

## **IOWA DEPARTMENT OF TRANSPORTATION**

<b>TO OFFICE:</b>	District 3	<b>DATE:</b>	August 10, 2015
<b>ATTENTION:</b>	Tony Lazarowicz	<b>REF. :</b>	Buena Vista County BRF-003-2(63)--38-11
<b>-FROM:</b>	Kevin K. Patel		Pin: 13-11-003-010
<b>OFFICE:</b>	Design		
<b>SUBJECT:</b>	Field Exam (D2)		

A field exam was held on Thursday, July 16 2015, to review the proposed plan for replacing a bridge over a drainage ditch (Lateral 3 of Drainage Ditch # 34), 3.3 miles east of U.S. 71.

Those present for the field exam included Tony Lazarowicz and Darwin Bishop from District 3; Chris King, Tim Chargualaf and William Diede from the Office of Bridges and Structures; Yan Jia, Kirk Romsey, Dave Campbell, Adam Dewolf, Amy Schleier and Kevin Patel from the Office of Design and Mike Carlson from the Office of Location and Environment.

IA 3 is functionally classified as an "area development" route and is a maintenance service level "B" roadway. The 2018 and 2038 ADT is 1,800 vpd and 2,400 vpd respectively with 33 % truck traffic. The bridge has a sufficiency rating of 66.

The proposed project will construct a 12' x 11' x 122' RCB under the 36' long x 30' wide steel beam bridge using the flowable mortar method. The void between the RCB and bridge will then be filled with floodable backfill and flowable mortar. Class 10 embankment for the shoulders and foreslopes will then be placed adjacent to the bridge allowing the existing concrete bridge barrier rail and guardrail to be removed.

The typical section will provide a 28' roadway with 8' wide effective shoulders. The 8' effective shoulders will consist of 2' paved with the remaining 6' being granular. The granular shoulders adjacent to the bridge deck will be reduced slightly to 5 ft. wide as the existing 30 ft. wide bridge deck will be utilized. The new foreslopes will be 6:1/3:1.

The existing bridge deck and bridge approach sections will be resurfaced with 3" of HMA. The length of the resurfacing will extend approximately 530'. Prior to placement of the HMA resurfacing, the bridge deck should receive approximately 9 square yards of Class A deck repair.

There are pipes located in each of the 4 quadrants of the existing bridge that drain the adjacent roadway ditches down to the stream. These pipes will be removed and replaced. The outlet of the proposed pipes will either drain over the wing walls of the new RCB or will outlet directly into the channel.

Minor channel shaping will be required at the inlet and outlet end of the RCB in order to provide a smooth transition to the drainage ditch.

There is a fiber optic and water line that extends under the proposed RCB that appears will need to be relocated.

Right of way will be required to construct and maintain the project.

Traffic will be maintained at all times; however, it will be necessary to close one lane of traffic during the grading immediately adjacent to IA 3 and the placement of the granular shoulder and flowable mortar. Traffic will also be reduced down to one lane during the resurfacing operations.

No plans are included in this submittal; however plan sheets may be viewed as pdf files at PW:\projectwise.dot.int.lan:PWMain\Documents\Projects\1100301013\Design\DesignEvents\D2\D2\_11003063\_Plan.pdf

This project is currently scheduled for a December 2017 letting. The final concept cost estimate for this project was \$459,500. The current cost estimate is now approximately \$419,000 (\$328,000 for the RCB items and \$90,000 for the roadway items). Please note that the current cost estimate does not include right of way or wetland mitigation costs.

### **Machine Guidance Electronic Files Checklist**

*Add information to address any incomplete items below:*

<b>Yes</b>	<b>N/A</b>	<b>No</b>	
<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:lls

M. J. Sankey	S. J. Gent	M. J. Kennerly
D. A. Widick	W.A. Sorenson	D. L. Maifield
T. L. Gettings	E.C. Wright	B. R. Smith
Y. Jia	N. L. Cuva	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	B. Kimble	S. Tymkowicz
D. Bishop	A. Dewolf	S. McElmeel
D. Manly	P.C. Keen	T. Hamski
J. R. Schoenrock	Z. T. Bitting	Local FHWA
W. N. Cameron	J. Garton	T. Bowman
M. Carlson	K. Romsey	T. Chargualaf
K.Clute	W. Diede	

LETTING DATE  
12-19-2017

BRIDGE-UNSPECIFIED  
BRF-003-2(63)--38-11

BUENA VISTA CO.



Highway Division

PLANS OF PROPOSED IMPROVEMENT ON THE

PRIMARY ROAD SYSTEM  
**BUENA VISTA COUNTY**  
BRIDGE-UNSPECIFIED

Ditch 3.3 miles E of US 71

SCALES: As Noted

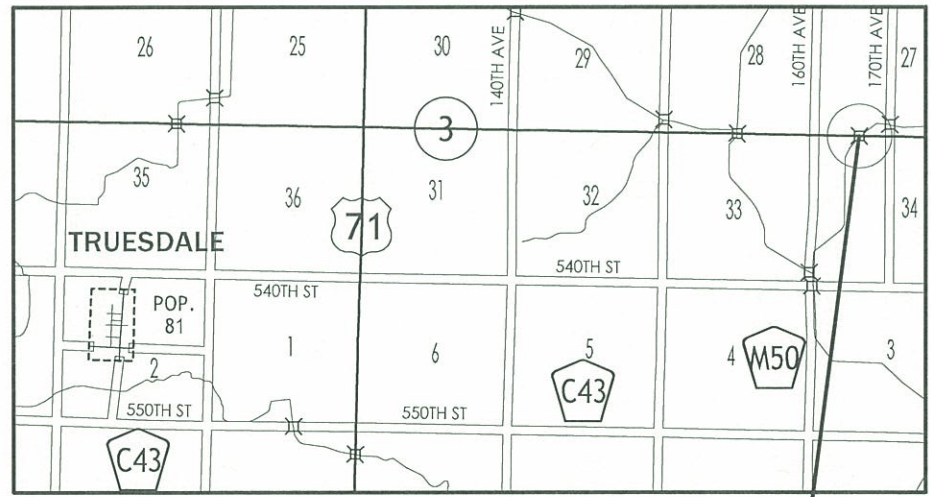
Refer to the Proposal Form for list of applicable specifications.

Value Engineering Saves. Refer to Article 1105.15 of the Specifications.



REVISIONS		TOTAL
PROJECT IDENTIFICATION NUMBER		
13-11-003-010		
PROJECT NUMBER		
BRF-003-2(63)--38-11		
R.O.W. PROJECT NUMBER		
NHSN-003-2(64)--2R-11		

INDEX OF SHEETS	
No.	DESCRIPTION
<b>A Sheets</b>	<b>Title Sheets</b>
A.1	Title Sheet
A.2 - 5	Project Concept Statement
A.6	Project Location
A.7 - 10	Design Criteria and Misc. Ques.
A.11 - 13	Correspondence
<b>B Sheets</b>	<b>Typical Cross Sections and Details</b>
B.1	Typical Cross Sections and Details
<b>D Sheets</b>	<b>Mainline Plan and Profile Sheets</b>
* D.1	Plan & Profile Legend & Symbol Information Sheet
* D.1	Ia. 3
<b>G Sheets</b>	<b>Survey Sheets</b>
G.1 - 2	Reference Ties and Bench Marks
<b>V Sheets</b>	<b>Bridge and Culvert Situation Plans</b>
V.1	Bridge and Culvert Situation Plans
<b>W Sheets</b>	<b>Mainline Cross Sections</b>
W.1	Cross Sections Legend & Symbol Information Sheet
	* Color Plan Sheets



Project Location

*Tony Lazarowicz*  
*Darwin Bishop* } *District 3*

*Yan Jia*  
*Kirk Romsey*  
*Dave Campbell*  
*Adam Dewolf*  
*Amy Schleiter*  
*Kevin Patel* } *Design*

*Mike Carlson - OLE*

*Chris King*  
*Tim Chargualaf*  
*William Diede* } *Prelim Bridge*

D3 PLAN - Date: 8-28-15  
D5 PLAN - Date: 12-31-15

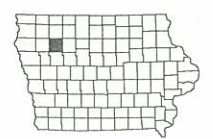
**PRELIMINARY PLANS**

Subject to change by final design.

D2 PLAN - Date: 7-17-2015

DESIGN DATA RURAL			
2018	AADT	1800	V.P.D.
2038	AADT	2400	V.P.D.
20--	DHV	--	V.P.H.
	TRUCKS	33	%
Total			
Design	ESALs	--	

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



IOWA DEPARTMENT OF TRANSPORTATION

**TO OFFICE:** District 3  
**ATTENTION:** Tony G. Lazarowicz  
**FROM:** Kevin K. Patel  
**OFFICE:** Design  
**SUBJECT:** Project Concept Statement; (Final, D0)

**DATE:** June 27, 2014  
**PROJECT:** Buena Vista County  
BRF-003-2(63)--38-11  
PIN: 13-11-003-010

This project involves the replacement of the IA 3 bridge (Maint No. 1184.9S003) over Lateral 3, 3.3 miles east of U.S. 71.

A concept review was held on April 14, 2014. Those present included Tony Lazarowicz, Shane Tymkowicz, Darwin Bishop and Greg Mize from the District 3 Office; Chris King from the Office of Bridges and Structures; and Kevin Patel, Jean Borton, Tom Bowman and Amy Schleier from the Office of Design.

The two alternatives considered were:

1. Replacing the existing bridge with a single 12 ft. x 11 ft. x 126 ft. reinforced concrete box. The preliminary cost estimate for this alternative is \$459,500.
2. Replacing the existing bridge with a 105 ft. x 40 ft. pretensioned, prestressed concrete beam bridge. The preliminary cost estimate for this alternative is \$910,700.

Alternative 1 is the preferred alternative due to the overall cost of construction, future maintenance benefits, and minimizes the disruption to the traveling public.

The Draft Project Concept Statement was sent out for review and comment with concerns to be resolved by Tuesday, June 24, 2014. Comments received during the review period have been considered and resolved.

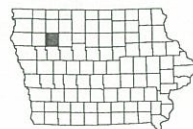
This project is recommended for construction in FY 2018. The Office of Bridges and Structures will coordinate plan preparation with assistance from the Office of Design.

KKP:als  
Attach.  
cc:

J. F. Adam  
D. L. Maifield  
N. M. Miller  
G. A. Novey  
A. Abu-Hawash  
J. S. McClain  
R. A. Younie  
B. D. Hofer  
B. E. Azeltine  
T. D. Crouch  
D. E. Sprengeler  
D. L. Bishop  
M. L. Wright  
B. J. Dolan  
M. E. Ross

M. J. Kennerly  
R. L. Stanley  
C. C. Poole  
D. R. Claman  
K.M. Olson  
M. A. Swenson  
Z. T. Bitting  
D. D. Matulac  
M. E. Khoda  
J.W. Laaser-Webb  
E. C. Wright  
D. S. Schultz  
D. E. Manley  
V. A. Brewer

K. D. Nicholson  
A. A. Welch  
N. L. McDonald  
P. Lu  
B. C. Worrel  
M. J. Sankey  
D. R. Tebben  
D. L. Newell  
S. J. Gent  
W.A. Sorenson  
S. W. Tymkowicz  
T. E. Huju  
M. J. Carlson  
FHWA



FINAL PROJECT CONCEPT STATEMENT

IA 3 Bridge over Lateral 3, 3.3 miles east of U.S. 71

Buena Vista County  
BRF-003-2(63)--38-11  
PIN: 13-11-003-010  
Maint. No. 1184.9S003  
FHWA No. 16230

Highway Division  
Office of Design

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

June 27, 2014

Buena Vista County  
BRF-003-2(63)--38-11  
PIN: 13-11-003-010  
Page 2

modifications. Provided the size and condition of the structure, deck replacement in conjunction with bridge repair and strengthening would not be a practical option. The structure should be replaced.



Looking west on IA 3



Stream bank on south side of bridge

I. STUDY AREA

A. Project Description

This project involves the replacement of the IA 3 bridge (Maint No. 1184.9S003) over Lateral 3, 3.3 miles east of U.S. 71.

The two alternatives considered were:

1. Replacing the existing bridge with a single 12 ft. x 11 ft. x 126 ft. reinforced concrete box. The preliminary cost estimate for this alternative is \$459,500.
2. Replacing the existing bridge with a 105 ft. x 40 ft. pretensioned, prestressed concrete beam bridge. The preliminary cost estimate for this alternative is \$910,700.

Alternative 1 is the preferred alternative due to the overall cost of construction, future maintenance benefits, and minimizes the disruption to the traveling public.

B. Need for Project

This is a 36' x 30' steel girder bridge which was constructed in 1950 and overlaid in 1991. The bridge is classified as "structurally deficient" due to the poor deck condition. Both the top and bottom of the deck have many random leaching cracks and spalls. The concrete rails and curbs also have several leaching cracks and spalls with exposed steel. Severe rust and missing bolts were found at diaphragms, beams, and the connections. There are several leaching cracks and spalls with exposed steel at both abutments. The bridge was originally designed for H20-44 load with

C. Present Facility

The existing structure is a 36 ft. x 30 ft. I beam bridge constructed in 1950.

IA 3 in the project area is 28 ft. wide PCC pavement with 6 ft. wide granular shoulders and 3:1 foreslopes, constructed in 1952. HMA resurfacing was accomplished in 1991 and 2013.

D. Traffic Estimates

The 2018 construction year and 2038 design year average daily traffic estimates are 1,800 ADT with 33% trucks and 2,400 ADT with 33% trucks, respectively.

E. Sufficiency Ratings

IA 3 is classified as an "area development" route and is a maintenance service level "B" road. The federal bridge sufficiency rating is 66.

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 was 1 crash and it resulted in possible injuries.

II. PROJECT CONCEPT

A. Feasible Alternatives

Alternative #1 - Replace with a culvert utilizing the flowable mortar method

The new single 12 ft. x 11 ft. x 126 ft. reinforced concrete box will be constructed under the existing 36 ft. x 30 ft. bridge, utilizing the flowable mortar method of construction. The typical cross section adjacent to the bridge will consist of a 24 ft. roadway (28 ft. wide pavement) with 8 ft. effective shoulders (2 ft. outside pavement, 6 ft. granular) and 6:1/3:1 foreslopes.

Class 10 will be necessary to flatten the existing foreslopes. The Drainage District will be consulted to verify if the banks of the ditch are acting as levees. If they are, disturbing the levees should be minimized. If approved by the Drainage District, the dike in the northeast corner of the existing bridge will be removed and replaced with revetment.

The new RCB can be built under the existing bridge without disturbing the bridge. After the culvert has been constructed, flooded backfill and flowable mortar will be used to fill the void between the RCB and bridge deck. Once the new foreslopes have been placed adjacent to the bridge, the existing concrete bridge barrier, curb, and guardrail can be removed. Additionally, existing abutment wings will be removed to 1 ft. below ground level. Extensions may be required on the existing culverts in all 4 quadrants to accommodate the new culvert, including replacing the flapgate in the NW corner.

The flow line of the box will be buried slightly below the existing flow line in the channel to provide adequate headroom to construct the culvert and to account for degradation. Class E revetment will be placed at the ends of the RCB.

The existing bridge deck and approaches will be resurfaced with 1.5 in. of HMA intermediate and 1.5 in. of HMA surface course material. The EF joints will be patched out prior to the resurfacing.

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. However, it will be necessary to reduce traffic down to one lane via the use of flaggers during the removal of the bridge rail, guardrail and placement of the flowable mortar.

<b>Bridge Items</b>	<u>Estimated Cost</u>
New Culvert	\$ 168,000
Revetment	50,000
Mobilization - 10%	22,000
M & C - 20%	<u>48,000</u>
<b>Bridge Total</b>	<b>\$ 288,000</b>

<b>Roadway Items</b>	
Floodable backfill	\$ 11,500
Flowable mortar	24,700
Embankment in place	13,700
HMA resurface patch, including binder	6,500
Granular Shoulders	800
Guardrail removal	1,800
Clearing and grubbing	900
Erosion Control	5,000
Wetland Mitigation	50,000
Right of Way	5,000
Traffic Control @ 5%	6,000
Mobilization @ 5%	6,000
M&C @ 30%	<u>39,600</u>
<b>Roadway Total</b>	<b>\$ 171,500</b>

**Project Total** **\$ 459,500**

Alternative #2 - Replace with a bridge

Replace the existing 36 ft. x 30 ft. I-beam bridge with a 105 ft. x 40 ft. prestressed pretensioned concrete beam bridge.

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

This bridge will be constructed on the existing vertical and horizontal alignment. Construct new bridge approaches. Replace the existing guardrail with new guardrail and pave the shoulders 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. The dike in the northeast corner of the existing bridge will be removed and replaced with revetment. Construct bridge end drains on each end of the bridge.

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

It appears that right of way will be required for this alternative. In addition to this, a temporary easement will be required to relocate the field entrances west of the new bridge, due to the conflict with the bridge guardrail.

Traffic will be maintained by an off-site detour. See detour details in Section B of this concept.

<b>Bridge Items</b>	<u>Estimated Costs</u>
New Bridge	\$ 397,000
Bridge Removal	10,000
Revetment	50,000
Mobilization - 10%	46,000
M & C - 20%	<u>101,000</u>
<b>Bridge Costs</b>	<b>\$ 604,000</b>

<b>Roadway Items</b>	
Bridge Approaches	\$ 80,200
Embankment in place	8,400
Class 10 excavation	2,300
Class 13 waste	1,200
Removal of Pavement	2,700
Guardrail (Includes Removal)	21,800
Paved Shoulders for Guardrail	16,000
Class 10 for Guardrail Blisters	11,800
Bridge End Drains	9,600
Seeding and Fertilizing	500
Erosion Control	5,000
Wetland Mitigation	50,000
Right of way	5,000
Traffic Control - 5%	10,700
Mobilization - 5%	10,700
M & C - 30%	<u>70,800</u>
<b>Roadway costs</b>	<b>\$ 306,700</b>

**Project Total** **\$ 910,700**

**B. Detour Analysis**

Alternative 1 uses the flowable mortar method of construction to minimize impact to traffic. Traffic will be maintained at all times. However, it will be necessary to reduce traffic down to one lane via the use of flaggers during the removal of the bridge rail, guardrail and placement of the flowable mortar.

In Alternative 2, IA 3 will be closed and an offsite detour will be utilized. It is anticipated the detour will be in place for approximately 120 days. The detour would

follow County Road M54 north at the junction with IA 3 for 7 miles to IA 10. Then it would follow IA 10 west for 8 miles. The detour then turns south on U.S. 71 for 7 miles. Out of distance travel is 14 miles. The total out-of-distance user cost is anticipated to be \$631,000. The cost for county road maintenance will be \$12,400 as calculated by the Gas Tax Method. Detour signing costs will be \$10,000. This detour may also accommodate construction of the North Raccoon River Bridge, 0.8 miles west of this bridge. Both BRF-003-2(63)--38-11 and BRF-003-2(65)--38-11 are scheduled for construction in 2018.

**C. Recommendations**

It is recommended that the present structure be replaced, as described in Alternative No. 1.

**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. ADA Accommodations**

There are no bike paths or sidewalks adjacent to IA 3; therefore, no ADA accommodations are planned in conjunction with this project.

**F. Special Considerations**

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

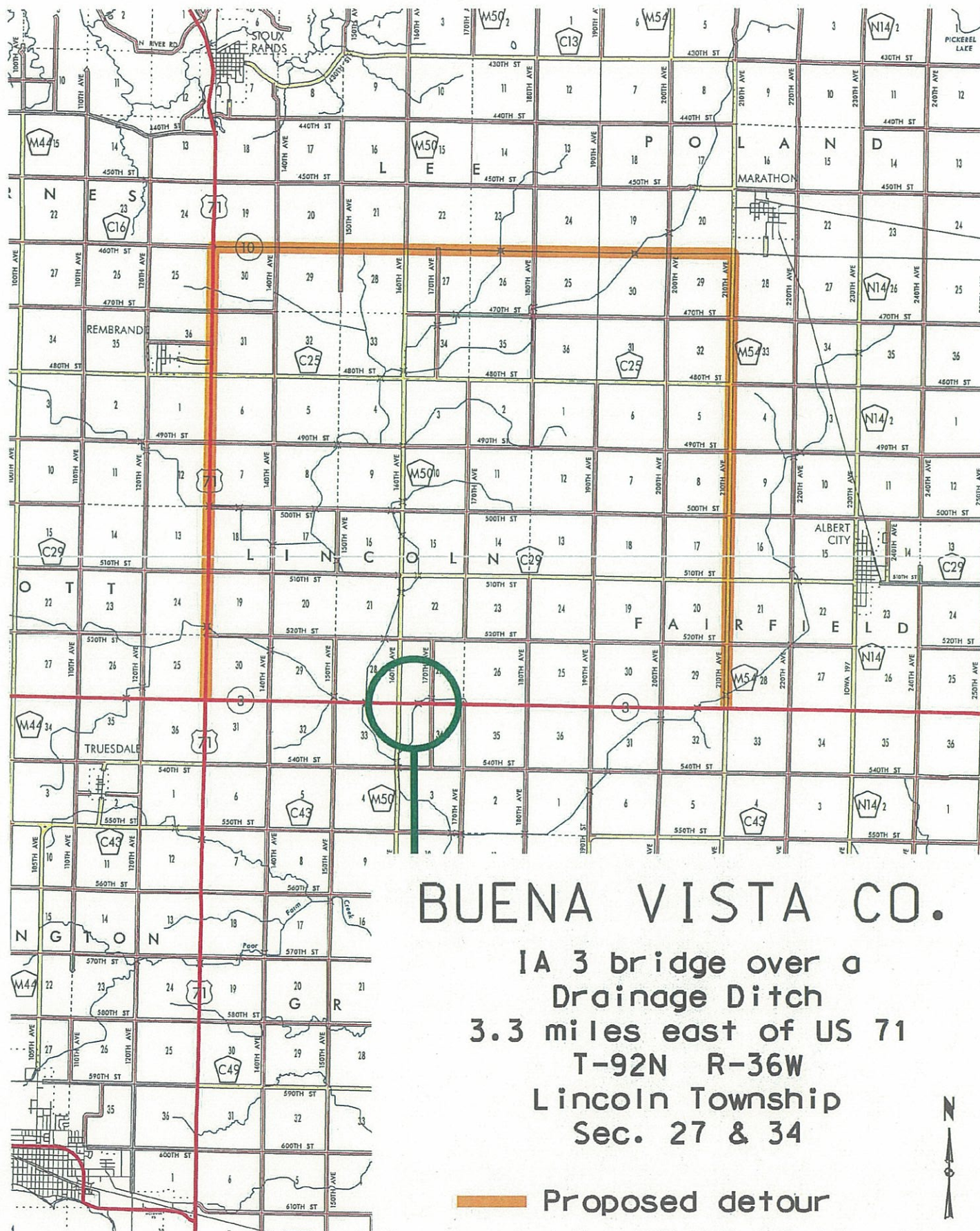
Right of Way will be required for the recommended alternative.

The Office of Location and Environment has reviewed this project and based on preliminary observations, has determined that replacing this bridge will require a routine Nationwide Permit without the need for wetland mitigation.

**F. Program Status**

Site data has been developed by the Office of Design. This project is listed in the Draft 2015-2019 Iowa Transportation Improvement Program, with \$800,000 programmed for replacement in FY 2018. Costs for this project may be eligible for bridge replacement funds. A schedule of events will be developed following approval of the Project Concept.

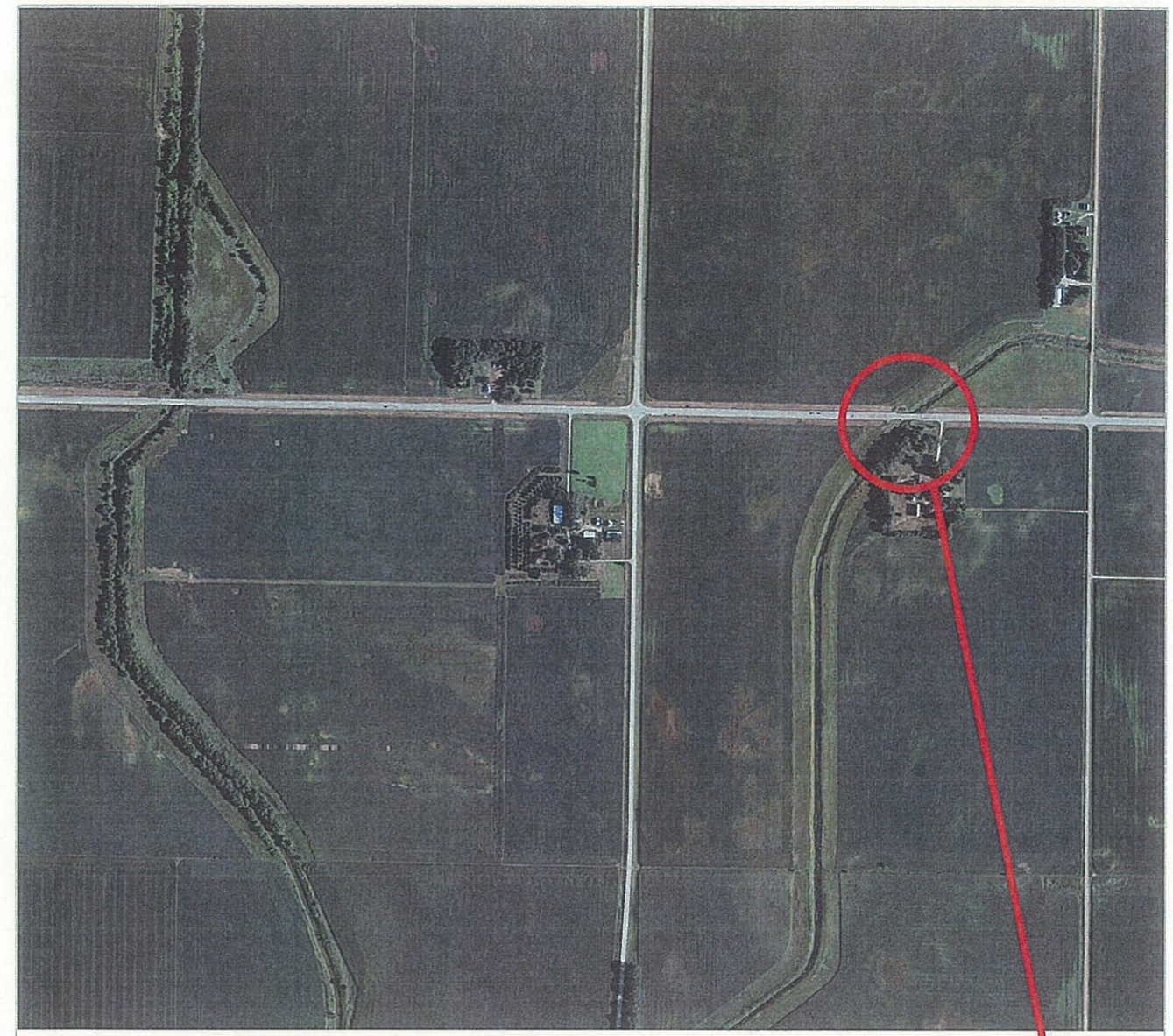
KKP: als



**BUENA VISTA CO.**

IA 3 bridge over a  
 Drainage Ditch  
 3.3 miles east of US 71  
 T-92N R-36W  
 Lincoln Township  
 Sec. 27 & 34

— Proposed detour



**BUENA VISTA CO.**

IA 3 bridge over a  
 Drainage Ditch  
 3.3 miles east of US 71  
 Maint. 1184.9S003  
 FHWA 16230





<b>Roadway</b>	IA 3		
<b>PIN Number</b>	13-11-003-010	<b>Submittal Date</b>	
<b>Project Number</b>	BRF-003-2(63)--38-11	<b>Approval Date</b>	
<b>District</b>	District 3	<b>Assistant District Engineer</b>	
<b>County</b>	Buena Vista (11)	<b>or</b>	
<b>Route</b>	IA 3	<b>Office Director</b>	
<b>Location</b>	Bridge over a drainage ditch, 3.3 miles east of US 71		
<b>Work Type</b>			
<b>Segment Manager</b>			
<b>Designer</b>			
Design Manual Section <a href="#">1C-1</a> last update: 05-06-14	<b>Rural Two-Lane Highways (Rural Arterials)</b>		
<b>Design Element</b>	<b>Preferred</b>	<b>Acceptable</b>	<b>Project Values</b>
Design speed (mph)	60	50	60
Maximum superelevation rate (Refer to Section <a href="#">2A-2</a> )	6%	8%	NA
Design lane width (ft)	12	12	12 ft.
Full depth paved width (ft)	14	12	28 ft.
Right turn lane (ft)	12	10	NA
Climbing Lane (ft)	12	12	NA
Left turn lane (ft)	12	10	NA
Pavement cross-slope (on tangent sections)	Through lanes	2%	1.5% minimum, 2% maximum
	Auxiliary and turn lanes	3%	3% maximum
	Crown break at centerline	4%	4% maximum
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	
Curb type (Refer to Section <a href="#">3C-2</a> )	Design speed = 50 or 55 mph	6-inch sloped	6-inch standard
	Design speed ≥ 60 mph	4-inch sloped	6-inch sloped
Foreslope (For fill areas greater than 40 ft, contact the Soils Design Section for assistance)	Adjacent to shoulder	10:1 for 4' then 6:1	3:1
	Beyond standard ditch depth and design clear zone	3.5:1	3:1
	Curbed roadways	2%	not steeper than 3:1
Backslope (For cut areas greater than 25 feet, contact the Soils Design Section for assistance with backslope benches.)	3:1	2.5:1	3:1
Transverse Slopes	w/ drainage structures	8:1	6:1
	w/o drainage structures	10:1	6:1
Ditches (Refer to Section <a href="#">3G-1</a> )	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	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
	Over non-primary	16.5 at interchange locations, 15 at all other locations	14
	Over railroad	23.3	23.3
	Sign trusses and pedestrian bridges	17.5	17
Structural Capacity	Contact Office of Bridges and Structures	Contact Office of Bridges and Structures	
Level of Service	B	B	

Rural Two-Lane Highways (Rural Arterials)

Roadway Design Speed (mph) = 60		Design Criteria for High Speed Roadways													
Design Manual Section <a href="#">1C-1</a> last update: 05-06-14		Preferred Criteria						Acceptable Criteria					Project Values		
Design Element		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 <a href="#">6D-1</a> )		425	495	570	645	730	820	425	495	570	645	730	820	>570	
Minimum horizontal curve radius (ft) (Refer to Sections <a href="#">2A-2</a> and <a href="#">2A-3</a> )	Method 5 superelevation and side friction distribution	$e_{max} = 6\%$	833	1060	1330	1660	2040	2500	833	1060	1330	1660	2040	2500	NA
		$e_{max} = 8\%$	--	--	--	--	--	--	758	960	1200	1480	1810	2210	
Minimum vertical curve length (ft) (Refer to Section <a href="#">2B-1</a> )		150	165	180	195	210	225	150	165	180	195	210	225	200	
Minimum rate of vertical curvature (K) (Refer to Section <a href="#">2B-1</a> )	crest vertical curves		84	114	151	193	247	312	84	114	151	193	247	312	NA
	sag vertical curves	roadways without fixed-source lighting	96	115	136	157	181	206	96	115	136	157	181	206	>136
		roadways with fixed-source lighting	96	115	136	157	181	206	54	66	78	91	106	121	
Minimum gradient (%) (Refer to Section <a href="#">2B-1</a> )		0.5						0.3% with a curb, 0.0% without a curb						-0.14%	
Maximum gradient (%) (Refer to Section <a href="#">2B-1</a> )	Urban roadways		4		3				7	6	6	--	--	--	5 x 10
	Rural roadways		4		3				5	5	4	4	4	4	<4%
	Interstates		4		3				5	5	4	4	4	4	
Clear zone		See "Preferred Clear Zone" table in Section <a href="#">8A-2</a>						See "Acceptable Clear Zone" table in Section <a href="#">8A-2</a>						30 ft.	

<b>Design year ADT =</b> 2,400						
Design Manual Section <a href="#">1C-1</a> last update: 05-06-14	<b>Effective Shoulder Width and Type for Two-Lane Highways</b>					
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	NA
Turn lanes with curbs	6	See Section <a href="#">3C-2</a>	Turn lanes with curbs	6	0	NA
	Effective Shoulder Width	Paved Width		Effective Shoulder Width	Paved Width	
Climbing Lanes	6	4	Climbing Lanes	4	0	NA
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*	8 ft. effective shoulders (outside 2 ft. of pavement and 6 ft. granular)
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:


## DISCUSSION/REVIEW IN FIELD

1. Is entrance at N.W. corner in use. *No*
2. Confirm entrance at S.W. corner is closed. *Not an entrance*
3. Existing C.M.P.s *Replace CMP*
  - N.W.
  - N.E.
  - S.W.
  - S.E.
4. Disposition of Old Guardrail. *District to review*
5. Is a Leveling Course needed for areas that exceed 3% cross slope? *No*
  - Bid as tons or square yards? *N/A*
6. Are existing banks levees? *No*
7. Channel shaping? *Yes*

*75 ft<sup>2</sup> class A repair (deck repair) - 3 patches*  
*↑ (9 sq yd)*

**From:** [Lazarowicz, Tony \[DOT\]](#)  
**To:** [King, Chris \[DOT\]](#)  
**Cc:** [Jia, Yanxiao \[DOT\]](#); [Campbell, David \[DOT\]](#); [Romsey, Kirk \[DOT\]](#); [Tymkowicz, Shane \[DOT\]](#)  
**Subject:** RE: Buena Vista - BRF-003-2(63)--38-11  
**Date:** Tuesday, June 30, 2015 9:12:56 AM  
**Attachments:** [FW Buena Vista - BRF-003-2\(63\)--38-11.msc](#)  
[image007.png](#)

I believe this is what you were looking for. Please let me know if you need something else.

Tony Lazarowicz  
District 3 Engineer  
Business Phone: 712-276-1451  
Email: [Tony.Lazarowicz@dot.iowa.gov](mailto:Tony.Lazarowicz@dot.iowa.gov)



---

**From:** King, Chris [DOT]  
**Sent:** Friday, June 26, 2015 5:48 PM  
**To:** Lazarowicz, Tony [DOT]; Tymkowicz, Shane [DOT]  
**Cc:** Jia, Yanxiao [DOT]; Campbell, David [DOT]; Romsey, Kirk [DOT]  
**Subject:** RE: Buena Vista - BRF-003-2(63)--38-11

That is for the existing pipes, but it is not what I meant.  
When we put an RCB in a Drainage Ditch, the Drainage District usually sends us what the Drainage District's flowlines are in the portion where the RCB is placed. This is done once the IDOT District notifies the Drainage District about the project and requests flowline information. This is needed because in almost all cases, the Drainage District flowlines govern, even if the ditch has silted in. Usually the first time the IDOT contacts the Drainage District is to notify them of our project and request flowline information. The emails you sent sounded like they were the last batch of several. What I need are the Drainage District flowlines for the ditch and the datum they used so I can design the RCB.  
So please send me this information if you have it.  
Thank you.

---

**From:** Romsey, Kirk [DOT]  
**Sent:** Friday, June 26, 2015 3:51 PM  
**To:** King, Chris [DOT]  
**Cc:** Jia, Yanxiao [DOT]; Campbell, David [DOT]  
**Subject:** RE: Buena Vista - BRF-003-2(63)--38-11

There is some information on structures under the following folder:

[172+42.77.43.73Rt.txt](#)

---

**From:** King, Chris [DOT]

**Sent:** Friday, June 26, 2015 1:36 PM  
**To:** Romsey, Kirk [DOT]  
**Cc:** Jia, Yanxiao [DOT]; Campbell, David [DOT]  
**Subject:** RE: Buena Vista - BRF-003-2(63)--38-11

Thank you.  
Do you also have any information on the Drainage District's flowlines?  
Since this is usually the original reason for contacting the Drainage District, it would probably be the letter referred to in the first attached email.  
Please let me know of their flowlines ASAP.  
Thanks.

---

**From:** Romsey, Kirk [DOT]  
**Sent:** Friday, June 26, 2015 10:13 AM  
**To:** King, Chris [DOT]  
**Cc:** Jia, Yanxiao [DOT]; Campbell, David [DOT]  
**Subject:** FW: Buena Vista - BRF-003-2(63)--38-11

FYI

---

**From:** Jia, Yanxiao [DOT]  
**Sent:** Monday, June 15, 2015 5:05 PM  
**To:** Romsey, Kirk [DOT]; Campbell, David [DOT]  
**Subject:** FW: Buena Vista - BRF-003-2(63)--38-11

---

**From:** Lazarowicz, Tony [DOT]  
**Sent:** Friday, June 12, 2015 3:27 PM  
**To:** 'Brian Blomme'  
**Cc:** Sue Lloyd <[sloyd@bvcountyiowa.com](mailto:sloyd@bvcountyiowa.com)> ([sloyd@bvcountyiowa.com](mailto:sloyd@bvcountyiowa.com)); Jia, Yanxiao [DOT]; Tymkowicz, Shane [DOT]  
**Subject:** RE: Buena Vista - BRF-003-2(63)--38-11

I could not find that I had responded to you so I apologize for not doing so earlier.

We will provide you with a draft set of plans when they are at that point. I believe the information you provided will provide the information needed at this point. Thanks for your comments.

---

**From:** Brian Blomme [<mailto:brian.blomme@is-grp.com>]  
**Sent:** Tuesday, May 19, 2015 5:14 PM  
**To:** Lazarowicz, Tony [DOT]  
**Cc:** Sue Lloyd <[sloyd@bvcountyiowa.com](mailto:sloyd@bvcountyiowa.com)> ([sloyd@bvcountyiowa.com](mailto:sloyd@bvcountyiowa.com))  
**Subject:** RE: Buena Vista - BRF-003-2(63)--38-11

Tony –

I wish you had some photos to clarify what you are describing as a dike, and show where the dike will be removed and replaced with revetment. In general, the open ditches in BV County were not constructed with "levees", but they do have spoil banks. The spoil from the construction of the

open ditch was placed alongside the open channel in a manner which would not allow surface drainage to freely flow over the side slopes of the facility. In some cases, the spoil was not leveled but left in piles. In most locations, the spoil was spread with a 10:1 slope away from the ditch in order to accommodate farming operations along the open channels. Please refer to the attachment to this email. It is a standard drawing included with our open ditch cleanout projects in order to construct these spoil banks. The side slope of the channel will destabilize if the surface runoff is allowed to freely flow over the banks instead of entering the channel through a surface drain pipe.

If you can send some preliminary plans for review by the District, I would be happy to discuss with you any concerns the District may have. I'm assuming the work will be taking place within the road right-of-way, and therefore would not expect to have a lot of concerns. As long as drainage to the surrounding farm fields is maintained the proposal should be fine.

Talk to you soon,  
Brian

**Brian Blomme PE**  
Agricultural Engineer  
Civil Engineering Group

1725 North Lake Avenue  
Storm Lake, IA 50588  
P: 712.732.7745  
C: 712.299.4889

[brian.blomme@is-grp.com](mailto:brian.blomme@is-grp.com)

[www.is-grp.com](http://www.is-grp.com)



**Architecture  
Engineering  
Environmental  
Planning**

**I+S GROUP**

---

**From:** Brian Blomme  
**Sent:** Tuesday, May 19, 2015 4:40 PM  
**To:** (Tony.Lazarowicz@dot.iowa.gov)  
**Cc:** Sue Lloyd <[sloyd@bvcountyiowa.com](mailto:sloyd@bvcountyiowa.com)> (<[sloyd@bvcountyiowa.com](mailto:sloyd@bvcountyiowa.com)>)  
**Subject:** FW: Buena Vista - BRF-003-2(63)--38-11

Tony –

I received your email through Sue Lloyd, BV County Auditor. I'm going to bet your email address for me has my last name spelled wrong (Blomme instead of Bloome).

I will get back to you shortly with an answer about the side slopes of DD 34, Main Open Ditch.

Brian

---

**From:** Sue Lloyd [<mailto:sloyd@bvcountyiowa.com>]  
**Sent:** Tuesday, May 19, 2015 4:09 PM  
**To:** Brian Blomme  
**Subject:** FW: Buena Vista - BRF-003-2(63)--38-11

Brian,

Mr. Lazarowicz has been trying to send this letter to you, and I have received it 4 times. I don't know if you received the previous ones or not, but I am trying to send it on to you to answer. Let me know if you receive this.

Thanks!

Sue

*Susan K. Lloyd*  
Auditor & Commissioner of Elections  
Buena Vista County  
712-213-7401  
e-mail: [sloyd@bvcountyiowa.com](mailto:sloyd@bvcountyiowa.com)

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---

**From:** Lazarowicz, Tony [DOT] [<mailto:Tony.Lazarowicz@dot.iowa.gov>]  
**Sent:** Tuesday, May 19, 2015 3:57 PM  
**To:** Sue Lloyd  
**Subject:** FW: Buena Vista - BRF-003-2(63)--38-11

I have attached a letter previously sent from Brian Bloome to Shane Tymkowicz (Assistant District Engineer District 3). I initially tried sending this note to Brian Bloome and sending a copy to you but this was undeliverable. I do have a few follow up questions for DD34 Main Open Ditch. Could you forward this question to the appropriate contact.

Are the banks of the ditch acting as levees? If so, our design would be done with the intent of minimizing any impact the Levees. There is a dike in the northeast corner of the existing bridge. If this is considered part of a Levee, will there be any requirements of the drainage district pertaining to the removal and replacement of this dike. The current intent is to remove the dike and replace with revetment.

I was having issues with email address so please confirm when you receive this.

Thanks.

County: Buena Vista

PIN: 13-11-003-010

Project Number: BRF-003-2(63)--38-11

Location: Ditch 3.3 miles E of US 71

Type of Work: Replace Bridge with a single 12 x 11 x 126' box culvert.

Project Directory: 1100301013

if the banks of the ditch are acting as levees.

**EXCAVATION AND BANK SHAPING**

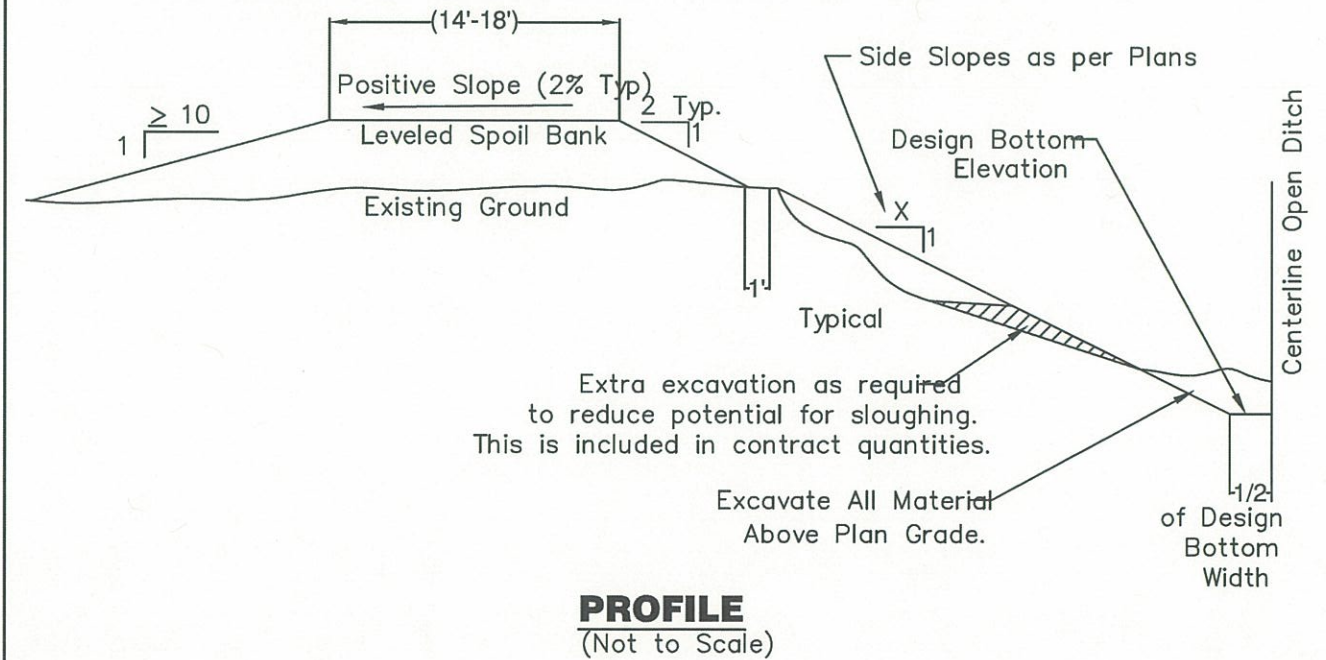
IS REQUIRED TO BE CARRIED OUT FROM BOTH SIDES OF THE OPEN DITCH. APPROXIMATELY EQUAL AMOUNTS OF SPOIL ARE TO BE PLACED ON BOTH SIDES OF THE DITCH, UNLESS OTHERWISE SPECIFIED ON PLANS.

CONTRACTOR SHALL LIMIT, AS MUCH AS PRACTICAL, DISTURBANCE OF STABLE VEGETATED BANKS WHICH LIE OUTSIDE THE DESIGN CROSS SECTION. WHERE THE DITCH IS WIDER THAN THE DESIGN CROSS SECTION, CONTRACTOR SHALL EXCAVATE AS REQUIRED TO SHAPE BOTTOM TO BASE OF SIDE SLOPES.

**SPOIL BANK LEVELING**

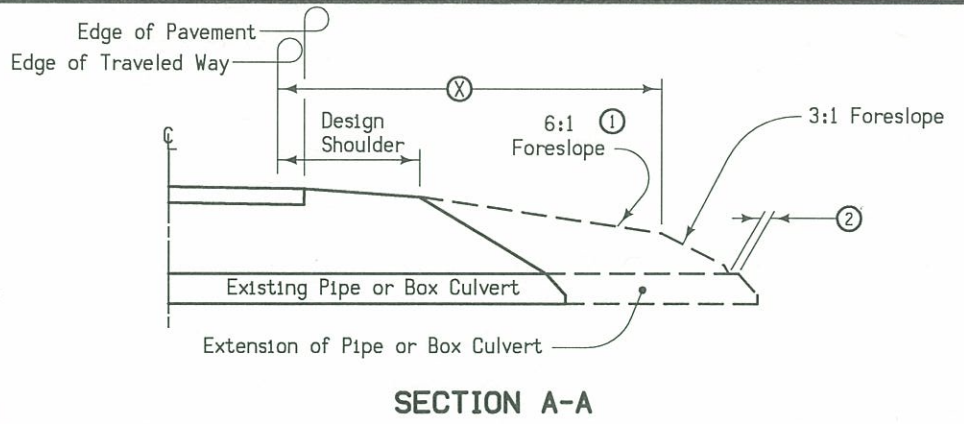
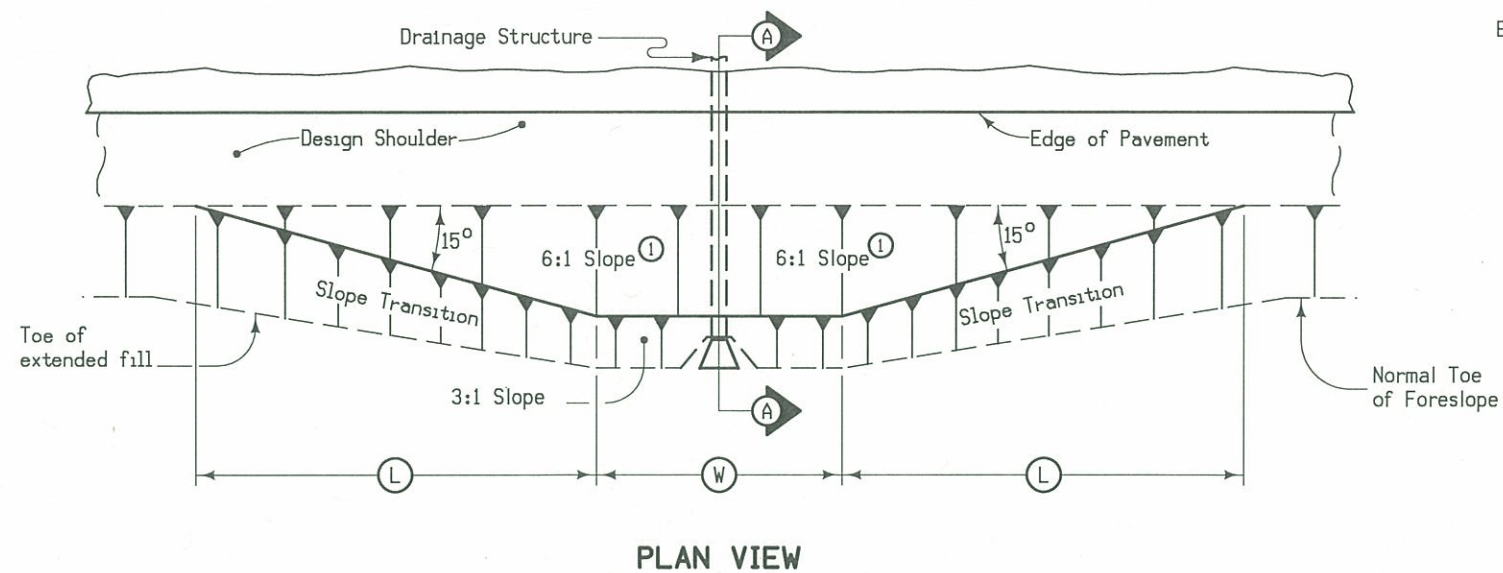
THE TOP 8 INCHES OF ALL LEVELED AND SHAPED SPOIL, OLD AND NEW, IS TO BE THOROUGHLY TILLED BY CONTRACTOR WITH CHISEL PLOW OR SIMILAR IMPLEMENT. DISPOSE OF ROCKS AND OTHER DEBRIS EXPOSED BY THIS OPERATION. ENTIRE SOIL SURFACE SHALL BE SHAPED TO DRAIN AWAY FROM THE DITCH AND SHALL BE GENERALLY LEVEL WITH ALLOWED GENTLE UNDULATIONS ON LINE PARALLEL TO DITCH. ENTIRE CHISELING AND FINISH GRADING ARE SUBSIDIARY TO THE SPOIL BANK LEVELING BID ITEM.

MINOR SURFACE GRADING TO DRAIN SMALL IMPOUNDED AREAS AND THE CONSTRUCTION OF FIELD ENTRANCES OR SURFACE WATER CONTROL DIKES IN THE PUBLIC ROAD DITCHES ARE SUBSIDIARY TO THE SPOIL BANK LEVELING BID ITEM.



THIS DRAWING IS TYPICAL AND MAY BE SUPERSEDED BY CONSTRUCTION NOTES, PLAN DETAILS, AND/OR ENGINEERS'S DIRECTION

<b>ISG</b> Architecture Engineering Environmental Planning www.is-gp.com	<b>TYPICAL OPEN DITCH EXCAVATION &amp; SPOIL LEVELING</b>	
	<small>THIS DOCUMENT IS THE PROPERTY OF I+S GROUP, INC. THEY MAY NOT BE USED, COPIED OR DUPLICATED WITHOUT PRIOR WRITTEN CONSENT.</small>	<b>G-01</b>



Notes:  
 At locations where an extended or newly constructed drainage structure extends beyond the normal foreslope cover, the foreslope shall be flattened as indicated so as to cover the structure. Minimum earth cover is 6".

① 6:1 Maximum - Slope may be flatter.  
 ② 6" Minimum for pipe installations or to top of headwall on R.C.B.  
 Ⓜ = Pipe or R.C.B. width plus 20 feet each side.  
 ⓧ = Clear Zone.

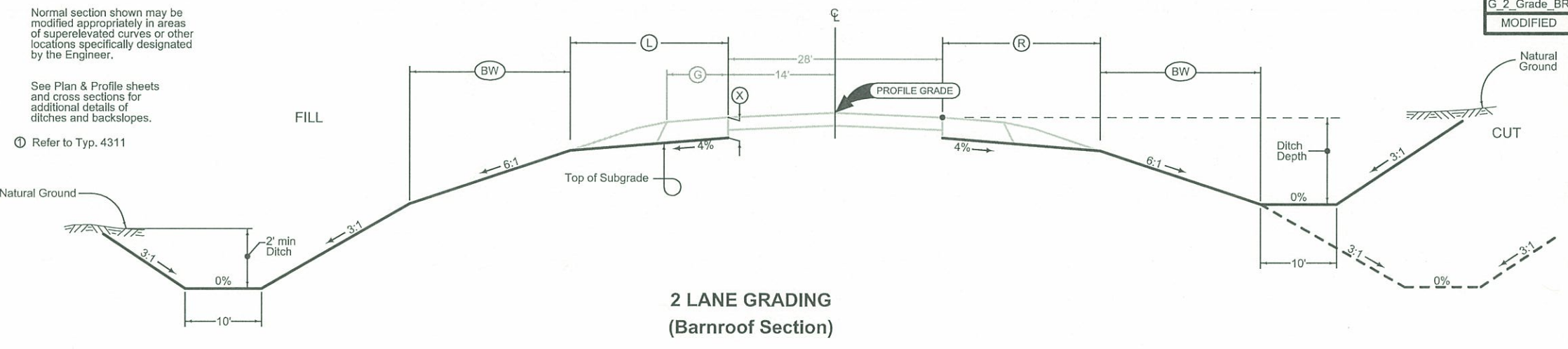
STRUCTURE LOCATION		Ⓜ	Ⓛ	ⓧ
STATION	SIDE	Feet	Feet	Feet
173+30.11	Lt.	94.20	81.96	30.00
174+19.20	Rt.	94.20	81.96	30.00

**DETAILS OF  
BARNROOF FORESLOPE  
AT DRAINAGE STRUCTURE**

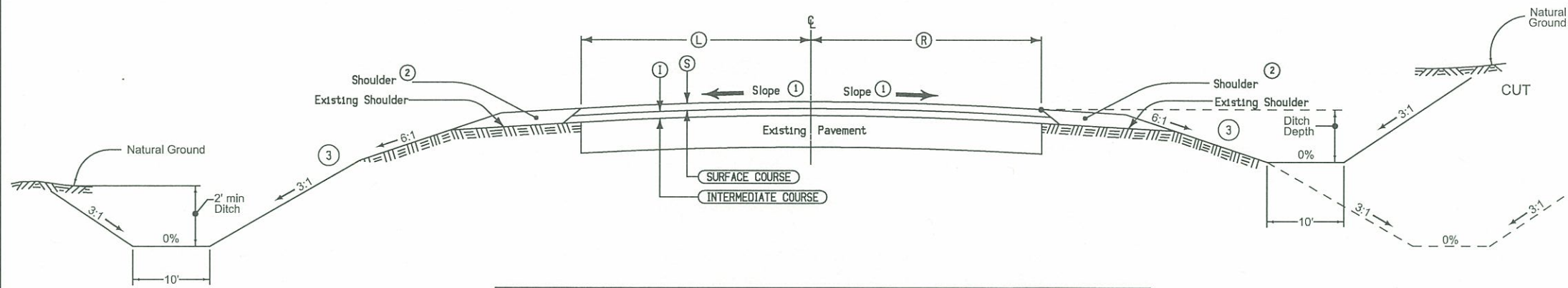
LOCATION		DIMENSIONS			
ROAD IDENTIFICATION	STATION TO STATION	Ⓛ	Ⓡ	ⓧ	Ⓜ
		Feet	Feet	Inches	Feet
Ia. 3	173+00.00 175+30.00	12.05	12.05	6	①

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

See Plan & Profile sheets and cross sections for additional details of ditches and backslopes.  
 ① Refer to Typ. 4311



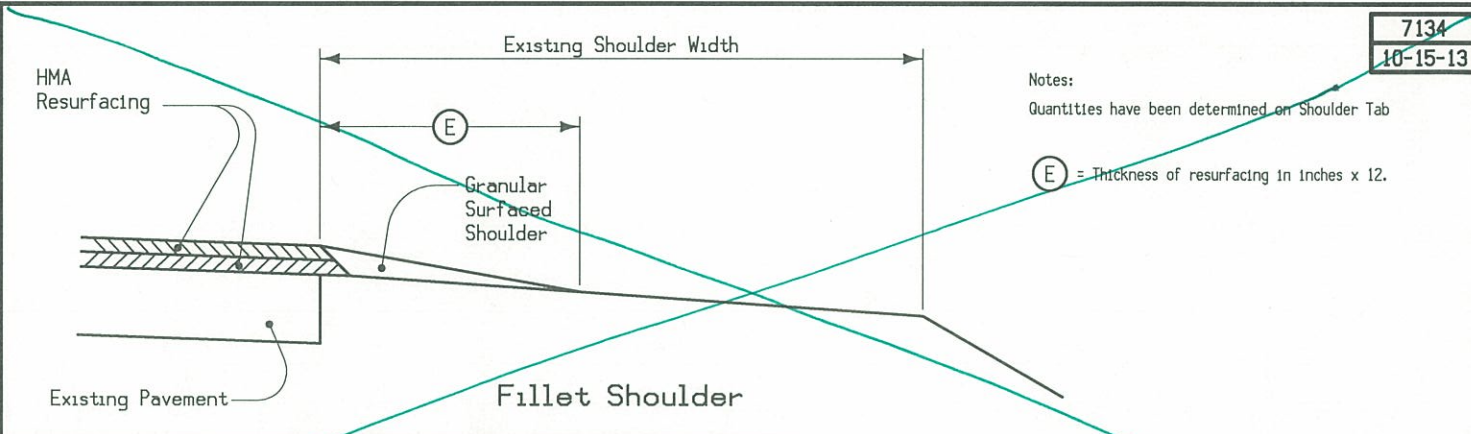




- Notes:
- Match finished slope to existing pavement, except that the maximum allowable slope is 3.0 %, minimum allowable slope is 2.0 %. Section may be modified as directed by the Engineer through areas of special shaping. Refer to tabulation listing of superelevated curves and Standard Road Plans for additional requirements through superelevated curves.
  - Refer to shoulder typicals
  - Refer to Typical 4311 and cross sections for slope transitions.

**TYPICAL CROSS SECTION  
HMA RESURFACING**

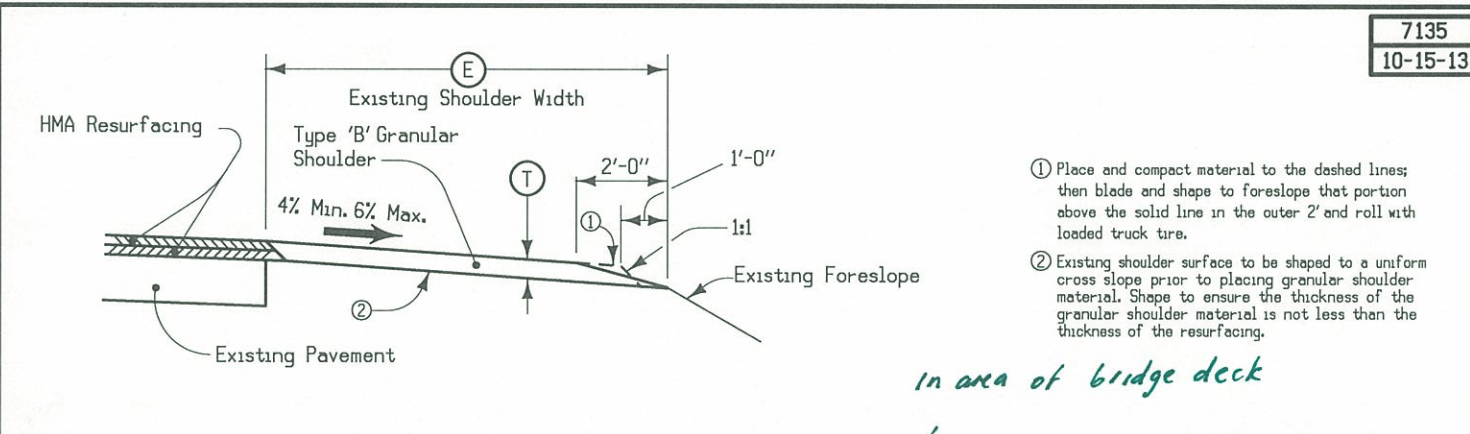
ROAD IDENTIFICATION		LOCATION		(S)	(I)	(L)	(R)
		STATION TO STATION		Inches	Inches	Feet	Feet
Ia. 3		173+50.00	173+00.00	1.5	0.0-1.5	14.0	14.0
Ia. 3		173+00.00	175+30.00	1.5	1.5	14.0	14.0
Ia. 3		175+30.00	176+80.00	1.5	1.5-0.0	14.0	14.0



7134  
10-15-13

**TYPICAL FILLET SECTION  
FOR TYPE 'B'  
GRANULAR SURFACED SHOULDER  
ADJACENT TO HOT MIX ASPHALT RESURFACING**

ROAD IDENTIFICATION		LOCATION		(E)
ROAD IDENTIFICATION	SIDE	STATION TO STATION		Feet
Ia. 3	Lt.	171+50.00	173+19.50	0-3
Ia. 3	Lt.	175+54.40	176+80.00	3-0
Ia. 3	Rt.	171+50.00	171+82.00	0-3
Ia. 3	Rt.	174+41.00	176+80.00	3-0



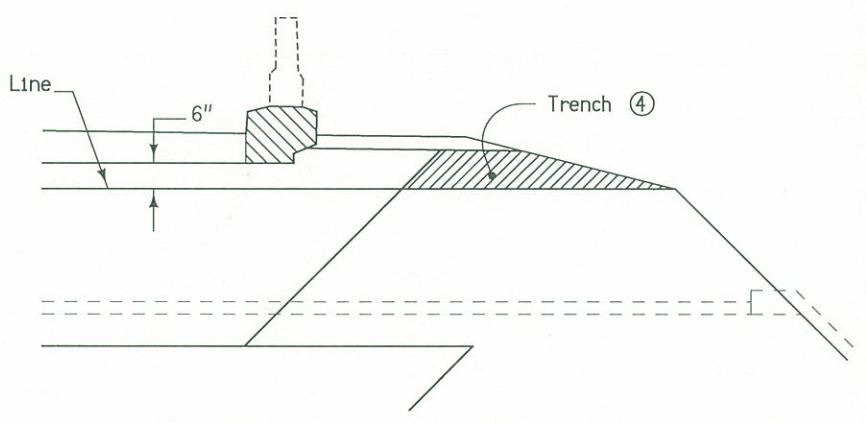
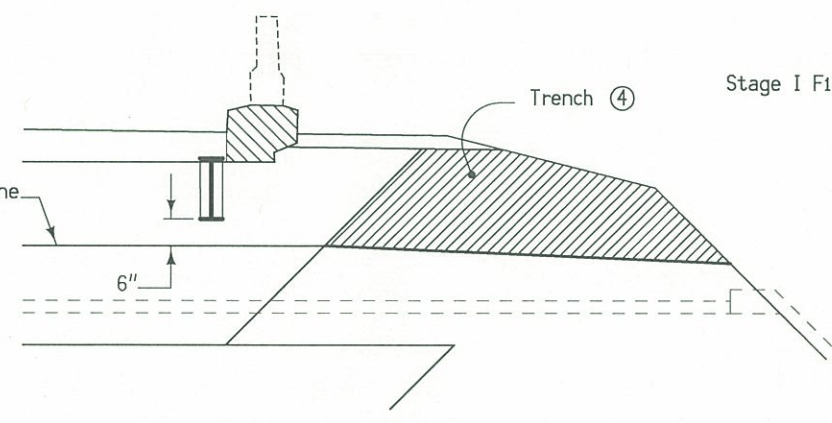
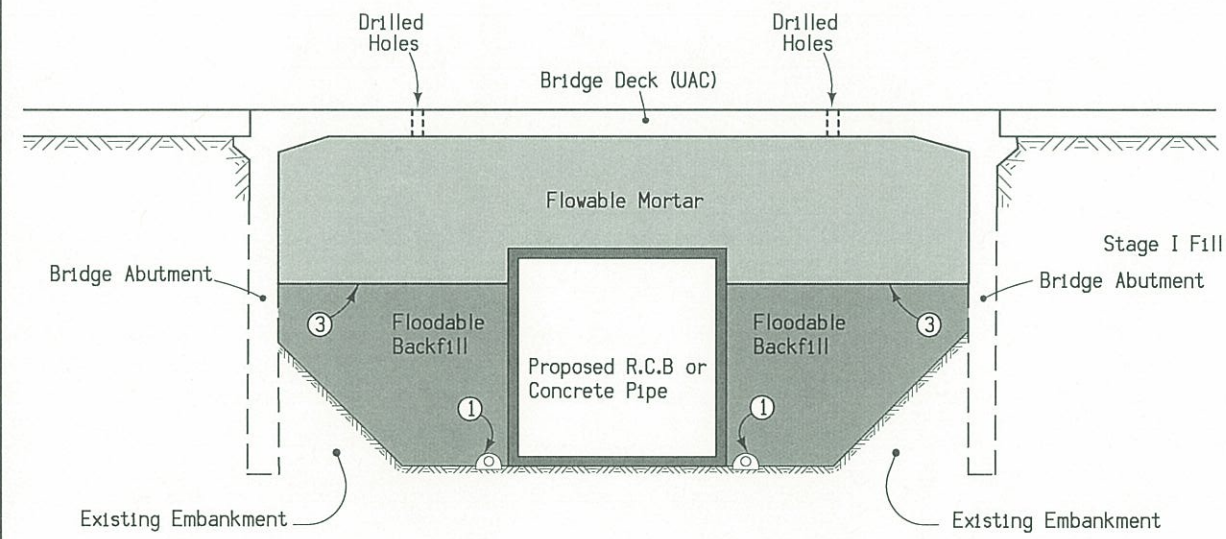
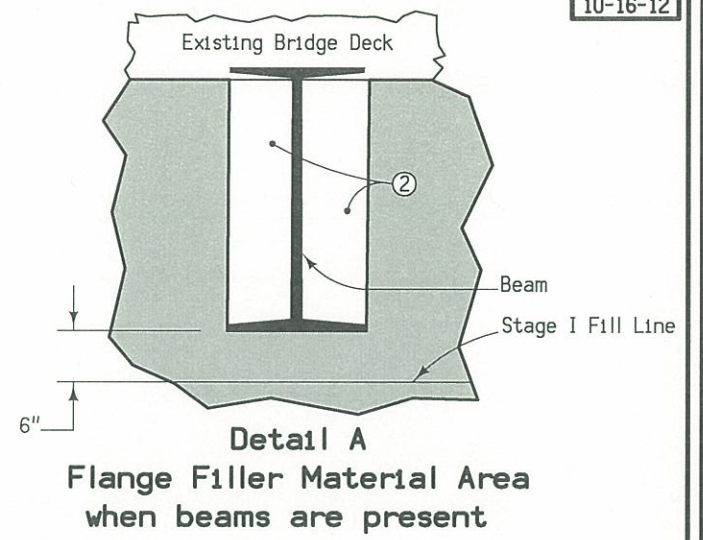
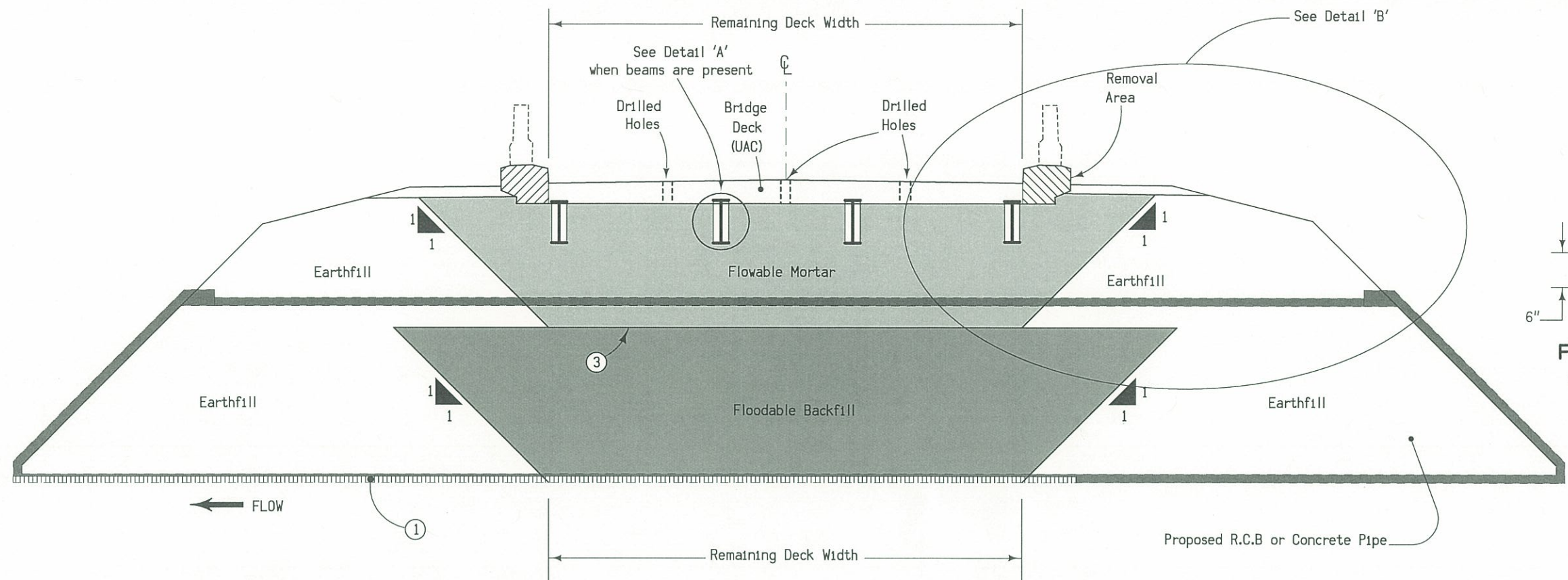
7135  
10-15-13

**TYPICAL SECTION  
FOR TYPE 'B'  
GRANULAR SHOULDER  
ADJACENT TO HOT MIX ASPHALT  
RESURFACING**

ROAD IDENTIFICATION		LOCATION		SIDE	(T)	(E)
ROAD IDENTIFICATION	STATION TO STATION	STATION TO STATION	SIDE	Inches	Feet	
Ia. 3	173+19.50	175+54.40	Lt.	6	6	
Ia. 3	171+82.00	174+41.00	Rt.	6	6	

*in area of bridge deck*

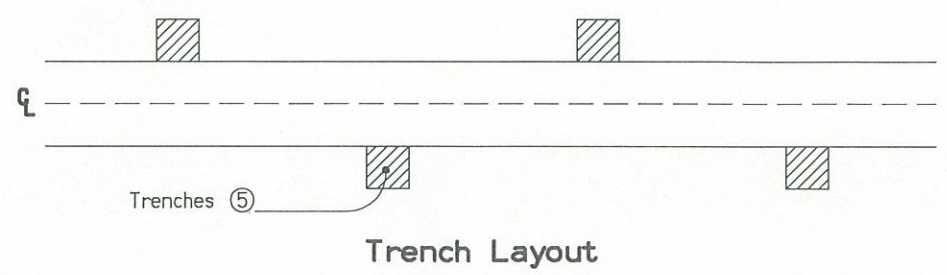
*5'*



Section along Centerline

Detail B (Beam Bridge)

Detail B (Slab Bridge)



Trench Layout

Denotes pay limits for flowable mortar  
 Denotes pay limits for flooded backfill

- ① 4" Subdrain at flowline elevation of culvert with 4" cover of porous backfill.
- ② Place Flange Filler Material to fill pocket area between flanges to prevent flowable mortar from building up. Flange Filler Material is incidental to flowable mortar.
- ③ Fill void with the maximum amount of Floodable Backfill possible. Distance from Floodable Backfill to bridge beams (when present) or bridge deck shall not exceed 5'.
- ④ Cut trenches in the soil plug to provide drainage for the flowable mortar. Backfill the trenches with open graded crushed stone, gravel, or recycled PCC to allow water to drain. Backfill material is incidental to flowable mortar.
- ⑤ Place trenches at 20' spacing with a minimum of two trenches on each side of the roadway.

**FILL FOR CULVERT USED IN BRIDGE REPLACEMENTS**

### SURVEY SYMBOLS

- x— FW Wire Fence
- GDL Guard Rail Steel
- BRG Bridge
- PIP Pipe Culvert
- o OUT Tile Outlet
- Tile TIL Tile Line
- LIN Miscellaneous Line
- ~~~~~ TLNL Tree Line Left
- ~~~~~ TLNR Tree Line Right
- PRO Profile Shot
- ENU Edge Unpaved Entrance & Parking
- EP Edge of Paved Roads (ML or SR)
- ENT Centerline BL of Entrance
- ← DU Centerline Draw or Stream (Up)
- SNP Unpaved Shoulder
- BNK Stream Bank
- D Centerline Draw or Stream (Down)
- SP Stream Profile
- CU Back of Curb
- GU Gutter In Front of Curb
- EW Edge of Water
- SOP Size of Pipe or Culvert
- TW Top of Water
- BD Bridge Deck
- BCL Bridge Centerline
- SBR Size of Bridge
- BLS Bridge Low Steel
- BL Topo Breakline
- C Centerline BL of Road (ML or SR)
- o MM Mile Marker Post
- W — Iowa Lakes Regional Water (QLD)
- FO — Century Link (QLD)

### UTILITY LEGEND

- W — Iowa Lakes Regional Water
- FO — CenturyLink

Iowa Lakes Regional Water  
 Kelly Graplar Design Coordinator/Cadd Technician  
 1301 38th Avenue West Box 555  
 Spencer, IA. 5130-0555  
 712-262-8847  
 kelly.graplar@ilrw.org

CenturyLink  
 Carroll Wheaton Manager  
 7404 N 78th Street  
 Omaha, NE. 68122  
 402-572-5887  
 Carroll.Wheaton@centurylink.com

### 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

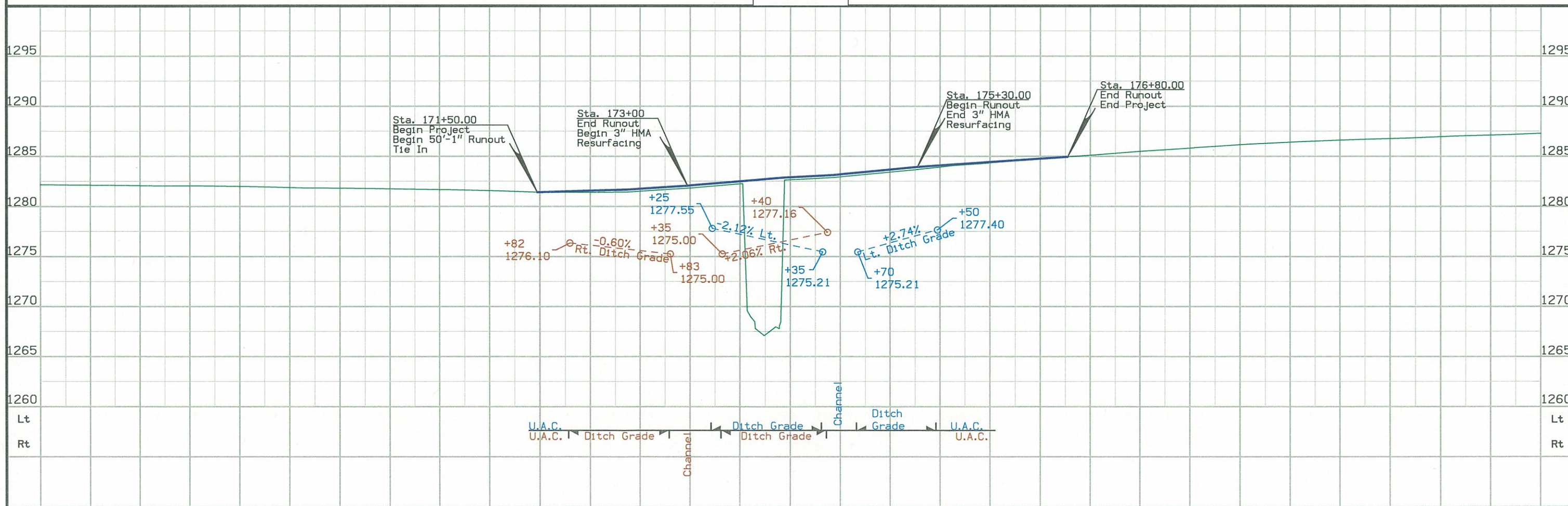
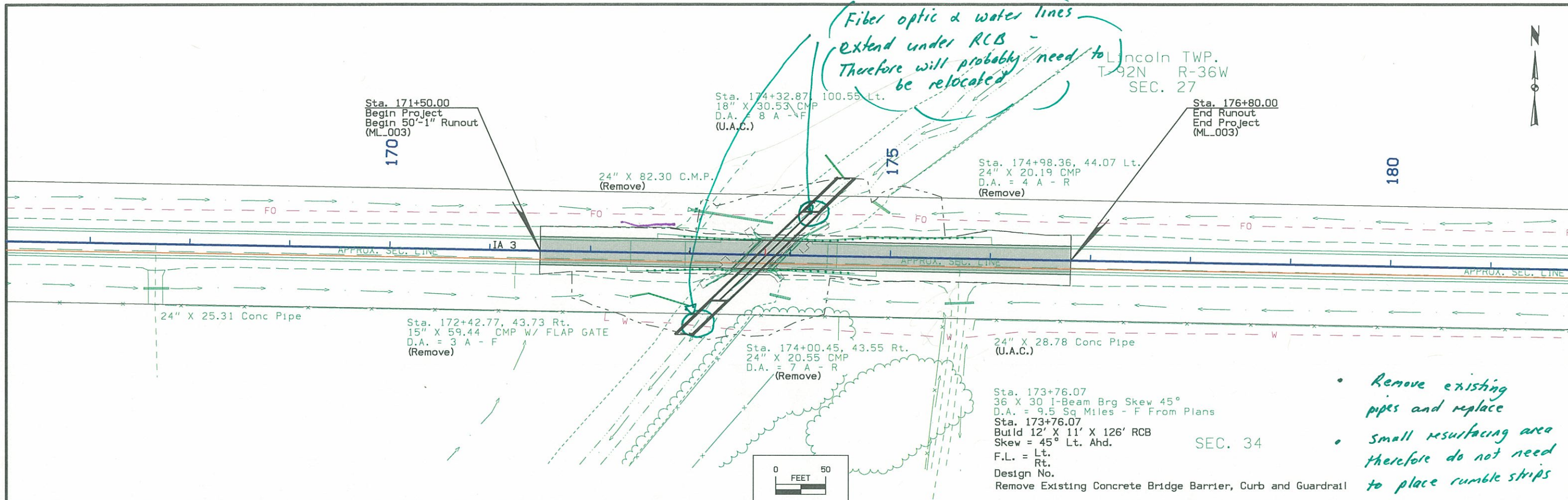
- Reference Point
- Station
- Survey Line
- Section Corner
- Ground Line Intercept
- Saw Cut
- Guardrail
- Trench Drain
- HighTension Cable Guardrail
- Sheet Pile
- Pavement Removal
- Clearing & Grubbing Area

### 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
- C/A Access Control
- Property Line

## PLAN AND PROFILE LEGEND AND SYMBOL INFORMATION SHEET

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



## Survey Information

Butler County  
 BRF-57-1(25)-39-12  
 Bridge Replacement over Phelps Creek  
 IA 57 0.3 miles east of east jct. of IA 14 at Parkersburg  
 PIN 12-12-057-020  
 Sap-0830

### General Information

Measurement units for this survey are US survey feet. This survey is for a proposed Bridge replacement project over Phelps Creek on IA 57 at Parkersburg. Project datum and control information is provided by Design Survey Office. This project is a Partial DTM with Photo control.

### Vertical Control

Vertical datum for this survey is NAVD88 computed using Geoid 12A. Datum was transferred to the project at points 100 and 102 from IaRTN reference stations using a static post processed network survey. BM 500 was located relative to Control points 100 and 102.

### Horizontal Control

The project coordinate system is modified Iowa State Plane North Zone (U.S. Survey Feet) scaled around Pt. 102 at 3513900.962 N, 5120477.557 E, 983.635 EL. Horizontal datum is NAD83(2011) (Epoch 2013.00). Coordinates were transferred to the project at points 100 and 102 from IaRTN reference stations using a static post processed network survey. Pt. 101 was located relative to Point 100 and 102.

1/Combined Scale Factor of project= 1.000095256429

The 1/Combined Scale Factor, scaled about Pt. 102, may be used for GNSS stakeout and location to survey in the Project Coordinate system.

### Alignment Information

The horizontal alignment for this survey is a retrace of 1929 Paving Plan 167-F for U.S.Road No.20 from Parkersburg east to the Grundy County Line. Survey stationing was equated to the plan PI at STA 100+00.0 and run ahead without equation throughout the survey.

Survey stationing relates to as built plan stationing as follows:

PI Sta. 83+59.4 Back = PI Sta. 100+00.0 Ahead 1929 Paving Plan 167-F =  
 Survey PI Sta. 100+00.00

PI Sta 117+80.1 Paving Plan 167-F =  
 Survey PI Sta.117+80.49

PI Sta. 134+06.8 Paving Plan 167-F =  
 Survey PI Sta. 134+06.91

## VERTICAL CONTROL

Point	North	East	Elevation	Station	Offset	Feature	Description
100	3671641.253	5117629.417	986.157	100+62.91	104.379	CP	FD 5/8IN RE-ROD
101	3671700.080	5117817.494	983.909	102+51.21	46.278	CP	SET 5/8IN RE-ROD
102	3671724.046	5120477.557	983.635	129+11.11	39.879	CP	SET FENO MONUMENT

<p>Diagram showing a path with segments of 115.94', 96.16', and 115.59'.</p>	<p>Diagram showing a path with segments of 47.93', 83.94', and 99.65'.</p>	<p>Diagram showing a path with segments of 26.03', 74.07', and 29.5'.</p>	

1300	CALC. HINGE POINT=1278.87	PG=1282.48	CALC. TOP SUBGRADE=1280.82	1300
1290				1290
1280	FL INLET=1265.00	3:1	6:1	1280
1270			VAR.	1270
1260				1260
1250				1250

PI STA X      VC = X'  
 PI ELEV X

### PROPOSED PROFILE GRADE ON IA 3

PROFILE GRADE LINE (PGL) IS AT  $\frac{1}{2}$  OF LANES.

#### TRAFFIC ESTIMATE

2018 AADT	1800 V.P.D.
2038 AADT	2400 V.P.D.
20?? DHV	- V.P.H
TRUCKS	33 %
TOTAL DESIGN ESAL's	-

#### UTILITIES LEGEND:

W IOWA LAKES REGIONAL WATER  
 FO CENTURYLINK

#### HYDRAULIC DATA

DRAINAGE AREA= 10 MI<sup>2</sup>  
 STREAM SLOPE= 12.80 FT./MI.

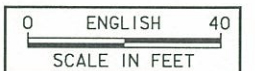
Q<sub>50</sub>= 1260 CFS  
 MAXIMUM HEADWATER= 1277.75  
 OUTLET VELOCITY= 12.33 FT/SEC

Q<sub>100</sub>= 1540 CFS  
 MAXIMUM HEADWATER= 1279.57

Q<sub>500</sub>= 2270 CFS  
 Q OVERTOPPING= 1743.83 CFS  
 ROADWAY OVERTOP ELEV.= 1281.17  
 STA 171+50.00

#### LOCATION

IA 3 OVER LATERAL 3 OF DD#34  
 T-92N R-36W  
 SECTION 27/34  
 LINCOLN TOWNSHIP  
 BUENA VISTA COUNTY  
 FHWA NO. 16230  
 BRIDGE MAINT. NO. 1184.9S003  
 LATITUDE 42.748815° N  
 LONGITUDE 95.086489° W

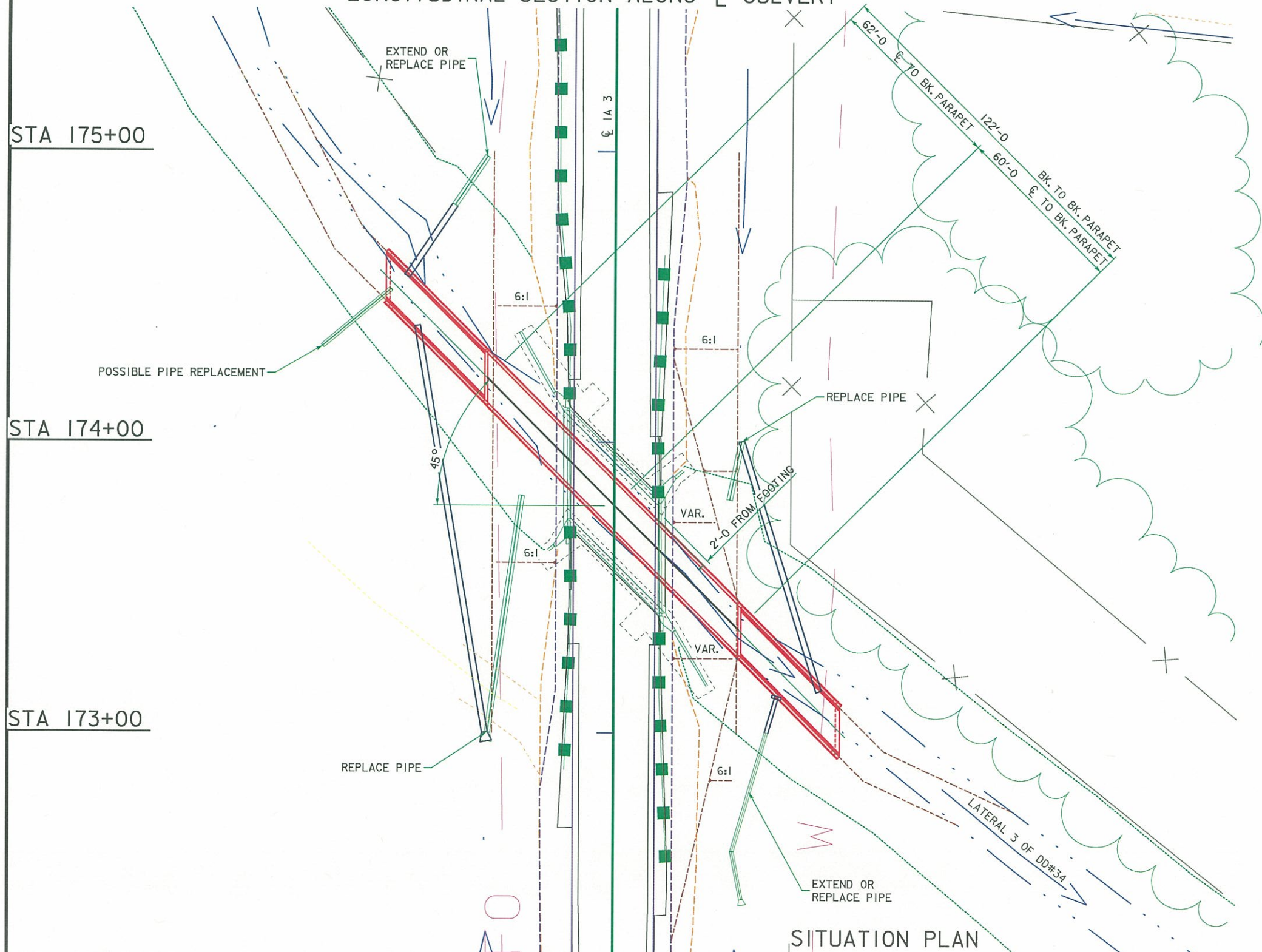


PRELIMINARY

DESIGN FOR 45° LA SKEW  
**12' x 11' x 122'-0 REINFORCED CONCRETE BOX CULVERT**  
 WITH 45° HEADWALLS

**SITUATION PLAN**  
 STATION: 173+78.17  
**BUENA VISTA COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. \_\_\_\_ OF \_\_\_\_ FILE NO. \_\_\_\_ DESIGN NO. \_\_\_\_

#### LONGITUDINAL SECTION ALONG $\frac{1}{2}$ CULVERT



#### 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 LO ----- 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
- BLDRS ----- 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**

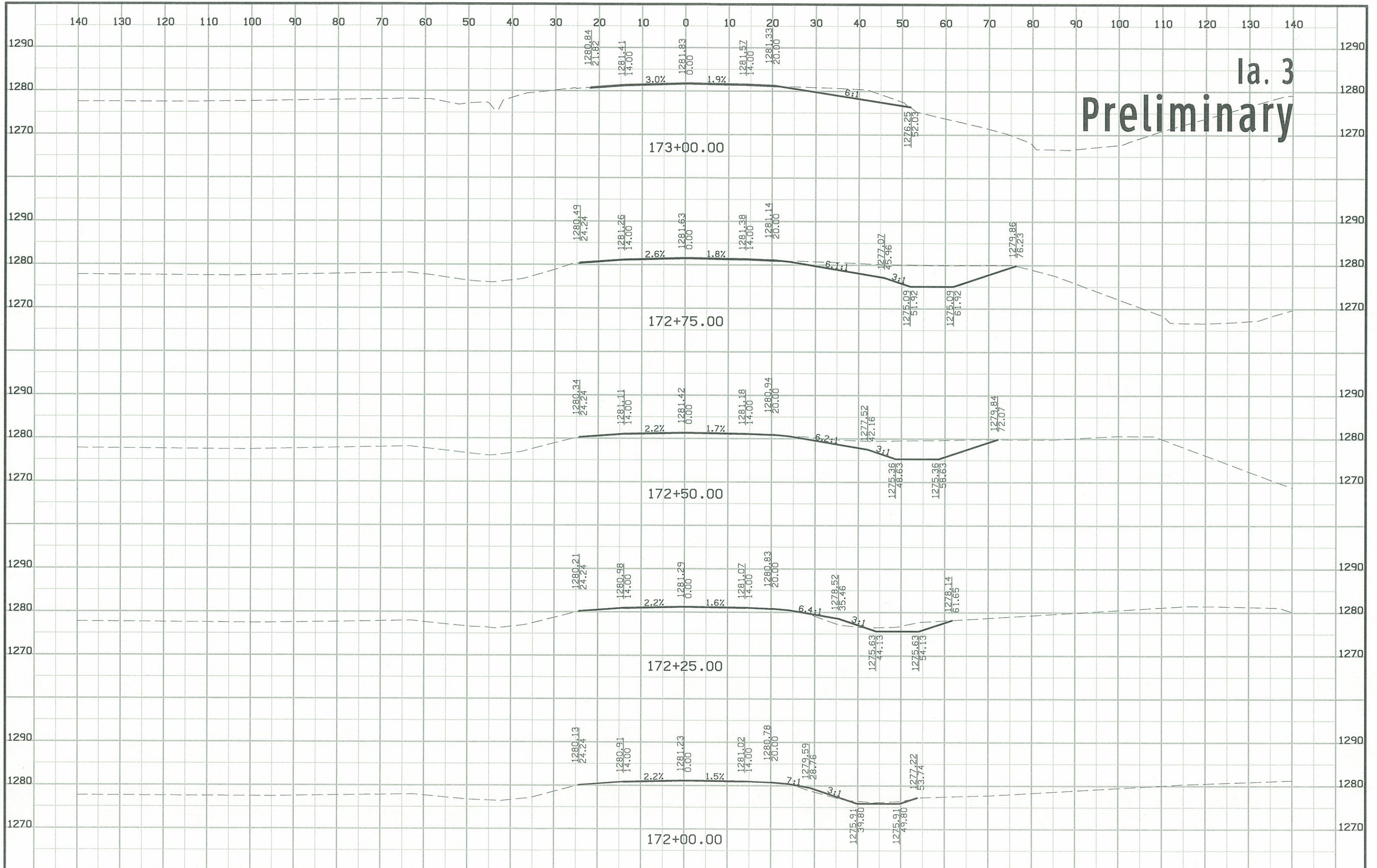
- Existing ROW  
----- Existing Right-of-Way Limit
- Proposed ROW  
----- Proposed Right-of-Way Limit
- Temporary ROW  
----- Temporary Right-of-Way Limit

**CROSS SECTION  
LEGEND AND SYMBOL  
INFORMATION SHEET**

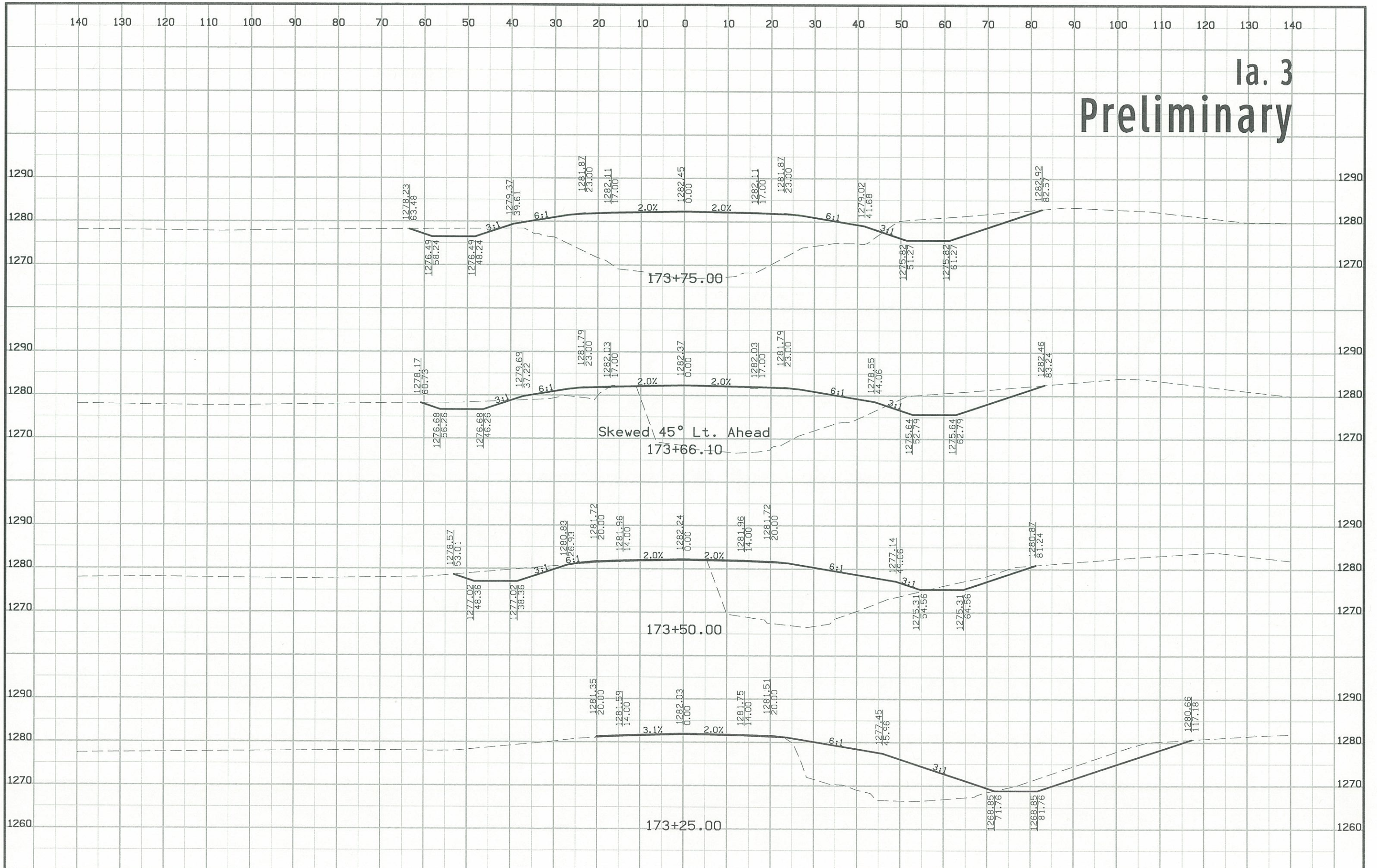
(COVERS SHEET SERIES W, X, Y, & Z)



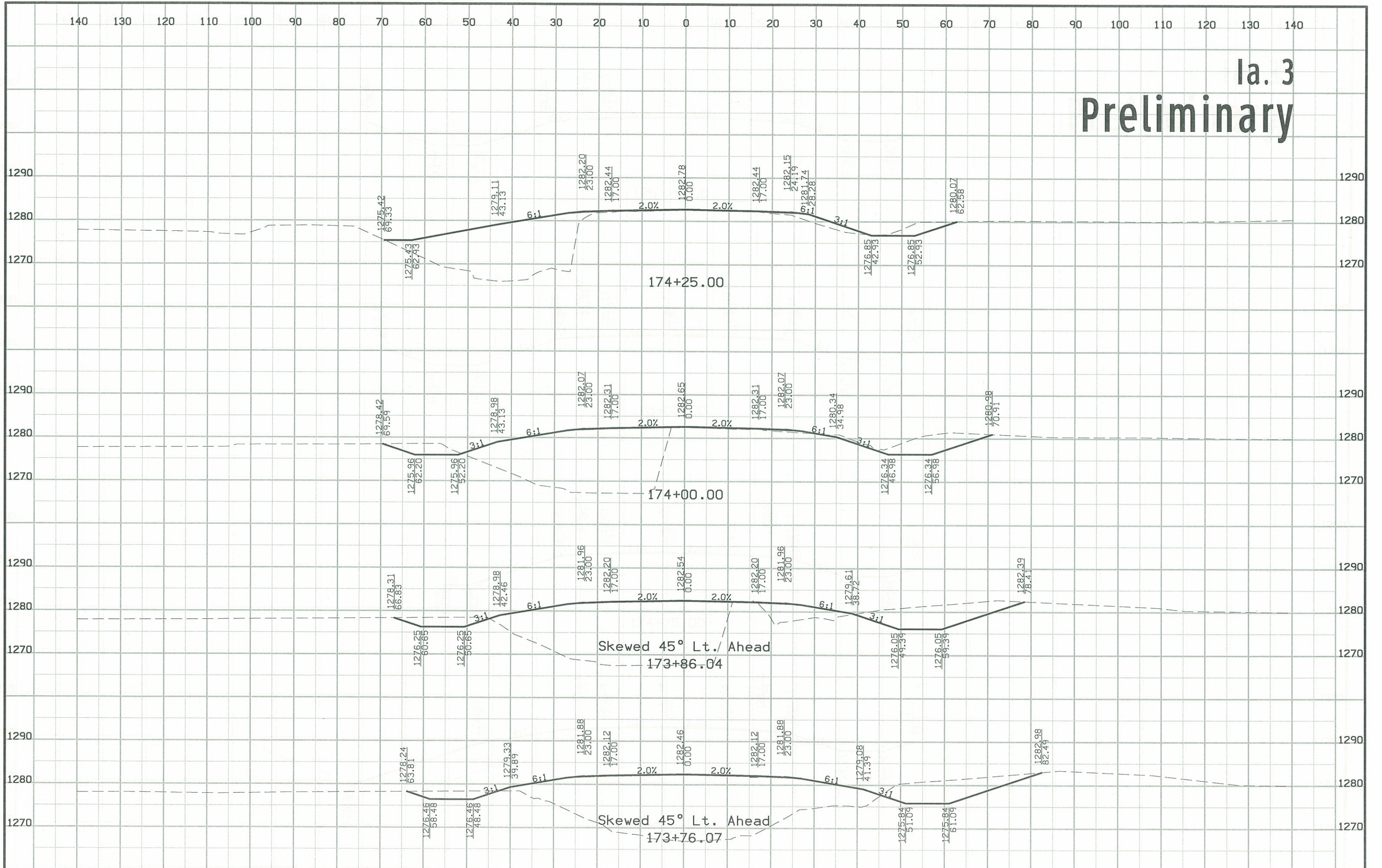
# Ia. 3 Preliminary



# 1a.3 Preliminary



# 1a.3 Preliminary



# 1a. 3 Preliminary

