

CONSTRAINTS

1. SOIL CONDITIONS AND BEARING CHARACTERISTICS ARE TO BE DETERMINED BY THE DISTRICT.
2. THIS STANDARD DETAIL IS FOR HORIZONTAL THRUST RESTRAINT ONLY.
3. CONCRETE BLOCKING SHALL BE PER DOT/APWA SPECIFICATION 7-09.3(21), CURRENT EDITION.
4. MAINTAIN 18" MINIMUM GROUND COVER OVER THE TOP OF ALL CONCRETE BLOCKING.
5. ALL THRUST BLOCKS TO BE FORMED AND FITTINGS COVERED IN PLASTIC.
6. ANY TEMPORARY BLOCKING USED TO SUPPORT FITTINGS DURING CONSTRUCTION SHALL BE REMOVED PRIOR TO BACKFILLING.

PROCEDURE

1. DETERMINE BEARING FACTOR IN TABLE 1 CORRESPONDING TO APPROPRIATE PIPE SIZE AND TYPE OF FITTING.
2. MULTIPLY THE BEARING FACTOR DETERMINED IN TABLE 1 BY THE MULTIPLICATION FACTOR IN TABLE 2 FOR THE APPROPRIATE SOIL CLASSIFICATION.

THE RESULT IS THE REQUIRED AREA OF CONCRETE (IN SQ. FT.) WHICH MUST BEAR AGAINST UNDISTURBED SOIL.

3. USING TABLE 3 LOCATE THE MINIMUM DEPTH OF CONCRETE (D_{min}) CORRESPONDING TO THE REQUIRED BEARING AREA.

4. USING D_{min}, THE HEIGHT AND LENGTH OF THE THRUST BLOCKING CAN BE DETERMINED FROM THE DIMENSION RELATIONSHIPS ILLUSTRATED IN FIGURE 1 AND DESCRIBED BELOW:

- A. "H" EQUALS "D"
- B. MAX. "L" EQUALS 2 x "H"
- C. MIN. "L" EQUALS "H"

TABLE 1 - BEARING FACTOR

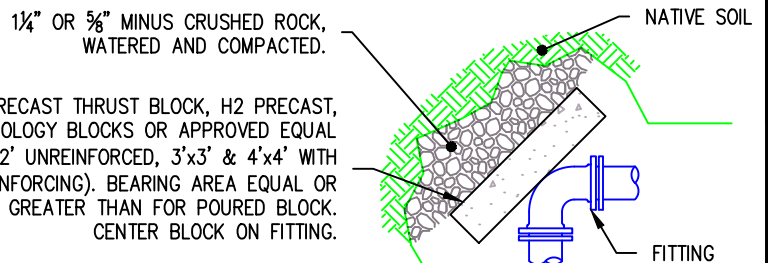
SIZE	TEST PRESSURE	TEES DEAD ENDS	90° BEND	45° BEND	22½° BEND	11¼° BEND
3	300	2.3*	2.6	2.3*	2.3*	2.3*
4	300	2.3*	3.8	2.3*	2.3*	2.3*
6	300	5.6	7.9	4.3	2.3*	2.3*
8	300	9.6	13.6	7.4	3.8	2.3*
10	300	14.5	20.5	11.1	5.7	2.8
12	300	20.5	29.0	15.7	8.0	4.0
14	300	27.6	39.0	21.1	10.8	5.4
16	300	35.7	50.4	27.3	13.9	7.0
18	300	44.8	63.4	34.3	17.5	8.8
20	300	55.0	77.7	42.1	21.4	10.8
24	300	78.4	111.0	60.0	30.6	15.4

* 2.3 BASED ON GEOMETRIC FACTORS

TABLE 2 - MULTIPLICATION FACTOR

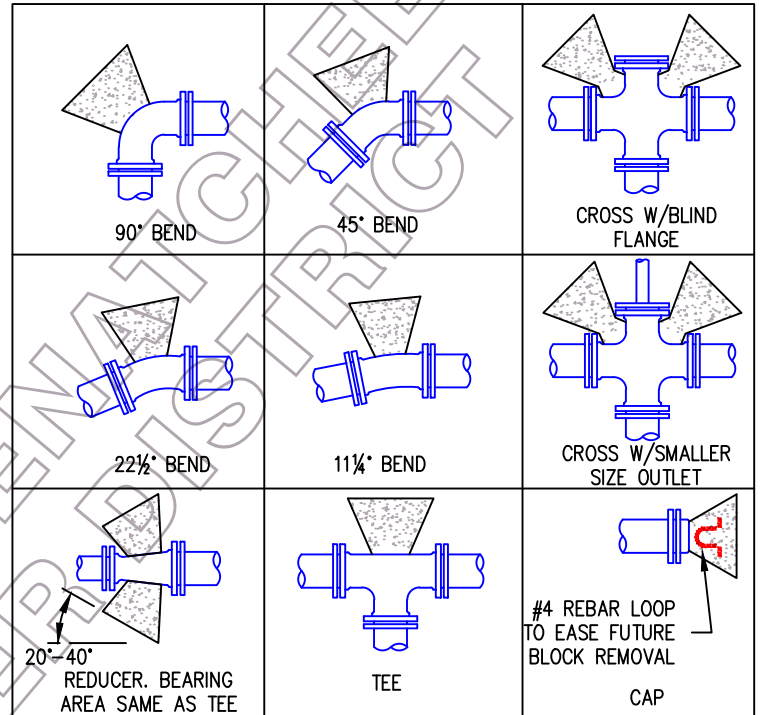
SOIL CONDITION	MULTIPLICATION FACTOR
*MUCK, PEAT, etc.	-
SOFT CLAY	2.0
SILT	1.3
SAND OR SANDY SILT	1.0
SAND AND GRAVEL	0.7
SAND AND GRAVEL CEMENTED W/ CLAY	0.5
HARD SHALE	0.2

* RESTRAINT SHALL BE DESIGNED BY ENGINEER

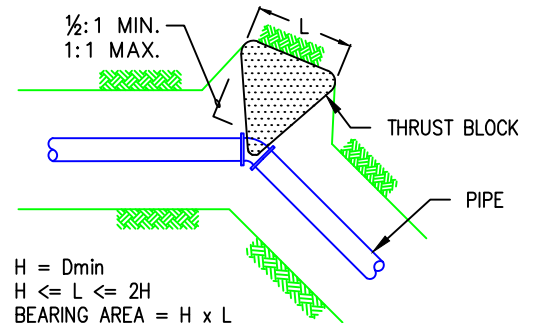


PRECAST THRUST BLOCK

CAST IN PLACE BLOCKS



NO PRESSURE MAY BE APPLIED TO THE CAST IN PLACE THRUST BLOCK UNTIL TEST RESULTS INDICATE THE MINIMUM OF THE 28-DAY COMPRESSIVE STRENGTH OF THE CONCRETE MIX DESIGN HAS BEEN ACHIEVED.



H = D_{min}
 H ≤ L ≤ 2H
 BEARING AREA = H x L

TABLE 3 - BLOCK SHAPE

REQ'D BEARING AREA (SQ. FT.)	MINIMUM DEPTH D _{min}
2.25 MIN. - 5.0	1.5'
5.01 - 10.0	2.3'
10.01 - 15.0	3.0'
15.01 - 30.0	4.0'
30.01 - 40.0	4.5'
40.01 - 50.0	5.0'
50.01 - 70.0	6.0'

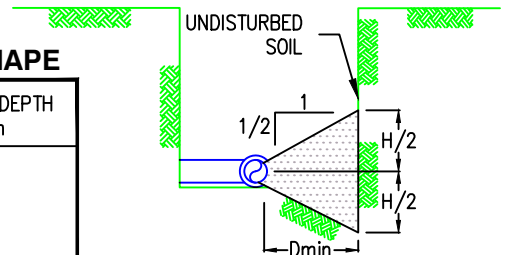


FIGURE 1

**East Wenatchee
Water District**



WATER SYSTEM STANDARD DETAIL

**HORIZONTAL
THRUST BLOCKING**