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B.1	Typical Cross Sections and Details
<b>C Sheets</b>	<b>Quantities and General Information</b>
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C.1	Estimated Project Quantities
C.1	Standard Road Plans
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### Highway Division

PLANS OF PROPOSED IMPROVEMENT ON THE

# PRIMARY ROAD SYSTEM HENRY COUNTY BRIDGE REPLACEMENT - PPCB

U.S. 34 Bridge over the Skunk River,  
3.8 miles east of County Road W40 (EB)

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

24

PROJECT IDENTIFICATION NUMBER

16-44-034-010

PROJECT NUMBER

BRF-034-9(224)--38-44

R.O.W. PROJECT NUMBER

#### DESIGN ACTIVITIES

	DUE DATE	EVENT
D2	05/25/18	Office Review
D2	05/31/18	Field Exam
D2	06/08/18	Plans for Review (PSS Date)
D3	07/06/18	Preliminary Plans to Bridge Office (PSS Date)
D5	11/09/18	Plans to ROW (PSS Date)
D4	09/23/20	Final Roadway Plans (PSS Date)
L5	01/20/21	Letting Date

For Project Location Map  
Refer to Sheet A.2

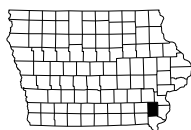
DESIGN DATA RURAL			
2021	AADT	7,900	V.P.D.
2041	AADT	11,800	V.P.D.
20--	DHV	--	V.P.H.
	TRUCKS	17	%
	Total		
	Design ESALs	6,500,000	

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

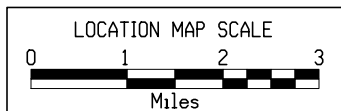
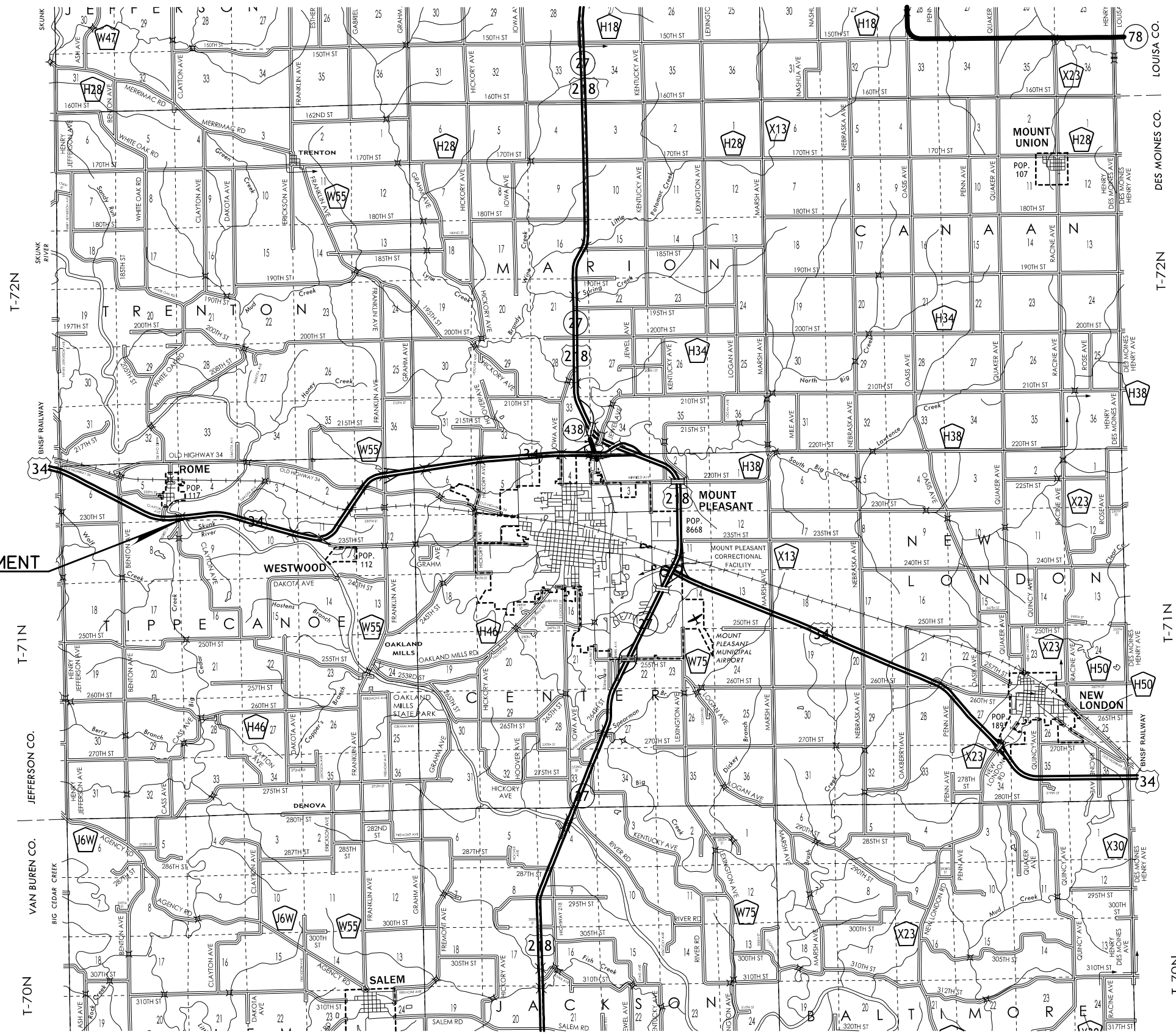
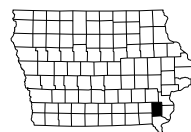
# PRELIMINARY PLANS

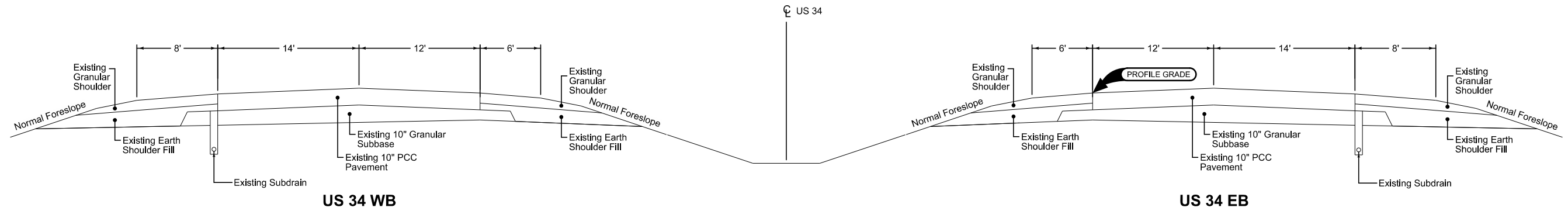
Subject to change by final design.

## D3 PLAN - Date: June 22, 2018

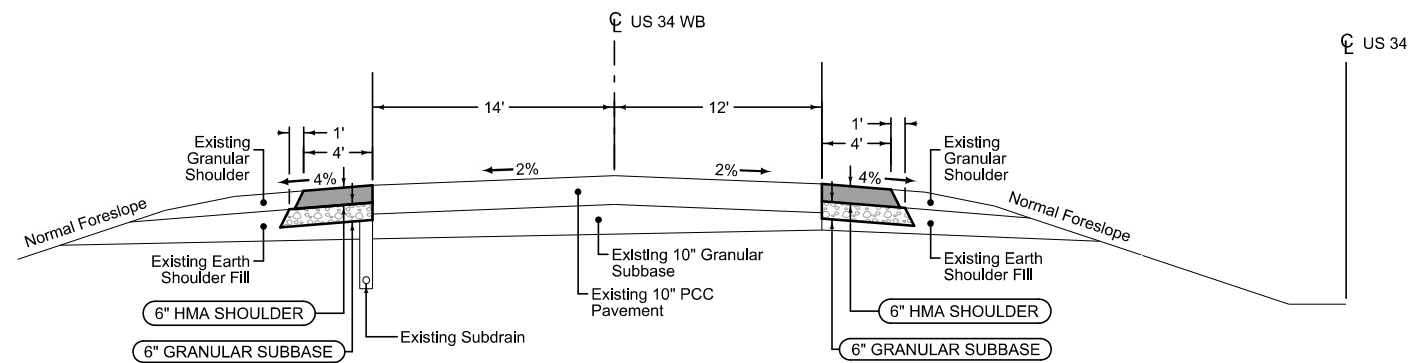


**U.S. 34 EB BRIDGE REPLACEMENT**  
**FHWA No. 28430**





EXISTING US 34



**HMA Shoulder**

Shoulder Jointing:  
Longitudinal joint: B

4_P_HMA_MODIFIED		
Direction of Travel	BEGIN STATION	END STATION
WB	937+00.00	939+93.00
WB	942+36.00	956+38.00
WB	962+47.00	969+22.00

**HMA Shoulder**

Shoulder Jointing:  
Longitudinal joint: B

4_P_HMA_MODIFIED		
Direction of Travel	BEGIN STATION	END STATION
WB	939+74.00	940+87.00
WB	941+75.00	956+84.00
WB	962+67.00	965+67.00

US 34 WB

**PROJECT DESCRIPTION**

100-1D  
10-18-05

This project involves the replacement of the U.S. 34 eastbound bridge (Maintenance Number 4426.7R034) over the Skunk River.

**ESTIMATED ROADWAY QUANTITIES  
(1 DIVISION PROJECT)**

100-0A  
10-28-97

Item No.	Item Code	Item	Unit	Total	As Built Qty.

**STANDARD ROAD PLANS**

105-4  
10-18-11

The following Standard Road Plans apply to construction work on this project.

Number	Date	Title
BA-200	10-18-16	Steel Beam Guardrail Components
BA-201	04-18-17	Steel Beam Guardrail Barrier Transition Section (MASH TL-3)
BA-202	10-20-15	Steel Beam Guardrail Bolted End Anchor
BA-205	04-19-16	Steel Beam Guardrail Tangent End Terminal (MASH TL-3)
BA-250	10-18-16	Steel Beam Guardrail Installation at Concrete Barrier or Bridge End Post (MASH TL-3)
BA-401	04-16-13	Temporary Barrier Rail (Precast Concrete)
BA-500	04-19-16	Temporary Crash Cushions Sand Barrel
BR-203	10-17-17	Double Reinforced 12" Approach
BR-211	10-17-17	Bridge Approach (Abutting PCC or Composite Pavement)
DR-102	04-21-15	Pipe Culvert (Cover and Camber)
DR-103	04-21-15	Pipe Culvert (Installation Details)
DR-104	04-19-16	Depth of Cover Tables for Concrete and Corrugated Pipe
DR-121	10-17-17	Connected Pipe Joints
DR-203	04-21-15	Metal Pipe Aprons and Beveled Ends
DR-213	10-17-17	Pipe Apron Guard
DR-306	10-16-18	Precast Concrete Headwall for Subdrain Outlets
DR-402	04-17-18	Rock Flume for Bridge End Drain
DR-621	04-18-17	Pipe Extension
DR-651	04-18-17	Unclassified Pipe Culvert
EC-103	04-21-15	Wood Excelsior Mat for Slope Protection
EC-201	10-16-18	Silt Fence
EC-204	04-18-17	Perimeter and Slope Sediment Control Devices
EC-502	04-21-15	Seeding in Rural Areas
EW-202	04-19-16	Bridge Berm Grading without Recoverable Slope (Non-Barnroof Section)
EW-301	10-20-15	Guardrail Grading
EW-401	10-20-15	Temporary Stream Crossing, Causeway, or Equipment Pad
EW-402	04-18-17	Temporary Stream Diversion
LI-130	10-17-17	Temporary Floodlighting Luminaires
PM-110	10-16-18	Line Types
PM-111	04-21-15	Symbols and Legends
PV-3	10-18-11	Safety Edge
PV-101	10-16-18	Joints
PV-513	Modified	Median Crossover (110' Median) 16' Wide 1 Lane
SI-172	04-19-16	Delineators
SI-173	04-19-16	Object Markers
SI-881	10-17-17	Special Signs for Workzones
TC-1	04-16-13	Work Not Affecting Traffic (Two-Lane or Multi-Lane)
TC-61	04-17-18	Two-Lane, Two-way Operation
TC-402	04-21-15	Work Within 15 ft of Traveled Way
TC-418	04-17-18	Lane Closure on Divided Highway
TC-433	10-17-17	Pavement Marking Operations

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### SURVEY SYMBOLS

- WC Wild Card (Misc. Field Shot)
- CP Control Point
- GHP - GH1D High Pres Gas Co 1 - Quality D
- TP TPD Telephone Pedestal
- T1 - TL1D Telephone Line Co. 1 - Quality D
- T2 - TL2D Telephone Line Co. 2 - Quality D
- PPA Power Pole Co. 1
- EP Edge of Paved Roads (ML or SR)
- GU Gutter In Front of Curb
- CU Back of Curb
- - - BL Topo Breakline
- - - C Centerline BL of Road (ML or SR)
- DU Centerline Draw or Stream (Up)
- - - SNP Unpaved Shoulder
- - - ENU Edge Unpaved Entrance & Parking
- - - ENT Centerline BL of Entrance
- RIP Rip-Rap
- FW Wire Fence
- OUT Tile Outlet
- TIL Tile Line
- ENP Edge Paved Entrance & Park Lot
- D Centerline Draw or Stream (Down)
- BM Bench Mark
- POT Tangent Point
- TS Spiral Point
- SC Spiral Point
- CS Curve Point
- ST Spiral Point
- REF Reference Tie Point
- BBB Bottom of Bridge Beam
- BRG Bridge
- PRO Profile Shot
- TOP Top of Bridge Pier
- SP Stream Profile
- EG Edge of Gravel Road
- PIP Pipe Culvert
- SOP Size of Pipe or Culvert
- BCL Bridge Centerline
- BD Bridge Deck
- SBR Size of Bridge
- GR Ground Shot
- CON Concrete or A/C Slab
- FENO FENO Monument

### UTILITY LEGEND

Sub-Surface Utility Mapping Quality Level is in accordance with CI/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

- Access Energy Cooperative  
Mark Fulton  
907 E. Washington Street  
Mt Pleasant, IA 52641  
319-385-1577
- GHP - ANR Pipeline Company - Quality D  
David Huebner  
P.O. Box 9  
2795 Locust Avenue  
Birmingham, IA 52535  
319-498-4200 ext 2252
- T1 - Iowa Communications Network - Quality D  
Mike Broderick  
400 E 14th Street  
Grimes State Office Bldg  
Des Moines, IA 50139
- T2 - Windstream Communications (Iowa Telecom) - Quality D  
Kelly Eggers  
101 West Madison Street  
Mt. Pleasant, IA 52641  
(319) 385-5004

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

LINEWORK	Design	Color No.	
Green	(2)		Existing Topographic Features and Labels
Blue	(1)		Proposed Alignment, Stationing, Tic Marks, and Alignment Annotation
Magenta	(5)		Existing Utilities
SHADING		Design	Color No.
Yellow	(4)		Highlight for Critical Notes or Features
Red	(3)		Delineates Restricted Areas
Lavender	(9)		Temporary Pavement Shading
Gray, Light	(48)		Proposed Pavement Shading
Gray, Med	(80)		Proposed Granular Shading
Gray, Dark	(112)		Proposed Grade and Pave Shading "In conjunction with a paving project"
Brown, Light	(236)		Grading Shading
Tan	(8)		Proposed Sidewalk Shading
Blue, Light	(230)		Proposed Sidewalk Landing Shading
Pink	(11)		Proposed Sidewalk Ramp Shading

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

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

- Reference Point
- Station
- 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 & F)



SCS PI Sta 936+61.24  
 $\Delta = 33^\circ 19' 22.78''$  (LT)  
 Theta =  $1^\circ 45' 24.96''$   
 Ls = 301.84  
 Ts = 1,624.10  
 Es = 216.49  
 P = 0.77  
 K = 150.91  
 Xc = 301.81  
 Yc = 3.08  
 LT = 201.23  
 ST = 100.62  
 LC = 301.82

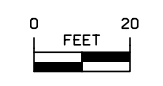
Curve Data  
 $\Delta = 29^\circ 48' 32.85''$  (LT)  
 T = 1,309.96  
 L = 2,560.56  
 R = 4,921.62  
 E = 171.35

Clayton Avenue

Install 6" HMA  
 Shoulders, 4' Wide  
 (Typ)

935 936 937 938 939 940 941

PI Sta 936+48.94

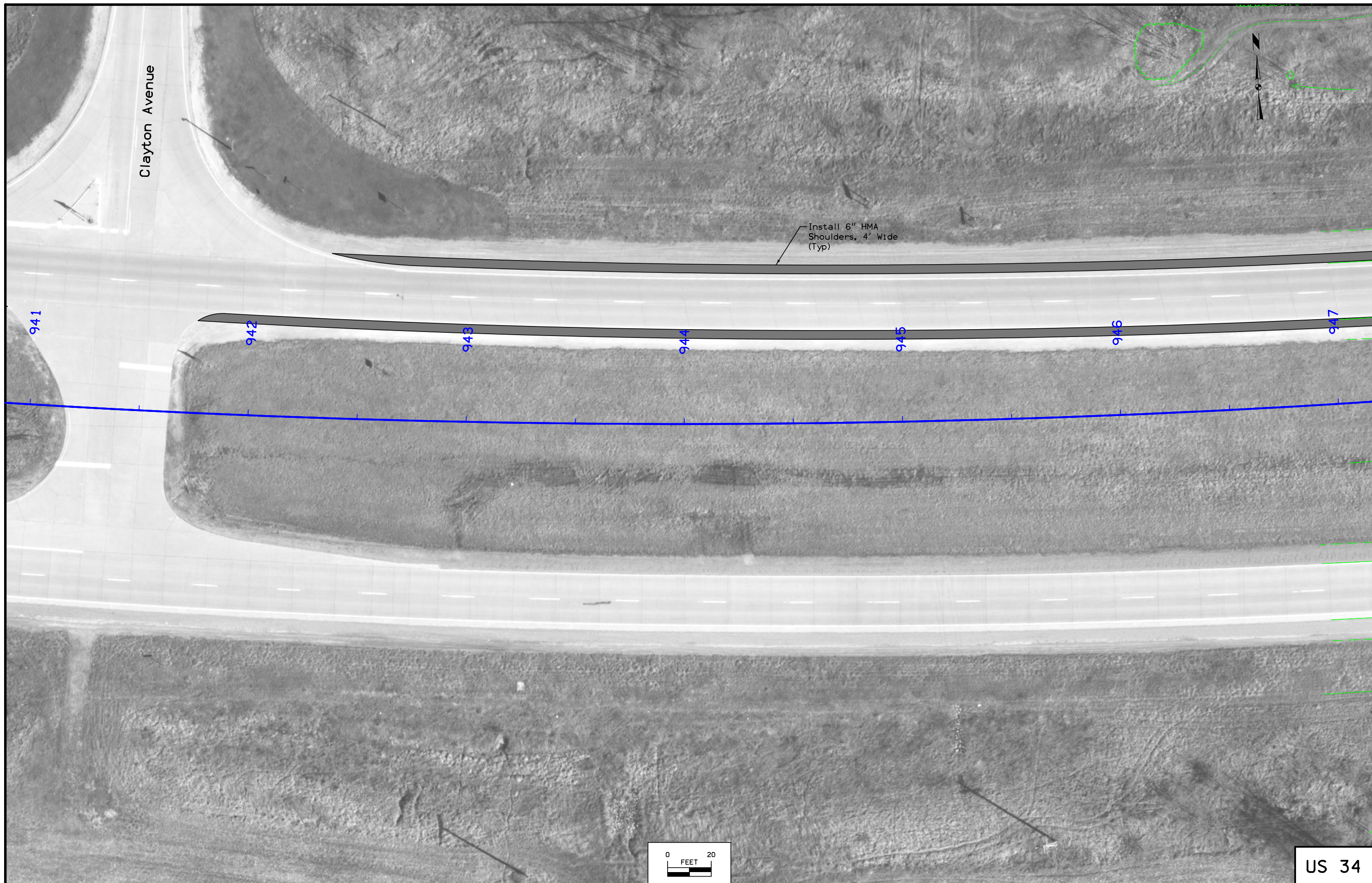


For Crossover Details  
 Refer to Sheet No. F.1

US 34

FILE NO.	ENGLISH	DESIGN TEAM	<b>Stanley Consultants Inc.</b>	HENRY COUNTY	PROJECT NUMBER	<b>BRF-034-9(224)--38-44</b>	SHEET NUMBER	<b>D.2</b>
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Clayton Avenue

Install 6" HMA  
Shoulders, 4' Wide  
(Typ)

941

942

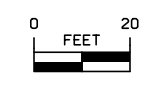
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944

945

946

947



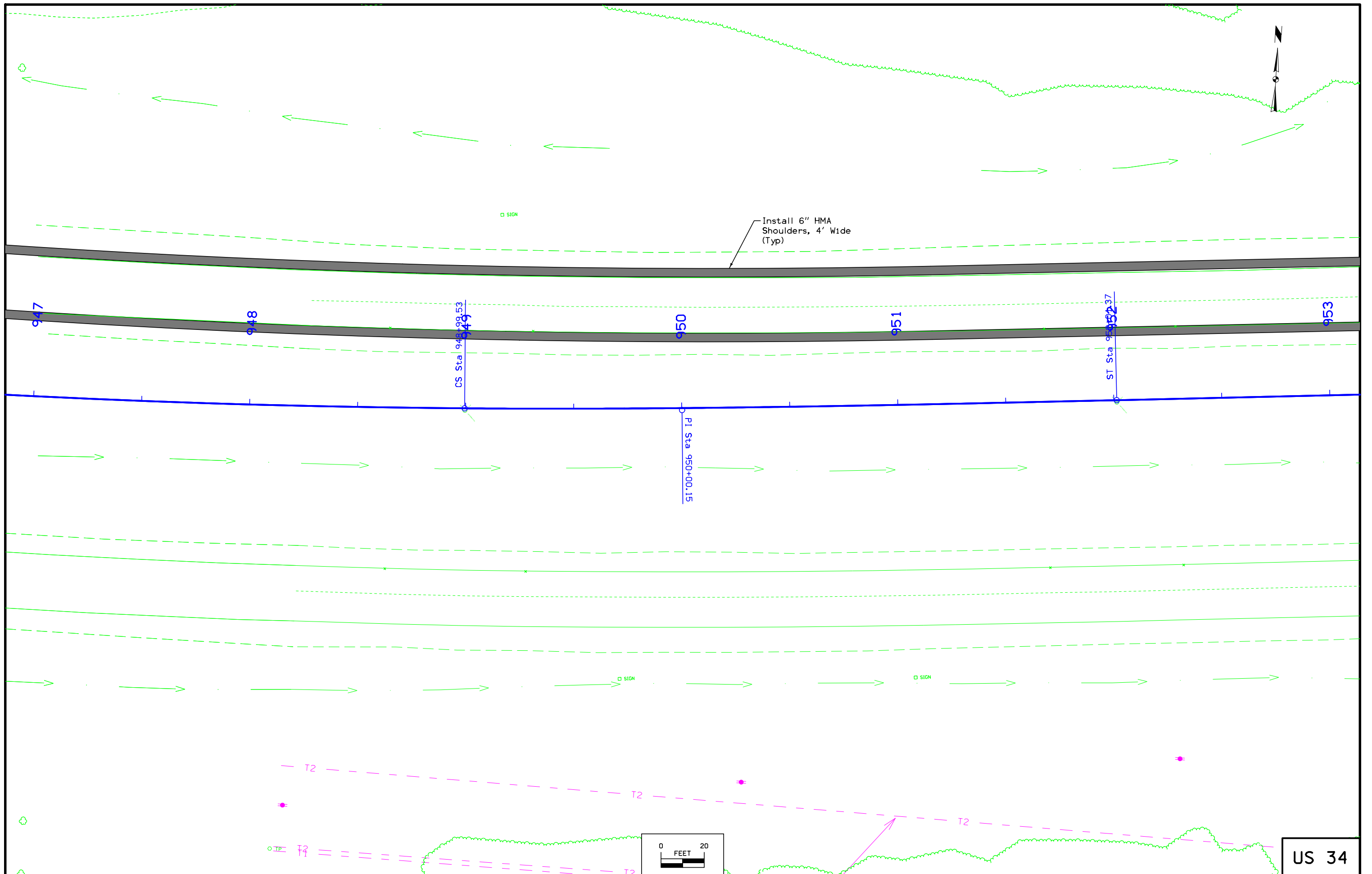
US 34

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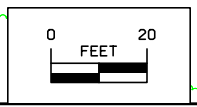
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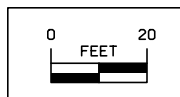
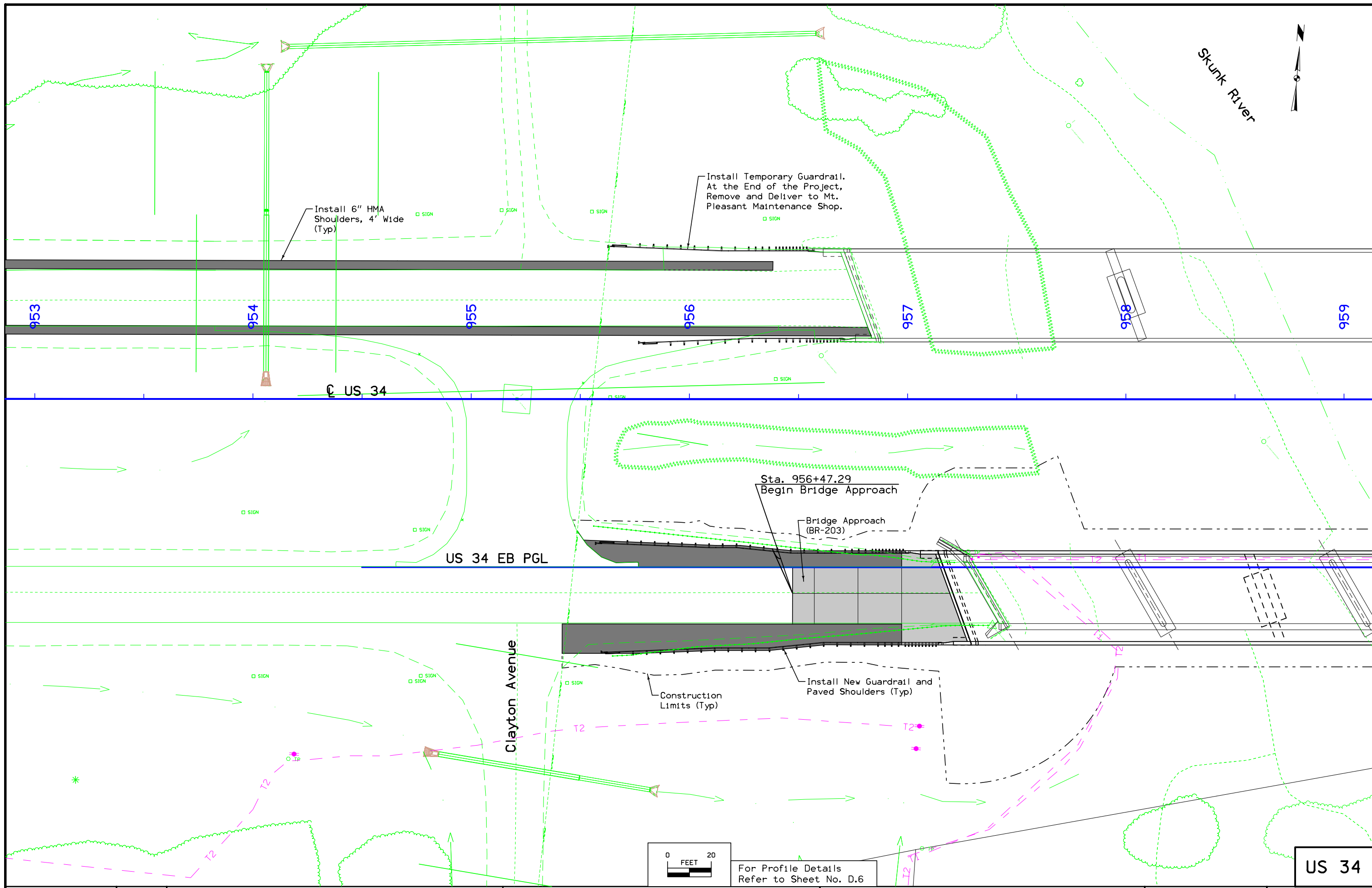
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US 34

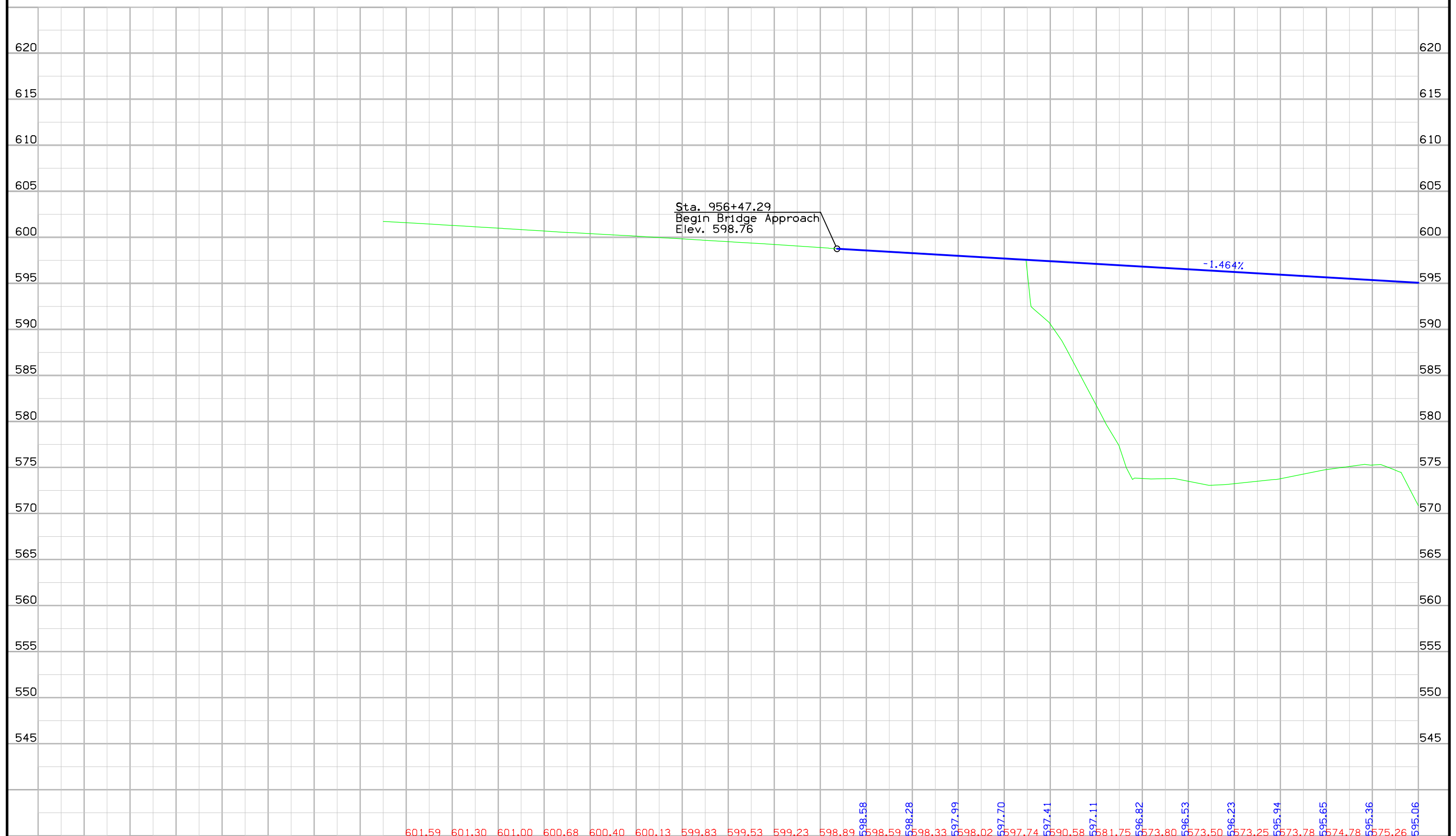


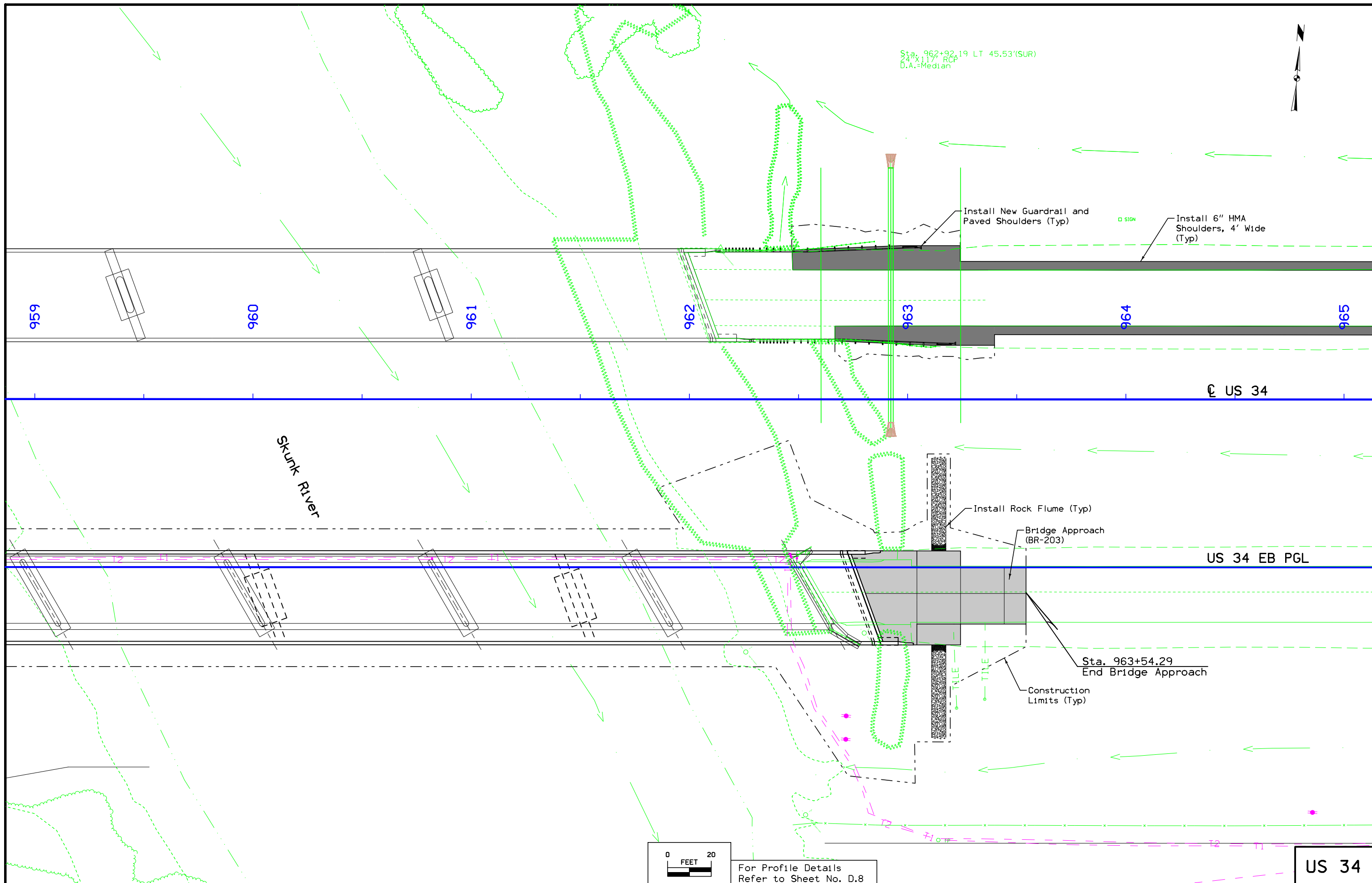


For Profile Details  
Refer to Sheet No. D.6

**US 34**

For Plan Details  
Refer to Sheet No. D.5





Sta. 962+92.19 LT 45.53'(SUR)  
 24"x117" RCP  
 D.A.=Median

Install New Guardrail and  
 Paved Shoulders (Typ)

Install 6" HMA  
 Shoulders, 4' Wide  
 (Typ)

US 34

Skunk River

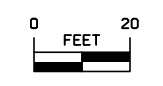
Install Rock Flume (Typ)

Bridge Approach  
 (BR-203)

US 34 EB PGL

Sta. 963+54.29  
 End Bridge Approach

Construction  
 Limits (Typ)



For Profile Details  
 Refer to Sheet No. D.8

US 34

FILE NO.	ENGLISH	DESIGN TEAM	Stanley Consultants Inc.	HENRY COUNTY	PROJECT NUMBER	BRF-034-9(224)--38-44	SHEET NUMBER	D.7
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For Plan Details  
Refer to Sheet No. D.7







Sta. 970+46.62 LT 45.61'(SUR)  
24"x70" RCP  
D.A.=Median

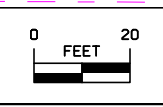
Install 6" HMA  
Shoulders, 4' Wide  
(Typ)

Extend  
Median  
Pipe

965 966 967 968 969 970 971

TILE

TILE



For Crossover Details  
Refer to Sheet No. F.2

US 34

FILE NO.	ENGLISH	DESIGN TEAM	<b>Stanley Consultants Inc.</b>	HENRY COUNTY	PROJECT NUMBER	<b>BRF-034-9(224)--38-44</b>	SHEET NUMBER	<b>D.9</b>
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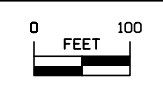


US 34 - West Median Crossover





POT Sta. 983+18.14



US 34 - East Median Crossover

FILE NO.	ENGLISH	DESIGN TEAM	Stanley Consultants Inc.	HENRY COUNTY	PROJECT NUMBER	BRF-034-9(224)--38-44	SHEET NUMBER	F.2
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## Survey Information

County: Henry  
SAP 908.0  
PIN: 16-44-034-010  
Project Number: BRF-034-9(224)--38-44  
Location: Skunk River 3.8 mi E of Co Rd W40 (EB)  
Type of Work: Bridge-Unspecified  
Project Directory: 4403401016  
laRCS Zone 14

### General Information

Measurement units for this survey are US survey feet. Project datum and control information is provided by Design Survey Office. This project is a Partial DTM with Photo control. This survey is for a bridge project over the Skunk River, 3.8 miles East of County Road W40 (EB).

### Vertical Control

Vertical datum for this survey is NAVD88 (Computed using Geoid12A). Benchmarks were placed throughout the project using post processed static observations relative to laRTN Base Network. A minimum of 6hrs of data was simultaneously collected on each of these primary control points.

X 124 is a NGS vertical control monument. It was checked only for vertical tolerance. The difference of 0.13 ft. is within acceptable tolerance.

Z124 RESET is a NGS vertical control monument. It was checked only for vertical tolerance. The difference of 0.03 ft. is within acceptable tolerance.

### Horizontal Control

The project coordinate system for this survey is laRCS Zone 14 (U.S. Survey Feet). This survey control is relative to laRTN reference stations. laRTN Reference Station coordinates are relative to the National Reference Station network datum: NAD83 (2011) for Epoch 2010.00.

Henry County Control Pt. 322 is checked for vertical and horizontal tolerance. The horizontal difference is about 0.2 ft. and the vertical difference is about 0.1 ft.

Henry County Control Pt. 323 is checked for vertical and horizontal tolerance. The horizontal difference is about 0.1 ft. and the vertical difference is about 0.1 ft.

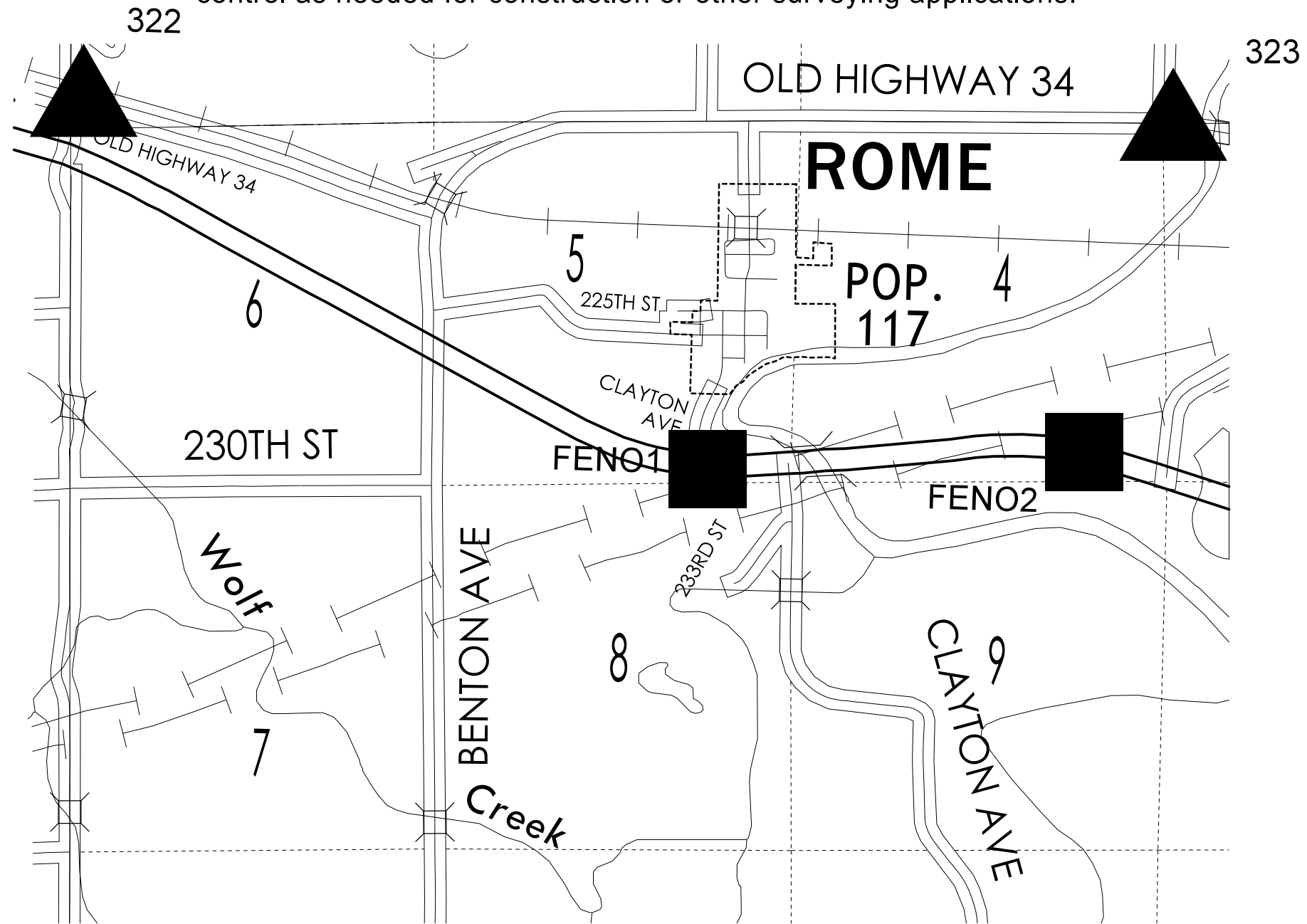
Note: The County mark system is using NAD83(96) datum so there is an expected difference in coordinates.

### Alignment Information

The horizontal alignment for this survey is a retrace of As-built Plans No. NHSX-34-8(72)--3H-51 and best fit to existing monumentation. Survey stationing was equated to the plan POT at Sta 274+11.901 (metric), converted to Sta 899+34.06 (standard) and ran ahead without equation throughout the survey.

### 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 2013.00

VERT. DATUM: NAVD88

1a. Regional Coordinate System Zone 14

Coordinate listing from next sheet will be used with 1aRTN for monument  
recovery. No other reference ties are given.

# HORIZONTAL AND VERTICAL PROJECT CONTROL COORDINATE LISTING

HORIZ. DATUM: NAD83(2011) EPOCH 2013.00

VERT. DATUM: NAVD88

Ia. Regional Coordinate System Zone 14

Point Name	Northing	Easting	Elevation	Feature Definition
FENO1	6464425.28	24379946.63	610.09	FENO MONUMENT STAMPED #1 53.5' EAST OF CENTERLINE MEDIAN CROSSOVER CLAYTON AVE 42' NORTH OF CENTERLINE HWY 34 EBL AND 94' SOUTH OF CENTERLINE HWY 34 WBL 4" BELOW THE SURFACE
FENO2	6464670.29	24385454.45	655.78	FENO MONUMENT STAMPED #2 26.5' WEST OF CENTERLINE MEDIAN CROSSOVER 42' NORTH OF CENTERLINE HWY 34 EBL AND 94' SOUTH OF CENTERLINE HWY 34 WBL 4' BELOW THE SURFACE
322	6469785.28	24370801.27	684.02	BM HENRY CO. MONUMENT 5/8" DIA DRIVEN ALUMINUM ROD WITH A 2-1/2" DIA ALUMINUM CAP AND PERMANENT MAGNET ENCASED IN A 5" DIA PVC PIPE WITH AN ALUMINUM ACCESS COVER
323	6469388.43	24386759.09	584.42	BM HENRY CO. MONUMENT 5/8" DIA DRIVEN ALUMINUM ROD WITH A 2-1/2" DIA ALUMINUM CAP AND PERMANENT MAGNET ENCASED IN A 5" DIA PVC PIPE WITH AN ALUMINUM ACCESS COVER

**ALIGNMENT COORDINATES**

Name	Location	Point on Tangent			Begin Spiral			Begin Curve			Simple Curve PI or Master PI of SCS			End Curve			End Spiral		
		Station	Coordinates		Station	Coordinates		Station	Coordinates		Station	Coordinates		Station	Coordinates		Station	Coordinates	
			Y (Northing)	X (Easting)		Y (Northing)	X (Easting)		Y (Northing)	X (Easting)		Y (Northing)	X (Easting)		Y (Northing)	X (Easting)		Y (Northing)	X (Easting)
POB	US 34	899+33.88	6466125.82	24376069.92															
TS	US 34				920+37.14	6465115.91	24377914.85												
SPI1	US 34									922+38.37	6465019.28	24378091.36							
SC	US 34														923+38.97	6464973.70	24378181.07		
PI	US 34									936+48.94	6464380.22	24379348.88							
CS	US 34				948+99.53	6464445.81	24380657.20												
SPI2	US 34									950+00.15	6464450.84	24380757.69							
ST	US 34														952+01.37	6464467.08	24380958.27		
POE	US 34	983+18.14	6464718.49	24384064.89															

**SPIRAL OR CIRCULAR CURVE DATA**

Name	Location	ΔSCS	Horizontal Alignment Data													Remarks
			Spiral Data								Curve Data					
			θS	Ls	Ts	Es	Xc	Yc	L.T.	S.T.	ΔC	T	L	R	E	
SCS	US 34	33° 19' 22.78" (LT)	01° 45' 24.96"	301.84	1624.10	216.49	301.81	3.08	201.23	100.62	29° 48' 32.85" (LT)	1309.96	2560.56	4921.62	171.35	

108-23A  
08-01-08

### TRAFFIC CONTROL PLAN

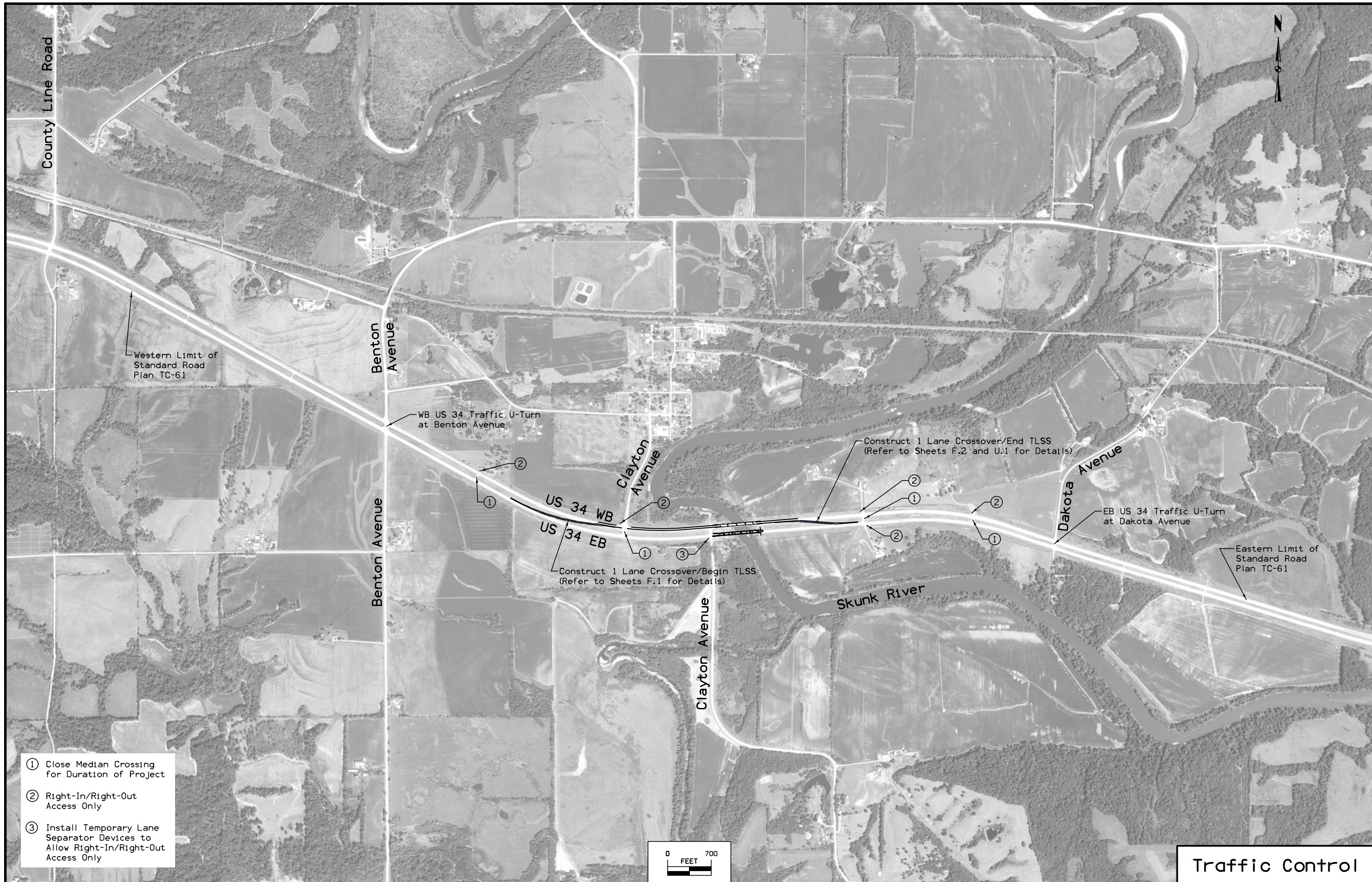
- US 34  
- Maintain one lane of EB and WB traffic at all times utilizing median crossovers and Standard Road Plan TC-61.
- Clayton Avenue  
- Maintain traffic using median crossing and temporary lane separator devices to access US 34.
- Median Crossings  
- Close median crossings as shown on Sheet J.2 for duration of the project.
- Private Entrances  
- Maintain access to US 34 for the duration of the project.

108-26A  
08-01-08

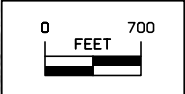
### STAGING NOTES

- Stage 1:  
- Close median crossings as identified in the Traffic Control Plan.  
- Shift traffic using Standard Road Plan TC-418 and construct both crossovers and HMA shoulders.  
- Install traffic control per Standard Road Plan TC-61 and install temporary guardrail on NW and SW corners of existing WB bridge.  
- Install temporary lane separator devices in locations shown on Sheet J.2.
- Stage 2:  
- Construct new EB bridge and roadway approaches.
- Stage 3:  
- Remove Standard Road Plan TC-61 traffic control.  
- Install traffic control per Standard Road Plan TC-418 to close inside WB lane from west median crossover to the east median crossover.  
- Remove median crossovers and temporary guardrail.  
- Install paved shoulders and guardrail on SE corner of existing WB bridge.  
- Shift traffic to inside WB lane and install paved shoulders and guardrail on NE corner of existing WB bridge.  
- Remove traffic control and open all lanes to traffic.



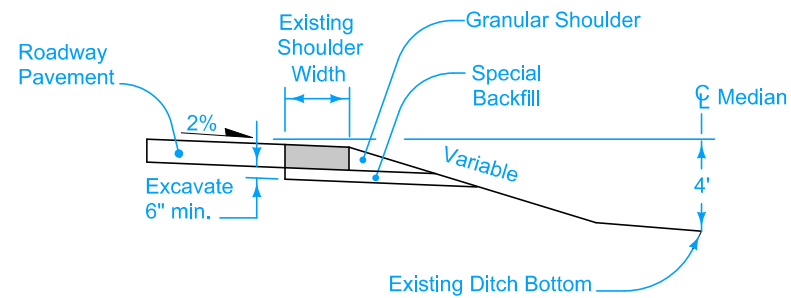


- ① Close Median Crossing for Duration of Project
- ② Right-In/Right-Out Access Only
- ③ Install Temporary Lane Separator Devices to Allow Right-In/Right-Out Access Only

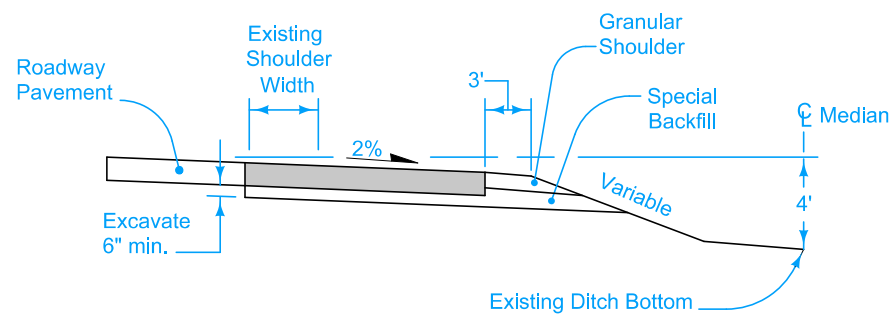


**Traffic Control**

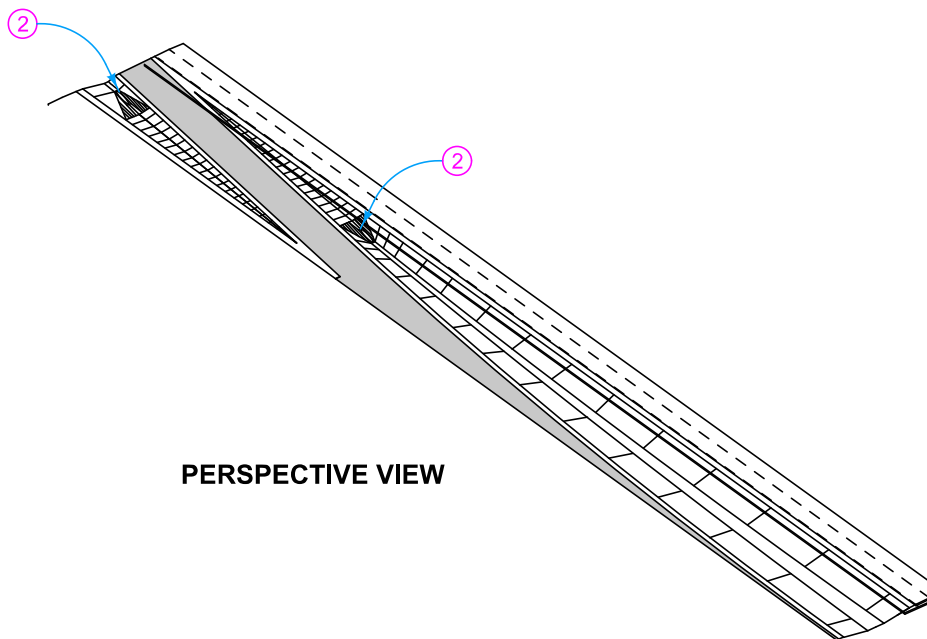




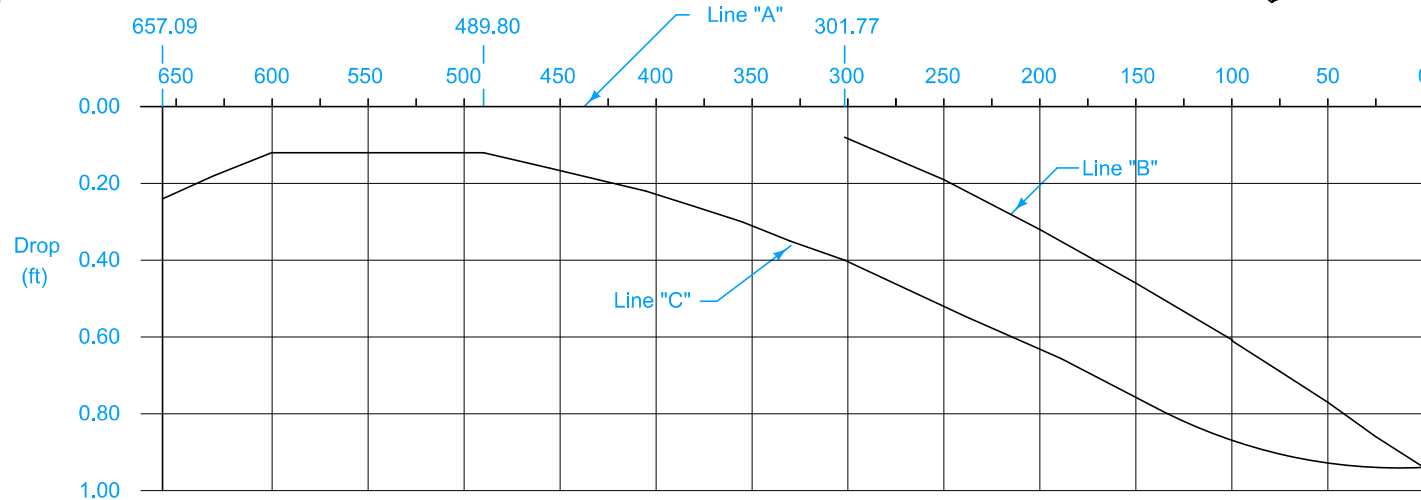
SECTION A-A



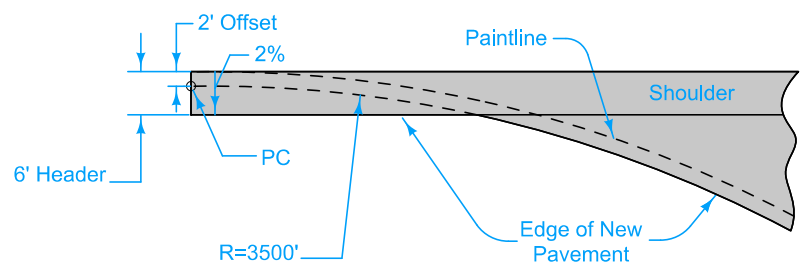
SECTION B-B



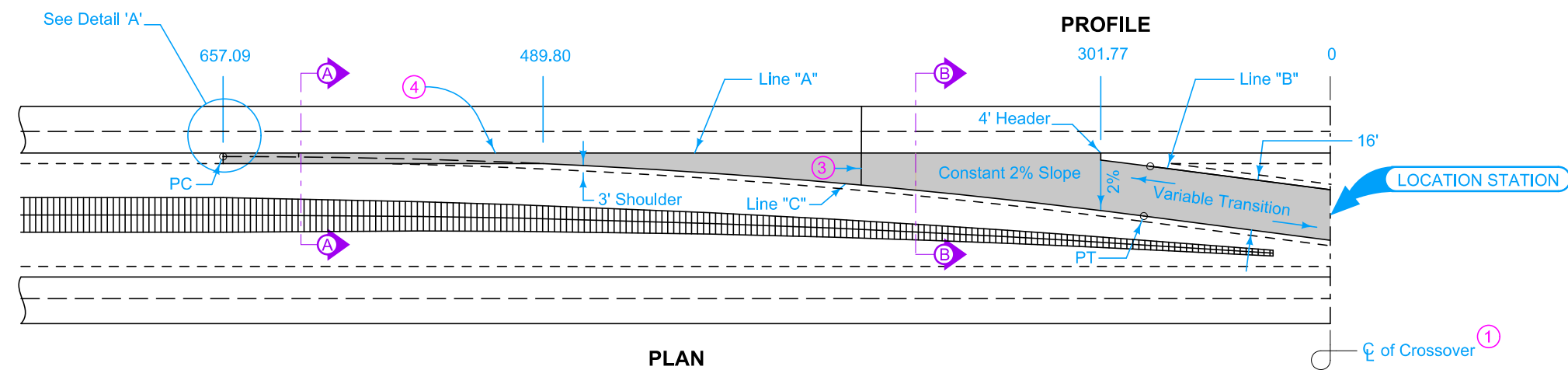
PERSPECTIVE VIEW



PROFILE



DETAIL 'A'



PLAN

Detour Pavement options: 9" PCC or 12" HMA

For joint details, see PV-101.

- ① Median crossover is symmetrical about centerline.
- ② Median pipe for crossover. See Detail 500-19.
- ③ For PCC Detour Pavement, match existing roadway joints. 'CD' joints are required.
- ④ 'KT-2' or 'L-2' joint if mainline pavement is new construction. Bend bars out. 'BT-3' joint if mainline pavement is existing. 'B' joint if Detour Pavement is HMA.

DESIGN QUANTITY TABLE		
Detour Pavement Sq. Yds.	Special Backfill Tons	Granular Shoulder Tons
1820	900	*340

\*Quantity based on 8" shoulder depth.



- Possible Contract Items:
- Detour Pavement
  - Embankment In Place
  - Excavation, Class 10, Roadway and Borrow
  - Excavation, Class 13, Roadway and Borrow
  - Granular Shoulder, Type A
  - Removal of Pavement
  - Special Backfill

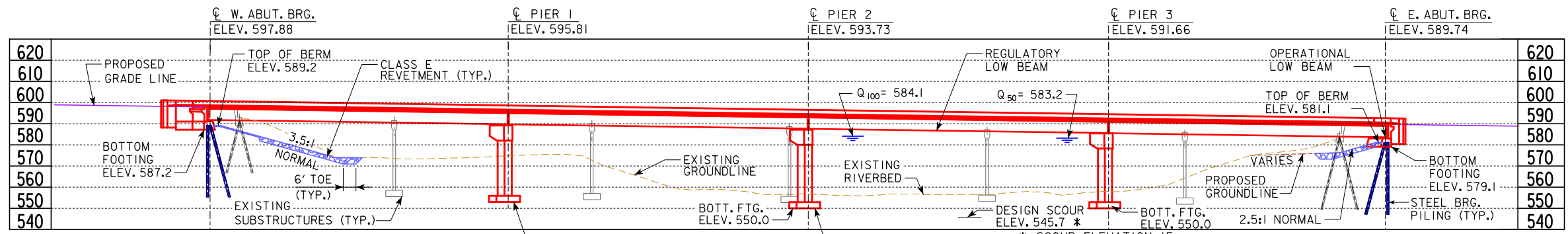
Possible Tabulation: 112-8

<b>MODIFIED STANDARD ROAD PLAN</b>	REVISION
	New 04-15-14
	<b>PV-513</b>
SHEET 1 of 1	

MODIFICATIONS: Lengthened the tangent section between centerline of crossover and the PT to accommodate a 110' median.

**MEDIAN CROSSOVER  
(110' MEDIAN)  
16' WIDE 1 LANE**

TABLE OF OFFSETS AND DROPS																					
Distance (Feet)	626.81	600	575	550	500	489.80	450	425	400	375	350	325	301.77	250	200	150	100	75	50	25	0
Offset A to C (Feet)	6.00	6.00	6.00	6.00	6.00	6.00	8.13	9.70	11.46	13.39	15.50	17.79	20.08	25.76	31.98	38.93	46.62	50.72	54.85	59.98	63.11
Drop A to C (Feet)	0.24	0.18	0.13	0.12	0.12	0.12	0.16	0.19	0.23	0.27	0.31	0.36	0.40	0.52	0.63	0.76	0.87	0.90	0.93	0.94	0.94
Drop A to B (Feet)													0.08	0.19	0.32	0.46	0.61	0.69	0.77	0.86	0.94



BENCH MARK NO. 322 - N:6469785.28 E:24370801.27 - BM 8" DIA. DRIVEN ALUMINUM ROD WITH 2.5" DIA. ALUMINUM CAP  
 VPI STA. 956+47.29 VPI ELEV. 598.76  
 VPI STA. 963+54.29 VPI ELEV. 588.41  
 -1.4642%

**PROPOSED PROFILE GRADE US 34**

- NOTES:**
- ALL UNITS ARE IN FEET UNLESS NOTED OTHERWISE.
  - TL-4 BRIDGE RAILING PROPOSED.
  - TOP OF BRIDGE DECK AT E.B. US 34 IS 0.21' ABOVE THE PROFILE GRADE TO ACCOUNT FOR DECK CROSS SLOPE AND PARABOLIC CROWN.
  - PIER TYPE - TEE PIERS.
  - BEAM TYPE - BTE BEAMS.
  - FOUNDATION TYPE AND FOOTING ELEVATIONS TO BE CONFIRMED DURING FINAL DESIGN.
  - BRIDGE AESTHETICS TO BE INCORPORATED DURING FINAL DESIGN.
  - CLASS E REVETMENT STONE IS EMBEDDED.
  - AN IOWA DNR SOVEREIGN LANDS PERMIT IS REQUIRED.
  - AS THE PROJECT REQUIRES A SOVEREIGN LANDS PERMIT, BID ITEM REFERENCES NOTES SHALL RESTRICT BROKEN CONCRETE AS A SUBSTITUTE FOR REVETMENT.
  - AN IOWA DNR FLOOD PLAIN CONSTRUCTION PERMIT IS REQUIRED.

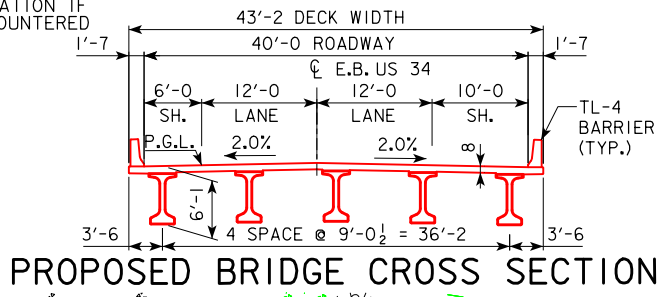
**STRUCTURAL DESIGN**

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: **Mark D. Werner** Date: \_\_\_\_\_  
 Printed or Typed Name: **Mark D. Werner**  
 My license renewal date is December 31, 2019

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

**Mark D. Werner**  
 LICENSED PROFESSIONAL ENGINEER  
 IOWA  
 15418



**HYDRAULIC DATA**

DRAINAGE AREA = 3430 SQ. MI.  
 STREAM SLOPE = 1.056 FT./MI.  
 AVG. LOW WATER STAGE = 576.6

Q<sub>25</sub> = 39,100 CFS  
 STAGE = 582.3

Q<sub>50</sub> = 43,850 CFS  
 STAGE = 583.2  
 REGULATORY LOW BEAM = 586.5  
 BACKWATER = 0.01 FT.

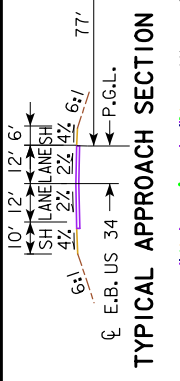
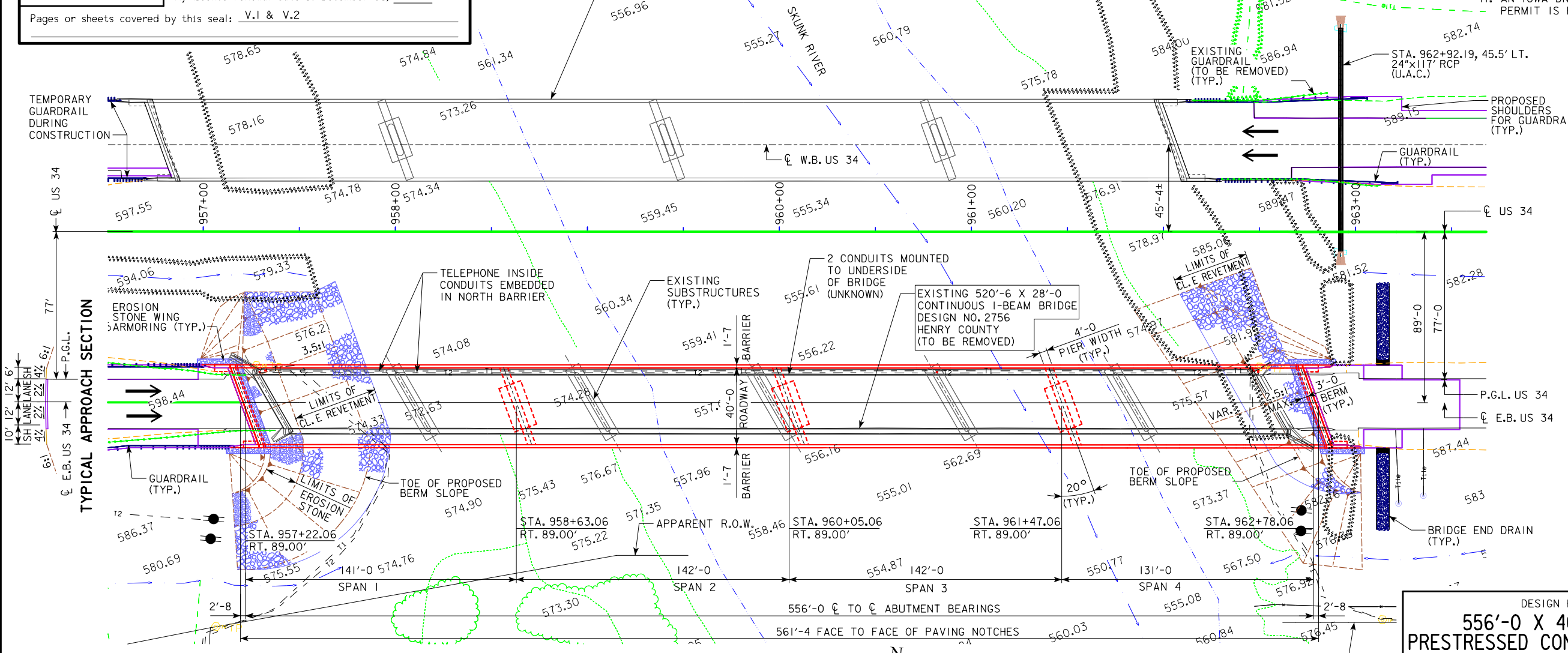
Q<sub>100</sub> = 48,300 CFS  
 STAGE = 584.1  
 OPERATIONAL LOW BEAM = 583.4  
 BACKWATER = 0.01 FT.  
 AVG. BRIDGE VELOCITY = 5.8 FPS

Q<sub>200</sub> = 55,500 CFS  
 STAGE = 585.0  
 CALCULATED DESIGN SCOUR = 545.7

Q<sub>500</sub> = 58,850 CFS  
 STAGE = 585.7  
 AVG. BRIDGE VELOCITY = 6.5 FPS  
 CALCULATED CHECK SCOUR = 545.7

ROADWAY OVERTOP ELEV. STA. 587.2  
 STA. 965+78.90

EXTREME HW STAGE = APPROX. 586.8  
 DATE = APRIL 1973



**TRAFFIC ESTIMATE**

2021 AADT	7900	V.P.D.
2041 AADT	11800	V.P.D.
TRUCKS	17	%

**UTILITIES LEGEND:**

— T1 — TELEPHONE LINE - ICON  
 — T2 — TELEPHONE LINE - WINDSTREAM

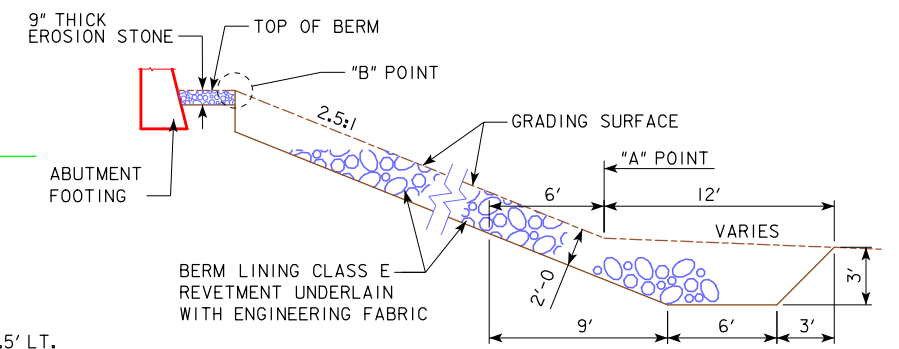
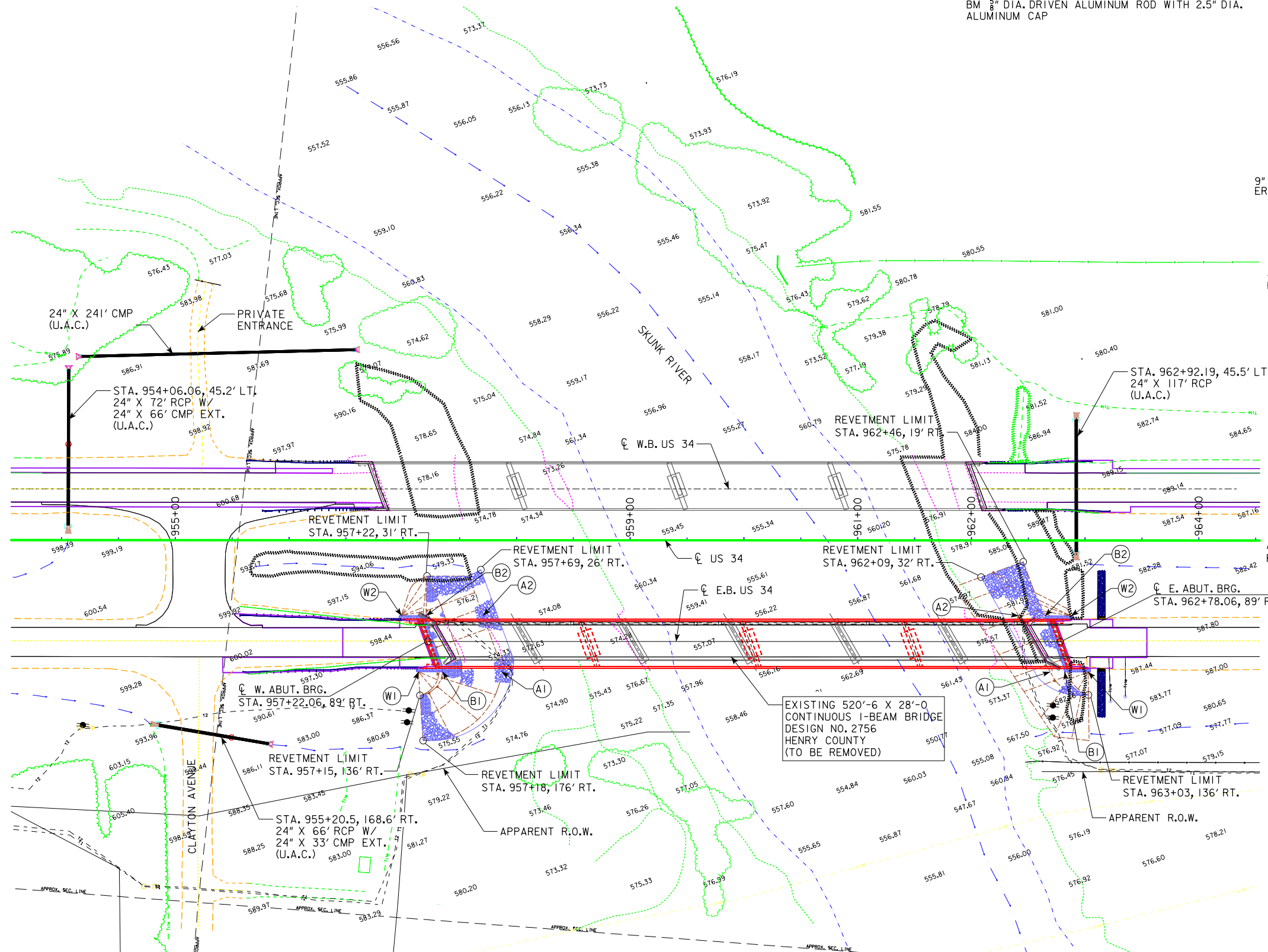


DESIGN FOR 20° SKEW (R.A.)  
**556'-0 X 40'-0 PRETENSIONED PRESTRESSED CONCRETE BEAM E.B. BRIDGE**  
 141' & 131' END SPANS (BTE BEAM TYPE) 142' INTERIOR SPANS  
**SITUATION PLAN**  
 STATION 960+00.06, RT. 89.00' JUNE 2018  
**HENRY COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 1 OF 2 FILE NO. \_\_\_\_\_ DESIGN NO. \_\_\_\_\_

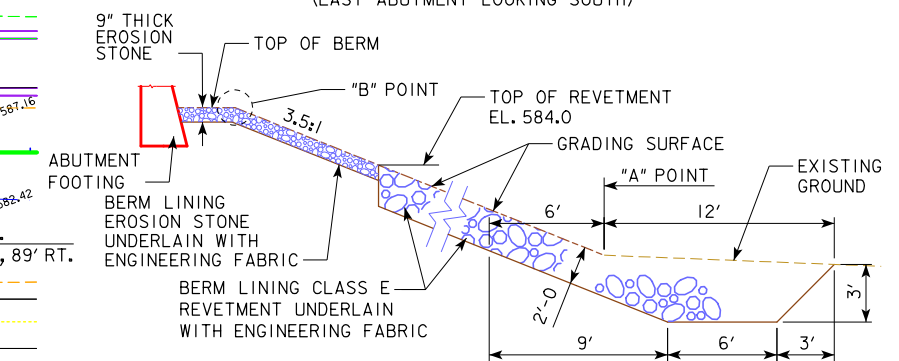
BENCH MARK NO. 322 - N:6469785.28 E:24370801.27 -  
 BM 3/4" DIA. DRIVEN ALUMINUM ROD WITH 2.5" DIA.  
 ALUMINUM CAP

POINTS	WEST ABUTMENT			EAST ABUTMENT		
	STATION	OFFSET	ELEV.	STATION	OFFSET	ELEV.
A1	957+86.9	115.58' RT.	575.0	962+69.4	115.58' RT.	575.0
A2	957+70.7	66.42' RT.	575.0	962+41.6	66.42' RT.	575.0
B1	957+35.0	115.58' RT.	589.2	962+82.0	115.58' RT.	581.1
B2	957+20.5	66.42' RT.	589.2	962+64.8	66.42' RT.	581.1
W1	957+14.0	115.58' RT.	597.5	963+02.7	115.58' RT.	588.9
W2	956+98.9	66.42' RT.	597.8	962+87.6	66.42' RT.	589.2

BERM SLOPE ELEVATIONS REFLECT THE GRADING SURFACE



SECTION THRU EMBEDDED REVETMENT BERM (EAST ABUTMENT LOOKING SOUTH)



SECTION THRU EMBEDDED REVETMENT BERM (WEST ABUTMENT LOOKING NORTH)

- UTILITIES LEGEND:**
- T1 — TELEPHONE LINE - ICN
  - T2 — TELEPHONE LINE - WINDSTREAM
  - G-HP — GAS LINE - ANR PIPELINE CO.

PRELIMINARY

ESTIMATED BERM ARMORING QUANTITIES				
LOCATION	REVETMENT CL. E (TON)	EROSION STONE (TON)	ENGINEERING FABRIC (SY)	EXCAVATION (CY)
BERM LINING - WEST ABUT.	710	100	1100	810
BERM LINING - EAST ABUT.	390	15	500	420
<b>TOTALS</b>	<b>1100</b>	<b>115</b>	<b>1600</b>	<b>1230</b>

EXCAVATION QUANTITY CALCULATED FROM GRADING SURFACE.

SITE PLAN



DESIGN FOR 20° SKEW (R.A.)  
**556'-0 X 40'-0 PRETENSIONED  
 PRESTRESSED CONCRETE BEAM E.B. BRIDGE**  
 141' & 131' END SPANS (BTE BEAM TYPE) 142' INTERIOR SPANS  
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 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. 2 OF 2 FILE NO. \_\_\_\_\_ DESIGN NO. \_\_\_\_\_