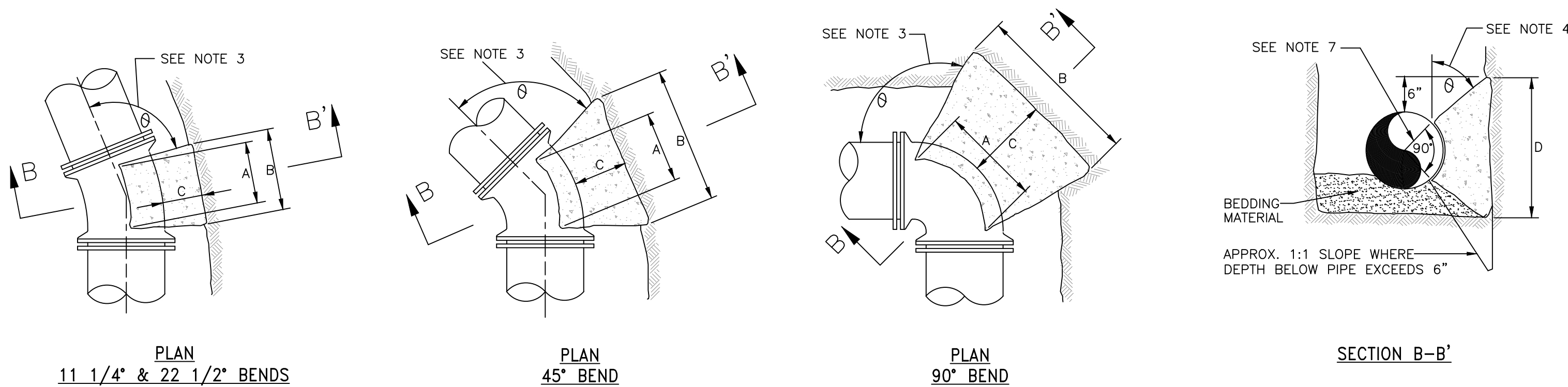


File: H:\DRAWINGS\RHINEBECK (V)\22-2496 WPD-D-101 - 102 - DETAILS.DWG Sheet: 7/2/2024, 12:57:33 PM Plotted: 10/2/2024, 10:15:56 AM User: lisa.brooks LstSaveBy: lbrooks



JOINT RESTRAINED SCHEDULE							
PIPE SIZE	90°	45°	22 1/2°	11 1/4°	TEES (ALONG BRANCH)	REDUCER (LARGER O.D.)	DEAD ENDS
6"	15'	10'	5'	5'	20'	—	60'
8"	20'	10'	5'	5'	55'	—	70'
10"	25'	10'	5'	5'	65'	—	85'
12"	30'	15'	10'	5'	80'	—	95'
16"	36'	20'	15'	15'	90'	—	105'
8"x6"	—	—	—	—	35'	30'	—
10"x8"	—	—	—	—	50'	30'	—
12"x8"	—	—	—	—	45'	55'	—
12"x10"	—	—	—	—	65	30'	—

- MINIMUM LENGTH IN FEET TO BE RESTRAINED IN EACH DIRECTION.
- ACTUAL LENGTH SHALL BE BASED ON SOIL CONDITIONS.
- RESTRAINT BASED ON TYPICAL SOIL CONDITIONS, 150 PSI TEST PRESSURE AND BEDDING PER PROJECT TRENCH DETAIL. FOR VALVES USE LENGTHS AS INDICATED FOR 90° BEND.
- RESTRAINT BASED ON DUCTILE IRON PIPE WITH POLYETHYLENE ENCASEMENT
- APPROVED RESTRAINERS: APPROVED MEGA-LUG TYPE FOR MECHANICAL JOINTS AND FIELD LOK GASKETS FOR PUSH JOINTS
- ALL RESTRAINT BOLTS AND NUTS SHALL BE 304 S.S WITH ANTI-SIEZE PER SPECS.
- THRUST BLOCKS SHALL ONLY BE USED ON DEAD ENDS PER CONTRACT PLANS.
- MIN 4' GROUND COVER REQUIRED.
- IF RESTRAINT LENGTH IS LESS THAN THE LENGTH OF PIPE, CONTRACTOR SHALL RESTRAIN THE NEXT JOINT.
- ALL RESTRAINTS FOR ELBOWS ARE FOR HORIZONTAL INSTALLATION. CONTRACTOR SHALL CONSULT ENGINEER FOR VERTICAL RESTRAINT SCHEDULE.

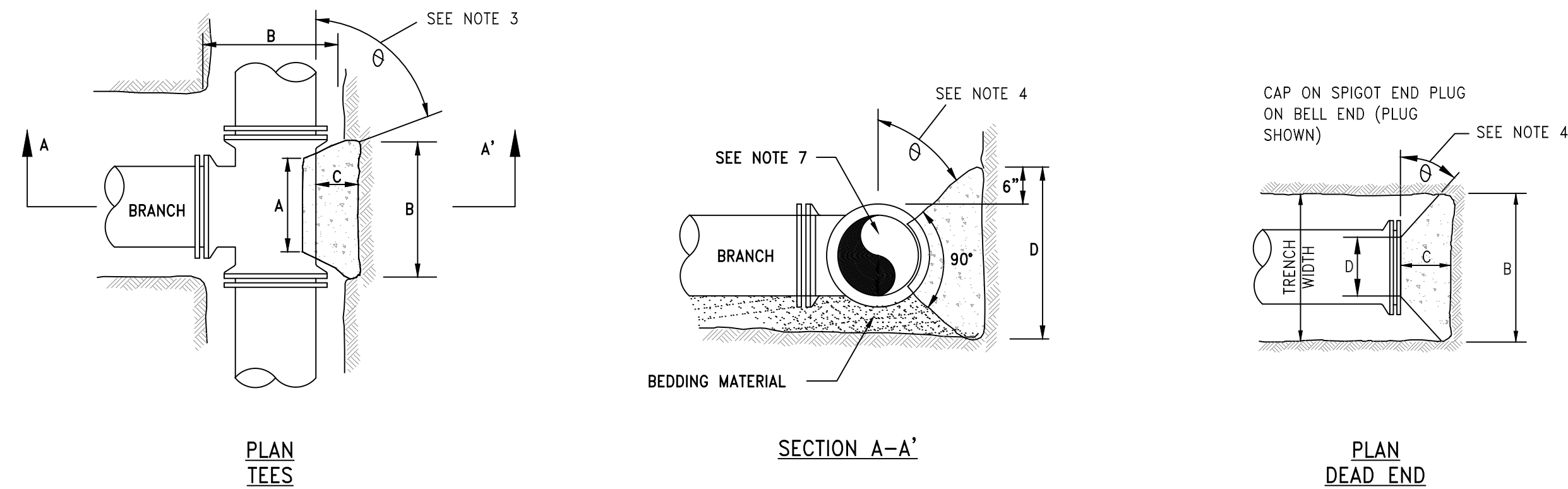


TABLE No. 1: THRUST BLOCK AREA REQUIRED

0-50 PSI TEST PRESSURE THRUST AREA REQ'D FT. ²						50-100 PSI TEST PRESSURE THRUST AREA REQ'D FT. ²						100-150 PSI TEST PRESSURE THRUST AREA REQ'D FT. ²					
NOMINAL PIPE DIAMETER	DEAD END	90° BEND OR TEE	45° BEND	22 1/2° BEND	11 1/4° BEND	NOMINAL PIPE DIAMETER	DEAD END	90° BEND	45° BEND	22 1/2° BEND	11 1/4° BEND	NOMINAL PIPE DIAMETER	DEAD END	90° BEND	45° BEND	22 1/2° BEND	11 1/4° BEND
4	1.0	1.0	1.0	1.0	1.0	4	1.0	2.0	1.0	1.0	1.0	4	2.0	2.0	1.0	1.0	1.0
6	1.0	2.0	1.0	1.0	1.0	6	2.0	3.0	2.0	1.0	1.0	6	3.0	4.0	2.0	1.0	1.0
8	2.0	3.0	1.0	1.0	1.0	8	3.0	5.0	3.0	2.0	1.0	8	5.0	7.0	4.0	2.0	1.0
10	3.0	3.0	2.0	1.0	1.0	10	5.0	7.0	4.0	2.0	1.0	10	8.0	11.0	6.0	3.0	2.0
12	4.0	5.0	3.0	2.0	1.0	12	7.0	10.0	5.0	3.0	2.0	12	10.0	15.0	8.0	4.0	2.0
16	5.0	6.0	4.0	3.0	2.0	16	8.0	12.0	6.0	4.0	3.0	16	12.0	18.0	10.0	6.0	4.0

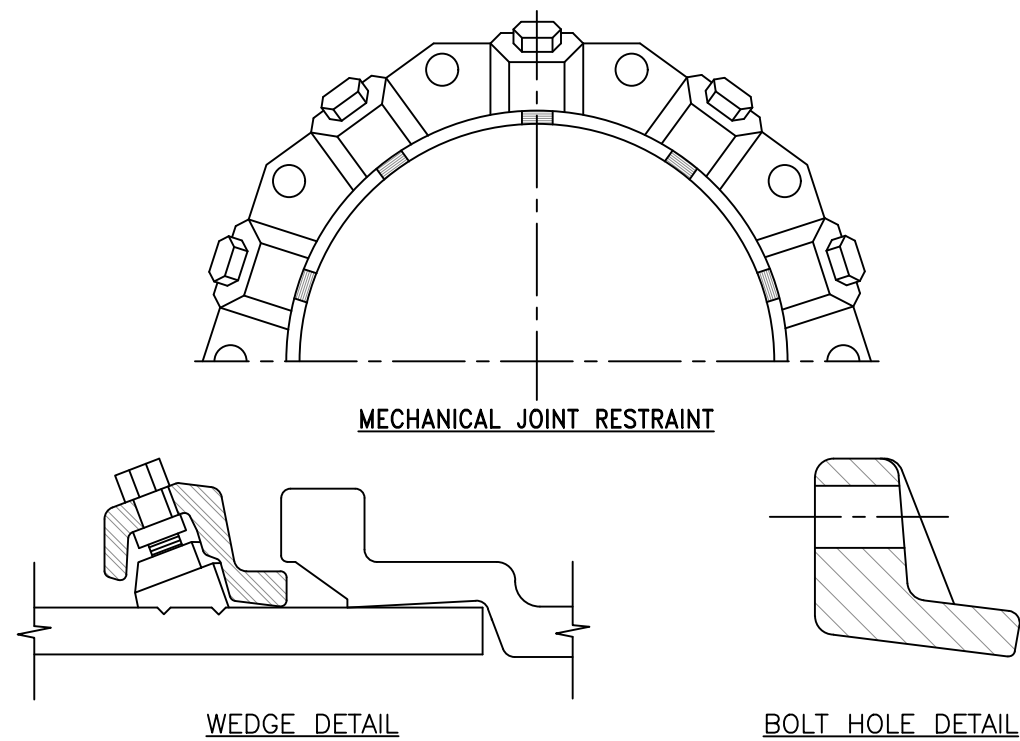
TABLE No. 2: RESTRAINING ROD REQUIREMENTS FOR MECHANICAL JOINT PIPING SYSTEMS

0-50 PSI TEST PRESSURE NUMBER & SIZE OF RESTRAINING RODS						50-100 PSI TEST PRESSURE NUMBER & SIZE OF RESTRAINING RODS						100-150 PSI TEST PRESSURE NUMBER & SIZE OF RESTRAINING RODS					
NOMINAL PIPE DIAMETER	DEAD END	90° BEND OR TEE	45° BEND	22 1/2° BEND	11 1/4° BEND	NOMINAL PIPE DIAMETER	DEAD END	90° BEND	45° BEND	22 1/2° BEND	11 1/4° BEND	NOMINAL PIPE DIAMETER	DEAD END	90° BEND	45° BEND	22 1/2° BEND	11 1/4° BEND
4	(2) 3/4"	(2) 3/4"	(2) 3/4"	(2) 3/4"	(2) 3/4"	4	(2) 3/4"	(2) 3/4"	(2) 3/4"	(2) 3/4"	(2) 3/4"	4	(2) 3/4"	(2) 3/4"	(2) 3/4"	(2) 3/4"	(2) 3/4"
6	(2) 3/4"	(2) 3/4"	(2) 3/4"	(2) 3/4"	(2) 3/4"	6	(2) 3/4"	(2) 3/4"	(2) 3/4"	(2) 3/4"	(2) 3/4"	6	(2) 3/4"	(2) 3/4"	(2) 3/4"	(2) 3/4"	(2) 3/4"
8	(2) 3/4"	(2) 3/4"	(2) 3/4"	(2) 3/4"	(2) 3/4"	8	(2) 3/4"	(2) 3/4"	(2) 3/4"	(2) 3/4"	(2) 3/4"	8	(2) 3/4"	(2) 3/4"	(2) 3/4"	(2) 3/4"	(2) 3/4"
10	(2) 3/4"	(2) 3/4"	(2) 3/4"	(2) 3/4"	(2) 3/4"	10	(2) 3/4"	(2) 3/4"	(2) 3/4"	(2) 3/4"	(2) 3/4"	10	(4) 3/4"	(4) 3/4"	(2) 3/4"	(2) 3/4"	(2) 3/4"
12	(2) 3/4"	(2) 3/4"	(2) 3/4"	(2) 3/4"	(2) 3/4"	12	(4) 3/4"	(4) 3/4"	(2) 3/4"	(2) 3/4"	(2) 3/4"	12	(4) 3/4"	(4) 3/4"	(2) 3/4"	(2) 3/4"	(2) 3/4"
16	(4) 3/4"	(4) 3/4"	(4) 3/4"	(4) 3/4"	(4) 3/4"	16	(6) 3/4"	(6) 3/4"	(4) 3/4"	(4) 3/4"	(4) 3/4"	16	(6) 3/4"	(6) 3/4"	(4) 3/4"	(4) 3/4"	(4) 3/4"

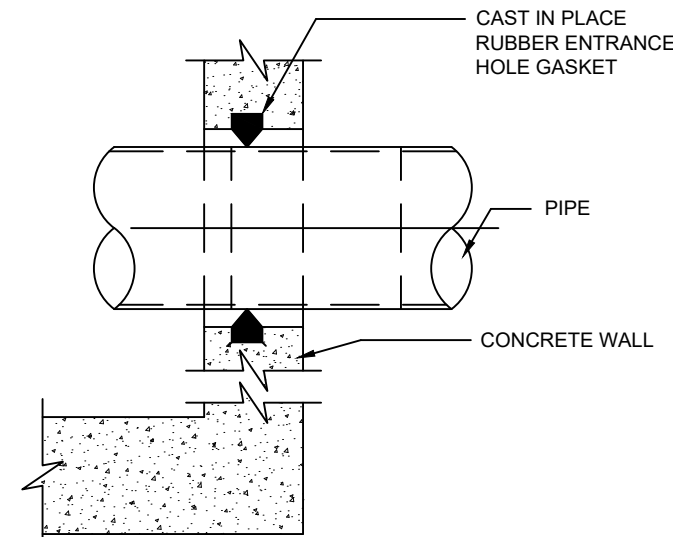
THRUST BLOCK NOTES:

- WHERE A HORIZONTAL BEND IS MADE, THE PIPING SHALL BE RESTRAINED BY MEANS OF A THRUST BLOCK AS DETAILED ON THIS SHEET. WHERE VERTICAL OFFSETS ARE MADE, THE TOP BEND SHALL BE RESTRAINED BY RESTRAINING RODS AND STRAPS, CONCRETE THRUST ANCHOR BLOCKS AND RESTRAINING RODS, OR A COMBINATION OF BOTH. THE BOTTOM BENDS SHALL BE RESTRAINED BY CONCRETE THRUST BLOCKS AS DETAILED.
- "A", "B" AND "D" DIMENSIONS SHALL BE AS LARGE AS POSSIBLE WITHOUT INTERFERING WITH THE MECHANICAL JOINTS OR THE BOLTS.
- "C" DIMENSIONS SHALL BE LARGE ENOUGH TO MAKE ANGLE θ EQUAL TO OR LARGER THAN 45°. ANGLE θ SHALL BE EQUAL TO OR LARGER THAN 45°.
- "B" AND "D" DIMENSIONS SHALL PROVIDE REQUIRED BLOCKING AREA AS LISTED IN TABLE 1. REFER TO THE SPECIFICATIONS FOR THE PRESSURE RATING OF THE PIPING SYSTEMS.
- CONCRETE SHALL BEAR ON THE CONCRETE QUADRANT OF PIPE AS A MINIMUM.
- WHERE THRUST BLOCKS ARE NOT POSSIBLE BECAUSE OF POOR SOIL CONDITIONS OR LACK OF ROOM, STRAPPING SHALL BE PERMITTED. THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER FOR REVIEW & APPROVAL A LIST OF RESTRAINT MATERIAL, DETAILS OF THE RESTRAINT & METHODS OF CONSTRUCTION, AND SIZES OF ALL RESTRAINT MEMBERS HE DESIRES TO USE FOR THRUST ANCHOR BLOCKS, RESTRAINING RODS AND STRAPS.
- THE THRUST BLOCK AREAS SHOWN IN TABLE 1 ARE CALCULATED USING A SOIL BEARING CAPACITY OF 2000 psf. IF GREATER SOIL BEARING CAPACITY IS AVAILABLE, THE CONTRACTOR MAY, AFTER REVIEW AND APPROVAL BY THE ENGINEER, REDUCE THE THRUST BLOCK AREAS SHOWN ON TABLE 1. THE THRUST BLOCK AREA SHALL BE INCREASED IF THE SOIL IS NOT CAPABLE OF PROVIDING 2000 psf SOIL BEARING CAPACITY.
- THE CONCRETE FOR BUTTRESSES SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 3000 psi.
- IF THE CONTRACTOR DESIRES TO USE ALTERNATE METHODS OF RESTRAINT, HE SHALL SUBMIT A RESTRAINT SCHEDULE TO THE ENGINEER FOR REVIEW & APPROVAL, DETAILING THE SYSTEM HE PROPOSES TO USE.
- RESTRAINT RODS FOR BOTH INTERIOR AND EXTERIOR PIPING SYSTEMS SHALL BE INSTALLED IN ACCORDANCE WITH THE NUMBER & SIZE LISTED IN TABLE 1 AND/OR TABLE 2. THE NUMBER & SIZE OF RESTRAINING RODS IN TABLES 1 & 2 ARE CALCULATED USING ASTM A307 STEEL. THE RESTRAINT RODS SHALL BE ANCHORED TO PROVIDE A RIGID PIPING SYSTEM. THE CONTRACTOR SHALL SUBMIT DETAILS OF THE SYSTEM TO THE ENGINEER FOR REVIEW & APPROVAL. ALL RESTRAINING RODS SHALL BE EQUALLY SPACED AROUND THE CIRCUMFERENCE OF THE PIPE. INTERIOR RESTRAINING RODS SHALL BE PAINTED THE SAME PAINTING SYSTEM SPECIFIED FOR THE PIPING SYSTEM. EXTERIOR RESTRAINING RODS AND MISCELLANEOUS STEEL MATERIALS SHALL BE COATED WITH A BITUMASTIC PAINT SUCH AS KOPPERS NO. 505, MOBILE, OR APPROVED EQUAL.
- THE CONTRACTOR SHALL SIZE ALL STRAPS, BOLTS, AND WASHERS TO BE COMPATIBLE WITH THE STRENGTH OF THE RESTRAINING RODS AND THE DETAILS SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL.
- THE CONTRACTOR SHALL REFER TO THE LATEST EDITION OF "A GUIDE FOR THE INSTALLATION OF DUCTILE IRON PIPE" PUBLISHED BY THE CAST IRON PIPE RESEARCH ASSOCIATION FOR DESIGN AND INSTALLATION OF RESTRAINT SYSTEM.
- ALL FITTINGS SHALL BE MECHANICAL JOINT WITH RETAINER GLANDS, TYPE 1.
- WHERE SHOWN ON THE PLANS ALL DUCTILE IRON PIPING, FITTINGS ETC. SHALL BE POLYETHYLENE ENCASED IN ACCORDANCE WITH THE LATEST STANDARDS OF THE AWWA.
- INSTALLATION OF ALL WATER SERVICES CROSSING STATE AND COUNTY ROADS SHALL BE BY DIRECT BORING METHODS. SERVICE CROSSINGS OF TOWN ROADS SHALL BE BY OPEN TRENCH METHOD.

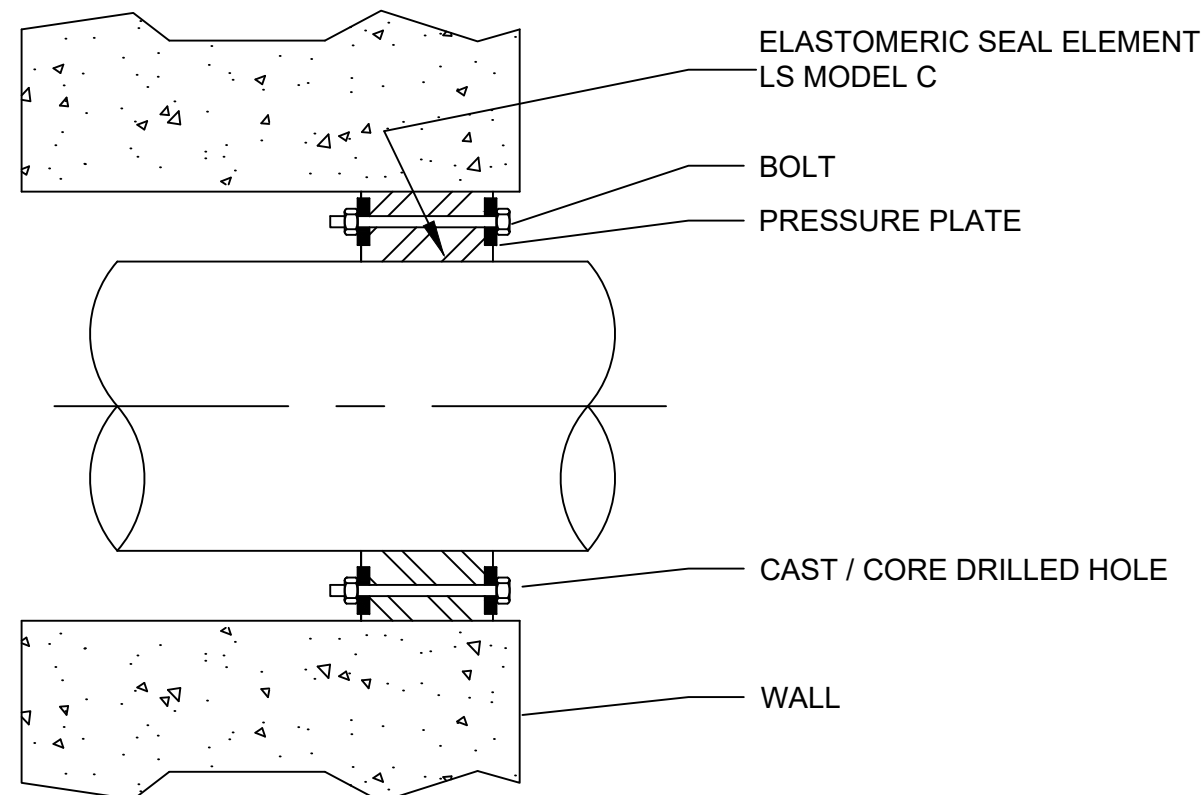
1 TYPICAL THRUST BLOCK DETAIL
0-102 SCALE: NOT TO SCALE



3 MECHANICAL JOINT DETAIL
0-102 SCALE: NOT TO SCALE



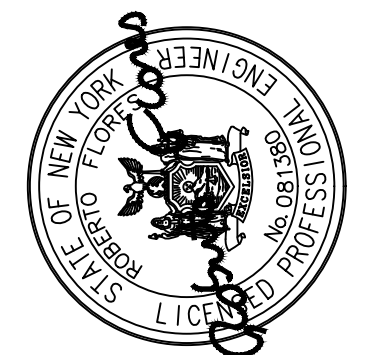
5 TYPICAL FLEXIBLE WATER-TIGHT BOOT SEAL THROUGH CONCRETE WALL DETAIL
0-102 SCALE: NOT TO SCALE
NOTE: TO BE INSTALLED DURING FABRICATION OF CONCRETE WALL



4 LINK SEAL DETAIL
0-102 SCALE: NOT TO SCALE

DATE: 7/2/2024
DRAWN BY:
SCALE:
REVIEWED BY: RF
PROJECT NO.:
FILE:

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NO.	DATE	DESCRIPTION

RHINEBECK WTP
PLANT IMPROVEMENTS
VILLAGE OF RHINEBECK
DUTCHESS COUNTY, NEW YORK

THRUST BLOCK &
WATER TIGHT SEAL
DETAILS

SHEET:

D-102

WARNING - IT IS A VIOLATION OF NEW YORK EDUCATION LAW SECTION 7209.2, FOR ANY PERSON, UNLESS HE IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER OR LAND SURVEYOR, TO ALTER THIS DOCUMENT IN ANY WAY. IF ALTERED THE ALTERING PERSON SHALL COMPLY WITH THE REQUIREMENTS OF NEW YORK EDUCATION LAW, SECTION 7209.2.