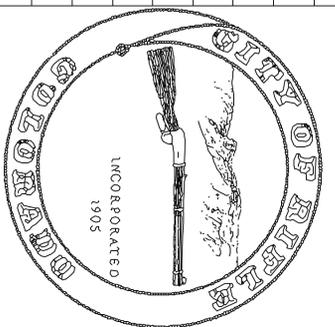


TYPICAL TRENCH SECTION

PIPE DIAMETER	MINIMUM WIDTH	MAXIMUM WIDTH
4"	1'-4"	2'-4"
6"	1'-6"	2'-6"
8"	1'-8"	2'-8"
12"	2'-0"	3'-0"
16"	2'-4"	3'-4"
20"	2'-8"	3'-8"
24"	4'-0"	5'-0"

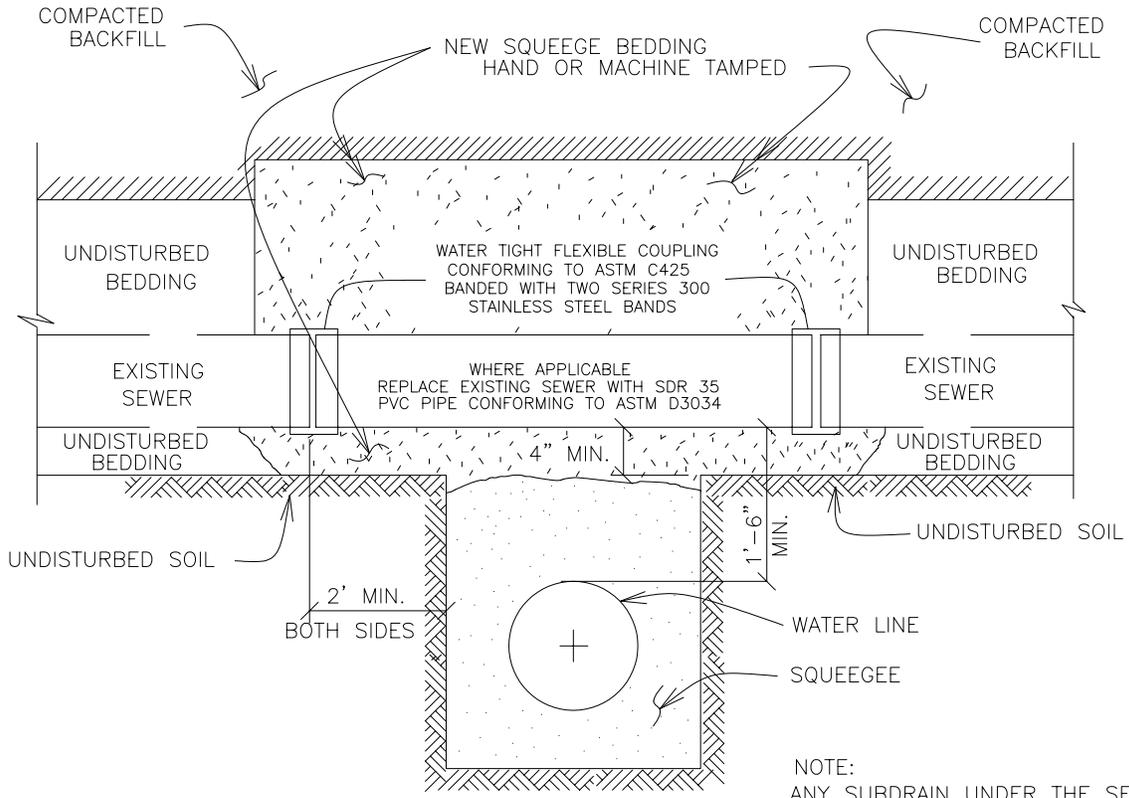
- NOTES:
1. PAVING SHALL COMPLY WITH SECTION 15
 2. TRENCH WALLS TO BE SUPPORTED AS REQUIRED BY O.S.H.A.
 3. ALL DISTURBED SURFACES SHALL BE RESTORED TO ORIGINAL CONDITIONS.
 4. BACKFILL COMPACTION SHALL BE 95% OF MAXIMUM DENSITY AS DETERMINED BY ASTM 0698 OR AASHTO 799.
 5. IF THE EXISTING PAVEMENT IS GREATER THAN 3", MATCH EXISTING WITH NEW PAVEMENT.
 6. IF THE EXISTING ROAD BASE IS GREATER THAN 6", MATCH EXISTING WITH NEW ROAD BASE.

TYPICAL TRENCH SECTION FOR
INSTALLATION OF WATER MAINS

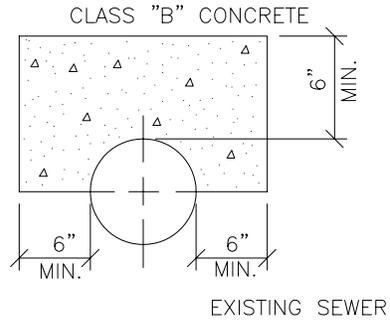
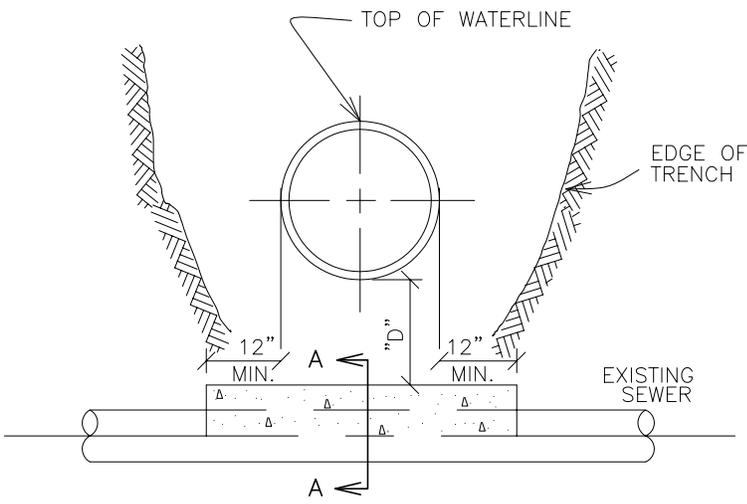


approved: WMS
 date: 11/6/02 scale: NTS dwn: dwg #: W-1
 ENGINEERING DIVISION OF PUBLIC WORKS DEPT.

No. Dwn. Date. Revision



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

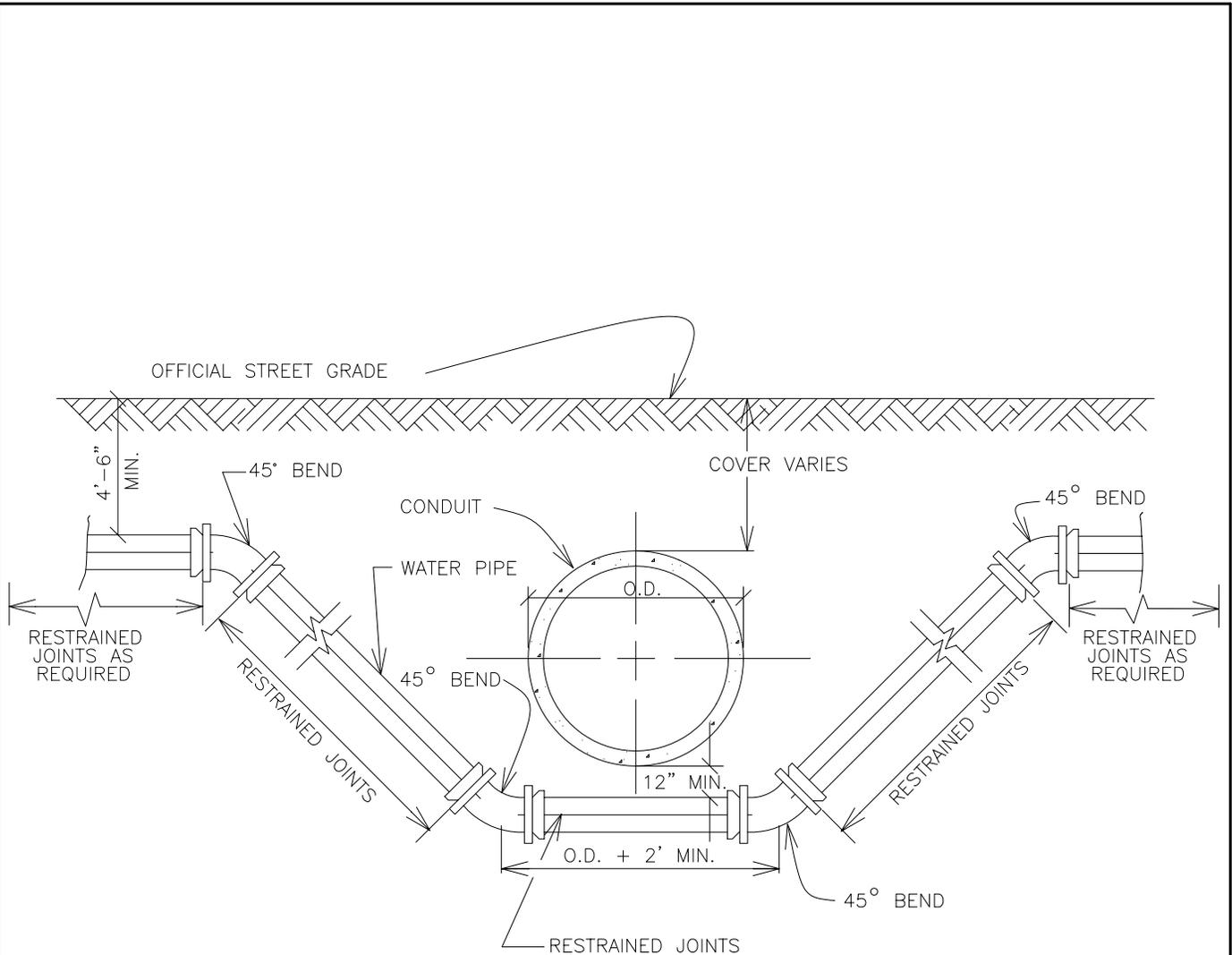
NOTE:
 ALL EXISTING SEWER DAMAGED DURING INSTALLATION MUST BE REPLACED WITH PVC PIPE.

No.	Dwn.	Date.	Revision



CROSSING STORM AND
 SANITARY SEWERS

approved: WMS
 date: 11/6/02 | scale: NTS | dwn: | dwg #: W-10
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NOTES:

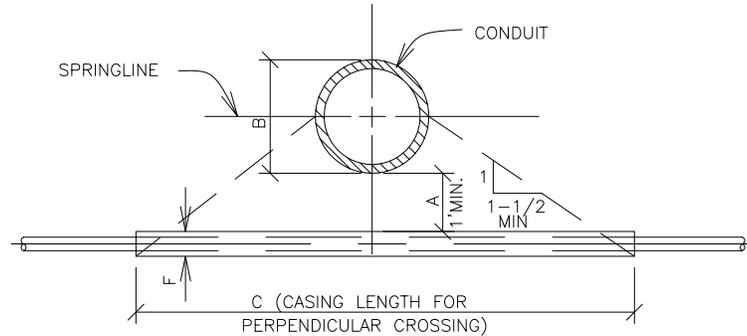
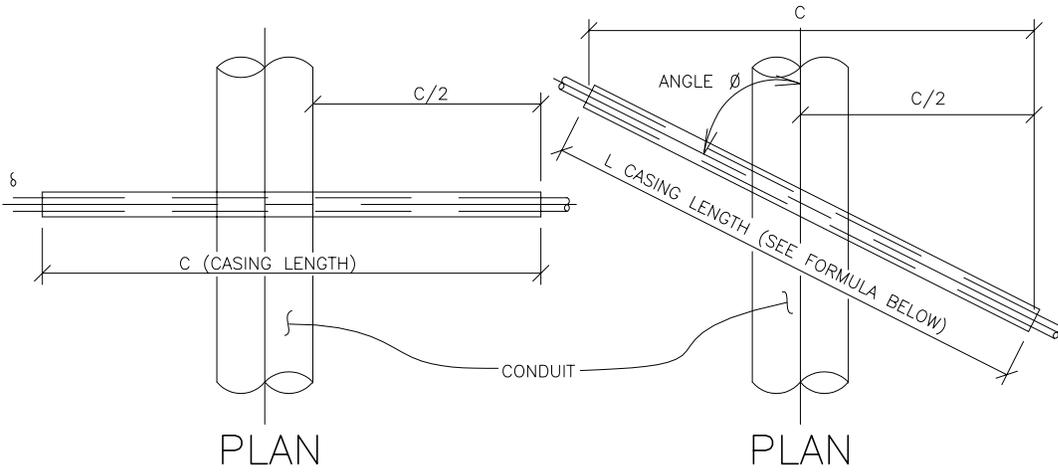
- 1.) LENGTH OF EXTENSION OF PIPE AND RESTRAINED JOINTS SHALL BE IN ACCORDANCE WITH THESE ENGINEERING STANDARDS.
- 2.) CATHODIC PROTECTION SHALL BE AS REQUIRED IN ACCORDANCE WITH THESE ENGINEERING STANDARDS.
- 3.) A BORED CROSSING MAY BE REQUIRED BY THE CITY ENGINEER.

No.	Dwn.	Date.	Revision



OPEN CUT CROSSING BENEATH CONDUIT

approved: WMS
 date: 11/6/02 scale: NTS dwn: dwg #: W-11
 ENGINEERING DIVISION OF PUBLIC WORKS DEPT.



PROFILE

FORMULA FOR FINDING C:

$$C = B + (2)(1.5) \left[\frac{B}{2} + A + F \right]$$

PERPENDICULAR CROSSING CASING LENGTH ——— C

O.D. CONDUIT ——— B

CONSTANT ——— (2)

RATIO OF MIN. SLOPE ——— 1.5

CASING O.D. ——— F

VERTICAL DISTANCE BETWEEN CASING AND CONDUIT. ——— A

1/2 O.D. CONDUIT ——— B/2

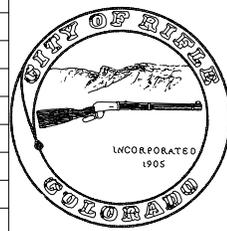
FORMULA FOR FINDING L:

$$L = \frac{C}{\sin \theta}$$

NOTES:

- 1 - FINAL APPROVAL OF BORING AND CASING METHOD AND MATERIALS SHALL BE OBTAINED FROM THE ENGINEER PRIOR TO CONSTRUCTION.
- 2 - SOIL AT ENDS OF CASING SHALL BE STABLE AT ALL TIMES.
- 3 - CATHODIC PROTECTION SHALL BE PROVIDED FOR STEEL CASING AS REQUIRED BY THE ENGR.
- 4 - CASING PIPE SHALL BE ONE PIECE, STRAIGHT, ROUND AND OF NEW MATERIAL.

No.	Dwn.	Date.	Revision



BORED CROSSINGS BENEATH CONDUITS

approved: WMS
 date: 11/6/02 | scale: NTS | dwn: | dwg #: W-12
 ENGINEERING DIVISION OF PUBLIC WORKS DEPT.

APS MODEL AW WRAP AROUND RUBBER END SEALS OR EQUAL.

PUSH-ON SINGLE GASKET CARRIER PIPE.

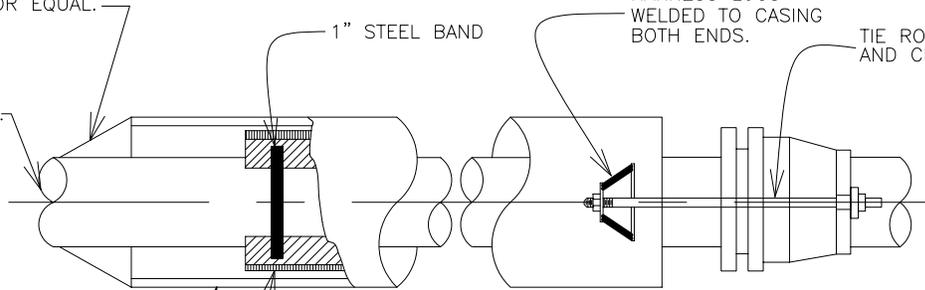
STEEL CASING PIPE (SEE TABLE BELOW FOR SIZE AND WALL THICKNESS).

REDWOOD RUNNER OR CASING SPACER AND INSULATOR

SLED DETAIL

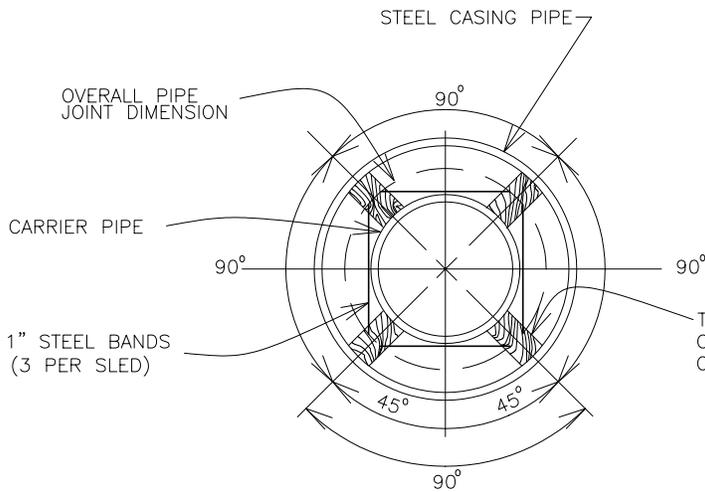
HARNES LUGS WELDED TO CASING BOTH ENDS.

TIE RODS AND CLAMPS



NOTES:

- 1 - RUNNER LENGTH TO BE 75% OF LAYING LENGTH.
- 2 - SEE SHEET 12 FOR CASING LENGTH.
- 3 - HARNES LUGS TO BE INSULATED FROM D.I. PIPE.
- 4 - CASING SPACERS AND INSULATORS TO BE PLACED AT 10' INTERVALS ALONG CARRIER PIPE WITH AN ADDITIONAL SPACER WITHIN 6" OF BOTH CASING PIPE ENDS.
- 5 - HARNES LUGS TO BE INSULATED FROM DUCTILE IRON OR STEEL CARRIER PIPE



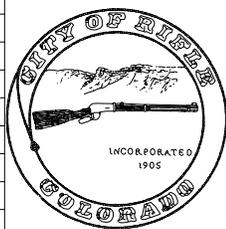
PIPE CASING DETAIL

NOTES:

- 1.) CENTERING RESTRAINING CASING SPACERS AND INSULATORS MAY BE USED AS AN ALTERNATIVE TO TREATED REDWOOD RUNNERS.
- 2.) TRENCH LAID CASINGS SHALL BE DESIGNED AND INSTALLED TO CONDUIT STANDARDS.

CARRIER PIPE NOMINAL DIA.	CASING PIPE		MINIMUM RUNNER SIZE
	MIN. O.D.	MIN. WALL THICK	
4"	12"	0.375"	2" x 4"
6"	16"	0.375"	2" x 4"
8"	18"	0.375"	2" x 4"
12"	22"	0.375"	2" x 4"
16"	28"	0.375"	2" x 6"
20"	32"	0.500"	2" x 6"
24"	36"	0.500"	2" x 6"

No.	Dwn.	Date.	Revision

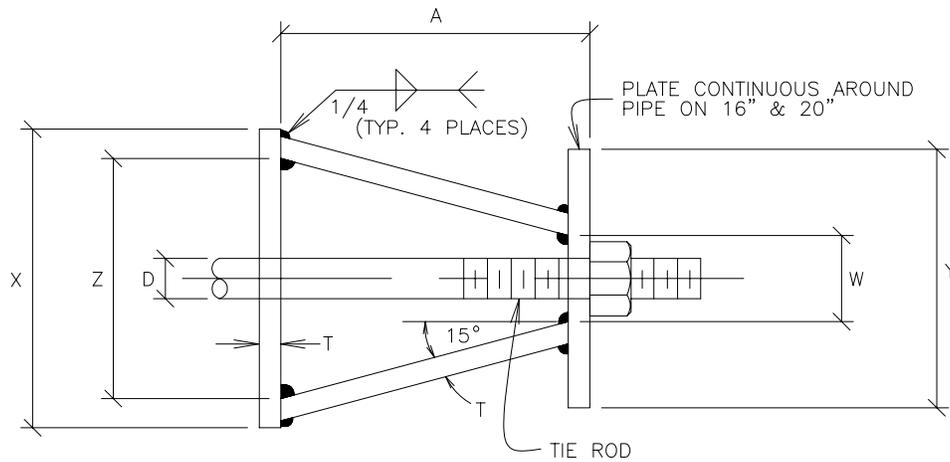


BORE CASING DETAILS

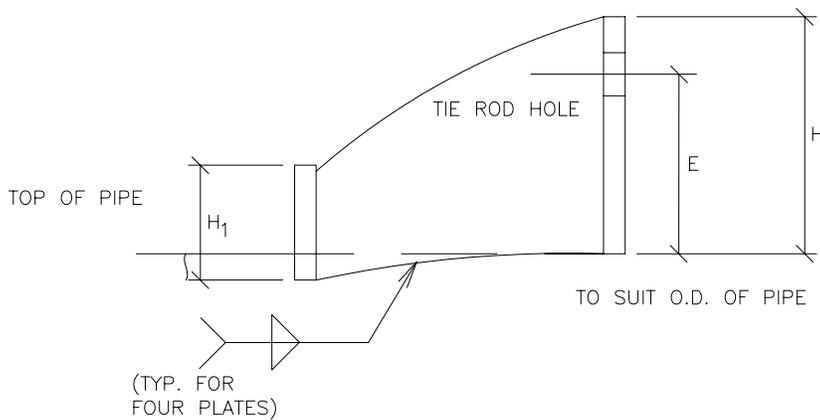
approved: WMS

date: 11/6/02 | scale: NTS | dwn: | dwg #: W-13

ENGINEERING DIVISION OF PUBLIC WORKS DEPT.



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.

No.	Dwn.	Date.	Revision

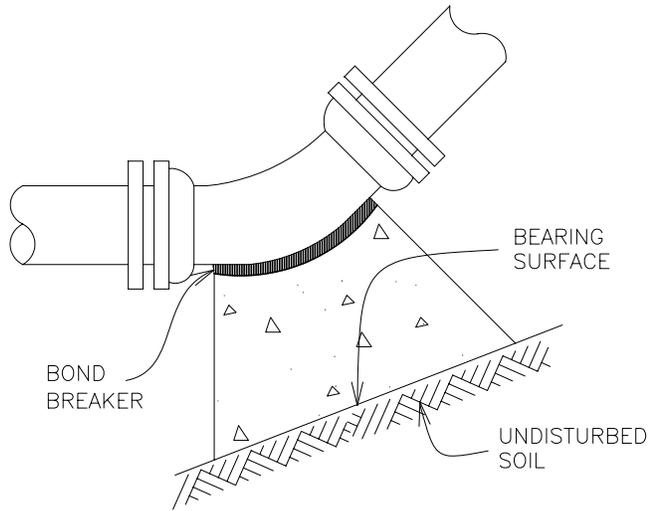


COMBINATION FLANGED
HARNESS LUG DETAILS

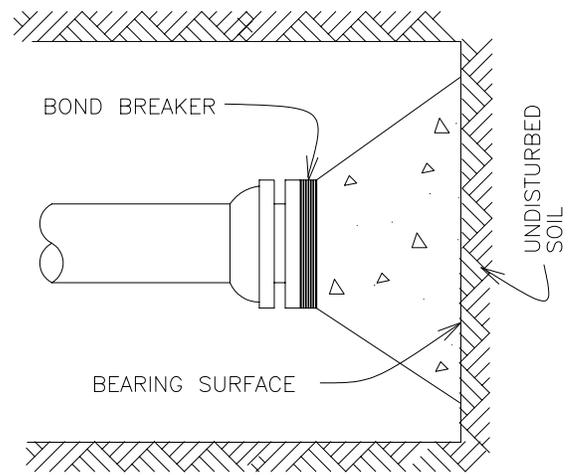
approved: WMS

date: 11/6/02 | scale: NTS | dwn: | dwg #: W-14

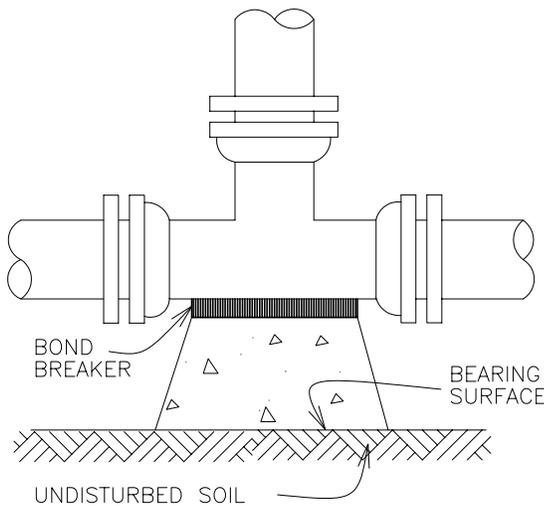
ENGINEERING DIVISION OF PUBLIC WORKS DEPT.



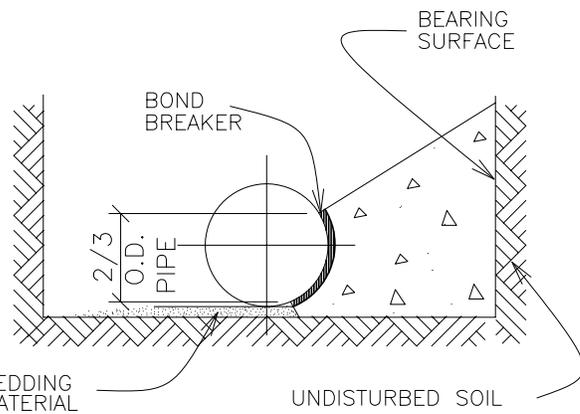
11¼°, 22½°, 45° AND 90° BENDS



DEAD END



TEE



TYPICAL CROSS SECTION

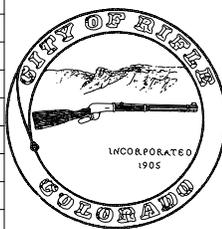
MINIMUM BEARING SURFACE AREA
(IN SQUARE FEET)

NOTES:

- 1.) BEARING SURFACES SHOWN IN CHART ARE MINIMUM.
- 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 psf SOIL BEARING CAPACITY.
- 4.) ALL BENDS, TEE BRANCHES AND DEAD ENDS SHALL BE RESTRAINED AND KICK BLOCKED.

SIZE OF PIPE	BENDS				TEE OR DEAD END
	11¼°	22½°	45°	90°	
4"	1.00	1.00	1.00	1.50	1.50
6"	1.00	1.25	2.25	3.00	3.00
8"	1.00	2.00	4.00	5.25	5.25
12"	2.25	4.50	8.75	11.25	11.25
16"	3.75	7.50	14.50	27.00	19.00
20"	5.00	10.00	19.50	35.50	25.00
24"	7.00	14.00	27.75	51.00	36.00

No.	Dwn.	Date.	Revision



CONCRETE KICKBLOCKS
BEARING SURFACES AND
INSTALLATION

approved: WMS
date: 11/6/02 | scale: NTS | dwn: | dwg #: W-16
ENGINEERING DIVISION OF PUBLIC WORKS DEPT.

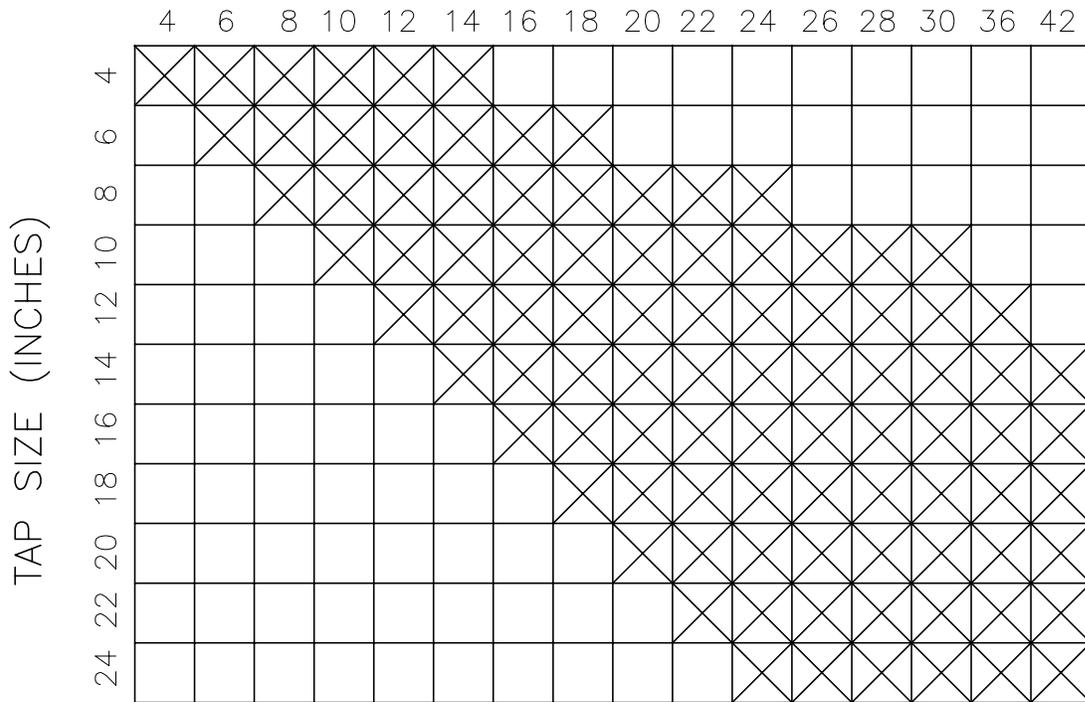
CONCRETE KICKBLOCKS

WATER MAIN AND TAP SIZE COMBINATIONS WHICH REQUIRE A CONCRETE KICKBLOCK BEHIND THE MAIN AT THE TAPPING SLEEVE OR SADDLE.

ALL WATER MAINS



INDICATED CONCRETE KICKBLOCK REQUIRED
MAIN SIZE (INCHES)



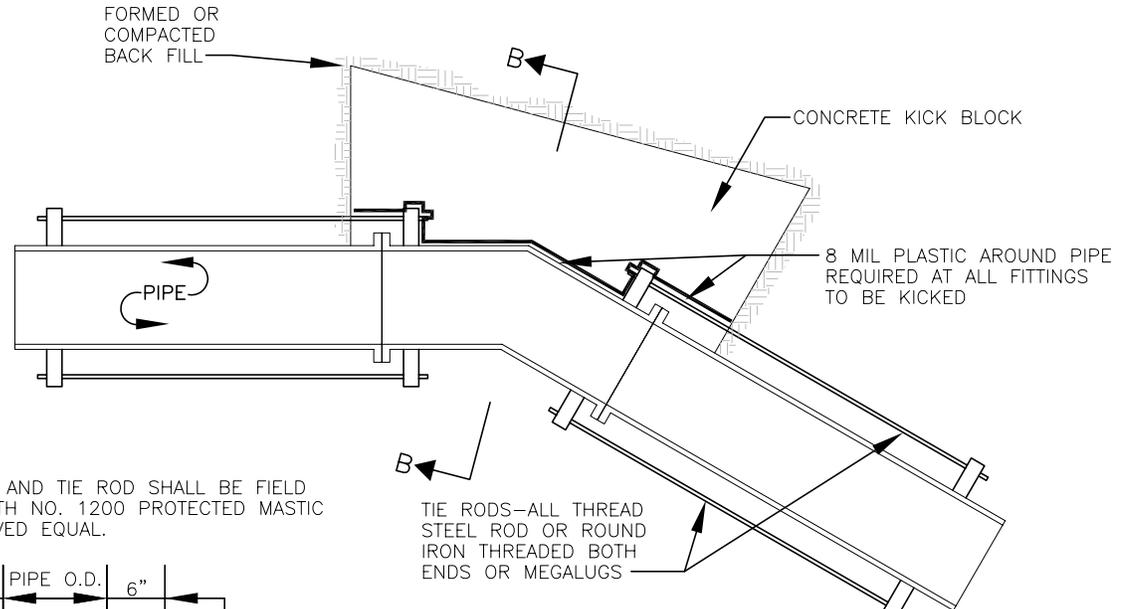
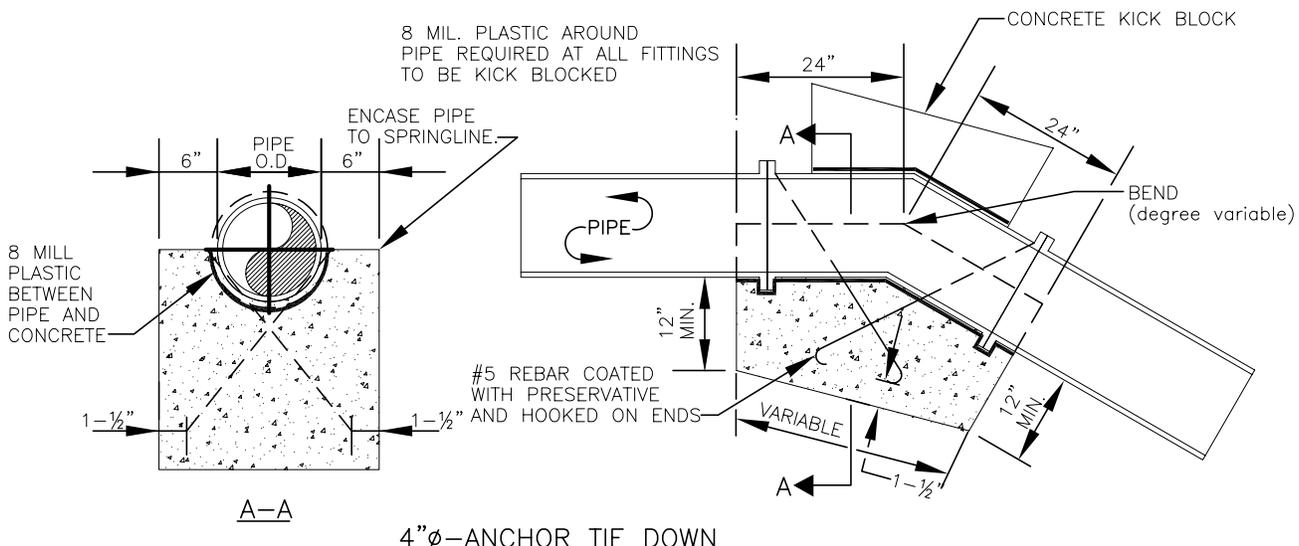
ANY KICKBLOCK REQUIREMENTS FOR WATER MAIN AND TAP SIZE COMBINATIONS OTHER THAN THOSE SHOWN ABOVE WILL REQUIRE SPECIAL DESIGN APPROVAL BY THE ENGINEERING DIVISION.

No.	Dwn.	Date	Revision

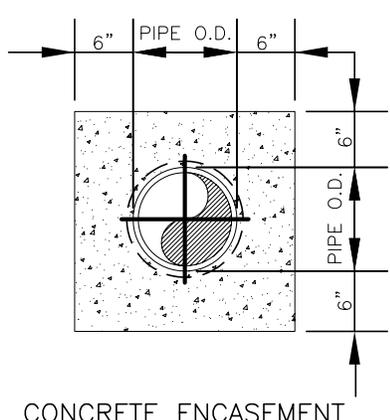


CONCRETE KICKBLOCKS FOR WET TAPS

approved: WMS
 date: 11/6/02 | scale: NTS | dwn: | dwg #: W-17
 ENGINEERING DIVISION OF PUBLIC WORKS DEPT.

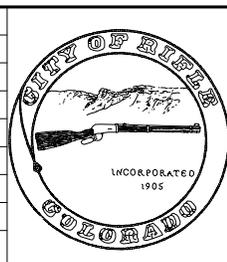


NOTE:
ALL BOLTS AND TIE ROD SHALL BE FIELD COATED WITH NO. 1200 PROTECTED MASTIC OR APPROVED EQUAL.



VERTICAL PLANE ANCHOR TIE DOWN 4" - 24" WATER PIPE

No.	Dwn.	Date.	Revision



REACTION BLOCKING ALL
THREAD ANCHOR

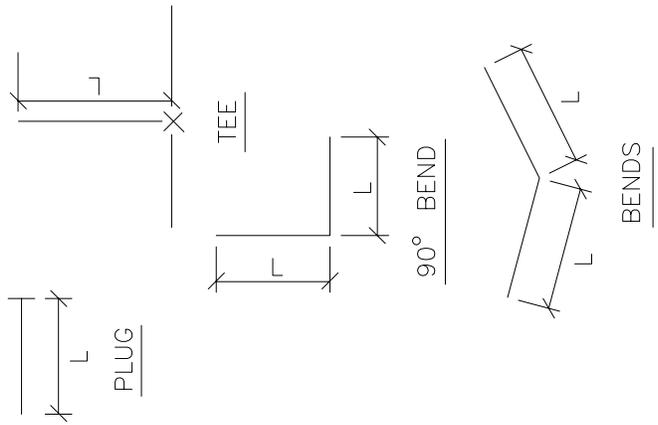
approved: WMS
date: 11/6/02 scale: NTS dwn: dwg #: W-18
ENGINEERING DIVISION OF PUBLIC WORKS DEPT.

ROD DIAMETER, GRADE & LENGTH OF RESTRAINED PIPE

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

NOTES:

- 1.) LENGTH OF RESTRAINED PIPE MEASURED EACH WAY FROM BENDS.
- 2.) CLAMPS, RODS OR MEGALUGS NOT ALLOWED FOR 30" & LARGER PIPES.
- 3.) D=DIAMETER, L=LENGTH, G=GRADE, M.S.=MILD STEEL, H.S.=HIGH STRENGTH.
- 4.) MINIMUM 4.5' GROUND COVER REQUIRED.
- 5.) BASED ON 150 PSI INTERNAL PRESSURE, FOR L AND PRESSURES LISTED ON SHEET 20 FOR D AND G.
- 6.) M.S. = MILD STAINLESS STEEL ROD ASTM A36 (36,000 psi TENSILE STRENGTH).
- 7.) H.S. = HIGH STRENGTH STAINLESS STEEL ROD ASTM A193 GRADE B7 (125,000 psi TENSILE STRENGTH)
- 8.) NUTS SHALL BE ASTM A307 GRADE A OR B HEXAGON HEAVY SERIES. HIGH STRENGTH NUTS SHALL BE ASTM A194 GRADE 2H
- 9.) SEE TIE ROD DETAIL DRAWING. ALSO, TIE ROD COUPLING DETAILS, CLAMP DETAILS AND SET CLAMP DETAILS.
- 10.) LENGTH REFERS TO THE AMOUNT OF PIPE WHICH MUST BE RESTRAINED TOGETHER AND IS NOT NECESSARILY THE LENGTH OF THE RODS.
- 11.) LENGTH OF RESTRAINED PIPE CHART IS ALSO FOR THE LENGTH OF JOINT RESTRAINT FOR MEGALUGS.
- 12.) CROSSES MUST BE RESTRAINED IN ALL APPLICABLE DIRECTIONS.
- 13.) 12" AND SMALLER IN LINE VALVES AND TEES SHALL HAVE A MECHANICAL JOINT RESTRAINT DEVICE ON EACH SIDE OF THE FITTING OR VALVE.
- 14.) CONTRACTOR MUST NOTIFY THE UTILITIES DIVISION WHEN EXCAVATING NEXT TO AN EXISTING LIVE VALVE SO THAT A SECOND VALVE UPSTREAM OR DOWNSTREAM CAN BE CLOSED.

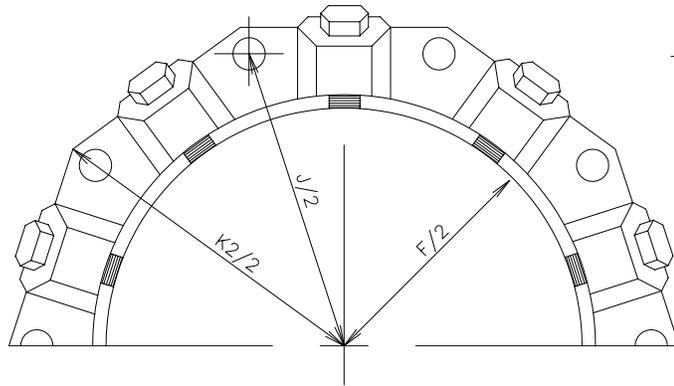


No.	Dwn.	Date.	Revision



LENGTH OF RESTRAINED PIPE

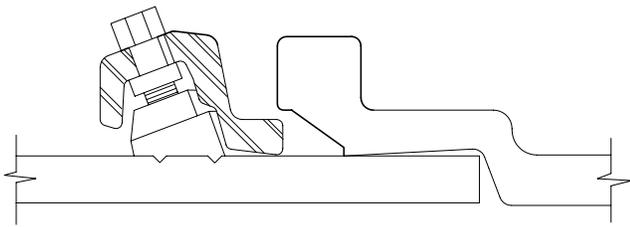
approved: WMS
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 ENGINEERING DIVISION OF PUBLIC WORKS DEPT.



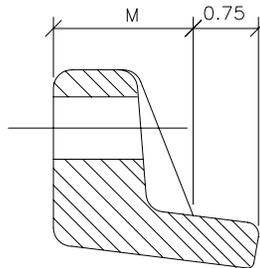
NOTES:

OTHER MECHANICAL JOINT RESTRAINT DEVICES APPROVED ARE UNI-FLANGE SERIES 1500 AND STAR PIPE ALLGRIP SERIES 3600.

MECHANICAL JOINT RESTRAINT



WEDGE DETAIL

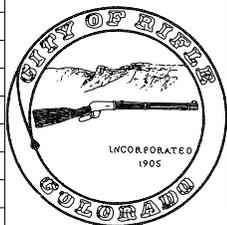


BOLT HOLE DETAIL

DIMENSIONS

	NOMINAL PIPE SIZE	NO. OF BOLTS	NO. OF WEDGES	K2 INCHES	J INCHES	F INCHES	M INCHES	
P V C	4"	4	4	9.13	7.50	4.90	0.50	P V C
	6"	6	6	11.13	9.50	7.00	0.50	
	8"	6	6	13.38	11.75	9.15	0.62	
	12"	8	8	17.88	16.25	13.30	0.75	
	14"	10	10	20.38	18.75	15.49	0.88	
	16"	12	12	22.63	21.00	17.58	0.88	
	18"	12	12	24.88	23.25	19.68	1.13	
	20"	14	14	27.13	25.50	21.79	1.25	
	24"	16	16	31.63	30.00	25.99	1.42	
	30"	20	20	39.12	36.88	32.22	1.50	
D I P	30"	20	20	39.12	36.88	32.17	2.25	D I P
	36"	24	24	46.00	43.75	38.47	2.25	
	42"	28	28	53.48	50.62	44.67	3.88	
	48"	32	32	60.36	57.50	50.97	3.88	

No.	Dwn.	Date	Revision



MECHANICAL JOINT RESTRAINT DETAILS

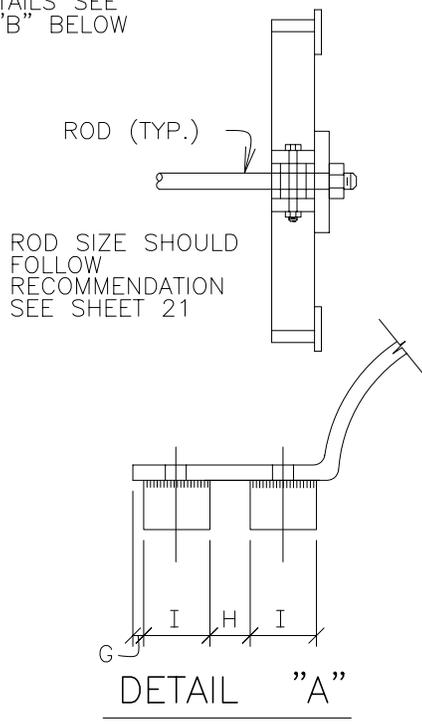
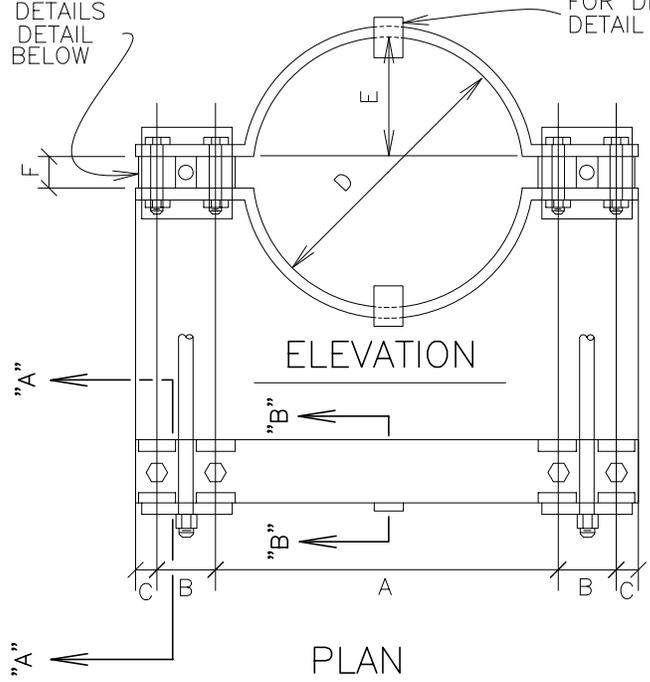
approved: WMS

date: 11/6/02 | scale: NTS | dwn: | dwg #: W-22

ENGINEERING DIVISION OF PUBLIC WORKS DEPT.

FOR DETAILS SEE
"A"
DETAIL
BELOW

FOR DETAILS SEE
DETAIL "B"
BELOW



ROD SIZE SHOULD
FOLLOW
RECOMMENDATION
SEE SHEET 21

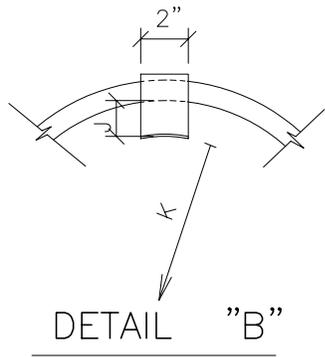
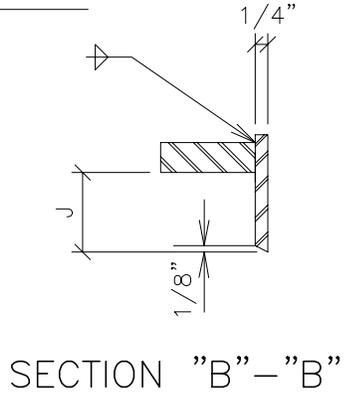
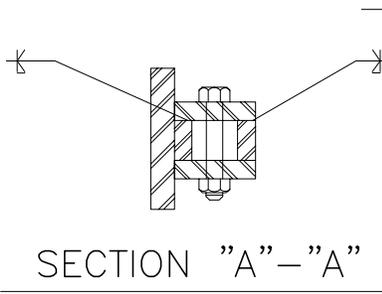


TABLE OF DIMENSIONS FOR CLAMPS

PIPE DIAMETER	BAR SIZE	A		B		C		D		E		F		G		H		I		J		K		BOLT SIZE		PIPE DIAMETER
		BELL CLAMP	BODY CLAMP	BELL CLAMP	BODY CLAMP	BELL CLAMP	BODY CLAMP																			
4	1-1/2 x 1/2	9	7-3/8	3	4	1-1/2	1-1/2	6-1/4	4-3/4	2-5/8	1-7/8			3/8	3/8	1-1/4	1-1/4	2-1/4	2-1/2	5/8	2-1/2	3 x 1-1/2	2-1/2 x 3/8		4	
6	2 x 1/2	11-1/4	9-5/8	3	4	1-1/2	1-1/2	8-1/2	6-7/8	3-3/4	2-15/16							2-1/4	2-1/2	1/2	3-3/4	3-1/2 x 1/2	3-1/2 x 1/2		6	
8	2-1/2 x 1/2	13-5/8	11-7/8	3-1/2	4	1-1/2	1-1/2	10-3/4	9-1/8	4-7/8	4-1/6							2-1/4	2-1/2	5/8	4-3/4	4-1/2 x 1/2	4 x 1/2		8	
12	2-1/2 x 5/8	18-1/4	16-3/8	3-1/2	4	1-1/2	1-1/2	15-1/8	13-1/4	7-1/16	6-1/8							2-1/4	2-1/2	13/16	6-3/4	4-1/2 x 5/8	4-1/2 x 5/8		12	
16	3 x 3/4	23-1/8	20-5/8	4	4-1/2	1-1/2	1-1/2	19-3/4	17-3/8	9-1/4	8-1/16	1-1/4	1-1/4	1/4	1/4	1-1/2	1-1/2	2-1/4	2-3/4	15/16	8-15/16	5-1/2 x 5/8	5-1/2 x 5/8		16	
20	3 x 3/4	27-1/2	25	4	4-1/2	1-1/2	1-1/2	24-1/8	21-5/8	11-5/16	10-1/16	1-1/2	1-1/2	3/8	3/8	1-3/4	1-3/4	2-1/4	2-1/2	1	11-1/16	5-1/2 x 5/8	5-1/2 x 5/8		20	
24	RODS AND CLAMPS NOT ALLOWED.																								24	

NOTE: ALL DIMENSIONS IN INCHES.

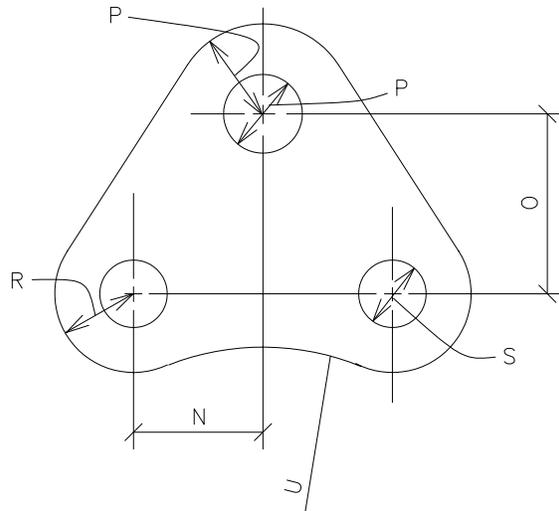
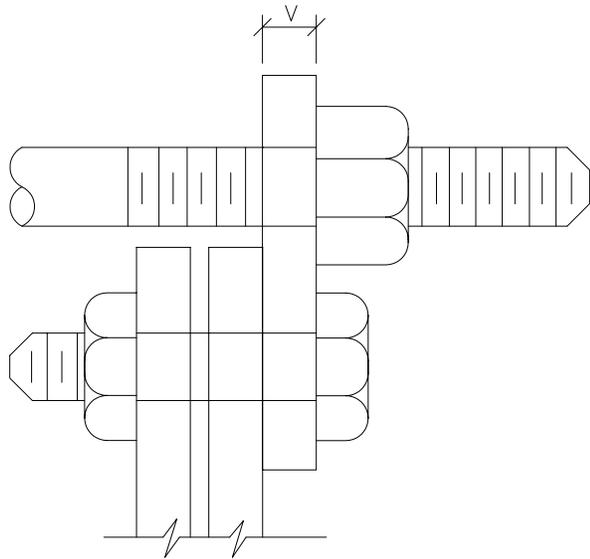
NOTE: NOT FOR USE WITH 18" & 20"
D.I. COMPACT FITTINGS.

No.	Dwn.	Date	Revision



CLAMP DETAILS & DIMENSIONS
FOR USE WITH C.I. & D.I.
FITTINGS ONLY

approved: WMS
date: 11/6/02 | scale: NTS | dwn: | dwg #: W-23
ENGINEERING DIVISION OF PUBLIC WORKS DEPT.



FLANGE LUG DETAIL

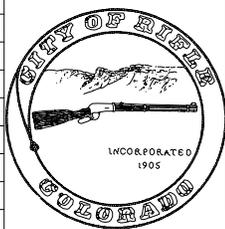
DIMENSIONS (IN INCHES)

PIPE DIA.	N	O	H.S. ROD		M.S. ROD		R	S	U	V	PIPE DIA.
			P	ROD DIA.	P	ROD DIA.					
3	2-1/8	2-9/16	7/8	3/4	7/8	3/4	3/4	5/8	2-3/8	3/4	3
4	1-7/16	2	7/8	3/4	7/8	3/4	3/4	5/8	3-1/8	3/4	4
6	1-13/16	2-1/16	7/8	3/4	7/8	3/4	7/8	3/4	4	3/4	6
8	2-1/4	2-1/4	7/8	3/4	7/8	3/4	7/8	3/4	5-1/8	3/4	8
10	1-7/8	2-1/16	7/8	3/4	7/8	3/4	1	7/8	6-1/4	3/4	10
12	2-1/4	2-5/16	7/8	3/4	-	-	1	7/8	7-5/8	1	12
16	2-1/8	2-7/16	1-1/8	1	-	-	1-1/8	1	9-5/8	1-1/8	16
20	2	2-5/8	1-3/8	1-1/4	-	-	1-1/4	1-1/8	11-3/8	1-1/4	20
24	RODS AND CLAMPS NOT ALLOWED										24

NOTES:

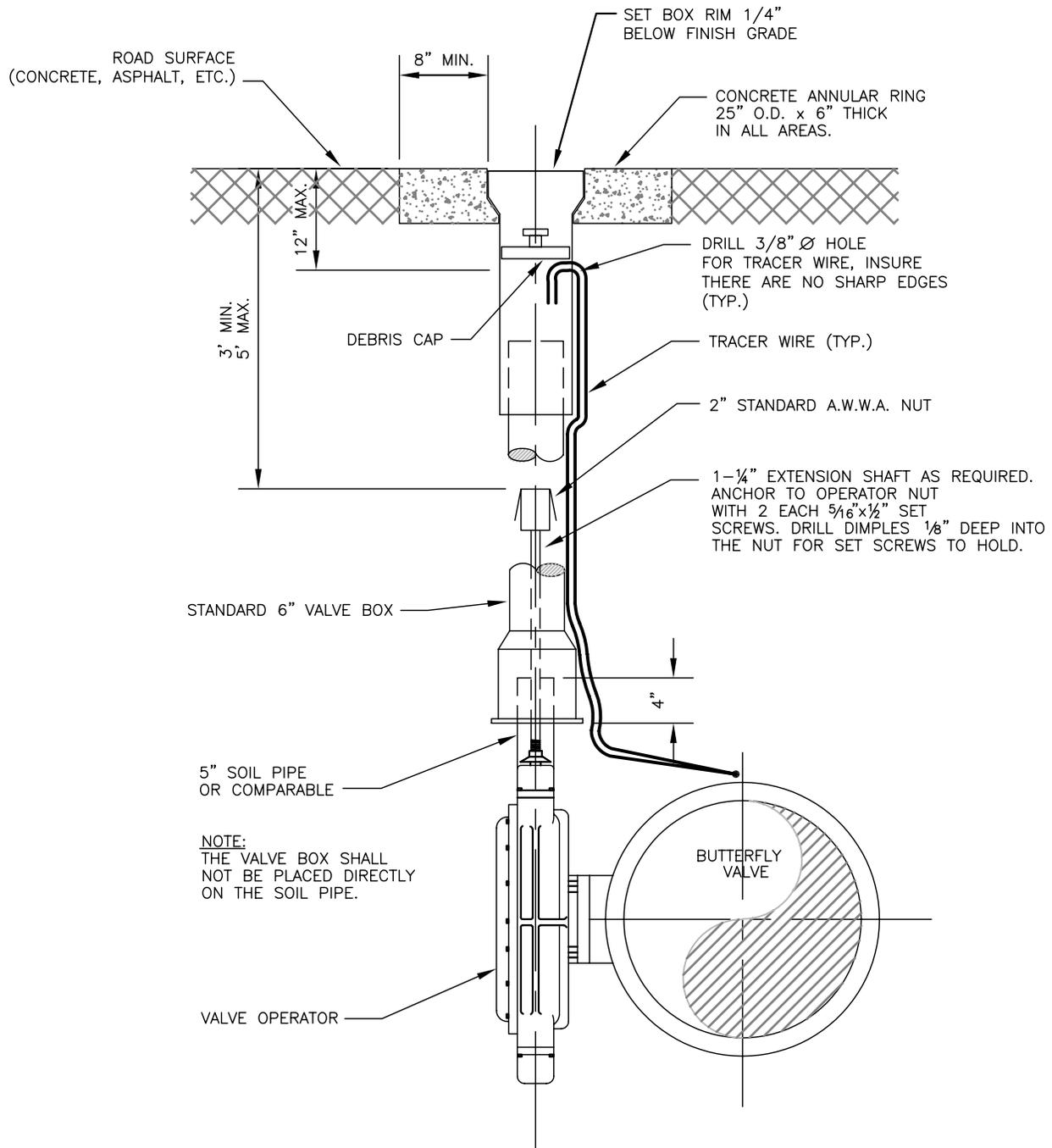
- 1.) MS MEANS MILD STEEL ROD ASTM A36.
(NUTS SHALL BE ASTM A307 GRADE A OR B
HEXAGON HEAVY SERIES.)
- 2.) HS MEANS HIGH STRENGTH STEEL
ROD ASTM A193 GRADE B7.
(NUTS SHALL BE ASTM A194 GRADE 2H.)

FLANGE LUG DETAIL

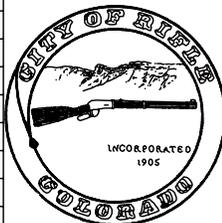


approved: WMS
 date: 11/6/02 | scale: NTS | dwn: | dwg #: W-24
 ENGINEERING DIVISION OF PUBLIC WORKS DEPT.

No. Dwn. Date. Revision



1	BGP	1.3.05	RELOCATE TRACER WIRE
No.	Dwn.	Date	Revision

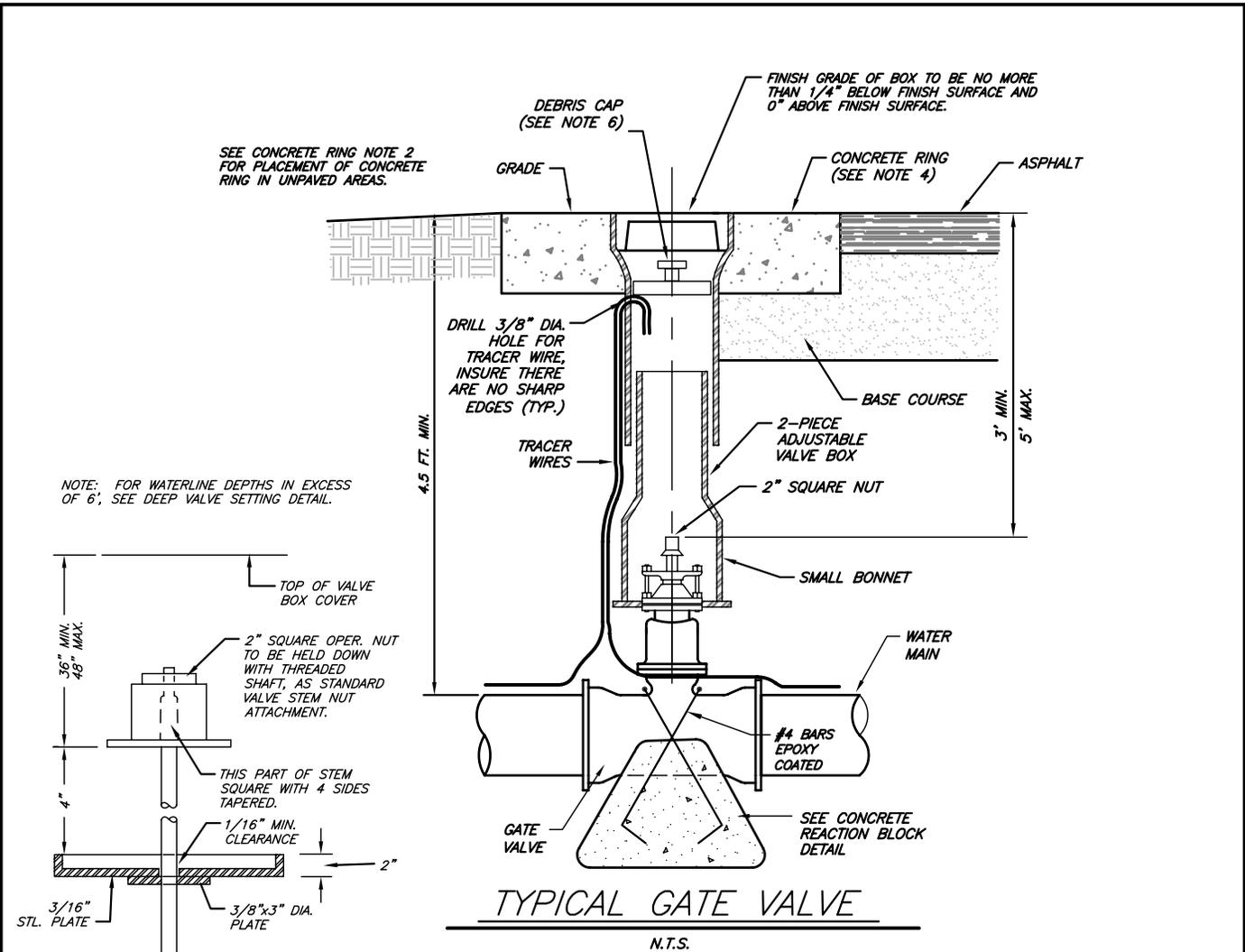


TRANSMISSION MAIN BUTTERFLY VALVE INSTALLATION

approved: WMS

date: 11/6/02 | scale: NTS | dwn: | dwg #: W-25

ENGINEERING DIVISION OF PUBLIC WORKS DEPT.



TYPICAL GATE VALVE

N.T.S.

NOTES

1. ALL VALVES ADJACENT TO FITTING SHALL BE FLANGE X M.J. FITTING SHALL BE FLANGED NEXT TO VALVE. LINE VALVES TO BE MJ X MJ.
2. IN UNPAVED AREAS, PROVIDE A SLIGHT GRADE FOR FINISH GRADE AWAY FROM TOP OF VALVE BOX.
3. DESIGN LOCATIONS OF VALVES SHALL BE SUCH THAT THEY ARE OUTSIDE OF CONCRETE CURB/GUTTER AND VALLEY PANS.
4. CONCRETE RING: AFTER PAVING, PROVIDE A 6" THICK X 8" WIDE CONCRETE RING. SURFACE AREA SHALL BE PREPARED BY SAW CUTTING ASPHALT AND ADJUSTING VALVE BOX TO FINISH GRADE. CONCRETE RING TO BE PROVIDED IN ALL AREAS.
5. OTHER TYPES OF VALVES SHALL BE INSTALLED IN A SIMILAR MANNER AS SHOWN FOR THE GATE VALVE INSTALLATION. INSTALLATION OF OTHER VALVE TYPES IS ALLOWED ONLY BY WRITTEN APPROVAL.
6. SEE DRAWING W-60 FOR DEBRIS CAP DETAIL.
7. TRACER WIRE SHALL BE NO LESS THAN 1 FT. FROM TOP OF VALVE BOX COVER. PROVIDE ADEQUATE SLACK IN WIRE TO PROVIDE FOR FUTURE ADJUSTMENT.

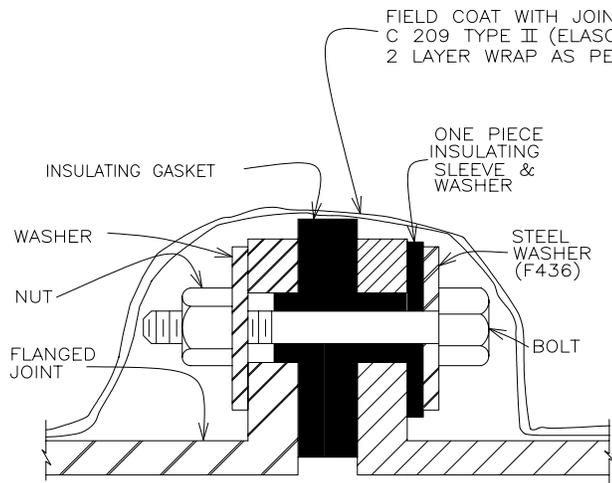
DEEP VALVE SETTING

1	BGP	1.3.05	RELOCATE TRACER WIRE
No.	Dwn.	Date.	Revision

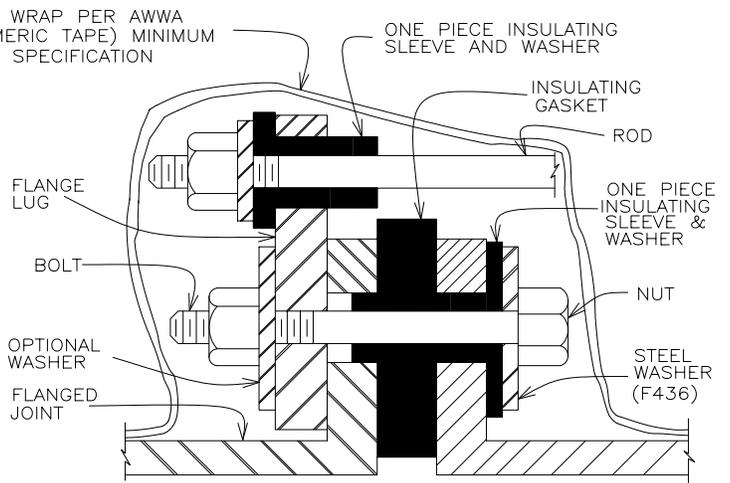


GATE VALVE & VALVE BOX DETAIL

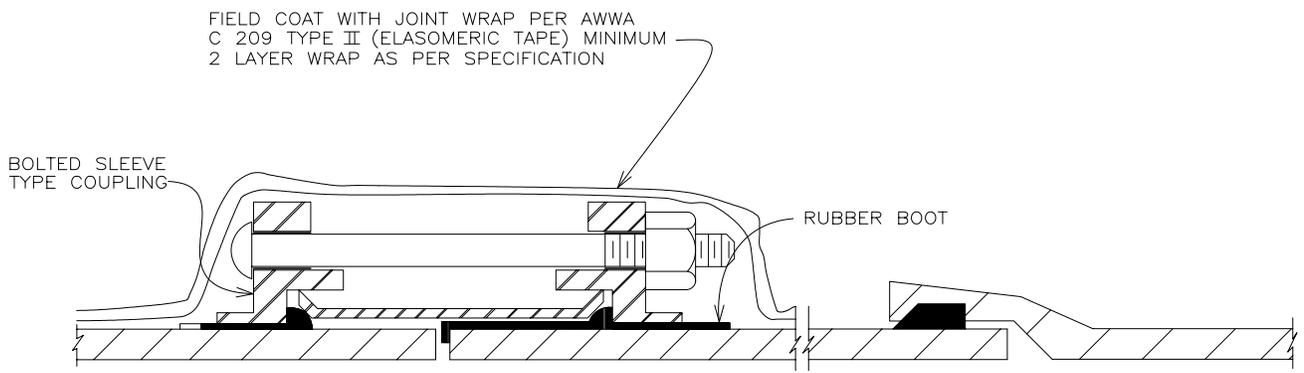
approved: WMS
 date: 11/6/02 | scale: NTS | dwn: | dwg #: W-25A
 ENGINEERING DIVISION OF PUBLIC WORKS DEPT.



INSULATED JOINT



INSULATED ROD



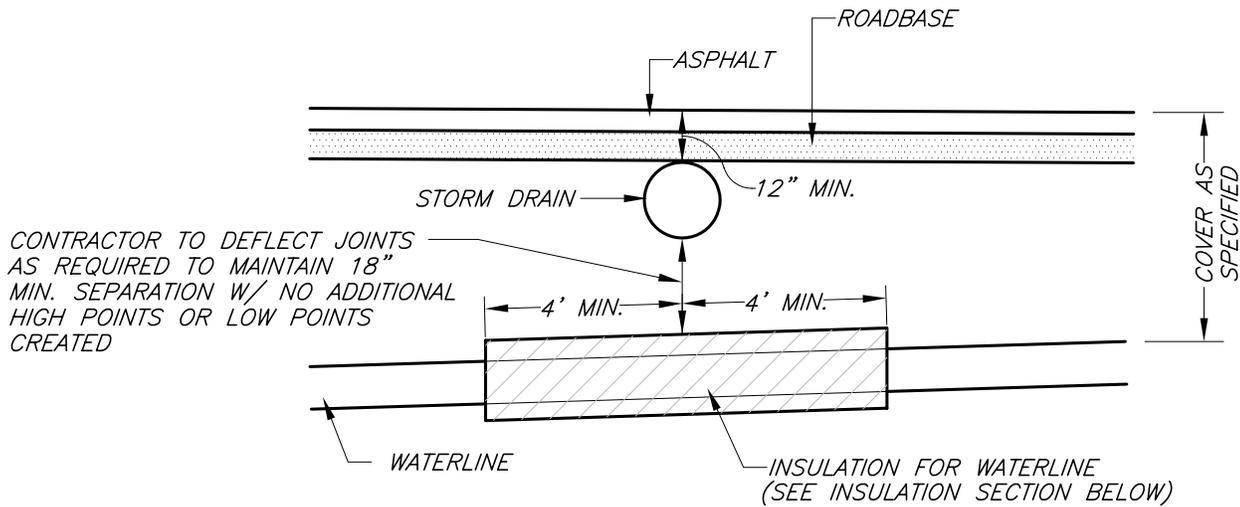
INSULATED BOLTED SLEEVE TYPE COUPLING

No.	Dwn.	Date.	Revision



INSULATED JOINTS, RODS AND BOLTED SLEEVE TYPE COUPLINGS

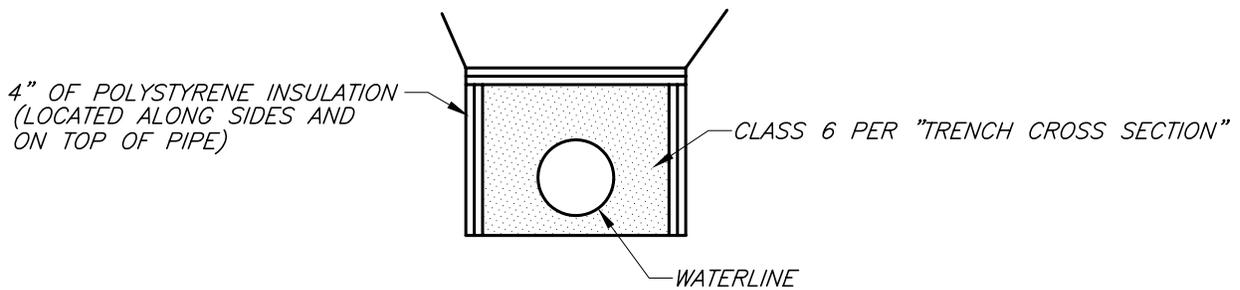
approved: WMS
 date: 11/6/02 | scale: NTS | dwn: | dwg #: W-26
 ENGINEERING DIVISION OF PUBLIC WORKS DEPT.



CONTRACTOR TO DEFLECT JOINTS AS REQUIRED TO MAINTAIN 18" MIN. SEPARATION W/ NO ADDITIONAL HIGH POINTS OR LOW POINTS CREATED

ELEVATION WATERLINE/CULVERT CROSSING

NO SCALE



INSULATION SECTION

NO SCALE

NOTE: AS DRAWN, THE INSULATION DETAIL ADDRESSES CULVERT CROSSINGS. PROVIDE THE SAME DETAIL FOR THOSE INSTANCES WHERE THE WATERLINE IS INSTALLED WITHIN 5' OF OPEN AIR.

No.	Dwn.	Date	Revision

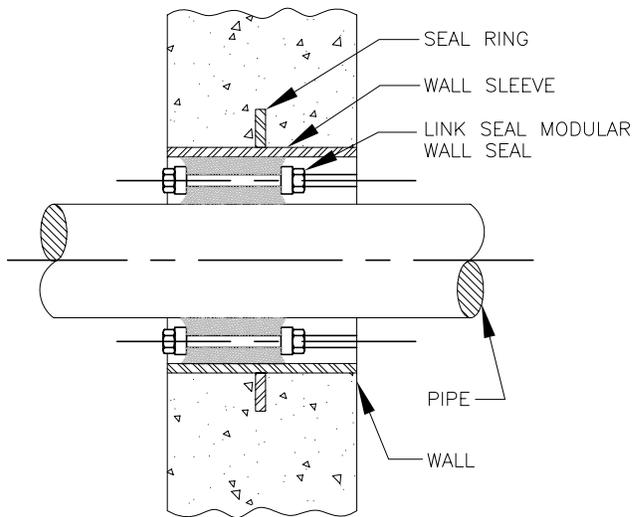


WATERLINE INSULATION DETAIL

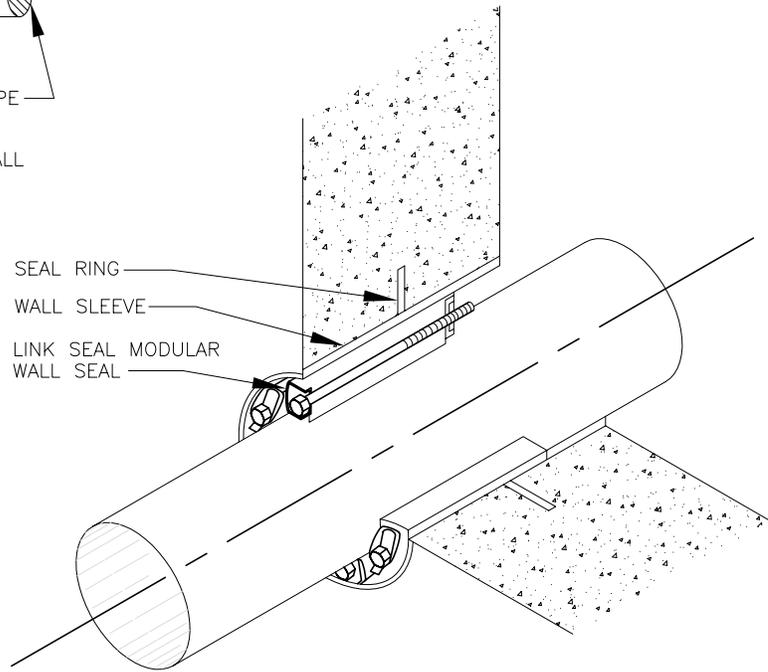
approved: WMS

date: 11/6/02 | scale: NTS | dwn: | dwg #: W-26A

ENGINEERING DIVISION OF PUBLIC WORKS DEPT.



SECTION



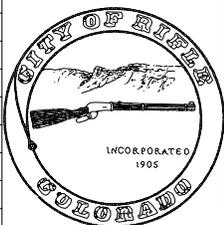
CUT OUT VIEW

Seals shall be modular mechanical type, consisting of interlocking synthetic runner links shaped to continuously fill the annular space between the pipe and wall opening. Links shall be loosely assembled with bolts to form a continuously rubber belt around the pipe with a pressure plate under each bolt head and nut. after the seal assembly is positioned in the sleeve, tightening of the bolts shall cause the rubber sealing elements to expand and provide an absolute water-tight seal between the pipe and wall opening. The seal shall be constructed so as to provide electrical insulation between the pipe and the wall. the pipe to wall penetration closures shall be "Link Seal" as manufactured by Thunderline Corporation, or approved equal.

Contractor shall determine the required inside diameter of each individual wall opening or sleeve before ordering, fabricating or installing. The inside diameter of each wall opening shall be sized to fit the pipe and Link-Seal to assure a water tight joint. If pipe O.D. is non standard due to coating, insulation, etc., consult the factory for engineering assistance and recommendation before proceeding with wall opening detail.

INSTALLATION shall be in accordance with manufacturer recommendations.

No.	Dwn.	Date.	Revision



LINK SEAL MODULAR WALL AND CASING SEAL

approved: WMS

date: 11/6/02 | scale: NTS | dwn: | dwg #: W-27

ENGINEERING DIVISION OF PUBLIC WORKS DEPT.

GENERAL METER NOTES

1. Location of meter to be approved by Project Engineer
2. All settings must be inspected by the Engineering Division before backfilling.
3. If the street or ground is not to final grade at the time of installation of the meter, the owner must raise or lower the meter vault when the final grade is established. Also the meter yoke must be adjusted to 10" to 14" below frost lid.
4. Joints and galvanized piping shall not be allowed inside the meter setting.
5. A bypass is required on all meters 1-1/2" and larger unless otherwise specified by Project Engineer. 1-1/2" and larger irrigation only meters do not require a bypass.
6. The service line through and on both sides of the meter pit must be of type K copper (3/4"-2").
7. No connections shall be made in the meter pit. Any connections including upsizing must be made more than 5 ft. from the meter pit on the downstream side.
8. Valves shall be in conformance with these standards
 - A. Valves less than 3" shall be full port ball valves only.
 - B. All gate valves 3" and larger shall conform with Arvada's Standard Specifications.
9. Stop and Waste Valves shall be Mueller H-15214 or equivalent.
10. All valves 3 inch diameter and larger inside vaults shall be supported by adjustable steel pipe valve supports. 1-1/2 inch diameter and larger meters shall be supported by concrete blocks with steel shims, if required by Utilities Division.
11. Manhole rings and covers shall be in conformance with Drawing W-59 of these Engineering Standards.
12. New meter pits and covers shall be in conformance with Section 30.2 of these Engineering Standards.
13. Other meter settings:
Settings of meters other than shown and detailed herein shall be considered as non-standard and shall require prior approval of proposed piping layout, meter setting and structural design of vault for each separate installation.
14. Install Ramneck between dome or set ring and all riser rings (or on barrel section when risers are not required) to prevent infiltration.

No.	Dwn.	Date.	Revision



GENERAL METER
NOTES

approved: WMS

date: 11/6/02	scale: NTS	dwn:	dwg #: W-29
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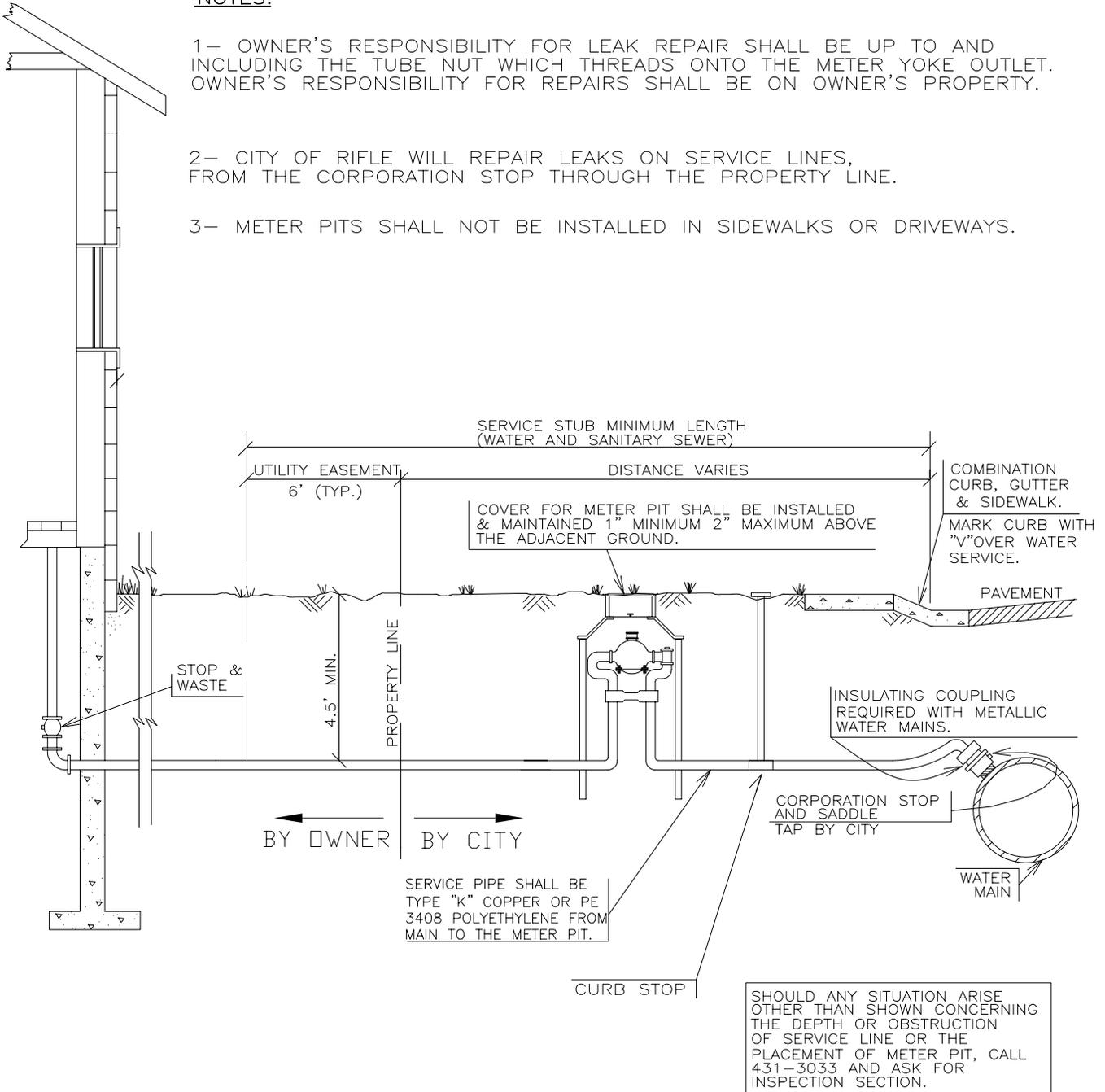
ENGINEERING DIVISION OF PUBLIC WORKS DEPT.

NOTES:

1- OWNER'S RESPONSIBILITY FOR LEAK REPAIR SHALL BE UP TO AND INCLUDING THE TUBE NUT WHICH THREADS ONTO THE METER YOKE OUTLET. OWNER'S RESPONSIBILITY FOR REPAIRS SHALL BE ON OWNER'S PROPERTY.

2- CITY OF RIFLE WILL REPAIR LEAKS ON SERVICE LINES, FROM THE CORPORATION STOP THROUGH THE PROPERTY LINE.

3- METER PITS SHALL NOT BE INSTALLED IN SIDEWALKS OR DRIVEWAYS.



No.	Dwn.	Date.	Revision

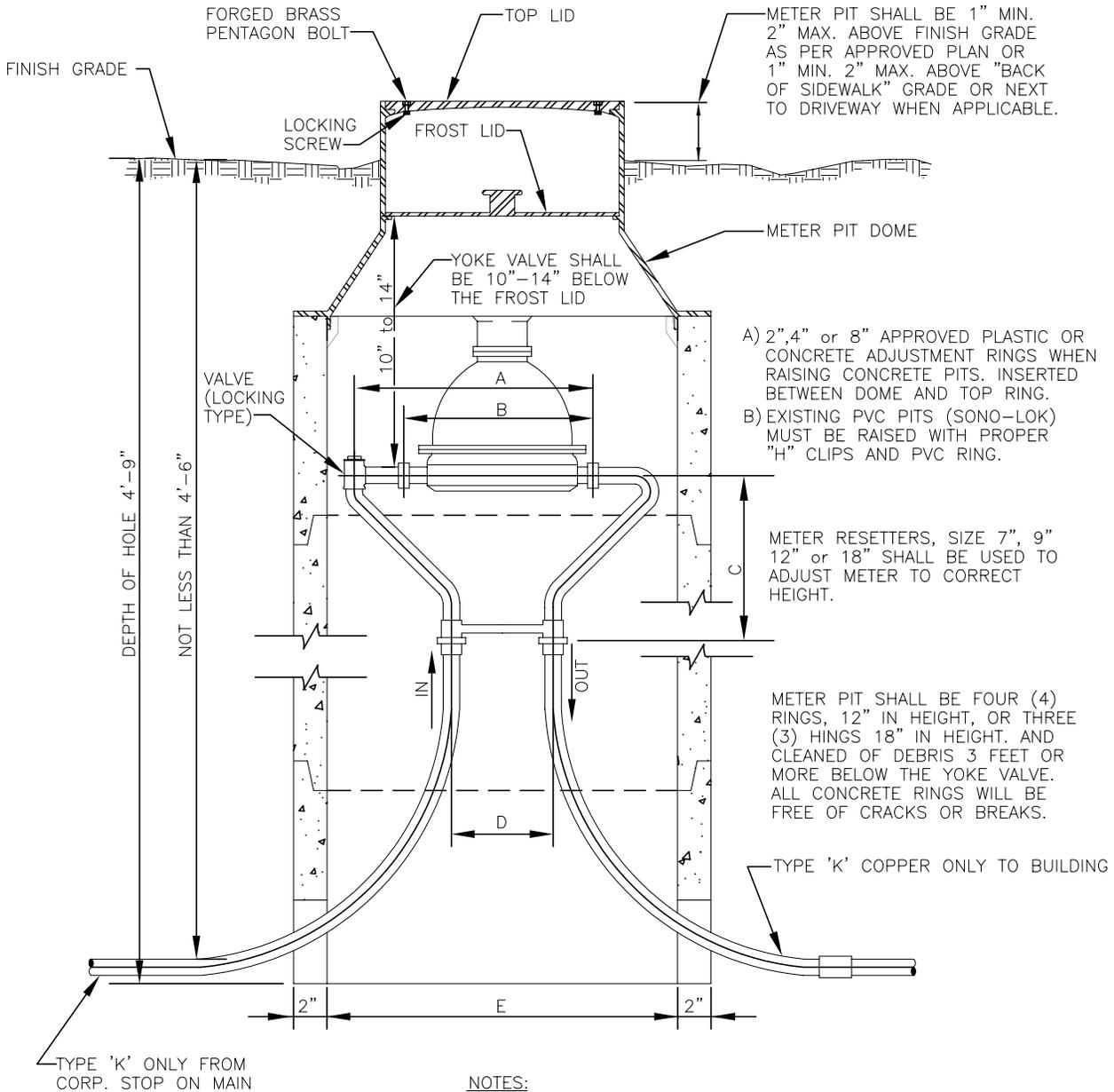


WATER SERVICE, PROFILE 5/8" x 3/4",
3/4" AND 1"

approved: WMS

date: 11/6/02 scale: NTS dwn: dwg #: W-30

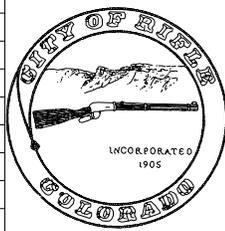
ENGINEERING DIVISION OF PUBLIC WORKS DEPT.



NOTES:

- 1.) Location of meter pit shall be established by the Project Engineer.
- 2.) All meter pits must be inspected by the municipal inspector before backfilling.
- 3.) Meter pits shall not be installed in driveways, sidewalks or parking lots. Unless approved by Project Engineer.
- 4.) A multi-family dwelling, serviced by a 3/4" water line will use a 3/4" meter.
- 5.) When approved for installation in asphalt, top of meter pit shall be flush with finish grade and recessed lid.
- 6.) No concrete floor allowed in meter pit.
- 7.) Lawn sprinkler connections shall be a minimum of five feet from the meter pit wall. on the out let side.

METER SIZE	A	B	C	D	E
5/8" x 3/4"	12-5/8"	7-7/8"	7-13/16"	4"	24"
3/4"	14-1/4"	9-3/8"	8-15/16"	5"	24"
1"	17-1/4"	11-1/8"	11-1/4"	6"	24"



**OUTSIDE METER SETTING
1" & SMALLER**

approved: WMS

date: 11/6/02 | scale: NTS | dwn: | dwg #: W-31

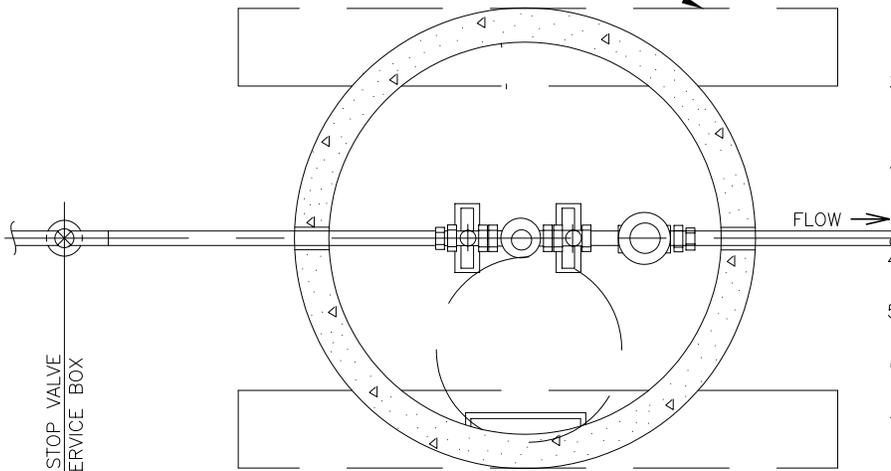
ENGINEERING DIVISION OF PUBLIC WORKS DEPT.

No. Dwn. Date. Revision

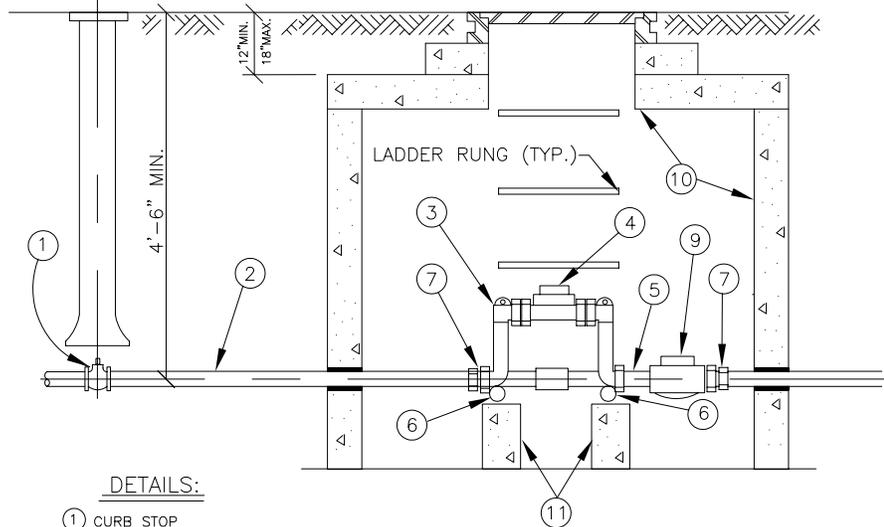
CONCRETE MANHOLE BASE BEAMS REQUIRED FOR INSTALLATIONS IN DRIVEWAYS AND PARKING AREAS.
(SEE DETAIL SHT. NO. 46)

NOTES

- 1- MANHOLE BASE BEAMS SHALL BE REQUIRED FOR INSTALLATIONS IN DRIVEWAYS, OR PARKING AREAS.
- 2- A 60" Ø MANHOLE PIT BY MINIMUM 4' HEIGHT WILL ACCOMODATE 1½" AND 2" SPLIT CASE METERS.
- 3- JOINTS INSIDE METER VAULT SHALL BE EITHER THREADED, COMPRESSION OR FLARE.
- 4- SEE DETAIL SHEET NO. W-29 FOR ADDITIONAL NOTES.
- 5- NO CONCRETE TO BE LAID IN FLOOR OF METER MANHOLE.
- 6- BOTTOM OF PIT TO HAVE 12" LAYER OF 1½" CRUSHED ROCK.
- 7- THE DISTANCE BETWEEN RUNGS, CLEATS, AND STEPS SHALL NOT EXCEED 12 INCHES AND SHALL BE UNIFORM THROUGHOUT THE LENGTH OF THE LADDER AND ALIGNED UNDER THE LID.
- 8- VAULT WALL PENETRATIONS MUST BE GROUTED WITH CONCRETE.
- 9- COPPERSETTER OR COPPER METER YOKE FOR 1-1/2" AND 2" WILL BE NO HIGHER THAN 15" WITH A BY-PASS AND BOOT FOR BY-PASS PROVIDED WITH SETTER.



PLAN

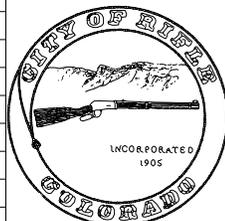


DETAILS:

- ① CURB STOP
- ② TYPE K COPPER TUBING
- ③ 15" COPPERSETTER /METER YOKE WITH BYPASS.
- ④ METER UNIT
- ⑤ 3" NIPPLE BETWEEN COPPERSETTER AND CHECK VALVE
- ⑥ 1" X 23" PIPE
- ⑦ MECH. IRON PIPE TO FLARE COUPLING FROM INLET SIDE OF COPPERSETTER AND OUTLET SIDE OF CHECK VALVE OR COMP.
- ⑧ BY-PASS WILL BE 1" FOR 1-1/2" COPPERSETTERS AND 1-1/2" OR 1-1/4" FOR 2" COPPERSETTERS.
- ⑨ CHECK VALVE
- ⑩ CONE MANHOLE WITH 24" LID.
- ⑪ CONCRETE BLOCK SUPPORTS 5"x12"x12"

ELEVATION

OUTSIDE SETTING FOR 1-½" & 2" METER WITH CHECK VALVE AND BYPASS IN MANHOLE

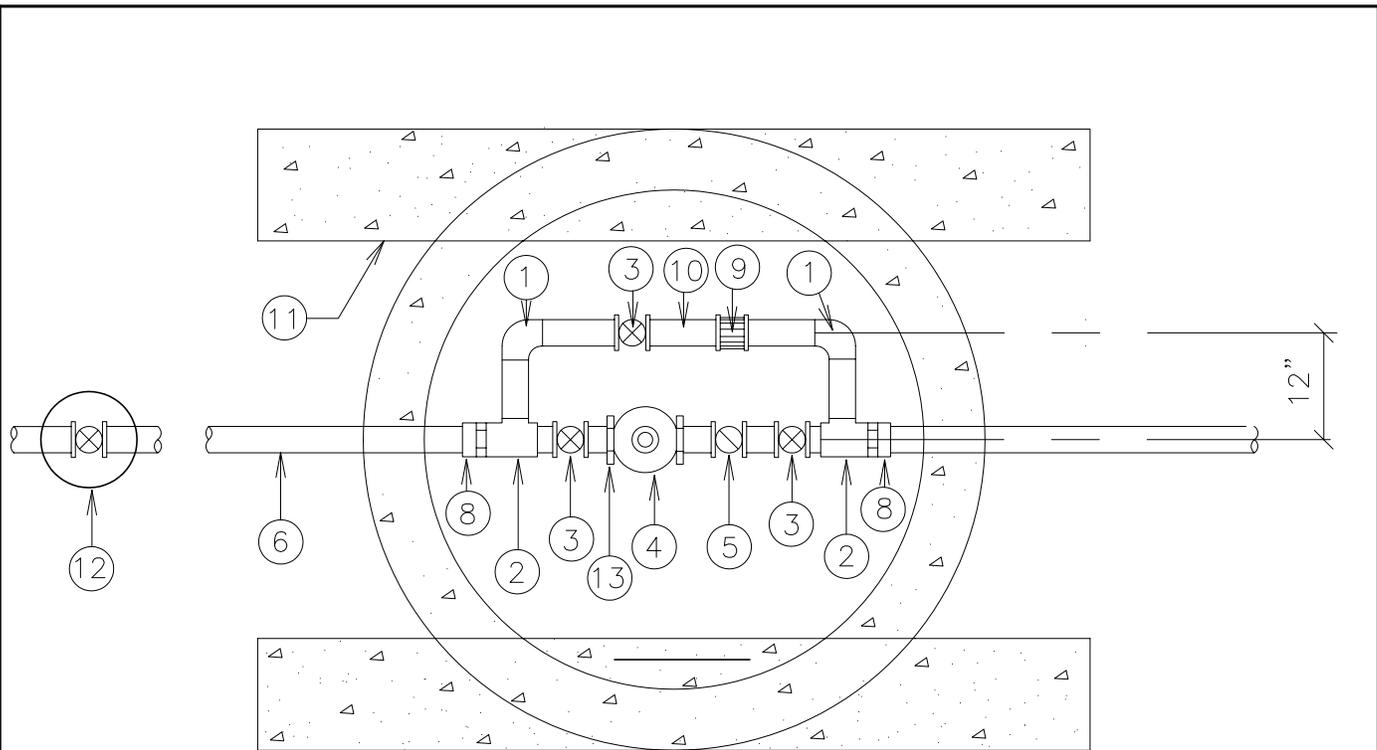


approved: WMS

date: 11/6/02 | scale: NTS | dwn: | dwg #: W-32

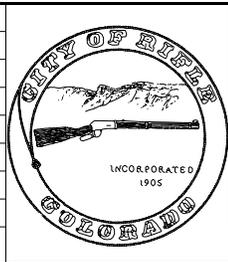
ENGINEERING DIVISION OF PUBLIC WORKS DEPT.

No. Dwn. Date. Revision



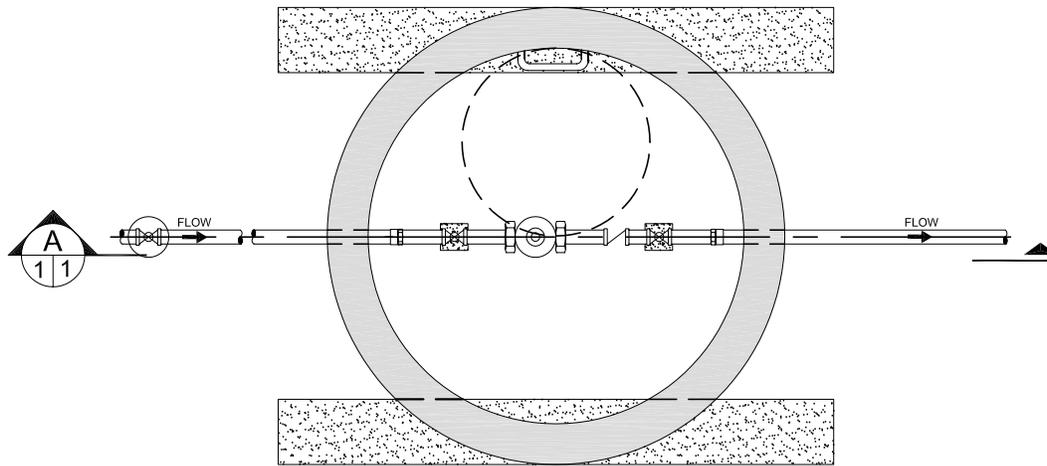
- 1- 90° BEND
- 2- TEE
- 3- BALL VALVE-ALL BRASS FULL PORT
- 4- METER UNIT
- 5- CHECK VALVE
- 6- TYPE K COPPER TUBING
- 7- 60" DIAMETER CONCRETE MANHOLE
- 8- FORD FLARED COPPER TO IRON COUPLING OR COMPRESSION OR APPROVED EQUAL.
- 9- FORD PACK JOINT COUPLING (1.1/2" METER CATALOG NO. C-55-66) OR (2" METER CATALOG NO. C-55-77) OR APPROVED EQUAL
- 10- BRASS TUBING
- 11- CONCRETE MANHOLE BASE BEAMS REQUIRED FOR INSTALLATIONS IN DRIVEWAYS AND PARKING AREAS.
- 12- CURB STOP VALVE AND SERVICE BOX
- 13- LOC-PAC COUPLING
- 14- METER GAP 13-1/4" (FOR 1-1/2" SERVICE) OR 17-1/4" (FOR 2" SERVICE).

No.	Dwn.	Date	Revision



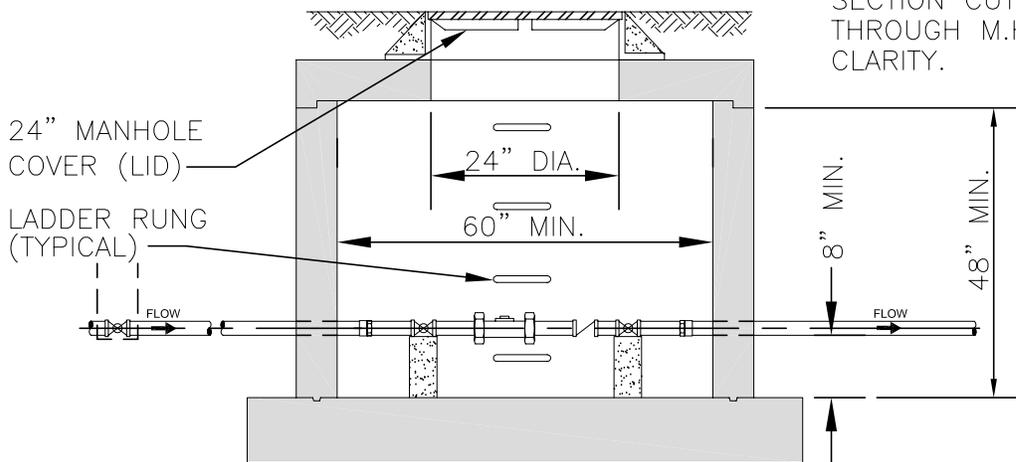
OUTSIDE SETTING FOR 1-1/2" & 2" METER BRASS ALTERNATE

approved: WMS
date: 11/6/02 | scale: NTS | dwn: | dwg #: W-33
ENGINEERING DIVISION OF PUBLIC WORKS DEPT.



WATER METER VAULT PLAN

NOTE:
SECTION CUT SHOWN
THROUGH M.H. LID FOR
CLARITY.



WATER METER VAULT SECTION A
1/1

NOTES:

- 1) MANHOLE BASE BEAMS REQUIRED FOR INSTALLATIONS IN DRIVEWAYS AND PARKING AREAS 5"x12"x60"
- 2) A 60" INSIDE DIAMETER MANHOLE IS REQUIRED FOR 1½" AND 2" SERVICES.
- 3) JOINTS INSIDE VAULT SHALL BE THREADED, SOLDERED, FLARED OR COMPRESSION.
- 4) WATER TIGHT SEAL ALL PIPE OUTLETS THROUGH WALL.
- 5) BOTTOM OF VAULT TO BE BEDDED WITH 1½" CRUSHED ROCK.
- 6) NO CHANGE IN PIPE DIAMETER SHALL BE MADE IN THE METER VAULT.
- 7) 24" MANHOLE COVER TO BE CENTERED OVER LADDER RUNGS.
- 8) ALSO GENERAL NOTES 1 THRU 7 APPLY OF SHEET W-29.
- 9) CONCRETE BLOCKS OR BRICKS TO BE USED TO SUPPORT PLUMBING AT VALVES INSIDE VAULT.
- 10) DISTANCE BETWEEN LADDER RUNGS 12" ALIGNED UNDER LID.

No.	Dwn.	Date	Revision

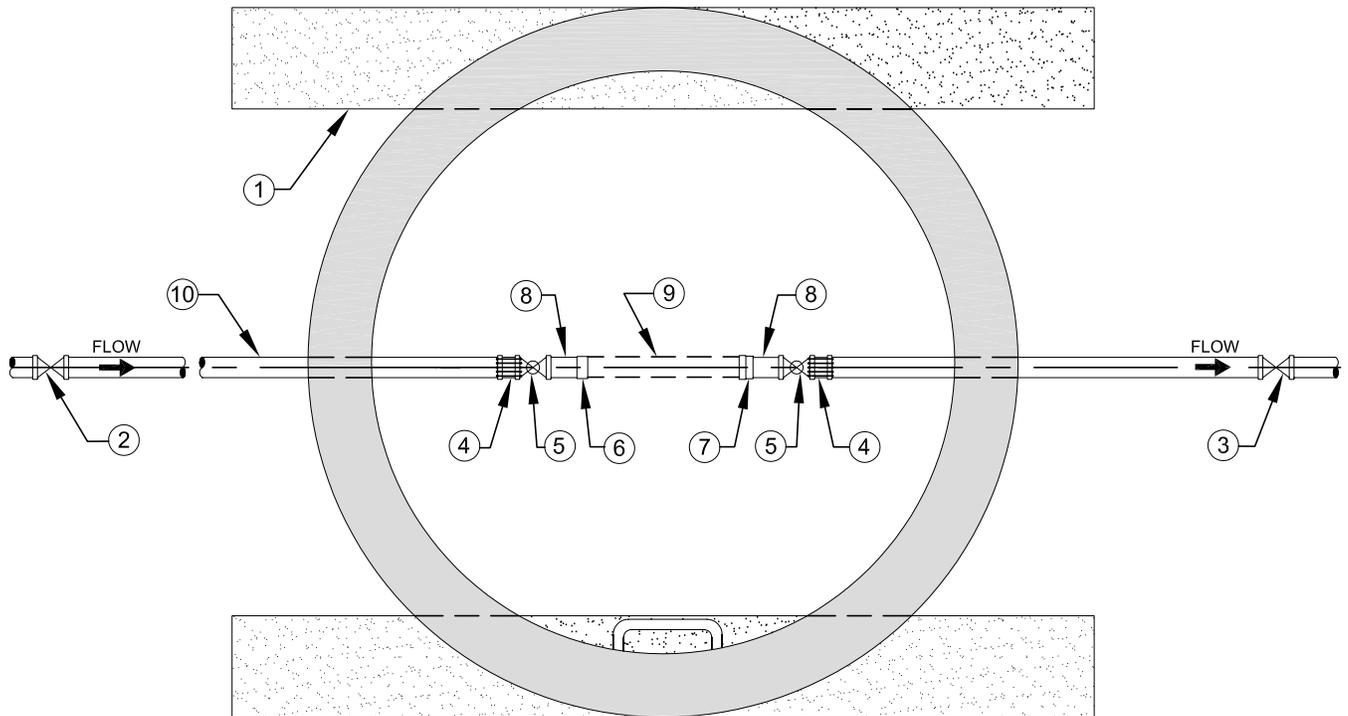


1-½" & 2" IRRIGATION (ONLY)
WATER METER VAULT DETAILS

approved: WMS

date: 11/6/02 | scale: NTS | dwn: | dwg #: W-34

ENGINEERING DIVISION OF PUBLIC WORKS DEPT.



METER PIT STRUCTURE

NOTES:

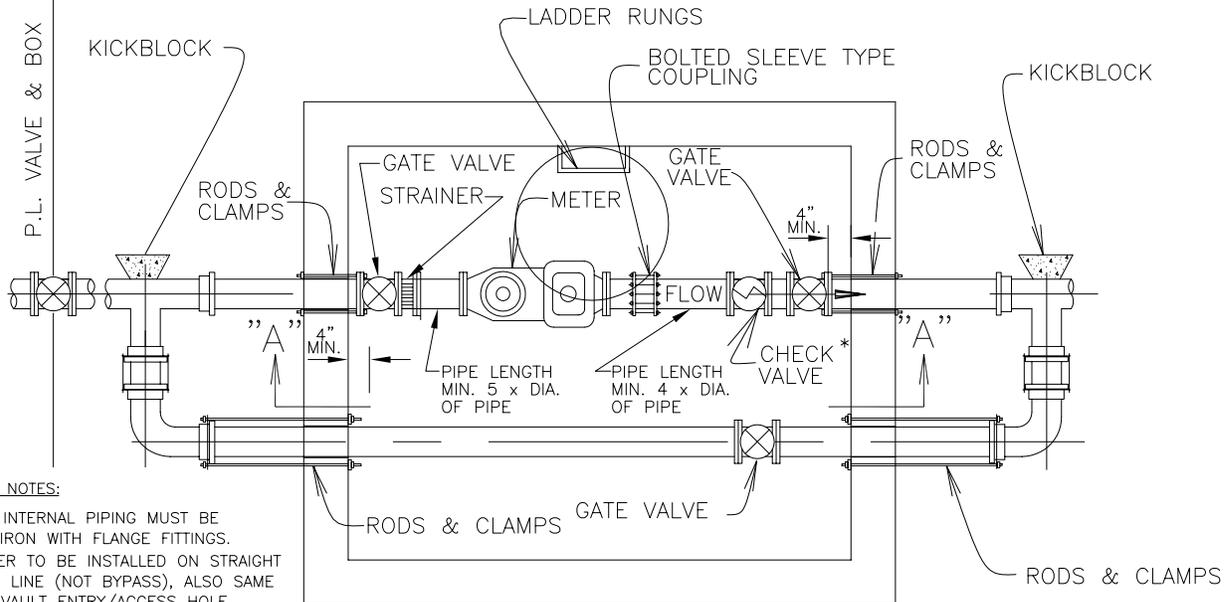
- ① CONCRETE MANHOLE BASE BEAMS 5"x12"x60" (NEEDED ONLY IN TRAFFIC AREAS).
- ② CURB STOP VALVE AND SERVICE BOX. (FORD B-44 OR APPROVED EQUAL).
- ③ CURB STOP VALVE AND SERVICE BOX (STOP-N-WASTE) (FORD B-11 SW OR APPROVED EQUAL).
- ④ MUELLER (H-15428) COMPRESSION x M.I.P. CONNECTOR OR APPROVED EQUAL.
- ⑤ BALL VALVE (FULL PORT) FORD B-11 OR APPROVED EQUAL.
- ⑥ FORD (CF31) 2-BOLT (FLANGE x F.I.P.) OR APPROVED EQUAL
- ⑦ FORD (CF35) 2-BOLT (FLANGE x PACK JOINT) OR APPROVED EQUAL.
- ⑧ BRASS NIPPLE.
- ⑨ METER GAP 13¼" (FOR 1½" SERVICE) OR 17¼" (FOR A 2" SERVICE).
- ⑩ TYPE K COPPER TUBING.

No.	Dwn.	Date.	Revision



1-½" & 2" IRRIGATION
(ONLY) METER SETTING

approved: WMS
 date: 11/6/02 | scale: NTS | dwn: | dwg #: W-35
 ENGINEERING DIVISION OF PUBLIC WORKS DEPT.



GENERAL NOTES:

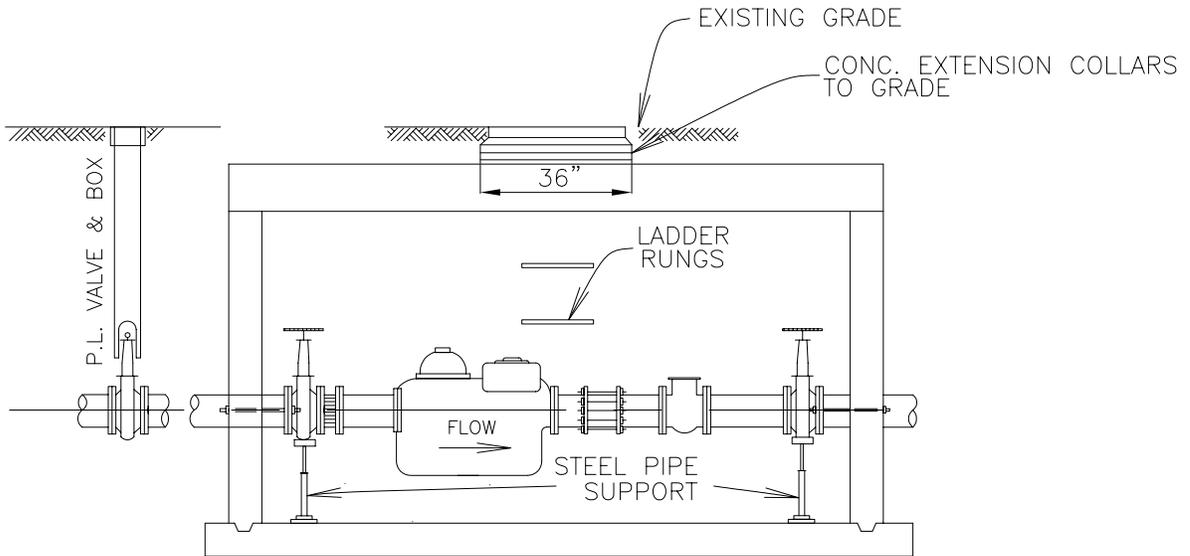
- (1.) ALL INTERNAL PIPING MUST BE DUCTILE IRON WITH FLANGE FITTINGS.
- (2.) METER TO BE INSTALLED ON STRAIGHT THROUGH LINE (NOT BYPASS), ALSO SAME SIDE AS VAULT ENTRY/ACCESS HOLE.
- (3.) ALL INTERNAL VALVES TO BE RESILIENT SEAT GATE VALVE LHO W/HAND WHEEL.
- (4.) WATER STRAINER MUST BE OF ALL BRONZE CONSTRUCTION.
- (5.) CHECK VALVE TO BE OF ALL BRONZE OR EPOXY COATED CAST BODY.
- (6.) VAULT KNOCKOUTS FOR PIPING EXIT TO BE FILLED W/MORTAR OR FOAM FILLER. OR RUB'R NEK LTM.

NOTE:

*CHECK VALVES ARE NOT REQUIRED WHERE A BACKFLOW PREVENTION DEVICE IS INSTALLED.

STEEL PIPE SUPPORTS NOT SHOWN IN THIS VIEW
PIPE SUPPORTS TO BE USED AT EACH GATE VALVE.

PLAN OF PIPING



SECTION "A"

No. Dwn.	Date	Revision



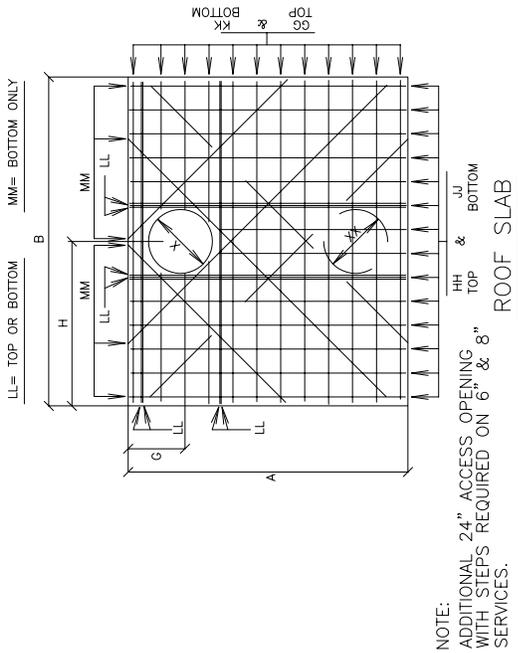
PIPING LAYOUT FOR 3", 4", 6"
& 8" COMPOUND OR TURBINE
METER SETTING WITH BYPASS

approved: WMS

date: 11/6/02 scale: NTS dwn: dwg #: W-36

ENGINEERING DIVISION OF PUBLIC WORKS DEPT.

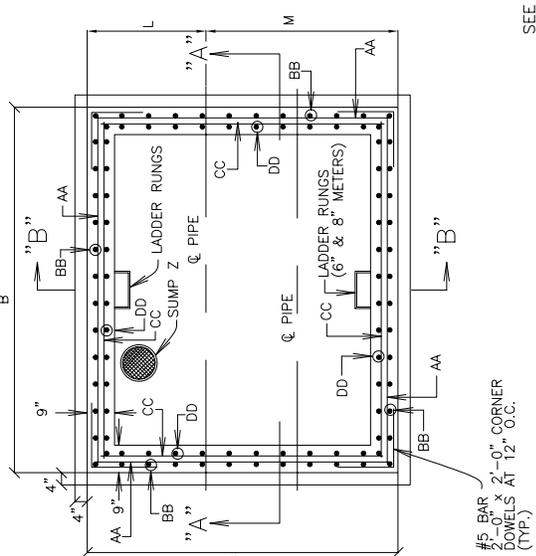
NOTE: A PRE CAST VAULT MEETING THESE STANDARDS IS ALSO ALLOWABLE



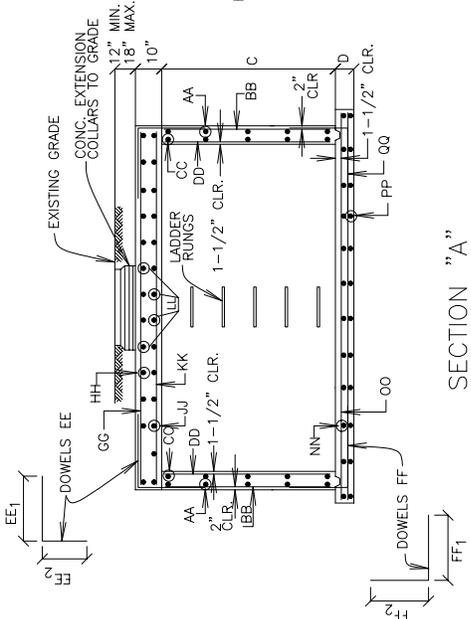
NOTE: THE ROOF SLAB MAY BE CAST IN SECTIONS FOR FUTURE ACCESS. THE INDIVIDUAL SECTION WEIGHT MUST NOT EXCEED 7,500 POUNDS.

NOTE: ADDITIONAL 24" ACCESS OPENING WITH STEPS REQUIRED ON 6" & 8" SERVICES.

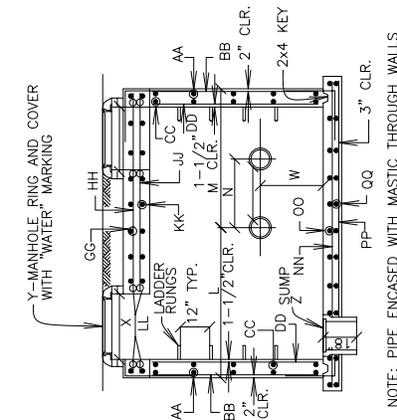
NOTE: ALL KNOCKOUTS FOR PIPE ENTRY AND EXIT MUST BE FILLED WITH MORTAR OR FOAM TYPE FILLER OR 1" MASTIC.



PLAN OF VAULT



SECTION "A"



SECTION "B"

NOTE: THE DISTANCE BETWEEN RUNGS, CLEATS, AND STEPS SHALL NOT EXCEED 12 INCHES, AND SHALL BE UNIFORM THROUGHOUT THE LENGTH OF THE LADDER(S).

SEE SHEET NO. W-38 FOR DIMENSIONS CORRESPONDING TO THIS DRAWING.

NOTE: PIPE ENCASED WITH MASTIC THROUGH WALLS



COMPOUND OR TURBINE METER VAULT WITH BYPASS 3", 4", 6" & 8" SERVICES

approved: WMS
 date: 11/6/02 scale: NTS dwn: dwg #: W-37
 ENGINEERING DIVISION OF PUBLIC WORKS DEPT.

No. Dwn. Date. Revision

NOTE: A PRECAST VAULT CAN BE USED FOR ALL COMPOUND METERS.

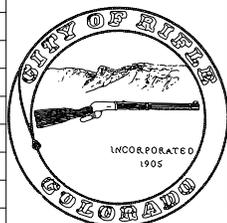
METER SIZE	WALLS				WALL DOWELS				ROOF SLAB								FLOOR SLAB			
	AA BAR DIST. No.4 1'-4"	BB BAR DIST. No.4 1'-0"	CC BAR DIST. No.4 1'-0"	DD BAR DIST. No.4 1'-0"	EE BAR DIST. No.5 1'-0"	FF BAR DIST. No.5 1'-0"	GG BAR DIST. No.5 1'-0"	HH BAR DIST. No.7 1'-0"	JJ BAR DIST. No.7 1'-0"	KK BAR DIST. No.7 1'-0"	LL TOP BOT. No.7 No.7	MM BOT. No.7	NN BAR DIST. No.5 1'-0"	OO BAR DIST. No.5 1'-0"	PP BAR DIST. No.5 1'-0"	QQ BAR DIST. No.5 1'-0"				
3"					EE1 2'-6"	FF1 3'-0"	GG 2'-0"	HH 2'-0"	JJ 2'-0"	KK 1'-0"	LL 2'-0"	MM 4'-6"	NN 2'-6"	OO 3'-0"	PP 2'-6"	QQ 2'-0"				
4"					EE1 2'-6"	FF1 3'-0"	GG 2'-0"	HH 2'-0"	JJ 2'-0"	KK 1'-0"	LL 2'-0"	MM 4'-6"	NN 2'-6"	OO 3'-0"	PP 2'-6"	QQ 2'-0"				
6"					EE1 2'-6"	FF1 3'-0"	GG 2'-0"	HH 2'-0"	JJ 2'-0"	KK 1'-0"	LL 2'-0"	MM 4'-6"	NN 2'-6"	OO 3'-0"	PP 2'-6"	QQ 2'-0"				
8"					EE1 3'-0"	FF1 2'-6"	GG 2'-6"	HH 1'-0"	JJ 1'-0"	KK 1'-0"	LL 1'-0"	MM 1'-0"	NN 1'-0"	OO 1'-0"	PP 1'-0"	QQ 1'-0"				

SEE SHEET No. W-37 FOR DRAWINGS CORRESPONDING TO THESE DIMENSIONS.

METER SIZE	PIPE SIZE DIA.	VAULT DIMENSIONS																MANHOLE			SUMP
		A	B	C*	D	E	F	G	H	J	K	L	M	N	W	X	XX	Y	Z		
3"	3"	8'-0"	10'-6"	5'-10"	0'-8"	9'-2"	10'-8"	2'-3"	5'-0"	1'-9"	2'-8"	3'-6"	4'-6"	2'-6"	2'-0"	3'-0"			24"x36"	1'-0"	
4"	4"	8'-0"	10'-6"	5'-10"	0'-8"	9'-2"	10'-8"	2'-3"	5'-0"	1'-9"	3'-4"	3'-6"	4'-6"	2'-6"	2'-0"	3'-0"			24"x36"	1'-0"	
6"	6"	11'-0"	13'-6"	5'-10"	10'-0"	9'-2"	11'-8"	2'-3"	6'-0"	1'-9"	3'-8"	4'-6"	6'-6"	3'-0"	2'-0"	3'-0"			24"x36"	1'-0"	
8"	8"	11'-0"	13'-6"	5'-10"	10'-0"	9'-2"	14'-8"	2'-3"	6'-0"	2'-3"	3'-8"	4'-6"	6'-6"	3'-0"	2'-0"	3'-0"			24"x36"	1'-6"	

*NOTE: DIMENSION C IS A MINIMUM SUGGESTED HEIGHT.

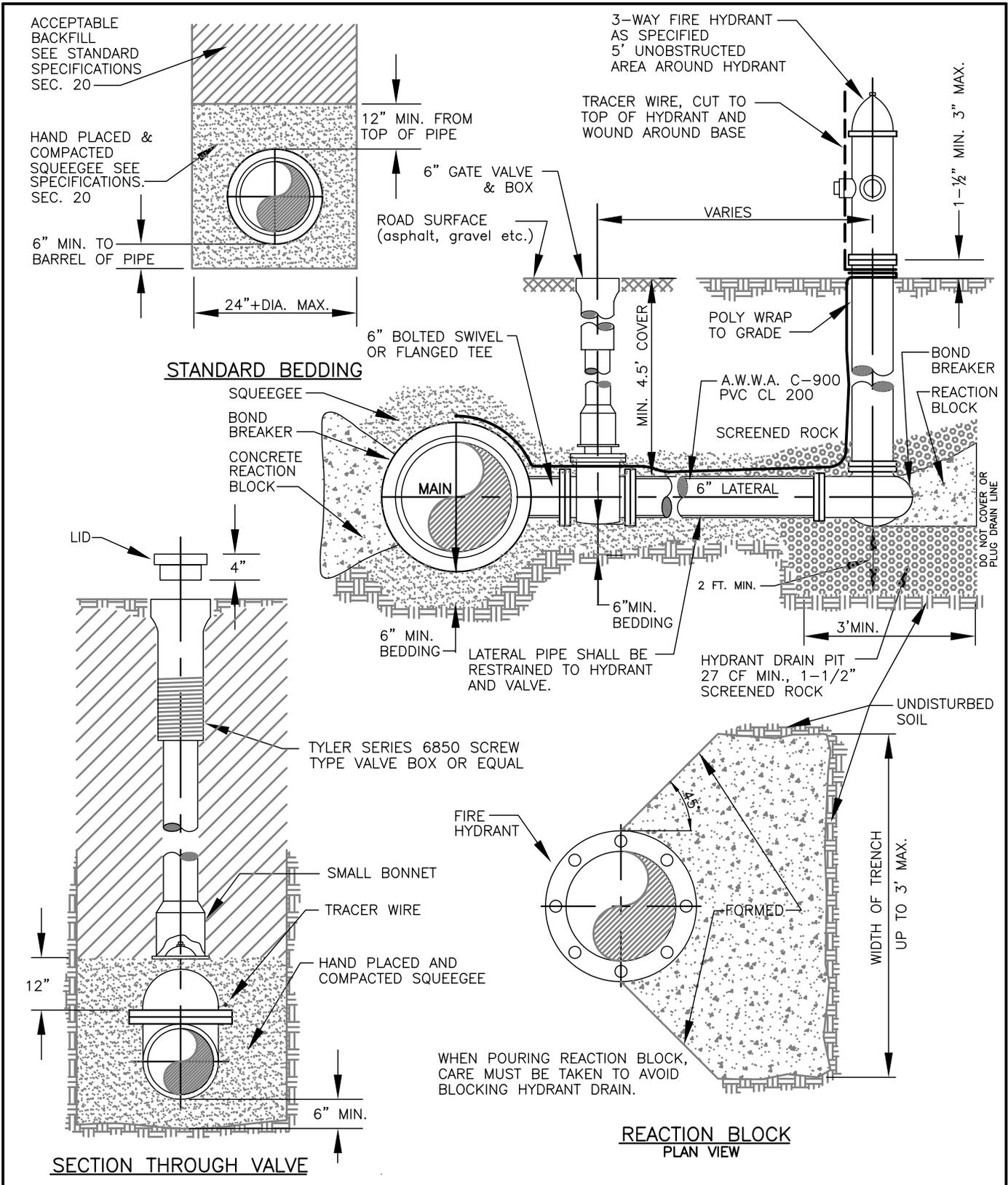
NOTE: 3" SEE SHEET NO. W-44 FOR WALL PLATES AND BODY CLAMPS.
 4" SEE SHEET NO. W-45 FOR WALL PLATES.
 6" USE 5/16"x 7" MIDDLE RING ON COUPLINGS.
 8" USE 5/16"x 7" MIDDLE RING ON COUPLINGS.
 10" USE 3/8"x 7" MIDDLE RING ON COUPLINGS.



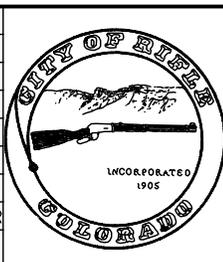
VAULT DIMENSIONS COMPOUND OR TURBINE METER WITH BYPASS 3", 4", 6" & 8" SERVICES

approved: WMS
 date: 11/6/02 scale: NTS dwn: dwg #: W-38
 ENGINEERING DIVISION OF PUBLIC WORKS DEPT.

No. Dwn. Date. Revision



1	BGP	12.16.04	2-PC VLV BOX, TRCR WR
No. Dwn., Date, Revision			



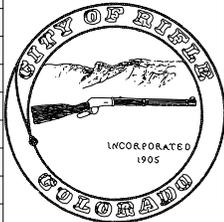
FIRE HYDRANT INSTALLATION

approved: WMS

date: 11/6/02 scale: NTS dwn: dwg #: W-4

ENGINEERING DIVISION OF PUBLIC WORKS DEPT.

No.	Dwn.	Date.	Revision



F.M.C.T. METER VAULT DIMENSIONS

approved: WMS
 date: 11/6/02 scale: NTS dwn: dwg #: W-40
 ENGINEERING DIVISION OF PUBLIC WORKS DEPT.

METER SIZE	WALLS				WALL DOWELS				ROOF SLAB								FLOOR SLAB			
	AA	BB	CC	DD	EE & FF	EE 1	EE 2	FF 1	FF 2	GG	HH	IJ	JK	LL	MM	NN	OO	PP	QQ	
BAR DIST.	BAR DIST.	BAR DIST.	BAR DIST.	BAR DIST.	BAR DIST.	BAR DIST.	BAR DIST.	BAR DIST.	BAR DIST.	BAR DIST.	BAR DIST.	BAR DIST.	BAR DIST.	BAR DIST.	BAR DIST.					
6"	No.4 1'-4"	No.5 1'-0"	No.4 1'-4"	No.5 1'-0"	No.5 1'-0"	3'-0"	2'-6"	3'-0"	2'-6"	No.5 1'-0"	No.5 1'-0"	No.7 1'-0"	No.8 1'-0"	No.5 1'-0"	No.7 No.7	No.5 1'-0"				
8"	No.4 1'-4"	No.5 1'-0"	No.4 1'-4"	No.5 1'-0"	No.5 1'-0"	3'-0"	2'-6"	3'-0"	2'-0"	No.5 1'-0"	No.5 1'-0"	No.7 1'-0"	No.8 1'-0"	No.5 1'-0"	No.7 No.7	No.5 1'-0"				
10"	No.4 1'-4"	No.5 1'-0"	No.4 1'-4"	No.5 1'-0"	No.6 1'-0"	4'-0"	2'-6"	2'-6"	2'-6"	No.5 1'-0"	No.5 1'-0"	No.7 0'-9"	No.8 0'-9"	No.5 1'-0"	No.7 No.7	No.5 1'-0"				

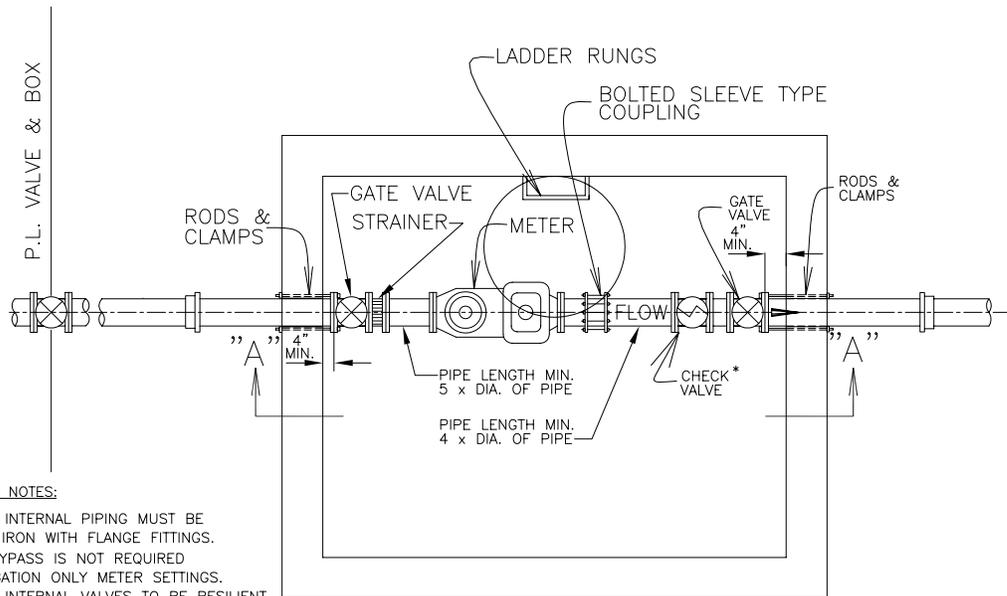
* NOTE: DIMENSION C IS A MINIMUM SUGGESTED HEIGHT.

F.M.C.T. METER With bypass (Cont.)

SEE SHEET No. W-39 FOR DRAWINGS CORRESPONDING TO THESE DIMENSIONS.

METER SIZE	PIPE SIZE DIA.	VAULT DIMENSIONS										PIPING DIMENSIONS										MANHOLE COVER		SUMP					
		A	B	C*	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V		W	X	Y	Z	
6"	6"	10'-6"	12'-0"	6'-0"	0'-10"	11'-2"	12'-8"	2'-3"	5'-0"	2'-3"	2'-9"	4'-9"	5'-9"	3'-0"	3'-9"	3'-0"	3'-0"	3'-0"	3'-0"	3'-0"	3'-0"	3'-0"	3'-0"	3'-0"	3'-0"	3'-0"	3'-0"	24"x36"	1'-6"
8"	8"	10'-6"	12'-0"	6'-0"	0'-10"	11'-2"	12'-8"	2'-3"	5'-0"	2'-3"	2'-9"	4'-9"	5'-9"	3'-0"	3'-8"	3'-0"	3'-0"	3'-0"	3'-0"	3'-0"	3'-0"	3'-0"	3'-0"	3'-0"	3'-0"	3'-0"	24"x36"	1'-6"	
10"	10"	12'-6"	13'-6"	6'-0"	0'-10"	13'-2"	14'-2"	2'-3"	5'-9"	2'-3"	3'-6"	5'-9"	6'-9"	3'-6"	4'-8"	3'-0"	3'-0"	3'-0"	3'-0"	3'-0"	3'-0"	3'-0"	3'-0"	3'-0"	3'-0"	3'-0"	24"x36"	1'-6"	

NOTES: 6" USE 5/16"x 7" MIDDLE RING ON COUPLINGS.
 8" USE 5/16"x 7" MIDDLE RING ON COUPLINGS.
 10" USE 3/8"x 7" MIDDLE RING ON COUPLINGS.



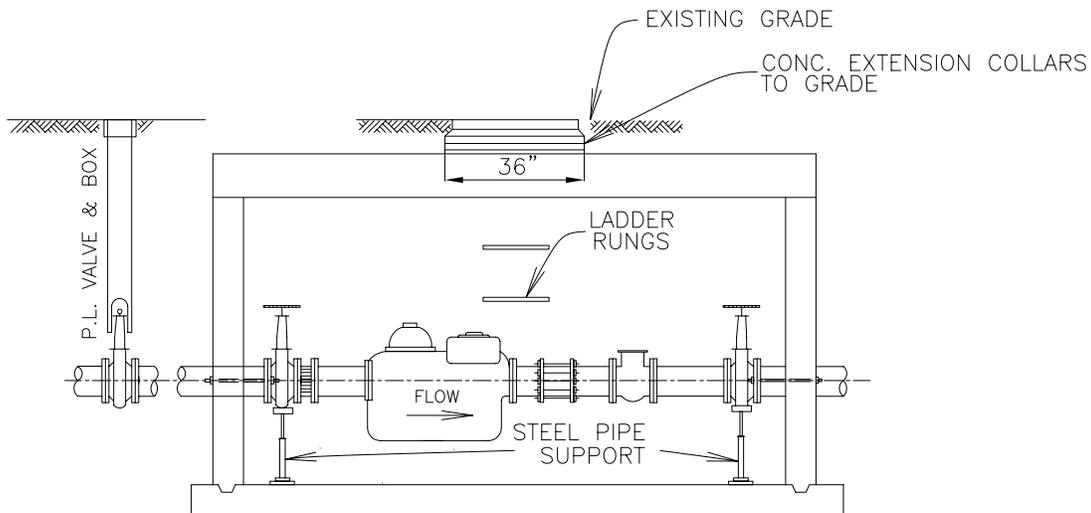
GENERAL NOTES:

- (1.) ALL INTERNAL PIPING MUST BE DUCTILE IRON WITH FLANGE FITTINGS.
- (2.) A BYPASS IS NOT REQUIRED ON IRRIGATION ONLY METER SETTINGS.
- (3.) ALL INTERNAL VALVES TO BE RESILIENT SEAT GATE VALVE LHO W/HAND WHEEL.
- (4.) WATER STRAINER MUST BE OF ALL BRONZE CONSTRUCTION.
- (5.) CHECK VALVE TO BE OF ALL BRONZE OR EPOXY COATED CAST BODY.
- (6.) VAULT KNOCKOUTS FOR PIPING EXIT TO BE FILLED W/MORTAR OR FOAM FILLER. OR RUB'R NEK LTM.

NOTE:

* CHECK VALVES ARE NOT REQUIRED WHERE A BACKFLOW PREVENTION DEVICE IS INSTALLED.
 STEEL PIPE SUPPORTS NOT SHOWN IN THIS VIEW
 PIPE SUPPORTS TO BE USED AT EACH GATE VALVE.

PLAN OF PIPING



SECTION "A"

No.	Dwn.	Date.	Revision



PIPING LAYOUT FOR 3", 4", 6" & 8" TURBINE METER SETTING
 "IRRIGATION ONLY"

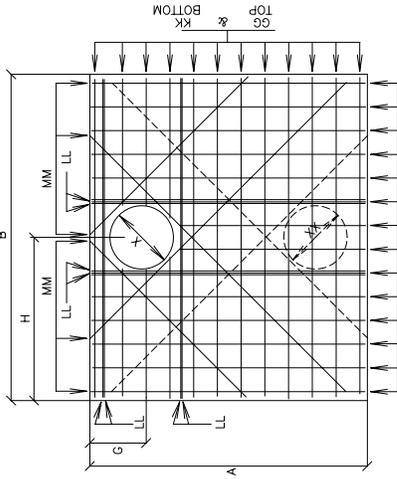
approved: WMS

date: 11/6/02 scale: NTS dwn: dwg #: W-41

ENGINEERING DIVISION OF PUBLIC WORKS DEPT.

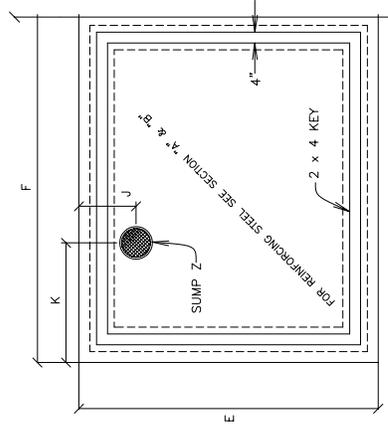
NOTE: A PRE CAST VAULT MEETING THESE STANDARDS IS ALSO ALLOWABLE

LL= TOP OR BOTTOM MM= BOTTOM ONLY



NOTE:
ADDITIONAL 24" ACCESS OPENING
WITH STEPS REQUIRED ON 6" & 8"
SERVICES.

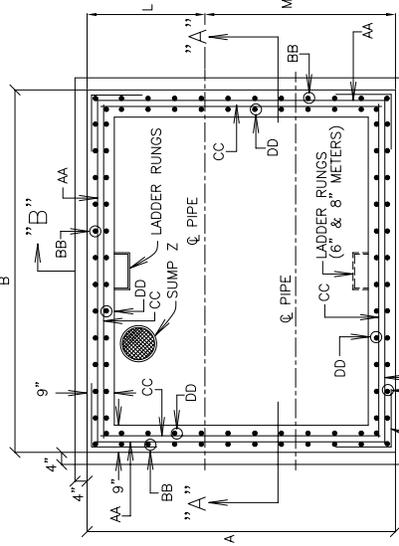
HH & JJ
TOP & BOTTOM
ROOF SLAB



FLOOR SLAB

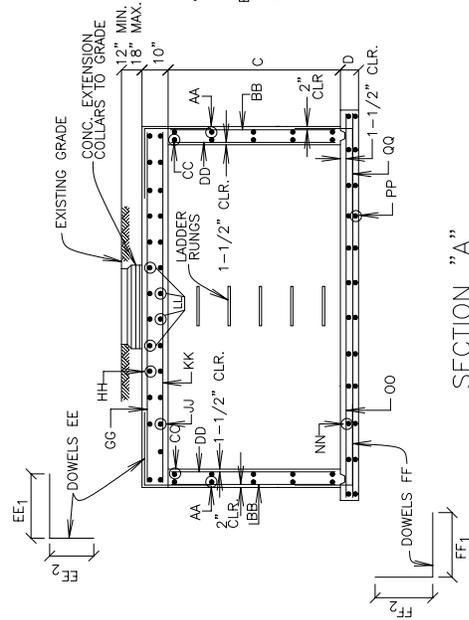
NOTE:
THE ROOF SLAB MAY BE CAST
IN SECTIONS FOR FUTURE ACCESS.
THE INDIVIDUAL SECTION WEIGHT
MUST NOT EXCEED 7,500 POUNDS.

NOTE:
ALL KNOCKOUTS FOR PIPE ENTRY AND EXIT MUST BE
FILLED WITH MORTAR OR FOAM TYPE FILLER OR 1" MASTIC.



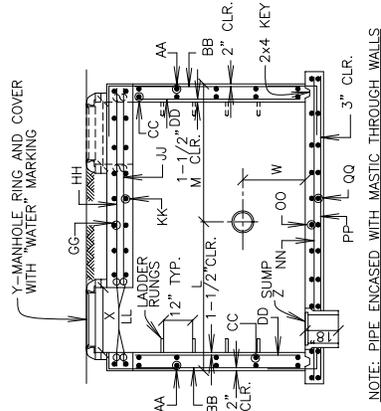
#5 BAR 2'-0" CORNER
DOWELS AT 12" O.C.
(TYP.)

PLAN OF VAULT



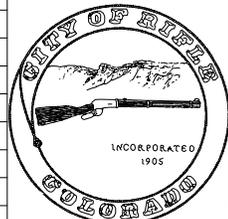
SECTION "A"

SEE SHEET NO. W-43 FOR DIMENSIONS
CORRESPONDING TO THIS DRAWING.



SECTION "B"

NOTE:
THE DISTANCE BETWEEN RUNGS, CLEATS, AND STEPS
SHALL NOT EXCEED 12 INCHES AND SHALL BE UNIFORM
THROUGHOUT THE LENGTH OF THE LADDER(S).



TURBINE METER VAULT 3", 4", 6" &
8" SERVICES "IRRIGATION ONLY"

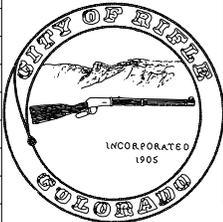
approved: WMS

date: 11/6/02 scale: NTS dwn: dwg #: W-42

ENGINEERING DIVISION OF PUBLIC WORKS DEPT.

No. Dwn. Date. Revision

No.	Dwn.	Date.	Revision



TURBINE METER VAULT DIMENSIONS
"IRRIGATION ONLY" 3", 4", 6" & 8"

approved: WMS
date: 11/6/02 scale: NTS dwn: dwg #: W-43
ENGINEERING DIVISION OF PUBLIC WORKS DEPT.

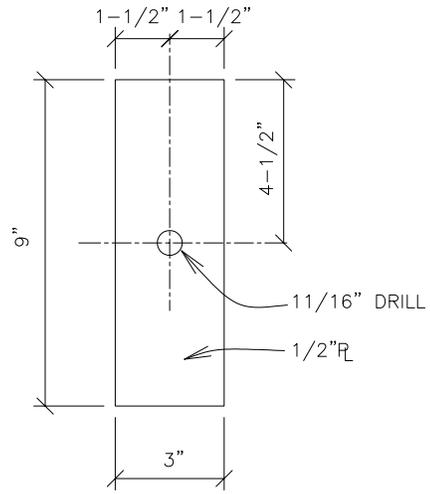
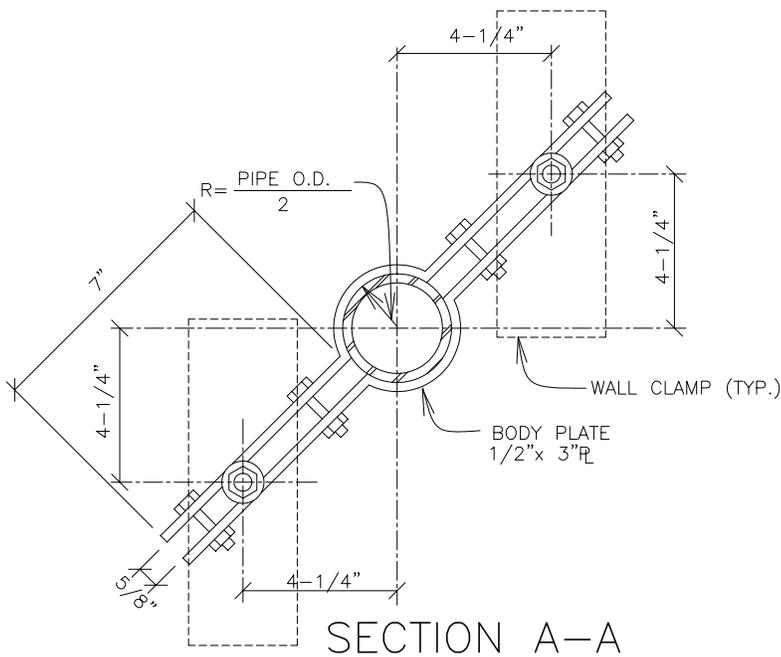
NOTE: A PRECAST VAULT CAN BE USED FOR ALL TURBINE METERS

METER SIZE	WALLS				WALL DOWELS				ROOF SLAB				FLOOR SLAB				
	AA BAR DIST. No.4 1'-4"	BB BAR DIST. No.4 1'-0"	CC BAR DIST. No.4 1'-4"	DD BAR DIST. No.5 1'-0"	EE & FF BAR DIST. No.5 1'-0"	EE 1 FF 1	EE 2 FF 2	GG BAR DIST. No.7 1'-0"	HH BAR DIST. No.7 1'-0"	IJ BAR DIST. No.7 1'-0"	KK BAR DIST. No.7 1'-0"	LL BOT. No.7	MM BOT. No.7	NN BAR DIST. No.5 1'-0"	OO BAR DIST. No.5 1'-0"	PP BAR DIST. No.5 1'-0"	QQ BAR DIST. No.5 1'-0"
3"																	
4"																	
6"																	
8"																	

SEE SHEET No. W-42 FOR DRAWINGS CORRESPONDING TO THESE DIMENSIONS.

METER SIZE	PIPE SIZE DIA.	VAULT DIMENSIONS														MANHOLE			SUMP			
		A	B	C*	D	E	F	G	H	J	K	L	M	N	P	W	X	XX		Y	Z	
3"	3"	8'-0"	10'-6"	5'-10"	0'-8"	9'-2"	11'-2"	2'-3"	5'-0"	1'-9"	2'-8"	3'-6"	4'-6"	2'-6"	0'-9"	2'-0"	36"				24"x36"	1'-0"
4"	4"	8'-0"	10'-6"	5'-10"	0'-8"	9'-2"	12'-7"	2'-3"	5'-0"	1'-9"	3'-4"	3'-6"	4'-6"	2'-6"	1'-0"	2'-0"	36"				24"x36"	1'-0"
6"	6"	11'-0"	13'-6"	5'-10"	0'-10"	9'-2"	14'-2"	2'-3"	6'-0"	1'-9"	3'-8"	4'-6"	6'-6"	3'-0"	1'-6"	2'-0"	36"				24"x36"	1'-0"
8"	8"	11'-0"	13'-6"	5'-10"	0'-10"	9'-2"	16'-1"	2'-3"	6'-0"	2'-3"	3'-8"	4'-6"	6'-6"	3'-0"	2'-0"	2'-0"	36"				24"x36"	1'-6"

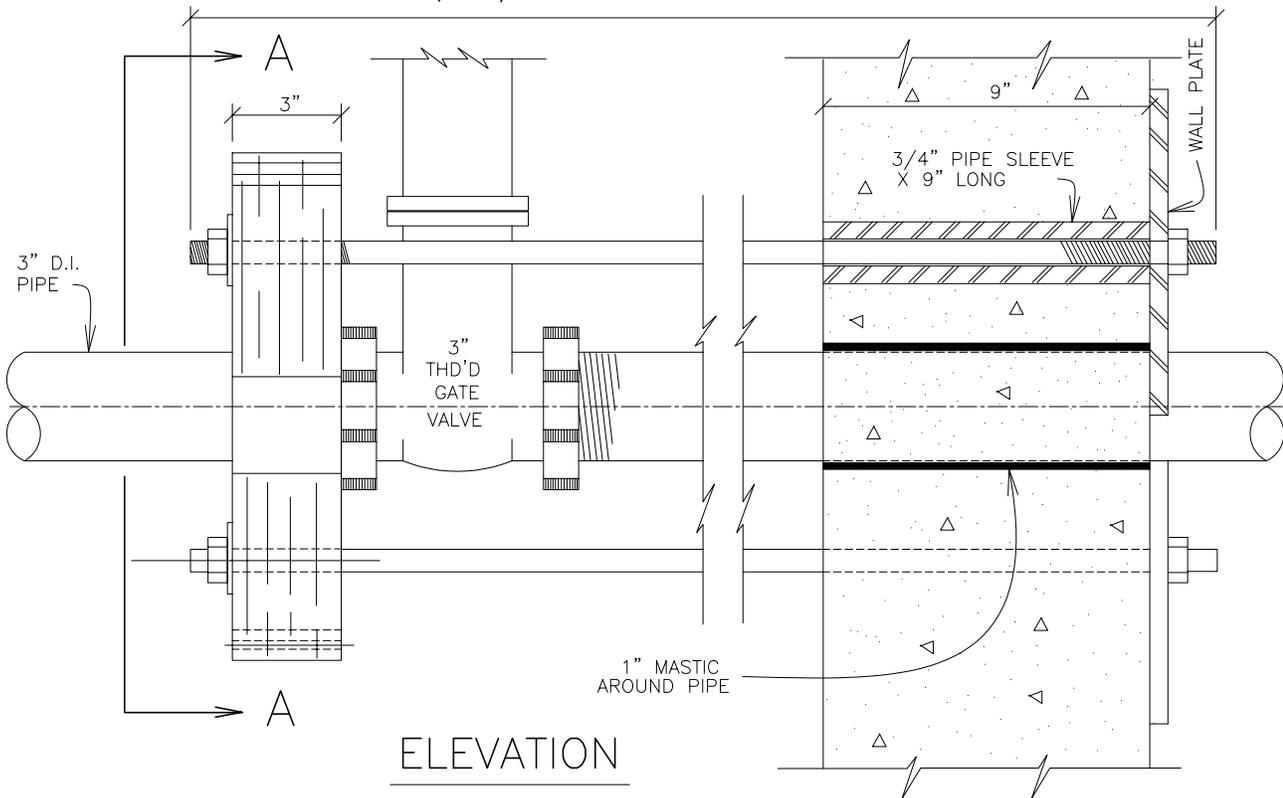
* NOTE: DIMENSION C IS A MINIMUM SUGGESTED HEIGHT. NOTES: SEE SHEET NO. W-44 FOR WALL PLATES AND BODY CLAMPS.
SEE SHEET NO. W-45 FOR WALL PLATES.
USE 5/16"x 7" MIDDLE RING ON COUPLINGS.
USE 3/8"x 7" MIDDLE RING ON COUPLINGS.
USE 3/8"x 7" MIDDLE RING ON COUPLINGS.



WALL PLATE

4 REQUIRED

2-5/8" Ø RODS 34" LONG THD'D. 5" EACH END



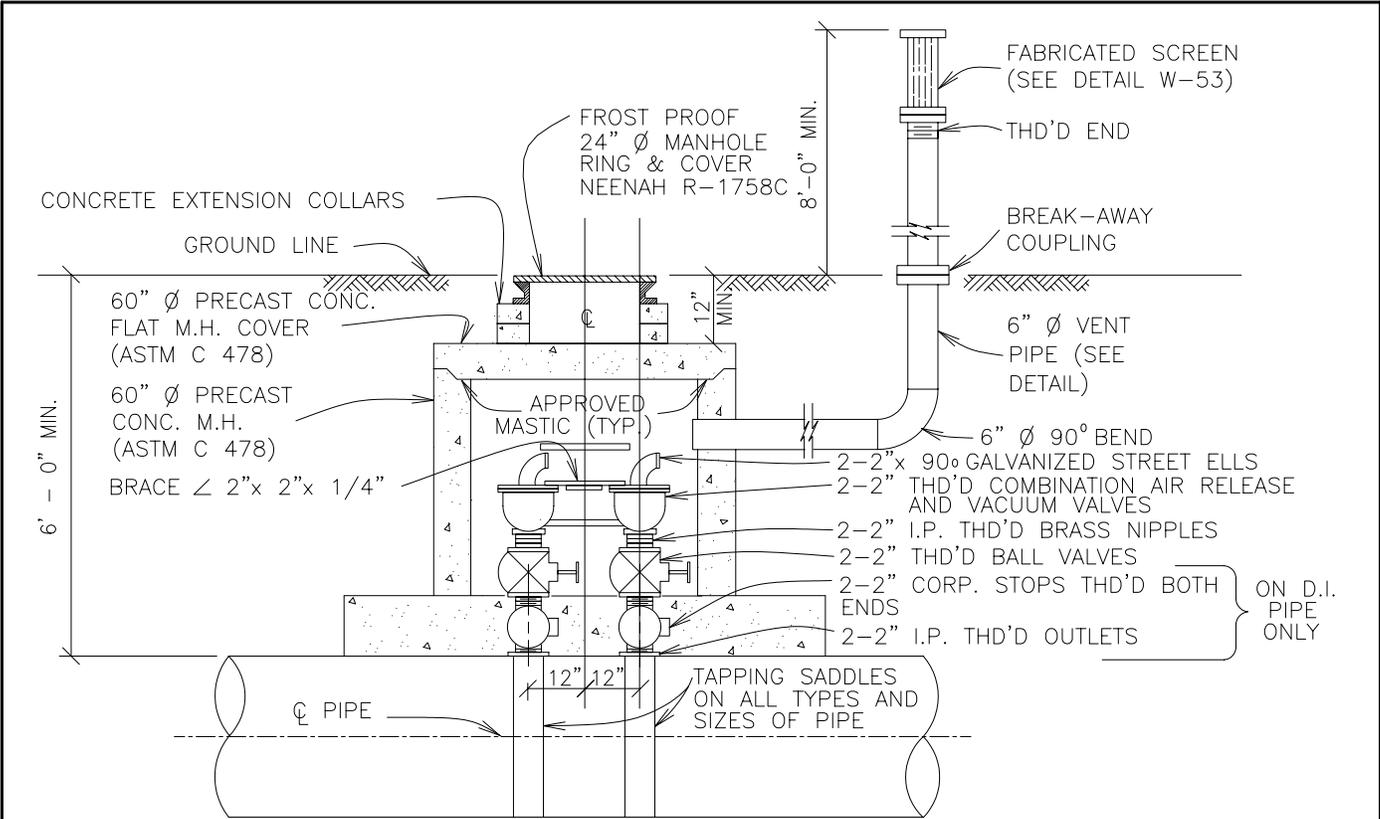
ELEVATION

No.	Dwn.	Date	Revision

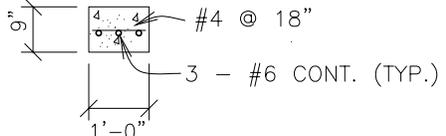


WALL PLATES AND BODY CLAMPS FOR 3" METERS

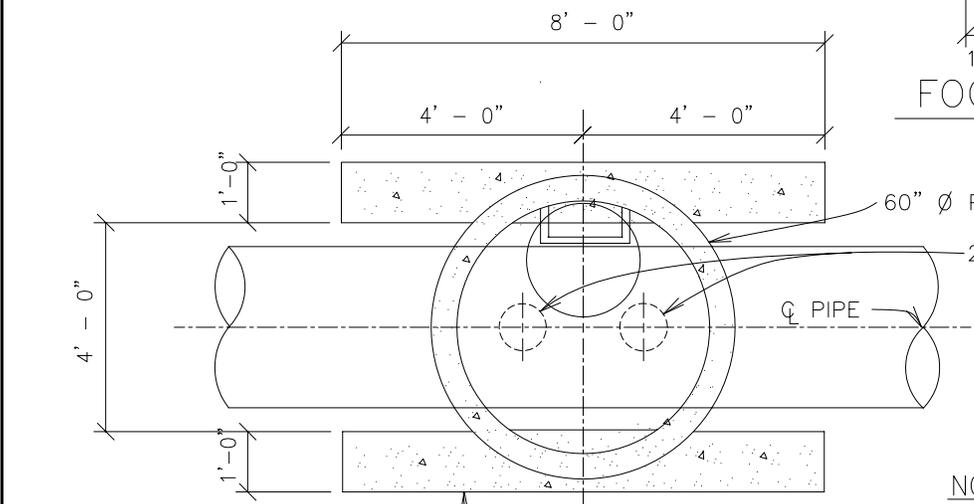
approved: WMS
 date: 11/6/02 scale: NTS dwn: dwg #: W-44
 ENGINEERING DIVISION OF PUBLIC WORKS DEPT.



ELEVATION



FOOTING DETAIL



PLAN

NOTES:

- 1.) USE 2" AIR VALVE ASSEMBLY ON 14" OR LARGER PIPE. APCO NO.145C OR VAL MATIC 202C OR EQUAL
- 2.) THE DISTANCE BETWEEN RUNGS, CLEATS, AND STEPS SHALL NOT EXCEED 12 INCHES AND SHALL BE UNIFORM THROUGHOUT THE LENGTH OF THE LADDER.
- 3.) LADDER RUNGS ARE REQUIRED IN PRECAST

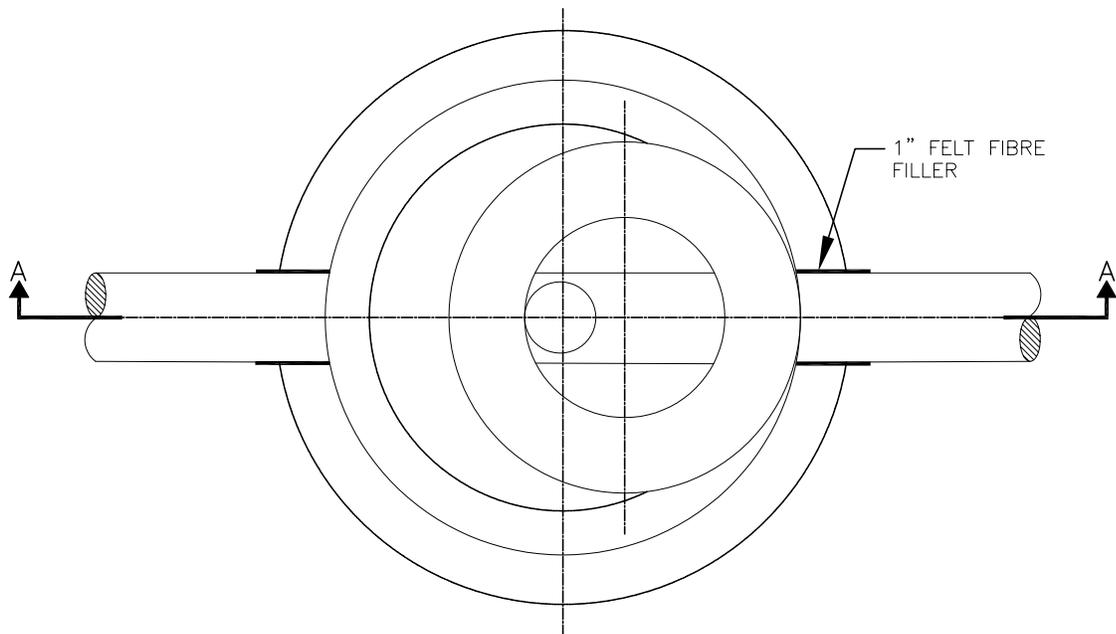
CONC. M.H. BASE BEAMS
9"x 1'-0"x 8'-0" REINF.
WITH BAR STEEL AS
SHOWN.

No.	Dwn.	Date	Revision

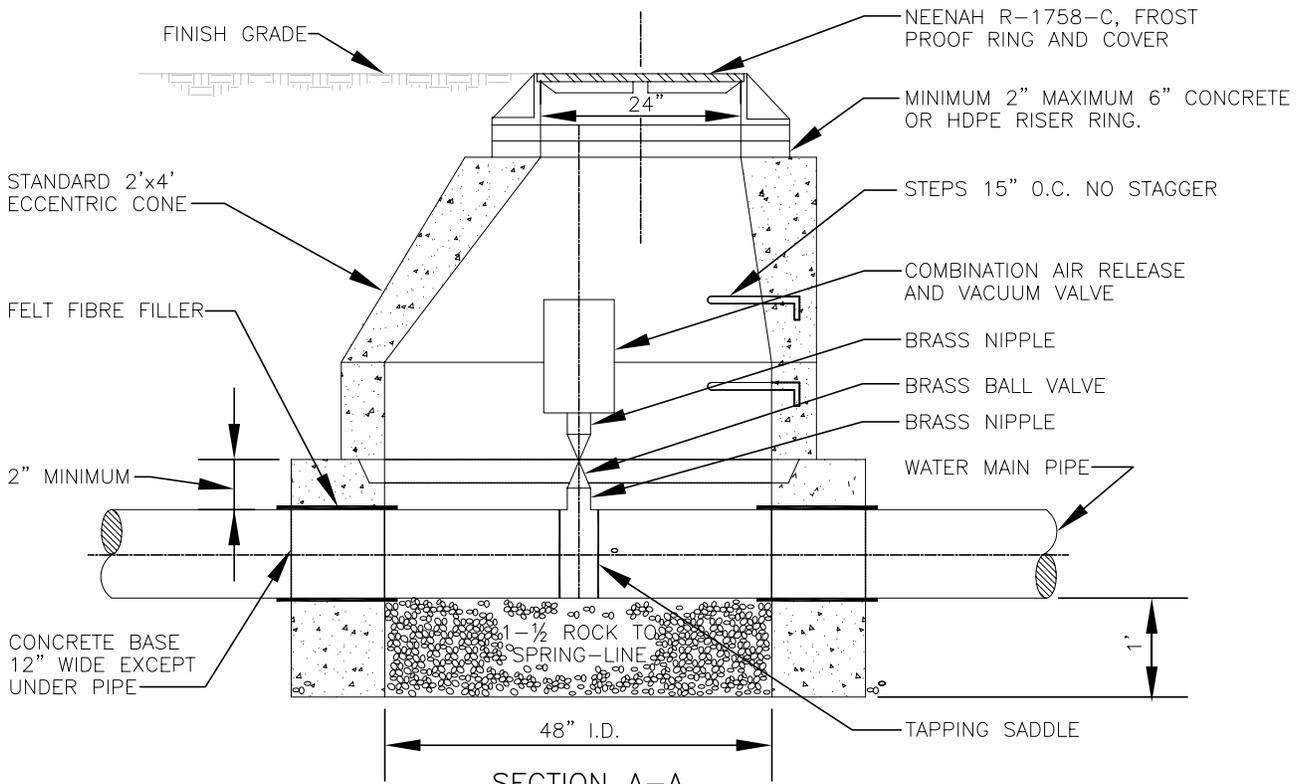


DUAL 2" AIR RELEASE AND VACUUM VALVE INSTALLATION FOR MAINS LARGER THAN 12" DIAMETER

approved: WMS
 date: 11/6/02 scale: NTS dwn: dwg #: W-46
 ENGINEERING DIVISION OF PUBLIC WORKS DEPT.

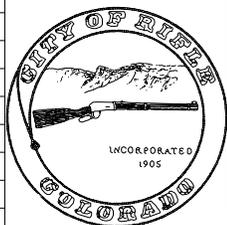


PLAN



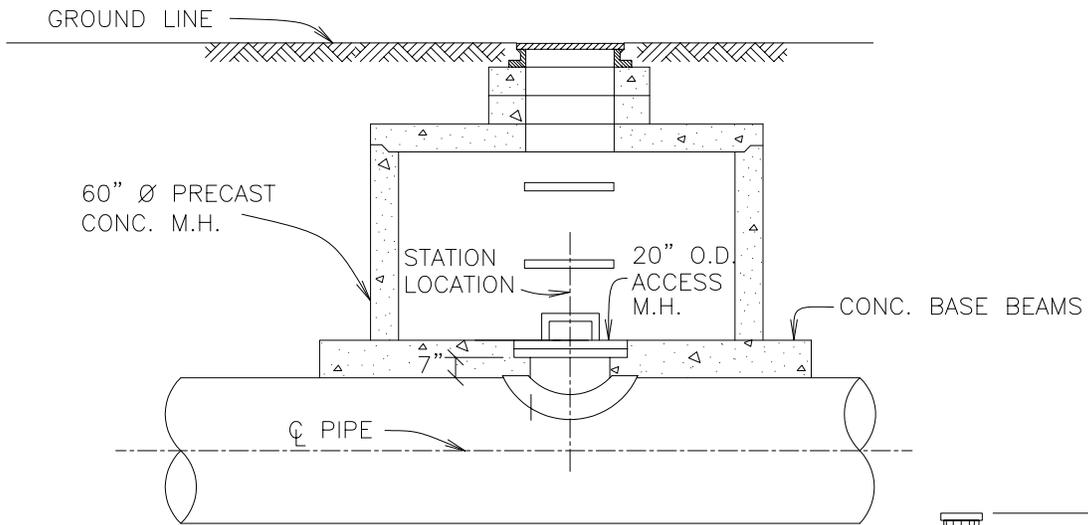
NOTE:

2" VALVE & FITTINGS-APCO NO. 145C OR VAL MATIC 202C OR EQUAL



SINGLE 2" AIR RELEASE AND VACUUM VALVE INSTALLATION FOR MAINS 12" OR LESS IN DIAMETER

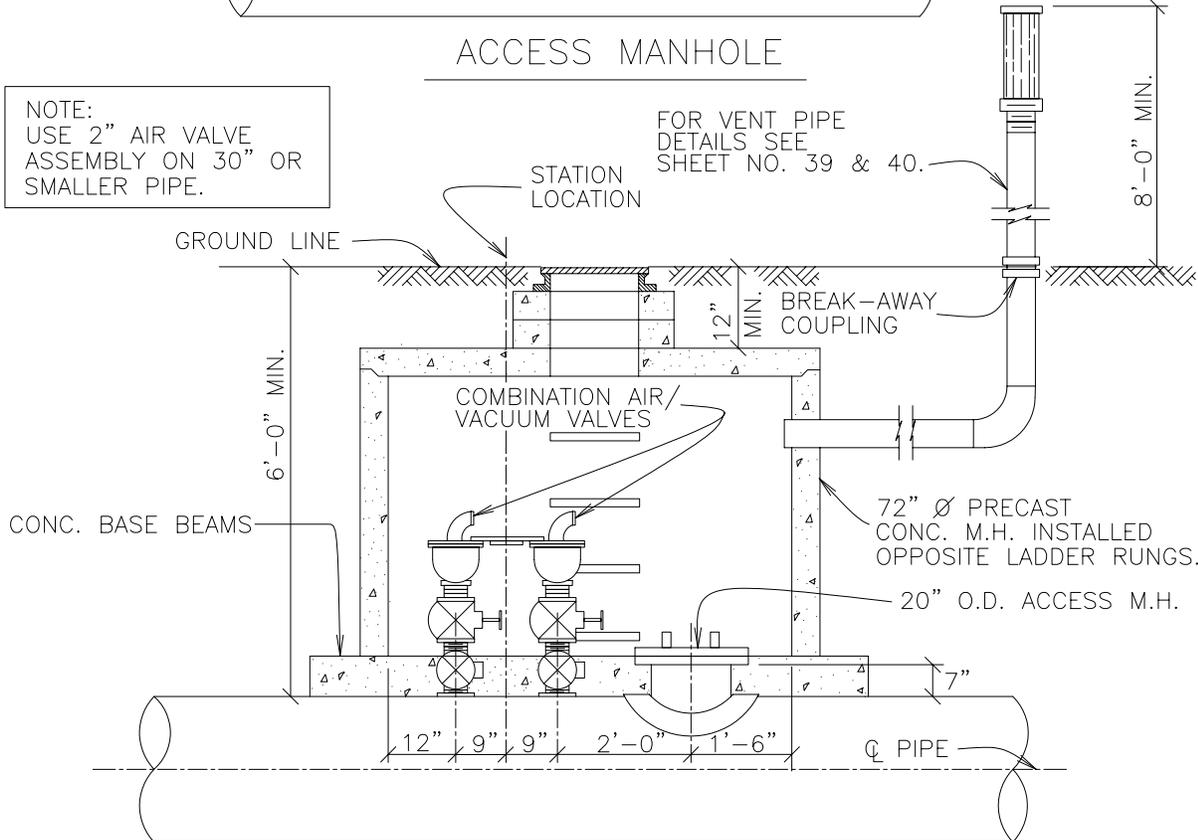
approved: WMS
 date: 11/6/02 | scale: NTS | dwn: | dwg #: W-47



ACCESS MANHOLE

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

FOR VENT PIPE
DETAILS SEE
SHEET NO. 39 & 40.

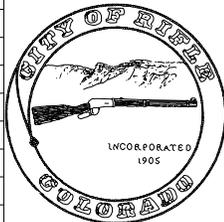


AIR VALVE ASSEMBLY WITH ACCESS MANHOLE

NOTES:

- 1.) SEE SHEET NO. W-44 FOR CONCRETE MANHOLE BASE BEAMS AND AIR/VACUUM VALVE DETAILS.
- 2.) LADDER RUNGS ARE REQUIRED IN PRECAST MANHOLES. THE DISTANCE BETWEEN RUNGS, CLEATS AND STEPS SHALL NOT EXCEED 12" AND SHALL BE UNIFORM THROUGHOUT THE LENGTH OF THE LADDER.

No.	Dwn.	Date	Revision

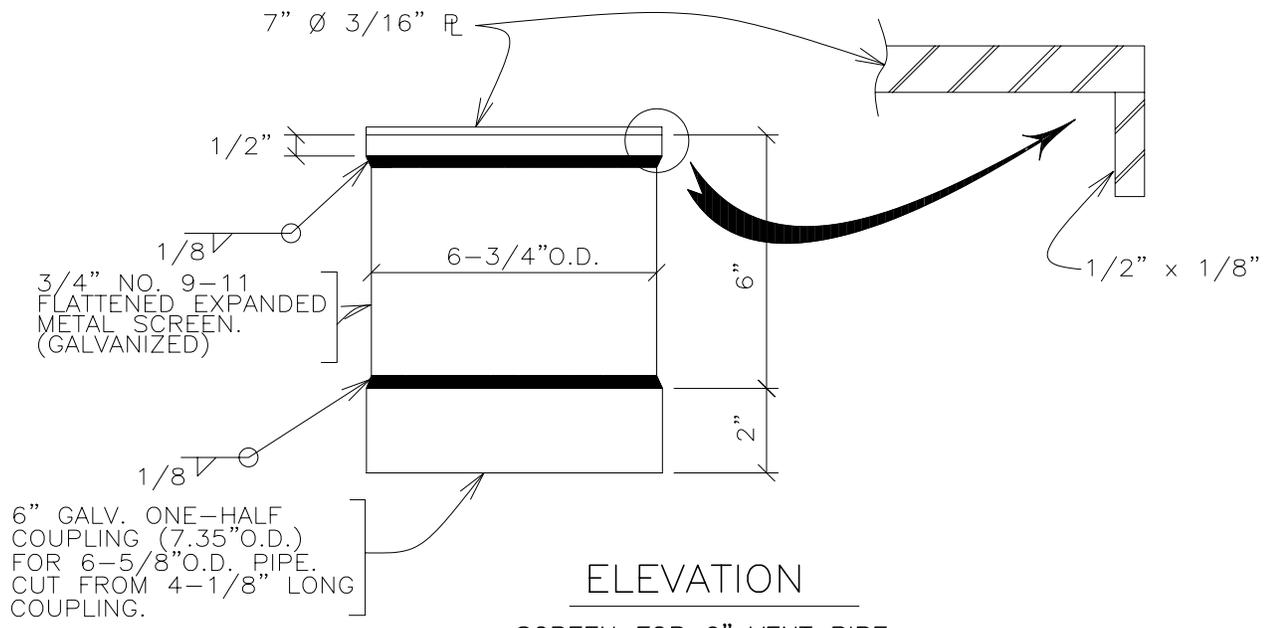


DUAL AIR AND VACUUM VALVE ASSEMBLY WITH ACCESS MANHOLE

approved: WMS

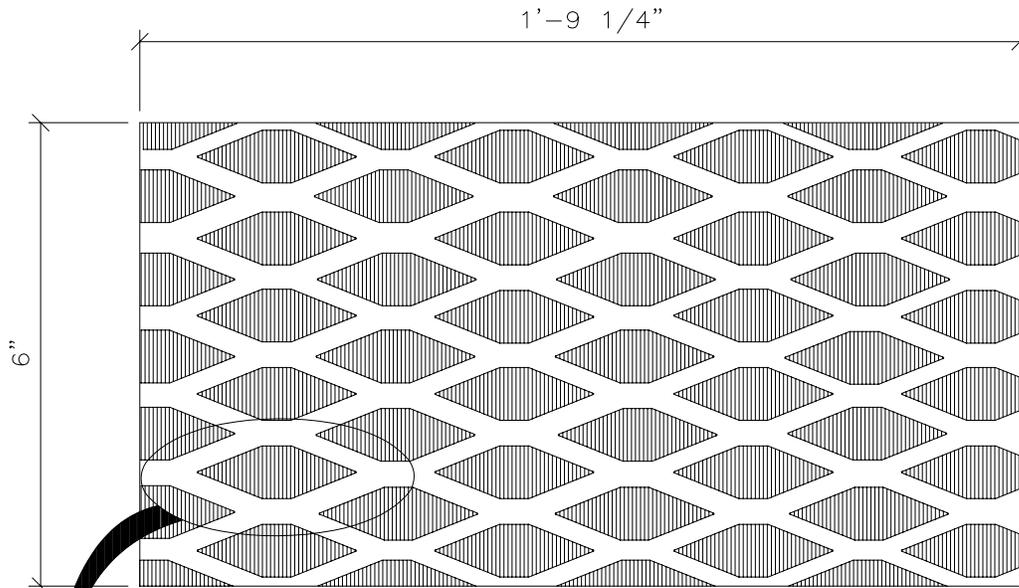
date: 11/6/02 scale: NTS dwn: dwg #: W-48

ENGINEERING DIVISION OF PUBLIC WORKS DEPT.

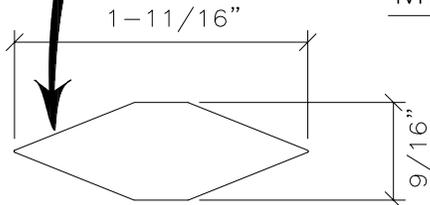


ELEVATION

SCREEN FOR 6" VENT PIPE



METAL SCREEN



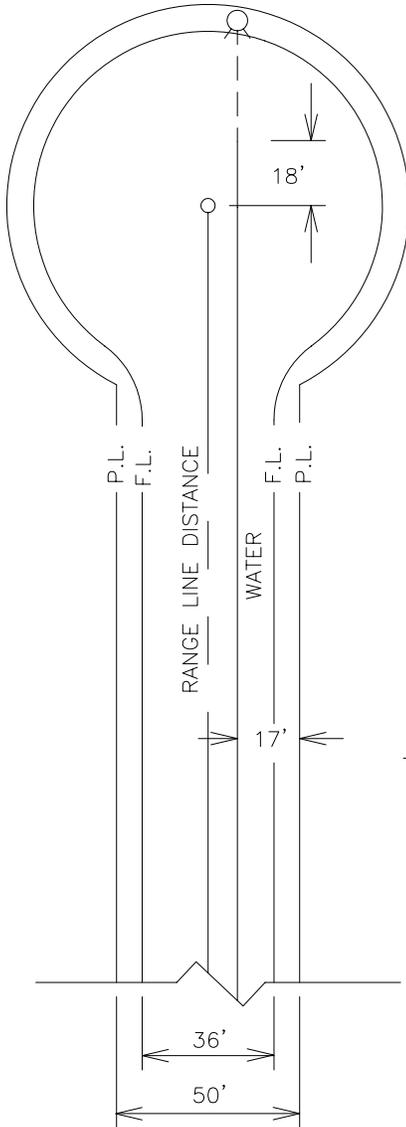
No.	Dwn.	Date.	Revision



6" DIAMETER VENT
PIPE SCREEN

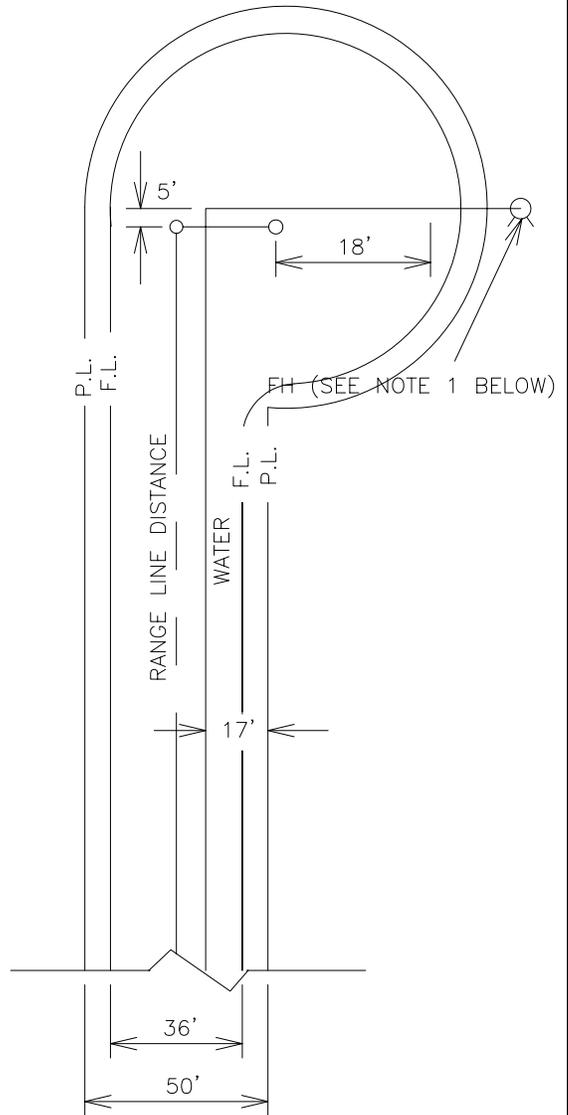
approved: WMS
 date: 11/6/02 | scale: NTS | dwn: | dwg #: W-49
 ENGINEERING DIVISION OF PUBLIC WORKS DEPT.

FH (SEE NOTE 1 BELOW)



"A" - STRAIGHT LINE CUL-DE-SAC:
 LAY PIPE TO 18'
 BEYOND THE CENTER
 (RADIUS POINT)
 OF CUL-DE-SAC.

"B" - OFFSET CUL-DE-SAC:
 SAC: LAY PIPE TO
 5' BEYOND P.I. THEN
 TO 18' BEYOND CENTER
 (RADIUS POINT) OF
 CUL-DE-SAC.



"A"

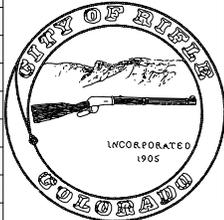
"B"

TYPICAL PLAN FOR CUL-DE-SACS

TYPICAL PLAN FOR CUL-DE-SACS

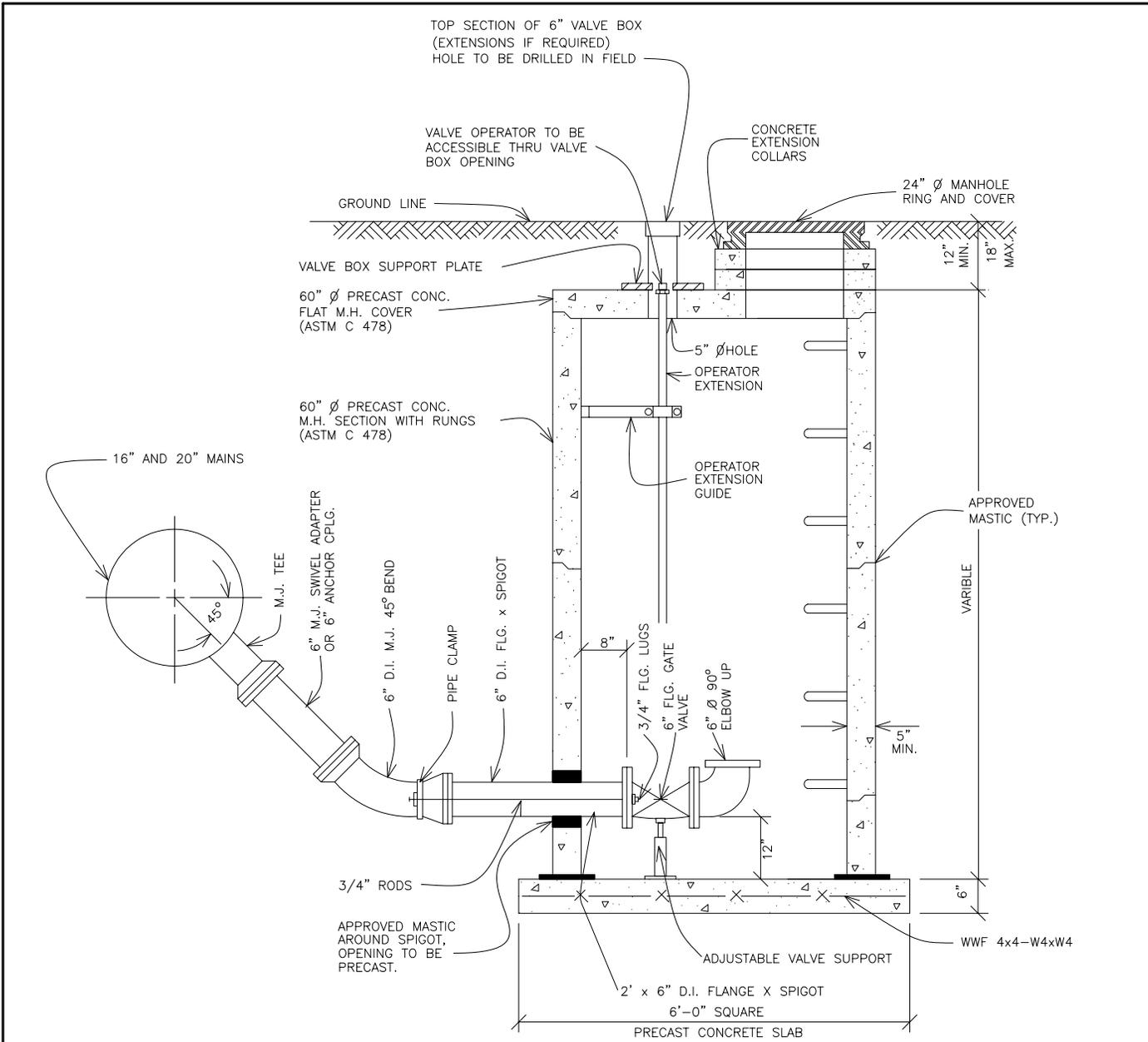
- 1.) WHEN THE DISTANCE BETWEEN AN 8" MAIN AND THE CENTER OF A CUL-DE-SAC IS LESS THAN 600' BUT GREATER THAN 150' THE BRANCH LATERAL SHALL TERMINATE AT A FIRE HYDRANT. IF APPROVED BY CITY ENGINEER, THE LATERAL MAY TERMINATE AT A BLOW OFF.

No.	Dwn.	Date.	Revision



WATER DISTRIBUTION SYSTEM
 TYPICAL PLAN FOR
 CUL-DE-SACS

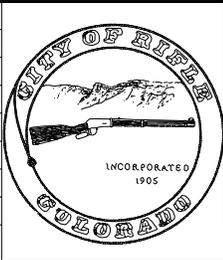
approved: WMS
 date: 11/6/02 scale: NTS dwn: dwg #: W-5
 ENGINEERING DIVISION OF PUBLIC WORKS DEPT.



ELEVATION

- NOTES: 1.) THIS BLOW-OFF INSTALLATION MAY BE REPLACED BY A FIRE HYDRANT WHERE APPROVED FOR 16" AND 20" MAINS.
- 2.) MEG-A-LUG IS AN ACCEPTABLE ALTERNATIVE TO RODDING.
- 3.) THE DISTANCE BETWEEN RUNGS, CLEATS, AND STEPS SHALL NOT EXCEED 12 INCHES AND SHALL BE UNIFORM THROUGHOUT THE LENGTH OF THE LADDER.

No.	Dwn.	Date.	Revision

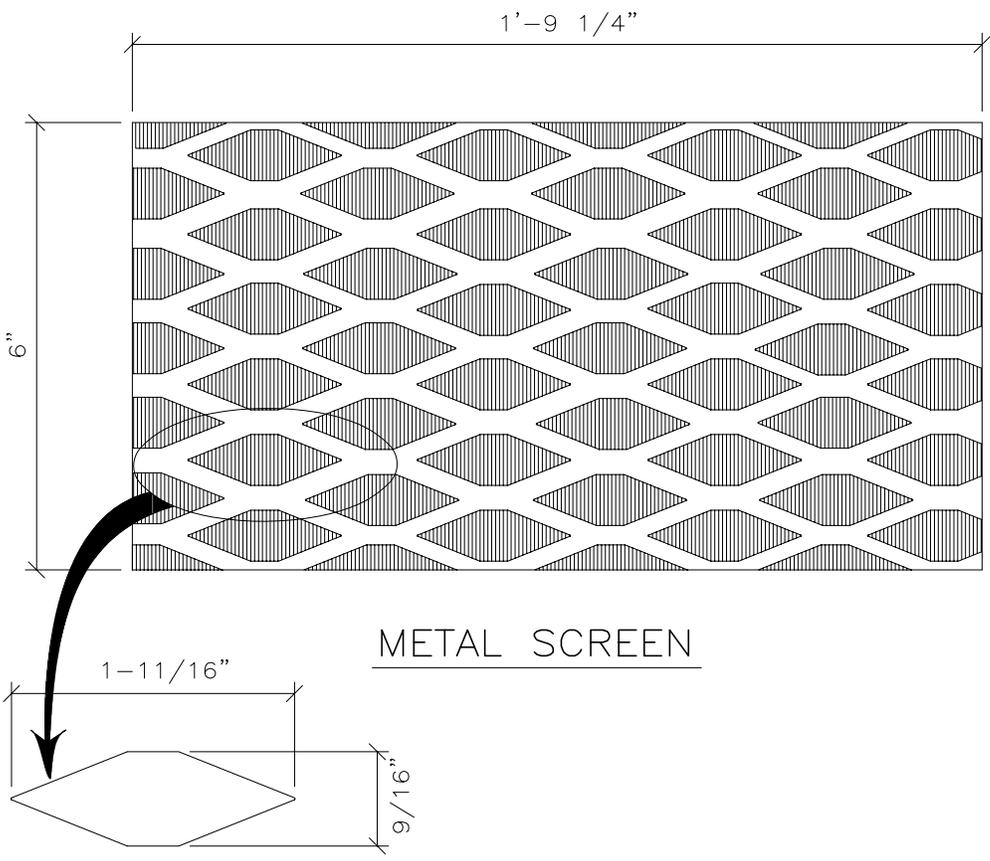
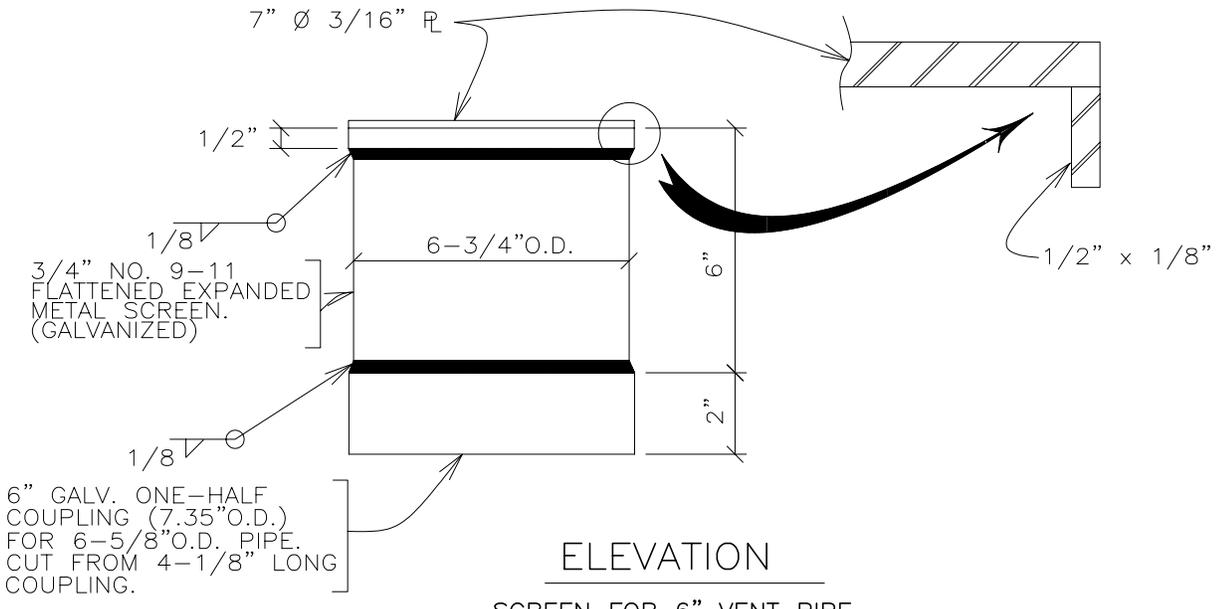


TRANSMISSION MAIN
BLOW-OFF INSTALLATION

approved: WMS

date: 11/6/02 scale: NTS dwn: dwg #: W-50

ENGINEERING DIVISION OF PUBLIC WORKS DEPT.

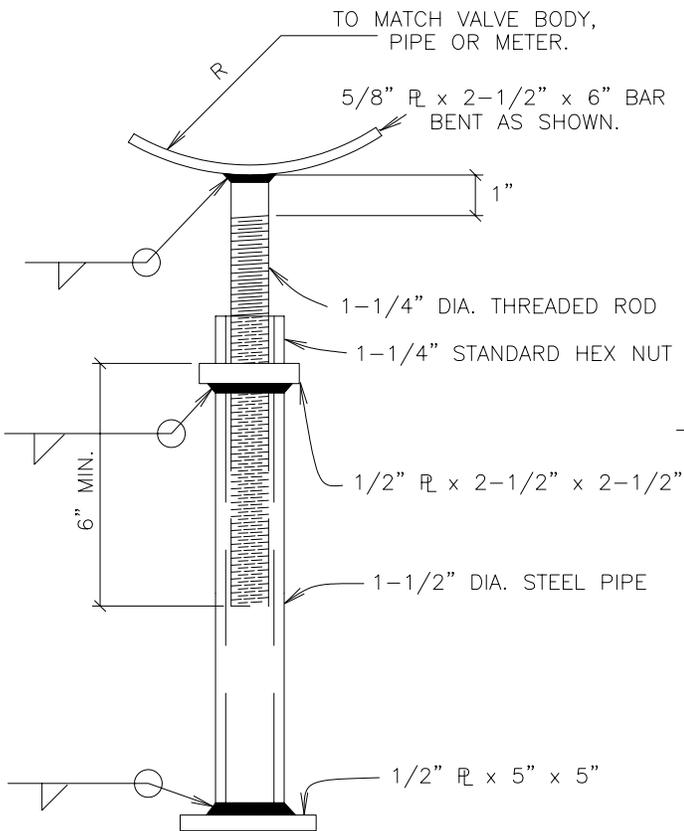


No.	Dwn.	Date	Revision

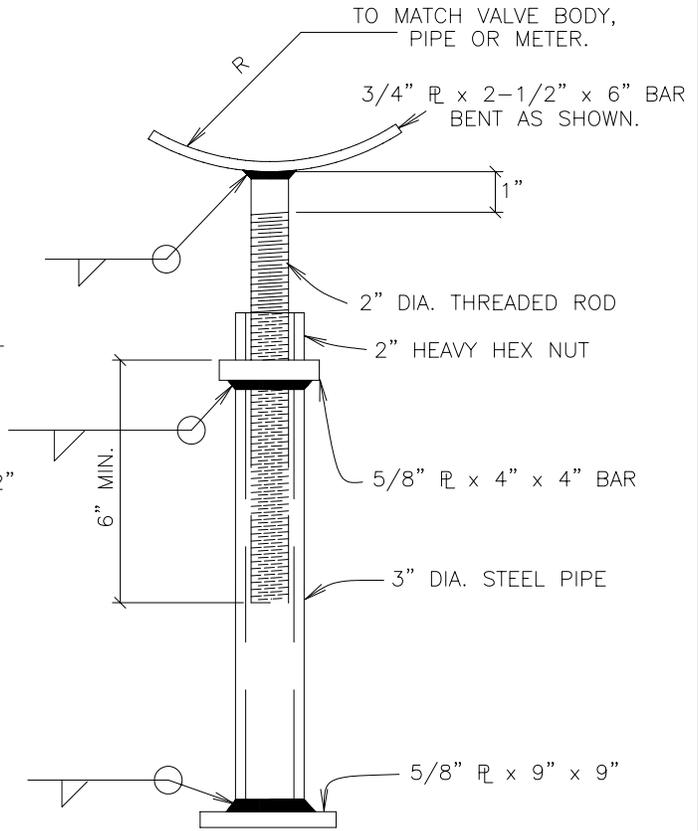


6" DIAMETER VENT
PIPE SCREEN

approved: WMS
date: 11/6/02 | scale: NTS | dwn: | dwg #: W-51
ENGINEERING DIVISION OF PUBLIC WORKS DEPT.

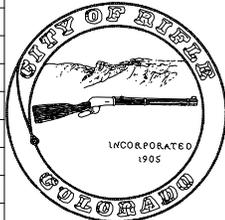


ADJUSTABLE-SUPPORT
(STANDARD)



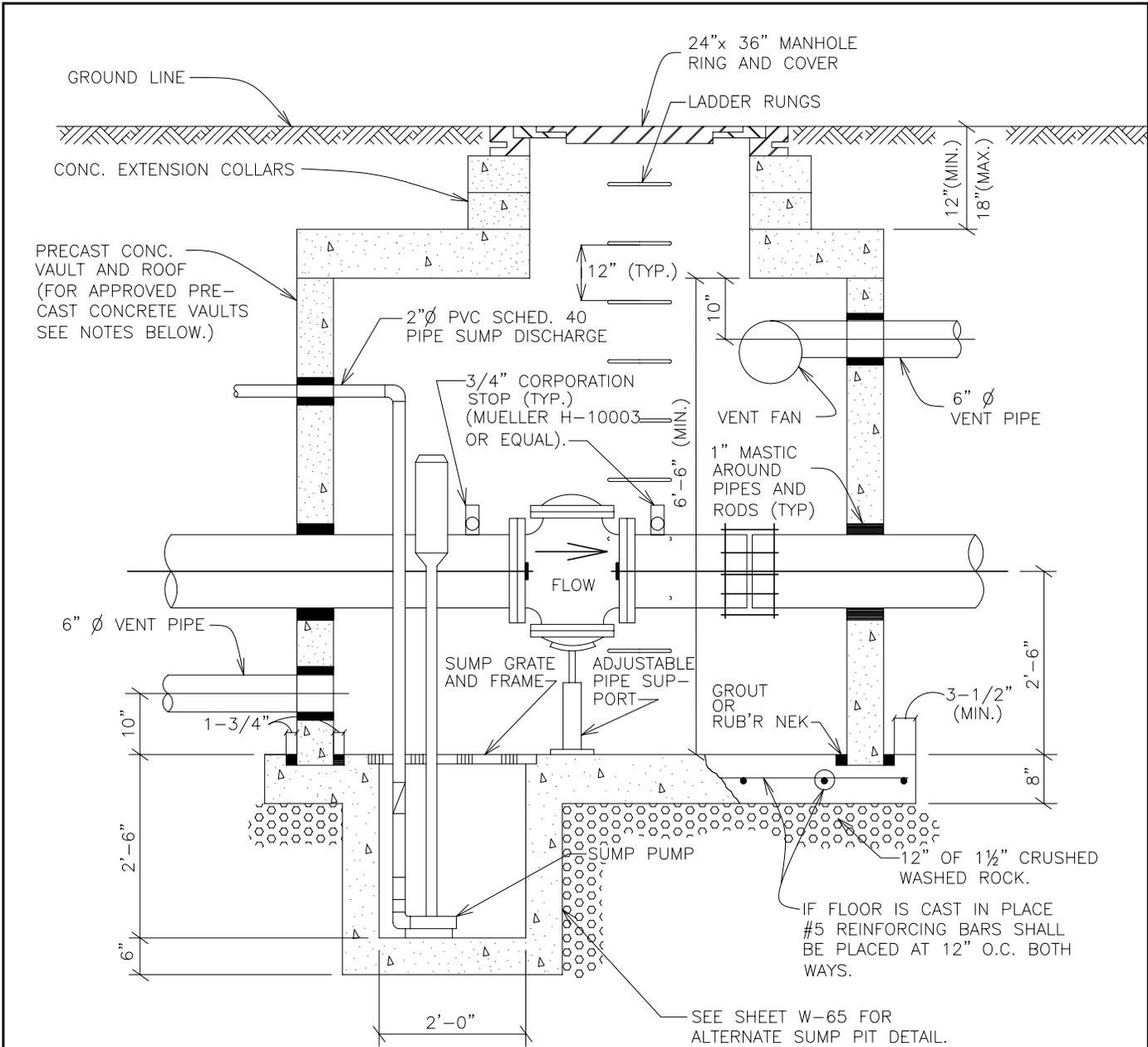
ADJUSTABLE-SUPPORT
(HEAVY DUTY)

No. Dwn.	Date	Revision



ADJUSTABLE STEEL PIPE VALVE
SUPPORT

approved: WMS
 date: 11/6/02 | scale: NTS | dwn: | dwg #: W-52
 ENGINEERING DIVISION OF PUBLIC WORKS DEPT.



NOTES:

- 1.) APPROVED PRECAST CONCRETE VAULTS:
 AMCOR CONC. INC.— 10' X 10' X 7' 7080M, 7080-12.
 ADAMS CITY MFG.—11' X 12', 6' X 8'-6", 7' X 12'-6"
- 2.) CITY ENGINEERS APPROVAL IS REQUIRED FOR
 SUMP PUMP DISCHARGE TO STORM SEWERS.
- 3.) SEE SHEET W-54 FOR PLAN VIEW AND
 ADDITIONAL NOTES.
- 4.) BYPASS NOT SHOWN THIS VIEW

No.	Dwn.	Date	Revision



**PRESSURE REGULATING VALVE
 RECTANGULAR VAULT CROSS SECTION**

approved: WMS

date: 11/6/02 | scale: NTS | dwn: | dwg #: W-55

ENGINEERING DIVISION OF PUBLIC WORKS DEPT.

PRV VAULT PIPING AND APPURTENANCES NOTES

<u>DESIGNATION</u>	<u>DESCRIPTION AND/OR SPECIFICATION</u>
VAULT	H-20 BRIDGE LOADING
VENT PIPING	6" PVC, SCHEDULE 40, FITTINGS AND SCREEN
GATE VALVES	MJ, WHEEL OPERATOR, AWWA C-509, RESILIENT SEAT, OPEN LEFT.
PRV	PRESSURE REGULATING VALVE CLA-VAL 92-G02, CL. 150, 30 TO 300 PSI UP, 20 TO 200 PSI DOWN OR SINGER BRAND MODEL 106-S. PRV TO BE SUPPLIED WITH POSITION INDICATOR ASSEMBLY, OPEN AND CLOSE SPEED CONTROLS, SUSTAINER AND PRESET PILOT VALVES IN ACCORDANCE WITH CITY SPECIFIED PRESSURES.
SUMP GRATE AND FRAME	NEENAH R-4380 OR EQUAL.
GAUGE	FLUID GAUGE 0-150 PSI, ASHCROFT OR MARSHALL TOWN OR EQUAL.
MANHOLE FRAME AND COVER	NEENAH R-1741-D OR EQUAL.
SUMP PUMP	1/3 HP SUBMERSIBLE SUMP PUMP, GORMAN-RUPP S-1 1/2 A3A OR EQUAL.
VENT FAN	240 CFM VENT FAN.
TELEMETRY	SEE STANDARD SPECIFICATIONS SECTION 30.2.10
ELECTRICAL	WEATHER PROOF: WEATHER HEAD: BREAKER, JUNCTION AND SWITCH BOXES, SWITCHES, DUPLEX RECEPTACLE WITH COVER. EXPLOSION PROOF: LIGHT FIXTURES AND 75 WATT BULBS. TUBING, CONDUIT, GROUND ROD, WIRE, METER ETC.
MISCELLANEOUS	TIE RODS, COPPER TUBING, TELEPHONE CONDUIT, ANCHOR BLOCKS, TAPPING SADDLES, MASTIC, SEALS COLD APPLIED TAPE, ETC. SEE DRAWINGS: W-54 AND W-55 FOR PLAN VIEW, CROSS SECTION AND ADDITIONAL NOTES.

No.	Dwn.	Date.	Revision

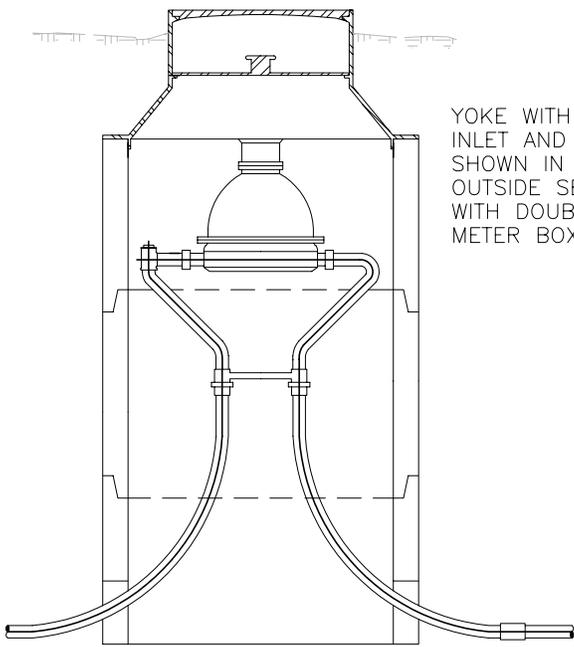


PRESSURE REGULATING VALVE
SYSTEM PIPING &
APPURTENANCES

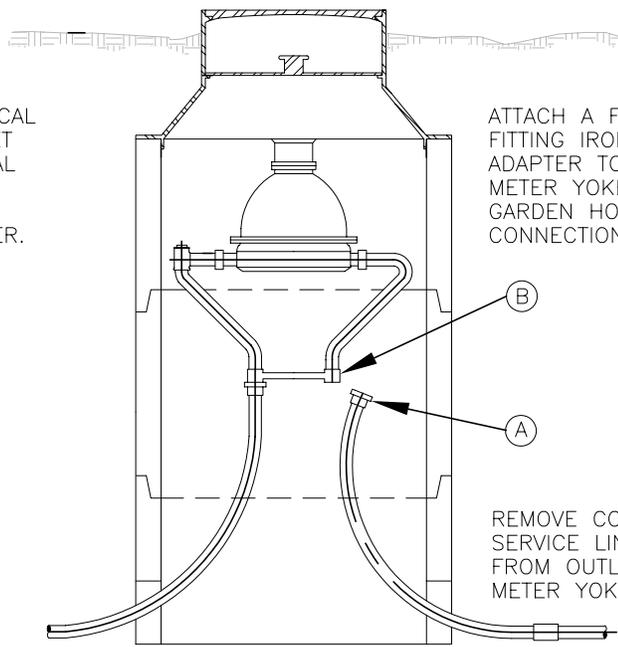
approved: WMS
 date: 11/6/02 | scale: NTS | dwn: | dwg #: W-56
 ENGINEERING DIVISION OF PUBLIC WORKS DEPT.

TEMPORARY CONSTRUCTION WATER SET-UP

YOU MAY OBTAIN YOUR WATER FROM YOUR WATER SERVICE CONNECTION ONLY AFTER THE METER HAS BEEN SET BUT PRIOR TO COMPLETION OF THE PLUMBING INSIDE THE STRUCTURE, BY SIMPLY REMOVING THE COPPER SERVICE LINE FROM THE OUTLET OF THE METER YOKE AND ATTACHING A FLARE FITTING IRON PIPE ADAPTER IN ITS PLACE. THIS ADAPTER WILL ALLOW A GARDEN HOSE TO BE ATTACHED AND USED FOR CONVEYING CONSTRUCTION WATER THROUGH THE METER.



YOKE WITH VERTICAL INLET AND OUTLET SHOWN IN TYPICAL OUTSIDE SETTING WITH DOUBLE LID METER BOX COVER.

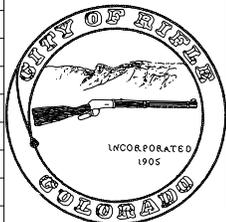


ATTACH A FLARE FITTING IRON PIPE ADAPTER TO THE METER YOKE FOR GARDEN HOSE CONNECTION.

REMOVE COPPER SERVICE LINE FROM OUTLET OF METER YOKE.

IF YOU HAVE ANY QUESTIONS PLEASE CALL CITY OF RIFLE, UTILITIES DIVISION (970) 625-6223

No.	Dwn.	Date	Revision

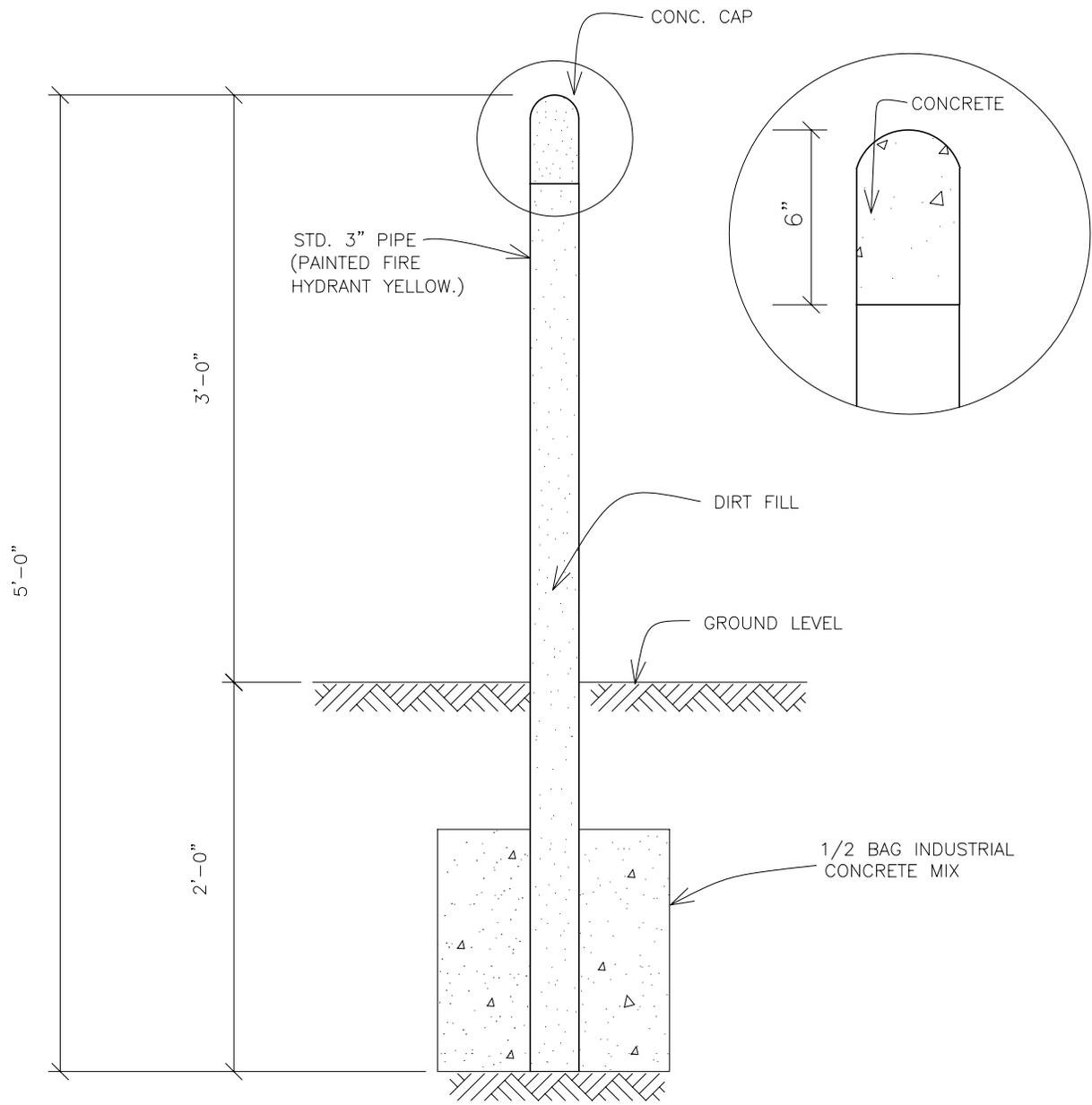


TEMPORARY WATER SET-UP FOR CONSTRUCTION USE

approved

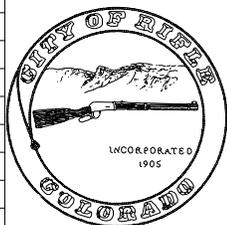
date: scale: NTS dwn: dwg #: W-57

ENGINEERING DIVISION OF PUBLIC WORKS DEPT.



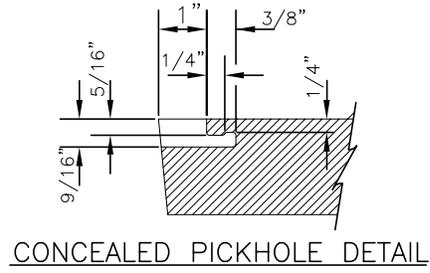
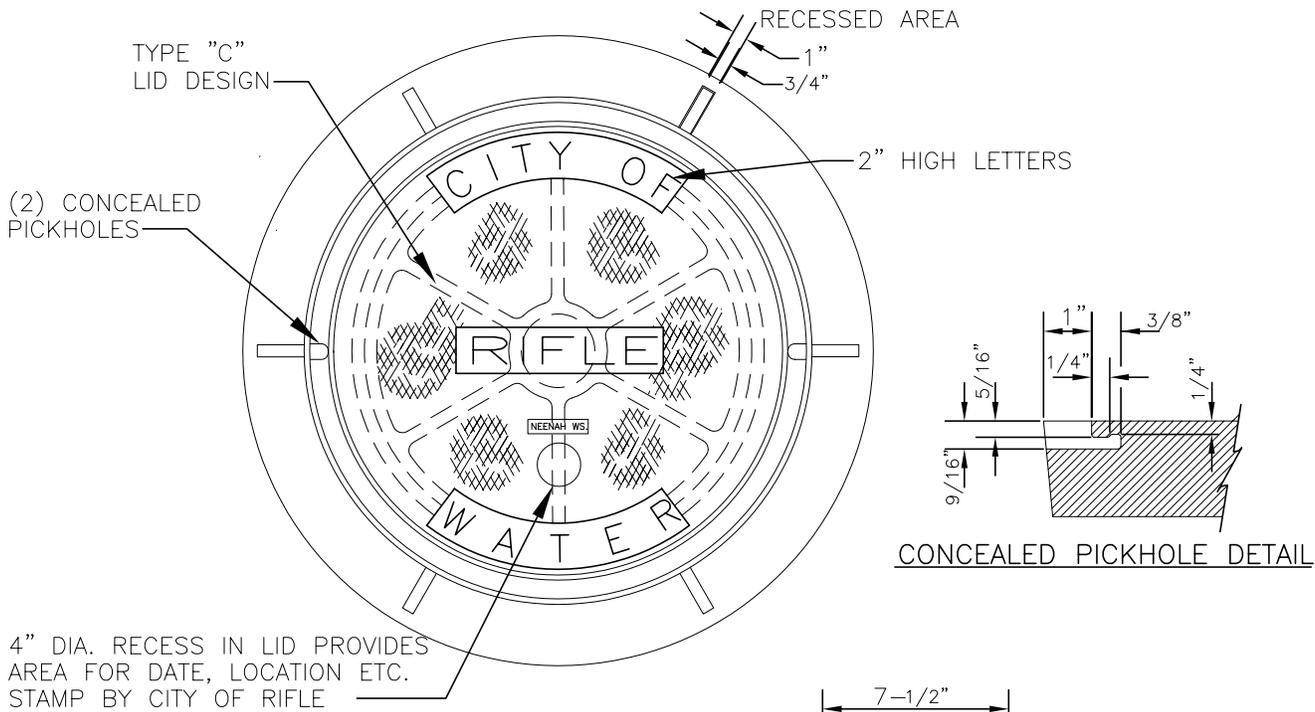
IDENTIFICATION MARKS ON POSTS SHALL BE 3" DIA. CIRCLES BROKEN IN VERTICAL CENTER (C) POINTING TO APPURTENANCE, WITH 1" STENCILS INSIDE CIRCLE INDICATING TYPE OF APPURTENANCE (MH, 12" GATE VALVE, ETC.) AND THE DISTANCE IN FEET AND INCHES FROM POST.

No.	Dwn.	Date.	Revision

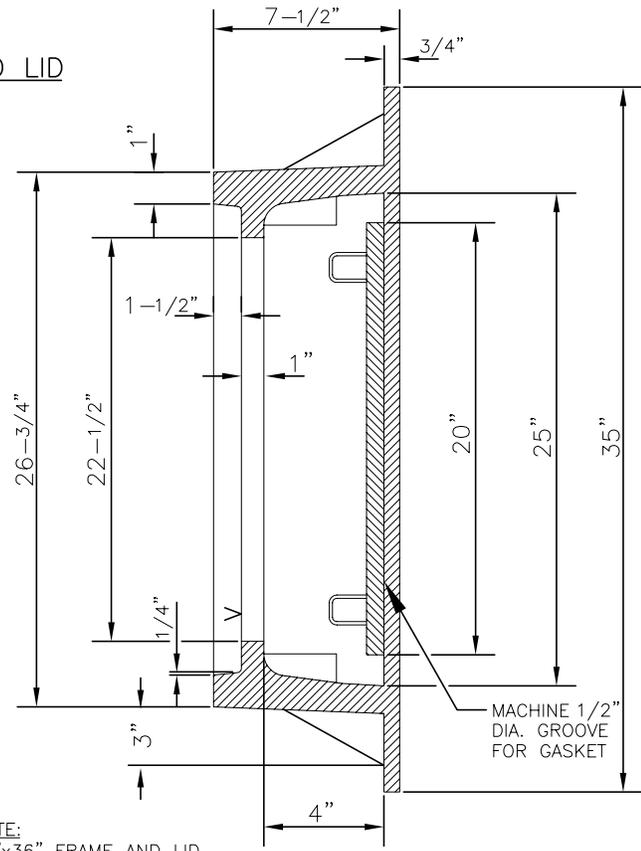
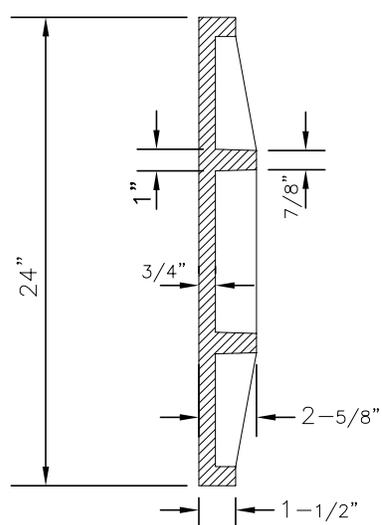


REFERENCE POST
TYPICAL DETAIL

approved: WMS
 date: 11/6/02 | scale: NTS | dwn: | dwg #: W-58
 ENGINEERING DIVISION OF PUBLIC WORKS DEPT.



FRAME AND LID



NEENAH R-1758-C OR EQUAL
 COMP. NOS: FR: 1755-0001, LID:
 INNER LID: 1755 0003
 MATERIAL: CAST GRAY IRON ASTM A-48, CLASS 35B
 FINISH: STD. BLACK ASPHALT EMULSION
 APPROX. WEIGHT: 455 LBS.

NOTE:
 24"x36" FRAME AND LID
 (NOT SHOWN) SHALL BE
 DEETER #1191 OR EQUAL
 (NO FROST LID).



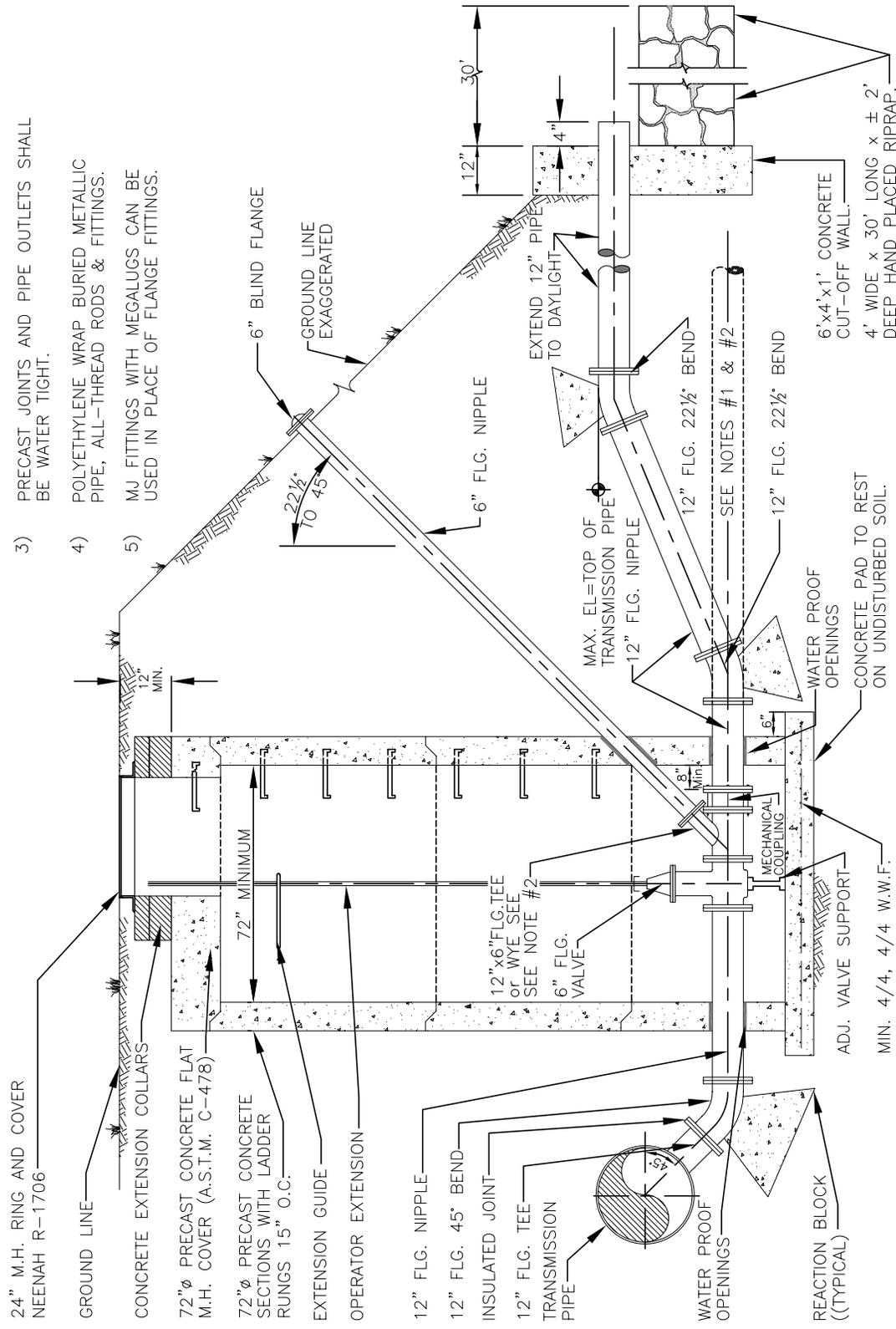
WATER METER OR VALVE
 VAULT FRAME AND LID DETAIL
 (NO FROST LID)

approved: WMS
 date: 11/6/02 scale: NTS dwn: dwg #: W-59
 ENGINEERING DIVISION OF PUBLIC WORKS DEPT.

No.	Dwn.	Date.	Revision

NOTES:

- 1) EXTEND 12" PIPE HORIZONTALLY TO DAYLIGHT WHEN DISTANCE BETWEEN THE MANHOLE AND THE CUT-OFF WALL IS $\leq 100'$.
- 2) WYE IS NOT REQUIRED WHEN OUTLET IS HORIZONTAL.
- 3) PRECAST JOINTS AND PIPE OUTLETS SHALL BE WATER TIGHT.
- 4) POLYETHYLENE WRAP BURIED METALLIC PIPE, ALL-THREAD RODS & FITTINGS.
- 5) MJ FITTINGS WITH MEGALUGS CAN BE USED IN PLACE OF FLANGE FITTINGS.

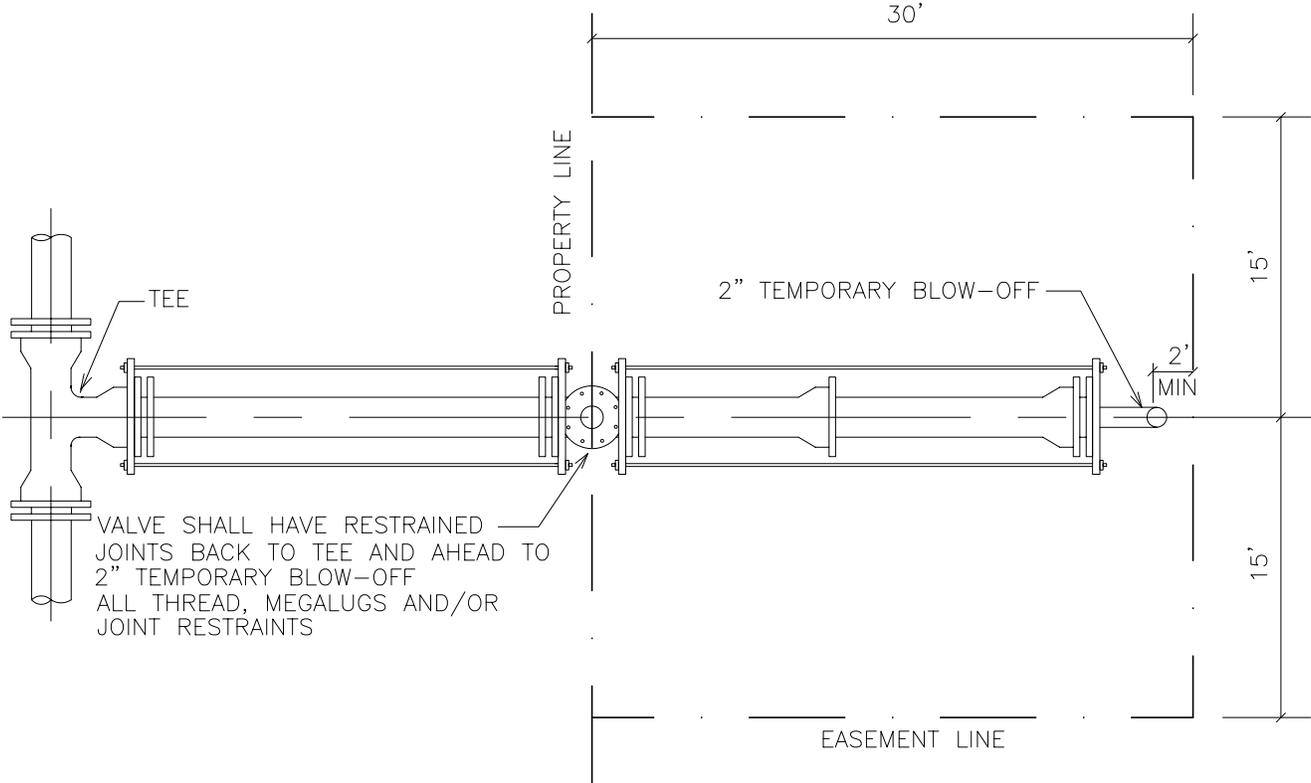
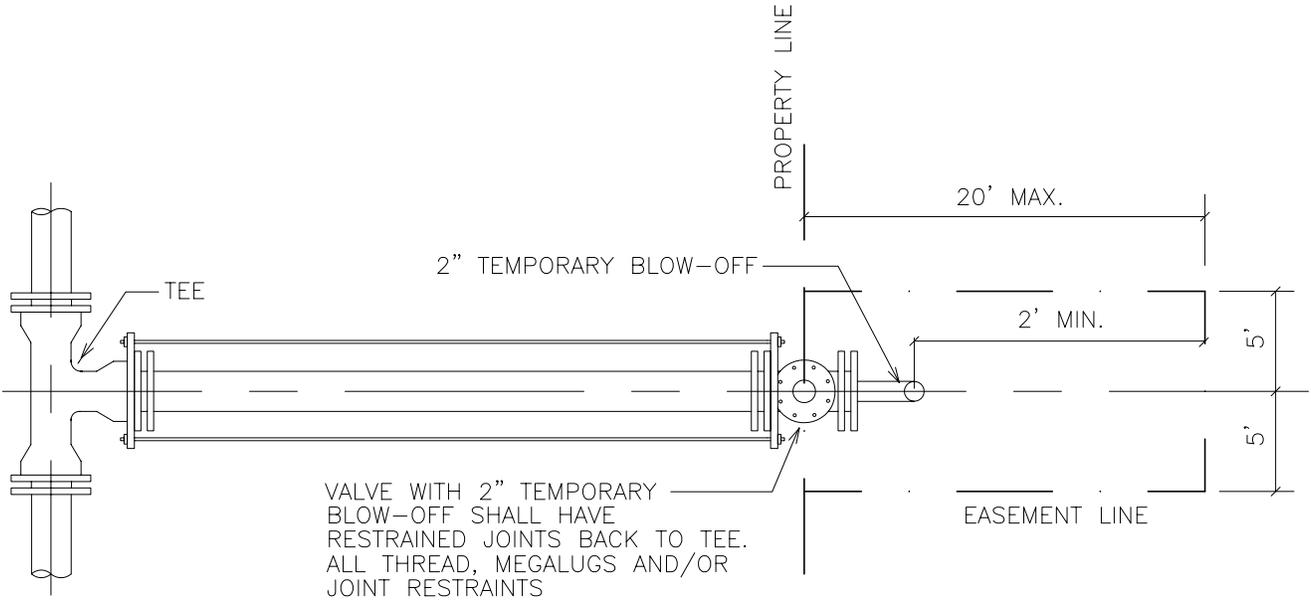


No.	Dwn.	Date	Revision



BLOW-OFF 24" DIA. & LARGER TRANSMISSION LINES (TYPICAL)

approved _____
 date: _____ scale: NTS dwn: _____ dwg #: W-61
 ENGINEERING DIVISION OF PUBLIC WORKS DEPT.



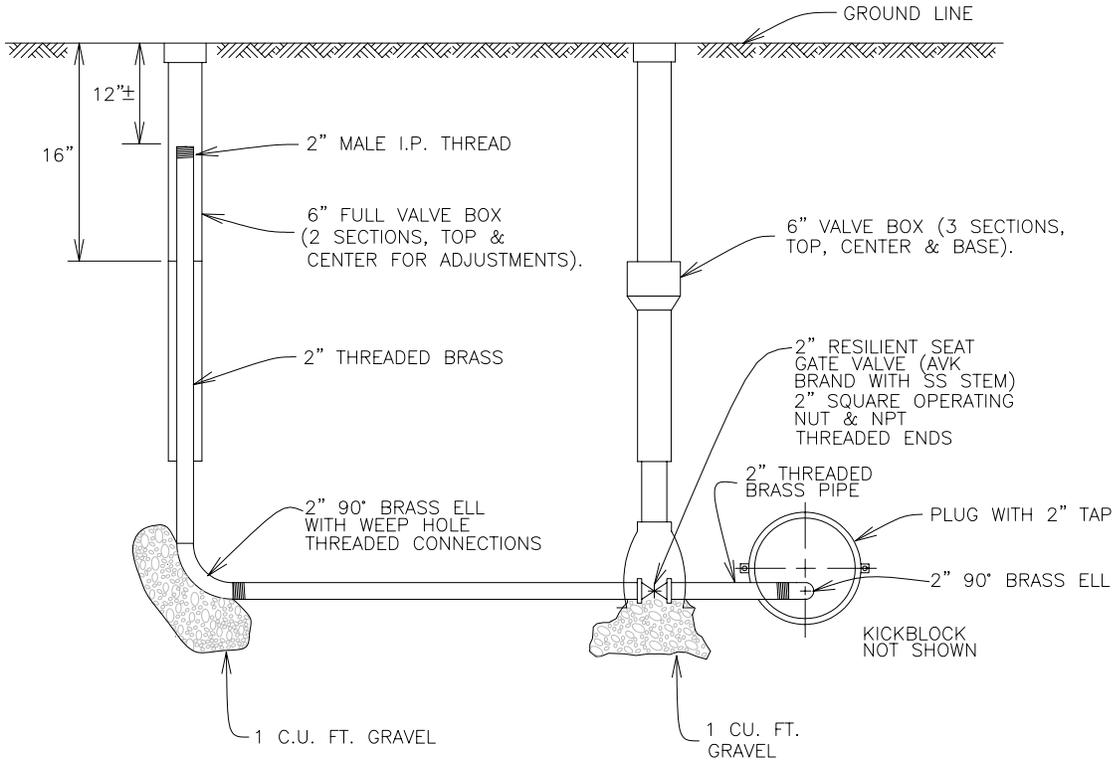
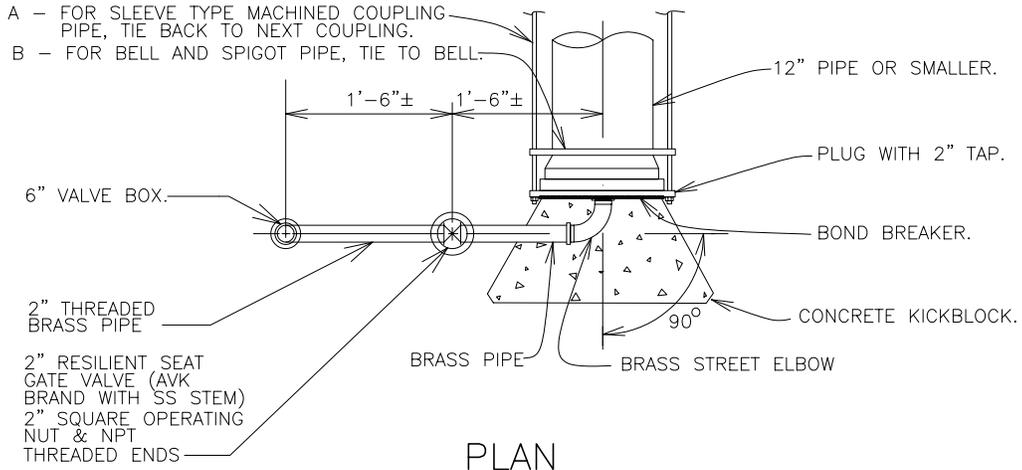
No.	Dwn.	Date.	Revision



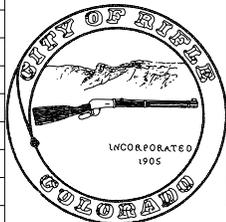
STUB-OUT CONFIGURATIONS FOR FUTURE MAIN EXTENSIONS

approved: WMS
 date: 11/6/02 | scale: NTS | dwn: | dwg #: W-7
 ENGINEERING DIVISION OF PUBLIC WORKS DEPT.

NOTE:
PLUG SHALL BE MECHANICALLY RESTRAINED:



No.	Dwn.	Date.	Revision



BLOW-OFF INSTALLATION FOR 12" AND SMALLER PIPE

approved: WMS

date: 11/6/02 | scale: NTS | dwn: | dwg #: W-9

ENGINEERING DIVISION OF PUBLIC WORKS DEPT.