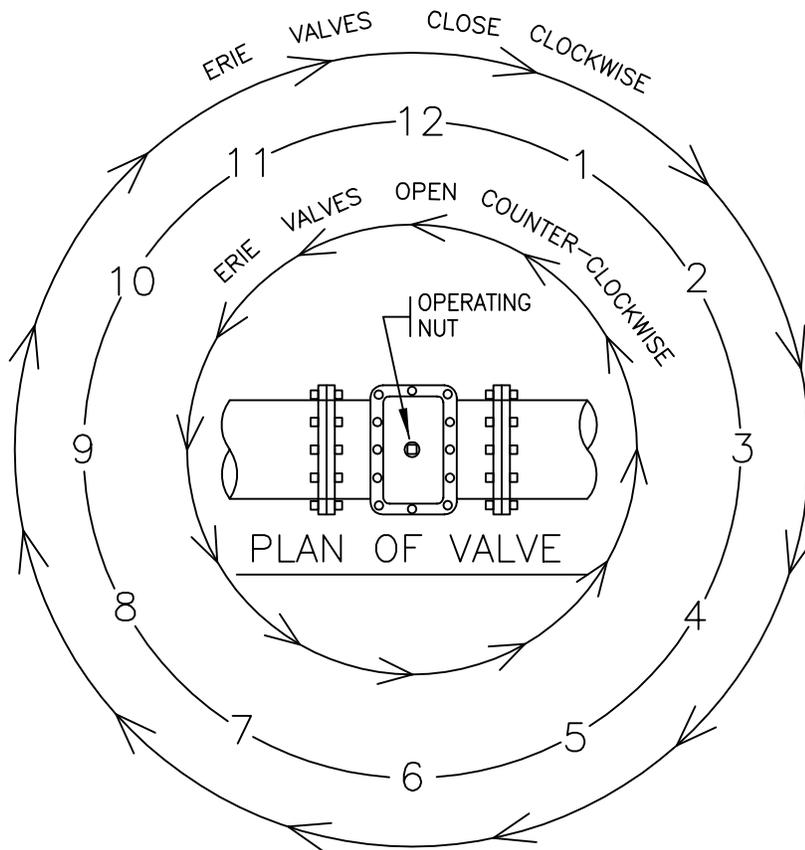


INDEX OF DRAWING—WATER

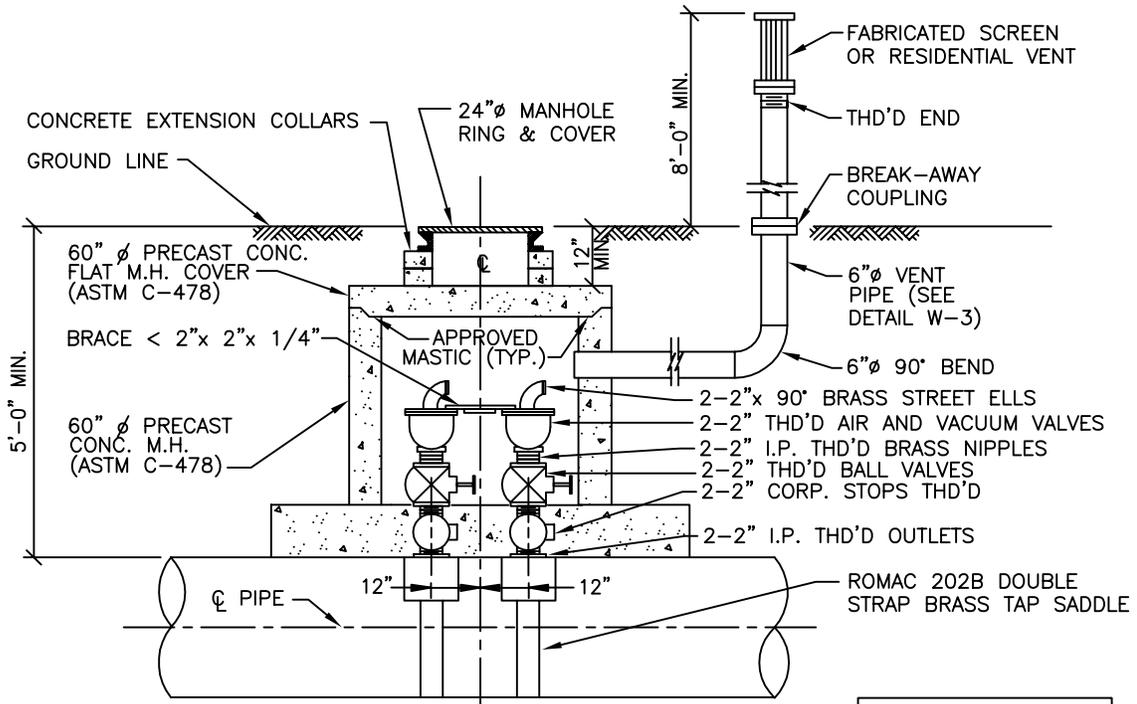
<u>DRAWING NO.</u>	<u>TITLE</u>
W1	VALVE OPERATION
W2	AIR RELIEF VALVE
W3	GALVANIZED STEEL VENT PIPE
W4	24" MANHOLE RING AND COVER
W5	BLOWOFF
W6A	STUB—OUT CONFIGURATIONS (1 OF 2)
W6B	STUB—OUT CONFIGURATIONS (2 OF 2)
W7	FIRE HYDRANTS, MAINS & VALVES
W8A	PRV IN A RECTANGULAR VAULT (PLAN VIEW) (1 OF 2)
W8B	PRV IN A RECTANGULAR VAULT (SECTION VIEW) (2 OF 2)
W9	POLYETHYLENE WRAP
W10	INSULATORS
W11A	POTABLE SERVICE LINE ATTACHED WALK (1 OF 2)
W11B	POTABLE SERVICE LINE DETACHED WALK (2 OF 2)
W12A	POTABLE METER PIT FOR 3/4" & 1" METER
W12B	3/4"—1" MULTIPLE METERS IN PRE—CAST VAULT
W12C	METER PIT & CURB STOP PROTECTION
W13	1—1/2" & 2" METER MANHOLE METER PIT
W14A	THRUST BLOCK
W14B	THRUST BLOCKING CHART
W15	UPPER VERTICAL THRUST BLOCK
W16	RESTRAINED PIPE LENGTHS
W17	MECHANICAL JOINT RESTRAINT DETAIL
W18	COMBINATION FLANGED HARNESS LUG DETAIL
W19	JOINT RESTRAINT DETAIL
W20	FIRE HYDRANT GUARDS
W21	TAPPING TEE AND VALVE
W22	DOMESTIC WATER TAPPING DETAIL
W23	CONCRETE ENCASEMENT DETAIL
W24	CASING PIPE DETAIL
W25	CROSSING STORM AND SANITARY SEWERS
W26	DITCH OR PIPE CROSSING
W27	12" OR SMALLER WATERLINE LOWERING FOR UTILITY CROSSINGS
W28	STEEL MARKER POST
W29	FIBERGLASS MARKER POST
W30	TYPICAL CUTOFF WALL FOR DITCH OR CANAL CROSSING
W31	2" AND LARGER DOMESTIC AND FIRELINE CONNECTIONS
W32A	TRACER WIRE (1 OF 2)
W32B	TRACER WIRE (2 OF 2)
W33	CONCRETE METER SUPPORTS
W34	PLASTIC STEP
W35	WATER TRENCH DETAIL
W36	PIPE CROSSING SUPPORT PAD
W37	CLAY OR CONCRETE CUT—OFF WALL
W38	STANDARD VALVE AND BOX



NOTE:
 NORMALLY VALVES WITH A BLACK
 OPERATING NUT INDICATE A STANDARD
 ERIE VALVE. (OPEN LEFT)

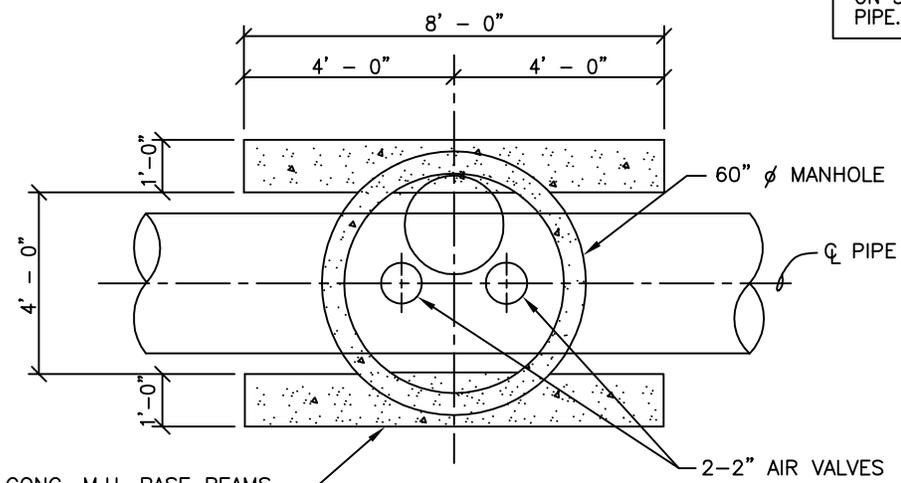
VALVE OPENING & CLOSING PROCEDURE



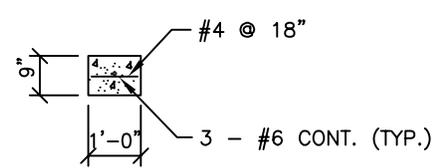


ELEVATION

NOTE:
 USE 2" AIR VALVE ASSEMBLY ON 30" OR SMALLER PIPE.



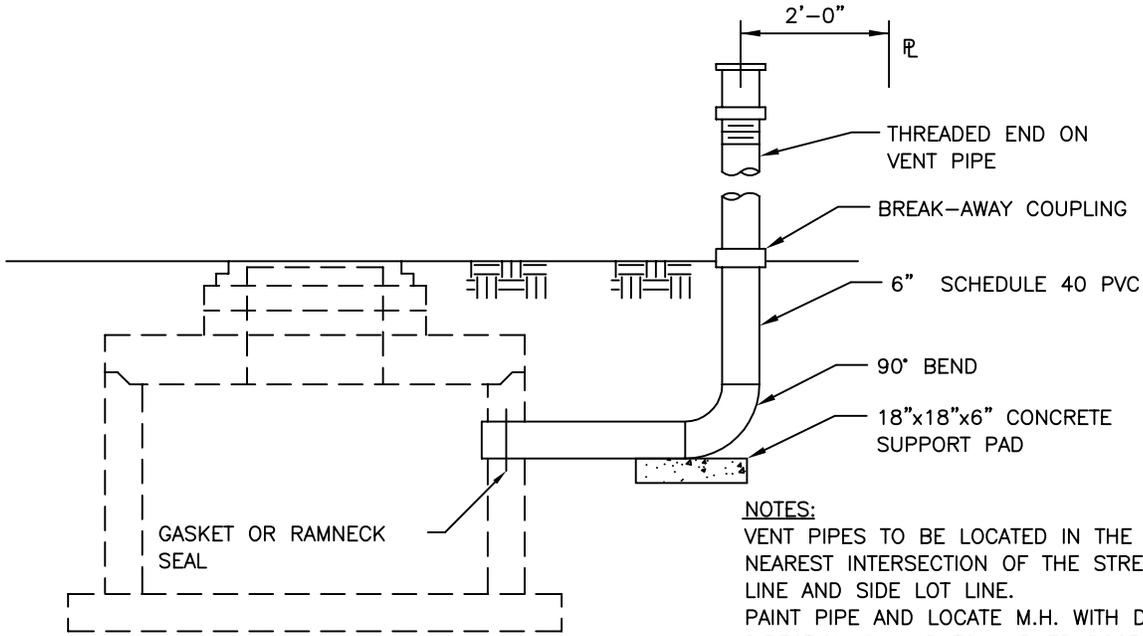
PLAN



FOOTING DETAIL

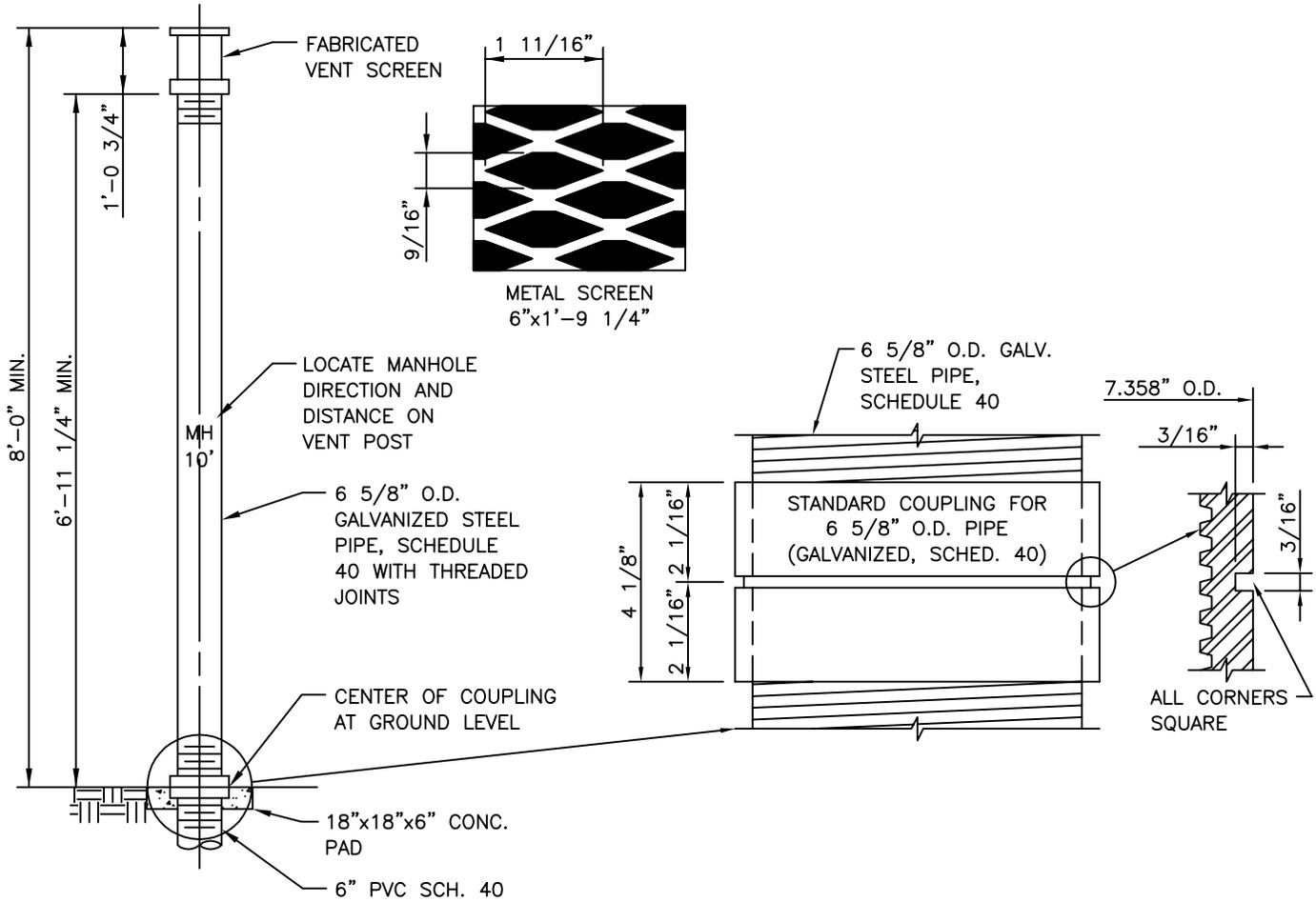


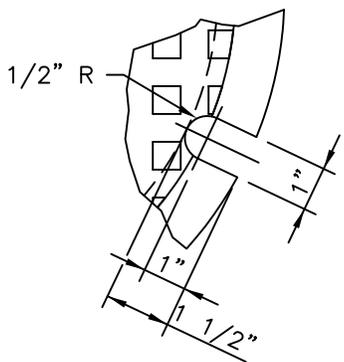
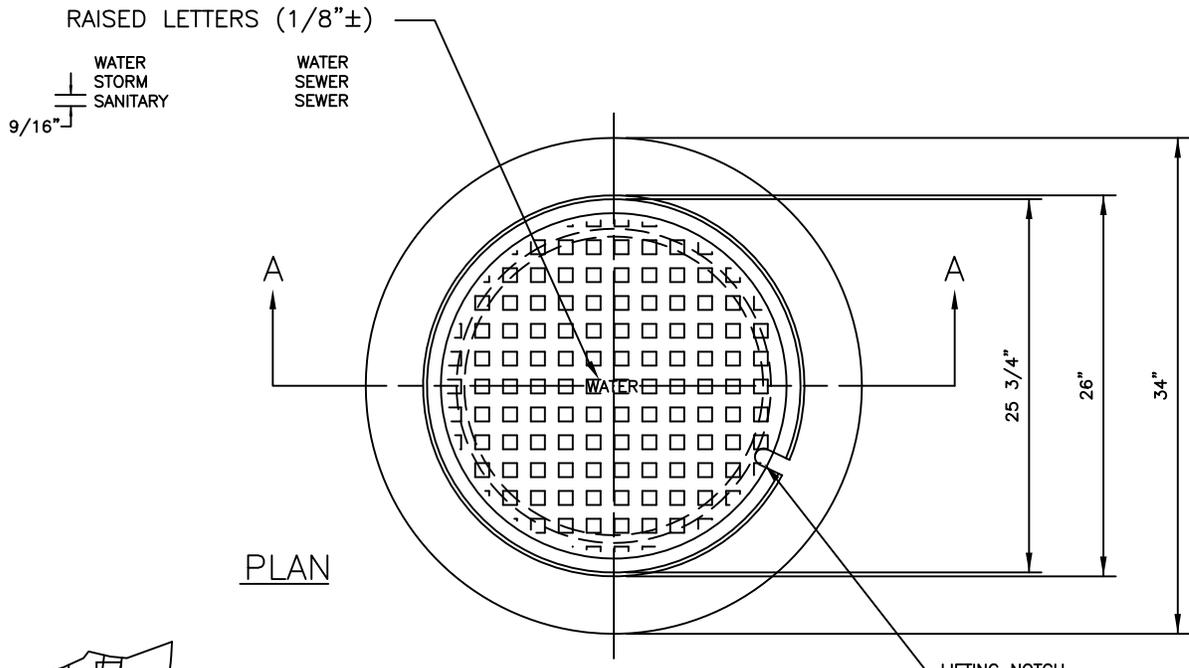
DRAWING TITLE: AIR RELIEF VALVE
 DRAWING NUMBER: W2
 DRAWN BY: D. JENKINS APPROVED BY: G. BEHLEN DATE: 06/2004



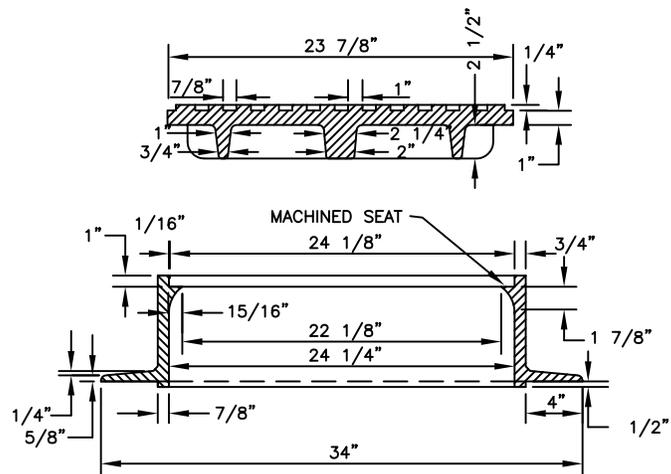
VENT PIPE INSTALLATION

NOTES:
 VENT PIPES TO BE LOCATED IN THE FIELD AT THE NEAREST INTERSECTION OF THE STREET PROPERTY LINE AND SIDE LOT LINE.
 PAINT PIPE AND LOCATE M.H. WITH DISTANCE AND DIRECTION SIMILAR TO MARKER POST.
 WRAP BURIED VENT PIPE WITH 8 MIL POLY-ETHYLENE.





LIFTING NOTCH



1. CASTING SPECIFICATIONS: ASTM A-48 WITH A MINIMUM TENSILE STRENGTH OF 25 KSI (CLASS 25)
2. ALL CASTINGS TO BE DIPPED IN ASPHALT BASE PAINT (OR APPROVED EQUAL)
3. CASTINGS SHALL BE AS SPECIFIED BELOW OR APPROVED EQUAL:

MANUFACTURERS	CAT. #
NEENAH	R-1706
CASTINGS, INC.	MH-400-24 C.I.
HUTCHINSON FDRY. & STL. INC.	MH-400

4. ALL NEW MANHOLES MUST INCLUDE A PLASTIC OR VINYL TAG ATTACHED TO THE TOP STEP STATING THE FOLLOWING "CAUTION CONFINED SPACE; ENTRY PERMIT REQUIRED".

The Town of
ERIE
COLORADO



DRAWING TITLE: 24" MANHOLE RING AND COVER

DRAWING NUMBER: W4

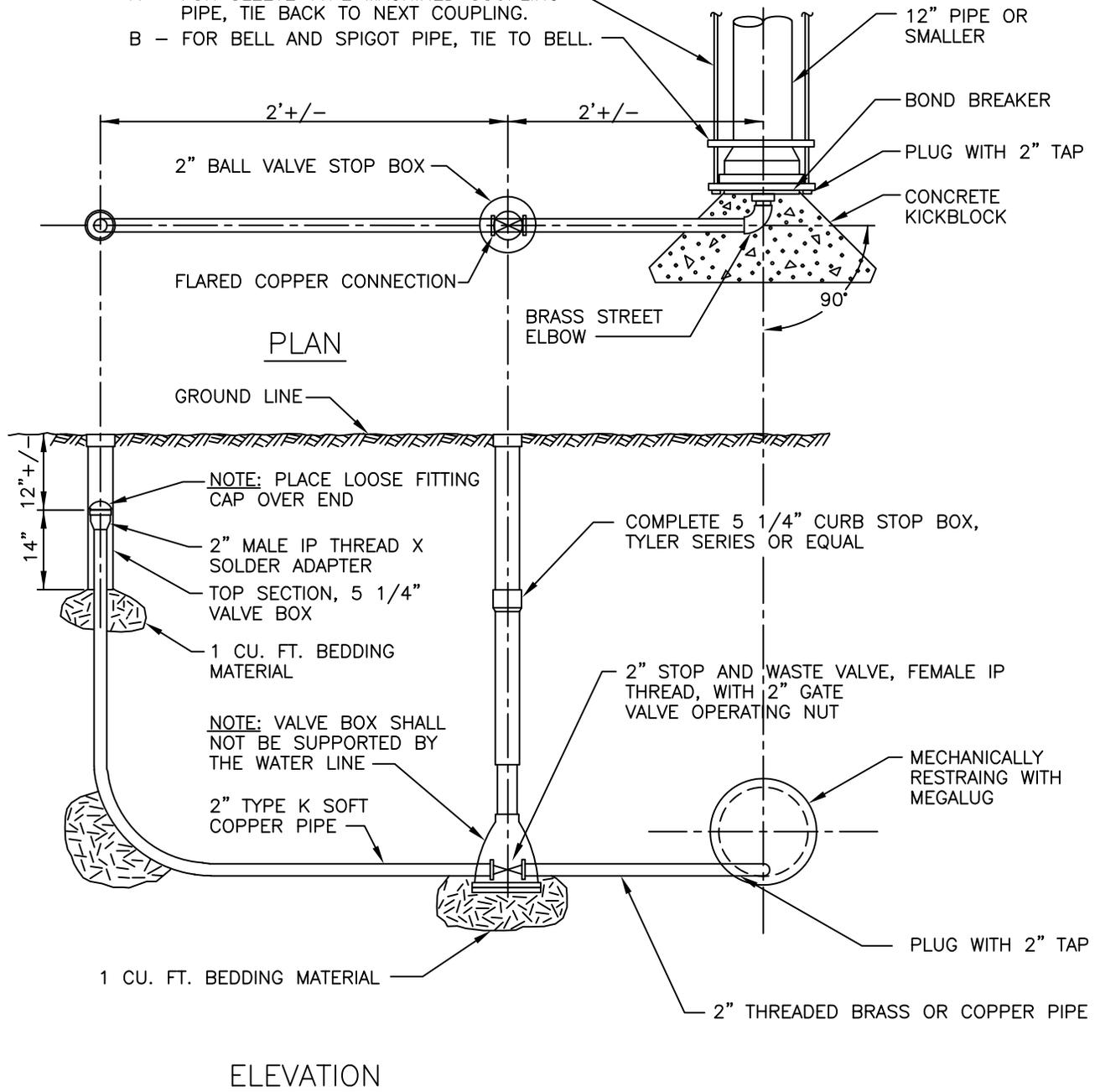
DRAWN BY: D. JENKINS APPROVED BY: G. BEHLEN DATE: 06/2015

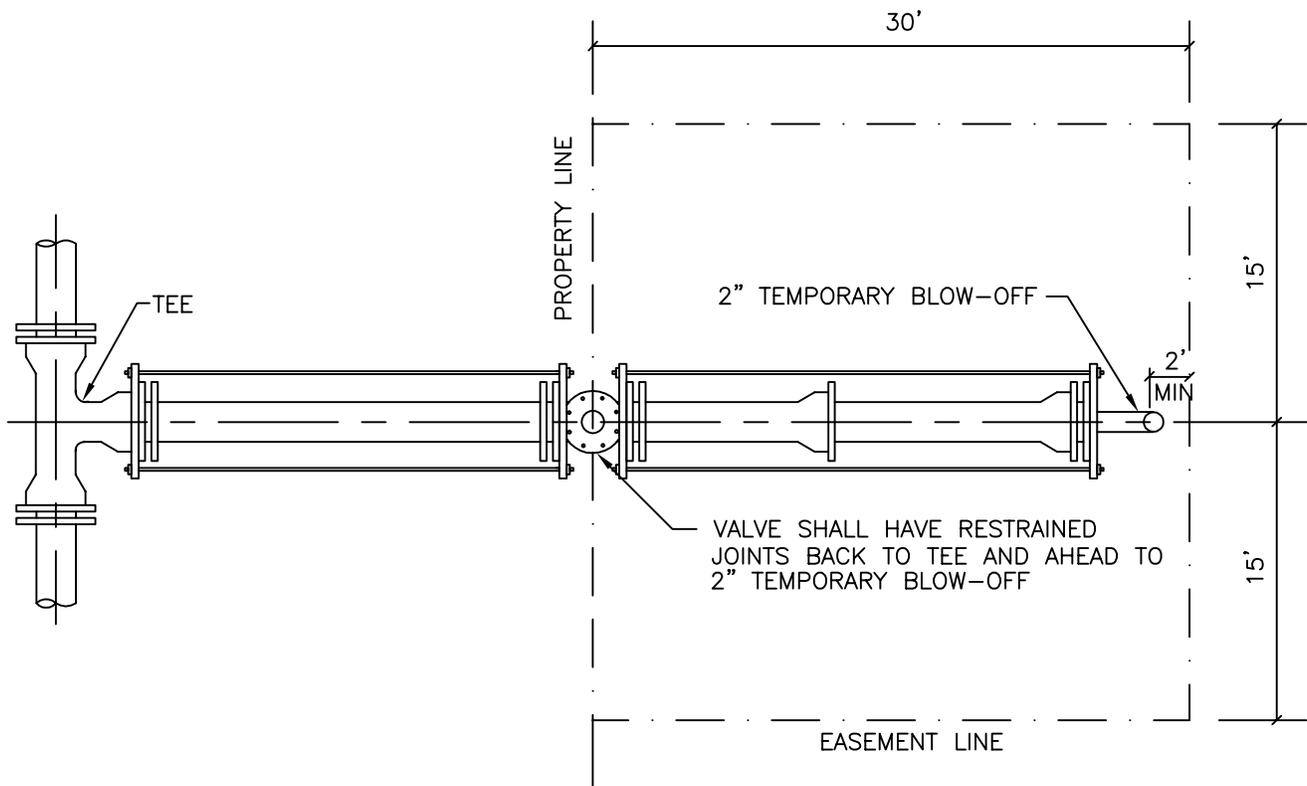
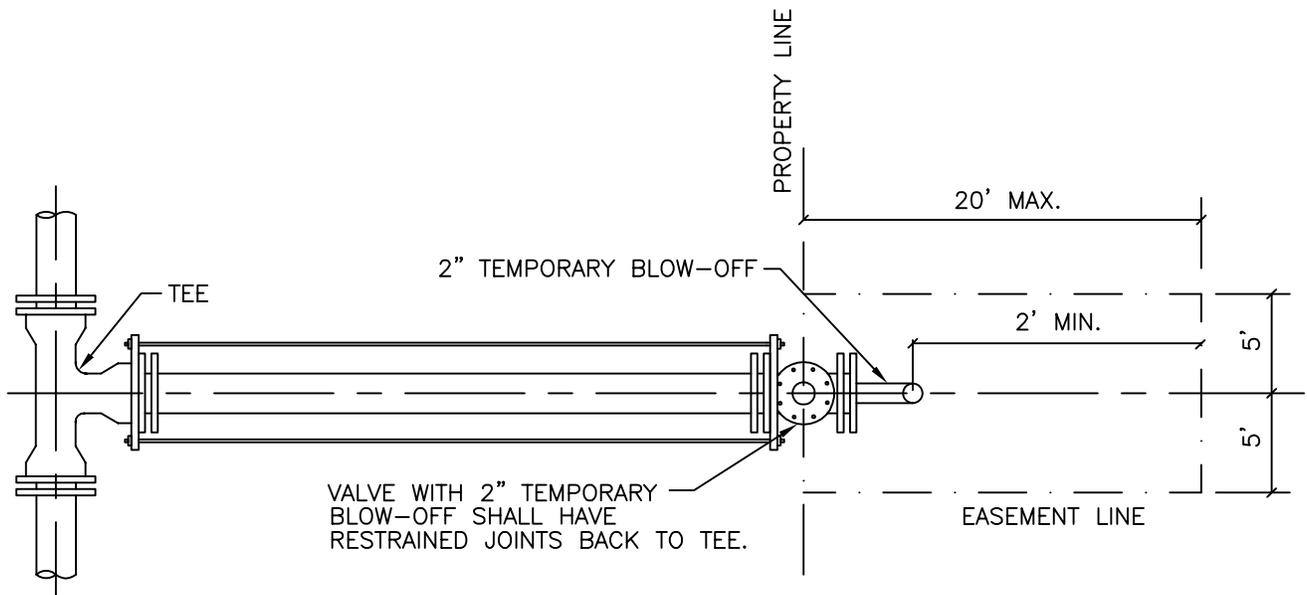
NOTE:

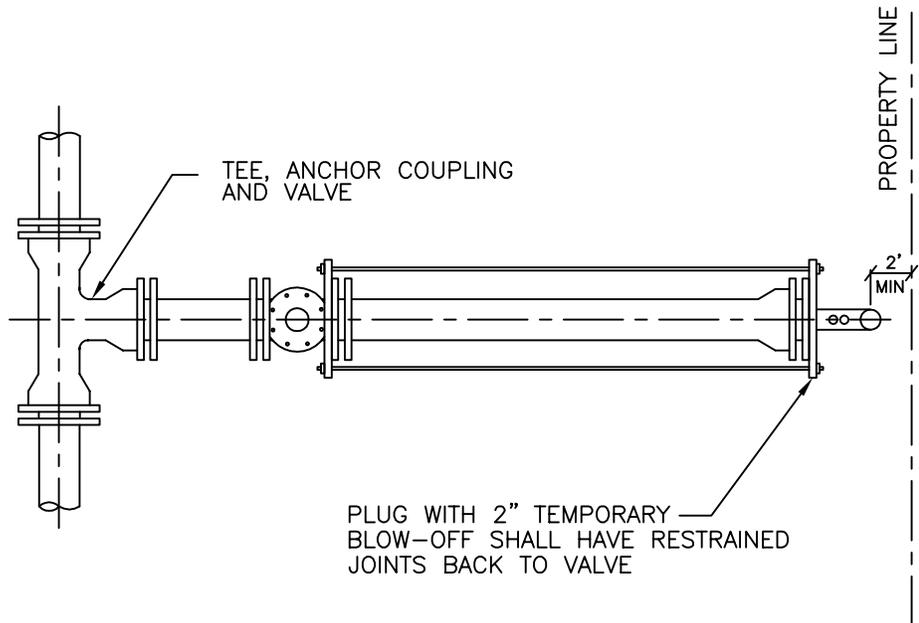
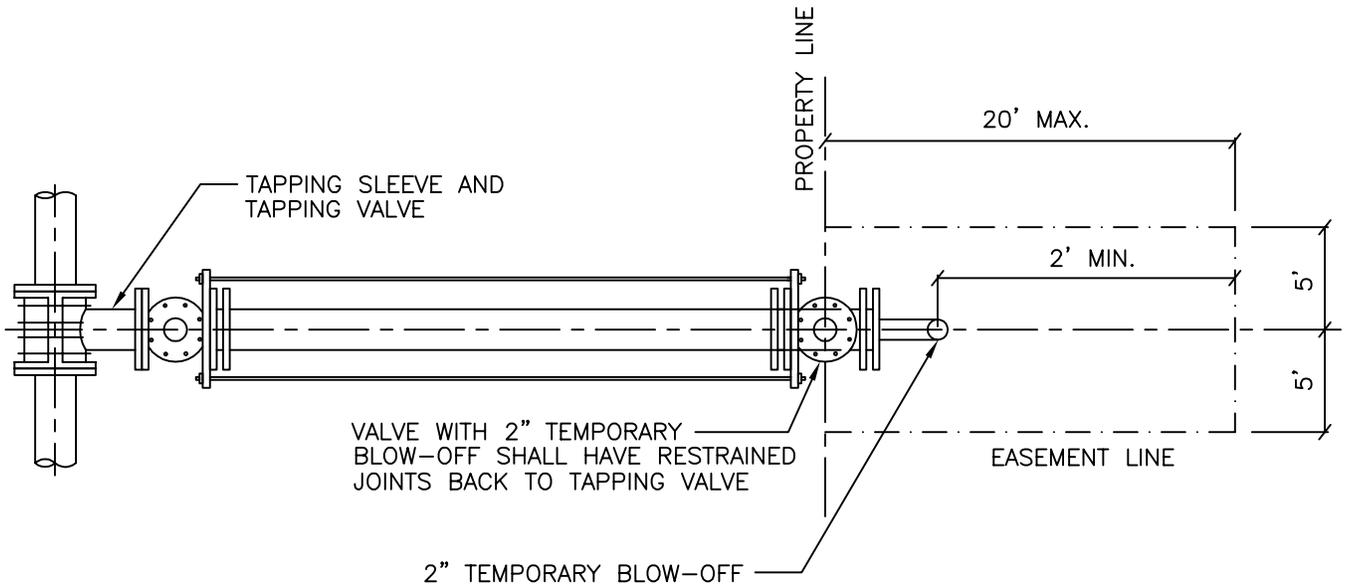
PLUG SHALL BE MECHANICALLY RESTRAINED:

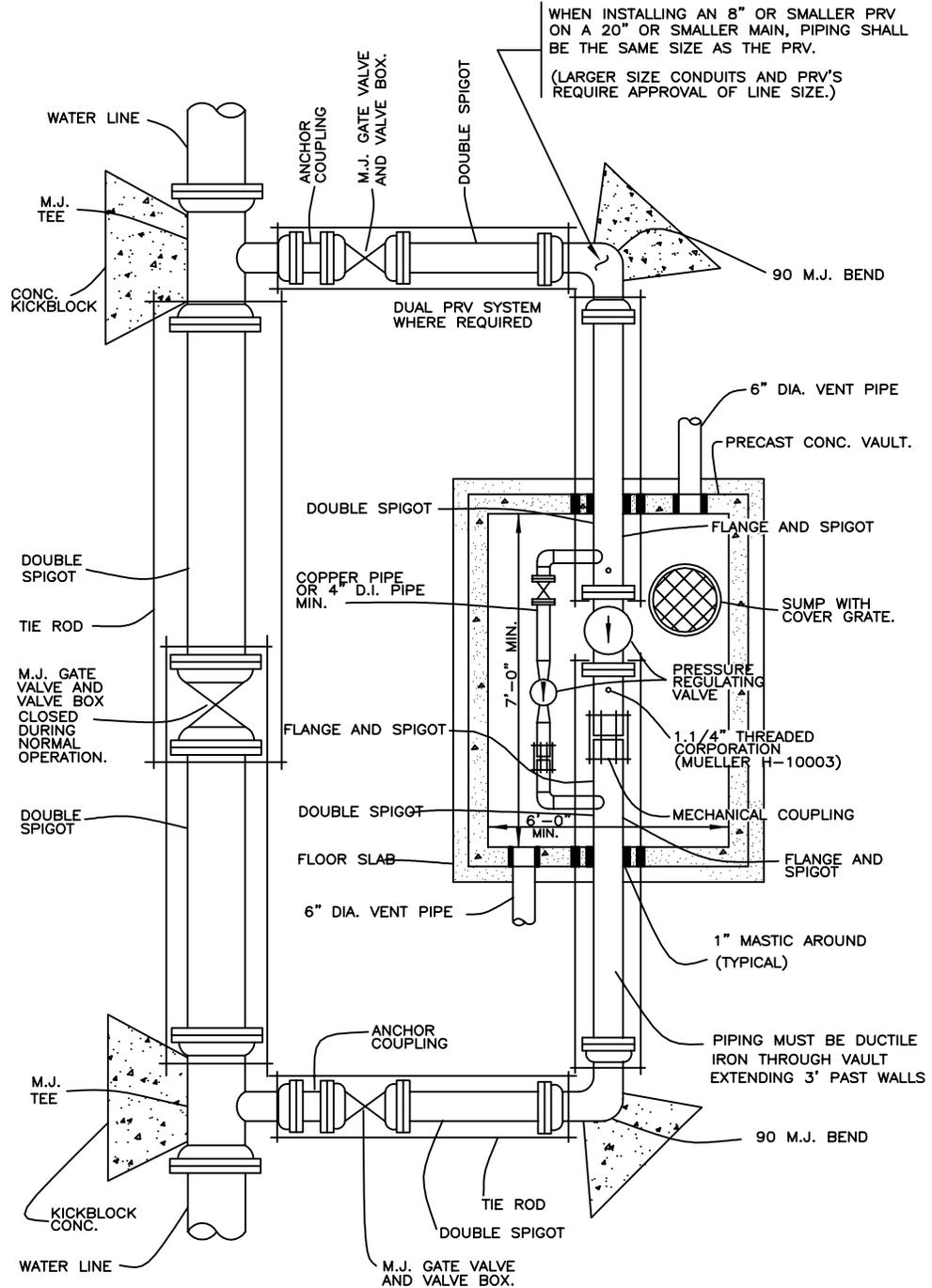
A - FOR SLEEVE TYPE MACHINED COUPLING PIPE, TIE BACK TO NEXT COUPLING.

B - FOR BELL AND SPIGOT PIPE, TIE TO BELL.







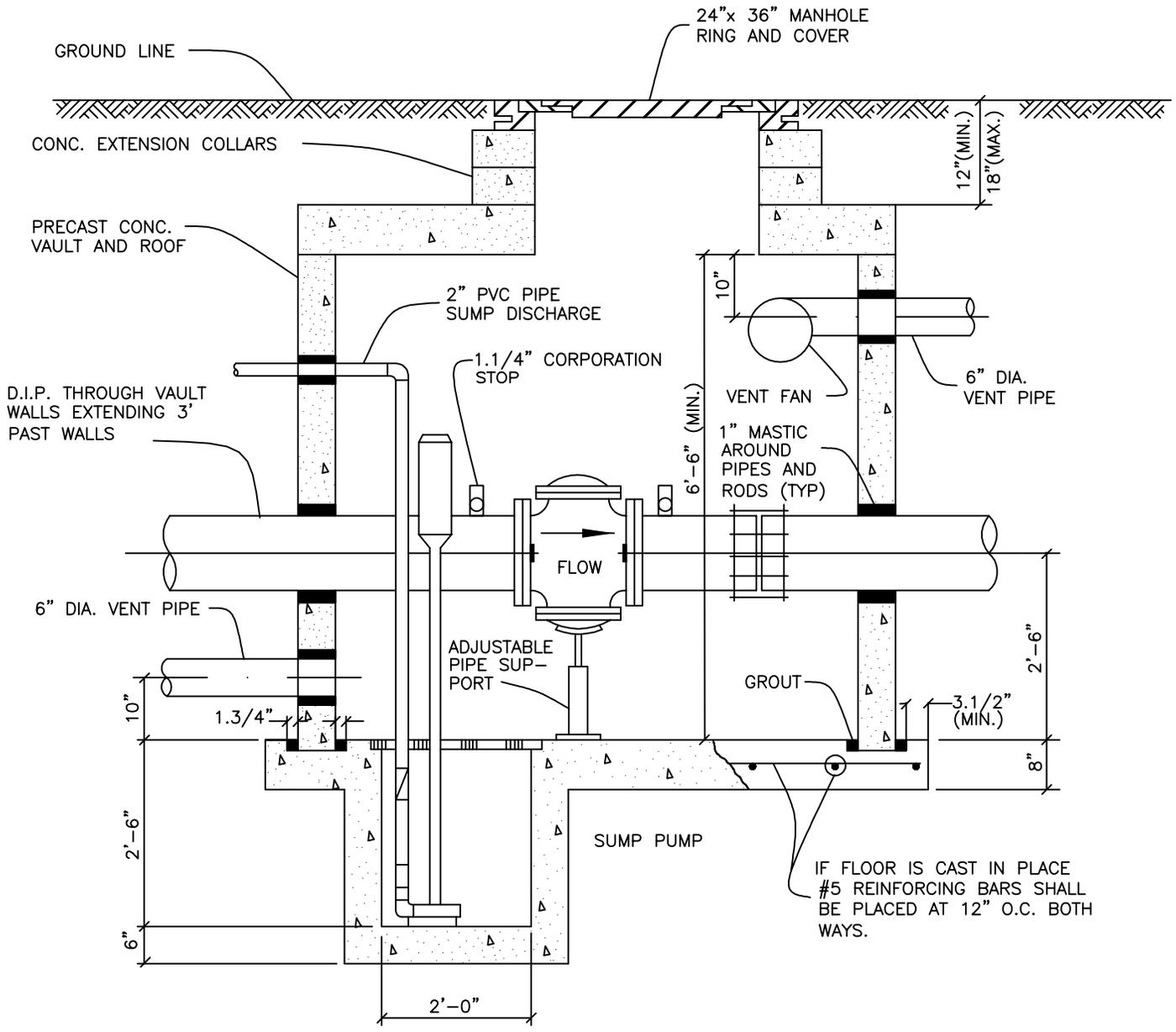


WHEN INSTALLING AN 8" OR SMALLER PRV ON A 20" OR SMALLER MAIN, PIPING SHALL BE THE SAME SIZE AS THE PRV.
(LARGER SIZE CONDUITS AND PRV'S REQUIRE APPROVAL OF LINE SIZE.)

NOTES:

1. A RECTANGLE VAULT IS REQUIRED. SIZE TO BE DESIGNED TO ACCOMMODATE REQUIRED EQUIPMENT WITH ADEQUATE WORKING SPACE. SHOP DRAWING APPROVAL REQUIRED PRIOR TO CONSTRUCTION.
2. ACCESS STAIRS WITH DOOR OUTSIDE OF PAVEMENT MAY BE REQUIRED ON STREETS WITH HEAVY TRAFFIC.
3. FOR ELEVATION VIEW SEE CROSS SECTION DRAWING SHEET 2 OF 2.
4. SUMP PUMP AND VENT FAN REQUIRED IN VAULTS WITH ELECTRICAL OR TELEMTRY EQUIPMENT.
5. THIS MANHOLE IS SUITABLE FOR CHECK VALVE INSTALLATIONS.
6. THREADED FITTINGS ON LOW FLOW
7. COUPLING ON LOW FLOW
8. SADDLE FOR TAP FOR LOW FLOW
9. ALL PIPING 4" IN DIAMETER OR GREATER IS D.I.P.
10. NO PVC ALLOWED

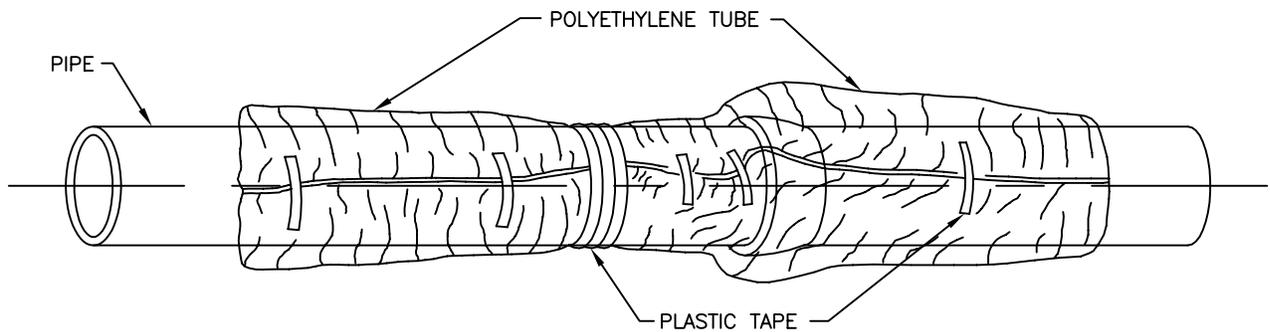
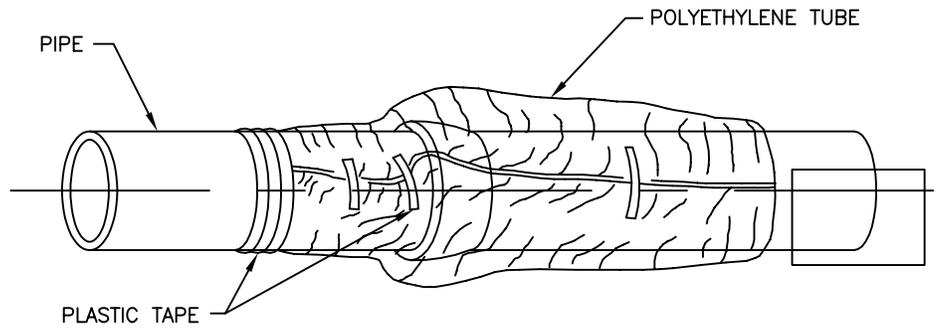
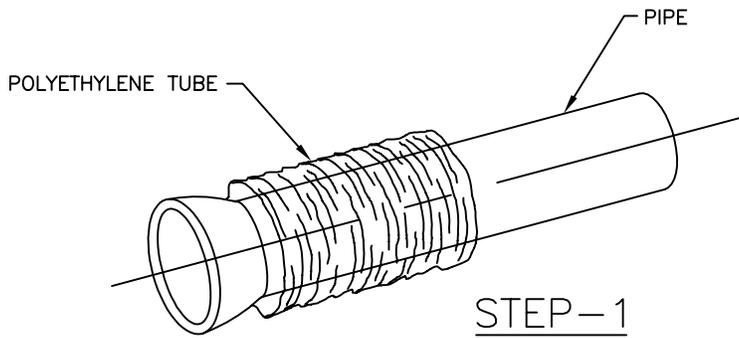




NOTES:

1. A PERMIT IS REQUIRED FOR SUMP PUMP DISCHARGE TO STORM SEWERS.
2. FOR PLAN VIEW AND ADDITIONAL NOTES SEE SHEET 1 OF 2.



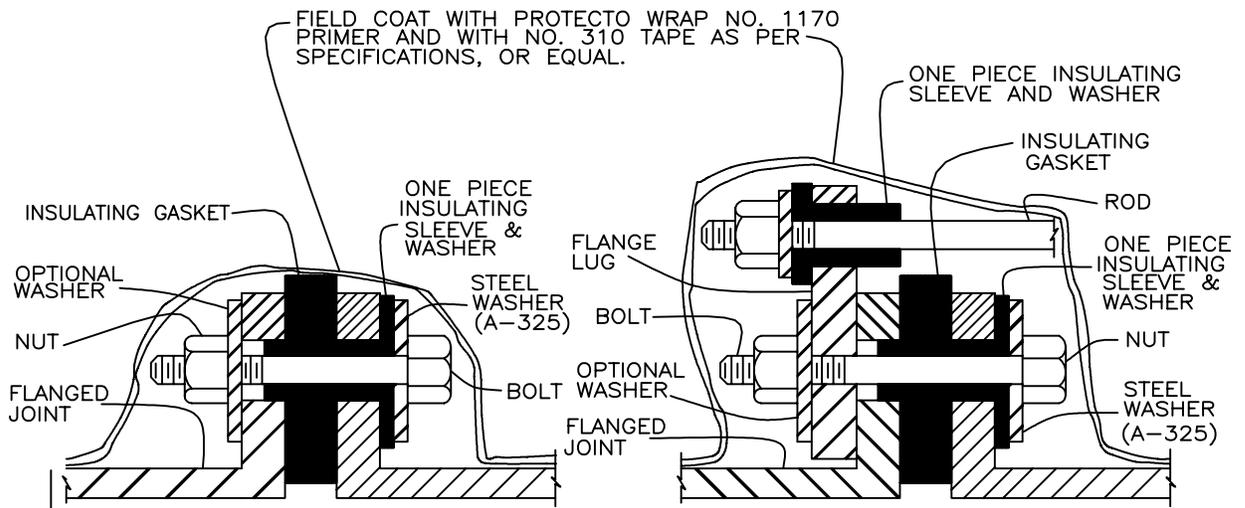


FIELD INSTALLATION-POLYETHYLENE WRAP

- STEP-1 PLACE TUBE OF POLYETHYLENE MATERIAL AROUND PIPE PRIOR TO LOWERING PIPE INTO TRENCH.
- STEP-2 PULL THE TUBE OVER THE LENGTH OF THE PIPE. TAPE TUBE TO PIPE AT JOINT. FOLD MATERIAL AROUND THE ADJACENT SPIGOT END AND WRAP WITH THREE CIRCUMFERENTIAL TURNS OF TWO-INCH WIDE PLASTIC TAPE TO HOLD PLASTIC TUBE AROUND SPIGOT END.
- STEP-3 ADJACENT TUBE OVERLAPS FIRST TUBE AND IS SECURED WITH PLASTIC ADHESIVE TAPE. THE POLYETHYLENE TUBE MATERIAL COVERING THE PIPE WILL BE LOOSE. EXCESS MATERIAL AND SHOULD BE NEATLY DRAWN UP AROUND THE PIPE BARREL, FOLDED INTO AN OVERLAP ON TOP OF THE PIPE AND HELD IN PLACE BY MEANS OF PIECES OF THE PLASTIC TAPE AT APPROXIMATELY THREE TO FIVE FOOT INTERVALS.

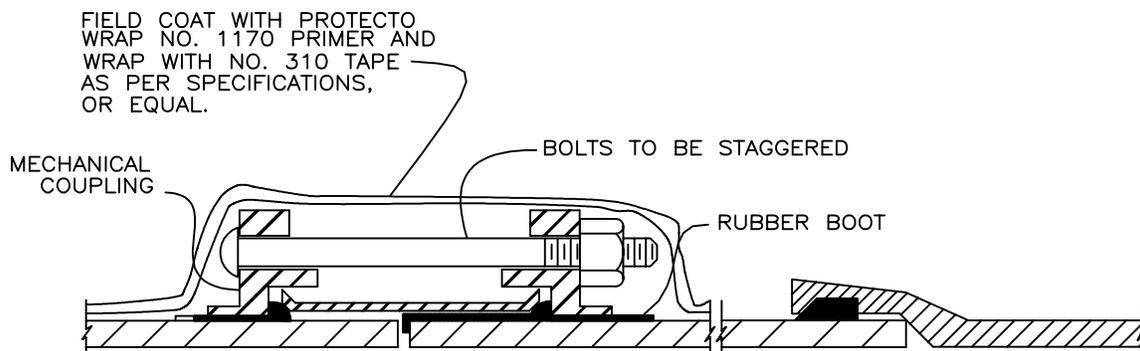
NOTE: ALL RODDING TO BE ENCASED IN POLYETHYLENE SEPARATED FROM THE PIPE





INSULATED JOINT

INSULATED ROD

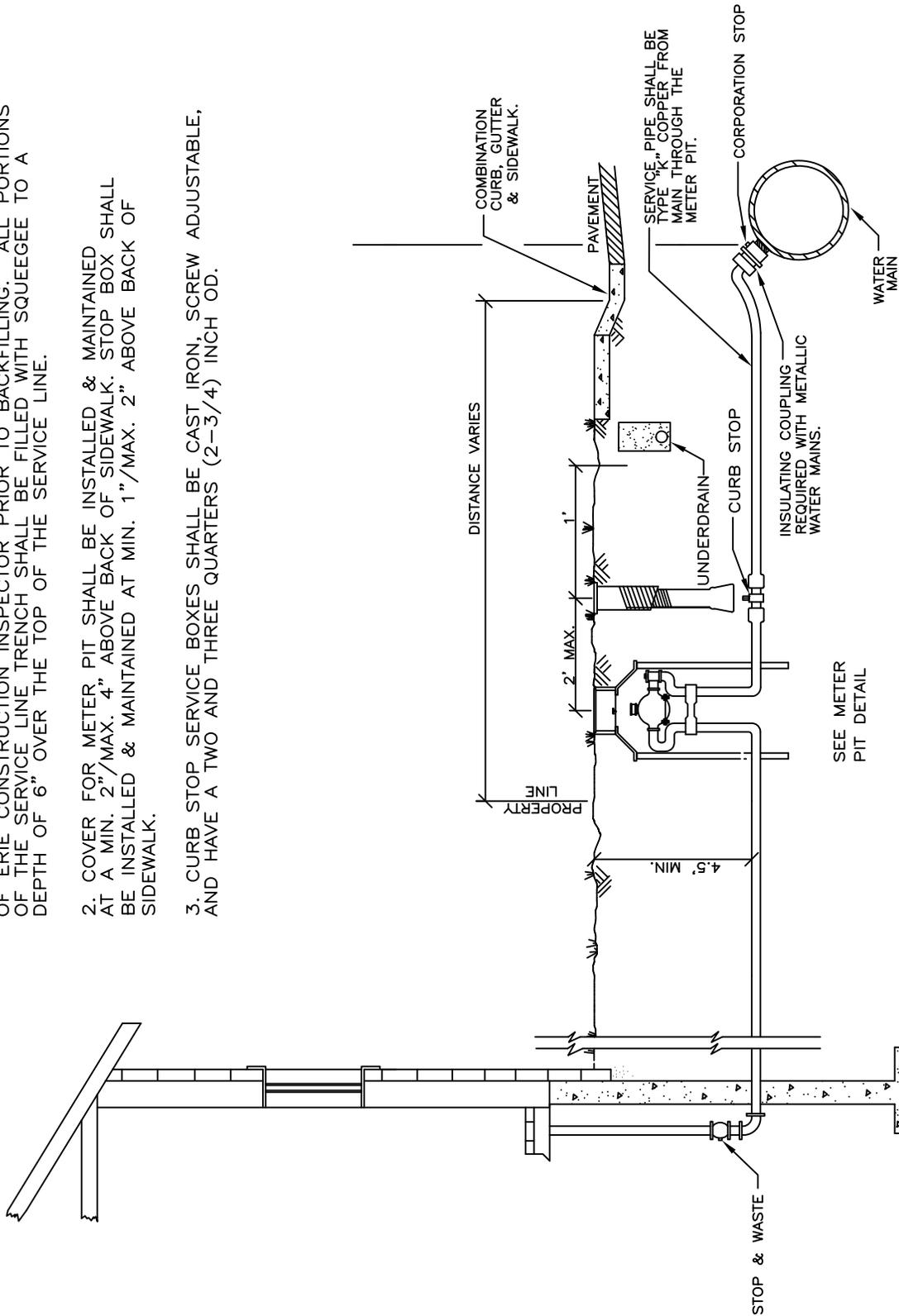


INSULATED MECHANICAL COUPLING



NOTE:

1. ALL SERVICE LINE WORK FROM THE WATER MAIN TO THE METER PIT SHALL BE INSTALLED BY THE CONTRACTOR AND INSPECTED BY A TOWN OF ERIE CONSTRUCTION INSPECTOR PRIOR TO BACKFILLING. ALL PORTIONS OF THE SERVICE LINE TRENCH SHALL BE FILLED WITH SQUEESEE TO A DEPTH OF 6" OVER THE TOP OF THE SERVICE LINE.
2. COVER FOR METER PIT SHALL BE INSTALLED & MAINTAINED AT A MIN. 2"/MAX. 4" ABOVE BACK OF SIDEWALK. STOP BOX SHALL BE INSTALLED & MAINTAINED AT MIN. 1"/MAX. 2" ABOVE BACK OF SIDEWALK.
3. CURB STOP SERVICE BOXES SHALL BE CAST IRON, SCREW ADJUSTABLE, AND HAVE A TWO AND THREE QUARTERS (2-3/4) INCH OD.



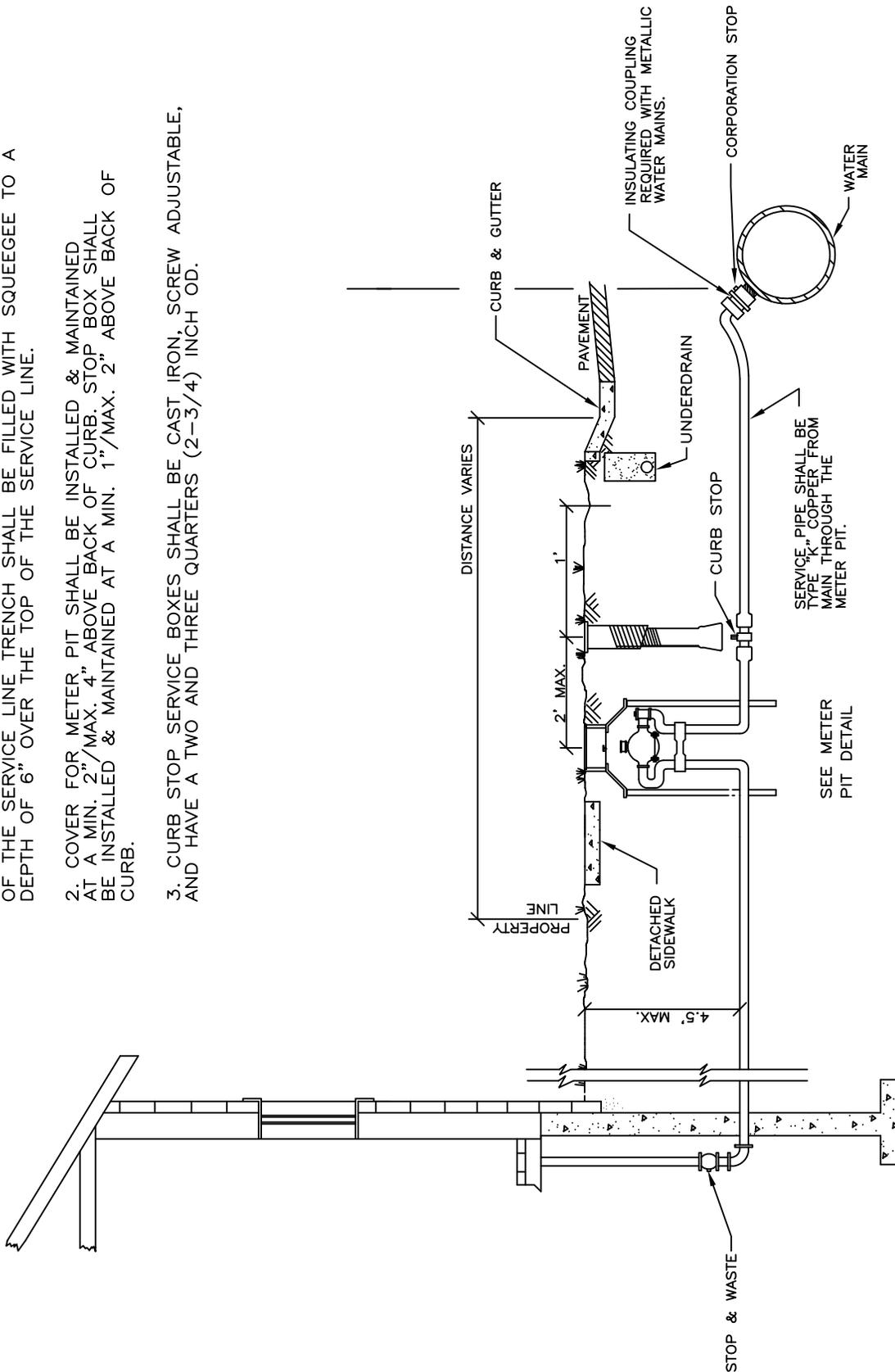
SEE METER
PIT DETAIL

ATTACHED WALK



NOTE:

1. ALL SERVICE LINE WORK FROM THE WATER MAIN TO THE METER PIT SHALL BE INSTALLED BY THE CONTRACTOR AND INSPECTED BY A TOWN OF ERIE CONSTRUCTION INSPECTOR PRIOR TO BACKFILLING. ALL PORTIONS OF THE SERVICE LINE TRENCH SHALL BE FILLED WITH SQUEEGEE TO A DEPTH OF 6" OVER THE TOP OF THE SERVICE LINE.
2. COVER FOR METER PIT SHALL BE INSTALLED & MAINTAINED AT A MIN. 2"/MAX. 4" ABOVE BACK OF CURB. STOP BOX SHALL BE INSTALLED & MAINTAINED AT A MIN. 1"/MAX. 2" ABOVE BACK OF CURB.
3. CURB STOP SERVICE BOXES SHALL BE CAST IRON, SCREW ADJUSTABLE, AND HAVE A TWO AND THREE QUARTERS (2-3/4) INCH OD.

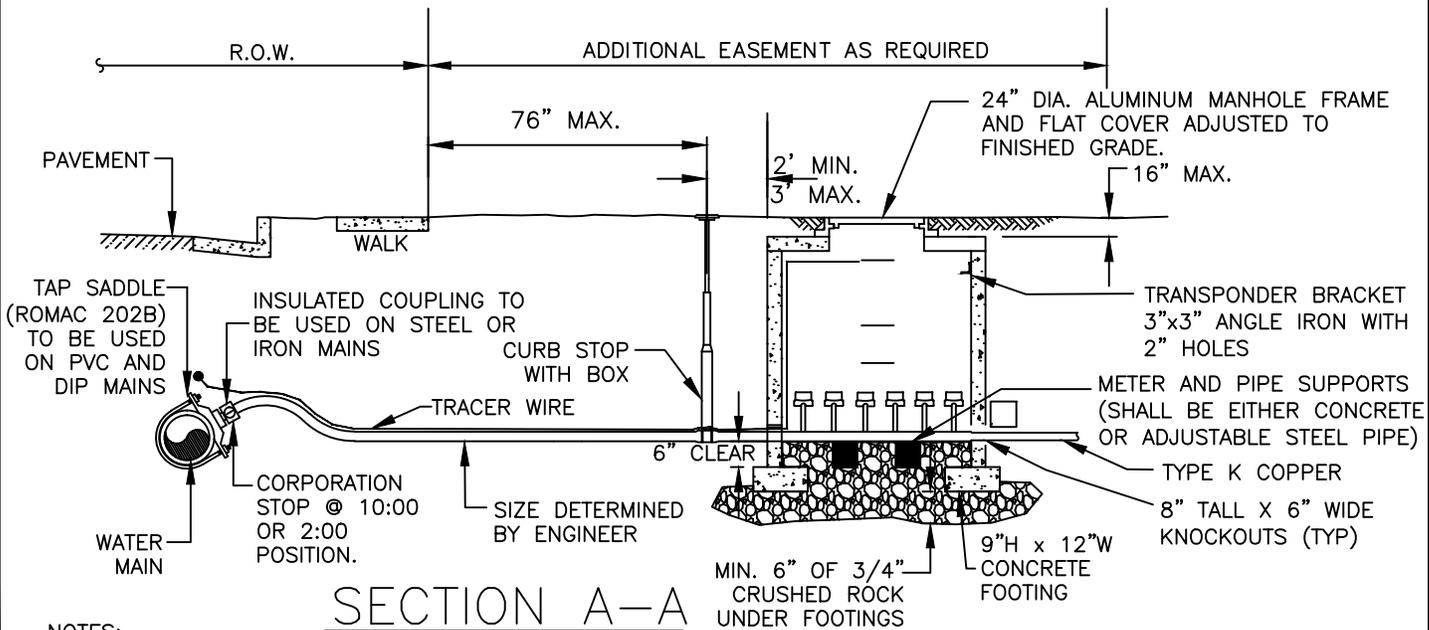
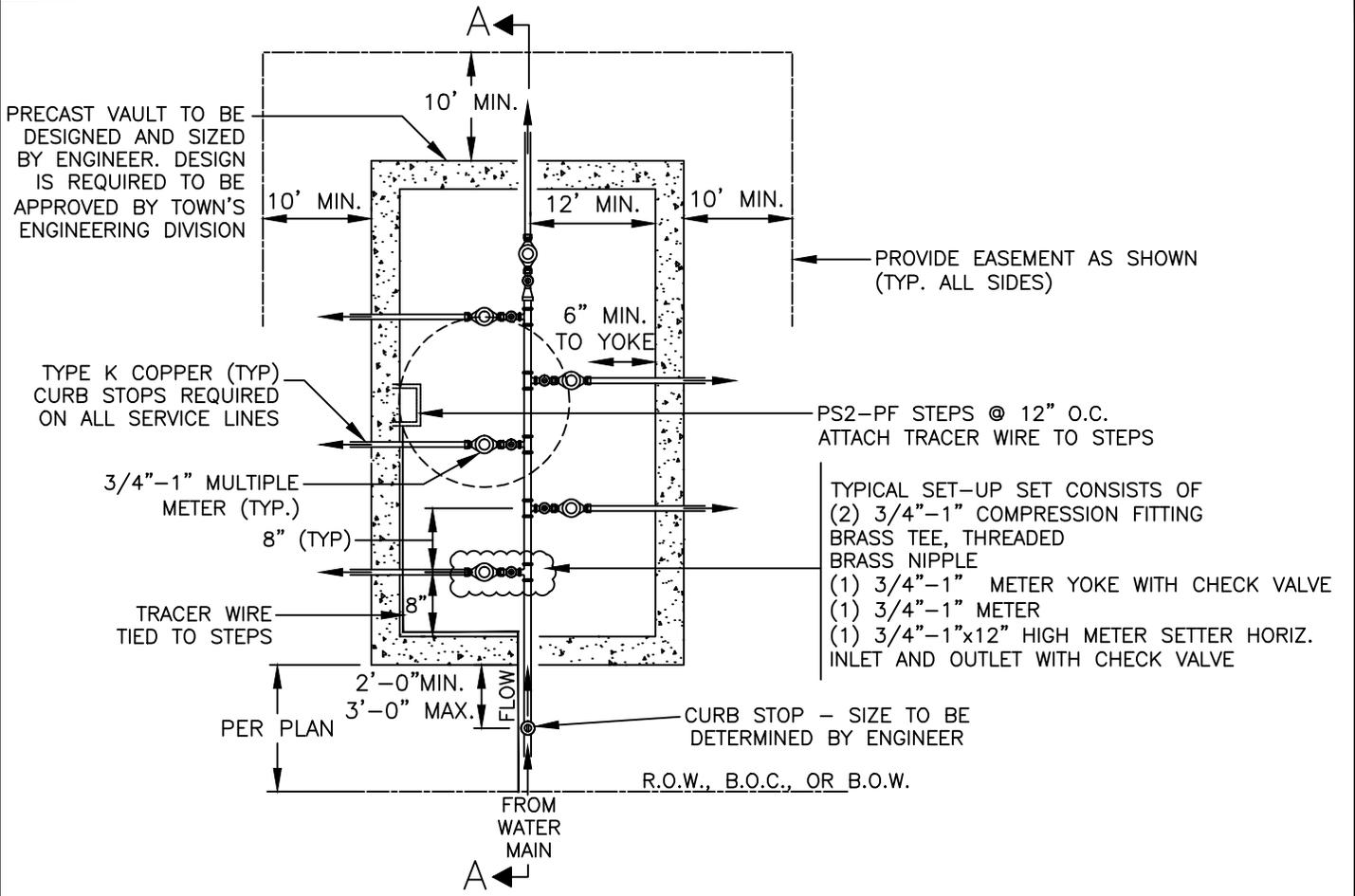


SERVICE PIPE SHALL BE TYPE K, COPPER FROM MAIN THROUGH THE METER PIT.

SEE METER PIT DETAIL

DETACHED WALK





SECTION A-A

NOTES:

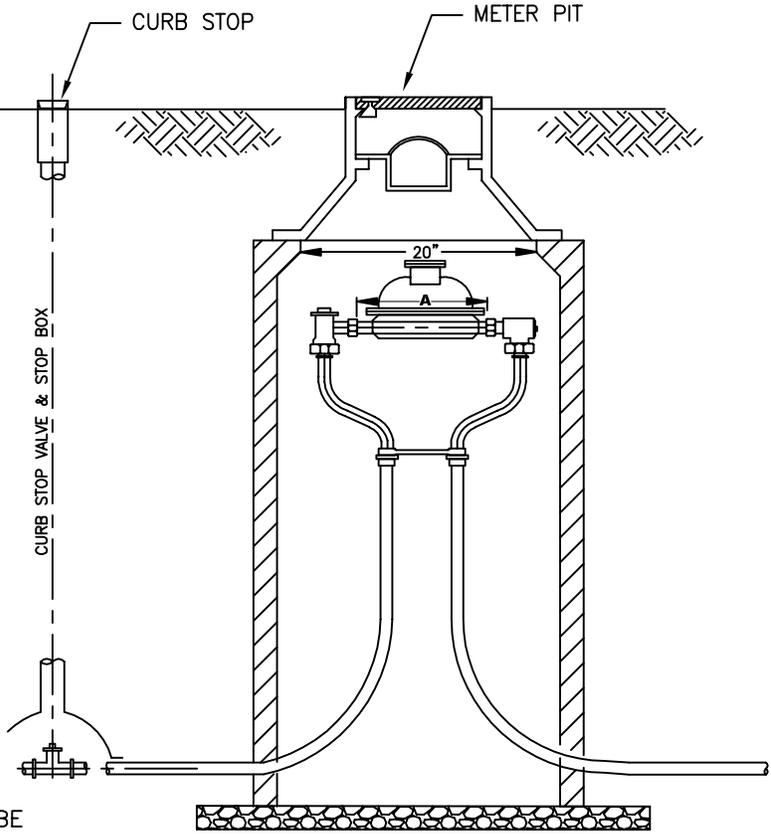
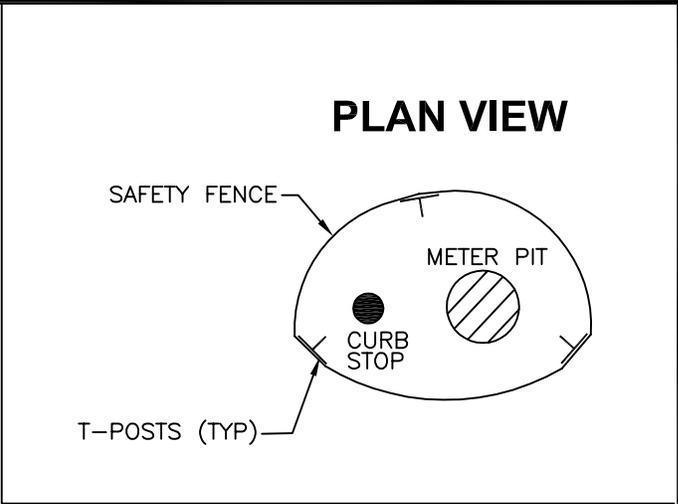
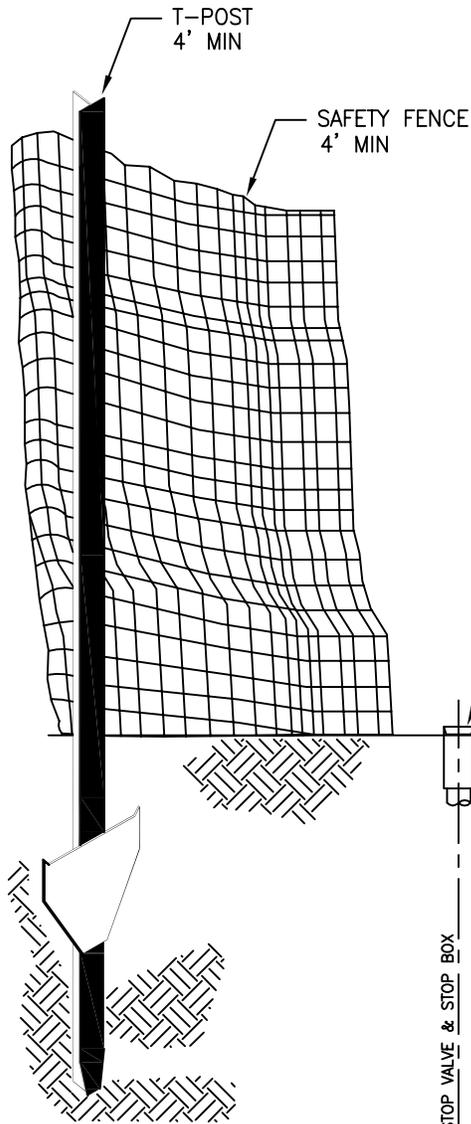
1. METER VAULT SHALL BE DESIGNED FOR AASHTO HS-20 LOADING AND IN ACCORDANCE WITH ASTM C858. CONCRETE FC=4000 PSI
2. BURY VAULT 16" MAX BELOW SURFACE. ADJUST MANHOLE COVER TO GRADE WITH CONCRETE GRADE RINGS WITH RAMNEK.
3. ENGINEER DESIGN OF VAULT IS REQUIRED.
4. ANY VARIATION OF THIS DETAIL SHALL BE APPROVED BY THE TOWN OF ERIE ENGINEERING DIVISION.
5. TRANSPONDER BRACKET TO BE MOUNTED INSIDE NEAR LID.



DRAWING TITLE: **3/4"-1" MULTIPLE METERS IN PRE CAST VAULT (TYP)**

DRAWING NUMBER: **W12B**

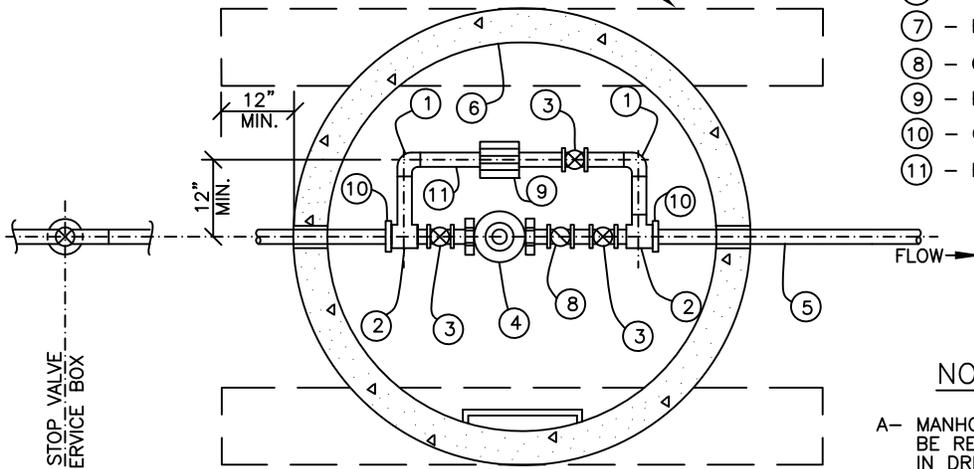
DRAWN BY: **S. ELKINS** APPROVED BY: **G. BEHLEN** REV. DATE: **01/2017**



NOTE:
 ALL METER PITS AND CURB STOPS SHALL BE PROTECTED AT THE TIME OF INSTALLATION WITH A MINIMUM OF 3 T-POSTS AND ORANGE SAFETY FENCE. THE T-POSTS AND SAFETY FENCE SHALL REMAIN IN PLACE AND IN GOOD CONDITION UNTIL THE LANDSCAPING IS INSTALLED.



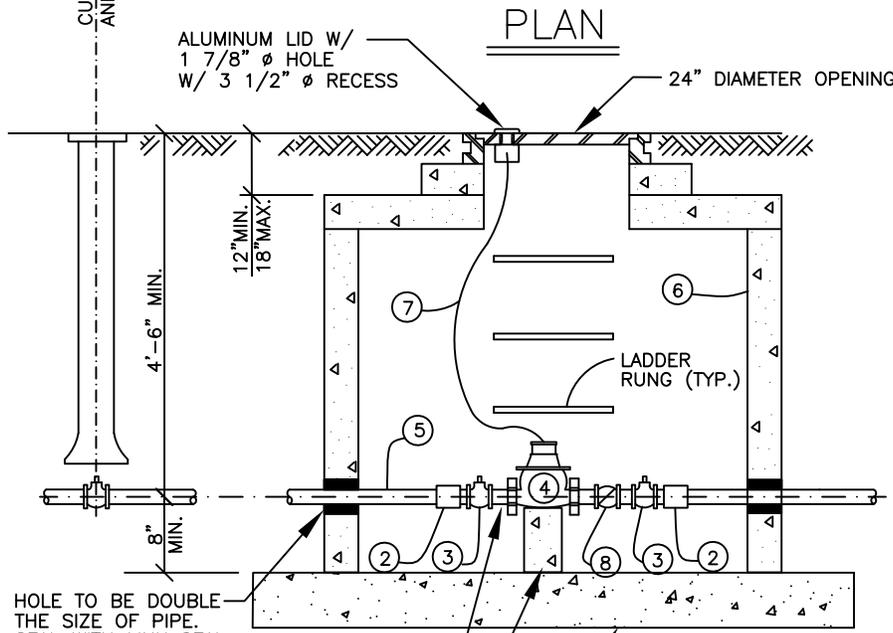
OPTIONAL CONCRETE MANHOLE BASE BEAMS
IF CONCRETE BEAMS ARE NOT USED, USE
1/2" ROCK, 6" DEEP MINIMUM



- ① - 90° ELL
- ② - TEE
- ③ - LOCKABLE BALL VALVE
- ④ - METER
- ⑤ - TYPE K COPPER TUBING
- ⑥ - CONC. MANHOLE
- ⑦ - REMOTE REGISTER WIRE
- ⑧ - CHECK VALVE
- ⑨ - PACK JOINT COUPLING
- ⑩ - COPPER TO IRON CPLG.
- ⑪ - BRASS TUBING

NOTES

- A- MANHOLE BASE BEAMS SHALL BE REQUIRED FOR INSTALLATIONS IN DRIVEWAYS, OR PARKING AREAS.
- B- A 60" MANHOLE PIT WILL ACCOMODATE 1 1/2" & 2" METERS.
- C- JOINTS SHALL BE EITHER THREADED, SOLDERED WITH 95-5 TINANTIMONY SOLDER (BRAZED), FLARED OR COMPRESSION. NO SWEATED JOINTS ALLOWED.
- D- NO CONCRETE TO BE LAID IN FLOOR OF METER MANHOLE.
- E- METER SHALL BE FLANGED WITH BRASS COMPANION FLANGES.
- F- NO CONNECTIONS OR CHANGES IN PIPE DIAMETER SHALL BE MADE IN THE METER PIT OR IN THE DISTANCE OF FIVE FEET BEYOND THE METER PIT ON THE OUTLET SIDE.
- G- LADDER RUNGS SHALL BE ON OPPOSITE SIDE OF BYPASS.
- H- HOLE IN LID TO BE RECESSED TO ACCEPT TRANSPONDER
- I- VERTICAL SETTERS MAY BE SUBSTITUTED BY SUBMITTAL

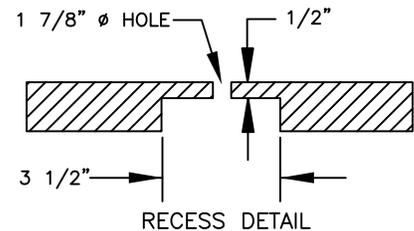


HOLE TO BE DOUBLE THE SIZE OF PIPE. SEAL WITH LINK SEAL

LOK-PAK COUPLING

METER SUPPORT (SHALL BE EITHER CONCRETE OR ADJUSTABLE STEEL PIPE)

OPTIONAL CONCRETE MANHOLE BASE BEAMS
IF CONCRETE BEAMS ARE NOT USED, USE
1/2" ROCK, 6" DEEP MINIMUM



ELEVATION

FOR SIZE OF METER PIT FOR LARGER THAN 2" METER, CONTACT TOWN OF ERIE ENGINEERING STAFF

FOR IRRIGATION METER PIT REQUIREMENTS SEE PARKS STANDARD DETAILS

The Town of
ERIE
COLORADO



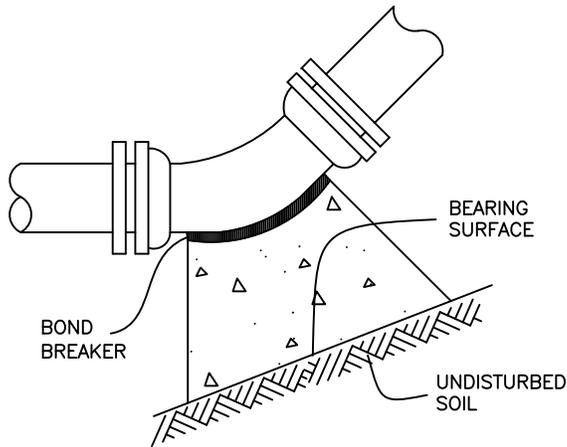
DRAWING TITLE: 1-1/2" & 2" METER MANHOLE METER PIT

DRAWING NUMBER: W13

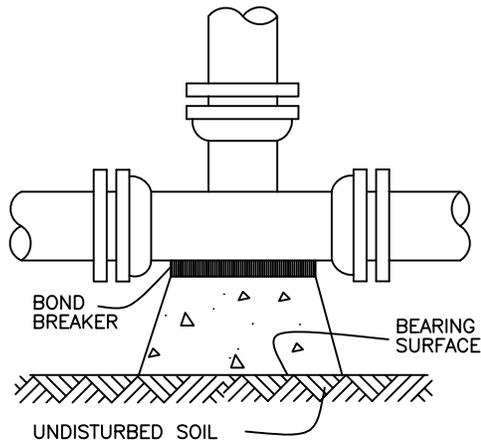
DRAWN BY: D. JENKINS

APPROVED BY: G. BEHLEN

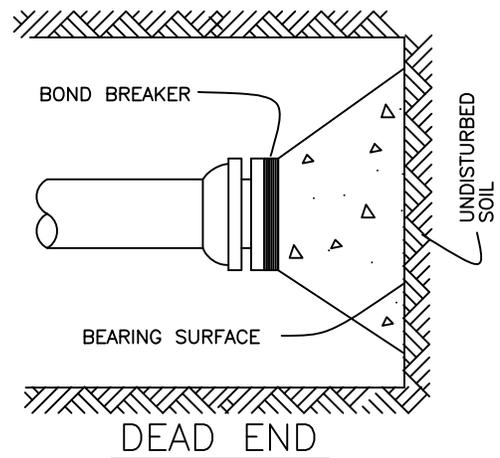
REV. DATE: 01/2016



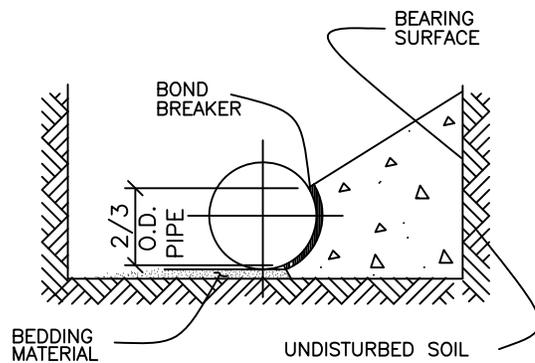
11-1/4°, 22-1/2°
45° AND 90° BENDS



TEE



DEAD END



TYPICAL CROSS SECTION

NOTES:

1. SEE THRUST BLOCKING CHART FOR MINIMUM BEARING SURFACE AREAS
2. BASED ON 150 PSI INTERNAL PIPE PRESSURE PLUS WATER HAMMER
4", 6", 8" AND 12" WATER HAMMER = 110 P.S.I.
16", 20" AND 24" WATER HAMMER = 70 P.S.I.
3. BASED ON 3,000 pfs SOIL BEARING CAPACITY
4. THRUST BLOCKING SHALL BE CAST AGAINST UNDISTURBED EARTH. FORMS SHALL BE USED AS REQUIRED TO OBTAIN ADEQUATE BEARING AND TO CONFINE THE CONCRETE. THRUST BLOCKING SHALL BEAR ON THE FITTING OR END CAP ONLY AND SHOULD NOT BE ALLOWED TO SPILL OVER THE JOINT OR AGAINST THE PIPE



TABLE OF BEARING AREAS IN SQ. FT. FOR CONCRETE THRUST BLOCKING
 FOR 100 P.S.I. INTERNAL STATIC PRESSURE AND 1,000 LBS. PER SQUARE
 FOOT SOIL BEARING CAPACITY.

SIZE	BENDS				TEES *	GATE VALVES	DEAD ENDS	CROSS W/ 1 BRANCH PLUGGED	CROSS W/ 2 BRANCHES PLUGGED
	90°	45°	22-1/2°	11-1/4°					
3	1.0	0.6	0.3	1.0	0.7	0.5	0.7	0.7	0.7
4	1.8	1.0	0.5	1.0	1.3	0.5	1.3	1.3	1.3
6	4.0	2.2	1.1	1.0	2.8	0.7	2.8	2.8	2.8
8	7.1	3.8	2.0	1.0	5.0	2.4	5.0	5.0	5.0
10	11.1	6.0	3.0	1.5	7.8	4.5	7.8	7.8	7.8
12	16.0	8.6	4.4	2.2	11.3	7.3	11.3	11.3	11.3
14	21.7	11.8	6.0	3.0	15.4	11.0	15.4	15.4	15.4
15	25.0	13.5	7.0	3.5	17.6	SPECIAL DESIGN	17.6	17.6	17.6
16	28.4	15.3	8.0	4.0	20.0		20.0	20.0	20.0
18	36.0	19.4	10.0	5.0	25.4		25.4	25.4	25.4
20	44.2	24.0	12.2	6.1	31.4		31.4	31.4	31.4
21	49.0	26.5	13.5	6.8	34.6		34.6	34.6	34.6
22	54.0	29.0	14.8	7.4	38.0		38.0	38.0	38.0
24	64.0	34.5	17.7	8.8	45.0		45.0	45.0	45.0
30	100.0	54.0	27.6	13.8	71.0		71.0	71.0	71.0
36	144.0	78.0	40.0	20.0	102.0		102.0	102.0	102.0

* SIZE IS BRANCH SIZE

AREAS GIVEN IN TABLE ARE BASED UPON AN INTERNAL STATIC PRESSURE OF 100 P.S.I. AND A SOIL BEARING CAPACITY OF 1,000 LBS. PER SQUARE FOOT. BEARING AREAS FOR ANY PRESSURE AND SOIL BEARING CAPACITY MAY BE OBTAINED BY MULTIPLYING THE TABULATED VALUES BY A CORRECTION FACTOR "F".

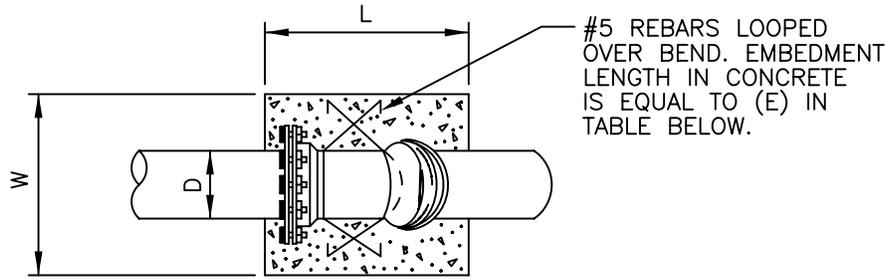
$$F = \frac{\text{ACTUAL SPECIFIED TEST PRESSURE IN HUNDRED OF LBS.}}{\text{ACTUAL SOIL BEARING CAPACITY IN THOUSANDS OF LBS.}}$$

EXAMPLE: TO FIND BEARING AREA FOR 8" - 90° BEND WITH A STATIC INTERNAL PRESSURE OF 150 P.S.I. AND WITH A SOIL BEARING CAPACITY OF 3,000 LBS. PER SQUARE FOOT.

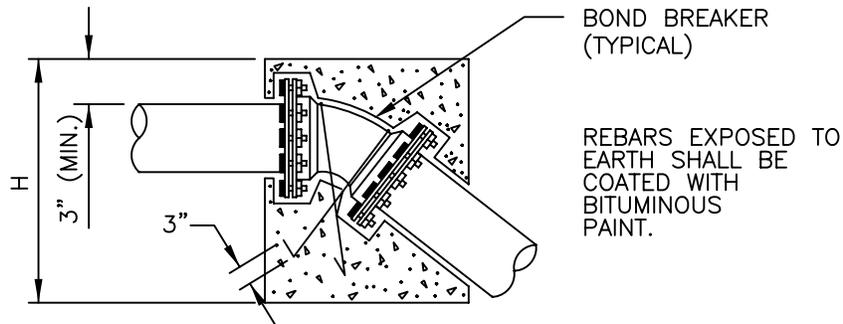
$$F = 1.5 \div 3 = 0.5 \text{ TABULATED VALUE} = 7.1 \text{ SQUARE FOOT.}$$

$$0.5 \times 7.1 = 3.56 \text{ SAY 4 SQUARE FEET OF 2 FOOT LONG BY 2 FOOT HIGH.}$$





PLAN



PROFILE

SIZE OF PIPE (D)	11 1/4 DEG.					22 1/2 DEG.					45 DEG.				
	L"	W"	H"	E"	VOL	L"	W"	H"	E"	VOL	L"	W"	H"	E"	VOL
4"	12	24	24	12	4	12	34	34	12	8	22	37	32	22	15
6"	18	32	27	18	9	15	52	40	15	18	28	64	32	28	33
8"	21	40	33	21	16	22	61	40	22	31	35	64	45	35	58
10"	24	50	36	24	25	30	59	48	30	49	42	72	52	42	90
12"	31	56	36	31	36	36	70	48	36	70	45	80	62	45	129

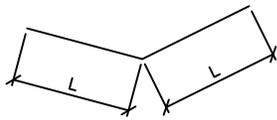
NOTES:

- THRUST BLOCKING SHALL BE CAST AGAINST UNDISTURBED EARTH. FORMS SHALL BE USED AS REQUIRED TO OBTAIN ADEQUATE BEARING AND TO CONFINE THE CONCRETE. THRUST BLOCKING SHALL BEAR ON THE FITTING OR END CAP ONLY AND SHOULD NOT BE ALLOWED TO SPILL OVER THE JOINT OR AGAINST THE PIPE.
- VOLUME IS IN CUBIC FEET.
- ALL CONCRETE TO BE 4000 P.S.I. MIN.
- BLOCKS TO BE CENTERED HORIZONTALLY ON THE BEND.
- DESIGN BASED ON A TEST PRESSURE OF 150 P.S.I. AND SAFETY FACTOR (S_f) OF 1.5
- $V_g = \frac{S_f PA \sin \theta}{W_m}$
- $W_m = 140 \# / FT^3$
- THE DESIGN ENGINEER IS RESPONSIBLE FOR VERIFYING THE ACTUAL SITE CONDITIONS WITH RESPECT TO THE ASSUMPTIONS LISTED ABOVE.

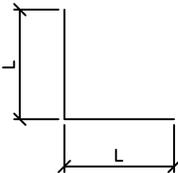


ROD DIAMETER, GRADE & LENGTH OF RESTRAINED PIPE

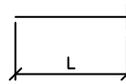
PIPE SIZE	4"			6"			8"			12"			16"			20"			24"		
	D	L	G	D	L	G	D	L	G	D	L	G	D	L	G	D	L	G	D	L	G
90° BEND, TEE, PLUG	3/4"	30'	MS	3/4"	45'	MS	3/4"	60'	MS	3/4"	86'	MS	1"	108'	HS	1 1/4"	132'	HS	-	155'	-
VALVE	-	-	-	-	-	-	-	-	-	-	-	-	1"	108'	HS	1 1/4"	132'	HS	-	155'	-
45° BEND	3/4"	9'	MS	3/4"	13'	MS	3/4"	18'	MS	3/4"	25'	MS	1"	32'	MS	3/4"	39'	HS	-	45'	-
22 1/2° BEND	3/4"	1'	MS	3/4"	4'	MS	3/4"	5'	MS	3/4"	7'	MS	3/4"	8'	MS	3/4"	10'	MS	-	12'	-
11 1/4° BEND	-	-	-	-	-	-	3/4"	1'	MS	3/4"	2'	MS	3/4"	2'	MS	3/4"	3'	MS	-	3'	-



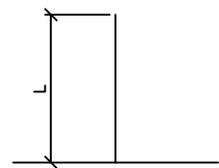
HORIZONTAL BENDS



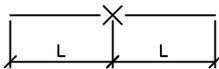
90° HORIZONTAL BEND



PLUG



TEE

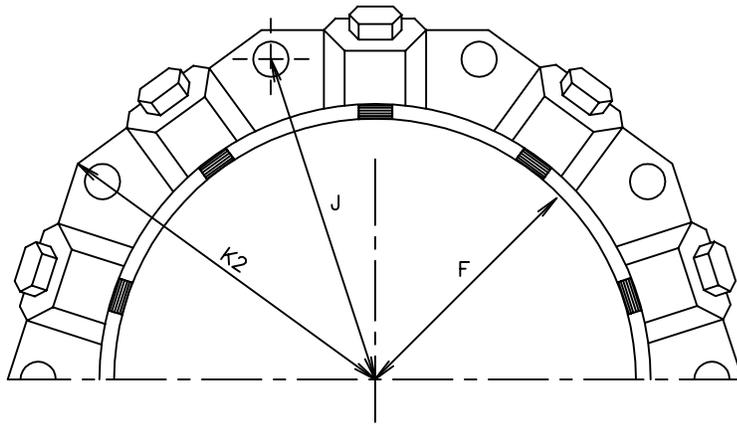


VALVE

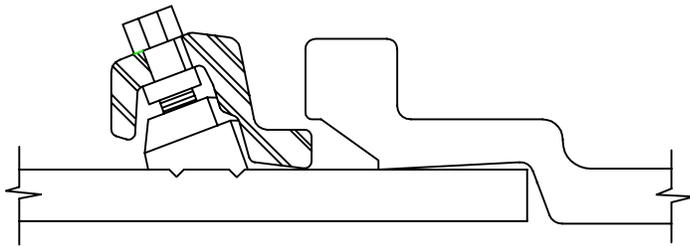
NOTES:

1. LENGTH OF RESTRAINED PIPE MEASURED EACH WAY FROM VALVES AND BENDS.
2. CLAMPS AND RODS NOT ALLOWED FOR 24" & LARGER PIPES.
3. D=DIAMETER, L=LENGTH, G=GRADE, MS=MILD STEEL, HS=HIGH STRENGTH.
4. MIN 4.5' GROUND COVER REQD.
5. BASED ON 150 PSI INTERNAL PRESSURE.
6. MS = MILD STEEL ROD ASTM A 36.
7. HS = HIGH STRENGTH ROD ASTM A 193 GRADE B7.
8. NUTS SHALL BE ASTM A 307 GRADE A OR B HEXAGON HEAVY SERIES. HS NUTS SHALL CONFORM TO MS-22.
9. LENGTH REFERS TO THE AMOUNT OF PIPE WHICH MUST BE RESTRAINED TOGETHER.
10. LENGTH OF RESTRAINED PIPE CHART IS ALSO FOR THE LENGTH OF JOINT RESTRAINT FOR MEGALUGS.
11. TEES & CROSSES MUST BE RESTRAINED IN ALL APPLICABLE DIRECTIONS.
12. 12" AND SMALLER IN LINE VALVES AND TEES SHALL HAVE A MECHANICAL JOINT RESTRAINT DEVICE ON EACH SIDE OF THE FITTING OR VALVE.
13. A SECOND VALVE WILL BE REQD TO BE CLOSED WHEN EXCAVATING NEXT TO A EXIST VALVE.
14. WHEN REDUCERS ARE USED ON VALVE INSTALLATIONS THE LENGTH OF RESTRAINT SHALL BE BASED ON THE SIZE OF THE PIPE NOT THE SIZE OF THE VALVE.
15. ALL REDUCERS/INCREASERS SHALL HAVE MECHANICAL RESTRAINT DEVICES ON EACH SIDE OF FITTING.
16. PIPE JOINT RESTRAINT MAY BE ACCOMPLISHED USING HARNESS RODS, MECHANICAL JOINT RESTRAINT OR RESTRAINED JOINT PIPE AND FITTINGS.
17. AN ANALYSIS OF THE NECESSARY RESTRAINT LENGTH FOR PIPE LARGER THAN 24" SHALL BE SUBMITTED TO THE PUBLIC WORKS DEPT FOR REVIEW AND APPROVAL ON A CASE BY CASE BASIS.

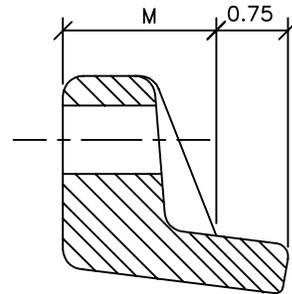




MECHANICAL JOINT RESTRAINT



WEDGE DETAIL



BOLT HOLE DETAIL

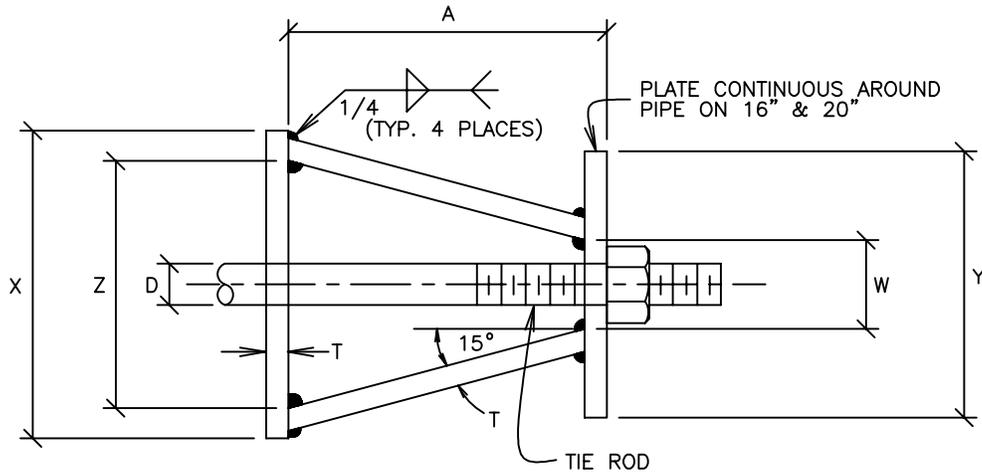
DIMENSIONS

	NOMINAL PIPE SIZE	NO. OF BOLTS	NO. OF WEDGES	K2 INCHES	J INCHES	F INCHES	M INCHES	
P V C	4"	2	2					P V C
	6"	6	3	11.12	9.50	7.00	0.88	
	8"	6	4	13.37	11.75	9.15	1.00	
	10"	8	6	15.62	14.00	11.20	1.00	
	12"	8	8	17.88	16.25	13.30	1.25	
D I	4"	4	2					D I
	6"	6	3	11.12	9.50	7.00	0.88	
	8"	6	4	13.37	11.75	9.15	1.00	
	10"	8	6	15.62	14.00	11.20	1.00	
	12"	8	8	17.88	16.25	13.30	1.25	

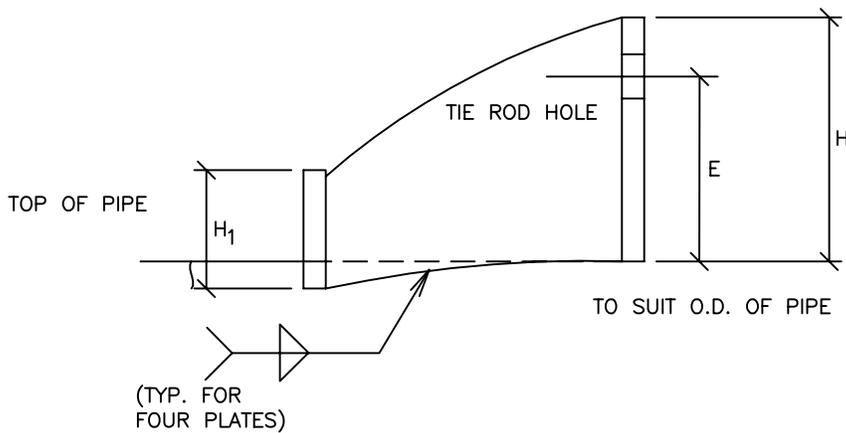
NOTES:

1. DIMENSIONS FOR 16" AND 20" D.I. PIPE NOT SHOWN.
2. OTHER MECHANICAL JOINT RESTRAINT DEVICES MUST BE APPROVED BEFORE INSTALLATION.





TOP VIEW



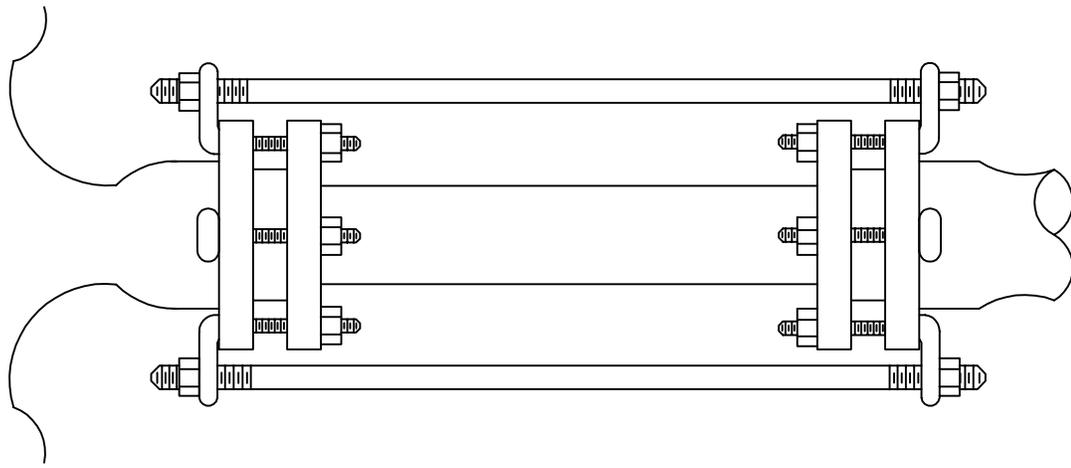
SIDE VIEW

	CARRIER PIPE NOMINAL DIA.	STUD DIA. D	A	W	Z	T	H	E	H ₁	Y	X
W/O FLANGED LUGS	4" TO 12"	3/4"	5"	1-1/2"	3-3/4"	3/8"	4-1/8"	3-1/8"	2"	4-1/2"	5"
	16"	1"	5-3/4"	1-3/4"	4-1/2"	1/2"	4-1/2"	3-1/4"	2"	RING	6"
	20"	1-1/4"	7-1/2"	2"	5-3/4"	5/8"	5"	3-3/4"	2-1/2"	RING	7-1/2"

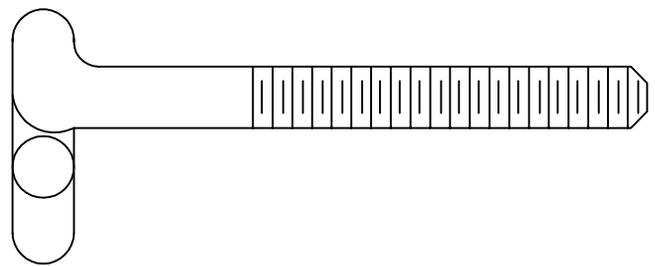
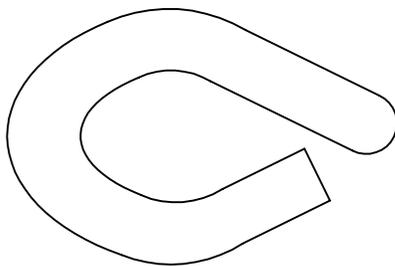
NOTES:

1. USE TWO HIGH STRENGTH STEEL TIE RODS AT END OF CASING.
2. TIE ROD HOLE DIAMETER 1/8" LARGER THAN STUD DIAMETER.
3. BOTTOM EDGE OF ALL PLATES SHAPED TO FIT O.D. OF PIPE.
4. HARNESS LUGS AS PER AWWA MANUAL M-II.





PLAN



DETAIL

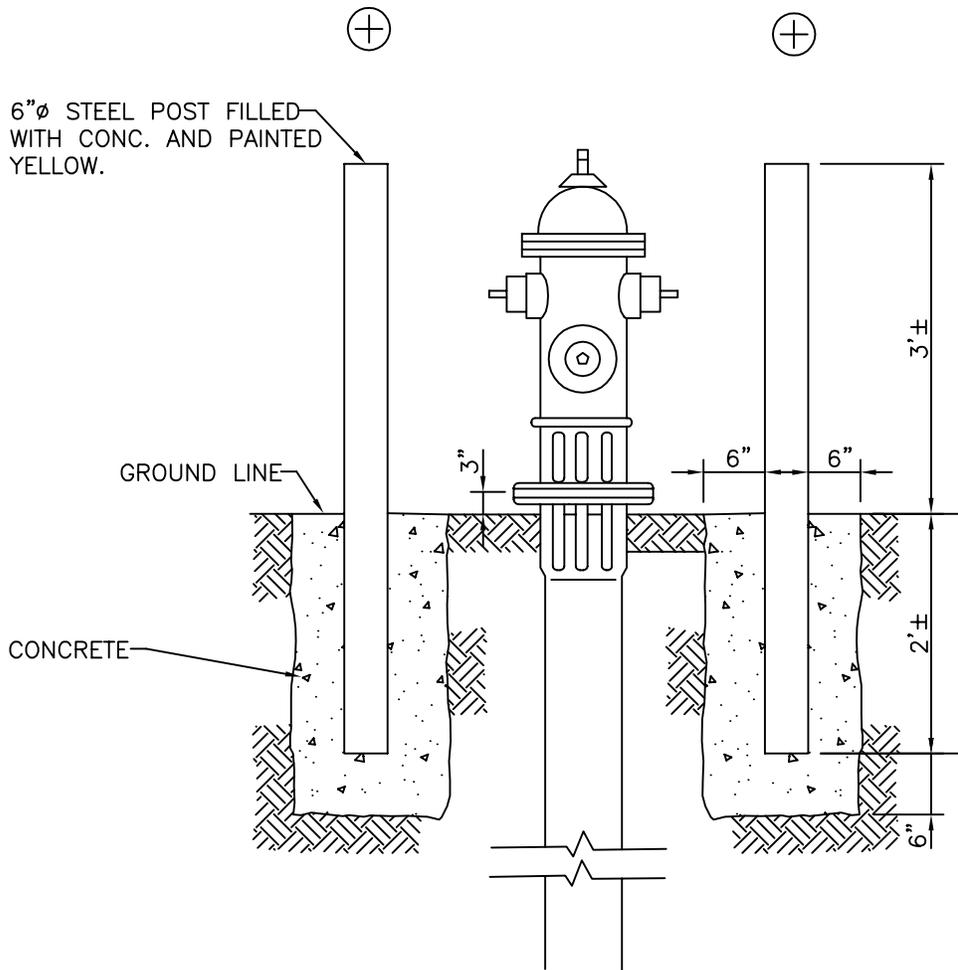
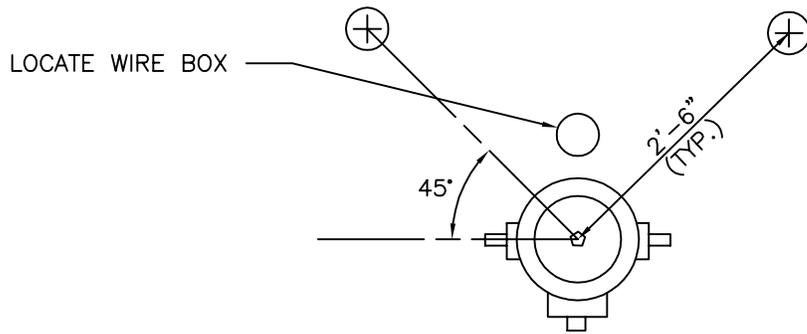
DIMENSIONS

ALLOWABLE PIPE DIAMETER INCHES	BOLT SIZE	NO . OF BOLTS REQUIRED
4	3/4"	2
6	3/4"	2
8	3/4"	2
10	3/4"	4
12	3/4"	6

NOTES:

1. THE BOLT SHALL BE MANUFACTURED OF "COR-TEN" OR APPROVED EQUAL.
2. THE BOLT MAY BE HEAT TREATED.

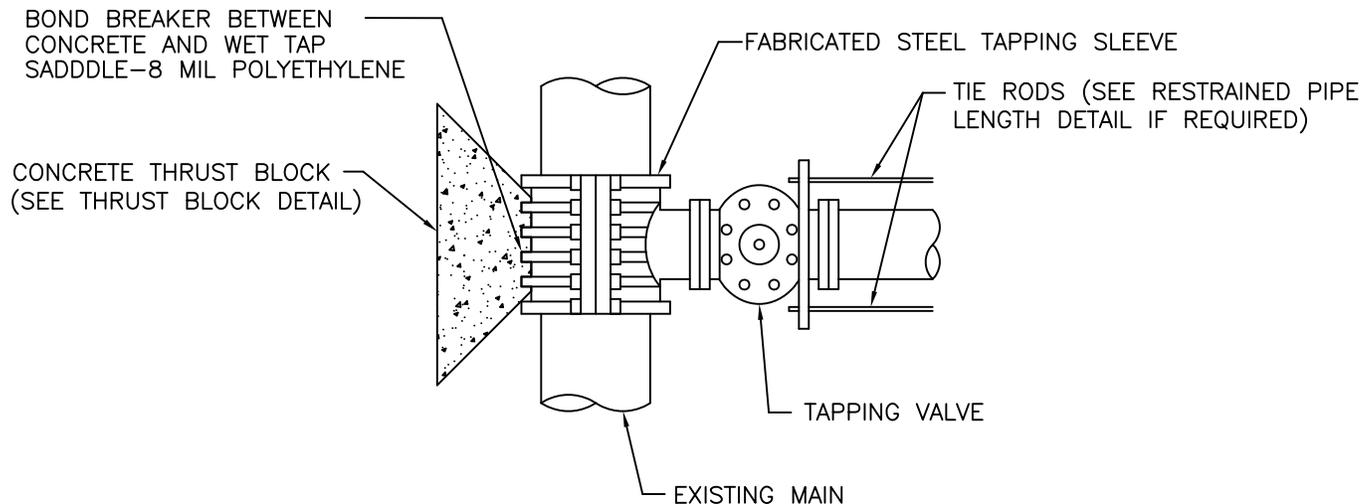




NOTES:

TO BE USED IN COMMERCIAL OR INDUSTRIAL AREAS WHERE
 HYDRANTS ARE UNPROTECTED FROM THE MAINFLOW OF TRAFFIC.
 STEAMER CONNECTION ON FIRE HYDRANT SHOULD FACE THE STREET.





NOTES:

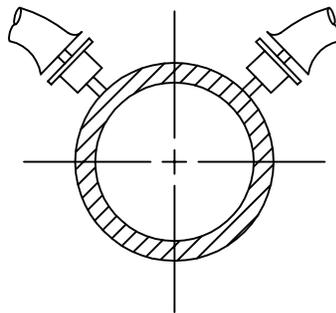
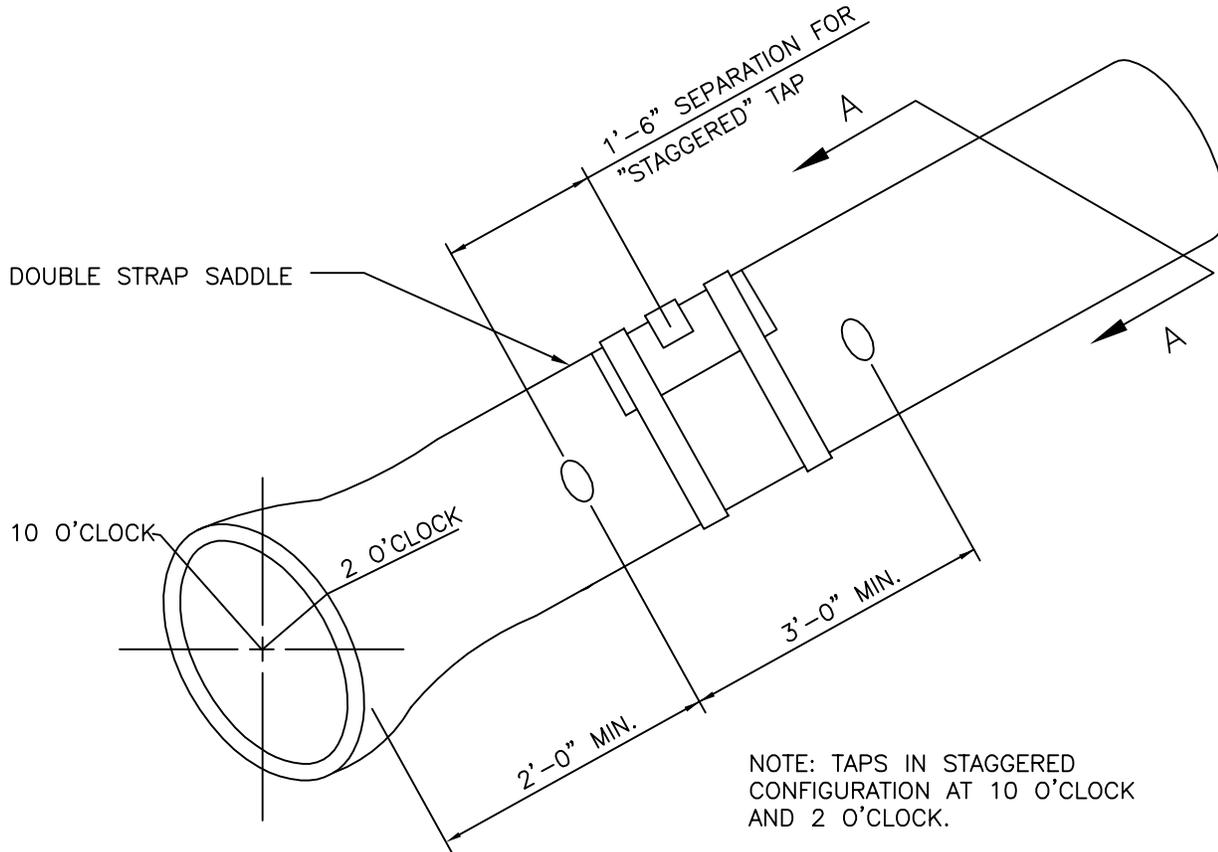
1. FABRICATED STEEL TAPPING SLEEVE SHALL BE:

ROMAC FTS419 OR APPROVED EQUAL TO BE USED FOR PVC UP TO 75% OF EXISTING MAIN

ROMAC FTS420 OR APPROVED EQUAL TO BE USED FOR DIP UP TO 75% OF EXISTING MAIN

ROMAC FTS425 OR APPROVED EQUAL TO BE USED ON ALL AC PIPE AND ANYTIME
BRANCH LINE IS GREATER THAN 75% OF EXISTING MAIN



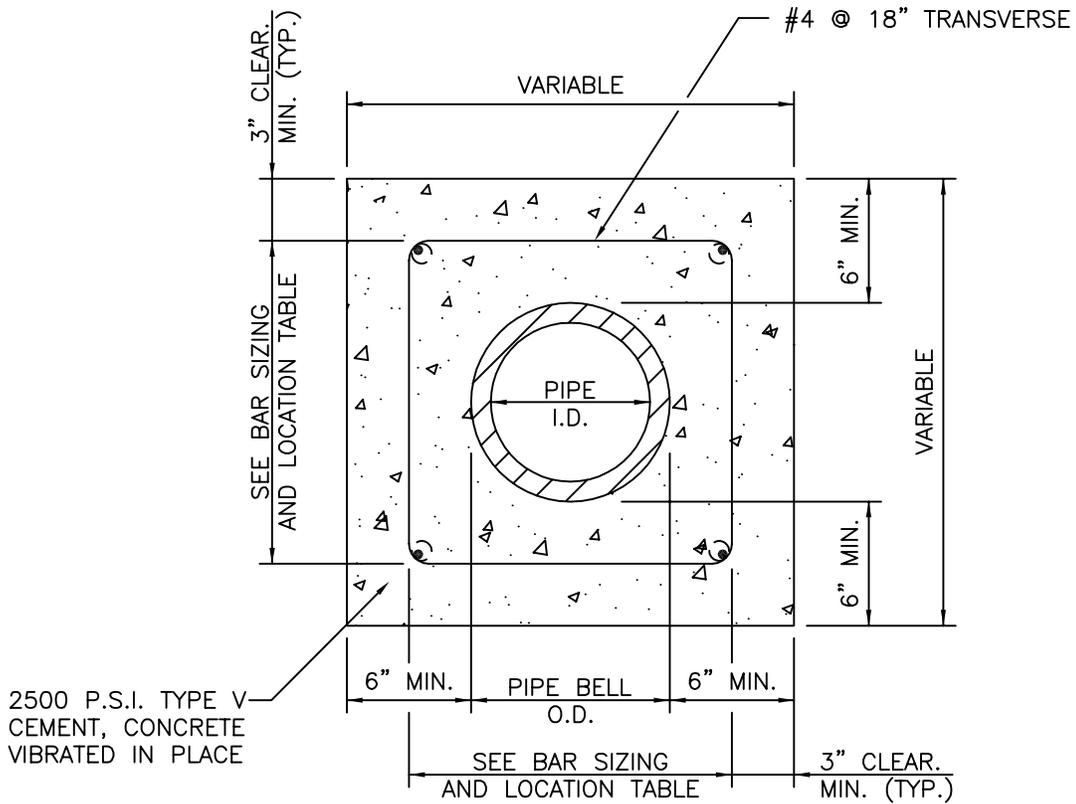


SECTION A-A

NOTE:

SERVICE TAPS – WATER SERVICE TAPS SHALL BE MADE AT EITHER THE 2 O'CLOCK OR THE 10 O'CLOCK POSITION ON THE CIRCUMFERENCE OF A WATER MAIN. THE MINIMUM DISTANCE BETWEEN A TAP MADE AT THE 2 O'CLOCK POSITION AND THE ONE MADE AT THE 10 O'CLOCK POSITION SHALL BE 18-INCHES MEASURED ALONG THE PIPE. THE MINIMUM DISTANCE BETWEEN SUCCESSIVE TAPS MADE EITHER AT THE 2 O'CLOCK OR THE 10 O'CLOCK POSITION SHALL BE 3- FEET. THE MINIMUM DISTANCE FROM EITHER THE BELL OR THE SPIGOT END OF A PIPE TO A TAP SHALL BE 2- FEET. A MAXIMUM OF 4 WATER SERVICE TAPS SHALL BE ALLOWED PER LENGTH OF PIPE. DOUBLE STRAP SADDLE (ROMAC 202B OR APPROVED EQUAL) SHALL BE USED FOR ALL SERVICE TAPS.





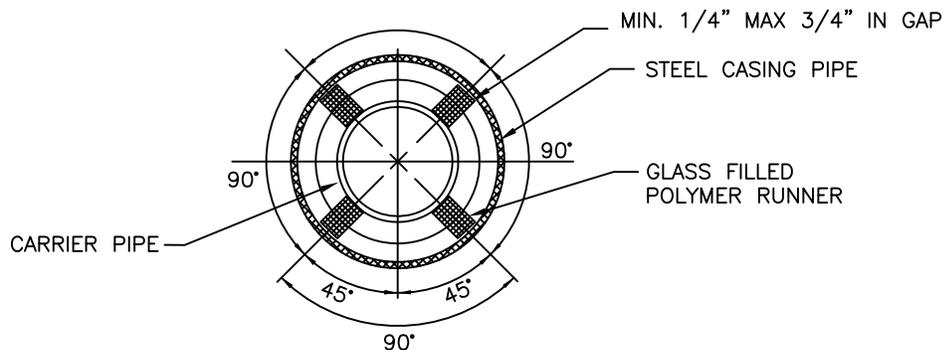
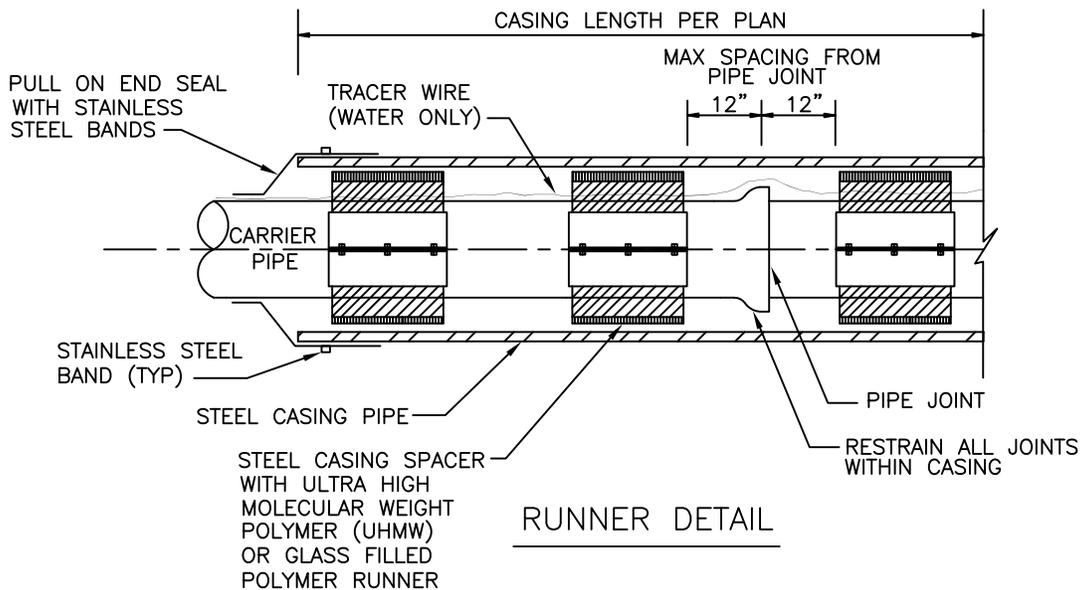
REINFORCEMENT STEEL

PIPE I.D.	LONGITUDINAL BARS – LOCATION		
6 IN.	4-NO. 4 BARS	1 EACH	CORNER
8 IN.	4-NO. 4 BARS	1 EACH	CORNER
10 IN.	8-NO. 4 BARS	3 EACH	SIDE
12 IN.	8-NO. 4 BARS	3 EACH	SIDE
15 IN.	8-NO. 4 BARS	3 EACH	SIDE
18 IN.	8-NO. 4 BARS	3 EACH	SIDE
21 IN.	12-NO. 4 BARS	4 EACH	SIDE
24 IN.	12-NO. 4 BARS	4 EACH	SIDE
27 IN.	12-NO. 4 BARS	4 EACH	SIDE
30 IN.	12-NO. 4 BARS	4 EACH	SIDE
33 IN.	12-NO. 4 BARS	4 EACH	SIDE
36 IN.	16-NO. 4 BARS	5 EACH	SIDE

NOTE:

THE DISTRICT SHALL REVIEW THIS DETAIL FOR USE ON A CASE BY CASE BASIS. SPECIAL ENCASEMENTS MAY BE REQUIRED AT CREEK CROSSINGS AND CONDUIT CROSSINGS.





1. EACH SECTION OF PIPE WITHIN CASING SHALL HAVE A MINIMUM OF (3) CASING SPACERS/SKIDS. THE MIDDLE SPACER/SKID SHALL BE CENTERED BETWEEN PIPE JOINTS
2. WATER & SANITARY SEWER PIPE JOINTS SHALL BE RESTRAINED
3. EXTEND TRACING WIRE THROUGH CASING (WATER APPLICATIONS ONLY)
4. MINIMUM RUNNER SIZE & DISTANCE BETWEEN SPACERS SHALL BE IN ACCORDANCE WITH MANUFACTURERS SPECIFICATIONS

CARRIER PIPE NOMINAL DIA.	CASING PIPE
	MIN. WALL THICK
4"	0.25"
6"	0.3125"
8"	0.3125"
12"	0.375"
16"	0.500"
20"	0.500"

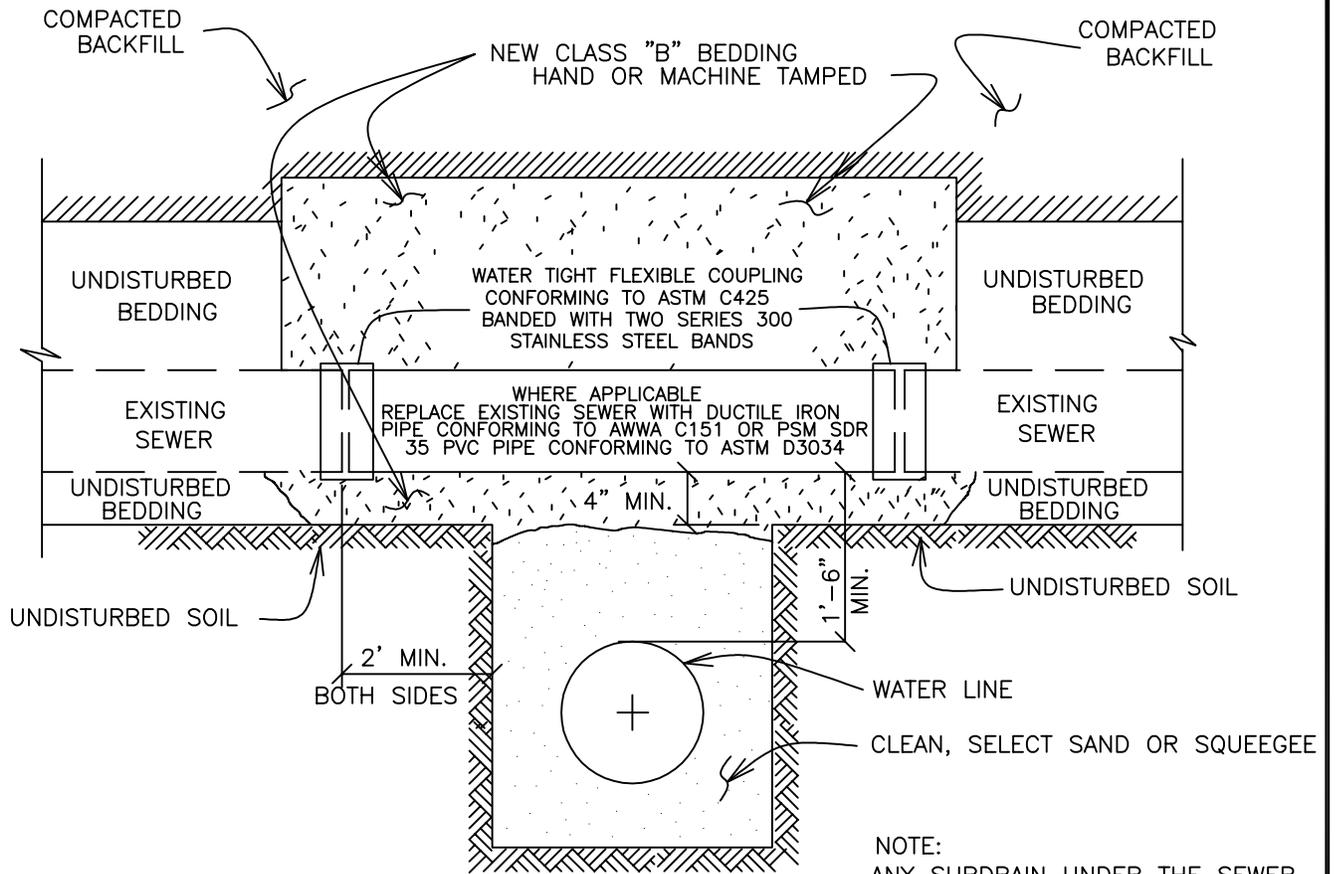
The Town of
ERIE
COLORADO



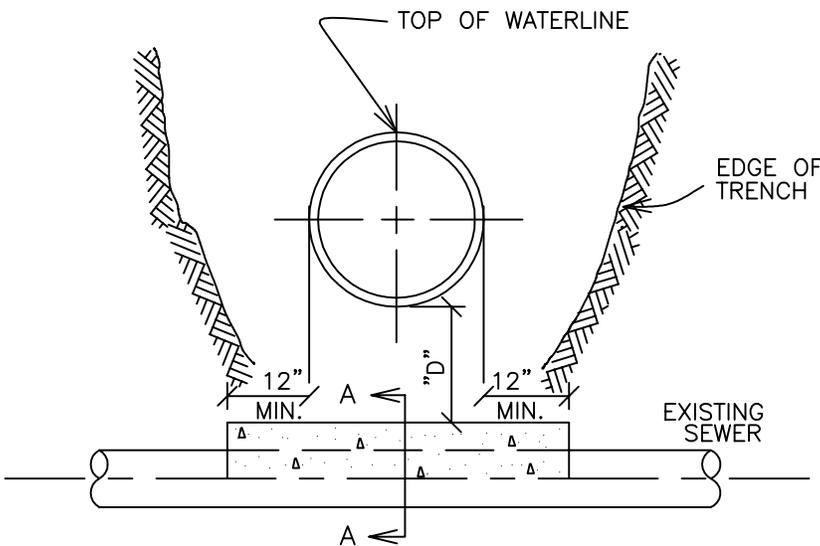
DRAWING TITLE: **CASING PIPE DETAIL**

DRAWING NUMBER: **W24**

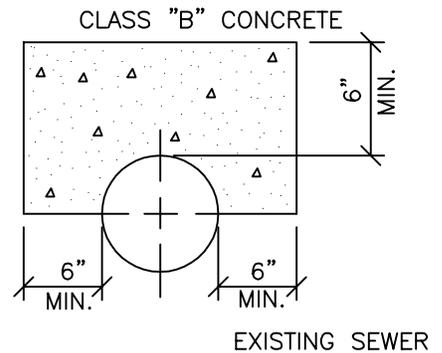
DRAWN BY: **D. JENKINS** APPROVED BY: **G. BEHLEN** REV. DATE: **01/2016**



NOTE:
 ANY SUBDRAIN UNDER THE SEWER SHALL BE REPLACED SUCH THAT NO FLOW SHALL ENTER THE WATER LINE TRENCH.



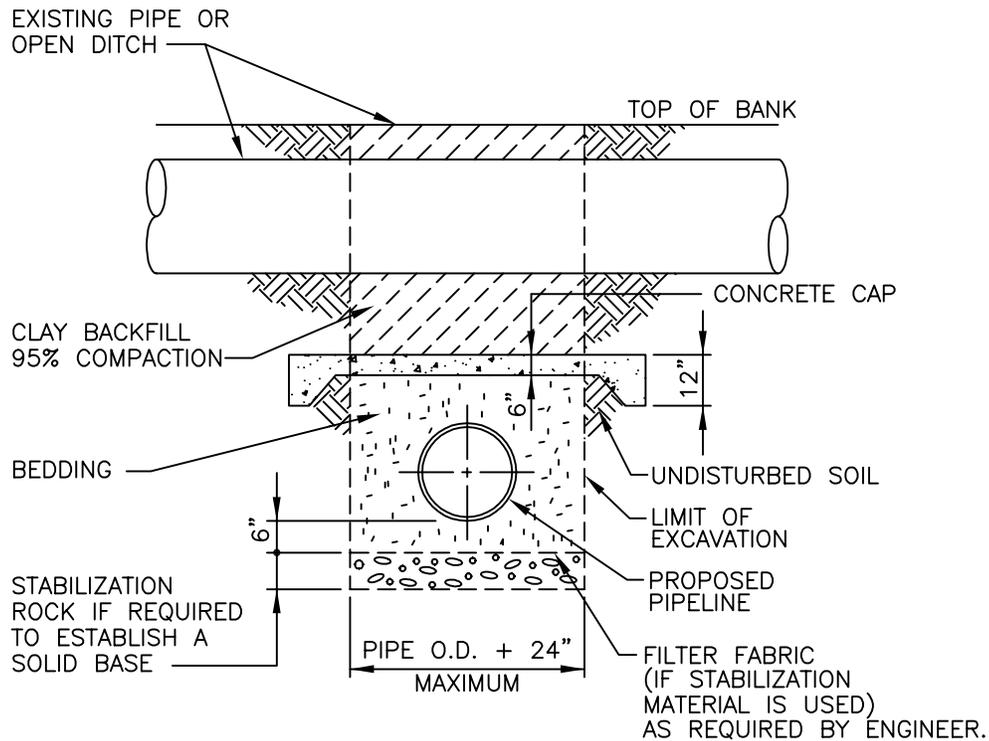
SEWER CROSSING UNDER
 WITH "D" LESS THAN 2'



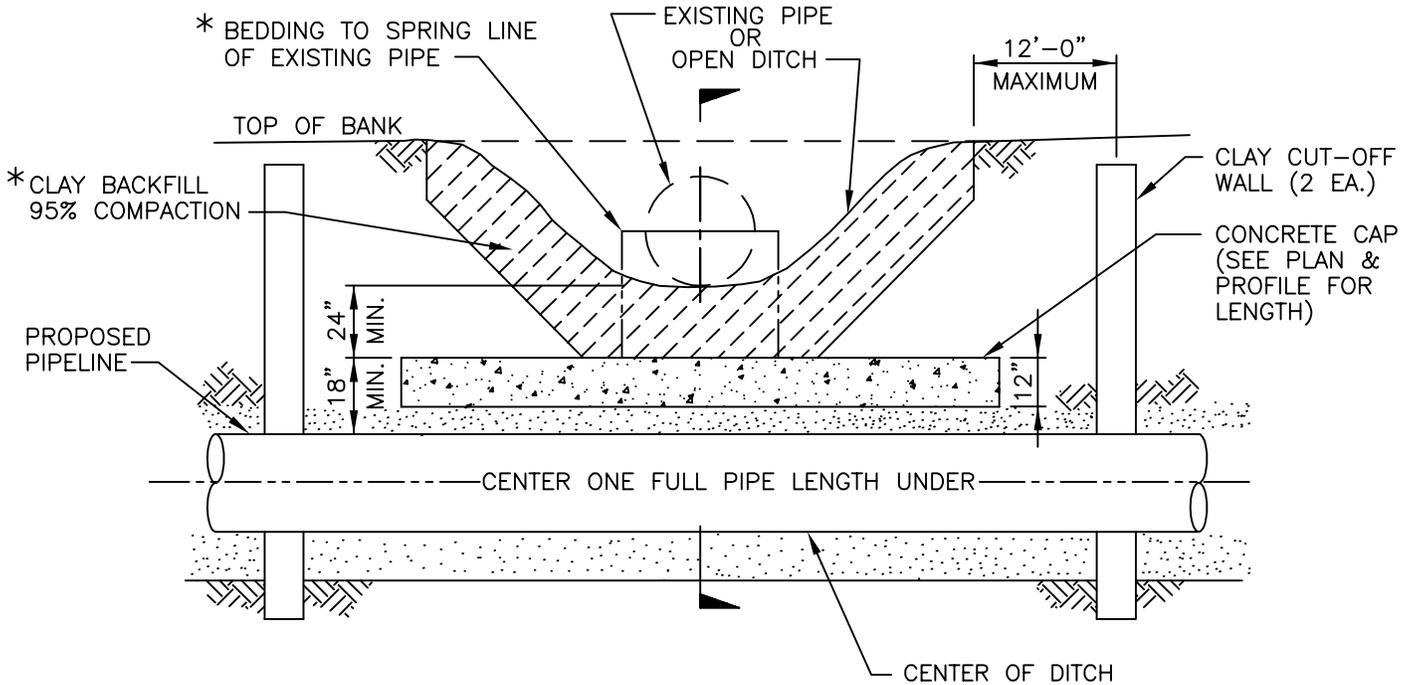
SECTION A-A

NOTE:
 ALL EXISTING SEWER DAMAGED DURING INSTALLATION MUST BE REPLACED WITH PVC PIPE.





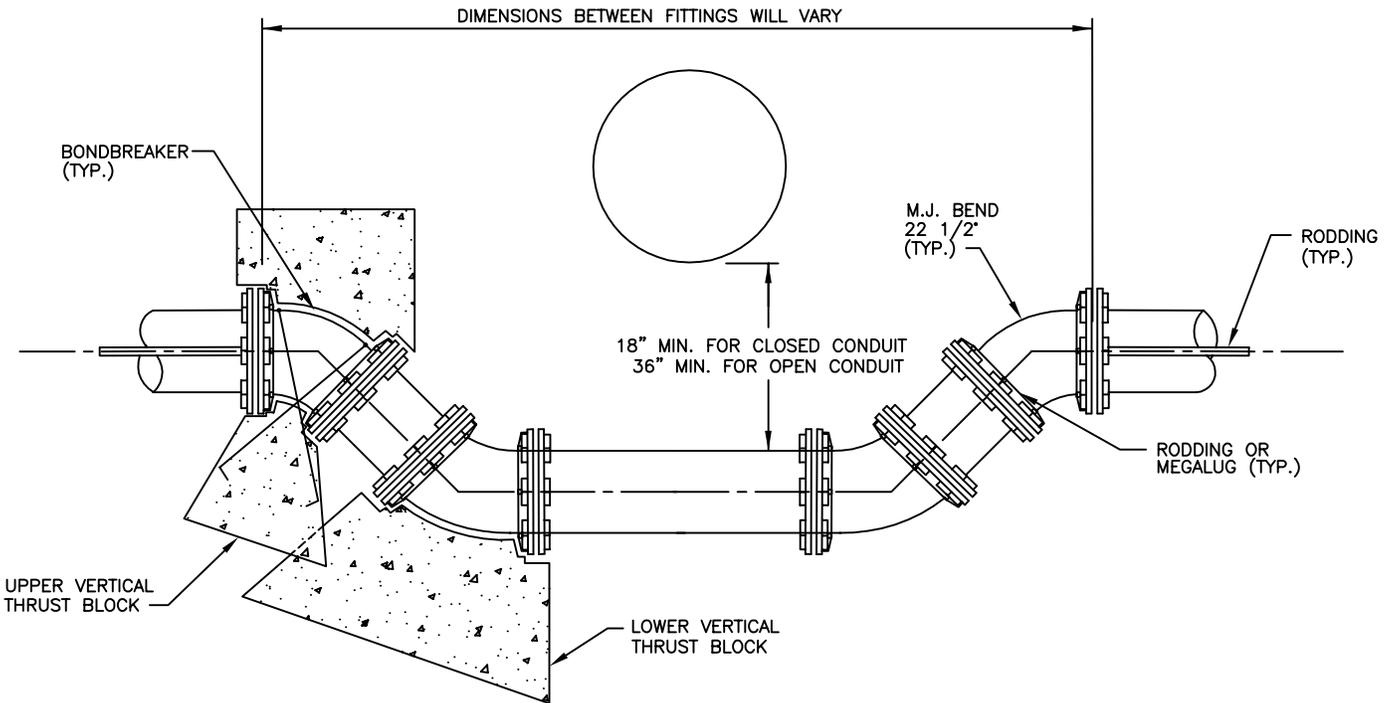
SECTION



PROFILE

* USE CLAY BACKFILL ONLY WHEN CROSSING OPEN DITCH. USE BEDDING MATERIAL TO SPRING LINE OF EXISTING PIPE WHEN CROSSING PIPE.





NOTES:

1. LOWERING OF THIS TYPE WILL BE RESTRAINED BY MEANS OF THRUST BLOCKING AND MEGALUGS OR RODDING.
2. FOR SIZING INFORMATION OF THRUST BLOCKS REFER TO THRUST BLOCK DETAILS.
3. WHEN RESTRAINING PIPE BY MEANS OF RODDING JOINTS, 3/4 " TIE RODS, NUTS, AND WASHERS WILL BE USED AND ARE TO BE MADE OF "COR-TEN" STEEL AS PER A.S.T.M. A242.
4. FOR FURTHER INFORMATION ON RODDING OF JOINTS REFER TO TABLE 1.
5. ALL METALLIC PIPE, FITTINGS, AND APPURTENANCES WILL BE WRAPPED IN POLYETHYLENE.
6. REQUIREMENTS FOR LARGER THAN 12" DIAMETER PIPE WILL BE DETERMINED ON A CASE BY CASE BASIS.
7. LENGTH OF EXTENSION OF PIPE AND RESTRAINED JOINTS SHALL BE IN ACCORDANCE WITH THE ENGINEERING STANDARDS.
8. CATHODIC PROTECTION SHALL BE AS REQUIRED IN ACCORDANCE WITH THE ENGINEERING STANDARDS.
9. A BORED CROSSING MAY BE REQUIRED BY THE ENGINEER.

TABLE 1

Pipe Size	Test Pressure	Minimum number of Tie Rods
10" and less	150	2
	200	2
12"	150	2
	200	4



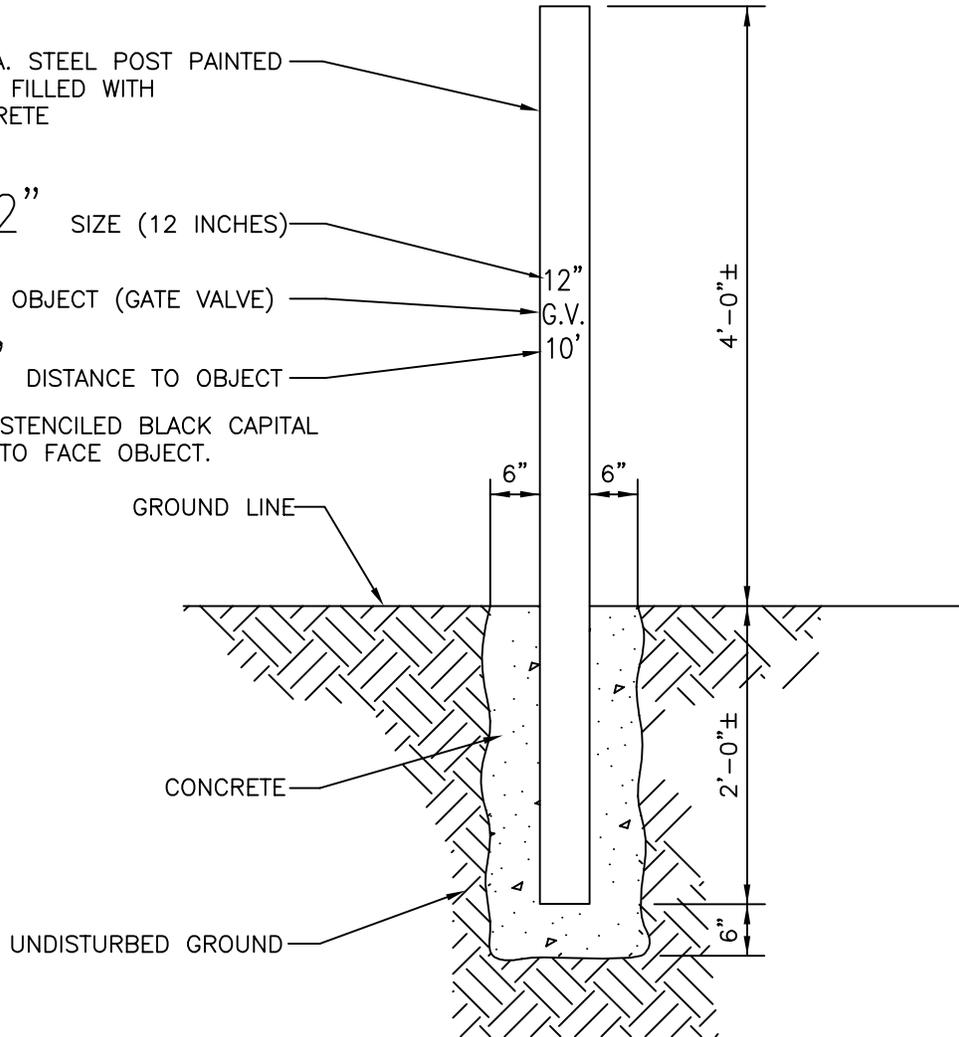
4" DIA. STEEL POST PAINTED
BLUE, FILLED WITH
CONCRETE

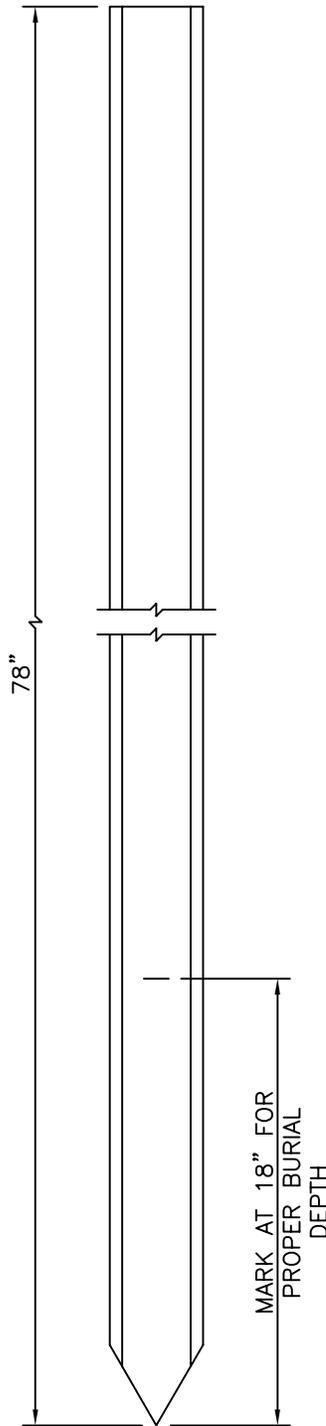
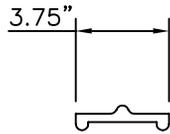
12" SIZE (12 INCHES)

G.V. OBJECT (GATE VALVE)

10' DISTANCE TO OBJECT

2" HIGH STENCILED BLACK CAPITAL
LETTERS TO FACE OBJECT.

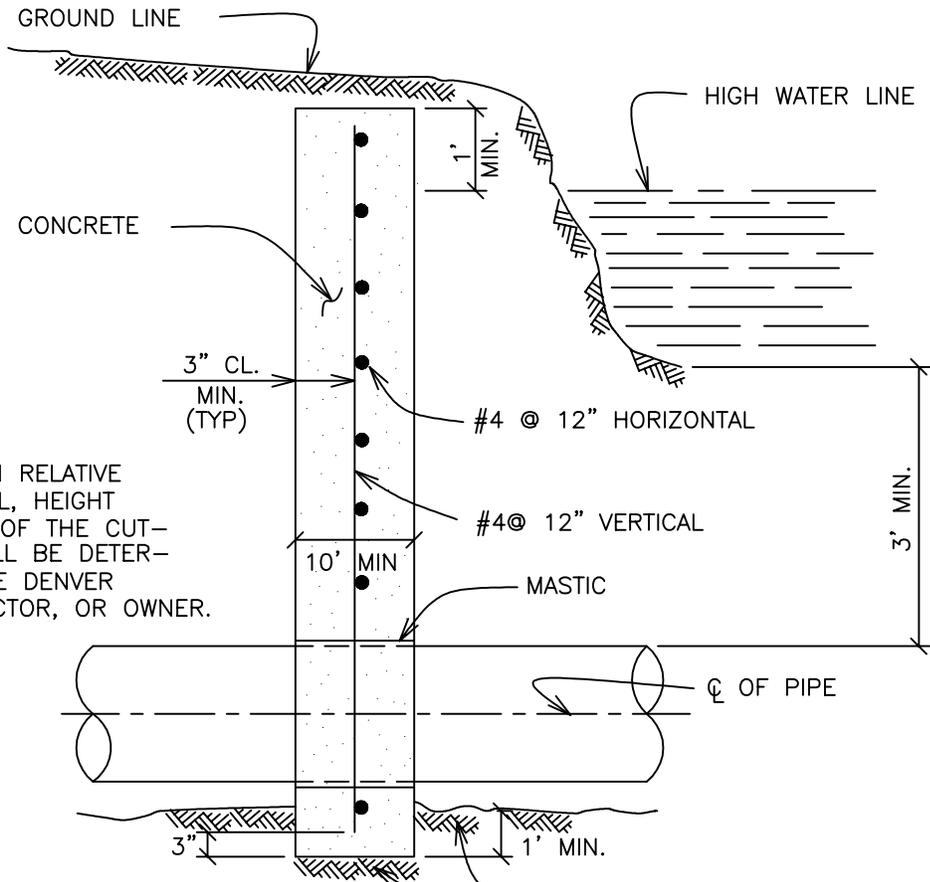




NOTES:

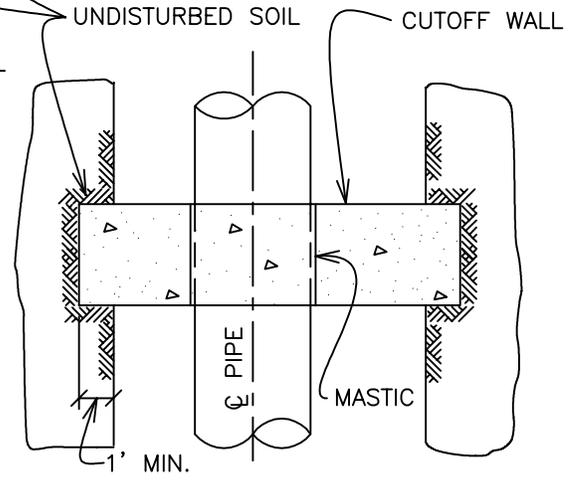
1. UTILITY MARKER POST SHALL BE CARSONITE CUM-375 OR EQUAL WITH ANCHORS AND APPROPRIATE DECALS FOR WATER.
2. COLOR FOR WATER-BLUE.
COLOR FOR NON POTABLE-PURPLE





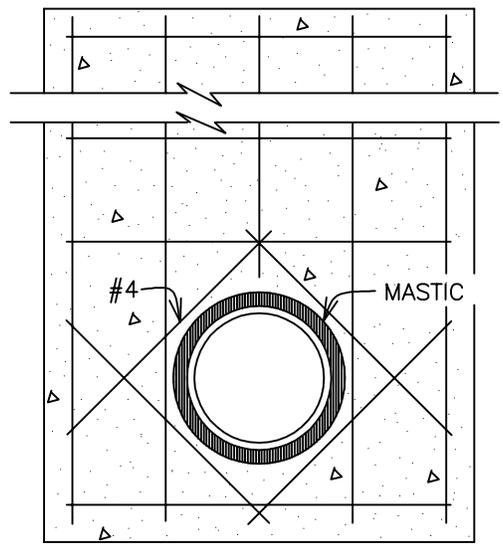
NOTE:
 THE LOCATION RELATIVE TO THE CANAL, HEIGHT AND LENGTH OF THE CUTOFF WALL WILL BE DETERMINED BY THE DENVER WATER INSPECTOR, OR OWNER.

SIDE VIEW



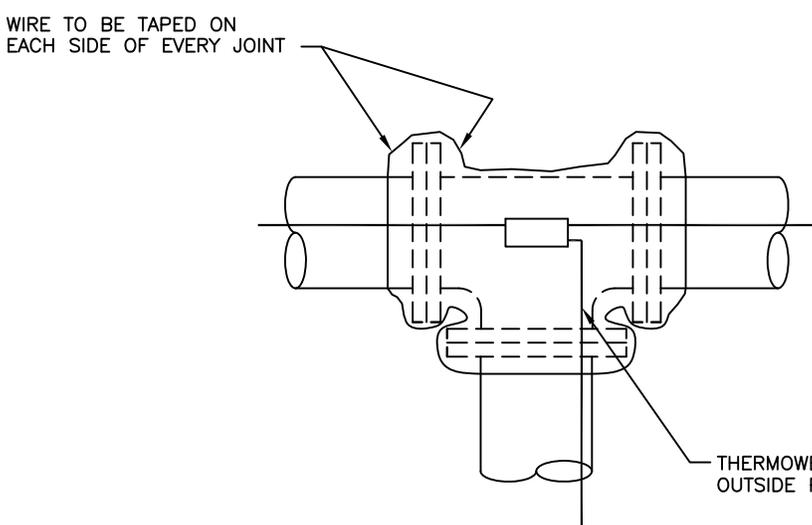
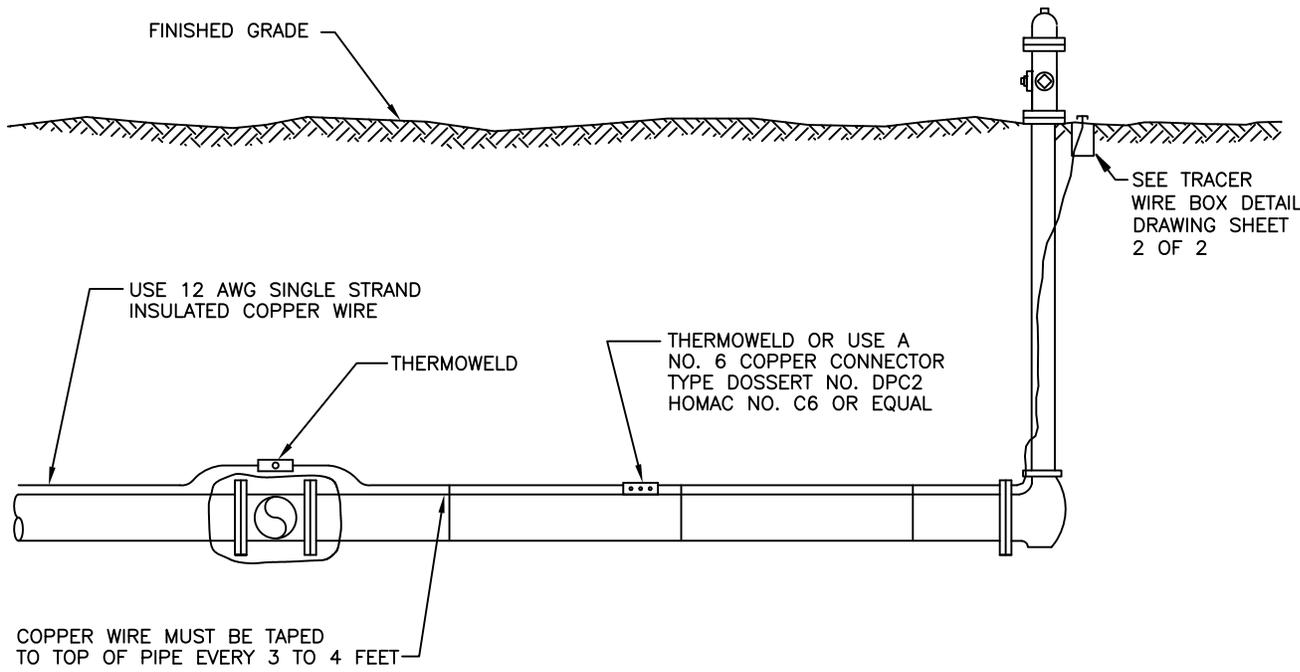
TOP VIEW

NOTE:
 REINFORCEMENT NOT SHOWN.



FRONT VIEW



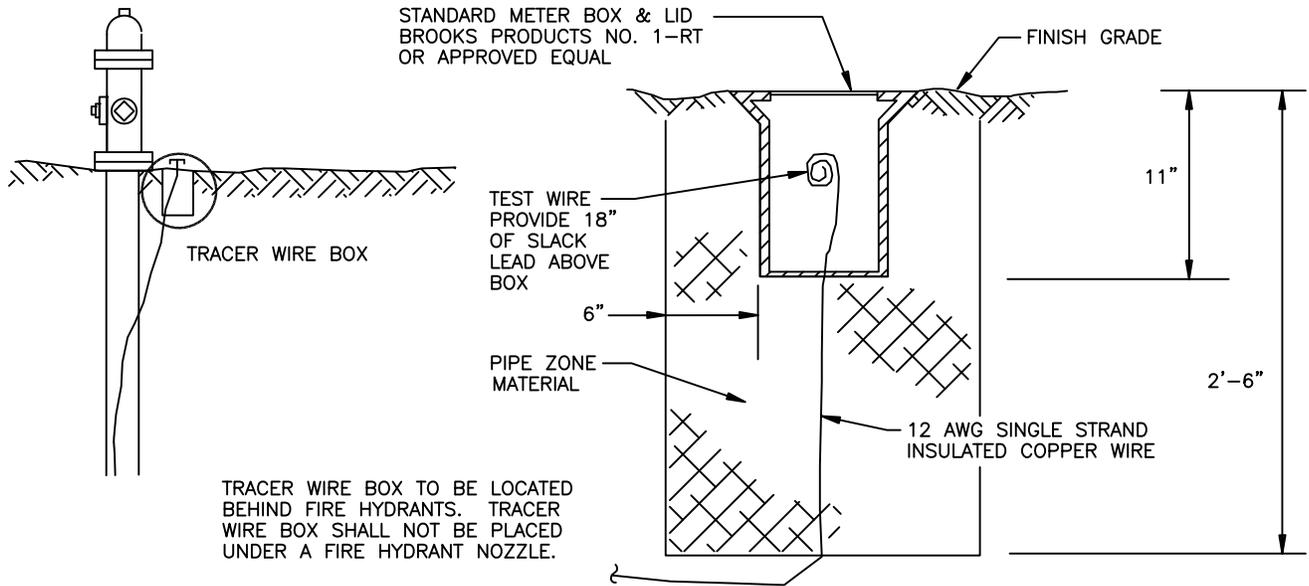


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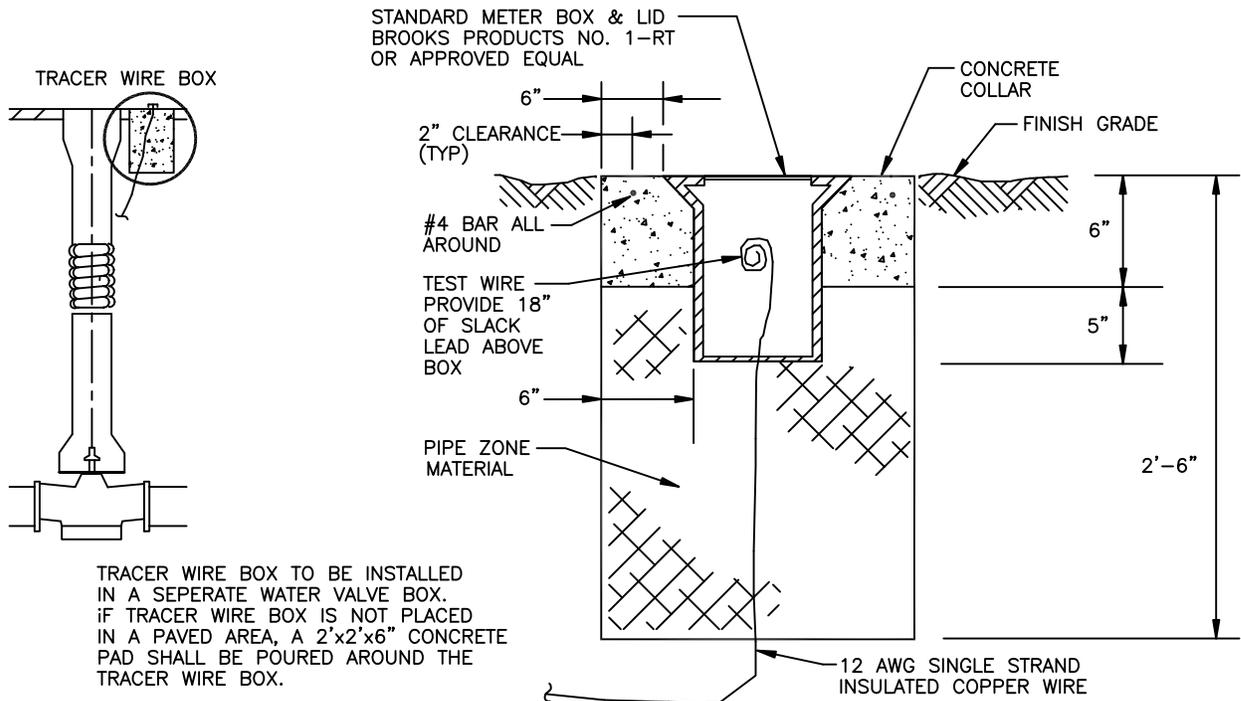


DRAWING TITLE: **TRACER WIRE**
 DRAWING NUMBER: **W32A (1 OF 2)**
 DRAWN BY: **C. GERATY** APPROVED BY: **G. BEHLEN**

REV. DATE: **01/2016**



TRACER WIRE BOX AT FIRE HYDRANT



TRACER WIRE BOX FOR AREA WITH NO FIRE HYDRANT

The Town of
ERIE
COLORADO



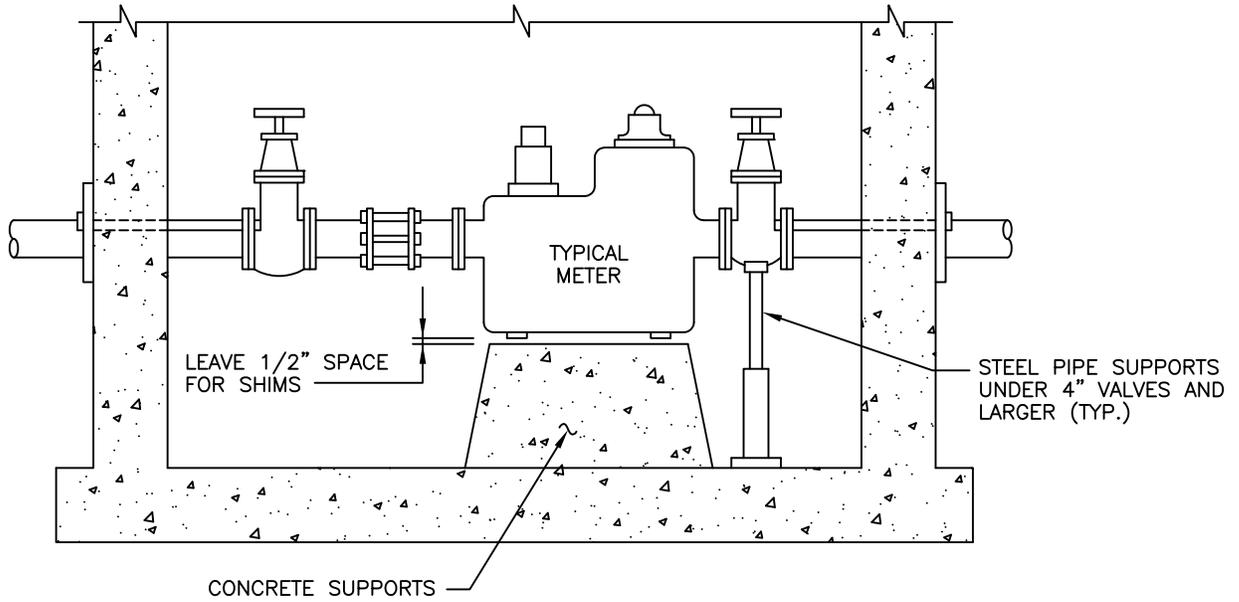
DRAWING TITLE: TRACER WIRE

DRAWING NUMBER: W32B (2 OF 2)

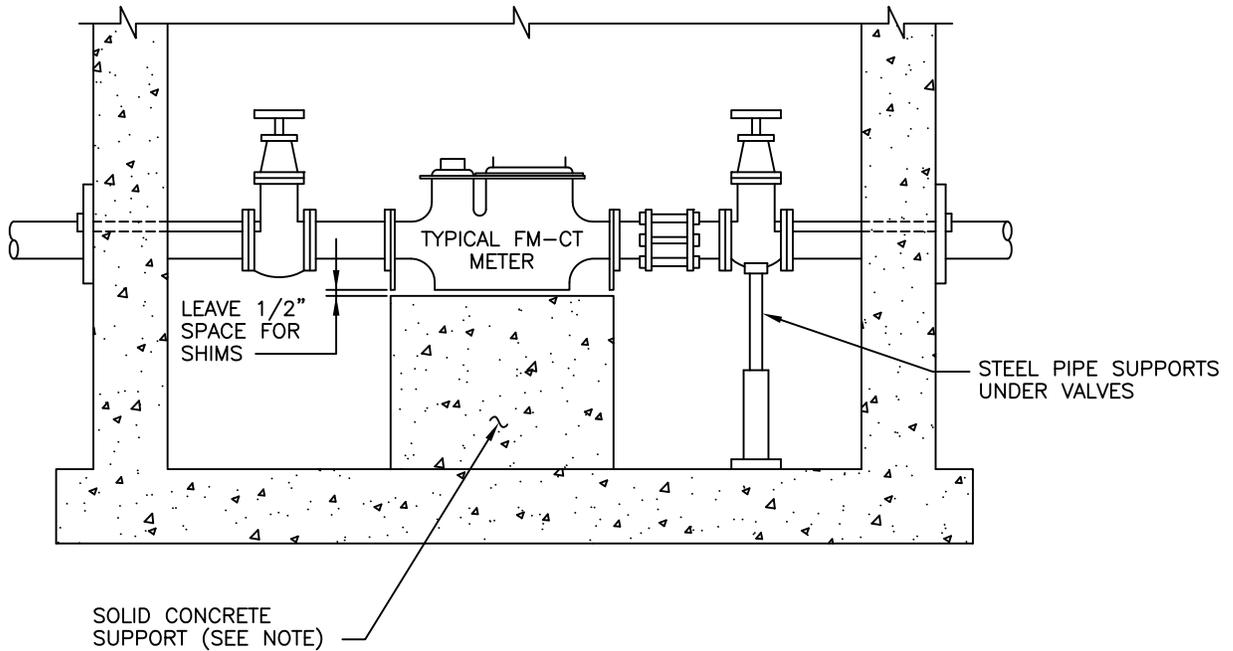
DRAWN BY: C. GERATY

APPROVED BY: G. BEHLEN

REV. DATE: 01/2016



TYPICAL CONCRETE METER SUPPORTS
FOR 2", 3", 4", 6", 8", & 10" METERS



TYPICAL CONCRETE METER SUPPORTS
FOR F.M.-C.T. METERS

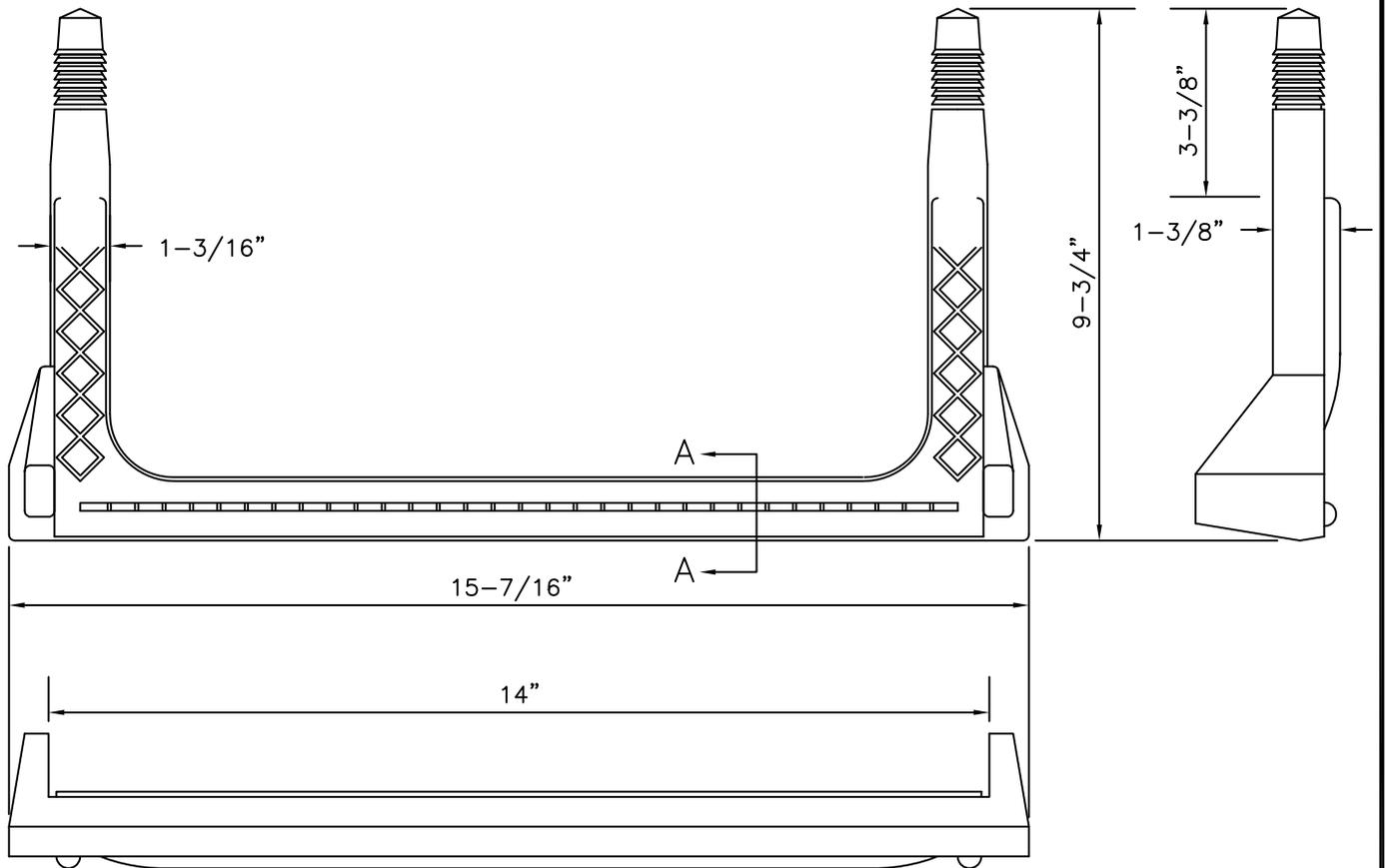
NOTE:

SOLID CONCRETE BASE EXTENDS UNDER THE FM-CT METER BY PASS FOR 6", 8", AND 10".

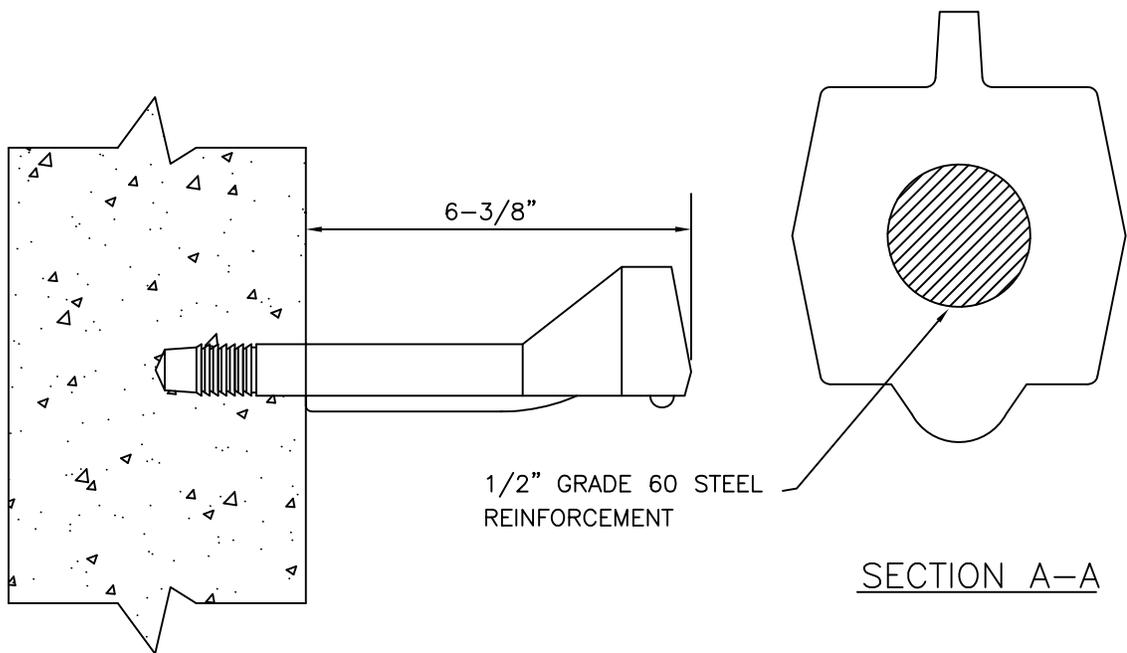
SIZE OF CONCRETE SUPPORT

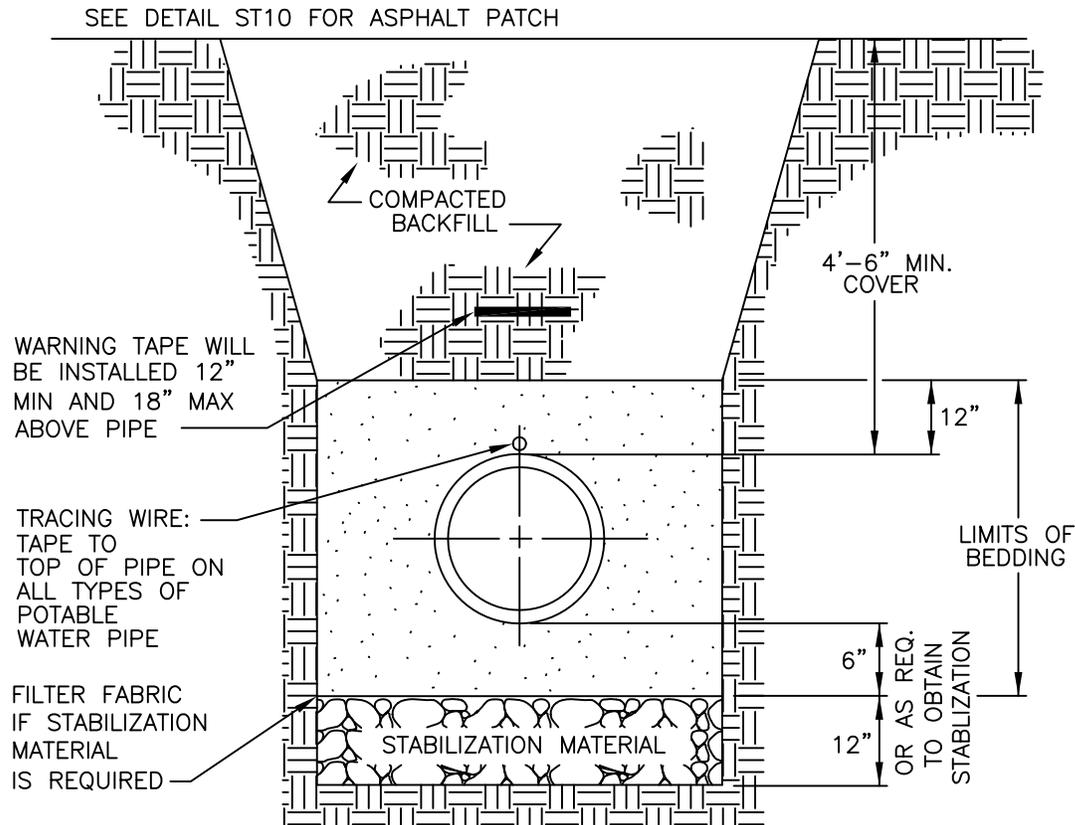
6" FM-CT	W=3'-9"	L=3'-0"
8" FM-CT	W=4'-5"	L=3'-8"
10" FM-CT	W=5'-8"	L=4'-8"





COPOLYMER POLYPROPYLENE PLASTIC





NOTES:

1. COMPACTION SHALL BE AS FOLLOWS: PIPE ZONE BEDDING 6" UNDER AND 12" OVER PIPE WILL REQUIRE 90% S.P.D. TRENCH ZONE ABOVE BEDDING MATERIALS, FULL TRENCH SECTION IN ROADWAY OR STREET R.O.W. LIMITS WILL REQUIRE 95% S.P.D. TRENCH ZONE ABOVE BEDDING MATERIALS, OUTSIDE OF STREET R.O.W. WILL REQUIRE 90% S.P.D.
2. 14 AWG. STRANDED COPPER WIRE SHALL BE INSTALLED AS TRACING WIRE ABOVE ALL POTABLE WATER PIPES. THE WIRE SHALL BE CONNECTED AND COME TO THE SURFACE BEHIND THE FIRE HYDRANTS IN A TEST BOX.
3. FILTER FABRIC IS REQUIRED IF STABILIZATION MATERIAL IS USED. THE FABRIC SHALL BE INSTALLED AS SHOWN IN THE DETAIL.
4. TRENCH TO BE BRACED OR SHEETED AS NECESSARY FOR THE SAFETY OF THE WORKMEN AND PROTECTION OF OTHER UTILITIES IN ACCORDANCE WITH APPLICABLE LOCAL, STATE AND FEDERAL SAFETY REGULATIONS.
5. PIPE SHALL BE BEDDED FROM 6" BELOW THE BOTTOM OF THE PIPE TO 12" ABOVE THE TOP OF THE PIPE.
6. TRENCH WIDTH SHALL NOT BE MORE THAN 24" NOR LESS THAN 12" WIDER THAN THE LARGEST OUTSIDE DIAMETER OF THE PIPE.



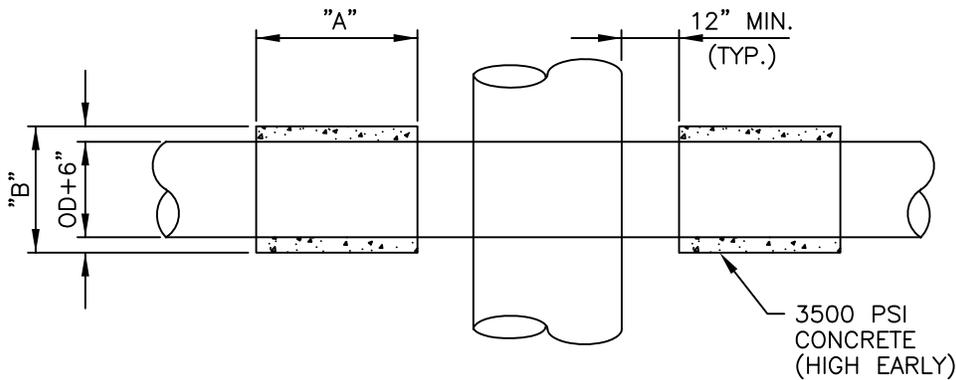
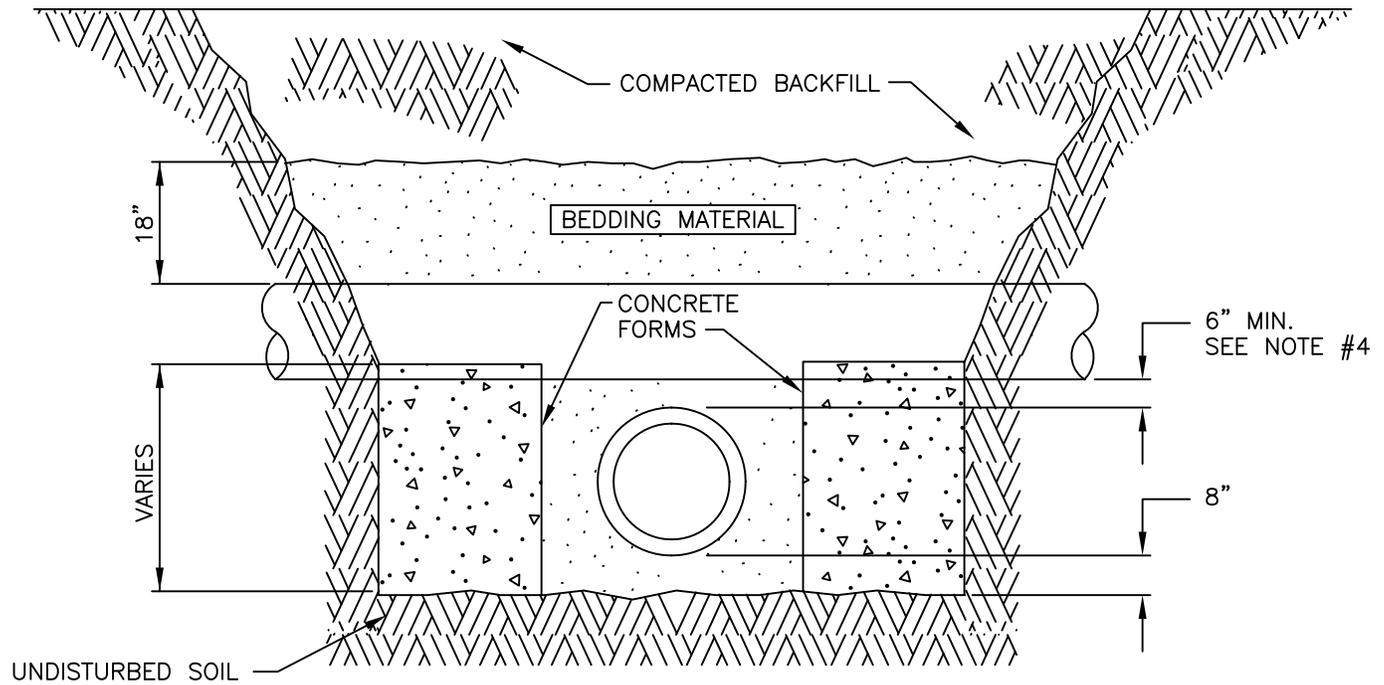
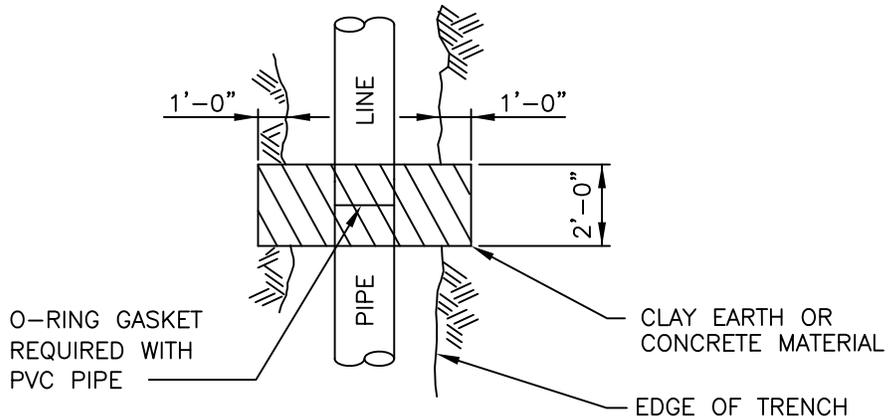


TABLE	
"A"	"B"
PIPES $\leq 12"$ = 12"	PIPE O.D. + 6" ON BOTH SIDES.
PIPES $> 12"$ = 18"	

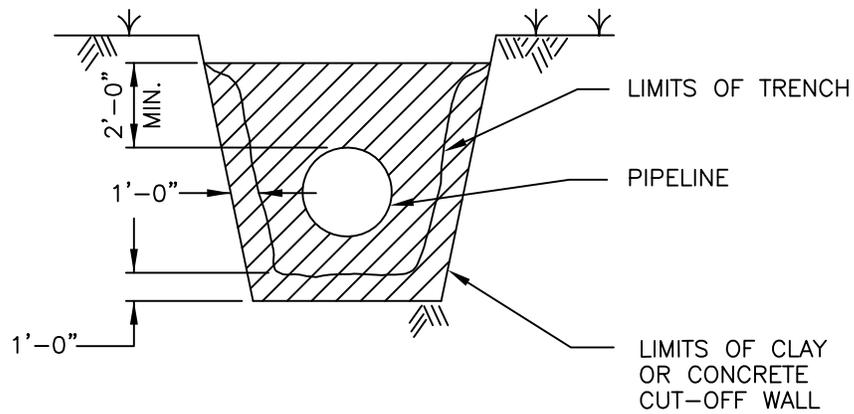
NOTES:

1. PIPE SECTIONS SHALL BE CENTERED OVER THE PIPE BEING CROSSED.
2. SIZES ABOVE 24" WILL BE DETERMINED BY THE ENGINEER.
3. A BOND BREAKER SHOULD BE PLACED BETWEEN THE CONCRETE AND THE PIPE BEING SUPPORTED.
4. IF THE CROSSING INVOLVES A WATER LINE AND THERE IS 6" OF CLEARANCE, OR THERE IS LESS THAN 4' OF COVER OVER THE UPPER PIPE, A FIBER BOARD INSULATION (DOW 2" EXTRUDED POLYSTYRENE IN ACCORDANCE WITH ASTM-C578 OR APPROVED EQUAL) MUST BE INSTALLED BETWEEN THE PIPES. THE BOARD SHOULD EXTEND 2' BEYOND THE OUTSIDE EDGES OF BOTH PIPES.





PLAN

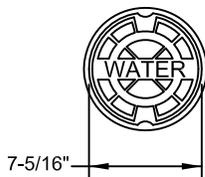
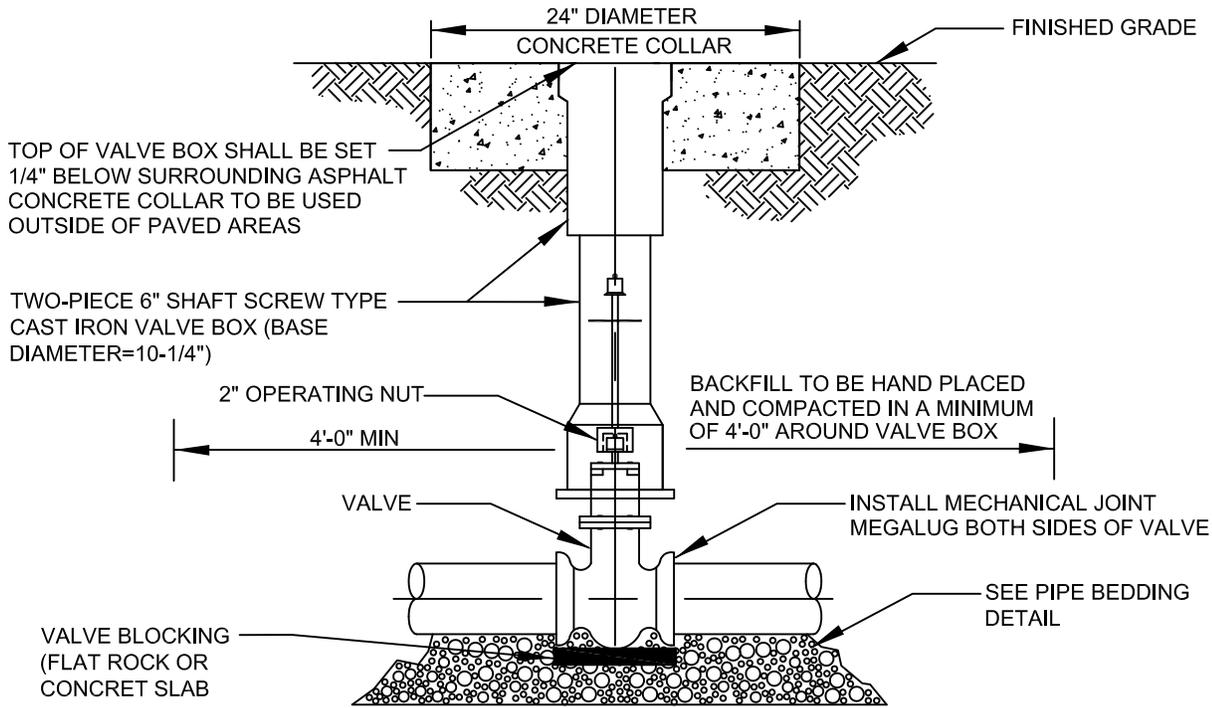


SECTION

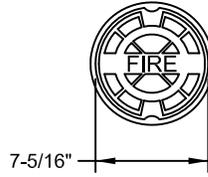
NOTES:

1. CLAY OR CONCRETE WALL EXTENDS A MINIMUM OF 12" INTO UNDISTURBED SOIL ON EACH SIDE AND ON BOTTOM OF TRENCH.
2. CLAY MATERIAL TO BE CLASSIFIED AS CL, CH, OR OH.
3. APPROVED FLOW-FILL MATERIAL MAY BE USED INSTEAD OF CLAY MATERIAL.





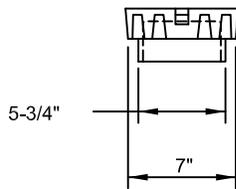
POTABLE VALVE BOX COVER PLAN



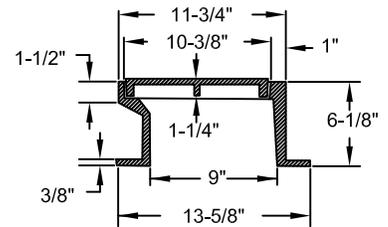
FIRE VALVE BOX COVER PLAN



NON-POTABLE VALVE BOX COVER PLAN



POTABLE & FIRE VALVE BOX COVER ELEVATION



NON-POTABLE VALVE BOX COVER ELEVATION

NOTES:

1. POTABLE & FIRE VALVE BOX LID RESTS INSIDE THE UPPER VALVE BOX SECTION.
2. NON-POTABLE VALVE BOX LID SLIDES OVER THE TOP OF THE UPPER VALVE BOX SECTION.
3. NON-POTABLE, WATER OR FIRE CAST IN TOP OF APPROPRIATE VALVE BOX COVER.
4. VALVE BOX SHALL NOT BE SUPPORTED BY WATER LINE.
5. VALVE BOX TO BE PLUMB AND CENTERED OVER NUT.
6. UTILIZING A VALVE BOX ALIGNMENT DEVICE IS OPTIONAL.
7. IF 2" OPERATING NUT IS MORE THAN 6' BELOW FINISHED GRADE, A VAULT NUT EXTENDER SHALL BE INSTALLED TO PUT THE VALVE NUT AT AN ELEVATION OF 4' BELOW FINISHED GRADE.

The Town of
ERIE
COLORADO



DRAWING TITLE: **STANDARD VALVE AND BOX**

DRAWING NUMBER: **W38**

DRAWN BY: **D. JENKINS** APPROVED BY: **G. BEHLEN** REV. DATE: **1/2015**