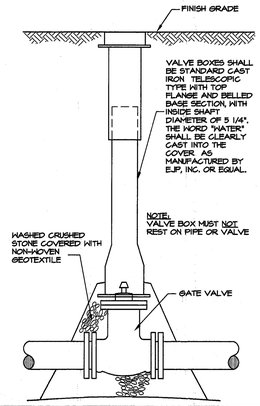


4 WATER VALVE DETAIL

SCALE NOT TO SCALE

REQUIRED BEARING AREAS & DIMENSIONS
FOR CONCRETE THRUST BLOCKS
(BASED ON NOMINAL PIPE DIAMETER)

PIPE SIZE INCHES	TEE (See Note 5)		90° (1/4) BEND		45° (1/8) BEND		22-1/2°(1/16) BEND		11-1/4°(1/32) BEND	
	AREA Sq.Ft.	Dimensions D x L	AREA Sq.Ft.	Dimensions D x L	AREA Sq.Ft.	Dimensions D x L	AREA Sq.Ft.	Dimensions D x L	AREA Sq.Ft.	Dimensions D x L
4	1.4	1.0 x 1.5	2.0	1.0 X 2.0	1.1	1.0 x 1.5	0.6	0.5 x 1.5	0.4	0.5 x 1.0
6	3.2	1.5 x 2.5	4.5	2.0 x 2.5	2.4	1.5 x 2.0	1.2	1.0 x 1.5	0.6	0.5 x 1.5
8	5.7	2.0 x 3.0	8.0	2.0 x 4.0	4.3	2.0 x 2.5	2.2	1.5 x 1.5	1.1	1.0 x 1.5
12	12.7	3.5 X 3.5	18.0	4.0 X 4.5	9.7	2.5 X 4.0	5.0	2.0 X 2.5	2.5	1.5 X 2.0

THRUST REACTIONS - R
PER 100 P.S.I. INTERNAL PRESSURE
(BASED ON NOMINAL PIPE DIAMETER)

PIPE SIZE INCHES	TEE (See Note 5) R POUNDS	90° (1/4) BEND (1.414 x R)	45° (1/8) BEND (0.765 x R)	22-1/2°(1/16) BEND (0.390 x R)	11-1/4° (1/32) BEND (0.196 x R)
4	1260	1780	960	490	340
6	2830	4000	2160	1100	550
8	5030	7110	3850	1960	990
12	10270	14520	7860	4010	2020

NOTES:

1. FOR REQUIRED BEARING AREA AND DIMENSIONS D & L SEE TABLE VALUES OF D & L OTHER THAN THOSE SHOWN IN THE TABLE MAY BE USED PROVIDED THEY YIELD A BEARING AREA EQUAL TO OR LARGER THAN THAT REQUIRED.
2. CONCRETE NOT TO OVERLAP ANY JOINT
3. CONCRETE TO BE PLACED SO AS NOT TO INTERFERE WITH REMOVING OR INSTALLING ANY OF THE JOINTING HARDWARE
4. APPROXIMATE VOLUME OF CONCRETE THRUST BLOCK:

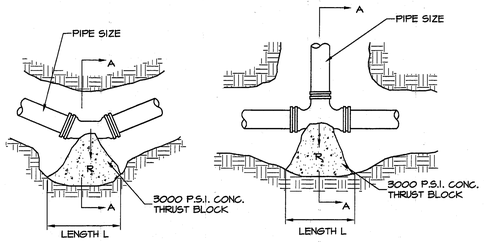
$$V\frac{3}{4} = \frac{L\,D\,(W + I.D.) - (I.D.)^3}{81}$$

WHERE:
V = VOLUME IN CUBIC YARDS
L = LENGTH OF BLOCK IN FEET
D = DEPTH OF BLOCK IN FEET
W = WIDTH OF BLOCK IN FEET
I.D. = INSIDE DIAMETER OF PIPE IN FEET

5. VALUES FOR TEE ALSO APPLY TO END PLUGS, CAPS AND TAPPING SLEEVES.
6. REQUIRED BEARING AREAS ARE DUE TO THRUSTS CAUSED BY 150 P.S.I. WORKING PRESSURE PLUS 50% (75 P.S.I.) SURGE ALLOWANCE RESULTING IN 225 P.S.I. TOTAL INTERNAL PRESSURE NOMINAL PIPE DIAMETER USED.
7. REQUIRED BEARING AREAS ARE BASED ON ALLOWABLE SOIL BEARING CAPACITY OF 2000 POUNDS PER SQUARE FOOT FOR SAND DUE TO OTHER SOIL CONDITIONS ENCOUNTERED, BEARING AREAS MAY BE MODIFIED BY THE ENGINEER BY MULTPLYING THE AREA GIVEN IN THE TABLE FOR THE APPROPRIATE PIPE SIZE AND FITTING BY THE CORRECTION FACTORS LISTED BELOW.

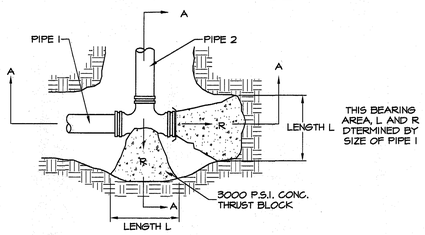
SOIL	ALLOWABLE SOIL PRESSURE (LBS./SQ./FT.)	CORRECTION FACTOR
SOFT CLAY	1000	2.00
SAND	2000	1.00
SAND & GRAVEL	3000	0.67
CEMENTED W/CLAY	4000	0.50
HARD SHALE	10,000	0.20

8. IN MUCK, PEAT, OR RECENTLY PLACED FILL ALL THRUSTS SHALL BE RESISTED BY PILES OR TIE RODS TO SOLID FOUNDATIONS, OR BY REMOVAL OF SUCH UNSTABLE MATERIAL AND REPLACEMENT WITH BALLAST OF SUFFICIENT STABILITY TO RESIST THE THRUSTS, ALL AS REQUIRED BY THE ENGINEER.
9. USE POLYETHLENE OR BUILDING PAPER TO PREVENT CONCRETE FROM BONDING TO PIPE AND HARDWARE, THUS FACILITATING FUTURE REMOVAL.



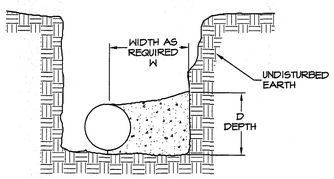
BEND

TEE

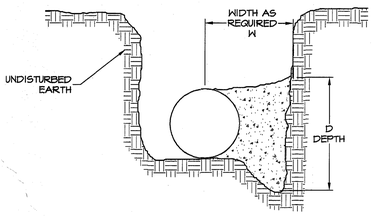


THIS BEARING AREA, L AND R DTERMINED BY SIZE OF PIPE 2

TEE WITH PLUG



STANDARD

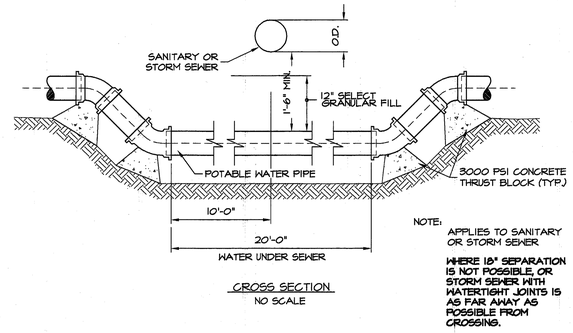


SECTION A-A

ALTERNATE WHEN LIMITED BY LACK OF COVER

1 THRUST BLOCK DETAIL

SCALE NOT TO SCALE



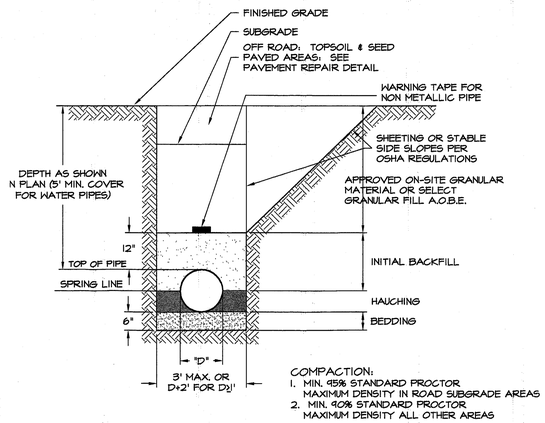
CROSS SECTION
NO SCALE

NOTE:
APPLIES TO SANITARY OR STORM SEWER

WHERE 18" SEPARATION IS NOT POSSIBLE, OR STORM SEWER WITH WATERTIGHT JOINTS IS AS FAR AWAY AS POSSIBLE FROM CROSSING.

6 SEWER SEPARATION DETAIL

SCALE NOT TO SCALE



COMPACTION:
1. MIN. 95% STANDARD PROCTOR MAXIMUM DENSITY IN ROAD SUBGRADE AREAS
2. MIN. 90% STANDARD PROCTOR MAXIMUM DENSITY ALL OTHER AREAS

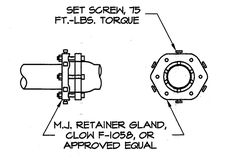
TRENCHING SCHEDULE

PIPE	CONDITION	BEDDING	HAUNCHING	INITIAL BACKFILL
PLASTIC	ALL	NYSDOT TYPE 2 OR NO 2 CRUSHED STONE	NYSDOT TYPE 2 OR NO 2 CRUSHED STONE	SELECT GRANULAR FILL
DIP	OVER BEDROCK	NYSDOT TYPE 2 OR NO 2 CRUSHED STONE	NYSDOT TYPE 2 OR NO 2 CRUSHED STONE	SELECT GRANULAR FILL
DIP	OTHER LOCATIONS	NO 2 CRUSHED STONE	NO 2 CRUSHED STONE	SELECT GRANULAR FILL

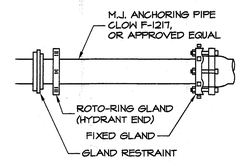
NOTE:
1. COMPLY WITH OSHA REGULATIONS AND NYSDOL INDUSTRIAL CODE 23.
   COMPLY WITH NYSDOT STANDARD SPECIFICATIONS:
   203-3.15 BACKFILL AT PIPES
   206 TRENCH EXCAVATION

5 TRENCH DETAIL

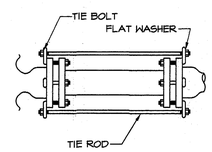
SCALE NOT TO SCALE



RETAINER GLAND



ANCHORING PIPE
PREFERRED FOR HYDRANT INSTALLATION

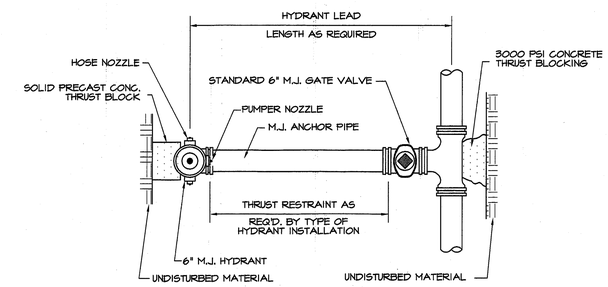


PREFERRED STYLE
AS MANUFACTURED BY STAR SUPPLY CORP. OR APPROVED EQUAL

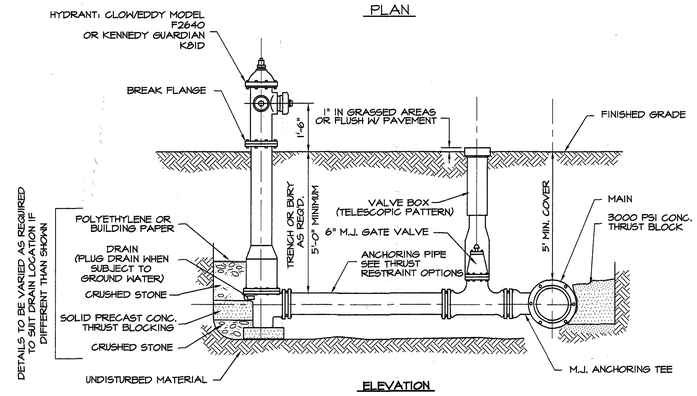
TIE RODS

2 THRUST RESTRAINTS DETAIL

SCALE NOT TO SCALE



PLAN



ELEVATION

3 TYPICAL HYDRANT INSTALLATION DETAIL

SCALE NOT TO SCALE

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BETHLEHEM CENTRAL SCHOOL DISTRICT
BETHLEHEM HIGH SCHOOL
VAN DYKE ROAD WATER MAIN

Project Title

INCHES 1 2 3 4 5 6 7 8 9 10 TOWN OF BETHLEHEM

No.	Date	Revision	By
4			
3			
2			
1			

Drawn By: THF
Checked By: DCC
Proj.# 01-03-06-00-0-006-024
CSA Project # 03124-00
Date: 2/09/06

Sheet Title
WATER MAIN DETAILS

Sheet No.
V-200

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