

3/21/17

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TEST PRESSURE = 150 PSI					
PIPE SIZE	TYPE FITTING	DIMENSIONS (FT)			VOLUME CONCRETE CU. YD.
		L"	H"	T"	
<4 INCHES	11 1/4"	-----	-----	-----	-----
	22 1/2"	1.00	1.00	1.50	0.06
	45"	1.00	1.00	1.50	0.06
	90"	1.00	1.00	2.50	0.09
	TEE	1.00	1.00	2.00	0.07
4 INCHES	11 1/4"	1.00	1.00	2.50	0.09
	22 1/2"	1.00	1.00	2.50	0.09
	45"	1.00	1.00	2.50	0.09
	90"	1.50	1.50	2.50	0.15
	TEE	1.50	1.50	2.00	0.12
6 INCHES	11 1/4"	1.50	1.50	2.50	0.15
	22 1/2"	1.50	1.50	2.50	0.15
	45"	1.50	1.50	2.50	0.15
	90"	2.00	2.00	3.00	0.28
	TEE	2.00	2.00	2.50	0.23
8 INCHES	11 1/4"	2.00	2.00	2.50	0.23
	22 1/2"	2.00	2.00	2.50	0.23
	45"	2.00	2.00	2.75	0.25
	90"	3.00	2.00	3.00	0.39
	TEE	3.00	2.00	2.50	0.32
12 INCHES	11 1/4"	2.00	2.00	3.00	0.28
	22 1/2"	2.00	2.00	3.00	0.28
	45"	3.00	2.50	3.00	0.47
	90"	4.50	3.00	3.50	0.94
	TEE	4.50	3.00	3.00	0.81
16 INCHES	11 1/4"	2.00	2.00	3.00	0.28
	22 1/2"	3.00	2.00	3.00	0.39
	45"	4.00	3.00	3.50	0.84
	90"	6.50	3.50	3.50	1.54
	TEE	6.50	3.50	3.00	1.32

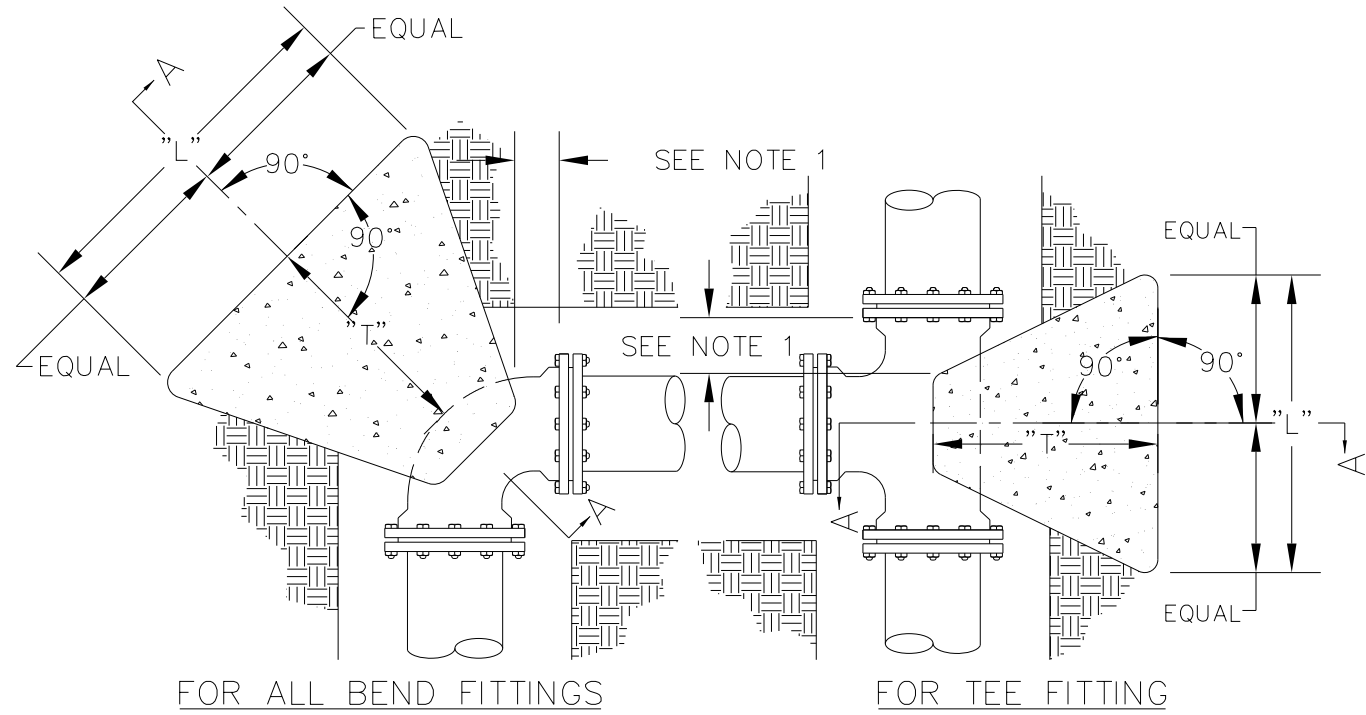
TEST PRESSURE = 200 PSI					
PIPE SIZE	TYPE FITTING	DIMENSIONS (FT)			VOLUME CONCRETE CU. YD.
		L"	H"	T"	
<4 INCHES	11 1/4"	1.00	1.00	1.00	0.04
	22 1/2"	1.00	1.00	1.50	0.06
	45"	1.00	1.00	1.50	0.06
	90"	1.50	1.50	2.50	0.15
	TEE	1.50	1.50	2.00	0.12
4 INCHES	11 1/4"	1.00	1.00	2.50	0.09
	22 1/2"	1.00	1.00	2.50	0.09
	45"	1.50	1.50	2.50	0.15
	90"	1.50	1.50	2.50	0.15
	TEE	1.50	1.50	2.00	0.12
6 INCHES	11 1/4"	1.50	1.50	2.50	0.15
	22 1/2"	1.50	1.50	2.50	0.15
	45"	1.50	1.50	2.50	0.15
	90"	2.50	2.00	3.00	0.33
	TEE	2.50	2.00	2.50	0.28
8 INCHES	11 1/4"	2.00	2.00	2.50	0.23
	22 1/2"	2.00	2.00	2.50	0.23
	45"	2.00	2.00	2.75	0.23
	90"	4.00	2.00	3.00	0.50
	TEE	4.00	2.00	2.50	0.42
12 INCHES	11 1/4"	2.00	2.00	3.00	0.28
	22 1/2"	3.00	2.00	3.00	0.39
	45"	4.00	2.50	3.00	0.61
	90"	5.50	3.00	3.50	1.13
	TEE	5.50	3.00	3.00	0.97
16 INCHES	11 1/4"	2.00	2.00	3.00	0.28
	22 1/2"	4.00	2.00	3.00	0.50
	45"	5.50	3.00	3.50	1.13
	90"	7.50	4.00	3.50	2.01
	TEE	7.50	4.00	3.00	1.72

CHART NOTES:

- IF BLOCKING EXCAVATION IS IN LIGHTLY COMPACTED FILL AREAS, OR IN AREAS WHERE BOULDERS OR STUMPS HAVE BEEN REMOVED, BLOCKING SIZE MUST BE RE-SIZED FOR THE SPECIFIC LOCATION/CIRCUMSTANCE BY A NC LICENSED PROFESSIONAL ENGINEER.
- BLOCKING SIZES SHOWN IN THESE TABLES ASSUME THE FOLLOWING:
 - BLOCKING IS CONSTRUCTED IN RESIDUAL SOILS AS SHOWN IN DETAIL
 - SOIL BEARING PRESSURE = 2000 PSF
 - VELOCITY OF FLOW = 15 FPS
- THIS DETAIL NOT APPLICABLE TO REDUCING BENDS.
- NEITHER THE WEIGHT OF THE CONCRETE BLOCKING NOR FRICTION BETWEEN CONCRETE BLOCKING AND SOIL WAS ADDED INTO BLOCKING SIZES COMPUTATION. THEREFORE, BLOCKING SIZE IS CONSERVATIVE.

THRUST BLOCKING TABLE

NOT TO SCALE



NOTES:

- CONCRETE BLOCKING IS TO BE FORMED TO ENSURE ACCESSIBILITY TO FITTINGS AND POURED AGAINST UNDISTURBED EARTH.
- ALL FITTINGS SHALL BE WRAPPED IN POLYETHYLENE TO PREVENT CONCRETE FROM CONTACTING FITTINGS, BOLTS OR ENDS OF MECHANICAL JOINT BENDS.
- CONCRETE TO BE MINIMUM 3,000 PSI @ 28 DAYS.
- WHEN SACKCRETE IS TO BE USED, IT SHALL BE PROPERLY MIXED PER MANUFACTURER SPECIFICATIONS.
- FOR REQUIRED DIMENSIONS, SEE THRUST BLOCKING TABLE.

THRUST BLOCKING

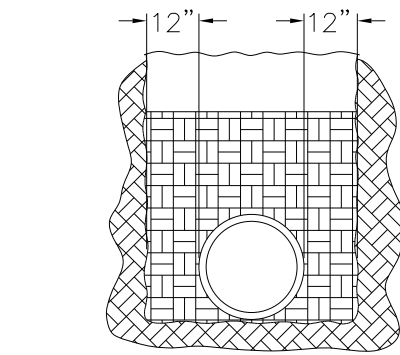
NOT TO SCALE

Pipe Restraint Charts

Horizontal & Vertical Up Bends			
Pipe Size (inch)	Bend	Angle	Pipeline Restraint Req. (feet)
4"	11.25	2	
	22.5	5	
	30	6	
	45	10	
	60	14	
6"	11.25	3	
	22.5	7	
	30	9	
	45	14	
	60	19	
8"	11.25	4	
	22.5	9	
	30	11	
	45	18	
	60	25	
10"	11.25	5	
	22.5	10	
	30	14	
	45	21	
	60	30	
12"	11.25	6	
	22.5	12	
	30	16	
	45	25	
	60	35	
16"	11.25	7	
	22.5	13	
	45	27	
	90	65	
	11.25	9	
24"	22.5	18	
	45	37	
	90	90	

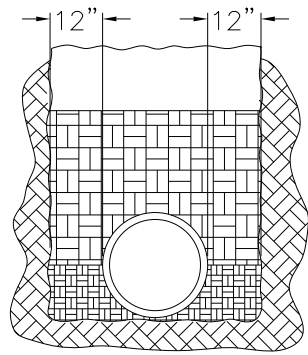
Vertical Down Bends			
Pipe Size (inch)	Bend Angle	Pipeline Restraint Req. (feet)	
4"	11.25	4	
	22.5	8	
	30	11	
	45	17	
	60	24	
6"	11.25	8	
	22.5	12	
	30	16	
	45	24	
	60	34	
8"	11.25	7	
	22.5	15	
	30	20	
	45	31	
	60	44	
10"	11.25	9	
	22.5	18	
	30	25	
	45	38	
	60	53	
12"	11.25	11	
	22.5	21	
	30	29	
	45	44	
	60	62	
16"	11.25	14	
	22.5	28	
	45	58	
	90	139	
	11.25	20	
24"	22.5	39	
	45	81	
	90	194	

Tees, Reducer, Caps		
Fitting Type	Size (inch)	Pipeline Restraint Req. (feet)
Tee	4	35
	6	52
	8	70
	10	85
	12	101
	16	131
	24	186
Reducer	6x4	30
	8x6	32
	10x4	74
	10x6	58
	10x8	21
	12x4	83
	12x6	78
	12x10	31
	16x4	128
	16x6	117
Cap	16x8	101
	16x10	82
	16x12	59
	24x4	187
	24x6	180
	24x8	170
	24x10	160
	24x12	143
	24x16	106
	4	41
Cap	6	59
	8	76
	10	92
	12	107
	16	139
Cap	24	194



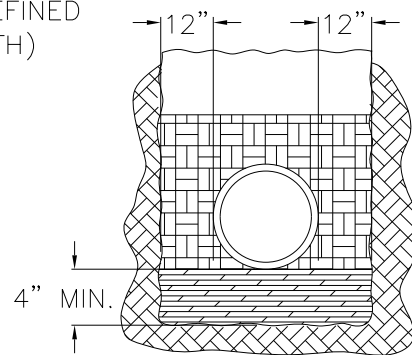
TYPE 1

(NOTE 1)
FLAT BOTTOM TRENCH WITH LOOSE DIRT (FLAT BOTTOM IS DEFINED AS UNDISTURBED EARTH)

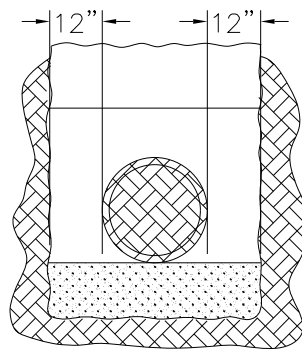


TYPE 2

FLAT BOTTOM TRENCH WITH BACKFILL LIGHTLY CONSOLIDATED TO CENTERLINE OF PIPE (FLAT BOTTOM IS DEFINED AS UNDISTURBED EARTH)

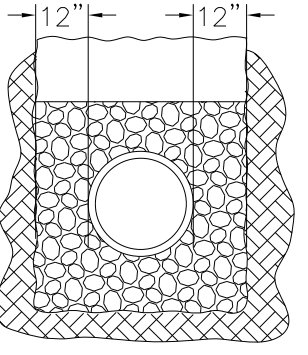


TYPE 3



TYPE 4

PIPE BEDDED IN SAND, GRAVEL OR CRUSHED STONE TO A DEPTH OF 1/8 PIPE DIAMETER, 4" MINIMUM WITH BACKFILL COMPACTED TO TOP OF PIPE (APPROXIMATELY 80 PERCENT STANDARD PROCTOR, AASHTO T-99)



TYPE 5

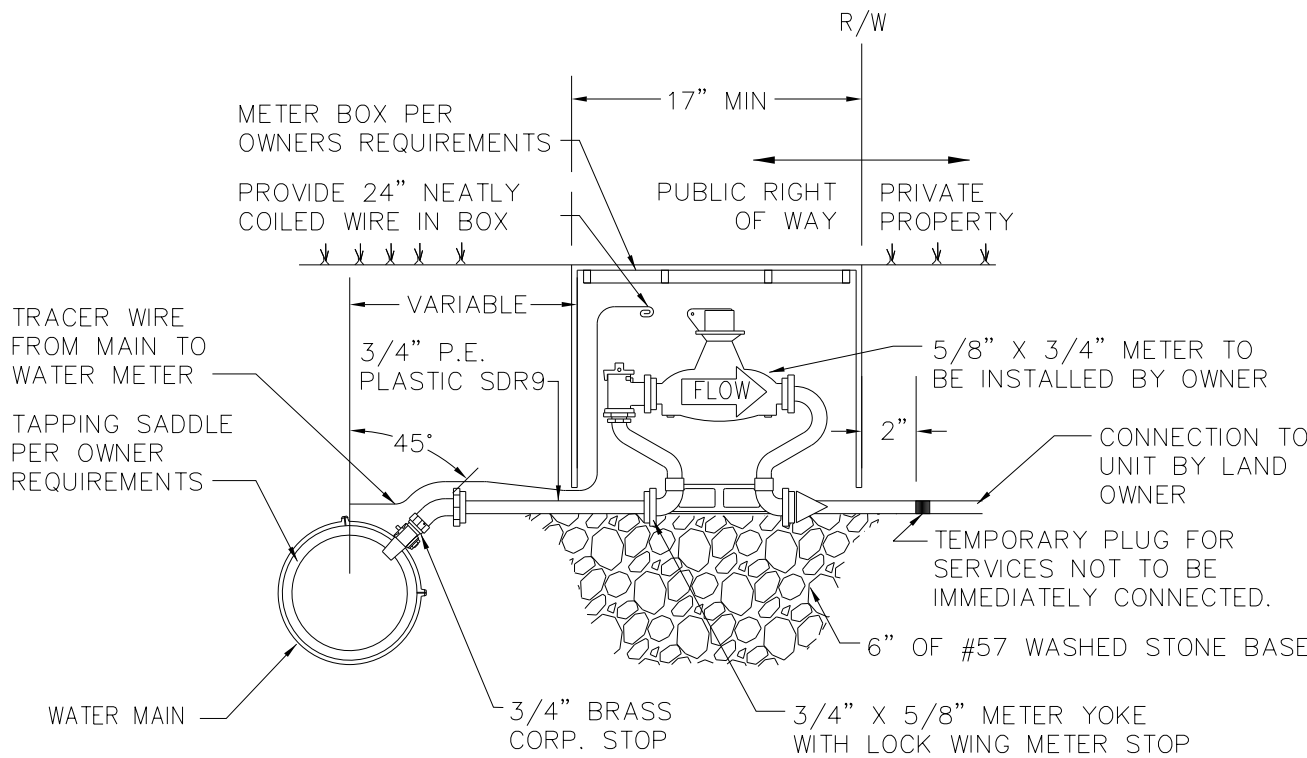
PIPE BEDDED TO ITS' CENTERLINE IN COMPACTED GRANULAR MATERIAL, 4" MINIMUM UNDER PIPE. COMPACTED GRANULAR OR SELECT MATERIAL TO TOP OF PIPE (APPROXIMATELY 90 PERCENT STANDARD PROCTOR, AASHTO T-99) (SELECT MATERIAL IS DEFINED AS NATIVE SOIL EXCAVATED FROM THE TRENCH, FREE OF ROCKS, ORGANIC MATERIAL, FOREIGN MATERIALS AND FROZEN EARTH)

NOTES:

- FOR NORMAL PIPE SIZES 14 INCH AND LARGER, CONSIDERATION SHOULD BE GIVEN TO THE USE OF LAYING CONDITIONS OTHER THAN TYPE 1.
- CONSIDERATION OF THE PIPE-ZONE EMBEDMENT CONDITIONS INCLUDED IN THIS FIGURE MAY BE INFLUENCE BY FACTORS OTHER THAN PIPE STRENGTH. FOR ADDITIONAL INFORMATION ON PIPE BEDDING AND BACKFILL, SEE ANSI/AWWA C600.

SEWER FORCE MAIN EMBEDMENT DETAIL

NOT TO SCALE



NOTE: METER BOX TO BE SUPPORTED ON BRICK OR BLOCK

3/4" TO 1" SERVICE CONNECTION AND METER

NOT TO SCALE

