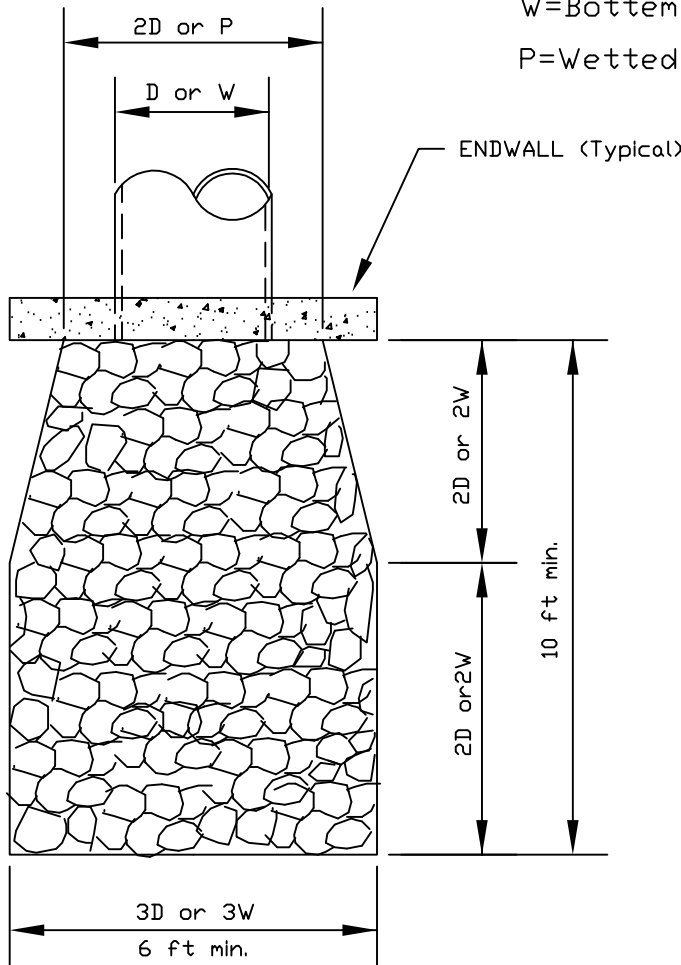


D=Pipe Diameter

W=Bottom Width of Channel

P=Wetted Perimeter of Channel

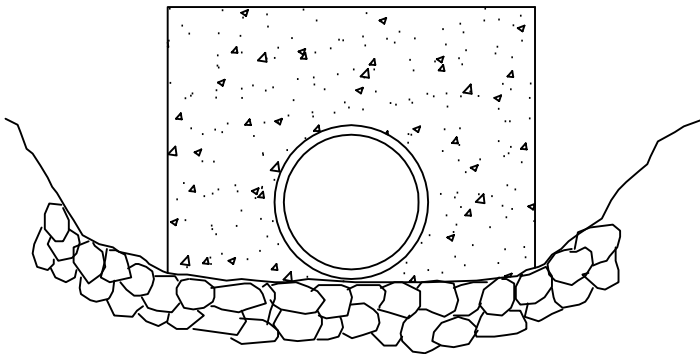


Design Velocity ft./sec.	Rock Classification by Weight
6 - 10	200 lbs.
10 - 12	1/4 Ton
12 - 14	1/2 Ton
14 - 16	1 Ton
16 - 18	2 Ton

Selection of Rip Rap
(SEE NOTE 1)

NOTES:

1. Dimensions for riprap apply to flows < 2 CFS; Rip Rap for flows > 2 CSF must be designed by an Engineer. Flows > 20 fps shall use Energy Dissipator.
2. Type of Rip Rap
 - a. Regular Quarry Stone
 - b. Rounded Cobblestone
 - c. Broken Concrete (only allowed upon approval of the District).
3. Placement
 - a. Minimum depth = 1 1/2 times average stone size.
 - b. Rocks shall be placed to provide a minimum of voids.
 - c. Surface rocks or concrete shall protrude at least 1/2 their vertical dimension.
 - d. Rip Rap is to be placed over a geotextile fabric on a natural bedding, or It may grouted or placed over a gravel bedding as required by the District.



TITLE: CULVERT & STORM SEWER OUTLET		SHEET: 1 OF 1
FILE NAME: SWM-0033	DRAWN BY: WDK	REV. DATE: 07/20/2001
SCALE: NOT TO SCALE	DATE: 8/4/94	CHECKED BY: MN