

LETTING DATE  
**Mar 16 2027**

RCB Culvert Replacement - Single Box  
 STPN-009-1(059)--2J-60

**LYON COUNTY**



PLANS OF PROPOSED IMPROVEMENT ON THE  
**PRIMARY ROAD SYSTEM**  
**LYON COUNTY**  
 RCB Culvert Replacement - Single Box  
 Approx 1.4mi W of Co Rd K60

SCALES: As Noted

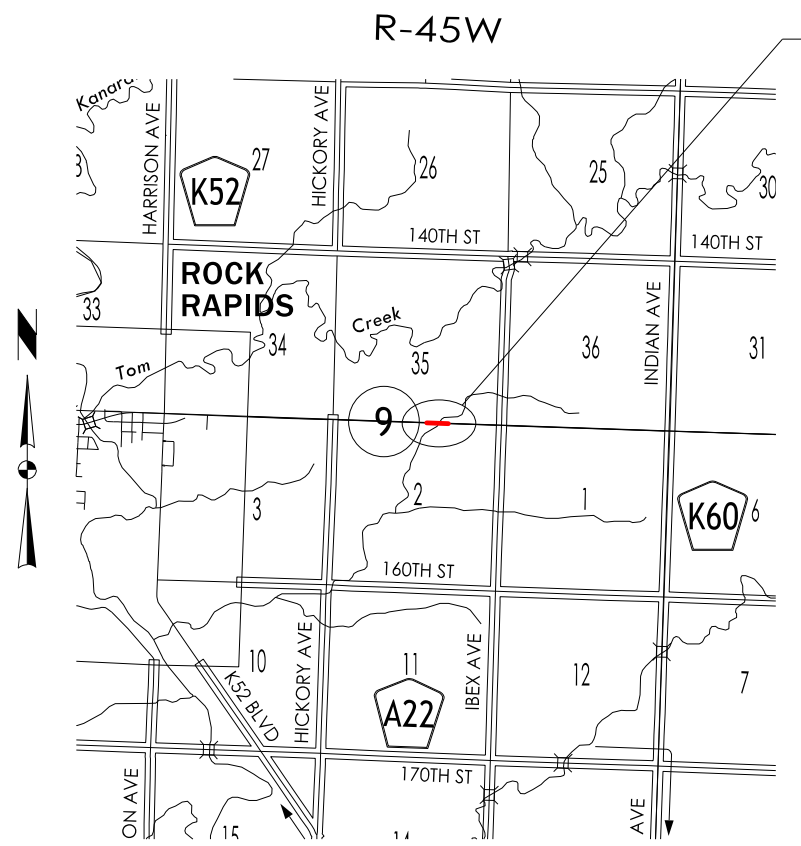
Refer to the Proposal Form for list of applicable specifications.  
 Value Engineering Saves. Refer to Article 1105.14 of the Specifications.



REVISIONS

TOTAL	--
PROJECT IDENTIFICATION NUMBER	24-60-009-030
PROJECT NUMBER	STPN-009-1(059)--2J-60
R.O.W. PROJECT NUMBER	-
	-
	-

No.	DESCRIPTION
<b>A Sheets</b>	<b>Title Sheets</b>
A.1	Title Sheet
<b>B Sheets</b>	<b>Typical Cross Sections and Details</b>
B.1 - 2	Typical Cross Sections and Details
<b>D Sheets</b>	<b>Mainline Plan and Profile Sheets</b>
* D.1	Plan & Profile Legend & Symbol Information Sheet
* D.2	IA 9
<b>G Sheets</b>	<b>Survey Sheets</b>
G.1	Reference Ties and Bench Marks
G.2 - 3	Horizontal Control Tab. & Super for all Alignments
<b>J Sheets</b>	<b>Traffic Control and Staging Sheets</b>
J.1	Traffic Control Plan
* J.2	Detour Map
<b>V Sheets</b>	<b>Bridge and Culvert Situation Plans</b>
* V.1 - 2	Bridge and Culvert Situation Plans
<b>W Sheets</b>	<b>Mainline Cross Sections</b>
* W.1	Cross Sections Legend & Symbol Information Sheet
* W.2 - 7	IA 9 Mainline Cross Sections
* W.8	Skewed Culvert Cross Sections
	* Color Plan Sheets



**PROJECT LOCATION**  
**MILEPOST 22.5**

DESIGN DATA RURAL			
2027	AADT	2800	V.P.D.
2047	AADT	3300	V.P.D.
20	DHV	-	V.P.H.
	TRUCKS	15	%
	Total		
	Design ESALS	-	

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

P9 PLAN - Date: 11/19/25  
 D4 PLAN - Date: 11/17/26

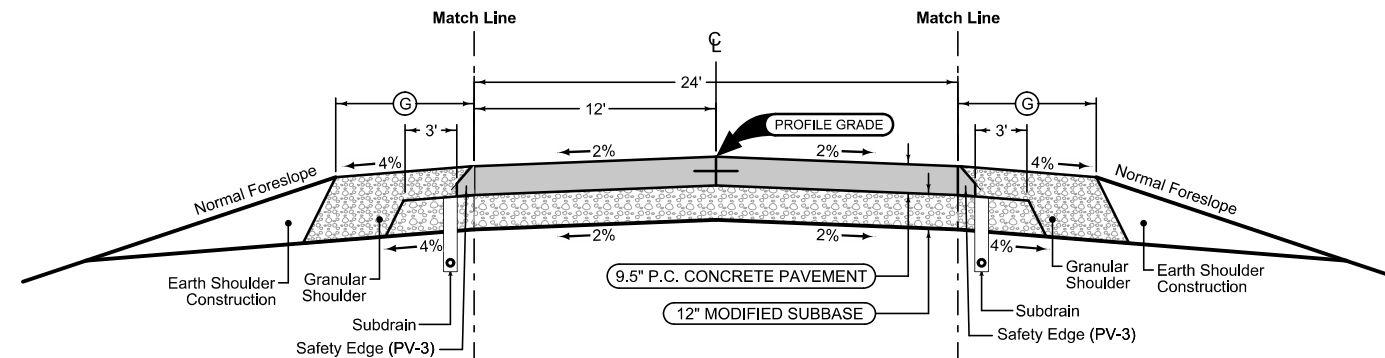
**PRELIMINARY PLANS**

Subject to change by final design.

D5 PLAN - Date: 7/25/25

**Granular Shoulder with Safety Edge**

2_G_		Ⓞ
04-21-20		
STATION TO STATION		Feet
207+05.00	208+61.06	6



**Granular Shoulder with Safety Edge**

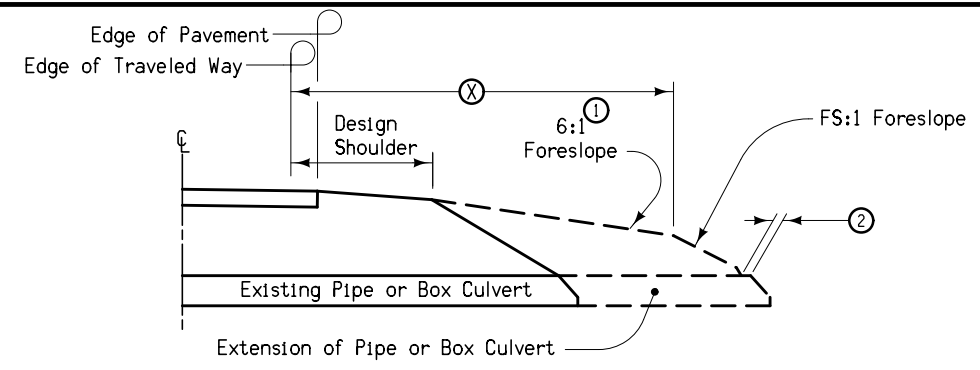
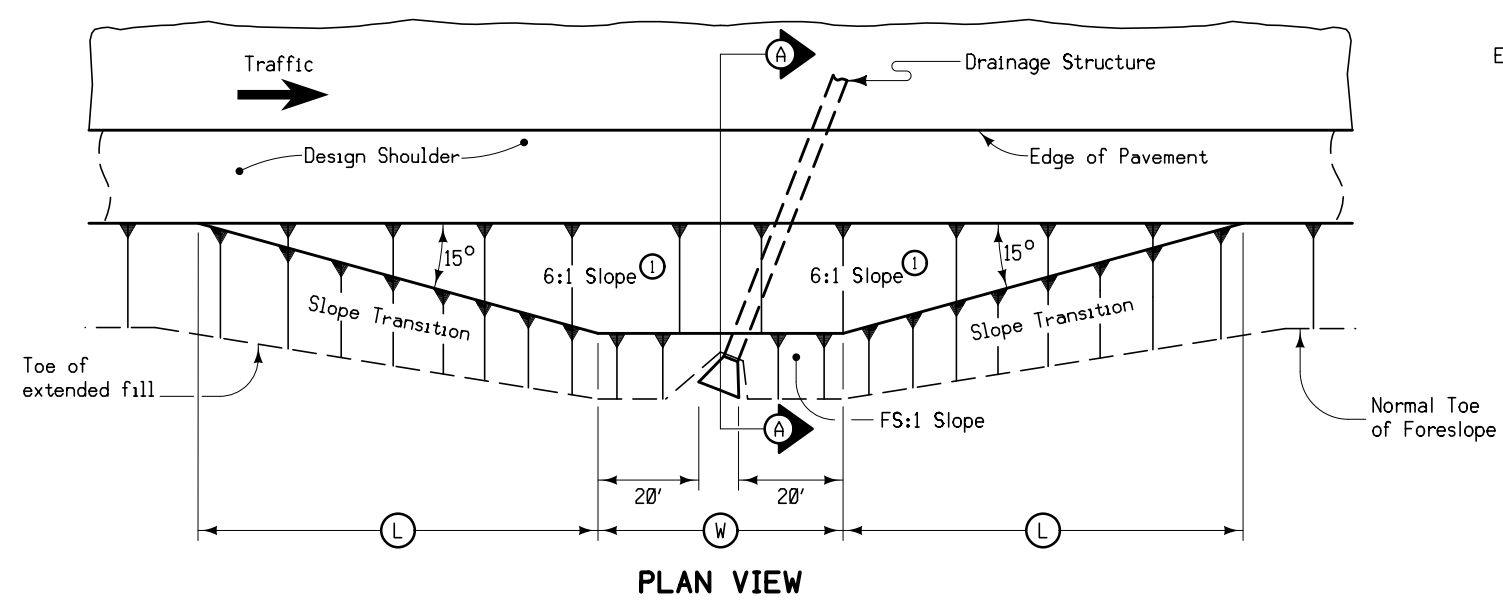
2_G_		Ⓞ
04-21-20		
STATION TO STATION		Feet
207+05.00	208+30.00	6

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

2P_	
04-21-20	
STATION TO STATION	
207+45.00	208+30.00

IA 9

4312  
MODIFIED



- At locations where an extended or newly constructed drainage structure extends beyond the normal foreslope cover, flatten as indicated so as to cover the structure. Minimum earth cover is 6 inches.
- ① Slope may be flatter than 6:1.
  - ② 6 inch minimum for pipe installations or to top of headwall on RCB.
  - ③ At  $\bar{C}$  of roadway.
  - Ⓜ = Pipe or RCB opening width plus 20 feet each side.

STRUCTURE LOCATION		Ⓜ	Ⓛ	Ⓧ	ⓕ
STATION ③	SIDE	Feet	Feet	Feet	
207+86.31	R	73.1	82.2	30	3
207+86.31	L	73.1	82.2	30	3

**BARNROOF FORESLOPE AT SKEWED DRAINAGE STRUCTURE**

### SURVEY SYMBOLS

- 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)
- Septic Tank
- Cistern
- L.P. Gas Tank (No Footing)
- Underground Storage Tank
- Latrine
- Satellite TV Dish
- Water Hook Up
- Radio Tower
- Tower Anchor
- Guardrail (Beam or Cable)
- Guard Post (one or two)
- Guard Post (over two)
- Filler Pipe
- Gas Valve
- Water Valve
- Speed Limit Sign
- Mile Marker Post
- SIGN Sign
- TCB Traffic Signal Control Box
- RRB Rail Road Signal Control Box
- TSB Telephone Switch Box
- EB Electric Box

### UTILITY LEGEND

- E1 **EL1D, Lyon County REC - Quality D**  
Bryan Herum  
bherum@lyonrec.coop  
712.739.0135
- F0 **FO1D, Premier Communications - Quality D**  
Jake Van Roekel  
jakevr@mypremieronline.com  
712.722.3451
- W **WL1D, Lyon-Sioux Rural Water - Quality D**  
Todd Vandekop  
Todd@lsrws.com  
712.723.3755

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

LINEWORK		Design Color No.	
Green	(2)		Existing Topographic Features and Labels
Blue	(1)		Proposed Alignment, Stationing, Tic Marks, and Alignment Annotation
Magenta	(5)		Existing Utilities
SHADING		Design Color No.	Transparency
Pink, Dark	(13)		Temporary Pavement Shading
Yellow	(4)		Proposed Pavement Shading
Orange	(6)		Proposed Granular Shading
Orange	(70)		Proposed Shoulder Granular Shading
Yellow	(68)		Proposed Shoulder Paved Full Depth Shading
Yellow	(132)		Proposed Shoulder Paved Partial Depth Shading
Brown, Light	(236)		Grading Shading
Orange, Light	(134)		Proposed Granular Entrance Shading
Yellow	(220)		Proposed Paved Entrance Shading
Tan	(8)		Proposed Sidewalk Shading
Blue, Light	(230)		Proposed Sidewalk Landing Shading
Pink	(11)		Proposed Sidewalk Ramp Shading
Red	(3)		Proposed Structure Shading
Red	(3)		Delineates Restricted Areas

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

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

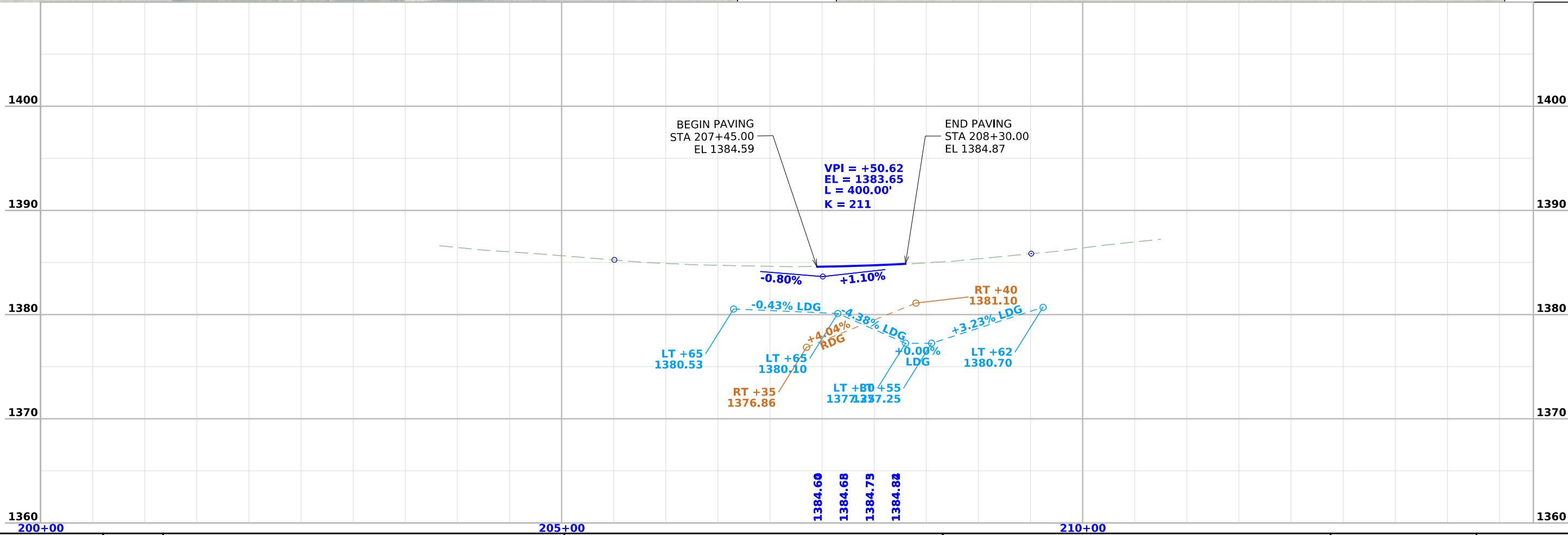
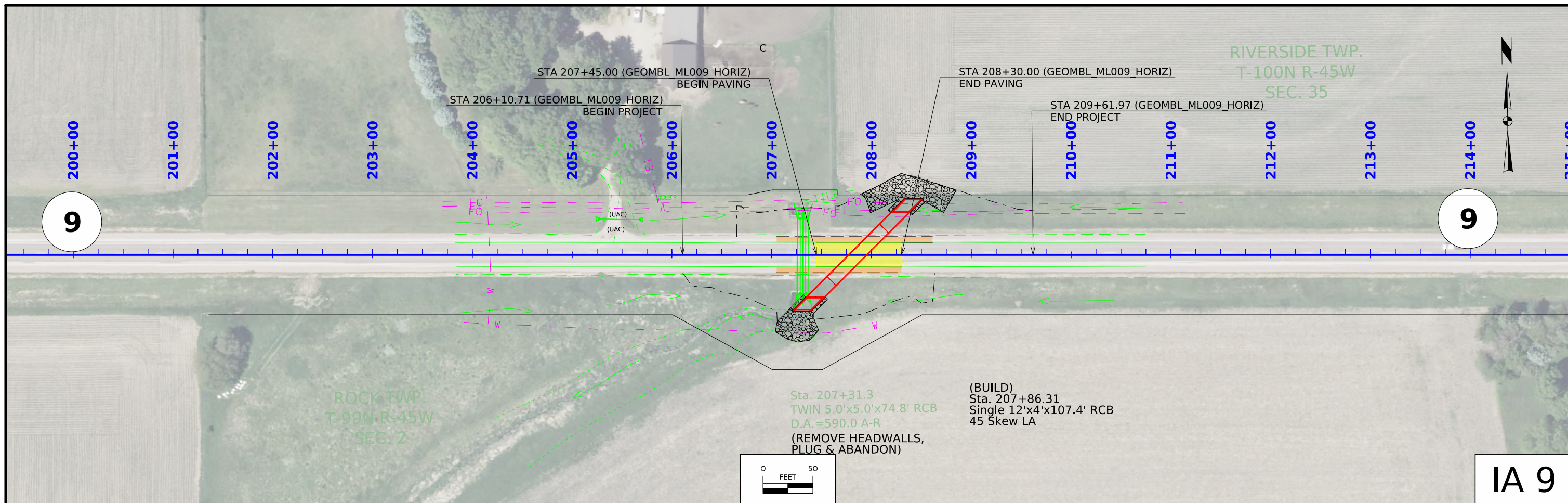
- Reference Point
- Station
- Survey Line
- Section Corner
- Ground Line Intercept
- Saw Cut
- Guardrail
- Trench Drain
- HighTension Cable Guardrail
- Sheet Pile
- Pavement Removal
- Clearing & Grubbing Area

### RIGHT-OF-WAY LEGEND

- Proposed Right-of-Way 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
- C/A Access Control
- Property Line Symbol
- Property Line

## PLAN AND PROFILE LEGEND AND SYMBOL INFORMATION SHEET

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



## Survey Information

### SURVEY INDEX

**County: Lyon**  
**PIN: 24-60-009-030**  
**Project Number: STPN-009-1(059)--2J-60**  
**Location: Approx 1.4 mi W of Co Rd K60**  
**Type of Work: Culvert**  
**Project Directory: 6000903024**

### Survey Personnel

Daniel Duncan – Survey Party Chief

### Date(s) of Survey

Begin Date 05/01/2024  
End Date 05/13/2024

### General Information

This survey is for IA Hwy 9 Culvert project. This project is a Full Field DTM survey.

### 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. Post processing is constrained to nearby Iowa Real Time Network reference stations. 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 01**  
**(U.S. SURVEY FOOT)**  
**VERTICAL DATUM: NAVD88**  
**GEOID MODEL: 2018u2**

### Alignment Information

The horizontal alignment for IA. Hwy 9 this survey is a retrace of As-built Plans No. FA-110EB Rock Rapids E 14 Miles Paving. Survey stationing was equated to the plan PI at Sta. 161+65.9 and carried ahead without equation throughout the survey.

Survey stationing relates to as built plan stationing as follows:

PI Sta. 161+65.9 As-built Plans Project No. FA-110EB  
Survey PI Sta. 161+65.90

NW Cor. Sec. 2 Sta. 174+93.4 Lt 2.8 ft As-built Plans Project No. FA-110EB  
Survey NW Cor. Sec. 2 Sta. 174+92.50 Lt 2.87 ft

N¼ Cor. Sec. 2 Sta. 201+35.2 Lt 2.5 ft As-built Plans Project No. FA-110EB  
Survey N¼ Cor. Sec. 2 Sta. 201+35.93 Lt 2.72 ft

NE Cor. Sec. 2 Sta. 227+55.8 Lt 0.7 ft As-built Plans Project No. FA-110EB  
Survey NE Cor. Sec. 2 Sta. 227+56.84 Lt 0.70 ft

## 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 01 (U.S. Survey Foot)

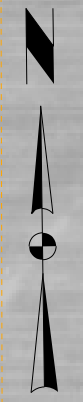
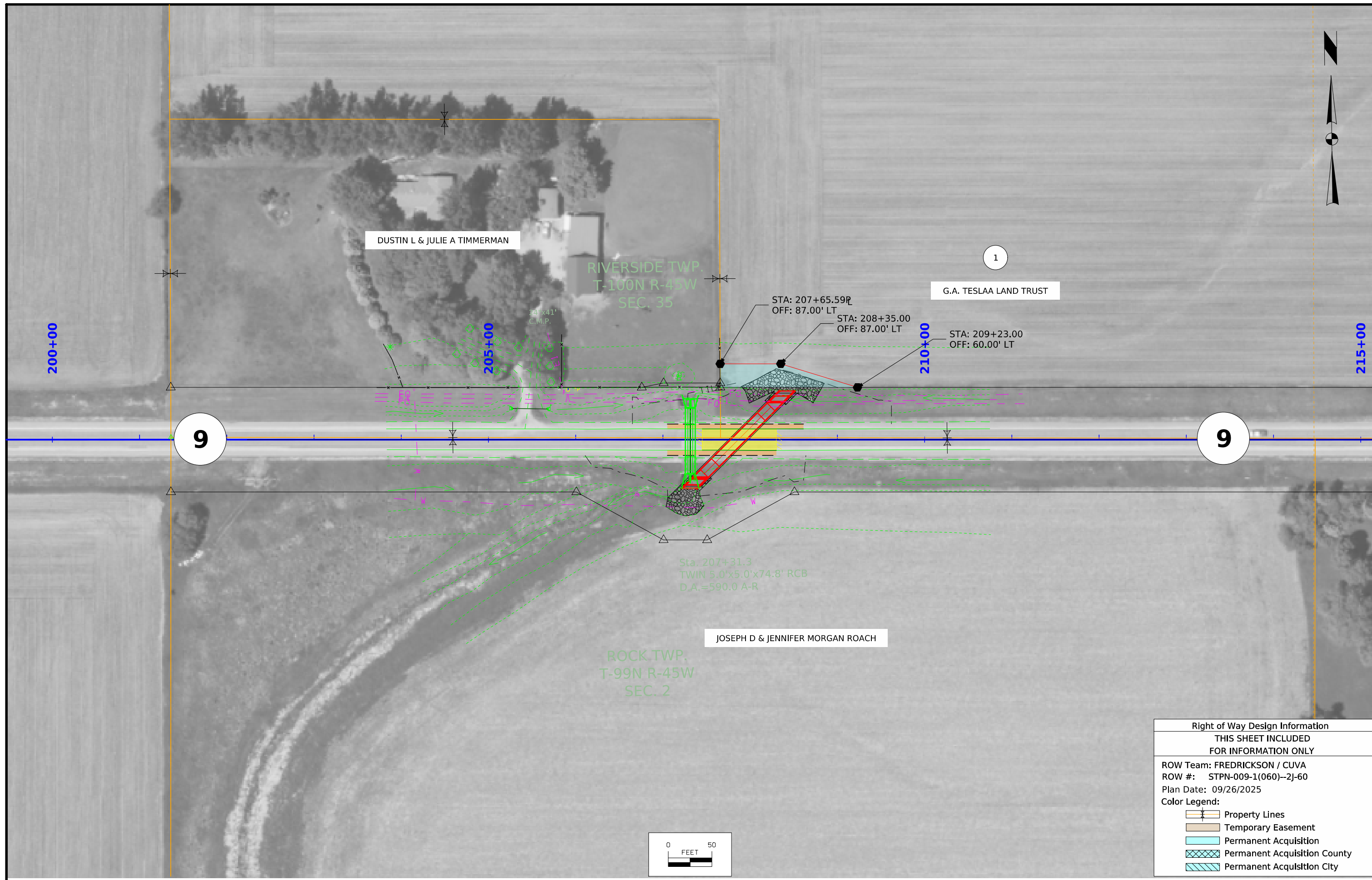
VERT. DATUM: NAVD88 - Geoid Model: 2018u2

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 01 (U.S. Survey Foot)  
 VERT. DATUM: NAVD88  
 Geoid Model: 2018u2

Point Name	Northing	Easting	Elevation	Code-Description
600090217	9686205.04	11263403.61	1431.24	CP FND IA DOT ROW RAIL SET DIMPLE IN BALL 0.25 MI WEST OF IA 9 AND HICKORY AVE INTERSECTION
600090224	9686153.15	11266921.99	1388.84	CP SET FENO MON 3IN DEEP 0.4 MI EAST OF IA 9 AND HICKORY AVE INTERSECTION
600090229	9686116.95	11269919.15	1403.89	CP SET FENO MON 3IN DEEP IN THE NW CORNER OF IA 9 AND IBEX AVE INTERSECTION
ROCKPORT	9693140.99	11253155.68	1357.63	CP FND NGS THIRD ORDER HORIZONTAL PRIMARY AIRPORT AZIMUTH MARK AS DESCRIBED

NO ACCESS RIGHTS ARE TO BE ACQUIRED ON THIS PROJECT.



9

9

1

DUSTIN L & JULIE A TIMMERMAN

RIVERSIDE TWP.  
T-100N R-45W  
SEC. 35

G.A. TESLAA LAND TRUST

STA: 207+65.59R  
OFF: 87.00' LT

STA: 208+35.00  
OFF: 87.00' LT

STA: 209+23.00  
OFF: 60.00' LT

200+00

205+00

210+00

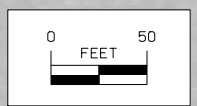
215+00

Sta. 207+31.3  
TWIN 5.0'x5.0'x74.8' RCB  
D.A.=590.0 A-R

JOSEPH D & JENNIFER MORGAN ROACH

ROCK TWP.  
T-99N R-45W  
SEC. 2

Right of Way Design Information	
THIS SHEET INCLUDED FOR INFORMATION ONLY	
ROW Team: FREDRICKSON / CUVA	
ROW #: STPN-009-1(060)--2J-60	
Plan Date: 09/26/2025	
Color Legend:	
	Property Lines
	Temporary Easement
	Permanent Acquisition
	Permanent Acquisition County
	Permanent Acquisition City

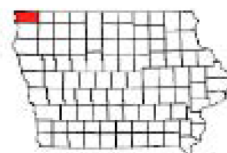
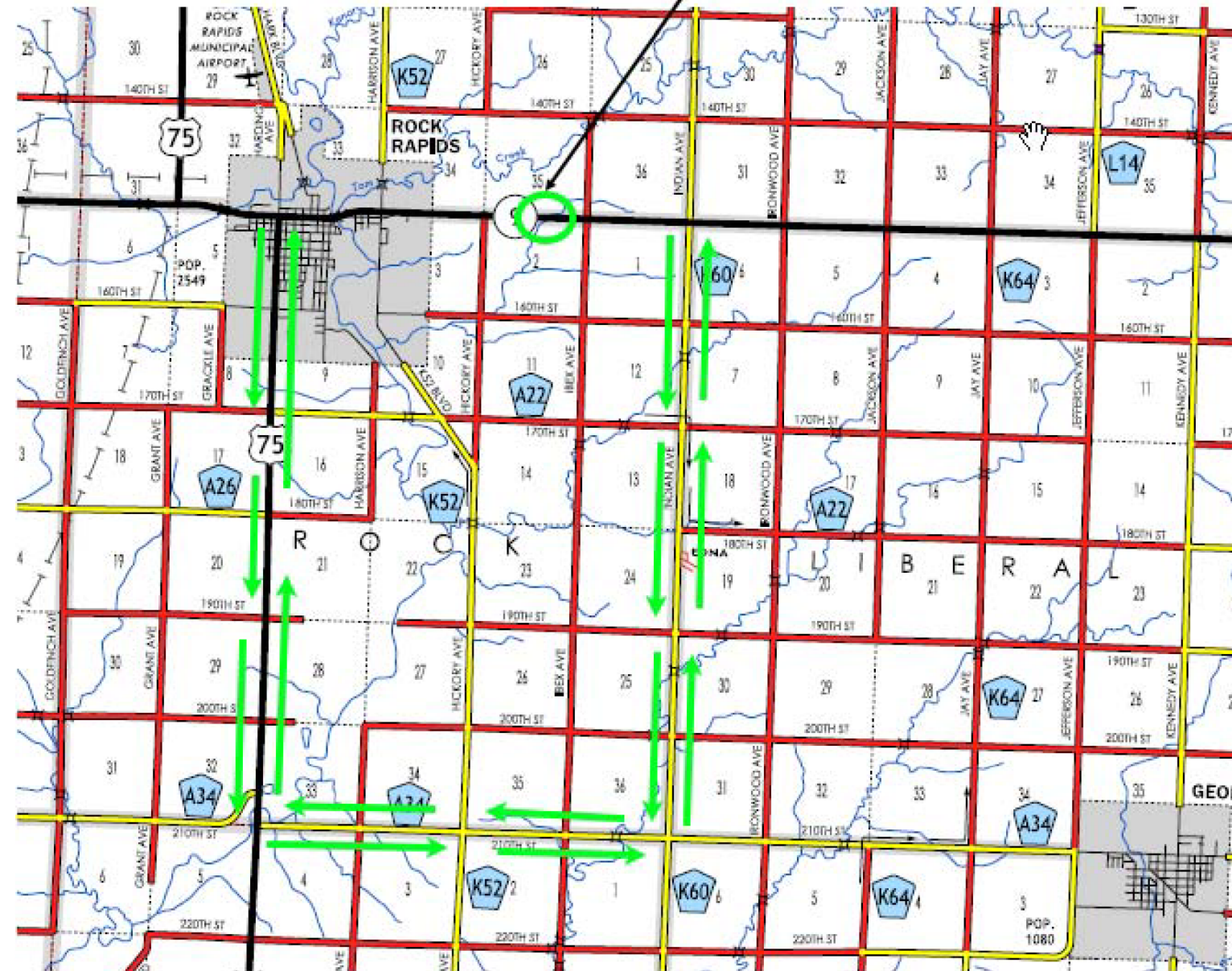


# TRAFFIC CONTROL PLAN

108\_23A  
8/15/22

Traffic on IA 9 will be maintained at all times via an off-site detour. Refer to J.2 for Detour Route.

PROJECT LOCATION



### Lyon County

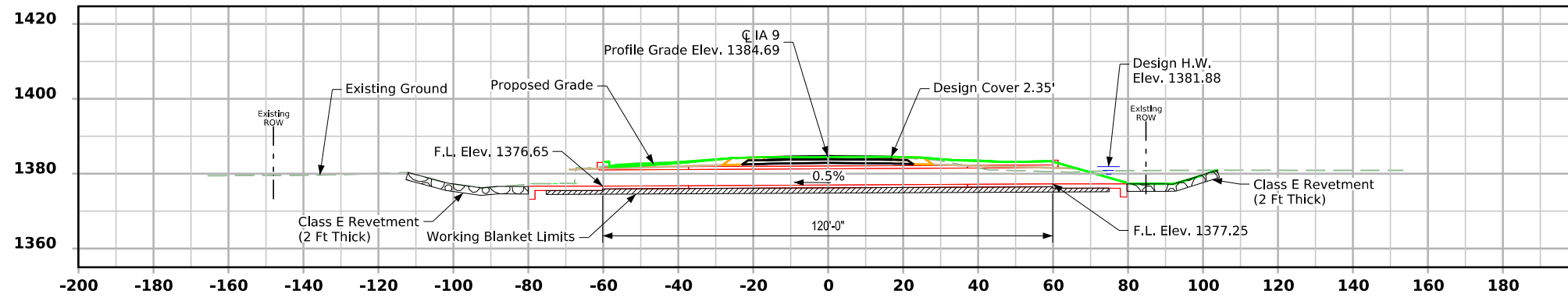
Approx 1.4 miles /west of County Road K60

STPN-009-1(059)--2J-60

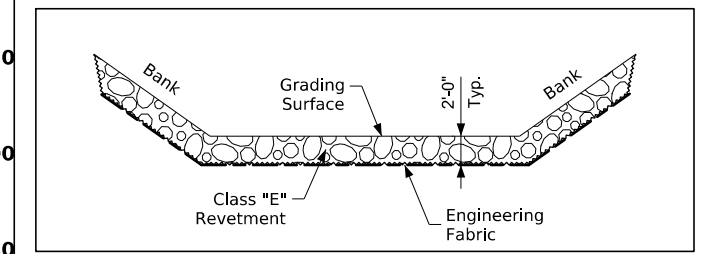
PIN: 24-60-009-030



Control Point: 600090217,Cp Fnd Ia Dot Row Rail Set Dimple In Ball 0.25 Mi West Of Ia 9 And Hickory Ave Intersection Elev. 1431.239, N.9686205.42, E.11263403.610



STA 207+86.22  
Longitudinal Section Along Centerline of Culvert



Typical Channel Protection

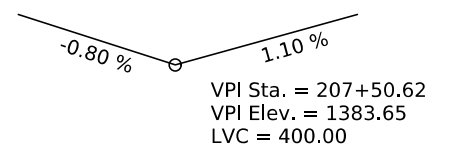
Estimated Revetment Quantities Included With Road Plans

Location	Revetment Class "E" (Ton)	Engineering Fabric (SY)	CL. 13 Channel Excavation (CY)
Inlet	217	229	153
Outlet	122	129	86
Totals	339	358	239

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. Quantities shown for information only. See Road Sheets.

VPC Sta. = 205+50.62  
VPC Elev. = 1385.25

VPT Sta. = 209+50.62  
VPT Elev. = 1385.85



Proposed Profile Grade IA 9

**General Notes:**

This design is for the replacement of an existing twin 5'-0" x 5'-0" x 75' RCB culvert with an single 12'-0" x 4'-0" x 120'-0" RCB Culvert, Asset ID no. 900920

**Design Notes:**

1. Design fill for this C.I.P. culvert is 2.35'.
2. Anticipated settlement is negligible.
3. Revetment is proposed at the culvert inlet and outlet due to erosion concerns.

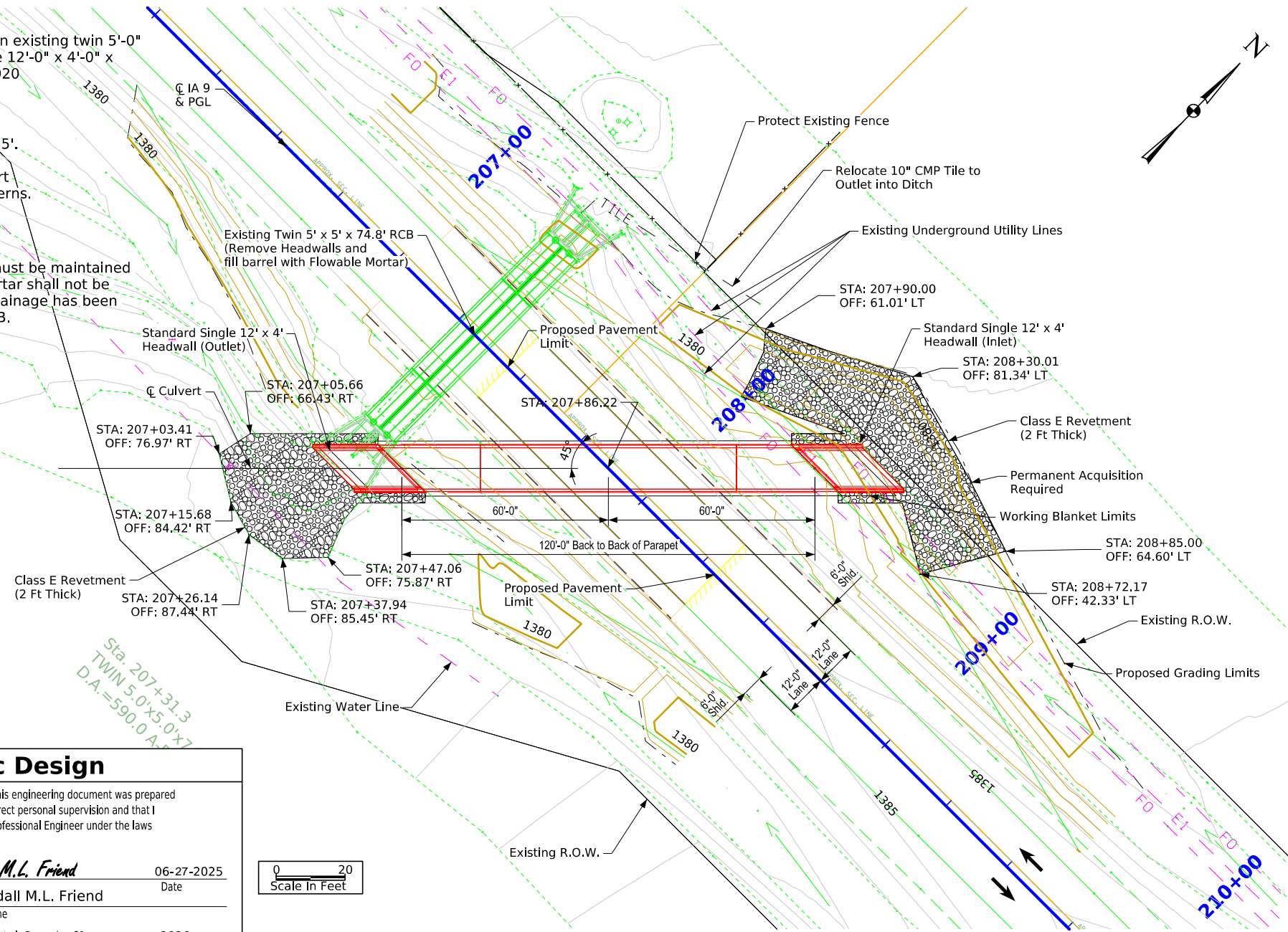
**Plan Notes:**

1. Drainage through culvert/channel must be maintained throughout construction. Flowable mortar shall not be placed in existing RCB until positive drainage has been established through proposed new RCB.

**Hydraulic Data**

RIDB: Not Applicable  
Drainage Area = 492.8 Acres  
Stream Slope = 35.9 Ft./Mi.  
Q<sub>50</sub> = 316 cfs  
HW Elev. = 1381.88  
Exit Velocity = 6.58 fps

Q<sub>100</sub> = 379 cfs  
HW Elev. = 1382.74  
Exit Velocity = 7.90 fps



Situation Plan

**Location**

IA-9 over Unnamed Trib to Rock River  
T-99N R-45W  
Section 2  
Rock Township  
Lyon County  
Bridge Maint. No. 6022.6B009  
Asset ID No. 900920  
Latitude 43.432828°  
Longitude -91.123586°

**Traffic Estimate**

2027 AADT 2800 V.P.D.  
2047 AADT 3300 V.P.D.  
TRUCKS 14 %

**Utilities Note:**

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

**General Utility Symbols:**

- E - Electric Line
- G - Gas Line
- SAN. - Sanitary Sewer
- T - Telephone Line
- W - Water Line
- FO - Fiber Optic Line
- GHP - Gas High Pressure
- ST S - Storm Sewer
- TV - TV
- Power Poles

**Hydraulic Design**

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

Signature: *Randall M.L. Friend* Date: 06-27-2025  
Printed or Typed Name: Randall M.L. Friend  
My license renewal date is December 31, 2026



Pages or sheets covered by this seal: V.1 and V.2  
P28452

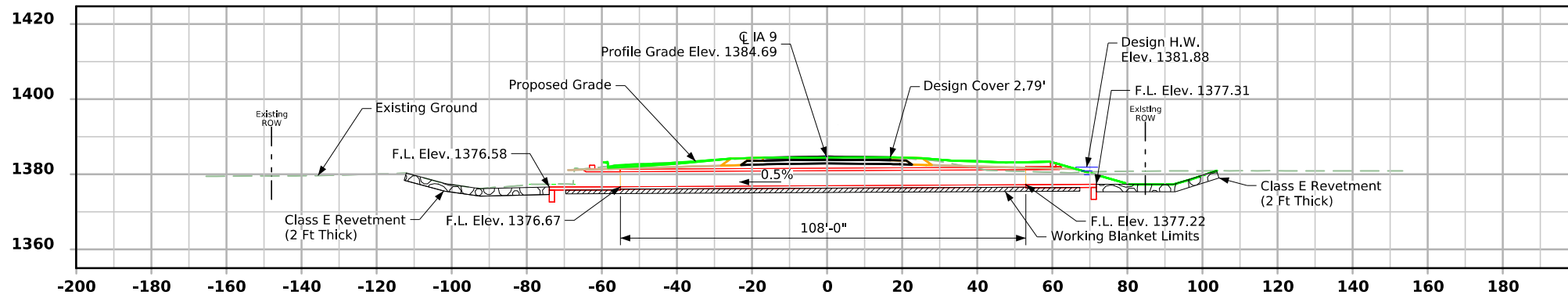
Design For 45° Left Ahead  
Single 12'-0" x 4'-0" x 120'-0" Reinforced Concrete Box Culvert

Situation Plan - C.I.P.

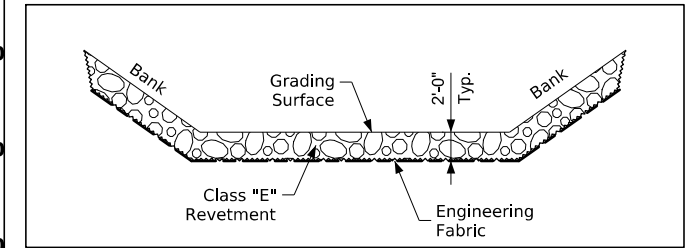
STA. 207+86.22 (IA 9) Turn-in Date: June 2025

Lyon County

IOWA DEPARTMENT OF TRANSPORTATION  
Design No. 0127 Design Sheet No. 1 of 2 FHWA/Asset 900920



STA 207+86.22  
Longitudinal Section Along Centerline of Culvert



Typical Channel Protection

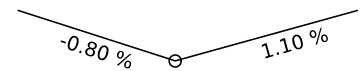
Estimated Revetment Quantities Included With Road Plans

Location	Revetment Class "E" (Ton)	Engineering Fabric (SY)	CL. 13 Channel Excavation (CY)
Inlet	237	250	167
Outlet	136	144	96
Totals	373	394	263

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. Quantities shown for information only. See Road Sheets.

VPC Sta. = 205+50.62  
VPC Elev. = 1385.25

VPT Sta. = 209+50.62  
VPT Elev. = 1385.85



VPI Sta. = 207+50.62  
VPI Elev. = 1383.65  
LVC = 400.00

Proposed Profile Grade IA 9

**General Notes:**

This design is for the replacement of an existing twin 5'-0" x 5'-0" x 75' RCB culvert with an single 12'-0" x 4'-0" x 121'-4 1/8" RCB Culvert, Asset ID no. 900920

**Design Notes:**

1. Design fill for this P.C. culvert is 2.79'.
2. Anticipated settlement is negligible.
3. Revetment is proposed at the culvert inlet and outlet due to erosion concerns.

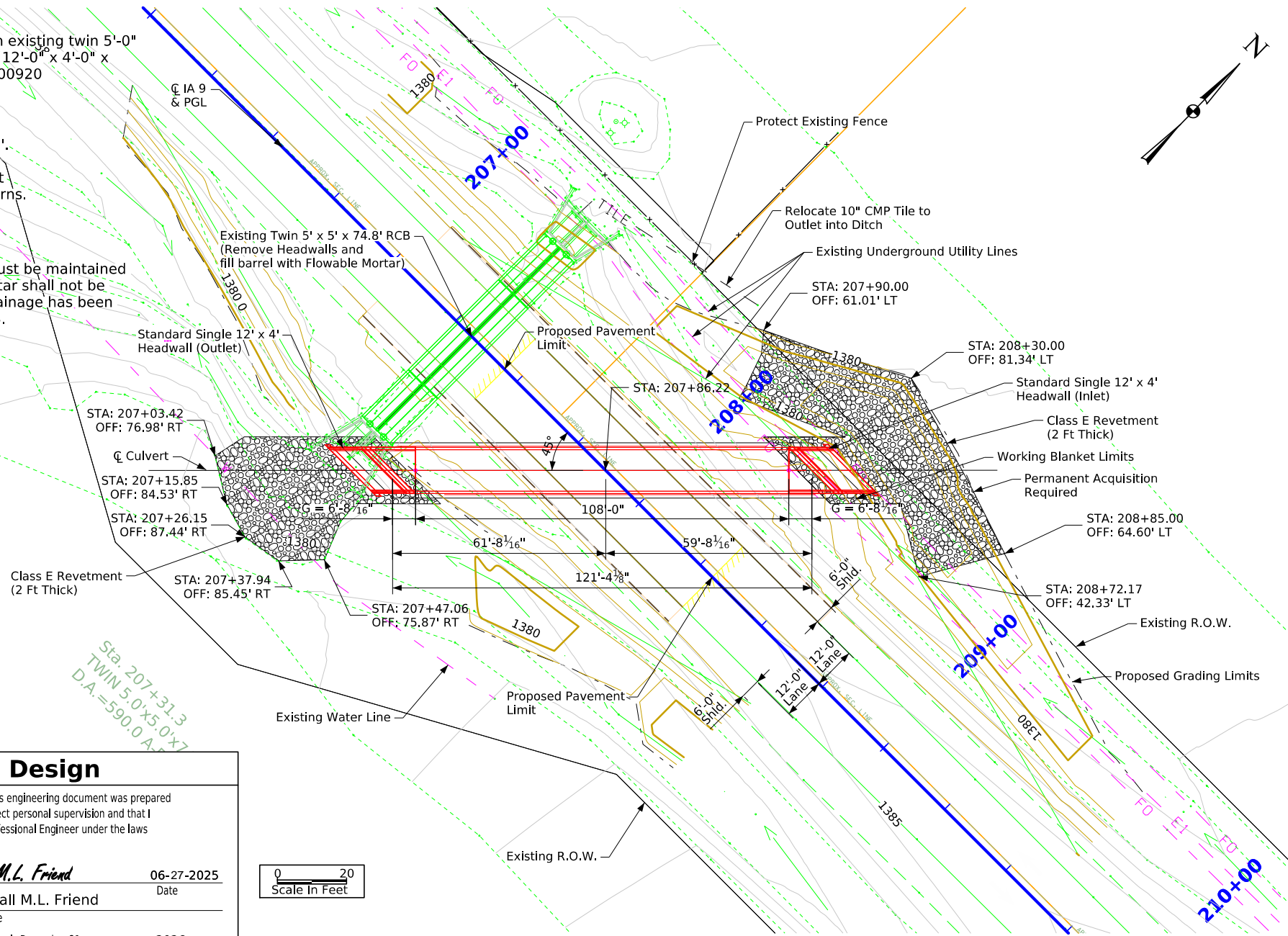
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Exit Velocity = 6.58 fps

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Exit Velocity = 7.90 fps



Situation Plan

**Location**

IA-9 over Unnamed Trib to Rock River  
T-99N R-45W  
Section 2  
Rock Township  
Lyon County  
Bridge Maint. No. 6022.6B009  
Asset ID No. 900920  
Latitude 43.432828°  
Longitude -91.123586°

**Traffic Estimate**

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2047 AADT 3300 V.P.D.  
TRUCKS 14 %

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- SAN. - Sanitary Sewer
- T - Telephone Line
- W - Water Line
- FO - Fiber Optic Line
- GHP - Gas High Pressure
- ST S - Storm Sewer
- TV - TV
- Power Poles

**Hydraulic Design**

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

Signature: *Randall M.L. Friend* Date: 06-27-2025  
Printed or Typed Name: Randall M.L. Friend  
My license renewal date is December 31, 2026



Pages or sheets covered by this seal: V.1 and V.2

P28452

Design For 45° Left Ahead  
Single 12'-0" x 4'-0" x 121'- 4 1/8"  
Reinforced Concrete Box Culvert

Situation Plan - P.C

STA. 207+86.22 (IA 9) Turn-in Date: June 2025

Lyon County

IOWA DEPARTMENT OF TRANSPORTATION  
Design No. 0127 Design Sheet No. 2 of 2 FHWA/Asset 900920

## CROSS SECTION VIEW COLOR LEGEND

Design Color No.	Feature	Design Color No.	Feature
<b>Aggregate</b>			
(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
<b>Grading</b>			
(8)	Revetment Class A	(128)	Boulder
(6)	Revetment Class B	(209)	Boulder Removed
(62)	Revetment Class C	(48)	Broken Weathered
(188)	Revetment Class D	(210)	Broken Weathered Removed
(28)	Revetment Class E	(3)	Core Out
(12)	Shoulder Special Backfill	(115)	Core Out Remove Only
(12)	Special Backfill	(195)	Core Out Remove and Replace
(20)	Subbase	(203)	Existing Pavement
(20)	Subbase Lower	(184)	Existing Pavement Remove Only
(20)	Subbase Upper	(200)	Existing Pavement Remove and Replace
(118)	Subgrade Treatment	(6)	Loam
<b>Substrata</b>			
(207)	HMA Base Course	(211)	Loam Removed
(207)	HMA Interim Course	(80)	Rock
(207)	HMA Surface Course	(212)	Rock Removed
<b>Asphalt</b>			
(0)	Bridge	(4)	Select Sand
(0)	Barrier Concrete	(214)	Select Sand Removed
(0)	Barrier Concrete Footing	(3)	Shale
(0)	Curb Gutter	(215)	Shale Removed
(48)	Flowable Mortar	(10)	Topsoil
(0)	Median Concrete	(2)	Topsoil Remove Only
(0)	PCC Pavement	(4)	Topsoil Remove and Replace
(0)	Sidewalk	<b>Unsuitable / Waste</b>	
<b>Concrete</b>			
(0)	Existing Pavement	(3)	Unsuitable Type A
(209)	Shoulder HMA	(216)	Unsuitable Type A Removed
(0)	Shoulder PCC	(13)	Unsuitable Type B
(6)	Shoulder Granular	(217)	Unsuitable Type B Removed
<b>Shoulder</b>			
(112)	Noise Wall	(11)	Unsuitable Type C
(112)	Noise Wall Footing	(218)	Unsuitable Type C Removed
(112)	Retaining Wall Back	(3)	Waste
(112)	Retaining Wall Back Excavate	(219)	Waste Removed
(112)	Retaining Wall Face		
(112)	Retaining Wall Front Excavate		
(112)	Retaining Wall Front Footing		
(112)	Retaining Wall MSE Gutter		
(112)	Retaining Wall Reinforced Earth		
<b>Structural</b>			

**NOTES:**

Text

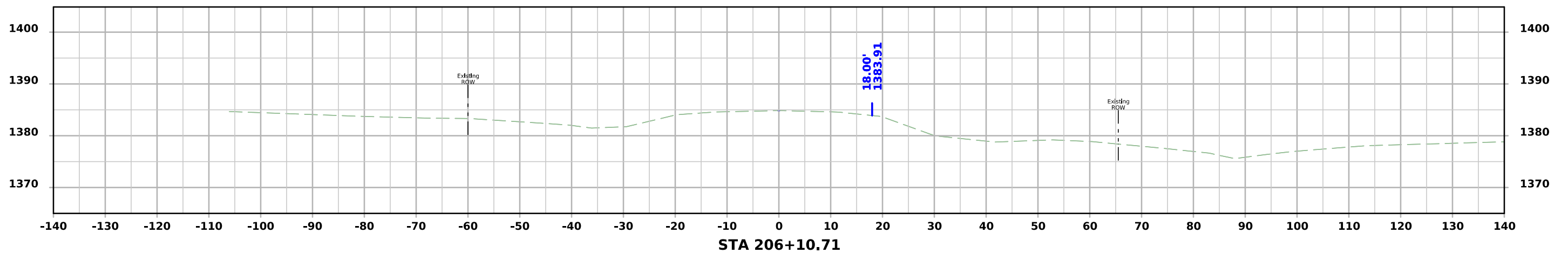
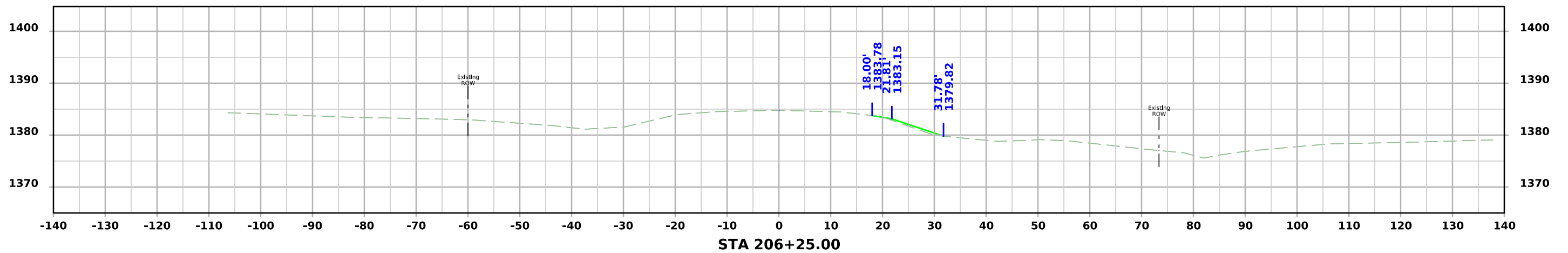
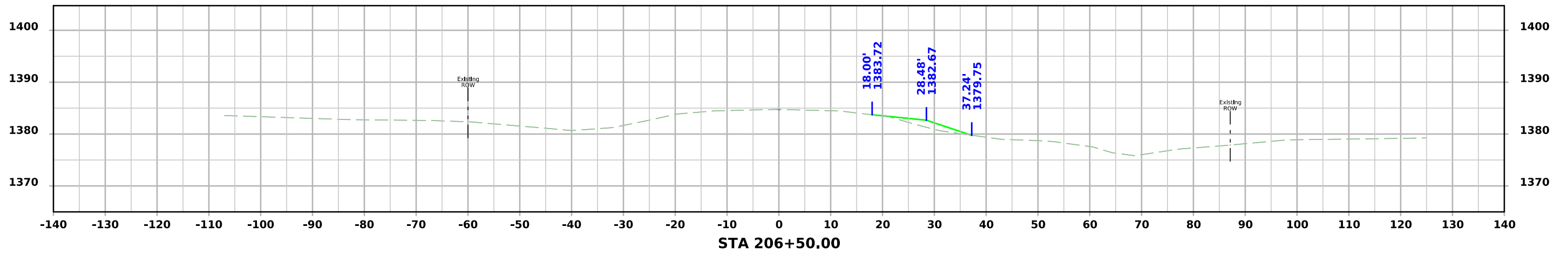
**NOTES:**

Text

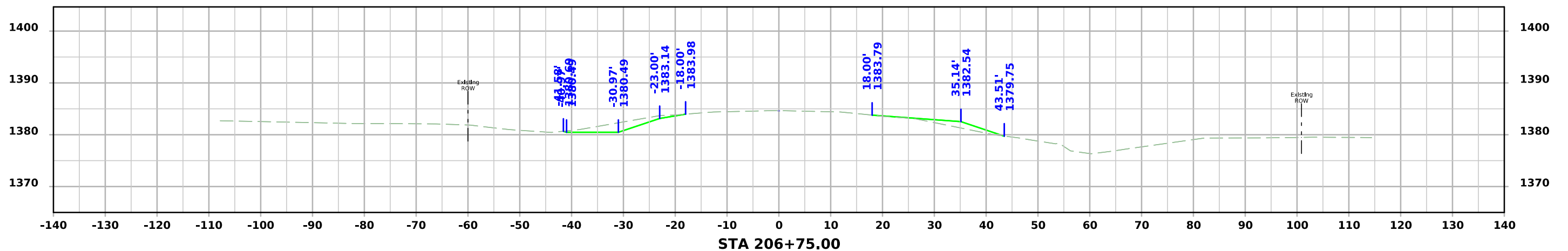
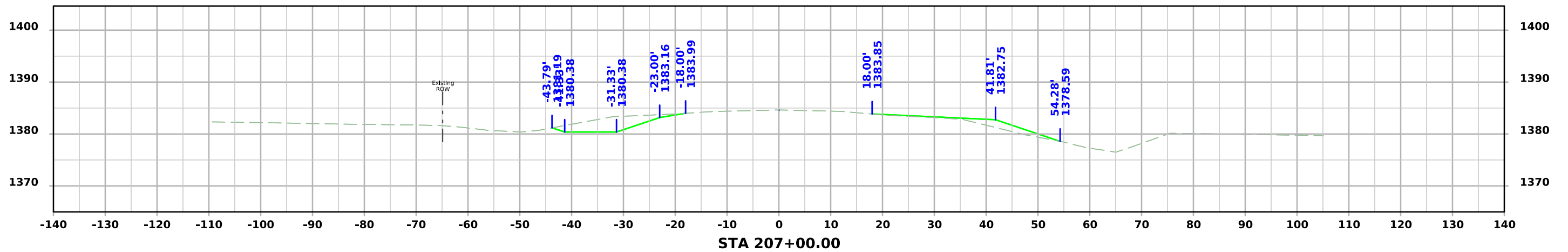
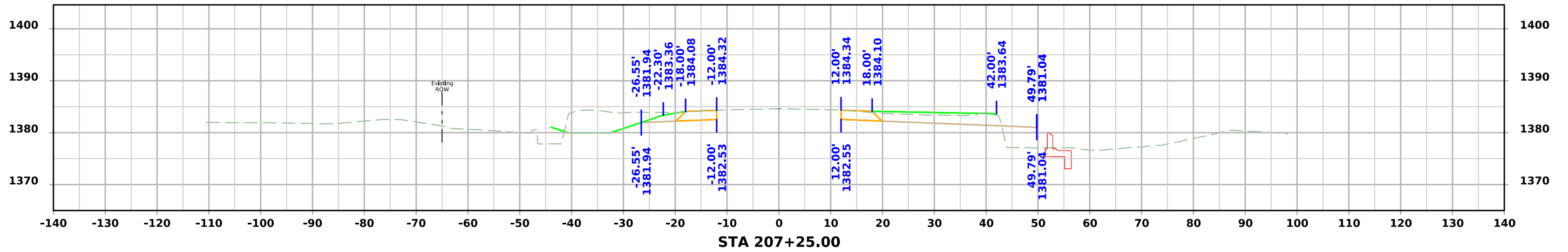
## CROSS SECTIONS LEGEND AND INFORMATION SHEET

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

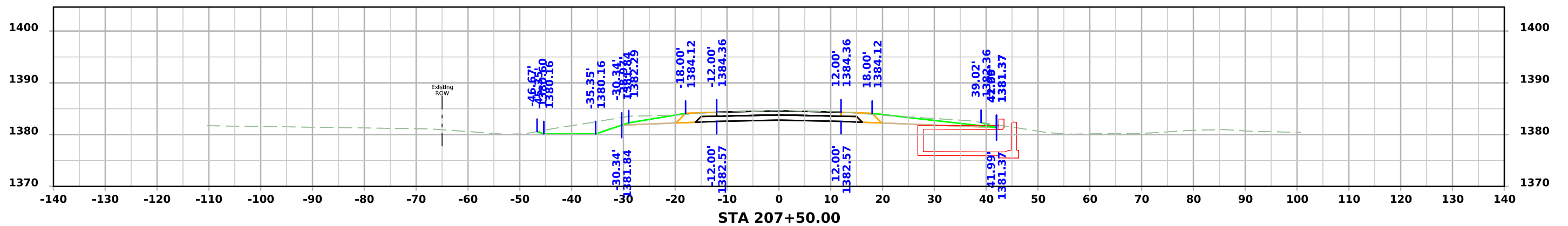
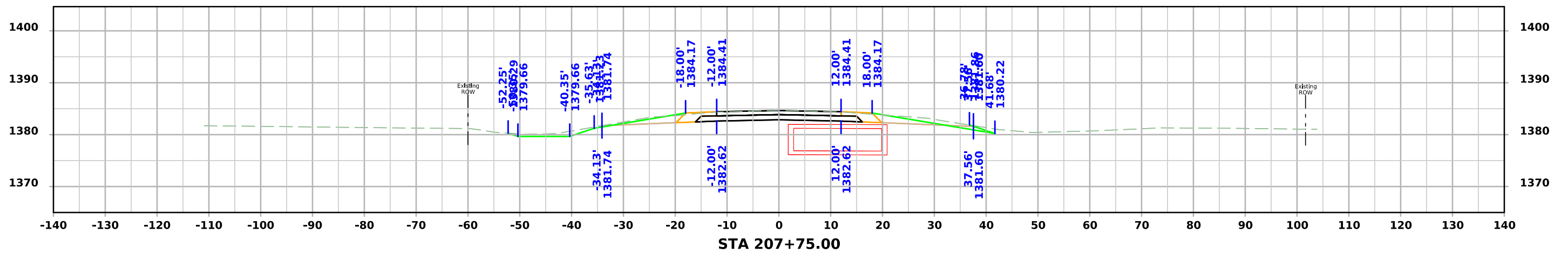
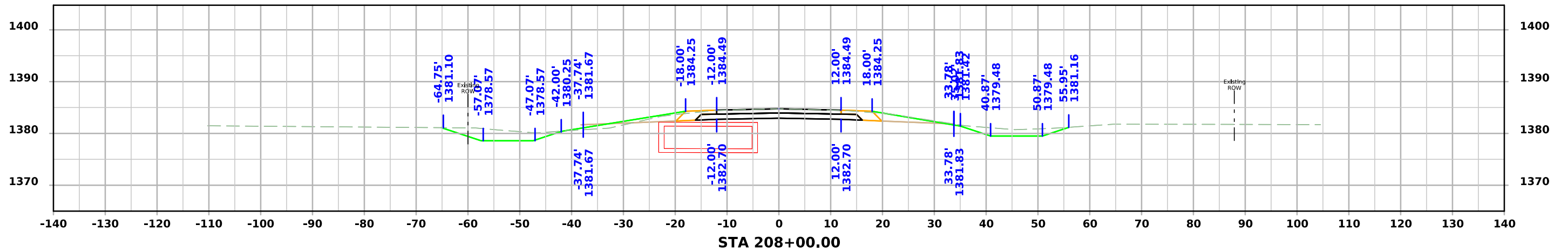
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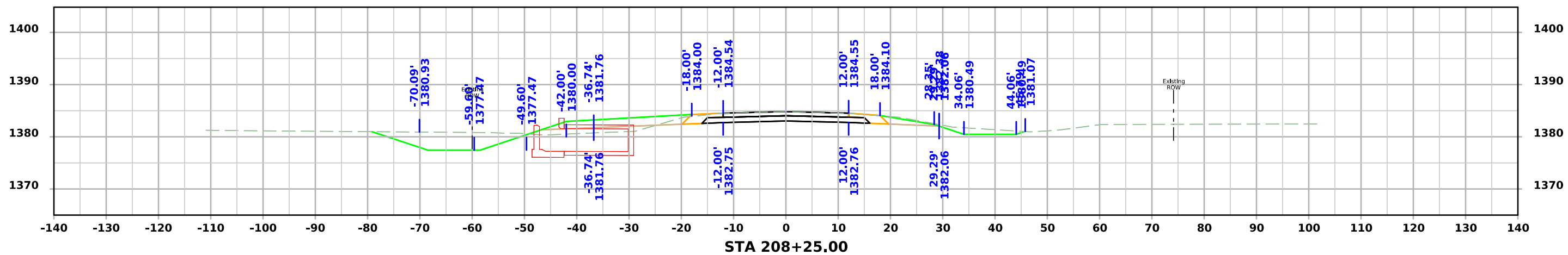
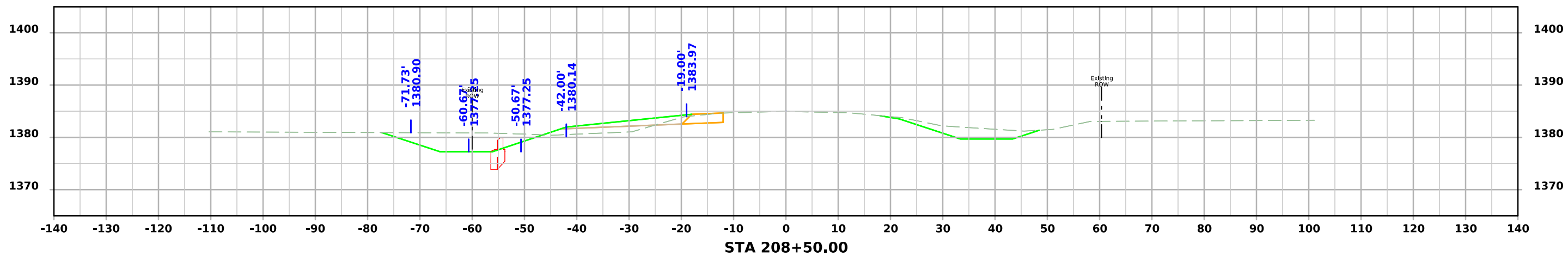
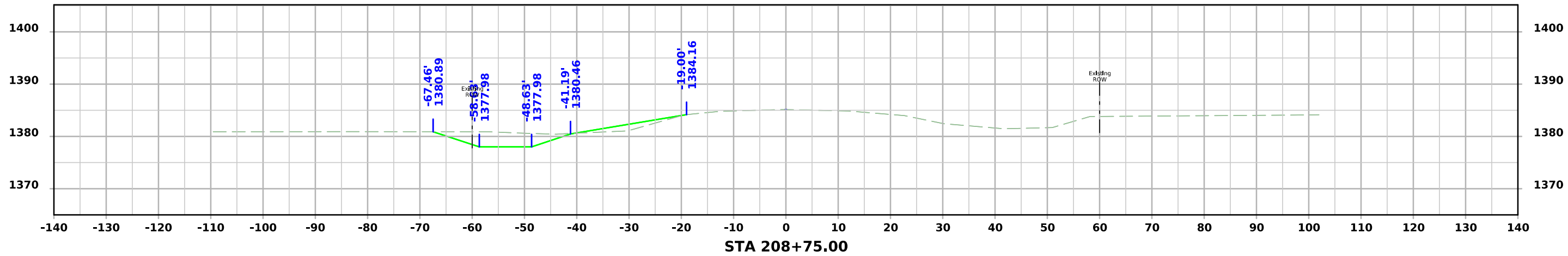
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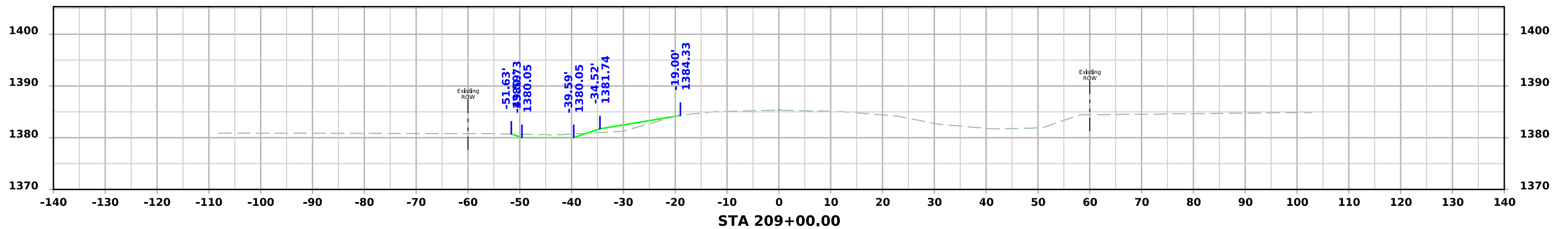
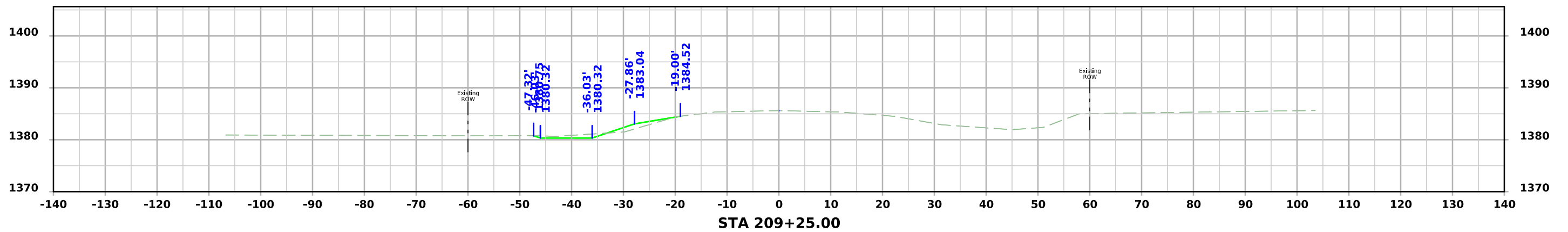
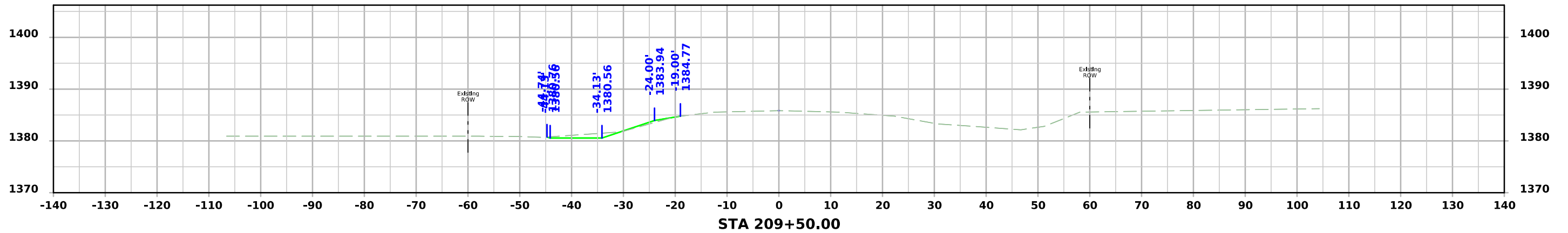
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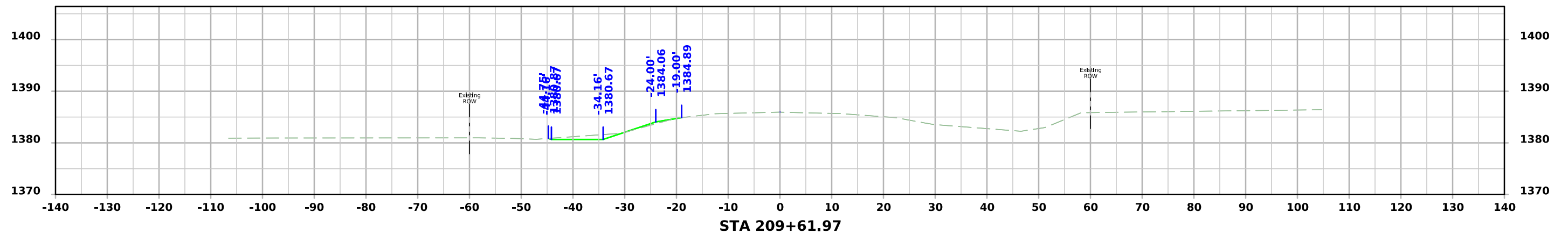


# ML - IA 9



# ML - IA 9





# Cross Section at Skewed Culvert

