

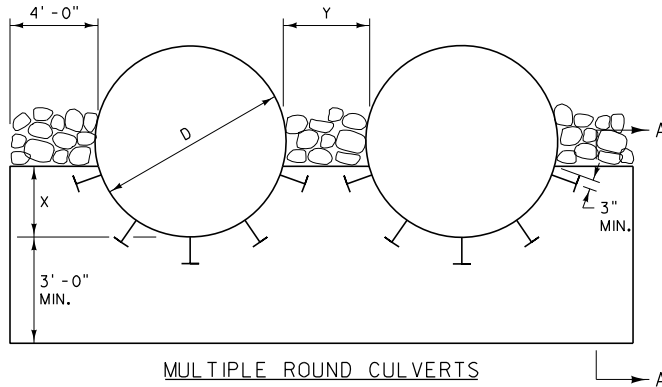
MULTIPLE ARCH CULVERTS
(METAL CULVERTS SHOWN)

X: VARIABLE (SEE DTL. DWG. NO. 603-10 FOR CONCRETE CULV. AND 603-34 FOR METAL CULV.)

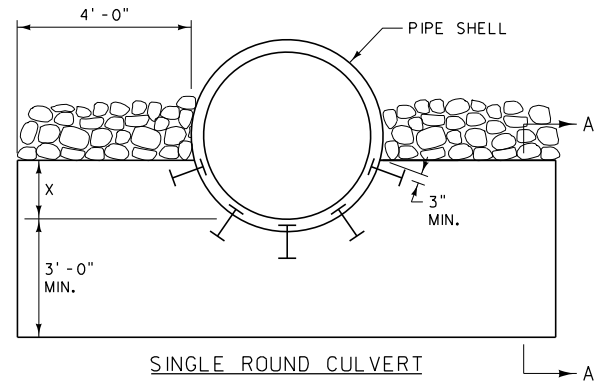
Y: FOR METAL CULV. AND CULV. WITHOUT FETS:
Y = 4'-0" (OUTSIDE WALL TO OUTSIDE WALL)

FOR CONCRETE CULV. WITH FETS: USE Y AS REQUIRED FOR PARALLEL PIPE INSTALLATION, PER DTL. DWG. NO. 613-08

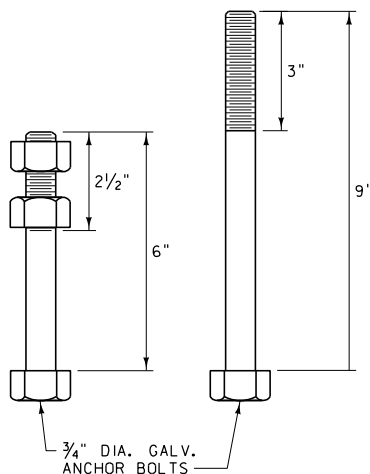
NOTE: Y MAY BE INCREASED ON LARGE DIAMETER PIPES (UP TO A MAX. OF 8'-0") TO AID IN INSTALLATION AND BACKFILL. THE QUANTITIES SHOWN IN 552-04, 06 & 08 WERE FIGURED USING Y = 4'-0". ADJUST QUANTITIES AS NEEDED WHEN Y IS OTHER THAN 4'-0".



MULTIPLE ROUND CULVERTS
(METAL CULVERTS SHOWN)

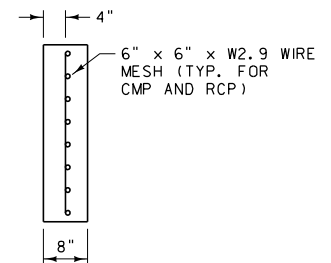
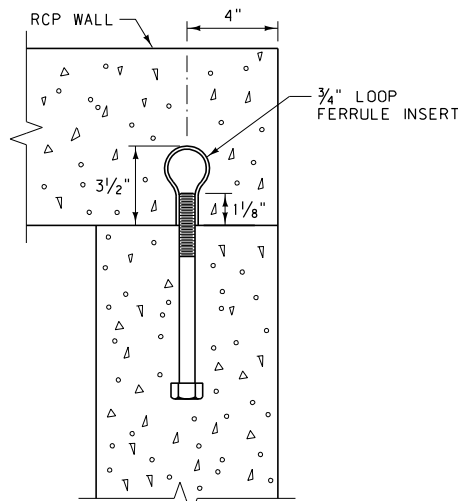


SINGLE ROUND CULVERT
(CONCRETE CULVERT SHOWN)



ANCHOR BOLT DETAILS
6" LONG FOR METAL PIPE
9" LONG FOR CONCRETE PIPE

ANCHOR BOLT SPACING:
MIN. OF FIVE 3/4" DIA. GALV. ANCHOR BOLTS
IN WALL. USE MAX. SPACING OF 1.5'.



SECTION A-A

NOTES:

USE CL. "DD" CONCRETE OR EQUAL.

SEE DTL. DWG. NO. 603-18 AND 603-19
FOR BEDDING UNDER CULVERTS.

SEE DTL. DWG. NO. 613-14 FOR RIPRAP.

DETAILED DRAWING	
REFERENCE STANDARD SPEC. SECTION 552	DWG. NO. 552-00
CONCRETE CUTOFF WALLS FOR CULVERTS	

-- REVISED --
January 2008

EFFECTIVE: FEBRUARY 2005

MDT MONTANA DEPARTMENT OF TRANSPORTATION
serving you with pride


DIAMETER OR SPAN × RISE	CUBIC YARDS OF CLASS DD CONCRETE (EACH END)										CUBIC YARDS OF RIPRAP (EACH END) ①								C. Y. BEDDING MATERIAL ② PER L. F. OF PIPE (DTL. DWG. NO. 603-19)	
	CUTOFF WALL (DTL. DWG. NO. 552-00)	CONCRETE EDGE PROTECTION (DTL. DWG. NO. 613-08)								(DTL. DWG. NO. 613-14)										
		1.5:1		2:1		2.5:1		3:1		1.5:1		2:1		2.5:1		3:1				
		SING.	DBL.	SING.	DBL.	SING.	DBL.	SING.	DBL.	SING.	DBL.	SING.	DBL.	SING.	DBL.	SING.	DBL.			
RCP (SQ. END)																				
54"	1.1	1.9	2.3	3.4	2.8	4.1	3.4	4.8	3.9	5.6	8.3	13.0	10.3	16.1	12.4	19.5	14.6	22.9	1.0	2.0
60"	1.2	2.0	2.6	3.7	3.1	4.5	3.7	5.3	4.3	6.1	8.8	13.9	11.0	17.3	13.3	20.9	15.6	24.6	1.1	2.2
66"	1.3	2.1	2.8	4.0	3.3	4.8	4.0	5.7	4.6	6.6	9.4	14.8	11.9	18.9	14.4	22.7	16.9	26.7	1.2	2.4
72"	1.3	2.2	3.0	4.3	3.6	5.2	4.3	6.2	5.0	7.2	10.2	16.1	12.6	20.0	15.2	24.1	17.9	28.3	1.3	2.6
78"	1.4	2.3	3.2	4.7	3.9	5.6	4.6	6.7	5.3	7.7	10.7	17.1	13.3	21.1	16.1	25.5	18.9	29.9	1.4	2.8
84"	1.4	2.4	3.4	5.0	4.1	6.0	4.9	7.1	5.7	8.3	11.3	18.0	14.0	22.3	16.9	26.9	19.9	31.6	1.5	3.0
90"	1.5	2.5	3.6	5.3	4.4	6.4	5.2	7.6	6.1	8.8	11.9	18.9	14.7	23.4	17.8	28.2	20.9	33.2	1.6	3.2
96"	1.6	2.6	3.8	5.6	4.7	6.8	5.5	8.1	6.4	9.4	12.5	19.8	15.5	24.6	18.6	29.6	21.9	34.9	1.7	3.4
RPCA (SQ. END)																				
65.00" × 40.00"	1.2	1.9	2.0	3.0	2.4	3.6	2.9	4.3	3.3	4.9	8.3	13.4	10.3	16.6	12.4	20.1	14.6	23.6	1.0	2.1
73.00" × 45.00"	1.2	2.0	2.2	3.3	2.7	4.0	3.2	4.7	3.7	5.4	9.0	14.6	11.1	18.1	13.4	21.8	15.8	25.7	1.1	2.3
88.00" × 54.00"	1.3	2.2	2.6	4.0	3.2	4.8	3.7	5.6	4.3	6.5	10.5	17.3	13.0	21.4	15.7	25.8	18.5	30.3	1.3	2.6
102.00" × 62.00"	1.4	2.4	3.0	4.6	3.6	5.5	4.3	6.5	5.0	7.5	11.9	19.6	14.7	24.3	17.7	29.2	20.8	34.4	1.5	2.9
115.00" × 72.00"	1.5	2.6	3.3	5.1	4.0	6.1	4.8	7.2	5.5	8.4	12.9	21.5	16.1	26.7	19.4	32.1	22.8	37.8	1.7	3.3
122.00" × 77.25"	1.6	2.7	3.6	5.5	4.3	6.6	5.1	7.8	6.0	9.1	13.8	23.0	17.1	28.5	20.7	34.3	24.3	40.4	1.7	3.5
138.00" × 87.13"	1.7	2.8	4.1	6.2	4.9	7.5	5.8	8.9	6.8	10.4	15.5	25.9	19.2	32.1	23.2	38.7	27.2	45.5	1.9	3.8
154.00" × 96.88"	1.8	3.0	4.5	7.1	5.5	8.5	6.5	10.1	7.6	11.7	17.2	29.0	21.4	36.0	25.8	43.3	30.3	50.9	2.1	4.2
168.75" × 106.50"	2.0	3.3	4.9	7.6	5.9	9.2	7.0	10.9	8.1	12.6	18.4	31.2	22.8	38.7	27.5	46.6	32.4	54.7	2.3	4.6

DIAMETER OR SPAN × RISE	CUBIC YARDS OF CLASS DD CONCRETE (EACH END)							CUBIC YARDS OF RIPRAP (EACH END) ① (DTL. DWG. NO. 613-14)					SLOPE	C. Y. BEDDING MATERIAL ② PER L. F. OF PIPE (DTL. DWG. NO. 603-19)	
	CUTOFF WALL (DTL. DWG. NO. 552-00)		CONCRETE EDGE PROTECTION (DTL. DWG. NO. 613-08)												
	SING.	DBL.		SING.	DBL.			SING.	DBL.			SING.		DBL.	
RCP (FETS)															
54"	1.8	3.0		2.7	4.2			12.5	21.2			2.0:1	1.0	2.0	
60"	1.9	3.2		2.5	4.0			11.9	20.1			1.9:1	1.1	2.2	
66"	1.9	3.2		3.0	4.6			13.2	22.5			1.7:1	1.2	2.4	
72"	2.0	3.4		3.3	5.1			14.8	25.1			1.9:1	1.3	2.6	
78"	2.1	3.5		3.5	5.6			15.6	26.6			1.8:1	1.4	2.7	
84"	2.1	3.6		3.5	5.5			15.0	25.8			1.5:1	1.4	2.8	
90"	2.3	3.9		3.6	5.8			15.9	27.4			1.5:1	1.5	3.1	
RPCA (FETS)															
65.00" × 40.00"	1.7	2.9		2.9	4.6			15.3	26.0			3.0:1	1.0	2.1	
73.00" × 45.00"	1.9	3.2		3.1	4.9			16.1	27.5			3.0:1	1.1	2.3	
88.00" × 54.00"	2.1	3.5		2.9	4.6			14.0	24.2			2.0:1	1.3	2.6	
102.00" × 62.00"	2.1	3.6		4.0	6.4			18.4	31.9			2.0:1	1.5	2.9	

NOTES:

① QUANTITIES ARE BASED ON A THICKNESS OF 2 FT. AND ARE PROPORTIONED WHEN A DIFFERENT THICKNESS IS SPECIFIED.


② BEDDING QUANTITIES FOR CONCRETE PIPES ARE BASED ON BEDDING DETAILS SHOWN ON DTL. DWG. NO. 603-19 WITH A WIDTH EQUAL TO (DIAMETER OR SPAN) + 4 FT. + (2 TIMES CONCRETE SHELL THICKNESS) AND A DEPTH EQUAL TO 2 FT. + (D/4 OR R/3) + (CONCRETE SHELL THICKNESS). TO COMPUTE THE TOTAL BEDDING QUANTITY MULTIPLY BY (LENGTH OF PIPE MINUS 24 FT.).

DETAILED DRAWING	
REFERENCE	DWG. NO.
STANDARD SPEC.	552-04
SECTION 552, 603, 613	
CONCRETE, RIPRAP AND BEDDING MATERIAL QUANTITIES FOR SING. AND DBL. CULVERT INSTALLATION	
-- REVISED -- January 2008	EFFECTIVE: APRIL 2006
 MONTANA DEPARTMENT OF TRANSPORTATION	

DIAMETER OR SPAN x RISE	CUBIC YARDS OF CLASS DD CONCRETE (EACH END) ④								CUBIC YARDS OF RIPRAP (EACH END) ① ④								C. Y. BEDDING MATERIAL ② PER L.F. OF PIPE (DTL. DWG. NO. 603-19)	
	CUTOFF WALL (DTL. DWG. NO. 552-00)	CONCRETE EDGE PROTECTION (DTL. DWG. NO. 613-06)						(DTL. DWG. NO. 613-14)										
		1.5:1		2:1		2.5:1		1.5:1		2:1		2.5:1						
		SING.	DBL.	SING.	DBL.	SING.	DBL.	SING.	DBL.	SING.	DBL.	SING.	DBL.	SING.	DBL.			
SSPPA 6" x 2" CORRUGATIONS 18" CORNER RADIUS																		
6'-1" x 4'-7"	1.5	2.5	1.8	2.8	2.2	3.3	2.5	3.8	7.8	12.8	9.7	15.9	11.7	19.2	1.2	2.4		
6'-4" x 4'-9"	1.5	2.5	2.0	3.0	2.4	3.6	2.8	4.2	8.4	13.7	10.4	17.0	12.5	20.5	1.2	2.3		
6'-9" x 4'-11"	1.6	2.7	2.0	3.0	2.3	3.6	2.7	4.2	8.4	13.8	10.4	17.1	12.5	20.7	1.3	2.5		
7'-0" x 5'-1"	1.6	2.7	2.1	3.2	2.5	3.8	2.9	4.4	8.8	14.5	10.9	18.0	13.2	21.7	1.2	2.5		
7'-3" x 5'-3"	1.6	2.6	2.2	3.4	2.7	4.1	3.2	4.8	9.3	15.4	11.6	19.1	14.0	23.0	1.2	2.5		
7'-8" x 5'-5"	1.7	2.8	2.3	3.5	2.7	4.1	3.2	4.9	9.5	15.7	11.8	19.5	14.2	23.5	1.3	2.7		
7'-11" x 5'-7"	1.7	2.8	2.4	3.6	2.8	4.3	3.3	5.1	9.8	16.2	12.2	20.1	14.7	24.3	1.3	2.6		
8'-2" x 5'-9"	1.6	2.8	2.5	3.8	3.0	4.6	3.6	5.4	10.3	17.1	12.8	21.2	15.5	25.6	1.3	2.6		
8'-7" x 5'-11"	1.7	2.9	2.5	3.9	3.1	4.7	3.6	5.5	10.5	17.5	13.0	21.7	15.7	26.1	1.4	2.8		
8'-10" x 6'-1"	1.7	2.9	2.7	4.1	3.2	4.9	3.8	5.8	10.9	18.2	13.6	22.5	16.3	27.2	1.4	2.8		
9'-4" x 6'-3"	1.8	3.1	2.7	4.1	3.2	5.0	3.8	5.8	11.0	18.4	13.6	22.8	16.4	27.5	1.5	3.0		
9'-6" x 6'-5"	1.8	3.1	2.8	4.4	3.4	5.2	4.0	6.2	11.5	19.3	14.3	23.9	17.2	28.8	1.5	2.9		
9'-9" x 6'-7"	1.8	3.1	3.0	4.5	3.6	5.5	4.2	6.4	11.9	20.0	14.8	24.7	17.9	29.8	1.4	2.9		
10'-3" x 6'-9"	1.9	3.2	3.0	4.7	3.6	5.6	4.3	6.6	12.2	20.4	15.1	25.3	18.2	30.5	1.6	3.1		
10'-8" x 6'-11"	2.0	3.5	3.0	4.7	3.6	5.6	4.2	6.6	12.1	20.4	15.0	25.3	18.1	30.6	1.7	3.4		
10'-11" x 7'-1"	2.0	3.4	3.1	4.9	3.8	5.9	4.5	6.9	12.7	21.3	15.7	26.5	19.0	31.9	1.7	3.3		
11'-5" x 7'-3"	2.1	3.6	3.2	5.0	3.8	6.0	4.5	7.0	12.9	21.8	16.0	27.0	19.3	32.6	1.8	3.6		
11'-7" x 7'-5"	2.1	3.6	3.3	5.2	4.0	6.2	4.7	7.3	13.3	22.5	16.5	28.0	19.9	33.7	1.7	3.5		
11'-10" x 7'-7"	2.0	3.5	3.5	5.4	4.2	6.5	5.0	7.7	13.9	23.5	17.2	29.1	20.8	35.1	1.7	3.4		
12'-4" x 7'-9"	2.2	3.8	3.5	5.5	4.2	6.6	5.0	7.8	14.0	23.7	17.3	29.4	20.9	35.5	1.8	3.7		
12'-6" x 7'-11"	2.1	3.7	3.6	5.7	4.4	6.8	5.2	8.1	14.4	24.5	17.9	30.4	21.6	36.6	1.8	3.6		
12'-8" x 8'-1"	2.1	3.7	3.8	5.9	4.6	7.1	5.4	8.4	15.0	25.4	18.6	31.5	22.4	37.9	1.8	3.6		
12'-10" x 8'-4"	2.1	3.6	3.9	6.1	4.8	7.4	5.6	8.7	15.5	26.3	19.3	32.6	23.2	39.2	1.7	3.5		
13'-5" x 8'-5"	2.2	3.9	3.9	6.2	4.7	7.4	5.6	8.8	15.5	26.4	19.3	32.8	23.2	39.5	1.9	3.8		
13'-11" x 8'-7"	2.3	4.1	4.0	6.3	4.8	7.6	5.7	9.0	15.8	27.0	19.6	33.5	23.6	40.4	2.0	4.0		
14'-1" x 8'-9"	2.3	4.0	4.1	6.5	5.0	7.8	5.9	9.2	16.3	27.7	20.2	34.4	24.3	41.5	2.0	4.0		
14'-3" x 8'-11"	2.3	4.0	4.3	6.7	5.2	8.1	6.1	9.6	16.8	28.6	20.9	35.5	25.1	42.8	1.9	3.9		
14'-10" x 9'-1"	2.4	4.2	4.3	6.8	5.2	8.2	6.2	9.7	17.0	29.0	21.0	36.0	25.4	43.4	2.1	4.2		
15'-4" x 9'-2"	2.5	4.5	4.3	6.9	5.2	8.3	6.2	9.8	17.1	29.4	21.2	36.4	25.6	43.9	2.2	4.5		
15'-6" x 9'-5"	2.5	4.4	4.5	7.2	5.4	8.6	6.4	10.2	17.7	30.4	22.0	37.7	26.5	45.4	2.2	4.4		
15'-8" x 9'-7"	2.4	4.3	4.7	7.4	5.6	8.9	6.7	10.6	18.3	31.3	22.7	38.8	27.3	46.8	2.2	4.3		
15'-10" x 9'-9"	2.4	4.3	4.8	7.6	5.8	9.2	6.9	10.8	18.7	32.0	23.2	39.7	28.0	47.9	2.1	4.2		
16'-5" x 9'-11"	2.6	4.5	4.8	7.7	5.8	9.3	6.9	11.0	18.9	32.5	23.4	40.3	28.3	48.6	2.3	4.5		
16'-7" x 10'-1"	2.5	4.5	5.0	8.0	6.1	9.6	7.2	11.4	19.5	33.4	24.2	41.5	29.1	50.0	2.2	4.4		
SSPPA 6" x 2" CORRUGATIONS 31" CORNER RADIUS																		
13'-3" x 9'-4"	2.5	4.3	3.8	6.0	4.6	7.3	5.5	8.6	15.1	25.7	18.8	32.0	22.6	38.5	2.2	4.3		
13'-6" x 9'-6"	2.5	4.3	4.0	6.2	4.8	7.5	5.6	8.9	15.6	26.5	19.3	32.9	23.3	39.7	2.1	4.3		
14'-0" x 9'-8"	2.6	4.5	4.0	6.3	4.8	7.6	5.7	9.0	15.8	27.0	19.6	33.5	23.6	40.4	2.3	4.5		
14'-3" x 9'-10"	2.6	4.4	4.2	6.6	5.0	8.0	6.0	9.4	16.4	28.0	20.4	34.7	24.5	41.9	2.2	4.5		
14'-5" x 10'-0"	2.5	4.4	4.3	6.8	5.2	8.2	6.2	9.7	16.8	28.7	20.9	35.6	25.2	42.9	2.2	4.4		
14'-11" x 10'-2"	2.7	4.6	4.3	6.9	5.2	8.3	6.2	9.8	17.0	29.1	21.1	36.1	25.4	43.5	2.3	4.7		
15'-4" x 10'-4"	2.8	4.9	4.3	6.9	5.2	8.4	6.2	9.9	17.1	29.4	21.2	36.5	25.6	44.0	2.5	4.9		
15'-7" x 10'-6"	2.8	4.8	4.5	7.2	5.5	8.7	6.5	10.3	17.7	30.4	22.0	37.7	26.5	45.5	2.4	4.9		
15'-10" x 10'-8"	2.7	4.8	4.7	7.5	5.7	9.0	6.7	10.6	18.3	31.4	22.7	38.9	27.4	46.9	2.4	4.8		
16'-3" x 10'-10"	2.9	5.0	4.7	7.5	5.7	9.0	6.7	10.7	18.3	31.6	22.8	39.2	27.4	47.3	2.5	5.1		
16'-6" x 11'-0"	2.8	5.0	4.9	7.8	5.9	9.4	7.0	11.1	18.9	32.6	23.5	40.4	28.3	48.7	2.5	5.0		
17'-0" x 11'-2"	3.0	5.2	4.9	7.8	5.9	9.4	7.0	11.2	19.1	32.9	23.7	40.9	28.5	49.3	2.7	5.3		
17'-2" x 11'-4"	2.9	5.2	5.0	8.1	6.1	9.7	7.2	11.5	19.6	33.8	24.3	41.9	29.3	50.5	2.6	5.2		
17'-5" x 11'-6"	2.9	5.1	5.2	8.3	6.3	10.0	7.5	11.9	20.2	34.8	25.0	43.2	30.2	52.0	2.6	5.2		
17'-11" x 11'-8"	3.0	5.3	5.3	8.5	6.4	10.2	7.5	12.1	20.4	35.4	25.4	43.9	30.6	52.9	2.7	5.5		
18'-1" x 11'-10"	3.0	5.3	5.4	8.7	6.5	10.5	7.8	12.4	20.9	36.2	26.0	44.9	31.3	54.1	2.7	5.4		
18'-7" x 12'-0"	3.1	5.5	5.4	8.8	6.6	10.6	7.8	12.5	21.1	36.6	26.2	45.4	31.6	54.8	2.8	5.7		
18'-9" x 12'-2"	3.1	5.5	5.6	9.0	6.8	10.9	8.1	12.9	21.7	37.6	26.9	46.7	32.5	56.3	2.8	5.6		
19'-3" x 12'-4"	3.2	5.7	5.6	9.2	6.8	11.0	8.1	13.0	21.9	38.1	27.2	47.3	32.8	56.9	3.0	5.9		
19'-6" x 12'-6"	3.2	5.7	5.8	9.4	7.1	11.4	8.4	13.5	22.5	39.1	28.0	48.6	33.7	58.5	2.9	5.8		
19'-8" x 12'-8"	3.2	5.6	6.0	9.6	7.2	11.6	8.6	13.8	23.0	40.0	28.6	49.6	34.4	59.8	2.9	5.8		
19'-11" x 12'-10"	3.1	5.6	6.1	9.9	7.4	12.0	8.8	14.2	23.6	40.9	29.3	50.8	35.3	61.2	2.8	5.7		
20'-5" x 13'-0"	3.3	5.8	6.2	10.0	7.5	12.1	8.9	14.3	23.8	41.5	29.6	51.5	35.6	62.0	3.0	6.0		
20'-7" x 13'-2"	3.2	5.8	6.3	10.2	7.7	12.4	9.1	14.6	24.3	42.3	30.2	52.5	36.4	63.2	3.0	5.9		

NOTES:


- QUANTITIES ARE BASED ON A THICKNESS OF 2 FT. AND ARE PROPORTIONED WHEN A DIFFERENT THICKNESS IS SPECIFIED.
- BEDDING QUANTITIES FOR METAL PIPES ARE BASED ON BEDDING DETAILS SHOWN ON DTL. DWG. NO. 603-19 WITH A WIDTH EQUAL TO (DIAMETER OR SPAN) + 4 FT. + (2 TIMES CORRUGATION WIDTH) AND A DEPTH EQUAL TO 2 FT. + "X" + (CORRUGATION WIDTH). TO COMPUTE THE TOTAL BEDDING QUANTITY MULTIPLY BY (LENGTH OF PIPE MINUS 24 FT.).
- SEE DTL. DWG. NO. 603-32 AND 603-34 FOR "X" DIMENSIONS OF METAL PIPES.
- FOR PIPES WITH SKEW BEVEL ENDS - DIVIDE THE QUANTITIES SHOWN BY COSINE OF SKEW ANGLE.

DETAILED DRAWING	
REFERENCE STANDARD SPEC. SECTION 552, 603, 613	DWG. NO. 552-06
CONCRETE, RIPRAP AND BEDDING MATERIAL QUANTITIES FOR SING. AND DBL. CULVERT INSTALLATION	
-- REVISED -- January 2008	EFFECTIVE: APRIL 2006
 MONTANA DEPARTMENT OF TRANSPORTATION	

DIAMETER OR SPAN × RISE	CUBIC YARDS OF CLASS DD CONCRETE (EACH END) ④								CUBIC YARDS OF RIPRAP (EACH END) ① ④								C. Y. BEDDING MATERIAL ② PER L. F. OF PIPE (DTL. DWG. NO. 603-19)	
	CUTOFF WALL (DTL. DWG. NO. 552-00)	CONCRETE EDGE PROTECTION (DTL. DWG. NO. 613-06)						(DTL. DWG. NO. 613-14)										
		1.5:1		2:1		2.5:1		1.5:1		2:1		2.5:1						
		SING.	DBL.	SING.	DBL.	SING.	DBL.	SING.	DBL.	SING.	DBL.	SING.	DBL.	SING.	DBL.			
CSP 3" × 1" OR 5" × 1" CORRUGATIONS																		
54"	1.2	2.0	2.1	3.0	2.5	3.6	2.9	4.3	8.3	13.3	10.3	16.5	12.5	20.1	0.9	1.8		
60"	1.3	2.1	2.2	3.3	2.7	4.0	3.2	4.7	8.9	14.3	11.1	17.8	13.4	21.6	1.0	2.0		
66"	1.3	2.2	2.4	3.6	2.9	4.3	3.5	5.1	9.6	15.4	11.9	19.1	14.3	23.1	1.0	2.1		
72"	1.4	2.4	2.6	3.9	3.2	4.6	3.7	5.5	10.2	16.4	12.7	20.4	15.2	24.6	1.1	2.3		
78"	1.5	2.5	2.8	4.1	3.4	5.0	4.0	5.9	10.8	17.5	13.4	21.7	16.2	26.2	1.2	2.4		
84"	1.6	2.7	3.0	4.4	3.6	5.3	4.3	6.3	11.5	18.6	14.2	23.1	17.1	27.7	1.3	2.6		
90"	1.6	2.8	3.2	4.7	3.8	5.7	4.6	6.7	12.1	19.7	15.3	24.9	18.0	29.3	1.4	2.7		
96"	1.7	3.0	3.4	5.0	4.1	6.1	4.8	7.2	13.0	21.2	16.1	26.3	19.0	30.9	1.5	2.9		
102"	1.8	3.1	3.6	5.3	4.3	6.4	5.1	7.6	13.6	22.3	16.9	27.7	19.9	32.5	1.5	3.1		
108"	1.9	3.3	3.8	5.6	4.6	6.8	5.4	8.1	14.3	23.5	17.8	29.1	20.9	34.2	1.6	3.3		
114"	2.0	3.4	4.0	6.0	4.8	7.2	5.7	8.5	15.0	24.6	18.6	30.6	21.9	35.9	1.7	3.4		
120"	2.1	3.6	4.2	6.3	5.1	7.6	6.0	9.0	15.7	25.8	19.5	32.0	22.9	37.6	1.8	3.6		
SSPP 6" × 2" CORRUGATIONS																		
10' - 6"	2.1	3.7	4.4	6.6	5.3	8.0	6.3	9.5	16.4	27.0	20.3	33.5	23.8	39.0	1.9	3.8		
11' - 0"	2.2	3.9	4.6	6.9	5.6	8.4	6.6	10.0	17.1	28.2	21.2	35.0	24.8	40.7	2.0	4.0		
11' - 6"	2.3	4.0	4.8	7.2	5.8	8.8	6.9	10.4	17.8	29.5	22.1	36.5	25.8	42.5	2.1	4.2		
12' - 0"	2.4	4.2	5.0	7.6	6.1	9.2	7.3	10.9	18.5	30.7	23.0	38.1	26.9	44.3	2.2	4.4		
12' - 6"	2.5	4.4	5.2	7.9	6.3	9.6	7.6	11.4	19.3	32.0	23.9	39.7	28.0	46.2	2.3	4.6		
13' - 0"	2.6	4.6	5.4	8.2	6.6	10.0	7.9	11.9	20.0	33.3	24.8	41.2	29.0	48.0	2.4	4.8		
13' - 6"	2.7	4.7	5.6	8.6	6.9	10.4	8.2	12.4	20.8	34.6	25.7	42.8	30.1	49.9	2.5	5.0		
14' - 0"	2.8	4.9	5.9	8.9	7.1	10.8	8.5	12.9	21.5	35.9	26.7	44.5	31.2	51.8	2.6	5.2		
14' - 6"	2.9	5.1	6.1	9.3	7.4	11.3	8.8	13.4	22.3	37.2	27.6	46.1	32.3	53.8	2.7	5.4		
15' - 0"	3.0	5.3	6.3	9.6	7.7	11.7	9.2	13.9	23.0	38.5	28.6	47.8	33.5	55.7	2.8	5.7		
15' - 6"	3.1	5.4	6.5	10.0	7.9	12.1	9.5	14.5	23.8	39.9	29.5	49.5	34.6	57.7	2.9	5.9		
16' - 0"	3.2	5.6	6.7	10.4	8.2	12.6	9.8	15.0	24.6	41.3	30.5	51.2	35.8	59.7	3.0	6.1		
16' - 6"	3.3	5.8	7.0	10.7	8.5	13.0	10.1	15.5	25.4	42.7	31.5	52.9	36.9	61.7	3.2	6.3		
17' - 0"	3.4	6.0	7.2	11.1	8.8	13.5	10.5	16.1	26.2	44.1	32.5	54.7	38.1	63.8	3.3	6.6		
17' - 6"	3.5	6.2	7.4	11.5	9.1	13.9	10.8	16.6	27.0	45.5	33.5	56.4	39.3	65.8	3.4	6.8		
18' - 0"	3.6	6.4	7.7	11.9	9.3	14.4	11.2	17.2	27.8	46.9	34.5	58.2	40.5	67.9	3.5	7.0		
19' - 0"	3.8	6.8	8.1	12.6	9.9	15.3	11.9	18.3	29.5	49.9	36.6	61.8	42.9	72.2	3.8	7.5		
20' - 0"	4.0	7.2	8.6	13.4	10.5	16.3	12.6	19.4	31.2	52.9	38.7	65.6	45.4	76.6	4.0	8.0		
21' - 0"	4.2	7.6	9.1	14.2	11.1	17.3	13.3	20.6	32.9	55.9	40.8	69.3	47.9	81.0	4.3	8.6		
CSPA 2⅔" × ½" CORRUGATIONS																		
64" × 43"	1.3	2.1	1.7	2.6	2.0	3.1	2.4	3.6	7.4	12.0	9.2	15.0	11.1	18.1	0.9	1.9		
71" × 47"	1.3	2.2	1.8	2.8	2.2	3.3	2.6	3.8	7.9	12.8	9.8	16.0	11.7	19.1	1.0	2.1		
77" × 52"	1.4	2.3	2.0	3.0	2.4	3.6	2.8	4.2	8.4	13.7	10.4	17.0	12.4	20.3	1.1	2.2		
83" × 57"	1.5	2.5	2.1	3.2	2.6	3.9	3.0	4.5	8.9	14.6	11.0	18.1	13.1	21.5	1.2	2.4		
CSPA 3" × 1" CORRUGATIONS																		
60" × 46"	1.3	2.2	1.7	2.5	2.0	3.0	2.3	3.5	7.2	11.7	9.0	14.5	10.6	17.1	1.0	2.0		
66" × 51"	1.4	2.3	1.8	2.8	2.2	3.3	2.6	3.8	7.7	12.6	9.8	15.9	11.3	18.2	1.1	2.2		
73" × 55"	1.5	2.5	2.0	2.9	2.3	3.5	2.7	4.1	8.3	13.5	10.3	16.8	11.8	19.2	1.2	2.5		
81" × 59"	1.5	2.5	2.2	3.3	2.6	3.9	3.0	4.5	9.1	14.8	11.2	18.4	12.9	21.0	1.2	2.4		
87" × 63"	1.6	2.7	2.3	3.5	2.8	4.2	3.2	4.9	9.6	15.7	11.9	19.5	13.6	22.2	1.3	2.6		
95" × 67"	1.7	2.9	2.4	3.7	2.9	4.5	3.4	5.2	10.0	16.6	12.5	20.6	14.2	23.3	1.4	2.8		
103" × 71"	1.8	3.0	2.6	4.0	3.1	4.7	3.6	5.5	10.6	17.5	13.1	21.7	14.9	24.5	1.5	3.0		
112" × 75"	1.9	3.2	2.7	4.2	3.3	5.0	3.8	5.8	11.1	18.5	13.8	22.9	15.6	25.7	1.6	3.2		
117" × 79"	2.0	3.4	2.9	4.4	3.4	5.3	4.0	6.2	11.6	19.4	14.4	24.1	16.3	26.9	1.7	3.5		
128" × 83"	2.1	3.5	3.0	4.7	3.6	5.6	4.2	6.5	12.1	20.3	15.1	25.2	16.9	28.0	1.8	3.7		
137" × 87"	2.2	3.7	3.2	4.9	3.8	5.9	4.4	6.9	12.7	21.3	15.7	26.5	17.6	29.3	2.0	3.9		
142" × 91"	2.2	3.9	3.3	5.2	4.0	6.2	4.7	7.2	13.2	22.3	16.4	27.7	18.3	30.4	2.1	4.2		

NOTES:

- ① QUANTITIES ARE BASED ON A THICKNESS OF 2 FT. AND ARE PROPORTIONED WHEN A DIFFERENT THICKNESS IS SPECIFIED.
- ② BEDDING QUANTITIES FOR METAL PIPES ARE BASED ON BEDDING DETAILS SHOWN ON DTL. DWG. NO. 603-19 WITH A WIDTH EQUAL TO (DIAMETER OR SPAN) + 4 FT. + (2 TIMES CORRUGATION WIDTH) AND A DEPTH EQUAL TO 2 FT. + "X" + (CORRUGATION WIDTH). TO COMPUTE THE TOTAL BEDDING QUANTITY MULTIPLY BY (LENGTH OF PIPE MINUS 24 FT.).
- ③ SEE DTL. DWG. NO. 603-32 AND 603-34 FOR "X" DIMENSIONS OF METAL PIPES.
- ④ FOR PIPES WITH SKEW BEVEL ENDS - DIVIDE THE QUANTITIES SHOWN BY COSINE OF SKEW ANGLE.

DETAILED DRAWING	
REFERENCE STANDARD SPEC.	DWG. NO. 552-08
SECTION 552, 603, 613	
CONCRETE, RIPRAP AND BEDDING MATERIAL QUANTITIES FOR SING. AND DBL. CULVERT INSTALLATION	
-- REVISED -- January 2008	EFFECTIVE: APRIL 2006
 MONTANA DEPARTMENT OF TRANSPORTATION	