

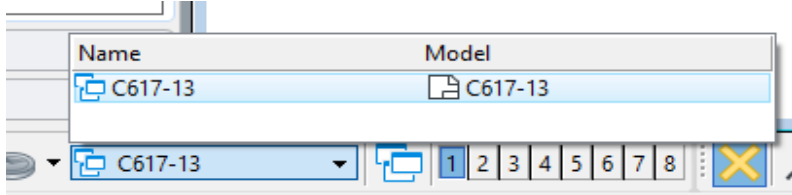
## Notes to the Designer

Updated January 2024

### Placed Riprap at Culvert Outlets

#### General Information

- Printing should be done from the **[Sheet]** View model



- **Maximum slope.** Riprap aprons shown in this drawing can be used for culvert outlets with slopes up to 10%. For steeper applications, use alternate protective aprons, such as revet mattresses.

#### Applicable SCRs

- None

#### Typical Pay Item Used

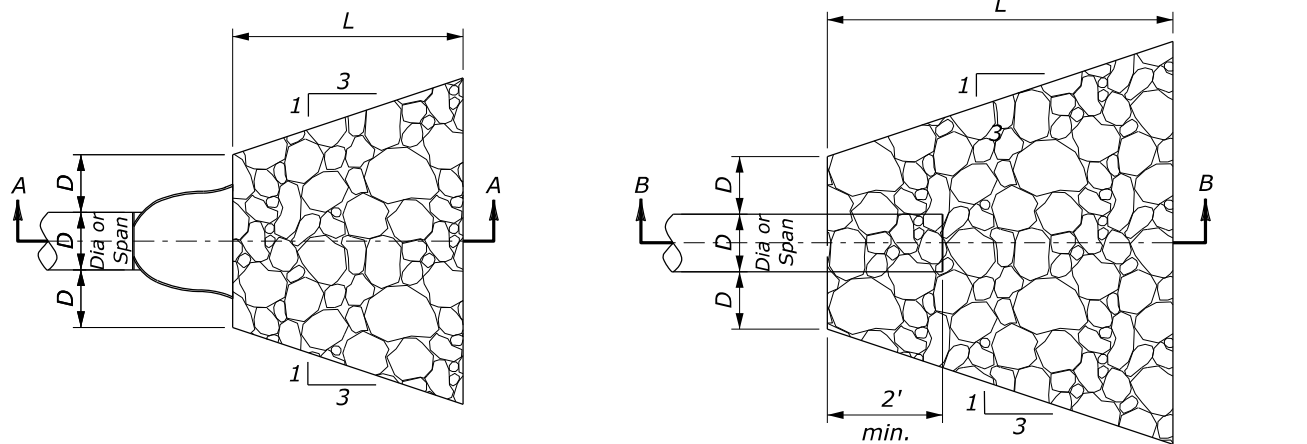
- 25101-0200 Placed riprap, class 2 [CUYD (m3)] and/or
- 25101-0300 Placed riprap, class 3 [CUYD (m3)] and/or
- 25101-0400 Placed riprap, class 4 [CUYD (m3)] and/or
  
- 60201-0?00 [12-inch to 48-inch] pipe culvert [LNFT (m)]
- 60210-0?00 End section for [12-inch to 48-inch] pipe culvert [EACH]
  
- Geotextile quantity is shown for information only

#### Updates

- **August 2014**
  - Updated for FP-14
- **August 2020**
  - Updated geotextile reference
- **September 2021**
  - Updated for OpenRoads Designer
- **January 2024**
  - Updated border; Updated for FP24

K:\CADD\_Coordinator\ORD Drawings\Details - 10:10 Version\International Seed C251-50.dgn [Det C251-50]

PROJECT	SHEET NUMBER
PROJECT NUMBER	
PROJECT NAME	

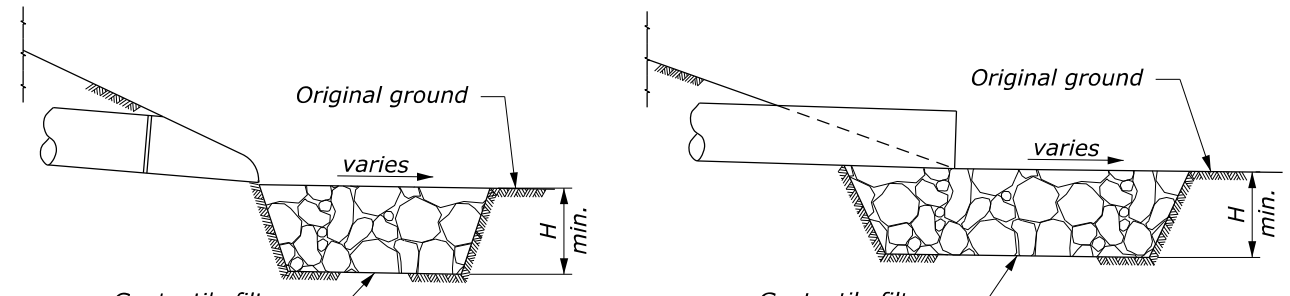


PLAN VIEW

PLAN VIEW

CULVERT WITH STANDARD END SECTION

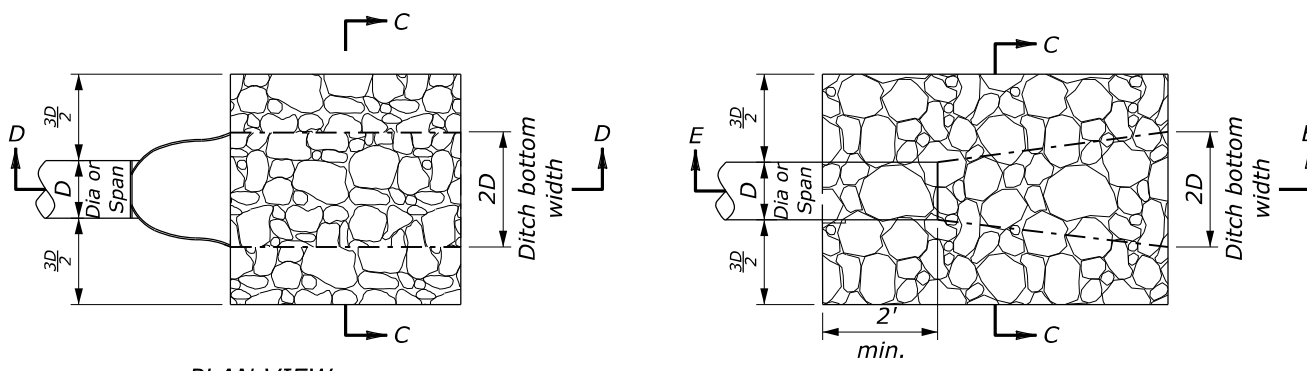
CULVERT WITHOUT STANDARD END SECTION



SECTION A-A

SECTION B-B

**PROTECTIVE APRON AT CULVERT OUTLET WITHOUT DITCH**

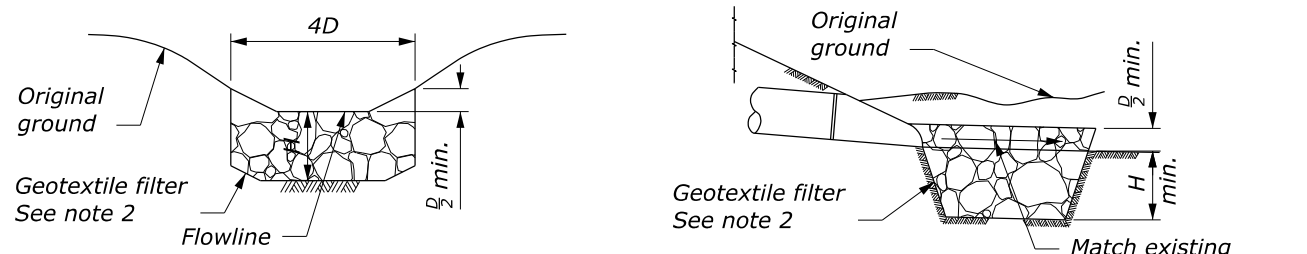


PLAN VIEW

PLAN VIEW

CULVERT WITH STANDARD END SECTION

CULVERT WITHOUT STANDARD END SECTION



SECTION C-C

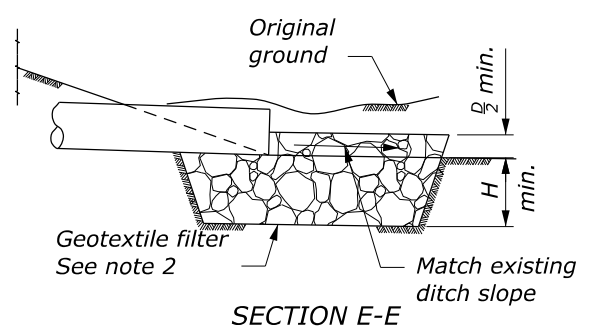
SECTION D-D

**PROTECTIVE APRON AT CULVERT OUTLET WITH DITCH**

<b>OUTLET WITHOUT DITCH</b>						
<b>PROTECTIVE APRON DIMENSIONS AND ESTIMATED QUANTITIES</b>						
	CULVERT SIZE D (inches)	RIPRAP CLASS	LENGTH OF APRON L (feet)	DEPTH OF APRON H (feet)	ESTIMATED RIPRAP QUANTITY (CY)	ESTIMATED GEOTEXTILE QUANTITY (SY)
WITH END SECTION	12	2	4	1.5	1	5
	18	2	6	1.5	2.2	9
	24	2	8	1.5	3.9	14
	30	3	12.5	2	10.9	28
	36	3	16	2	15.6	37
	42	4	21	2.5	34.1	63
WITHOUT END SECTION	12	2	6	1.5	1.7	8
	18	2	8	1.5	3.2	12
	24	2	10	1.5	5.2	17
	30	3	14.5	2	13.3	33
	36	3	17	2	18.5	43
	42	4	23	2.5	38.7	70
48	4	26	2.5	49.8	87	

**OUTLET WITH DITCH**

<b>PROTECTIVE APRON DIMENSIONS AND ESTIMATED QUANTITIES</b>						
	CULVERT SIZE D (inches)	RIPRAP CLASS	LENGTH OF APRON L (feet)	DEPTH OF APRON H (feet)	ESTIMATED RIPRAP QUANTITY (CY)	ESTIMATED GEOTEXTILE QUANTITY (SY)
WITH END SECTION	12	2	4	1.5	0.9	5
	18	2	6	1.5	2	8
	24	2	8	1.5	3.6	13
	30	3	12.5	2	9.3	24
	36	3	16	2	13.4	32
	42	4	21	2.5	27.3	53
WITHOUT END SECTION	12	2	6	1.5	1.4	6
	18	2	8	1.5	2.7	10
	24	2	10	1.5	4.5	15
	30	3	14.5	2	10.8	27
	36	3	17	2	15.2	36
	42	4	23	2.5	29.9	57
48	4	26	2.5	38.6	70	



SECTION E-E

**NOTE:**

1. Use for slopes serving culverts with slopes of less than 10%.
2. Furnish geotextile filter conforming to Subsection 714.01(c).
3. Excavation for placement of riprap will not be measured for payment.

U.S. DEPARTMENT OF TRANSPORTATION, FHWA OFFICE OF FEDERAL LANDS HIGHWAY	CFLHD DETAIL <b>C251-50</b>
<b>PLACED RIPRAP AT CULVERT OUTLETS</b>	SPECIFICATION FP-24
	APPROVED FOR USE 06/2024

NO SCALE