

CULVERT REPLACEMENT - TWIN BOX
BRFN-025-1(13)--39-80

RINGGOLD COUNTY

LETTING DATE
Dec 19 2028

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PLANS OF PROPOSED IMPROVEMENT ON THE
PRIMARY ROAD SYSTEM
RINGGOLD COUNTY
CULVERT REPLACEMENT - TWIN BOX
IA 25
2.5 Miles North of the South Junction of J23

<-- H Sheets

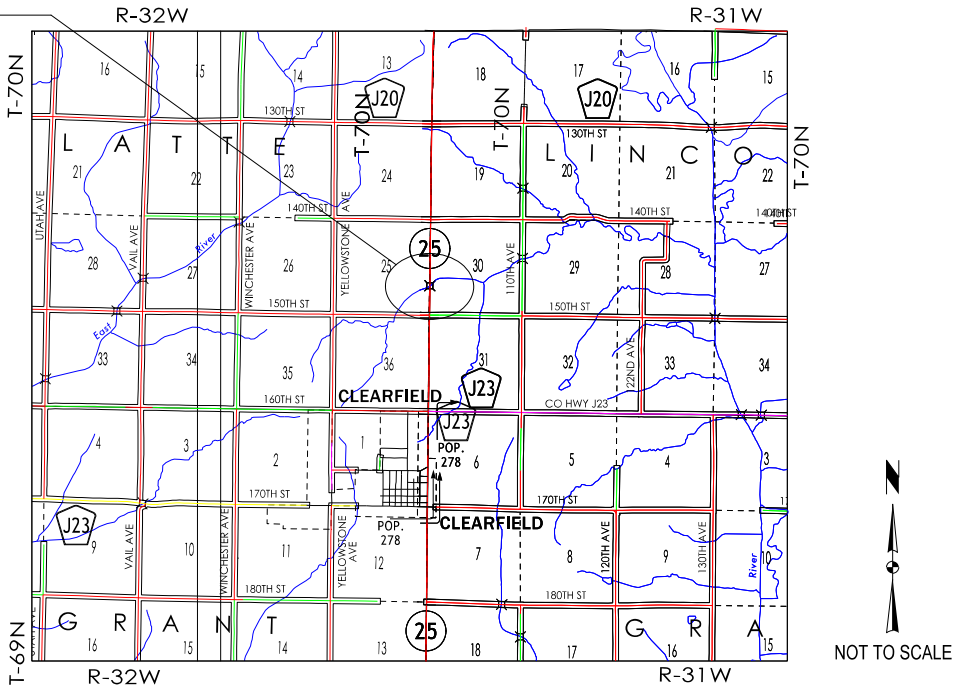
SCALES: As Noted

Refer to the Proposal Form for list of applicable specifications.

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



PROJECT
LOCATION



DESIGN DATA RURAL			
20 --	AADT	—	V.P.D.
20 --	AADT	—	V.P.D.
20 --	DHV	—	V.P.H.
	TRUCKS	—	%
	Total		
	Design ESALs	—	

INDEX OF SEALS			
SHEET NO.	NAME	TYPE	BID QUANTITY SHEETS
A.1	Cindy Spencer	Primary Signature Block	X
V.1	Dave Mulholland	Hydraulic Signature	X
X	X	X	X

PRELIMINARY PLANS

Subject to change by final design.

D5 PLAN - Date: 1-20-26

PROJECT CONCEPT STATEMENT

RCB on Iowa 25 over Stream

Ringgold County
Project # BRFN-025-1(013)--39-80
PIN: 24-80-025-010
Maint. No. 8017.9S025
FHWA No. 046490

Prepared for:
Iowa Department of Transportation
District 4
Wes Mayberry, P.E.

Prepared by: Snyder & Associates, Inc. / Shuck-Britson Inc.

February 10, 2025

I. STUDY AREA

A. Project Description

This project involves replacement of a 10' x 10' twin RCB on Iowa 25 over stream (Maint. No. 8017.9S025), approximately 2.5 miles north of the south junction with J23 in Ringgold County.

B. Present Facility--Need for Project

The existing RCB is a 10' x 10' twin RCB, skewed 30 degrees RT ahead, constructed in 1934 (Design No. 1134). The roadway is 24 foot wide PCC with 8 foot wide granular shoulders. Roadway foreslopes are 3:1, and the roadway was built without clear zone considerations.



Ringgold County
Proj. # BRFN-025-1(013)--39-80
PIN: 24-80-025-010
Page 2

The culvert was last inspected in January, 2023 and has a culvert condition rating of 5, on a scale of 0 to 9. A condition rating of '5' is classified as "Fair". A rating of '4' or less for the culvert condition rating would make the culvert "Poor". There are no plans available that show that this culvert has been repaired since its original construction year 1934. It is likely the condition rating will drop below a '4' in the near future which would make the culvert classification "Poor".

For these reasons, the culvert is not a rehabilitation or extension candidate but should be held as a replacement candidate for a future letting. The culvert's expected replacement type and total project cost should be determined with this Project Concept phase.



There do not appear to be any accesses in the immediate vicinity of the box culvert. A field entrance is indicated in the as-built plans at Sta. 845+07 LT, approximately 300 feet north of the culvert.

C. Hydrology

V:\Projects\2024\124.1467.01\Administration\Concept_2025-02-10_RinggoldIA25FINAL.docx

The design discharge is 1,060 cfs (50-year) for the 2.2 square mile drainage area based on the “DOT Regional Equation Annual Exceedance – Probability Discharge” spreadsheet. The 1987 regression equations were used to compute the design flows as recommended in the United States Geological Survey (USGS) Report 2015-5055.

A twin 10’ x 7’ reinforced concrete box culvert is hydraulically capable of conveying the design flow. Replacing the existing twin 10’ x 10’ box culvert with a smaller structure is not desirable from the DOT’s standpoint. The DOT prefers the proposed structure to match the existing structure at a minimum. For this case the proposed structure will be a twin 10’ x 12’ with a flowline buried 2 feet as per the recommendations of Section 4.2.2 of Chapter 4 of the Bridge Design Manual.

The structure is located in FEMA Zone A. A DNR floodplain permit will not be required for construction of the replacement structure.

The structure does not appear to be located within a drainage district.

D. Traffic Estimates

The 2016 traffic count was 1,250 vehicles per day (VPD), with trucks comprising approximately 16% of total traffic (approximately 200 trucks per day). Historical traffic counts from 2000-2016 vary between 840 VPD and 1,250 VPD.

No traffic forecasts were provided for this location.

E. Crash History

No crash history was provided at this location.

F. Bridge Condition Index (BCI)

The culvert has a current Bridge Condition Index (BCI) of 59.4.

G. Accelerated Bridge Construction Score

The Accelerated Bridge Construction (ABC) normalized score when using county roads is 33, which is below the threshold (50) that would qualify for further evaluation of ABC techniques. The contributing factors to the raw score are the out of distance travel (OODT) raw score of 30, average annual daily traffic (AADT) raw score of 10, a daily road user costs (DRUC) raw score of 10, and an economy of scale (EOS) raw score of 5.

H. Access Control

Access rights will not be acquired on this project.

II. PROJECT CONCEPT

A. Proposed Improvements

Two options were explored for replacement of the existing culvert: a precast and cast-in-place alternative for the proposed twin 10’ x 12’ RCB. Refer to attached sheets for additional information.

1. Alternative Number 1: Twin 10’ x 12’ x 84’ Cast-in-place RCB Culvert

This alternative removes the existing RCB and installs a new box culvert in the same location and at the same skew (30 degrees), with the culvert flowlines buried two feet from the natural stream elevation. An estimated 80 feet of existing roadway pavement will be removed to allow for open trench construction, and replaced with 24 foot wide, 10 inch thick PCC pavement and 8 foot wide granular shoulders. A 6:1 / 3.5:1 barnroof section with a 24 foot clear zone will be utilized at the box culvert, per Standard Detail 4312.

The proposed structure will be a twin 10’ x 12’ x 84’ RCB with 30 degree skew headwalls. Standard LRFD culvert details will be used in construction, and maximum fill over the culvert will be approximately 4 feet. Rip-rap will be installed at the outlet per Standard Detail 1092, with an estimated length of 10 feet.

The proposed detour route for this option requires 10 miles of out-of-distance travel for through traffic. While the detour route is the same for the cast-in-place and precast culvert options, it is estimated that the cast-in-place option will require a longer construction duration. Based on standard construction rates provided by the Office of Contracts, construction of the cast-in-place option is estimated to take 26 construction days. No rates are provided for installation of precast box culverts, although the installation rate for both round culvert pipe and storm sewer is estimated at 150 feet per day, which would mean installation at this location could be completed in 2 working days. We felt that actual rates for this work would be much slower due to the size of the culvert sections and other mitigating circumstances, and assumed approximately 18 days for installation of the precast box, a differential of 8 working days. The Federal Highway Administration provides a road user cost calculator that estimates the daily additional road used costs due to the additional detour travel length and time, based on traffic volumes and current labor, fuel, and maintenance costs. This calculator estimated a road user cost of

\$16,291 per day due to the detour. Those costs have been included in the project cost estimate (below).

Estimated Construction Cost

Item	Estimated Cost
Embankment-in-Place	\$ 25,740
Modified Subbase	\$ 3,382
Granular Shoulders, Type B	\$ 2,100
PCC Pavement, 10 Inch	\$ 16,401
Removal of Existing Culvert	\$ 18,500
Structural Concrete (RCB Culvert)	\$342,040
Reinforcing Steel	\$125,828
Temporary Stream Diversion	\$ 10,000
Revetment, Class E	\$ 3,861
Removal of Pavement	\$ 2,130
Traffic Control (5%)	\$ 27,500
Mobilization (5%)	\$ 27,500
Base Cost	\$604,982
Contingency (30%)	\$181,495
Additional Road User Costs	\$130,328
Project Total	\$916,805
	\$917,000

2. Alternative Number 2: Twin 10’ x 12’ x 100’ Precast RCB Culvert

Similar to Alternative 1, this option involves removal of the existing RCB and installation of a new box in the same location and at the same skew as the existing with the flowlines lowered two feet from the natural stream elevation, using open trench methods. Roadway geometry will be the same as Alternative 1.

The proposed structure is a twin 10’ x’ 12’ x 100’ precast RCB with Type 3 precast end sections, per standard LRFD Precast RCB details. Rip-rap will be placed at the culvert outlet per Standard Detail PEP 12-20, with an estimated length of 10 feet. Per standard culvert notes, the cost of the granular leveling material and porous backfill between barrels is included in the precast RCB item cost. Because this option is estimated to have a shorter construction duration, it will not include additional road user costs.

Estimated Construction Cost

Item	Estimated Cost
Embankment-in-place	\$ 25,740
Modified Subbase	\$ 3,382
Granular Shoulders, Type B	\$ 2,100
PCC Pavement, 10 Inch	\$ 16,401
Removal of Existing Culvert	\$ 18,500
Precast Box Culvert, 10 Ft. x 12 Ft.	\$400,000
Precast End Section, 10 Ft. x 12 Ft.	\$148,000
Temporary Stream Diversion	\$ 10,000
Revetment, Class E	\$ 4,648
Removal of Pavement	\$ 2,130
Traffic Control (5%)	\$ 31,546
Mobilization (5%)	\$ 31,546
Base Cost	\$693,993
Contingency (30%)	\$208,198
Project Total	\$902,191
	\$903,000

B. Recommendations

Road user costs and construction duration factor heavily into the price differential between the two alternatives. Typically RCB projects are bid to allow the Contractor to choose either precast or cast-in-place alternatives to achieve the best price, although assigned contract period typically does not differ between the two despite the obvious difference in construction rates. We recommend letting the project with bid alternates for precast and cast-in-place options, and adding the Developmental Specifications for Lane Rental (A+B Bidding with Incentive / Disincentive) if minimizing the roadway closure time and associated user costs is considered an important consideration.

C. Detour Analysis

Iowa 25 will be closed to traffic during construction. Through traffic will be detoured. U.S. 169 is 13 miles east of the project site and Iowa 148 is 14 miles west of the project site. To limit out-of-distance travel, use of paved county roads would be recommended. Our recommended detour route is J23, west to N64, then north to U.S. 34. Out-of-distance travel for this option is 10 miles. Refer to Sheet J.1 of the attached plans.

D. Special Considerations

Existing right-of-way width at this location is 130 feet left of centerline and 100 feet right of centerline, per as-builts, which should be adequate to accommodate the

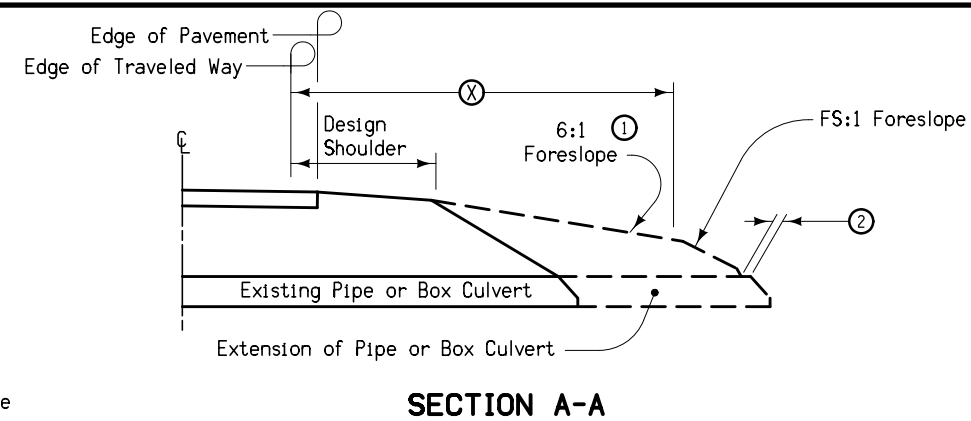
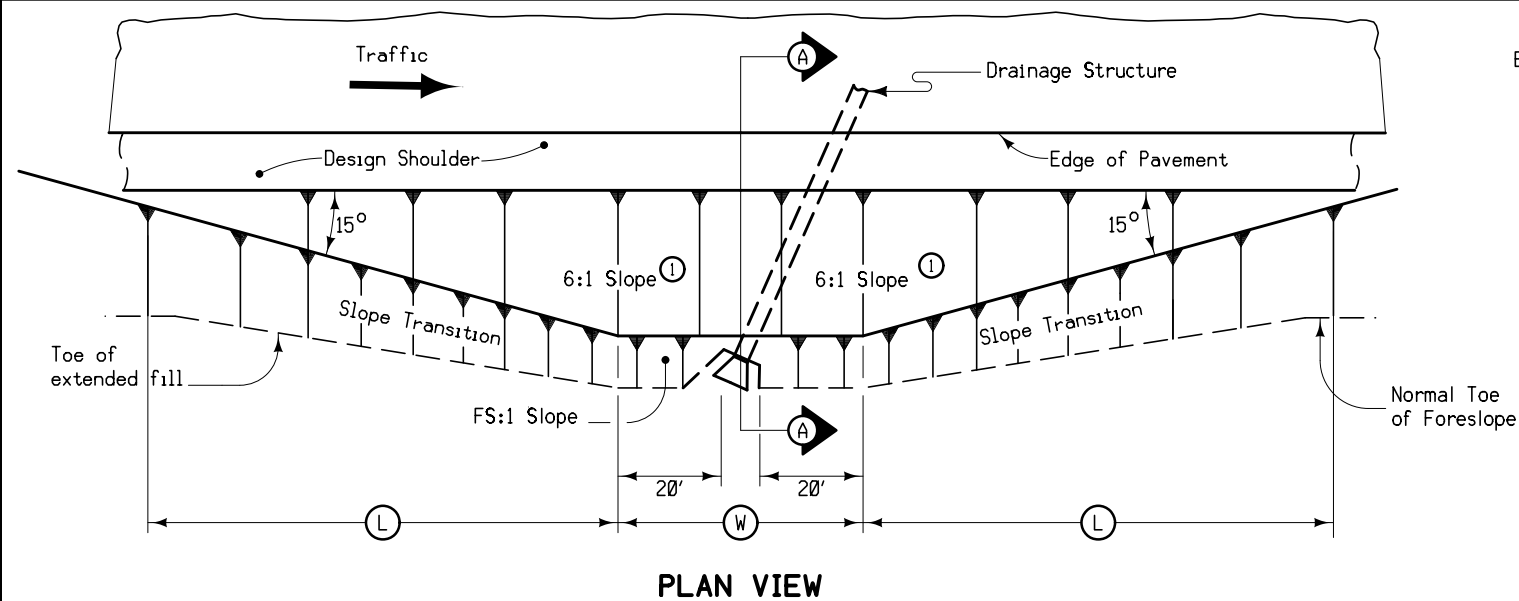
proposed structure and associated grading. However, the GIS mapping from the County Assessor’s office appears to indicate that the existing ROW was purchased in easement. If additional right-of-way were needed to accommodate the new structure, we would recommend clearing up right-of-way title as part of this project.

E. Construction Sequence

It is anticipated that all work will be awarded to one prime contractor. The Bridges and Structures Bureau will coordinate the plan preparation with Snyder & Associates, Inc. / Shuck-Britson.

F. Program Status

This project is listed in the 2025-2029 Iowa Transportation Improvement Program with \$520,000 programmed for construction in FY 2029 and \$10,000 programmed for right-of-way. The project is currently scheduled for a December 19, 2028 letting.



Notes:

At locations where an extended or newly constructed drainage structure extends beyond the normal foreslope cover, flatten the foreslope as indicated so as to cover the structure. Minimum earth cover is 6 inches.

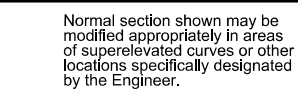
① Slope may be flatter than 6:1.

② 6" Minimum for pipe installations or to top of headwall on R.C.B.

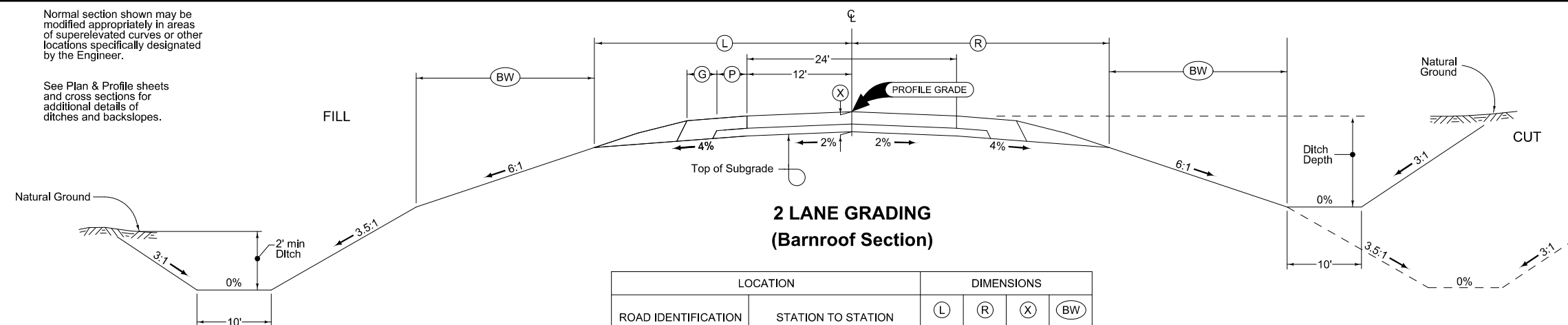
③ At $\mathbb{C}$ of roadway

Ⓢ = Pipe or R.C.B. opening width plus 20 feet each side.

BARNROOF FORESLOPE AT SKEWED DRAINAGE STRUCTURE



See Plan & Profile sheets
and cross sections for
additional details of
ditches and backslopes.



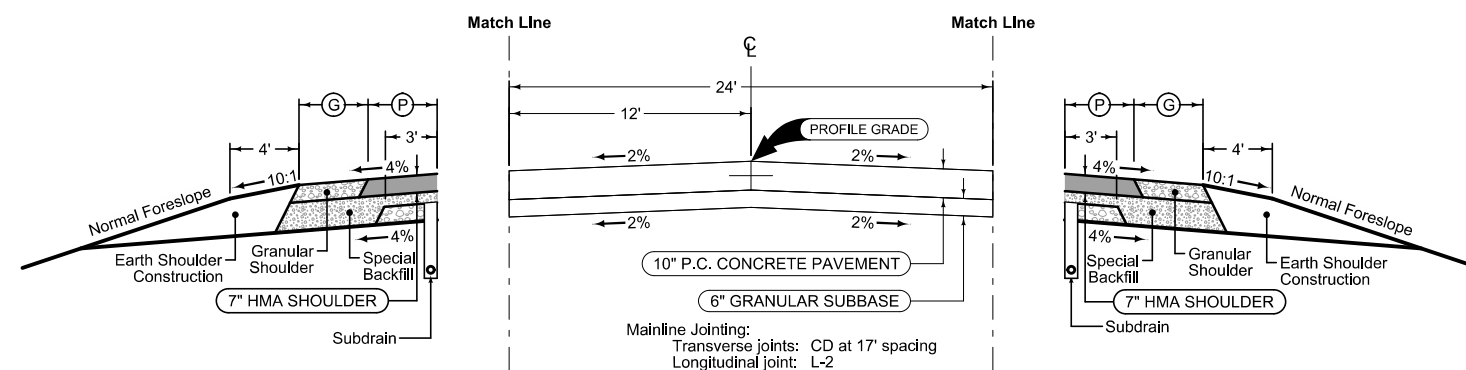
2 LANE GRADING (Barnroof Section)

LOCATION			DIMENSIONS			
ROAD IDENTIFICATION	STATION TO STATION		(L) Feet	(R) Feet	(X) Inches	(BW) Feet
IOWA 25	841+30.00	842+30	39.9	39.9	16	2.1

Combination Shoulder

Shoulder Jointing:
Longitudinal joint: B

2_C_			
04-21-20			
STATION TO STATION		(P) Feet	(G) Feet
841+30.00	842+30.00	4	4

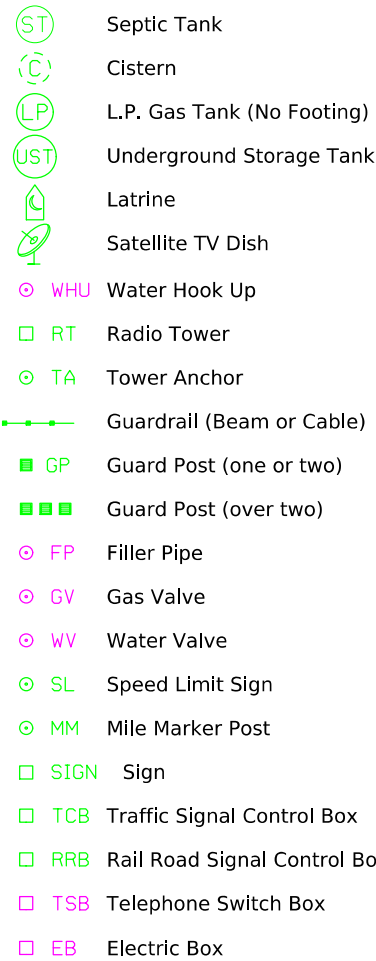


Combination Shoulder

Shoulder Jointing:
Longitudinal joint: B

2_C_			
04-21-20			
STATION TO STATION		(P) Feet	(G) Feet
841+30.00	842+30.00	4	4

	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)

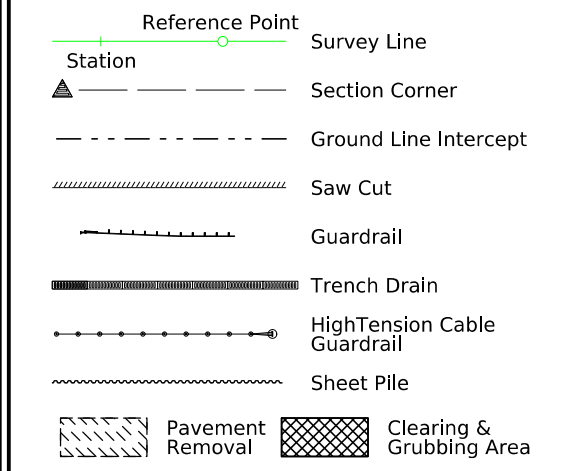


— W — (SIRWA) SOUTHERN IOWA RURAL WATER
Contact Name: Chad Mahan
Contact Phone:
Contact Email: cmahan@sirwa.org

— F03 — WINDSTREAM
Contact Name: Lisa Zingula
Contact Phone:
Contact Email: Lisa.Zingula@windstream.com

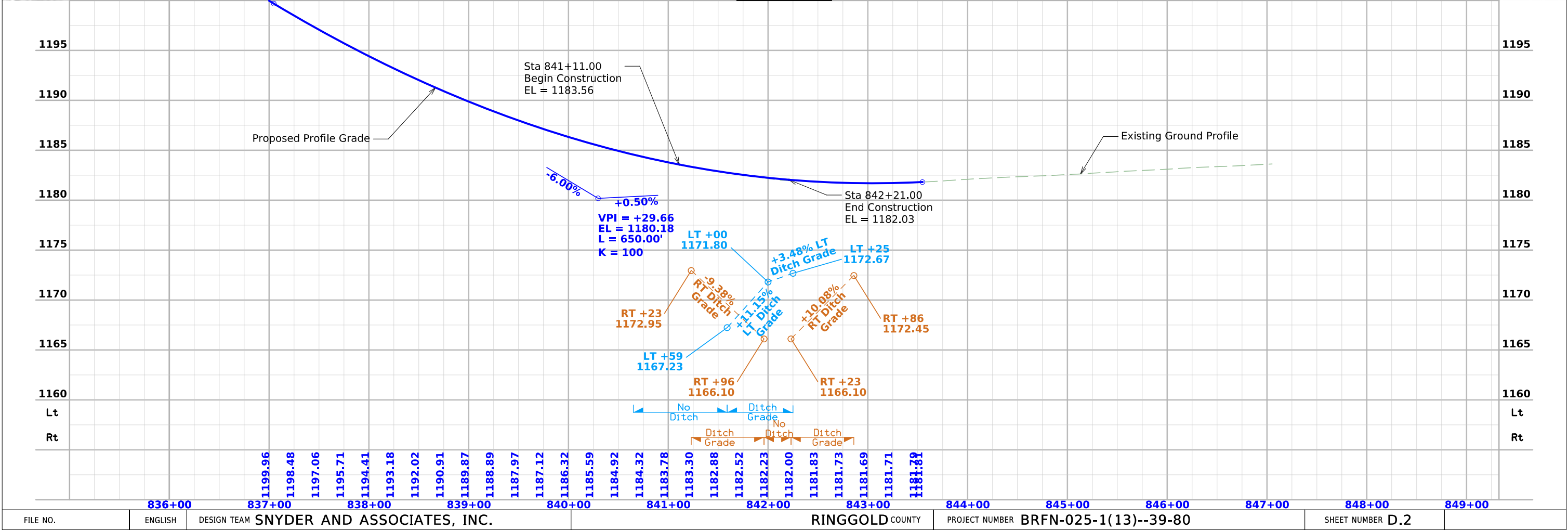
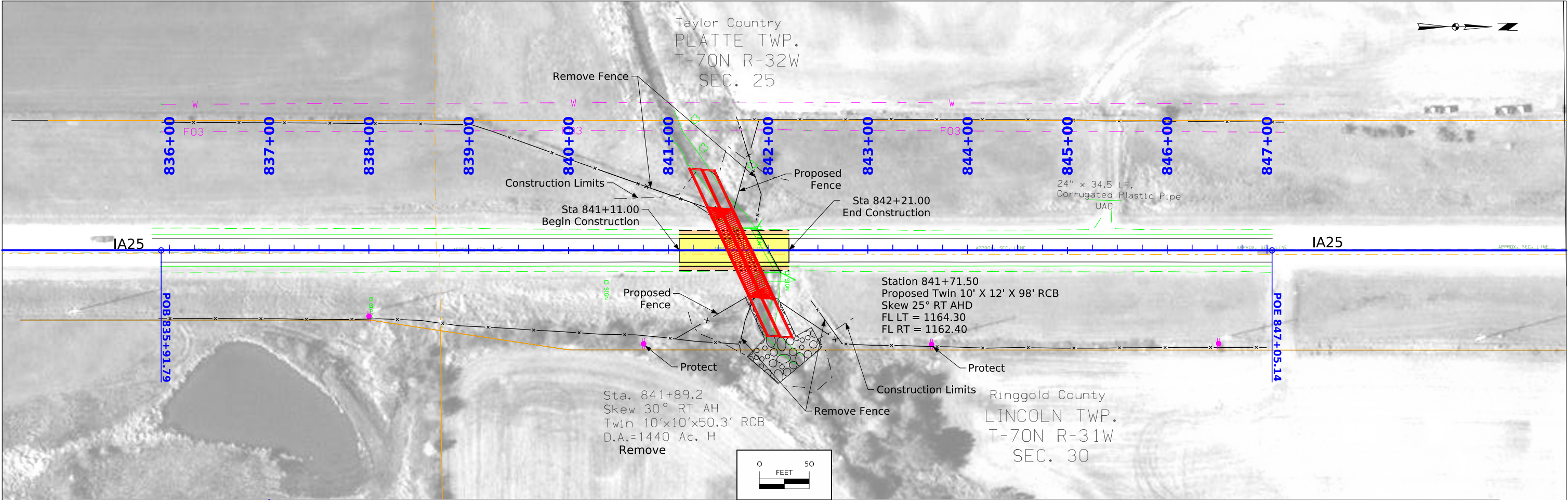
LINEWORK		Design Color No.		
Green	(2)		Existing Topographic Features and Labels	
Blue	(1)		Proposed Alignment, Stationing, Tic Marks, and Alignment Annotation	
Magenta	(5)		Existing Utilities	
SHADING		Design Color No.		Transparency
Pink, Dark	(13)		Temporary Pavement Shading	50%
Yellow	(4)		Proposed 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)



Survey Information

SURVEY INDEX

County: Ringgold
PIN: 24-80-025-010
Project Number: BRFN-025-1(013)--39-80
Location: Stream 2.3 mi N of N Jct Co Rd J23
Type of Work: Culvert Repair
Project Directory: 8002501024

Survey Personnel

Eric Miller – Survey Project Manager
Adam Catrenich – Survey Party Chief
Sam Blaisdell – Survey Cad Technician

Date(s) of Survey

Begin Date 01/27/2025
End Date 02/07/2025

General Information

This survey is for design services associated with the replacement of a box culvert Stream 2.3 miles North of N Junction County Road J23. 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

Measurement units for this survey are US survey feet. Project coordinate system is relative to the Iowa Regional Coordinate System, Zone 12. Horizontal control originated from Ringold County’s control network. Verification checks were observed on county control point 1007 using laRTN with multiple observations with appropriate time spans in between. Positions were within tolerance and published coordinates and elevations were accepted (Coordinates are published in NAD83(2011) Iowa State South Zone and converted to laRCS Zone 12 using Leica Geo Office).

Additional project primary control (FENO1) was set for this project using nearby Iowa Real Time Network reference stations to obtain horizontal and vertical control positions. Three five-minute observations were taken with a minimum two-hour time span between and used in a weighted average to obtain final coordinate values.

Alignment Information

The horizontal alignment for Iowa Hwy 25 this survey is a retrace of As-built Plans No. F Proj. No. 4-51 (6) Survey stationing was equated to the plan POT at Sta. 825+64.1 and carried back and ahead with/without equation throughout the survey. Due to lack of centerline monumentation, the roadway as constructed was used to establish alignment.

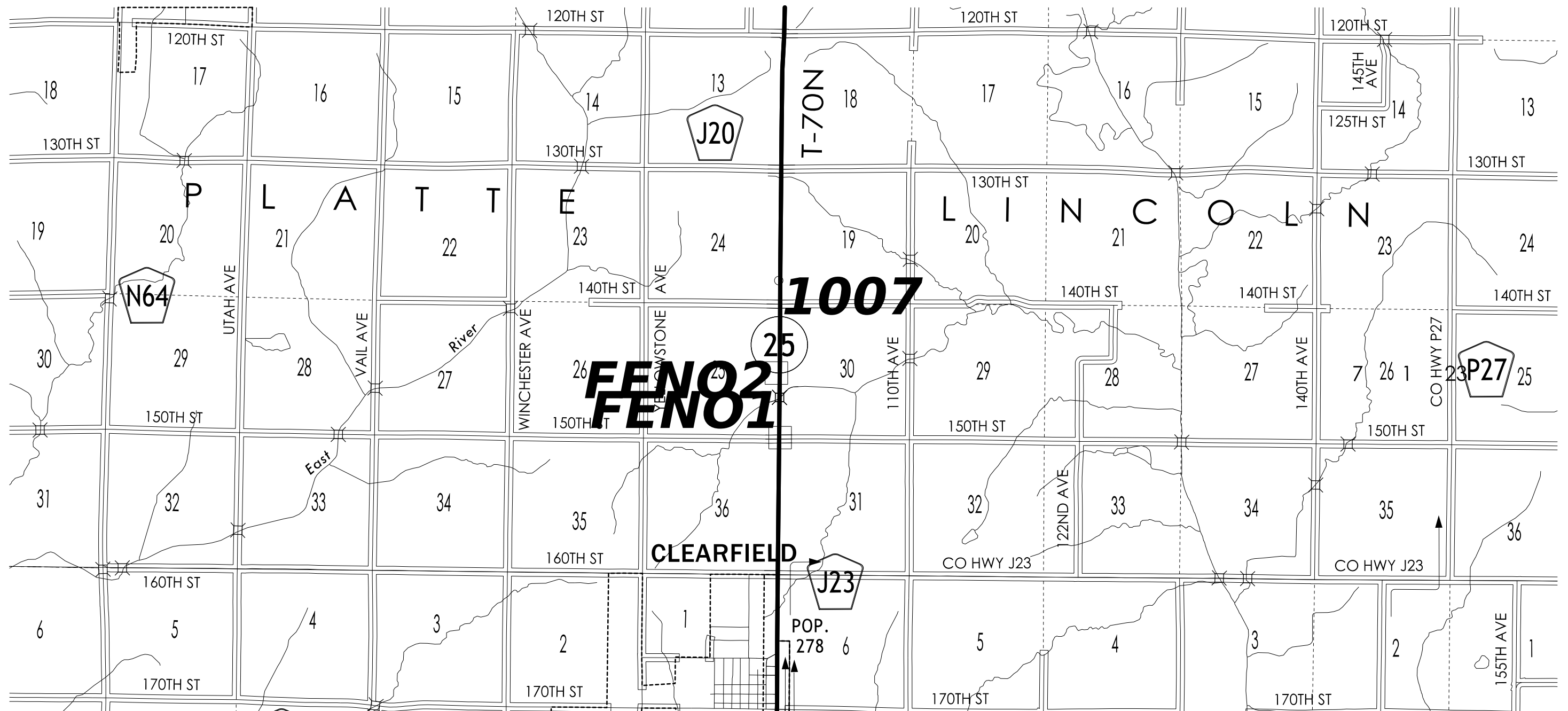
Survey stationing relates to as built plan stationing as follows:

POT Sta. 825+64.1 As-built Plans Project No. F Proj. No. 4-51 (6)
This Survey POT Sta. 825+64.1 (Fnd Mag Nail)

PC Sta. 862+70.3 As-built Plans Project No. F Proj. No. 4-51 (6)
This Survey PC Sta. 862+70.3

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 12 (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 12 (U.S. Survey Foot)
VERT. DATUM: NAVD88
Geoid Model: 2018u3

Point Name	Northing	Easting	Elevation	Code Feature Description
1007	6174361.319	22300263.03	1252.036	CP CP1007 FOUND FENO MONUMENT//+/-50' WEST OF HWY 25//+/-25' SOUTH OF FIELD ENTRANCE//+/-900' NORTH OF 140TH STREET
FENO1	6168234.814	22300317.14	1241.918	FENO FENO1 SET FENO MONUMENT//+/-25' EAST OF HWY 25//+/-25' NORTH OF 150TH STREET//+/-100' SOUTH OF GRAVEL DRIVEWAY//+/-10' NORTH OF STOP SIGN
FENO2	6170755.67	22300176.28	1197.83	FENO FENO2 SET FENO MONUMENT//WEST SIDE OF HWY 25//+/- 125' WEST OF CENTERLINE//+/- 8' EAST OF FENCE//SECOND FIELD DRIVE WEST OF CULVERT

Ringgold

STPN-025-1(014)--2J-80
Stream 2.3 mi N of N Jct Co Rd J23
[8002501024](#)

Project Code

24-80-025-010

Route

IA 25

		State			County			City										
Parcel No	Owner Name	Fee	Hwy Ease	Other Ease	Fee	Hwy Ease	Other Ease	Fee	Hwy Ease	Other Ease	Excess	Temp Ease	Mitigation	Utility Ease	Relocation	TE Only	A/C Only	Total Acq
1	BONNIE J BAKER (LE) MARVIN R BAKER (REM)	0.06 AC										0.06 AC						

1 Parcels

NO ACCESS RIGHTS ARE TO BE ACQUIRED ON THIS PROJECT.

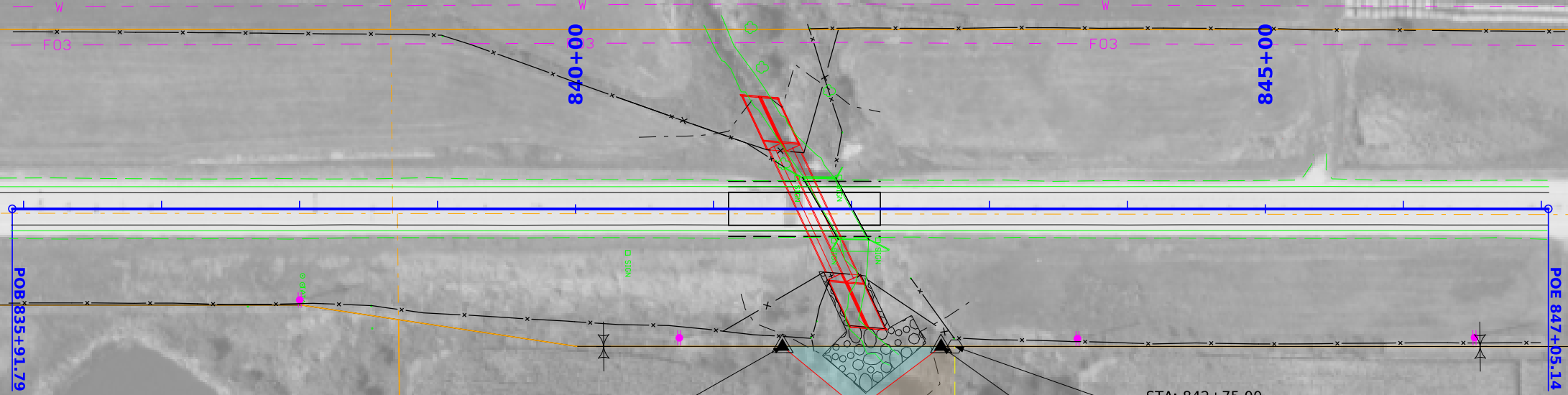
ACCESS CONTROL PREVIOUSLY ACQUIRED.

PLATTE TWP.
T-70N R-32W
SEC. 25
(TAYLOR CO)



25

25



STA: 841+50.00
OFF: 99.84' RT

STA: 842+05.00
OFF: 145.00' RT

STA: 842+20.00
OFF: 165.00' RT

STA: 842+75.00
OFF: 99.85' RT

STA: 842+65.00
OFF: 99.85' RT

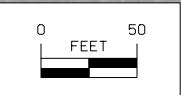
STA: 842+75.00
OFF: 145.00' RT

TEMPORARY EASEMENT
FOR CHANNEL SHAPING

1

BONNIE J BAKER (LE)
MARVIN R BAKER (REM)

LINCOLN TWP.
T-70N R-31W
SEC. 30
(RINGGOLD CO)



Right of Way Design Information	
THIS SHEET INCLUDED FOR INFORMATION ONLY	
ROW Team: Crystal / Cuva	
ROW #: STPN-025-1(014)--2J-80	
Plan Date: 6/3/2026	
Color Legend:	
	Property Lines
	Temporary Easement
	Permanent Acquisition
	Permanent Acquisition County
	Permanent Acquisition City

108_23A
8/15/22

TRAFFIC CONTROL PLAN

- 1. Iowa 25 will be closed to traffic during construction. Follow detour route shown on Sheet J.2.
- 2. Access to individual properties will be maintained at all times.
- 3. Coordinate with the Engineer prior to closing the roadway. Notification will be required 10 business days prior to closure to allow the public to be informed.

CROSS SECTION VIEW COLOR LEGEND OF TRAFFIC CONTROL AND STAGING SHEETS		
SHADING	Design Color No.	
Green, Light	(225)	Existing Pavement Shading
Gray, Light	(48)	Previously Constructed Pavement Shading
Gray, Med	(80)	Previously Constructed Granular Surface Shading
Blue, Light	(230)	Proposed Pavement Shading
Lavender	(9)	Temporary Pavement Shading
Brown, Med	(237)	Future Proposed Pavement Shading

CROSS SECTION VIEW PATTERN AND SYMBOL LEGEND OF TRAFFIC CONTROL AND STAGING SHEETS			
	Pavement Removal		Proposed Granular Shoulder
	Proposed Granular Subbase		Temporary Shoulder
	Proposed Special Backfill		Existing Shoulder Strengthening
	Temporary Barrier Rail		Permanent Barrier Rail
			Channelizing Device

PLAN VIEW COLOR LEGEND OF TRAFFIC CONTROL AND STAGING SHEETS			
LINEWORK	Design Color No.		
Green	(2)	Existing Topographic Features and Labels	
Magenta	(5)	Pavement Marking Call Outs	
Blue	(1)	Proposed Alignment, Stationing, Tic Marks, and Alignment Annotation	
Yellow	(4)	Pavement Markings, Yellow	
Off White	(254)	Pavement Markings, White	
Violet	(15)	Temporary barrier rail, Unpinned	
Flush Orange	(228)	Temporary barrier rail, Pinned	
SHADING	Design Color No.		
Green, Light	(225)	Existing Pavement Shading	
Gray, Light	(48)	Previously Constructed Pavement Shading	
Orange	(6)	Proposed Granular Surface Shading	
Gray, Med	(80)	Previously Constructed Granular Surface Shading	
Blue, Light	(230)	Proposed Pavement Shading	
Pink, Dark	(13)	Temporary Pavement Shading	
Brown, Light	(236)	Proposed Grading Limits Shading	
Cyan	(7)	Proposed MSE or CIP Wall Shading	
Red	(3)	Proposed Bridge Shading and Sign Trusses	
Black w/Gray, Light Fill	(0,48)	Previously Constructed Structure	

PLAN VIEW PATTERN AND SYMBOL LEGEND OF TRAFFIC CONTROL AND STAGING SHEETS			
	Channelizing Device		Crash Cushion (Temp or Perm)
	Drum		Traffic Signal
	Temporary Lane Separator		Flagger
	Tubular Marker		Temporary Floodlighting
	Channelizer Marker		Traffic Sign
	Concrete Barrier Marker		Type III Barricade
	Delineator		Type A Warning Light
	Temporary Barrier Rail		Direction of Traffic
	Pavement Removal		Safety Closure
	Sand Barrel Layout		Lane Identification

NOTE: Device spacing according to Standard Road Plans unless specifically dimensioned.

TRAFFIC CONTROL
AND
STAGING
LEGEND AND SYMBOL
INFORMATION SHEET

(COVERS SHEET SERIES J)

M4-8P
24" X 12"

DETOUR

M3-1P
24" X 12"

NORTH

M1-5
24" X 24"

25

A

M4-8P
24" X 12"

DETOUR

M3-1P
24" X 12"

NORTH

M1-5
24" X 24"

25

B

M4-8P
24" X 12"

DETOUR

M3-1P
24" X 12"

NORTH

M1-5
24" X 24"

25

C

M4-8P
24" X 12"

DETOUR

M3-1P
24" X 12"

NORTH

M1-5
24" X 24"

25

D

M4-8P
24" X 12"

DETOUR

M3-1P
24" X 12"

NORTH

M1-5
24" X 24"

25

E

M4-8P
24" X 12"

DETOUR

M3-3P
24" X 12"

SOUTH

M1-5
24" X 24"

25

F

M4-8P
24" X 12"

DETOUR

M3-3P
24" X 12"

SOUTH

M1-5
24" X 24"

25

G

M4-8P
24" X 12"

DETOUR

M3-3P
24" X 12"

SOUTH

M1-5
24" X 24"

25

H

M4-8P
24" X 12"

DETOUR

M3-3P
24" X 12"

SOUTH

M1-5
24" X 24"

25

I

M4-8P
24" X 12"

DETOUR

M3-3P
24" X 12"

SOUTH

M1-5
24" X 24"

25

J

M4-8a
24" X 18"

END
DETOUR

M1-5
24" X 24"

25

K

M4-8P
24" X 12"

DETOUR

M3-3P
24" X 12"

SOUTH

M1-5
24" X 24"

25

L

M5-1PL
21" X 15"

←

M5-1PR
21" X 15"

→

M6-1PL
21" X 15"

←

M6-1PR
21" X 15"

→

M5-1PL
21" X 15"

↶

M5-1PR
21" X 15"

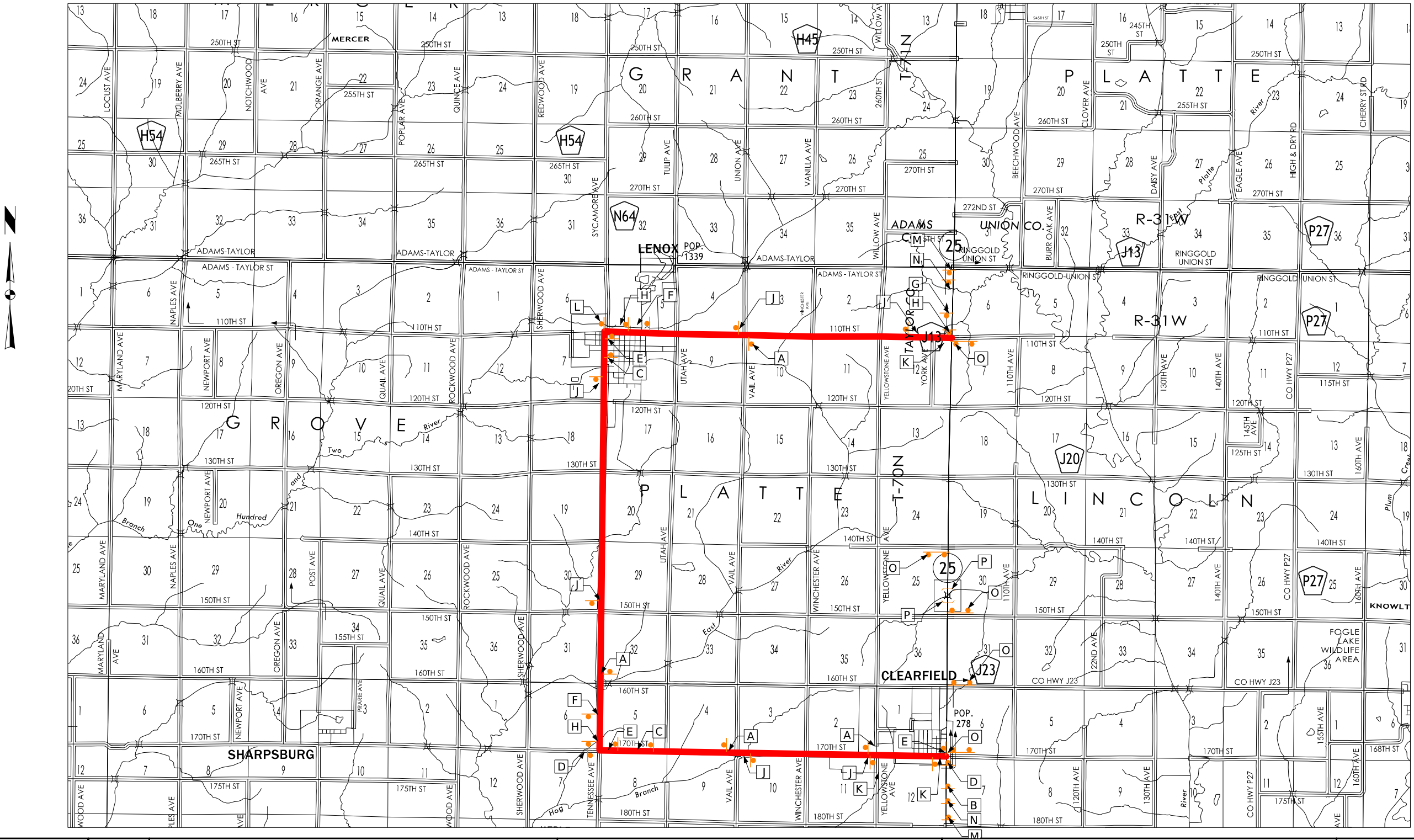
↷

M6-1PL
21" X 15"

↶

M6-1PR
21" X 15"

↷



DETOUR
AHEAD

W20-2
48" X 48"

M

ROAD
CLOSED
1000 FT

W20-3C
48" X 48"

N

ROAD CLOSED
TO
THRU TRAFFIC

R11-4
60" X 30"

O

ROAD
CLOSED

R11-2
48" X 30"

P

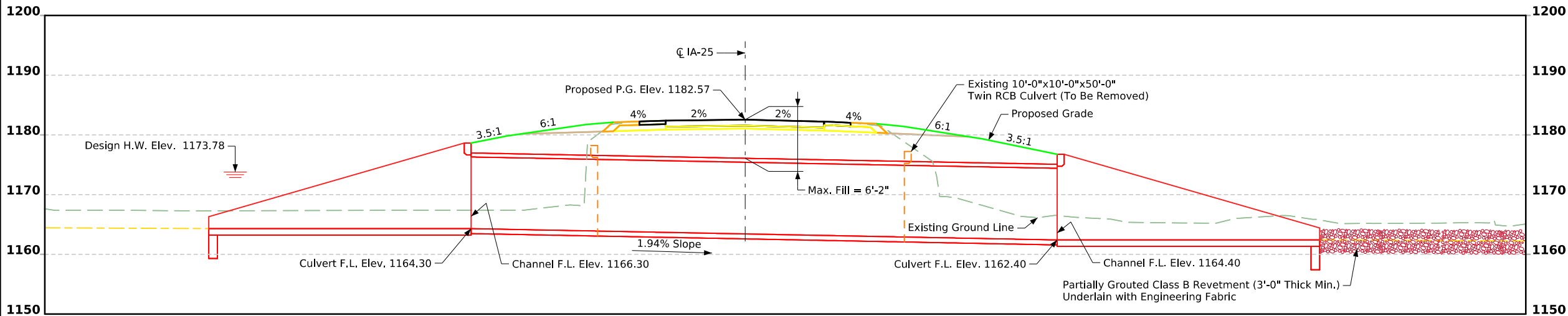
LEGEND

DETOUR ROUTE

DETOUR SIGN

TYPE 3 BARRICADE

DETOUR ROUTE



Hydraulic Data

RIDB: Not Applicable
Drainage Area = 1382 Acres
Stream Slope = 15.8 Ft./Mi.
 $Q_{50} = 1,060$ cfs
HW Elev. = 1173.78
Exit Velocity = 21.1 fps

Traffic Estimate

2016 AADT	1,250	V.P.D.
2045 AADT	???	V.P.D.
2045 DHV	???	V.P.H.
TRUCKS	16 %	
Total	???	
Design ESALs	???	

Utilities Legend

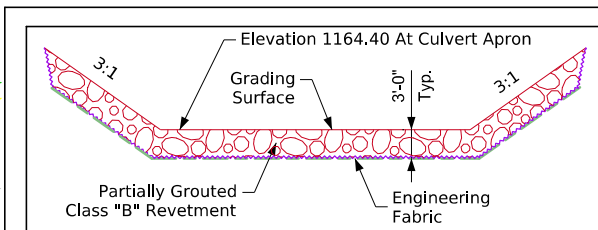
W - Water Line
FO3 - Overhead Powerline

Utilities shown on this sheet are for information only, see Road Design sheets for final utility information.

Utilities W and FO3 not shown within extents of plan view on this plan sheet; refer to roadway plans for utility locations.

Proposed Profile Grade on IA-25

VPI Sta. = 840+29.66
VPI Elev. = 1180.18
L = 650'



Estimated Revetment Quantities Included With Road Plans

Location	Revetment Class "B" (Ton)	Engineering Fabric (SY)	CL. 10 Channel Excavation (CY)	Concrete Grout (CY)
Inlet	--	--	--	--
Outlet	405	345	243	37
Totals	405	345	243	37

Density used for Class B revetment quantity calculations is 1.6 Ton/CY. 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. Concrete Grout for revetment estimated at 0.20 CY/SY.

Location

IA-25 over Unnamed Stream
T-70N R-31/32W
Section 30/25
Platte/Lincoln Township
Ringgold County
Bridge Maint. No. 8017.9S025
FHWA No. 046491
Latitude 40.831530°
Longitude -94.471642°

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 *David J. Mulholland* Date 1-6-2026
Printed or Typed Name David J. Mulholland
My license renewal date is December 31, 2026

Pages or sheets covered by this seal: Sheets V.1 & V.2
(Hydraulic Data, Channel Grading & Revetment)

Design For 25 Degree RA
Twin 10'-0" x 12'-0" x 98'-0"
Reinforced Concrete Box Culvert - C.I.P.

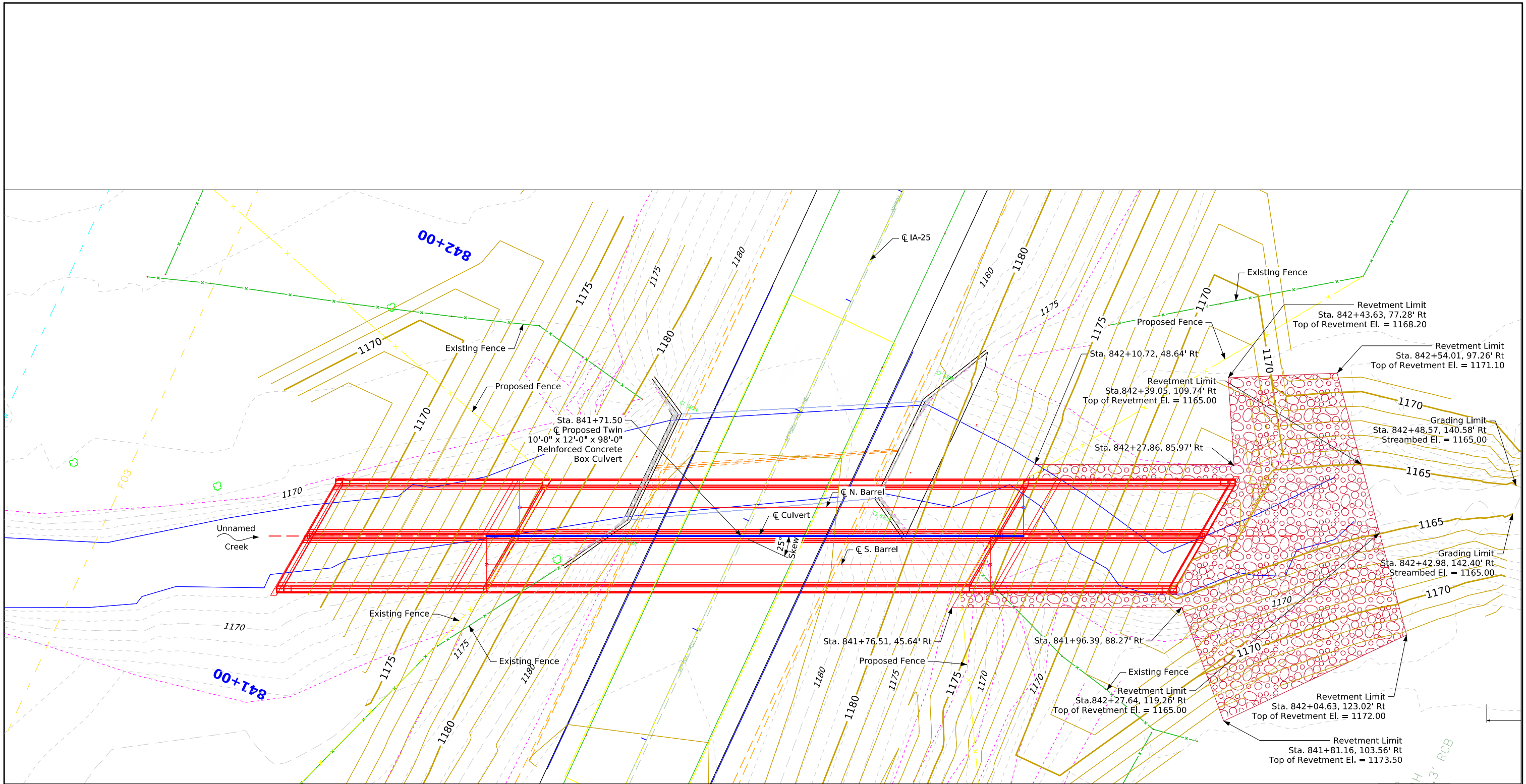
Situation Plan

STA. 841+71.50 (IA-25) Turn-in Date: Jan. 2026
Ringgold County
IOWA DEPARTMENT OF TRANSPORTATION
Design No. 0229 Design Sheet No. 1 of 2 FHWA 046491

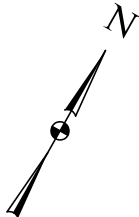


Situation Plan

0 10
Scale In Feet



Site Plan



Utilities Legend

W - Water Line
FO3 - Overhead Powerline

Utilities shown on this sheet are for information only, see Road Design sheets for final utility information.

Design For 25 Degree RA
Twin 10'-0" x 12'-0" x 98'-0"
Reinforced Concrete Box Culvert - C.I.P.

Site Plan

STA. 841+71.50 (IA-25) Turn-in Date: Jan. 2026

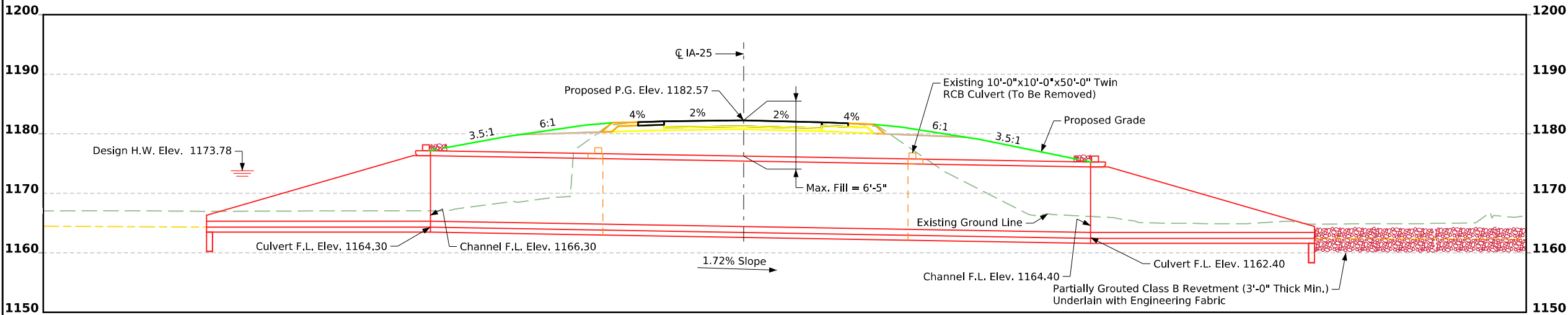
Ringgold County

IOWA DEPARTMENT OF TRANSPORTATION

Design No. 0229

Design Sheet No. 2 of 2

FHWA 046491



Hydraulic Data

RIDB: Not Applicable
Drainage Area = 1382 Acres
Stream Slope = 15.8 Ft./Mi.
 $Q_{50} = 1,060$ cfs
HW Elev. = 1173.78
Exit Velocity = 21.1 fps

Traffic Estimate

2016 AADT	1,250 V.P.D.
2045 AADT	??? V.P.D.
2045 DHV	??? V.P.H.
TRUCKS	16 %
Total	???
Design ESALs	???

Utilities Legend

W - Water Line
FO3 - Overhead Powerline

Utilities shown on this sheet are for information only, see Road Design sheets for final utility information.
Utilities W and FO3 not shown within extents of plan view on this plan sheet; refer to roadway plans for utility locations.

Anticipated settlement to be determined.

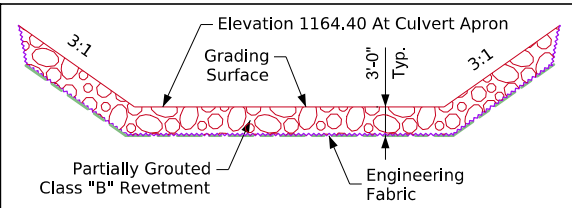
Plan Notes:
Flow line of culvert has been set 2' feet below stream bed.

Proposed Profile Grade on IA-25

VPI Sta. = 840+29.66
VPI Elev. = 1180.18
L = 650'

Longitudinal Section Along Centerline of Culvert

Design Fill Height = 7'
Note:
Revetment is proposed at the culvert outlet due to the outlet velocity exceeding policy limits.



Typical Channel Protection

Estimated Revetment Quantities Included With Road Plans

Location	Revetment Class 'B' (Ton)	Engineering Fabric (SY)	CL 10 Channel Excavation (CY)	Concrete Grout (CY)
Inlet	--	--	--	--
Outlet	400	320	223	36
Totals	400	320	223	36

Density used for Class B revetment quantity calculations is 1.6 Ton/CY. 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. Concrete Grout for revetment estimated at 0.20 CY/SY.

Location

IA-25 over Unnamed Creek
T-70N R-31/32W
Section 30/25
Platte/Lincoln Township
Ringgold County
Bridge Maint. No. 8017.9S025
FHWA No. 046491
Latitude 40.831530°
Longitude -94.471642°

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.
David J. Mulholland
Signature Date 1-6-2026
David J. Mulholland
Printed or Typed Name
My license renewal date is December 31, 2026
Sheets V.3 & V.4
(Hydraulic Data, Channel Grading & Revetment)

Pages or sheets covered by this seal:

Twin 10'x12'x110'-11 1/8" Reinforced Concrete Box Culvert - Precast

Design For 25 Degree RA

Situation Plan

STA. 841+71.50 (IA-25) Turn-in Date: Jan. 2026
Ringgold County
IOWA DEPARTMENT OF TRANSPORTATION
Design No. 0229 Design Sheet No. 1 of 2 FHWA 046491

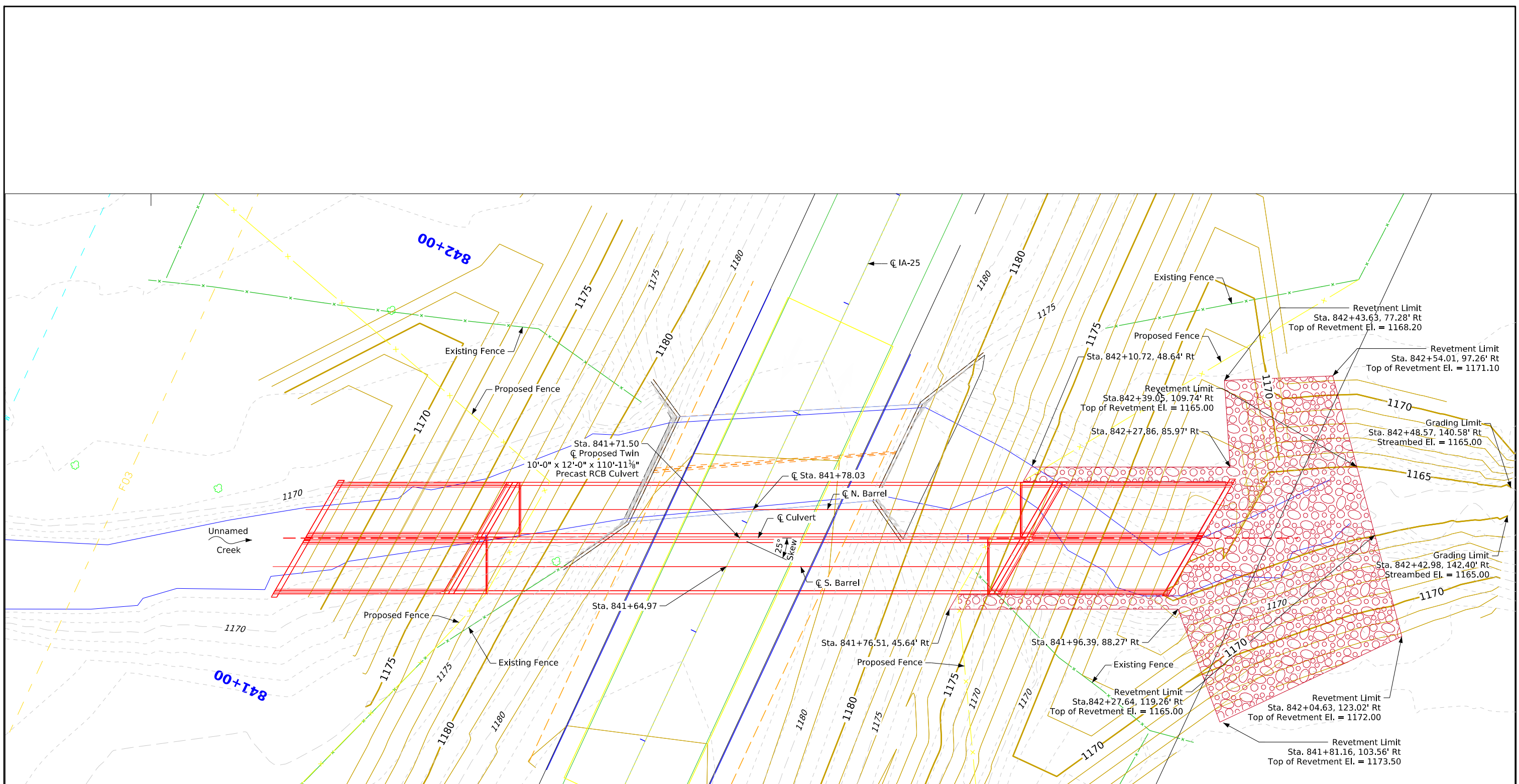
Note: Lintel beam and curtain walls shall form one continuous line and shall not be staggered or offset.

* For twin culverts, the centerline culvert equals the centerline of gap.

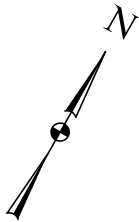


Situation Plan

0 10
Scale In Feet



Site Plan



Utilities Legend

W - Water Line
FO3 - Overhead Powerline
Utilities shown on this sheet are for information only, see Road Design sheets for final utility information.

Design For 25 Degree RA

Twin 10'x12'x110'-11 1/8" Reinforced Concrete Box Culvert - Precast

Site Plan

STA. 841+71.50 (IA-25) Turn-in Date: Jan. 2026

Ringgold County

IOWA DEPARTMENT OF TRANSPORTATION

Design No. 0229 Design Sheet No. 2 of 2 FHWA 046491

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

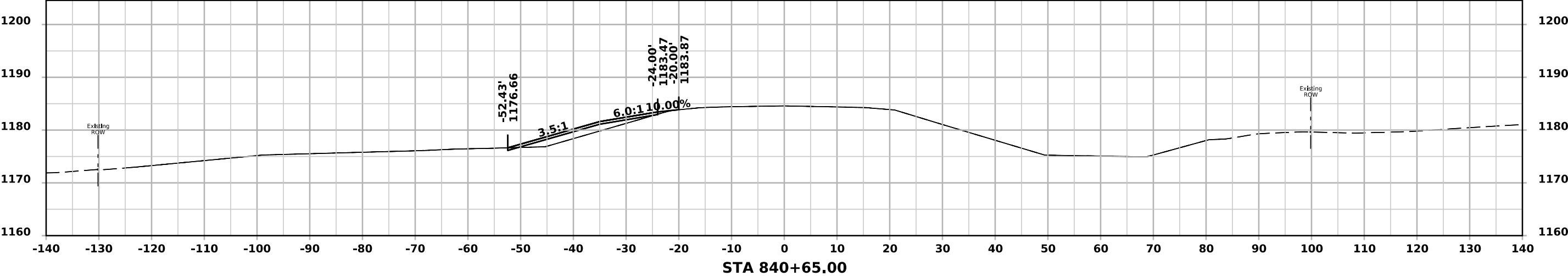
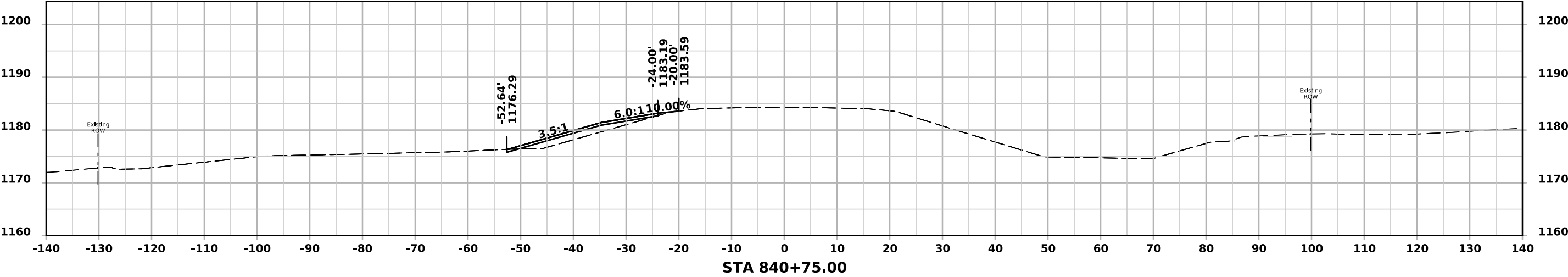
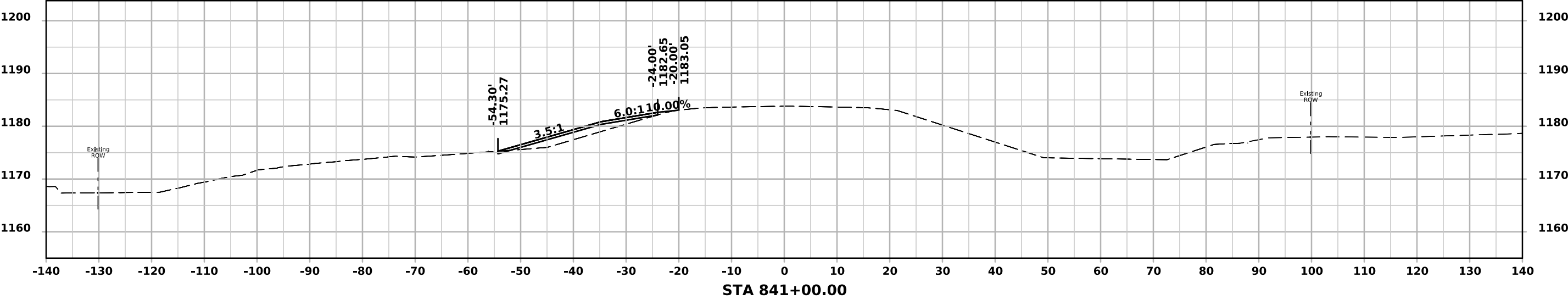
NOTES:

Text

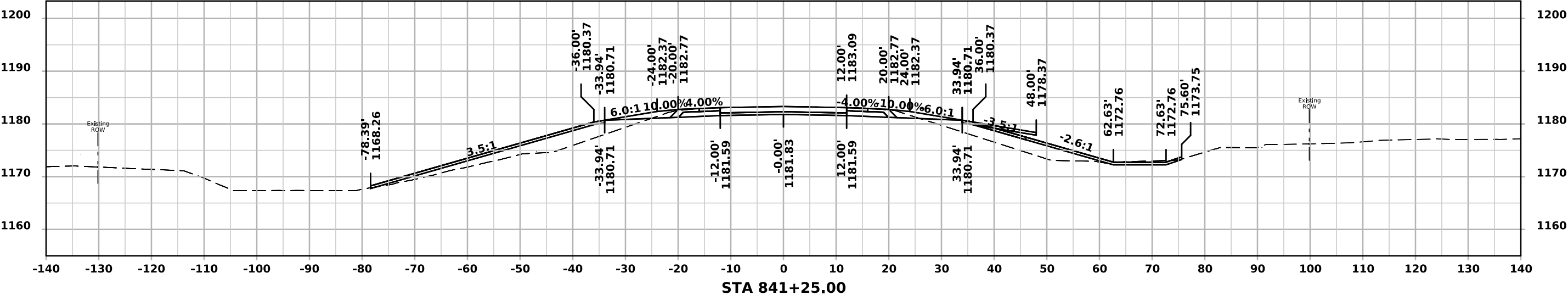
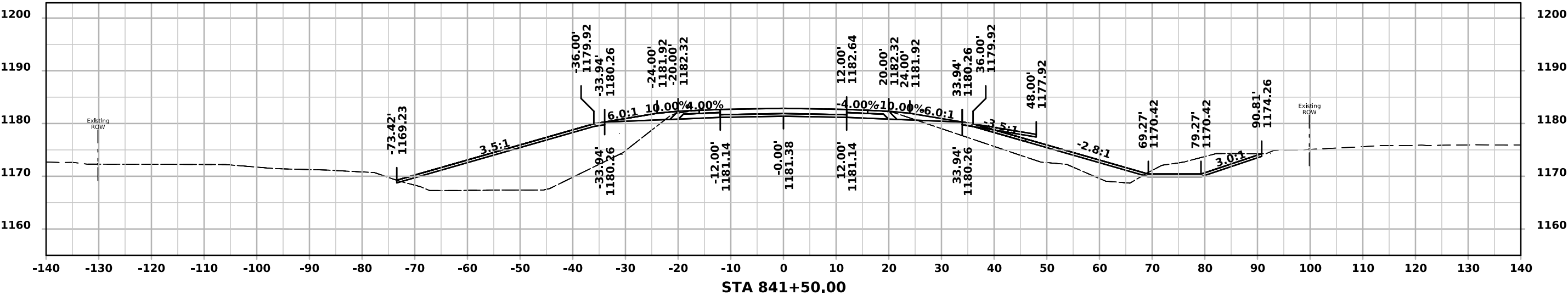
CROSS SECTIONS
LEGEND AND INFORMATION SHEET

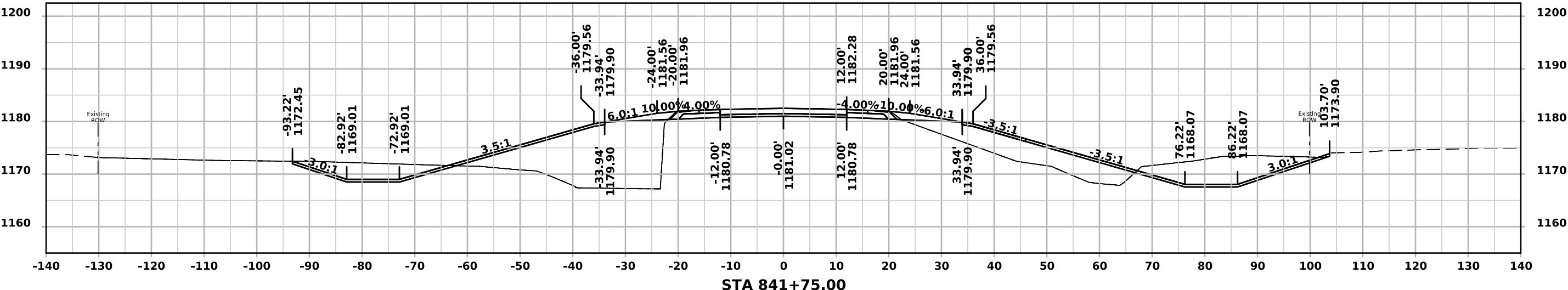
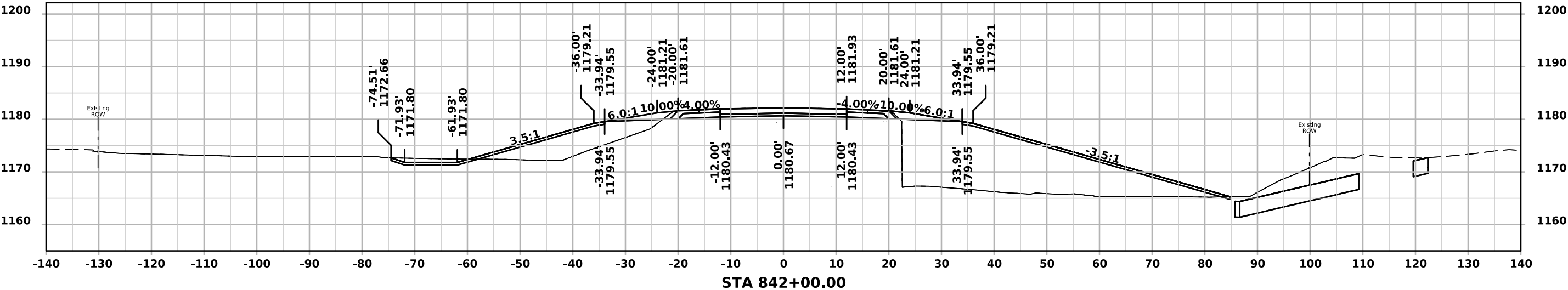
(COVERS SHEET SERIES W, X, Y, & Z)

IOWA 25



IOWA 25





IOWA 25

