

PROJECT TYPICAL DETAILS

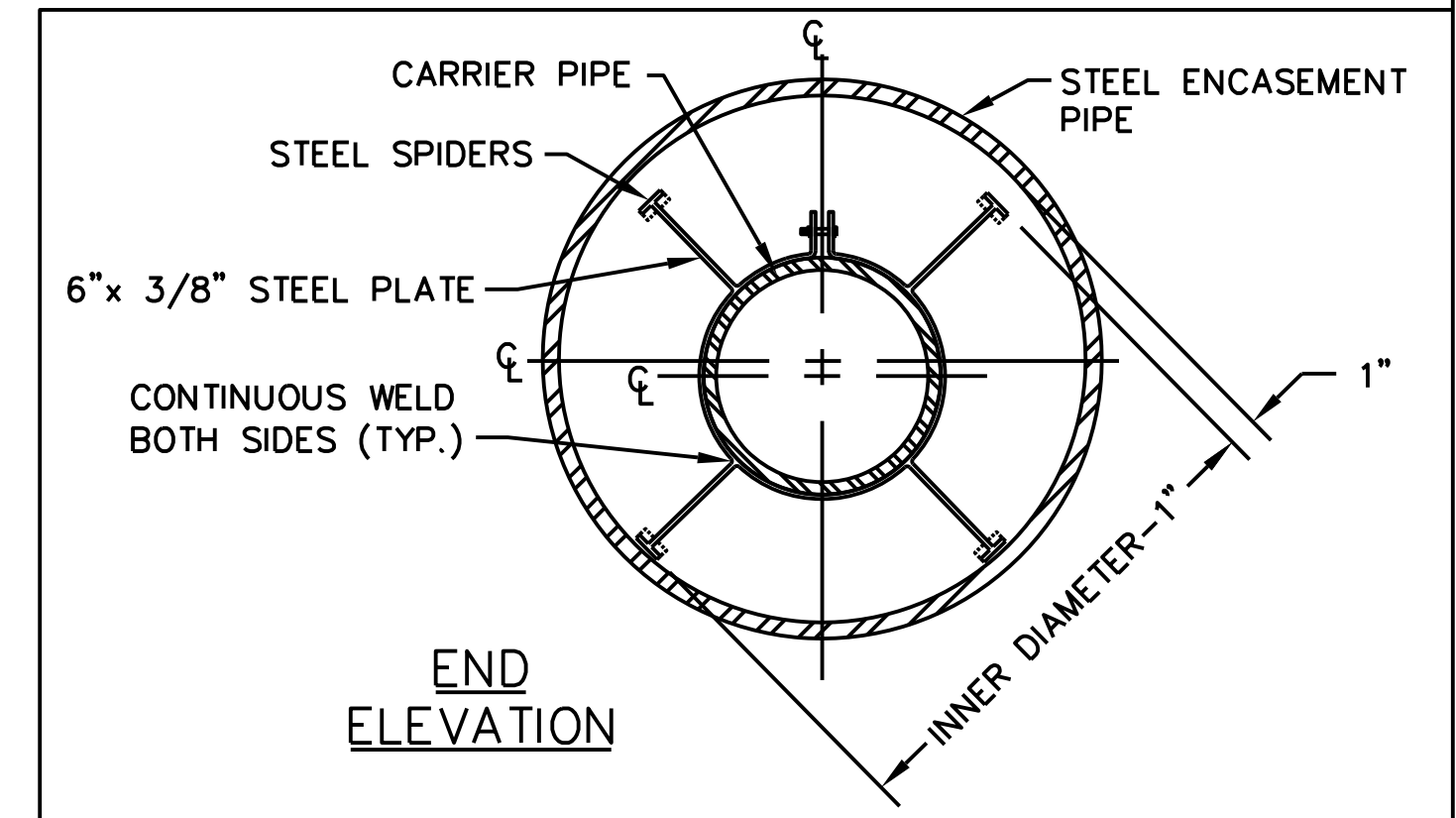
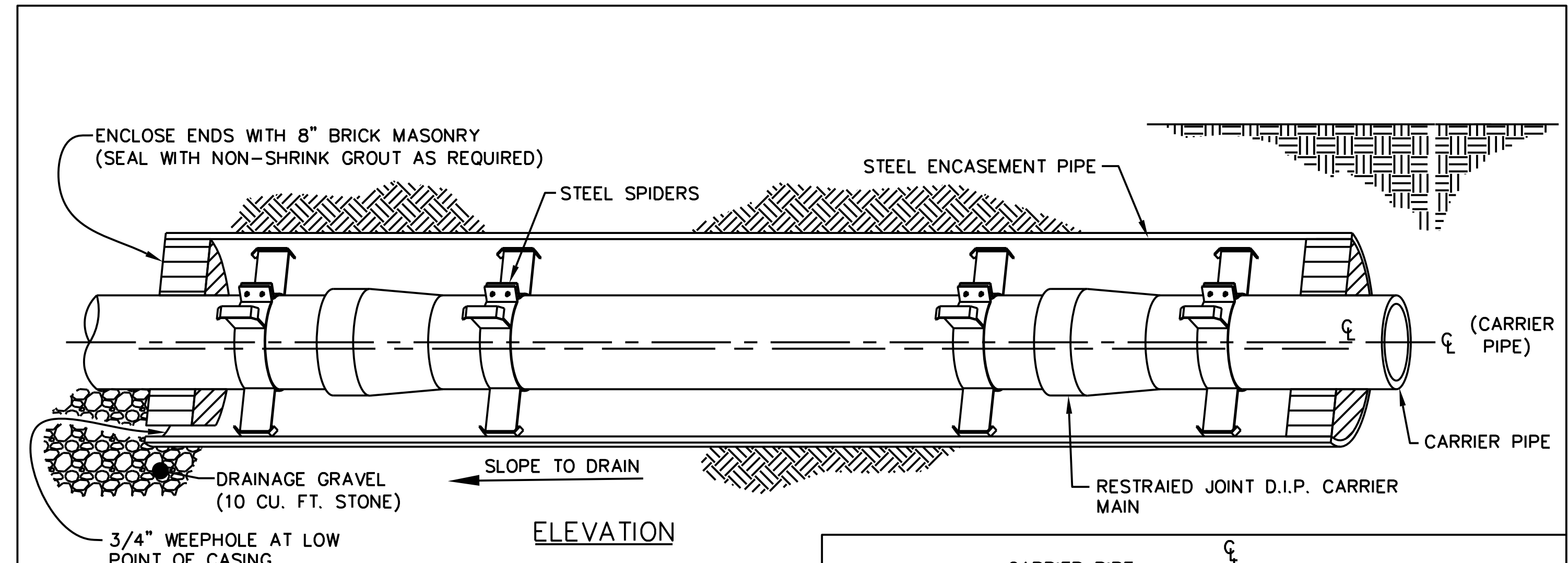
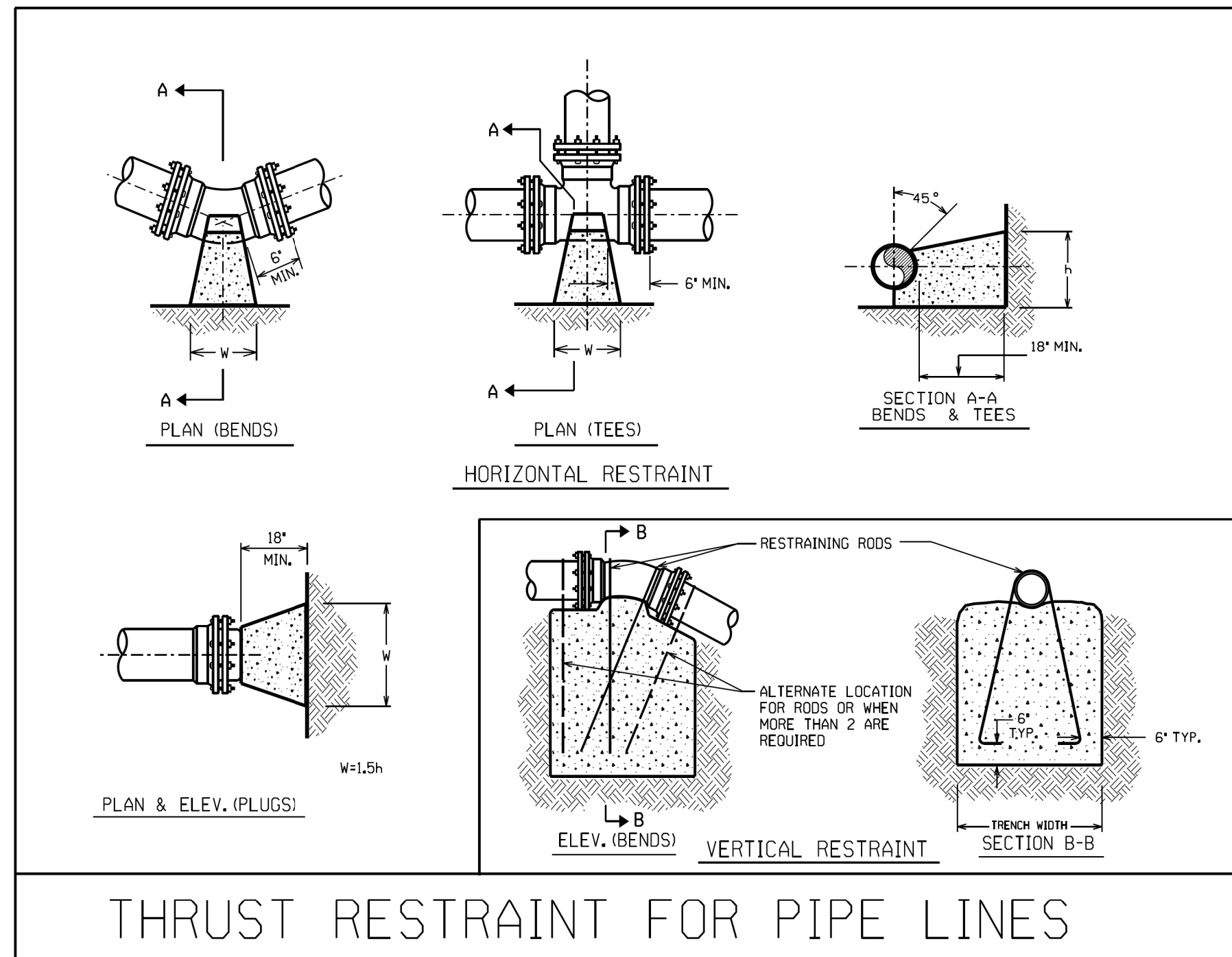
NOT TO SCALE

HINDE ENGINEERING
License No. C-2639
401 Harrison Oaks Blvd., Suite 220 Cary, NC 27513

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UNLESS ALL SIGNATURES COMPLETED**

WATER AND SEWER PLANS

PROJECT REFERENCE NO. U-5839	SHEET NO. UC-3H
DESIGNED BY: JKC	
DRAWN BY: JKC	
CHECKED BY: CLS	
APPROVED BY: CDB	
REVISED:	
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION 3/9/2023 UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151 UTILITY CONSTRUCTION PLANS ONLY	



- NOTES:**
1. STEEL "SPIDERS" SHALL BE USED FOR SUPPORT OF THE CARRIER PIPE WITHIN THE CASING PIPE.
 2. A MINIMUM SPACING OF 2 SPIDERS PER JOINT OF CARRIER PIPE SHALL BE REQUIRED.
 3. THE SPIDERS SHALL BE SPACED EVENLY ALONG THE CARRIER PIPE SUCH THAT EACH SPIDER SUPPORTS THE SAME UNIT WEIGHT OF THE CARRIER MAIN.
 4. FOR CASING SIZE SEE STANDARD SPECIFICATION SECTION 05000.
 5. RECLAIMED LINE SHALL BE PVC WITH RESTRAINED JOINT PIPE.

STEEL ENCASEMENT & CARRIER PIPE

BASED ON TEST PRESSURE OF 200 P.S.I.

HORIZONTAL RESTRAINT (ALL AREAS GIVEN ARE IN SQUARE FEET)								VERTICAL RESTRAINT (ALL VOLUMES GIVEN ARE IN CUBIC YARDS)**										
PIPE SIZE	DEGREE OF BEND	LBS. STATIC THRUST **	ALLOWABLE SOIL BEARING (PSF)								PIPE SIZE	RESTRAINING RODS NO.	DEGREE OF BEND					
			1000	2000	3000	4000	5000	6000	7000	8000				NO. REQ'D	DIA.	11 1/4"	22 1/2"	45"
4"	11 1/4"	615	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	22 1/2"	1,226	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
	45°	2,452	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
6"	TEE/PLUG	3,143	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	11 1/4"	1,385	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	22 1/2"	2,768	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1
8"	45°	3,399	5	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1
	90°	3,399	10	5	3	2	2	2	2	2	2	2	2	2	2	2	2	2
	TEE/PLUG	7,068	3	4	3	2	2	2	2	2	2	2	2	2	2	2	2	2
10"	11 1/4"	2,452	5	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1
	22 1/2"	4,904	5	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1
	45°	3,619	10	5	3	2	2	2	2	2	2	2	2	2	2	2	2	2
12"	11 1/4"	1,773	18	9	6	4	4	4	4	4	4	4	4	4	4	4	4	4
	22 1/2"	3,546	12	6	4	3	3	3	3	3	3	3	3	3	3	3	3	3
	45°	1,681	8	4	3	2	2	2	2	2	2	2	2	2	2	2	2	2
14"	11 1/4"	1,385	15	8	5	4	3	3	3	3	3	3	3	3	3	3	3	3
	22 1/2"	2,768	28	14	9	7	6	6	6	6	6	6	6	6	6	6	6	6
	45°	1,681	10	5	4	3	3	3	3	3	3	3	3	3	3	3	3	3
16"	11 1/4"	1,032	11	6	4	3	2	2	2	2	2	2	2	2	2	2	2	2
	22 1/2"	2,064	22	11	7	5	4	4	4	4	4	4	4	4	4	4	4	4
	45°	1,508	15	8	5	4	3	3	3	3	3	3	3	3	3	3	3	3
18"	11 1/4"	38,387	40	20	13	10	8	7	6	5	4	4	4	4	4	4	4	4
	22 1/2"	76,774	28	14	9	7	6	5	4	4	4	4	4	4	4	4	4	4
	45°	15,080	15	8	5	4	3	3	3	3	3	3	3	3	3	3	3	3
20"	11 1/4"	7,544	8	4	3	2	2	2	2	2	2	2	2	2	2	2	2	2
	22 1/2"	15,088	15	8	5	4	3	3	3	3	3	3	3	3	3	3	3	3
	45°	29,455	29	15	10	7	6	5	4	4	4	4	4	4	4	4	4	4
24"	11 1/4"	54,426	58	27	18	14	11	9	8	7	6	5	4	4	4	4	4	4
	22 1/2"	108,852	38	19	12	10	8	7	6	5	4	4	4	4	4	4	4	4
	45°	38,854	10	5	3	2	2	2	2	2	2	2	2	2	2	2	2	2
30"	11 1/4"	15,512	20	10	7	5	4	3	3	3	3	3	3	3	3	3	3	3
	22 1/2"	31,024	20	10	7	5	4	3	3	3	3	3	3	3	3	3	3	3
	45°	38,471	58	27	18	14	11	9	8	7	6	5	4	4	4	4	4	4
36"	11 1/4"	1,032	7	4	3	2	2	2	2	2	2	2	2	2	2	2	2	2
	22 1/2"	2,064	14	7	4	3	2	2	2	2	2	2	2	2	2	2	2	2
	45°	1,508	17	9	6	4	3	3	3	3	3	3	3	3	3	3	3	3
42"	11 1/4"	50,285	50	25	15	11	9	8	7	6	5	4	4	4	4	4	4	4
	22 1/2"	100,570	33	17	11	9	7	6	5	4	4	4	4	4	4	4	4	4
	45°	33,523	17	9	6	4	3	3	3	3	3	3	3	3	3	3	3	3

**INCLUDES 1.50 SAFETY FACTOR

GENERAL NOTES:
 1. CONCRETE SHALL BE CLASS "B".
 2. CONCRETE SHALL NOT CONTACT BOLTS ENDS OF MECHANICAL JOINT FITTINGS.
 3. CONSULT WITH ENGINEER FOR CONCRETE REQUIREMENTS ON MAINS LARGER THAN 16 INCHES.
 (FOR VERTICAL & HORIZONTAL BENDS)
 4. ALLOWABLE SOIL BEARING SHALL BE DETERMINED BY THE ENGINEER.

THRUST RESTRAINT FOR WATER MAINS

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