

LETTING DATE  
12-17-2024

Bridge - Unspecified  
BRFN-078-4(25)--39-44

Henry COUNTY



PLANS OF PROPOSED IMPROVEMENT ON THE  
PRIMARY ROAD SYSTEM  
**Henry COUNTY**  
Bridge - Unspecified  
IA 78 Bridge over Stream 0.3 mi W of E Jct Co Rd W66

REVISIONS

TOTAL

25

PROJECT IDENTIFICATION NUMBER

20-44-078-010

PROJECT NUMBER

BRFN-078-4(25)--39-44

R.O.W. PROJECT NUMBER

STPN-078-4(26)--2J-44

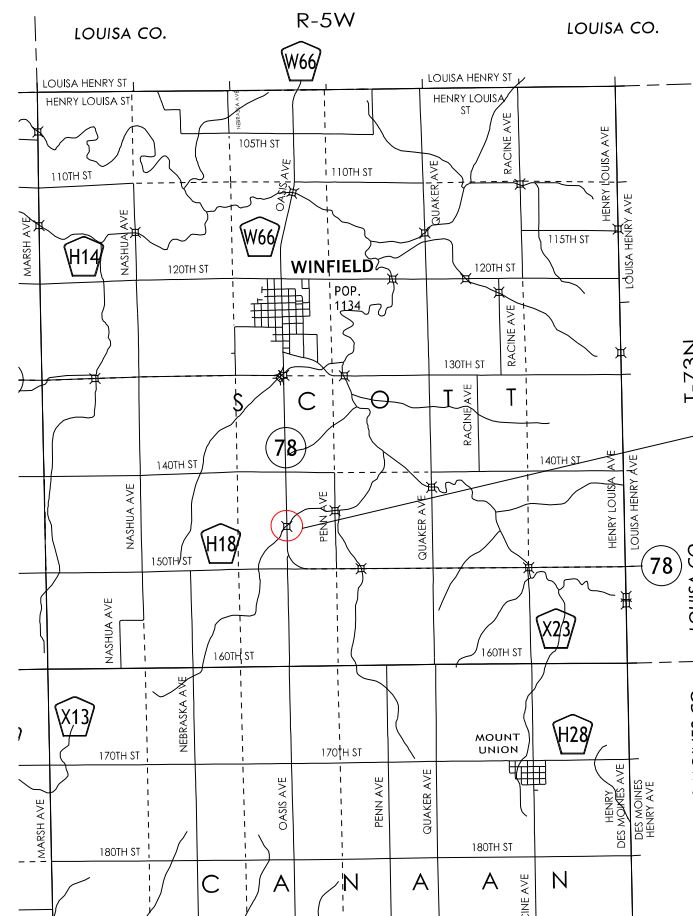
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SCALES: As Noted

Refer to the Proposal Form for list of applicable specifications.

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



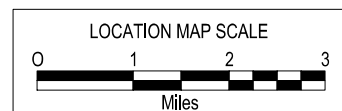
PROJECT LOCATION  
Sta. 96+22.67  
M.P. 44.98

Upcoming Event Dates:

D3 - 10-06-2022

B1 - 10-07-2022

D5 - 11-10-2022



DESIGN DATA RURAL			
2025	AADT	800	V.P.D.
2045	AADT	1000	V.P.D.
20 -	DHV	-	V.P.H.
	TRUCKS	9 %	
	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.

D2 PLAN - Date: 09-22-2022

<b>Roadway</b>	IA-78		
<b>PIN Number</b>	20-44-078-010	<b>Submittal Date</b>	
<b>Project Number</b>	BRFN-078-4(25)--39-44	<b>Approval Date</b>	
<b>District</b>	District 5	<b>Assistant District Engineer</b>	Mark Van Dyke
<b>County</b>	HENRY	<b>Office Director</b>	or
<b>Route</b>	IA-78		
<b>Location</b>	Stream 0.3 mi W of E Jct Co Rd W88		
<b>Work Type</b>	Bridge Replacement		
<b>Segment Manager</b>			
<b>Designer</b>			
<a href="#">Design Manual Section 1C-1</a> <a href="#">Last Updated: 04-28-19</a>			
<b>Rural Two-Lane Highways (Rural Arterials)</b>			
<b>Design Element</b>	<b>Preferred</b>	<b>Acceptable</b>	<b>Project Values</b>
Design speed (mph)	60	50	50
Maximum superelevation rate (Refer to Section 2A-2)	6%	8%	N/A
Design lane width (ft)	12	12	11
Full depth paved width (ft)	12	12	11
Right turn lane (ft)	12	10	N/A
Climbing Lane (ft)	12	12	N/A
Left turn lane (ft)	12	10	N/A
Pavement cross-slope (on tangent sections)	Through lanes	1.5% minimum, 2% maximum	N/A
	Auxiliary and turn lanes	3% maximum	N/A
	Crown break at centerline	4% maximum	4%
Shoulder cross-slope (on tangent sections)	4%	Shoulder cross-slope cannot be less than the adjacent lane, 6% max for paved or granular shoulders, 8% max for earth shoulders	4%
Curb type (Refer to Section 3C-2)	Design speed = 50 or 55 mph	6-inch sloped	6-inch standard
	Design speed ≥ 60 mph	4-inch sloped	6-inch sloped
Foreslope (For fill areas greater than 40 ft, contact the Soils Design Section for assistance)	Adjacent to shoulder	10:1 for 4' than 6:1	3:1
	Beyond standard ditch depth and design clear zone	3.5:1	3:1
Curbed roadways		2%	not steeper than 3:1
	Backslope (For cut areas greater than 25 feet, contact the Soils Design Section for assistance with backslope benches.)	3:1	2.5:1
Transverse Slopes	w/ drainage structures		5:1
	w/o drainage structures		6:1
Ditches (Refer to Section 3C-1)	Outside ditch (depth x width) (ft)	5 x 10	5 x 10
Bridge width—new*	Bridge length ≤ 200 ft	design lane width + effective shoulder widths	design lane width + effective shoulder widths
	Bridge length > 200 ft	design lane width + effective shoulder widths	design lane width + 4' right and left of the design lane widths
Bridge width—existing*	Bridge length ≤ 200 ft	design lane width + no less than 2 ft left and right	design lane width + 2 ft offset left and right
	Bridge length > 200 ft	design lane width + no less than 2 ft left and right	design lane width + 2 ft offset left and right
Vertical clearance (ft) (above lanes, shoulders and 25 feet left and right of the center of railroad tracks)	Over primary	16.5	16
	Over non-primary	15.5 at interchange locations, 15 at all other locations	14
	Over railroad	23.3	23.3
Sign trusses and pedestrian bridges		17.5	17
		17.5	17
Structural Capacity	Contact Office of Bridges and Structures	Contact Office of Bridges and Structures	—
Level of Service	B	B	B

\*FHWA notification via email is required if acceptable criteria is not met on the NHS system (No formal design exception is required)

<b>Design year ADT = 2025</b>		<b>Effective Shoulder Width and Type for Two-Lane Highways</b>			
<a href="#">Design Manual Section 1C-1</a> <a href="#">Last Updated: 04-28-19</a>					
Preferred (values shown in feet)		Rural Roadways		Urban Roadways	
		Rural Roadways		Urban Roadways	
Turn lanes with shoulders	5	5	Turn lanes with shoulders	5	0
Turn lanes with curbs	6	See Section 3C-2	Turn lanes with curbs	5	0
	Effective Shoulder Width	Paved Width		Effective Shoulder Width	Paved Width
Climbing Lanes	6	4	Climbing Lanes	6	0
Two-Lane Highways	Effective Shoulder Width	Paved Width	Two-Lane Highways	Effective Shoulder Width	Paved Width
Routes where bicycles are to be accommodated					
On roadways approaching urban areas (due to increased bike traffic)					
On all curves with a superelevation rate of 7.0% or greater					
On roadways with design year ADT > 5000					
On all other NHS					
On non-NHS routes with design year ADT > 3000					
On non-NHS routes with design year ADT ≤ 3000					
Design year ADT > 2000 vpd					
Design year ADT between 400 - 2000 vpd					
Design year ADT < 400 vpd					
*Requires safety edge—Refer to Section 3C-3					
Curb should be located beyond the outer edge of the effective shoulder width in rural areas					
Refer to Section 3C-3 for curb offsets in urban areas					
Notes:					
*Bridge approach section only					

<b>Roadway Design Speed (mph) = 60</b>		<b>Design Criteria for High Speed Roadways</b>												
<a href="#">Design Manual Section 1C-1</a> <a href="#">Last Updated: 04-28-19</a>														
<b>Design Element</b>		Preferred Criteria					Acceptable Criteria					<b>Project Values</b>		
		Design Speed, mph					Design Speed, mph							
		50	55	60	65	70	75	50	55	60	65	70	75	
Stopping sight distance (ft) (Refer to Section 3B-1)		425	495	570	645	730	820	425	495	570	645	730	820	570
Minimum horizontal curve radius (ft) (Refer to Sections 2A-2 and 2A-3)	Method 5 superelevation and side friction distribution	633	1060	1330	1660	2040	2500	833	1060	1330	1660	2040	2500	—
		—	—	—	—	—	—	758	960	1200	1480	1810	2210	—
Minimum vertical curve length (ft) (Refer to Section 2B-1)	crest vertical curves	150	165	180	195	210	225	150	165	180	195	210	225	100
	sag vertical curves	84	114	151	193	247	312	84	114	151	193	247	312	—
Minimum rate of vertical curvature (K) (Refer to Section 2B-1)	roadways without fixed-source lighting	96	115	136	157	181	206	96	115	136	157	181	206	—
	roadways with fixed-source lighting	96	115	136	157	181	206	64	66	78	91	106	121	—
Minimum gradient (%) (Refer to Section 2B-1)	Urban roadways	0.5					0.3% with a curb, 0.0% without a curb					+22%/-22%		
Maximum gradient (%) (Refer to Section 2B-1)	Rural roadways	4					3					+22%/-22%		
	Interstates	4					3					+22%/-22%		
		4					3					+22%/-22%		
Clear zone		See "Preferred Clear Zone" table in Section 3A-2					See "Acceptable Clear Zone" table in Section 3A-2					32		

## Project Design Criteria

IOWA DEPARTMENT OF TRANSPORTATION

**TO OFFICE:** District 5  
**ATTENTION:** Bob Younie  
**FROM:** John E. Bartholomew  
**BUREAU:** Design  
**SUBJECT:** Project Concept Statement; (Final Approval, D0)

**DATE:** October 5, 2021  
**PROJECT:** Henry County  
 BRFN-078-4(25)- -39-44  
 PIN: 20-44-078-010

JEB: jaa

C. Purcell  
 S. J. Megivern  
 M. A. Swenson  
 S. Majors  
 B. Bradley  
 E. C. Wright  
 J. Harris  
 B. E. Azeltine  
 S. Anderson  
 K. K. Patel  
 D. R. Claman  
 M. E. Khoda  
 S. McElmeel  
 B. Lauderman  
 J. Woodcock  
 H. Torres-Cacho

M. J. Kennerly  
 J. S. Nelson  
 R. A. Younie  
 K. Brink  
 J. W. Laaser-Webb  
 M. E. Ross  
 C. C. Poole  
 A. Poole  
 D. Stokes  
 S. Godbold  
 J. Hauber  
 K. Olson  
 J. R. Webb  
 J. R. Phillips  
 B. M. Clancy  
 S. Seivert

K. D. Nicholson  
 M. Nop  
 D. E. Sprengeler  
 D. L. Newell  
 W. A. Sorenson  
 A. A. Welch  
 B. Hofer  
 S. J. Gent  
 T. Jerman  
 J. Vortherms  
 A. Abu-Hawash  
 S. Neubauer  
 B. Beavers  
 J. Garton  
 B. Porter  
 FHWA

This project involves the replacement of the IA 78 bridge (Maint. No. 4445.0S078) over stream 0.3 mi W of E Jct Co Rd W66

A concept review was held on September 7, 2021. Those present included Lauren Giarmo, Anthony Blint, Bonnie Clancy, Marv May and Steven McElmeel from the District 5 Office; Dave Claman and Abraham Kuol from the Bridges and Structures Bureau; Brandy Beavers from the Location and Environment Bureau and John Bartholomew, Joe Adams, Kevin Patel and Yuejia Gu from the Design Bureau.

This is the preferred alternative due to the minimized inconvenience and disruption to the traveling public. The only alternative considered was replacing the existing 36 ft. x 30 ft. bridge with a twin 12 ft. x 11 ft. x 102 ft. reinforced concrete box (RCB). Additional right of way may be required. Traffic will be maintained by off-site detour. The total cost of this project is \$985,000.

The Draft Project Concept Statement was sent out for review and comment with concerns to be resolved by Monday, October 4, 2021. Comments received during the review period have been considered and resolved.

This project is recommended for construction in FY 2025. The Office of Bridges and Structures will coordinate plan preparation with assistance from the Office of Design.

Project Concept

FINAL PROJECT CONCEPT STATEMENT

IA 78 Bridge over Stream 0.3 mi W of E Jct Co Rd W66

Henry County  
BRFN-078-4(25)--39-44  
PIN: 20-44-078-010  
Maint. No. 4445.0S078  
FHWA No. 28590

Highway Division  
Design Bureau

John Bartholomew, P.E.  
515-239-1540

October 5, 2021

Henry County  
BRFN-078-4(25)--39-44  
PIN: 20-44-078-010  
Page 2



Roadway with route



Roadway against route

I. STUDY AREA

A. Project Description

This project involves the replacement of the IA 78 bridge (Maint. No. 4445.0S078) over a stream.

The alternatives considered were:

1. This project involves the replacement of the bridge FHWA 28590 (Maint. No. 4445.0S078) over Stream 0.3 mi W of E Jct Co Rd W66 with a Twin Box Culvert.

B. Need for Project

This is a 36 ft X 30 ft steel girder bridge that was built in 1932 and reconstructed in 1952. A deck replacement and overlay were done in 1989, and the overly has reached the end of its service life. The deck has leaching cracks, hollows and spalls, and the joints need replacement. The steel beams have severe rust and section loss, and the concrete beams have leaching cracks and hollows. The substructure has cracking and scaling. The bridge was designed for live loads below current standards. Due to the condition of the overall structure, it is recommended the bridge be replaced.

C. Present Facility

The existing structure is a 36 ft x 30 ft beam and concrete girder bridge constructed in 1932, widened in 1952, barrier rails updated in 1989 and the deck overlaid in 1993.

IA 78 in the project area is 22 ft wide PCC pavement with 10 ft wide granular shoulders and 3:1 foreslopes, constructed in 1953.

D. Traffic Estimates

The 2025 construction year and 2045 design year average daily traffic estimates are 800 ADT with 9 % trucks and 1000 ADT with 9 % trucks, respectively.

E. Sufficiency Ratings

IA 78 is classified as an access route and is a maintenance service level C roadway. The federal bridge sufficiency rating is 61.7.

F. Access Control

Access rights will not be acquired for this project.

G. Crash History

During the five-year study period from January 1, 2016 through December 31, 2020, there was 1 personal property crash.

Project Concept

II. PROJECT CONCEPT

A. Replace with a culvert

The existing 36 ft x 30 ft bridge will be replaced with a twin 12 ft x 11 ft x 102 ft reinforced concrete box (RCB) placed at a 45 degree right ahead skew. The typical cross section over the RCB will consist of a 24 ft. wide roadway with 10 ft. effective granular shoulders and 6:1/3:1 foreslopes.

Approximately 150 ft. of pavement will be replaced with 9 inches of class C class 3 PCC on 12 inches of modified subbase. Longitudinal subdrains will be installed. The flow line of the RCB will be buried one foot below the existing flow line in the channel. This will allow the bottom of the RCB to silt in and provide a natural bottom for fish passage. The existing ditches will need to be relocated to meet the inlet and outlet flowlines of the new RCB. Class E revetment will be placed at the ends of the RCB.

There is not sufficient horizontal clearance to construct the new RCB by the flowable mortar method.

The existing guardrails will be removed.

Apply erosion control and rural seeding and fertilizing to all disturbed areas.

Right of way may be required for this project.

Traffic will be maintained by an off-site detour for approximately 90 days.

<b>Bridge Items</b>	<u>Estimated Costs</u>
New Culvert	\$ 268,000
Headwall	197,000
Bridge Removal	14,000
Revetment	12,000
Mobilization - 10%	49,000
M & C - 20%	<u>108,000</u>
<b>Bridge Costs</b>	<b>\$ 648,000</b>

**Roadway Items**

Clearing & Grubbing	4,000
Embankment in place, contractor furnished	13,000
Excavation Class 13 Waste	3,000
Granular Subbase	3,500
Modified Subbase	7,500
Granular Shoulder	3,000
STD/S-F PCC PAV'T CL C CL 3,9"	41,000
Flooded Backfill	7,000
Subdrain, Longitudinal,(Shld) 4"	5,000
Subdrain, Outlet,DR-303	3,000
Guardrail Removal	2,000
Removal of Pavement	4,000
Wetland Mitigation	50,000
Erosion Control	50,000
Seeding and Fertilizing	1,000
Right of Way	5,000
Traffic Control - 5%	17,000
Mobilization - 5%	17,000
M & C - 30%	<u>101,000</u>
<b>Roadway Costs</b>	<b>\$ 337,000</b>

**Project Total**

**\$985,000**

B. Detour Analysis

IA 78 will be closed and an offsite detour will be utilized. It is anticipated the detour will be in place for approximately 90 days. The detour from the Junction of IA 78 and Co Rd H18 go south for 2.03 miles to the junction of Co Rd H18 & Co Rd H28, go west on H28 for 5.53 miles to the junction of Co Rd H 28 and US 218 & IA 27. Go north on US 218 & IA 27 for 4.47 miles to the junction of IA 78 and US 218 & IA 27. Out of distance travel is 7.56 miles. The total distance user cost is anticipated to be \$125,700. The cost for county road maintenance will be \$3,475 as calculated by the Gas Tax Method.

C. Recommendations

It is recommended that the present structure be replaced with a box culvert.

D. Construction Sequence

It is anticipated that all work on this project will be awarded to one prime contractor. The Bridges and Structures Bureau will coordinate the plan preparation with assistance from the Design Bureau.

Project Concept

# HENRY COUNTY

E. ADA Accommodations

There are no bike paths or sidewalks adjacent to IA 78; therefore, no ADA accommodations are planned in conjunction with this project.

F. Special Considerations

This will not be a traffic critical project.

No bike path or sidewalk will be required as part of this project.

The ABC Rating Score of 24 is less than the first stage filter threshold of 50, therefore this bridge will not be considered further as a candidate for ABC construction.

Right of Way may be required for this project.

The Location and Environment Bureau has reviewed this project and based on preliminary desktop observations, has determined that a Section 404 Permit will be required. It is expected that the work will be covered by Nationwide Permit 14.

G. Program Status

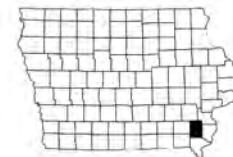
Site data has been developed by the Design Bureau. This project is listed in the 2022-2026 Iowa Transportation Improvement Program, with \$5,000 programmed for right of way in FY 2025, and \$959,000 for replacement in FY 2025. Costs for this project may be eligible for bridge replacement funds. A schedule of events will be developed following approval of the Project Concept.

JEB:jaa

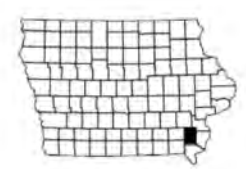
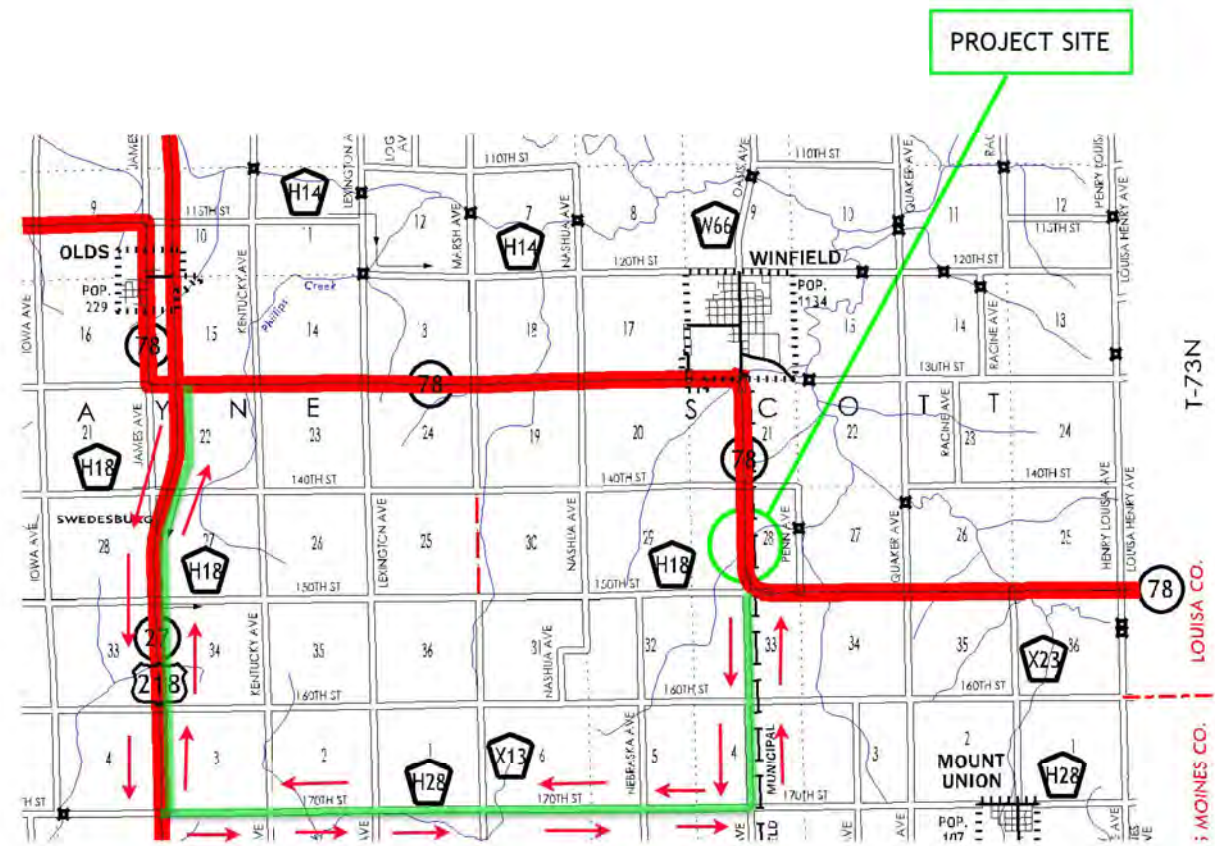
PROJECT LOC  
MILEPOST 45



STREAM 0.3 MI W OF E JCT CO RD W66  
BRFN-078-4(25)- -39-44  
PIN: 20-44-078-010



Project Concept



**HENRY COUNTY**  
 On IA 78 Over Stream 0.3 mi W of E Jct  
 Co Rd W66  
 BRFN-078-4(25)- -39-44  
 PIN: 20-44-078-010

← DETOUR

Project Concept

Utilities

Alliant Energy  
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Alliant Energy  
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[sjackson@rrwa.net](mailto:sjackson@rrwa.net)

Winfield (city of)  
Angie Oepping  
(Gas Distribution)  
115 North Locust Street  
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[winfield@farmtel.net](mailto:winfield@farmtel.net)

Windstream  
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Project Concept



Field Exam Questions/Comments:

Will pavement markings for the detour be needed in the plans?

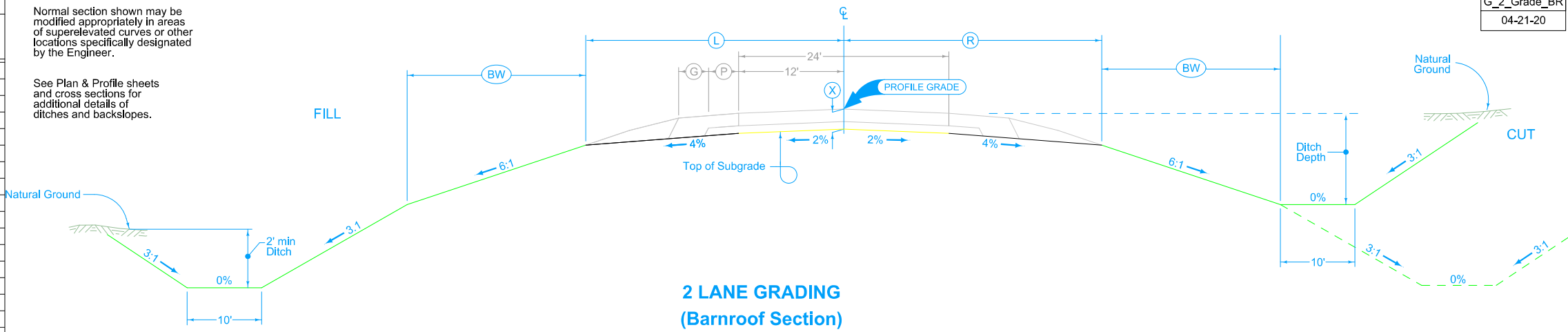
Design would prefer that the property owner(s) be paid to replace their fence rather than having a small amount of fence in the plans.

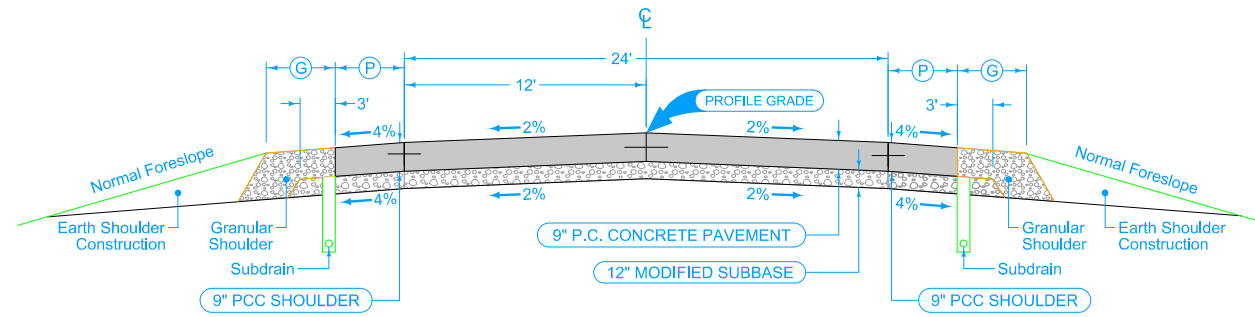
Other Questions/Comments

LOCATION		DIMENSIONS			
ROAD IDENTIFICATION	STATION TO STATION	Ⓛ Feet	Ⓡ Feet	ⓧ Inches	ⒷⓌ Feet
IA 78	95+00.00 97+45.00	35.8	35.8	21	0.2

Normal section shown may be modified appropriately in areas of superelevated curves or other locations specifically designated by the Engineer.

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





**Full Depth PCC Combination Shoulder**

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

2_C_FullPCC_04-21-20			
STATION TO STATION		(P) Feet	(G) Feet
95+00.00	97+45.00	4	6

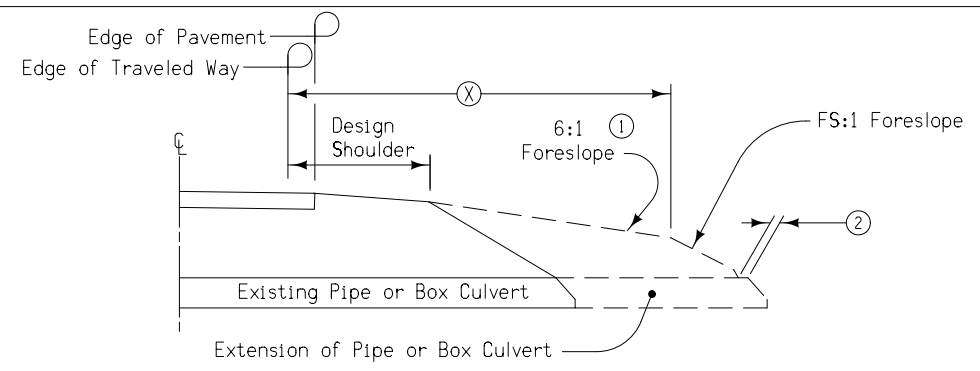
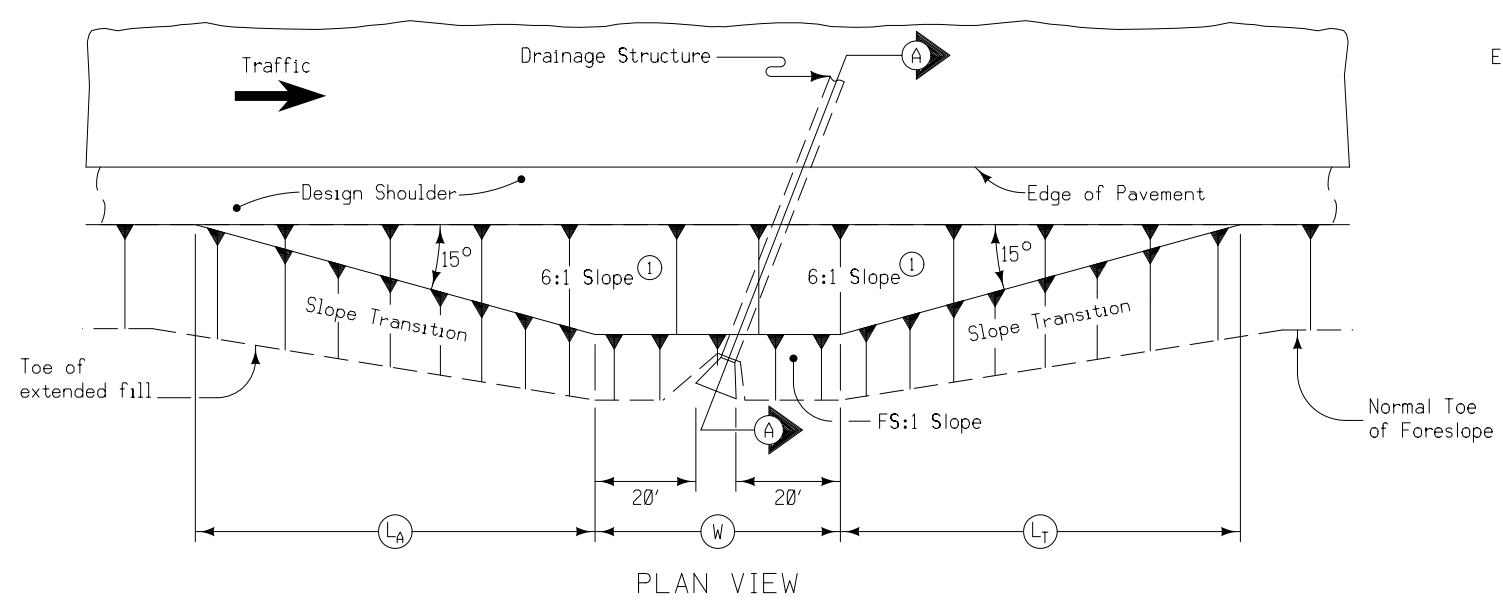
Mainline Jointing:  
 Transverse joints: CD at 17' spacing  
 Longitudinal joint: L-2

2P_04-21-20	
STATION TO STATION	
95+00.00	97+45.00

**Full Depth PCC Combination Shoulder**

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

2_C_FullPCC_04-21-20			
STATION TO STATION		(P) Feet	(G) Feet
95+00.00	97+45.00	4	6



SECTION A-A

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 road.
- Ⓜ = Pipe or RCB opening width plus 20 feet each side.

STRUCTURE LOCATION		Ⓜ	L <sub>A</sub>	L <sub>T</sub>	X	FS
STATION ③	SIDE	Feet	Feet	Feet	Feet	
96+22.67	RT	55	53	53	24	3:1
96+22.67	LT	55	53	53	24	3:1

BARNROOF FORESLOPE AT  
SKEWED DRAINAGE STRUCTURE

# SURVEY SYMBOLS

<ul style="list-style-type: none"> <li>⊕ AST, Above Ground Storage Tank</li> <li>BB Billboard</li> <li>BBB, Bottom of Bridge Beam</li> <li>BCL, Bridge Centerline</li> <li>BD, Bridge Deck</li> <li>⊙ BIN, Grain Bin</li> <li>BL, Topo Breakline</li> <li>BLD, Building or Foundation</li> <li>BLS, Bridge Low Steel</li> <li>△ BM, Bench Mark</li> <li>BNK, Stream Bank</li> <li>BRG, Bridge</li> <li>C, Centerline BL of Road -ML or SR</li> <li>CAV, Cave</li> <li>CEL, Cell Phone Tower</li> <li>CIS, Cistern</li> <li>CON, Concrete or A/C Slab</li> <li>CP, Control Point</li> <li>CRP, Corporation Line</li> <li>CS, Curve Point</li> <li>CU, Back of Curb</li> <li>CUL, Culvert</li> <li>D, Centerline Draw or Stream -Down</li> <li>DAB, Drainage Area Boundary</li> <li>DIK, Centerline of Dike or Dam</li> <li>DTM, Photogrammetry Elevation Control Check</li> <li>DU, Centerline Draw or Stream -Up</li> <li>EB, Electrical Box</li> <li>EG, Edge of Gravel Road</li> <li>ENP, Edge Paved Entrance and Park Lot</li> <li>ENT, Centerline BL of Entrance</li> <li>ENU, Edge Unpaved Entrance and Parking</li> <li>EP, Edge of Paved Roads -ML or SR</li> <li>EW, Edge of Water</li> <li>FCL, Chain Link and Security Fence</li> <li>FENO, FENO Monument</li> <li>FHD, Fire Hydrants</li> <li>FLG, Flag Poles</li> <li>FP, Filler Pipe</li> <li>FW, Wire Fence</li> <li>FWD, Wood Fence</li> <li>GDC, Guard Rail Cable</li> <li>GDL, Guard Rail Steel</li> <li>GP, Guard Post -Less Than 4 Posts</li> <li>GPR, Guard Post -4 or More Posts</li> <li>GR, Ground Shot</li> <li>GRV, Grave</li> <li>GU, Gutter In Front of Curb</li> <li>GV, Gas Valve</li> <li>HDG, Hedge Row</li> <li>HS, Hydric Soil -Wetlands</li> <li>HT, Electrical Highline Tower</li> <li>IN, Storm Sewer Intake</li> <li>INB, Storm Sewer Beehive Intake</li> <li>LC, Lot Corner</li> <li>LIN, Miscellaneous Line</li> <li>LP, L.P. Tank</li> <li>LUM, Luminaire</li> <li>MH, Utility Access -Manhole</li> <li>MIS, Miscellaneous</li> <li>MM, Mile Marker Post</li> <li>OUT, Tile Outlet</li> <li>PC, Curve Point</li> <li>PCP, Photo Control Point</li> <li>PCT, Photo Control Target</li> <li>PI, Tangent Point</li> <li>PIP, Pipe Culvert</li> <li>PL, Location of Photo -Wetlands</li> <li>PLG, Location of General Photo</li> <li>POC, Curve Point</li> <li>POST, Spiral Point</li> </ul>	<ul style="list-style-type: none"> <li>PR, Electric Riser Pole</li> <li>PRO, Profile Shot</li> <li>PT, Curve Point</li> <li>REF, Reference Tie Point</li> <li>RET, Retaining Walls</li> <li>RIP, Rip-Rap</li> <li>ROC, Rock Outcropping</li> <li>ROW, Right of Way Mark</li> <li>RR, Centerline of Railroad Tracks</li> <li>RRB, Railroad Signal Box</li> <li>RRF, Railroad Frog</li> <li>RRR, Railroad Rail</li> <li>RRS, Railroad Signal</li> <li>RRW, Railroad Switch</li> <li>RT, Radio Tower</li> <li>S, Soil Sampling Site -Wetlands</li> <li>SBR, Size of Bridge</li> <li>SC, Spiral Point</li> <li>SCR, Section Corner</li> <li>SEP, Septic Tank</li> <li>SF, Silt Fence -Wetlands</li> <li>SG, Staff Gauge -Wetlands</li> <li>SH, Paved Shoulder</li> <li>SHR, Shrub</li> <li>SI, Sign</li> <li>SL, Speed Limit Sign</li> <li>SLN, Section Line</li> <li>SLO, Silo</li> <li>SNK, Sink Hole</li> <li>SNP, Unpaved Shoulder</li> <li>SP, Stream Profile</li> <li>STP, Stump</li> <li>SWK, Sidewalk</li> <li>SWP, Swamp or Marsh</li> <li>TA, Tower Anchor</li> <li>TBO, Telephone Booth</li> <li>TCB, Traffic Signal Box</li> <li>TDC, Tree Deciduous</li> <li>TDL, Traffic Detection Loop</li> <li>TER, Terrace</li> <li>TEV, Evergreen Tree</li> <li>TFR, Tree Fruit</li> <li>TGP, Telegraph Pole</li> <li>TIL, Tile Line</li> <li>TLNL, Tree Line Left</li> <li>TLNR, Tree Line Right</li> <li>TOP, Top of Bridge Pier</li> <li>TPA, Telephone Pole Co. 1</li> <li>TPB, Telephone Pole Co. 2</li> <li>TPC, Telephone Pole Co. 3</li> <li>TR, Telephone Riser Pole</li> <li>TRL, Trail</li> <li>TS, Spiral Point</li> <li>TSB, Telephone Switch Box</li> <li>TSG, Traffic Signal</li> <li>TSL, Traffic Signal and Luminare</li> <li>TV, Satellite TV Dish</li> <li>TVP, TV Pedestal</li> <li>TW, Top of Water</li> <li>UB, Utility Box</li> <li>UE, Utility Elevation</li> <li>UPH, Utility Pot Hole - Quality A</li> <li>UST, Underground Tank</li> <li>UV, Underground Utility Vault</li> <li>VS, Channel Cross Section</li> <li>WC, Wild Card -Misc. Field Shot</li> <li>WEL, Well</li> <li>WHD, Water Hydrant</li> <li>WHU, RV Water Hook Up</li> <li>WM, Wind Mill</li> <li>WND, Wind Turbine</li> <li>WV, Water Valve</li> </ul>
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## SURVEYED UTILITY OWNER SYMBOLS

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

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

— TI	TLID, Windstream Communications - Quality D
— W	WLID, Rathbun Rural Water - Quality D
— G	PPA, Alliant Energy
— FO	GLID, Winfield, City of - Quality D
— FO	FOID, Windstream Communications - Quality D

## PLAN VIEW COLOR LEGEND OF PLAN AND PROFILE SHEETS

LINEWORK		Design Color No.
Green	(2)	Existing Topographic Features and Labels
Blue	(1)	Proposed Alignment, Stationing, Tic Marks, and Alignment Annotation
Magenta	(5)	Existing Utilities
SHADING		Design Color No.
Lavender	(9)	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
Gray, Dark	(112)	Proposed Grade and Pave Shading "In conjunction with a paving project"
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
Green, Light	(225)	Existing Pavement Shading
Red	(3)	Proposed Structure Shading

## PROFILE VIEW COLOR LEGEND OF PLAN AND PROFILE SHEETS

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

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

RIGHT-OF-WAY LEGEND	
▲	Proposed Right-of-Way
△	Existing Right of Way
▲△	Existing and Proposed Right-of-Way
▲△	Easement and Existing Right-of-Way
○	Easement (Temporary)
●	Easement
C/A	Access Control
—	Property Line

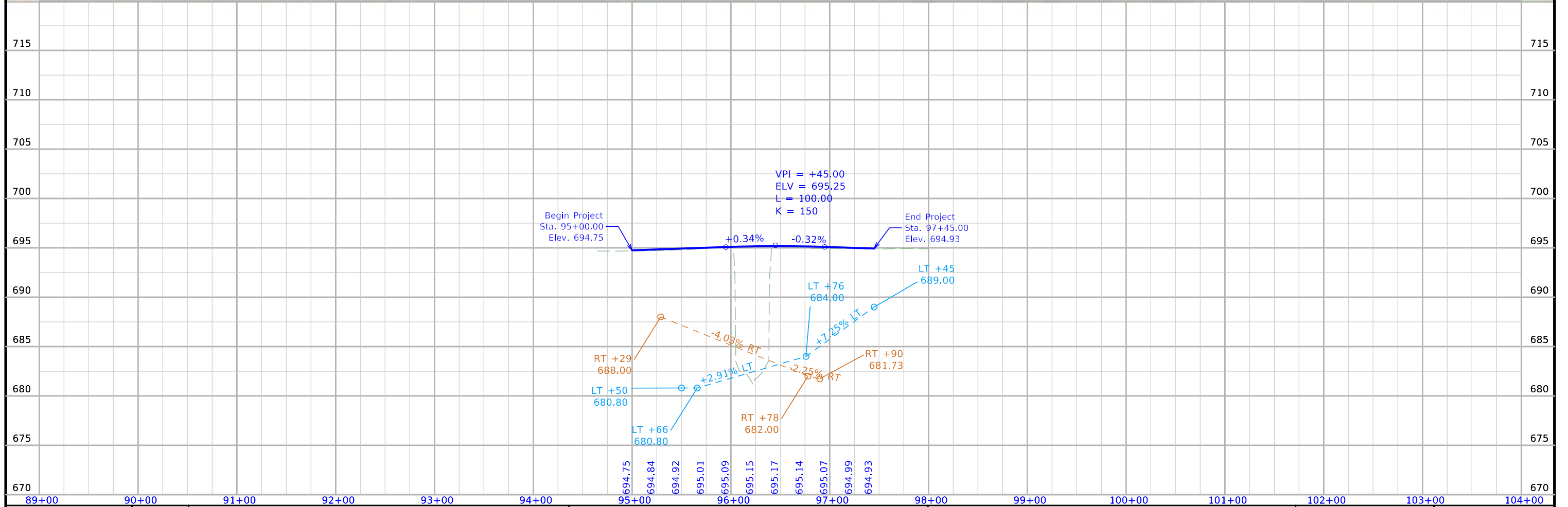
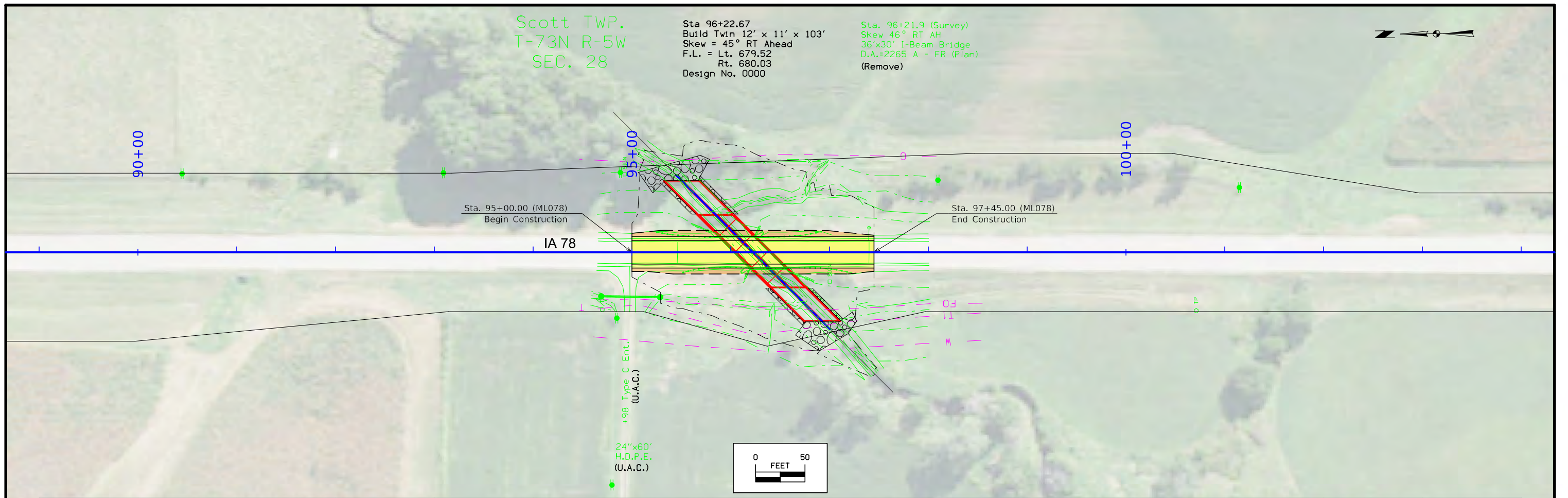
# PLAN AND PROFILE LEGEND AND SYMBOL INFORMATION SHEET

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

Scott TWP.  
T-73N R-5W  
SEC. 28

Sta 96+22.67  
Build Twin 12' x 11' x 103'  
Skew = 45° RT Ahead  
F.L. = Lt. 679.52  
Rt. 680.03  
Design No. 0000

Sta. 96+21.9 (Survey)  
Skew 46° RT AH  
36'x30' I-Beam Bridge  
D.A.=2265 A - FR (Plan)  
(Remove)



89+00	90+00	91+00	92+00	93+00	94+00	95+00	96+00	97+00	98+00	99+00	100+00	101+00	102+00	103+00	104+00
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## Survey Information

### SURVEY INDEX

**County: Henry**  
**PIN: 20-44-078-010**  
**Project Number: BRFN-078-4(25)—39-44**  
**Location: IA 78 0.3 mi W of E Jct Co Rd W66**  
**Type of Work: Bridge Replacement**  
**Project Directory: 4407801020**

### Survey Personnel

Nels Sutherland – Survey Party Chief  
Myron Fox – Survey Party Chief

### Date(s) of Survey

Begin Date 11/10/2021  
End Date 03/14/2022

### General Information

Measurement units for this survey are US survey feet. This survey is for IA 78 bridge replacement 0.3 mi W of E Jct Co Rd W66. This project is a Full DTM Survey.

### Project Control

Nearby Iowa Real Time Network reference stations were utilized to obtain horizontal and vertical control on primary project control points. Two or more five-minute observations were taken with appropriate time spans between and used in a weighted average to obtain final coordinate values. For additional details of the control survey, contact the Preliminary Survey department.

**PROJECT DATUM: NAD83(2011) EPOCH 2010.00**

**VERTICAL DATUM: NAVD88**

**COORDINATE SYSTEM: IOWA REGIONAL COORDINATE SYSTEM ZONE 14**

**GEOID MODEL: 2012bu3**

### Alignment Information

The alignment created for this project was based off as-built plan set F-352(6) and coordinates provided by the district 5 Land Survey office in Fairfield, Ia.

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

POT Sta. 79+79.70 Plan  
= Survey POT Sta. 79+79.70 (Held)

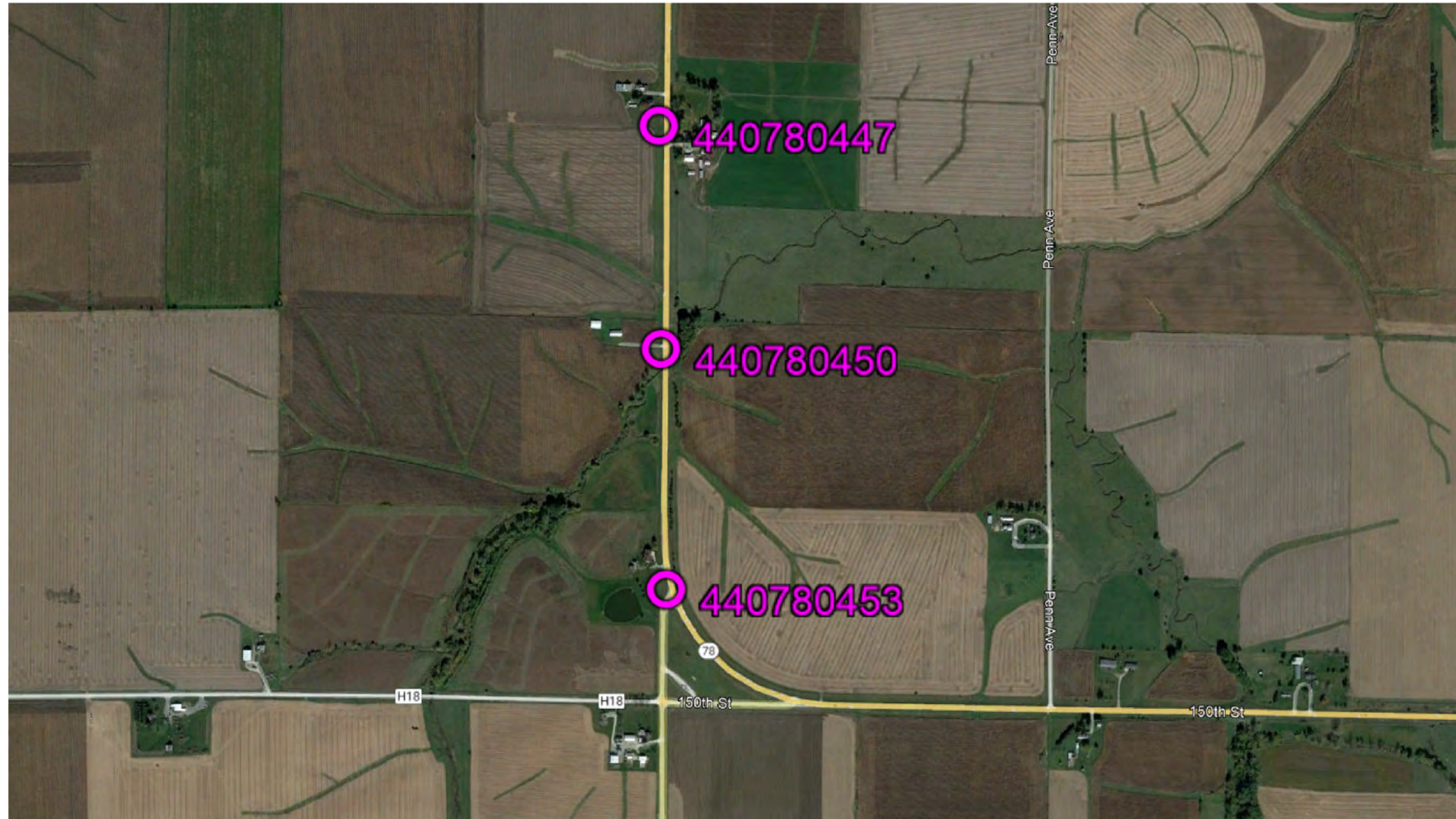
TS Sta. 106+36.60 Plan  
= Survey TS Sta. 106+39.69

### Utility Information

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

### CONTROL POINT VICINITY MAP

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



HORIZ. DATUM: NAD83(2011) EPOCH 2010.00 - Ia. RCS Zone 14  
VERT. DATUM: NAVD88 - Geoid Model 2012bu3

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) EPOCH 2010.00  
 1a. Regional Coordinate System Zone 14

VERT. DATUM: NAVD88  
 Geoid Model 2012bu3  
 Project Control Marks are Bench Marks

Point Name	Northing	Easting	Elevation	Code Description
440780453	6506723.89	24448179.38	729.33	CP from the intersection of H18 and Oasis Ave proceed N 780ft along Oasis Ave point is 55ft NW of cl of Oasis Ave Idot FENO mon w/brass disc 4in below surface
440780450	6508403.99	24448146.76	693.59	CP from the intersection of 140th st and hwy 78 proceed S 2875ft along hwy 78 point is 31ft W of cl of hwy 78 5/8th x 42in rebar 4in below surface
440780447	6509937.38	24448138.26	726.93	CP from the intersection of 140th st and hwy 78 proceed S 1335ft along hwy 78 point is 55ft W of cl of hwy 78 ROW rail cut x on ball 1ft above ground

**NOTE:**

The first two digits in the control point name refer to the county number.  
 The next 3 digits refer to the highway number.  
 The next 3 digits refer to the highway milepost.  
 The last digit refers to the distance from the referenced milepost to the nearest tenth of a mile.

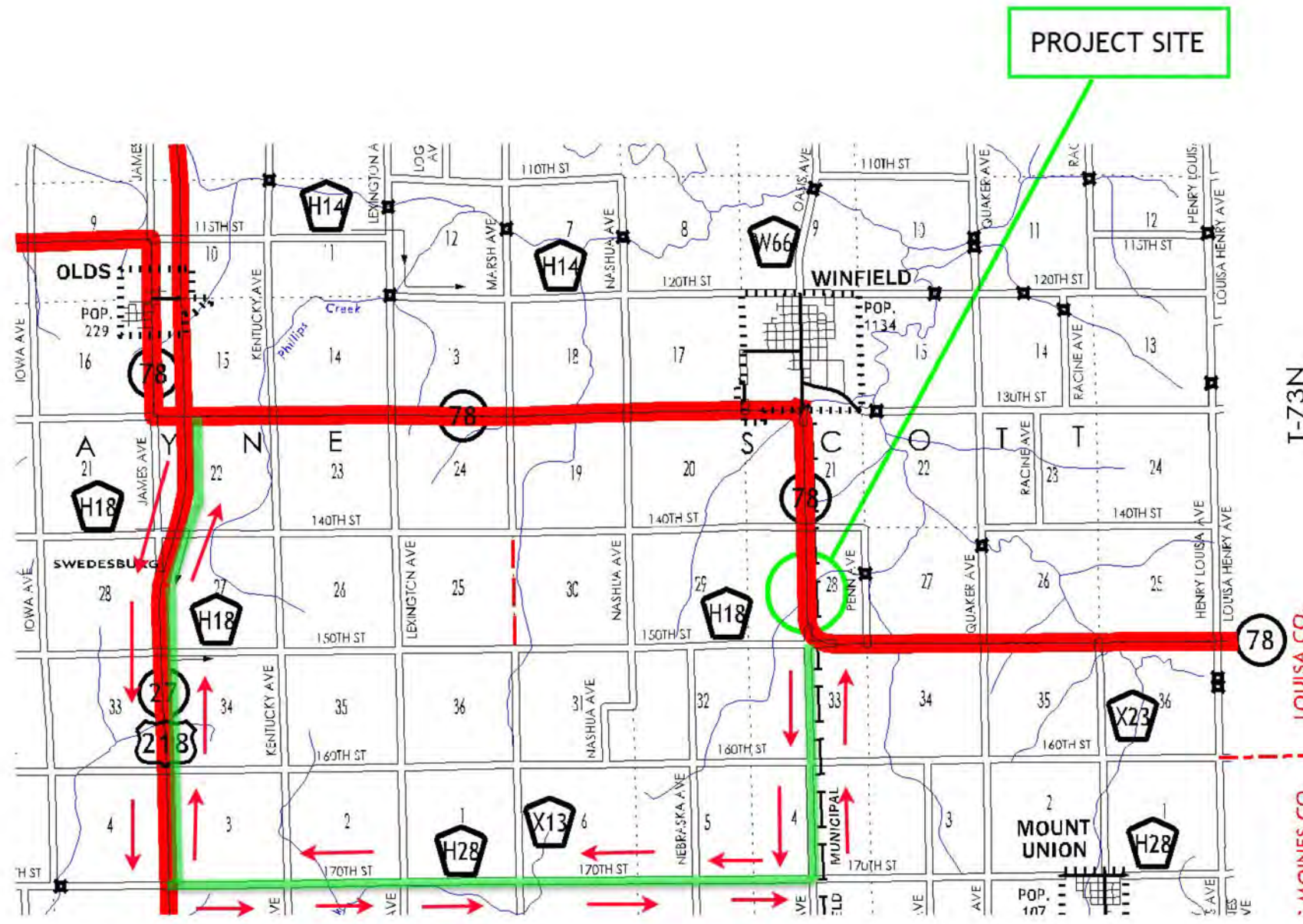
**511 TRAVEL RESTRICTIONS**

Route	Direction	County	Location Description	Feature Crossed	Object Type	Maint. Bridge No., Structure ID, or FHWA No.	Type of Restriction	Existing Measurement	Construction Measurement	Construction Measurement as Signed	Projected As Built Measurement	Remarks
IA 78	Both	Henry	IA 78 Bridge over stream 0.3 mi W of E Jct Co Rd W66				Closure					

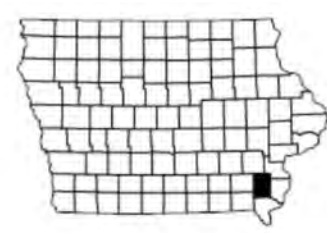
108-23A  
08-01-08

**TRAFFIC CONTROL PLAN**

IA 78 will be closed, and an offsite detour will be utilized.  
 Access to properties shall be maintained at all times.  
 The Contractor shall install, maintain, and remove signing for the detour. Detour signs will become property of the Contractor.  
 Refer to J-sheets for the detour signing plan.

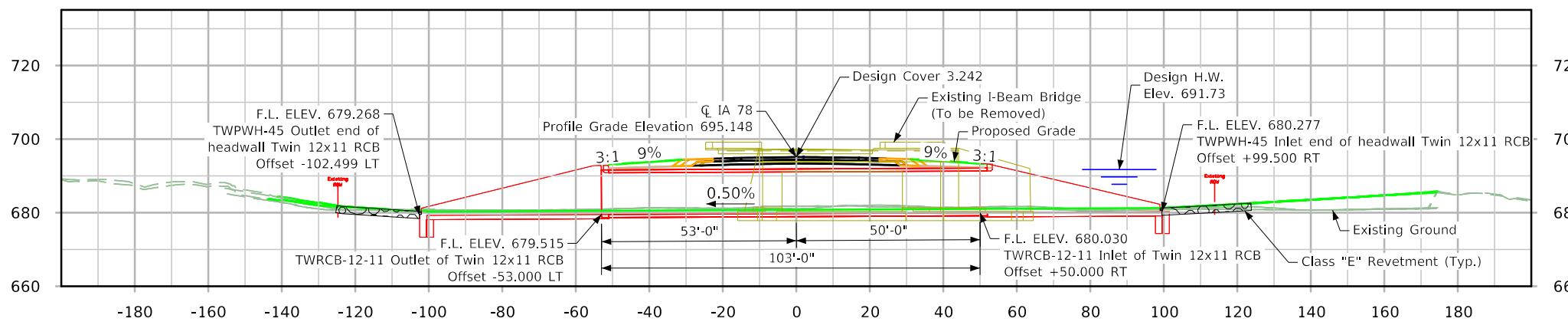


PROJECT SITE

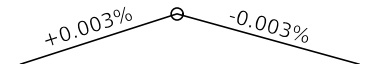


**HENRY COUNTY**  
 On IA 78 Over Stream 0.3 mi W of E Jct  
 Co Rd W66  
 BRFN-078-4(25)- -39-44  
 PIN: 20-44-078-010

← DETOUR



Control Point: 440780450, CP from the intersection of 140th St. and Hwy. 78, proceed S 2875 ft. along Hwy 78, point is 31 ft. W of CL of Hwy. 78, 5/8th x 42 in. rebar 4 in. below surface, Elev. 693.59, N.6508403.99, E.24448146.76



VPI Sta. = 96+45.000 VC = 100'  
VPI Elev. = 695.250

**Proposed Profile Grade IA 78**

**Notes:**  
All units are in feet unless noted otherwise.  
Class "E" revetment stone is embedded.  
Flow line of the culvert has been set 1' below streambed.  
Final design plans should include precast concrete alternative.

**LONGITUDINAL SECTION ALONG CL CULVERT**

**Utilities Legend:**

FO - Fiber Optic - Windstream Communications  
G - Gas - City of Winfield  
T1 - Telephone - Windstream Communications  
W - Water - Rathbun Rural Water  
- Electric - Alliant Energy

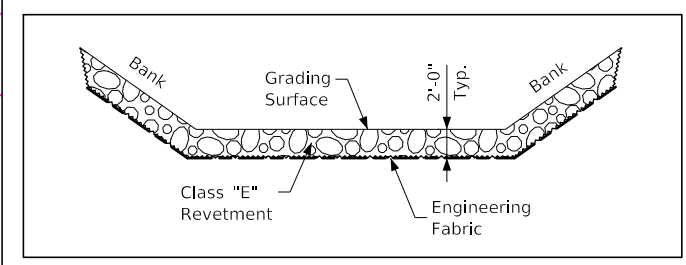
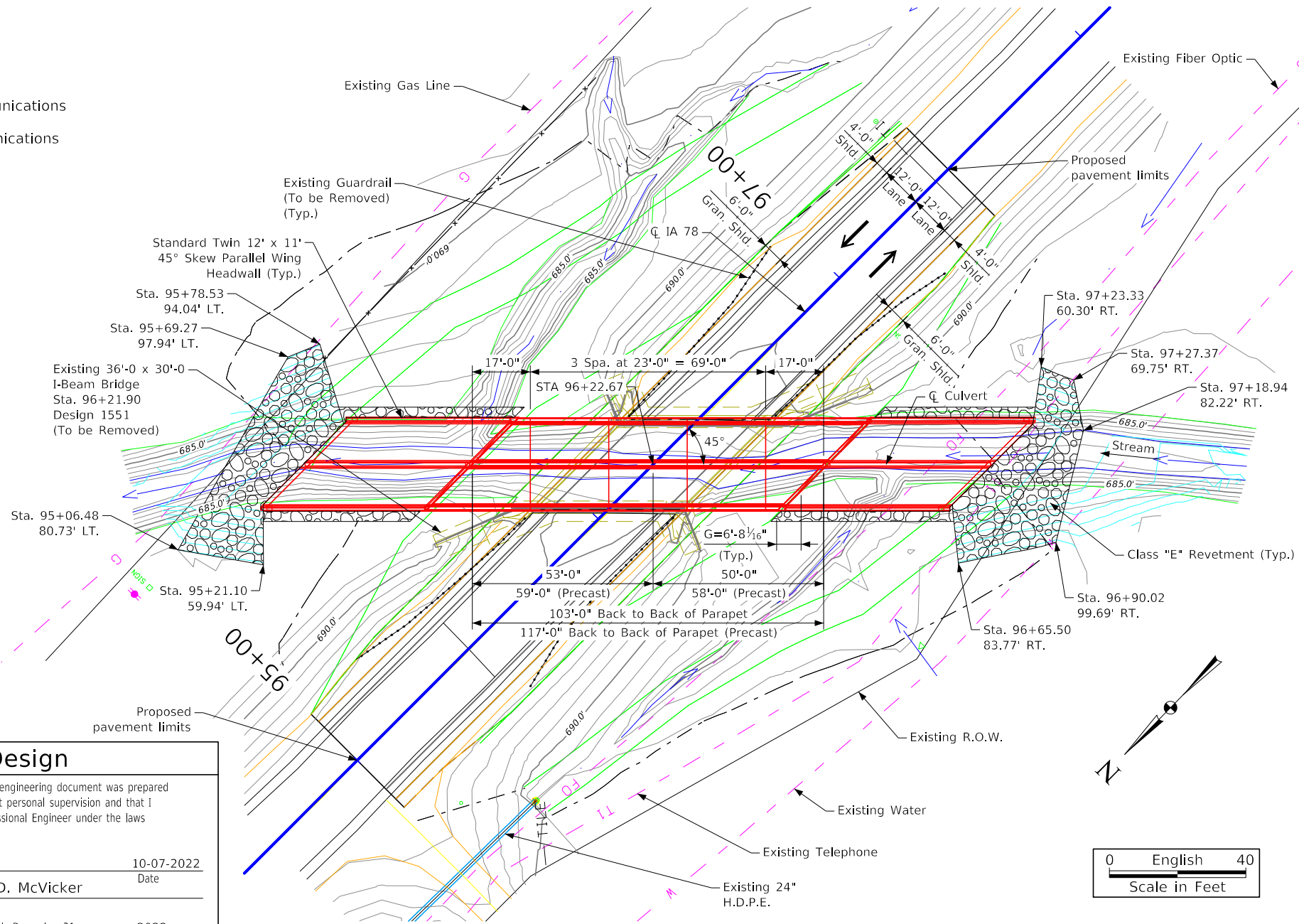
Utilities shown on this sheet are for information only, see road design sheets for final utility information.

**Hydraulic Data**

Drainage Area = 3.3 Sq. Mi.  
Q<sub>50</sub> = 2,140 CFS  
HW Elev. = 691.73  
Stream Slope = 17.1 Ft./Mi.  
Q<sub>100</sub> = 2,550 CFS  
HW Elev. = 693.19  
Q Overtop = 3,050 CFS  
Overtop Elev. = 695.15

**Traffic Estimate**

2025 AADT 800 V.P.D.  
2045 AADT 1,000 V.P.D.  
202? DHV - V.P.H.  
Trucks 9 %  
Total  
Design ESALS -



**Typical Channel Protection**

**Estimated Revetment Quantities Included With Road Plans**

Location	Revetment Class "E" (Ton)	Engineering Fabric (SY)	Excavation (CY)
Inlet	189	175	118
Outlet	195	185	122
Totals	384	360	240

Excavation quantity calculated from grading surface. Quantities shown for information only. See Road Sheets.

**Location**

IA 78 over Stream  
T-73N R-5W Section 28  
Scott Township  
Henry County  
FHWA No. 28590  
Bridge Maint. No. 4445.0S078  
Asset ID No. ??  
Latitude 41.096028°  
Longitude -91.438015°

Sta. 96+22.67  
Build Twin 12' x 11' x 103' RCB  
Skew 45° RT Ahead  
Length LT 53'  
Length RT 50'  
F.L. LT 679.515  
F.L. RT 680.030  
DA 3.3 Sq. Mi.  
DES # ??

**Hydraulic Design**

**Aaron D. McVicker**  
25251  
IOWA

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.

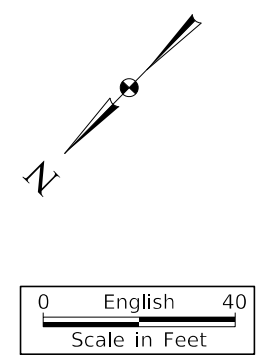
Signature: Aaron D. McVicker Date: 10-07-2022

Printed or Typed Name: Aaron D. McVicker

My license renewal date is December 31, 2022

Pages or sheets covered by this seal: V.1

**SITUATION PLAN**



Design For 45 Degree RA

**Twin 12' x 11' x 103' Reinforced Concrete Box Culvert**

Situation Plan

STA. 96+22.67 (IA 78) Turn-In Date: Oct 07 2022

Henry County

IOWA DEPARTMENT OF TRANSPORTATION

Design No. Design Sheet No. 1 of 1 FHWA/Asset XXXXXX

## CROSS SECTION VIEW COLOR LEGEND

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

**NOTES:**

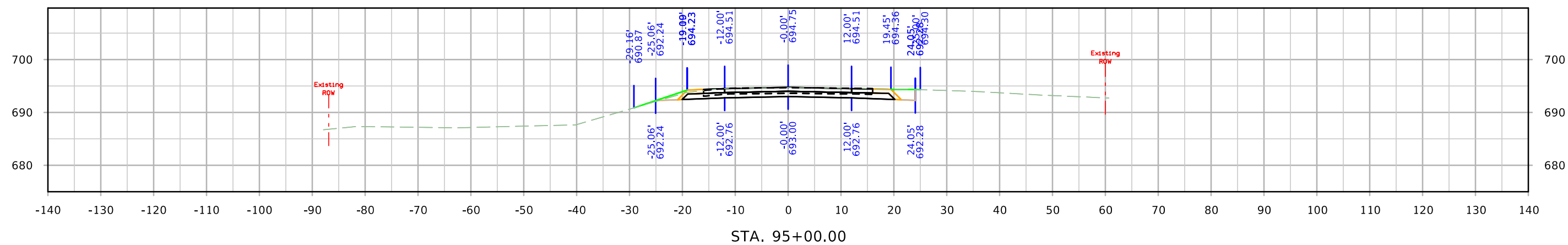
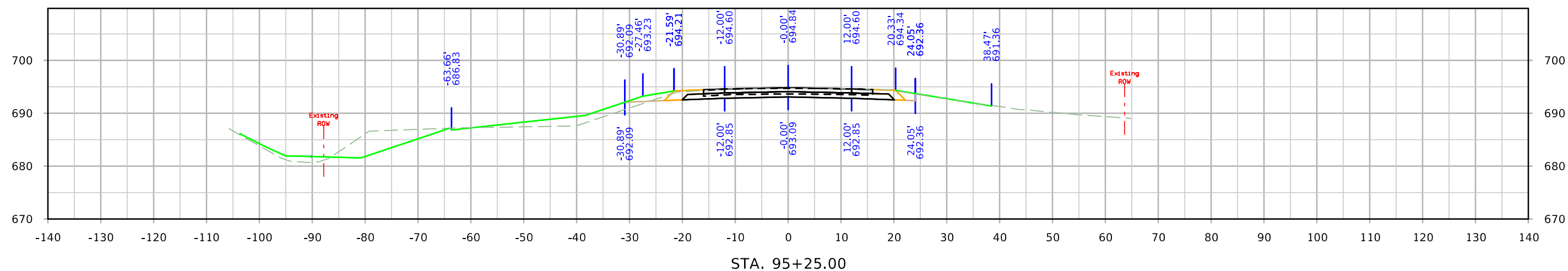
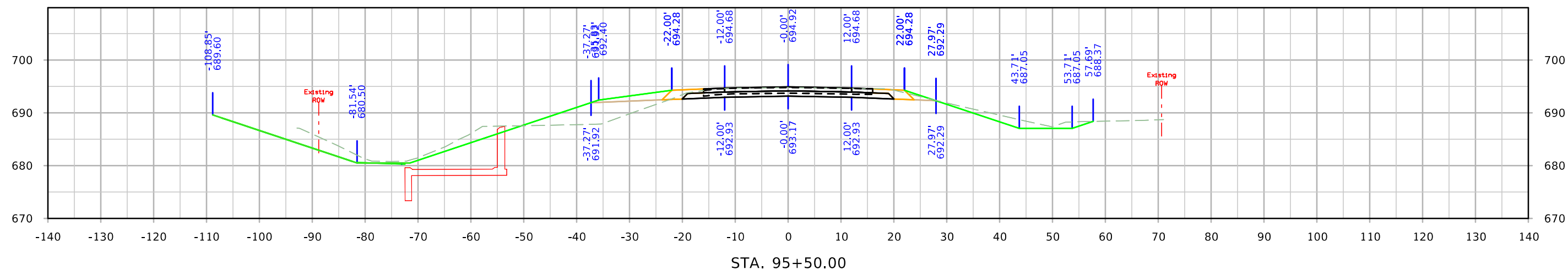
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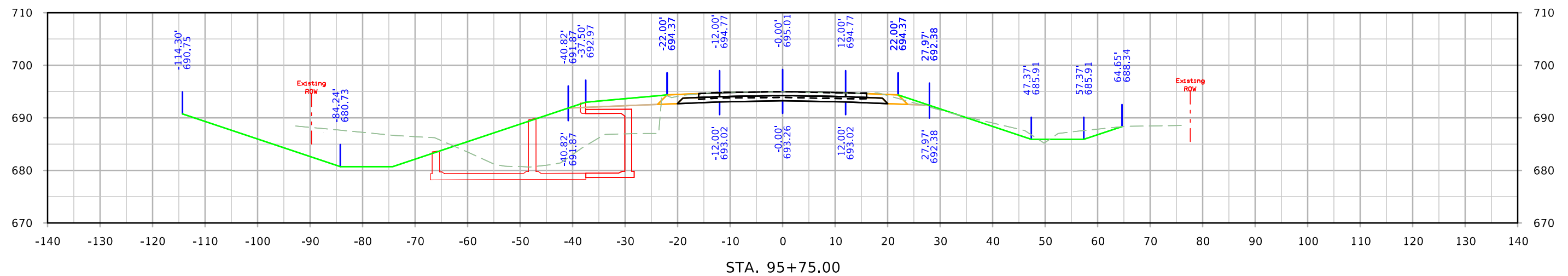
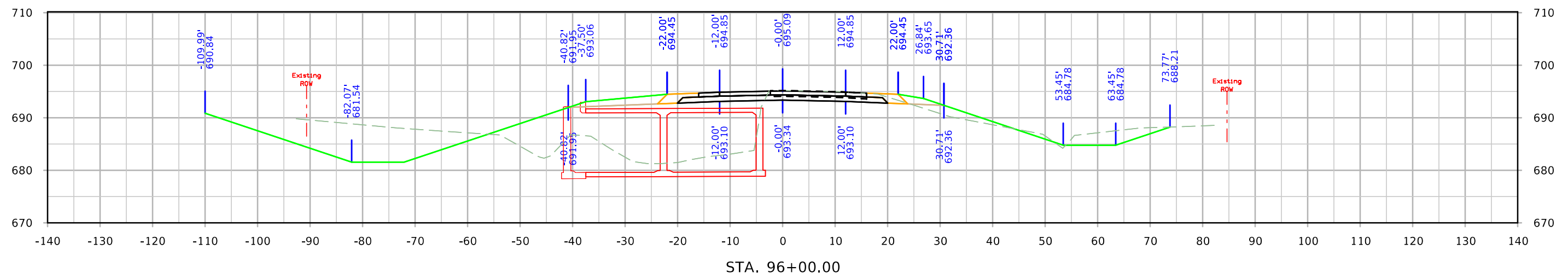
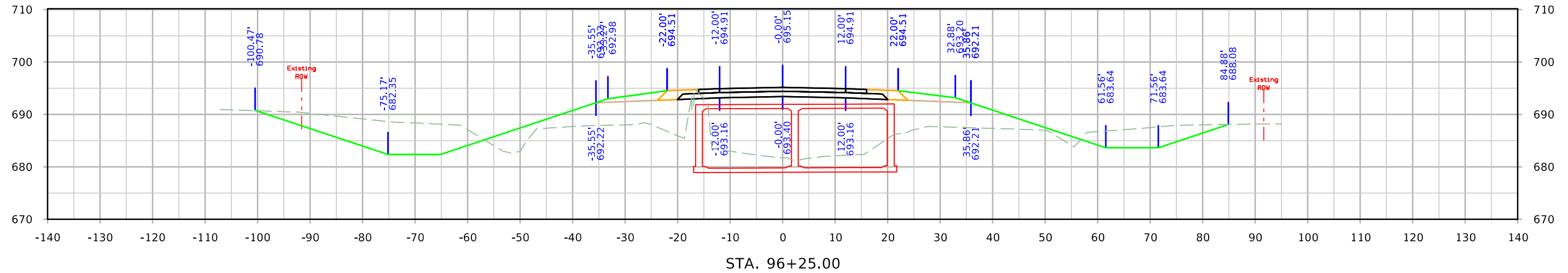
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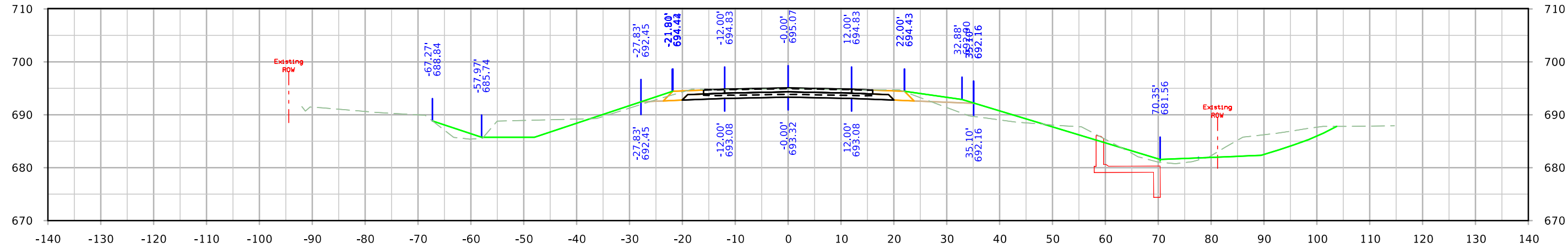
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## CROSS SECTIONS LEGEND AND INFORMATION SHEET

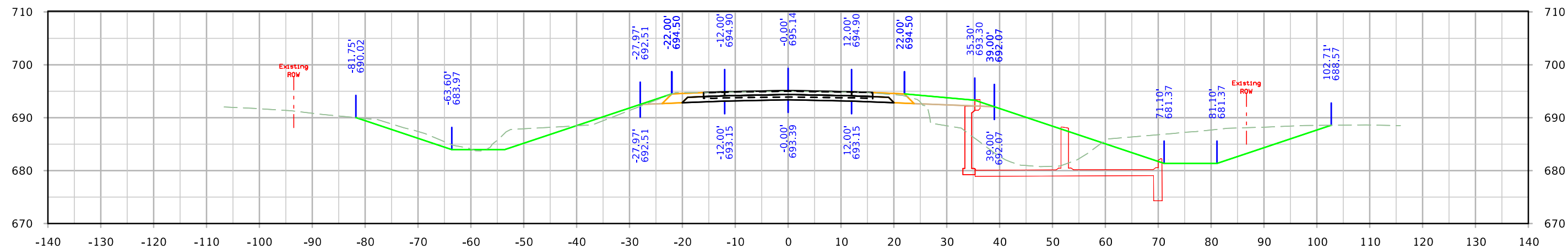
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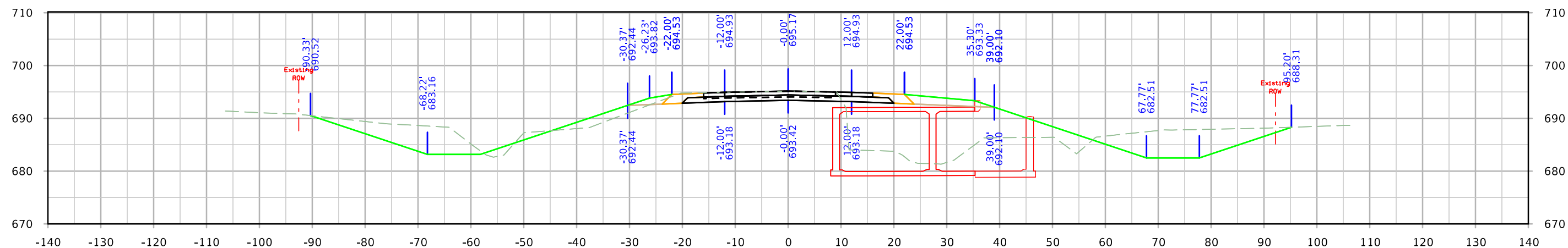




STA. 97+00.00



STA. 96+75.00



STA. 96+50.00



