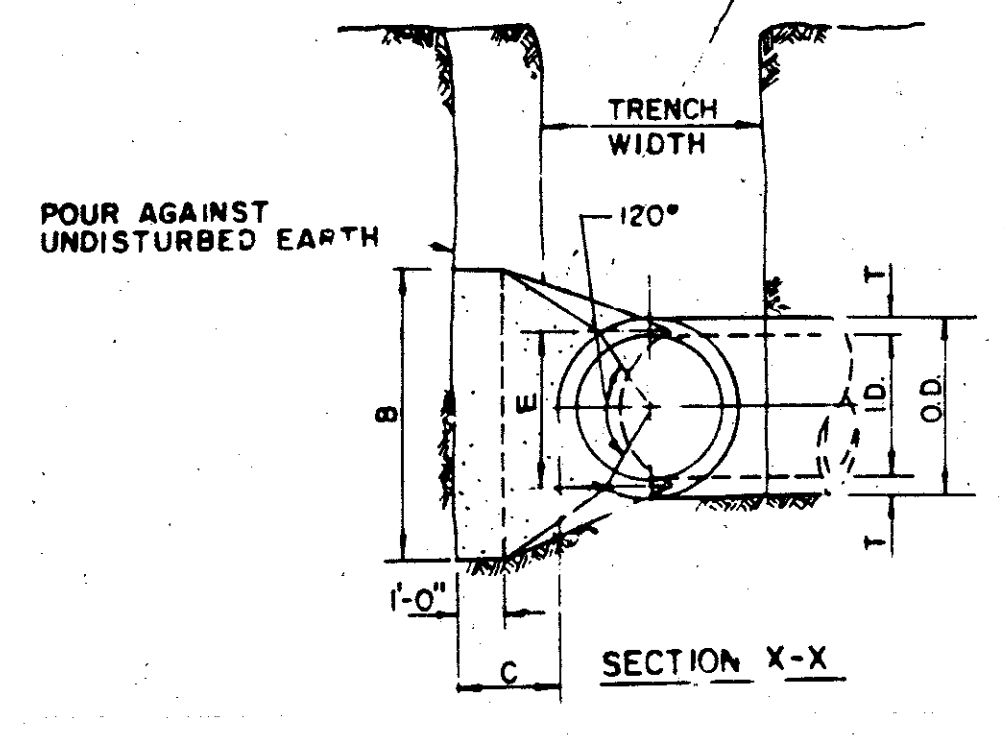
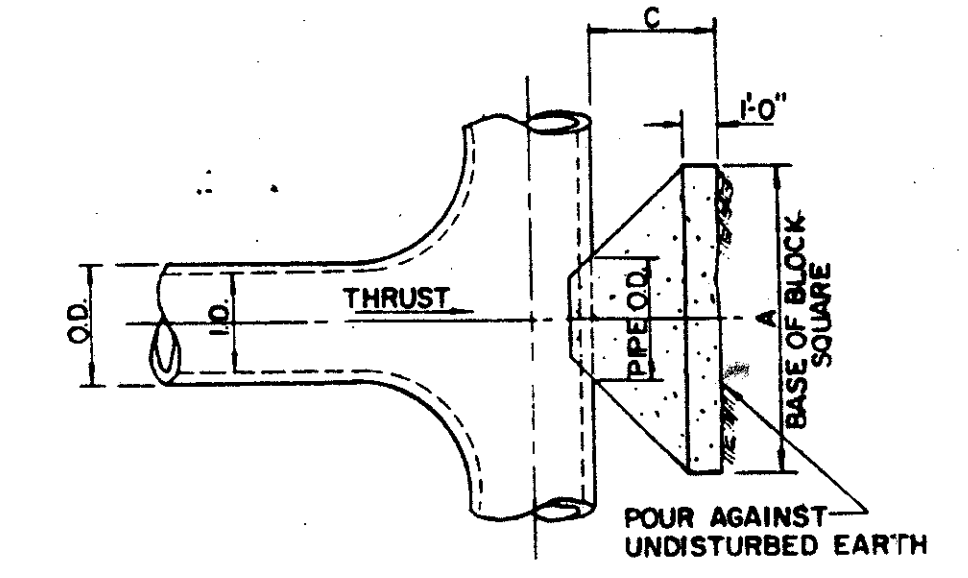
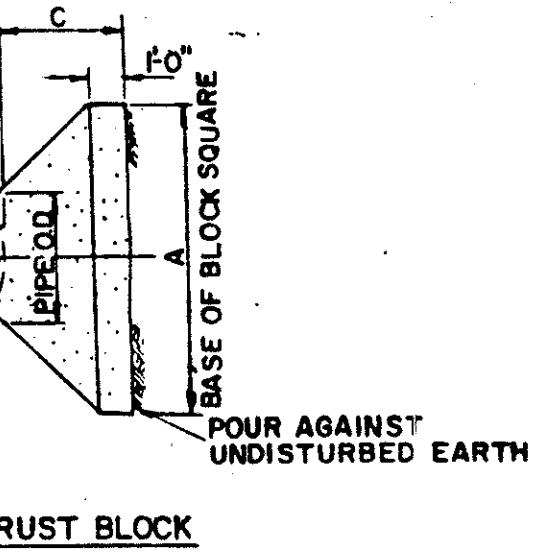


I.D. (IN.)	T (IN.)	C 11.25°		C 22.50°		E (FT.)
		FT.	FT.	FT.	FT.	
4.8	0.4	1.5	1.5	1.5	0.9	
10.12	0.5	1.5	1.5	1.5	1.2	
16.18	0.6	1.5	1.5	1.5	1.6	
20	0.7	1.5	1.5	1.5	1.8	
24	0.9	1.5	1.5	1.5	2.1	
30	2.9	1.5	1.9	2.6		
36	4.5	1.5	2.3	3.3		
42	5.0	1.8	2.6	3.8		
48	5.5	2.0	3.0	4.3		
54	6.0	2.3	3.4	4.8		
60	6.5	2.5	3.8	5.3		
66	6.8	2.8	4.1	5.7		
72	7.5	3.0	4.5	6.3		
78	7.5	3.5	4.9	6.7		
84	8.0	3.5	5.3	7.2		
90	8.5	3.8	5.6	7.7		
96	9.0	4.0	6.0	8.2		



I.D. (IN.)	G (FT.)	EARTH			ROCK			I.D. (IN.)	G (FT.)	EARTH			ROCK			
		THRUST (TONS)	A (FT.)	B (FT.)	VOL. (C.Y.)	THRUST (TONS)	A (FT.)			B (FT.)	VOL. (C.Y.)	THRUST (TONS)	A (FT.)	B (FT.)	VOL. (C.Y.)	
4.8	0.4	1.0	1.3	0.1	1.0	1.0	0.1	4.8	0.8	2.0	1.5	0.1	1.0	1.0	0.1	
10.12	0.6	2.2	1.5	0.1	1.0	1.5	0.1	10.12	1.1	4.4	2.0	2.5	0.3	1.5	1.5	0.1
16.18	0.8	3.0	2.0	2.5	0.3	1.5	2.0	16.18	1.6	9.9	3.0	3.5	0.6	2.0	2.5	0.3
20	0.9	6.2	2.0	3.5	0.4	1.5	3.0	20	1.8	12.3	3.5	3.5	0.7	2.0	3.5	0.4
24	1.1	8.9	3.0	3.0	0.5	1.5	3.0	24	2.2	17.7	4.0	4.5	1.0	3.0	3.0	0.5
30	1.4	10.4	3.0	3.5	0.6	2.0	3.5	30	2.7	20.7	5.0	4.5	1.5	3.0	4.0	0.8
36	1.7	15.0	3.5	4.5	0.9	2.0	4.0	36	3.3	29.8	5.5	5.5	2.3	4.0	4.0	1.3
42	1.9	20.4	4.5	5.0	1.5	2.5	5.0	42	3.8	40.5	7.0	6.0	3.9	4.5	5.0	2.1
48	2.2	26.6	4.5	6.0	2.0	2.5	6.0	48	4.4	52.9	8.0	7.0	5.7	4.8	6.0	2.8
54	2.5	33.7	6.0	6.0	3.0	3.0	6.0	54	4.9	67.0	9.0	8.0	8.0	6.0	6.0	4.1
60	2.7	41.6	6.0	7.0	3.8	3.0	7.0	60	5.5	82.7	9.5	9.0	10.6	6.0	7.0	5.3
66	3.0	50.3	6.5	8.0	3.1	3.5	8.0	66	6.0	100.1	10.5	10.0	14.1	6.5	8.0	7.2
72	3.3	59.9	7.5	8.0	6.3	4.0	8.0	72	6.6	119.1	11.0	11.0	17.8	7.5	8.0	9.1
78	3.6	70.2	8.0	9.0	6.1	4.0	9.0	78	7.1	139.8	12.0	12.0	22.5	8.0	9.0	11.7
84	3.8	81.5	8.5	10.0	10.3	4.5	10.0	84	7.6	162.1	13.0	12.5	27.2	8.5	10.0	14.8
90	4.1	93.5	9.5	10.0	12.2	5.0	10.0	90	8.2	186.1	14.0	13.5	33.7	9.5	10.0	17.7
96	4.4	106.4	10.0	11.0	15.0	5.0	11.0	96	8.7	211.7	15.0	14.5	41.2	10.0	11.0	21.8

**HORIZONTAL BEND THRUST BLOCK**



I.D. (IN.)	THRUST (TONS)	C (FT.)	EARTH		ROCK	
			A (FT.)	VOL. (C.Y.)	A (FT.)	VOL. (C.Y.)
4.8	3.1	1.5	2.5	0.3	2.0	0.2
10.12	11.3	1.5	3.5	0.8	2.3	0.3
16.18	23.5	2.0	5.5	1.6	4.0	0.9
20	31.5	2.0	6.0	1.9	4.0	0.9
24	45.2	2.5	7.0	3.1	5.0	1.7
30	53.0	3.0	7.5	4.1	5.5	2.4
36	74.3	4.0	9.0	7.3	6.5	4.2
42	104.0	4.5	10.5	11.0	7.5	6.2
48	136.0	5.0	12.0	15.6	8.5	8.7
54	172.0	5.5	13.5	21.4	9.5	11.9
60	212.0	6.0	15.0	28.4	10.5	15.7
66	257.0	6.5	16.5	36.8	11.5	20.5
72	303.0	7.5	17.5	47.2	12.5	27.2
78	358.0	8.0	19.0	58.9	13.5	35.7
84	416.0	8.5	20.5	72.3	14.5	41.2
90	477.0	9.0	22.0	87.7	15.5	49.7
96	543.0	9.5	23.5	104.8	16.5	61.0

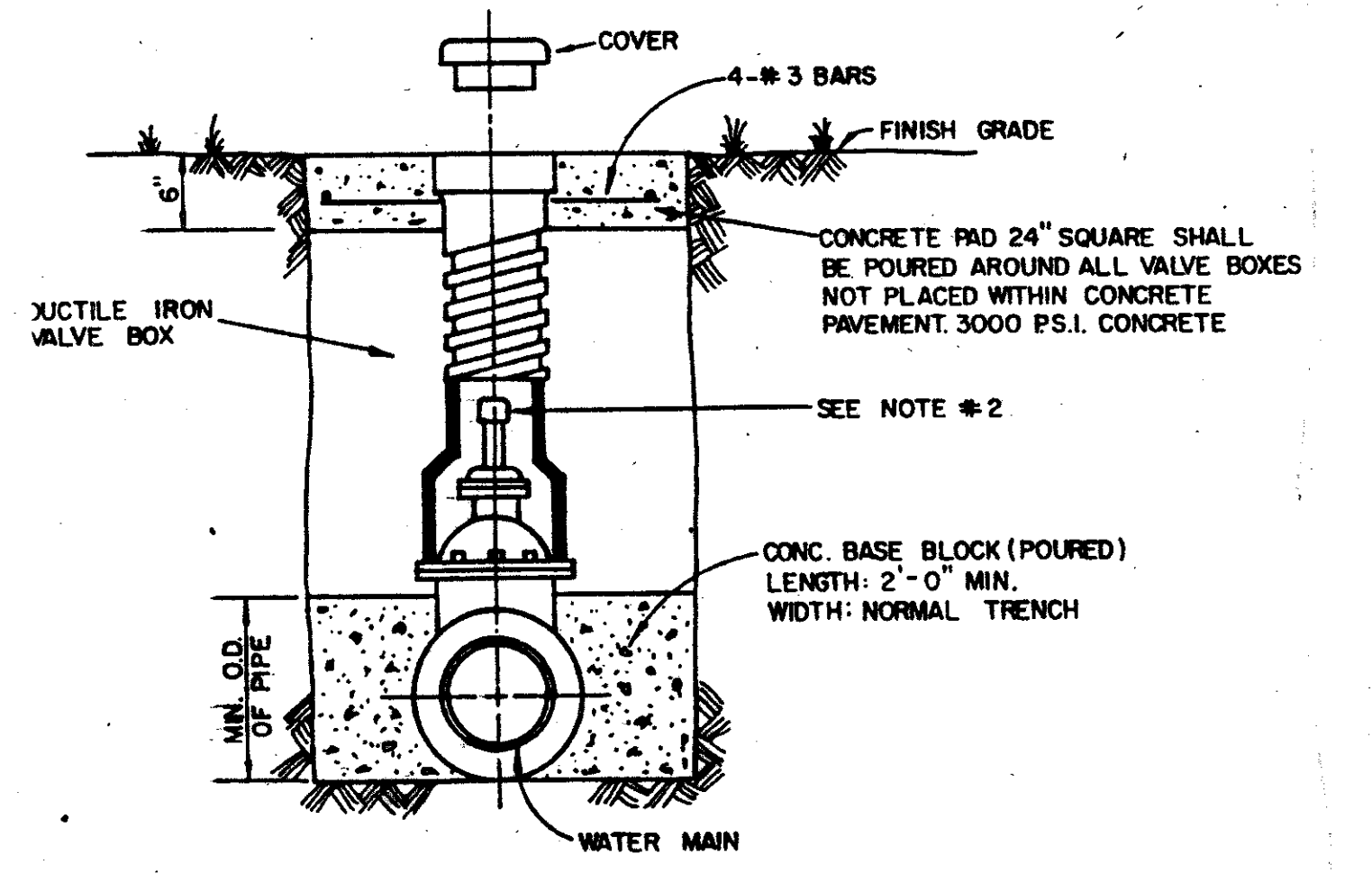
**PLUG & TEE THRUST BLOCK**

I.D. (IN.)	THRUST (TONS)	VOL. (C.Y.)	11.25°		22.50°		30°		45°		67.50°		90°		I.D. (IN.)
			THRUST (TONS)	VOL. (C.Y.)	THRUST (TONS)	VOL. (C.Y.)	THRUST (TONS)	VOL. (C.Y.)	THRUST (TONS)	VOL. (C.Y.)	THRUST (TONS)	VOL. (C.Y.)	THRUST (TONS)	VOL. (C.Y.)	
4.8	1.0	0.3	2.0	1.0	2.5	1.3	3.6	1.8	4.6	2.3	5.0	2.9	16.6	4.8	
10.12	2.2	1.1	4.3	2.2	5.7	2.8	8.0	4.0	10.5	5.2	11.3	8.7	10.12	10.12	
16.18	3.0	2.3	9.7	4.9	12.7	6.4	18.0	9.0	23.5	11.8	25.5	12.7	16.18	16.18	
20	4.1	3.1	12.0	6.0	15.7	7.9	22.2	11.1	29.2	14.9	31.4	15.7	20	20	
24	4.8	4.4	17.3	8.7	22.6	11.3	32.0	16.0	41.6	20.9	45.2	22.6	24	24	
30	10.5	5.2	20.3	10.1	26.5	13.3	37.5	18.8	49.0	24.5	53.1	26.5	30	30	
36	14.9	7.5	29.2	14.6	38.2	19.1	54.0	27.0	70.5	33.3	76.4	38.2	36	36	
42	19.3	10.1	33.8	19.9	42.0	24.0	63.0	36.7	88.0	48.0	104.0	42.0	42	42	
48	24.5	13.1	51.9	26.0	47.9	33.9	96.0	48.0	124.0	62.7	136.0	47.9	48	48	
54	33.5	16.9	65.7	32.9	63.9	42.9	122.0	60.7	159.0	79.4	172.0	63.9	54	54	
60	41.4	20.7	81.2	40.8	106.0	53.0	150.0	75.0	194.0	98.0	212.0	81.2	60	60	
66	50.1	25.0	98.2	49.1	125.0	64.5	182.0	90.7	237.0	119.0	257.0	98.2	66	66	
72	59.1	29.8	117.0	58.4	153.0	76.3	216.0	108.0	282.0	141.0	305.0	117.0	72	72	
78	69.9	35.0	137.0	68.6	179.0	90.0	235.0	127.0	311.0	164.0	338.0	137.0	78	78	
84	81.1	40.5	159.0	79.5	208.0	104.0	264.0	147.0	344.0	182.0	364.0	159.0	84	84	
90	93.1	46.5	183.0	91.3	239.0	119.0	337.0	168.0	441.0	210.0	477.0	183.0	90	90	
96	106.0	53.0	206.0	104.0	272.0	136.0	384.0	192.0	500.0	251.0	543.0	206.0	96	96	

GENERAL NOTES FOR ALL THRUST BLOCKS

- All Calculations Are Based On Internal Pressure Of 200 P.S.I. For 24" I.D. Pipe And Smaller And 150 P.S.I. On 30" I.D. And Larger.
- Volumes Of Vertical Bend Thrust Blocks Are Net Volumes Of Concrete To Be Furnished. The Corresponding Weight Of The Concrete (Class F) Is Equal To Or Greater Than The Vertical Component Of Thrust On The Vertical Bend.
- Wall Thickness (T) Assumed Here For Estimating Purposes Only.
- Concrete For Blocking Shall Be Class B Concrete.
- Dimensions May Be Varied As Required By Field Conditions Where And As Directed By The Engineer. The Volume Of Concrete Blocking Shall Not Be Less Than Shown Here.

**VERTICAL BEND THRUST BLOCK**



- NOTE:
- GATE VALVES SHALL BE IN ACCORDANCE WITH ANNA STANDARD C-509-80 OR LATEST THEREOF. ALL VALVES SHALL BE "MULLER" OR APPROVED EQUAL.
  - A PERMANENTLY ATTACHED VALVE EXTENSION STEM SHALL BE REQUIRED FOR ANY VALVE THATS OPERATING NUT IS LOCATED IN EXCESS OF 4 FEET BELOW THE TOP OF VALVE BOX. THIS EXTENSION SHALL BE OF SUFFICIENT LENGTH TO INSURE THAT ITS TOP IS WITHIN 4" OF VALVE BOX LID. MANUFACTURED VALVE-STACK DUCTILE IRON PIPE TO BE USED FOR EXTENSION GREATER THAN 4'-0" BELL END OF STACK TO BE FITTED OVER VALVE. VALVE AND VALVE STACK IS TO BE POLY WRAPPED.
  - VALVES SHALL BE OF DUCTILE IRON W/RUBBER ENCAPSULATED DISK BODY BOLTS SHALL BE STAINLESS STEEL OF SAME SIZE ON EACH VALVE.
- TYPICAL VALVE SETTING AND BOX**

**AS BUILT**

DATE	REVISION	MADE	CHK.	APPD.			
<b>RAWHIDE CREEK LIFT STATION</b>							
<b>AND FORCE MAIN</b>							
<b>THRUST BLOCKING DETAILS</b>							
<b>TOWN OF ADDISON, TEXAS</b>							
DESIGN	DRAWN	CHKD.	SCALE	DATE	FILE	NO.	
ISOPALL	BARR	MULLEN	LINDNER	AS SHOWN	AUG. 92	01-1457	12 of 13

JOHN H. LINDNER  
REGISTERED PROFESSIONAL ENGINEER  
8/17/92