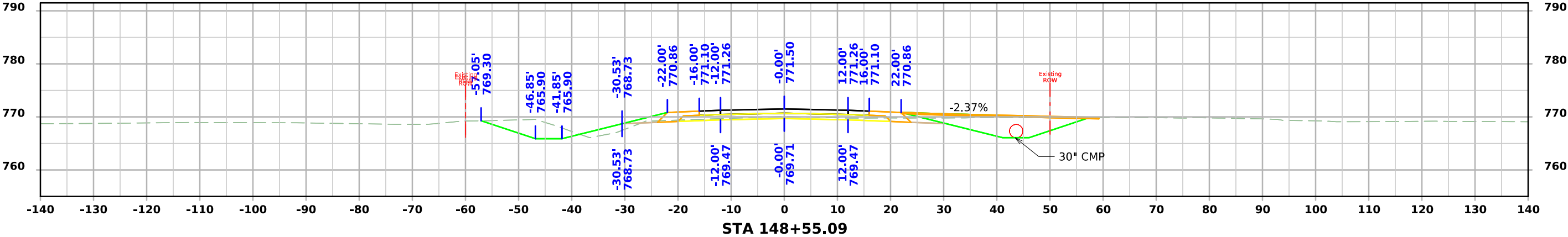
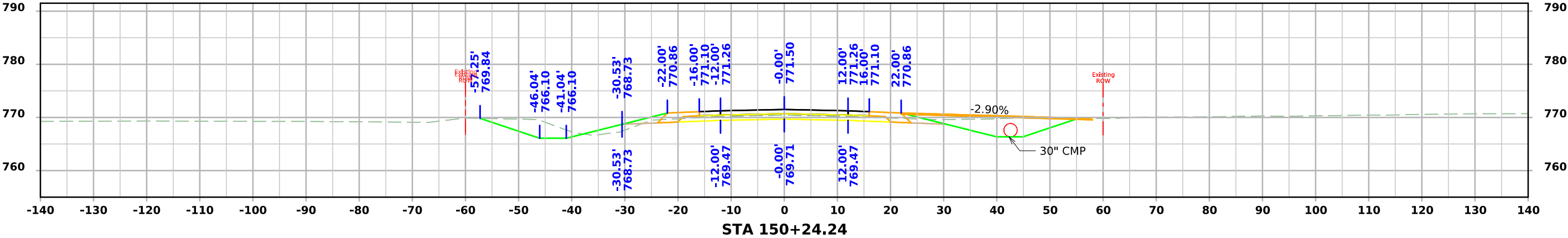
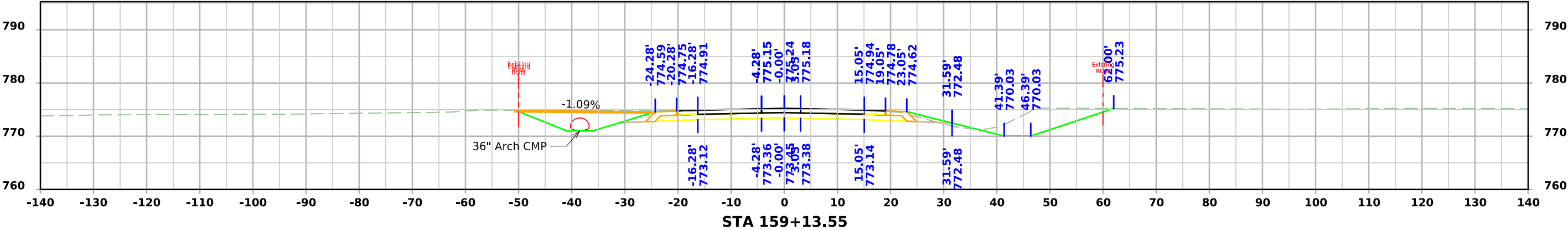
Mainline Entrances



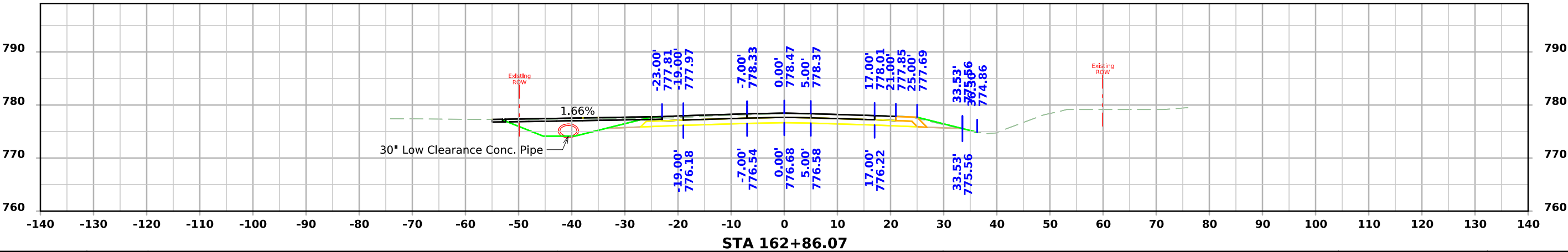
Mainline Entrances



Mainline Entrances



Mainline Entrances



Side Road Entrances

