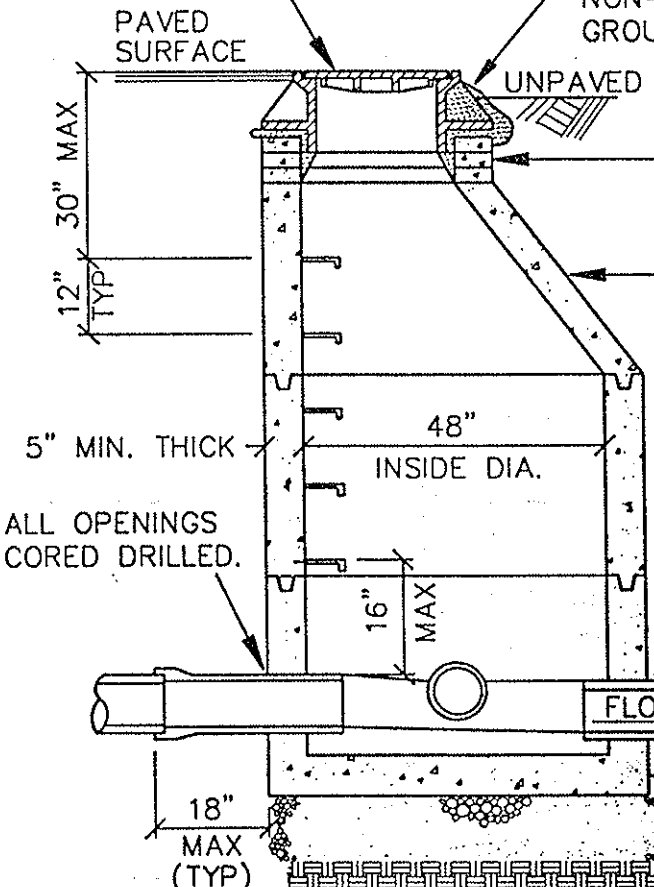


PLAN

MANHOLE FRAME AND COVER
PAVED SURFACE
UNPAVED



ALL INSIDE JOINTS & WALL PENETRATIONS TO BE GROUTED FOLLOWING MH ASSEMBLY (TYP).

KEYLOCK JOINT

GRADE RINGS (VARIABLE)
18" MAX.—TOP OF CONE TO RIM

SLOPE OF PRECAST ECCENTRIC CONE SHALL FACE DOWN GRADE. LOCATE STEPS ON UPSTREAM SIDE OF MANHOLE.

FLAT TOP MH'S SHALL BE USED FOR ALL MANHOLES LESS THAN 6' RIM TO INVERT

ALL PIPE PENETRATIONS ON SANITARY SEWER MANHOLES TO HAVE NEOPRENE RUBBER BOOTS AS SPECIFIED.

PRECAST BASE, 6" MIN THICKNESS
6" MIN COMPACTED GRANULAR BEDDING

SECTION A-A

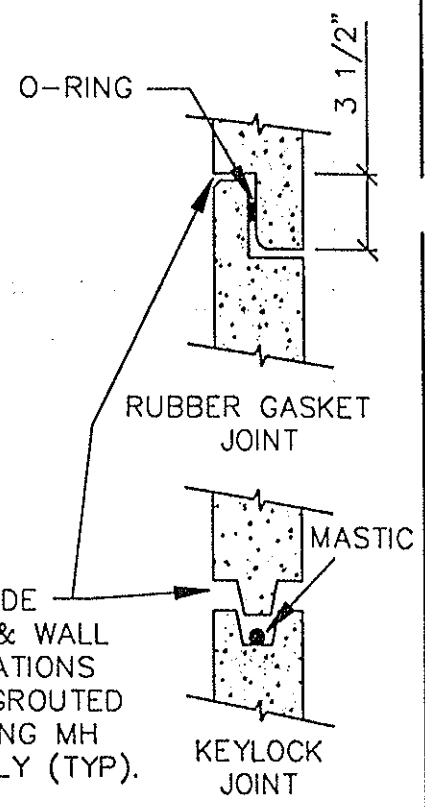
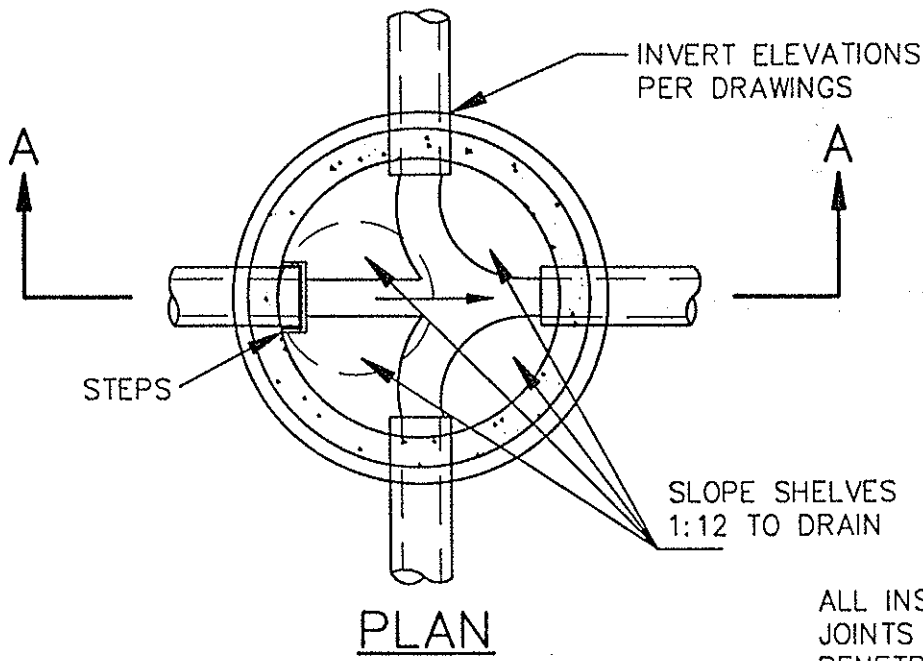
NOTES:

1. PRECAST SECTIONS SHALL MEET OR EXCEED ASTM C-478.
2. WATERTIGHT O-RING OR MASTIC KEYLOCK JOINTS REQUIRED.
3. STEPS TO BE FACTORY INSTALLED POLYPROPYLENE PLASTIC WITH GRADE 60 REINFORCING ROD.

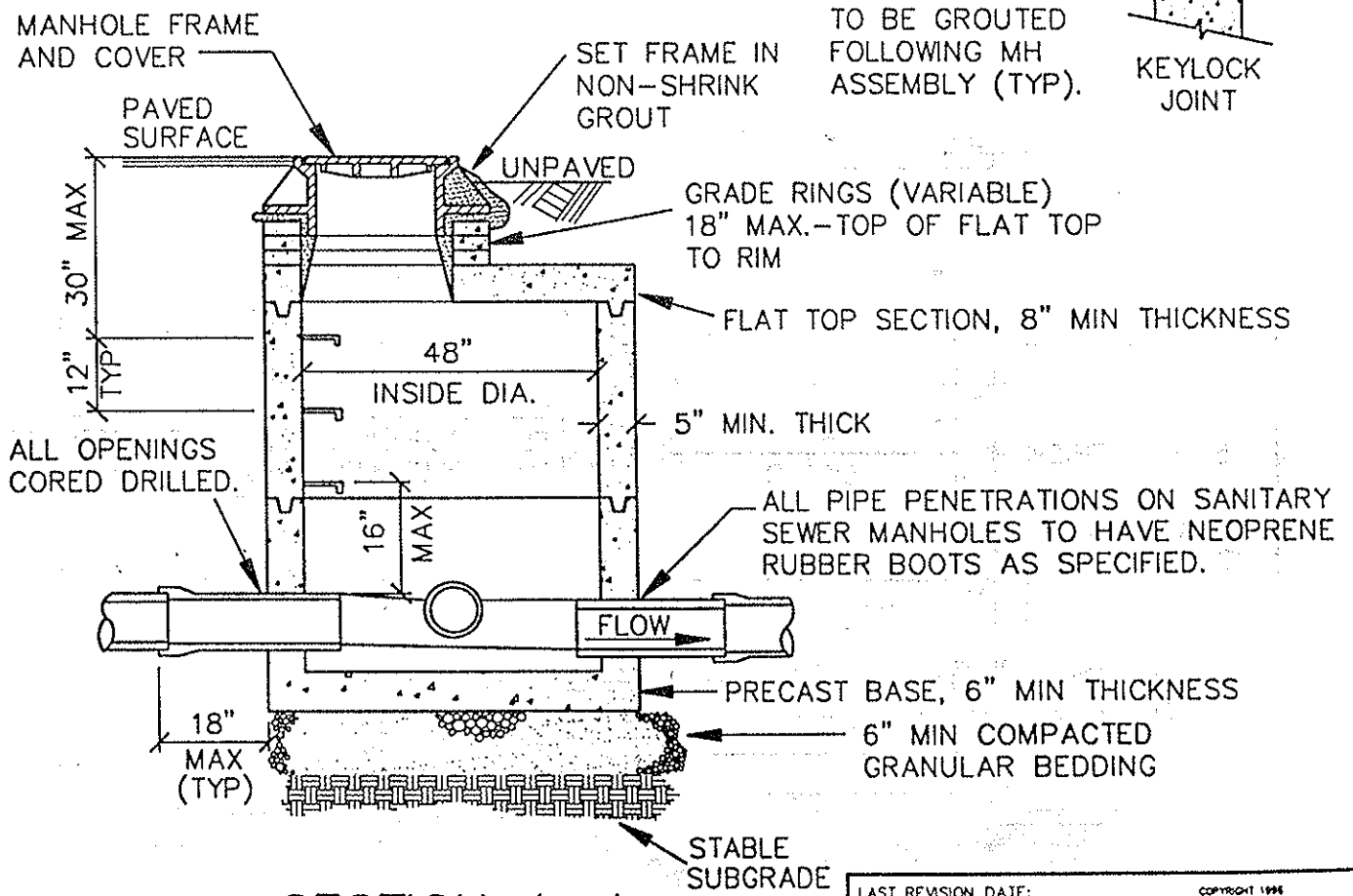
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STANDARD MANHOLE FOR 21" PIPE AND SMALLER

CITY: MT ANGEL, OR
DRAWING NO. 401



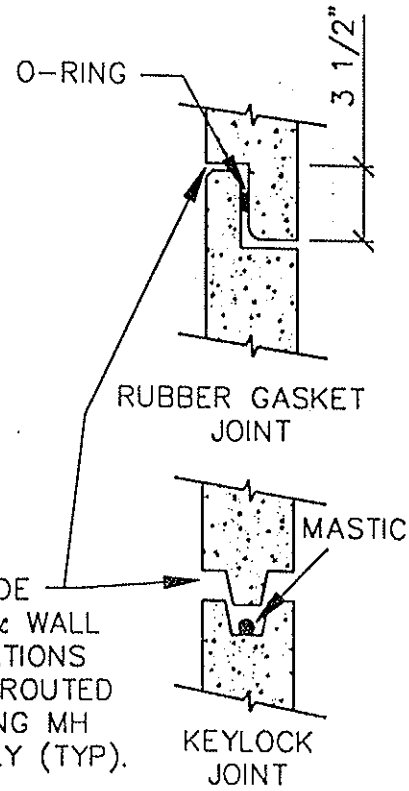
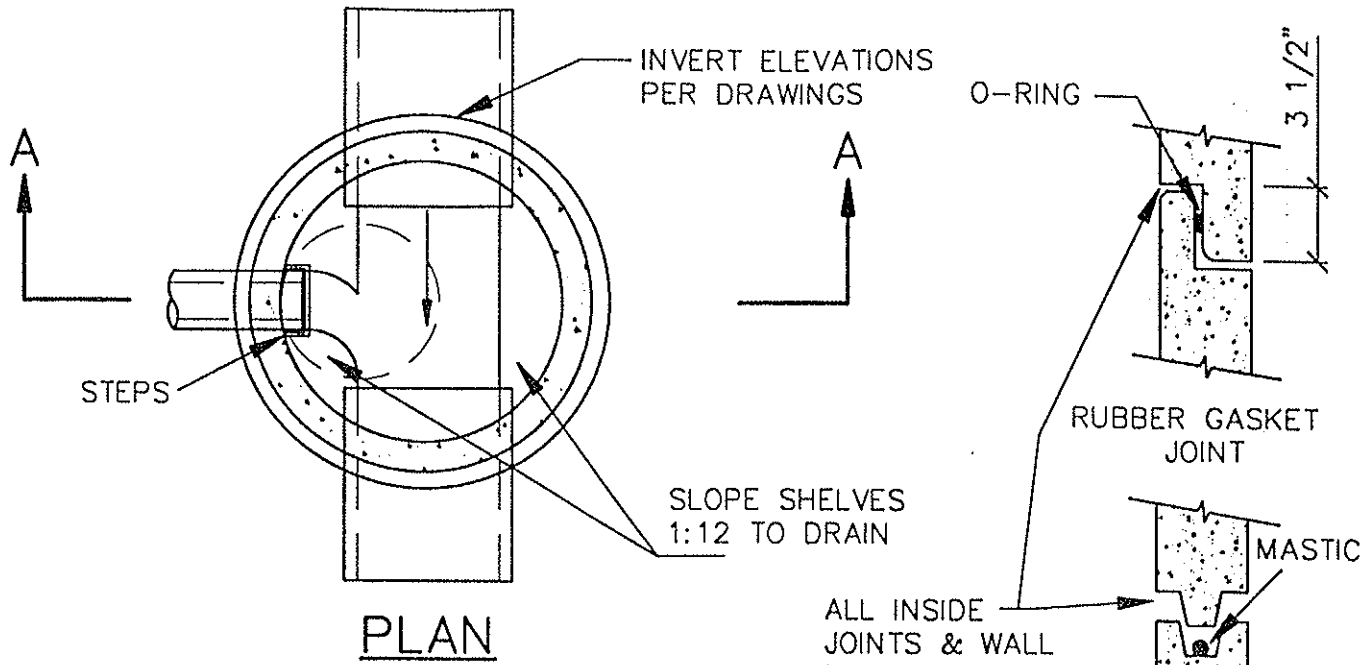
PLAN



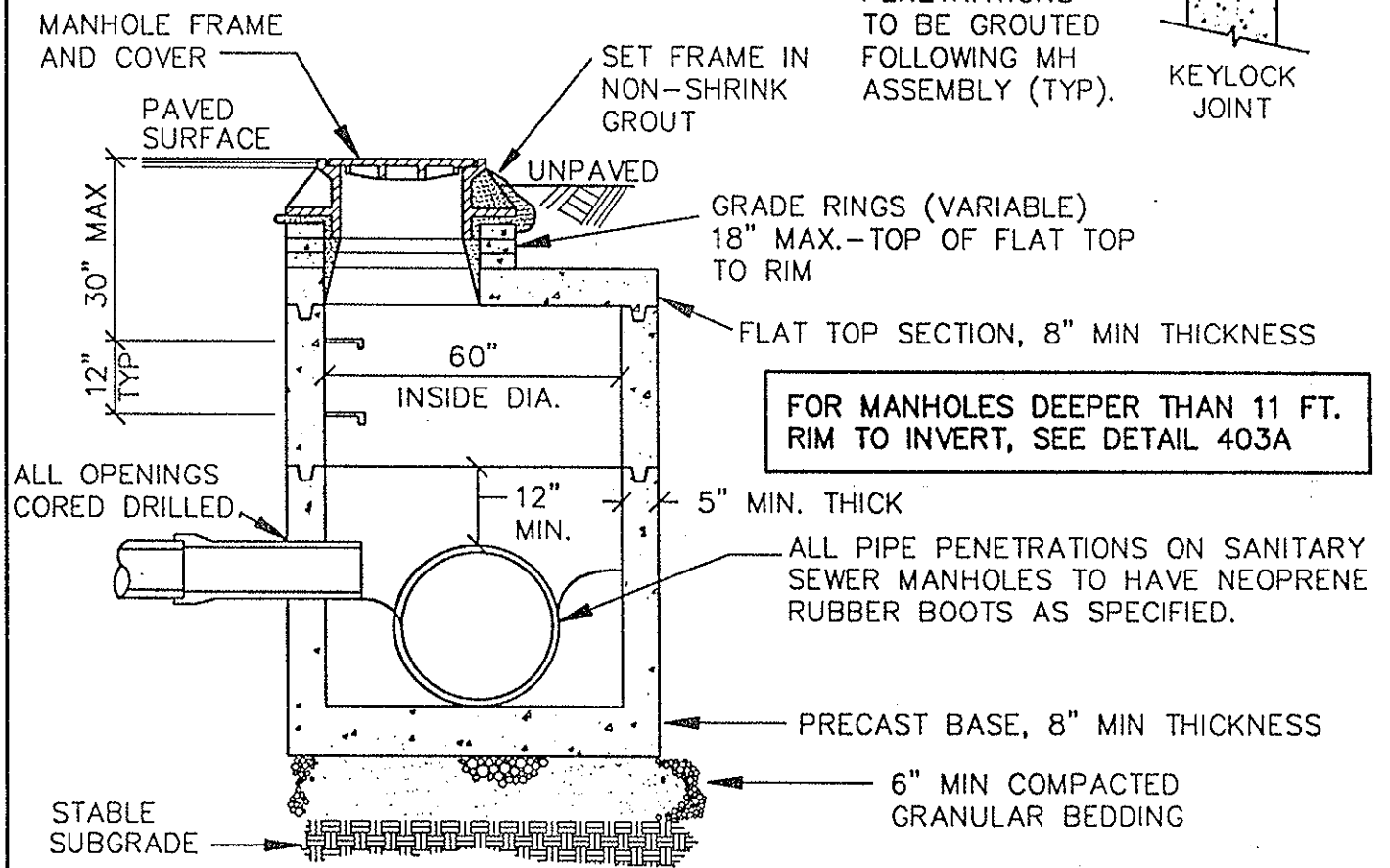
SECTION A-A

- NOTES:**
1. PRECAST SECTIONS SHALL MEET OR EXCEED ASTM C-478.
 2. WATERTIGHT O-RING OR MASTIC KEYLOCK JOINTS REQUIRED.
 3. STEPS TO BE FACTORY INSTALLED POLYPROPYLENE PLASTIC WITH GRADE 60 REINFORCING ROD.

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FLAT TOP MANHOLE FOR 21" PIPE AND SMALLER			
CITY: MT ANGEL, OR		DRAWING NO. 402	



ALL INSIDE JOINTS & WALL PENETRATIONS TO BE GROUTED FOLLOWING MH ASSEMBLY (TYP).



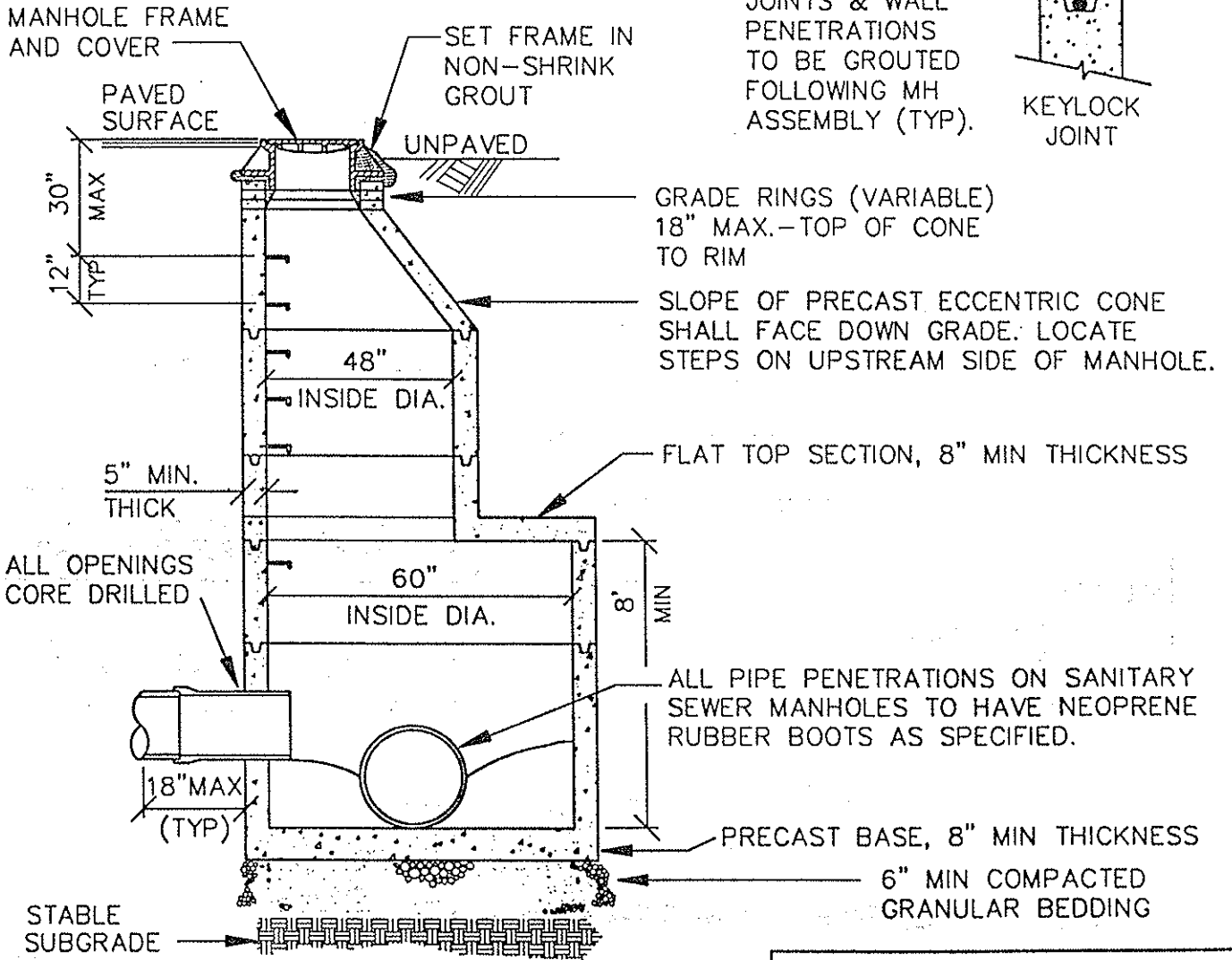
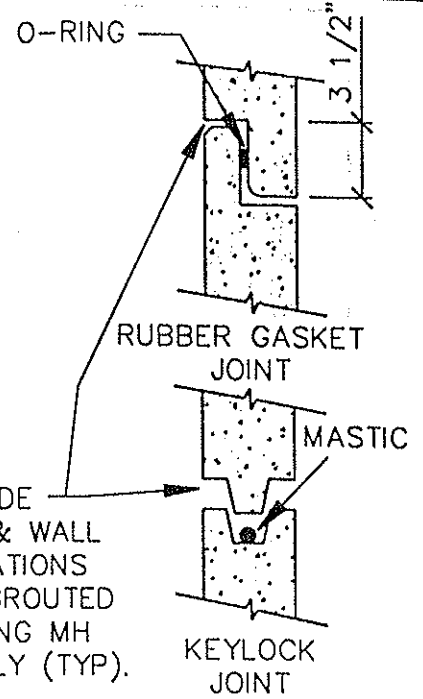
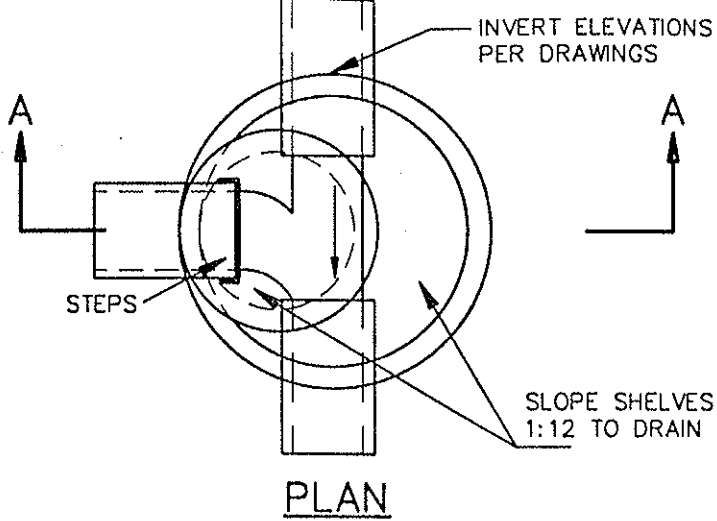
FOR MANHOLES DEEPER THAN 11 FT. RIM TO INVERT, SEE DETAIL 403A

SECTION A-A

NOTES:

1. PRECAST SECTIONS SHALL MEET OR EXCEED ASTM C-478.
2. WATERTIGHT O-RING OR MASTIC KEYLOCK JOINTS REQUIRED.
3. STEPS TO BE FACTORY INSTALLED POLYPROPYLENE PLASTIC WITH GRADE 60 REINFORCING ROD.

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MANHOLE FOR 24' AND 27' PIPE			
CITY: MT ANGEL, OR		DRAWING NO. 403	



SECTION A-A

NOTES:

1. PRECAST SECTIONS SHALL MEET OR EXCEED ASTM C-478.
2. WATERTIGHT O-RING OR MASTIC KEYLOCK JOINTS REQUIRED.
3. STEPS TO BE FACTORY INSTALLED POLYPROPYLENE PLASTIC WITH GRADE 60 REINFORCING ROD.

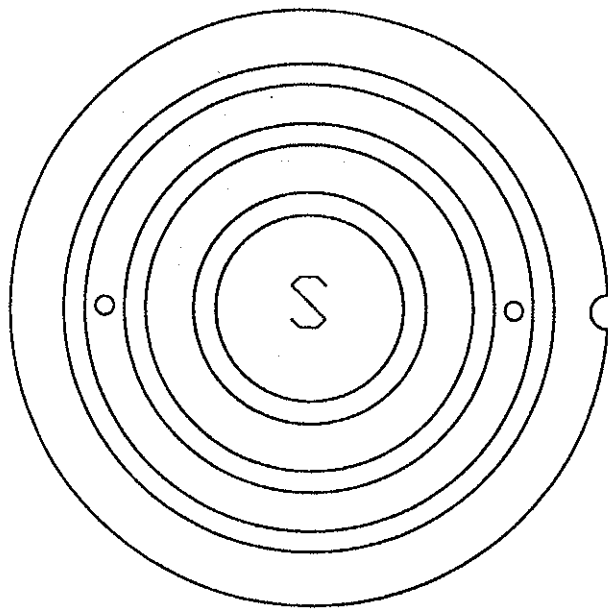
LAST REVISION DATE:
OCTOBER 1997

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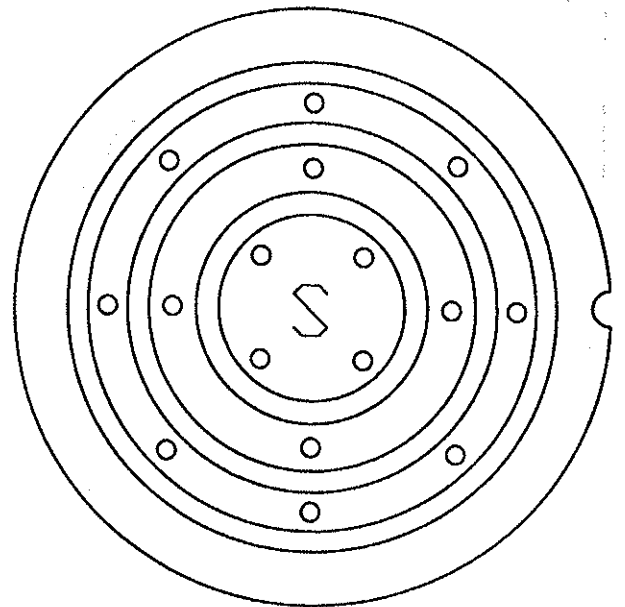
**DEEP MANHOLE
FOR 24' AND 27' PIPE**

CITY:
MT ANGEL, OR

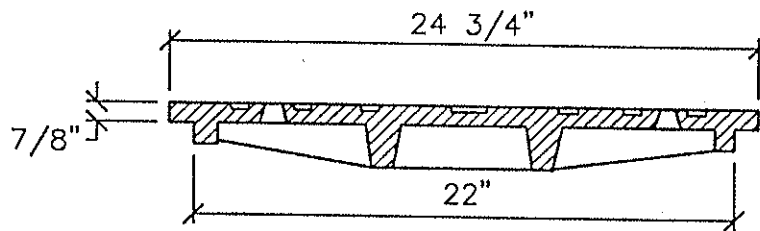
DRAWING NO.
403A



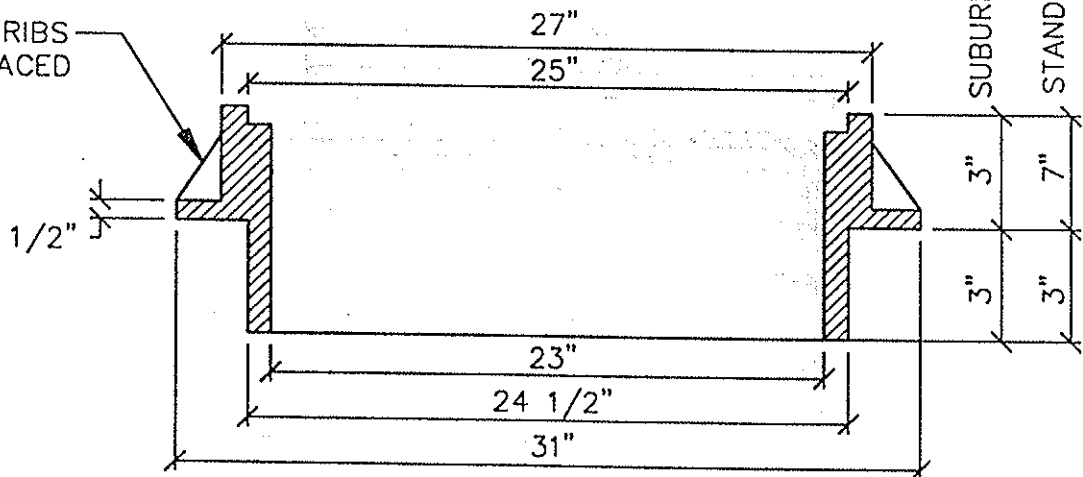
SANITARY



STORM



8 EA. -1/2" RIBS
EQUALLY SPACED



NOTES:

1. COVER AND FRAME SHALL BE GRAY CAST IRON
ASTM A-48, CLASS 30.
2. COVER AND FRAME TO BE MACHINED TO A TRUE
BEARING ALL AROUND.
3. NOTCH LID FOR LIFTING HOOK.

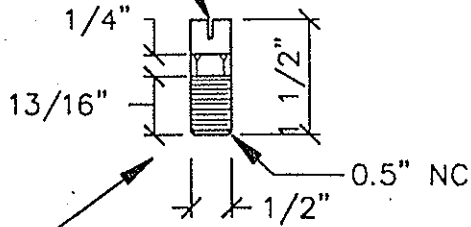
LAST REVISION DATE:
OCTOBER 1997

**MANHOLE FRAME AND COVER
(STANDARD AND SUBURBAN)**

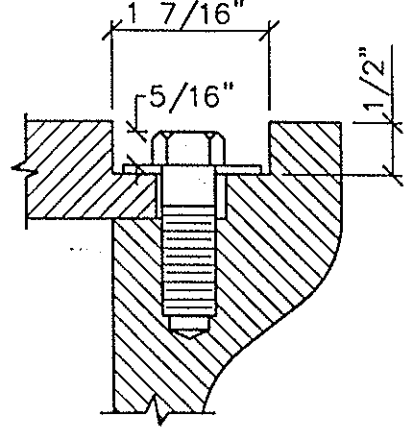
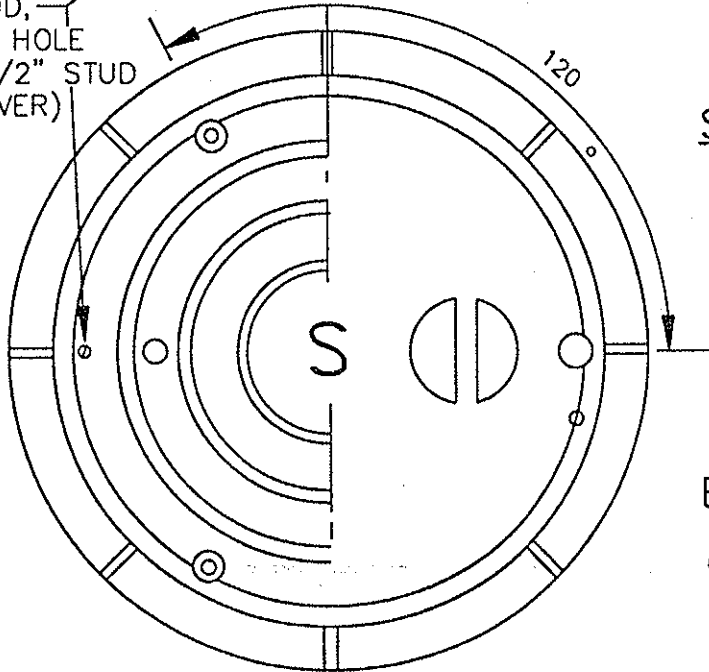
CITY:
MT. ANGEL, OR

DRAWING NO.
405

SLOT FOR SCREWDRIVER

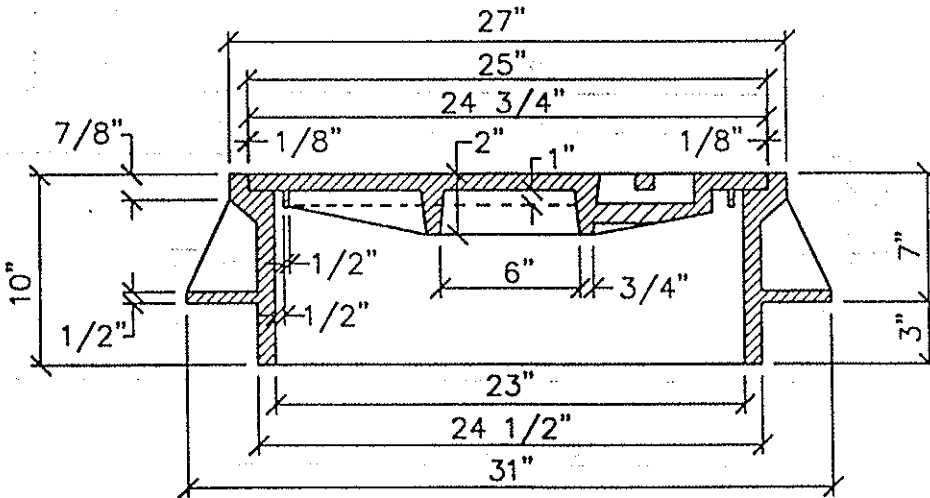
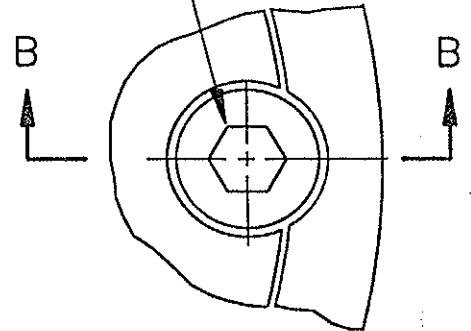


LOCATING STUD,
DRILL 25/64" HOLE
& TAP FOR 1/2" STUD
(ONE PER COVER)



SECTION B-B

1/2"-13NCx1"
STAINLESS STEEL
HEX HEAD
CAP SCREW



SECTION A-A

NOTES:

1. COVER AND FRAME TO BE MACHINED TO A TRUE BEARING ALL AROUND.
2. MATERIAL SHALL BE OF GRAY CAST IRON ASTM A-48, CLASS 30.

LAST REVISION DATE:

SEPTEMBER 1996

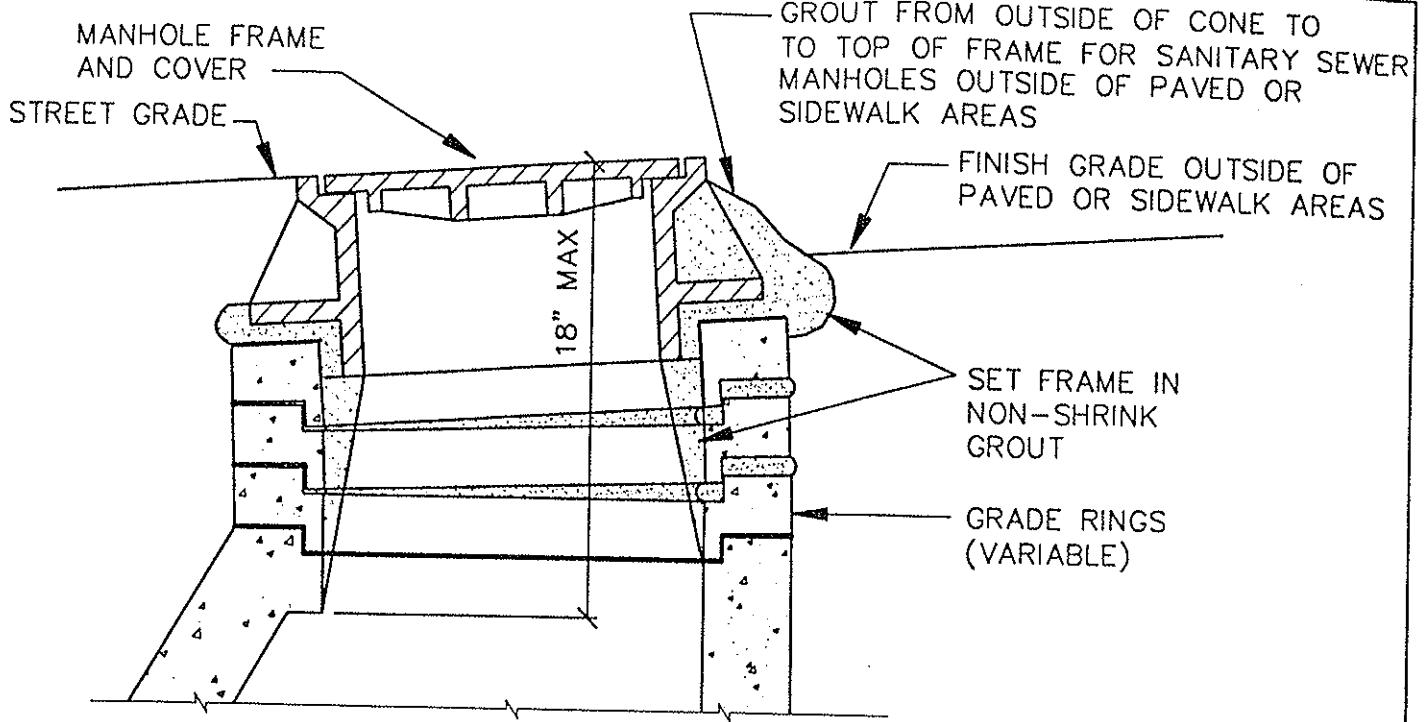
**LOCKDOWN
MANHOLE FRAME AND COVER**

CITY:

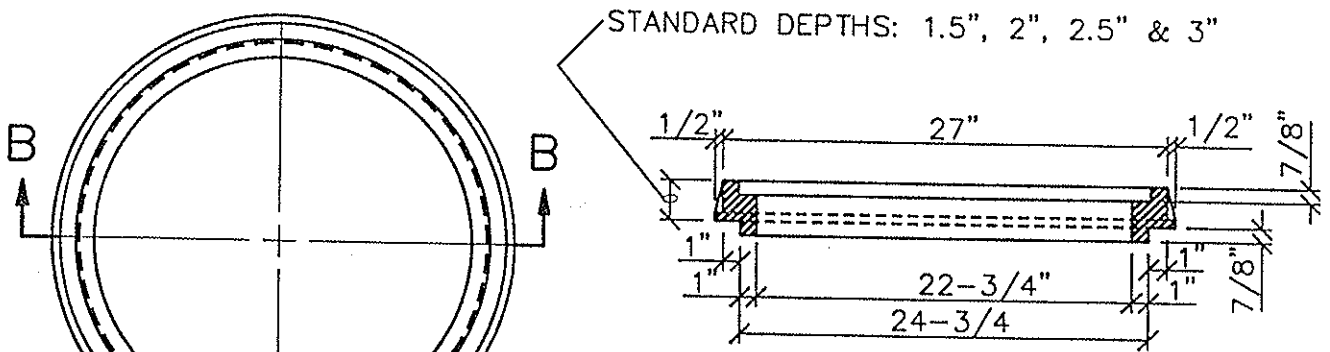
MT ANGEL, OR

DRAWING NO.

406



TYPICAL MANHOLE GRADE ADJUSTMENT



SECTION B-B

CAST IRON ADJUSTMENT RINGS

MANHOLE ADJUSTMENT RINGS
FOR RESURFACING ONLY

NOTES:

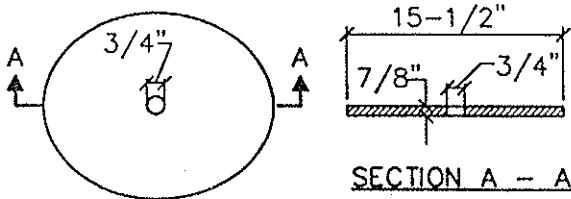
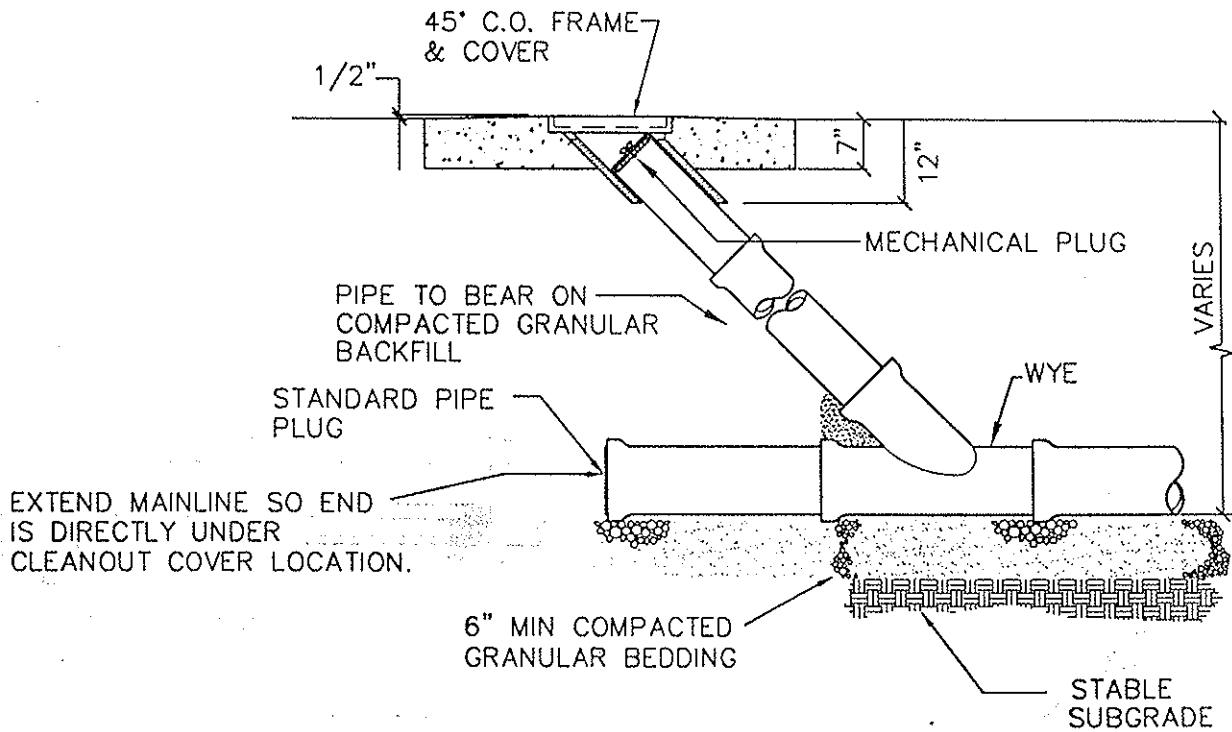
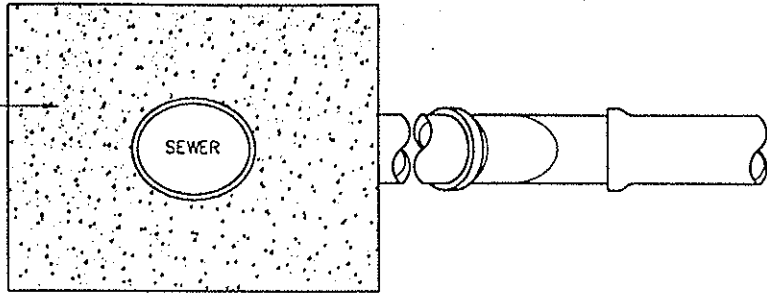
1. CAST IRON ADJUSTMENT RINGS ALLOWED ONLY WITH OVERLAYS AND NOT ON NEW MANHOLES. MAXIMUM 1 ADJUSTMENT RING PER MANHOLE.
2. SANITARY SEWER - 2 HOLE LIDS
STORM DRAINS - 16 HOLE LIDS

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**MANHOLE RIM
ADJUSTMENT DETAILS**

CITY: MT ANGEL, OR DRAWING NO 407

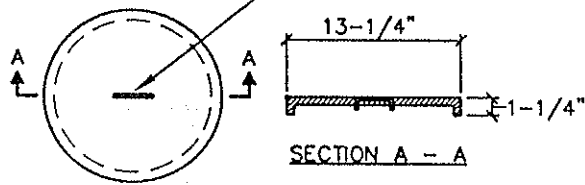
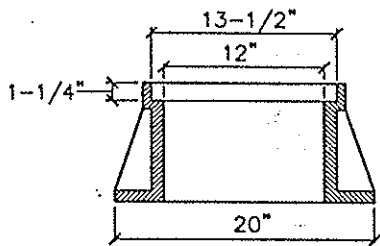
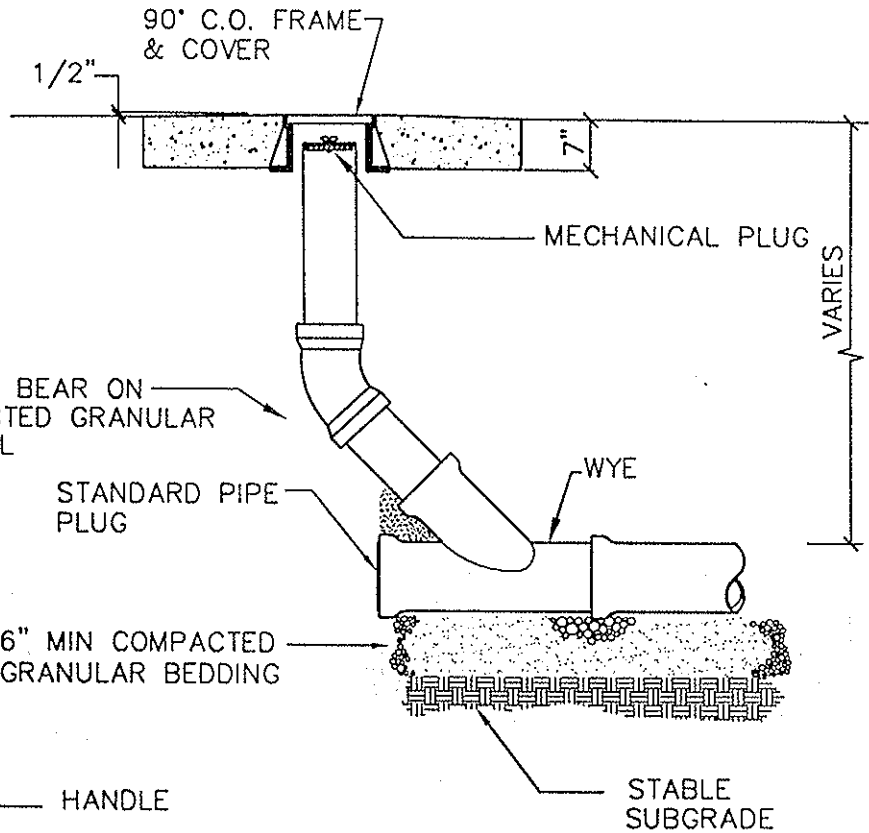
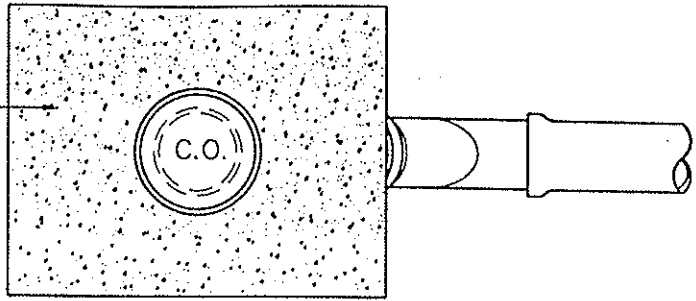
24" SQUARE CONCRETE PAD OR AC PAVEMENT OUTSIDE OF PAVED AREAS. SLOPE AWAY FROM CLEANOUT.



CLEANOUT LID

LAST REVISION DATE: NOVEMBER 1999		COPYRIGHT 1994 WESTECH ENGINEERING, INC.	
MAINLINE CLEANOUT			
DATE: MT ANGEL, OR		DRAWING NO. 410	

24" SQUARE CONCRETE PAD OR AC PAVEMENT OUTSIDE OF PAVED AREAS. SLOPE AWAY FROM CLEANOUT.



CLEANOUT FRAME & COVER

NOTES:

1. USE INLAND FOUNDRY MODEL 240 FRAME & COVER IN ALL AREAS.
2. COVER AND FRAME SHALL BE GRAY CAST IRON ASTM A-48, CLASS 30.
3. COVER AND FRAME TO BE MACHINED TO A TRUE BEARING ALL AROUND.

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MAINLINE CLEANOUT		
CITY: MT ANGEL, OR	DRAWING NO 410A	

NOTE: NO VERTICAL OR HORIZONTAL BENDS GREATER THAN 22-1/2° WITHIN RIGHT-OF-WAY OR PUBLIC UTILITY EASEMENT.

2" X 4" STAKE WIRED TO INVERT AND EXTENDING ABOVE FINISH GRADE. STAKE SHALL BE CONTINUOUS AND REMAIN VERTICAL AFTER BACKFILLING. END SHALL BE PAINTED WHITE (TYP. AT ALL SERVICES). EXTEND TONING WIRE TO SURFACE.

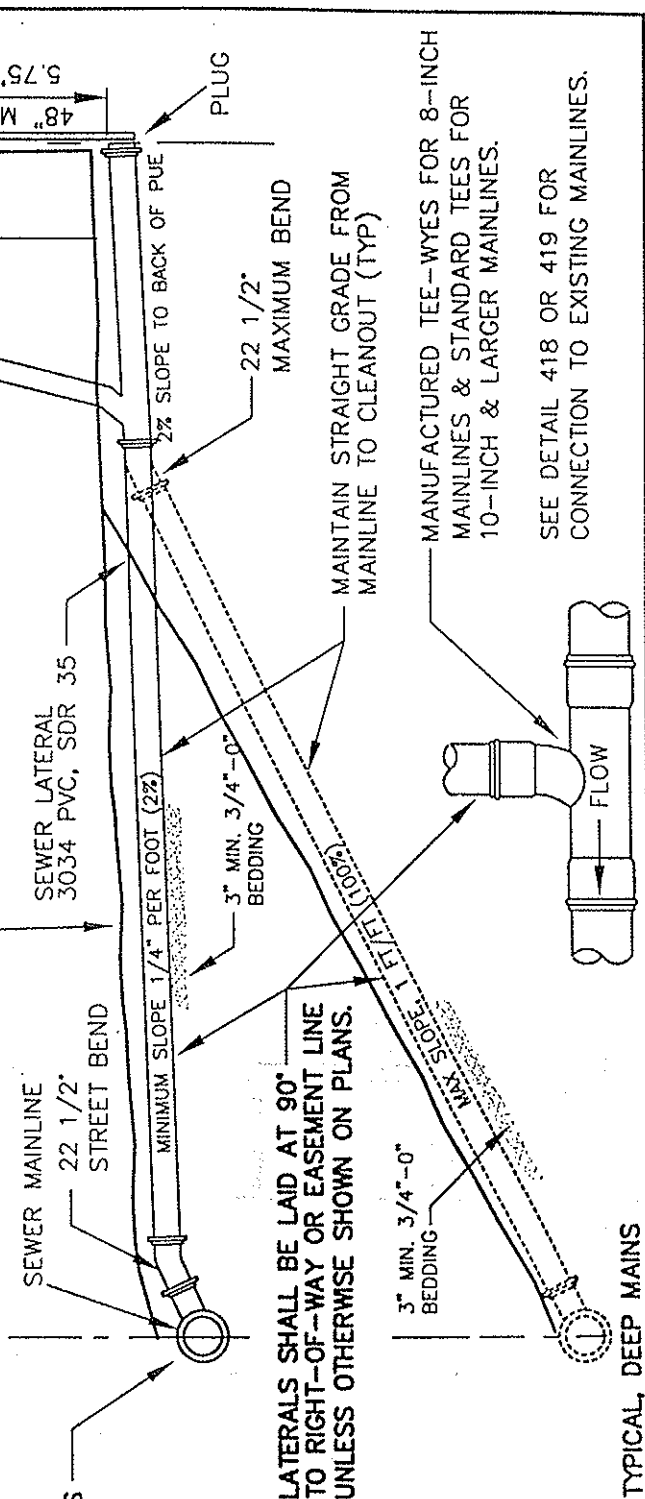
STAMP 2" TALL "S" IN TOP OF CURB & GUTTER PAN AT POINT OF CROSSING.

PROPERTY LINE
CLEANOUT
SEE DETAIL 416

NOTES:

1. MIN. 18" SEPARATION BETWEEN ADJACENT LATERALS.
2. ONE FULL LENGTH (18') OF C-900 PVC PIPE (DR 18) REQUIRED FOR ALL SERVICE LATERALS WHICH CROSS UNDER WATER LINES WITH LESS THAN 5.75 FEET MINIMUM COVER TO FINISH GRADE OR LESS THAN 18" MINIMUM VERTICAL CLEARANCE BETWEEN WATER LINE AND SERVICE LATERAL.
3. SERVICE SHALL NOT BE BACKFILLED PRIOR TO INSPECTION BY PUBLIC WORKS.
4. INSTALL A CONTINUOUS 12 GAUGE GREEN INSULATED TRACER WIRE FROM MAINLINE WIRE TO END OF LATERAL.

TYPICAL, SHALLOW MAINS



LATERALS SHALL BE LAID AT 90° TO RIGHT-OF-WAY OR EASEMENT LINE UNLESS OTHERWISE SHOWN ON PLANS.

MANUFACTURED TEE-WYES FOR 8-INCH MAINLINES & STANDARD TEES FOR 10-INCH & LARGER MAINLINES.
SEE DETAIL 418 OR 419 FOR CONNECTION TO EXISTING MAINLINES.

LAST REVISION DATE:
SEPTEMBER 1999

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WESTCOY ENGINEERING, PC

SEWER SERVICE LATERALS

CITY:
MT ANGEL, OR

DRAWING NO.
415

SEE NOTE 2

CLEANOUT COVERS: CLEANOUT LIDS TO READ "SEWER" OR "STORM" AS APPLICABLE.

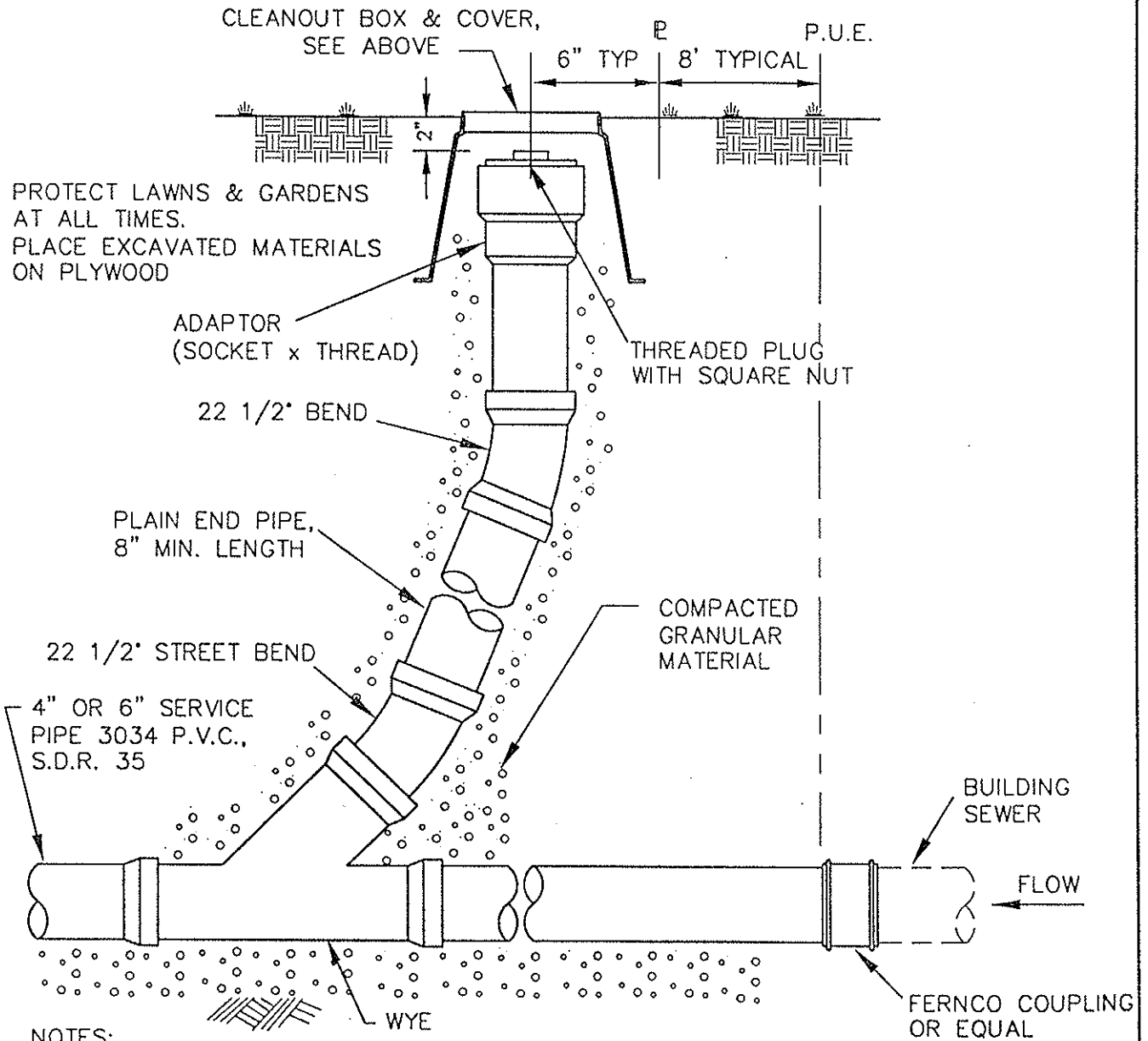
1. NON-TRAFFIC AREAS:

4" CO, DFW PLASTICS MODEL D-109 OR EQUAL (6-1/2" MIN. CLEAR OPENING).

6" CO, DFW PLASTICS MODEL D-1100 OR EQUAL (10" MIN. CLEAR OPENING).

2. TRAFFIC AREAS, INCLUDING DRIVEWAYS:

8" X 4" CAST IRON FRAME & COVER, OLYMPIC M1007 OR EQUAL.



NOTES:

1. CLEANOUT RISER SHALL BE SAME SIZE AND MATERIAL AS LATERAL PIPE.
2. PROVIDE CASTING FOR CLEANOUTS LOCATED IN DRIVEWAYS.
3. CLEANOUT PIPE SHALL BE LEFT A MINIMUM OF 18" ABOVE EXISTING GRADE UNTIL ALL CURBING IS INSTALLED AND ALL PRIVATE UTILITY TRENCHES ARE BACKFILLED. CLEANOUTS SHALL THEN BE SET FLUSH WITH FINISH GRADE.

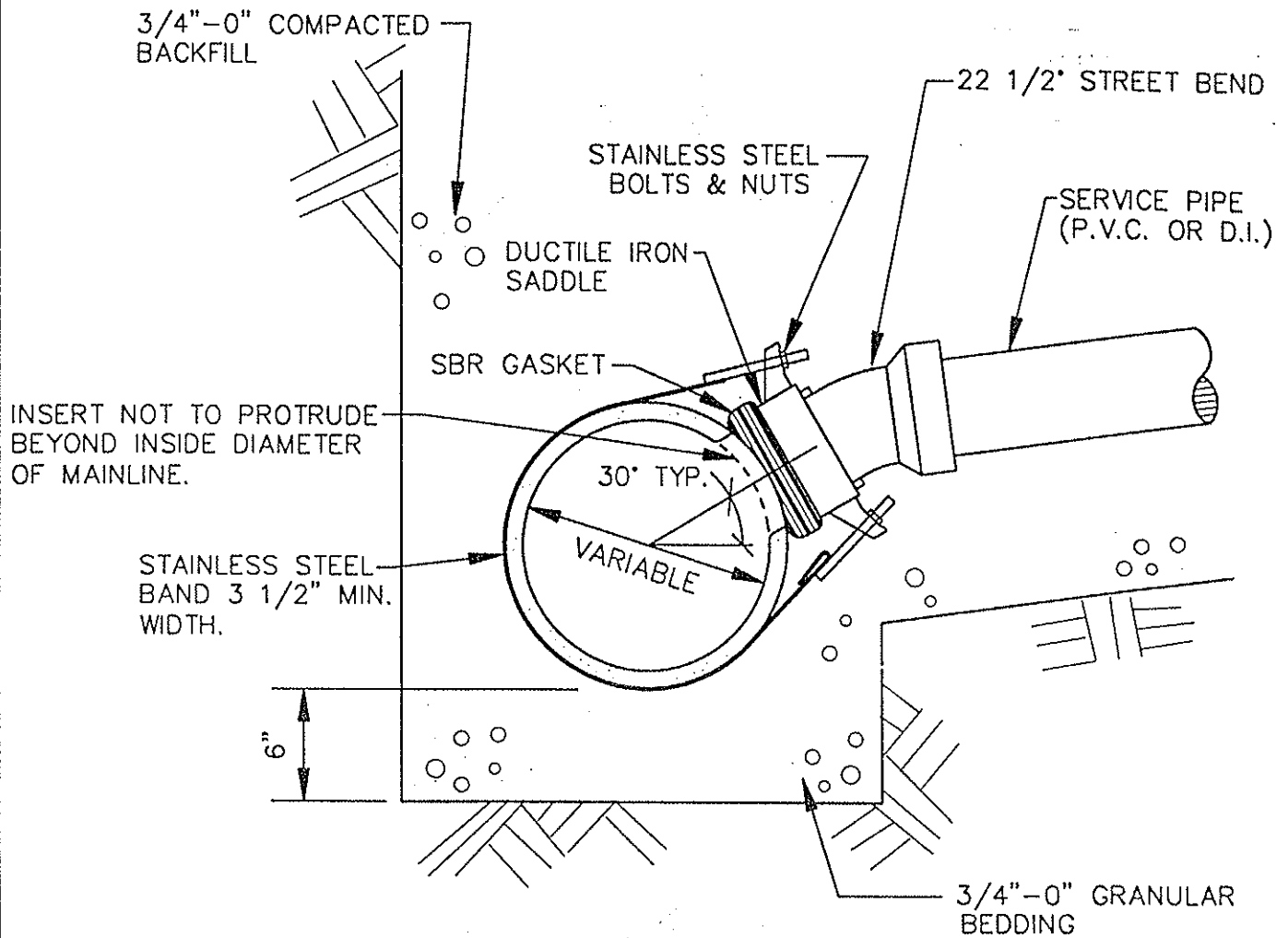
LAST REVISION DATE:
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STANDARD SERVICE
LATERAL CLEANOUT

CITY:
MT ANGEL, OR

DRAWING NO
416



NOTES:

1. SERVICE SADDLES ALLOWED ON EXISTING SEWER MAINS ONLY. MANUFACTURED TEE-WYE FITTINGS SHALL BE USED ON ALL NEW MAINLINES.
2. THE TAP SHALL NOT BE MADE EXCEPT IN THE PRESENCE OF A CITY INSPECTOR; NOR SHALL ANY CONNECTION BE MADE WITHOUT CITY APPROVAL.
3. SERVICE SADDLES SHALL BE ROMAC STYLE "CB" OR EQUAL W/ VIRGIN SBR GASKET PER ASTM D2000 MBA 710.
4. HOLE IN MAIN SHALL BE CORE DRILLED.
5. ϕ OF TAP SHALL BE ABOVE SPRINGLINE.

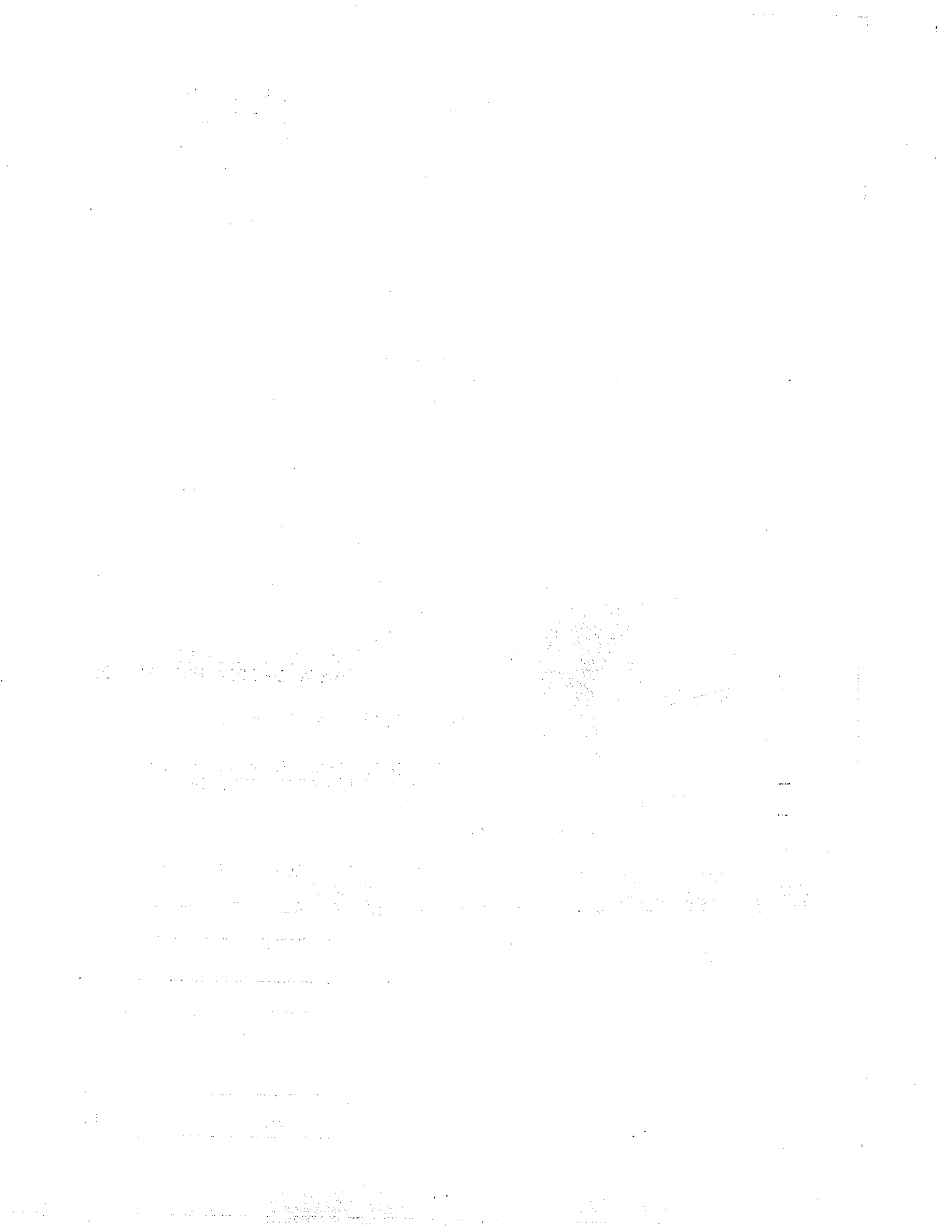
LAST REVISION DATE:
OCTOBER 1997

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SERVICE SADDLE CONNECTION
TO EXISTING SEWERS

CITY:
MT ANGEL, OR

DRAWING NO.
418



MANHOLE VACUUM TEST REPORT

Project Location: (City)			Project Name:				
Inspector: (Print)			Date: (Separate Report Required for Each Test Session)				
Testing Company: (Name & Phone #)							
Manhole No.	Manhole Diameter (inch)	Manhole Depth (ft)	Surface Restoration Complete?	Time Required ³ (sec)	Time to Drop from 10" Hg to 9" Hg (sec)	Results	Comments
			Yes / No			Pass / Fail	
			Yes / No			Pass / Fail	
			Yes / No			Pass / Fail	
			Yes / No			Pass / Fail	
			Yes / No			Pass / Fail	
			Yes / No			Pass / Fail	
			Yes / No			Pass / Fail	
			Yes / No			Pass / Fail	
			Yes / No			Pass / Fail	

1. All adjacent surface restoration shall be completed prior to conducting manhole acceptance tests, including finish paving and final adjustments to grade. Any test conducted prior to completion of surface restoration shall be considered informal, and will not count for acceptance.
2. The vacuum test head seal shall be inflated in accordance with the manufacturer's recommendations, but in all cases the grade rings and casting shall be included in the test. A vacuum of 10-inches of mercury shall be drawn and the vacuum pump shut off. With the valves closed, the time shall be measured for the vacuum to drop to 9-inches.
3. The manhole shall pass if the time for the vacuum reading to drop to 9-inches meets or exceeds the values indicated on the following table. Times for deeper depths as required by the City Engineer.

REQUIRED MANHOLE VACUUM TEST TIMES			
Manhole Depth (feet)	Required Time (sec)		
	48-inch diameter	60-inch diameter	72-inch diameter
8	20	26	33
10	25	33	41
12	30	39	49
14	35	46	57
18	40	52	65
20	45	59	73
22	50	65	81

SANITARY SEWER AIR TEST REPORT

Project Location:	Project Name:
Inspector: (Print)	Date: (Separate Report Required for Each Test Session)
TV Inspection Required? Yes / No	Mandrel Testing Completed? Date Completed or Scheduled:

Station (& Manhole #)		Main/ Lateral	Size & Material	Total Length (ft)	C ¹	K ¹	Test Time (Seconds) for Pressure Drop Shown (psi)			Comments
							From	To	Required ²	
		Main								Pass / Fail
		Laterals								
		Totals								
		Main								Pass / Fail
		Laterals								
		Totals								
		Main								Pass / Fail
		Laterals								
		Totals								
		Main								Pass / Fail
		Laterals								
		Totals								

¹ For C and K values, see table and formulas on reverse side.

² For total C ≤ 1.0, test time (seconds) required = 2 times K
 For total C > 1.0, test time (seconds) required = 2 times (K/C)

TEST PROCEDURE

1. Add air slowly to the portion of the pipe installation under test until the internal air pressure is raised to 4.0 psig. Increase the test pressure by 0.433 psi for each foot of average ground water depth over the invert of the pipe under test.
2. After an internal pressure of 4.0 psig is reached, allow at least 2 minutes for the air temperature to stabilize, adding only the amount of air required to maintain pressure.
3. After the 2 minute period, disconnect the air supply.
4. When the pressure decreases to 3.5 psi (or as required due to groundwater), start stopwatch. Determine the time in seconds required for the internal air pressure to reach 2.5 psig. If this time exceeds the required time, the test is successful.

ACCEPTANCE: The tested sewer section shall be considered acceptable when tested as described herein if the section under test does not lose air at a rate greater than 0.0015 cfm per square foot of internal sewer surface.

SEWER AIR TEST C AND K VALUES

Pipe Size (inch)	C-Value ¹ per foot length	K-Value ² per foot length
4	0.00155	0.176
6	0.00233	0.396
8	0.00311	0.704
10	0.00388	1.100
12	0.00466	1.584
15	0.00582	2.475
18	0.00699	3.564
21	0.00815	4.851

$$^1 C = 0.0003882dL$$

Where d = diameter (inches)

$$^2 K = 0.011d^2L$$

L = Length (ft)

Example:

Air Test a system consisting of two mainline segments as follows:

Segment 1: 395 feet of 8-inch mainline, 100 feet of 4-inch laterals, and 35 feet of 6 inch laterals.

Segment 2: 200 feet of 8-inch mainline, 30 feet of 4-inch laterals, and 20 feet of 6 inch laterals.

Station (& Manhole #)		Main/ Lateral	Size & Material	Total Length (ft)	C ¹	K ¹	Test Time (Seconds) for Pressure Drop Shown (psi)			Comments	
							From	To	Required ²		4.0 - 3.5
0+00 MH A1	3+95 MH A2	Main	8" PVC	395	1.2285	278.1	310/1.46= 212			Pass / Fail	
		Laterals	4" PVC 6" PVC	100 35	0.155 0.01855	17.6 13.86		212*2= 414 sec			
		Totals			1.465	309.54					
3+95 MH A2	5+95 MH A3	Main	8" PVC	200	0.622	140.8	2*154= 308 sec			Pass / Fail	
		Laterals	4" PVC 6" PVC	20 30	0.0465 0.0466	5.28 7.92					
		Totals			0.715	154.0					

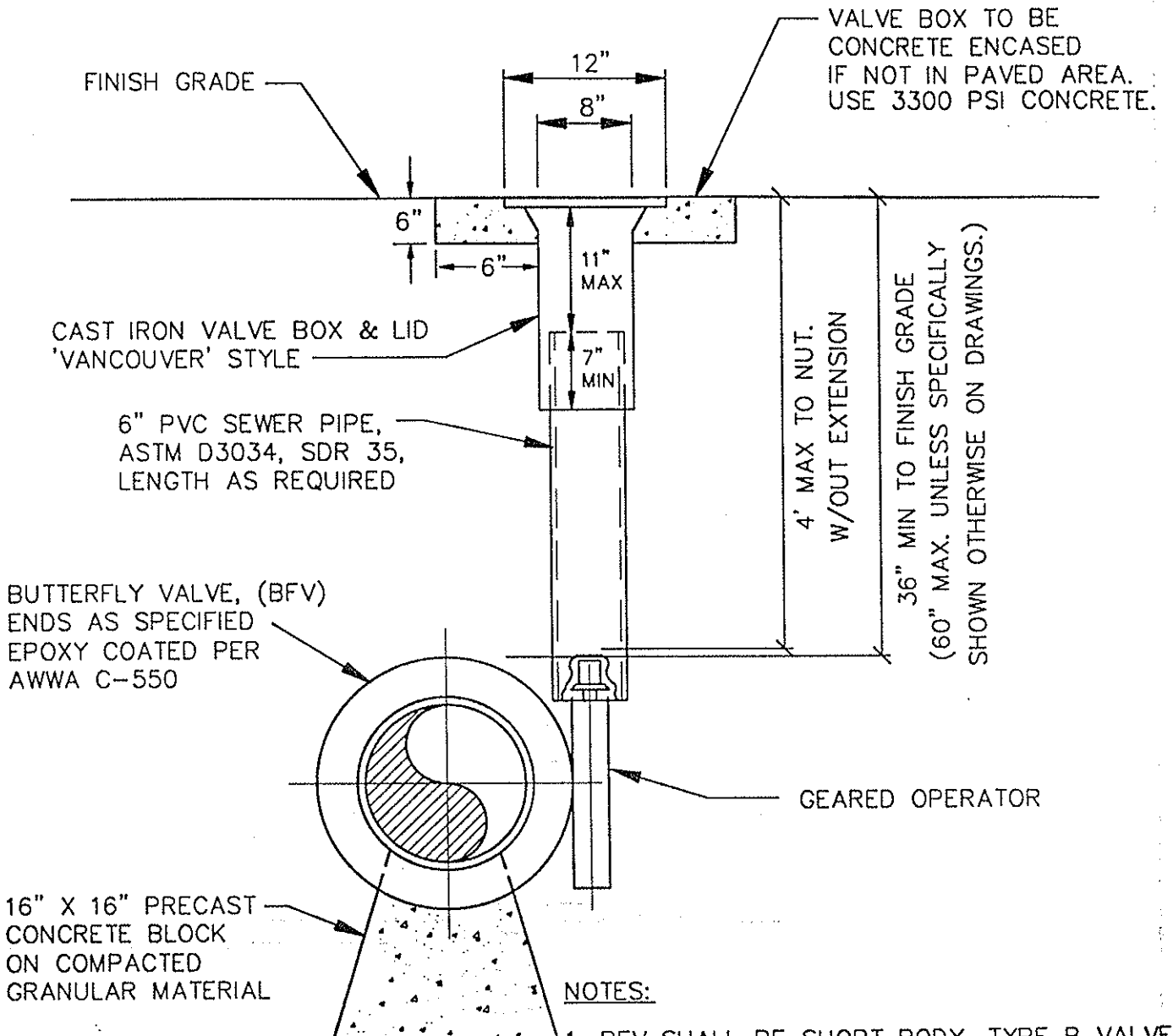
Note: For total C ≤ 1.0, test time (seconds) required = 2 times K
 For total C > 1.0, test time (seconds) required = 2 times (K/C)

SANITARY SEWER MANDREL TEST REPORT

Project Location: (City)	Project Name:
Inspector: (Print)	Date: (Separate Report Required for Each Test Session)
Mandrel Diameters Verified? Yes / No	

Station (& Manhole #)		Size & Material	Length (ft)	Results	Backfill Compaction Completed?	Date Sewer Flushed & Cleaned	Comments
From	To						
				Pass / Fail	Yes / No		
				Pass / Fail	Yes / No		
				Pass / Fail	Yes / No		
				Pass / Fail	Yes / No		
				Pass / Fail	Yes / No		
				Pass / Fail	Yes / No		
				Pass / Fail	Yes / No		
				Pass / Fail	Yes / No		
				Pass / Fail	Yes / No		
				Pass / Fail	Yes / No		
				Pass / Fail	Yes / No		
				Pass / Fail	Yes / No		
				Pass / Fail	Yes / No		
				Pass / Fail	Yes / No		
				Pass / Fail	Yes / No		

1. Mandrel testing shall be conducted on a manhole to manhole (or cleanout) basis and shall be done after the line has been completely flushed out with water.
2. Mandrel testing shall be conducted after trench backfill and compaction has been completed.
3. The mandrel diameter shall be 95% of the pipe initial inside diameter. The inspector shall verify the diameter of each mandrel used during each test session.



FINISH GRADE

CAST IRON VALVE BOX & LID
'VANCOUVER' STYLE

6" PVC SEWER PIPE,
ASTM D3034, SDR 35,
LENGTH AS REQUIRED

VALVE BOX TO BE
CONCRETE ENCASED
IF NOT IN PAVED AREA.
USE 3300 PSI CONCRETE.

BUTTERFLY VALVE, (BFV)
ENDS AS SPECIFIED
EPOXY COATED PER
AWWA C-550

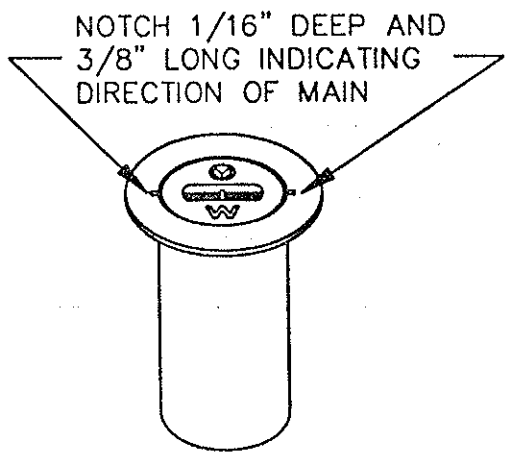
16" X 16" PRECAST
CONCRETE BLOCK
ON COMPACTED
GRANULAR MATERIAL

12"
8"
6"
6"
11" MAX
7" MIN
4' MAX TO NUT.
W/OUT EXTENSION
36" MIN TO FINISH GRADE
(60" MAX. UNLESS SPECIFICALLY
SHOWN OTHERWISE ON DRAWINGS.)

GEARED OPERATOR

NOTES:

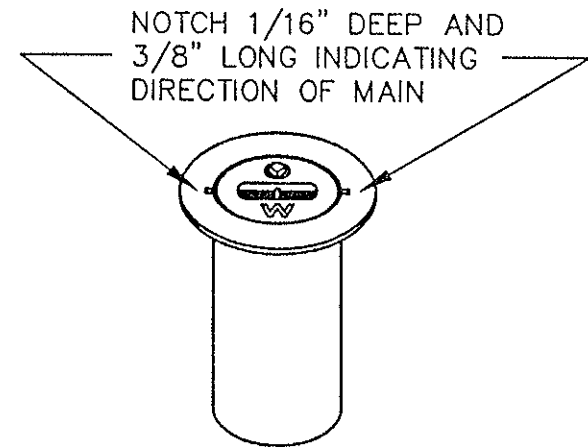
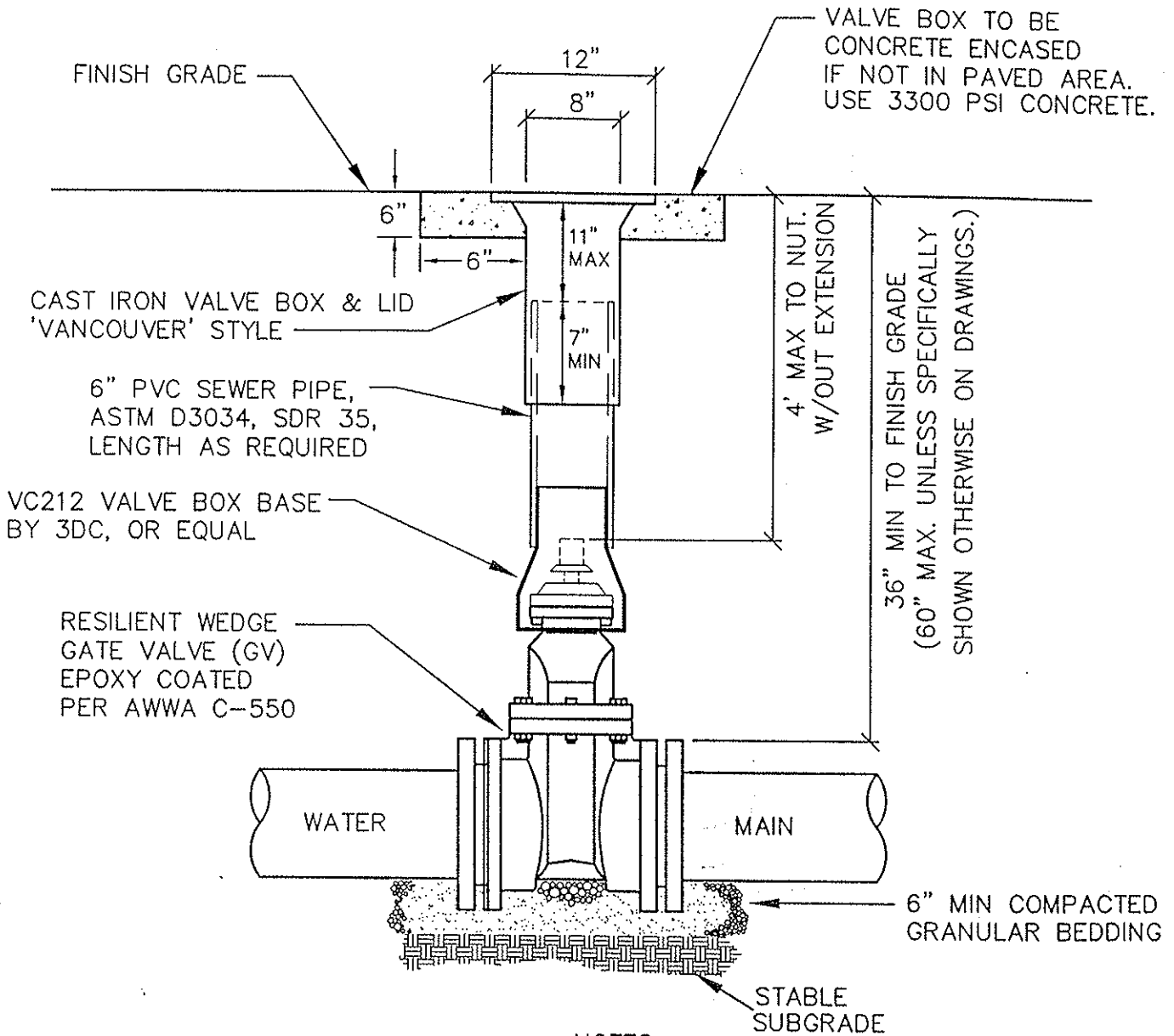
1. BFV SHALL BE SHORT BODY, TYPE B VALVE PER AWWA C-504.
2. VALVE BOXES SHALL BE PLUMB AND CENTERED DIRECTLY OVER THE VALVE NUT.
3. VALVE BOX TOP SHALL BE ADJUSTED TO MEET FINISHED GRADE.
4. PVC SHALL BE ONE CONTINUOUS PIECE, NO BELLS OR COUPLERS.



NOTCH 1/16" DEEP AND
3/8" LONG INDICATING
DIRECTION OF MAIN

'VANCOUVER'
18" TALL VALVE BOX

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BUTTERFLY VALVE AND VALVE BOX DETAILS			
CITY: MT ANGEL, OR		DRAWING NO. 502	

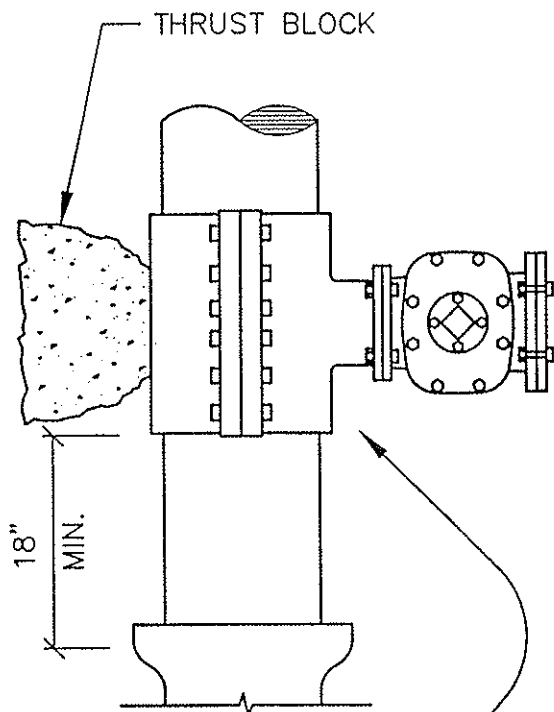


'VANCOUVER'
18" TALL VALVE BOX

NOTES:

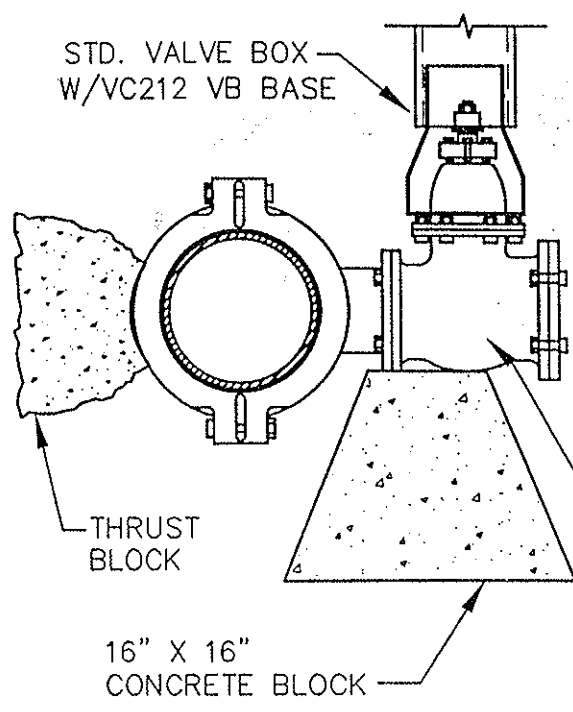
1. GV SHALL CONFORM TO AWWA C-509.
2. VALVE BOXES SHALL BE PLUMB AND CENTERED DIRECTLY OVER THE VALVE NUT.
3. VALVE BOX TOP SHALL BE ADJUSTED TO MEET FINISHED GRADE.
4. PVC SHALL BE ONE CONTINUOUS PIECE, NO BELLS OR COUPLERS.

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GATE VALVE AND VALVE BOX DETAIL (NTS)	
MT ANGEL, OR	DETAIL NO. 501



MUELLER MODEL H304,
JCM MODEL 432 OR APPROVED EQUAL

TOP VIEW



STD. VALVE BOX
W/VC212 VB BASE

THRUST
BLOCK

16" X 16"
CONCRETE BLOCK

RESILIENT WEDGE GATE VALVE

SIDE VIEW

NOTES:

1. WATER MAIN SHALL BE CLEANED BEFORE ATTACHING SLEEVE.
2. TAPPING SLEEVE SHALL BE ALL STAINLESS STEEL WITH FULL PERIMETER GASKET.
2. TAPPING VALVE SHALL BE EPOXY COATED PER AWWA C-550.
3. SLEEVE AND VALVE SHALL BE PRESSURE TESTED BEFORE MAKING TAP. PRESSURE TEST AND TAP SHALL BE MADE IN THE PRESENCE OF AN AUTHORIZED CITY REPRESENTATIVE.
4. APPROVED TAPPING MACHINE SHALL BE USED TO MAKE TAP.
5. 3/4" GRANULAR BACKFILL SHALL BE PLACED AND COMPACTED TO 95% OF MAXIMUM DENSITY AS DETERMINED BY AASHTO T-180.
6. THRUST BLOCKING REQUIREMENTS SHALL BE DETERMINED BY THE ENGINEER.
7. TAP SHALL BE MADE NO CLOSER THAN 18" FROM THE NEAREST JOINT.
8. **SLEEVE AND VALVE SHALL BE WRAPPED WITH 8 MIL PLASTIC PRIOR TO CONCRETE PLACEMENT.**
9. CONCRETE BLOCK(S) SHALL COMPLETELY SUPPORT TAPPING TEE AND VALVE.
10. CONTRACTOR SHALL COORDINATE ALL TAPS WITH CITY AND PERFORM ALL TAPS WITH PUBLIC WORKS STAFF PRESENT.

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TAPPING TEE AND VALVE (NTS)	
MT ANGEL, OR	DETAIL NO. 505

STANDARD VALVE BOX
(TWO REQUIRED)
'VANCOUVER' STYLE

BRASS PLUG

FINISHED
GRADE

P.C.C. ENCASEMENT IF
NOT IN PAVED AREA

6"
TYP

6"

BRASS NIPPLE

BRASS
COUPLING

1' - 3'

GRANULAR
BACKFILL

6" & 8"
WATER MAIN

THRUST
BLOCK

STABLE
SUBGRADE

SCHEDULE 80 PVC
PIPE AND ELBOW

BLOWOFF SIZED C.I. BODY VALVE
WITH 2" OPERATING NUT
(2" MIN. SIZE)

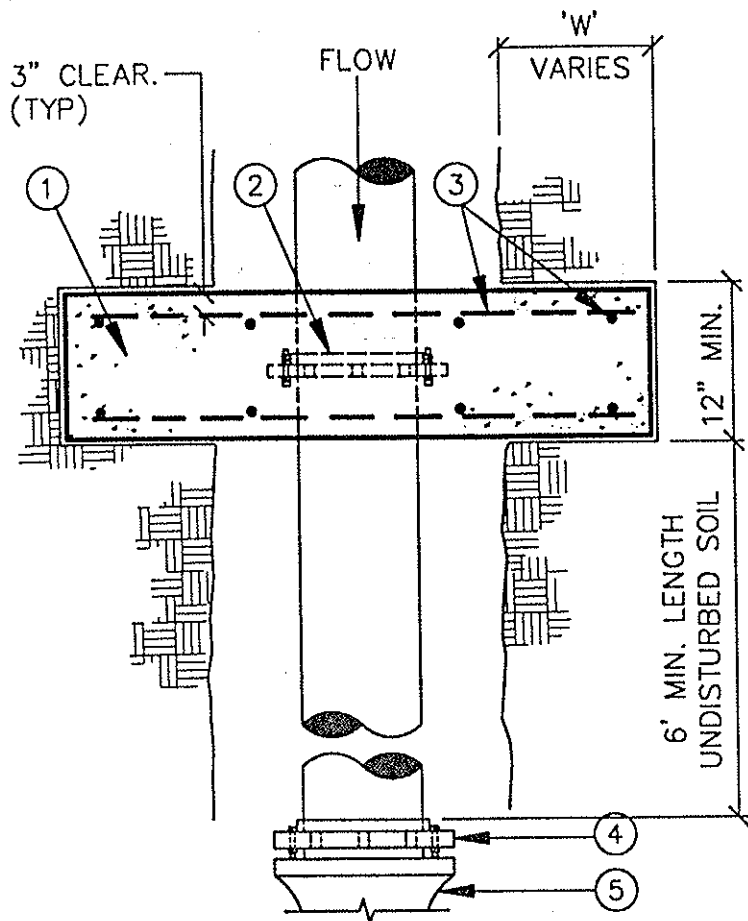
STD. STRADDLE
BLOCK PER
DWG. 511

MJ CAP & RETAINER GLAND
(TAPPED TO BLOWOFF SIZE)

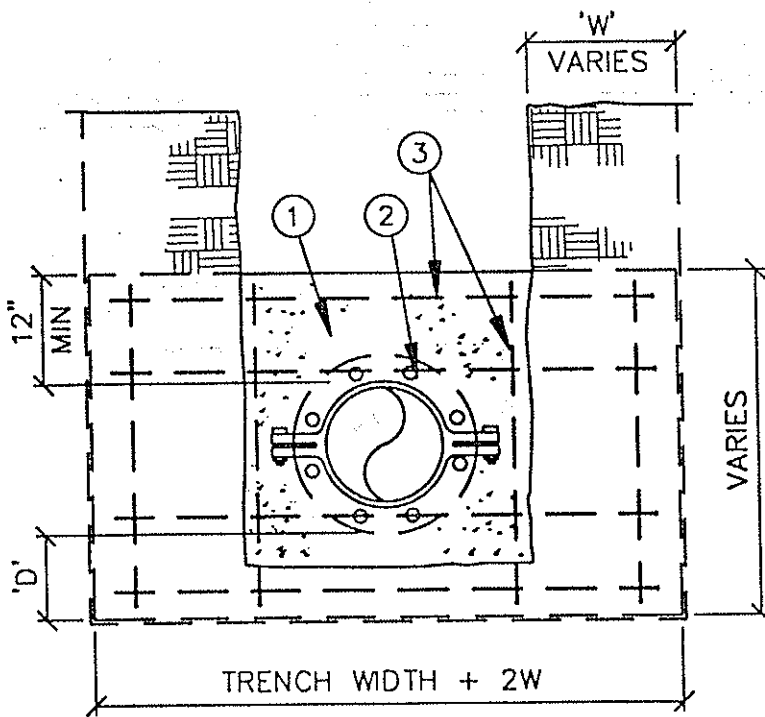
NOTES:

1. BACKFILL WITH GRANULAR BACKFILL.
2. ALLOWED ONLY ON PERMANENT DEAD END LINES IN CUL-DE-SACS WHICH CANNOT BE EXTENDED IN THE FUTURE.
3. ALL CONCRETE TO BE 3300 PSI @ 28 DAYS.
4. 2" BLOWOFF SIZE ASSUMES 40 PSI RESIDUAL PRESSURE.

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STANDARD BLOWOFF WITH PLUGGED END (NTS)	
MT ANGEL, OR	DETAIL NO. 507



TOP VIEW



FRONT VIEW

MATERIALS

- ① CONCRETE STRADDLE BLOCK.
- ② UNI-FLANGE, SERIES 900, CL.125
- ③ #4 REBAR EA. WAY, 12" O.C.
- ④ RETAINER GLAND.
- ⑤ MJ FITTING, VALVE OR BLOWOFF.

PIPE SIZE	'W'	'D'
6"	12"	8"
8"	16"	10"
10"	20"	12"
>10"	BY ENGINEER	

NOTES:

- 1. STRADDLE BLOCKS FOR >10" PIPE SHALL BE DESIGNED INDIVIDUALLY BY THE ENGINEER AND SHALL BE BASED ON THE FOLLOWING:
 - a.) 200 PSI WATER PRESSURE.
 - b.) SOIL BRG. CAPACITY, STEEL SIZE & SPACING BY THE ENGINEER.
- 2. BEARING AREA OF BLOCK SHALL BE AGAINST UNDISTURBED SOIL.
- 3. STRADDLE BLOCK SHALL HAVE A MINIMUM OF 18" COVER.
- 4. CONCRETE SHALL HAVE A MIN. 28 DAY STRENGTH OF 3300 PSI.

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OCTOBER 1997

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**STRADDLE BLOCK FOR
10" AND SMALLER PIPE**

CITY:
MT ANGEL, OR

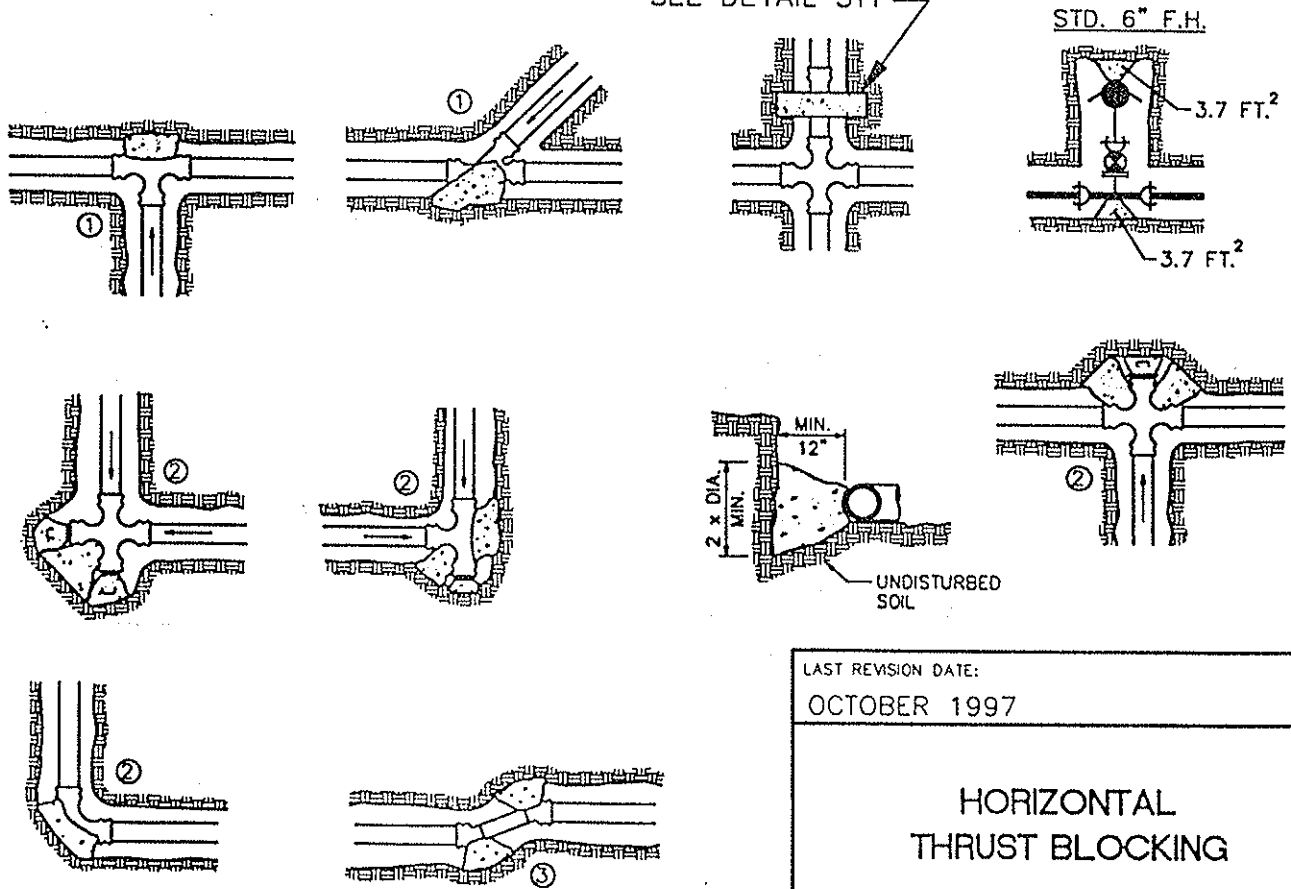
DRAWING NO.
511

FITTING SIZE (Inches)	TEE, WYE, & ① HYDRANTS	90° BEND ② PLUGGED CROSS TEE PLUGGED-RUNS	45° BEND ③	22 1/2° BEND ③	11 1/4° BEND ③
2	*	*	*	*	*
4	1.7	2.4	1.3	*	*
6	3.7	5.3	2.9	1.5	*
8	6.7	9.5	5.1	2.7	1.3
10	10.5	14.8	8	4.1	2
12	15.1	21.3	11.6	5.9	2.9
16	26.8	37.9	20.5	10.4	5.2
18	33.9	47.9	25.9	12.8	6.7
LARGER	**	**	**	**	**
BEARING AREA OF THRUST BLOCKS (sq. ft.)					

1. ALL VALUES ARE BASED ON THE FOLLOWING ASSUMPTIONS:
AVG. PRESSURE = 100 PSI x 2 (safety factor); 1500 PSF SOIL BEARING CAPACITY; NORMAL DISTRIBUTION DESIGN VELOCITY NOT TO EXCEED 5 FPS.
2. **ALL FITTINGS SHALL BE WRAPPED IN PLASTIC PRIOR TO PLACEMENT OF CONCRETE.**
3. BEARING SURFACE OF THRUST BLOCKING SHALL BE AGAINST UNDISTURBED SOIL.
4. ALL CONCRETE MIX SHALL HAVE A MIN. 28 DAY STRENGTH OF 3300 PSI.
5. ALL PIPE ZONES SHALL BE BACKFILLED WITH GRANULAR BACKFILL AND COMPACTED.
6. THRUST BLOCKS FOR PLUGGED CROSS AND PLUGGED TEE SHALL HAVE #4 REBAR LIFTING LOOPS INSTALLED AS SHOWN.
7. VERTICAL THRUST DETAILS--SEE DWG. 512.
8. STRADDLE BLOCK DETAILS--SEE DWG. 511.

- * BLOCK TO UNDISTURBED TRENCH WALLS
- ** THRUST BLOCKS FOR PIPES LARGER THAN 18" WILL BE INDIVIDUALLY DESIGNED BY THE ENGINEER.

SEE DETAIL 511

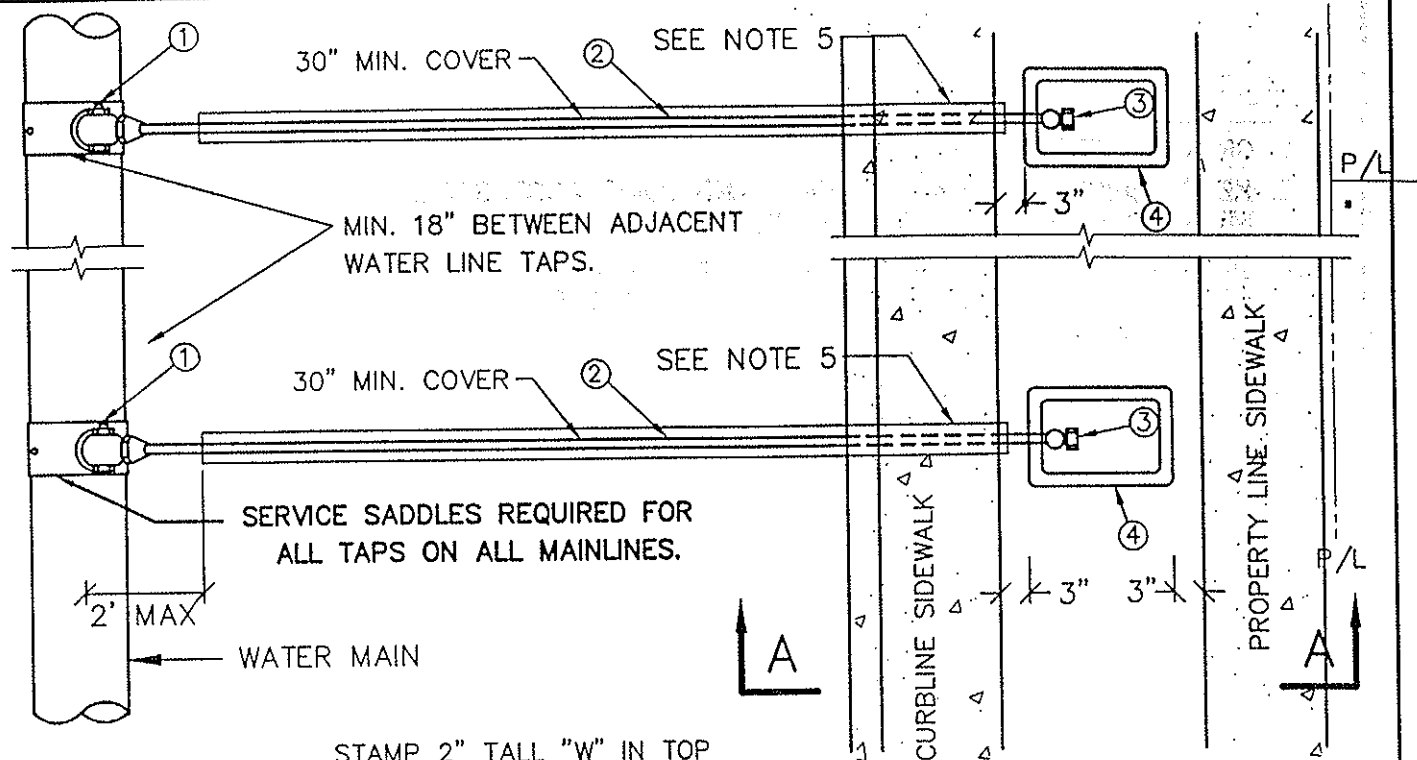


LAST REVISION DATE:
OCTOBER 1997

HORIZONTAL THRUST BLOCKING

CITY:
MT. ANGEL, OR

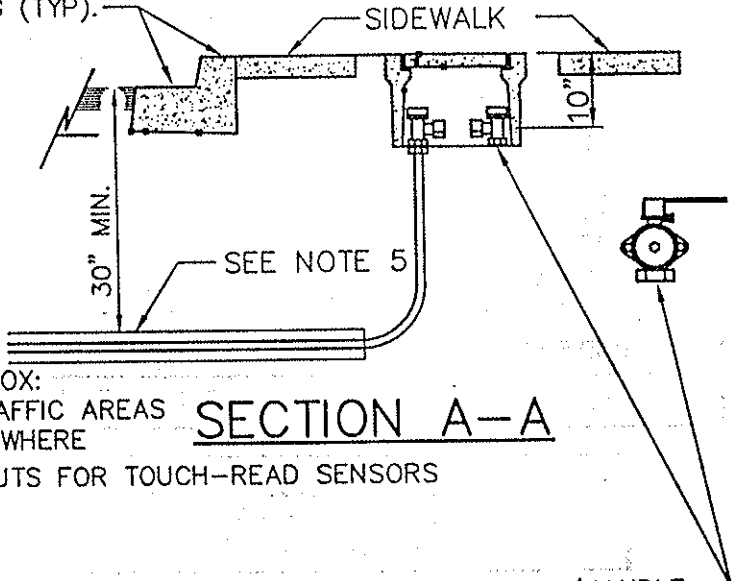
DRAWING NO.
510



STAMP 2" TALL "W" IN TOP OF CURB AND GUTTER PAN AT POINT OF CROSSING (TYP).

MATERIALS:

- ① BALL STYLE CORPORATION STOP FORD FB-1100. SET AT 30° ANGLE UP FROM HORIZONTAL.
- ② SOFT TEMPER TYPE 'K' COPPER TUBING COMPLYING W/ASTM B-88. SINGLE RESIDENTIAL SERVICE: 1" (TYP)
- ③ BALL STYLE LOCKING ANGLE METER STOP, FORD BA43-232W.
- ④ ARMORCAST POLYMER CONCRETE METER BOX:
 A6001946PCX12 W/A6001866 LID IN TRAFFIC AREAS
 A6001946PCX12 W/A6001866R LID ELSEWHERE
 PROVIDE ALL METER BOXES WITH KNOCKOUTS FOR TOUCH-READ SENSORS



NOTES:

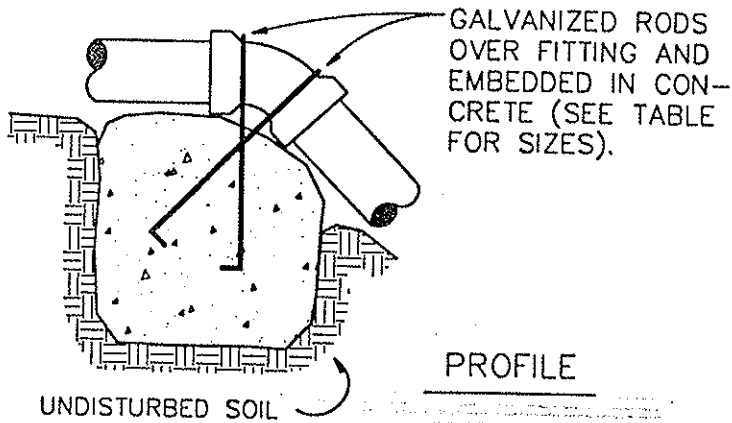
ANGLE BALL VALVE W/HANDLE. INSTALL PRIOR TO INSTALLATION OF WATER METER

- 1. SUBSTITUTES FOR ANY MATERIALS SHOWN SHALL BE APPROVED BY THE CITY ENGINEER.
- 2. ALL PIPE AND BACKFILL ZONES SHALL BE BACKFILLED USING 3/4" MINUS GRANULAR MATERIAL AND COMPACTED TO 92% MAX. DENSITY DETERMINED BY AASHTO T-180.
- 3. SET FRONT OF METER BOX 3-INCHES BEHIND BACK OF SIDEWALK LOCATION FOR CURBLINE WALKS.
- 4. METER BOX SHALL BE CENTERED OVER THE COMPLETED METER ASSEMBLY.
- 5. MIN. SIZE COMMERCIAL SERVICES SHALL BE 1-1/2-INCH. FOR NEW STREETS OR STREETS BEING CUT FOR SERVICE INSTALLATION, FAR SIDE COMMERCIAL SERVICES SHALL BE INSTALLED IN A 3" MIN. SCHED 40 PVC SLEEVE

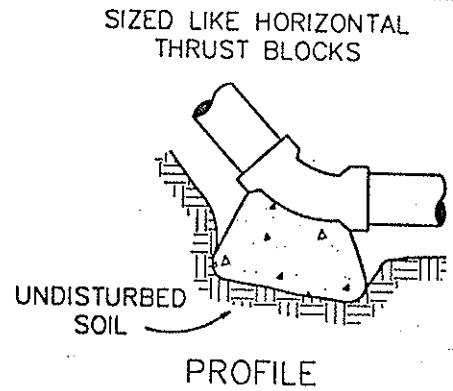
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1" WATER SERVICE (NTS)	
MT ANGEL, OR	DETAIL NO. 515

NOTES:

1. GRAVITY VERTICAL THRUST BLOCKS SHALL BE DESIGNED BY THE ENGINEER.
2. **KEEP CONCRETE CLEAR OF JOINT AND JOINT ACCESSORIES. FITTINGS SHALL BE WRAPPED IN PLASTIC PRIOR TO PLACEMENT OF CONCRETE.**
3. CONCRETE THRUST BLOCKING SHALL BE POURED AGAINST UNDISTURBED EARTH.
4. CONCRETE MIX SHALL HAVE A MIN. 28 DAY STRENGTH OF 3000 P.S.I.
5. THRUST BLOCK VOLUMES FOR VERTICAL BENDS HAVING UPWARD RESULTANT THRUSTS ARE BASED ON TEST PRESSURE OF 150 P.S.I.G. AND THE WEIGHT OF CONCRETE = 4050 LBS./CU.YD.
6. VERTICAL BENDS THAT REQUIRE A THRUST BLOCK VOLUME EXCEEDING 5 CUBIC YARDS REQUIRE SPECIAL BLOCKING DETAILS. SEE PLANS FOR VOLUMES SHOWN INSIDE HEAVY LINE IN TABLE.
7. ALL REBAR SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM-123 (MIN. 3.4 MIL). REBAR SHALL BE BENT BEFORE GALVANIZATION, AND LAST 4" OF BAR SHALL BE BENT 90 DEGREES WITH A 1/2" RADIUS BEND. REBAR SHALL BE TIGHTLY FIT TO RESTRAINED FITTING.
8. FOR HORIZONTAL THRUST BLOCK DETAILS SEE DRAWING NO. 510.



GRAVITY VERTICAL THRUST BLOCK



NORMAL VERTICAL THRUST BLOCK

VOLUME OF THRUST BLOCK IN CUBIC YARDS (VERTICAL BENDS)			
FITTING SIZE	BEND ANGLE		
	45°	22 1/2°	11 1/4°
4	1.1	0.4	0.2
6	2.7	1.0	0.4
8	4.0	1.5	0.6
10	6.0	2.3	0.9
12	8.5	3.2	1.3
14	11.5	4.3	1.8
16	14.8	5.6	2.3

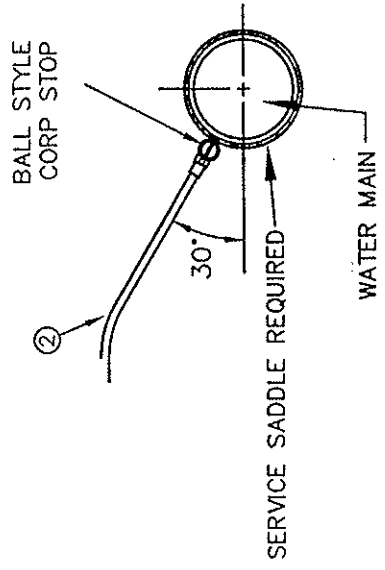
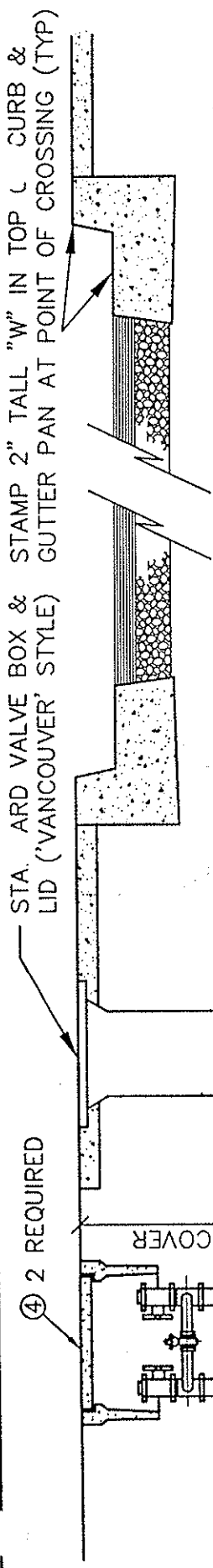
FITTING SIZE	ROD SIZE	EMBEDMENT
12" AND LESS	#6	30"
14" - 16"	#8	36"

LAST REVISION DATE:
OCTOBER 1997

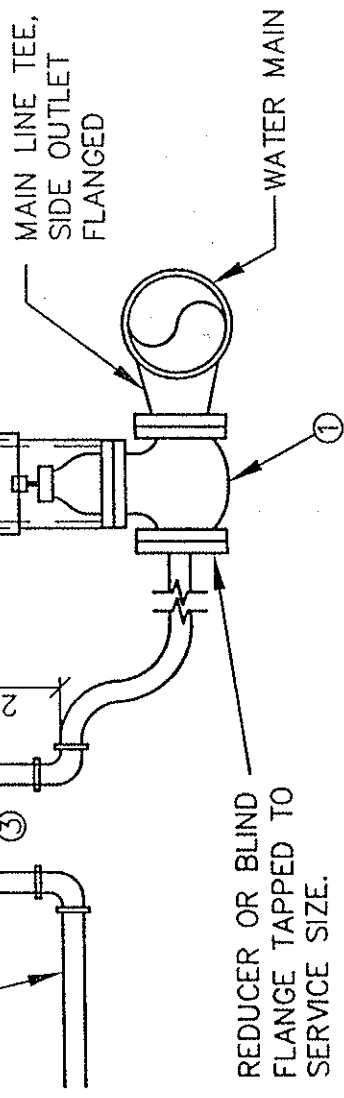
VERTICAL THRUST BLOCKING

CITY:
MT. ANGEL, OR

DRAWING NO.
512



1-1/2" SERVICE



2" & LARGER SERVICE

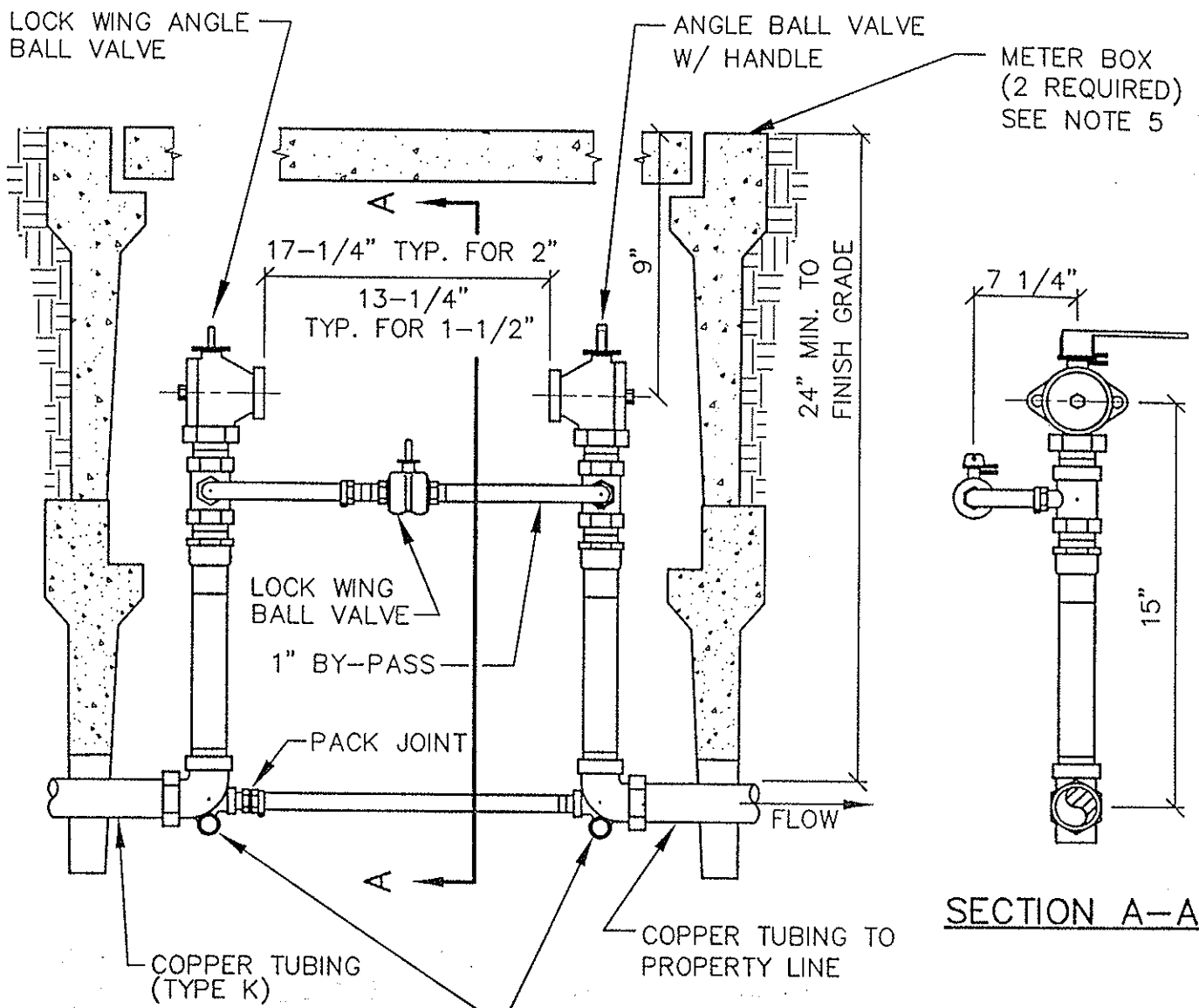
MATERIALS

- ① FLG X FLG RESILIENT WEDGE GATE VALVE PER AWWA C-509. 4" DIA. OR SERVICE SIZE, WHICHEVER IS LARGER. EPOXY COATED PER AWWA C-550.
- ② ASTM B-88, TYPE 'K' COPPER TUBING WITH COMPRESSION FITTINGS.
- ③ METER STOP ASSEMBLY W/BYPASS PER PUBLIC WORKS REQUIREMENTS. SEE DETAIL 516 FOR 1-1/2" & 2" SERVICES.
- ④ CONCRETE METER BOX FOR 1-1/2" AND 2" SERVICES SHALL BE:
A6001946PCX12 W/A6001643 LID, TRAFFIC AREA,
A6001946PCX12 W/A6001643R ELSEWHERE.
METER VAULT FOR LARGER SERVICE PER PUBLIC WORKS REQUIREMENTS. PROVIDE WITH TOUCH-READ SENSOR KNOCKOUT

NOTES

- 1. SUBSTITUTES FOR ANY MATERIAL SHOWN SHALL BE APPROVED BY THE CITY ENGINEER.
- 2. ALL PIPE AND STRUCTURE ZONES SHALL BE BACKFILLED USING 3/4" MINUS GRANULAR MATERIAL AND COMPACTED TO 95% MAX DENSITY AS DETERMINED BY ASHTO T-180.
- 3. METER BOX SHALL BE CENTERED OVER THE COMPLETED METER AND FITTING ASSEMBLY.
- 4. CUSTOMER SHALL INSTALL AN APPROVED BACKFLOW PREVENTION DEVICE ON PRIVATE PROPERTY IMMEDIATELY DOWNSTREAM OF WATER METER.

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TAPPING REQUIREMENTS, 1-1/2" AND LARGER SERVICE (NTS)	
MT ANGEL, OR	DETAIL NO. 517



NOTES:

PLACE 12" LONG 1" DIA. PVC PIPE THROUGH RINGS TO STABILIZE BASE OF COPPERSETTER.

1. METERS SET TO BE FORD COPPERSETTER #B-95082 WITH RAISED LOCKING BYPASS OR APPROVED EQUAL.
2. SUBSTITUTES FOR ANY MATERIALS SHOWN SHALL BE APPROVED BY THE CITY ENGINEER.
3. ALL PIPE AND BACKFILL ZONES SHALL BE BACKFILLED USING 3/4" MINUS GRANULAR MATERIAL AND COMPACTED TO 92% OPTIMUM DENSITY PER AASHTO T-180.
4. SET FRONT OF METER BOX 3-INCHES BEHIND SIDEWALK (TYPICAL) FOR CURBLINE WALKS. NO METERS ON PRIVATE PROPERTY WITHOUT A RECORDED EASEMENT.
5. METER BOX SHALL BE CENTERED OVER THE COMPLETED METER ASSEMBLY. METER BOX TO BE ARMORCAST A6001946PCX12 W/A6001643 LID IN TRAFFIC AREAS, A6001946PCX12 W/A6001643R ELSEWHERE. PROVIDE WITH KNOCKOUTS FOR TOUCH-READ SENSORS
6. WATER METER SET BY CITY FORCES. COPPERSETTER, METER BOX, & ALL FITTINGS PROVIDED BY DEVELOPER.
7. SEE DETAIL 517 FOR TAPPING REQUIREMENTS.

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1 1/2" AND 2" METER SET W/ 1" HIGH BY-PASS (NTS)	
MT ANGEL, OR	DETAIL NO. 516

WATERLINE PRESSURE TEST REPORT

Project Location:	Project Name:	Date:
Operator: (Print)	Waterline to be tested. From Station:	To Station:
Verify that all in-line valves, including hydrant mainline valves, are open? Yes / No		
Verify that all corp stops are open? Yes / No		
Verify that pressure gauge is mounted at high point of line to be tested? Yes / No If no, correct for elevation difference (ie. add 0.433 psi per foot elevation difference).		
System Static Pressure (psi):	Starting Pressure (psi): (greater of 150 psi or 1.5 times static)	Ending Pressure (psi):
Test Length: (2 hours minimum)	Starting Time:	Ending Time:
Volume Required to Reach Initial Test Pressure (gal):	Allowable Leakage (gal): (2 times table value below)	Measured Leakage (gal):
TEST RESULTS: Pass / Fail		

ALLOWABLE LEAKAGE PER 1,000 FEET OF PIPELINE - *gph*

Test Pressure <i>psi</i>	NOMINAL PIPE DIAMETER - <i>in.</i>									
	3	4	6	8	10	12	14	16	18	20
200	0.32	0.43	0.64	0.85	1.06	1.28	1.48	1.70	1.91	2.12
175	0.30	0.40	0.59	0.80	0.99	1.19	1.39	1.59	1.79	1.98
150	0.28	0.37	0.55	0.74	0.92	1.10	1.29	1.47	1.66	1.84

If the pipeline under test contains various diameters, the allowable leakage shall be the sum of the allowable leakage for each size. No additional leakage allowance will be given for fire hydrant assemblies or valves.

Allowable leakage based on: $L = SD(P)^{1/2} / 133,200$

Where:

L = allowable leakage, in gallons per hour

S = length of pipe tested, in feet

D = nominal diameter of the pipe, in inches

P = test pressure during the leakage test, in psig

Regardless of leakage, maximum pressure drop during test period shall not exceed 5 psi/hour.

TEST PROCEDURE

1. Apply hydrostatic pressure by pumping water from an auxiliary supply basin. Accurately determine the amount of water required to reach the initial test pressure by refilling the supply basin with a calibrated container following pressurization of pipeline.
2. Monitor test pressure for 2 hour period.
3. At the completion of the test period, re-pressurize the pipeline by pumping water from the auxiliary supply basin. Accurately determine the amount of water required to reach the test pressure by refilling the supply basin with a calibrated container following pressurization of pipeline. If the measured leakage is less than the allowable leakage, the test is successful.

Dear Mr. [Name],

I have received your letter of the 15th and am pleased to hear from you.

The information you provided is being reviewed and I will contact you again.

I am sorry that I cannot provide a more definitive answer at this time.

Your patience is appreciated and I will be sure to get back to you as soon as possible.

I am sure that you will understand the need for thoroughness in this process.

Thank you for your understanding and cooperation.

Very truly yours,

[Signature]