

WATER STORAGE TANK

EXIT 44, I-81

BOTETOURT COUNTY, VIRGINIA

PREPARED BY:

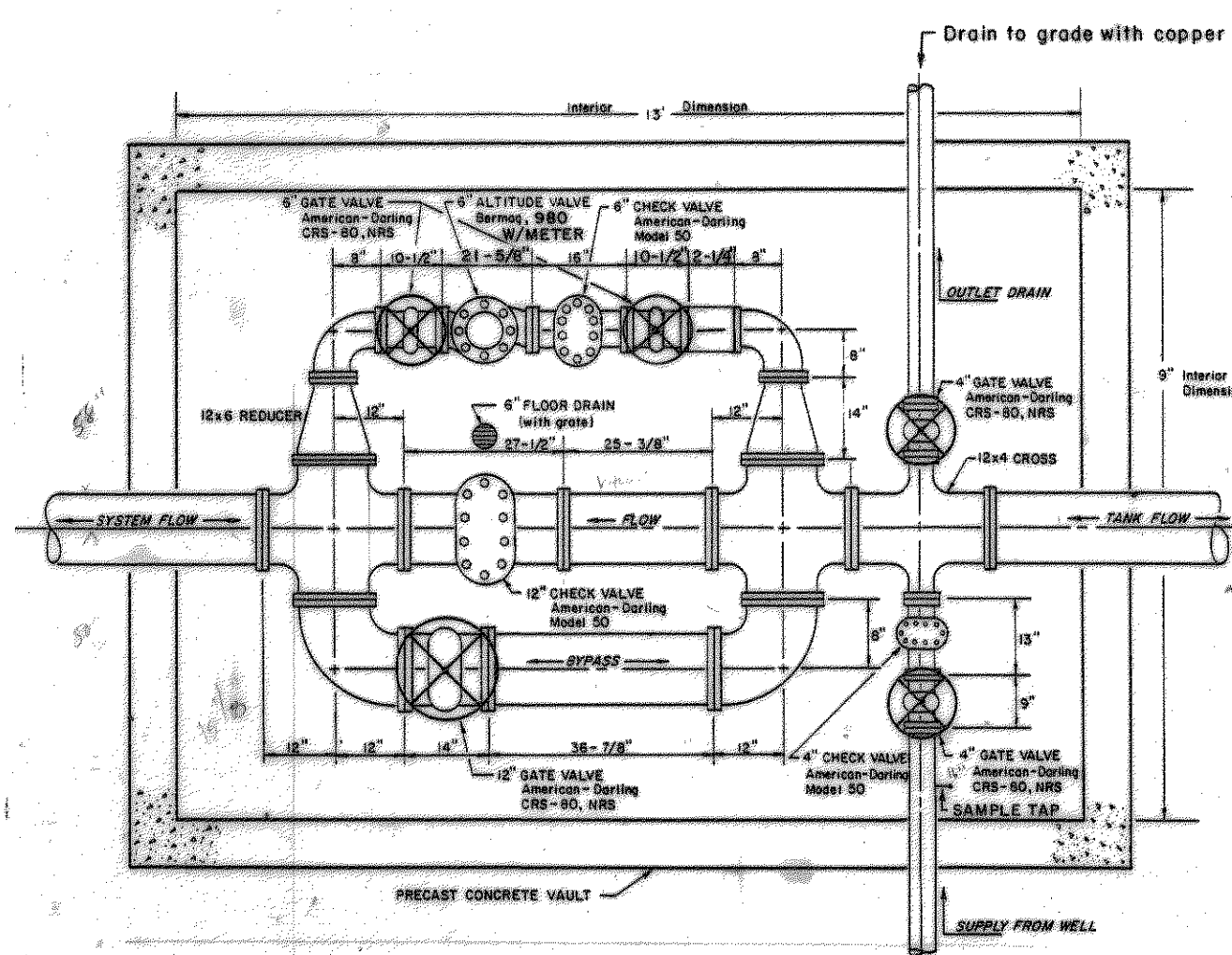
LANG ENGINEERING COMPANY
P.O. BOX 565
DALEVILLE, VIRGINIA 24083

Sheet Index:

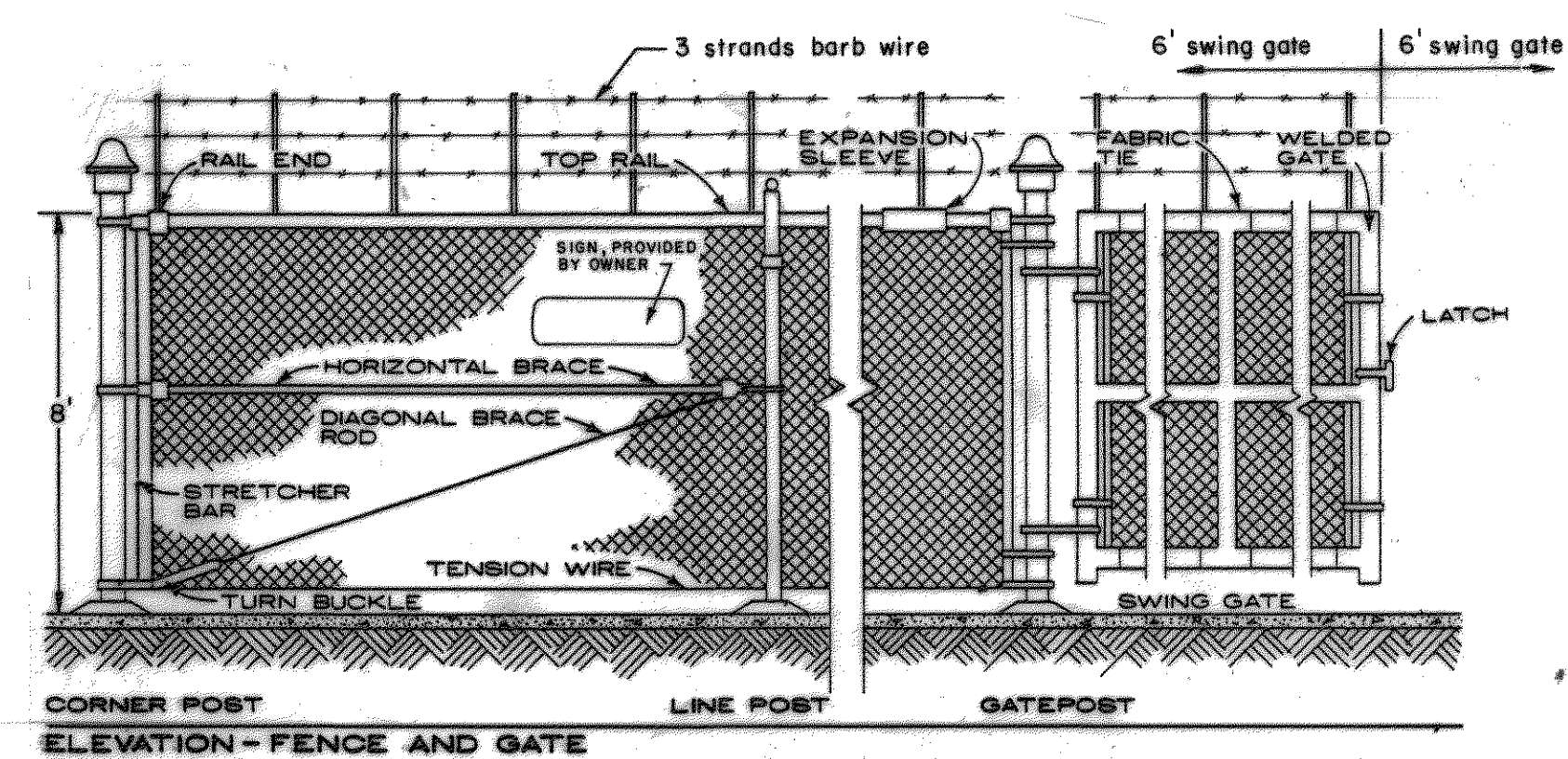
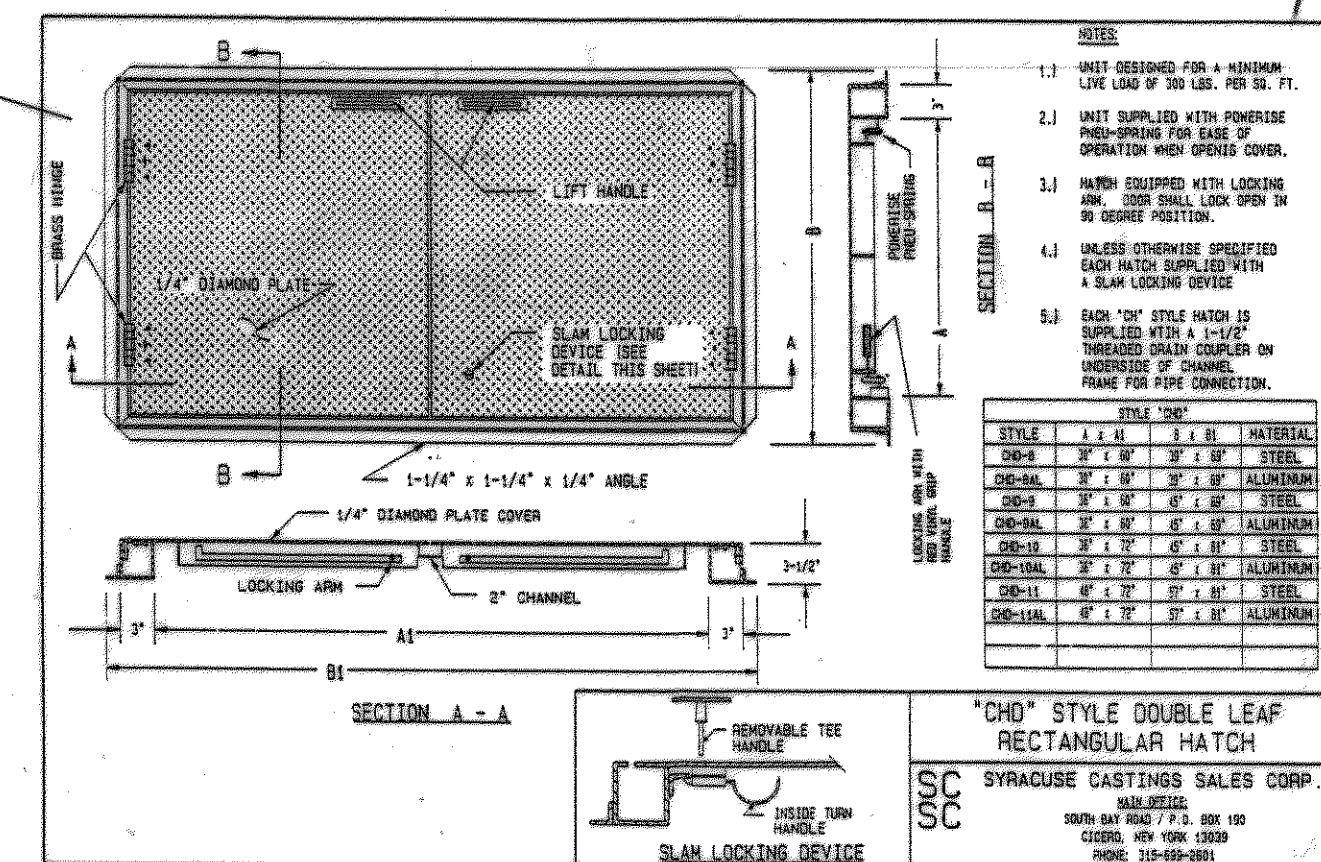
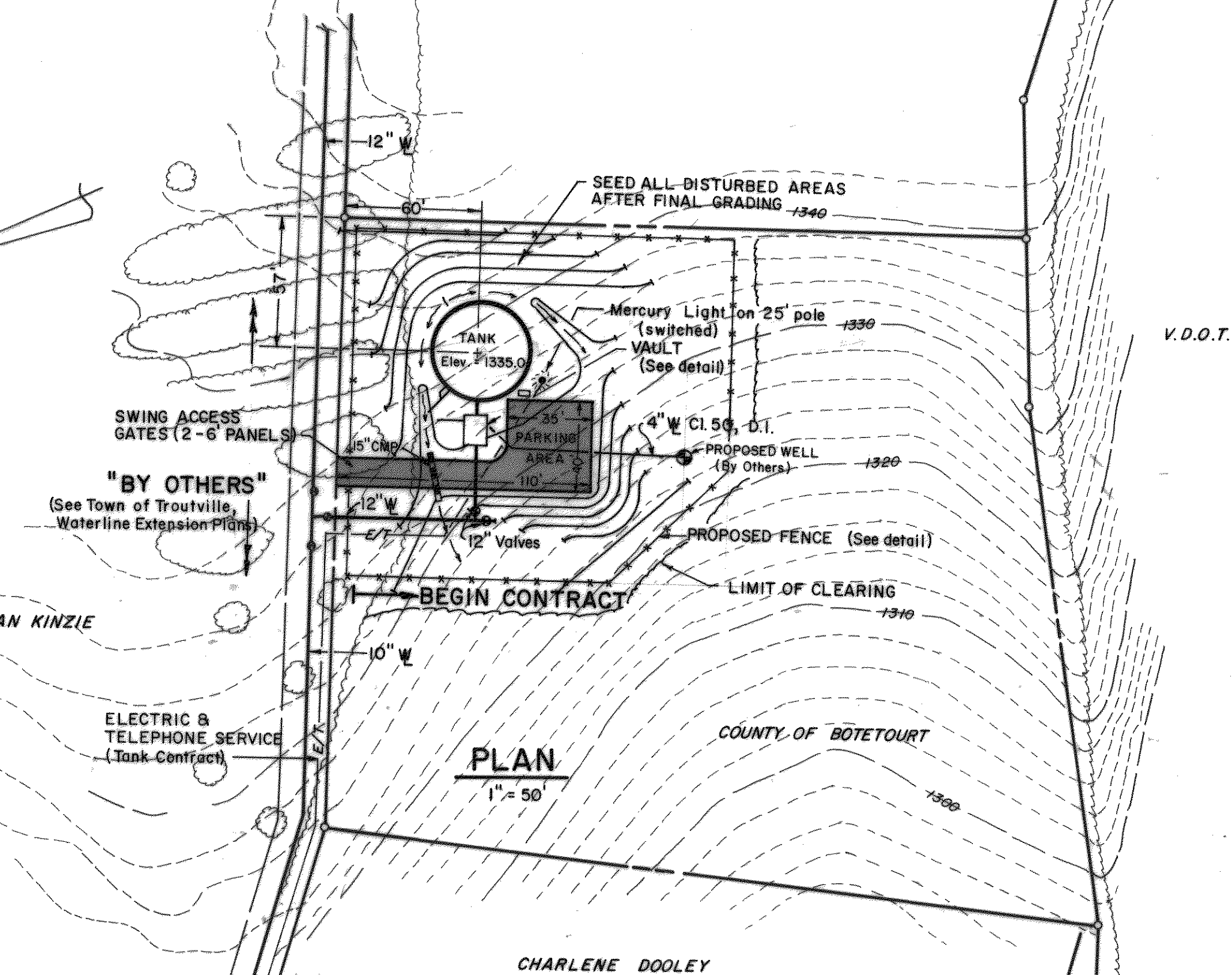
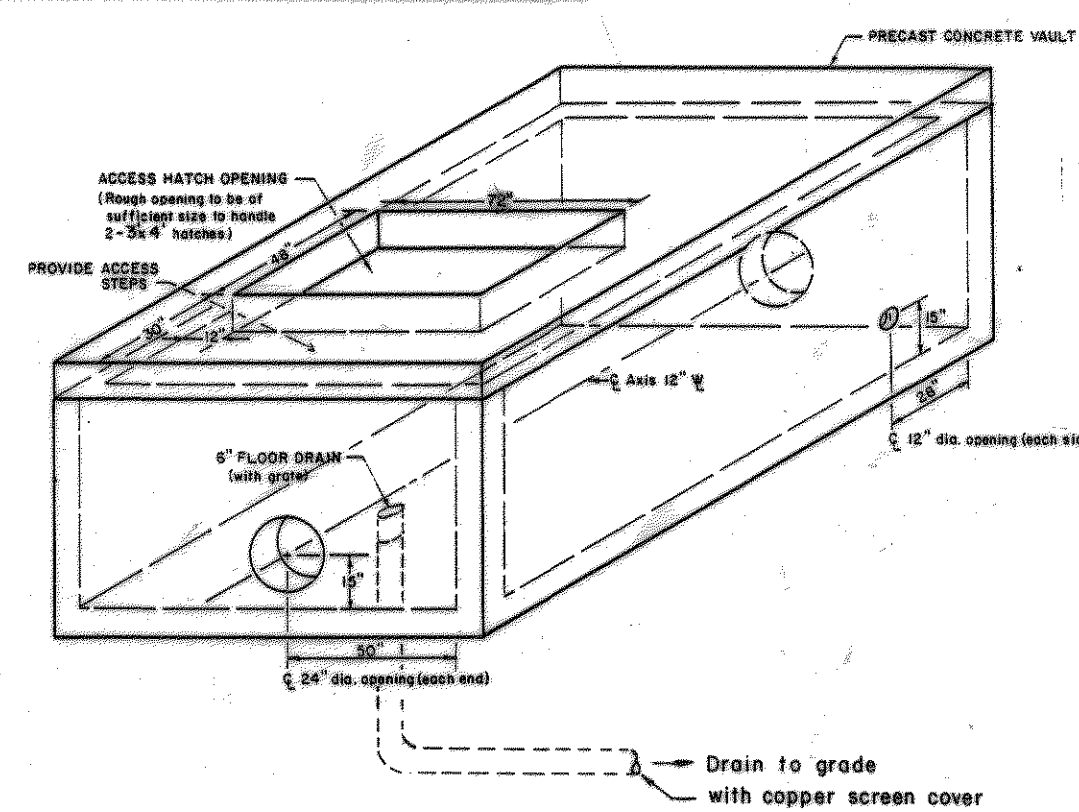
Sheet 1: Title Sheet
Sheet 2: Tank Details
Sheet 3: Standard Details
Sheet 4: Standard Details

Date: February 1991

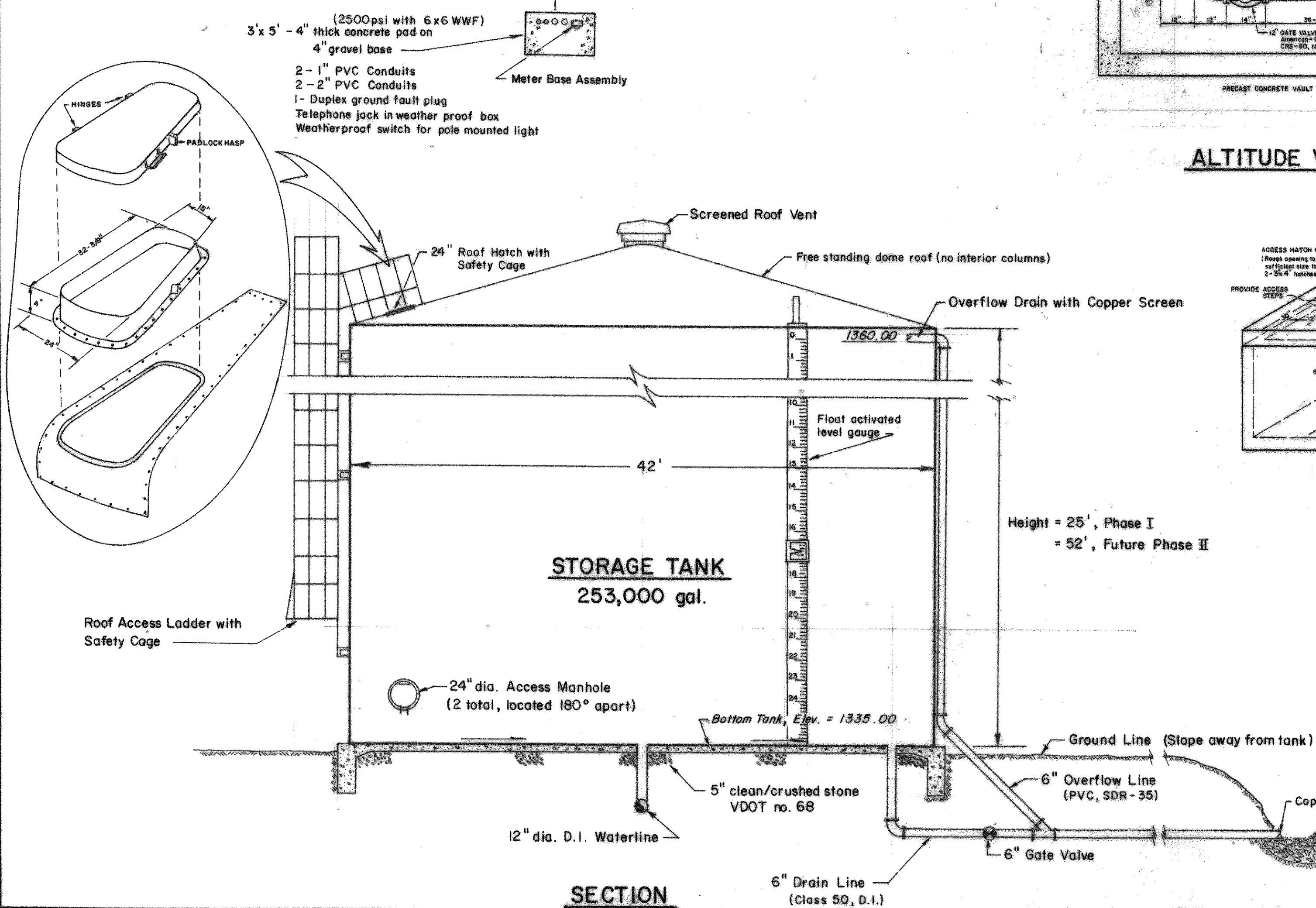
Job No.: 900516

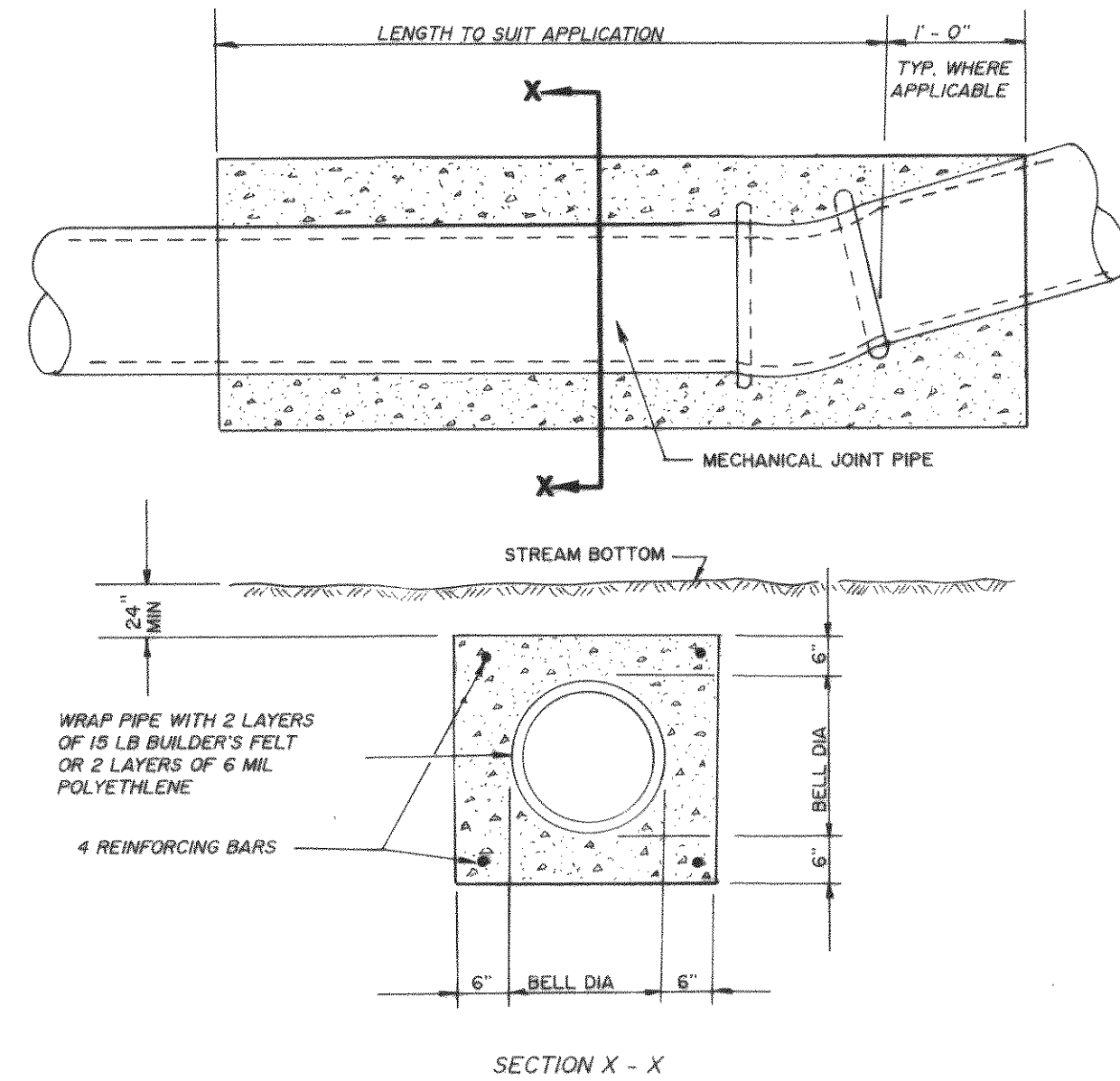
[illegible]

ALTITUDE VALVE VAULT

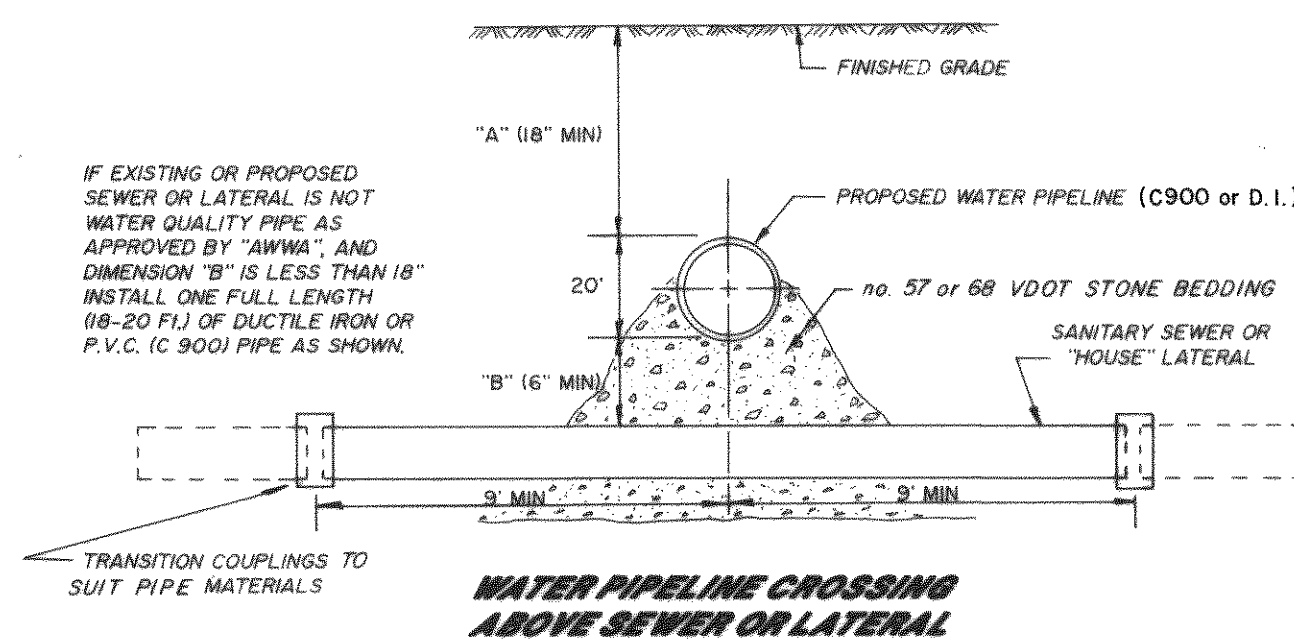


PERIMETER FENCE DETAIL

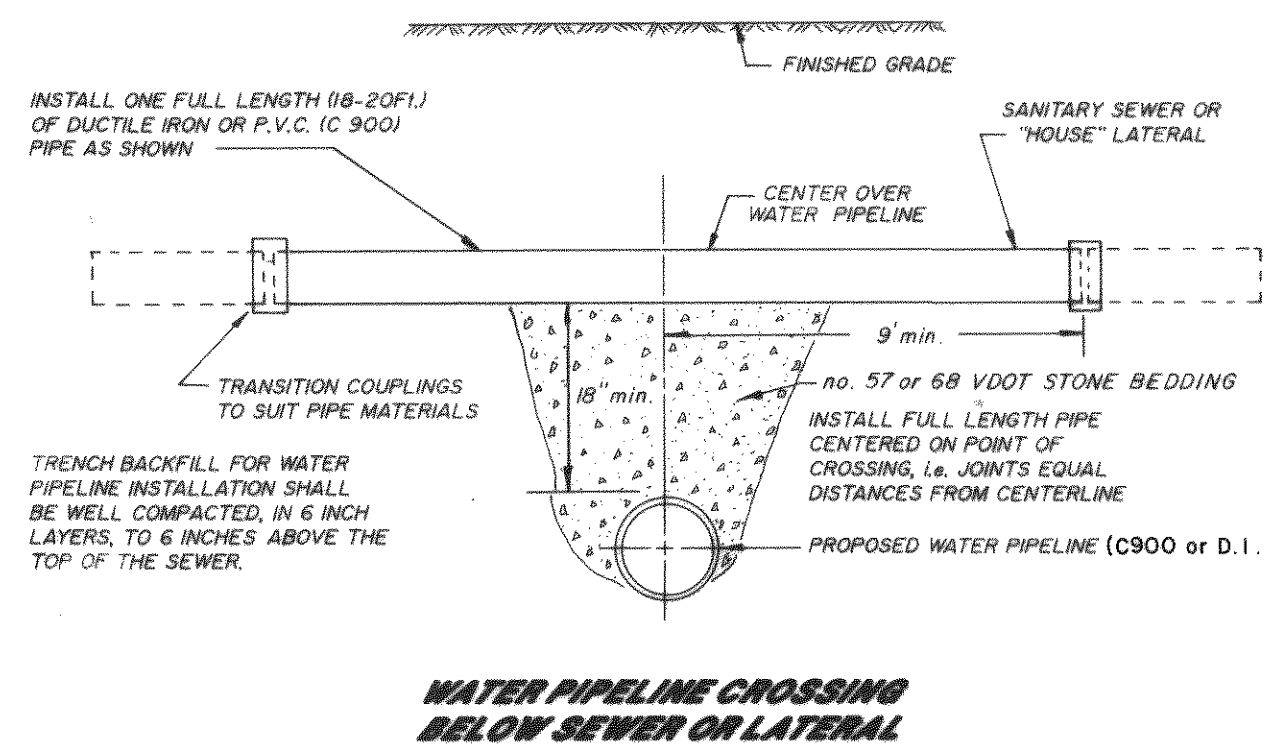




TYPICAL STREAM CROSSING

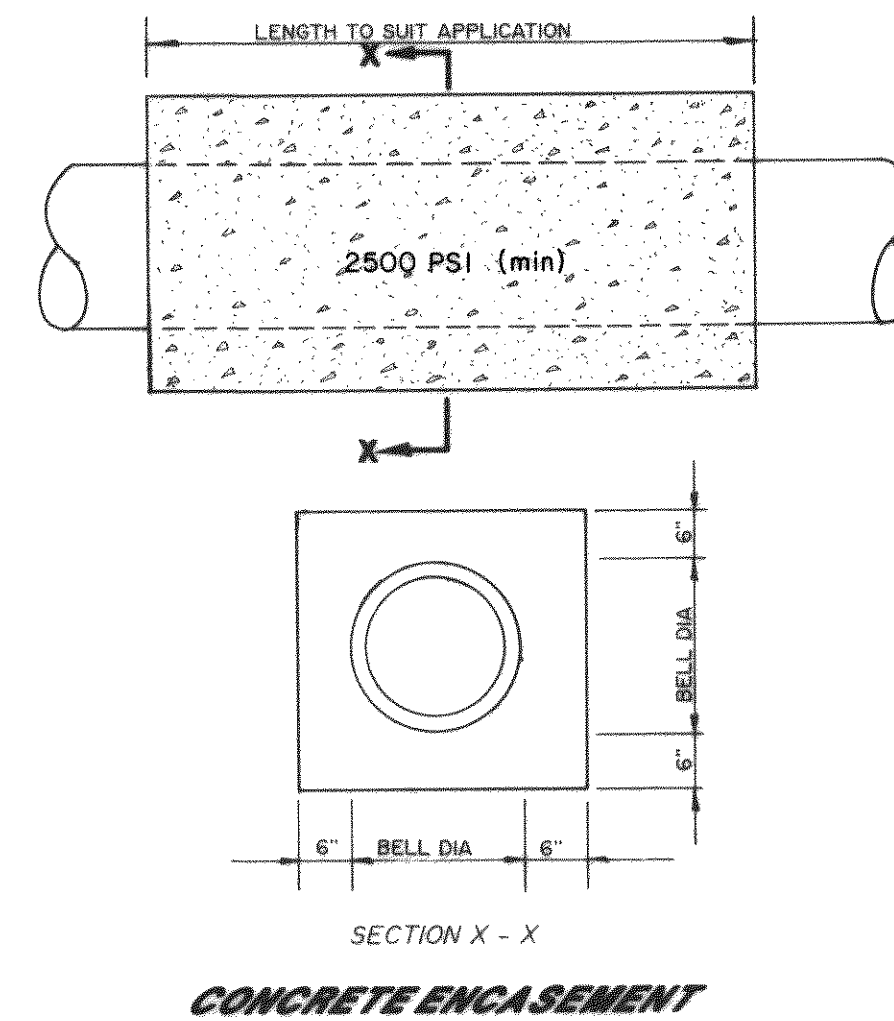


WATER PIPELINE CROSSING ABOVE SEWER OR LATERAL

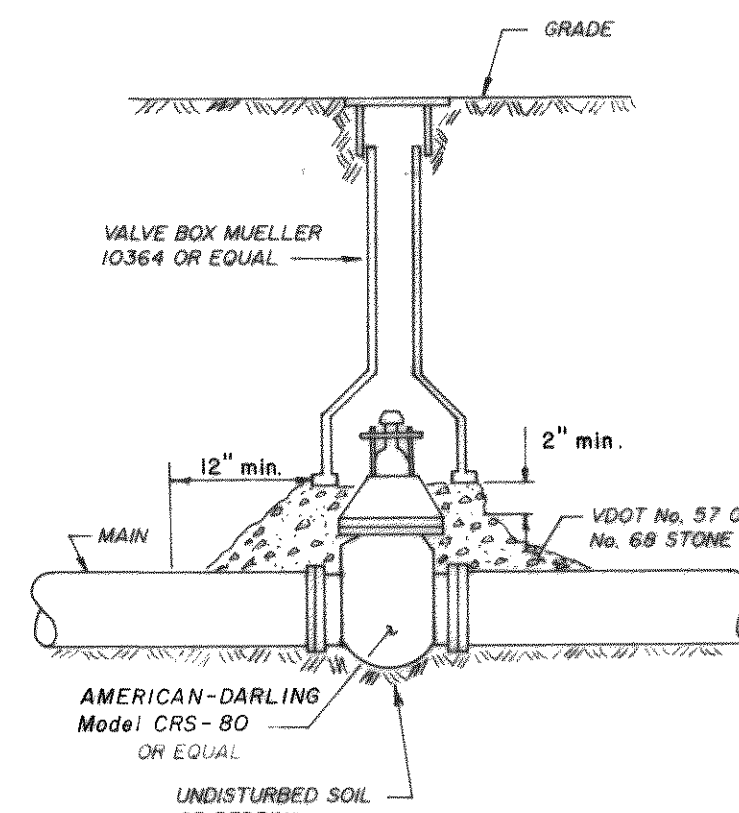


WATER PIPELINE CROSSING BELOW SEWER OR LATERAL

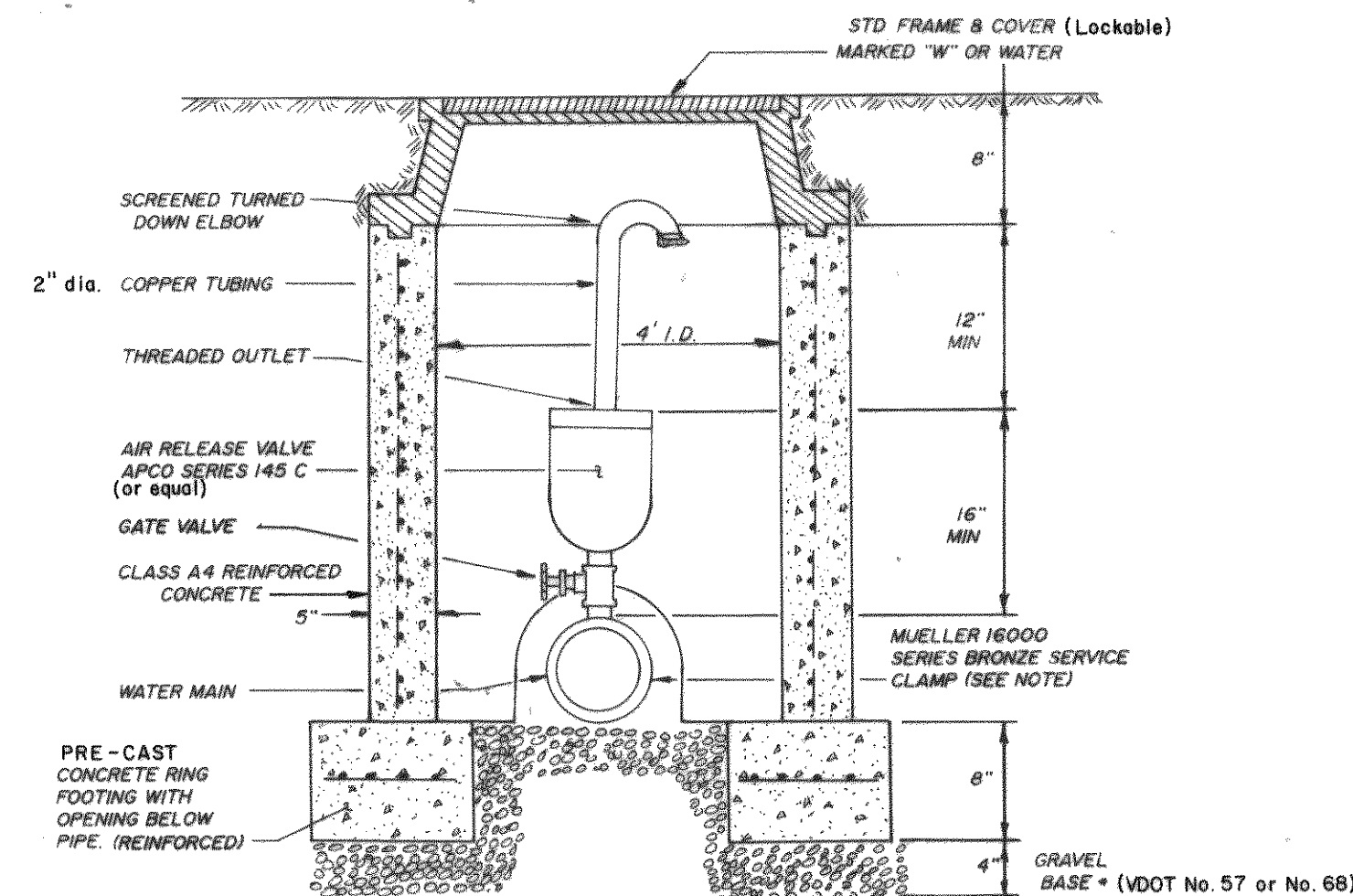
WATER PIPELINE CROSSING SANITARY SEWER OR "HOUSE" LATERAL



CONCRETE ENCASEMENT

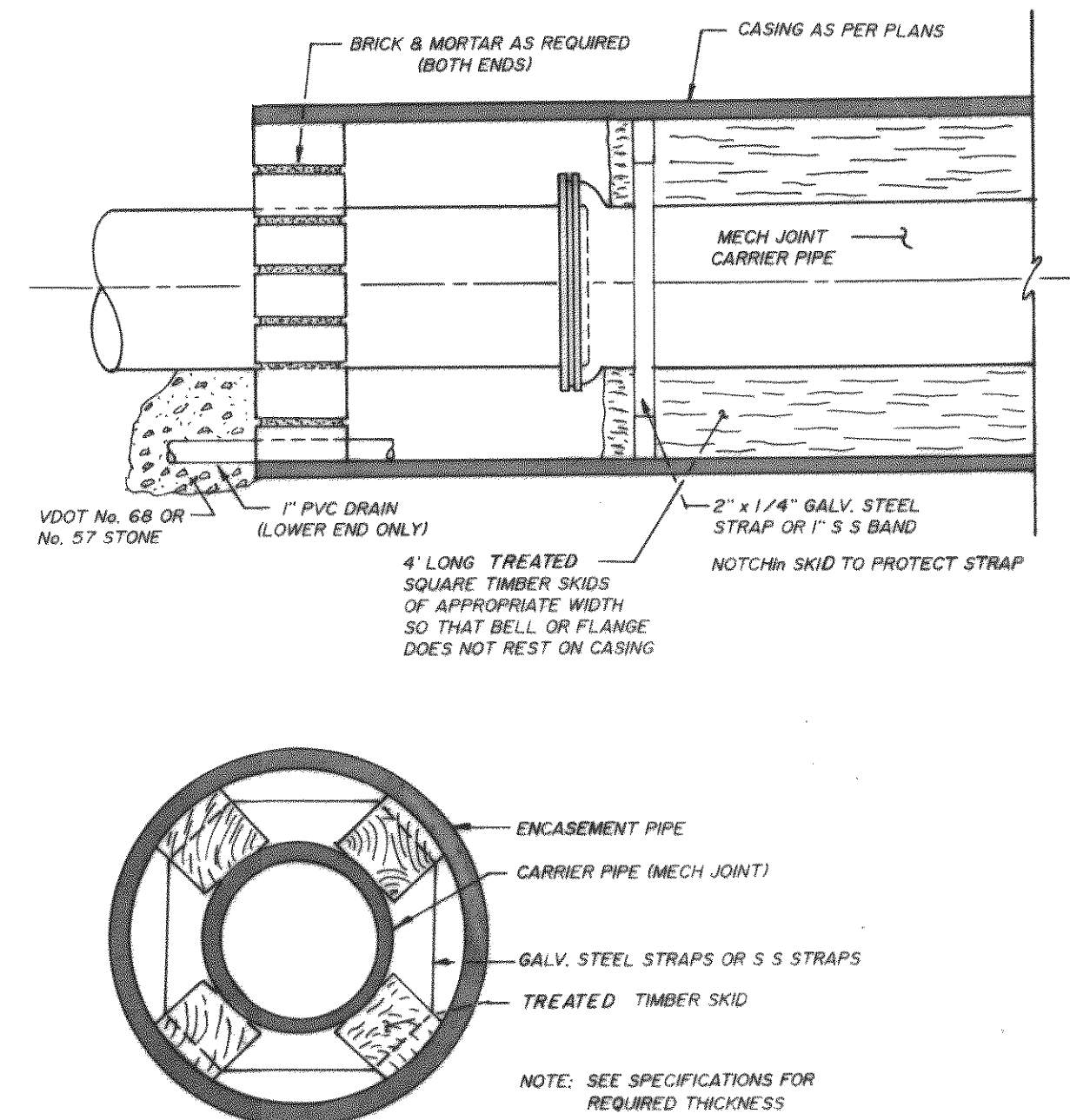


TYPICAL GATE VALVE INSTALLATION



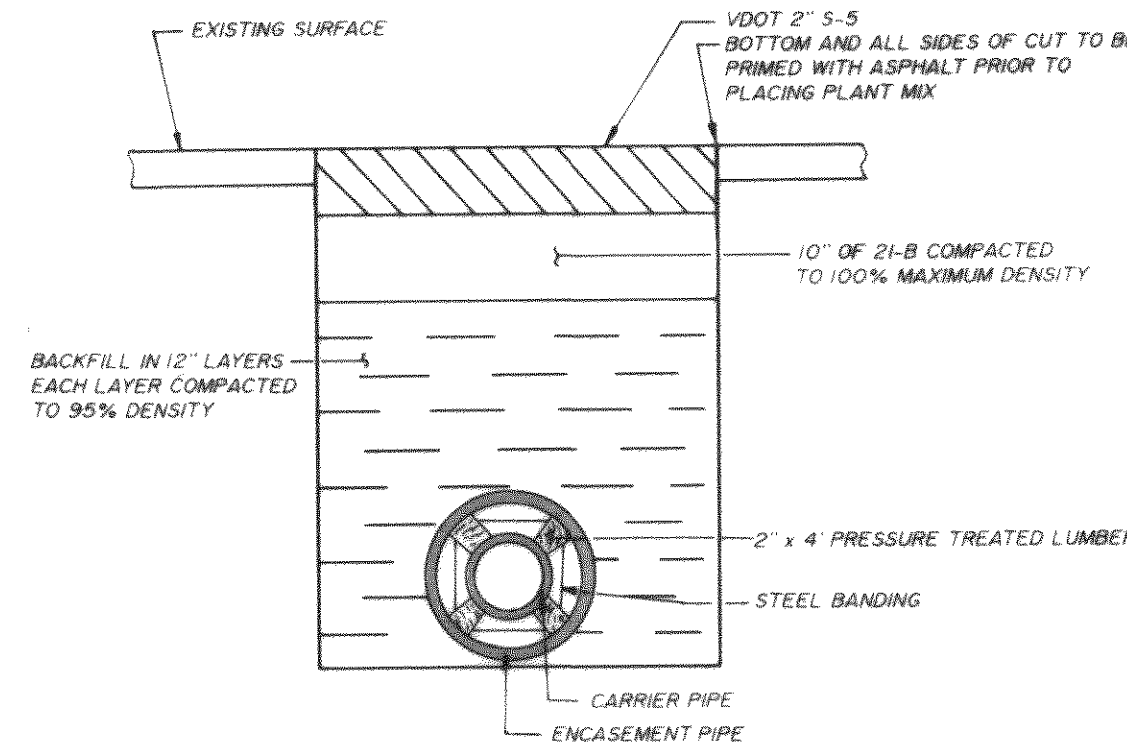
DETAIL FOR WATER MAINS 10" OR SMALLER IN DIAMETER AND ARVs 2" OR SMALLER.

AUTOMATIC AIR RELEASE VALVE

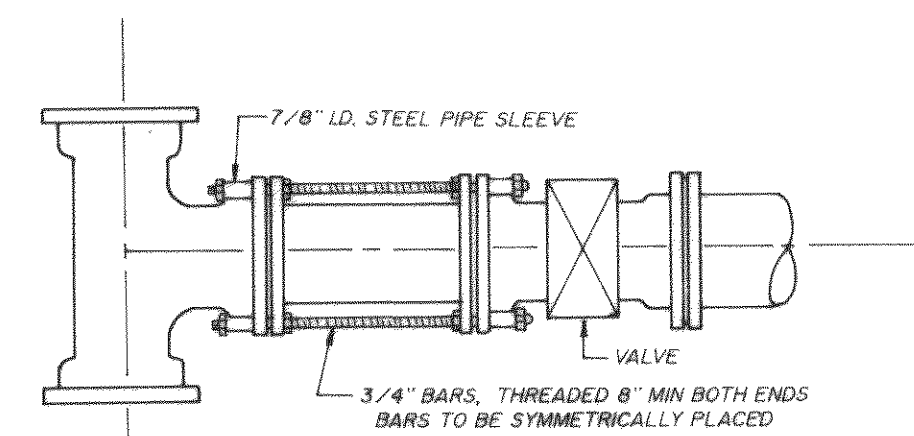


NOTE: FOR DUCTILE IRON PIPE, SOAP-BASED LUBRICANT MAY BE USED TO EASE SLIDING OF SKID. FOR PVC PIPE, FLAX SOAP OR DRILLING MUD SHOULD BE UTILIZED FOR LUBRICATION.

ENCASEMENT DETAIL



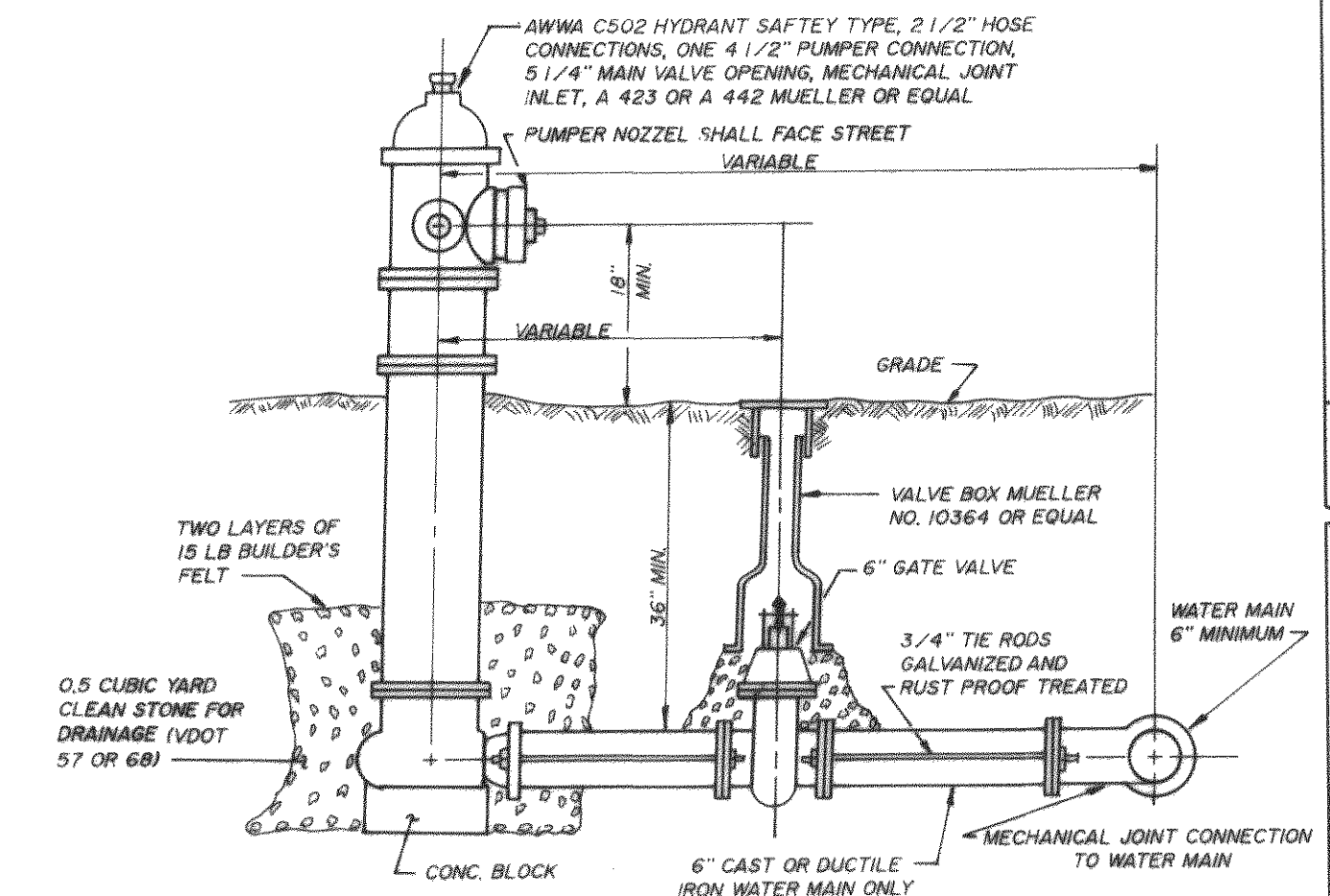
OPEN CUT ROAD CROSSING



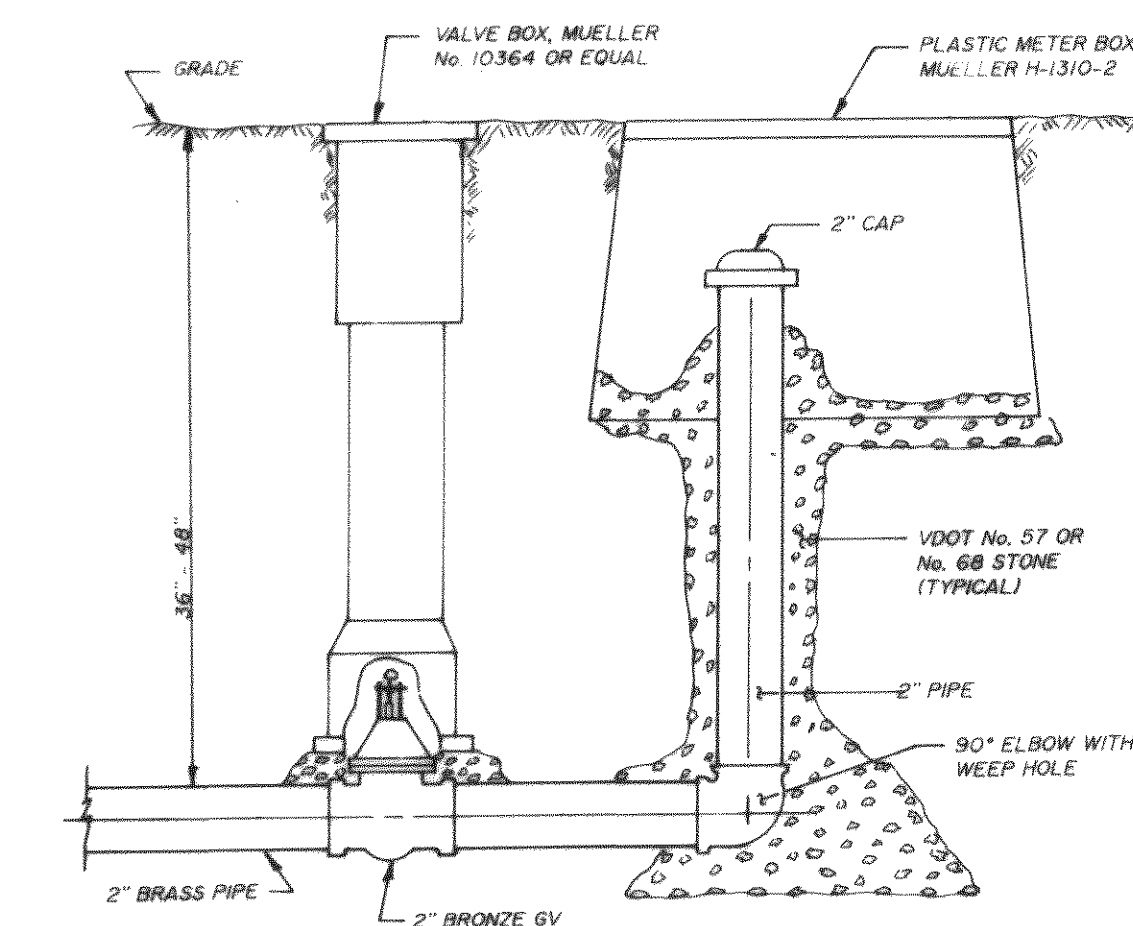
VALVE SIZE	NUMBER OF 3/4" BARS REQUIRED	MAX LENGTH OF SPIGOT PIPE
3"	2	24"
4"	2	24"
6"	2	27"
8"	2	27"
10"	4	27"
12"	6	27"
16"	8	36"
20"	12	36"
24"	16	36"
30"	20	42"

METHOD OF STRAPPING VALVE TO MAIN

NOTE: MINIMUM DISTANCE BETWEEN HYDRANT AND FACE OF CURB SHALL BE 24 INCHES, (WHERE APPLICABLE)



FIRE HYDRANT ASSEMBLY



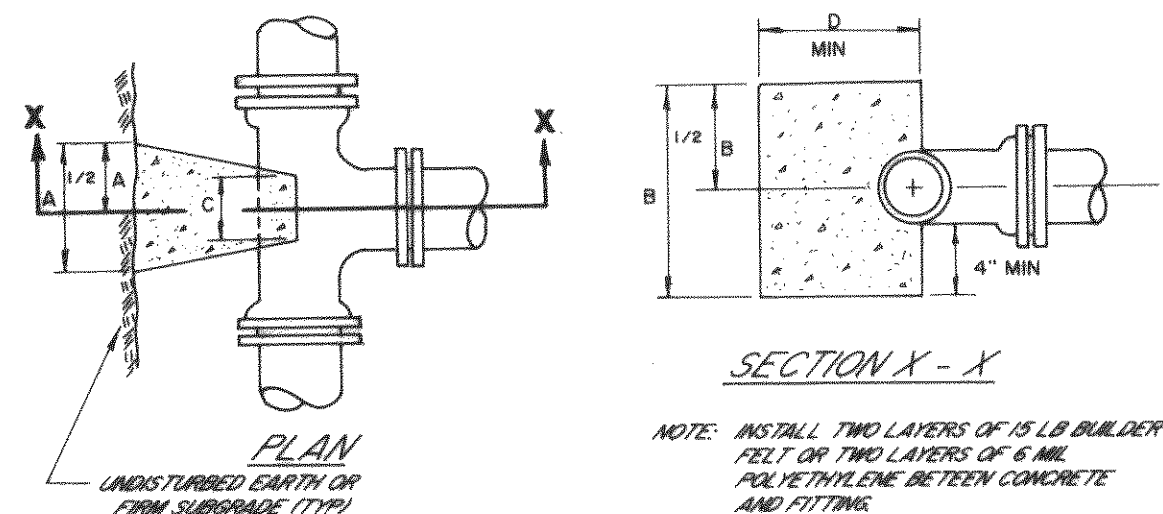
TYPICAL CONNECTION

NOTE: GALVANIZED PIPE MAY BE SUBSTITUTED FOR BRASS PIPE

DEAD-END CONNECTION

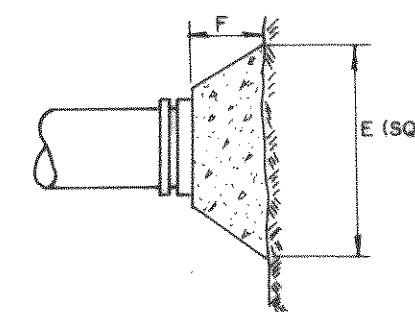
BLOWOFF ASSEMBLY

DATE	REVISIONS	DATE	SCALE	CHKD.	REVIEW	COMMENTS
SEPTEMBER 1990	1	SEPTEMBER 1990	1	CHKD.	REVIEW	COMMENTS
LANG ENGINEERING Co. Consulting Engineers • Land Planners JOB No. 900516 P.O. Box 565 Daleville, Va. 24083 (703) 992-5520			COMMONWEALTH OF VIRGINIA RICHARD G. LANG No. 16720 PROFESSIONAL ENGINEER WATER STORAGE TANK EXIT 44, I-81 BOTETOURT COUNTY VIRGINIA SHEET NO. 3 OF 4			



TEE	BRANCH DIAMETER								
	3"	4"	6"	8"	10"	12"	16"	20"	24"
A	12"	12"	16"	18"	26"	30"	40"	48"	60"
B	12"	16"	20"	30"	32"	42"	56"	72"	96"
C	8"	8"	12"	12"	12"	16"	24"	24"	24"
D	6"	6"	8"	9"	10"	12"	14"	18"	20"

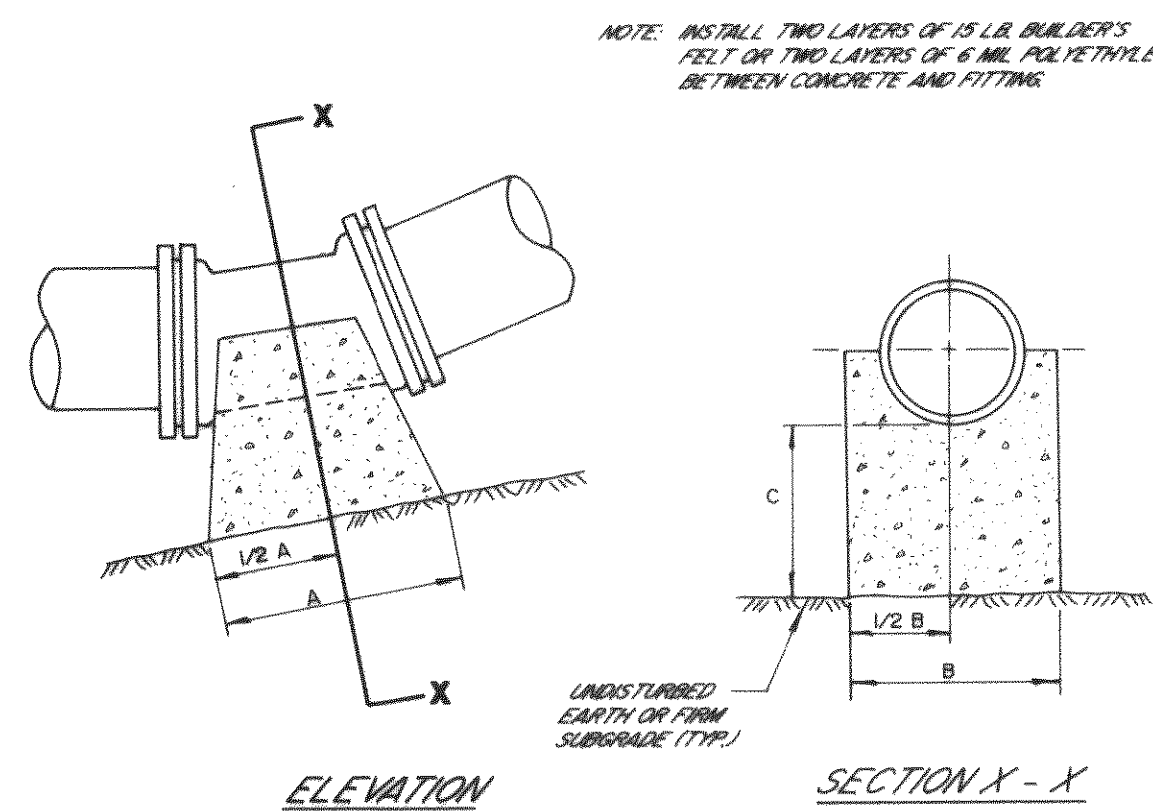
BASED ON NORMAL OPERATING PRESSURE UP TO 150 PSI



PLUG	PIPE DIAMETER								
	3"	4"	6"	8"	10"	12"	16"	20"	24"
E	14"	16"	21"	29"	36"	41"	54"	64"	75"
F	8"	8"	10"	10"	12"	14"	16"	18"	20"

BASED ON NORMAL OPERATING PRESSURE UP TO 150 PSI

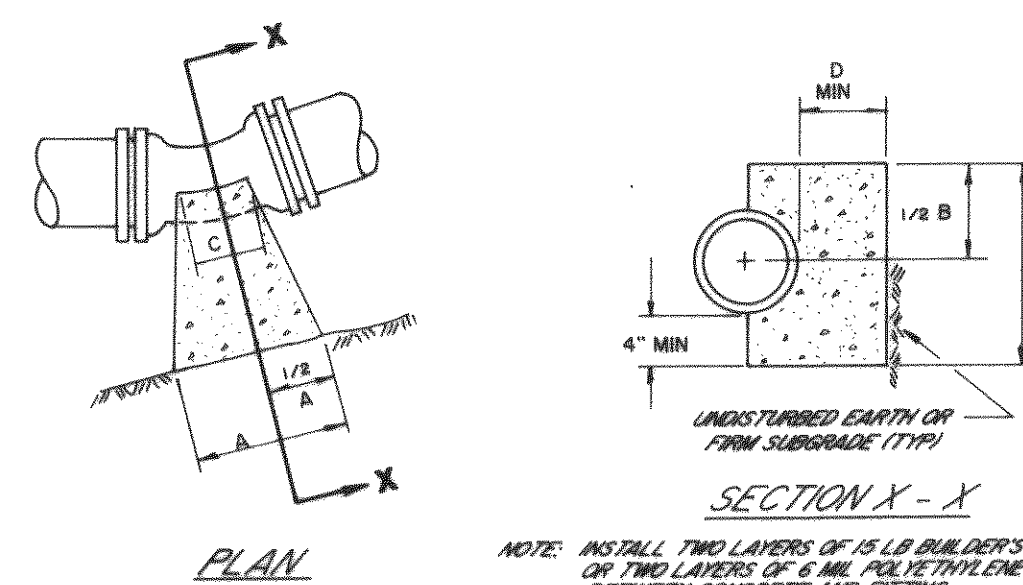
THRUST BLOCK DETAILS TEES, TAPPING SLEEVES, PLUGS, CAPS



BEND	PIPE DIAMETER									
	3"	4"	6"	8"	10"	12"	16"	20"	24"	30"
11 1/4"	A	6"	6"	6"	8"	8"	13"	15"	22"	32"
	B	12"	12"	14"	16"	18"	24"	28"	32"	40"
	C	8"	8"	8"	8"	8"	9"	10"	12"	14"
22 1/2"	A	6"	6"	10"	11"	15"	16"	25"	33"	43"
	B	12"	12"	14"	16"	18"	24"	28"	32"	40"
	C	8"	8"	8"	8"	9"	9"	12"	14"	18"
45°	A	10"	12"	14"	21"	29"	32"	48"	66"	98"
	B	12"	12"	14"	16"	18"	24"	28"	32"	48"
	C	8"	8"	8"	8"	12"	14"	18"	24"	36"

BASED ON NORMAL OPERATING PRESSURE UP TO 150 PSI

THRUST BLOCK DETAILS LOWER VERTICAL BENDS

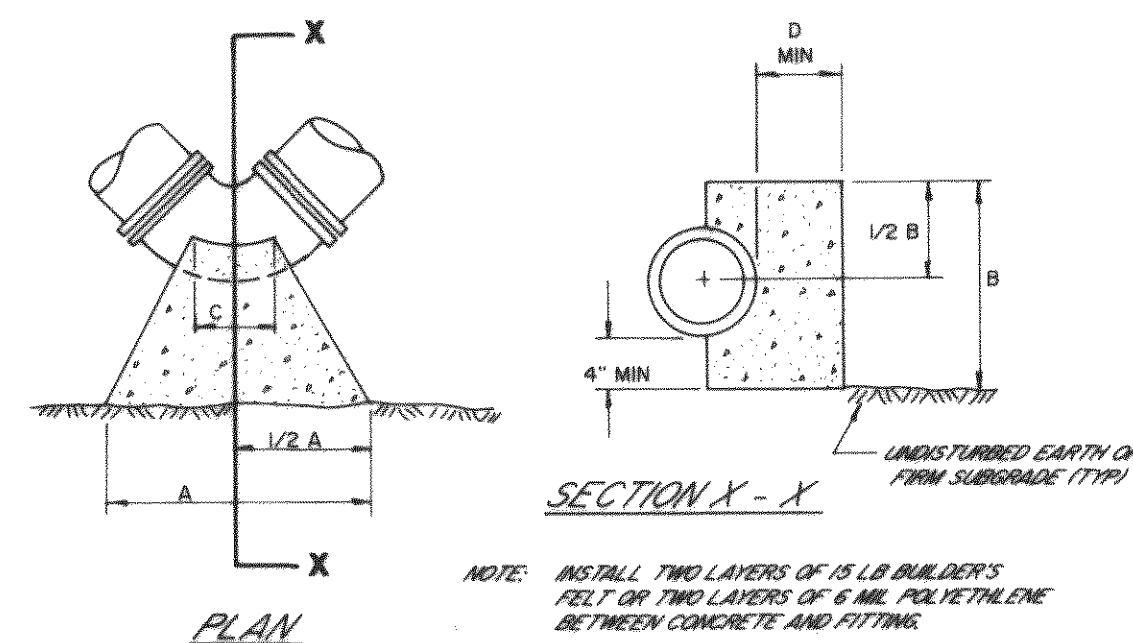


PIPE DIAM	11 1/4" BEND					22 1/2" BEND				
	A	B	C	D	E	A	B	C	D	E
3"	4"	12"	4"	6"	2"	6"	12"	6"	7"	2"
4"	4"	12"	4"	6"	2"	6"	12"	6"	7"	2"
6"	6"	14"	6"	7"	2"	8"	14"	6"	8"	2"
8"	8"	16"	8"	7"	2"	12"	16"	8"	8"	4"
10"	9"	18"	8"	8"	4"	15"	18"	8"	10"	4"
12"	12"	20"	12"	9"	4"	18"	20"	12"	12"	6"
16"	15"	24"	12"	9"	6"	24"	24"	12"	15"	6"
20"	30"	12"	10"	6"	30"	30"	12"	18"	9"	
24"	18"	36"	12"	12"	6"	36"	36"	12"	18"	9"
30"	24"	42"	16"	14"	9"	48"	42"	16"	21"	12"

BASED ON NORMAL OPERATING PRESSURE UP TO 150 PSI

E = ADDITIONAL LENGTH TO BE ADDED TO DIMENSION "A" FOR EACH ADDITIONAL 50 PSI PRESSURE UP TO 300 PSI

THRUST BLOCK DETAILS 11 1/4" - 22 1/2" BENDS

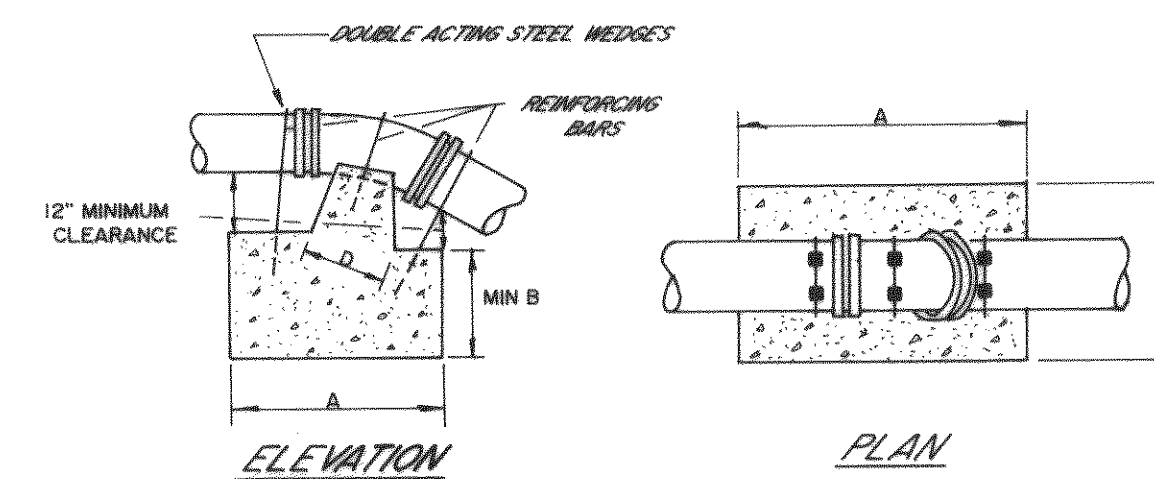


PIPE DIAM	45° BEND					90° BEND				
	A	B	C	D	E	A	B	C	D	E
3"	9"	12"	6"	6"	4"	12"	12"	6"	12"	6"
4"	9"	12"	6"	6"	4"	16"	12"	6"	12"	6"
6"	12"	14"	6"	8"	4"	21"	14"	6"	18"	6"
8"	18"	16"	8"	9"	6"	30"	16"	8"	18"	9"
10"	24"	16"	8"	10"	6"	36"	24"	10"	18"	9"
12"	30"	20"	12"	12"	9"	48"	24"	12"	18"	12"
16"	42"	30"	12"	15"	9"	60"	30"	16"	21"	12"
20"	56"	30"	12"	16"	16"	72"	40"	20"	21"	24"
24"	60"	36"	12"	21"	24"	84"	48"	24"	24"	30"
30"	72"	48"	16"	27"	24"	108"	60"	30"	24"	36"

BASED ON NORMAL OPERATING PRESSURE UP TO 150 PSI

E = ADDITIONAL LENGTH TO BE ADDED TO DIMENSION "A" FOR EACH ADDITIONAL 50 PSI PRESSURE UP TO 300 PSI

THRUST BLOCK DETAILS 45° - 90° BENDS



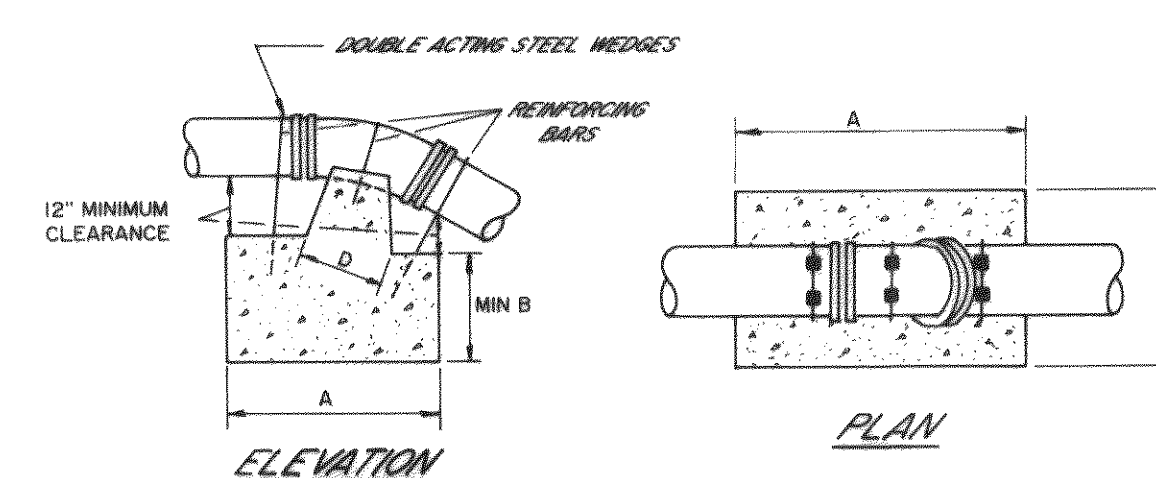
NOTES:
1. EMBED REINFORCING BARS MINIMUM OF 36" DIAMETERS INCLUDING HOOK
2. PAINT EXPOSED BARS WITH TWO COATS OF BITUMINOUS PAINT
3. WHERE 4 BARS ARE REQUIRED, PLACE 2 BARS SYMMETRICALLY AROUND FITTING
4. INSTALL TWO LAYERS OF 15 LB BUILDER'S FELT OR TWO LAYERS OF 6 MIL POLYETHYLENE

C = NUMBER AND SIZE OF REINFORCING BARS
D = DIMENSION OF PIPE DIAMETER

BEND	PIPE DIAMETER									
	3"	4"	6"	8"	10"	12"	16"	20"	24"	30"
11 1/4"	A	18"	18"	24"	24"	27"	30"	39"	48"	60"
	B	18"	18"	18"	24"	24"	27"	30"	30"	36"
	C	3 #5	3 #5	3 #5	3 #6	3 #6	3 #6	3 #6	3 #8	3 #8
22 1/2"	A	18"	24"	30"	33"	42"	48"	54"	66"	84"
	B	18"	18"	24"	27"	27"	30"	36"	42"	48"
	C	3 #5	3 #5	3 #5	3 #6	3 #6	4 #6	4 #6	3 #8	4 #8
45°	A	24"	30"	36"	42"	48"	54"	60"	90"	98"
	B	18"	24"	24"	30"	33"	36"	42"	48"	54"
	C	3 #5	3 #5	3 #5	3 #6	4 #6	4 #6	4 #8	4 #8	4 #9

BASED ON NORMAL OPERATING PRESSURE UP TO 150 PSI

THRUST BLOCK DETAILS UPPER VERTICAL BENDS



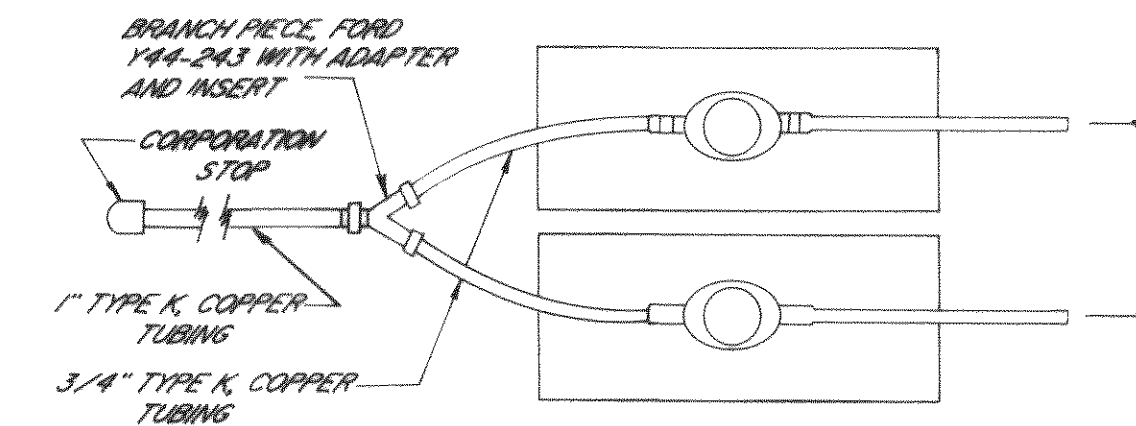
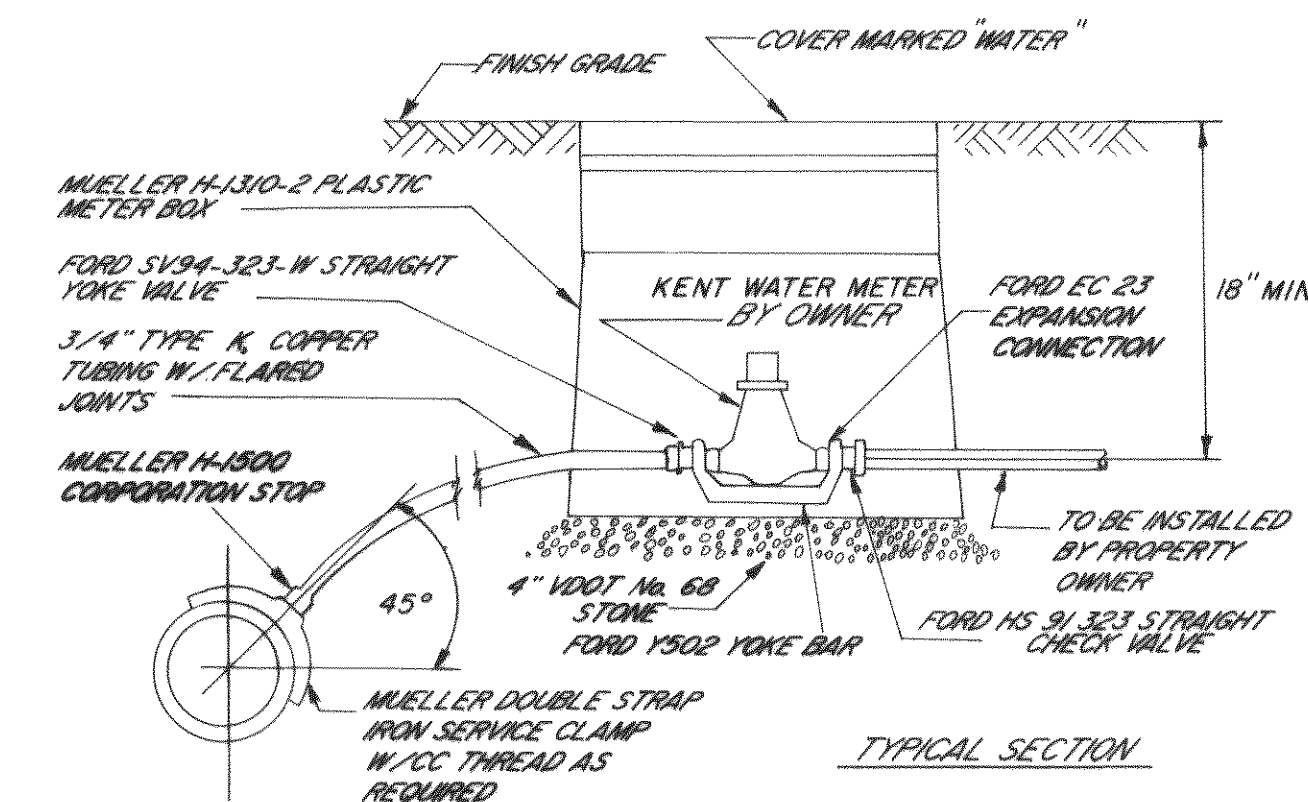
NOTES:
1. EMBED REINFORCING BARS MINIMUM OF 36" DIAMETERS INCLUDING HOOK
2. PAINT EXPOSED BARS WITH TWO COATS OF BITUMINOUS PAINT
3. WHERE 4 BARS ARE REQUIRED, PLACE 2 BARS SYMMETRICALLY AROUND FITTING
4. INSTALL TWO LAYERS OF 15 LB BUILDER'S FELT OR TWO LAYERS OF 6 MIL POLYETHYLENE

C = NUMBER AND SIZE OF REINFORCING BARS
D = DIMENSION OF PIPE DIAMETER

BEND	PIPE DIAMETER									
	3"	4"	6"	8"	10"	12"	16"	20"	24"	30"
11 1/4"	A	18"	18"	24"	24"	27"	30"	39"	48"	60"
	B	18"	18"	18"	24"	24"	27"	30"	30"	36"
	C	3 #5	3 #5	3 #5	3 #6	3 #6	3 #6	3 #6	3 #8	3 #8
22 1/2"	A	18"	24"	30"	33"	42"	48"	54"	66"	84"
	B	18"	18"	24"	27"	27"	30"	36"	42"	48"
	C	3 #5	3 #5	3 #5	3 #6	3 #6	4 #6	4 #6	3 #8	4 #8
45°	A	24"	30"	36"	42"	48"	54"	60"	90"	98"
	B	18"	24"	24"	30"	33"	36"	42"	48"	54"
	C	3 #5	3 #5	3 #5	3 #6	4 #6	4 #6	4 #8	4 #8	4 #9

BASED ON NORMAL OPERATING PRESSURE UP TO 150 PSI

THRUST BLOCK DETAILS UPPER VERTICAL BENDS



DOUBLE METER INSTALLATION

RESIDENTIAL SERVICE CONNECTION

DATE	REVISIONS
6	1
5	2
4	3
3	4
2	5

DATE	SEPTEMBER 1990
SCALE	
CHKD.	RL
JOB No.	90051

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COMMONWEALTH OF VIRGINIA
RICIARD G. LANG
No. 16720
PROFESSIONAL ENGINEER

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VIRGINIA

SHEET NO.
4
OF **4**