

SECTION 6

WATER

6-1 General

The purpose of this section is to define the general requirements for the design of potable water infrastructures and to provide typical construction details for these improvements. The City of Belton Public Works Department should be consulted if variations from these standards are anticipated.

6-2 Master Plan

All potable water infrastructure design must be sized and located according to the land uses projected in the comprehensive Master Plan. Also, the City of Belton periodically updates the Water Master Plan which should be used as guidance during the design process.

6-3 Water Improvements

A. Design Standards

All water mains must be designed in accordance with Chapter 290 - Rules and Regulations For Public Water Systems by the Texas Natural Resource Conservation Commission.

B. Materials

All materials used in water improvement projects shall comply with the American Water Works Association (AWWA). The following are general requirements for water mains as to materials and types.

C. All water pipe shall have minimum cover of 42-inches.

General Notes

1. All water mains to be one or a combination of the following materials having cast or ductile iron outside diameters:

A. Ductile iron pipe must:

1. Meet or exceed AWWA specifications C150/A21.5 & C151/A21.51
2. Be bell & spigot joints with a single rubber gasket, meeting or exceeding AWWA specifications CIII/A21.11
3. Meet or exceed thickness AWWA C150/A21.50 and C151/A21.51

4. Fittings shall be in accordance with C110 & C153

B. P.V.C.

1. 3" or less CL150 (minimum) w/ring-tite seal

2. Pipe 3" to 12" shall meet AWWA C900 CL150 w/ring-tite seal DR 18

3. Pipe Larger than 12" shall meet AWWA C905 CL150 w/ring tite seal, DR 21

4. All buried ductile iron pipe and fittings shall be encased with 8 mil, Type I, Grade E-1, polyethylene film according to AWWA C105/A21.50

C. Pipe sizes shall be that required to serve the anticipated development but not less than:

1. Single Family - 6"

2. Commercial, Retail, Multi-family - 8"

3. Industrial - 8"

Any over-sizing required will be paid by the City of Belton.

2. Tapping sleeve & valve:

A. Tapping sleeve to meet AWWA specifications with a minimum working pressure of 150 P.S.I.

B. Tapping valves shall meet AWWA specifications with a minimum working pressure of 175. P.S.I.

3. Bends & Fittings:

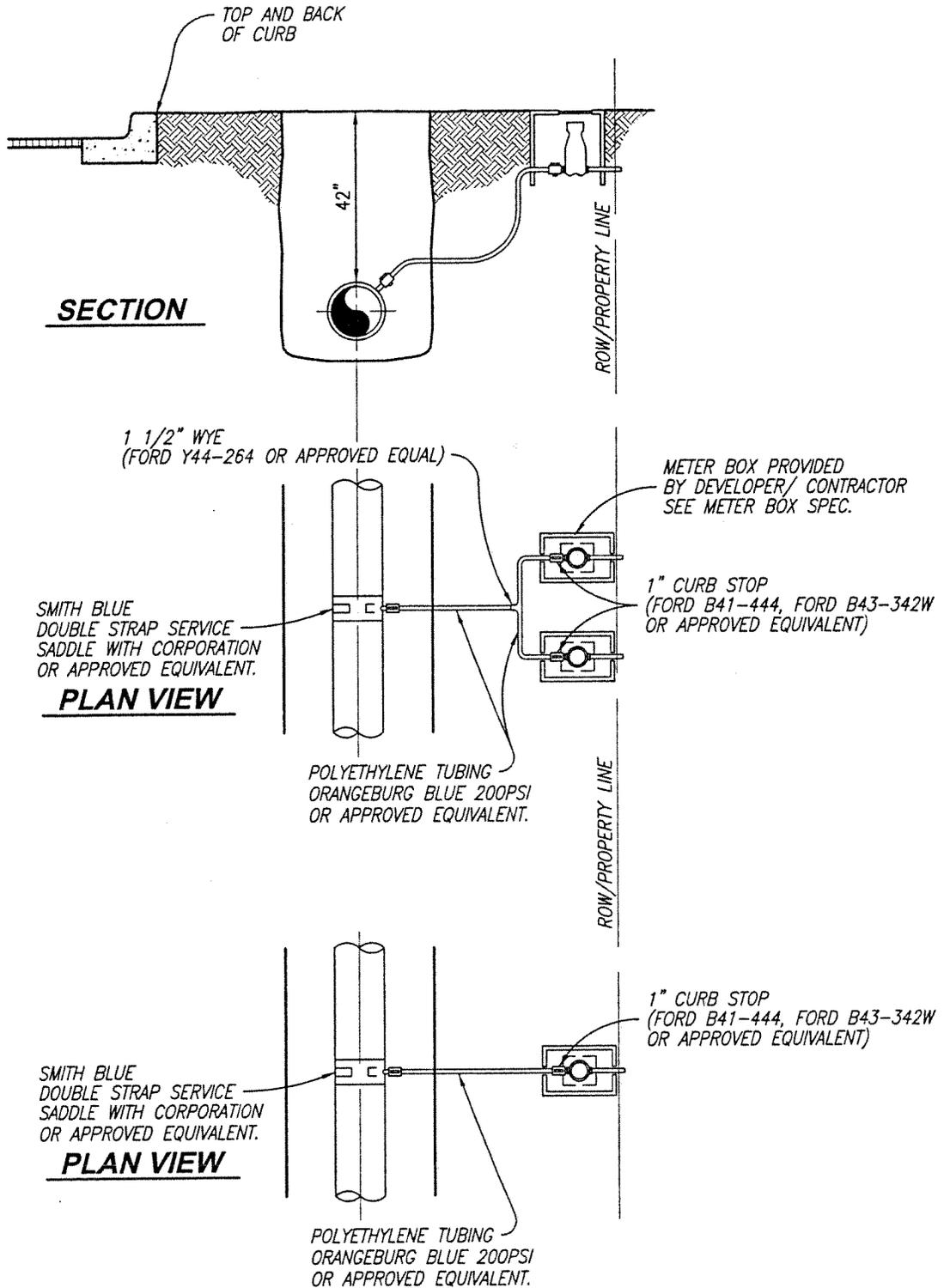
All bends & fittings will be cast iron mechanical joint 2" or larger (C.I.M.J.) meeting the specifications of A.N.S.I./AWWA C-110-77

4. All water services shall be polybutylene tubing unless otherwise approved by the Belton Water and Sewer Superintendent and Director of Public Works.

5. No galvanized pipe fittings will be allowed.

6-4 Testing

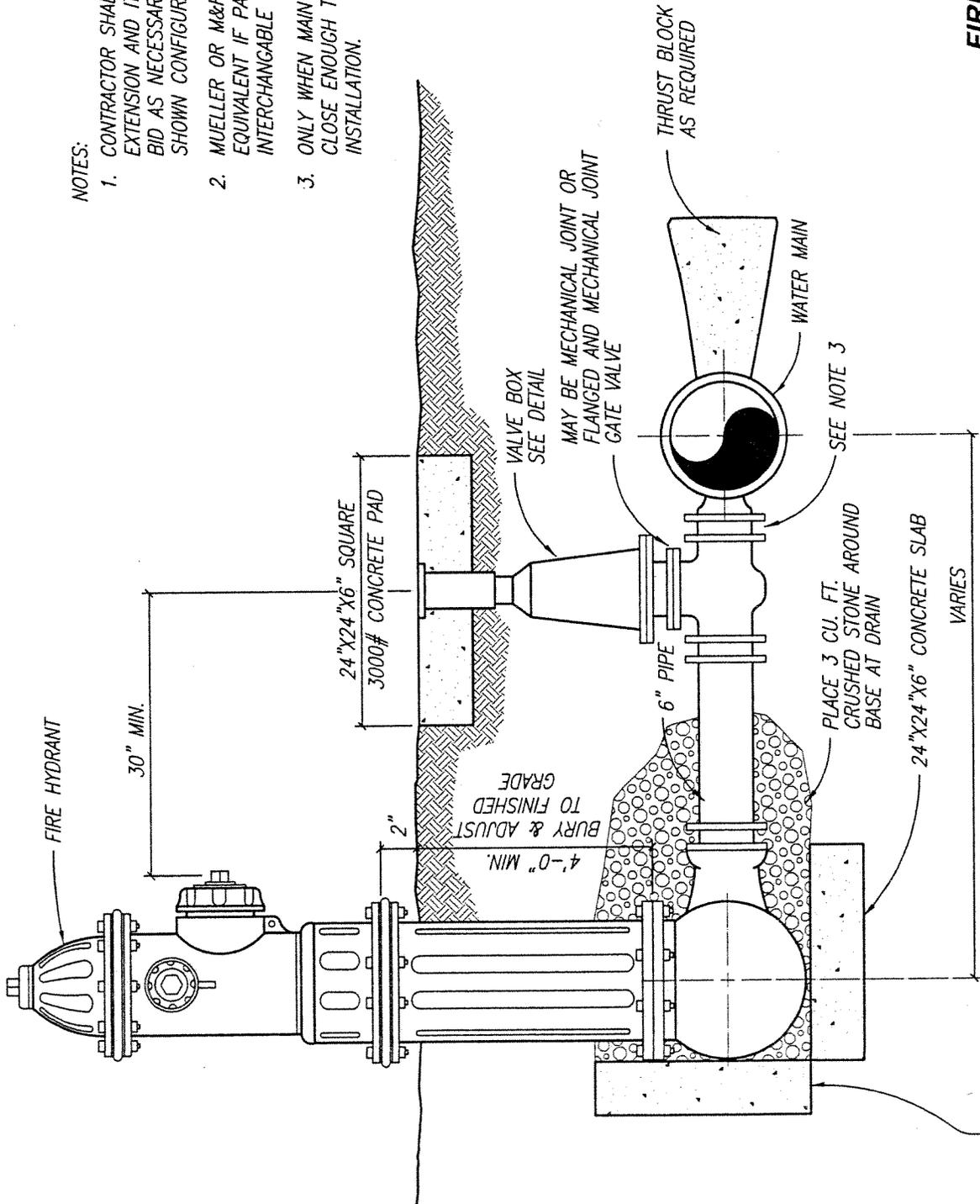
Testing of installed improvements shall meet all Texas Natural Resource Conservation Commission requirements and guidelines.



- NOTE:
1. SERVICE THAT CARRY 2 METERS SHALL BE A MINIMUM OF 1 1/2 INCHES.
 2. SERVICE THAT CARRY 1 METER SHALL BE A MINIMUM OF 1 INCH.
 3. METERS SHALL BE PLACED IN THE STREET R.O.W. WHEN POSSIBLE.
 4. SERVICE LINES CROSSING STREET SHALL BE BURIED A MINIMUM OF 24" BELOW SUBGRADE

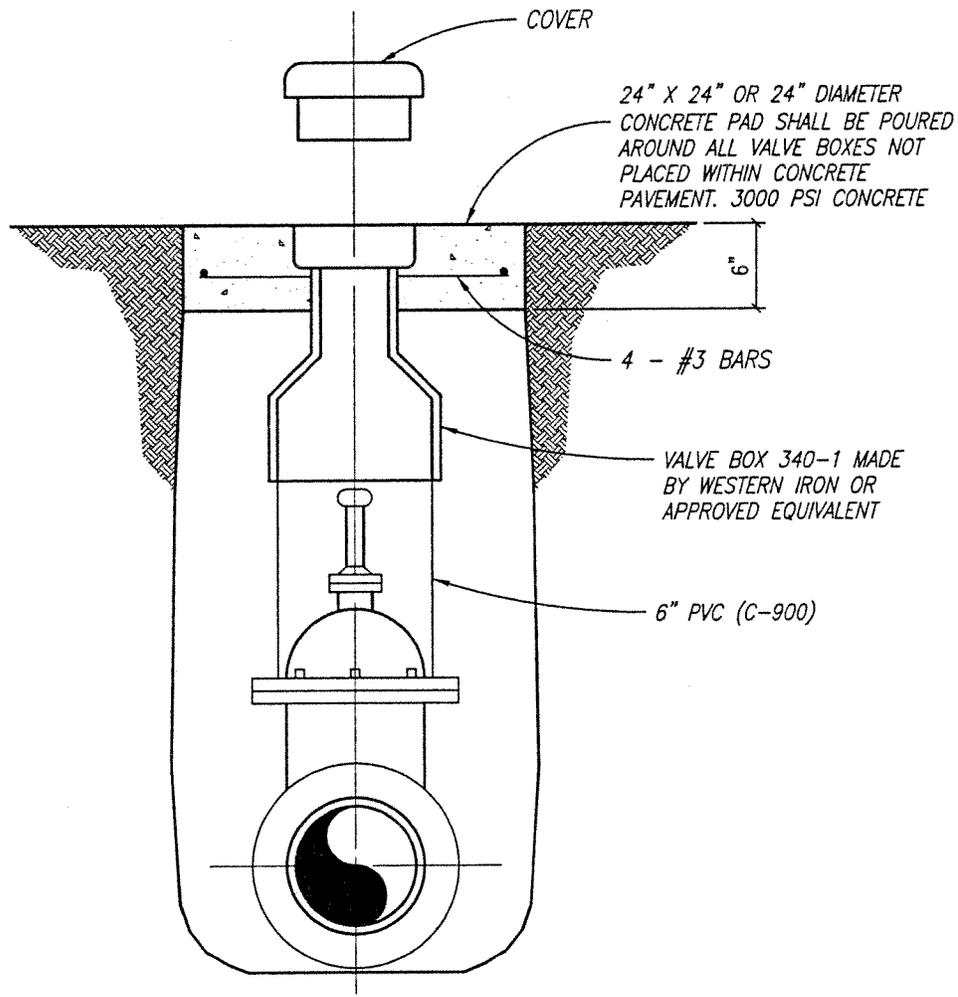
WATER MAIN
BULLHEAD METER SERVICE CONNECTION

NOT TO SCALE



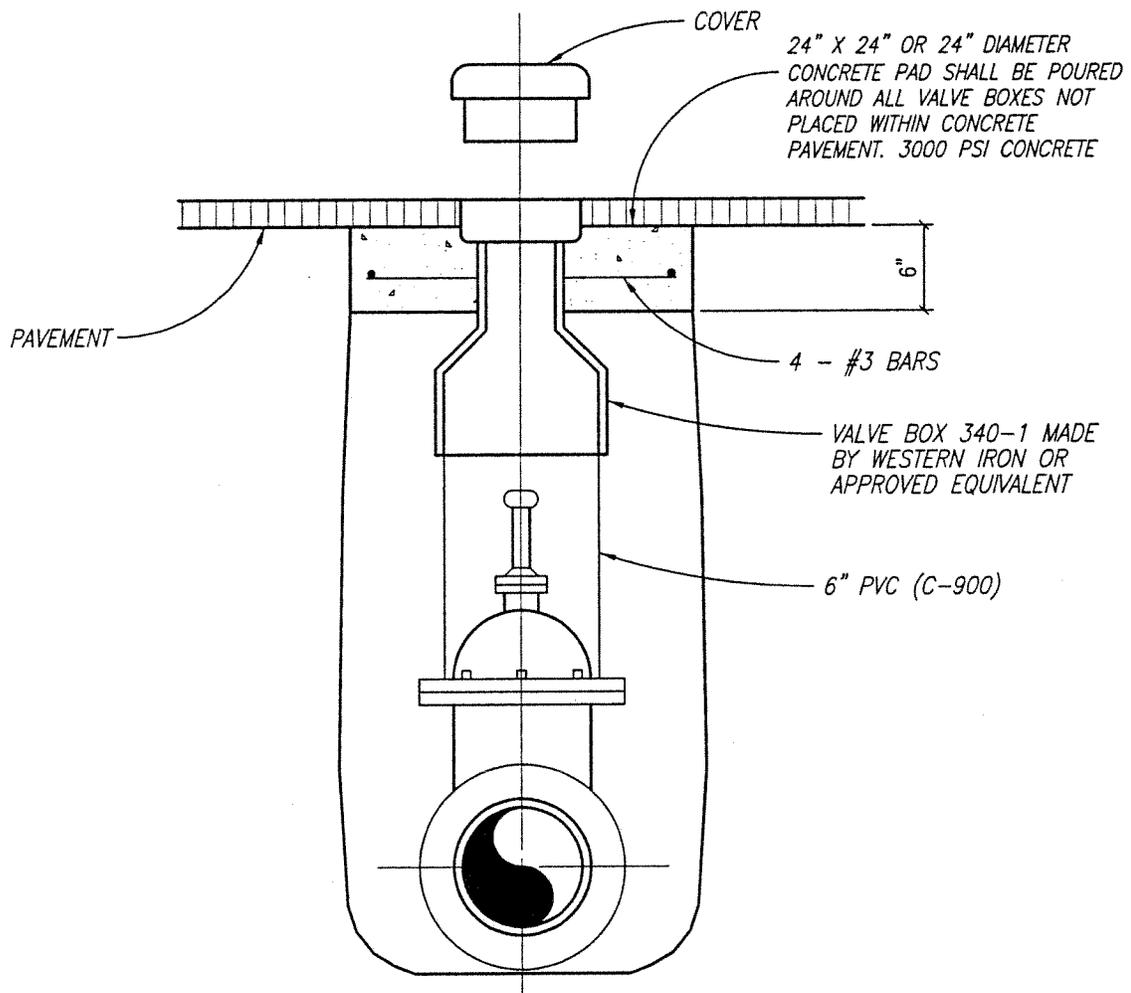
- NOTES:
1. CONTRACTOR SHALL INCLUDE RISER EXTENSION AND ITS INSTALLATION IN THE BID AS NECESSARY TO ACHIEVE THE SHOWN CONFIGURATION.
 2. MUELLER OR M&H OR APPROVED EQUIVALENT IF PARTS ARE INTERCHANGABLE WITH MUELLER OR M&H.
 3. ONLY WHEN MAIN AND FIRE HYDRANT ARE CLOSE ENOUGH TO INSTALL FLANGED INSTALLATION.

FIRE HYDRANT
INSTALLATION
 NOT TO SCALE

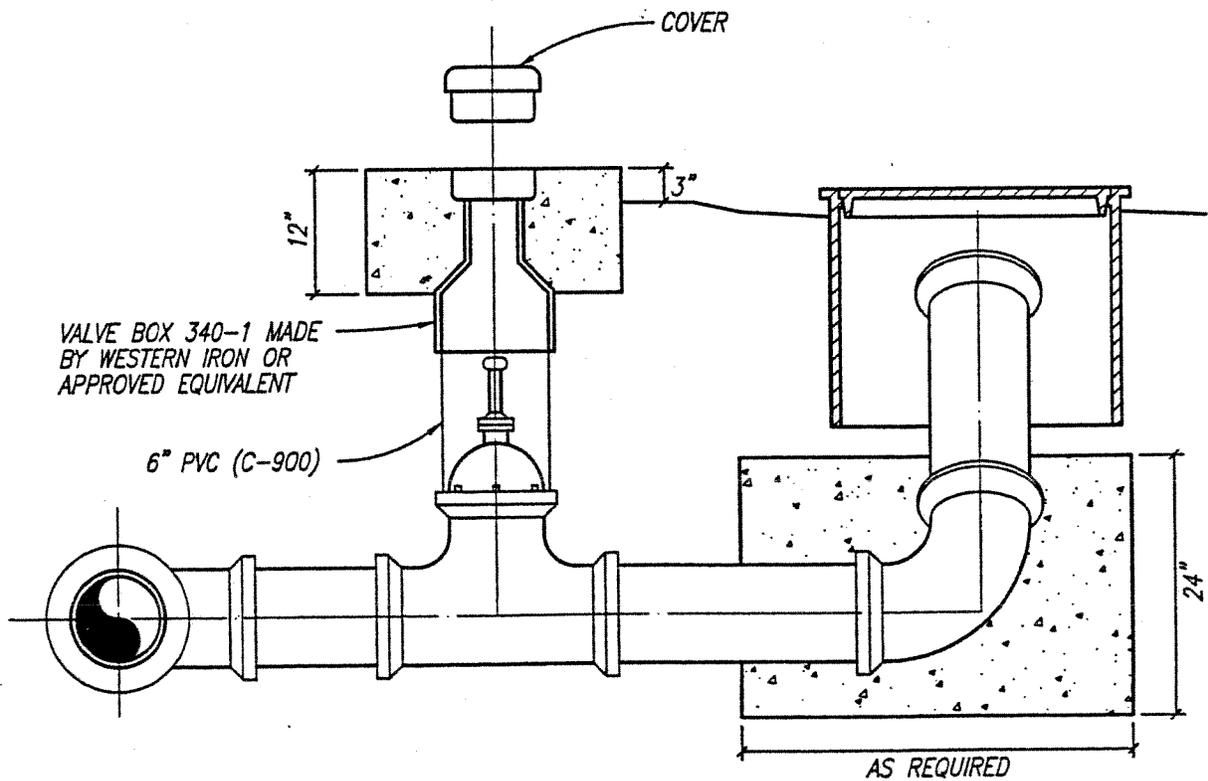
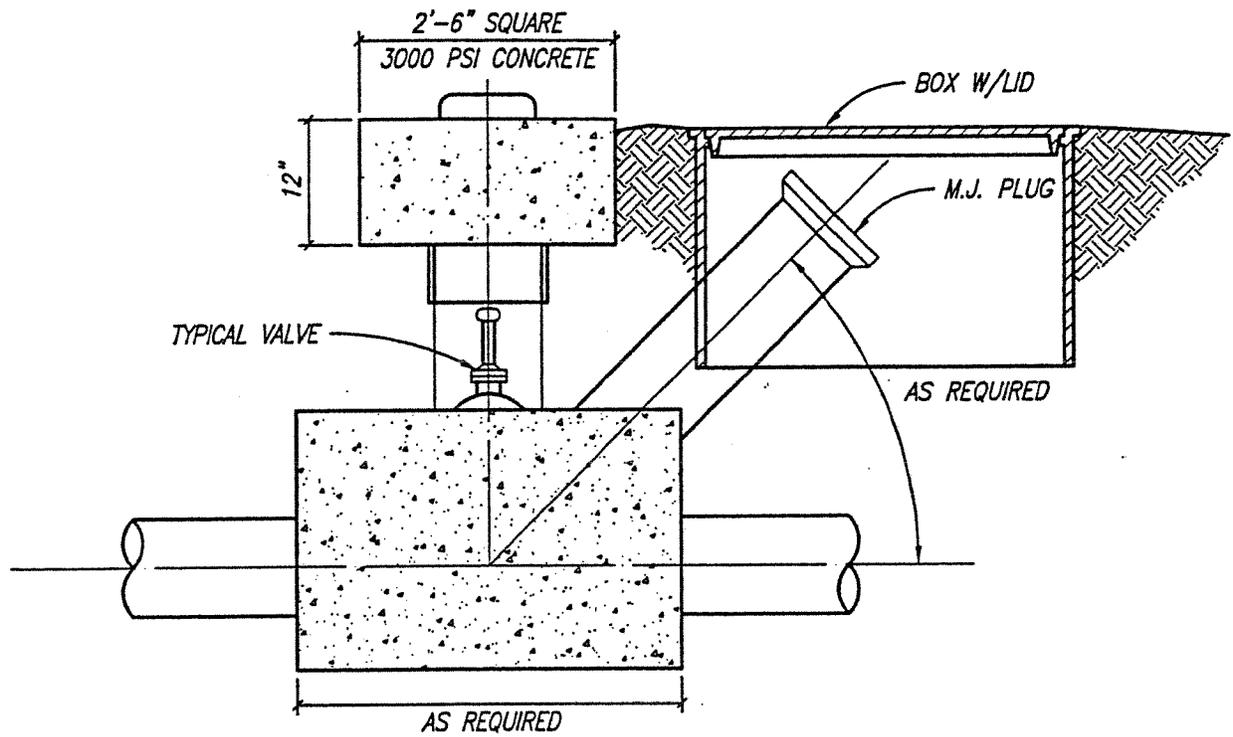


TYPICAL
VALVE SETTING AND BOX
(BEHIND CURB LINE)

NOT TO SCALE

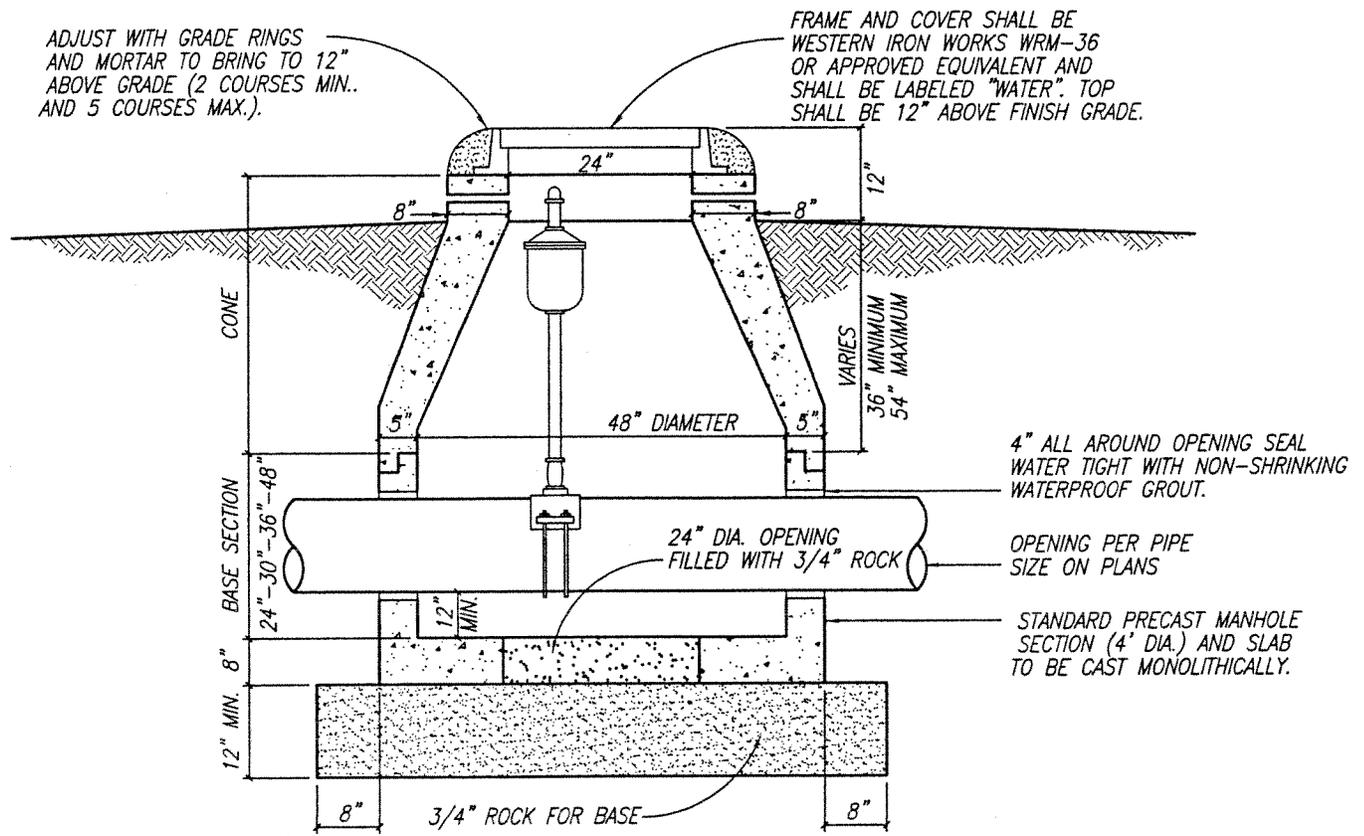
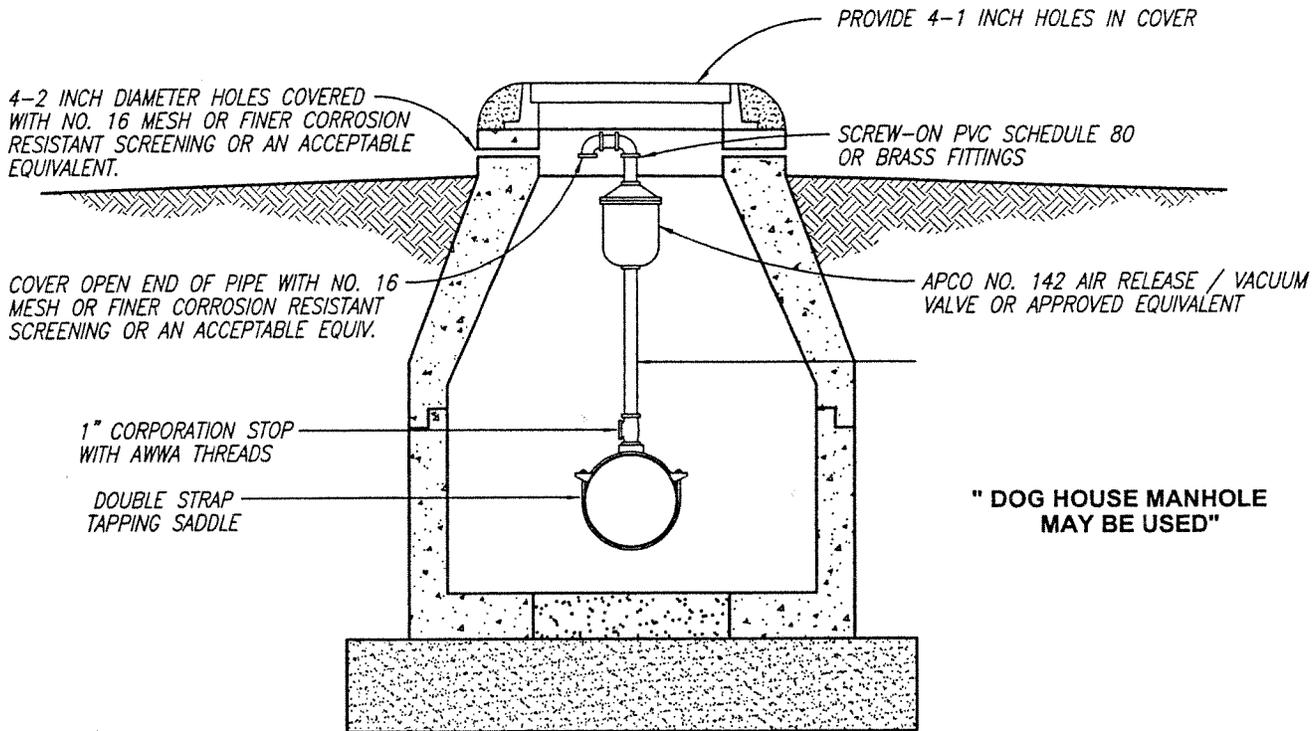


TYPICAL
VALVE SETTING AND BOX
(IN PAVED AREAS)
 NOT TO SCALE



**TYPICAL
FLUSH VALVE INSTALLATION**

NOT TO SCALE

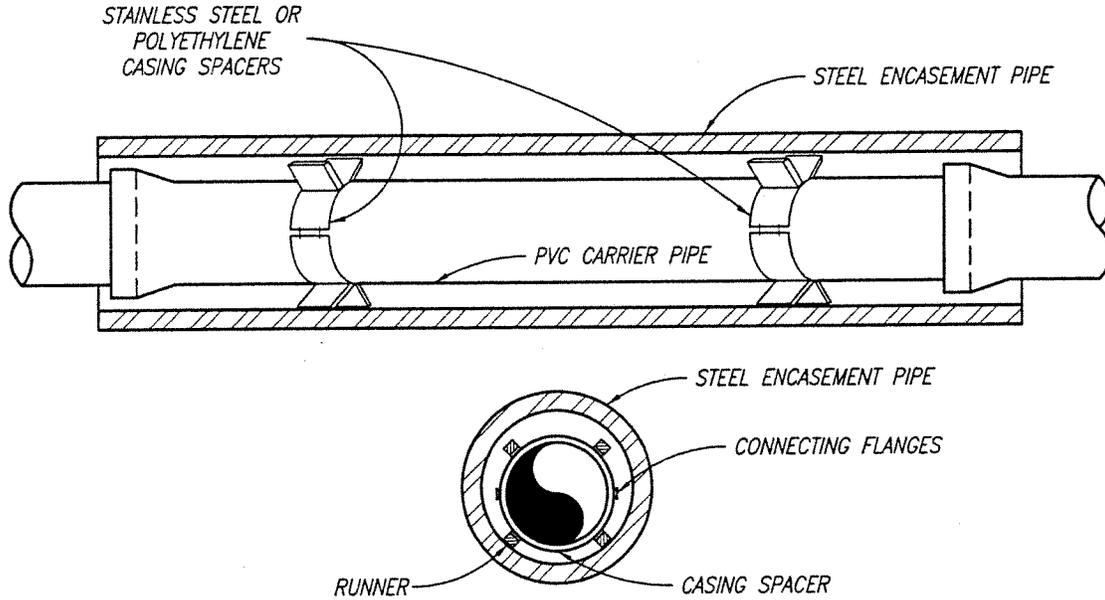


**STANDARD AIR AND VACUUM
RELEASE VALVE DETAIL**

NOT TO SCALE

INSTALLATION OF PVC PIPE THROUGH CASINGS

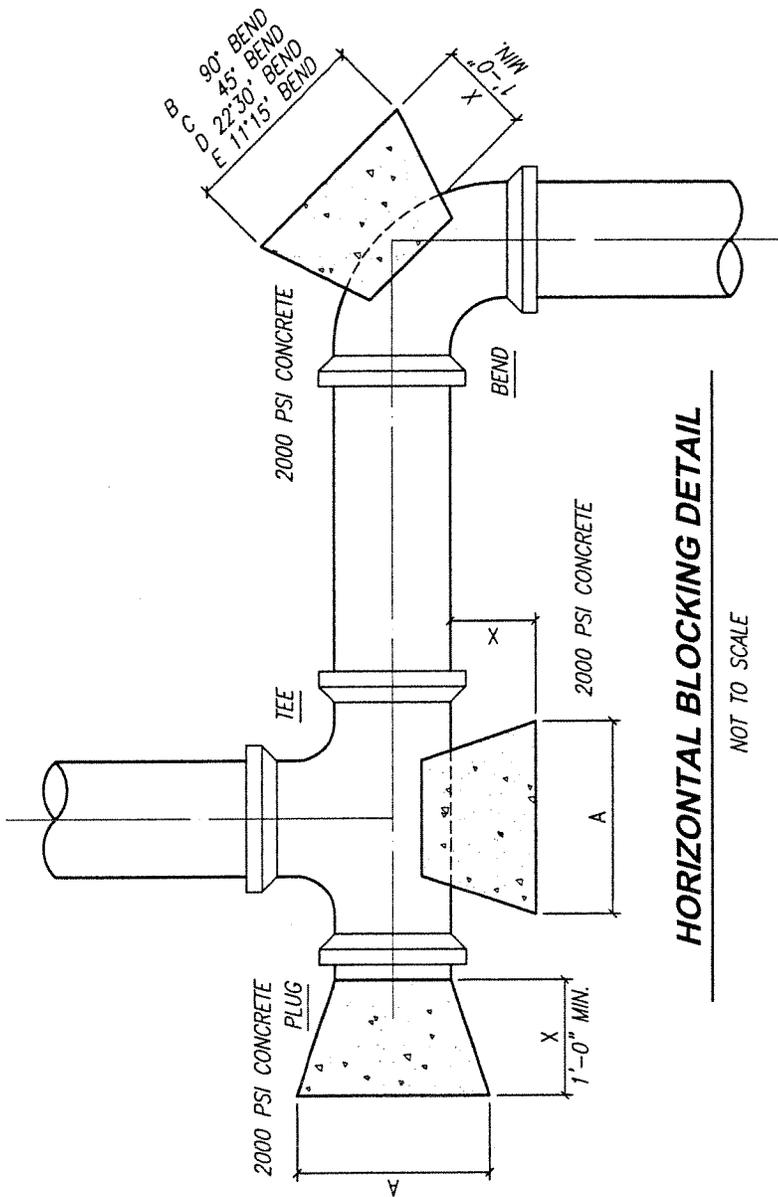
NOT TO SCALE



NOTES:

1. CASING SPACERS SHALL BE BOLT ON STYLE WITH A SHELL MADE IN TWO SECTIONS OF HEAVY T-304 STAINLESS STEEL OR POLYETHYLENE CASING SPACERS (RACI OR APPROVED EQUIVALENT). CONNECTING FLANGES SHALL BE RIBBED FOR EXTRA STRENGTH. CASING SPACERS SHALL BE MADE BY CASCADE WATERWORKS MFG. CO. OR APPROVED EQUAL.
2. CASING SPACERS SHALL HAVE RUNNERS MADE OF ULTRA HIGH MOLECULAR WEIGHT POLYMER, WITH A MINIMUM HEIGHT OF 2 INCHES.
3. DO NOT USE WEDGES BETWEEN TOP OF PVC CARRIER PIPE AND INSIDE OF CASING TO KEEP PVC FROM MOVING.
4. PRIOR TO INSERTING PVC CARRIER PIPE, ANY WATER SHOULD BE PUMPED OUT OF THE CASING PIPE.
5. SPACERS WILL BE REQUIRED WITHIN AT LEAST 3 FEET FROM BOTH OPENINGS OF THE ENCASEMENT PIPE AND SPACED NO GREATER THAN 6 FEET THROUGHOUT THE ENCASEMENT PIPE.
6. CASING SPACERS WILL NOT BE PAID DIRECTLY BUT SHALL BE CONSIDERED SUBSIDIARY TO THE APPROPRIATE BID ITEM FOR INSTALLING PVC PIPE.
7. ENCASEMENT PIPE SHALL BE SMOOTH STEEL 35,000 PSI YIELD STRENGTH WITH THICKNESS ACCORDING TO THE FOLLOWING TABLE:

PIPE SIZE-CARRIER (DIAMETER)	PIPE SIZE-CASING (DIAMETER)(MIN.)	PIPE SIZE (DIAMETER)	MINIMUM PIPE THICKNESS (INCHES)	
6"	16"	LESS THAN 12"	1/4	0.2500
8"	18"	12" TO LESS THAN 18"	5/16	0.3125
10"	20"	18" TO LESS THAN 22"	3/8	0.3750
12" - 14"	24"	22" TO LESS THAN 28"	7/16	0.4375
16" - 18"	30"	28" TO LESS THAN 34"	1/2	0.5000
20"	36"	34" TO LESS THAN 42"	9/16	0.5625
24"	42"	42" TO LESS THAN 48"	5/8	0.6250
30"	48"			



HORIZONTAL BLOCKING DETAIL

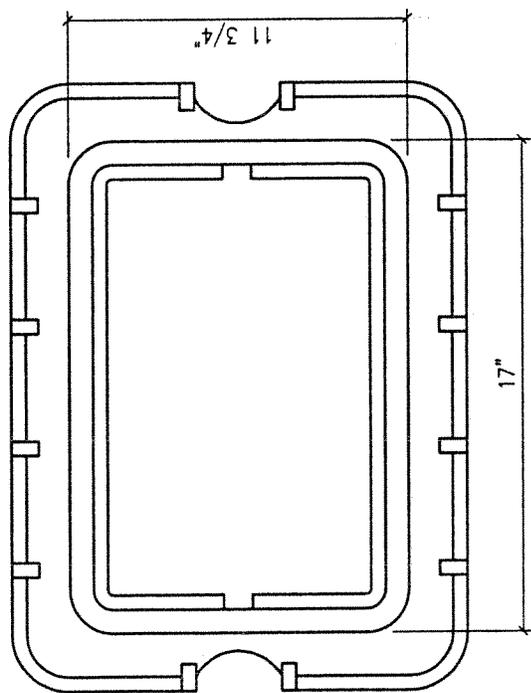
NOT TO SCALE

HORIZONTAL BLOCKING TABLE

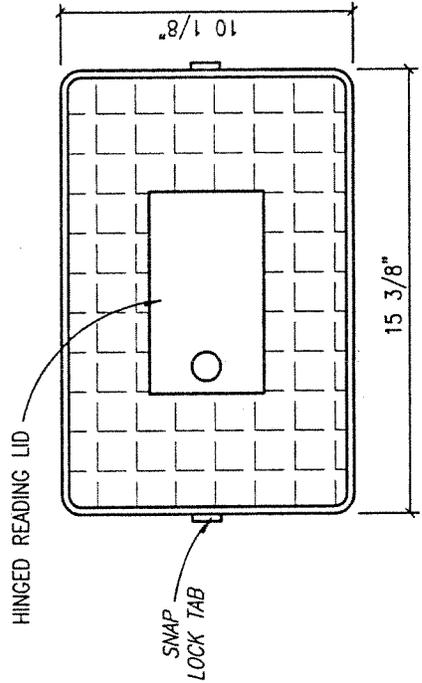
PIPE SIZE	"X"	PLUGS AND TEES			90° BENDS			45° BENDS			22' 30" BENDS			11' 15" BENDS		
		"A"	AREA ¹	VOL ²	"B"	AREA ¹	VOL ²	"C"	AREA ¹	VOL ²	"D"	AREA ¹	VOL ²	"E"	AREA ¹	VOL ²
4"	1'-0"	1'-0"	.83	.05	1'-0"	.83	.05	1'-0"	.83	.05	1'-0"	.83	.05	1'-0"	.83	.05
6"	1'-6"	1'-0"	1.06	.06	1'-2"	1.50	.09	1'-0"	.83	.05	1'-0"	.83	.05	1'-0"	.83	.05
8"	1'-6"	1'-3"	1.89	.11	1'-6"	2.66	.15	1'-3"	1.44	.08	1'-0"	.83	.05	1'-0"	.83	.05
10"	1'-6"	1'-9"	2.95	.17	2'-0"	4.17	.24	1'-6"	2.26	.13	1'-3"	1.15	.07	1'-0"	.83	.05
12"	1'-6"	2'-0"	4.25	.24	2'-3"	6.00	.34	1'-9"	3.25	.18	1'-3"	1.65	.10	1'-0"	.83	.05
16"	2'-0"	2'-7"	7.54	.56	3'-0"	10.65	.79	2'-3"	5.76	.43	1'-8"	2.94	.22	1'-2"	1.48	.11
18"	2'-0"	2'-11"	7.70	.57	3'-5"	10.89	.82	2'-6"	5.89	.44	1'-10"	3.01	.22	1'-5"	1.51	.11
20"	2'-0"	3'-3"	7.86	.59	3'-9"	11.12	.89	2'-9"	6.01	.45	2'-0"	3.07	.23	1'-7"	1.54	.12
24"	2'-0"	3'-8"	11.33	.84	4'-3"	16.00	1.20	3'-2"	8.65	.65	2'-6"	4.42	.23	1'-10"	2.22	.17

¹ SQUARE FEET (MINIMUM)

² CUBIC YARDS (MAXIMUM)

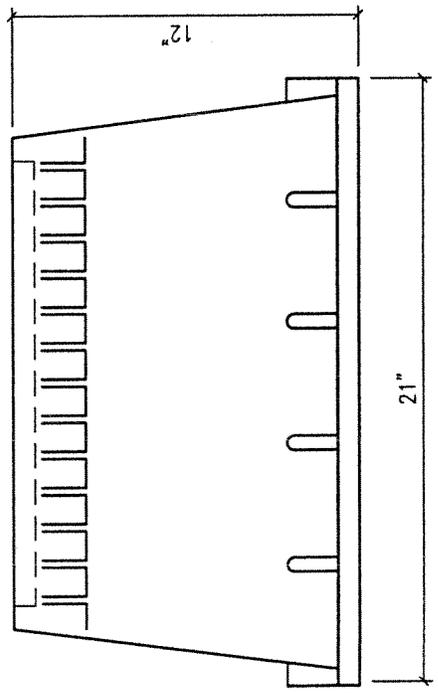


TOP VIEW

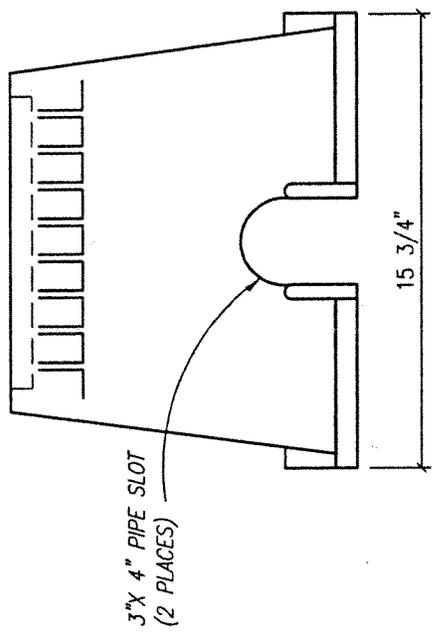


COVER

USA BLUEBOOK (McDONALD)
 MODEL D-1200 12" RECTANGULAR
 BOX WITH CAST IRON READER OR
 APPROVED EQUIVALENT



SIDE VIEW

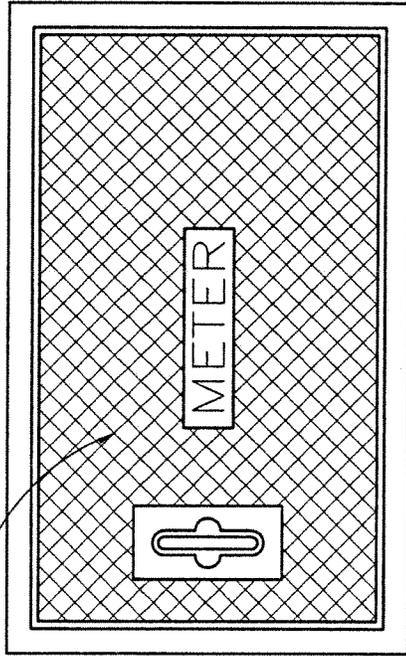


FRONT

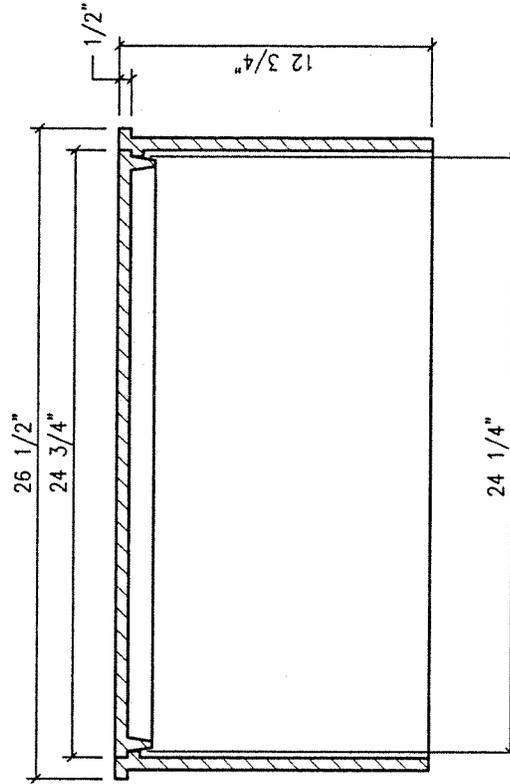
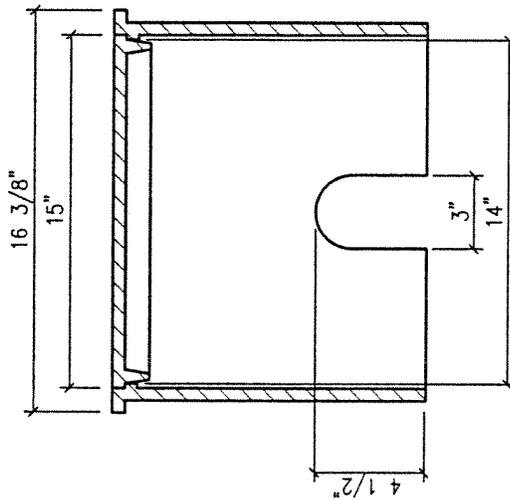
METER BOX (NON TRAFFIC AREA)

NOT TO SCALE

LID WITH A DROP TYPE
LIFTING HANDLE OF 3/8"
DIA. STEEL STANDARD. KEY
FOR LIFT HOLE OPTIONAL.
(39lbs.)



ALAMO IRON WORKS MODEL
MB1782 12" RECTANGULAR CAST
IRON BOX (92lbs.) AND LID OR
APPROVED EQUIVALENT.



METER BOX (TRAFFIC AREA)

NOT TO SCALE