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Updated April 2020

Standard Plan No.

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APPROVED CONSTRUCTION MATERIALS
WATER

WATER MAINS: CLASS 52 DUCTILE IRON PIPE FOR PIPE 4" TO 12".
CLASS 50 DUCTILE IRON PIPE FOR PIPE LARGER THAN 12".
ALL DUCTILE IRON PIPE SHALL CONFORM TO ASTM A536, ANSI A21.51, AND
AWWA C151.
PVC PIPE AWWA C900/C905 FOR PIPE 8" AND LARGER, AS PRE-APPROVED BY
CITY FOR NON BED ROCK AREAS; FIRE HYDRANTS TO CONNECT TO 8" MAINS OR
LARGER ONLY.

LOCATE WIRE: ALL MAINLINE PIPING MATERIALS WILL HAVE SOLID BLUE #12 AWG LOCATE WIRE FOR
WATER. SPLICE KITS SHALL BE 3M-DIRECT BURY SPLICE KIT DBR/Y-6. WIRE TO BE
CONTINUOUS AND ATTACHED BY 6" OF 2" DUCT TAPE TO MAIN AND ALL RISERS AT
MAXIMUM 10' INTERVALS.

CONTINUITY REQUIREMENT: ALL INFRASTRUCTURE (VALVES, HYDRANTS, BLOW OFF'S, SERVICES, PRV'S, ETC) SHALL
HAVE CONTINUOUS CONTINUITY. WHEN USING A NONCONDUCTIVE MATERIAL TO A
CONDUCTIVE MATERIAL SUITABLE DEVICE MUST BE USED SUCH AS AN APPROVED
NON-CORROSIVE GROUNDING CLAMP OR CORPORATION STOP WITH APPROVED
GROUNDING NUT. ENOUGH WIRE WILL BROUGHT TO SURFACE AT EVERY LOCATION AND
TO EXTEND MINIMUM 6" ABOVE FINISHED GRADE UNLESS OTHERWISE NOTED. TO BE
TESTED AFTER BEING BURIED BUT BEFORE FINAL APPROVAL.

ASPHALT CONCRETE: PER CITY TYPICAL ROADWAY STANDARDS, OR DESIGNED BY AN OREGON LICENSED
PROFESSIONAL ENGINEER USING THE LATEST VERSION OF THE ODOT CONTRACTOR
MIX DESIGN GUIDELINES FOR ASPHALT CONCRETE. STRUCTURAL SECTION WILL BE
DESIGNED USING THE LATEST VERSION OF THE ASPHALT PAVEMENT DESIGN GUIDE
PUBLISHED BY AMERICAN PAVEMENT ASSOCIATION OF OREGON (APAO).

TESTING REQUIREMENTS

DISINFECTION: WATER LINE CHLORINATION AND TESTING PER AWWA C651 AND OAR
333-061-0050(10). CONTRACTOR TO CHLORINATE, FLUSH, CITY TO TEST.



WATER LINE: WATER LEAKAGE METHOD PER OREGON STD SPECS 01140.51. AFTER PASSING
DISINFECTION TEST, MAX PRESSURE = 200 PSIG. ALLOW LEAKAGE IN
ACCORDANCE WITH THE FORMULA:

$$L = \frac{SD \sqrt{P}}{148,000}$$

L = THE ALLOWABLE LEAKAGE IN GALLONS PER HOUR.
S = THE LENGTH OF PIPELINE TESTED IN FEET.
D = THE NOMINAL DIAMETER OF THE PIPE IN INCHES.
P = THE AVERAGE TEST PRESSURE DURING THE LEAKAGE TEST IN PSI.

ASPHALT CONCRETE: AS DIRECTED BY THE CITY:
REFERENCE TO THE OREGON STD SPECS ARE REFERRING TO THIS LATEST
VERSION OF THE ODOT/APWA OREGON STD SPECS FOR CONSTRUCTION.

1. EMERSION - COMPRESSION (RETAINED STRENGTH).
2. GRADATION AND OIL CONTENT.
3. VOIDS AND COMPACTION.
4. RESILIENT MODULUS.



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	<p>FEBRUARY 2019 APPROVAL DATE</p>		<p>DWG NO. 101</p>
	<p>REVISED DATE</p>		

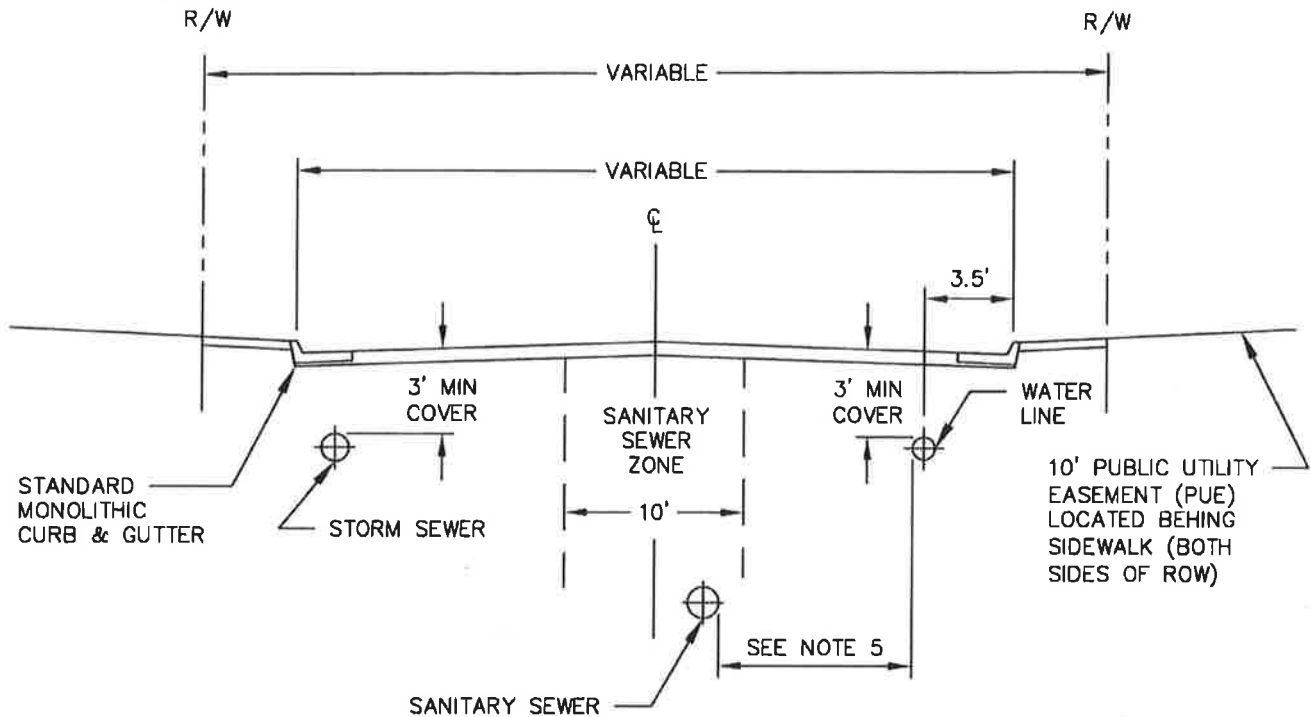
APPROVED CONSTRUCTION MATERIALS
SANITARY, STORM SEWER

- SANITARY SEWER MAIN: PVC PIPE AND FITTINGS CONFORMING TO THE REQUIREMENTS OF ASTM D3034 SDR 35, ASTM F679 OR ASTM F794. JOINTS TO ASTM D3212 AND ELECTROMETRIC GASKET CONFORMING TO ASTM F477.
- SEWER SERVICES: SAME AS SANITARY SEWER MAIN OR ALTERNATE MATERIAL: ABS PIPE WITH GLUED JOINTS AND FLEXIBLE WATER TIGHT GASKET TO CONNECT TO SEWER MAIN SERVICE WYE.
- STORM SEWER MAINS: ADS N-12 OR HANCORE SURE LO-LOK HDPE PIPE, OR APPROVED EQUIVALENT. PIPE AND FITTINGS SHALL CONFORM TO ASTM F2648, AASHTO M252, M294, OR MP7-97. JOINTS SHALL BE SILT TIGHT AND NON-RATED WATERTIGHT MEETING ASTM F477. OR PVC PIPE AND FITTINGS CONFORMING TO THE REQUIREMENTS OF ASTM D3034 SDR 35, ASTM F679, OR ASTM F794. JOINTS CONFORMING TO ASTM D3212 AND ELASTOMERIC GASKET CONFORMING TO ASTM F477.
- LOCATE WIRE: ALL PIPE MATERIALS WILL HAVE SOLID GREEN #12 AWG LOCATE WIRE FOR SEWER AND STORM. SPLICE KITS SHALL BE 3M-DIRECT BURY SPLICE KIT DBR/Y-6. WIRE TO BE CONTINUOUS AND ATTACHED BY 6" OF 2" DUCT TAPE TO MAIN AND ALL RISERS AT MAXIMUM 10' INTERVALS, WITH ENOUGH WIRE BROUGHT TO SURFACE AT EVERY LOCATION TO EXTEND MINIMUM 6" ABOVE FINISHED GRADE UNLESS OTHERWISE NOTED. TO BE TESTED AFTER BEING BURIED BUT BEFORE FINAL APPROVAL.
- ASPHALT CONCRETE: PER CITY TYPICAL ROADWAY STANDARDS, OR DESIGNED BY AN OREGON LICENSED PROFESSIONAL ENGINEER USING THE LATEST VERSION OF THE ODOT CONTRACTOR MIX DESIGN GUIDELINES FOR ASPHALT CONCRETE. STRUCTURAL SECTION WILL BE DESIGNED USING THE LATEST VERSION OF THE ASPHALT PAVEMENT DESIGN GUIDE PUBLISHED BY APAO.

TESTING REQUIREMENTS

- SANITARY SEWER: AIR PRESSURE TIME DROP METHOD PER OREGON STD SPECS 00445.72. MAX PRESSURE = 3.5 PSIG, FOR 15 MINUTES. ON NEW CONSTRUCTION, VISUAL TV INSPECTION.
- STORM SEWER: VISUAL CCTV INSPECTION.
- ASPHALT CONCRETE: AS DIRECTED BY THE CITY:
REFERENCE TO THE OREGON STD SPECS ARE REFERRING TO THIS LATEST VERSION OF THE ODOT/APWA OREGON STD SPECS FOR CONSTRUCTION.
1. EMERSION-COMPRESSION (RETAINED STRENGTH).
 2. GRADATION AND OIL CONTENT.
 3. VOIDS AND COMPACTION.
 4. RESILIENT MODULUS.

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NOTES:

1. UTILITIES SHALL BE LOCATED AS SHOWN UNLESS OTHERWISE APPROVED BY THE CITY.
2. THE SANITARY SEWER ZONE SHOWN ABOVE IS THE PREFERRED CORRIDOR IN WHICH SEWERS ARE TO BE LOCATED, UNLESS OTHERWISE PRE-APPROVED BY THE CITY.
3. STORM SEWER IS TO BE LOCATED ON THE SOUTH OR WEST SIDE OF THE STREET.
4. WATER IS TO BE LOCATED ON THE NORTH OR EAST SIDE OF THE STREET.
5. THE SEPARATION BETWEEN WATER LINES AND SEWER LINES SUBJECT TO THE REQUIREMENTS OF OAR 333-061-0050. SEE STD DWG 104.
6. ALTERNATIVE DEPTHS AND LOCATIONS AS APPROVED BY CITY.
7. MANHOLE LIDS SHOULD AVOID WHEEL TRACKS FOR VEHICLES.



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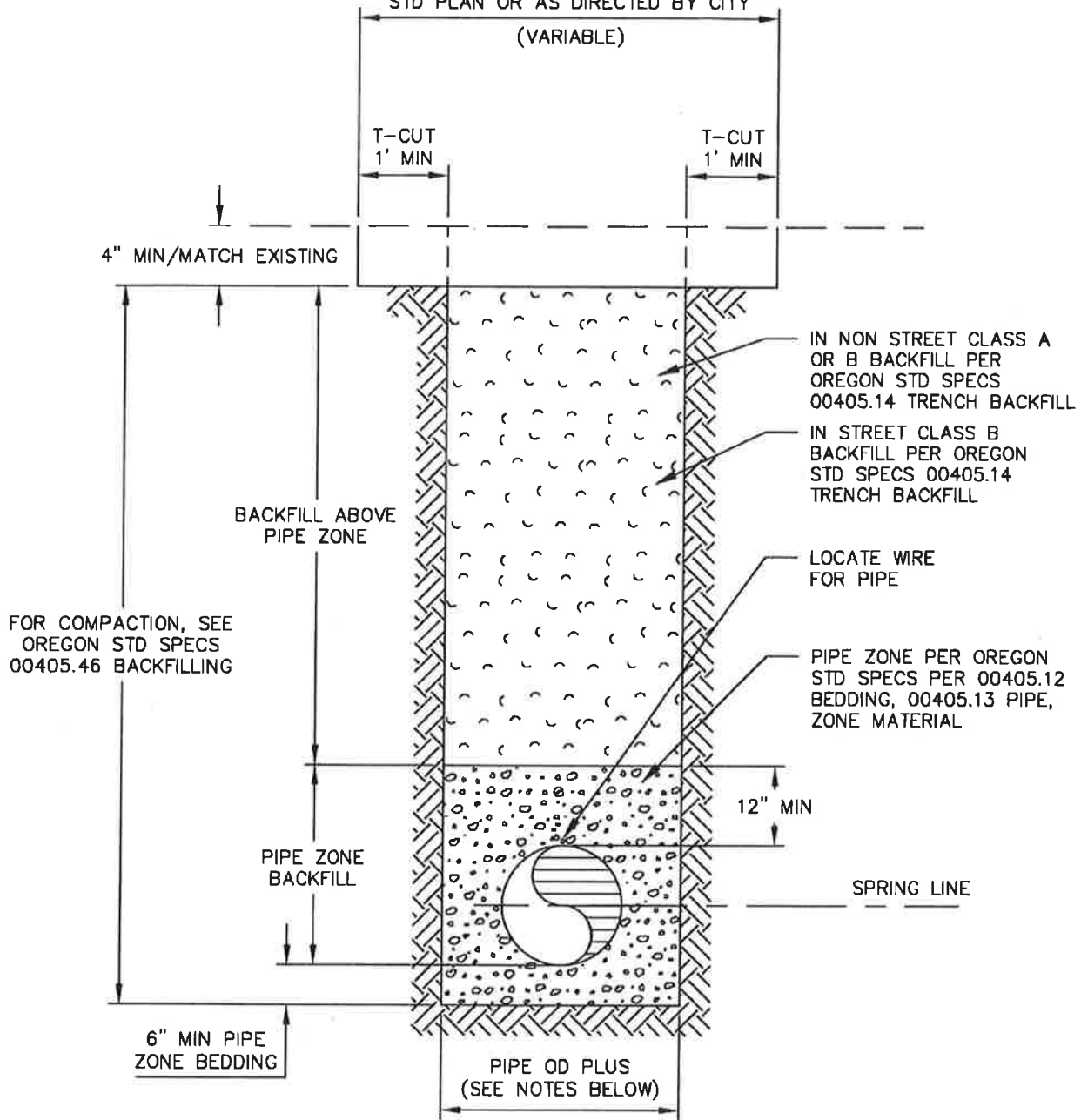
**TYPICAL ROADWAY
UTILITY LOCATION**

NO SCALE

DWG NO.

102

SURFACE RESTORATION PER CITY OF
PENDLETON STD SPECS AND STREET PATCHING
STD PLAN OR AS DIRECTED BY CITY



1. 24" FOR OD EQUAL OR LESS THAN 24" DIAMETER
2. 36" FOR OD GREATER THAN 24" DIAMETER



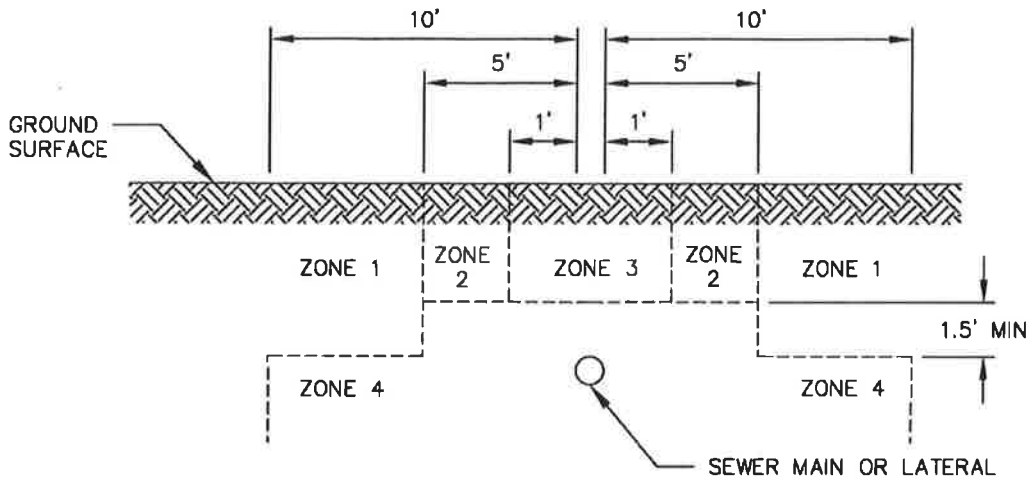
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TYPICAL PIPE
TRENCH

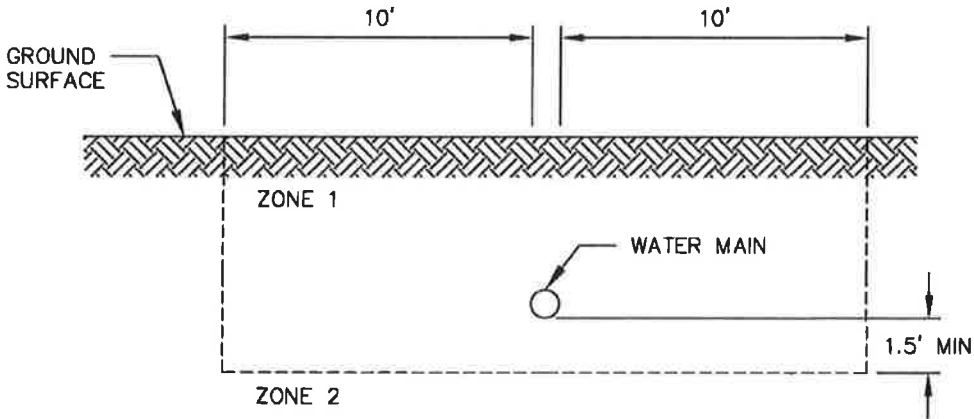
NO SCALE
DWG NO.
103

WHEN A WATER LINE IS PARALLEL TO A GRAVITY SEWER MAIN OR SEWER LATERAL THE SEPARATION BETWEEN THE TWO SHALL BE (PER OAR 333-061-0050(9)(b):



- ZONE 1: ONLY CROSSING RESTRICTIONS APPLY
- ZONE 2: CASE BY CASE DETERMINATION
- ZONE 3: PARALLEL WATER LINE PROHIBITED
- ZONE 4: PARALLEL WATER LINE PROHIBITED

WHEN GRAVITY SEWER MAIN OR SEWER LATERAL CROSSES A WATER LINE THE CROSSING SHALL BE AT AN ANGLE OF APPROXIMATELY 90° AND THE SEPARATION BETWEEN THE TWO SHALL BE:



- ZONE 1: REQUIREMENTS PER OAR 333-061-0050(9)(c), (B) AND (C).
- ZONE 2: APPROVED SANITARY SEWER MATERIAL AND ONE FULL LENGTH OF WATER LINE SHALL BE CENTERED AT THE CROSSING.



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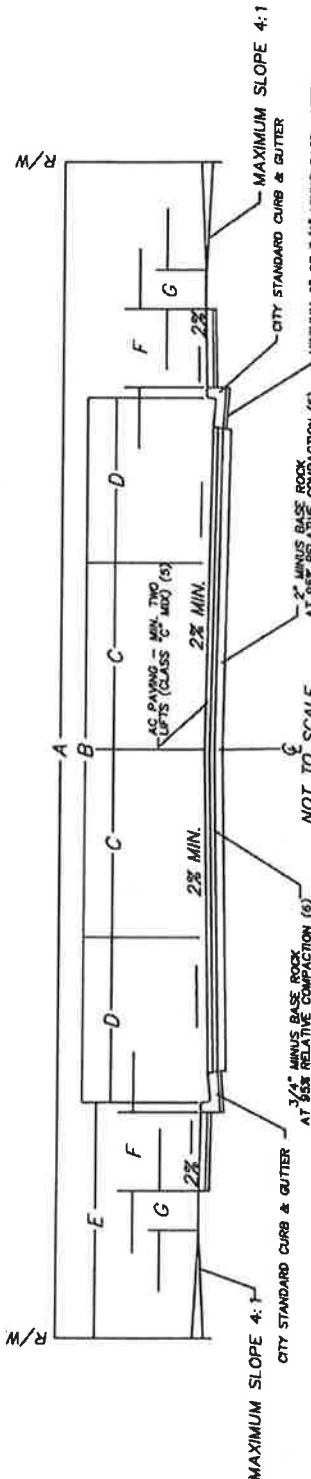
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UTILITY LINE SEPARATION REQUIREMENTS

NO SCALE

DWG NO.

104



CLASSIFICATION	R/W WIDTH (MIN.)	PAVEMENT WIDTH (MIN.)	TRAVEL LANE WIDTH	PARKING LANE WIDTH	PLANTING, UTILITY & SIDEWALK AREAS (EACH SIDE)	DESIGN SPEED	DESIGN LEVEL	PAVEMENT SECTION	BASE ROCK SECTION	SIDEWALK WIDTH (MIN.)	SHOULDER WIDTH (MIN.)	PROFILE GRADE (%)
ARTERIAL	60' 80'	44' 56'	2-12' 4-12'	2-10' 1-8'	8' 18'	30-45	IV IV	4.5" (5) 4.5" (5)	12"	5'	2'	8 MAX. 0.30 MIN.
COLLECTOR	60' 80'	36' 44'	2-10' 2-12'	2-8' 2-10'	12' 18'	25-35	III	4"	12"	4.5'	2'	12 MAX. 0.30 MIN.
MINOR (RESIDENTIAL)	50'-60'	26'-34'	2-12' 2-10'	NONE 2-8'	18' (VARIABLE) 12' (VARIABLE)	20-25	II	4" 3.5"	8" 12"	4.5'	2'	15 MAX. 0.50 MIN.
MINOR (INDUSTRIAL)	60'	24' (4) 28' (4)	2-12' 2-14'	NONE	2'-3' ASPHALT SHOULDERS (NO CURB, OR GUTTER)		V	5" (5) 5" (5)	12"	NONE	AS NOTED	8 MAX. 0.50 MIN.

- (1) This pavement width shall be permissible on dead-end street with a cul-de-sac and approved by the Planning Commission
- (2) Reduced pavement width approved by the Planning Commission.
- (3) Where the street serves partially as a collector and has been so designated by the Planning Commission and approved by the City Council.
- (4) Alternative street standards where pavement and base thickness is increased in exchange for eliminating the requirement for curb, gutter and sidewalks would apply for M-1 and M-2 zones located west of the US 30 (westgate) bridge over the Umatilla River, as approved by the Planning Commission.
- (5) Actual asphalt and base rock sections may be modified if designed by a professional engineer using criteria from the Asphalt Pavement Design Manual by the Asphalt Pavement Association of Oregon, and/or a geotechnical engineer certifies that the subgrade is adequate to support a modified section.
- (6) The bottom 2/3 of the base rock section may substitute a 2" minus material w/City Engineers approval.
- (7) 2" of sub-base rock material may be substituted for the use of a pre-approved subgrade stabilization geotextile fabric.

* ONLY WITH ADEQUATE CROSS SLOPES AND CATCH BASIN SPACING
 *** THE PROFILE GRADE MAY BE MODIFIED PROVIDING ADEQUATE ROADWAY CROSS SLOPE AND ROADSIDE DITCHES ALLOW FOR ADEQUATE DRAINAGE CAPACITY.
 **** SIDEWALK WIDTH MUST CONFORM TO CURRENT CITY STANDARDS AND ADA STANDARDS.

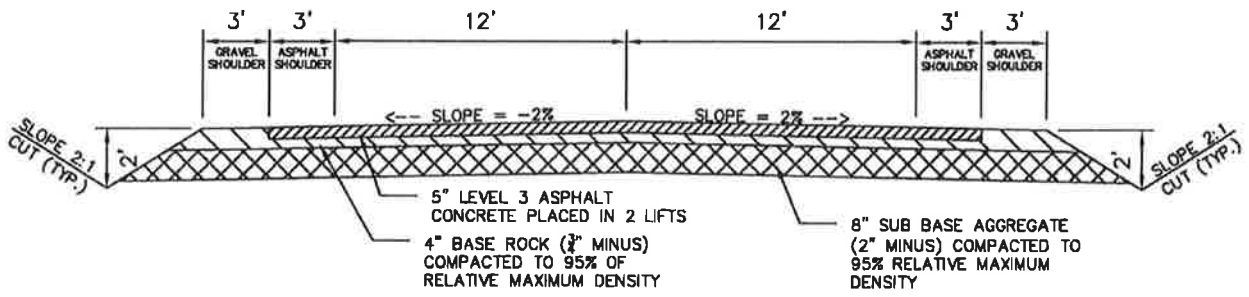


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TYPICAL ROADWAY SECTION

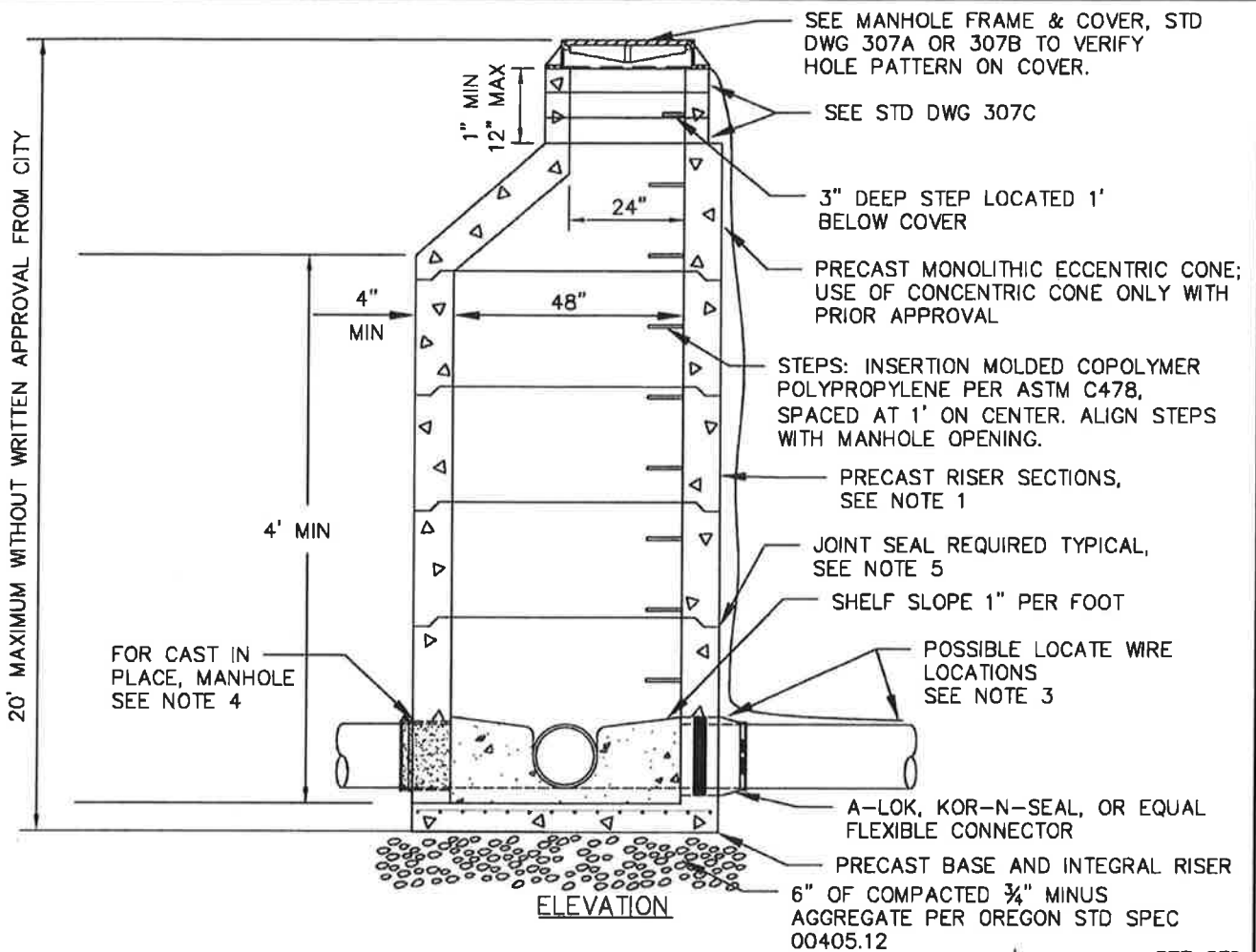
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 201



NOTES:

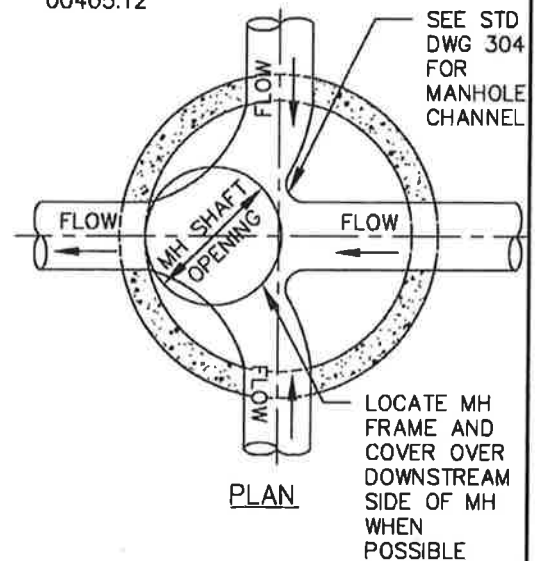
- 1) ACTUAL ASPHALT AND BASE ROCK SECTIONS MAY BE MODIFIED IF DESIGNED BY A PROFESSIONAL ENGINEER USING CRITERIA FROM THE ASPHALT PAVEMENT DESIGN GUIDE BY THE ASPHALT PAVEMENT ASSOCIATION OF OREGON, AND/OR A GEOTECHNICAL ENGINEER CERTIFIES THAT THE SUBGRADE IS ADEQUATE TO SUPPORT A MODIFIED SECTION.
- 2) 2" OF BASE ROCK MATERIAL MAY BE SUBSTITUTED FOR THE USE OF PRE-APPROVED SUBGRADE STABILIZATION GEOTEXTILE FABRIC.
- 3) RIGHT-OF-WAY AND STREET WIDTH DETERMINED BY COMPREHENSIVE PLAN AS APPROVED BY CITY COUNCIL.
- 4) INDUSTRIAL STREET MAXIMUM GRADE 8%.



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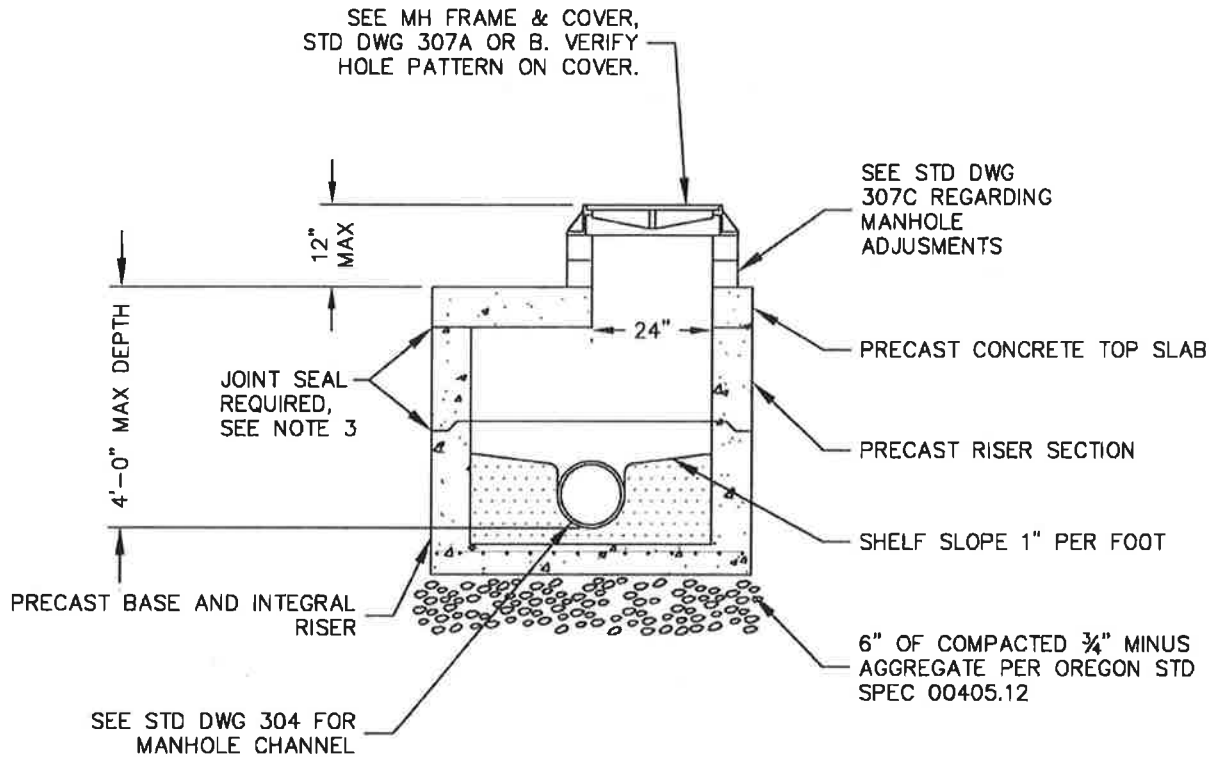


NOTES:

1. ALL MATERIAL AND WORK SHALL BE IN COMPLIANCE WITH THE CITY OF PENDLETON STANDARD SPECIFICATIONS AND INSTALLATION OF MANHOLE AS PER MANUFACTURERS RECOMMENDATION AND CONDITIONS FOR LOCATION.
2. FOR 48" DIAMETER MANHOLE THE MAXIMUM PIPE SIZE IS 24". LARGER DIAMETERS SHALL BE APPROVED BY THE CITY.
3. LOCATE WIRE MUST BE ATTACHED AND ACCESSIBLE BELOW COVER WITH AN 18" TAIL SEE STD DWG 101.
4. PRECAST MANHOLE WITH FLEXIBLE CONNECTOR ON INFLOW/OUTFLOW DOES NOT REQUIRE A FLEXIBLE JOINT. CAST-IN-PLACE MANHOLES OR CUT-IN CONNECTIONS TO EXISTING MANHOLES REQUIRE A FLEXIBLE JOINT AND/OR A SAND COLLAR.
5. JOINTS SHALL BE WATER TIGHT AND COATED WITH WATERPROOF RUBBERIZED MASTIC MATERIAL BEFORE SETTING RISERS AND TOP. INSIDE JOINTS SHALL BE GROUTED.
6. MINIMUM CLEAR DISTANCE BETWEEN PIPE HOLES IS 12".
7. SEE NOTE 7, STD DWG 102.





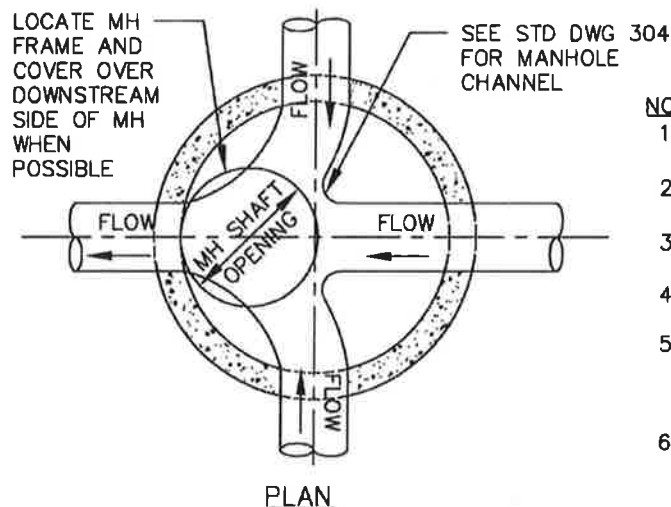
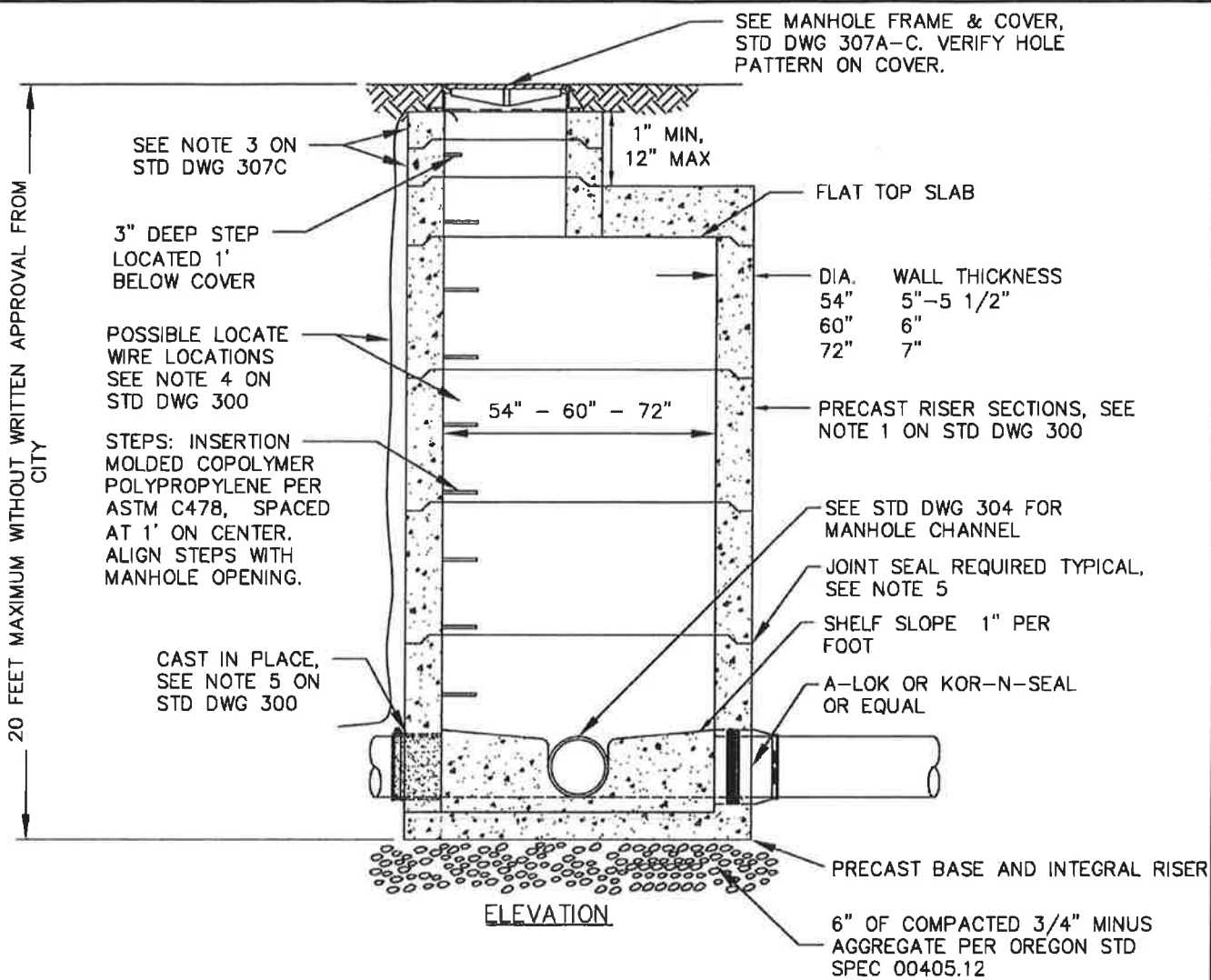
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NOTES:

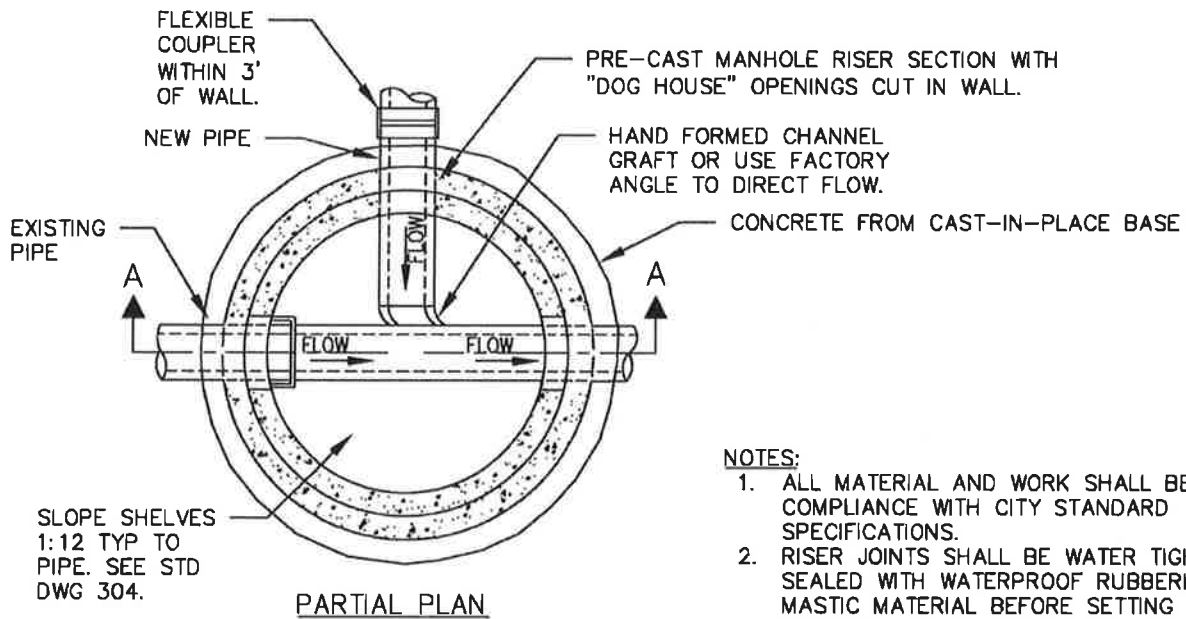
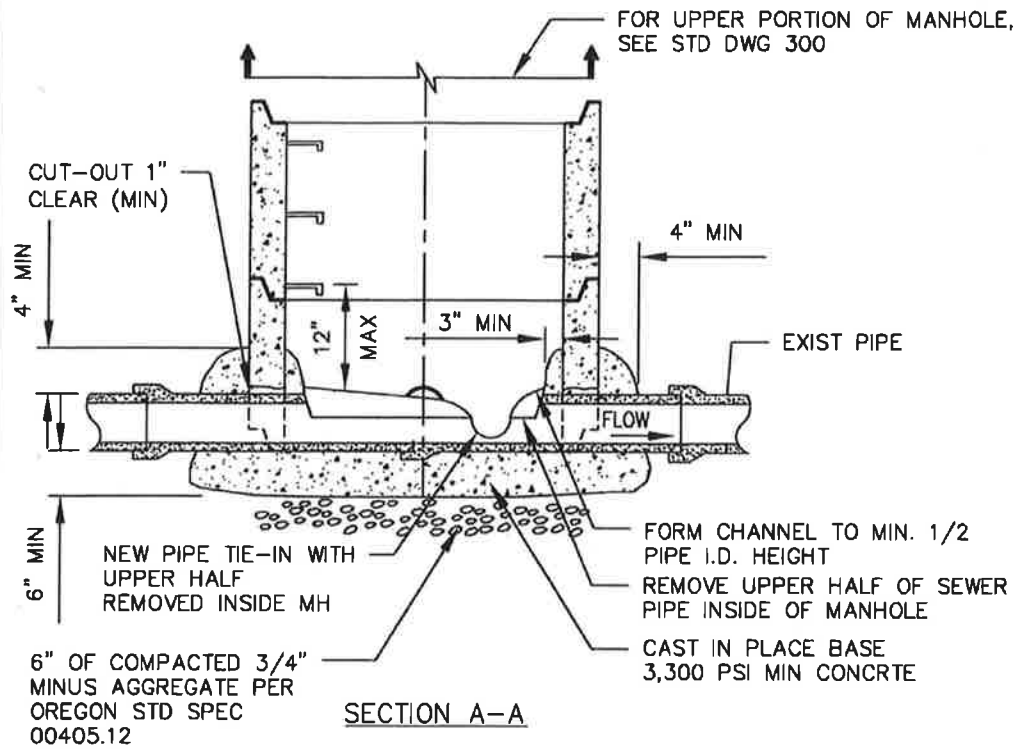
1. NO STEPS IN MANHOLE LESS THEN 4' IN HEIGHT.
2. SEE STD DWG 300 FOR LOCATE WIRE AND OTHER REQUIREMENTS.
3. JOINTS SHALL BE WATER TIGHT AND COATED WITH WATERPROOF RUBBERIZED MASTIC MATERIAL BEFORE SETTING RISERS AND TOP. ALL INSIDE JOINTS SHALL BE GROUTED.

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	<p>FEBRUARY 2019 APPROVAL DATE</p> <p>REVISED DATE</p>		<p>DWG NO. 301</p>



- NOTES:**
1. FOR 54" DIAMETER MANHOLE, THE MAXIMUM PIPE SIZE IS 36".
 2. FOR 60" DIAMETER MANHOLE, THE MAXIMUM PIPE SIZE IS 42".
 3. FOR 72" DIAMETER MANHOLE, THE MAXIMUM PIPE SIZE IS 54".
 4. SEE STD DWG 300 FOR LOCATE WIRE AND OTHER REQUIREMENTS.
 5. JOINTS SHALL BE WATER TIGHT AND SEALED WITH WATERPROOF RUBBERIZED MASTIC MATERIAL BEFORE SETTING RISERS AND TOP. ALL INSIDE JOINTS SHALL BE GROUTED.
 6. MINIMUM CLEAR DISTANCE BETWEEN PIPE HOLES IS 12".

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	<p>FEBRUARY 2019 APPROVAL DATE</p> <p>REVISED DATE</p>		<p>DWG NO.</p> <p style="font-size: 24pt; font-weight: bold;">302</p>



NOTES:

1. ALL MATERIAL AND WORK SHALL BE IN COMPLIANCE WITH CITY STANDARD SPECIFICATIONS.
2. RISER JOINTS SHALL BE WATER TIGHT AND SEALED WITH WATERPROOF RUBBERIZED MASTIC MATERIAL BEFORE SETTING RISERS AND TOP. INSIDE JOINTS SHALL BE GROUTED.
3. MANHOLES SHALL HAVE A 12" MIN BOTTOM RISER. RISER TO BE BEDDED IN THE CAST-IN-PLACE 3,300 PSI CONCRETE AS THE BASE TAKES ITS INITIAL SET.
4. PIPES CUT AND PLACED TO PROVIDE A SMOOTH CONTINUOUS CHANNELS.



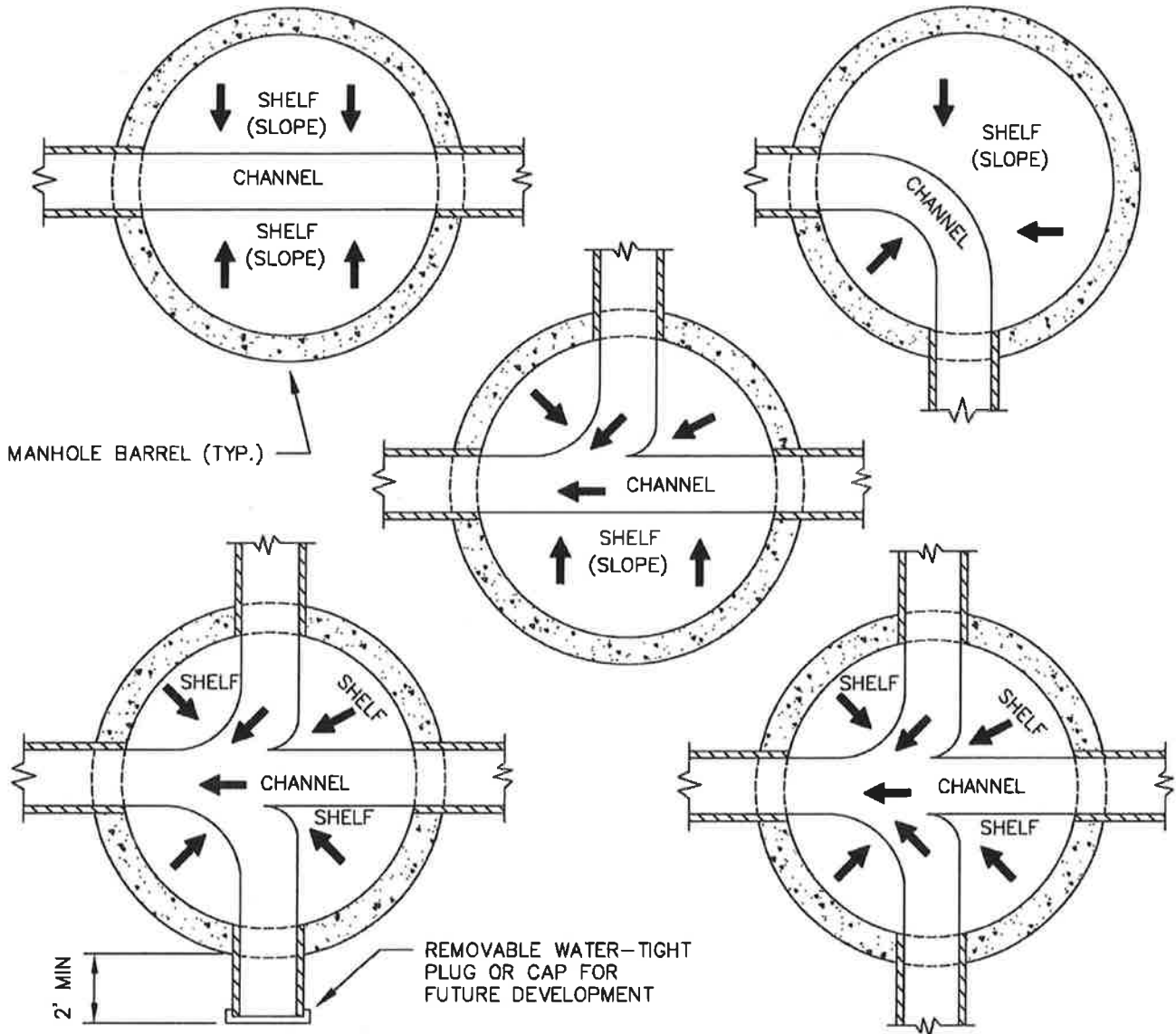
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**EXISTING LINE
TIE-IN MANHOLE
("DOG HOUSE"
MANHOLE)**

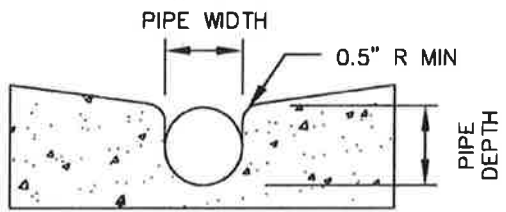
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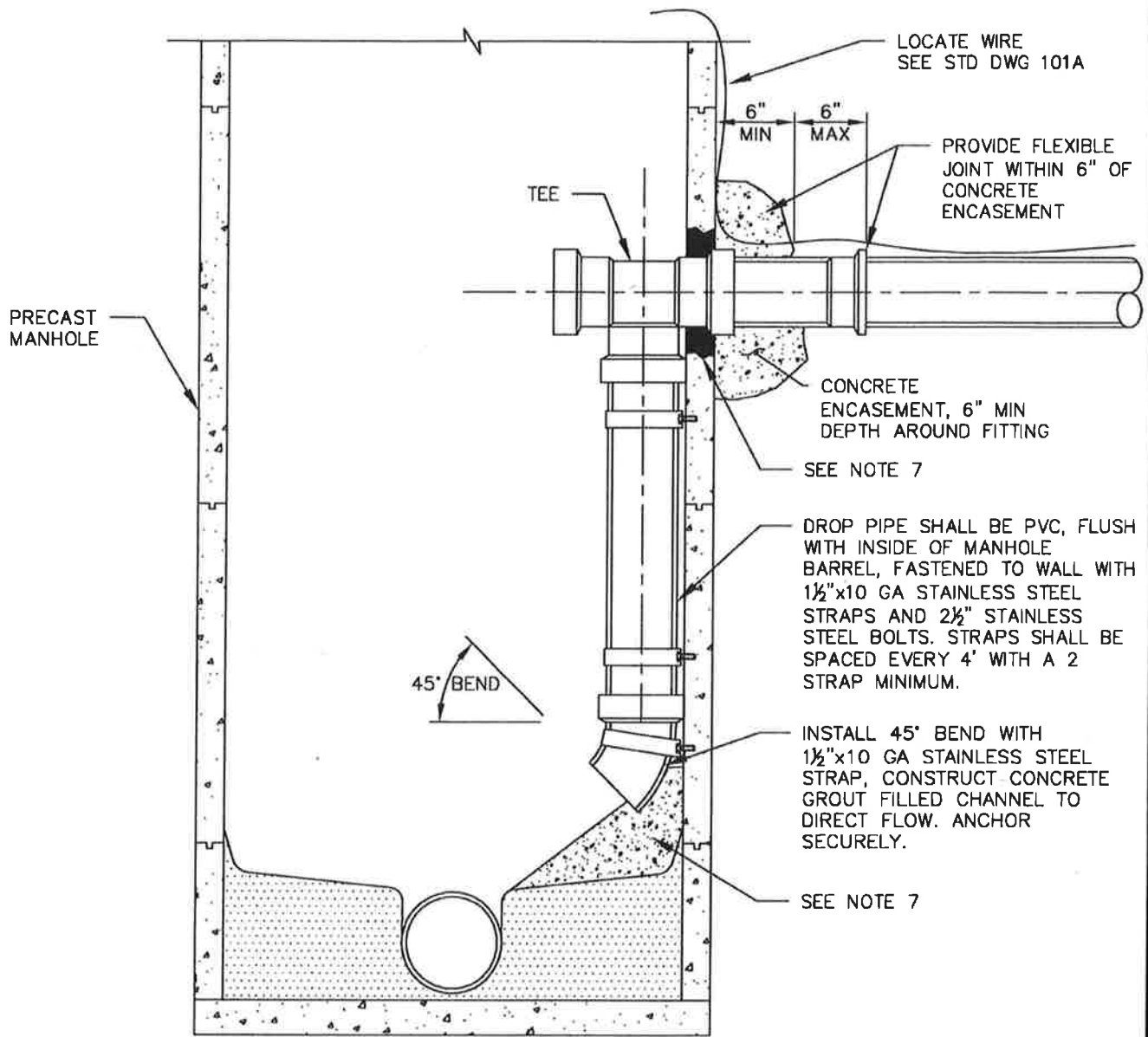
NOTES:

1. SLOPE ALL SHELVES TO CHANNEL AT 1:12.
2. FOR PIPES OF DIFFERENT SIZES, THE TOP OF PIPE (CROWN) SHALL BE AT THE SAME ELEVATION.
3. PROVIDE MINIMUM 0.1 FOOT IN-OUT DROP FOR STRAIGHT RUNS AND 0.2 FOOT IN-OUT DROP FOR ALL OTHER RUNS.
4. STORM SEWER MANHOLES WILL HAVE A MINIMUM 6" DEEP SUMP AND NO CHANNELS.
5. MINIMUM CLEAR DISTANCE BETWEEN PIPE HOLES IS 12".

← = DIRECTION OF DOWNWARD SLOPE



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NOTES:

1. ONLY ONE INSIDE DROP CONNECTION ALLOWED PER MANHOLE.
2. MINIMUM MANHOLE DIAMETER WITH DROP CONNECTION SHALL BE 48".
3. MAXIMUM DROP PIPE DIAMETER SHALL BE 8".
4. SEE STD DWG 300 FOR OTHER MANHOLE DETAILS.
5. POSITION MANHOLE LID TO MAXIMIZE THE HORIZONTAL CLEAR DISTANCE FOR MAINTENANCE PERSONNEL.
6. GLUED JOINTS FOR PIPES ALLOWABLE INSIDE MANHOLE.
7. REMOVE EXISTING SHELF AND PREP CONCRETE AS NEEDED TO MAKE SHELF 45°.
8. SEE STD DWG 300 FOR MANHOLE DETAILS.



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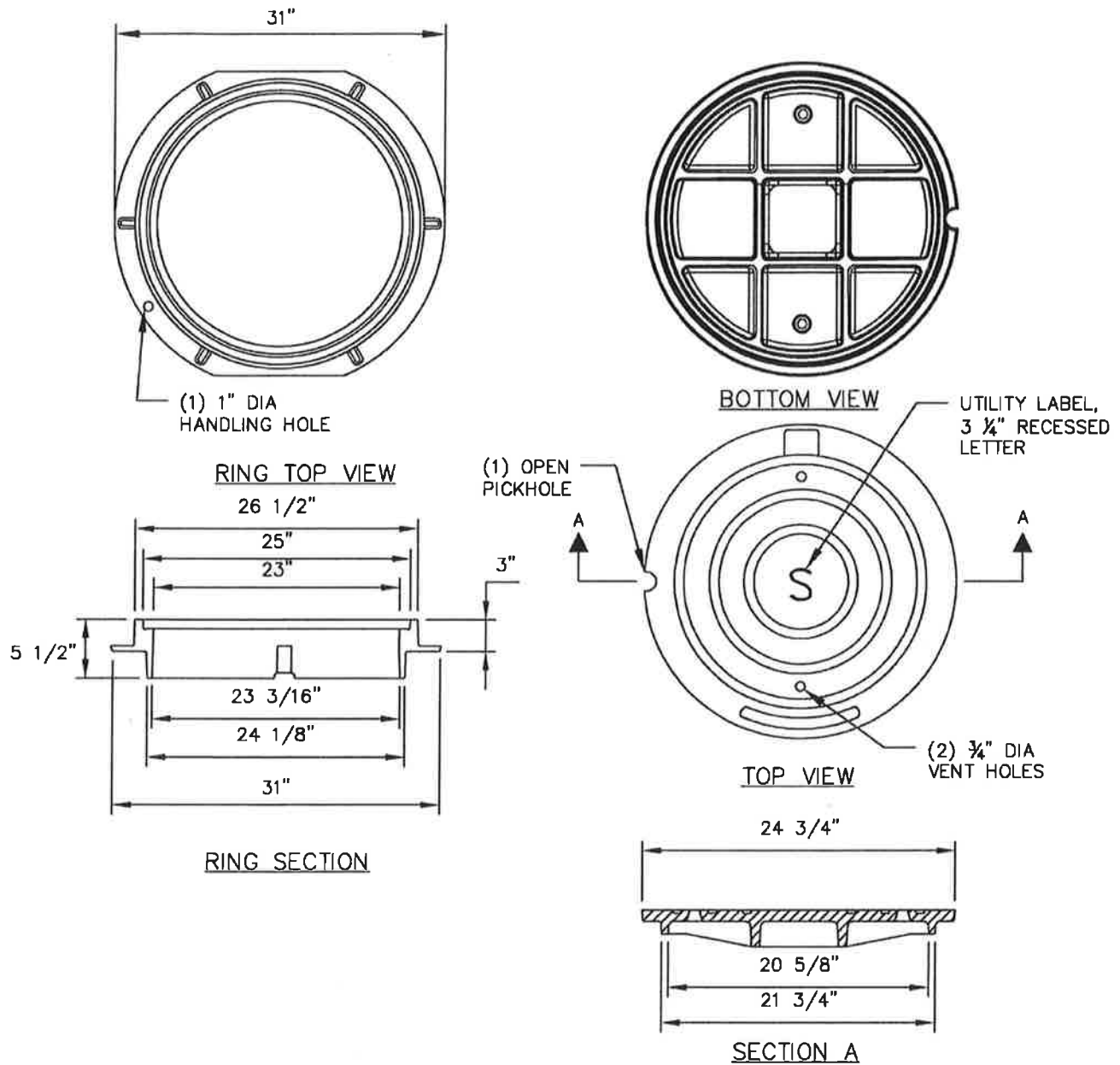
REVISED DATE

**STANDARD INSIDE
DROP MANHOLE**

NO SCALE

DWG NO.

306



NOTES:

1. MANHOLE FRAME AND COVER SHALL BE OREGON SUBURBAN EJIW #2601Z1 WITH 2603C LID OR APPROVED EQUAL VERIFY "SEWER" OR "S" UTILITY LABEL LETTERING ON COVER.
2. COVER MATERIAL SPECIFICATION GRAY IRON (ASTM A48 CL35B).
3. WATERTIGHT FRAME AND COVER REQUIRED IN HIGH WATER AREAS.



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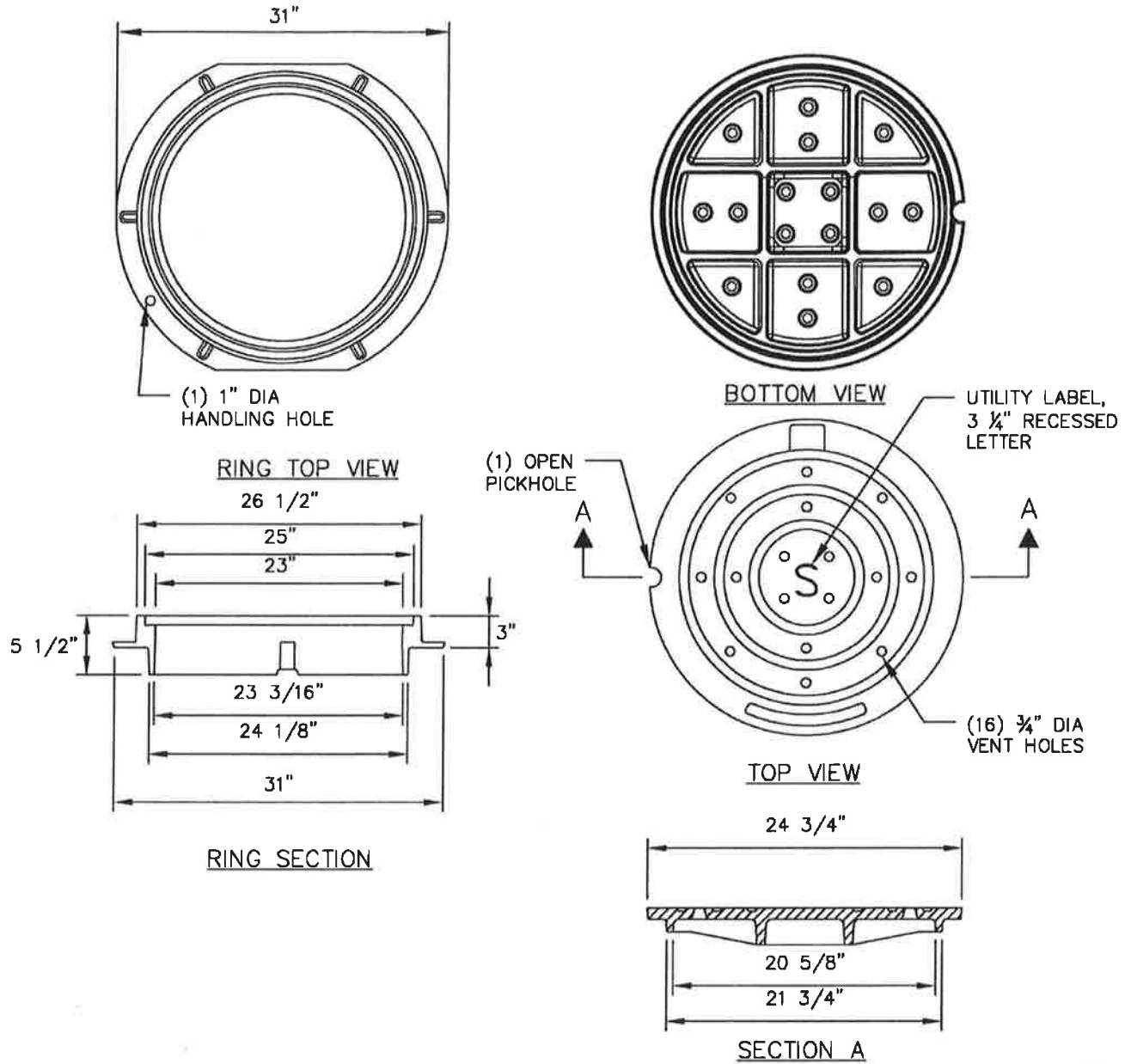
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**SEWER MANHOLE
FRAME AND COVER**

NO SCALE

DWG NO.

307A



NOTES:

1. MANHOLE FRAME EJIW 2601Z AND COVER SHALL BE EJIW 2603B LID OR APPROVED EQUAL, "S" UTILITY LABEL LETTERING ON COVER.
2. COVER MATERIAL SPECIFICATION GRAY IRON (ASTM A48 CL35B).



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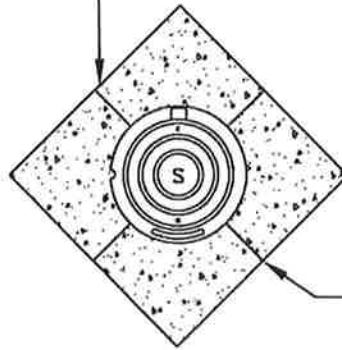
**STORM MANHOLE
FRAME AND COVER**

NO SCALE

DWG NO.

307B

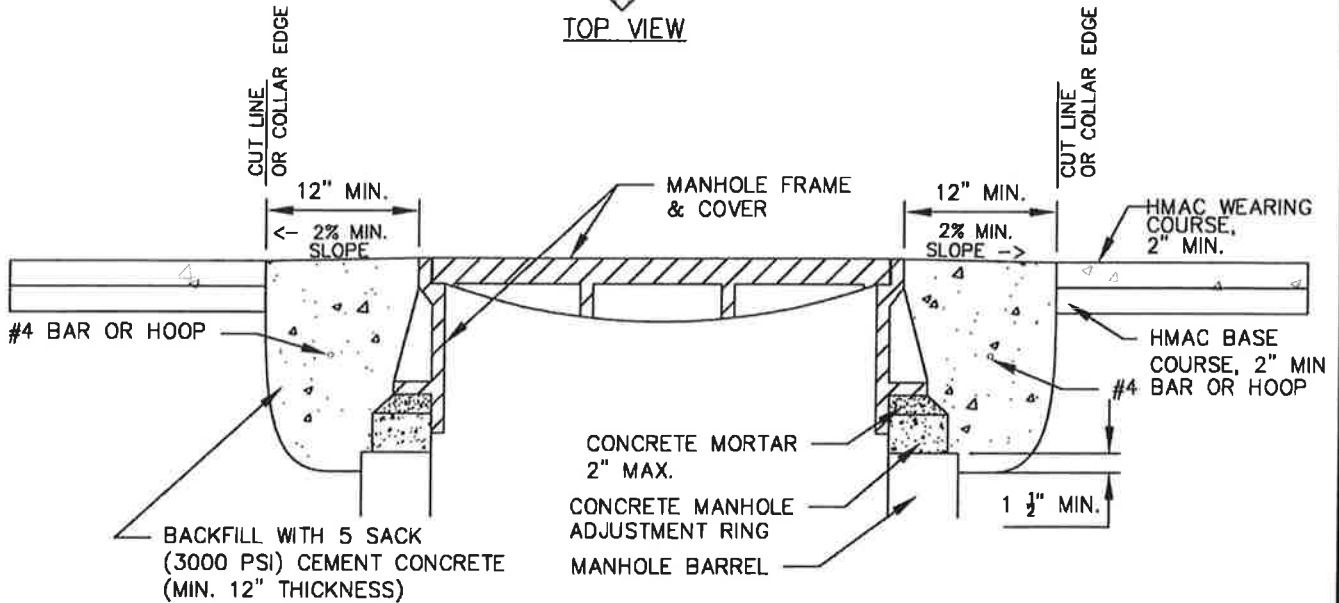
SEE NOTE 2



DIRECTION OF TRAFFIC

HAND TROVELED CONTROL JOINT (TYP)

TOP VIEW



NOTES:

1. COVER MANHOLE WITH STEEL PLATE AND CONSTRUCT BASE AND FINISH ASPHALT COURSE.
2. CUT DIAMOND (WITH CORNERS POINTED TOWARD TRAFFIC) 12" MINIMUM FROM MANHOLE FRAME.
3. RAISE MANHOLE FRAME AND COVER TO FINISH GRADE BY INSTALLING CONCRETE ADJUSTMENT RINGS, STEEL SHIMS, AND LEVELING MORTAR. (NOTE: IF THE TOTAL OF THE CONCRETE RING ADJUSTMENTS NEEDED IS GREATER THAN 12", AN ADDITIONAL 12" MANHOLE BARREL SHALL BE INSTALLED).
4. INSTALL #4 REBAR.
5. BACKFILL WITH 5 SACK (3000 PSI) CONCRETE CEMENT SLOPED AT MIN. 2% (MAX. 4%) TO FINISH GRADE. FINISH CONCRETE IN A GOOD WORKMAN LIKE FASHION WITH BROOMED FINISH AND MINIMAL SPILLAGE ONTO SURROUNDING ASPHALT. TAPE AND TARP ASPHALT IF NEEDED. CLEAN UP ANY SPILLAGE ON ASPHALT AND VALVE CAN LID.
6. PROTECT FROM TRAFFIC LOADING FOR A MIN. OF 7 DAYS.



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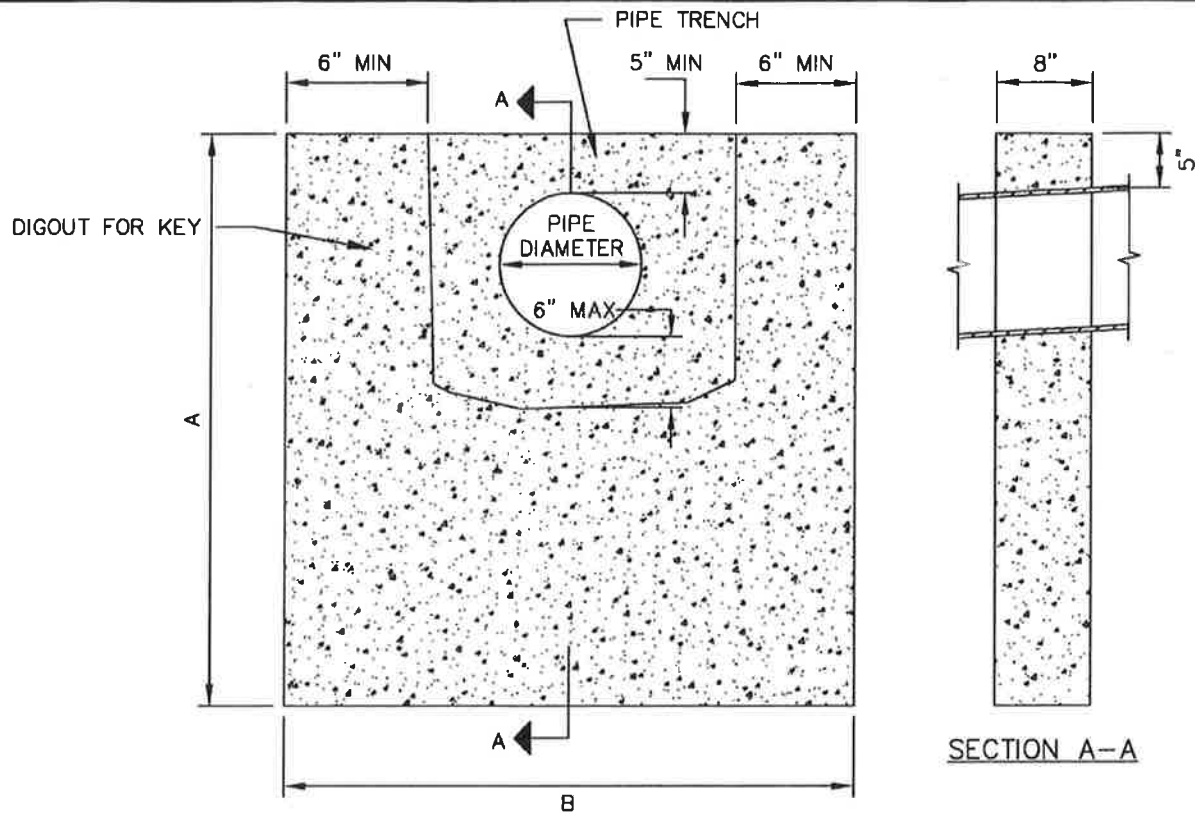
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MANHOLE ADJUSTMENT

NO SCALE

DWG NO.

307C



PIPE DIAMETER	A	B
6"–12"	3'–0"	4'–0"
12"–15"	4'–0"	4'–0"
18"–24"	4'–0"	5'–0"

ANCHORS TO BE EQUALLY SPACED:

SLOPE	MINIMUM ANCHOR SPACING CENTER TO CENTER
20%–30%	35 FEET
30%–50%	25 FEET
OVER 50%	15 FEET OR CONCRETE ENCASEMENT

NOTES:

1. CONCRETE TO BE 3000 PSI AT 28 DAYS, 6 SACK MIX, PLACE WALL IMMEDIATELY BELOW BELL OF PIPE WHERE POSSIBLE.



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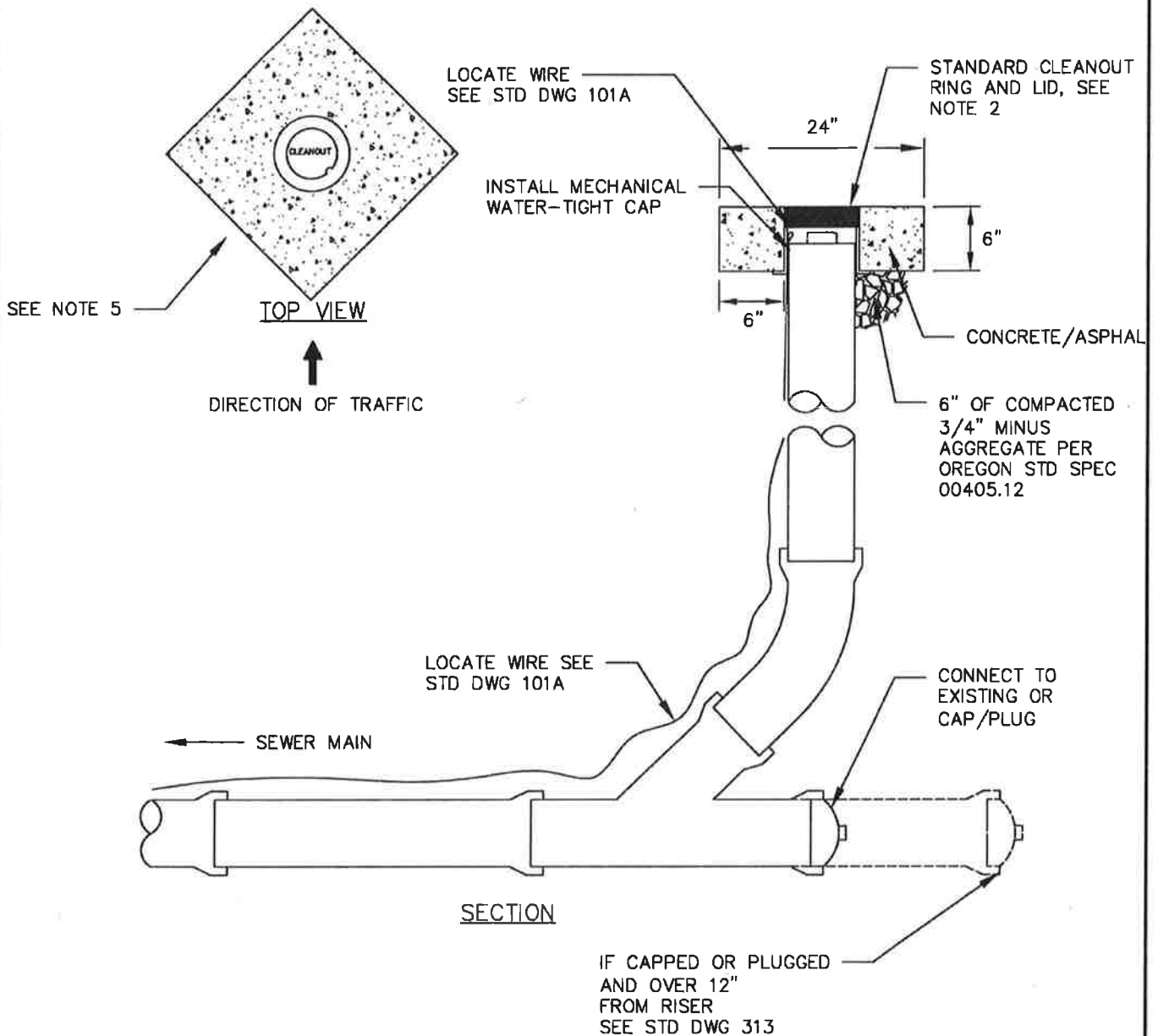
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**ANCHOR WALL
STANDARDS**

NO SCALE

DWG NO.

308



NOTES:

1. BACKFILL ENTIRE ASSEMBLY WITH BEDDING PER OREGON STD SPEC 00405.12.
2. RING AND LID SHALL BE OLYMPIC M1007 OR APPROVED EQUAL.
3. 6" OR 8" PIPE ONLY FOR PUBLICLY OWNED SYSTEMS. CLEANOUT TO MATCH THE SIZE OF THE DOWNSTREAM PIPE.
4. CLEANOUT CAN ALSO CONSIST OF A COMBO WYE WITH 45° ELBOW AND END PLUG.
5. CLEANOUT PAD CAN BE 24" ROUND OR SQUARE, MADE OF CONCRETE 6" THICK OR ASPHALT TO MATCH EXISTING THICKNESS, MIN 4".
6. CLEANOUT CAN ALSO CONSIST OF A LONG RADIUS SWEEP 90° (COMBO WYE/TEE).



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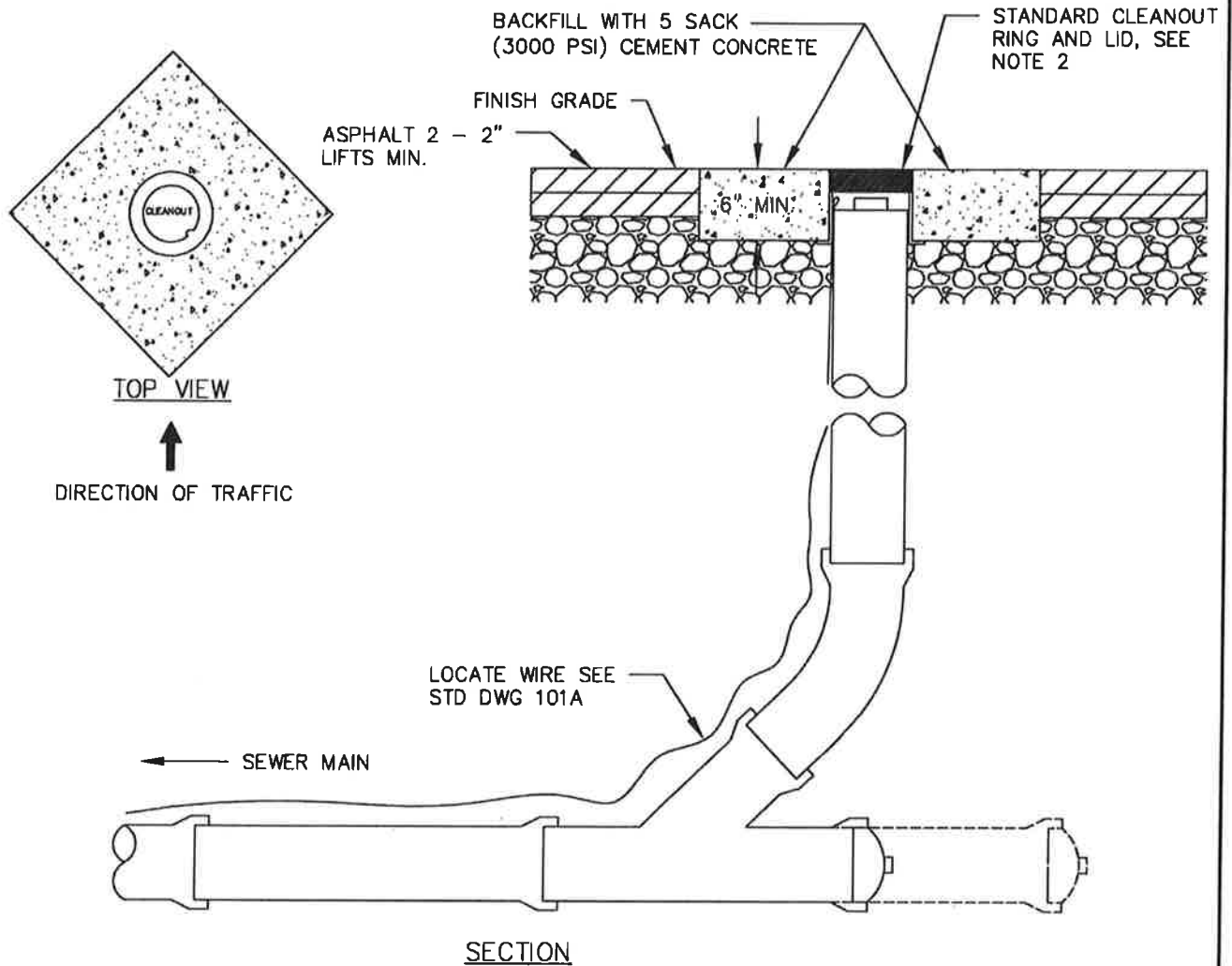
REVISED DATE

**STANDARD
CLEANOUT**

NO SCALE

DWG NO.

309



NOTES:

1. SET SEWER CLEAN OUT BOX BELOW GRADE AND CONSTRUCT BASE AND FINISH ASPHALT COURSE.
2. CUT DIAMOND (WITH CORNERS POINTED TOWARD TRAFFIC) 12" MINIMUM FROM CLEAN OUT FRAME.
3. RAISE AND ADJUST CLEAN OUT FRAME AND COVER TO FINISH GRADE. COVER CLEAN OUT LID WITH PLASTIC TO PREVENT CONCRETE FROM STICKING TO LID.
4. BACKFILL WITH 5 SACK (3000 PSI) CONCRETE CEMENT SLOPED AT MIN. 2% (MAX. 4%) TO FINISH GRADE. FINISH CONCRETE IN A GOOD WORKMAN LIKE FASHION WITH BROOMED FINISH AND MINIMAL SPILLAGE ONTO SURROUNDING ASPHALT. TAPE AND TARP ASPHALT IF NEEDED. CLEAN UP ANY SPILLAGE ON ASPHALT AND VALVE CAN LID.
5. PROTECT FROM TRAFFIC LOADING FOR A MIN. OF 7 DAYS.



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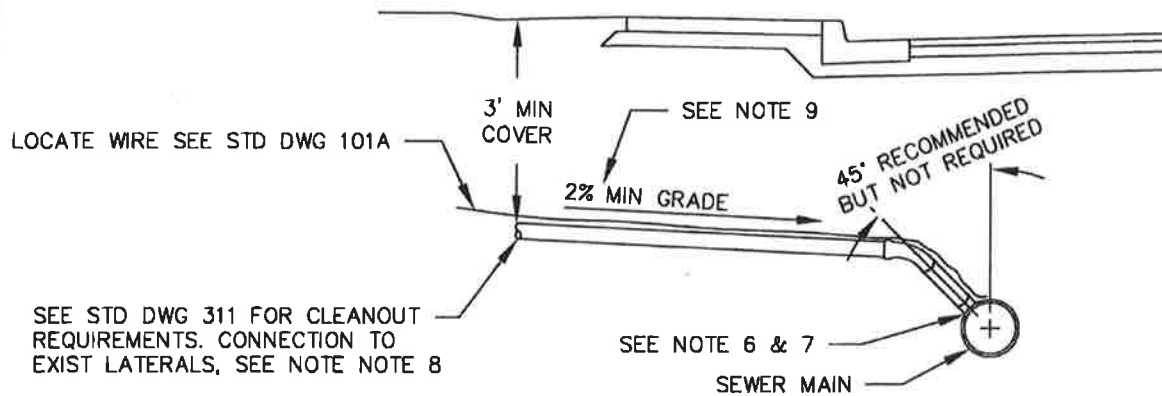
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**STANDARD
CLEANOUT
ADJUSTMENT**

NO SCALE

DWG NO.



309A



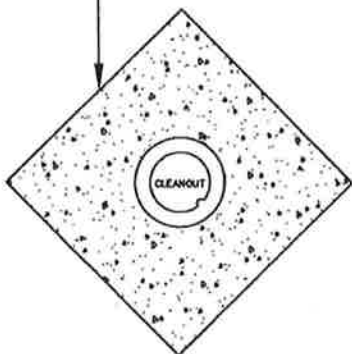
TYPICAL SECTION

NOTES:

1. PIPE DIAMETER SHALL BE 4" OR GREATER. SEE STD DWG 101 FOR ACCEPTABLE MATERIALS.
2. PIPES STUBBED OUT FOR FUTURE BUILDING CONNECTIONS SEE STD DWG 311 AND 313.
3. MAXIMUM DISTANCE BETWEEN CLEANOUTS SHALL BE 100 FEET. THE MAXIMUM AGGREGATE CHANGE IN DIRECTION BETWEEN CLEANOUTS SHALL BE 135°. CONSTRUCT ADDITIONAL CLEANOUTS AS NECESSARY. SERVICE LINES ON PRIVATE PROPERTY MUST MEET PLUMBING CODE.
4. WATER SERVICE AND SEWER SERVICE SEPARATION PER STD DWG 104.
5. ABANDONED SEWER SEE STD DWG 313.
6. LATERALS CONNECTING TO NEW SEWER MAINS SHALL BE CONNECTED WITH A GASKETED WYE.
7. LATERALS CONNECTING TO EXISTING SEWER MAINS SHALL BE CONNECTED WITH "ROMAC CB", "INSERTA TEE", OR APPROVED EQUAL. CENTER OF WYE SHALL BE IN TOP HALF OF PIPE.
8. CONNECTION TO EXISTING LATERALS SHALL BE FERNCO FLEX COUPLER OR APPROVED EQUAL.
9. 1% SLOPE ALLOWED FOR SPECIAL CONDITIONS AS PRE-APPROVED BY CITY.
10. ALL NEW SEWER SERVICES REQUIRE TWO-WAY CLEANOUTS AT PROPERTY LINE/ROW. SEE DWG 311.

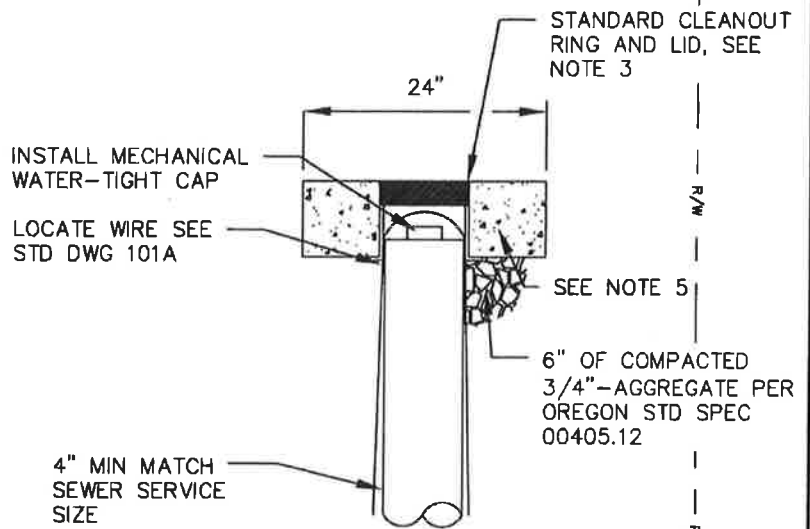
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	<p>FEBRUARY 2019 APPROVAL DATE</p> <p>REVISED DATE</p>		<p>DWG NO. 310</p>

SEE NOTE 5



TOP VIEW

DIRECTION OF TRAFFIC



INSTALL MECHANICAL WATER-TIGHT CAP

LOCATE WIRE SEE STD DWG 101A

STANDARD CLEANOUT RING AND LID, SEE NOTE 3

24"

SEE NOTE 5

6" OF COMPACTED 3/4"-AGGREGATE PER OREGON STD SPEC 00405.12

4" MIN MATCH SEWER SERVICE SIZE

4" MIN. TWO-WAY CLEANOUT WYE TEE AS APPROVED BY CITY

4" MIN LATERAL

5' MAX

LOCATE WIRE SEE STD DWG 101A

SECTION

TO SEWER MAIN TO DWELLING

NOTES:

1. IF THE LOWEST DRAINING FLOOR IN THE BUILDING IS LOWER THAN THE RIM OF THE NEAREST DOWNSTREAM MANHOLE, A BACKFLOW DEVICE WILL BE REQUIRED AND WILL BE MAINTAINED BY PROPERTY OWNER, WITHIN 5' OF STRUCTURE.
2. BACKFILL ENTIRE ASSEMBLY WITH BEDDING PER OREGON STD SPEC 00405.12.
3. RING AND LID SHALL BE OLYMPIC M1007 OR APPROVED EQUAL.
4. CLEANOUT TO BE LOCATED BETWEEN BACK OF CURB AND ROW LINE, A MAXIMUM OF 5' FROM ROW LINE.
5. CLEANOUT PAD CAN BE 24" ROUND OR SQUARE, MADE OF CONCRETE 6" THICK OR ASPHALT TO MATCH EXISTING THICKNESS, MIN 4".



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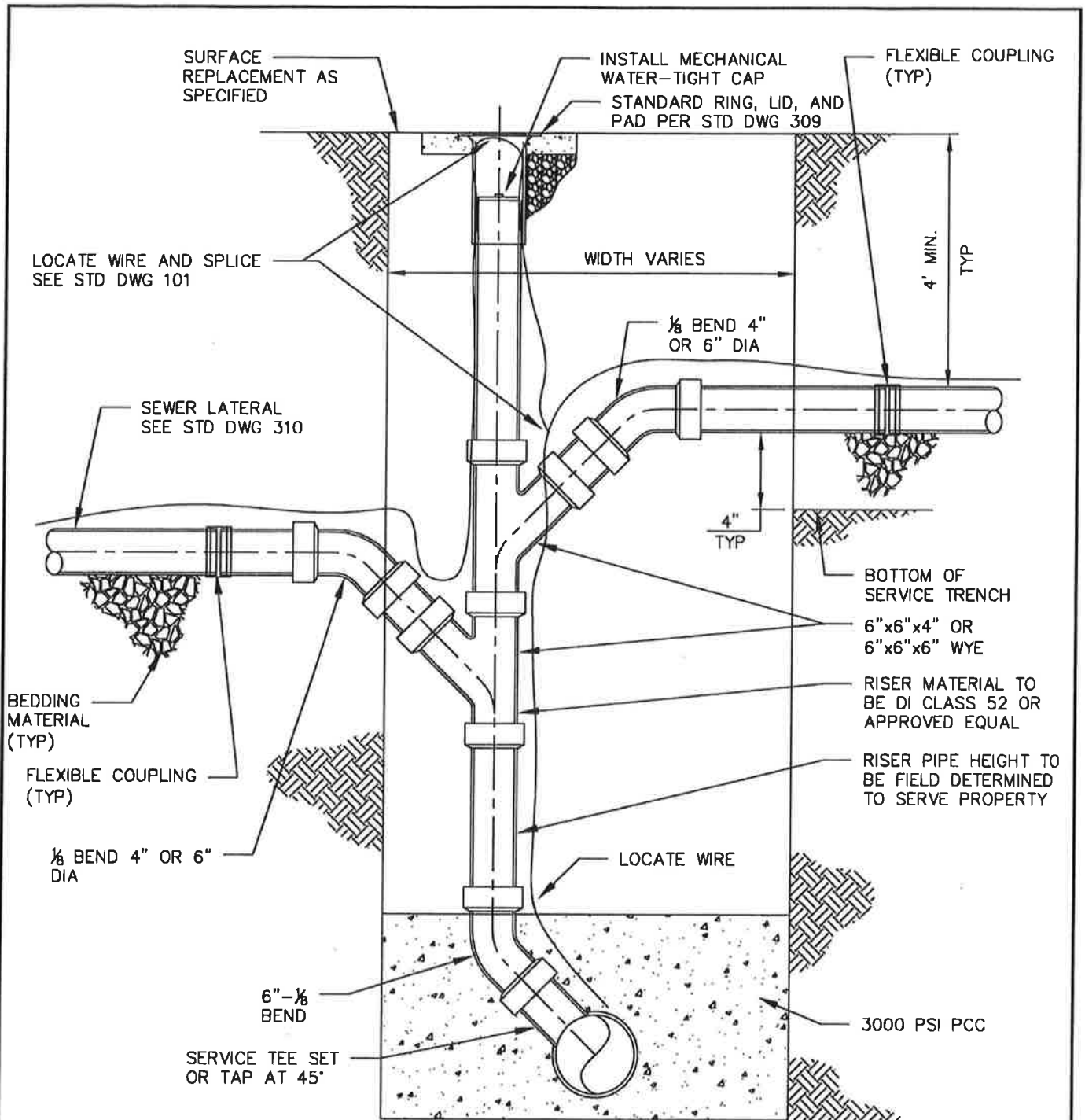
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TWO-WAY CLEANOUT

NO SCALE



DWG NO.

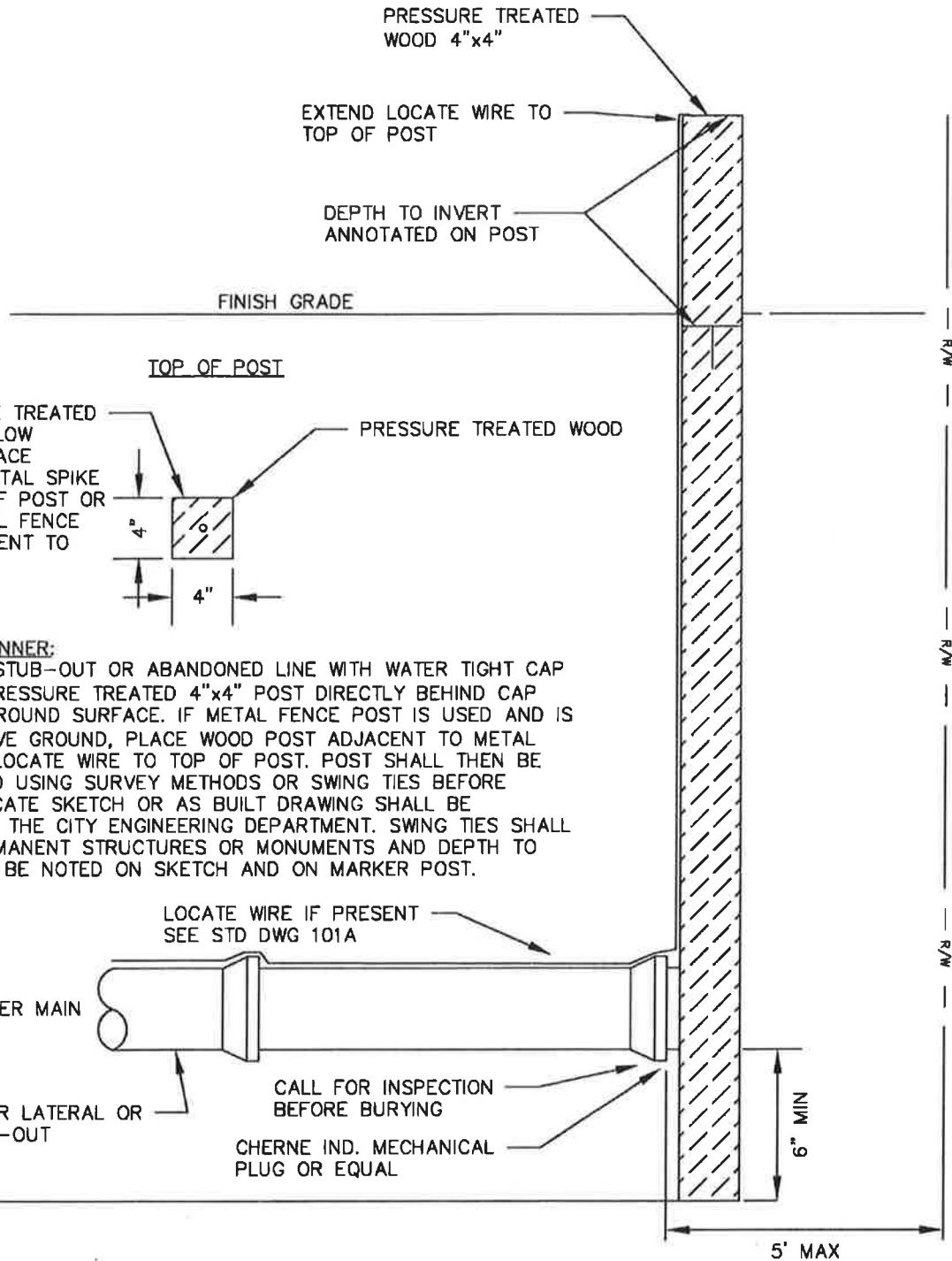
311



NOTES:

1. THE DEEP CONNECTION RISER MAY ONLY BE USED WHEN MAIN LINE IS 12' DEEP OR THE SERVICE PIPE SLOPE WOULD BE OVER 100% SLOPE AND IF PRE-APPROVED BY CITY.
2. USE 6" RISER, MAX. 4 SERVICES.
3. CDB AND 3000 PSI P.C.C. SHALL EXTEND 2 FEET MINIMUM EACH WAY FROM RISER ALONG MAINLINE TRENCH.
4. LOCATE WIRE PER DWG 101A.

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	<p>FEBRUARY 2019 APPROVAL DATE</p> <p>REVISED DATE</p>		<p>DWG NO.</p> <h1 style="text-align: center;">312</h1>



R/W
R/W
R/W



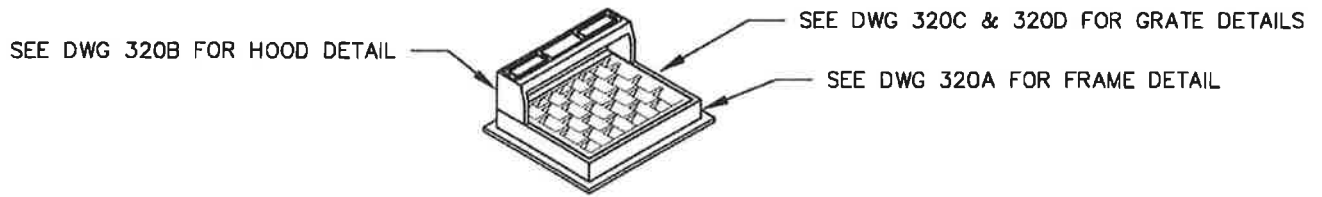
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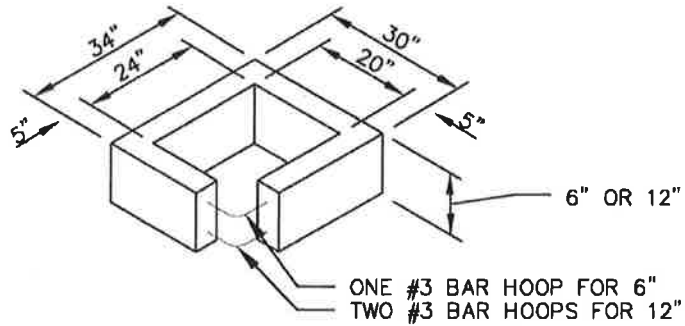
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DEMOLITION OR STUB OUT SEWER CAP

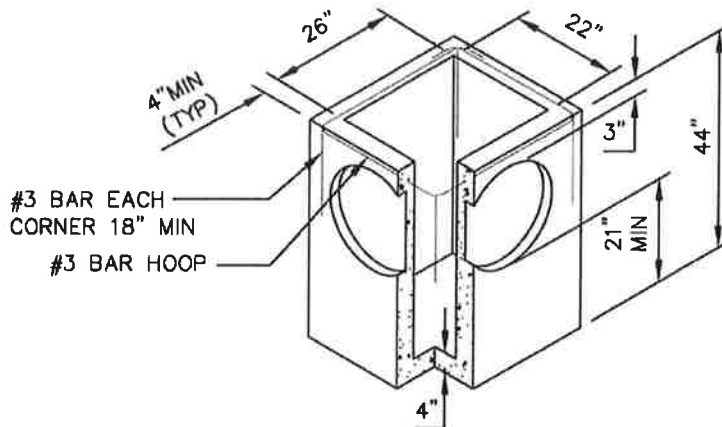
NO SCALE
 DWG NO.
 313



FRAME, VANED GRATE, AND HOOD



RECTANGULAR ADJUSTMENT SECTION



PRECAST BASE SECTION

NOTES:

1. REESE CONCRETE PRODUCTS CATCH BASIN TYPE 1 OR EQUAL.



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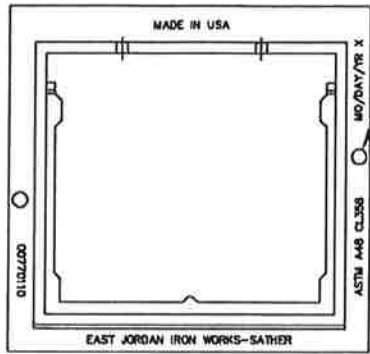
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**TYPE 1 30"X34"
RECTANGULAR
CURB INLET
CATCH BASIN**

NO SCALE

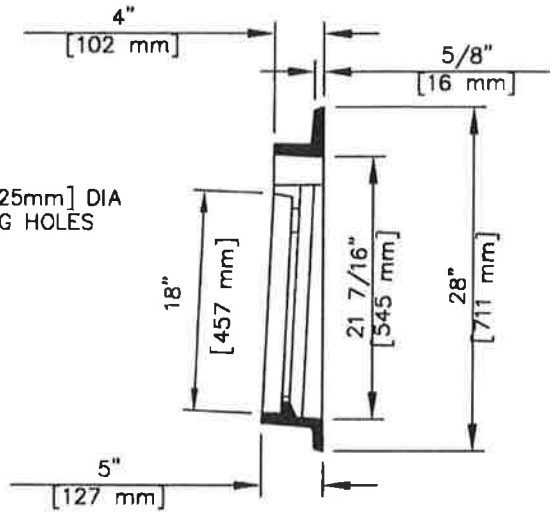
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320

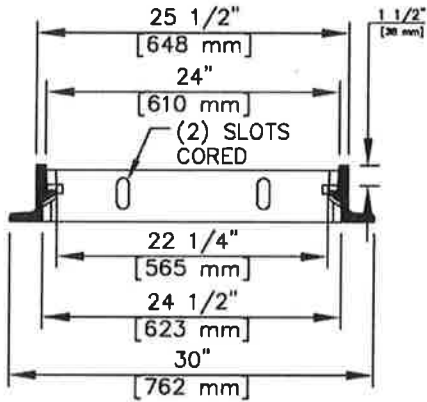


PLAN VIEW

(2) 1" [25mm] DIA
HANDLING HOLES



SECTION VIEW



SECTION VIEW

NOTES:

1. CATCH BASIN FRAME SHALL BE EJIW 7701 Z FRAME UNBOLTED OR APPROVED EQUAL.
2. JOINTS SHALL BE WATER TIGHT AND COATED COVER MATERIAL SPECIFICATION GRAY IRON (ASTM A48 CL35B).



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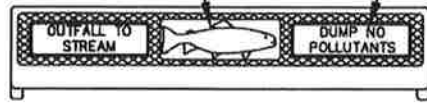
CURB INLET CATCH
BASIN FRAME

NO SCALE

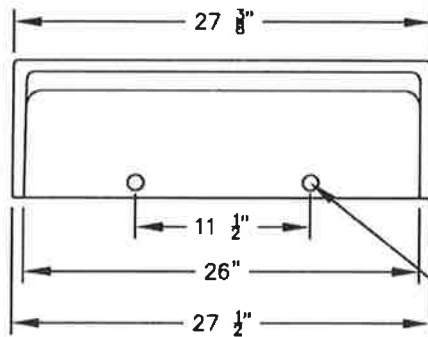
DWG NO.

320A

FISH LOGO TAG
(RECESSED FLUSH) 1/2" SHARP FACE GOTHIC.

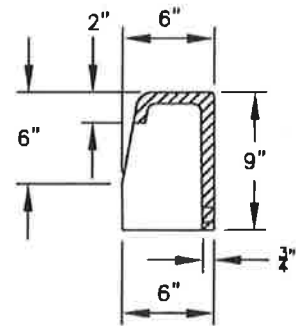


PLAN VIEW



(2) 1" DIA.
CORED HOLES

SECTION VIEW



SECTION VIEW

NOTES:

1. CATCH BASIN HOOD SHALL BE EJIW 7701T1 HOOD OR APPROVED EQUAL.
2. HOOD SHALL BE GRAY IRON ASTM A48 CL35B.



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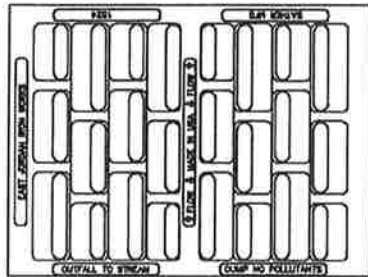
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CURB INLET CATCH
BASIN HOOD

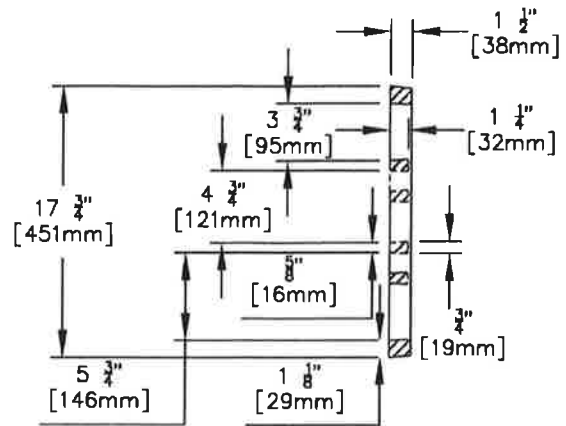
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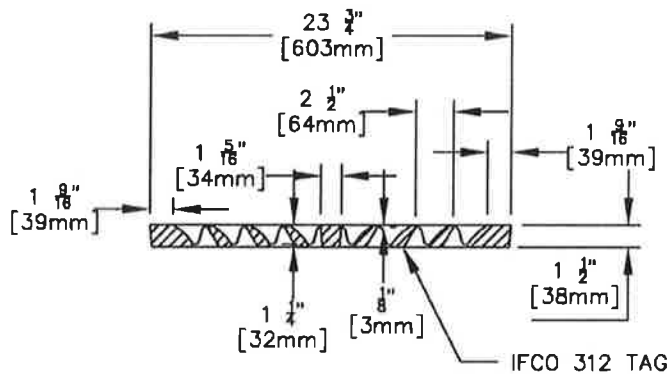
320B



PLAN VIEW



SECTION VIEW



SECTION VIEW

NOTES:

1. CATCH BASIN GRATE SHALL BE EJIW 7700M3 DI BIDIRECTIONAL VANE GRATE OR APPROVED EQUAL.
2. GRATE SHALL BE DUCTILE IRON ASTM A536.



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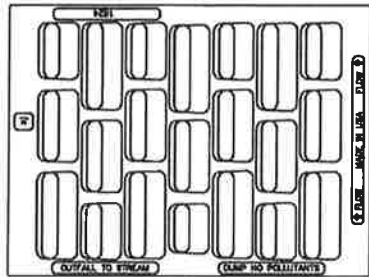
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CURB INLET CATCH BASIN BIDIRECTIONAL GRATE

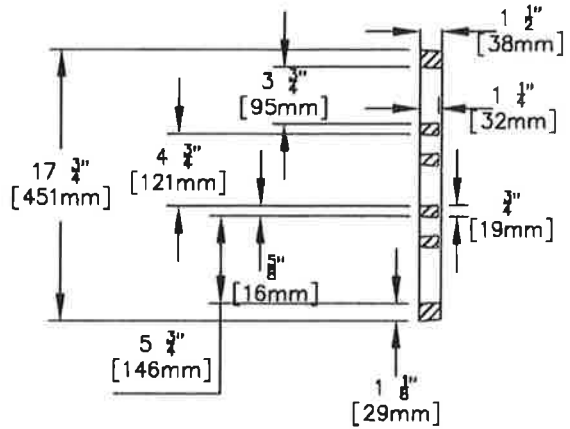
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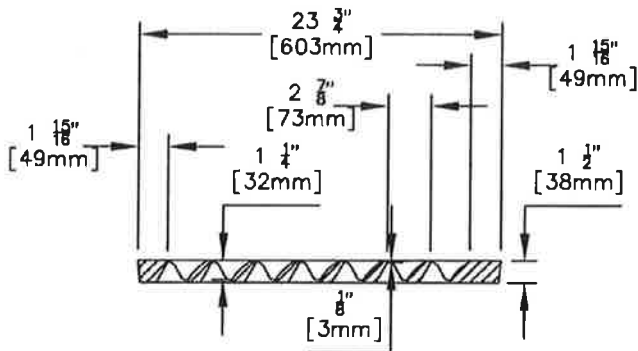
320C



PLAN VIEW



SECTION VIEW



SECTION VIEW

NOTES:

1. CATCH BASIN GRATE SHALL BE EJIW 7700M2 GRATE OR APPROVED EQUAL.
2. GRATE SHALL BE DUCTILE IRON ASTM A536.



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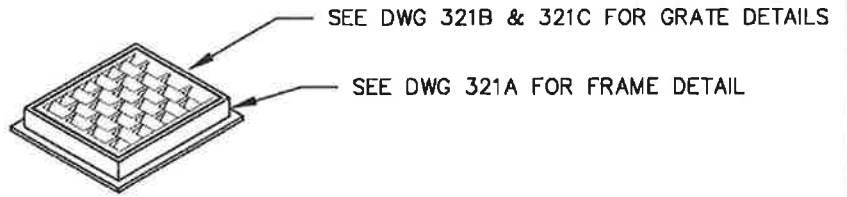
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CURB INLET CATCH
BASIN DIRECTIONAL
GRATE

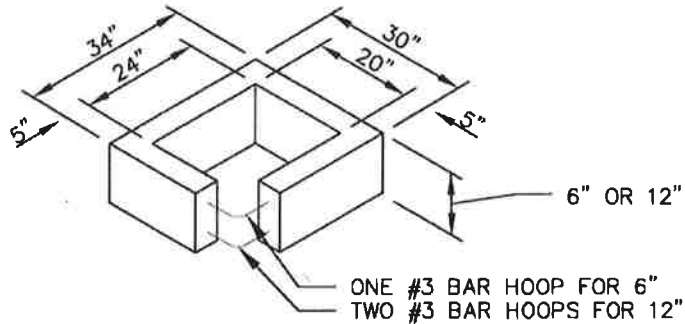
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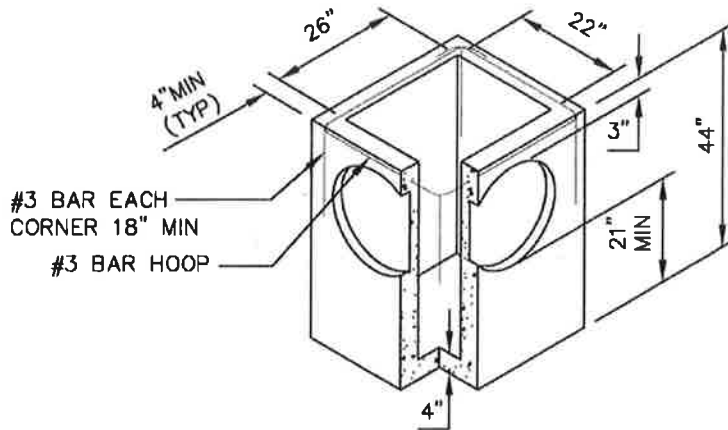
320D



FRAME AND VANED GRATE



RECTANGULAR ADJUSTMENT SECTION



PRECAST BASE SECTION

NOTES:

1. REESE CONCRETE PRODUCTS CATCH BASIN TYPE 1 OR EQUAL.



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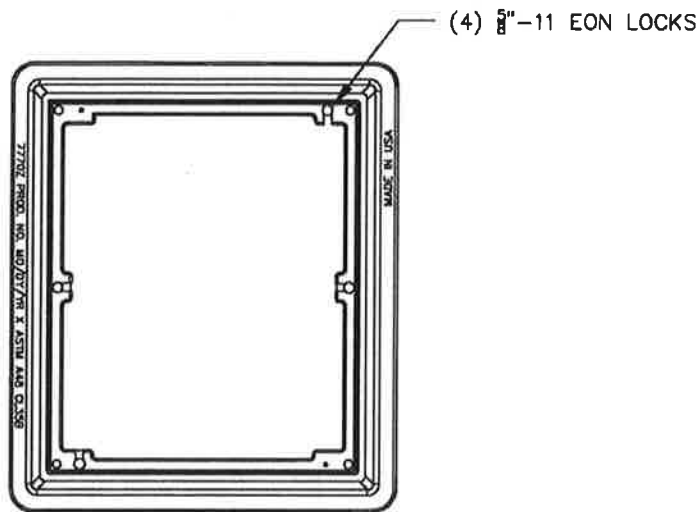
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**TYPE 1 30"X34"
RECTANGULAR
FLAT TOP
CATCH BASIN**

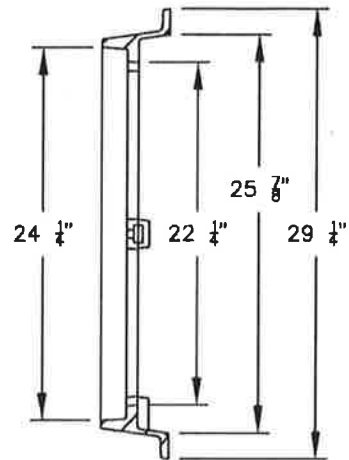
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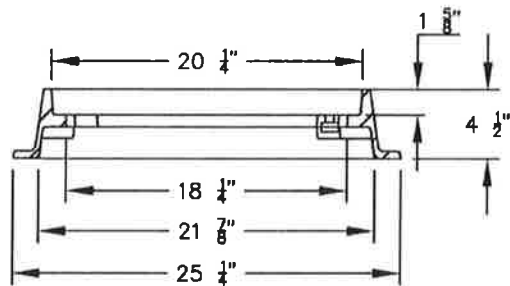
321



PLAN VIEW



SECTION VIEW



SECTION VIEW

NOTES:

1. CATCH BASIN FRAME SHALL BE EJIW 7770Z FRAME OR APPROVED EQUAL.
2. JOINTS SHALL BE WATER TIGHT AND COATED COVER MATERIAL SPECIFICATION GRAY IRON (ASTM A48 CL35B).



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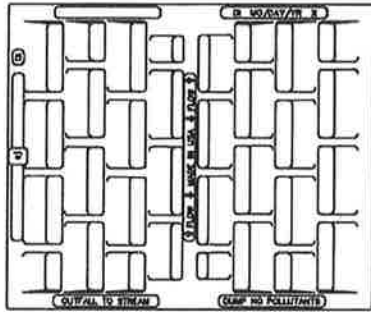
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**FLAT TOP CATCH
BASIN FRAME**

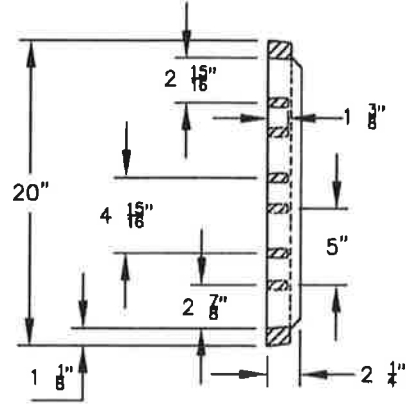
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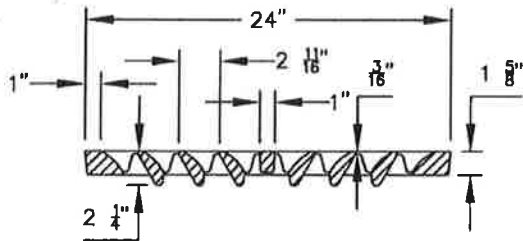
321A



PLAN VIEW



SECTION VIEW



SECTION VIEW

NOTES:

1. CATCH BASIN GRATE SHALL BE EJIW 7750M3 DI GRATE OR APPROVED EQUAL.
2. GRATE SHALL BE DUCTILE IRON ASTM A536.



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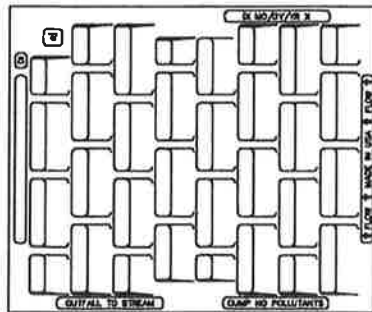
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FLAT TOP CATCH
BASIN BIDIRECTIONAL
GRATE

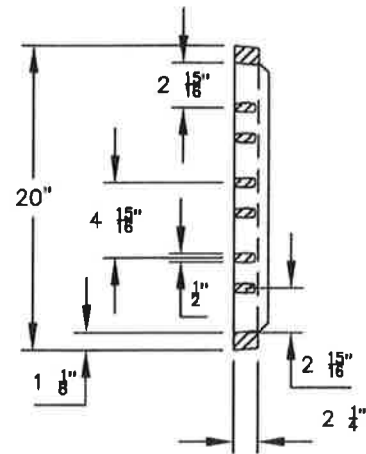
NO SCALE

DWG NO.

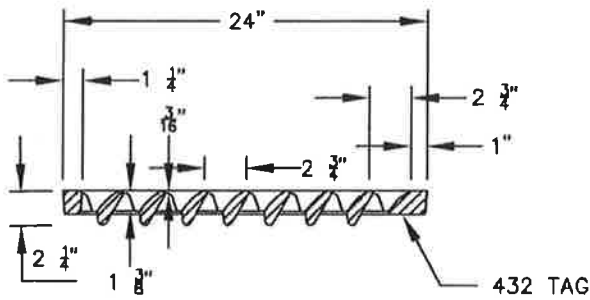
321B



PLAN VIEW



SECTION VIEW



SECTION VIEW

NOTES:

1. CATCH BASIN GRATE SHALL BE EJIW 7750M2 DI GRATE OR APPROVED EQUAL.
2. GRATE SHALL BE DUCTILE IRON ASTM A536.



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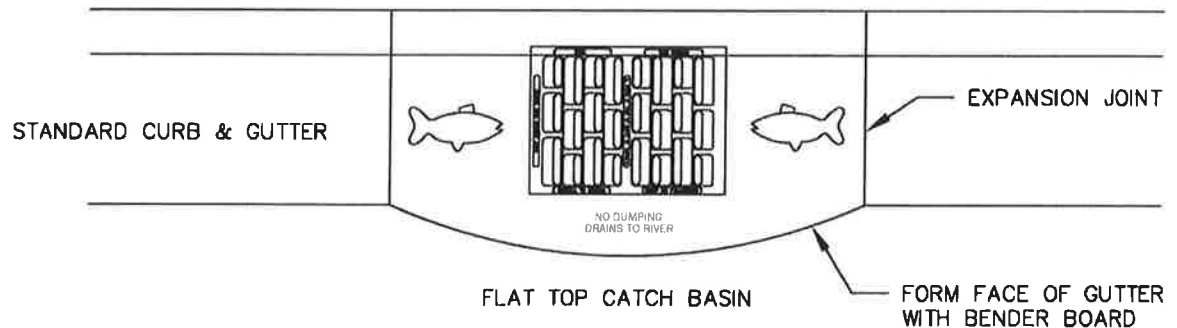
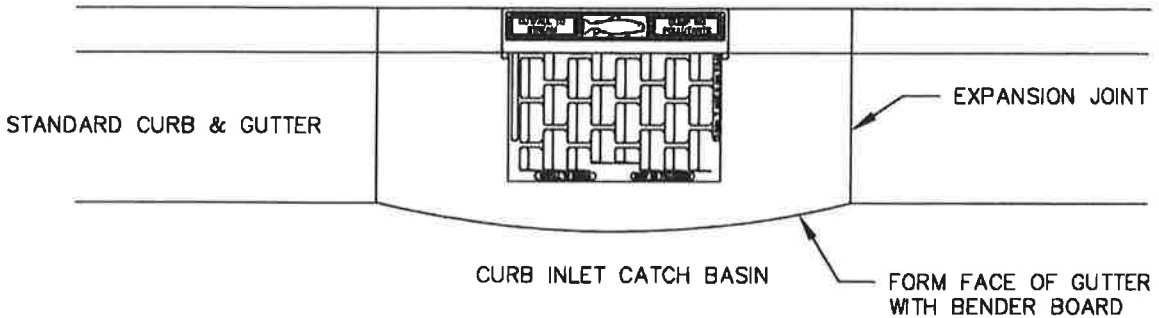
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FLAT TOP CATCH
BASIN DIRECTIONAL
GRATE

NO SCALE

DWG NO.

321C



NOTES:

1. CONCRETE TO BE 3000 PSI AT 28 DAYS, 6 SACK MIX.
2. CATCH BASIN, FRAME, AND GRATE TO BE CITY STANDARD OR APPROVED EQUAL. SEE STD DWG 320 & 321.
3. DRAIN PIPE TO BE 12" MIN AND 24" MAX UP FROM BOTTOM OF CATCH BASIN.
4. CONCRETE STAMPING TO BE DONE AS SHOWN, AS APPROVED BY CITY.
5. FORM FACE OF GUTTER AT THE FRONT OF CATCH BASIN GRATE WITH BENDER BOARD.



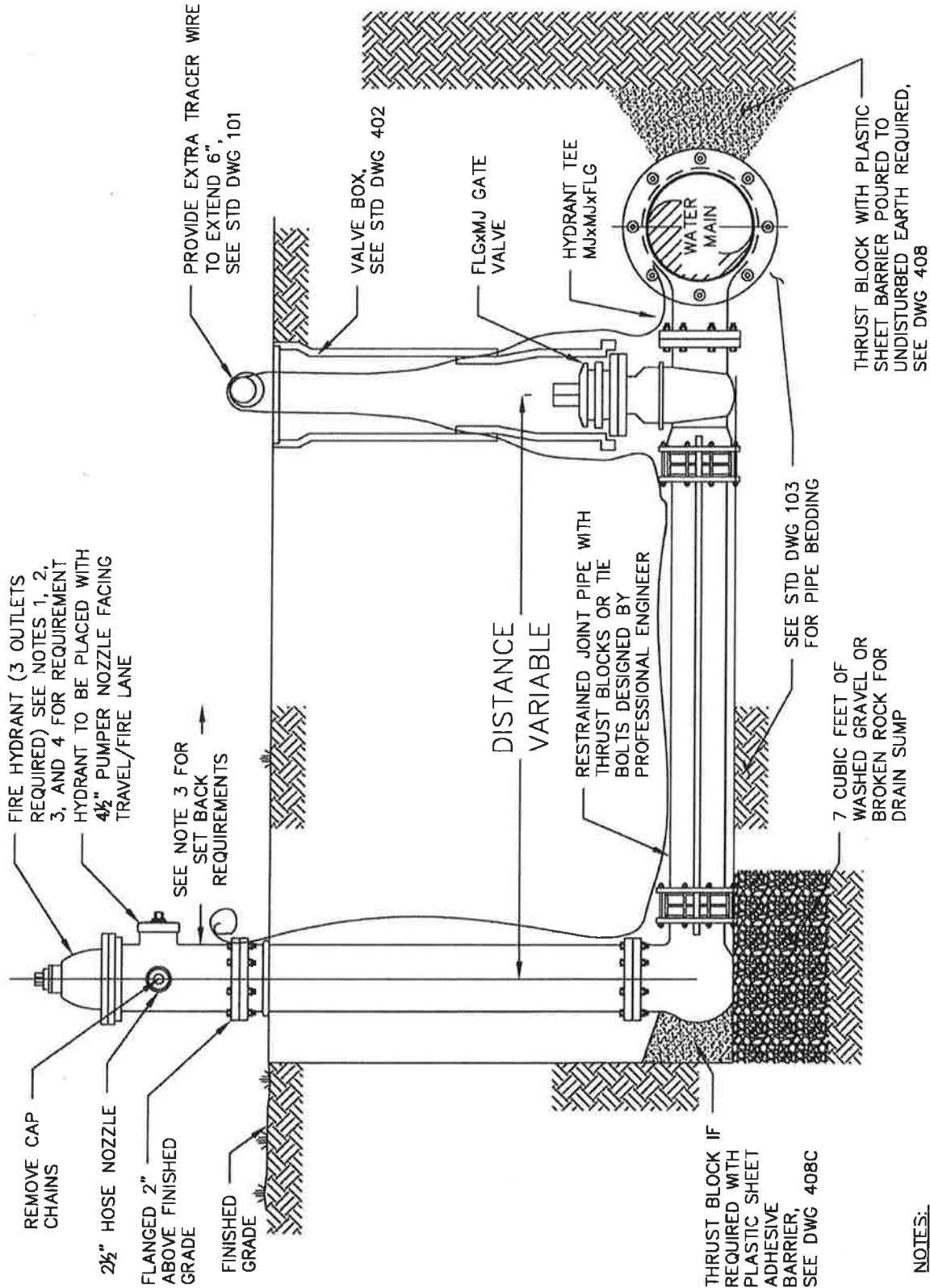
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**CATCH BASIN
CONCRETE STAMPING
DETAIL**

NO SCALE
DWG NO.
322



- NOTES:
1. 5 1/4" COMPRESSION TYPE HYDRANTS, TRAFFIC MODEL (BREAK OFF FLANGE).
 2. 4' BURY, 6" MJ SHOE, TWO 2 1/2" NST DISCHARGES, ONE 4 1/2" PUMPER NOZZLE, OPEN LEFT.
 3. FIRE HYDRANT TO BE LOCATED ON PUBLIC RIGHT-OF-WAY 1' BACK OF SIDEWALK TYPICAL.
 4. THE CITY WILL ACCEPT ONLY THE FOLLOWING BRAND NAME HYDRANTS: MUELLER CENTURION NO. 200, CLOW MEDALLION, WATEROUS NO. WB-67-250, OR KENNEDY NO K-81A.



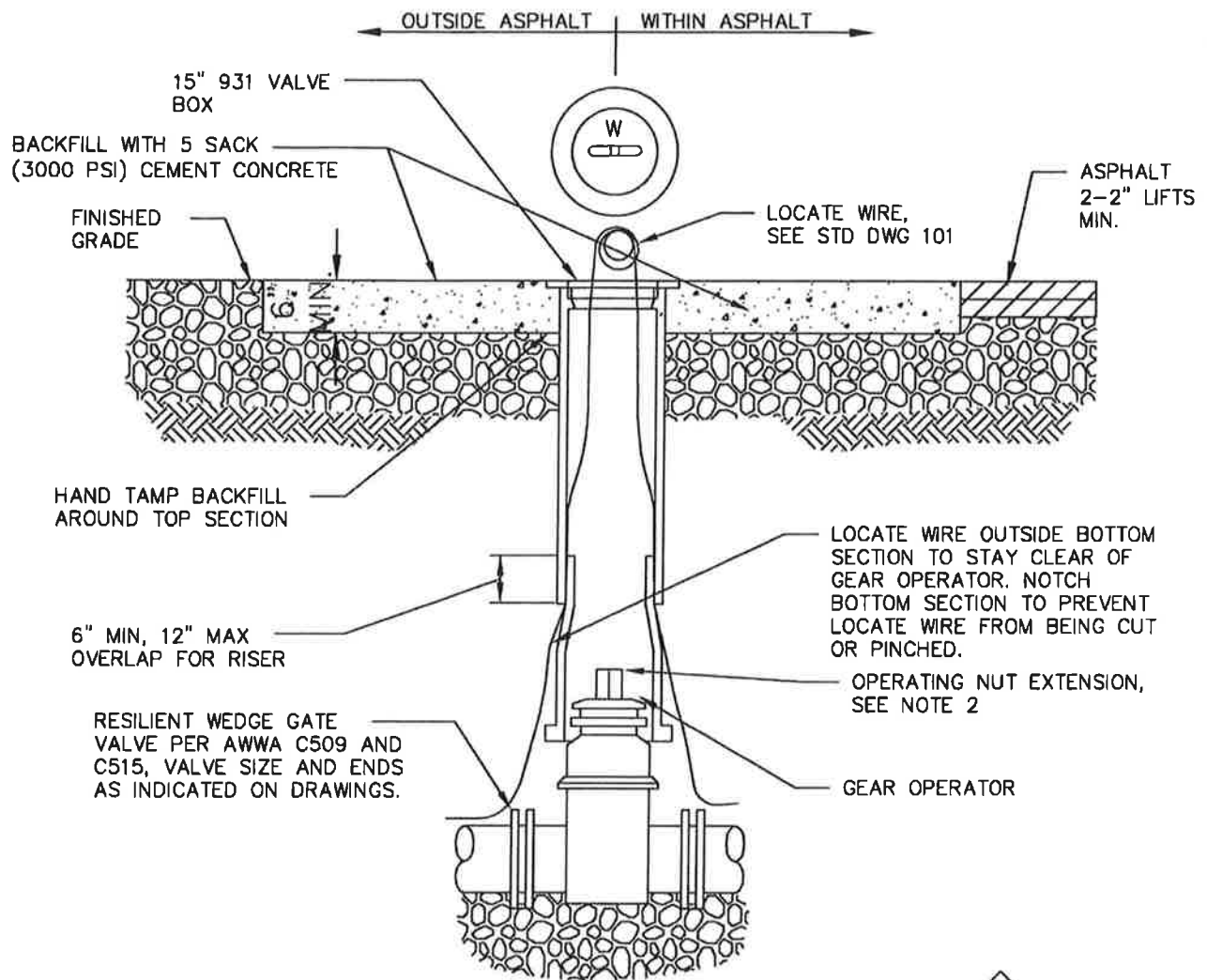
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HYDRANT ASSEMBLY

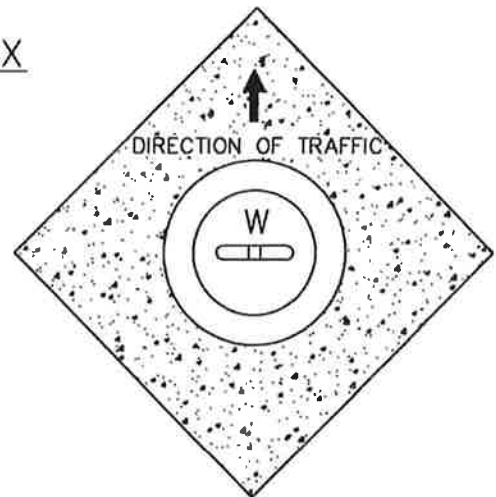
NO SCALE
 DWG NO.
400



BURIED VALVE BOX

NOTES:

1. SET VALVE BOX BELOW GRADE AND CONSTRUCT BASE AND FINISH ASPHALT COURSE.
2. CUT DIAMOND (WITH CORNERS POINTED TOWARD TRAFFIC) 12" MINIMUM FROM VALVE BOX FRAME.
3. RAISE AND ADJUST VALVE BOX TO FINISH GRADE AND COVER VALVE CAN LID WITH PLASTIC TO PREVENT CONCRETE FROM STICKING TO VALVE CAN LID.
4. VALVE BOX NOT TO REST ON OPERATING ASSEMBLY.
5. OPERATING NUT EXTENSION REQUIRED WHEN VALVE NUT IS DEEPER THAN 4' FROM FINISHED GRADE. SEE STD DWG 403.
6. CENTER VALVE BOX ON AXIS OF OPERATING NUT.
7. ORIENT GEAR OPERATOR TO CENTERLINE SIDE IN ROADWAYS.
8. BACKFILL WITH 5 SACK (3000 PSI) CONCRETE CEMENT SLOPED AT MIN. 2% (MAX. 4%) TO FINISH GRADE. FINISH CONCRETE IN A GOOD WORKMAN LIKE FASHION WITH BROOMED FINISH AND MINIMAL SPILLAGE ONTO SURROUND ASPHALT. TAPE AND TARP ASPHALT IF NEEDED. CLEAN UP ANY SPILLAGE ON ASPHALT AND VALVE CAN LID.
9. PROTECT FROM TRAFFIC LOADING FOR A MIN. OF 7 DAYS.



CONCRETE PAD



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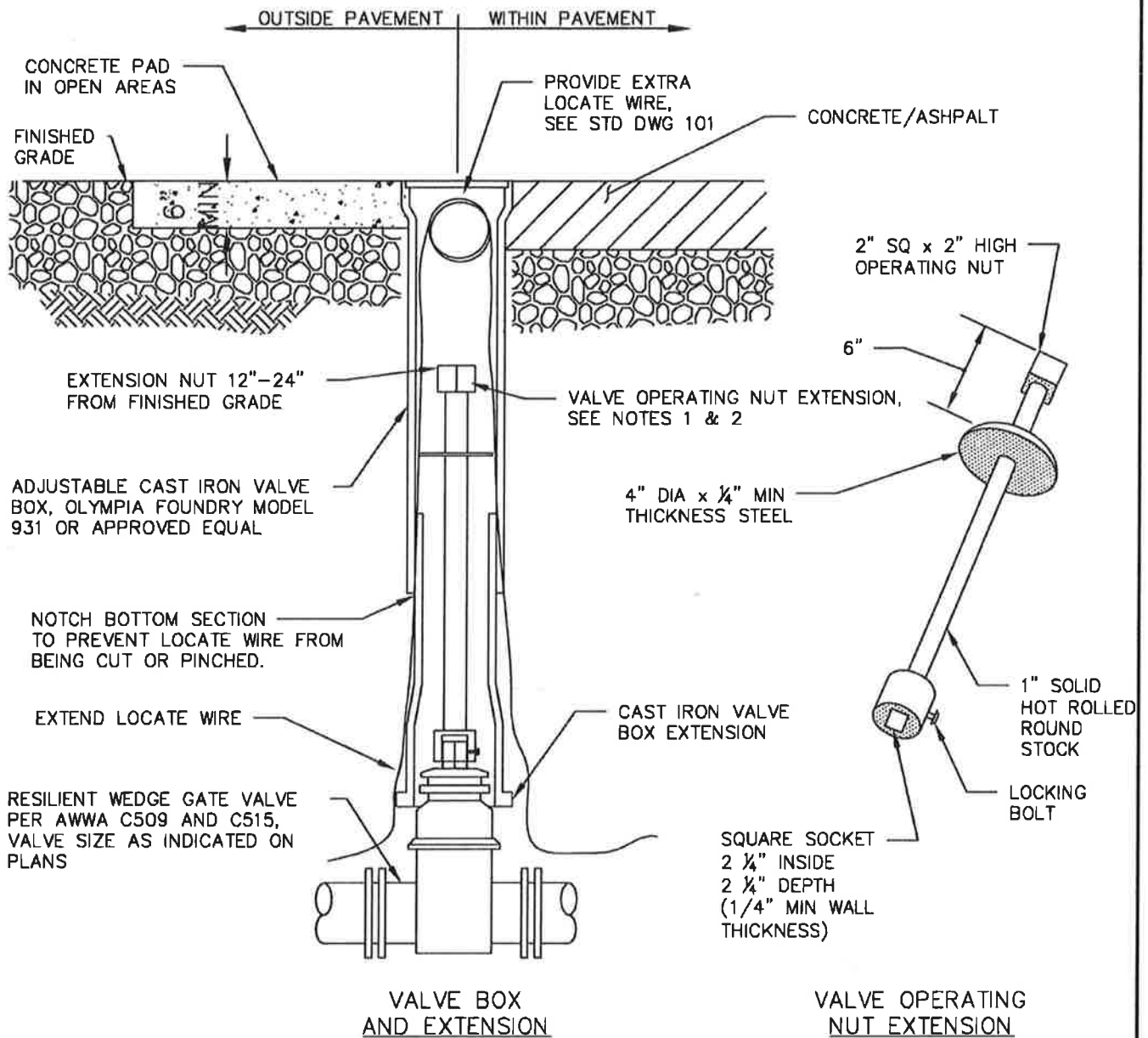
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BURIED VALVE AND BOX ADJUSTMENT

NO SCALE

DWG NO.

402



NOTES:

1. VALVE OPERATING NUT EXTENSIONS ARE REQUIRED WHEN THE VALVE NUT IS MORE THAN 4' BELOW FINISHED GRADE.
2. ALL VALVE OPERATING NUT EXTENSIONS ARE TO BE MADE OF STEEL, SIZED AS NOTED, AND PAINTED WITH 2 COATS OF METAL PAINT.
3. MUST CONFORM TO ALL NOTES ON STD DWG 402.



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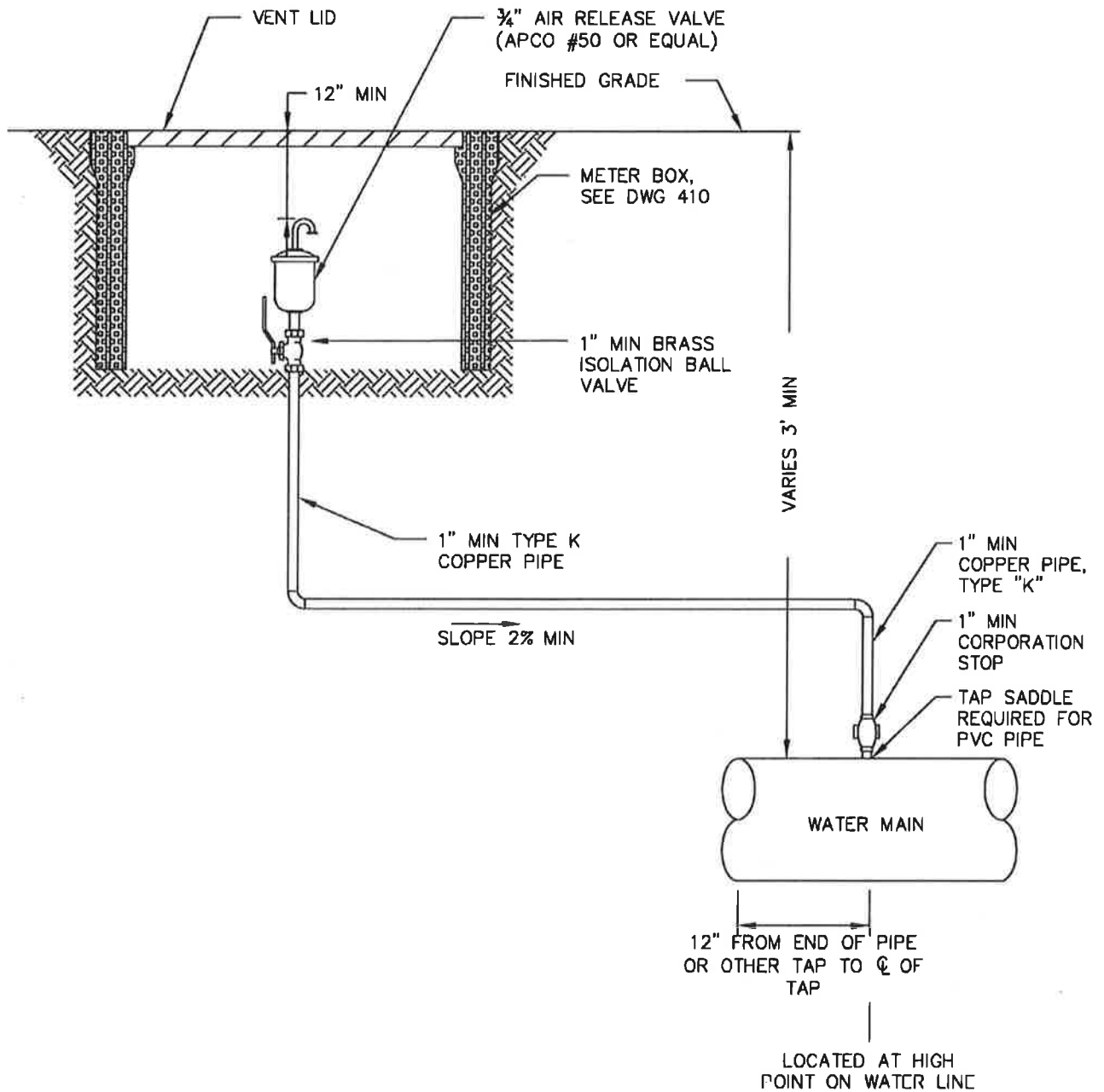
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VALVE OPERATING NUT AND EXTENSION

NO SCALE

DWG NO.

403



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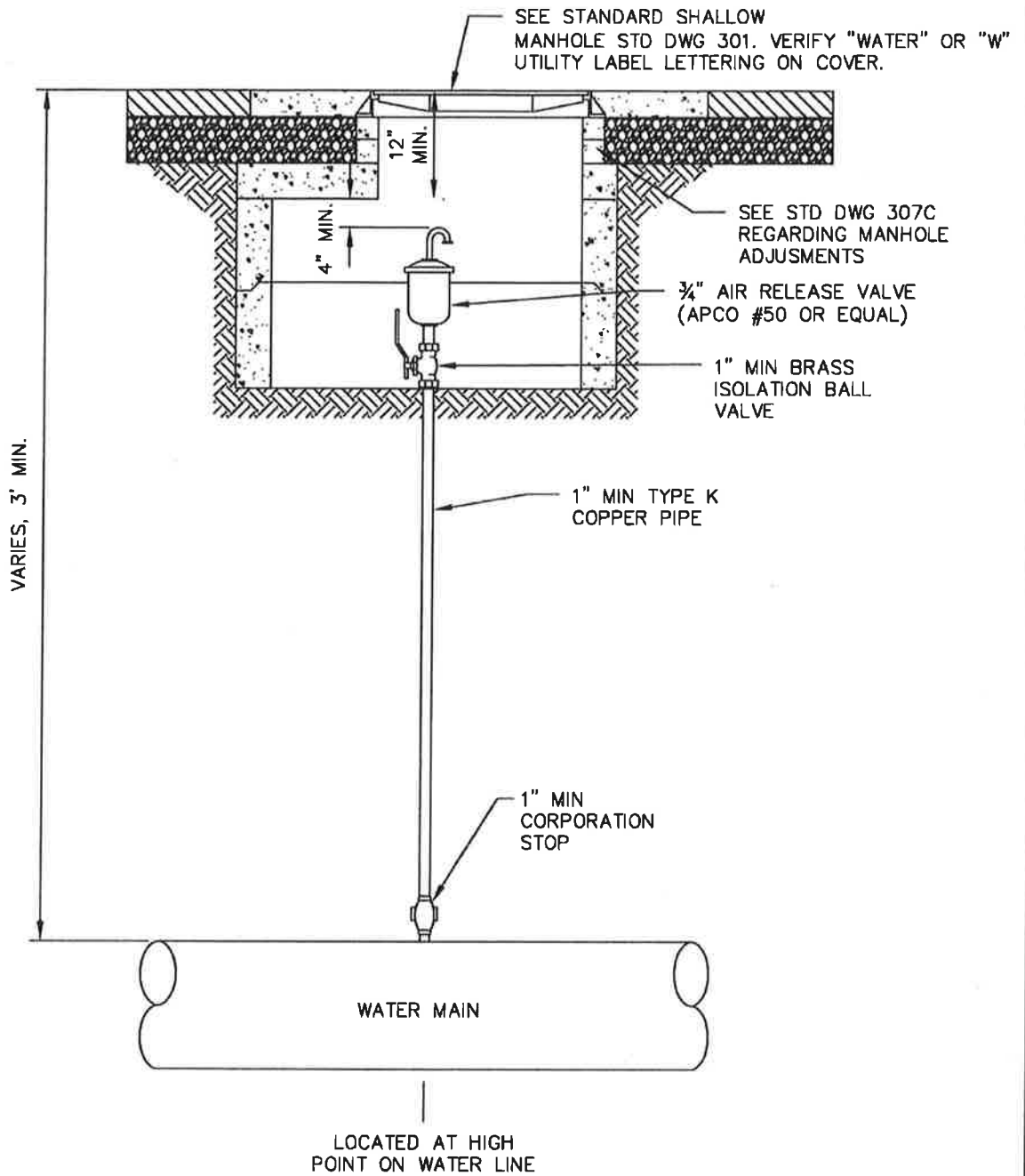
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TYPICAL AIR RELEASE VALVE ASSEMBLY OUT OF STREET

NO SCALE

DWG NO.

405



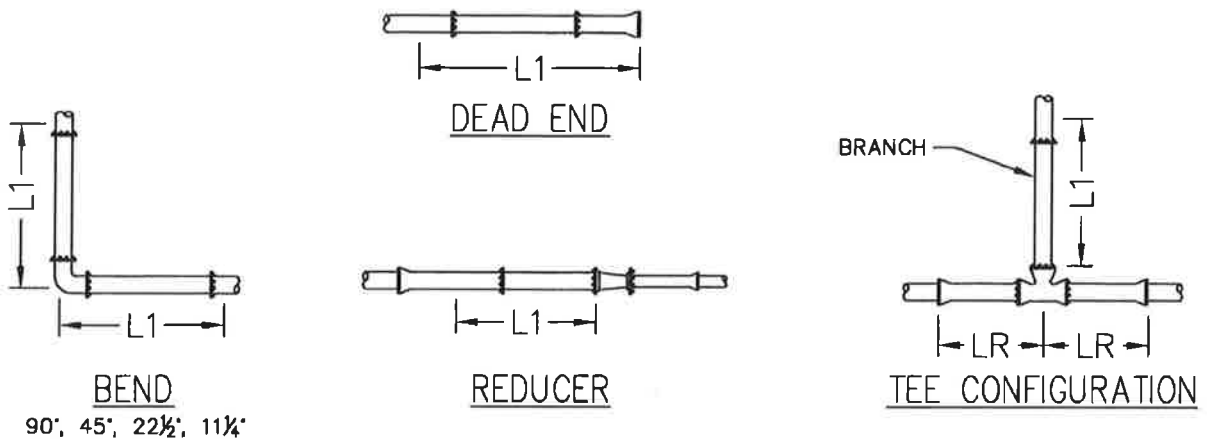
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TYPICAL AIR RELEASE VALVE ASSEMBLY IN STREET

NO SCALE
 DWG NO.
406



NOTES:

1. ALL JOINTS WITHIN THE LENGTH "L1" FROM STD DWG 407B, SHALL BE RESTRAINED.
2. THE JOINT RESTRAINT LENGTHS CALCULATED ARE FOR FITTINGS USED TO CHANGE PIPE HORIZONTAL ALIGNMENT ONLY. FOR APPLICATIONS WHERE FITTINGS ARE USED TO CHANGE THE SLOPE OF THE PIPE, THE DESIGN ENGINEER SHALL INCLUDE THE JOINT RESTRAINT REQUIREMENTS ON THE PROJECT DRAWINGS.
3. IF AN UNANTICIPATED NEED FOR JOINT RESTRAINT ARISES TO CHANGE THE SLOPE OF THE PIPE, THE CONTRACTOR SHALL CONTACT THE DESIGN ENGINEER OR UTILIZE ANCHORS.
4. JOINT TYPES NOT COVERED ON ABOVE TABLE MUST BE DESIGNED INDIVIDUALLY IN ORDER TO DETERMINE APPROPRIATE RESTRAINED LENGTH. THIS LENGTH SHALL BE SHOWN ON THE PROJECT DRAWINGS.
5. THE SMALL DIAMETER SIDE OF A REDUCER DOES NOT REQUIRE RESTRAINT IF THE LARGE DIAMETER SIDE IS PROPERLY RESTRAINED.
6. ABOVE RESTRAINED LENGTHS ARE BASED ON:
 - 6.1. PIPE MATERIAL - DUCTILE IRON AND PVC, SEE STD DWG 407B.
 - 6.2. TEST PRESSURE OF 200 PSI.
 - 6.3. MINIMUM OF 3' COVER.
 - 6.4. SAFETY FACTOR = 1.5 TO 1.
 - 6.5. SOIL TYPE = CL(granular) - CL NATIVE SOIL, BACKFILLED WITH GRANULAR MATERIAL.
 - 6.6. TRENCH TYPE 4 - PIPE BEDDED IN SAND, GRAVEL, OR CRUSHED STONE TO A DEPTH OF $\frac{1}{8}$ " PIPE DIAMETER, 4" MIN. BACKFILL COMPACTED TO TOP OF PIPE. (MINIMUM 80% STANDARD PROCTOR, AASHTO T-99).
 - 6.7. WHEN ORGANIC OR CLAY TYPE SOILS ARE BEING USED FOR BACKFILL, GRANULAR BACKFILL MUST BE USED FOR BEDDING AND BACKFILL TO A HEIGHT OF 12" OVER THE TOP OF THE PIPE BEFORE OTHER SOILS ARE PLACED.
 - 6.8. UNCOATED PIPE, THIS TABLE IS NOT APPLICABLE FOR PIPE ENCASED IN POLYETHYLENE ANY REDUCTION OF THESE VALUES AS A RESULT OF OTHER CONDITIONS ENCOUNTERED SHALL BE BASED ON THE APPROPRIATE EVALUATION AND RECOMMENDATION BY A QUALIFIED, REGISTERED ENGINEER AND WITH APPROVAL BY THE CITY.
7. INLINE VALVES SHALL HAVE RESTRAINT JOINTS FOR A LENGTH REQUIRED FOR DEAD END LINES ON BOTH SIDES OF VALVES.
8. ALL THRUSTING AND RESTRAINING PLANS MUST BE PRE-APPROVED BY CITY ENGINEER (ON ALL STD DWG 407 & 408).

 <p>ENGINEERING DEPARTMENT 500 S.W. DORION AVENUE PENDLETON, OREGON 97801 VOICE: (541) 968-0203 FAX: (541) 968-0251</p>	<p>APPROVED BY</p> 	<p>PIPE JOINT RESTRAINT LENGTH</p>	<p>NO SCALE</p>
	<p>FEBRUARY 2019 APPROVAL DATE</p> <p>REVISED DATE</p>		<p>DWG NO. 407A</p>

DI RESTRAINED LENGTH TABLE

LENGTH (L) OF DI PIPE REQUIRED FOR RESTRAINT (FEET)											
DIA	HORIZONTAL BEND				DEAD END	REDUCER (RESTRAINED LENGTH FOR LARGER DIAMETER SIDE)					
	90°	45°	22.5°	11.25°		6"	8"	10"	12"	16"	18"
4	17	7	4	2	35	26	47	63	79	107	120
6	24	10	5	3	50	-	27	48	66	98	112
8	31	13	7	3	65	-	-	26	48	85	100
10	37	15	8	4	77	-	-	-	27	69	87
12	43	18	9	5	91	-	-	-	-	50	70
16	54	23	11	6	116	-	-	-	-	-	26
18	59	25	12	6	128	-	-	-	-	-	-

LENGTH (L) OF DI PIPE REQUIRED FOR RESTRAINT WHEN USING TEES (FEET)											
TEE CONFIGURATIONS (RESTRAINT LENGTH FOR BRANCH)											
DIA	LR=0	LR=2	LR=4	LR=6	LR=8	LR=10	LR=12	LR=14	LR=16	LR=18	LR=20
4	35	29	22	16	9	3	1	1	1	1	1
6	50	43	36	30	23	16	10	3	1	1	1
8	65	58	51	45	38	31	24	18	11	4	1
10	77	71	64	57	50	43	37	30	23	16	9
12	91	84	77	70	63	57	50	43	36	29	22
16	116	109	102	95	88	81	74	67	60	53	46
18	128	121	114	107	100	93	86	79	72	65	57

LR is the minimum length in either direction from tee to nearest adjacent joint (Branch and Run are the same size)

PVC RESTRAINED LENGTH TABLE

LENGTH (L) OF PVC PIPE REQUIRED FOR RESTRAINT (FEET)											
DIA	HORIZONTAL BEND				DEAD END	REDUCER (RESTRAINED LENGTH FOR LARGER DIAMETER SIDE)					
	90°	45°	22.5°	11.25°		6"	8"	10"	12"	16"	18"
4	21	9	5	2	5	40	73	99	124	170	190
6	29	12	6	3	78	-	43	75	104	155	177
8	37	16	8	4	102	-	-	41	76	134	159
10	44	19	9	5	122	-	-	-	42	109	137
12	51	22	11	6	143	-	-	-	-	78	110
16	65	27	13	7	184	-	-	-	-	-	42
18	71	30	15	7	202	-	-	-	-	-	-

LENGTH (L) OF PVC PIPE REQUIRED FOR RESTRAINT WHEN USING TEES (FEET)											
TEE CONFIGURATIONS (RESTRAINT LENGTH FOR BRANCH)											
DIA	LR=0	LR=2	LR=4	LR=6	LR=8	LR=10	LR=12	LR=14	LR=16	LR=18	LR=20
4	55	45	35	24	14	4	1	1	1	1	1
6	78	67	57	46	36	25	15	4	1	1	1
8	102	91	81	70	59	49	38	28	17	7	1
10	122	111	100	89	79	68	57	47	36	25	15
12	143	132	122	111	100	89	78	68	57	46	35
16	184	173	162	150	139	128	117	106	95	84	73
18	202	191	180	169	158	147	135	124	113	102	91

LR is the minimum length in either direction from tee to nearest adjacent joint (Branch and Run are the same size)

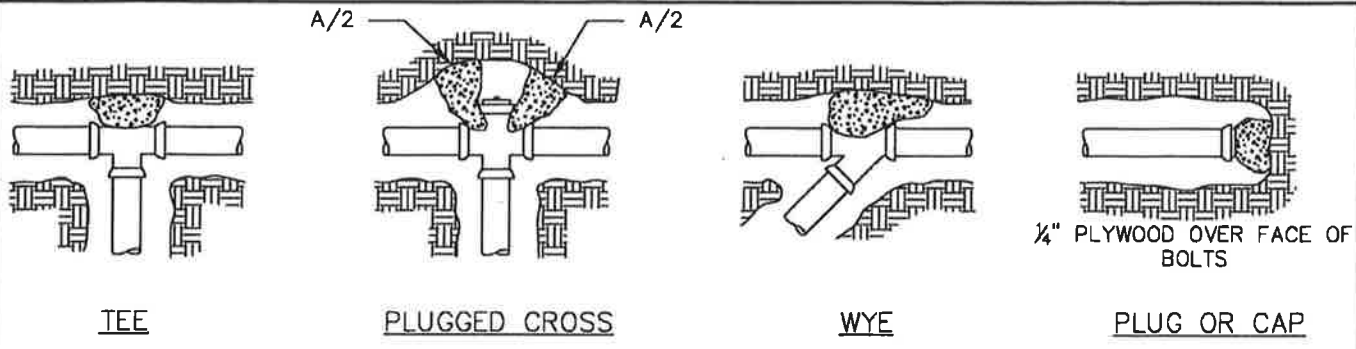


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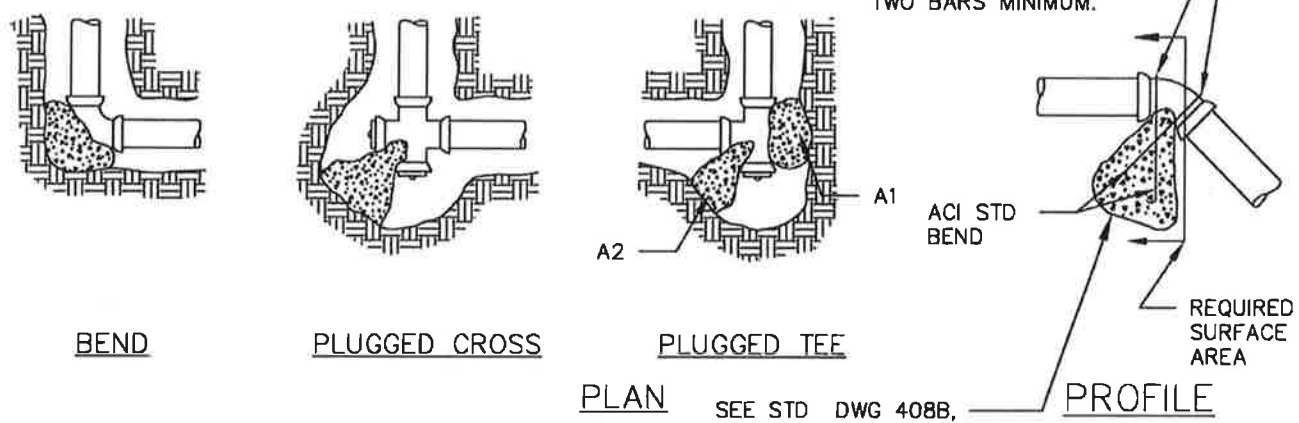
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PIPE JOINT RESTRAINT LENGTH

NO SCALE
DWG NO.
407B



TEE PLUGGED CROSS WYE PLUG OR CAP



BEND PLUGGED CROSS PLUGGED TEE PROFILE

NOTES:

1. SEE STD DWG 408B AND 408C FOR THRUST BLOCK TABLES AND NOTES.
2. KEEP CONCRETE CLEAR OF JOINT AND JOINT ACCESSORIES. COVER PIPE/FITTINGS WITH PLASTIC PRIOR TO POURING THRUST BLOCK.
3. REQUIRED VOLUMES OR BEARING AREAS IN TABLE I OR TABLE II AT FITTINGS SHALL BE AS INDICATED AND ADJUSTED, IF NECESSARY, TO CONFORM TO ACTUAL TEST PRESSURE(S) AND ALLOWABLE SOIL BEARING STRESS(ES).
4. THRUST BLOCK VOLUMES FOR VERTICAL DOWNWARD BENDS HAVING UPWARD RESULT AND THRUSTS ARE BASED ON TEST PRESSURE OF 200 PSIG AND THE WEIGHT OF CONCRETE = 4050 LBS/CU YD. TO COMPUTE VOLUMES FOR DIFFERENT TEST PRESSURES, USE THE FOLLOWING EQUATION: VOLUME = (TEST PRESS/200)x(TABLE VALUE).
5. BEARING AREAS, VOLUMES, AND SPECIAL BLOCKING DETAILS SHOWN ON THE PLANS TAKE PRECEDENCE OVER THIS STD DWG.
6. BEARING AREA OF THRUST BLOCK SHALL NOT BE LESS THAN 1.0 SQ FT.
7. SEE STD DWG 101 AND STANDARD SPECIFICATIONS FOR PIPELINE TESTING AND DISINFECTION FOR TEST PRESSURES.
8. CONSULT SOIL ENGINEER FOR ACTUAL SOIL BEARING PRESSURE.
9. FOR CONDITIONS WHERE THE ELEVATION OF THE CROWN OF THE PIPE IS ABOVE THE GROUND SURFACE WITHIN 50' OF THE THRUST BLOCK, OR IF THE SOIL BEHIND A BEARING AREA THRUST BLOCK IS DISTURBED WITHIN 40', OTHER METHODS OF RESTRAINT SHALL BE USED UNLESS EVALUATED BY A GEOTECHNICAL ENGINEER TO CONFIRM THERE IS ADEQUATE BEARING CAPACITY.



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	<p>FEBRUARY 2019 APPROVAL DATE</p> <p>REVISED DATE</p>		<p>DWG NO. 408A</p>

TABLE I - HORIZONTAL FITTINGS								
BEARING AREA, 'A', OF THRUST BLOCKS IN SQUARE FEET								
FITTING SIZE (INCH.)	SAFETY FACTOR	TEE, WYE, PLUG, OR CAP	90° BEND, PLUGGED CROSS	TEE PLUGGED ON RUN		45° BEND	22.5° BEND	11.25° BEND
				A1	A2			
		A	A			A	A	A
4	2.125	2.7	3.8	3.9	2.5	2.0	1.0	1.0
6	2.000	5.7	8.0	8.3	5.3	4.3	2.2	1.1
8	1.925	9.7	13.7	14.2	9.1	7.4	3.8	1.9
10	1.850	14.5	20.5	21.4	13.7	11.1	5.7	2.8
12	1.825	20.6	29.2	30.4	19.5	15.8	8.1	4.0
16	1.775	35.7	50.5	52.5	33.6	27.3	13.9	7.0
18	1.750	44.5	63.0	65.5	42.0	34.1	17.4	8.7

*BEARING AREAS BASED UPON PEAK OPERATING PRESSURE OF 150 PSI AND AN ALLOWABLE SOIL BEARING STRESS OF 1500 POUNDS PER SQUARE FOOT. TO COMPUTE BEARING AREAS FOR DIFFERENT TEST PRESSURES AND SOIL BEARING STRESSES, USE THE FOLLOWING EQUATION:
 BEARING AREA = (TEST PRESSURE/200) X (1500/SOIL BEARING STRESS) X (TABLE VALUE)

TABLE II - VERTICAL DOWNWARD BEND								
FITTING SIZE	90°		45°		22.5°		11.25°	
	VOL (CY)	MIN AREA (SF)	VOL (CY)	MIN AREA (SF)	VOL (CY)	MIN AREA (SF)	VOL (CY)	MIN AREA (SF)
4	0.9	2.5	0.7	1.0	0.4	1.0	0.2	1.0
6	*	*	1.5	1.7	0.8	1.0	0.4	1.0
8	*	*	*	*	1.4	1.0	0.7	1.0
10	*	*	*	*	*	*	1.1	1.0
12	*	*	*	*	*	*	1.6	1.0
16	*	*	*	*	*	*	*	*
18	*	*	*	*	*	*	*	*

*BEARING AREAS BASED UPON TEST PRESSURE OF 200 PSI AND AN ALLOWABLE SOIL BEARING STRESS OF 1500 POUNDS PER SQUARE FOOT.

*THRUST BLOCK WITH VOLUME OVER 2 CY NOT ALLOWED FOR VERTICAL DOWNWARD BEND. SEE STD DWG 408A, PROFILE DIAGRAM. USE RESTRAINED JOINT PIPE, SEE STD DWG 407A AND 407B.

TABLE III		
FITTING SIZE	ROD SIZE	EMBEDMENT
6" OR LESS	½"	16"
8" - 12"	⅝"	20"
12" - 14"	¾"	24"
16"-18"	1"	28"



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THRUST BLOCK TABLES

NO SCALE

DWG NO.

408B

2-TIE RODS WITH ACI STD BEND.
 COAT EXPOSED PORTION AND 3"
 OF EMBEDDED PORTION W/
 MASTIC EPOXY. SEE TABLE IV FOR
 REBAR SIZE AND REQUIRED
 EMBEDMENT.

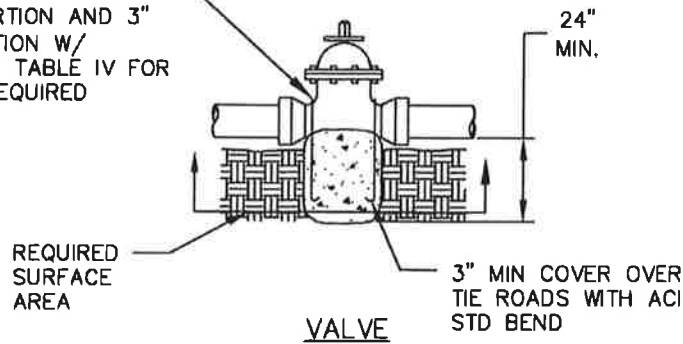


TABLE IV - THRUST BLOCK FOR VALVES

VALVE SIZE	BEARING AREA PLACED AGAINST UNDISTURBED EARTH (SQ FT)	TIE ROD SIZE (IN) 2-BARS MIN.	MINIMUM EMBEDMENT OF TIE ROD (IN)
4"	3.6	1/2	16"
6"	7.5	1/2	16"
8"	12.9	5/8	20"
10"	19.4	3/4	20"
12"	27.4	3/4	24"
16"	47.6	1	28"
18"	59.7	1	28"

*BEARING AREAS BASED UPON TEST PRESSURE OF 200 PSI, AN ALLOWABLE SOIL BEARING STRESS OF 1500 POUNDS PER SQUARE FOOT AND A SAFETY FACTOR OF 1.5 TO 1. TO COMPUTE BEARING AREAS FOR DIFFERENT TEST PRESSURES AND SOIL BEARING STRESSES, USE THE FOLLOWING EQUATION: BEARING AREA = (TEST PRESS/200) X (1500/SOIL BEARING STRESS) X (TABLE VALUE)

NOTES:

1. KEEP CONCRETE CLEAR OF JOINT AND JOINT ACCESSORIES. COVER PIPE/FITTINGS WITH PLASTIC PRIOR TO POURING THRUST BLOCK.
2. CONCRETE THRUST BLOCKING SHALL BE POURED AGAINST UNDISTURBED EARTH.
3. REQUIRED BEARING AREAS IN TABLE IV AT VALVES SHALL BE AS INDICATED, ADJUSTED, IF NECESSARY, TO CONFORM TO ACTUAL TEST PRESSURE(S) AND ALLOWABLE SOIL BEARING AREAS, AND SPECIAL BLOCKING DETAILS SHOWN ON PLANS TAKE PRECEDENCE OVER THIS STD DWG.
4. BEARING AREA OF THRUST BLOCK SHALL NOT BE LESS THAN 1.0 SQ FT.
5. SEE STD DWG 101 AND STANDARD SPECIFICATIONS FOR PIPELINE TESTING AND DISINFECTION FOR TEST PRESSURES.
6. CONSULT GEOTECHNICAL ENGINEER FOR ACTUAL SOIL BEARING PRESSURE.



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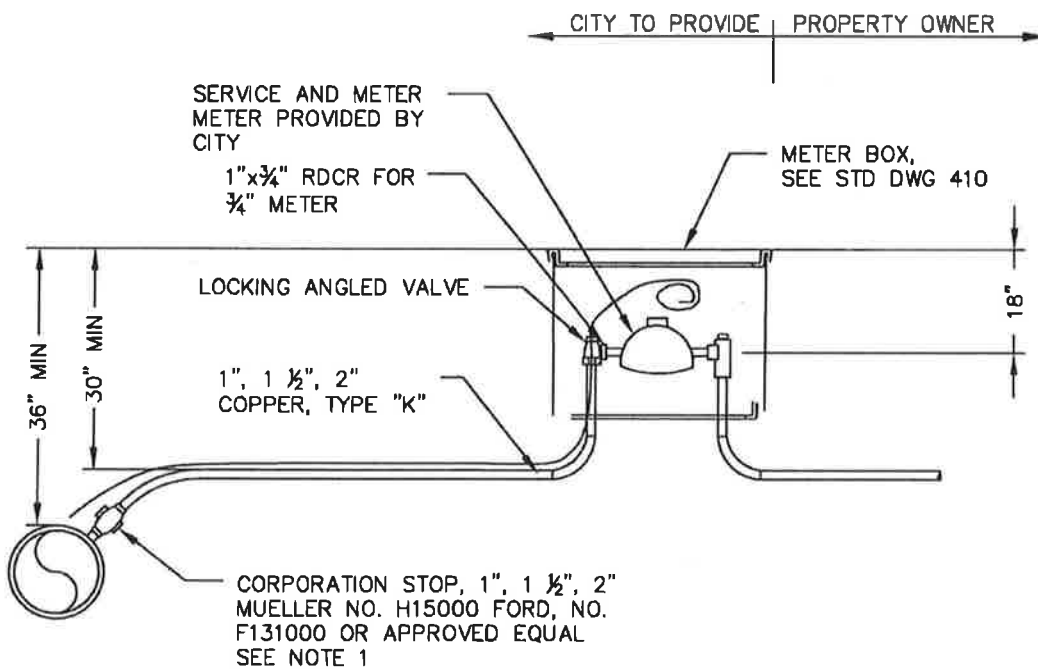
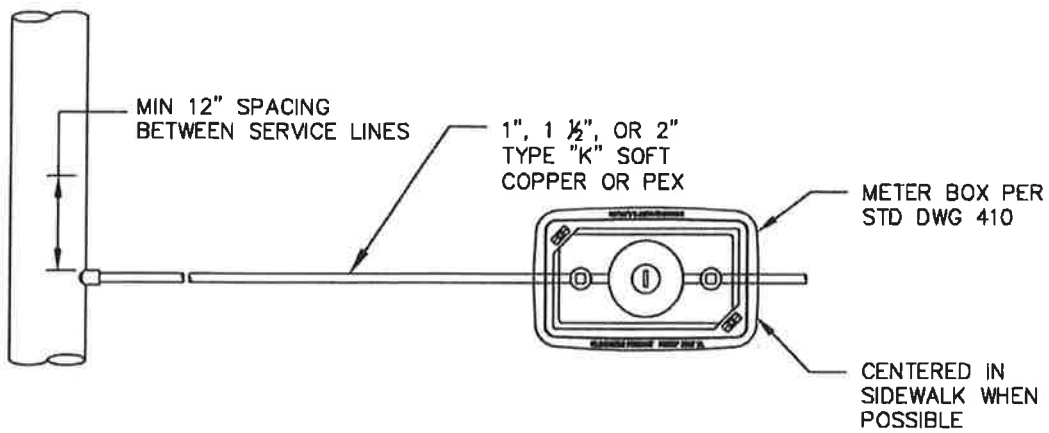
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THRUST BLOCK
 TABLE AND NOTES

NO SCALE

DWG NO.

408C



TYPICAL SERVICE

NOTES:

1. SADDLE TEE SHALL BE USED ON PVC MAIN PIPE.
2. INSULATE METER WITH MIN R13 INSULATION WITH ADEQUATE WATER PROOFING.
3. METER TO BE INSTALLED IN SIDEWALK UNLESS OTHERWISE APPROVED.

DEVELOPER/CUSTOMER NOTES:

1. IF PRESSURE IS GREATER THAN 80 PSI, A PRESSURE REDUCING VALVE IS REQUIRED TO BE INSTALLED FOLLOWING THE METER.
2. PROPERTY OWNER TO PROVIDE SHUT OFF VALVE AFTER METER.
3. ALL SERVICES SUPPLYING IRRIGATION MUST HAVE AN APPROVED BACK FLOW DEVICE.
4. SUBDIVISION: CONTRACTOR IS TO PROVIDE TRENCH AND BACKFILL FOR CITY CREWS TO INSTALL SADDLE TEE, CORP. STOP, PIPING, METER, AND BOX.



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TYPICAL SERVICE LATERAL INSTALLATION

NO SCALE

DWG NO.

409