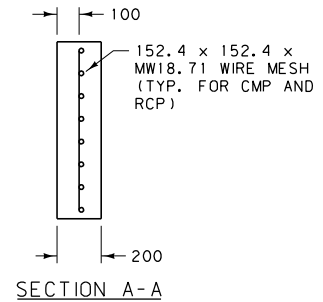
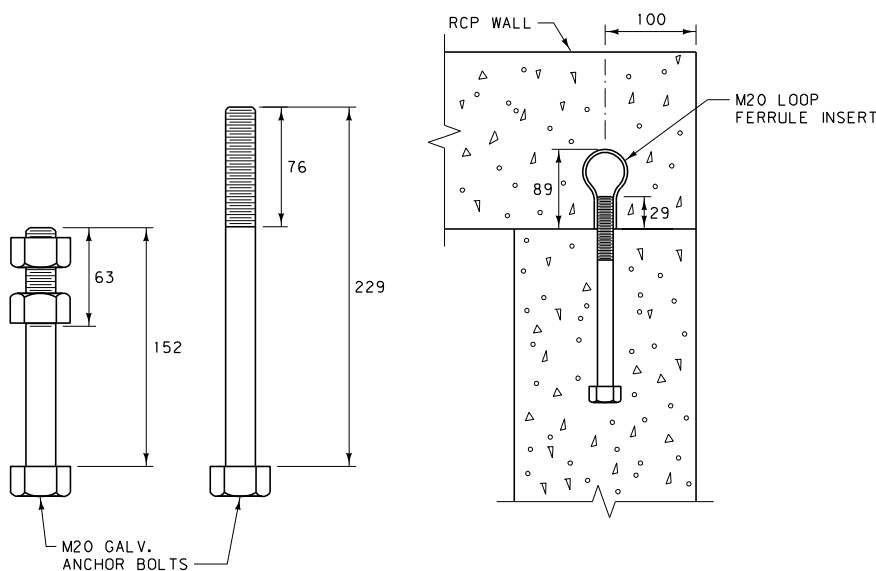
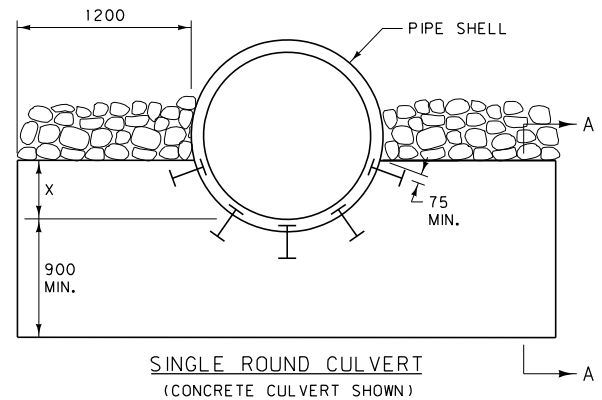
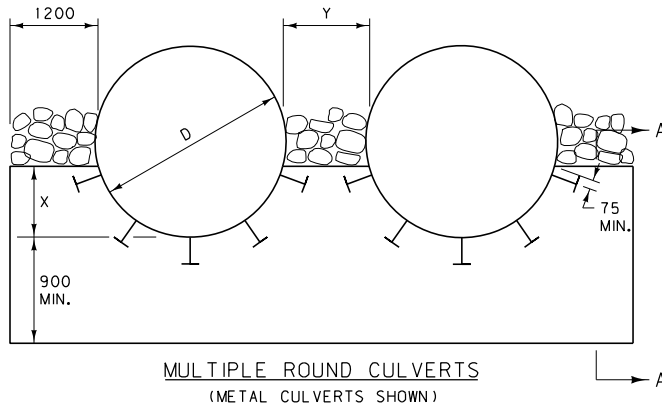


X: VARIABLE (SEE DTL. DWG. NO. 603-10 FOR CONCRETE CULV. AND 603-34 FOR METAL CULV.)

Y: FOR METAL CULV. AND CULV. WITHOUT FETS:  
Y = 1200 (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 2400) TO AID IN INSTALLATION AND BACKFILL. THE QUANTITIES SHOWN IN 552-04, 06 & 08 WERE FIGURED USING Y = 1200. ADJUST QUANTITIES AS NEEDED WHEN Y IS OTHER THAN 1200.



**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.

ANCHOR BOLT SPACING:  
MIN. OF FIVE M20 GALV. ANCHOR BOLTS  
IN WALL. USE MAX. SPACING OF 455 mm.

ALL DIMENSIONS ARE MILLIMETERS  
(mm) UNLESS OTHERWISE NOTED.

DETAILED DRAWING	
REFERENCE STANDARD SPEC. SECTION 552	DWG. NO. 552-00
CONCRETE CUTOFF WALLS FOR CULVERTS	
-- REVISED -- January 2008	EFFECTIVE: FEBRUARY 2005
 MONTANA DEPARTMENT OF TRANSPORTATION serving you with pride	

DIAMETER OR SPAN × RISE (mm)	CUBIC METERS OF CLASS DD CONCRETE (EACH END)								CUBIC METERS OF RIPRAP (EACH END) ①						m³ BEDDING MATERIAL ② PER METER 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									
	SING.	DBL.	SING.	DBL.	SING.	DBL.	SING.	DBL.	SING.	DBL.	SING.	DBL.	SING.	DBL.	SING.	DBL.
RCP (SQ. END)																
1350	1.0	1.7	1.7	2.5	2.0	3.0	~	~	6.7	10.8	8.3	13.4	~	~	2.57	5.14
1500	1.1	1.8	1.8	2.7	2.2	3.3	~	~	7.2	11.7	9.0	14.5	~	~	2.80	5.60
1650	1.2	2.0	2.0	3.0	2.4	3.6	~	~	7.7	12.6	9.8	15.9	~	~	3.03	6.06
1800	1.2	2.1	2.2	3.2	2.6	3.9	~	~	8.4	13.7	10.4	17.0	~	~	3.27	6.54
1950	1.3	2.2	2.3	3.5	2.8	4.2	~	~	9.0	14.6	11.1	18.1	~	~	3.52	7.04
2100	1.4	2.4	2.5	3.7	3.0	4.5	~	~	9.5	15.6	11.8	19.3	~	~	3.78	7.56
2250	1.4	2.5	2.6	4.0	3.2	4.8	~	~	10.1	16.5	12.5	20.5	~	~	4.04	8.08
2400	1.5	2.6	2.8	4.2	3.4	5.1	~	~	10.6	17.5	13.2	21.7	~	~	4.31	8.62
RPCA (SQ. END)																
1650 × 1015	0.9	1.5	1.6	2.5	1.9	2.9	~	~	6.7	11.0	8.3	13.6	~	~	2.60	5.20
1855 × 1145	1.0	1.6	1.8	2.7	2.1	3.3	~	~	7.3	12.0	9.0	15.0	~	~	2.84	5.68
2235 × 1370	1.1	1.8	2.1	3.3	2.6	3.9	~	~	8.6	14.5	10.7	17.9	~	~	3.27	6.54
2590 × 1575	1.1	2.0	2.5	3.8	3.0	4.6	~	~	9.8	16.6	12.2	20.5	~	~	3.66	7.32
2920 × 1830	1.3	2.2	2.7	4.3	3.3	5.2	~	~	10.8	18.3	13.3	22.7	~	~	4.15	8.30
3100 × 1960	1.3	2.2	2.9	4.6	3.6	5.6	~	~	11.5	19.6	14.3	24.4	~	~	4.33	8.66
3505 × 2215	1.4	2.4	3.4	5.3	4.1	6.4	~	~	13.1	22.4	16.2	27.8	~	~	4.81	9.62
3910 × 2460	1.5	2.6	3.8	6.1	4.6	7.4	~	~	14.7	25.3	18.2	31.4	~	~	5.31	10.62
4285 × 2705	1.6	2.8	4.0	6.4	4.9	7.8	~	~	15.4	26.7	19.1	33.1	~	~	5.73	11.46

DIAMETER OR SPAN × RISE (mm)	CUBIC METERS OF CLASS DD CONCRETE (EACH END)						CUBIC METERS OF RIPRAP (EACH END) ①						SLOPE	m³ BEDDING MATERIAL ② PER LIN. m 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)								
	SING.	DBL.		SING.	DBL.			SING.	DBL.			SING.		DBL.	
RCP (FETS)															
1350	1.3	2.2		2.0	3.1			9.3	15.7			2.0:1	2.57	5.14	
1500	1.4	2.4		1.9	2.9			8.8	14.9			1.9:1	2.80	5.60	
1650	1.4	2.3		2.2	3.4			9.8	16.7			1.7:1	3.03	6.06	
1800	1.5	2.5		2.3	3.7			10.5	17.9			1.9:1	3.27	6.54	
1950	1.5	2.6		2.6	4.1			11.6	19.8			1.8:1	3.52	7.04	
2100	1.6	2.7		2.7	4.2			11.7	20.1			1.5:1	3.78	7.56	
2250	1.7	2.9		2.8	4.5			12.3	21.3			1.5:1	4.04	8.08	
RPCA (FETS)															
1650 × 1015	1.3	2.2		2.2	3.4			11.3	19.2			3.0:1	2.60	5.20	
1855 × 1145	1.4	2.3		2.3	3.6			11.9	20.4			3.0:1	2.84	5.68	
2235 × 1370	1.5	2.6		2.1	3.4			10.4	18.0			2.0:1	3.27	6.54	
2590 × 1575	1.6	2.8		3.1	4.9			14.1	24.4			2.0:1	2.98	5.97	

NOTES:

① QUANTITIES ARE BASED ON A THICKNESS OF 600 mm 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) + 1200 mm + (2 TIMES CONCRETE SHELL THICKNESS) AND A DEPTH EQUAL TO 600 mm + (D/4 OR R/3) + (CONCRETE SHELL THICKNESS). TO COMPUTE THE TOTAL BEDDING QUANTITY MULTIPLY BY (LENGTH OF PIPE MINUS 7.0 m).

ALL DIMENSIONS ARE MILLIMETERS (mm) UNLESS OTHERWISE NOTED.

DETAILED DRAWING	
REFERENCE STANDARD SPEC. SECTION 552, 603, 613	DWG. NO. 552-04
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 (m)	CUBIC METERS OF CLASS DD CONCRETE (EACH END) ④								CUBIC METERS OF RIPRAP (EACH END) ① ④						m³ BEDDING MATERIAL ② PER METER 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.	SING.	DBL.
SSPPA 152 mm x 51 mm CORRUGATIONS 457 mm CORNER RADIUS																
1.850 x 1.400	1.0	1.7	1.5	2.2	1.8	2.6	2.1	3.1	6.1	10.0	7.6	12.5	9.2	15.0	2.64	5.28
1.930 x 1.450	1.0	1.8	1.5	2.3	1.8	2.8	2.2	3.3	6.4	10.5	8.0	13.0	9.6	15.7	2.66	5.32
2.060 x 1.500	1.1	1.9	1.6	2.4	1.9	2.9	2.2	3.4	6.6	10.8	8.3	13.6	10.0	16.4	2.83	5.66
2.130 x 1.550	1.1	1.9	1.7	2.5	2.0	3.0	2.4	3.5	6.8	11.2	8.5	14.0	10.4	17.1	2.84	5.68
2.210 x 1.600	1.1	1.9	1.7	2.6	2.1	3.1	2.5	3.7	7.1	11.7	8.8	14.5	10.7	17.5	2.85	5.70
2.340 x 1.650	1.2	2.0	1.8	2.7	2.1	3.2	2.5	3.8	7.4	12.2	9.2	15.2	11.1	18.3	3.03	6.06
2.410 x 1.700	1.2	2.0	1.9	2.8	2.2	3.4	2.6	4.0	7.6	12.5	9.5	15.8	11.5	19.0	3.03	6.06
2.490 x 1.750	1.2	2.0	1.9	2.9	2.3	3.5	2.8	4.2	7.8	12.9	9.7	16.1	11.8	19.4	3.02	6.04
2.620 x 1.800	1.2	2.1	2.0	3.0	2.4	3.6	2.8	4.3	8.1	13.5	10.1	16.7	12.2	20.2	3.22	6.44
2.690 x 1.850	1.2	2.1	2.1	3.1	2.5	3.8	2.9	4.4	8.3	13.7	10.4	17.3	12.6	20.9	3.21	6.42
2.840 x 1.910	1.3	2.2	2.1	3.2	2.5	3.9	3.0	4.6	8.6	14.3	10.6	17.8	12.8	21.4	3.43	6.86
2.900 x 1.960	1.3	2.2	2.2	3.3	2.6	4.0	3.1	4.7	8.9	14.8	11.0	18.4	13.3	22.1	3.41	6.82
2.970 x 2.010	1.3	2.2	2.3	3.5	2.7	4.2	3.2	4.9	9.1	15.1	11.4	19.0	13.7	22.9	3.37	6.74
3.120 x 2.060	1.3	2.3	2.3	3.5	2.8	4.3	3.3	5.0	9.3	15.7	11.6	19.4	14.0	23.4	3.62	7.24
3.250 x 2.110	1.4	2.4	2.3	3.6	2.8	4.4	3.3	5.2	9.5	16.0	11.8	19.8	14.2	23.9	3.85	7.70
3.330 x 2.160	1.4	2.4	2.4	3.8	2.9	4.5	3.5	5.4	9.8	16.5	12.2	20.5	14.7	24.7	3.83	7.66
3.480 x 2.210	1.5	2.6	2.5	3.8	3.0	4.6	3.5	5.5	10.0	16.8	12.4	20.9	14.9	25.2	4.08	8.16
3.530 x 2.260	1.5	2.5	2.6	4.0	3.1	4.8	3.7	5.7	10.3	17.4	12.8	21.6	15.4	26.0	4.05	8.10
3.610 x 2.310	1.4	2.5	2.7	4.1	3.2	5.0	3.8	5.9	10.6	17.9	13.2	22.2	15.9	26.8	4.01	8.02
3.760 x 2.360	1.5	2.7	2.7	4.2	3.3	5.1	3.9	6.0	10.8	18.3	13.4	22.7	16.1	27.3	4.27	8.54
3.810 x 2.410	1.5	2.6	2.8	4.3	3.4	5.2	4.0	6.2	11.1	18.8	13.8	23.4	16.6	28.1	4.24	8.48
3.860 x 2.460	1.5	2.6	2.9	4.5	3.5	5.4	4.1	6.4	11.4	19.4	14.2	24.0	17.1	28.9	4.18	8.36
3.910 x 2.540	1.5	2.6	3.0	4.6	3.6	5.6	4.3	6.6	11.8	19.9	14.6	24.7	17.6	29.7	4.12	8.24
4.090 x 2.570	1.6	2.8	3.0	4.7	3.6	5.7	4.3	6.7	12.0	20.3	14.8	25.2	17.9	30.3	4.41	8.82
SSPPA 152 mm x 51 mm CORRUGATIONS 787 mm CORNER RADIUS																
4.040 x 2.840	1.8	3.2	2.8	4.4	3.4	5.3	4.0	6.3	11.2	19.0	13.9	23.6	16.7	28.5	5.23	10.46
4.110 x 2.900	1.8	3.2	2.9	4.5	3.5	5.5	4.1	6.5	11.4	19.5	14.2	24.2	17.1	29.2	5.19	10.38
4.270 x 2.950	1.9	3.3	2.9	4.7	3.5	5.6	4.2	6.6	11.7	19.9	14.5	24.8	17.5	29.9	5.46	10.92
4.320 x 3.000	1.9	3.3	3.1	4.8	3.7	5.8	4.4	6.9	12.1	20.7	15.0	25.7	18.1	31.0	5.39	10.78
4.390 x 3.050	1.9	3.3	3.2	5.0	3.8	6.0	4.5	7.1	12.4	21.2	15.4	26.3	18.6	31.8	5.34	10.68
4.550 x 3.100	2.0	3.4	3.2	5.0	3.8	6.1	4.6	7.2	12.5	21.5	15.6	26.7	18.8	32.2	5.66	11.32
4.670 x 3.150	2.1	3.6	3.2	5.1	3.9	6.1	4.6	7.3	12.6	21.7	15.7	27.0	18.9	32.6	5.98	11.96
4.750 x 3.200	2.0	3.6	3.3	5.3	4.0	6.4	4.8	7.6	13.1	22.5	16.3	27.9	19.6	33.7	5.90	11.80
4.830 x 3.250	2.0	3.5	3.5	5.5	4.2	6.6	5.0	7.8	13.5	23.2	16.8	28.8	20.3	34.7	5.82	11.64
4.950 x 3.300	2.1	3.7	3.4	5.5	4.2	6.6	4.9	7.9	13.6	23.4	16.8	29.0	20.3	35.0	6.19	12.38
5.030 x 3.350	2.1	3.7	3.6	5.7	4.3	6.9	5.1	8.2	14.0	24.1	17.4	29.9	21.0	36.1	6.10	12.20
5.180 x 3.400	2.2	3.8	3.6	5.8	4.3	6.9	5.1	8.2	14.1	24.4	17.5	30.3	21.1	36.5	6.45	12.90
5.230 x 3.450	2.2	3.8	3.7	5.9	4.5	7.1	5.3	8.5	14.5	25.0	18.0	31.0	21.7	37.4	6.40	12.80
5.310 x 3.510	2.1	3.8	3.8	6.1	4.6	7.4	5.5	8.8	14.9	25.7	18.5	32.0	22.3	38.5	6.30	12.60
5.460 x 3.560	2.2	3.9	3.9	6.2	4.7	7.5	5.6	8.9	15.1	26.2	18.8	32.5	22.6	39.2	6.62	13.24
5.510 x 3.610	2.2	3.9	4.0	6.4	4.8	7.7	5.7	9.1	15.5	26.8	19.2	33.3	23.2	40.2	6.55	13.10
5.660 x 3.660	2.3	4.1	4.0	6.5	4.8	7.8	5.7	9.2	15.6	27.1	19.4	33.7	23.4	40.6	6.92	13.84
5.720 x 3.710	2.3	4.1	4.1	6.6	5.0	8.0	5.9	9.5	16.1	27.9	19.9	34.6	24.0	41.7	6.82	13.64
5.870 x 3.760	2.4	4.2	4.2	6.7	5.0	8.1	6.0	9.6	16.2	28.2	20.1	35.0	24.3	42.2	7.19	14.38
5.940 x 3.810	2.4	4.2	4.3	6.9	5.2	8.4	6.2	9.9	16.7	29.0	20.7	36.0	25.0	43.4	7.09	14.18
5.990 x 3.860	2.3	4.2	4.4	7.1	5.3	8.6	6.3	10.2	17.0	29.6	21.2	36.8	25.5	44.3	7.02	14.04
6.070 x 3.910	2.3	4.1	4.5	7.3	5.5	8.8	6.5	10.5	17.5	30.3	21.7	37.6	26.2	45.4	6.90	13.80
6.220 x 3.960	2.4	4.3	4.6	7.4	5.5	8.9	6.6	10.6	17.6	30.7	21.9	38.2	26.4	46.0	7.29	14.58
6.270 x 4.010	2.4	4.3	4.7	7.5	5.7	9.1	6.7	10.8	18.0	31.3	22.4	38.9	27.0	46.9	7.20	14.40

NOTES:

- ① QUANTITIES ARE BASED ON A THICKNESS OF 600 mm 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) + 1200 mm + (2 TIMES CORRUGATION WIDTH) AND A DEPTH EQUAL TO 600 mm + "X" + (CORRUGATION WIDTH). TO COMPUTE THE TOTAL BEDDING QUANTITY MULTIPLY BY (LENGTH OF PIPE MINUS 7.0 m).
- 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.

ALL DIMENSIONS ARE MILLIMETERS  
(mm) UNLESS OTHERWISE NOTED.

DETAILED DRAWING	
REFERENCE DWG. NO.	552-06
STANDARD SPEC.	
SECTION 552, 603, 613	
CONCRETE, RIPRAP AND BEDDING MATERIAL QUANTITIES FOR SING. AND DBL. CULVERT INSTALLATION	

DIAMETER OR SPAN x RISE (mm OR m)	CUBIC METERS OF CLASS DD CONCRETE (EACH END) ④								CUBIC METERS OF RIPRAP (EACH END) ① ④								m³ BEDDING MATERIAL ② PER METER 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																		
75 mm x 25 mm OR 125 mm x 25 mm CORRUGATIONS																		
1350	0.9	1.4	1.5	2.2	1.8	2.6	2.2	3.3	6.1	9.7	7.5	12.0	9.6	15.3	2.09	4.18		
1500	0.9	1.5	1.6	2.4	2.0	2.9	2.4	3.6	6.5	10.4	8.1	13.0	10.3	16.5	2.27	4.54		
1650	1.0	1.6	1.8	2.6	2.1	3.1	2.6	3.9	7.0	11.2	8.7	13.9	11.0	17.7	2.45	4.90		
1800	1.0	1.7	1.9	2.8	2.3	3.4	2.9	4.2	7.4	12.0	9.2	14.9	11.7	18.8	2.63	5.26		
1950	1.1	1.8	2.0	3.0	2.5	3.6	3.1	4.5	7.9	12.8	9.8	15.8	12.4	20.0	2.82	5.64		
2100	1.1	1.9	2.2	3.2	2.6	3.9	3.3	4.8	8.4	13.6	10.4	16.8	13.1	21.2	3.01	6.02		
2250	1.2	2.0	2.3	3.5	2.8	4.2	3.5	5.2	8.8	14.4	11.1	18.2	13.8	22.4	3.20	6.40		
2400	1.3	2.2	2.5	3.7	3.0	4.4	3.7	5.5	9.5	15.5	11.7	19.2	14.5	23.6	3.40	6.80		
2550	1.3	2.3	2.6	3.9	3.2	4.7	3.9	5.8	9.9	16.3	12.3	20.2	15.2	24.9	3.61	7.22		
2700	1.4	2.4	2.7	4.1	3.3	5.0	4.1	6.2	10.4	17.1	12.9	21.2	16.0	26.2	3.82	7.64		
2850	1.4	2.5	2.9	4.3	3.5	5.2	4.4	6.5	10.9	18.0	13.6	22.3	16.8	27.5	4.03	8.06		
3000	1.5	2.6	3.0	4.6	3.7	5.5	4.6	6.9	11.4	18.8	14.2	23.3	17.5	28.8	4.25	8.50		
SSPP																		
152 mm x 51 mm CORRUGATIONS																		
3.205	1.6	2.7	3.3	4.9	4.0	6.0	4.8	7.3	12.2	20.1	15.1	24.9	18.2	29.8	4.52	9.04		
3.360	1.6	2.9	3.4	5.2	4.2	6.3	5.1	7.6	12.7	21.0	15.8	26.1	19.0	31.2	4.75	9.50		
3.515	1.7	3.0	3.6	5.4	4.3	6.6	5.3	8.0	13.3	22.0	16.5	27.2	19.8	32.5	4.99	9.98		
3.670	1.8	3.1	3.7	5.7	4.5	6.9	5.5	8.3	13.8	22.9	17.1	28.4	20.6	33.9	5.23	10.46		
3.825	1.8	3.2	3.9	5.9	4.7	7.2	5.8	8.7	14.4	23.9	17.8	29.6	21.4	35.3	5.48	10.96		
3.980	1.9	3.4	4.1	6.2	4.9	7.5	6.0	9.1	14.9	24.8	18.5	30.8	22.2	36.7	5.73	11.46		
4.135	2.0	3.5	4.2	6.4	5.1	7.8	6.3	9.5	15.5	25.8	19.2	32.0	23.0	38.2	5.99	11.98		
4.290	2.1	3.6	4.4	6.7	5.3	8.1	6.5	9.9	16.1	26.8	20.0	33.3	23.9	39.6	6.25	12.50		
4.445	2.1	3.8	4.6	7.0	5.5	8.5	6.7	10.3	16.7	27.8	20.7	34.5	24.7	41.1	6.52	13.04		
4.600	2.2	3.9	4.7	7.2	5.8	8.8	7.0	10.6	17.3	28.9	21.4	35.8	25.6	42.6	6.79	13.58		
4.755	2.3	4.0	4.9	7.5	6.0	9.1	7.2	11.0	17.8	29.9	22.1	37.1	26.5	44.1	7.06	14.12		
4.910	2.3	4.2	5.1	7.8	6.2	9.5	7.5	11.5	18.4	30.9	22.9	38.4	27.3	45.6	7.34	14.68		
5.065	2.4	4.3	5.2	8.1	6.4	9.8	7.8	11.9	19.0	32.0	23.6	39.7	28.2	47.2	7.63	15.26		
5.220	2.5	4.5	5.4	8.4	6.6	10.1	8.0	12.3	19.7	33.1	24.4	41.0	29.1	48.8	7.92	15.84		
5.375	2.6	4.6	5.6	8.6	6.8	10.5	8.3	12.7	20.3	34.2	25.2	42.4	30.0	50.3	8.21	16.42		
5.530	2.7	4.8	5.8	8.9	7.0	10.8	8.5	13.1	20.9	35.3	25.9	43.7	30.9	51.9	8.51	17.02		
5.685	2.7	4.9	5.9	9.2	7.2	11.2	8.8	13.5	21.5	36.4	26.7	45.1	31.9	53.6	8.82	17.64		
5.840	2.8	5.1	6.1	9.5	7.5	11.6	9.1	14.0	22.2	37.5	27.5	46.5	32.8	55.2	9.13	18.26		
5.995	2.9	5.2	6.3	9.8	7.7	11.9	9.3	14.4	22.8	38.6	28.3	47.9	33.8	56.9	9.44	18.88		
6.150	3.0	5.4	6.5	10.1	7.9	12.3	9.6	14.9	23.5	39.8	29.1	49.3	34.7	58.5	9.76	19.52		
6.305	3.1	5.5	6.7	10.4	8.1	12.7	9.9	15.3	24.1	40.9	29.9	50.8	35.7	60.2	10.08	20.16		
6.460	3.1	5.7	6.9	10.7	8.4	13.0	10.1	15.7	24.8	42.1	30.7	52.2	36.6	61.9	10.41	20.82		
CSPA																		
68 mm x 13 mm CORRUGATIONS																		
1620 x 1100	0.9	1.5	1.3	1.9	1.5	2.3	1.8	2.7	5.5	8.9	6.8	11.0	8.5	13.8	2.23	4.46		
1800 x 1200	1.0	1.6	1.4	2.0	1.6	2.4	2.0	2.9	5.8	9.5	7.2	11.8	9.0	14.6	2.42	4.84		
1950 x 1320	1.0	1.7	1.5	2.2	1.7	2.6	2.1	3.2	6.2	10.1	7.7	12.5	9.5	15.5	2.58	5.16		
2100 x 1450	1.1	1.8	1.6	2.4	1.9	2.8	2.3	3.4	6.6	10.8	8.1	13.4	10.0	16.4	2.74	5.48		
CSPA																		
75 mm x 25 mm CORRUGATIONS																		
1520 x 1170	1.0	1.6	1.2	1.9	1.5	2.2	1.8	2.7	5.3	8.6	6.6	10.7	8.1	13.1	2.38	4.76		
1670 x 1300	1.0	1.7	1.4	2.0	1.6	2.4	2.0	2.9	5.8	9.4	7.2	11.7	8.6	13.9	2.59	5.18		
1850 x 1400	1.1	1.8	1.4	2.2	1.7	2.6	2.1	3.1	6.1	9.9	7.5	12.3	9.1	14.7	2.81	5.62		
2050 x 1500	1.1	1.9	1.6	2.4	1.9	2.9	2.3	3.5	6.6	10.9	8.2	13.5	9.9	16.0	2.86	5.72		
2200 x 1620	1.2	2.0	1.7	2.6	2.0	3.1	2.5	3.7	7.0	11.6	8.7	14.4	10.4	16.9	3.07	6.14		
2400 x 1720	1.2	2.1	1.8	2.7	2.2	3.3	2.6	4.0	7.4	12.2	9.2	15.2	10.9	17.8	3.27	6.54		
2600 x 1820	1.3	2.2	1.9	2.9	2.3	3.5	2.8	4.2	7.8	12.9	9.7	16.1	11.4	18.7	3.50	7.00		
2840 x 1920	1.4	2.4	2.0	3.1	2.4	3.7	2.9	4.5	8.2	13.6	10.1	16.9	11.9	19.6	3.72	7.44		
2970 x 2020	1.5	2.5	2.1	3.3	2.5	3.9	3.1	4.7	8.6	14.3	10.6	17.8	12.4	20.5	3.94	7.88		
3240 x 2120	1.5	2.6	2.2	3.4	2.7	4.1	3.2	5.0	9.0	15.0	11.1	18.7	12.9	21.4	4.16	8.32		
3470 x 2220	1.6	2.7	2.3	3.6	2.8	4.3	3.4	5.2	9.4	15.8	11.6	19.6	13.5	22.4	4.38	8.76		
3600 x 2320	1.7	2.9	2.4	3.8	2.9	4.6	3.6	5.5	9.8	16.5	12.1	20.5	14.0	23.3	4.62	9.24		

NOTES:


- ① QUANTITIES ARE BASED ON A THICKNESS OF 600 mm 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) + 1200 mm + (2 TIMES CORRUGATION WIDTH) AND A DEPTH EQUAL TO 600 mm + "X" + (CORRUGATION WIDTH). TO COMPUTE THE TOTAL BEDDING QUANTITY MULTIPLY BY (LENGTH OF PIPE MINUS 7.0 m).
- 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.

ALL DIMENSIONS ARE MILLIMETERS  
(mm) UNLESS OTHERWISE NOTED.

DETAILED DRAWING	
REFERENCE STANDARD SPEC. SECTION 552, 603, 613	DWG. NO. 552-08
CONCRETE, RIPRAP AND BEDDING MATERIAL QUANTITIES FOR SING. AND DBL. CULVERT INSTALLATION	

-- REVISED --  
January 2008

EFFECTIVE: APRIL 2006

 MONTANA DEPARTMENT  
OF TRANSPORTATION