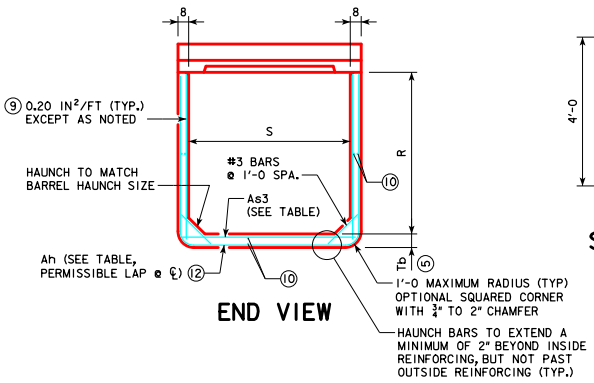
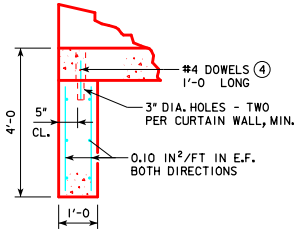
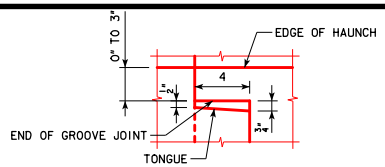


END VIEW

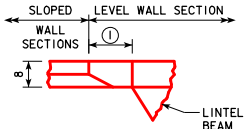


SECTION A-A



DETAIL "A"

(DETAIL SHOWN AT FLOOR; SIMILAR AT WALLS)



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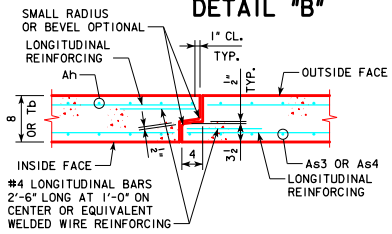
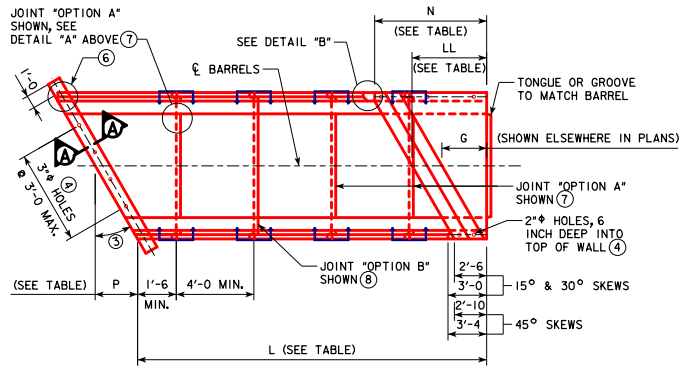
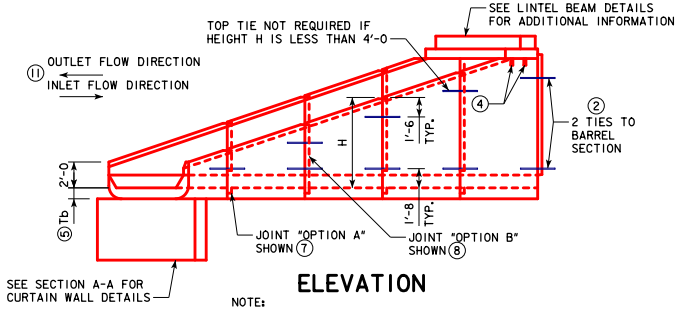


TONGUE AND GROOVE JOINT DETAIL



PLAN VIEW



ELEVATION

NOTE:
DETAILS SHOWN ARE FOR LEFT AHEAD SKEW.
SEE SITUATION PLAN FOR ACTUAL DIRECTION OF SKEW.
DETAILS FOR RIGHT AHEAD SKEWS SIMILAR.

DIMENS. / Ah & As3 REINFORCEMENT

SPAN S (FT)	SECTION HT. H (FT)	Ah (IN²/FT) 15° SKEW	30° SKEW	45° SKEW	BOTTOM SLAB THICK. (IN) REQUIRED As3 (IN²/FT)	
6		15° SKEW	30° SKEW	45° SKEW	8	10
	3	0.20	0.20	0.20	0.20	---
	4	0.20	0.20	0.20	0.20	---
	5	0.20	0.20	0.20	0.20	---
	6	0.21	0.22	0.24	0.20	---
	7	0.33	0.36	0.38	0.23	---
	8	0.50	0.53	0.56	0.31	---
8		15° SKEW	30° SKEW	45° SKEW	8	10
	4	0.24	0.24	0.24	---	0.24
	5	0.24	0.24	0.24	---	0.24
	6	0.24	0.24	0.24	---	0.24
	7	0.25	0.27	0.28	---	0.24
	8	0.37	0.40	0.42	---	0.24
	9	0.53	0.57	0.60	---	0.29
	10	0.73	0.78	0.83	---	0.37
10		15° SKEW	30° SKEW	45° SKEW	8	10
	4	0.24	0.24	0.24	---	0.24
	5	0.24	0.24	0.24	---	0.24
	6	0.24	0.24	0.24	---	0.24
	7	0.24	0.24	0.24	---	0.24
	8	0.27	0.28	0.30	---	0.24
	9	0.39	0.42	0.44	---	0.31
	10	0.56	0.60	0.64	---	0.40
	11	0.77	0.82	0.87	---	0.50
	12	1.02	1.09	1.16	---	0.62
12		15° SKEW	30° SKEW	45° SKEW	8	10
	4	0.24	0.24	0.24	---	0.24
	5	0.24	0.24	0.24	---	0.24
	6	0.24	0.24	0.24	---	0.24
	7	0.24	0.24	0.24	---	0.24
	8	0.29	0.29	0.29	---	0.26
	9	0.37	0.40	0.42	---	0.34
	10	0.53	0.57	0.60	---	0.42
	11	0.73	0.78	0.83	---	0.53
	12	0.97	1.05	1.10	---	0.65

NOTE: H IS THE LARGEST VERTICAL DIMENSION OF THE SECTION.

NOTES:

PRECAST BOX CULVERT END SECTIONS SHALL BE CONSTRUCTED IN ACCORDANCE WITH DETAILS AND NOTES, AS SHOWN BELOW:

REINFORCING FOR PRECAST END SECTIONS AND CURTAIN WALLS SHALL BE WELDED WIRE REINFORCING (WWR) MEETING THE REQUIREMENTS OF AASHTO LRFD SECTION 5. THE CONCRETE COVER OVER THE REINFORCING SHALL NOT BE LESS THAN 1.5 INCHES OR GREATER THAN 2.0 INCHES.

REFER TO SHEET PRCB G1-13 FOR ADDITIONAL NOTES.

REFER TO FABRIC LAYER DETAIL ON SHEET PRCB G2-13 FOR MULTIPLE WWR LAYERS.

① 8⅛" @ 15° ; 10⅝" @ 30° ; 1'-2 @ 45°

② CULVERT TIES ARE TO BE 1 INCH DIA. RODS.

③ FOR SKEW ANGLES OVER 7°30' UP TO 22°30', USE A 15° SKEW END SECTION. FOR SKEW ANGLES OVER 22°30' UP TO 37°30', USE A 30° SKEW END SECTION. FOR SKEW ANGLES OVER 37°30' UP TO 45°, USE A 45° SKEW END SECTION.

④ FILL HOLES WITH GROUT. GROUT SHALL CONSIST OF 1 PART CEMENT AND 2 PARTS SAND. USE AIR ENTRAINED PORTLAND CEMENT. GROUT MIX SHALL HAVE A MAXIMUM SLUMP OF 4 INCHES.

⑤ THICKNESS OF FLOOR, Tb = 8 IN. FOR 6' SPAN AND Tb = 10 IN. FOR ALL OTHER SPANS.

⑥ END OF WALL MAY BE CUT SQUARE AS SHOWN OR FOLLOW THE SKEW.

⑦ JOINT "OPTION A": PROVIDE JOINT IN WALLS AND FLOOR. TERMINATE JOINT AT HAUNCH. SEE DETAIL "A" ON THIS SHEET.

⑧ JOINT "OPTION B": PROVIDE JOINT IN WALLS, FLOOR AND HAUNCH.

⑨ FOR THE FIRST SECTION ADJACENT TO THE BARREL, SEE As4 TABLE

⑩ MINIMUM LONGITUDINAL REINFORCEMENT SHALL BE 0.06 SQ. INCHES PER PERIPHERAL FOOT ON ALL FACES OF THE END SECTION, EXCEPT IN THE TONGUE AND GROOVE AREA.

⑪ USE TONGUE ON INLET END SECTION AND GROOVE ON OUTLET END SECTION.

⑫ LAP SPLICES SHALL BE CLASS C AND SHALL BE DESIGNED ACCORDING TO THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.

LENGTH L

RISE R (FT)	15° SKEW	30° SKEW	45° SKEW
3	6'-1	6'-6	7'-11
4	9'-3	9'-11	12'-2
5	12'-4	13'-5	16'-5
6	15'-5	16'-10	20'-8
7	18'-6	20'-4	24'-11
8	21'-8	23'-9	29'-1
9	24'-9	27'-3	33'-4
10	27'-10	30'-9	37'-7
11	30'-11	34'-2	41'-10
12	34'-1	37'-8	46'-1

L - BASED ON 3:1 FORESLOPE NORMAL TO ℄ OF ROADWAY.

As4 REINF. (IN²/FT)

SECTION HT. H (FT)	15° SKEW	30° SKEW	45° SKEW
10 OR LESS	0.20	0.20	0.20
11	0.20	0.21	0.22
12	0.25	0.27	0.29

NOTE:
As4 IS INSIDE FACE WALL STEEL FOR THE FIRST SECTION ADJACENT TO THE BARREL ONLY. H IS THE LARGEST VERTICAL DIMENSION OF THE SECTION. FOR ALL OTHER SECTIONS, As4 = 0.20 IN²/FT

LENGTH LL

SPAN S (FT)	15° SKEW	30° SKEW	45° SKEW
6	3'-6	4'-7	6'-6
8	3'-9	5'-2	7'-6
10	4'-0	5'-9	8'-6
12	4'-3	6'-4	9'-6

LENGTH N

SPAN S (FT)	15° SKEW	30° SKEW	45° SKEW
6	4'-3	6'-4	9'-6
8	4'-10	7'-6	11'-6
10	5'-4	8'-8	13'-6
12	5'-11	9'-10	15'-6

LENGTH P

SPAN S (FT)	15° SKEW	30° SKEW	45° SKEW
6	1'-0	2'-1	3'-8
8	1'-3	2'-8	4'-8
10	1'-6	3'-3	5'-8
12	1'-9	3'-10	6'-8

NOTE:
DIMENSIONS SHOWN IN TABLES ARE ROUNDED TO THE NEAREST WHOLE INCH.

07-2016
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

Iowa Department of Transportation
Highway Division

STANDARD DESIGN

SINGLE PRECAST REINFORCED CONCRETE BOX CULVERTS

JANUARY, 2013

TYPE 3 END SECTION DETAILS

FOR SKEWS OF 7.5° TO 45°

PES 2-13-T3

REVISED 05-13 - ADDED THE 3' RISE TO THE LENGTH L INFORMATION TABLE.
REVISED 07-2016 - CORRECTED TYPOS. ADDED DIM. "G" ALONG CENTERLINE OF SKEWED LINTLE BEAM.
ENGLISHSIGNEDPRECASTCULVERTS.DGN - PES 2-13-T3 - THIS SHEET ISSUED 01-13.