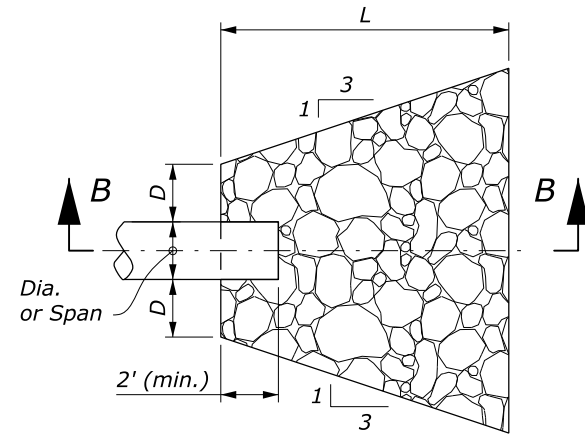


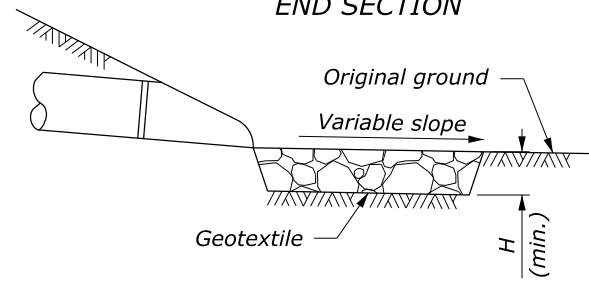
PLAN VIEW

CULVERT WITH STANDARD END SECTION

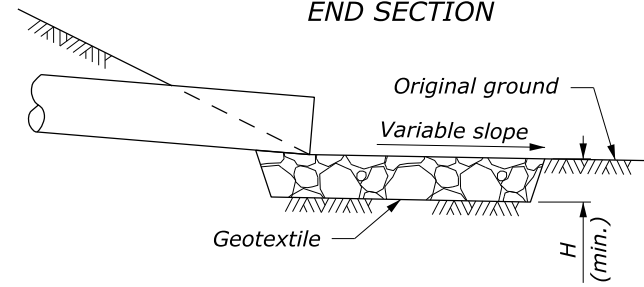


PLAN VIEW

CULVERT WITHOUT STANDARD END SECTION

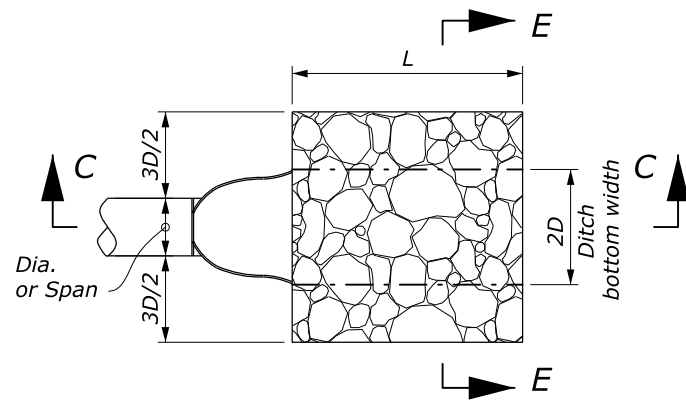


SECTION A-A



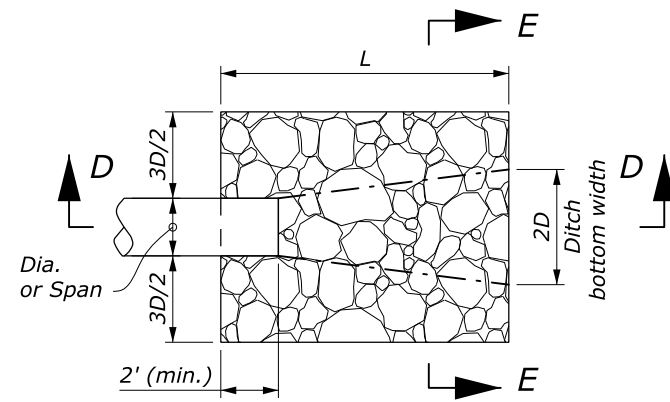
SECTION B-B

PROTECTIVE APRON AT CULVERT OUTLET WITHOUT DITCH



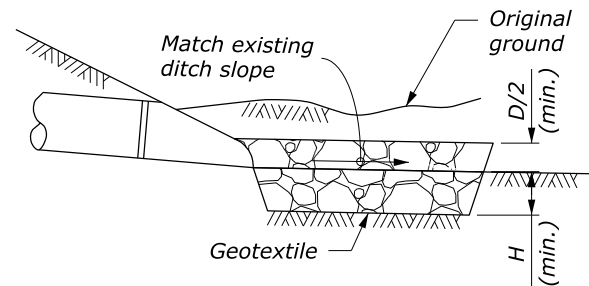
PLAN VIEW

CULVERT WITH STANDARD END SECTION

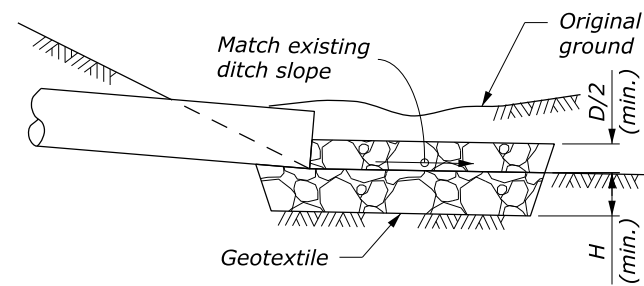


PLAN VIEW

CULVERT WITHOUT STANDARD END SECTION



SECTION C-C



SECTION D-D

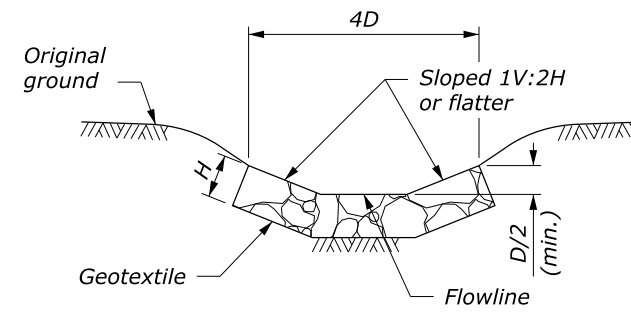
PROTECTIVE APRON AT CULVERT OUTLET WITH DITCH

**OUTLET WITHOUT DITCH
PROTECTIVE APRON DIMENSIONS AND QUANTITIES
FOR INFORMATION ONLY**

| | CULVERT SIZE D (INCHES) | RIPAP CLASS | APRON LENGTH L (FEET) | APRON DEPTH H (INCHES) | ESTIMATED RIPRAP QUANTITY (CUYD) | ESTIMATED GEOTEXTILE QUANTITY (SQYD) |
|---------------------|-------------------------|-------------|-----------------------|------------------------|----------------------------------|--------------------------------------|
| WITH END SECTION | 12 | 2 | 4 | 18 | 1.0 | 5 |
| | 18 | 2 | 6 | 18 | 2.2 | 9 |
| | 24 | 2 | 8 | 18 | 3.9 | 13 |
| | 30 | 3 | 12.5 | 24 | 10.8 | 27 |
| | 36 | 3 | 15 | 24 | 15.6 | 37 |
| | 42 | 4 | 21 | 30 | 34.0 | 63 |
| WITHOUT END SECTION | 12 | 2 | 6 | 18 | 1.7 | 7 |
| | 18 | 2 | 8 | 18 | 3.2 | 12 |
| | 24 | 2 | 10 | 18 | 5.2 | 17 |
| | 30 | 3 | 14.5 | 24 | 13.2 | 32 |
| | 36 | 3 | 17 | 24 | 18.5 | 42 |
| | 42 | 4 | 23 | 30 | 38.7 | 70 |
| 48 | 4 | 26 | 30 | 49.8 | 86 | |

**OUTLET WITH DITCH
PROTECTIVE APRON DIMENSIONS AND QUANTITIES
FOR INFORMATION ONLY**

| | CULVERT SIZE D (INCHES) | RIPAP CLASS | APRON LENGTH L (FEET) | APRON DEPTH H (INCHES) | ESTIMATED RIPRAP QUANTITY (CUYD) | ESTIMATED GEOTEXTILE QUANTITY (SQYD) |
|---------------------|-------------------------|-------------|-----------------------|------------------------|----------------------------------|--------------------------------------|
| WITH END SECTION | 12 | 2 | 4 | 18 | 0.9 | 4 |
| | 18 | 2 | 6 | 18 | 2.0 | 8 |
| | 24 | 2 | 8 | 18 | 3.6 | 12 |
| | 30 | 3 | 12.5 | 24 | 9.3 | 24 |
| | 36 | 3 | 15 | 24 | 13.3 | 32 |
| | 42 | 4 | 21 | 30 | 27.2 | 52 |
| WITHOUT END SECTION | 12 | 2 | 6 | 18 | 1.3 | 6 |
| | 18 | 2 | 8 | 18 | 2.7 | 10 |
| | 24 | 2 | 10 | 18 | 4.4 | 15 |
| | 30 | 3 | 14.5 | 24 | 10.7 | 27 |
| | 36 | 3 | 17 | 24 | 15.1 | 36 |
| | 42 | 4 | 23 | 30 | 29.8 | 56 |
| 48 | 4 | 26 | 30 | 38.5 | 70 | |



SECTION E-E

NOTE:

1. Use for aprons serving culverts with slopes less than 10%.
2. Furnish separation and stabilization geotextile.
3. Do not measure riprap placement excavation for payment.

NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
WESTERN FEDERAL LANDS HIGHWAY DIVISION

U.S. CUSTOMARY DETAIL

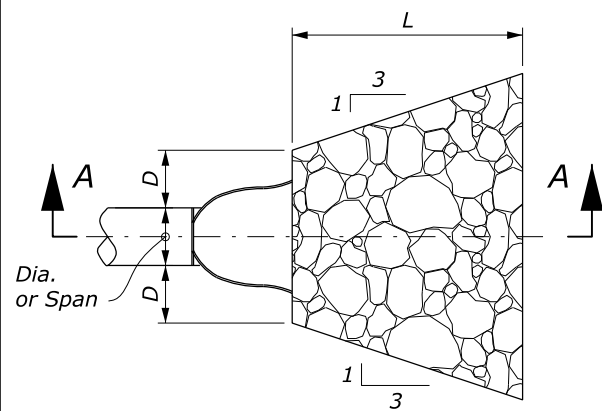
**PLACED RIPRAP AT
CULVERT OUTLETS**

DETAIL APPROVED FOR USE --/----

REVISID: 8/2016

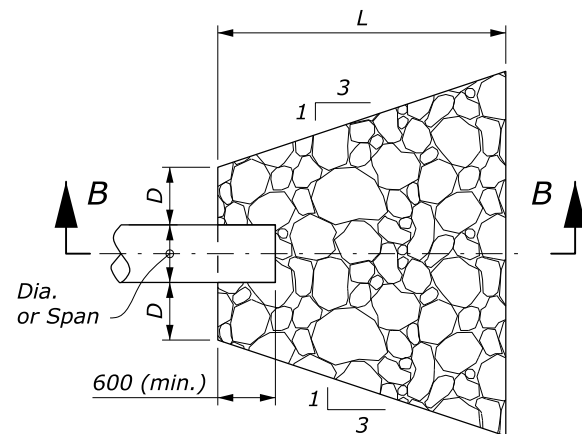
DETAIL
W251-1

c:\myfiles\pw_production\0266573\W251-1.dgn [USC] 18 July 2016 1:06 PM



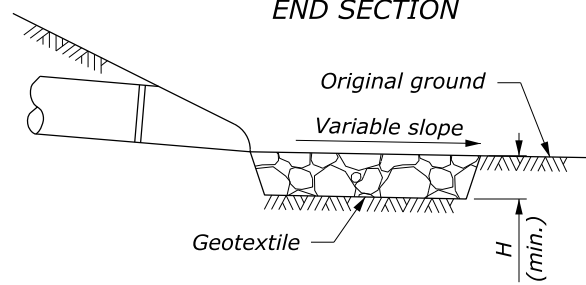
PLAN VIEW

CULVERT WITH STANDARD END SECTION

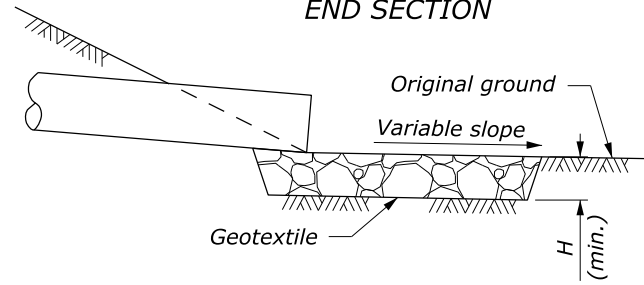


PLAN VIEW

CULVERT WITHOUT STANDARD END SECTION

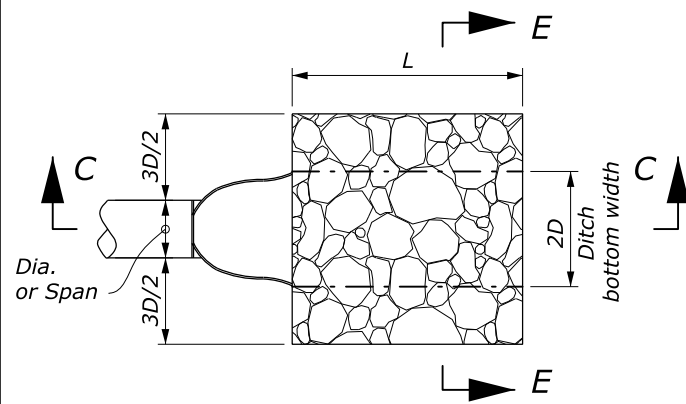


SECTION A-A



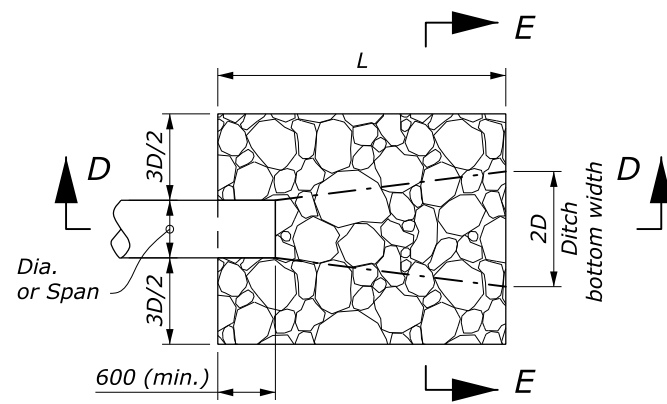
SECTION B-B

PROTECTIVE APRON AT CULVERT OUTLET WITHOUT DITCH



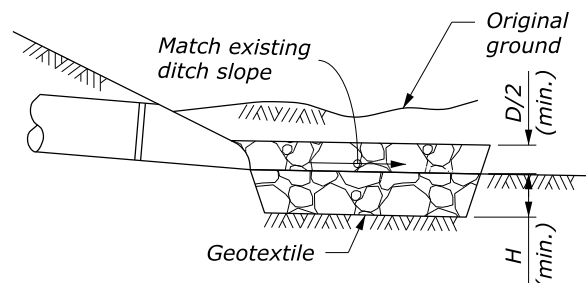
PLAN VIEW

CULVERT WITH STANDARD END SECTION

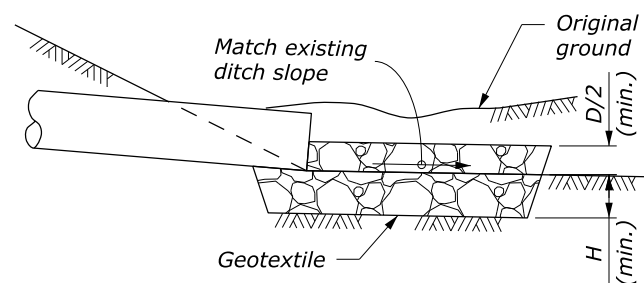


PLAN VIEW

CULVERT WITHOUT STANDARD END SECTION



SECTION C-C

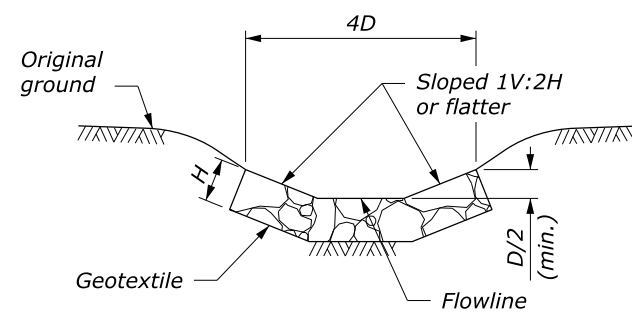


SECTION D-D

PROTECTIVE APRON AT CULVERT OUTLET WITH DITCH

| OUTLET WITHOUT DITCH PROTECTIVE APRON DIMENSIONS AND QUANTITIES FOR INFORMATION ONLY | | | | | | |
|--|---------------------|--------------|---------------------|--------------------|--------------------------------|------------------------------------|
| | CULVERT SIZE D (mm) | RIPRAP CLASS | APRON LENGTH L (mm) | APRON DEPTH H (mm) | ESTIMATED RIPRAP QUANTITY (m3) | ESTIMATED GEOTEXTILE QUANTITY (m2) |
| WITH END SECTION | 300 | 2 | 1200 | 460 | 0.7 | 4 |
| | 450 | 2 | 1800 | 460 | 1.6 | 7 |
| | 600 | 2 | 2400 | 460 | 2.9 | 11 |
| | 750 | 3 | 3750 | 610 | 8.0 | 22 |
| | 900 | 3 | 4500 | 610 | 11.5 | 30 |
| | 1050 | 4 | 6300 | 760 | 25.1 | 51 |
| WITHOUT END SECTION | 300 | 2 | 1800 | 460 | 1.2 | 6 |
| | 450 | 2 | 2400 | 460 | 2.4 | 9 |
| | 600 | 2 | 3000 | 460 | 3.9 | 14 |
| | 750 | 3 | 4350 | 610 | 9.8 | 26 |
| | 900 | 3 | 5100 | 610 | 13.7 | 34 |
| | 1050 | 4 | 6900 | 760 | 28.6 | 57 |
| 1200 | 4 | 7800 | 760 | 36.8 | 70 | |

| OUTLET WITH DITCH PROTECTIVE APRON DIMENSIONS AND QUANTITIES FOR INFORMATION ONLY | | | | | | |
|---|---------------------|--------------|---------------------|--------------------|--------------------------------|------------------------------------|
| | CULVERT SIZE D (mm) | RIPRAP CLASS | APRON LENGTH L (mm) | APRON DEPTH H (mm) | ESTIMATED RIPRAP QUANTITY (m3) | ESTIMATED GEOTEXTILE QUANTITY (m2) |
| WITH END SECTION | 300 | 2 | 1200 | 460 | 0.7 | 4 |
| | 450 | 2 | 1800 | 460 | 1.5 | 7 |
| | 600 | 2 | 2400 | 460 | 2.6 | 10 |
| | 750 | 3 | 3750 | 610 | 6.9 | 19 |
| | 900 | 3 | 4500 | 610 | 9.9 | 26 |
| | 1050 | 4 | 6300 | 760 | 20.1 | 42 |
| WITHOUT END SECTION | 300 | 2 | 1800 | 460 | 1.0 | 5 |
| | 450 | 2 | 2400 | 460 | 2.0 | 8 |
| | 600 | 2 | 3000 | 460 | 3.3 | 12 |
| | 750 | 3 | 4350 | 610 | 8.0 | 22 |
| | 900 | 3 | 5100 | 610 | 11.2 | 29 |
| | 1050 | 4 | 6900 | 760 | 22.0 | 46 |
| 1200 | 4 | 7800 | 760 | 28.5 | 57 | |



SECTION E-E

NOTE:

1. Use for aprons serving culverts with slopes less than 10%.
2. Furnish separation and stabilization geotextile.
3. Do not measure riprap placement excavation for payment.
4. Dimensions without units are millimeters.

NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
WESTERN FEDERAL LANDS HIGHWAY DIVISION

METRIC DETAIL

**PLACED RIPRAP AT
CULVERT OUTLETS**

DETAIL APPROVED FOR USE --/----
REVISED: 8/2016

DETAIL
MW251-1