

CLASS A
 REINFORCED $A_s = 1.0\%$ $L = 4.8$
 REINFORCED $A_s = 0.4\%$ $L = 3.4$
 PLAIN $L = 2.8$

CLASS B
 $L = 1.9$

CLASS C
 $L = 1.5$

CLASS E
 (POLYETHYLENE WRAPPED,
 COATED OR PLASTIC PIPE)
 $L = 1.5$

CLASS E
 $L = 1.9$

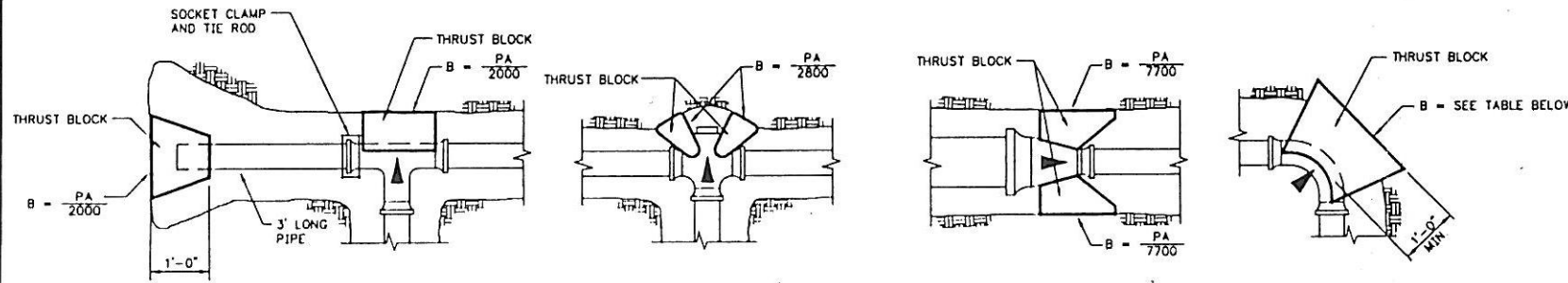
LEGEND

 CONCRETE, 3000 PSI MIN.
 GRANULAR EMBEDMENT
 COMPACTED EMBEDMENT

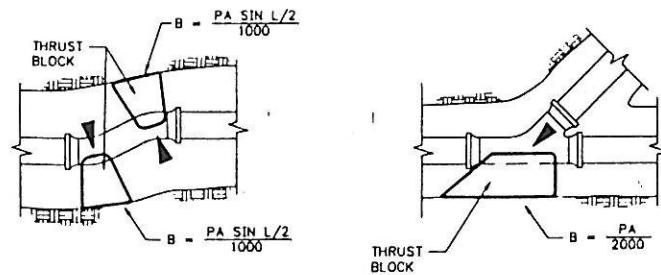
B_c OUTSIDE DIAMETER OF PIPE
 H BACKFILL COVER ABOVE TOP OF PIPE
 d INSIDE PIPE DIAMETER
 d DEPTH OF BEDDING MATERIAL BELOW PIPE
 A_s AREA OF TRANSVERSE STEEL IN THE ARCH EXPRESSED AS A PERCENTAGE OF AREA OF CONCRETE AT INVERT OF CROWN
 L LOAD FACTOR

DEPTH OF BEDDING MATERIAL BELOW PIPE		
D	d MIN. SOIL	d MIN. ROCK
27" AND SMALLER	3"	6"
30" TO 60"	4"	9"
66" AND LARGER	6"	12"

PIPE EMBEDMENTS

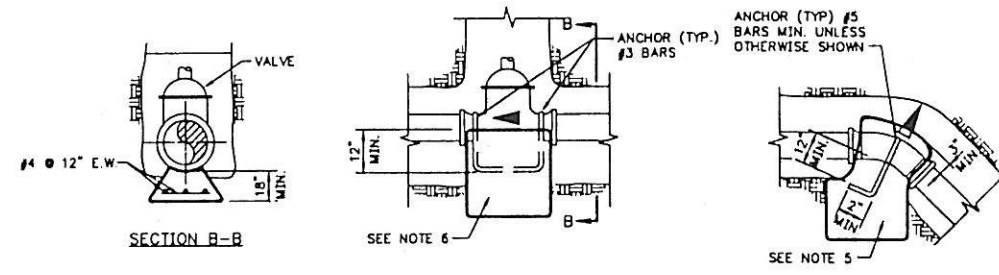


TYPE OF BEND	VALUE OF B
90°	PA/1400
80°	PA/2000
45°	PA/3800
30°	PA/3800
15°	PA/7600



OFFSET

WYE



VALVE

VERTICAL BEND

TABLE A
ANCHORAGE OF VALVES

WORKING PRESSURE (PSI)	SIZE OF VALVE REQUIRING ANCHORAGE
50 - 100	12" & UP
101 - 150	18" & UP
151 - 200	ALL SIZES

LEGEND
 B - BEARING AREA, MINIMUM CONCRETE THRUST AREA IN SQUARE FEET
 A - AREA OF PIPE IN SQUARE INCHES
 P - TEST PRESSURE IN PSI
 L - ANGLE OF BEND IN DEGREES

THRUST BLOCKING NOTES:

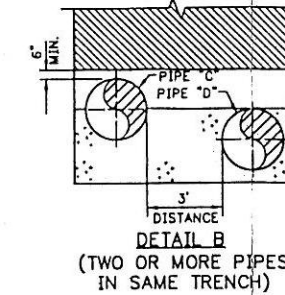
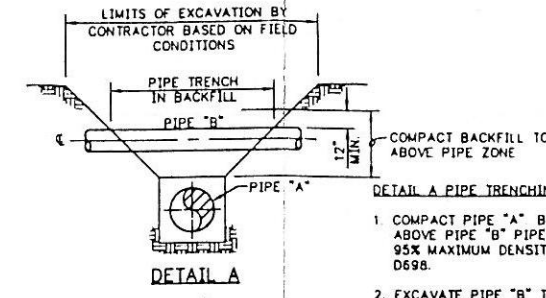
- CONCRETE THRUST BLOCKING INSTALLATIONS ARE SHOWN TO GIVE THE CONTRACTOR A GENERAL KNOWLEDGE OF THE WORK HE MUST PERFORM. CHANGES IN MATERIALS ENCOUNTERED IN THE TRENCH MAY CHANGE THE EXACT LOCATION OF THE BLOCKS SHOWN HEREIN.
- 3000 PSI CONCRETE SHALL BE PLACED FOR BLOCKING AT EACH CHANGE IN DIRECTION OF THE PIPELINE IN A MANNER WHICH WILL SUBSTANTIALLY BRACE THE PIPE AGAINST UNDISTURBED TRENCH WALLS. 3000 PSI CONCRETE SHALL CONFORM TO THE SPECIFICATIONS.
- CONCRETE BLOCKING SHALL HAVE BEEN IN PLACE FOUR (4) DAYS PRIOR TO TESTING THE PIPELINE.
- BLOCKING OF BEARING AREAS OF TWO (2) SQUARE FEET OR GREATER SHALL REQUIRE FORM CONSTRUCTION.

- EVERY VERTICAL BEND SHALL BE ANCHORED TO A CONCRETE THRUST BLOCK KEVED INTO UNDISTURBED SOIL. THE THRUST BLOCK SHALL BE OF SUFFICIENT SIZE AND WEIGHT TO RESIST THRUST WITHOUT MOVING.
- ALL VALVES UNDER CONDITIONS OF SIZE AND PRESSURE, AS NOTED IN TABLE "A", SHALL REQUIRE BLOCKING AGAINST THRUST CREATED BY VALVE CLOSURE.
- ANCHORS KEVED OR TIED TO UNDISTURBED SOIL SHALL BE REQUIRED AT EVERY THIRD LENGTH OF PIPE PLACED ON SLOPES.
- THRUST BLOCKING OF 3000 PSI CONCRETE SHALL BE PROVIDED AT ALL BENDS, TEES, AND ELBOWS ON ALL BURIED PIPELINES WITH FLEXIBLE JOINTS. THRUST BLOCKING SHALL BE ADEQUATE FOR THE PARTICULAR CONDITIONS OF PIPE DIAMETER, PIPE PRESSURE, AND SOIL BEARING PRESSURE ENCOUNTERED. THRUST BLOCKING SHALL EXTEND TO THE LIMITS OF TRENCH EXCAVATION AND SHALL BEAR AGAINST UNDISTURBED TRENCH WALLS.

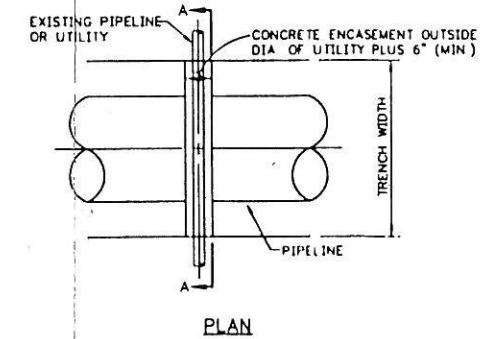
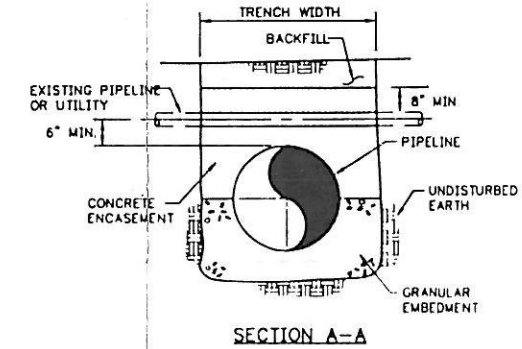
- BURIED PLASTIC PIPE SHALL REQUIRE CONCRETE THRUST BLOCKING. THRUST BLOCKING FOR PLASTIC PIPE SHALL BE INSTALLED AFTER INITIAL SERVICE LEAK TESTING OR LEAVE JOINTS EXPOSED TO PROVIDE FOR VISUAL EXAMINATION OF JOINTS DURING INITIAL SERVICE LEAK TESTING. ADEQUATE TEMPORARY BRACING OF BENDS, ETC., SHALL BE PROVIDED DURING PIPE TESTING.
- ALL "DEAD-END" LINES WHICH WILL BE EXTENDED IN THE FUTURE SHALL REQUIRE CONCRETE THRUST BLOCKING.
- THE MINIMUM BEARING AREA REQUIRED FOR OFFSET PIPING MUST BE CALCULATED FOR EACH INDIVIDUAL CASE, DEPENDING UPON ANGLE OF OFFSET SECTION.

EMBEDMENT NOTES:

- GRANULAR EMBEDMENT SHALL BE CRUSHED ROCK OR PEA GRAVEL ASTM C-33, TYPE 57 WITH NOT LESS THAN 95% PASSING 1/2" (3/4" FOR 30" & LARGER PIPE) AND NOT LESS THAN 95% RETAINED ON A NO. 4 SIEVE. MAXIMUM SIZE 1/2". EMBEDMENT SHALL BE PLACED IN NOT MORE THAN 6" THICK LAYERS AND COMPACTED BY SLICING WITH A SHOVEL OR VIBRATING.
- COMPACTED EMBEDMENT SHALL BE SELECT FILL MATERIALS FREE FROM DEBRIS, ORGANIC MATERIALS, ROCKS, TRENCH LOAM AND CLAY. UNIFORMLY GRADED HAVING LESS THAN 50% FINES BY WEIGHT PASSING NO. 200 SIEVE AND PLASTICITY INDEX OF LESS THAN 12. PLACE IN UNIFORM LAYERS NOT MORE THAN 6" THICK AND COMPACT TO 95% STANDARD PROCTOR DENSITY.
- TRENCH WIDTH IF ACTUAL TRENCH WIDTH IS GREATER THAN MAXIMUM PERMITTED, THEN CONTRACTOR SHALL PROVIDE NEXT HIGHER CLASS OF EMBEDMENT AS APPROVED BY ENGINEER.
- FINE GRADED SAND SHALL BE NATURAL SAND MEETING ASTM C33. PLACE SAND AROUND PIPE IN 6" LAYERS AND THOROUGHLY HAND TAMP. ASSURE THAT ALL VOIDS ARE FILLED BY "WALKING IN" AND SLICING WITH A SHOVEL TO PIPE SPRING-LINE. AVOID DAMAGE TO THE POLYETHYLENE WRAP DURING PLACING AND COMPACTING OF SAND BEDDING AND SAND COVER.



PIPE TRENCHING DETAILS



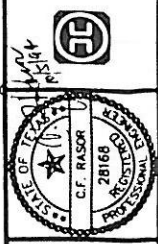
TYPICAL DETAIL OF PIPELINE OR UTILITY CROSSING

CONCRETE THRUST BLOCKS FOR BURIED PIPES

No.	Date	Revisions	App.

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY C.F. RASOR, P.E. NO. 28168 ON OCTOBER 5th, 1994.

Chiang, Patel and Associates, Inc.
 Consulting Engineers • Planners • Project Managers
 Dallas, Texas



CITY OF ROCKWALL
 "THE NEW HORIZON"

CHANDLERS DEEP LIFT STATION AND FORCE MAIN MODIFICATIONS AND PIPE EMBEDMENT & THRUST BLOCKING DETAILS

Scale: AS SHOWN	Date: 10/94
Designed by: J.A. MARLER	
Drawn by: C.W. JOHNSON	
Checked by: E.M. MOTLEY	
Approved by: C.F. RASOR	
Project No: CR09471.2	