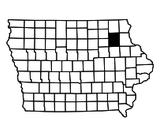
INDEX OF SHEETS

J.2 DETOUR SHEET TO BE PROVIDED BY DISTRICT 2

Included on pages 34-44 is the plan set for the culvert replacement



DESIGN DATA RURAL

2024 AADT	1,600	V.P.D.
2044 AADT	1,700	V.P.D.
2044 DHV	170	V.P.H.
TRUCKS	11	%
Total Design ESALs	--	

INDEX OF SEALS

SHEET NO.	NAME	TYPE
A.1	Michael J. Janechek	Primary Signature Block
CS.1	David J. Heer	Geotechnical Design

I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

Signature Date

Michael J. Janechek

Printed or Typed Name

My license renewal date is December 31, 2024

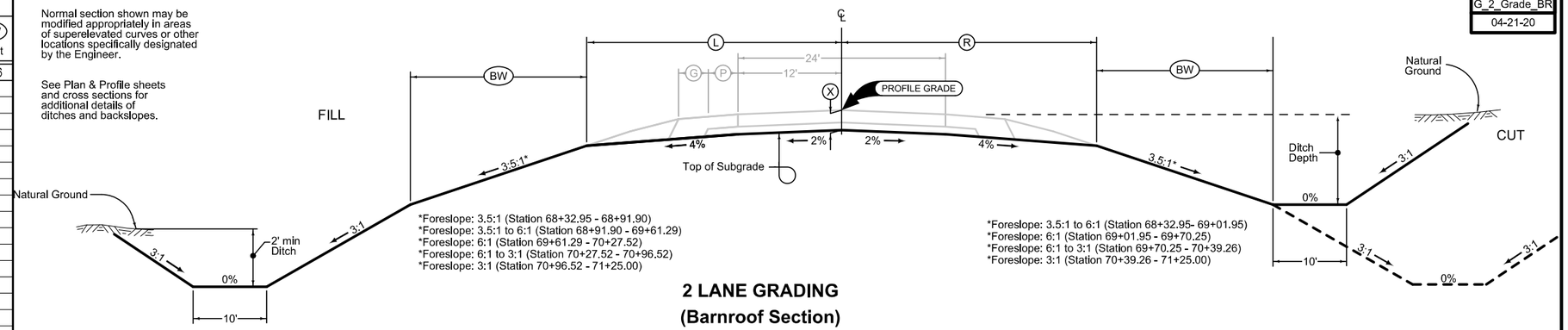
Pages or sheets covered by this seal: A.1, B.1-2, C.1-6, D.1-2, G.1-4, H.1, J.1-2, RC.1-6, R.1-2, W.1-5

LOCATION			DIMENSIONS			
ROAD IDENTIFICATION	STATION TO STATION		(L) Feet	(R) Feet	(X) Inches	(BW) Feet
IA 93	68+32.95	71+25.00	30.84	30.84	22	11.16

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

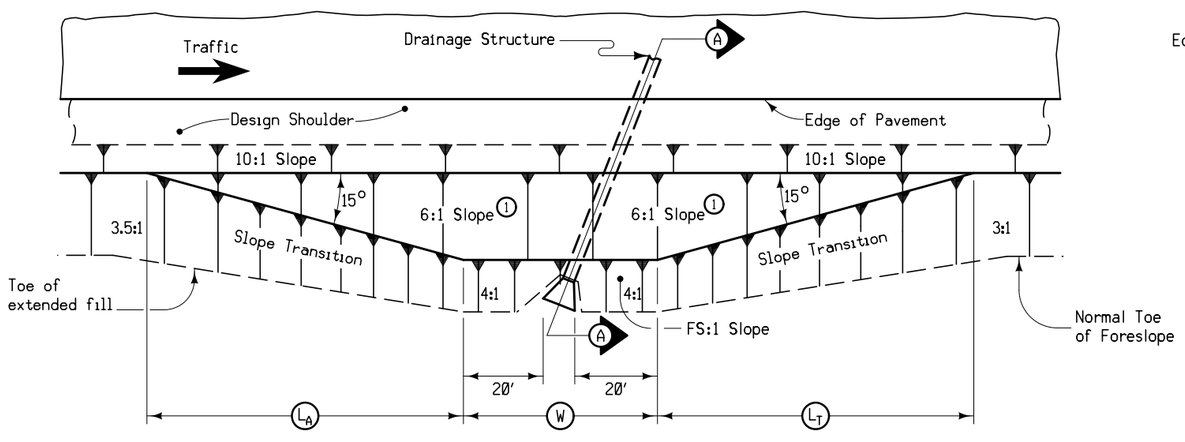
See Plan & Profile sheets and cross sections for additional details of ditches and backslopes.

G_2_Grade_BR
04-21-20

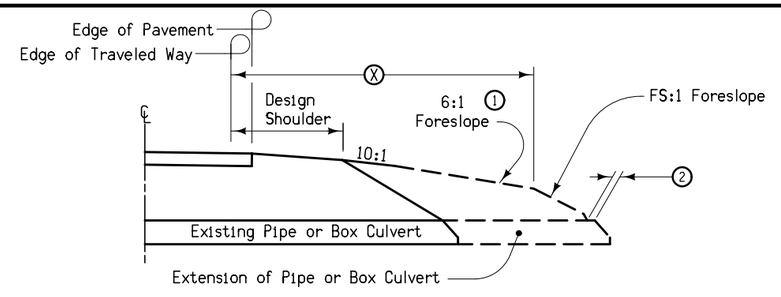


2 LANE GRADING
(Barnroof Section)

Grading Extends Beyond Pavement Limits



PLAN VIEW



SECTION A-A

STRUCTURE LOCATION		(W)	(L_A)	(L_T)	(X)	(FS)
STATION (3)	SIDE	Feet	Feet	Feet	Feet	
69+73.73	LT	68	69	69	30	4
	RT	68	69	69	30	4

DESIGNER INFO
4312
MODIFIED

At locations where an extended or newly constructed drainage structure extends beyond the normal foreslope cover, flatten as indicated so as to cover the structre. Minimum earth cover is 6 inches.

(1) Slope may be flatter than 6:1.

(2) 6 inch minimum for pipe installations or to top of headwall on RCB.

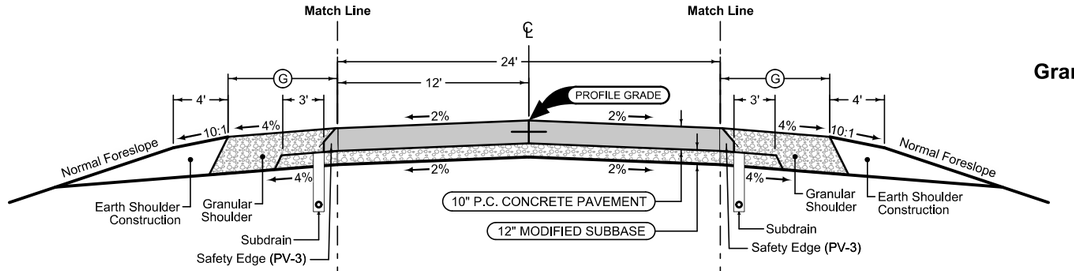
(3) At ℄ of road.

(W) = Pipe or RCB opening width plus 20 feet each side.

BARNROOF FORESLOPE AT SKEWED DRAINAGE STRUCTURE

Granular Shoulder with Safety Edge

		2_G_ 04-21-20
STATION TO STATION		Ⓖ Feet
69+00.61	70+65.87	8



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

	2P_ 04-21-20
STATION TO STATION	
69+00.61	70+65.87

Granular Shoulder with Safety Edge

		2_G_ 04-21-20
STATION TO STATION		Ⓖ Feet
69+00.61	70+65.87	8

See Tab 100-24 or 100-25 for pavement quantities.

See Tab 112-9 for shoulder quantities.

IA 93

ESTIMATED PROJECT QUANTITIES AND REFERENCE NOTES

Item no.	Item Code	Item	Unit	Quantities	Estimate Reference Notes
				Estimated	
				Roadway Items	
1	2101-0850001	CLEARING AND GRUBBING	ACRE	1	All material generated as a result of Clearing and Grubbing shall become the property of the contractor and must be disposed off site. Quantity included for area within ROW.
2	2102-2625001	EMBANKMENT-IN-PLACE, CONTRACTOR FURNISHED	CY	1,530	Includes 1,980 CY of fill material. Adding 30% shrink = 2,570 CY. Subtracting 590 CY of cut material = 1,980 CY Factoring out shrink to establish bid item = 1,530 CY Overhaul will not be paid.
3	2102-2710070	EXCAVATION, CLASS 10, ROADWAY AND BORROW	CY	590	Includes cut material for removals to reach proposed subgrade. (590 CY of Cut). Shrink is not included.
4	2102-2712015	EXCAVATION, CLASS 12, BOULDERS OR ROCK FRAGMENTS	CY	10	A. Refer to Tab. 103-7. B. Dispose of excess material according to Article 1106.07 of the current specifications.
5	2105-8425015	TOPSOIL, STRIP, SALVAGE AND SPREAD	CY	910	Refer to Tab. 103-10 on sheet CS.1 Strip 12 inches of topsoil within the limits of grading. After excavating to the sub grade elevations, spread the stockpiled topsoil to an 8 inch depth across the grading area. Seed the disturbed topsoil stockpile area as per section 2601.05 of the standard specifications. Seeding of the stockpile areas shall be considered incidental to this bid item.
6	2107-0425020	COMPACTING BACKFILL ADJACENT TO BRIDGES, CULVERTS OR STRUCTURES	CY	100	Refer to Tab.104-4 in the C-sheets.
7	2107-0875100	COMPACTION WITH MOISTURE CONTROL	CY	1,980	Refer to Tab. 103-6 on Sheet CS.1. Cubic yards shown on the contract documents as determined by the template fill volume. Shrinkage will not be included in the moisture control quantity.
8	2115-0100000	MODIFIED SUBBASE	CY	80	Refer to Typical sections and tab 100-24 in the C-sheets.
9	2121-7425020	GRANULAR SHOULDERS, TYPE B	TON	339.4	Refer to Typical section and Tabulation 112-9.
10	2123-7450000	SHOULDER CONSTRUCTION, EARTH	STA	3.31	Refer to Tab. 112-9. Requires a minimum of 4 inches of topsoil. Place according to Article 2105.03,B of the Standard Specifications.
11	2301-1033100	STANDARD OR SLIP FORM PORTLAND CEMENT CONCRETE PAVEMENT, CLASS C, CLASS 3 DURABILITY, 10 IN.	SY	440.7	Refer to typical section and tab 100-24.
12	2402-0425040	FLOODED BACKFILL	CY	94	Refer to tab 104-4.
13	2416-0100030	APRONS, CONCRETE, 30 IN. DIA.	EACH	2	Refer to tab 104-3. Includes removal and disposal of existing 30" RCP aprons and placement with new 30" RCP aprons at field entrance as shown on sheet D.2.

Item no.	Item Code	Item	Unit	Quantities	Estimate Reference Notes
				Estimated	
				Roadway Items	
14	2418-0000010	TEMPORARY STREAM DIVERSION	EACH	1	
15	2502-8212034	SUBDRAIN, LONGITUDINAL, (SHOULDER) 4 IN. DIA.	LF	391.6	Refer to sheet CS.1.
16	2502-8221306	SUBDRAIN OUTLET, DR-306	EACH	4	
17	2505-4008120	REMOVAL OF STEEL BEAM GUARDRAIL	LF	264	Refer to tab 110-7A on sheet C.4. Includes removal and disposal of beams and posts.
18	2510-6745850	REMOVAL OF PAVEMENT	SY	368.3	A. Refer to Tabs.110-1 and 102-5 on Sheet C.4.
19	2527-9263109	PAINTED PAVEMENT MARKING, WATERBORNE OR SOLVENT-BASED	STA	3.72	Refer to Tab. 108-22 on Sheet C.6.
20	2528-2518000	SAFETY CLOSURE	EACH	3	Refer to Tab. 108-13A on sheet C.4. Item includes 2 hazard closures and 1 roadway closure.
21	2528-8445110	TRAFFIC CONTROL	LS	1	Refer to Traffic Control Plan on Sheet J.1 and detour on J.2. Contractor to furnish and install, maintain and remove all road closure signage and detour signage.

100-1D
10-18-05

PROJECT DESCRIPTION

This project involves the replacement of the IA 93 bridge at a stream 0.7 mi W of Co Rd V68 with a twin 12'x11 RCB using an off-site detour.

111-25
10-18-11

INDEX OF TABULATIONS

Tabulation	Tabulation Title	Sheet No.
C Sheets		
100-0A	ESTIMATED ROADWAY QUANTITIES (1 DIVISION PROJECT)	C.1-2
100-1D	PROJECT DESCRIPTION	C.3
100-4A	ESTIMATE REFERENCE INFORMATION	C.1 - C.2
100-24	P.C.C. PAVEMENT	C.6
102-5	EXISTING PAVEMENT	C.4
104-3	DRAINAGE STRUCTURE BY ROADWAY CONTRACTOR	C.5
104-4	ROADWAY ITEMS FOR DRAINAGE STRUCTURES INSTALLED BY CULVERT CONTRACTOR	C.5
105-4	STANDARD ROAD PLANS	C.3
108-13A	SAFETY CLOSURES	C.4
108-22	PAVEMENT MARKING LINE TYPES	C.6
110-1	REMOVAL OF PAVEMENT	C.4
110-7A	REMOVAL OF STEEL BEAM GUARDRAIL	C.4
111-25	INDEX OF TABULATIONS	C.3
112-9	SHOULDERS	C.5

105-4
10-18-11

STANDARD ROAD PLANS

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

Number	Date	Title
DR-101	04-18-17	Pipe Culvert (Bedding and Backfill)
DR-111	04-17-18	Box Culvert (Backfill)
DR-121	04-18-23	Connected Pipe Joints
DR-201	10-17-23	Concrete Aprons
DR-303	10-17-17	Subdrains (Longitudinal)
DR-306	10-16-18	Precast Concrete Headwall for Subdrain Outlets
EW-101	10-17-17	Embankment and Rebuilding Embankments
EW-402	04-18-17	Temporary Stream Diversion
PM-110	04-21-20	Line Types
PV-101	04-19-22	Joints
SW-101	04-17-18	Trench Bedding and Backfill Zones
SW-102	04-20-21	Rigid Gravity Pipe Trench Bedding
TC-1	10-15-19	Work Not Affecting Traffic (Two-Lane or Multi-Lane)
TC-202	10-19-21	Work Within 15 ft of Traveled Way
TC-252	04-21-20	Routes Closed to Traffic

102-5
04-18-17

EXISTING PAVEMENT

No.	Location					Year	Type	Project Number	Surface		Base		Subbase		Removal		Coarse Aggregate			Reinforcement	Remarks
	County	Route	Dir. of Travel	Begin Ref. Loc. Sign	End Ref. Loc. Sign				Type	Depth IN	Type	Depth IN	Type	Depth IN	Type	Depth IN	Source	Type	Durability Class	Type	
1	33	IA 93	1	17.09	19.08	2013		MP-093-2-(701)16--76-33	BSC		HMA	1.5			SCR	1					
						1990		MP-93-2(1)16--76-3	BSC												
						1971		FN-93-2(2)--21-3	BAC	2	TBB	2.5					TEMPLETON-S.E.	C. LST.			
						1951		F-380(8)	BSC	0.5	RSB	6					SUMNER	GRAVEL			

LEGEND

BSC	BITUMINOUS SEAL COAT
C. LST.	CRUSHED LIMESTONE
HMA	HOT MIX ASPHALT
SCR	SCARIFICATION
TBB	TYPE B ASPHALT CEMENT CONCRETE BASE
BAC	TYPE B ASPHALT CEMENT CONCRETE
RSB	ROLLED STONE BASE

262-6
10-18-05

UTILITIES
(NON POINT 25 PROJECT)

This is NOT a POINT 25 project and is not subject to the provisions of IAC 761-115.25.

110-1
04-16-13

REMOVAL OF PAVEMENT

Refer to Tabulation 102-5

* Not a Bid Item

Begin Station	End Station	Side	Pavement Type	Area SY	Saw Cut* LF	Remarks
69+00.61	69+71.56	BOTH	HMA	189.2	24.0	
69+98.71	70+65.87	BOTH	HMA	179.1	24.0	
			TOTAL:	**368.3**	**48.0**	

110-7A
04-17-12

REMOVAL OF STEEL BEAM GUARDRAIL

(1) Lane(s) to which the installation is adjacent.
(2) Includes length of End Terminals and End Anchors.

No.	(1) Direction of Traffic	Location: Station to Station		Side	Removal of Guardrail (2) LF
1	BOTH	69+03.00	69+69.00	LT	66.0
2	BOTH	70+00.00	70+66.00	LT	66.0
3	BOTH	69+03.00	69+69.00	RT	66.0
4	BOTH	70+00.00	70+66.00	RT	66.0
			TOTAL:		**264.0**

108-13A
08-01-08

SAFETY CLOSURES

Refer to Section 2518 of the Standard Specifications

Station	Closure Type: Road Qty.	Closure Type: Hazard Qty.	Remarks
65+00.00	1		
68+20.00		1	
71+00.00		1	
TOTALS=	1	2	

SHOULDERS

(1) Lane(s) to which the shoulder is adjacent.
(2) Bid Item
(3) Applies only for Paved Shoulders constructed on project with existing granular shoulders.
(4) Does not include shrink.

Calculations assume a HMA unit weight (lbs/cf) of 145, a Special Backfill unit weight (lbs/cf) of 140, and a Granular Shoulder unit weight (lbs/cf) of 140.

Location					Quantities																	
Road Identification	(1) Direction Of Traffic	Station to Station		Side	(P) Width	(G) Width	(L) Length	(3) Class 13 Excavation	Hot Mix Asphalt		Binder	Paved Shoulder	Temporary Pavement	Special Backfill				Modified Subbase	Granular Shoulder		Earth Shoulder Construction Alternates			Remarks
														HMA Alternate		PCC Alternate					(2) STA	HMA	PCC	
					FT	FT	FT	CY (2)	TON	TON/STA	TONS	SY (2)	SY (2)	TON (2)	TON/STA	TON (2)	TON/STA	CY (2)	TON (2)	TON/STA		CY (4)	CY (4)	
IA 93	BOTH	69+00.61	70+65.87	LT		8.0	165.3												169.7	102.7	1.65			
	BOTH	69+00.61	70+65.87	RT		8.0	165.3												169.7	102.7	1.65			
			TOTALS:																**339.4**		**3.31**			

ROADWAY ITEMS FOR DRAINAGE STRUCTURES INSTALLED BY CULVERT CONTRACTOR

* Not a Bid Item
(1) Backfill according to DR-111

Location	Design Number	Size	Kind	By Road Contractor								Floodable* Backfill	Porous* Backfill	Flooded Backfill (1)	Excavation		Revetment		Engineering Fabric	Remarks
				Dike				Compacting Backfill Adjacent	Compaction w/Moisture Control	Compaction w/Moisture and Density					Type	Quantity	Type	Quantity		
				Rt. / Lt.	Location Station	Top. Elev.	Type	CY	CY	CY		(A) CY	(B) CY	(A+B) CY		CY		TONS	SY	
69+73.73	124	TWIN 12'x11'x90'	RCB					100.0				80.0	14.0	94.0						
TOTALS:								**100.0**						**94.0**						

DRAINAGE STRUCTURE BY ROAD CONTRACTOR

Length of unclassified pipe calculated is based on using Reinforced Concrete Pipe.
* Not a bid item
(1) Diameter or equivalent diameter
(2) UNCL = Unclassified Pipe CMP = Corrugated Metal Pipe RCP = Reinforced Concrete Pipe LCP = Arch or Elliptical Low Clearance Pipe SARC = Steel Arch Pipe
(3) Backfill according to DR-101

Drainage Area	Location	Type	Size (1)	Kind Of Pipe (2)	Length New Const.	Bedding Class	Design Cover (H)	Camber* (DR-102)	Apron No.		Apron Guard* (DR-213)	Elbow* (DR-141)	Diaphragm* (DR-501)	Tee Section* (DR-142)	"D" Section* (DR-141)	Reducer*	Type 'C' Connections* (DR-122)		Connected Pipe Joint* (DR-121)	4" Perforated Subdrain*	Flow Line Elevations				Dimensions Lin. Ft.				Skew Ahead Degrees		Dike				Class 20	Flowable Mortar	Flooddable* Backfill	Porous* Backfill	Flooded Backfill (3)	Remarks
																									Total		Extensions				Rt. / Lt.	Location Station	Top Elevation	Type			(A)	(B)	(A+B)	
ACRE			IN		LF		FT	FT	IN	OUT	No.	No.	No.	No.	No.	No.	Type	No.	Type	FT	Lt.	Rt.	Other	Other	Lt.	Rt.	Lt.	Rt.	Lt.	Rt.	Lt.				CY	CY	CY	CY	CY	
	71+30.00	RCP	30"	RCP	0	R-1				1									Type 3		1074.21	EXIST			0.0	0.0													1
	71+45.00	RCP	30"	RCP	0	R-1			1										Type 3		EXIST	1074.33																	1
				TOTALS:					**2**																														

1) Replaces existing flared end section pipe aprons at entrance

PAVEMENT MARKING LINE TYPES

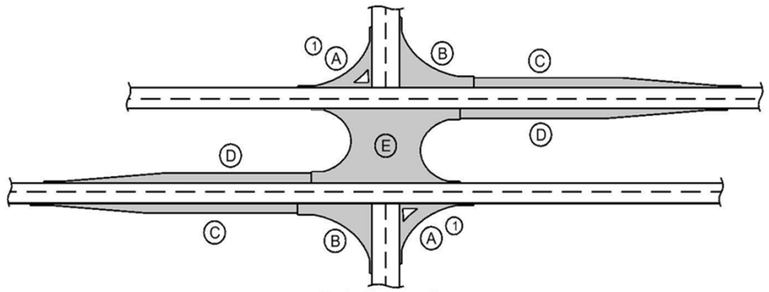
See PM-110

*BCY4 - Place on the same side of the roadway to match existing markings near the project.
**NPY4 - For estimating purposes only. No Passing Zone Lines will be located in the field.
***MNY4 - Factor of 1.00 as value includes number of 4-inch passes to cover median nose area.

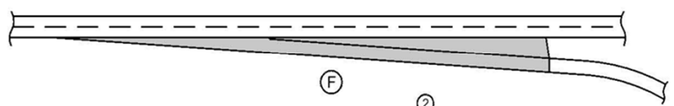
BCY4: Broken Centerline (Yellow) @ 0.25 DCY4: Double Centerline (Yellow) @ 2.00 NPY4: No Passing Zone Line (Yellow) @ 1.25 BLW4: Broken Lane Line (White) @ 0.25 ELW4: Edge Line Right (White) @ 1.00
ELY4: Edge Line Left (Yellow) @ 1.00

Location							Length by Line Type (Unfactored)														Remarks
Road ID	Station to Station		Dir. of Travel	Marking Type	Side			BCY4*	DCY4	NPY4**	BLW4	ELW4	ELY4	SLW2								
					L	C	R	STA	STA	STA	STA	STA	STA	STA	STA	STA	STA	STA	STA	STA	STA	
IA 93	69+00.61	70+65.87	BOTH	Waterborne/Solvent Paint	X							1.65									
	69+00.61	70+65.87	BOTH	Waterborne/Solvent Paint		X		1.65													
	69+00.61	70+65.87	BOTH	Waterborne/Solvent Paint			X					1.65									
								1.65	**-**	**-**	**-**	**3.31**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	
								-	-	-	-	-	-	-	-	-	-	-	-	-	-	
								-	-	-	-	-	-	-	-	-	-	-	-	-	-	
				Factored Total: Waterborne/Solvent Paint				**0.41**			**-**	**3.31**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	
				Bid Quantity: Painted Pavement Markings, Waterborne or Solvent-Based							**3.72**											

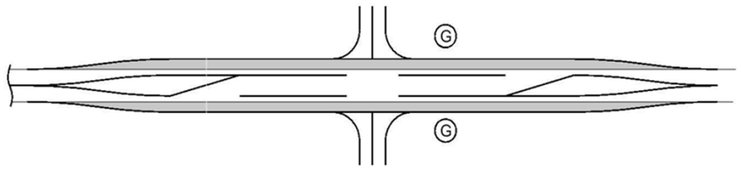
PCC PAVEMENT



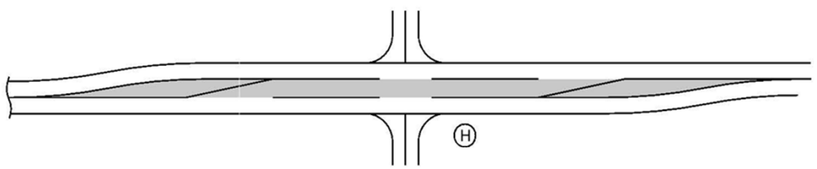
Typical Intersection



Ramp or Loop Taper (2)



Channelized Intersection
Widen Existing Roadway



Channelized Intersection
Reconstructed Roadway

(1) Does not include raised island area or curb. Refer to tabulation 112-4 for quantities.

(2) Refer to PV-410, PV-411, PV-412, and PV-414.

(3) Quantity includes Pavement Header.

Location				Mainline			Area (3)								Total Area By Pavement Thickness		Special Backfill	Modified Subbase	Granular Subbase	Remarks
Road Identification	Direction of Travel	Station to Station		Width	Length	Area	A (1)	B	C	D	E	F (2)	G	H	SY					
				FT	FT	SY	SY	SY	SY	SY	SY	SY	SY	SY	10 IN	TEMP	TONS	CY	SY	
IA 93	BOTH	69+00.61	70+65.87	24.0	165.3	440.7									440.7			240.0		
													TOTALS:		**440.7**			**240.0**		

EMBANKMENT WITH MOISTURE CONTROL

103_06
8/15/22

Moisture Control is required for all Class 10 fill placed in all locations and depths. Stability berms placed outside the normal foreslope template and topsoil will not require Moisture Control.

SHRINKAGE DATA

103_07
8/15/22

Material	%	Remarks
Topsoil	40.0	
Class 10	30.0	
Boulders		10 CY

TOPSOIL STRIPPING AND PLACEMENT

103_10
8/15/22

Line No.	Road Identification	Dir. of Traffic	Station From	Station To	Topsoil Stripping Thickness (IN)	Topsoil Placement Thickness (IN)	Remarks
1.0	IA 93		69+00.00	70+65.77	12	8	

LONGITUDINAL SUBDRAIN SHOULDER

104_09A
12/8/22

* Not a bid item.

Line No.	Road or Lane Identification	Station From	Station To	Side	Depth (IN) (D)	Subdrain Size (IN)	Length (FT)	Outlet Station	Outlet Type	Porous Backfill* (CY)	Remarks
1.0	IA 93	69+00.00	70+65.77	Left	42.0	4.0	165.8	69+00.00	DR-306	15.3	
2.0					42.0		30.0	70+65.77	DR-306	2.8	
3.0	IA 93	69+00.00	70+65.77	Right	42.0	4.0	165.8	69+00.00	DR-306	15.3	
4.0					42.0		30.0	70+65.77	DR-306	2.8	
Total:							**391.6**		**DR-306=4**	**36.2**	

NOTE: ALL LONGITUDINAL SUBDRAINS ARE TYPE 7 WITH PCC OR TYPE 8 WITH HMA (ACC) UNLESS OTHERWISE NOTED IN REMARKS COLUMN.

NOTE: ALL LONGITUDINAL SUBDRAINS MAY BE ADJUSTED BOTH VERTICALLY AND HORIZONTALLY IN THE FIELD AS NECESSARY.

NOTE: ADJUST SUBDRAIN DEPTH (42") AS NEEDED TO CLEAR THE TOP OF THE RCB CULVERT

GEOTECHNICAL DESIGN

LICENSED PROFESSIONAL ENGINEER
David J. Heer
12100
IOWA

I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

David Heer 07/03/2023
Signature Date

David J. Heer
Printed or Typed Name
My license renewal date is December 31, 20 24

Pages or sheets covered by this seal: CS.1 & Q.1-Q.2

SURVEY SYMBOLS

- PI Tangent Point
- SCR Section Corner
- CP Control Point
- WC Wild Card (Misc. Field Shot)
- BM Bench Mark
- BNK Stream Bank
- TW Top of Water
- SBR Size of Bridge
- BL Topo Breakline
- D Centerline Draw or Stream (Down)
- FW Wire Fence
- GR Ground Shot
- ENU Edge Unpaved Entrance & Parking
- PIP Pipe Culvert
- PLG Location of General Photo
- PPA Power Pole Co. 1
- ENT Centerline BL of Entrance
- DU Centerline Draw or Stream (Up)
- SNP Unpaved Shoulder
- EP Edge of Paved Roads (ML or SR)
- C Centerline BL of Road (ML or SR)
- TP TPD Telephone Pedestal
- ROW Right of Way Mark
- OUT Tile Outlet
- GDL Guard Rail Steel
- BD Bridge Deck
- BRG Bridge
- CON Concrete or A/C Slab
- RIP Rip-Rap
- BLD Building or Foundation
- FWD Wood Fence
- EW Edge of Water
- BLS Bridge Low Steel
- BCL Bridge Centerline
- FO FO1D Fiber Optic Co. 1 - Quality D
- G GL1D Gas Line Co. 1 - Quality D

UTILITY LEGEND

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

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

PPA Power Pole Black Hills Energy
Jan Krueger
563-382-0953
jan.krueger@blackhillscorp.com

FO - Windstream Communications - Quality D
800-289-1901
LOCATE.DESK@WINDSTREAM.COM

GL Gas Line - Black Hills Energy - Quality D
Jan Krueger
563-382-0953
jan.krueger@blackhillscorp.com

PLAN VIEW COLOR LEGEND OF PLAN AND PROFILE SHEETS

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

PROFILE VIEW COLOR LEGEND OF PLAN AND PROFILE SHEETS

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

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

RIGHT-OF-WAY LEGEND

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

PLAN AND PROFILE LEGEND AND SYMBOL INFORMATION SHEET

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

Banks TWP.
T-93N R-10W
SEC. 20

STA. 69+00.61
BEGIN ROADWAY

STA. 68+32.95
BEGIN CONSTRUCTION

ENT +91.53
(U.A.C.)

65

70

75

STA. 70+65.87
END ROADWAY

ENT +37.16
(U.A.C.)

30" x 25'
Conc. Pipe
(U.A.C. PIPE, REPLACE END SECTIONS WITH NEW APRONS)

Pi Sta 77+16.20

93

APPROX. SEC. LINE

FO

Sta. 69+85.1
30'x30'
I-Beam Bridge
D.A.=1486 A-R (Per Plan F-380(8))
REMOVE
Install Twin 12'x11'x90' RCB
Sta. 69+73.73
Skew = 15° Lt. Ahd.
F.L. = Lt. 1069.80
Rt. 1069.30

STA. 71+50.00
END CONSTRUCTION

PC Sta 74+16.20

Curve Data
Δ = 0° 11' 51.92" (RT)
T = 300.00
L = 600.00
R = 173,837.22
E = 0.26

24" x 20'
Conc. Pipe

Sect. No. 29

N

0 FEET 50

1110
1105
1100
1095
1090
1085
1080
1075
1070
1065
1060
1055

1,085.94
1,085.04

-0.546%

+50 Lt
1,077.79
4.64% LDG

+00 Lt.
1,075.47
-1.96% Lng

+75 Lt.
1,073.00

+25 Lt.
1,073.53
2.27% RDG

+75 Lt.
1,075.27

+90 Lt.
1,074.45
1.42% LDG

+75 Lt.
1,074.00

Lt
Rt

U.A.C.
U.A.C.

Ditch Grade
Culv.

Culv.
DG

DG

U.A.C.
U.A.C.

1,085.81
1,085.67
1,085.53
1,085.40
1,085.26
1,085.12

63 +50 64 +50 65 +50 66 +50 67 +50 68 +50 69 +50 70 +50 71 +50 72 +50 73 +50 74 +50 75 +50 76 +50 77 +50 78

FILE NO. 31934	ENGLISH	DESIGN TEAM Iowa DOT \ Shive-Hattery	FAYETTE COUNTY	PROJECT NUMBER BRF-093-2(22)--38-33	SHEET NUMBER D.2

12:04:31 PM 8/16/2023 mjanechek pw:\\projectwise.dot.int.lan:PWMain\Documents\Projects\3309301019\Design\SHT_33093022_D2.dgn

Survey Information

Fayette County
BRFN-093-2(22)—39-33
Stream 0.7 mi W of Co Rd V68
Bridge-Unspecified
PIN 19-33-093-010
Sap-958.0

General Information

Measurement units for this survey are US survey feet. This survey is for proposed Bridge replacement. Project datum and control information is provided by Design Survey Office. This project is a Full Field concept survey. This survey request was for the Iowa Hwy. 93 corridor only.

Vertical Control

Vertical datum for this survey is NAVD88 (Computed using Geoid12b). GRS80 Ellipsoidal Height was computed at project control Pts. 341, 93168, 93175, J 38 RESET, and JOHNSON by conducting two concurrent six-hour static observations. Additional benchmarks were placed throughout the project using a GNSS Base-Rover setup relative to Pt. 93168 and Pt. 93175. Two observations with a minimum of four-hours between were collected and used in a weighted average.

This survey observed 1 NGS Control Monument with published NAVD88 height to compare to local ground control:

NGS 3rd. order mark designated J 38 RESET has a published Elev. Of 1071.8
Survey Elev. = 1071.67

This survey observed 1 local area county Control Monument with published NAVD88 height to compare to local ground control:

Fayette County GPS Control Pt 341 has a published Elev. of 1165.00
Survey Elev. = 1164.89

This survey observed 1 As-Built plan benchmark to compare to local ground control:

BM 6A As-built Plans Project No. F-380(8) Elev. 1077.50
Survey Elev. = 1077.17

Survey elevations obtained on the bridge seats have a close vertical difference relationship with the plan bridge seat elevations as follows:

As-built Plan FA-380(8) Bridges and Culverts Design No. 1048

West abutment bridge seat plan elev. = 1082.89
Survey elev. = 1082.58

East abutment bridge seat plan elev. = 1082.78
Survey elev. = 1082.49

The average vertical difference of the As-built plan benchmark and the As-built plan bridge seat elevations is -0.31 to be applied to as built elevations.

Horizontal Control

The project coordinate system for this survey is Iowa RCS Zone 5 (U.S. Survey Feet). This survey control is relative to IaRTN reference stations. IaRTN Reference Station coordinates are relative to the National Reference Station network datum: NAD83 (2011) for Epoch 2010.00. Coordinates were determined by conducting two concurrent six-hour static observations at project control Pts. 341, 93168, 93175, J 38 RESET, and JOHNSON.

Alignment Information

The horizontal alignment for this survey is a retrace of As-built Plans Project No. F-380(8) Grading and Surfacing. Survey stationing was equated to the plan PI at Sta. 77+16.2 and run back and ahead without equation throughout the survey.

Survey stationing relates to as built plan stationing as follows:

PI Sta. 50+37.5 As-built Plans Project No. F-380(8)
Survey PI Sta. 50+37.94

PI Sta. 77+16.2 As-built Plans Project No. F-380(8)
Survey PI Sta. 77+16.20

POT Sta. 103+85.5 As-built Plans Project No. F-380(8)
Survey POT Sta. 103+85.58

CONTROL POINT VICINITY MAP

This map is a guide to the vicinity of the primary project control points

Primary control is for use with RTK base stations and for RTN validation.
Future surveys will use primary project control to establish temporary control as needed for construction or other surveying applications.

HORIZ. DATUM: NAD83(2011) EPOCH 2010.00

VERT. DATUM: NAVD88

Ia. Regional Coordinate System Zone 5

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

HORIZONTAL AND VERTICAL PROJECT CONTROL COORDINATE LISTING

HORIZ. DATUM: NAD83(2011) EPOCH 2010.00

VERT. DATUM: NAVD88

Ia. Regional Coordinate System Zone 5

Point Name	Northing	Easting	Elevation	Code - Description
341	8977390.543	15560825.317	1164.892	BM FD FAYETTE CO GPS CONTROL POINT 341_28 FT NORTH OF 160TH ST AND 33 FT WEST OF V AVE
J38 RESET	8966691.288	15548226.786	1071.670	BM FD NGS THIRD ORDER BENCH MARK J 38 RESET 160 FT EAST OF OLD RR GRADE TOP EAST END OF SOUTH HDWLL 4X6 RCB AND 17 FT SOUTH OF 140TH ST
JOHNSON	8972208.660	15560924.846	1178.429	BM FD NGS SECOND ORDER TRIANGULATION STATION JOHNSON 140 FT NORTH OF IA HWY 93 AND 40 FT EAST OF V AVE
93168	8972086.448	15550427.922	1076.226	BM FD ROW RAIL DRILL HOLE IN BALL 82 FEET EAST OF X AVE AND 58 FEET NORTH OF IA HWY 93
93175	8972110.745	15554220.381	1092.081	BM FD ROW RAIL DRILL HOLE IN BALL 60 FEET NORTH OF IA HWY 93 AND 40 FEET SOUTH OF ROW RAIL

Alignment Coordinates

101-16
04-19-11

Element Number	Location	Point on Tangent			Begin Spiral			Begin Curve			Simple Curve PI or Master PI of SCS			End Curve			End Spiral		
		Station	Y (Northing)	X (Easting)	Station	Y (Northing)	X (Easting)	Station	Y (Northing)	X (Easting)	Station	Y (Northing)	X (Easting)	Station	Y (Northing)	X (Easting)	Station	Y (Northing)	X (Easting)
1	ML093	50+37.94 R1	8972024.87	15550211.73															
2	ML093							74+16.20 R1	8972041.96	15552589.93	77+16.20 R1	8972044.11	15552889.92	80+16.20 R1	8972045.23	15553189.92			
3	ML093	103+85.58 R1	8972054.08	15555559.29															

Spiral or Circular Curve Data

101-17
04-19-11

Name	Location	$DELTA_{SCS}$	Horizontal Alignment Data													Remarks
			Spiral Data								Curve Data					
			$THETA_S$	L_S	T_S	E_S	X_C	Y_C	L.T.	S.T.	$DELTA_C$	T	L	R	E	
C1	ML093										0°11'51.9"	300.000	599.999	173837.223	0.259	

Banks TWP.
T-93N R-10W
SEC. 20

N

1

SHARON M RIES

68+43
℄71'

68+29
℄60'±EX R/W

70+15
℄103'

70+87
℄66'±EX R/W

65

75

ENT +91.53
(U.A.C.)

EX R/W

EX R/W

ENT +37.16
(U.A.C.)

℄ IA 93

℄ IA 93

21

EX R/W

EX R/W

68+29
℄58'EX R/W

71+07
℄57'±EX R/W

69+30
℄117'

Banks TWP.
T-93N R-10W
SEC. 29

2

JAMES L NIEMANN

REVOCABLE TRUST

0 FEET 50

Right of Way Design Information
THIS SHEET INCLUDED FOR INFORMATION ONLY

ROW Team: ATINKEN /JLARSON
ROW #: STPN-093-2(23-2J-33
Plan Date: 12/14/21
Color Legend:
Property Lines
Temporary Easement
Permanent Acquisition

FILE NO. 31934	ENGLISH	DESIGN TEAM Iowa DOT \ Shive-Hattery	FAYETTE COUNTY	PROJECT NUMBER BRF-093-2(22)--38-33	SHEET NUMBER H.1

10:57:55 AM 12/16/2021 atinken pw:\\NTPwint1.dot.int.lan:PWMain\Documents\Projects\3309301019\ROW\33093023.sht

108-23A
08-01-08

TRAFFIC CONTROL PLAN

1) While existing bridge is removed and replaced with a RCB, IA 93 traffic shall be maintained via off-site detour as shown on sheet J.2. (Using Co. Rd. V62, C33 and V68)

2) Detour signage, road closure and safety closure related signage shall be installed, maintained, and removed by Contractor.

108-25
10-21-14

511 TRAVEL RESTRICTIONS

Route	Direction	County	Location Description	Feature Crossed	Object Type	Maint. Bridge No., Structure ID, or FHWA No.	Type of Restriction	Existing Measurement	Construction Measurement	Construction Measurement as Signed	Projected As Built Measurement	Remarks
IA 93	Both	Fayette	0.7 Miles West of Co. Rd. V68	Stream			None					

111-01
04-17-12

COORDINATED OPERATIONS

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

Project	Type of Work
None Provided	

DETOUR PLAN TO BE PROVIDED BY DISTRICT 2

SURVEY SYMBOLS

- PI Tangent Point
- SCR Section Corner
- CP Control Point
- WC Wild Card (Misc. Field Shot)
- BM Bench Mark
- BNK Stream Bank
- TW Top of Water
- SBR Size of Bridge
- BL Topo Breakline
- D Centerline Draw or Stream (Down)
- FW Wire Fence
- GR Ground Shot
- ENU Edge Unpaved Entrance & Parking
- PIP Pipe Culvert
- PLG Location of General Photo
- PPA Power Pole Co. 1
- ENT Centerline BL of Entrance
- DU Centerline Draw or Stream (Up)
- SNP Unpaved Shoulder
- EP Edge of Paved Roads (ML or SR)
- C Centerline BL of Road (ML or SR)
- TP TPD Telephone Pedestal
- ROW Right of Way Mark
- OUT Tile Outlet
- GDL Guard Rail Steel
- BD Bridge Deck
- BRG Bridge
- CON Concrete or A/C Slab
- RIP Rip-Rap
- BLD Building or Foundation
- FWD Wood Fence
- EW Edge of Water
- BLS Bridge Low Steel
- BCL Bridge Centerline
- FO1D Fiber Optic Co. 1 - Quality D
- GL1D Gas Line Co. 1 - Quality D

UTILITY LEGEND

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

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

PPA Power Pole Black Hills Energy
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800-289-1901
LOCATE.DESK@WINDSTREAM.COM

GL Gas Line - Black Hills Energy - Quality D
Jan Krueger
563-382-0953
jan.krueger@blackhillscorp.com

PLAN VIEW COLOR LEGEND OF SOILS SHEETS

LINEWORK	Design Color No.	
Green	(2)	Existing Topographic Features and Labels
Purple (Halo)	(15)	Backslope Drains
Blue	(1)	Proposed Alignment, Stationing, Tic Marks, and Alignment Annotation
SHADING	**Design Color No.**	
Brown, Light	(236)	Core Out

PROFILE VIEW COLOR LEGEND OF SOILS SHEETS

LINEWORK	Design Color No.	
Blue	(1)	Proposed Alignment, Stationing, and Alignment Annotation
Green	(2)	Existing Ground Line Profile
Green, Med	(227)	Topsoil
Green, Med	(227)	Slope Dressing Only
Orange	(6)	Loam
Brown, Dark	(238)	Class 10
Brown, Med	(237)	Sand
Red	(3)	Unsuitable A
Pink, Dark	(13)	Unsuitable B
Pink	(11)	Unsuitable C
Red	(3)	Shale
Red	(3)	Waste
Gray, Light	(48)	Broken and Weathered Rock
Gray, Med	(80)	Rock
Gray, V.Dark	(128)	Boulders

PATTERN AND SYMBOL LEGEND OF SOILS SHEETS

- Drill
- Dig/Core
- Date(s) Drilled_____
- Water
- Dry
- Sample
- Plugged
- Moisture
- Shelby
- Blow Count
- Dens. Core
- Treatment
- Sand Blanket
- Soil Remediation Area
- Select Soil
- Select Sand
- Slope Dressing Only
- Broken and Weathered Rock
- Rock
- Sandstone
- Unsuitable A
- Unsuitable B
- Unsuitable C
- Sandy Soil
- Boulders
- Shale

Reference Point
Station
Survey Line
Section Corner
Ground Line Intercept
Saw Cut
Guardrail
Clearing & Grubbing Area
Pavement Removal

RIGHT-OF-WAY LEGEND

- Proposed Right-of-Way
- Existing and Proposed Right-of-Way
- Easement and Existing Right-of-Way
- Borrow
- Easement (Temporary)
- Easement
- Excess
- A/C Access Control

NOTE: Sounding and test boring data shown in the plans were accumulated for designing and estimating purposes. Their appearance on the plans does not constitute a guarantee that conditions other than those indicated will be encountered. Details and notes shown elsewhere shall be used for roadway and structure construction.

SOILS LEGEND AND SYMBOL INFORMATION SHEET

(COVERS SHEET SERIES Q)

FILE NO. 31934	ENGLISH	DESIGN TEAM Dell\ Immel	Fayette COUNTY	PROJECT NUMBER BRF-093-2(22)-038-33	SHEET NUMBER Q.1

8:46:54 AM 6/15/2023 gsieggr pw:\\NTPwint1.dot.int.lan:PWMain\Documents\Projects\3309301019\Soils\CADD\S3_Work\33093022_Qshts.dgn

Banks TWP.
T-93N R-10W
SEC. 20

STA. 69+00.61
BEGIN ROADWAY

STA. 68+32.95
BEGIN CONSTRUCTION

ENT +91.62
(U.A.C.)

65

93

SB-1

SB-2

SB-3

STA. 70+65.87
END ROADWAY

ENT +87.86
(U.A.C.)

30" x 25'
Conc. Pipe
(REPLACE END SECTIONS WITH NEW APRONS)
(REPLACE END SECTIONS WITH NEW APRONS)

75

93

PI Sta 77+16.20

ENT +91.90
(U.A.C.)

24" x 20'
Conc. Pipe
(U.A.C.)

PC Sta 74+16.20

Curve Data
Δ = 0° 11' 51.92" (RT)
T = 300.00
L = 600.00
R = 173,837.22
E = 0.26

Sta. 69+85.1
30'x30'
I-Beam Bridge
D.A.=1486 A-R (Per Plan F-3808(1))
REMOVE
Install Twin 12'x11'x90' RCB
Sta. 69+73.73
Skew = 15° Lt. Ahd.
F.L. = Lt. 1069.80
Rt. 1069.30

STA. 71+50.00
END CONSTRUCTION

Sect. No. 29

N

0 50
FEET

THIS SHEET IS INCLUDED TO SHOW SOIL INFORMATION.
DETAILS AND NOTES SHOWN ELSEWHERE IN THESE PLANS SHALL BE USED FOR STRUCTURE CONSTRUCTION.

SHELBY TUBE CORE DATA

CORE NO.	SB-1-B1	SB-1-D1	SB-2-C2	SB-2-E1	SB-3-E1	SB-3-E2
DEPTH IN FEET	1.0-3.0	18.0-20.0	3.0-5.0	13.0-15.0	23.0-25.0	28.0-30.0
CLASSIFICATION (AASHTO)	--	--	--	--	--	--
COEFF.CONSOL. (SQ.FT /DAY)	0.16	--	--	0.263	--	--
TRIAXIAL COMPRESSION	--	UC	UC	--	--	--
COHESION - PSF	--	2410	368.7	--	--	--
FRICTION COEFF.	--	--	--	--	--	--
MOISTURE CONTENT %	36.0	10.5	18.3	22.1	11.0	10.8
DRY DENSITY - PCF	102.2	132.9	112.0	96.9	136.2	136.0

CU-CONSOLIDATED UNDRAINED
UU-UNCONSOLIDATED UNDRAINED
UC-UNCONFINED COMPRESSION (c=1/2 Qu)

EXISTING GROUND

A- ASPHALT
B- Apparent Aggregate Base
C- Fill: Sandy Lean Clay, Trace Gravel, Gry Br to Drk Br
SB-1 Shown Here For Clarity
A- Gravel
B- Fill: Clayey Sand, Trace Gravel, Br
C- Alluvium: Clayey Sand, Fine to Med Grained, Loose, Drk Br
D- Glacial Till: Sandy Lean Clay, Trace Gravel, Very Soft, Drk Br to Gry
E- Glacial Till: Sandy Lean Clay, Trace Gravel, Very Stiff to Hard, Gry
D- Alluvium: Clayey Sand, Fine to Med Grained, Trace Organics, Gry and Drk Br
E- Glacial Till: Sandy Lean Clay, Trace Gravel, Drk Br to Br Gry
F- Glacial Outwash: Clayey Sand, Fine to Coarse Grained, Med Dense, Trace Gravel, Gry
G- Glacial Till: Sandy Lean Clay, Trace Gravel, Very Stiff, Gry
A- TOPSOIL
B- Alluvium: Clayey Sand, Fine to Coarse Grained, Trace Gravel, Loose, Gry
C- Glacial Till: Sandy Lean Clay, Trace Gravel, Med Stiff, Br Gry to Gry
D- Glacial Till: Sandy Lean Clay, Trace Gravel, Very Stiff to Hard.

SB-2
Rt. 2.2'
SB-3 SB-1
Rt. 64.3' Lt. 70.9'

1110 1105 1100 1095 1090 1085 1080 1075 1070 1065 1060 1055 1050 1045

63 +50 64 +50 65 +50 66 +50 67 +50 68 +50 69 +50 70 +50 71 +50 72 +50 73 +50 74 +50 75 +50 76 +50 77 +50 78

FILE NO. 31934	ENGLISH	DESIGN TEAM Dell \ Heer \ Immel	Fayette COUNTY	PROJECT NUMBER BRF-093-2(22)-038-33	SHEET NUMBER Q.2

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ESTIMATED PROJECT QUANTITIES AND REFERENCE NOTES

Item no.	Item Code	Item	Unit	Quantities Estimated Erosion Control Items	Estimate Reference Notes
1	2601-2634100	MULCHING	ACRE	0.9	Perform mulching according to Article 2601.03, E, 2, of the Standard Specifications. Anchor mulch into the soil using mulch anchoring equipment with a minimum of two passes. Item is included for areas requiring reshaping and seedbed preparation. Use mulch that is Certified Noxious Weed Seed Free Mulch as certified by the Iowa Crop Improvement Association or adjacent states Crop Improvement Associations.
2	2601-2636015	NATIVE GRASS SEEDING	ACRE	0.8	Seed all areas outside eight feet adjacent to outside shoulder along mainline, side roads, and infield areas at interchanges with "Native Grass Seeding". Supply all seed for "Native Grass Seeding". Apply all forb seed through the native grass drill wildflower or small seed box. Do not mix and apply Forb seed with the native grass seed. Apply cover crop through the cool season or through cover crop seed box. Do not mix and apply cover crop seed with the native grass seed. Remove seed remaining in the drill at the end of each day. At the completion of all seeding, remove remaining seed from the drill by vacuum or other means. Hand broadcast remaining seed on the project. The Owner's Representative will review the limits with the Contractor prior to seeding. Mulch Rate: 1 1/2 tons of dry cereal straw or native grass straw per acre.
3	2601-2636043	SEEDING AND FERTILIZING (RURAL)	ACRE	0.1	Seed all areas within eight feet adjacent to outside shoulder along mainline, side roads, and infield areas at interchanges with "Rural Grass Seeding". Supply all seed for "Rural Grass Seeding". Do not mix and apply cover crop seed with the rural grass seed. Remove seed remaining in the drill at the end of each day. At the completion of all seeding, remove remaining seed from the drill by vacuum or other means. Hand broadcast remaining seed on the project. The Owner's Representative will review the limits with the Contractor prior to seeding.
4	2601-2642100	STABILIZING CROP - SEEDING AND FERTILIZING	ACRE	0.9	Item is included for disturbed areas. Seed and fertilize all disturbed areas according to Article 2601.03, C, 1, of the Standard Specifications.
5	2602-0000020	SILT FENCE	LF	490	Refer to Tab. 100-17. The tabulation includes estimated locations for placement of "Silt Fence" to address erosion to be encountered during construction. Verify the specific locations with the Engineer prior to beginning placement. Bid item includes 25% additional quantity for field adjustments and replacements.

Item no.	Item Code	Item	Unit	Quantities Estimated Erosion Control Items	Estimate Reference Notes
6	2602-0000030	SILT FENCE FOR DITCH CHECKS	LF	99	Refer to Tab 100-18. The tabulation includes estimated locations for placement of "Silt Fence for Ditch Checks" to address erosion to be encountered during construction. Verify the specific locations with the Engineer prior to beginning placement. Bid item includes 50% additional quantity for field adjustments and replacements.
7	2602-0000071	REMOVAL OF SILT FENCE OR SILT FENCE FOR DITCH CHECKS	LF	589	This item is included for silt fence and silt fence for ditch check removal required for staging reasons, removal to allow for replacement (replacement to be paid separately), or for areas that have achieved 70% permanent growth. This item is included for silt fence and silt fence for ditch check removal.
8	2602-0000101	MAINTENANCE OF SILT FENCE OR SILT FENCE FOR DITCH CHECK	LF	59	This item is included for clean-out and repair of the silt fence and silt fence for ditch checks during the project.
9	2602-0000150	STABILIZED CONSTRUCTION ENTRANCE, EC-303	LF	200	
10	2602-0000312	PERIMETER AND SLOPE SEDIMENT CONTROL DEVICE, 12 IN. DIA.	LF	1,370	Refer to Tab. 100-19. The tabulation includes estimated locations for placement of "Perimeter and Slope Sediment Control Device, 12 in. dia." to address erosion to be encountered during construction. Verify the specific locations with the Engineer prior to beginning placement. Bid item includes 25% additional quantity for field adjustments and replacements. Use Perimeter and Slope Sediment Control Devices fabricated using wood excelsior.
11	2602-0000320	PERIMETER AND SLOPE SEDIMENT CONTROL DEVICE, 20 IN. DIA.	LF	200	Item is included for temporary perimeter sediment control, inlet protection, and water velocity reduction on slopes or ditches at locations to be determined during construction. Verify specific locations with the Engineer prior to beginning placement. Use Perimeter and Slope Sediment Control Devices fabricated using wood excelsior.
12	2602-0000351	REMOVAL OF PERIMETER AND SLOPE OR DITCH CHECK SEDIMENT CONTROL DEVICE	LF	1,570	
13	2602-0010010	MOBILIZATIONS, EROSION CONTROL	EACH	2	
14	2602-0010020	MOBILIZATIONS, EMERGENCY EROSION CONTROL	EACH	1	

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10-18-11

STANDARD ROAD PLANS

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

Number	Date	Title
EC-201	10-15-19	Silt Fence
EC-204	10-19-21	Perimeter and Slope Sediment Control Devices
EC-303	10-19-21	Stabilized Construction Entrance
EC-502	04-21-15	Seeding in Rural Areas

111-25
10-18-11

INDEX OF TABULATIONS

Tabulation	Tabulation Title	Sheet No.
RC Sheets		
100-1A	ESTIMATED PROJECT QUANTITIES (1 DIVISION PROJECT)	RC.1-2
100-4A	ESTIMATE REFERENCE INFORMATION	RC.1-2
100-17	TABULATION OF SILT FENCES	RC.4
100-18	SILT FENCES FOR DITCH CHECKS	RC.4
100-19	PERIMETER AND SLOPE SEDIMENT CONTROL DEVICE	RC.4
105-4	STANDARD ROAD PLANS	RC.3
110-12	POLLUTION PREVENTION PLAN	RC.5-6
111-25	INDEX OF TABULATIONS	RC.3

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10-18-16

SECTION 404 PERMIT AND CONDITIONS

Construct this project according to the requirements of U.S. Army Corps of Engineers Nationwide, Permit No. 14. A copy of this permit is available from the Iowa DOT website (http://www.envpermits.iowadot.gov/). The U.S. Army Corps of Engineers reserves the right to visit the site without prior notice.

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10-17-17

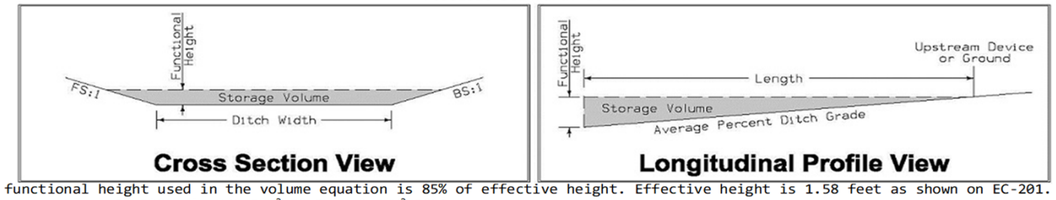
STORM WATER BEST MANAGEMENT PRACTICES

When the following best management practices are used, they are intended to account for disturbed areas where storage volume cannot be provided: Wood Excelsior Mat for Ditch Protection, Silt Fence, Silt Fence for Ditch Protection, Perimeter and Slope Sediment Control Devices

100-18
10-16-18

SILT FENCES FOR DITCH CHECKS

Possible Standard: EC-201



* The functional height used in the volume equation is 85% of effective height. Effective height is 1.58 feet as shown on EC-201.
* Volume equation: [0.5*Spacing*(0.5*H^2*FS+DW*H+0.5*H^2*BS)]

Basin No.	Type	Location		Bid Items			Stormwater Storage Volume Summary					Remarks
		Station	Side	Installation	Maintenance	Removal	Foreslope	Backslope	Ditch Width	Avg.% Slope	Volume*	
				LF	LF	LF	FS:1	BS:1	FT	Ditch Grade	CF	
1	4	69+75.00	Rt	22.0	2.2	22.0	3.0	3.0	10.0	2.3%	376.8	
1	4	70+15.00	Rt	22.0	2.2	22.0	3.0	3.0	10.0	2.3%	376.8	
1	4	70+50.00	Rt	22.0	2.2	22.0	3.0	3.0	10.0	2.3%	376.8	
	SFDC Tab Totals:			**66.0**	**6.6**	**66.0**						
	SFDC Bid Totals:			**99**			**Tab Total**					
	SFDC Main. Totals:				**10**		**Bid Total**					
	SFDC Rem. Totals:					**99**	**Bid Total**					

100-19
04-19-16

PERIMETER AND SLOPE SEDIMENT CONTROL DEVICE

Possible Standards: EC-204

Location			Length of Installation			Remarks
Begin Station	End Station	Side	9 inch Dia	12 inch Dia	20 inch Dia	
			LF	LF	LF	
68+45.00	71+10.00	RT		265		
69+00.00	69+90.00	RT		90		
68+40.00	71+20.00	LT		280		
69+40.00	70+35.00	LT		95		
68+45.00		LT		20		Ditch Check
68+85.00		LT		20		Ditch Check
69+25.00		LT		20		Ditch Check
69+65.00		LT		20		Ditch Check
69+75.00		LT		30		Culvert Edge
70+00.00		LT		30		Culvert Edge
70+10.00		LT		20		Ditch Check
70+50.00		LT		20		Ditch Check
70+90.00		LT		20		Ditch Check
70+90.00	71+20.00	LT		30		
71+30.00		LT		20		Entrance
71+50.00		LT		20		Entrance
71+50.00		LT		30		Inlet Protection
69+20.00		RT		30		Culvert Edge
69+53.00		RT		30		Culvert Edge
PSSCD Tab Totals:				**1090**	**0**	
12 inch PSSCD Bid Totals:				**1370**		**125% of Tab Total**
20 inch PSSCD Bid Totals:					**200**	**125% of Tab Total**
PSSCD Removal Totals:					**1570**	**100% of Bid Total**

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04-20-10

TABULATION OF SILT FENCES

Refer to EC-201

Location			Length	Remarks
Begin Station	End Station	Side	LF	
68+30.00	69+20.00	Rt	90	
69+80.00	70+91.00	Rt	111	
68+34.00	69+60.00	Lt	126	
70+25.00	70+90.00	Lt	65	
SF Tab Totals:			**392.0**	
SF Bid Totals:			**490**	**125% of Tab Total**
SF maintenance Totals:			**49**	**10% of Bid Total**
SF Removal Totals:			**490**	**100% of Bid Total**

POLLUTION PREVENTION PLAN

This project is regulated by the requirements of the Iowa Department of Natural Resources (DNR) National Pollutant Discharge Elimination System (NPDES) General Permit No. 2 OR an Iowa Department of Natural Resources (DNR) National Pollutant Discharge Elimination System (NPDES) individual storm water permit. The Contractor shall carry out the terms and conditions of this permit and the Pollution Prevention Plan (PPP).

This Base PPP includes information on Roles and Responsibilities, Project Site Description, Controls, Maintenance Procedures, Inspection Requirements, Non-Storm Water Controls, Potential Sources of Off Right-of-Way Pollution, and Definitions. This plan references other documents rather than repeating the information contained in the documents. A copy of this Base Pollution Prevention Plan, amended as needed during construction, will be readily available for review.

All contractors shall conduct their operations in a manner that controls pollutants, minimizes erosion, and prevents sediments from entering waters of the state and leaving the highway right-of-way. The Contractor shall be responsible for compliance and implementation of the PPP for their entire contract. This responsibility shall be further shared with subcontractors whose work is a source of potential pollution as defined in this PPP.

I. ROLES AND RESPONSIBILITES

A. Designer:
1. Prepares Base PPP included in the project plan.
2. Prepares Notice of Intent (NOI) submitted to Iowa DNR.
3. Is signature authority on the Base PPP. If consultant designed, signature from Contracting Authority is also required.

B. Contractor:
1. Signs a co-permittee certification statement adhering to the requirements of the NPDES permit and this PPP. All co-permittees are legally required under the Clean Water Act and the Iowa Administrative Code to ensure compliance with the terms and conditions of this PPP.
2. Designates a Water Pollution Control Manager (WPCM), who has the duties and responsibilities as defined in Section 2602 of the Standard Specifications.
3. Submits an Erosion Control Implementation Plan (ECIP) and ECIP updates according to Section 2602 of the Standard Specifications.
4. Installs and maintains appropriate controls. This work may be subcontracted as documented through Subcontractor Request Forms (Form 830231).
5. Supervises and implements good housekeeping practices according to Paragraph III, C, 2.
6. Conducts joint required inspections of the site with inspection staff. When Contractor is not mobilized on site, Contractor may delegate this responsibility to a trained or certified subcontractor. Contracting Authority also may waive joint inspection requirement during winter shutdown. In both circumstances, WPCM (or trained or certified delegate from the Contractor) is still responsible to review and sign inspection reports.
7. Complies with training and certification requirements of Section 2602 of the Standard Specifications.
8. Submits amended PPP site map according to Section 2602 of the Standard Specifications.

C. Subcontractors:
1. Sign a co-permittee certification statement adhering to the requirements of the NPDES permit and this PPP if: responsible for sediment or erosion controls; involved in land disturbing activities; or perorming work that is a source of potential pollution as defined in this PPP. Subcontracted work items are identified in Subcontractor Request Forms (Form 830231). All co-permittees are legally required under the Clean Water Act and the Iowa Administrative Code to ensure compliance with the terms and conditions of this PPP.
2. Implement good housekeeping practices according to Paragraph III, C, 2.

D. RCE/Project Engineer:
1. Is Project Storm Water Manager.
2. On projects where DOT is the Contracting Authority, is current with erosion control training or certification.
3. Takes actions necessary to ensure compliance with storm water requirements including, where appropriate, issuing stop work orders, and directing additional inspections at construction project sites that are experiencing problems with achieving permit compliance.
4. Orders the taking of measures to cease, correct, prevent, or minimize the consequences of non-compliance with the storm water requirements of the Applicable Permit.
5. Supervises all work necessary to meet storm water requirements at the Project, including work performed by contractors and subcontractors.
6. Requires employees, contractors, and subcontractors to take appropriate responsive action to comply with storm water requirements, including requiring any such person to cease or correct a violation of storm water requirements, and to order or recommend such other actions as necessary to meet storm water requirements.
7. Is familiar with the Project PPP and storm water site map.
8. On projects where DOT is Contracting Authority, is responsible for periodically monitoring inspection reports to determine whether deficiencies identified in inspection reports were adequately and timely addressed, and if not, has the authority and responsibility to direct immediate actions to correct the deficiencies.
9. Is the point of contact for the Project for regulatory officials, Inspector, contractors, and subcontractors regarding storm water requirements.
10. Is signature authority on Notice of Discontinuation.
11. Maintains an up-to-date record of contractors, subcontractors, and subcontracted work items through Subcontractor Request Forms (Form 830231).
12. Makes information to determine permit compliance available to the DNR upon their request.

E. Inspector:
1. Updates PPP through fieldbook entries and storm water site inspection reports if there is a change in design, construction, operation, or maintenance which has a significant effect on the discharge of pollutants from the project.
2. Makes information to determine permit compliance available to the DNR upon their request.
3. Conducts joint required inspections of the site with the contractor/subcontractor.
4. Completes an inspection report after each inspection.
5. Is signature authority on storm water inspection reports.

II. PROJECT SITE DESCRIPTION

A. This Pollution Prevention Plan (PPP) is for the construction of a Box Culvert and nearby replacment of a culvert pipe.

B. This PPP covers approximately 1.1 acres with an estimated 1.2 acres being disturbed. The portion of the PPP covered by this contract has 1.1 acres disturbed.

C. The PPP is located in an area of Kenyon-Clyde-Floyde soil association
The estimated weighted average runoff coefficient number for this PPP after completion will be 0.28.

D. Storm Water Site Map is located in the R sheets. Proposed slopes are shown in cross sections, details, or standard road plans. Supplemental information is located in the Tabulations in the C or CE sheets.

E. The base storm water site map is amended by contract modifications and progress payments (fieldbook entries) of completed erosion control work. Also, due to project phasing, erosion and sediment controls shown on project plans may not be installed until needed, based on site conditions. For example, silt fence ditch checks will typically not be installed until the ditch has been

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10-20-20

POLLUTION PREVENTION PLAN

installed. Installed locations may also be modified from tabulation locations by field staff. Installed locations will be documented by fieldbook entries and amended PPP site map.

F. Runoff from this work will flow into the Wapsipinicon River.

III. CONTROLS

A. The Contractor's ECIP specified in Article 2602.03 of the Standard Specifications for accomplishment of storm water controls should clearly describe the intended sequence of major activities, and for each activity define the control measure and the timing during the construction process that the measure will be implemented.

B. Preserve vegetation in areas not needed for construction.

C. Sections 2601 and 2602 of the Standard Specifications define requirements to implement erosion and sediment control measures. Actual quantities used and installed locations may vary from the Base PPP and amendment of the plan will be documented via fieldbook entries, amended PPP site map, or by contract modification. Additional erosion and sediment control items may be required as determined by the inspector and/or contractor during storm water site inspections. If the work involved is not applicable to any contract items, the work will be paid for according to Article 1109.03 paragraph B of the Standard Specifications.

1. EROSION AND SEDIMENT CONTROLS

a. Stabilization Practices
1) Site plans will ensure that existing vegetation or natural buffers are preserved where attainable and disturbed portions of the site will be stabilized.
2) Initialize stabilization of disturbed areas immediately after clearing, grading, excavating, or other earth disturbing activities have:
a) Permanently ceased on any portion of the site, or
b) Temporarily ceased on any portion of the site and will not resume for a period exceeding 14 calendar days.
3) Staged permanent and/or temporary stabilizing seeding and mulching shall be completed as the disturbed areas are completed. Incomplete areas shall be stabilized according to paragraph III, C, 1, a, 2, b above.
4) Permanent and Temporary Stabilization practices to be used for this project are located in the storm water site map, Estimated Project Quantities (100-0A, 100-1A, or 100-1C), and Estimate Reference Information (100-4A) located in the C or R sheets. Typical drawings detailing construction of the practices to be used on this project are referenced in the Standard Road Plans Tabulation (105-4) in the C or R sheets.
5) Preservation of existing vegetation within right-of-way or easements will act as vegetative buffer strips.
6) Preservation of topsoil: Bid items to be used for this project are located in the Estimated Project Quantities (100-0A, 100-1A, or 100-1C) and Estimate Reference Information (100-4A) located in the C or R sheets. Additional information may be found in the Tabulations in the C or T Tabulation sheets, or is referenced in Section 2105 of the Standard Specifications.

b. Structural Practices
1) Structural practices will be implemented to divert flows from exposed soils and detain or otherwise limit runoff and the discharge of pollutants from exposed areas of the site. Additionally, structural practices may include: silt basins that provide 3600 cubic feet of storage per acre drained or equivalent sediment controls, outlet structures that withdraw water from surface when discharging basins, and controls to direct storm water to vegetated areas.
2) Structural practices to be used for this project are located in the storm water site map, Estimated Project Quantities (100-0A, 100-1A, or 100-1C), and Estimate Reference Information (100-4A) located in the C or R sheets, as well as all other item specific Tabulations. Typical drawings detailing construction of the devices to be used on this project can be found on the B or R sheets or are referenced in the Standard Road Plans Tabulation (105-4) located in the C or R sheets.

c. Storm Water Management
Measures shall be installed during the construction process to control pollutants in storm water discharges that will occur after construction operations have been completed. This may include velocity dissipation devices at discharge locations and along length of outfall channel as necessary to provide a non-erosion velocity flow from structure to water course. If included with this project, these items are located in the storm water site map and Estimated Project Quantities (100-0A, 100-1A, or 100-1C) and Estimate Reference Information (100-4A) located in the C or R sheets, as well as all other item specific Tabulations. Typical drawings detailing construction of the practices to be used on this project are referenced in the Standard Road Plans Tabulation. The installation of these devices may be subject to Section 404 of the Clean Water Act.

2. OTHER CONTROLS
Contractor disposal of unused construction materials and construction material wastes shall comply with applicable state and local waste disposal, sanitary sewer, or septic system regulations. In the event of a conflict with other governmental laws, rules and regulations, the more restrictive laws, rules or regulations shall apply.
a. Vehicle Entrances and Exits - Construct and maintain entrances and exits to prevent tracking of sediments onto roadways.
b. Material Delivery, Storage and Use - Implement practices to prevent discharge of construction materials during delivery, storage, and use.
c. Stockpile Management - Install controls to reduce or eliminate pollution of storm water from stockpiles of soil and paving.
d. Waste Disposal - Do not discharge any materials, including building materials, into waters of the state, except as authorized by a Section 404 permit.
e. Spill Prevention and Control - Implement chemical spill and leak prevention and response procedures to contain and clean up spills and prevent material discharges to the storm drain system and waters of the state.
f. Concrete Residuals and Washout Wastes - Waste shall not be discharged to a surface water and is not allowed to adversely affect a water of the state. Designate temporary concrete washout facilities for rinsing out concrete trucks. Provide directions to truck drivers where designated washout facilities are located. Designated washout areas should be located at least 50 feet away from storm drains, streams or other water bodies. Care should be taken to ensure these facilities do not overflow during storm events.
g. Concrete Grooving/Grinding Slurry – Do not discharge slurry to a waterbody or storm drain. Slurry may be applied on foreslopes or removed from the project.
h. Vehicle and Equipment Storage and Maintenance Areas - Perform on site fueling and maintenance in accordance with all environment laws such as proper storage of onsite fuels and proper disposal of used engine oil or other fluids on site. Employ washing practices that prevent contamination of surface and ground water from wash water. Wash waters must be treated in a sediment basin or alternative control that provides equivalent or better treatment prior to discharge.
i. Litter Management - Ensure employees properly dispose of litter. Minimize exposure of trash if exposure to precipitation or storm water would result in a discharge of pollutants.
j. Dewatering – Properly treat water to remove suspended sediment before it re-enters a waterbody or discharges off-site. Measures are also to be taken to prevent scour erosion at dewatering discharge point.

3. APPROVED STATE OR LOCAL PLANS
During the course of this construction, it is possible that situations will arise where unknown materials will be encountered. When such situations are encountered, they will be handled according to all federal, state, and local regulations in effect at the time.

POLLUTION PREVENTION PLAN

IV. MAINTENANCE PROCEDURES

The Contractor is required to maintain all temporary erosion and sediment control measures in proper working order, including cleaning, repairing, or replacing them throughout the contract period. This shall begin when the features have lost 50% of their capacity.

V. INSPECTION REQUIREMENTS

A. Inspections shall be made jointly by the Contractor and the Contracting Authority's inspector at least once every seven calendar days. Storm water site inspections will include:
   1. Date of the inspection.
   2. Summary of the scope of the inspection.
   3. Name and qualifications of the personnel making the inspection.
   5. Review of erosion and sediment control measures within disturbed areas for the effectiveness in preventing impacts to receiving waters.
   6. Major observations related to the implementation of the PPP.
   7. Identification of corrective actions required to maintain or modify erosion and sediment control measures.

B. Include storm water site inspection reports in the Amended PPP. Incorporate any additional erosion and sediment control measures determined as a result of the inspection. Immediately begin corrective actions on all deficiencies found within 3 calendar days of the inspection and complete within 7 calendar days following the inspection. If it is determined that making the corrections less than 72 hours after the inspection is impracticable, it should be documented why it is impracticable and indicate an estimated date by which the corrections will be made.

VI. NON-STORM WATER DISCHARGES

This includes subsurface drains (i.e. longitudinal and standard subdrains) and slope drains. The velocity of the discharge from these features may be controlled by the use of headwalls or blocks, Class A stone, erosion stone or other appropriate materials. This also includes uncontaminated groundwater from dewatering operations, which will be controlled as discussed in Section III of the PPP.

VII. POTENTIAL SOURCES OF OFF RIGHT-OF-WAY (ROW) POLLUTION

Silts, sediment, and other forms of pollution may be transported onto highway right-of-way (ROW) as a result of a storm event. Potential sources of pollution located outside highway ROW are beyond the control of this PPP. Pollution within highway ROW will be conveyed and controlled per this PPP.

VIII. DEFINITIONS

A. Base PPP - Initial Pollution Prevention Plan.

B. Amended PPP - Base PPP amended during construction. May include Plan Revisions or Contract Modifications for new items, storm water site inspection reports, fieldbook entries made by the inspector, amended PPP site map by the Contractor, ECIP, NOI, co-permittee certifications, and Subcontractor Request Forms. Items amending the PPP are stored electronically and are readily available upon request.

C. Fieldbook Entries – This contains the inspector’s daily diary and bid item postings.

D. Controls - Methods, practices, or measures to minimize or prevent erosion, control sedimentation, control storm water, or minimize contaminants from other types of waste or materials. Also called Best Management Practices (BMPs).

E. Signature Authority - Representative authorized to sign various storm water documents.

CERTIFICATION STATEMENT

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

_____
Signature

Michael Janechek
Printed or Typed Name

_____
Signature

_____

LINE STYLE LEGEND OF EROSION CONTROL SHEETS

- Silt Fence
- Perimeter and Slope Sediment Control Device (9")
- Perimeter and Slope Sediment Control Device (12")
- Perimeter and Slope Sediment Control Device (20")
- Open-Throat Curb Intake Sediment Filter
- Concentrated Flow
- Sheet Flow

CELL LEGEND OF EROSION CONTROL SHEETS

- Temporary Sediment Control basin
- Erosion Control for Circular Intake or Manhole Well
- Erosion Control for Rectangular Intake or Manhole Well
- Grate Intake Sediment Filter Bag
- Silt Basin
- Silt Fence Tail
- Stormwater Drainage Basin Discharge Point

PLAN VIEW COLOR LEGEND OF EROSION CONTROL SHEETS

LINEWORK	Design Color No.	
Green	(2)	Existing Topographic Features and Labels
Blue	(1)	Proposed Alignment, Stationing, Tic Marks, and Alignment Annotation
Magenta	(5)	Existing Utilities
Black	(Ø)	Permanent Erosion Control Features
Blaze Orange	(222)	Temporary Erosion Control Features

SHADING	Design Color No.		Transparency
Citron	(234)	Mulching, All Types	50%
Light Brown	(238)	Special Ditch Control, Wood Excelsior Mat	Ø%

PATTERN LEGEND OF EROSION CONTROL SHEETS

- Seeding and Fertilizing
- R — Seeding and Fertilizing (Rural)
- U — Seeding and Fertilizing (Urban)
- N — Native Grass Seeding
- ST — Salt Tolerant Seeding
- WL — Wetland Grass Seeding
- WF — Wildflower Seeding
- SOD — Sodding
- Turf Reinforcement Mat Type 1
- Turf Reinforcement Mat Type 2
- Turf Reinforcement Mat Type 3
- Turf Reinforcement Mat Type 4
- Slope Protection, Wood Excelsior Mat
- Transition Mat
- Rock Features, Permanent
- Rock Features, Temporary

EROSION CONTROL LEGEND AND SYMBOL INFORMATION SHEET

(COVERS SHEET SERIES R)

FILE NO. 31934	ENGLISH	DESIGN TEAM Iowa DOT \ Shive-Hattery	FAYETTE COUNTY	PROJECT NUMBER BRF-093-2(22)--38-33	SHEET NUMBER R.1

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Banks TWP.
T-93N R-10W
SEC. 20

STA. 69+00.61
BEGIN ROADWAY

STA. 70+65.87
END ROADWAY

ENT +91.62
(U.A.C.)

ENT +6.28
(U.A.C.)

30" x 25'
Conc. Pipe
(U.A.C. PIPE, REPLACE END SECTIONS WITH NEW APRONS)

65

75

93

93

PI Sta 77+16.20

PC Sta 74+16.20

Sta. 69+85.1
30'x30'
I-Beam Bridge
D.A.=1486 A-R (Per Plan F-380(8))
REMOVE
Install Twin 12'x11'x90' RCB
Sta. 69+73.73
Skew = 15° Lt. Ahd.
F.L. = Lt. 1069.80
Rt. 1069.30

Sect. No. 29

Curve Data
Δ = 0° 11' 51.92" (RT)
T = 300.00
L = 600.00
R = 173,837.22
E = 0.26

ENT +01.90
(U.A.C.)

24" x 20'
Conc. Pipe
(U.A.C.)

N

0 FEET 50

31934		Iowa DOT \ Shive-Hattery	FAYETTE	BRF-093-2(22)--38-33	R.2	

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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)

- Topsoil (Class 10)
- Slope Dressing Only
- Class 10 Materials
- Select Loams And Clay-Loams
- Select Sand
- Unsuitable Type A Disposal
- Unsuitable Type B Disposal
- Unsuitable Type C Disposal
- Shale
- Waste
- Broken and Weathered Rock
- Solid Rock
- Boulders

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

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

SYMBOL LEGEND OF CROSS SECTION SHEETS

Existing ROW — Existing Right-of-Way Limit

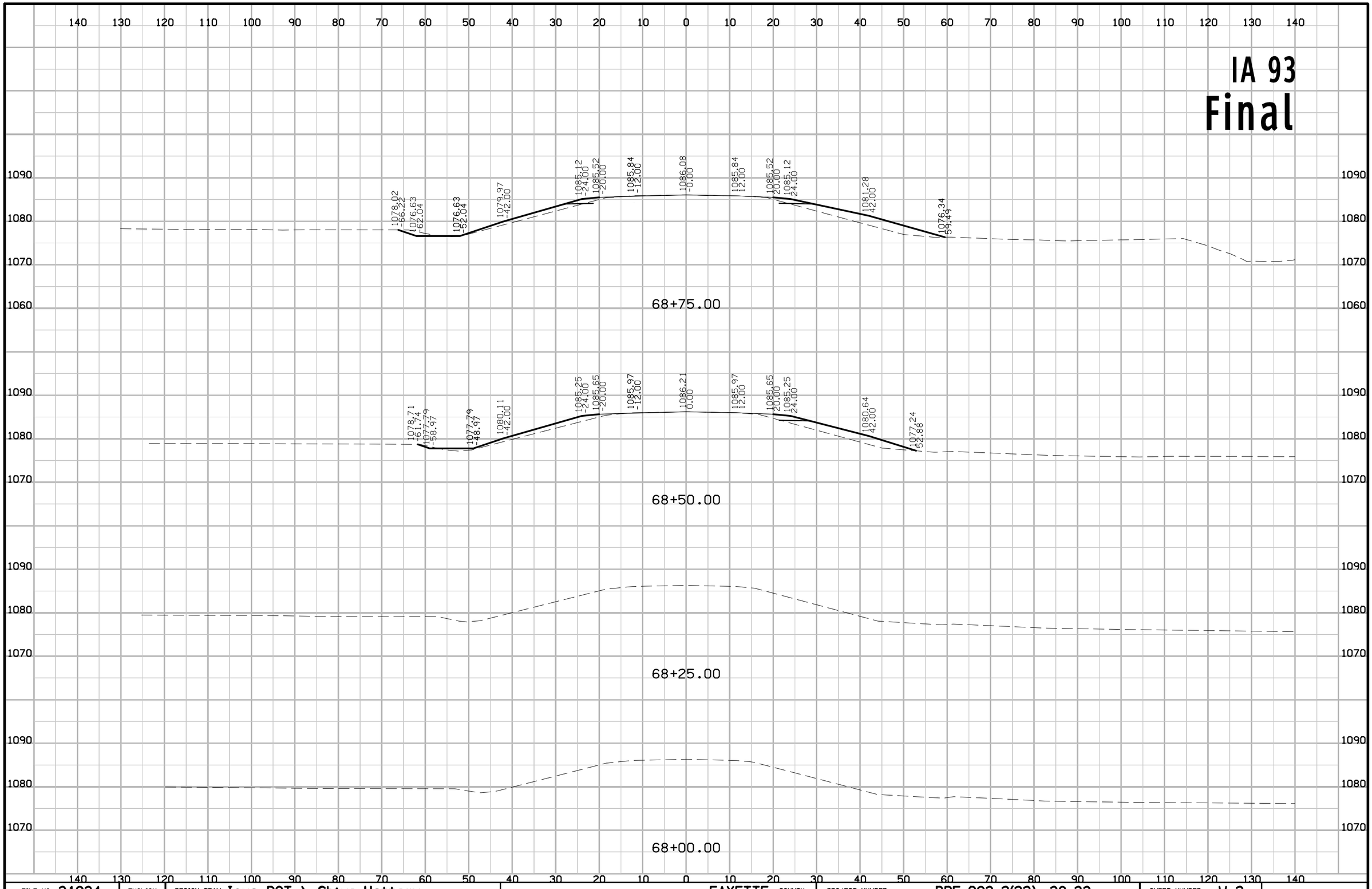
Proposed ROW — Proposed Right-of-Way Limit

Temporary ROW — Temporary Right-of-Way Limit

CROSS SECTION LEGEND AND SYMBOL INFORMATION SHEET

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

IA 93
Final



FILE NO. 31934	ENGLISH	DESIGN TEAM Iowa DOT \ Shive-Hattery	FAYETTE COUNTY	PROJECT NUMBER BRF-093-2(22)--38-33	SHEET NUMBER W.2

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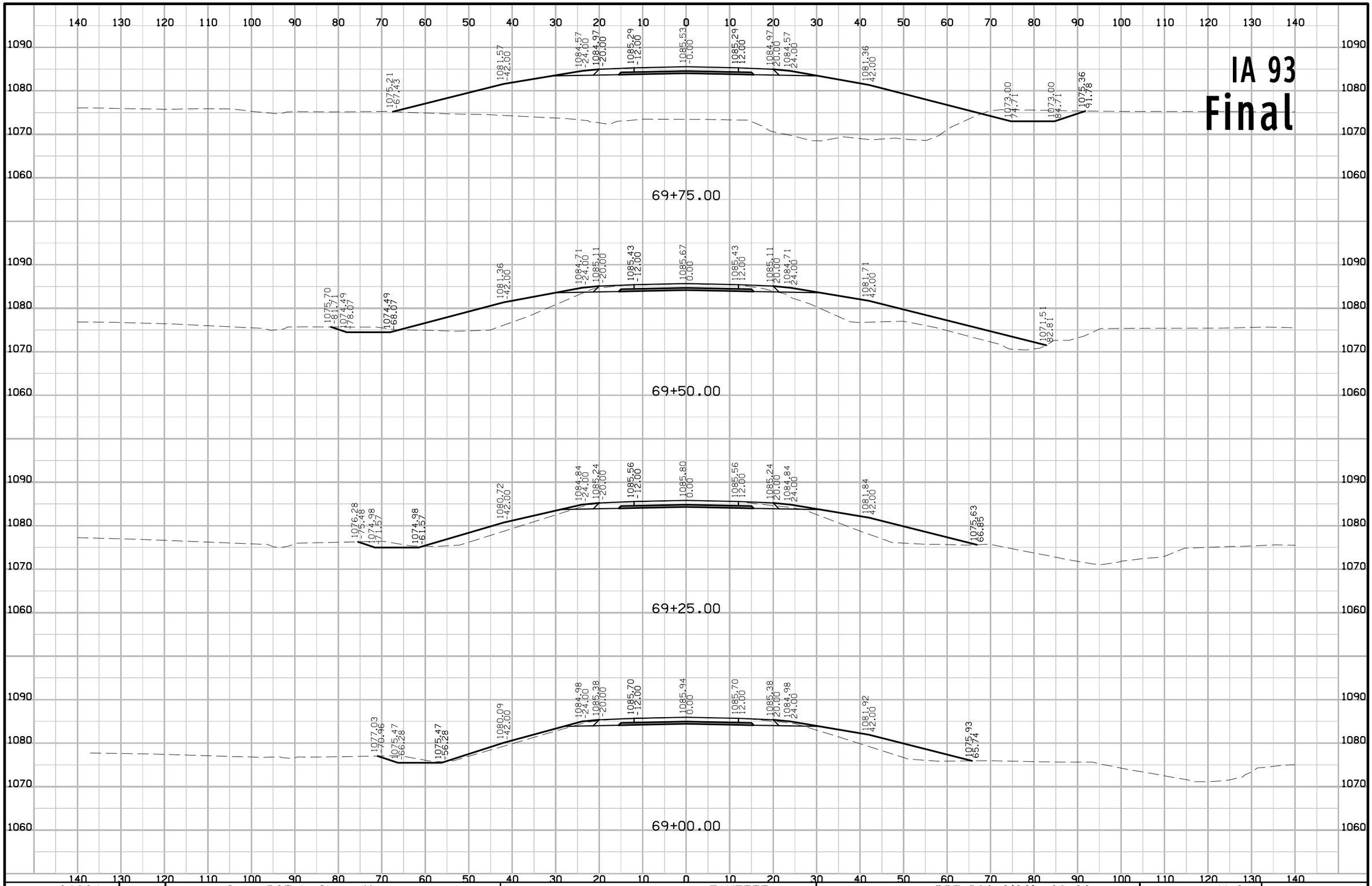
IA 93
Final



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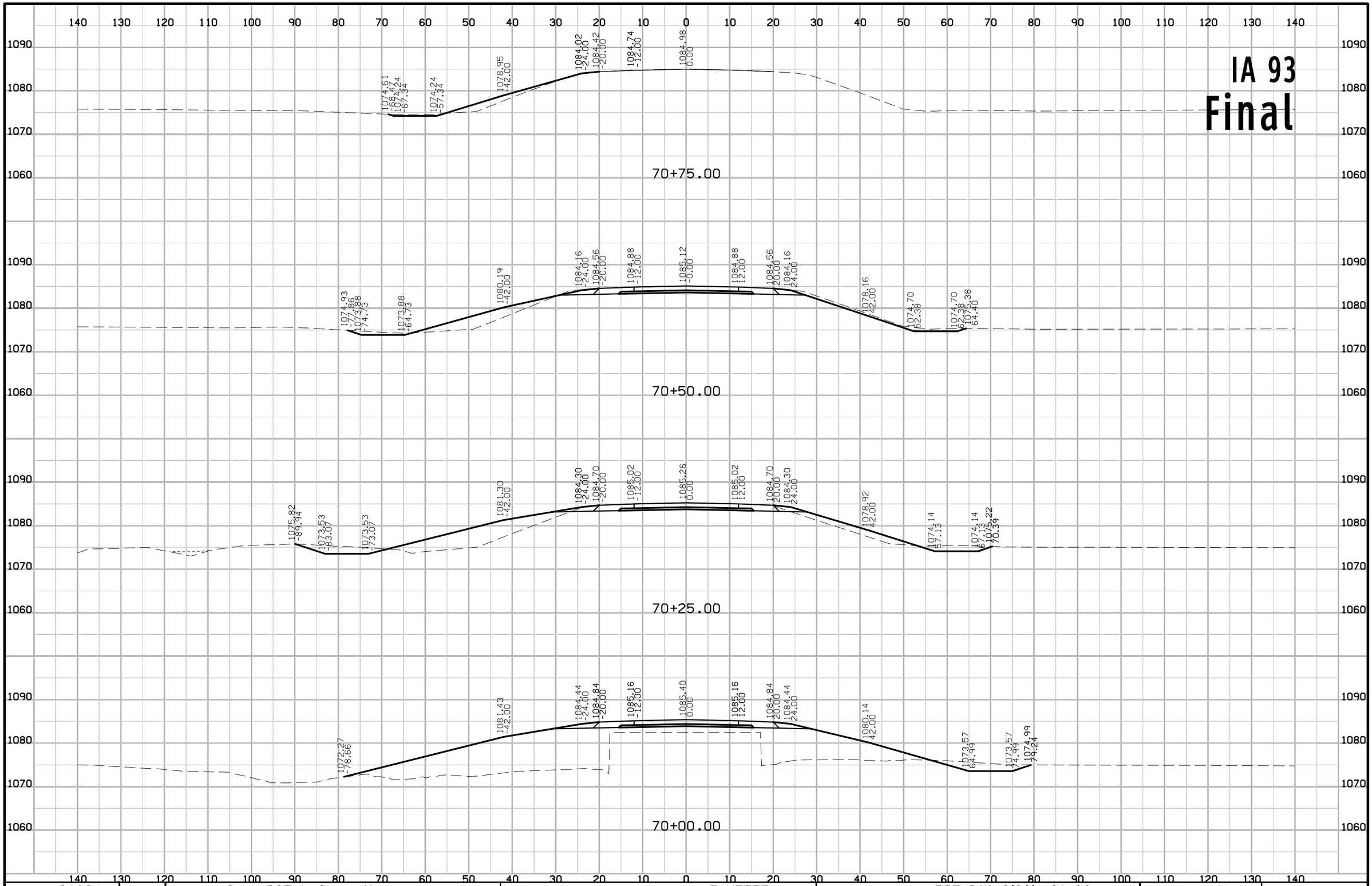
IA 93
Final



FILE NO. 31934	ENGLISH	DESIGN TEAM Iowa DOT \ Shive-Hattery	FAYETTE COUNTY	PROJECT NUMBER BRF-093-2(22)--38-33	SHEET NUMBER W.4

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IA 93
Final

140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140

1080
1070
1060

71+50.00

71+25.00

1090
1080
1070
1060

1075.03
50.48
1077.86
42.00
1083.86
24.00
1084.26
20.00
1084.58
12.00
1084.82
0.00
1084.58
12.00
1084.26
20.00
1083.86
24.00
1080.39
34.41

71+00.00

140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140

FILE NO. 31934	ENGLISH	DESIGN TEAM Iowa DOT \ Shive-Hattery	FAYETTE COUNTY	PROJECT NUMBER BRF-093-2(22)--38-33	SHEET NUMBER W.5

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LETTING DATE
DEC 17, 2024

RCB CULVERT NEW - TWIN BOX
BRF-093-2(22)--38-33

Fayette COUNTY

Index of Sheets	
No.	Description
Sheets	Culvert Plan
A.1	Title Sheet
A.2	Location Map Sheet
V.1	Estimated Quantites - Design No. 124
V.2 - V.8	Design No. 124
SPS Sheets	Culvert Plan Soils Sheet
SPS.1	Culvert Plan Soils Sheet
Road Sheets	Road Plan
A.3 - W.5	Road Plans
C.1 - C.2	Estimated Quantities - Road
C.3	Standard Plans - Road
RC.1 - RC.2	Erosion Control Quantities

IOWA DOT

PLANS OF PROPOSED IMPROVEMENT ON THE

PRIMARY ROAD SYSTEM
FAYETTE COUNTY
RCB CULVERT NEW - TWIN BOX

IA 93 over Stream
0.7 Miles W. of Co. Rd. V68

Refer to the Plan Sheets for list of applicable specifications.

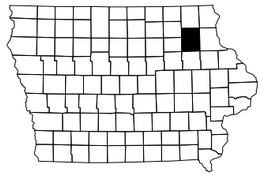
Value Engineering Saves. Refer to Article 1105.14 of the Specifications.

IOWA ONE CALL
1-800-292-8989
www.iowaonecall.com
811 Know what's below. Call before you dig.

	TOTAL
	45
PROJECT IDENTIFICATION NUMBER	
19-33-093-010	
CONTRACT ID NUMBER	
PROJECT NUMBER	
BRF-093-2(22)--38-33	
R.O.W. PROJECT NUMBER	
PROJECT DIRECTORY NUMBER	
3309301019	

English Culvert Standards		
Standard	Issued	Revised
TWRCB G1-20	07-2020	--------
TWRCB G2-20	07-2020	--------
TWRCB G3-20	07-2020	--------
TWRCB 12-11-20	07-2020	--------
TWPWH 15-1-20	07-2020	--------
TWPWH 15-2-20	07-2020	08-2022
TWPWH 15-3-20	07-2020	--------
TWPWH 15-4-20	07-2020	--------
TWPWH 15-5-20	07-2020	--------
TWPWH 15-6-20	07-2020	--------
TWPWH 30-1-20	07-2020	--------
TWPWH 30-2-20	07-2020	08-2022
TWPWH 30-3-20	07-2020	--------
TWPWH 30-4-20	07-2020	--------
TWPWH 30-5-20	07-2020	--------
TWPWH 30-6-20	07-2020	--------

Revisions to this Design Plan and/or Project Specifications should be submitted by _____



Standard Road Plans
Standard Road Plans are Listed on Sheet Number C.3

Design Data Rural		
2024 AADT	1600	V.P.D.
2044 AADT	1700	V.P.D.
2044 DHV	170	V.P.H.
TRUCKS	11	%
Total Design ESALs	-	

Index Of Seals		
Sheet No.	Name	Type
A.1	J. Scott Ingersoll	Structural Design
A.3	Michael J. Janechek	Roadway Design
V.3	Philip M. Harpole	Hydraulic Design
SPS.1	Mark A. Dell	Geotechnical Design
CS.1	David J. Heer	Geotechnical Design

Structural Design

LICENSED PROFESSIONAL ENGINEER
J. Scott Ingersoll
17556
IOWA

I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

XX-XX-XXXX
Signature Date

J. Scott Ingersoll
Printed or Typed Name

My license renewal date is December 31, 2024

Pages or sheets covered by this seal: A.1 thru A.2 & V.1 thru V.8

Preliminary
Not For Construction

FILE NO. 31934	ENGLISH	DESIGN TEAM Foth	Fayette COUNTY	PROJECT NUMBER BRF-093-2(22)--38-33	SHEET NUMBER A.1	

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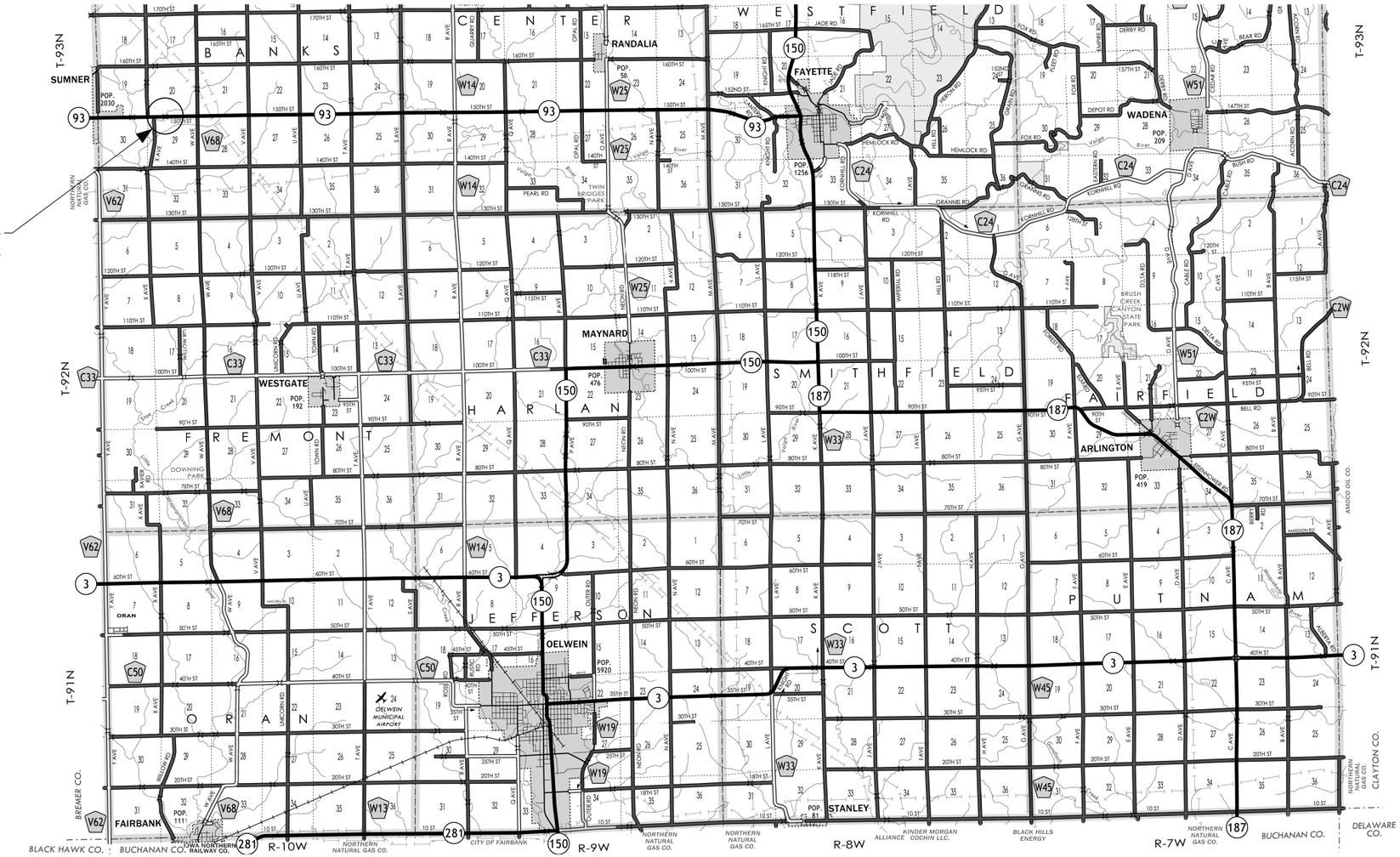
Design No. 124
FHWA No. 24581



N

LEGEND

- INTERSTATE HIGHWAY
- PRIMARY HIGHWAY-DIVIDED
- PRIMARY HIGHWAY
- PORTLAND CEMENT CONCRETE ROAD
- ASPHALT ROAD
- BITUMINOUS ROAD
- GRAVEL ROAD
- EARTHEN ROAD

- INTERSTATE HIGHWAY
- UNITED STATES HIGHWAY
- STATE HIGHWAY
- COUNTY HIGHWAY

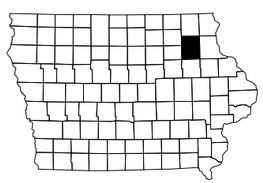
- RAILROAD
- PIPELINE
- AIRPORT
- HYDROLOGY
- BRIDGE

- STATE BOUNDARY
- COUNTY BOUNDARY
- CORPORATE BOUNDARY
- TOWNSHIP LINE
- SECTION LINE
- ROAD NAMES — ABBEY ROAD
- UNINCORPORATED PLACE — ELWOOD

- STATE PARKS
- STATE INSTITUTIONS
- FEDERAL LAND

Fayette County Location Map

Not To Scale



FILE NO. 31934	ENGLISH	DESIGN TEAM Foth	Fayette COUNTY	PROJECT NUMBER BRF-093-2(22)--38-33	SHEET NUMBER A.2	

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Estimated Culvert Quantities

Item No.	Item Code	Item	Unit	Total	As Built Quantity
1	2401-6745625	Removal of Existing Bridge	LS	1	
2	2402-2720000	Excavation, Class 20	CY	1824	
3	2402-3825025	Granular Material for Blanket	CY	174	
4	2403-0100020	Structural Concrete (RCB Culvert)	CY	420.4	
5	2404-7775000	Reinforcing Steel	LB	69,489	
6	2526-8285000	Construction Survey	LS	1	
7	2533-4980005	Mobilization	LS	1	

Item No. Estimate Reference Information

1 Contractor to add the following information when submitting the Iowa DNR "Notification of Demolition" form:
Name of asbestos inspector: Brad Azeltine
Date inspected: 05/29/2019
IA license number: Iowa DOT
Inspector phone number: 515-239-1938
Procedure used to detect the presence of asbestos materials: Polarized Light Microscopy (PLM)

2 Includes excavation necessary to place the 1'-0" thick working blanket. Includes filling and compacting low areas around proposed culvert.

3 Granular material shall be in accordance with Section 4118 of the Standard Specifications. Includes 174 CY for a working blanket. The working blanket may be deleted if determined to be unnecessary at the time of construction.

Note:
Roadway quantities shown elsewhere in these plans.

Design For 15° Skew (L.A.)

Twin 12' x 11' x 90' Reinforced Concrete Box Culvert

Estimated Quantities

STA. 69+73.75 (IA 93)

Turn-in Date: Oct 2023

Fayette County

IOWA DEPARTMENT OF TRANSPORTATION

Design No. 124 | Design Sheet No. 1 of 8 | FHWA/Asset 24581

General Notes:

This design is for the replacement of the existing 28' x 30' steel beam bridge, Design No. 1048 with a year of construction of 1949, with a twin 12'-0 x 11'-0 x 90'-0 reinforced concrete box culvert skewed 15° left ahead at Station 69+73.75. Electronic plans of the existing structure are available to the Contractor as part of the e-files supplied with the contract documents.

The R.C.B. culvert sections are designed for HL-93 live load and earth fills of 4'-0".

Faint lines on plans indicate existing structure.

Utility companies whose facilities are shown on the plans or known to be within the construction limits shall be notified by the contractor of the construction starting date.

When de-watering presents a problem for placing the curtain walls as detailed, alternate methods such as steel sheet pile and precast concrete walls may be approved but at no additional cost. The Culvert Contractor is to submit to the Engineer for approval complete drawings of the proposed curtain wall alternative before beginning construction.

The lump sum bid for "Removal of Existing Bridge" shall include removal of the concrete deck, abutments and steel beams.

Removals shall be in accordance with Section 2401, of the Standard Specifications. The west abutment and footing shall be completely removed. Timber piles shall be trimmed to 3 feet minimum below the proposed culvert flow line elevation.

The roadway will be closed to traffic during construction. See Traffic Control Plan note.

All reinforcing bars and bars noted as dowels supplied for this structure shall be deformed reinforcement unless otherwise noted or shown.

Excess Class 20 excavation material suitable for backfilling shall be stockpiled at the construction site, as directed by the Engineer.

Scrape samples were taken from two areas of this bridge to get an indication of the existence of and level of total lead and total chromium. Analysis of total lead and total chromium on these samples were:

Location	Total Lead	Total Chromium
Abutment Bearing	190 PPM	110 PPM
Beam	600 PPM	130 PPM

These analyses show the existence of these two toxic constituents. Levels indicated by these tests could create conditions above regulatory limits for health and safety requirements. No other constituents were analyzed. The bidder should not rely on the Iowa DOT's testing and analysis for any purpose other than as an indication of the existence of these two toxic constituents.

Standards:
For details and notes not shown refer to the following Iowa D.O.T. - Culvert Standards:

Standard	Issued	Revised
TWRCB G1-20	07-2020	--------
TWRCB G2-20	07-2020	--------
TWRCB G3-20	07-2020	--------
TWRCB 12-11-20	07-2020	--------
TWPWH 15-1-20	07-2020	--------
TWPWH 15-2-20	07-2020	08-2022
TWPWH 15-3-20	07-2020	--------
TWPWH 15-4-20	07-2020	--------
TWPWH 15-5-20	07-2020	--------
TWPWH 15-6-20	07-2020	--------
TWPWH 30-1-20	07-2020	--------
TWPWH 30-2-20	07-2020	08-2022
TWPWH 30-3-20	07-2020	--------
TWPWH 30-4-20	07-2020	--------
TWPWH 30-5-20	07-2020	--------
TWPWH 30-6-20	07-2020	--------

Summary of Reinforcing Steel

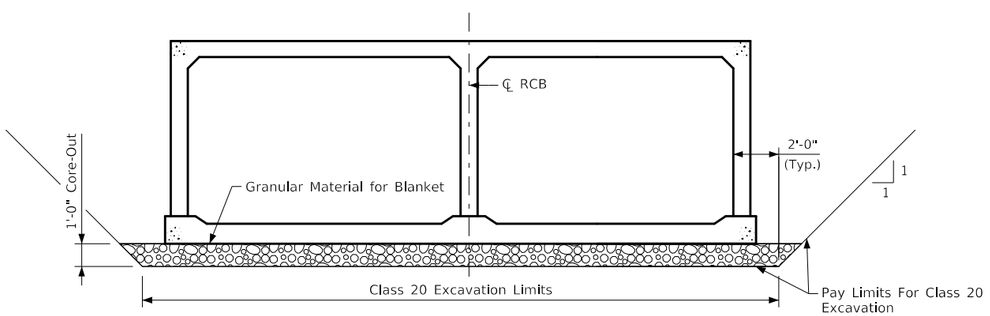
Location	Quantity	Total
Twin 12x11 Headwall, 15° Skew (1 Req'd)	10,704	10,704
Twin 12x11 Headwall, 30° Skew (1 Req'd)	12,852	12,852
23'-0 Barrel Section (2 Req'd)	2 @ 11,467	22,934
13'-0 Barrel End Section (2 Req'd)	2 @ 6481	12,962
18'-0 Bend Section (1 Req'd)	9657	9657
**5rl Bars (4 Sets Req'd)	4 @ 95	380
	Total (LB)	69,489

** One set of 5rl bars includes 26-#5 bars x 3'-6" long, SPA at 1'-0 C-C in slab.

Concrete Placement Quantities

Location	Footing	Walls	Slab	Total
Twin 12x11 Headwall, 15° Skew (1 Req'd)	50.6	26.5	* 2.8	79.9
Twin 12x11 Headwall, 30° Skew (1 Req'd)	56.5	29.6	* 3.2	89.3
23'-0 Barrel Section (2 Req'd)	2 @ 20.8 = 41.6	2 @ 24.8 = 49.6	2 @ 18.6 = 37.2	128.4
13'-0 Barrel End Section (2 Req'd)	2 @ 11.8 = 23.6	2 @ 14.0 = 28.0	2 @ 10.5 = 21.0	72.6
18'-0 Bend Section (1 Req'd)	16.3	19.4	14.5	50.2
Total (CY)	188.6	153.1	78.7	420.4

** Includes parapet and top of wingwall.



Class 20 Excavation Details

Granular Material for Blanket to Terminate 3'-0" Short of the Cast-in-place Curtain Wall

Note:
Pollution prevention plan shown elsewhere in these plans

Traffic Control Plan

Note: The roadway will be closed to thru traffic. Refer to the Traffic Control Plan shown elsewhere in these plans.

Design History at This Site
(Includes This Design)

Des. No.	Type of Work
Unknown	Original Design 24' x 20' CCS Bridge
1048	28' x 30' I Beam Bridge
287	Retrofit Barrier Rails
212	Scour Countermeasure
124	Twin RCB Culvert

Design For 15° Skew (L.A.)

Twin 12' x 11' x 90' Reinforced Concrete Box Culvert

General Notes

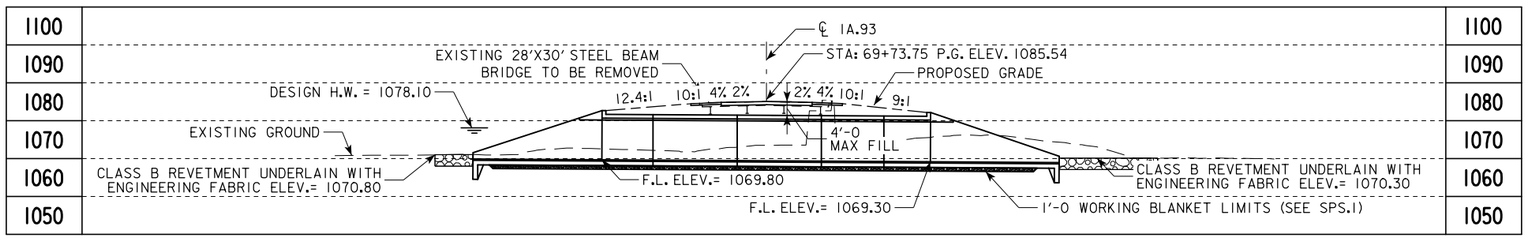
STA. 69+73.75 (IA 93)

Turn-in Date: Oct 2023

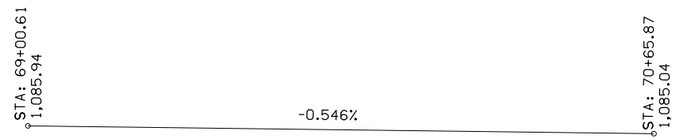
Fayette County

IOWA DEPARTMENT OF TRANSPORTATION

Design No. 124 | Design Sheet No. 2 of 8 | FHWA/Asset 24581



BENCH MARK NO. 93168, N8972086.448, E15550427.922, BM FOUND ROW RAIL DRILL HOLE IN BALL 82 FEET EAST OF X AVE AND 60 FEET NORTH OF IA HWY 93, ELEVATION = 1076.23

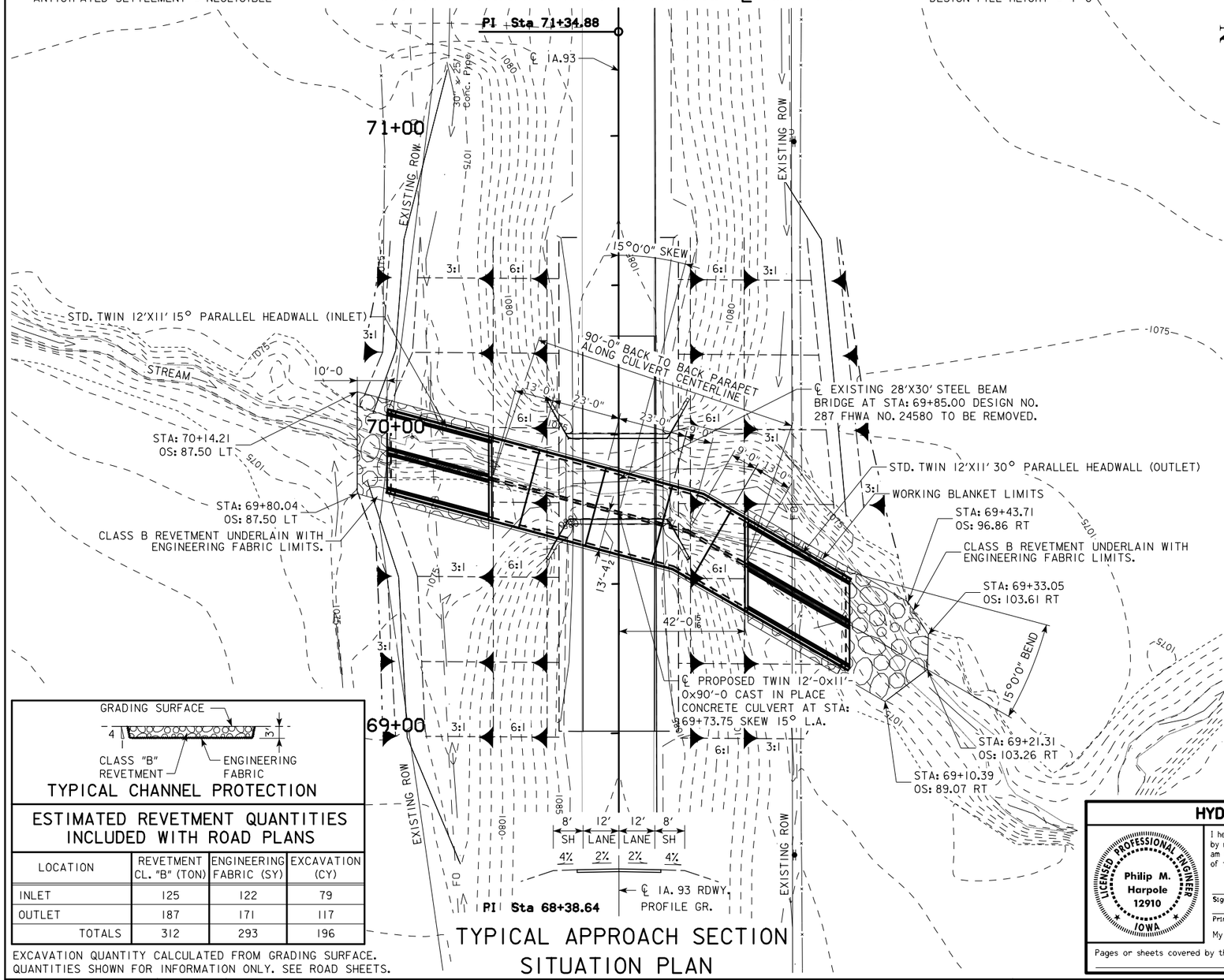


PROPOSED PROFILE GRADE IA 93

LONGITUDINAL SECTION ALONG ℄ CULVERT

ANTICIPATED SETTLEMENT = NEGLIGIBLE

DESIGN FILL HEIGHT = 4'-0



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PLAN NOTES:
1. DRAINAGE THROUGH EXISTING CULVERT/CHANNEL MUST BE MAINTAINED THROUGHOUT CONSTRUCTION
2. FLOW LINE OF CULVERT HAS BEEN SET 1 FOOT BELOW STREAMBED.

HYDRAULIC DATA

DRAINAGE AREA = 2.43 SQ. MI.
Q_{50} = 1,743 CFS
HW ELEV. = 1078.10
STREAM SLOPE = 30.60 FT./MI.

Q_{100}= 2,079 CFS
HW ELEV. = 1079.39

Q_{500}= 2,998 CFS
HW ELEV. = 1081.05

UTILITIES LEGEND:

PPA Power Pole Black Hills Energy
FO - Windstream Communications - Quality D
GL Gas Line Black Hills Energy - Quality D

UTILITIES SHOWN ON THIS SHEET ARE FOR INFORMATION ONLY, SEE ROAD DESIGN SHEETS FOR FINAL UTILITY INFORMATION.

LOCATION

IA. 93 OVER STREAM
T-93N R-10W
SECTION 20 - 29
BANKS TOWNSHIP
FAYETTE COUNTY
FHWA NO. 24581
BRIDGE MAINT. NO.3317.IS093
LATITUDE 42.847486°
LONGITUDE -92.055557°

TRAFFIC ESTIMATE

2024 AADT	1600	V.P.D.
2044 AADT	1700	V.P.D.
2044 DHV	170	V.P.H.
TRUCKS	11	%
TOTAL DESIGN ESALs	-	

TYPICAL CHANNEL PROTECTION

ESTIMATED REVETMENT QUANTITIES INCLUDED WITH ROAD PLANS

LOCATION	REVETMENT CL. "B" (TON)	ENGINEERING FABRIC (SY)	EXCAVATION (CY)
INLET	125	122	79
OUTLET	187	171	117
TOTALS	312	293	196

EXCAVATION QUANTITY CALCULATED FROM GRADING SURFACE.
QUANTITIES SHOWN FOR INFORMATION ONLY. SEE ROAD SHEETS.

TYPICAL APPROACH SECTION SITUATION PLAN

HYDRAULIC DESIGN

LICENSED PROFESSIONAL ENGINEER
Philip M. Harpole
12910
IOWA

I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

Signature Philip M Harpole Date
Printed or Typed Name
My license renewal date is December 31, 2023
Pages or sheets covered by this seal:

Design For 15° Skew (L.A.)

Twin 12' x 11' x 90' Reinforced Concrete Box Culvert

Situation Plan

STA. 69+73.75 (IA 93)

Turn-in Date: Oct 2023

Fayette County

IOWA DEPARTMENT OF TRANSPORTATION

Design No. 124 | Design Sheet No. 3 of 8 | FHWA/Asset 24581

FILE NO. 31934	ENGLISH	DESIGN TEAM Foth	Fayette COUNTY	PROJECT NUMBER BRF-093-2(22)--38-33	SHEET NUMBER V.3

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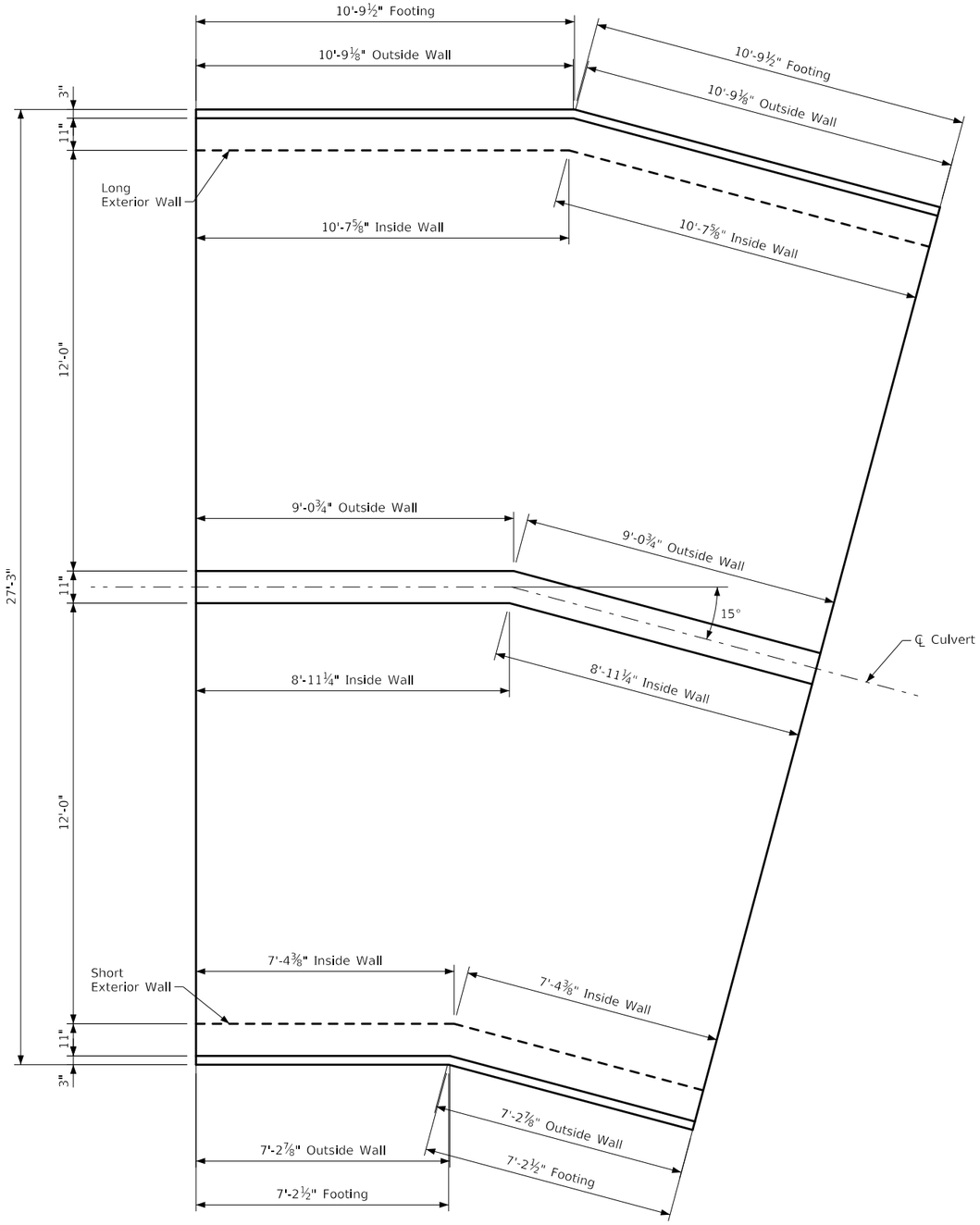
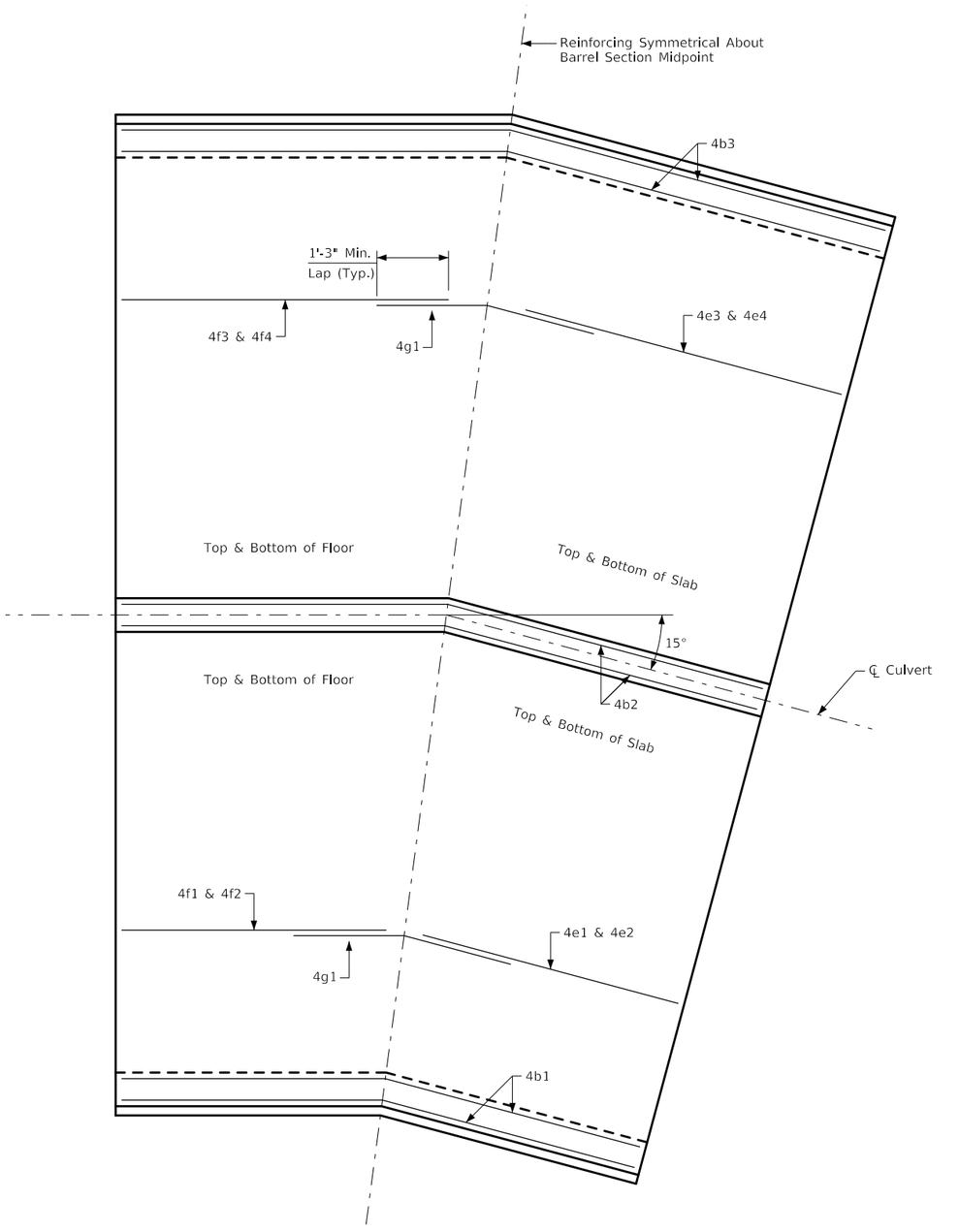


Plan Dimensions
(Floor and Walls)



Plan - Longitudinal Reinforcing

Design For 15° Skew (L.A.)

Twin 12' x 11' x 90' Reinforced Concrete Box Culvert

18'-0" Bend Section Details

STA. 69+73.75 (IA 93)

Turn-in Date: Oct 2023

Fayette County

IOWA DEPARTMENT OF TRANSPORTATION

Design No. 124 | Design Sheet No. 4 of 8 | FHWA/Asset 24581

FILE NO. 31934	ENGLISH	DESIGN TEAM Foth	Fayette COUNTY	PROJECT NUMBER BRF-093-2(22)--38-33	SHEET NUMBER V.4

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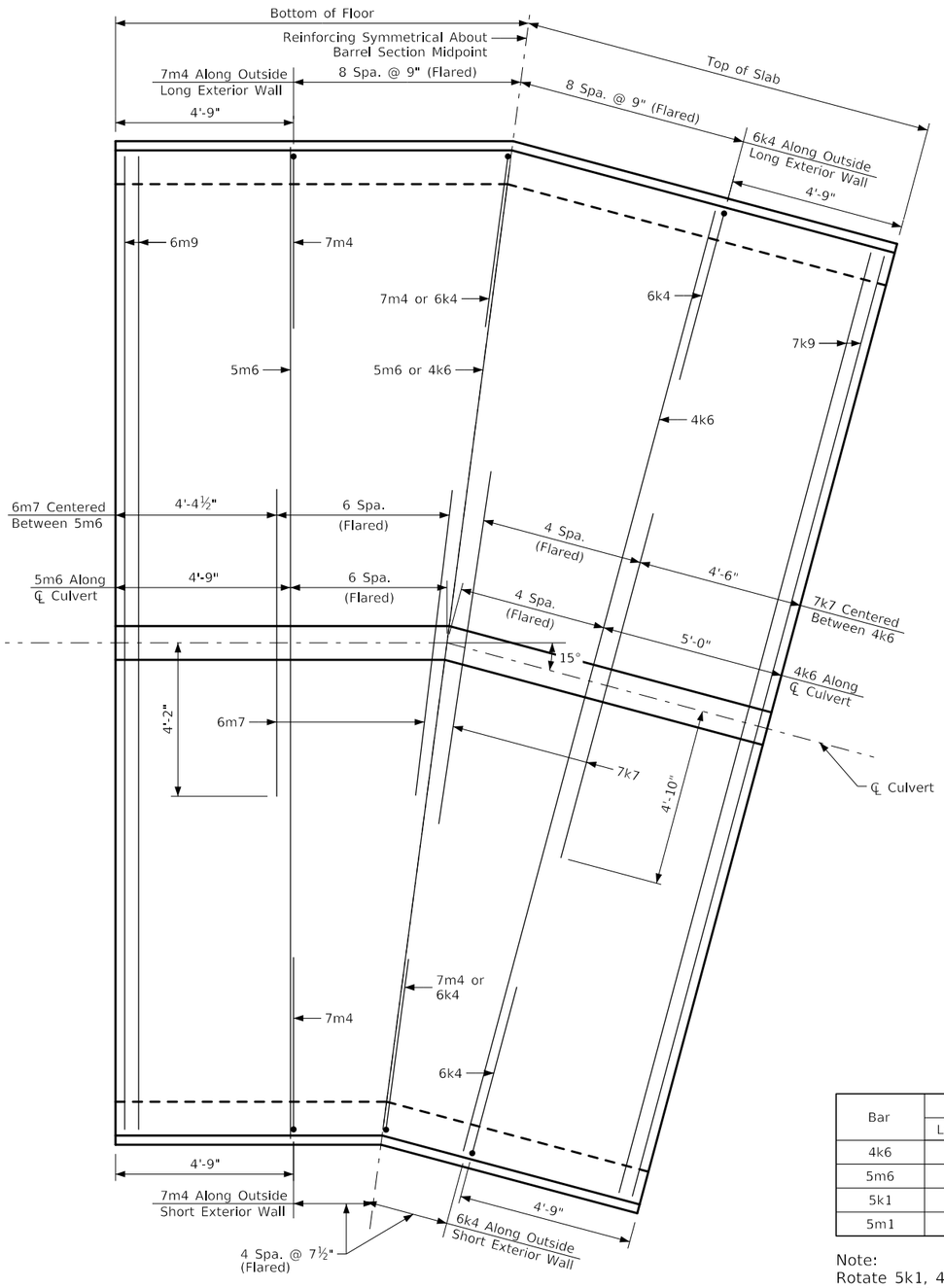
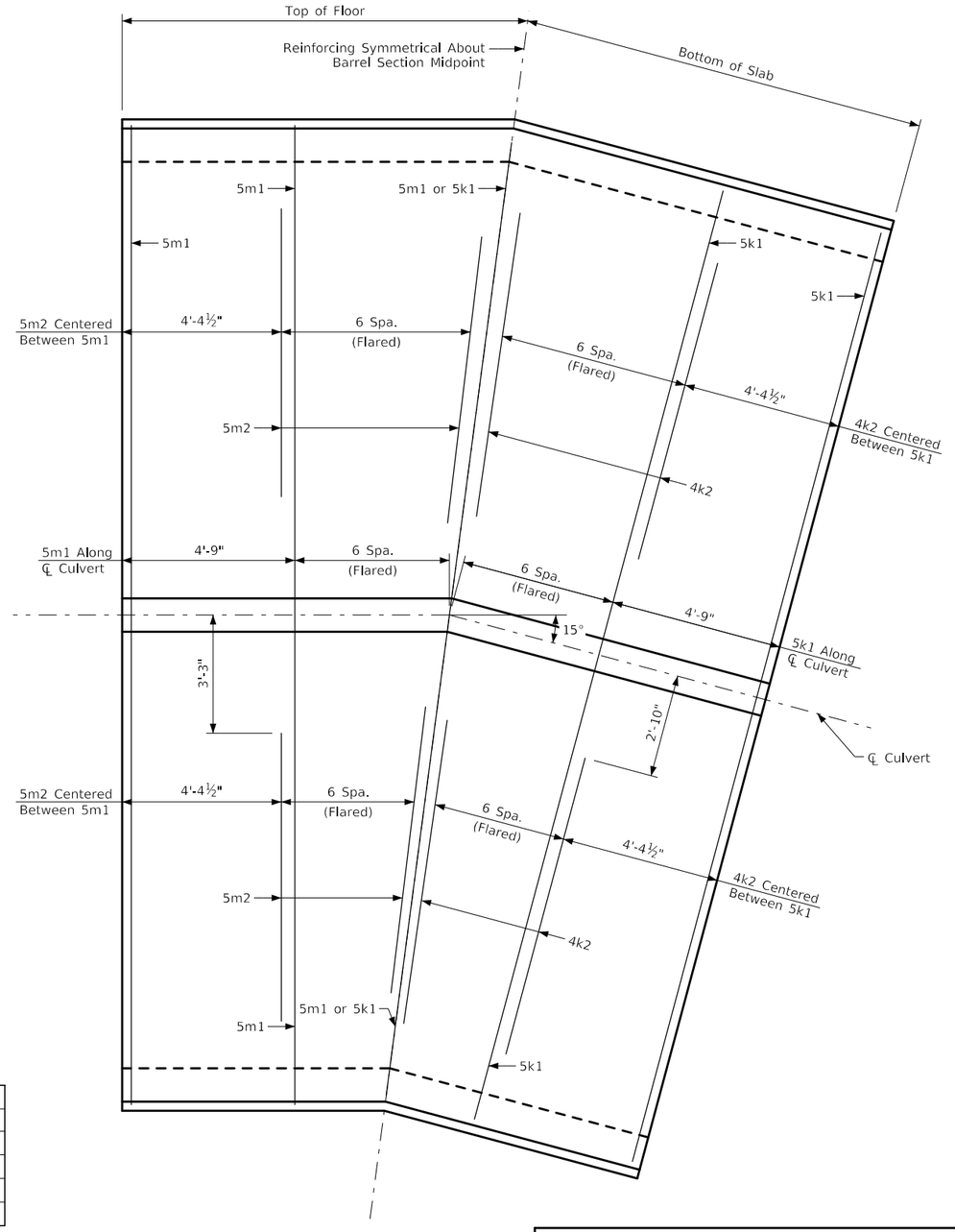


Plan - Transverse Reinforcing
(Top of Slab and Bottom of Floor)

Bar	End Spacing	
	Long Wall	Short Wall
4k6	1'-5¼"	6¾"
5m6	1'-0"	5"
5k1	1'-0"	5"
5m1	1'-0"	5"

Note:
Rotate 5k1, 4k6, 5m1 and 5m6 bars through 15° bend as shown. Refer to table on this sheet for bar end spacing values.

Note:
See Part Longitudinal Section on Design Sheet 7 for transverse bar spacing.



Plan - Transverse Reinforcing
(Bottom of Slab and Top of Floor)

Design For 15° Skew (L.A.)

Twin 12' x 11' x 90' Reinforced Concrete Box Culvert

18'-0" Bend Section Details

STA. 69+73.75 (IA 93)

Turn-in Date: Oct 2023

Fayette County

IOWA DEPARTMENT OF TRANSPORTATION

Design No. 124 | Design Sheet No. 5 of 8 | FHWA/Asset 24581

FILE NO. 31934	ENGLISH	DESIGN TEAM Foth	Fayette COUNTY	PROJECT NUMBER BRF-093-2(22)--38-33	SHEET NUMBER V.5

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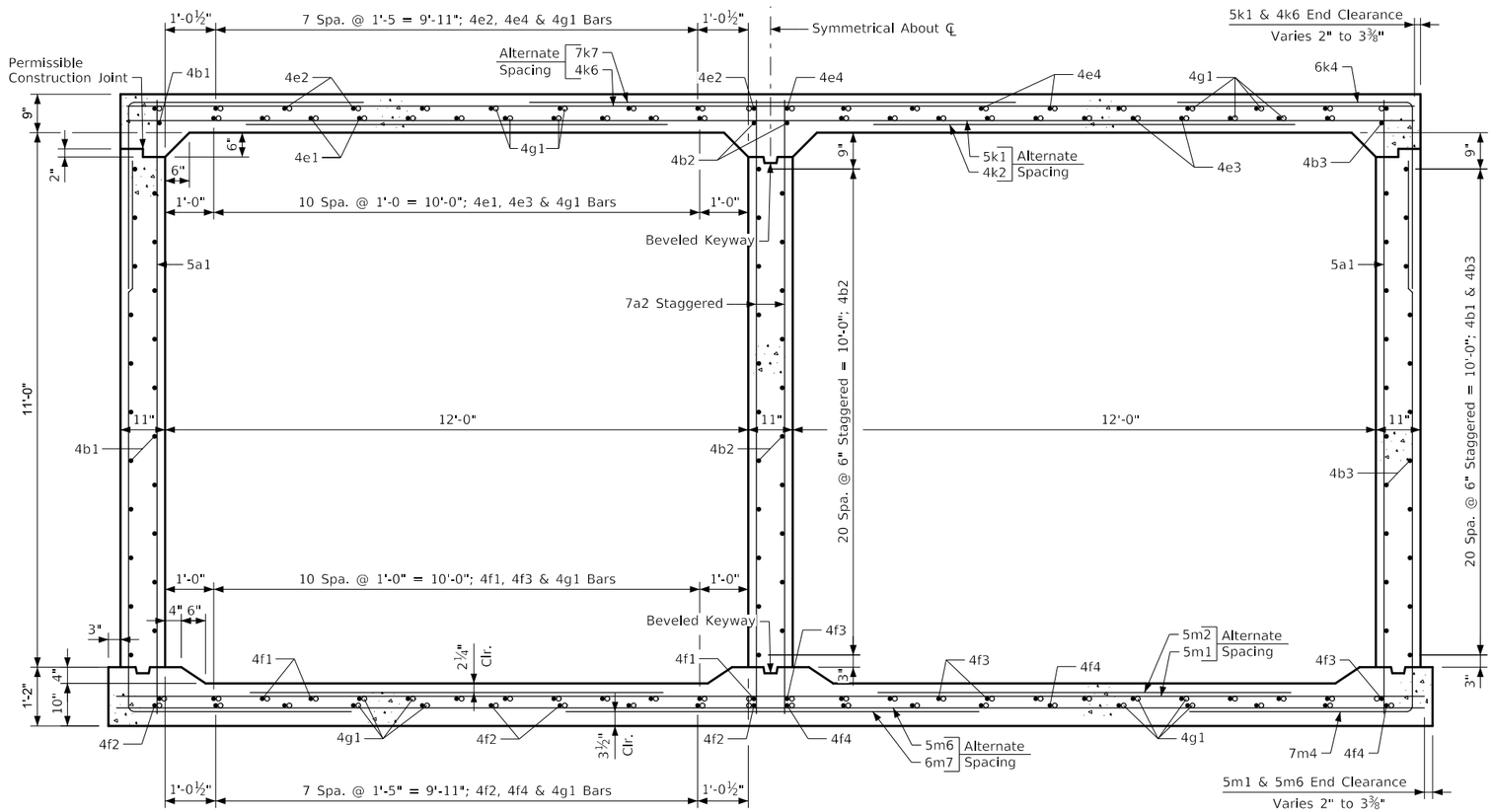

Twin 12' x 11' Barrel Section at 15° Bend
(Looking North)

Design For 15° Skew (L.A.)

Twin 12' x 11' x 90' Reinforced Concrete Box Culvert

18'-0" Bend Section Details

STA. 69+73.75 (IA 93)

Turn-in Date: Oct 2023

Fayette County

IOWA DEPARTMENT OF TRANSPORTATION

Design No. 124 | Design Sheet No. 6 of 8 | FHWA/Asset 24581

FILE NO. 31934	ENGLISH	DESIGN TEAM Foth	Fayette COUNTY	PROJECT NUMBER BRF-093-2(22)--38-33	SHEET NUMBER V.6

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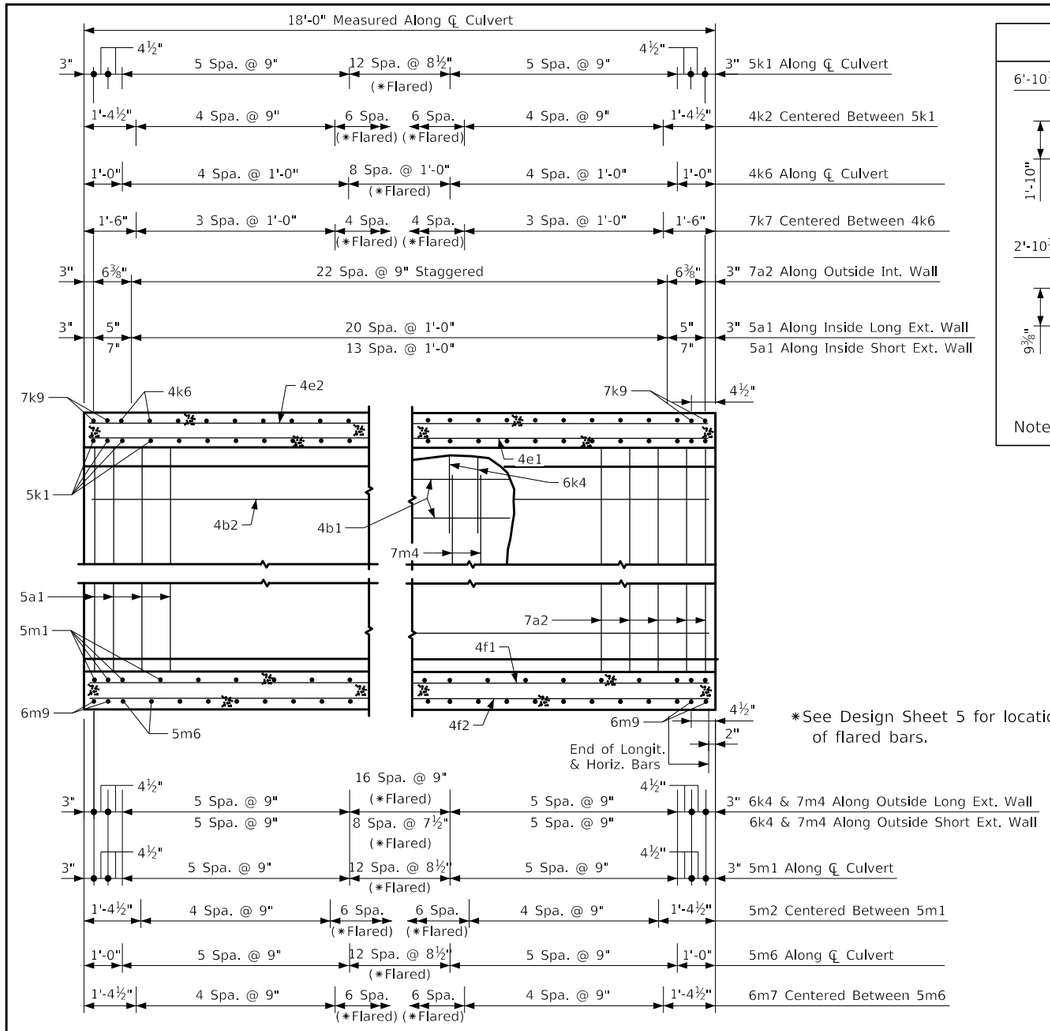
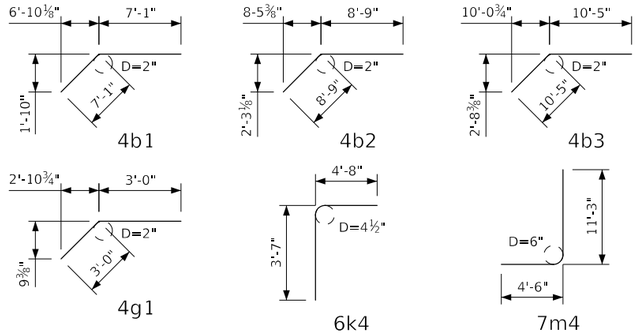


Part Longitudinal Section
(Along ℄ Culvert)

∗See Design Sheet 5 for location of flared bars.

Bent Bar Details



Note: All Dimensions are out to out. D = Pin Diameter.

Reinforcing Bar List - 18'-0" Bend Section

Bar	Location	Shape	No.	Length	Weight
5a1	Exterior Walls, Vertical, Front Face	——	39	12'-6"	508
7a2	Interior Walls, Vertical, Both Faces	——	25	12'-6"	639
4b1	Short Exterior Wall, Horizontal, Both Faces	⟍	22	14'-2"	208
4b2	Interior Wall, Horizontal, Both Faces	⟍	23	17'-6"	269
4b3	Long Exterior Wall, Horizontal, Both Faces	⟍	22	20'-10"	306
4e1	Slab, Longit., Bott.	——	22	7'-2"	105
4e2	Slab, Longit., Top	——	20	7'-2"	96
4e3	Slab, Longit., Bott.	——	22	8'-10"	130
4e4	Slab, Longit., Top	——	20	8'-10"	118
4f1	Floor, Longit., Top	——	26	7'-2"	124
4f2	Floor, Longit., Bott.	——	20	7'-2"	96
4f3	Floor, Longit., Top	——	26	8'-10"	153
4f4	Floor, Longit., Bott.	——	20	8'-10"	118
4g1	Slab & Floor Longit. Bend	⟍	88	6'-0"	353
5k1	Slab, Transv., Bott.	——	27	26'-5"	744
4k2	Slab, Transv., Bott.	——	44	8'-5"	247
6k4	Slab Corner, Top	⌜	54	8'-3"	669
4k6	Slab, Transv., Top	——	17	26'-5"	300
7k7	Slab, Transv., Top	——	16	9'-8"	316
7k9	Slab, Transv., Top	——	4	26'-5"	216
5m1	Floor, Transv., Top	——	27	26'-11"	758
5m2	Floor, Transv., Top	——	44	7'-11"	363
7m4	Floor Corner, Bott.	⌞	54	15'-9"	1738
5m6	Floor, Transv., Bott.	——	23	26'-11"	646
6m7	Floor, Transv., Bott.	——	22	8'-4"	275
6m9	Floor, Transv., Bott.	——	4	26'-11"	162
				Reinforcing Steel - Total (LB)	9657

Concrete Placement Quantities

Location	Total
Floor	16.3
Walls	19.4
Slab	14.5
Total (CY)	50.2

Note:
See Design Sheet 6 for barrel cross section.

Design For 15° Skew (L.A.)

Twin 12' x 11' x 90' Reinforced Concrete Box Culvert

18'-0" Bend Section Details

STA. 69+73.75 (IA 93) Turn-in Date: Oct 2023

Fayette County

IOWA DEPARTMENT OF TRANSPORTATION

Design No. 124 Design Sheet No. 7 of 8 FHWA/Asset 24581

FILE NO. 31934	ENGLISH	DESIGN TEAM Foth	Fayette COUNTY	PROJECT NUMBER BRF-093-2(22)--38-33	SHEET NUMBER V.7	

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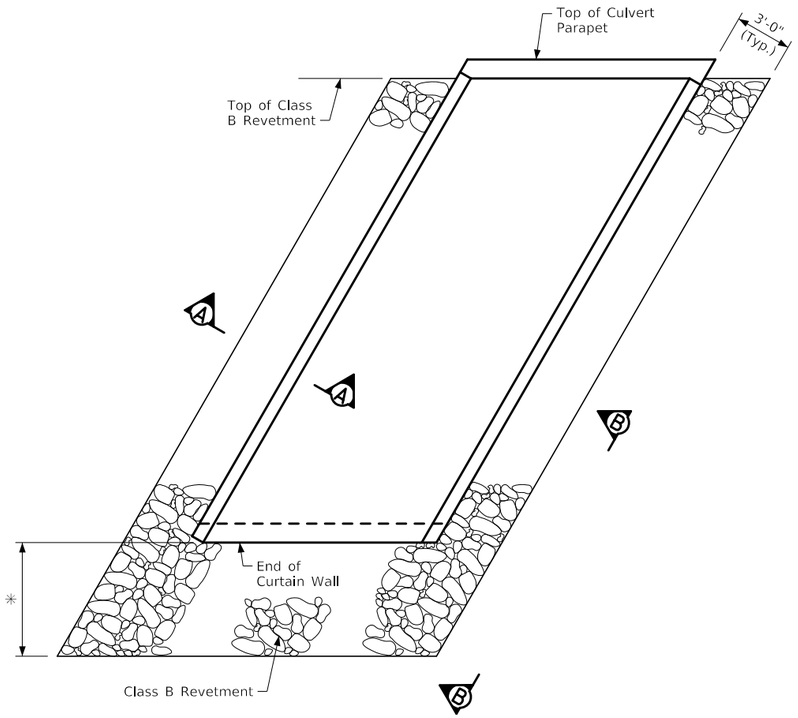
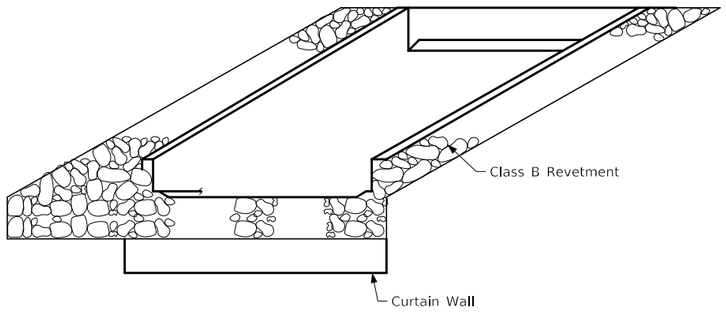
✳ = See culvert plans for limits of revetment and engineering fabric.



Plan View

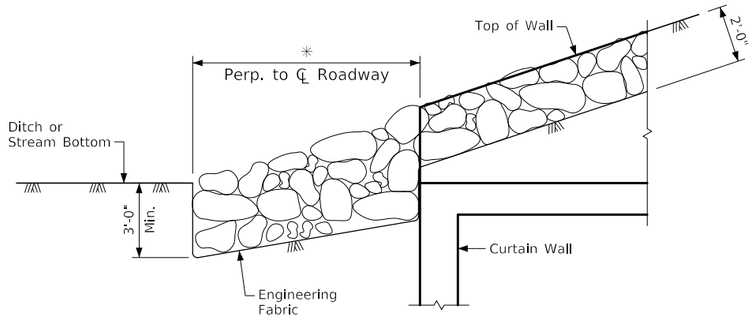


Elevation View

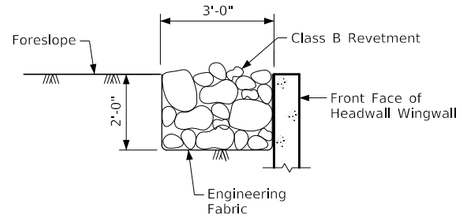
15° Skewed Headwall

(30° Skewed Headwall Similar)

✳ = See culvert plans for limits of revetment and engineering fabric.



View B-B



Section A-A

Typical Details

Construction Notes:

Class B Revetment shall be used and placed according to Article 2507.03, of the Standard Specifications. The engineering fabric shall meet the material requirements in accordance with Article 4196.01,B,3, of the Standard Specifications.

Design For 15° Skew (L.A.)

Twin 12' x 11' x 90' Reinforced Concrete Box Culvert

Revetment Protection Details

STA. 69+73.75 (IA 93)

Turn-in Date: Oct 2023

Fayette County

IOWA DEPARTMENT OF TRANSPORTATION

Design No. 124 | Design Sheet No. 8 of 8 | FHWA/Asset 24581

FILE NO. 31934	ENGLISH	DESIGN TEAM Foth	Cast-In-Place Culvert Revetment Protection Details	Standard Sheet 1092 (Mod.)	Fayette COUNTY	PROJECT NUMBER BRF-093-2(22)--38-33	SHEET NUMBER V.8	

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