

LUCAS CO.
BRIDGE REPLACEMENT - CCS
BRFN-034-6(95)--39-59

LETTING DATE
 12-21-2021

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Highway Division

PLANS OF PROPOSED IMPROVEMENT ON THE

PRIMARY ROAD SYSTEM LUCAS COUNTY BRIDGE REPLACEMENT - CCS

US 34 bridge over stream 2.1 miles east of East Junction US 65

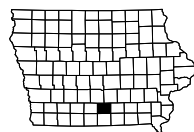
SCALES: As Noted

Refer to the Proposal Form for list of applicable specifications.

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



SEE SHEET A.02 FOR
LOCATION MAP



DESIGN DATA RURAL			
2021	AADT	3,300	V.P.D.
2041	AADT	3,400	V.P.D.
2041	DHV	--	V.P.H.
	TRUCKS	18	%
	Total		
	Design ESALs	--	

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

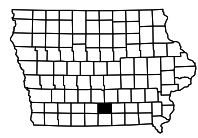
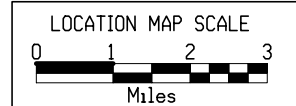
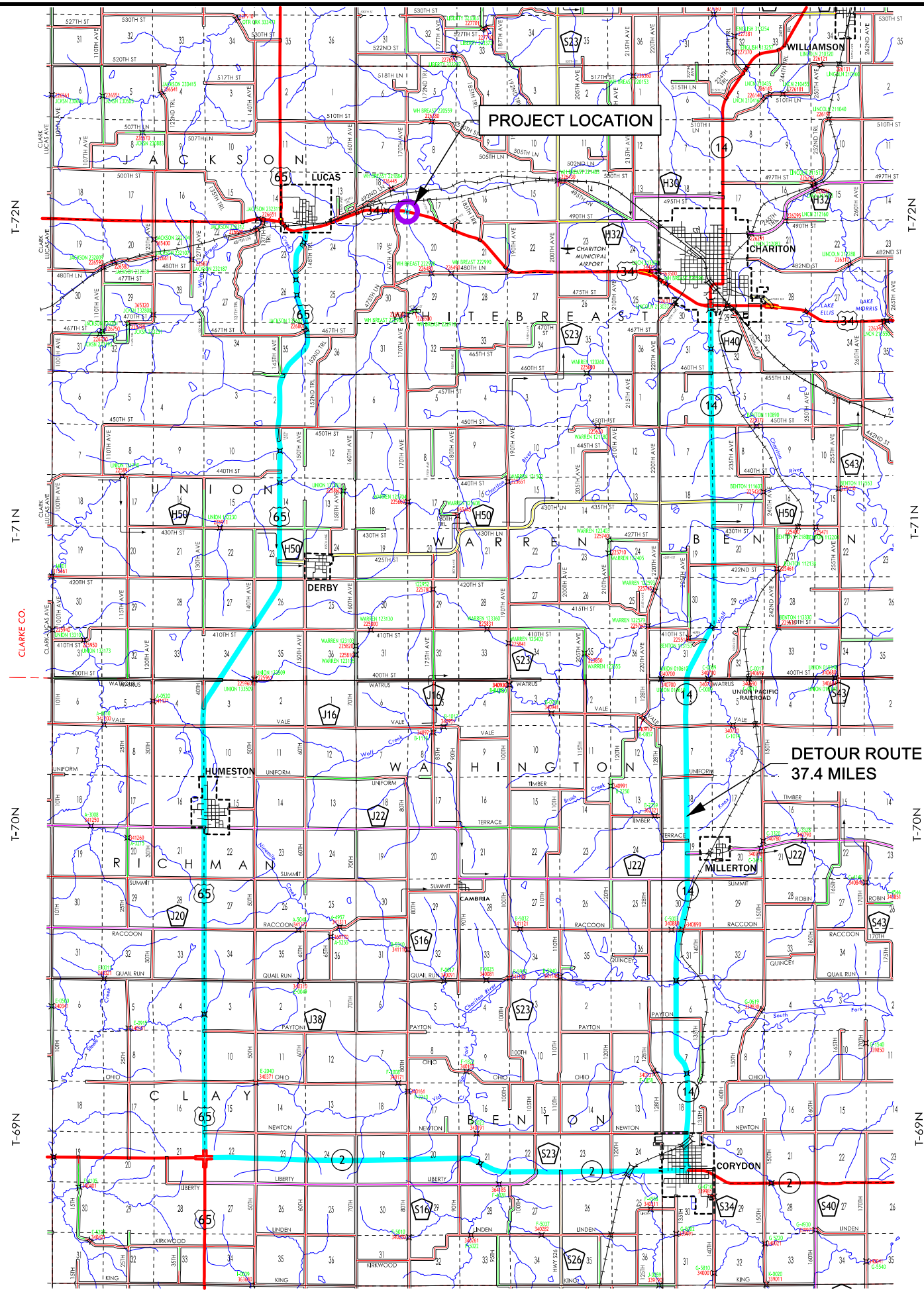
PRELIMINARY PLANS

Subject to change by final design.

D2 PLAN - Date: June 7, 2019

D3 PLAN - Date: July 12, 2019
 D4 PLAN - Date: Aug 24, 2021
 D5 PLAN - Date: Nov 22, 2019

REVISIONS	TOTAL
	33
PROJECT IDENTIFICATION NUMBER	
17-59-034-010	
PROJECT NUMBER	
BRFN-034-6(95)--39-59	
R.O.W. PROJECT NUMBER	



Roadway	HWY 34		
PIN Number	18-59-034-020	Submittal Date	10/01/18
Project Number	NHSN-034-6(100)—2R-59		Approval Date
District	District 5	Assistant District Engineer	Mark Van Dyke
County	LUCAS	or	
Route	HWY 34	Office Director	
Location	Bridge over natural stream, East limits of Lucas, 2.3 mi. East of E Jct. US 65		
Work Type	Bridge Replacement		
Segment Manager			
Designer	Jenifer Bates		

Design Manual Section 1C-1

Last Updated: 05-26-17

Rural Two-Lane Highways (Rural Arterials)

Design Element	Preferred	Acceptable	Project Values
Design speed (mph)	60	50	60
Maximum superelevation rate (Refer to Section 2A-2)	6%	8%	6%
Design lane width (ft)	12	12	12
Full depth paved width (ft)	14	12	14
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	2%
	Auxiliary and turn lanes	3% maximum	N/A
	Crown break at centerline	4% maximum	N/A
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	N/A
	Design speed ≥ 60 mph	4-inch sloped	N/A
Foreslope (For fill areas greater than 40 ft, contact the Soils Design Section for assistance)	Adjacent to shoulder	10:1 for 4' then 6:1	10:1 for 4' then 4:1
	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	3:1
Transverse Slopes	w/ drainage structures	8:1	N/A
	w/o drainage structures	10:1	N/A
Ditches (Refer to Section 3G-1)	Outside ditch (depth x width) (ft)	5 x 10	--
Bridge width—new*	Bridge length ≤ 200 ft	design lane widths + effective shoulder widths	design lane widths + effective shoulder widths
	Bridge length > 200 ft	design lane widths + effective shoulder widths	design lane width + 4' right and left of the design lane widths
Bridge width—existing*	design lane widths + no less than 2 ft left and right		design lane widths + 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	16.5
	Over non-primary	16.5 at interchange locations, 15 at all other locations	N/A
	Over railroad	23.3	N/A
	Sign trusses and pedestrian bridges	17.5	N/A
Structural Capacity	Contact Office of Bridges and Structures		Contact Office of Bridges and Structures
Level of Service	B		B

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

Design year ADT = 3300

Design Manual Section 1C-1
Last Updated: 05-26-17

Effective Shoulder Width and Type for Two-Lane Highways

Preferred (values shown in feet)			Acceptable (values shown in feet)			Project Values
	Rural Roadways	Urban Roadways		Rural Roadways	Urban Roadways	
Turn lanes with shoulders	6	6	Turn lanes with shoulders	6	0	N/A
Turn lanes with curbs	6	See Section 3C-2	Turn lanes with curbs	6	0	N/A
	Effective Shoulder Width	Paved Width		Effective Shoulder Width	Paved Width	
Climbing Lanes	6	4	Climbing Lanes	4	0	N/A
Two-Lane Highways	Effective Shoulder Width	Paved Width	Two-Lane Highways	Effective Shoulder Width	Paved Width	
Routes where bicycles are to be accommodated	10	10	Design year ADT > 2000 vpd	8	2*	Effective = 10 Paved = 4
On roadways approaching urban areas (due to increased bike traffic)	10	10				
On all curves with a superelevation rate of 7.0% or greater	10	10				
On roadways with design year ADT > 5000	10	6	Design year ADT between 400 - 2000 vpd	6	2*	
On all other NHS	10	4				
On non-NHS routes with design year ADT > 3000	10	4	Design year ADT < 400 vpd	4	2*	
On non-NHS routes with design year ADT < 3000	8	2*				

*Requires safety edge-Refer to Section 3C-6

Curbs should be located beyond the outer edge of the effective shoulder width in rural areas

Refer to Section 3C-2 for curb offsets in urban areas

Notes:

Used the Acceptable chart for clear zone calculations.

Roadway Design Speed (mph) = 60

Design Manual Section 1C-1
Last Updated: 05-26-17

Design Criteria for High Speed Roadways

Design Element	Preferred Criteria						Acceptable Criteria						Project Values		
	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 6D-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	e _{max} = 6%	833	1060	1330	1660	2040	2500	833	1060	1330	1660	2040	2500	1330
		e _{max} = 8%	--	--	--	--	--	--	758	960	1200	1480	1810	2210	N/A
Minimum vertical curve length (ft) (Refer to Section 2B-1)		150	165	180	195	210	225	150	165	180	195	210	225	180	
Minimum rate of vertical curvature (K) (Refer to Section 2B-1)	crest vertical curves	84	114	151	193	247	312	84	114	151	193	247	312	151	
	sag vertical curves	96	115	136	157	181	206	96	115	136	157	181	206	136	
		96	115	136	157	181	206	54	66	78	91	106	121		
Minimum gradient (%) (Refer to Section 2B-1)		0.5						0.3% with a curb, 0.0% without a curb						0.5	
Maximum gradient (%) (Refer to Section 2B-1)	Urban roadways	4		3				7	6	6	--	--	--		
	Rural roadways	4		3				5	5	4	4	4	4	3	
	Interstates	4		3				5	5	4	4	4	4		
Clear zone		See "Preferred Clear Zone" table in Section 8A-2						See "Acceptable Clear Zone" table in Section 8A-2						30	

IOWA DEPARTMENT OF TRANSPORTATION

FINAL PROJECT CONCEPT STATEMENT

TO OFFICE: District 5
ATTENTION: Jim Armstrong
FROM: Jenifer Bates
OFFICE: Shive-Hattery
SUBJECT: Project Concept Statement; (Final Approval D0)

DATE: October 18, 2018
PROJECT: Lucas County
 BRFN-034-6(95)--39-59
 PIN: 17-59-034-010

US 34 – Bridge over stream, 2.1 miles E of E Jct US 65
 Lucas County
 BRFN-034-6(95)--39-59
 PIN: 17-59-034-010
 Maint No. 5934.8S034
 FHWA No. 34260
 Jenifer J. Bates, P.E.
 515-223-8104
 October 18, 2018

This project involves the replacement of the US 34 bridge (Maint. No. 5934.8S034) over stream, 2.1 miles E of E Jct US 65.

A concept review was held on September 17, 2018. Those present included Mark Van Dyke, Jarid Klein, and Marv May from the District 5 Office; Steven Schroder from the Office of Project Management; Patricia Schwarz and Dave Mulholland from the Office of Bridges and Structures; and Jenifer Bates, Joe Appel, and Mark Harpole from Shive-Hattery.

One alternative was considered:

- Proposed structure is a 100 ft. three span continuous concrete slab bridge at ten degree skew with an estimated cost of \$1,728,700.

Alternative 1 is the preferred alternative due to conventional methods of construction and it minimizes inconvenience for the traveling public. Traffic will be maintained by a temporary runaround.

The Draft Project Concept Statement was sent out for review and comment with concerns to be resolved by Thursday, October 11, 2018. Comments received during the review period have been considered and resolved.

This project is recommended for construction in FY 2022. The Office of Bridges and Structures will coordinate plan preparation with assistance from the Office of Design.

Cc:

C. Purcell	M. J. Kennerly	K. D. Nicholson
S. J. Megivern	J. S. Nelson	B. Walls
G. A. Novey	M. A. Swenson	R. A. Younie
D. R. Tebben	K. Brink	D. L. Newell
J. W. Laaser-Webb	W. A. Sorenson	D. E. Sprengeler
E. C. Wright	M. E. Ross	A. A. Welch
N. M. Miller	C. C. Poole	M. J. Sankey
B. E. Azeltine	B. D. Hofer	T. D. Crouch
S. J. Gent	S. Anderson	P. C. Keen
J. Selmer	K. K. Patel	S. Godbold
D. R. Claman	J. Hauber	A. Abu-Hawash
M. E. Khoda	K. Olson	S. Neubauer
M. Van Dyke	J. R. Webb	T. Quam
A. J. Klein	J. R. Phillips	J. Garton
J. Woodcock	B. M. Clancy	B. Hucker
H. Torres-Cacho	J. Bartholomew	

I. STUDY AREA

A. Project Description

This project involves the replacement of the US 34 bridge (Maint. No. 5934.8S034) over stream, 2.1 miles E of E Jct US 65.

One alternative was considered:

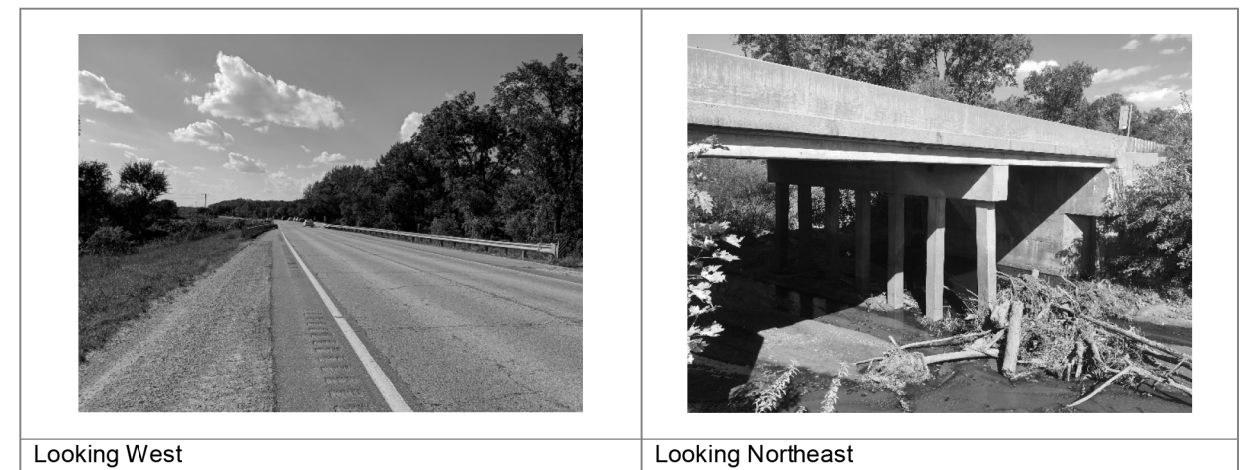
- Proposed structure is a 100 ft. three span continuous concrete slab bridge at ten degree skew.

Alternative 1 is the preferred alternative due to conventional methods of construction and it minimizes inconvenience for the traveling public. Traffic will be maintained by a temporary runaround.

The preliminary project cost is \$1,728,700.

B. Need for Project

The existing structure is a two span, 51 ft. long by 30.2 ft. wide concrete continuous slab bridge built in 1957, replacing a Pony Truss bridge built in 1921. The existing bridge is near the end of its useful life. The existing bridge width does not meet current standards. The existing design loading is H20.



SH Project #4172081

SH Project #4172081

Shive-Hattery | 4125 Westown Parkway | Suite 100 | West Des Moines, IA 50266 | 515.223.8104 | shive-hattery.com

Shive-Hattery | 4125 Westown Parkway | Suite 100 | West Des Moines, IA 50266 | 515.223.8104 | shive-hattery.com



C. Present Facility

US 34 is a two lane roadway. The existing structure is a two span, 51 ft. long by 30.2 ft. wide concrete continuous slab bridge built in 1921 and last reconstructed in 1957.

US 34 in the project area was originally constructed in 1958 as a 24 ft. PCC roadway with 10 ft. granular shoulders and 3:1 foreslopes. US 34 was resurfaced with HMA in 1975, 1985, and 2005.

D. Traffic Estimates

The traffic counts used were that from a recent nearby project. As per the Iowa DOT Rural Forecasting Coordinator, due to a general declining trend in traffic from 2000, it is expected that the pattern would still stand. Therefore, the 2021 construction year and 2041 design year average daily traffic estimates are 3,300 ADT with 18% trucks and 3,400 ADT with 18% trucks, respectively.

E. Sufficiency Ratings

US 34 is classified as a commercial and industrial route and is a maintenance service level "B" road. The federal bridge sufficiency rating is 52.8.

F. Access Control

Access rights will be acquired for this project.

G. Crash History

During the five-year study period from January 1, 2013 through December 31, 2017, there were nine total crashes reported; seven involved property damage only, one was a minor injury crash, and one was a major injury crash. There were three total reported injuries from these crashes; two were suspected serious injuries and one was a suspected minor injury. Of these crashes, four were caused by an animal, one was listed as a distracted driver, two crossed the centerline, and two ran off the road on the right side.

II. PROJECT CONCEPT

A. Feasible Alternatives

Proposed Alternative #1 – three span slab bridge (with temporary runaround)

The existing 51' x 30.2' wide, two span continuous concrete slab bridge will be replaced with a 100' x 44' three span continuous concrete slab bridge at ten degree skew. An approximately 5 in. grade raise is proposed to keep the low beam elevation the same as the existing bridge low beam elevation. A ten degree skew fits the stream layout well. Two corners of the proposed pier foundations will be in close proximity to the existing bridge foundations.

The typical section of the pavement as it approaches the bridge is a 24 ft. roadway with 10 ft. shoulders (4 ft. paved, 6 ft. granular). Slopes are 10:1 for 4 ft., then 4:1 to the clear zone, then 3:1 to the toe of slope.

This bridge will be constructed on the existing horizontal alignment. The 5 in. grade raise will result in a total of 161 ft. of roadway reconstruction beyond the new bridge approach sections (57 ft. to the west, 104 ft. to the east). See attached drawing.

Pavement typical section outside of approach pavement was estimated at 9.5 in. PCC over 6 in. modified subbase.

New bridge approaches will be constructed. The existing guardrail will be replaced with new guardrail and the shoulders will be paved 20 ft. beyond the ends of the guardrail.

Traffic will be maintained by constructing a two lane runaround approximately 75 ft. south of the current bridge. The runaround will consist of 11 ft. wide lanes with 3 ft. paved shoulders and 3:1 foreslopes. The pavement thickness for the runaround will be 7.5 in. PCC or 8.5 in. HMA on 6 in. of special backfill. The two lane runaround will be approximately 1,100 ft. long.

A 40' x 24' single span temporary runaround structure will be used to accommodate drainage. The low beam of the temporary structure will be set at the low roadway overtop elevation near the driveway west of the Wolf Hollow bridge.

Field fence will need to be removed and relocated to accommodate the runaround. This field fence will then be removed and relocated back to its existing location once the runaround has been removed.

There will be one power pole that will need to be relocated to construct the runaround. The District said they preferred the runaround, even with the power pole relocation, because of the 37 mile detour route required to close the road.

There is one field entrance at the eastern end of the runaround that may need a small amount of shaping to maintain the access during construction.

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

Right-of-way will be required for this project.

Traffic will be maintained at all times.

Bridge Items	<u>Estimated Costs</u>
New Bridge	\$450,300
Temporary runaround bridge	\$40,000
Remove existing bridge	\$12,500
Revetment	\$23,100
Engineering fabric	\$1,700
Erosion stone	\$900
Mobilization – 10%	\$52,900
Contingency – 20%	<u>\$116,300</u>
Bridge Costs	\$697,700

Roadway Items	<u>Estimated Costs</u>
Bridge Approaches	\$85,500
Removal of Pavement	\$10,100
Modified Subbase	\$6,000
Pavement, 9.5" PCC	\$34,800
Guardrail (includes removal)	\$47,600
Paved Shoulders for Guardrail	\$42,000
Class 10 for Guardrail Blisters	\$23,600
Bridge End Drains	\$14,000
Class 10 Excavation	\$10,500
Embankment-In-Place, Contractor Furnish	\$216,000
Erosion Control	\$50,000
Clearing & Grubbing	\$20,000
Detour Pavement	\$144,900
Right-of-Way	\$10,000
Traffic Control – 5%	\$39,000
Mobilization – 5%	\$39,000
M & C – 30%	<u>\$238,000</u>
Roadway Total	\$1,031,000
Project Total	\$1,728,700

Proposed Alternative #2 – three span slab bridge (stage or ABC construction)

Two other construction options considered at the site meeting were staged construction and ABC construction. Staged construction would be more difficult with the volume of traffic and difficulties staging a slab bridge construction. A short duration detour would be required for ABC construction. ABC construction was not desirable because of the long 37 mile detour.

Detour Analysis

A detour was considered, but to close US 34 the offsite detour would follow US 65 south to IA 2, then east IA 14, then north to US 34. Out of distance would be 37.4 miles. It is anticipated the detour would be in place for approximately 90 days. The total out of distance user cost was anticipated to be \$2,422,798. The cost for county road maintenance was estimated to be \$131,473 as calculated by the Gas Tax Method. It was decided an onsite runaround was the better option.

B. Recommendations

It is recommended the present structure be replaced as described in Alternative #1 above.

C. Construction Sequence

It is anticipated all work on this project will be awarded to one prime contractor. The Office of Bridges and Structures will coordinate the plan preparation with the assistance of the Office of Design and Shive-Hattery.

D. ADA Accommodations

There are no bike paths or sidewalks adjacent to US 34; therefore no ADA accommodations are planned in conjunction with this project.

E. Special Considerations

The Accelerated Bridge Constructed (ABC) Rating Score is 58. Score based on using a three span bridge. Score is greater than 50 and further evaluation was considered during the site visit. The detour length of 37 miles is greater than the 30 miles or more minimum for receiving a score of 50. ABC construction is not desirable with the long 37 mile detour.

This will not be a traffic critical project.

Standard survey coverage will be required.

Right-of-Way will be required for this project.

A listing of existing utilities present within the project limits are shown in Attachment A.

The District cultural resources manager has not yet completed a cultural resources review on this project.

The Office of Location and Environment has not yet reviewed this project to determine if a Section 404 Permit will be required.

F. Program Status

Site data has been developed by the Office of Design. This project is listed in the 2018-2022 Iowa Transportation Improvement Program with \$1,030,000 for replacement in FY 2022. Costs for this project may be eligible for bridge replacement funds. A schedule of events will be developed following approval of the Project Concept.

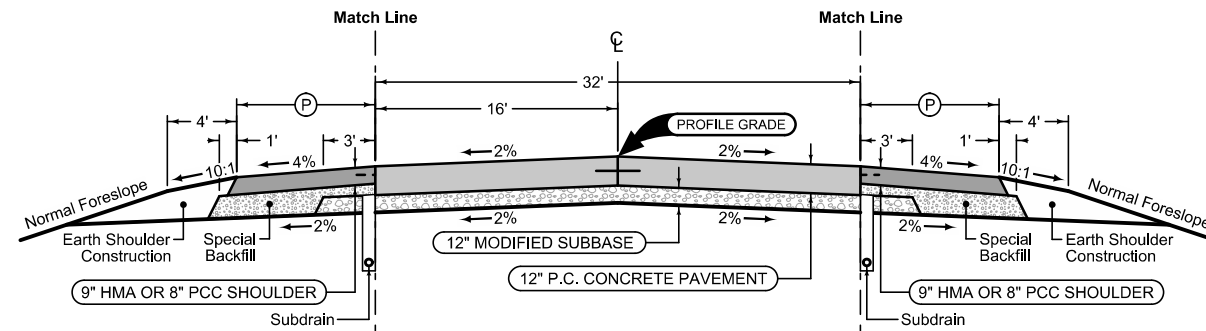
Following pages include a map of the county and location of project area with the proposed detour route shown and the concept drawing.

Attachment A – Utilities

Paved Shoulder at Guardrail

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

2_P_Guard_10-17-17		
STATION TO STATION		(P) Feet
940+45.65	941+62.82	VARIES
942+65.87	944+20.46	VARIES



Mainline Jointing:
 Transverse joints: CD at 20' spacing
 Longitudinal joint: L-2

2P_10-19-10		
STATION TO STATION		(P) Feet
940+38.30	941+66.98	
942+70.02	944+42.72	

Paved Shoulder at Guardrail

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

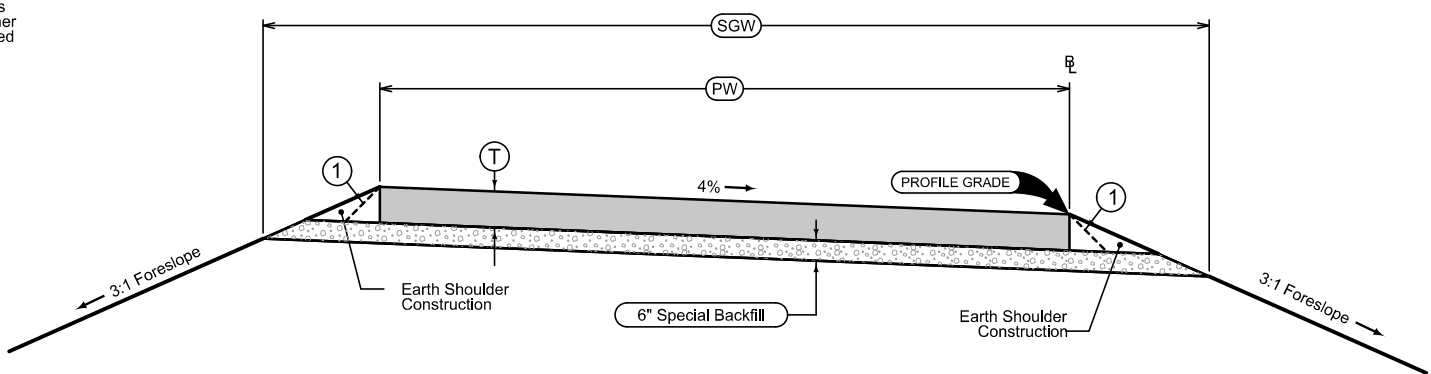
2_P_Guard_10-17-17		
STATION TO STATION		(P) Feet
940+16.51	941+70.86	VARIES
940+38.30	944+42.72	VARIES

See Tab 100-24 or 100-25 for pavement quantities.
 See Tab 112-9 for shoulder quantities.

US 34

LOCATION			DIMENSIONS						6" Special Backfill	Earth Shoulder Construction
ROAD IDENTIFICATION	STATION TO STATION		HMA			PCC				
			PW Feet	T Inches	SGW Feet	PW Feet	T Inches	SGW Feet		
Detour	0+00	11+69.49	28	8.5		28	7.5			

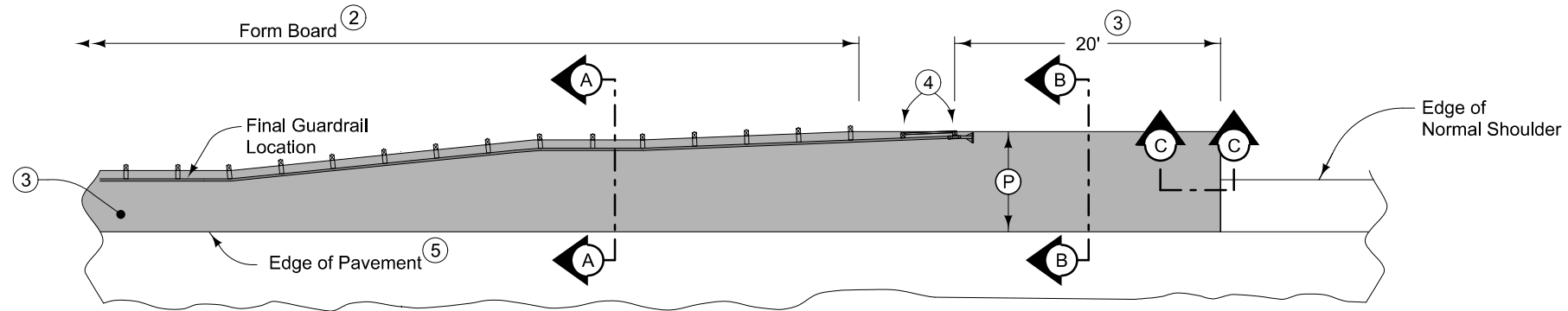
Quantity calculations based on vertical pavement edges.
 Normal section shown may be modified appropriately in areas of super-elevated curves or other locations specifically designated by the Engineer.
 ① Possible HMA 1:1 slope



DETOUR PAVING

D_Detour
10-21-14

DESIGNER INFO



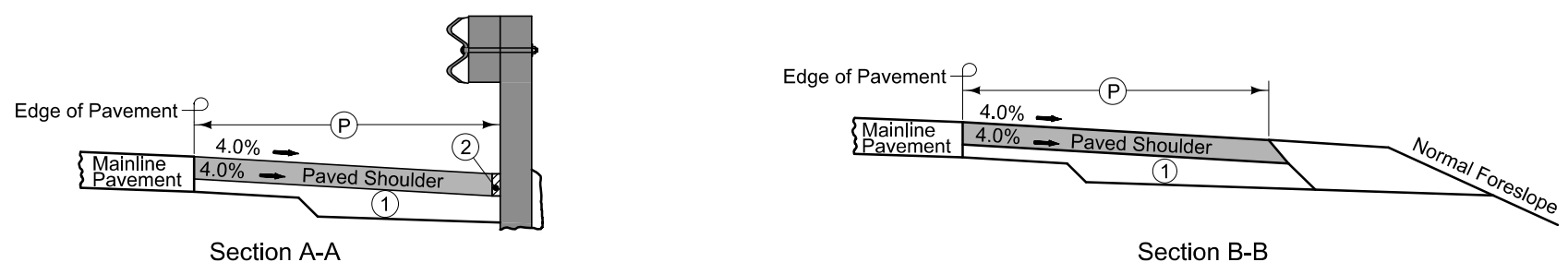
PLAN VIEW

9" HMA Paved Shoulder at guardrail. 8" PCC may be substituted with the following jointing layout:

Match mainline pavement joint spacing. When mainline pavement is 8" or greater in thickness, place additional transverse 'C' joints in shoulder at mid-panel of the mainline pavement. Place longitudinal 'C' joint at P/2 from edge of mainline pavement when P is greater than 10' wide. Terminate longitudinal joint at transverse joint less than 10' in length.

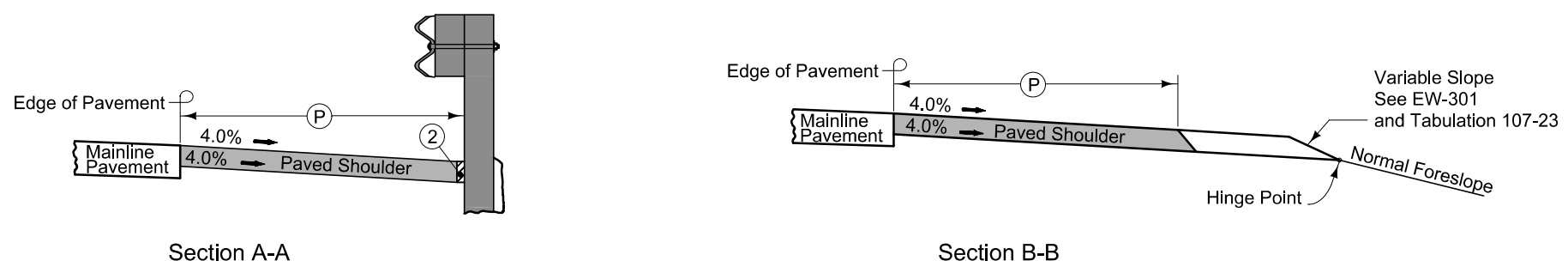
Compaction of HMA is required to face of guardrail post. Hand compaction will be allowed under guardrail. Removal and reinstallation of guardrail will be allowed with no additional payment.

Refer to Tabulation 112-9 for shoulder quantities.

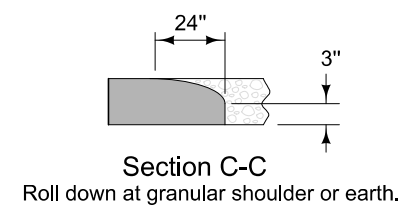


NEW CONSTRUCTION

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



EXISTING SHOULDER



PAVED SHOULDER AT GUARDRAIL

100-1D
10-18-05

PROJECT DESCRIPTION

This project involves the replacement of the US 34 bridge over a stream, 2.1 miles east of the East Junction of US 65.

105-4
10-18-11

STANDARD ROAD PLANS

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

100-0A
10-28-97

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

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

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 on Bridge End Post (MASH TL-3)
DR-203	10-17-17	Double Reinforced 12" Approach
DR-303	10-17-17	Subdrains (Longitudinal)
DR-305	04-17-18	Subdrain Outlets (standard Subdrain, Pressure Release and Special)
DR-402	04-17-18	Rock Flume for Bridge End Drain
EC-201	10-16-18	Silt Fence
EC-202	10-21-14	Floating Silt Curtain
EC-204	04-18-17	Perimeter and Slope Sediment Control Devices
EC-301	10-18-16	Rock Erosion Control (REC)
EW-101	10-17-17	Embankment and Rebuilding Embankments
EW-102	10-20-15	Allowable Placement of Unsuitable Soil in Embankments
EW-201	04-19-16	Bridge Berm Grading without Recoverable Slope (Barnroof Section)
EW-301	10-20-15	Guardrail Grading
PM-110	10-16-18	Line Types
PM-420	04-19-11	Two-Lane Roadway with no Turn Lanes (One-Way Stop Condition)
PV-101	10-16-18	Joints
SI-173	04-19-16	Object Markers
SI-211	10-18-16	Object Markers and Delineator Placement with Guardrail
TC-1	04-16-13	Work Not Affecting Traffic (Two-Lane or Multi-Lane)
TC-202	04-21-15	Work Within 15 ft of Traveled Way
TC-252	04-19-16	Routes Closed to Traffic

SURVEY SYMBOLS

- VS Channel Cross Section
- SIGN SI Sign
- PPA Power Pole Co. 1
- MM Mile Marker Post
- EP Edge of Paved Roads (ML or SR)
- SH Paved Shoulder
- ENT Centerline BL of Entrance
- PLG Location of General Photo
- WV WW Water Valve
- SP Stream Profile
- TW Top of Water
- TR Telephone Riser Pole
- TDC Tree Deciduous
- TEV Evergreen Tree
- WH WHD Water Hydrant
- MH Utility Access (Manhole)
- LP L.P. Tank
- TPD Telephone Pedestal
- EHW Extreme High Water
- PR Electric Riser Pole
- COS Square Bridge Pier Column
- OUT Tile Outlet
- BCL Bridge Centerline
- BD Bridge Deck
- BL Topo Breakline
- BLD Building or Foundation
- BNK Stream Bank
- BRG Bridge
- CON Concrete or A/C Slab
- CU Back of Curb
- CUL Culvert
- D Centerline Draw or Stream (Down)
- DIK Centerline of Dike or Dam
- DU Centerline Draw or Stream (Up)
- EG Edge of Gravel Road
- ENP Edge Paved Entrance & Park Lot
- ENU Edge Unpaved Entrance & Parking
- EW Edge of Water
- F0 — FO1D Fiber Optic Co. 1 - Quality D
- F02 — FO2D Fiber Optic Co. 2 - Quality D
- F03 — FO3D Fiber Optic Co. 3 - Quality D
- x FW Wire Fence
- GDL Guard Rail Steel
- GU Gutter In Front of Curb
- LIN Miscellaneous Line
- PIP Pipe Culvert
- RET Retaining Walls
- SNP Unpaved Shoulder
- SWK Sidewalk
- Tile — TIL Tile Line
- T1 — TL1D Telephone Line Co. 1 - Quality D
- T2 — TL2D Telephone Line Co. 2 - Quality D
- TLNL Tree Line Left
- TLNR Tree Line Right
- W — WL1D Water Line Co. 1 - Quality D

UTILITY LEGEND

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

- PPA Alliant Energy
Heather Dee
319-786-8196
rerow@alliantenergy.com
- F0 — FO1D Chat Mobility - Quality D
Tom Weis
712-829-2800
TOM@I35-SWT.com
- T1 — TL1D Windstream - Quality D
Barbara Graves
501-647-4590
Barbara.Graves@windstream.com
- F03 — FO3D ICN - Quality D
Mike Broderick
515-725-4610
mike.broderick@iowa.gov
- W — WL1D Rathburn Regional Water - Quality D
Mike Stevens
641-647-2416
641-895-3655
mstevens@rrwa.net
- W — WL1D Rathburn Regional Water - Quality D
Tyler Havard
641-647-2416
641-895-8542
thavard@rrwa.net
- F02 — FO2D Qwest - Quality D
- T2 — TL2D Qwest - Quality D
- WV WW Water Valve
- TR Telephone Riser Pole
- MH Utility Access (Manhole)
- TPD Telephone Pedestal
- PR Electric Riser Pole

PLAN VIEW COLOR LEGEND OF PLAN AND PROFILE SHEETS

LINEWORK	Design Color No.	Description
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.	Description	
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

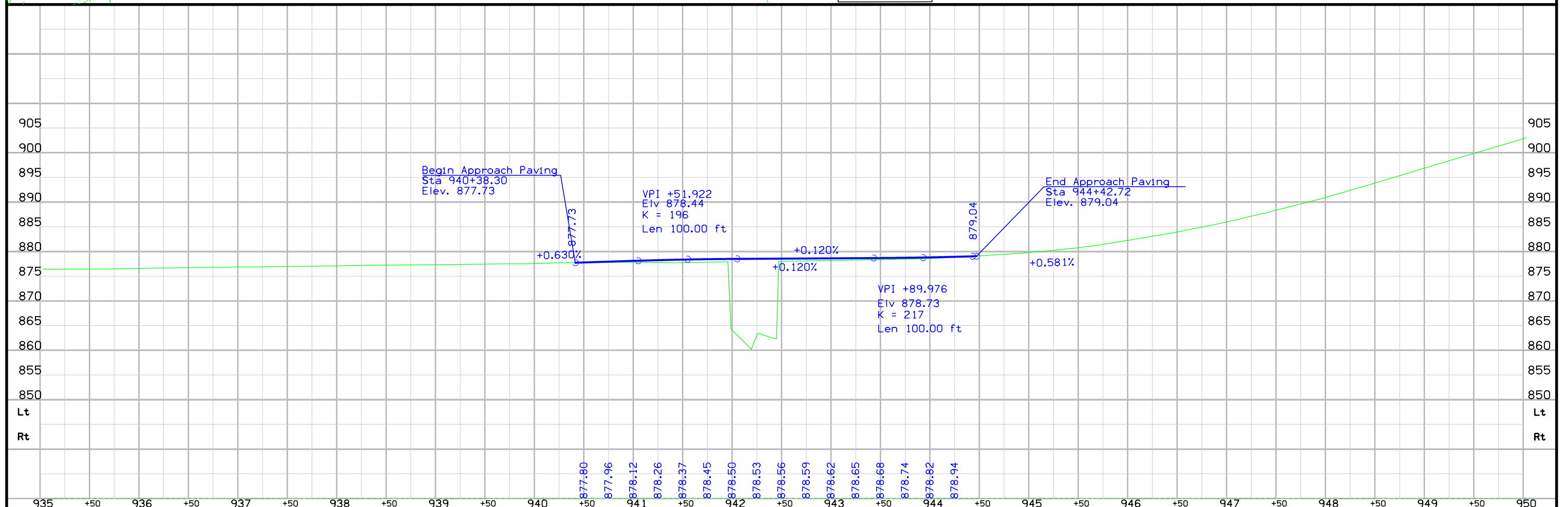
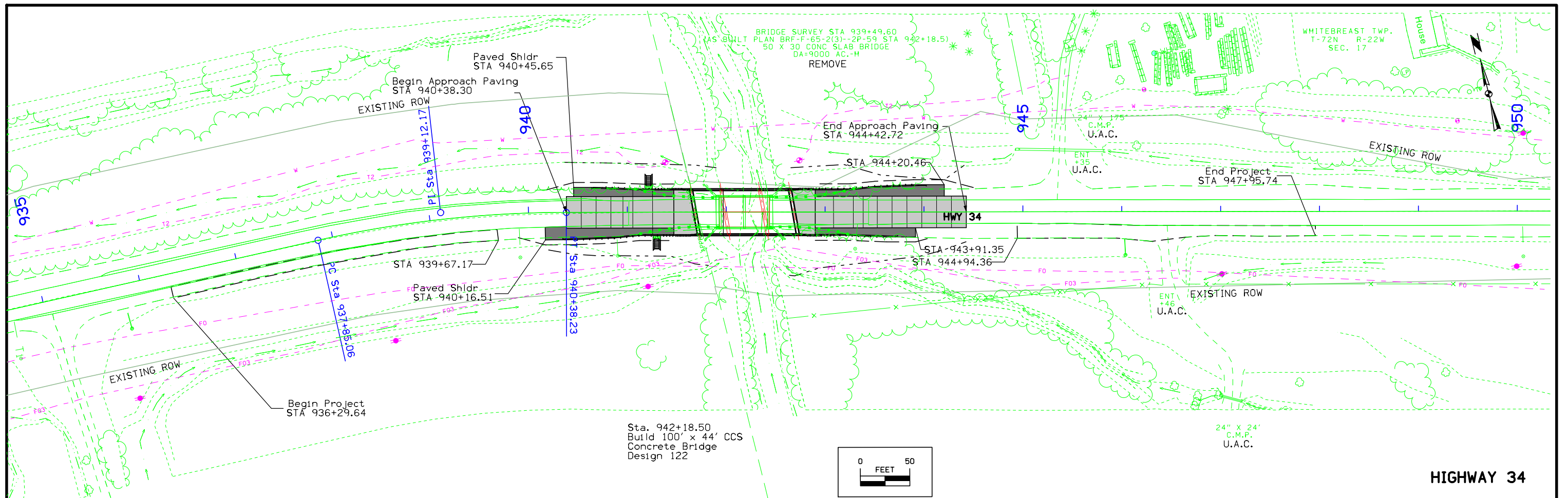
LINEWORK	Design Color No.	Description
Green	(2)	Existing Ground Line Profile
Blue	(1)	Proposed Profile and Annotation
Magenta	(5)	Existing Utilities
Blue, Light	(230)	Proposed Ditch Grades, Left
Black	(0)	Proposed Ditch Grades, Median
Rust	(14)	Proposed Ditch Grades, Right

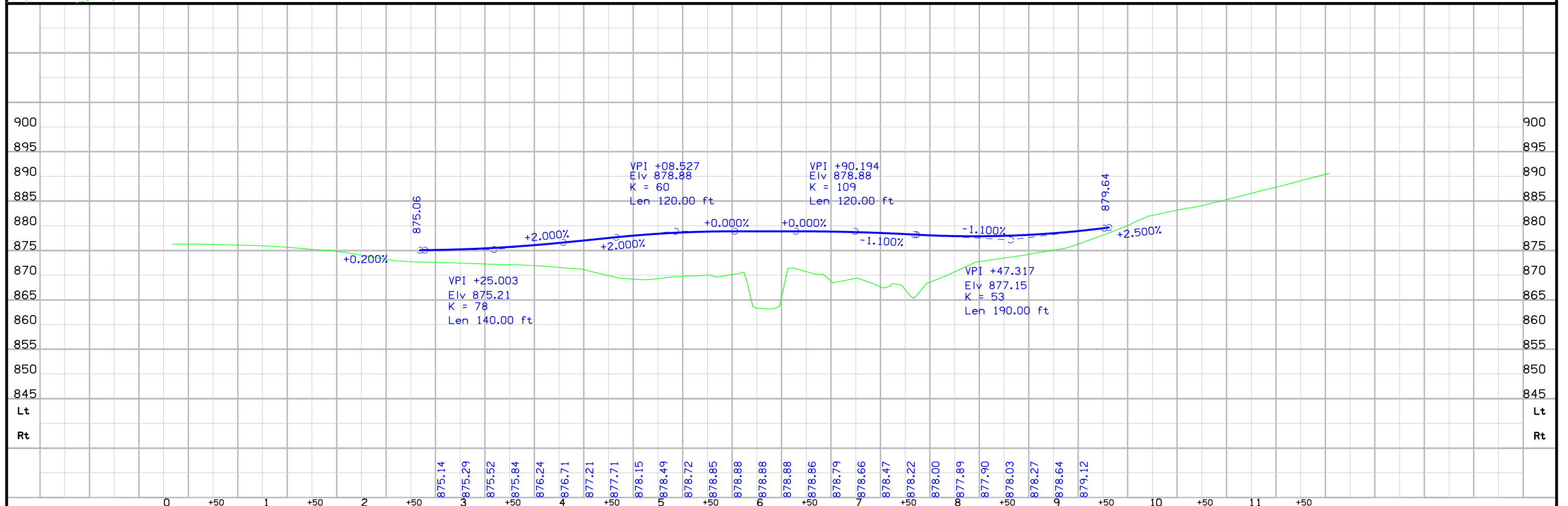
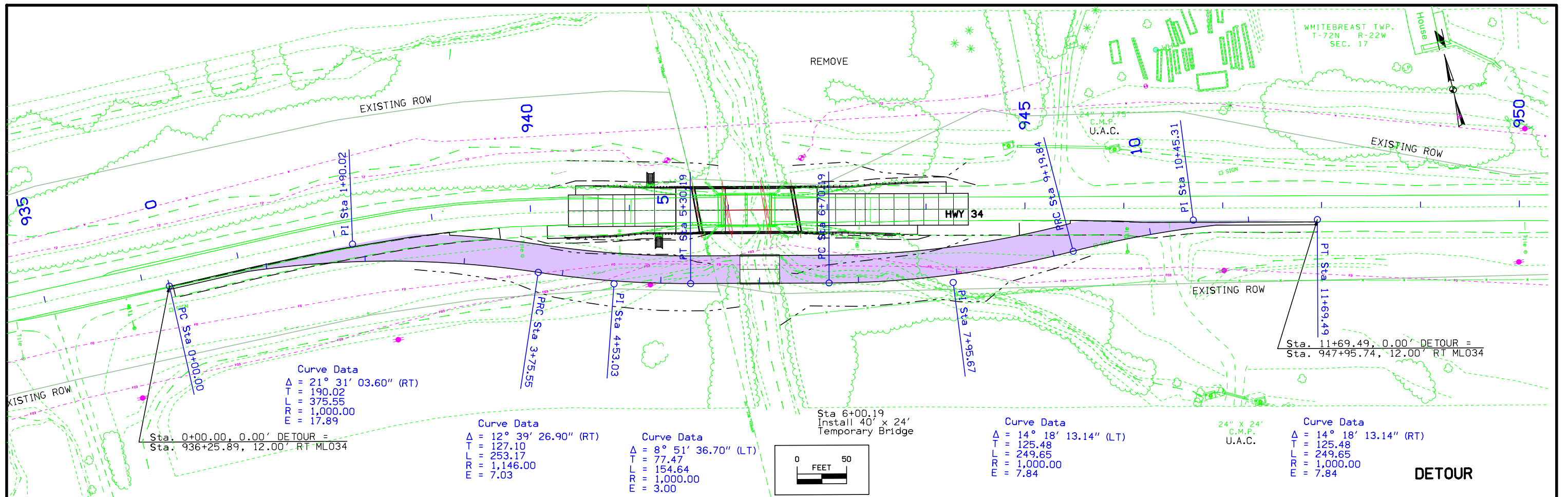
- Reference Point
- Station
- ▲ Section Corner
- Ground Line Intercept
- /// Saw Cut
- Guardrail
- Trench Drain
- HighTension Cable Guardrail
- Sheet Pile
- ▨ Pavement Removal
- ▩ Clearing & Grubbing Area

- ### 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)





Survey Information

Lucas County
BRF-034-6(79)38-59
Over White Breast Creek 1.6 Miles E. Of US 65
PIN 13-59-034-010
Sap-0810

High Water Information:

02/12/2014- Talked to Bill Homes, owner of the property to the South of the bridge over Whitebreast Creek and he stated that there has not been water in any flooding event. He recalls a couple of 100 year events getting as high as 1 foot over the pavement on the lower spots of Highway 34. He refers us to talk to Kevin Kent from Kevin Kent Construction.
Talk to Kevin Kent construction secretary Billy Joe and she told me Kevin was on vacation at the time. We will follow up in a week to ask about flooding in the area. According to Billy Joe, she mention the water getting as high as the outlets on the walls of their building, but she wasn't present at the time of the flooding because she is a newer employee of the company.
02/19/2014- Followed up on Kevin to get information on the high water. We spoke to Debbie(Kevin's wife) and she mention an incident in 1993 where the water went up to the outlets of their building (+/- 3 ft off floor elevation). She stated that it was after a recent construction of a bridge on Hwy 65 just west of their property. Surveyed elevation: 886.07 ft.
03/20/2014- Talked to the owner of the property to the North East of the bridge and pointed us to a location where the water got in the year of 1992. Surveyed elevation: 881.79 ft.

General Information

Measurement units for this survey are US survey feet. This survey is for a proposed replacement of the U.S. 34 Bridge (Maint. No. 5934.4S034) over White Breast Creek, 1.6 miles east of U.S. 65. This project is a Full Field Survey with Photo control. Additional drainage study was performed in the area for bridge design.

Vertical Control

Vertical datum for this survey is NAVD88 (Computed using Geoid12A). GRS80 Ellipsoid Height was computed at project Pt. 300, by doing 6 hour static observations. The project control is relative to IaRTN base stations. Additional benchmarks were placed throughout the project using a GNSS Base-Rover setup relative to Pt. 300 and Pt. 301. A minimum of three observations with appropriate time spans between were collected. The vertical standard deviation of these observations was less than 0.03 ft. at 95% confidence level (2 sigma).

This survey observed 2 As-Built plan bench marks to compare to local ground control:

BM 500 Project FN 63 W Elev. 742.53
Survey Elev. = 884.55

BM 501 Project FN 63 W Elev. 738.62
Survey Elev. = 880.58

Horizontal Control

The project coordinate system is modified Iowa State Plane South Zone (U.S. Survey Feet) scaled around Pt. 300 at 375991.869 N, 1657982.482 E, 874,109 EL. Horizontal datum is NAD83 (2011) for Epoch 2010.00. Coordinates were determined by doing 6 hour static observations. The project control is relative to IaRTN base stations. Additional control points were placed throughout the project using a GNSS Base-Rover setup relative to Pt. 300. A minimum of three observations with appropriate time spans between were averaged. The horizontal standard deviation of these observations was less than 0.03 ft. at 95% confidence level (2 sigma).

1/Combined Scale Factor of project= 1.000084174214

The 1/Combined Scale Factor, scaled about Pt. 300, may be used for GNSS stakeout and location to survey in the Project Coordinate system. A scale factor of 1 should be used with total station stakeout.

Alignment Information

The horizontal alignment for this survey is a retrace of As-built Plans No. BRF-F-65-2(3)- -2P-59. Survey stationing was equated to the plan PI at STA 895+58.00 and run back and ahead without equation throughout the survey. It is a Design Office policy to run stationing continuously throughout the project even if the As Built Plans contain station equations. This survey passes through two plan station equations. As a result survey stationing will differ significantly as noted.

Survey stationing relates to as built plan stationing as follows:

POT Sta. 858+68.04 Project No. BRF-F-65-2(3)- -2P-59
=Survey POT Sta. 857+60.42
As built stationing = Survey stationing + 107.62 ft.

Equation Sta. 882+05.84 Back= Sta. 881+00 Ahead As-built Plans Project No. BRF-F-65-2(3)- -2P-59 = Survey Sta. 881+00 (survey contains no station equation)
As built stationing back =Survey stationing + 105.84 ft.
As built stationing ahead = Survey stationing

PI Sta. 895+58.00 As-built Plans Project No. BRF-F-65-2(3)- -2P-59
=Survey PI Sta. 895+58.00

Equation Sta. 898+24.2 Back= Sta. 900+94.0 Ahead As-built Plans Project No. BRF-F-65-2(3)- -2P-59 = Survey Sta. 898+24.2 (survey contains no station equation)
As built stationing Back = Survey stationing
As built stationing ahead =Survey stationing + 269.8 ft.

PI Sta 939+11.00 Project No. BRF-F-65-2(3)- -2P-59
Survey PI Sta. 936+43.00
As built stationing = Survey stationing + 268.0 ft.

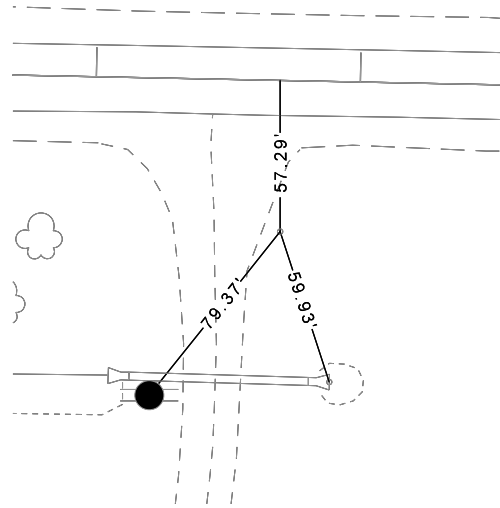
VERTICAL CONTROL

Point	North	East	Elevation	Station	Offset	Feature	Description
502	372842.9790	1650999.5400	890.9180	Off Chain	Off Chain	BM502	BM 502 FOUND IDOT BUTTON NW WING POST BRIDGE OVER WHITE BREST CREEK HIGHWAY 65 S BM 502
504	373937.6490	1649854.0720	883.6630	Off Chain	Off Chain	BM504	BM 504 FOUND IDOT INLET HDWL 12.00 X 4.00 RCB BM 504
505	374314.7510	1649048.7380	922.0440	Off Chain	Off Chain	BM505	BM 505 FOUND IDOT BUTTON SW WING POST BRIDGE OVER RR BM 505
503	374914.3540	1654163.5370	883.1520	861+57.88	-41.0391	BM503	BM 503 FOUND IDOT BUTTON INLET HDWL 12.0 X 6.0 RCB BM 503
500	376003.9950	1659480.6970	884.5470	916+68.46	14.7671	BM500	BM 500 FOUND IDOT BUTTON SW HAND RAIL BRIDGE OVER WHITE BREAST CREEK BM 500
501	375896.0920	1661725.8350	880.5790	939+24.57	15.5664	BM501	BM 501 FOUND IDOT BUTTON SW HAND RAIL BRIDGE OVER SMALL NATURAL STREAM BM 501

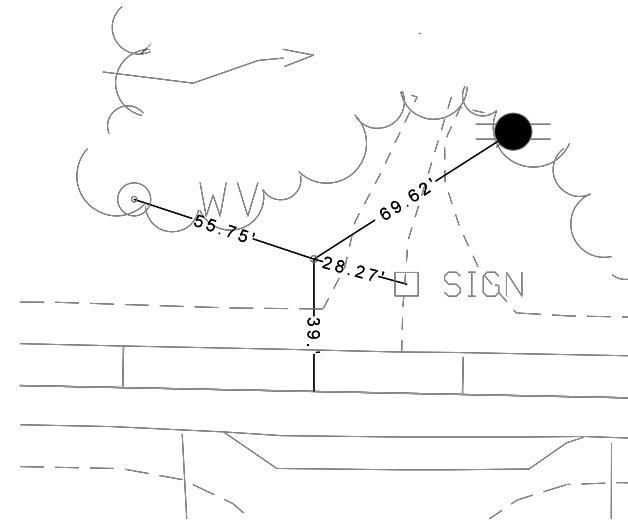
CP STA OFF CHAIN
CP 59001, Set Feno Type Monument
N=373961.67, E=1651086.24, ELEV. 880.54

MONUMENT MAY BE LOCATED BY
STAKING OUT COORDINATE

CP STA 901+70.80, 57 FT RT
CP 300, Set 5/8 RE-ROD
N=375991.87, E=1657982.48, ELEV. 874.11



CP STA 925+55.47, 39 FT LT
CP 301, Set 5/8 RE-ROD
N=376039.75, E=1660368.62, ELEV. 876.27



CP STA 959+22.10, 96 FT LT
CP 59003, Set Feno Type Monument
N=375527.71, E=1663692.30, ELEV. 970.70

MONUMENT MAY BE LOCATED BY
STAKING OUT STATION/OFFSET
OR BY COORDINATE

ALIGNMENT COORDINATES

101-16
10-20-09

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	
			Y (Northing)	X (Easting)		Y (Northing)	X (Easting)		Y (Northing)	X (Easting)		Y (Northing)	X (Easting)		Y (Northing)	X (Easting)
MLO34 (US 34)																
MLO34_1		857+60.42	374,737.30	1,653,805.34												
MLO34_3						892+85.85	375,966.78	1,657,109.43	895+58.00	376,061.69	1,657,364.49	898+23.69	376,056.17	1,657,636.58		
MLO34_6						935+15.93	375,981.29	1,661,328.06	936+43.04	375,978.71	1,661,455.13	937+69.10	375,948.35	1,661,578.56		
MLO34_8		967+10.27	375,245.81	1,664,434.59												
DET1 (DETOUR)																
DET1_1						0+00.00	375,972.52	1,661,168.68	1+90.02	375,968.67	1,661,358.65	3+75.55	375,895.40	1,661,533.98		
DET1_2						3+75.55	375,895.40	1,661,533.98	4+53.03	375,865.53	1,661,605.46	5+30.19	375,847.02	1,661,680.69		
DET1_5						6+70.19	375,813.58	1,661,816.64	7+95.67	375,783.61	1,661,938.48	9+19.84	375,784.67	1,662,063.95		
DET1_6						9+19.84	375,784.67	1,662,063.95	10+45.31	375,785.73	1,662,189.42	11+69.49	375,755.76	1,662,311.27		

SPIRAL OR CIRCULAR CURVE DATA

101-17
04-19-11

Name	Location	Δ_{scs}	Horizontal Alignment Data												Remarks		
			Spiral Data						Curve Data								
			θ_s	L_s	T_s	E_s	X_c	Y_c	L.T.	S.T.	Δ_c	T	L	R		E	
MLO34_3								892+85.85	375,966.78	1,657,109.43	895+58.00	376,061.69	1,657,364.49	898+23.69	376,056.17	1,657,636.58	
MLO34_6								935+15.93	375,981.29	1,661,328.06	936+43.04	375,978.71	1,661,455.13	937+69.10	375,948.35	1,661,578.56	
DET1_1								0+00.00	375,972.52	1,661,168.68	1+90.02	375,968.67	1,661,358.65	3+75.55	375,895.40	1,661,533.98	
DET1_2								3+75.55	375,895.40	1,661,533.98	4+53.03	375,865.53	1,661,605.46	5+30.19	375,847.02	1,661,680.69	
DET1_5								6+70.19	375,813.58	1,661,816.64	7+95.67	375,783.61	1,661,938.48	9+19.84	375,784.67	1,662,063.95	
DET1_6								9+19.84	375,784.67	1,662,063.95	10+45.31	375,785.73	1,662,189.42	11+69.49	375,755.76	1,662,311.27	

108-26A
08-01-08

STAGING NOTES

Stage 1:
Construct runaround using shoulder closure per TC-202

Stage 2:
Close US 34.
Move traffic to runaround per TC-252
Replace bridge and approaches.

Stage 3:
Return traffic to US 34 new pavement.
Use TC-202 to remove runaround and place granular shoulders.

108-23A
08-01-08

TRAFFIC CONTROL PLAN

1) Traffic on U.S. 34 will be maintained at all times during construction with a paved on-site detour.

108-25
10-21-14

511 TRAVEL RESTRICTIONS

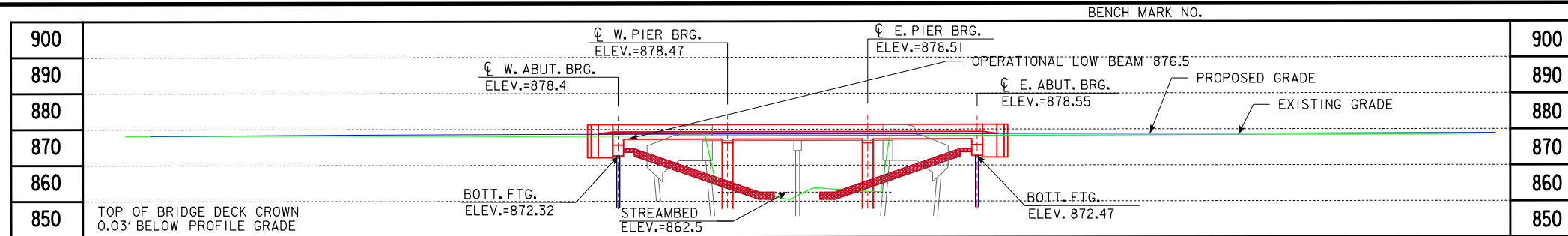
Route	Direction	County	Location Description	Feature Crossed	Object Type	Maint. Bridge No., Structure ID, or FHWA No.	Type of Restriction	Existing Measurement	Construction Measurement	Construction Measurement as Signed	Projected As Built Measurement	Remarks
			No Travel Restrictions Expected									

111-01
04-17-12

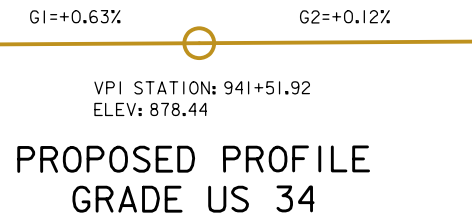
COORDINATED OPERATIONS

Other work in progress during the same period of time will include the construction of the projects listed. Coordinate operations with those of other contractors working within the same area.

Project	Type of Work
None Provided	



LONGITUDINAL SECTION ALONG ϕ APPROACH ROADWAY



HYDRAULIC DATA

DRAINAGE AREA = 12.7 SQ. MI.
 STREAM SLOPE = 22.6 FT./MI.
 AVG. LOW WATER STAGE = ????.?

*NOTE: OVERFLOW FROM WHITE BREAST CREEK OCCURS AT < Q₅ EVENTS

[USE IF Q₅₀ IS THE DESIGN EVENT]

Q₅₀ = 6,400 CFS
 STAGE = ????.?
 REGULATORY LOW BEAM = ????.?
 BACKWATER = ?? FT.
 AVG. BRIDGE VELOCITY = ?? FPS

[USE IF Q₁₀₀ IS THE DESIGN EVENT]

Q₁₀₀ = 7,777 CFS
 STAGE = ????.?
 OPERATIONAL LOW BEAM = ????.?
 BACKWATER = ?? FT.
 AVG. BRIDGE VELOCITY = ?? FPS

Q₂₀₀ = 7,777 CFS
 STAGE = ????.?
 CALCULATED DESIGN SCOUR = ????.?

[USE IF Q₁₀₀ INUNDATES PART OF THE SUPERSTRUCTURE]
 [USE FOLLOWING WHEN Q₅₀₀ DOES NOT OVERTOP]

Q₅₀₀ = 7,777 CFS
 STAGE = ????.?
 AVG. BRIDGE VELOCITY = ?? FPS
 CALCULATED CHECK SCOUR = ????.?

ROADWAY OVERTOP ????.?
 STA. ???+??

NOTE: ROW BASEDD ON IDOT SHP FILES

UTILITIES LEGEND:

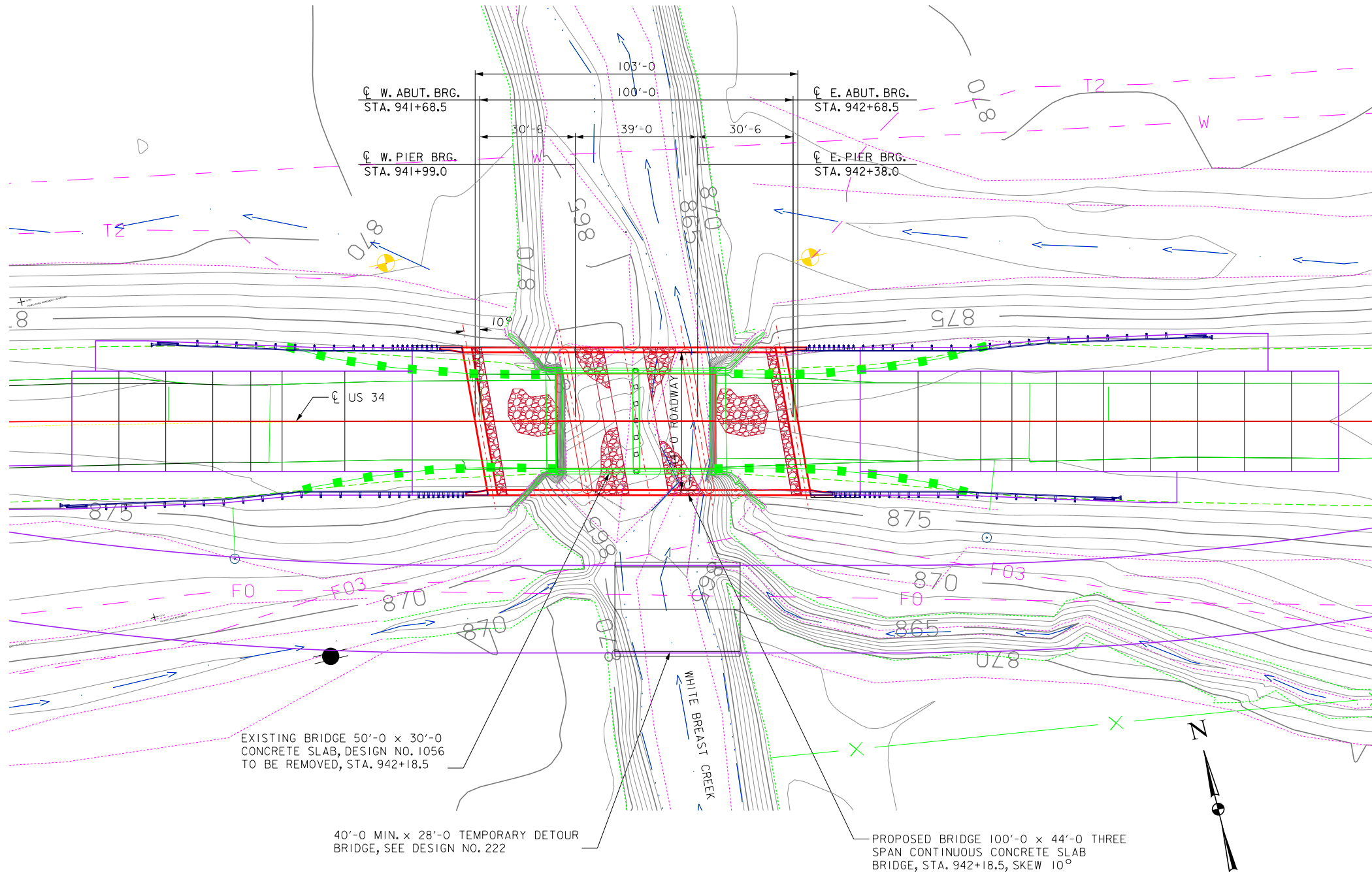
- FO - FIBER - CHAT MOBILITY
- T1- TELE - WINDSTREAM
- F03- FIBER - ICN
- F02- FIBER - QWEST
- T02-TELE - QWEST

LOCATION

US34 BRIDGE 2.IE US65
 T-72N R-22W
 SECTION 17 & 18
 WHITEBREAST TOWNSHIP
 LUCAS COUNTY
 FHWA NO. 34260
 BRIDGE MAINT. NO. 5934.85034
 LATITUDE 41.031744°
 LONGITUDE -93.422639°

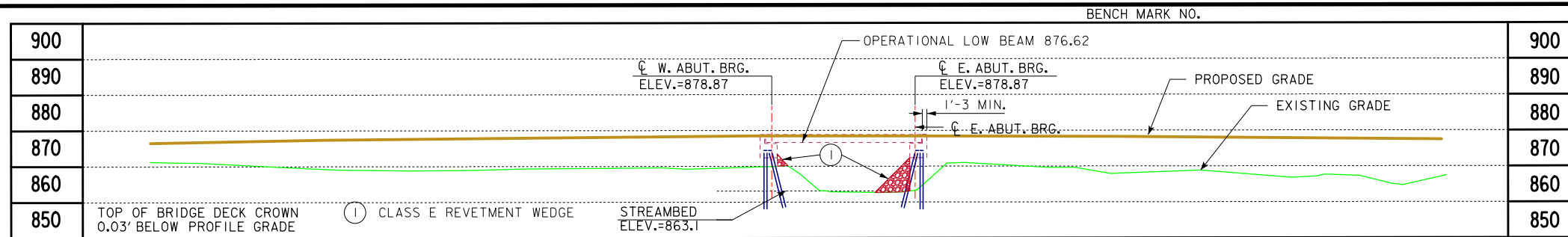
TRAFFIC ESTIMATE

2017 AADT	3300	V.P.D.
2037 AADT	3400	V.P.D.
2037 DHV	350	V.P.H.
TRUCKS	18	%
TOTAL DESIGN ESALS		



SITUATION PLAN

DESIGN FOR 10° SKEW (R.A.)
100'-0 X 44'-0 CONTINUOUS CONCRETE SLAB BRIDGE
 30'-6, 30'-6 END SPANS 39'-0 INTERIOR SPAN
SITUATION PLAN
 STA. 942+18.5 JUNE, 2019
LUCAS COUNTY
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
 DESIGN SHEET NO. ___ OF ? FILE NO. 31695 DESIGN NO. 122



LONGITUDINAL SECTION ALONG CL APPROACH ROADWAY

G2=+0.0%

VPI STATION: 5+08.53
VPI STATION: 6+90.19
ELEV: 878.88

PROPOSED PROFILE GRADE DETOUR

HYDRAULIC DATA

DRAINAGE AREA = 12.7 SQ. MI.
STREAM SLOPE = 22.6 FT./MI.
AVG. LOW WATER STAGE = ????.?

*NOTE: OVERFLOW FROM WHITE BREAST CREEK OCCURS AT < Q₅ EVENTS

[USE IF Q₅₀ IS THE DESIGN EVENT]

Q₅₀ = 6,400 CFS
STAGE = ????.?
REGULATORY LOW BEAM = ????.?
BACKWATER = ?? FT.
AVG. BRIDGE VELOCITY = ?? FPS

[USE IF Q₁₀₀ IS THE DESIGN EVENT]

Q₁₀₀ = 7,777 CFS
STAGE = ????.?
OPERATIONAL LOW BEAM = ????.?
BACKWATER = ?? FT.
AVG. BRIDGE VELOCITY = ?? FPS

Q₂₀₀ = 7,777 CFS
STAGE = ????.?
CALCULATED DESIGN SCOUR = ????.?

[USE IF Q₁₀₀ INUNDATES PART OF THE SUPERSTRUCTURE]
[USE FOLLOWING WHEN Q₅₀₀ DOES NOT OVERTOP]

Q₅₀₀ = 7,777 CFS
STAGE = ????.?
AVG. BRIDGE VELOCITY = ?? FPS
CALCULATED CHECK SCOUR = ????.?

ROADWAY OVERTOP ????.?
STA. ???+??

NOTE: ROW BASEDD ON IDOT SHP FILES

UTILITIES LEGEND:

- F0 - FIBER - CHAT MOBILITY
- T1 - TELE - WINDSTREAM
- F03 - FIBER - ICN
- F02 - FIBER - QWEST
- T02 - TELE - QWEST

LOCATION

US34 BRIDGE 2.1E US65
T-72N R-22W
SECTION 17 & 18
WHITEBREAST TOWNSHIP
LUCAS COUNTY
FHWA NO. 34260
BRIDGE MAINT. NO. 5934.85034
LATITUDE 41.031744°
LONGITUDE -93.422639°

TRAFFIC ESTIMATE

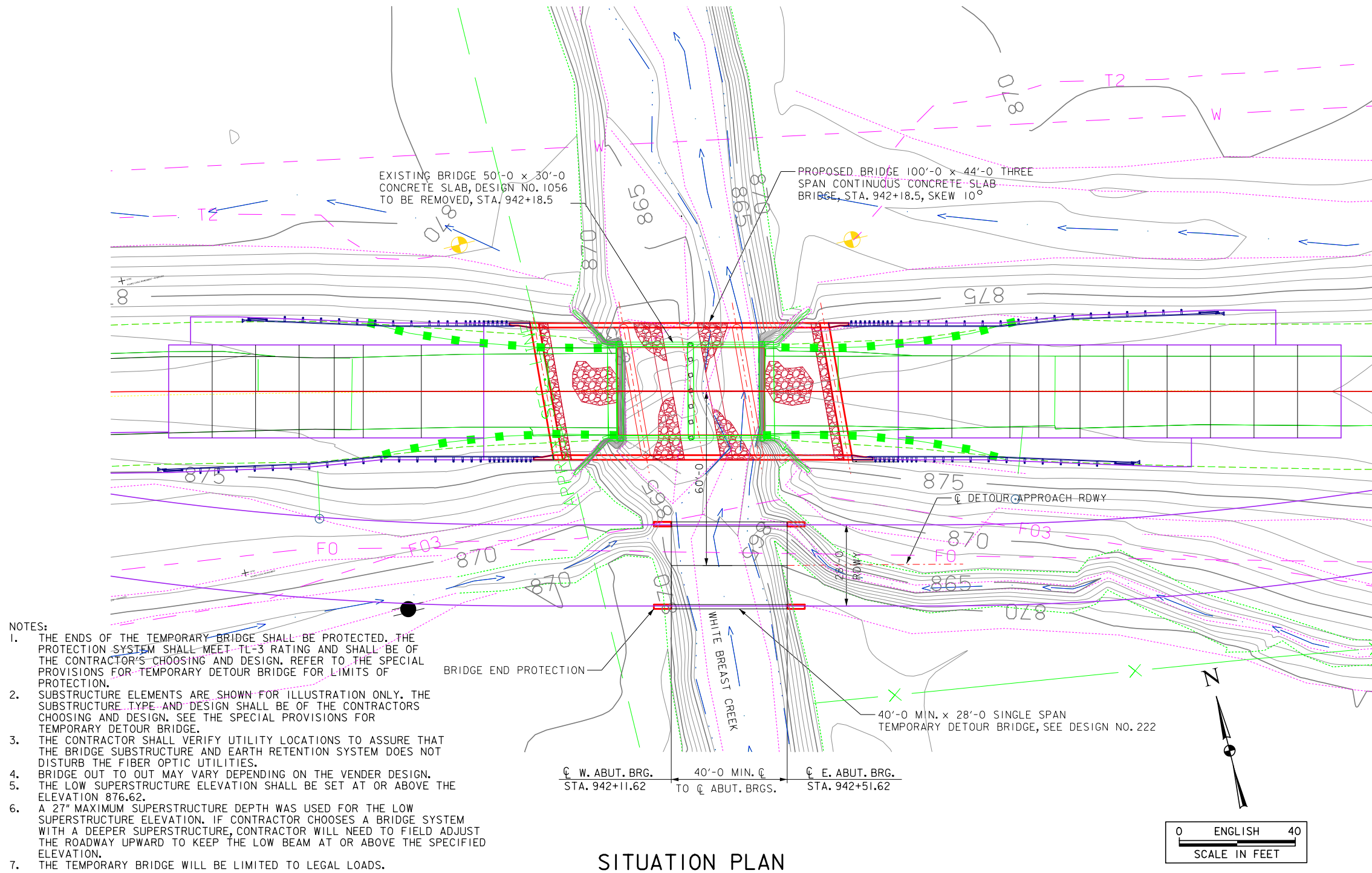
Year	ADT	V.P.D.
2017	3300	V.P.D.
2037	3400	V.P.D.
2037	350	V.P.H.
	18	%
TOTAL		DESIGN ESALS

DESIGN FOR 0° SKEW
**40'-0" MIN. X 28'-0" STEEL
TEMPORARY ON-SITE DETOUR BRIDGE**
40'-0" MIN. SINGLE SPAN

SITUATION PLAN
LUCAS COUNTY

STA. 942+31.62
JUNE, 2019

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. ___ OF ? FILE NO. 31695 DESIGN NO. 222



- NOTES:
1. THE ENDS OF THE TEMPORARY BRIDGE SHALL BE PROTECTED. THE PROTECTION SYSTEM SHALL MEET TL-3 RATING AND SHALL BE OF THE CONTRACTOR'S CHOOSING AND DESIGN. REFER TO THE SPECIAL PROVISIONS FOR TEMPORARY DETOUR BRIDGE FOR LIMITS OF PROTECTION.
 2. SUBSTRUCTURE ELEMENTS ARE SHOWN FOR ILLUSTRATION ONLY. THE SUBSTRUCTURE TYPE AND DESIGN SHALL BE OF THE CONTRACTOR'S CHOOSING AND DESIGN. SEE THE SPECIAL PROVISIONS FOR TEMPORARY DETOUR BRIDGE.
 3. THE CONTRACTOR SHALL VERIFY UTILITY LOCATIONS TO ASSURE THAT THE BRIDGE SUBSTRUCTURE AND EARTH RETENTION SYSTEM DOES NOT DISTURB THE FIBER OPTIC UTILITIES.
 4. BRIDGE OUT TO OUT MAY VARY DEPENDING ON THE VENDER DESIGN.
 5. THE LOW SUPERSTRUCTURE ELEVATION SHALL BE SET AT OR ABOVE THE ELEVATION 876.62.
 6. A 27" MAXIMUM SUPERSTRUCTURE DEPTH WAS USED FOR THE LOW SUPERSTRUCTURE ELEVATION. IF CONTRACTOR CHOOSES A BRIDGE SYSTEM WITH A DEEPER SUPERSTRUCTURE, CONTRACTOR WILL NEED TO FIELD ADJUST THE ROADWAY UPWARD TO KEEP THE LOW BEAM AT OR ABOVE THE SPECIFIED ELEVATION.
 7. THE TEMPORARY BRIDGE WILL BE LIMITED TO LEGAL LOADS.

SITUATION PLAN



LINE STYLE LEGEND OF CROSS SECTION SHEETS (ROAD)

- - - - - - Existing Ground Line
- Proposed Template
- Proposed Topsoil Placement
- - - - - Additional Topsoil Removal
- Subgrade Treatment
- - - - - Granular Shoulder
- Pavement
- - - - - Existing Pipe\RCB
- Proposed Pipe\RCB
- Proposed Dike
- All Elements Associated with Proposed Entrances

LINE STYLE LEGEND OF CROSS SECTION SHEETS (SOILS)

- TS————— Topsoil (Class 10)
- SLOPE DRESSING — Slope Dressing Only
- CL 10————— Class 10 Materials
- SEL L0————— Select Loams And Clay-Loams
- SEL SA————— Select Sand
- UNS A————— Unsuitable Type A Disposal
- UNS B————— Unsuitable Type B Disposal
- UNS C————— Unsuitable Type C Disposal
- SHALE————— Shale
- WASTE————— Waste
- B&W LS————— Broken and Weathered Rock
- ROCK————— Solid Rock
- Boulders

Note: All layer lines and descriptions identify layers above the line.

Note: Vertical or near vertical lines connecting soil layers at edges of cross sections are only for the purpose of calculating template quantities and do not depict soil stratification.

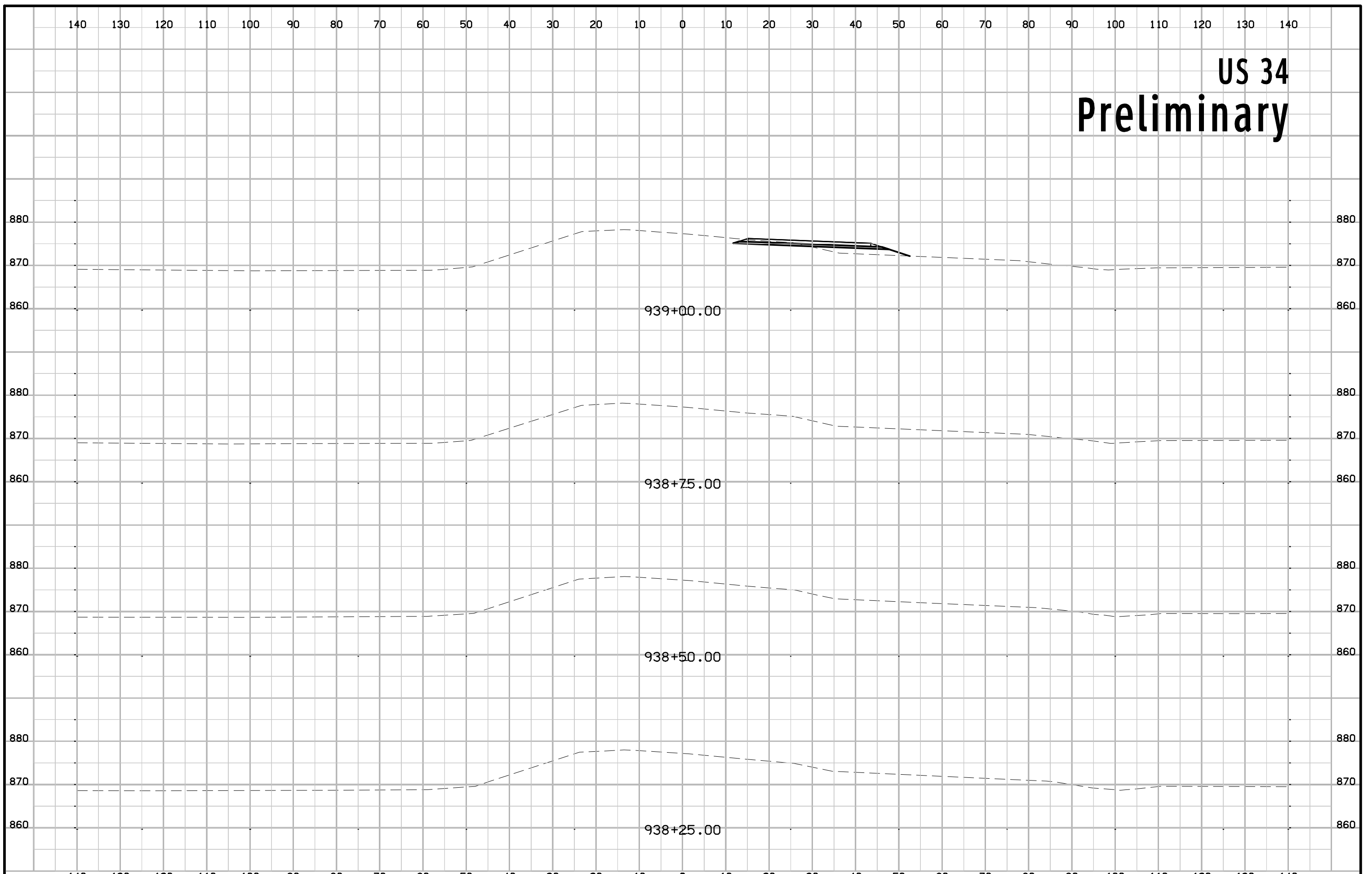
SYMBOL LEGEND OF CROSS SECTION SHEETS

- Existing ROW
|
Existing Right-of-Way Limit
- Proposed ROW
|
Proposed Right-of-Way Limit
- Temporary ROW
|
Temporary Right-of-Way Limit

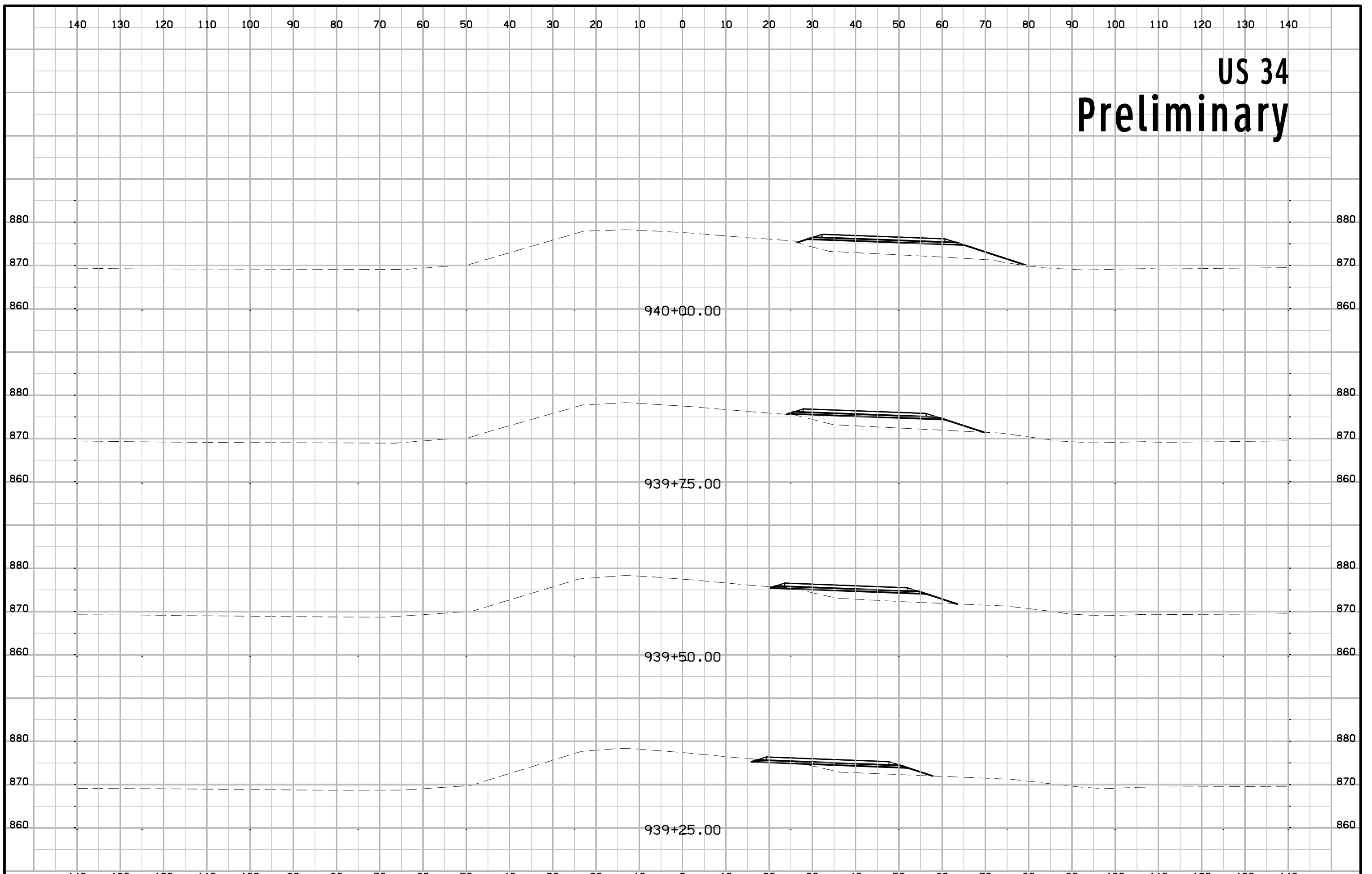
**CROSS SECTION
LEGEND AND SYMBOL
INFORMATION SHEET**

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

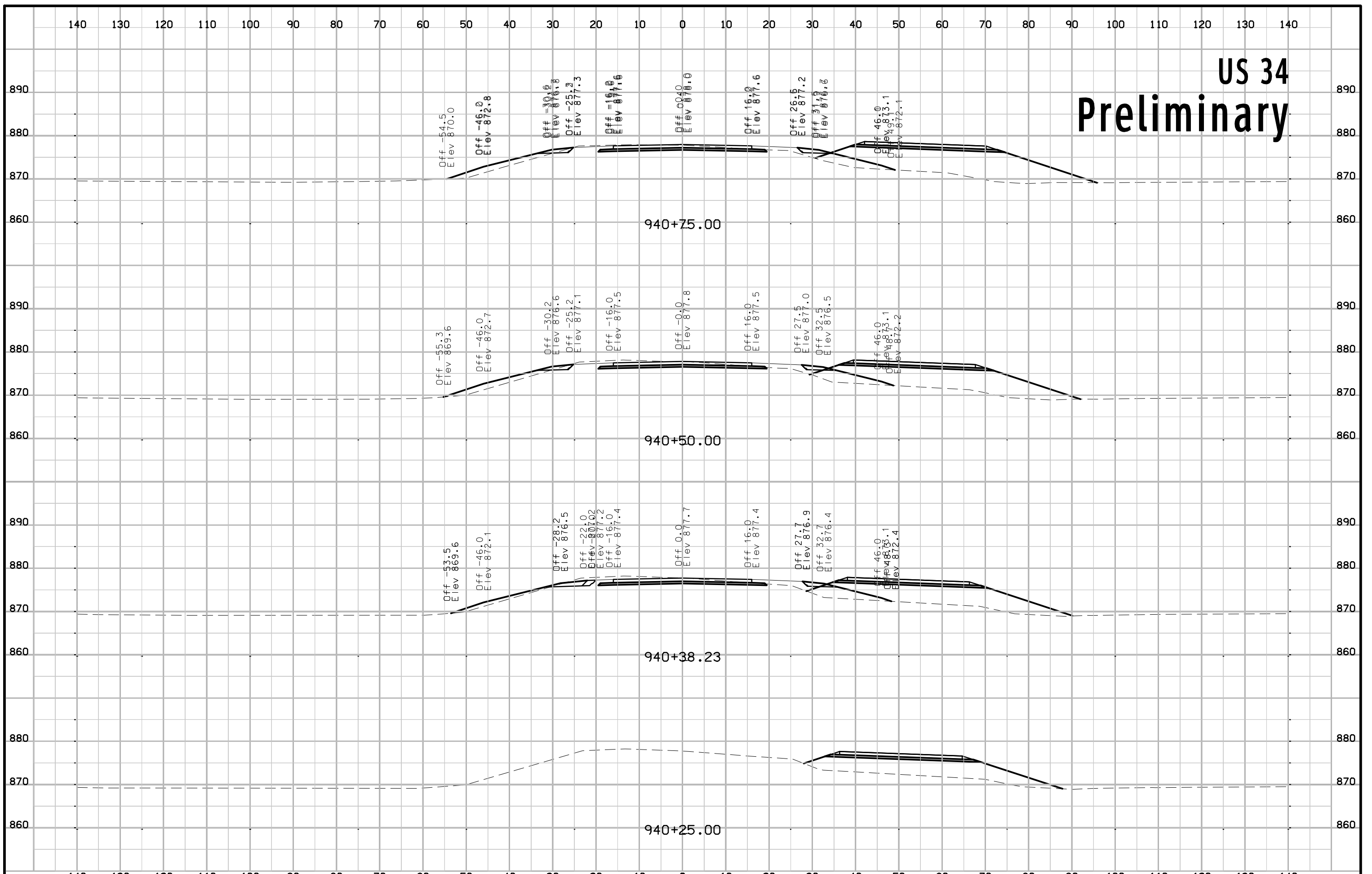
US 34 Preliminary

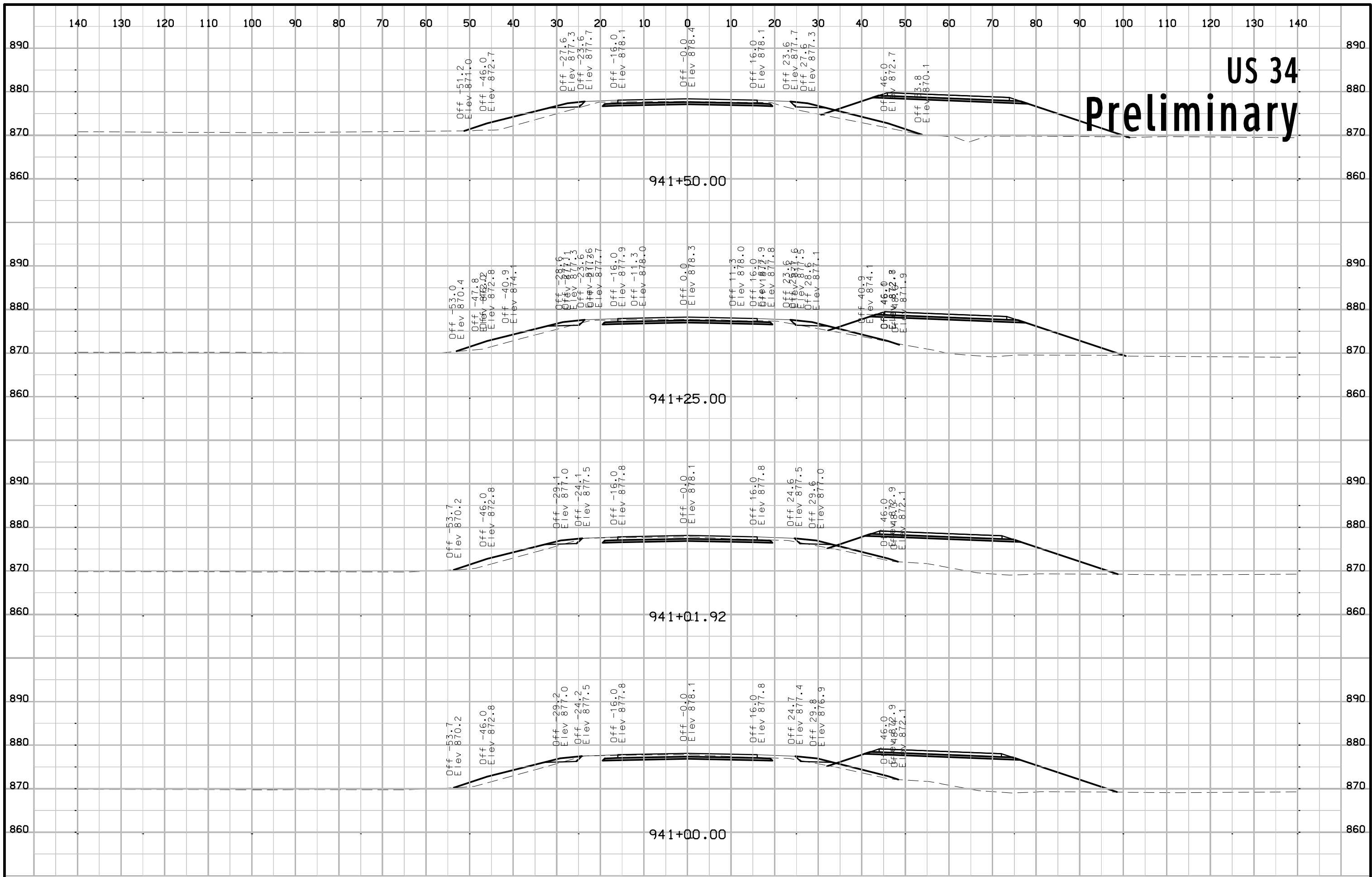


US 34 Preliminary

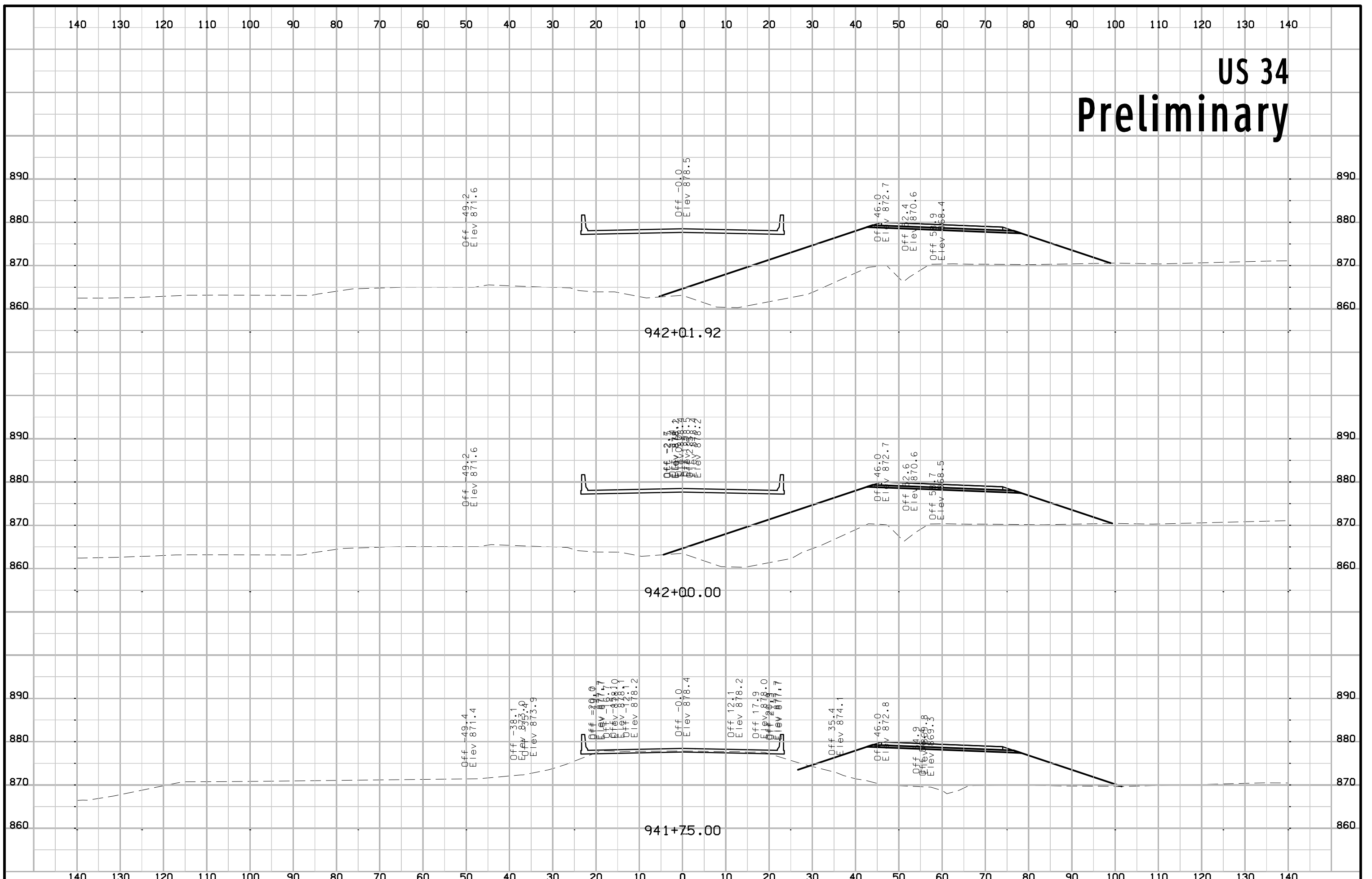


US 34 Preliminary

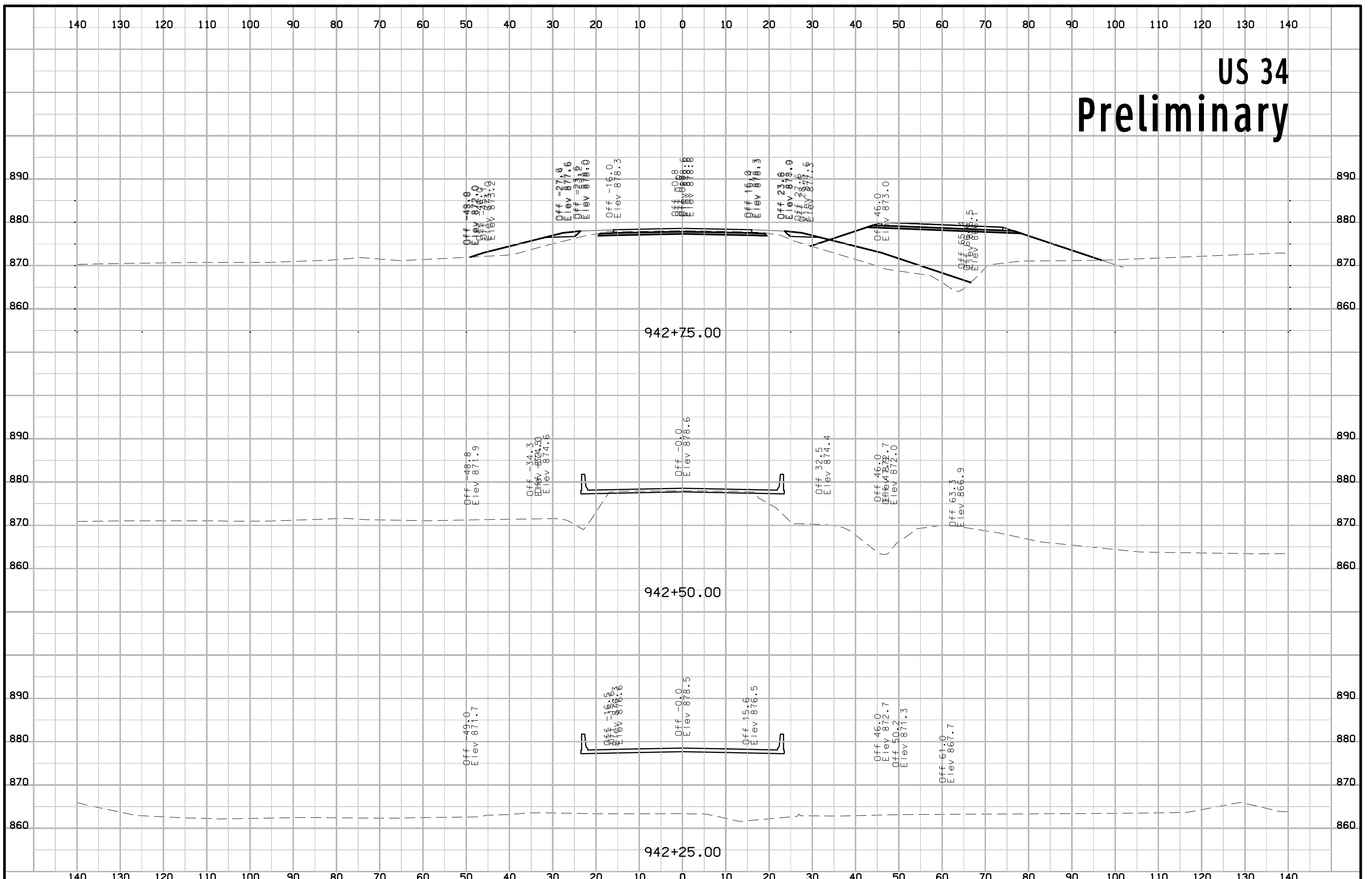




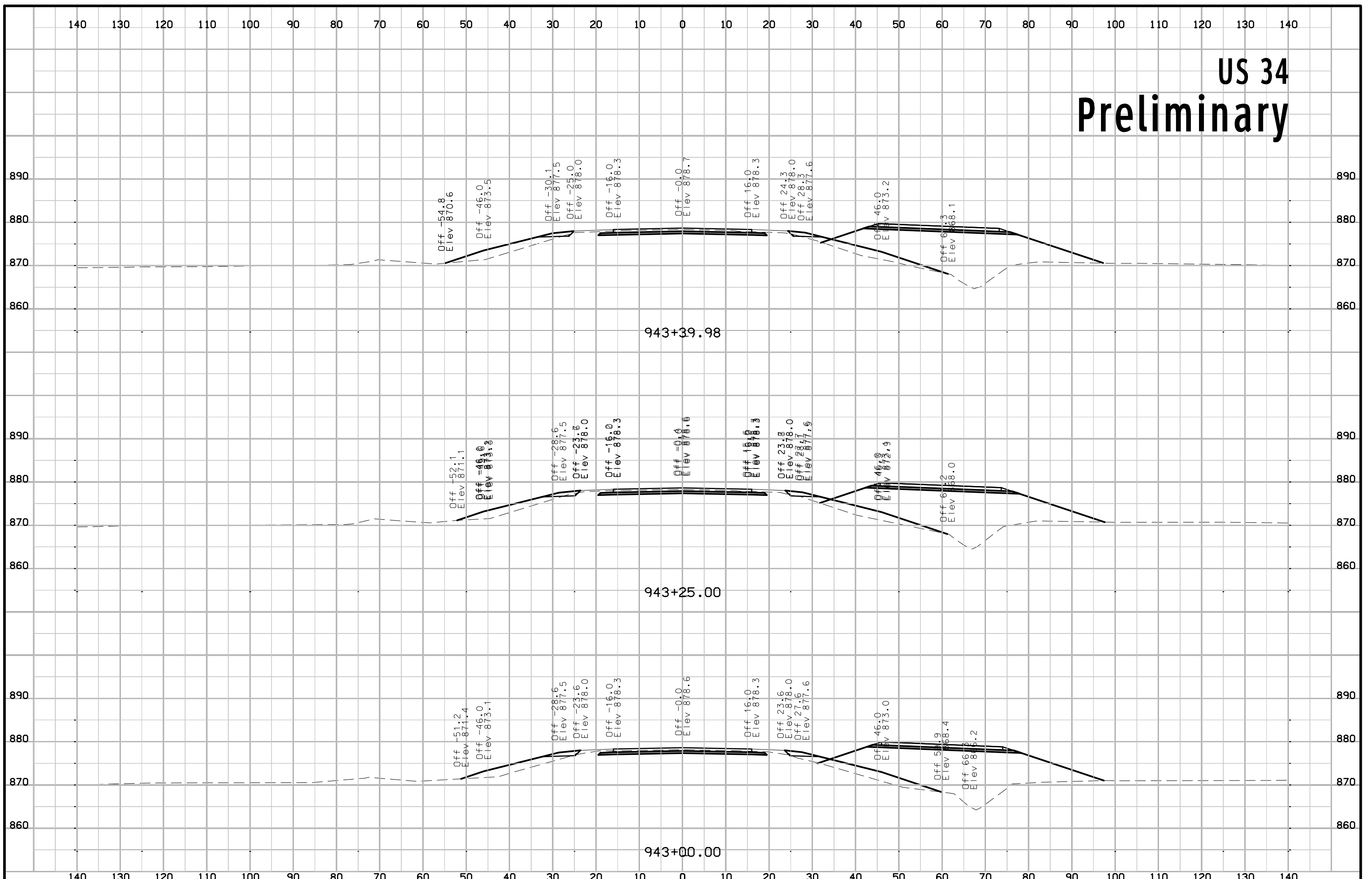
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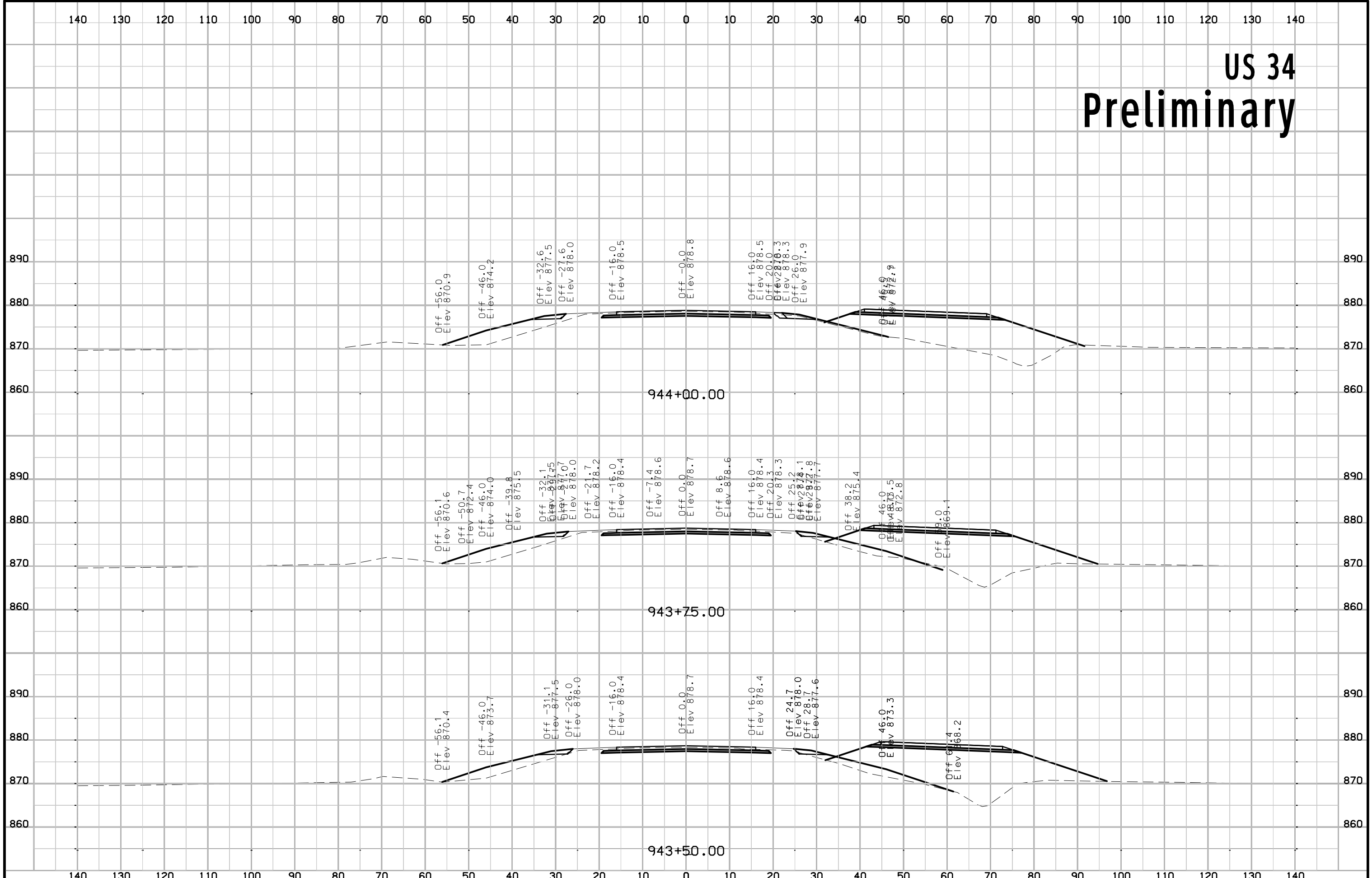
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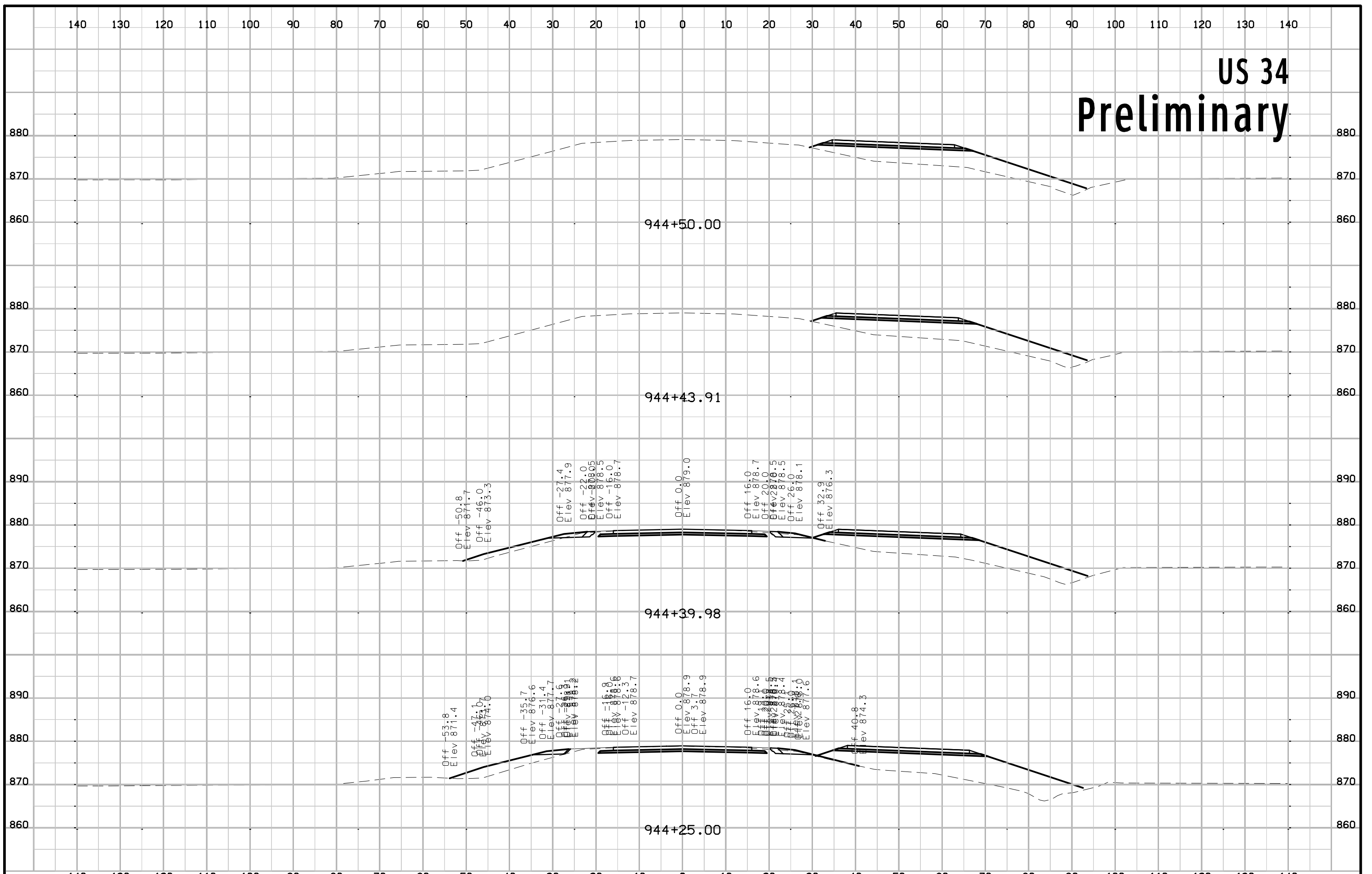
US 34 Preliminary



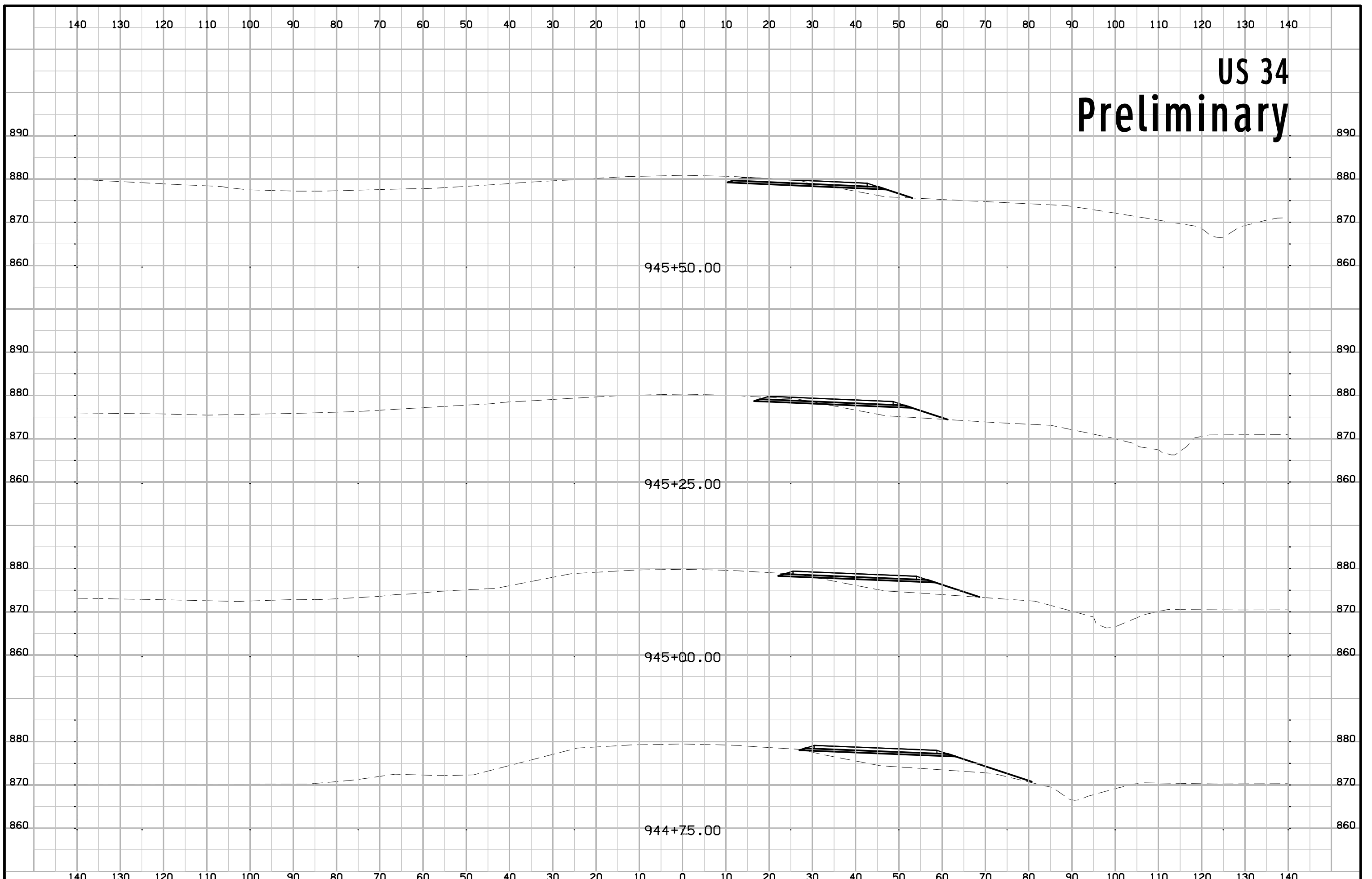
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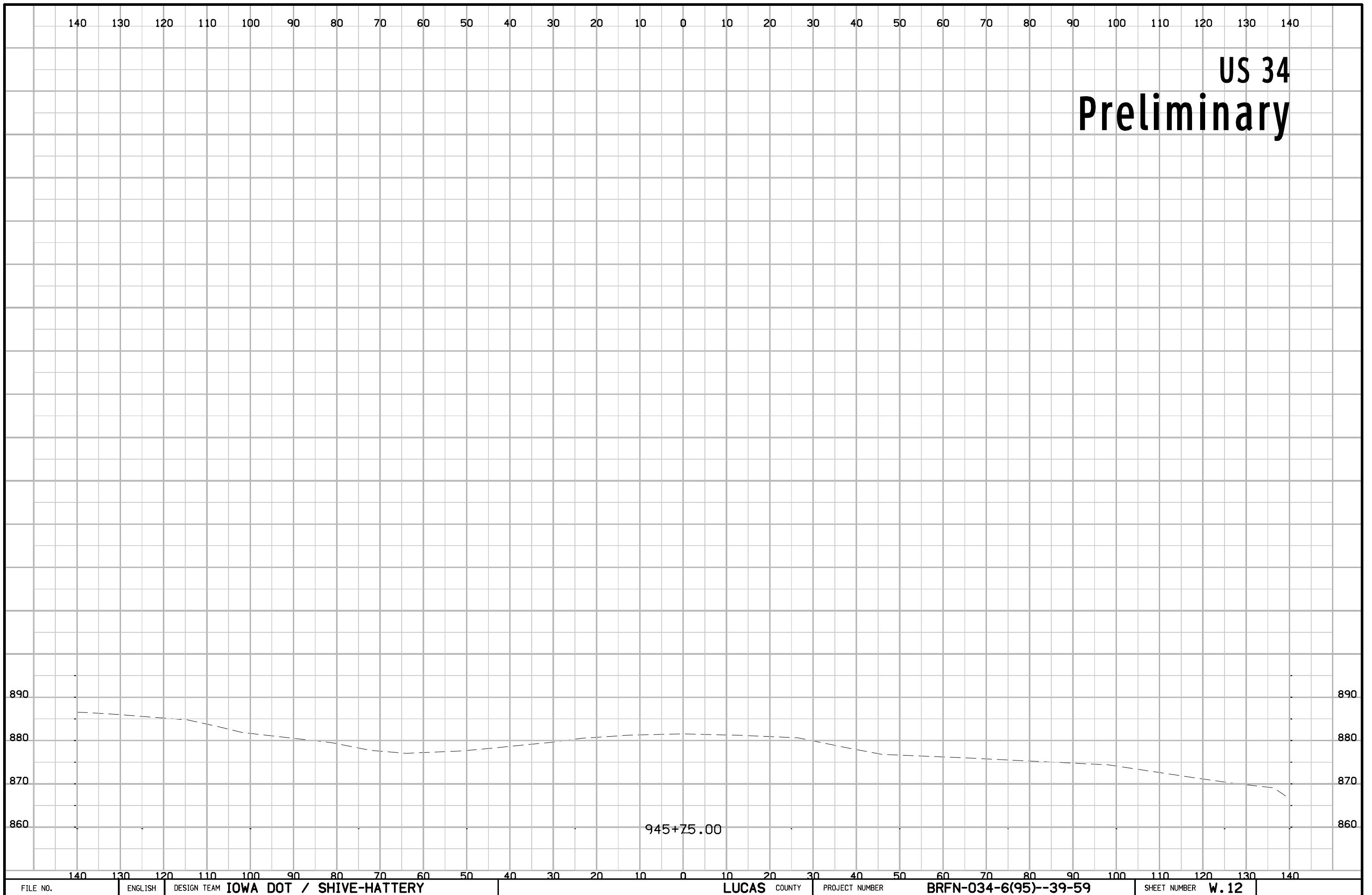
US 34 Preliminary



US 34 Preliminary



US 34 Preliminary



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