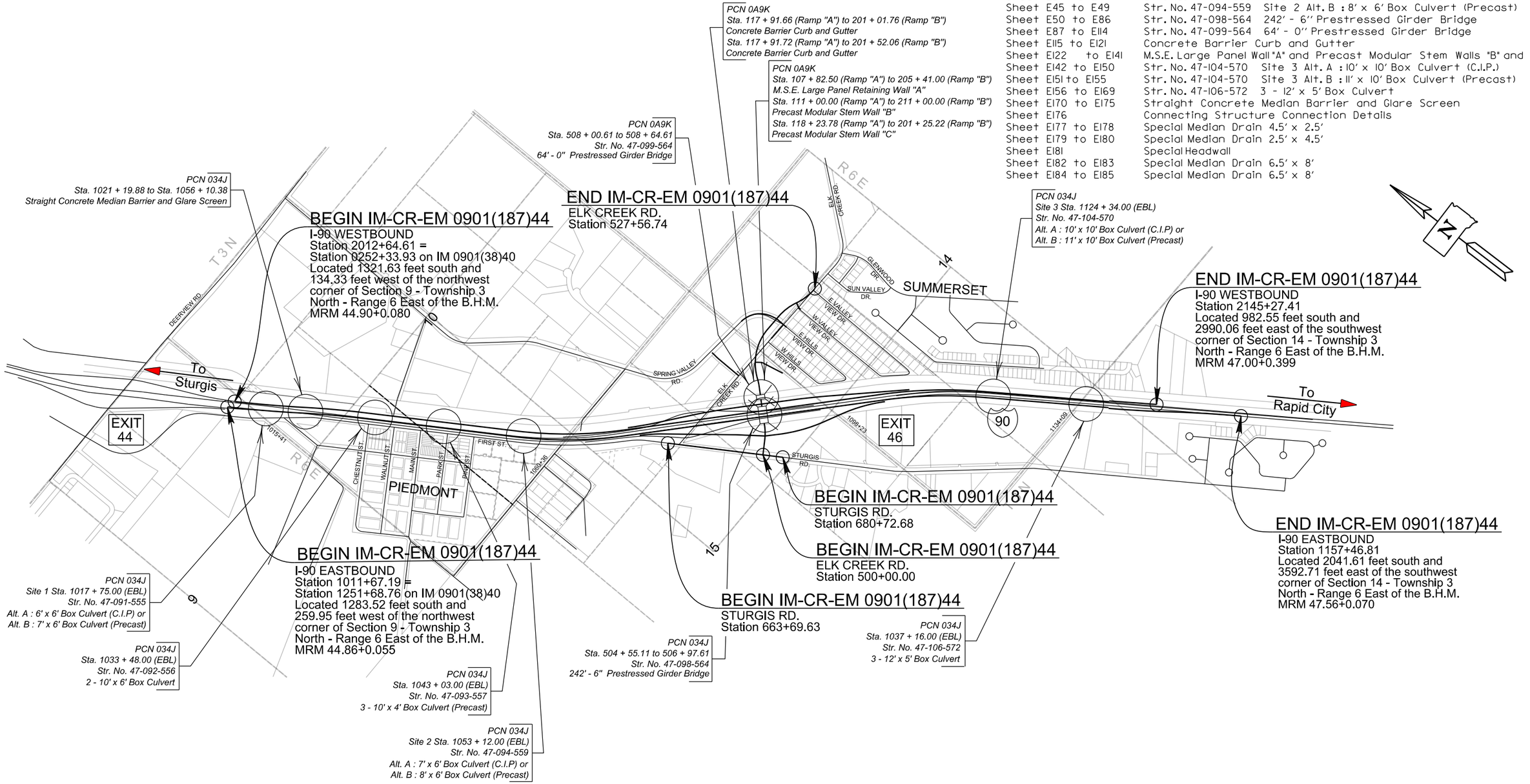
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E1	E185

Section E: Structure Plans

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Sheet E4 to E11	Str. No. 47-091-555 Site 1 Alt. A : 6' x 6' Box Culvert (C.I.P.)
Sheet E12 to E16	Str. No. 47-091-555 Site 1 Alt. B : 7' x 6' Box Culvert (Precast)
Sheet E17 to E30	Str. No. 47-092-556 2 - 10' x 6' Box Culvert
Sheet E31 to E36	Str. No. 47-093-557 3 - 10' x 4' Box Culvert (Precast)
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Sheet E50 to E86	Str. No. 47-098-564 242' - 6'' Prestressed Girder Bridge
Sheet E87 to E114	Str. No. 47-099-564 64' - 0'' Prestressed Girder Bridge
Sheet E115 to E121	Concrete Barrier Curb and Gutter
Sheet E122 to E141	M.S.E. Large Panel Wall "A" and Precast Modular Stem Walls "B" and "C"
Sheet E142 to E150	Str. No. 47-104-570 Site 3 Alt. A : 10' x 10' Box Culvert (C.I.P.)
Sheet E151 to E155	Str. No. 47-104-570 Site 3 Alt. B : 11' x 10' Box Culvert (Precast)
Sheet E156 to E169	Str. No. 47-106-572 3 - 12' x 5' Box Culvert
Sheet E170 to E175	Straight Concrete Median Barrier and Glare Screen
Sheet E176	Connecting Structure Connection Details
Sheet E177 to E178	Special Median Drain 4.5' x 2.5'
Sheet E179 to E180	Special Median Drain 2.5' x 4.5'
Sheet E181	Special Headwall
Sheet E182 to E183	Special Median Drain 6.5' x 8'
Sheet E184 to E185	Special Median Drain 6.5' x 8'



SECTION E – ESTIMATE OF STRUCTURE QUANTITIES

PCN 034J
Site 1 – Alternate A
Str. No. 47-091-555

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
420E0200	Structure Excavation, Box Culvert	71	CuYd
421E0200	Box Culvert Undercut	152	CuYd
460E0120	Class A45 Concrete, Box Culvert	206.6	CuYd
480E0100	Reinforcing Steel	30,418	Lb
700E0210	Class B Riprap	20.5	Ton
831E0110	Type B Drainage Fabric	31	SqYd

PCN 034J
Site 1 – Alternate B
Str. No. 47-091-555

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
420E0200	Structure Excavation, Box Culvert	68	CuYd
421E0200	Box Culvert Undercut	144	CuYd
560E0074	7'x6' Precast Concrete Box Culvert, Furnish	270.0	Ft
560E0075	7'x6' Precast Concrete Box Culvert, Install	270.0	Ft
560E1074	7'x6' Precast Concrete Box Culvert End Section, Furnish	2	Each
560E1075	7'x6' Precast Concrete Box Culvert End Section, Install	2	Each
700E0210	Class B Riprap	22.2	Ton
831E0110	Type B Drainage Fabric	33	SqYd

PCN 034J
Str. No. 47-092-556

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
420E0200	Structure Excavation, Box Culvert	258	CuYd
421E0200	Box Culvert Undercut	817	CuYd
460E0120	Class A45 Concrete, Box Culvert	635.2	CuYd
480E0100	Reinforcing Steel	106,268	Lb
700E0210	Class B Riprap	53.4	Ton
831E0110	Type B Drainage Fabric	72	SqYd
831E0300	Reinforcement Fabric (MSE)	1,179	SqYd

PCN 034J
Str. No. 47-093-557

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
420E0200	Structure Excavation, Box Culvert	248	CuYd
421E0200	Box Culvert Undercut	374	CuYd
464E0100	Controlled Density Fill	44.8	CuYd
560E0130	10'x4' Precast Concrete Box Culvert, Furnish	244.0	Ft
560E0131	10'x4' Precast Concrete Box Culvert, Install	244.0	Ft
560E1130	10'x4' Precast Concrete Box Culvert End Section, Furnish	2	Each
560E1131	10'x4' Precast Concrete Box Culvert End Section, Install	2	Each
560E2112	2-10'x4' Precast Concrete Box Culvert, Furnish	244.0	Ft
560E2113	2-10'x4' Precast Concrete Box Culvert, Install	244.0	Ft
560E3112	2-10'x4' Precast Concrete Box Culvert End Section, Furnish	2	Each
560E3113	2-10'x4' Precast Concrete Box Culvert End Section, Install	2	Each
700E0210	Class B Riprap	143.7	Ton
831E0110	Type B Drainage Fabric	152	SqYd

PCN 034J
Site 2 – Alternate A
Str. No. 47-094-559

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
420E0200	Structure Excavation, Box Culvert	74	CuYd
421E0200	Box Culvert Undercut	146	CuYd
460E0120	Class A45 Concrete, Box Culvert	196.6	CuYd
480E0100	Reinforcing Steel	30,421	Lb
700E0210	Class B Riprap	22.2	Ton
831E0110	Type B Drainage Fabric	33	SqYd

PCN 034J
Site 2 – Alternate B
Str. No. 47-094-559

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
420E0200	Structure Excavation, Box Culvert	68	CuYd
421E0200	Box Culvert Undercut	138	CuYd
560E0092	8'x6' Precast Concrete Box Culvert, Furnish	236.0	Ft
560E0093	8'x6' Precast Concrete Box Culvert, Install	236.0	Ft
560E1092	8'x6' Precast Concrete Box Culvert End Section, Furnish	2	Each
560E1093	8'x6' Precast Concrete Box Culvert End Section, Install	2	Each
700E0210	Class B Riprap	24.0	Ton
831E0110	Type B Drainage Fabric	35	SqYd

PCN 034J
Str. No. 47-098-564

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
009E3310	Bridge Elevation Survey	Lump Sum	LS
009E5000	Concrete Penetrating Sealer	1,598.7	SqYd
120E7000	Select Granular Backfill	49.0	Ton
250E0030	Incidental Work, Structure	Lump Sum	LS
260E1010	Base Course	1,641.7	Ton
410E0030	Structural Steel, Miscellaneous	Lump Sum	LS
410E2600	Membrane Sealant Expansion Joint	135.0	Ft
420E0100	Structure Excavation, Bridge	307	CuYd
430E0200	Bridge End Embankment	1,705	CuYd
430E0300	Granular Bridge End Backfill	210.1	CuYd
430E0510	Approach Slab Underdrain Excavation	4.3	CuYd
430E0700	Precast Concrete Headwall for Drain	2	Each
460E0028	Class A45 Low Shrinkage Concrete, Bridge Deck	519.3	CuYd
460E0050	Class A45 Concrete, Bridge	376.3	CuYd
460E0150	Concrete Approach Slab for Bridge	302.3	SqYd
460E0160	Concrete Approach Sleeper Slab for Bridge	108.7	SqYd
460E0380	Install Dowel in Concrete	208	Each
462E0100	Class M6 Concrete	87.1	CuYd
470E0120	Steel Pedestrian Railing on Sidewalk	464.0	Ft
480E0100	Reinforcing Steel	54,875	Lb
480E0200	Epoxy Coated Reinforcing Steel	3,636	Lb
480E0300	Stainless Reinforcing Steel	117,963	Lb
480E0514	No. 14 Rebar Splice	78	Each
510E0300	Preboring Pile	120	Ft
510E3521	HP 14x73 Steel Test Pile, Furnish and Drive	195	Ft
510E3525	HP 14x73 Steel Bearing Pile, Furnish and Drive	3,180	Ft
560E8081	81" Minnesota Shape Prestressed Concrete Beam	1,916	Ft
635E8030	3" Rigid Galvanized Steel Conduit	243	Ft
680E0040	4" Underdrain Pipe	105	Ft
680E2500	Porous Backfill	8.1	Ton
734E2022	Bridge Berm Slope Protection, Quarried Aggregate	290.7	SqYd
831E0100	Type A Drainage Fabric	291	SqYd
831E1010	Geogrid Reinforcement	1,043	SqYd
831E1030	Perforated Geocell	1,271	SqFt

PCN 0A9K
Str. No. 47-099-564

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
009E3310	Bridge Elevation Survey	Lump Sum	LS
009E5000	Concrete Penetrating Sealer	427.1	SqYd
120E7000	Select Granular Backfill	32.4	Ton
260E1010	Base Course	1,485.4	Ton
410E0030	Structural Steel, Miscellaneous	Lump Sum	LS
410E2600	Membrane Sealant Expansion Joint	152.0	Ft
420E0100	Structure Excavation, Bridge	35	CuYd
430E0200	Bridge End Embankment	733	CuYd
430E0300	Granular Bridge End Backfill	139.9	CuYd
460E0028	Class A45 Low Shrinkage Concrete, Bridge Deck	168.1	CuYd
460E0050	Class A45 Concrete, Bridge	35.4	CuYd
460E0150	Concrete Approach Slab for Bridge	270.3	SqYd
460E0160	Concrete Approach Sleeper Slab for Bridge	80.8	SqYd
460E0380	Install Dowel in Concrete	87	Each
462E0100	Class M6 Concrete	32.5	CuYd
470E0120	Steel Pedestrian Railing on Sidewalk	112.0	Ft
480E0100	Reinforcing Steel	9,096	Lb
480E0200	Epoxy Coated Reinforcing Steel	2,554	Lb
480E0300	Stainless Reinforcing Steel	26,760	Lb
510E3401	HP 12x53 Steel Test Pile, Furnish and Drive	135	Ft
510E3405	HP 12x53 Steel Bearing Pile, Furnish and Drive	1,000	Ft
560E8036	36" Minnesota Shape Prestressed Concrete Beam	436	Ft
831E1010	Geogrid Reinforcement	1,752	SqYd
831E1030	Perforated Geocell	922	SqFt

PCN 0A9K
Concrete Barrier Curb and Gutter, M.S.E.Large Panel Wall "A", and Precast Modular Stem Walls "B" and "C"

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
420E0300	Structure Excavation, Retaining Wall	1,681	CuYd
420E1000	Foundation Preparation, Retaining Wall	2,734	CuYd
430E0700	Precast Concrete Headwall for Drain	3	Each
530E0420	MSE Large Panel Wall, Furnish	26,699	SqFt
530E0422	MSE Large Panel Wall, Install	26,699	SqFt
530E0450	Precast Modular Stem Wall, Furnish	44,560	SqFt
530E0452	Precast Modular Stem Wall, Install	44,560	SqFt
530E0702	Granular Backfill for MSE Large Panel Wall	52,357.0	CuYd
650E2000	Concrete Barrier Curb and Gutter	434	Ft
650E2001	Concrete Barrier Curb and Gutter End Section	28	Ft
650E4060	Type C6 Concrete Gutter	3,644	Ft
680E0040	4" Underdrain Pipe	477	Ft
680E0060	6" Underdrain Pipe	5,049	Ft
831E1010	Geogrid Reinforcement	832	SqYd

PCN 034J
Site 3 – Alternate A
Str. No. 47-104-570

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
420E0200	Structure Excavation, Box Culvert	108	CuYd
421E0200	Box Culvert Undercut	179	CuYd
460E0120	Class A45 Concrete, Box Culvert	298.0	CuYd
480E0100	Reinforcing Steel	43,644	Lb
700E0210	Class B Riprap	27.4	Ton
831E0110	Type B Drainage Fabric	39	SqYd

PCN 034J
Site 3 – Alternate B
Str. No. 47-104-570

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
420E0200	Structure Excavation, Box Culvert	81	CuYd
421E0200	Box Culvert Undercut	148	CuYd
560E0166	11'x10' Precast Concrete Box Culvert, Furnish	190.0	Ft
560E0167	11'x10' Precast Concrete Box Culvert, Install	190.0	Ft
560E1166	11'x10' Precast Concrete Box Culvert End Section, Furnish	2	Each
560E1167	11'x10' Precast Concrete Box Culvert End Section, Install	2	Each
700E0210	Class B Riprap	29.1	Ton
831E0110	Type B Drainage Fabric	41	SqYd

PCN 034J
Str. No. 47-106-572

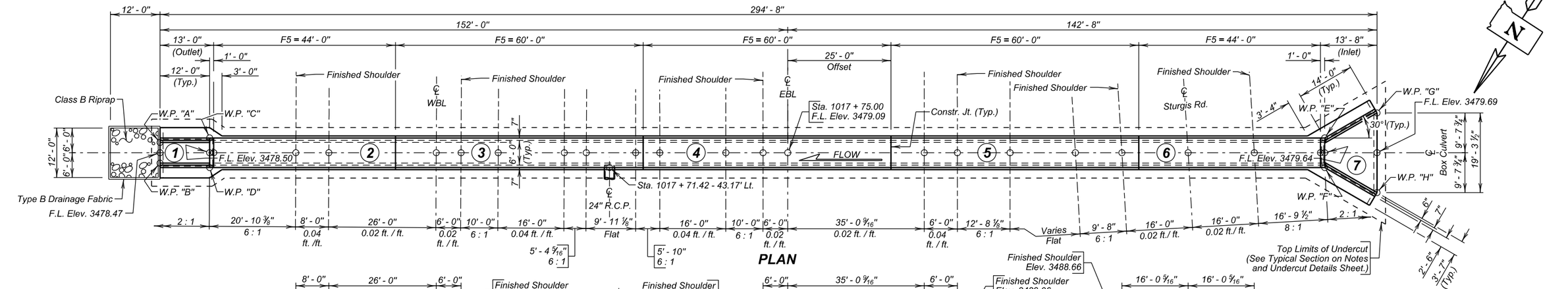
BID ITEM NUMBER	ITEM	QUANTITY	UNIT
420E0200	Structure Excavation, Box Culvert	380	CuYd
421E0200	Box Culvert Undercut	473	CuYd
460E0120	Class A45 Concrete, Box Culvert	841.4	CuYd
480E0100	Reinforcing Steel	122,265	Lb
700E0210	Class B Riprap	86.3	Ton
831E0110	Type B Drainage Fabric	109	SqYd

PCN 034J
Straight Concrete Median Barrier and Glare Screen, Connecting Structure Connection Details, Special Median Drain 4.5' x 2.5', Special Median Drain 2.5' x 4.5', Special Headwall, Special Median Drain 6.5' x 8', and Special Median Drain 6.5' x 8'

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
410E0030	Structural Steel, Miscellaneous	Lump Sum	LS
460E0300	Breakout Structural Concrete	0.8	CuYd
462E0100	Class M6 Concrete	72.9	CuYd
480E0100	Reinforcing Steel	12,081	Lb
480E0200	Epoxy Coated Reinforcing Steel	670	Lb
628E1000	Straight Concrete Barrier	1,223	Ft
628E1300	Straight Glare Screen for Concrete Barrier	1,223	Ft
670E4205	Type M Frame and Grate Assembly	8	Each
670E4325	Barrier Drop Inlet Double Unit Frame and Grate Assembly	10	Each

The elevations shown in these plans are based on the National Geodetic Survey (NGS) North American Vertical Datum of 1988 (NAVD88).

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
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HYDRAULIC DATA

Q_d	280 cfs
A_d	24 sq ft
V_d	11.7 fps
Q_F	280 cfs
Q_{100}	410 cfs
Q_{OT}	378 cfs
V_{max}	12.9 fps

Q_d = Design discharge for the proposed culvert based on 50 year frequency. El. 3486.0.

Q_{OT} = Overtopping discharge and frequency > Q_{94} year recurrence interval. El. 3488.0 @ Sta. 607+ 50.00. (Sturgis Road)

Q_F = Designated peak discharge for the basin approaching proposed project based on 50 year frequency.

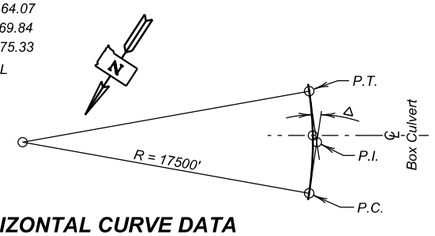
Q_{100} = Computed discharge for the basin approaching proposed project based on 100 year frequency. El. 3488.3.

V_{max} = Maximum computed outlet velocity for the proposed culvert, based on 100 year frequency.

INDEX OF CULVERT SHEETS -

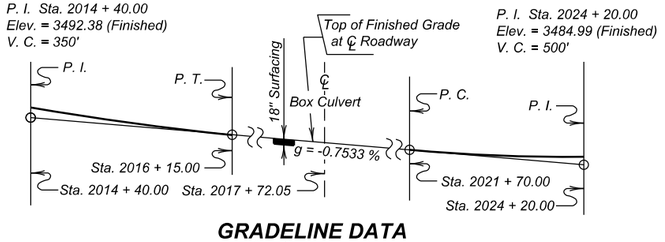
Sheet No. 1 - General Drawing and Quantities
Sheet No. 2 - Notes and Undercut Details
Sheet No. 3 - Inlet Details
Sheet No. 4 - Outlet Details
Sheet No. 5 - F5 Barrel End Section Details (44' - 0")
Sheet No. 6 - F5 Barrel Interior Section Details (60' - 0")
Sheet No. 7 - Standard Plate No.'s 460.02 and 460.10
Sheet No. 8 - Standard Plate No. 620.16

P. C. Sta. 2012 + 64.07
P. I. Sta. 2017 + 69.84
P. T. Sta. 2022 + 75.33
△ = 3° 18' 39.00" L
D = 0° 19' 39.00"
R = 17500'
T = 505.77'
L = 1011.26



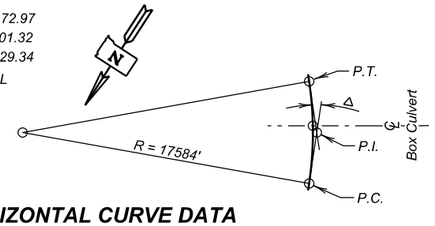
HORIZONTAL CURVE DATA
(Westbound Lanes)

P. I. Sta. 2014 + 40.00
Elev. = 3492.38 (Finished)
V. C. = 350'
P. I. Sta. 2024 + 20.00
Elev. = 3484.99 (Finished)
V. C. = 500'



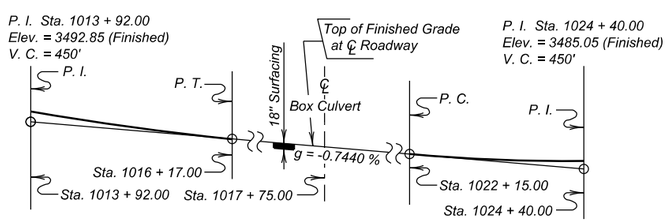
GRADELINE DATA
(Westbound Lanes)

P. C. Sta. 1011 + 72.97
P. I. Sta. 1017 + 01.32
P. T. Sta. 1022 + 29.34
△ = 3° 26' 32.00" L
D = 0° 19' 33.00"
R = 17584'
T = 528.35'
L = 1056.37'



HORIZONTAL CURVE DATA
(Eastbound Lanes)

P. I. Sta. 1013 + 92.00
Elev. = 3492.85 (Finished)
V. C. = 450'
P. I. Sta. 1024 + 40.00
Elev. = 3485.05 (Finished)
V. C. = 450'



GRADELINE DATA
(Eastbound Lanes)

TABLE OF WORKING POINTS

W. P.	STATION	OFFSET
"A"	1017 + 77.51	152.00' Lt.
"B"	1017 + 72.48	152.00' Lt.
"C"	1017 + 78.61	140.00' Lt.
"D"	1017 + 71.39	140.00' Lt.
"E"	1017 + 78.56	130.00' Rt.
"F"	1017 + 71.44	130.00' Rt.
"G"	1017 + 84.57	142.67' Rt.
"H"	1017 + 65.43	142.67' Rt.

ESTIMATED QUANTITIES

	ITEM	UNIT	QUANTITY
	Class A45 Concrete, Box Culvert	Cu. Yd.	206.6
	Reinforcing Steel	Lb.	30418
	Structure Excavation, Box Culvert	Cu. Yd.	71
	Box Culvert Undercut	Cu. Yd.	152
#	Class B Riprap	Ton	20.5
#	Type B Drainage Fabric	Sq. Yd.	31

For estimating purposes only, a factor of 1.4 tons/cu. yd. was used to convert Cu. Yd. to Tons.

SITE 1
ALTERNATE A

GENERAL DRAWING AND QUANTITIES

FOR

6' X 6' BOX CULVERT (C.I.P.)

OVER TRIB. TO ELK CREEK — 0° SKEW
STA. 1017 + 75.00 (EBL) — SEC. 9-T3N-R6E
STR. NO. 47-091-555 — IM-CR-EM 0901(187)44
PCN 034J — HL-93

MEADE COUNTY

S. D. DEPT. OF TRANSPORTATION

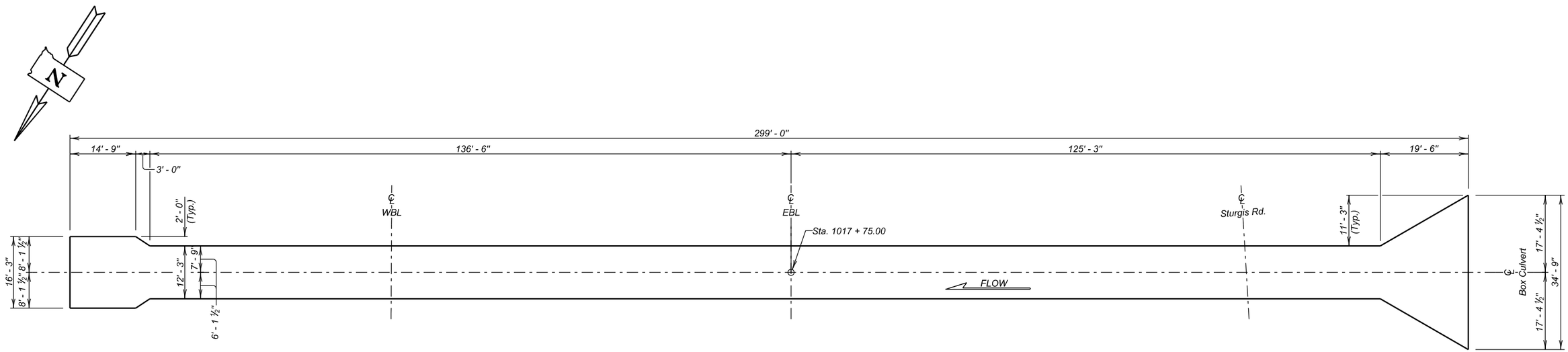
SEPTEMBER 2022

PLANS BY :
OFFICE OF BRIDGE DESIGN, SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION

DESIGNED BY	CK. DES. BY	DRAFTED BY	
AU MEAD034J	AH 034JLA01	BT	Steve A Johnson BRIDGE ENGINEER

Revised October 15, 2025 AU

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E5	E185



UNDERCUT LAYOUT

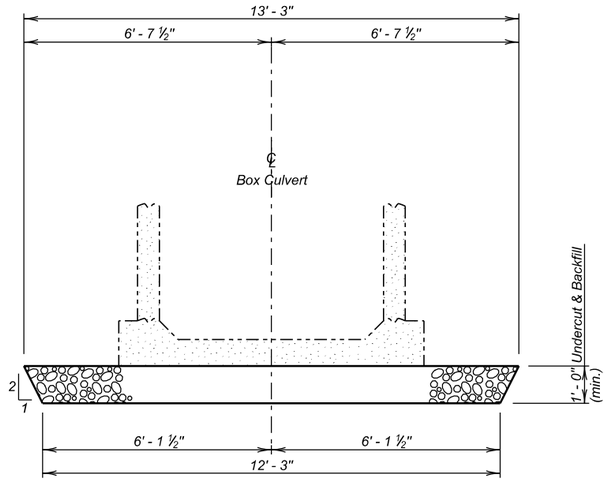
(Bottom Dimensions)

SPECIFICATIONS

1. *Design Specifications: AASHTO LRFD Bridge Design Specifications, 9th Edition.*
2. Construction Specifications: South Dakota Standard Specifications for Roads and Bridges, 10-1-25 Version, Required Provisions, and Special Provisions as included in the Proposal. The Standard Specifications for Roads and Bridges are available for download and viewing at: https://dot.sd.gov/doing-business/contractors/standard-specifications.

GENERAL NOTES

1. *Design Live Load: HL-93 and construction loading consisting of one 7' - 6" gage axle with gross axle weight = 95,850 lbs. The construction load will not be applied until a minimum of 4 ft. of fill has been placed over the box culvert. Other construction loads in excess of legal load must be submitted thru proper channels to the Office of Bridge Design for analysis.*
2. *The design of the barrel section is based on a minimum fill height of 2 feet and includes all subsequent fill heights up to and including the maximum fill height of 5 ft. (F5).*
3. *Design Material Strengths: Concrete $f'c$ = 4500 p.s.i.*
   Reinforcing Steel fy = 60000 p.s.i.
4. *All concrete will be Class A45 Concrete, Box Culvert conforming to Section 460 of the Construction Specifications.*
5. *All reinforcing steel will conform to ASTM A615 Grade 60.*
6. *All lap splices shown are contact lap splices unless noted otherwise.*
7. *All exposed edges will be chamfered ¾ inch unless noted otherwise in the plans.*
8. *Use 1 inch clear cover on all reinforcing steel EXCEPT as shown.*
9. *The Contractor will imprint on the structure the date of construction as specified and detailed on Standard Plate No. 460.02.*
10. *Care will be taken to establish Working Points (W.P.) as shown on the wings.*
11. *Circled numbers in PLAN and ELEVATION views on the General Drawing are section I.D. Numbers (see SDDOT Materials Manual).*
12. *Cost of Preformed Expansion Joint Filler used in apron construction will be incidental to the other contract items.*
13. *Soils below the bottom of the proposed RCBC consist of red sandy silt with gravel and gypsum streaks. Groundwater not encountered in the borings during the subsurface investigation conducted in October and November 2021.*



TYPICAL SECTION

(For Limits of Undercut)

ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY
⌀ Box Culvert Undercut	Cu. Yd.	152

⌀ *For payment, quantity is based on plan shown undercut dimensions and will not be measured unless the Engineer orders a change.*

SITE 1
ALTERNATE A

NOTES AND UNDERCUT DETAILS

FOR

6' X 6' BOX CULVERT (C.I.P.)

OVER TRIB. TO ELK CREEK — 0° SKEW
STA. 1017 + 75.00 (EBL) — SEC. 9-T3N-R6E
STR. NO. 47-091-555 — IM-CR-EM 0901(187)44
HL-93

MEADE COUNTY

S. D. DEPT. OF TRANSPORTATION

SEPTEMBER 2022

2 OF 8

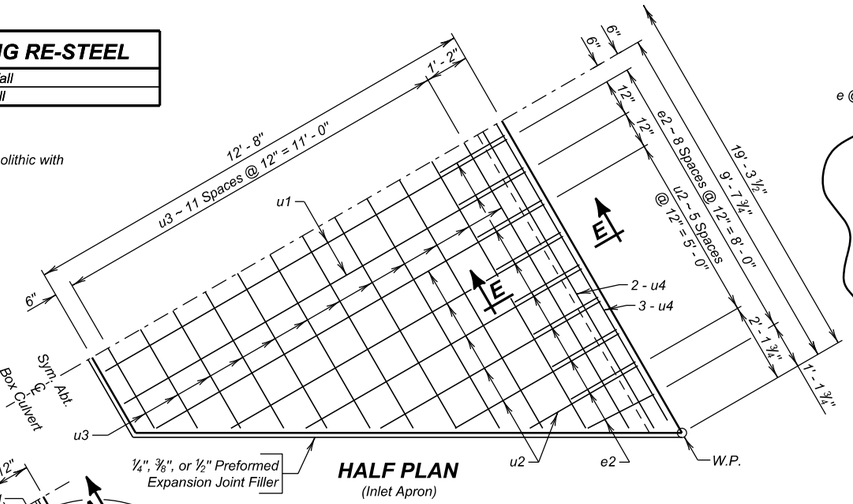
DESIGNED BY	CK. DES. BY	DRAFTED BY	
AU	AH	BT	BRIDGE ENGINEER
MEAD034J	034JLA02		

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E6	E185

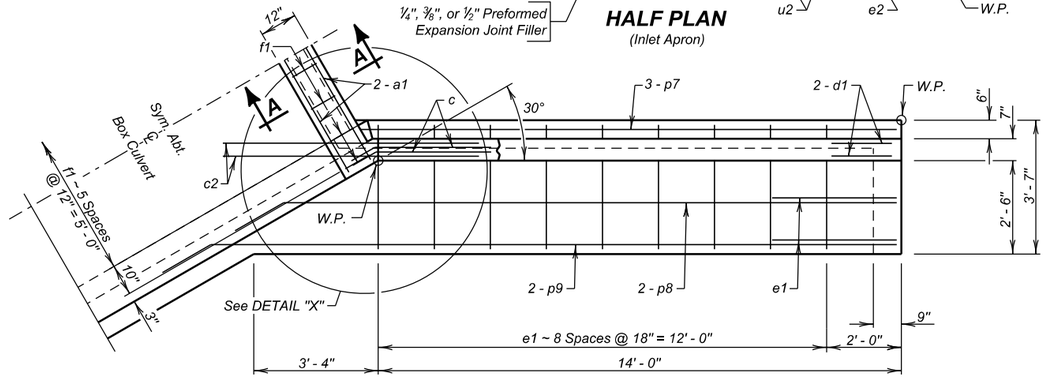
LEGEND FOR PLACING RE-STEEL

O. F. W. W. - Outside Face of Wing Wall
I. F. W. W. - Inside Face of Wing Wall

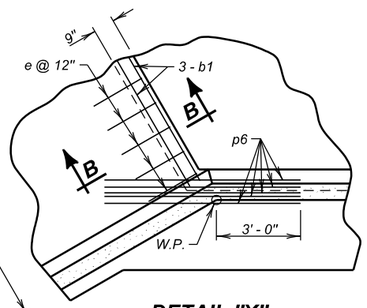
NOTE:
Apron will NOT be built monolithic with the Box Culvert.



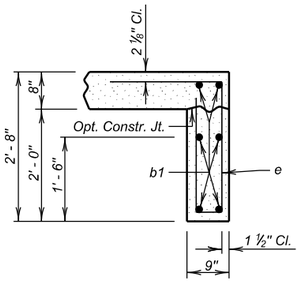
HALF PLAN
(Inlet Apron)



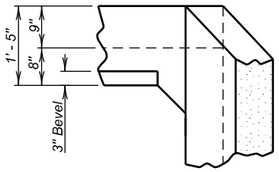
HALF PLAN



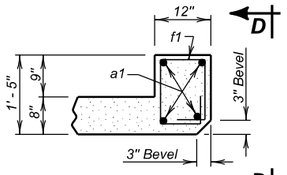
DETAIL "X"
(At Bottom Slab)



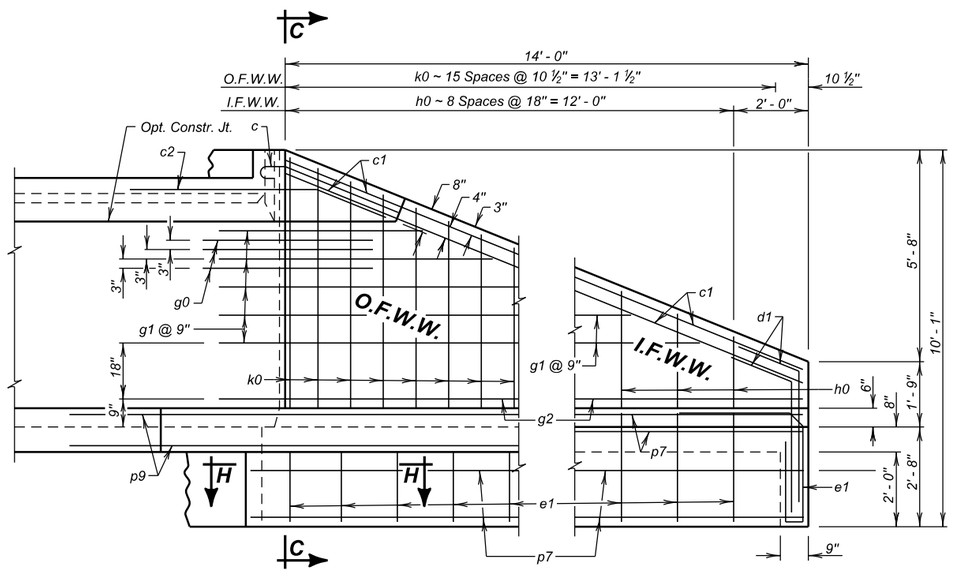
SECTION B - B



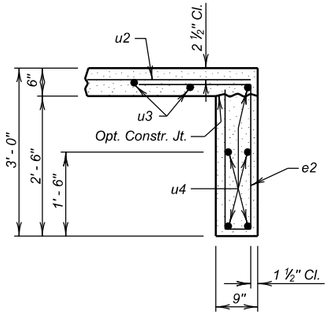
VIEW D - D
(At Exterior Wall)



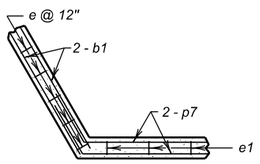
SECTION A - A
(At Top Slab)



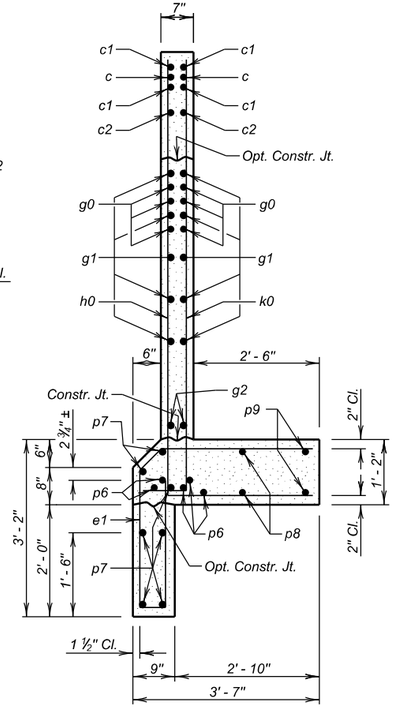
ELEVATION



SECTION E - E



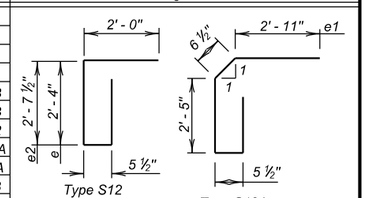
SECTION H - H

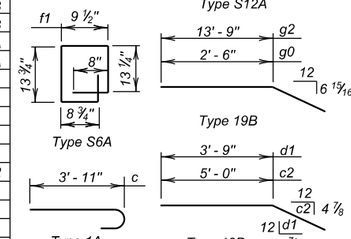


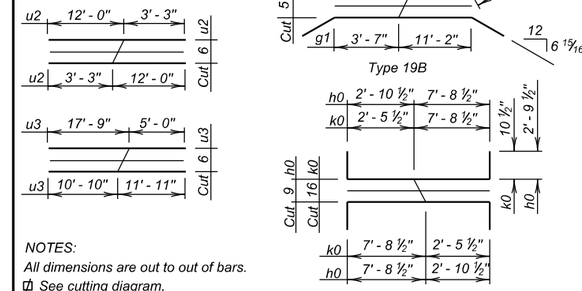
SECTION C - C

REINFORCING SCHEDULE

	Mk.	No.	Size	Length	Type	Bending Details
*	a1	4	6	6' - 9"	Str.	
	b1	6	6	5' - 3"	Str.	
*	c	4	5	4' - 6"	1A	
	c1	8	5	15' - 0"	Str.	
	c2	4	5	7' - 0"	19B	
	d1	8	5	5' - 6"	19B	
	e	7	4	6' - 9"	S12	
	e1	22	4	8' - 9"	S12A	
	f1	8	4	5' - 3"	S6A	
	g0	12	5	5' - 0"	19B	
⌀	g1	10	4	18' - 6"	19B	
	g2	4	4	15' - 9"	19B	
⌀	h0	9	4	16' - 3"	17A	
⌀	k0	16	4	12' - 0"	17A	
	p6	10	6	7' - 0"	Str.	
*	p7	14	4	16' - 6"	Str.	
*	p8	4	4	17' - 3"	Str.	
*	p9	4	4	19' - 9"	Str.	
	INLET APRON					
	e2	18	4	7' - 6"	S12	
	u1	4	4	12' - 3"	Str.	
⌀	u2	6	4	15' - 3"	Str.	
⌀	u3	6	4	22' - 9"	Str.	
	u4	5	4	18' - 3"	Str.	







NOTES:
All dimensions are out to out of bars.
⌀ See cutting diagram.
* Bend in field as necessary to fit.

ESTIMATED QUANTITIES

ITEM	Class A45 Concrete, Box Culvert	Reinforcing Steel	Structure Excavation, Box Culvert
UNIT	Cu. Yd.	Lb.	Cu. Yd.
Inlet	10.1	1308	5.1
Inlet Apron	4.4	336	4.4

SITE 1
ALTERNATE A

INLET DETAILS

FOR

6' X 6' BOX CULVERT (C.I.P.)

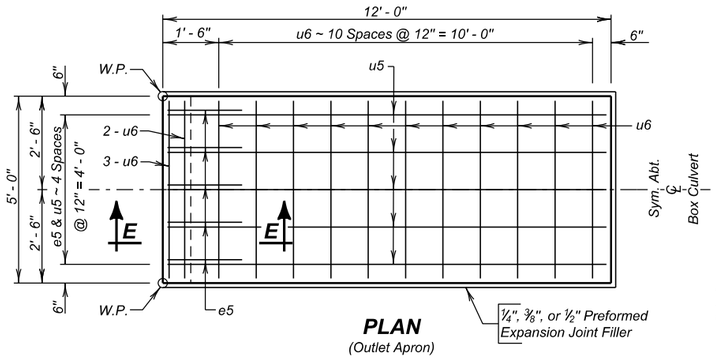
OVER TRIB. TO ELK CREEK — 0° SKEW
STA. 1017 + 75.00 (EBL) — SEC. 9-T3N-R6E
STR. NO. 47-091-555 — IM-CR-EM 0901(187)44
HL-93

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
SEPTEMBER 2022

3 OF 8

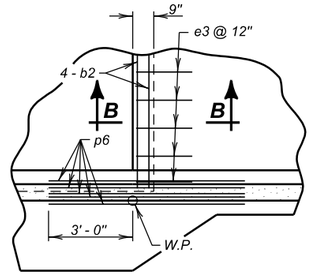
DESIGNED BY	CK. DES. BY	DRAFTED BY	
AU	AH	BT	Steve A. Johnson BRIDGE ENGINEER
MEAD034J	034JLA03		

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E7	E185

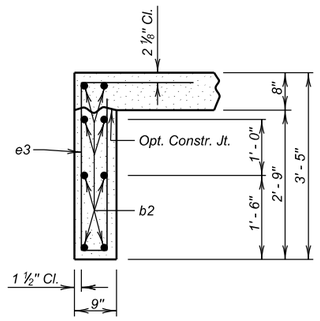


PLAN
(Outlet Apron)

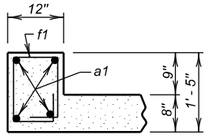
NOTE:
Apron will NOT be built monolithic with the Box Culvert.



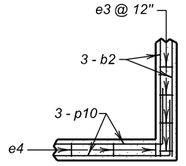
DETAIL "X"
(At Bottom Slab)



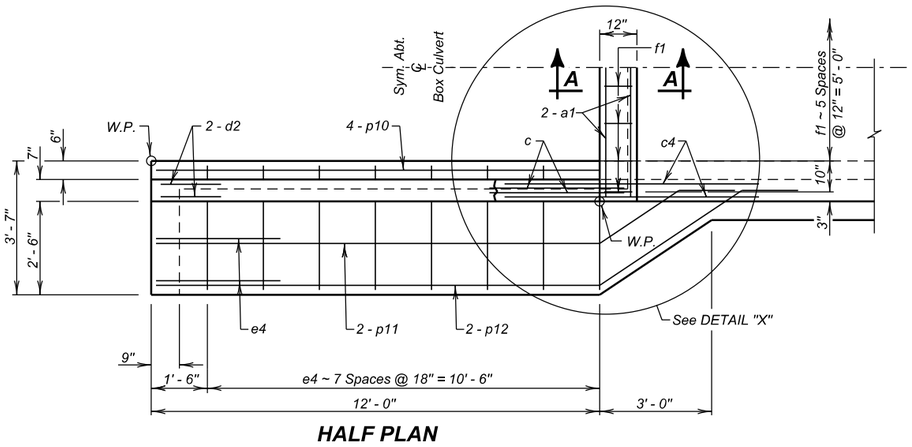
SECTION B - B



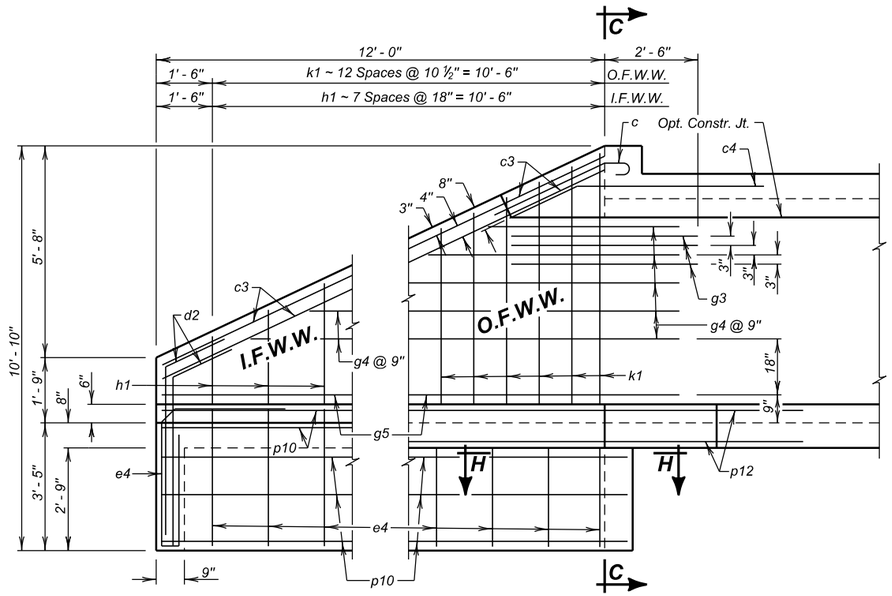
SECTION A - A
(At Top Slab)



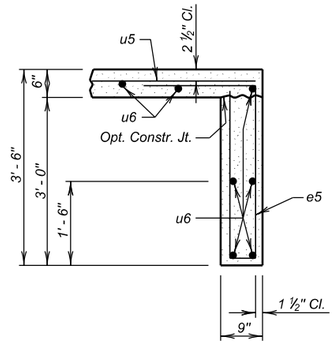
SECTION H - H



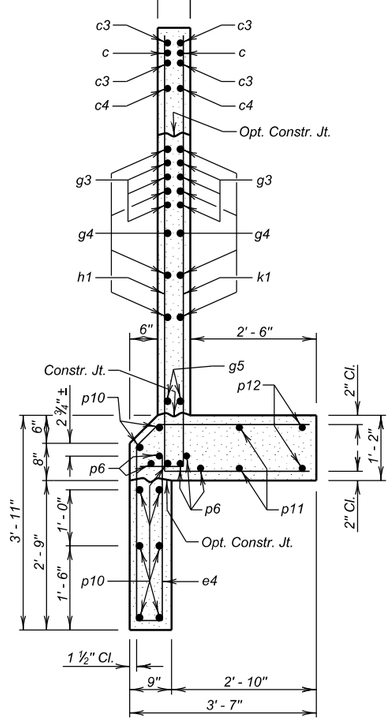
HALF PLAN



ELEVATION



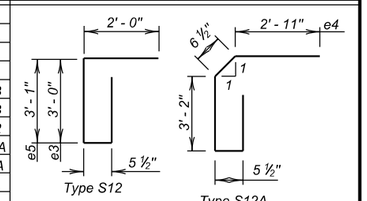
SECTION E - E

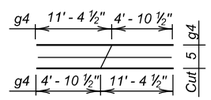


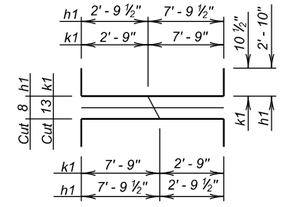
SECTION C - C

REINFORCING SCHEDULE

	Mk.	No.	Size	Length	Type	Bending Details
	a1	4	6	6' - 9"	Str.	
	b2	8	6	6' - 3"	Str.	
*	c	4	5	4' - 6"	1A	
	c3	8	5	13' - 3"	Str.	
	c4	4	5	7' - 0"	19B	
	d2	8	5	6' - 0"	19B	
	e3	7	4	8' - 3"	S12	
	e4	20	4	10' - 0"	S12A	
	f1	8	4	5' - 3"	S6A	
	g3	12	5	5' - 0"	Str.	
⌀	g4	10	4	16' - 3"	Str.	
	g5	4	4	13' - 9"	Str.	
⌀	h1	8	4	16' - 3"	17A	
⌀	k1	13	4	12' - 3"	17A	
	p6	10	6	7' - 0"	Str.	
*	p10	18	4	14' - 6"	Str.	
*	p11	4	4	16' - 0"	Str.	
*	p12	4	4	18' - 0"	Str.	
	OUTLET APRON					
	e5	5	4	8' - 6"	S12	
	u5	5	4	11' - 9"	Str.	
	u6	16	4	4' - 9"	Str.	







NOTES:
All dimensions are out to out of bars.
⌀ See cutting diagram.
** Bend in field as necessary to fit.*

ESTIMATED QUANTITIES

ITEM	Class A45 Concrete, Box Culvert	Reinforcing Steel	Structure Excavation, Box Culvert
UNIT	Cu. Yd.	Lb.	Cu. Yd.
Outlet	9.6	1296	5.3
Outlet Apron	1.6	119	1.6

LEGEND FOR PLACING RE-STEEL

O. F. W. W. - Outside Face of Wing Wall
I. F. W. W. - Inside Face of Wing Wall

SITE 1
ALTERNATE A

OUTLET DETAILS

FOR

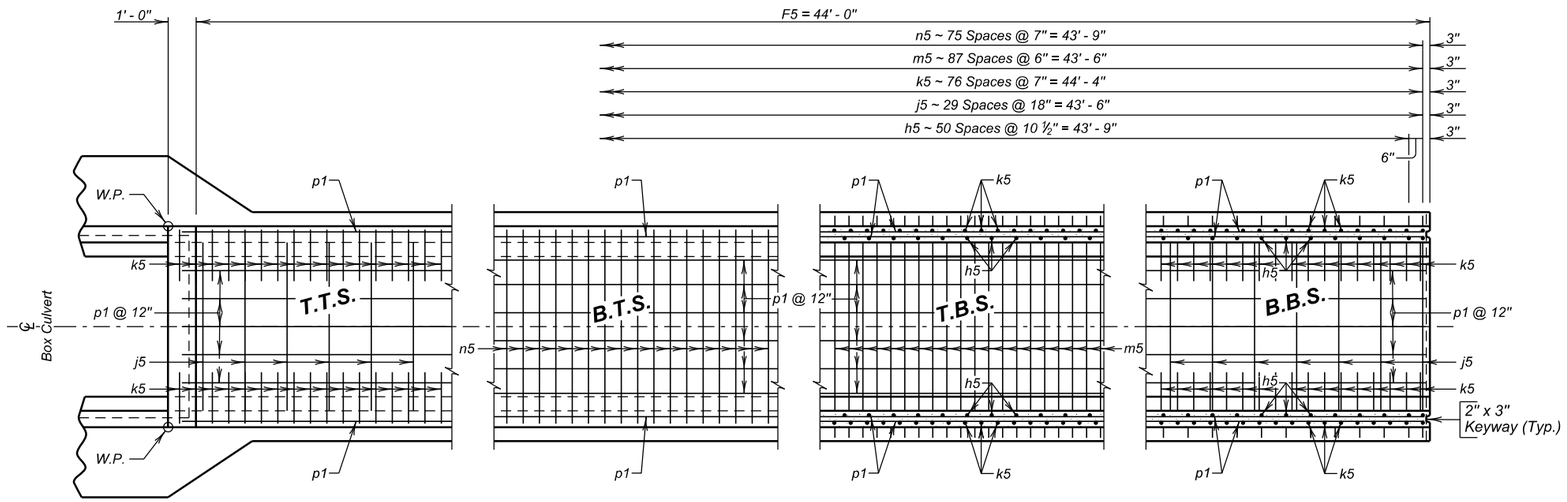
6' X 6' BOX CULVERT (C.I.P.)

OVER TRIB. TO ELK CREEK — 0° SKEW
STA. 1017 + 75.00 (EBL) — SEC. 9-T3N-R6E
STR. NO. 47-091-555 — IM-CR-EM 0901(187)44
HL-93

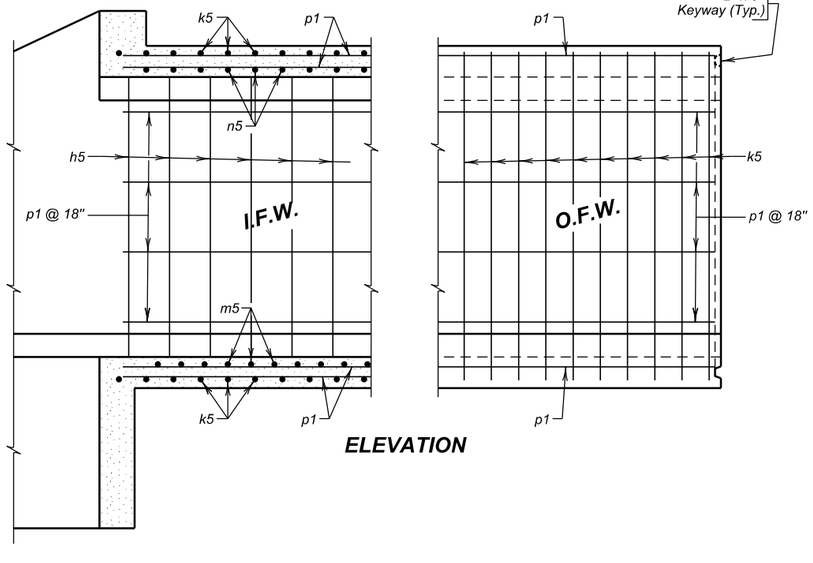
MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
SEPTEMBER 2022

DESIGNED BY	CK. DES. BY	DRAFTED BY	
AU	AH	BT	Steve A. Johnson BRIDGE ENGINEER
MEAD034J	034JLA04		

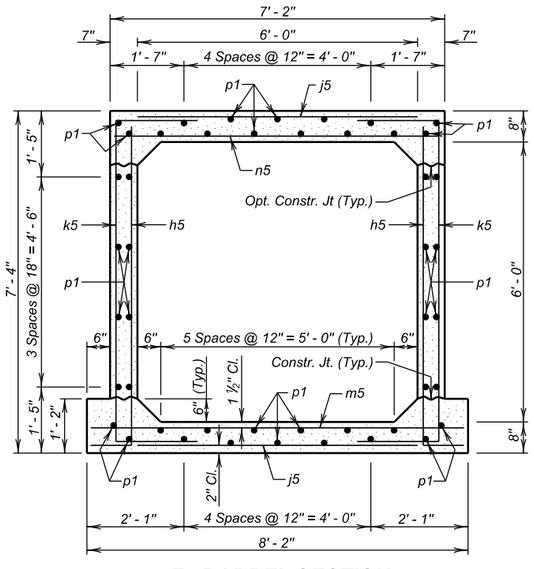
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E8	E185



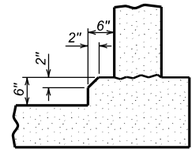
PLAN
(Outlet End shown, Inlet similar by rotation)



ELEVATION



F5 BARREL SECTION
(5' - 0" Maximum Fill)



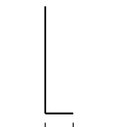
OPTIONAL FILLET DETAIL
(At Bottom Slab)

NOTE: Contractor may form the optional full fillet, with 2" Chamfer, as detailed. The cost of the additional concrete will be borne by the Contractor.

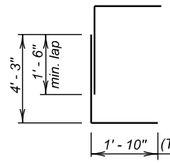
△ *Place z1 bars thru construction joint between barrel sections as shown on Standard Plate No. 460.10. Quantity of z1 bars is for two construction joints.*

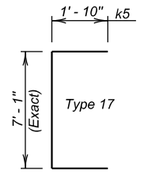
REINFORCING SCHEDULE
(For 2 - F5 Barrel End Sections @ 44' - 0")

Mk.	No.	Size	Length	Type	Bending Details
h5	208	4	7' - 6"	17A	
j5	120	4	6' - 0"	Str.	
k5	308	4	10' - 9"	17	
m5	176	5	7' - 9"	Str.	
n5	152	5	6' - 9"	Str.	
p1	92	4	44' - 6"	Str.	
△ z1	40	5	3' - 6"	Str.	



Type 17A





Type 17

OPTIONAL k5 SPLICE DETAIL
Contractor may use optional reinforcing steel splice, as shown. The cost of the additional reinforcing steel will be borne by the Contractor.

NOTES:
All dimensions are out to out of bars.
Request for additional reinforcing steel splices at points other than those shown, must be submitted to the Engineer for prior approval. If additional splices are approved, no payment will be allowed for the added quantity of reinforcing steel.

ESTIMATED QUANTITIES

ITEM	Class A45 Concrete, Box Culvert	Reinforcing Steel	Structure Excavation, Box Culvert
UNIT	Cu.Yd.	Lb.	Cu.Yd.
2 - F5 Barrel End Sections @ 44' - 0"	59.4	9108	17.8

LEGEND FOR PLACING RE-STEEL

T.T.S. - Top of Top Slab
B.T.S. - Bottom of Top Slab
T.B.S. - Top of Bottom Slab
B.B.S. - Bottom of Bottom Slab
O.F.W. - Outside Face of Wall
I.F.W. - Inside Face of Wall

SITE 1
ALTERNATE A

F5 BARREL END SECTION DETAILS (44' - 0")

FOR

6' X 6' BOX CULVERT (C.I.P.)

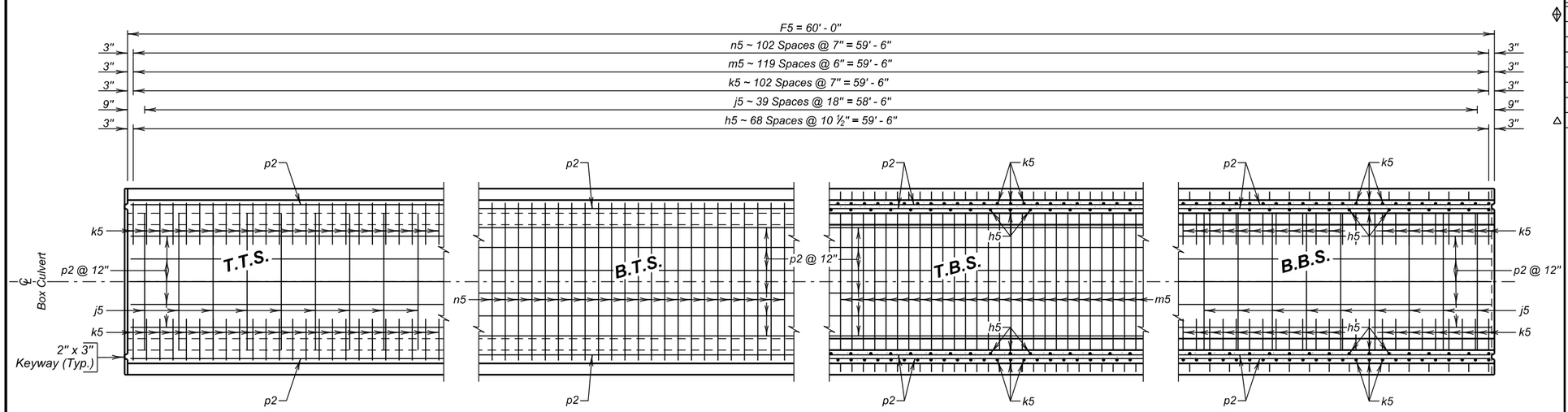
OVER TRIB. TO ELK CREEK — 0° SKEW
STA. 1017 + 75.00 (EBL) — SEC. 9-T3N-R6E
STR. NO. 47-091-555 — IM-CR-EM 0901(187)44
HL-93

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
SEPTEMBER 2022

5 OF 8

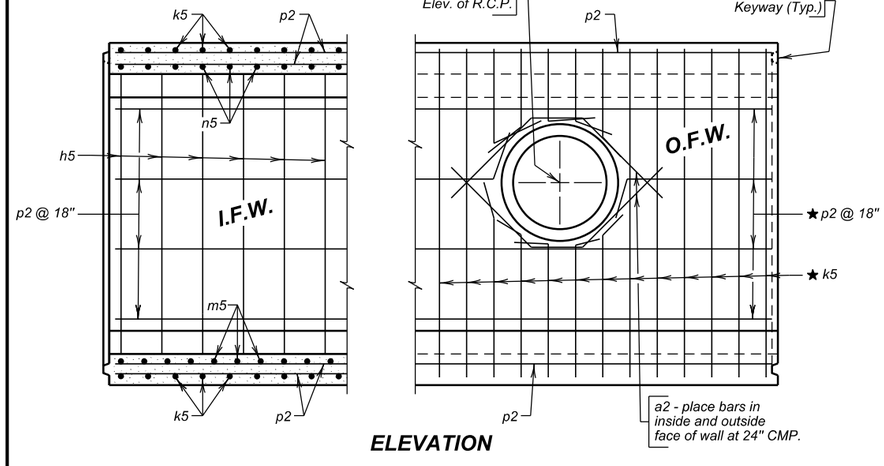
DESIGNED BY	CK. DES. BY	DRAFTED BY	
AU	AH	BT	BRIDGE ENGINEER
MEAD034J	034JLA05		

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E9	E185

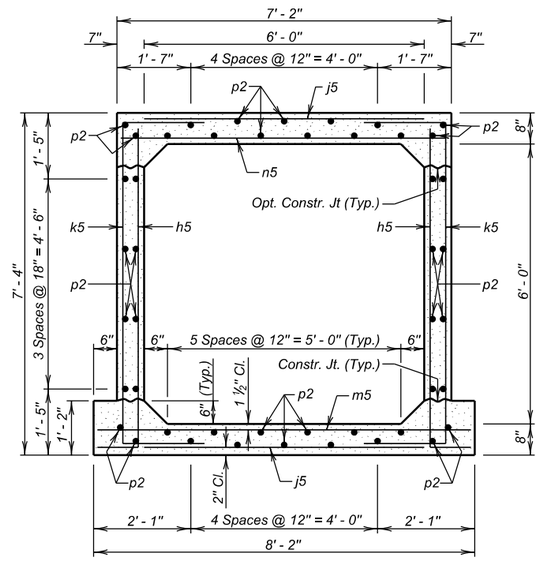


PLAN

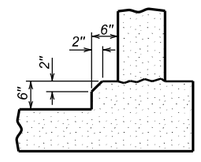
★ NOTE:
Cut and bend h5, k5, and p2 bars as required to place 24" CMP thru barrel wall.



ELEVATION



F5 BARREL SECTION
(5' - 0" Maximum Fill)



OPTIONAL FILLET DETAIL
(At Bottom Slab)

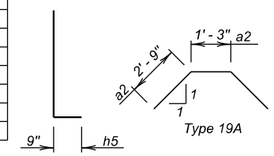
NOTE: Contractor may form the optional full fillet, with 2" Chamfer, as detailed. The cost of the additional concrete will be borne by the Contractor.

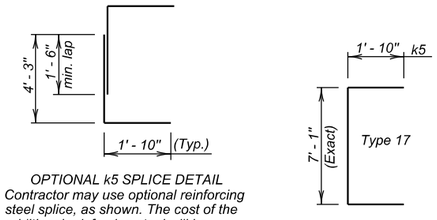
△ Place z1 bars thru construction joint between barrel sections as shown on Standard Plate No. 460.10. Quantity of z1 bars is for two construction joints.

◈ Place a2 bars in both faces of barrel wall. Quantity of a2 bars is for one pipe location.

REINFORCING SCHEDULE
(For 3 - F5 Barrel Interior Sections @ 60' - 0")

	Mk.	No.	Size	Length	Type	Bending Details
◈	a2	4	5	9' - 0"	19A	
	h5	414	4	7' - 6"	17A	
	j5	240	4	6' - 0"	Str.	
	k5	618	4	10' - 9"	17	
	m5	360	5	7' - 9"	Str.	
	n5	309	5	6' - 9"	Str.	
	p2	138	4	59' - 9"	Str.	
△	z1	40	5	3' - 6"	Str.	





OPTIONAL k5 SPLICE DETAIL
Contractor may use optional reinforcing steel splice, as shown. The cost of the additional reinforcing steel will be borne by the Contractor.

NOTES:
All dimensions are out to out of bars.

Request for additional reinforcing steel splices at points other than those shown, must be submitted to the Engineer for prior approval. If additional splices are approved, no payment will be allowed for the added quantity of reinforcing steel.

ESTIMATED QUANTITIES

ITEM	Class A45 Concrete, Box Culvert	Reinforcing Steel	Structure Excavation, Box Culvert
UNIT	Cu.Yd.	Lb.	Cu.Yd.
3 - F5 Barrel Interior Sections @ 60' - 0"	121.5	18251	36.3

LEGEND FOR PLACING RE-STEEL

T.T.S.	- Top of Top Slab
B.T.S.	- Bottom of Top Slab
T.B.S.	- Top of Bottom Slab
B.B.S.	- Bottom of Bottom Slab
O.F.W.	- Outside Face of Wall
I.F.W.	- Inside Face of Wall

SITE 1
ALTERNATE A

F5 BARREL INTERIOR SECTION DETAILS (60' - 0")

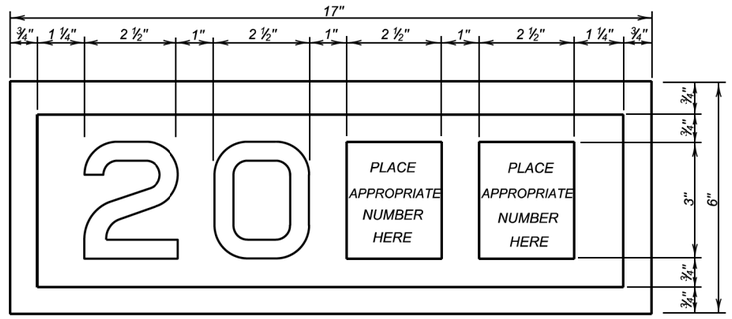
FOR

6' X 6' BOX CULVERT (C.I.P.)

OVER TRIB. TO ELK CREEK — 0° SKEW
STA. 1017 + 75.00 (EBL) — SEC. 9-T3N-R6E
STR. NO. 47-091-555 — IM-CR-EM 0901(187)44
HL-93

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
SEPTEMBER 2022

DESIGNED BY	CK. DES. BY	DRAFTED BY	
AU	AH	BT	Steve A Johnson BRIDGE ENGINEER
MEAD034J	034JLA06		



YEAR PLATE DETAILS

GENERAL NOTES:

1. Year plates of the general dimensions shown will be constructed on all box culverts and bridges. The year plates will be constructed in reverse and attached to the forms in such a manner that the finished imprint in the concrete does not exceed one-half (1/2) inch in depth.

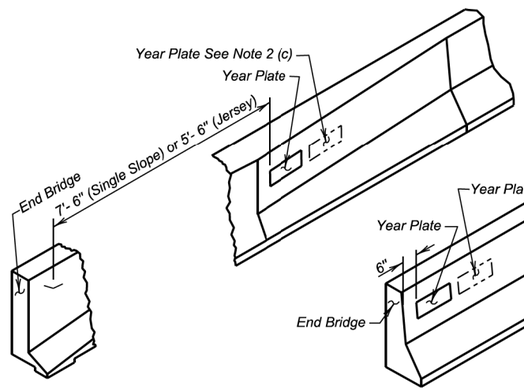
2. Year plates will be located on structure(s) as follows:

   a. On cast-in-place box culverts the year plates will be four and one - half (4 ½) inches below the top of the upstream parapet wall and centered laterally on the upstream face. On precast box culverts the year plate will be centered laterally on the upstream face of the top slab. Where an extended interior wall interferes with this location, the year plate will be centered in an adjacent barrel.

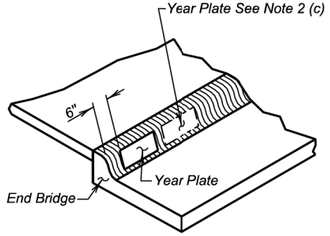
   b. On bridges with six (6) inch curbs, "Jersey" shaped barriers with no endblocks, or "Single Slope" shaped barriers with no endblocks, the year plate will be centered vertically on the curb face approximately six (6) inches from the end of the bridge, or as designated by the Engineer. On bridges with barrier endblocks, the year plate will be centered on the upper sloped portion of the barrier approximately 5'- 6" for "Jersey" shaped barriers from the end of the bridge and 7'-6" for "Single Slope" shaped barriers from the end of bridge, or as designated by the Engineer. There will be one year plate at each end of the bridge on opposite sides.

   c. When the plans specify that both the original date of construction and the date of reconstruction are to be shown, one date will be placed as listed above and the other located adjacent to it. Both year plates will be shown at each end of the bridge on opposite sides.

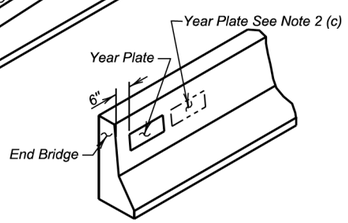
3. There will be no separate measurement or payment made for year plates on box culverts and bridges. All costs for this work will be incidental to other contract items.



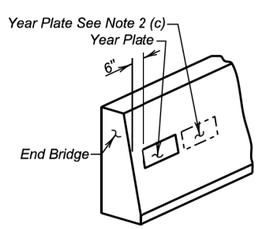
BARRIER
(With Endblock)



TYPE B CURB



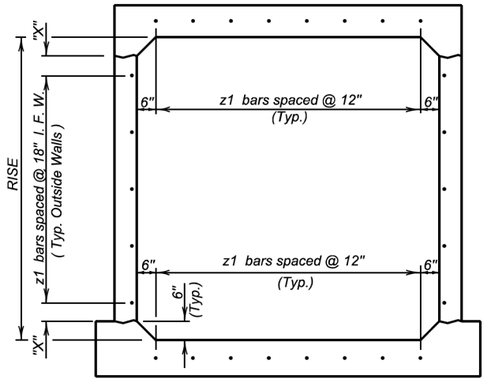
JERSEY BARRIER



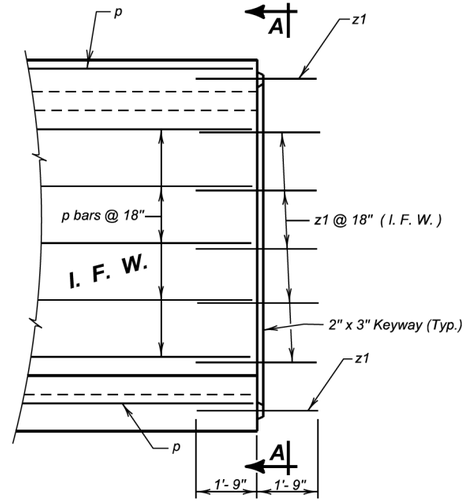
SINGLE SLOPE BARRIER

January 22,2021

Published Date: 2026	SDDOT	YEAR PLATE DETAILS	PLATE NUMBER 460.02 Sheet 1 Of 1



TYPICAL SINGLE BARREL VIEW A - A

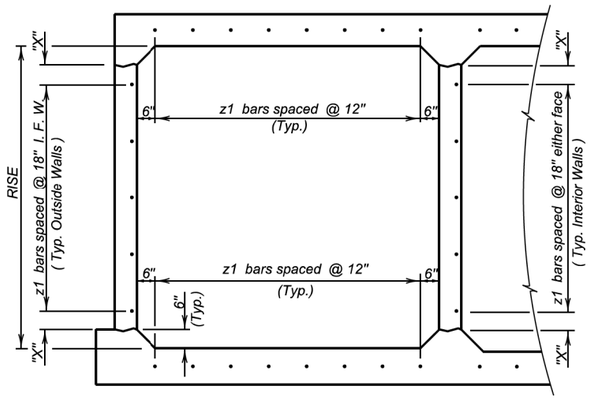


ELEVATION

LEGEND FOR PLACING RE-STEEL

I. F. W. - Inside Face Wall

RISE	"X"
3'- 0"	3"
4'- 0"	9"
5'- 0"	6"
6'- 0"	3"
7'- 0"	9"
8'- 0"	6"
9'- 0"	3"
10'- 0"	9"
11'- 0"	6"
12'- 0"	3"
13'- 0"	9"
14'- 0"	6"



TYPICAL MULTIPLE BARREL VIEW A - A

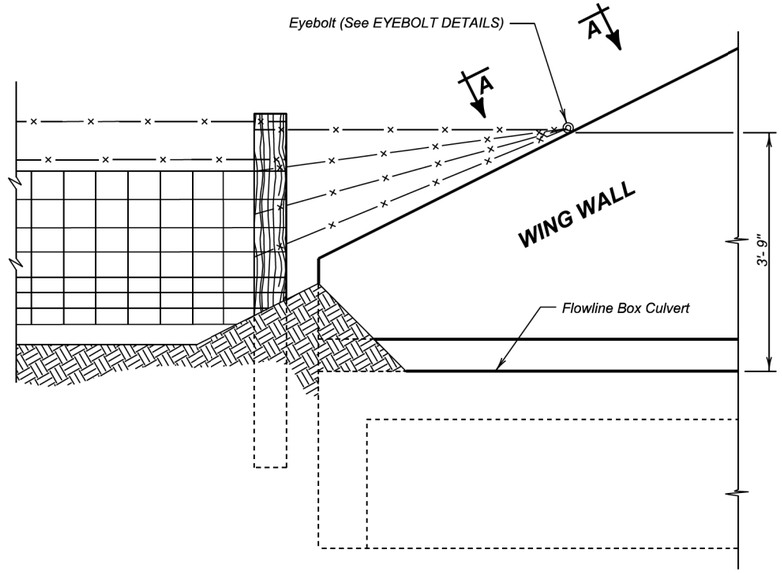
GENERAL NOTES:

1. z1 bars will be placed in the middle of the 2" X 3" keyway in the top and bottom slabs. z1 bars will be lapped with the longitudinal p bars in the inside face of the wall for outside walls and in either face for interior walls. z1 bars are listed and included elsewhere in plans.

2. Drainage Fabric Protection will be placed in accordance with Section 422, or Section 560, whichever is applicable.

June 1, 2022

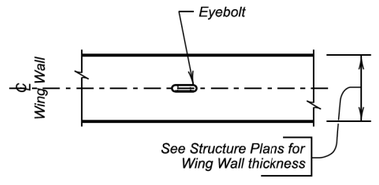
Published Date: 2026	SDDOT	BOX CULVERT BARREL TIE REINFORCEMENT	PLATE NUMBER 460.10 Sheet 1 of 1



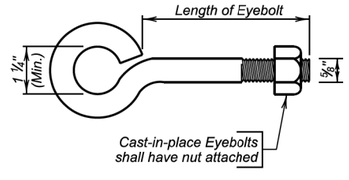
DETAIL FOR FENCE ANCHORS

GENERAL NOTES:

1. The fence and post details shown are for illustrative purpose only. The fence shall be as specified elsewhere in the plans.
2. Eyebolts shall be placed on all of the box culvert wing walls.
3. Eyebolts shall be ⅝ inch diameter and shall conform to ASTM A307.
4. Eyebolts, nuts, and concrete inserts shall be galvanized in accordance with AASHTO M232 (ASTM A153). Concrete inserts of corrosion resistant material need not be galvanized.
5. Cast-in-place eyebolts shall have a nut attached, be 4 ½ inches (Min.) in length and shall be embedded such that the eye of the bolt is flush with the concrete surface. (See Eyebolt Details) As an alternate, cast-in-place concrete inserts, capable of developing the full strength of the ⅝ inch diameter threaded eyebolt, may be used and shall be set in the concrete in accordance with the manufacturer's recommendations. The eyebolt shall be of sufficient length to develop its full strength. The eye of the eyebolt shall be flush with the concrete surface.
6. The cost for furnishing and installing eyebolts and/or concrete inserts shall be incidental to various contract items.



VIEW A - A



EYEBOLT DETAILS

December 23,2012

Published Date: 2026	SDDOT	FENCE ANCHORS FOR BOX CULVERT WING WALLS	PLATE NUMBER 620.16 Sheet 1 of 1

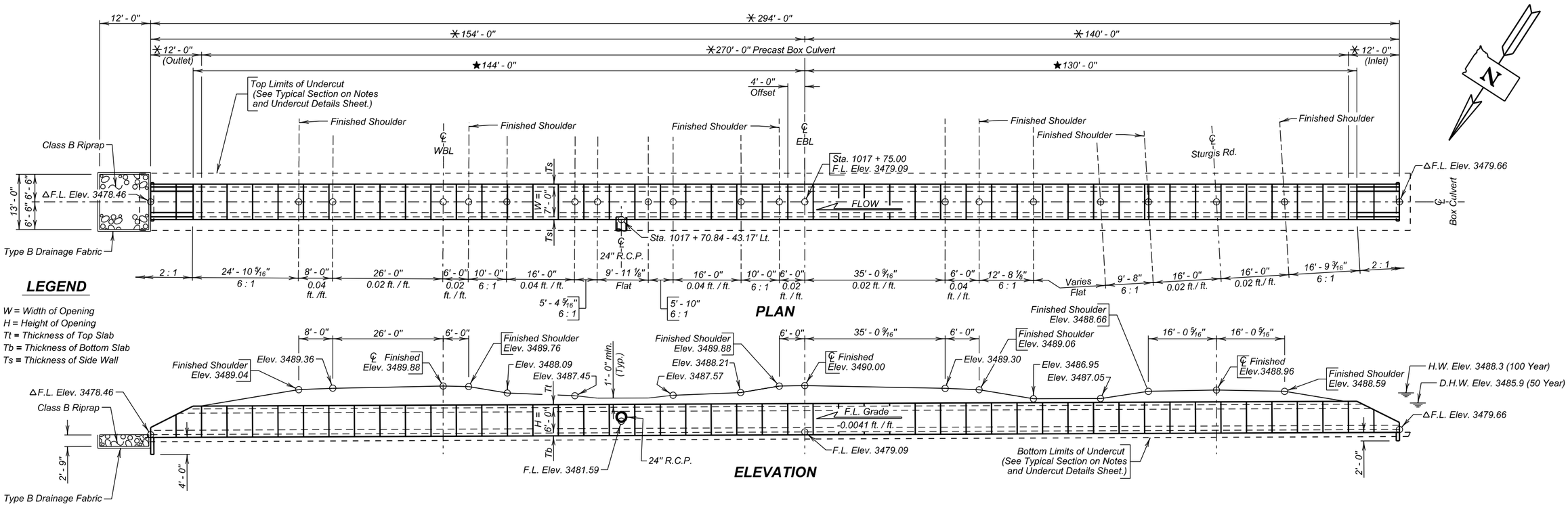
SITE 1
ALTERNATE A

6' X 6' BOX CULVERT (C.I.P.)
STR. NO. 47-091-555
SEPTEMBER 2022

The elevations shown in these plans are based on the National Geodetic Survey (NGS) North American Vertical Datum of 1988 (NAVD88).

✳ Dimension may vary with fabricator and/or installation. See Shop Plans for actual installation length.
★ Minimum distance to satisfy fill slopes.
△ Based on dimensions shown.

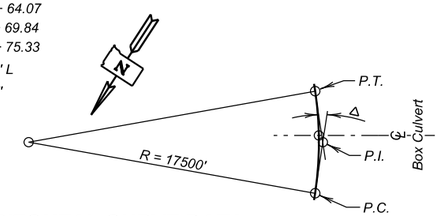
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E12	E185



LEGEND

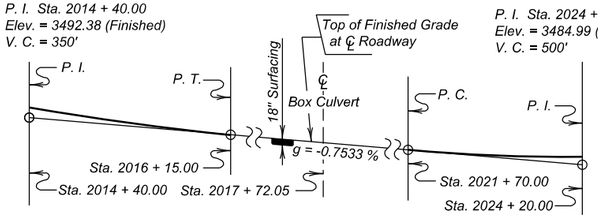
W = Width of Opening
H = Height of Opening
Tt = Thickness of Top Slab
Tb = Thickness of Bottom Slab
Ts = Thickness of Side Wall

P. C. Sta. 2012 + 64.07
P. I. Sta. 2017 + 69.84
P. T. Sta. 2022 + 75.33
△ = 3° 18' 39.00" L
D = 0° 19' 39.00"
R = 17500'
T = 505.77'
L = 1011.26



HORIZONTAL CURVE DATA
(Westbound Lanes)

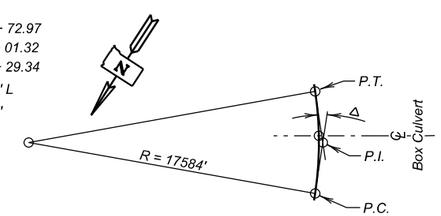
P. I. Sta. 2014 + 40.00
Elev. = 3492.38 (Finished)
V. C. = 350'



P. I. Sta. 2024 + 20.00
Elev. = 3484.99 (Finished)
V. C. = 500'

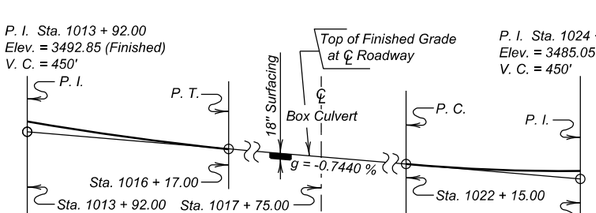
GRADELINE DATA
(Westbound Lanes)

P. C. Sta. 1011 + 72.97
P. I. Sta. 1017 + 01.32
P. T. Sta. 1022 + 29.34
△ = 3° 26' 32.00" L
D = 0° 19' 33.00"
R = 17584'
T = 528.35'
L = 1056.37'



HORIZONTAL CURVE DATA
(Eastbound Lanes)

P. I. Sta. 1013 + 92.00
Elev. = 3492.85 (Finished)
V. C. = 450'



P. I. Sta. 1024 + 40.00
Elev. = 3485.05 (Finished)
V. C. = 450'

GRADELINE DATA
(Eastbound Lanes)

HYDRAULIC DATA

Q_d	280 cfs
A_d	28 sq ft
V_d	10.0 fps
Q_F	280 cfs
Q_{100}	410 cfs
Q_{OT}	389 cfs
V_{max}	12.5 fps

Q_d = Design discharge for the proposed culvert based on 50 year frequency. El. 3485.9.
Q_{OT} = Overtopping discharge and frequency > Q_{94} year recurrence interval. El. 3488.0 @ Sta. 607+ 50.00. (Sturgis Road)
Q_F = Designated peak discharge for the basin approaching proposed project based on 50 year frequency.
Q_{100} = Computed discharge for the basin approaching proposed project based on 100 year frequency. El. 3488.3.
V_{max} = Maximum computed outlet velocity for the proposed culvert, based on 100 year frequency.

ESTIMATED QUANTITIES

	ITEM	UNIT	QUANTITY
≙	Structure Excavation, Box Culvert	Cu. Yd.	68
	Box Culvert Undercut	Cu. Yd.	144
≠	Class B Riprap	Ton	22.2
	Type B Drainage Fabric	Sq. Yd.	33
	7' X 6' Precast Concrete Culvert, Furnish	Ft.	270
	7' X 6' Precast Concrete Culvert, Install	Ft.	270
	7' X 6' Precast Concrete Culvert End Section, Furnish	Each	2
	7' X 6' Precast Concrete Culvert End Section, Install	Each	2

≙ Quantity is based on 9" bottom slab and 8" outside walls.
≠ For estimating purposes only, a factor of 1.4 tons/cu. yd. was used to convert Cu. Yd. to Tons.

INDEX OF CULVERT SHEETS-

Sheet No. 1 - General Drawing and Quantities
Sheet No. 2 - Notes and Undercut Details
Sheet No. 3 - Details of Standard Plate No.'s 460.02 & 560.01
Sheet No. 4 - Details of Standard Plate No.'s 560.10 & 560.11
Sheet No. 5 - Details of Standard Plate No. 620.16

SITE 1
ALTERNATE B

GENERAL DRAWING AND QUANTITIES

FOR

7' X 6' BOX CULVERT (PRECAST)

OVER TRIB. TO ELK CREEK — 0° SKEW
STA. 1017 + 75.00 (EBL) — SEC. 9-T3N-R6E
STR. NO. 47-091-555 — IM-CR 0901(187)44
PCN 034J — HL-93

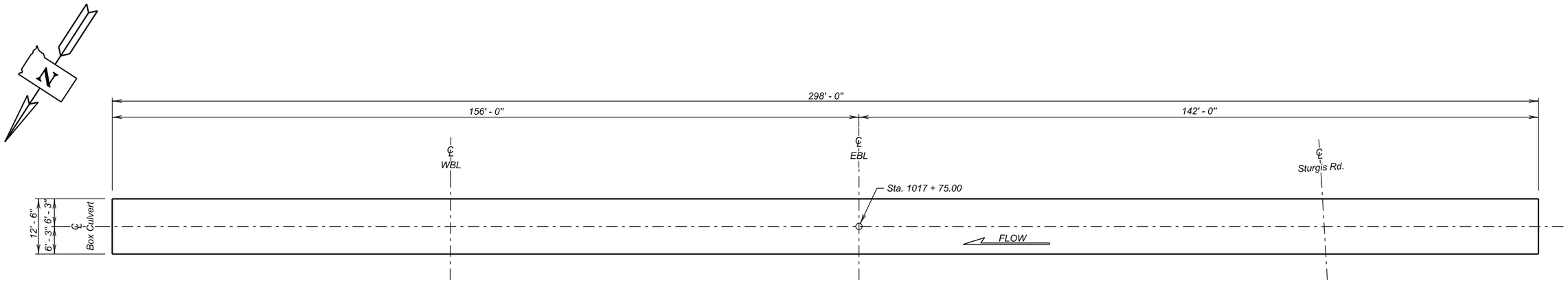
MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
SEPTEMBER 2022

PLANS BY :
OFFICE OF BRIDGE DESIGN, SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION

DESIGNED BY	CK. DES. BY	DRAFTED BY	
AU	AH	BT	Steve A. Johnson BRIDGE ENGINEER
MEAD034J	034JGA09		

Revised October 15, 2025 AU

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E13	E185



UNDERCUT LAYOUT
(Bottom Dimensions)

SPECIFICATIONS

Use South Dakota Standard Specifications for Roads and Bridges, 10-1-25 Version, Required Provisions, and Special Provisions as included in the Proposal. The Standard Specifications for Roads and Bridges are available for download and viewing at: https://dot.sd.gov/doing-business/contractors/standard-specifications.

GENERAL NOTES

Design will be in accordance with Section 560 of the Construction Specifications with the following criteria:

1. *Box culvert and box culvert end section design will conform to the AASHTO LRFD Bridge Design Specifications, 9th Edition.*
2. *Design Live Load: HL-93 and construction loading consisting of one 7' - 6" gage axle with gross weight = 95,850 lbs. The construction load will not be applied until a minimum of 4 feet of fill has been placed over the Box Culvert. If other construction loads in excess of legal load are anticipated by the Contractor, the Contractor will submit a design analysis for the anticipated construction loading, through the proper channels, to the Office of Bridge Design for approval.*
3. *The box culvert will be load rated in accordance with the AASHTO Manual for Bridge Evaluation, 2018 Edition with the latest Interim Revisions using the LRFR method. The rating will include evaluation of the Design HL-93 truck at both Inventory and Operating levels and a Legal Load rating for three SD legal trucks (Type 3, 3S2 and 3-2) as well as the notional rating load and four specialized hauling vehicles. The structure will also be evaluated for the emergency vehicles, EV2 and EV3, at the legal load rating level. All sections of the box culvert will rate at HL-93 or better (Inventory Level). The three SD legal loads, the notional rating load, the four specialized hauling vehicles, and two emergency vehicles will rate greater than 1.0 at legal load rating level. AASHTOWare Bridge Rating (BrR) is required to be used to rate the box culvert. Include the BrR rating model and a load rating summary table with the load rating calculations, Submit load rating calculations with the design and independent check design calculations or shop plans, as appropriate.*
4. *The design of the barrel sections will be based on a minimum fill height of 2 feet and include all subsequent fill heights up to and including the maximum fill height of 5 feet over the box culvert.*
5. *Minimum inside corner fillet shall be 6 in.*
6. *Minimum precast barrel section length will be 6 foot; however, no more than two 4 foot sections are allowed in any one length of precast barrel.*
7. *Lift holes will be plugged with an approved non-shrinkable grout.*
8. *The Fabricator will imprint on the structure the date of construction as specified and detailed on Standard Plate No. 460.02.*
9. *Alternate end section details will be allowed, subject to the approval of the Bridge Construction Engineer. No additional payment will be made for any change in the barrel/end section configuration.*

GENERAL NOTES CONTINUED

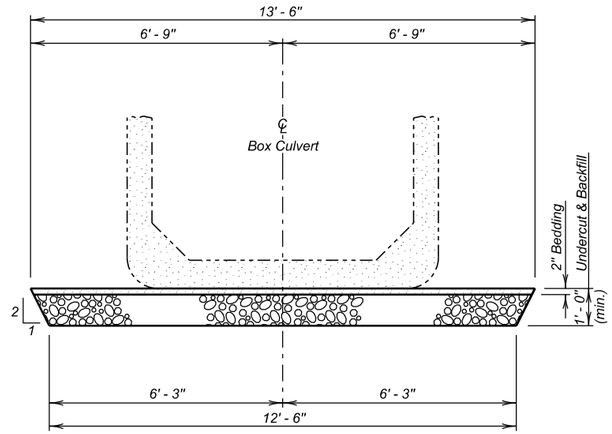
10. *Installation of the precast sections will be in accordance with the final approved shop plans.*
11. *Care will be taken when placing sections. Sections will be only moved using the lifting holes by approved equipment.*
12. *Soils below the bottom of the proposed RCBC consist of red sandy silt with gravel and gypsum streaks. Groundwater was not encountered in the borings during the subsurface investigation conducted in October and November 2021.*

DESIGN MIX OF CONCRETE

1. *Mix will be as per fabricator's design; however, a minimum compressive strength will not be less than 4500 p.s.i. at 28 days.*
2. *Type II cement is required.*

SHOP PLANS

The fabricator shall submit shop plans in accordance with the Construction Specifications. Include design and independent check design, if applicable, with initial submittal.



TYPICAL SECTION
(For Limits of Undercut)

ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY
₵ Box Culvert Undercut	Cu. Yd.	144

₵ *For payment, quantity is based on plan shown undercut dimensions and will not be measured unless the Engineer orders a change.*

SITE 1
ALTERNATE B

NOTES AND UNDERCUT DETAILS

FOR

7' X 6' BOX CULVERT (PRECAST)

OVER TRIB. TO ELK CREEK — 0° SKEW
STA. 1017 + 75.00 (EBL) — SEC. 9-T3N-R6E
STR. NO. 47-091-555 — IM-CR 0901(187)44
HL-93

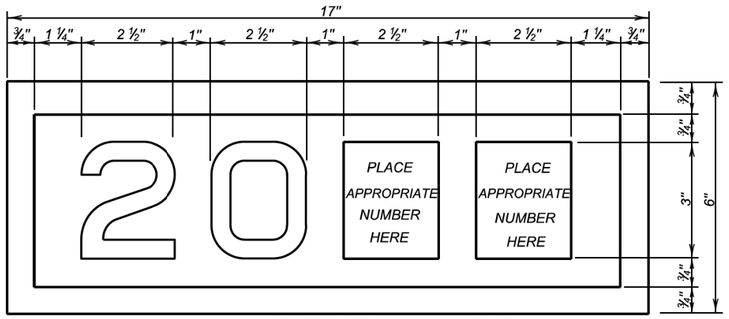
MEADE COUNTY

S. D. DEPT. OF TRANSPORTATION

SEPTEMBER 2022

2 OF 5

DESIGNED BY	CK. DES. BY	DRAFTED BY	
AU	AH	BT	BRIDGE ENGINEER
MEAD034J	034JGA10		



YEAR PLATE DETAILS

GENERAL NOTES:

1. Year plates of the general dimensions shown will be constructed on all box culverts and bridges. The year plates will be constructed in reverse and attached to the forms in such a manner that the finished imprint in the concrete does not exceed one-half (1/2) inch in depth.

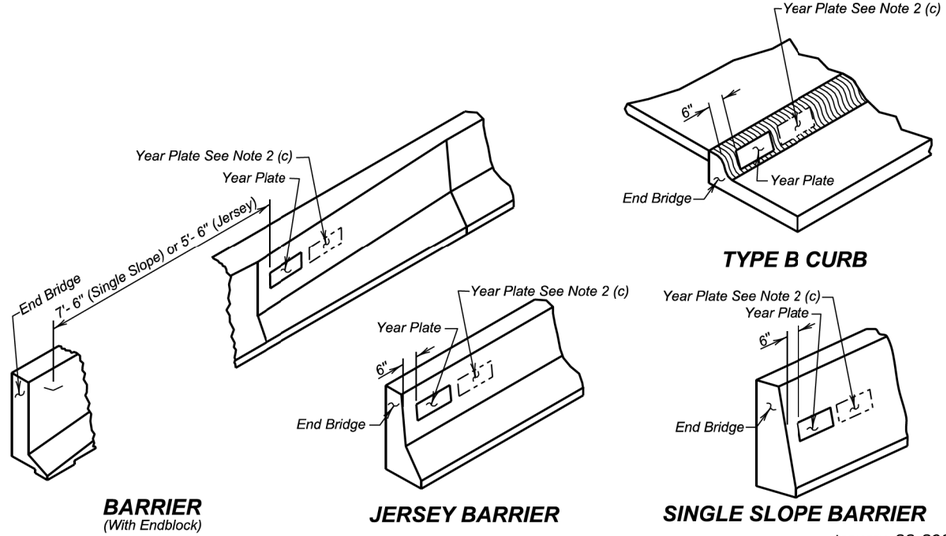
2. Year plates will be located on structure(s) as follows:

   a. On cast-in-place box culverts the year plates will be four and one - half (4 ½) inches below the top of the upstream parapet wall and centered laterally on the upstream face. On precast box culverts the year plate will be centered laterally on the upstream face of the top slab. Where an extended interior wall interferes with this location, the year plate will be centered in an adjacent barrel.

   b. On bridges with six (6) inch curbs, "Jersey" shaped barriers with no endblocks, or "Single Slope" shaped barriers with no endblocks, the year plate will be centered vertically on the curb face approximately six (6) inches from the end of the bridge, or as designated by the Engineer. On bridges with barrier endblocks, the year plate will be centered on the upper sloped portion of the barrier approximately 5'- 6" for "Jersey" shaped barriers from the end of the bridge and 7'-6" for "Single Slope" shaped barriers from the end of bridge, or as designated by the Engineer. There will be one year plate at each end of the bridge on opposite sides.

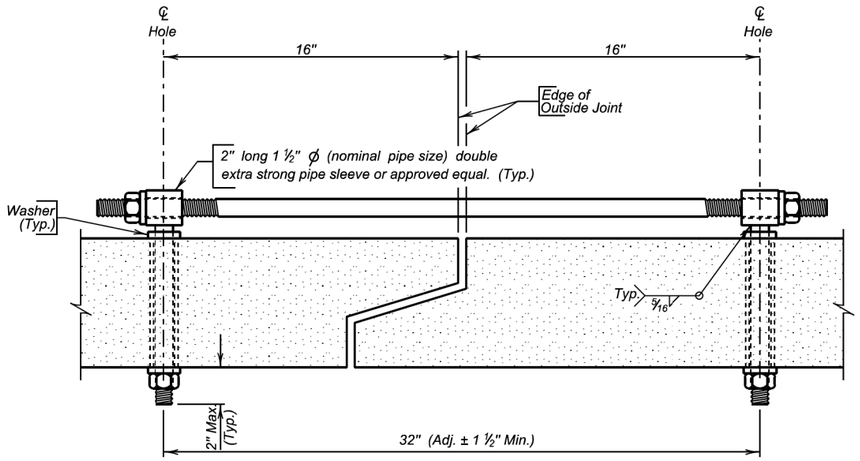
   c. When the plans specify that both the original date of construction and the date of reconstruction are to be shown, one date will be placed as listed above and the other located adjacent to it. Both year plates will be shown at each end of the bridge on opposite sides.

3. There will be no separate measurement or payment made for year plates on box culverts and bridges. All costs for this work will be incidental to other contract items.



January 22, 2021

Published Date: 2026	SDDOT	YEAR PLATE DETAILS	PLATE NUMBER 460.02
			Sheet 1 Of 1



TIE BOLT ASSEMBLY

GENERAL NOTES:

1. All holes for tie bolts shall be cast-in-place,16 inches from outside edge of joint. Cast in inserts or sleeves, if used, shall be made of a corrosion resistant material.

2. Ties shall be 1 inch ∅ and conform to the requirements of ASTM A36, ASTM A307, or ASTM F1554, Gr. 36. Nuts shall be heavy hex in conformance with ASTM A563. Washers shall conform to ASTM F436, Type 1. The welded pipe sleeve shall conform to ASTM A53, Grade B.

3. Welding and weld inspection shall be in conformance with AWS/ANSI D1.1 - (Current Year) Structural Welding Code - Steel.

4. Tie Bolt Assembly shall be galvanized in accordance with ASTM A153 or ASTM F2329 as applicable.

5. Tie Bolt Assembly details may vary from that shown, but alternate tie bolt assemblies are subject to testing to demonstrate equal strength. Submit details, through proper channels, to the Office of Bridge Design for approval.

6. All costs for furnishing and installing the precast box culvert tie bolt assembly shall be incidental to the contract unit price per Foot for "Precast Concrete Box Culvert, Furnish".

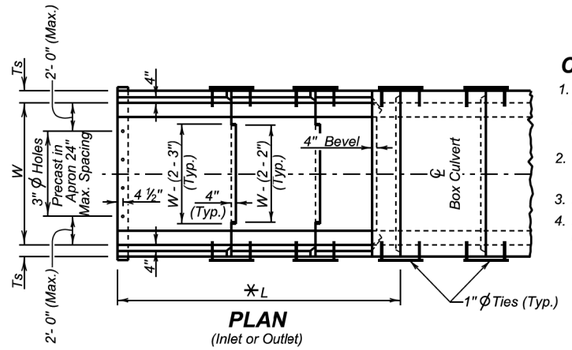
March 21, 2016

Published Date: 2026	SDDOT	PRECAST BOX CULVERT TIE BOLT ASSEMBLY DETAILS	PLATE NUMBER 560.01
			Sheet 1 of 1

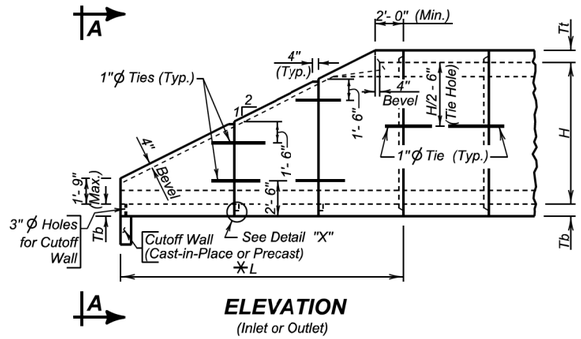
SITE 1
ALTERNATE B

7' X 6' BOX CULVERT (PRECAST)
STR. NO. 47-091-555
SEPTEMBER 2022

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E15	E185

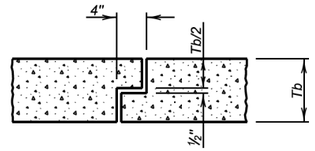


PLAN
(Inlet or Outlet)



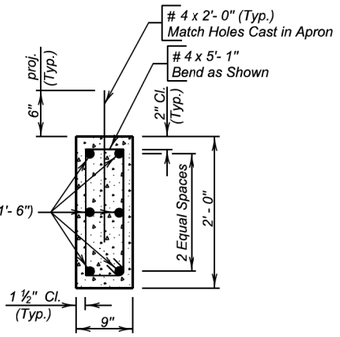
ELEVATION
(Inlet or Outlet)

VIEW A - A



DETAIL " X "

NOTE: Joint details may vary from that shown, according to the manufacturer's design. Submit details with shop plans for approval.



SEC. C - C

LEGEND

W = Width of Opening
H = Height of Opening
Tt = Thickness of Top Slab
Tb = Thickness of Bottom Slab
Ts = Thickness of Side Wall
L = Length of End Section

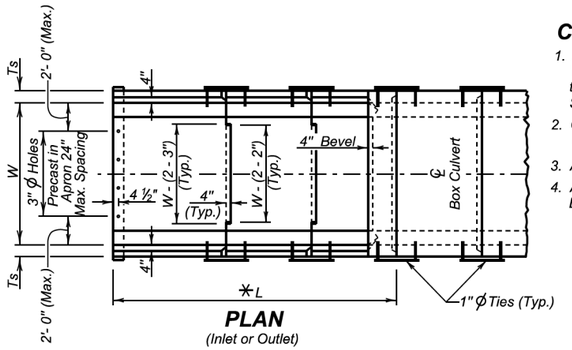
NOTES:
See GENERAL DRAWING for W and H dimensions.
Tt, Tb, L, and Ts dimensions shall be furnished by the Contractor.
⚹ Length and number of units may vary from that shown.

June 26, 2015

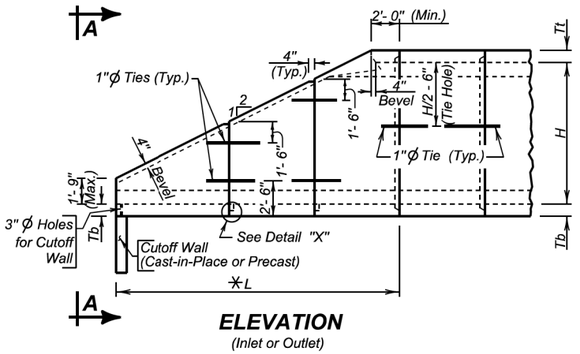
Published Date: 2026	SDDOT	PRECAST SINGLE BOX CULVERT SLOPED END SECTION DETAILS WITH 2'–0" CUTOFF WALL	PLATE NUMBER 560.10
			Sheet 1 of 1

CUTOFF WALL

1. All costs associated with furnishing and installing the Cutoff Wall, whether precast or cast-in-place, shall be incidental to the contract unit price per each for "Precast Box Culvert End Section, Furnish".
2. Concrete for cast-in-place cutoff wall shall be Class M6 concrete in accordance with Section 462 of the Specifications.
3. All reinforcing steel shall conform to ASTM A615 Grade 60.
4. Alternate details will be allowed, subject to the approval of the Bridge Construction Engineer.

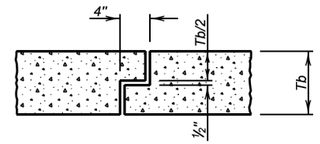


PLAN
(Inlet or Outlet)



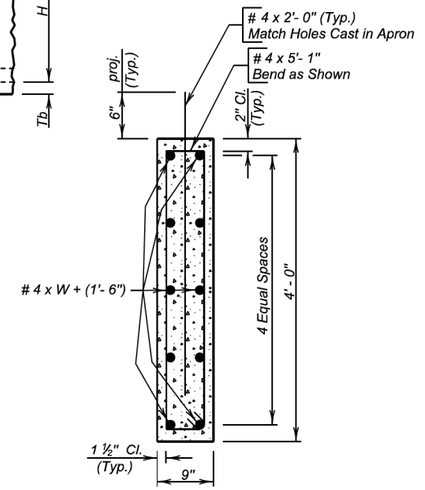
ELEVATION
(Inlet or Outlet)

VIEW A - A



DETAIL " X "

NOTE: Joint details may vary from that shown, according to the manufacturer's design. Submit details with shop plans for approval.



SEC. C - C

LEGEND

W = Width of Opening
H = Height of Opening
Tt = Thickness of Top Slab
Tb = Thickness of Bottom Slab
Ts = Thickness of Side Wall
L = Length of End Section

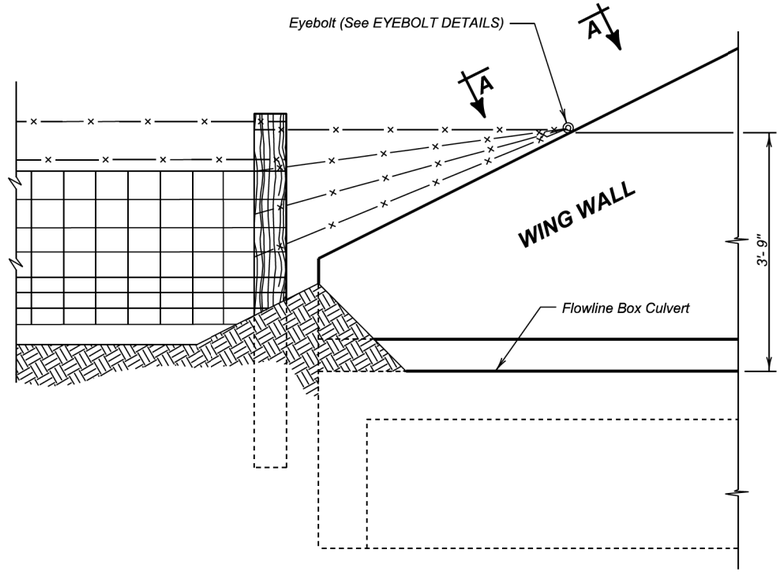
NOTES:
See GENERAL DRAWING for W and H dimensions.
Tt, Tb, L, and Ts dimensions shall be furnished by the Contractor.
⚹ Length and number of units may vary from that shown.

June 26, 2015

Published Date: 2026	SDDOT	PRECAST SINGLE BOX CULVERT SLOPED END SECTION DETAILS WITH 4'–0" CUTOFF WALL	PLATE NUMBER 560.11
			Sheet 1 of 1

SITE 1
ALTERNATE B

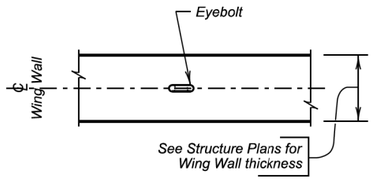
7' X 6' BOX CULVERT (PRECAST)
STR. NO. 47-091-555
SEPTEMBER 2022



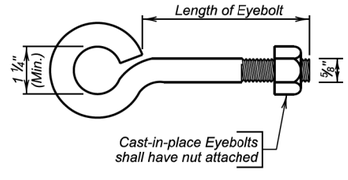
DETAIL FOR FENCE ANCHORS

GENERAL NOTES:

1. The fence and post details shown are for illustrative purpose only. The fence shall be as specified elsewhere in the plans.
2. Eyebolts shall be placed on all of the box culvert wing walls.
3. Eyebolts shall be ⅞ inch diameter and shall conform to ASTM A307.
4. Eyebolts, nuts, and concrete inserts shall be galvanized in accordance with AASHTO M232 (ASTM A153). Concrete inserts of corrosion resistant material need not be galvanized.
5. Cast-in-place eyebolts shall have a nut attached, be 4 ½ inches (Min.) in length and shall be embedded such that the eye of the bolt is flush with the concrete surface. (See Eyebolt Details) As an alternate, cast-in-place concrete inserts, capable of developing the full strength of the ⅞ inch diameter threaded eyebolt, may be used and shall be set in the concrete in accordance with the manufacturer's recommendations. The eyebolt shall be of sufficient length to develop its full strength. The eye of the eyebolt shall be flush with the concrete surface.
6. The cost for furnishing and installing eyebolts and/or concrete inserts shall be incidental to various contract items.



VIEW A - A



EYEBOLT DETAILS

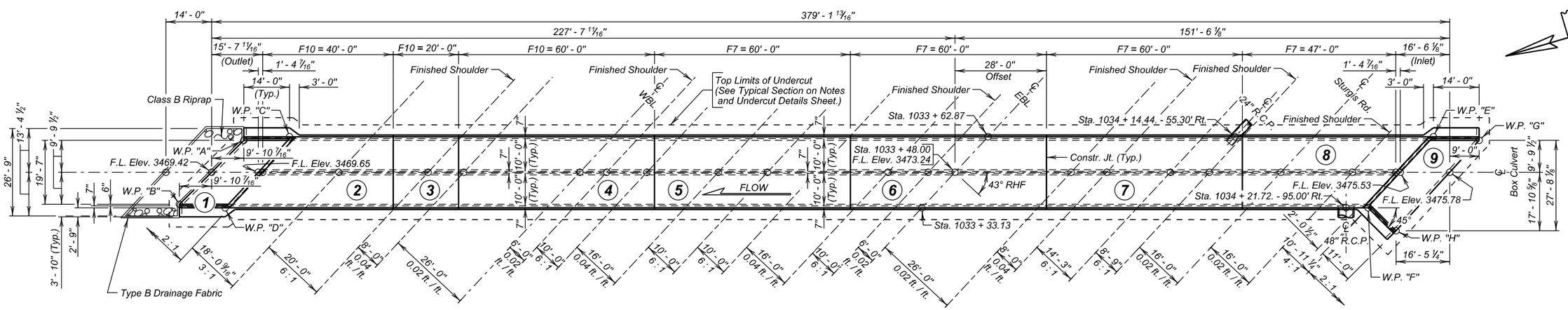
December 23,2012

Published Date: 2026	SDDOT	FENCE ANCHORS FOR BOX CULVERT WING WALLS	PLATE NUMBER 620.16 Sheet 1 of 1

The elevations shown in these plans are based on the National Geodetic Survey (NGS) North American Vertical Datum of 1988 (NAVD88).

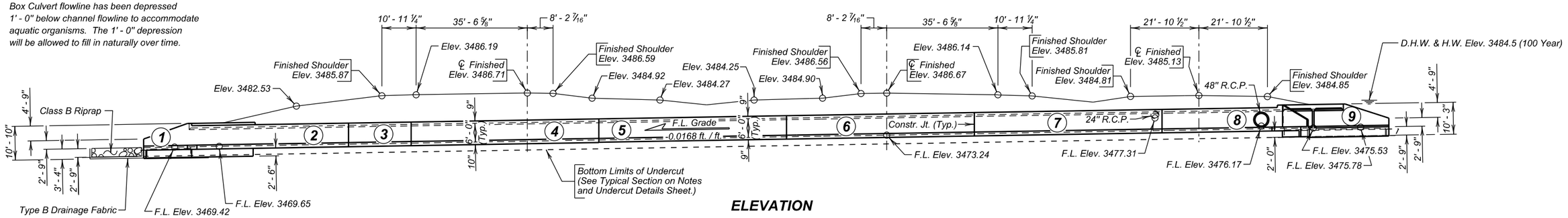
Revised August 28, 2025 AU

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E17	E185



PLAN

NOTE:
Box Culvert flowline has been depressed 1' - 0" below channel flowline to accommodate aquatic organisms. The 1' - 0" depression will be allowed to fill in naturally over time.



ELEVATION

HYDRAULIC DATA

Q_d	1215 cfs
A_d	57 sq ft
V_d	12.5 fps
Q_F	1215 cfs
Q_{100}	1215 cfs
Q_{OT}	1318 cfs
V_{max}	12.5 fps

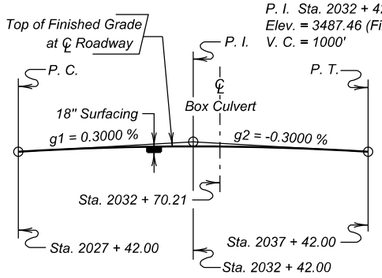
Q_d = Design discharge for the proposed culvert based on 100 year frequency. El. 3484.5.

Q_{OT} = Overtopping discharge and frequency > Q_{102} year recurrence interval. El. 3485.0 @ Sta. 621 + 00.00.

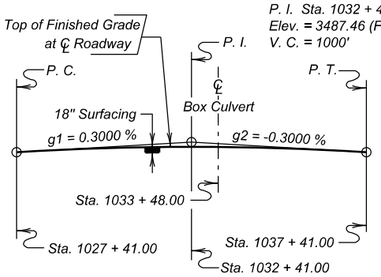
Q_F = Designated peak discharge for the basin approaching proposed project based on 100 year frequency.

Q_{100} = Computed discharge for the basin approaching proposed project based on 100 year frequency. El. 3484.5.

V_{max} = Maximum computed outlet velocity for the proposed culvert, based on 100 year frequency.



VERTICAL CURVE DATA
(Westbound Lanes)



VERTICAL CURVE DATA
(Eastbound Lanes)

-X028-

INDEX OF CULVERT SHEETS -

Sheet No. 1 - General Drawing and Quantities
Sheet No. 2 - Notes and Undercut Details
Sheet No. 3 - Inlet Details (A)
Sheet No. 4 - Inlet Details (B)
Sheet No. 5 - Outlet Details
Sheet No. 6 - F7 Barrel End Section Details (47' - 0") (A)
Sheet No. 7 - F7 Barrel End Section Details (47' - 0") (B)
Sheet No. 8 - F7 Barrel Interior Section Details (60' - 0")
Sheet No. 9 - F10 Barrel End Section Details (40' - 0") (A)
Sheet No. 10 - F10 Barrel End Section Details (40' - 0") (B)
Sheet No. 11 - F10 Barrel Interior Section Details (20' - 0")
Sheet No. 12 - F10 Barrel Interior Section Details (60' - 0")
Sheet No. 13 - Standard Plate No.'s 460.02 and 460.10
Sheet No. 14 - Standard Plate No. 620.16

TABLE OF WORKING POINTS

W. P.	STATION	OFFSET
"A"	1032 + 06.64	165.94' Lt.
"B"	1031 + 78.86	167.02' Lt.
"C"	1032 + 16.98	156.44' Lt.
"D"	1031 + 87.61	156.05' Lt.
"E"	1034 + 55.87	99.73' Rt.
"F"	1034 + 26.34	99.95' Rt.
"G"	1034 + 64.63	110.71' Rt.
"H"	1034 + 27.04	110.99' Rt.

ESTIMATED QUANTITIES

	ITEM	UNIT	QUANTITY
	Class A45 Concrete, Box Culvert	Cu. Yd.	635.2
	Reinforcing Steel	Lb.	106268
	Structure Excavation, Box Culvert	Cu. Yd.	258
	Box Culvert Undercut	Cu. Yd.	817
≠	Class B Riprap	Ton	53.4
	Type B Drainage Fabric	Sq. Yd.	72
	Reinforcement Fabric (MSE)	Sq. Yd.	1179

≠ For estimating purposes only, a factor of 1.4 tons/cu. yd. was used to convert Cu. Yd. to Tons.

GENERAL DRAWING AND QUANTITIES

FOR

2 - 10' X 6' BOX CULVERT

OVER PRIEST CANYON CREEK — 43° RHF SKEW
STA. 1033 + 48.00 (EBL) — SEC. 10-T3N-R6E
STR. NO. 47-092-556 — IM-CR-EM 0901(187)44
PCN 034J — HL-93

MEADE COUNTY

S. D. DEPT. OF TRANSPORTATION

SEPTEMBER 2022

1 OF 14

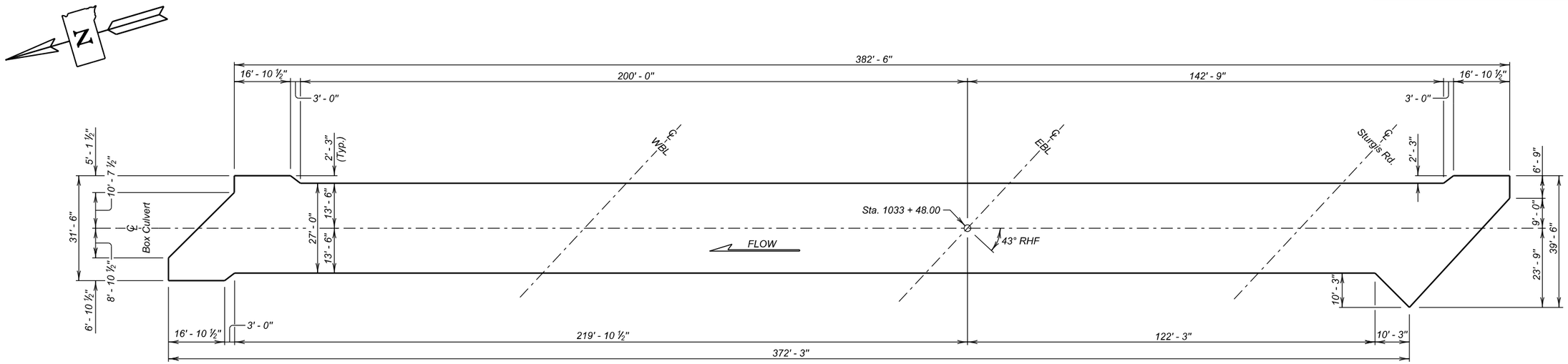
-X028-

PLANS BY :
OFFICE OF BRIDGE DESIGN, SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION

DESIGNED BY	CK. DES. BY	DRAFTED BY	
AU MEAD034J	JU 034JGB01	BT	Steve A Johnson BRIDGE ENGINEER

Revised October 15, 2025 AU

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E18	E185



UNDERCUT LAYOUT
(Bottom Dimensions)

SPECIFICATIONS

1. *Design Specifications: AASHTO LRFD Bridge Design Specifications, 9th Edition.*
2. Construction Specifications: South Dakota Standard Specifications for Roads and Bridges, 10-1-25 Version, Required Provisions, and Special Provisions as included in the Proposal. The Standard Specifications for Roads and Bridges are available for download and viewing at: https://dot.sd.gov/doing-business/contractors/standard-specifications.

GENERAL NOTES

1. *Design Live Load: HL-93 and construction load consisting of two 7' - 6" gage axles spaced 30 foot apart with gross axle weight (each axle) = 95,850 lbs. The construction load will not be applied until a minimum of 4 feet of fill has been placed over the box culvert. Other construction loads in excess of legal load must be submitted through proper channels to the Office of Bridge Design for analysis.*
2. *The design of the barrel section is based on a minimum fill height of 2 feet and includes all subsequent fill heights up to and including the maximum fill height of 7 ft. (F7) and 10 ft. (F10).*
3. *Design Material Strengths: Concrete f'c = 4500 p.s.i.*
   Reinforcing Steel fy = 60000 p.s.i.
4. *All concrete will be Class A45 Concrete, Box culvert conforming to Section 460 of the Construction Specifications.*
5. *All reinforcing steel will conform to ASTM A615 Grade 60.*
6. *All lap splices shown are contact lap splices unless noted otherwise.*
7. *All exposed edges will be chamfered ¾ inch unless noted otherwise in the plans.*
8. *Use 1 inch clear cover on all reinforcing steel EXCEPT as shown.*
9. *The Contractor will imprint on the structure the date of construction as specified and detailed on Standard Plate No. 460.02.*
10. *Care will be taken to establish Working Points (W.P.) as shown on the wings.*
11. *Circled numbers in PLAN and ELEVATION views on the General Drawing are section I.D. Numbers (see SDDOT Materials Manual).*
12. *Cost of Preformed Expansion Joint Filler used in apron construction will be incidental to the other contract items.*
13. *Soils below the bottom of the proposed RCBC consist of soft brown silt clay (alluvium). Groundwater was encountered in the borings at an elevation of 3474.5 during the subsurface investigation conducted in October to November 2021. Dewatering will be required for the construction of the RCBC. All costs incurred for dewatering will be incidental to the other contract items.*

GEOTEXTILE SPECIFICATION

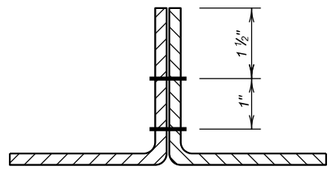
1. *The geotextile will conform to specification for Geotextiles and Impermeable Plastic Membrane, Reinforcement Fabric (MSE) (Section 831 of the Standard Specifications). The textile will be on the Approved Products List for this material or will be certified by the supplier to meet this specification prior to installation.*
2. *Geotextile will be paid for at the contract unit price per sq. yd. for Reinforcement Fabric (MSE). Payment will be full compensation for furnishing and installing the fabric only. Granular backfill materials will be incidental to the contract unit price per cubic yard for Box Culvert Undercut.*

INSTALLATION PROCEDURE - GEOTEXTILE

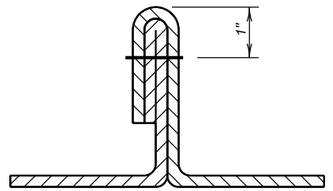
1. *Place the Reinforcement Fabric (MSE) on as level and smooth of surface as possible.*
2. *Any protrusions that might damage the geotextile will be removed prior to placing the geotextile.*
3. *All seams in the geotextile will be stitched in accordance with the seaming procedure notes and as shown on the details labeled "Geotextile Seam Types".*
4. *No equipment is to be allowed on the geotextile until the granular material is in place.*
5. *The geotextile should be kept as taut as possible prior to backfilling.*
6. *Granular material will be dumped at least 20' behind the leading edge of the fill and pushed into place with a loader or dozer.*

SEAMING PROCEDURE

1. *The sewn seams will consist of two parallel rows of stitching ("prayer" seam, TypeSSa-2), or will consist of a J-seam, (Type SSn-1), using a single row of stitching. The stitching will be lock type stitch.*
2. *If the SSa-2 seam is used, the two rows of stitching will be 1" apart with a tolerance of plus or minus ½" and will not cross, except for restitching. The minimum seam allowance, i.e., the minimum distance from the geotextile edge to the stitch line nearest to that edge, will be 1 ½".*
3. *If the J-seam, Type SSn-1, is used, the minimum seam allowance will be 1".*
4. *The seam, stitch type, and the equipment used to perform the stitching will be as recommended by the manufacturer of the geotextile and approved by the Engineer.*
5. *The seams will be sewn in such a manner that the seam can be readily inspected by the Engineer.*
6. *Thread used will be high strength polypropylene, polyester, or Kevlar thread. Nylon threads will not be allowed.*

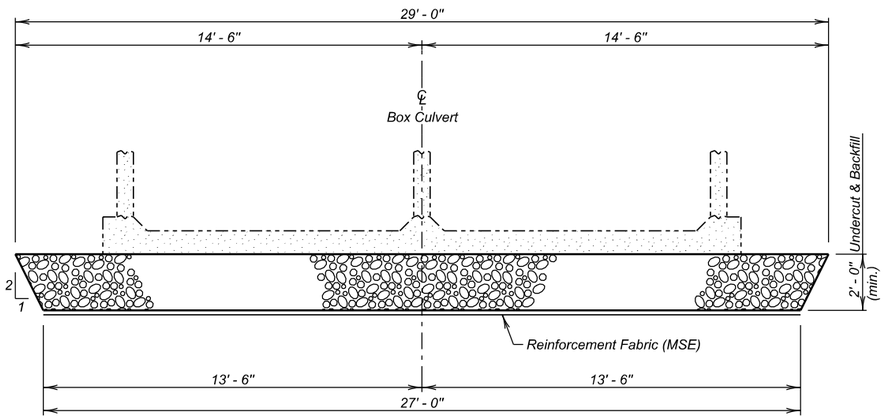


Flat or "prayer" seam
Type SSa-2



J seam
Type SSn-1

GEOTEXTILE SEAM TYPES



TYPICAL SECTION
(For Limits of Undercut)

ESTIMATED QUANTITIES

	ITEM	UNIT	QUANTITY
⌀	Box Culvert Undercut	Cu. Yd.	817
	Reinforcement Fabric (MSE)	Sq. Yd.	1179

⌀ *For payment, quantity is based on plan shown undercut dimensions and will not be measured unless the Engineer orders a change.*

NOTES AND UNDERCUT DETAILS

FOR

2 - 10' X 6' BOX CULVERT

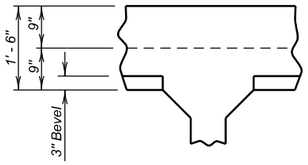
OVER PRIEST CANYON CREEK — 43° RHF SKEW
STA. 1033 + 48.00 (EBL) — SEC. 10-T3N-R6E
STR. NO. 47-092-556 — IM-CR-EM 0901(187)44
HL-93

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
SEPTEMBER 2022

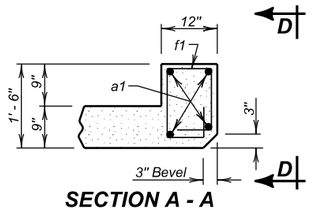
2 OF 14

DESIGNED BY	CK. DES. BY	DRAFTED BY	
AU	JU	BT	Steve A. Johnson BRIDGE ENGINEER
MEAD034J	034JGB02		

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E19	E185

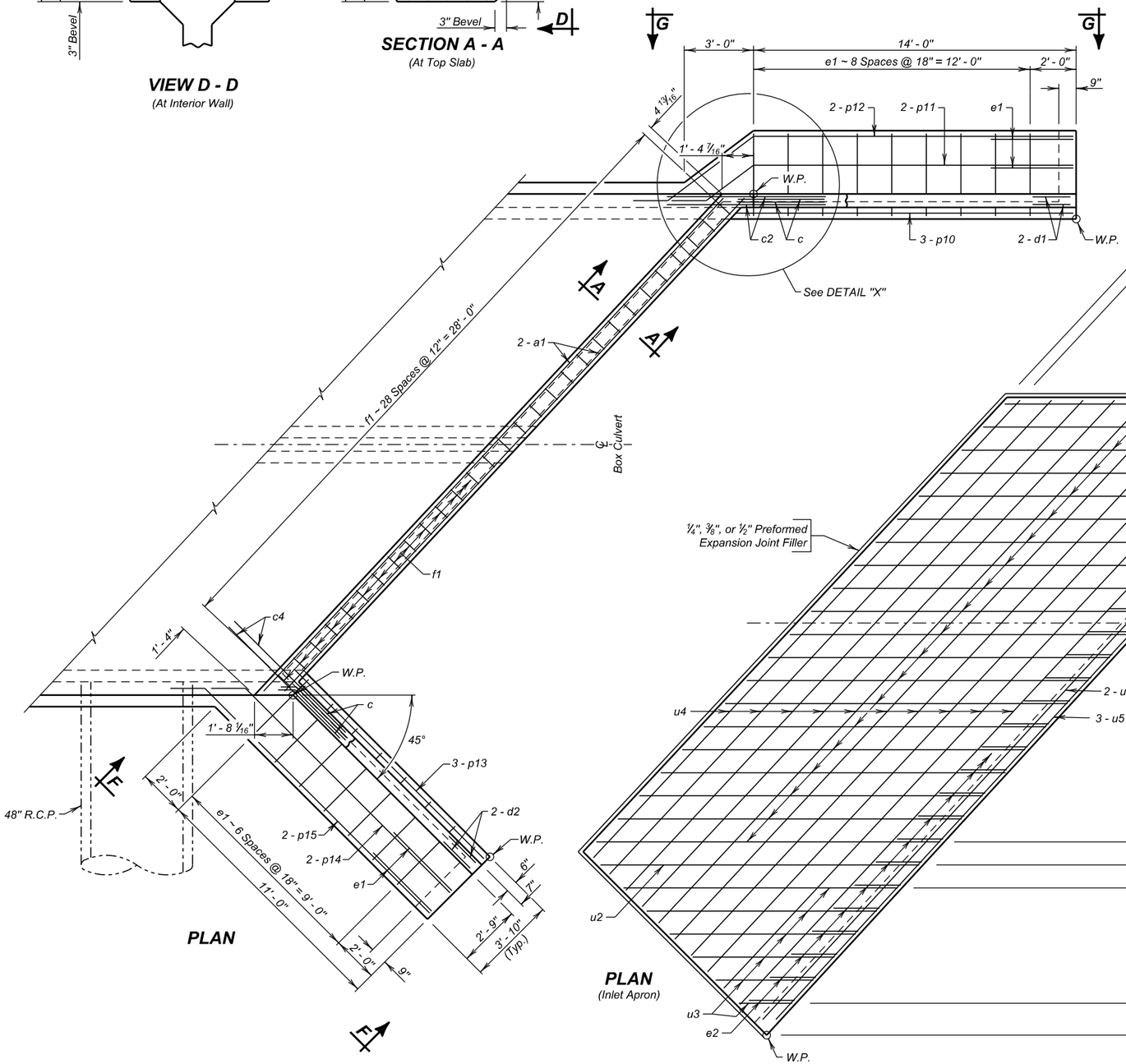


VIEW D - D
(At Interior Wall)

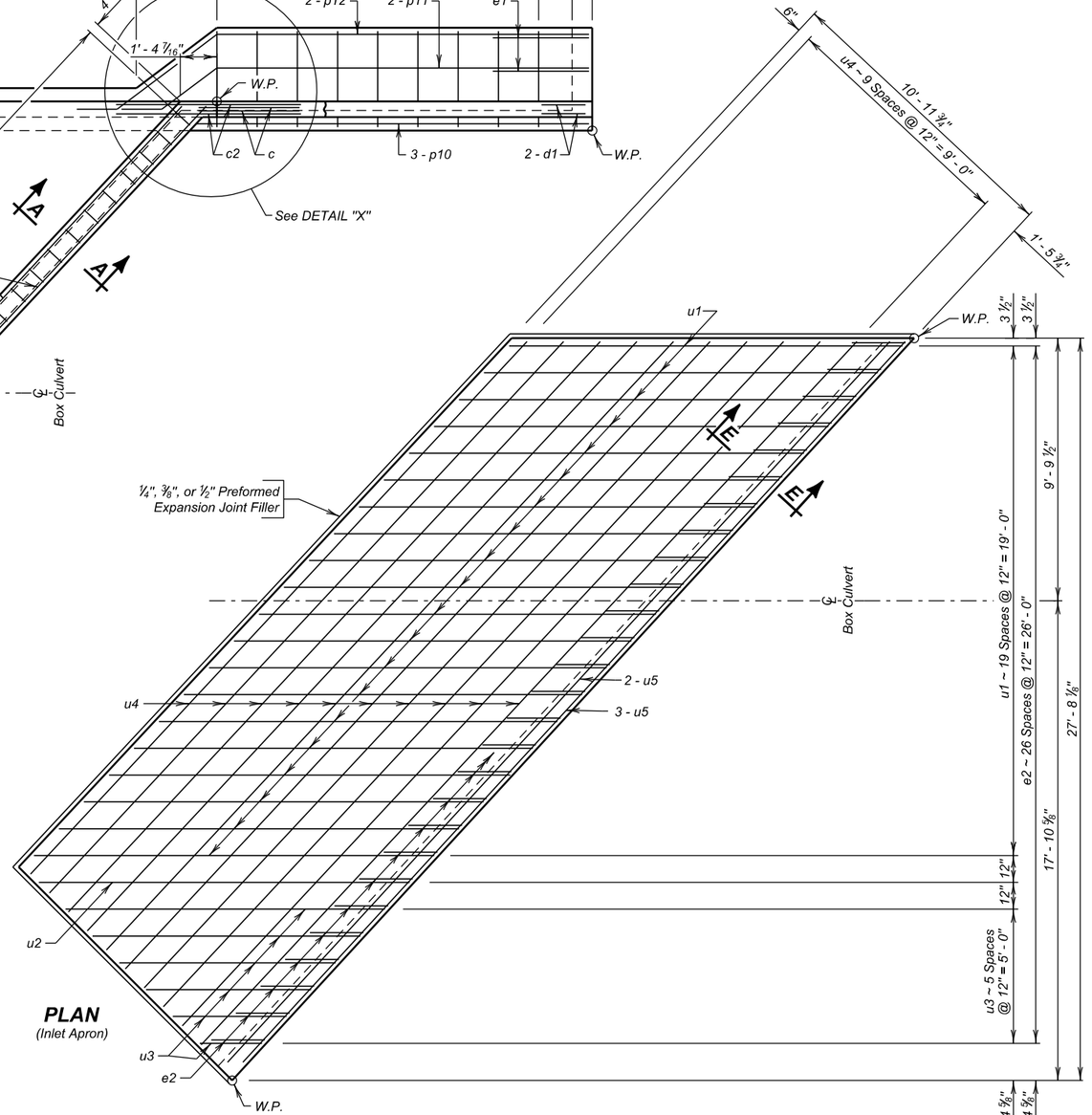


SECTION A - A
(At Top Slab)

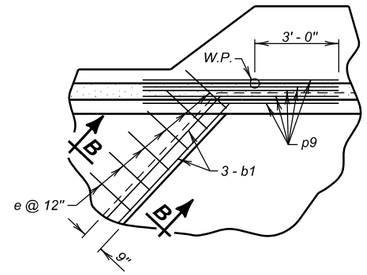
NOTE:
Apron will NOT be built
monolithic with the Box Culvert.



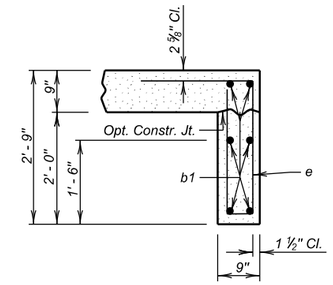
PLAN



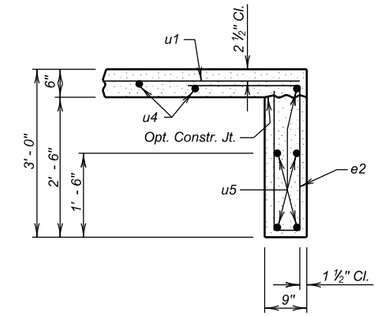
PLAN
(Inlet Apron)



DETAIL "X"
(At Bottom Slab)



SECTION B - B



SECTION E - E

INLET DETAILS (A)

FOR

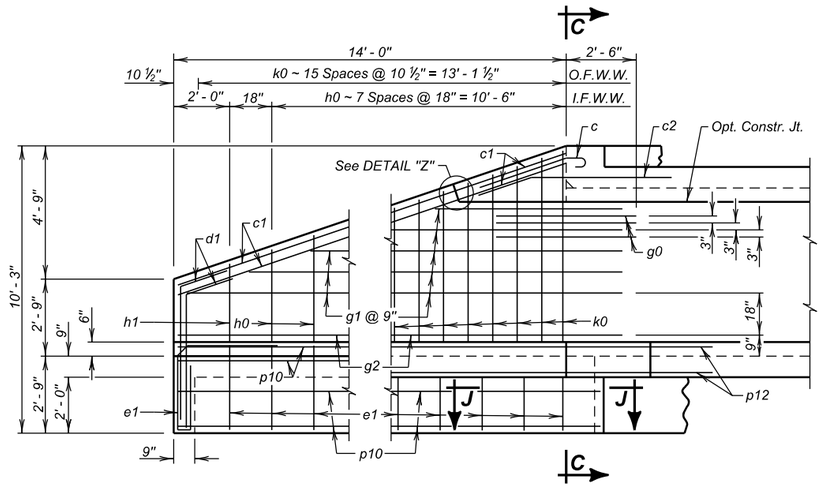
2 - 10' X 6' BOX CULVERT

OVER PRIEST CANYON CREEK — 43° RHF SKEW
STA. 1033 + 48.00 (EBL) — SEC. 10-T3N-R6E
STR. NO. 47-092-556 — IM-CR-EM 0901(187)44
HL-93

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
SEPTEMBER 2022

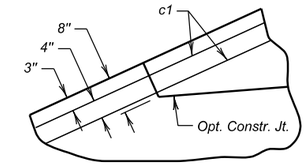
DESIGNED BY	CK. DES. BY	DRAFTED BY	
AU	JU	BT	Steve A Johnson BRIDGE ENGINEER
MEAD034J	034JGB03		

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E20	E185

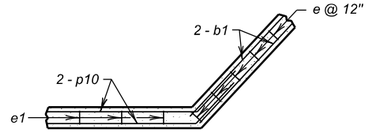


I.F.W.W. ***O.F.W.W.***

VIEW G - G



DETAIL "Z"
(showing c1 bars only)

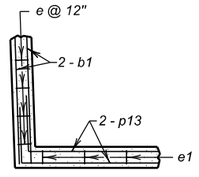


SECTION J - J

O.F.W.W. ***I.F.W.W.***

VIEW F - F

DETAIL "Y"
(showing c3 bars only)



SECTION H - H

SECTION C - C

ESTIMATED QUANTITIES

ITEM	Class A45 Concrete, Box Culvert	Reinforcing Steel	Structure Excavation, Box Culvert
UNIT	Cu. Yd.	Lb.	Cu. Yd.
Inlet	14.1	1781	7.5
Inlet Apron	6.0	703	6.0

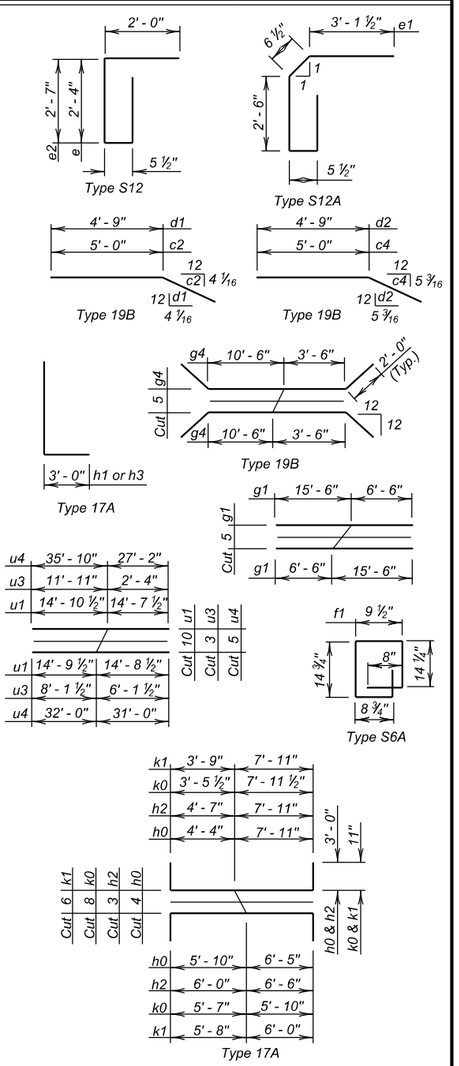
LEGEND FOR PLACING RE-STEEL

O. F. W. W. - Outside Face of Wing Wall
I. F. W. W. - Inside Face of Wing Wall

REINFORCING SCHEDULE

	Mk.	No.	Size	Length	Type
*	a1	4	6	29' - 3"	Str.
	b1	6	6	28' - 0"	Str.
*	c	4	5	4' - 6"	1A
	c1	4	5	14' - 9"	Str.
	c2	2	5	7' - 0"	19B
	c3	4	5	11' - 9"	Str.
	c4	2	5	7' - 0"	19B
	d1	4	5	6' - 6"	19B
	d2	4	5	6' - 6"	19B
	e	28	4	7' - 0"	S12
	e1	20	4	8' - 9"	S12A
	f1	29	4	5' - 3"	S6A
	g0	6	5	5' - 0"	Str.
◫	g1	5	4	22' - 0"	Str.
	g2	2	4	15' - 9"	Str.
	g3	6	5	5' - 0"	19B
◫	g4	5	4	18' - 0"	19B
	g5	2	4	12' - 9"	19B
◫	h0	4	4	18' - 3"	17A
	h1	1	4	6' - 9"	17A
◫	h2	3	4	18' - 6"	17A
	h3	1	4	7' - 0"	17A
◫	k0	8	4	13' - 3"	17A
◫	k1	6	4	13' - 6"	17A
	p9	10	6	7' - 0"	Str.
*	p10	7	4	16' - 6"	Str.
*	p11	2	4	18' - 0"	Str.
*	p12	2	4	20' - 0"	Str.
*	p13	7	4	13' - 6"	Str.
*	p14	2	4	14' - 3"	Str.
*	p15	2	4	15' - 3"	Str.
	INLET APRON				
	e2	27	4	7' - 6"	S12
◫	u1	10	4	29' - 6"	Str.
	u2	1	4	13' - 9"	Str.
◫	u3	3	4	14' - 3"	Str.
◫	u4	5	4	63' - 0"	Str.
	u5	5	4	36' - 9"	Str.

Bending Details



NOTES:
All dimensions are out to out of bars.
◫ *See cutting diagram.*
✳ *Bend in field as necessary to fit.*

INLET DETAILS (B)

FOR

2 - 10' X 6' BOX CULVERT

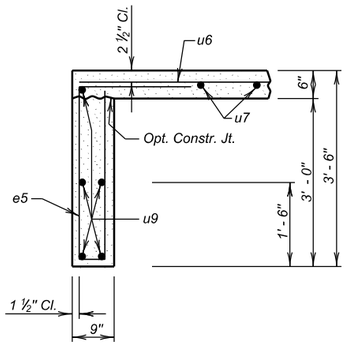
OVER PRIEST CANYON CREEK — 43° RHF SKEW
STA. 1033 + 48.00 (EBL) — SEC. 10-T3N-R6E
STR. NO. 47-092-556 — IM-CR-EM 0901(187)44
HL-93

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
SEPTEMBER 2022

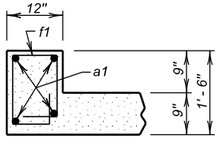
4 OF 14

DESIGNED BY	CK. DES. BY	DRAFTED BY	
AU	JU	BT	Steve A Johnson BRIDGE ENGINEER
MEAD034J	034JGB04		

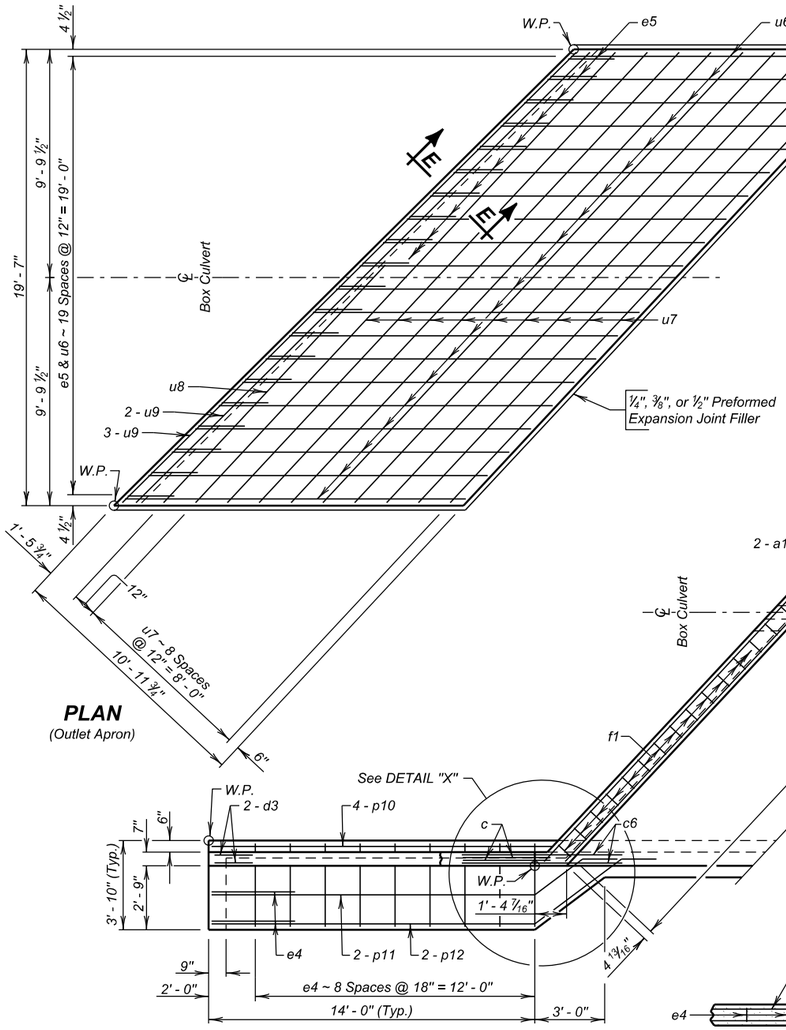
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E21	E185



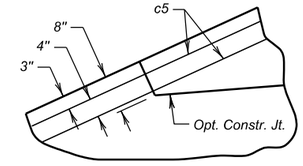
SECTION E - E



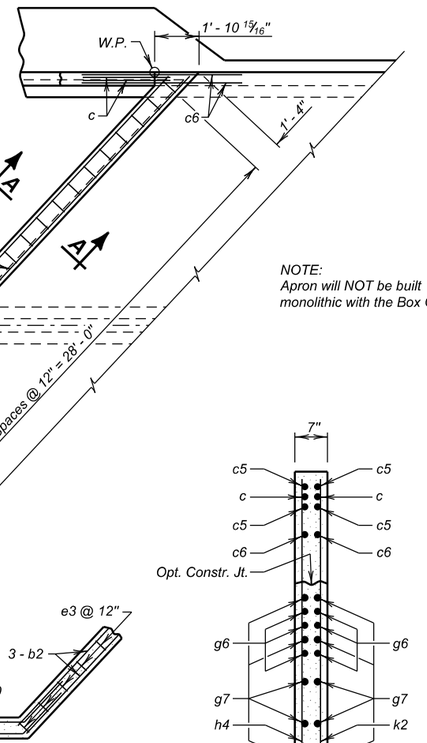
SECTION A - A
(At Top Slab)



PLAN
(Outlet Apron)

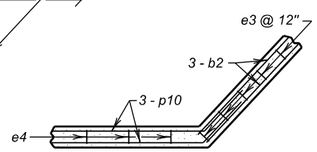


DETAIL "Y"
(showing c5 bars only)

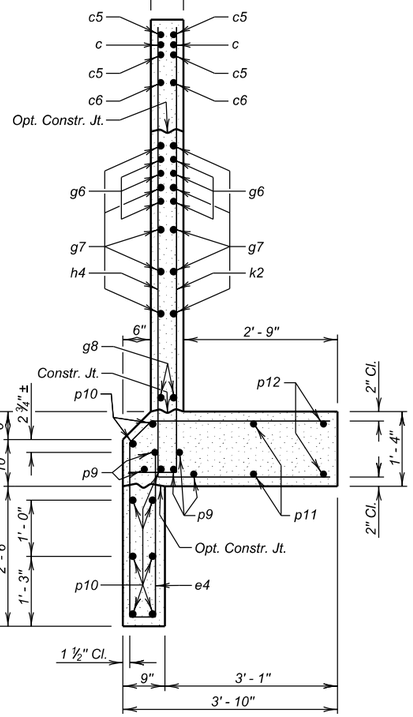


NOTE:
Apron will NOT be built monolithic with the Box Culvert.

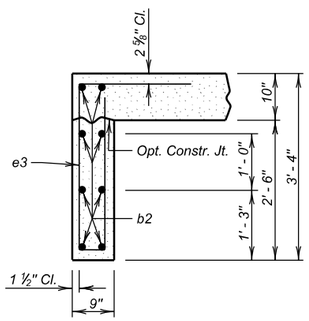
PLAN



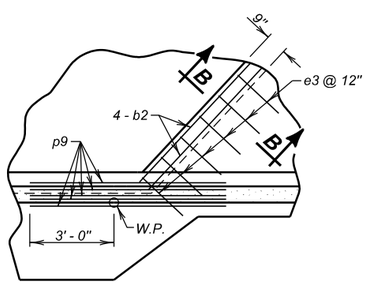
SECTION H - H



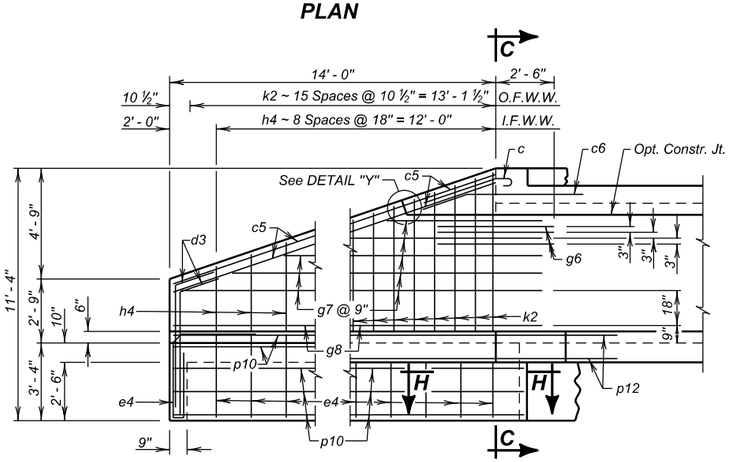
SECTION C - C



SECTION B - B



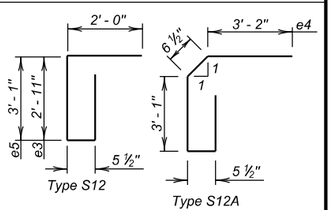
DETAIL "X"
(At Bottom Slab)

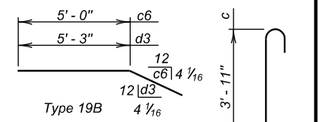


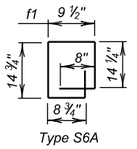
I.F.W.W. **O.F.W.W.**
ELEVATION

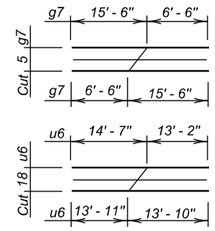
REINFORCING SCHEDULE

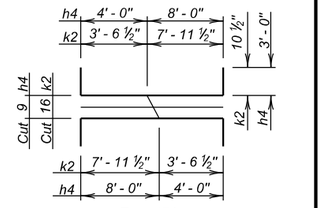
Mk.	No.	Size	Length	Type	Bending Details
a1	4	6	29' - 3"	Str.	
b2	8	6	28' - 6"	Str.	
* c	4	5	4' - 6"	1A	
c5	8	5	14' - 9"	Str.	
c6	4	5	7' - 0"	19B	
d3	8	5	7' - 0"	19B	
e3	29	4	8' - 0"	S12	
e4	22	4	10' - 0"	S12A	
f1	29	4	5' - 3"	S6A	
g6	12	5	5' - 0"	Str.	
◻ g7	10	4	22' - 0"	Str.	
g8	4	4	15' - 9"	Str.	
◻ h4	9	4	18' - 0"	17A	
◻ k2	16	4	13' - 3"	17A	
p9	10	6	7' - 0"	Str.	
* p10	18	4	16' - 6"	Str.	
* p11	4	4	18' - 0"	Str.	
* p12	4	4	20' - 0"	Str.	
OUTLET APRON					
e5	20	4	8' - 6"	S12	
◻ u6	10	4	27' - 9"	Str.	
u7	9	4	26' - 3"	Str.	
u8	1	4	14' - 0"	Str.	
u9	5	4	27' - 3"	Str.	











NOTES:
All dimensions are out to out of bars.
◻ See cutting diagram.
* Bend in field as necessary to fit.

ESTIMATED QUANTITIES

ITEM	Class A45 Concrete, Box Culvert	Reinforcing Steel	Structure Excavation, Box Culvert
UNIT	Cu. Yd.	Lb.	Cu. Yd.
Outlet	16.1	2058	8.9
Outlet Apron	7.5	557	7.5

LEGEND FOR PLACING RE-STEEL

O. F. W. W. - Outside Face of Wing Wall
I. F. W. W. - Inside Face of Wing Wall

OUTLET DETAILS
FOR
2 - 10' X 6' BOX CULVERT

OVER PRIEST CANYON CREEK
STA. 1033 + 48.00 (EBL)
STR. NO. 47-092-556

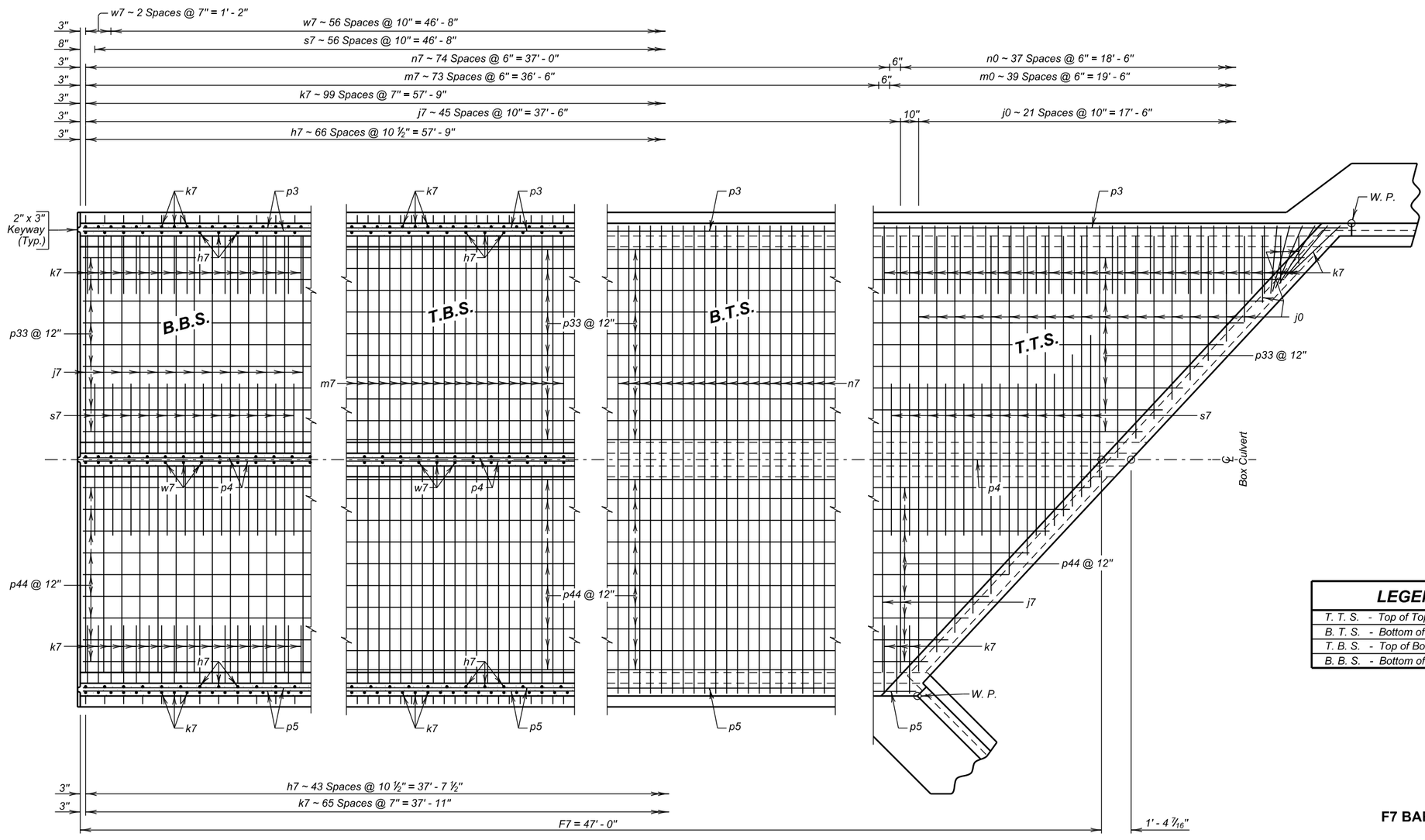
43° RHF SKEW
SEC. 10-T3N-R6E
IM-CR-EM 0901(187)44
HL-93

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
SEPTEMBER 2022

5 OF 14

DESIGNED BY	CK. DES. BY	DRAFTED BY	
AU	JU	BT	Steve A Johnson BRIDGE ENGINEER
MEAD034J	034JGB05		

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E22	E185



PLAN

LEGEND FOR PLACING RE-STEEL
T. T. S. - Top of Top Slab
B. T. S. - Bottom of Top Slab
T. B. S. - Top of Bottom Slab
B. B. S. - Bottom of Bottom Slab

F7 BARREL END SECTION DETAILS (47' - 0") (A)

FOR

2 - 10' X 6' BOX CULVERT

OVER PRIEST CANYON CREEK — 43° RHF SKEW
STA. 1033 + 48.00 (EBL) — SEC. 10-T3N-R6E
STR. NO. 47-092-556 — IM-CR-EM 0901(187)44
HL-93

MEADE COUNTY

S. D. DEPT. OF TRANSPORTATION

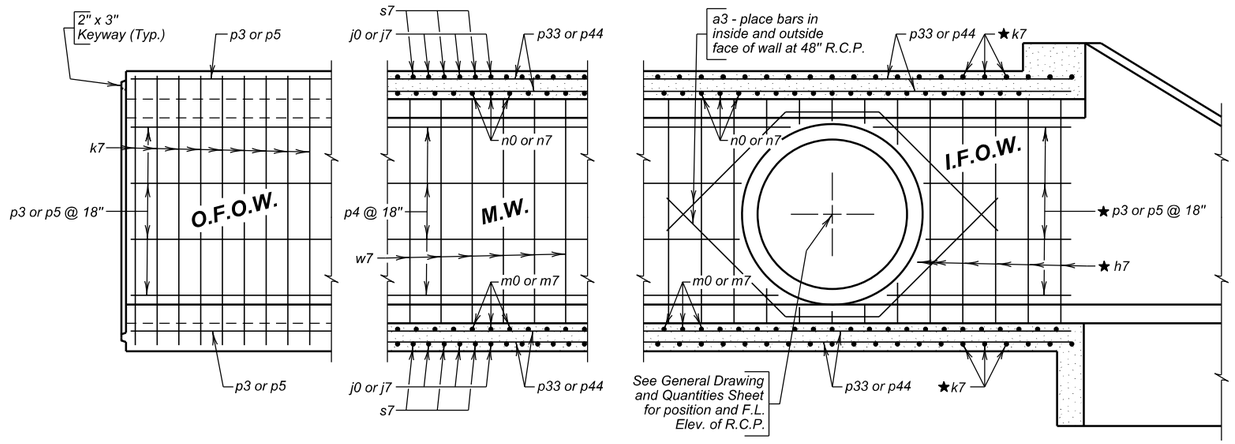
SEPTEMBER 2022

6 OF 14

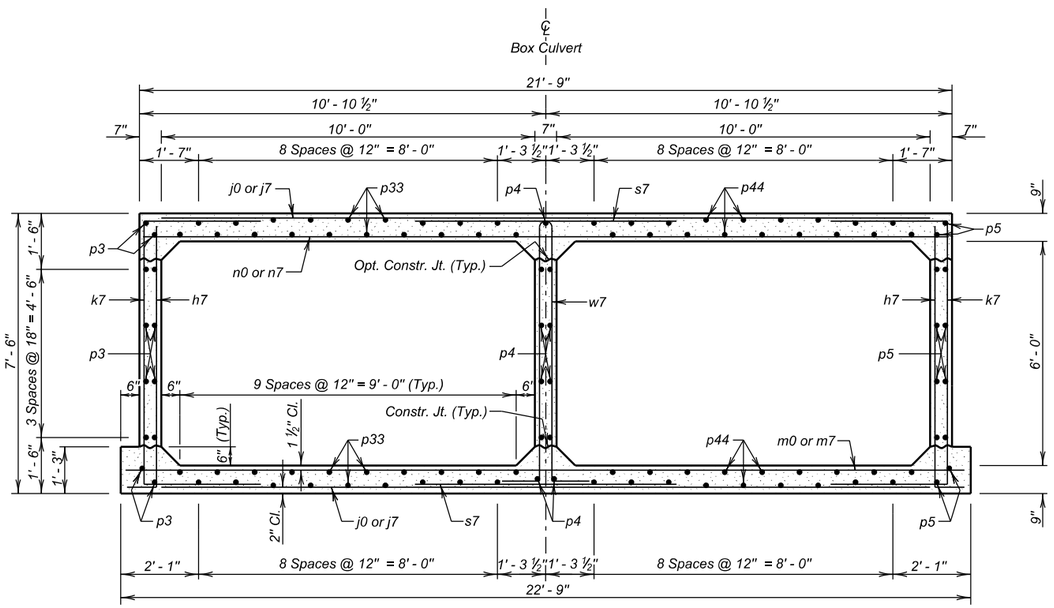
DESIGNED BY	CK. DES. BY	DRAFTED BY	
AU	JU	BT	BRIDGE ENGINEER
MEAD034J	034JGB06		

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E23	E185

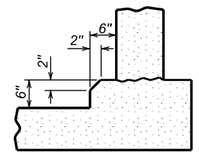
★ NOTE:
Cut and bend h7, k7, and p5 bars as required to place 48" R.C.P. thru barrel wall.



ELEVATION



F7 BARREL SECTION
(7' - 0" Maximum Fill)



OPTIONAL FILLET DETAIL
(At Bottom Slab)

NOTE:
Contractor may form the optional full fillet, with 2" Chamfer, as detailed. The cost of the additional concrete will be borne by the Contractor.

◈ Place a3 bars in both faces of barrel wall. Quantity of a3 bars is for one pipe location.

△ Place z1 bars thru construction joint between barrel sections as shown on Standard Plate No. 460.10. Quantity of z1 bars are for one construction joint.

ESTIMATED QUANTITIES

ITEM	Class A45 Concrete, Box Culvert	Reinforcing Steel	Structure Excavation, Box Culvert
UNIT	Cu.Yd.	Lb.	Cu.Yd.
1 - F7 Barrel End Section @ 47' - 0"	79.0	13973	29.7

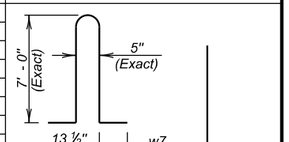
LEGEND FOR PLACING RE-STEEL

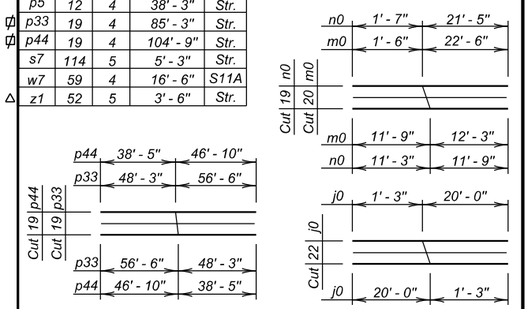
O. F. O. W. - Outside Face of Outside Wall
I. F. O. W. - Inside Face of Outside Wall
M. W. - Middle Wall

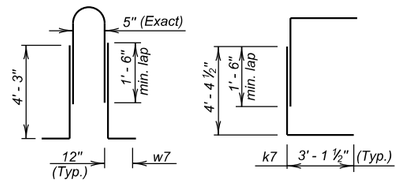
REINFORCING SCHEDULE
(For 1 - F7 Barrel End Section @ 47' - 0")

	Mk.	No.	Size	Length	Type
◈	a3	4	5	11' - 6"	19A
	h7	111	4	7' - 9"	17A
⍁	j0	22	5	21' - 3"	Str.
	j7	92	5	20' - 9"	Str.
	k7	166	4	13' - 6"	17
⍁	m0	20	5	24' - 0"	Str.
	m7	74	5	22' - 6"	Str.
⍁	n0	19	5	23' - 0"	Str.
	n7	75	5	21' - 6"	Str.
	p3	12	4	58' - 0"	Str.
	p4	11	4	48' - 0"	Str.
	p5	12	4	38' - 3"	Str.
⍁	p33	19	4	85' - 3"	Str.
⍁	p44	19	4	104' - 9"	Str.
	s7	114	5	5' - 3"	Str.
	w7	59	4	16' - 6"	S11A
△	z1	52	5	3' - 6"	Str.

Bending Details

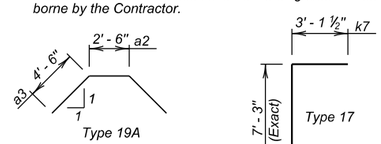






OPTIONAL w7 SPLICE DETAIL OPTIONAL k7 SPLICE DETAIL

Contractor may use optional reinforcing steel splices, as shown. The cost of the additional reinforcing steel will be borne by the Contractor.



NOTES:
All dimensions are out to out of bars.
⍁ See cutting diagram.
Request for additional reinforcing steel splices at points other than those shown, must be submitted to the Engineer for prior approval. If additional splices are approved, no payment will be allowed for the added quantity of reinforcing steel.

F7 BARREL END SECTION DETAILS (47' - 0") (B)

FOR

2 - 10' X 6' BOX CULVERT

OVER PRIEST CANYON CREEK
STA. 1033 + 48.00 (EBL)
STR. NO. 47-092-556

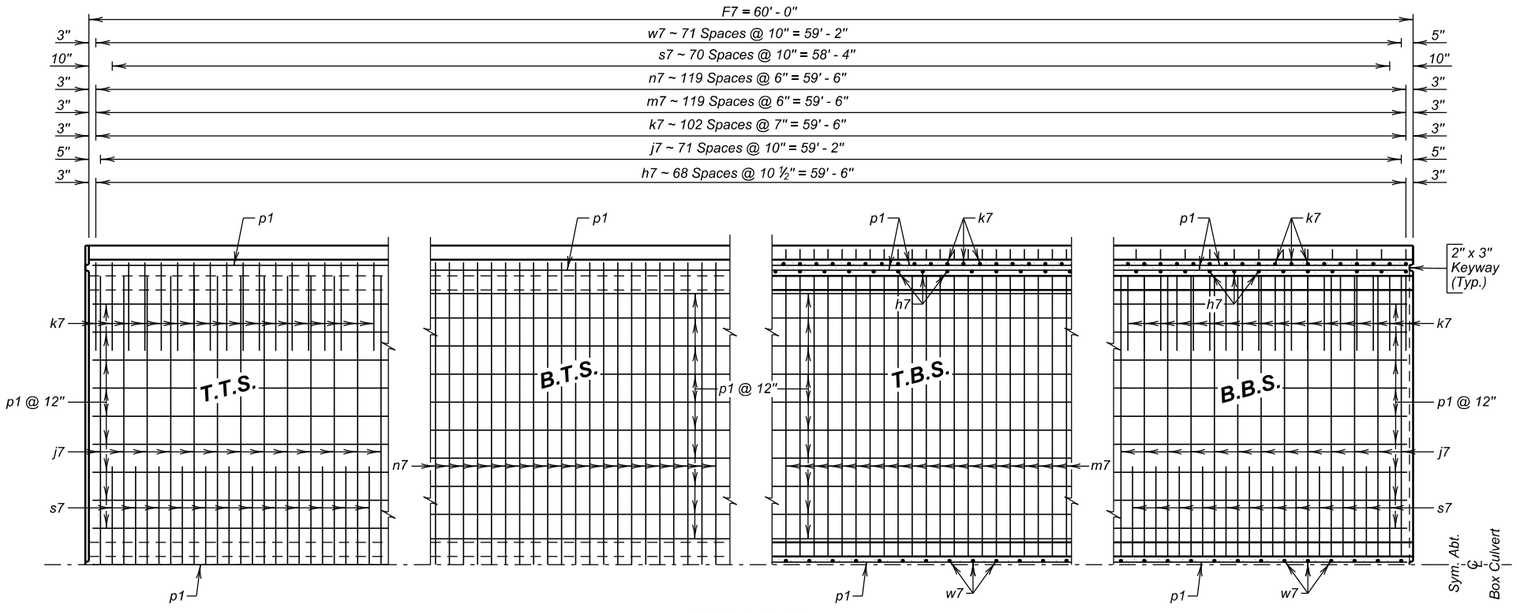
43° RHF SKEW
SEC. 10-T3N-R6E
IM-CR-EM 0901(187)44
HL-93

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
SEPTEMBER 2022

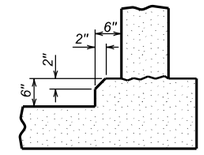
7 OF 14

DESIGNED BY	CK. DES. BY	DRAFTED BY	
AU	JU	BT	Steve A. Johnson BRIDGE ENGINEER
MEAD034J	034JGB07		

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E24	E185



HALF PLAN



OPTIONAL FILLET DETAIL

(At Bottom Slab)

NOTE:
Contractor may form the optional full fillet, with 2" Chamfer, as detailed. The cost of the additional concrete will be borne by the Contractor.

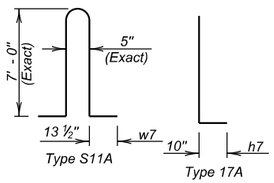
◈ *Place a2 bars in both faces of barrel wall. Quantity of a2 bars is for one pipe location.*

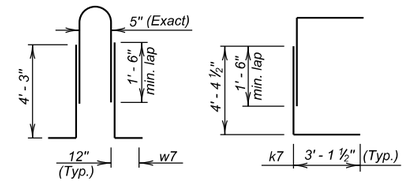
△ *Place z1 bars thru construction joint between barrel sections as shown on Standard Plate No. 460.10. Quantity of z1 bars are for three construction joints.*

REINFORCING SCHEDULE

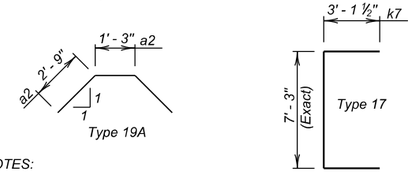
(For 3 - F7 Barrel Interior Section @ 60' - 0")

Mk.	No.	Size	Length	Type	Bending Details
◈ a2	4	5	9' - 0"	19A	
h7	414	4	7' - 9"	17A	
j7	432	5	20' - 9"	Str.	
k7	618	4	13' - 6"	17	
m7	360	5	22' - 6"	Str.	
n7	360	5	21' - 6"	Str.	
p1	333	4	59' - 9"	Str.	
s7	426	5	5' - 3"	Str.	
w7	216	4	16' - 6"	S11A	
△ z1	156	5	3' - 6"	Str.	





Contractor may use optional reinforcing steel splices, as shown. The cost of the additional reinforcing steel will be borne by the Contractor.

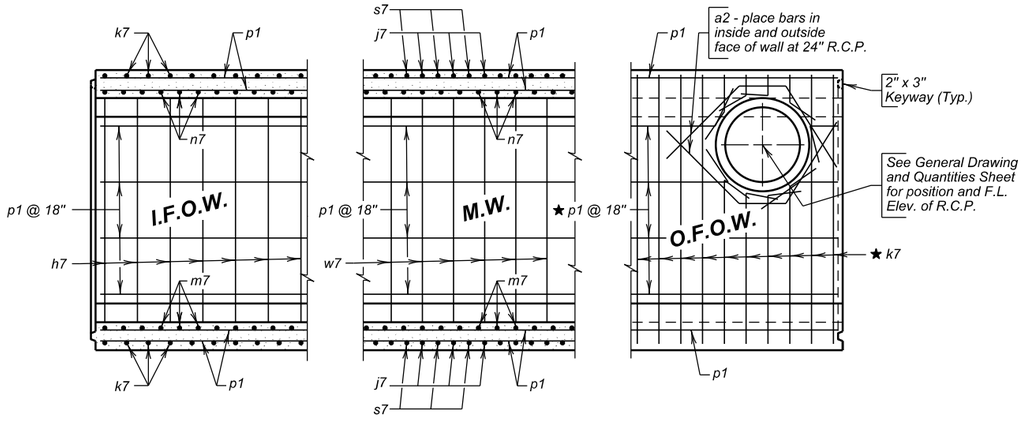


NOTES:

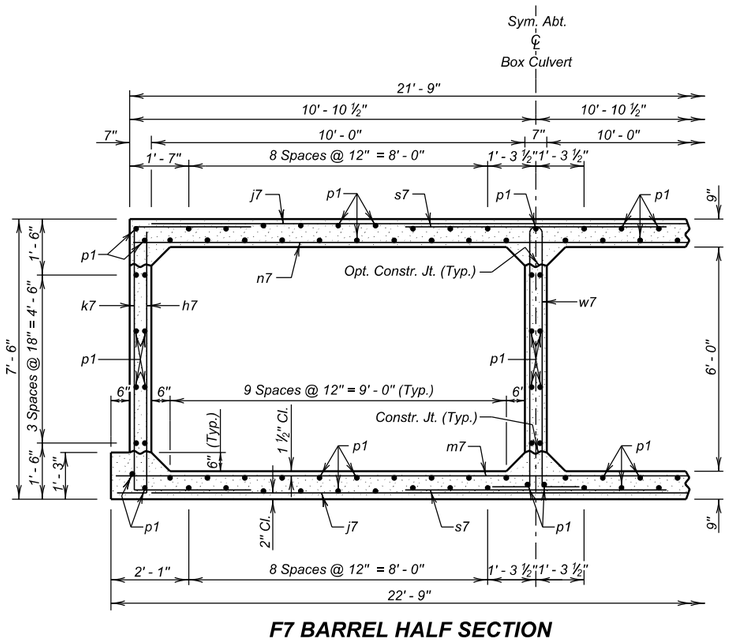
All dimensions are out to out of bars.

Request for additional reinforcing steel splices at points other than those shown, must be submitted to the Engineer for prior approval. If additional splices are approved, no payment will be allowed for the added quantity of reinforcing steel.

★ *NOTE:*
Cut and bend h7, k7, and p1 bars as required to place 24" R.C.P. thru barrel wall.



ELEVATION



F7 BARREL HALF SECTION

(7' - 0" Maximum Fill)

ESTIMATED QUANTITIES

ITEM	Class A45 Concrete, Box Culvert	Reinforcing Steel	Structure Excavation, Box Culvert
UNIT	Cu.Yd.	Lb.	Cu.Yd.
3 - F7 Barrel Interior Section @ 60' - 0"	302.5	52199	113.8

LEGEND FOR PLACING RE-STEEL

T.T.S. - Top of Top Slab
B.T.S. - Bottom of Top Slab
T.B.S. - Top of Bottom Slab
B.B.S. - Bottom of Bottom Slab
O.F.O.W. - Outside Face of Outside Wall
I.F.O.W. - Inside Face of Outside Wall
M.W. - Middle Wall

F7 BARREL INTERIOR SECTION DETAILS (60' - 0")

FOR

2 - 10' X 6' BOX CULVERT

OVER PRIEST CANYON CREEK
STA. 1033 + 48.00 (EBL)
STR. NO. 47-092-556

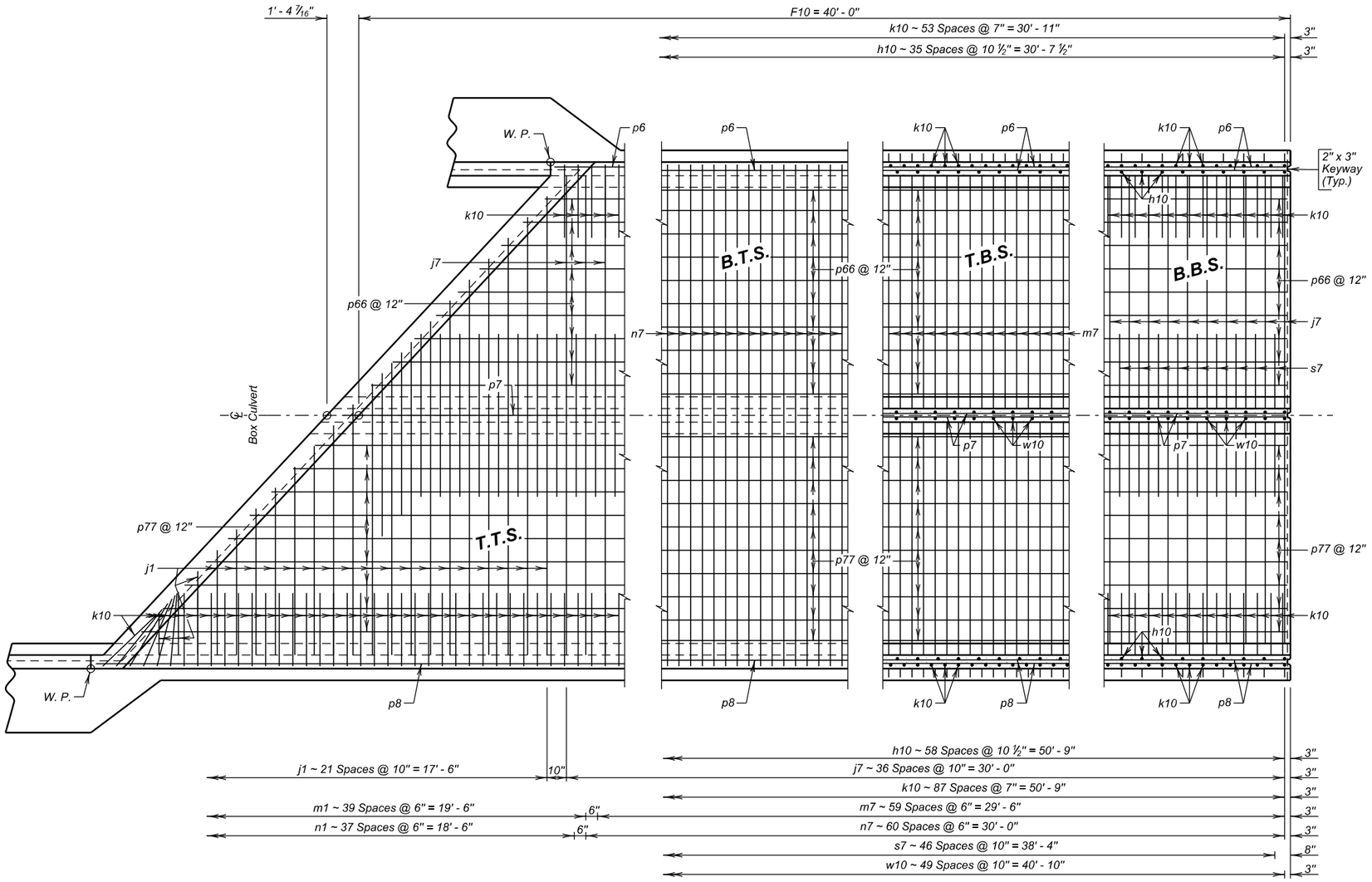
43° RHF SKEW
SEC. 10-T3N-R6E
IM-CR-EM 0901(187)44
HL-93

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
SEPTEMBER 2022

8 OF 14

DESIGNED BY	CK. DES. BY	DRAFTED BY	
AU MEAD034J	JU 034JGB08	BT	Steve A Johnson BRIDGE ENGINEER

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E25	E185



PLAN

LEGEND FOR PLACING RE-STEEL
T. T. S. - Top of Top Slab
B. T. S. - Bottom of Top Slab
T. B. S. - Top of Bottom Slab
B. B. S. - Bottom of Bottom Slab

F10 BARREL END SECTION DETAILS (40' - 0") (A)

FOR

2 - 10' X 6' BOX CULVERT

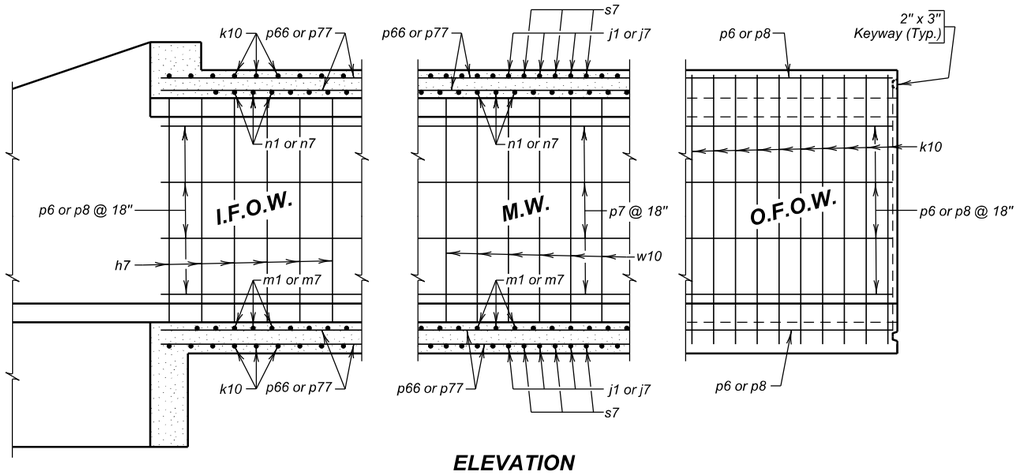
OVER PRIEST CANYON CREEK — 43° RHF SKEW
STA. 1033 + 48.00 (EBL) — SEC. 10-T3N-R6E
STR. NO. 47-092-556 — IM-CR-EM 0901(187)44
HL-93

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
SEPTEMBER 2022

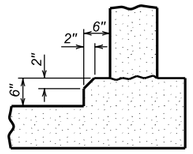
9 OF 14

DESIGNED BY	CK. DES. BY	DRAFTED BY	
AU	JU	BT	Steve A Johnson BRIDGE ENGINEER
MEAD034J	034JGB09		

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E26	E185



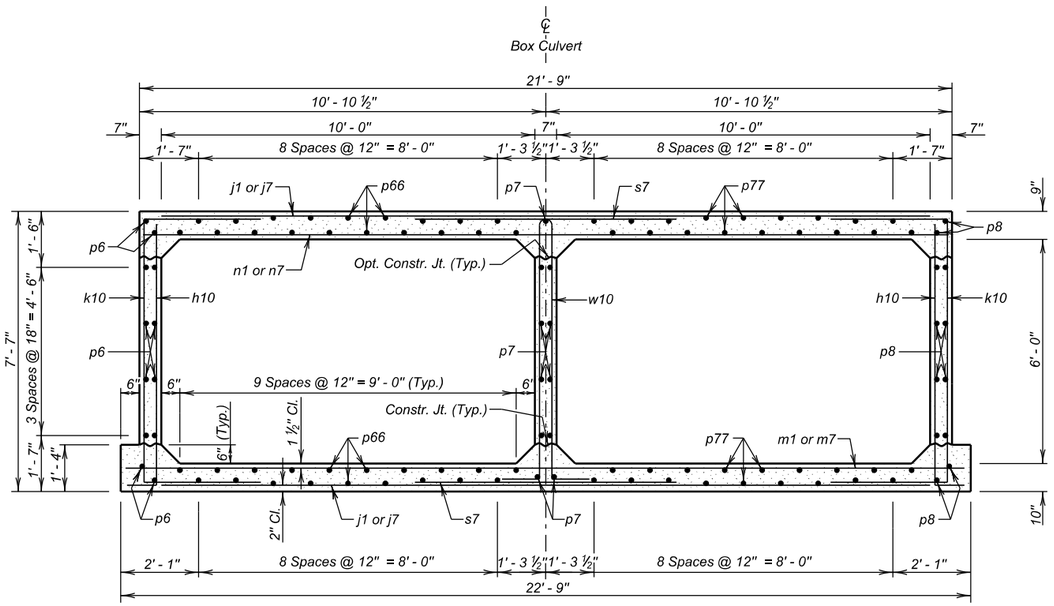
ELEVATION



OPTIONAL FILLET DETAIL

(At Bottom Slab)

NOTE: *Contractor may form the optional full fillet, with 2" Chamfer, as detailed. The cost of the additional concrete will be borne by the Contractor.*



F10 BARREL SECTION

(10' - 0" Maximum Fill)

ESTIMATED QUANTITIES

ITEM	*Class A45 Concrete, Box Culvert*	*Reinforcing Steel*	*Structure Excavation, Box Culvert*
UNIT	*Cu.Yd.*	*Lb.*	*Cu.Yd.*
1 - F10 Barrel End Section @ 40' - 0"	*70.0*	*11695*	*28.1*

LEGEND FOR PLACING RE-STEEL

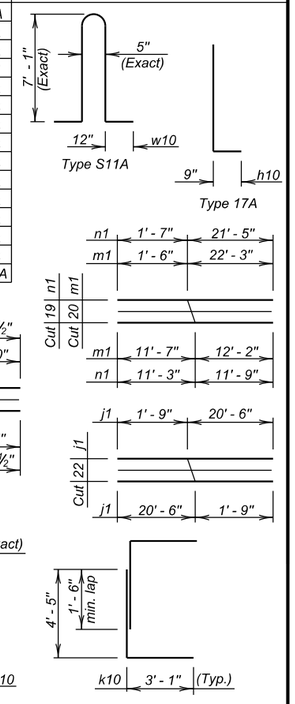
O. F. O. W. - Outside Face of Outside Wall
I. F. O. W. - Inside Face of Outside Wall
M. W. - Middle Walls

REINFORCING SCHEDULE

(For 1 - F10 Barrel End Section @ 40' - 0")

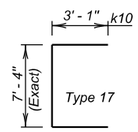
	Mk.	*No.*	*Size*	*Length*	*Type*
	h10	*95*	*4*	*7' - 9"*	*17A*
℄	*j1*	*22*	*5*	*21' - 3"*	*Str.*
	j7	*74*	*5*	*20' - 9"*	*Str.*
	k10	*142*	*4*	*13' - 6"*	*17*
℄	*m1*	*20*	*5*	*23' - 9"*	*Str.*
	m7	*60*	*5*	*22' - 6"*	*Str.*
℄	*n1*	*19*	*5*	*23' - 0"*	*Str.*
	n7	*61*	*5*	*21' - 6"*	*Str.*
	p6	*12*	*4*	*31' - 0"*	*Str.*
	p7	*11*	*4*	*41' - 0"*	*Str.*
	p8	*12*	*4*	*51' - 0"*	*Str.*
℄	*p66*	*19*	*4*	*71' - 3"*	*Str.*
℄	*p77*	*19*	*4*	*90' - 0"*	*Str.*
	s7	*94*	*5*	*5' - 3"*	*Str.*
	w10	*50*	*4*	*16' - 6"*	*S11A*

Bending Details



OPTIONAL w10 SPLICE DETAIL *OPTIONAL k10 SPLICE DETAIL*

Contractor may use optional reinforcing steel splices, as shown. The cost of the additional reinforcing steel will be borne by the Contractor.



NOTES:

All dimensions are out to out of bars.

℄ *See cutting diagram.*

Request for additional reinforcing steel splices at points other than those shown, must be submitted to the Engineer for prior approval. If additional splices are approved, no payment will be allowed for the added quantity of reinforcing steel.

F10 BARREL END SECTION DETAILS (40' - 0") (B)

FOR

2 - 10' X 6' BOX CULVERT

OVER PRIEST CANYON CREEK — 43° RHF SKEW

STA. 1033 + 48.00 (EBL) — SEC. 10-T3N-R6E

STR. NO. 47-092-556 — IM-CR-EM 0901(187)44

HL-93

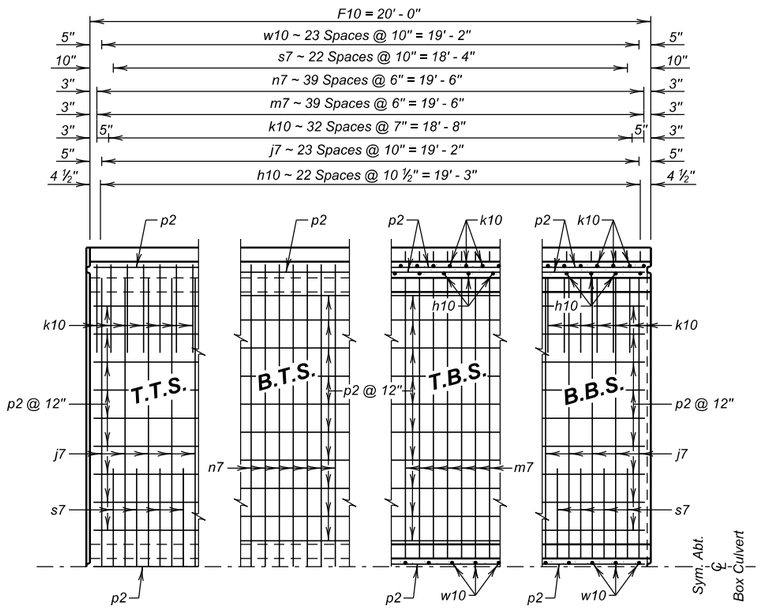
MEADE COUNTY

S. D. DEPT. OF TRANSPORTATION

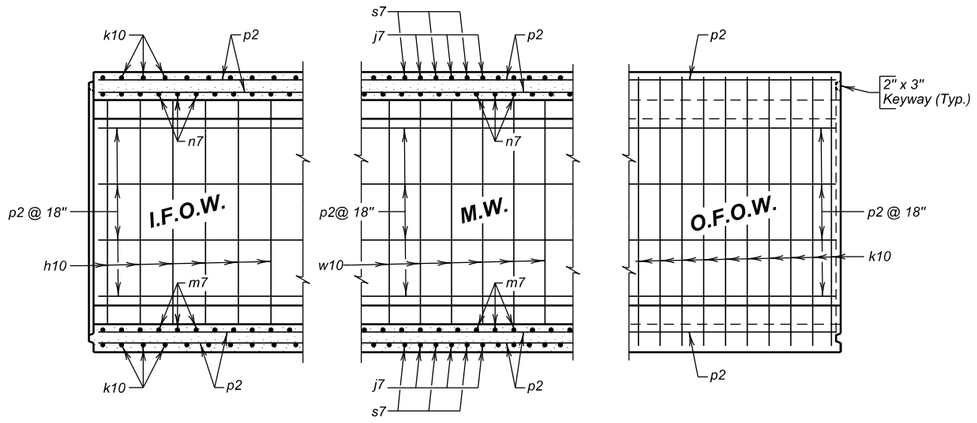
SEPTEMBER 2022

DESIGNED BY	CK. DES. BY	DRAFTED BY	
AU	JU	BT	Steve A Johnson BRIDGE ENGINEER
MEAD034J	034JGB10		

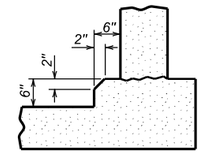
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E27	E185



HALF PLAN



ELEVATION

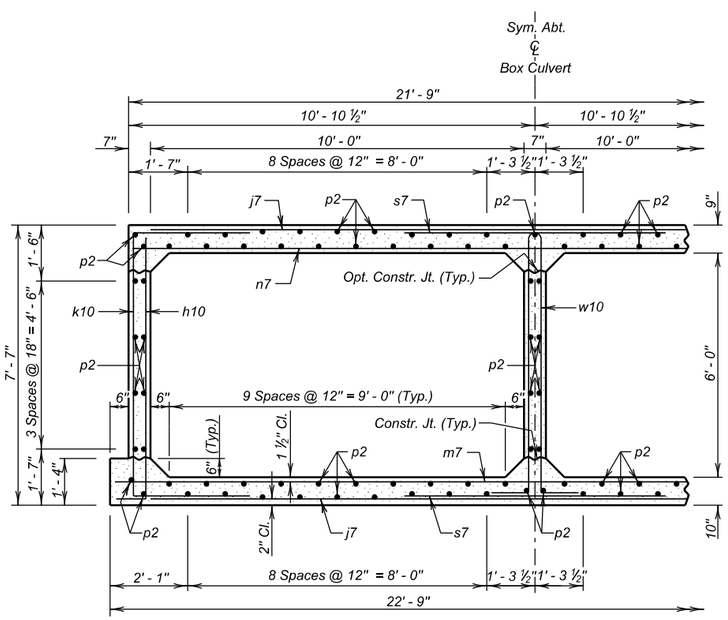


OPTIONAL FILLET DETAIL

(At Bottom Slab)

NOTE:
Contractor may form the optional full fillet, with 2" Chamfer, as detailed. The cost of the additional concrete will be borne by the Contractor.

△ *Place z1 bars thru construction joint between barrel sections as shown on Standard Plate No. 460.10. Quantity of z1 bars are for one construction joint.*



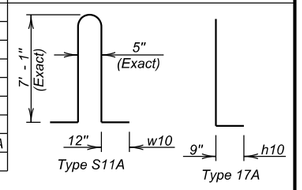
F10 BARREL HALF SECTION

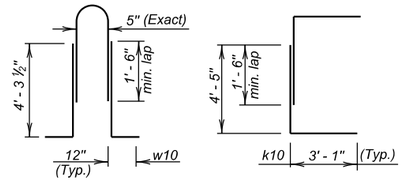
(10' - 0" Maximum Fill)

REINFORCING SCHEDULE

(For 1 - F10 Barrel Interior Section @ 20' - 0")

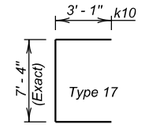
Mk.	No.	Size	Length	Type	Bending Details
h10	46	4	7' - 9"	17A	
j7	48	5	20' - 9"	Str.	
k10	70	4	13' - 6"	17	
m7	40	5	22' - 6"	Str.	
n7	40	5	21' - 6"	Str.	
p2	111	4	19' - 9"	Str.	
s7	46	5	5' - 3"	Str.	
w10	24	4	16' - 6"	S11A	
△ z1	52	5	3' - 6"	Str.	





OPTIONAL w10 SPLICE DETAIL OPTIONAL k10 SPLICE DETAIL

Contractor may use optional reinforcing steel splices, as shown. The cost of the additional reinforcing steel will be borne by the Contractor.



NOTES:

All dimensions are out to out of bars.

Request for additional reinforcing steel splices at points other than those shown, must be submitted to the Engineer for prior approval. If additional splices are approved, no payment will be allowed for the added quantity of reinforcing steel.

ESTIMATED QUANTITIES

ITEM	Class A45 Concrete, Box Culvert	Reinforcing Steel	Structure Excavation, Box Culvert
UNIT	Cu.Yd.	Lb.	Cu.Yd.
1 - F10 Barrel Interior Section @ 20' - 0"	35.0	5915	14.0

LEGEND FOR PLACING RE-STEEL

T.T.S. - Top of Top Slab
B.T.S. - Bottom of Top Slab
T.B.S. - Top of Bottom Slab
B.B.S. - Bottom of Bottom Slab
O.F.O.W. - Outside Face of Outside Wall
I.F.O.W. - Inside Face of Outside Wall
M.W. - Middle Wall

F10 BARREL INTERIOR SECTION DETAILS (20' - 0")

FOR

2 - 10' X 6' BOX CULVERT

OVER PRIEST CANYON CREEK — 43° RHF SKEW
STA. 1033 + 48.00 (EBL) — SEC. 10-T3N-R6E
STR. NO. 47-092-556 — IM-CR-EM 0901(187)44
HL-93

MEADE COUNTY

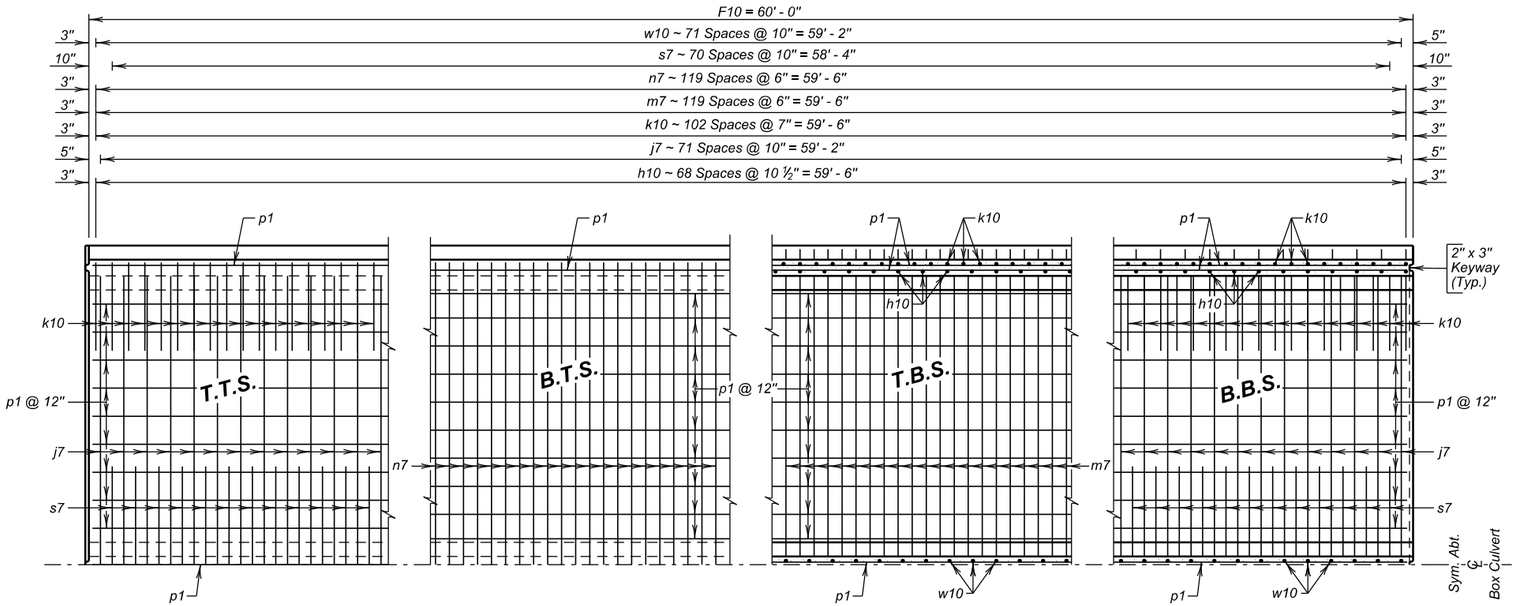
S. D. DEPT. OF TRANSPORTATION

SEPTEMBER 2022

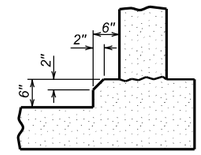
11 OF 14

DESIGNED BY	CK. DES. BY	DRAFTED BY	
AU	JU	BT	Steve A Johnson BRIDGE ENGINEER
MEAD034J	034JGB11		

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E28	E185



HALF PLAN



OPTIONAL FILLET DETAIL

(At Bottom Slab)

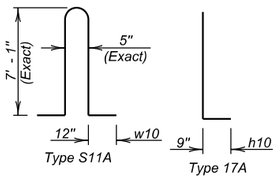
NOTE:
Contractor may form the optional full fillet, with 2" Chamfer, as detailed. The cost of the additional concrete will be borne by the Contractor.

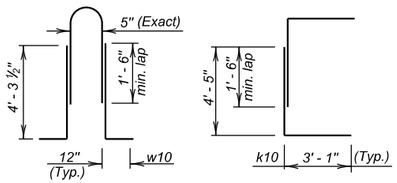
△ *Place z1 bars thru construction joint between barrel sections as shown on Standard Plate No. 460.10. Quantity of z1 bars are for one construction joint.*

REINFORCING SCHEDULE

(For 1 - F10 Barrel Interior Section @ 60' - 0")

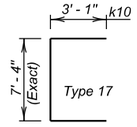
Mk.	No.	Size	Length	Type	Bending Details
h10	138	4	7' - 9"	17A	
j7	144	5	20' - 9"	Str.	
k10	206	4	13' - 6"	17	
m7	120	5	22' - 6"	Str.	
n7	120	5	21' - 6"	Str.	
p1	111	4	59' - 9"	Str.	
s7	142	5	5' - 3"	Str.	
w10	72	4	16' - 6"	S11A	
△ z1	52	5	3' - 6"	Str.	





OPTIONAL w10 SPLICE DETAIL OPTIONAL k10 SPLICE DETAIL

Contractor may use optional reinforcing steel splices, as shown. The cost of the additional reinforcing steel will be borne by the Contractor.



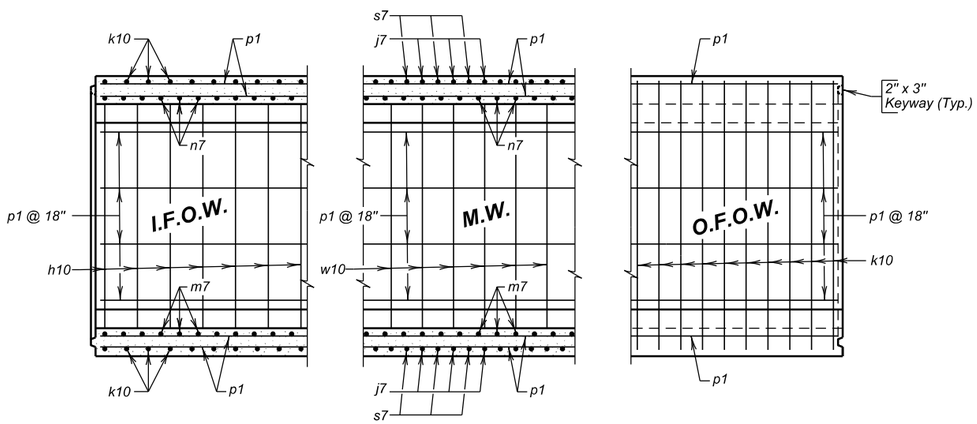
NOTES:
All dimensions are out to out of bars.
Request for additional reinforcing steel splices at points other than those shown, must be submitted to the Engineer for prior approval. If additional splices are approved, no payment will be allowed for the added quantity of reinforcing steel.

ESTIMATED QUANTITIES

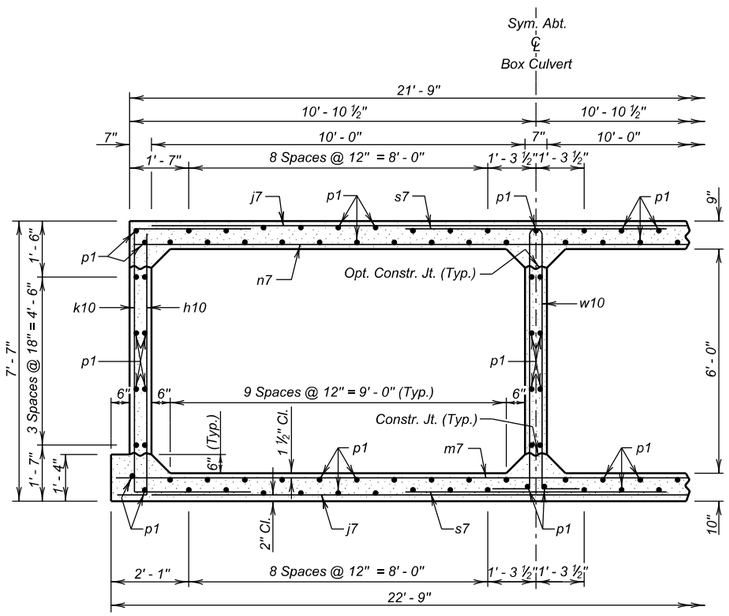
ITEM	Class A45 Concrete, Box Culvert	Reinforcing Steel	Structure Excavation, Box Culvert
UNIT	Cu.Yd.	Lb.	Cu.Yd.
1 - F10 Barrel Interior Section @ 60' - 0"	105.0	17387	42.1

LEGEND FOR PLACING RE-STEEL

T.T.S. - Top of Top Slab
B.T.S. - Bottom of Top Slab
T.B.S. - Top of Bottom Slab
B.B.S. - Bottom of Bottom Slab
O.F.O.W. - Outside Face of Outside Wall
I.F.O.W. - Inside Face of Outside Wall
M.W. - Middle Wall



ELEVATION



F10 BARREL HALF SECTION

(10' - 0" Maximum Fill)

F10 BARREL INTERIOR SECTION DETAILS (60' - 0")

FOR

2 - 10' X 6' BOX CULVERT

OVER PRIEST CANYON CREEK
STA. 1033 + 48.00 (EBL)
STR. NO. 47-092-556

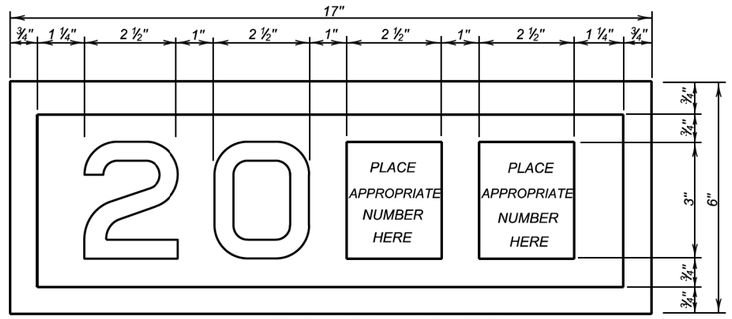
43° RHF SKEW
SEC. 10-T3N-R6E
IM-CR-EM 0901(187)44
HL-93

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
SEPTEMBER 2022

12 OF 14

DESIGNED BY	CK. DES. BY	DRAFTED BY	
AU	JU	BT	Steve A Johnson BRIDGE ENGINEER
MEAD034J	034JGB12		

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E29	E185



YEAR PLATE DETAILS

GENERAL NOTES:

1. Year plates of the general dimensions shown will be constructed on all box culverts and bridges. The year plates will be constructed in reverse and attached to the forms in such a manner that the finished imprint in the concrete does not exceed one-half (1/2) inch in depth.

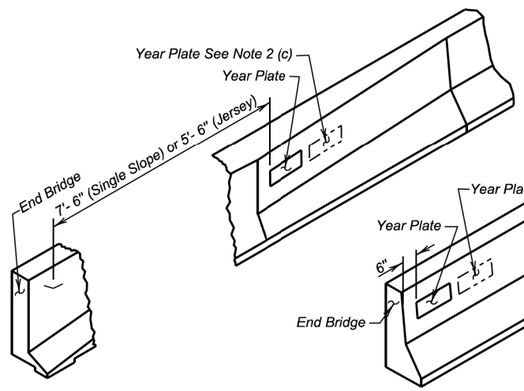
2. Year plates will be located on structure(s) as follows:

   a. On cast-in-place box culverts the year plates will be four and one - half (4 ½) inches below the top of the upstream parapet wall and centered laterally on the upstream face. On precast box culverts the year plate will be centered laterally on the upstream face of the top slab. Where an extended interior wall interferes with this location, the year plate will be centered in an adjacent barrel.

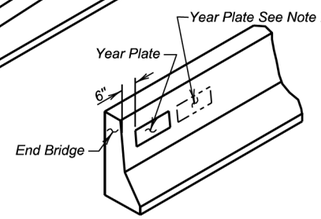
   b. On bridges with six (6) inch curbs, "Jersey" shaped barriers with no endblocks, or "Single Slope" shaped barriers with no endblocks, the year plate will be centered vertically on the curb face approximately six (6) inches from the end of the bridge, or as designated by the Engineer. On bridges with barrier endblocks, the year plate will be centered on the upper sloped portion of the barrier approximately 5'- 6" for "Jersey" shaped barriers from the end of the bridge and 7'-6" for "Single Slope" shaped barriers from the end of bridge, or as designated by the Engineer. There will be one year plate at each end of the bridge on opposite sides.

   c. When the plans specify that both the original date of construction and the date of reconstruction are to be shown, one date will be placed as listed above and the other located adjacent to it. Both year plates will be shown at each end of the bridge on opposite sides.

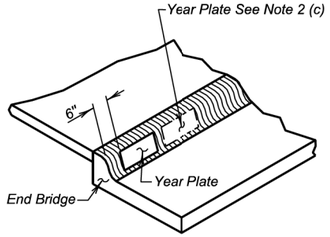
3. There will be no separate measurement or payment made for year plates on box culverts and bridges. All costs for this work will be incidental to other contract items.



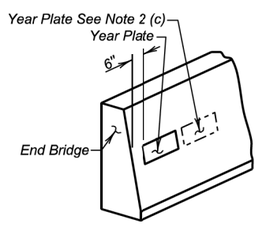
BARRIER
(With Endblock)



JERSEY BARRIER



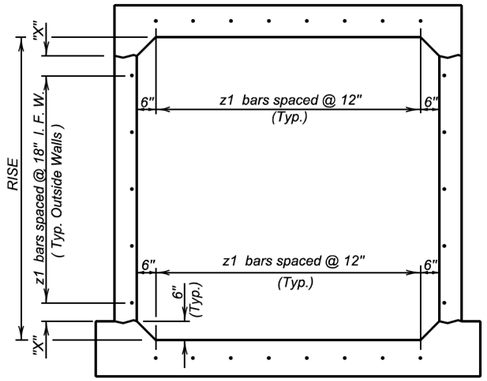
TYPE B CURB



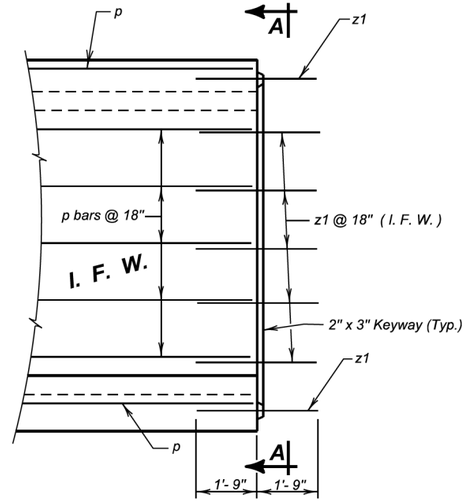
SINGLE SLOPE BARRIER

January 22,2021

Published Date: 2026	SDDOT	YEAR PLATE DETAILS	PLATE NUMBER 460.02
			Sheet 1 Of 1



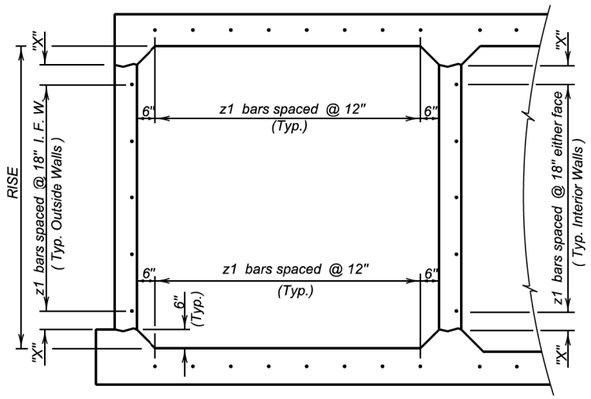
TYPICAL SINGLE BARREL VIEW A - A



ELEVATION

LEGEND FOR PLACING RE-STEEL
I. F. W. - Inside Face Wall

RISE	"X"
3'- 0"	3"
4'- 0"	9"
5'- 0"	6"
6'- 0"	3"
7'- 0"	9"
8'- 0"	6"
9'- 0"	3"
10'- 0"	9"
11'- 0"	6"
12'- 0"	3"
13'- 0"	9"
14'- 0"	6"



TYPICAL MULTIPLE BARREL VIEW A - A

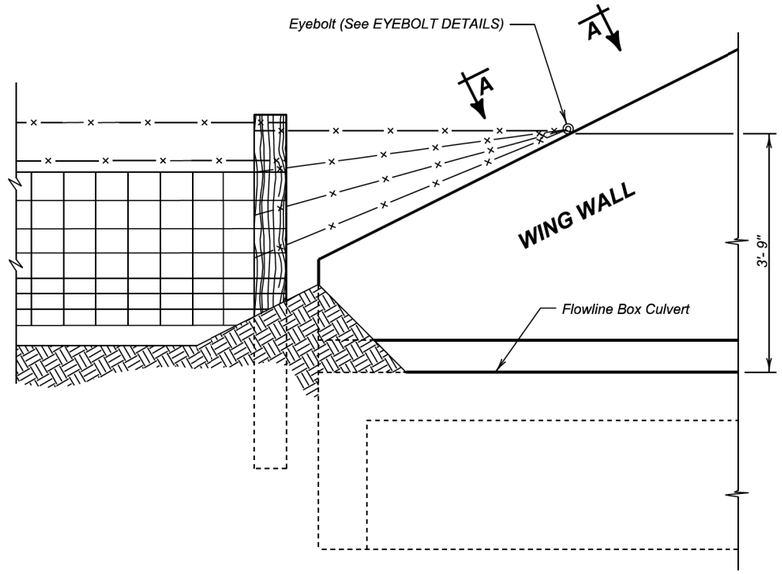
GENERAL NOTES:

1. z1 bars will be placed in the middle of the 2" X 3" keyway in the top and bottom slabs. z1 bars will be lapped with the longitudinal p bars in the inside face of the wall for outside walls and in either face for interior walls. z1 bars are listed and included elsewhere in plans.

2. Drainage Fabric Protection will be placed in accordance with Section 422, or Section 560, whichever is applicable.

June 1, 2022

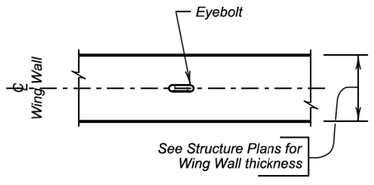
Published Date: 2026	SDDOT	BOX CULVERT BARREL TIE REINFORCEMENT	PLATE NUMBER 460.10
			Sheet 1 of 1



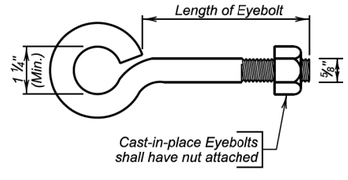
DETAIL FOR FENCE ANCHORS

GENERAL NOTES:

1. The fence and post details shown are for illustrative purpose only. The fence shall be as specified elsewhere in the plans.
2. Eyebolts shall be placed on all of the box culvert wing walls.
3. Eyebolts shall be ⅝ inch diameter and shall conform to ASTM A307.
4. Eyebolts, nuts, and concrete inserts shall be galvanized in accordance with AASHTO M232 (ASTM A153). Concrete inserts of corrosion resistant material need not be galvanized.
5. Cast-in-place eyebolts shall have a nut attached, be 4 ½ inches (Min.) in length and shall be embedded such that the eye of the bolt is flush with the concrete surface. (See Eyebolt Details) As an alternate, cast-in-place concrete inserts, capable of developing the full strength of the ⅝ inch diameter threaded eyebolt, may be used and shall be set in the concrete in accordance with the manufacturer's recommendations. The eyebolt shall be of sufficient length to develop its full strength. The eye of the eyebolt shall be flush with the concrete surface.
6. The cost for furnishing and installing eyebolts and/or concrete inserts shall be incidental to various contract items.



VIEW A - A



EYEBOLT DETAILS

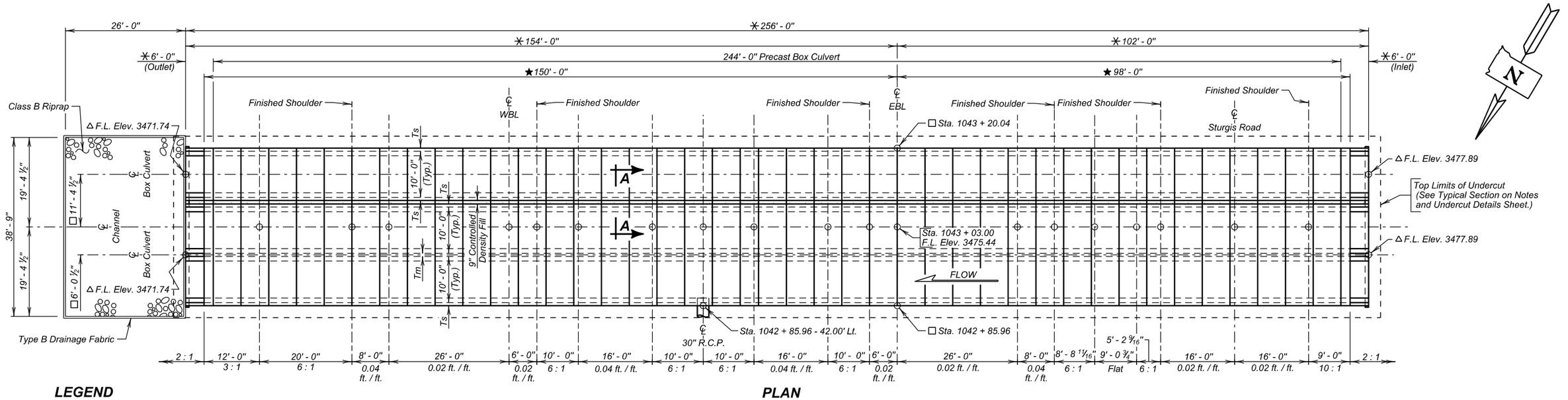
December 23,2012

Published Date: 2026	SDDOT	FENCE ANCHORS FOR BOX CULVERT WING WALLS	PLATE NUMBER 620.16 Sheet 1 of 1

The elevations shown in these plans are based on the National Geodetic Survey (NGS) North American Vertical Datum of 1988 (NAVD88).

⚹ Dimension may vary with installation and/or fabrication. See Shop Plans for actual installation length.
★ Minimum distance to satisfy fill slope.
△ Based on dimensions shown.
☐ Based on Ts = 8" and Tm = 8".

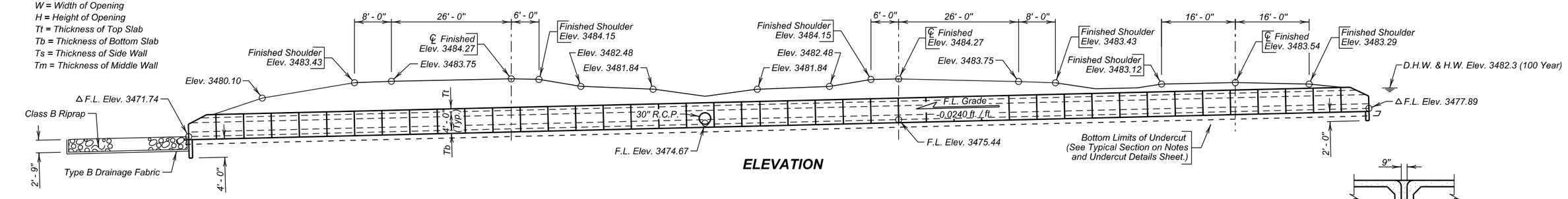
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E31	E185



PLAN

LEGEND

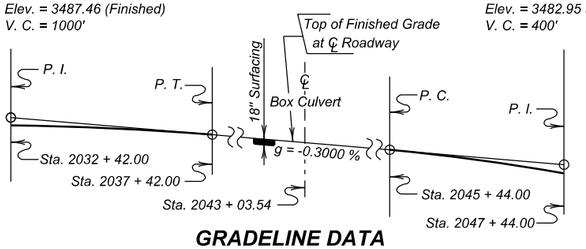
W = Width of Opening
H = Height of Opening
Tt = Thickness of Top Slab
Tb = Thickness of Bottom Slab
Ts = Thickness of Side Wall
Tm = Thickness of Middle Wall



ELEVATION

P. I. Sta. 2032 + 42.00
Elev. = 3487.46 (Finished)
V. C. = 1000'

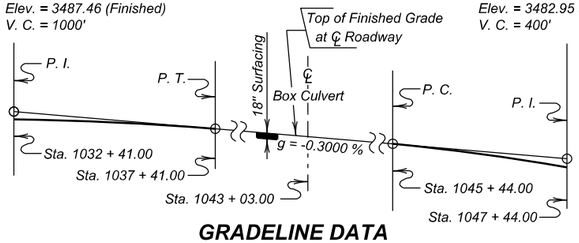
P. I. Sta. 2047 + 44.00
Elev. = 3482.95 (Finished)
V. C. = 400'



GRADELINE DATA
(Westbound Lanes)

P. I. Sta. 1032 + 41.00
Elev. = 3487.46 (Finished)
V. C. = 1000'

P. I. Sta. 1047 + 44.00
Elev. = 3482.95 (Finished)
V. C. = 400'



GRADELINE DATA
(Eastbound Lanes)

-X028-

INDEX OF CULVERT SHEETS-

Sheet No. 1 - General Drawing and Quantities
Sheet No. 2 - Notes and Undercut Details
Sheet No. 3 - Details of Standard Plate No.'s 460.02 & 560.01
Sheet No. 4 - Details of Standard Plate No.'s 560.10 & 560.11
Sheet No. 5 - Details of Standard Plate No.'s 560.20 & 560.21
Sheet No. 6 - Details of Standard Plate No. 620.16

ESTIMATED QUANTITIES

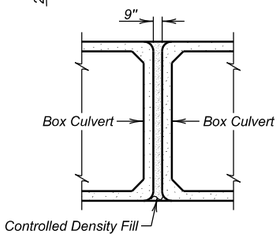
	ITEM	UNIT	QUANTITY
∉	Structure Excavation, Box Culvert	Cu. Yd.	248
	Box Culvert Undercut	Cu. Yd.	374
	Controlled Density Fill	Cu. Yd.	44.8
≠	Class B Riprap	Ton	143.7
	Type B Drainage Fabric	Sq. Yd.	152
	10' X 4' Precast Concrete Culvert, Furnish	Ft.	244
	10' X 4' Precast Concrete Culvert, Install	Ft.	244
	10' X 4' Precast Concrete Culvert End Section, Furnish	Each	2
	10' X 4' Precast Concrete Culvert End Section, Install	Each	2
	2 - 10' X 4' Precast Concrete Culvert, Furnish	Ft.	244
	2 - 10' X 4' Precast Concrete Culvert, Install	Ft.	244
	2 - 10' X 4' Precast Concrete Culvert End Section, Furnish	Each	2
	2 - 10' X 4' Precast Concrete Culvert End Section, Install	Each	2

∉ Quantity is based on 9" bottom slab and 8" outside walls.
≠ For estimating purposes only, a factor of 1.4 tons/cu. yd. was used to convert Cu. Yd. to Tons.

HYDRAULIC DATA

Q_d	1140 cfs
A_d	90 sq ft
V_d	12.7 fps
Q_F	1140 cfs
Q_{100}	1140 cfs
Q_{OT}	2877 cfs
V_{max}	12.7 fps

Q_d = Design discharge for the proposed culvert based on 100 year frequency. El. 3482.3.
Q_{OT} = Overtopping discharge and frequency > Q_{522} year recurrence interval. El. 3483.5 @ Sta. 625 + 00.00.
Q_F = Designated peak discharge for the basin approaching proposed project based on 100 year frequency.
Q_{100} = Computed discharge for the basin approaching proposed project based on 100 year frequency. El. 3482.3.
V_{max} = Maximum computed outlet velocity for the proposed culvert, based on 100 year frequency.



SECTION A - A

PLANS BY :
OFFICE OF BRIDGE DESIGN, SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION

GENERAL DRAWING AND QUANTITIES

FOR

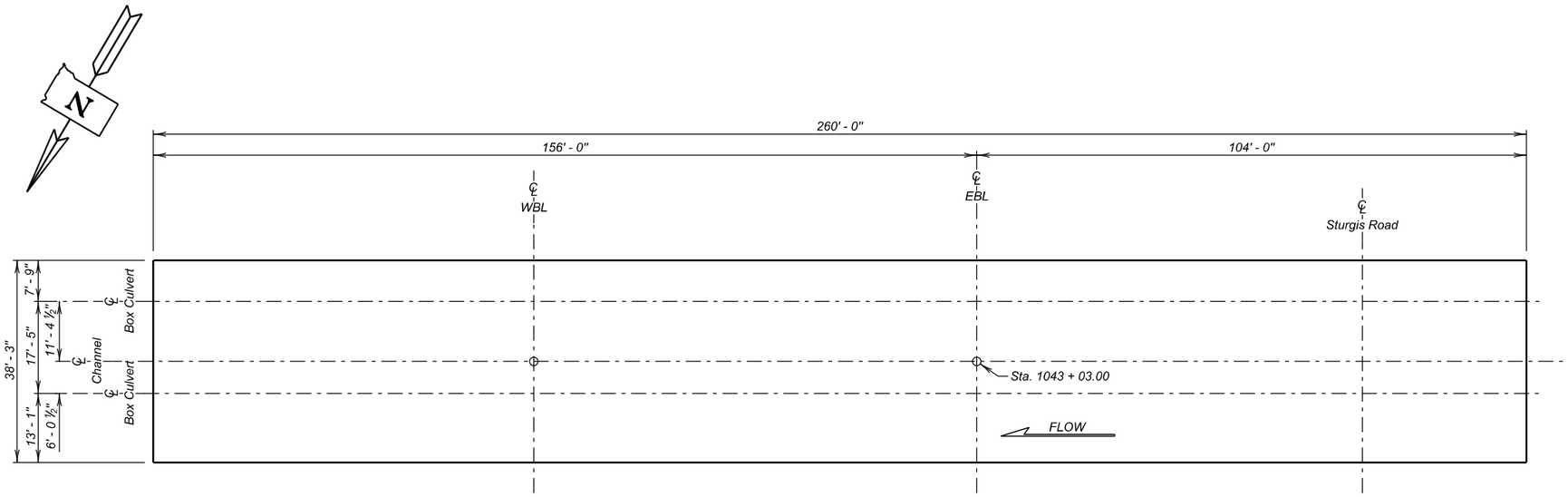
3 - 10' X 4' BOX CULVERT (PRECAST)

OVER TRIB. TO PRIEST CANYON CREEK — 0° SKEW
STA. 1043 + 03.00 (EBL) — SEC. 10-T3N-R6E
STR. NO. 47-093-557 — IM-CR-EM 0901(187)44
PCN 034J — HL-93

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
SEPTEMBER 2022

-X028-

DESIGNED BY	CK. DES. BY	DRAFTED BY	
AU	BB	BT	Steve A Johnson BRIDGE ENGINEER
MEAD034J	034JGC01		

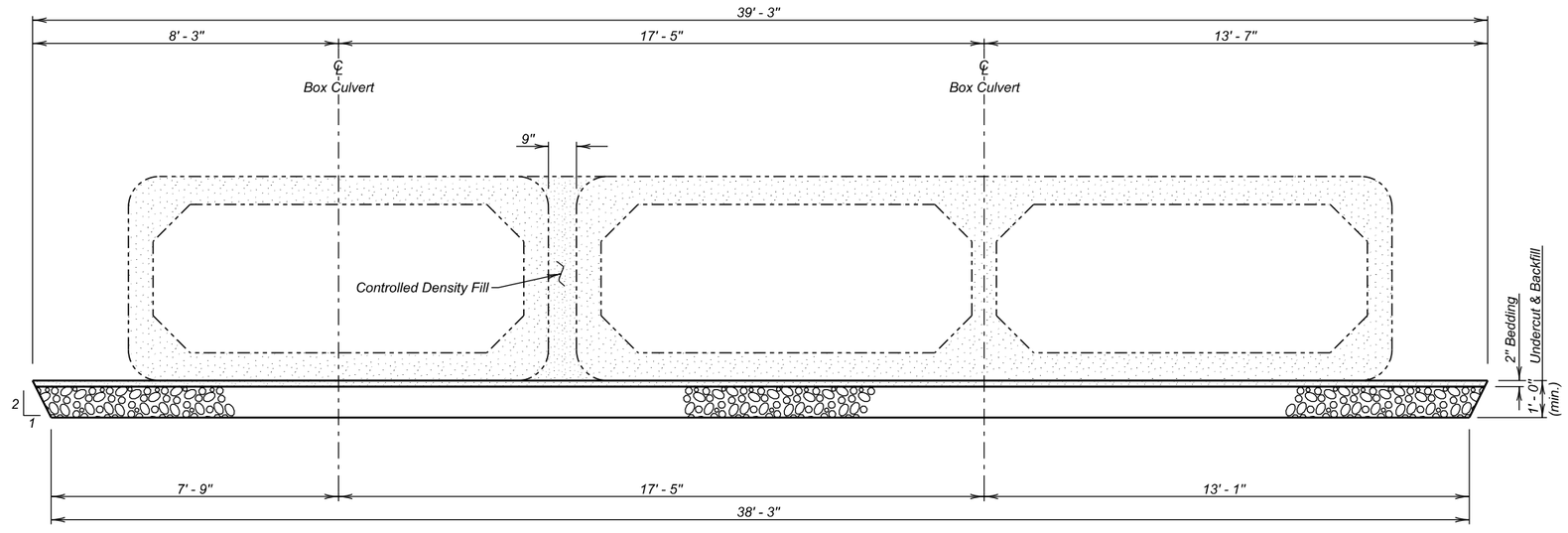


UNDERCUT LAYOUT
(Bottom Dimensions)

ESTIMATED QUANTITIES

	ITEM	UNIT	QUANTITY
⌀	Box Culvert Undercut	Cu. Yd.	374

⌀ For payment, quantity is based on plan shown undercut dimensions and will not be measured unless the Engineer orders a change.



TYPICAL SECTION
(For Limits of Undercut)

SPECIFICATIONS

Use South Dakota Standard Specifications for Roads and Bridges, 10-1-25 Version, Required Provisions, and Special Provisions as included in the Proposal. The Standard Specifications for Roads and Bridges are available for download and viewing at: https://dot.sd.gov/doing-business/contractors/standard-specifications.

GENERAL NOTES

Design will be in accordance with Section 560 of the Specifications with the following criteria:

1. *Box culvert and box culvert end section design will conform to the AASHTO LRFD Bridge Design Specifications, 9th Edition.*
2. *Design Live Load: HL-93 and construction loading consisting of one 7' - 6" gage axle with gross weight = 95,850 lbs. The construction load shall not be applied until a minimum of 4 feet of fill has been placed over the box culvert. If other construction loads in excess of legal load are anticipated by the Contractor, the Contractor will submit a design analysis for the anticipated construction loading, through the proper channels, to the Office of Bridge Design for approval.*
3. *The box culvert will be load rated in accordance with the AASHTO Manual for Bridge Evaluation, 2018 Edition with latest Interim Revisions using the LRFR method. The rating will include evaluation of the Design HL-93 truck at both Inventory and Operating levels and a Legal Load rating for the three SD legal trucks (Type 3, 3S2, and 3-2) as well as the notional rating load and four specialized hauling vehicles. The structure will also be evaluated for the emergency vehicles, EV2 and EV3, at the legal load rating level. All sections of the box culvert will rate at HL-93 or better (Inventory Level). The three SD Legal Loads, the notional rating load, the four specialized hauling vehicles, and two emergency vehicles will rate greater than 1.0 at legal load rating level. AASHTOWare Bridge Rating (BrR) is required to be used to rate the box culvert. Include the BrR rating model and a load rating summary table with load rating calculations. Submit load rating calculations with the design and independent check design calculations or shop plans, as appropriate.*
4. *The design of the barrel sections will be based on a minimum fill height of 2 foot and include all subsequent fill heights up to and including the maximum fill height of 7 ft. over the box culvert.*
5. *Minimum inside corner fillet will be 6 in.*
6. *Minimum precast barrel section length will be 6 - foot; however, no more than two 4-foot sections are allowed in any one length of precast barrel.*
7. *Lift holes will be plugged with an approved nonshrinkable grout.*
8. *The fabricator will imprint on the structure the date of construction as specified and detailed on Standard Plate 460.02.*
9. *Alternate end section details will be allowed, subject to the approval of the Bridge Construction Engineer. No additional payment will be made for any change in the barrel/end section configuration.*
10. *Installation of the precast sections will be in accordance with the final approved shop plans.*
11. *Care will be taken when placing sections. Sections will be only moved using the lifting holes by approved equipment.*
12. *Soils below the bottom of the proposed RCBC consist of red sandy silt with gravel and gypsum streaks. Groundwater was encountered in the borings at an elevation of 3467.3 during the subsurface investigation conducted in October to November 2021.*

DESIGN MIX OF CONCRETE

1. *Mix will be as per fabricator's design, however minimum compressive strength will not be less than 4500 p.s.i. at 28 days.*
2. *Type II cement is required.*

SHOP PLANS

The fabricator will submit shop plans in accordance with the Construction Specifications. Include design and independent check design, if applicable, with initial submittal.

NOTES AND UNDERCUT DETAILS

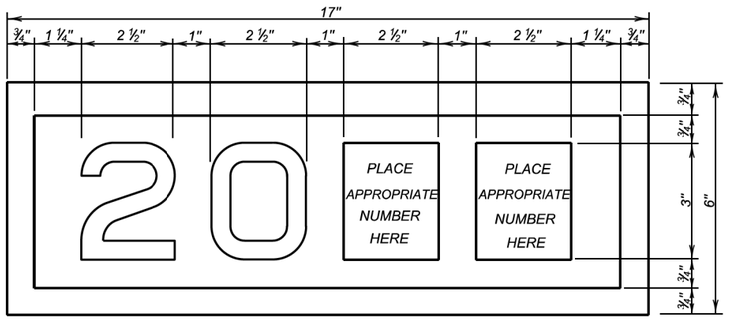
FOR

3 - 10' X 4' BOX CULVERT (PRECAST)

OVER TRIB. TO PRIEST CANYON CREEK 0° SKEW
STA. 1043 + 03.00 (EBL) SEC. 10-T3N-R6E
STR. NO. 47-093-557 IM-CR-EM 0901(187)44
HL-93

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
SEPTEMBER 2022

DESIGNED BY	CK. DES. BY	DRAFTED BY	
AU MEAD034J	BB 034JGC02	BT	Steve A Johnson BRIDGE ENGINEER



YEAR PLATE DETAILS

GENERAL NOTES:

1. Year plates of the general dimensions shown will be constructed on all box culverts and bridges. The year plates will be constructed in reverse and attached to the forms in such a manner that the finished imprint in the concrete does not exceed one-half (1/2) inch in depth.

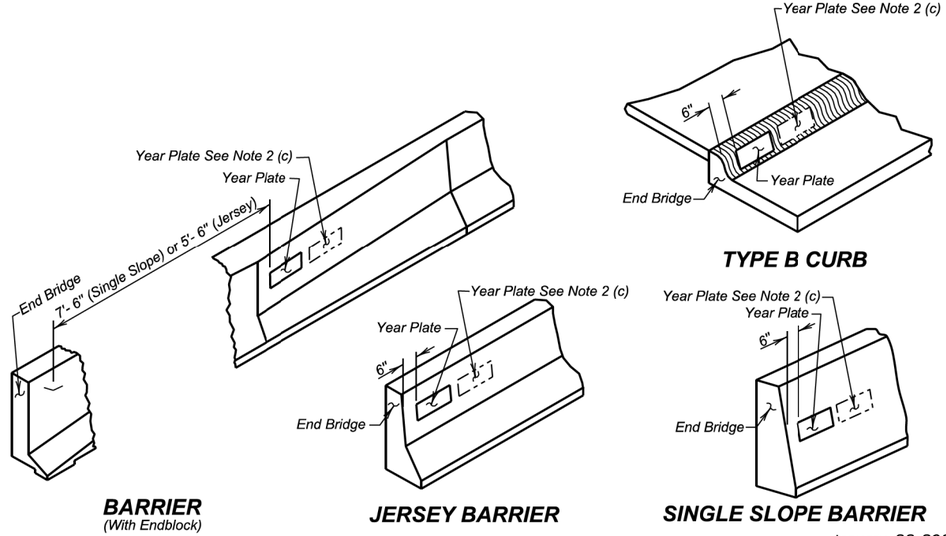
2. Year plates will be located on structure(s) as follows:

   a. On cast-in-place box culverts the year plates will be four and one - half (4 ½) inches below the top of the upstream parapet wall and centered laterally on the upstream face. On precast box culverts the year plate will be centered laterally on the upstream face of the top slab. Where an extended interior wall interferes with this location, the year plate will be centered in an adjacent barrel.

   b. On bridges with six (6) inch curbs, "Jersey" shaped barriers with no endblocks, or "Single Slope" shaped barriers with no endblocks, the year plate will be centered vertically on the curb face approximately six (6) inches from the end of the bridge, or as designated by the Engineer. On bridges with barrier endblocks, the year plate will be centered on the upper sloped portion of the barrier approximately 5'- 6" for "Jersey" shaped barriers from the end of the bridge and 7'-6" for "Single Slope" shaped barriers from the end of bridge, or as designated by the Engineer. There will be one year plate at each end of the bridge on opposite sides.

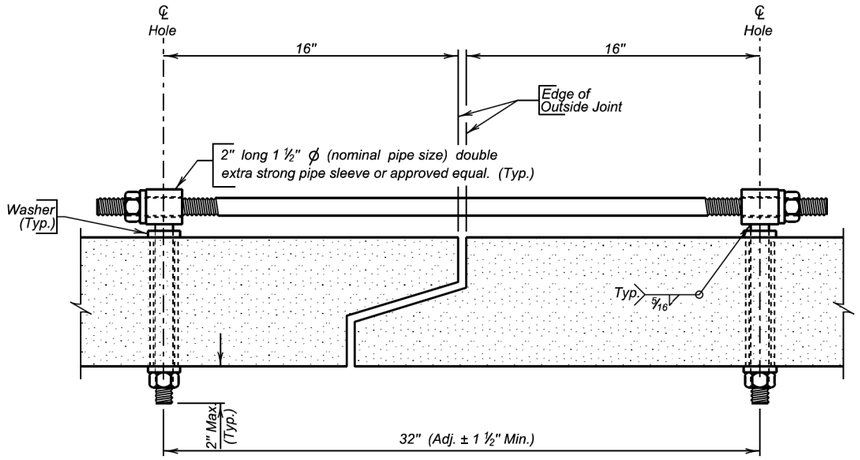
   c. When the plans specify that both the original date of construction and the date of reconstruction are to be shown, one date will be placed as listed above and the other located adjacent to it. Both year plates will be shown at each end of the bridge on opposite sides.

3. There will be no separate measurement or payment made for year plates on box culverts and bridges. All costs for this work will be incidental to other contract items.



January 22, 2021

Published Date: 2026	SDDOT	YEAR PLATE DETAILS	PLATE NUMBER 460.02
			Sheet 1 Of 1



TIE BOLT ASSEMBLY

GENERAL NOTES:

1. All holes for tie bolts shall be cast-in-place,16 inches from outside edge of joint. Cast in inserts or sleeves, if used, shall be made of a corrosion resistant material.

2. Ties shall be 1 inch ∅ and conform to the requirements of ASTM A36, ASTM A307, or ASTM F1554, Gr. 36. Nuts shall be heavy hex in conformance with ASTM A563. Washers shall conform to ASTM F436, Type 1. The welded pipe sleeve shall conform to ASTM A53, Grade B.

3. Welding and weld inspection shall be in conformance with AWS/ANSI D1.1 - (Current Year) Structural Welding Code - Steel.

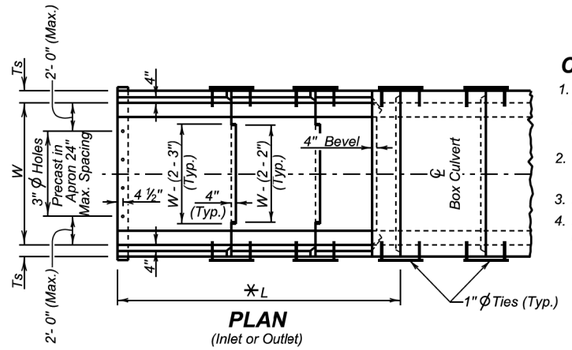
4. Tie Bolt Assembly shall be galvanized in accordance with ASTM A153 or ASTM F2329 as applicable.

5. Tie Bolt Assembly details may vary from that shown, but alternate tie bolt assemblies are subject to testing to demonstrate equal strength. Submit details, through proper channels, to the Office of Bridge Design for approval.

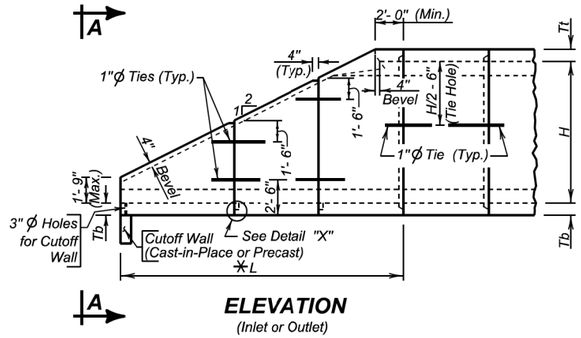
6. All costs for furnishing and installing the precast box culvert tie bolt assembly shall be incidental to the contract unit price per Foot for "Precast Concrete Box Culvert, Furnish".

March 21, 2016

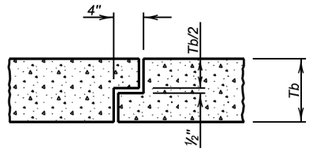
Published Date: 2026	SDDOT	PRECAST BOX CULVERT TIE BOLT ASSEMBLY DETAILS	PLATE NUMBER 560.01
			Sheet 1 of 1



PLAN
(Inlet or Outlet)

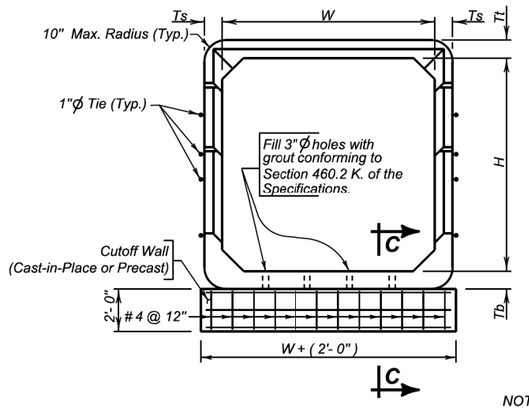


ELEVATION
(Inlet or Outlet)

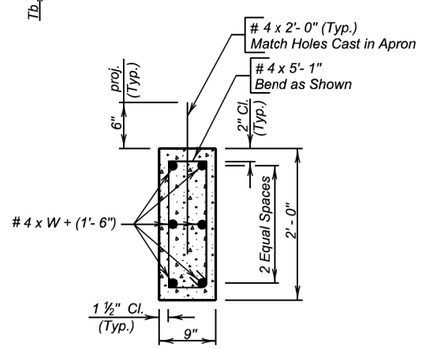


DETAIL "X"

NOTE: Joint details may vary from that shown, according to the manufacturer's design. Submit details with shop plans for approval.



VIEW A - A



SEC. C - C

LEGEND

W = Width of Opening
H = Height of Opening
Tt = Thickness of Top Slab
Tb = Thickness of Bottom Slab
Ts = Thickness of Side Wall
L = Length of End Section

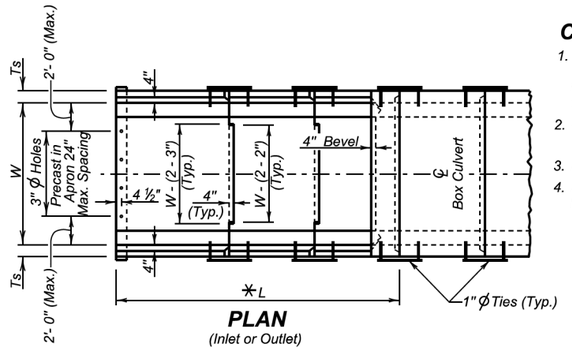
NOTES:
See GENERAL DRAWING for W and H dimensions.
Tt, Tb, L, and Ts dimensions shall be furnished by the Contractor.
⁎ Length and number of units may vary from that shown.

June 26, 2015

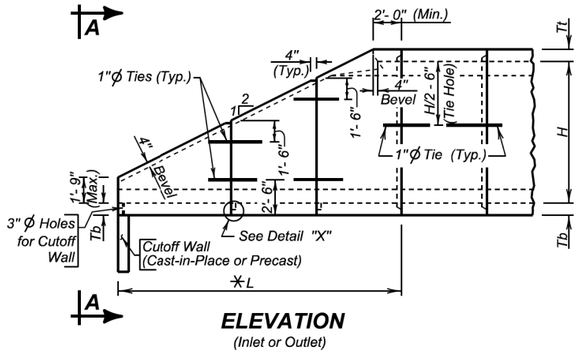
Published Date: 2026	SDDOT	PRECAST SINGLE BOX CULVERT SLOPED END SECTION DETAILS WITH 2'–0" CUTOFF WALL	PLATE NUMBER 560.10 Sheet 1 of 1

CUTOFF WALL

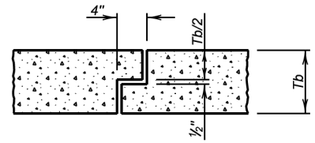
1. All costs associated with furnishing and installing the Cutoff Wall, whether precast or cast-in-place, shall be incidental to the contract unit price per each for "Precast Box Culvert End Section, Furnish".
2. Concrete for cast-in-place cutoff wall shall be Class M6 concrete in accordance with Section 462 of the Specifications.
3. All reinforcing steel shall conform to ASTM A615 Grade 60.
4. Alternate details will be allowed, subject to the approval of the Bridge Construction Engineer.



PLAN
(Inlet or Outlet)

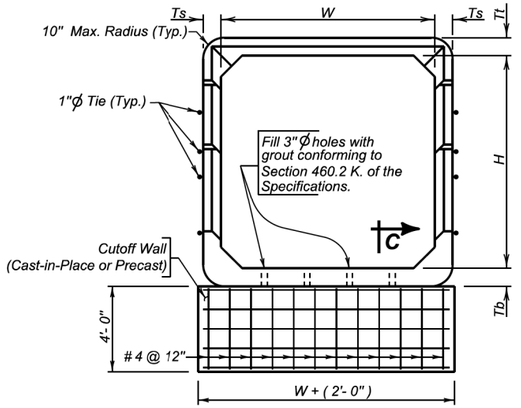


ELEVATION
(Inlet or Outlet)

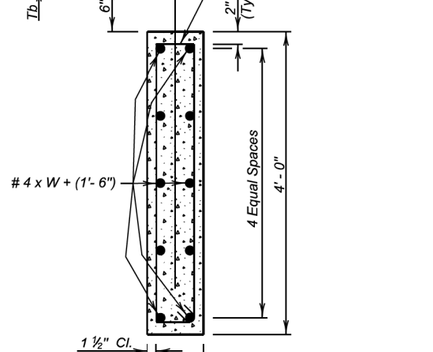


DETAIL "X"

NOTE: Joint details may vary from that shown, according to the manufacturer's design. Submit details with shop plans for approval.



VIEW A - A



SEC. C - C

LEGEND

W = Width of Opening
H = Height of Opening
Tt = Thickness of Top Slab
Tb = Thickness of Bottom Slab
Ts = Thickness of Side Wall
L = Length of End Section

NOTES:
See GENERAL DRAWING for W and H dimensions.
Tt, Tb, L, and Ts dimensions shall be furnished by the Contractor.
⁎ Length and number of units may vary from that shown.

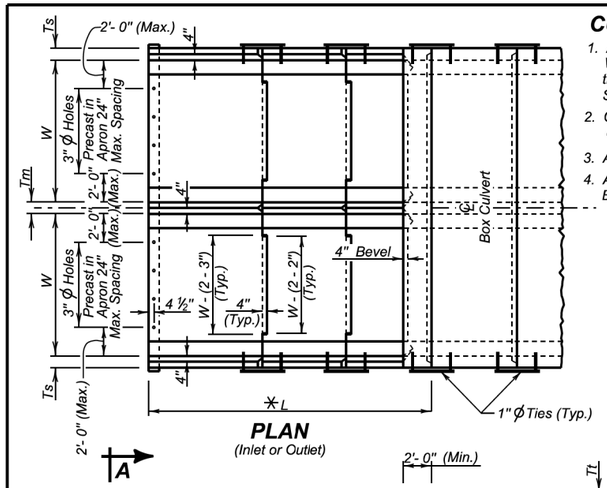
June 26, 2015

Published Date: 2026	SDDOT	PRECAST SINGLE BOX CULVERT SLOPED END SECTION DETAILS WITH 4'–0" CUTOFF WALL	PLATE NUMBER 560.11 Sheet 1 of 1

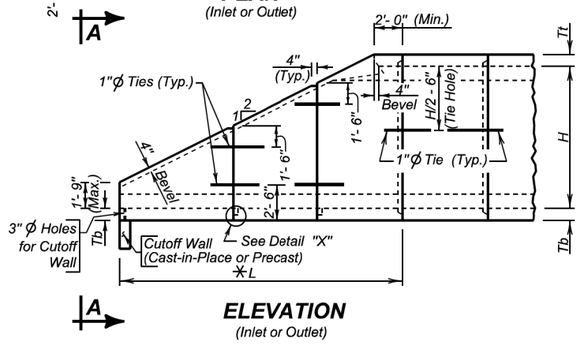
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E35	E185

CUTOFF WALL

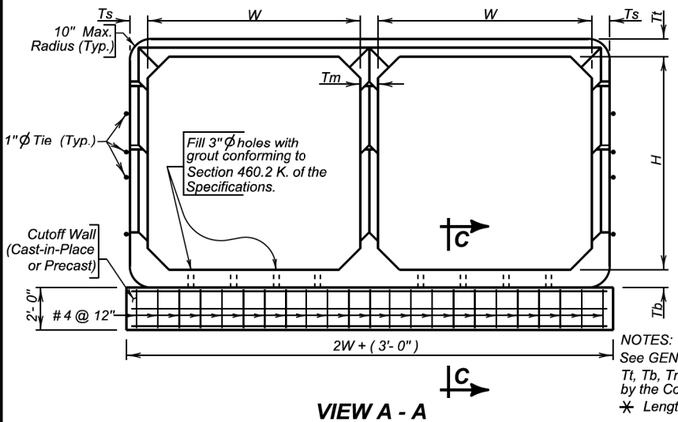
1. All costs associated with furnishing and installing the Cutoff Wall, whether precast or cast-in-place, shall be incidental to the contract unit price per each for "Precast Box Culvert End Section, Furnish".
2. Concrete for cast-in-place cutoff wall shall be Class M6 concrete in accordance with Section 462 of the Specifications.
3. All reinforcing steel shall conform to ASTM A615 Grade 60.
4. Alternate details will be allowed, subject to the approval of the Bridge Construction Engineer.



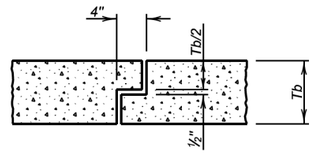
PLAN
(Inlet or Outlet)



ELEVATION
(Inlet or Outlet)

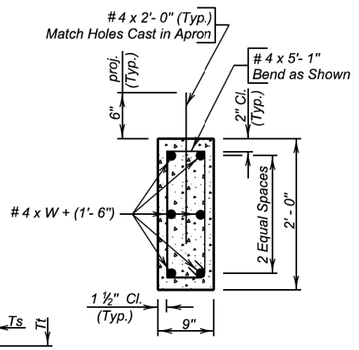


VIEW A - A



DETAIL " X "

NOTE: Joint details may vary from that shown, according to the manufacturer's design. Submit details with shop plans for approval.



SEC. C - C

LEGEND

W = Width of Opening
H = Height of Opening
Tt = Thickness of Top Slab
Tb = Thickness of Bottom Slab
Ts = Thickness of Side Wall
Tm = Thickness of Middle Wall
L = Length of End Section

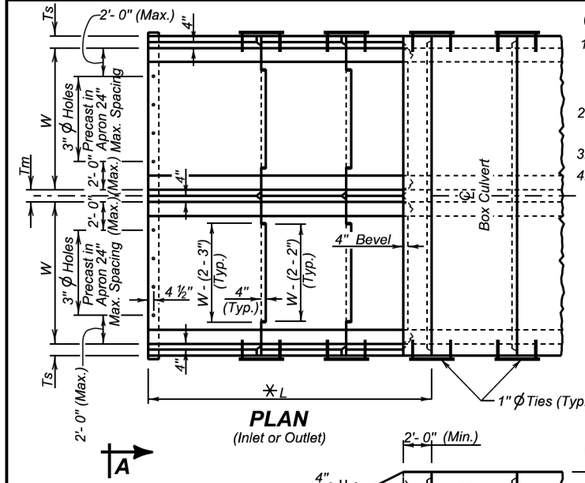
NOTES:
See GENERAL DRAWING for W and H dimensions.
Tt, Tb, Tm, L, and Ts dimensions shall be furnished by the Contractor.
⁎ Length and number of units may vary from that shown.

June 26, 2015

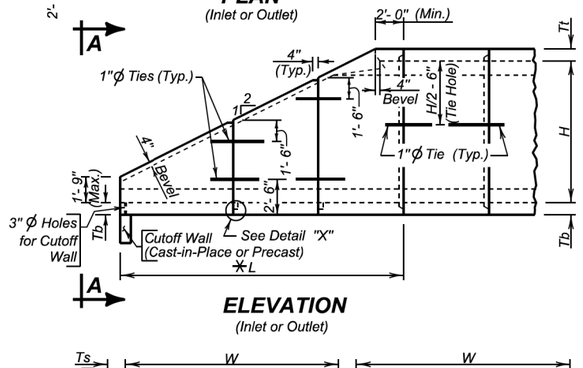
Published Date: 2026	SDDOT	PRECAST DOUBLE BOX CULVERT SLOPED END SECTION DETAILS WITH 2'–0" CUTOFF WALL	PLATE NUMBER 560.20
			Sheet 1 of 1

CUTOFF WALL

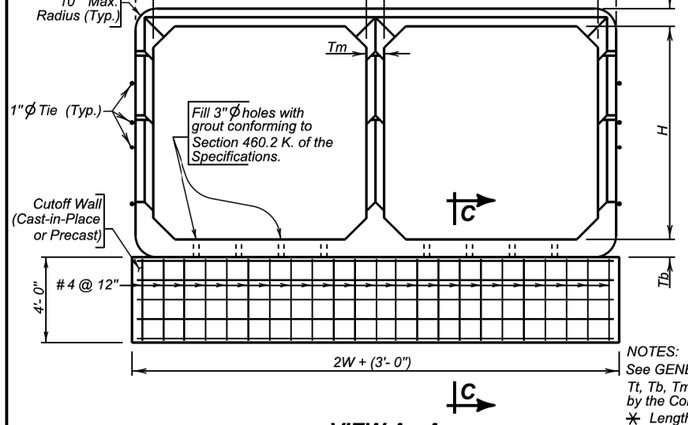
1. All costs associated with furnishing and installing the Cutoff Wall, whether precast or cast-in-place, shall be incidental to the contract unit price per each for "Precast Box Culvert End Section, Furnish:".
2. Concrete for cast-in-place cutoff wall shall be Class M6 concrete in accordance with Section 462 of the Specifications.
3. All reinforcing steel shall conform to ASTM A615 Grade 60.
4. Alternate details will be allowed, subject to the approval of the Bridge Construction Engineer.



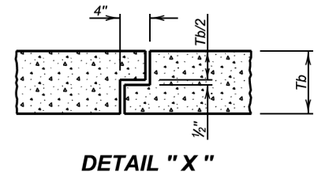
PLAN
(Inlet or Outlet)



ELEVATION
(Inlet or Outlet)

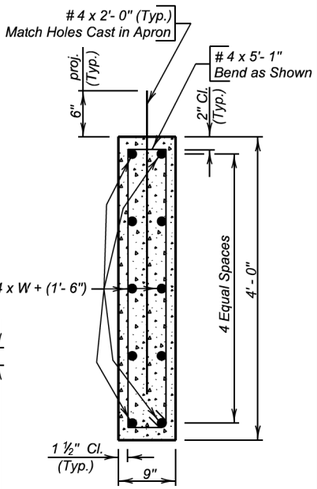


VIEW A - A



DETAIL " X "

NOTE: Joint details may vary from that shown, according to the manufacturer's design. Submit details with shop plans for approval.



SEC. C - C

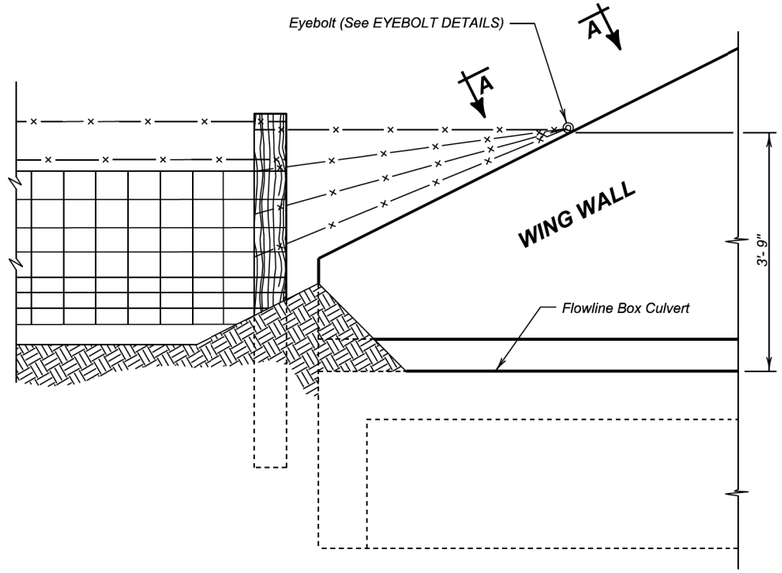
LEGEND

W = Width of Opening
H = Height of Opening
Tt = Thickness of Top Slab
Tb = Thickness of Bottom Slab
Ts = Thickness of Side Wall
Tm = Thickness of Middle Wall
L = Length of End Section

NOTES:
See GENERAL DRAWING for W and H dimensions.
Tt, Tb, Tm, L, and Ts dimensions shall be furnished by the Contractor.
⁎ Length and number of units may vary from that shown.

June 26, 2015

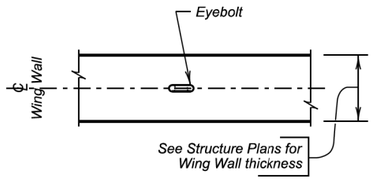
Published Date: 2026	SDDOT	PRECAST DOUBLE BOX CULVERT SLOPED END SECTION DETAILS WITH 4'–0" CUTOFF WALL	PLATE NUMBER 560.21
			Sheet 1 of 1



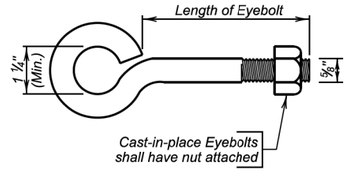
DETAIL FOR FENCE ANCHORS

GENERAL NOTES:

1. The fence and post details shown are for illustrative purpose only. The fence shall be as specified elsewhere in the plans.
2. Eyebolts shall be placed on all of the box culvert wing walls.
3. Eyebolts shall be ⅞ inch diameter and shall conform to ASTM A307.
4. Eyebolts, nuts, and concrete inserts shall be galvanized in accordance with AASHTO M232 (ASTM A153). Concrete inserts of corrosion resistant material need not be galvanized.
5. Cast-in-place eyebolts shall have a nut attached, be 4 ½ inches (Min.) in length and shall be embedded such that the eye of the bolt is flush with the concrete surface. (See Eyebolt Details) As an alternate, cast-in-place concrete inserts, capable of developing the full strength of the ⅞ inch diameter threaded eyebolt, may be used and shall be set in the concrete in accordance with the manufacturer's recommendations. The eyebolt shall be of sufficient length to develop its full strength. The eye of the eyebolt shall be flush with the concrete surface.
6. The cost for furnishing and installing eyebolts and/or concrete inserts shall be incidental to various contract items.



VIEW A - A



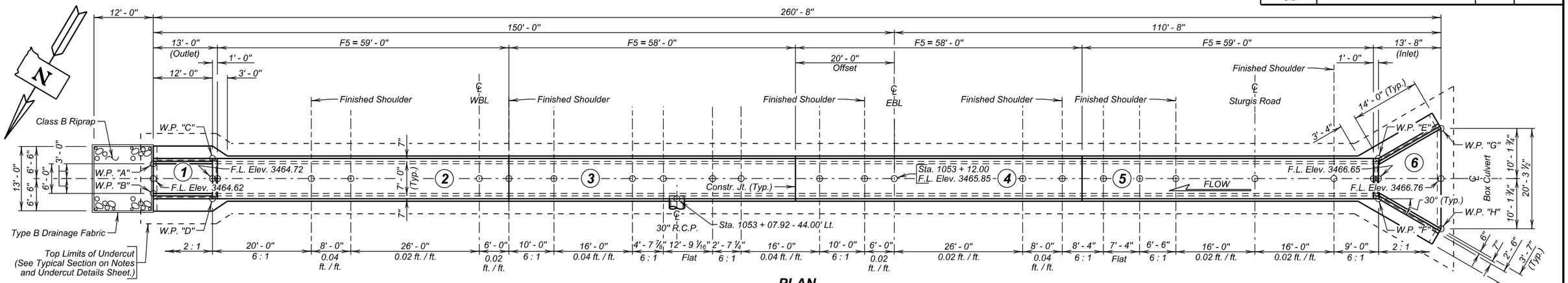
EYEBOLT DETAILS

December 23,2012

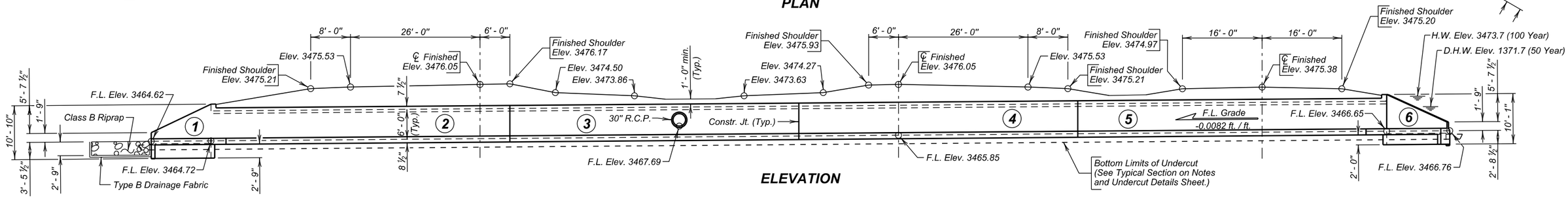
Published Date: 2026	SDDOT	FENCE ANCHORS FOR BOX CULVERT WING WALLS	PLATE NUMBER 620.16 Sheet 1 of 1

The elevations shown in these plans are based on the National Geodetic Survey (NGS) North American Vertical Datum of 1988 (NAVD88).

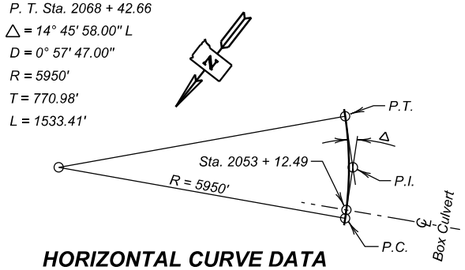
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E37	E185



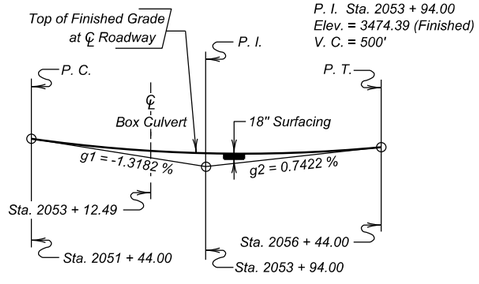
PLAN



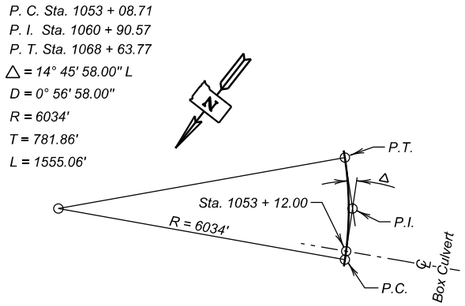
ELEVATION



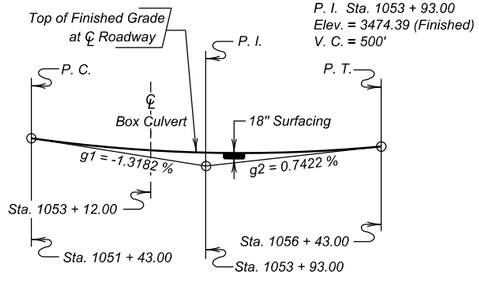
HORIZONTAL CURVE DATA
(Westbound Lanes)



VERTICAL CURVE DATA
(Westbound Lanes)



HORIZONTAL CURVE DATA
(Eastbound Lanes)



VERTICAL CURVE DATA
(Eastbound Lanes)

HYDRAULIC DATA

Q_d	238 cfs
A_d	19 sq ft
V_d	13.1 fps
Q_F	238 cfs
Q_{100}	375 cfs
Q_{OT}	481 cfs
V_{max}	14.8 fps

Q_d = Design discharge for the proposed culvert based on 50 year frequency. El. 3471.7.

Q_{OT} = Overtopping discharge and frequency > Q_{124} year recurrence interval. El. 3475.4. Location 1053 + 45.00.

Q_F = Designated peak discharge for the basin approaching proposed project based on 50 year frequency.

Q_{100} = Computed discharge for the basin approaching proposed project based on 100 year frequency. El. 3473.7.

V_{max} = Maximum computed outlet velocity for the proposed culvert, based on 100 year frequency.

INDEX OF CULVERT SHEETS -

Sheet No. 1 - General Drawing and Quantities
Sheet No. 2 - Notes and Undercut Details
Sheet No. 3 - Inlet Details
Sheet No. 4 - Outlet Details
Sheet No. 5 - F5 Barrel End Section Details (59' - 0")
Sheet No. 6 - F5 Barrel Interior Section Details (58' - 0")
Sheet No. 7 - Standard Plate No.'s 460.02 and 460.10
Sheet No. 8 - Standard Plate No. 620.16

TABLE OF WORKING POINTS

W. P.	STATION	OFFSET
"A"	1053 + 15.07	150.00' Lt.
"B"	1053 + 08.92	150.00' Lt.
"C"	1053 + 16.18	138.00' Lt.
"D"	1053 + 07.84	138.00' Lt.
"E"	1053 + 16.02	98.00' Rt.
"F"	1053 + 07.97	98.00' Rt.
"G"	1053 + 21.96	110.67' Rt.
"H"	1053 + 01.91	110.67' Rt.

ESTIMATED QUANTITIES

	ITEM	UNIT	QUANTITY
	Class A45 Concrete, Box Culvert	Cu. Yd.	196.6
	Reinforcing Steel	Lb.	30421
	Structure Excavation, Box Culvert	Cu. Yd.	74
	Box Culvert Undercut	Cu. Yd.	146
#	Class B Riprap	Ton	22.2
	Type B Drainage Fabric	Sq. Yd.	33

For estimating purposes only, a factor of 1.4 tons/cu. yd. was used to convert Cu. Yd. to Tons.

SITE 2
ALTERNATE A

GENERAL DRAWING AND QUANTITIES

FOR

7' X 6' BOX CULVERT (C.I.P.)

OVER TRIB. TO ELK CREEK — 0° SKEW
STA. 1053 + 12.00 (EBL) — SEC. 10-T3N-R6E
STR. NO. 47-094-559 — IM-CR-EM 0901(187)44
PCN 034J — HL-93

MEADE COUNTY

S. D. DEPT. OF TRANSPORTATION

OCTOBER 2022

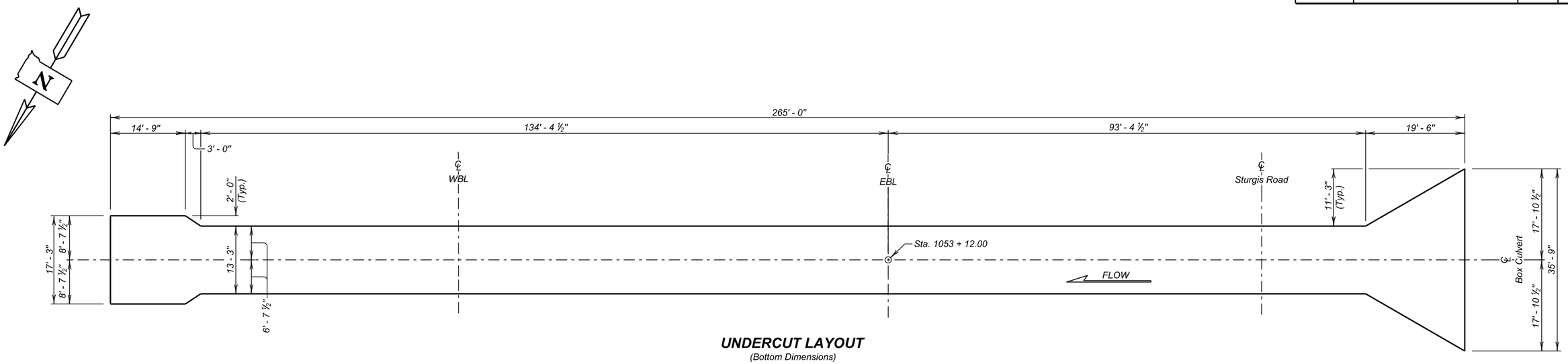
1 OF 8

PLANS BY :
OFFICE OF BRIDGE DESIGN, SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION

DESIGNED BY	CK. DES. BY	DRAFTED BY	
AU MEAD034J	AH 034JGD01	BT	Steve A Johnson BRIDGE ENGINEER

Revised October 15, 2025 AU

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E38	E185



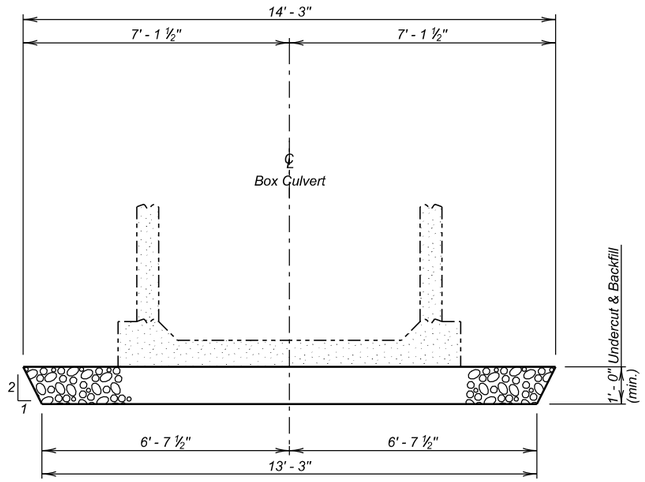
UNDERCUT LAYOUT
(Bottom Dimensions)

SPECIFICATIONS

1. *Design Specifications: AASHTO LRFD Bridge Design Specifications, 9th Edition.*
2. Construction Specifications: South Dakota Standard Specifications for Roads and Bridges, 10-1-25 Version, Required Provisions, and Special Provisions as included in the Proposal. The Standard Specifications for Roads and Bridges are available for download and viewing at: https://dot.sd.gov/doing-business/contractors/standard-specifications.

GENERAL NOTES

1. *Design Live Load: HL-93 and construction loading consisting of one 7' - 6" gage axle with gross axle weight = 95,850 lbs. The construction load will not be applied until a minimum of 4 ft. of fill has been placed over the box culvert. Other construction loads in excess of legal load must be submitted thru proper channels to the Office of Bridge Design for analysis.*
2. *The design of the barrel section is based on a minimum fill height of 2 feet and includes all subsequent fill heights up to and including the maximum fill height of 5 ft. (F5).*
3. *Design Material Strengths: Concrete f'c = 4500 p.s.i.*
   Reinforcing Steel fy = 60000 p.s.i.
4. *All concrete will be Class A45 Concrete, Box culvert conforming to Section 460 of the Construction Specifications.*
5. *All reinforcing steel will conform to ASTM A615 Grade 60.*
6. *All lap splices shown are contact lap splices unless noted otherwise.*
7. *All exposed edges will be chamfered ¾ inch unless noted otherwise in the plans.*
8. *Use 1 inch clear cover on all reinforcing steel EXCEPT as shown.*
9. *The Contractor will imprint on the structure the date of construction as specified and detailed on Standard Plate No. 460.02.*
10. *Care will be taken to establish Working Points (W.P.) as shown on the wings.*
11. *Circled numbers in PLAN and ELEVATION views on the General Drawing are section I.D. Numbers (see SDDOT Materials Manual).*
12. *Cost of Preformed Expansion Joint Filler used in apron construction will be incidental to the other contract items.*
13. *Soils below the bottom of the proposed RCBC consist of brown silt clay (alluvium). Groundwater was encountered in the borings at an elevation of 3464.9 during the subsurface investigation conducted in October to November 2021. Dewatering will be required for the construction of the RCBC. All costs incurred for dewatering will be incidental to the other contract items.*



TYPICAL SECTION
(For Limits of Undercut)

ESTIMATED QUANTITIES		
ITEM	*UNIT*	*QUANTITY*
℄ *Box Culvert Undercut*	*Cu. Yd.*	*146*

℄ *For payment, quantity is based on plan shown undercut dimensions and will not be measured unless the Engineer orders a change.*

SITE 2
ALTERNATE A

NOTES AND UNDERCUT DETAILS

FOR

7' X 6' BOX CULVERT (C.I.P.)

OVER TRIB. TO ELK CREEK — 0° SKEW
STA. 1053 + 12.00 (EBL) — SEC. 10-T3N-R6E
STR. NO. 47-094-559 — IM-CR-EM 0901(187)44
HL-93

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
OCTOBER 2022

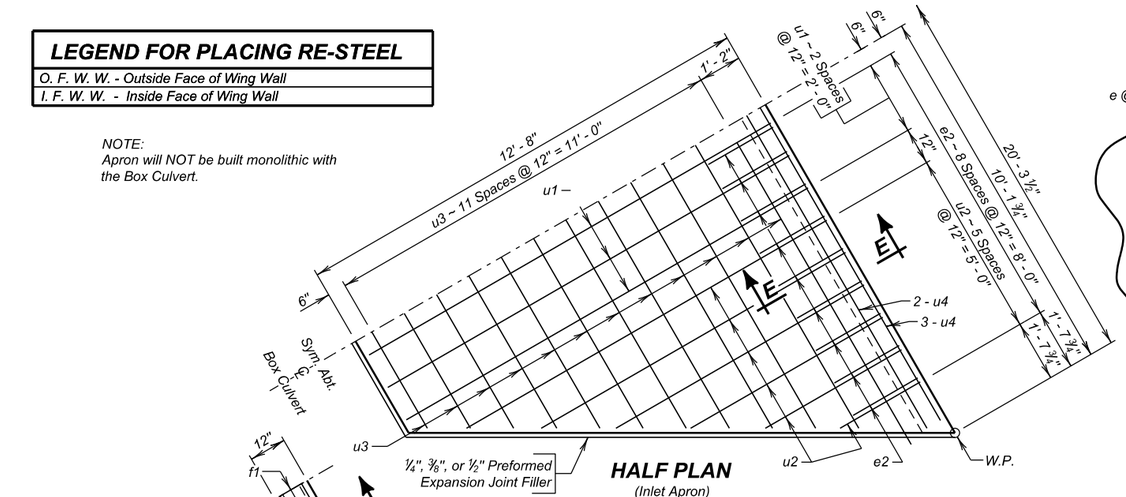
DESIGNED BY	CK. DES. BY	DRAFTED BY	
AU	AH	BT	Steve A. Johnson BRIDGE ENGINEER
MEAD034J	034JGD02		

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E39	E185

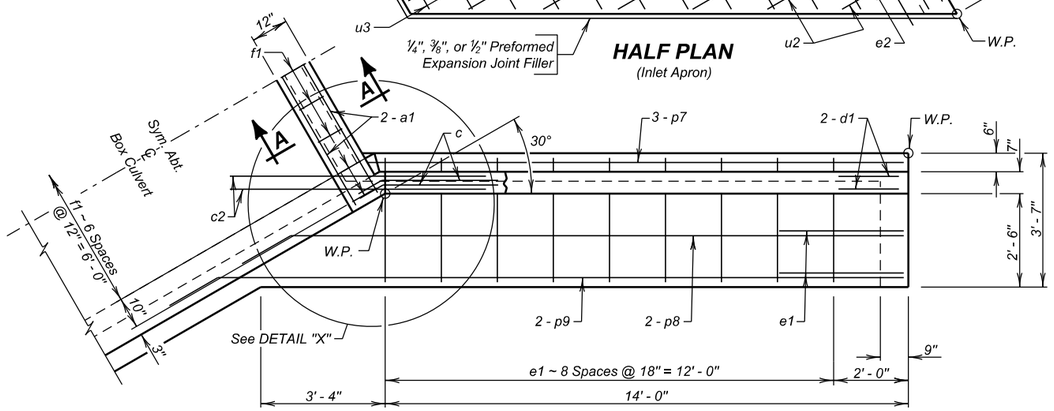
LEGEND FOR PLACING RE-STEEL

O. F. W. W. - Outside Face of Wing Wall
I. F. W. W. - Inside Face of Wing Wall

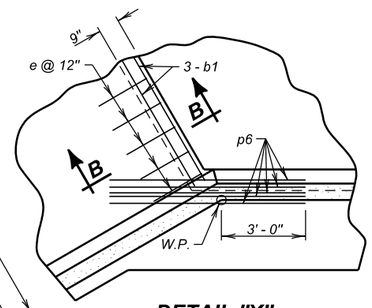
NOTE:
Apron will NOT be built monolithic with the Box Culvert.



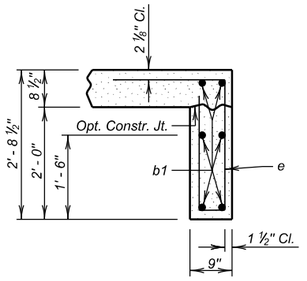
HALF PLAN
(Inlet Apron)



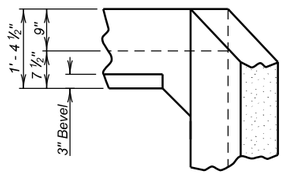
HALF PLAN

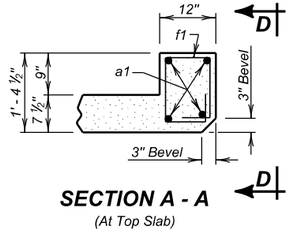


DETAIL "X"
(At Bottom Slab)

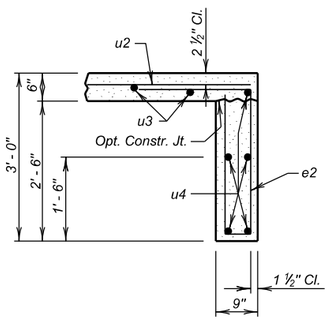


SECTION B - B

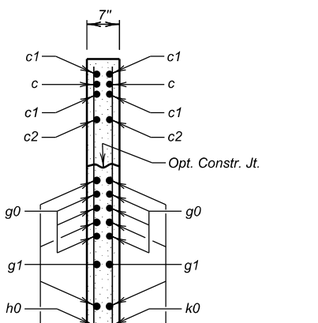




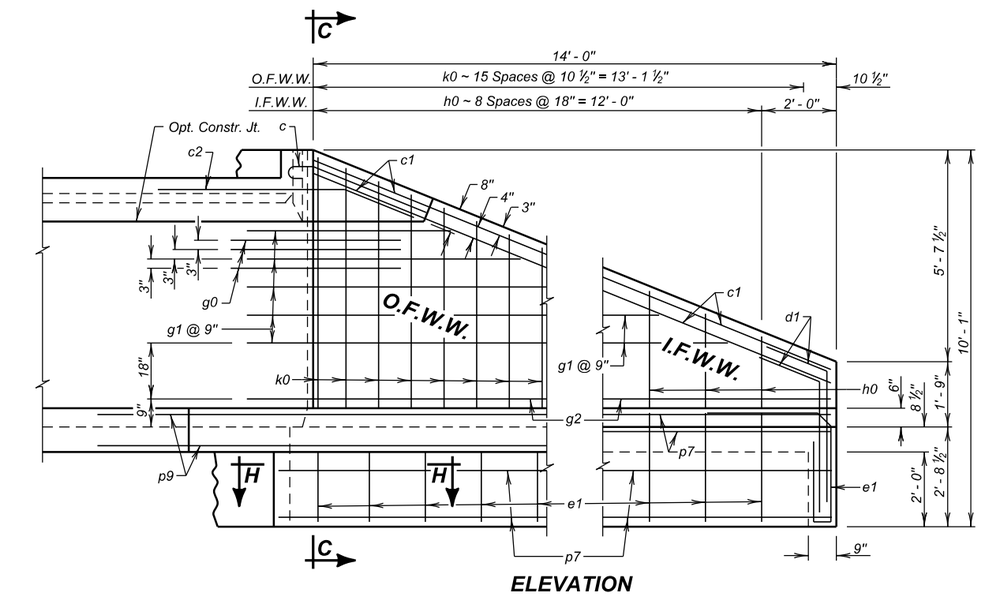
SECTION A - A
(At Top Slab)



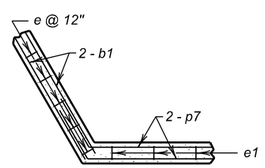
SECTION E - E



SECTION C - C



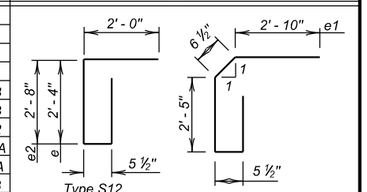
ELEVATION

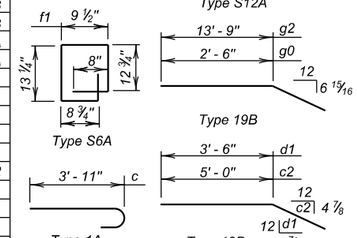


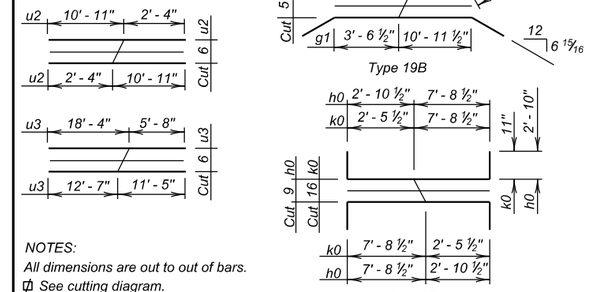
SECTION H - H

REINFORCING SCHEDULE

	Mk.	No.	Size	Length	Type	Bending Details
*	a1	4	6	7' - 9"	Str.	
	b1	6	6	6' - 3"	Str.	
*	c	4	5	4' - 6"	1A	
	c1	8	5	15' - 0"	Str.	
	c2	4	5	7' - 0"	19B	
	d1	8	5	5' - 6"	19B	
	e	7	4	6' - 9"	S12	
	e1	22	4	8' - 6"	S12A	
	f1	9	4	5' - 0"	S6A	
	g0	12	5	5' - 0"	19B	
℄	g1	10	4	18' - 6"	19B	
	g2	4	4	15' - 9"	19B	
℄	h0	9	4	16' - 3"	17A	
℄	k0	16	4	12' - 0"	17A	
	p6	10	6	7' - 0"	Str.	
*	p7	14	4	16' - 6"	Str.	
*	p8	4	4	17' - 3"	Str.	
*	p9	4	4	19' - 9"	Str.	
	INLET APRON					
	e2	18	4	7' - 6"	S12	
	u1	6	4	12' - 3"	Str.	
℄	u2	6	4	13' - 3"	Str.	
℄	u3	6	4	24' - 0"	Str.	
	u4	5	4	19' - 3"	Str.	







NOTES:
All dimensions are out to out of bars.
℄ See cutting diagram.
* Bend in field as necessary to fit.

ESTIMATED QUANTITIES

ITEM	Class A45 Concrete, Box Culvert	Reinforcing Steel	Structure Excavation, Box Culvert
UNIT	Cu. Yd.	Lb.	Cu. Yd.
Inlet	10.5	1321	5.4
Inlet Apron	4.4	353	4.4

SITE 2
ALTERNATE A

INLET DETAILS

FOR

7' X 6' BOX CULVERT (C.I.P.)

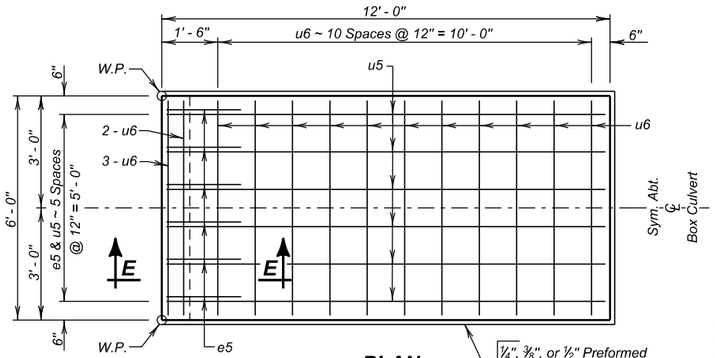
OVER TRIB. TO ELK CREEK — 0° SKEW
STA. 1053 + 12.00 (EBL) — SEC. 10-T3N-R6E
STR. NO. 47-094-559 — IM-CR-EM 0901(187)44
HL-93

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
OCTOBER 2022

3 OF 8

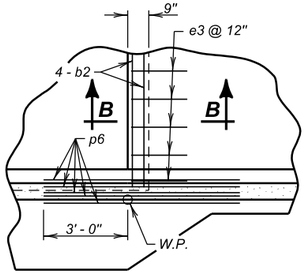
DESIGNED BY	CK. DES. BY	DRAFTED BY	
AU	AH	BT	Steve A. Johnson BRIDGE ENGINEER
MEAD034J	034JGD03		

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E40	E185

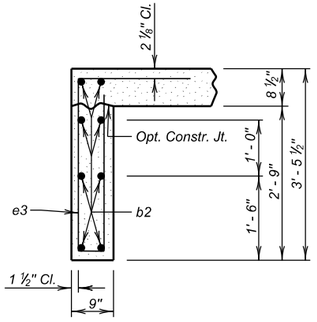


PLAN
(Outlet Apron)

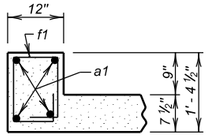
NOTE:
Apron will NOT be built monolithic with the Box Culvert.



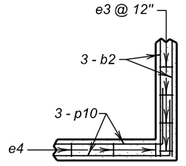
DETAIL "X"
(At Bottom Slab)



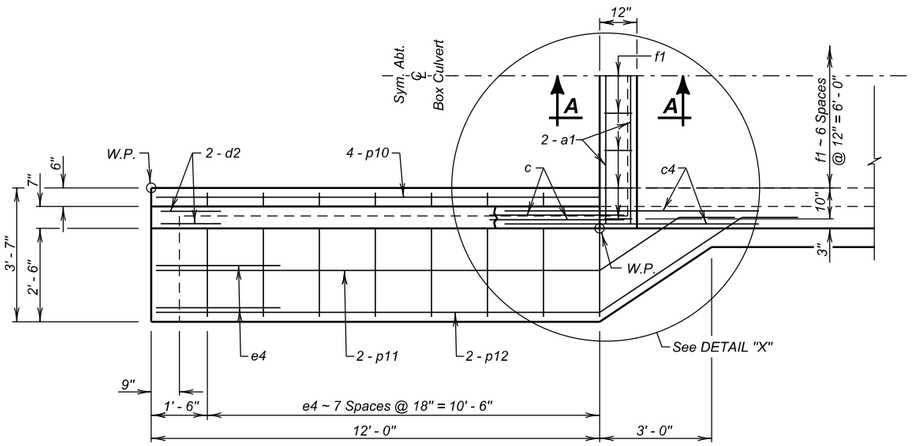
SECTION B - B



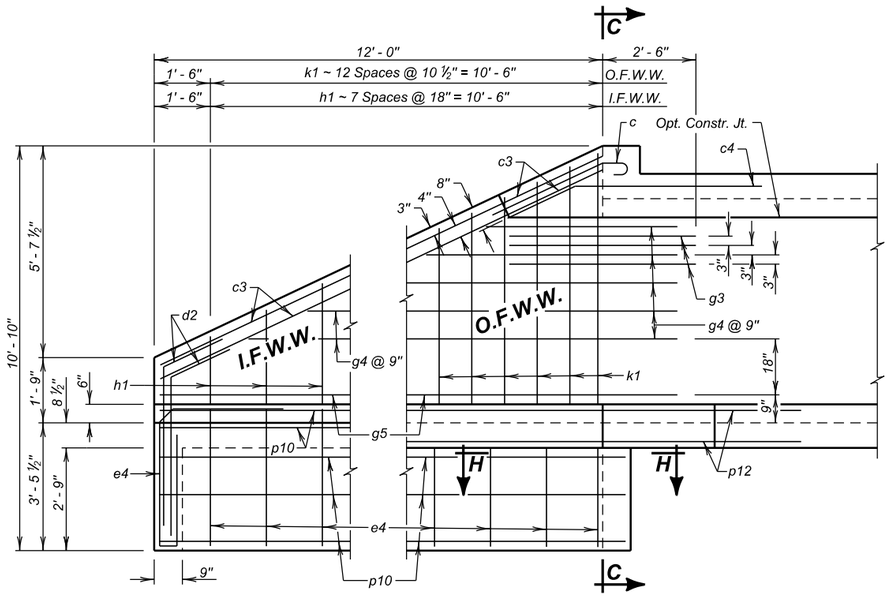
SECTION A - A
(At Top Slab)



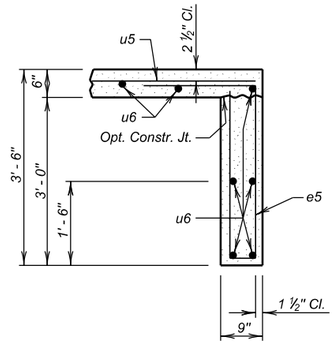
SECTION H - H



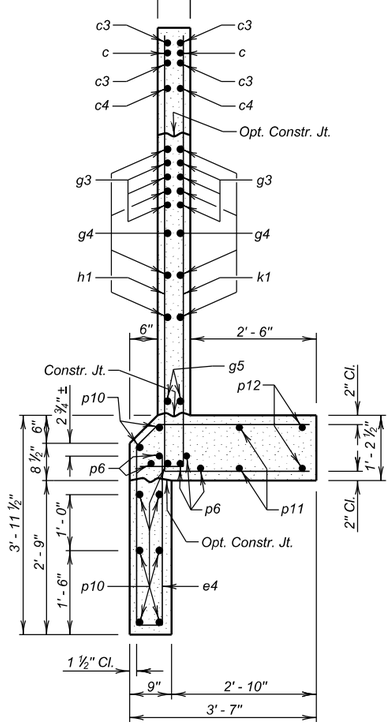
HALF PLAN



ELEVATION



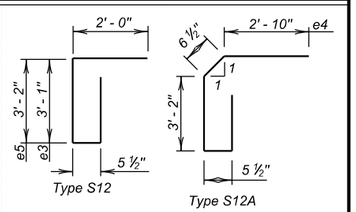
SECTION E - E

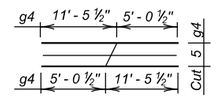


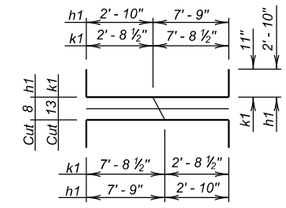
SECTION C - C

REINFORCING SCHEDULE

	Mk.	No.	Size	Length	Type	Bending Details
*	a1	4	6	7' - 9"	Str.	
	b2	8	6	7' - 3"	Str.	
	c	4	5	4' - 6"	1A	
*	c3	8	5	13' - 3"	Str.	
	c4	4	5	7' - 0"	19B	
	d2	8	5	6' - 0"	19B	
	e3	8	4	8' - 3"	S12	
	e4	20	4	10' - 0"	S12A	
	f1	9	4	5' - 0"	S6A	
	g3	12	5	5' - 0"	Str.	
⌀	g4	10	4	16' - 6"	Str.	
	g5	4	4	13' - 9"	Str.	
⌀	h1	8	4	16' - 3"	17A	
⌀	k1	13	4	12' - 3"	17A	
	p6	10	6	7' - 0"	Str.	
*	p10	18	4	14' - 6"	Str.	
*	p11	4	4	14' - 9"	Str.	
*	p12	4	4	17' - 9"	Str.	
	OUTLET APRON					
	e5	6	4	8' - 6"	S12	
	u5	6	4	11' - 9"	Str.	
	u6	16	4	5' - 9"	Str.	







Type 17A

NOTES:
All dimensions are out to out of bars.
⌀ See cutting diagram.
* Bend in field as necessary to fit.

ESTIMATED QUANTITIES

ITEM	Class A45 Concrete, Box Culvert	Reinforcing Steel	Structure Excavation, Box Culvert
UNIT	Cu. Yd.	Lb.	Cu. Yd.
Outlet	9.9	1319	5.5
Outlet Apron	1.9	143	1.9

LEGEND FOR PLACING RE-STEEL

O. F. W. W. - Outside Face of Wing Wall
I. F. W. W. - Inside Face of Wing Wall

SITE 2
ALTERNATE A

OUTLET DETAILS

FOR

7' X 6' BOX CULVERT (C.I.P.)

OVER TRIB. TO ELK CREEK
STA. 1053 + 12.00 (EBL)
STR. NO. 47-094-559

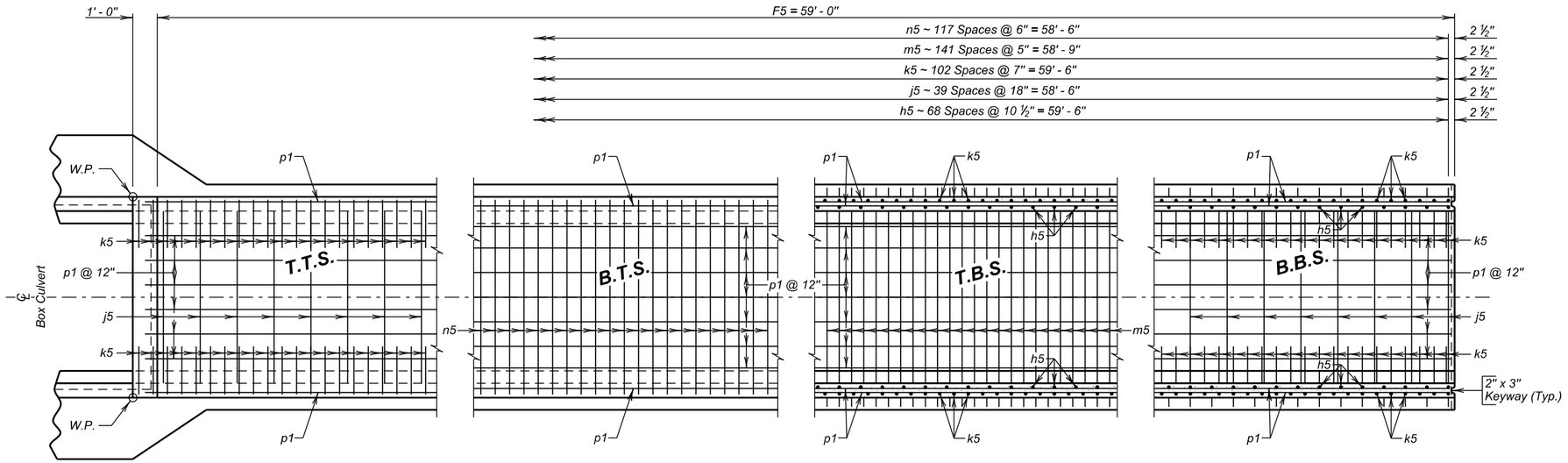
0° SKEW
SEC. 10-T3N-R6E
IM-CR-EM 0901(187)44
HL-93

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
OCTOBER 2022

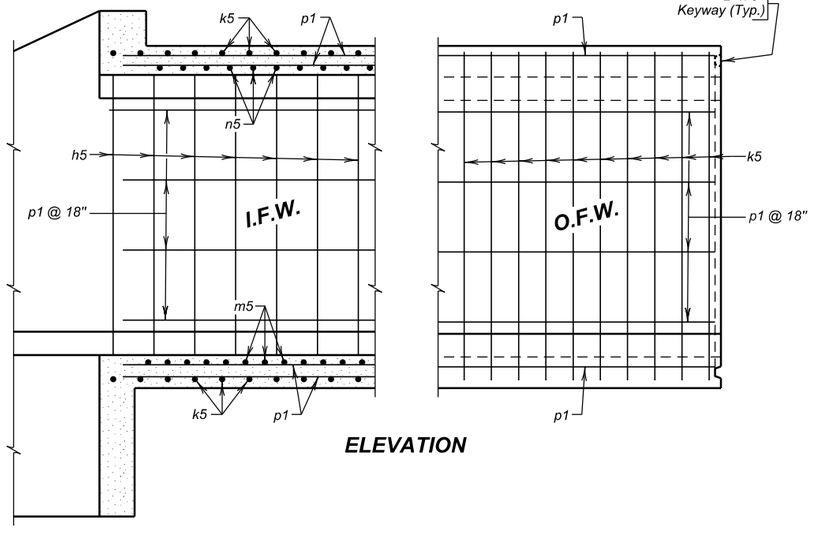
4 OF 8

DESIGNED BY	CK. DES. BY	DRAFTED BY	
AU	AH	BT	Steve A. Johnson BRIDGE ENGINEER
MEAD034J	034JGD04		

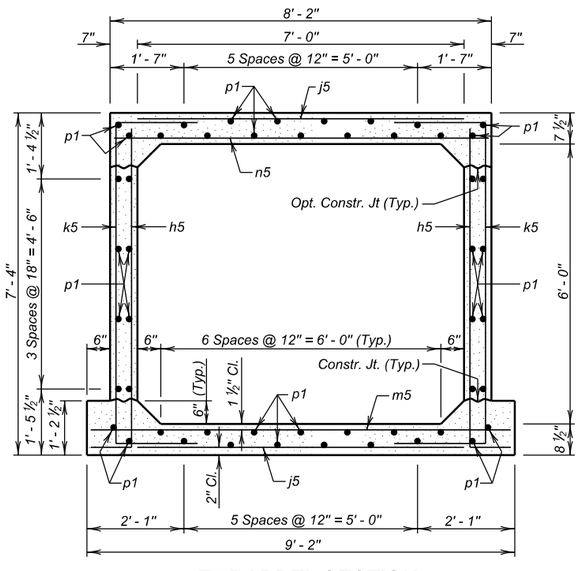
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E41	E185



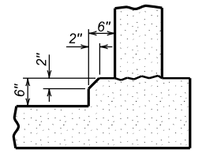
PLAN
(Outlet End shown, Inlet similar by rotation)



ELEVATION



F5 BARREL SECTION
(5' - 0" Maximum Fill)



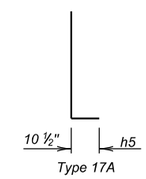
OPTIONAL FILLET DETAIL
(At Bottom Slab)

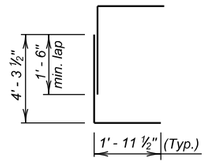
NOTE: Contractor may form the optional full fillet, with 2" Chamfer, as detailed. The cost of the additional concrete will be borne by the Contractor.

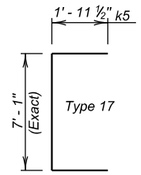
△ *Place z1 bars thru construction joint between barrel sections as shown on Standard Plate No. 460.10. Quantity of z1 bars is for two construction joints.*

REINFORCING SCHEDULE
(For 2 - F5 Barrel End Sections @ 59' - 0")

Mk.	No.	Size	Length	Type	Bending Details
h5	276	4	7' - 9"	17A	
j5	160	4	7' - 0"	Str.	
k5	412	4	11' - 0"	17	
m5	284	5	8' - 9"	Str.	
n5	236	5	7' - 9"	Str.	
p1	100	4	59' - 6"	Str.	
△ z1	44	5	3' - 6"	Str.	







OPTIONAL k5 SPLICE DETAIL
Contractor may use optional reinforcing steel splice, as shown. The cost of the additional reinforcing steel will be borne by the Contractor.

NOTES:
All dimensions are out to out of bars.
Request for additional reinforcing steel splices at points other than those shown, must be submitted to the Engineer for prior approval. If additional splices are approved, no payment will be allowed for the added quantity of reinforcing steel.

ESTIMATED QUANTITIES

ITEM	Class A45 Concrete, Box Culvert	Reinforcing Steel	Structure Excavation, Box Culvert
UNIT	Cu.Yd.	Lb.	Cu.Yd.
2 - F5 Barrel End Sections @ 59' - 0"	85.7	13840	28.4

LEGEND FOR PLACING RE-STEEL

T.T.S.	- Top of Top Slab
B.T.S.	- Bottom of Top Slab
T.B.S.	- Top of Bottom Slab
B.B.S.	- Bottom of Bottom Slab
O.F.W.	- Outside Face of Wall
I.F.W.	- Inside Face of Wall

SITE 2
ALTERNATE A

F5 BARREL END SECTION DETAILS (59' - 0")

FOR

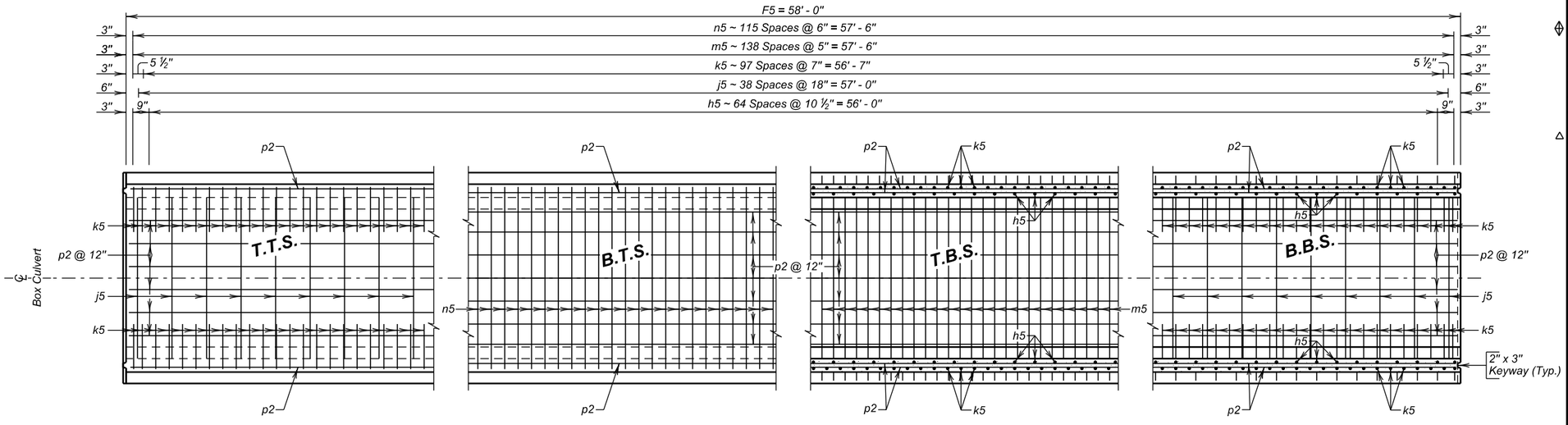
7' X 6' BOX CULVERT (C.I.P.)

OVER TRIB. TO ELK CREEK — 0° SKEW
STA. 1053 + 12.00 (EBL) — SEC. 10-T3N-R6E
STR. NO. 47-094-559 — IM-CR-EM 0901(187)44
HL-93

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
OCTOBER 2022

DESIGNED BY	CK. DES. BY	DRAFTED BY	
AU	AH	BT	Steve A Johnson BRIDGE ENGINEER
MEAD034J	034JGD05		

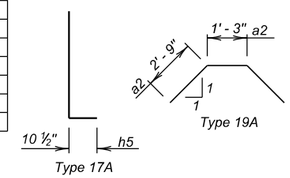
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E42	E185

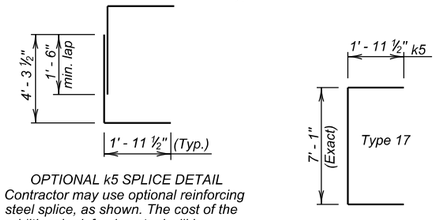


PLAN

REINFORCING SCHEDULE
(For 2 - F5 Barrel Interior Sections @ 58' - 0")

Mk.	No.	Size	Length	Type	Bending Details
a2	4	5	9' - 0"	19A	
h5	268	4	7' - 9"	17A	
j5	156	4	7' - 0"	Str.	
k5	400	4	11' - 0"	17	
m5	278	5	8' - 9"	Str.	
n5	232	5	7' - 9"	Str.	
p2	100	4	57' - 9"	Str.	
z1	22	5	3' - 6"	Str.	





OPTIONAL k5 SPLICE DETAIL
Contractor may use optional reinforcing steel splice, as shown. The cost of the additional reinforcing steel will be borne by the Contractor.

NOTES:

All dimensions are out to out of bars.

Request for additional reinforcing steel splices at points other than those shown, must be submitted to the Engineer for prior approval. If additional splices are approved, no payment will be allowed for the added quantity of reinforcing steel.

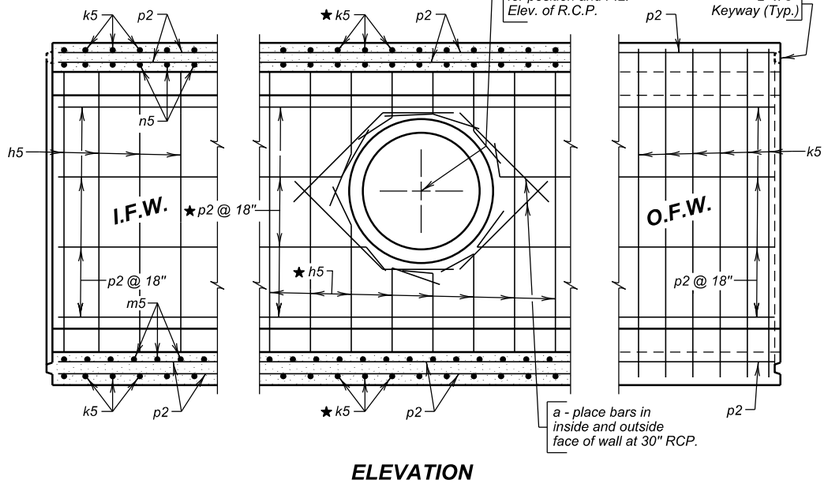
ESTIMATED QUANTITIES

ITEM	Class A45 Concrete, Box Culvert	Reinforcing Steel	Structure Excavation, Box Culvert
UNIT	Cu.Yd.	Lb.	Cu.Yd.
2 - F5 Barrel Interior Section @ 58' - 0"	84.2	13445	27.9

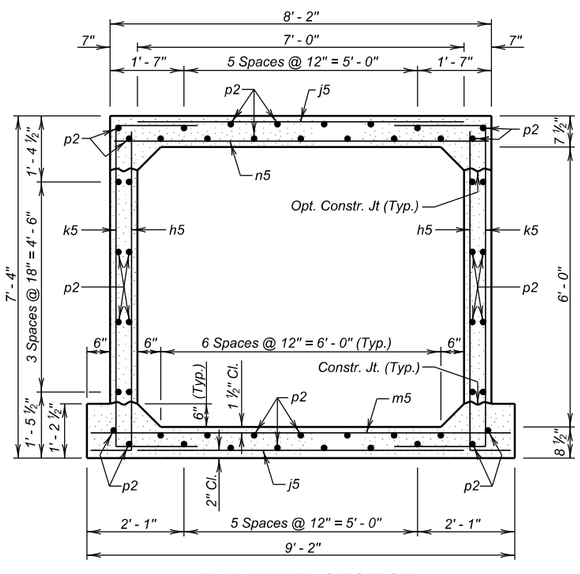
LEGEND FOR PLACING RE-STEEL

T.T.S.	- Top of Top Slab
B.T.S.	- Bottom of Top Slab
T.B.S.	- Top of Bottom Slab
B.B.S.	- Bottom of Bottom Slab
O.F.W.	- Outside Face of Wall
I.F.W.	- Inside Face of Wall

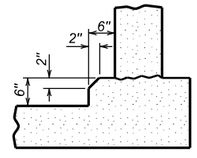
★ NOTE:
Cut and bend h5, k5, and p2 bars as required to place 30" RCP thru barrel wall.



ELEVATION



F5 BARREL SECTION
(5' - 0" Maximum Fill)



OPTIONAL FILLET DETAIL
(At Bottom Slab)

NOTE: Contractor may form the optional full fillet, with 2" Chamfer, as detailed. The cost of the additional concrete will be borne by the Contractor.

△ Place z1 bars thru construction joint between barrel sections as shown on Standard Plate No. 460.10. Quantity of z1 bars is for one construction joint.

◈ Place a2 bars in both faces of barrel wall. Quantity of a2 bars is for one pipe location.

SITE 2
ALTERNATE A

F5 BARREL INTERIOR SECTION DETAILS (58' - 0")

FOR

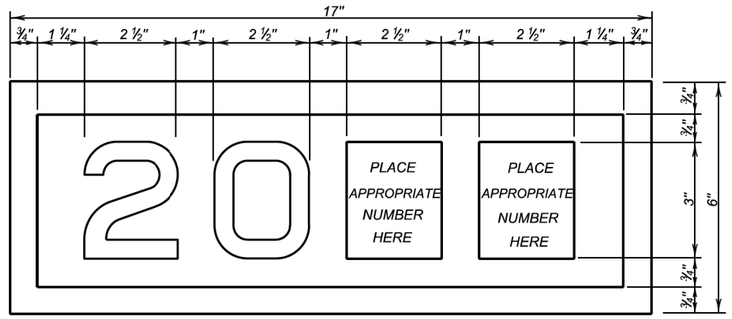
7' X 6' BOX CULVERT (C.I.P.)

OVER TRIB. TO ELK CREEK — 0° SKEW
STA. 1053 + 12.00 (EBL) — SEC. 10-T3N-R6E
STR. NO. 47-094-559 — IM-CR-EM 0901(187)44
HL-93

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
OCTOBER 2022

6 OF 8

DESIGNED BY	CK. DES. BY	DRAFTED BY	
AU	AH	BT	Steve A Johnson BRIDGE ENGINEER
MEAD034J	034JGD06		



YEAR PLATE DETAILS

GENERAL NOTES:

1. Year plates of the general dimensions shown will be constructed on all box culverts and bridges. The year plates will be constructed in reverse and attached to the forms in such a manner that the finished imprint in the concrete does not exceed one-half (1/2) inch in depth.

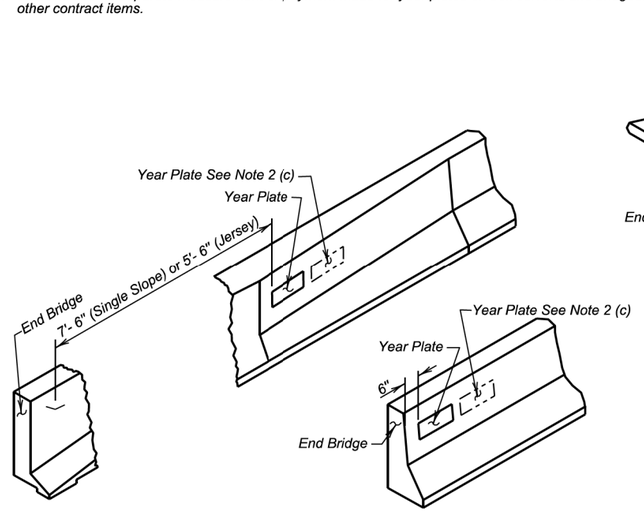
2. Year plates will be located on structure(s) as follows:

   a. On cast-in-place box culverts the year plates will be four and one - half (4 ½) inches below the top of the upstream parapet wall and centered laterally on the upstream face. On precast box culverts the year plate will be centered laterally on the upstream face of the top slab. Where an extended interior wall interferes with this location, the year plate will be centered in an adjacent barrel.

   b. On bridges with six (6) inch curbs, "Jersey" shaped barriers with no endblocks, or "Single Slope" shaped barriers with no endblocks, the year plate will be centered vertically on the curb face approximately six (6) inches from the end of the bridge, or as designated by the Engineer. On bridges with barrier endblocks, the year plate will be centered on the upper sloped portion of the barrier approximately 5'- 6" for "Jersey" shaped barriers from the end of the bridge and 7'-6" for "Single Slope" shaped barriers from the end of bridge, or as designated by the Engineer. There will be one year plate at each end of the bridge on opposite sides.

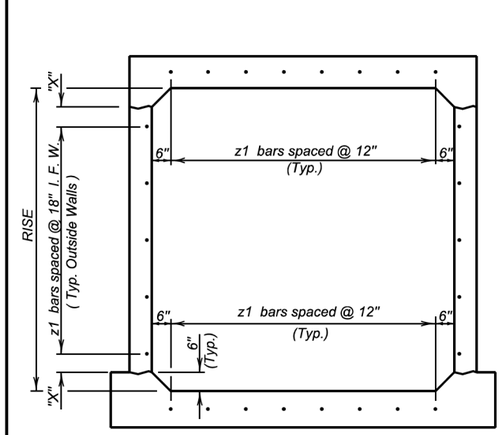
   c. When the plans specify that both the original date of construction and the date of reconstruction are to be shown, one date will be placed as listed above and the other located adjacent to it. Both year plates will be shown at each end of the bridge on opposite sides.

3. There will be no separate measurement or payment made for year plates on box culverts and bridges. All costs for this work will be incidental to other contract items.

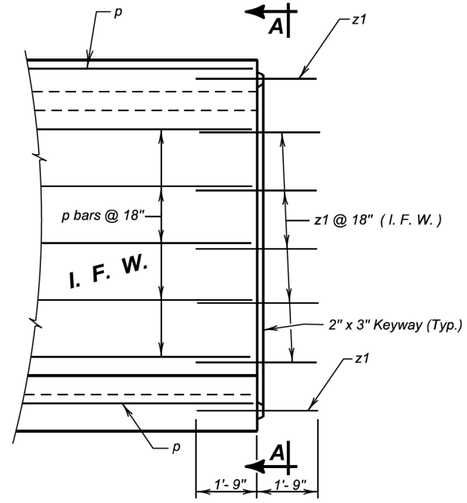


January 22,2021

Published Date: 2026	SDDOT	YEAR PLATE DETAILS	PLATE NUMBER 460.02
			Sheet 1 Of 1



TYPICAL SINGLE BARREL VIEW A - A

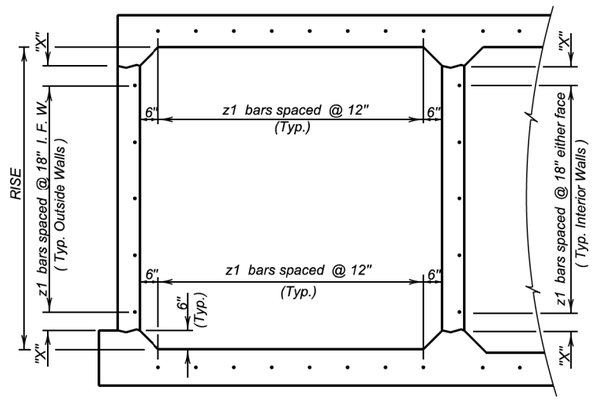


ELEVATION

LEGEND FOR PLACING RE-STEEL

I. F. W.	- Inside Face Wall

RISE	"X"
3'- 0"	3"
4'- 0"	9"
5'- 0"	6"
6'- 0"	3"
7'- 0"	9"
8'- 0"	6"
9'- 0"	3"
10'- 0"	9"
11'- 0"	6"
12'- 0"	3"
13'- 0"	9"
14'- 0"	6"



TYPICAL MULTIPLE BARREL VIEW A - A

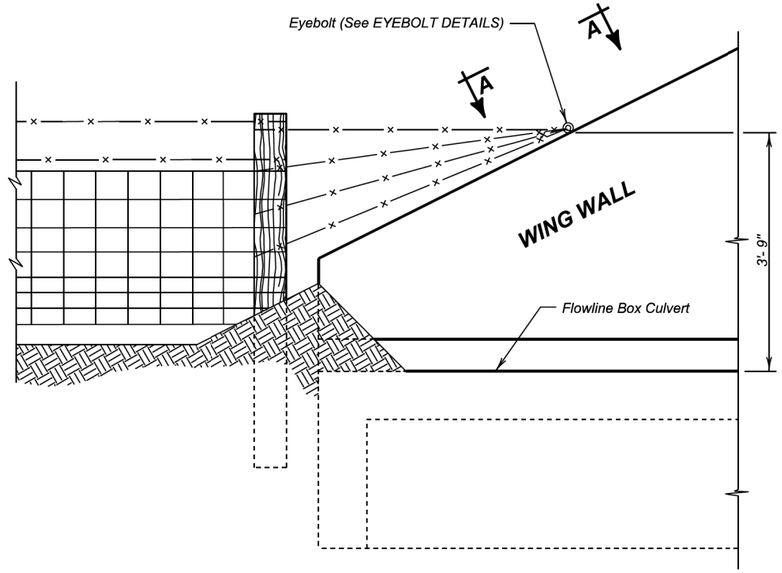
GENERAL NOTES:

1. z1 bars will be placed in the middle of the 2" X 3" keyway in the top and bottom slabs. z1 bars will be lapped with the longitudinal p bars in the inside face of the wall for outside walls and in either face for interior walls. z1 bars are listed and included elsewhere in plans.

2. Drainage Fabric Protection will be placed in accordance with Section 422, or Section 560, whichever is applicable.

June 1, 2022

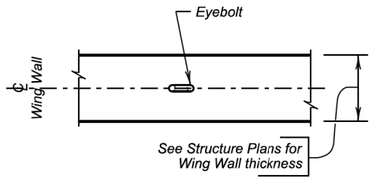
Published Date: 2026	SDDOT	BOX CULVERT BARREL TIE REINFORCEMENT	PLATE NUMBER 460.10
			Sheet 1 of 1



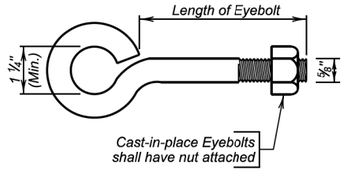
DETAIL FOR FENCE ANCHORS

GENERAL NOTES:

1. The fence and post details shown are for illustrative purpose only. The fence shall be as specified elsewhere in the plans.
2. Eyebolts shall be placed on all of the box culvert wing walls.
3. Eyebolts shall be ⅝ inch diameter and shall conform to ASTM A307.
4. Eyebolts, nuts, and concrete inserts shall be galvanized in accordance with AASHTO M232 (ASTM A153). Concrete inserts of corrosion resistant material need not be galvanized.
5. Cast-in-place eyebolts shall have a nut attached, be 4 ½ inches (Min.) in length and shall be embedded such that the eye of the bolt is flush with the concrete surface. (See Eyebolt Details) As an alternate, cast-in-place concrete inserts, capable of developing the full strength of the ⅝ inch diameter threaded eyebolt, may be used and shall be set in the concrete in accordance with the manufacturer's recommendations. The eyebolt shall be of sufficient length to develop its full strength. The eye of the eyebolt shall be flush with the concrete surface.
6. The cost for furnishing and installing eyebolts and/or concrete inserts shall be incidental to various contract items.



VIEW A - A



EYEBOLT DETAILS

December 23,2012

Published Date: 2026	SDDOT	FENCE ANCHORS FOR BOX CULVERT WING WALLS	PLATE NUMBER 620.16 Sheet 1 of 1

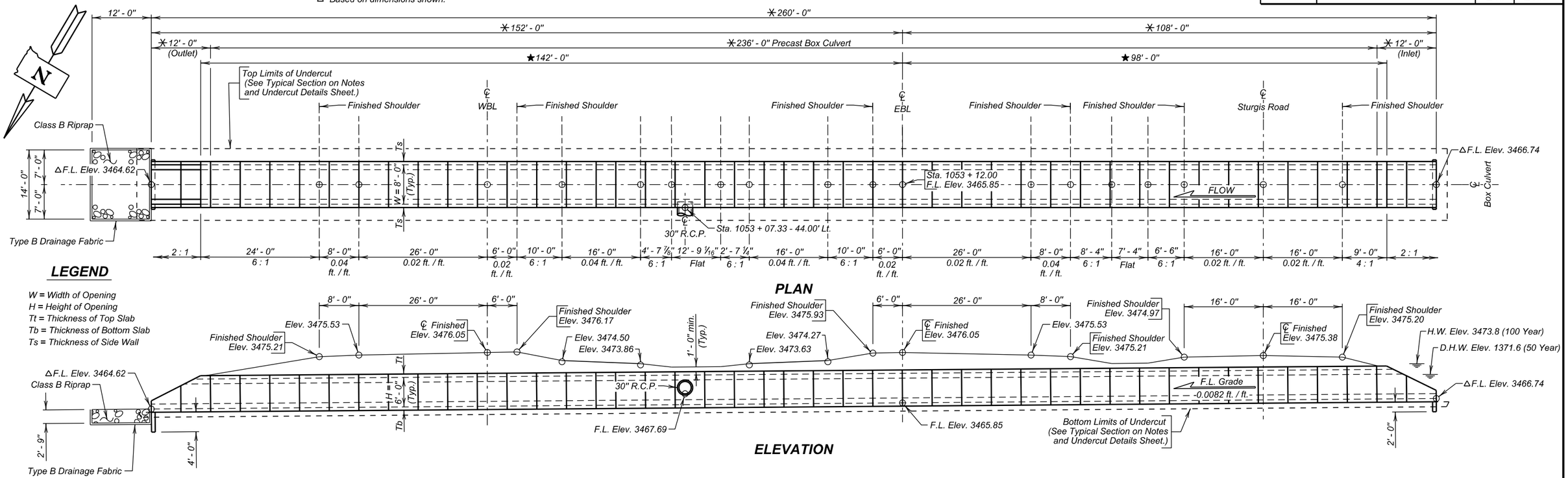
SITE 2
ALTERNATE A

7' X 6' BOX CULVERT (C.I.P.)
STR. NO. 47-094-559
OCTOBER 2022

The elevations shown in these plans are based on the National Geodetic Survey (NGS) North American Vertical Datum of 1988 (NAVD88).

✳ Dimension may vary with fabricator and/or installation. See Shop Plans for actual installation length.
★ Minimum distance to satisfy fill slopes.
△ Based on dimensions shown.

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E45	E185



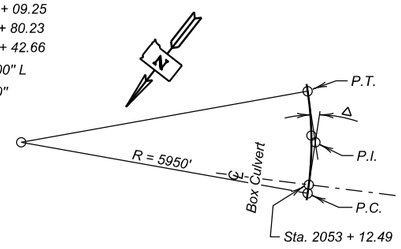
PLAN

ELEVATION

LEGEND

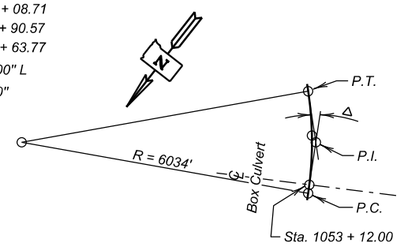
W = Width of Opening
H = Height of Opening
Tt = Thickness of Top Slab
Tb = Thickness of Bottom Slab
Ts = Thickness of Side Wall

P. C. Sta. 2053 + 09.25
P. I. Sta. 2060 + 80.23
P. T. Sta. 2068 + 42.66
△ = 14° 45' 58.00" L
D = 0° 57' 47.00"
R = 5950'
T = 770.98'
L = 1533.41'

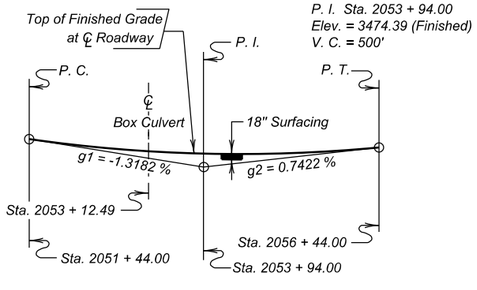


HORIZONTAL CURVE DATA
(Westbound Lanes)

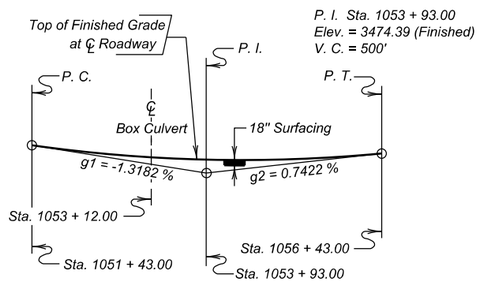
P. C. Sta. 1053 + 08.71
P. I. Sta. 1060 + 90.57
P. T. Sta. 1068 + 63.77
△ = 14° 45' 58.00" L
D = 0° 56' 58.00"
R = 6034'
T = 781.86'
L = 1555.06'



HORIZONTAL CURVE DATA
(Eastbound Lanes)



VERTICAL CURVE DATA
(Westbound Lanes)



VERTICAL CURVE DATA
(Eastbound Lanes)

HYDRAULIC DATA

Q_d	238 cfs
A_d	19 sq ft
V_d	12.9 fps
Q_F	238 cfs
Q_{100}	375 cfs
Q_{OT}	481 cfs
V_{max}	14.6 fps

Q_d = Design discharge for the proposed culvert based on 50 year frequency. El. 3471.6.
Q_{OT} = Overtopping discharge and frequency > Q_{124} year recurrence interval. El. 3475.4. Location 1053 + 45.00.
Q_F = Designated peak discharge for the basin approaching proposed project based on 50 year frequency.
Q_{100} = Computed discharge for the basin approaching proposed project based on 100 year frequency. El. 3473.8.
V_{max} = Maximum computed outlet velocity for the proposed culvert, based on 100 year frequency.

ESTIMATED QUANTITIES

	ITEM	UNIT	QUANTITY
∢	Structure Excavation, Box Culvert	Cu. Yd.	68
	Box Culvert Undercut	Cu. Yd.	138
≠	Class B Riprap	Ton	24.0
	Type B Drainage Fabric	Sq. Yd.	35
	8' X 6' Precast Concrete Culvert, Furnish	Ft.	236
	8' X 6' Precast Concrete Culvert, Install	Ft.	236
	8' X 6' Precast Concrete Culvert End Section, Furnish	Each	2
	8' X 6' Precast Concrete Culvert End Section, Install	Each	2

∢ Quantity is based on 9" bottom slab and 8" outside walls.
≠ For estimating purposes only, a factor of 1.4 tons/cu. yd. was used to convert Cu. Yd. to Tons.

INDEX OF CULVERT SHEETS-

Sheet No. 1 - General Drawing and Quantities
Sheet No. 2 - Notes and Undercut Details
Sheet No. 3 - Details of Standard Plate No.'s 460.02 & 560.01
Sheet No. 4 - Details of Standard Plate No.'s 560.10 & 560.11
Sheet No. 5 - Details of Standard Plate No. 620.16

SITE 2
ALTERNATE B

GENERAL DRAWING AND QUANTITIES

FOR

8' X 6' BOX CULVERT (PRECAST)

OVER TRIB. TO ELK CREEK — 0° SKEW
STA. 1053 + 12.00 (EBL) — SEC. 10-T3N-R6E
STR. NO. 47-094-559 — IM-CR-EM 0901(187)44
PCN 034J — HL-93

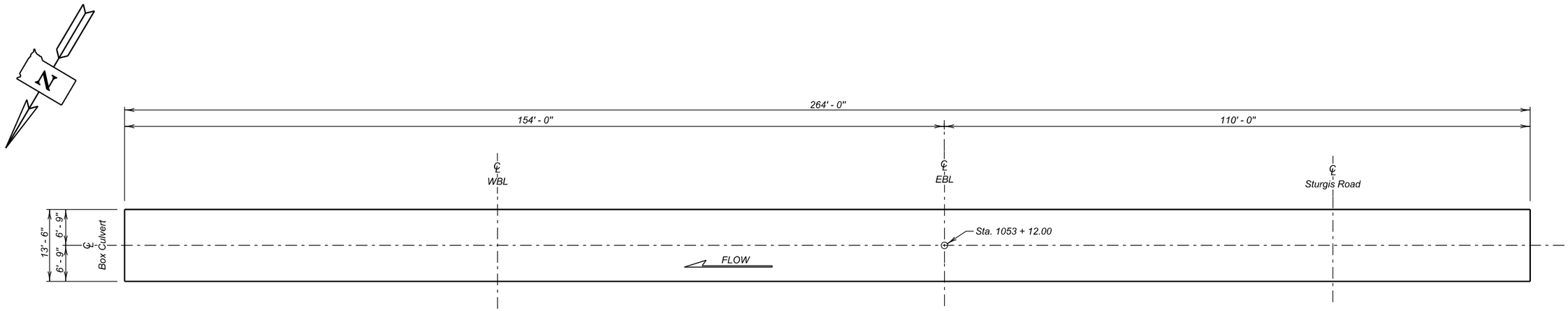
MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
SEPTEMBER 2022

PLANS BY :
OFFICE OF BRIDGE DESIGN, SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION

DESIGNED BY	CK. DES. BY	DRAFTED BY	
AU MEAD034J	AH 034JGD09	BT	Steve A Johnson BRIDGE ENGINEER

Revised October 15, 2025 AU

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E46	E185



UNDERCUT LAYOUT
(Bottom Dimensions)

SPECIFICATIONS

Use South Dakota Standard Specifications for Roads and Bridges, 10-1-25 Version, Required Provisions, and Special Provisions as included in the Proposal. The Standard Specifications for Roads and Bridges are available for download and viewing at: https://dot.sd.gov/doing-business/contractors/standard-specifications.

GENERAL NOTES

Design will be in accordance with Section 560 of the Construction Specifications with the following criteria:

1. *Box culvert and box culvert end section design will conform to the AASHTO LRFD Bridge Design Specifications, 9th Edition.*
2. *Design Live Load: HL-93 and construction loading consisting of one 7' - 6" gage axle with gross weight = 95,850 lbs. The construction load will not be applied until a minimum of 4 feet of fill has been placed over the Box Culvert. If other construction loads in excess of legal load are anticipated by the Contractor, the Contractor will submit a design analysis for the anticipated construction loading, through the proper channels, to the Office of Bridge Design for approval.*
3. *The box culvert will be load rated in accordance with the AASHTO Manual for Bridge Evaluation, 2018 Edition with the latest Interim Revisions using the LRFR method. The rating will include evaluation of the Design HL-93 truck at both Inventory and Operating levels and a Legal Load rating for three SD legal trucks (Type 3, 3S2 and 3-2) as well as the notional rating load and four specialized hauling vehicles. The structure will also be evaluated for the emergency vehicles, EV2 and EV3, at the legal load rating level. All sections of the box culvert will rate at HL-93 or better (Inventory Level). The three SD legal loads, the notional rating load, the four specialized hauling vehicles, and two emergency vehicles will rate greater than 1.0 at legal load rating level. AASHTOWare Bridge Rating (BrR) is required to be used to rate the box culvert. Include the BrR rating model and a load rating summary table with the load rating calculations, Submit load rating calculations with the design and independent check design calculations or shop plans, as appropriate.*
4. *The design of the barrel sections will be based on a minimum fill height of 2 feet and include all subsequent fill heights up to and including the maximum fill height of 5 feet over the box culvert.*
5. *Minimum inside corner fillet shall be 6 in.*
6. *Minimum precast barrel section length will be 6 foot; however, no more than two 4 foot sections are allowed in any one length of precast barrel.*
7. *Lift holes will be plugged with an approved non-shrinkable grout.*
8. *The Fabricator will imprint on the structure the date of construction as specified and detailed on Standard Plate No. 460.02.*
9. *Alternate end section details will be allowed, subject to the approval of the Bridge Construction Engineer. No additional payment will be made for any change in the barrel/end section configuration.*

GENERAL NOTES CONTINUED

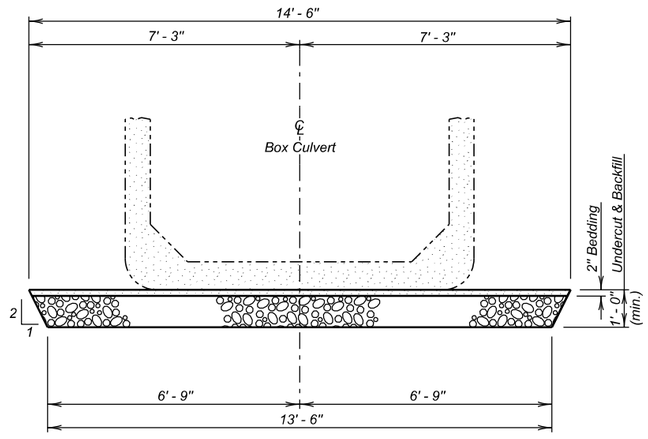
10. *Installation of the precast sections will be in accordance with the final approved shop plans.*
11. *Care will be taken when placing sections. Sections will be only moved using the lifting holes by approved equipment.*
12. *Soils below the bottom of the proposed RCBC consist of brown silt clay (alluvium). Groundwater was encountered in the borings at an elevation of 3464.9 during the subsurface investigation conducted in October to November 2021.*

DESIGN MIX OF CONCRETE

1. *Mix will be as per fabricator's design; however, a minimum compressive strength will not be less than 4500 p.s.i. at 28 days.*
2. *Type II cement is required.*

SHOP PLANS

The fabricator will submit shop plans in accordance with the Construction Specifications. Include design and independent check design, if applicable, with initial submittal.



TYPICAL SECTION
(For Limits of Undercut)

ESTIMATED QUANTITIES

	ITEM	UNIT	QUANTITY
₡	Box Culvert Undercut	Cu. Yd.	138

₡ *For payment, quantity is based on plan shown undercut dimensions and will not be measured unless the Engineer orders a change.*

SITE 2
ALTERNATE B

NOTES AND UNDERCUT DETAILS

FOR

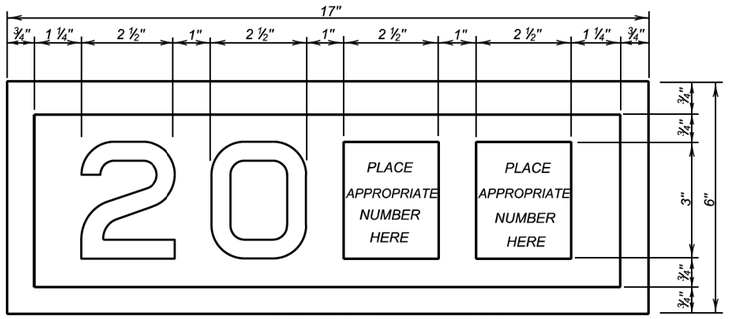
8' X 6' BOX CULVERT (PRECAST)

OVER TRIB. TO ELK CREEK — 0° SKEW
STA. 1053 + 12.00 (EBL) — SEC. 10-T3N-R6E
STR. NO. 47-094-559 — IM-CR-EM 0901(187)44
HL-93

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
SEPTEMBER 2022

2 OF 5

DESIGNED BY	CK. DES. BY	DRAFTED BY	
AU	AH	BT	Steve A Johnson BRIDGE ENGINEER
MEAD034J	034JGD10		



YEAR PLATE DETAILS

GENERAL NOTES:

1. Year plates of the general dimensions shown will be constructed on all box culverts and bridges. The year plates will be constructed in reverse and attached to the forms in such a manner that the finished imprint in the concrete does not exceed one-half (1/2) inch in depth.

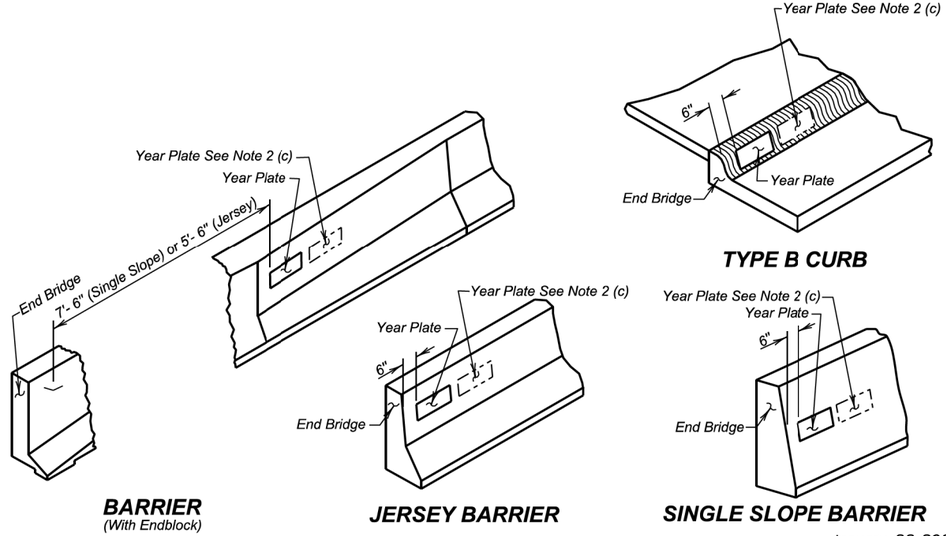
2. Year plates will be located on structure(s) as follows:

   a. On cast-in-place box culverts the year plates will be four and one - half (4 ½) inches below the top of the upstream parapet wall and centered laterally on the upstream face. On precast box culverts the year plate will be centered laterally on the upstream face of the top slab. Where an extended interior wall interferes with this location, the year plate will be centered in an adjacent barrel.

   b. On bridges with six (6) inch curbs, "Jersey" shaped barriers with no endblocks, or "Single Slope" shaped barriers with no endblocks, the year plate will be centered vertically on the curb face approximately six (6) inches from the end of the bridge, or as designated by the Engineer. On bridges with barrier endblocks, the year plate will be centered on the upper sloped portion of the barrier approximately 5'- 6" for "Jersey" shaped barriers from the end of the bridge and 7'-6" for "Single Slope" shaped barriers from the end of bridge, or as designated by the Engineer. There will be one year plate at each end of the bridge on opposite sides.

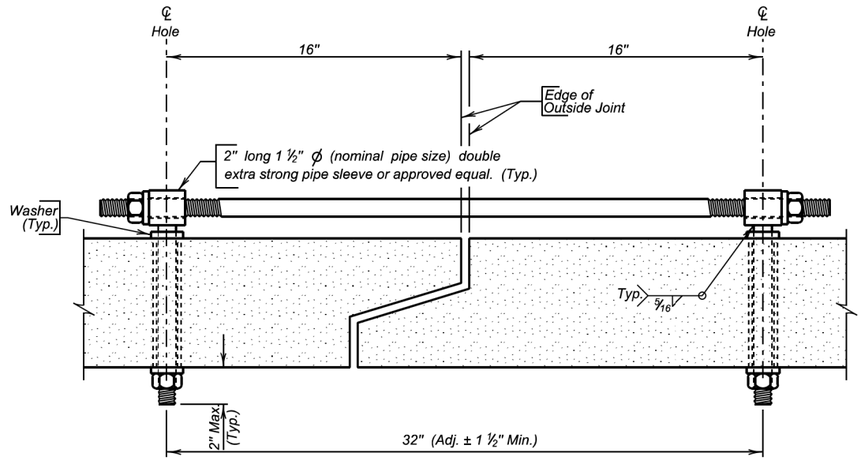
   c. When the plans specify that both the original date of construction and the date of reconstruction are to be shown, one date will be placed as listed above and the other located adjacent to it. Both year plates will be shown at each end of the bridge on opposite sides.

3. There will be no separate measurement or payment made for year plates on box culverts and bridges. All costs for this work will be incidental to other contract items.



January 22, 2021

Published Date: 2026	SDDOT	YEAR PLATE DETAILS	PLATE NUMBER 460.02
			Sheet 1 Of 1



TIE BOLT ASSEMBLY

GENERAL NOTES:

1. All holes for tie bolts shall be cast-in-place,16 inches from outside edge of joint. Cast in inserts or sleeves, if used, shall be made of a corrosion resistant material.

2. Ties shall be 1 inch ∅ and conform to the requirements of ASTM A36, ASTM A307, or ASTM F1554, Gr. 36. Nuts shall be heavy hex in conformance with ASTM A563. Washers shall conform to ASTM F436, Type 1. The welded pipe sleeve shall conform to ASTM A53, Grade B.

3. Welding and weld inspection shall be in conformance with AWS/ANSI D1.1 - (Current Year) Structural Welding Code - Steel.

4. Tie Bolt Assembly shall be galvanized in accordance with ASTM A153 or ASTM F2329 as applicable.

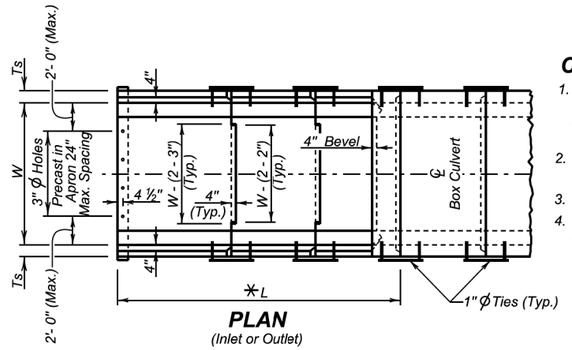
5. Tie Bolt Assembly details may vary from that shown, but alternate tie bolt assemblies are subject to testing to demonstrate equal strength. Submit details, through proper channels, to the Office of Bridge Design for approval.

6. All costs for furnishing and installing the precast box culvert tie bolt assembly shall be incidental to the contract unit price per Foot for "Precast Concrete Box Culvert, Furnish".

March 21, 2016

Published Date: 2026	SDDOT	PRECAST BOX CULVERT TIE BOLT ASSEMBLY DETAILS	PLATE NUMBER 560.01
			Sheet 1 of 1

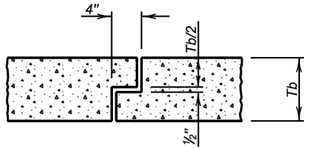
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E48	E185



PLAN
(Inlet or Outlet)

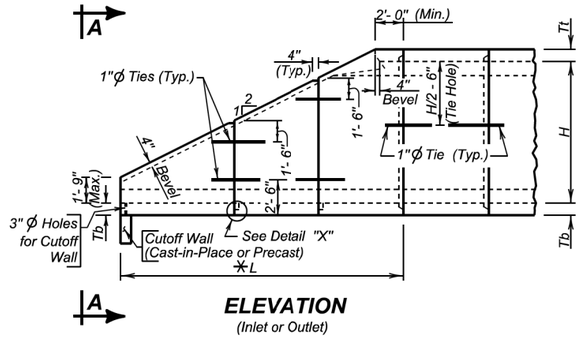
CUTOFF WALL

1. *All costs associated with furnishing and installing the Cutoff Wall, whether precast or cast-in-place, shall be incidental to the contract unit price per each for "Precast Box Culvert End Section, Furnish".*
2. *Concrete for cast-in-place cutoff wall shall be Class M6 concrete in accordance with Section 462 of the Specifications.*
3. *All reinforcing steel shall conform to ASTM A615 Grade 60.*
4. *Alternate details will be allowed, subject to the approval of the Bridge Construction Engineer.*

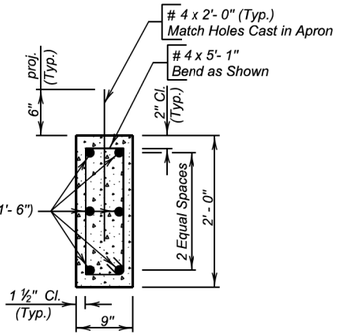


DETAIL " X "

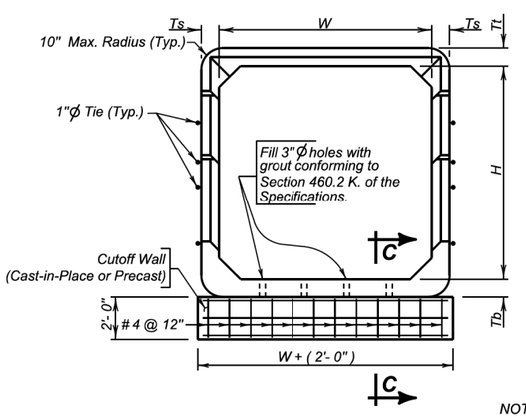
NOTE: *Joint details may vary from that shown, according to the manufacturer's design. Submit details with shop plans for approval.*



ELEVATION
(Inlet or Outlet)



SEC. C - C



VIEW A - A

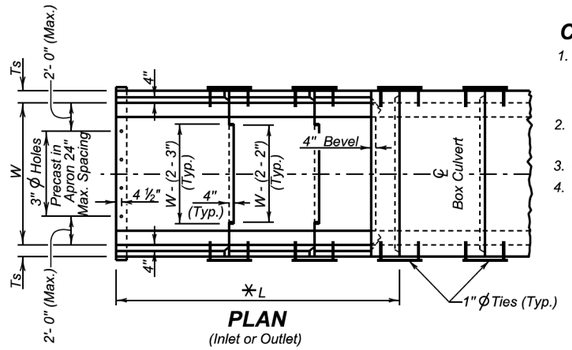
LEGEND

W = Width of Opening
H = Height of Opening
Tt = Thickness of Top Slab
Tb = Thickness of Bottom Slab
Ts = Thickness of Side Wall
L = Length of End Section

NOTES:
See GENERAL DRAWING for W and H dimensions.
Tt, Tb, L, and Ts dimensions shall be furnished by the Contractor.
⚹ Length and number of units may vary from that shown.

June 26, 2015

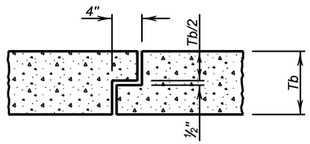
Published Date: 2026	SDDOT	PRECAST SINGLE BOX CULVERT SLOPED END SECTION DETAILS WITH 2'–0" CUTOFF WALL	PLATE NUMBER 560.10 Sheet 1 of 1



PLAN
(Inlet or Outlet)

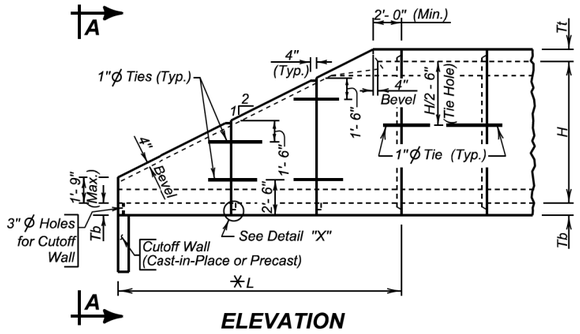
CUTOFF WALL

1. *All costs associated with furnishing and installing the Cutoff Wall, whether precast or cast-in-place, shall be incidental to the contract unit price per each for "Precast Box Culvert End Section, Furnish".*
2. *Concrete for cast-in-place cutoff wall shall be Class M6 concrete in accordance with Section 462 of the Specifications.*
3. *All reinforcing steel shall conform to ASTM A615 Grade 60.*
4. *Alternate details will be allowed, subject to the approval of the Bridge Construction Engineer.*

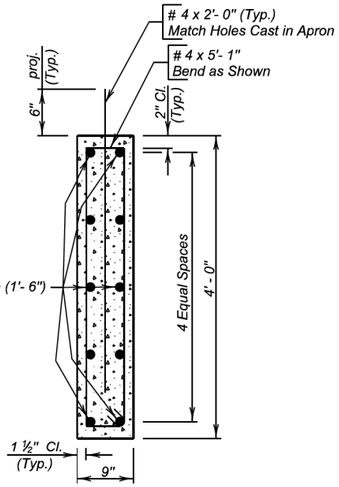


DETAIL " X "

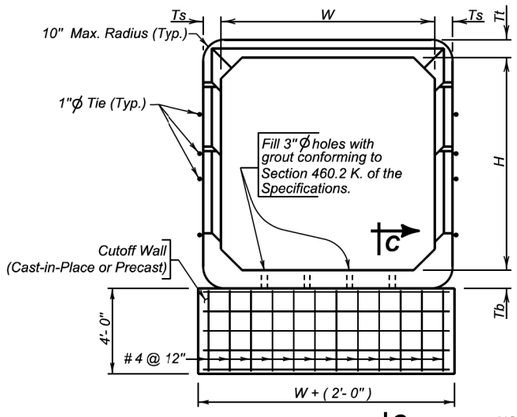
NOTE: *Joint details may vary from that shown, according to the manufacturer's design. Submit details with shop plans for approval.*



ELEVATION
(Inlet or Outlet)



SEC. C - C



VIEW A - A

LEGEND

W = Width of Opening
H = Height of Opening
Tt = Thickness of Top Slab
Tb = Thickness of Bottom Slab
Ts = Thickness of Side Wall
L = Length of End Section

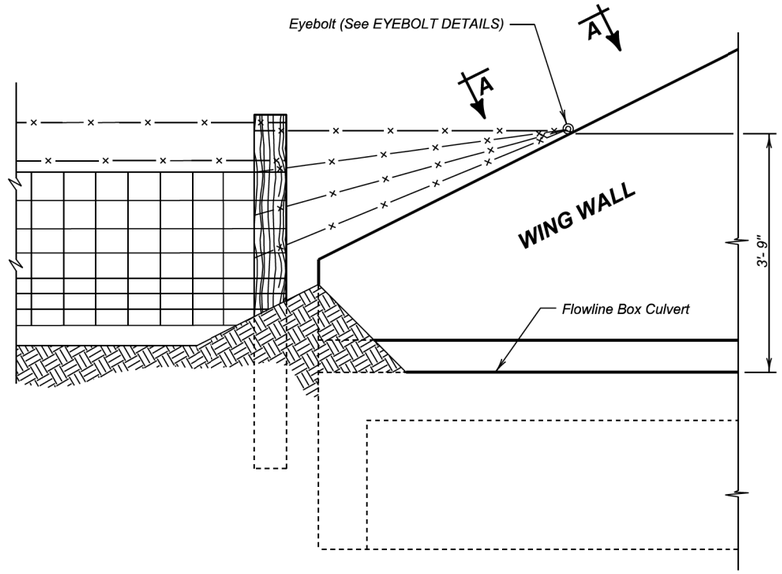
NOTES:
See GENERAL DRAWING for W and H dimensions.
Tt, Tb, L, and Ts dimensions shall be furnished by the Contractor.
⚹ Length and number of units may vary from that shown.

June 26, 2015

Published Date: 2026	SDDOT	PRECAST SINGLE BOX CULVERT SLOPED END SECTION DETAILS WITH 4'–0" CUTOFF WALL	PLATE NUMBER 560.11 Sheet 1 of 1

SITE 2
ALTERNATE B

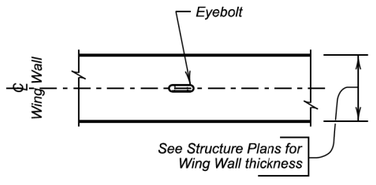
8' X 6' BOX CULVERT (PRECAST)
STR. NO. 47-094-559
SEPTEMBER 2022



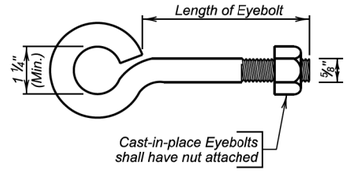
DETAIL FOR FENCE ANCHORS

GENERAL NOTES:

1. The fence and post details shown are for illustrative purpose only. The fence shall be as specified elsewhere in the plans.
2. Eyebolts shall be placed on all of the box culvert wing walls.
3. Eyebolts shall be ⅝ inch diameter and shall conform to ASTM A307.
4. Eyebolts, nuts, and concrete inserts shall be galvanized in accordance with AASHTO M232 (ASTM A153). Concrete inserts of corrosion resistant material need not be galvanized.
5. Cast-in-place eyebolts shall have a nut attached, be 4 ½ inches (Min.) in length and shall be embedded such that the eye of the bolt is flush with the concrete surface. (See Eyebolt Details) As an alternate, cast-in-place concrete inserts, capable of developing the full strength of the ⅝ inch diameter threaded eyebolt, may be used and shall be set in the concrete in accordance with the manufacturer's recommendations. The eyebolt shall be of sufficient length to develop its full strength. The eye of the eyebolt shall be flush with the concrete surface.
6. The cost for furnishing and installing eyebolts and/or concrete inserts shall be incidental to various contract items.



VIEW A - A



EYEBOLT DETAILS

December 23,2012

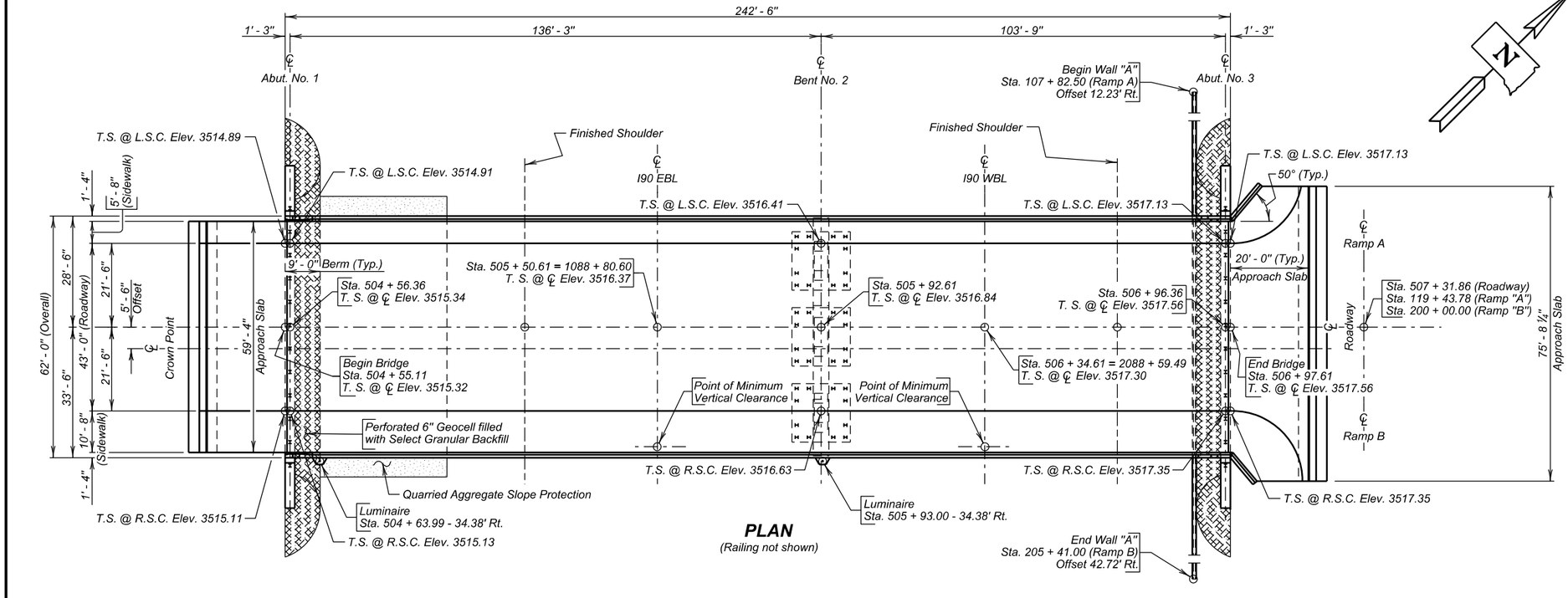
Published Date: 2026	SDDOT	FENCE ANCHORS FOR BOX CULVERT WING WALLS	PLATE NUMBER 620.16 Sheet 1 of 1

SITE 2
ALTERNATE B

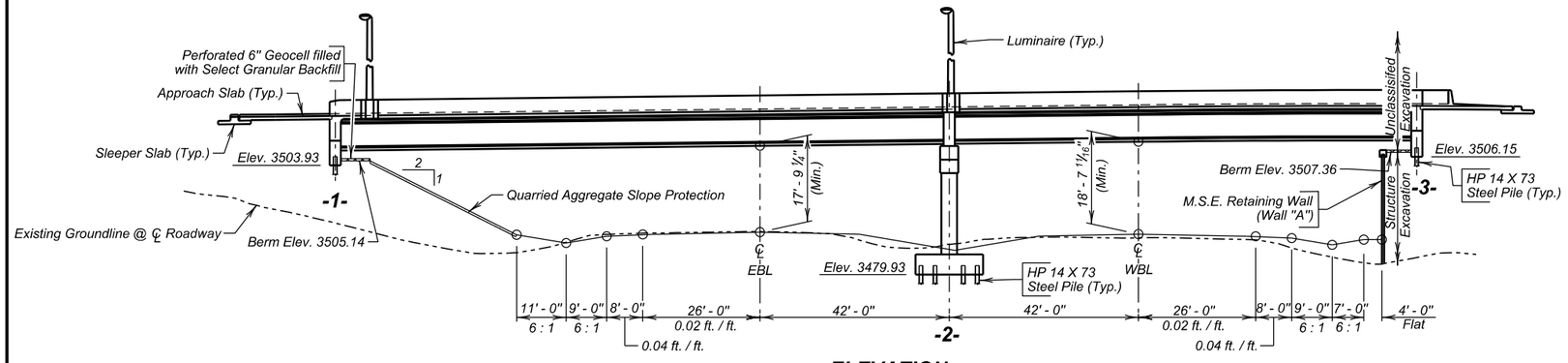
8' X 6' BOX CULVERT (PRECAST)
STR. NO. 47-094-559
SEPTEMBER 2022

The elevations shown in these plans are based on the National Geodetic Survey (NGS) North American Vertical Datum of 1988 (NAVD88).

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E50	E185



PLAN
(Railing not shown)

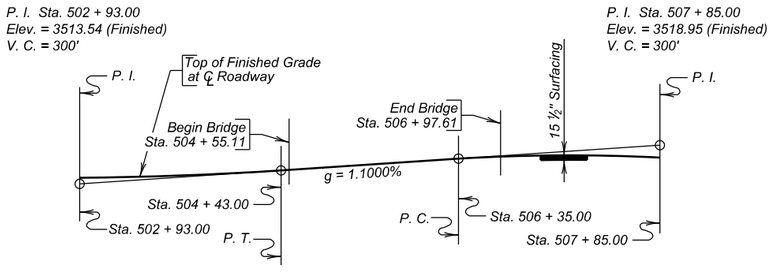


ELEVATION
(Railing not shown)

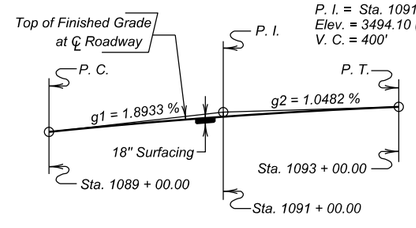
NOTE:
T.S. @ ℄ Elev. = Top of Slab at Centerline Elevation
T.S. @ L.S.C. Elev. = Top of Slab at Left Sidewalk Curb Elevation
T.S. @ R.S.C. Elev. = Top of Slab at Right Sidewalk Curb Elevation

-X281-
INDEX OF BRIDGE SHEETS -

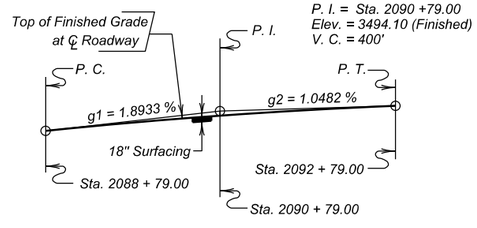
Sheet No. 1 - General Drawing
Sheet No. 2 - Estimate of Structure Quantities and Notes
Sheet No. 3 - Notes (Continued)
Sheet No. 4 - Notes (Continued)
Sheet No. 5 - Notes (Continued)
Sheet No. 6 - Notes (Continued)
Sheet No. 7 - Subsurface Investigation and Piling Layout
Sheet No. 8 - Abutment Details (A)
Sheet No. 9 - Abutment Details (B)
Sheet No. 10 - Bent Details (A)
Sheet No. 11 - Bent Details (B)
Sheet No. 12 - Superstructure Details (A)
Sheet No. 13 - Superstructure Details (B)
Sheet No. 14 - Endblock and Barrier Curb Details (A)
Sheet No. 15 - Endblock and Barrier Curb Details (B)
Sheet No. 16 - Endblock and Barrier Curb Details (C)
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Sheet No. 22 - Details of Bridge End Backfill Adjacent ot Abutment No. 1 (A)
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Sheet No. 24 - Details of Bridge End Backfill Adjacent ot Abutment No. 3 (A)
Sheet No. 25 - Details of Bridge End Backfill Adjacent to Abutment No. 3 (B)
Sheet No. 26 - Slope Protection Details
Sheet No. 27 - Details of Approach Slab Adjacent to Abutment No. 1
Sheet No. 28 - Details of Approach Slab Adjacent to Abutment No. 3 (A)
Sheet No. 29 - Details of Approach Slab Adjacent to Abutment No. 3 (B)
Sheet No. 30 - Approach Slab Joint Details (A)
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Sheet No. 32 - Raised Concrete Sidewalk Details (A)
Sheet No. 33 - Raised Concrete Sidewalk Details (B)
Sheet No. 34 - As-Built Elevation Survey
Sheet No. 35 - Details of Standard Plate No.'s 430.50 and 460.02
Sheet No. 36 - Details of Standard Plate No.'s 460.05 and 510.40
Sheet No. 37 - Details of Standard Plate No.'s 620.17 and 630.92



GRADELINE DATA
(Elk Creek Road)



VERTICAL CURVE DATA
(I90 EBL)



VERTICAL CURVE DATA
(I90 WBL)

PLANS BY :
OFFICE OF BRIDGE DESIGN, SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION

GENERAL DRAWING

FOR

242' - 6" PRESTRESSED GIRDER BRIDGE

43' - 0" ROADWAY, 1 - 10' - 0" SIDEWALK, & 1 - 5' - 0" SIDEWALK — 0° SKEW
OVER I-90 — SEC. 15-T3N-R6E
STA. 504 + 55.11 TO — IM-CR-EM 0901(187)44
STA. 506 + 97.61 — HL-93
STR. NO. 47-098-564
PCN 034J

MEADE COUNTY

S. D. DEPT. OF TRANSPORTATION

JULY 2023

-X281-

1 OF 37

DESIGNED BY	CK. DES. BY	DRAFTED BY	
PW MEAD034J	AU 034JTE01	BT/MG	Steven A. Johnson BRIDGE ENGINEER

ESTIMATE OF STRUCTURE QUANTITIES

DESCRIPTION	QUANTITY	UNIT	REMARKS
Bridge Elevation Survey	Lump Sum	LS	
Concrete Penetrating Sealer	1598.7	SqYd	See Special Provision
Select Granular Backfill	49.0	Ton	
Incidental Work, Structure	Lump Sum	LS	
Structural Steel, Miscellaneous	Lump Sum	LS	
Membrane Sealant Expansion Joint	135.0	Ft	
Structure Excavation, Bridge	307	CuYd	
Bridge End Embankment	1705	CuYd	
Granular Bridge End Backfill	210.1	CuYd	
Approach Slab Underdrain Excavation	4.3	CuYd	
Precast Concrete Headwall for Drain	2	Each	
Class A45 Low Shrinkage Concrete, Bridge Deck	519.3	CuYd	See Special Provision
Class A45 Concrete, Bridge	376.3	CuYd	
Concrete Approach Slab for Bridge	302.3	SqYd	
Concrete Approach Sleeper Slab for Bridge	108.7	SqYd	
Reinforcing Steel	54875	Lb	
Epoxy Coated Reinforcing Steel	3636	Lb	
Stainless Reinforcing Steel	117963	Lb	See Special Provision
Preboring Pile	120	Ft	
HP 14x73 Steel Test Pile, Furnish and Drive	195	Ft	
HP 14x73 Steel Bearing Pile, Furnish and Drive	3180	Ft	
81" Minnesota Shape Prestressed Concrete Beam	1916	Ft	
4" Underdrain Pipe	105	Ft	
Porous Backfill	8.1	Ton	
Bridge Berm Slope Protection, Quarried Aggregate	290.7	SqYd	
Perforated Geocell	1271	SqFt	
Install Dowel in Concrete	208	Each	
No. 14 Rebar Splice	78	Each	
Steel Pedestrian Railing on Sidewalk	464	Ft	
Class M6 Concrete	87.1	CuYd	
3" Rigid Galvanized Steel Conduit	243	Ft	
Type A Drainage Fabric	291	SqYd	
Base Course	1641.7	Ton	
Geogrid Reinforcement	1043	SqYd	

BRIDGE SPECIFICATIONS

1. Design Specifications: AASHTO LRFD Bridge Design Specifications, 9th Edition.

2. Construction Specifications: South Dakota Standard Specifications for Roads and Bridges, 10-1-25 Version, Required Provisions, and Special Provisions as included in the Proposal. The Standard Specifications for Roads and Bridges are available for download and viewing at https://dot.sd.gov/doing-business/contractors/standard-specifications.

BRIDGE DESIGN LOADING

1. Girders are designed as continuous for AASHTO HL-93 Live Load.

2. Dead Load includes 22 psf for future wearing surface on the roadway.

DESIGN MATERIAL STRENGTHS*

Class A45 Concrete	f'_c = 4,500 psi
Reinforcing Steel (ASTM A615, Gr. 60)	f_y = 60,000 psi
Stainless Steel (ASTM A955, Gr. 60)	f_y = 60,000 psi
Piling (ASTM A572 Grade 50)	f_y = 50,000 psi

*For prestressed beams, see notes regarding Prestressed Girders.

GENERAL CONSTRUCTION

1. All lap splices shown are contact lap splices unless noted otherwise.

2. All exposed concrete corners and edges will be chamfered 3/4-inch unless noted otherwise.

3. Use 2-inch clear cover on all reinforcing steel except as shown otherwise on plans.

4. The Contractor will imprint on the structure the date of new construction as specified and detailed on Standard Plate 460.02.

5. Barrier Curbs and End blocks will be built perpendicular to the roadway grade line.

6. Requests for construction joints or reinforcing steel splices at points other than those shown, must be submitted to the Engineer for prior approval. If additional splices are approved, no payment will be allowed for the added quantity of reinforcing steel.

7. Bridge berms will be constructed to the plans template prior to any pile driving or construction of abutment footings. See Standard Plate 120.11 as appropriate. Berm slopes will not be disturbed after construction. Any requests to alter the berm or slopes after berm construction will be submitted to the Bridge Construction Engineer for approval. Allow 30 days for review of proposals.

8. The elevation of the bridge deck is 15 ½ inches above subgrade elevation.

INCIDENTAL WORK, STRUCTURE

1. In place I-90 EBL Sta. 1078+36.07—64' RT to I-90 EBL Sta. 1080+49.57—127' LT is a 290.5 ft, 4 span continuous steel bridge with a 24'-0" clear roadway. The superstructure consists of a reinforced concrete deck and steel girders with steel railing continuous across the bridge. The substructure consists of single column reinforced concrete bents and reinforced concrete sill abutments, supported on timber piling.

2. Break down and remove the existing bridge, and approach/sleeper slabs if applicable, to 1-foot below finished groundline, or as required to construct the new structure in accordance with Section 110 of the Construction Specifications. All portions of the existing bridge not salvaged for future highway related use will be removed and disposed of by the Contractor on a site obtained by the Contractor and approved by the Engineer in accordance with the Environmental Commitments found in Section A.

3. The foregoing is a general description of the in-place bridge and should not be construed to be complete in all details. Before preparing the bid, it is the responsibility of the Contractor to make a visual inspection of the structure to verify the extent of the work and materials involved. If desired by the Contractor, a copy of the original construction plans may be obtained through the Office of Bridge Design.

NOTICE - LEAD BASED PAINT

Be advised that the paint on the steel surfaces of the existing structure contains lead. The Contractor should plan operations accordingly and inform employees of the hazards of lead exposure.

DESIGN MIX OF CONCRETE

1. All structural concrete will be Class A45 Concrete unless otherwise indicated.

2. Type II cement conforming to Section 750 is required except Type III cement may be used for prestressed beams.

3. Grout design mix will be as specified in Section 460.2 K of the Construction Specifications. A compressive strength of 2000 psi will be attained by the grout prior to erection of any beams. Chamfer edges of grout pads 3/4-inch. The quantity of grout is included in and will be paid for at the contract unit price per cubic yard for Class A45 Concrete, Bridge.

4. See Special Provision for Low Shrinkage Bridge Deck Concrete.

ESTIMATE OF STRUCTURE QUANTITIES AND NOTES
FOR
242' - 6" PRESTRESSED GIRDER BRIDGE

STR. NO. 47-098-564
JULY 2023

DESIGNED BY	CK. DES. BY	DRAFTED BY	
AU MEAD034J	PW 034JTE02	AU	Steve A Johnson BRIDGE ENGINEER

BOLT TESTING

The certified mill test reports for all bolts used on the project will include the test results for all the testing specified in section 972.2 D of the Construction Specifications. Some of these tests are supplemental tests that must be requested at the time the bolts are ordered. It is the responsibility of the Contractor to notify the bolt supplier of these requirements.

ABUTMENT BACKWALL COATING

The material for waterproofing the abutment backwall will be one of the products from the approved products list. The acceptable abutment backwall coating suppliers are listed on the approved products list at the following Internet address:

http://apps.sd.gov/applications/HC60ApprovedProducts/ProductList.aspx

The cost of furnishing and applying the coating will be incidental to the contract unit price per cubic yard for Class A45 Concrete, Bridge.

BENT

1. The HP 14x73 piling were designed using a factored bearing resistance of 134 tons per pile. Piling will develop a field verified nominal bearing resistance of 335 tons per pile.

2. One test pile will be driven at the bent and will become part of the pile group. The test pile will be driven before any other pile and will be driven to the required field verified nominal bearing resistance or as directed by the Engineer prior to driving any portion of the bearing piles.

3. The Contractor will have sufficient pile splice material on hand before pile driving is started. See Plate 510.40.

4. Piles can be driven to elevation 3470, but not below, prior to splicing. This will prevent setup of pile before full bearing depth is reached.

ABUTMENT NO. 1

1. Preboring piling at abutment no. 1 is required to whichever is greater, ten feet or to natural ground.

2. The HP 14x73 Piling were designed using a factored bearing resistance of 134 tons per pile. Piling will develop a field verified nominal bearing resistance of 335 tons per pile.

3. One test pile will be driven at the abutment and will become part of the pile group. The test pile will be driven before any other pile and will be driven to the required field verified nominal bearing resistance or as directed by the Engineer prior to driving any portion of the bearing piles.

4. The Contractor will have sufficient pile splice material on hand before pile driving is started. See Standard Plate 510.40.

5. Piles will not be driven out of position by more than three inches in the direction parallel to the girder centerline. A pile-driving template will be used to ensure this accuracy.

6. Abutment backwalls above the construction joint may be cast separately from the deck slab. The concrete used for the backwalls and wings will be Class A45 Concrete, Bridge. All abutment and bridge deck concrete will have attained design strength prior to backfilling.

7. The finished abutment will include a Bridge Survey Marker. See Standard Plate 460.05.

8. Piles can be driven to elevation 3475, but not below, prior to splicing. This will prevent setup of pile before full bearing depth is reached.

ABUTMENT NO. 3

1. Preboring is not required adjacent to MSE Walls

2. The HP 14x73 Piling were designed using a factored bearing resistance of 134 tons per pile. Piling will develop a field verified nominal bearing resistance of 335 tons per pile.

3. One test pile will be driven at the abutment and will become part of the pile group. The test pile will be driven before any other pile and will be driven to the required field verified nominal bearing resistance or as directed by the Engineer prior to driving any portion of the bearing piles.

4. The Contractor will have sufficient pile splice material on hand before pile driving is started. See Standard Plate 510.40.

5. Piles will not be driven out of position by more than three inches in the direction parallel to the girder centerline. A pile-driving template will be used to ensure this accuracy.

5. Abutment backwalls above the construction joint may be cast separately from the deck slab. The concrete used for the backwalls and wings will be Class A45 Concrete, Bridge. All abutment and bridge deck concrete will have attained design strength prior to backfilling.

6. Each finished abutment will include a Bridge Survey Marker. See Standard Plate 460.05.

7. All piling within the Granular MSE Backfill limits will be encased with a 27-inch minimum inside diameter steel casing. The steel casing will be of sufficient strength to withstand all forces, including those from earth pressure and will be approved by the Engineer. The pile will be encased the entire height of the backfill to an elevation of 3 inches below the bottom of abutment. See MSE Retaining Wall plans for measurement and payment of casing.

8. The Contractor will drive the pile and then place the casings. The Contractor will take all necessary precautions to prevent displacement of the casings during placement and compaction of the backfill. Backfill material within 3 feet of the casing will be placed in small lifts and compacted in such a manner that the required density is achieved, without causing displacement or damage to the steel casing. The Contractor will coordinate casing installation with the MSE wall installation.

9. After the piles are driven, the steel casings are installed and the backfill is placed, the steel casings will be filled with course dry sand to a depth of 6 feet from the top of the casing. The sand will be compacted to prevent bridging. The top 6 feet of the casing will be filled with natural bentonite slurry. The slurry will consist of a polymer free sodium bentonite designed for sealing wells and bore holes. The bentonite material will be a granular bentonite with 1/4-inch or larger particles. The bentonite particles will be poured directly into the casing and hydrated with water in 2-foot lifts. The quantity of water used will be determined according to the manufacturer's recommendations for a solution of approximately 20% solids.

10. After filling the casings with bentonite, the top of each casing will be covered and sealed with a layer of plywood covered with a minimum of 2-inch-thick polystyrene, as approved by the Engineer.

11. All costs associated with filling the steel casings with sand and bentonite slurry will be incidental to the contract unit price per foot for Steel Bearing Pile, Furnish and Drive, or Steel Test Pile, Furnish and Drive.

12. Piles can be driven to elevation 3465, but not below, prior to splicing. This will prevent setup of pile before full bearing depth is reached.

NOTES (CONTINUED)

FOR

242' - 6" PRESTRESSED GIRDER BRIDGE

STR. NO. 47-098-564

JULY 2023

DESIGNED BY	CK. DES. BY	DRAFTED BY	
AU	PW	AU	Steve A Johnson BRIDGE ENGINEER
MEAD034J	034JTE03		

SUPERSTRUCTURE

1. Girder lifting hooks will be cut off before placement of concrete deck slab.

2. The diaphragms at the bent will be poured integrally with the deck slab. Placement of the diaphragm at the bent will not slow down the rate of deck concrete placement and finishing. The Contractor will place the concrete for the specified diaphragm ahead of the deck concrete in such a manner that advancement of the deck concrete reaches the diaphragm just as placement of concrete in the diaphragm is complete.

3. The use of an approved deck finishing machine will be required during placement of bridge deck concrete. The deck finishing machine will be adjusted and operated in such a manner that the screed or screeds are parallel with the centerline of the bridge. The finish machine and concrete placement will be parallel to the skew of the bridge.

4. An admixture will be required to ensure the concrete remains plastic for 3 hours after placement. The concrete bridge deck will be placed and finished at a minimum rate of 43 feet of deck per hour measured along centerline roadway. If concrete cannot be placed and finished at this rate, the Engineer will order a header installed and operations stopped. If a header is required sometime during the pour operation, its location will be at or as near as possible to the three-quarter point of the span. Notify the Bridge Construction Engineer if deck pour operations are stopped. Operations may resume only when the Engineer is satisfied that a rate of 43 feet per hour can be maintained and the concrete has attained a minimum compressive strength of 2000 psi.

5. Snap ties, if used in the barrier curb formwork, will be corrosion resistant. The corrosion resistant ties will be inert in concrete and compatible with the reinforcing steel.

6. See Special Provision for Concrete Penetrating Sealer.

7. See Special Provision for Low Shrinkage Bridge Deck Concrete.

FALL PROTECTION

1. The Contractor will install a Fall Protection System conforming to OSHA Regulations. When working on the girders prior to decking installation, a Horizontal Lifeline – or other OSHA approved system will be installed. The Contractor will have one Personal Fall Arrest System (PFAS) available for use by a Department Inspector. The PFAS will be compatible with the installed Fall Protection System.

2. Modifications to any bridge components used to accommodate the Fall Protection System will be shown on the Falsework Plans and/or the appropriate Shop Plans. Field welding to bridge components will not be allowed. Field placed concrete inserts or drilled-in anchor bolts will be allowed if approved by the Engineer. All costs associated with providing the Fall Protection System will be incidental to the other contract items.

PRESTRESSED GIRDERS

1. Minimum concrete compressive strength f'_c = 8000 psi at 28 days for all girders, f'_{ci} = 6000 psi for all girders.

2. All mild reinforcing steel will be deformed bars conforming to ASTM A615, Grade 60.

3. Individual tendons in all pretensioned sections will consist of seven-wire uncoated Type 270K Strands having a nominal diameter of 0.6-inch and a minimum ultimate strength of 58600 lbs. per cable. An initial tensile force of 43500 lbs. will be applied to all 0.6-inch cables in all girders. All prestressing steel will conform to AASHTO M203. (low-relaxation strands).

4. All prestressed girders within a span will be cast within an 8-day period. If not, the newest girder will be at least 6 weeks old before the deck slab is poured. The girders will be poured in all steel forms.

5. Prestressed concrete girders will always be lifted by the devices provided in the top flanges near the ends of the girders. Types of lifting devices other than those shown on the plans may be used provided they are approved by the Office of Bridge Design. The design of the lifting devices will be the responsibility of the Fabricator.

6. Each beam will be marked showing structure number, casting date, and beam number. Marking will be on the face of the beam near the end and the location will be exposed after the diaphragms have been cast. Facia beams will be marked on an inside face. All markings will be stenciled and clearly legible. For beam designations and locations, see superstructure layout plan and Erection Data sheet.

7. The physical properties of the elastomeric bearing pads will conform to the requirements of Section 18.2 of the AASHTO LFRD Bridge Construction Specification and the AASHTO Materials Specification M251. The elastomeric bearing pads will conform to Grade 70 (durometer). The cost of the pads will be incidental to the contract unit price per cubic yard for Class A45 Concrete, Bridge. Certification that pads are 70 durometer and meet the requirements of AASHTO LFRD Bridge Construction Specification Section 18.2 and AASHTO Materials Specification M251 will be furnished to the Engineer with the shop drawings. No laminated bearing pads will be allowed.

8. All exposed corners will be chamfered 3/4-inch or rounded to 3/4-inch radius.

9. Dead Load of girder taken as effective at transfer. Cut strands flush with end of girder and coat end of strands with mortar, EXCEPT the strands that are to be extended and bent,

10. The Contractor will be responsible for ensuring that transportation stresses, handling, and erection do not cause damage to the girders.

11. Furnish and install inserts for T7 Rebars as shown in the plans. Costs involved will be incidental to the contract unit price per foot of 81" Minnesota Shape Prestressed Concrete Beam.

AS - BUILT ELEVATION SURVEY

The Contractor will be responsible for producing an as-built elevation survey soon after construction is completed but before the bridge is opened to traffic. The Contractor will be responsible for recording the as-built elevation shown in the plans. The completed table will be given to the Engineer and copies forwarded to the Office of Bridge Design and the Senior Region Bridge Engineer. The elevations will be based on the National Geodetic Survey (NGS) North American Vertical Datum of 1988 (NAVD88). The Engineer will provide the Contractor with a description, elevation, and location of the nearest benchmark that has a NAVD88 established elevation for the Contractor's use. The benchmark shown in the plans has not been tied to the NAVD88. The Contractor will be responsible for establishing a NAVD88 elevation for the benchmark provided in the plans. All cost associated with obtaining the NAVD88 elevations at the locations shown in the table and for the benchmark shown in the plans, including all equipment, labor, and any incidentals required will be incidental to the contract lump sum price for Bridge Elevation Survey.

SHOP PLANS

Shop plans will be required as specified by the Construction Specifications.

NOTES (CONTINUED)

FOR

242' - 6" PRESTRESSED GIRDER BRIDGE

STR. NO. 47-098-564

JULY 2023

DESIGNED BY	CK. DES. BY	DRAFTED BY	
AU MEAD034J	PW 034JTE04	AU	Steve A Johnson BRIDGE ENGINEER

APPROACH SLABS

1. Sleeper slab riser will be cast with or later than the approach slab. Care will be taken to ensure the correct grade is maintained across the top of the sleeper slab riser.

2. The portion of the sleeper slab below the construction joint may be precast. If the bottom portion of the sleeper slab is precast, the Contractor will submit proposed lifting and setting plans to the Bridge Construction Engineer for approval. In addition, if reinforcing or other details differ from those shown in the plans, the Contractor will submit proposed alternate details for approval.

3. The use of an approved finishing machine will be required during placement of Class A45 Concrete for the approach slabs. Concrete placement in front of the machine will be kept parallel to the screed.

4. Concrete Approach Sleeper Slab for Bridge, whether cast-in-place or precast, will be paid for at the contract unit price per square yard. This payment will be full compensation for all excavation, furnishing, hauling, and placing all materials including concrete and reinforcing steel; for disposal of all surplus materials; and for labor, tools, equipment, and any incidentals necessary to complete this item of work.

5. Concrete Approach Slab for Bridge will be paid for at the contract unit price per square yard. This payment will be full compensation for all excavation, furnishing, hauling, and placing all materials including concrete, asphalt paint or 6 mil polyethylene sheeting, elastic joint sealer, and reinforcing steel; for disposal of all excavated material and surplus materials and for labor, tools, equipment and any incidentals necessary to complete this item of work.

CHAIN LINK FENCE

1. The chain link fence fabric and supports will conform to Section 930 of the Construction Specifications as modified by the following notes.

2. The chain link fence fabric, wire ties, and miscellaneous hardware will be galvanized and conform to AASHTO M181. The fence fabric will be Type IV 9-gauge wire woven in a 2-inch diamond mesh. Knuckled selvage will be used on the top and bottom of the fence fabric.

3. The chain link fence fabric and miscellaneous hardware will have Natina Solution applied per manufacturer's recommendation.

   Natina
   1555 N VIP Blvd.
   Casa Grande, AZ 85122
   https://www.natina.com/

4. A brown (AMS STD 595 Color 30045) thermally extruded polyvinyl chloride coating may be applied to the wire ties in lieu of the Natina Solution treatment.

5. The item Chain Link Fence for Bridge Sidewalk will be paid for at the contract unit price per linear foot. This payment will be full compensation for furnishing all material, labor, tools, and equipment necessary or incidental to the construction of the chain link fence including chain link fence fabric, posts, rails, wire ties, miscellaneous hardware, Natina Solution treatment, and welding all to satisfactorily complete the work.

STEEL RAILING – SIDEWALK

1. All rail and chain link fence posts will be built vertical.

2. All structural steel parts for railing will conform to ASTM A500, Grade B. Material less than 1/4-inch thick may be ASTM A1011, Grade 36. Rail post base plates will conform to ASTM A36.

3. Anchor bolts and nuts for railing will conform to ASTM A307. Washers will conform to ASTM F436 and all components will be galvanized in accordance with ASTM F2329. The bolts will be hex head "Structural" type with heavy hex nuts and round washers.

4. Anchor bolts will be tightened to a torque of 120 ft-lbs (approximated without the use of a calibrated torque wrench).

5. All steel railing will be galvanized in accordance with ASTM F2329. All steel railing and miscellaneous hardware will have Natina Solution applied per manufacturer's recommendation. The galvanized steel railing will be cleaned in accordance with ASTM D6386 before application of the Natina Solution.

   Natina
   1555 N VIP Blvd.
   Casa Grande, AZ 85122
   https://www.natina.com/

6. Welding and Weld Inspection will be done in accordance with the current edition of AWS D1.5 Bridge Welding Code.

7. The costs of structural steel, welding, weld inspection, Natina Solution treatment, and galvanization will be incidental to the contract unit price per foot for Steel Pedestrian Railing on Sidewalk.

PERFORATED GEOCELL

1. Perforated Geocell will be from the following company or equivalent:

   Company: Agtec
   Phone: 1-818-724-7657
   Website: http://www.agtec.com

2. Perforated Geocell will be 6 inches tall and will be installed according to the manufacturer's recommendation.

3. Perforated Geocell will be filled with Select Granular Backfill in accordance with Section 850 of the Construction Specifications.

4. Perforated Geocell will be paid for at the contract unit price per square foot. Payment will be full compensation for furnishing and installing the Perforated Geocell.

5. Select Granular Backfill will be paid for at the contract unit price per ton of material furnished. Payment will be full compensation for furnishing, loading, hauling, and placing the Select Granular Backfill.

CLASS B COMMERCIAL TEXTURE FINISH

1. A Class B commercial texture finish will be applied to the following areas:

   a. ***Abutments:** all exposed surfaces to an elevation 1-foot below finished ground line.
   b. **Barrier:** all exposed surfaces (Back*, top** and Front**).
   c. ***Slab:** edge of slab.
   d. ***Girder:** Outside face and bottom of facia girders.
   e. ***Bent:** All exposed surfaces.

   * Color will be AMS – STD - 595 33690
   ** Color will be AMS – STD - 595 37875

2. The Class B commercial texture finish will be applied in accordance with Section 460.3 L.1.c and Section 460.3 M.1 of the Construction Specifications.

APPROACH SLAB UNDERDRAIN SYSTEM

1. An underdrain system will be placed underneath the sleeper slabs and behind the abutments as shown in the plans in accordance with Section 435 of the Construction Specifications.

2. The 4-inch diameter Perforated PVC Drain Pipe will be PS 46 Solvent Weld PVC Pipe conforming to ASTM F758 or SDR 35 Solvent Weld PVC Pipe conforming to ASTM D3034 with perforations in accordance with ASTM F758. The 2-inch and 4-inch diameter PVC Outlet Pipe will be Schedule 40 PVC Pipe conforming to ASTM D1785 designated as PVC 1120, PVC 1220, or PVC 2120. Pipe sections will be connected using a PVC Solvent Cement conforming to ASTM D2564. The Drain Sleeve will conform to ASTM D6707.

3. Care will be taken to ensure that the 4-inch diameter Perforated PVC Drain Pipe and the 4-inch diameter PVC Outlet Pipe are not damaged during construction. Sufficient cover material will be placed over the pipes before compaction equipment is allowed over the underdrain system. Any damaged pipes will be replaced by the Contractor at no additional cost to the Department.

4. All labor, tools, equipment, and any incidentals necessary for the Installation of 4-inch diameter Perforated PVC Drain Pipe, 4-inch diameter PVC Outlet Pipe, 5-inch diameter schedule 40 steel pipe, SDR Solvent Weld PVC Coupling, and PVC Cement will be incidental to the contract unit price per foot for 4" Underdrain Pipe.

NOTES (CONTINUED)
FOR
242' - 6" PRESTRESSED GIRDER BRIDGE

STR. NO. 47-098-564
JULY 2023

DESIGNED BY	CK. DES. BY	DRAFTED BY	
AU	PW	AU	Steve A Johnson BRIDGE ENGINEER
MEAD034J	034JTE05		

3" RIGID GALVANIZED STEEL CONDUIT

1. Conduit, with expansion fittings, and junction boxes will be provided at the location detailed in the plans.

2. Cast in place concrete inserts for conduit attachment will be Dayton Superior ¼" bolt diameter stainless steel F-42 Loop Ferrule Inserts with ¼" stainless steel bolts conforming to ASTM F593.

3. Conduit, fittings and attaching hardware will meet the requirements of NFPA 70 National Electrical Code (NEC). All steel components will be hot dip galvanized in accordance with ASTM A123 or A153 as applicable. Isolate the galvanized conduit brackets from the stainless steel insert and bolt with fiber washers.

4. All costs to provide the 3" diameter conduit, including concrete inserts, conduit, fittings, attaching hardware, junction boxes, labor, equipment and any incidentals necessary to install the conduit will be included in the contract unit price per foot for 3" Rigid Galvanized Steel Conduit.

PILE DRIVING

1. A drivability analysis was performed using the wave equation analysis program (GRLWEAP). The following pile hammers were evaluated and found to produce acceptable driving stresses:

   Delmag D30-32 SPI D-30 APE D30-32

2. Pile hammers not listed will require evaluation and approval prior to use from the Geotechnical Engineering Activity. Requests for evaluation of hammers not listed will be submitted a minimum of 5 business days prior to installation of piles.

QUARRIED AGGREGATE SLOPE PROTECTION

1. This work will consist of paving the bridge berm slopes with crushed aggregate slope protection for control and prevention of berm erosion.

2. The aggregate used in the crushed aggregate slope protection will be composed of durable fragments of Ledge Rock or Rhyolite or an approved alternative. The material will be tan in color and well graded with 90 to 100% passing a 6-inch sieve and 0 to 10% passing a 2-inch sieve.

3. The Type A Drainage Fabric will be non-woven.

4. The surface upon which the slope protection is to be placed will be smooth, uniform, and free from foreign material. The top surface of the slope protection will conform to the dimensions, elevations, and slopes shown in the plans.

5. The crushed aggregate will be shaped and compacted to provide a stable, smooth, and uniform surface.

6. Payment for crushed aggregate slope protection will be at the contract unit price per square yard for Bridge Berm Slope Protection, Crushed Aggregate and will include furnishing all materials, labor, and equipment necessary or incidental to the satisfactory completion of this work. Payment will be for plans quantity.

GRANULAR BRIDE END BACKFILL, BASE COURSE, AND GEOGRID REINFORCEMENT

1. The Geogrid Reinforcement will be a biaxial grid of single layer construction. Vibratory welded, integrally formed or woven and coated geogrids will be acceptable. Grids with laser welded grid junctions will not be allowed. The Geogrid Reinforcement will be certified by the supplier to meet the following specification prior to installation:

Property	Test	MARV
Wide Width Strip Tensile Strength Ultimate	ASTM D 6637	850lb/ft MD and XD

2. Geogrid Reinforcement will be paid for at the contract unit price per square yard for Geogrid Reinforcement. Payment quantities will be based on area covered plus 15%. Overlaps are accounted for by the additional 15%. Payment will be full compensation for furnishing and installing the Geogrid Reinforcement only. Granular backfill materials will be paid for under a different bid item.

3. Granular Bridge End Backfill will conform to Section 882 of the Specifications.

4. Granular Bridge End Backfill will be paid for at the contract unit price per cubic yard in accordance with 430.5 of the Specifications. Payment will be full compensation for furnishing and placing this material.

5. Base Course material will conform to the specification for Aggregate Base Course in Section 882 of the Specifications.

6. The Geogrid Reinforcement will be placed on a level surface and overlapped a minimum of 2 feet.

7. The Geogrid Reinforcement will be placed as taut as possible with minimal wrinkles. Placement will be done so that subsequent granular cover material does not shove, wrinkle, or distort the in-place Geogrid Reinforcement. The overlaps will be shingled in a manner that assures granular material will not be forced under the geogrid during backfilling operations. The Geogrid Reinforcement may be held in place with small piles of granular material or staples.

8. Base course will be dumped at least 20 feet behind the leading edge of the backfill and pushed into place with a loader or dozer from the covered areas to the uncovered areas. Traffic will not be allowed on the uncovered geogrid.

9. Granular Bridge End Backfill, Base Course, and adjacent soil embankment will be built simultaneously in horizontal layers. Base course will be placed in 6-inch maximum lifts and compacted to 97 percent of maximum standard proctor dry density using a smooth face vibratory roller or vibratory plate compactor. Each layer of granular material will be thoroughly watered prior to and during compaction.

10. Density tests within the berm limits will consist of tests conducted both in the soil embankment and the granular bridge end backfill according to the modified zone requirements below:

Zone	Depth (ft.)	Min. required tests
1	0-1	1
2	1-3	1
3	3-5	1
4	5 to Bottom	1 per 3 vertical feet

11. The zone requirement will be enforced for all phases of staged construction. For example, if the berm on the west side of centerline is constructed separately from the east side, testing by zone will be required on both sides of centerline.

12. Cylindrical footing for light poles, pedestals, and/or signposts located within the reinforced Bridge End Backfill or Base Course will be cased. Casing will be of sufficient strength to withstand handling and installation procedures. The casing material may consist of sonotube, corrugated metal pipe, PVC, smooth metal pipe, or any other material as approved by Engineer. Casing will be placed during the construction of the reinforced Bridge End Backfill or Base Course and filled around casing. The geogrid is to be cut at the casing locations.

NOTES (CONTINUED)

FOR

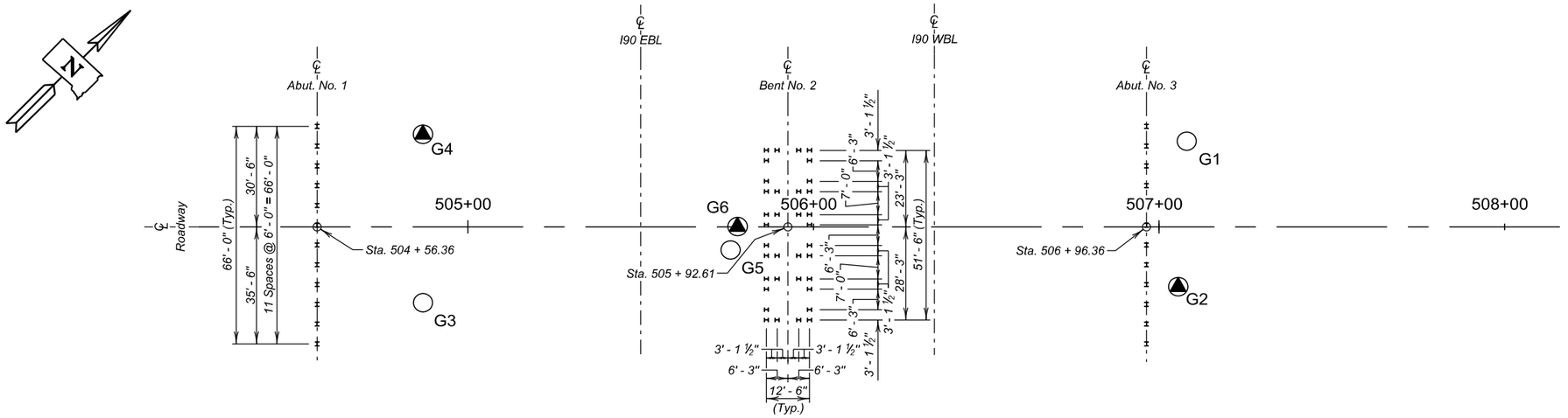
242' - 6" PRESTRESSED GIRDER BRIDGE

STR. NO. 47-098-564

JULY 2023

DESIGNED BY	CK. DES. BY	DRAFTED BY	
AU	PW	AU	Steve A Johnson BRIDGE ENGINEER
MEAD034J	034JTE06		

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E56	E185



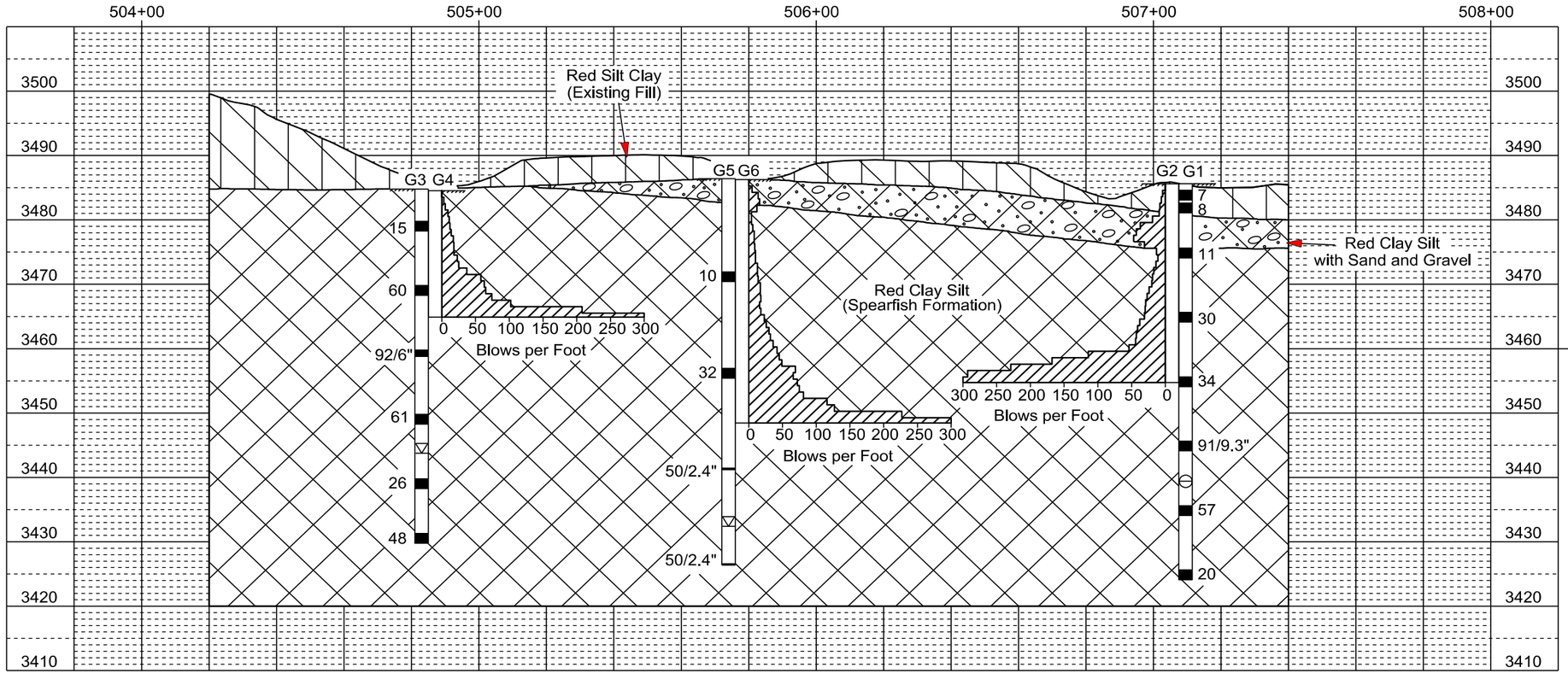
PILING LAYOUT

Hole Number	G3	
Station	504+87	
Depth	36.5	ft
Soil Color	Red	
Classification	Clay Silt	
Strength (Qu)	6,021	psf
Dry Density	127.1	pcf
Wet Density	142.3	pcf
Moisture	11.9	%
Pass No. 10	100.0	%
Pass No. 40	97.9	%
Pass No. 200	91.8	%
Sand Content	8.2	%
Silt Content	61.4	%
Clay Content	30.4	%

Hole Number	G5	
Station	505+76	
Depth	15.3	ft
Soil Color	Red	
Classification	Silt Clay	
Strength (Qu)	3,426	psf
Dry Density	110.3	pcf
Wet Density	130.3	pcf
Moisture	18.1	%
Pass No. 10	100.0	%
Pass No. 40	98.5	%
Pass No. 200	92.9	%
Sand Content	7.1	%
Silt Content	54.9	%
Clay Content	38.0	%

Hole Number	G5	
Station	505+76	
Depth	31.0	ft
Soil Color	Red	
Classification	Silt Clay	
Strength (Qu)	3,988	psf
Dry Density	117.0	pcf
Wet Density	131.2	pcf
Moisture	12.1	%
Pass No. 10	100.0	%
Pass No. 40	95.0	%
Pass No. 200	91.3	%
Sand Content	8.7	%
Silt Content	59.3	%
Clay Content	32.0	%

Hole Number	G1	
Station	507+08	
Depth	12.5	ft
Soil Color	Red	
Classification	Clay	
Strength (Qu)	6,717	psf
Dry Density	102.3	pcf
Wet Density	122.6	pcf
Moisture	19.8	%
Pass No. 10	99.9	%
Pass No. 40	97.9	%
Pass No. 200	94.7	%
Sand Content	5.2	%
Silt Content	20.8	%
Clay Content	73.9	%



The Spearfish Formation is a relatively weak red sandy shale. Textural classification typically is a clay silt. Gypsum is present throughout the formation that varies from thin stringers to massive deposits over 30 feet thick. Bedded layers of red stained sandstone can also be encountered. Unweathered Spearfish Formation is considered to be "Soft Rock", although massive unweathered gypsum may behave similar to weak limestone.

The Geotechnical Engineering Activity has all of the boring logs and laboratory test results available for review at the Central Office in Pierre.

LEGEND

- ◯ Penetration Test
- ▲ Drive Test
- ▽ Water
- ⊖ Caved
- ▮ Sample Zone

Drive tests are conducted by dropping a 490 pound hammer 30 inches to drive a 2⅞ inch drill stem to measure the resistance to penetration of the soil.

Penetration test holes are drilled with a 6⅝ inch diameter hollow stem auger. Penetration tests are conducted by dropping a 140 pound hammer 30 inches to collect samples and measure the resistance to penetration of the soil. Samples are collected using a lined Modified California Sampler. Penetration test results are listed as uncorrected "N" values in blows per foot. Blows over inches are listed if refusal is achieved, which is 50 blows within one 6 inch set.

GROUNDWATER ELEVATIONS

NOVEMBER 2021

G1	(CAVED)	3439.6
G2		DRY
G3		3443.8
G4		DRY
G5		3432.4
G6		DRY

MEASURED SKIN FRICTION

	ELEV.	PSF
G2	3454.8	2175
G4	3464.9	3434
G6	3448.5	1121

SUBSURFACE INVESTIGATION AND PILING LAYOUT

FOR

242' - 6" PRESTRESSED GIRDER BRIDGE

43' - 0" ROADWAY, 1 - 10' - 0" SIDEWALK, & 1 - 5' - 0" SIDEWALK
OVER I-90
STA. 504 + 55.11 TO
STA. 506 + 97.61
STR. NO. 47-098-564

0° SKEW
SEC. 15-T3N-R6E
IM-CR-EM 0901(187)44
HL-93

MEADE COUNTY

S. D. DEPT. OF TRANSPORTATION

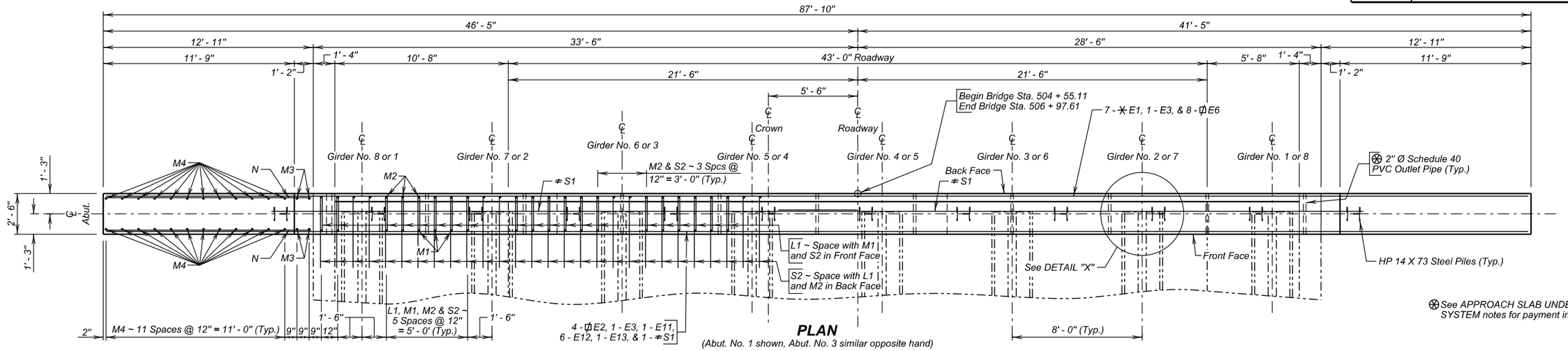
JULY 2023

DESIGNED BY	CK. DES. BY	DRAFTED BY	
PW	AU	HK/MG	Steve A Johnson BRIDGE ENGINEER
MEAD034J	034JTE07		

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E57	E185

INCREASING STATIONS
Abut. No. 1

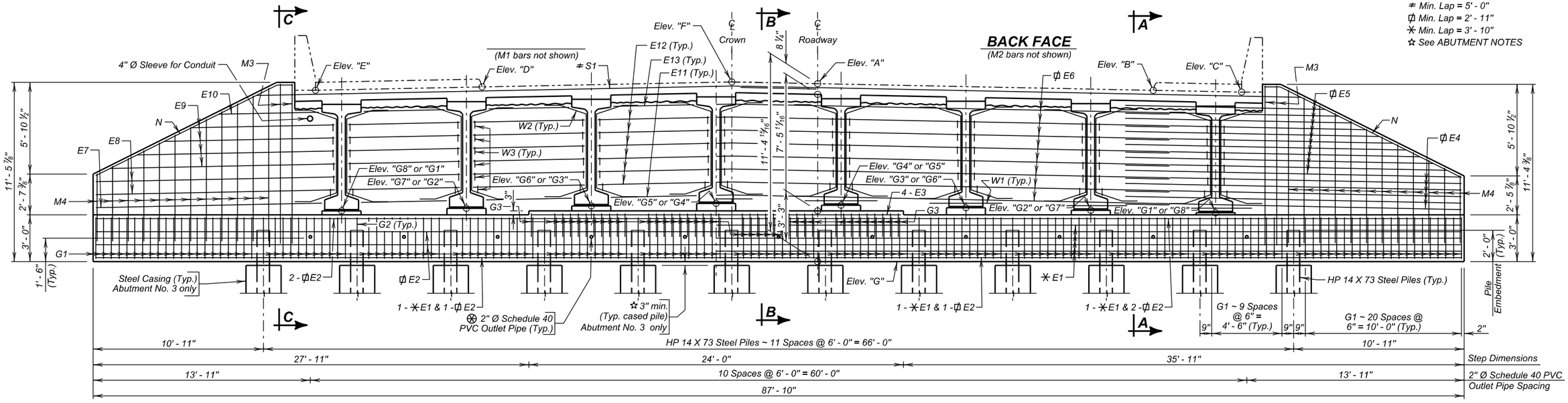
INCREASING STATIONS
Abut. No. 3



PLAN
(Abut. No. 1 shown, Abut. No. 3 similar opposite hand)

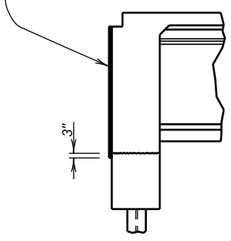
⊛ See APPROACH SLAB UNDERDRAIN SYSTEM notes for payment information.

≠ Min. Lap = 5' - 0"
⌀ Min. Lap = 2' - 11"
⌖ Min. Lap = 3' - 10"
☆ See ABUTMENT NOTES

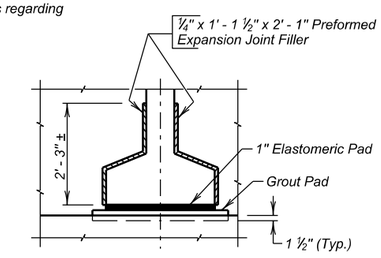


ELEVATION
(Along ℄ Abutment)

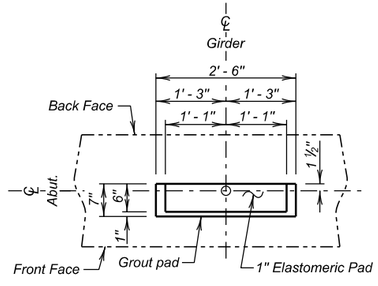
The face on the back side of the Abutment between the Abut. Wings shall be thoroughly coated with an approved waterproof sealant. (See notes regarding Abutment Backwall Coating.)



ABUT. BACKWALL COATING DETAILS



DETAIL "Y"
(Typical at Girder Ends; Abutments only)



DETAIL "X"

TABLE OF ELEVATIONS

Abut. No.	Elev. "A"	Elev. "B"	Elev. "C"	Elev. "D"	Elev. "E"	Elev. "F"	Elev. "G"
1	3515.34	3514.91	3515.30	3515.13	3515.42	3515.45	3503.93
3	3517.56	3517.13	3517.52	3517.35	3517.64	3517.67	3506.15

TABLE OF ELEVATIONS

Abut. No.	Elev. "G1"	Elev. "G2"	Elev. "G3"	Elev. "G4"	Elev. "G5"	Elev. "G6"	Elev. "G7"	Elev. "G8"
1	3507.06	3507.22	3507.38	3507.54	3507.66	3507.50	3507.34	3507.18
3	3509.28	3509.44	3509.60	3509.76	3509.88	3509.72	3509.56	3509.40

NOTE - Elev. "A", "B", "C", "D", "E" and "F" are top of slab at ℄ of Abutment.
Elev. "G1", "G2", "G3", "G4", "G5", "G6", "G7", and "G8" are top of grout pad elevations at ℄ Abutment.
Top of Grout Pads will be Level and Smooth.

ABUTMENT DETAILS (A)
FOR
242' - 6" PRESTRESSED GIRDER BRIDGE

43' - 0" ROADWAY, 1 - 10' - 0" SIDEWALK, & 1 - 5' - 0" SIDEWALK — 0° SKEW
OVER I-90 — SEC. 15-T3N-R6E
STA. 504 + 55.11 TO — IM-CR-EM 0901(187)44
STA. 506 + 97.61 — HL-93
STR. NO. 47-098-564

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
JULY 2023

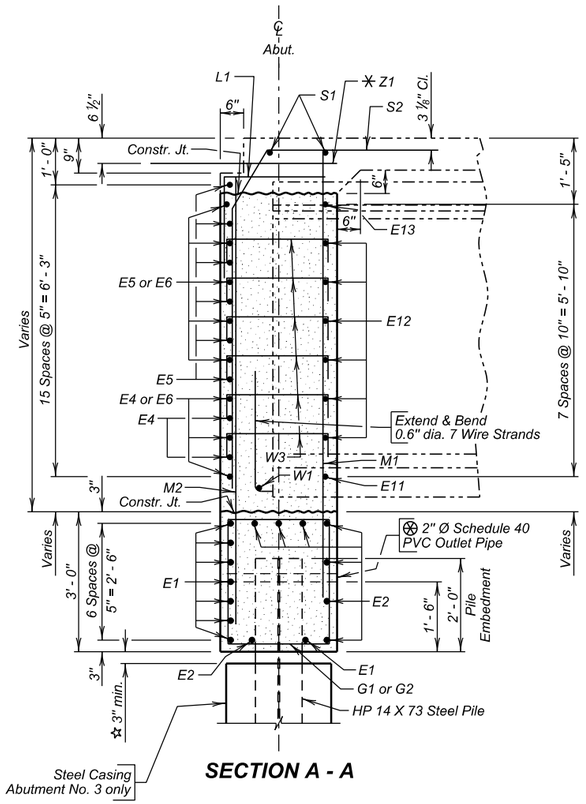
DESIGNED BY	CK. DES. BY	DRAFTED BY	
PW	AU	MG	Steve A Johnson BRIDGE ENGINEER
MEAD034J	034JTE08		

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E58	E185

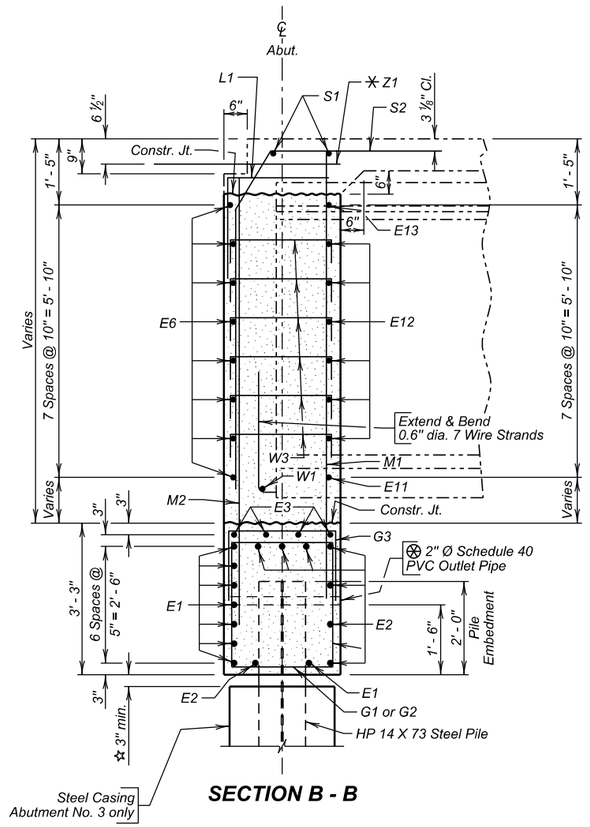
✳ *Z1 bars are listed and included in superstructure. See SUPERSTRUCTURE DETAILS (A) & (B).*

⊛ *See APPROACH SLAB UNDERDRAIN SYSTEM notes for payment information.*

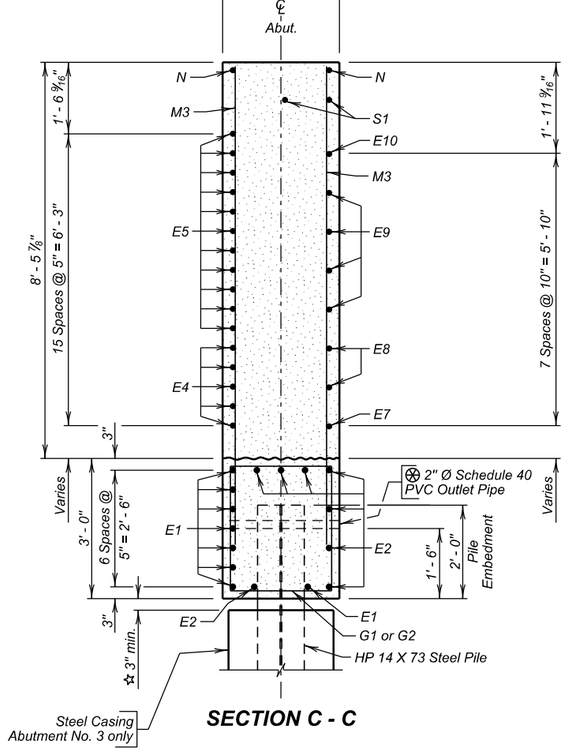
☆ *See ABUTMENT NOTES*



SECTION A - A



SECTION B - B

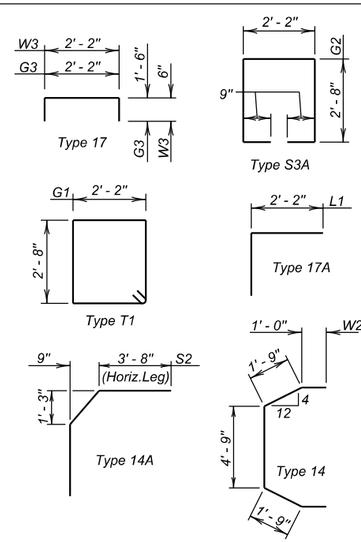


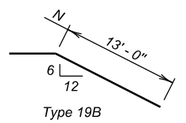
SECTION C - C

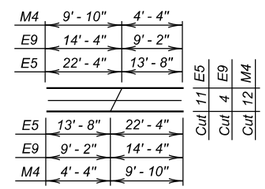
REINFORCING SCHEDULE

(For One Abutment - Two Required)

Mk.	No.	Size	Length	Type	Bending Details
	E1	16	8	45' - 8"	Str.
	E2	16	6	45' - 3"	Str.
	E3	4	4	23' - 8"	Str.
	E4	10	8	22' - 6"	Str.
⌀	E5	11	8	36' - 0"	Str.
	E6	8	8	50' - 0"	Str.
	E7	2	5	14' - 6"	Str.
	E8	4	5	15' - 4"	Str.
⌀	E9	4	5	23' - 6"	Str.
	E10	2	5	6' - 5"	Str.
	E11	7	5	5' - 6"	Str.
	E12	42	5	7' - 2"	Str.
	E13	7	5	5' - 2"	Str.
	G1	152	5	10' - 7"	T1
	G2	12	5	9' - 0"	S3A
	G3	40	5	5' - 2"	17
△	L1	44	4	4' - 4"	17A
△	M1	46	5	9' - 7"	Str.
	M2	62	5	9' - 7"	Str.
	M3	8	5	10' - 3"	Str.
⌀	M4	24	5	14' - 2"	Str.
	N	4	5	14' - 0"	19B
△	S1	4	9	36' - 0"	Str.
△	S2	54	5	11' - 3"	14A
	W1	8	5	4' - 8"	Str.
	W2	16	4	10' - 3"	14
	W3	112	5	3' - 2"	17







NOTE:
All dimensions are out to out of bars.
△ Bars to be Epoxy Coated.
⌀ See cutting diagram.

ESTIMATED QUANTITIES

	ITEM	UNIT	QUANTITY	
			Abut. No. 1	Abut. No. 3
ϕ	Class A45 Concrete, Bridge	Cu. Yd.	79.2	79.2
	Reinforcing Steel	Lb.	10068	10068
	Epoxy Coated Reinforcing Steel	Lb.	1710	1710
	Structure Excavation, Bridge	Cu. Yd.	22.4	22.4
	HP 14 x 73 Steel Test Pile, Furnish and Drive	Ft.	1 @ 65' = 65'	1 @ 75' = 75'
	HP 14 x 73 Steel Bearing Pile, Furnish and Drive	Ft.	11 @ 60' = 660'	11 @ 70' = 770'
	Preboring Pile	Ft.	12 @ 10' = 120'	———

ϕ *Each abutment includes 0.2 cu. yds. for grout pads. 50 ft. of 2" dia. PVC Outlet Pipe is an approximate quantity contained in the Class A45 Concrete, Bridge.*

Note:
Concrete will be placed in the space under the beams (within the backwall width) during the pour. If upon form removal the space is not completely filled and consolidated, the Contractor will grout the remaining voids.

ABUTMENT DETAILS (B)

FOR

242' - 6" PRESTRESSED GIRDER BRIDGE

43' - 0" ROADWAY, 1 - 10' - 0" SIDEWALK, & 1 - 5' - 0" SIDEWALK — 0° SKEW
OVER I-90 — SEC. 15-T3N-R6E
STA. 504 + 55.11 TO — IM-CR-EM 0901(187)44
STA. 506 + 97.61 — HL-93
STR. NO. 47-098-564

MEADE COUNTY

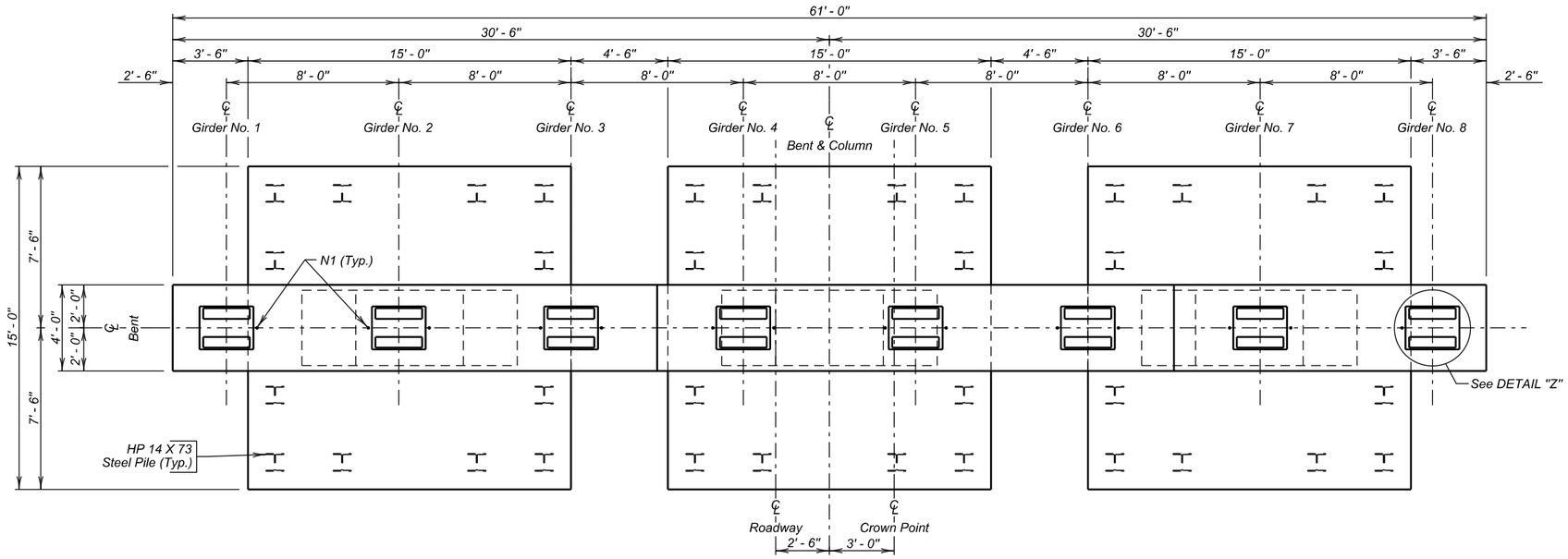
S. D. DEPT. OF TRANSPORTATION

JULY 2023

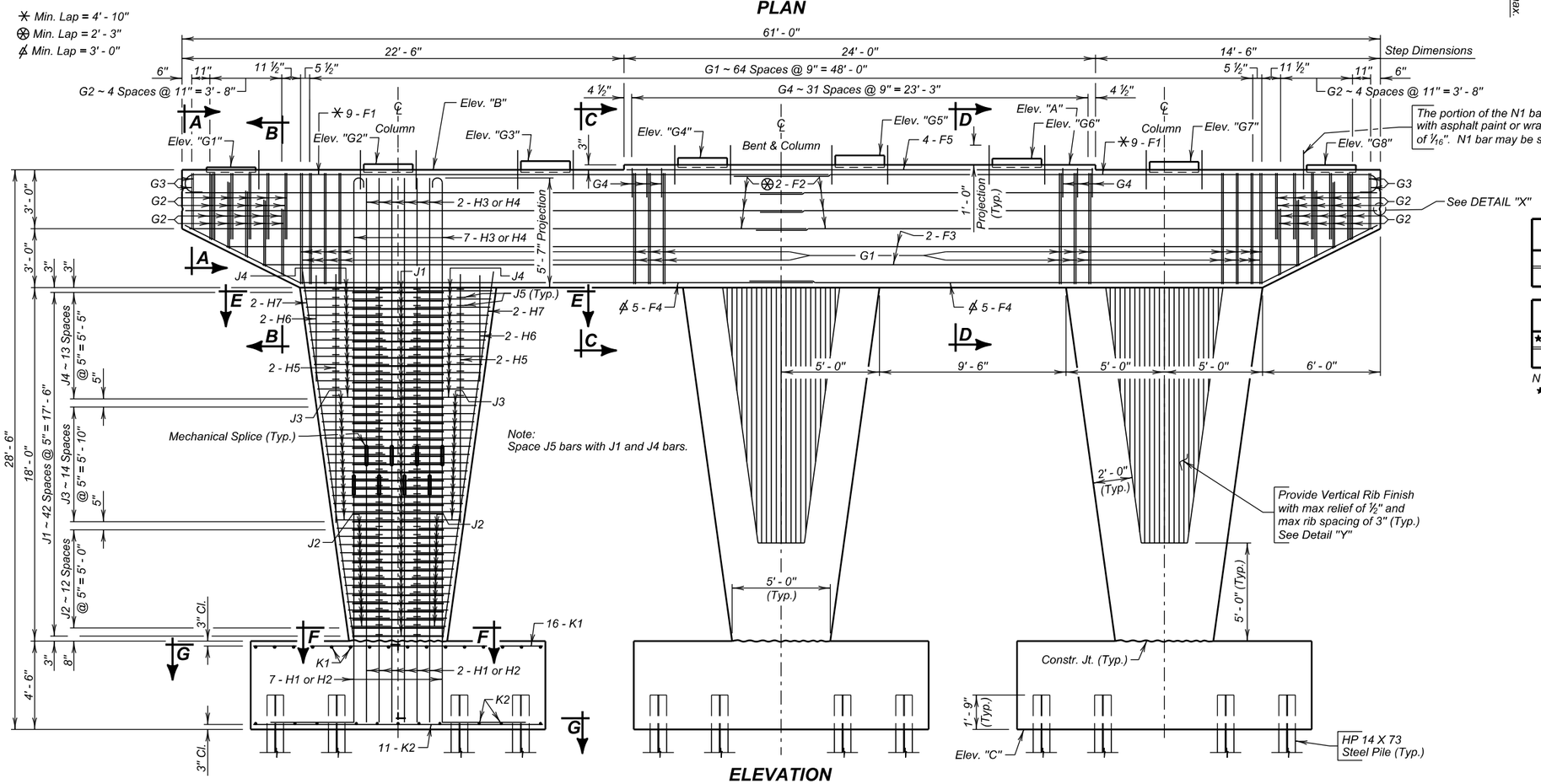
9 OF 37

DESIGNED BY	CK. DES. BY	DRAFTED BY	
PW	AU	MG	Steve A Johnson BRIDGE ENGINEER
MEAD034J	034JTE09		

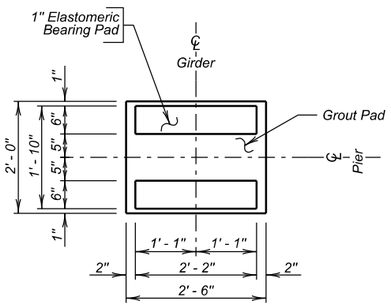
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E59	E185



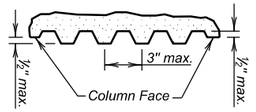
PLAN



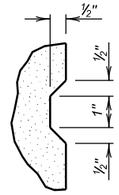
ELEVATION



DETAIL "Z"



DETAIL "Y"



DETAIL "X"

INCREASING STATIONS

The portion of the N1 bar above the bent cap is to be coated with asphalt paint or wrapped with tar paper to a minimum thickness of 1/16". N1 bar may be shifted slightly off ℄ Bent to avoid top mat of resteel.

TABLE OF ELEVATIONS					
Elev. "A"	Elev. "B"	Elev. "C"	★Elev. "G1"	★Elev. "G2"	★Elev. "G3"
3508.68	3508.43	3479.93	3508.56	3508.72	3508.88

TABLE OF ELEVATIONS				
★Elev. "G4"	★Elev. "G5"	★Elev. "G6"	★Elev. "G7"	★Elev. "G8"
3509.04	3509.16	3509.00	3508.84	3508.68

NOTE: Top of Grout Pad will be level and smooth.
★Elevations are Top of Grout Pad at centerline of bent.

BENT DETAILS (A)

FOR

242' - 6" PRESTRESSED GIRDER BRIDGE

43' - 0" ROADWAY, 1 - 10' - 0" SIDEWALK, & 1 - 5' - 0" SIDEWALK
OVER I-90
STA. 504 + 55.11 TO
STA. 506 + 97.61
STR. NO. 47-098-564

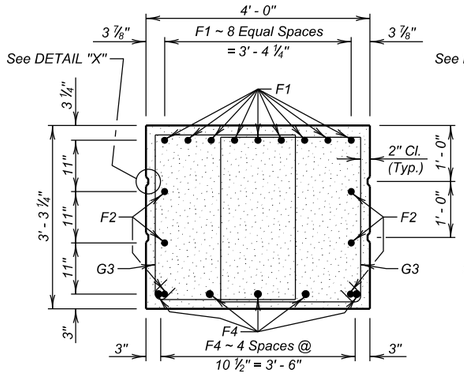
0° SKEW
SEC. 15-T3N-R6E
IM-CR-EM 0901(187)44
HL-93

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
JULY 2023

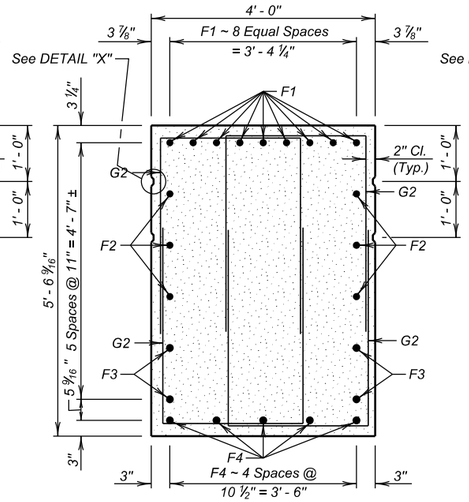
10 OF 37

DESIGNED BY	CK. DES. BY	DRAFTED BY	
PW	AU	MG	Steve A. Johnson BRIDGE ENGINEER
MEAD034J	034JTE10		

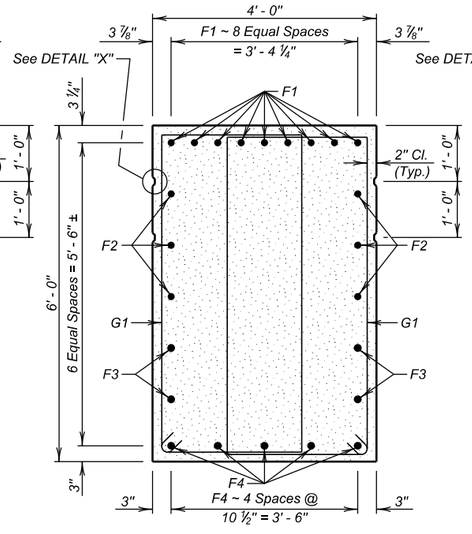
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E60	E185



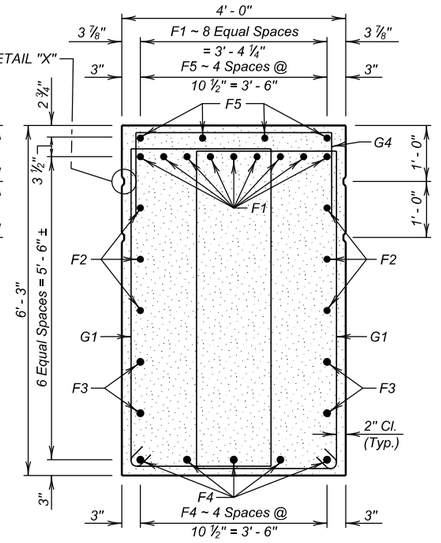
VIEW A - A



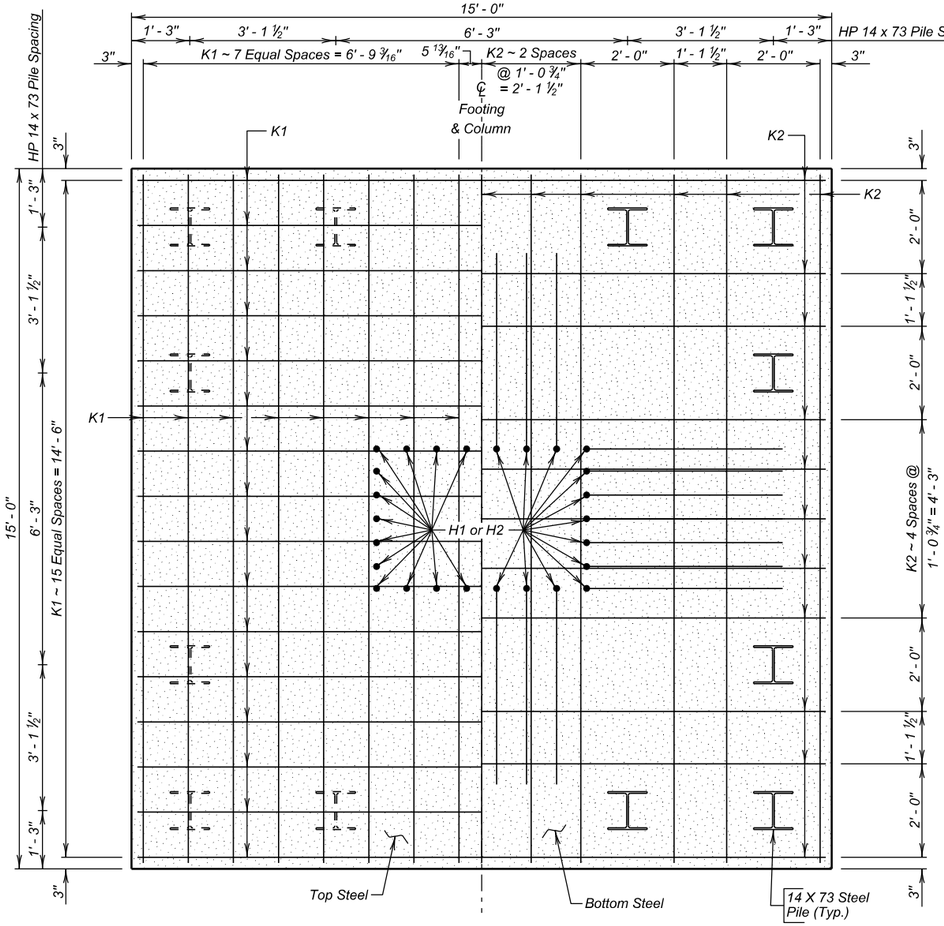
SECTION B - B



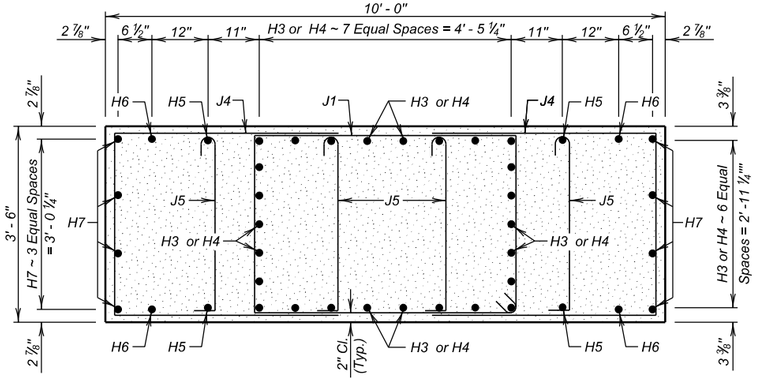
SECTION C - C



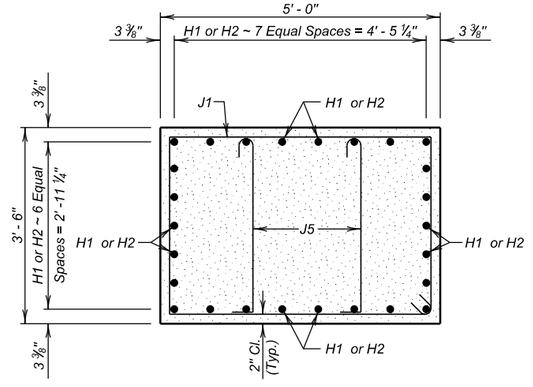
SECTION D - D



SECTION G - G



SECTION E - E

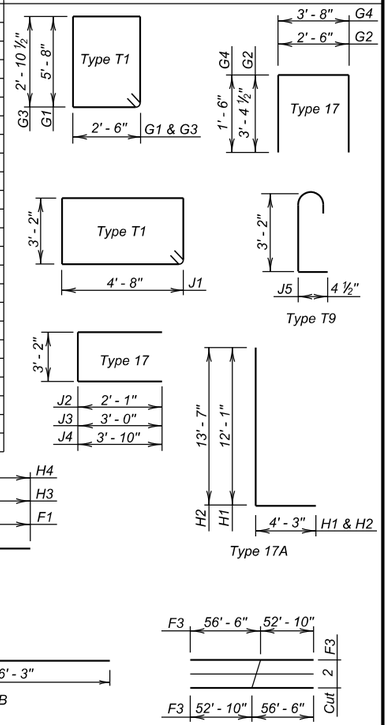


SECTION F - F

REINFORCING SCHEDULE

Mk.	No.	Size	Length	Type
F1	18	10	34' - 3"	1A
F2	12	6	31' - 7"	Str.
F3	2	6	109' - 4"	Str.
F4	10	8	32' - 8"	19B
F5	4	4	23' - 9"	Str.
G1	134	5	17' - 3"	T1
G2	40	5	9' - 3"	17
G3	4	5	11' - 8"	T1
G4	32	4	6' - 8"	17
H1	39	14	16' - 4"	17A
H2	39	14	17' - 10"	17A
H3	39	14	18' - 0"	1A
H4	39	14	15' - 9"	1A
H5	12	6	12' - 8"	Str.
H6	12	6	5' - 5"	Str.
H7	12	6	19' - 0"	Str.
J1	129	4	16' - 5"	T1
J2	78	4	7' - 4"	17
J3	90	4	9' - 2"	17
J4	84	4	10' - 10"	17
J5	342	4	3' - 11"	T9
K1	96	4	14' - 9"	Str.
K2	66	6	14' - 9"	Str.
N1	14	8	2' - 0"	Str.

Bending Details



NOTES-
All dimensions are out to out of bars.
℄ See cutting diagram.

ESTIMATED QUANTITIES

	ITEM	UNIT	QUANTITY
✳	Class A45 Concrete, Bridge	Cu. Yd.	217.9
	Reinforcing Steel	Lb.	34739
	Structure Excavation, Bridge	Cu. Yd.	262.1
	HP 14 X 73 Steel Test Pile, Furnish & Drive	Ft.	1 @ 55' = 55'
	HP 14 X 73 Steel Bearing Pile, Furnish & Drive	Ft.	35 @ 50' = 1750'
	No. 14 Rebar Splice	Each	78

✳ Includes 0.5 Cu. Yds. for Grout Pads.

BENT DETAILS (B)

FOR

242' - 6" PRESTRESSED GIRDER BRIDGE

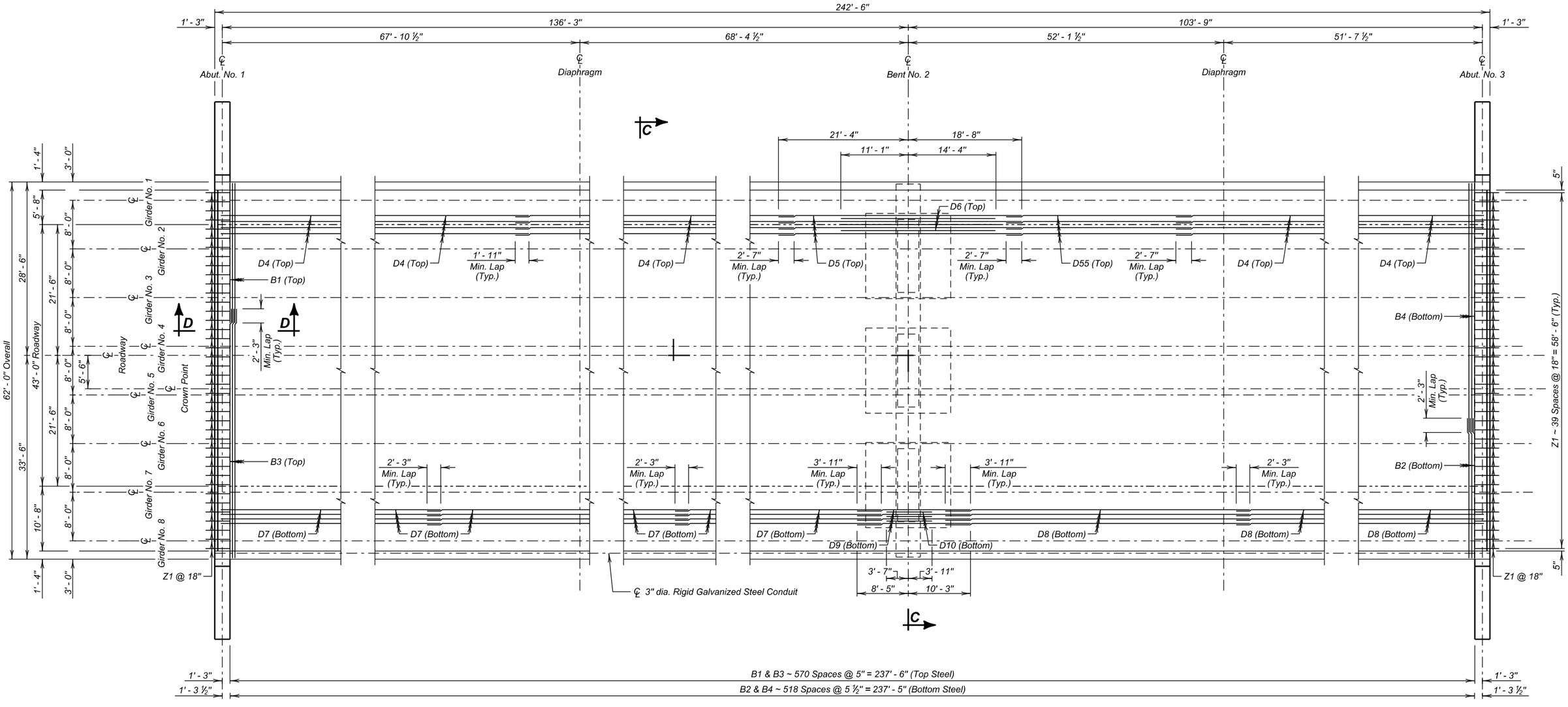
43' - 0" ROADWAY, 1 - 10' - 0" SIDEWALK, & 1 - 5' - 0" SIDEWALK
OVER I-90
STA. 504 + 55.11 TO
STA. 506 + 97.61
STR. NO. 47-098-564

0° SKEW
SEC. 15-T3N-R6E
IM-CR-EM 0901(187)44
HL-93

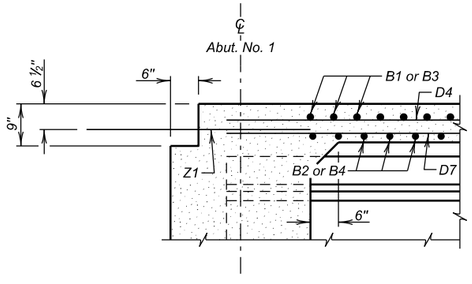
MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
JULY 2023

DESIGNED BY	CK. DES. BY	DRAFTED BY	
PW	AU	MG	Steve A Johnson BRIDGE ENGINEER
MEAD034J	034JTE11		

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E61	E185



PLAN



SECTION D - D

SUPERSTRUCTURE DETAILS (A)

FOR

242' - 6" PRESTRESSED GIRDER BRIDGE

43' - 0" ROADWAY, 1 - 10' - 0" SIDEWALK, & 1 - 5' - 0" SIDEWALK
OVER I-90
STA. 504 + 55.11 TO STA. 506 + 97.61
STR. NO. 47-098-564

0° SKEW
SEC. 15-T3N-R6E
IM-CR-EM 0901(187)44
HL-93

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
JULY 2023

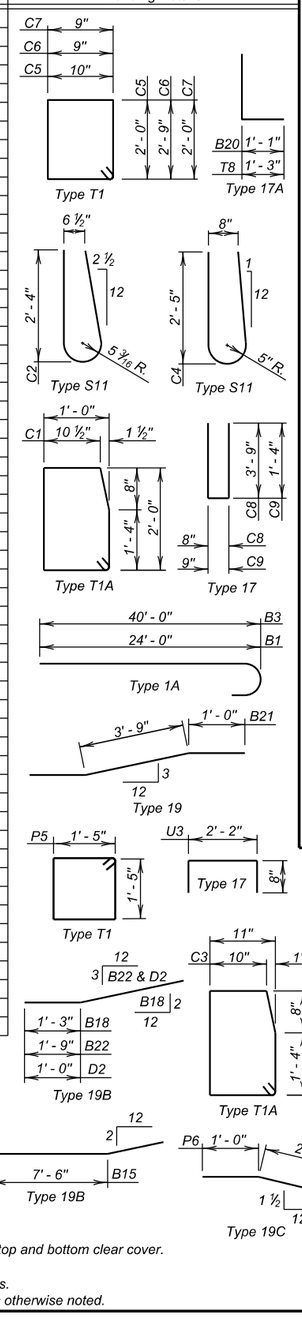
12 OF 37

DESIGNED BY	CK. DES. BY	DRAFTED BY	
PW	AU	MG	Steve A Johnson BRIDGE ENGINEER
MEAD034J	034JTE12		

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E62	E185

REINFORCING SCHEDULE

	Mk.	No.	Size	Length	Type
∉	B1	571	5	24' - 7"	1A
	B2	519	4	24' - 0"	Str.
∉	B3	571	5	40' - 7"	1A
	B4	519	4	40' - 0"	Str.
	B15	6	5	9' - 6"	19B
	B16	10	4	48' - 3"	Str.
✳	B17	4	4	5' - 8"	Str.
	B18	6	8	3' - 0"	19B
	B19	6	5	2' - 0"	Str.
	B20	6	6	4' - 0"	17A
	B21	2	4	5' - 9"	19
	B22	2	4	3' - 3"	19B
	B23	2	5	11' - 0"	Str.
	B25	2	5	8' - 10"	Str.
	C1	496	5	6' - 10"	T1A
	C2	498	5	5' - 3"	S11
	C3	2	5	6' - 8"	T1A
	C4	4	5	5' - 3"	S11
	C5	4	5	6' - 7"	T1
	C6	6	6	8' - 4"	T1
	C7	6	5	6' - 5"	T1
	C8	2	6	8' - 3"	17
	C9	2	5	3' - 5"	17
	D	20	4	49' - 9"	Str.
	D0	20	5	50' - 0"	Str.
	D1	60	4	48' - 7"	Str.
	D2	2	4	2' - 6"	19B
	D4	180	5	60' - 0"	Str.
	D5	60	7	40' - 0"	Str.
	D55	60	6	30' - 6"	Str.
	D6	59	7	25' - 6"	Str.
	D7	174	5	45' - 7"	Str.
	D8	116	5	50' - 1"	Str.
	D9	58	7	18' - 2"	Str.
	D10	49	7	7' - 6"	Str.
	D11	9	4	11' - 0"	Str.
	D12	9	4	8' - 10"	Str.
	P1	8	5	3' - 10"	Str.
	P2	16	4	3' - 0"	1
	P3	10	4	6' - 9"	7
	P4	8	4	7' - 6"	7
	P5	18	4	6' - 6"	T1
	P6	8	4	4' - 0"	19C
	T2	14	6	5' - 8"	Str.
	T3	70	5	7' - 4"	Str.
	T4	14	5	5' - 4"	Str.
	T5	6	5	59' - 3"	Str.
ϕ	T6	12	5	5' - 0"	Str.
	T7	28	6	2' - 6"	Str.
ϕ	T8	28	5	5' - 3"	17A
	T9	4	5	7' - 0"	Str.
	U1	28	4	18' - 5"	S4
	U2	16	6	18' - 11"	S4
	U3	84	4	3' - 6"	17
	Z1	80	7	4' - 0"	Str.

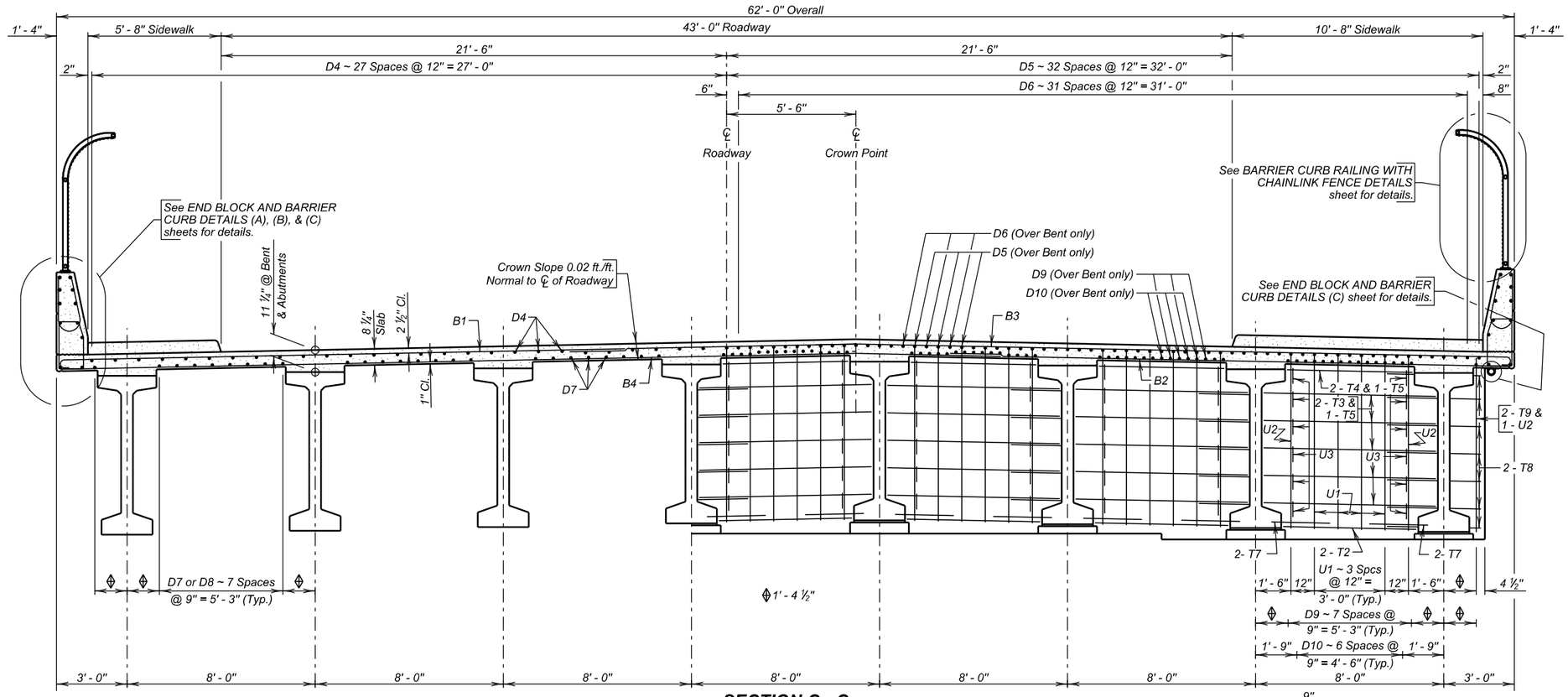


NOTES-
✳ Bend in field as necessary to fit.
∉ Tip bars as required to maintain top and bottom clear cover.
ϕ Bars to be epoxy coated.
All dimensions are out to out of bars.
All bars to be stainless steel unless otherwise noted.

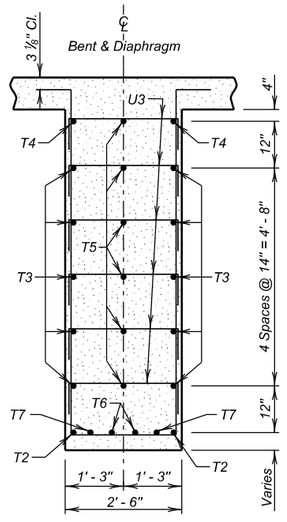
ESTIMATED QUANTITIES

	ITEM	UNIT	QUANTITY
☆	Class A45 Low Shrinkage Concrete, Bridge Deck	Cu.Yd.	519.3
	Stainless Reinforcing Steel	Lb.	114162
	Epoxy Coated Reinforcing Steel	Lb.	216
	81" Minnesota Shape Prestressed Concrete Beam	Ft.	1916
	Concrete Penetrating Sealer	Sq.Yd.	1598.7
	3" Rigid Galvanized Steel Conduit	Ft.	243

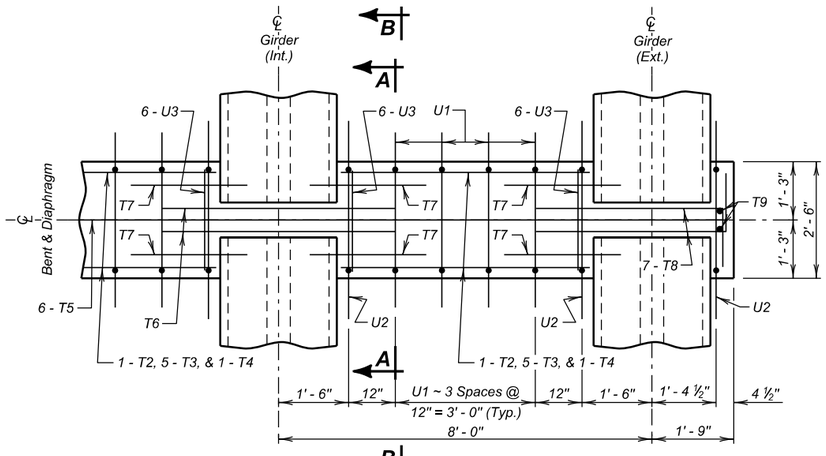
☆ Includes quantities for Barrier Curbs, Slab, and Haunch . (Average depth of 3" used for Haunch Quantity.) Concrete Quantity for Barrier Curbs is 0.1431 Cu. Yd. per foot and for End blocks is 0.8912 Cu.Yd. each.



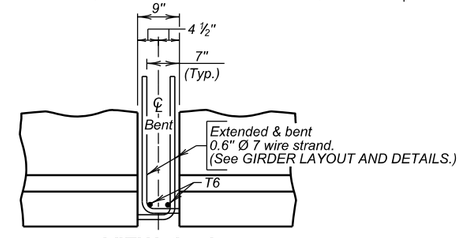
SECTION C - C
(Midspan diaphragm not shown in this section, see DIAPHRAGM DETAILS sheet.)



SECTION B - B
(Girders Not Shown)



BENT DIAPHRAGM
(Slab Not Shown)



VIEW A - A
(Showing extended and bent strand detail and T6 bar placement at Bent. T8 similar at exterior girder.)

SUPERSTRUCTURE DETAILS (B)

FOR

242' - 6" PRESTRESSED GIRDER BRIDGE

43' - 0" ROADWAY, 1 - 10' - 0" SIDEWALK, & 1 - 5' - 0" SIDEWALK
OVER I-90
STA. 504 + 55.11 TO
STA. 506 + 97.61
STR. NO. 47-098-564

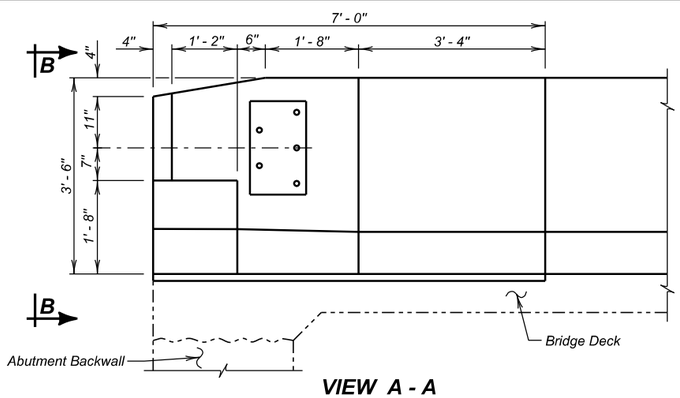
0° SKEW
SEC. 15-T3N-R6E
IM-CR-EM 0901(187)44
HL-93

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
JULY 2023

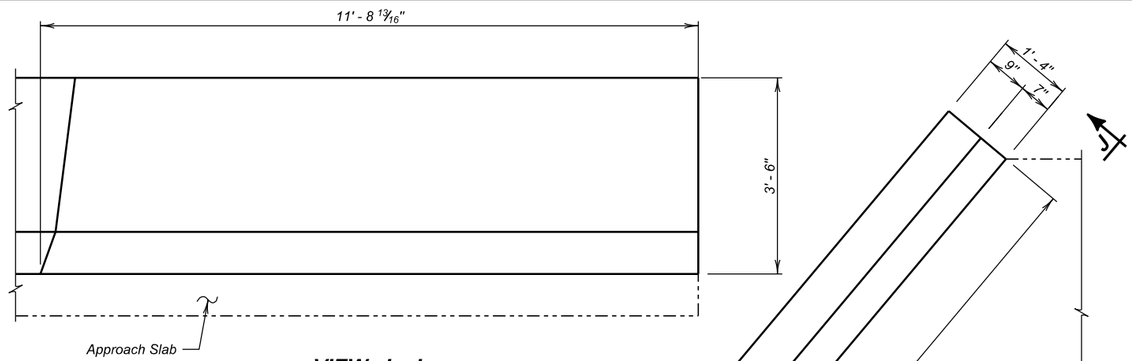
13 OF 37

DESIGNED BY	CK. DES. BY	DRAFTED BY	
PW MEAD034J	AU 034JTE13	MG	Steve A Johnson BRIDGE ENGINEER

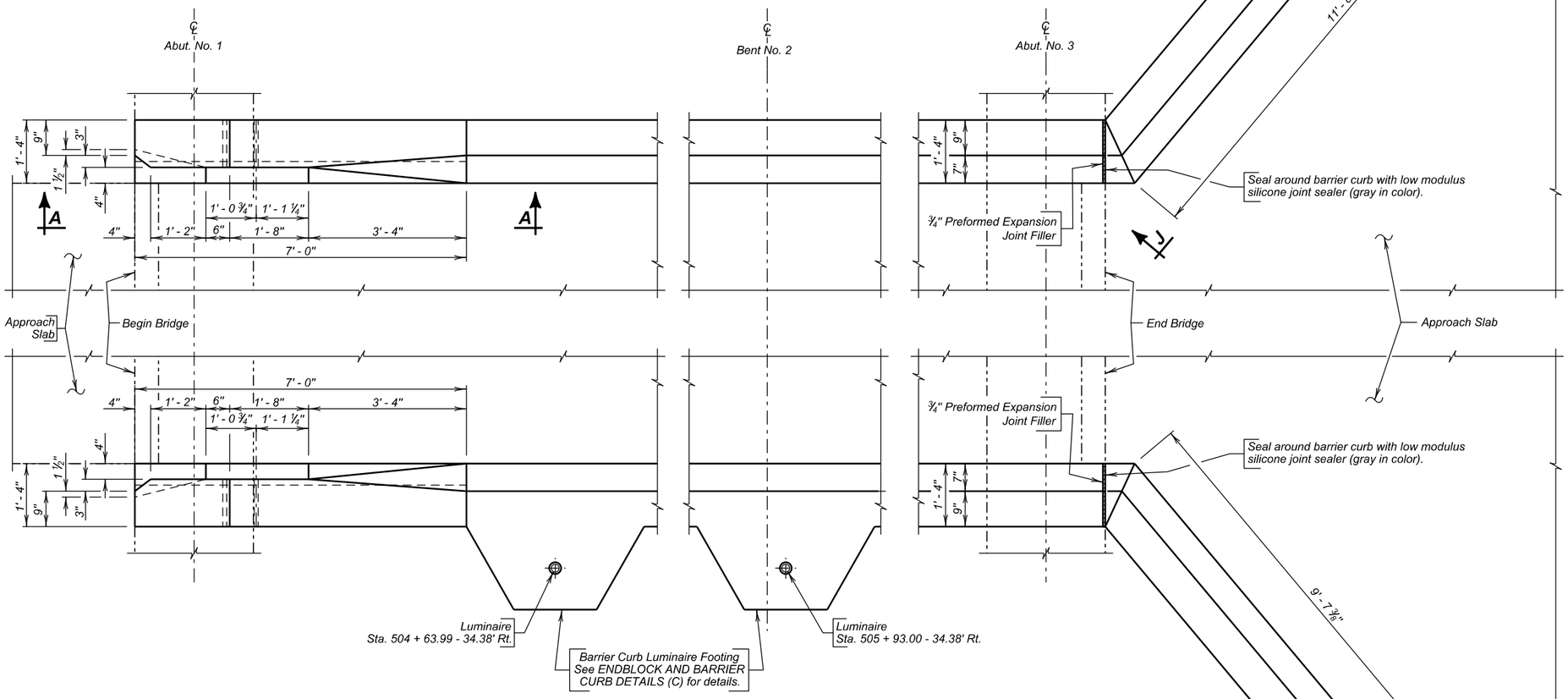
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E63	E185



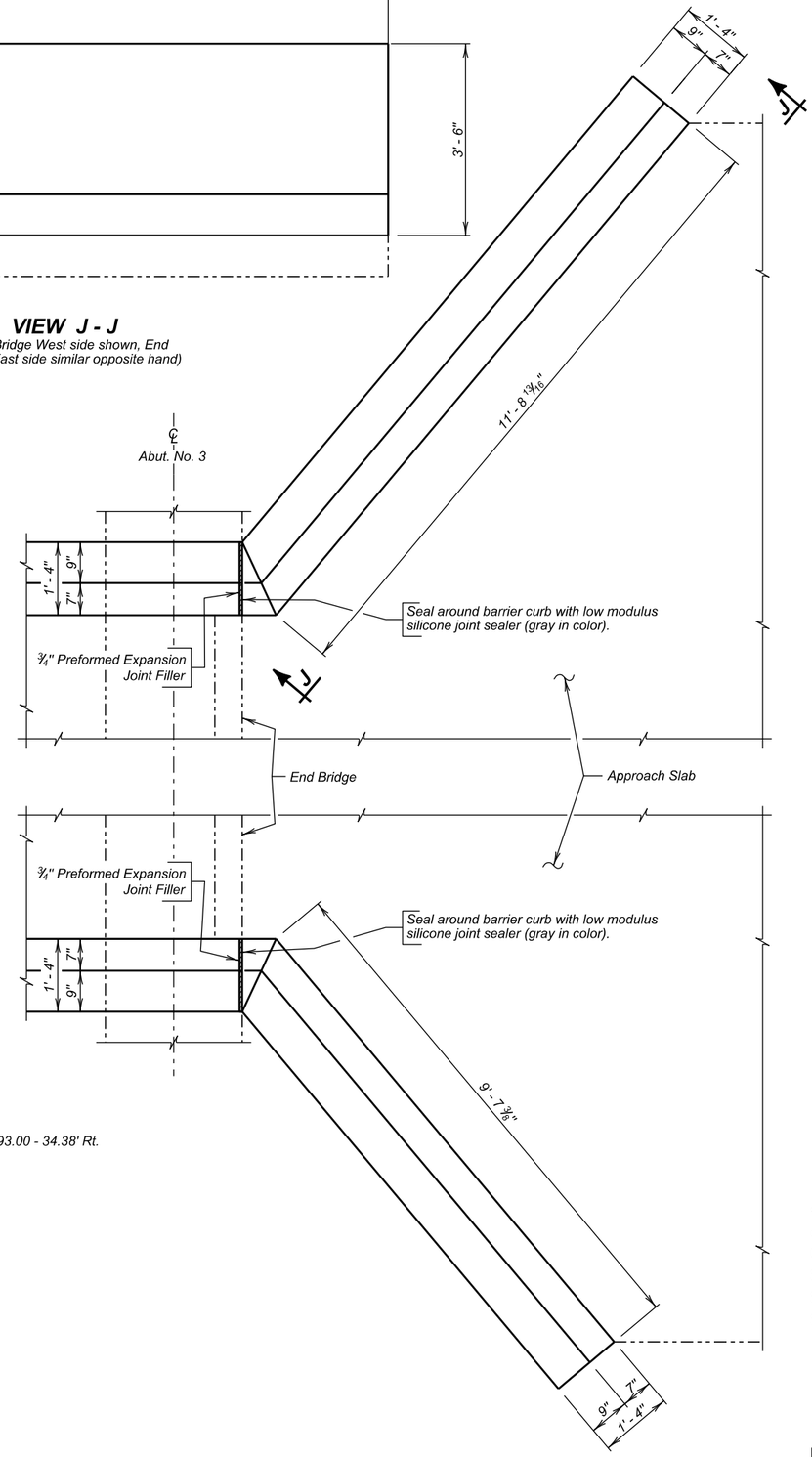
VIEW A - A
(Begin Bridge West side shown, Begin Bridge East side similar opposite hand)



VIEW J - J
(End Bridge West side shown, End Bridge East side similar opposite hand)



PLAN
(Resteel not shown)



NOTE :
This sheet is to be used in conjunction with the ENDBLOCK AND BARRIER CURB (B) & (C) sheets.

ENDBLOCK AND BARRIER CURB DETAILS (A)

FOR

242' - 6" PRESTRESSED GIRDER BRIDGE

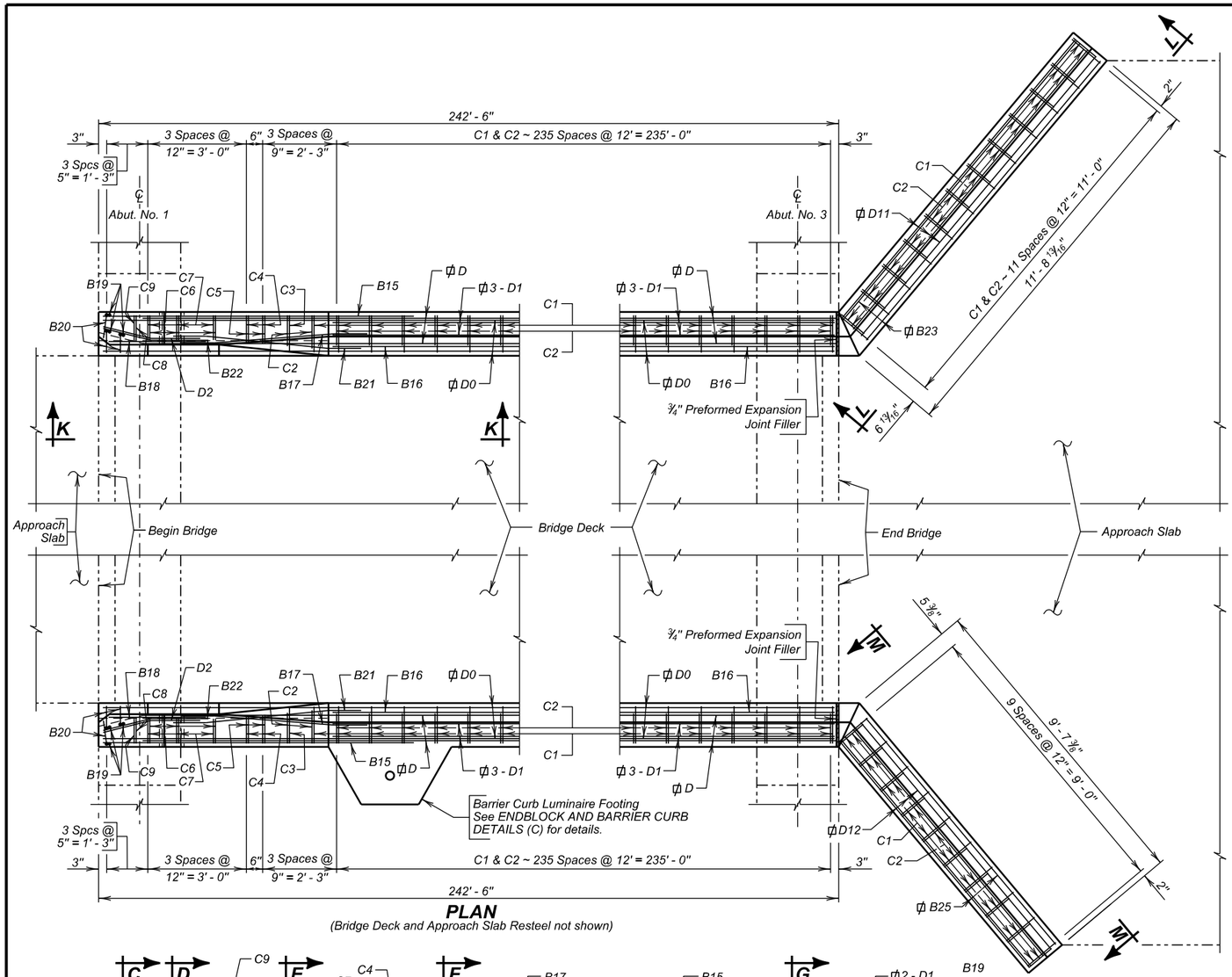
43' - 0" ROADWAY, 1 - 10' - 0" SIDEWALK, & 1 - 5' - 0" SIDEWALK
OVER I-90
STA. 504 + 55.11 TO
STA. 506 + 97.61
STR. NO. 47-098-564

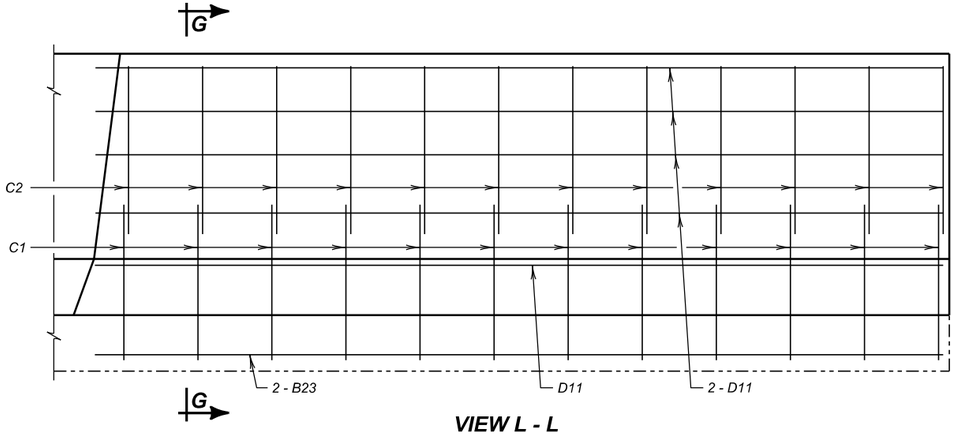
0° SKEW
SEC. 15-T3N-R6E
IM-CR-EM 0901(187)44
HL-93

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
JULY 2023

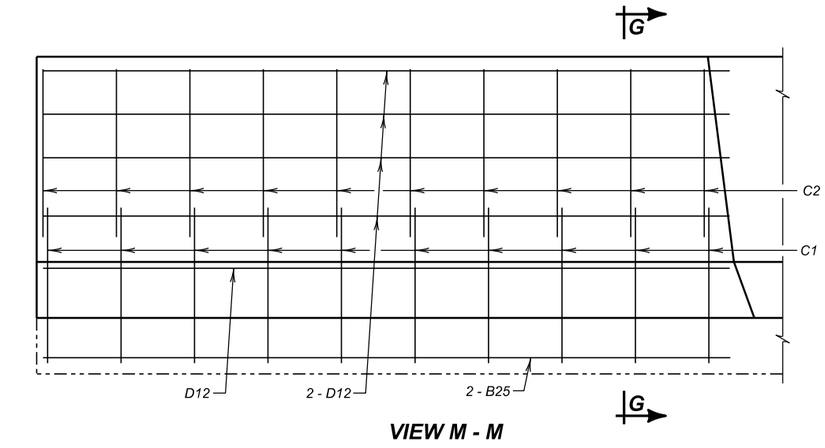
DESIGNED BY	CK. DES. BY	DRAFTED BY	
PW	AU	MG	Steve A Johnson BRIDGE ENGINEER
MEAD034J	034JTE14		

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E64	E185

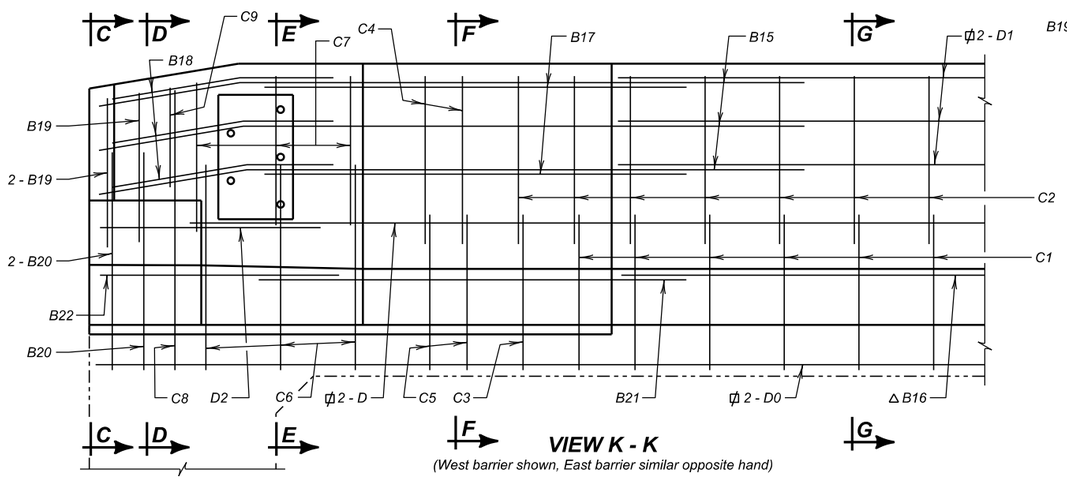




VIEW L - L



VIEW M - M



VIEW K - K

(West barrier shown, East barrier similar opposite hand)

℄ Min. Lap = 1' - 11"
△ Min. Lap = 1' - 6"

NOTE :
This sheet is to be used in conjunction with the ENDBLOCK AND BARRIER CURB (A) & (C) sheets.

ENDBLOCK AND BARRIER CURB DETAILS (B)

FOR

242' - 6" PRESTRESSED GIRDER BRIDGE

43' - 0" ROADWAY, 1 - 10' - 0" SIDEWALK, & 1 - 5' - 0" SIDEWALK
OVER I-90
STA. 504 + 55.11 TO
STA. 506 + 97.61
STR. NO. 47-098-564

0° SKEW
SEC. 15-T3N-R6E
IM-CR-EM 0901(187)44
HL-93

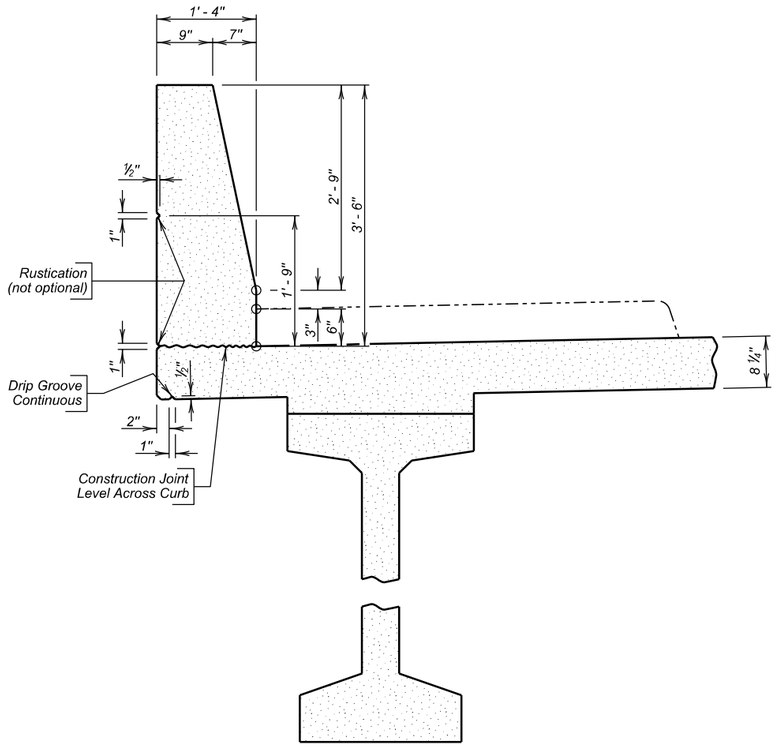
MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
JULY 2023

15 OF 37

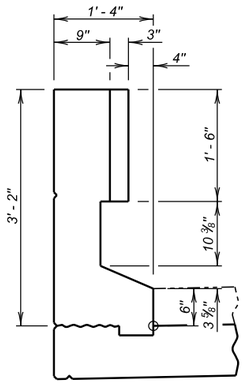
DESIGNED BY	CK. DES. BY	DRAFTED BY	
PW	AU	MG	BRIDGE ENGINEER
MEAD034J	034JTE15		

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E65	E185

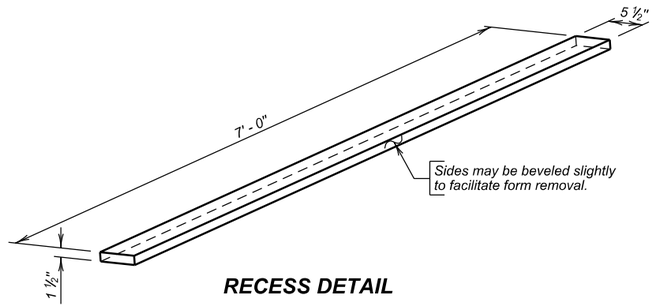
NOTE :
This sheet is to be used in conjunction with the ENDBLOCK AND BARRIER CURB (A) & (B) sheets.



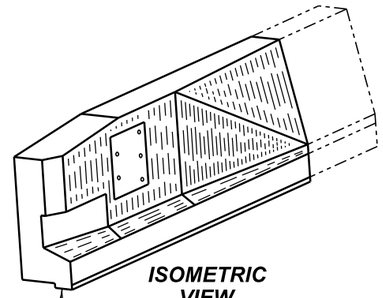
BARRIER DETAILS



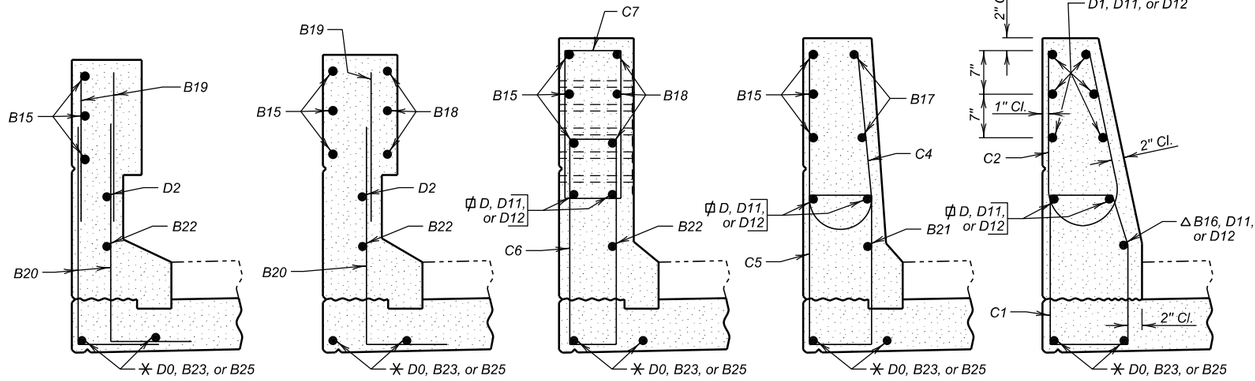
VIEW B - B

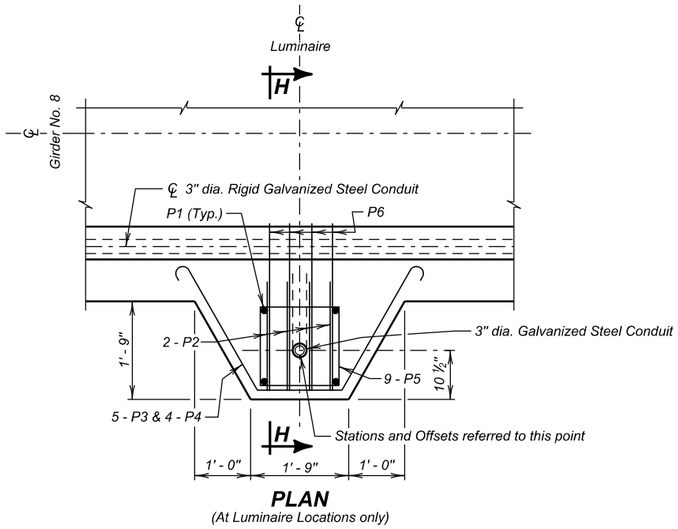


RECESS DETAIL

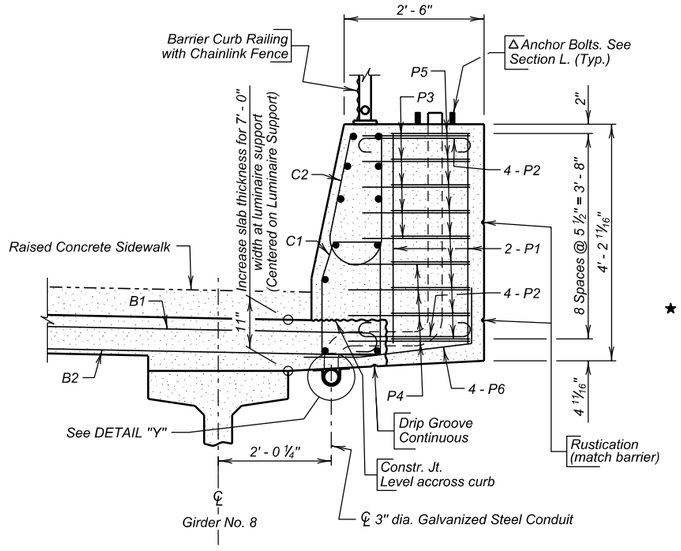


ISOMETRIC VIEW





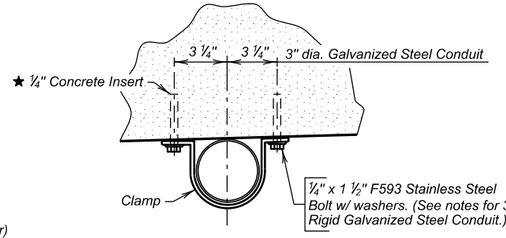
PLAN
(At Luminaire Locations only)



SECTION H - H
(At Luminaire Locations only)

△ *Anchor Bolts not to exceed height of barrier.*

★ *Space Concrete Inserts @ 5' - 0" Maximum Spacing (All hardware will be incidental to contract unit price per foot for 3" Rigid Galvanized Steel Conduit)*



DETAIL "Y"
(Typ. 3" dia. Galvanized Steel Conduit)

LUMINAIRE LOCATIONS	
Station	*Offset*
504 + 63.99	*34.38' Rt.*
505 + 93.00	*34.38' Rt.*

ENDBLOCK AND BARRIER CURB DETAILS (C)

FOR

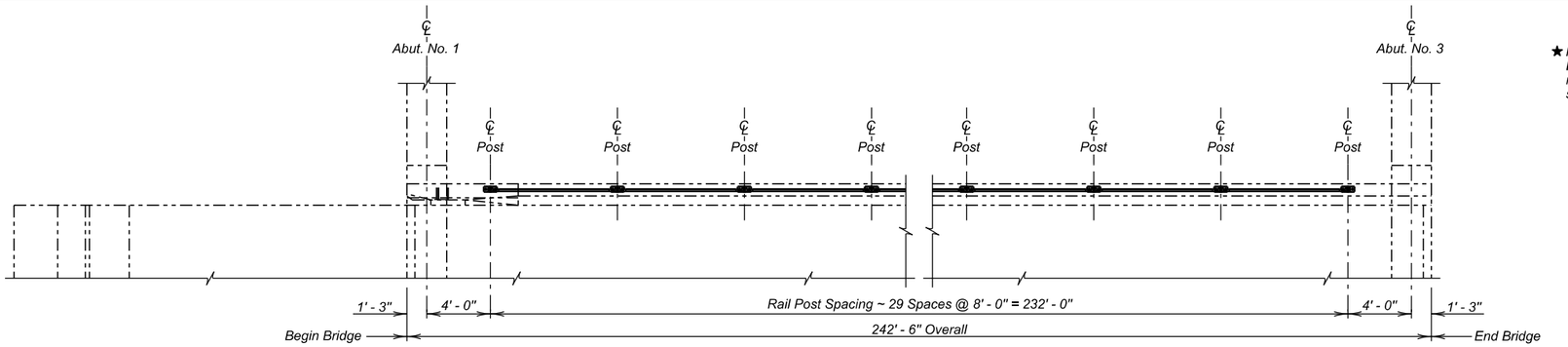
242' - 6" PRESTRESSED GIRDER BRIDGE

43' - 0" ROADWAY, 1 - 10' - 0" SIDEWALK, & 1 - 5' - 0" SIDEWALK — 0° SKEW
OVER I-90 — SEC. 15-T3N-R6E
STA. 504 + 55.11 TO — IM-CR-EM 0901(187)44
STA. 506 + 97.61 — HL-93
STR. NO. 47-098-564

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
JULY 2023

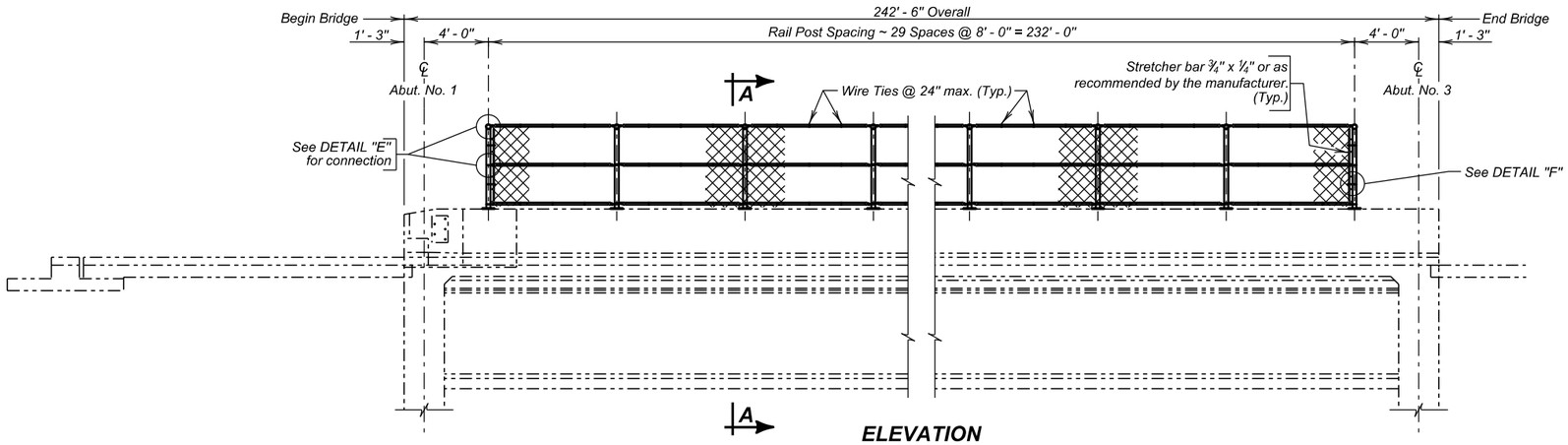
DESIGNED BY	CK. DES. BY	DRAFTED BY	
PW	AU	MG	Steve A Johnson BRIDGE ENGINEER
MEAD034J	034JTE16		

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E66	E185



PLAN

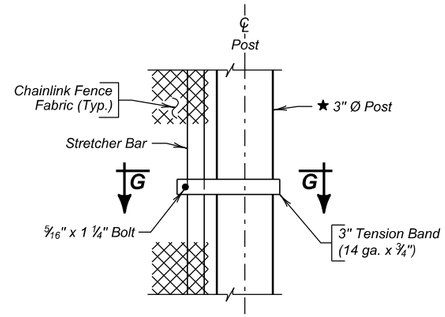
(Right side shown, Left side similar opposite hand)



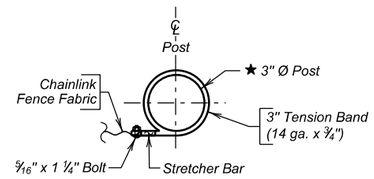
ELEVATION

(Right side shown, Left side similar opposite hand)

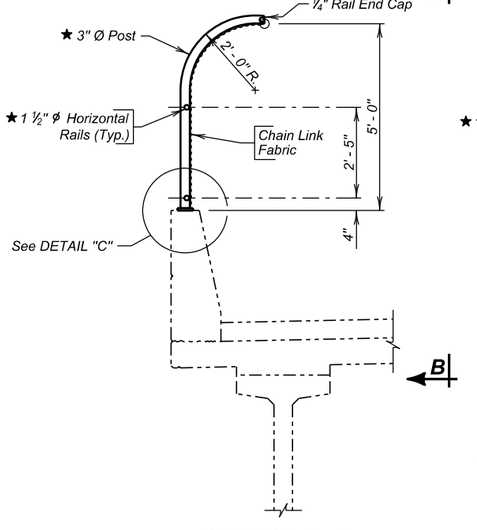
★ *NOTE:*
Diameter of pipe shown is the nominal diameter. All pipe will be standard weight (schedule 40) pipe.



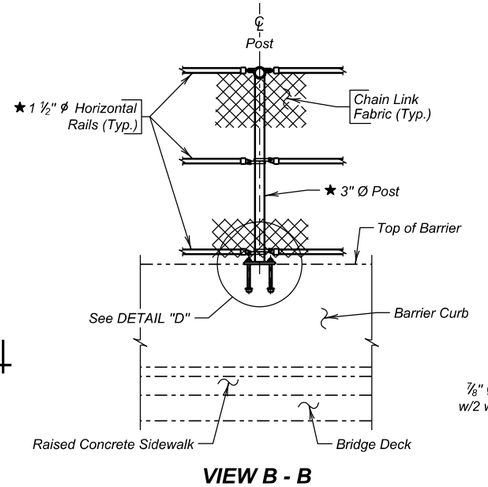
DETAIL "F"



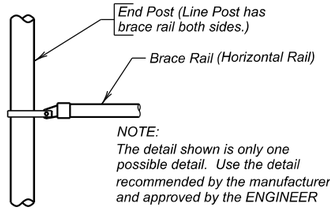
SECTION G - G



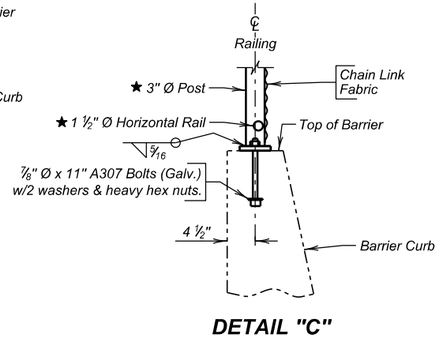
SECTION A - A



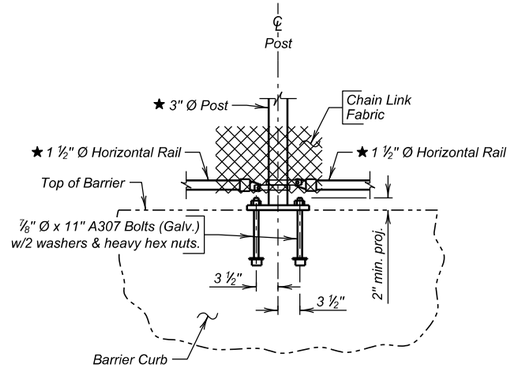
VIEW B - B



DETAIL "E"

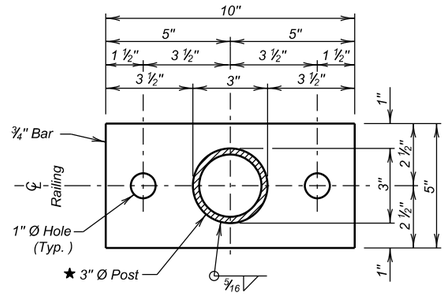


DETAIL "C"



DETAIL "D"

ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
Steel Pedestrian Rail on Sidewalk	Ft.	464



BASE PLATE DETAILS

BARRIER CURB RAILING WITH CHAINLINK FENCE DETAILS

FOR

242' - 6" PRESTRESSED GIRDER BRIDGE

43' - 0" ROADWAY, 1 - 10' - 0" SIDEWALK, & 1 - 5' - 0" SIDEWALK
OVER I-90
STA. 504 + 55.11 TO
STA. 506 + 97.61
STR. NO. 47-098-564

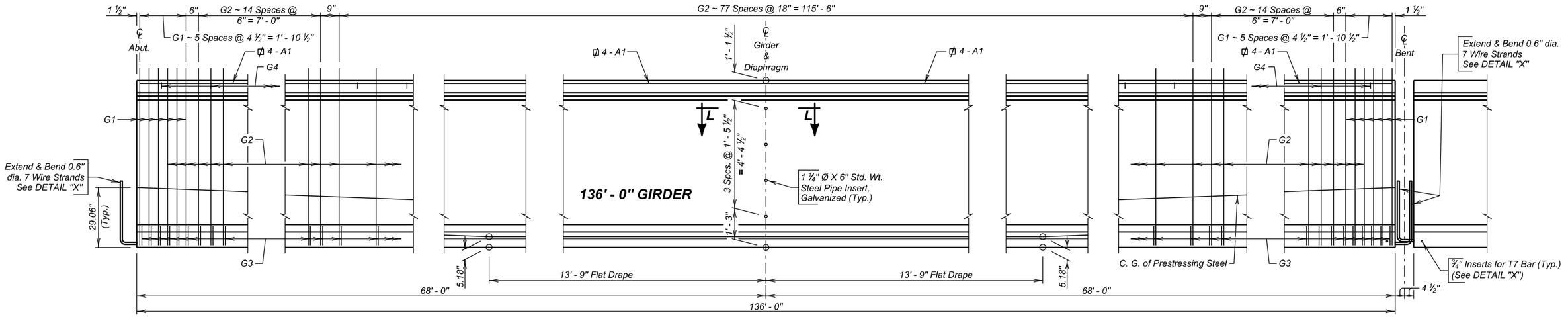
0° SKEW
SEC. 15-T3N-R6E
IM-CR-EM 0901(187)44
HL-93

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
JULY 2023

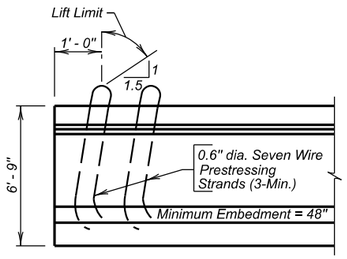
17 OF 37

DESIGNED BY	CK. DES. BY	DRAFTED BY	
PW	AU	MG	Steve A Johnson BRIDGE ENGINEER
MEAD034J	034JTE17		

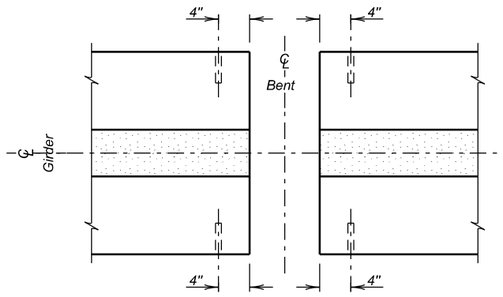
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E67	E185



ELEVATION

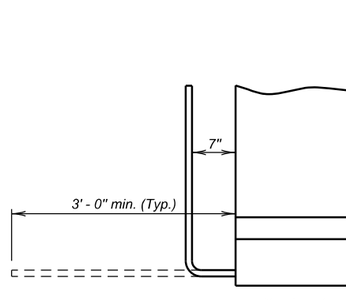


TYPICAL LIFTING DEVICE



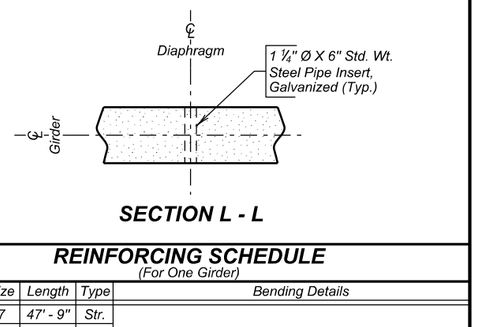
SECTION K - K

Layout for inserts at beam ends (Bent only)



DETAIL "X"

ϕ Min. Lap = 3' - 6"

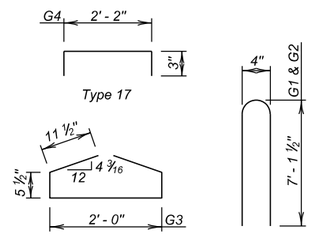


SECTION L - L

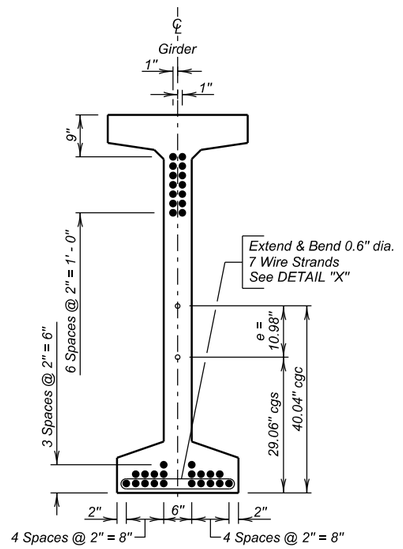
REINFORCING SCHEDULE

(For One Girder)

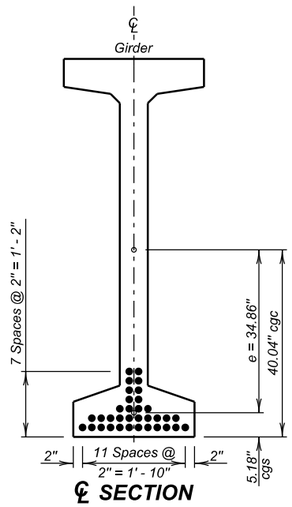
Mk.	No.	Size	Length	Type	Bending Details
A1	12	7	47' - 9"	Str.	
ϕ G1	12	5	14' - 6"	S11	
ϕ G2	108	4	14' - 6"	S11	
G3	120	4	4' - 10"	S3A	
G4	68	4	2' - 8"	17	



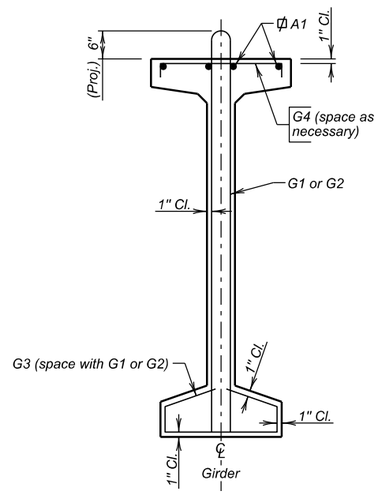
ϕ Bars to be epoxy coated.
All dimensions are out to out of bars.



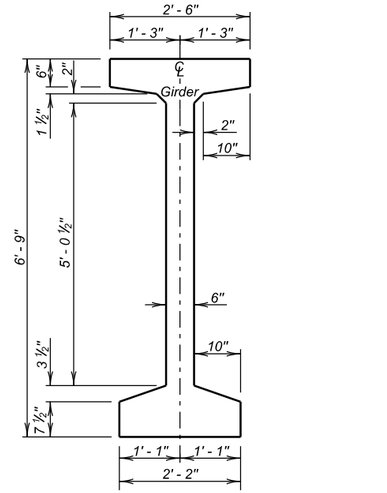
END VIEW



℄ SECTION



STIRRUP DETAILS



TYPE 81 GIRDER

136' - 0" GIRDERS

(34 ~ 0.6 Dia. Type 270 Low Lax. Strands)

136' - 0" GIRDER DETAILS

FOR

242' - 6" PRESTRESSED GIRDER BRIDGE

43' - 0" ROADWAY, 1 - 10' - 0" SIDEWALK, & 1 - 5' - 0" SIDEWALK OVER I-90
STA. 504 + 55.11 TO STA. 506 + 97.61
STR. NO. 47-098-564

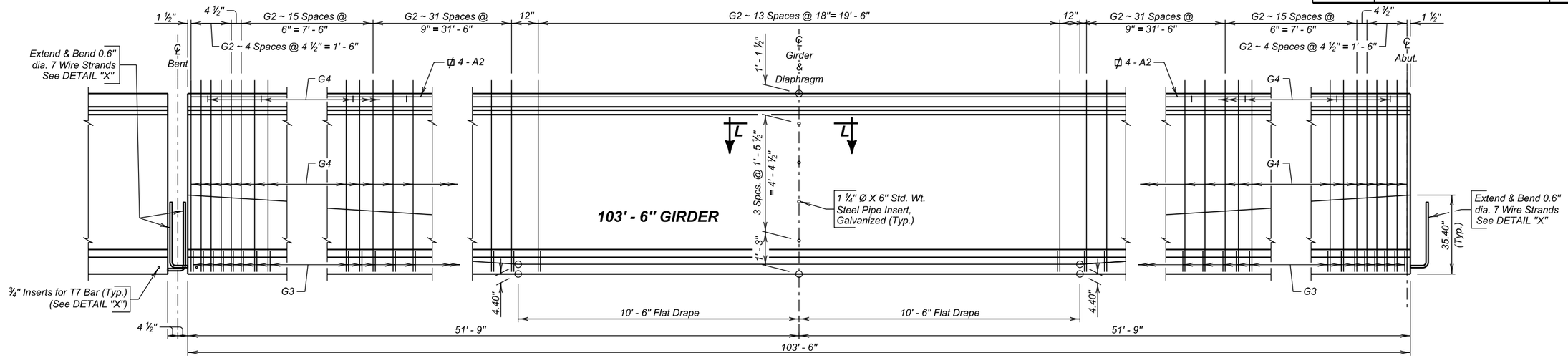
0° SKEW
SEC. 15-T3N-R6E
IM-CR-EM 0901(187)44
HL-93

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
JULY 2023

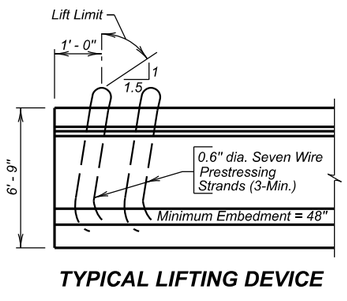
18 OF 37

DESIGNED BY	CK. DES. BY	DRAFTED BY	
PW	AU	MG	Steve A Johnson BRIDGE ENGINEER
MEAD034J	034JTE18		

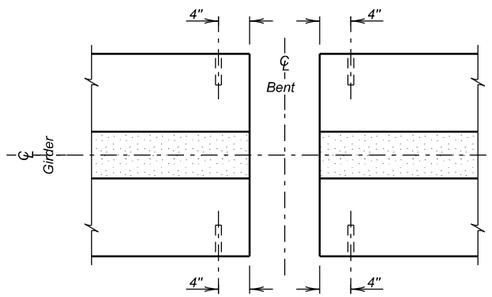
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E68	E185



ELEVATION

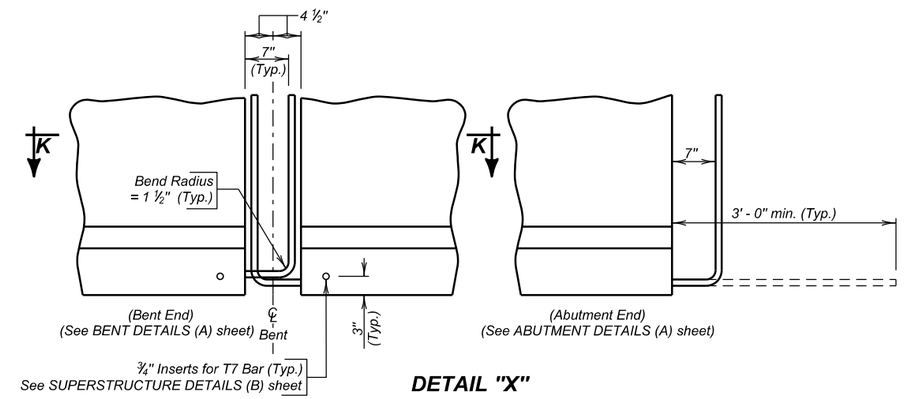


TYPICAL LIFTING DEVICE

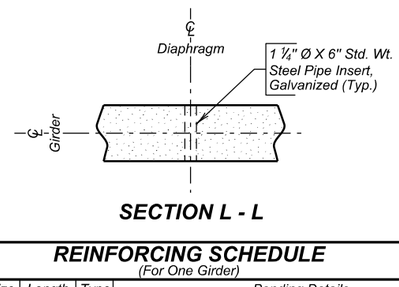


SECTION K - K

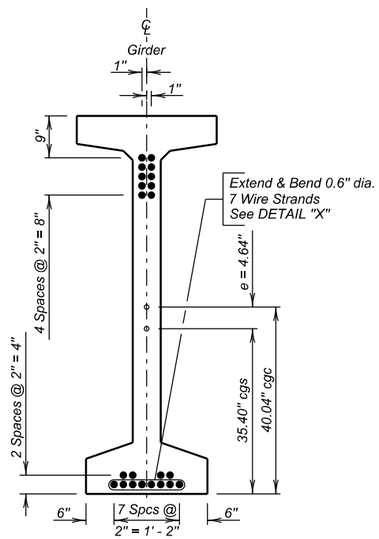
Layout for inserts at beam ends (Bent only)



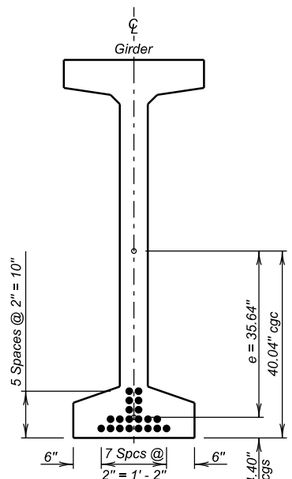
DETAIL "X"



SECTION L - L



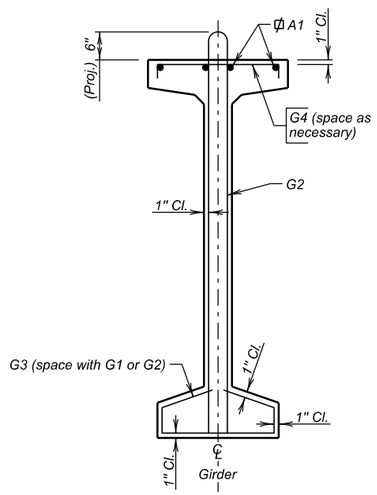
END VIEW



℄ SECTION

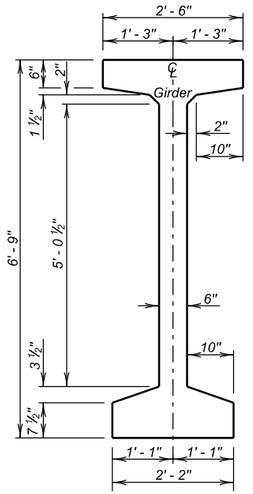
103' - 6" GIRDERS

(20 ~ 0.6 Dia. Type 270 Low Lax. Strands)



STIRRUP DETAILS

℄ Min. Lap = 3' - 6"

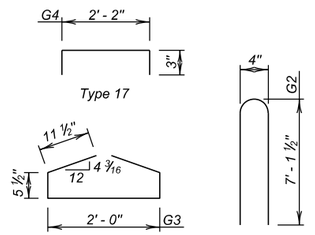


TYPE 81 GIRDER

REINFORCING SCHEDULE

(For One Girder)

Mk.	No.	Size	Length	Type	Bending Details
A2	8	7	53' - 6"	Str.	
℄ G2	140	4	14' - 6"	S11	
G3	140	4	4' - 10"	S3A	
G4	54	4	2' - 8"	17	



℄ Bars to be epoxy coated.
All dimensions are out to out of bars.

103' - 6" GIRDER DETAILS

FOR

242' - 6" PRESTRESSED GIRDER BRIDGE

43' - 0" ROADWAY, 1 - 10' - 0" SIDEWALK, & 1 - 5' - 0" SIDEWALK OVER I-90
STA. 504 + 55.11 TO STA. 506 + 97.61
STR. NO. 47-098-564

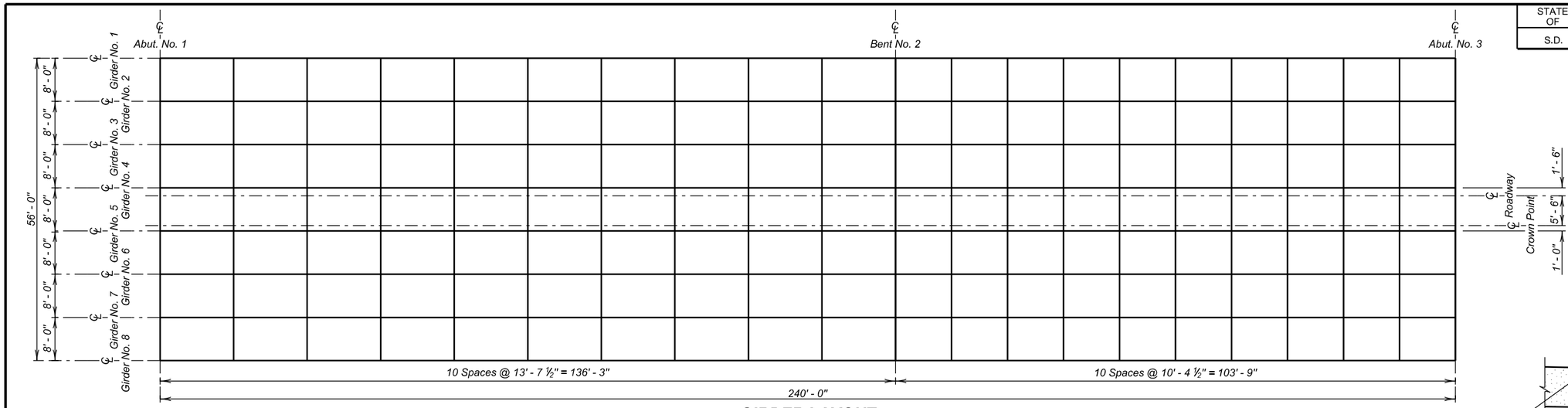
0° SKEW
SEC. 15-T3N-R6E
IM-CR-EM 0901(187)44
HL-93

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
JULY 2023

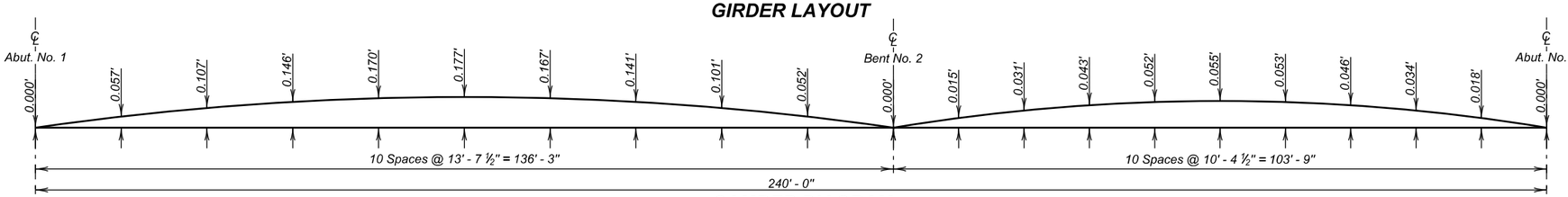
19 OF 37

DESIGNED BY	CK. DES. BY	DRAFTED BY	
PW	AU	MG	Steve A Johnson BRIDGE ENGINEER
MEAD034J	034JTE19		

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E69	E185

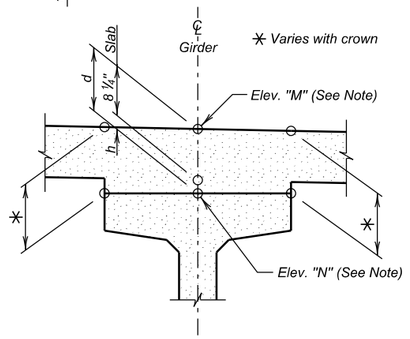


GIRDER LAYOUT



CAMBER DIAGRAM

The Camber shown is the amount which has been added to the theoretical slab elevations to get slab elevations shown in the table of Slab Form Elevations and Calculations. Camber shown is for D. L. of slab, traffic barrier, sidewalks, and haunch, but does not include D. L. of beams.



NOTE –

Based on a "d" of 11 ¼" at the ℄ of each abutment and bent (see SEC. C - C on SUPERSTRUCTURE DETAILS (B), it is anticipated that the midspan haunch dimension "h" over the ℄ of each girder will be 1 ½". If when computing the dimensions in the table, it is found that any dimension "h" is less than zero or greater than 4" the Office of Bridge Design of the South Dakota Dept. of Transportation will be notified immediately. After the "Table of Slab Form Elevations and Calculations" has been completely filled out and approved for deck forming, a copy will be forwarded to the Office of Bridge Design for review and analysis for the purpose of securing information relative to camber growth in the beams. This information is necessary for preparing plans for future structures of this type.

NOTE –

The table contains the information necessary to determine the depth of concrete over the girders at points shown. Calculations may be carried in the spaces provided. Elev. "M" is the design elevation of the top of slab before any concrete has been poured. This elevation includes correction for camber and dead load deflection. Elev. "N" is a field measured elevation taken on top of girders at the points shown with the girders in their positions. This elevation must be taken after erection is completed, but prior to placing any of the concrete. Girders will not be supported between bearings when elevations are taken.

TABLE OF SLAB FORM ELEVATIONS AND CALCULATIONS

		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Girder No. 1	Elev. "M"	3514.825	3515.031	3515.231	3515.420	3515.594	3515.751	3515.891	3516.015	3516.125	3516.226	3516.324	3516.453	3516.583	3516.709	3516.832	3516.940	3517.018	3517.068	3517.089	3517.083	3517.051
	(-) Elev. "N"																					
	(=) d																					
	(-) 0.688																					
	(=) h																					
Girder No. 2	Elev. "M"	3514.985	3515.191	3515.391	3515.580	3515.754	3515.911	3516.051	3516.175	3516.285	3516.386	3516.484	3516.613	3516.743	3516.869	3516.992	3517.100	3517.178	3517.228	3517.249	3517.243	3517.211
	(-) Elev. "N"																					
	(=) d																					
	(-) 0.688																					
	(=) h																					
Girder No. 3	Elev. "M"	3515.145	3515.351	3515.551	3515.740	3515.914	3516.071	3516.211	3516.335	3516.445	3516.546	3516.644	3516.773	3516.903	3517.029	3517.152	3517.260	3517.338	3517.388	3517.409	3517.403	3517.371
	(-) Elev. "N"																					
	(=) d																					
	(-) 0.688																					
	(=) h																					
Girder No. 4	Elev. "M"	3515.305	3515.511	3515.711	3515.900	3516.074	3516.231	3516.371	3516.495	3516.605	3516.706	3516.804	3516.933	3517.063	3517.189	3517.312	3517.420	3517.498	3517.548	3517.569	3517.563	3517.531
	(-) Elev. "N"																					
	(=) d																					
	(-) 0.688																					
	(=) h																					
Girder No. 5	Elev. "M"	3515.425	3515.631	3515.831	3516.020	3516.194	3516.351	3516.491	3516.615	3516.725	3516.826	3516.924	3517.053	3517.183	3517.309	3517.432	3517.540	3517.618	3517.668	3517.689	3517.683	3517.651
	(-) Elev. "N"																					
	(=) d																					
	(-) 0.688																					
	(=) h																					
Girder No. 6	Elev. "M"	3515.265	3515.471	3515.671	3515.860	3516.034	3516.191	3516.331	3516.455	3516.565	3516.666	3516.764	3516.893	3517.023	3517.149	3517.272	3517.380	3517.458	3517.508	3517.529	3517.523	3517.491
	(-) Elev. "N"																					
	(=) d																					
	(-) 0.688																					
	(=) h																					
Girder No. 7	Elev. "M"	3515.105	3515.311	3515.511	3515.700	3515.874	3516.031	3516.171	3516.295	3516.405	3516.506	3516.604	3516.733	3516.863	3516.989	3517.112	3517.220	3517.298	3517.348	3517.369	3517.363	3517.331
	(-) Elev. "N"																					
	(=) d																					
	(-) 0.688																					
	(=) h																					
Girder No. 8	Elev. "M"	3514.945	3515.151	3515.351	3515.540	3515.714	3515.871	3516.011	3516.135	3516.245	3516.346	3516.444	3516.573	3516.703	3516.829	3516.952	3517.060	3517.138	3517.188	3517.209	3517.203	3517.171
	(-) Elev. "N"																					
	(=) d																					
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ERECTION DATA AND SLAB FORM ELEVATIONS

FOR

242' - 6" PRESTRESSED GIRDER BRIDGE

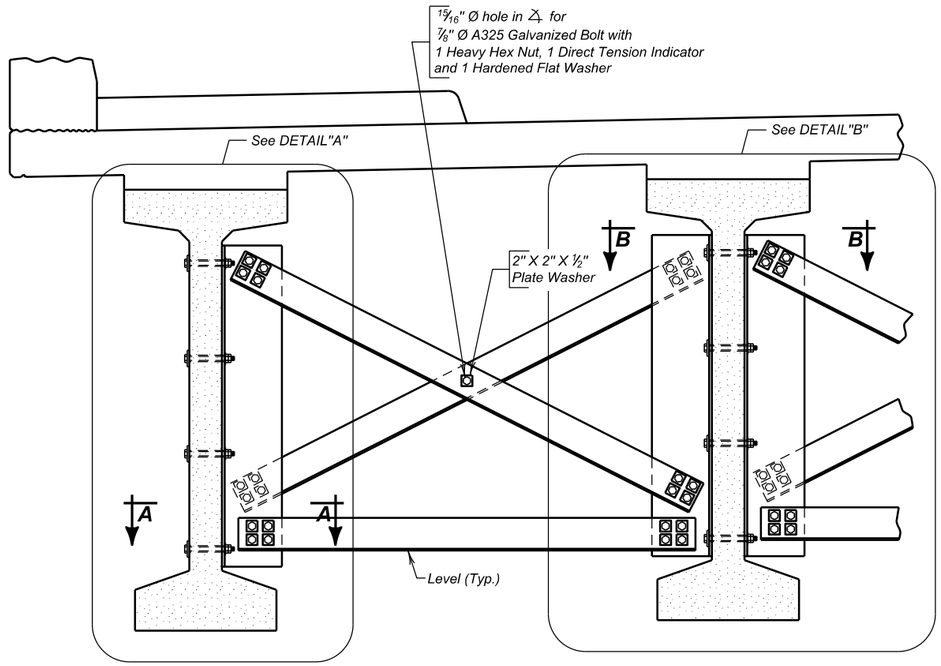
43' - 0" ROADWAY, 1 - 10' - 0" SIDEWALK, & 1 - 5' - 0" SIDEWALK OVER I-90
STA. 504 + 55.11 TO STA. 506 + 97.61
STR. NO. 47-098-564

0° SKEW
SEC. 15-T3N-R6E
IM-CR-EM 0901(187)44
HL-93

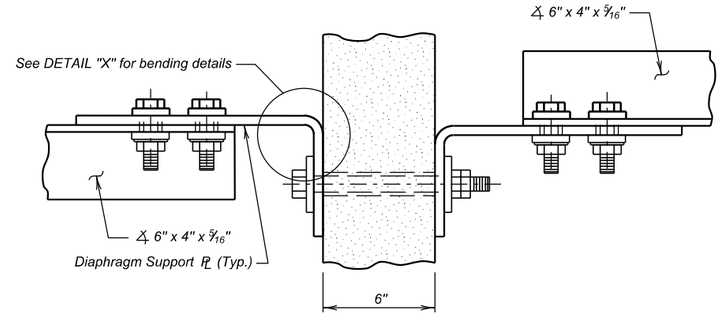
MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
JULY 2023

DESIGNED BY	CK. DES. BY	DRAFTED BY	
PW	AU	MG	Steve A. Johnson BRIDGE ENGINEER
MEAD034J	034JTE20		

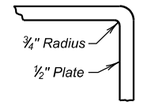
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E70	E185



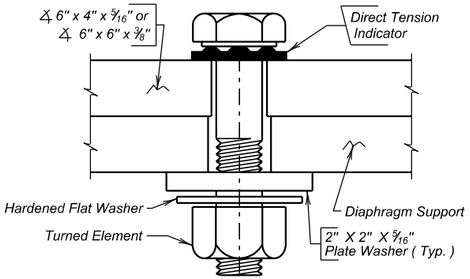
SECTION AT DIAPHRAGM



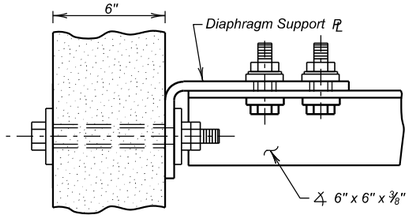
SECTION B - B



DETAIL "X"



DIRECT TENSION INDICATOR DETAIL



SECTION A - A

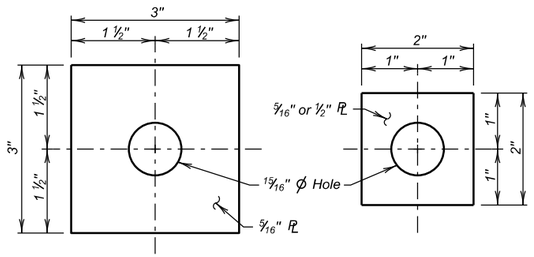
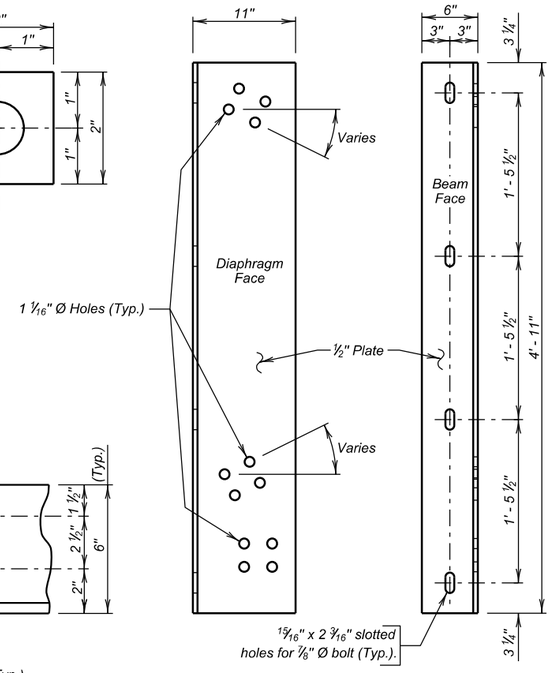
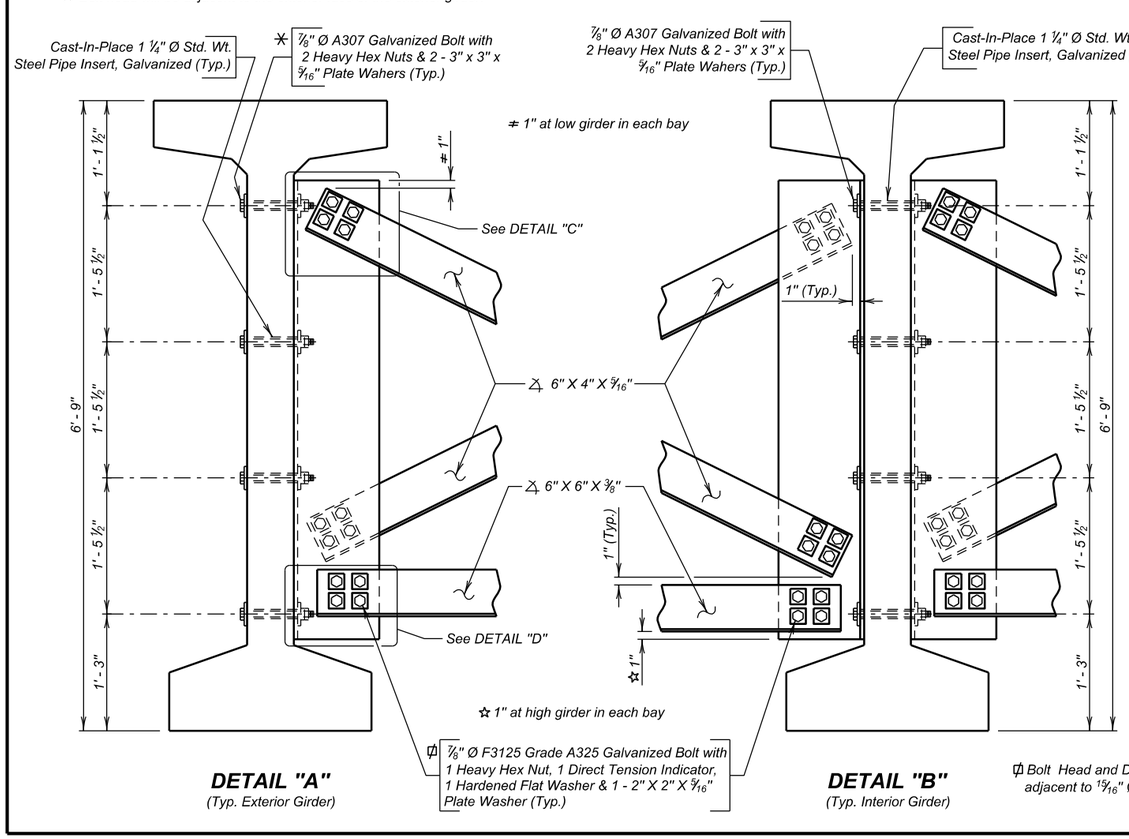


PLATE WASHER DETAILS



DIAPHRAGM SUPPORT PLATE

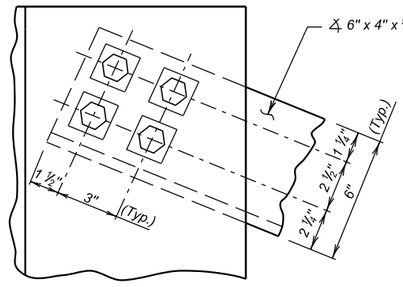
✳ Bolt head will be adjacent to the exterior face of the exterior girder.



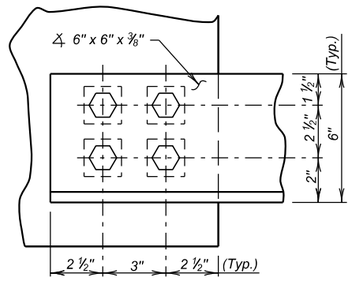
DETAIL "A"
(Typ. Exterior Girder)

DETAIL "B"
(Typ. Interior Girder)

⌀ Bolt Head and Direct Tension Indicator will be adjacent to 15/16" Ø holes in Bent Plate Diaphragm.



DETAIL "C"



DETAIL "D"

NOTES:

1. All steel for the diaphragms including plate washers will conform to ASTM A36 and will be galvanized in accordance with ASTM A123 or A153. Bolts, nuts, and washers will be galvanized in accordance with ASTM F2329. Direct Tension Indicators will conform to Section 410 of the Specifications.
2. The steel diaphragms between adjacent girders will be installed as soon as possible and in conjunction with girder erection.
3. All costs associated with furnishing, fabricating, assembly and installation of diaphragms will be included in the lump sum price for Structural Steel, Miscellaneous.

ESTIMATED QUANTITIES

	ITEM	UNIT	QUANTITY
△	Structural Steel, Miscellaneous	L.S.	Lump Sum

△ For informational purposes only, the estimated weight of structural steel is 8078 Lbs. for 14 diaphragms.

DIAPHRAGM DETAILS

FOR

242' - 6" PRESTRESSED GIRDER BRIDGE

43' - 0" ROADWAY, 1 - 10' - 0" SIDEWALK, & 1 - 5' - 0" SIDEWALK OVER I-90
STA. 504 + 55.11 TO STA. 506 + 97.61
STR. NO. 47-098-564

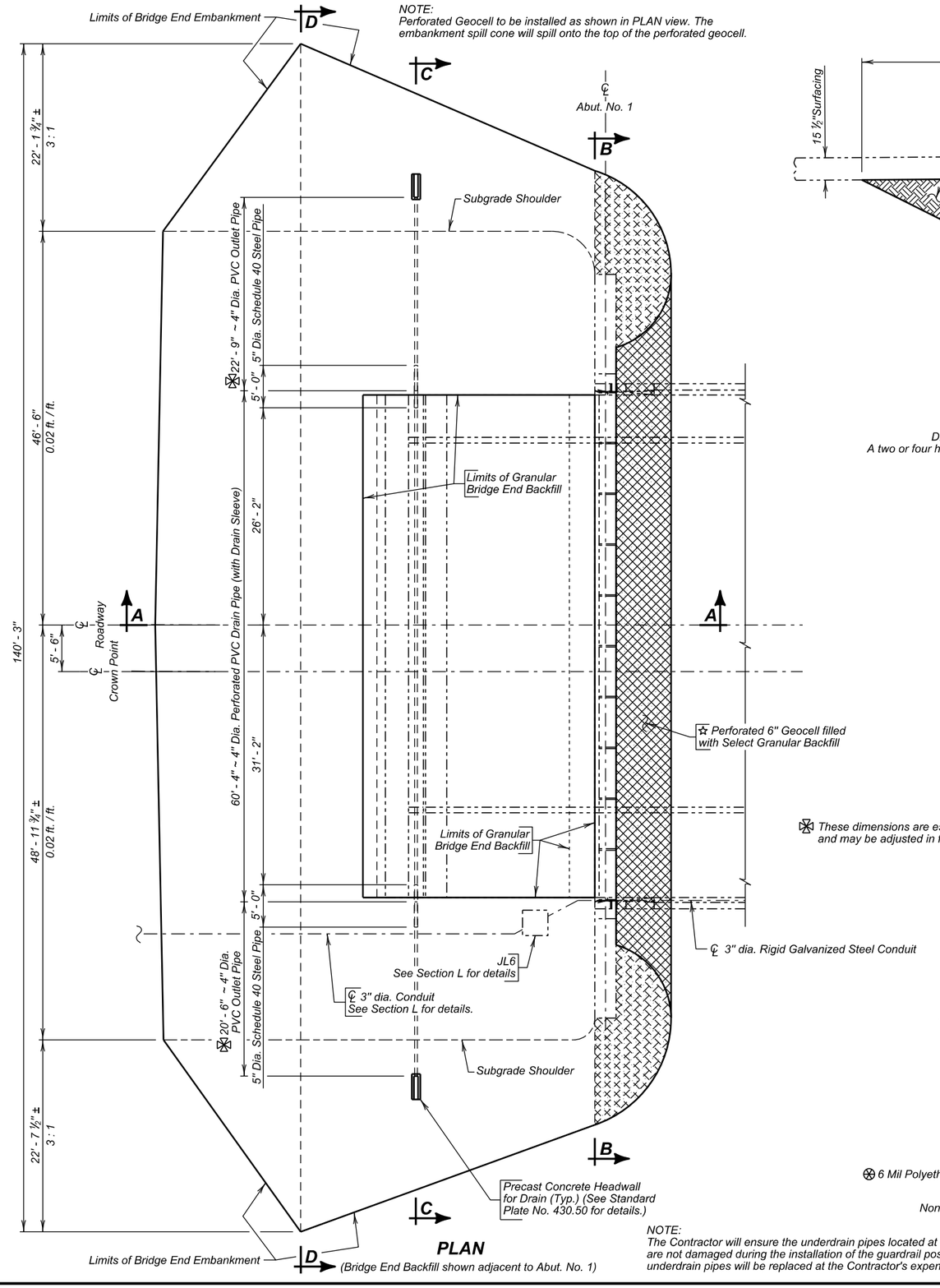
0° SKEW
SEC. 15-T3N-R6E
IM-CR-EM 0901(187)44
HL-93

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
JULY 2023

21 OF 37

DESIGNED BY	CK. DES. BY	DRAFTED BY	
PW	AU	MG	Steve A Johnson BRIDGE ENGINEER
MEAD034J	034JTE21		

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E71	E185

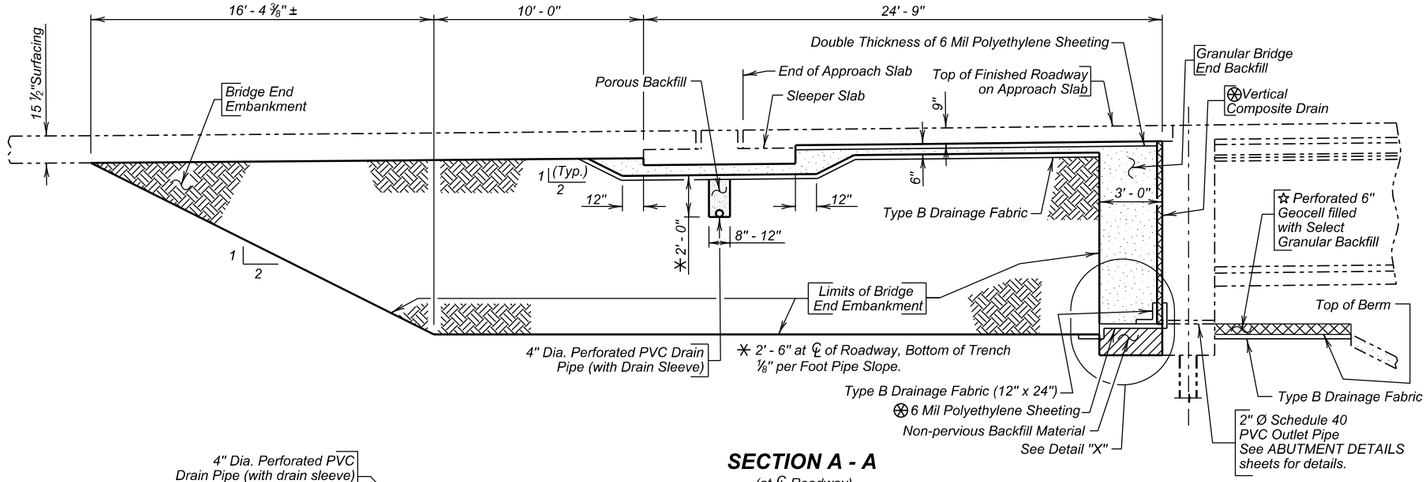


PLAN

NOTE:
Perforated Geocell to be installed as shown in PLAN view. The embankment spill cone will spill onto the top of the perforated geocell.

These dimensions are estimates and may be adjusted in field.

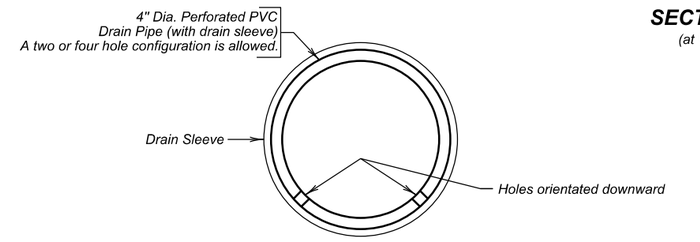
NOTE:
The Contractor will ensure the underdrain pipes located at the sleeper slab are not damaged during the installation of the guardrail posts. Damaged underdrain pipes will be replaced at the Contractor's expense.



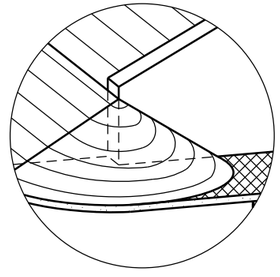
SECTION A - A
(at ℄ Roadway)

Provide hole in vertical composite drain and 6 mil polyethylene sheeting to provide drainage through weep holes.

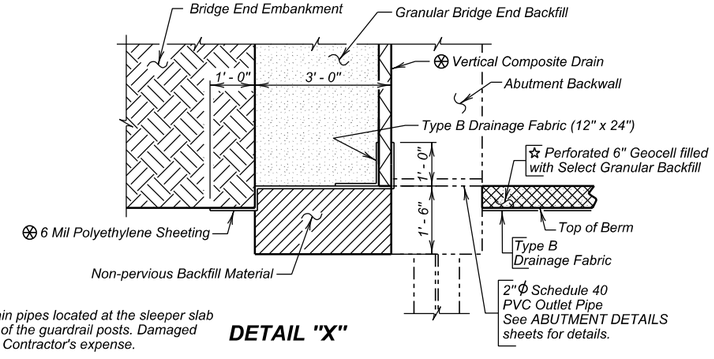
☆ See PERFORATED GEOCELL notes for payment information.



DRAIN DETAIL



SPILL CONE DETAIL AT EMBANKMENT



DETAIL "X"

ESTIMATED QUANTITIES
(For One Abutment)

	ITEM	UNIT	QUANTITY
	Granular Bridge End Backfill	Cu. Yd.	95.1
⧋	Bridge End Embankment	Cu. Yd.	1218
⧈ ⧍	Porous Backfill	Ton	8.1
	4" Underdrain Pipe	Ft.	105
⧈	Approach Slab Underdrain Excavation	Cu. Yd.	4.3
	Precast Concrete Headwall for Drain	Each	2
⧍	Select Granular Backfill	Ton	24.5
☆	Perforated Geocell	Sq. Ft.	571

1. 61 ft. 4" dia. Perforated PVC Drain Pipe (with Drain Sleeve).
2. 44 ft. 4" dia. PVC Outlet Pipe.
3. 10 ft. 5" dia. Schedule 40 Steel Pipe.
4. 558 sq. ft. Vertical Composite Drain.

Items 1 thru 4 are approximate quantities contained in the 4" Underdrain Pipe and are for information only.

5. 2372 sq. ft. 6 mil Polyethylene Sheeting, not including laps.
6. 244 sq. yd. Type B Drainage Fabric.

Items 5 and 6 are approximate quantities contained in the Granular Bridge End Backfill and are for information only.

⧍ For estimating purposes only, a factor of 1.89 tons/cu. yd. was used to convert cu. yds. to tons.

⧋ Shrinkage Factor of 1.25 used.

⧈ Quantity based on a 12" wide trench.

DETAILS OF BRIDGE END BACKFILL ADJACENT TO ABUTMENT NO. 1 (A)

FOR

242' - 6" PRESTRESSED GIRDER BRIDGE

43' - 0" ROADWAY, 1 - 10' - 0" SIDEWALK, & 1 - 5' - 0" SIDEWALK
OVER I-90
STA. 504 + 55.11 TO
STA. 506 + 97.61
STR. NO. 47-098-564

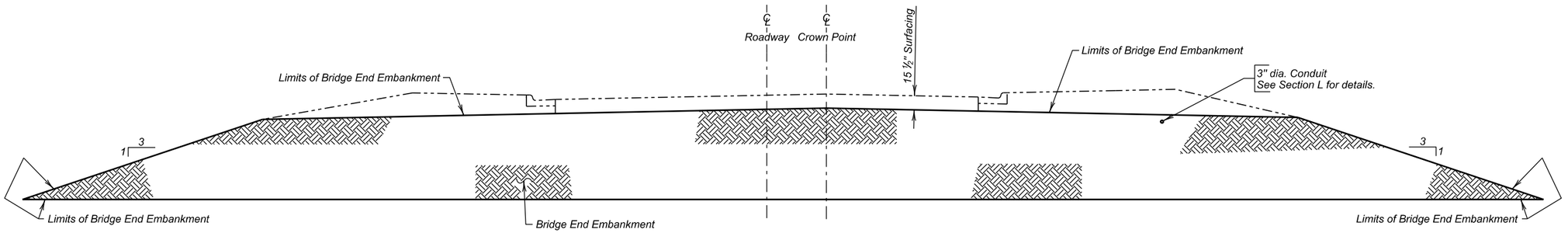
0° SKEW
SEC. 15-T3N-R6E
IM-CR-EM 0901(187)44
HL-93

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
JULY 2023

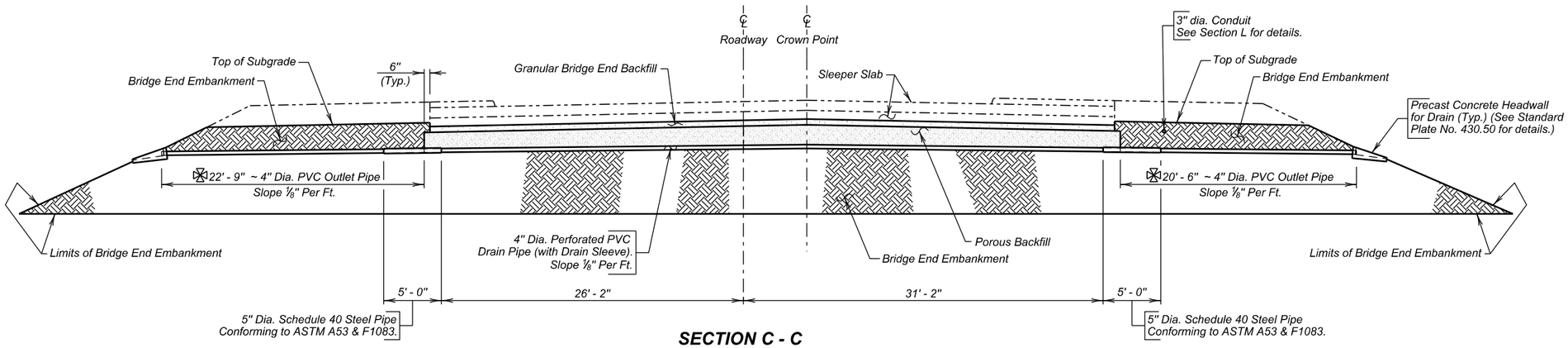
22 OF 37

DESIGNED BY	CK. DES. BY	DRAFTED BY	
PW	AU	MG	BRIDGE ENGINEER
MEAD034J	034JTE22		

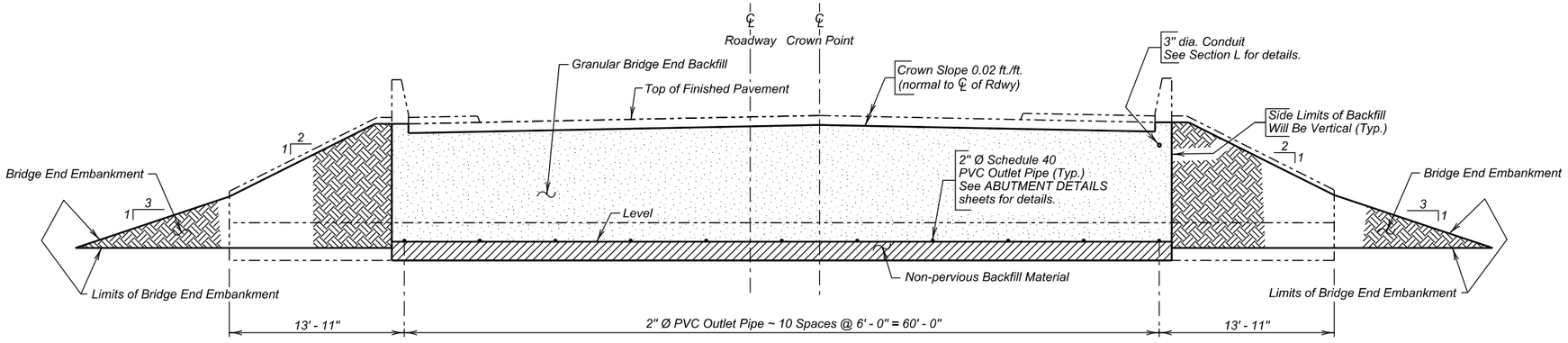
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E72	E185



SECTION D - D



SECTION C - C



SECTION B - B

DETAILS OF BRIDGE END BACKFILL ADJACENT TO ABUTMENT NO. 1 (B)

FOR

242' - 6" PRESTRESSED GIRDER BRIDGE

43' - 0" ROADWAY, 1 - 10' - 0" SIDEWALK, & 1 - 5' - 0" SIDEWALK OVER I-90
STA. 504 + 55.11 TO STA. 506 + 97.61
STR. NO. 47-098-564

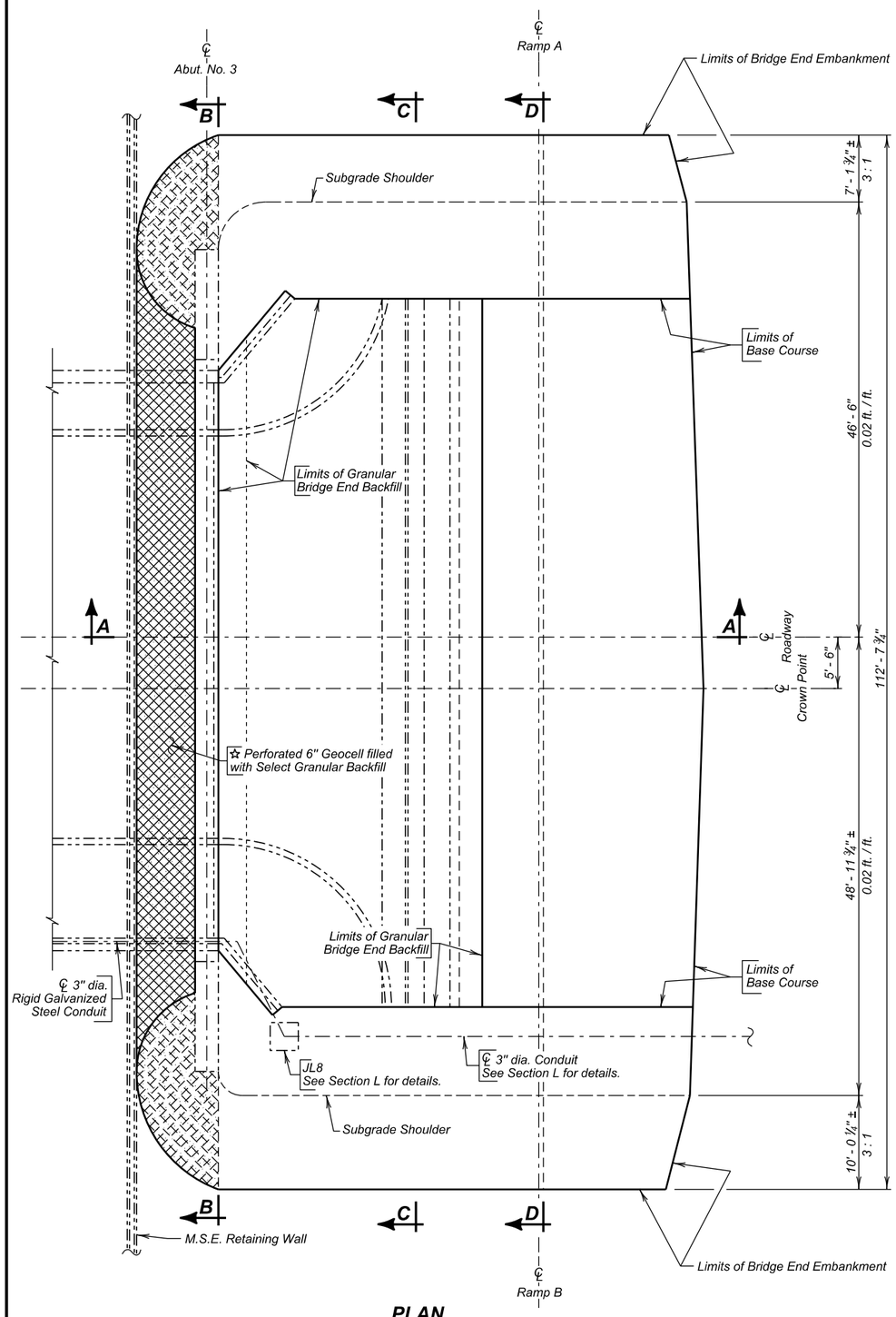
0° SKEW
SEC. 15-T3N-R6E
IM-CR-EM 0901(187)44
HL-93

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
JULY 2023

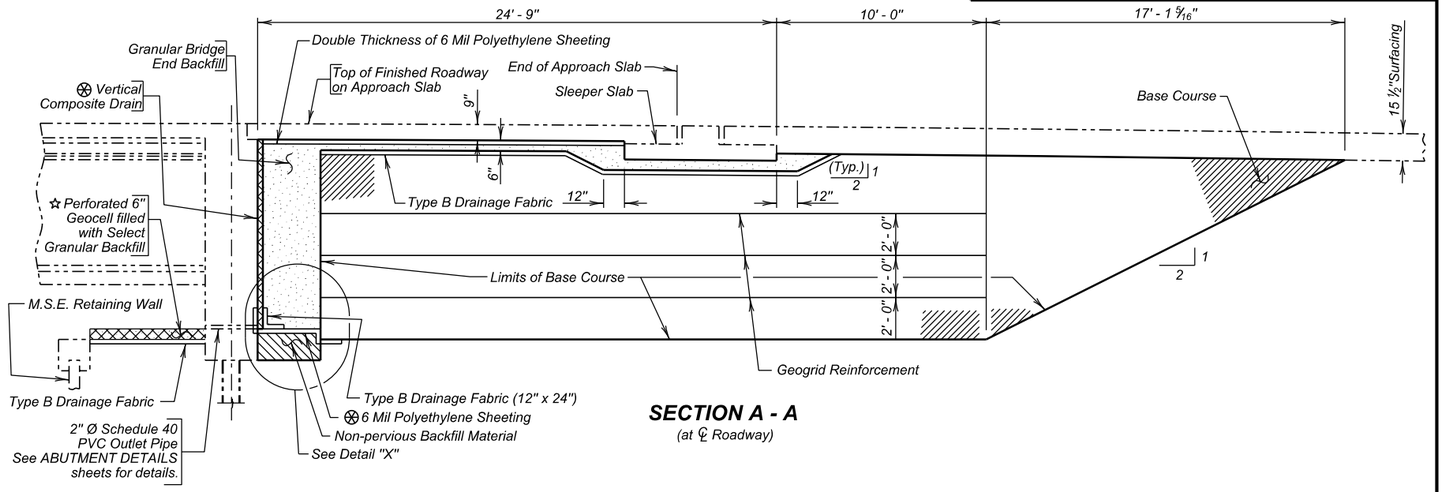
DESIGNED BY	CK. DES. BY	DRAFTED BY	
PW	AU	MG	Steve A. Johnson BRIDGE ENGINEER
MEAD034J	034JTE23		

NOTE:
Perforated Geocell to be installed as shown in PLAN view. The embankment spill cone will spill onto the top of the perforated geocell.

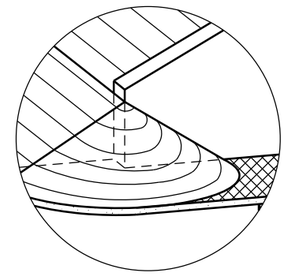
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E73	E185



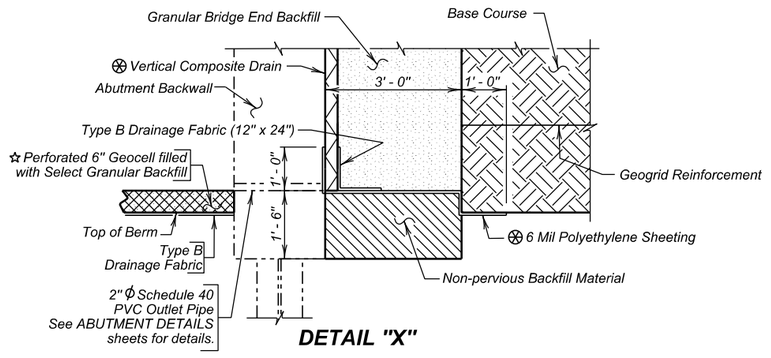
PLAN
(Bridge End Backfill shown adjacent to Abut. No. 3)



SECTION A - A
(at ℄ Roadway)



SPILL CONE DETAIL AT EMBANKMENT



DETAIL "X"

⊛ Provide hole in vertical composite drain and 6 mil polyethylene sheeting to provide drainage through weep holes.

☆ See PERFORATED GEOCELL notes for payment information.

ESTIMATED QUANTITIES
(For One Abutment)

	ITEM	UNIT	QUANTITY
	Granular Bridge End Backfill	Cu. Yd.	115.0
∡	Bridge End Embankment	Cu. Yd.	487
⊄	Select Granular Backfill	Ton	24.5
☆	Perforated Geocell	Sq. Ft.	700
⊄	Base course	Ton	1641.7
	Geogrid Reinforcement	Sq. Yd.	1043

1. 558 sq. ft. Vertical Composite Drain.
2. 3029 sq. ft. 6 mil Polyethylene Sheeting, not including laps.
3. 290 sq. yd. Type B Drainage Fabric.

Items 1 thru 3 are approximate quantities contained in the Granular Bridge End Backfill and are for information only.

∡ Shrinkage Factor of 1.25 used.

⊄ For estimating purposes only, a factor of 1.89 tons/cu. yd. was used to convert cu. yds. to tons.

DETAILS OF BRIDGE END BACKFILL ADJACENT TO ABUTMENT NO. 3 (A)

FOR

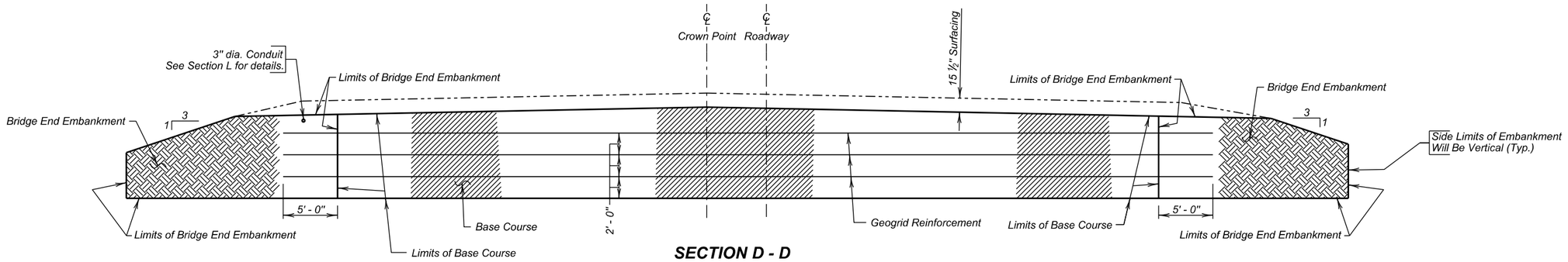
242' - 6" PRESTRESSED GIRDER BRIDGE

43' - 0" ROADWAY, 1 - 10' - 0" SIDEWALK, & 1 - 5' - 0" SIDEWALK — 0° SKEW
OVER I-90 — SEC. 15-T3N-R6E
STA. 504 + 55.11 TO STA. 506 + 97.61 — IM-CR-EM 0901(187)44
STR. NO. 47-098-564 — HL-93

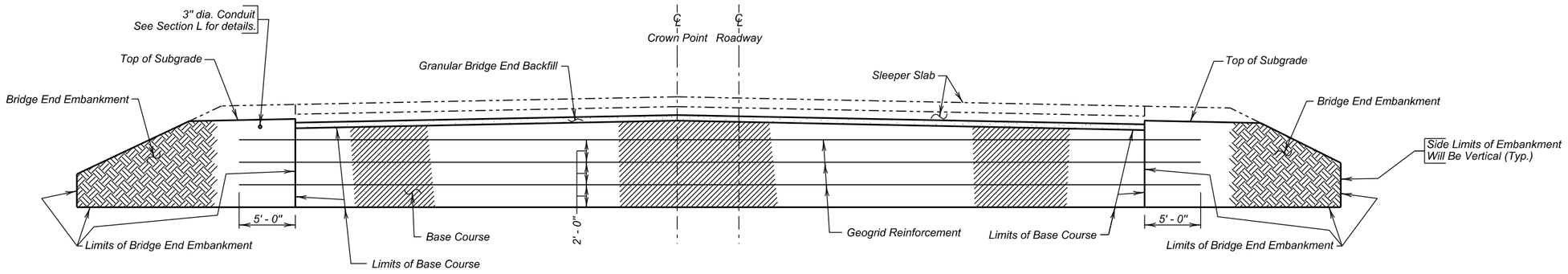
MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
JULY 2023

DESIGNED BY	CK. DES. BY	DRAFTED BY	
PW	AU	MG	Steve A Johnson BRIDGE ENGINEER
MEAD034J	034JTE24		

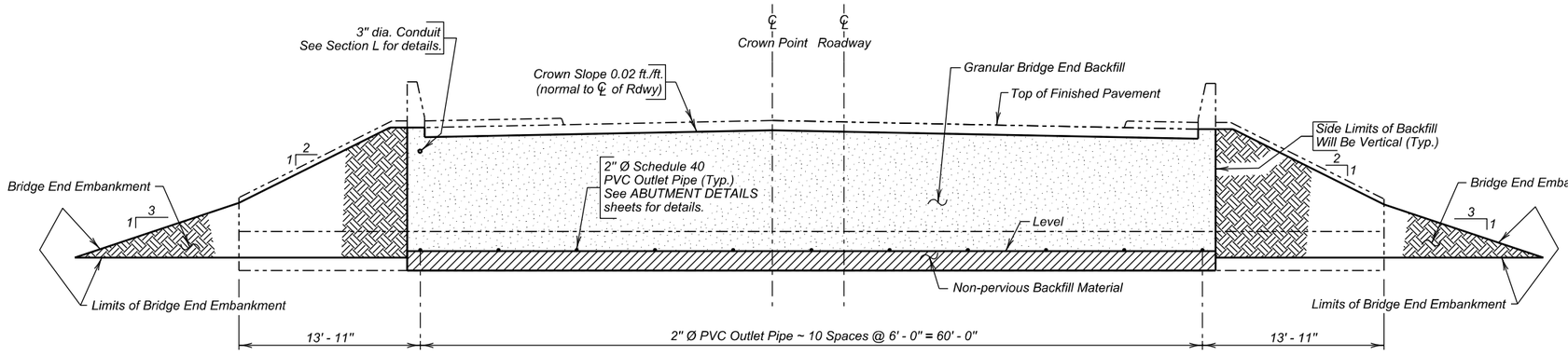
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E74	E185



SECTION D - D



SECTION C - C



SECTION B - B

DETAILS OF BRIDGE END BACKFILL ADJACENT TO ABUTMENT NO. 3 (B)

FOR

242' - 6" PRESTRESSED GIRDER BRIDGE

43' - 0" ROADWAY, 1 - 10' - 0" SIDEWALK, & 1 - 5' - 0" SIDEWALK
OVER I-90
STA. 504 + 55.11 TO
STA. 506 + 97.61
STR. NO. 47-098-564

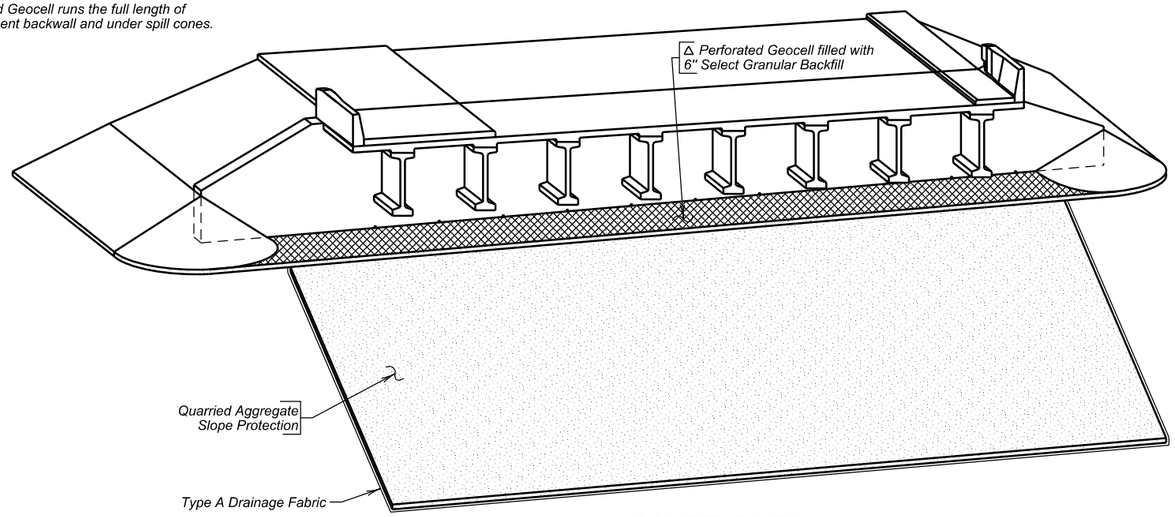
0° SKEW
SEC. 15-T3N-R6E
IM-CR-EM 0901(187)44
HL-93

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
JULY 2023

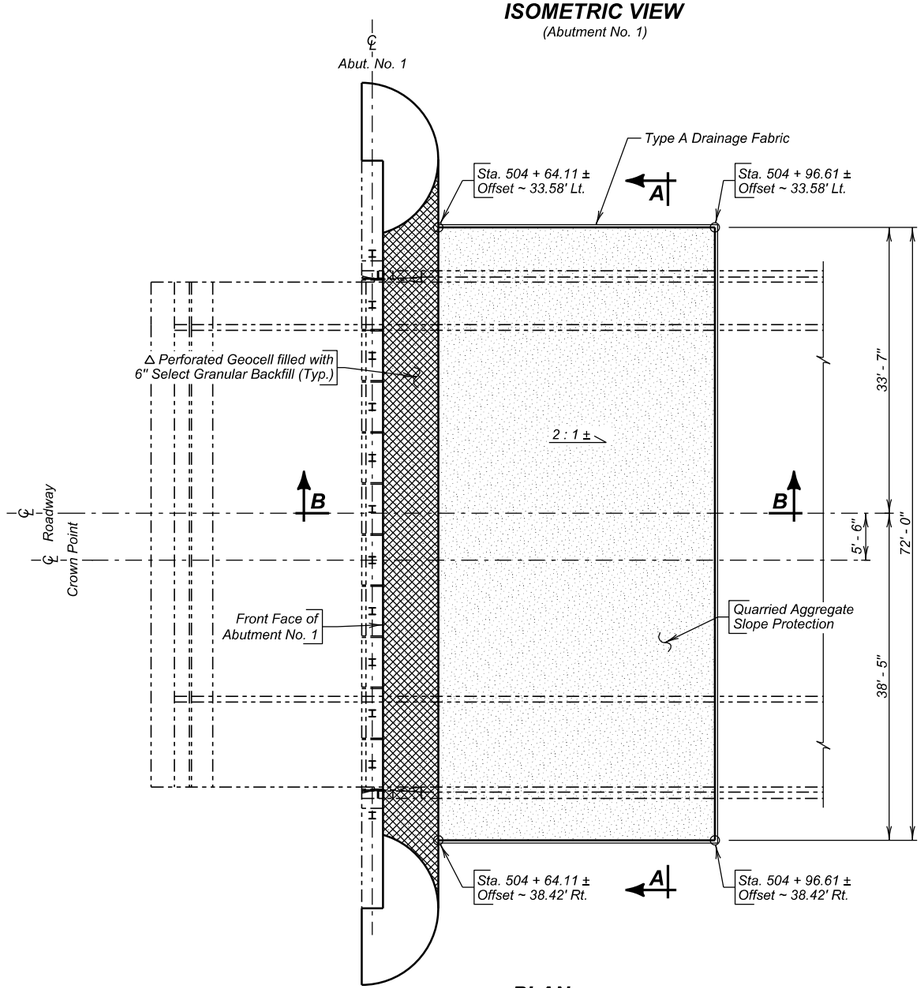
DESIGNED BY	CK. DES. BY	DRAFTED BY	
PW	AU	MG	Steven A. Johnson BRIDGE ENGINEER
MEAD034J	034JTE25		

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E75	E185

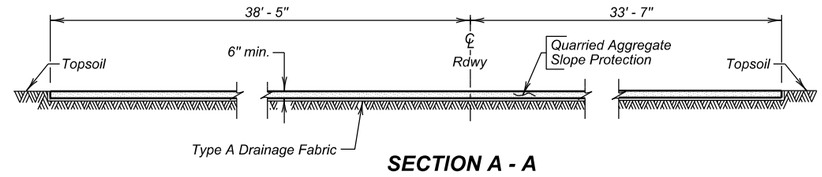
Note:
Perforated Geocell runs the full length of the abutment backwall and under spill cones.



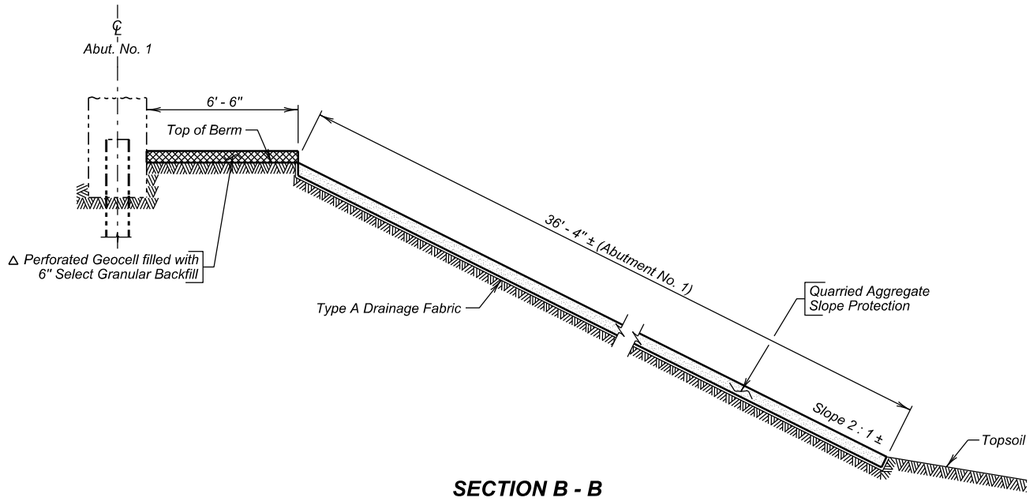
ISOMETRIC VIEW
(Abutment No. 1)



PLAN



SECTION A - A



SECTION B - B
(Along ℄ Rdwy)

ESTIMATED QUANTITIES
(For One Abutment)

ITEM	UNIT	QUANTITY
Bridge Berm Slope Protection, Quarried Aggregate	Sq. Yd.	290.7
Type A Drainage Fabric	Sq. Yd.	291

△ *See DETAILS OF BRIDGE END BACKFILL ADJACENT TO ABUTMENT NO. 1 (A) for details and quantities.*

SLOPE PROTECTION DETAILS

FOR

242' - 6" PRESTRESSED GIRDER BRIDGE

43' - 0" ROADWAY, 1 - 10' - 0" SIDEWALK, & 1 - 5' - 0" SIDEWALK OVER I-90
STA. 504 + 55.11 TO STA. 506 + 97.61
STR. NO. 47-098-564

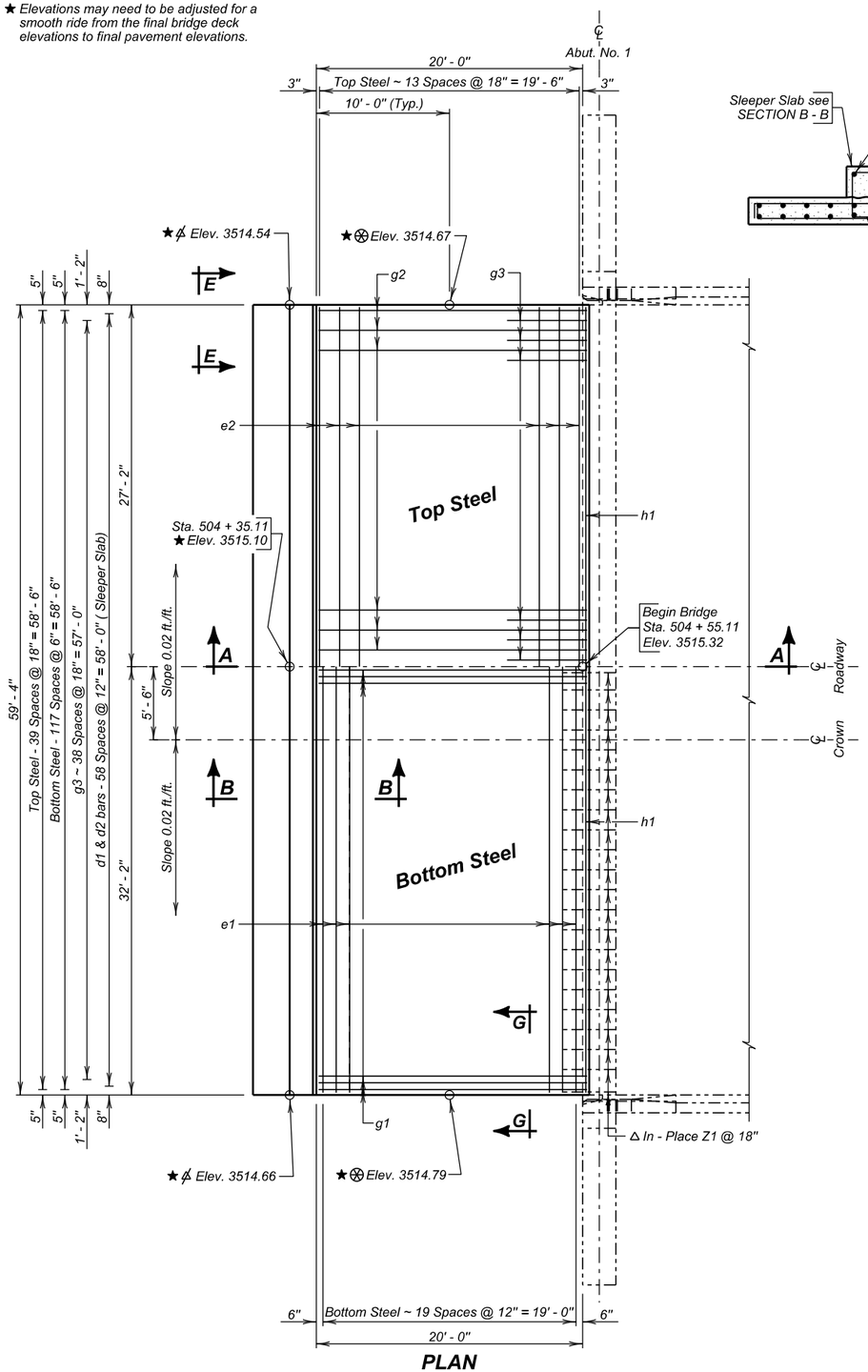
0° SKEW
SEC. 15-T3N-R6E
IM-CR-EM 0901(187)44
HL-93

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
JULY 2023

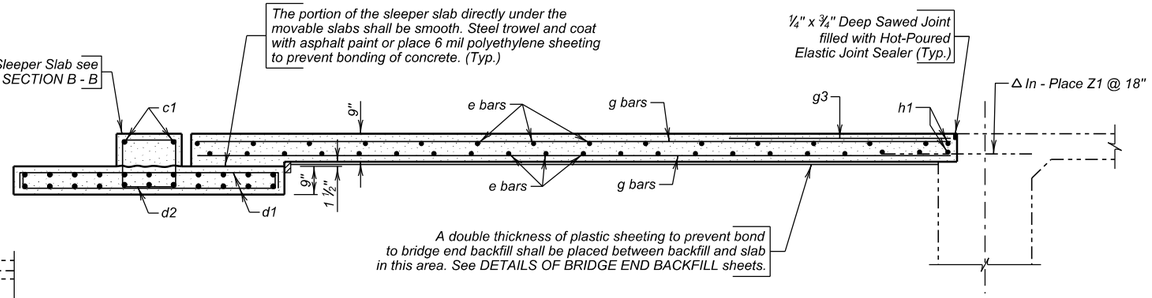
DESIGNED BY	CK. DES. BY	DRAFTED BY	
PW MEAD034J	AU 034JTE26	MG	Steve A Johnson BRIDGE ENGINEER

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E76	E185

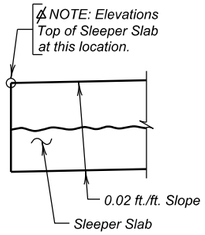
★ *Elevations may need to be adjusted for a smooth ride from the final bridge deck elevations to final pavement elevations.*



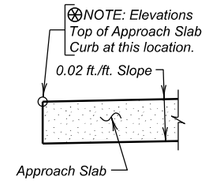
PLAN
(Adjacent to Abut. No. 1)



SECTION A - A



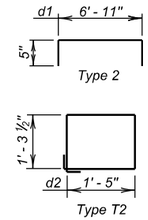
VIEW E - E



SECTION G - G
(Resteel not show)

REINFORCING SCHEDULE
(For One Approach Slab & One Sleeper Slab)

Mk.	No.	Size	Length	Type	Bending Details
Sleeper Slab					
c1	24	5	59' - 0"	Str.	
d1	118	4	7' - 9"	2	
d2	59	4	6' - 2"	T2	
Approach Slab					
e1	20	6	59' - 0"	Str.	
e2	14	4	59' - 0"	Str.	
g1	118	8	20' - 2"	Str.	
g2	40	4	20' - 2"	Str.	
g3	39	4	6' - 0"	Str.	
h1	2	6	59' - 0"	Str.	



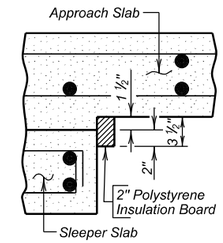
NOTE:
All bars to be epoxy coated.
All dimensions are out to out of bars.

ESTIMATED QUANTITIES
(For One Approach Slab and One Sleeper Slab)

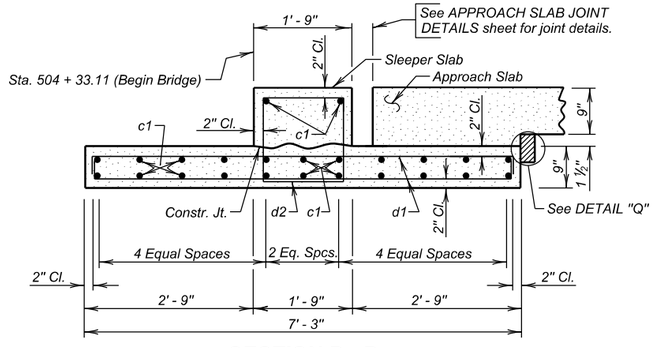
ITEM	UNIT	QUANTITY
Concrete Approach Slab for Bridge	Sq. Yd.	135.1
Concrete Approach Sleeper Slab for Bridge	Sq. Yd.	47.8

1. 34.5 Cu. Yds. Concrete in Approach Slab.
2. 9550 Lbs. Epoxy Coated Re-Steel in Approach Slab.
3. 15.3 Cu. Yds. Concrete in Sleeper Slab.
4. 2331 Lbs. Epoxy Coated Re-Steel in Sleeper Slab.
5. 18 Sq. Ft. of Polystryrene Insulation Board

Items 1 thru 5 are approximate quantities contained in the above bid items and are for information only.



DETAIL "Q"



SECTION B - B
(Sleeper Slab)

△ *In-place Z1 bars are listed and included in superstructure quantities. See SUPERSTRUCTURE DETAILS sheet.*

DETAILS OF APPROACH SLAB ADJACENT TO ABUTMENT NO. 1

FOR

242' - 6" PRESTRESSED GIRDER BRIDGE

43' - 0" ROADWAY, 1 - 10' - 0" SIDEWALK, & 1 - 5' - 0" SIDEWALK
OVER I-90
STA. 504 + 55.11 TO STA. 506 + 97.61
STR. NO. 47-098-564

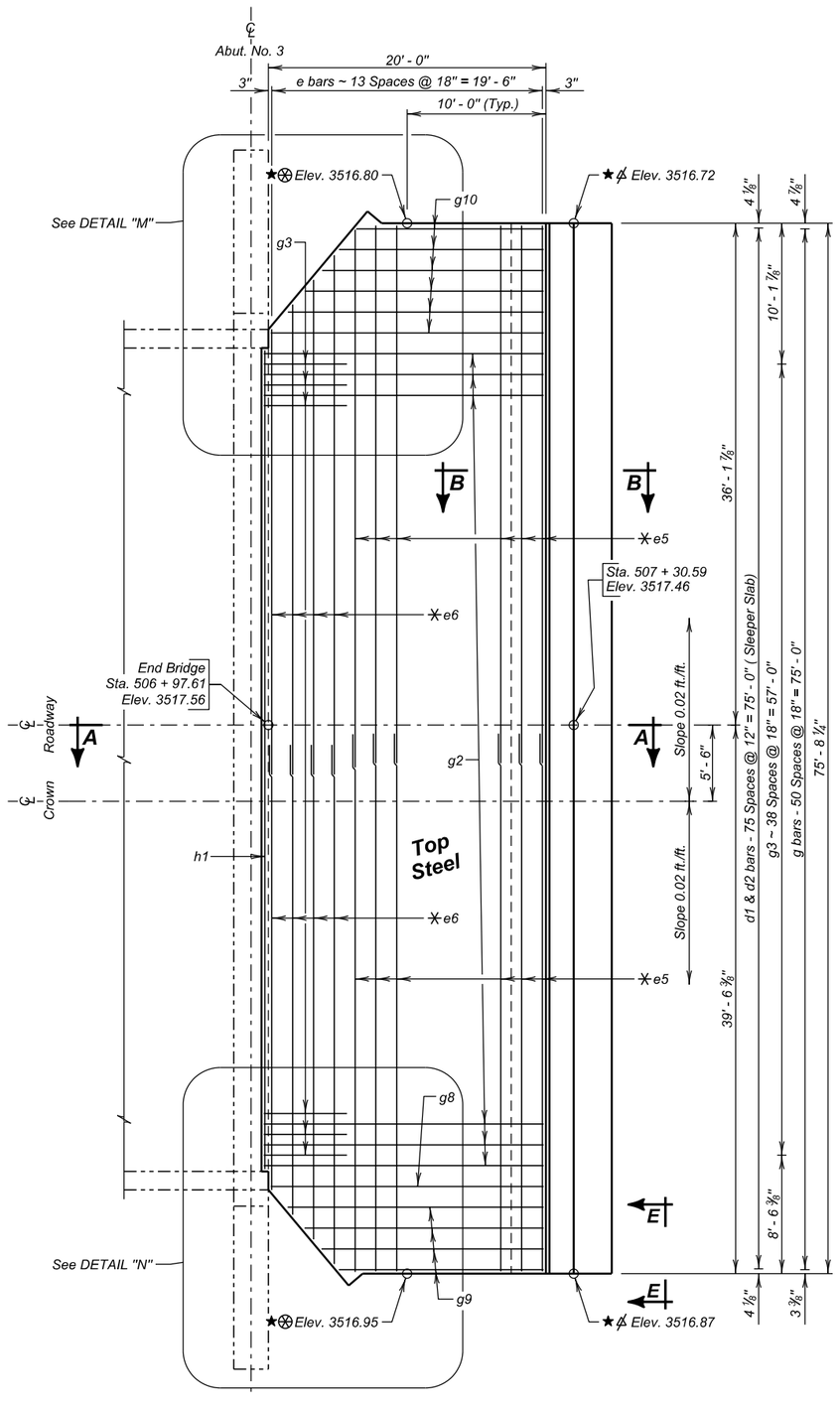
0° SKEW
SEC. 15-T3N-R6E
IM-CR-EM 0901(187)44
HL-93

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
JULY 2023

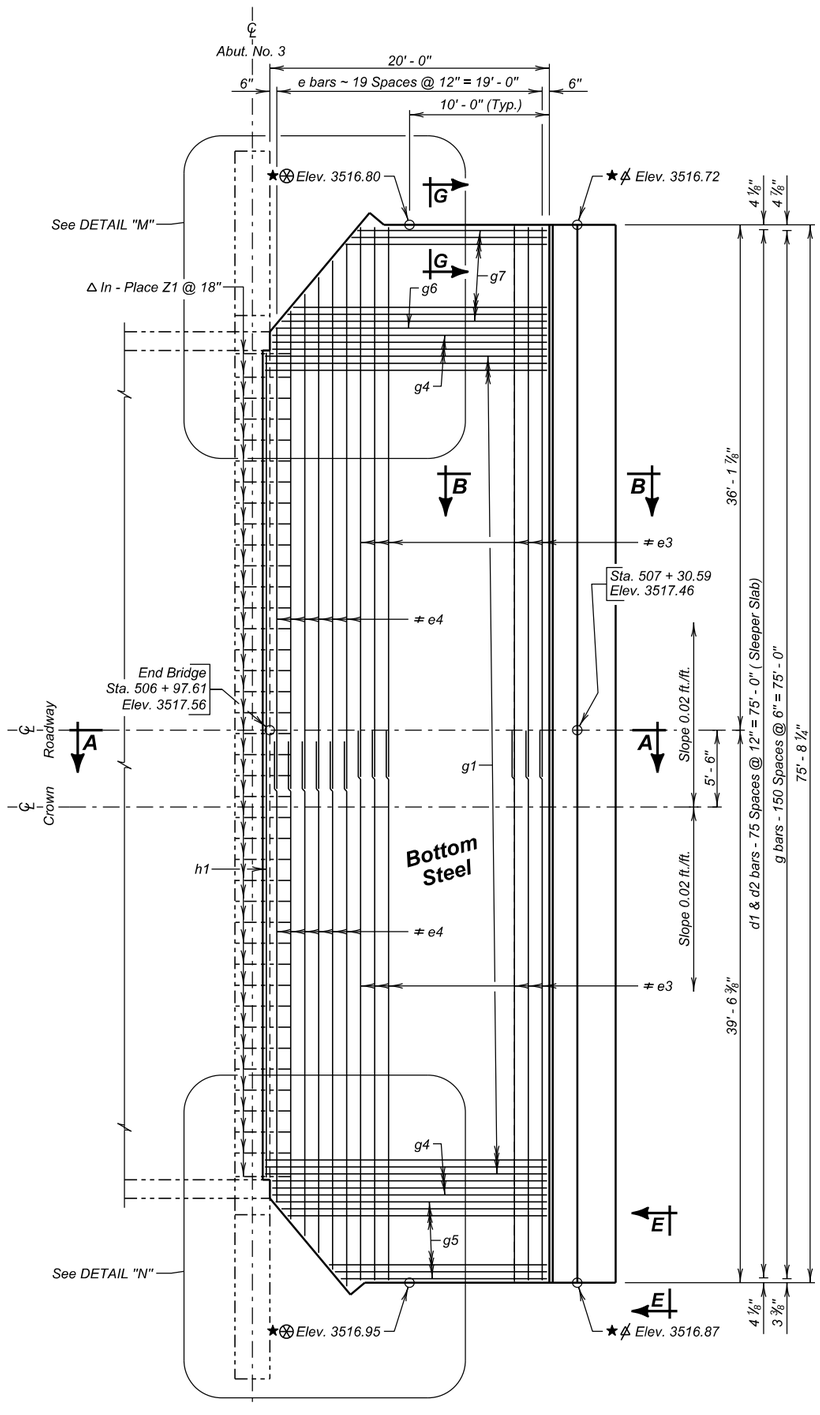
27 OF 37

DESIGNED BY	CK. DES. BY	DRAFTED BY	
PW	AU	MG	Steve A. Johnson BRIDGE ENGINEER
MEAD034J	034JTE27		

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E77	E185



PLAN
(Adjacent to Abut. No. 3)



PLAN
(Adjacent to Abut. No. 3)

✳ *Min. Lap = 2' - 0"*

≠ *Min. Lap = 3' - 4"*

★ *Elevations may need to be adjusted for a smooth ride from the final bridge deck elevations to final pavement elevations.*

△ *In-place Z1 bars are listed and included in superstructure quantities. See SUPERSTRUCTURE DETAILS (B) sheets.*

DETAILS OF APPROACH SLAB ADJACENT TO ABUTMENT NO. 3 (A)

FOR

242' - 6" PRESTRESSED GIRDER BRIDGE

43' - 0" ROADWAY, 1 - 10' - 0" SIDEWALK, & 1 - 5' - 0" SIDEWALK
OVER I-90
STA. 504 + 55.11 TO
STA. 506 + 97.61
STR. NO. 47-098-564

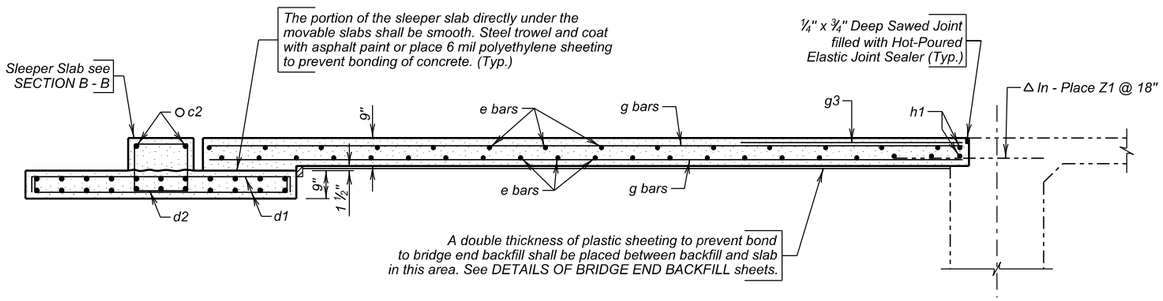
0° SKEW
SEC. 15-T3N-R6E
IM-CR-EM 0901(187)44
HL-93

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
JULY 2023

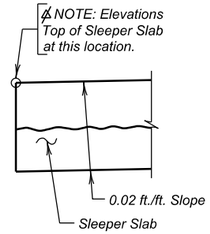
28 OF 37

DESIGNED BY	CK. DES. BY	DRAFTED BY	
PW MEAD034J	AU 034JTE28	MG	Steve A Johnson BRIDGE ENGINEER

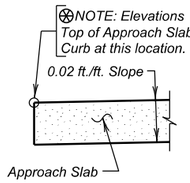
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E78	E185



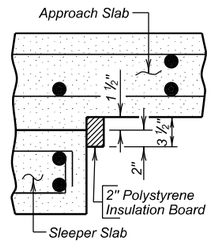
SECTION A - A



VIEW E - E



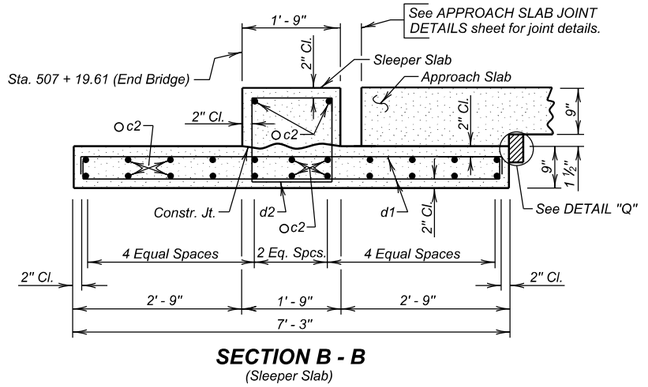
SECTION G - G
(Resteel not show)



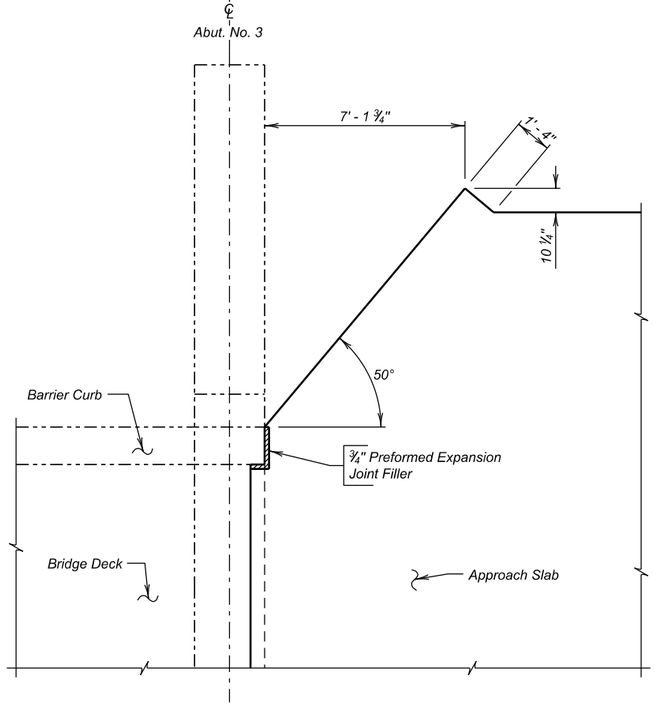
DETAIL "Q"

△ In-place Z1 bars are listed and included in superstructure quantities. See SUPERSTRUCTURE DETAILS (B) sheets.

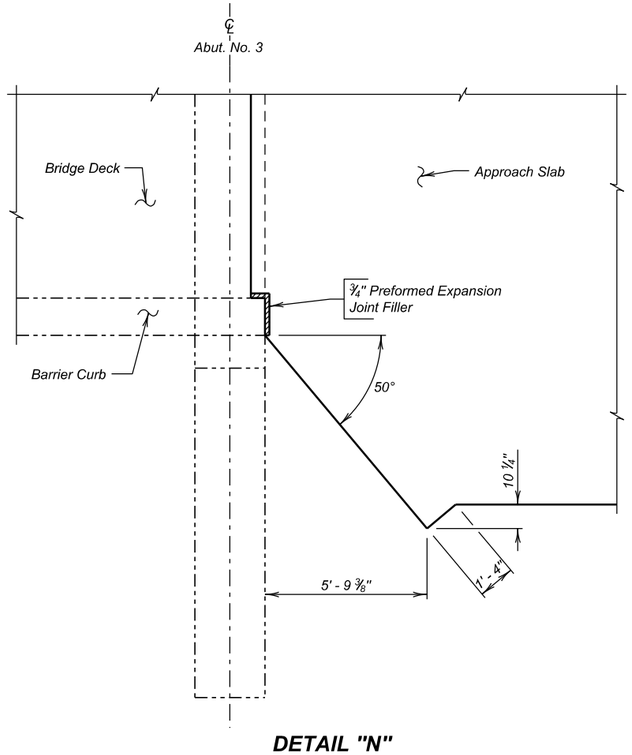
✳ Min. Lap = 2' - 0"
○ Min. Lap = 2' - 3"
≠ Min. Lap = 3' - 4"



SECTION B - B
(Sleeper Slab)



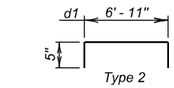
DETAIL "M"
(Resteel not shown)

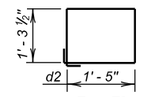


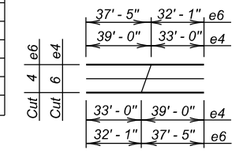
DETAIL "N"
(Resteel not shown)

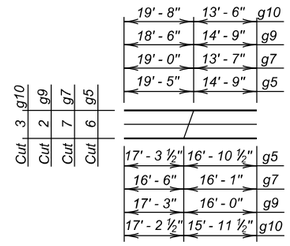
REINFORCING SCHEDULE
(For One Approach Slab & One Sleeper Slab)

	Mk.	No.	Size	Length	Type	Bending Details
	Sleeper Slab					
	c2	48	5	38' - 9"	Str.	
	d1	152	4	7' - 9"	2	
	d2	76	4	6' - 2"	T2	
	Approach Slab					
	e3	28	6	39' - 4"	Str.	
✠	e4	6	6	72' - 0"	Str.	
	e5	20	4	38' - 9"	Str.	
✠	e6	4	4	69' - 6"	Str.	
	g1	118	8	20' - 2"	Str.	
	g2	40	4	20' - 2"	Str.	
	g3	39	4	6' - 0"	Str.	
	g4	6	8	19' - 8"	Str.	
✠	g5	6	8	34' - 2"	Str.	
	g6	1	8	19' - 5"	Str.	
✠	g7	7	8	32' - 7"	Str.	
	g8	1	4	19' - 8"	Str.	
✠	g9	2	4	33' - 3"	Str.	
✠	g10	3	4	33' - 2"	Str.	
	h1	2	6	59' - 0"	Str.	









NOTES:
All bars to be epoxy coated.
All dimensions are out to out of bars.
✠ See cutting diagram.

ESTIMATED QUANTITIES
(For One Approach Slab and One Sleeper Slab)

ITEM	UNIT	QUANTITY
Concrete Approach Slab for Bridge	Sq. Yd.	167.2
Concrete Approach Sleeper Slab for Bridge	Sq. Yd.	60.9

1. 42.1 Cu. Yds. Concrete in Approach Slab.
2. 11880 Lbs. Epoxy Coated Re-Steel in Approach Slab.
3. 19.5 Cu. Yds. Concrete in Sleeper Slab.
4. 3040 Lbs. Epoxy Coated Re-Steel in Sleeper Slab.
5. 23 Sq. Ft. of Polystryrene Insulation Board

Items 1 thru 5 are approximate quantities contained in the above bid items and are for information only.

DETAILS OF APPROACH SLAB ADJACENT TO ABUTMENT NO. 3 (B)

FOR

242' - 6" PRESTRESSED GIRDER BRIDGE

43' - 0" ROADWAY, 1 - 10' - 0" SIDEWALK, & 1 - 5' - 0" SIDEWALK
OVER I-90
STA. 504 + 55.11 TO
STA. 506 + 97.61
STR. NO. 47-098-564

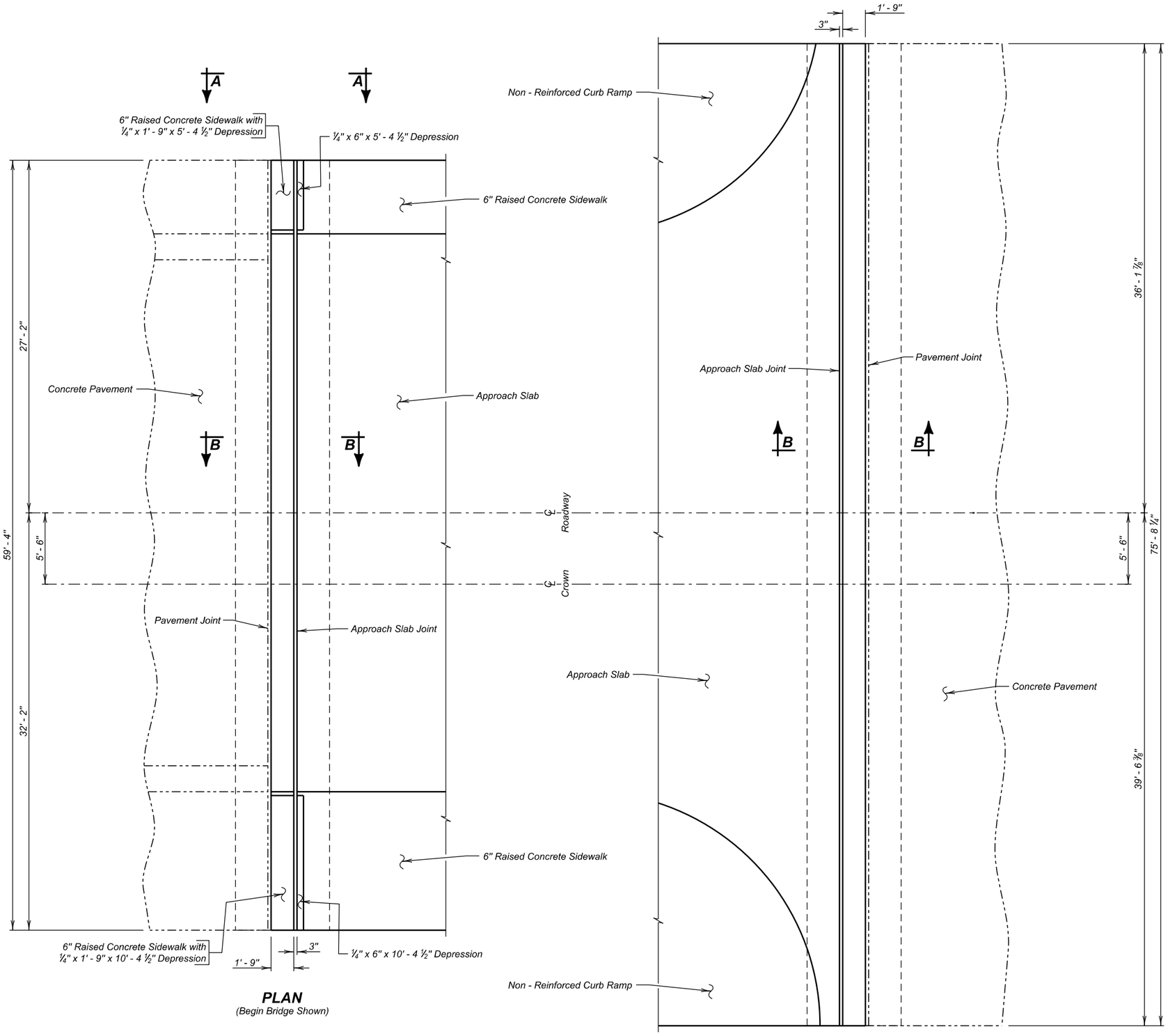
0° SKEW
SEC. 15-T3N-R6E
IM-CR-EM 0901(187)44
HL-93

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
JULY 2023

29 OF 37

DESIGNED BY	CK. DES. BY	DRAFTED BY	
PW	AU	MG	Steve A Johnson BRIDGE ENGINEER
MEAD034J	034JTE29		

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E79	E185



GENERAL NOTES

1. The membrane sealant will be on the approved product list for membrane sealant expansion joints.
2. The manufacturer will supply the membrane sealant in packaging that precompresses the membrane sealant. The precompressed dimension will be as recommended by the sealant manufacturer to provide a water tight seal throughout a joint movement range of + 25% (minimum) from the specified joint opening dimension. In no case will the precompressed dimension exceed 75% of the joint opening width. The foam sealant will be slowly self expanding to permit workers ample time to install the membrane sealant before the membrane sealant exceeds the joint opening width.
3. The membrane sealant will be supplied in pieces 5 feet in length or longer. The foam sealant will be ultra-violet and ozone resistant.
4. The bonding adhesive used to attach the membrane sealant to the adjacent concrete will be approved by the membrane sealant manufacturer.
5. Adhesive used to join adjacent pieces of the membrane sealant will be as recommended by the manufacturer.
6. If styrofoam filler material is used in the construction, it will be closed cell and water-tight as approved by the Engineer.
7. The minimum ambient air temperature at the time of joint installation and adhesive curing will be 40° F.
8. A technical representative of the membrane sealant manufacturer will be present at the jobsite during installation. The technical representative will be knowledgeable in the correct procedures for the preparation and installation of the joint material to insure the Contractor installs the joint to the Manufacturers recommendations.
9. Concrete surfaces that will be in contact with the membrane sealant will be thoroughly cleaned by abrasive blasting to remove all laitance and contaminants (such as oil, curing compounds, etc.) from the concrete surface. At a minimum two passes of abrasive blasting with the nozzle held at an angle to within 1 to 2 inches of the concrete surface will be required. Cleaning of the concrete surfaces with solvents, wire brushing, or grinding will not be permitted.
10. After abrasive blasting, but immediately prior to membrane joint installation, the entire joint contact surface will be air blasted. The air compressor used for joint cleaning will be equipped with trap devices capable of providing moisture-free and oil-free air at a recommended pressure of 90 psi. To obtain complete bonding with the adhesive, the adjacent concrete surfaces must be dry and clean. The contact surfaces for the joint will be visually inspected by the Engineer immediately prior to joint installation to verify the surface is dry and clean.
11. Individual spliced sections will be installed as per the manufacturers' recommendations. The membrane joint sealant manufacturer will submit a detailed installation procedure to the Engineer at least 5 days prior to joint installation for his review.
12. Traffic will not be allowed on the joint until the bonding adhesive has had time to cure, as recommended by the manufacturer.
13. Use plywood or other material to protect concrete adjacent to the joint from spalling before any equipment is moved across the joint. Any spall areas will be repaired at the Contractor's expense by breaking out and replacing adjacent concrete, as approved by the Engineer.
14. The membrane sealant expansion joint will be measured in feet to the nearest one-tenth foot, complete in place. Measurement will be made of the overall horizontal length. The membrane sealant expansion joint will be paid for at the contract unit price per foot complete in place. Payment for this item will be full compensation for furnishing all the required materials in place, including labor, equipment and incidentals necessary to complete the work in accordance with the plans and the foregoing specifications.

ESTIMATED QUANTITIES

(For Two Approach Slabs)

ITEM	UNIT	QUANTITY
Membrane Sealant Expansion Joint	Ft.	135.0

APPROACH SLAB JOINT DETAILS (A)

FOR

242' - 6" PRESTRESSED GIRDER BRIDGE

43' - 0" ROADWAY, 1 - 10' - 0" SIDEWALK, & 1 - 5' - 0" SIDEWALK
OVER I-90
STA. 504 + 55.11 TO
STA. 506 + 97.61
STR. NO. 47-098-564

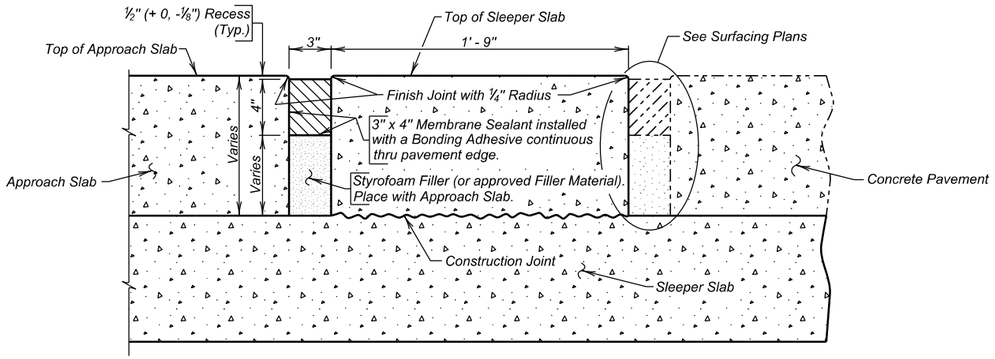
0° SKEW
SEC. 15-T3N-R6E
IM-CR-EM 0901(187)44
HL-93

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
JULY 2023

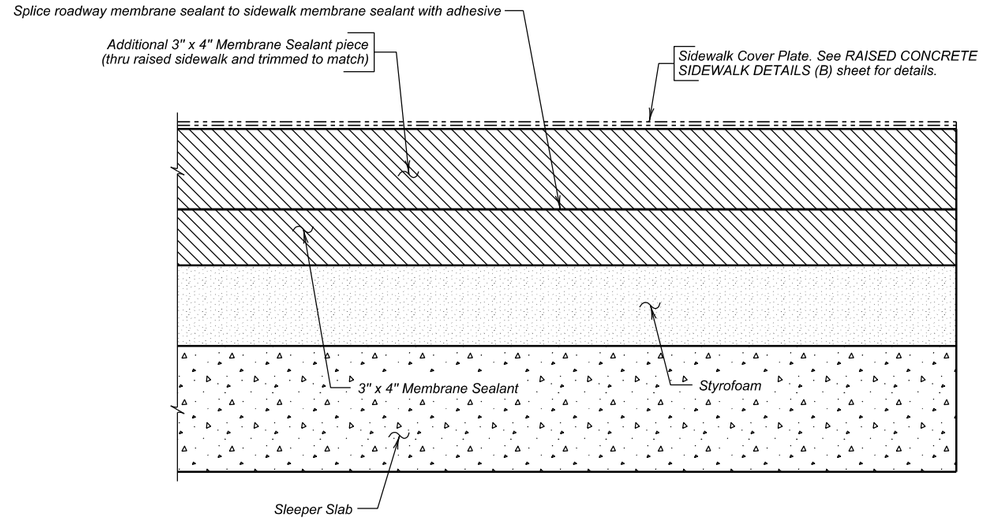
30 OF 37

DESIGNED BY	CK. DES. BY	DRAFTED BY	
PW	AU	MG	Steve A Johnson BRIDGE ENGINEER
MEAD034J	034JTE30		

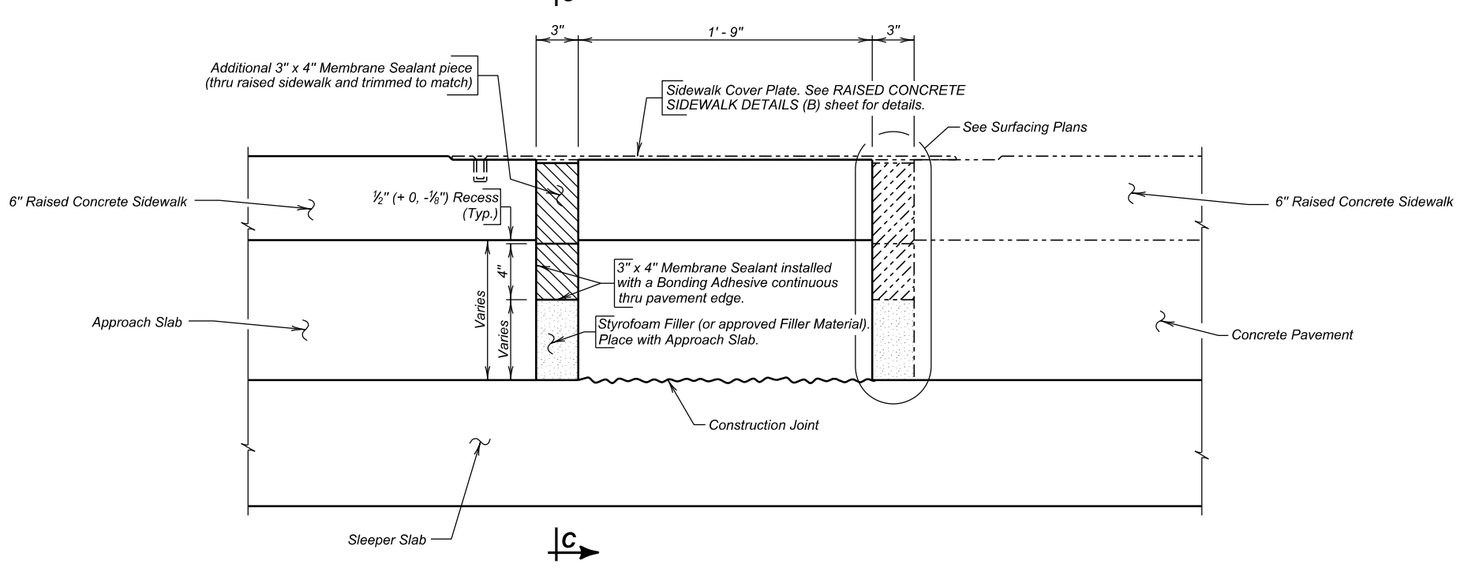
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E80	E185



SECTION B - B



SECTION C - C
(Begin Bridge end only)



VIEW A - A
(Begin Bridge end only)

APPROACH SLAB JOINT DETAILS (B)

FOR

242' - 6" PRESTRESSED GIRDER BRIDGE

43' - 0" ROADWAY, 1 - 10' - 0" SIDEWALK, & 1 - 5' - 0" SIDEWALK
OVER I-90
STA. 504 + 55.11 TO STA. 506 + 97.61
STR. NO. 47-098-564

0° SKEW
SEC. 15-T3N-R6E
IM-CR-EM 0901(187)44
HL-93

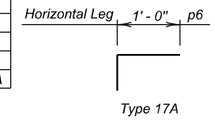
MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
JULY 2023

DESIGNED BY	CK. DES. BY	DRAFTED BY	
PW MEAD034J	AU 034JTE31	MG	Steve A Johnson BRIDGE ENGINEER

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E81	E185

REINFORCING SCHEDULE

Mk.	No.	Size	Length	Type	Bending Details
p1	11	4	1' - 5"	Str.	
p2	11	4	20' - 2"	Str.	
p3	55	4	49' - 3"	Str.	
p4	177	4	5' - 3"	Str.	
p5	177	4	10' - 3"	Str.	
p6	208	4	1' - 7"	17A	

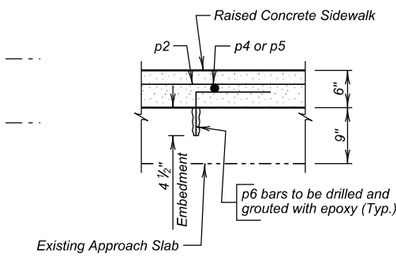


NOTES:
All dimensions are out to out of bars.
All bars to be stainless steel.

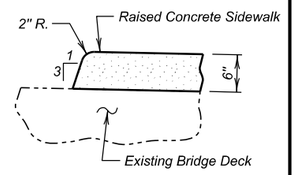
ESTIMATED QUANTITIES

	ITEM	UNIT	QUANTITY
	Class M6 Concrete	Cu. Yd.	87.1
✳	Stainless Reinforcing Steel	Lb.	3801
	Install Dowel in Concrete	Each	208

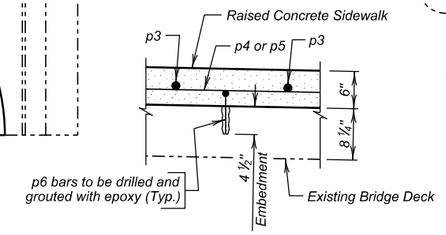
✳ Does not include quantitiy for p6 bars.



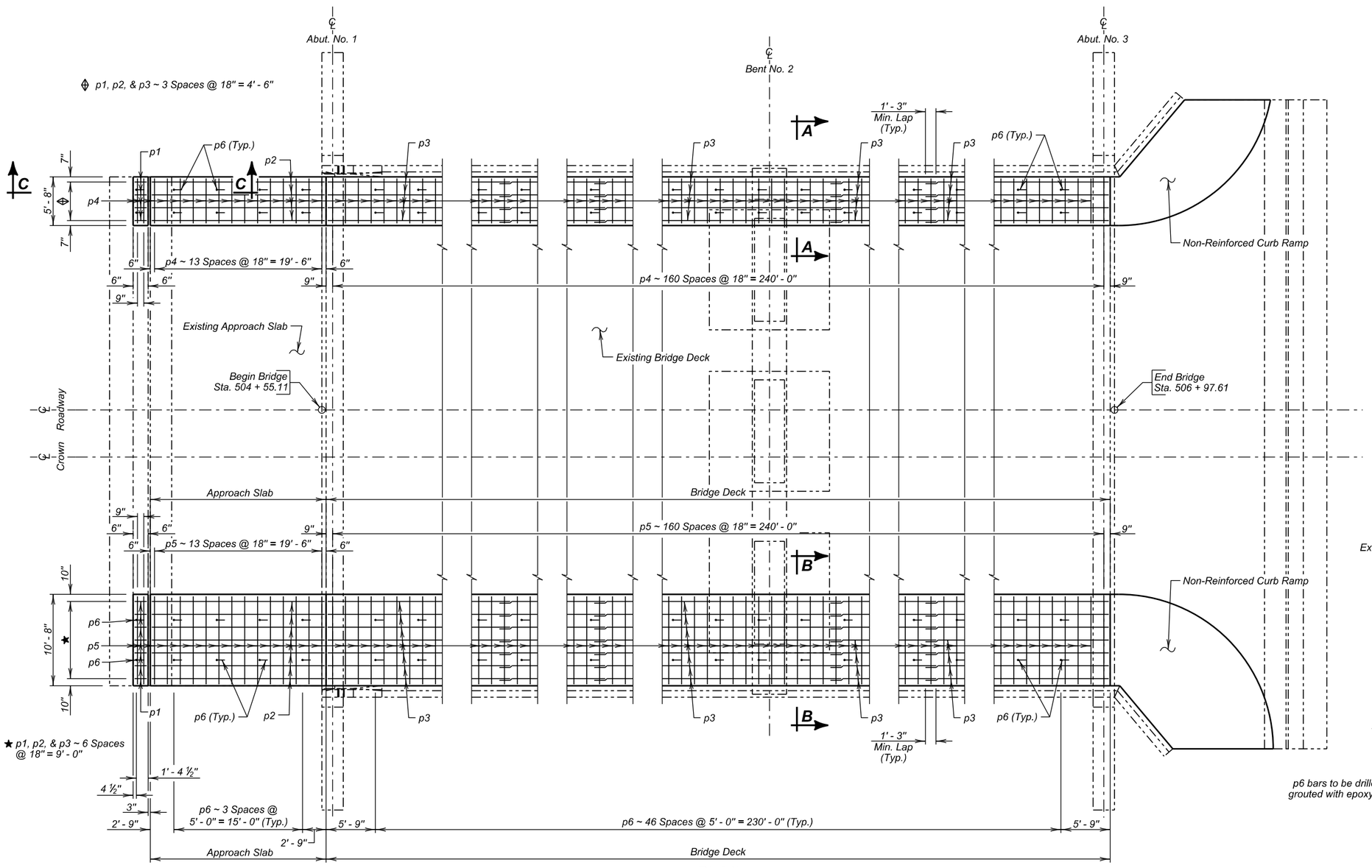
DETAIL "X"



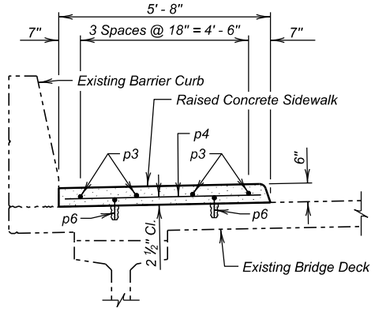
DETAIL "Y"
(Resteel not shown)



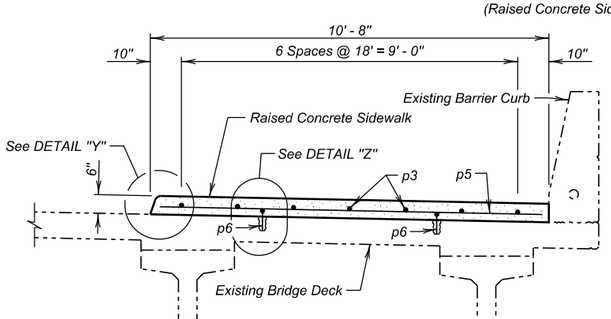
DETAIL "Z"



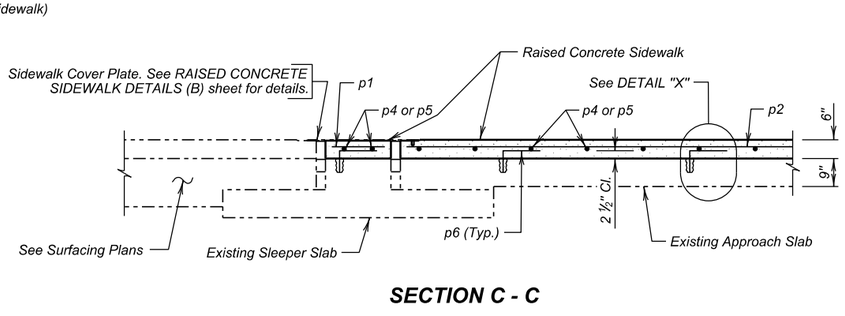
PLAN
(Raised Concrete Sidewalk)



SECTION A - A



SECTION B - B



SECTION C - C

RAISED CONCRETE SIDEWALK DETAILS (A)

FOR

242' - 6" PRESTRESSED GIRDER BRIDGE

43' - 0" ROADWAY, 1 - 10' - 0" SIDEWALK, & 1 - 5' - 0" SIDEWALK
OVER I-90
STA. 504 + 55.11 TO STA. 506 + 97.61
STR. NO. 47-098-564

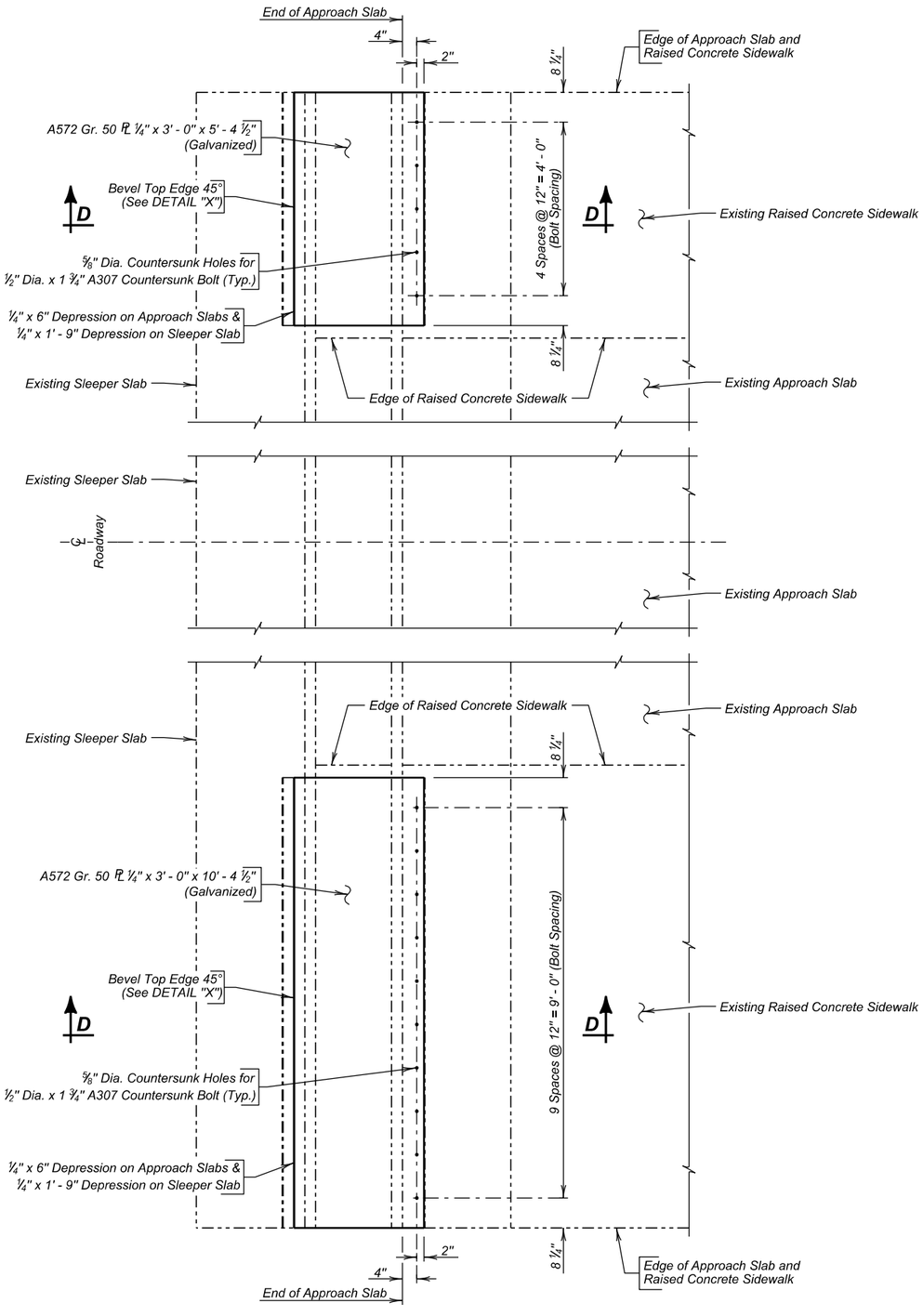
0° SKEW
SEC. 15-T3N-R6E
IM-CR-EM 0901(187)44
HL-93

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
JULY 2023

32 OF 37

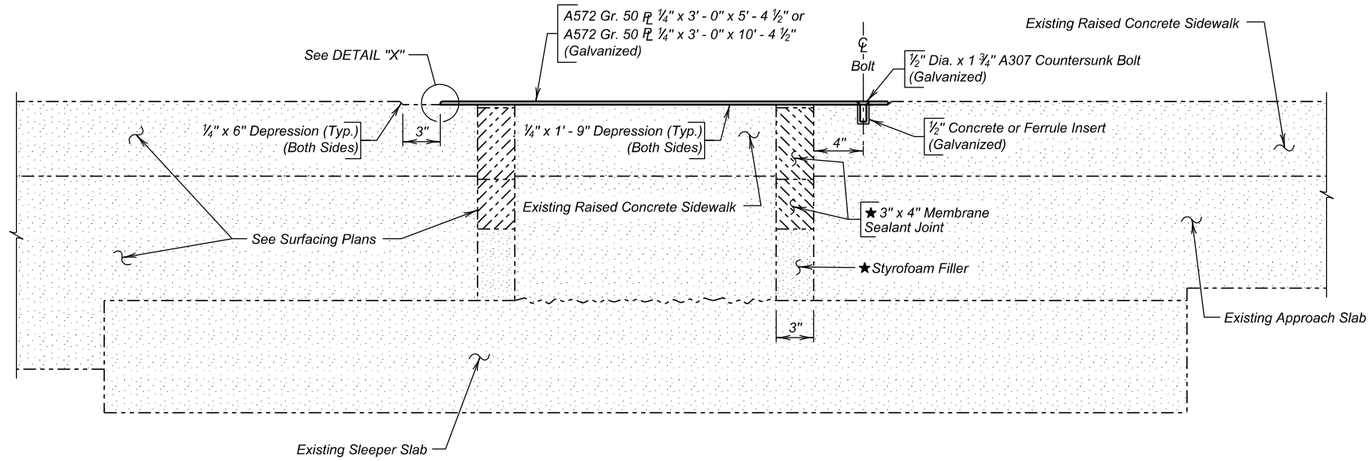
DESIGNED BY	CK. DES. BY	DRAFTED BY	
PW	AU	MG	Steve A. Johnson BRIDGE ENGINEER
MEAD034J	034JTE32		

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E82	E185



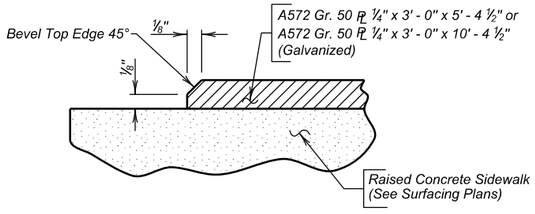
PLAN

(Sidewalk Cover Plates shown adjacent to Abut. No. 1, Abut. No. 3 simiar opposite hand)



SECTION D - D

★ *See APPROACH SLAB JOINT DETAILS (A) & (B) sheets.*



DETAIL "X"

NOTE -
All costs associated with installing the Sidewalk Cover Plates will be incidental to Class M6 Concrete.

RAISED CONCRETE SIDEWALK DETAILS (B)

FOR

242' - 6" PRESTRESSED GIRDER BRIDGE

43' - 0" ROADWAY, 1 - 10' - 0" SIDEWALK, & 1 - 5' - 0" SIDEWALK OVER I-90
STA. 504 + 55.11 TO STA. 506 + 97.61
STR. NO. 47-098-564

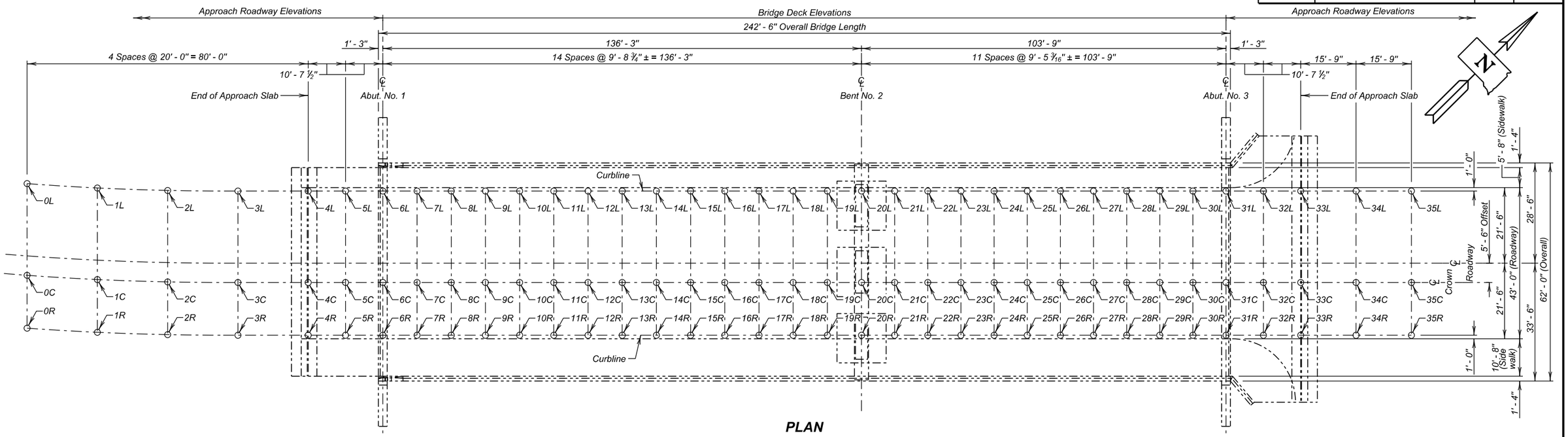
0° SKEW
SEC. 15-T3N-R6E
IM-CR-EM 0901(187)44
HL-93

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
JULY 2023

DESIGNED BY	CK. DES. BY	DRAFTED BY	
PW	AU	MG	Steve A Johnson BRIDGE ENGINEER
MEAD034J	034JTE33		

The elevations shown in these plans are based on the National Geodetic Survey (NGS) North American Vertical Datum of 1988 (NAVD88).

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E83	E185



PLAN

Table of As - Built Elevations - Bridge Deck

Location	Elevation	Location	Elevation	Location	Elevation
6L		6C		6R	
7L		7C		7R	
8L		8C		8R	
9L		9C		9R	
10L		10C		10R	
11L		11C		11R	
12L		12C		12R	
13L		13C		13R	
14L		14C		14R	
15L		15C		15R	
16L		16C		16R	
17L		17C		17R	
18L		18C		18R	
19L		19C		19R	
20L		20C		20R	
21L		21C		21R	
22L		22C		22R	
23L		23C		23R	
24L		24C		24R	
25L		25C		25R	
26L		26C		26R	
27L		27C		27R	
28L		28C		28R	
29L		29C		29R	
30L		30C		30R	
31L		31C		31R	

Table of As - Built Elevations - Approach Roadway

Location	Elevation	Location	Elevation	Location	Elevation
0L		0C		0R	
1L		1C		1R	
2L		2C		2R	
3L		3C		3R	
4L		4C		4R	
5L		5C		5R	
32L		32C		32R	
33L		33C		33R	
34L		34C		34R	
35L		35C		35R	

Table of Elevations - Bridge Survey Markers

Location	Station - Offset	Elevation
Begin Bridge		
End Bridge		

ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY
Bridge Elevation Survey	L. S.	Lump Sum

NOTE -
The Contractor will be responsible for producing the As - Built Elevation Survey soon after construction is complete and before the bridge is opened to traffic. The As - Built Elevations of the Bridge will be taken and recorded at the locations shown by the table on this sheet. The completed table will be given to the Engineer who will forward a copy to the Office of Bridge Design and the Region Office.

AS - BUILT ELEVATION SURVEY

FOR

242' - 6" PRESTRESSED GIRDER BRIDGE

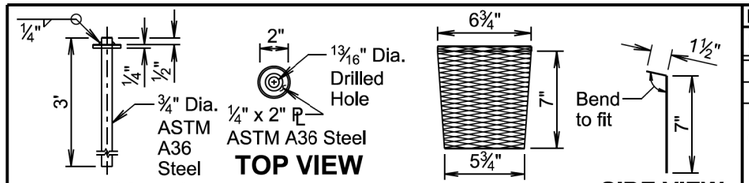
43' - 0" ROADWAY, 1 - 10' - 0" SIDEWALK, & 1 - 5' - 0" SIDEWALK — 0° SKEW
OVER I-90 — SEC. 15-T3N-R6E
STA. 504 + 55.11 TO — IM-CR-EM 0901(187)44
STA. 506 + 97.61 — HL-93
STR. NO. 47-098-564

MEADE COUNTY

S. D. DEPT. OF TRANSPORTATION

JULY 2023

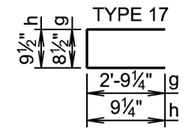
DESIGNED BY	CK. DES. BY	DRAFTED BY	
PW	AU	MG	BRIDGE ENGINEER
MEAD034J	034JTE34		

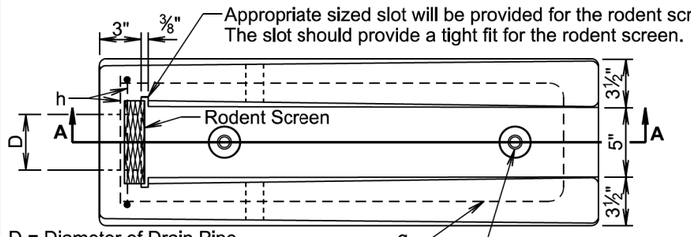


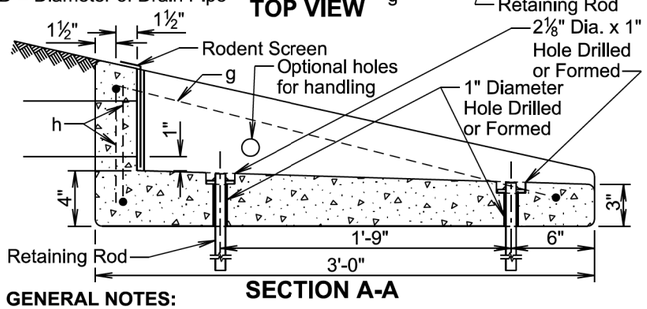
REINFORCING SCHEDULE				
MK.	No.	Size	Length	Type
g	1	4	6'-3"	17
h	2	4	2'-4"	17

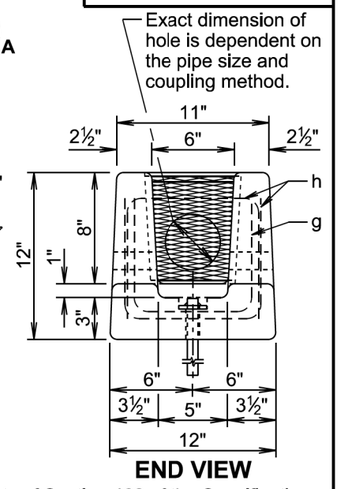
NOTE: All dimensions are out to out of bars.

Bending Details









GENERAL NOTES:

The concrete will be Class M6. The concrete will conform to the requirements of Section 462 of the Specifications. It is estimated that each unit weighs approximately 210 pounds.

All reinforcing steel will conform to ASTM A615, Grade 60 and will be epoxy coated. The reinforcing steel will be securely retained to prevent displacement during placement of concrete. It is estimated that 7.3 pounds of reinforcing steel is required for each unit.

The pipe will be placed in the concrete headwall with the pipe end flush with the concrete surface adjacent to the rodent screen.

The rodent screen will be galvanized 13 Ga. steel with a diamond shaped flattened mesh pattern. The size will be ½". The size refers to the measurement across the smallest diamond shaped opening measured from the centers of the wires.

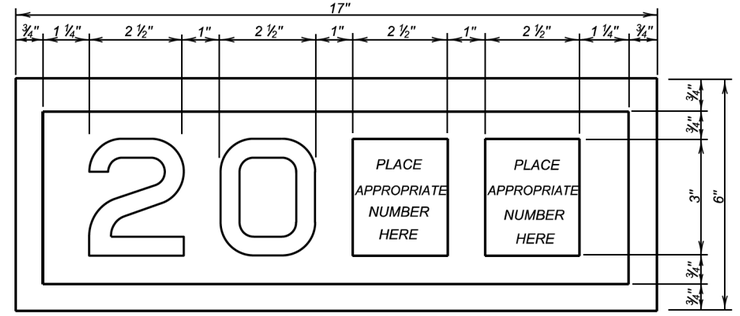
The retaining rod will be galvanized in accordance with ASTM A123 after all shop welding has been completed.

The drawing indicates using ½" fillets; however, ¾" chamfers may be substituted for the ½" fillets.

All costs for furnishing and installing the concrete headwall including equipment, labor, and materials including concrete, reinforcing steel, retaining rods, and rodent screen will be incidental to the contract unit price per each for "Precast Concrete Headwall for Drain".

November 19, 2021

Published Date: 2026	SDDOT	PRECAST CONCRETE HEADWALL FOR DRAIN	PLATE NUMBER 430.50 Sheet 1 of 1



YEAR PLATE DETAILS

GENERAL NOTES:

1. *Year plates of the general dimensions shown will be constructed on all box culverts and bridges. The year plates will be constructed in reverse and attached to the forms in such a manner that the finished imprint in the concrete does not exceed one-half (1/2) inch in depth.*

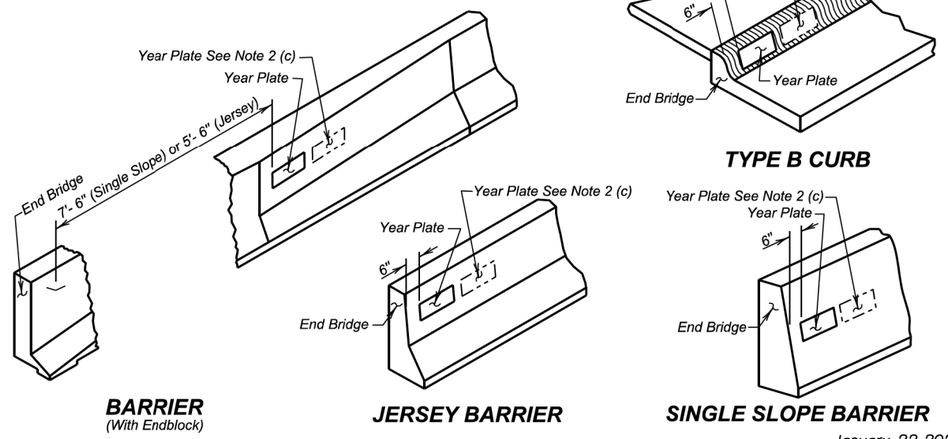
2. *Year plates will be located on structure(s) as follows:*

   a. *On cast-in-place box culverts the year plates will be four and one - half (4 ½) inches below the top of the upstream parapet wall and centered laterally on the upstream face. On precast box culverts the year plate will be centered laterally on the upstream face of the top slab. Where an extended interior wall interferes with this location, the year plate will be centered in an adjacent barrel.*

   b. *On bridges with six (6) inch curbs, "Jersey" shaped barriers with no endblocks, or "Single Slope" shaped barriers with no endblocks, the year plate will be centered vertically on the curb face approximately six (6) inches from the end of the bridge, or as designated by the Engineer. On bridges with barrier endblocks, the year plate will be centered on the upper sloped portion of the barrier approximately 5'- 6" for "Jersey" shaped barriers from the end of the bridge and 7'-6" for "Single Slope" shaped barriers from the end of bridge, or as designated by the Engineer. There will be one year plate at each end of the bridge on opposite sides.*

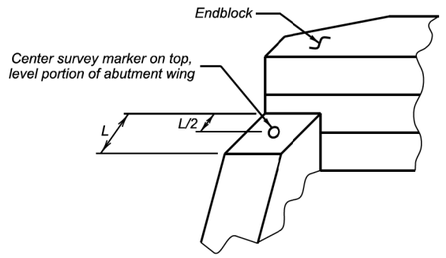
   c. *When the plans specify that both the original date of construction and the date of reconstruction are to be shown, one date will be placed as listed above and the other located adjacent to it. Both year plates will be shown at each end of the bridge on opposite sides.*

3. *There will be no separate measurement or payment made for year plates on box culverts and bridges. All costs for this work will be incidental to other contract items.*

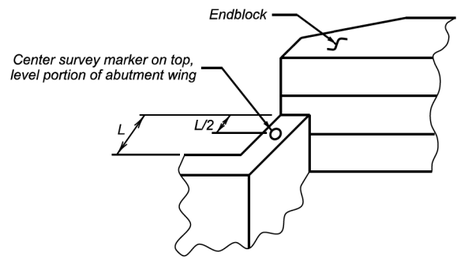


January 22, 2021

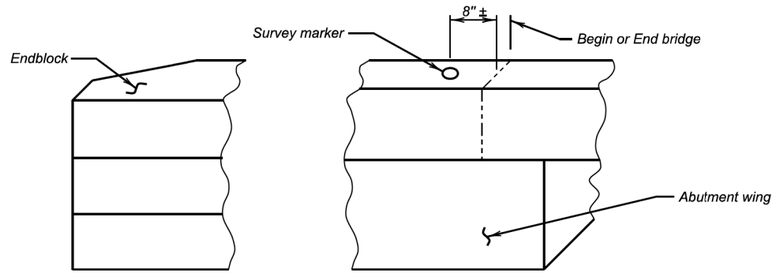
Published Date: 2026	SDDOT	YEAR PLATE DETAILS	PLATE NUMBER 460.02 Sheet 1 Of 1



ABUTMENT WITH "STRAIGHT" WINGS



ABUTMENT WITH "SWEPT BACK" WINGS



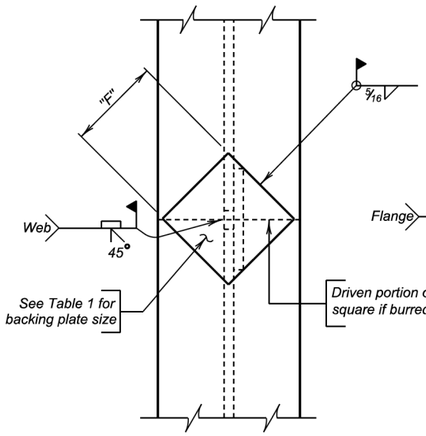
ABUTMENT WITH "SWEPT BACK" WINGS
(Endblock on top of wings)

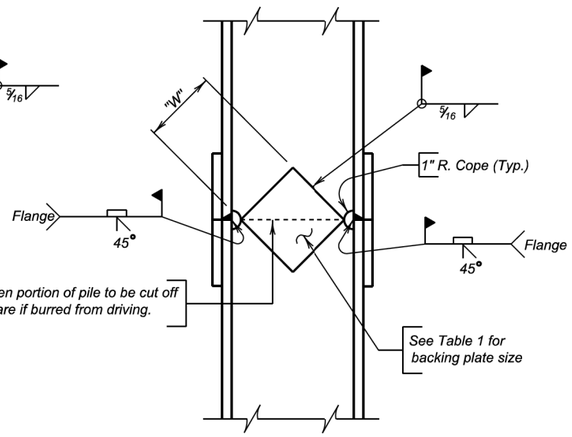
GENERAL NOTES:

1. Survey markers shall be located at each abutment on the same side of the bridge as the year plate. Place survey markers on abutment wings as shown. Two survey markers will be required at each bridge.
2. Survey markers shall be of a type intended for installation in concrete, be made of solid brass or bronze, have a domed top and be either a 3" top diameter (with a ¾" X 2" long ribbed shank), or a US Army Corps of Engineers Type C Disc with a 3 ½" top diameter.
3. There will be no separate measurement or payment made for survey markers. All costs for this work shall be incidental to the other contract items.

June 26,2012

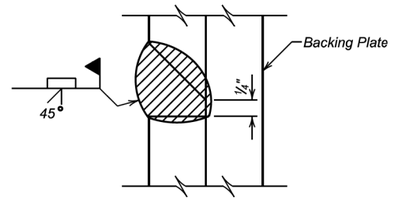
Published Date: 2026	SDDOT	BRIDGE SURVEY MARKER	PLATE NUMBER 460.05
			Sheet 1 of 1





NOTE:
Prepare joint surfaces lower end of upper section on the ground and weld on backing plates; then place upper section on lower section and weld.

COMPLETE JOINT PENETRATION WELD DETAIL



GENERAL NOTES:

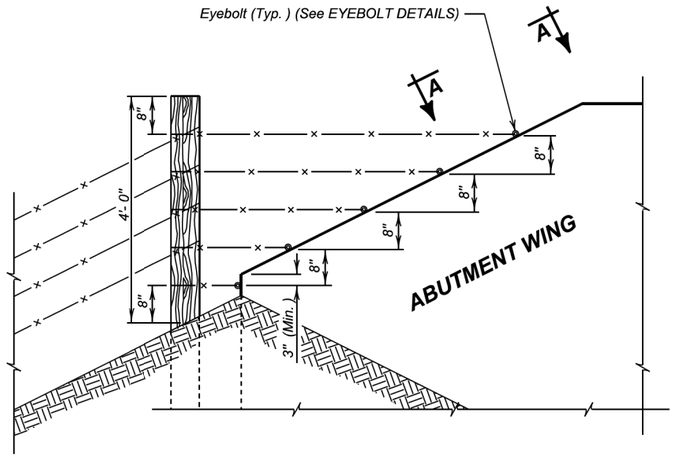
1. Steel for backing plates shall conform to ASTM A709 Grade 50.
2. Welding and weld inspection shall be in conformance with AWS D1.5 (Current Year) Bridge Welding Code - Steel.
3. Welder must be certified and registered with the SDDOT.
4. Backing plate shall at a minimum be as thick as the web of the pile being spliced.
5. Web must be coped with 1 inch radius.
6. Submit Welding Procedure Specification (WPS) to Bridge Construction Engineer for approval prior to pile driving.

TABLE 1
(BACKING PLATES)

PILE	10"	12"	14"
"F" FLANGE	6 ½"	8"	10"
"W" WEB	4 ¾"	6 ¼"	7 ½"

December 23,2012

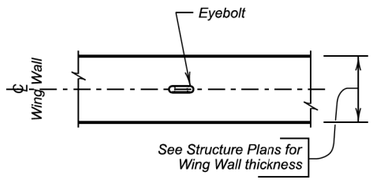
Published Date: 2026	SDDOT	STEEL PILE SPLICE DETAILS	PLATE NUMBER 510.40
			Sheet 1 of 1



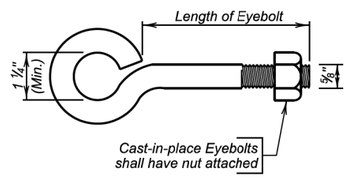
DETAIL FOR FENCE ANCHORS

GENERAL NOTES:

1. The fence and post details shown are for illustrative purpose only. The fence shall be as specified elsewhere in the plans.
2. Eyebolts shall be placed on all of the bridge abutment wings.
3. Eyebolts shall be ⅝ inch diameter and shall conform to ASTM A307.
4. Eyebolts, nuts, and concrete inserts shall be galvanized in accordance with AASHTO M232 (ASTM A153). Concrete inserts of corrosion resistant material need not be galvanized.
5. Cast-in-place eyebolts shall have a nut attached, be 4 ½ inches (Min.) in length and shall be embedded such that the eye of the bolt is flush with the concrete surface. (See Eyebolt Details) As an alternate, cast-in-place concrete inserts, capable of developing the full strength of the ⅝ inch diameter threaded eyebolt, may be used and shall be set in the concrete in accordance with the manufacturer's recommendations. The eyebolt shall be of sufficient length to develop its full strength. The eye of the eyebolt shall be flush with the concrete surface.
6. The cost for furnishing and installing eyebolts and/or concrete inserts shall be incidental to various contract items.



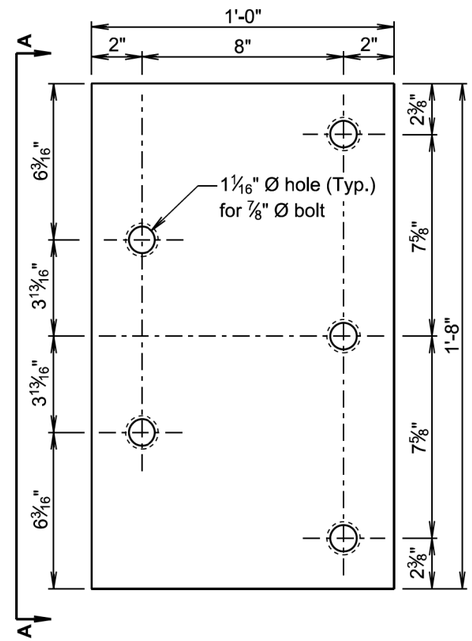
VIEW A - A



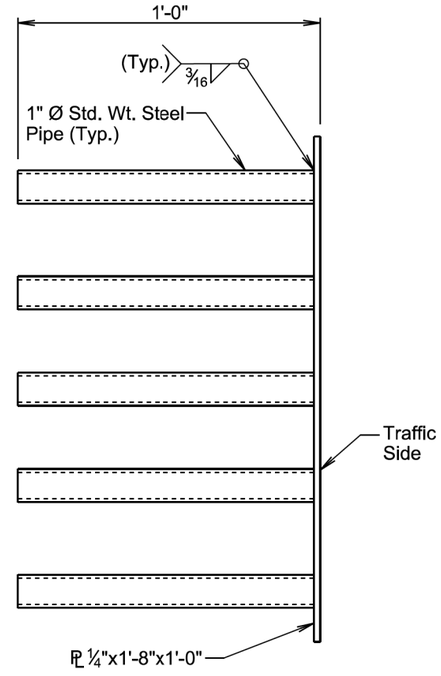
EYEBOLT DETAILS

December 23, 2012

Published Date: 2026	SDDOT	FENCE ANCHORS FOR BRIDGE ABUTMENT WINGS (WINGS LONGER THAN 6')	PLATE NUMBER 620.17
			Sheet 1 of 1



ELEVATION VIEW



VIEW A - A

GENERAL NOTES:

Steel plate for the insert assembly will conform to ASTM A709, Grade 36. The steel pipes will conform to ASTM A53, Grade B or ASTM A500, Grade B or C.

Welding and weld inspection will be in conformance with AWS D1.1 - (Current Year) Structural Welding Code - Steel.

After fabrication, galvanize in accordance with AASHTO M111 (ASTM A123).

Bolts, nuts, and washers will be provided with each assembly. Bolts will be galvanized and conform to the requirements of ASTM A307, F3125 Grade A325, or A449. Plain washers will be galvanized and conform to ASTM F844.

Bolt heads will be placed on the traffic side of the endblock. Bolt projection at the back side of the insert will not exceed 1 inch beyond the nut.

The cost of the 5 bolt insert plate assembly complete in place including welding and galvanizing will be incidental to the contract unit price per cubic yard for "Class A45 Concrete, Miscellaneous", "Class A45 Concrete, Bridge Deck", or "Class A45 Concrete, Bridge Repair", as applicable.

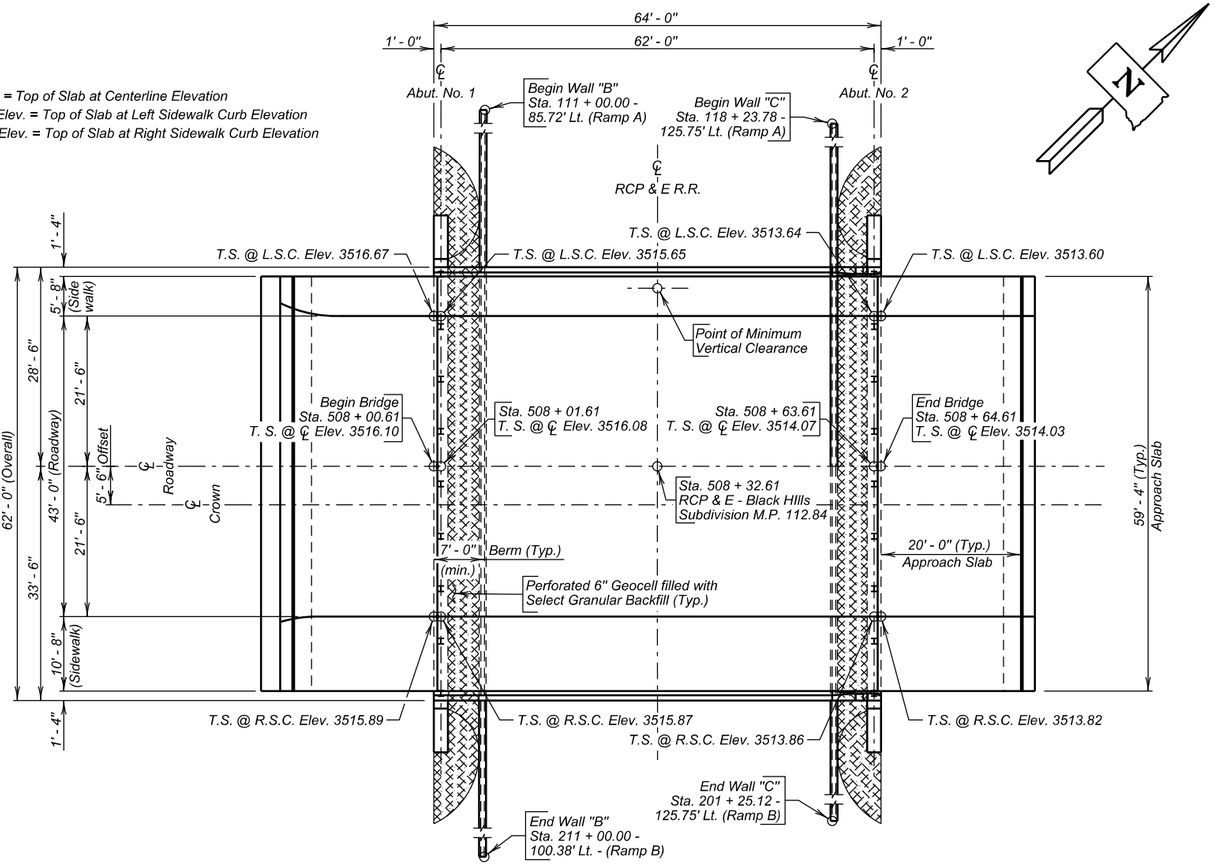
April 8, 2025

Published Date: 2026	SDDOT	5 BOLT INSERT PLATE ASSEMBLY	PLATE NUMBER 630.92
			Sheet 1 of 1

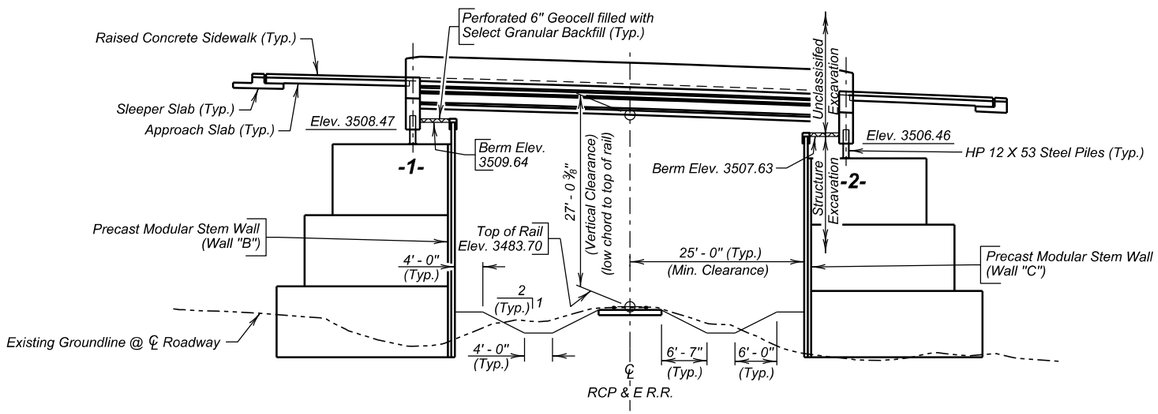
The elevations shown in these plans are based on the National Geodetic Survey (NGS) North American Vertical Datum of 1988 (NAVD88).

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E87	E185

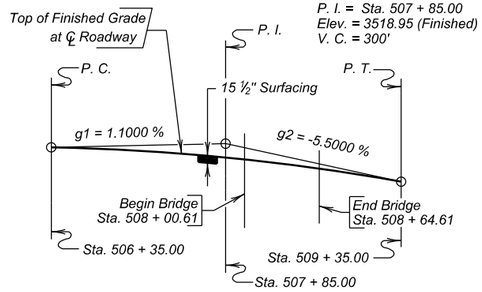
NOTE:
T.S. @ ℄ Elev. = Top of Slab at Centerline Elevation
T.S. @ L.S.C. Elev. = Top of Slab at Left Sidewalk Curb Elevation
T.S. @ R.S.C. Elev. = Top of Slab at Right Sidewalk Curb Elevation



PLAN
(Barrier Curb Railing not shown)



ELEVATION
(Barrier Curb Railing not shown)



VERTICAL CURVE DATA

-X181-
INDEX OF BRIDGE SHEETS -

Sheet No. 1 - General Drawing
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GENERAL DRAWING

FOR

64' - 0" PRESTRESSED GIRDER BRIDGE

43' - 0" ROADWAY, 1 - 10' - 0" SIDEWALK, & 1 - 5' - 0" SIDEWALK OVER RCP & E R.R.
STA. 508 + 00.61 TO STA. 508+ 64.61
STR. NO. 47-099-564
PCN 0A9K

0° SKEW
SEC. 15-T3N-R6E
IM-CR-EM 0901(187)44
HL-93

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
JUNE 2022

-X181-

1 OF 28

PLANS BY :
OFFICE OF BRIDGE DESIGN, SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION

DESIGNED BY	CK. DES. BY	DRAFTED BY	
PW	AU	BT/MG	Steve A Johnson BRIDGE ENGINEER
MEAD0A9K	0A9KTF01		

ESTIMATE OF STRUCTURE QUANTITIES

DESCRIPTION	QUANTITY	UNIT	REMARKS
Bridge Elevation Survey	Lump Sum	LS	
Concrete Penetrating Sealer	427.1	SqYd	See Special Provision
Select Granular Backfill	32.4	Ton	
Structural Steel, Miscellaneous	Lump Sum	LS	
Membrane Sealant Expansion Joint	152.0	Ft	
Structure Excavation, Bridge	35	CuYd	
Bridge End Embankment	733	CuYd	
Granular Bridge End Backfill	139.9	CuYd	
Class A45 Low Shrinkage Concrete, Bridge Deck	168.1	CuYd	See Special Provision
Class A45 Concrete, Bridge	35.4	CuYd	
Concrete Approach Slab for Bridge	270.3	SqYd	
Concrete Approach Sleeper Slab for Bridge	80.8	SqYd	
Reinforcing Steel	9096	Lb	
Epoxy Coated Reinforcing Steel	2554	Lb	
Stainless Reinforcing Steel	26760	Lb	See Special Provision
HP 12x53 Steel Test Pile, Furnish and Drive	135	Ft	
HP 12x53 Steel Bearing Pile, Furnish and Drive	1000	Ft	
36" Minnesota Shape Prestressed Concrete Beam	436	Ft	
Perforated Geocell	922	SqFt	
Install Dowel in Concrete	87	Each	
Steel Pedestrian Railing on Sidewalk	112	Ft	
Class M6 Concrete	32.5	CuYd	
Base Course	1485.4	Ton	
Geogrid Reinforcement	1752	SqYd	

BRIDGE SPECIFICATIONS

1. Design Specifications: AASHTO LRFD Bridge Design Specifications, 9th Edition.

2. Construction Specifications: South Dakota Standard Specifications for Roads and Bridges, 10-1-25 Version, Required Provisions, and Special Provisions as included in the Proposal. The Standard Specifications for Roads and Bridges are available for download and viewing at https://dot.sd.gov/doing-business/contractors/standard-specifications.

BRIDGE DESIGN LOADING

1. AASHTO HL-93.

2. Dead Load includes 22 psf for future wearing surface on the roadway.

DESIGN MATERIAL STRENGTHS*

Class A45 Concrete	f'_c = 4,500 psi
Reinforcing Steel (ASTM A615, Gr. 60)	f_y = 60,000 psi
Stainless Steel (ASTM A955, Gr. 60)	f_y = 60,000 psi
Piling (ASTM A572 Grade 50)	f_y = 50,000 psi

*For prestressed beams, see notes regarding Prestressed Girders.

GENERAL CONSTRUCTION

1. All lap splices shown are contact lap splices unless noted otherwise.

2. All exposed concrete corners and edges will be chamfered 3/4-inch unless noted otherwise.

3. Use 2-inch clear cover on all reinforcing steel except as shown otherwise on plans.

4. The Contractor will imprint on the structure the date of new construction as specified and detailed on Standard Plate 460.02.

5. Barrier Curbs and End blocks will be built perpendicular to the roadway grade line.

6. Requests for construction joints or reinforcing steel splices at points other than those shown, must be submitted to the Engineer for prior approval. If additional splices are approved, no payment will be allowed for the added quantity of reinforcing steel.

7. Bridge berms will be constructed to the plans template prior to any pile driving or construction of abutment footings. See Standard Plate 120.11. Berm slopes will not be disturbed after construction. Any requests to alter the berm or slopes after berm construction will be submitted to the Bridge Construction Engineer for approval. Allow 30 days for review of proposals.

8. The elevation of the bridge deck is 15 ½ inches above subgrade elevation.

DESIGN MIX OF CONCRETE

1. All structural concrete will be Class A45 Concrete unless otherwise indicated.

2. Type II cement conforming to Section 750 is required except Type III cement may be used for prestressed beams.

3. Grout design mix will be as specified in Section 460.2 K of the Construction Specifications. A compressive strength of 2000 psi will be attained by the grout prior to erection of any beams. Chamfer edges of grout pads 3/4-inch. The quantity of grout is included in and will be paid for at the contract unit price per cubic yard for Class A45 Concrete, Bridge.

4. See Special Provision for Low Shrinkage Bridge Deck Concrete.

PILE DRIVING

1. A drivability analysis was performed using the wave equation analysis program (GRLWEAP). The following pile hammers were evaluated and found to produce acceptable driving stresses:

   Delmag D30-32 SPI D-30 APE D30-32

2. Pile hammers not listed will require evaluation and approval prior to use from the Geotechnical Engineering Activity. Requests for evaluation of hammers not listed will be submitted a minimum of 5 business days prior to installation of piles.

ABUTMENT BACKWALL COATING

The material for waterproofing the abutment backwall will be one of the products from the approved products list. The acceptable abutment backwall coating suppliers are listed on the approved products list at the following Internet address:

http://apps.sd.gov/applications/HC60ApprovedProducts/ProductList.aspx

The cost of furnishing and applying the coating will be incidental to the contract unit price per cubic yard for Class A45 Concrete, Bridge Deck.

ESTIMATE OF STRUCTURE QUANTITIES AND NOTES
FOR
64' - 0" PRESTRESSED GIRDER BRIDGE

STR. NO. 47-099-564
JUNE 2022

DESIGNED BY	CK. DES. BY	DRAFTED BY	
PW	AU	PW	Steve A Johnson BRIDGE ENGINEER
MEAD0A9K	0A9KTF02		

ABUTMENTS

1. The HP 12x53 Piling were designed using a factored bearing resistance of 98 tons per pile. Piling will develop a field verified nominal bearing resistance of 245 tons per pile.

2. One test pile will be driven at each abutment and will become part of the pile group. The test pile will be driven before any other pile and will be driven to the required field verified nominal bearing resistance or as directed by the Engineer prior to driving any portion of the bearing piles.

3. The Contractor will have sufficient pile splice material on hand before pile driving is started. See Standard Plate 510.40.

4. Piles will not be driven out of position by more than three inches in the direction parallel to the girder centerline. A pile-driving template will be used to ensure this accuracy.

5. Abutment backwalls above the construction joint must be cast concurrently with the deck slab. The concrete used for the pile cap will be Class A45 Concrete, Bridge. The concrete used for the backwall and wings will be Class A45 Concrete, Bridge Deck. All abutment and bridge deck concrete will have attained design strength prior to backfilling.

6. Each finished abutment will include a Bridge Survey Marker. See Standard Plate 460.05.

7. All piling within the Granular Backfill limits will be encased with a 24-inch minimum inside diameter steel casing. The steel casing will be of sufficient strength to withstand all forces, including those from earth pressure and will be approved by the Engineer. The pile will be encased the entire height of the backfill to an elevation of 3 inches below the bottom of abutment. See Retaining Wall plans for measurement and payment of casing.

8. The Contractor will drive the pile and then place the casings. The Contractor will take all necessary precautions to prevent displacement of the casings during placement and compaction of the backfill. Backfill material within 3 feet of the casing will be placed in small lifts and compacted in such a manner that the required density is achieved, without causing displacement or damage to the steel casing. The Contractor will coordinate casing installation with the wall installation.

9. After the piles are driven, the steel casings are installed and the backfill is placed, the steel casings will be filled with course dry sand to a depth of 6 feet from the top of the casing. The sand will be compacted to prevent bridging. The top 6 feet of the casing will be filled with natural bentonite slurry. The slurry will consist of a polymer free sodium bentonite designed for sealing wells and bore holes. The bentonite material will be a granular bentonite with 1/4-inch or larger particles. The bentonite particles will be poured directly into the casing and hydrated with water in 2-foot lifts. The quantity of water used will be determined according to the manufacturer's recommendations for a solution of approximately 20% solids.

10. After filling the casings with bentonite, the top of each casing will be covered and sealed with a layer of plywood covered with a minimum of 2-inch thick polystyrene, as approved by the Engineer.

11. All costs associated with filling the steel casings with sand and bentonite slurry will be incidental to the contract unit price per foot for Steel Bearing Pile, Furnish and Drive, or Steel Test Pile, Furnish and Drive.

12. Pile can be driven to elevation 3465, but not below, prior to splicing. This will prevent setup of the pile before full bearing depth is reached.

SUPERSTRUCTURE

1. Girder lifting hooks will be cut off before placement of concrete deck slab.

2. The use of an approved deck finishing machine will be required during placement of bridge deck concrete. The deck finishing machine will be adjusted and operated in such a manner that the screed or screeds are parallel with the centerline of the bridge. The finish machine and concrete placement will be parallel to the skew of the bridge.

3. The concrete bridge deck will be placed and finished at a minimum rate of 31 feet of deck per hour measured along centerline roadway. If concrete cannot be placed and finished at this rate, the Engineer will order a header installed and operations stopped. If a header is required sometime during the pour operation, its location will be at or as near as possible to the three-quarter point of the span. Notify the Bridge Construction Engineer if deck pour operations are stopped. Operations may resume only when the Engineer is satisfied that a rate of 31 feet per hour can be maintained and the concrete has attained a minimum compressive strength of 2000 psi.

4. Snap ties, if used in the barrier curb formwork, will be corrosion resistant. The corrosion resistant ties will be inert in concrete and compatible with the reinforcing steel.

5. See Special Provision for Concrete Penetrating Sealer.

6. See Special Provision for Low Shrinkage Bridge Deck Concrete

PRESTRESSED GIRDERS

1. Minimum concrete compressive strength f'_c = 8000 psi at 28 days for all girders, f'_{ci} = 6000 psi for all girders.

2. All mild reinforcing steel will be deformed bars conforming to ASTM A615, Grade 60.

3. Individual tendons in all pretensioned sections will consist of seven-wire uncoated Type 270K Strands having a nominal diameter of 0.6-inch and a minimum ultimate strength of 58600 lbs. per cable. An initial tensile force of 43500 lbs. will be applied to all 0.6-inch cables in all girders. All prestressing steel will conform to AASHTO M203. (low-relaxation strands).

4. All prestressed girders within a span will be cast within an 8-day period. If not, the newest girder will be at least 6 weeks old before the deck slab is poured. The girders will be poured in all steel forms.

5. Prestressed concrete girders will always be lifted by the devices provided in the top flanges near the ends of the girders. Types of lifting devices other than those shown on the plans may be used provided they are approved by the Office of Bridge Design. The design of the lifting devices will be the responsibility of the fabricator.

6. Each beam will be marked showing structure number, casting date, and beam number. Marking will be on the face of the beam near the end and the location will be exposed after the diaphragms have been cast. Facia beams will be marked on an inside face. All markings will be stenciled and clearly legible. For beam designations and locations, see superstructure layout plan and Erection Data sheet.

7. The physical properties of the elastomeric bearing pads will conform to the requirements of Section 18.2 of the AASHTO LFRD Bridge Construction Specification and the AASHTO Materials Specification M251. The elastomeric bearing pads will conform to Grade 50 (durometer). The cost of the pads will be incidental to the contract unit price per cubic yard for Class A45 Concrete, Bridge. Certification that pads are 50 durometer and meet the requirements of AASHTO LFRD Bridge Construction Specification Section 18.2 and AASHTO Materials Specification M251 will be furnished to the Engineer with the shop drawings. No laminated bearing pads will be allowed.

8. All exposed corners will be chamfered 3/4-inch or rounded to 3/4-inch radius.

9. Dead Load of girder taken as effective at transfer. Cut strands flush with end of girder and coat end of strands with mortar, EXCEPT the strands that are to be extended and bent,

10. The Contractor will be responsible for ensuring that transportation stresses, handling, and erection do not cause damage to the girders.

BOLT TESTING

The certified mill test reports for all bolts used on the project will include the test results for all the testing specified in section 972.2 D of the Construction Specifications. Some of these tests are supplemental tests that must be requested at the time the bolts are ordered. It is the responsibility of the Contractor to notify the bolt supplier of these requirements.

SHOP PLANS

Shop plans will be required as specified by the Construction Specifications.

NOTES (CONTINUED)

FOR

64' - 0" PRESTRESSED GIRDER BRIDGE

STR. NO. 47-099-564

JUNE 2022

DESIGNED BY	CK. DES. BY	DRAFTED BY	
PW MEAD0A9K	AU 0A9KTF03	PW	Steve A Johnson BRIDGE ENGINEER

FALL PROTECTION

1. The Contractor will install a Fall Protection System conforming to OSHA Regulations. When working on the girders prior to decking installation, a Horizontal Lifeline – or other OSHA approved system will be installed. The Contractor will have one Personal Fall Arrest System (PFAS) available for use by a Department Inspector. The PFAS will be compatible with the installed Fall Protection System.

2. Modifications to any bridge components used to accommodate the Fall Protection System will be shown on the Falsework Plans and/or the appropriate Shop Plans. Field welding to bridge components will not be allowed. Field placed concrete inserts or drilled-in anchor bolts will be allowed if approved by the Engineer. All costs associated with providing the Fall Protection System will be incidental to the other contract items.

CLASS B COMMERCIAL TEXTURE FINISH

1. A Class B commercial texture finish will be applied to the following areas:

    a. *Abutments: all exposed surfaces to an elevation 1-foot below finished ground line.
    b. Barrier: all exposed surfaces (**front, **top, and *back).
    c. *Slab: edge of slab.
    d. *Girder: Outside face and bottom of facia girders.

    * Color will be AMS-STD-595 33690.
    ** Color will be AMS-STD-595 37875.

2. The Class B commercial texture finish will be applied in accordance with Section 460.3 L.1.c and Section 460.3 M.1 of the Specifications.

CHAIN LINK FENCE

1. The chain link fence fabric and supports will conform to Section 930 of the Construction Specifications as modified by the following notes.

2. The chain link fence fabric, wire ties, and miscellaneous hardware will be galvanized and conform to AASHTO M181. The fence fabric will be Type IV 9-gauge wire woven in a 2-inch diamond mesh. Knuckled selvage will be used on the top and bottom of the fence fabric.

3. The chain link fence fabric and miscellaneous hardware will have Natina Solution applied per manufacturer's recommendation.

    Natina
    1555 N VIP Blvd.
    Casa Grande, AZ 85122
    https://www.natina.com/

4. A brown (AMS STD 595 Color 30045) thermally extruded polyvinyl chloride coating may be applied to the wire ties in lieu of the Natina Solution treatment.

5. The item Chain Link Fence for Bridge Sidewalk will be paid for at the contract unit price per linear foot. This payment will be full compensation for furnishing all material, labor, tools, and equipment necessary or incidental to the construction of the chain link fence including chain link fence fabric, posts, rails, wire ties, miscellaneous hardware, Natina Solution treatment, and welding all to satisfactorily complete the work.

STEEL RAILING – SIDEWALK

1. All rail and chain link fence posts will be built vertical.

2. All structural steel parts for railing will conform to ASTM A500, Grade B. Material less than 1/4-inch thick may be ASTM A1011, Grade 36. Rail post base plates will conform to ASTM A36.

3. Anchor bolts and nuts for railing will conform to ASTM A307. Washers will conform to ASTM F436 and all components will be galvanized in accordance with ASTM F2329. The bolts will be hex head "Structural" type with heavy hex nuts and round washers.

4. Anchor bolts will be tightened to a torque of 120 ft-lbs (approximated without the use of a calibrated torque wrench).

5. All steel railing will be galvanized in accordance with ASTM F2329. All steel railing and miscellaneous hardware will have Natina Solution applied per manufacturer's recommendation. The galvanized steel railing will be cleaned in accordance with ASTM D6386 before application of the Natina Solution.

    Natina
    1555 N VIP Blvd.
    Casa Grande, AZ 85122
    https://www.natina.com/

6. Welding and Weld Inspection will be done in accordance with the current edition of AWS D1.5 Bridge Welding Code.

7. The costs of structural steel, welding, weld inspection, Natina Solution treatment, and galvanization will be incidental to the contract unit price per foot for Steel Pedestrian Railing on Sidewalk.

APPROACH SLABS

1. Sleeper slab riser will be cast with or later than the approach slab. Care will be taken to ensure the correct grade is maintained across the top of the sleeper slab riser.

2. The portion of the sleeper slab below the construction joint may be precast. If the bottom portion of the sleeper slab is precast, the Contractor will submit proposed lifting and setting plans to the Bridge Construction Engineer for approval. In addition, if reinforcing or other details differ from those shown in the plans, the Contractor will submit proposed alternate details for approval.

3. The use of an approved finishing machine will be required during placement of Class A45 Concrete for the approach slabs. Concrete placement in front of the machine will be kept parallel to the screed.

4. Concrete Approach Sleeper Slab for Bridge, whether cast-in-place or precast, will be paid for at the contract unit price per square yard. This payment will be full compensation for all excavation, furnishing, hauling, and placing all materials including concrete and reinforcing steel; for disposal of all surplus materials; and for labor, tools, equipment, and any incidentals necessary to complete this item of work.

5. Concrete Approach Slab for Bridge will be paid for at the contract unit price per square yard. This payment will be full compensation for all excavation, furnishing, hauling, and placing all materials including concrete, asphalt paint or 6 mil polyethylene sheeting, elastic joint sealer, and reinforcing steel; for disposal of all excavated material and surplus materials and for labor, tools, equipment and any incidentals necessary to complete this item of work.

AS - BUILT ELEVATION SURVEY

The Contractor will be responsible for producing an as-built elevation survey soon after construction is completed but before the bridge is opened to traffic. The Contractor will be responsible for recording the as-built elevation shown in the plans. The completed table will be given to the Engineer and copies forwarded to the Office of Bridge Design and the Senior Region Bridge Engineer. The elevations will be based on the National Geodetic Survey (NGS) North American Vertical Datum of 1988 (NAVD88). The Engineer will provide the Contractor with a description, elevation, and location of the nearest benchmark that has a NAVD88 established elevation for the Contractor's use. The benchmark shown in the plans has not been tied to the NAVD88. The Contractor will be responsible for establishing a NAVD88 elevation for the benchmark provided in the plans. All cost associated with obtaining the NAVD88 elevations at the locations shown in the table and for the benchmark shown in the plans, including all equipment, labor, and any incidentals required will be incidental to the contractor lump sum price for Bridge Elevation Survey.

NOTES (CONTINUED)
FOR
64' - 0" PRESTRESSED GIRDER BRIDGE

STR. NO. 47-099-564
JUNE 2022

DESIGNED BY	CK. DES. BY	DRAFTED BY	
PW	AU	PW	BRIDGE ENGINEER
MEAD0A9K	0A9KTF04		

APPROACH SLAB UNDERDRAIN SYSTEM

1. An underdrain system will be placed underneath the sleeper slabs and behind the abutments as shown in the plans in accordance with Section 435 of the Construction Specifications.

2. The 4-inch diameter Perforated PVC Drain Pipe will be PS 46 Solvent Weld PVC Pipe conforming to ASTM F758 or SDR 35 Solvent Weld PVC Pipe conforming to ASTM D3034 with perforations in accordance with ASTM F758. The 2-inch and 4-inch diameter PVC Outlet Pipe will be Schedule 40 PVC Pipe conforming to ASTM D1785 designated as PVC 1120, PVC 1220, or PVC 2120. Pipe sections will be connected using a PVC Solvent Cement conforming to ASTM D2564. The Drain Sleeve will conform to ASTM D6707.

3. Care will be taken to ensure that the 4-inch diameter Perforated PVC Drain Pipe and the 4-inch diameter PVC Outlet Pipe are not damaged during construction. Sufficient cover material will be placed over the pipes before compaction equipment is allowed over the underdrain system. Any damaged pipes will be replaced by the Contractor at no additional cost to the Department.

4. All labor, tools, equipment, and any incidentals necessary for the Installation of 4-inch diameter Perforated PVC Drain Pipe, 4-inch diameter PVC Outlet Pipe, SDR Solvent Weld PVC Coupling, and PVC Cement will be incidental to the contract unit price per foot for 4" Underdrain Pipe.

PERFORATED GEOCELL

1. Perforated Geocell will be from the following company or equivalent:

   Company: Agtec
   Phone: 1-818-724-7657
   Website: http://www.agtec.com

2. Perforated Geocell will be 6 inches tall with Type B Drainage Fabric underlying the perforated Geocell. Installation will adhere to the manufacturer's recommendation.

3. Perforated Geocell will be filled with the Select Granular Backfill in accordance with Section 850 of the Construction Specifications.

4. Perforated Geocell will be paid for at the contract unit price per square foot. Payment will be full compensation for furnishing and installing the Perforated Geocell.

5. Select Granular Backfill will be paid for at the contract unit price per ton of material furnished. Payment will be full compensation for furnishing, loading, hauling, and placing the Select Granular Backfill.

COORDINATION WITH RAILROAD

1. During construction of the bridge, the Contractor will not interfere with the operations of railroad train movements. Construction activity must not take place within 25 feet of the centerline track when train movements are occurring through the construction site and construction equipment will be removed from this zone prior to arrival of any train. See Special Provision for Working on Railroad Company Right-of-Way.

2. See Special Provision Regarding Railroad Protective Liability Insurance.

GRANULAR BRIDE END BACKFILL, BASE COURSE, AND GEOGRID REINFORCEMENT

1. The Geogrid Reinforcement will be a biaxial grid of single layer construction. Vibratory welded, integrally formed or woven and coated geogrids will be acceptable. Grids with laser welded grid junctions will not be allowed. The Geogrid Reinforcement will be certified by the supplier to meet the following specification prior to installation:

Property	Test	MARV
Wide Width Strip Tensile Strength Ultimate	ASTM D 6637	850lb/ft MD and XD

2. Geogrid Reinforcement will be paid for at the contract unit price per square yard for Geogrid Reinforcement. Payment quantities will be based on area covered plus 15%. Overlaps are accounted for by the additional 15%. Payment will be full compensation for furnishing and installing the Geogrid Reinforcement only. Granular backfill materials will be paid for under a different bid item.

3. Granular Bridge End Backfill will conform to Section 882 of the Specifications.

4. Granular Bridge End Backfill will be paid for at the contract unit price per cubic yard in accordance with 430.5 of the Specifications. Payment will be full compensation for furnishing and placing this material.

5. Base Course material will conform to the specification for Aggregate Base Course in Section 882 of the Specifications.

6. The Geogrid Reinforcement will be placed on a level surface and overlapped a minimum of 2 feet.

7. The Geogrid Reinforcement will be placed as taut as possible with minimal wrinkles. Placement will be done so that subsequent granular cover material does not shove, wrinkle, or distort the in-place Geogrid Reinforcement. The overlaps will be shingled in a manner that assures granular material will not be forced under the geogrid during backfilling operations. The Geogrid Reinforcement may be held in place with small piles of granular material or staples.

8. Base course will be dumped at least 20 feet behind the leading edge of the backfill and pushed into place with a loader or dozer from the covered areas to the uncovered areas. Traffic will not be allowed on the uncovered geogrid.

9. Granular Bridge End Backfill, Base Course, and adjacent soil embankment will be built simultaneously in horizontal layers. Base course will be placed in 6-inch maximum lifts and compacted to 97 percent of maximum standard proctor dry density using a smooth face vibratory roller or vibratory plate compactor. Each layer of granular material will be thoroughly watered prior to and during compaction.

10. Density tests within the berm limits will consist of tests conducted both in the soil embankment and the granular bridge end backfill according to the modified zone requirements below:

Zone	Depth (ft.)	Min. required tests
1	0-1	1
2	1-3	1
3	3-5	1
4	5 to Bottom	1 per 3 vertical feet

11. The zone requirement will be enforced for all phases of staged construction. For example, if the berm on the west side of centerline is constructed separately from the east side, testing by zone will be required on both sides of centerline.

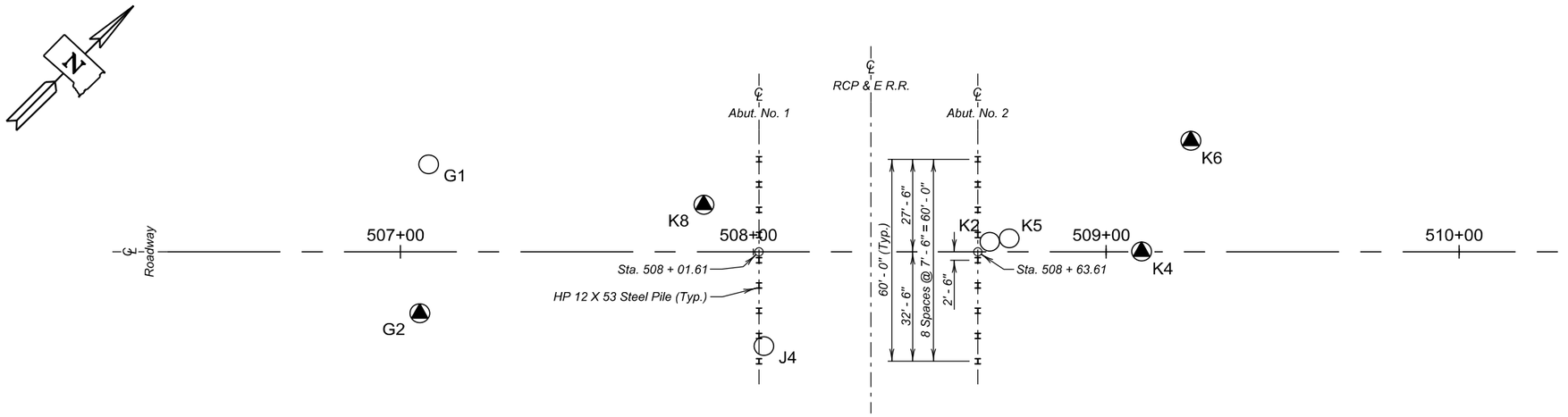
12. Cylindrical footing for light poles, pedestals, and/or signposts located within the reinforced Bridge End Backfill or Base Course will be cased. Casing will be of sufficient strength to withstand handling and installation procedures. The casing material may consist of sonotube, corrugated metal pipe, PVC, smooth metal pipe, or any other material as approved by Engineer. Casing will be placed during the construction of the reinforced Bridge End Backfill or Base Course and filled around casing. The geogrid is to be cut at the casing locations.

NOTES (CONTINUED)
FOR
64' - 0" PRESTRESSED GIRDER BRIDGE

STR. NO. 47-099-564
JUNE 2022

DESIGNED BY	CK. DES. BY	DRAFTED BY	
PW	AU	PW	Steve A Johnson BRIDGE ENGINEER
MEAD0A9K	0A9KTF05		

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E92	E185



PILING LAYOUT

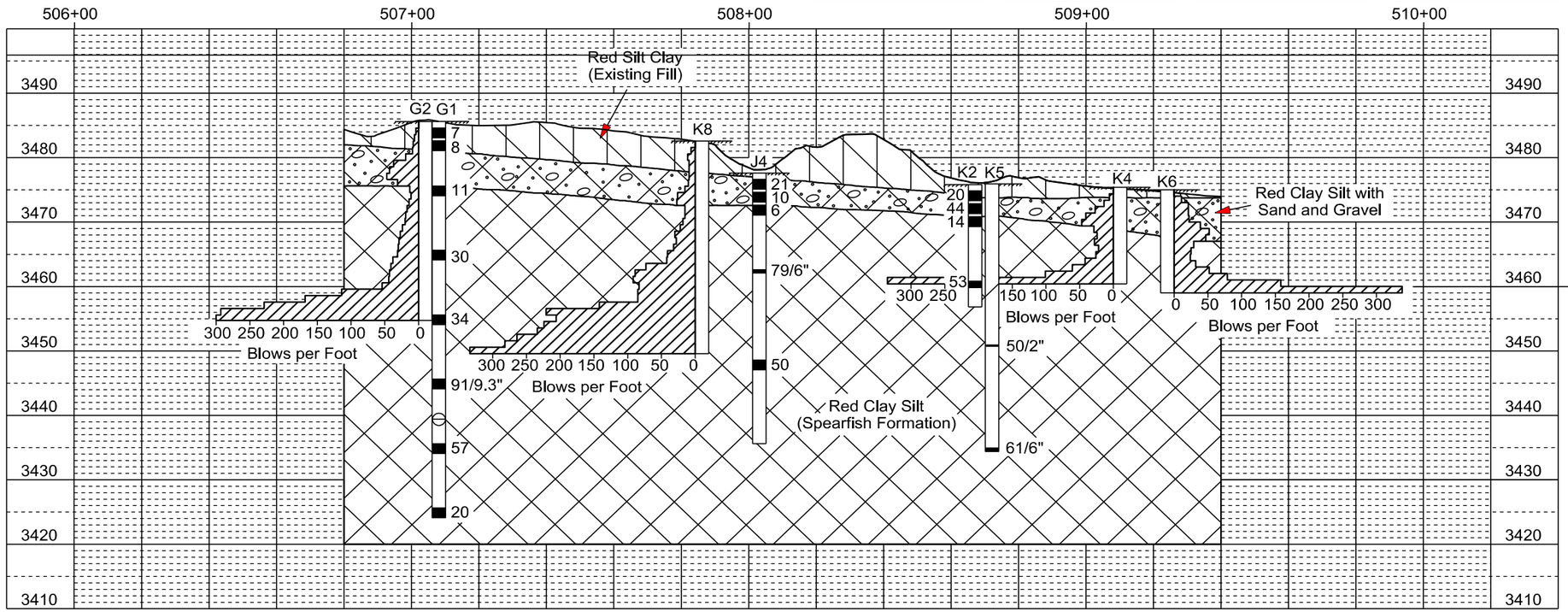
The Spearfish Formation is a relatively weak red sandy shale. Textural classification typically is a clay silt. Gypsum is present throughout the formation that varies from thin stringers to massive deposits over 30 feet thick. Bedded layers of red stained sandstone can also be encountered. Unweathered Spearfish Formation is considered to be "Soft Rock", although massive unweathered gypsum may behave similar to weak limestone.

Hole Number	J4	
Station	508+03	
Depth	4.5	ft
Soil Color	Red	
Classification	Clay	
Strength (Qu)	6,566	psf
Dry Density	111.4	pcf
Wet Density	129.2	pcf
Moisture	15.9	%
Pass No. 10	100.0	%
Pass No. 40	99.8	%
Pass No. 200	97.8	%
Sand Content	2.2	%
Silt Content	43.0	%
Clay Content	54.8	%

Hole Number	J4	
Station	508+03	
Depth	15.2	ft
Soil Color	Red	
Classification	Sandy Silt	
Strength (Qu)	2,427	psf
Dry Density	117.8	pcf
Wet Density	128.8	pcf
Moisture	9.3	%
Pass No. 10	100.0	%
Pass No. 40	81.2	%
Pass No. 200	71.7	%
Sand Content	28.3	%
Silt Content	54.9	%
Clay Content	16.8	%

Hole Number	K2	
Station	508+67	
Depth	2.2	ft
Soil Color	Brown	
Classification	Silt Clay	
Strength (Qu)	3,546	psf
Dry Density	95.2	pcf
Wet Density	106.1	pcf
Moisture	11.5	%
Pass No. 10	99.8	%
Pass No. 40	99.6	%
Pass No. 200	96.5	%
Sand Content	3.3	%
Silt Content	57.8	%
Clay Content	38.7	%

Hole Number	K5	
Station	508+72	
Depth	41.2	ft
Soil Color	Red	
Classification	Silt Clay	
Strength (Qu)	1,869	psf
Dry Density	119.7	pcf
Wet Density	131.3	pcf
Moisture	9.6	%
Pass No. 10	100.0	%
Pass No. 40	99.3	%
Pass No. 200	97.5	%
Sand Content	2.5	%
Silt Content	58.7	%
Clay Content	38.8	%



The Geotechnical Engineering Activity has all of the boring logs and laboratory test results available for review at the Central Office in Pierre.

LEGEND

Penetration Test
Drive Test
Water
Caved
Sample Zone

Drive tests are conducted by dropping a 490 pound hammer 30 inches to drive a 2⅞ inch drill stem to measure the resistance to penetration of the soil.

Penetration test holes are drilled with a 6⅝ inch diameter hollow stem auger. Penetration tests are conducted by dropping a 140 pound hammer 30 inches to collect samples and measure the resistance to penetration of the soil. Samples are collected using a lined Modified California Sampler. Penetration test results are listed as uncorrected "N" values in blows per foot. Blows over inches are listed if refusal is achieved, which is 50 blows within one 6 inch set.

GROUNDWATER ELEVATIONS

NOVEMBER 2021

G1	(DRY) 3439.6
G2	DRY
K2	NO DATA

DECEMBER 2021

J4	NO DATA
K4	DRY
K5	NO DATA
K6	DRY
K8	NO DATA

MEASURED SKIN FRICTION

	ELEV.	PSF
G2	3454.8	2175
K4	3460.4	1120
K6	3459.0	673
K8	3449.6	1439

SUBSURFACE INVESTIGATION AND PILING LAYOUT

FOR

64' - 0" PRESTRESSED GIRDER BRIDGE

43' - 0" ROADWAY, 1 - 10' - 0" SIDEWALK, & 1 - 5' - 0" SIDEWALK OVER RCP & E R.R.
STA. 508 + 00.61 TO STA. 508+ 64.61
STR. NO. 47-099-564

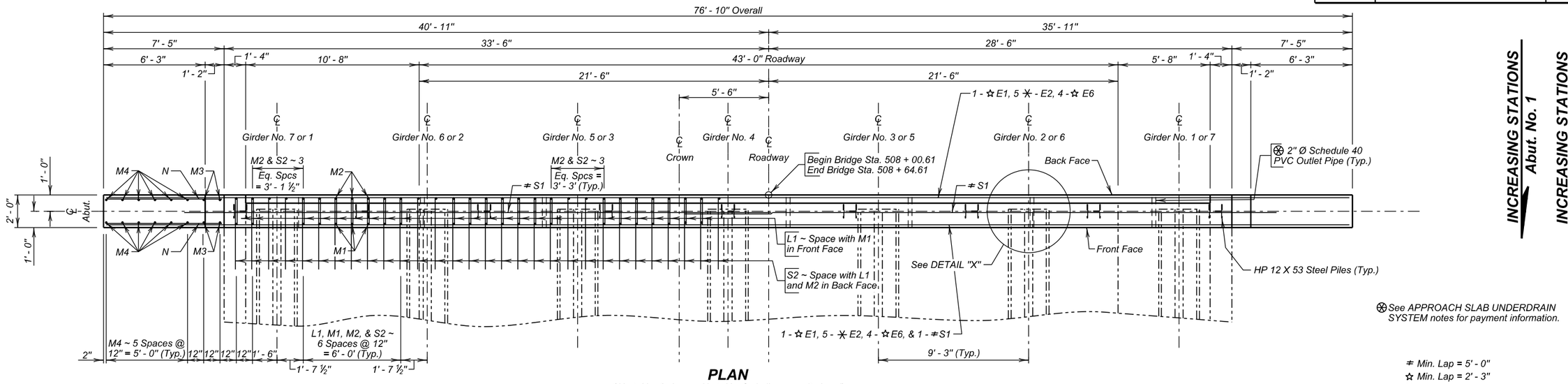
0° SKEW
SEC. 15-T3N-R6E
IM-CR-EM 0901(187)44
HL-93

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
JUNE 2022

6 OF 28

DESIGNED BY	CK. DES. BY	DRAFTED BY	
PW	AU	HK/MG	Steve A Johnson BRIDGE ENGINEER
MEAD0A9K	0A9KTF06		

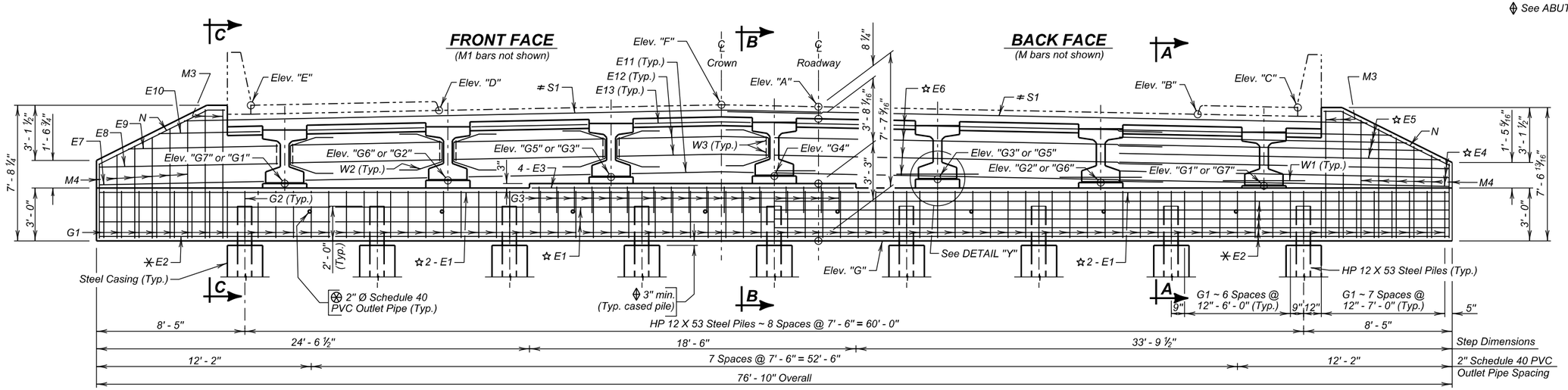
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E93	E185



PLAN
(Abut. No. 1 shown, Abut. No. 2 similar opposite hand)

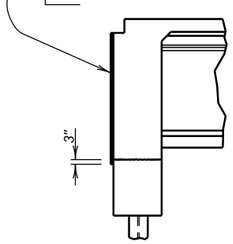
⊛ See APPROACH SLAB UNDERDRAIN SYSTEM notes for payment information.

≠ Min. Lap = 5' - 0"
☆ Min. Lap = 2' - 3"
⚹ Min. Lap = 3' - 10"
⟠ See ABUTMENT NOTES

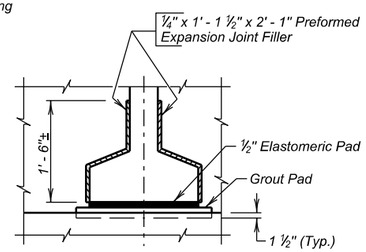


ELEVATION
(Along ℄ Abutment)

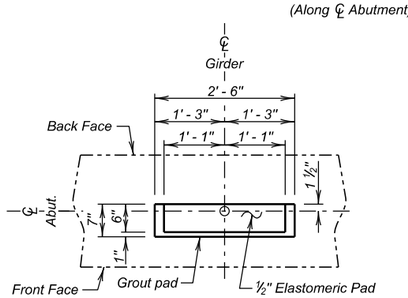
The face on the back side of the Abutment between the Abut. Wings will be thoroughly coated with an approved waterproof sealant. (See Notes regarding Abutment Backwall Coating.)



ABUT. BACKWALL COATING DETAILS



DETAIL "Y"
(Typical at Girder Ends; Abutments only)



DETAIL "X"

TABLE OF ELEVATIONS

Abut. No.	Elev. "A"	Elev. "B"	Elev. "C"	Elev. "D"	Elev. "E"	Elev. "F"	Elev. "G"
1	3516.08	3515.65	3516.04	3515.87	3516.16	3516.19	3508.47
2	3514.07	3513.64	3514.03	3513.86	3514.15	3514.18	3506.46

TABLE OF ELEVATIONS

Abut. No.	Elev. "G1"	Elev. "G2"	Elev. "G3"	Elev. "G4"	Elev. "G5"	Elev. "G6"	Elev. "G7"
1	3511.60	3511.78	3511.97	3512.15	3512.09	3511.90	3511.72
2	3509.59	3509.77	3509.96	3510.14	3510.08	3509.89	3509.71

NOTE - Elev. "A", "B" "D", and "F" are top of slab at ℄ of Abutment. Elev. "C" and "E" are at top of sidewalk at barrier curb elevation. Elev. "G1", "G2", "G3", "G4", "G5", "G6", and "G7" are top of grout pad elevations at ℄ Abutment.
Top of Grout Pads will be Level and Smooth.

ABUTMENT DETAILS (A)

FOR

64' - 0" PRESTRESSED GIRDER BRIDGE

43' - 0" ROADWAY, 1 - 10' - 0" SIDEWALK, & 1 - 5' - 0" SIDEWALK OVER RCP & E R.R.
STA. 508 + 00.61 TO STA. 508+ 64.61
STR. NO. 47-099-564

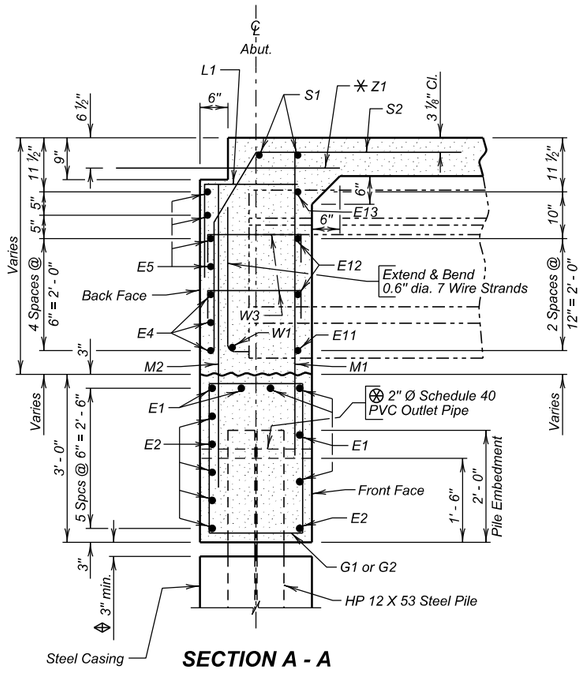
0° SKEW
SEC. 15-T3N-R6E
IM-CR-EM 0901(187)44
HL-93

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
JUNE 2022

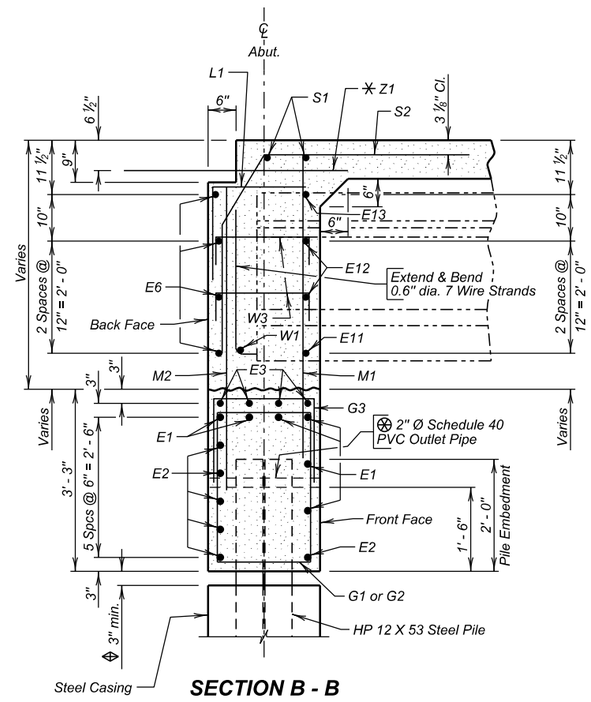
7 OF 28

DESIGNED BY	CK. DES. BY	DRAFTED BY	
PW	AU	MG	BRIDGE ENGINEER
MEAD0A9K	0A9KTF07		

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E94	E185



SECTION A - A



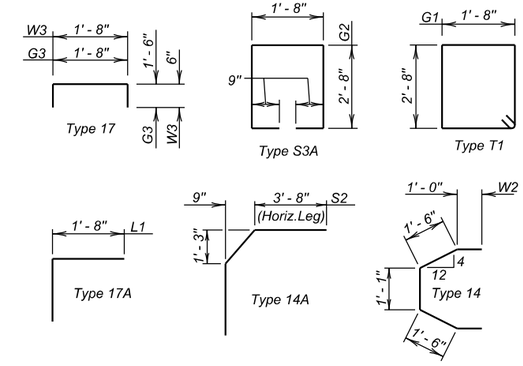
SECTION B - B

REINFORCING SCHEDULE

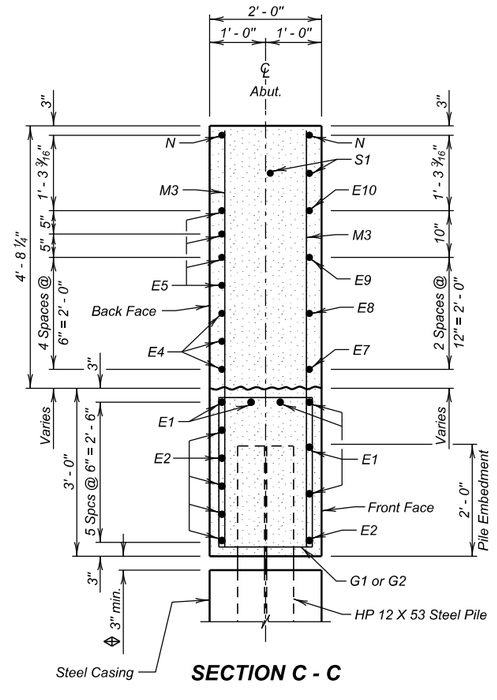
(For One Abutment - Two Required)

	Mk.	No.	Size	Length	Type
	E1	12	6	39' - 6"	Str.
	E2	12	8	40' - 3"	Str.
	E3	4	4	18' - 3"	Str.
	E4	6	6	18' - 7"	Str.
ϕ	E5	4	6	33' - 1"	Str.
	E6	4	6	44' - 0"	Str.
	E7	2	5	9' - 4"	Str.
	E8	2	5	10' - 2"	Str.
	E9	2	5	8' - 9"	Str.
	E10	2	5	5' - 10"	Str.
	E11	6	5	6' - 9"	Str.
	E12	12	5	8' - 5"	Str.
	E13	6	5	6' - 5"	Str.
	G1	72	5	9' - 5"	T1
	G2	9	5	8' - 6"	S3A
	G3	17	4	4' - 8"	17
△	L1	46	4	3' - 4"	17A
△	M1	46	5	5' - 9"	Str.
	M2	60	5	5' - 9"	Str.
	M3	8	5	7' - 3"	Str.
ϕ	M4	6	5	10' - 10"	Str.
	N	4	5	8' - 0"	19B
△	S1	4	9	35' - 11"	Str.
△	S2	53	5	7' - 5"	14A
	W1	7	5	4' - 8"	Str.
	W2	14	4	6' - 1"	14
	W3	56	5	2' - 8"	17

Bending Details



NOTE:
All dimensions are out to out of bars.
△ Bars to be Epoxy Coated.
ϕ See cutting diagram.



SECTION C - C

✳ Z1 bars are listed and included in superstructure. See SUPERSTRUCTURE DETAILS (A) & (B).

⊛ See APPROACH SLAB UNDERDRAIN SYSTEM notes for payment information.

⟠ See ABUTMENT NOTES

ESTIMATED QUANTITIES

	ITEM	UNIT	QUANTITY Abut. No. 1	QUANTITY Abut. No. 2
ϕ	Class A45 Concrete, Bridge Deck	Cu. Yd.	19.1	19.1
	Class A45 Concrete, Bridge	Cu. Yd.	17.7	17.7
	Reinforcing Steel	Lb.	4548	4548
	Epoxy Coated Reinforcing Steel	Lb.	1277	1277
	Structure Excavation, Bridge	Cu. Yd.	17.3	17.3
	HP 12 x 53 Steel Test Pile, Furnish and Drive	Ft.	1 @ 70' = 70'	1 @ 65' = 65'
	HP 12 x 53 Steel Bearing Pile, Furnish and Drive	Ft.	8 @ 65' = 520'	8 @ 60' = 480'

ϕ Each abutment includes 0.1 cu. yds. for grout pads. 32 ft. of 2" dia. PVC Outlet Pipe is an approximate quantity contained in the Class A45 Concrete, Bridge Deck.

Note:
Concrete will be placed in the space under the beams (within the backwall width) during the pour. If upon form removal the space is not completely filled and consolidated, the Contractor will grout the remaining voids.

ABUTMENT DETAILS (B)

FOR

64' - 0" PRESTRESSED GIRDER BRIDGE

43' - 0" ROADWAY, 1 - 10' - 0" SIDEWALK, & 1 - 5' - 0" SIDEWALK OVER RCP & E R.R.
STA. 508 + 00.61 TO STA. 508+ 64.61
STR. NO. 47-099-564

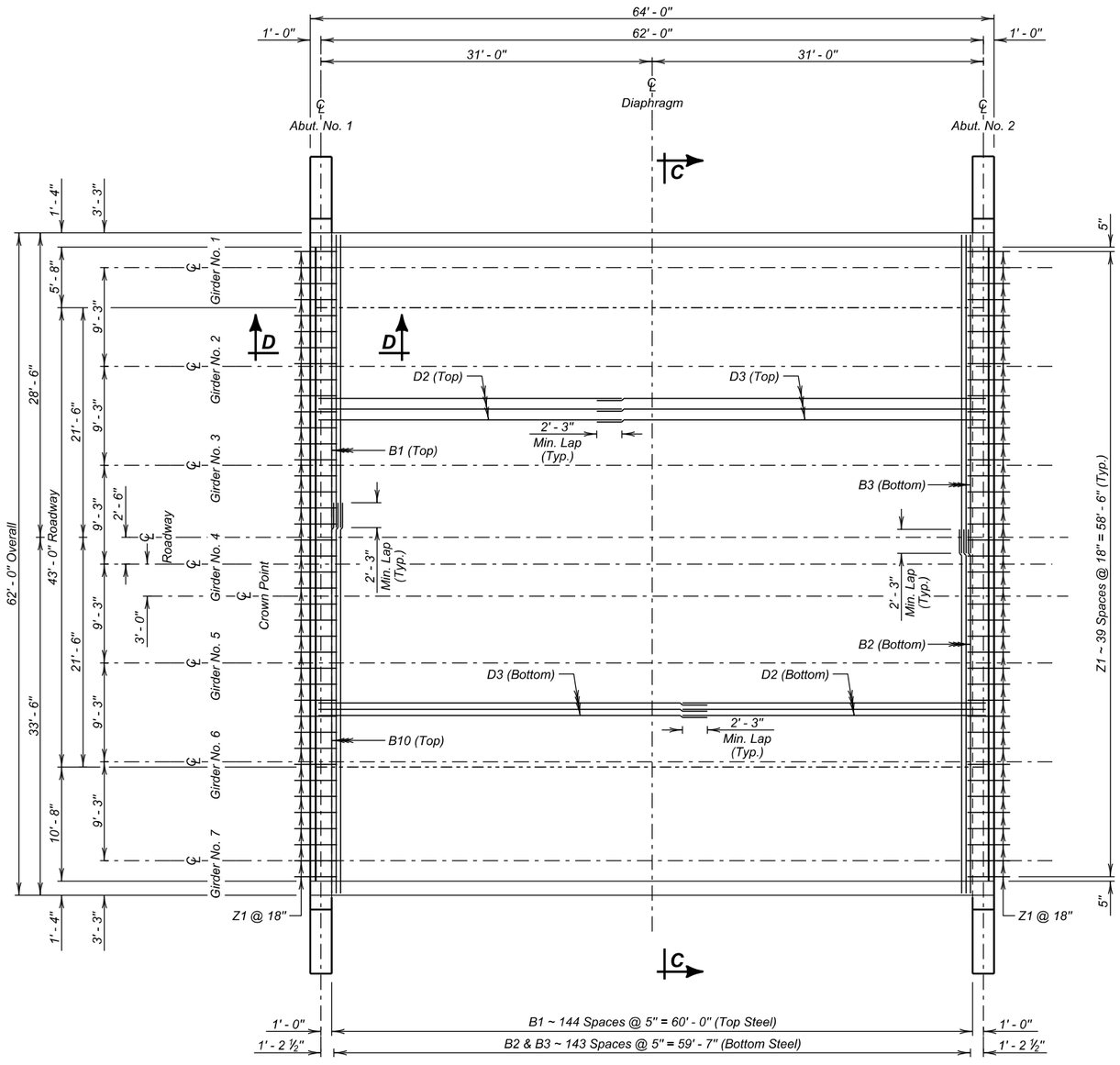
0° SKEW
SEC. 15-T3N-R6E
IM-CR-EM 0901(187)44
HL-93

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
JUNE 2022

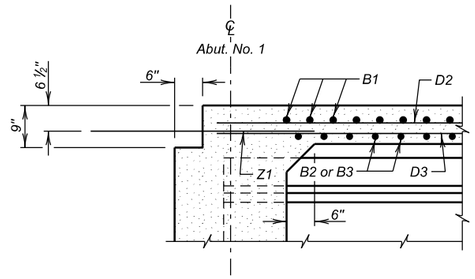
8 OF 28

DESIGNED BY	CK. DES. BY	DRAFTED BY	
PW	AU	MG	Steve A Johnson BRIDGE ENGINEER
MEAD0A9K	0A9KTF08		

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E95	E185



PLAN



SECTION D - D

SUPERSTRUCTURE DETAILS (A)

FOR

64' - 0" PRESTRESSED GIRDER BRIDGE

43' - 0" ROADWAY, 1 - 10' - 0" SIDEWALK, & 1 - 5' - 0" SIDEWALK OVER RCP & E R.R.
STA. 508 + 00.61 TO STA. 508+ 64.61
STR. NO. 47-099-564

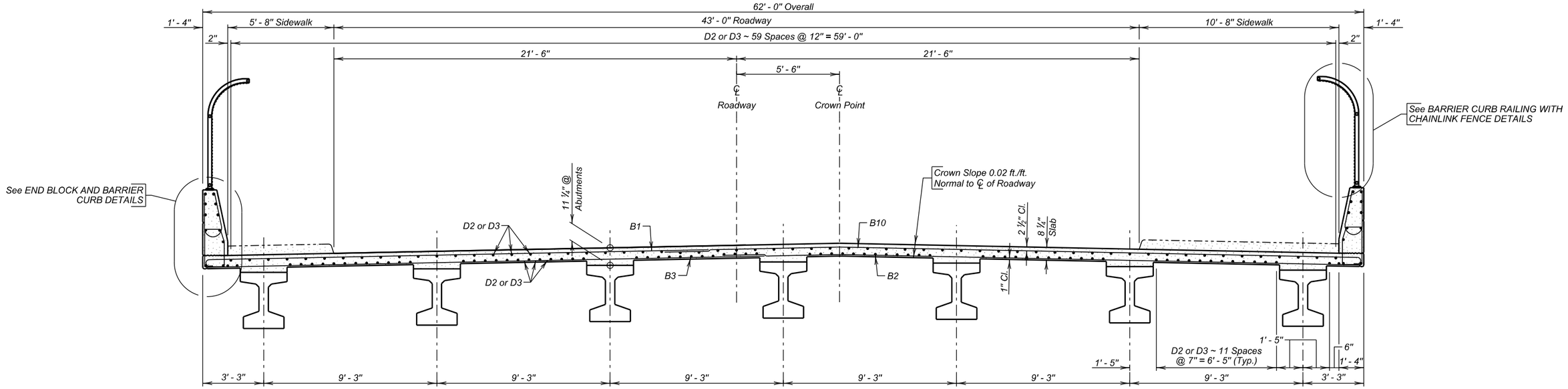
0° SKEW
SEC. 15-T3N-R6E
IM-CR-EM 0901(187)44
HL-93

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
JUNE 2022

DESIGNED BY	CK. DES. BY	DRAFTED BY	
PW	AU	MG	Steve A Johnson BRIDGE ENGINEER
MEAD0A9K	0A9KTF09		

Revised August 28, 2025 AU

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E96	E185



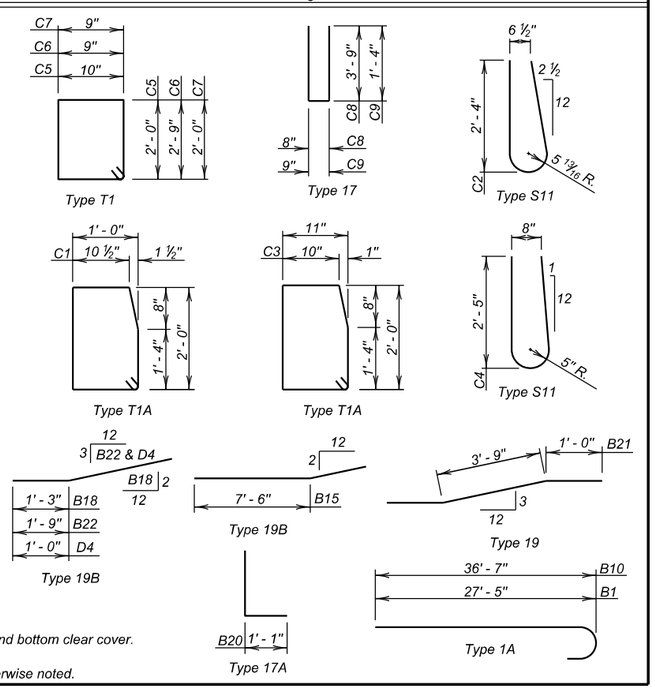
SECTION C - C

(Midspan diaphragm not shown in this section, see DIAPHRAGM DETAILS sheet.)

REINFORCING SCHEDULE

	Mk.	No.	Size	Length	Type
∉	B1	145	5	28' - 0"	1A
	B2	144	4	34' - 3"	Str.
	B3	144	4	30' - 9"	Str.
∉	B10	145	5	37' - 2"	1A
	B15	6	5	9' - 6"	19B
	B16	2	4	57' - 0"	Str.
✳	B17	4	4	5' - 8"	Str.
	B18	6	8	3' - 0"	19B
	B19	6	5	2' - 0"	Str.
	B20	6	6	4' - 0"	17A
	B21	2	4	5' - 9"	19
	B22	2	4	3' - 3"	19B
	C1	118	5	6' - 10"	T1A
	C2	120	5	5' - 3"	S11
	C3	2	5	6' - 8"	T1A
	C4	4	5	5' - 3"	S11
	C5	4	5	6' - 7"	T1
	C6	6	6	8' - 4"	T1
	C7	6	5	6' - 5"	T1
	C8	2	6	8' - 2"	17
	C9	2	5	3' - 5"	17
	D	8	4	33' - 3"	Str.
	D0	8	5	33' - 7"	Str.
	D1	12	4	57' - 0"	Str.
	D2	130	4	28' - 5"	Str.
	D3	130	4	36' - 5"	Str.
	D4	2	4	2' - 6"	19B
	Z1	80	7	4' - 0"	Str.

Bending Details



NOTES-

✳ Bend in field as necessary to fit.

∉ Tip bars as required to maintain top and bottom clear cover.

All dimensions are out to out of bars.

All bars to be stainless steel unless otherwise noted.

ESTIMATED QUANTITIES

	ITEM	UNIT	QUANTITY
☆	Class A45 Low Shrinkage Concrete, Bridge Deck	Cu.Yd.	129.9
	Stainless Reinforcing Steel	Lb.	25206
	36" Minnesota Shape Prestressed Concrete Beam	Ft.	436
	Concrete Penetrating Sealer	Sq.Yd.	427.1

☆ *Includes quantities for Barrier Curbs, Slab, and Haunch . (Average depth of 3" used for Haunch Quantity.) Concrete Quantity for Barrier Curbs is 0.1431 Cu. Yd. per foot and for End blocks is 0.8912 Cu.Yd. each.*

SUPERSTRUCTURE DETAILS (B)

FOR

64' - 0" PRESTRESSED GIRDER BRIDGE

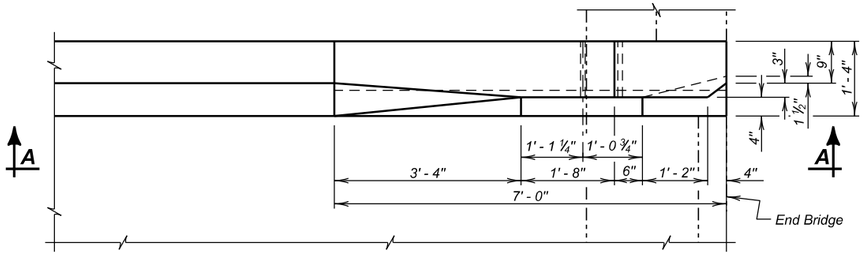
43' - 0" ROADWAY, 1 - 10' - 0" SIDEWALK, & 1 - 5' - 0" SIDEWALK OVER RCP & E R.R.
STA. 508 + 00.61 TO STA. 508+ 64.61
STR. NO. 47-099-564

0° SKEW
SEC. 15-T3N-R6E
IM-CR-EM 0901(187)44
HL-93

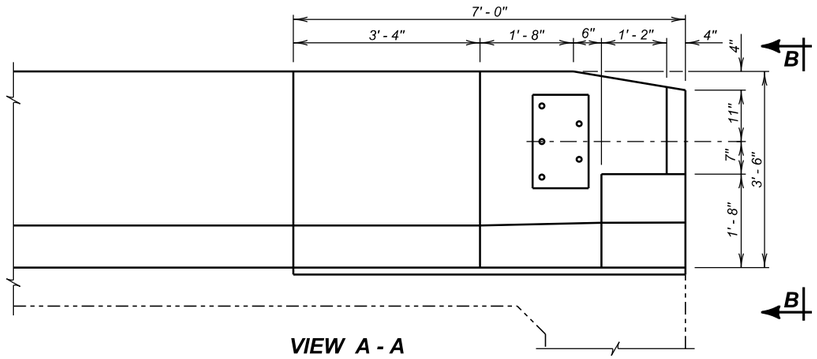
MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
JUNE 2022

DESIGNED BY	CK. DES. BY	DRAFTED BY	
PW	AU	MG	Steve A Johnson BRIDGE ENGINEER
MEAD0A9K	0A9KTF10		

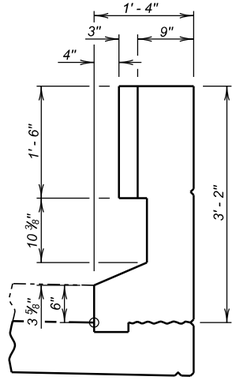
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E97	E185



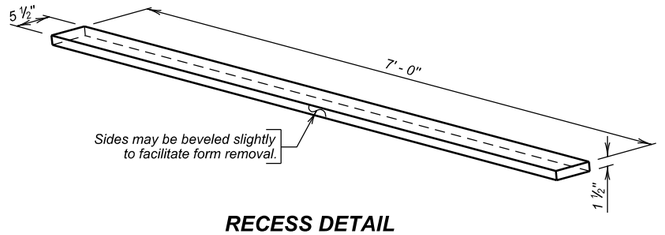
PART PLAN



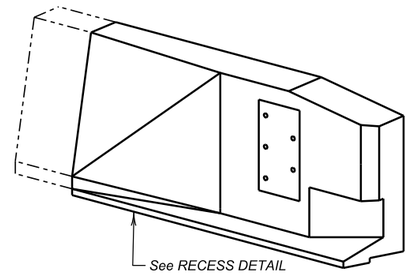
VIEW A - A



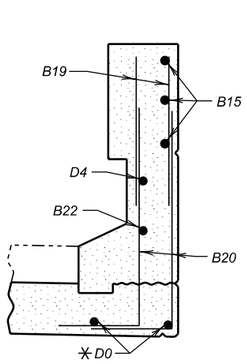
VIEW B - B



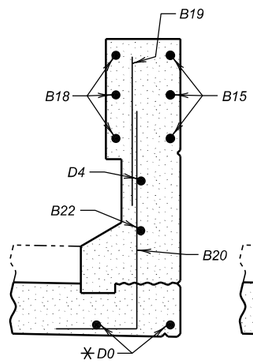
RECESS DETAIL



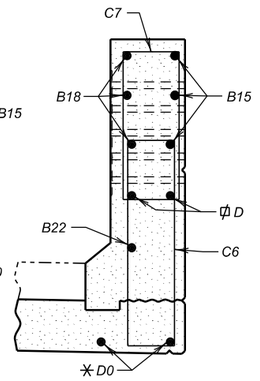
ISOMETRIC VIEW



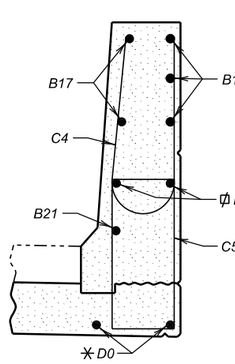
SECTION C - C



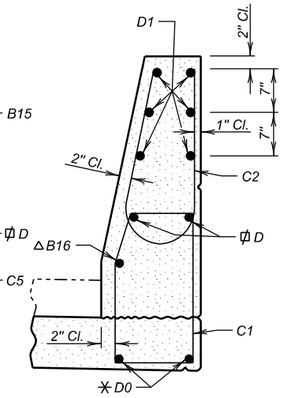
SECTION D - D



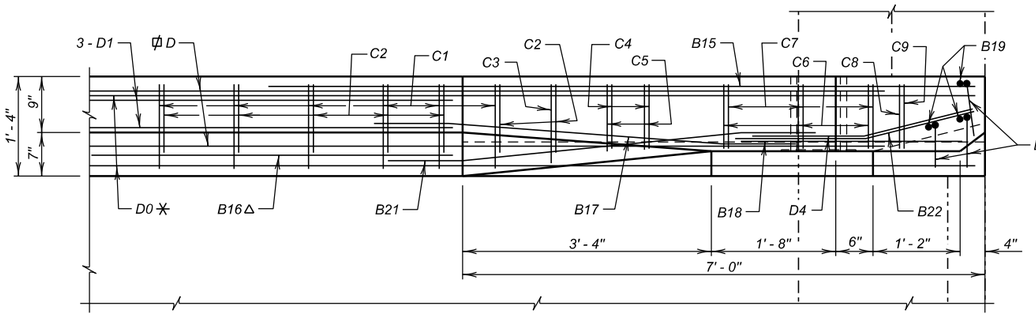
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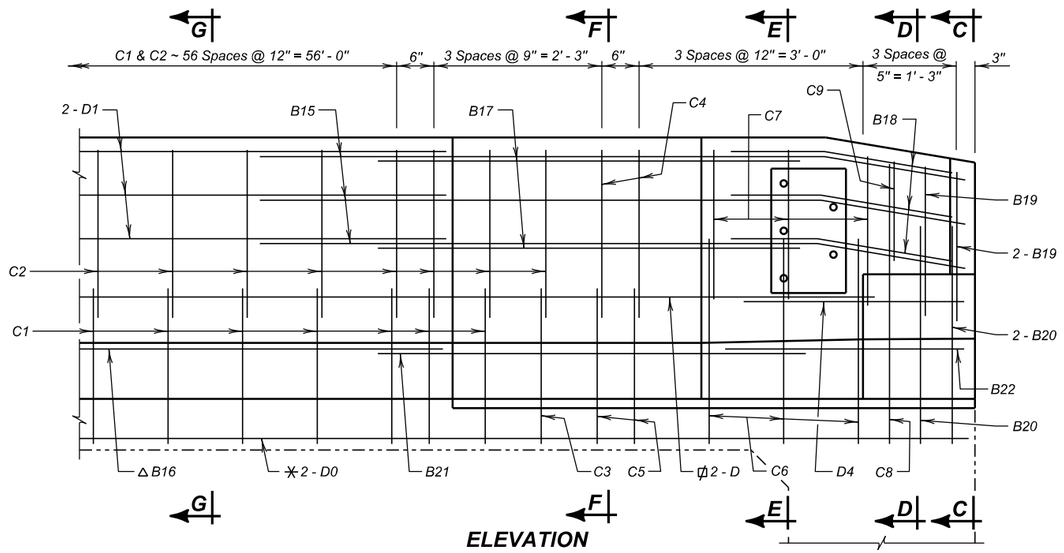
SECTION F - F



SECTION G - G

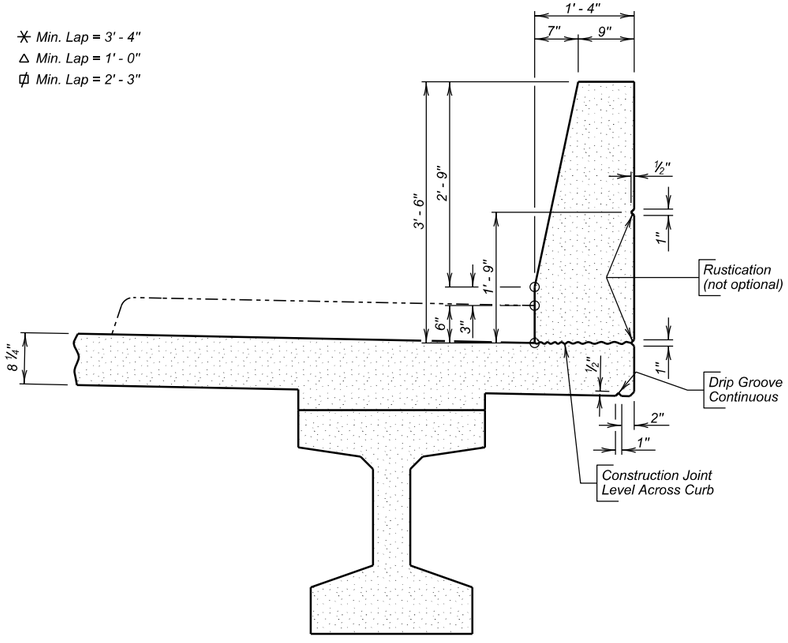


PLAN



ELEVATION

Min. Lap = 3' - 4"
Min. Lap = 1' - 0"
Min. Lap = 2' - 3"



BARRIER DETAILS

ENDBLOCK AND BARRIER CURB DETAILS

FOR

64' - 0" PRESTRESSED GIRDER BRIDGE

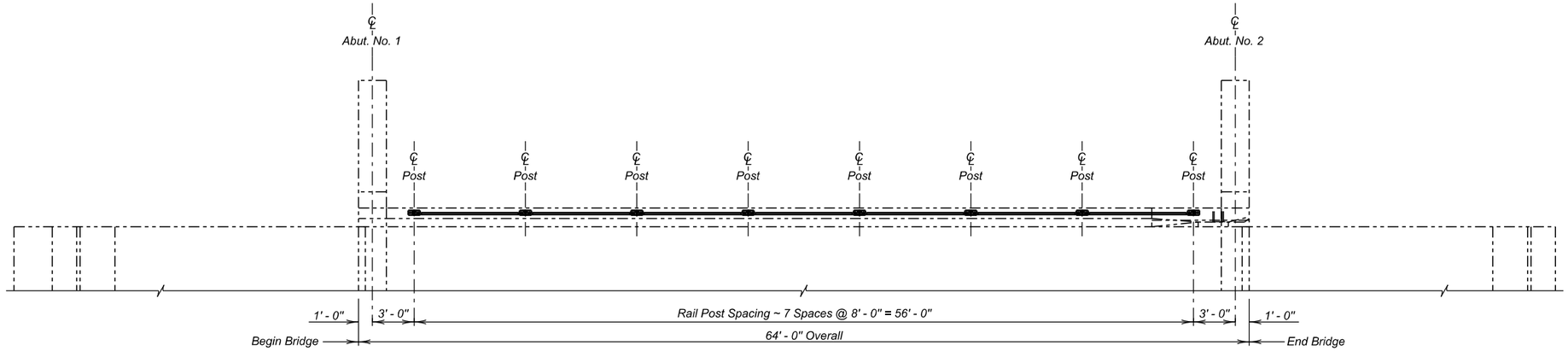
43' - 0" ROADWAY, 1 - 10' - 0" SIDEWALK, & 1 - 5' - 0" SIDEWALK
OVER RCP & E R.R.
STA. 508 + 00.61 TO
STA. 508+ 64.61
STR. NO. 47-099-564

0° SKEW
SEC. 15-T3N-R6E
IM-CR-EM 0901(187)44
HL-93

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
JUNE 2022

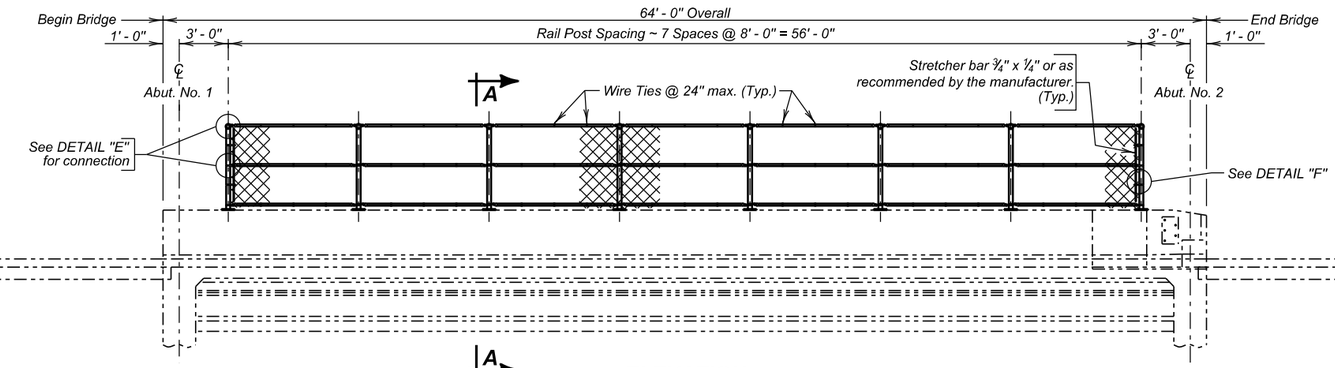
DESIGNED BY	CK. DES. BY	DRAFTED BY	
PW	AU	MG	Steve A Johnson BRIDGE ENGINEER
MEAD0A9K	0A9KTF11		

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E98	E185

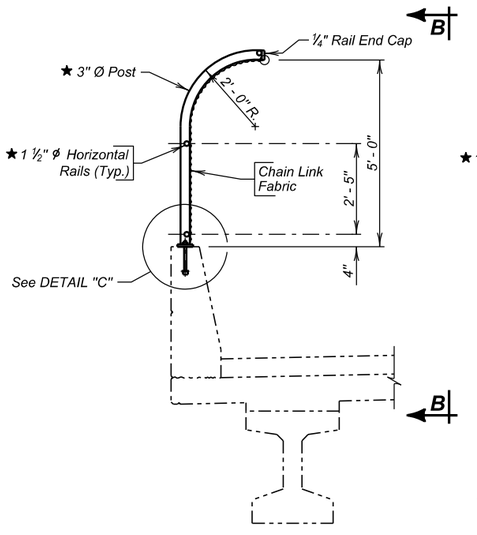


PLAN
(Left side shown, Right side similar opposite hand)

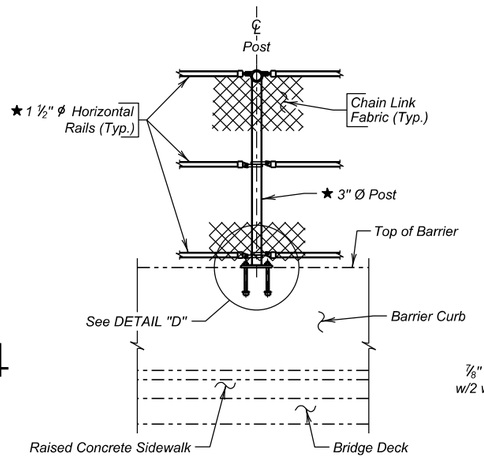
★ NOTE:
Diameter of pipe shown is the nominal diameter. All pipe will be standard weight (schedule 40) pipe.



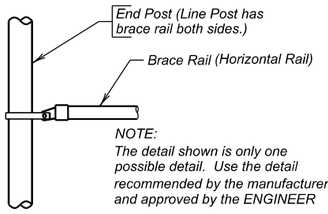
ELEVATION
(Left side shown, Right side similar opposite hand)



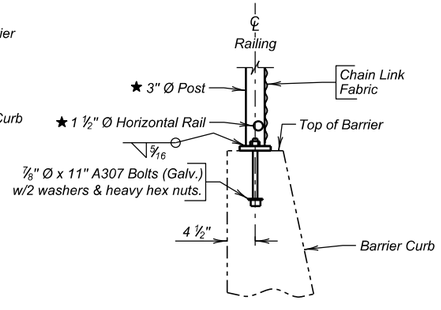
SECTION A - A



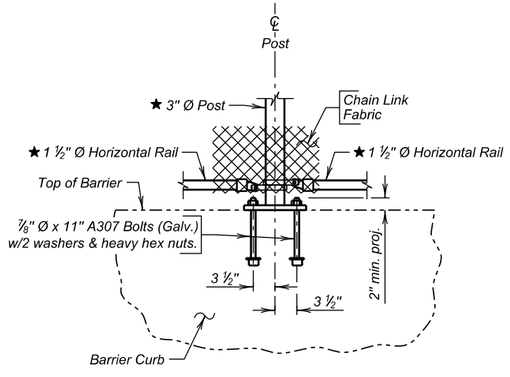
VIEW B - B



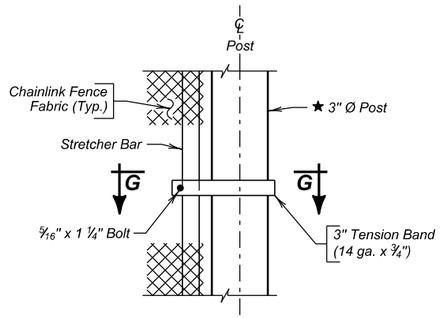
DETAIL "E"



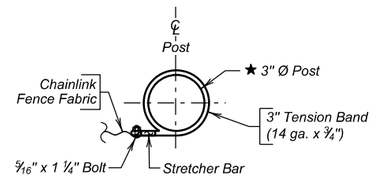
DETAIL "C"



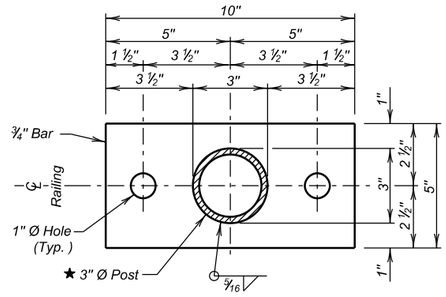
DETAIL "D"



DETAIL "F"



SECTION G - G



BASE PLATE DETAILS

ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
Steel Pedestrian Railing on Sidewalk	Ft.	112.0

BARRIER CURB RAILING WITH CHAINLINK FENCE DETAILS

FOR

64' - 0" PRESTRESSED GIRDER BRIDGE

43' - 0" ROADWAY, 1 - 10' - 0" SIDEWALK, & 1 - 5' - 0" SIDEWALK
OVER RCP & E R.R.
STA. 508 + 00.61 TO
STA. 508+ 64.61
STR. NO. 47-099-564

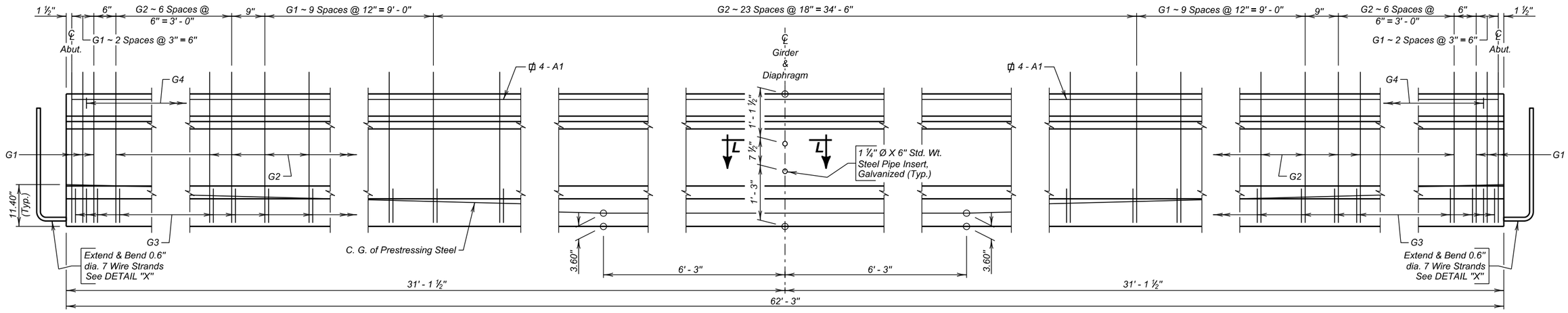
0° SKEW
SEC. 15-T3N-R6E
IM-CR-EM 0901(187)44
HL-93

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
JUNE 2022

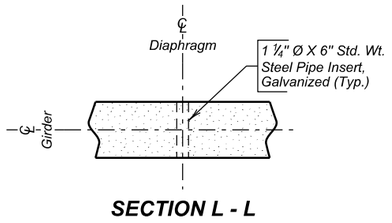
12 OF 28

DESIGNED BY	CK. DES. BY	DRAFTED BY	
PW MEAD0A9K	AU 0A9KTF12	MG	Steve A Johnson BRIDGE ENGINEER

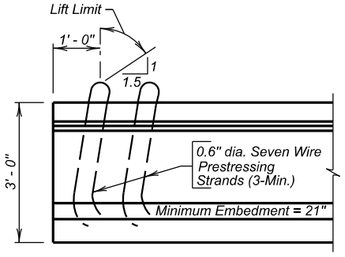
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E99	E185



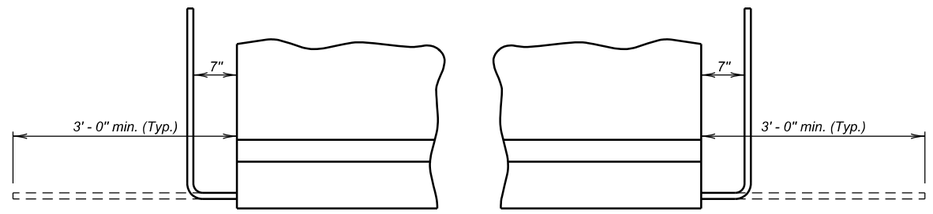
ELEVATION



SECTION L - L



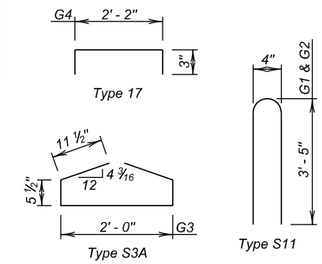
TYPICAL LIFTING DEVICE



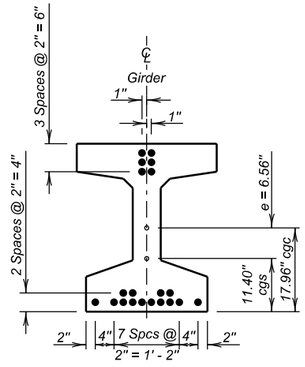
DETAIL "X"

REINFORCING SCHEDULE
(For One Girder)

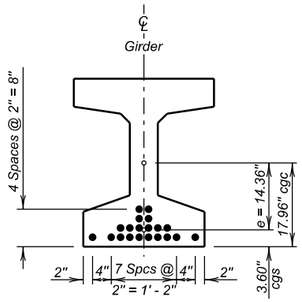
	Mk.	No.	Size	Length	Type	Bending Details
	A1	8	7	32' - 9"	Str.	
△	G1	6	5	7' - 0"	S11	
△	G2	56	4	7' - 0"	S11	
	G3	62	4	4' - 10"	S3A	
	G4	32	4	2' - 8"	17	



△ Bars to be Epoxy Coated.
All dimensions are out to out of bars.

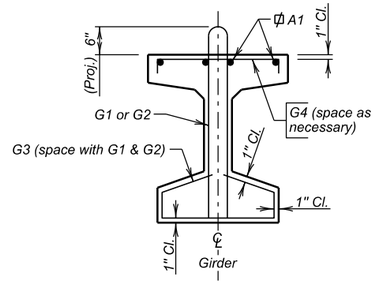


END VIEW

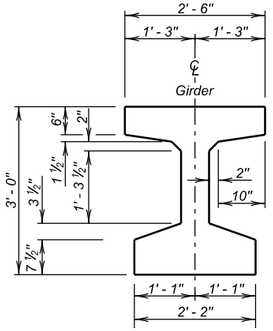


℄ SECTION

ϕ Min. Lap = 3' - 6"



STIRRUP DETAILS



TYPE 36 GIRDER

62' - 3" GIRDERS
(20 ~ 0.6 Dia. Type 270 Low Lax. Strands)

62' - 3" GIRDER DETAILS

FOR

64' - 0" PRESTRESSED GIRDER BRIDGE

43' - 0" ROADWAY, 1 - 10' - 0" SIDEWALK, & 1 - 5' - 0" SIDEWALK OVER RCP & E R.R.
STA. 508 + 00.61 TO STA. 508+ 64.61
STR. NO. 47-099-564

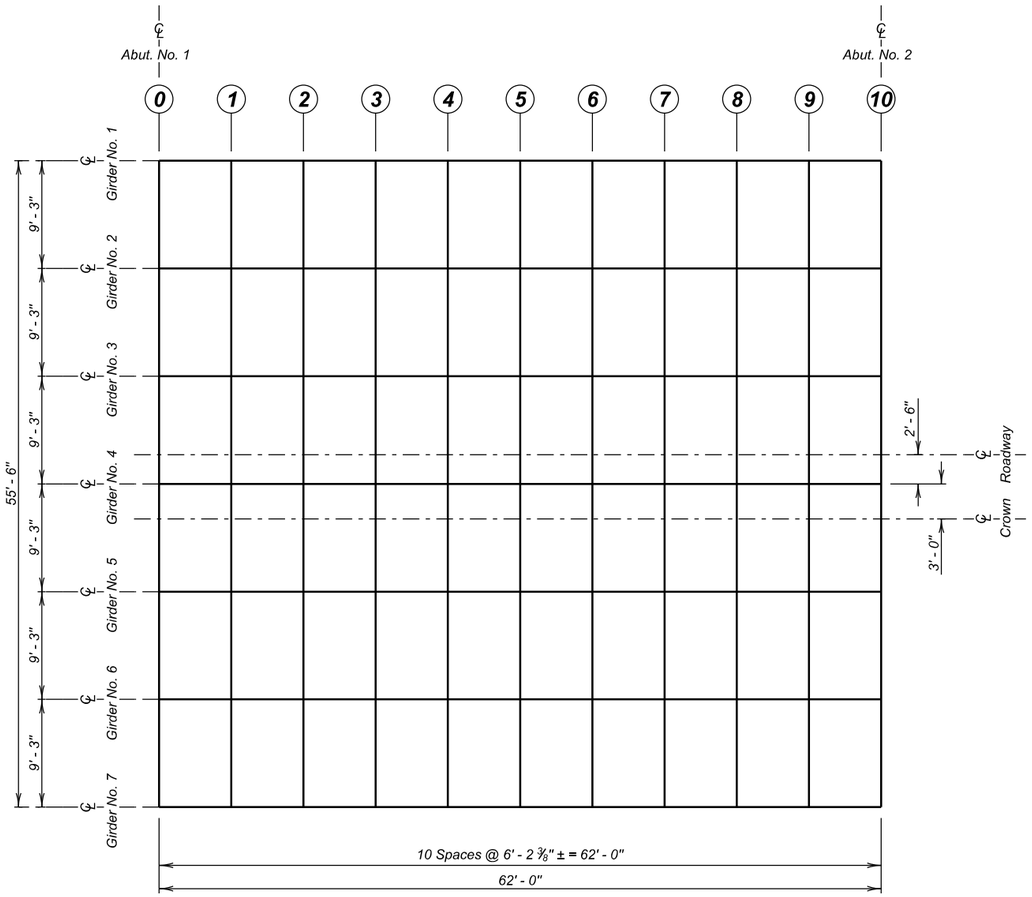
0° SKEW
SEC. 15-T3N-R6E
IM-CR-EM 0901(187)44
HL-93

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
JUNE 2022

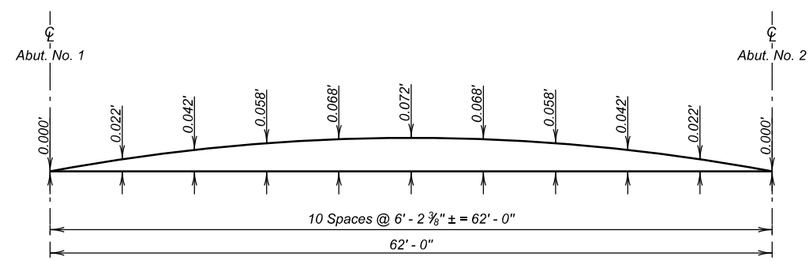
13 OF 28

DESIGNED BY	CK. DES. BY	DRAFTED BY	
PW	AU	MG	Steve A Johnson BRIDGE ENGINEER
MEAD0A9K	0A9KTF13		

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E100	E185



GIRDER LAYOUT



CAMBER DIAGRAM

The Camber shown is the amount which has been added to the theoretical slab elevations to get slab elevations shown in the table of Slab Form Elevations and Calculations. Camber shown is for D. L. of slab, traffic barrier, sidewalks, and haunch, but does not include D. L. of beams.

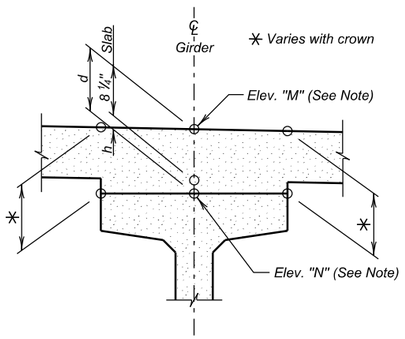


TABLE OF SLAB FORM ELEVATIONS AND CALCULATIONS

		0	1	2	3	4	5	6	7	8	9	10
Girder No. 1	Elev. "M"	3515.574	3515.433	3515.282	3515.117	3514.938	3514.745	3514.536	3514.312	3514.074	3513.823	3513.561
	(-) Elev. "N"											
	(=) d											
	(-) 0.688											
	(=) h											
Girder No. 2	Elev. "M"	3515.759	3515.618	3515.467	3515.302	3515.123	3514.930	3514.721	3514.497	3514.259	3514.008	3513.746
	(-) Elev. "N"											
	(=) d											
	(-) 0.688											
	(=) h											
Girder No. 3	Elev. "M"	3515.944	3515.803	3515.652	3515.487	3515.308	3515.115	3514.906	3514.682	3514.444	3514.193	3513.931
	(-) Elev. "N"											
	(=) d											
	(-) 0.688											
	(=) h											
Girder No. 4	Elev. "M"	3516.129	3515.988	3515.837	3515.672	3515.493	3515.300	3515.091	3514.867	3514.629	3514.378	3514.116
	(-) Elev. "N"											
	(=) d											
	(-) 0.688											
	(=) h											
Girder No. 5	Elev. "M"	3516.114	3515.973	3515.822	3515.657	3515.478	3515.285	3515.076	3514.852	3514.614	3514.363	3514.101
	(-) Elev. "N"											
	(=) d											
	(-) 0.688											
	(=) h											
Girder No. 6	Elev. "M"	3515.929	3515.788	3515.637	3515.472	3515.293	3515.100	3514.891	3514.667	3514.429	3514.178	3513.916
	(-) Elev. "N"											
	(=) d											
	(-) 0.688											
	(=) h											
Girder No. 7	Elev. "M"	3515.744	3515.603	3515.452	3515.287	3515.108	3514.915	3514.706	3514.482	3514.244	3513.993	3513.731
	(-) Elev. "N"											
	(=) d											
	(-) 0.688											
	(=) h											

NOTE –

Based on a "d" of 11 ¼" at the ℄ of each abutment (see SEC. C - C on SUPERSTRUCTURE DETAILS (B), it is anticipated that the midspan haunch dimension "h" over the ℄ of each girder will be 1 ½". If when computing the dimensions in the table, it is found that any dimension "h" is less than zero or greater than 4" the Office of Bridge Design of the South Dakota Dept. of Transportation will be notified immediately. After the "Table of Slab Form Elevations and Calculations" has been completely filled out and approved for deck forming, a copy will be forwarded to the Office of Bridge Design for review and analysis for the purpose of securing information relative to camber growth in the beams. This information is necessary for preparing plans for future structures of this type.

NOTE –

The table contains the information necessary to determine the depth of concrete over the girders at points shown. Calculations may be carried in the spaces provided. Elev. "M" is the design elevation of the top of slab before any concrete has been poured. This elevation includes correction for camber and dead load deflection. Elev. "N" is a field measured elevation taken on top of girders at the points shown with the girders in their positions. This elevation must be taken after erection is completed, but prior to placing any of the concrete. Girders will not be supported between bearings when elevations are taken.

ERECTION DATA AND SLAB FOR ELEVATIONS

FOR

64' - 0" PRESTRESSED GIRDER BRIDGE

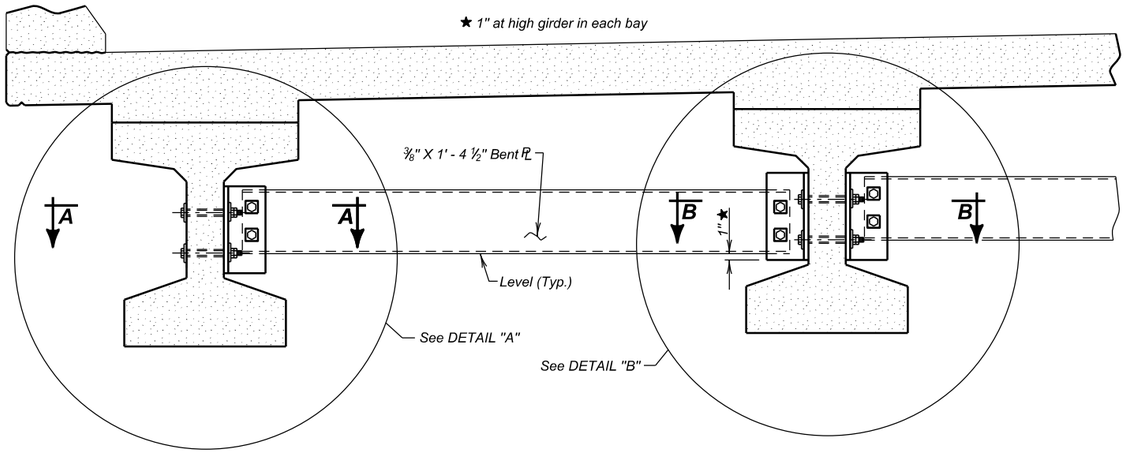
43' - 0" ROADWAY, 1 - 10' - 0" SIDEWALK, & 1 - 5' - 0" SIDEWALK OVER RCP & E R.R.
STA. 508 + 00.61 TO STA. 508+ 64.61
STR. NO. 47-099-564

0° SKEW
SEC. 15-T3N-R6E
IM-CR-EM 0901(187)44
HL-93

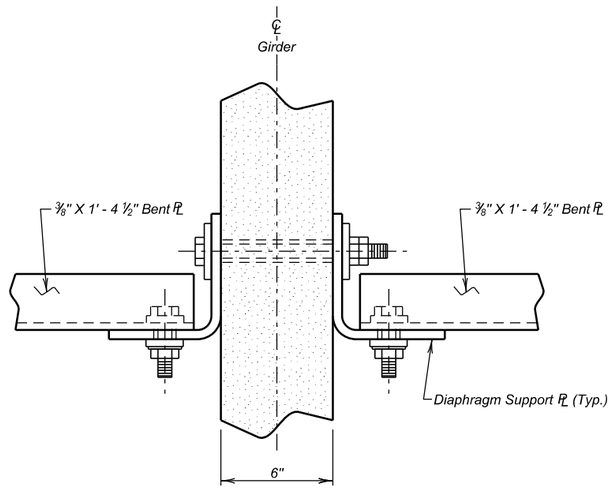
MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
JUNE 2022

DESIGNED BY	CK. DES. BY	DRAFTED BY	
PW	AU	MG	Steve A Johnson BRIDGE ENGINEER
MEAD0A9K	0A9KTF14		

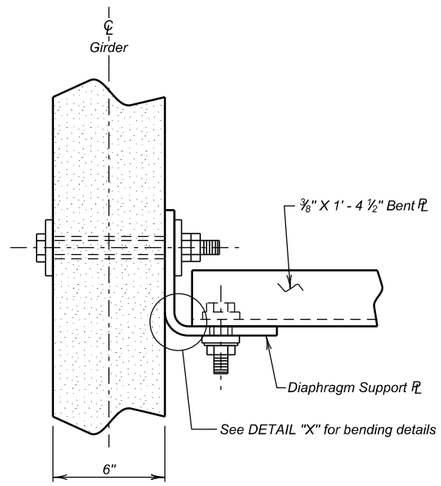
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E101	E185



SECTION AT DIAPHRAGM

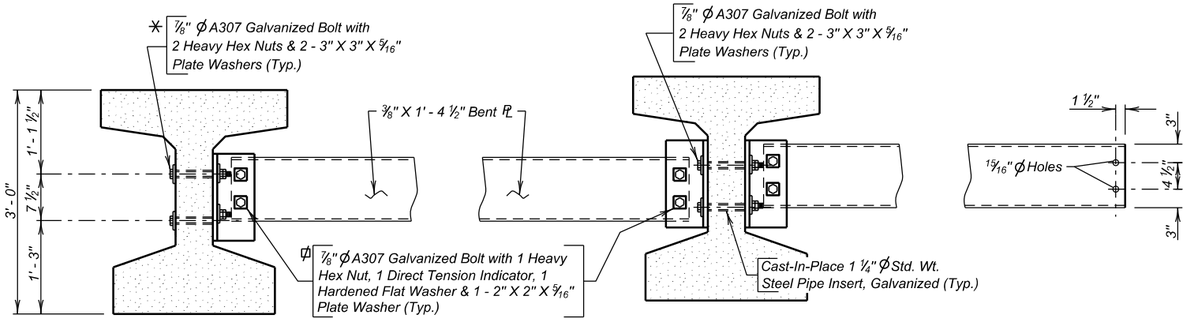


SEC. B - B



SEC. A - A

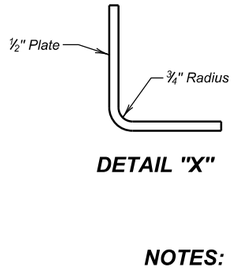
✳ *Bolt head shall be adjacent to the Exterior Face of the Exterior Girder.*



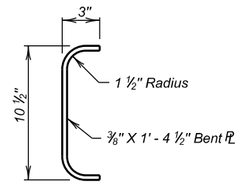
DETAIL "A"
(Typ. Exterior Girder)

⌀ *Bolt Head and Direct Tension Indicator shall be adjacent to 15/16" ∅ holes in Bent Plate Diaphragm.*

DETAIL "B"
(Typ. Interior Girder)



DETAIL "X"



END VIEW BENT PLATE DIAPHRAGM

NOTES:

1. *All steel for the diaphragms including plate washers will conform to ASTM A36 and will be galvanized in accordance with ASTM A123 or A153. Bolts, nuts, and washers will be galvanized in accordance with ASTM F2329. Direct Tension Indicators will conform to Section 410.3. G.5b of the Specifications.*
2. *The steel diaphragms between adjacent girders will be installed as soon as possible and in conjunction with girder erection.*
3. *All costs associated with furnishing, fabricating, assembly and installation of diaphragms will be included in the lump sum price for Structural Steel, Miscellaneous.*

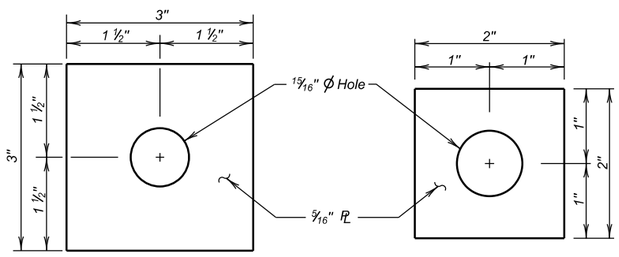
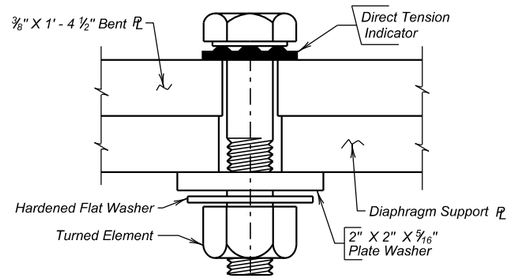
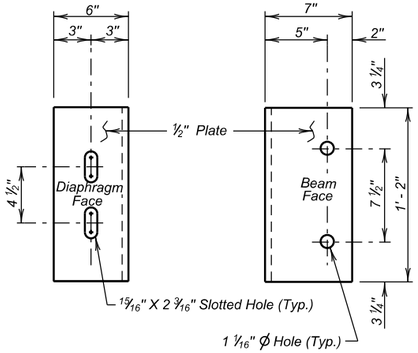


PLATE WASHER DETAILS



DIRECT TENSION INDICATOR DETAIL



DIAPHRAGM SUPPORT PLATE

ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY
△ Structural Steel, Miscellaneous	L.S.	Lump Sum

△ *For informational purposes only, the estimated weight of structural steel is 1398 Lbs. for 6 diaphragms.*

DIAPHRAGM DETAILS

FOR

64' - 0" PRESTRESSED GIRDER BRIDGE

43' - 0" ROADWAY, 1 - 10' - 0" SIDEWALK, & 1 - 5' - 0" SIDEWALK OVER RCP & E R.R.
STA. 508 + 00.61 TO STA. 508+ 64.61
STR. NO. 47-099-564

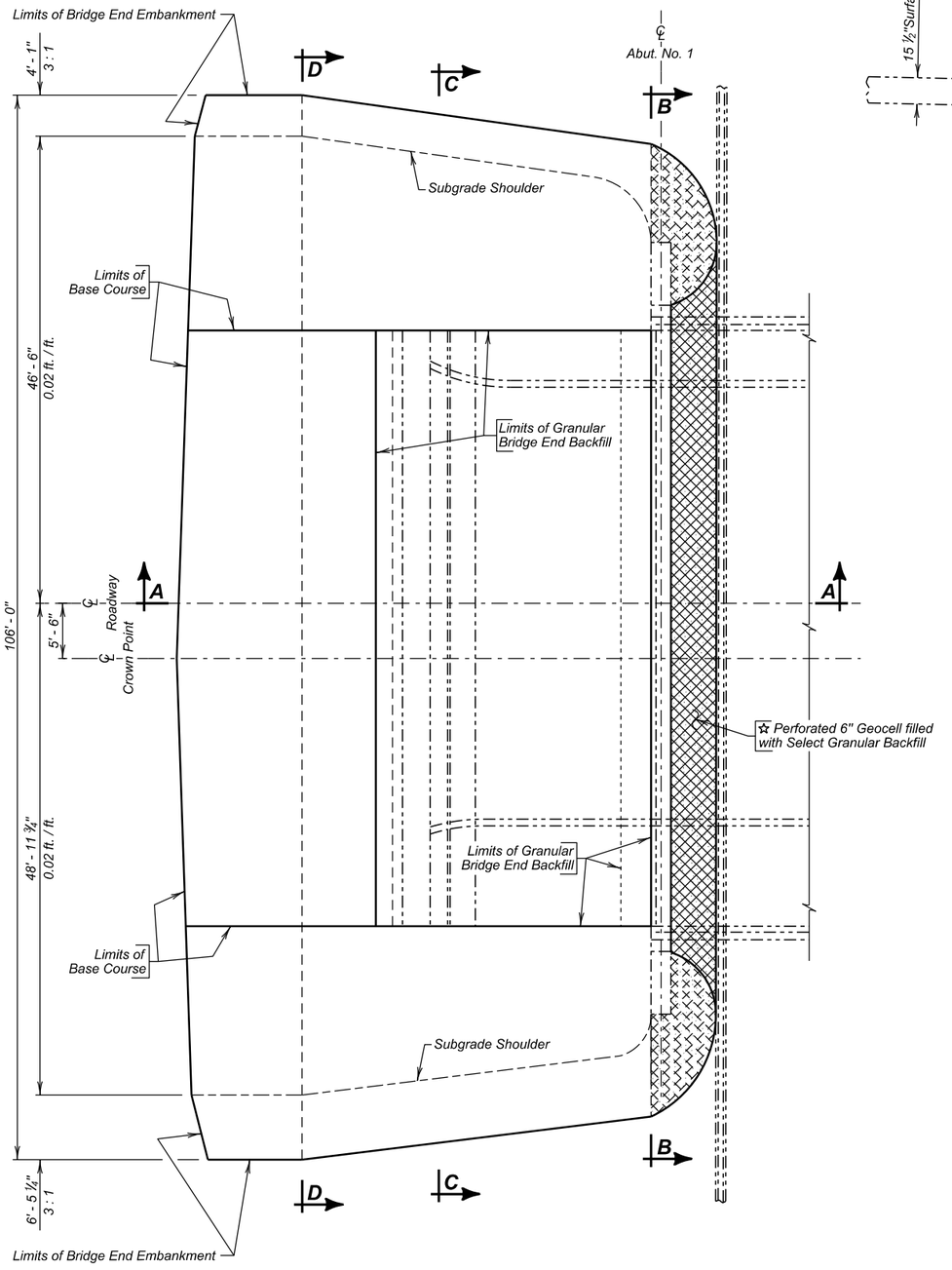
0° SKEW
SEC. 15-T3N-R6E
IM-CR-EM 0901(187)44
HL-93

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
JUNE 2022

15 OF 28

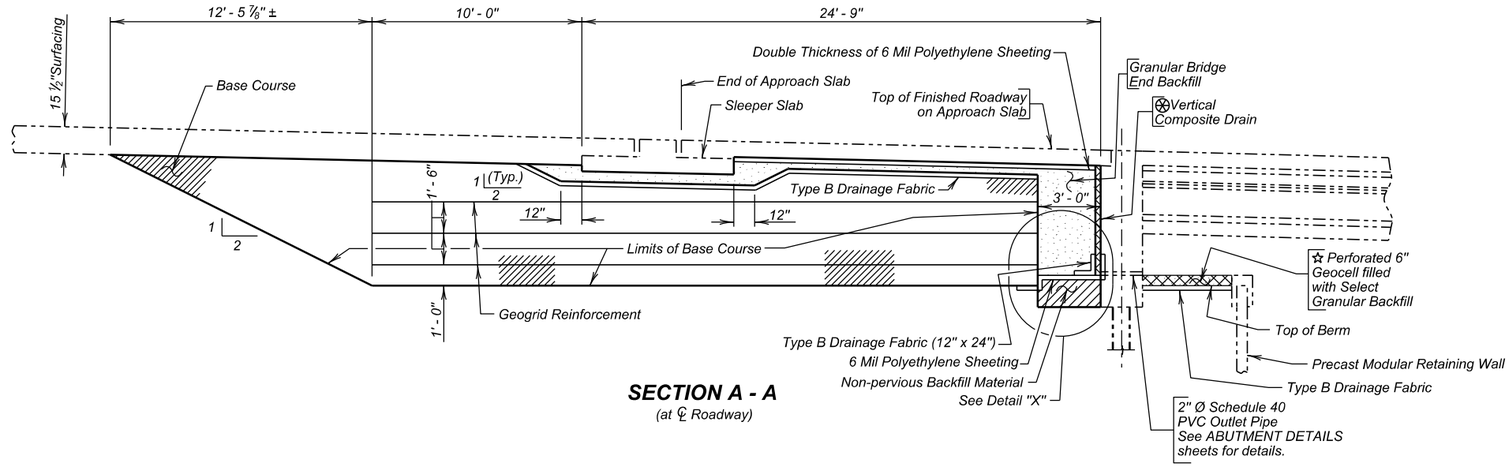
DESIGNED BY	CK. DES. BY	DRAFTED BY	
PW	AU	MG	Steve A Johnson BRIDGE ENGINEER
MEAD0A9K	0A9KTF15		

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E102	E185



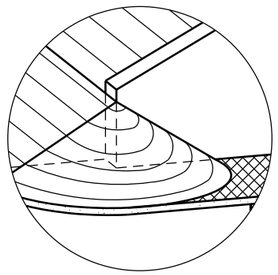
PLAN

(Bridge End Backfill shown adjacent to Abut. No. 1)

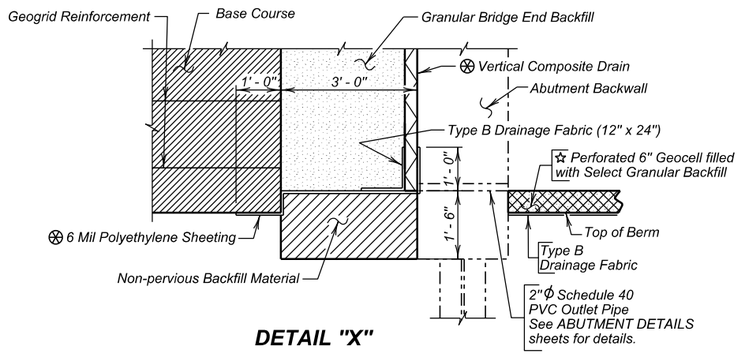


SECTION A - A

(at ℄ Roadway)



SPILL CONE DETAIL AT EMBANKMENT



DETAIL "X"

⊛ *Provide hole in vertical composite drain and 6 mil polyethylene sheeting to provide drainage through weep holes.*

☆ *See PERFORATED GEOCELL notes for payment information.*

ESTIMATED QUANTITIES
(For One Abutment)

	ITEM	UNIT	QUANTITY
	Granular Bridge End Backfill	Cu. Yd.	70.5
⊿	Bridge End Embankment	Cu. Yd.	473
⏢	Select Granular Backfill	Ton	16.2
☆	Perforated Geocell	Sq. Ft.	461
⏢	Base Course	Ton	847.1
	Geogrid Reinforcement	Sq. Yd.	876

1. 317 sq. ft. Vertical Composite Drain.
2. 2373 sq. ft. 6 mil Polyethylene Sheeting, not including laps.
3. 217 sq. yd. Type B Drainage Fabric.

Items 1 thru 3 are approximate quantities contained in the Granular Bridge End Backfill and are for information only.

⊿ *Shrinkage Factor of 1.25 used.*

⏢ *For estimating purposes only, a factor of 1.89 tons/cu. yd. was used to convert cu. yds. to tons.*

DETAILS OF BRIDGE END BACKFILL ADJACENT TO ABUTMENT NO. 1 (A)

FOR

64' - 0" PRESTRESSED GIRDER BRIDGE

43' - 0" ROADWAY, 1 - 10' - 0" SIDEWALK, & 1 - 5' - 0" SIDEWALK OVER RCP & E R.R.
STA. 508 + 00.61 TO STA. 508+ 64.61
STR. NO. 47-099-564

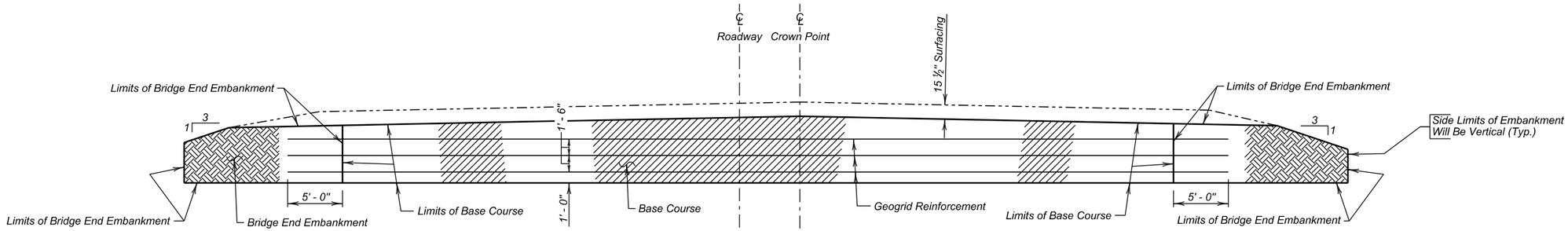
0° SKEW
SEC. 15-T3N-R6E
IM-CR-EM 0901(187)44
HL-93

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
JUNE 2022

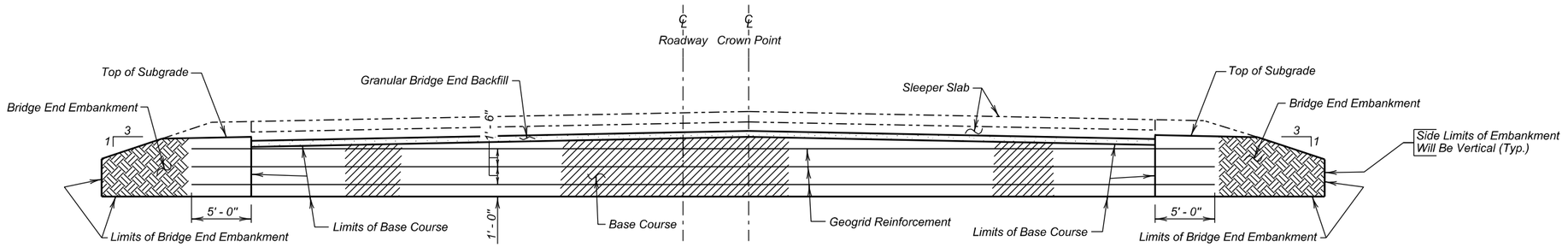
16 OF 28

DESIGNED BY	CK. DES. BY	DRAFTED BY	
PW	AU	MG	Steve A. Johnson BRIDGE ENGINEER
MEAD0A9K	0A9KTF16		

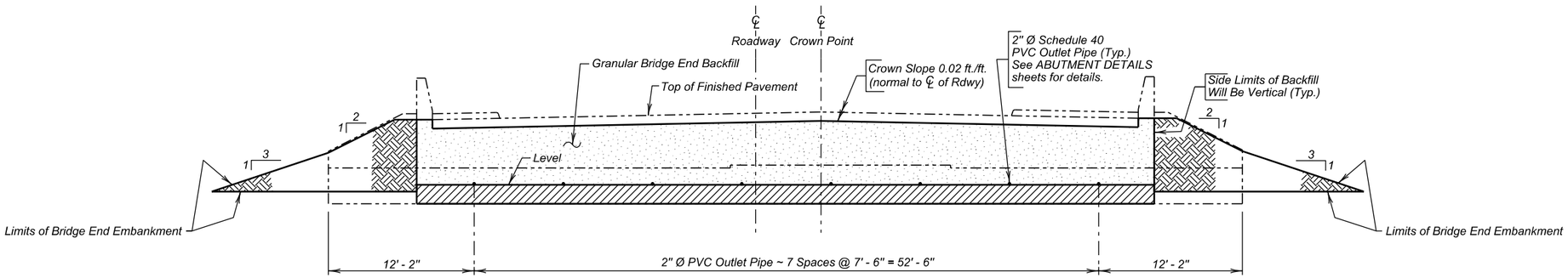
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E103	E185



SECTION D - D



SECTION C - C



SECTION B - B

DETAILS OF BRIDGE END BACKFILL ADJACENT TO ABUTMENT NO. 1 (B)

FOR

64' - 0" PRESTRESSED GIRDER BRIDGE

43' - 0" ROADWAY, 1 - 10' - 0" SIDEWALK, & 1 - 5' - 0" SIDEWALK OVER RCP & E R.R.
STA. 508 + 00.61 TO STA. 508+ 64.61
STR. NO. 47-099-564

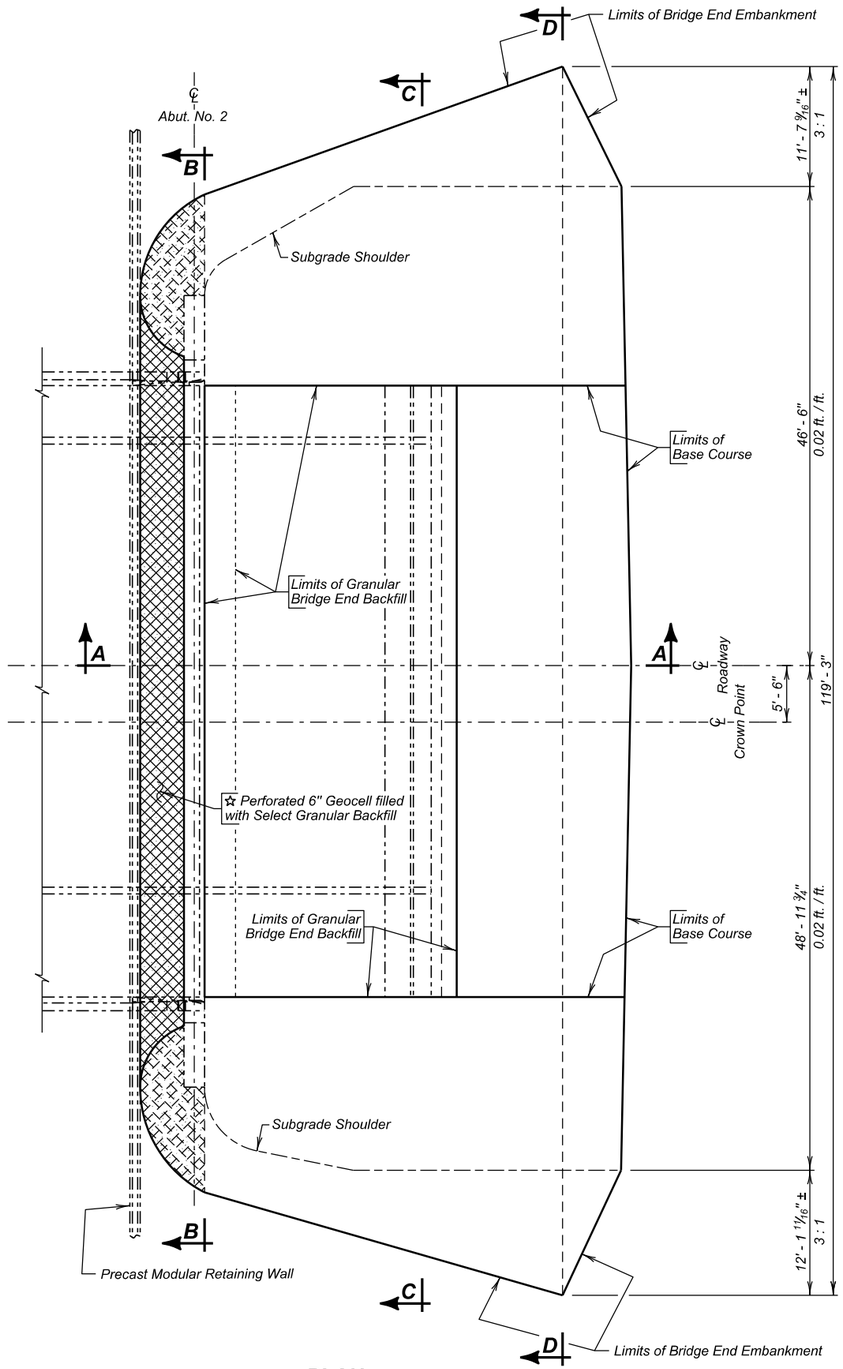
0° SKEW
SEC. 15-T3N-R6E
IM-CR-EM 0901(187)44
HL-93

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
JUNE 2022

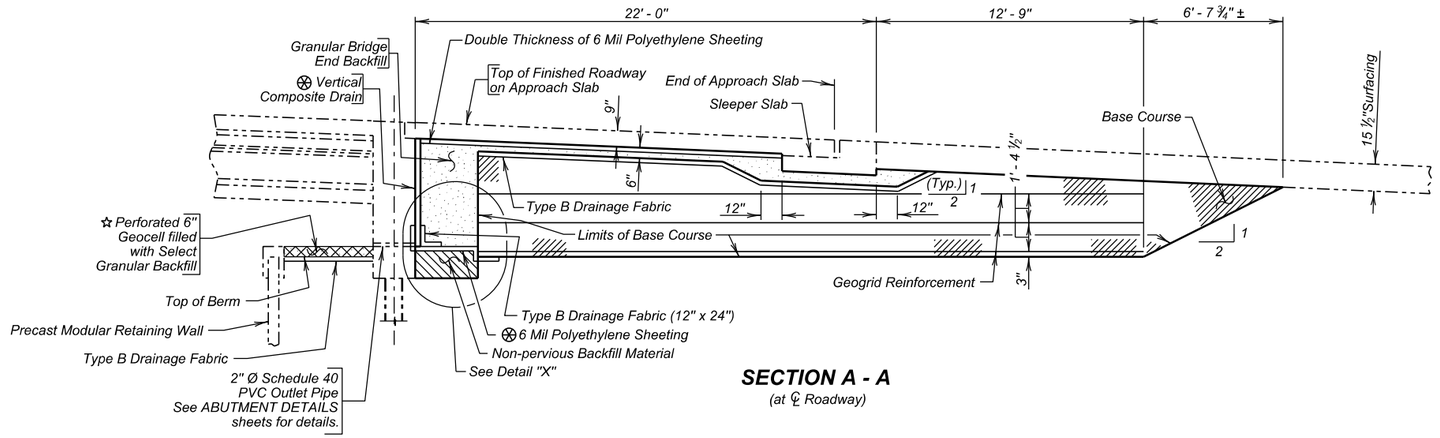
DESIGNED BY	CK. DES. BY	DRAFTED BY	
PW	AU	MG	Steve A Johnson BRIDGE ENGINEER
MEAD0A9K	0A9KTF17		

NOTE:
Perforated Geocell to be installed as shown in PLAN view. The embankment spill cone will spill onto the top of the perforated geocell.

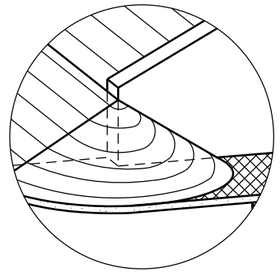
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E104	E185



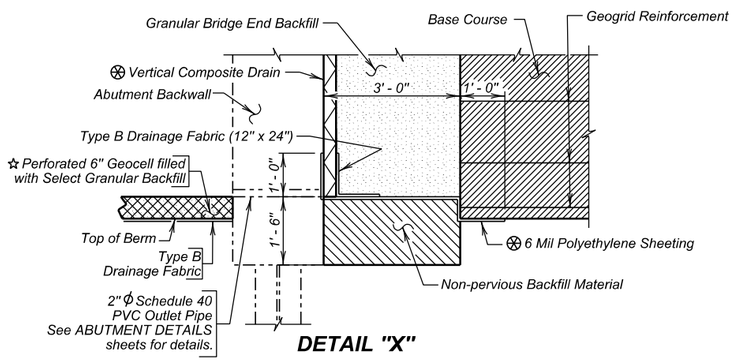
PLAN
(Bridge End Backfill shown adjacent to Abut. No. 2)



SECTION A - A
(at ℄ Roadway)



SPILL CONE DETAIL AT EMBANKMENT



DETAIL "X"

⊛ Provide hole in vertical composite drain and 6 mil polyethylene sheeting to provide drainage through weep holes.

☆ See PERFORATED GEOCELL notes for payment information.

ESTIMATED QUANTITIES
(For One Abutment)

	ITEM	UNIT	QUANTITY
	Granular Bridge End Backfill	Cu. Yd.	69.4
⊿	Bridge End Embankment	Cu. Yd.	260
⊓	Select Granular Backfill	Ton	16.2
☆	Perforated Geocell	Sq. Ft.	461
⊓	Base course	Ton	638.3
	Geogrid Reinforcement	Sq. Yd.	876

1. 317 sq. ft. Vertical Composite Drain.
2. 2373 sq. ft. 6 mil Polyethylene Sheeting, not including laps.
3. 215 sq. yd. Type B Drainage Fabric.

Items 1 thru 3 are approximate quantities contained in the Granular Bridge End Backfill and are for information only.

⊿ Shrinkage Factor of 1.25 used.

⊓ For estimating purposes only, a factor of 1.89 tons/cu. yd. was used to convert cu. yds. to tons.

DETAILS OF BRIDGE END BACKFILL ADJACENT TO ABUTMENT NO. 2 (A)

FOR

64' - 0" PRESTRESSED GIRDER BRIDGE

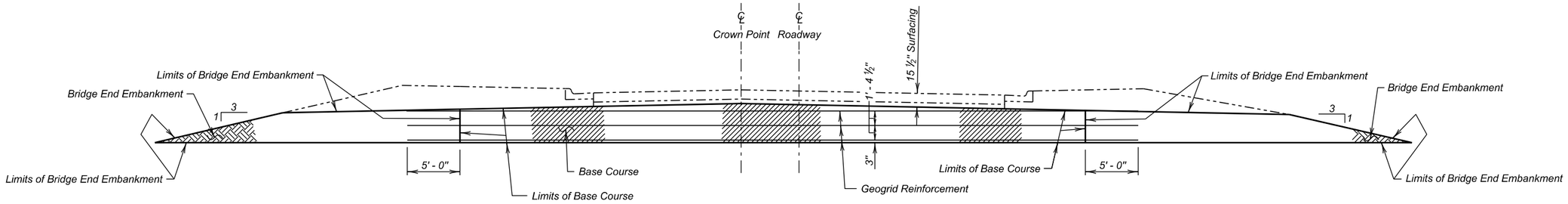
43' - 0" ROADWAY, 1 - 10' - 0" SIDEWALK, & 1 - 5' - 0" SIDEWALK OVER RCP & E R.R.
STA. 508 + 00.61 TO
STA. 508+ 64.61
STR. NO. 47-099-564

0° SKEW
SEC. 15-T3N-R6E
IM-CR-EM 0901(187)44
HL-93

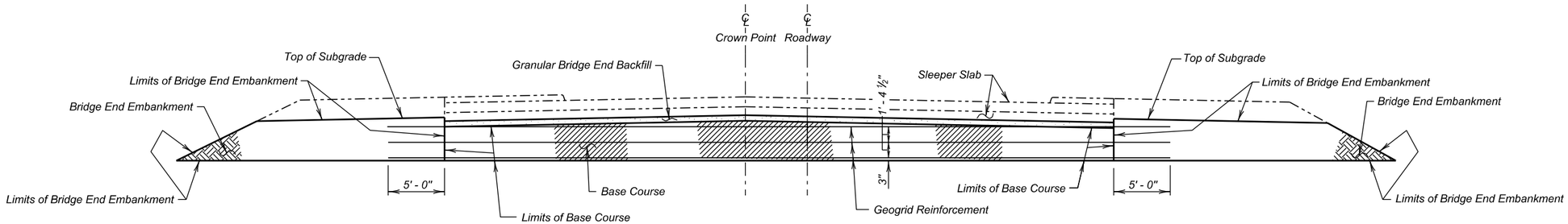
MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
JUNE 2022

DESIGNED BY	CK. DES. BY	DRAFTED BY	
PW	AU	MG	Steve A. Johnson BRIDGE ENGINEER
MEAD0A9K	0A9KTF18		

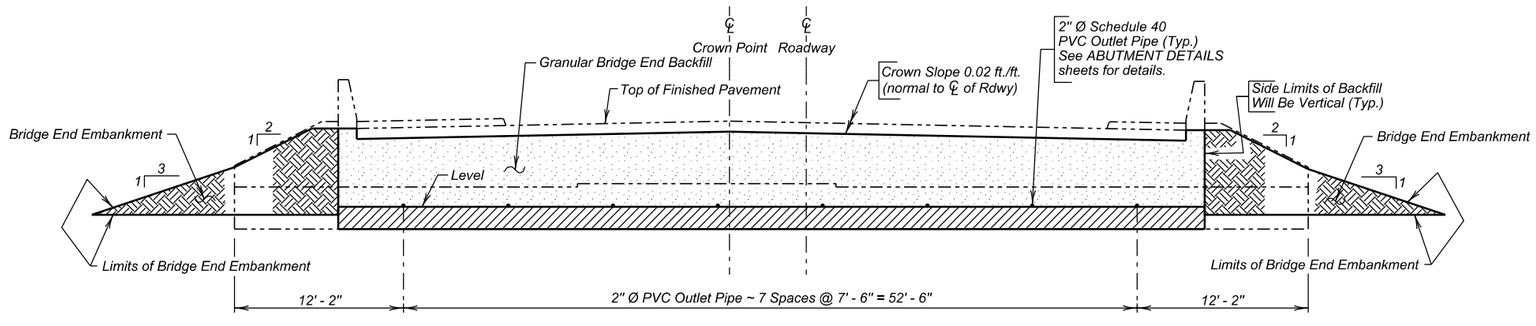
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E105	E185



SECTION D - D



SECTION C - C



SECTION B - B

DETAILS OF BRIDGE END BACKFILL ADJACENT TO ABUTMENT NO. 2 (B)

FOR

64' - 0" PRESTRESSED GIRDER BRIDGE

43' - 0" ROADWAY, 1 - 10' - 0" SIDEWALK, & 1 - 5' - 0" SIDEWALK OVER RCP & E R.R.
STA. 508 + 00.61 TO STA. 508+ 64.61
STR. NO. 47-099-564

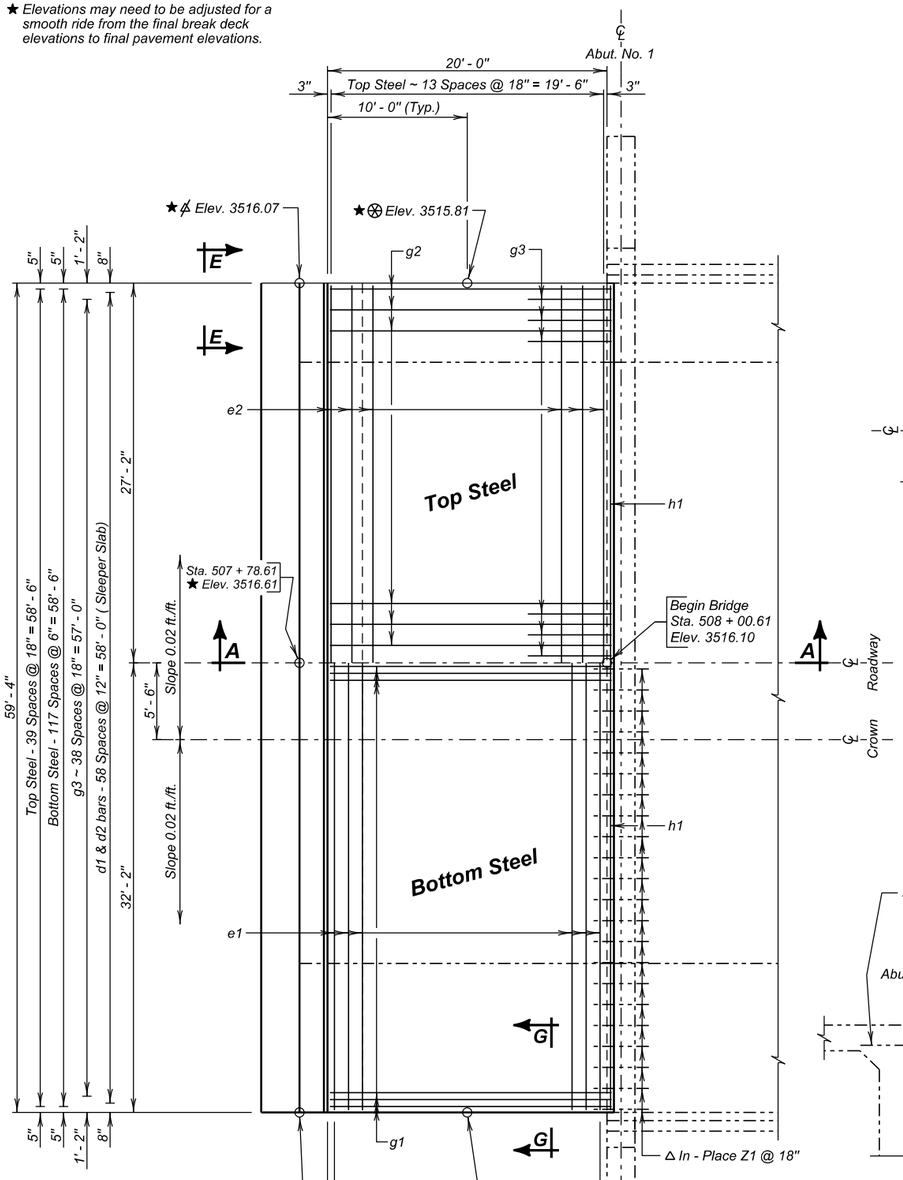
0° SKEW
SEC. 15-T3N-R6E
IM-CR-EM 0901(187)44
HL-93

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
JUNE 2022

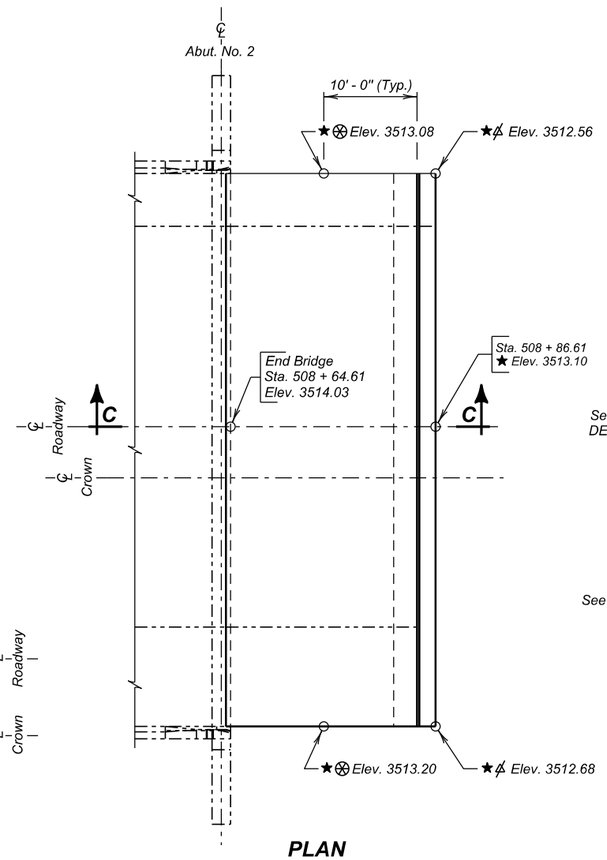
DESIGNED BY	CK. DES. BY	DRAFTED BY	
PW MEAD0A9K	AU 0A9KTF19	MG	Steve A Johnson BRIDGE ENGINEER

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E106	E185

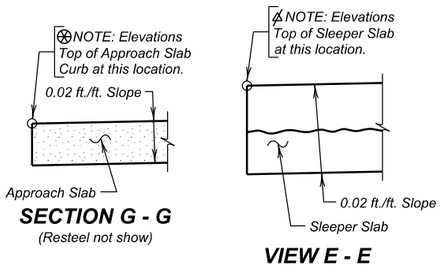
★ *Elevations may need to be adjusted for a smooth ride from the final break deck elevations to final pavement elevations.*



PLAN
(Shown adj. to Abut. No. 1, Abut No. 2 similar opposite hand except as shown.)



PLAN
(Shown adj. to Abut. No. 2)



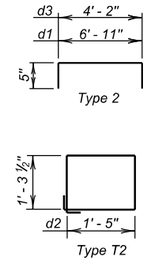
SECTION G - G
(Resteel not show)

VIEW E - E

REINFORCING SCHEDULE
(For Two Approach Slabs & Two Sleeper Slabs)

Mk.	No.	Size	Length	Type
Sleeper Slab (Abutment No. 1)				
c1	24	5	59' - 0"	Str.
d1	118	4	7' - 9"	2
d2	59	4	6' - 2"	T2
Sleeper Slab (Abutment No. 2)				
c1	16	5	59' - 0"	Str.
d2	59	4	6' - 2"	T2
d3	118	4	5' - 0"	2
Approach Slabs				
e1	40	6	59' - 0"	Str.
e2	28	4	59' - 0"	Str.
g1	236	8	20' - 2"	Str.
g2	80	4	20' - 2"	Str.
g3	78	4	6' - 0"	Str.
h1	4	6	59' - 0"	Str.

Bending Details



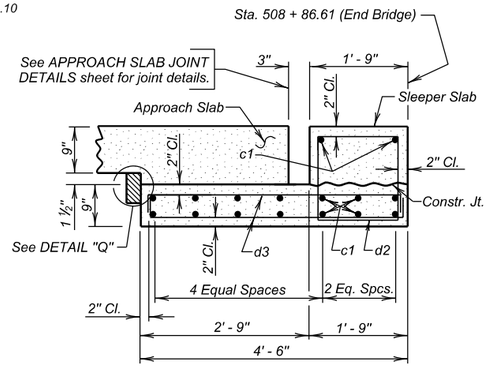
NOTE:
All bars to be epoxy coated.
All dimensions are out to out of bars.

ESTIMATED QUANTITIES
(For Two Approach Slabs and Two Sleeper Slabs)

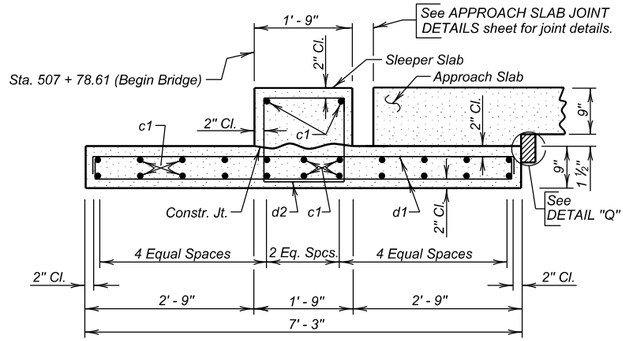
ITEM	UNIT	QUANTITY
Concrete Approach Slab for Bridge	Sq. Yd.	270.3
Concrete Approach Sleeper Slab for Bridge	Sq. Yd.	80.8

1. 68.9 Cu. Yds. Concrete in Approach Slabs.
2. 19101 Lbs. Epoxy Coated Re-Steel in Approach Slabs.
3. 26.9 Cu. Yds. Concrete in Sleeper Slabs.
4. 3999 Lbs. Epoxy Coated Re-Steel in Sleeper Slabs.
5. 35 Sq. Ft. of Polystryrene Insulation Board

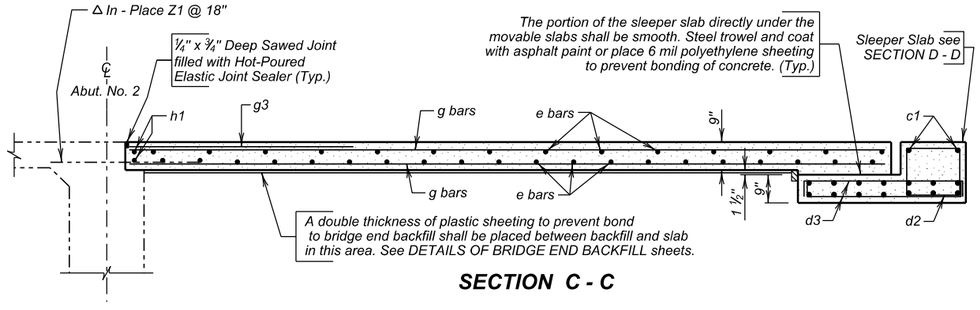
Items 1 thru 5 are approximate quantities contained in the above bid items and are for information only.



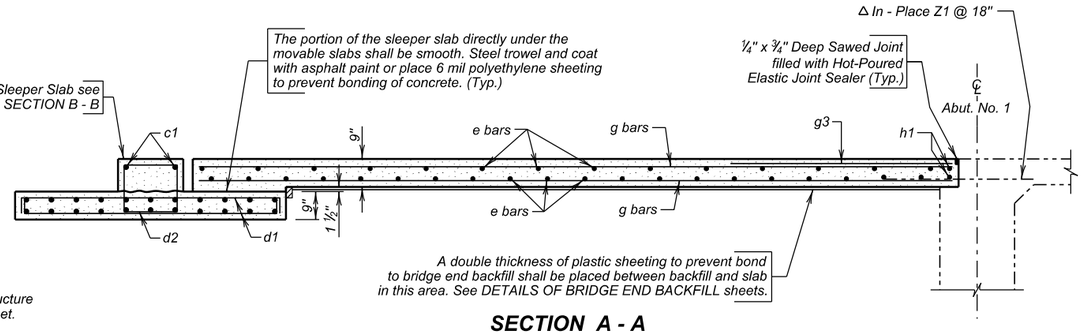
SECTION D - D
(Sleeper Slab)



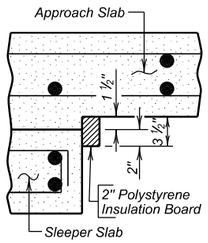
SECTION B - B
(Sleeper Slab)



SECTION C - C



SECTION A - A



DETAIL "Q"

Δ *In-place Z1 bars are listed and included in superstructure quantities. See SUPERSTRUCTURE DETAILS sheet.*

DETAILS OF APPROACH SLAB ADJACENT TO BRIDGE

FOR

64' - 0" PRESTRESSED GIRDER BRIDGE

43' - 0" ROADWAY, 1 - 10' - 0" SIDEWALK, & 1 - 5' - 0" SIDEWALK
OVER RCP & E R.R.
STA. 508 + 00.61 TO STA. 508+ 64.61
STR. NO. 47-099-564

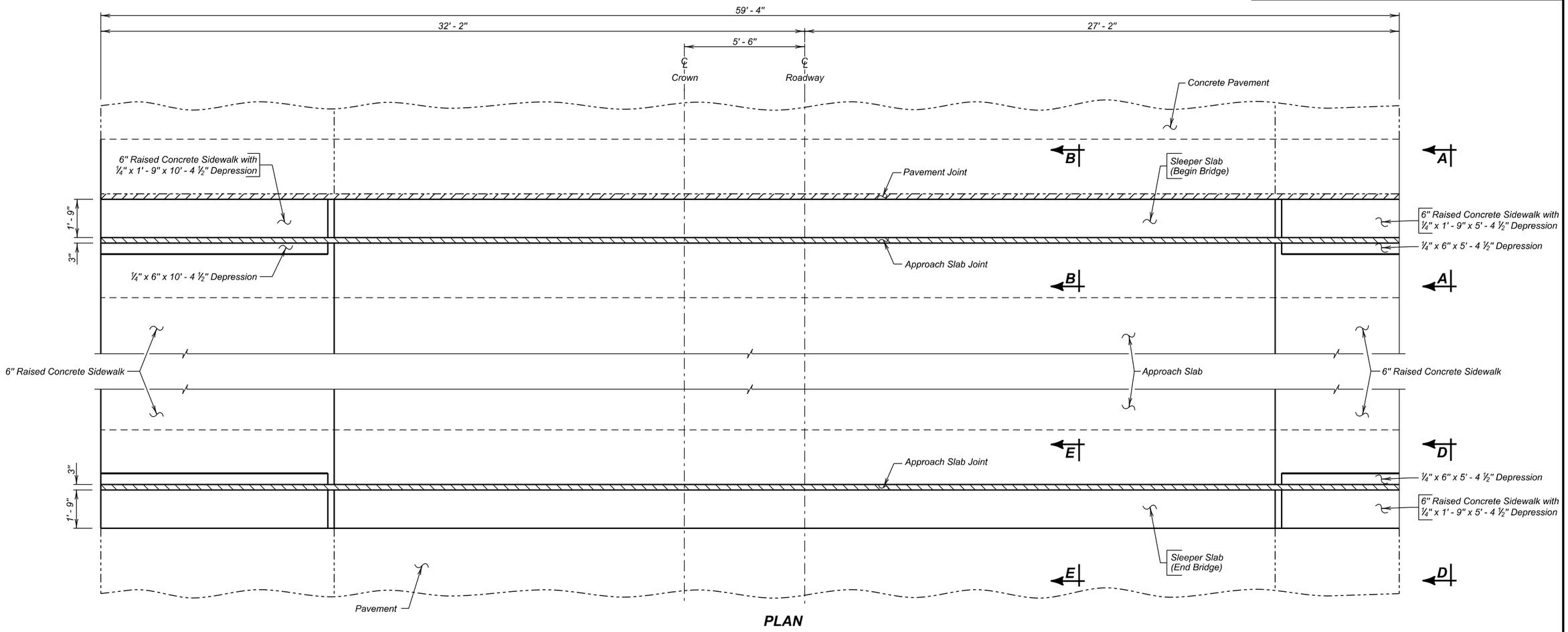
0° SKEW
SEC. 15-T3N-R6E
IM-CR-EM 0901(187)44
HL-93

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
JUNE 2022

20 OF 28

DESIGNED BY	CK. DES. BY	DRAFTED BY	
PW MEAD0A9K	AU 0A9KTF20	MG	Steve A Johnson BRIDGE ENGINEER

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E107	E185



PLAN

GENERAL NOTES

1. The membrane sealant will be on the approved product list for membrane sealant expansion joints.
2. The manufacturer will supply the membrane sealant in packaging that precompresses the membrane sealant. The precompressed dimension will be as recommended by the sealant manufacturer to provide a water tight seal throughout a joint movement range of + 25% (minimum) from the specified joint opening dimension. In no case will the precompressed dimension exceed 75% of the joint opening width. The foam sealant will be slowly self expanding to permit workers ample time to install the membrane sealant before the membrane sealant exceeds the joint opening width.
3. The membrane sealant will be supplied in pieces 5 feet in length or longer. The foam sealant will be ultra-violet and ozone resistant.
4. The bonding adhesive used to attach the membrane sealant to the adjacent concrete will be approved by the membrane sealant manufacturer.
5. Adhesive used to join adjacent pieces of the membrane sealant will be as recommended by the manufacturer.
6. If styrofoam filler material is used in the construction, it will be closed cell and water-tight as approved by the Engineer.
7. The minimum ambient air temperature at the time of joint installation and adhesive curing will be 40° F.
8. A technical representative of the membrane sealant manufacturer will be present at the jobsite during installation. The technical representative will be knowledgeable in the correct procedures for the preparation and installation of the joint material to insure the Contractor installs the joint to the Manufacturers recommendations.

GENERAL NOTES - CONTINUED

9. Concrete surfaces that will be in contact with the membrane sealant will be thoroughly cleaned by abrasive blasting to remove all laitance and contaminants (such as oil, curing compounds, etc.) from the concrete surface. At a minimum two passes of abrasive blasting with the nozzle held at an angle to within 1 to 2 inches of the concrete surface will be required. Cleaning of the concrete surfaces with solvents, wire brushing, or grinding will not be permitted.
10. After abrasive blasting, but immediately prior to membrane joint installation, the entire joint contact surface will be air blasted. The air compressor used for joint cleaning will be equipped with trap devices capable of providing moisture-free and oil-free air at a recommended pressure of 90 psi. To obtain complete bonding with the adhesive, the adjacent concrete surfaces must be dry and clean. The contact surfaces for the joint will be visually inspected by the Engineer immediately prior to joint installation to verify the surface is dry and clean.
11. Individual spliced sections will be installed as per the manufacturers' recommendations. The membrane joint sealant manufacturer will submit a detailed installation procedure to the Engineer at least 5 days prior to joint installation for his review.
12. Traffic will not be allowed on the joint until the bonding adhesive has had time to cure, as recommended by the manufacturer.
13. Use plywood or other material to protect concrete adjacent to the joint from spalling before any equipment is moved across the joint. Any spall areas will be repaired at the Contractor's expense by breaking out and replacing adjacent concrete, as approved by the Engineer.
14. The membrane sealant expansion joint will be measured in feet to the nearest one-tenth foot, complete in place. Measurement will be made of the overall horizontal length. The membrane sealant expansion joint will be paid for at the contract unit price per foot complete in place. Payment for this item will be full compensation for furnishing all the required materials in place, including labor, equipment and incidentals necessary to complete the work in accordance with the plans and the foregoing specifications.

ESTIMATED QUANTITIES

(For Two Approach Slabs)

ITEM	UNIT	QUANTITY
Membrane Sealant Expansion Joint	Ft.	152.0

APPROACH SLAB JOINT DETAILS (A)

FOR

64' - 0" PRESTRESSED GIRDER BRIDGE

43' - 0" ROADWAY, 1 - 10' - 0" SIDEWALK, & 1 - 5' - 0" SIDEWALK — 0° SKEW

OVER RCP & E R.R. — SEC. 15-T3N-R6E

STA. 508 + 00.61 TO STA. 508+ 64.61 — IM-CR-EM 0901(187)44

STR. NO. 47-099-564 — HL-93

MEADE COUNTY

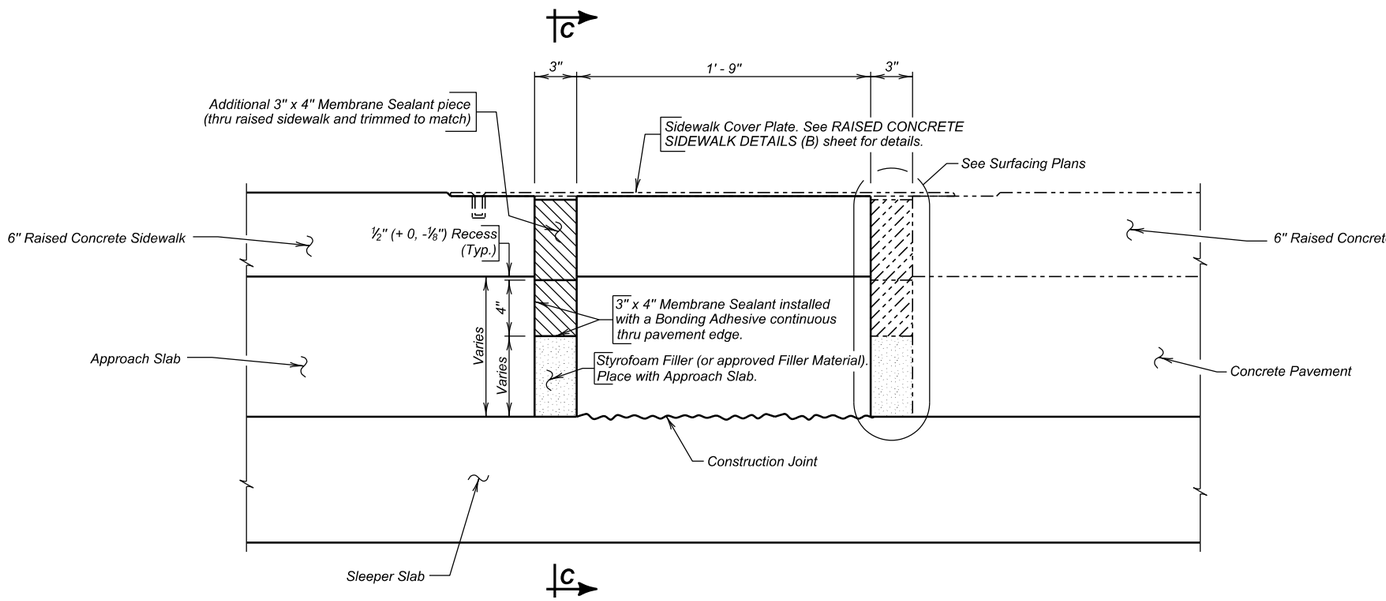
S. D. DEPT. OF TRANSPORTATION

JUNE 2022

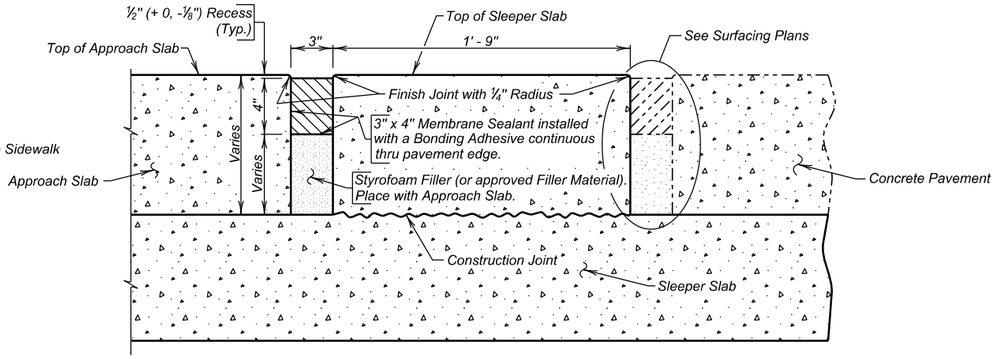
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DESIGNED BY	CK. DES. BY	DRAFTED BY	
PW	AU	MG	Steve A Johnson BRIDGE ENGINEER
MEAD0A9K	0A9KTF21		

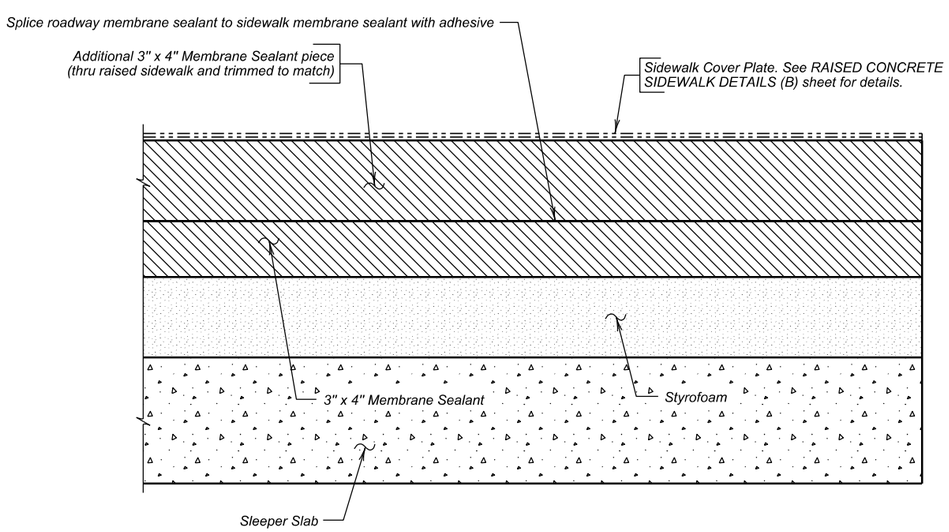
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E108	E185



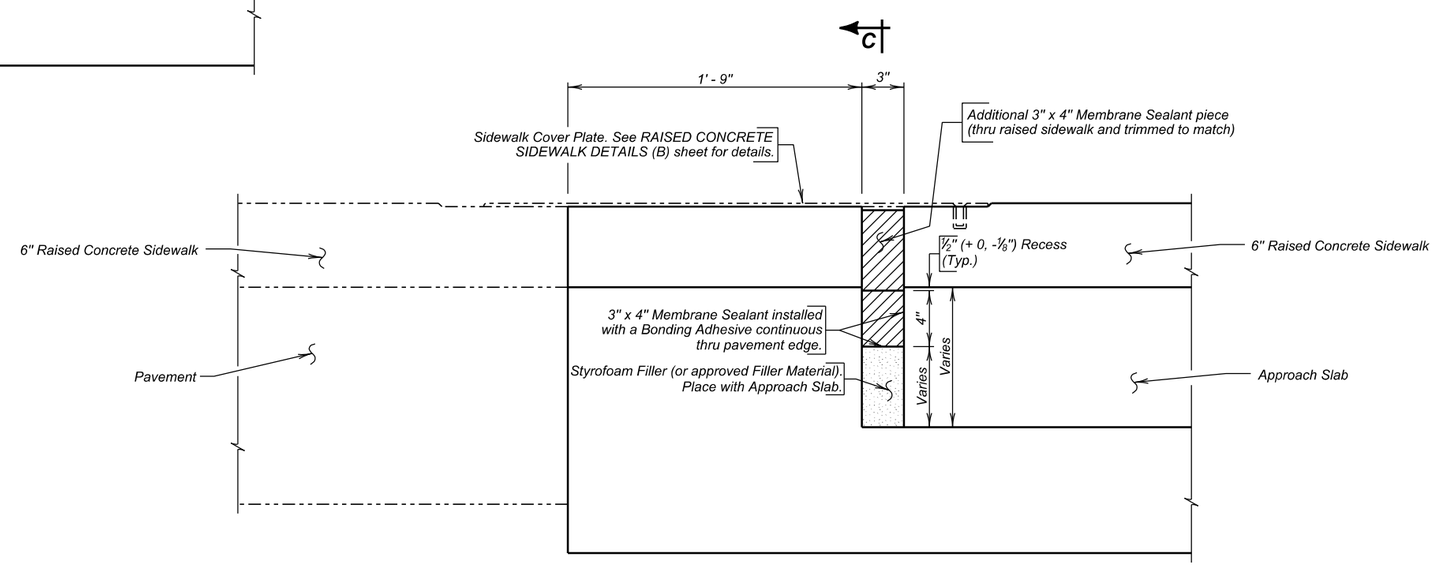
VIEW A - A
(Begin Bridge)



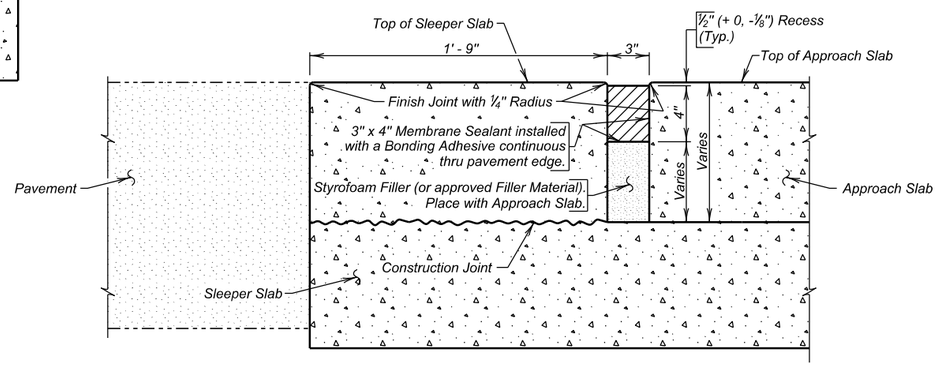
SECTION B - B



SECTION C - C



VIEW D - D
(End Bridge)



SECTION E - E

APPROACH SLAB JOINT DETAILS (B)

FOR

64' - 0" PRESTRESSED GIRDER BRIDGE

43' - 0" ROADWAY, 1 - 10' - 0" SIDEWALK, & 1 - 5' - 0" SIDEWALK OVER RCP & E R.R.
STA. 508 + 00.61 TO STA. 508+ 64.61
STR. NO. 47-099-564

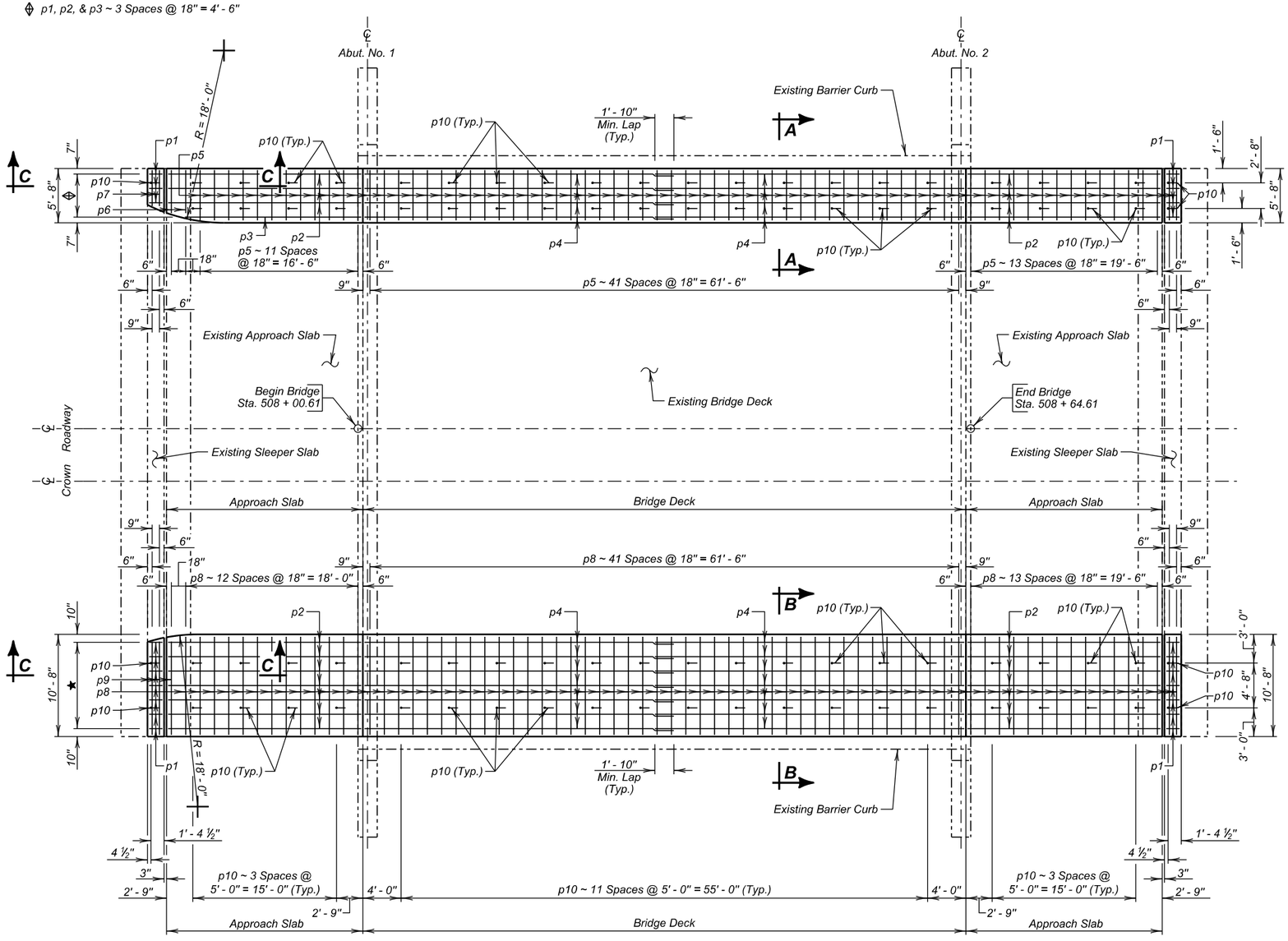
0° SKEW
SEC. 15-T3N-R6E
IM-CR-EM 0901(187)44
HL-93

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
JUNE 2022

22 OF 28

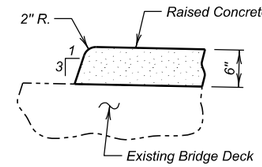
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PW	AU	MG	Steve A Johnson BRIDGE ENGINEER
MEAD0A9K	0A9KTF22		

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E109	E185

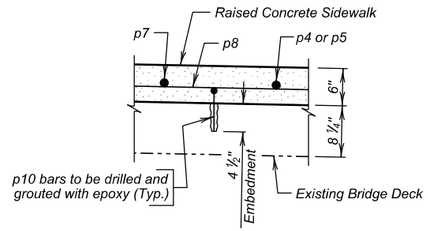


★ p1, p2, & p3 ~ 6 Spaces @ 18" = 9' - 0"

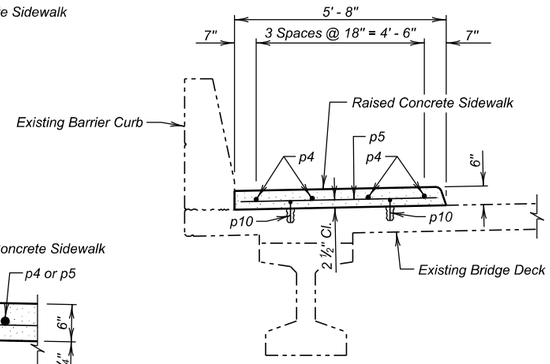
PLAN
(Raised Concrete Sidewalk)



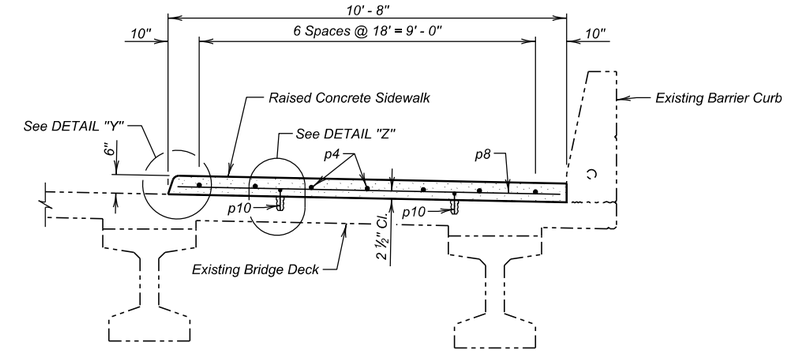
DETAIL "Y"
(Resteel not shown)



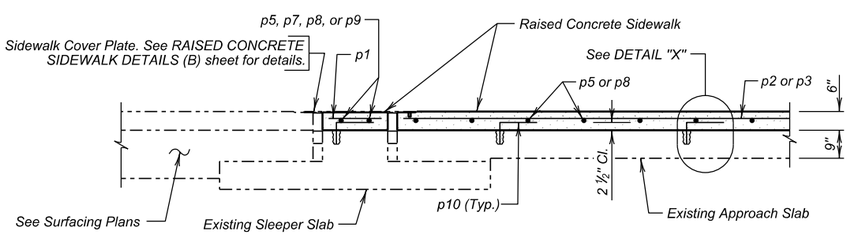
DETAIL "Z"



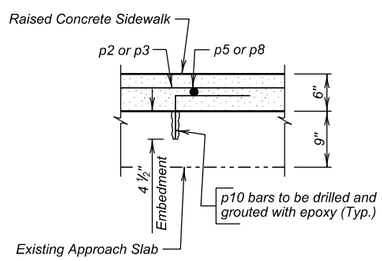
SECTION A - A



SECTION B - B



SECTION C - C



DETAIL "X"

ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY
Class M6 Concrete	Cu. Yd.	32.5
Stainless Reinforcing Steel	Lb.	1554
Install Dowel in Concrete	Each	87

REINFORCING SCHEDULE

Mk.	No.	Size	Length	Type	Bending Details
p1	21	4	1' - 5"	Str.	
p2	21	4	20' - 3"	Str.	
p3	1	4	18' - 5"	Str.	
p4	22	4	32' - 4"	Str.	
p5	70	4	5' - 3"	Str.	
p6	2	4	4' - 6"	Str.	
p7	2	4	3' - 9"	Str.	
p8	71	4	10' - 3"	Str.	
p9	3	4	9' - 9"	Str.	
p10	87	4	1' - 7"	17A	Horizontal Leg 1' - 0" p10

Type 17A

NOTES:
All dimensions are out to out of bars.
All bars to be stainless steel.

RAISED CONCRETE SIDEWALK DETAILS (A)

FOR

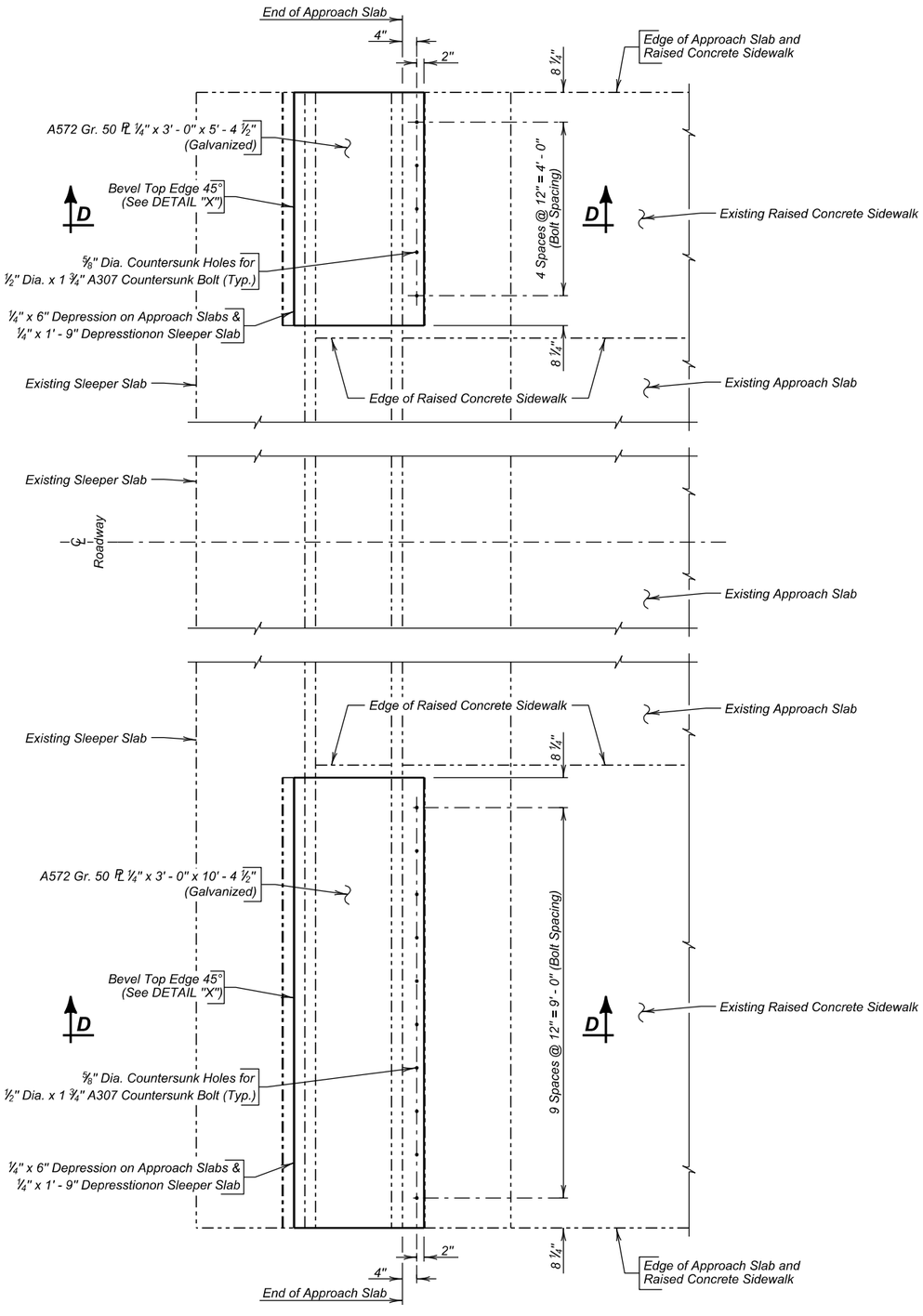
64' - 0" PRESTRESSED GIRDER BRIDGE

43' - 0" ROADWAY, 1 - 10' - 0" SIDEWALK, & 1 - 5' - 0" SIDEWALK — 0° SKEW
OVER RCP & E R.R. — SEC. 15-T3N-R6E
STA. 508 + 00.61 TO — IM-CR-EM 0901(187)44
STA. 508+ 64.61 — HL-93
STR. NO. 47-099-564

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
JUNE 2022

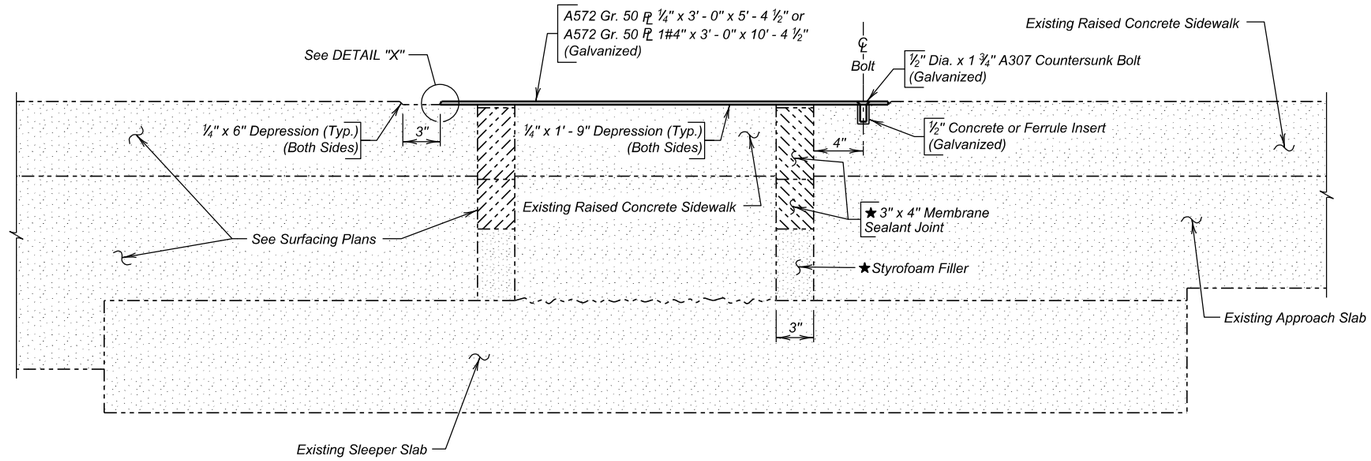
DESIGNED BY	CK. DES. BY	DRAFTED BY	
PW	AU	MG	BRIDGE ENGINEER
MEAD0A9K	0A9KTF23		

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E110	E185



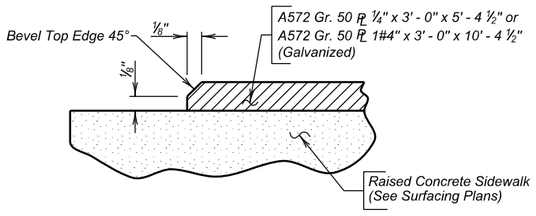
PLAN

(Sidewalk Cover Plates shown adjacent to Abut. No. 1, Abut. 2 simiar opposite hand)



SECTION D - D

★ *See APPROACH SLAB JOINT DETAILS (A) & (B) sheets.*



DETAIL "X"

NOTE -
All costs associated with installing the Sidewalk Cover Plates will be incidental to Class M6 Concrete.

NOTE -
Begin Bridge end shown, End Bridge end similar except L shaped Sleper slab..

RAISED CONCRETE SIDEWALK DETAILS (B)

FOR

64' - 0" PRESTRESSED GIRDER BRIDGE

43' - 0" ROADWAY, 1 - 10' - 0" SIDEWALK, & 1 - 5' - 0" SIDEWALK OVER RCP & E R.R.
STA. 508 + 00.61 TO STA. 508+ 64.61
STR. NO. 47-099-564

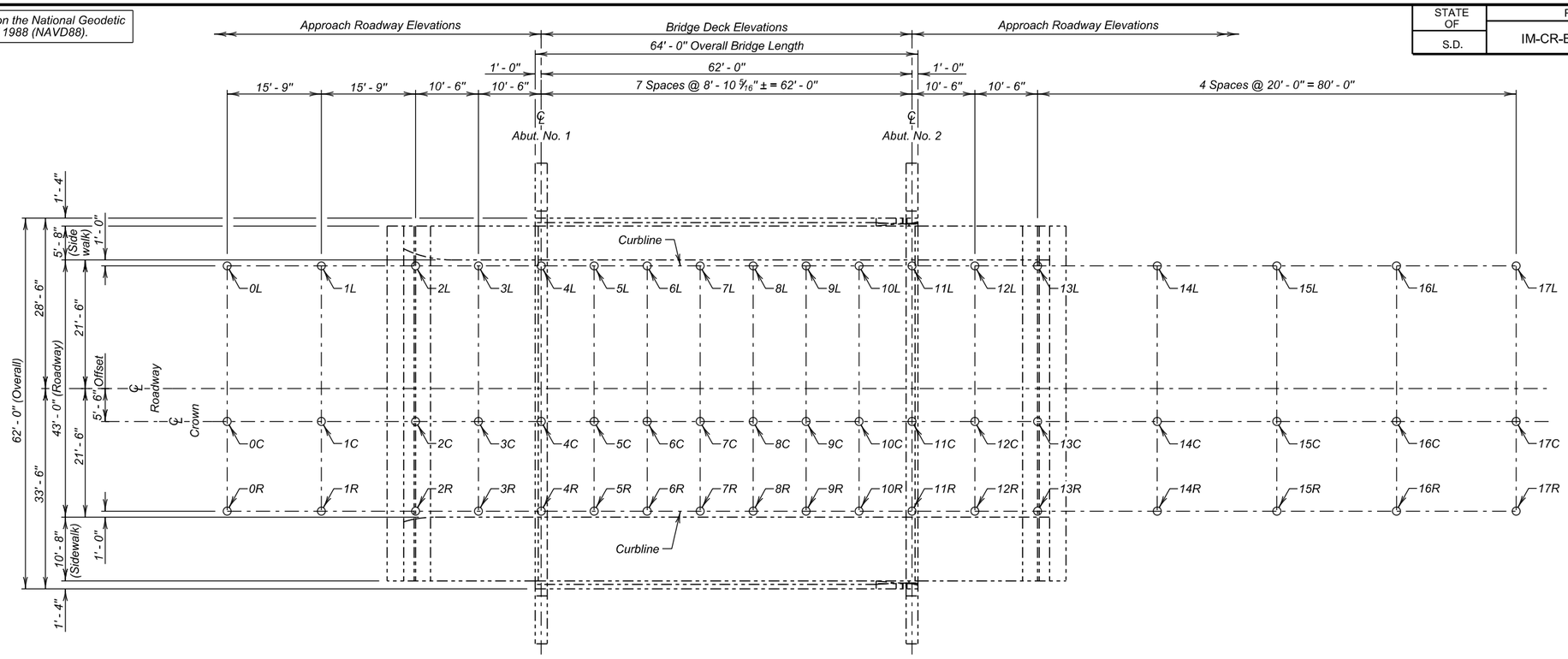
0° SKEW
SEC. 15-T3N-R6E
IM-CR-EM 0901(187)44
HL-93

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
JUNE 2022

DESIGNED BY	CK. DES. BY	DRAFTED BY	
PW MEAD0A9K	AU 0A9KTF24	MG	Steve A Johnson BRIDGE ENGINEER

The elevations shown in these plans are based on the National Geodetic Survey (NGS) North American Vertical Datum of 1988 (NAVD88).

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E111	E185



PLAN

Table of As - Built Elevations - Approach Roadway					
Location	**Elevation**	**Location**	**Elevation**	**Location**	**Elevation**
0L		0C		0R	
1L		1C		1R	
2L		2C		2R	
3L		3C		3R	
12L		12C		12R	
13L		13C		13R	
14L		14C		14R	
15L		15C		15R	
16L		16C		16R	
17L		17C		17R	

Table of As - Built Elevations - Bridge Deck					
Location	**Elevation**	**Location**	**Elevation**	**Location**	**Elevation**
4L		4C		4R	
5L		5C		5R	
6L		6C		6R	
7L		7C		7R	
8L		8C		8R	
9L		9C		9R	
10L		10C		10R	
11L		11C		11R	

Table of Elevations - Bridge Survey Markers		
Location	**Station - Offset**	**Elevation**
Begin Bridge		
End Bridge		

ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
Bridge Elevation Survey	L. S.	Lump Sum

NOTE -
The Contractor will be responsible for producing the As - Built Elevation Survey soon after construction is complete and before the bridge is opened to traffic. The As - Built Elevations of the Bridge will be taken and recorded at the locations shown by the table on this sheet. The completed table will be given to the Engineer who will forward a copy to the Office of Bridge Design and the Region Office.

AS-BUILT ELEVATION SURVEY

FOR

64' - 0" PRESTRESSED GIRDER BRIDGE

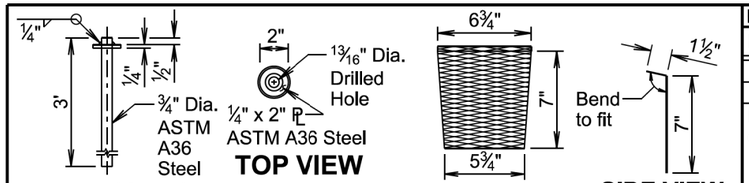
43' - 0" ROADWAY, 1 - 10' - 0" SIDEWALK, & 1 - 5' - 0" SIDEWALK
OVER RCP & E R.R.
STA. 508 + 00.61 TO
STA. 508+ 64.61
STR. NO. 47-099-564

0° SKEW
SEC. 15-T3N-R6E
IM-CR-EM 0901(187)44
HL-93

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
JUNE 2022

DESIGNED BY	CK. DES. BY	DRAFTED BY	
PW MEAD0A9K	AU 0A9KTF25	MG	Steve A Johnson BRIDGE ENGINEER

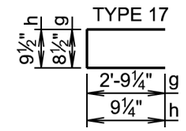
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E112	E185



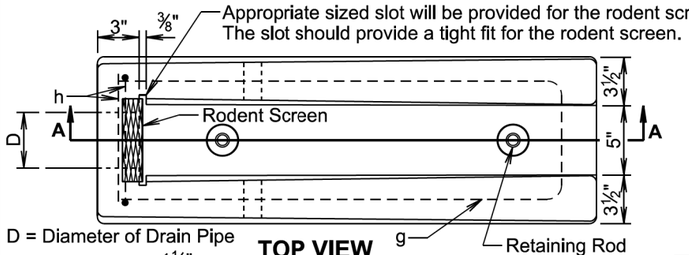
REINFORCING SCHEDULE				
MK.	No.	Size	Length	Type
g	1	4	6'-3"	17
h	2	4	2'-4"	17

NOTE: All dimensions are out to out of bars.

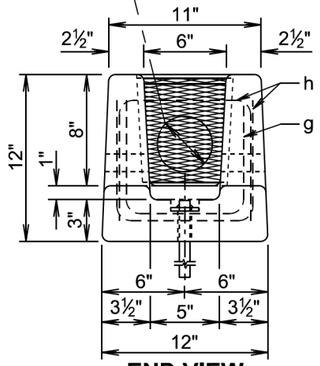
Bending Details

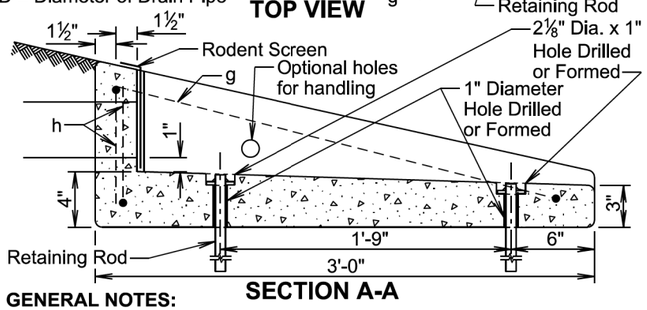


Appropriate sized slot will be provided for the rodent screen. The slot should provide a tight fit for the rodent screen.



Exact dimension of hole is dependent on the pipe size and coupling method.





GENERAL NOTES:

The concrete will be Class M6. The concrete will conform to the requirements of Section 462 of the Specifications. It is estimated that each unit weighs approximately 210 pounds.

All reinforcing steel will conform to ASTM A615, Grade 60 and will be epoxy coated. The reinforcing steel will be securely retained to prevent displacement during placement of concrete. It is estimated that 7.3 pounds of reinforcing steel is required for each unit.

The pipe will be placed in the concrete headwall with the pipe end flush with the concrete surface adjacent to the rodent screen.

The rodent screen will be galvanized 13 Ga. steel with a diamond shaped flattened mesh pattern. The size will be ½". The size refers to the measurement across the smallest diamond shaped opening measured from the centers of the wires.

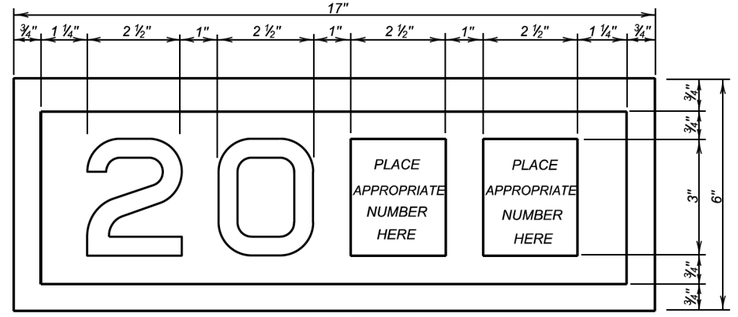
The retaining rod will be galvanized in accordance with ASTM A123 after all shop welding has been completed.

The drawing indicates using ½" fillets; however, ¾" chamfers may be substituted for the ½" fillets.

All costs for furnishing and installing the concrete headwall including equipment, labor, and materials including concrete, reinforcing steel, retaining rods, and rodent screen will be incidental to the contract unit price per each for "Precast Concrete Headwall for Drain".

November 19, 2021

Published Date: 2026	SDDOT	PRECAST CONCRETE HEADWALL FOR DRAIN	PLATE NUMBER 430.50 Sheet 1 of 1



YEAR PLATE DETAILS

GENERAL NOTES:

1. Year plates of the general dimensions shown will be constructed on all box culverts and bridges. The year plates will be constructed in reverse and attached to the forms in such a manner that the finished imprint in the concrete does not exceed one-half (1/2) inch in depth.

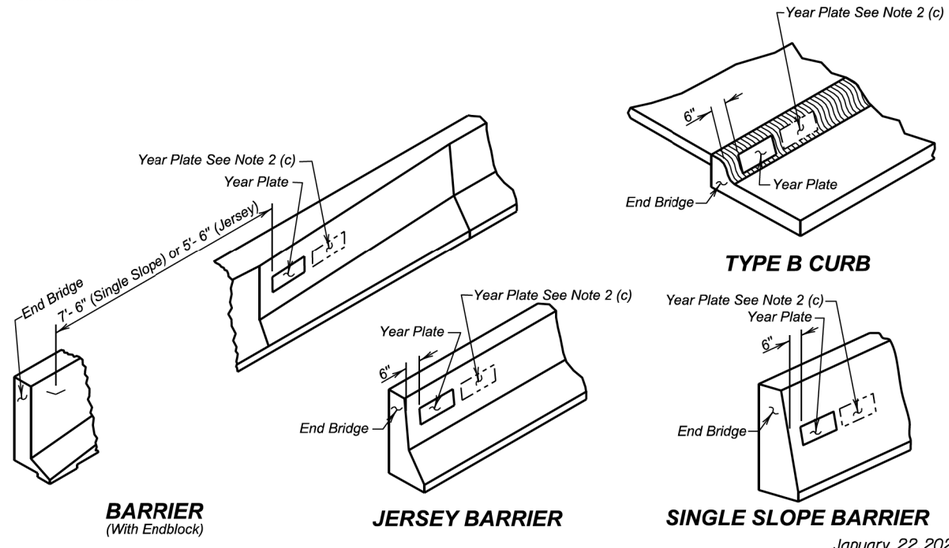
2. Year plates will be located on structure(s) as follows:

   a. On cast-in-place box culverts the year plates will be four and one - half (4 ½) inches below the top of the upstream parapet wall and centered laterally on the upstream face. On precast box culverts the year plate will be centered laterally on the upstream face of the top slab. Where an extended interior wall interferes with this location, the year plate will be centered in an adjacent barrel.

   b. On bridges with six (6) inch curbs, "Jersey" shaped barriers with no endblocks, or "Single Slope" shaped barriers with no endblocks, the year plate will be centered vertically on the curb face approximately six (6) inches from the end of the bridge, or as designated by the Engineer. On bridges with barrier endblocks, the year plate will be centered on the upper sloped portion of the barrier approximately 5'- 6" for "Jersey" shaped barriers from the end of the bridge and 7'-6" for "Single Slope" shaped barriers from the end of bridge, or as designated by the Engineer. There will be one year plate at each end of the bridge on opposite sides.

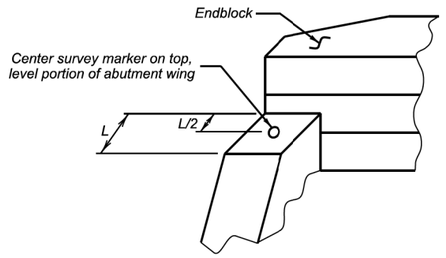
   c. When the plans specify that both the original date of construction and the date of reconstruction are to be shown, one date will be placed as listed above and the other located adjacent to it. Both year plates will be shown at each end of the bridge on opposite sides.

3. There will be no separate measurement or payment made for year plates on box culverts and bridges. All costs for this work will be incidental to other contract items.

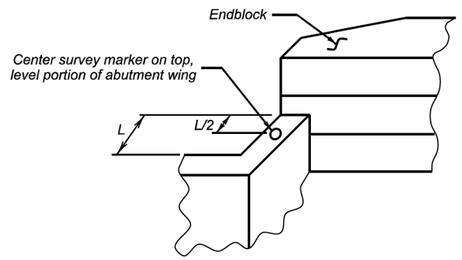


January 22, 2021

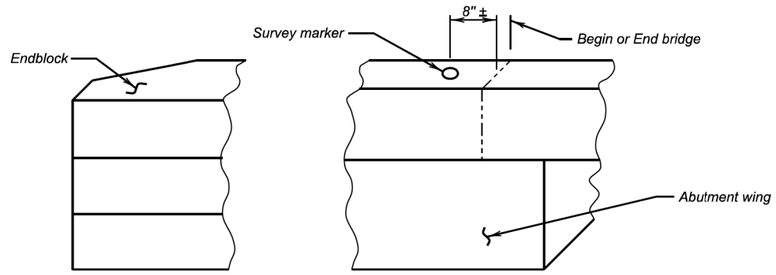
Published Date: 2026	SDDOT	YEAR PLATE DETAILS	PLATE NUMBER 460.02 Sheet 1 Of 1



ABUTMENT WITH "STRAIGHT" WINGS



ABUTMENT WITH "SWEPT BACK" WINGS



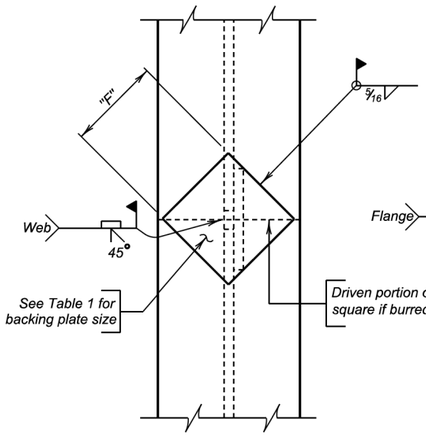
ABUTMENT WITH "SWEPT BACK" WINGS
(Endblock on top of wings)

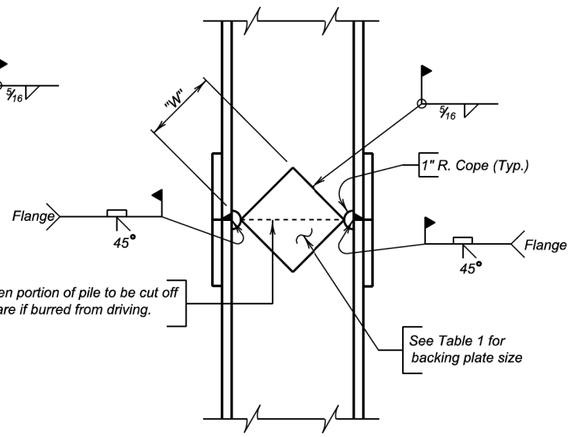
GENERAL NOTES:

1. Survey markers shall be located at each abutment on the same side of the bridge as the year plate. Place survey markers on abutment wings as shown. Two survey markers will be required at each bridge.
2. Survey markers shall be of a type intended for installation in concrete, be made of solid brass or bronze, have a domed top and be either a 3" top diameter (with a ¾" X 2" long ribbed shank), or a US Army Corps of Engineers Type C Disc with a 3 ½" top diameter.
3. There will be no separate measurement or payment made for survey markers. All costs for this work shall be incidental to the other contract items.

June 26,2012

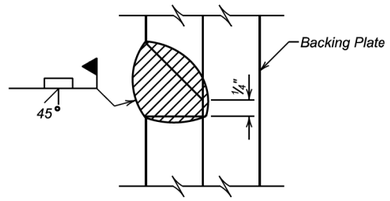
Published Date: 2026	SDDOT	BRIDGE SURVEY MARKER	PLATE NUMBER 460.05
			Sheet 1 of 1





NOTE:
Prepare joint surfaces lower end of upper section on the ground and weld on backing plates; then place upper section on lower section and weld.

COMPLETE JOINT PENETRATION WELD DETAIL



GENERAL NOTES:

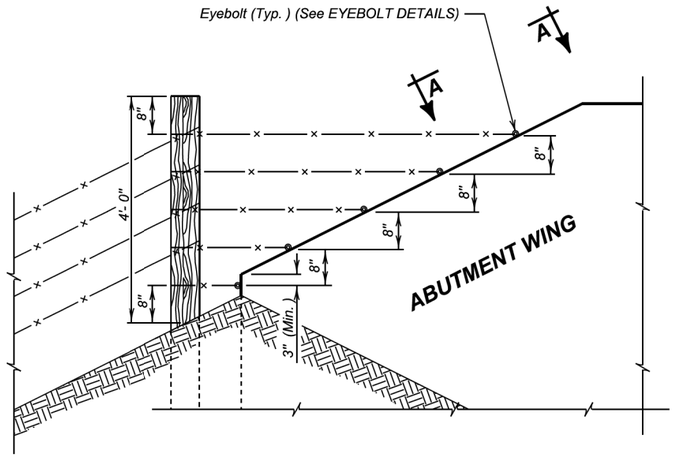
1. Steel for backing plates shall conform to ASTM A709 Grade 50.
2. Welding and weld inspection shall be in conformance with AWS D1.5 (Current Year) Bridge Welding Code - Steel.
3. Welder must be certified and registered with the SDDOT.
4. Backing plate shall at a minimum be as thick as the web of the pile being spliced.
5. Web must be coped with 1 inch radius.
6. Submit Welding Procedure Specification (WPS) to Bridge Construction Engineer for approval prior to pile driving.

TABLE 1
(BACKING PLATES)

PILE	10"	12"	14"
"F" FLANGE	6 ½"	8"	10"
"W" WEB	4 ¾"	6 ¼"	7 ½"

December 23,2012

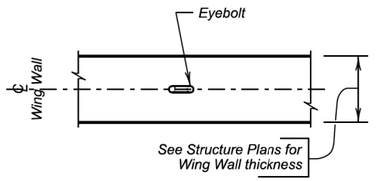
Published Date: 2026	SDDOT	STEEL PILE SPLICE DETAILS	PLATE NUMBER 510.40
			Sheet 1 of 1



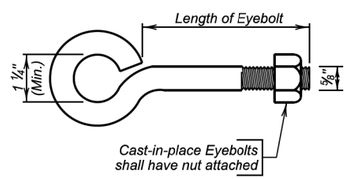
DETAIL FOR FENCE ANCHORS

GENERAL NOTES:

1. The fence and post details shown are for illustrative purpose only. The fence shall be as specified elsewhere in the plans.
2. Eyebolts shall be placed on all of the bridge abutment wings.
3. Eyebolts shall be ⅝ inch diameter and shall conform to ASTM A307.
4. Eyebolts, nuts, and concrete inserts shall be galvanized in accordance with AASHTO M232 (ASTM A153). Concrete inserts of corrosion resistant material need not be galvanized.
5. Cast-in-place eyebolts shall have a nut attached, be 4 ½ inches (Min.) in length and shall be embedded such that the eye of the bolt is flush with the concrete surface. (See Eyebolt Details) As an alternate, cast-in-place concrete inserts, capable of developing the full strength of the ⅝ inch diameter threaded eyebolt, may be used and shall be set in the concrete in accordance with the manufacturer's recommendations. The eyebolt shall be of sufficient length to develop its full strength. The eye of the eyebolt shall be flush with the concrete surface.
6. The cost for furnishing and installing eyebolts and/or concrete inserts shall be incidental to various contract items.



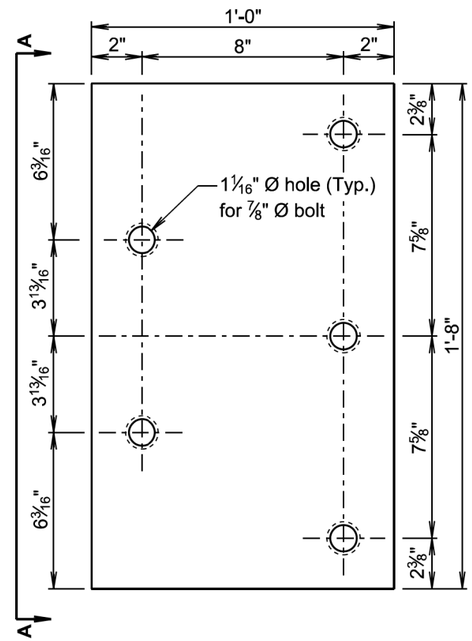
VIEW A - A



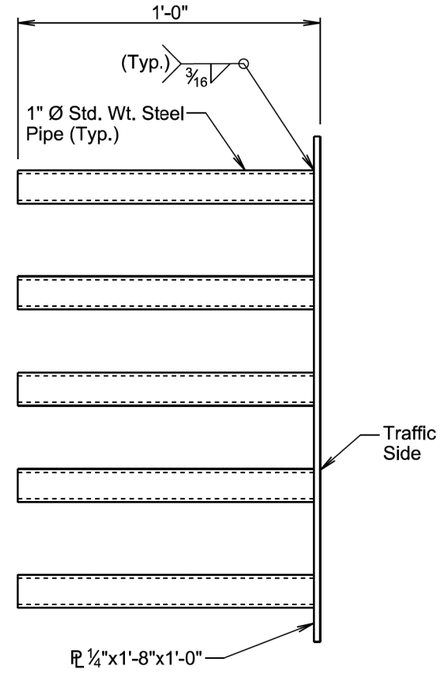
EYEBOLT DETAILS

December 23, 2012

Published Date: 2026	SDDOT	FENCE ANCHORS FOR BRIDGE ABUTMENT WINGS (WINGS LONGER THAN 6')	PLATE NUMBER 620.17
			Sheet 1 of 1



ELEVATION VIEW



VIEW A - A

GENERAL NOTES:

Steel plate for the insert assembly will conform to ASTM A709, Grade 36. The steel pipes will conform to ASTM A53, Grade B or ASTM A500, Grade B or C.

Welding and weld inspection will be in conformance with AWS D1.1 - (Current Year) Structural Welding Code - Steel.

After fabrication, galvanize in accordance with AASHTO M111 (ASTM A123).

Bolts, nuts, and washers will be provided with each assembly. Bolts will be galvanized and conform to the requirements of ASTM A307, F3125 Grade A325, or A449. Plain washers will be galvanized and conform to ASTM F844.

Bolt heads will be placed on the traffic side of the endblock. Bolt projection at the back side of the insert will not exceed 1 inch beyond the nut.

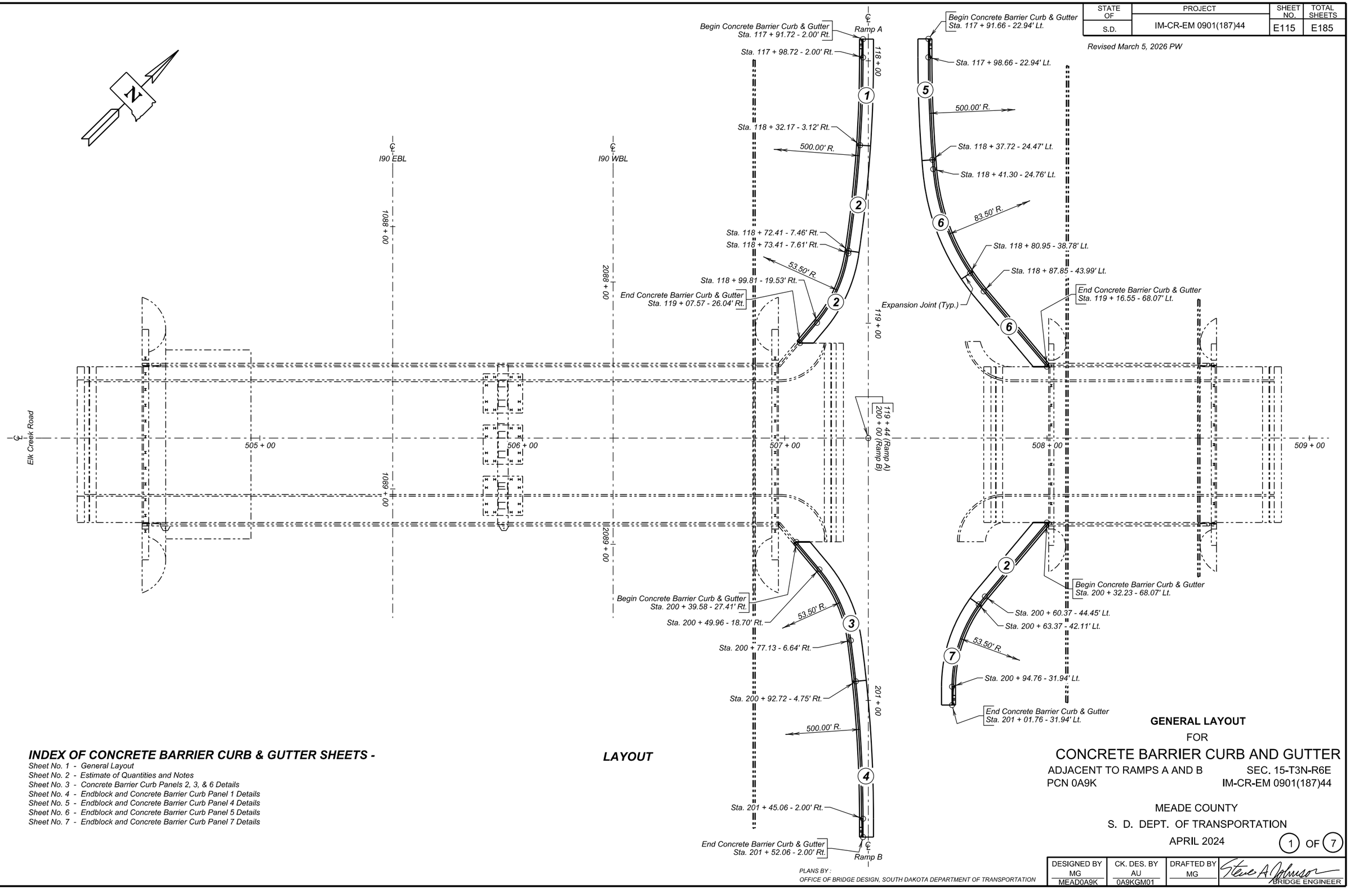
The cost of the 5 bolt insert plate assembly complete in place including welding and galvanizing will be incidental to the contract unit price per cubic yard for "Class A45 Concrete, Miscellaneous", "Class A45 Concrete, Bridge Deck", or "Class A45 Concrete, Bridge Repair", as applicable.

April 8, 2025

Published Date: 2026	SDDOT	5 BOLT INSERT PLATE ASSEMBLY	PLATE NUMBER 630.92
			Sheet 1 of 1

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E115	E185

Revised March 5, 2026 PW



INDEX OF CONCRETE BARRIER CURB & GUTTER SHEETS -

Sheet No. 1 - General Layout
Sheet No. 2 - Estimate of Quantities and Notes
Sheet No. 3 - Concrete Barrier Curb Panels 2, 3, & 6 Details
Sheet No. 4 - Endblock and Concrete Barrier Curb Panel 1 Details
Sheet No. 5 - Endblock and Concrete Barrier Curb Panel 4 Details
Sheet No. 6 - Endblock and Concrete Barrier Curb Panel 5 Details
Sheet No. 7 - Endblock and Concrete Barrier Curb Panel 7 Details

LAYOUT

PLANS BY :
OFFICE OF BRIDGE DESIGN, SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION

GENERAL LAYOUT

FOR

CONCRETE BARRIER CURB AND GUTTER

ADJACENT TO RAMPS A AND B — SEC. 15-T3N-R6E

PCN 0A9K — IM-CR-EM 0901(187)44

MEADE COUNTY

S. D. DEPT. OF TRANSPORTATION

APRIL 2024

1 OF 7

DESIGNED BY	CK. DES. BY	DRAFTED BY	
MG	AU	MG	Steve A Johnson BRIDGE ENGINEER
MEAD0A9K	0A9KGM01		

ESTIMATE OF STRUCTURE QUANTITIES

DESCRIPTION	QUANTITY	UNIT	REMARKS
Concrete Barrier Curb and Gutter	434	Ft	
Concrete Barrier Curb and Gutter End Section	28	Ft	

SPECIFICATIONS FOR BRIDGE

1. Design Specifications: AASHTO LRFD Bridge Design Specifications, 9th Edition.

2. Construction Specifications: South Dakota Standard Specifications for Roads and Bridges, 10-1-25 Version, Required Provisions, and Special Provisions as included in the Proposal. The Standard Specifications for Roads and Bridges are available for download and viewing at https://dot.sd.gov/doing-business/contractors/standard-specifications.

DESIGN MATERIAL STRENGTHS

Class A45 Concrete	f'c = 4,500 psi
Reinforcing Steel	fy = 60,000 psi

DESIGN MIX OF CONCRETE

1. Concrete will be Class A45 in accordance with Section 460.

2. Reinforcing steel will conform to ASTM A615, Grade 60.

GENERAL CONSTRUCTION

1. All mild reinforcing steel will conform to ASTM A615, Grade 60.

2. All exposed concrete corners and edges will be chamfered 3/4" unless noted otherwise.

3. Use 1" clear cover on all reinforcing steel except as shown.

4. The Concrete Barrier Curb and Gutter will be cast-in-place.

5. The transverse sawed or formed joints in the Concrete Barrier Curb and Gutter will align with the transverse joints in the PCC pavement. The joint grooves may either be formed or saw cut. If saw cut, the concrete will have attained a compressive strength of 2,000 psi prior to sawing. Keyed joints will be used between concrete barrier curb and gutter and concrete barrier curb and gutter end section and between separate pours. Saw cut and seal same as adjacent PCC pavement.

6. End of day joints or construction joints will be roughened to provide aggregate interlock and will have 24" of resteel extending beyond the joint to provide a 21" lap. These joints will be located at a pavement joint or contraction joint location.

7. Snap ties, if used, will be epoxy coated. The epoxy coating will be inert in concrete and compatible with the coating applied to the new epoxy coated reinforcing steel.

8. The contract unit price per foot for Concrete Barrier Curb and Gutter and Concrete Barrier Curb and Gutter End Section will include the cost of all materials, labor, equipment, and incidentals necessary to furnish the barrier complete in place in accordance with these plans and specifications.

COMMERCIAL TEXTURE FINISH

1. A commercial texture finish will be applied to the front, top, and back face of the barrier curbs.

2. The commercial texture finish used will be on the Department's approved list.

3. The commercial texture finish will be applied in accordance with Section 460.3 L.1.c

4. Where the commercial texture finish is to be applied, curing will be accomplished with cotton or burlap mats and polyethylene sheeting. Curing will continue for not less than seven days after placing concrete before the commercial texture finish is applied. Various commercial texture finish products require that the concrete be 28 days old before application. Therefore, the commercial texture surface finish will be applied in accordance with the manufacturer's recommendations. The commercial texture finish itself does not require a specific cure except for drying.

5. No separate payment will be made for the commercial texture finish. All costs for the surface preparation, furnishing, and installing the commercial texture finish will be incidental to the Concrete Curb and Gutter and Concrete Curb and Gutter End Section items to which the finish is applied.

6. The color of the back face will be AMS – STD - 595 33690 to match the barrier on the bridges.

7. The color of the top and front face will be AMS – STD - 595 37875 to match the barrier on the bridge.

ESTIMATE OF STRUCTURE QUANTITIES AND NOTES
FOR
CONCRETE BARRIER CURB AND GUTTER

MEADE COUNTY
APRIL 2024

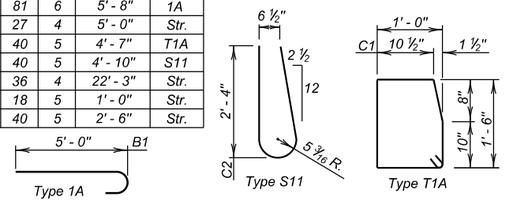
DESIGNED BY	CK. DES. BY	DRAFTED BY	
AU	PW	AU	Steve A Johnson BRIDGE ENGINEER
MEAD0A9K	0A9KGM02		

Revised March 5, 2026 PW

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E117	E185

REINFORCING SCHEDULE
(For 1 Concrete Barrier Panel 2 - 3 required)

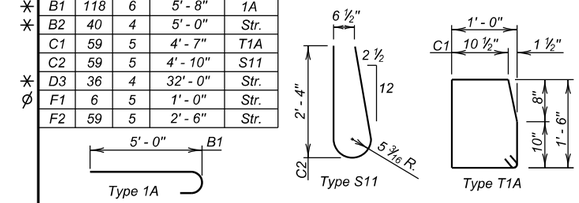
	Mk.	No.	Size	Length	Type	Bending Details
✳	B1	81	6	5' - 8"	1A	
✳	B2	27	4	5' - 0"	Str.	
	C1	40	5	4' - 7"	T1A	
	C2	40	5	4' - 10"	S11	
✳	D2a	36	4	22' - 3"	Str.	
ø	F1	18	5	1' - 0"	Str.	
	F2	40	5	2' - 6"	Str.	



NOTES:
All dimensions are out to out of bars.
All bars to be Epoxy Coated.
✳ Warp and rotate bars to fit transition.

REINFORCING SCHEDULE
(For 1 Concrete Barrier Panel 3 - 1 required)

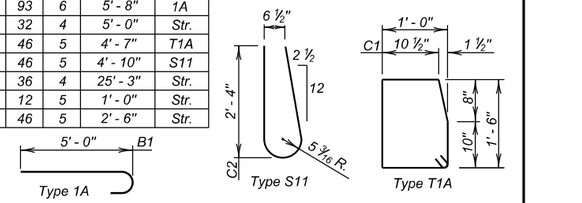
	Mk.	No.	Size	Length	Type	Bending Details
✳	B1	118	6	5' - 8"	1A	
✳	B2	40	4	5' - 0"	Str.	
	C1	59	5	4' - 7"	T1A	
	C2	59	5	4' - 10"	S11	
✳	D3	36	4	32' - 0"	Str.	
ø	F1	6	5	1' - 0"	Str.	
	F2	59	5	2' - 6"	Str.	



NOTES:
All dimensions are out to out of bars.
All bars to be Epoxy Coated.
✳ Warp and rotate bars to fit transition.

REINFORCING SCHEDULE
(For 1 Concrete Barrier Panel 6 - 2 required)

	Mk.	No.	Size	Length	Type	Bending Details
✳	B1	93	6	5' - 8"	1A	
✳	B2	32	4	5' - 0"	Str.	
	C1	46	5	4' - 7"	T1A	
	C2	46	5	4' - 10"	S11	
✳	D7	36	4	25' - 3"	Str.	
ø	F1	12	5	1' - 0"	Str.	
	F2	46	5	2' - 6"	Str.	



NOTES:
All dimensions are out to out of bars.
All bars to be Epoxy Coated.
✳ Warp and rotate bars to fit transition.

NOTES:
ø Place F1 bar as shown on the TYPICAL SECTIONS at the expansion joints. See GENERAL LAYOUT for number and location of expansion joints required. 6 F1 bars at each Expansion Joint.

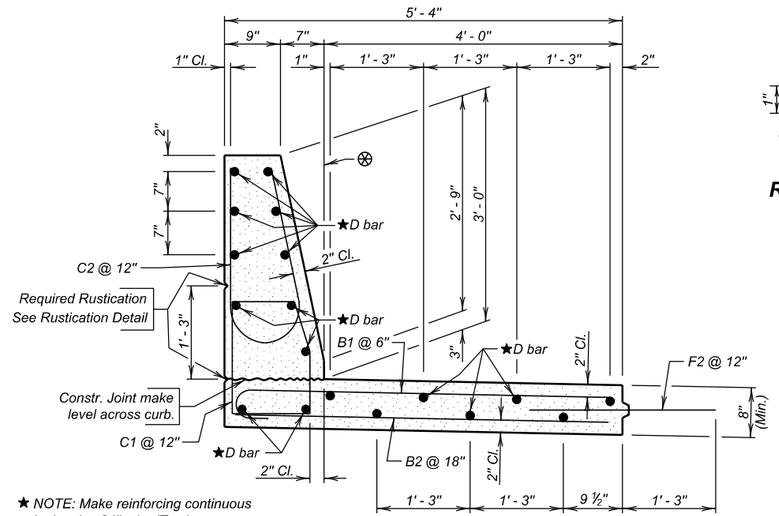
⊛ The stated radii on the plans and cross sections refer to this line and it will also be the basis for horizontal linear foot measurement and payment.

ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY
Concrete Barrier Curb and Gutter	Ft.	274

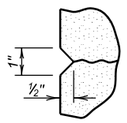
Items 1 thru 3 are approximate quantities contained in the above bid item and are for information only.

1. 0.3 Cu. Yds. of Concrete per foot of Concrete Barrier Curb & Gutter Section.
2. 44 Lbs. Epoxy Coated Re-Steel per foot of Concrete Barrier Curb & Gutter Section. NOT including laps.
3. 16 Lbs. of Re-Steel per Expansion Joint

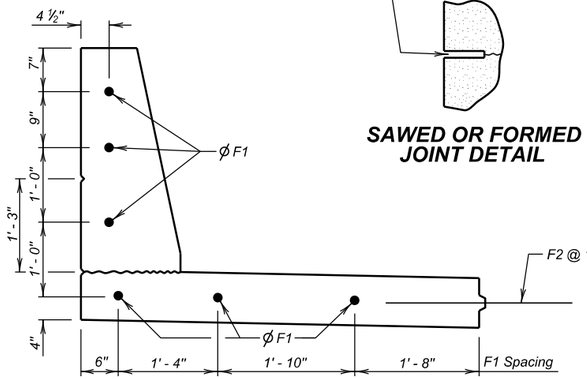


★ NOTE: Make reinforcing continuous by lapping 24" min. (Typ.)

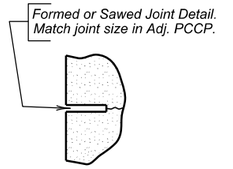
BARRIER CURB GUTTER - TYPICAL SECTION



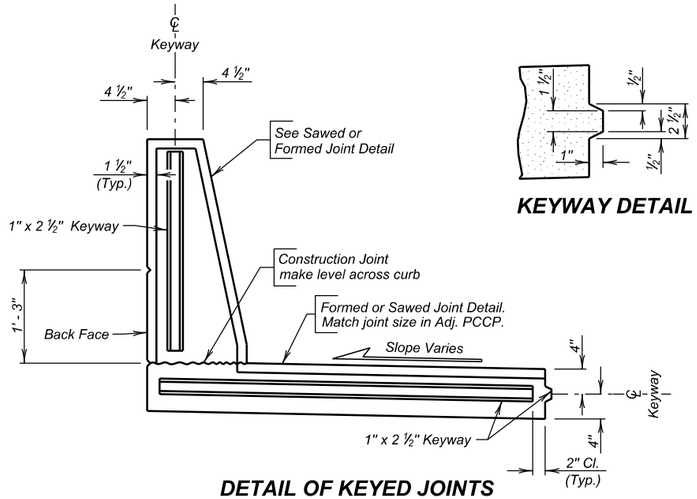
RUSTICATION DETAIL



BARRIER CURB GUTTER - TYPICAL SECTION
(At expansion joint)

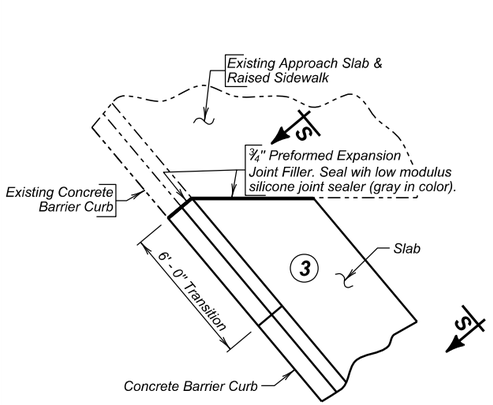


SAWED OR FORMED JOINT DETAIL

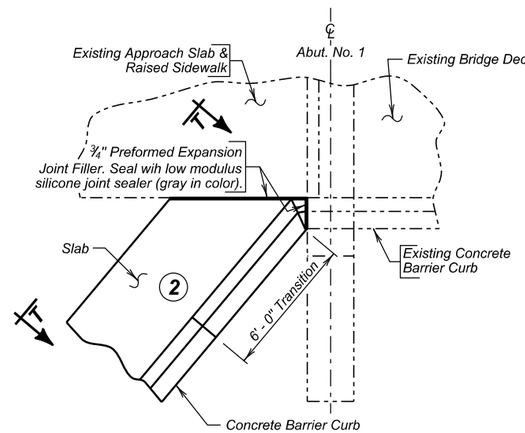


DETAIL OF KEYED JOINTS
(Typ. between pours)

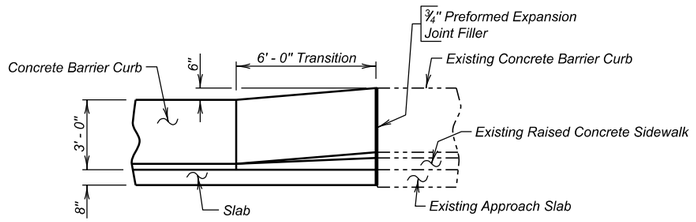
KEYWAY DETAIL



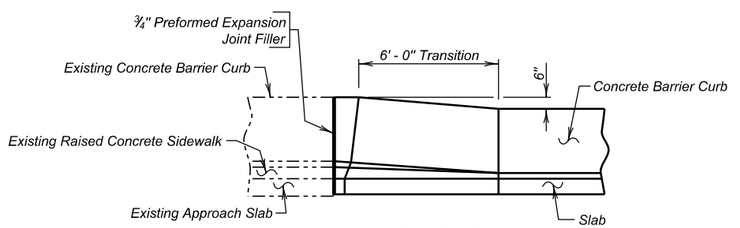
BARRIER CURB GUTTER TRANSITION DETAIL
(Panel 3 shown, Panel 2 similar opposite hand)



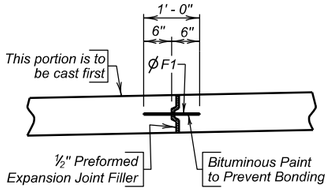
BARRIER CURB GUTTER TRANSITION DETAIL
(Panel 2 shown, Panel 6 similar opposite hand)



VIEW S - S
(Reinforcing Steel not shown)



VIEW T - T
(Reinforcing Steel not shown)



EXPANSION JOINT
(Steel not shown for clarity.)

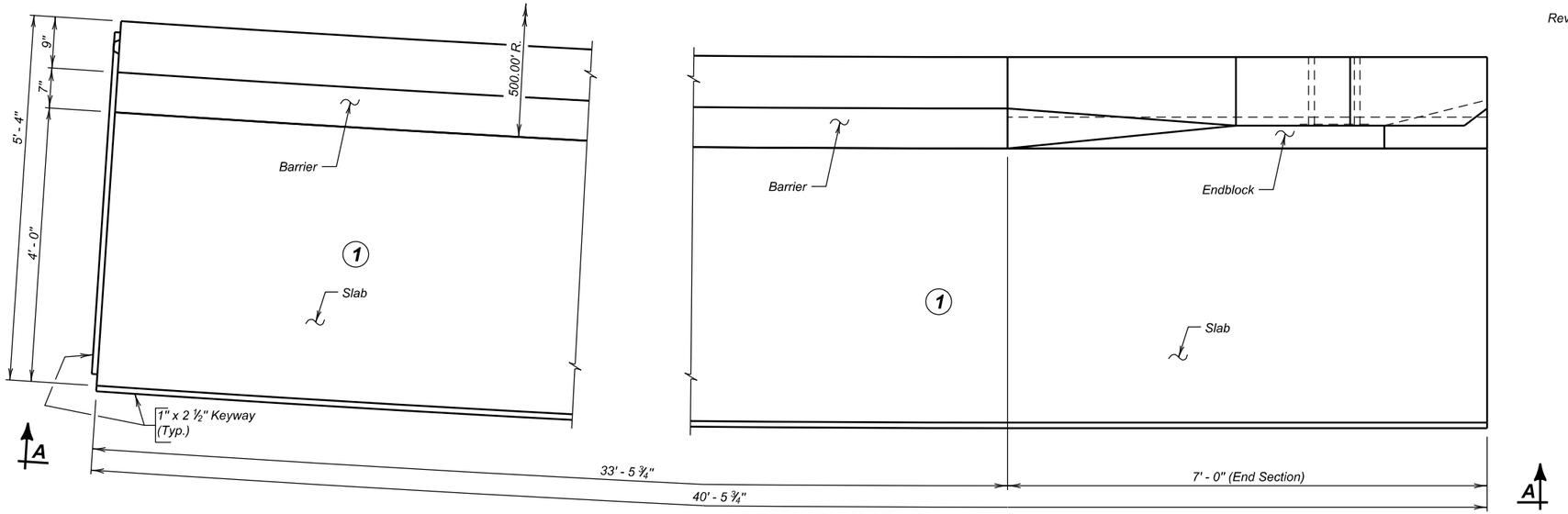
CONCRETE BARRIER CURB
PANELS 2, 3, & 6 DETAILS
FOR
CONCRETE BARRIER CURB AND GUTTER
ADJACENT TO RAMPS A AND B SEC. 15-T3N-R6E
IM-CR-EM 0901(187)44

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
APRIL 2024

DESIGNED BY	CK. DES. BY	DRAFTED BY	
MG	AU	MG	Steven A Johnson BRIDGE ENGINEER
MEAD0A9K	0A9KGM03		

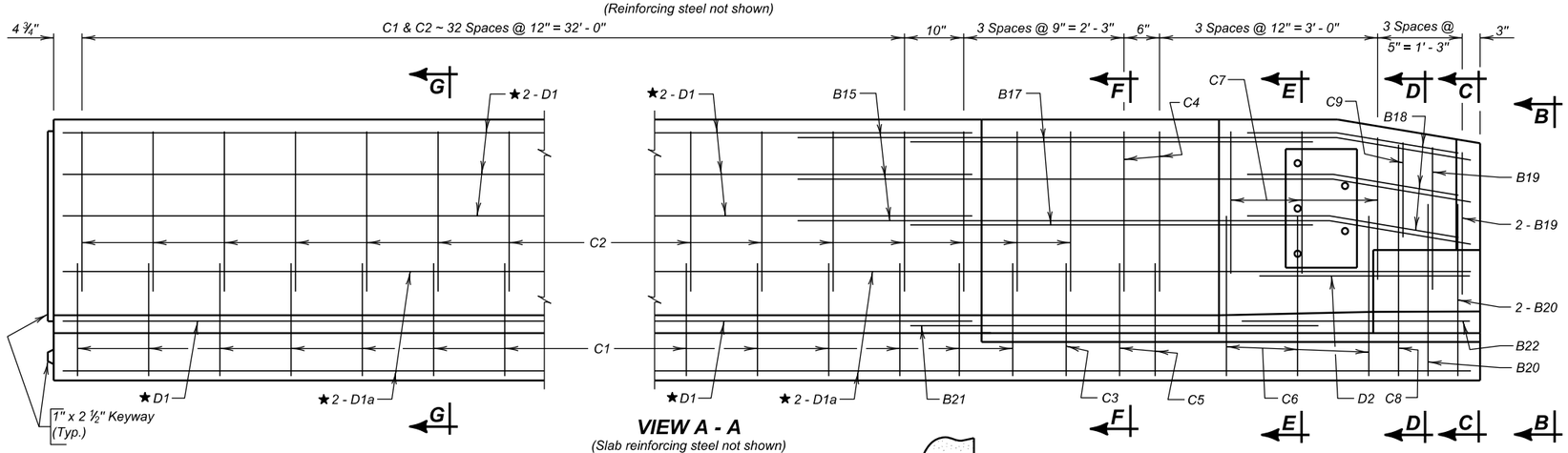
Revised March 5, 2026 PW

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E118	E185



PLAN - PANEL 1

(Reinforcing steel not shown)



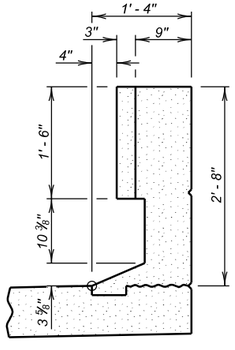
VIEW A - A

(Slab reinforcing steel not shown)

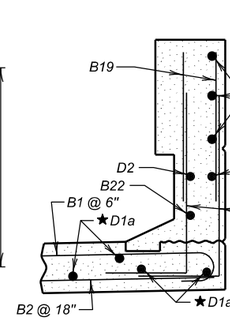
★ NOTE: Make reinforcing continuous by lapping 24" min. (Typ.)



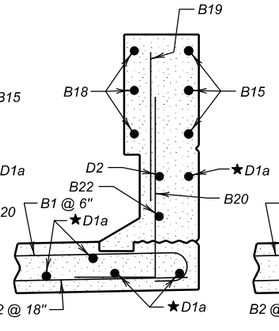
RUSTICATION DETAIL



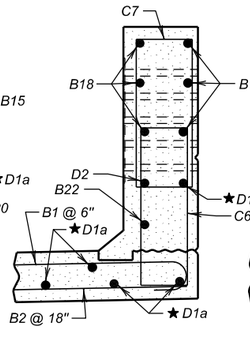
VIEW B - B



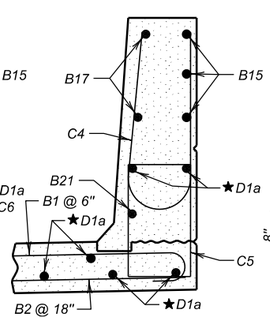
SECTION C - C



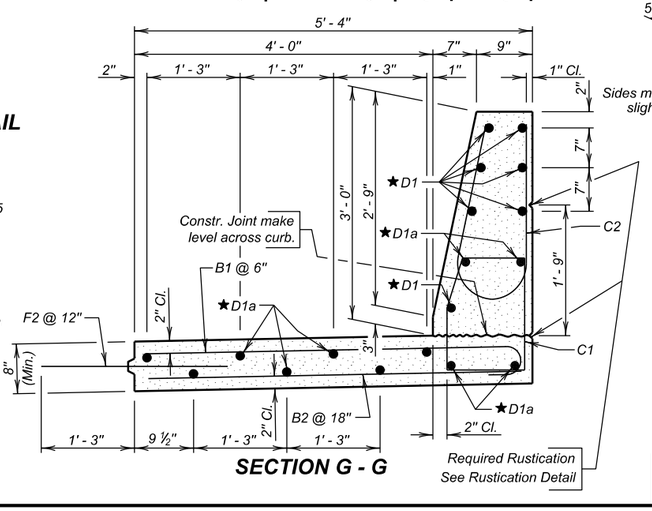
SECTION D - D



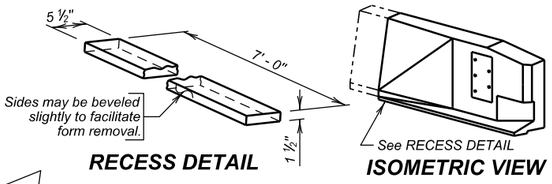
SECTION E - E



SECTION F - F



SECTION G - G

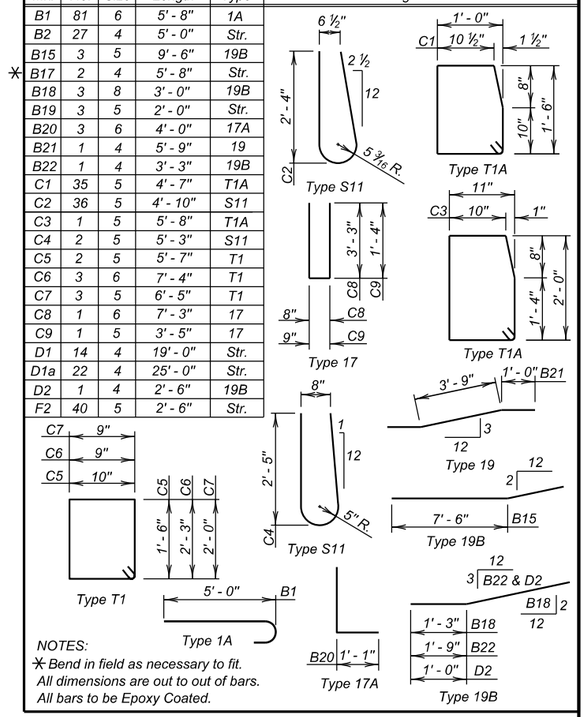


RECESS DETAIL

ISOMETRIC VIEW

REINFORCING SCHEDULE

Mk.	No.	Size	Length	Type
B1	81	6	5' - 8"	1A
B2	27	4	5' - 0"	Str.
B15	3	5	9' - 6"	19B
✳B17	2	4	5' - 8"	Str.
B18	3	8	3' - 0"	19B
B19	3	5	2' - 0"	Str.
B20	3	6	4' - 0"	17A
B21	1	4	5' - 9"	19
B22	1	4	3' - 3"	19B
C1	35	5	4' - 7"	T1A
C2	36	5	4' - 10"	S11
C3	1	5	5' - 8"	T1A
C4	2	5	5' - 3"	S11
C5	2	5	5' - 7"	T1
C6	3	6	7' - 4"	T1
C7	3	5	6' - 5"	T1
C8	1	6	7' - 3"	17
C9	1	5	3' - 5"	17
D1	14	4	19' - 0"	Str.
D1a	22	4	25' - 0"	Str.
D2	1	4	2' - 6"	19B
F2	40	5	2' - 6"	Str.



NOTES:
✳ Bend in field as necessary to fit.
All dimensions are out to out of bars.
All bars to be Epoxy Coated.

ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY
Concrete Barrier Curb and Gutter	Ft.	34
Concrete Barrier Curb and Gutter End Section	Ft.	7

Items 1 thru 4 are approximate quantities contained in the above bid items and are for information only.

1. 0.9 Cu. Yds. Concrete in one Endblock Section.
2. 189 Lbs. Epoxy Coated Re-Steel in one Endblock Section.
3. 0.3 Cu. Yds. of Concrete per foot in Regular Barrier Section.
4. 52 Lbs. Epoxy Coated Re-Steel per foot of Regular Barrier Section.

ENDBLOCK AND CONCRETE BARRIER CURB PANEL 1 DETAILS

FOR

CONCRETE BARRIER CURB AND GUTTER

ADJACENT TO RAMPS A AND B

SEC. 15-T3N-R6E

IM-CR-EM 0901(187)44

MEADE COUNTY

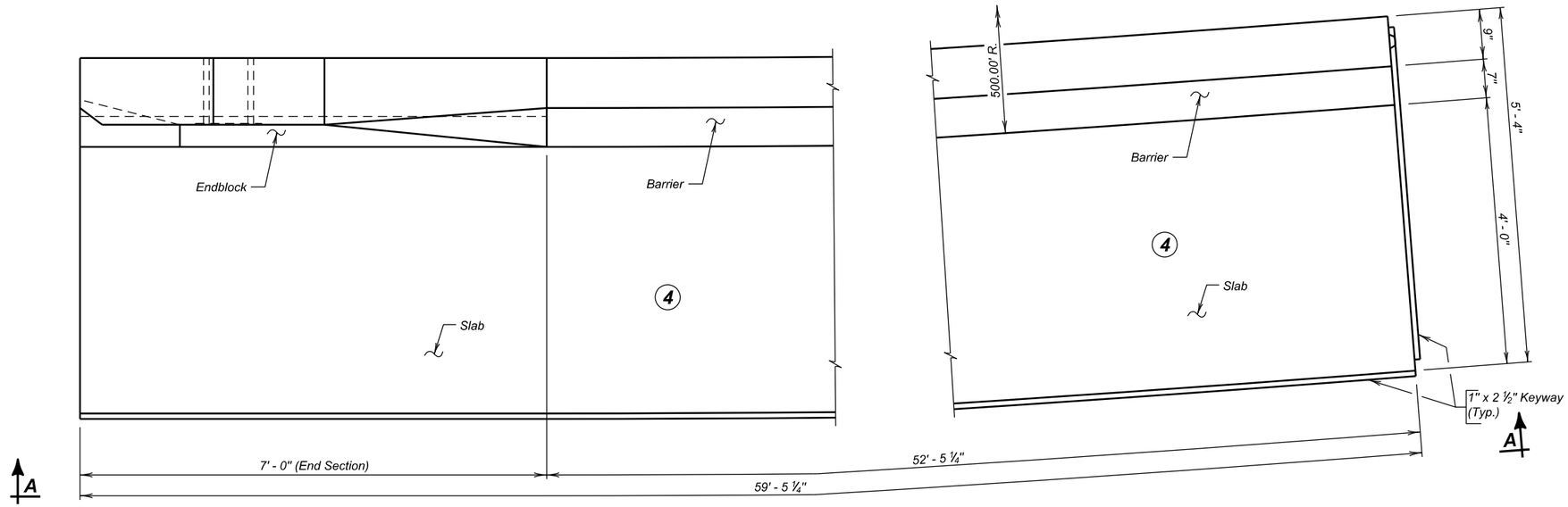
S. D. DEPT. OF TRANSPORTATION

APRIL 2024

DESIGNED BY	CK. DES. BY	DRAFTED BY	
MG	AU	MG	Steve A Johnson BRIDGE ENGINEER
MEAD0A9K	0A9KGM04		

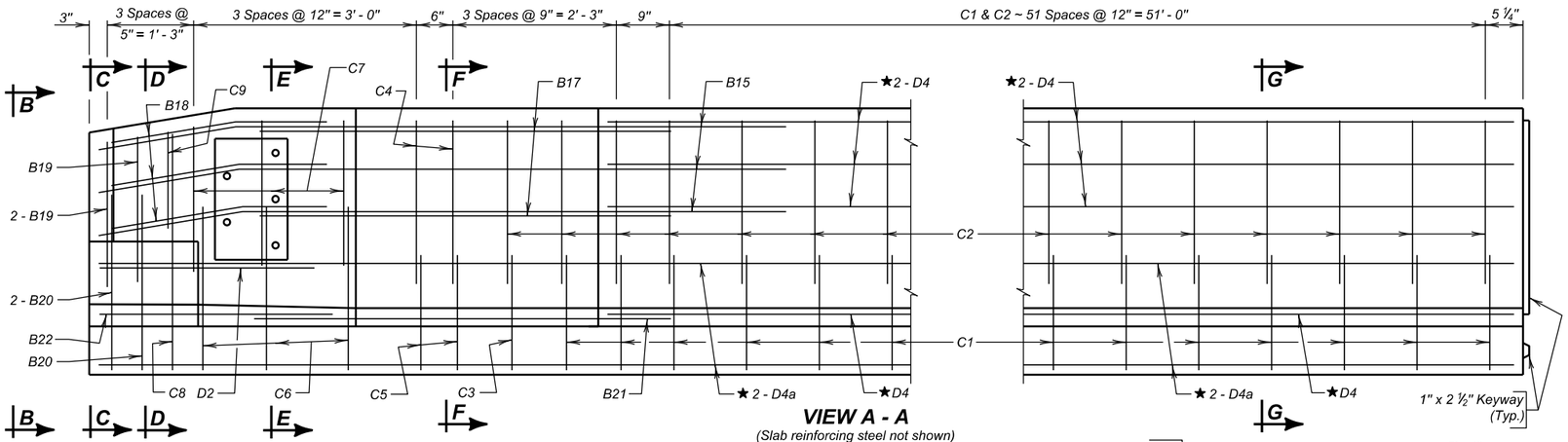
Revised March 5, 2026

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E119	E185



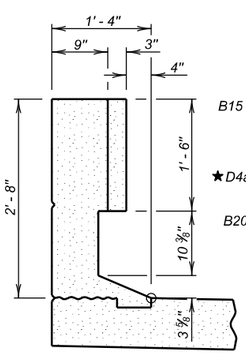
PLAN - PANEL 4

(Reinforcing steel not shown)

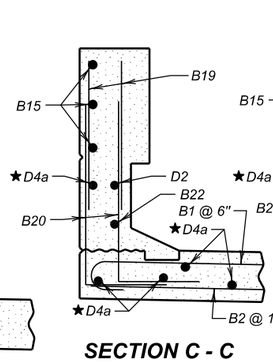


VIEW A - A

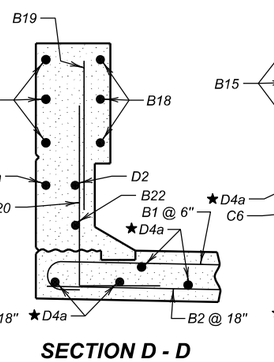
(Slab reinforcing steel not shown)



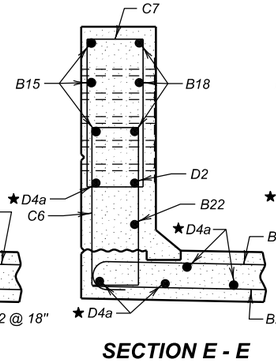
VIEW B - B



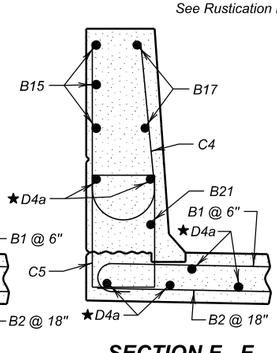
SECTION C - C



SECTION D - D

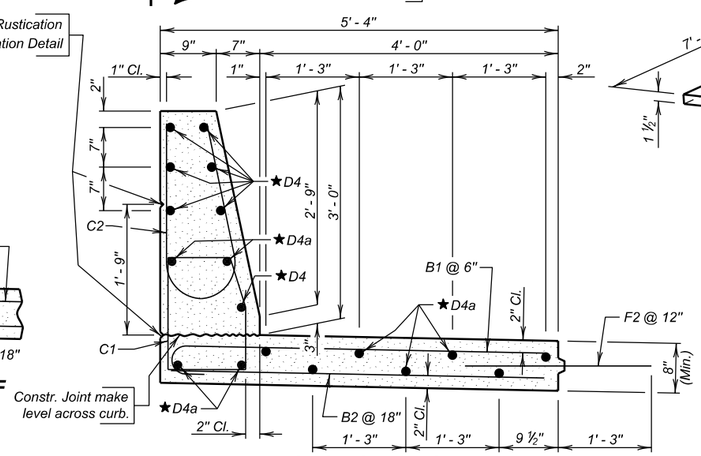


SECTION E - E

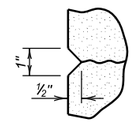


SECTION F - F

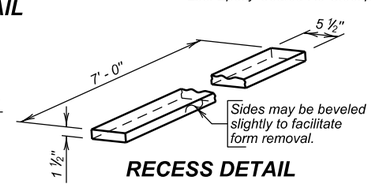
★ NOTE: Make reinforcing continuous by lapping 24" min. (Typ.)



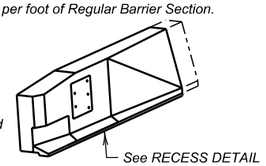
SECTION G - G



RUSTICATION DETAIL



RECESS DETAIL

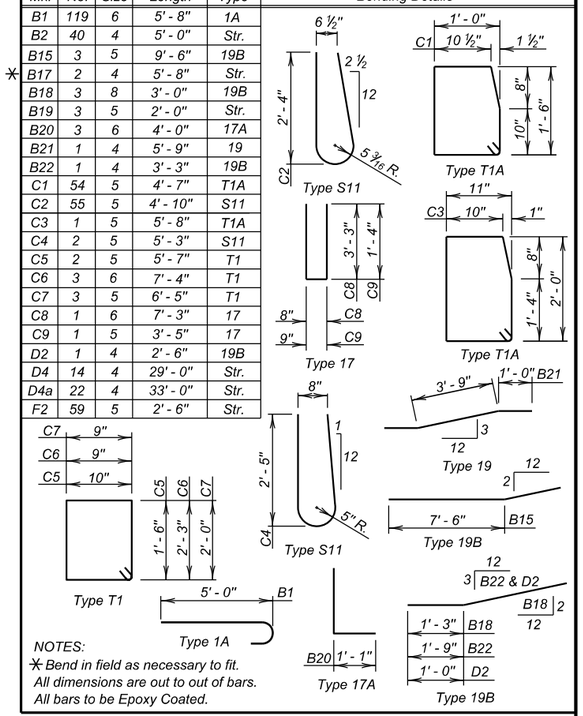


ISOMETRIC VIEW

REINFORCING SCHEDULE

Mk.	No.	Size	Length	Type
B1	119	6	5' - 8"	1A
B2	40	4	5' - 0"	Str.
B15	3	5	9' - 6"	19B
✳ B17	2	4	5' - 8"	Str.
B18	3	8	3' - 0"	19B
B19	3	5	2' - 0"	Str.
B20	3	6	4' - 0"	17A
B21	1	4	5' - 9"	19
B22	1	4	3' - 3"	19B
C1	54	5	4' - 7"	T1A
C2	55	5	4' - 10"	S11
C3	1	5	5' - 8"	T1A
C4	2	5	5' - 3"	S11
C5	2	5	5' - 7"	T1
C6	3	6	7' - 4"	T1
C7	3	5	6' - 5"	T1
C8	1	6	7' - 3"	17
C9	1	5	3' - 5"	17
D2	1	4	2' - 6"	19B
D4	14	4	29' - 0"	Str.
D4a	22	4	33' - 0"	Str.
F2	59	5	2' - 6"	Str.

Bending Details



NOTES:
✳ Bend in field as necessary to fit.
All dimensions are out to out of bars.
All bars to be Epoxy Coated.

ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY
Concrete Barrier Curb and Gutter	Ft.	53
Concrete Barrier Curb and Gutter End Section	Ft.	7

Items 1 thru 4 are approximate quantities contained in the above bid items and are for information only.

1. 0.9 Cu. Yds. Concrete in one Endblock Section.
2. 189 Lbs. Epoxy Coated Re-Steel in one Endblock Section.
3. 0.3 Cu. Yds. of Concrete per foot in Regular Barrier Section.
4. 49 Lbs. Epoxy Coated Re-Steel per foot of Regular Barrier Section.

ENDBLOCK AND CONCRETE BARRIER CURB PANEL 4 DETAILS

FOR

CONCRETE BARRIER CURB AND GUTTER

ADJACENT TO RAMPS A AND B

SEC. 15-T3N-R6E
IM-CR-EM 0901(187)44

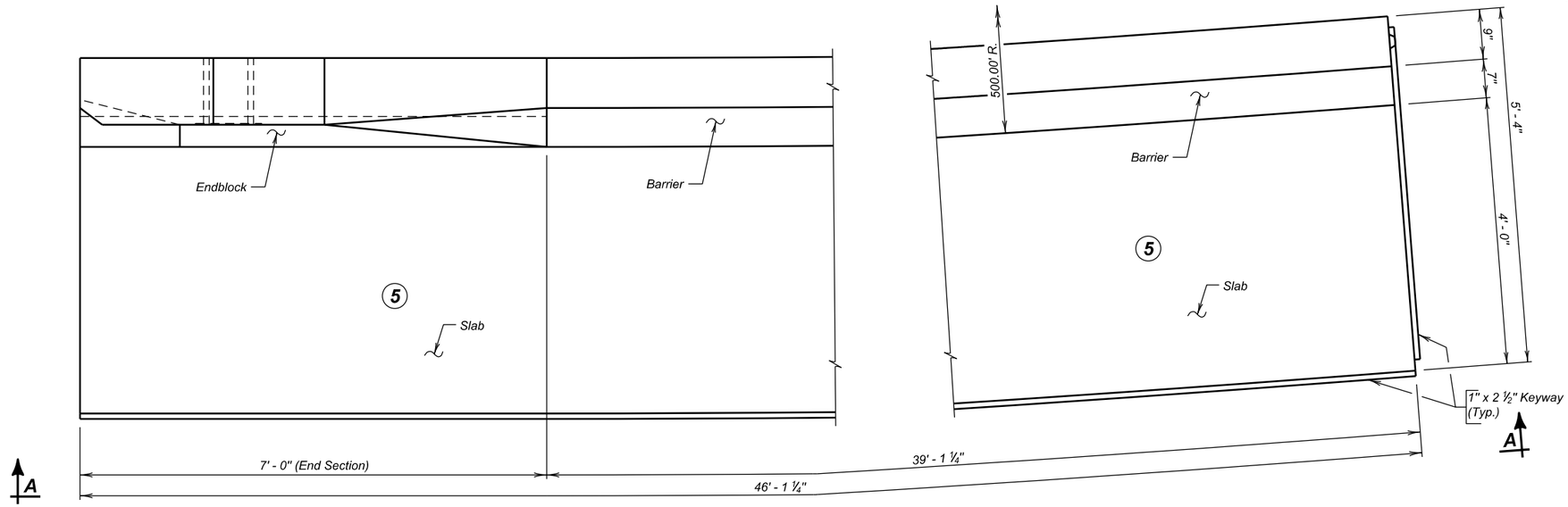
MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
APRIL 2024

5 OF 7

DESIGNED BY	CK. DES. BY	DRAFTED BY	
MG	AU	MG	BRIDGE ENGINEER
MEAD0A9K	0A9KGM05		

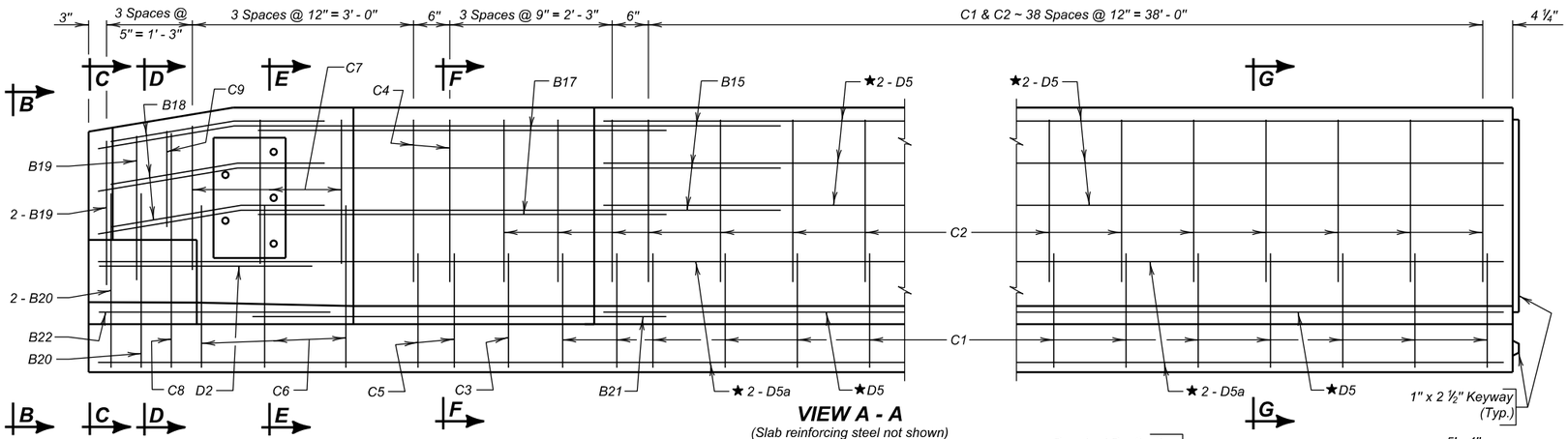
Revised March 5, 2026

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E120	E185



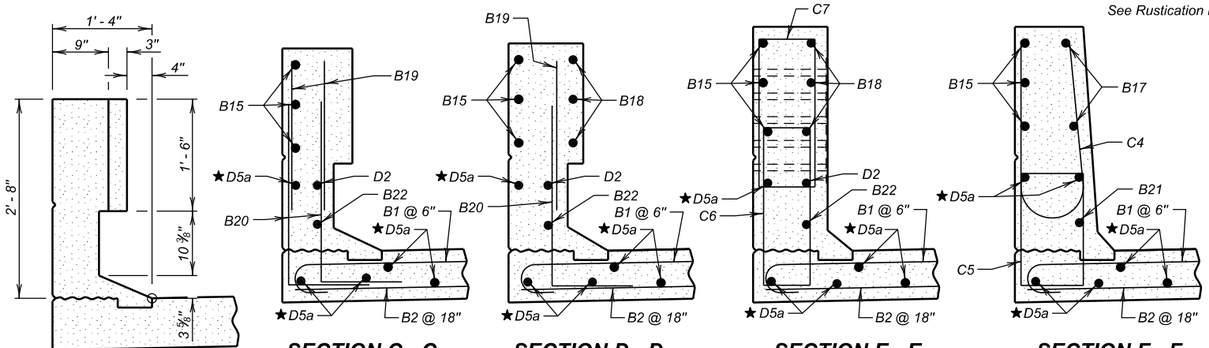
PLAN - PANEL 5

(Reinforcing steel not shown)



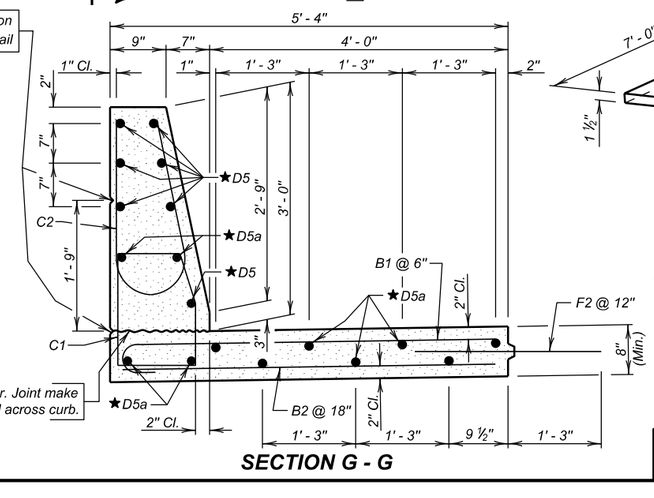
VIEW A - A

(Slab reinforcing steel not shown)

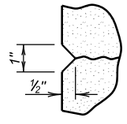


VIEW B - B | SECTION C - C | SECTION D - D | SECTION E - E | SECTION F - F

★ NOTE: Make reinforcing continuous by lapping 24" min. (Typ.)



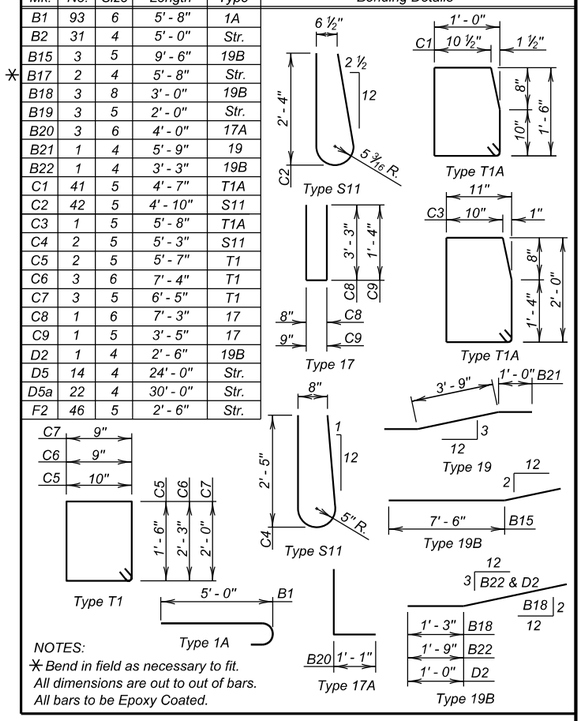
SECTION G - G



RUSTICATION DETAIL

REINFORCING SCHEDULE

Mk.	No.	Size	Length	Type
B1	93	6	5' - 8"	1A
B2	31	4	5' - 0"	Str.
B15	3	5	9' - 6"	19B
✳ B17	2	4	5' - 8"	Str.
B18	3	8	3' - 0"	19B
B19	3	5	2' - 0"	Str.
B20	3	6	4' - 0"	17A
B21	1	4	5' - 9"	19
B22	1	4	3' - 3"	19B
C1	41	5	4' - 7"	T1A
C2	42	5	4' - 10"	S11
C3	1	5	5' - 8"	T1A
C4	2	5	5' - 3"	S11
C5	2	5	5' - 7"	T1
C6	3	6	7' - 4"	T1
C7	3	5	6' - 5"	T1
C8	1	6	7' - 3"	17
C9	1	5	3' - 5"	17
D2	1	4	2' - 6"	19B
D5	14	4	24' - 0"	Str.
D5a	22	4	30' - 0"	Str.
F2	46	5	2' - 6"	Str.



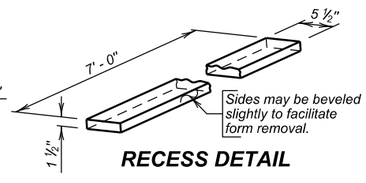
NOTES:
✳ Bend in field as necessary to fit.
All dimensions are out to out of bars.
All bars to be Epoxy Coated.

ESTIMATED QUANTITIES

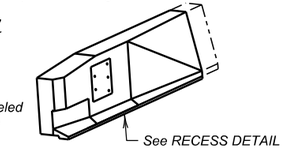
ITEM	UNIT	QUANTITY
Concrete Barrier Curb and Gutter	Ft.	39
Concrete Barrier Curb and Gutter End Section	Ft.	7

Items 1 thru 4 are approximate quantities contained in the above bid items and are for information only.

1. 0.9 Cu. Yds. Concrete in one Endblock Section.
2. 189 Lbs. Epoxy Coated Re-Steel in one Endblock Section.
3. 0.3 Cu. Yds. of Concrete per foot in Regular Barrier Section.
4. 54 Lbs. Epoxy Coated Re-Steel per foot of Regular Barrier Section.



RECESS DETAIL



ISOMETRIC VIEW

ENDBLOCK AND CONCRETE BARRIER CURB PANEL 5 DETAILS

FOR

CONCRETE BARRIER CURB AND GUTTER

ADJACENT TO RAMPS A AND B SEC. 15-T3N-R6E

IM-CR-EM 0901(187)44

MEADE COUNTY

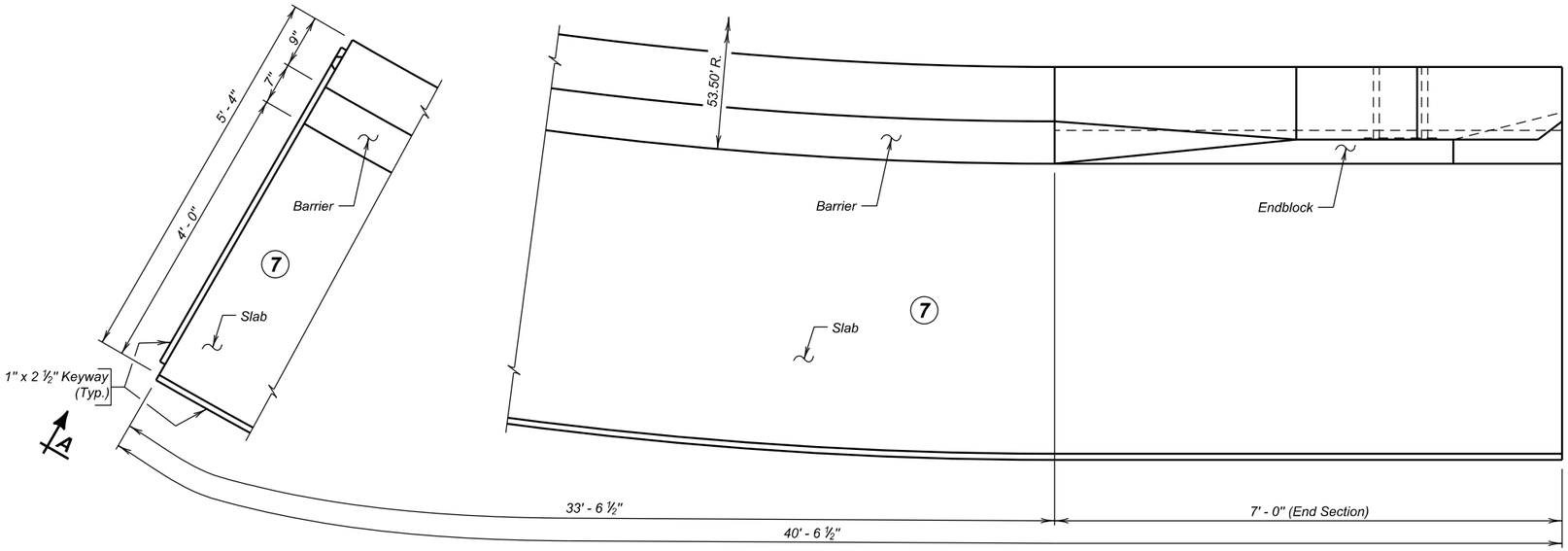
S. D. DEPT. OF TRANSPORTATION

APRIL 2024

DESIGNED BY	CK. DES. BY	DRAFTED BY	
MG	AU	MG	Steve A Johnson BRIDGE ENGINEER
MEAD0A9K	0A9KGM06		

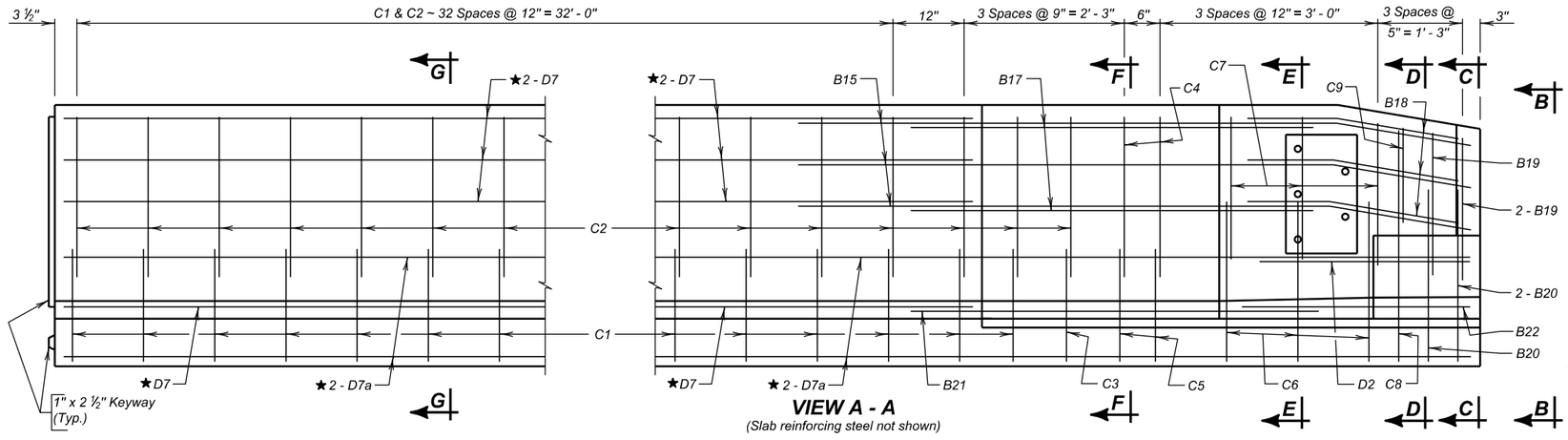
Revised March 5, 2026 PW

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E121	E185



PLAN - PANEL 7

(Reinforcing steel not shown)



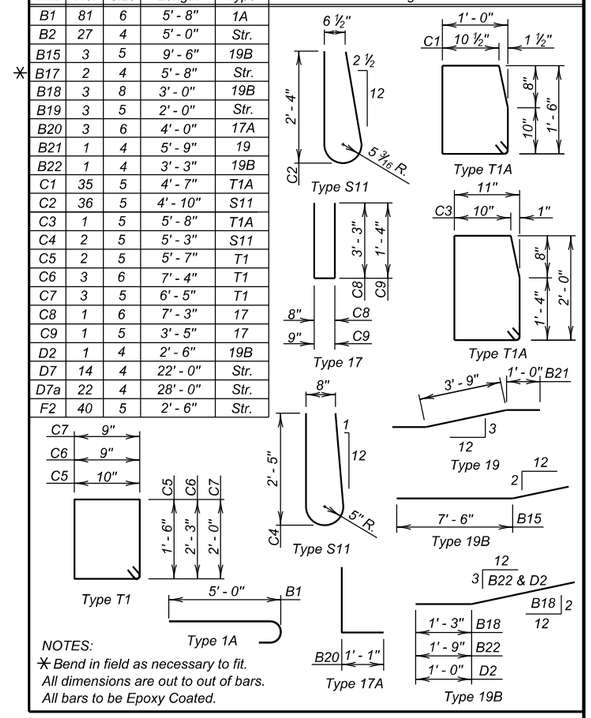
VIEW A - A

(Slab reinforcing steel not shown)

★ NOTE: Make reinforcing continuous by lapping 24" min. (Typ.)

REINFORCING SCHEDULE

Mk.	No.	Size	Length	Type
B1	81	6	5' - 8"	1A
B2	27	4	5' - 0"	Str.
B15	3	5	9' - 6"	19B
✶ B17	2	4	5' - 8"	Str.
B18	3	8	3' - 0"	19B
B19	3	5	2' - 0"	Str.
B20	3	6	4' - 0"	17A
B21	1	4	5' - 9"	19
B22	1	4	3' - 3"	19B
C1	35	5	4' - 7"	T1A
C2	36	5	4' - 10"	S11
C3	1	5	5' - 8"	T1A
C4	2	5	5' - 3"	S11
C5	2	5	5' - 7"	T1
C6	3	6	7' - 4"	T1
C7	3	5	6' - 5"	T1
C8	1	6	7' - 3"	17
C9	1	5	3' - 5"	17
D2	1	4	2' - 6"	19B
D7	14	4	22' - 0"	Str.
D7a	22	4	28' - 0"	Str.
F2	40	5	2' - 6"	Str.



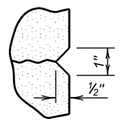
NOTES:
✶ Bend in field as necessary to fit.
All dimensions are out to out of bars.
All bars to be Epoxy Coated.

ESTIMATED QUANTITIES

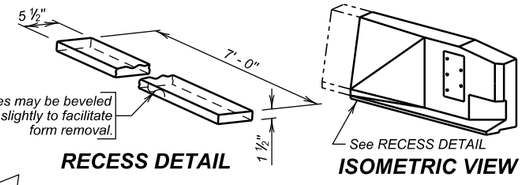
ITEM	UNIT	QUANTITY
Concrete Barrier Curb and Gutter	Ft.	34
Concrete Barrier Curb and Gutter End Section	Ft.	7

Items 1 thru 4 are approximate quantities contained in the above bid items and are for information only.

1. 0.9 Cu. Yds. Concrete in one Endblock Section.
2. 189 Lbs. Epoxy Coated Re-Steel in one Endblock Section.
3. 0.3 Cu. Yds. of Concrete per foot in Regular Barrier Section.
4. 54 Lbs. Epoxy Coated Re-Steel per foot of Regular Barrier Section.

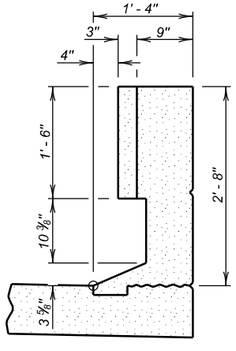


RUSTICATION DETAIL

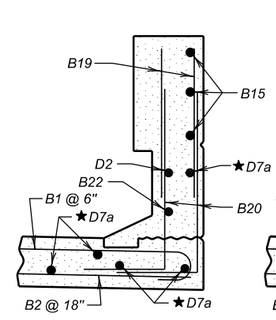


RECESS DETAIL

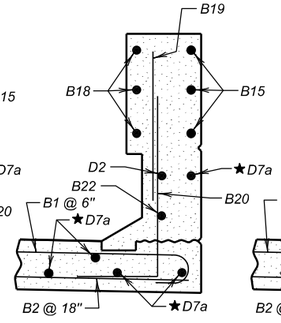
ISOMETRIC VIEW



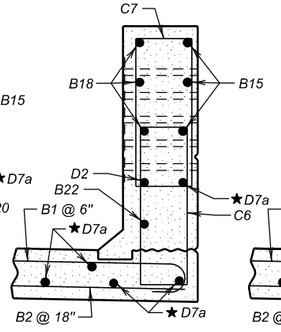
VIEW B - B



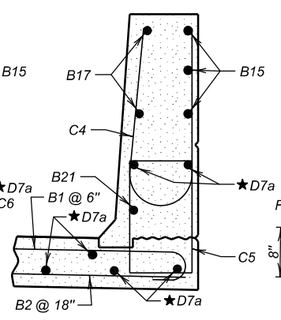
SECTION C - C



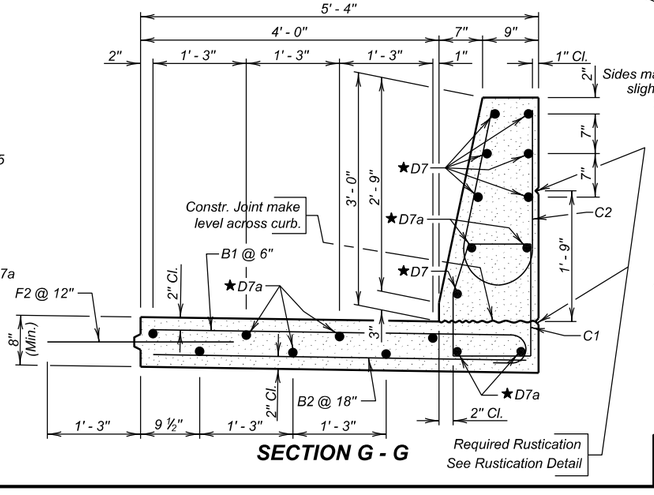
SECTION D - D



SECTION E - E



SECTION F - F



SECTION G - G

ENDBLOCK AND CONCRETE BARRIER CURB PANEL 7 DETAILS

FOR

CONCRETE BARRIER CURB AND GUTTER

ADJACENT TO RAMPS A AND B

SEC. 15-T3N-R6E
IM-CR-EM 0901(187)44

MEADE COUNTY

S. D. DEPT. OF TRANSPORTATION

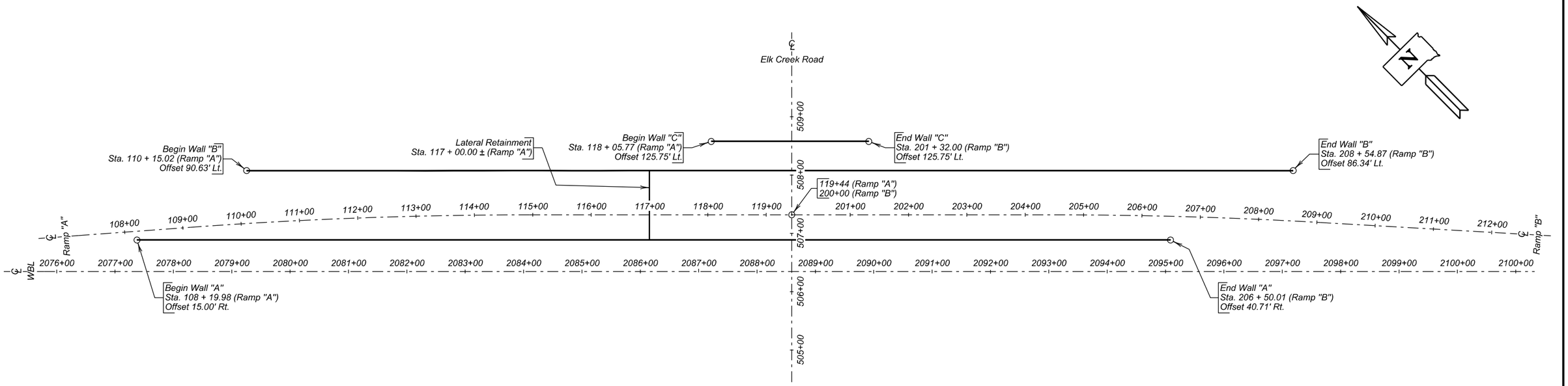
APRIL 2024

7 OF 7

DESIGNED BY	CK. DES. BY	DRAFTED BY	
MG	AU	MG	BRIDGE ENGINEER
MEAD0A9K	0A9KGM07		

Revised March 5, 2026 PW

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E122	E185



PLAN

INDEX OF WALL SHEETS-

Sheet No. 1 - Layout for M.S.E. Large Panel Retaining Wall "A" and Precast Modular Retaining Walls "B" and "C"
Sheet No. 2 - Estimate of Quantities and Notes for M.S.E. Large Panel Retaining Wall "A"
Sheet No. 3 - Notes (Continued) for M.S.E. Large Panel Retaining Wall "A"
Sheet No. 4 - Details (A) for M.S.E. Large Panel Retaining Wall "A"
Sheet No. 5 - Details (B) for M.S.E. Large Panel Retaining Wall "A"
Sheet No. 6 - Details (C) for M.S.E. Large Panel Retaining Wall "A"
Sheet No. 7 - Details (D) for M.S.E. Large Panel Retaining Wall "A"
Sheet No. 8 - Subsurface Investigation for M.S.E. Large Panel Retaining Wall "A"
Sheet No. 9 - Typical Section for M.S.E. Large Panel Retaining Wall "A"
Sheet No. 10 - Estimate of Quantities and Notes for Precast Modular Stem Walls "B" and "C"
Sheet No. 11 - Details (A) for Precast Modular Stem Wall "B"
Sheet No. 12 - Details (B) for Precast Modular Stem Wall "B"
Sheet No. 13 - Details (C) for Precast Modular Stem Wall "B"
Sheet No. 14 - Details (D) for Precast Modular Stem Wall "B"
Sheet No. 15 - Subsurface Investigation for Precast Modular Stem Wall "B"
Sheet No. 16 - Details for Precast Modular Stem Wall "C"
Sheet No. 17 - Subsurface Investigation for Precast Modular Stem Wall "C"
Sheet No. 18 - Typical Section (A) for Precast Modular Stem Walls "B" and "C"
Sheet No. 19 - Typical Section (B) for Precast Modular Stem Walls "B" and "C"
Sheet No. 20 - Details of Standard Plate No.'s 430.50 & 650.10

LATERAL RETAINMENT NOTES

1. Retaining Walls "A" and "B" will require lateral retainment of granular backfill and embankment or tapered down retaining wall construction to keep present Ramp "B" open for exiting traffic to present Elk Creek Road until the beginning of Phase 2A. See Traffic Control Overview - Year 1 in SECTION C.
2. Retaining wall shop plans will include specific details for phased wall construction including how to retain backfill material laterally without undermining wall reinforcement.
3. The cost of any additional retaining wall systems to retain embankment between the walls and/or lateral retaining systems to retain wall backfill will be incidental to other retaining wall contract items.

LAYOUT

FOR

M.S.E. LARGE PANEL RETAINING WALL "A" AND PRECAST MODULAR STEM WALLS "B" AND "C"

ADJ. TO WBL I-90 & RAMP A & B — SEC. 15-T3N-R6E

PCN 0A9K — IM-CR-EM 0901(187)44

MEADE COUNTY

S. D. DEPT. OF TRANSPORTATION

NOVEMBER 2023

1 OF 20

PLANS BY :
OFFICE OF BRIDGE DESIGN, SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION

DESIGNED BY	CK. DES. BY	DRAFTED BY	
PW	AU	MG/BT	Steve A Johnson BRIDGE ENGINEER
MEAD0A9K	0A9KTL01		

* ESTIMATE OF STRUCTURE QUANTITIES

DESCRIPTION	QUANTITY	UNIT	REMARKS
Structure Excavation, Retaining Wall	883	CuYd	
MSE Large Panel Wall, Furnish	26699	SqFt	See Special Provision
MSE Large Panel Wall, Install	26699	SqFt	
Granular Backfill for MSE Large Panel Wall	17515	CuYd	
6" Underdrain Pipe	2482	Ft	
Geogrid Reinforcement	832	SqYd	
Foundation Preparation, Retaining Wall	2340	CuYd	
Type C6 Concrete Gutter	1774	Ft	
Precast Concrete Headwall for Drain	1	Each	

* Quantities shown are for bidding purposes only. Actual quantities are to be determined by the wall designer and shown on the shop plans.

SPECIFICATIONS

1. Design Specifications: AASHTO LRFD Bridge Design Specifications, 9th Edition.

2. Construction Specifications: South Dakota Standard Specifications for Roads and Bridges, 10-1-25 Version, Required Provisions, and Special Provisions as included in the Proposal. The Standard Specifications for Roads and Bridges are available for download and viewing at https://dot.sd.gov/doing-business/contractors/standard-specifications.

MSE RETAINING WALL GENERAL NOTES

1. The concrete facing panels for the wall will be square.

2. The Mechanically Stabilized Earth (MSE) Large Panel Retaining Walls will be on the current approved products list located at the following website address: http://apps.sd.gov/HC60ApprovedProducts/main.aspx.

3. See Special Provision for MECHANICALLY STABILIZED EARTH (LARGE PANEL) WALLS

4. The wall panel front face surface texture will be intended to simulate a natural rock wall. Wall panels and coping will be colored to blend with the surrounding landscape. Color may be achieved by the use of colored concrete or surface staining. A minimum of 3 colors will be used to prevent a uniform appearance. Submit wall panel pattern, colors, and method of achieving colors to the Engineer for approval a minimum of 2 weeks prior to fabrication.

5. The minimum embedment depth to the bottom of the wall will be 2 feet below finished ground elevation.

6. The wall designer will use the soil parameters provided in the plans unless changes have been approved through the Geotechnical Engineering Activity.

7. Horizontal dimensions shown are measured along the front face of the wall.

8. Top of wall elevations shown are at the top of the concrete coping.

9. The retaining wall will be installed in accordance to the selected wall companies' instructions, specifications, and approved shop drawings.

10. If the Designer of the MSE Large Panel Wall determines that direct sliding controls the reinforcement length during the design of the wall, the Designer will consult the Department's Geotechnical Engineering Activity for possible alternatives to lengthening the reinforcement.

11. A layer of Type B Drainage Fabric will be placed over the top of the Granular Backfill for MSE Large Panel Wall prior to placing any soil over the granular backfill. The intent of this fabric is to act as a separator and keep fines from intruding into the granular material. All costs in furnishing and installing the Type B Drainage Fabric will be incidental to the contract unit price per cubic yard for "Granular Backfill for MSE Large Panel Wall".

12. Required minimum reinforcement length will be 8 feet per AASHTO 11.10.2.1, or as determined by the wall designer. Initial calculations have determined that reinforcement lengths will be approximately 80% of the total wall height for wall sections less than 15 feet high; 85% of the total wall height for wall sections between 15 – 21.5 feet; 105% for wall sections greater than 21.5 feet high; and 110% of the total wall height for wall sections beneath the bridge abutment.

13. A 27-inch (minimum inside diameter) steel casing will be installed at abutment pile locations prior to the placing and compacting of fill for construction of the proprietary wall(s). Twelve (12) casings are required. See bridge plans for pile and casing locations. The Contractor's method of installing casing will be submitted to the Engineer for approval a minimum of 2 weeks prior to construction Casing will be cut off 3" below the bottom of the abutment footing. The type of casing proposed by the Contractor will be of sufficient strength to withstand all forces including those from earth pressure and will be approved by the Engineer. The cost of furnishing and installing the casings will be incidental to the contract unit price per cubic yard for "Granular Backfill for MSE Large Panel Wall."

14. The Contractor will take necessary precautions to prevent displacement of the casings during placing and compacting fill material within close proximity of the casings. Granular backfill material within three feet of the casings will be placed in lifts and compacted as directed by the Engineer to obtain required density.

15. A structural extension of the connection of the wall panel to the soil reinforcement will be used whenever necessary to avoid the cutting or excessive skewing (greater than 15 degrees) of the soil reinforcement at pile casings. Soil reinforcements will be placed a minimum of 4 inches from the steel H-pile casings.

16. Construction of the wall will begin at the lowest course and proceed upwards. An underdrain will be placed prior to wall backfill placement and will be functional to prevent water from backing up into the wall backfill. The lowest course must be placed and backfilled in its entirety prior to construction of any subsequent courses. Backfill placement must be placed in successive horizontal lifts. Requests for exceptions to building the wall from the full lowest course must be approved by the Bridge Construction Engineer.

UNDERDRAINS

1. An underdrain system will be placed behind the MSE Large Panel retaining wall as shown in the plans.

2. The 6-inch diameter Perforated PVC Drain Pipe will be PS 46 Solvent Weld PVC pipe conforming ASTM F758 or SDR 35 Solvent Weld PVC Pipe conforming to ASTM D3034 with perforations in accordance with ASTM F758. The 6" Dia. PVC Outlet Pipe will be Schedule 40 PVC Pipe conforming to ASTM D1785 designated as PVC 1120, PVC 1220, or PVC 2120. Pipe sections will be connected using a PVC Solvent Cement conforming to ASTM D2564. The Drain Sleeve will conform to ASTM D6707.

3. Care will be taken to ensure that the 6-inch diameter Perforated PVC Drain Pipe and the 6-inch diameter PVC Outlet Pipe are not damaged during construction. Sufficient cover material will be placed over the pipes before compaction equipment is allowed over the underdrain system. Any damaged pipes will be replaced by the Contractor at no additional cost to the Department.

4. All labor, tools, equipment, and any incidentals necessary for the Installation of 6-inch diameter Perforated PVC Drain Pipe, 6-inch diameter PVC Outlet Pipe, SDR Solvent Weld PVC Coupling, and PVC Cement will be incidental to the contract unit price per foot for 6" Underdrain Pipe.

ESTIMATE OF STRUCTURE QUANTITIES AND NOTES
FOR
M.S.E. LARGE PANEL RETAINING WALL "A"

DECEMBER 2023

DESIGNED BY	CK. DES. BY	DRAFTED BY	
AU	PW	AU	Steve A. Johnson BRIDGE ENGINEER
MEAD0A9K	0A9KTL02		

FOUNDATION PREPARATION

Foundation preparation for the retaining wall will consist of excavating the wall footprint to two feet below the bottom of the leveling pad elevation as shown on the typical sections. Granular material conforming to the gradation requirements of Base Course in Section 882 of the Specifications will be placed in six-inch lifts to the bottom of wall elevation and be compacted according to Section 260.3.B. Prior to placing any granular material, all spoil or loose material will be removed, and the area wetted then proof rolled to ensure adequate density.

GEOGRID

1. The geogrid will be a biaxial grid of single-layer construction. Vibratory welded, integrally formed or woven, and coated geogrids will be acceptable. Grids with laser-welded grid junctions will not be allowed. Geogrid will be certified by the supplier to meet the following specification prior to installation:

Property	Test	MARV
Wide Width Strip Tensile Strength (Ultimate)	ASTM D 6637	850lb/ft MD and XD

2. Geogrid will be paid for at the contract unit price per sq. yd. for Geogrid Reinforcement. Payment quantities will be based on area covered plus 15% to account for overlap. Payment will be full compensation for furnishing and installing the geogrid only. Granular backfill materials will be paid for under a different bid item.

3. The geogrid will be placed on a level surface and overlapped a minimum of 2 feet.

4. The geogrid will be placed as taut as possible with minimal wrinkles, and so that subsequent granular material does not displace, wrinkle, or distort the in-place geogrid. Overlaps will be shingled in a manner that ensures that granular material will not be forced under the geogrid during backfilling operations. Geogrid may be held in place with small piles of granular material or staples.

5. Granular material will be dumped at least 20 feet behind the leading edge of the backfill and pushed into place with a loader or dozer from the covered areas to the uncovered areas. No traffic will be allowed on the uncovered geogrid.

NOTES (CONTINUED)

FOR

M.S.E. LARGE PANEL RETAINING WALL "A"

DECEMBER 2023

DESIGNED BY	CK. DES. BY	DRAFTED BY	
AU	PW	AU	Steve A. Johnson BRIDGE ENGINEER
MEAD0A9K	0A9KTL03		

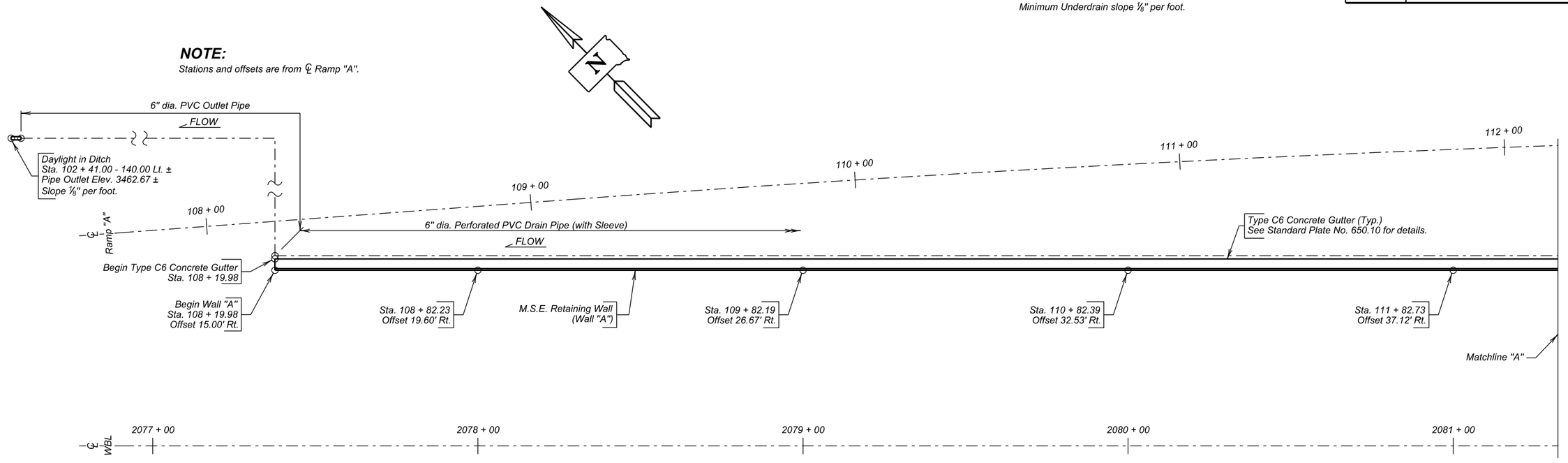
The elevations shown in these plans are based on the National Geodetic Survey (NGS) North American Vertical Datum of 1988 (NAVD88).

Revised March 5, 2026 PW

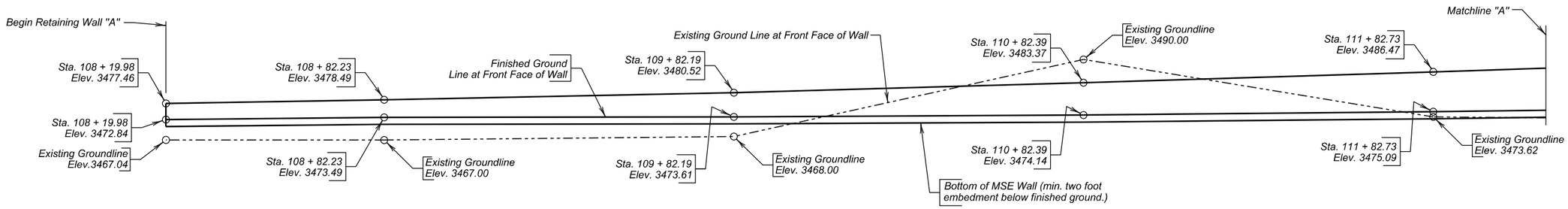
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E125	E185

Note:
Minimum Underdrain slope ⅛" per foot.

NOTE:
Stations and offsets are from ℄ Ramp "A".



PLAN



ELEVATION

ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
6" Underdrain Pipe	Ft.	2482

1. 1772 ft. 6" dia. Perforated PVC Drain Pipe (with Sleeve).
2. 710 ft. 6" dia. PVC Outlet Pipe.

Items 1 and 2 are approximate quantities contained in the 6" Underdrain Pipe and are for information only.

WALL "A"

DETAILS (A)

FOR

M.S.E. LARGE PANEL RETAINING WALL

ADJ. I-90 SEC. 15-T3N-R6E
STA. 108 + 19.98 (RAMP "A") TO IM-CR-EM 0901(187)44
STA. 206 + 50.01 (RAMP "B")

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
SEPEMBER 2023

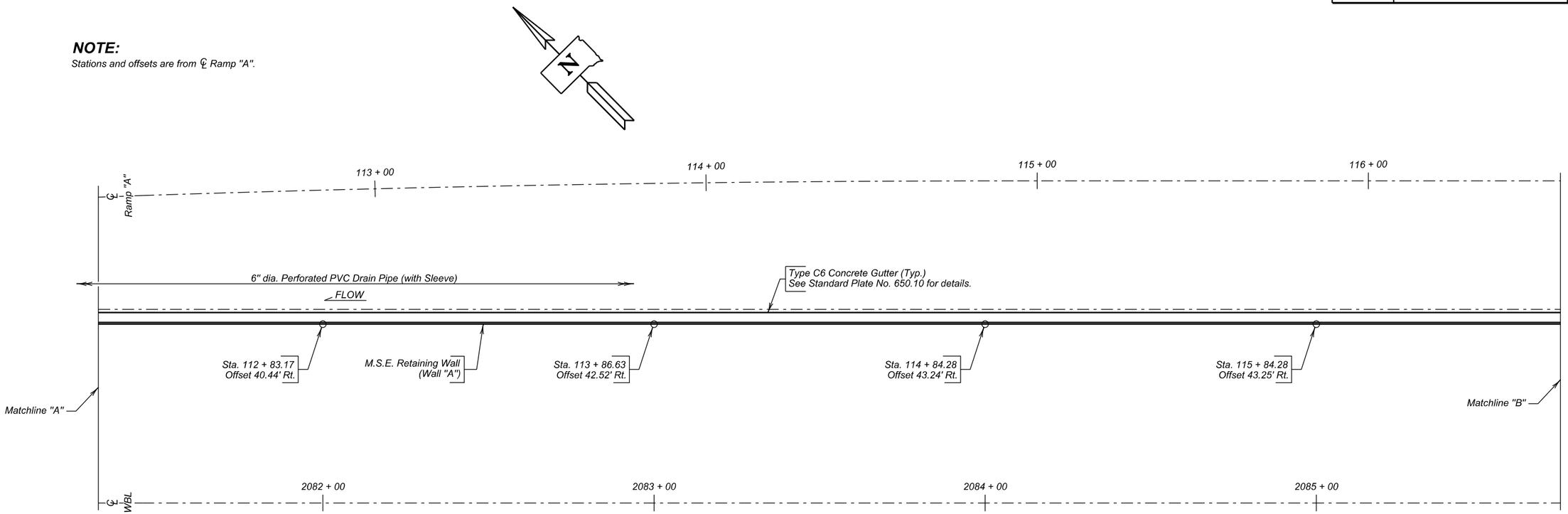
DESIGNED BY	CK. DES. BY	DRAFTED BY	
PW MEAD0A9K	AU 0A9KTL04	MG	Steve A Johnson BRIDGE ENGINEER

The elevations shown in these plans are based on the National Geodetic Survey (NGS) North American Vertical Datum of 1988 (NAVD88).

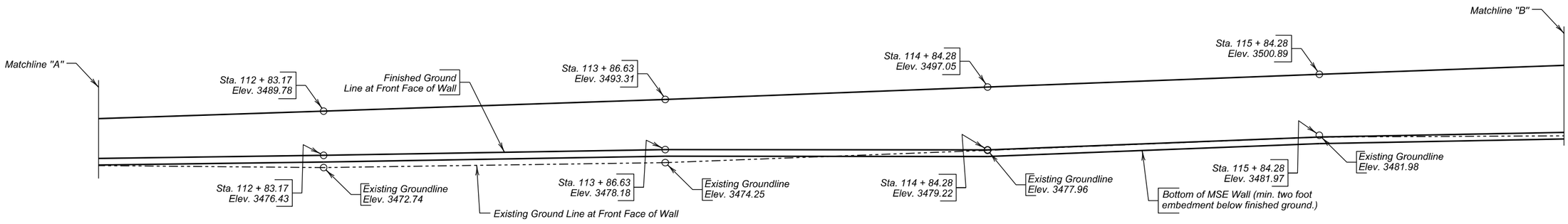
Revised March 5, 2026 PW

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E126	E185

NOTE:
Stations and offsets are from ℄ Ramp "A".



PLAN



ELEVATION

WALL "A"

DETAILS (B)

FOR

M.S.E. LARGE PANEL RETAINING WALL

ADJ. I-90 SEC. 15-T3N-R6E
STA. 108 + 19.98 (RAMP "A") TO IM-CR-EM 0901(187)44
STA. 206 + 50.01 (RAMP "B")

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
SEPEMBER 2023

DESIGNED BY	CK. DES. BY	DRAFTED BY	
PW MEAD0A9K	AU 0A9KTL05	MG	Steve A Johnson BRIDGE ENGINEER

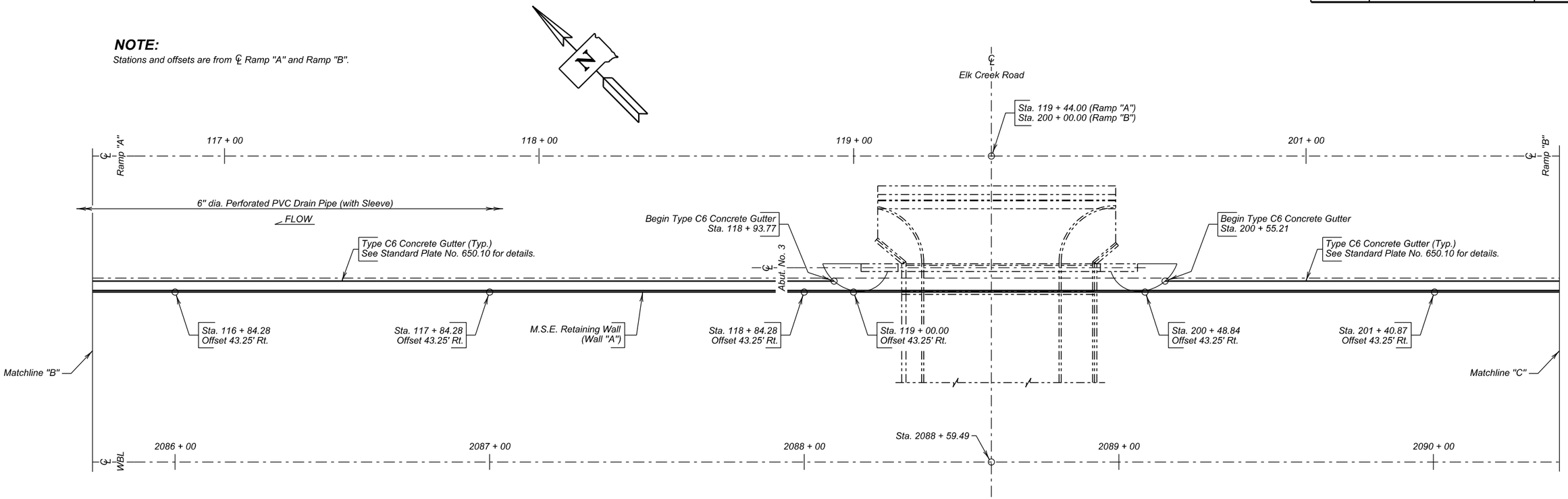
The elevations shown in these plans are based on the National Geodetic Survey (NGS) North American Vertical Datum of 1988 (NAVD88).

Revised March 5, 2026 PW

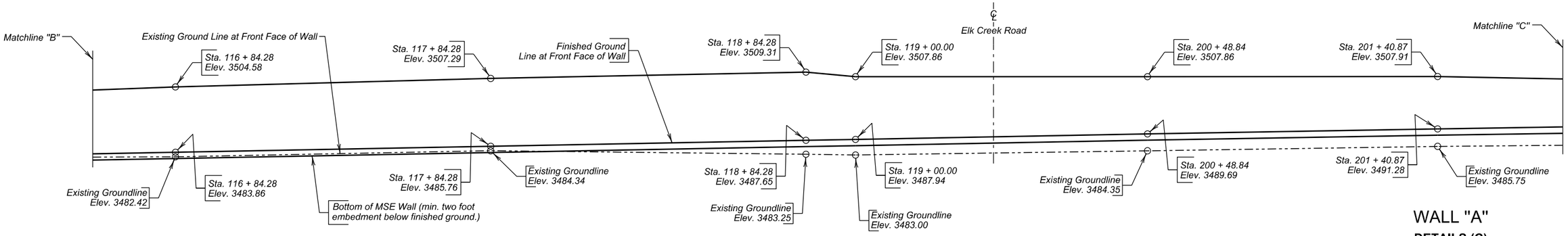
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E127	E185

NOTE:

Stations and offsets are from ℄ Ramp "A" and Ramp "B".



PLAN



ELEVATION

WALL "A"

DETAILS (C)

FOR

M.S.E. LARGE PANEL RETAINING WALL

ADJ. I-90 SEC. 15-T3N-R6E

STA. 108 + 19.98 (RAMP "A") TO IM-CR-EM 0901(187)44

STA. 206 + 50.01 (RAMP "B")

MEADE COUNTY

S. D. DEPT. OF TRANSPORTATION

SEPEMBER 2023

6 OF 20

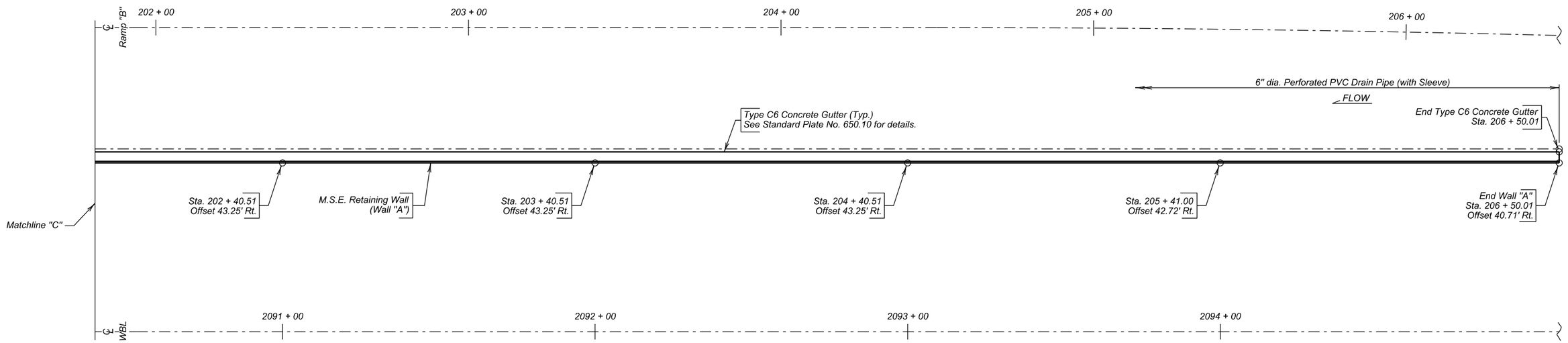
DESIGNED BY	CK. DES. BY	DRAFTED BY	
PW	AU	MG	Steve A Johnson BRIDGE ENGINEER
MEAD0A9K	0A9KTL06		

The elevations shown in these plans are based on the National Geodetic Survey (NGS) North American Vertical Datum of 1988 (NAVD88).

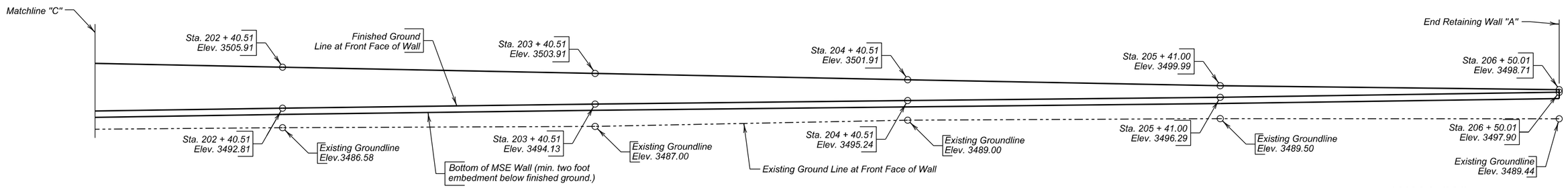
Revised March 5, 2026 PW

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E128	E185

NOTE:
Stations and offsets are from ℄ Ramp "B".



PLAN



ELEVATION

WALL "A"

DETAILS (D)

FOR

M.S.E. LARGE PANEL RETAINING WALL

ADJ. I-90 SEC. 15-T3N-R6E
STA. 108 + 19.98 (RAMP "A") TO IM-CR-EM 0901(187)44
STA. 206 + 50.01 (RAMP "B")

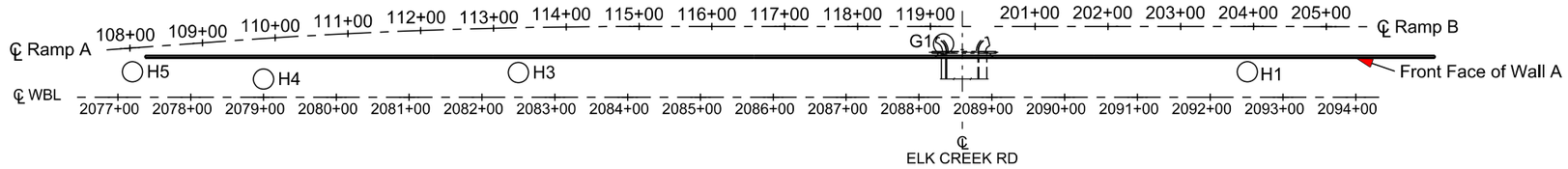
MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
SEPEMBER 2023

DESIGNED BY	CK. DES. BY	DRAFTED BY	
PW	AU	MG	Steve A Johnson BRIDGE ENGINEER
MEAD0A9K	0A9KTL07		

Revised March 5, 2026 PW

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E129	E185

	Factored Bearing Resistance, R_r	Friction Angle (Φ)	Cohesion (c)	Wet Unit Weight (γw)
Clay Silt with Sand & Gravel	6,000 psf	30°	0 psf	100 pcf
Clay Silt	6,000 psf	22°	300 psf	123 pcf
Select Fill	6,000 psf	26°	150 psf	124 pcf
Base Course	6,000 psf	32°	0 psf	135 pcf
Reinforced Soils	-	34°	0 psf	105 pcf
Retained Soils	-	22°	100 psf	120 pcf



Hole Number	H5	
Station	2077+20	
Depth	2.5	ft
Soil Color	Red	
Classification	Clay Silt	
Strength (Qu)	No Test	psf
Dry Density	110.1	pcf
Wet Density	123.6	pcf
Moisture	12.2	%
Pass No. 10	99.0	%
Pass No. 40	95.2	%
Pass No. 200	85.0	%
Sand Content	14.0	%
Silt Content	54.5	%
Clay Content	30.5	%

Hole Number	H4	
Station	2079+00	
Depth	2.5	ft
Soil Color	Red	
Classification	Clay Silt	
Strength (Qu)	No Test	psf
Dry Density	117.2	pcf
Wet Density	127.4	pcf
Moisture	8.7	%
Pass No. 10	99.7	%
Pass No. 40	88.8	%
Pass No. 200	83.6	%
Sand Content	16.2	%
Silt Content	62.8	%
Clay Content	20.7	%

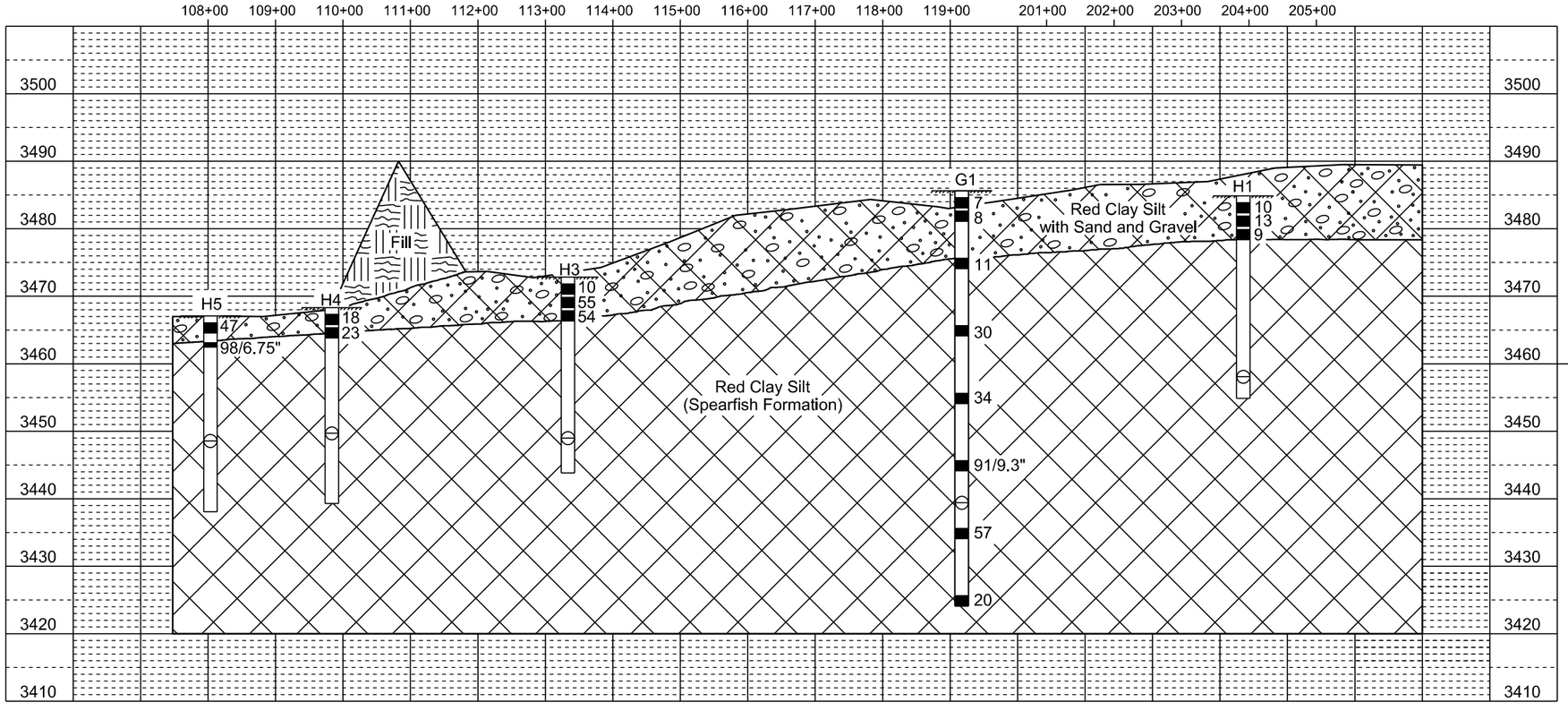
Hole Number	H4	
Station	2079+00	
Depth	4.5	ft
Soil Color	Red	
Classification	Sandy Silt	
Strength (Qu)	1,974	psf
Dry Density	122.0	pcf
Wet Density	131.2	pcf
Moisture	7.6	%
Pass No. 10	99.7	%
Pass No. 40	87.8	%
Pass No. 200	77.6	%
Sand Content	22.2	%
Silt Content	60.8	%
Clay Content	16.8	%

Hole Number	H3	
Station	2082+50	
Depth	2.5	ft
Soil Color	Red	
Classification	Silt Clay	
Strength (Qu)	No Test	psf
Dry Density	79.8	pcf
Wet Density	87.0	pcf
Moisture	8.9	%
Pass No. 10	100.0	%
Pass No. 40	99.7	%
Pass No. 200	93.6	%
Sand Content	6.4	%
Silt Content	58.8	%
Clay Content	34.8	%

Hole Number	G1	
Station	119+24	
Depth	2.5	ft
Soil Color	Red	
Classification	Sandy Silt	
Strength (Qu)	No Test	psf
Dry Density	79.6	pcf
Wet Density	84.2	pcf
Moisture	5.7	%
Pass No. 10	99.3	%
Pass No. 40	95.6	%
Pass No. 200	57.0	%
Sand Content	42.3	%
Silt Content	41.1	%
Clay Content	15.9	%

Hole Number	H1	
Station	2092+51	
Depth	2.2	ft
Soil Color	Red	
Classification	Silt Clay	
Strength (Qu)	2,032	psf
Dry Density	97.8	pcf
Wet Density	108.5	pcf
Moisture	11.0	%
Pass No. 10	99.9	%
Pass No. 40	97.9	%
Pass No. 200	73.7	%
Sand Content	26.2	%
Silt Content	43.0	%
Clay Content	30.8	%

Hole Number	H1	
Station	2092+51	
Depth	4.5	ft
Soil Color	Red	
Classification	Clay Silt	
Strength (Qu)	1,385	psf
Dry Density	90.9	pcf
Wet Density	98.2	pcf
Moisture	8.0	%
Pass No. 10	99.9	%
Pass No. 40	99.6	%
Pass No. 200	85.0	%
Sand Content	15.0	%
Silt Content	58.2	%
Clay Content	26.8	%



The Spearfish Formation is a relatively weak red sandy shale. Textural classification typically is a clay silt. Gypsum is present throughout the formation that varies from thin stringers to massive deposits over 30 feet thick. Bedded layers of red stained sandstone can also be encountered. Unweathered Spearfish Formation is considered to be "Soft Rock", although massive unweathered gypsum may behave similar to weak limestone.

The Geotechnical Engineering Activity has all of the boring logs and laboratory test results available for review at the Central Office in Pierre.

LEGEND

○ Penetration Test ⊖ Caved ▬ Sample Zone

Penetration test holes are drilled with a 6⅝ inch diameter hollow stem auger. Penetration tests are conducted by dropping a 140 pound hammer 30 inches to collect samples and measure the resistance to penetration of the soil. Samples are collected using a lined Modified California Sampler. Penetration test results are listed as uncorrected "N" values in blows per foot. Blows over inches are listed if refusal is achieved, which is 50 blows within one 6 inch set.

GROUNDWATER ELEVATIONS
NOVEMBER 2021

G1	(CAVED)	3439.6
H1	(CAVED)	3458.1
H3	(CAVED)	3449.0
H4	(CAVED)	3449.7
H5	(CAVED)	3448.6

WALL "A"

SUBSURFACE INVESTIGATION

FOR

M.S.E. LARGE PANEL RETAINING WALL

ADJ. I-90 SEC. 15-T3N-R6E
STA. 108 + 19.98 (RAMP "A") TO STA. 206 + 50.01 (RAMP "B") IM-CR-EM 0901(187)44

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
DECEMBER 2023

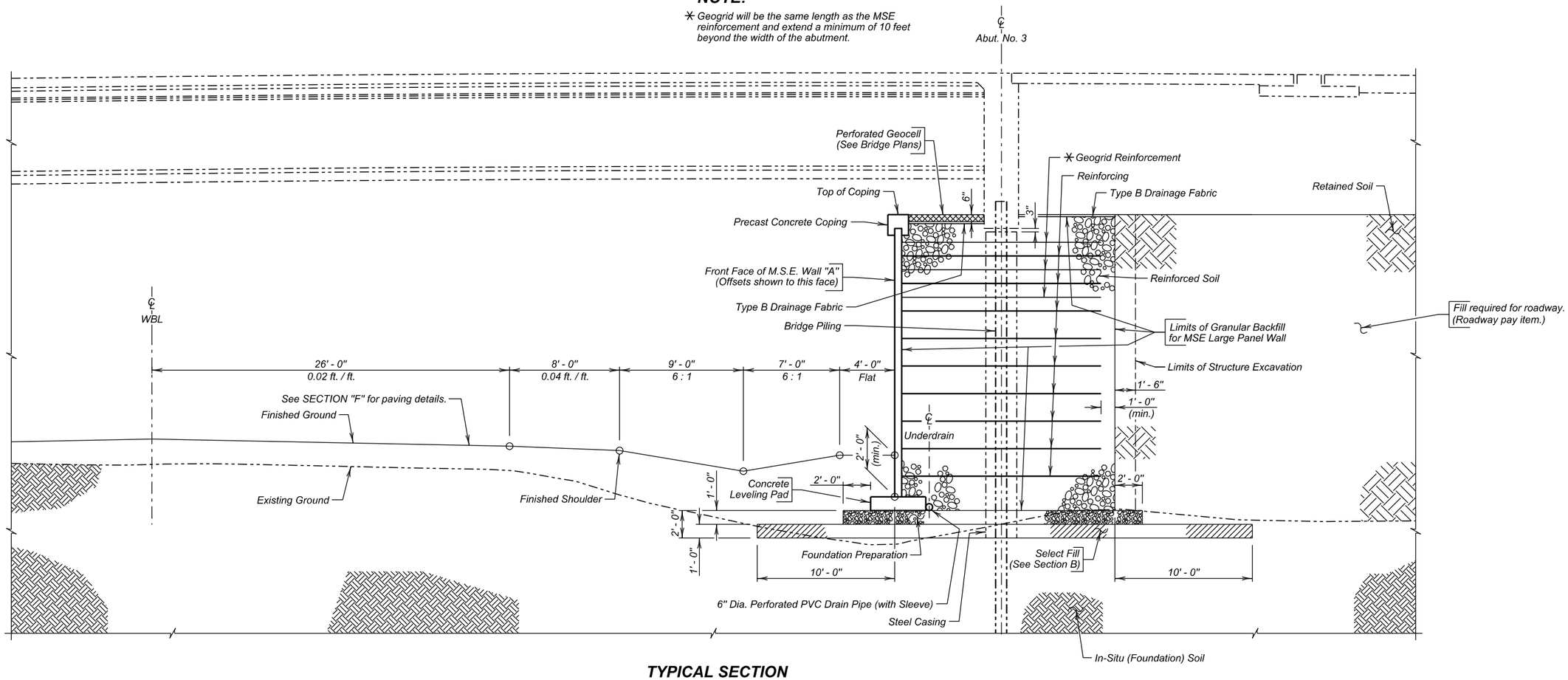
DESIGNED BY	CK. DES. BY	DRAFTED BY	
SH/PW	SH/AU	HK/MG/BT	Steven A. Johnson BRIDGE ENGINEER
MEAD0A9K	0A9KTL08		

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E130	E185

Revised March 5, 2026 PW

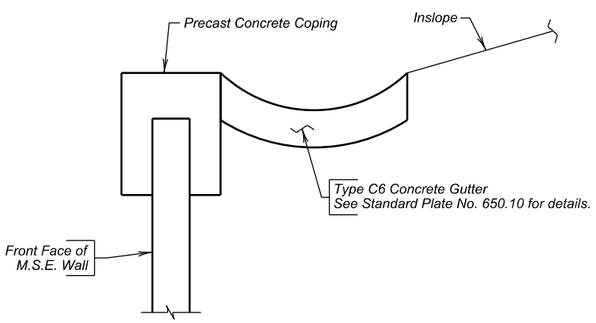
NOTE:

✳ *Geogrid will be the same length as the MSE reinforcement and extend a minimum of 10 feet beyond the width of the abutment.*

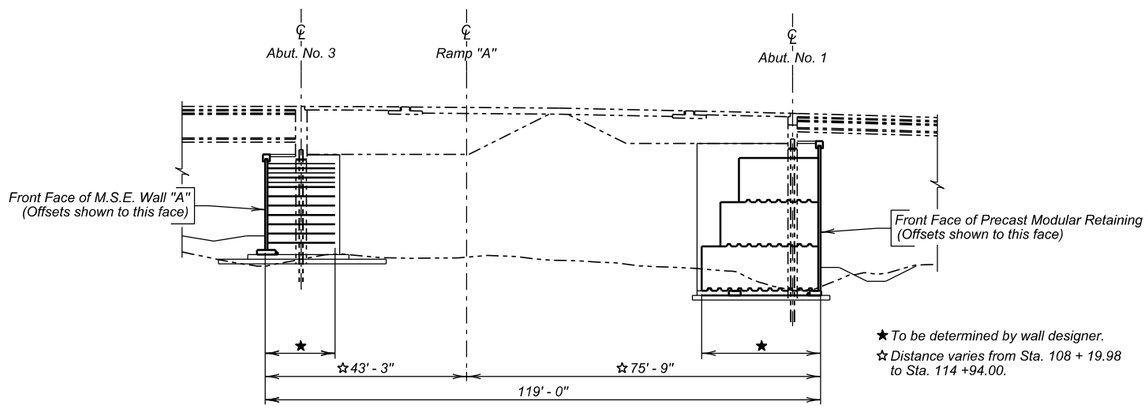


TYPICAL SECTION

(Perpendicular to ℄ of Wall at ℄ Roadway and ℄ Bridge)



GUTTER DETAIL



★ *To be determined by wall designer.*

☆ *Distance varies from Sta. 108 + 19.98 to Sta. 114 +94.00.*

TYPICAL SECTION

(Perpendicular to ℄ of Wall at ℄ Roadway and ℄ Bridge)

NOTE:

See Special Provision for M.S.E. Large Panel Retaining Wall.

WALL "A"

TYPICAL SECTION

FOR

M.S.E. LARGE PANEL RETAINING WALL

ADJ. TO WBL I-90 & RAMP A & B SEC. 15-T3N-R6E

IM-CR-EM 0901(187)44

MEADE COUNTY

S. D. DEPT. OF TRANSPORTATION

DECEMBER 2023

DESIGNED BY	CK. DES. BY	DRAFTED BY	
PW	AU	MG/BT	Steve A Johnson BRIDGE ENGINEER
MEAD0A9K	0A9KTL09		

* ESTIMATE OF STRUCTURE QUANTITIES

DESCRIPTION	QUANTITY	UNIT	REMARKS
Precast Modular Stem Wall, Furnish	44560	SqFt	See Special Provision
Precast Modular Stem Wall, Install	44560	SqFt	See Special Provision
Granular Backfill for MSE Large Panel Wall	34842	CuYd	See Special Provision
4" Underdrain Pipe	477	Ft	
6" Underdrain Pipe	2567	Ft	
Foundation Preparation, Retaining Wall	394	CuYd	
Type C6 Concrete Gutter	1870	Ft	
Structure Excavation, Retaining Wall	798	CuYd	
Precast Concrete Headwall for Drain	2	Each	

* Quantities shown are for bidding purposes only. Actual quantities are to be determined by the wall designer and shown on the shop plans.

SPECIFICATIONS

1. Design Specifications: AASHTO LRFD Bridge Design Specifications, 9th Edition.

2. Construction Specifications: South Dakota Standard Specifications for Roads and Bridges, 10-1-25 Version, Required Provisions, and Special Provisions as included in the Proposal. The Standard Specifications for Roads and Bridges are available for download and viewing at https://dot.sd.gov/doing-business/contractors/standard-specifications.

STEM WALL GENERAL NOTES

1. See the Special Provision for Precast Modular Stem Walls.

2. The concrete facing panels for the wall will be rectangular.

3. The Precast Modular Stem Walls will be from the following company:

   Geoquest USA, Inc. – T Wall
   (703) 547-8797
   https://www.geoquest-group.us/

4. The Stem wall will be installed in accordance to the selected wall companies' instructions, specifications, and approved shop drawings.

5. The wall panel front face surface texture will be will intended to simulate a natural rock wall. Wall panels and coping will be colored to blend with the surrounding landscape. Color may be achieved by the use of colored concrete or surface staining. A minimum of 3 colors will be used to prevent a uniform appearance. Submit wall panel pattern, colors, and method of achieving colors to the Engineer for approval a minimum of 2 weeks prior to fabrication.

6. The minimum embedment depth to the bottom of the walls will be 3 feet below the finished railroad ditch grade flowline elevation at Wall B, and 4 feet below finished railroad ditch grade flowline elevation at Wall C.

7. Top of wall elevations shown are at the top of the concrete coping.

8. The wall designer will use the soil parameters provided in the plans unless prior communication and approval has been provided through the Geotechnical Engineering Activity.

9. A layer of Type B Drainage Fabric will be placed over the top of the Granular Backfill for MSE Wall prior to placing any soil over the granular backfill. The intent of this fabric is to act as a separator and keep fines from intruding into the granular material. All costs in furnishing and installing the Type B Drainage Fabric will be incidental to the contract unit price per cubic yard for "Granular Backfill for MSE Wall".

10. Construction of the wall will begin at the lowest course and proceed upwards. An underdrain will be placed prior to wall backfill placement and will be functional to prevent water from backing up into the wall backfill. The lowest course must be placed and backfilled in its entirety prior to construction of any subsequent courses. Backfill placement must be placed in successive horizontal lifts. Requests for exceptions to building the wall from the full lowest course must be approved by the Bridge Construction Engineer.

11. A 24-inch (minimum inside diameter) steel casing will be installed at abutment pile locations prior to the placing and compacting of fill for construction of the proprietary wall(s). Nine (9) casings are required at each abutment. See bridge plans for pile and casing locations. The Contractor's method of installing casing will be submitted to the Engineer for approval a minimum of 2 weeks prior to construction Casing will be cut off 3" below the bottom of the abutment footing. The type of casing proposed by the Contractor will be of sufficient strength to withstand all forces including those from earth pressure and will be approved by the Engineer. The cost of furnishing and installing the casings will be incidental to the contract unit price per cubic yard for "Granular Backfill for MSE Wall."

12. The Contractor will take necessary precautions to prevent displacement of the casings during placing and compacting fill material within close proximity of the casings. Granular backfill material within three feet of the casings will be placed in lifts and compacted as directed by the Engineer to obtain required density.

13. The Contractor will take necessary precautions to avoid conflict between abutment pile and stem locations. Stem reinforcement will be placed a minimum of 6 inches from pile casings. Care will be taken to avoid altering pile locations.

14. Wall C must be constructed at the same time as its corresponding section in Wall B. Excavation must take place at the same rate at the same time. The lowest course must be placed and backfilled in its entirety prior to construction of any subsequent courses. Backfill must be placed in successive horizontal lifts, bringing the backfill for both walls up to the same elevation at the same time.

UNDERDRAINS

1. An underdrain system will be placed behind the Precast Modular Stem Walls as shown in the plans.

2. The 4-inch and 6-inch diameter Perforated PVC Drain Pipe will be PS 46 Solvent Weld PVC pipe conforming ASTM F758 or SDR 35 Solvent Weld PVC Pipe conforming to ASTM D3034 with perforations in accordance with ASTM F758. The 4" Dia. and 6" Dia. PVC Outlet Pipe will be Schedule 40 PVC Pipe conforming to ASTM D1785 designated as PVC 1120, PVC 1220, or PVC 2120. Pipe sections will be connected using a PVC Solvent Cement conforming to ASTM D2564. The Drain Sleeve will conform to ASTM D6707.

3. Care will be taken to ensure that the 4-inch and 6-inch diameter Perforated PVC Drain Pipe and the 4-inch and 6-inch diameter PVC Outlet Pipe are not damaged during construction. Sufficient cover material will be placed over the pipes before compaction equipment is allowed over the underdrain system. Any damaged pipes will be replaced by the Contractor at no additional cost to the Department.

4. All labor, tools, equipment, and any incidentals necessary for the Installation of 4-inch diameter Perforated PVC Drain Pipe, 4-inch diameter PVC Outlet Pipe, SDR Solvent Weld PVC Coupling, and PVC Cement will be incidental to the contract unit price per foot for 4" Underdrain Pipe.

5. All labor, tools, equipment, and any incidentals necessary for the Installation of 6-inch diameter Perforated PVC Drain Pipe, 6-inch diameter PVC Outlet Pipe, SDR Solvent Weld PVC Coupling, and PVC Cement will be incidental to the contract unit price per foot for 6" Underdrain Pipe.

FOUNDATION PREPARATION

The soils underlying the embankments will be improved with aggregate columns prior to wall construction. The size, spacing, and number of aggregate columns will be determined by the column designer.

The sequence of operations will prioritize construction of the walls shortly following placement of the aggregate columns.

Foundation preparation for areas outside the limits of the aggregate columns will consist of stripping the organic material and topsoil from over the work area, and then placing a 12-inch layer of granular material. Final limits of the granular material will extend from 2 feet in front of the wall to at least 2 feet beyond the bottom wall stem (or as far as is required for installation of the aggregate columns), and laterally from 5 feet before the beginning of the wall to 5 feet past the end of the wall. Granular material conforming to the gradation requirements of Base Course in Section 882 of the Specifications will be placed in six-inch lifts to the bottom of wall elevation and be compacted according to Section 260.3.B. Prior to placing any granular material, all spoil or loose material will be removed, and the area wetted then proof rolled to ensure adequate density.

ESTIMATE OF STRUCTURE QUANTITIES AND NOTES
FOR
PRECAST MODULAR STEM WALLS "B" AND "C"

DECEMBER 2023

DESIGNED BY	CK. DES. BY	DRAFTED BY	
AU	PW	AU	Steve A Johnson BRIDGE ENGINEER
MEAD0A9K	0A9KTL10		

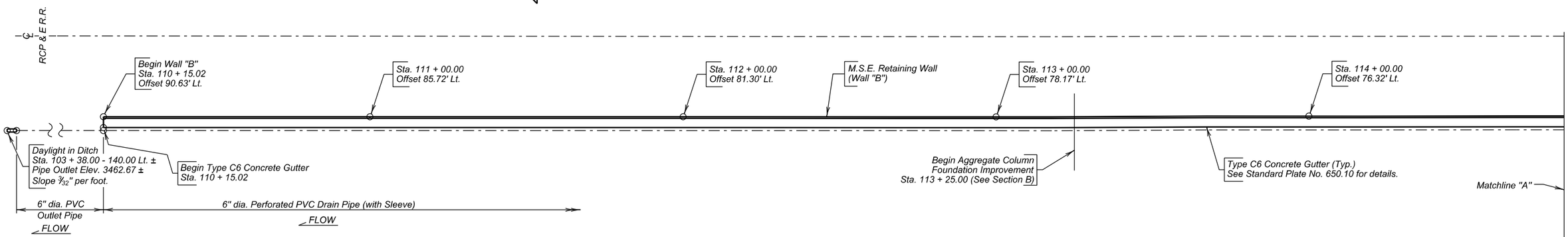
The elevations shown in these plans are based on the National Geodetic Survey (NGS) North American Vertical Datum of 1988 (NAVD88).

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E132	E185

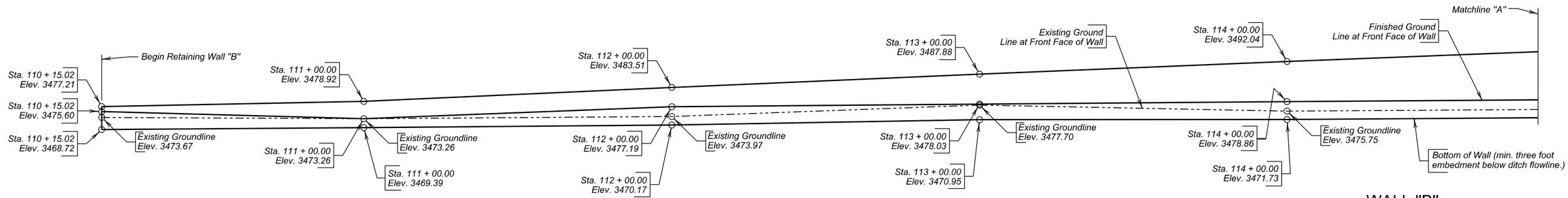
Note:
Minimum Underdrain slope $\frac{3}{32}$" per foot.

NOTE:

Stations and offsets are from ℄ Ramp A.



PLAN



ELEVATION

ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY
Precast Modular Stem Wall, Furnish	Sq. Ft.	38394
Precast Modular Stem Wall, Install	Sq. Ft.	38394
Granular Backfill for MSE Large Panel Wall	Cu. Yd.	29952
6" Underdrain Pipe	Ft.	2567
Foundation Preparation, Retaining Wall	Cu. Yd.	318
Type C6 Concrete Gutter	Ft.	1692
Structure Excavation, Retaining Wall	Cu. Yd	719

1. 1793 ft. 6" dia. Perforated PVC Drain Pipe (with Sleeve).
2. 774 ft. 6" dia. PVC Outlet Pipe.

Items 1 and 2 are approximate quantities contained in the 6" Underdrain Pipe and are for information only.

WALL "B"

DETAILS (A)

FOR

PRECAST MODULAR STEM WALL

ADJ. TO RAMP A & B — SEC. 15-T3N-R6E
STA. 110 + 15.02 (RAMP A) TO — IM-CR-EM 0901(187)44
STA. 208 + 54.87 (RAMP B)

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
SEPTEMBER 2023

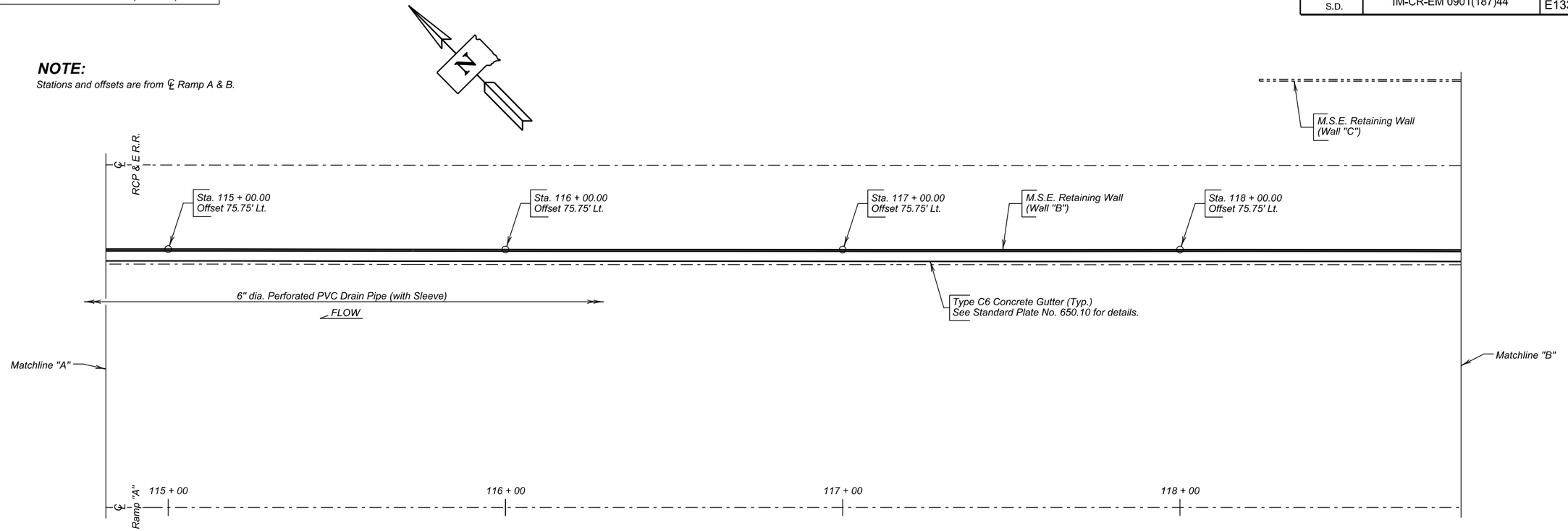
11 OF 20

DESIGNED BY	CK. DES. BY	DRAFTED BY	
PW	AU	MG	Steve A. Johnson BRIDGE ENGINEER
MEAD0A9K	0A9KTL11		

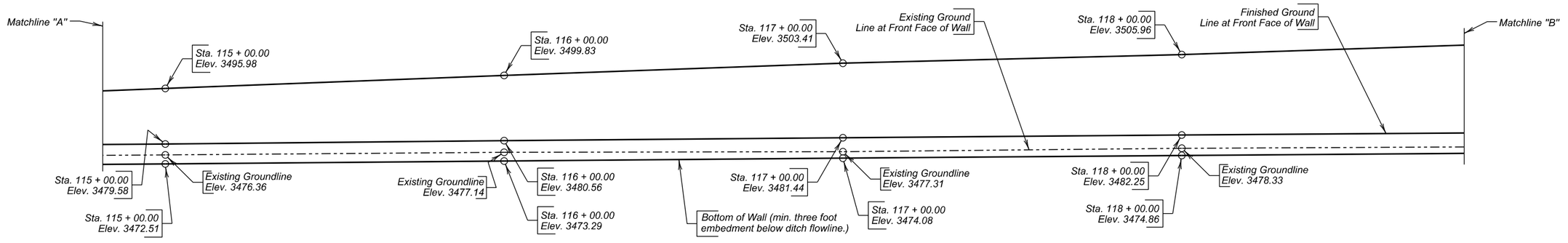
The elevations shown in these plans are based on the National Geodetic Survey (NGS) North American Vertical Datum of 1988 (NAVD88).

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E133	E185

NOTE:
Stations and offsets are from ℄ Ramp A & B.



PLAN



ELEVATION

WALL "B"

DETAILS (B)

FOR

PRECAST MODULAR STEM WALL

ADJ. TO RAMP A & B
STA. 110 + 15.02 (RAMP A) TO
STA. 208 + 54.87 (RAMP B)

SEC. 15-T3N-R6E
IM-CR-EM 0901(187)44

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
SEPTEMBER 2023

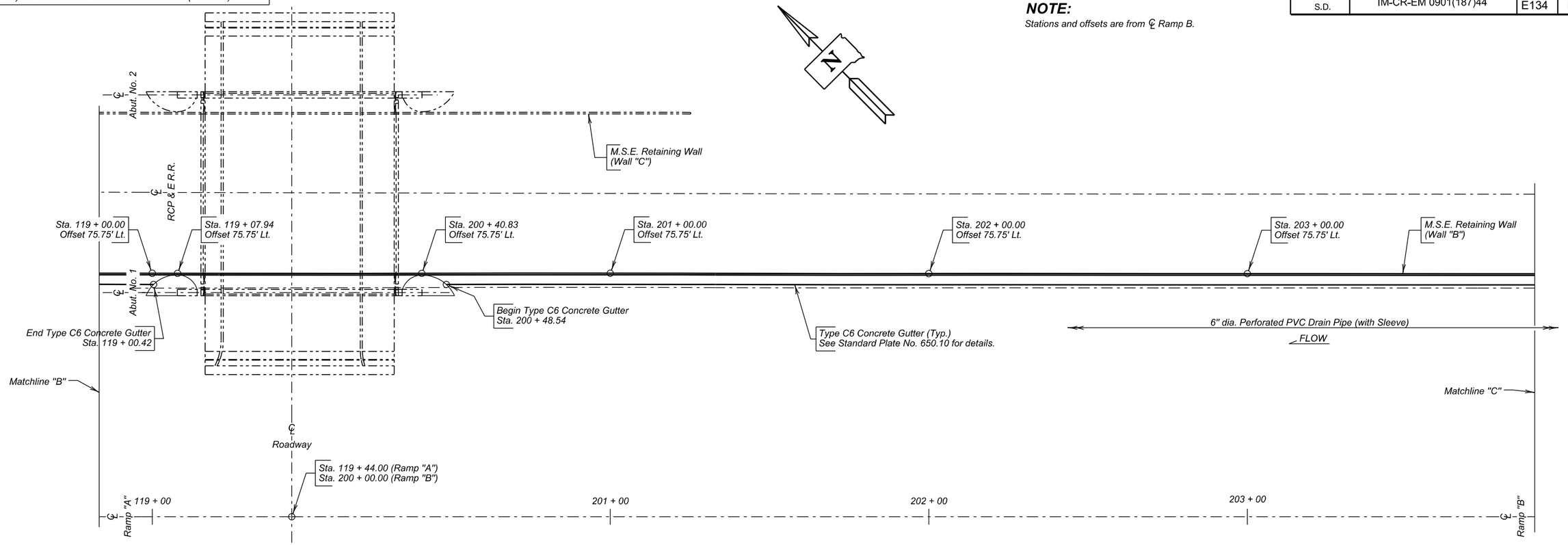
12 OF 20

DESIGNED BY	CK. DES. BY	DRAFTED BY	
PW	AU	MG	Steve A Johnson BRIDGE ENGINEER
MEAD0A9K	0A9KTL12		

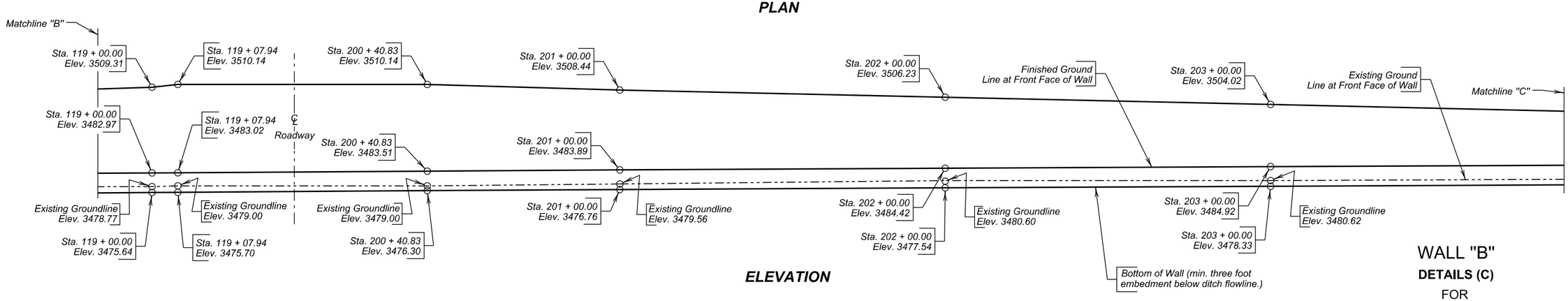
The elevations shown in these plans are based on the National Geodetic Survey (NGS) North American Vertical Datum of 1988 (NAVD88).

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E134	E185

NOTE:
Stations and offsets are from ℄ Ramp B.



PLAN



ELEVATION

WALL "B"

DETAILS (C)

FOR

PRECAST MODULAR STEM WALL

ADJ. TO RAMP A & B
STA. 110 + 15.02 (RAMP A) TO
STA. 208 + 54.87 (RAMP B)

SEC. 15-T3N-R6E
IM-CR-EM 0901(187)44

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
SEPTEMBER 2023

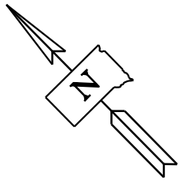
13 OF 20

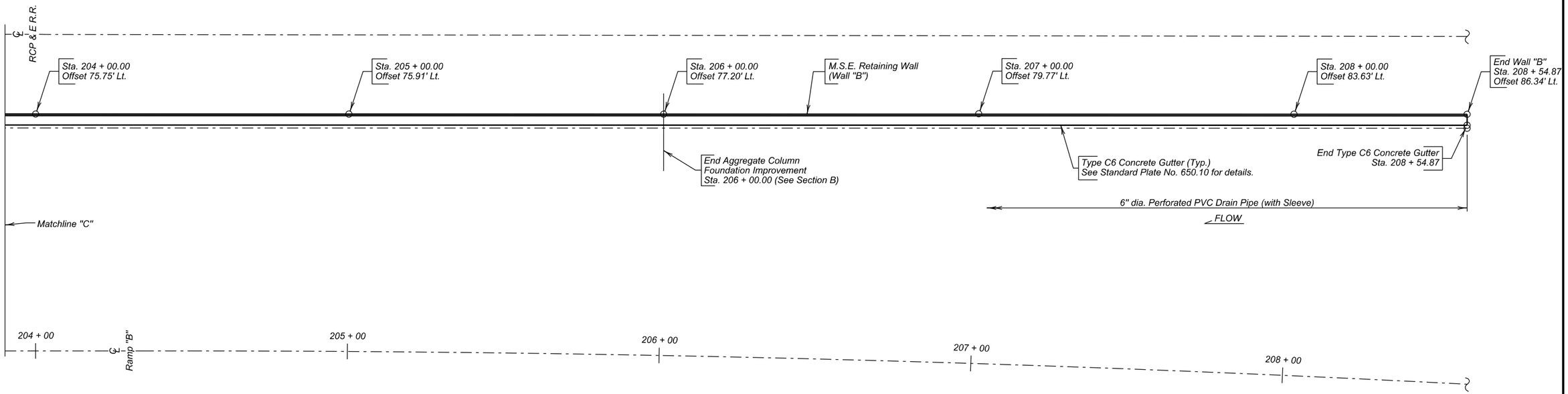
DESIGNED BY	CK. DES. BY	DRAFTED BY	
PW	AU	MG	Steven A Johnson BRIDGE ENGINEER
MEAD0A9K	0A9KTL13		

The elevations shown in these plans are based on the National Geodetic Survey (NGS) North American Vertical Datum of 1988 (NAVD88).

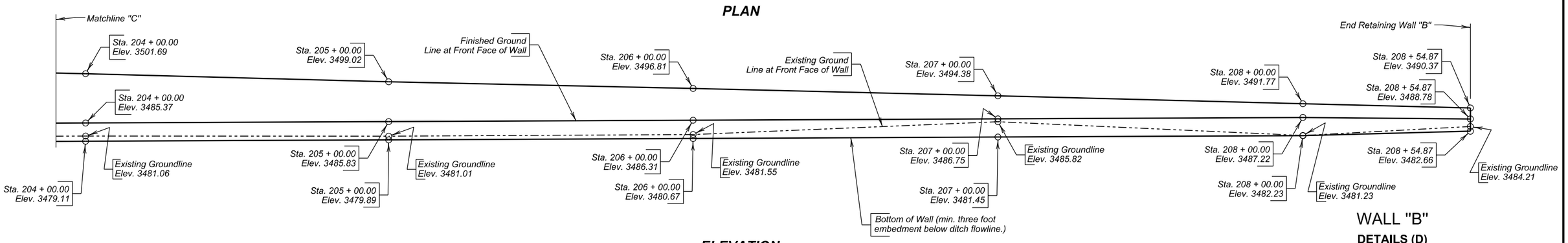
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E135	E185

NOTE:
Stations and offsets are from ℄ Ramp B.





PLAN



ELEVATION

WALL "B"

DETAILS (D)

FOR

PRECAST MODULAR STEM WALL

ADJ. TO RAMP A & B
STA. 110 + 15.02 (RAMP A) TO
STA. 208 + 54.87 (RAMP B)

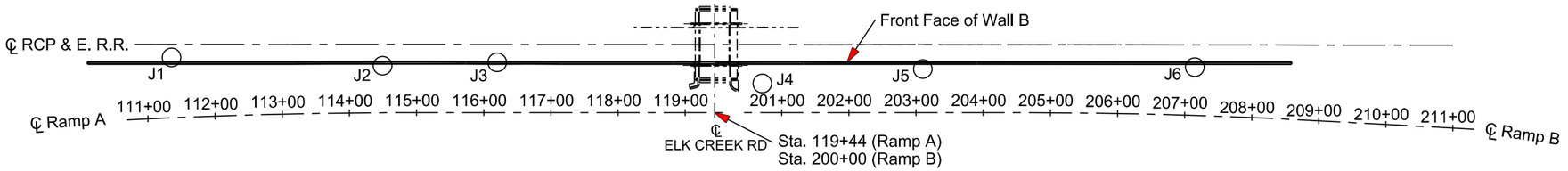
SEC. 15-T3N-R6E
IM-CR-EM 0901(187)44

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
SEPTEMBER 2023

DESIGNED BY	CK. DES. BY	DRAFTED BY	
PW	AU	MG	Steve A Johnson BRIDGE ENGINEER
MEAD0A9K	0A9KTL14		

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E136	E185

	Factored Bearing Resistance, R_r	Friction Angle (Φ)	Cohesion (c)	Wet Unit Weight (γw)
Clay Silt with Sand & Gravel	9,500 psf	30°	0 psf	100 pcf
Clay Silt	9,500 psf	22°	300 psf	123 pcf
Base Course	9,500 psf	32°	0 psf	135 pcf
Reinforced Soils	-	34°	0 psf	105 pcf
Retained Soils	-	22°	100 psf	120 pcf



Hole Number	J1	
Station	111+37	
Depth	2.5	ft
Soil Color	Red	
Classification	Clay Silt	
Strength (Qu)	1,371	psf
Dry Density	98.7	pcf
Wet Density	110.7	pcf
Moisture	12.2	%
Pass No. 10	99.4	%
Pass No. 40	97.8	%
Pass No. 200	69.2	%
Sand Content	30.2	%
Silt Content	44.5	%
Clay Content	24.6	%

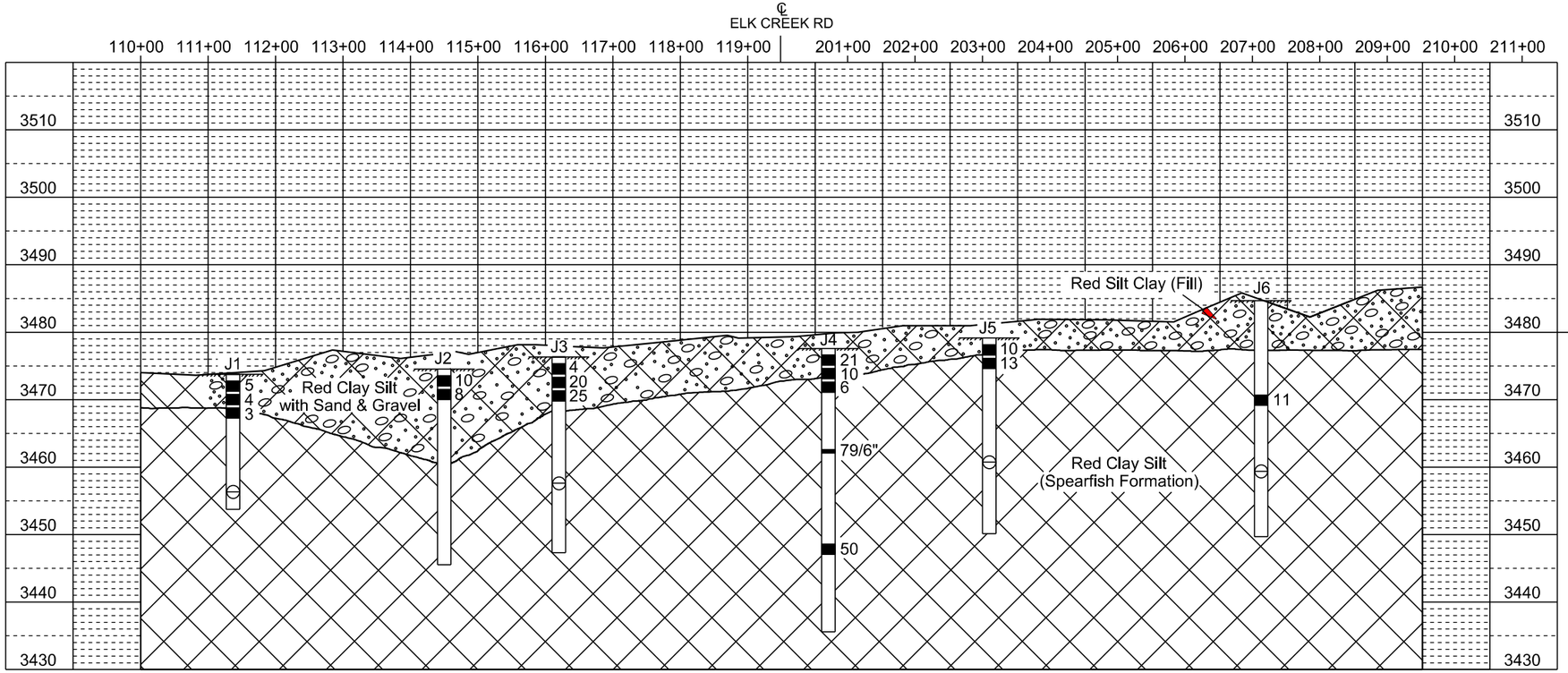
Hole Number	J2	
Station	114+50	
Depth	2.5	ft
Soil Color	Red	
Classification	Grvlly Slty Snd	
Strength (Qu)	No Test	psf
Dry Density	112.3	pcf
Wet Density	121.0	pcf
Moisture	7.8	%
Pass No. 10	78.2	%
Pass No. 40	68.8	%
Pass No. 200	43.0	%
Sand Content	35.2	%
Silt Content	29.8	%
Clay Content	13.1	%

Hole Number	J3	
Station	116+20	
Depth	2.5	ft
Soil Color	Red	
Classification	Clay Silt	
Strength (Qu)	No Test	psf
Dry Density	104.5	pcf
Wet Density	120.1	pcf
Moisture	14.9	%
Pass No. 10	100.0	%
Pass No. 40	99.7	%
Pass No. 200	76.1	%
Sand Content	23.9	%
Silt Content	53.3	%
Clay Content	22.8	%

Hole Number	J4	
Station	508+03	
Depth	2.5	ft
Soil Color	Red	
Classification	Sandy Silt	
Strength (Qu)	No Test	psf
Dry Density	120.6	pcf
Wet Density	131.1	pcf
Moisture	8.8	%
Pass No. 10	100.0	%
Pass No. 40	71.3	%
Pass No. 200	64.6	%
Sand Content	35.4	%
Silt Content	45.8	%
Clay Content	18.8	%

Hole Number	J4	
Station	508+03	
Depth	4.5	ft
Soil Color	Red	
Classification	Clay	
Strength (Qu)	6,566	psf
Dry Density	111.4	pcf
Wet Density	129.2	pcf
Moisture	15.9	%
Pass No. 10	100.0	%
Pass No. 40	99.8	%
Pass No. 200	97.8	%
Sand Content	2.2	%
Silt Content	43.0	%
Clay Content	54.8	%

Hole Number	J5	
Station	203+10	
Depth	2.5	ft
Soil Color	Red	
Classification	Clay Sand	
Strength (Qu)	No Test	psf
Dry Density	90.0	pcf
Wet Density	96.5	pcf
Moisture	7.3	%
Pass No. 10	87.2	%
Pass No. 40	82.7	%
Pass No. 200	55.9	%
Sand Content	31.3	%
Silt Content	34.3	%
Clay Content	21.6	%



The Spearfish Formation is a relatively weak red sandy shale. Textural classification typically is a clay silt. Gypsum is present throughout the formation that varies from thin stringers to massive deposits over 30 feet thick. Bedded layers of red stained sandstone can also be encountered. Unweathered Spearfish Formation is considered to be "Soft Rock", although massive unweathered gypsum may behave similar to weak limestone.

The Geotechnical Engineering Activity has all of the boring logs and laboratory test results available for review at the Central Office in Pierre.

LEGEND

◯ Penetration Test ⊖ Caved ▬ Sample Zone

Penetration test holes are drilled with a 6⅝ inch diameter hollow stem auger. Penetration tests are conducted by dropping a 140 pound hammer 30 inches to obtain 2 inch nominal diameter samples and to measure the resistance to penetration of the soil. Penetration Test results are listed as uncorrected "N" values in blows per foot. Blows over inches are listed if refusal is achieved, which is 50 blows within one 6 inch set.

GROUND WATER ELEVATIONS

NOVEMBER 2021

J1	(CAVED) 3456.4
J2	(CAVED) 3445.7
J3	(CAVED) 3457.6
J4	NO DATA
J5	(CAVED) 3460.7
J6	(CAVED) 3459.4
J7	(CAVED) 3464.8

WALL "B"

SUBSURFACE INVESTIGATION

FOR

PRECAST MODULAR STEM WALL

ADJ. TO RAMP A & B
STA. 110 + 15.02 (RAMP A) TO
STA. 208 + 54.87 (RAMP B)

SEC. 15-T3N-R6E
IM-CR-EM 0901(187)44

MEADE COUNTY

S. D. DEPT. OF TRANSPORTATION

SEPTEMBER 2023

15 OF 20

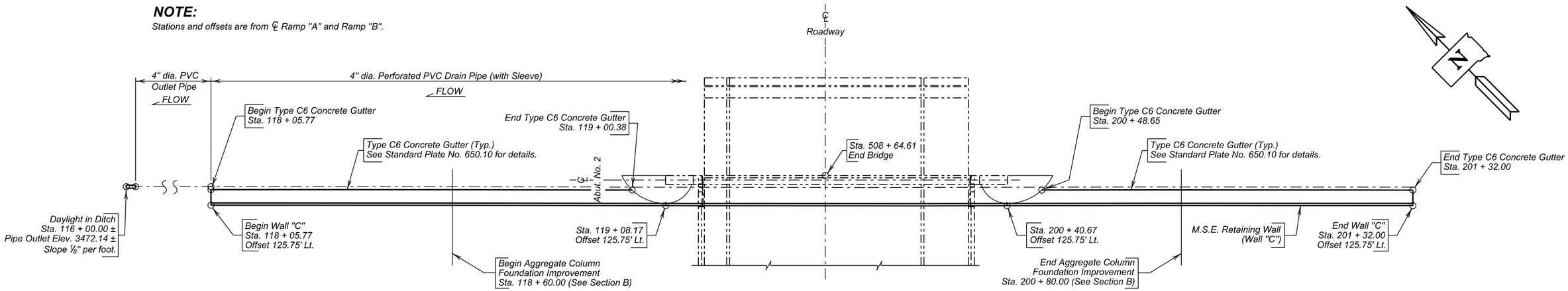
DESIGNED BY	CK. DES. BY	DRAFTED BY	
SH/PW	SH/AU	HK/MG/BT	Steve A Johnson BRIDGE ENGINEER
MEAD0A9K	0A9KTL15		

The elevations shown in these plans are based on the National Geodetic Survey (NGS) North American Vertical Datum of 1988 (NAVD88).

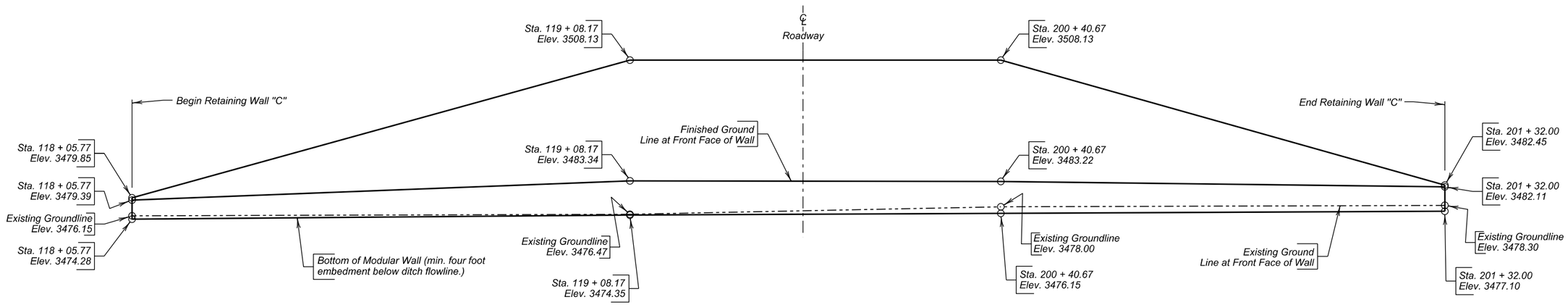
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E137	E185

Note:
Minimum Underdrain slope ⅛" per foot.

NOTE:
Stations and offsets are from ℄ Ramp "A" and Ramp "B".



PLAN



ELEVATION

ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY
Precast Modular Stem Wall, Furnish	Sq. Ft.	6166
Precast Modular Stem Wall, Install	Sq. Ft.	6166
Granular Backfill for MSE Large Panel Wall	Cu. Yd.	4890
4" Underdrain Pipe	Ft.	477
Foundation Preparation, Retaining Wall	Cu. Yd.	76
Type C6 Concrete Gutter	Ft.	178
Structure Excavation, Retaining Wall	Cu. Yd	79

1. 271 ft. 4" dia. Perforated PVC Drain Pipe (with Sleeve).
2. 206 ft. 4" dia. PVC Outlet Pipe.

Items 1 and 2 are approximate quantities contained in the 4" Underdrain Pipe and are for information only.

WALL "C"

DETAILS

FOR

PRECAST MODULAR STEM WALL

ADJ. TO RCP & E R.R.
STA. 118 + 05.77 (RAMP "A") TO
STA. 201 + 32.00 (RAMP "B")

SEC. 15-T3N-R6E
IM-CR-EM 0901(187)44

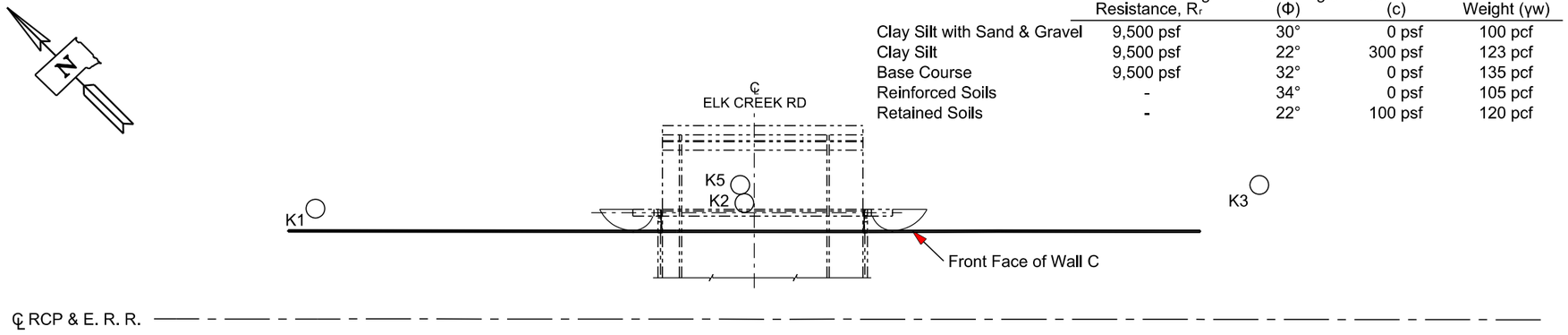
MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
SEPTEMBER 2023

16 OF 20

DESIGNED BY	CK. DES. BY	DRAFTED BY	
PW	AU	MG	Steven A. Johnson BRIDGE ENGINEER
MEAD0A9K	0A9KTL16		

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E138	E185

	Factored Bearing Resistance, R_r	Friction Angle (Φ)	Cohesion (c)	Wet Unit Weight (γw)
Clay Silt with Sand & Gravel	9,500 psf	30°	0 psf	100 pcf
Clay Silt	9,500 psf	22°	300 psf	123 pcf
Base Course	9,500 psf	32°	0 psf	135 pcf
Reinforced Soils	-	34°	0 psf	105 pcf
Retained Soils	-	22°	100 psf	120 pcf



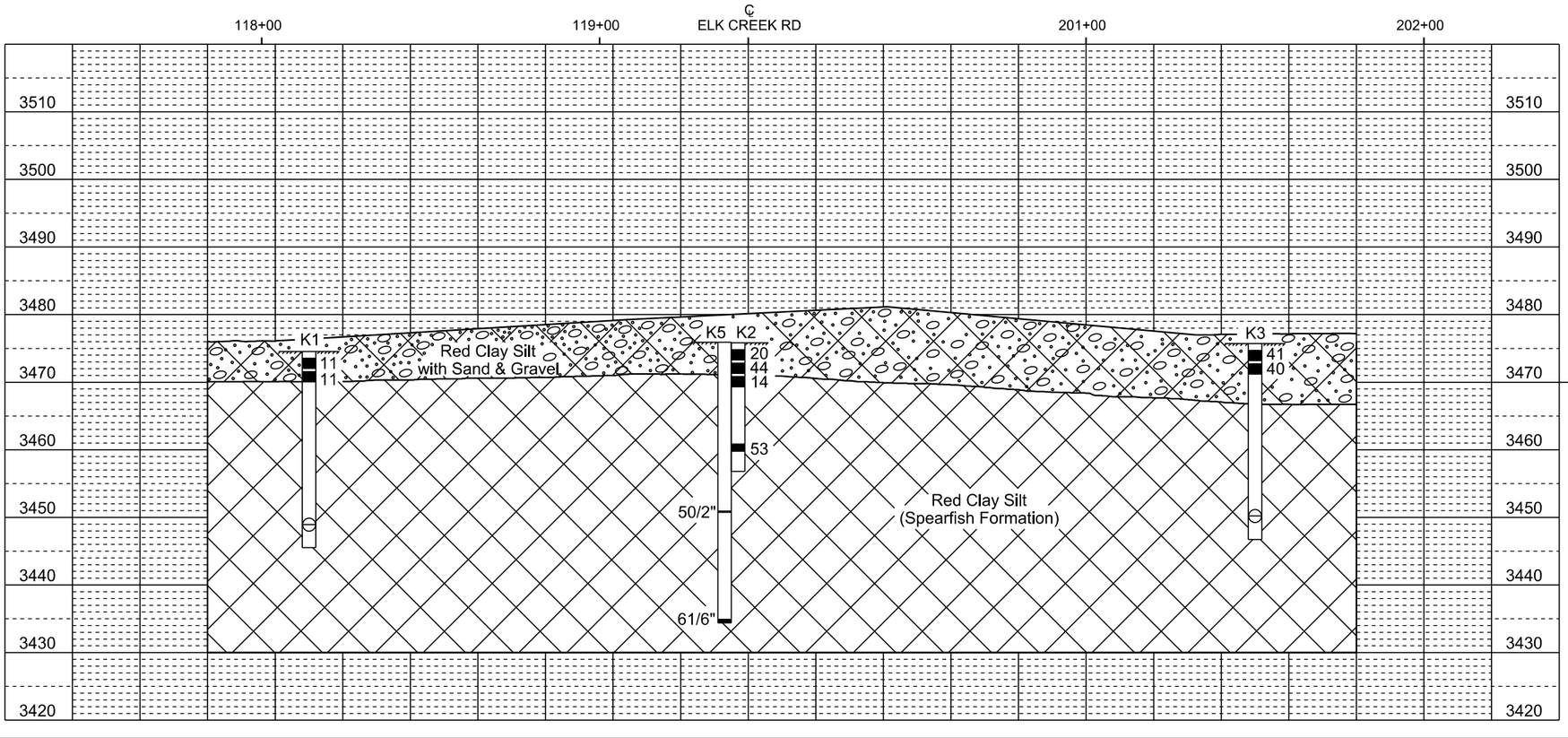
Hole Number	K1	
Station	508+65	
Depth	2.5	ft
Soil Color	Red	
Classification	Silt Clay	
Strength (Qu)	2,546	psf
Dry Density	101.3	pcf
Wet Density	117.6	pcf
Moisture	16.2	%
Pass No. 10	99.4	%
Pass No. 40	98.7	%
Pass No. 200	94.5	%
Sand Content	4.9	%
Silt Content	52.0	%
Clay Content	42.5	%

Hole Number	K2	
Station	508+67	
Depth	2.2	ft
Soil Color	Brown	
Classification	Silt Clay	
Strength (Qu)	3,546	psf
Dry Density	95.2	pcf
Wet Density	106.1	pcf
Moisture	11.5	%
Pass No. 10	99.8	%
Pass No. 40	99.6	%
Pass No. 200	96.5	%
Sand Content	3.3	%
Silt Content	57.8	%
Clay Content	38.7	%

Hole Number	K2	
Station	508+67	
Depth	6.5	ft
Soil Color	Red	
Classification	Clay Silt	
Strength (Qu)	2,427	psf
Dry Density	105.3	pcf
Wet Density	118.9	pcf
Moisture	12.9	%
Pass No. 10	100.0	%
Pass No. 40	99.9	%
Pass No. 200	97.1	%
Sand Content	2.9	%
Silt Content	70.3	%
Clay Content	26.8	%

Hole Number	K3	
Station	508+72	
Depth	2.2	ft
Soil Color	Pink	
Classification	Grvlly Sity Snd	
Strength (Qu)	No Test	psf
Dry Density	110.3	pcf
Wet Density	116.4	pcf
Moisture	5.5	%
Pass No. 10	51.6	%
Pass No. 40	44.0	%
Pass No. 200	29.3	%
Sand Content	22.3	%
Silt Content	18.6	%
Clay Content	10.7	%

Hole Number	K3	
Station	508+72	
Depth	4.2	ft
Soil Color	Red	
Classification	Sandy Gravel	
Strength (Qu)	No Test	psf
Dry Density	114.6	pcf
Wet Density	117.8	pcf
Moisture	2.9	%
Pass No. 10	43.2	%
Pass No. 40	28.8	%
Pass No. 200	17.1	%
Sand Content	26.1	%
Silt Content	11.6	%
Clay Content	5.5	%



The Spearfish Formation is a relatively weak red sandy shale. Textural classification typically is a clay silt. Gypsum is present throughout the formation that varies from thin stringers to massive deposits over 30 feet thick. Bedded layers of red stained sandstone can also be encountered. Unweathered Spearfish Formation is considered to be "Soft Rock", although massive unweathered gypsum may behave similar to weak limestone.

The Geotechnical Engineering Activity has all of the boring logs and laboratory test results available for review at the Central Office in Pierre.

LEGEND

Penetration Test

Water

Caved

Sample Zone

Penetration test holes are drilled with a 6⅝ inch diameter hollow stem auger. Penetration tests are conducted by dropping a 140 pound hammer 30 inches to collect samples and measure the resistance to penetration of the soil. Samples are collected using a lined Modified California Sampler. Penetration test results are listed as uncorrected "N" values in blows per foot. Blows over inches are listed if refusal is achieved, which is 50 blows within one 6 inch set.

GROUNDWATER ELEVATIONS

NOVEMBER 2021

K1	(CAVED) 3448.9
K2	NO DATA
K3	(CAVED) 3450.2
K5	NO DATA

WALL "C"

SUBSURFACE INVESTIGATION

FOR

PRECAST MODULAR STEM WALL

ADJ. TO RCP & E R.R. SEC. 15-T3N-R6E

STA. 118 + 05.77 (RAMP "A") TO STA. 201 + 32.00 (RAMP "B") IM-CR-EM 0901(187)44

MEADE COUNTY

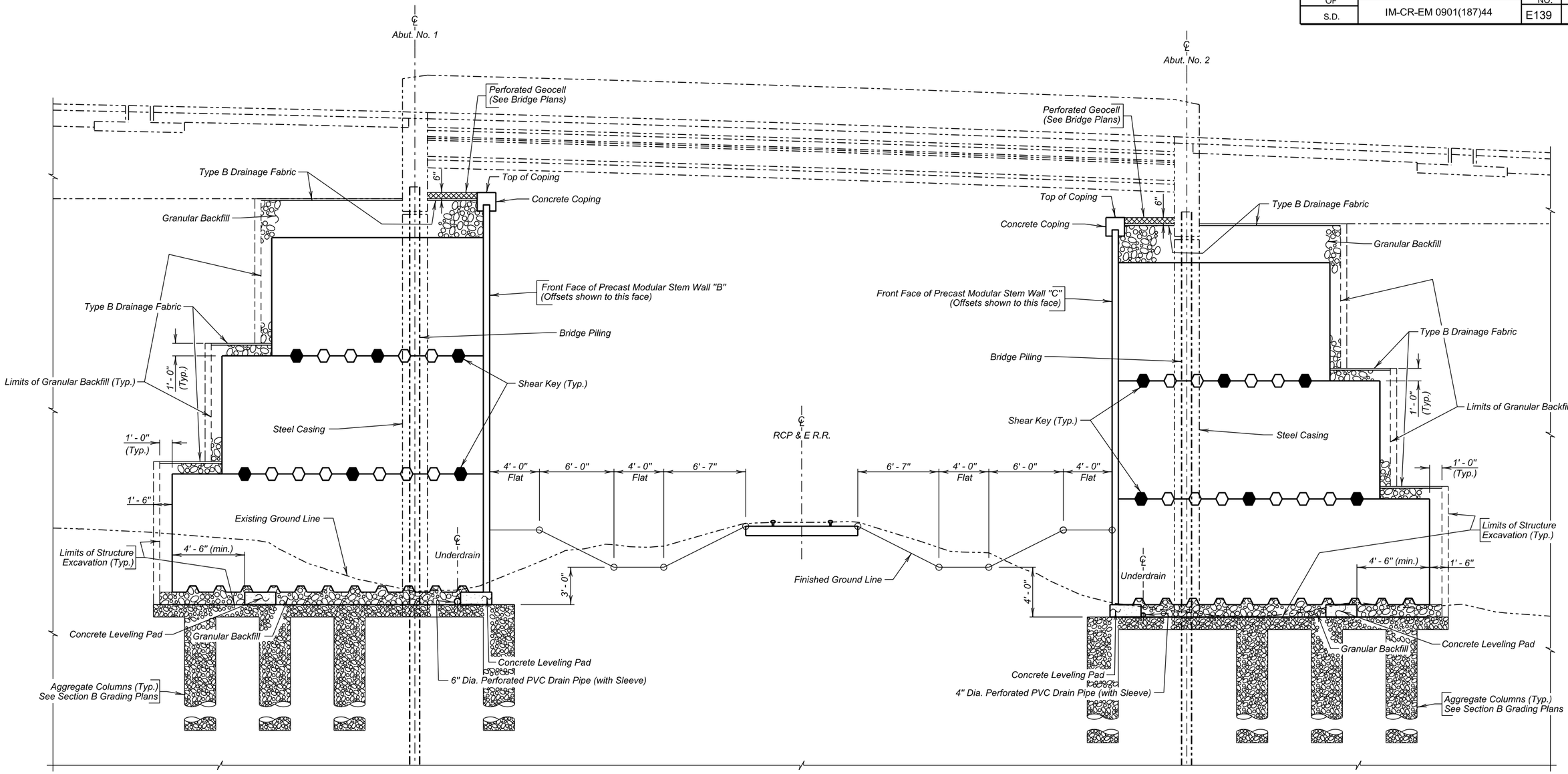
S. D. DEPT. OF TRANSPORTATION

DECEMBER 2023

17 OF 20

DESIGNED BY	CK. DES. BY	DRAFTED BY	
SH/PW	SH/AU	HK/MG/BT	Steve A Johnson BRIDGE ENGINEER
MEAD0A9K	0A9KTL17		

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E139	E185



TYPICAL SECTION

(Perpendicular to ℄ of Wall at ℄ Roadway at ℄ Bridge)

WALLS "B" & "C"

TYPICAL SECTION (A)

FOR

PRECAST MODULAR STEM WALLS

ADJ. TO WBL I-90 & RAMP A & B SEC. 15-T3N-R6E

IM-CR-EM 0901(187)44

MEADE COUNTY

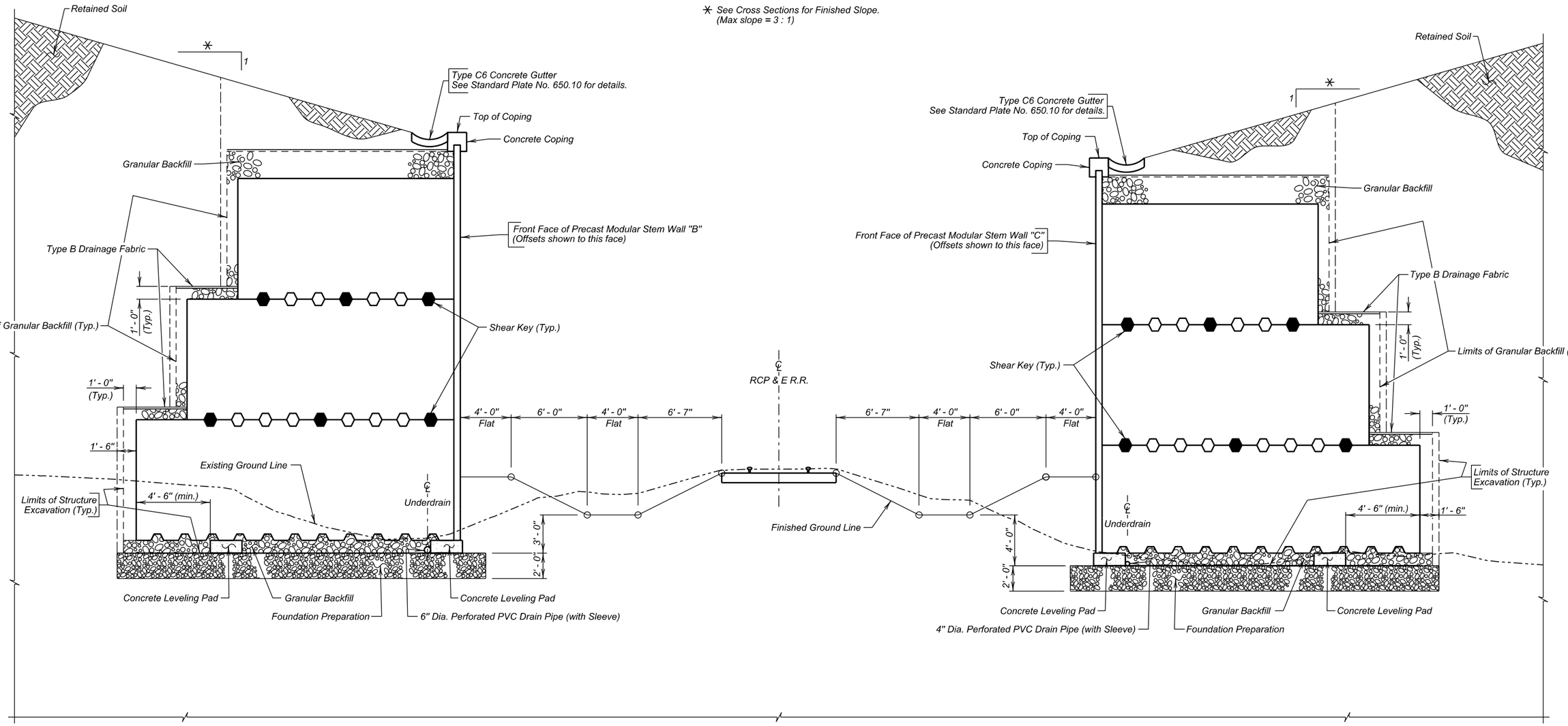
S. D. DEPT. OF TRANSPORTATION

DECEMBER 2023

18 OF 20

DESIGNED BY	CK. DES. BY	DRAFTED BY	
PW	AU	MG	Steve A. Johnson BRIDGE ENGINEER
MEAD0A9K	0A9KTL18		

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E140	E185



TYPICAL SECTION

(Perpendicular to ℄ of Wall)

WALLS "B" & "C"

TYPICAL SECTION (B)

FOR

PRECAST MODULAR STEM WALLS

ADJ. TO WBL I-90 & RAMP A & B SEC. 15-T3N-R6E

IM-CR-EM 0901(187)44

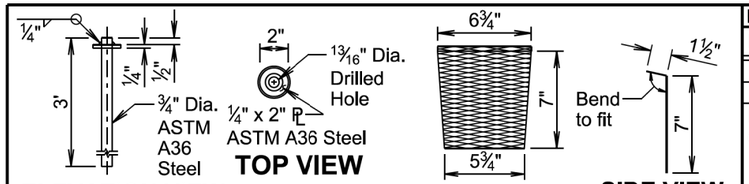
MEADE COUNTY

S. D. DEPT. OF TRANSPORTATION

DECEMBER 2023

19 OF 20

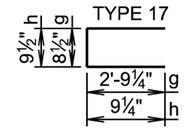
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PW	AU	BT	Steve A. Johnson BRIDGE ENGINEER
MEAD0A9K	0A9KTL19		

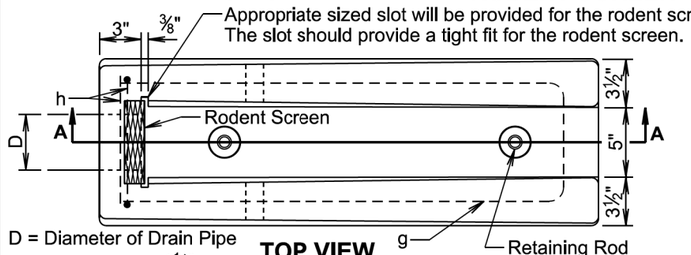


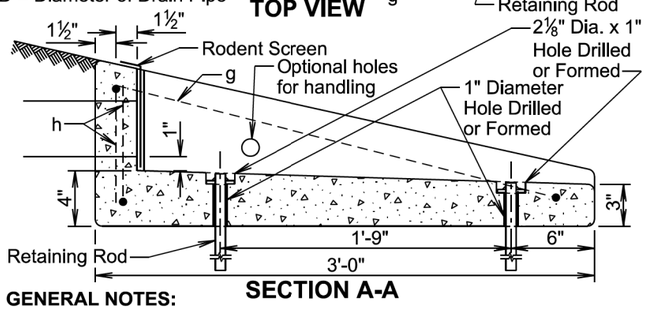
REINFORCING SCHEDULE				
MK.	No.	Size	Length	Type
g	1	4	6'-3"	17
h	2	4	2'-4"	17

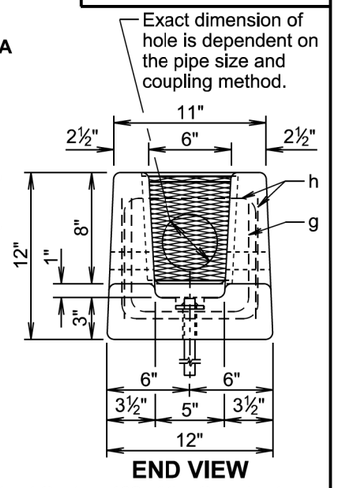
NOTE: All dimensions are out to out of bars.

Bending Details









GENERAL NOTES:

The concrete will be Class M6. The concrete will conform to the requirements of Section 462 of the Specifications. It is estimated that each unit weighs approximately 210 pounds.

All reinforcing steel will conform to ASTM A615, Grade 60 and will be epoxy coated. The reinforcing steel will be securely retained to prevent displacement during placement of concrete. It is estimated that 7.3 pounds of reinforcing steel is required for each unit.

The pipe will be placed in the concrete headwall with the pipe end flush with the concrete surface adjacent to the rodent screen.

The rodent screen will be galvanized 13 Ga. steel with a diamond shaped flattened mesh pattern. The size will be ½". The size refers to the measurement across the smallest diamond shaped opening measured from the centers of the wires.

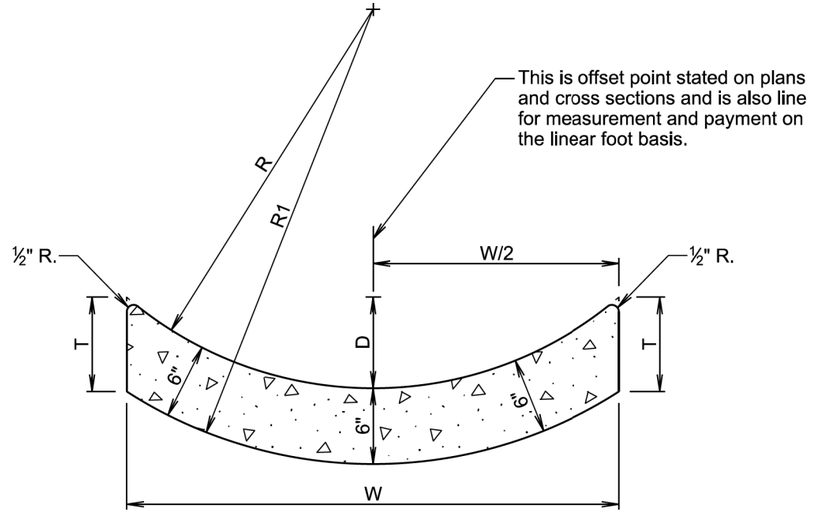
The retaining rod will be galvanized in accordance with ASTM A123 after all shop welding has been completed.

The drawing indicates using ½" fillets; however, ¾" chamfers may be substituted for the ½" fillets.

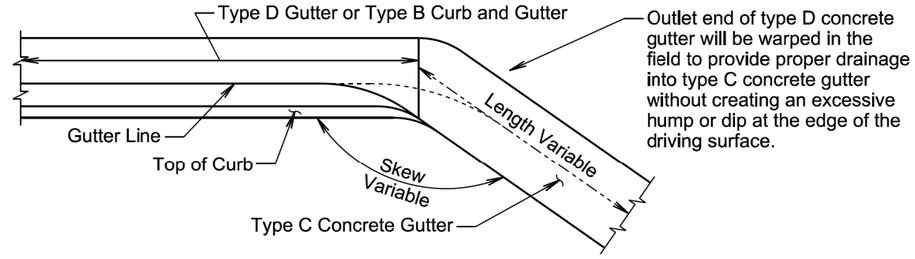
All costs for furnishing and installing the concrete headwall including equipment, labor, and materials including concrete, reinforcing steel, retaining rods, and rodent screen will be incidental to the contract unit price per each for "Precast Concrete Headwall for Drain".

November 19, 2021

Published Date: 2026	SDDOT	***PRECAST CONCRETE HEADWALL FOR DRAIN***	***PLATE NUMBER 430.50*** *Sheet 1 of 1*



TYPE C CONCRETE GUTTER							
Type	Gutter Depth D	Gutter Width W	Radius of Top of Gutter R	Radius of Bottom of Gutter R1	Vertical Depth of Concrete at Edges T	Cu. Yd. Per Lin. Foot	Lin. Ft. Per Cu. Yd.
C6	6"	30"	21¾"	27¾"	7⅝"	0.04982	20.1
C9	9"	48"	36½"	42½"	7⅝"	0.07966	12.6
C12	12"	72"	60"	66"	7⅜"	0.11828	8.5



GENERAL NOTE:

The concrete for the type C concrete gutter will comply with the requirements of the specifications for class M6 concrete.

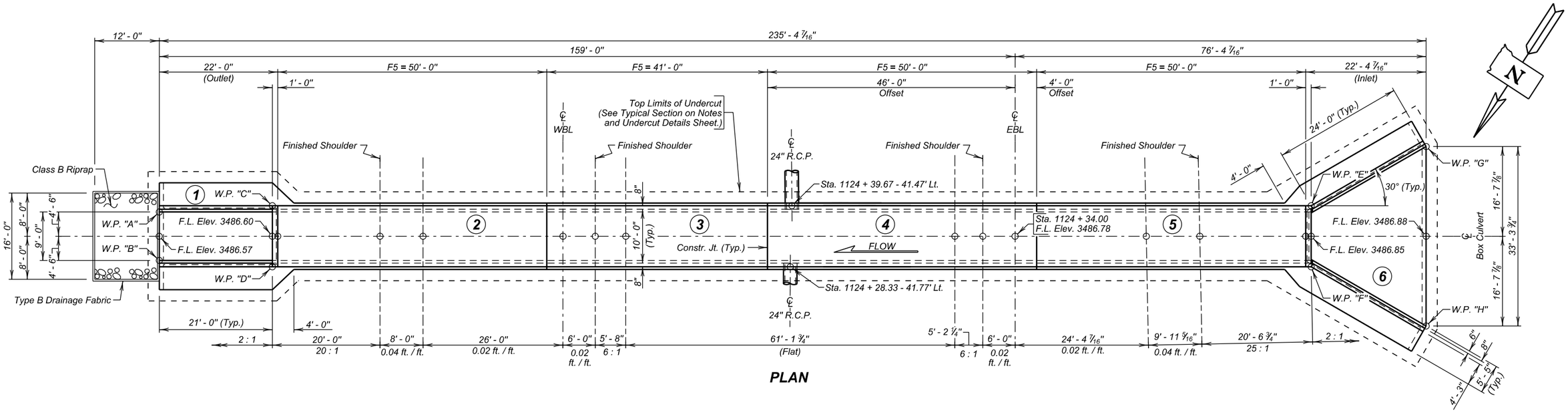
One-half inch preformed expansion joint filler will be placed transversely in the concrete gutter at intervals of approximately 30 feet.

December 23, 2019

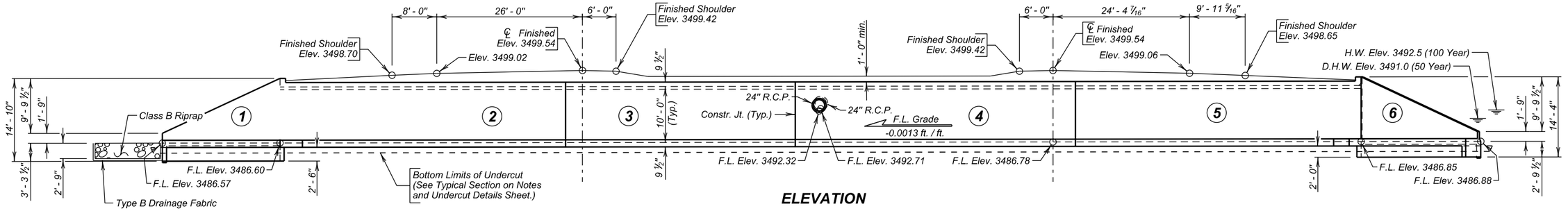
Published Date: 2026	SDDOT	***TYPE C CONCRETE GUTTER***	***PLATE NUMBER 650.10*** *Sheet 1 of 1*

The elevations shown in these plans are based on the National Geodetic Survey (NGS) North American Vertical Datum of 1988 (NAVD88).

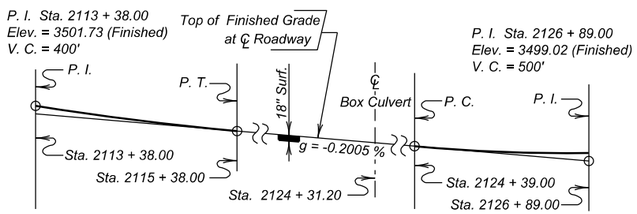
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E142	E185



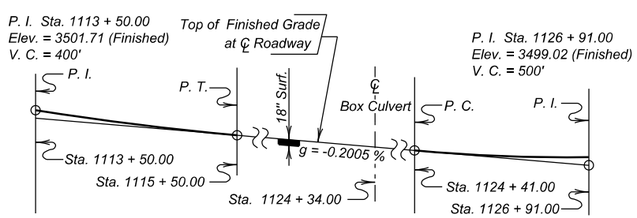
PLAN



ELEVATION



GRADELINE DATA
(Westbound Lanes)



GRADELINE DATA
(Eastbound Lanes)

INDEX OF CULVERT SHEETS -

Sheet No. 1 - General Drawing and Quantities
Sheet No. 2 - Notes and Undercut Details
Sheet No. 3 - Inlet Details
Sheet No. 4 - Outlet Details
Sheet No. 5 - F5 Barrel End Section Details (50' - 0")
Sheet No. 6 - F5 Barrel Interior Section Details (41' - 0")
Sheet No. 7 - F5 Barrel Interior Section Details (50' - 0")
Sheet No. 8 - Standard Plate No.'s 460.02 and 460.10
Sheet No. 9 - Standard Plate No. 620.16

TABLE OF WORKING POINTS

W. P.	STATION	OFFSET
"A"	1124 + 38.50	159.00' Lt.
"B"	1124 + 29.50	159.00' Lt.
"C"	1124 + 39.67	138.00' Lt.
"D"	1124 + 28.33	138.00' Lt.
"E"	1124 + 39.67	55.00' Rt.
"F"	1124 + 28.33	55.00' Rt.
"G"	1124 + 50.66	76.38' Rt.
"H"	1124 + 17.34	76.38' Rt.

HYDRAULIC DATA

Q_d	220 cfs
A_d	25 sq ft
V_d	8.9 fps
Q_F	220 cfs
Q_{100}	348 cfs
Q_{OT}	990 cfs
V_{max}	14.0 fps

Q_d = Design discharge for the proposed culvert based on 50 year frequency. El. 3491.0.

Q_{OT} = Overtopping discharge and frequency > Q_{353} year recurrence interval. El. 3498.2 @ Sta. 1126 + 30.00.

Q_F = Designated peak discharge for the basin approaching proposed project based on 50 year frequency.

Q_{100} = Computed discharge for the basin approaching proposed project based on 100 year frequency. El. 3492.5.

V_{max} = Maximum computed outlet velocity for the proposed culvert, based on 100 year frequency.

ESTIMATED QUANTITIES

	ITEM	UNIT	QUANTITY
	Class A45 Concrete, Box Culvert	Cu. Yd.	298.0
	Reinforcing Steel	Lb.	43644
	Structure Excavation, Box Culvert	Cu. Yd.	108
	Box Culvert Undercut	Cu. Yd.	179
#	Class B Riprap	Ton	27.4
	Type B Drainage Fabric	Sq. Yd.	39

For estimating purposes only, a factor of 1.4 tons/cu. yd. was used to convert Cu. Yd. to Tons.

PLANS BY :
OFFICE OF BRIDGE DESIGN, SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION

SITE 3
ALTERNATE A
GENERAL DRAWING AND QUANTITIES
FOR
10' X 10' BOX CULVERT (C.I.P.)

OVER TRIB. TO ELK CREEK — 0° SKEW
STA. 1124 + 34.00 (EBL) — SEC. 14-T3N-R6E
STR. NO. 47-104-570 — IM-CR-EM 0901(187)44
PCN 034J — HL-93

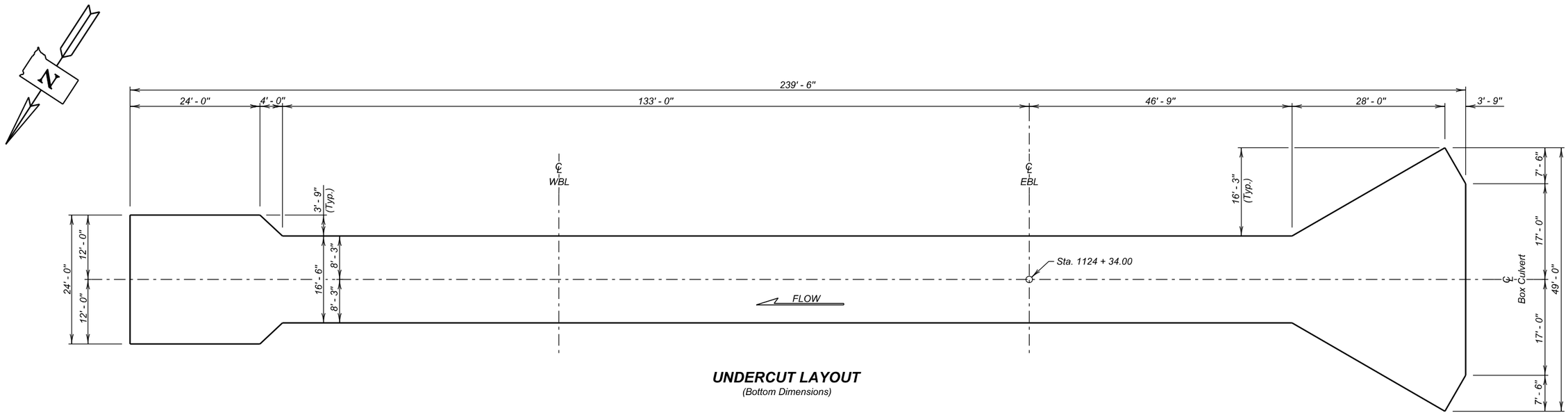
MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
JULY 2022

1 OF 9

DESIGNED BY	CK. DES. BY	DRAFTED BY	
AU	BB	BT	Steven A. Johnson BRIDGE ENGINEER
MEAD034J	034JLG01		

Revised October 15, 2025 AU

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E143	E185



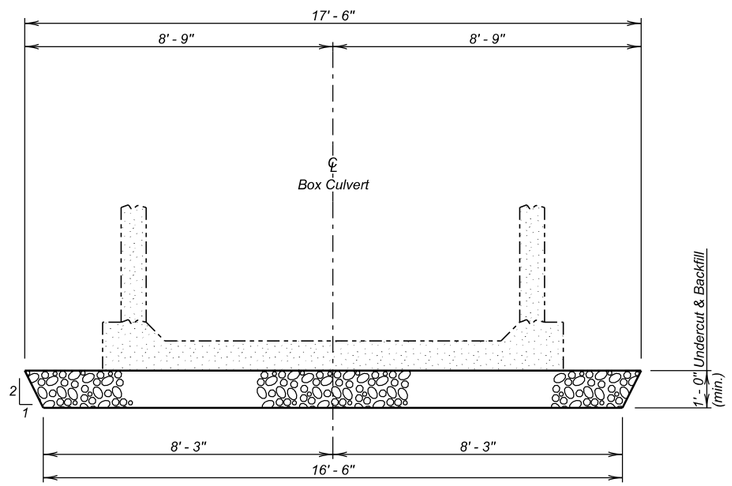
UNDERCUT LAYOUT
(Bottom Dimensions)

SPECIFICATIONS

1. *Design Specifications: AASHTO LRFD Bridge Design Specifications, 9th Edition.*
2. Construction Specifications: South Dakota Standard Specifications for Roads and Bridges, 10-1-25 Version, Required Provisions, and Special Provisions as included in the Proposal. The Standard Specifications for Roads and Bridges are available for download and viewing at: https://dot.sd.gov/doing-business/contractors/standard-specifications.

GENERAL NOTES

1. *Design Live Load: HL-93 and construction loading consisting of one 7' - 6" gage axle with gross axle weight = 95,850 lbs. The construction load will not be applied until a minimum of 4 ft. of fill has been placed over the box culvert. Other construction loads in excess of legal load must be submitted thru proper channels to the Office of Bridge Design for analysis.*
2. *The design of the barrel section is based on a minimum fill height of 1 foot and includes all subsequent fill heights up to and including the maximum fill height of 5 ft. (F5).*
3. *Design Material Strengths: Concrete f'c = 4500 p.s.i.*
   Reinforcing Steel fy = 60000 p.s.i.
4. *All concrete will be Class A45 Concrete, Box Culvert conforming to Section 460 of the Construction Specifications.*
5. *All reinforcing steel will conform to ASTM A615 Grade 60.*
6. *All lap splices shown are contact lap splices unless noted otherwise.*
7. *All exposed edges will be chamfered ¾ inch unless noted otherwise in the plans.*
8. *Use 1 inch clear cover on all reinforcing steel EXCEPT as shown.*
9. *The Contractor will imprint on the structure the date of construction as specified and detailed on Standard Plate No. 460.02.*
10. *Care will be taken to establish Working Points (W.P.) as shown on the wings.*
11. *Circled numbers in PLAN and ELEVATION views on the General Drawing are section I.D. Numbers (see SDDOT Materials Manual).*
12. *Cost of Preformed Expansion Joint Filler used in apron construction will be incidental to the other contract items.*
13. *Soils below the bottom of the proposed RCBC consist of red sandy silt with gravel and gypsum streaks. Groundwater was not encountered in the borings during the subsurface investigation conducted in October and November 2021.*



TYPICAL SECTION
(For Limits of Undercut)

ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY
⌀ Box Culvert Undercut	Cu. Yd.	179

⌀ *For payment, quantity is based on plan shown undercut dimensions and will not be measured unless the Engineer orders a change.*

SITE 3
ALTERNATE A
NOTES AND UNDERCUT DETAILS
FOR
10' X 10' BOX CULVERT (C.I.P.)

OVER TRIB. TO ELK CREEK — 0° SKEW
STA. 1124 + 34.00 (EBL) — SEC. 14-T3N-R6E
STR. NO. 47-104-570 — IM-CR-EM 0901(187)44
PCN 034J — HL-93

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
JULY 2022

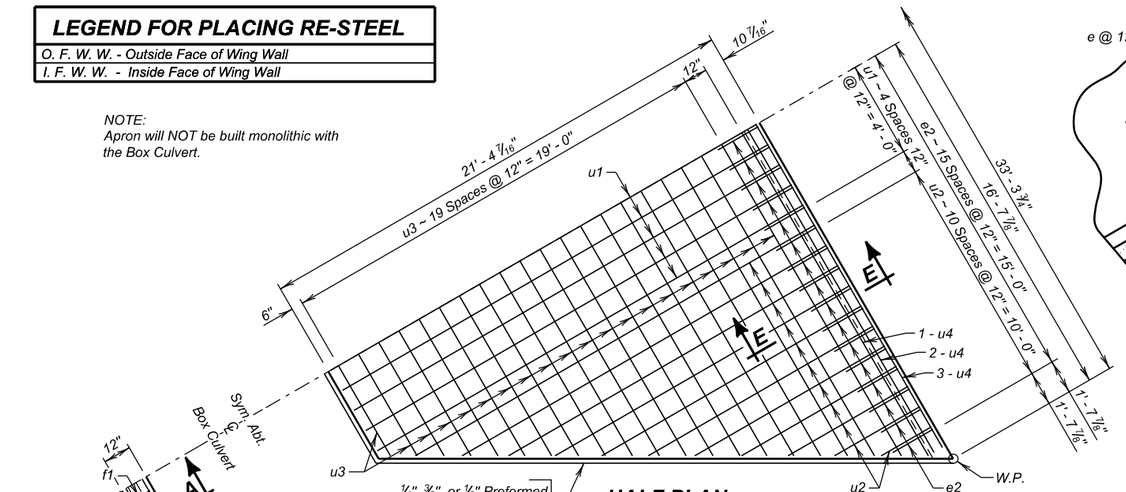
DESIGNED BY	CK. DES. BY	DRAFTED BY	
AU	BB	BT	Steve A. Johnson BRIDGE ENGINEER
MEAD034J	034JLG02		

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E144	E185

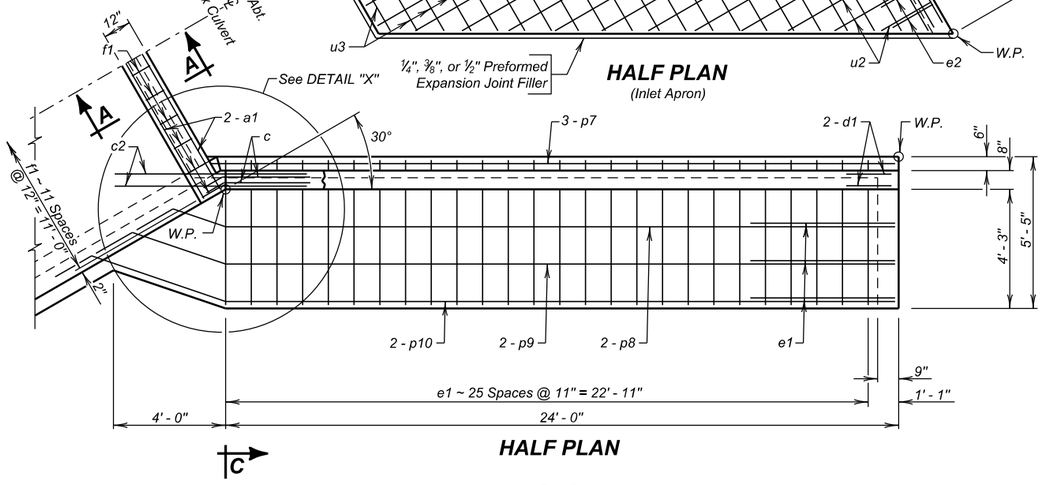
LEGEND FOR PLACING RE-STEEL

O. F. W. W. - Outside Face of Wing Wall
I. F. W. W. - Inside Face of Wing Wall

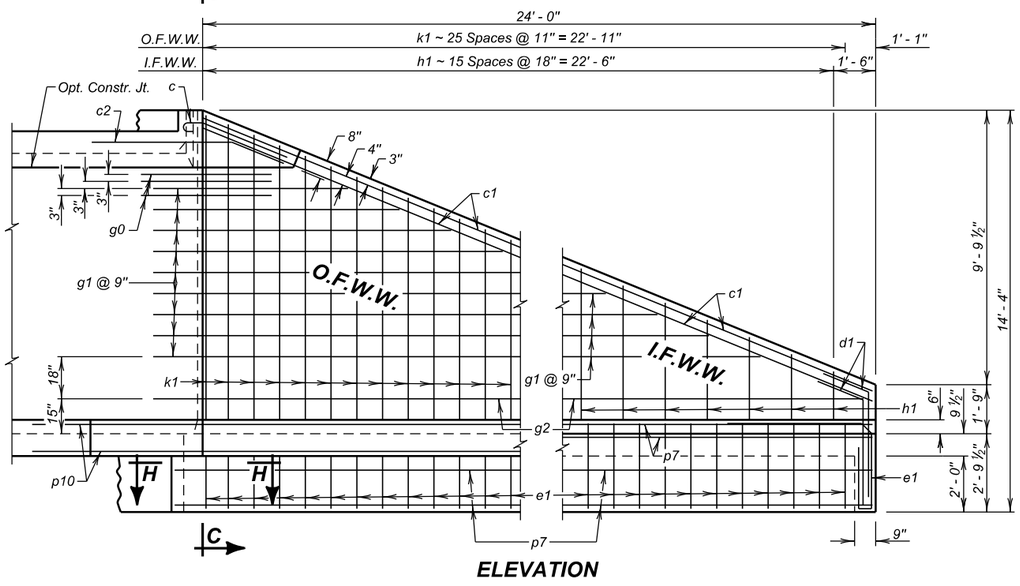
NOTE:
Apron will NOT be built monolithic with the Box Culvert.



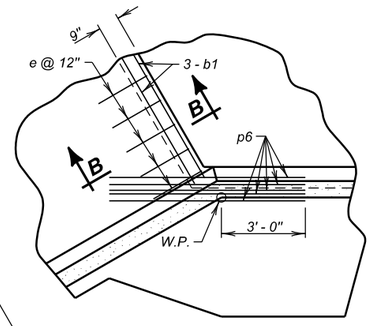
HALF PLAN
(Inlet Apron)



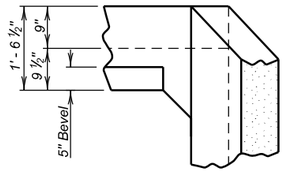
HALF PLAN



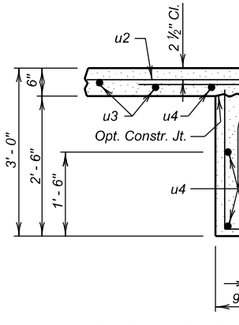
ELEVATION



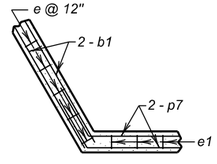
DETAIL "X"
(At Bottom Slab)



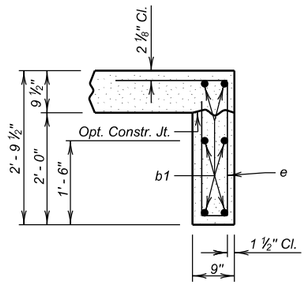
VIEW D - D
(At Exterior Wall)



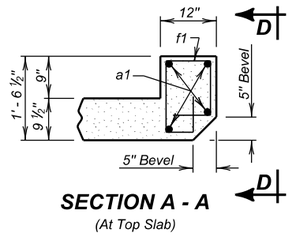
SECTION E - E



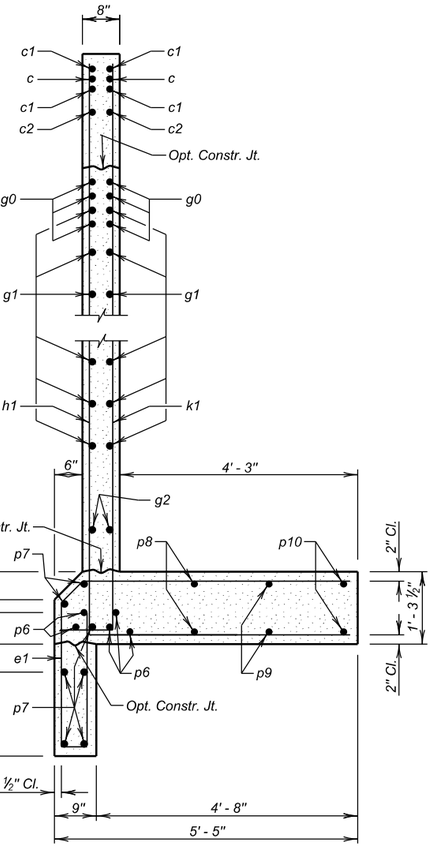
SECTION H - H



SECTION B - B



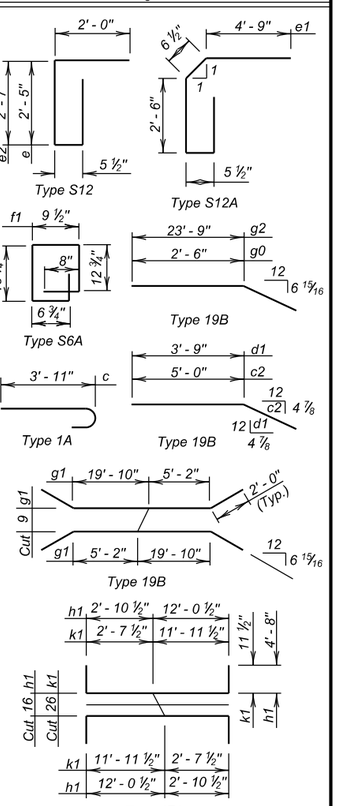
SECTION A - A
(At Top Slab)

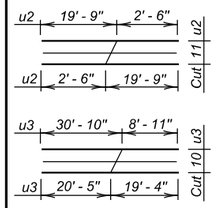


SECTION C - C

REINFORCING SCHEDULE

Mk.	No.	Size	Length	Type	Bending Details
a1	4	6	11' - 0"	Str.	
b1	6	6	9' - 3"	Str.	
c	4	5	4' - 6"	1A	
c1	8	5	25' - 9"	Str.	
c2	4	5	7' - 0"	19B	
d1	8	5	5' - 6"	19B	
e	10	4	7' - 0"	S12	
e1	58	4	10' - 9"	S12A	
f1	12	4	5' - 0"	S6A	
g0	12	5	5' - 0"	19B	
g1	18	4	29' - 0"	19B	
g2	4	4	25' - 9"	19B	
h1	16	4	24' - 3"	17A	
k1	26	4	16' - 6"	17A	
p6	10	6	7' - 0"	Str.	
p7	14	4	26' - 6"	Str.	
p8	4	4	27' - 6"	Str.	
p9	4	4	29' - 0"	Str.	
p10	4	4	31' - 0"	Str.	
INLET APRON					
e2	31	4	7' - 6"	S12	
u1	9	4	21' - 0"	Str.	
u2	11	4	22' - 3"	Str.	
u3	10	4	39' - 9"	Str.	
u4	6	4	32' - 0"	Str.	





NOTES:
All dimensions are out to out of bars.
℄ See cutting diagram.
✳ Bend in field as necessary to fit.

ESTIMATED QUANTITIES

ITEM	Class A45 Concrete, Box Culvert	Reinforcing Steel	Structure Excavation, Box Culvert
UNIT	Cu. Yd.	Lb.	Cu. Yd.
Inlet	25.8	2574	12.3
Inlet Apron	10.6	839	10.6

SITE 3
ALTERNATE A

INLET DETAILS

FOR

10' X 10' BOX CULVERT (C.I.P.)

OVER TRIB. TO ELK CREEK
STA. 1124 + 34.00 (EBL)
STR. NO. 47-104-570

0° SKEW
SEC. 14-T3N-R6E
IM-CR-EM 0901(187)44
HL-93

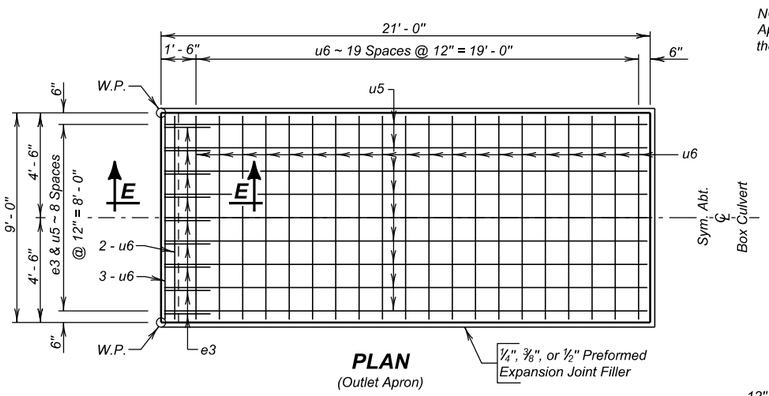
MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
JULY 2022

3 OF 9

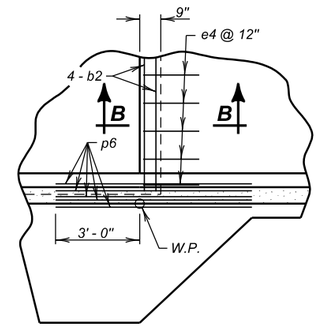
DESIGNED BY	CK. DES. BY	DRAFTED BY	
AU MEAD034J	BB 034JLG03	BT	Steve A Johnson BRIDGE ENGINEER

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E145	E185

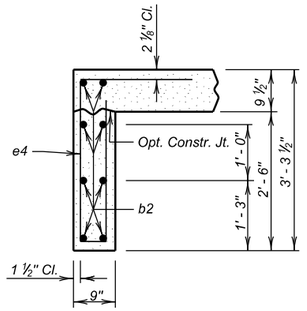
NOTE:
Apron will NOT be built monolithic with the Box Culvert.



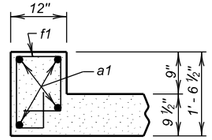
PLAN
(Outlet Apron)



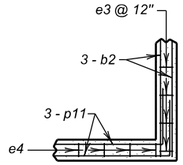
DETAIL "X"
(At Bottom Slab)



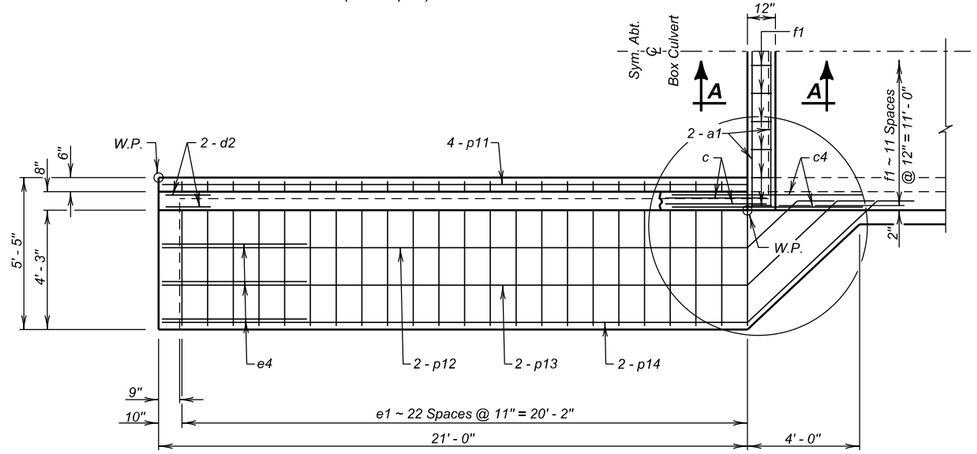
SECTION B - B



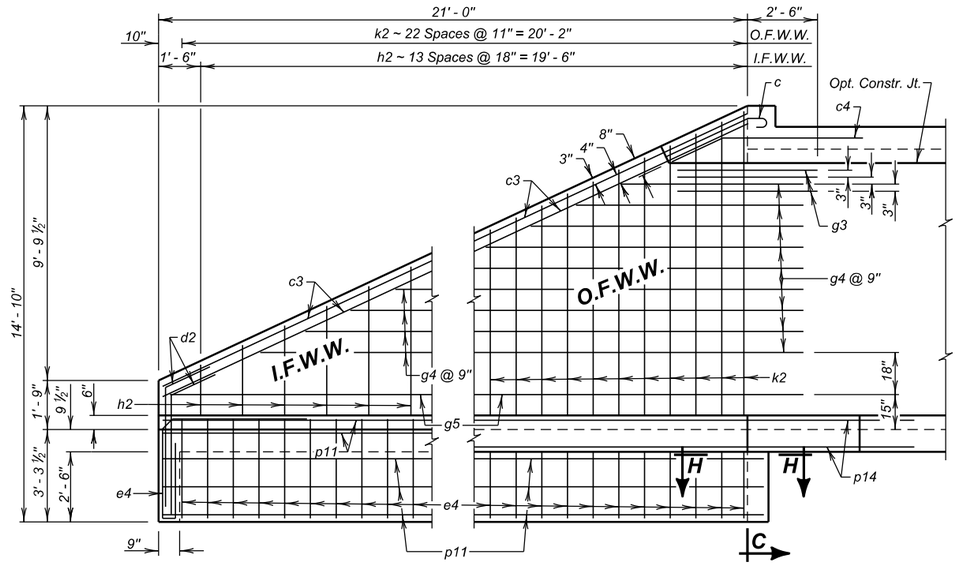
SECTION A - A
(At Top Slab)



SECTION H - H



HALF PLAN



ELEVATION

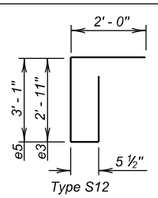
SECTION E - E

SECTION C - C

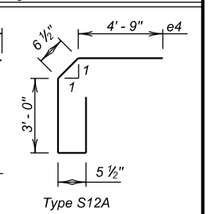
REINFORCING SCHEDULE

Mk.	No.	Size	Length	Type	Bending Details
a1	4	6	11' - 0"	Str.	
b2	8	6	10' - 3"	Str.	
c	4	5	4' - 6"	1A	
c3	8	5	23' - 3"	Str.	
c4	4	5	7' - 0"	19B	
d2	8	5	6' - 0"	19B	
e3	11	4	8' - 3"	S12	
e4	52	4	11' - 9"	S12A	
f1	12	4	5' - 0"	S6A	
g3	12	5	5' - 0"	Str.	
g4	18	4	26' - 0"	Str.	
g5	4	4	22' - 9"	Str.	
h2	14	4	24' - 3"	17A	
k2	23	4	16' - 6"	17A	
p6	10	6	7' - 0"	Str.	
p11	18	4	23' - 6"	Str.	
p12	4	4	25' - 0"	Str.	
p13	4	4	27' - 0"	Str.	
p14	4	4	28' - 9"	Str.	
OUTLET APRON					
e5	9	4	8' - 6"	S12	
u5	9	4	20' - 9"	Str.	
u6	25	4	8' - 9"	Str.	

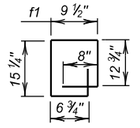
Type S12



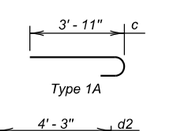
Type S12A



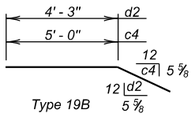
Type S6A

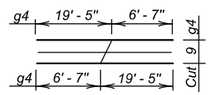


Type 1A

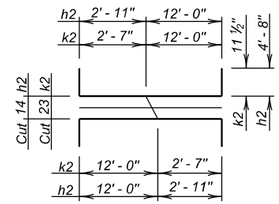


Type 19B





Type 17A



NOTES:
All dimensions are out to out of bars.
⏍ See cutting diagram.
✳ Bend in field as necessary to fit.

ESTIMATED QUANTITIES

ITEM	Class A45 Concrete, Box Culvert	Reinforcing Steel	Structure Excavation, Box Culvert
UNIT	Cu. Yd.	Lb.	Cu. Yd.
Outlet	23.6	2510	11.7
Outlet Apron	4.2	322	4.2

LEGEND FOR PLACING RE-STEEL

O. F. W. W. - Outside Face of Wing Wall
I. F. W. W. - Inside Face of Wing Wall

SITE 3
ALTERNATE A

OUTLET DETAILS

FOR

10' X 10' BOX CULVERT (C.I.P.)

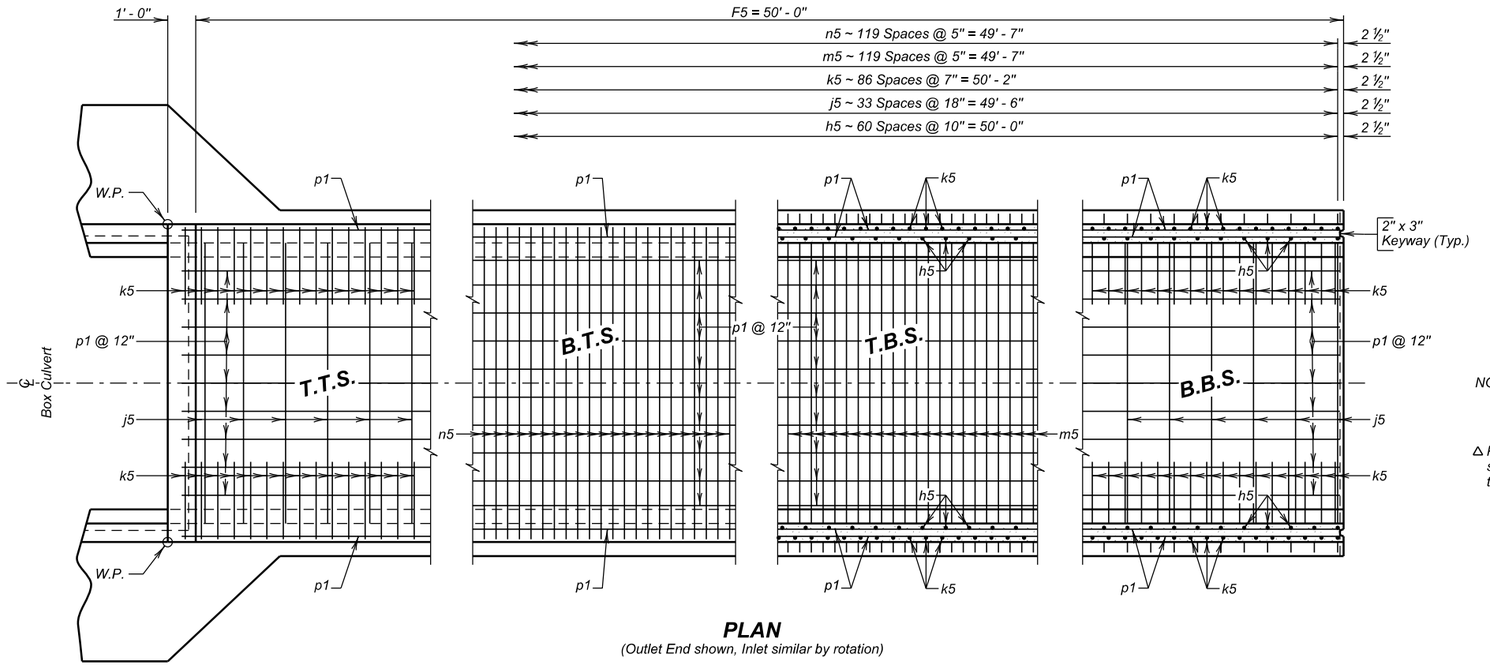
OVER TRIB. TO ELK CREEK — 0° SKEW
STA. 1124 + 34.00 (EBL) — SEC. 14-T3N-R6E
STR. NO. 47-104-570 — IM-CR-EM 0901(187)44
HL-93

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
JULY 2022

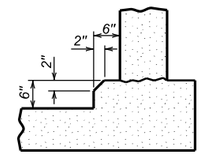
4 OF 9

DESIGNED BY	CK. DES. BY	DRAFTED BY	
AU	BB	BT	Steve A Johnson BRIDGE ENGINEER
MEAD034J	034JLG04		

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E146	E185



PLAN
(Outlet End shown, Inlet similar by rotation)



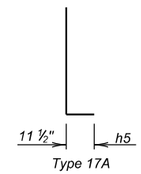
OPTIONAL FILLET DETAIL
(At Bottom Slab)

NOTE: Contractor may form the optional full fillet, with 2" Chamfer, as detailed. The cost of the additional concrete will be borne by the Contractor.

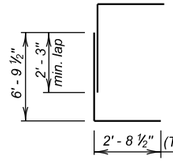
△ Place z1 bars thru construction joint between barrel sections as shown on Standard Plate No. 460.10. Quantity of z1 bars is for two construction joints.

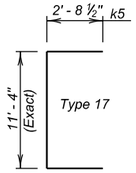
REINFORCING SCHEDULE
(For 2 - F5 Barrel End Sections @ 50' - 0")

Mk.	No.	Size	Length	Type	Bending Details
h5	244	4	12' - 0"	17A	
j5	136	4	10' - 0"	Str.	
k5	348	5	16' - 9"	17	
m5	240	5	12' - 0"	Str.	
n5	240	5	11' - 0"	Str.	
p1	140	4	50' - 6"	Str.	
△ z1	64	5	3' - 6"	Str.	



Type 17A





OPTIONAL k5 SPLICE DETAIL
Contractor may use optional reinforcing steel splice, as shown. The cost of the additional reinforcing steel will be borne by the Contractor.

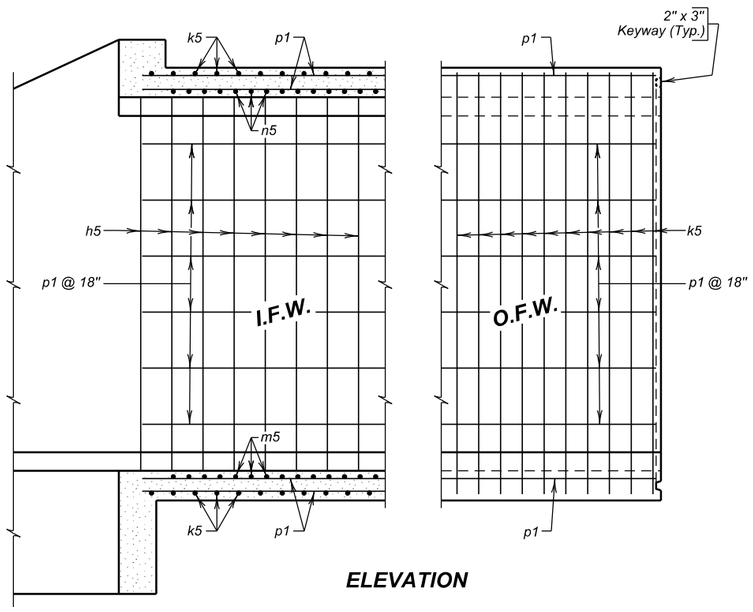
NOTES:
All dimensions are out to out of bars.
Request for additional reinforcing steel splices at points other than those shown, must be submitted to the Engineer for prior approval. If additional splices are approved, no payment will be allowed for the added quantity of reinforcing steel.

ESTIMATED QUANTITIES

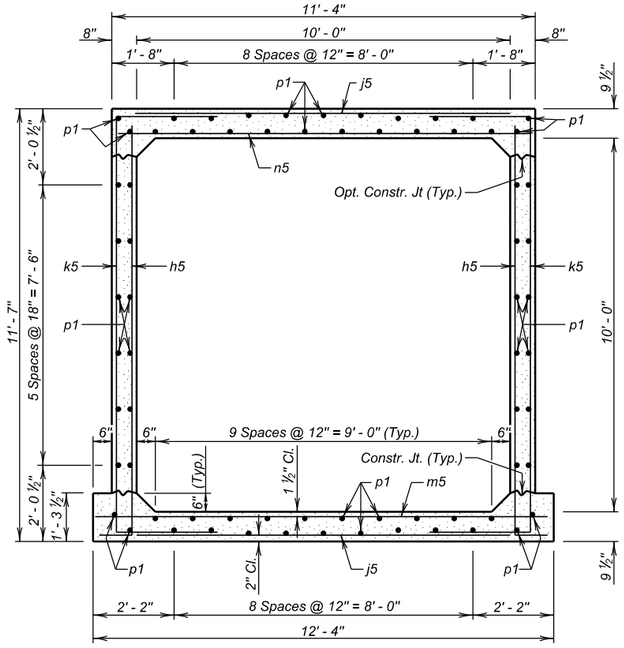
ITEM	Class A45 Concrete, Box Culvert	Reinforcing Steel	Structure Excavation, Box Culvert
UNIT	Cu.Yd.	Lb.	Cu.Yd.
2 - F5 Barrel End Sections @ 50' - 0"	122.4	19658	36.2

LEGEND FOR PLACING RE-STEEL

T.T.S.	- Top of Top Slab
B.T.S.	- Bottom of Top Slab
T.B.S.	- Top of Bottom Slab
B.B.S.	- Bottom of Bottom Slab
O.F.W.	- Outside Face of Wall
I.F.W.	- Inside Face of Wall



ELEVATION



F5 BARREL SECTION
(5' - 0" Maximum Fill)

SITE 3
ALTERNATE A

F5 BARREL END SECTION DETAILS (50' - 0")

FOR

10' X 10' BOX CULVERT (C.I.P.)

OVER TRIB. TO ELK CREEK
STA. 1124 + 34.00 (EBL)
STR. NO. 47-104-570

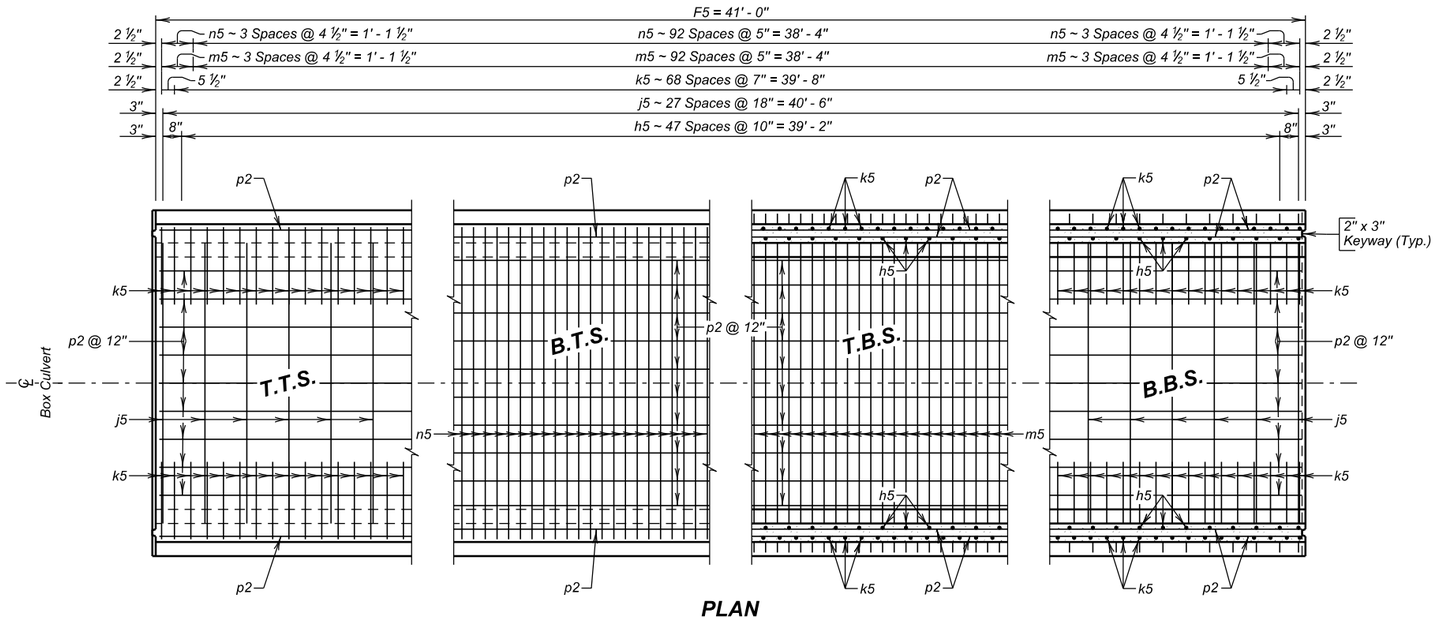
0° SKEW
SEC. 14-T3N-R6E
IM-CR-EM 0901(187)44
HL-93

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
JULY 2022

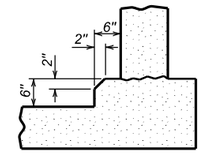
5 OF 9

DESIGNED BY	CK. DES. BY	DRAFTED BY	
AU	BB	BT	Steve A Johnson BRIDGE ENGINEER
MEAD034J	034JLG05		

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E147	E185



PLAN



OPTIONAL FILLET DETAIL

(At Bottom Slab)

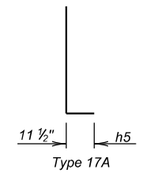
NOTE: Contractor may form the optional full fillet, with 2" Chamfer, as detailed. The cost of the additional concrete will be borne by the Contractor.

△ *Place z1 bars thru construction joint between barrel sections as shown on Standard Plate No. 460.10. Quantity of z1 bars is for one construction joint.*

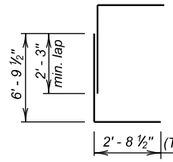
REINFORCING SCHEDULE

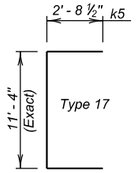
(For 1 - F5 Barrel Interior Section @ 41' - 0")

Mk.	No.	Size	Length	Type	Bending Details
h5	100	4	12' - 0"	17A	
j5	56	4	10' - 0"	Str.	
k5	142	5	16' - 9"	17	
m5	99	5	12' - 0"	Str.	
n5	99	5	11' - 0"	Str.	
p2	70	4	40' - 9"	Str.	
△ z1	32	5	3' - 6"	Str.	



Type 17A





OPTIONAL k5 SPLICE DETAIL
Contractor may use optional reinforcing steel splice, as shown. The cost of the additional reinforcing steel will be borne by the Contractor.

NOTES:

All dimensions are out to out of bars.

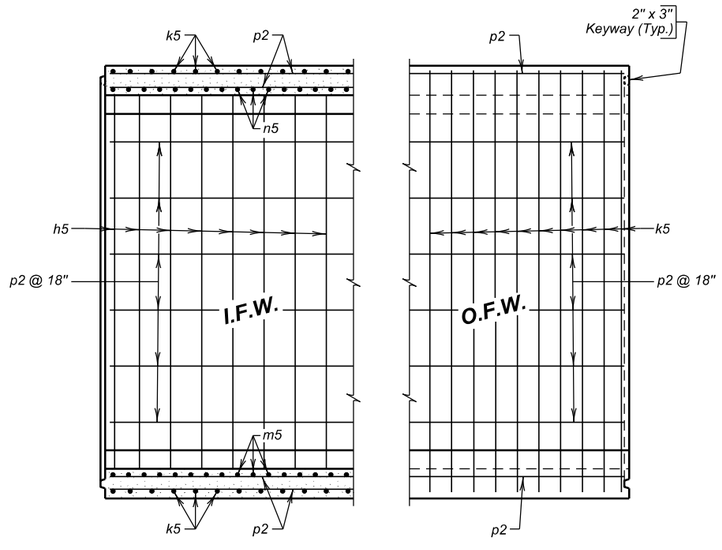
Request for additional reinforcing steel splices at points other than those shown, must be submitted to the Engineer for prior approval. If additional splices are approved, no payment will be allowed for the added quantity of reinforcing steel.

ESTIMATED QUANTITIES

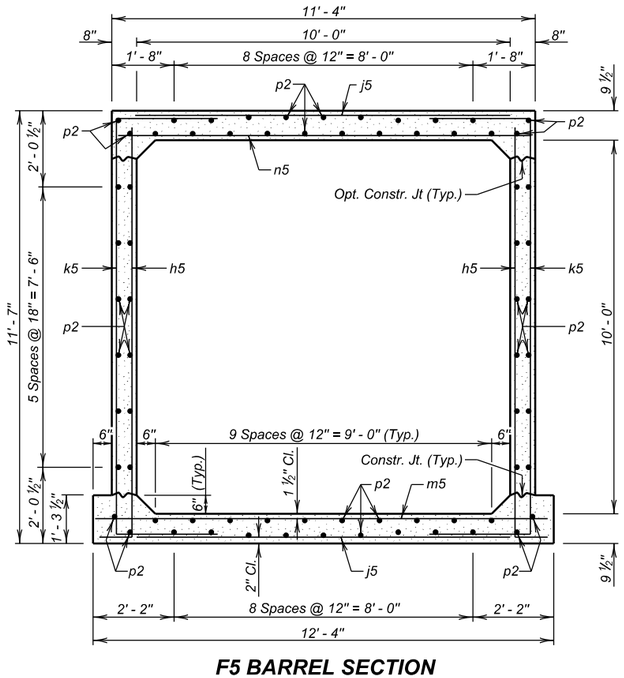
ITEM	Class A45 Concrete, Box Culvert	Reinforcing Steel	Structure Excavation, Box Culvert
UNIT	Cu.Yd.	Lb.	Cu.Yd.
1 - F5 Barrel Interior Section @ 41' - 0"	50.2	8054	14.8

LEGEND FOR PLACING RE-STEEL

T.T.S.	- Top of Top Slab
B.T.S.	- Bottom of Top Slab
T.B.S.	- Top of Bottom Slab
B.B.S.	- Bottom of Bottom Slab
O.F.W.	- Outside Face of Wall
I.F.W.	- Inside Face of Wall



ELEVATION



F5 BARREL SECTION

(5' - 0" Maximum Fill)

SITE 3
ALTERNATE A

F5 BARREL INTERIOR SECTION DETAILS (41' - 0")

FOR

10' X 10' BOX CULVERT (C.I.P.)

OVER TRIB. TO ELK CREEK — 0° SKEW
STA. 1124 + 34.00 (EBL) — SEC. 14-T3N-R6E
STR. NO. 47-104-570 — IM-CR-EM 0901(187)44
HL-93

MEADE COUNTY

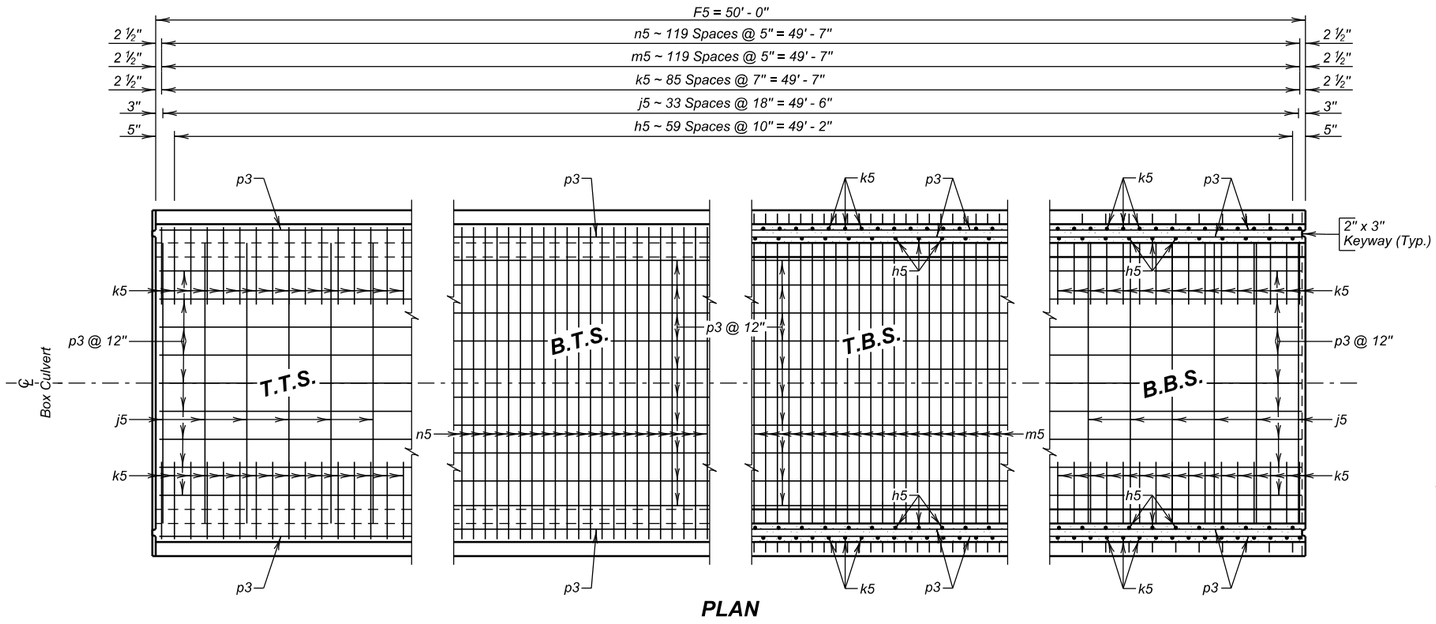
S. D. DEPT. OF TRANSPORTATION

JULY 2022

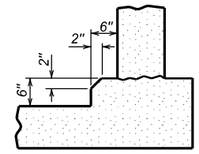
6 OF 9

DESIGNED BY	CK. DES. BY	DRAFTED BY	
AU	BB	BT	Steve A Johnson BRIDGE ENGINEER
MEAD034J	034JLG06		

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E148	E185



PLAN



OPTIONAL FILLET DETAIL

(At Bottom Slab)

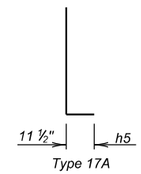
NOTE: Contractor may form the optional full fillet, with 2" Chamfer, as detailed. The cost of the additional concrete will be borne by the Contractor.

◈ Place a2 bars in both faces of barrel wall. Quantity of a2 bars is for two pipe locations.

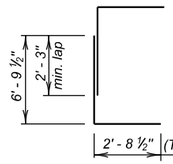
REINFORCING SCHEDULE

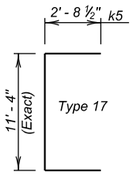
(For 1 - F5 Barrel Interior Section @ 50' - 0")

Mk.	No.	Size	Length	Type	Bending Details
◈ a2	8	5	7' - 3"	19A	
h5	120	4	12' - 0"	17A	
j5	68	4	10' - 0"	Str.	
k5	172	5	16' - 9"	17	
m5	120	5	12' - 0"	Str.	
n5	120	5	11' - 0"	Str.	
p3	70	4	49' - 9"	Str.	

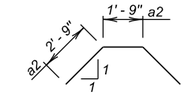


Type 17A





OPTIONAL k5 SPLICE DETAIL
Contractor may use optional reinforcing steel splice, as shown. The cost of the additional reinforcing steel will be borne by the Contractor.



Type 19A

NOTES:

All dimensions are out to out of bars.

Request for additional reinforcing steel splices at points other than those shown, must be submitted to the Engineer for prior approval. If additional splices are approved, no payment will be allowed for the added quantity of reinforcing steel.

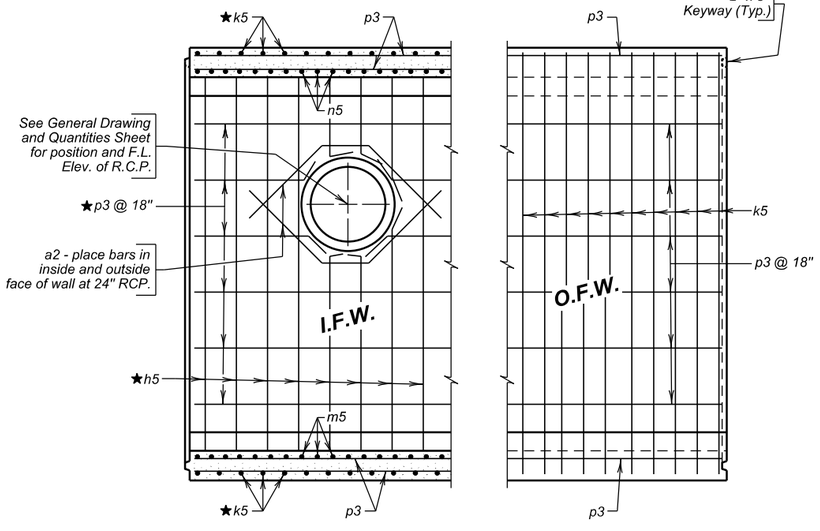
ESTIMATED QUANTITIES

ITEM	Class A45 Concrete, Box Culvert	Reinforcing Steel	Structure Excavation, Box Culvert
UNIT	Cu.Yd.	Lb.	Cu.Yd.
1 - F5 Barrel Interior Section @ 50' - 0"	61.2	9687	18.1

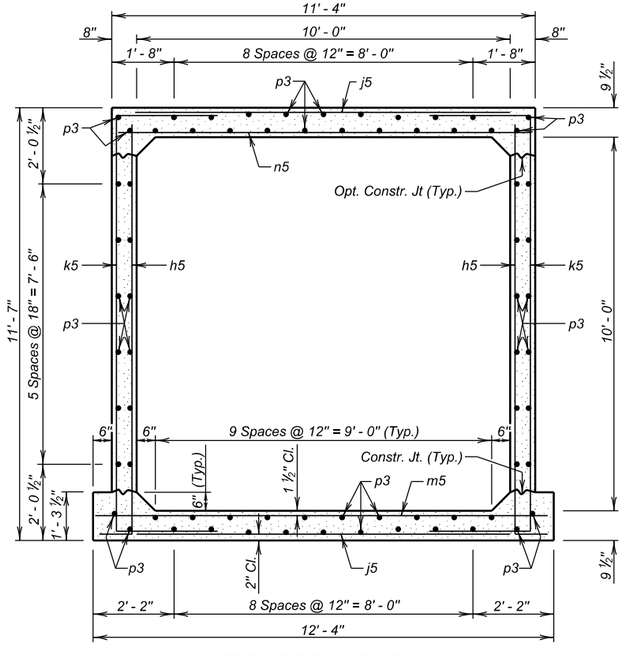
LEGEND FOR PLACING RE-STEEL

T.T.S.	- Top of Top Slab
B.T.S.	- Bottom of Top Slab
T.B.S.	- Top of Bottom Slab
B.B.S.	- Bottom of Bottom Slab
O.F.W.	- Outside Face of Wall
I.F.W.	- Inside Face of Wall

★ NOTE:
Cut and bend h5, k5, and p3 bars as required to place 24" RCP thru barrel wall.



ELEVATION



F5 BARREL SECTION

(5' - 0" Maximum Fill)

SITE 3
ALTERNATE A

F5 BARREL INTERIOR SECTION DETAILS (50' - 0")

FOR

10' X 10' BOX CULVERT (C.I.P.)

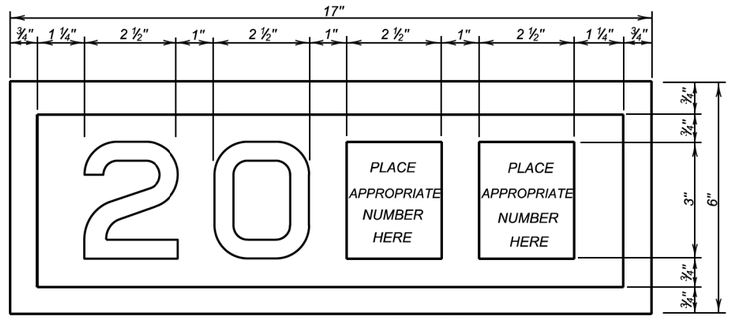
OVER TRIB. TO ELK CREEK
STA. 1124 + 34.00 (EBL)
STR. NO. 47-104-570

0° SKEW
SEC. 14-T3N-R6E
IM-CR-EM 0901(187)44
HL-93

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
JULY 2022

7 OF 9

DESIGNED BY	CK. DES. BY	DRAFTED BY	
AU	BB	BT	Steve A Johnson BRIDGE ENGINEER
MEAD034J	034JLG07		



YEAR PLATE DETAILS

GENERAL NOTES:

1. Year plates of the general dimensions shown will be constructed on all box culverts and bridges. The year plates will be constructed in reverse and attached to the forms in such a manner that the finished imprint in the concrete does not exceed one-half (1/2) inch in depth.

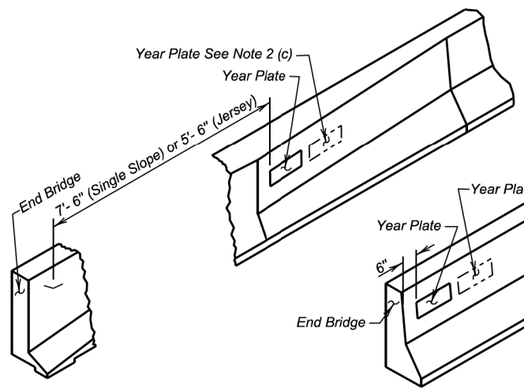
2. Year plates will be located on structure(s) as follows:

   a. On cast-in-place box culverts the year plates will be four and one - half (4 ½) inches below the top of the upstream parapet wall and centered laterally on the upstream face. On precast box culverts the year plate will be centered laterally on the upstream face of the top slab. Where an extended interior wall interferes with this location, the year plate will be centered in an adjacent barrel.

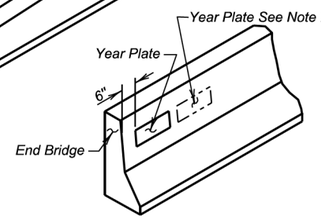
   b. On bridges with six (6) inch curbs, "Jersey" shaped barriers with no endblocks, or "Single Slope" shaped barriers with no endblocks, the year plate will be centered vertically on the curb face approximately six (6) inches from the end of the bridge, or as designated by the Engineer. On bridges with barrier endblocks, the year plate will be centered on the upper sloped portion of the barrier approximately 5'- 6" for "Jersey" shaped barriers from the end of the bridge and 7'-6" for "Single Slope" shaped barriers from the end of bridge, or as designated by the Engineer. There will be one year plate at each end of the bridge on opposite sides.

   c. When the plans specify that both the original date of construction and the date of reconstruction are to be shown, one date will be placed as listed above and the other located adjacent to it. Both year plates will be shown at each end of the bridge on opposite sides.

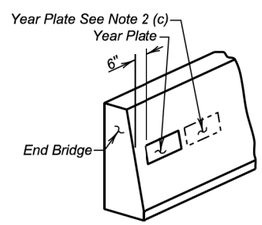
3. There will be no separate measurement or payment made for year plates on box culverts and bridges. All costs for this work will be incidental to other contract items.



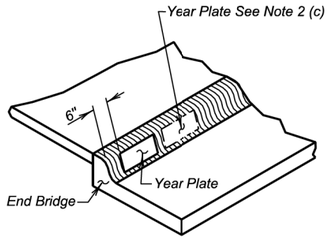
BARRIER
(With Endblock)



JERSEY BARRIER



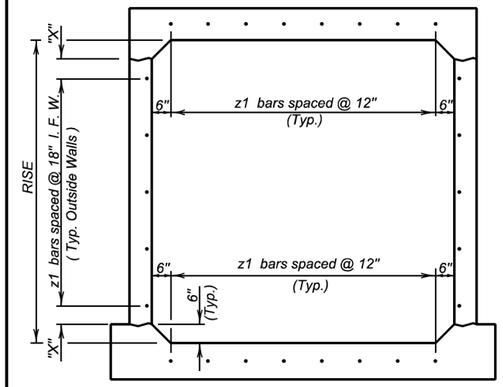
SINGLE SLOPE BARRIER



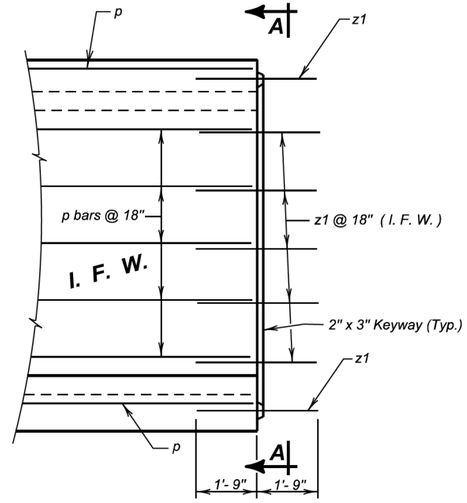
TYPE B CURB

January 22, 2021

Published Date: 2026	SDDOT	YEAR PLATE DETAILS	PLATE NUMBER 460.02 Sheet 1 Of 1



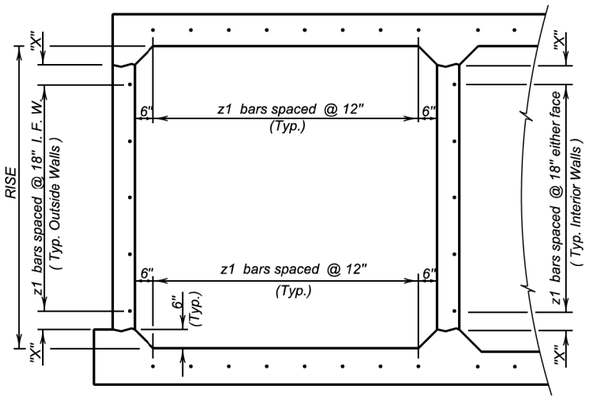
TYPICAL SINGLE BARREL VIEW A - A



ELEVATION

LEGEND FOR PLACING RE-STEEL
I. F. W. - Inside Face Wall

RISE	"X"
3'- 0"	3"
4'- 0"	9"
5'- 0"	6"
6'- 0"	3"
7'- 0"	9"
8'- 0"	6"
9'- 0"	3"
10'- 0"	9"
11'- 0"	6"
12'- 0"	3"
13'- 0"	9"
14'- 0"	6"



TYPICAL MULTIPLE BARREL VIEW A - A

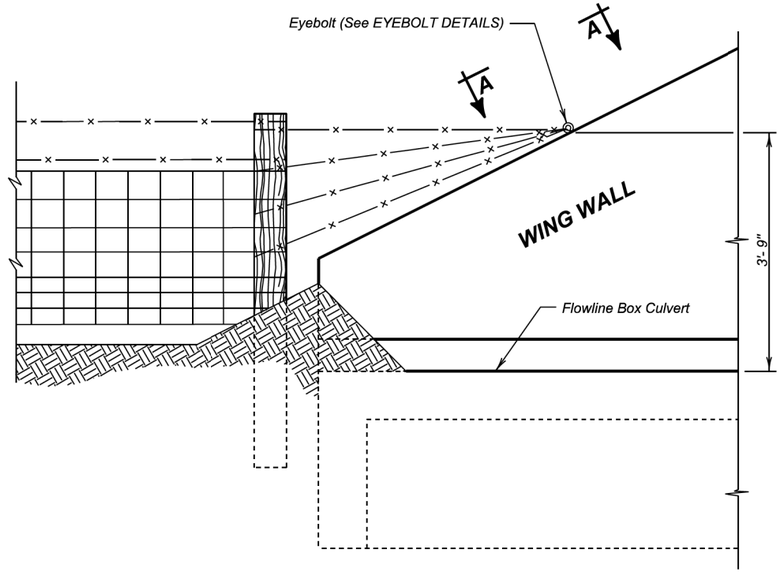
GENERAL NOTES:

1. z1 bars will be placed in the middle of the 2" X 3" keyway in the top and bottom slabs. z1 bars will be lapped with the longitudinal p bars in the inside face of the wall for outside walls and in either face for interior walls. z1 bars are listed and included elsewhere in plans.

2. Drainage Fabric Protection will be placed in accordance with Section 422, or Section 560, whichever is applicable.

June 1, 2022

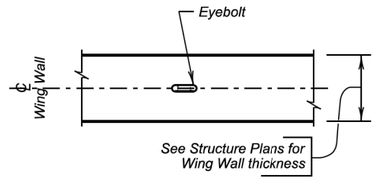
Published Date: 2026	SDDOT	BOX CULVERT BARREL TIE REINFORCEMENT	PLATE NUMBER 460.10 Sheet 1 of 1



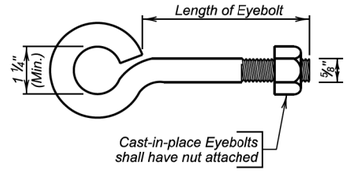
DETAIL FOR FENCE ANCHORS

GENERAL NOTES:

1. The fence and post details shown are for illustrative purpose only. The fence shall be as specified elsewhere in the plans.
2. Eyebolts shall be placed on all of the box culvert wing walls.
3. Eyebolts shall be ⅝ inch diameter and shall conform to ASTM A307.
4. Eyebolts, nuts, and concrete inserts shall be galvanized in accordance with AASHTO M232 (ASTM A153). Concrete inserts of corrosion resistant material need not be galvanized.
5. Cast-in-place eyebolts shall have a nut attached, be 4 ½ inches (Min.) in length and shall be embedded such that the eye of the bolt is flush with the concrete surface. (See Eyebolt Details) As an alternate, cast-in-place concrete inserts, capable of developing the full strength of the ⅝ inch diameter threaded eyebolt, may be used and shall be set in the concrete in accordance with the manufacturer's recommendations. The eyebolt shall be of sufficient length to develop its full strength. The eye of the eyebolt shall be flush with the concrete surface.
6. The cost for furnishing and installing eyebolts and/or concrete inserts shall be incidental to various contract items.



VIEW A - A



EYEBOLT DETAILS

December 23,2012

Published Date: 2026	SDDOT	FENCE ANCHORS FOR BOX CULVERT WING WALLS	PLATE NUMBER 620.16 Sheet 1 of 1

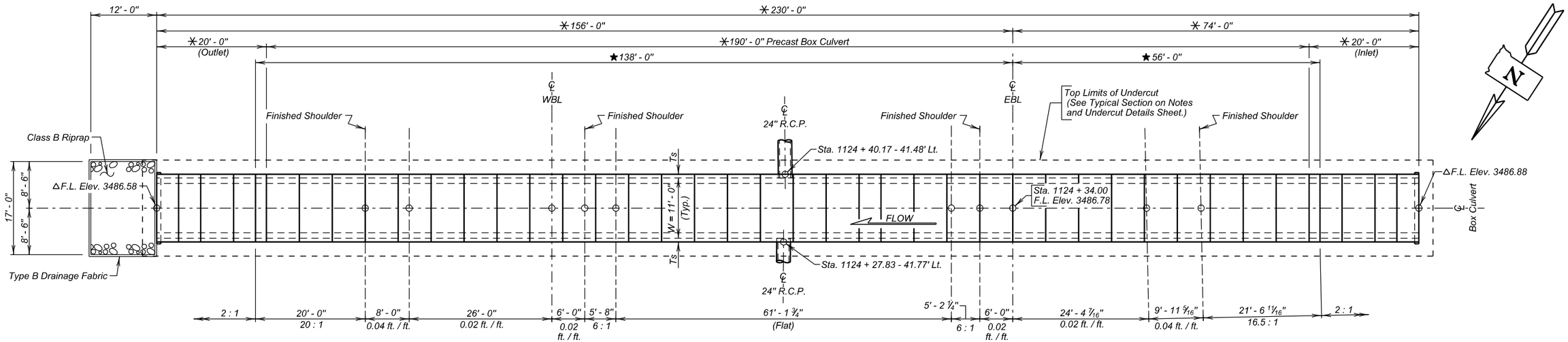
SITE 3
ALTERNATE A

10' X 10' BOX CULVERT (C.I.P.)
STR. NO. 47-104-570
JULY 2022

The elevations shown in these plans are based on the National Geodetic Survey (NGS) North American Vertical Datum of 1988 (NAVD88).

⚹ Dimension may vary with fabricator and/or installation. See Shop Plans for actual installation length.
★ Minimum distance to satisfy clear zone.
△ Based on dimensions shown.

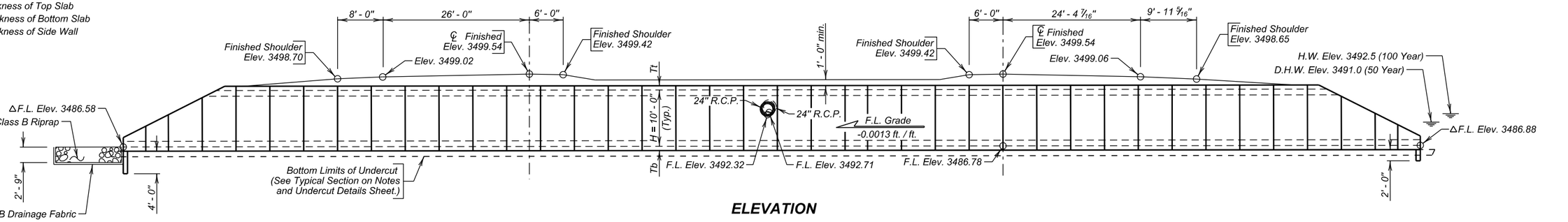
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E151	E185



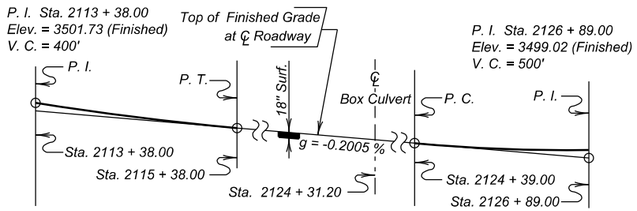
PLAN

LEGEND

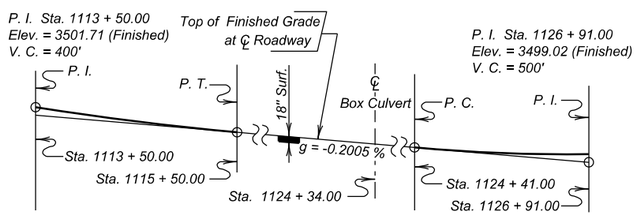
W = Width of Opening
H = Height of Opening
Tt = Thickness of Top Slab
Tb = Thickness of Bottom Slab
Ts = Thickness of Side Wall



ELEVATION



GRADELINE DATA
(Westbound Lanes)



GRADELINE DATA
(Eastbound Lanes)

INDEX OF CULVERT SHEETS-

Sheet No. 1 - General Drawing and Quantities
Sheet No. 2 - Notes and Undercut Details
Sheet No. 3 - Details of Standard Plate No.'s 460.02 & 560.01
Sheet No. 4 - Details of Standard Plate No.'s 560.10 & 560.11
Sheet No. 5 - Details of Standard Plate No. 620.16

ESTIMATED QUANTITIES

	ITEM	UNIT	QUANTITY
∢	Structure Excavation, Box Culvert	Cu. Yd.	81
	Box Culvert Undercut	Cu. Yd.	148
≠	Class B Riprap	Ton	29.1
	Type B Drainage Fabric	Sq. Yd.	41
	11' X 10' Precast Concrete Culvert, Furnish	Ft.	190
	11' X 10' Precast Concrete Culvert, Install	Ft.	190
	11' X 10' Precast Concrete Culvert End Section, Furnish	Each	2
	11' X 10' Precast Concrete Culvert End Section, Install	Each	2

∢ Quantity is based on 9" bottom slab, 9" top slab, 8" outside walls.
≠ For estimating purposes only, a factor of 1.4 tons/cu. yd. was used to convert Cu. Yd. to Tons.

HYDRAULIC DATA

Q_d	220 cfs
A_d	26 sq ft
V_d	8.6 fps
Q_F	220 cfs
Q_{100}	348 cfs
Q_{OT}	996 cfs
V_{max}	12.8 fps

Q_d = Design discharge for the proposed culvert based on 50 year frequency. El. 3491.0.
Q_{OT} = Overtopping discharge and frequency > Q_{353} year recurrence interval. El. 3498.2 @ Sta. 1126 + 30.00.
Q_F = Designated peak discharge for the basin approaching proposed project based on 50 year frequency.
Q_{100} = Computed discharge for the basin approaching proposed project based on 100 year frequency. El. 3492.5.
V_{max} = Maximum computed outlet velocity for the proposed culvert, based on 100 year frequency.

SITE 3
ALTERNATE B

GENERAL DRAWING AND QUANTITIES

FOR

11' X 10' BOX CULVERT (PRECAST)

OVER TRIB. TO ELK CREEK — 0° SKEW
STA. 1124 + 34.00 (EBL) — SEC. 14-T3N-R6E
STR. NO. 47-104-570 — IM-CR-EM 0901(187)44
PCN 034J — HL-93

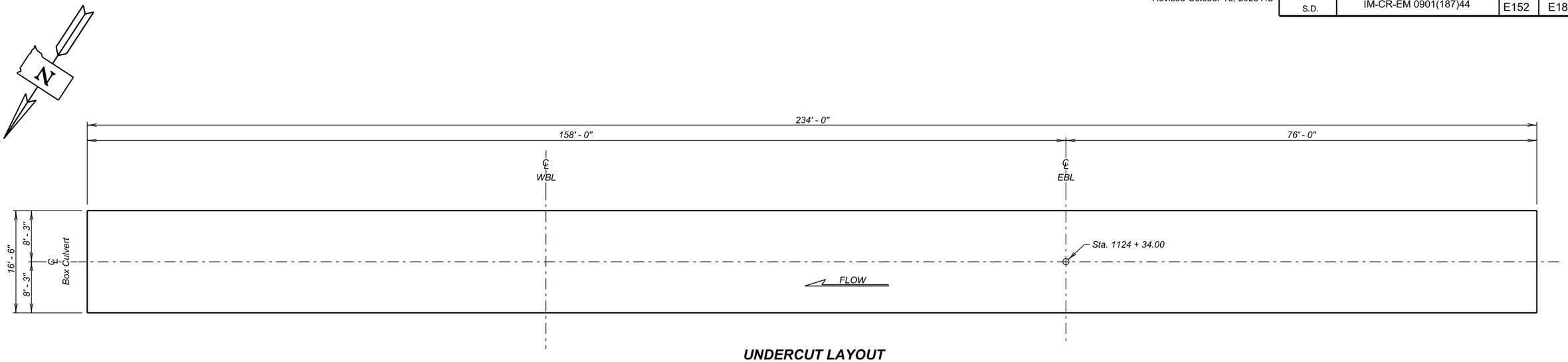
MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
JULY 2022

PLANS BY :
OFFICE OF BRIDGE DESIGN, SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION

DESIGNED BY	CK. DES. BY	DRAFTED BY	
AU	BB	BT	Steve A Johnson BRIDGE ENGINEER
MEAD034J	034JLG10		

Revised October 15, 2025 AU

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E152	E185



UNDERCUT LAYOUT
(Bottom Dimensions)

SPECIFICATIONS

Use South Dakota Standard Specifications for Roads and Bridges, 10-1-25 Version, Required Provisions, and Special Provisions as included in the Proposal. The Standard Specifications for Roads and Bridges are available for download and viewing at:
https://dot.sd.gov/doing-business/contractors/standard-specifications.

GENERAL NOTES

Design will be in accordance with Section 560 of the Construction Specifications with the following criteria:

1. *Box culvert and box culvert end section design will conform to the AASHTO LRFD Bridge Design Specifications, 9th Edition.*
2. *Design Live Load: HL-93 and construction loading consisting of one 7' - 6" gage axle with gross weight = 95,850 lbs. The construction load will not be applied until a minimum of 4 feet of fill has been placed over the Box Culvert. If other construction loads in excess of legal load are anticipated by the Contractor, the Contractor will submit a design analysis for the anticipated construction loading, through the proper channels, to the Office of Bridge Design for approval.*
3. *The box culvert will be load rated in accordance with the AASHTO Manual for Bridge Evaluation, 2018 Edition with the latest Interim Revisions using the LRFR method. The rating will include evaluation of the Design HL-93 truck at both Inventory and Operating levels and a Legal Load rating for three SD legal trucks (Type 3, 3S2 and 3-2) as well as the notional rating load and four specialized hauling vehicles. The structure will also be evaluated for the emergency vehicles, EV2 and EV3, at the legal load rating level. All sections of the box culvert will rate at HL-93 or better (Inventory Level). The three SD legal loads, the notional rating load, the four specialized hauling vehicles, and two emergency vehicles will rate greater than 1.0 at legal load rating level. AASHTOWare Bridge Rating (BrR) is required to be used to rate the box culvert. Include the BrR rating model and a load rating summary table with the load rating calculations, Submit load rating calculations with the design and independent check design calculations or shop plans, as appropriate.*
4. *The design of the barrel sections will be based on a minimum fill height of 1 foot and include all subsequent fill heights up to and including the maximum fill height of 5 feet over the box culvert.*
5. *Minimum inside corner fillet shall be 6 in.*
6. *Minimum precast barrel section length will be 6 foot; however, no more than two 4 foot sections are allowed in any one length of precast barrel.*
7. *Lift holes will be plugged with an approved non-shrinkable grout.*
8. *The Fabricator will imprint on the structure the date of construction as specified and detailed on Standard Plate No. 460.02.*
9. *Alternate end section details will be allowed, subject to the approval of the Bridge Construction Engineer. No additional payment will be made for any change in the barrel/end section configuration.*

GENERAL NOTES CONTINUED

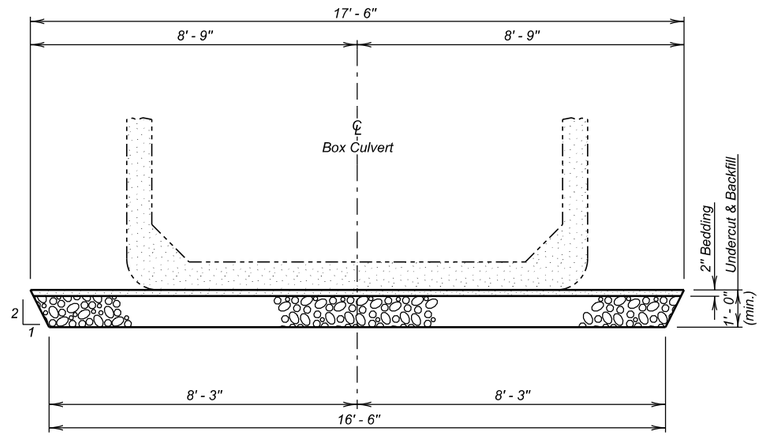
10. *Installation of the precast sections will be in accordance with the final approved shop plans.*
11. *Care will be taken when placing sections. Sections will be only moved using the lifting holes by approved equipment.*
12. *Soils below the bottom of the proposed RCBC consist of red sandy silt with gravel and gypsum streaks. Groundwater was not encountered in the borings during the subsurface investigation conducted in October and November 2021.*

DESIGN MIX OF CONCRETE

1. *Mix will be as per fabricator's design; however, a minimum compressive strength will not be less than 4500 p.s.i. at 28 days.*
2. *Type II cement is required.*

SHOP PLANS

The fabricator will submit shop plans in accordance with the Construction Specifications. Include design and independent check design, if applicable, with initial submittal.



TYPICAL SECTION
(For Limits of Undercut)

ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY
₡ Box Culvert Undercut	Cu. Yd.	148

₡ *For payment, quantity is based on plan shown undercut dimensions and will not be measured unless the Engineer orders a change.*

SITE 3
ALTERNATE B

NOTES AND UNDERCUT DETAILS

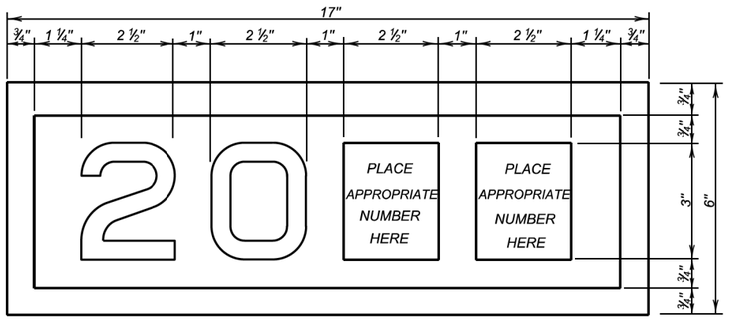
FOR

11' X 10' BOX CULVERT (PRECAST)

OVER TRIB. TO ELK CREEK — 0° SKEW
STA. 1124 + 34.00 (EBL) — SEC. 14-T3N-R6E
STR. NO. 47-104-570 — IM-CR-EM 0901(187)44
HL-93

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
JULY 2022

DESIGNED BY	CK. DES. BY	DRAFTED BY	
AU	BB	BT	Steve A. Johnson BRIDGE ENGINEER
MEAD034J	034JLG11		



YEAR PLATE DETAILS

GENERAL NOTES:

1. Year plates of the general dimensions shown will be constructed on all box culverts and bridges. The year plates will be constructed in reverse and attached to the forms in such a manner that the finished imprint in the concrete does not exceed one-half (1/2) inch in depth.

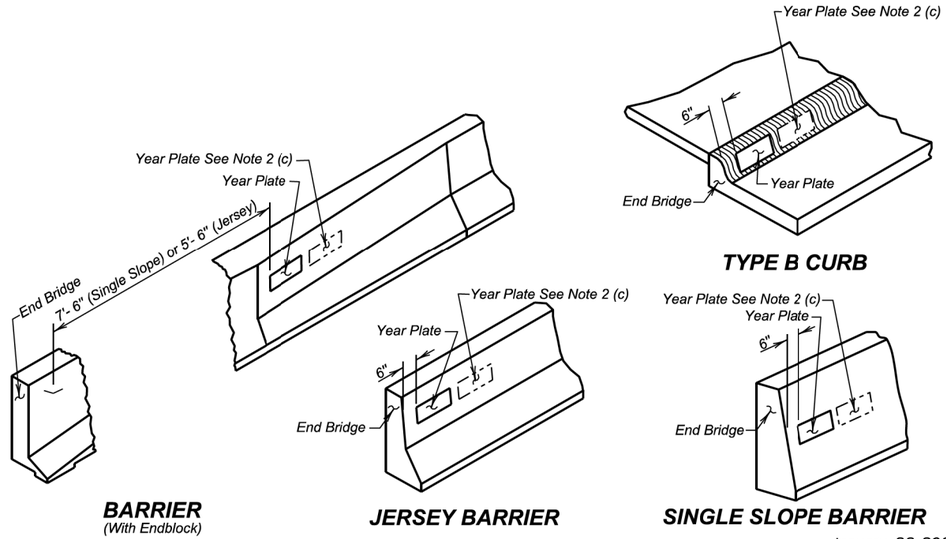
2. Year plates will be located on structure(s) as follows:

   a. On cast-in-place box culverts the year plates will be four and one - half (4 ½) inches below the top of the upstream parapet wall and centered laterally on the upstream face. On precast box culverts the year plate will be centered laterally on the upstream face of the top slab. Where an extended interior wall interferes with this location, the year plate will be centered in an adjacent barrel.

   b. On bridges with six (6) inch curbs, "Jersey" shaped barriers with no endblocks, or "Single Slope" shaped barriers with no endblocks, the year plate will be centered vertically on the curb face approximately six (6) inches from the end of the bridge, or as designated by the Engineer. On bridges with barrier endblocks, the year plate will be centered on the upper sloped portion of the barrier approximately 5'- 6" for "Jersey" shaped barriers from the end of the bridge and 7'-6" for "Single Slope" shaped barriers from the end of bridge, or as designated by the Engineer. There will be one year plate at each end of the bridge on opposite sides.

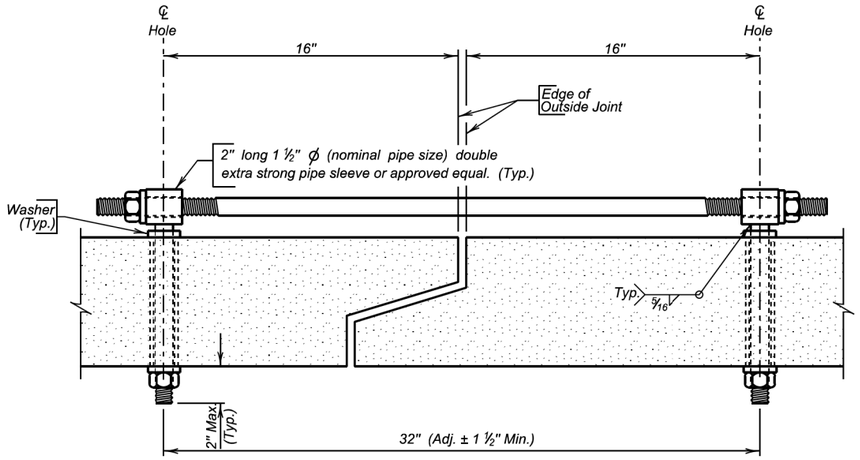
   c. When the plans specify that both the original date of construction and the date of reconstruction are to be shown, one date will be placed as listed above and the other located adjacent to it. Both year plates will be shown at each end of the bridge on opposite sides.

3. There will be no separate measurement or payment made for year plates on box culverts and bridges. All costs for this work will be incidental to other contract items.



January 22, 2021

Published Date: 2026	SDDOT	YEAR PLATE DETAILS	PLATE NUMBER 460.02
			Sheet 1 Of 1



TIE BOLT ASSEMBLY

GENERAL NOTES:

1. All holes for tie bolts shall be cast-in-place, 16 inches from outside edge of joint. Cast in inserts or sleeves, if used, shall be made of a corrosion resistant material.

2. Ties shall be 1 inch ∅ and conform to the requirements of ASTM A36, ASTM A307, or ASTM F1554, Gr. 36. Nuts shall be heavy hex in conformance with ASTM A563. Washers shall conform to ASTM F436, Type 1. The welded pipe sleeve shall conform to ASTM A53, Grade B.

3. Welding and weld inspection shall be in conformance with AWS/ANSI D1.1 - (Current Year) Structural Welding Code - Steel.

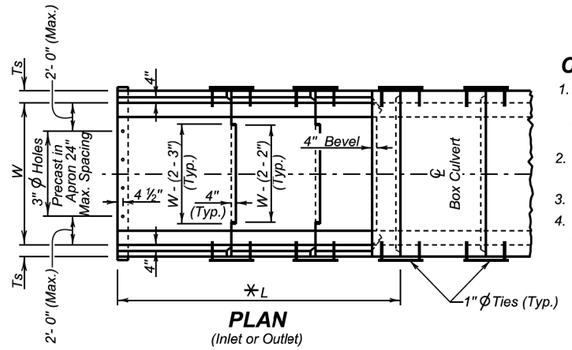
4. Tie Bolt Assembly shall be galvanized in accordance with ASTM A153 or ASTM F2329 as applicable.

5. Tie Bolt Assembly details may vary from that shown, but alternate tie bolt assemblies are subject to testing to demonstrate equal strength. Submit details, through proper channels, to the Office of Bridge Design for approval.

6. All costs for furnishing and installing the precast box culvert tie bolt assembly shall be incidental to the contract unit price per Foot for "Precast Concrete Box Culvert, Furnish".

March 21, 2016

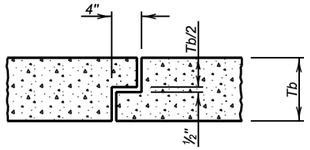
Published Date: 2026	SDDOT	PRECAST BOX CULVERT TIE BOLT ASSEMBLY DETAILS	PLATE NUMBER 560.01
			Sheet 1 of 1



PLAN
(Inlet or Outlet)

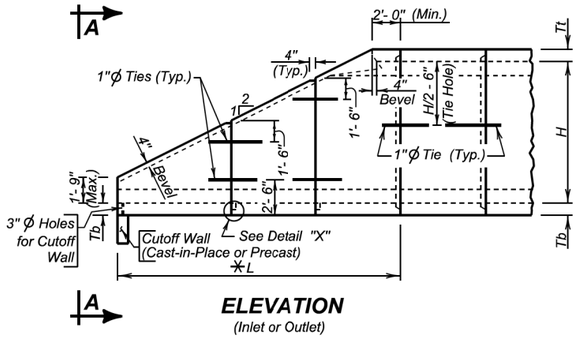
CUTOFF WALL

1. *All costs associated with furnishing and installing the Cutoff Wall, whether precast or cast-in-place, shall be incidental to the contract unit price per each for "Precast Box Culvert End Section, Furnish".*
2. *Concrete for cast-in-place cutoff wall shall be Class M6 concrete in accordance with Section 462 of the Specifications.*
3. *All reinforcing steel shall conform to ASTM A615 Grade 60.*
4. *Alternate details will be allowed, subject to the approval of the Bridge Construction Engineer.*

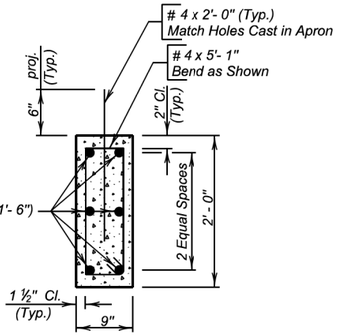


DETAIL " X "

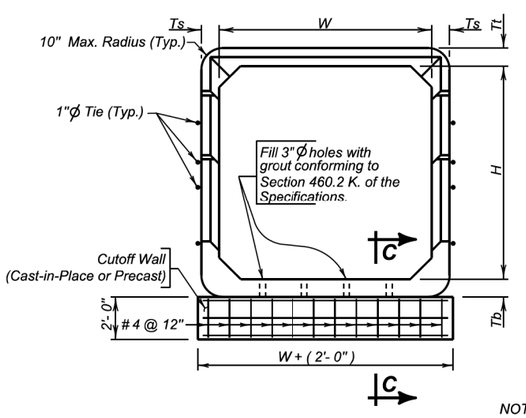
NOTE: Joint details may vary from that shown, according to the manufacturer's design. Submit details with shop plans for approval.



ELEVATION
(Inlet or Outlet)



SEC. C - C



VIEW A - A

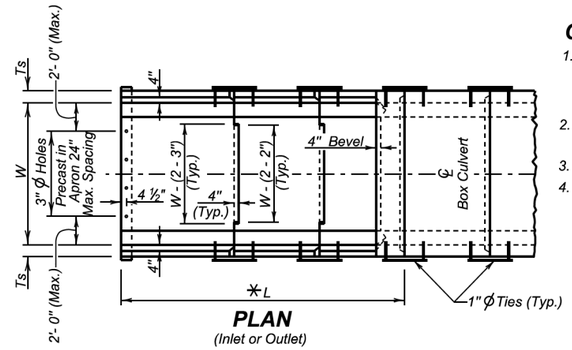
LEGEND

W = Width of Opening
H = Height of Opening
Tt = Thickness of Top Slab
Tb = Thickness of Bottom Slab
Ts = Thickness of Side Wall
L = Length of End Section

NOTES:
See GENERAL DRAWING for W and H dimensions.
Tt, Tb, L, and Ts dimensions shall be furnished by the Contractor.
⁎ Length and number of units may vary from that shown.

June 26, 2015

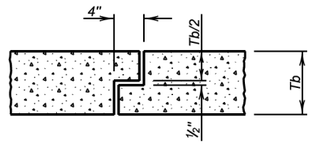
Published Date: 2026	SDDOT	PRECAST SINGLE BOX CULVERT SLOPED END SECTION DETAILS WITH 2'–0" CUTOFF WALL	PLATE NUMBER 560.10
			Sheet 1 of 1



PLAN
(Inlet or Outlet)

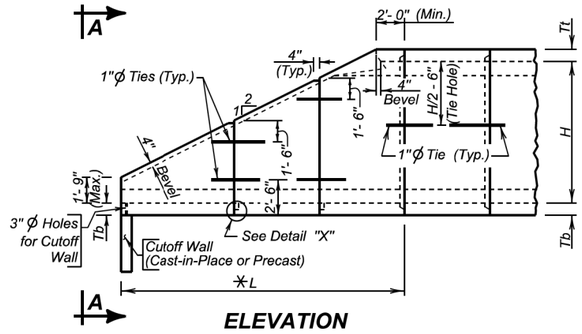
CUTOFF WALL

1. *All costs associated with furnishing and installing the Cutoff Wall, whether precast or cast-in-place, shall be incidental to the contract unit price per each for "Precast Box Culvert End Section, Furnish".*
2. *Concrete for cast-in-place cutoff wall shall be Class M6 concrete in accordance with Section 462 of the Specifications.*
3. *All reinforcing steel shall conform to ASTM A615 Grade 60.*
4. *Alternate details will be allowed, subject to the approval of the Bridge Construction Engineer.*

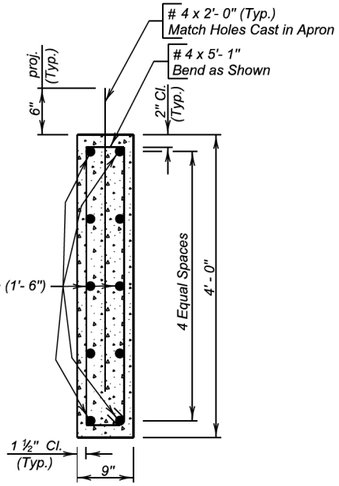


DETAIL " X "

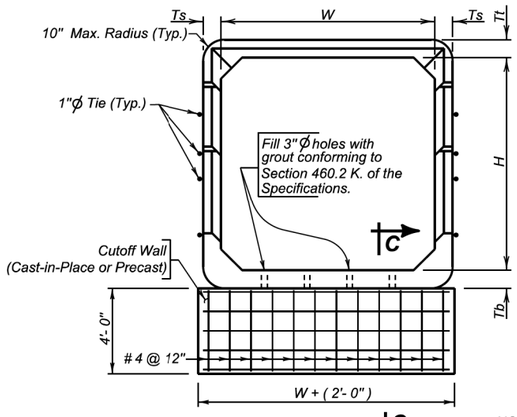
NOTE: Joint details may vary from that shown, according to the manufacturer's design. Submit details with shop plans for approval.



ELEVATION
(Inlet or Outlet)



SEC. C - C



VIEW A - A

LEGEND

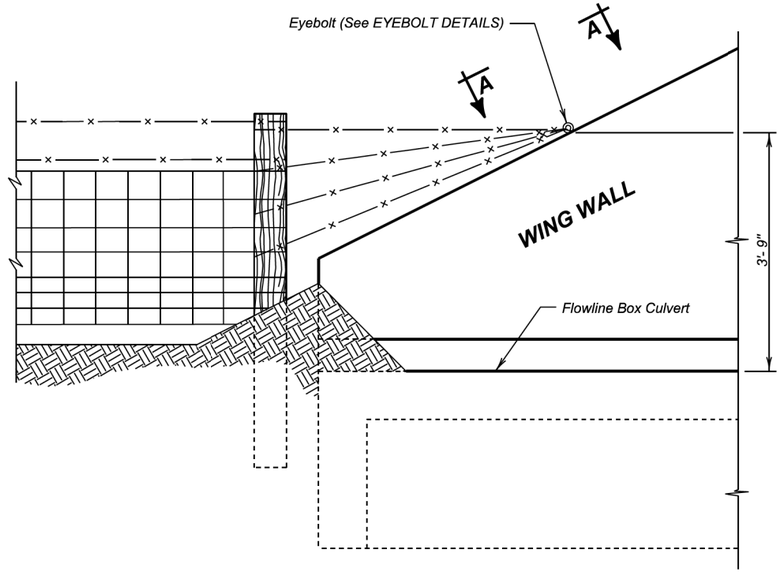
W = Width of Opening
H = Height of Opening
Tt = Thickness of Top Slab
Tb = Thickness of Bottom Slab
Ts = Thickness of Side Wall
L = Length of End Section

NOTES:
See GENERAL DRAWING for W and H dimensions.
Tt, Tb, L, and Ts dimensions shall be furnished by the Contractor.
⁎ Length and number of units may vary from that shown.

June 26, 2015

Published Date: 2026	SDDOT	PRECAST SINGLE BOX CULVERT SLOPED END SECTION DETAILS WITH 4'–0" CUTOFF WALL	PLATE NUMBER 560.11
			Sheet 1 of 1

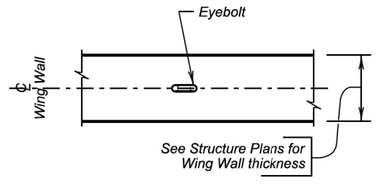
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E155	E185



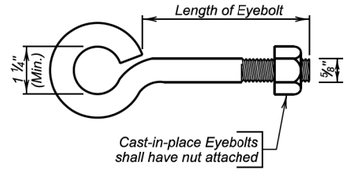
DETAIL FOR FENCE ANCHORS

GENERAL NOTES:

1. The fence and post details shown are for illustrative purpose only. The fence shall be as specified elsewhere in the plans.
2. Eyebolts shall be placed on all of the box culvert wing walls.
3. Eyebolts shall be ⅝ inch diameter and shall conform to ASTM A307.
4. Eyebolts, nuts, and concrete inserts shall be galvanized in accordance with AASHTO M232 (ASTM A153). Concrete inserts of corrosion resistant material need not be galvanized.
5. Cast-in-place eyebolts shall have a nut attached, be 4 ½ inches (Min.) in length and shall be embedded such that the eye of the bolt is flush with the concrete surface. (See Eyebolt Details) As an alternate, cast-in-place concrete inserts, capable of developing the full strength of the ⅝ inch diameter threaded eyebolt, may be used and shall be set in the concrete in accordance with the manufacturer's recommendations. The eyebolt shall be of sufficient length to develop its full strength. The eye of the eyebolt shall be flush with the concrete surface.
6. The cost for furnishing and installing eyebolts and/or concrete inserts shall be incidental to various contract items.



VIEW A - A



EYEBOLT DETAILS

December 23,2012

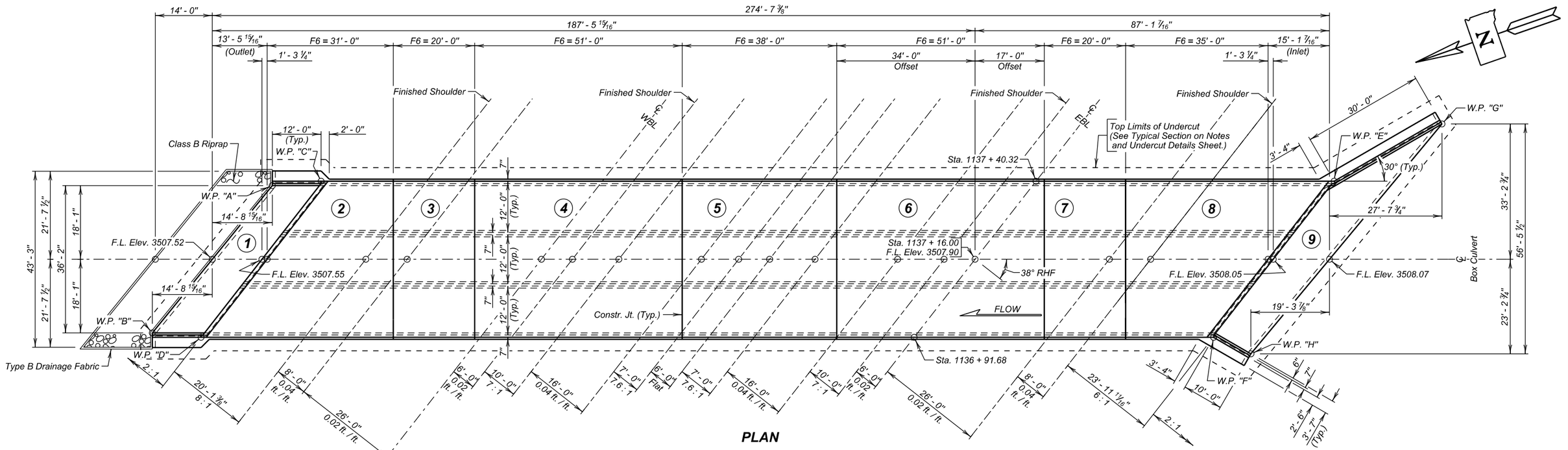
Published Date: 2026	SDDOT	FENCE ANCHORS FOR BOX CULVERT WING WALLS	PLATE NUMBER 620.16
			Sheet 1 of 1

SITE 3
ALTERNATE B

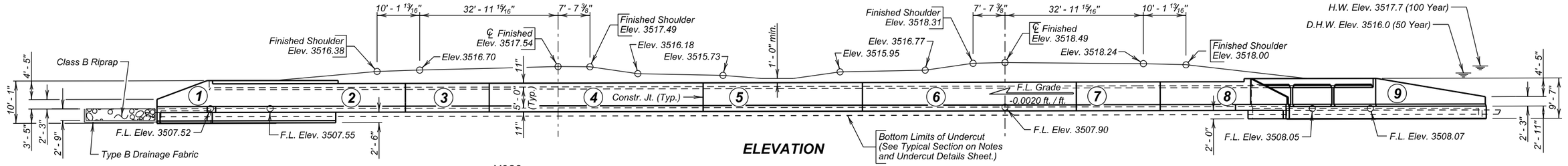
11' X 10' BOX CULVERT (PRECAST)
STR. NO. 47-104-570
JULY 2022

The elevations shown in these plans are based on the National Geodetic Survey (NGS) North American Vertical Datum of 1988 (NAVD88).

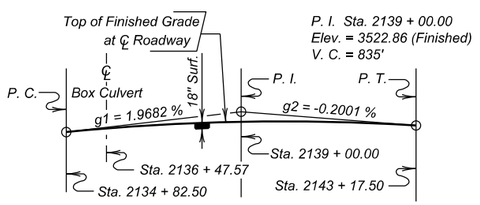
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E156	E185



PLAN

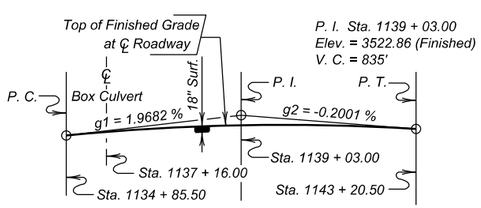


ELEVATION



VERTICAL CURVE DATA

(Westbound Lanes)



VERTICAL CURVE DATA

(Eastbound Lanes)

-X028-

INDEX OF CULVERT SHEETS -

Sheet No. 1 - General Drawing and Quantities
Sheet No. 2 - Notes and Undercut Details
Sheet No. 3 - Inlet Details (A)
Sheet No. 4 - Inlet Details (B)
Sheet No. 5 - Outlet Details
Sheet No. 6 - F6 Barrel End Section Details (31' - 0") (A)
Sheet No. 7 - F6 Barrel End Section Details (31' - 0") (B)
Sheet No. 8 - F6 Barrel End Section Details (35' - 0") (A)
Sheet No. 9 - F6 Barrel End Section Details (35' - 0") (B)
Sheet No. 10 - F6 Barrel Interior Section Details (20 - 0")
Sheet No. 11 - F6 Barrel Interior Section Details (38' - 0")
Sheet No. 12 - F6 Barrel Interior Section Details (51' - 0")
Sheet No. 13 - Standard Plate No.'s 460.02 and 460.10
Sheet No. 14 - Standard Plate No. 620.16

HYDRAULIC DATA

Q_d	1503 cfs
A_d	137 sq ft
V_d	11.0 fps
Q_F	1503 cfs
Q_{100}	2378 cfs
Q_{OT}	$>Q_{114}$
V_{max}	11.6 fps

Q_d = Design discharge for the proposed culvert based on 50 year frequency. El. 3516.0.

Q_{OT} = Overtopping discharge and frequency > Q_{114} year recurrence interval. El. 3518.2 @ Sta. 1137 + 00.00.

Q_F = Designated peak discharge for the basin approaching proposed project based on 50 year frequency.

Q_{100} = Computed discharge for the basin approaching proposed project based on 100 year frequency. El. 3517.7

V_{max} = Maximum computed outlet velocity for the proposed culvert, based on 100 year frequency.

TABLE OF WORKING POINTS

W. P.	STATION	OFFSET
"A"	1136 + 23.89	147.26' Lt.
"B"	1135 + 77.24	148.24' Lt.
"C"	1136 + 32.13	138.47' Lt.
"D"	1135 + 83.77	138.11' Lt.
"E"	1137 + 85.43	57.74' Rt.
"F"	1137 + 36.97	57.97' Rt.
"G"	1138 + 12.84	69.98' Rt.
"H"	1137 + 39.43	67.72' Rt.

ESTIMATED QUANTITIES

	ITEM	UNIT	QUANTITY
	Class A45 Concrete, Box Culvert	Cu. Yd.	841.4
	Reinforcing Steel	Lb.	122265
	Structure Excavation, Box Culvert	Cu. Yd.	380
	Box Culvert Undercut	Cu. Yd.	473
≠	Class B Riprap	Ton	86.3
	Type B Drainage Fabric	Sq. Yd.	109

≠ For estimating purposes only, a factor of 1.4 tons/cu. yd. was used to convert Cu. Yd. to Tons.

PLANS BY :
OFFICE OF BRIDGE DESIGN, SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION

GENERAL DRAWING AND QUANTITIES

FOR

3 - 12' X 5' BOX CULVERT

OVER STAGEBARN CANYON CREEK — 38° RHF SKEW
STA. 1137 + 16.00 (EBL) — SEC. 14-T3N-R6E
STR. NO. 47-106-572 — IM-CR-EM 0901(187)44
PCN 034J — HL-93

MEADE COUNTY

S. D. DEPT. OF TRANSPORTATION

AUGUST 2022

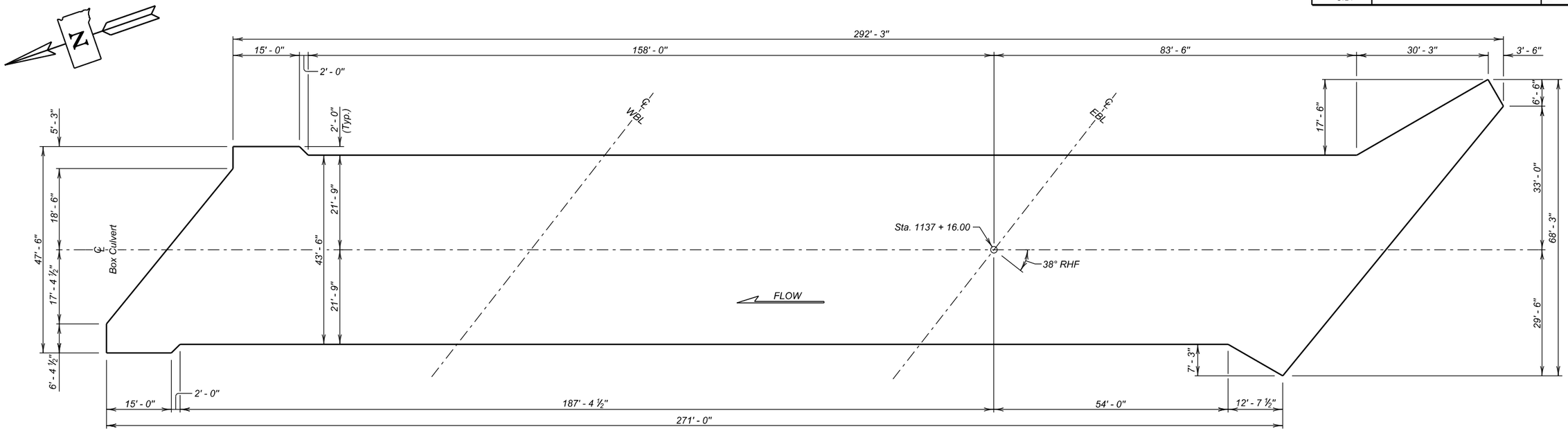
1 OF 14

-X028-

DESIGNED BY	CK. DES. BY	DRAFTED BY	
AU	BB	BT	Steven A Johnson BRIDGE ENGINEER
MEAD034J	034JGH01		

Revised October 15, 2025 AU

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E157	E185



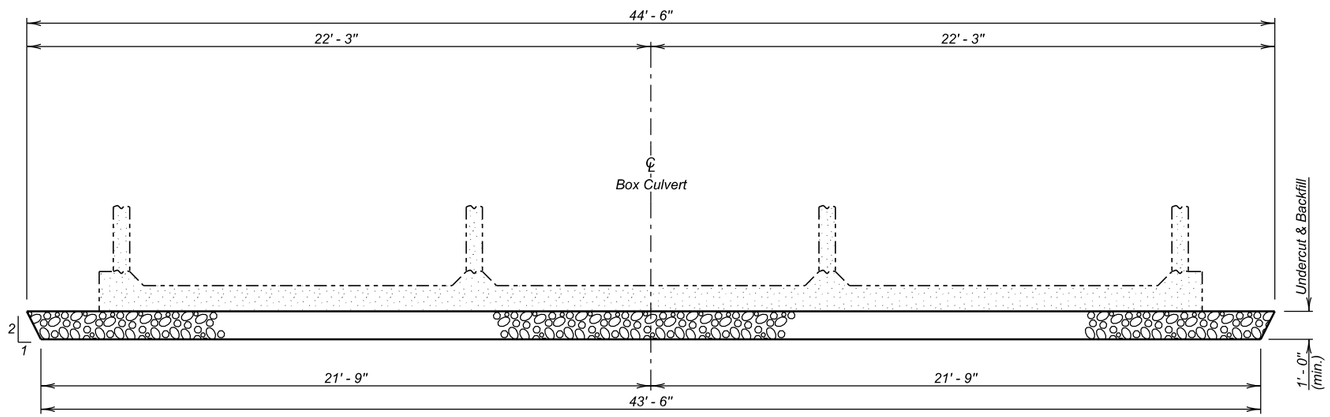
UNDERCUT LAYOUT
(Bottom Dimensions)

SPECIFICATIONS

1. *Design Specifications: AASHTO LRFD Bridge Design Specifications, 9th Edition.*
2. Construction Specifications: South Dakota Standard Specifications for Roads and Bridges, 10-1-25 Version, Required Provisions, and Special Provisions as included in the Proposal. The Standard Specifications for Roads and Bridges are available for download and viewing at: https://dot.sd.gov/doing-business/contractors/standard-specifications.

GENERAL NOTES

1. *Design Live Load: HL-93 and construction load consisting of two 7' - 6" gage axles spaced 30 foot apart with gross axle weight (each axle) = 95,850 lbs. The construction load will not be applied until a minimum of 4 feet of fill has been placed over the box culvert. Other construction loads in excess of legal load must be submitted thru proper channels to the Office of Bridge Design for analysis.*
2. *The design of the barrel section is based on a minimum fill height of 1 feet and includes all subsequent fill heights up to and including the maximum fill height of 6 ft. (F6).*
3. *Design Material Strengths: Concrete f'c = 4500 p.s.i.*
   Reinforcing Steel fy = 60000 p.s.i.
4. *All concrete will be Class A45 Concrete, Box culvert conforming to Section 460 of the Construction Specifications.*
5. *All reinforcing steel will conform to ASTM A615 Grade 60.*
6. *All lap splices shown are contact lap splices unless noted otherwise.*
7. *All exposed edges will be chamfered ¾ inch unless noted otherwise in the plans.*
8. *Use 1 inch clear cover on all reinforcing steel EXCEPT as shown.*
9. *The Contractor will imprint on the structure the date of construction as specified and detailed on Standard Plate No. 460.02.*
10. *Care will be taken to establish Working Points (W.P.) as shown on the wings.*
11. *Circled numbers in PLAN and ELEVATION views on the General Drawing are section I.D. Numbers (see SDDOT Materials Manual).*
12. *Cost of Preformed Expansion Joint Filler used in apron construction will be incidental to the other contract items.*
13. *Soils below the bottom of the proposed RCBC consist of gray cobbles and coarse gravel. Groundwater was not encountered in the borings during the subsurface investigation conducted in October and November 2021.*



TYPICAL SECTION
(For Limits of Undercut)

ESTIMATED QUANTITIES

	ITEM	UNIT	QUANTITY
₡	Box Culvert Undercut	Cu. Yd.	473

₡ *For payment, quantity is based on plan shown undercut dimensions and will not be measured unless the Engineer orders a change.*

NOTES AND UNDERCUT DETAILS

FOR

3 - 12' X 5' BOX CULVERT

OVER STAGEBARN CANYON CREEK — 38° RHF SKEW
STA. 1137 + 16.00 (EBL) — SEC. 14-T3N-R6E
STR. NO. 47-106-572 — IM-CR-EM 0901(187)44
HL-93

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
AUGUST 2022

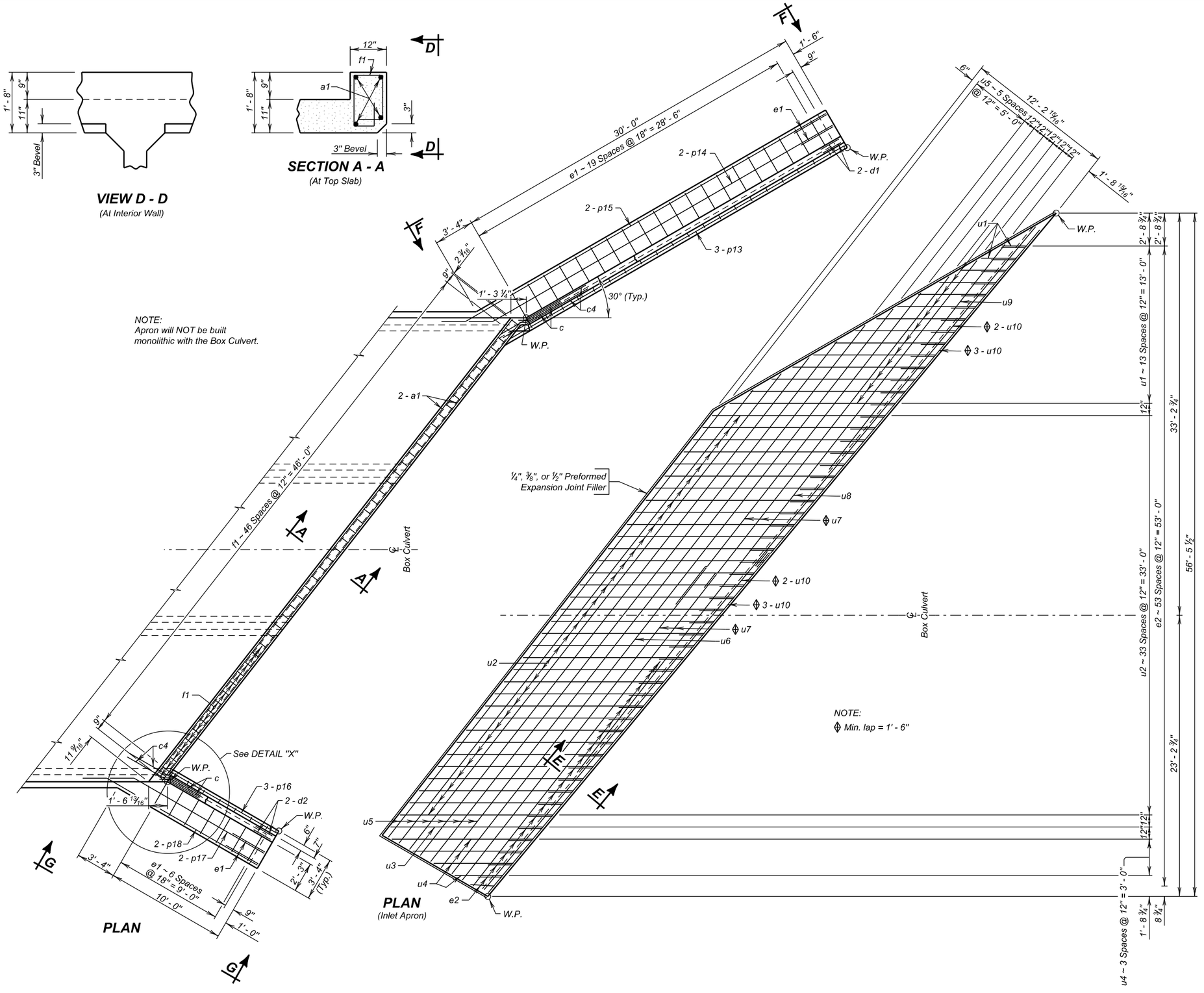
DESIGNED BY	CK. DES. BY	DRAFTED BY	
AU	BB	BT	Steve A. Johnson BRIDGE ENGINEER
MEAD034J	034JGH02		

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E158	E185

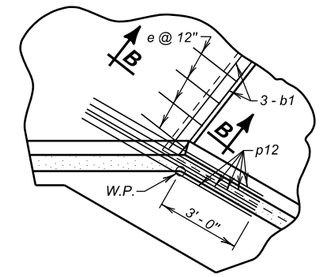
VIEW D - D
(At Interior Wall)

SECTION A - A
(At Top Slab)

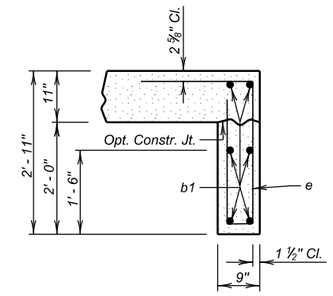
NOTE:
Apron will NOT be built monolithic with the Box Culvert.



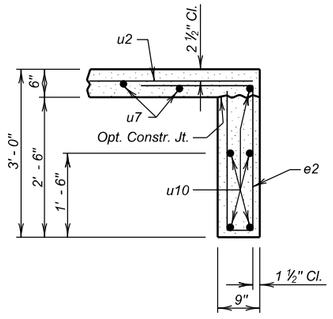
NOTE:
Min. lap = 1' - 6"



DETAIL "X"
(At Bottom Slab)



SECTION B - B



SECTION E - E

INLET DETAILS (A)

FOR

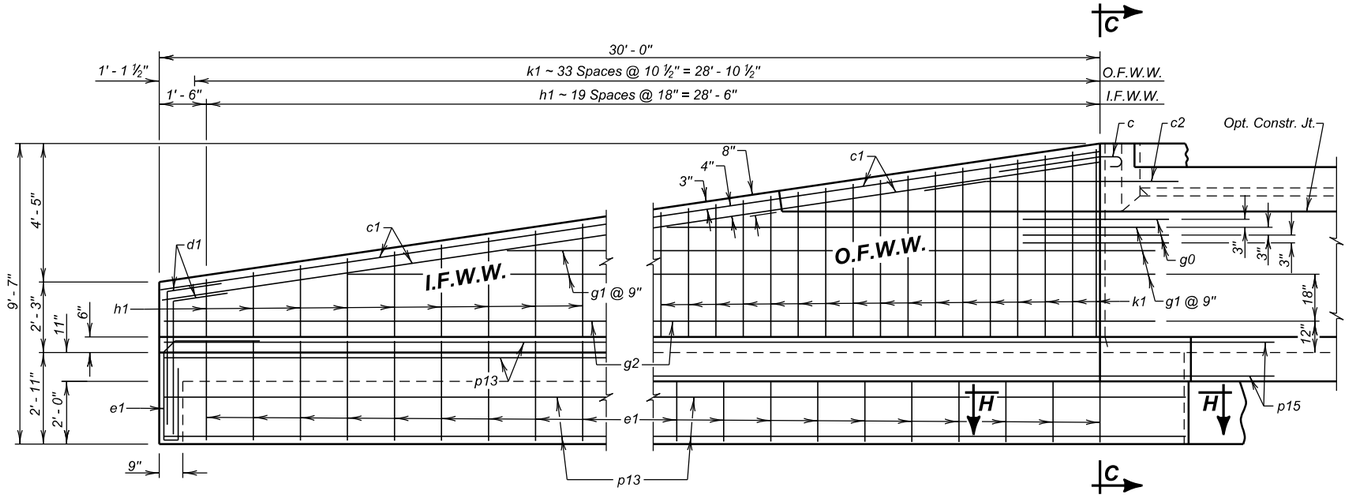
3 - 12' X 5' BOX CULVERT

OVER STAGEBARN CANYON CREEK — 38° RHF SKEW
STA. 1137 + 16.00 (EBL) — SEC. 14-T3N-R6E
STR. NO. 47-106-572 — IM-CR-EM 0901(187)44
HL-93

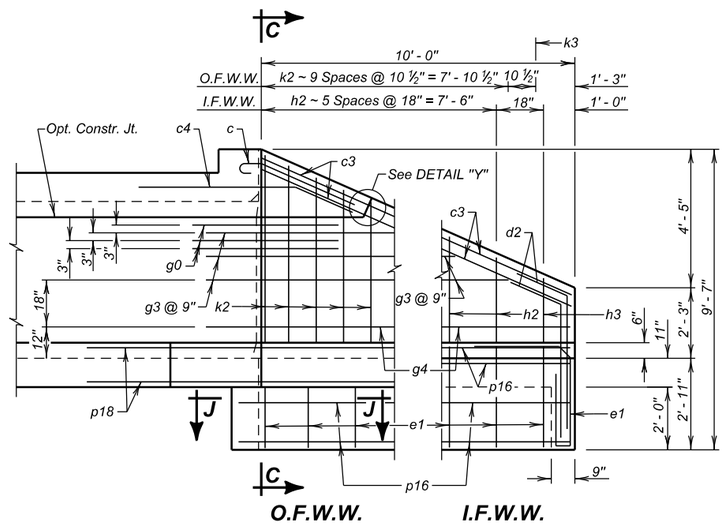
MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
AUGUST 2022

DESIGNED BY	CK. DES. BY	DRAFTED BY	
AU MEAD034J	BB 034JGH03	BT	Steve A Johnson BRIDGE ENGINEER

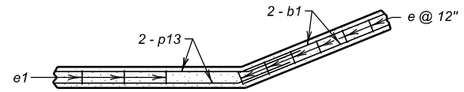
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E159	E185



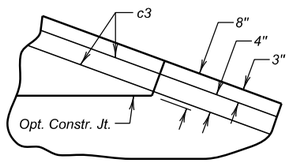
VIEW F - F



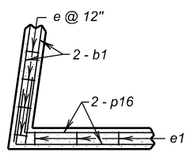
VIEW G - G



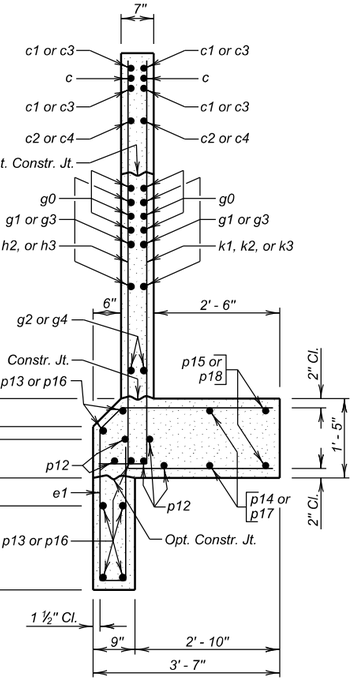
SECTION H - H



DETAIL "Y"
(showing c3 bars only)



SECTION J - J



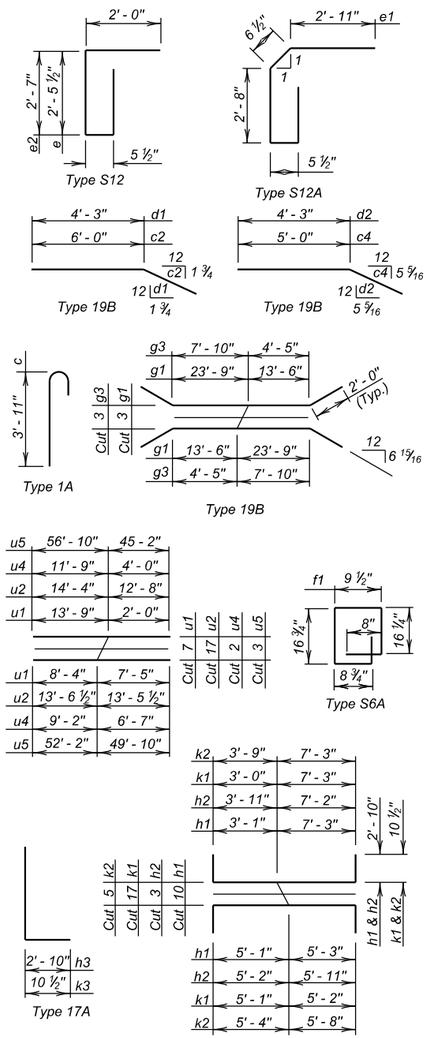
SECTION C - C

REINFORCING SCHEDULE

	Mk.	No.	Size	Length	Type
*	a1	4	6	48' - 3"	Str.
	b1	6	6	45' - 3"	Str.
*	c	4	5	4' - 6"	1A
	c1	4	5	30' - 3"	Str.
	c2	2	5	8' - 0"	19B
	c3	4	5	11' - 0"	Str.
	c4	2	5	7' - 0"	19B
	d1	4	5	6' - 0"	19B
	d2	4	5	6' - 0"	19B
	e	46	4	7' - 3"	S12
	e1	31	4	9' - 3"	S12A
	f1	49	4	5' - 9"	S6A
	g0	12	5	5' - 0"	19B
⌀	g1	3	4	41' - 3"	19B
	g2	2	4	31' - 9"	19B
⌀	g3	3	4	16' - 3"	19B
	g4	2	4	11' - 9"	19B
⌀	h1	10	4	16' - 0"	17A
⌀	h2	3	4	16' - 9"	17A
	h3	1	4	6' - 0"	17A
⌀	k1	17	4	12' - 0"	17A
⌀	k2	5	4	12' - 9"	17A
	k3	1	4	4' - 3"	17A
	p12	10	6	7' - 0"	Str.
*	p13	7	4	32' - 6"	Str.
*	p14	2	4	34' - 0"	Str.
*	p15	2	4	36' - 0"	Str.
*	p16	7	4	12' - 6"	Str.
*	p17	2	4	14' - 0"	Str.
*	p18	2	4	16' - 0"	Str.
	INLET APRON				
	e2	54	4	7' - 6"	S12
⌀	u1	7	4	15' - 9"	Str.
	u2	17	4	27' - 0"	Str.
	u3	1	4	12' - 6"	Str.
	u4	2	4	15' - 9"	Str.
	u5	3	4	102' - 0"	Str.
	u6	1	4	59' - 3"	Str.
	u7	4	4	33' - 0"	Str.
	u8	1	4	57' - 9"	Str.
	u9	1	4	27' - 6"	Str.
	u10	5	4	36' - 6"	Str.

⌀ ⌀ ⌀ ⌀

Bending Details



NOTES:
All dimensions are out to out of bars.
⌀ See cutting diagram.
* Bend in field as necessary to fit.

ESTIMATED QUANTITIES

ITEM	Class A45 Concrete, Box Culvert	Reinforcing Steel	Structure Excavation, Box Culvert
UNIT	Cu. Yd.	Lb.	Cu. Yd.
Inlet	21.8	2584	12.1
Inlet Apron	16.9	1191	16.9

LEGEND FOR PLACING RE-STEEL

O. F. W. W. - Outside Face of Wing Wall
I. F. W. W. - Inside Face of Wing Wall

INLET DETAILS (B)

FOR

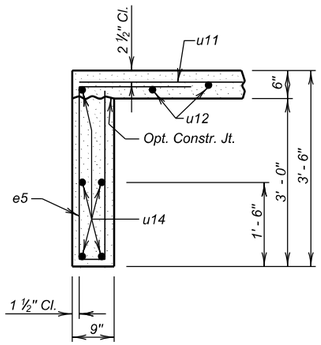
3 - 12' X 5' BOX CULVERT

OVER STAGEBARN CANYON CREEK — 38° RHF SKEW
STA. 1137 + 16.00 (EBL) — SEC. 14-T3N-R6E
STR. NO. 47-106-572 — IM-CR-EM 0901(187)44
HL-93

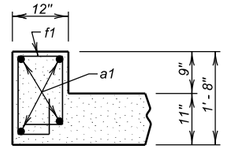
MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
AUGUST 2022

DESIGNED BY	CK. DES. BY	DRAFTED BY	
AU	BB	BT	Steve A Johnson BRIDGE ENGINEER
MEAD034J	034JGH04		

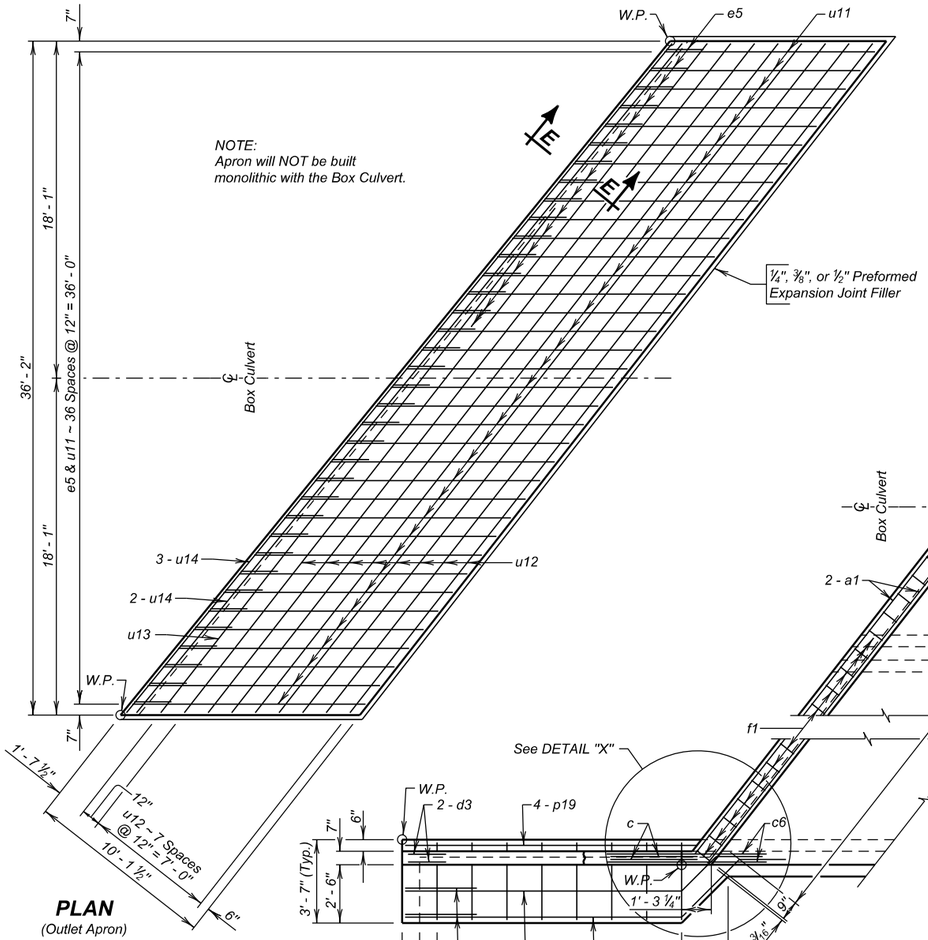
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E160	E185



SECTION E - E

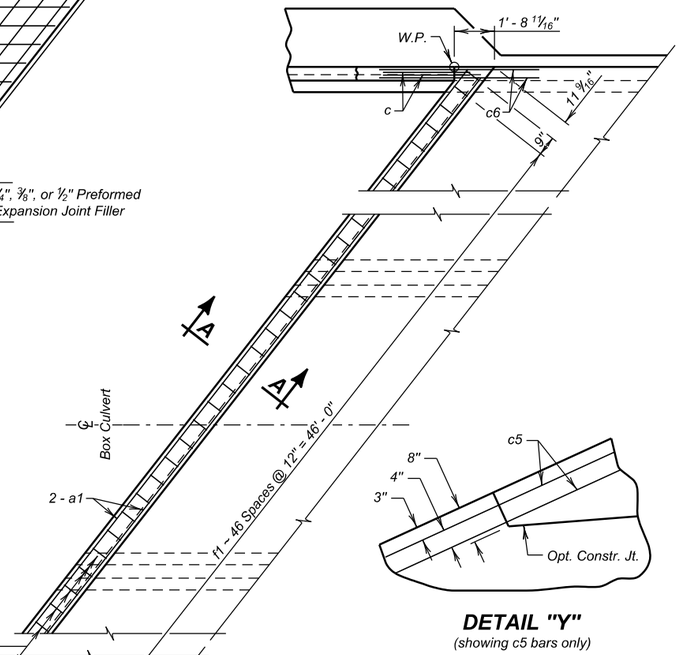


SECTION A - A
(At Top Slab)

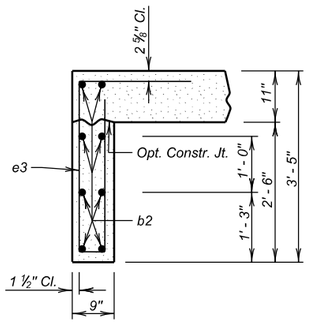


PLAN
(Outlet Apron)

PLAN



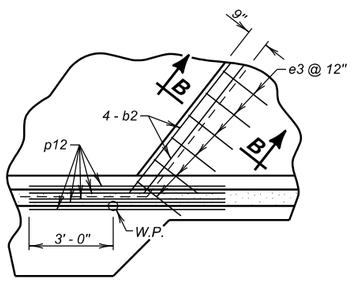
DETAIL "Y"
(showing c5 bars only)



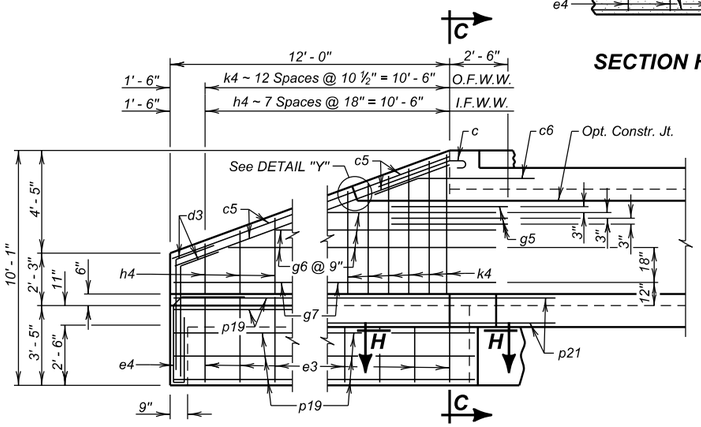
SECTION B - B



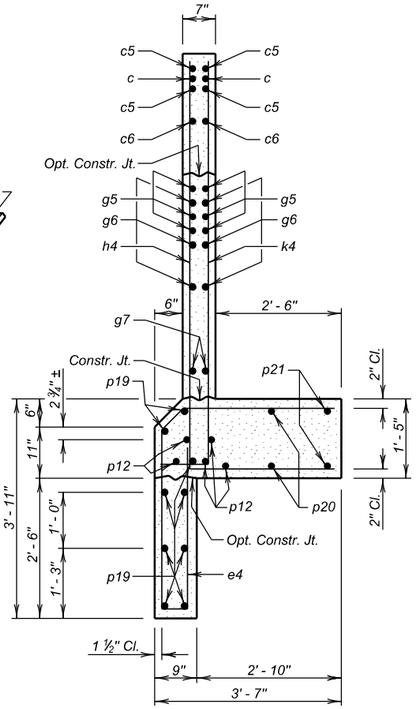
SECTION H - H



DETAIL "X"
(At Bottom Slab)



I.F.W.W. O.F.W.W.
ELEVATION

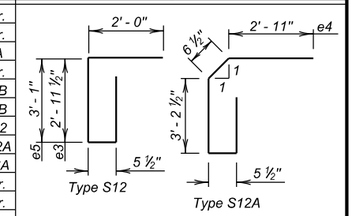


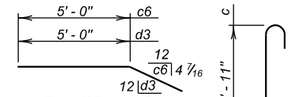
SECTION C - C

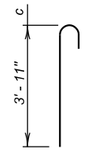
REINFORCING SCHEDULE

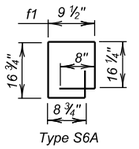
Mk.	No.	Size	Length	Type
a1	4	6	48' - 3"	Str.
b2	8	6	47' - 6"	Str.
* c	4	5	4' - 6"	1A
c5	8	5	12' - 9"	Str.
c6	4	5	7' - 0"	19B
d3	8	5	6' - 9"	19B
e3	48	4	8' - 3"	S12
e4	20	4	10' - 0"	S12A
f1	49	4	5' - 9"	S6A
g5	12	5	5' - 0"	Str.
◻ g6	6	4	18' - 9"	Str.
g7	4	4	13' - 9"	Str.
◻ h4	8	4	16' - 3"	17A
◻ k4	13	4	12' - 6"	17A
p12	10	6	7' - 0"	Str.
* p19	18	4	14' - 6"	Str.
* p20	4	4	15' - 6"	Str.
* p21	4	4	17' - 0"	Str.
OUTLET APRON				
e5	36	4	8' - 6"	S12
◻ u11	18	4	23' - 9"	Str.
u12	8	4	45' - 6"	Str.
u13	1	4	34' - 6"	Str.
u14	5	4	46 - 3"	Str.

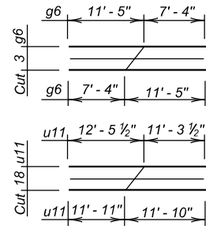
Bending Details

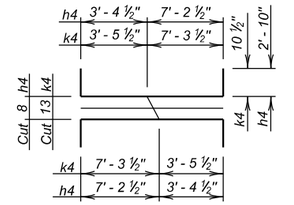












NOTES:
All dimensions are out to out of bars.
◻ See cutting diagram.
* Bend in field as necessary to fit.

ESTIMATED QUANTITIES

ITEM	Class A45 Concrete, Box Culvert	Reinforcing Steel	Structure Excavation, Box Culvert
UNIT	Cu. Yd.	Lb.	Cu. Yd.
Outlet	17.5	2394	10.2
Outlet Apron	12.0	911	12.0

LEGEND FOR PLACING RE-STEEL

O. F. W. W. - Outside Face of Wing Wall
I. F. W. W. - Inside Face of Wing Wall

OUTLET DETAILS

FOR

3 - 12' X 5' BOX CULVERT

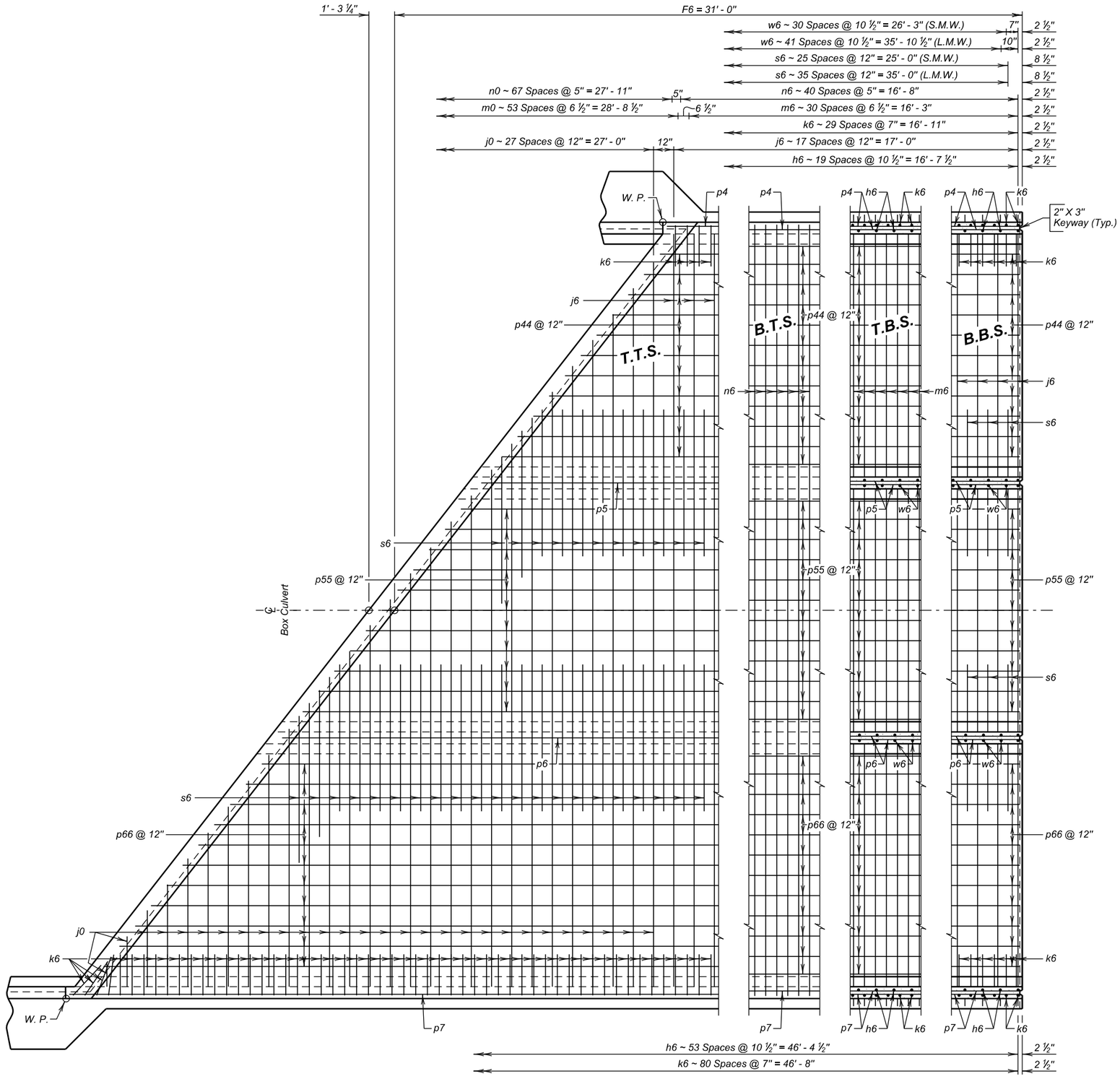
OVER STAGEBARN CANYON CREEK — 38° RHF SKEW
STA. 1137 + 16.00 (EBL) — SEC. 14-T3N-R6E
STR. NO. 47-106-572 — IM-CR-EM 0901(187)44
HL-93

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
AUGUST 2022

5 OF 14

DESIGNED BY	CK. DES. BY	DRAFTED BY	
AU	BB	BT	Steve A Johnson
MEAD034J	034JGH05		BRIDGE ENGINEER

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E161	E185



PLAN

LEGEND FOR PLACING RE-STEEL

T. T. S.	- Top of Top Slab
B. T. S.	- Bottom of Top Slab
T. B. S.	- Top of Bottom Slab
B. B. S.	- Bottom of Bottom Slab
S. M. W.	- Short Middle Wall
L. M. W.	- Long Middle Wall

F6 BARREL END SECTION DETAILS (31' - 0") (A)

FOR

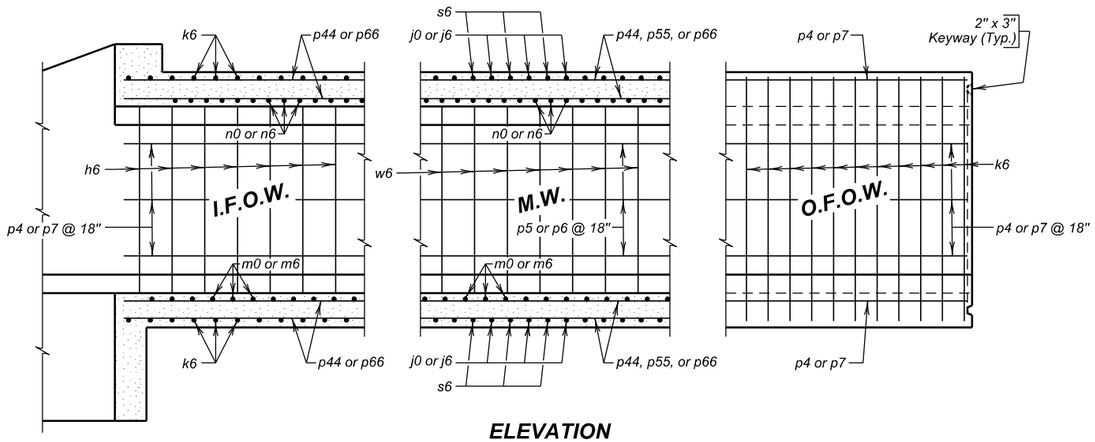
3 - 12' X 5' BOX CULVERT

OVER STAGEBARN CANYON CREEK — 38° RHF SKEW
STA. 1137 + 16.00 (EBL) — SEC. 14-T3N-R6E
STR. NO. 47-106-572 — IM-CR-EM 0901(187)44
HL-93

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
AUGUST 2022

DESIGNED BY	CK. DES. BY	DRAFTED BY	
AU	BB	BT	Steve A Johnson BRIDGE ENGINEER
MEAD034J	034JGH06		

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E162	E185



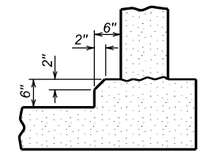
ELEVATION

ESTIMATED QUANTITIES

ITEM	Class A45 Concrete, Box Culvert	Reinforcing Steel	Structure Excavation, Box Culvert
UNIT	Cu.Yd.	Lb.	Cu.Yd.
1 - F6 Barrel End Section @ 31' - 0"	97.4	14777	41.4

LEGEND FOR PLACING RE-STEEL

O. F. O. W. - Outside Face of Outside Wall
I. F. O. W. - Inside Face of Outside Wall
M. W. - Middle Walls



OPTIONAL FILLET DETAIL

(At Bottom Slab)

NOTE: Contractor may form the optional full fillet, with 2" Chamfer, as detailed. The cost of the additional concrete will be borne by the Contractor.

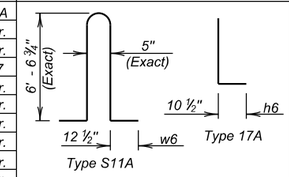
△ Place z1 bars thru construction joint between barrel sections as shown on Standard Plate No. 460.10. Quantity of z1 bars are for one construction joint.

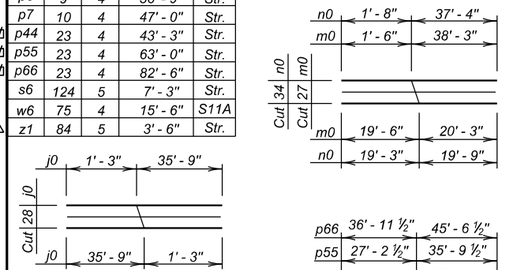
REINFORCING SCHEDULE

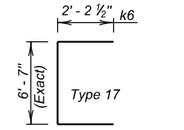
(For 1 - F6 Barrel End Section @ 31' - 0")

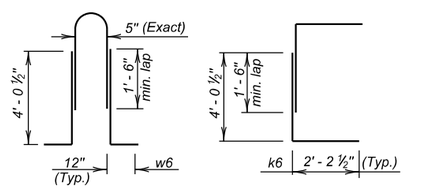
	Mk.	No.	Size	Length	Type
	h6	74	4	7' - 3"	17A
⌀	j0	28	5	37' - 0"	Str.
	j6	36	5	37' - 3"	Str.
	k6	111	4	11' - 0"	17
⌀	m0	27	5	39' - 9"	Str.
	m6	31	5	39' - 0"	Str.
⌀	n0	34	5	39' - 0"	Str.
	n6	41	5	38' - 0"	Str.
	p4	10	4	17' - 6"	Str.
	p5	9	4	27' - 0"	Str.
	p6	9	4	36' - 9"	Str.
	p7	10	4	47' - 0"	Str.
⌀	p44	23	4	43' - 3"	Str.
⌀	p55	23	4	63' - 0"	Str.
⌀	p66	23	4	82' - 6"	Str.
	s6	124	5	7' - 3"	Str.
	w6	75	4	15' - 6"	S11A
△	z1	84	5	3' - 6"	Str.

Bending Details









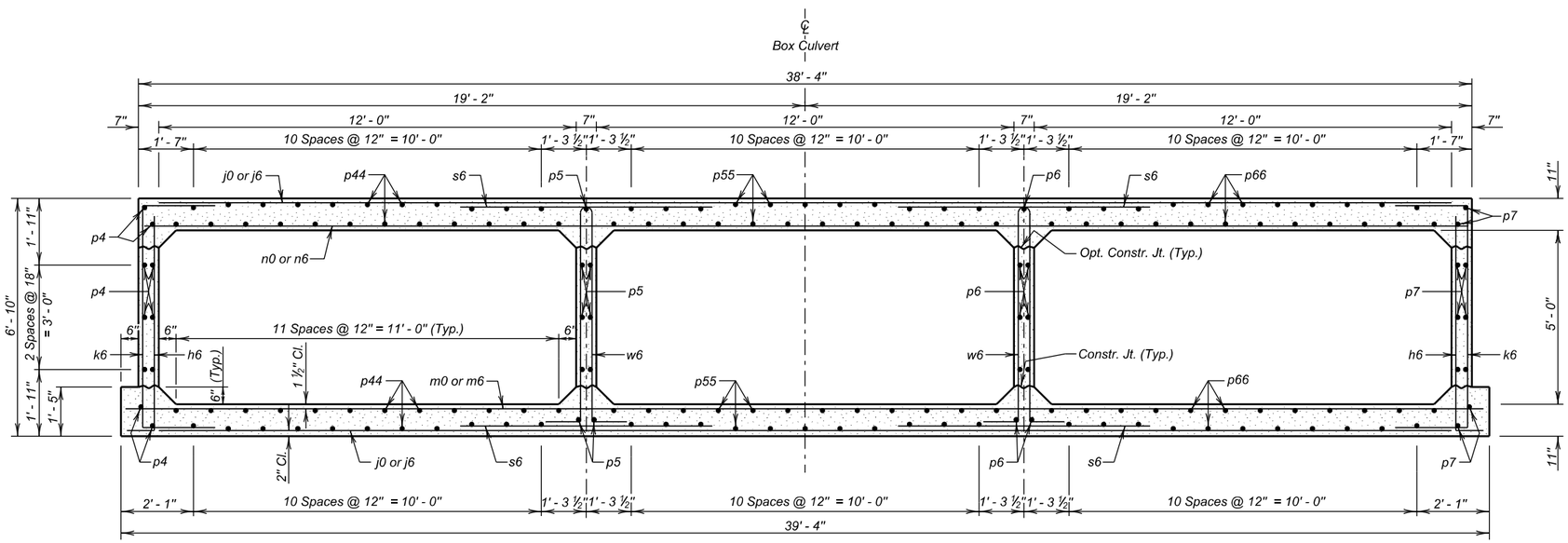
Contractor may use optional reinforcing steel splices, as shown. The cost of the additional reinforcing steel will be borne by the Contractor.

NOTES:

All dimensions are out to out of bars.

⌀ See cutting diagram.

Request for additional reinforcing steel splices at points other than those shown, must be submitted to the Engineer for prior approval. If additional splices are approved, no payment will be allowed for the added quantity of reinforcing steel.



F6 BARREL SECTION

(6' - 0" Maximum Fill)

F6 BARREL END SECTION DETAILS (31' - 0") (B)

FOR

3 - 12' X 5' BOX CULVERT

OVER STAGEBARN CANYON CREEK — 38° RHF SKEW

STA. 1137 + 16.00 (EBL) — SEC. 14-T3N-R6E

STR. NO. 47-106-572 — IM-CR-EM 0901(187)44

HL-93

MEADE COUNTY

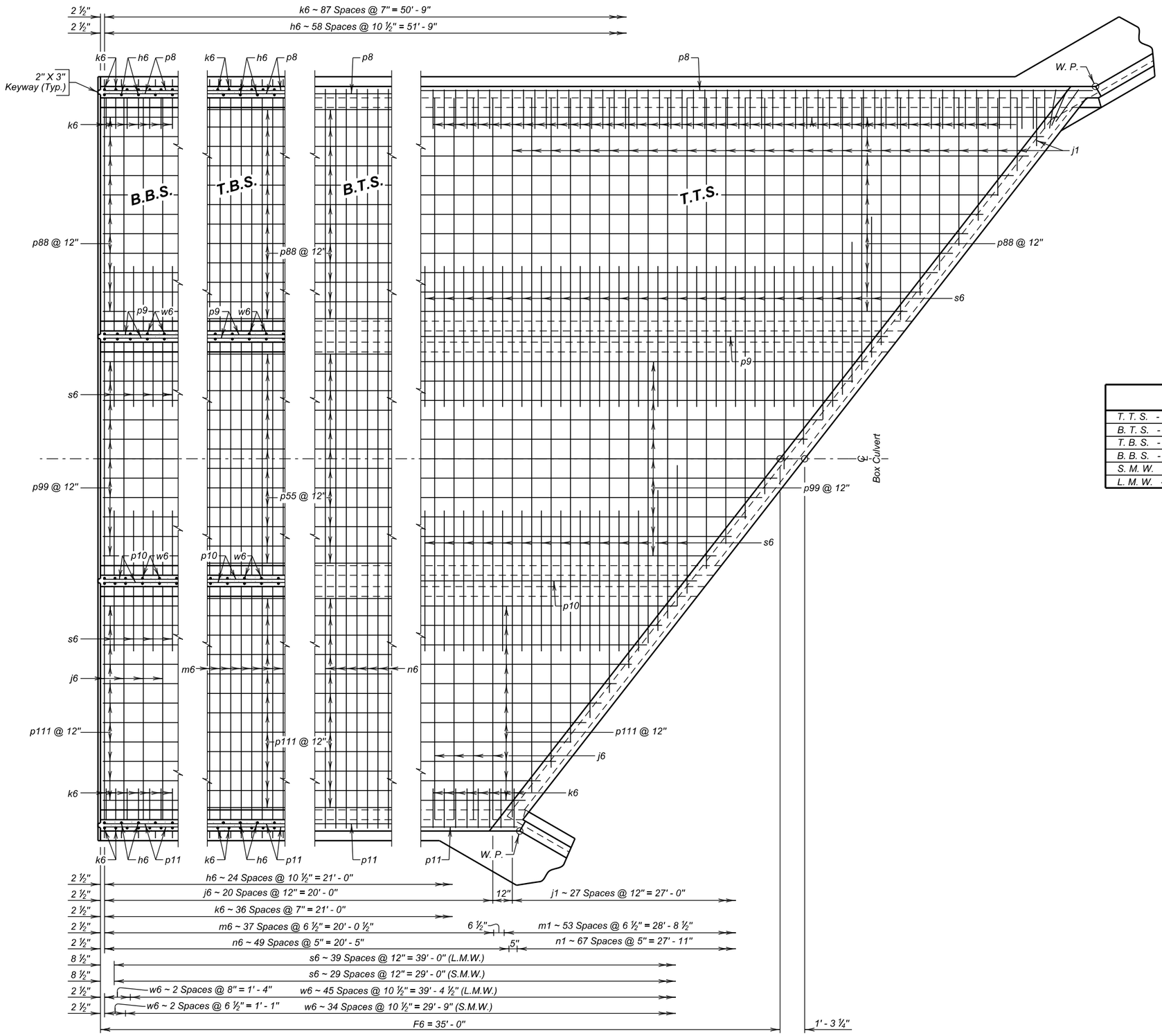
S. D. DEPT. OF TRANSPORTATION

AUGUST 2022

7 OF 14

DESIGNED BY	CK. DES. BY	DRAFTED BY	
AU	BB	BT	Steve A. Johnson BRIDGE ENGINEER
MEAD034J	034JGH07		

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E163	E185



PLAN

LEGEND FOR PLACING RE-STEEL

T. T. S. - Top of Top Slab
B. T. S. - Bottom of Top Slab
T. B. S. - Top of Bottom Slab
B. B. S. - Bottom of Bottom Slab
S. M. W. - Short Middle Wall
L. M. W. - Long Middle Wall

F6 BARREL END SECTION DETAILS (35' - 0") (A)

FOR

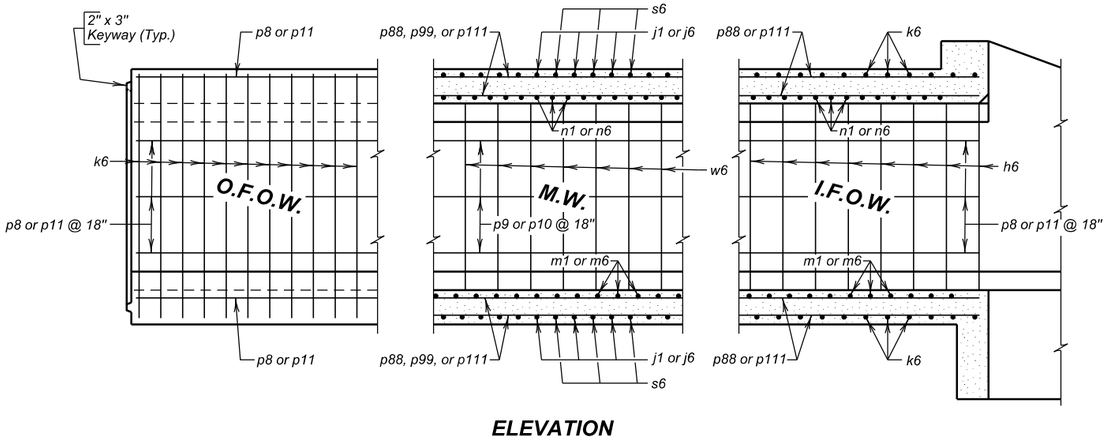
3 - 12' X 5' BOX CULVERT

OVER STAGEBARN CANYON CREEK — 38° RHF SKEW
STA. 1137 + 16.00 (EBL) — SEC. 14-T3N-R6E
STR. NO. 47-106-572 — IM-CR-EM 0901(187)44
HL-93

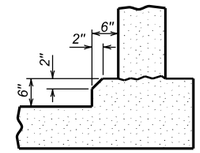
MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
AUGUST 2022

DESIGNED BY	CK. DES. BY	DRAFTED BY	
AU	BB	BT	Steve A. Johnson BRIDGE ENGINEER
MEAD034J	034JGH08		

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E164	E185



ELEVATION

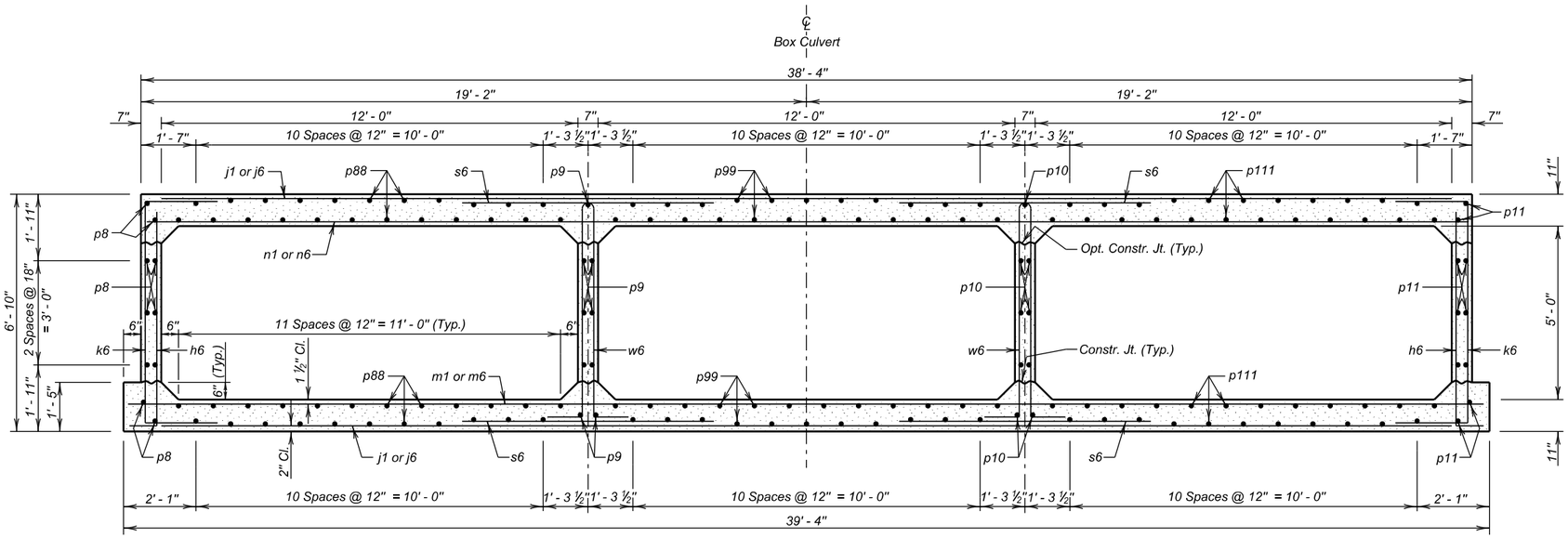


OPTIONAL FILLET DETAIL

(At Bottom Slab)

NOTE: Contractor may form the optional full fillet, with 2" Chamfer, as detailed. The cost of the additional concrete will be borne by the Contractor.

△ Place z1 bars thru construction joint between barrel sections as shown on Standard Plate No. 460.10. Quantity of z1 bars are for one construction joint.



F6 BARREL SECTION

(6' - 0" Maximum Fill)

ESTIMATED QUANTITIES

ITEM	*Class A45 Concrete, Box Culvert*	*Reinforcing Steel*	*Structure Excavation, Box Culvert*
UNIT	*Cu.Yd.*	*Lb.*	*Cu.Yd.*
1 - F6 Barrel End Section @ 35' - 0"	*110.0*	*16610*	*46.7*

LEGEND FOR PLACING RE-STEEL

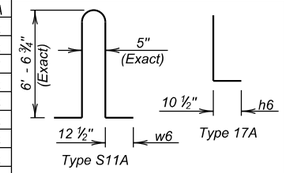
O. F. O. W. - Outside Face of Outside Wall
I. F. O. W. - Inside Face of Outside Wall
M. W. - Middle Walls

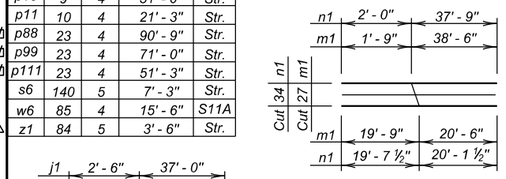
REINFORCING SCHEDULE

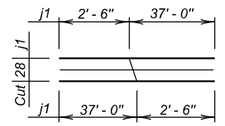
(For 1 - F6 Barrel End Section @ 35' - 0")

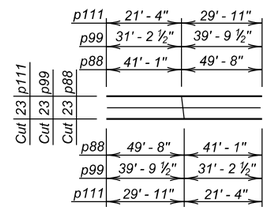
	Mk.	*No.*	*Size*	*Length*	*Type*
	h6	*84*	*4*	*7' - 3"*	*17A*
⌀	*j1*	*28*	*5*	*39' - 6"*	*Str.*
	j6	*42*	*5*	*37' - 3"*	*Str.*
	k6	*125*	*4*	*11' - 0"*	*17*
⌀	*m1*	*27*	*5*	*40' - 3"*	*Str.*
	m6	*38*	*5*	*39' - 0"*	*Str.*
⌀	*n1*	*34*	*5*	*39' - 9"*	*Str.*
	n6	*50*	*5*	*38' - 0"*	*Str.*
	p8	*10*	*4*	*50' - 6"*	*Str.*
	p9	*9*	*4*	*40' - 9"*	*Str.*
	p10	*9*	*4*	*31' - 0"*	*Str.*
	p11	*10*	*4*	*21' - 3"*	*Str.*
⌀	*p88*	*23*	*4*	*90' - 9"*	*Str.*
⌀	*p99*	*23*	*4*	*71' - 0"*	*Str.*
⌀	*p111*	*23*	*4*	*51' - 3"*	*Str.*
	s6	*140*	*5*	*7' - 3"*	*Str.*
	w6	*85*	*4*	*15' - 6"*	*S11A*
△	*z1*	*84*	*5*	*3' - 6"*	*Str.*

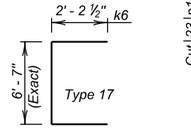
Bending Details

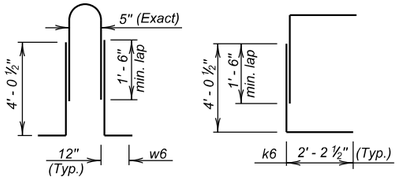












OPTIONAL w6 SPLICE DETAIL *OPTIONAL k6 SPLICE DETAIL*

Contractor may use optional reinforcing steel splices, as shown. The cost of the additional reinforcing steel will be borne by the Contractor.

NOTES:

All dimensions are out to out of bars.

⌀ *See cutting diagram.*

Request for additional reinforcing steel splices at points other than those shown, must be submitted to the Engineer for prior approval. If additional splices are approved, no payment will be allowed for the added quantity of reinforcing steel.

F6 BARREL END SECTION DETAILS (35' - 0") (B)

FOR

3 - 12' X 5' BOX CULVERT

OVER STAGEBARN CANYON CREEK — 38° RHF SKEW
STA. 1137 + 16.00 (EBL) — SEC. 14-T3N-R6E
STR. NO. 47-106-572 — IM-CR-EM 0901(187)44
HL-93

MEADE COUNTY

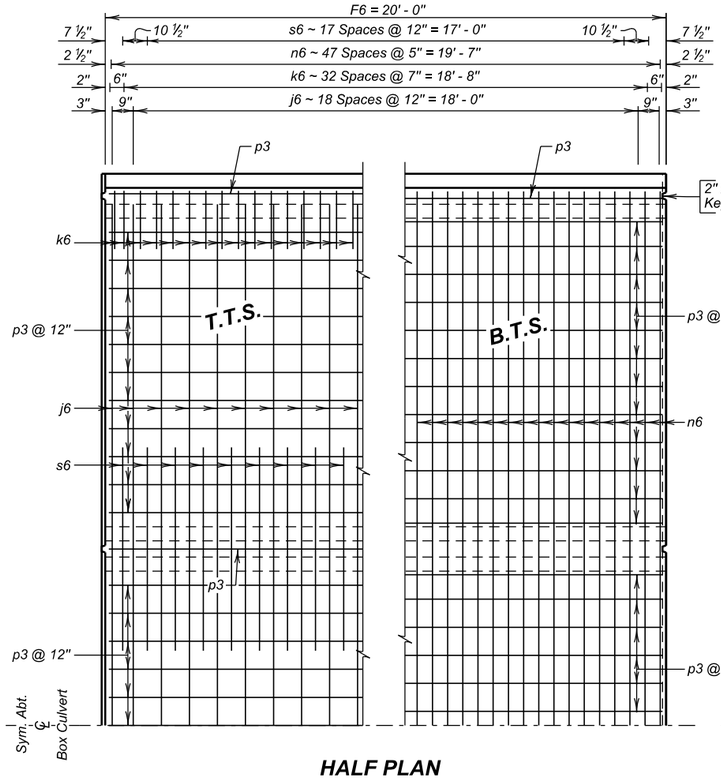
S. D. DEPT. OF TRANSPORTATION

AUGUST 2022

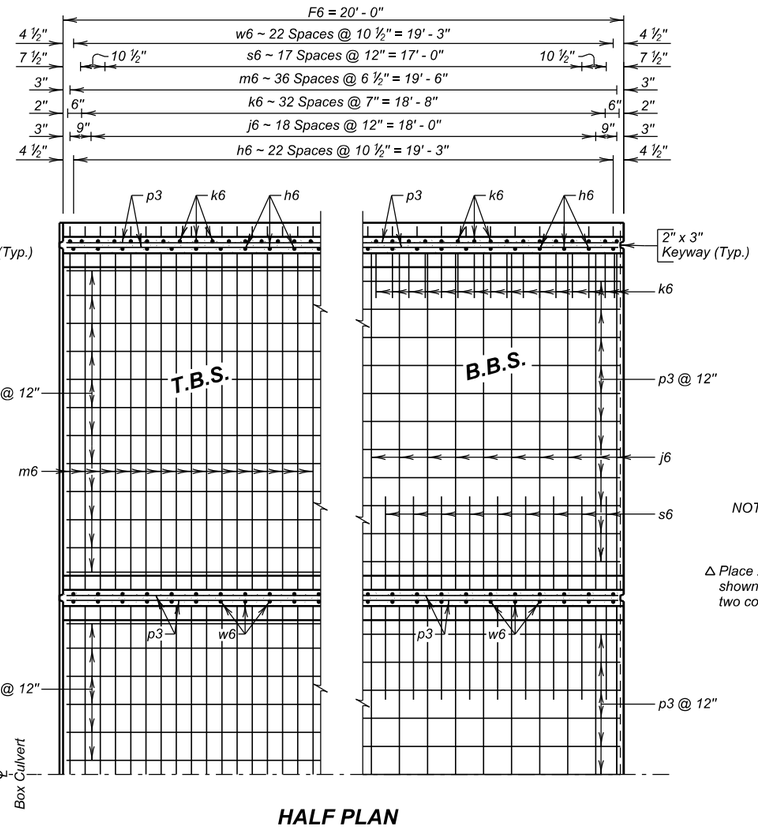
9 OF 14

DESIGNED BY	CK. DES. BY	DRAFTED BY	
AU	BB	BT	Steve A. Johnson BRIDGE ENGINEER
MEAD034J	034JGH09		

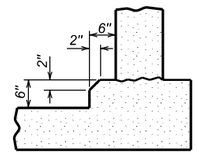
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E165	E185



HALF PLAN



HALF PLAN



OPTIONAL FILLET DETAIL

(At Bottom Slab)

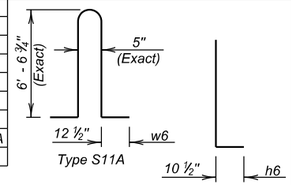
NOTE: Contractor may form the optional full fillet, with 2" Chamfer, as detailed. The cost of the additional concrete will be borne by the Contractor.

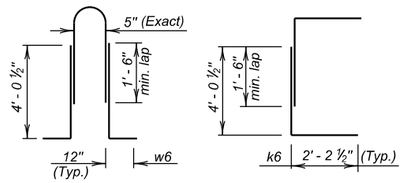
△ Place z1 bars thru construction joint between barrel sections as shown on Standard Plate No. 460.10. Quantity of z1 bars are for two construction joints.

REINFORCING SCHEDULE

(For 2 - F6 Barrel Interior Sections @ 20' - 0")

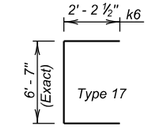
Mk.	No.	Size	Length	Type	Bending Details
h6	92	4	7' - 3"	17A	
j6	84	5	37' - 3"	Str.	
k6	140	4	11' - 0"	17	
m6	74	5	39' - 0"	Str.	
n6	96	5	38' - 0"	Str.	
p3	352	4	19' - 9"	Str.	
s6	160	5	7' - 3"	Str.	
w6	92	4	15' - 6"	S11A	
△ z1	168	5	3' - 6"	Str.	





OPTIONAL w6 SPLICE DETAIL OPTIONAL k6 SPLICE DETAIL

Contractor may use optional reinforcing steel splices, as shown. The cost of the additional reinforcing steel will be borne by the Contractor.



NOTES:

All dimensions are out to out of bars.

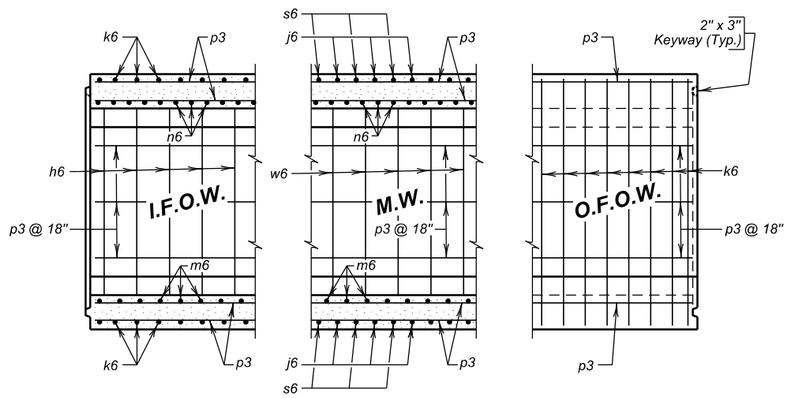
Request for additional reinforcing steel splices at points other than those shown, must be submitted to the Engineer for prior approval. If additional splices are approved, no payment will be allowed for the added quantity of reinforcing steel.

ESTIMATED QUANTITIES

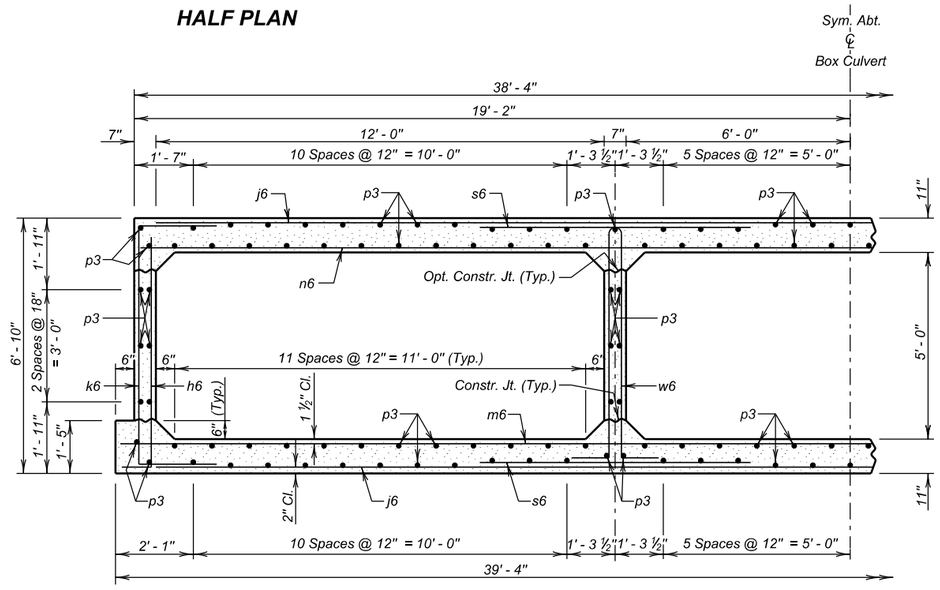
ITEM	Class A45 Concrete, Box Culvert	Reinforcing Steel	Structure Excavation, Box Culvert
UNIT	Cu.Yd.	Lb.	Cu.Yd.
2 - F6 Barrel Interior Sections @ 20' - 0"	125.8	18973	53.4

LEGEND FOR PLACING RE-STEEL

T.T.S.	- Top of Top Slab
B.T.S.	- Bottom of Top Slab
T.B.S.	- Top of Bottom Slab
B.B.S.	- Bottom of Bottom Slab
O.F.O.W.	- Outside Face of Outside Wall
I.F.O.W.	- Inside Face of Outside Wall
M.W.	- Middle Wall



ELEVATION



F6 BARREL HALF SECTION

(6' - 0" Maximum Fill)

F6 BARREL INTERIOR SECTION DETAILS (20' - 0")

FOR

3 - 12' X 5' BOX CULVERT

OVER STAGEBARN CANYON CREEK 38° RHF SKEW
STA. 1137 + 16.00 (EBL) SEC. 14-T3N-R6E
STR. NO. 47-106-572 IM-CR-EM 0901(187)44
HL-93

MEADE COUNTY

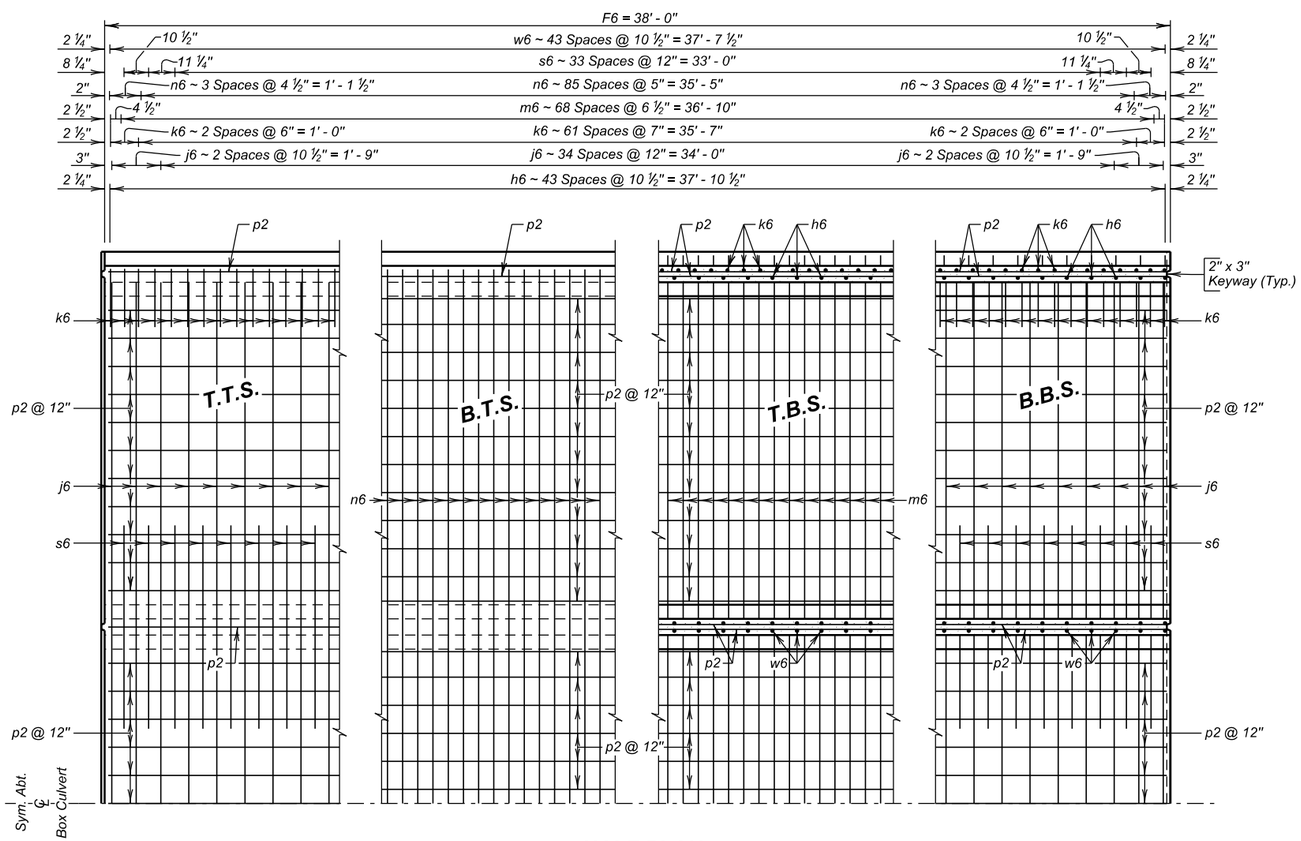
S. D. DEPT. OF TRANSPORTATION

AUGUST 2022

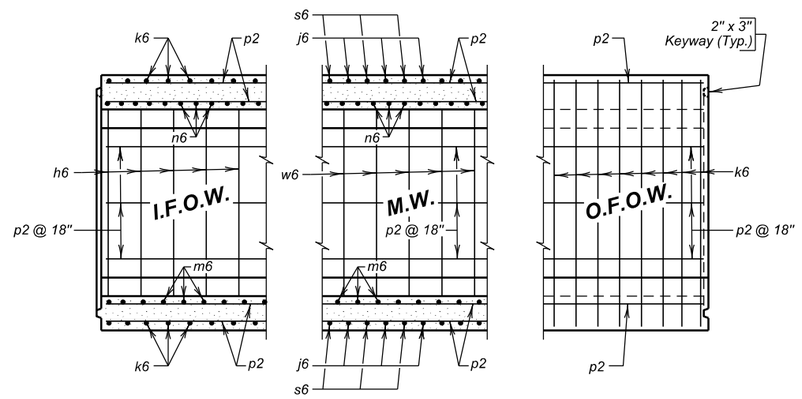
10 OF 14

DESIGNED BY	CK. DES. BY	DRAFTED BY	
AU	BB	BT	Steve A Johnson BRIDGE ENGINEER
MEAD034J	034JGH10		

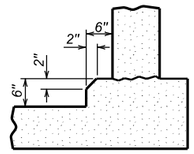
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E166	E185



HALF PLAN



ELEVATION



OPTIONAL FILLET DETAIL

(At Bottom Slab)

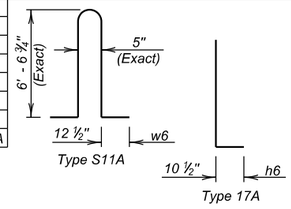
NOTE: Contractor may form the optional full fillet, with 2" Chamfer, as detailed. The cost of the additional concrete will be borne by the Contractor.

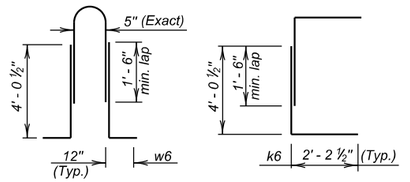
REINFORCING SCHEDULE

(For 1 - F6 Barrel Inerior Section @ 38' - 0")

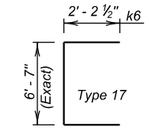
Mk.	No.	Size	Length	Type
h6	88	4	7' - 3"	17A
j6	78	5	37' - 3"	Str.
k6	132	4	11' - 0"	17
m6	71	5	39' - 0"	Str.
n6	92	5	38' - 0"	Str.
p2	176	4	37' - 9"	Str.
s6	152	5	7' - 3"	Str.
w6	88	4	15' - 6"	S11A

Bending Details





Contractor may use optional reinforcing steel splices, as shown. The cost of the additional reinforcing steel will be borne by the Contractor.



NOTES:

All dimensions are out to out of bars.

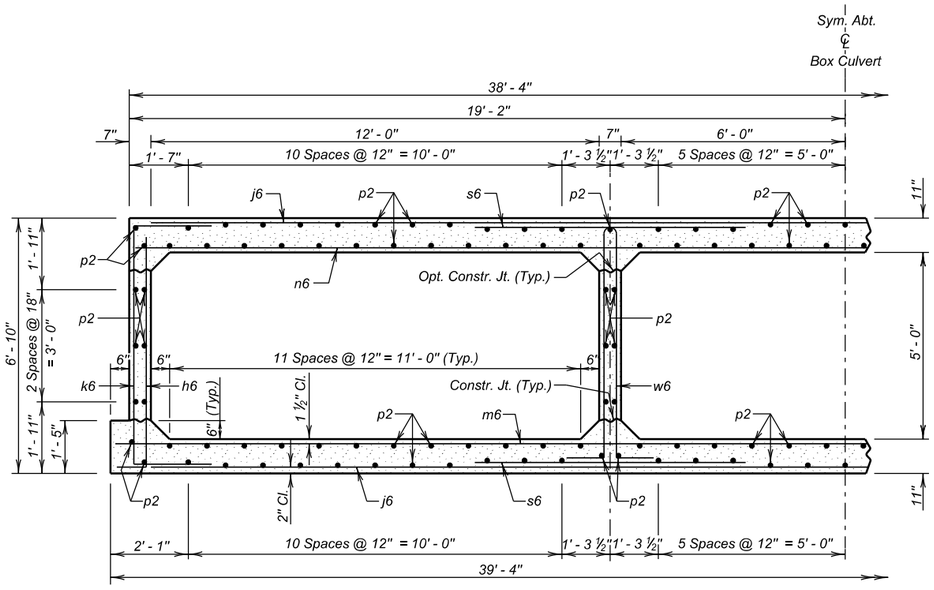
Request for additional reinforcing steel splices at points other than those shown, must be submitted to the Engineer for prior approval. If additional splices are approved, no payment will be allowed for the added quantity of reinforcing steel.

ESTIMATED QUANTITIES

ITEM	Class A45 Concrete, Box Culvert	Reinforcing Steel	Structure Excavation, Box Culvert
UNIT	Cu.Yd.	Lb.	Cu.Yd.
1 - F6 Barrel Interior Section @ 38' - 0"	119.4	17460	50.7

LEGEND FOR PLACING RE-STEEL

T.T.S.	- Top of Top Slab
B.T.S.	- Bottom of Top Slab
T.B.S.	- Top of Bottom Slab
B.B.S.	- Bottom of Bottom Slab
O.F.O.W.	- Outside Face of Outside Wall
I.F.O.W.	- Inside Face of Outside Wall
M.W.	- Middle Wall



F6 BARREL HALF SECTION

(6' - 0" Maximum Fill)

F6 BARREL INTERIOR SECTION DETAILS (38' - 0")

FOR

3 - 12' X 5' BOX CULVERT

OVER STAGEBARN CANYON CREEK — 38° RHF SKEW
STA. 1137 + 16.00 (EBL) — SEC. 14-T3N-R6E
STR. NO. 47-106-572 — IM-CR-EM 0901(187)44
HL-93

MEADE COUNTY

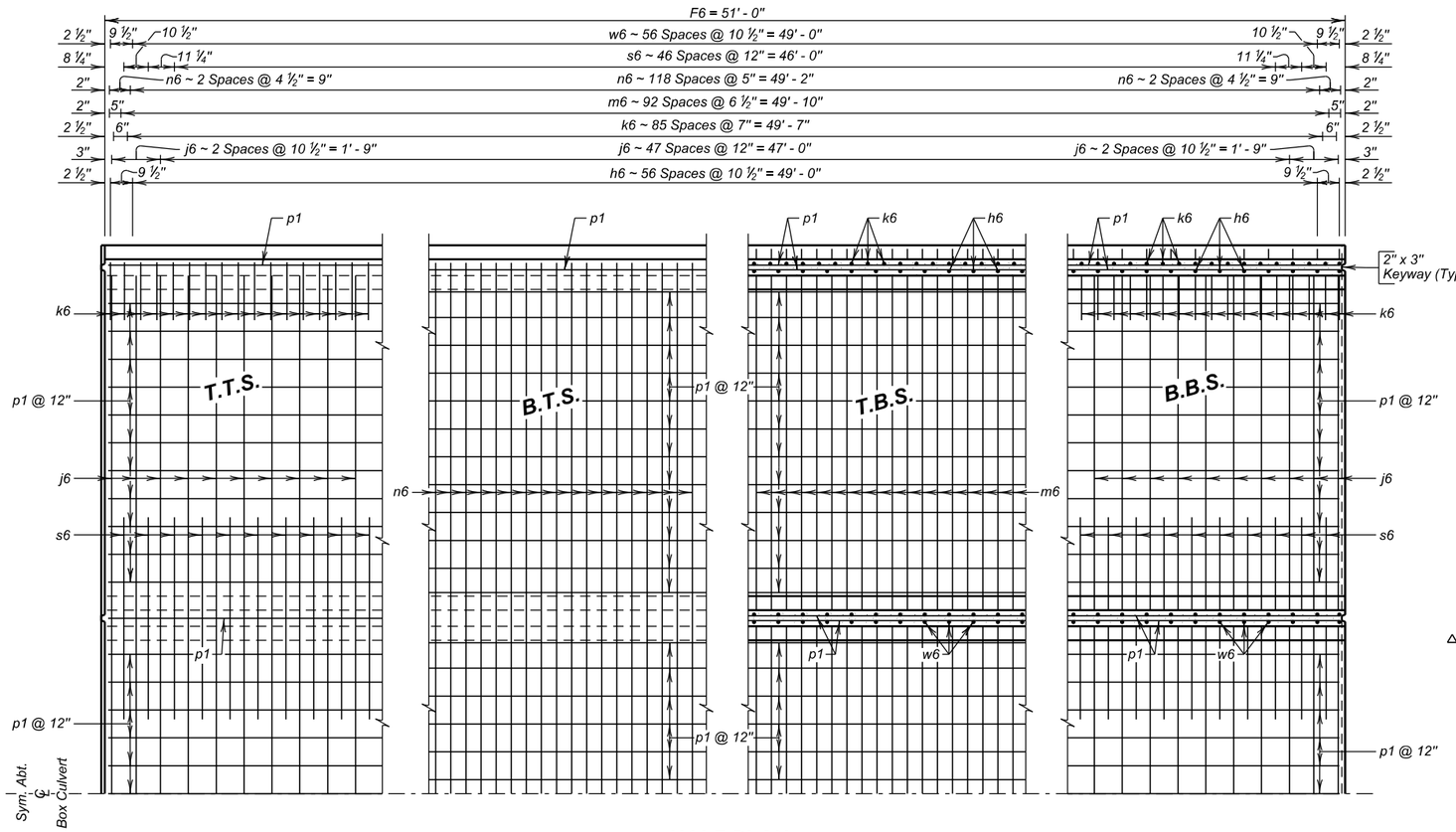
S. D. DEPT. OF TRANSPORTATION

AUGUST 2022

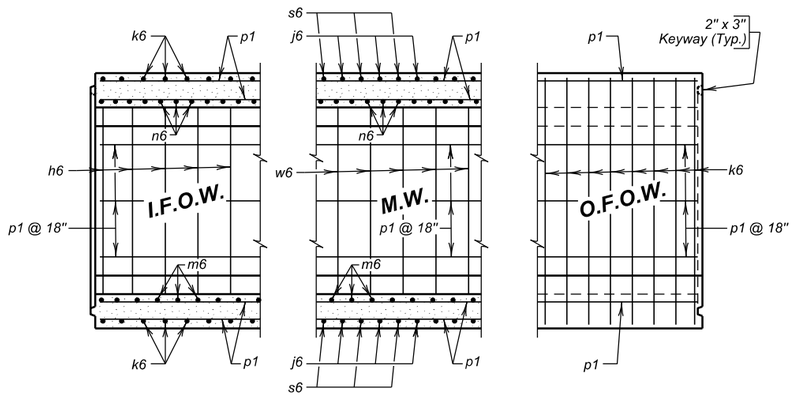
11 OF 14

DESIGNED BY	CK. DES. BY	DRAFTED BY	
AU	BB	BT	Steve A Johnson BRIDGE ENGINEER
MEAD034J	034JGH11		

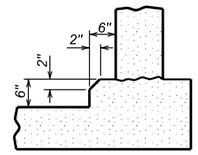
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E167	E185



HALF PLAN



ELEVATION



OPTIONAL FILLET DETAIL

(At Bottom Slab)

NOTE: Contractor may form the optional full fillet, with 2" Chamfer, as detailed. The cost of the additional concrete will be borne by the Contractor.

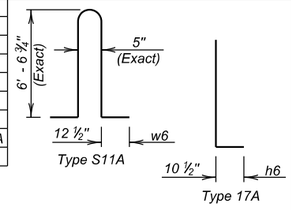
△ Place z1 bars thru construction joint between barrel sections as shown on Standard Plate No. 460.10. Quantity of z1 bars are for two construction joints.

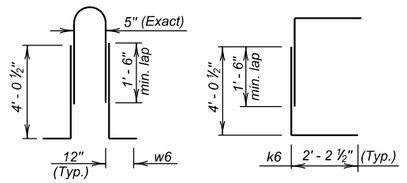
REINFORCING SCHEDULE

(For 2 - F6 Barrel Inerior Sections @ 51' - 0")

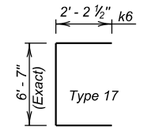
Mk.	No.	Size	Length	Type
h6	236	4	7' - 3"	17A
j6	208	5	37' - 3"	Str.
k6	352	4	11' - 0"	17
m6	190	5	39' - 0"	Str.
n6	246	5	38' - 0"	Str.
p1	352	4	50' - 9"	Str.
s6	408	5	7' - 3"	Str.
w6	236	4	15' - 6"	S11A
△ z1	168	5	3' - 6"	Str.

Bending Details





Contractor may use optional reinforcing steel splices, as shown. The cost of the additional reinforcing steel will be borne by the Contractor.



NOTES:

All dimensions are out to out of bars.

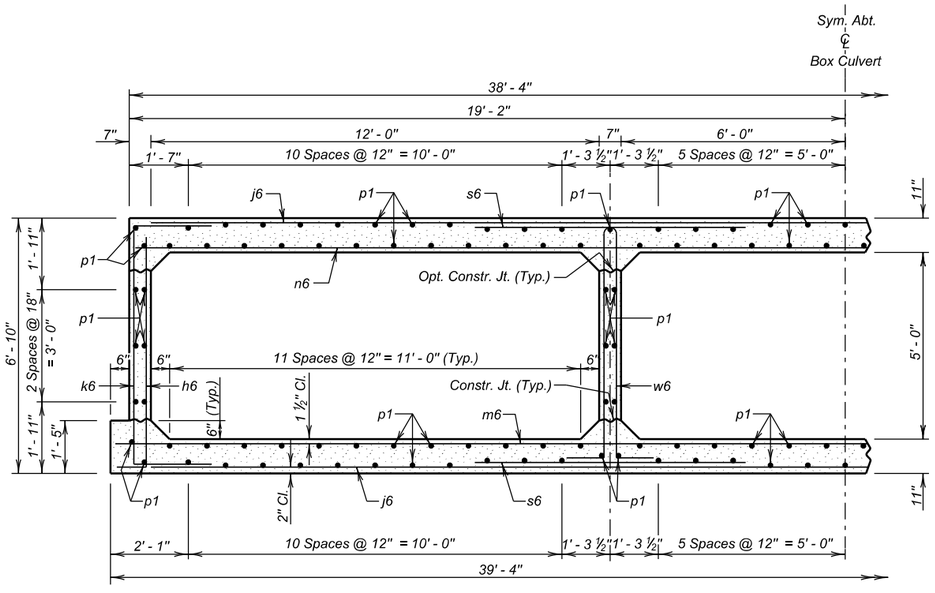
Request for additional reinforcing steel splices at points other than those shown, must be submitted to the Engineer for prior approval. If additional splices are approved, no payment will be allowed for the added quantity of reinforcing steel.

ESTIMATED QUANTITIES

ITEM	Class A45 Concrete, Box Culvert	Reinforcing Steel	Structure Excavation, Box Culvert
UNIT	Cu.Yd.	Lb.	Cu.Yd.
2 - F6 Barrel Interior Sections @ 51' - 0"	320.6	47365	136.2

LEGEND FOR PLACING RE-STEEL

T.T.S.	- Top of Top Slab
B.T.S.	- Bottom of Top Slab
T.B.S.	- Top of Bottom Slab
B.B.S.	- Bottom of Bottom Slab
O.F.O.W.	- Outside Face of Outside Wall
I.F.O.W.	- Inside Face of Outside Wall
M.W.	- Middle Wall



F6 BARREL HALF SECTION

(6' - 0" Maximum Fill)

F6 BARREL INTERIOR SECTION DETAILS (51' - 0")

FOR

3 - 12' X 5' BOX CULVERT

OVER STAGEBARN CANYON CREEK — 38° RHF SKEW

STA. 1137 + 16.00 (EBL) — SEC. 14-T3N-R6E

STR. NO. 47-106-572 — IM-CR-EM 0901(187)44

HL-93

MEADE COUNTY

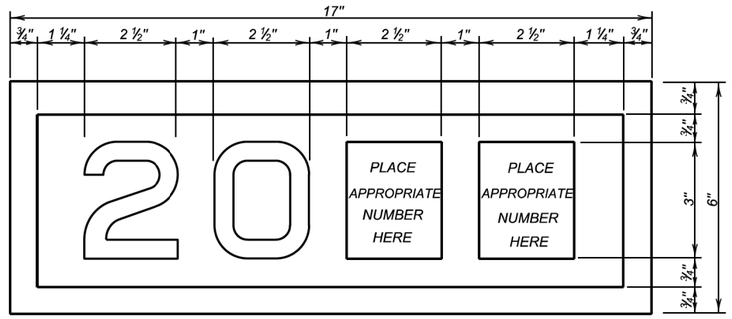
S. D. DEPT. OF TRANSPORTATION

AUGUST 2022

12 OF 14

DESIGNED BY	CK. DES. BY	DRAFTED BY	
AU	BB	BT	Steve A Johnson BRIDGE ENGINEER
MEAD034J	034JGH12		

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E168	E185



YEAR PLATE DETAILS

GENERAL NOTES:

1. Year plates of the general dimensions shown will be constructed on all box culverts and bridges. The year plates will be constructed in reverse and attached to the forms in such a manner that the finished imprint in the concrete does not exceed one-half (1/2) inch in depth.

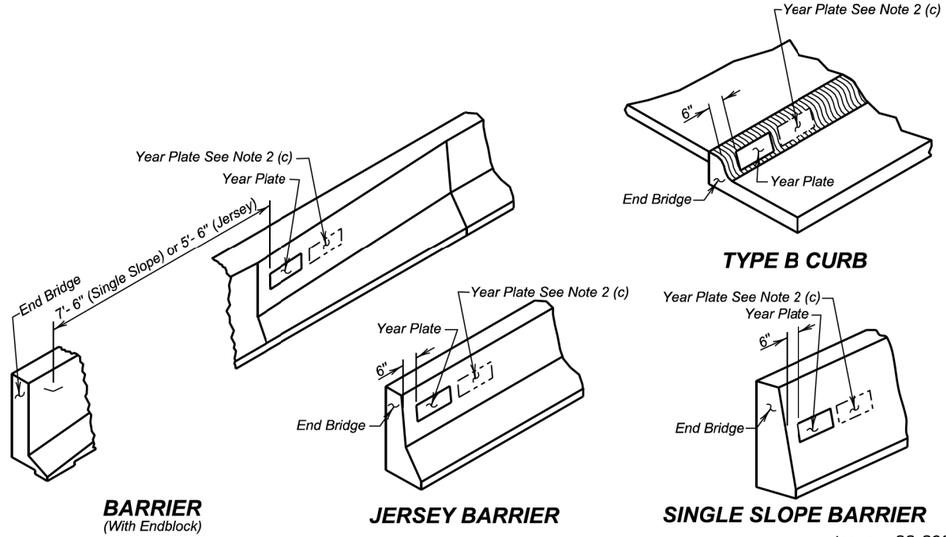
2. Year plates will be located on structure(s) as follows:

   a. On cast-in-place box culverts the year plates will be four and one - half (4 ½) inches below the top of the upstream parapet wall and centered laterally on the upstream face. On precast box culverts the year plate will be centered laterally on the upstream face of the top slab. Where an extended interior wall interferes with this location, the year plate will be centered in an adjacent barrel.

   b. On bridges with six (6) inch curbs, "Jersey" shaped barriers with no endblocks, or "Single Slope" shaped barriers with no endblocks, the year plate will be centered vertically on the curb face approximately six (6) inches from the end of the bridge, or as designated by the Engineer. On bridges with barrier endblocks, the year plate will be centered on the upper sloped portion of the barrier approximately 5'- 6" for "Jersey" shaped barriers from the end of the bridge and 7'-6" for "Single Slope" shaped barriers from the end of bridge, or as designated by the Engineer. There will be one year plate at each end of the bridge on opposite sides.

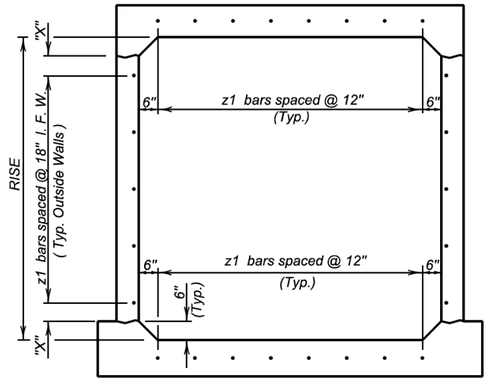
   c. When the plans specify that both the original date of construction and the date of reconstruction are to be shown, one date will be placed as listed above and the other located adjacent to it. Both year plates will be shown at each end of the bridge on opposite sides.

3. There will be no separate measurement or payment made for year plates on box culverts and bridges. All costs for this work will be incidental to other contract items.

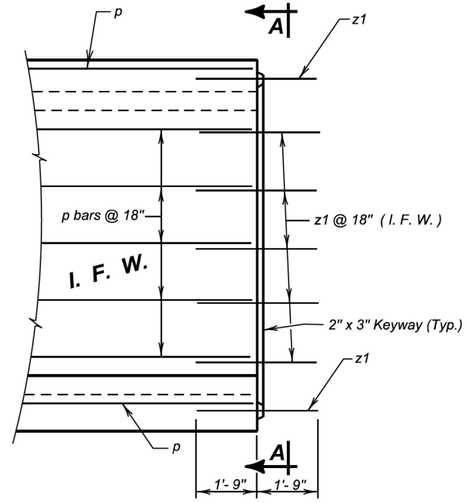


January 22, 2021

Published Date: 2026	SDDOT	YEAR PLATE DETAILS	PLATE NUMBER 460.02
			Sheet 1 Of 1



TYPICAL SINGLE BARREL VIEW A - A

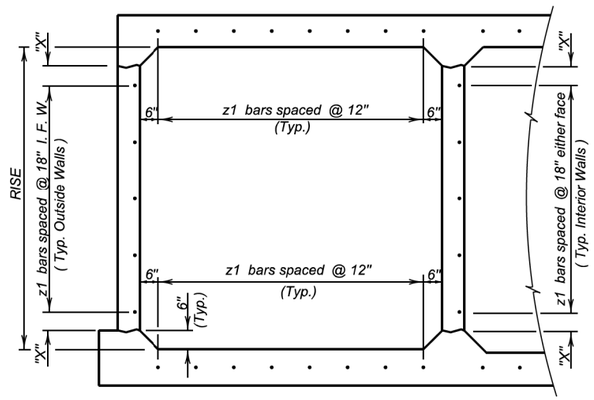


ELEVATION

LEGEND FOR PLACING RE-STEEL

I. F. W.	- Inside Face Wall

RISE	"X"
3'- 0"	3"
4'- 0"	9"
5'- 0"	6"
6'- 0"	3"
7'- 0"	9"
8'- 0"	6"
9'- 0"	3"
10'- 0"	9"
11'- 0"	6"
12'- 0"	3"
13'- 0"	9"
14'- 0"	6"



TYPICAL MULTIPLE BARREL VIEW A - A

GENERAL NOTES:

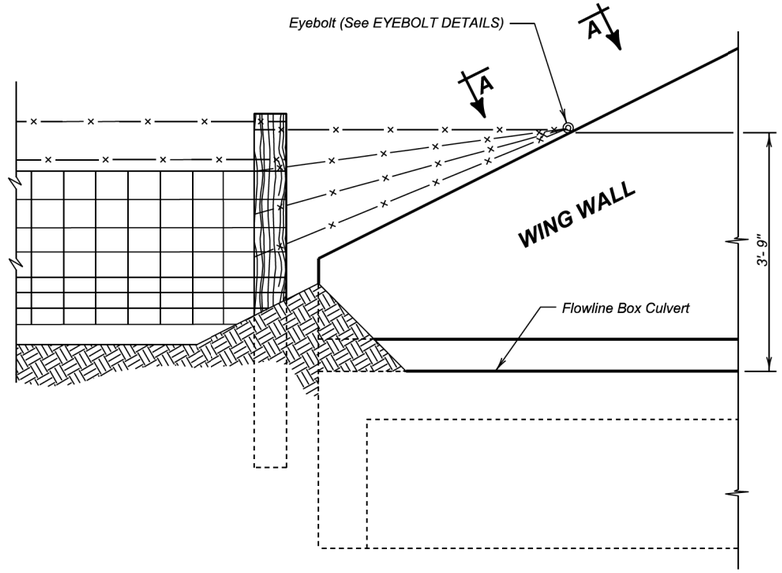
1. z1 bars will be placed in the middle of the 2" X 3" keyway in the top and bottom slabs. z1 bars will be lapped with the longitudinal p bars in the inside face of the wall for outside walls and in either face for interior walls. z1 bars are listed and included elsewhere in plans.

2. Drainage Fabric Protection will be placed in accordance with Section 422, or Section 560, whichever is applicable.

June 1, 2022

Published Date: 2026	SDDOT	BOX CULVERT BARREL TIE REINFORCEMENT	PLATE NUMBER 460.10
			Sheet 1 of 1

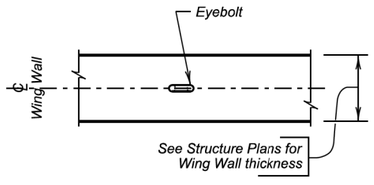
3 - 12' X 5' BOX CULVERT
STR. NO. 47-106-572
AUGUST 2022



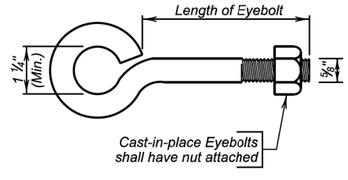
DETAIL FOR FENCE ANCHORS

GENERAL NOTES:

1. The fence and post details shown are for illustrative purpose only. The fence shall be as specified elsewhere in the plans.
2. Eyebolts shall be placed on all of the box culvert wing walls.
3. Eyebolts shall be ⅞ inch diameter and shall conform to ASTM A307.
4. Eyebolts, nuts, and concrete inserts shall be galvanized in accordance with AASHTO M232 (ASTM A153). Concrete inserts of corrosion resistant material need not be galvanized.
5. Cast-in-place eyebolts shall have a nut attached, be 4 ½ inches (Min.) in length and shall be embedded such that the eye of the bolt is flush with the concrete surface. (See Eyebolt Details) As an alternate, cast-in-place concrete inserts, capable of developing the full strength of the ⅞ inch diameter threaded eyebolt, may be used and shall be set in the concrete in accordance with the manufacturer's recommendations. The eyebolt shall be of sufficient length to develop its full strength. The eye of the eyebolt shall be flush with the concrete surface.
6. The cost for furnishing and installing eyebolts and/or concrete inserts shall be incidental to various contract items.



VIEW A - A



EYEBOLT DETAILS

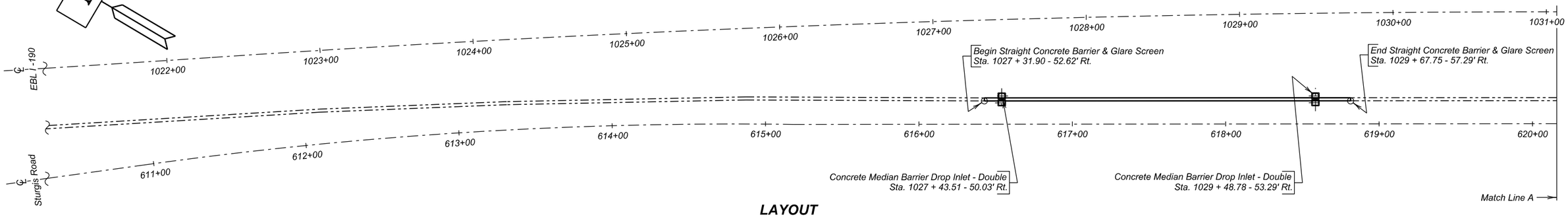
December 23,2012

Published Date: 2026	SDDOT	FENCE ANCHORS FOR BOX CULVERT WING WALLS	PLATE NUMBER 620.16 Sheet 1 of 1

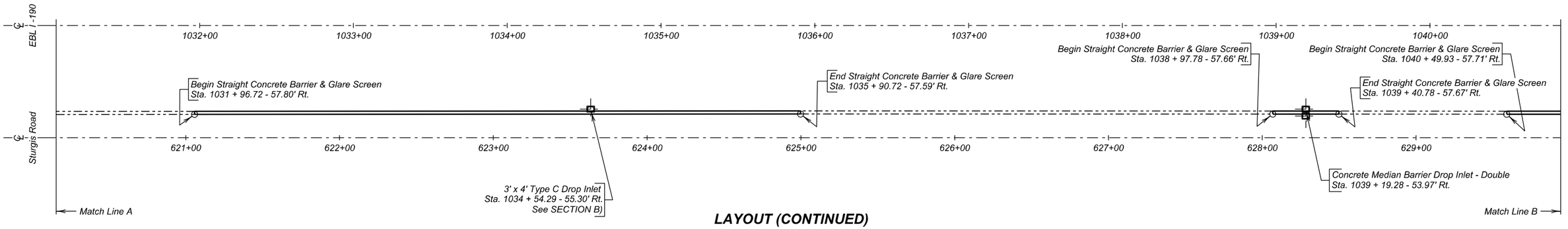
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E170	E185

NOTE:
Stations and offsets are from ℄ EBL I-90.

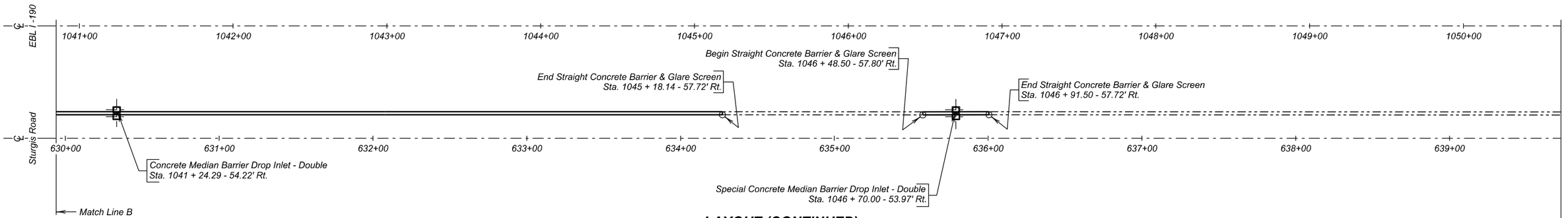
△ *See Section L for lighting details.*



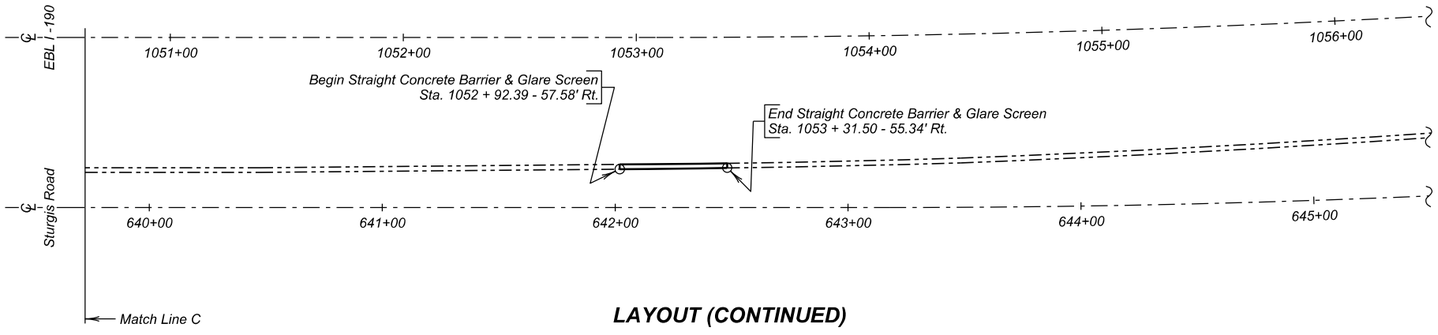
LAYOUT



LAYOUT (CONTINUED)



LAYOUT (CONTINUED)



LAYOUT (CONTINUED)

INDEX OF SHEETS-

Sheet No. 1 - Layout & Quantities for Concrete Median Barrier & Concrete Glare Screen
Sheet No. 2 - Estimate of Structure Quantities & Notes
Sheet No. 3 - Notes (Continued)
Sheet No. 4 - Details for Concrete Median Barrier & Glare Screen
Sheet No. 5 - Concrete Median Barrier Drop Inlet - Double
Sheet No. 6 - Details for Special Concrete Median Barrier Drop Inlet - Double

LAYOUT & QUANTITIES FOR STRAIGHT CONCRETE MEDIAN BARRIER & CONCRETE GLARE SCREEN

I-90 & STURGIS ROAD — IM-CR-EM 0901(187)44
PCN 034J

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
NOVEMBER 2023

PLANS BY :
OFFICE OF BRIDGE DESIGN, SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION

DESIGNED BY	CK. DES. BY	DRAFTED BY	
AU	PW	MG/BT	Steven A Johnson BRIDGE ENGINEER
MEAD034J	034JGK01		

ESTIMATE OF STRUCTURE QUANTITIES

DESCRIPTION	QUANTITY	UNIT	REMARKS
Straight Concrete Barrier	1223	Ft	
Straight Glare Screen for Concrete Barrier	1223	Ft	
Class M6 Concrete	21.9	CuYd	
Epoxy Coated Reinforcing Steel	670	Lb	
Reinforcing Steel	4341	Lb	
Structural Steel, Miscellaneous	Lump Sum	LS	
Barrier Drop Inlet Double Unit Frame and Grate Assembly	10	Each	

SPECIFICATIONS FOR BRIDGE

1. Design Specifications: AASHTO LRFD Bridge Design Specifications, 9th Edition.

2. Construction Specifications: South Dakota Standard Specifications for Roads and Bridges, 10-1-25 Version, Required Provisions, and Special Provisions as included in the Proposal. The Standard Specifications for Roads and Bridges are available for download and viewing at https://dot.sd.gov/doing-business/contractors/standard-specifications.

DESIGN MATERIAL STRENGTHS

Class A45 Concrete	f'c = 4,500 psi
Class M6 Concrete	f'c = 4,000 psi
Reinforcing Steel	fy = 60,000 psi

DESIGN MIX OF CONCRETE

1. All concrete will be Class A45.

2. Type II cement is required.

3. Mix will be designed to produce a concrete having a minimum 28 day compressive strength of 4,500 psi for Class A45 and 4,000 psi for Class M6.

4. Coarse aggregate to be used in concrete will consist of either crushed quartzite or other crushed ledge rock. If crushed ledge rock other than quartzite is to be used, it will be from a source approved by the Engineer.

GENERAL CONSTRUCTION

1. All mild reinforcing steel will conform to ASTM A615, Grade 60.

2. All exposed concrete corners and edges will be chamfered 3/4" unless noted otherwise.

3. Use 1" clear cover on all reinforcing steel except as shown.

4. Median barrier and glare screen will be built normal to the grade.

CONCRETE MEDIAN BARRIER DROP INLET

1. Concrete Median Barrier Drop Inlets and Special Concrete Median Barrier Drop Inlets will be paid for at the contract unit price for the individual bid items as shown in the plans, which will be full compensation for furnishing all materials and labor including necessary excavation and backfill required to construct one complete drain.

CONCRETE MEDIAN BARRIER AND GLARE SCREEN

1. The Concrete Median Barrier may be cast-in-place by using stationary forms, slipforming or a combination of the two construction methods. The glare screen will be constructed using stationary forms only. See notes for STATIONARY FORM CONSTRUCTION or SLIPFORM CONSTRUCTION.

2. Payment for Straight Concrete Barrier and Straight Glare Screen for Concrete Barrier will be full compensation for all materials, labor, equipment and incidentals necessary to satisfactorily complete the work required.

CONTRACTION JOINTS

1. Contraction joints are required at spacing of 20 ft. Match joints in adjacent concrete pavement. Joints are required in both the concrete barrier and the concrete glare screen.

2. The contraction joints may be either sawed or formed. If sawed, the concrete must have reached a strength of 2,000 psi prior to sawing.

3. End of day joints or construction joints will be roughened to provide aggregate interlock and will have 24" of resteel extending beyond the joint to provide a 21" lap. These joints will be located at a pavement joint or contraction joint location.

INSTALLING DOWELS IN CONCRETE

1. Holes drilled in the existing concrete will be true and normal or as shown in the plans. Concrete will have attained a strength of 2,000 psi before drilling dowel holes.

2. The epoxy resin mixture will be of a type for bonding steel to hardened concrete and will conform to AASHTO M235 Type IV, Grade 3 (Equivalent to ASTM C881, Type IV, Grade 3).

3. The diameter of the drilled holes will not be less than 1/8 inch greater nor more than 3/8 inch greater than the diameter of the dowels or as per the Manufacturer's recommendations. Use compressed air or other techniques to ensure that the hole is free of any loose material before epoxy resin is applied.

4. Mix epoxy resin as recommended by the Manufacturer and apply by an injection method as approved by the Engineer. Beginning at the bottom/back of the drilled holes, fill the holes 1/3 to 1/2 full of epoxy, or as recommended by the Manufacturer, prior to insertion of the steel bar. Holes will not be drilled using core bits. The drilled holes will be blown out with compressed air using a device that will reach the back of the hole to ensure that all debris or loose material has been removed prior to epoxy injection. Rotate the steel bar during installation to eliminate voids and ensure complete bonding of the bar. Insertion of the bars by the dipping or painting method will not be allowed.

5. No loads will be applied to the epoxy grouted dowel bars until the epoxy resin has had sufficient time to cure as specified by the epoxy resin manufacturer.

6. Include the cost of epoxy resin, dowels, installation and other incidental items in the contract unit price per foot for Straight Glare Screen for Concrete Barrier.

ESTIMATE OF STRUCTURE QUANTITIES & NOTES

FOR

STRAIGHT CONCRETE MEDIAN BARRIER & CONCRETE GLARE SCREEN

NOVEMBER 2023

DESIGNED BY	CK. DES. BY	DRAFTED BY	
PW	AU	MG	Steve A Johnson BRIDGE ENGINEER
MEAD034J	034JGK02		

SLIPFORM CONSTRUCTION

1. The Concrete Glare Screen may not be constructed using slipform equipment.

2. Concrete barrier may be constructed using slipform equipment provided that the finished concrete barrier is true to the specified line and grade within a tolerance of + or – ¼ inch in 10 ft.

3. The concrete barrier will present a smooth, uniform appearance in its final position, and will conform to horizontal and vertical lines shown in the plans or as directed by the Engineer. The surfaces will be free from humps, sags, or other irregularities. Should a section of the concrete barrier prove to be unsatisfactory in the judgement of the Engineer, that section will be removed and reconstructed at the Contractor's expense.

4. The concrete will be vibrated, rammed, tamped or worked with suitable appliances until the concrete has been consolidated to the maximum practical density, free of rock pockets, and snug against the form surfaces. The concrete will be of such consistency after slipforming that it will maintain the shape of the concrete barrier without support. Prior to the beginning of operations, the Contractor will ensure that a continuous deposit of concrete can be made at the slipform machine to minimize starting and stopping.

5. The grade for the top of the concrete barrier will be indicated by an offset guideline set by the Contractor from survey marks established by the Engineer. The forming portion of the slipform machine will be readily adjustable vertically during the forward motion of the machine to conform to the predetermined grade line. The slipform machine will be guided by horizontal sensors that ride along a wire line. A grade line gauge or pointer will be attached to the machine in such a manner that a continual comparison can be made between the barrier being placed and the established grade line. The slipform machine will not exceed the speed recommended by the manufacturer.

6. In lieu of the above method for maintaining the barrier grade, the slipform machine may be operated on rails or forms set at uniform depth below the predetermined finished top of the barrier grade, or on existing pavement.

7. Compensation for concrete barrier slump may be made by running the machine slightly higher and reducing the size of the forming area so that the end result is equivalent to the design section and acceptable to the Engineer. Concrete that is furnished to the slipform machine will not exceed ¾ inch slump, unless directed otherwise by the Engineer, to further minimize the barrier slump.

STATIONARY FORM CONSTRUCTION

1. Forms will be maintained in a true position during the placement of concrete. External bracing for aligning and holding of the forms will be required unless other methods are approved by the Engineer.

2. Snap ties, if used in concrete median barrier or glare screen formwork, will be epoxy coated. The epoxy coating will be inert in concrete and compatible with the coating applied to the new epoxy coated reinforcing steel.

SHOP PLANS

Shop plans will be required as specified by the Construction Specifications.

INCIDENTAL WORK, GRADING

Removal of existing concrete barrier will be included in Incidental Work, Grading (See Section B).

NOTES (CONTINUED)

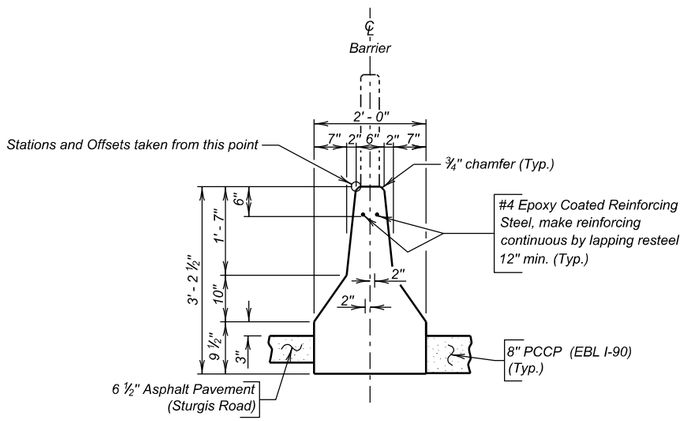
FOR

STRAIGHT CONCRETE MEDIAN BARRIER
& CONCRETE GLARE SCREEN

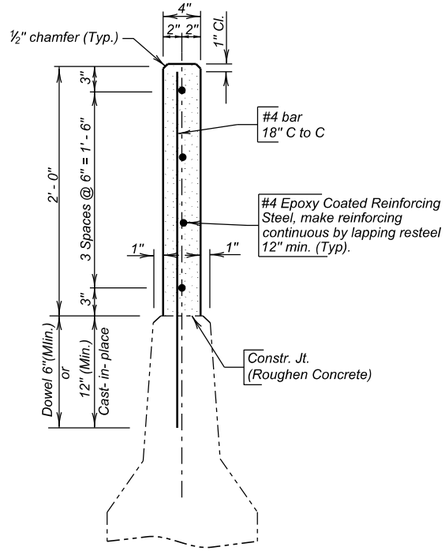
NOVEMBER 2023

DESIGNED BY	CK. DES. BY	DRAFTED BY	
PW	AU	MG	Steve A Johnson BRIDGE ENGINEER
MEAD034J	034JGK03		

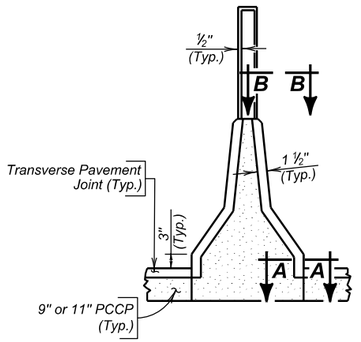
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E173	E185



CONCRETE MEDIAN BARRIER
TYPICAL SECTION

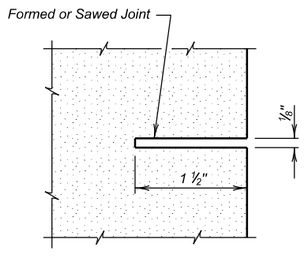


GLARE SCREEN
TYPICAL SECTION

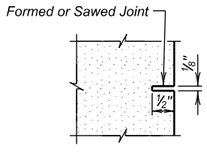


CONTRACTION JOINT

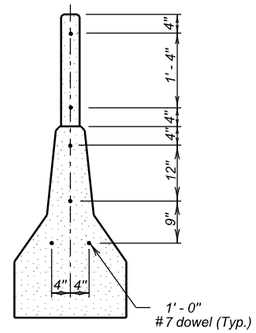
NOTE :
For informational purposes:
Each foot of Concrete Barrier adjacent to 8" PCCP contains 0. 1461 Cu. Yds. of Concrete and 1.34 lbs. of No. 4 Epoxy Coated Reinforcing Steel. Each foot of glare screen contains 0.0247 Cu. Yds. of concrete and 3.97 lbs. of No. 4 Epoxy Coated Reinforcing Steel.



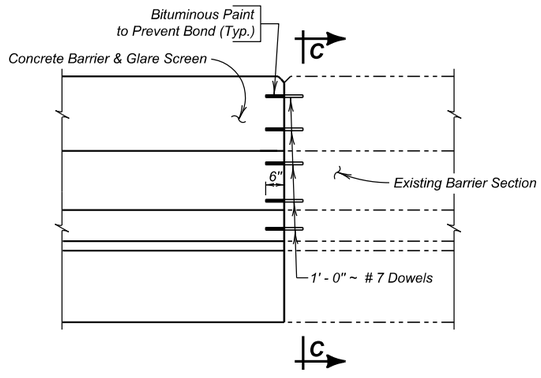
SECTION A - A



SECTION B - B



SECTION C - C



ELEVATION - TIE TO EXISTING BARRIER

DETAILS FOR
CONCRETE MEDIAN BARRIER & GLARE SCREEN

I-90 & STURGIS ROAD IM-CR-EM 0901(187)44
PCN 034J

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
NOVEMBER 2023

DESIGNED BY	CK. DES. BY	DRAFTED BY	
AU	PW	MG	BRIDGE ENGINEER
MEAD034J	034JGK04		

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E174	E185

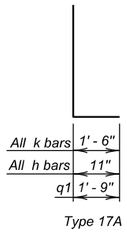
REINFORCING SCHEDULE

	Mk.	No.	Size	Length	Type
H = 3'- 0"	h1	26	4	4' - 4"	17A
	k1	44	5	4' - 11"	17A
	m1	7	6	6' - 9"	Str.
	m2	9	6	5' - 9"	Str.
	p1	10	4	5' - 0"	Str.
	p2	11	4	4' - 0"	Str.
	q1	12	4	3' - 6"	17A
H = 3'- 6"	h2	26	4	4' - 10"	17A
	k2	44	5	5' - 5"	17A
	m1	7	6	6' - 9"	Str.
	m2	9	6	5' - 9"	Str.
	p1	16	4	5' - 0"	Str.
	p2	17	4	4' - 0"	Str.
	q1	12	4	3' - 6"	17A
H = 4'- 0"	h3	26	4	5' - 4"	17A
	k3	44	5	5' - 11"	17A
	m1	7	6	6' - 9"	Str.
	m2	9	6	5' - 9"	Str.
	p1	20	4	5' - 0"	Str.
	p2	21	4	4' - 0"	Str.
	q1	12	4	3' - 6"	17A
H = 4'- 6"	h4	26	4	5' - 10"	17A
	k4	44	5	6' - 5"	17A
	m1	7	6	6' - 9"	Str.
	m2	9	6	5' - 9"	Str.
	p1	20	4	5' - 0"	Str.
	p2	21	4	4' - 0"	Str.
	q1	12	4	3' - 6"	17A
H = 5'- 0"	h5	26	4	6' - 4"	17A
	k5	44	5	6' - 11"	17A
	m1	7	6	6' - 9"	Str.
	m2	9	6	5' - 9"	Str.
	p1	20	4	5' - 0"	Str.
	p2	21	4	4' - 0"	Str.
	q1	12	4	3' - 6"	17A
H = 5'- 6"	h6	26	4	6' - 10"	17A
	k6	44	5	7' - 5"	17A
	m1	7	6	6' - 9"	Str.
	m2	9	6	5' - 9"	Str.
	p1	24	4	5' - 0"	Str.
	p2	25	4	4' - 0"	Str.
	q1	16	4	3' - 6"	17A
H = 6'- 0"	h7	26	4	7'- 4"	17A
	k7	44	5	7'- 11 "	17A
	m1	7	6	6' - 9"	Str.
	m2	9	6	5' - 9"	Str.
	p1	24	4	5' - 0"	Str.
	p2	25	4	4' - 0"	Str.
	q1	16	4	3' - 6"	17A
H = 6'- 6"	h8	26	4	7' - 10"	17A
	k8	44	5	8' - 5"	17A
	m1	7	6	6' - 9"	Str.
	m2	9	6	5' - 9"	Str.
	p1	24	4	5' - 0"	Str.
	p2	25	4	4' - 0"	Str.
	q1	16	4	3' - 6"	17A
H = 7'- 0"	h9	26	4	8' - 4"	17A
	k9	44	5	8' - 11"	17A
	m1	7	6	6' - 9"	Str.
	m2	9	6	5' - 9"	Str.
	p1	28	4	5' - 0"	Str.
	p2	29	4	4' - 0"	Str.
	q1	20	4	3' - 6"	17A

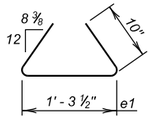
	Mk.	No.	Size	Length	Type
H = 7'- 6"	h10	26	4	8' - 10"	17A
	k10	44	5	9' - 5"	17A
	m1	7	6	6' - 9"	Str.
	m2	9	6	5' - 9"	Str.
	p1	28	4	5' - 0"	Str.
	p2	29	4	4' - 0"	Str.
	q1	20	4	3' - 6"	17A
H = 8'- 0"	h11	26	4	9' - 4"	17A
	k11	44	5	9' - 11"	17A
	m1	7	6	6' - 9"	Str.
	m2	9	6	5' - 9"	Str.
	p1	28	4	5' - 0"	Str.
	p2	29	4	4' - 0"	Str.
	q1	20	4	3' - 6"	17A
★	a1	11	5	7' - 6"	Str.
	e	9	4	4' - 9"	S11A
	e1	9	4	3' - 3"	17B

Bending Details

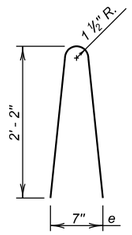
★ *Epoxy Coated Reinforcement Steel (For one drop inlet)*



Type 17A

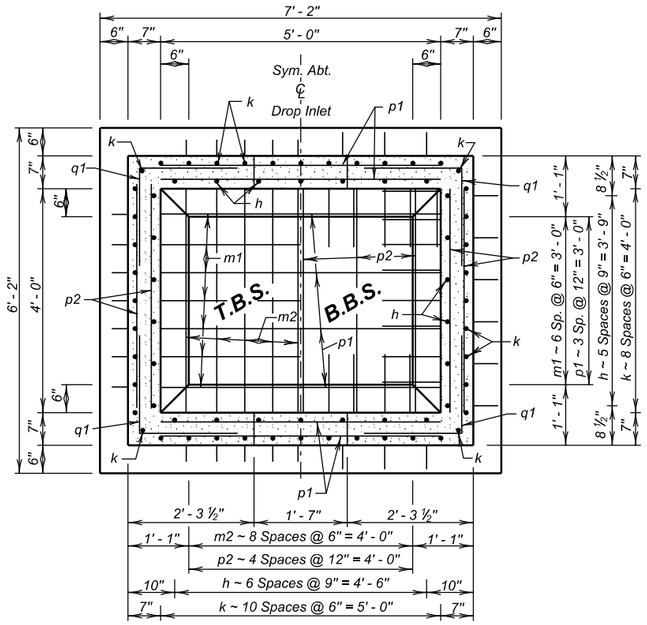


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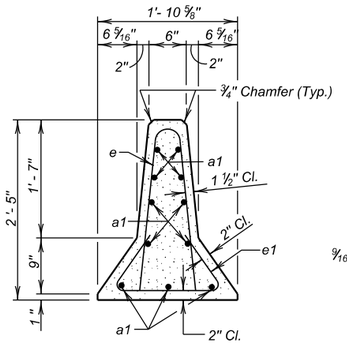


Type S11A

All dimensions are out to out of bars.

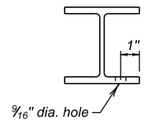


PLAN

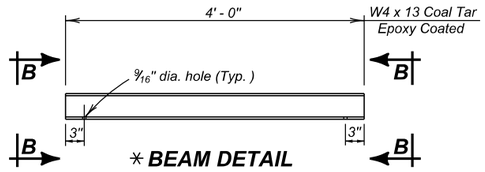


SEC. A - A

(Glare Section not Shown)



VIEW B - B



✳ BEAM DETAIL

NOTE -

For informational purposes only, the estimated quantities for Drop Inlet heights ("H") are given below.

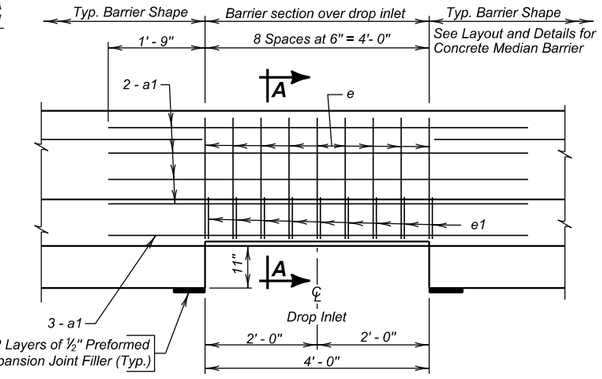
"H"	Class "M6" Concrete	Re-steel
3 '- 0"	2.8 Cu. Yd.	540 Lb.
3' - 6"	3.0 Cu. Yd.	608 Lb.
4' - 0"	3.2 Cu. Yd.	664 Lb.
4' - 6"	3.4 Cu. Yd.	695 Lb.
5' - 0"	3.6 Cu. Yd.	727 Lb.
5' - 6"	3.9 Cu. Yd.	792 Lb.
6' - 0"	4.1 Cu. Yd.	824 Lb.
6' - 6"	4.3 Cu. Yd.	855 Lb.
7' - 0"	4.5 Cu. Yd.	920 Lb.
7' - 6"	4.8 Cu. Yd.	952 Lb.
8' - 0"	5.0 Cu. Yd.	984 Lb.

For informational purposes only, the estimated quantitiies for epoxy coated reinforcing steel and structural steel, misc. is 134 lbs. and 158 lbs. respectively; typical each drop inlet.

DROP INLET LOCATIONS

⊛Station	Class "M6" Concrete	Re-steel
1027 + 43.51	4.3 Cu. Yd.	855 Lb.
1029 + 48.78	3.2 Cu. Yd.	664 Lb.
1039 + 19.28	4.3 Cu. Yd.	855 Lb.
1041 + 24.29	4.3 Cu. Yd.	855 Lb.

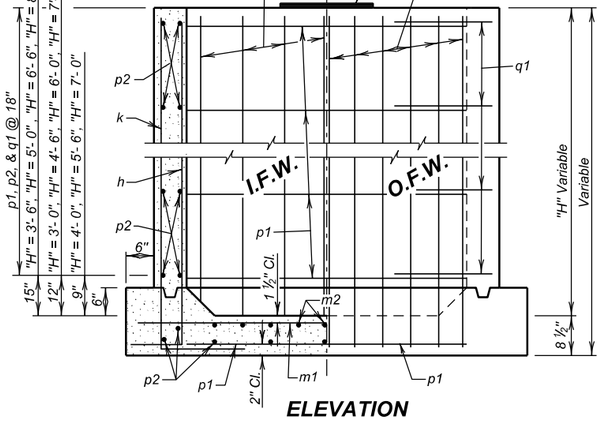
⊛ *Locations shown in SECTION B.*



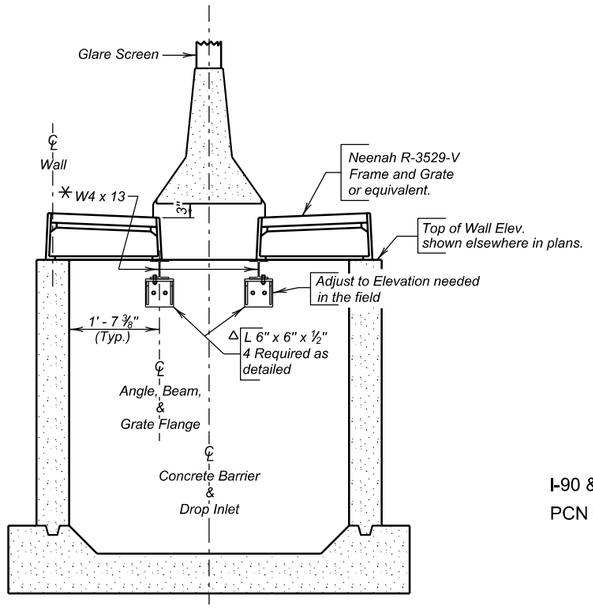
ELEVATION

CONCRETE BARRIER OVER DROP INLET

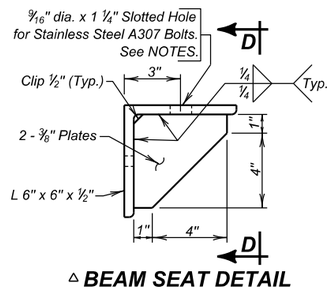
(Glare Screen not Shown)



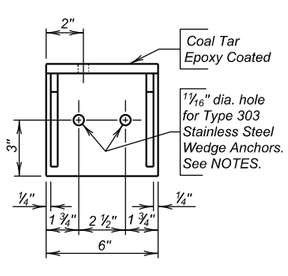
ELEVATION



TYPICAL SECTION



△ **BEAM SEAT DETAIL**



VIEW D - D

LEGEND FOR PLACING RE-STEEL

T.B.S. - Top of Bottom Slab
B.B.S. - Bottom of Bottom Slab
O.F.W. - Outside Face of Wall
I.F.W. - Inside Face of Wall

ESTIMATED QUANTITIES

(For 4 Median Barrier Drop Inlets - Double)

ITEM	UNIT	QUANTITY
Class M6 Concrete	Cu. Yd.	16.1
Reinforcing Steel	Lb.	3229
Epoxy Coated Reinforcing Steel	Lb.	536
Structural Steel, Miscellaneous	L.S.	Lump Sum
Barrier Drop Inlet Double Unit Frame and Grate Assembly	Each	8

DETAILS FOR CONCRETE MEDIAN BARRIER
DROP INLET - DOUBLE

I-90 & STURGIS ROAD — IM-CR-EM 0901(187)44

PCN 034J — HL-93

MEADE COUNTY

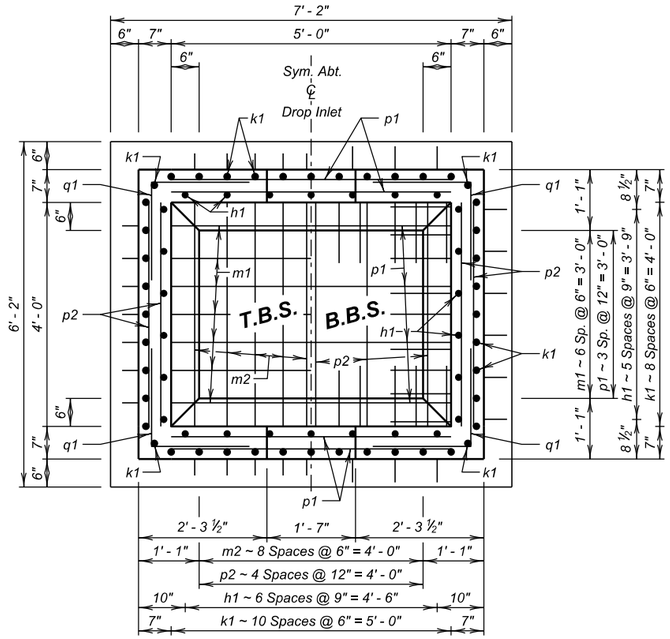
S. D. DEPT. OF TRANSPORTATION

MARCH 2025

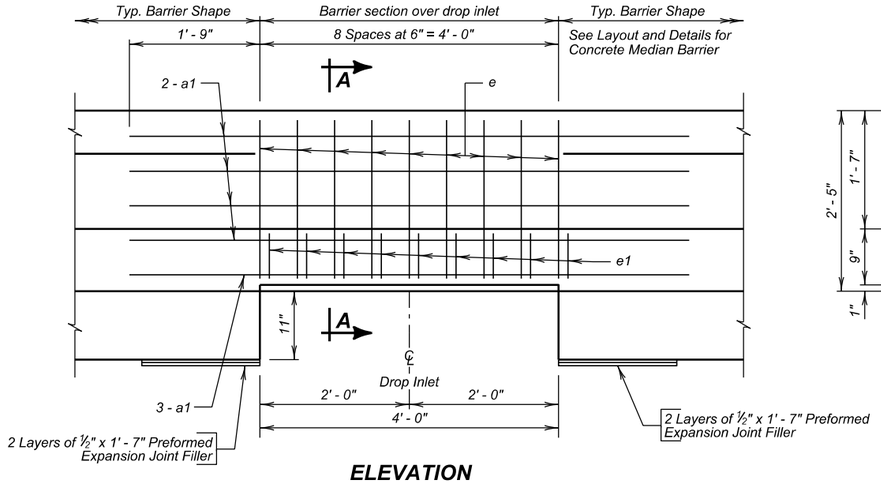
5 OF 6

DESIGNED BY	CK. DES. BY	DRAFTED BY	
AU	PW	BT	Steve A. Johnson BRIDGE ENGINEER
MEAD034J	034JTA05		

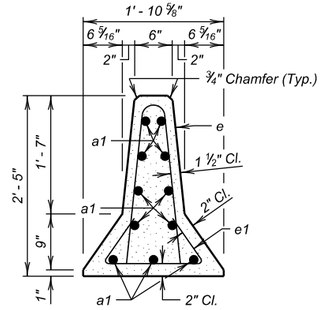
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E175	E185



PLAN



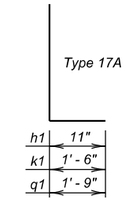
ELEVATION
CONCRETE BARRIER OVER DROP INLET
(Glare Screen not Shown)



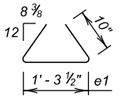
SECTION A - A
(Glare Screen not Shown)

Mk.	No.	Size	Length	Type
h1	26	4	10' - 10"	17A
k1	44	5	11' - 5"	17A
m1	7	6	6' - 9"	Str.
m2	9	6	5' - 9"	Str.
p1	32	4	5' - 0"	Str.
p2	33	4	4' - 0"	Str.
q1	24	4	3' - 6"	17A
★ a1	11	5	7' - 6"	Str.
★ e	9	4	4' - 9"	S11A
★ e1	9	4	3' - 3"	17B

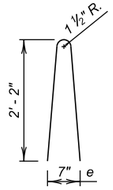
REINFORCING SCHEDULE



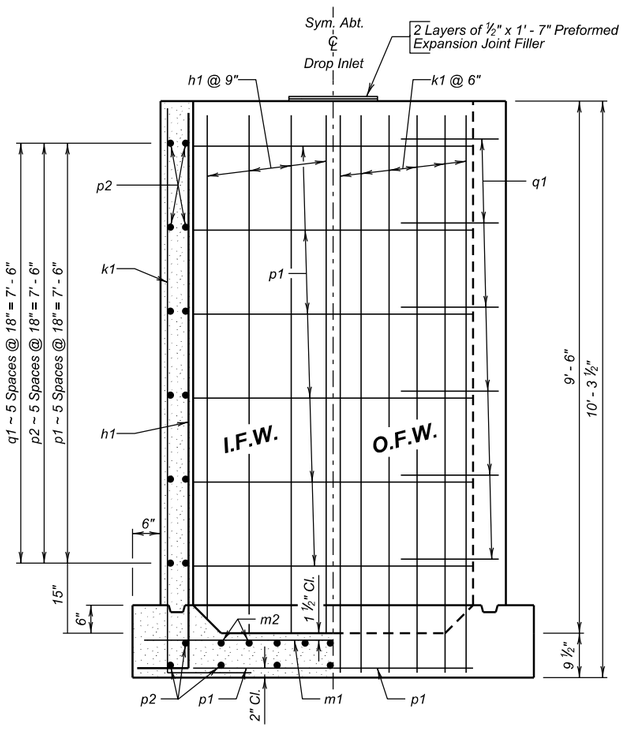
NOTES:
All dimensions are out to out of bars.
★ Epoxy Coated Reinforcement Steel (For one drop inlet)



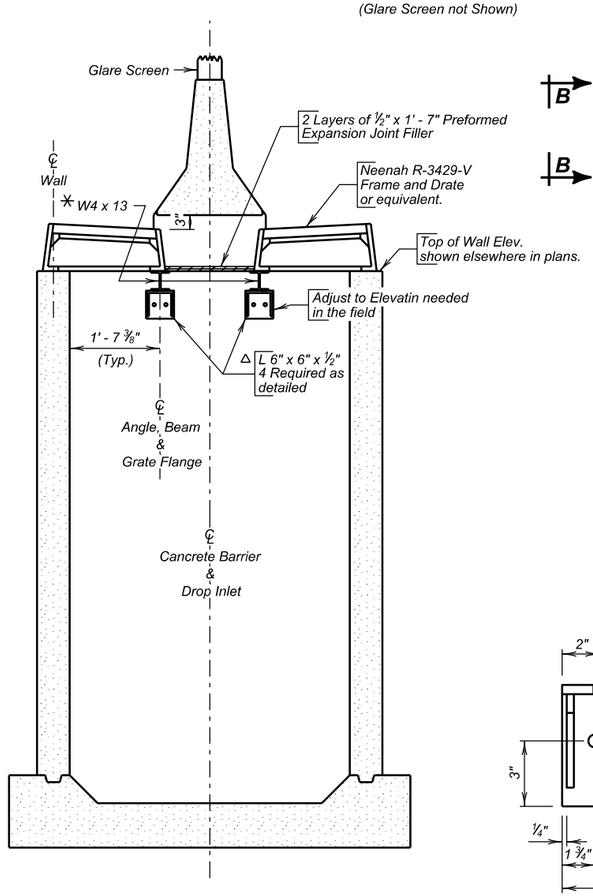
Type 17B



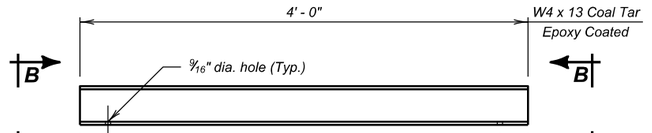
Type S11A



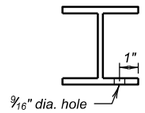
ELEVATION



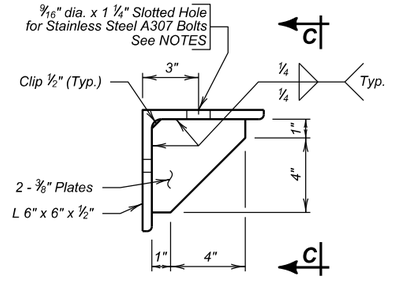
TYPICAL SECTION



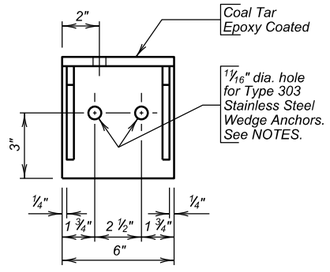
✳ **BEAM DETAIL**



VIEW B - B



△ **BEAM SEAT DETAIL**



VIEW C - C

GENERAL NOTES-

1. Special Concrete Median Barrier Drop Inlet - Double will be paid for at the contract unit price for the individual bid items as shown in the plans, which will be full compensation for furnishing all materials and labor including necessary excavation and backfill required to construct one complete drain.

LEGEND FOR PLACING RE-STEEL

T.B.S - Top of Bottom Slab
B.B.S. - Bottom of Bottom Slab
O.F.W. - Outside Face of Wall
I.F.W. - Inside Face of Wall

ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY
Class M6 Concrete	Cu. Yd.	5.8
Reinforcing Steel	Lb.	1112
Epoxy Coated Reinforcing Steel	Lb.	134
✳ Structural Steel, Miscellaneous	L.S.	Lump Sum
Barrier Drop Inlet Double Unit Frame and Grate Assemply	Each	2

✳ For information purposes only, the estimated quantity for Structural Steel, Miscellaneous is 158 lbs.

DETAILS FOR SPECIAL MEDIAN
BARRIER DROP INLET - DOUBLE

STA. 1046 + 70.00 — SEC. 10-T3N-R6E
PCN 034J — IM-CR-EM 0901(187)44
HL-93

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
DECEMBER 2024

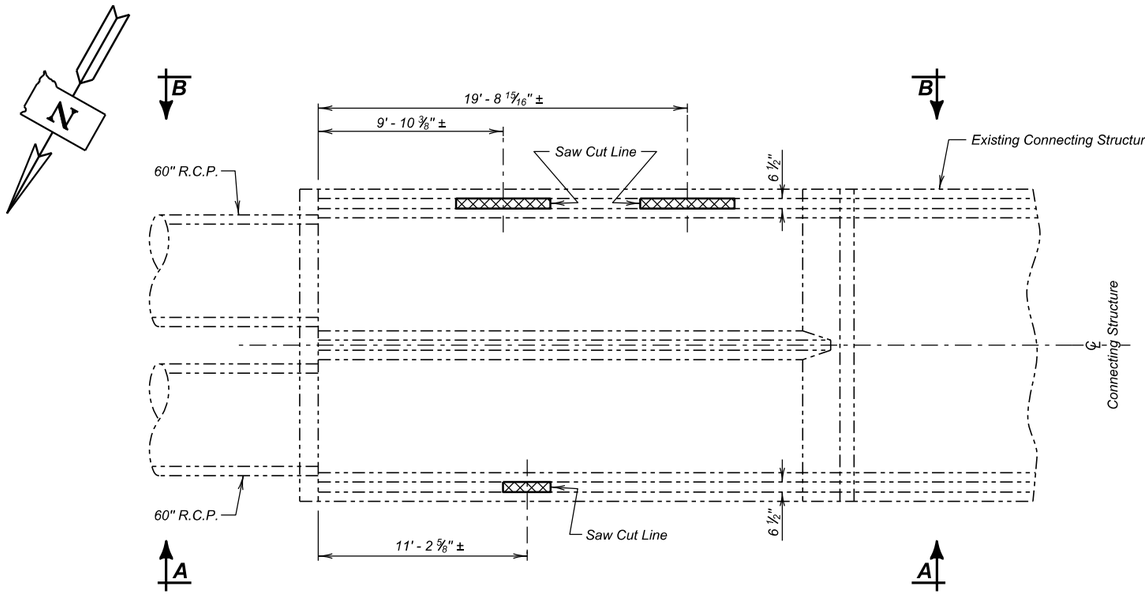
6 OF 6

PLANS BY :
OFFICE OF BRIDGE DESIGN, SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION

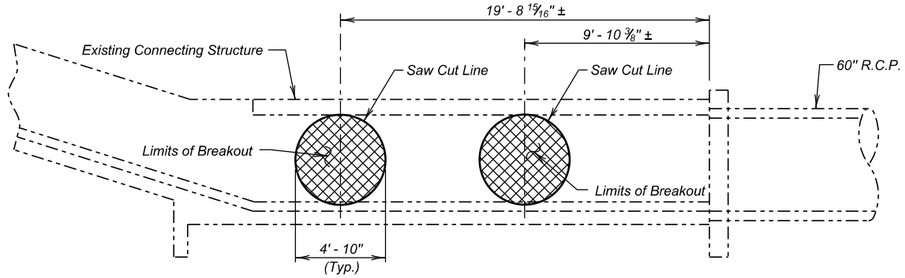
DESIGNED BY	CHECKED BY	DRAWN BY	
AH	JU	CK	BRIDGE ENGINEER
MEAD034J	034JKA06		

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E176	E185

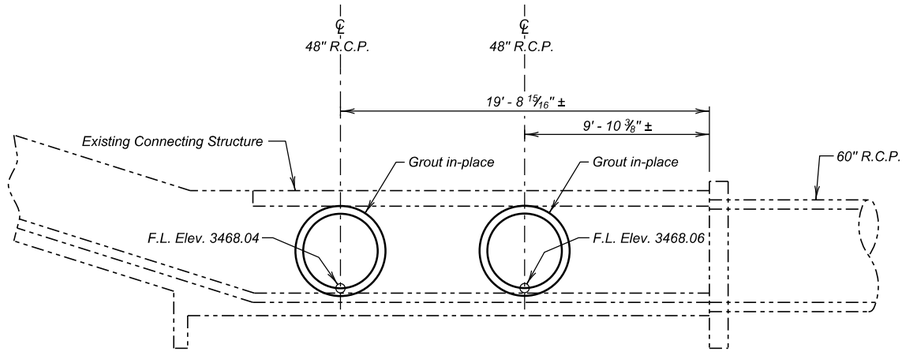
NOTE:
See Section B for 48" and 24" R.C.P. location and details.



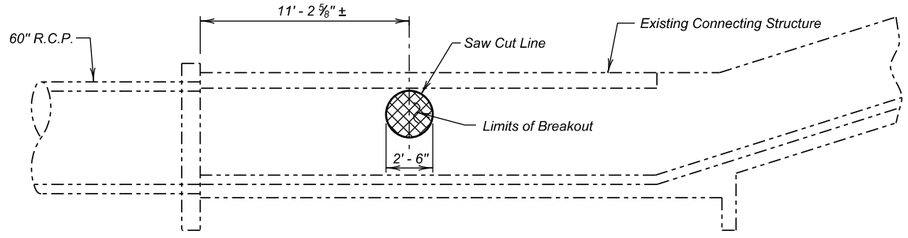
PLAN - BREAKOUT DETAILS



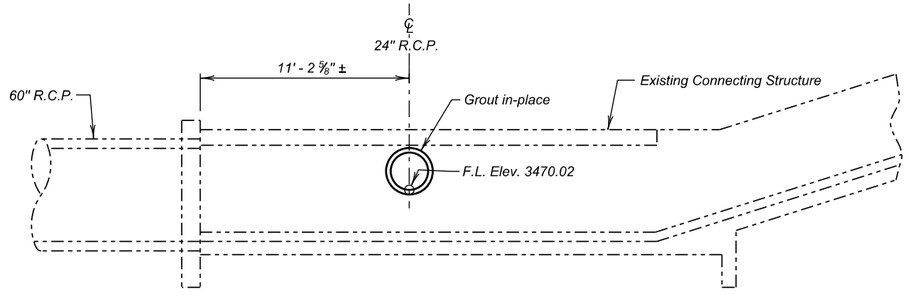
VIEW B - B
(Breakout Details)



VIEW B - B
(Placement Details)



VIEW A - A
(Breakout Details)



VIEW A - A
(Placement Details)

BREAKOUT STRUCTURAL CONCRETE

1. *This work will consist of breaking out and disposing of structural concrete. All broken out concrete and other discarded material will be disposed of in accordance with the Environmental Commitment notes found elsewhere in the plans.*

2. *Define the breakout limits with 3/4 inch deep saw cuts.*

3. *Any additional breakout required due to spalling or cracking of the existing structure will be determined by the Engineer. Where additional breakout is required, care will be taken not to damage any of the existing reinforcing steel. All steel will be left in place and thoroughly cleaned by sandblasting.*

4. *Plans quantity payment will be full compensation for this item regardless of the quantity actually broken out, unless measurement is ordered by the Engineer. If the Engineer orders breakout beyond the limits shown, this additional breakout will be paid for at the contract unit price per cubic yard for Breakout Structural Concrete. If additional breakout is caused by the Contractor's operations, no additional payment will be made.*

5. *Breakout Structural Concrete will be paid for at the contract unit price per cubic yard. This payment will be full compensation for furnishing all materials, labor, tools and equipment necessary or incidental to breaking out the structural concrete. Payment includes, but is not limited to, excavation required to perform the required breakout, sawcutting, breaking out concrete, cleaning and sandblasting reinforcing steel and concrete surfaces, and removing and disposing of all waste materials to satisfactorily complete the work.*

ESTIMATED QUANTITIES		
ITEM	*UNIT*	*QUANTITY*
Breakout Structural Concrete	*Cu. Yd.*	*0.8*

CONNECTING STRUCTURE CONNECTION DETAILS

FOR

24" & 48" REINFORCED CONCRETE PIPES

OVER DRAW — SEC. 15-T3N-R6E
PCN 034J — IM-CR-EM 0901(187)44

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
OCTOBER 2023

1 OF 1

DESIGNED BY	CK. DES. BY	DRAFTED BY	
PW	AU	MG	Steve A Johnson BRIDGE ENGINEER
MEAD034J	034JGJ01		

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E177	E185

Revised October 15, 2025 AU

SPECIFICATIONS

1) Design Specifications: AASHTO LRFD Bridge Design Specifications, 9th Edition.

2) Construction Specifications: South Dakota Standard Specifications for Roads and Bridges, 10-1-25 Version, Required Provisions, and Special Provisions as included in the Proposal. The Standard Specifications for Roads and Bridges are available for download and viewing at: https://dot.sd.gov/doing-business/contractors/standard-specifications.

GENERAL NOTES

1) Design Live Load: HL-93. No construction loading in excess of legal load was considered.

2) Reinforcing steel will conform to ASTM A615 grade 60. The d bars will be lapped 12 inches with the b and c bars. Cut and bend reinforcing steel as required to place pipe(s) through the drop inlet wall.

3) Median drain may be precast. If precast median drain details differ from this standard plate, submit a checked design done by a SD registered P.E. and shop plans to the Office of Bridge Design for approval.

⚹ 4) Reduce total quantities of concrete by the amount of concrete displaced by the pipe(s). The total quantity of concrete shall be computed to the nearest hundredth of a cubic yard. The total quantity of reinforcing steel will be computed to the nearest pound.

5) Median drain shown may be modified by the addition or omission of connecting pipes as noted elsewhere in the plans. All pipes entering median drain must fit between the inside face of walls and will not enter through the corners.

6) Structural steel for angles and plates will conform to ASTM A36. Structural steel for rectangular HSS will conform to ASTM A500 grade B. For informational purposes, the approximate weight of the frame is 100 pounds and the approximate weight of the grate is 254 pounds.

7) The dimension of "H" is in feet. Maximum "H" is 7 feet.

8) Special Median Drain 4.5' x 2.5' will be paid for at the contract unit price for the individual bid items as shown in the plans, which will be full compensation for furnishing all materials and labor including necessary excavation and backfill required to construct on complete drain.

PIPE DISPLACEMENT REDUCTIONS

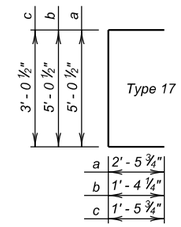
Diameter (Inches)	Wall T (Inches)	Class M6 Concrete (Cu. Yd.)
24" R.C.P.	3	0.09
30" R.C.P.	3 ½	0.14
36" R.C.P.	4	0.20

INDEX OF SHEETS-

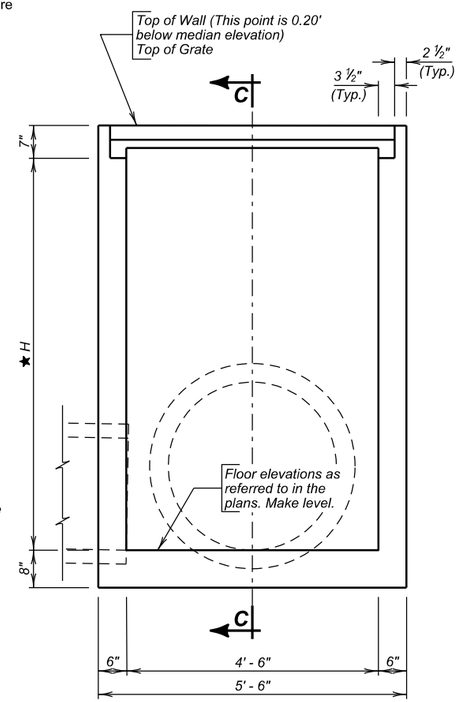
Sheet No. 1 - Details and Estimated Quantities
Sheet No. 2 - Grate Details

REINFORCING SCHEDULE

Mk.	No.	Size	Length	Type	Bending Details
a	2.67H	4	10' - 0"	17	
b	5	5	7' - 9"	17	
c	8	4	6' - 0"	17	
d	2	4	H - 1 ½"	Str.	
d1	16	4	H + 3"	Str.	
d2	8	4	H	Str.	

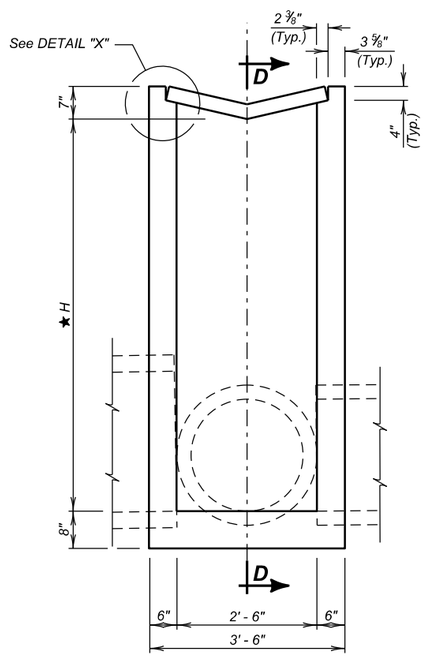


NOTES:
All dimensions are out to out of bars.

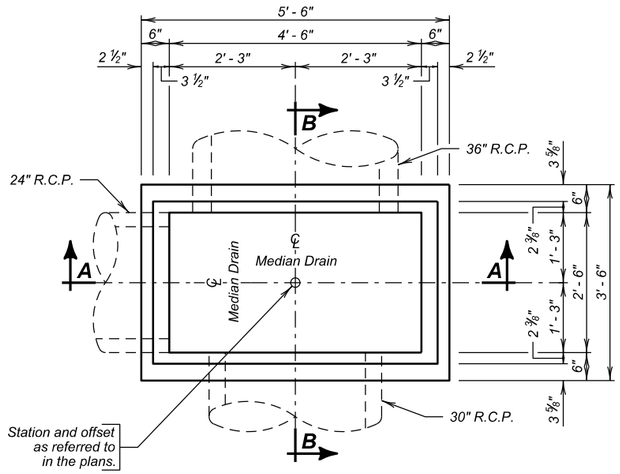


SECTION A - A

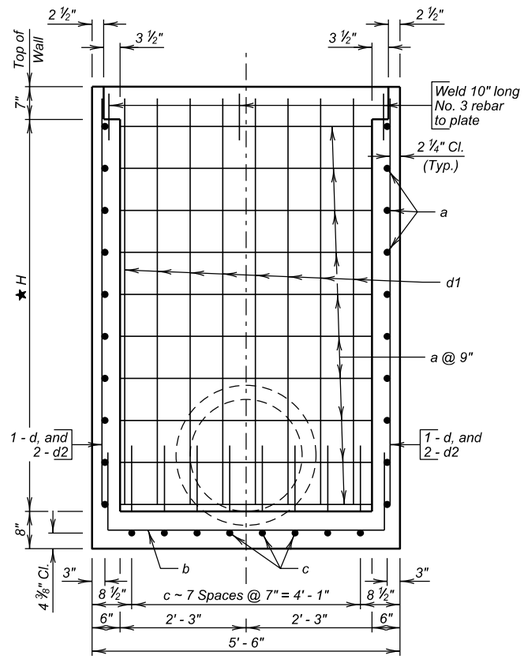
★Maximum "H" is 7' - 0"



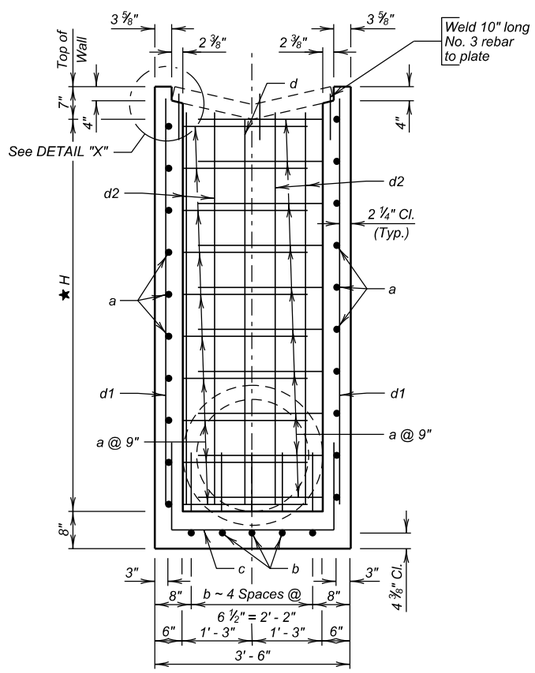
SECTION B - B



PLAN VIEW
(1027 + 45.08 - Frame and Grate Assembly Not Shown)



SECTION D - D



SECTION C - C

ESTIMATED QUANTITIES
(For One Special Median Drain 4.5 x 2.5)

	ITEM	UNIT	CONSTANT QUANTITY	VARIABLE QUANTITY
⚹	Class M6 Concrete	Cu. Yd.	0.69	0.30H
	Reinforcing Steel	Lb.	74.99	35.20H
	Type M Frame and Grate Assembly	Each	1	----------

DETAILS AND ESTIMATED QUANTITIES
FOR
SPECIAL MEDIAN DRAIN 4.5' x 2.5'

STA. 1027 + 45.08
PCN 034J

SEC. 15-T3N-R6E
IM-CR-EM 0901(187)44
HL-93

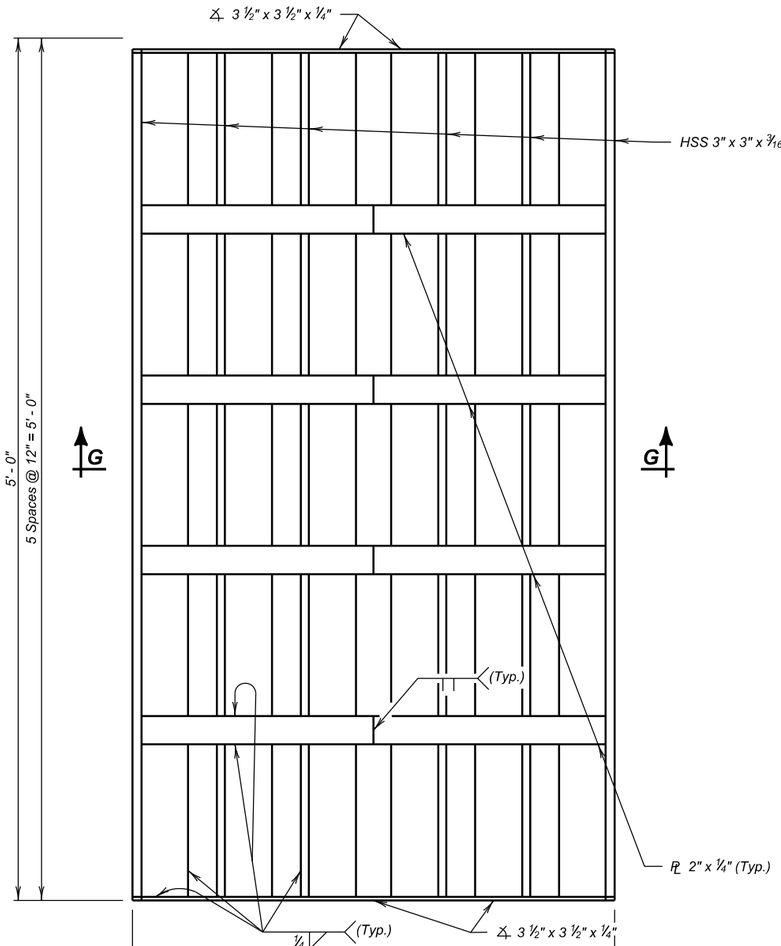
MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
FEBRUARY 2025

1 OF 2

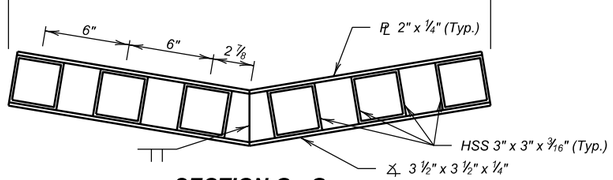
PLANS BY :
OFFICE OF BRIDGE DESIGN, SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION

DESIGNED BY	CHECKED BY	DRAWN BY	
AH	JU	CK	BRIDGE ENGINEER
MEAD034J	034JKA01		

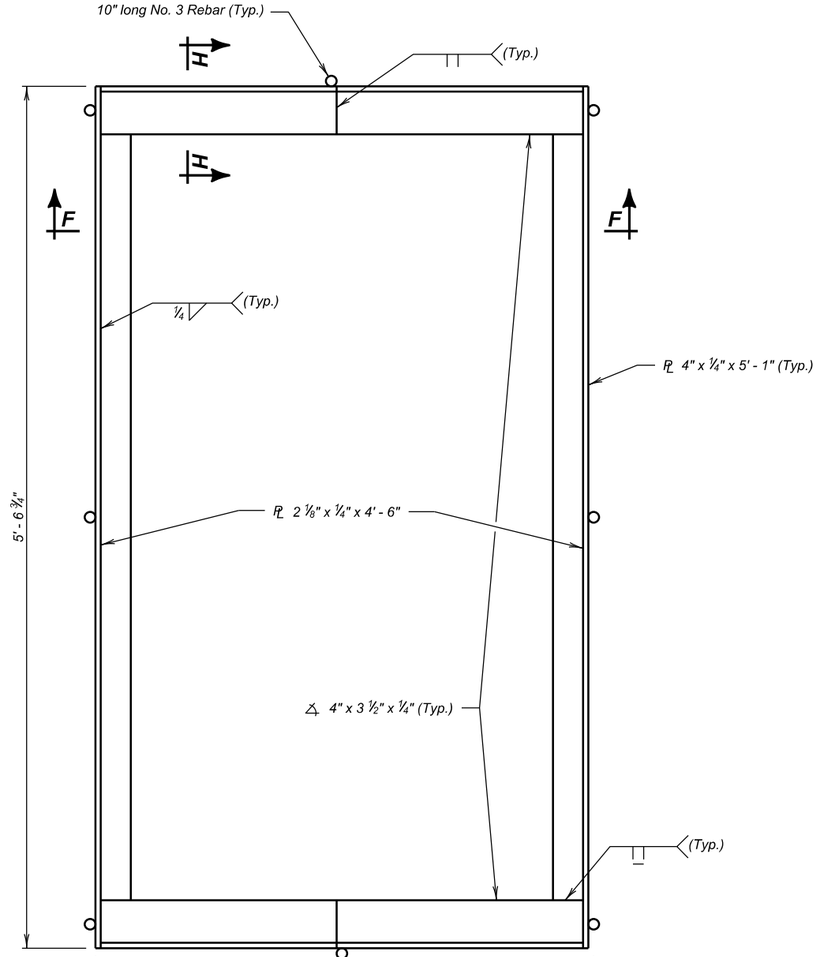
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E178	E185



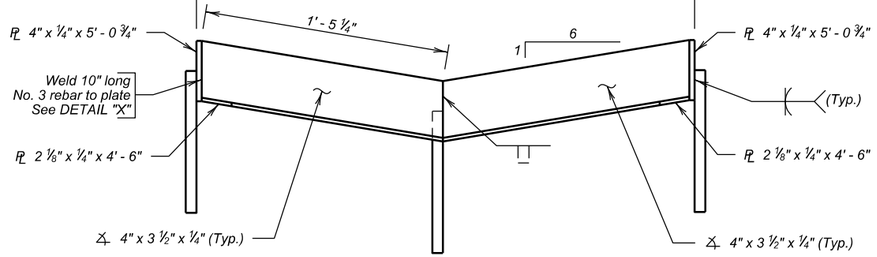
PLAN VIEW
(Grade)



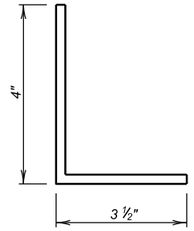
SECTION G - G
(Grade)



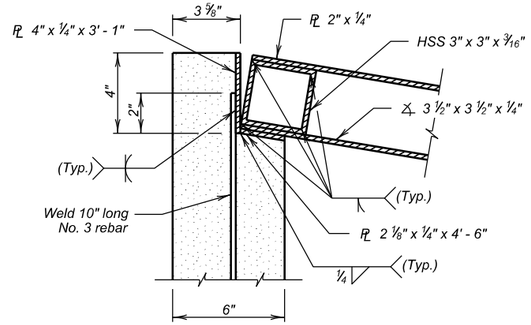
PLAN VIEW
(Frame)



SECTION F - F
(Frame)



SECTION H - H



DETAIL "X"

GRATE DETAILS

FOR

SPECIAL MEDIAN DRAIN 4.5' x 2.5'

STA. 1027 + 45.08

SEC. 15-T3N-R6E
IM-CR-EM 0901(187)44
HL-93

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
FEBRUARY 2025

2 OF 2

PLANS BY :
OFFICE OF BRIDGE DESIGN, SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION

DESIGNED BY	CHECKED BY	DRAWN BY	
AH	JU	CK	Steve A Johnson BRIDGE ENGINEER
MEAD034J	034JKA02		

Revised October 15, 2025 AU

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E179	E185

SPECIFICATIONS

1) *Design Specifications: AASHTO LRFD Bridge Design Specifications, 9th Edition.*

2) Construction Specifications: South Dakota Standard Specifications for Roads and Bridges, 10-1-25 Version, Required Provisions, and Special Provisions as included in the Proposal. The Standard Specifications for Roads and Bridges are available for download and viewing at: https://dot.sd.gov/doing-business/contractors/standard-specifications.

GENERAL NOTES

1) *Design Live Load: HL-93. No construction loading in excess of legal load was considered.*

2) *Reinforcing steel will conform to ASTM A615 grade 60. The d bars will be lapped 12 inches with the b and c bars. Cut and bend reinforcing steel as required to place pipe(s) through the drop inlet wall.*

3) *Median drain may be precast. If precast median drain details differ from this standard plate, submit a checked design done by a SD registered P.E. and shop plans to the Office of Bridge Design for approval.*

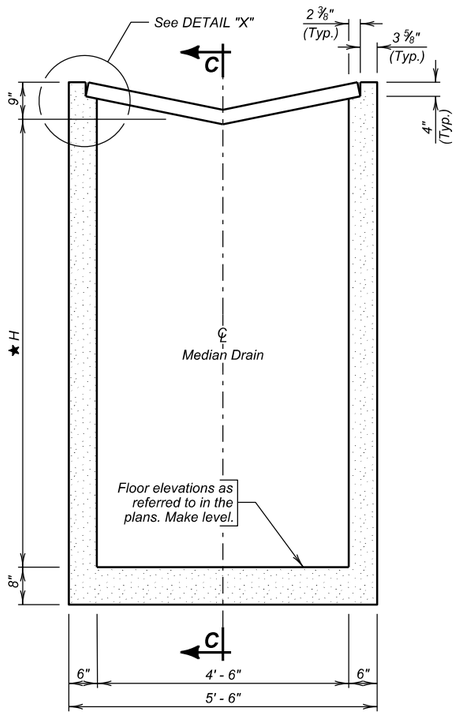
✳ 4) *Reduce total quantities of concrete by the amount of concrete displaced by the pipe(s). The total quantity of concrete shall be computed to the nearest hundredth of a cubic yard. The total quantity of reinforcing steel will be computed to the nearest pound.*

5) *Median drain shown may be modified by the addition or omission of connecting pipes as noted elsewhere in the plans. All pipes entering median drain must fit between the inside face of walls and will not enter through the corners.*

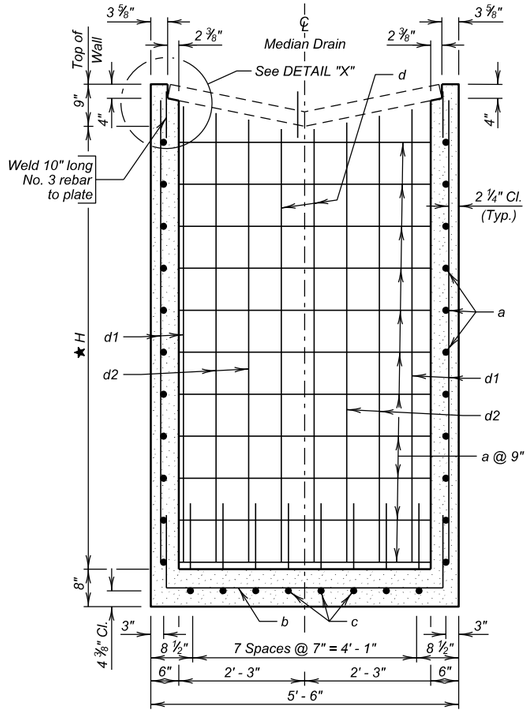
6) *Structural steel for angles and plates will conform to ASTM A36. Structural steel for rectangular HSS will conform to ASTM A500 grade B. For informational purposes, the approximate weight of the frame is 100 pounds and the approximate weight of the grate is 254 pounds.*

7) *The dimension of "H" is in feet. Maximum "H" is 8 feet.*

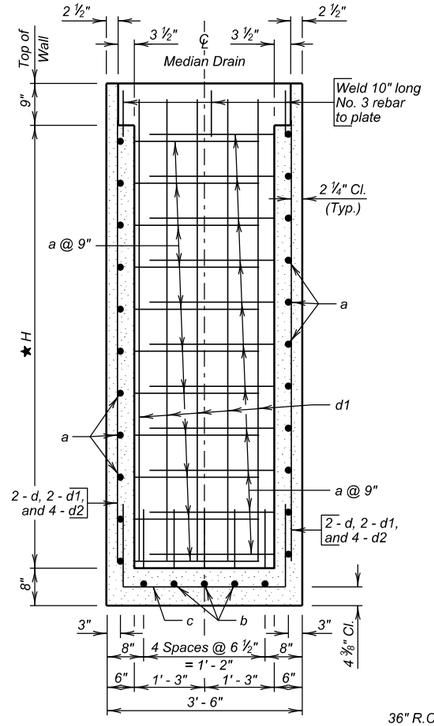
8) *Special Median Drain 2.5' x 4.5' will be paid for at the contract unit price for the individual bid items as shown in the plans, which will be full compensation for furnishing all materials and labor including necessary excavation and backfill required to construct on complete drain.*



SECTION A - A
(Pipe Not Shown)



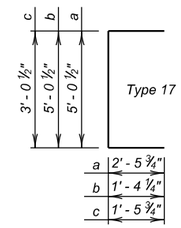
SECTION D - D
(Pipe Not Shown)



SECTION C - C
(Pipe Not Shown)

REINFORCING SCHEDULE

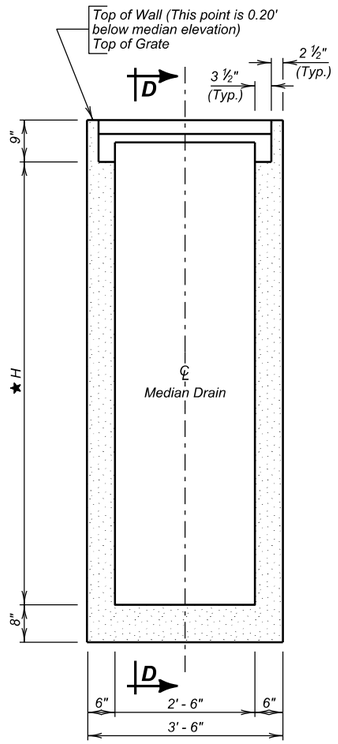
Mk.	No.	Size	Length	Type	Bending Details
a	2.67H	4	10' - 0"	17	
b	5	5	7' - 9"	17	
c	8	4	6' - 0"	17	
d	4	4	H - 1 ½"	Str.	
d1	14	4	H + 3"	Str.	
d2	8	4	H	Str.	



NOTES:
All dimensions are out to out of bars.

PIPE DISPLACEMENT REDUCTIONS

Diameter (Inches)	Wall T (Inches)	Class M6 Concrete (Cu. Yd.)
24" R.C.P.	3	0.09
30" R.C.P.	3 ½	0.14
36" R.C.P.	4	0.20



SECTION B - B
(Pipe Not Shown)

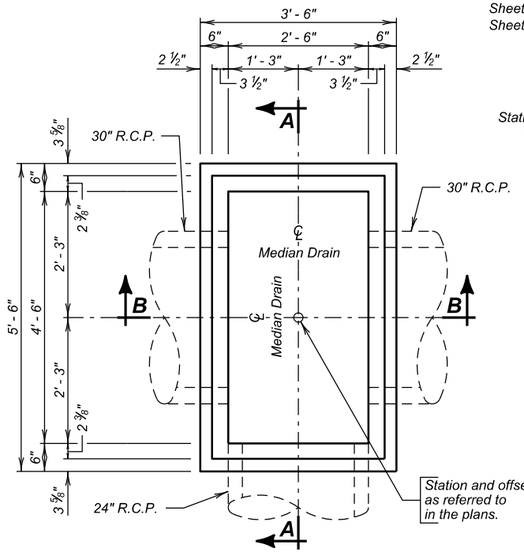
★ *Maximum "H" is 8' - 0"*

INDEX OF SHEETS-

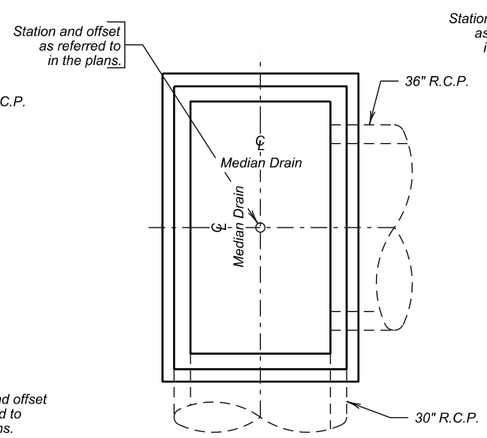
Sheet No. 1 - Details and Estimated Quantities
Sheet No. 2 - Grate Details

ESTIMATED QUANTITIES
(For One Special Median Drain 2.5 x 4.5)

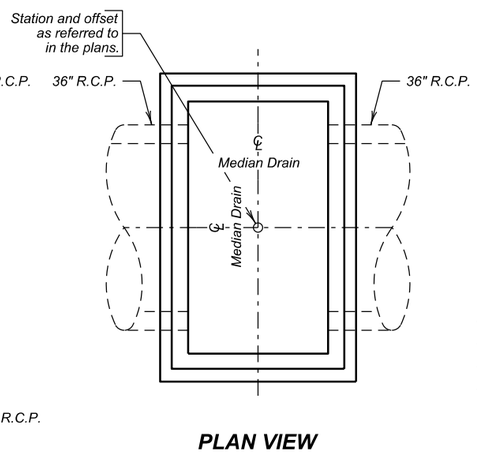
ITEM	UNIT	CONSTANT QUANTITY	VARIABLE QUANTITY
✳ Class M6 Concrete	Cu. Yd.	0.69	0.30H
Reinforcing Steel	Lb.	74.48	35.20H
Type M Frame and Grate Assembly	Each	1	----------



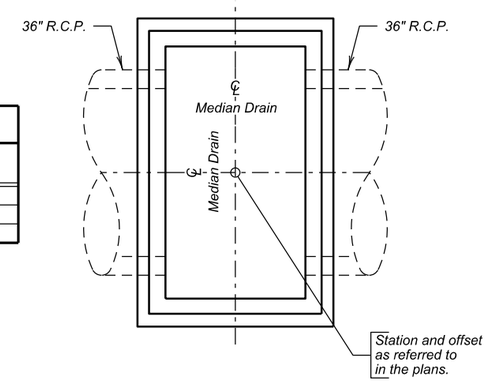
PLAN VIEW
(1041 + 24.23 - Frame and Grate Assembly Not Shown)



PLAN VIEW
(1046 + 69.76 - Frame and Grate Assembly Not Shown)



PLAN VIEW
(1049 + 69.38 - Frame and Grate Assembly Not Shown)



PLAN VIEW
(1052 + 66.95 - Frame and Grate Assembly Not Shown)

DETAILS AND ESTIMATED QUANTITIES

FOR

SPECIAL MEDIAN DRAIN 2.5' x 4.5'

STA. 1041 + 24.23
STA. 1046 + 69.76
STA. 1049 + 69.38
STA. 1052 + 66.95
PCN 034J

SEC. 15-T3N-R6E
IM-CR-EM 0901(187)44
HL-93

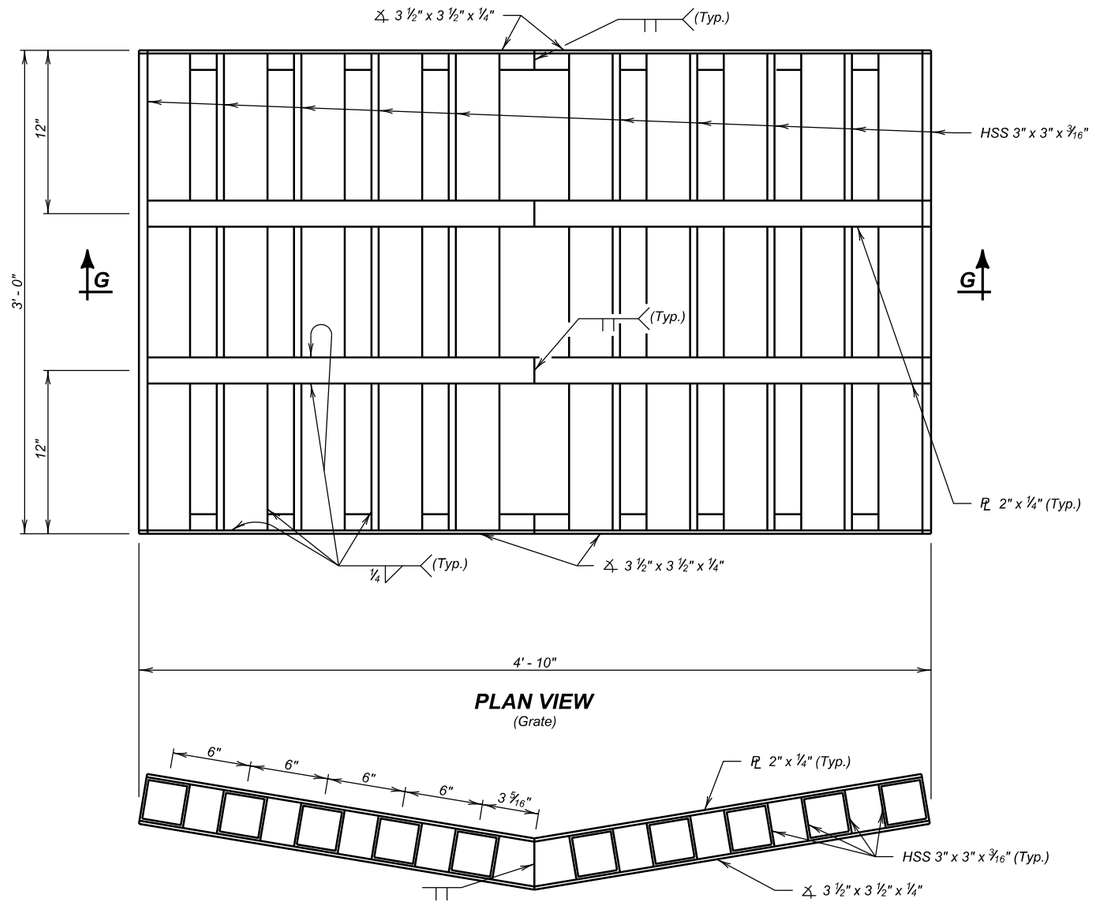
MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
FEBRUARY 2025

1 OF 2

PLANS BY :
OFFICE OF BRIDGE DESIGN, SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION

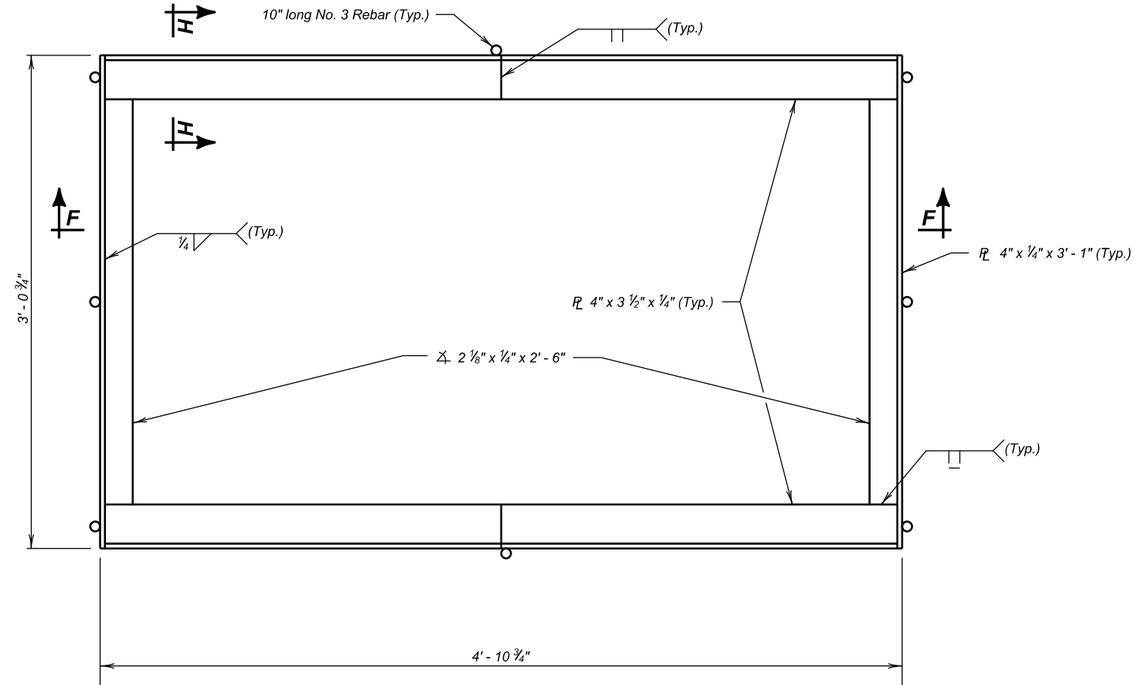
DESIGNED BY	CHECKED BY	DRAWN BY	
AH	JU	CK	Steve A Johnson BRIDGE ENGINEER
MEAD034J	034JKA01		

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E180	E185

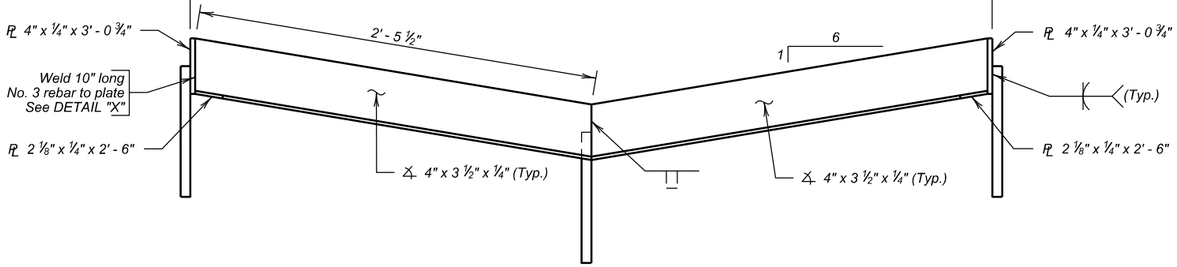


PLAN VIEW
(Grate)

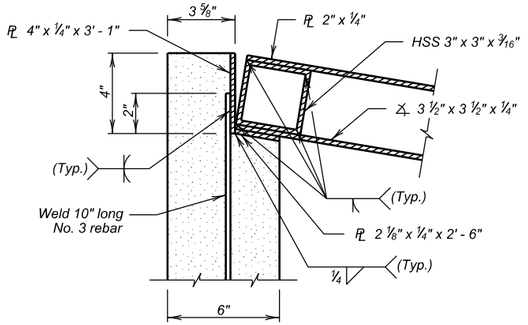
SECTION G - G
(Grate)



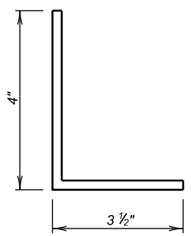
PLAN VIEW
(Frame)



SECTION F - F
(Frame)



DETAIL "X"



SECTION H - H

GRATE DETAILS

FOR

SPECIAL MEDIAN DRAIN 2.5' x 4.5'

STA. 1041 + 24.23	SEC. 15-T3N-R6E
STA. 1046 + 69.76	IM-CR-EM 0901(187)44
STA. 1049 + 69.38	HL-93
STA. 1052 + 66.95	

MEADE COUNTY

S. D. DEPT. OF TRANSPORTATION

FEBRUARY 2025

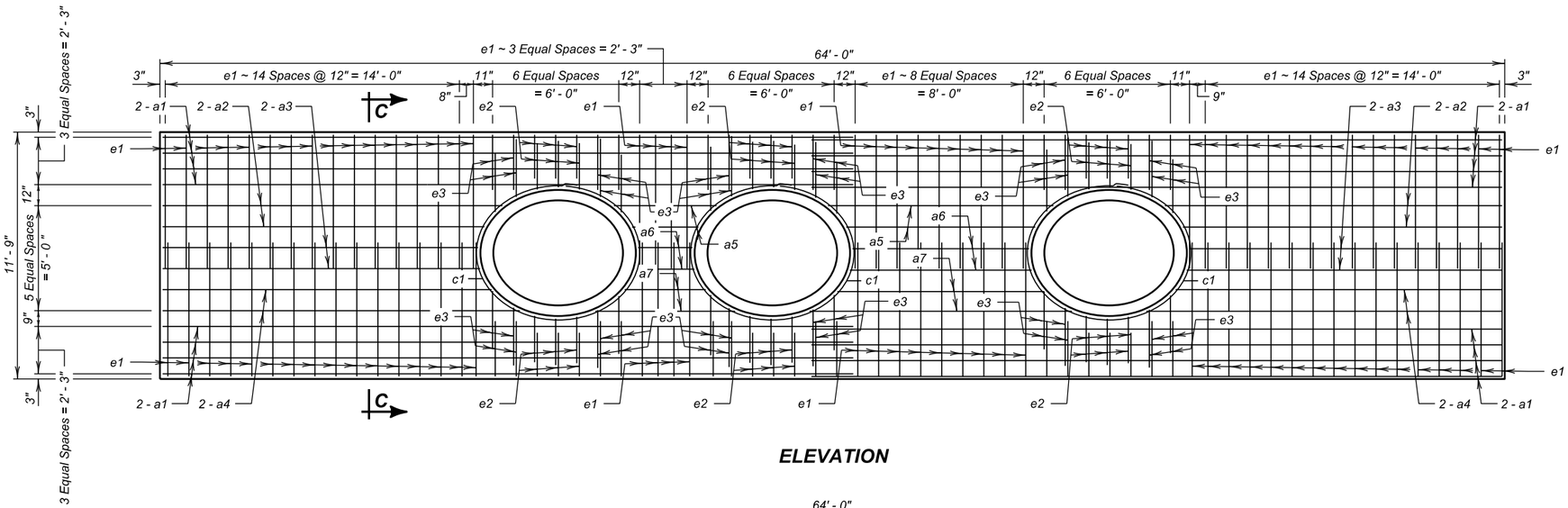
2 OF 2

PLANS BY :
OFFICE OF BRIDGE DESIGN, SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION

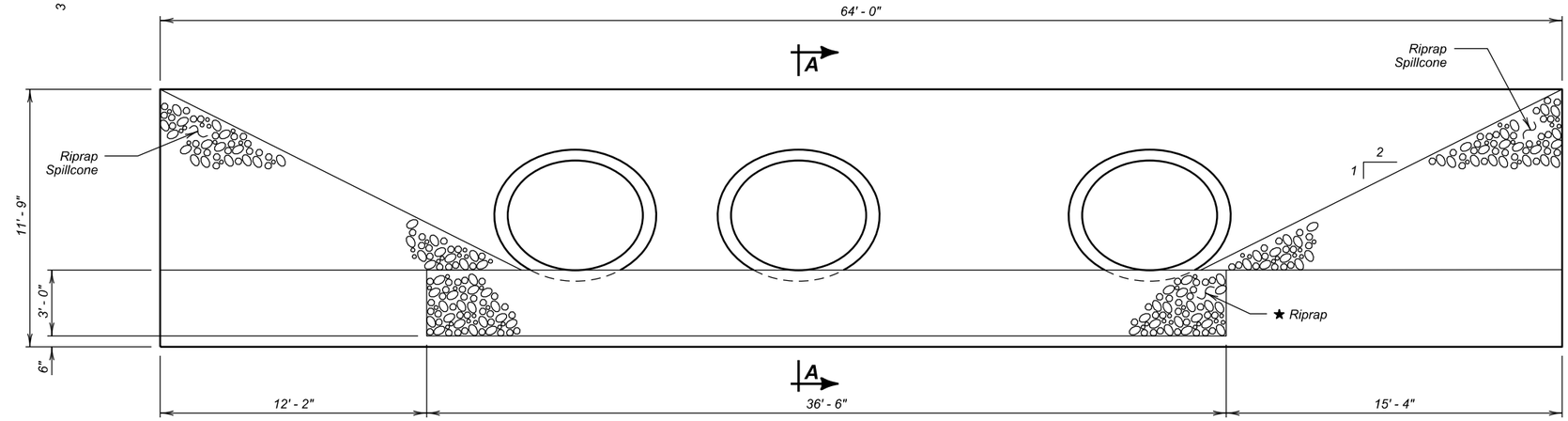
DESIGNED BY	CHECKED BY	DRAWN BY	
AH	JU	CK	Steve A Johnson BRIDGE ENGINEER
MEAD034J	034JKA02		

Revised October 15, 2025 AU

STATE	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E181	E185

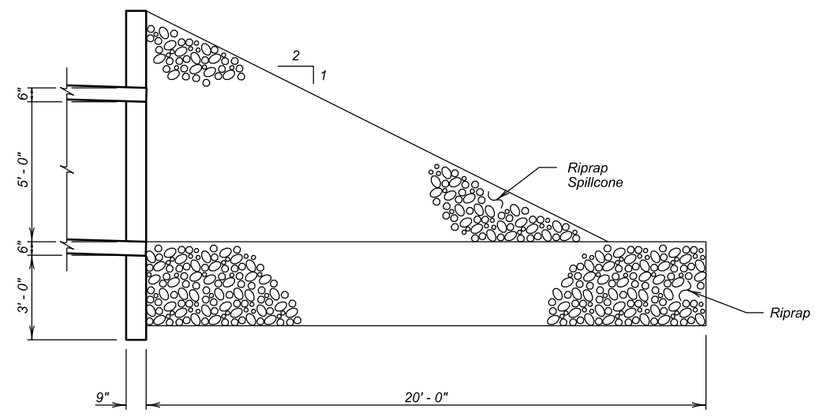


ELEVATION

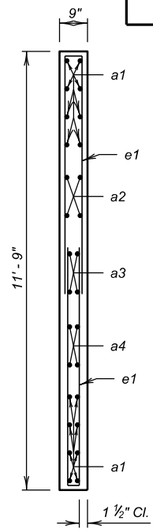


ELEVATION
(Resteel not Shown)

★ See Section B



SECTION A - A

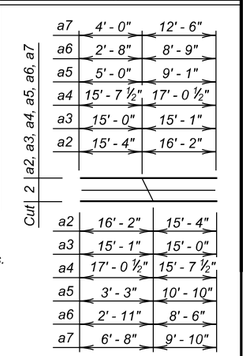


SECTION C - C

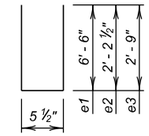
REINFORCING SCHEDULE

Mk.	No.	Size	Length	Type
e1	90	4	13' - 6"	S10
e2	36	4	4' - 11"	S10
e3	48	4	6' - 0"	S10
a1	32	5	33' - 0"	Str.
a2	4	4	31' - 6"	Str.
a3	4	4	30' - 1"	Str.
a4	4	4	32' - 8"	Str.
a5	4	4	14' - 1"	Str.
a6	4	4	11' - 5"	Str.
a7	4	4	16' - 6"	Str.
c1	6	4	22' - 6"	T3

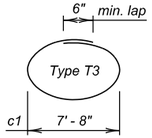
Bending Details



NOTES:
All dimensions are out to out of bars.



Type S10



SPECIFICATIONS

Construction Specifications: South Dakota Standard Specifications for Roads and Bridges, 10-1-25 Version, Required Provisions, and Special Provisions as included in the Proposal. The Standard Specifications for Roads and Bridges are available for download and viewing at:
https://dot.sd.gov/doing-business/contractors/standard-specifications.

GENERAL NOTES

1. Concrete shall be Class M6 in conformance with Section 462.
2. Reinforcing Steel shall conform to ASTM A615 Grade 60.
3. Use 1 ½" clear cover on all reinforcing steel except as shown.
4. All exposed edges shall be chamfered ¾".
5. Special Headwall will be paid for at the contract unit price for the individual bid items as shown in the plans, which will be full compensation for furnishing all materials and labor including necessary excavation and backfill required to construct one complete drain.

ESTIMATED QUANTITIES

ITEM	UNIT	CONSTANT QUANTITY
Class M6 Concrete	Cu. Yd.	18.0
Reinforcing Steel	Lb.	2678

DETAILS AND ESTIMATED QUANTITIES

FOR

SPECIAL HEADWALL

STA. 1071 + 95.00 - 229.79' L SEC. 15-T3N-R6E
PCN 034J IM-CR-EM 0901(187)44
HL-93

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
DECEMBER 2024

1 OF 1

PLANS BY :
OFFICE OF BRIDGE DESIGN, SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION

DESIGNED BY	CHECKED BY	DRAWN BY	
AH	JU	CK	Steve A Johnson BRIDGE ENGINEER
MEAD034J	034JKA01		

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E182	E185

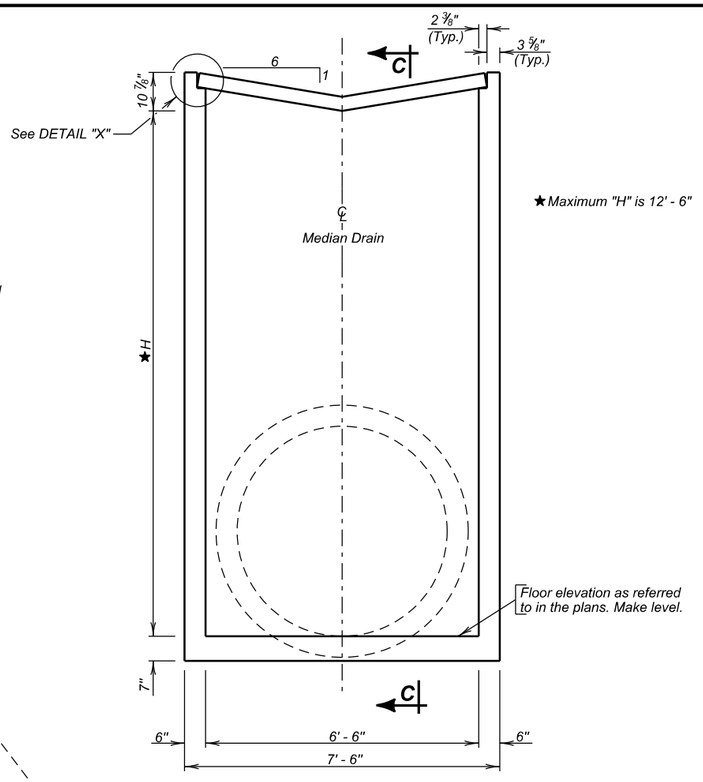
Revised October 15, 2025 AU

SPECIFICATIONS

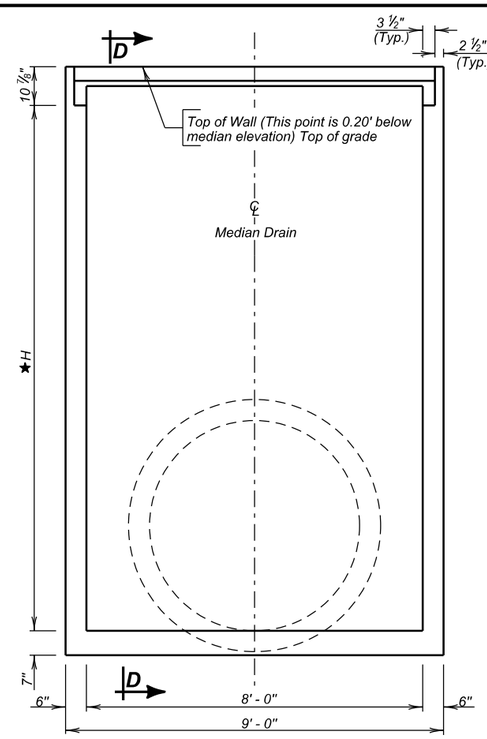
1. *Design Specifications: AASHTO LRFD Bridge Design Specifications, 9th Edition.*
2. Construction Specifications: South Dakota Standard Specifications for Roads and Bridges, 10-1-25 Version, Required Provisions, and Special Provisions as included in the Proposal. The Standard Specifications for Roads and Bridges are available for download and viewing at: https://dot.sd.gov/doing-business/contractors/standard-specifications.

GENERAL NOTES

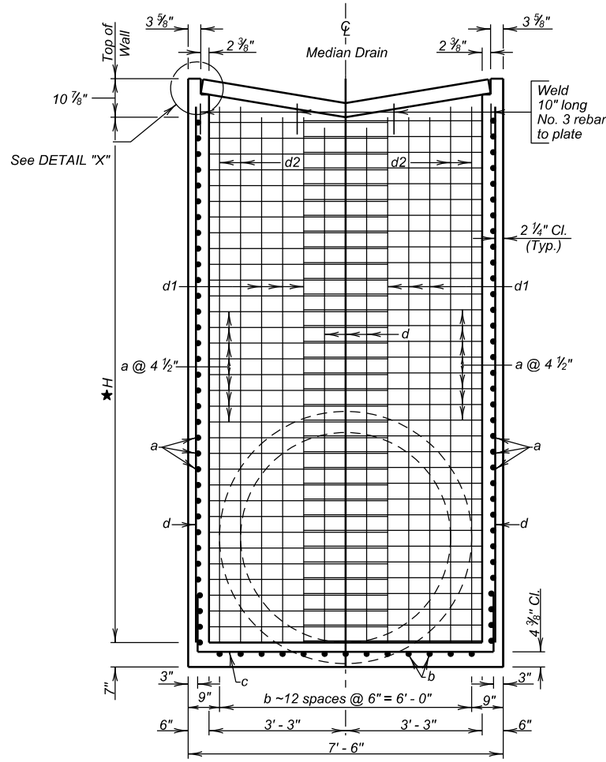
1. *Design Live Load: HL-93. No construction loading in excess of legal load was considered.*
2. *Reinforcing steel will conform to ASTM A615 grade 60. the d bars will be lapped 12 inches with the b and c bars. Cut and bend reinforcing steel as required to place pipe(s) through the drop inlet wall.*
3. *Median drain may be precast. If precast median drain details differ from this standard plate, submit a checked design done by a SD registered P.E. and shop plans to the Office of Bridge Design for approval.*
4. ✳ *Reduce total quantities of concrete by the amount of concrete displaced by the pipe(s). The total quantity of concrete shall be computed to the nearest hundredth of a cubic yard. The total quantity of reinforcing steel shall be computed to the nearest pound.*
5. *Median drain shown may be modified by the addition or omission of connecting pipes as noted elsewhere in the plans. All pipes entering median drain must fit between the inside face of walls and will not through the corners.*
6. *Structural steel for angles and plates will conform to ASTM A36. Structural steel for rectangular HSS will conform to ASTM A500 grade B. For informational purposes, the approximate weight of the frame is 400 pounds and the approximate weight of the grate is 1049 pounds.*
7. *The dimension of "H" is in feet. Maximum "H" is 12' - 6".*
8. *Special Median Drain 6.5' X 8' will be paid for at the contact unit price for the individual bid items as shown in the plans, which will be full compensation for furnishing all materials and labor inculding necessary excavation and backfill required to construct on complete drain.*



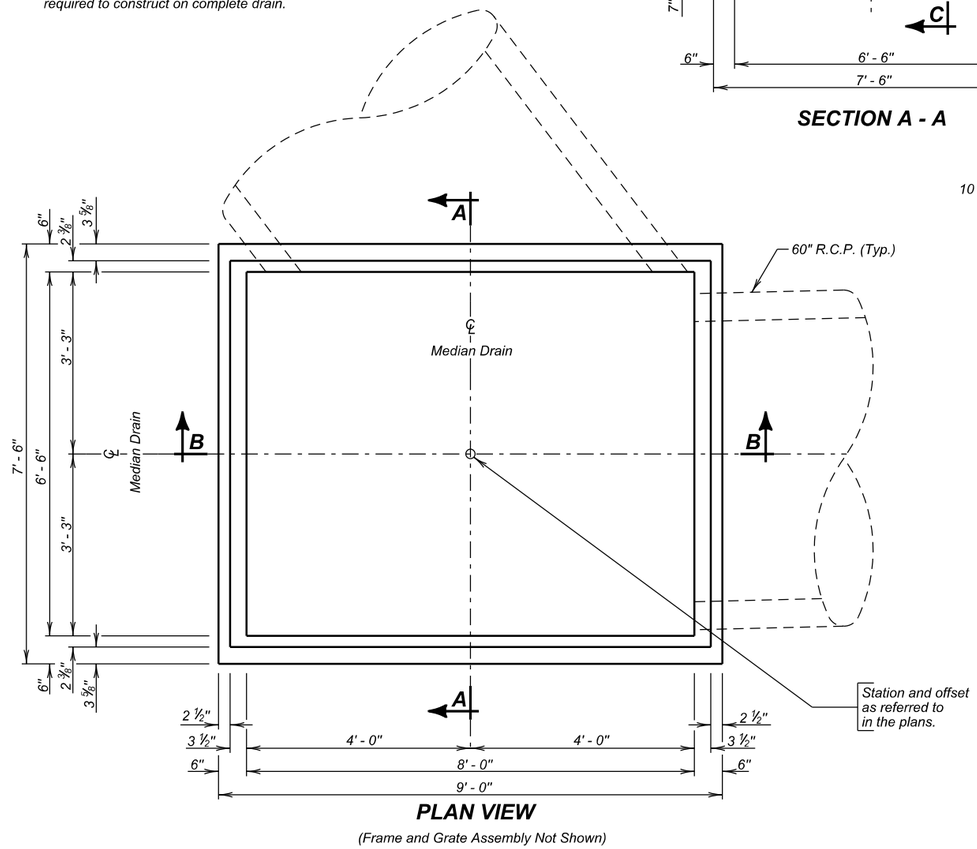
SECTION A - A



SECTION B - B

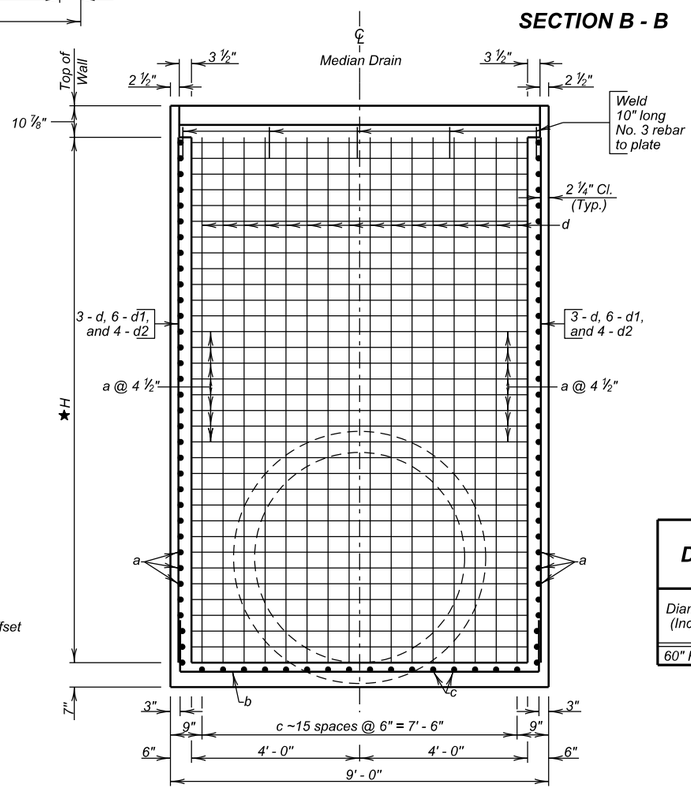


SECTION D - D



PLAN VIEW

(Frame and Grate Assembly Not Shown)



SECTION C - C

INDEX OF SHEETS-

Sheet No. 1 - Details and Estimated Quatities
Sheet No. 2 - Grate Details

ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY
✳ Class M6 Concrete	Cu. Yd.	7.6
Reinforcing Steel	Lb.	1995
Type M Frame and Grate Assembly	Each	1

PIPE DISPLACEMENT REDUCTIONS

Diameter (Inches)	Wall T (Inches)	Class M6 Concrete (Cu. Yd.)
60" R.C.P.	6	0.52

DETAILS AND ESTIMATED QUANTITIES

FOR

SPECIAL MEDIAN DRAIN 6.5' X 8'

STA. 1073 + 47.60
PCN 034J

SEC.15-T3N-R6E
IM-CR-EM 0901(187)44
HL-93

MEAD COUNTY
S. D. DEPT. OF TRANSPORTATION
JANUARY 2025

1 OF 2

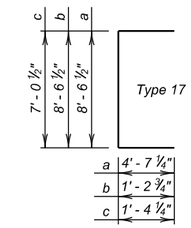
PLANS BY :
OFFICE OF BRIDGE DESIGN, SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION

DESIGNED BY	CK. DES. BY	DRAFTED BY	
AH	JU	CRW	Steven A Johnson BRIDGE ENGINEER
MEAD034J	034JWA01		

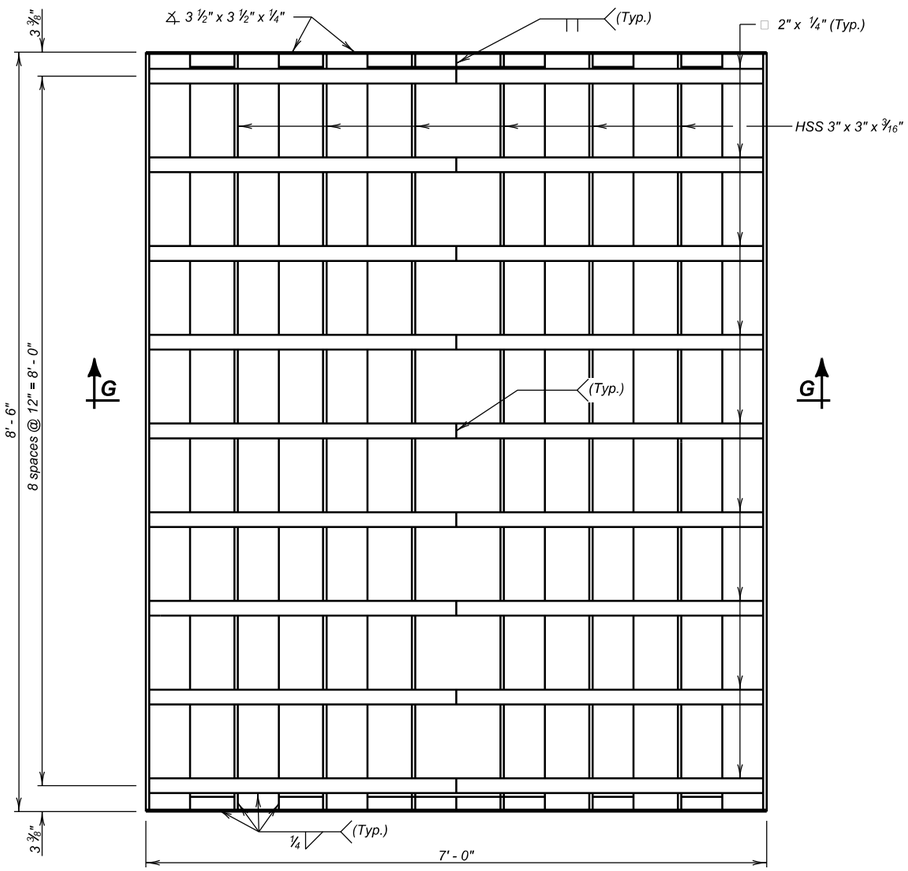
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E183	E185

REINFORCING SCHEDULE

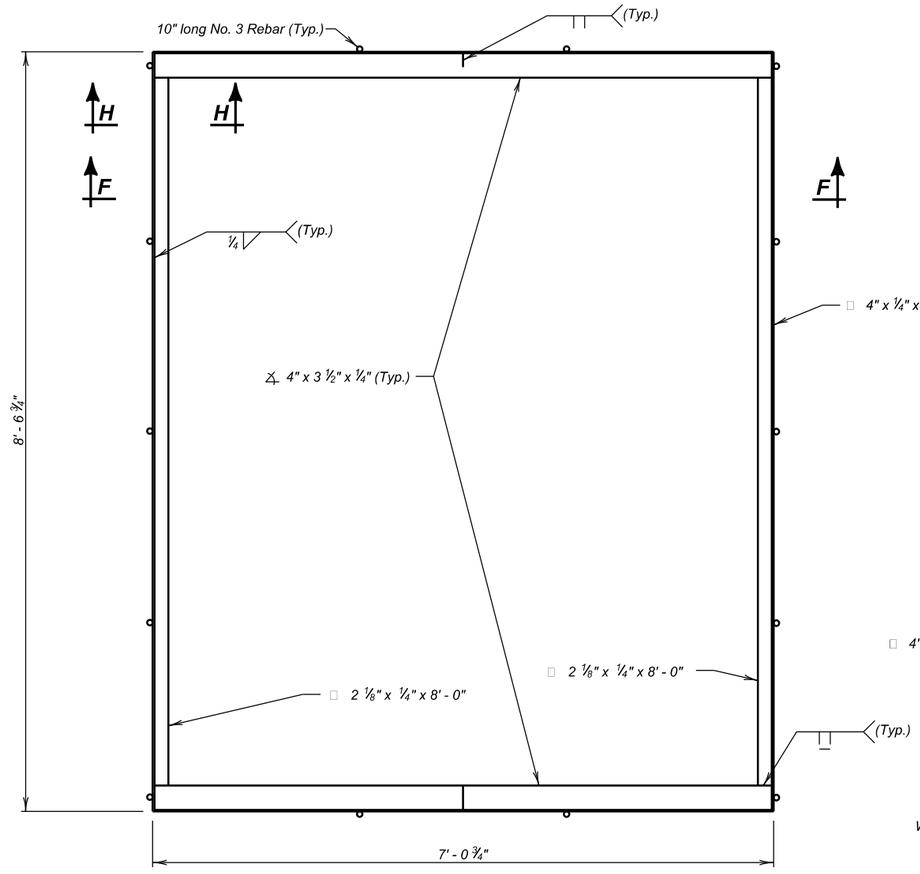
Mk.	No.	Size	Length	Type	Bending Details
a	68	5	17' - 9"	17	
b	13	5	11' - 0"	17	
c	16	4	9' - 9"	17	
d	38	4	12 - 4 ½"	Str.	
d1	12	4	12' - 6"	Str.	
d2	8	4	12' - 9"	Str.	



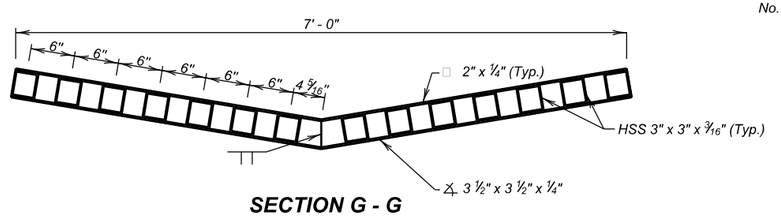
NOTES:
All dimensions are out to out of bars.



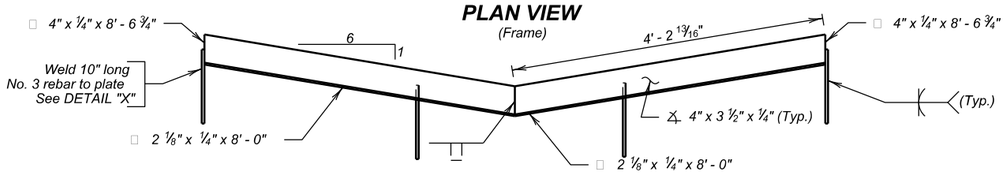
PLAN VIEW
(Grate)



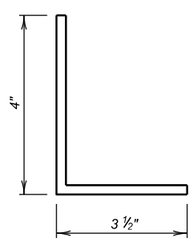
PLAN VIEW
(Frame)



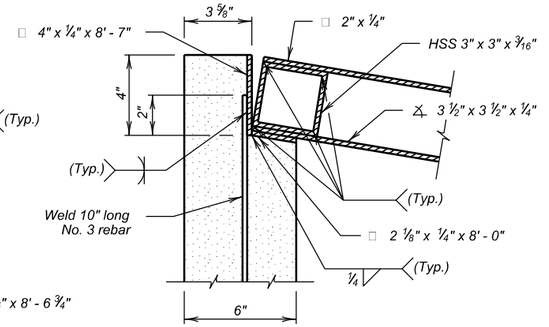
SECTION G - G
(Grate)



SECTION F - F
(Frame)



SECTION H - H



DETAIL "X"

GRATE DETAILS

FOR

SPECIAL MEDIAN DRAIN 6.5' X 8'

STA. 1073 + 47.60
PCN 034J

SEC. 15-T3N-R6E
IM-CR-EM 0901(187)44
HL-93

MEAD COUNTY
S. D. DEPT. OF TRANSPORTATION
JANUARY 2025

2 OF 2

PLANS BY :
OFFICE OF BRIDGE DESIGN, SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION

DESIGNED BY	CK. DES. BY	DRAFTED BY	
AH	JU	CRW	BRIDGE ENGINEER
MEAD034J	034JWA02		

Revised October 15, 2025 AU

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E184	E185

SPECIFICATIONS

1) *Design Specifications: AASHTO LRFD Bridge Design Specifications, 9th Edition.*

2) Construction Specifications: South Dakota Standard Specifications for Roads and Bridges, 10-1-25 Version, Required Provisions, and Special Provisions as included in the Proposal. The Standard Specifications for Roads and Bridges are available for download and viewing at: https://dot.sd.gov/doing-business/contractors/standard-specifications.

GENERAL NOTES

1) *Design Live Load: HL-93. No construction loading in excess of legal load was considered.*

2) *Reinforcing steel will conform to ASTM A615 grade 60. The d bars will be lapped 12 inches with the b and c bars. Cut and bend reinforcing steel as required to place pipe(s) through the drop inlet wall.*

3) *Median drain may be precast. If precast median drain details differ from this standard plate, submit a checked design done by a SD registered P.E. and shop plans to the Office of Bridge Design for approval.*

⚹ 4) *Reduce total quantities of concrete by the amount of concrete displaced by the pipe(s). The total quantity of concrete shall be computed to the nearest hundredth of a cubic yard. The total quantity of reinforcing steel will be computed to the nearest pound.*

5) *Median drain shown may be modified by the addition or omission of connecting pipes as noted elswhere in the plans. All pipes entering median drain must fit beteen the inside face of walls and will not enter through the corners.*

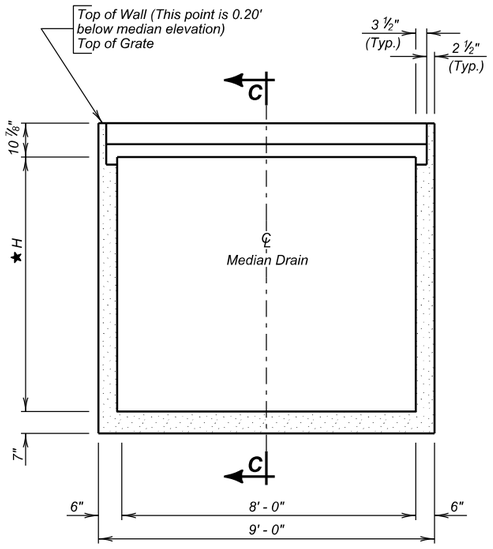
6) *Structural steel for angles and plates will conform to ASTM A36. Structural steel for rectangular HSS will conform to ASTM A500 grade B. For informational purposes, the approximate weight of the frame is 400 pounds and the approximate weight of the grate is 1049 pounds.*

7) *The dimension of "H" is in feet. Maximum "H" is 7 feet.*

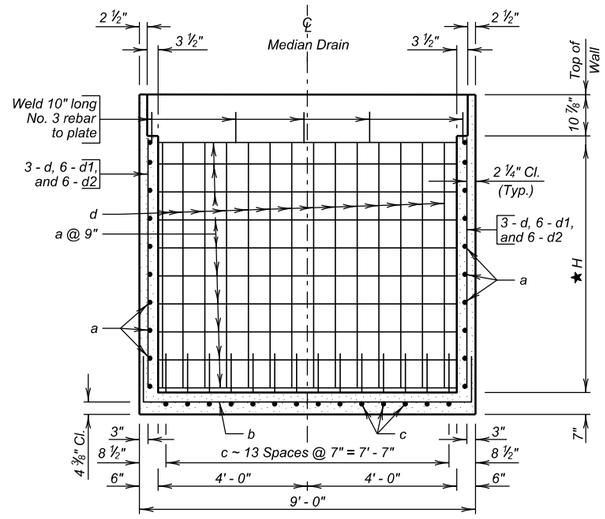
8) *Special Median Drain 6.5' x 8' will be paid for at the contract unit price for the individual bid items as shown in the plans, which will be full compensation for furnishing all materials and labor including necessary excavation and backfill required to construct one complete drain.*

ESTIMATED QUANTITIES
(For One Special Median Drain 6.5 x 8)

ITEM	UNIT	CONSTANT QUANTITY	VARIABLE QUANTITY
⚹ Class M6 Concrete	Cu. Yd.	1.89	0.57H
Reinforcing Steel	Lb.	262.44	69.52H
Type M Frame and Grate Assembly	Each	1	----------



SECTION A - A
(Pipe Not Shown)



SECTION D - D
(Pipe Not Shown)

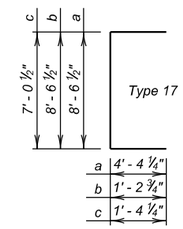
★ *Maximum "H" is 7' - 0"*

INDEX OF SHEETS-

Sheet No. 1 - Details and Estimated Quantities
Sheet No. 2 - Grate Details

REINFORCING SCHEDULE

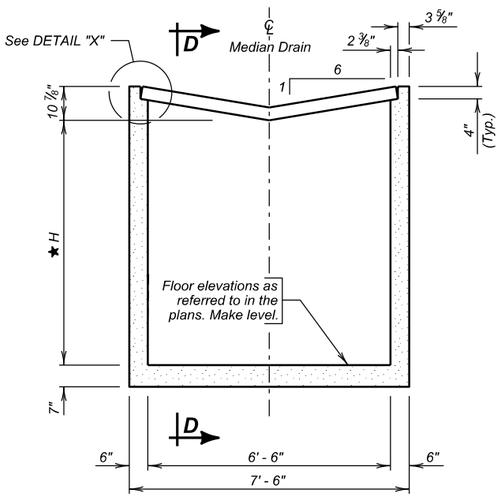
Mk.	No.	Size	Length	Type	Bending Details
a	2.67H	4	17' - 3"	17	
b	15	5	11' - 0"	17	
c	14	4	9' - 9"	17	
d	34	4	H - 1 ½"	Str.	
d1	12	4	H	Str.	
d2	12	4	H + 3"	Str.	



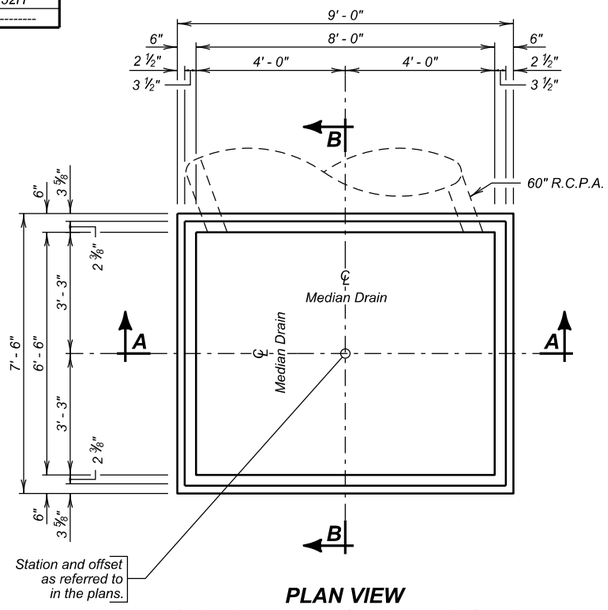
NOTES:
All dimensions are out to out of bars.

PIPE DISPLACEMENT REDUCTIONS

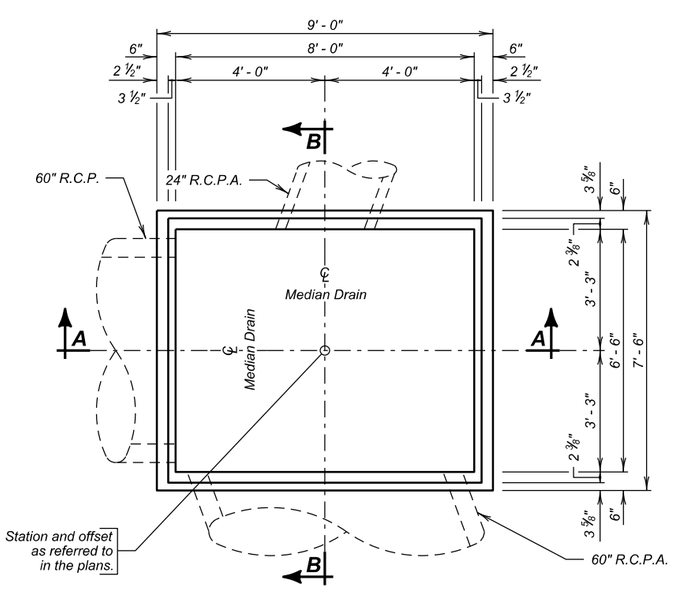
Diameter (Inches)	Wall T (Inches)	Class M6 Concrete (Cu. Yd.)
24" R.C.P.	3	0.09
60" R.C.P.	6	0.52
60" R.C.P.A.	6	0.49



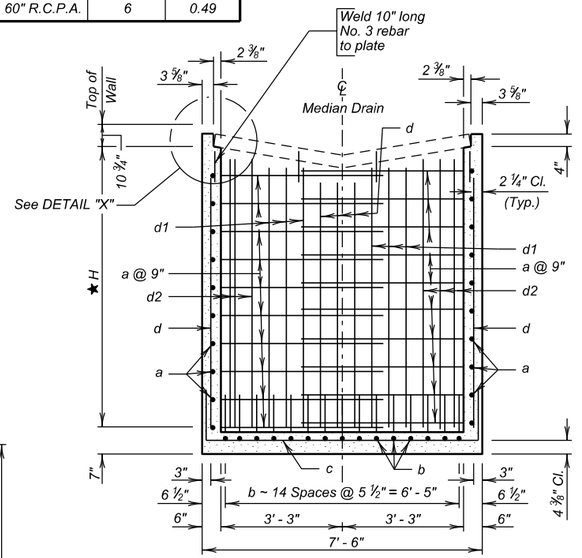
SECTION B - B
(Pipe Not Shown)



PLAN VIEW
(1078 + 78.98 - Frame and Grate Assembly Not Shown)



PLAN VIEW
(1078 + 51.06 - Frame and Grate Assembly Not Shown)



SECTION C - C
(Pipe Not Shown)

DETAILS AND ESTIMATED QUANTITIES

FOR

SPECIAL MEDIAN DRAIN 6.5' x 8'

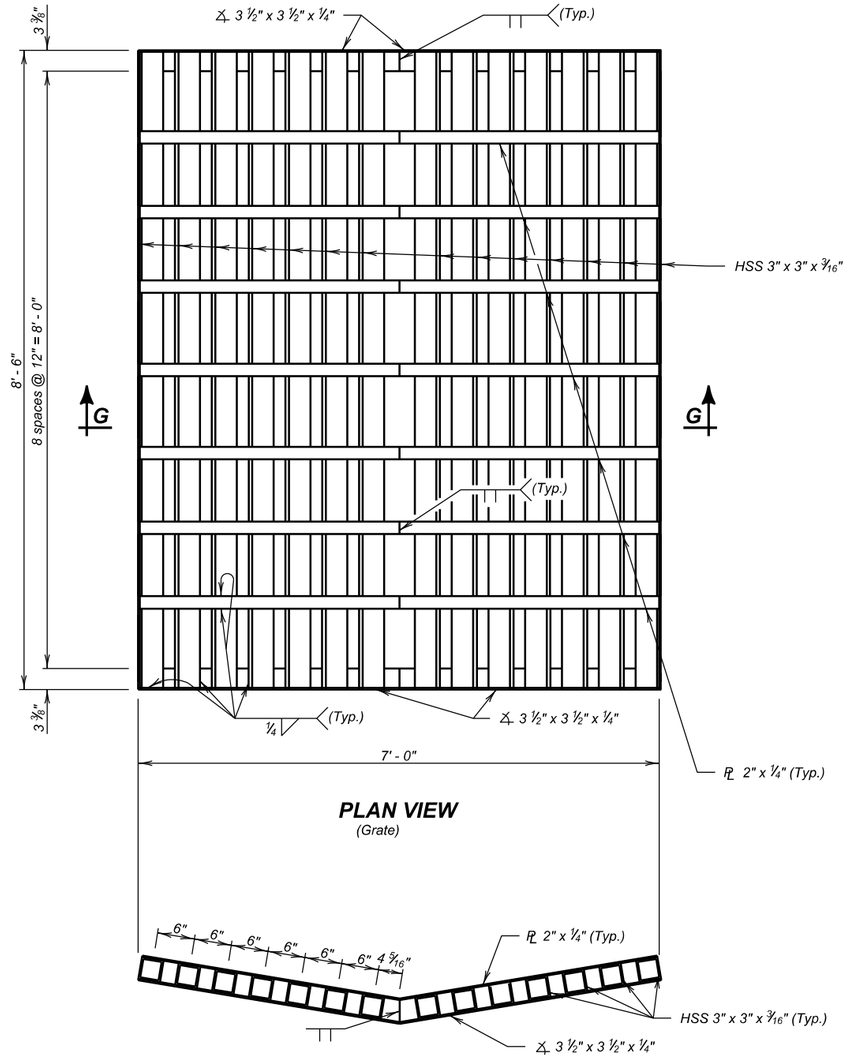
STA. 1078 + 51.06 — SEC. 15-T3N-R6E
STA. 1078 + 78.98 — IM-CR-EM 0901(187)44
PCN 034J — HL-93

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
NOVEMBER 2024

PLANS BY :
OFFICE OF BRIDGE DESIGN, SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION

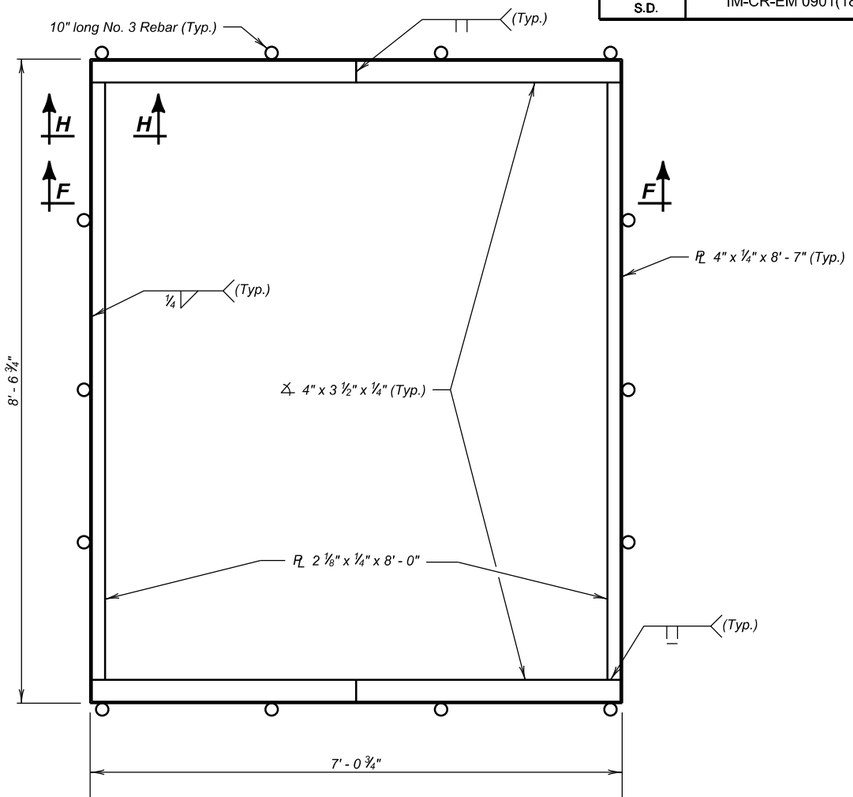
DESIGNED BY	CHECKED BY	DRAWN BY	
AH	JU	CK	Steve A Johnson BRIDGE ENGINEER
MEAD034J	034JKA01		

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-CR-EM 0901(187)44	E185	E185

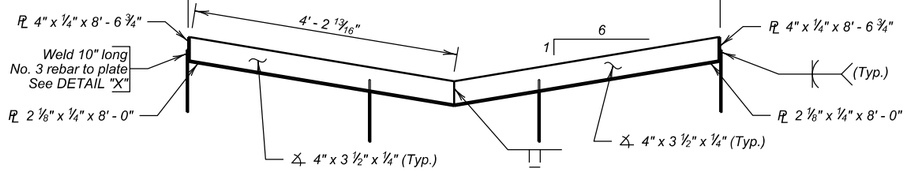


PLAN VIEW
(Grate)

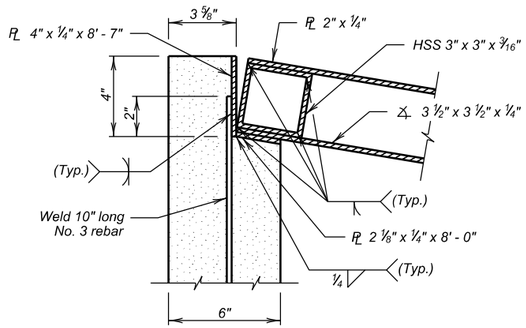
SECTION G - G
(Grate)



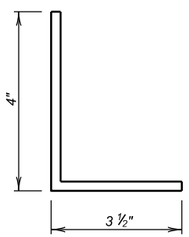
PLAN VIEW
(Frame)



SECTION F - F
(Frame)



DETAIL "X"



SECTION H - H

GRATE DETAILS

FOR

SPECIAL MEDIAN DRAIN 6.5' x 8'

STA. 1078 + 51.06 SEC 15-T3N-R6E
STA. 1078 + 78.98 IM-CR-EM 0901(187)44
HL-93

MEADE COUNTY

S. D. DEPT. OF TRANSPORTATION

NOVEMBER 2024

2 OF 2

PLANS BY :
OFFICE OF BRIDGE DESIGN, SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION

DESIGNED BY	CHECKED BY	DRAWN BY	
AH	JU	CK	Steve A Johnson BRIDGE ENGINEER
MEAD034J	034JKA02		