

| CULVERT SIZE DIAMETER (in.) | 1 ½ : 1 Slope | | | | 2 : 1 Slope | | | |
|--------------------------------------|----------------|--------------------|--------------------|--------------------|----------------|--------------------|--------------------|--------------------|
| | EC-3 Type B | Depth (T) (18") | Depth (T) (24") | Depth (T) (36") | EC-3 Type B | Depth (T) (18") | Depth (T) (24") | Depth (T) (36") |
| | | Class A1 | Class I | Class II | | Class A1 | Class I | Class II |
| | Sq. Yds. | Cu. Yds. | Cu. Yds. | Cu. Yds. | Sq. Yds. | Cu. Yds. | Cu. Yds. | Cu. Yds. |
| 12 | 1.09 | 0.55 | 0.73 | 1.09 | 1.03 | 0.52 | 0.69 | 1.03 |
| 15 | 1.71 | 0.85 | 1.14 | 1.71 | 1.62 | 0.81 | 1.08 | 1.62 |
| 18 | 2.47 | 1.24 | 1.65 | 2.47 | 2.34 | 1.17 | 1.56 | 2.34 |
| 24 | 4.39 | 2.20 | 2.93 | 4.39 | 4.17 | 2.08 | 2.78 | 4.17 |
| 30 | 6.88 | 3.44 | 4.59 | 6.88 | 6.54 | 3.27 | 4.36 | 6.54 |
| 36 | 16.76 | 8.38 | 11.17 | 16.76 | 15.93 | 7.97 | 10.62 | 15.93 |

TABLE D-4 CULVERT OUTLET PROTECTION WITH ST'D. EW-1 ENDWALLS

| CULVERT SIZE DIAMETER (in.) | Increments For Each Additional Pipe | | | | | | | |
|--------------------------------------|-------------------------------------|----------|--------------------------------|----------|-------------------------------|----------|--------------------------------|----------|
| | EC-3 Type B | | Depth (T) (18") Class A1 | | Depth (T) (24") Class I | | Depth (T) (36") Class II | |
| | Conc. | C. M. | Conc. | C. M. | Conc. | C. M. | Conc. | C. M. |
| | Sq. Yds. | Sq. Yds. | Cu. Yds. | Cu. Yds. | Cu. Yds. | Cu. Yds. | Cu. Yds. | Cu. Yds. |
| 12 | 0.52 | 0.45 | 0.26 | 0.22 | 0.35 | 0.30 | 0.52 | 0.45 |
| 15 | 0.81 | 0.70 | 0.40 | 0.35 | 0.54 | 0.47 | 0.81 | 0.70 |
| 18 | 1.18 | 1.03 | 0.59 | 0.51 | 0.79 | 0.69 | 1.18 | 1.03 |
| 24 | 2.07 | 1.83 | 1.03 | 0.91 | 1.38 | 1.22 | 2.07 | 1.83 |
| 30 | 3.25 | 2.88 | 1.63 | 1.44 | 2.17 | 1.92 | 3.25 | 2.88 |
| 36 | 6.74 | 5.53 | 3.37 | 3.43 | 4.49 | 4.13 | 6.74 | 5.33 |

TABLE D-5 CULVERT OUTLET PROTECTION WITH ST'D. EW-6 ENDWALLS*

* Rev. 7/08

| ELLIPTICAL PIPE SPAN RISE (in.) | 1 ½ : 1 Slope | | | | 2 : 1 Slope | | | |
|--|----------------|------------------------------------|-----------------------------------|------------------------------------|----------------|------------------------------------|-----------------------------------|------------------------------------|
| | EC-3 Type B | Depth (T) (18") Class A1 | Depth (T) (24") Class I | Depth (T) (36") Class II | EC-3 Type B | Depth (T) (18") Class A1 | Depth (T) (24") Class I | Depth (T) (36") Class II |
| | Sq. Yds. | Cu. Yds. | Cu. Yds. | Cu. Yds. | Sq. Yds. | Cu. Yds. | Cu. Yds. | Cu. Yds. |
| | | | | | | | | |
| 23 x 14 | 2.43 | 1.21 | 1.62 | 2.43 | 2.31 | 1.15 | 1.54 | 2.31 |
| 30 x 19 | 4.35 | 2.17 | 2.90 | 4.35 | 4.12 | 2.06 | 2.75 | 4.12 |
| 34 x 22 | 5.71 | 2.85 | 3.81 | 5.71 | 5.41 | 2.71 | 3.61 | 5.41 |
| 38 x 24 | 6.94 | 3.47 | 4.63 | 6.94 | 6.60 | 3.30 | 4.40 | 6.60 |
| 42 x 27 | 8.67 | 4.33 | 5.78 | 8.67 | 8.25 | 4.12 | 5.49 | 8.23 |
| 45 x 29 | 9.97 | 4.99 | 6.65 | 9.97 | 9.46 | 4.73 | 6.31 | 9.46 |
| 49 x 32 | 12.01 | 6.00 | 8.01 | 12.01 | 11.40 | 5.70 | 7.60 | 11.40 |
| 53 x 34 | 13.78 | 6.89 | 9.19 | 13.78 | 13.09 | 6.55 | 8.73 | 13.09 |

**TABLE D-6 CULVERT OUTLET PROTECTION WITH ST'D. EW-2S AND EW-7S
ENDWALLS (30° SKEW)***

* Rev. 7/08

| CULVERT SIZE DIAMETER (in.) | 1 ½ : 1 Slope | | | | 2 : 1 Slope | | | |
|--------------------------------------|----------------|--------------------|--------------------|--------------------|----------------|--------------------|--------------------|--------------------|
| | EC-3 Type B | Depth (T) (18") | Depth (T) (24") | Depth (T) (36") | EC-3 Type B | Depth (T) (18") | Depth (T) (24") | Depth (T) (36") |
| | | Class A1 | Class I | Class II | | Class A1 | Class I | Class II |
| | Sq. Yds. | Cu. Yds. | Cu. Yds. | Cu. Yds. | Sq. Yds. | Cu. Yds. | Cu. Yds. | Cu. Yds. |
| 42 | 25.46 | 12.73 | 16.97 | 25.46 | 23.91 | 11.96 | 15.94 | 23.91 |
| 48 | 33.29 | 16.64 | 22.19 | 33.29 | 31.25 | 15.62 | 20.83 | 31.25 |
| 54 | 42.02 | 21.01 | 28.01 | 42.02 | 39.56 | 19.78 | 26.37 | 39.56 |
| 60 | 52.04 | 26.02 | 34.69 | 52.04 | 48.20 | 24.10 | 32.13 | 48.20 |
| 66 | 63.29 | 31.64 | 42.19 | 63.29 | 59.15 | 29.57 | 39.43 | 59.15 |
| 72 | 75.03 | 37.52 | 50.02 | 75.03 | 70.41 | 35.21 | 46.94 | 70.41 |
| 78 | 88.08 | 44.04 | 58.72 | 88.08 | 82.67 | 41.33 | 55.11 | 82.67 |
| 84 | 102.17 | 51.08 | 68.11 | 102.17 | 95.90 | 47.95 | 63.93 | 95.90 |

**TABLE D-7 CULVERT OUTLET PROTECTION WITH ST'D. EW-2 ENDWALLS
(30° SKEW)**

| CULVERT SIZE DIAMETER (in.) | Increments For Each Additional Pipe | | | |
|--------------------------------------|-------------------------------------|--------------------|--------------------|--------------------|
| | EC-3 Type B | Depth (T) (18") | Depth (T) (24") | Depth (T) (36") |
| | | Class A1 | Class I | Class II |
| | Conc. | Conc. | Conc. | Conc. |
| | Sq. Yds. | Cu. Yds. | Cu. Yds. | Cu. Yds. |
| 42 | 11.67 | 5.83 | 7.78 | 11.67 |
| 48 | 15.17 | 7.58 | 10.11 | 15.17 |
| 54 | 19.17 | 9.58 | 12.78 | 19.17 |
| 60 | 23.60 | 11.80 | 15.73 | 23.60 |
| 66 | 28.51 | 14.26 | 19.01 | 28.51 |
| 72 | 33.90 | 16.95 | 22.60 | 33.90 |
| 78 | 39.71 | 19.86 | 26.48 | 39.71 |
| 84 | 46.01 | 23.01 | 30.68 | 46.01 |

**TABLE D-8 CULVERT OUTLET PROTECTION WITH ST'D. EW-7 ENDWALLS
(30° SKEW)***

* Rev. 7/08

| CULVERT SIZE DIAMETER (in.) | 1 ½ : 1 Slope | | | | 2 : 1 Slope | | | |
|--------------------------------------|----------------|--------------------|--------------------|--------------------|----------------|--------------------|--------------------|--------------------|
| | EC-3 Type B | Depth (T) (18") | Depth (T) (24") | Depth (T) (36") | EC-3 Type B | Depth (T) (18") | Depth (T) (24") | Depth (T) (36") |
| | | Class A1 | Class I | Class II | | Class A1 | Class I | Class II |
| | Sq. Yds. | Cu. Yds. | Cu. Yds. | Cu. Yds. | Sq. Yds. | Cu. Yds. | Cu. Yds. | Cu. Yds. |
| 42 | 26.09 | 13.04 | 17.39 | 26.09 | 24.54 | 12.27 | 16.36 | 24.54 |
| 48 | 34.11 | 17.06 | 22.74 | 34.11 | 32.07 | 16.04 | 21.38 | 32.07 |
| 54 | 43.20 | 21.60 | 28.80 | 43.20 | 40.61 | 20.30 | 27.07 | 40.61 |
| 60 | 53.34 | 26.67 | 35.56 | 53.34 | 49.50 | 24.75 | 33.00 | 49.50 |
| 66 | 64.85 | 32.42 | 43.23 | 64.85 | 60.71 | 30.35 | 40.47 | 60.71 |
| 72 | 76.89 | 38.45 | 51.26 | 76.89 | 72.27 | 36.14 | 48.18 | 72.27 |
| 78 | 90.27 | 45.14 | 60.18 | 90.27 | 70.83 | 35.42 | 47.22 | 70.83 |
| 84 | 104.70 | 52.35 | 69.80 | 104.70 | 98.42 | 49.21 | 65.61 | 98.42 |

**TABLE D-9 CULVERT OUTLET PROTECTION WITH ST'D. EW-2S ENDWALLS
(30° SKEW)**

| CULVERT SIZE DIAMETER (in.) | Increments For Each Additional Pipe | | | |
|--------------------------------------|-------------------------------------|--------------------|--------------------|--------------------|
| | EC-3 Type B | Depth (T) (18") | Depth (T) (24") | Depth (T) (36") |
| | Class A1 | Class I | Class II | Class II |
| | Conc. | Conc. | Conc. | Conc. |
| Sq. Yds. | Cu. Yds. | Cu. Yds. | Cu. Yds. | |
| 42 | 13.46 | 6.73 | 8.98 | 13.46 |
| 48 | 17.50 | 8.75 | 11.66 | 17.50 |
| 54 | 22.15 | 11.06 | 14.76 | 22.15 |
| 60 | 27.25 | 13.61 | 18.17 | 27.25 |
| 66 | 32.95 | 16.46 | 21.96 | 32.95 |
| 72 | 39.15 | 19.56 | 26.10 | 39.15 |
| 78 | 45.85 | 22.91 | 30.57 | 45.85 |
| 84 | 53.15 | 26.56 | 35.43 | 53.15 |

**TABLE D-10 CULVERT OUTLET PROTECTION WITH ST'D. EW-7S ENDWALLS
(30° SKEW)***

* Rev. 7/08

| CULVERT SIZE DIAMETER (in.) | 1 ½ : 1 Slope | | | | 2 : 1 Slope | | | |
|--------------------------------------|----------------|--------------------|--------------------|--------------------|----------------|--------------------|--------------------|--------------------|
| | EC-3 Type B | Depth (T) (18") | Depth (T) (24") | Depth (T) (36") | EC-3 Type B | Depth (T) (18") | Depth (T) (24") | Depth (T) (36") |
| | | Class A1 | Class I | Class II | | Class A1 | Class I | Class II |
| | Sq. Yds. | Cu. Yds. | Cu. Yds. | Cu. Yds. | Sq. Yds. | Cu. Yds. | Cu. Yds. | Cu. Yds. |
| 42 | 28.80 | 14.40 | 19.20 | 28.80 | 27.65 | 13.82 | 18.43 | 27.65 |
| 48 | 37.64 | 18.82 | 25.09 | 37.64 | 36.12 | 18.06 | 24.08 | 36.12 |
| 54 | 47.64 | 23.82 | 31.76 | 47.64 | 45.71 | 22.85 | 30.47 | 45.71 |
| 60 | 58.80 | 29.40 | 39.20 | 58.80 | 55.77 | 27.89 | 37.18 | 55.77 |
| 66 | 71.12 | 35.56 | 47.41 | 71.12 | 68.30 | 34.15 | 45.53 | 68.30 |
| 72 | 84.71 | 42.35 | 56.47 | 84.71 | 81.29 | 40.64 | 54.19 | 81.29 |
| 78 | 99.41 | 49.70 | 66.27 | 99.41 | 95.39 | 47.69 | 63.59 | 95.39 |
| 84 | 115.29 | 57.65 | 76.86 | 115.29 | 110.63 | 55.31 | 73.75 | 110.63 |

**TABLE D-11 CULVERT OUTLET PROTECTION WITH ST'D. EW-2S ENDWALLS
(45° SKEW)**

| CULVERT SIZE DIAMETER (in.) | Increments For Each Additional Pipe | | | |
|--------------------------------------|-------------------------------------|--------------------|--------------------|--------------------|
| | EC-3 Type B | Depth (T) (18") | Depth (T) (24") | Depth (T) (36") |
| | | Class A1 | Class I | Class II |
| | Conc. | Conc. | Conc. | Conc. |
| Sq. Yds. | Cu. Yds. | Cu. Yds. | Cu. Yds. | |
| 42 | 12.63 | 6.32 | 8.42 | 12.63 |
| 48 | 16.44 | 8.22 | 10.96 | 16.44 |
| 54 | 20.78 | 10.39 | 13.85 | 20.78 |
| 60 | 25.58 | 12.79 | 17.05 | 25.58 |
| 66 | 30.92 | 15.46 | 20.61 | 30.92 |
| 72 | 36.75 | 18.38 | 24.50 | 36.75 |
| 78 | 43.10 | 21.55 | 28.73 | 43.10 |
| 84 | 49.94 | 24.97 | 33.29 | 49.94 |

**TABLE D-12 CULVERT OUTLET PROTECTION WITH ST'D. EW-7S ENDWALLS
(45° SKEW)***

* Rev. 7/08

| ELLIPTICAL PIPE SPAN RISE (in.) | 1 ½ : 1 Slope | | | | 2 : 1 Slope | | | |
|--|----------------|--------------------------------|-------------------------------|--------------------------------|----------------|--------------------------------|-------------------------------|--------------------------------|
| | EC-3 Type B | Depth (T) (18") Class A1 | Depth (T) (24") Class I | Depth (T) (36") Class II | EC-3 Type B | Depth (T) (18") Class A1 | Depth (T) (24") Class I | Depth (T) (36") Class II |
| | Sq. Yds. | Cu. Yds. | Cu. Yds. | Cu. Yds. | Sq. Yds. | Cu. Yds. | Cu. Yds. | Cu. Yds. |
| | | | | | | | | |
| 60 x 38 | 29.10 | 14.55 | 19.40 | 29.10 | 26.39 | 13.19 | 17.59 | 26.39 |
| 68 x 43 | 37.95 | 18.98 | 25.30 | 37.95 | 34.52 | 17.26 | 23.01 | 34.52 |
| 76 x 48 | 47.31 | 23.66 | 31.54 | 47.31 | 42.99 | 21.50 | 28.66 | 42.99 |
| 83 x 53 | 57.03 | 28.52 | 38.02 | 57.03 | 51.86 | 25.93 | 34.57 | 51.86 |
| 91 x 58 | 68.34 | 34.17 | 45.56 | 68.34 | 62.07 | 31.04 | 41.38 | 62.07 |
| 98 x 63 | 80.82 | 40.41 | 53.88 | 80.82 | 72.66 | 36.33 | 48.44 | 72.66 |
| 106 x 68 | 93.35 | 46.67 | 62.23 | 93.35 | 84.74 | 42.37 | 56.49 | 84.74 |
| | | | | | | | | |
| | | | | | | | | |

TABLE D-13 CULVERT OUTLET PROTECTION WITH ST'D. EW-2A ENDWALLS*

* Rev. 7/08

| PIPE ARCH Span Riser (in.) | 1 ½ : 1 Slope | | | | 2 : 1 Slope | | | |
|--------------------------------------|----------------|--------------------|--------------------|--------------------|----------------|--------------------|--------------------|--------------------|
| | EC-3 Type B | Depth (T) (18") | Depth (T) (24") | Depth (T) (36") | EC-3 Type B | Depth (T) (18") | Depth (T) (24") | Depth (T) (36") |
| | | Class A1 | Class I | Class II | | Class A1 | Class I | Class II |
| | Sq. Yds. | Cu. Yds. | Cu. Yds. | Cu. Yds. | Sq. Yds. | Cu. Yds. | Cu. Yds. | Cu. Yds. |
| 17 x 13 | 1.68 | 0.84 | 1.12 | 1.68 | 1.59 | 0.79 | 1.06 | 1.59 |
| 21 x 15 | 2.40 | 1.20 | 1.60 | 2.40 | 2.28 | 1.14 | 1.52 | 2.28 |
| 24 x 18 | 3.30 | 1.65 | 2.20 | 3.30 | 3.13 | 1.57 | 2.09 | 3.13 |
| 28 x 20 | 4.29 | 2.14 | 2.86 | 4.29 | 4.06 | 2.03 | 2.71 | 4.06 |
| 35 x 24 | 6.40 | 3.20 | 4.27 | 6.40 | 6.07 | 3.04 | 4.05 | 6.07 |
| 42 x 29 | 9.30 | 4.65 | 6.20 | 9.30 | 8.83 | 4.42 | 5.89 | 8.83 |
| 49 x 33 | 12.40 | 6.20 | 8.27 | 12.40 | 11.77 | 5.89 | 7.85 | 11.77 |
| 57 x 38 | 24.33 | 12.11 | 16.15 | 24.33 | 23.03 | 11.51 | 15.35 | 23.03 |

TABLE D-14 CULVERT OUTLET PROTECTION WITH ST'D. EW-9 PIPE ARCHES

| PIPE ARCH Span Riser (in.) | Increments For Each Additional Pipe | | | |
|--------------------------------------|-------------------------------------|--------------------------------|-------------------------------|--------------------------------|
| | EC-3 Type B | Depth (T) (18") Class A1 | Depth (T) (24") Class I | Depth (T) (36") Class II |
| | Conc. | Conc. | Conc. | Conc. |
| | Sq. Yds. | Cu. Yds. | Cu. Yds. | Cu. Yds. |
| 17 x 13 | 0.78 | 0.39 | 0.52 | 0.78 |
| 21 x 15 | 1.05 | 0.52 | 0.70 | 1.05 |
| 24 x 18 | 1.38 | 0.69 | 0.92 | 1.38 |
| 28 x 20 | 1.71 | 0.85 | 1.14 | 1.71 |
| 35 x 24 | 2.37 | 1.18 | 1.58 | 2.37 |
| 42 x 29 | 3.49 | 1.75 | 2.33 | 3.49 |
| 49 x 33 | 4.65 | 2.32 | 3.10 | 4.65 |
| 57 x 38 | 11.33 | 5.66 | 7.55 | 11.33 |

TABLE D-15 CULVERT OUTLET PROTECTION WITH ST'D. EW-10 PIPE ARCHES*

* Rev. 7/08

| CULVERT SIZE (FEET) SPAN X RISE | 1 ½ : 1 Slope | | | | 2 : 1 Slope | | | |
|---|----------------|-----------------------|-----------------------|-----------------------|----------------|-----------------------|-----------------------|-----------------------|
| | EC-3 Type B | Depth (T) (18") | Depth (T) (24") | Depth (T) (36") | EC-3 Type B | Depth (T) (18") | Depth (T) (24") | Depth (T) (36") |
| | | Class A1 | Class I | Class II | | Class A1 | Class I | Class II |
| | Sq. Yds. | Cu. Yds. | Cu. Yds. | Cu. Yds. | Sq. Yds. | Cu. Yds. | Cu. Yds. | Cu. Yds. |
| 3 x 3 | 21.12 | 10.56 | 14.08 | 21.12 | 20.39 | 10.19 | 13.59 | 20.39 |
| 3 x 4 | 28.71 | 14.36 | 19.14 | 28.71 | 28.26 | 14.13 | 18.84 | 28.26 |
| 4 x 3 | 28.49 | 14.24 | 18.99 | 28.49 | 26.85 | 13.43 | 17.90 | 26.85 |
| 4 x 4 | 37.61 | 18.80 | 25.07 | 37.61 | 36.41 | 18.20 | 24.27 | 36.41 |
| 4 x 5 | 47.66 | 23.83 | 31.77 | 47.66 | 46.86 | 23.43 | 31.24 | 46.86 |
| 4 x 6 | 58.01 | 29.00 | 38.67 | 58.01 | 58.34 | 29.17 | 38.89 | 58.34 |
| 5 x 3 | 36.62 | 18.31 | 24.41 | 36.62 | 33.95 | 16.97 | 22.63 | 33.95 |
| 5 x 4 | 47.25 | 23.63 | 31.50 | 47.25 | 44.78 | 22.39 | 29.85 | 44.78 |
| 5 x 5 | 58.82 | 29.41 | 39.21 | 58.82 | 56.72 | 28.36 | 37.81 | 56.72 |
| 5 x 6 | 70.86 | 35.43 | 47.24 | 70.86 | 69.62 | 34.81 | 46.41 | 69.62 |
| 5 x 7 | 84.08 | 42.04 | 56.05 | 84.08 | 83.45 | 41.72 | 55.63 | 83.45 |
| 6 x 4 | 57.68 | 28.84 | 38.45 | 57.68 | 53.93 | 26.96 | 35.95 | 53.93 |
| 6 x 5 | 70.74 | 35.37 | 47.16 | 70.74 | 67.20 | 33.60 | 44.80 | 67.20 |
| 6 x 6 | 84.50 | 42.25 | 56.33 | 84.50 | 81.54 | 40.77 | 54.36 | 81.54 |
| 6 x 7 | 97.89 | 48.95 | 65.26 | 97.89 | 96.83 | 48.41 | 64.55 | 96.83 |
| 6 x 8 | 114.17 | 57.08 | 76.11 | 114.17 | 113.04 | 56.52 | 75.36 | 113.04 |
| 7 x 4 | 68.82 | 34.41 | 45.88 | 68.82 | 63.77 | 31.88 | 42.51 | 63.77 |
| 7 x 6 | 98.96 | 49.48 | 65.97 | 98.96 | 94.10 | 47.05 | 62.73 | 94.10 |
| 7 x 8 | 132.47 | 66.23 | 88.31 | 132.47 | 128.49 | 64.25 | 85.66 | 128.49 |
| 7 x 10 | 167.46 | 83.73 | 111.64 | 167.46 | 165.53 | 82.76 | 110.35 | 165.53 |
| 8 x 4 | 80.73 | 40.37 | 53.82 | 80.73 | 74.30 | 37.15 | 49.53 | 74.30 |
| 8 x 6 | 114.09 | 57.05 | 76.06 | 114.09 | 107.36 | 53.68 | 71.57 | 107.36 |
| 8 x 8 | 150.47 | 75.23 | 100.31 | 150.47 | 145.11 | 72.56 | 96.74 | 145.11 |
| 8 x 10 | 189.00 | 94.50 | 126.00 | 189.00 | 174.18 | 87.09 | 116.12 | 174.18 |
| 9 x 4 | 93.39 | 46.70 | 62.26 | 93.39 | 85.47 | 42.74 | 56.98 | 85.47 |
| 9 x 6 | 130.17 | 65.09 | 86.78 | 130.17 | 121.41 | 60.71 | 80.94 | 121.41 |
| 9 x 8 | 163.32 | 81.66 | 108.88 | 163.32 | 161.72 | 80.86 | 107.81 | 161.72 |
| 9 x 10 | 211.31 | 105.65 | 140.87 | 211.31 | 217.35 | 108.68 | 144.90 | 217.35 |
| 9 x 12 | 256.28 | 128.14 | 170.85 | 256.28 | 293.36 | 146.68 | 195.57 | 293.36 |
| 10 x 4 | 106.83 | 53.42 | 71.22 | 106.83 | 97.31 | 48.65 | 64.87 | 97.31 |
| 10 x 6 | 147.00 | 73.50 | 98.00 | 147.00 | 136.13 | 68.06 | 90.75 | 136.13 |
| 10 x 8 | 189.03 | 94.52 | 126.02 | 189.03 | 179.00 | 89.50 | 119.33 | 179.00 |
| 10 x 10 | 234.86 | 117.43 | 156.57 | 234.86 | 226.31 | 113.15 | 150.87 | 226.31 |
| 10 x 12 | 283.50 | 141.75 | 189.00 | 283.50 | 277.40 | 138.70 | 184.93 | 277.40 |
| 12 x 6 | 182.09 | 91.04 | 121.39 | 182.09 | 168.32 | 84.16 | 112.21 | 168.32 |
| 12 x 8 | 231.05 | 115.52 | 154.03 | 231.05 | 215.67 | 107.84 | 143.78 | 215.67 |
| 12 x 10 | 283.01 | 141.50 | 188.67 | 283.01 | 268.80 | 134.40 | 179.20 | 268.80 |
| 12 x 12 | 338.57 | 169.28 | 225.71 | 338.57 | 326.13 | 163.07 | 217.42 | 326.13 |

TABLE D-16 CULVERT OUTLET PROTECTION FOR BOX CULVERT ST'D BCS-02 THRU BCS-50 (NO SKEW)*

* Rev. 7/08

| CULVERT SIZE (FEET) SPAN X RISE | 1 ½ : 1 Slope | | | | 2 : 1 Slope | | | |
|---|----------------|-----------------------|-----------------------|-----------------------|----------------|-----------------------|-----------------------|-----------------------|
| | EC-3 Type B | Depth (T) (18") | Depth (T) (24") | Depth (T) (36") | EC-3 Type B | Depth (T) (18") | Depth (T) (24") | Depth (T) (36") |
| | | Class A1 | Class I | Class II | | Class A1 | Class I | Class II |
| | Sq. Yds. | Cu. Yds. | Cu. Yds. | Cu. Yds. | Sq. Yds. | Cu. Yds. | Cu. Yds. | Cu. Yds. |
| 3 x 3 | 21.23 | 10.61 | 14.15 | 21.23 | 20.49 | 10.25 | 13.66 | 20.49 |
| 3 x 4 | 28.86 | 14.43 | 19.24 | 28.86 | 28.40 | 14.20 | 18.93 | 28.40 |
| 4 x 3 | 28.62 | 14.31 | 19.08 | 28.62 | 27.00 | 13.50 | 18.00 | 27.00 |
| 4 x 4 | 37.80 | 18.90 | 25.20 | 37.80 | 36.59 | 18.29 | 24.39 | 36.59 |
| 4 x 5 | 47.90 | 23.95 | 31.93 | 47.90 | 47.13 | 23.57 | 31.42 | 47.13 |
| 4 x 6 | 58.29 | 29.15 | 38.86 | 58.29 | 58.62 | 29.31 | 39.08 | 58.62 |
| 5 x 3 | 36.50 | 18.25 | 24.33 | 36.50 | 34.13 | 17.06 | 22.75 | 34.13 |
| 5 x 4 | 47.48 | 23.74 | 31.65 | 47.48 | 45.00 | 22.50 | 30.00 | 45.00 |
| 5 x 5 | 59.12 | 29.56 | 39.41 | 59.12 | 57.02 | 28.51 | 38.01 | 57.02 |
| 5 x 6 | 71.21 | 35.60 | 47.47 | 71.21 | 69.96 | 34.98 | 46.64 | 69.96 |
| 5 x 7 | 84.50 | 42.25 | 56.33 | 84.50 | 83.87 | 41.93 | 55.91 | 83.87 |
| 6 x 4 | 57.96 | 28.98 | 38.64 | 57.96 | 54.21 | 27.11 | 36.14 | 54.21 |
| 6 x 5 | 71.10 | 35.55 | 47.40 | 71.10 | 67.56 | 33.78 | 45.04 | 67.56 |
| 6 x 6 | 84.93 | 42.47 | 56.62 | 84.93 | 81.98 | 40.99 | 54.65 | 81.98 |
| 6 x 7 | 98.39 | 49.19 | 65.59 | 98.39 | 97.32 | 48.66 | 64.88 | 97.32 |
| 6 x 8 | 114.72 | 57.36 | 76.48 | 114.72 | 113.61 | 56.81 | 75.74 | 113.61 |
| 7 x 4 | 69.17 | 34.58 | 46.11 | 69.17 | 64.10 | 32.05 | 42.73 | 64.10 |
| 7 x 6 | 99.45 | 49.73 | 66.30 | 99.45 | 30.18 | 15.09 | 20.12 | 30.18 |
| 7 x 8 | 197.39 | 98.69 | 131.59 | 197.39 | 129.15 | 64.58 | 86.10 | 129.15 |
| 7 x 10 | 168.27 | 84.14 | 112.18 | 168.27 | 166.35 | 83.18 | 110.90 | 166.35 |
| 8 x 4 | 81.11 | 40.55 | 54.07 | 81.11 | 74.67 | 37.34 | 49.78 | 74.67 |
| 8 x 6 | 114.65 | 57.32 | 76.43 | 114.65 | 107.91 | 53.96 | 71.94 | 107.91 |
| 8 x 8 | 151.22 | 75.61 | 100.81 | 151.22 | 145.86 | 72.93 | 97.24 | 145.86 |
| 8 x 10 | 189.95 | 94.97 | 126.63 | 189.95 | 175.11 | 87.56 | 116.74 | 175.11 |
| 9 x 4 | 93.83 | 46.91 | 62.55 | 93.83 | 85.89 | 42.95 | 57.26 | 85.89 |
| 9 x 6 | 130.80 | 65.40 | 87.20 | 130.80 | 122.04 | 61.02 | 81.36 | 122.04 |
| 9 x 8 | 164.18 | 82.09 | 109.45 | 164.18 | 162.57 | 81.29 | 108.38 | 162.57 |
| 9 x 10 | 212.37 | 106.19 | 141.58 | 212.37 | 218.42 | 109.21 | 145.61 | 218.42 |
| 9 x 12 | 257.54 | 128.77 | 171.69 | 257.54 | 294.63 | 147.32 | 196.42 | 294.63 |
| 10 x 4 | 107.30 | 53.65 | 71.53 | 107.30 | 97.77 | 48.89 | 65.18 | 97.77 |
| 10 x 6 | 147.71 | 73.85 | 98.47 | 147.71 | 136.83 | 68.42 | 91.22 | 136.83 |
| 10 x 8 | 189.98 | 94.99 | 126.65 | 189.98 | 179.93 | 89.96 | 119.95 | 179.93 |
| 10 x 10 | 236.03 | 118.01 | 157.35 | 236.03 | 227.48 | 113.74 | 151.65 | 227.48 |
| 10 x 12 | 284.91 | 142.46 | 189.94 | 284.91 | 278.81 | 139.40 | 185.87 | 278.81 |
| 12 x 6 | 182.94 | 91.47 | 121.96 | 182.94 | 169.17 | 84.59 | 112.78 | 169.17 |
| 12 x 8 | 232.17 | 116.09 | 154.78 | 232.17 | 216.80 | 108.40 | 144.53 | 216.80 |
| 12 x 10 | 284.42 | 142.21 | 189.61 | 284.42 | 270.21 | 135.11 | 180.14 | 270.21 |
| 12 x 12 | 340.26 | 170.13 | 226.84 | 340.26 | 327.83 | 163.91 | 218.55 | 327.83 |

**TABLE D-17 CULVERT OUTLET PROTECTION FOR BOX CULVERT ST'D BCS-02
THRU BCS-50 (15° SKEW)***

* Rev. 7/08

| CULVERT SIZE (FEET) | 1 ½ : 1 Slope | | | | 2 : 1 Slope | | | |
|---------------------------|----------------|-----------------------|-----------------------|-----------------------|----------------|-----------------------|-----------------------|-----------------------|
| | EC-3 Type B | Depth (T) (18") | Depth (T) (24") | Depth (T) (36") | EC-3 Type B | Depth (T) (18") | Depth (T) (24") | Depth (T) (36") |
| | | Class A1 | Class I | Class II | | Class A1 | Class I | Class II |
| | SPAN X RISE | Sq. Yds. | Cu. Yds. | Cu. Yds. | Cu. Yds. | Sq. Yds. | Cu. Yds. | Cu. Yds. |
| 3 x 3 | 21.69 | 10.85 | 14.46 | 21.69 | 21.03 | 10.52 | 14.02 | 21.03 |
| 3 x 4 | 29.61 | 14.81 | 19.74 | 29.61 | 29.40 | 14.70 | 19.60 | 29.40 |
| 4 x 3 | 29.07 | 14.54 | 19.38 | 29.07 | 27.48 | 13.74 | 18.32 | 27.48 |
| 4 x 4 | 38.67 | 19.34 | 25.78 | 38.67 | 37.59 | 18.80 | 25.06 | 37.59 |
| 4 x 5 | 49.22 | 24.61 | 32.81 | 49.22 | 48.87 | 24.44 | 32.58 | 48.87 |
| 4 x 6 | 60.56 | 30.28 | 40.37 | 60.56 | 61.35 | 30.68 | 40.90 | 61.35 |
| 5 x 3 | 37.22 | 18.61 | 24.81 | 37.22 | 34.55 | 17.27 | 23.03 | 34.55 |
| 5 x 4 | 48.27 | 24.14 | 32.18 | 48.27 | 45.90 | 22.95 | 30.60 | 45.90 |
| 5 x 5 | 60.39 | 30.20 | 40.26 | 60.39 | 62.21 | 31.10 | 41.47 | 62.21 |
| 5 x 6 | 73.35 | 36.68 | 48.90 | 73.35 | 72.50 | 36.25 | 48.33 | 72.50 |
| 5 x 7 | 87.30 | 43.65 | 58.20 | 87.30 | 87.38 | 43.69 | 58.25 | 87.38 |
| 6 x 4 | 58.77 | 29.39 | 39.18 | 58.77 | 55.04 | 27.52 | 36.69 | 55.04 |
| 6 x 5 | 72.35 | 36.17 | 48.23 | 72.35 | 69.00 | 34.50 | 46.00 | 69.00 |
| 6 x 6 | 86.93 | 43.46 | 57.95 | 86.93 | 84.30 | 42.15 | 56.20 | 84.30 |
| 6 x 7 | 100.83 | 50.42 | 67.22 | 100.83 | 100.64 | 50.32 | 67.09 | 100.64 |
| 6 x 8 | 118.52 | 59.26 | 79.01 | 118.52 | 118.22 | 59.11 | 78.81 | 118.22 |
| 7 x 4 | 84.98 | 42.49 | 56.65 | 84.98 | 64.86 | 32.43 | 43.24 | 64.86 |
| 7 x 6 | 101.27 | 50.63 | 67.51 | 101.27 | 96.74 | 48.37 | 64.49 | 96.74 |
| 7 x 8 | 136.32 | 68.16 | 90.88 | 136.32 | 133.52 | 66.76 | 89.01 | 133.52 |
| 7 x 10 | 174.42 | 87.21 | 116.28 | 174.42 | 174.21 | 87.11 | 116.14 | 174.21 |
| 8 x 4 | 81.96 | 40.98 | 54.64 | 81.96 | 75.36 | 37.68 | 50.24 | 75.36 |
| 8 x 6 | 116.39 | 58.19 | 77.59 | 116.39 | 109.85 | 54.92 | 73.23 | 109.85 |
| 8 x 8 | 154.32 | 77.16 | 102.88 | 154.32 | 150.05 | 75.02 | 100.03 | 150.05 |
| 8 x 10 | 196.26 | 98.13 | 130.84 | 196.26 | 182.82 | 91.41 | 121.88 | 182.82 |
| 9 x 4 | 94.68 | 47.34 | 63.12 | 94.68 | 86.52 | 43.26 | 57.68 | 86.52 |
| 9 x 6 | 132.45 | 66.23 | 88.30 | 132.45 | 123.81 | 61.91 | 82.54 | 123.81 |
| 9 x 8 | 167.51 | 83.75 | 111.67 | 167.51 | 166.50 | 83.25 | 111.00 | 166.50 |
| 9 x 10 | 218.42 | 109.21 | 145.61 | 218.42 | 225.68 | 112.84 | 150.45 | 225.68 |
| 9 x 12 | 266.64 | 133.32 | 177.76 | 266.64 | 305.79 | 152.90 | 203.86 | 305.79 |
| 10 x 4 | 108.18 | 54.09 | 72.12 | 108.18 | 98.34 | 49.17 | 65.56 | 98.34 |
| 10 x 6 | 149.27 | 74.63 | 99.51 | 149.27 | 138.45 | 69.23 | 92.30 | 138.45 |
| 10 x 8 | 193.16 | 96.58 | 128.77 | 193.16 | 183.66 | 91.83 | 122.44 | 183.66 |
| 10 x 10 | 241.77 | 120.89 | 161.18 | 241.77 | 234.47 | 117.23 | 156.31 | 234.47 |
| 10 x 12 | 293.69 | 146.84 | 195.79 | 293.69 | 289.74 | 144.87 | 193.16 | 289.74 |
| 12 x 6 | 184.10 | 92.05 | 122.73 | 184.10 | 170.30 | 85.15 | 113.53 | 170.30 |
| 12 x 8 | 235.04 | 117.52 | 156.69 | 235.04 | 219.90 | 109.95 | 146.60 | 219.90 |
| 12 x 10 | 289.53 | 144.77 | 193.02 | 289.53 | 276.30 | 138.15 | 184.20 | 276.30 |
| 12 x 12 | 348.38 | 174.19 | 232.25 | 348.38 | 337.88 | 168.94 | 225.25 | 337.88 |

**TABLE D-18 CULVERT OUTLET PROTECTION FOR BOX CULVERT ST'D BCS-02
THRU BCS-50 (30° SKEW)***

* Rev. 7/08

| CULVERT SIZE (FEET) | 1 ½ : 1 Slope | | | | 2 : 1 Slope | | | |
|---------------------------|----------------|-----------------------|-----------------------|-----------------------|----------------|-----------------------|-----------------------|-----------------------|
| | EC-3 Type B | Depth (T) (18") | Depth (T) (24") | Depth (T) (36") | EC-3 Type B | Depth (T) (18") | Depth (T) (24") | Depth (T) (36") |
| | | Class A1 | Class I | Class II | | Class A1 | Class I | Class II |
| | SPAN X RISE | Sq. Yds. | Cu. Yds. | Cu. Yds. | Cu. Yds. | Sq. Yds. | Cu. Yds. | Cu. Yds. |
| 3 x 3 | 22.46 | 11.23 | 14.97 | 22.46 | 21.80 | 10.90 | 14.53 | 21.80 |
| 3 x 4 | 30.65 | 15.32 | 20.43 | 30.65 | 30.44 | 15.22 | 20.29 | 30.44 |
| 4 x 3 | 30.11 | 15.05 | 20.07 | 30.11 | 28.52 | 14.26 | 19.01 | 28.52 |
| 4 x 4 | 40.05 | 20.03 | 26.70 | 40.05 | 38.97 | 19.49 | 25.98 | 38.97 |
| 4 x 5 | 50.96 | 25.48 | 33.97 | 50.96 | 50.60 | 25.30 | 33.73 | 50.60 |
| 4 x 6 | 62.64 | 31.32 | 41.76 | 62.64 | 63.42 | 31.71 | 42.28 | 63.42 |
| 5 x 3 | 38.51 | 19.25 | 25.67 | 38.51 | 35.85 | 17.93 | 23.90 | 35.85 |
| 5 x 4 | 50.01 | 25.01 | 33.34 | 50.01 | 47.63 | 23.81 | 31.75 | 47.63 |
| 5 x 5 | 62.57 | 31.28 | 41.71 | 62.57 | 60.77 | 30.38 | 40.51 | 60.77 |
| 5 x 6 | 75.95 | 37.97 | 50.63 | 75.95 | 75.09 | 37.55 | 50.06 | 75.09 |
| 5 x 7 | 90.33 | 45.17 | 60.22 | 90.33 | 90.41 | 45.20 | 60.27 | 90.41 |
| 6 x 4 | 60.86 | 30.43 | 40.57 | 60.86 | 57.11 | 28.55 | 38.07 | 57.11 |
| 6 x 5 | 74.94 | 37.47 | 49.96 | 74.94 | 71.60 | 35.80 | 47.73 | 71.60 |
| 6 x 6 | 90.03 | 45.02 | 60.02 | 90.03 | 87.42 | 43.71 | 58.28 | 87.42 |
| 6 x 7 | 104.73 | 52.37 | 69.82 | 104.73 | 104.27 | 52.13 | 69.51 | 104.27 |
| 6 x 8 | 122.67 | 61.34 | 81.78 | 122.67 | 122.37 | 61.19 | 81.58 | 122.37 |
| 7 x 4 | 72.39 | 36.20 | 48.26 | 72.39 | 67.28 | 33.64 | 44.85 | 67.28 |
| 7 x 6 | 104.90 | 52.45 | 69.93 | 104.90 | 100.37 | 50.18 | 66.91 | 100.37 |
| 7 x 8 | 141.17 | 70.58 | 94.11 | 141.17 | 138.36 | 69.18 | 92.24 | 138.36 |
| 7 x 10 | 180.48 | 90.24 | 120.32 | 180.48 | 180.26 | 90.13 | 120.17 | 180.26 |
| 8 x 4 | 84.72 | 42.36 | 56.48 | 84.72 | 78.14 | 39.07 | 52.09 | 78.14 |
| 8 x 6 | 120.54 | 60.27 | 80.36 | 120.54 | 114.00 | 57.00 | 76.00 | 114.00 |
| 8 x 8 | 160.23 | 80.12 | 106.82 | 160.23 | 155.63 | 77.81 | 103.75 | 155.63 |
| 8 x 10 | 203.22 | 101.61 | 135.48 | 203.22 | 189.74 | 94.87 | 126.49 | 189.74 |
| 9 x 4 | 97.80 | 48.90 | 65.20 | 97.80 | 89.64 | 44.82 | 59.76 | 89.64 |
| 9 x 6 | 137.13 | 68.57 | 91.42 | 137.13 | 128.49 | 64.25 | 85.66 | 128.49 |
| 9 x 8 | 173.73 | 86.87 | 115.82 | 173.73 | 172.73 | 86.36 | 115.15 | 172.73 |
| 9 x 10 | 226.20 | 113.10 | 150.80 | 226.20 | 233.46 | 116.73 | 155.64 | 233.46 |
| 9 x 12 | 275.97 | 137.99 | 183.98 | 275.97 | 315.14 | 157.57 | 210.09 | 315.14 |
| 10 x 4 | 111.65 | 55.82 | 74.43 | 111.65 | 101.81 | 50.90 | 67.87 | 101.81 |
| 10 x 6 | 154.46 | 77.23 | 102.97 | 154.46 | 143.64 | 71.82 | 95.76 | 143.64 |
| 10 x 8 | 200.07 | 100.04 | 133.38 | 200.07 | 190.59 | 95.30 | 127.06 | 190.59 |
| 10 x 10 | 250.41 | 125.21 | 166.94 | 250.41 | 243.12 | 121.56 | 162.08 | 243.12 |
| 10 x 12 | 304.07 | 152.03 | 202.71 | 304.07 | 300.12 | 150.06 | 200.08 | 300.12 |
| 12 x 6 | 190.32 | 95.16 | 126.88 | 190.32 | 176.52 | 88.26 | 117.68 | 176.52 |
| 12 x 8 | 243.35 | 121.67 | 162.23 | 243.35 | 228.20 | 114.10 | 152.13 | 228.20 |
| 12 x 10 | 299.91 | 149.96 | 199.94 | 299.91 | 286.68 | 143.34 | 191.12 | 286.68 |
| 12 x 12 | 360.83 | 180.41 | 240.55 | 360.83 | 350.34 | 175.17 | 233.56 | 350.34 |

TABLE D-19 CULVERT OUTLET PROTECTION FOR BOX CULVERT ST'D BCS-02 THRU BCS-50 (45° SKEW)*

* Rev. 7/08

| CULVERT SIZE (FEET) SPAN X RISE | 1 ½ : 1 Slope No Skew | | | | 1 ½ : 1 Slope 15° Skew | | | |
|---|--------------------------|-----------------------|-----------------------|-----------------------|---------------------------|-----------------------|-----------------------|-----------------------|
| | EC-3 Type B | Depth (T) (18") | Depth (T) (24") | Depth (T) (36") | EC-3 Type B | Depth (T) (18") | Depth (T) (24") | Depth (T) (36") |
| | | Class A1 | Class I | Class II | | Class A1 | Class I | Class II |
| | Sq. Yds. | Cu. Yds. | Cu. Yds. | Cu. Yds. | Sq. Yds. | Cu. Yds. | Cu. Yds. | Cu. Yds. |
| 3 x 3 | 5.84 | 2.92 | 3.89 | 5.84 | 5.97 | 2.99 | 3.98 | 5.97 |
| 3 x 4 | 7.29 | 3.65 | 4.86 | 7.29 | 7.47 | 3.74 | 4.98 | 7.47 |
| 4 x 3 | 8.22 | 4.11 | 5.48 | 8.22 | 8.40 | 4.20 | 5.60 | 8.40 |
| 4 x 4 | 9.78 | 4.89 | 6.52 | 9.78 | 10.01 | 5.00 | 6.67 | 10.01 |
| 4 x 5 | 11.34 | 5.67 | 7.56 | 11.34 | 11.61 | 5.81 | 7.74 | 11.61 |
| 4 x 6 | 12.89 | 6.44 | 8.59 | 12.89 | 13.22 | 6.61 | 8.81 | 13.22 |
| 5 x 3 | 11.22 | 5.61 | 7.48 | 11.22 | 11.42 | 5.71 | 7.61 | 11.42 |
| 5 x 4 | 13.10 | 6.55 | 8.73 | 13.10 | 13.38 | 6.69 | 8.92 | 13.38 |
| 5 x 5 | 15.00 | 7.50 | 10.00 | 15.00 | 15.33 | 7.67 | 10.22 | 15.33 |
| 5 x 6 | 16.89 | 8.45 | 11.26 | 16.89 | 17.30 | 8.65 | 11.53 | 17.30 |
| 5 x 7 | 18.78 | 9.39 | 12.52 | 18.78 | 19.23 | 9.62 | 12.82 | 19.23 |
| 6 x 4 | 16.89 | 8.45 | 11.26 | 16.89 | 17.21 | 8.60 | 11.47 | 17.21 |
| 6 x 5 | 19.23 | 9.62 | 12.82 | 19.23 | 19.62 | 9.81 | 13.08 | 19.62 |
| 6 x 6 | 21.69 | 10.85 | 14.46 | 21.69 | 22.16 | 11.08 | 14.77 | 22.16 |
| 6 x 7 | 24.15 | 12.08 | 16.10 | 24.15 | 24.69 | 12.35 | 16.46 | 24.69 |
| 6 x 8 | 25.77 | 12.89 | 17.18 | 25.77 | 26.40 | 13.20 | 17.60 | 26.40 |
| 7 x 4 | 21.11 | 10.55 | 14.07 | 21.11 | 21.47 | 10.73 | 14.31 | 21.47 |
| 7 x 6 | 26.40 | 13.20 | 17.60 | 26.40 | 26.94 | 13.47 | 17.96 | 26.94 |
| 7 x 8 | 31.98 | 15.99 | 21.32 | 31.98 | 32.70 | 16.35 | 21.80 | 32.70 |
| 7 x 10 | 37.56 | 18.78 | 25.04 | 37.56 | 38.46 | 19.23 | 25.64 | 38.46 |
| 8 x 4 | 25.77 | 12.89 | 17.18 | 25.77 | 26.19 | 13.10 | 17.46 | 26.19 |
| 8 x 6 | 31.55 | 15.77 | 21.03 | 31.55 | 32.18 | 16.09 | 21.45 | 32.18 |
| 8 x 8 | 37.32 | 18.66 | 24.88 | 37.32 | 38.15 | 19.07 | 25.43 | 38.15 |
| 8 x 10 | 43.11 | 21.56 | 28.74 | 43.11 | 44.13 | 22.07 | 29.42 | 44.13 |
| 9 x 4 | 30.90 | 15.45 | 20.60 | 30.90 | 31.35 | 15.68 | 20.90 | 31.35 |
| 9 x 6 | 37.34 | 18.67 | 24.89 | 37.34 | 38.03 | 19.01 | 25.35 | 38.03 |
| 9 x 8 | 43.76 | 21.88 | 29.17 | 43.76 | 44.69 | 22.34 | 29.79 | 44.69 |
| 9 x 10 | 51.00 | 25.50 | 34.00 | 51.00 | 52.13 | 26.06 | 34.75 | 52.13 |
| 9 x 12 | 57.92 | 28.96 | 38.61 | 57.92 | 59.28 | 29.64 | 39.52 | 59.28 |
| 10 x 4 | 36.44 | 18.22 | 24.29 | 36.44 | 36.95 | 18.47 | 24.63 | 36.95 |
| 10 x 6 | 43.56 | 21.78 | 29.04 | 43.56 | 44.31 | 22.16 | 29.54 | 44.31 |
| 10 x 8 | 50.67 | 25.34 | 33.78 | 50.67 | 51.68 | 25.84 | 34.45 | 51.68 |
| 10 x 10 | 57.77 | 28.88 | 38.51 | 57.77 | 59.03 | 29.51 | 39.35 | 59.03 |
| 10 x 12 | 64.88 | 32.44 | 43.25 | 64.88 | 66.39 | 33.20 | 44.26 | 66.39 |
| 12 x 6 | 57.33 | 28.67 | 38.22 | 57.33 | 58.22 | 29.11 | 38.81 | 58.22 |
| 12 x 8 | 65.78 | 32.89 | 43.85 | 65.78 | 66.96 | 33.48 | 44.64 | 66.96 |
| 12 x 10 | 74.22 | 37.11 | 49.48 | 74.22 | 75.71 | 37.85 | 50.47 | 75.71 |
| 12 x 12 | 82.67 | 41.33 | 55.11 | 82.67 | 84.45 | 42.23 | 56.30 | 84.45 |

**TABLE D-20 CULVERT OUTLET PROTECTION FOR MULTIPLE BOX CULVERT
(INCREMENTS FOR EACH ADDITIONAL BARREL)***

* Rev. 7/08

| CULVERT SIZE (FEET) SPAN X RISE | 2 : 1 Slope 30° Skew | | | | 2 : 1 Slope 45° Skew | | | |
|---|-------------------------|-----------------------|-----------------------|-----------------------|-------------------------|-----------------------|-----------------------|-----------------------|
| | EC-3 Type B | Depth (T) (18") | Depth (T) (24") | Depth (T) (36") | EC-3 Type B | Depth (T) (18") | Depth (T) (24") | Depth (T) (36") |
| | | Class A1 | Class I | Class II | | Class A1 | Class I | Class II |
| | Sq. Yds. | Cu. Yds. | Cu. Yds. | Cu. Yds. | Sq. Yds. | Cu. Yds. | Cu. Yds. | Cu. Yds. |
| 3 x 3 | 6.45 | 3.23 | 4.30 | 6.45 | 7.41 | 3.71 | 4.94 | 7.41 |
| 3 x 4 | 7.83 | 3.92 | 5.22 | 7.83 | 9.42 | 4.71 | 6.28 | 9.42 |
| 4 x 3 | 8.94 | 4.47 | 5.96 | 8.94 | 10.16 | 5.08 | 6.77 | 10.16 |
| 4 x 4 | 10.74 | 5.37 | 7.16 | 10.74 | 12.36 | 6.18 | 8.24 | 12.36 |
| 4 x 5 | 12.54 | 6.27 | 8.36 | 12.54 | 14.57 | 7.28 | 9.71 | 14.57 |
| 4 x 6 | 14.34 | 7.17 | 9.56 | 14.34 | 16.76 | 8.38 | 11.17 | 16.76 |
| 5 x 3 | 12.09 | 6.05 | 8.06 | 12.09 | 13.56 | 6.78 | 9.04 | 13.56 |
| 5 x 4 | 14.28 | 7.14 | 9.52 | 14.28 | 16.23 | 8.12 | 10.82 | 16.23 |
| 5 x 5 | 16.46 | 8.23 | 10.97 | 16.46 | 18.92 | 9.46 | 12.61 | 18.92 |
| 5 x 6 | 18.65 | 9.32 | 12.43 | 18.65 | 21.59 | 10.79 | 14.39 | 21.59 |
| 5 x 7 | 20.82 | 10.41 | 13.88 | 20.82 | 24.24 | 12.12 | 16.16 | 24.24 |
| 6 x 4 | 18.27 | 9.14 | 12.18 | 18.27 | 20.57 | 10.28 | 13.71 | 20.57 |
| 6 x 5 | 20.99 | 10.49 | 13.99 | 20.99 | 23.87 | 11.93 | 15.91 | 23.87 |
| 6 x 6 | 23.75 | 11.87 | 15.83 | 23.75 | 27.21 | 13.61 | 18.14 | 27.21 |
| 6 x 7 | 26.73 | 13.37 | 17.82 | 26.73 | 30.74 | 15.37 | 20.49 | 30.74 |
| 6 x 8 | 28.53 | 14.27 | 19.02 | 28.53 | 33.14 | 16.57 | 22.09 | 33.14 |
| 7 x 4 | 22.68 | 11.34 | 15.12 | 22.68 | 25.34 | 12.67 | 16.89 | 25.34 |
| 7 x 6 | 28.76 | 14.38 | 19.17 | 28.76 | 32.75 | 16.37 | 21.83 | 32.75 |
| 7 x 8 | 35.30 | 17.65 | 23.53 | 35.30 | 40.61 | 20.30 | 27.07 | 40.61 |
| 7 x 10 | 41.79 | 20.90 | 27.86 | 41.79 | 48.44 | 24.22 | 32.29 | 48.44 |
| 8 x 4 | 27.57 | 13.79 | 18.38 | 27.57 | 30.57 | 15.29 | 20.38 | 30.57 |
| 8 x 6 | 34.25 | 17.12 | 22.83 | 34.25 | 38.23 | 19.12 | 25.82 | 38.23 |
| 8 x 8 | 40.91 | 20.45 | 27.27 | 40.91 | 46.91 | 23.45 | 31.27 | 46.91 |
| 8 x 10 | 47.58 | 23.79 | 31.72 | 47.58 | 55.23 | 27.62 | 36.82 | 55.23 |
| 9 x 4 | 32.90 | 16.45 | 21.93 | 32.90 | 36.23 | 18.11 | 24.15 | 36.23 |
| 9 x 6 | 40.34 | 20.17 | 26.89 | 40.34 | 45.33 | 22.67 | 30.22 | 45.33 |
| 9 x 8 | 48.00 | 24.00 | 32.00 | 48.00 | 54.69 | 27.35 | 36.46 | 54.69 |
| 9 x 10 | 56.18 | 28.09 | 37.45 | 56.18 | 64.55 | 32.27 | 43.03 | 64.55 |
| 9 x 12 | 64.22 | 32.11 | 42.81 | 64.22 | 74.24 | 37.12 | 49.49 | 74.24 |
| 10 x 4 | 38.64 | 19.32 | 25.76 | 38.64 | 42.33 | 21.17 | 28.22 | 42.33 |
| 10 x 6 | 46.85 | 23.42 | 31.23 | 46.85 | 52.40 | 26.20 | 34.93 | 52.40 |
| 10 x 8 | 55.07 | 27.53 | 36.71 | 55.07 | 62.45 | 31.22 | 41.63 | 62.45 |
| 10 x 10 | 63.27 | 31.64 | 42.18 | 63.27 | 72.51 | 36.26 | 48.34 | 72.51 |
| 10 x 12 | 71.49 | 35.75 | 47.66 | 71.49 | 82.56 | 41.28 | 55.04 | 82.56 |
| 12 x 6 | 61.25 | 30.62 | 40.83 | 61.25 | 67.83 | 33.92 | 45.22 | 67.83 |
| 12 x 8 | 71.01 | 35.51 | 47.34 | 71.01 | 79.77 | 39.89 | 53.18 | 79.77 |
| 12 x 10 | 80.76 | 40.38 | 53.84 | 80.76 | 91.71 | 45.86 | 61.14 | 91.71 |
| 12 x 12 | 90.51 | 45.26 | 60.34 | 90.51 | 103.65 | 51.83 | 69.10 | 103.65 |

**TABLE D-21 CULVERT OUTLET PROTECTION FOR MULTIPLE BOX CULVERT
(INCREMENTS FOR EACH ADDITIONAL BARREL)***

* Rev. 7/08