



**OUTLET PROTECTION / RIP RAP**

**RIPRAP:**

- ROCK FOR RIPRAP SHALL BE ANGULAR IN SHAPE.
- THICKNESS OF A SINGLE RAMP SHALL NOT BE LESS THAN 1/3 ITS LENGTH.
- DESIGN BASED ON ODOT HYDRAULICS MANUAL AND COSM.

**RIPRAP INSTALLATION:**

- EXCAVATE BELOW FINISHED GRADE TO DEPTH & DIMENSION SHOWN ON APPROVED PLANS.
- INSTALL WOVEN GEOTEXTILE FABRIC.
- PLACE RIP RAP TO FINISHED GRADE.

GRADE RIPRAP SHALL BE THE CLASS AND SIZE OF ROCK ACCORDING TO THE FOLLOWING:					
CLASS 50	CLASS 100	CLASS 200	CLASS 700	CLASS 2000	
WEIGHT OF ROCK (LBS)					% (BY WEIGHT)
50-30	100-60	200-140	700-500	2000-1400	20
30-15	60-25	140-80	500-200	1400-700	30
15-2	25-2	80-8	200-20	700-40	40
2-0	2-0	8-0	20-0	40-0	10

DRAWN CJH	
DIV EROSION	
REV	DATE



**CITY OF BEND**  
 STANDARD DRAWING  
 710 NW WALL ST., BEND, OREGON 97701  
**PIPE SLOPE DRAIN**

SCALE NTS
DATE 11/01/2024
APPR
STD DWG E-11