

IOWA DEPARTMENT OF TRANSPORTATION

TO OFFICE:	District 5	DATE:	September 22, 2015
ATTENTION:	Jim Armstrong	REF. :	Lucas County BRF-34-6(79)--38-59
FROM:	Kevin K. Patel		PIN: 13-59-034-010
OFFICE:	Design		
SUBJECT:	Field Exam		

A field exam was held on Thursday, September 3, 2015 to review the proposed plan for replacing a bridge on U.S. 34 over White Breast Creek, 1.6 miles east of east junction with U.S. 65.

Those present for the field exam included the following: Mark Van Dyke and Jim Webb from District 5; Patricia Schwarz from the Office of Bridges and Structures; Tami Quam from the Office of Location and Environment; and Jason Holst, Jean Borton and Kevin Patel from the Office of Design.

U.S. 34 is functionally classified as a commercial and industrial route and is a maintenance service level "B" roadway. The 2017 and 2037 ADT is estimated to be 3,300 vpd and 3,400 vpd respectively with 18% trucks. The existing bridge has a sufficiency rating of 36.

The proposed project will remove the existing 250 ft. x 32 ft. steel beam bridge and replace it with a 268 ft. x 44 ft. pretensioned prestressed concrete beam bridge. The proposed roadway typical section is a 28 ft. wide pavement with 8 ft. shoulders and 6:1/3:1 foreslopes. The limits of mainline reconstruction will be limited to the new bridge and the adjacent bridge approach sections. It was requested to compare the proposed 6:1/3:1 foreslopes with 4:1 foreslopes to see if the footprint would be reduced.

Traffic on U.S. 34 will be maintained via a two-lane, on-site runaround placed on the south side of the roadway. It was recommended to review shifting the runaround in closer to the mainline roadway to minimize impacts to the existing ditches and the adjacent utility lines. The shift in the runaround alignment would also shorten the length of the runaround and therefore provide more separation from the intersection with 167th Ave. at the east end of the project.

The runaround will consist of a 28 ft. wide pavement (stripped to provide 11 ft. wide lanes with 3 ft. paved shoulders) and 3:1 foreslopes. The length of the runaround will be approximately 1400 ft. After the runaround is no longer required, a saw cut will be made to allow 4' of the runaround to remain in place to become the 4' paved shoulder. Six foot wide granular shoulders will be placed adjacent to the paved shoulders.

A 200 ft. x 30 ft. temporary modular truss bridge will be used on the runaround to span over White Breast Creek. This bridge will be rented by the contractor. It was recommended to review how the guardrail would attach to the bridge rail.

Rip-rap was recently placed under and adjacent to the White Breast Creek Bridge. It was recommended that this rip-rap be removed and placed under the temporary bridge. This rip-rap will then be salvaged and placed under the new bridge.

The existing guardrail will be removed and new guardrail will be installed. The District will determine if the existing guardrail should be salvaged or become property of the contractor.

It appears that no permanent or temporary right of way will be required; however, this will need to be verified.

No plans are included in this submittal; however, the field exam plan with comments may be viewed as PDF files at: `pw:\projectwise.dot.int.lan:PWMain\Documents\Projects\5903401013\Design\D2Submittal\D2_59034079_Plan.pdf`

This project is currently scheduled for a December 2016 letting. The concept cost estimate for this project was \$3,293,800. The current cost estimate is now approximately \$3,532,500 (\$2,837,800 for bridge items and \$694,700 for roadway items). The 2016-2020 Iowa Highway Program shows \$15,000 for right of way in 2016, and \$1,540,000 for bridge replacement and \$300,000 for wetland mitigation in FY 2017.

Machine Guidance Electronic Files Checklist

Add information to address any incomplete items below:

Yes	N/A	No	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Horizontal and Vertical Alignments Complete
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Typical Templates showing proposed Pavement, Shoulder, Foreslope design
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Correct Feature Naming for Roadway Breaklines and Components

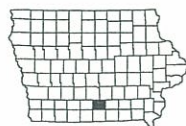
KKP:

cc: M. J. Sankey	S. J. Gent	M. J. Kennerly
D. A. Widick	W.A. Sorenson	D. L. Maifield
M. Van Dyke	E.C. Wright	B. R. Smith
J. Holst	T. Quam	J. P. Rost
K. D. Nicholson	K. Brink	J. E. Laaser-Webb
T. Crouch	V. A. Brewer	D. R. Tebben
M. D. Masteller	D. Matulac	M. A. Swenson
C. B. Brakke	D.E. Sprengeler	N. L. McDonald
D. A. Popp	B. Bradley	G. A. Novey
D. R. Claman	J. McCollough	S. P. Anderson
B. Hofer	M. Hobbs (RR)	S. Sommers
J. Webb	E. Engle (RR)	J. Borton
B. Clancy	P.C. Keen	P. Schwarz
J. R. Schoenrock	Local FHWA	W. N. Cameron
J. Garton	N. L. Cuva	T. Hamski
K. Clute	C. Richardson	T. Bowman
B. Kimble	S. Ryan	

BRIDGE APPROACH REPAIR
BRF-034-6(79)--38-59

LETTING DATE
 12-20-2016

LUCAS CO.



Highway Division

PLANS OF PROPOSED IMPROVEMENT ON THE

PRIMARY ROAD SYSTEM

LUCAS COUNTY

BRIDGE APPROACH REPAIR Replacement

White Brest Creek 1.6 mi E of E Jct 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.



Jim Webb
Mark Van Dyke } *District 5*

Jason Holst
Jean Borton
Kevin Patel } *Design*

Tammy Quam - OLE

Patricia Schwarz - Prelim Bridge

REVISIONS

TOTAL

PROJECT IDENTIFICATION NUMBER	13-59-034-010
PROJECT NUMBER	BRF-034-6(79)--38-59
R.O.W. PROJECT NUMBER	NHSN-34-6(80)--2R-59

INDEX OF SHEETS

No.	DESCRIPTION
A Sheets	Title Sheets
A.1	Title Sheet
A.2	Field Exam Questions
A.3 - 11	Final Concept and Design Criteria
B Sheets	Typical Cross Sections and Details
B.1 - 3	Typical Cross Sections and Details
D Sheets	Mainline Plan and Profile Sheets
* D.1	Plan & Profile Legend & Symbol Information Sheet
* D.2	U.S. 34
F Sheets	Detour or Temporary Pavement Sheets
* F.1	Detour Plan and Profile Sheets
G Sheets	Survey Sheets
G.1	Reference Ties and Bench Marks
G.2	Horizontal Control Tab. & Super for all Alignments
J Sheets	Traffic Control and Staging Sheets
V Sheets	Bridge and Culvert Situation Plans
V.1 - 2	Bridge Situation Plans
W Sheets	Mainline Cross Sections
W.1 - 7	US 34 Cross Sections
W.8 - 17	Detour Cross Sections
	* Color Plan Sheets

KID
9-18-15

BT PLAN - Date: 12-18-2015

D5 PLAN - Date: 12-31-2015

D4 PLAN - Date: 8-23-2016

P3 - Date:

DESIGN DATA RURAL

2017	AADT	3,300	V.P.D.
2037	AADT	3,400	V.P.D.
20--	DHV	--	V.P.H.
TRUCKS		18	%
Total			
Design	ESALs	--	

INDEX OF SEALS

SHEET NO.	NAME	TYPE
A.1	X	Primary Signature Block
X	X	X

PRELIMINARY PLANS

Subject to change by final design.

D2 PLAN - Date: 9-3-2015

Clearing and Grubbing by area or unit?
If by unit, need District to provide count.

Area

Is the location of 167th Ave. with respect
to detour going to work?

*Yes, unless safety problem
arise during construction*

Tile Lines other than those noted in the plans?

No

Note any special features not shown on plans.

Revetment

Note condition of existing culverts.

NA

Note existing guardrail lengths and number of posts.

Requested

Do any of the utilities need to be relocated
(power/telephone poles)? Permanently or temporarily?

Yes

Disposition of the existing structure, guardrail, signs, etc.?
213-1 or the District Office?

To be determined

Are there any historical items within the project?

No ?

Are there any endangered species in the area?

*Bat habitat
(not been evaluated)*

Are there any wetland impacts or any other
environmental issues?

Wetland impacts.

Is sight distance a problem?

No

Are there existing drainage problems?

No

FINAL PROJECT CONCEPT STATEMENT

U.S. 34 Bridge over White Breast Creek,
1.6 miles east of U.S. 65

Lucas County
BRF-034-6(79)--38-59
PIN: 13-59-034-010
Maint. No.5934.4S034
FHWA No. 34250

Highway Division
Office of Design

Kevin K. Patel, P.E.
515-239-1540

July 10, 2015

Lucas County
BRF-034-6(79)--38-59
PIN: 13-59-034-010
Page 2

B. Need for Project

Extensive cracks were found at the top and bottom of the deck as well as the reinforced concrete bridge railing and substructures. The structural analysis indicates a marginal adequacy of this bridge for two lane legal loads due to the deterioration of the remodeled substructure. Deck replacement in conjunction with substructure strengthening would not be cost-benefit effective; therefore, it is recommended the bridge should be replaced.



Looking West

Looking East

I. STUDY AREA

A. Project Description

This project involves the replacement of the U.S. 34 bridge (Maint. No 5934.4S034) over White Breast Creek, 1.6 miles east of U.S. 65.

The two alternatives considered were:

1. Replace with a new bridge using traditional construction methods. A two lane on-site runaround will be used to maintain traffic. Total cost is estimated to be \$3,293,800.
2. Replace with a new bridge utilizing accelerated bridge construction (ABC) methods at a total cost of \$3,335,500. The total out of distance user cost for the detour is anticipated to be \$441,000 for the 21 day duration of the detour.

Alternative 1 is the preferred alternative due to minimizing inconvenience to the traveling public that would incur with a 37.4 mile out of distance travel using the off-site detour. The Office of Bridge and Structure also prefers using a pretensioned, prestressed concrete beam bridge rather than a rolled steel beam bridge, (that would be used in the ABC) due to the potential for frequent flooding at this location.

C. Present Facility

The existing structure is a 251' x 28' steel beam bridge which was constructed in 1921 and reconstructed in 1954. The deck was overlaid in 1977.

U.S 34 in the project area is 24 ft. wide PCC pavement with 10 ft. wide granular shoulders and 3:1 foreslopes, constructed in 1957. HMA resurfacing was accomplished in 1975 and 1985.

D. Traffic Estimates

The 2017 and 2037 average daily traffic estimates are 3,300 ADT with 18% trucks and 3,400 ADT with 18% trucks, respectively.

E. Sufficiency Ratings

U.S. 34 is classified as a commercial and industrial route and is a maintenance service level "B" road. The federal bridge sufficiency rating is 36.4.

F. Access Control

Access rights will not be acquired for this project.

G. Crash History

During the five-year study period from January 1, 2009 through December 31, 2013 there were no crashes involving or near the bridge

II. PROJECT CONCEPT

A. Feasible Alternatives

Alternative #1 - Replace with a new bridge on existing alignment, using a two-lane on-site runaround.

The existing 251' x 28' steel beam bridge will be replaced with a 253' x 44' pretensioned prestressed concrete beam bridge.

The typical cross section adjacent to the bridge consists of a 24 ft. roadway (28 ft. wide pavement) with 10 ft. effective shoulders (2 ft. outside pavement and 8 ft. granular) and 6:1/3:1 foreslopes.

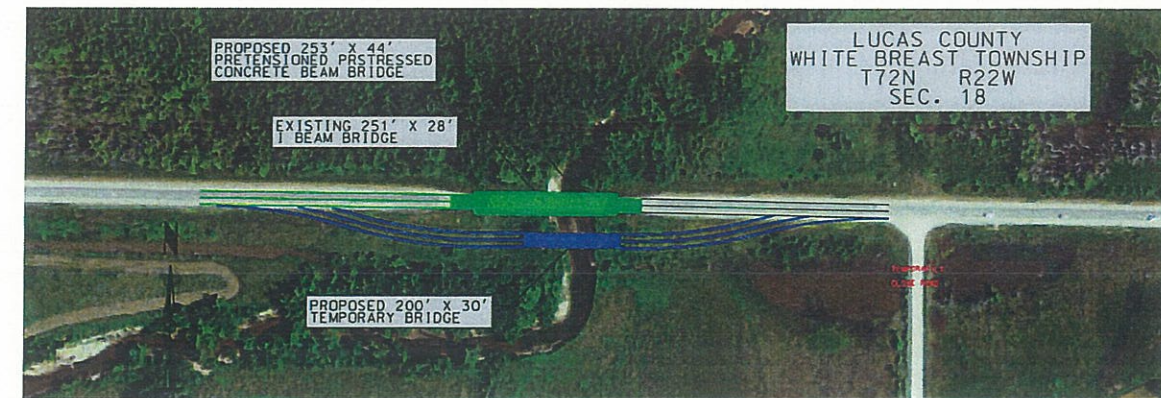
The new bridge will be replaced on the existing horizontal and vertical alignment. The reconstruction on the mainline roadway will not extend beyond the ends of the new bridge approach sections.

The existing guardrail will be removed and replaced new guardrail. The shoulders will be paved 20 ft. beyond the ends of the guardrail. Class 10 will be necessary to flatten the existing foreslopes and to construct the new guardrail blisters. Place class E revetment for slope protection under the bridge. Construct two bridge end drains on each end of the bridge.

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

Temporary easement may be required for the construction of the on-site detour with this project.

Traffic will be maintained by an on-site detour. The on-site detour consists of a 24 ft. wide pavement with 3 ft. wide paved shoulders and 3:1 foreslopes. The length of the detour will be approximately 880 ft. long and will be constructed approximately 80 ft. south of the existing mainline roadway. A 200' x 30' temporary bridge will be required to span over White Breast Creek. This will be an ACROW style temporary bridge and will be rented.



Bridge Items	<u>Estimated Costs</u>
New Bridge	\$ 1,207,300
Bridge Removal	59,200
Revetment	99,000
Coffer Dams	50,000
Mobilization - 10%	141,600
Subtotal	1,557,100
M & C - 20%	311,400
Bridge Costs	\$ 1,868,500

Roadway Items	
Bridge Approaches	\$88,800
Removal of Pavement	3,800
Class 13 waste	2,300
New Guardrail and Removal	23,300
Paved Shoulders for Guardrail	18,400
Class 10 for Guardrail Blisters	11,800
Seeding and Fertilizing	1,200
Erosion Control	5,000
Wetland Mitigation	50,000
Temporary Floodlighting	7,400
Right of Way	10,000
On-site Detour	199,800
Detour Bridge	575,000
Traffic Control - 5%	49,800
Mobilization - 5%	49,800
Sub-total	1,096,400
M & C - 30%	328,900
Roadway Total	\$ 1,425,300

Alternate #1, Project Total **\$ 3,293,800**

Alternative #2 - Replace with a new bridge on existing alignment, using the lateral slide accelerated bridge construction technique and an off-site detour.

The existing 251' x 28', steel beam bridge will be replaced with a 280' x 44' rolled steel beam bridge on the existing alignment utilizing accelerated bridge construction (ABC), specifically the lateral slide method.

The first phase of construction will construct the drilled shafts for the new bridge piers outside the footprint of the existing bridge. The temporary foundations will be constructed south of the existing bridge and the new bridge superstructure will be constructed on the temporary foundations.

In the second phase traffic will be detoured off-site. The existing bridge will be removed, allowing the remainder of the piers and abutments to be built. The new bridge superstructure will then be slid onto the new piers. The new bridge approaches and guardrail will then be installed. Traffic will be maintained by an off-site detour for a maximum of 21 days during the second stage.

The typical cross section adjacent to the bridge consists of a 24 ft. roadway (28 ft. wide pavement) with 10 ft. effective shoulders and 6:1/3:1 foreslopes. The reconstruction on the mainline roadway will not extend beyond the ends of the new bridge approach section.

The existing guardrail will be removed and replaced new guardrail. The shoulders will be paved 20 ft. beyond the ends of the guardrail. Class 10 will be necessary to flatten the existing foreslopes and to construct the new guardrail blisters. Place class E revetment for slope protection under the bridge. Construct two bridge end drains on each end of the bridge.

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

Temporary easement may be required south of the roadway for the construction of the temporary bridge foundations and to provide working room for the contractor.

Bridge Items	<u>Estimated Costs</u>
New Bridge	\$ 2,102,000
Bridge Removal	84,600
Revetment	99,000
Mobilization - 10%	<u>228,600</u>
Subtotal	2,514,200
M & C - 20%	<u>502,900</u>
Bridge Costs	\$ 3,017,100

Roadway Items

Bridge Approaches	\$88,800
Removal of Pavement	4,200
Class 13 waste	2,600
New Guardrail and Removal	23,300
Paved Shoulders for Guardrail	18,400
Class 10 for Guardrail Blisters	11,800
Seeding and Fertilizing	1,200
Erosion Control	5,000
Wetland Mitigation	50,000
Temporary Floodlighting	7,400
Right of Way	10,000
Traffic Control - 5%	11,100
Mobilization - 5%	<u>11,100</u>
Sub-total	244,900
M & C - 30%	<u>73,500</u>
Roadway Total	\$ 318,400

Alternate #2, Project Total \$ 3,335,500

B. Detour Analysis

Alternative 1: Traffic will be maintained by an on-site detour.

Alternative 2: U.S. 34 will be closed and an offsite detour will be utilized. It is anticipated the detour will be in place for approximately 21 days. The detour would follow U.S. 65 south at the south junction of U.S. 34 and U.S. 65 to Iowa 2, then east on Iowa 2 to Iowa 14 then north to the junction of U.S. 34. Out of distance travel is 37.4 miles. Total distance user cost is anticipated to be \$441,000. Detour signing costs will be \$10,000.

C. Recommendations

Although both alternatives appear viable at this location, the Bridge Office recommends the traditional methods of construction shown in Alternative 1, with an on-site detour using a rented temporary bridge. This is based upon the advantage of using pretensioned, prestressed concrete beams (PPCBs) as they are preferred for situations where the beams will be subject to frequent beam inundation. PPCBs are heavier and the Office of Bridge and Structures has less concern relative to buoyant/hydraulic forces and debris floating into the beams. With the proposed concept using the existing roadway profile grade, the bridge low beams will be under water for a 5-10 year flood, and the beams will be completely inundated for a 100 year flood. Therefore venting of the beams is recommended. The Office of Bridge and Structures is also interested in renting the ACROW style temporary bridge system in order to gain experience.

In addition to the Bridge Office's recommendations, Alternative 1 eliminates the 37.4 mile out of distance travel for traveling public. Therefore, alternative 1 is selected as the recommended alternative.

D. Construction Sequence

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

E. Accelerated Bridge Construction (ABC) Analysis

The ABC Rating Score of 45 is less than the first stage filter threshold of 50. This was based on an 18 mile detour shown on the structural inventory appraisal sheet. However, the official off-site detour length is 46 miles and would require 37.4 miles out of distance travel. Due to the out of distance travel greater than 30 miles, and upon District request, an ABC option was considered. Site conditions and project delivery support an ABC alternative based on the District, Design and Office of Bridges and Structures (OBS) evaluation. Therefore, the Concept Team performed the second stage filter evaluation.

The second stage Analytical Hierarchy Process (AHP) was used to compare the ABC lateral slide to more traditional methods. The AHP results slightly preferred the ABC option (0.60) over the traditional alternative (0.40) with on site-detour using the temporary bridge.

F. Special Considerations

A hydraulic study was completed for this project area due to the water overtopping that has occurred approximately 15 times in the past 30 years. Numerous alternatives were considered in this location but due to the high costs they were dismissed by the district.

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

Temporary easement may be required south of the roadway for the construction of the temporary bridge foundations and to provide working room for the contractor.

The Office of Location and Environment has not reviewed this project at this time. Once their review is completed, comments will be incorporated into the final concept statement.

G. Program Status

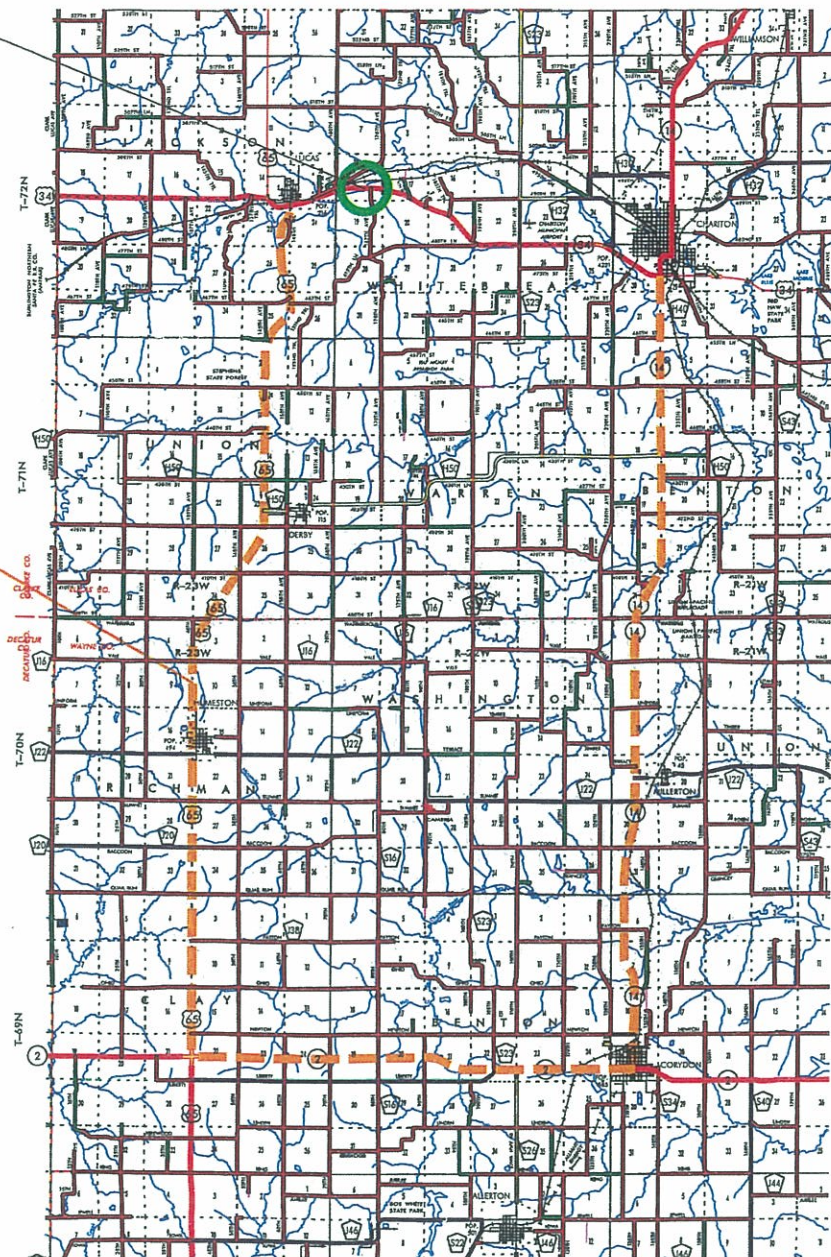
Site data has been developed by the Office of Design. This project is listed in the 2016-2020 Iowa Transportation Improvement Program, with \$15,000 programmed for right of way in FY 2016, and \$1,540,000 for replacement, and \$300,000 for wetland mitigation in FY 2017. Costs for this project may be eligible for bridge replacement funds. A schedule of events will be developed following approval of the Project Concept.

KKP: jmb

LUCAS COUNTY

STA 920+66.80
MAINT. NO. 5934.4S034
DESIGN 856

DETOUR



WAYNE COUNTY

ON U.S. 34, 1.6 MILES EAST OF U.S. 65
WHITE BREAST CREEK
BRF-034-6(79)-38-59
PIN: 13-59-034-010



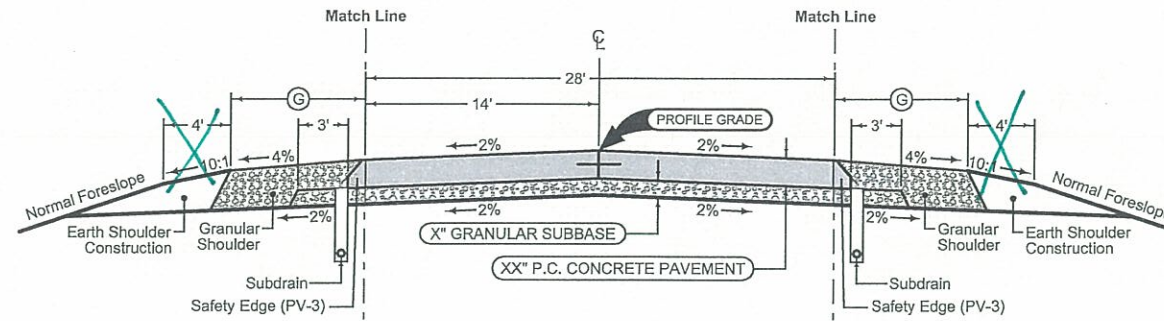
Roadway	U.S. 34		
PIN Number	13-59-034-010	Submittal Date	
Project Number	BRF-034-6(79)--38-59		Approval Date
District	District 5	Assistant District Engineer	
County	Lucas	or	
Route	U.S. 34	Office Director	
Location	Over White Breast Creek, 1.6 miles east of U.S. 65		
Work Type	Bridge Replacement		
Segment Manager			
Designer			

Design Manual Section 1C-1 last update: 08-05-13			
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%	n/a
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	2%	2%
	Auxiliary and turn lanes	3%	n/a
	Crown break at centerline	4%	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	none
	Design speed ≥ 60 mph	4-inch sloped	none
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	6:1
	Beyond standard ditch depth and design clear zone	3.5:1	3:1
	Curbed roadways	2%	n/a
Backslope (For cut areas greater than 25 feet, contact the Soils Design Section for assistance with backslope benches.)	3:1	2.5:1	2.5:1
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	5 x 10
Bridge width—new	Bridge length ≤ 200 ft	design lane widths + effective shoulder widths	n/a
	Bridge length > 200 ft	design lane widths + effective shoulder widths	44
Bridge width—existing	design lane widths + no less than 2 ft left and right	design lane widths + 2 ft. offset left and right	n/a
Vertical clearance (ft) (above lanes, shoulders and 25 feet left and right of the center of railroad tracks)	Over primary	16.5	n/a
	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	-

Roadway Design Speed (mph) =		60														
Design Manual Section 1C-1 last update: 08-05-13		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	n/a	
		$e_{max} = 8\%$	--	--	--	--	--	--	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	300		
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	500	
	sag vertical curves	roadways without fixed source lighting	96	115	136	157	181	206	96	115	136	157	181	206	n/a	
		roadways with fixed-source lighting	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						0.3%	
Maximum gradient (%)	(Refer to Section 2B-1)	Urban roadways	4		3						7	6	6	--	--	--
		Rural roadways	4		3						5	5	4	4	4	4
		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								

Granular Shoulder with Safety Edge

2_G_	
10-21-14	
STATION TO STATION	Ⓞ
	Feet
	8



Granular Shoulder with Safety Edge

2_G_	
10-21-14	
STATION TO STATION	Ⓞ
	Feet
	8

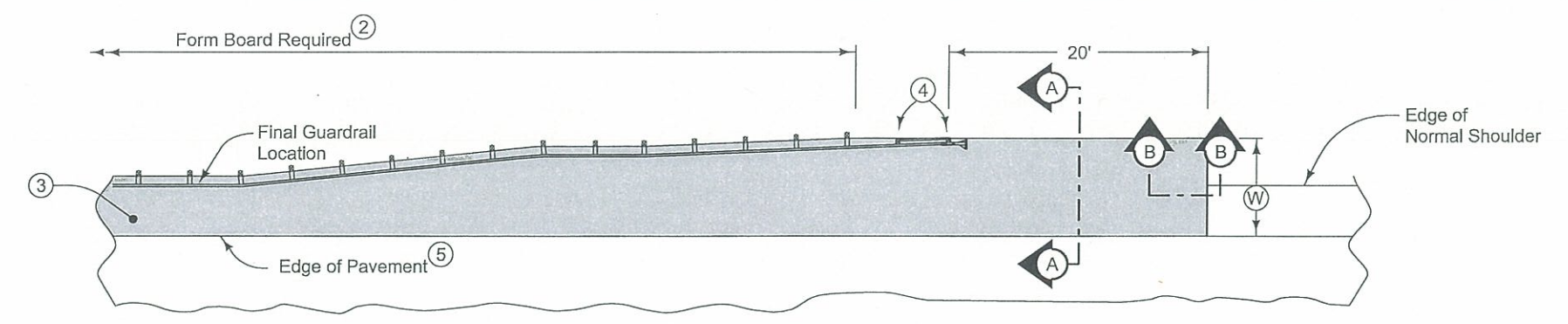
Mainline Jointing:
 Transverse joints: CD at 20' spacing
 Longitudinal joint: L-2

2P_	
10-19-10	
STATION TO STATION	
8	8

4' paved shoulder detail

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

U.S. 34

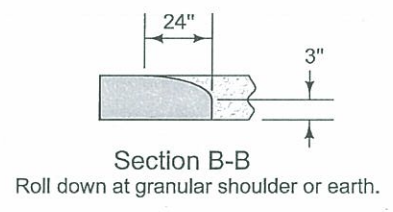
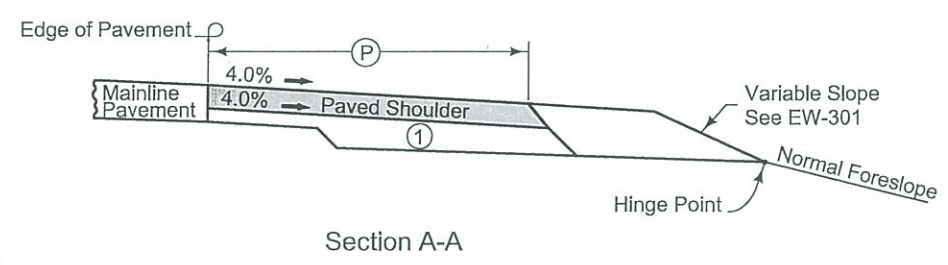
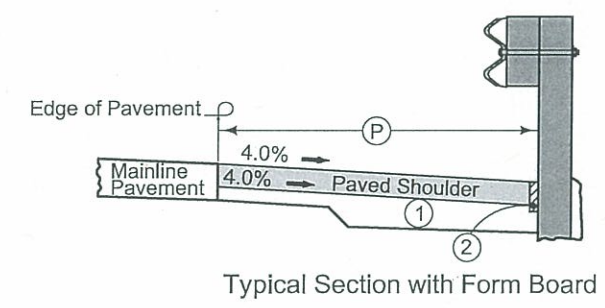


6" HMA Paved Shoulder at guardrail. 7" PCC may be substituted with the following jointing layout:

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 W/2 from edge of mainline pavement when W 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 & reinstallation of guardrail will be allowed with no additional payment.

Refer to Shoulder tabulation (112-9) for quantities.



- ① 6" subgrade treatment.
- ② When guardrail posts are installed prior to construction of paved shoulder, nail 1" x 6" untreated form boards along the face of guardrail posts for the length shown. This board is to prevent shoulder material from contacting the sides of the posts and altering the function of the guardrail. Form board not required for final 2 posts.
- ③ Continue paved shoulder to existing paved shoulder or 20' beyond the end of guardrail.
- ④ Shoulder may be notched for final 2 posts or post sleeves may be installed through pavement.
- ⑤ 'KT-1' joint for PCC shoulder.
'B' joint for HMA shoulder.

PAVED SHOULDER AT GUARDRAIL

SURVEY SYMBOLS

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

UTILITY LEGEND

This is a POINT 25 Project and is subject to the provisions of IAC 761-115.25.

- Iowa Communications Network
Larry Klawitter
400 E 14th Street
Des Moines, IA 50319
515-725-4741
larry.klawitter@iowa.gov
- Chat Mobility
Tom Weis
P.O. Box 289
Emerson, IA 51533
712-829-2800
TOM@135-swt.com
- Alliant Energy
Jason A. Hogan
4902 North Biltmore
Madison, WI 53707-1007
608-458-4871
jasonhogan@alliantenergy.com
- Windstream Communications of Iowa
John Wisse
606 N Godfrey Lane
Knoxville, IA 50138
641-842-2776
john.wisse@iowatelecom.com
- MediaCom
Curt Hodges
3306 E Main Street
Knoxville, IA 50138
641-842-7202
chodges@mediacomcc.com
- Rathbun Regional Water Association, Inc.
Mike Stevens
16166 Highway J29
Centerville, IA 52544-8307
641-647-2416
mstevens@rrwa.net

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

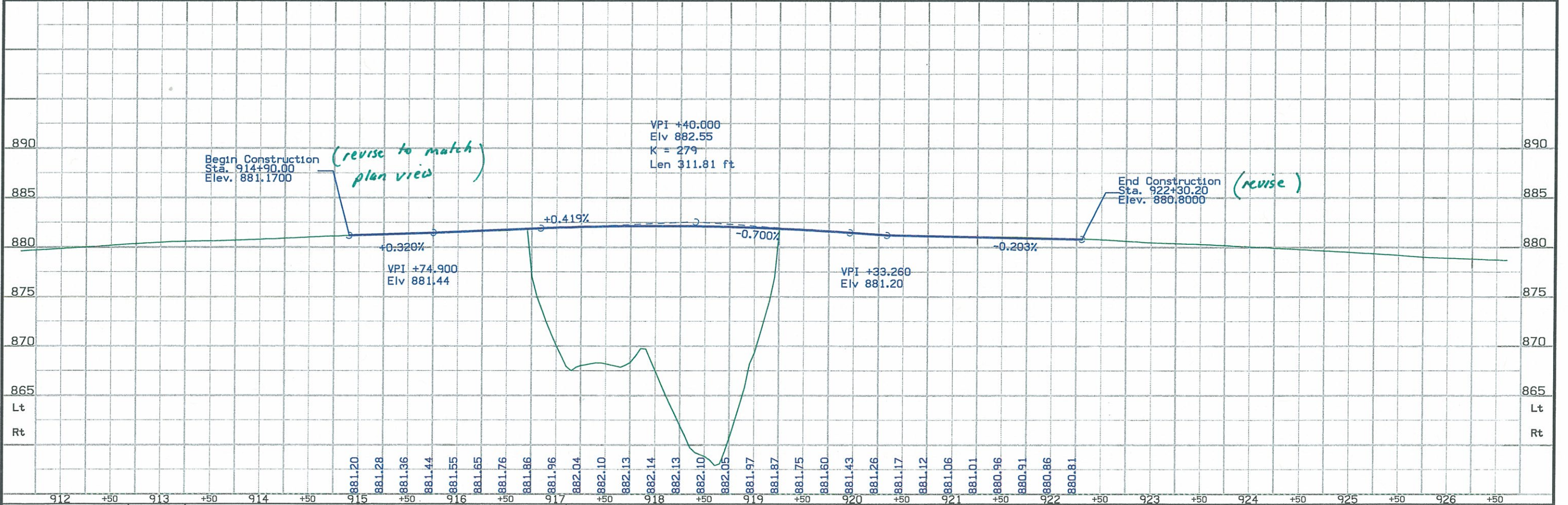
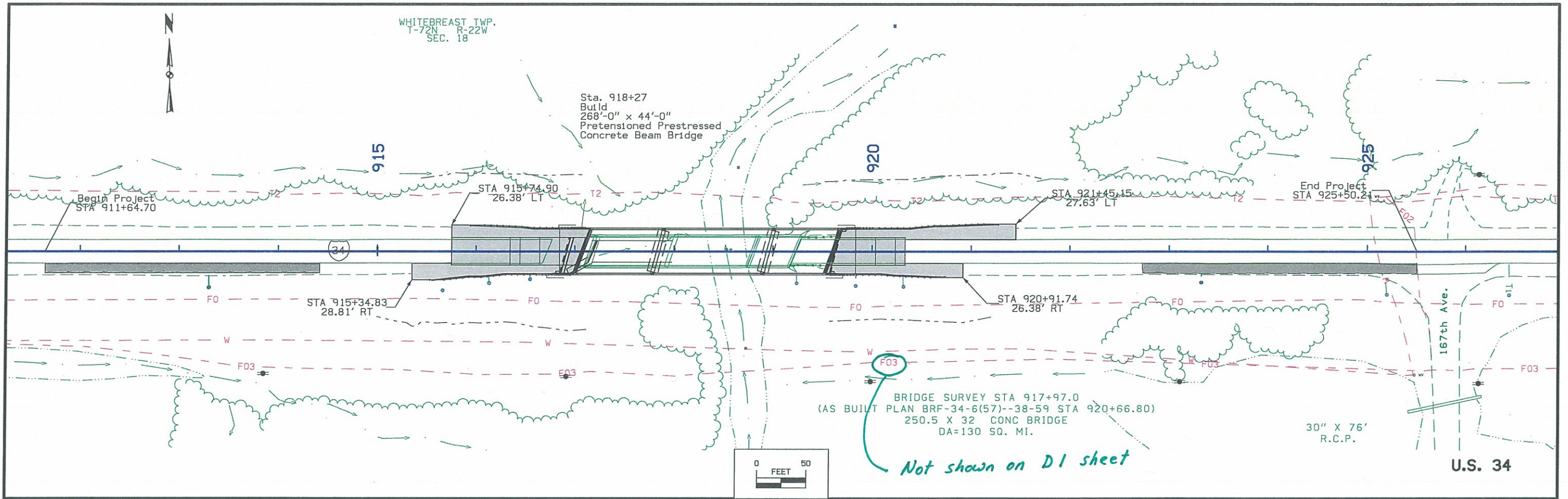
- Reference Point
- Station
- Survey Line
- Section Corner
- Ground Line Intercept
- Saw Cut
- Guardrail
- Trench Drain
- HighTension Cable Guardrail
- Sheet Pile
- Pavement Removal
- Clearing & Grubbing Area

RIGHT-OF-WAY LEGEND

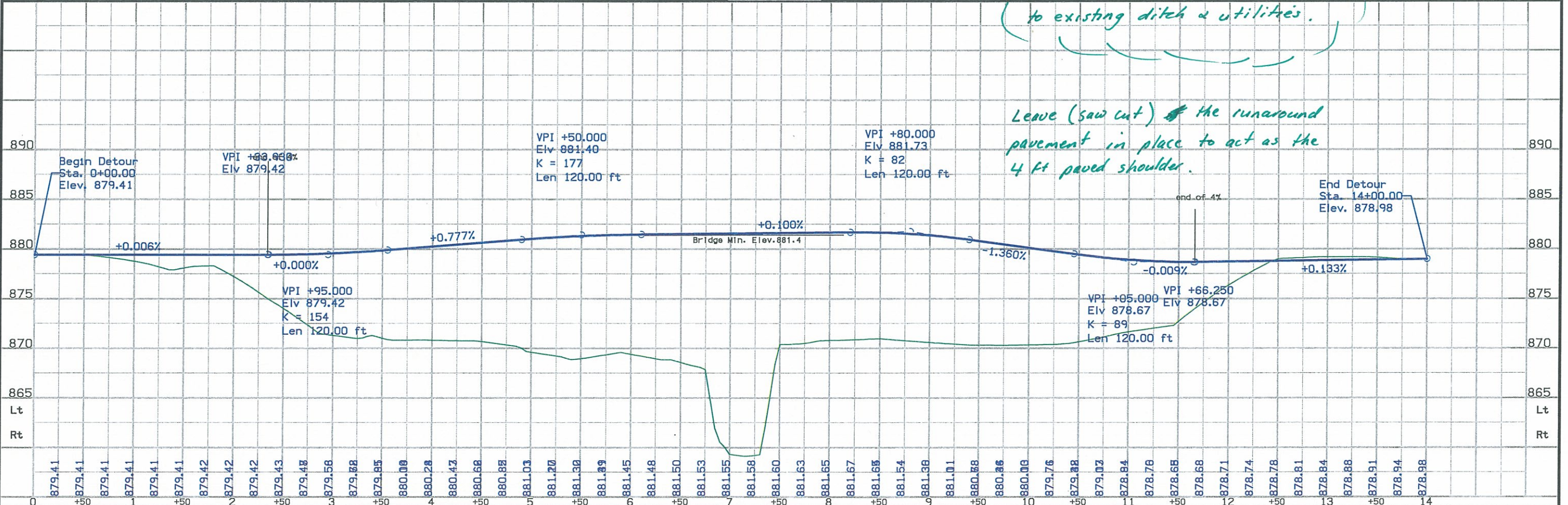
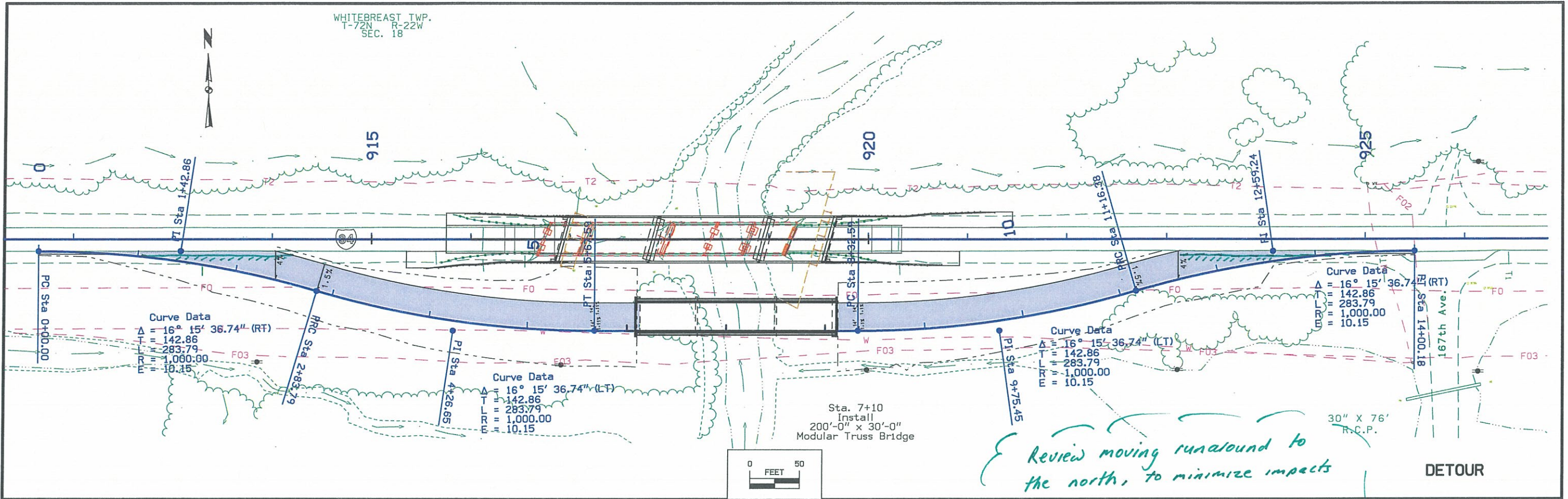
- Proposed Right-of-Way
- Existing Right of Way
- Existing and Proposed Right-of-Way
- Easement and Existing Right-of-Way
- Easement (Temporary)
- Easement
- Access Control
- Property Line

PLAN AND PROFILE LEGEND AND SYMBOL INFORMATION SHEET

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



WHITEBREAST TWP.
T-72N R-22W
SEC. 18



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

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. 593445034) 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 Ellipsoidal Height was computed at project PI. 300, by doing 6 hour static observations. The project control is relative to IARTRM 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 IARTRM 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 equal 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. 938+43.00
As built stationing = Survey stationing + 268.0 ft.

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 on 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.

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

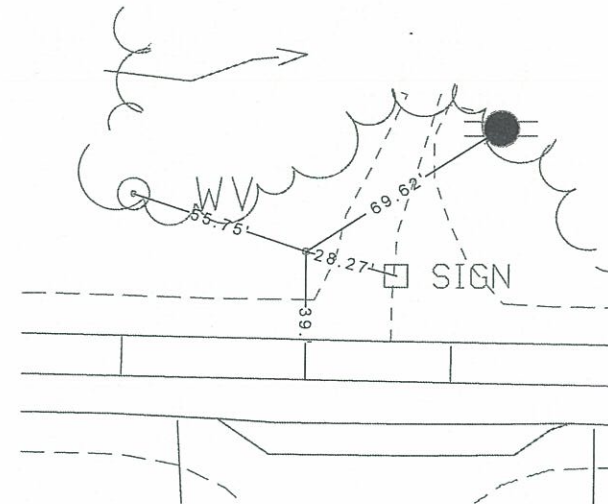
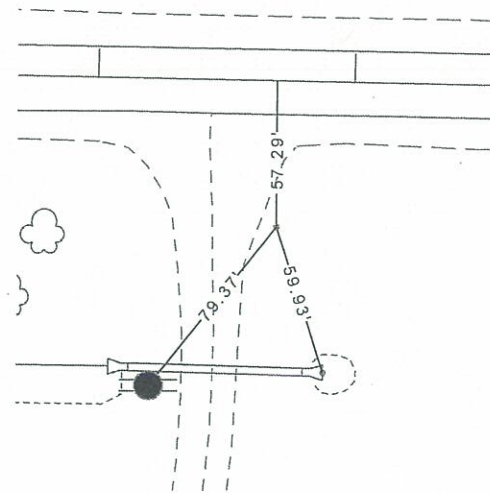
CP STA OFF CHAIN
CP 59001, Set Feno Type Monument
N=373961.67, E=1651086.24, ELEV. 880.54

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 COORDINATE



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

108-23A
08-01-08

TRAFFIC CONTROL PLAN

US 34 Traffic will be maintain via an onsite runaround.

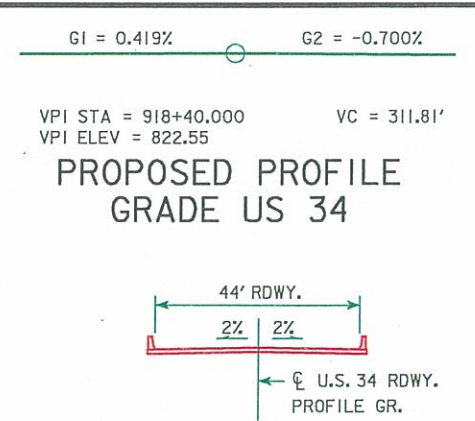
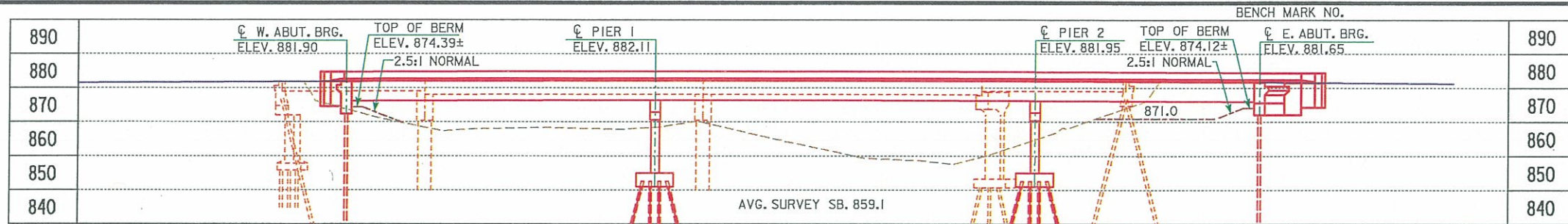
108-26A
08-01-08

STAGING NOTES

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

Stage 2
Close US 34.
Move Traffic to Runaround per TC-253
Replace bridge and approaches.

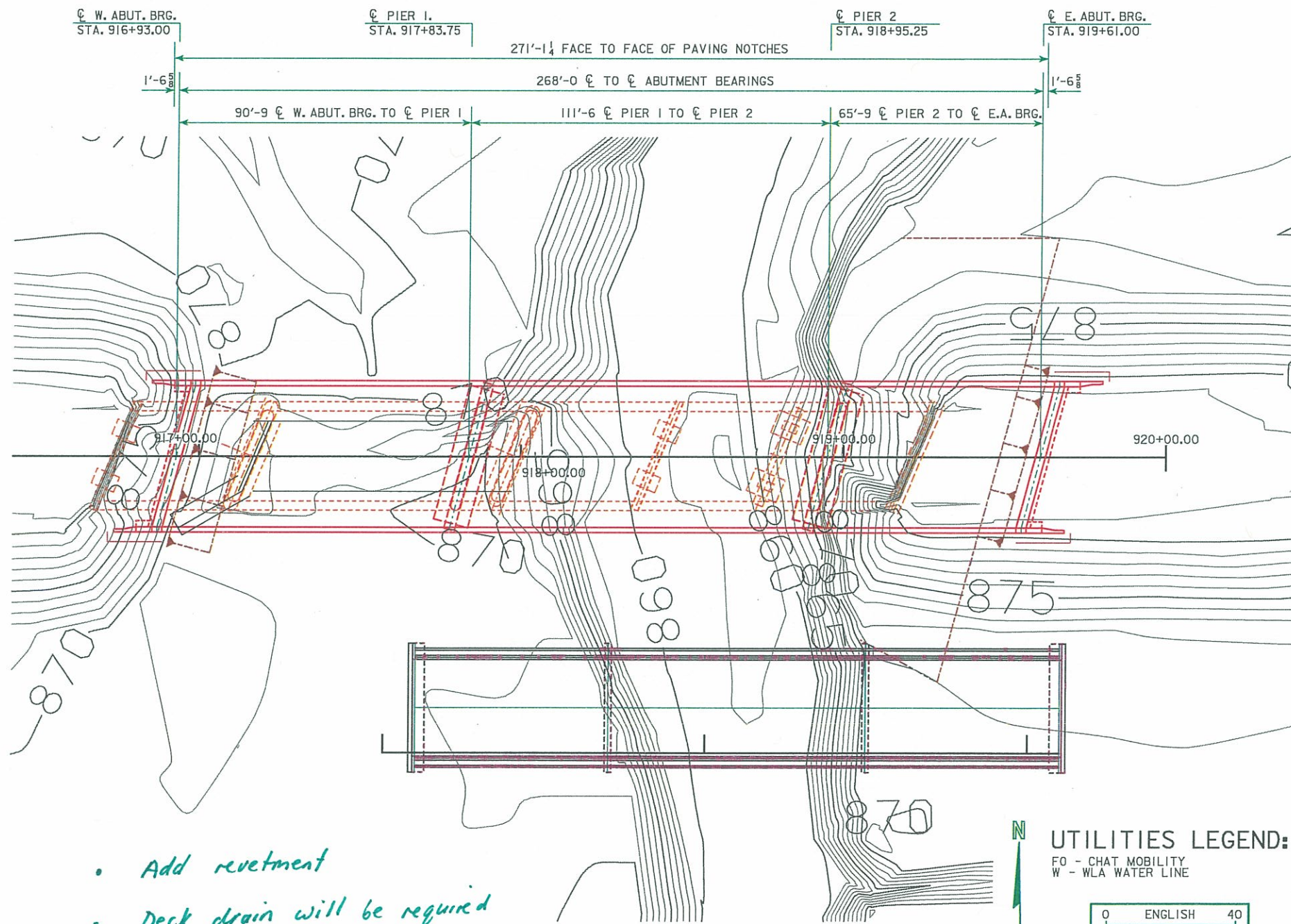
Stage 3
Return Traffic to US 34 new pavement.
Using TC-202 to remove runaround and place granular shoulders.



NOTES:

1. TOP OF BRIDGE DECK CROWN '0.03' BELOW PROFILE GRADE.
2. THE BEAMS SHALL BE VENTED DUE TO INUNDATION AT THE 100 YEAR DISCHARGE.
3. TL-4 BARRIER RAIL PROPOSED.

LONGITUDINAL SECTION ALONG C APPROACH ROADWAY



TYPICAL BRIDGE SECTION

HYDRAULIC DATA

DRAINAGE AREA = 133 SQ. MI.
STREAM SLOPE = 2.5 FT./MI.

Q₅₀ = 16,200 CFS
STAGE = 880.8
BACKWATER = ?? FT.
AVG. BRIDGE VELOCITY = ?? FPS

Q₁₀₀ = 19,100 CFS
STAGE = 881.4
BACKWATER = ?? FT.

Q₂₀₀ = 22,000 CFS
STAGE = ????.?

Q OVERTOP = (5600-6400) CFS
CALCULATED DESIGN AND CHECK SCOUR = ????.?
ROADWAY OVERTOP 876.2
STA. 903-905

Q₅₀₀ = 25,500 CFS

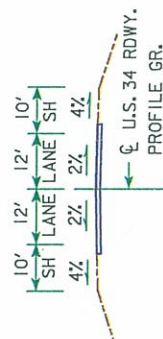
TRAFFIC ESTIMATE

200_ AADT	_____	V.P.D.
202_ AADT	_____	V.P.D.
202_ DHV	_____	V.P.H.
TRUCKS	_____	%
TOTAL DESIGN ESALs	_____	

LOCATION

U.S. 34 OVER WHITE BREAST CK.
T-72N R-22W
SECTION 18
WHITE BREAST TOWNSHIP
LUCAS COUNTY
FHWA NO.
BRIDGE MAINT. NO. 5934.4s034
LATITUDE ??°12'34.56"
LONGITUDE -??°12'34.56"

TYPICAL APPROACH SECTION



- Add revetment
- Deck drain will be required

SITUATION PLAN

UTILITIES LEGEND:

FO - CHAT MOBILITY
W - WLA WATER LINE



PRELIMINARY

DESIGN FOR 15° SKEW (R.A.)

268'-0 x 44'-0 PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGE

90'-9, 65'-9 END SPANS (D BEAMS) 111'-6 INTERIOR SPAN

SITUATION PLAN

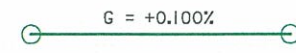
STATION 918+27.00 SEPTEMBER 3, 2015

LUCAS COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. _____ OF _____ FILE NO. 31292 DESIGN NO. 117

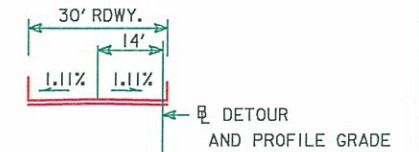
BENCH MARK NO.	
990	990
980	980
970	970
960	960
950	950
940	940

LONGITUDINAL SECTION ALONG ϕ APPROACH ROADWAY



VPT STA = 6+00.00 VPC STA = 8+20.00
 VPT ELEV = 881.45 VPC ELEV =

PROPOSED PROFILE GRADE DETOUR



TYPICAL BRIDGE SECTION

HYDRAULIC DATA

DRAINAGE AREA = 133 SQ. MI.
 STREAM SLOPE = 2.5 FT./MI.

Q10 = 10,400 CFS
 STAGE = 877.5
 AVG. BRIDGE VELOCITY =

Q OVERTOP = (5600-6400) CFS
 AVG. BRIDGE VELOCITY =
 CALCULATED DESIGN AND CHECK SCOUR = ????
 ROADWAY OVERTOP 876.2
 STA. 903-905

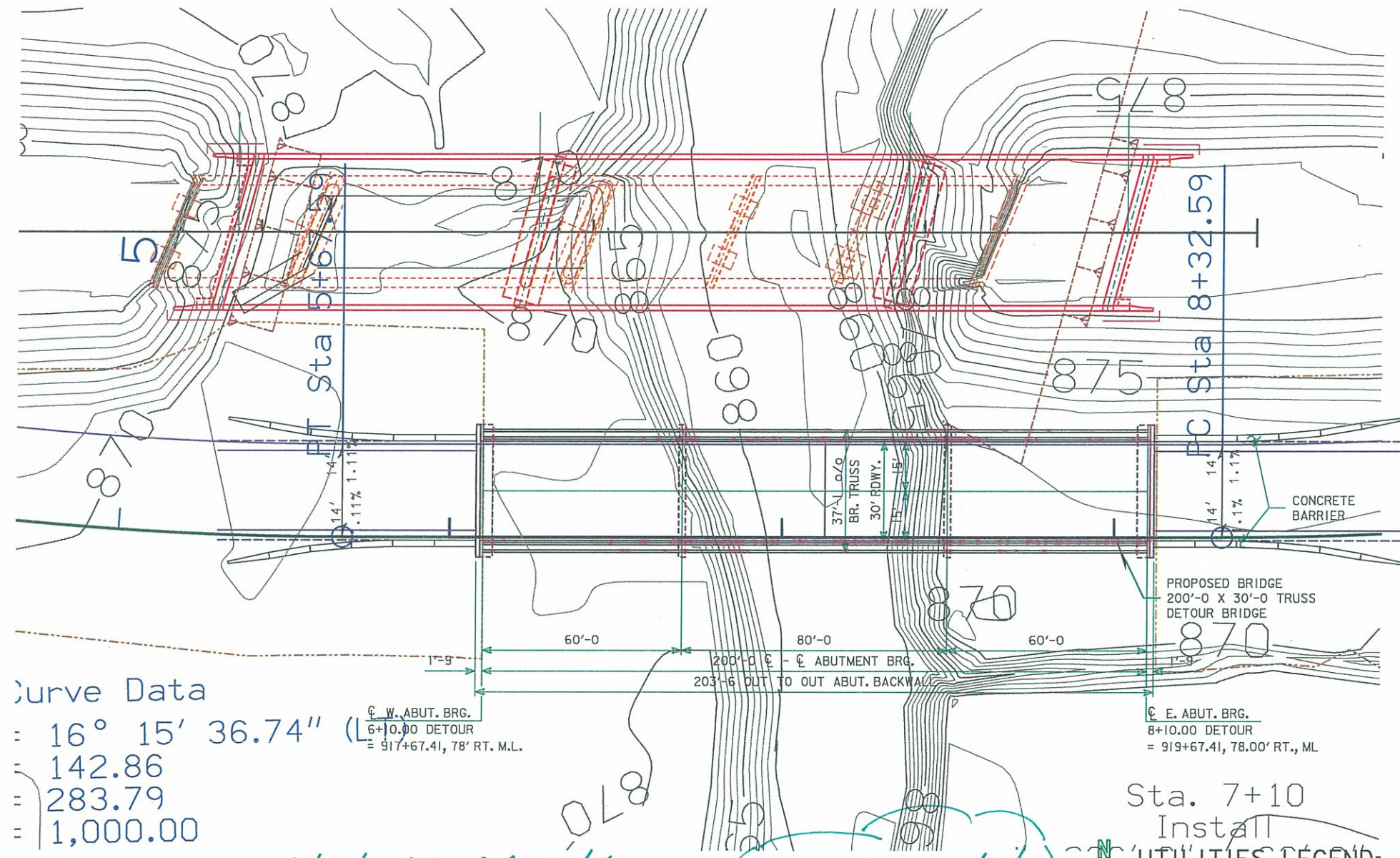
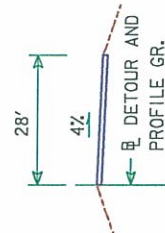
TRAFFIC ESTIMATE

200_ AADT _____ V.P.D.
 202_ AADT _____ V.P.D.
 202_ DHV _____ V.P.H.
 TRUCKS _____ %
 TOTAL DESIGN ESALS _____

LOCATION

U.S. 34 DETOUR OVER WHITE BREAST CK.
 T-72N R-22W
 SECTION 18
 WHITE BREAST TOWNSHIP
 LUCAS COUNTY
 LATITUDE ??°12'34.56"
 LONGITUDE -??°12'34.56"

TYPICAL APPROACH SECTION



Curve Data

= 16° 15' 36.74" (L)
 = 142.86
 = 283.79
 = 1,000.00

ϕ W. ABUT. BRG. = 6+10.00 DETOUR
 = 917+67.41, 78' RT. M.L.

ϕ E. ABUT. BRG. = 8+10.00 DETOUR
 = 919+67.41, 78.00' RT., ML

Relocate rip-rap under detour bridge to new bridge

Review how guardrail will attach to temp. bridge

SITUATION PLAN

Sta. 7+10
 Install UTILITIES LEGEND:
 FO - CHAT MOBILITY
 W - WLA WATER LINE



PRELIMINARY
 DESIGN FOR 0° SKEW
**200'-0 x 30'-0 MODULAR TRUSS
 TEMPORARY ON-SITE DETOUR BRIDGE**
 60'-0 END SPANS 80'-0 INTERIOR SPAN
SITUATION PLAN
 STATION 7+10.00 SEPTEMBER 3, 2015
LUCAS COUNTY
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
 DESIGN SHEET NO. _____ OF _____ FILE NO. 31292 DESIGN NO. 217