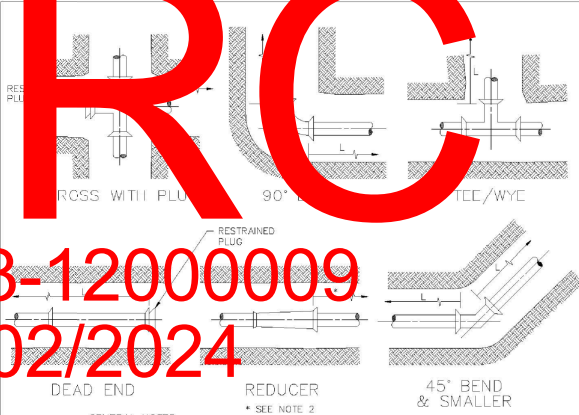


DRC

PZ23-12000009  
10/02/2024



GENERAL NOTES:

- VALUES IN TABLE ARE BASED ON 3' OF COVER, 100 PSI INTERNAL PRESSURE, FOR FORCE MAINS, 150 PSI REUSE WATER LINES, ANSI/AWWA C605 & C150/A21.50 LAYING CONDITION 3, ASTM D2487 SAND-SILT SP. SOL. TYPE, AND SAFETY FACTOR OF 2.0. RESTRAINED LENGTHS WERE COMPUTED PER DIPRA "THRUST RESTRAINT DESIGN FOR DUCTILE IRON PIPE" AND "PVC PIPE THRUST RESTRAINT DESIGN HANDBOOK," EBAA IRON, INC.
- CONFIRM THE EXACT LENGTH OF RESTRAINING REQUIRED FOR REDUCERS, PIPE ENGAGED IN POLYETHYLENE AND ENCRGOACHING RESTRAINED LENGTHS WITH THE DESIGN ENGINEER.
- THE CONTRACTOR IS RESPONSIBLE FOR PROPER INSTALLATION OF THE RESTRAINED JOINTS TO PREVENT MOVEMENT OF THE PIPE & FITTINGS.
- IN THE EVENT OF A CONFLICT BETWEEN RESTRAINED LENGTHS SHOWN ON THE TABLE AND RESTRAINED LENGTHS SHOWN ON THE DRAWINGS, THE LONGEST RESTRAINED LENGTH SHALL BE USED.

RESTRAINED JOINT INFORMATION

ENGINEERING STANDARDS 2022			
REVISIONS		ENGINEERING DIVISION CITY OF POMPANO BEACH	RESTRAINED JOINT INFORMATION
BY	DATE		
		SCALE: N.T.S.	DATE: MAY 2022 DWG. NO. 118-1

PVC HORIZONTAL BENDS AND VERTICAL UP BENDS						
PIPE SIZE (IN.)	RESTRAINED JOINT LENGTH L (MINIMUM DISTANCE IN FEET FROM FITTING - EACH WAY)				GROSS WITH PLUG - 90° BEND - REUSE	
	BENDS					
	90°	45°	22.5°	11.25°		
6	26	11	6	3	53	
8	33	14	7	4	68	
12	46	19	10	5	95	

PVC VERTICAL DOWN BEND						
PIPE SIZE (IN.)	RESTRAINED JOINT LENGTH L (MINIMUM DISTANCE IN FEET FROM FITTING - EACH WAY)				GROSS WITH PLUG - 90° BEND - REUSE	
	BENDS					
	90°	45°	22.5°	11.25°		
6	26	11	6	3		
8	33	14	7	4		
12	46	19	10	5		

DIP HORIZONTAL BENDS AND VERTICAL UP BENDS						
PIPE SIZE (IN.)	RESTRAINED JOINT LENGTH L (MINIMUM DISTANCE IN FEET FROM FITTING - EACH WAY)				GROSS WITH PLUG - 90° BEND - REUSE	
	BENDS					
	90°	45°	22.5°	11.25°		
12"	68	28	14	7	144	
24"	119	49	24	12	258	

DIP VERTICAL DOWN BEND						
PIPE SIZE (IN.)	RESTRAINED JOINT LENGTH L (MINIMUM DISTANCE IN FEET FROM FITTING - EACH WAY)				GROSS WITH PLUG - 90° BEND - REUSE	
	BENDS					
	90°	45°	22.5°	11.25°		
12"	144	60	29	14		
24"	258	107	51	25		

RESTRAINED JOINT INFORMATION

ENGINEERING STANDARDS 2022			
REVISIONS		ENGINEERING DIVISION CITY OF POMPANO BEACH	RESTRAINED JOINT INFORMATION
BY	DATE		
		SCALE: N.T.S.	DATE: MAY 2022 DWG. NO. 118-2

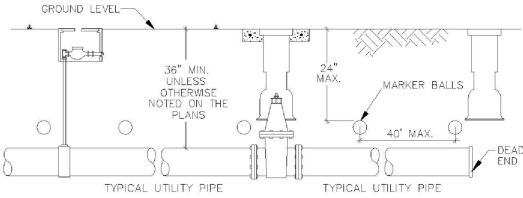
MIN. LENGTH OF PIPE (FEET) TO BE RESTRAINED  
(SOURCES: EBAA IRON RESTRAINT LENGTH CALCULATION PROGRAM FOR PVC PIPE, RELEASE 3.1, AND DIPRA THRUST RESTRAINT FOR DUCTILE IRON PIPE, RELEASE 2.0)

FITTING TYPE	PIPE															
	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"	30"	36"	42"	48"	54"	60"
90° HORIZ. BEND	14	20	25	30	35	40	45	50	55	65	75	85	95	105	115	125
45° HORIZ. BEND	8	11	13	15	18	20	22	25	28	32	36	40	45	50	55	60
22.5° HORIZ. BEND	4	5	6	7	8	9	10	11	12	13	15	16	18	20	22	25
11.25° HORIZ. BEND	2	3	3	4	4	4	5	5	6	7	8	9	10	11	12	13
90° VERT. OFFSET	29	41	53	64	74	85	95	105	114	124	144	164	184	204	224	244
45° VERT. OFFSET	15	21	26	31	36	41	46	51	56	61	71	81	91	101	111	121
22.5° VERT. OFFSET	8	11	13	15	18	20	22	25	28	32	36	40	45	50	55	60
11.25° VERT. OFFSET	4	5	6	7	8	9	10	11	12	13	15	16	18	20	22	25
PLUG (HEAD END)	25	44	68	70	83	101	129	153	181	214	248	278	304	324	344	364
IN-LINE VALVE	30	43	45	45	45	45	45	45	45	45	45	45	45	45	45	45
48" Ø	25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
42" Ø	25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
36" Ø	25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
30" Ø	25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
24" Ø	25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
18" Ø	25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
12" Ø	25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6" Ø	25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
48" Ø	25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
42" Ø	25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
36" Ø	25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
30" Ø	25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
24" Ø	25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
18" Ø	25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
12" Ø	25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6" Ø	25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
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42" Ø	25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
36" Ø	25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
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18" Ø	25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
12" Ø	25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6" Ø	25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
48" Ø	25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
42" Ø	25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
36" Ø	25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
30" Ø	25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
24" Ø	25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
18" Ø	25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
12" Ø	25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6" Ø	25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

- NOTES:
- THE DATA IN THE ABOVE TABLE ARE BASED UPON THE FOLLOWING INSTALLATION CONDITIONS:  
SOIL TYPE-SAND  
BENCH TYPE-1  
MINIMUM PIPE LENGTH-10'-0"  
125' PRESSURE-100 PSI/200 PSI  
SAFETY FACTOR-1.5  
DEPTH OF BURY-2'  
VERTICAL OFFSET-3'
  - THE RESTRAINED PIPE LENGTHS APPLY TO DUCTILE IRON AND PVC PIPE.
  - ALL JOINTS BETWEEN UPPER AND LOWER BENDS SHALL BE RESTRAINED.
  - RESTRAINED PIPE LENGTHS APPLY TO PIPE ON BOTH SIDES OF VALVES AND FITTINGS.

RESTRAINED JOINT INFORMATION

ENGINEERING STANDARDS 2022			
REVISIONS		ENGINEERING DIVISION CITY OF POMPANO BEACH	RESTRAINED JOINT INFORMATION
BY	DATE		
		SCALE: N.T.S.	DATE: MAY 2022 DWG. NO. 118-3



GENERAL NOTES:

- ALL NONMETALLIC PIPE SHALL BE INSTALLED WITH 12 THHN SOLID COPPER TRACING WIRE.
- THE MARKER BALLS MUST BE INSTALLED DIRECTLY ABOVE THE PIPE.
- MARKER BALLS SHALL BE INSTALLED AT 40' O.C.
- BALL COLOR CODING:  
POTABLE WATER SYSTEM: BLUE PER 655.320(2)(b)(3) F.A.C.

UTILITY PIPE AND MARKER BALLS LOCATION

ENGINEERING STANDARDS 2022			
REVISIONS		ENGINEERING DIVISION CITY OF POMPANO BEACH	UTILITY PIPE AND MARKER BALLS LOCATION
BY	DATE		
S.S.	01/12		
S.S.	06/16		
		SCALE: N.T.S.	DATE: JAN. 2022 DWG. NO. 120-1



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E86C2580002F48A, cn=Bealinda M Pell  
Date: 2024.08.20 16:06:31 -04'00'



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