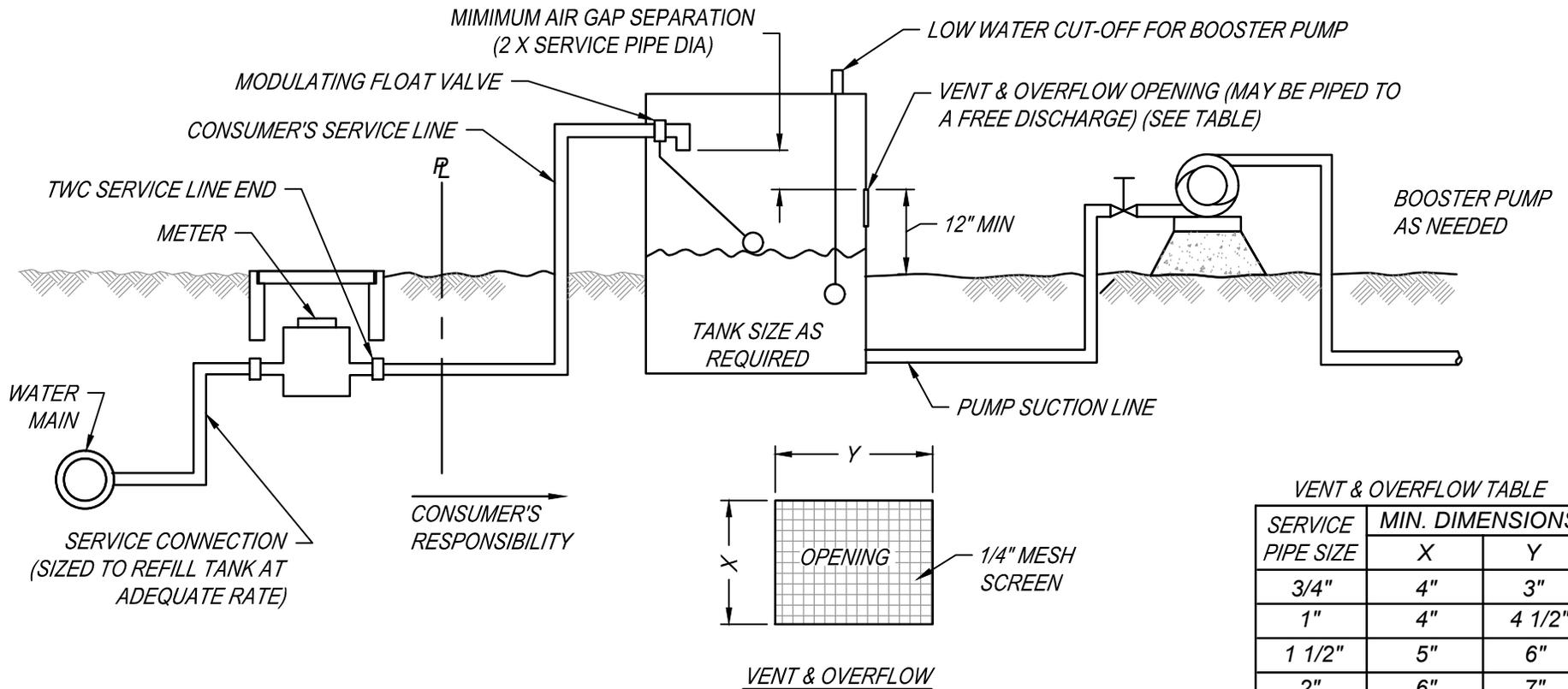


Sheet List Table

Sheet Number	Sheet Title
INDEX	TEXAS WATER COMPANY STANDARD DETAILS - SHEET INDEX
BK-AG	AIR GAP SEPARATION
BK-DCDA	APPROVED DOUBLE CHECK DETECTOR ASSEMBLY INSTALLATION
BK-DCDA1	BELOW GRADE DOUBLE CHECK DETECTOR ASSEMBLY INSTALLATION
BK-DCV	APPROVED DOUBLE CHECK VALVE ASSEMBLY INSTALLATION
BK-RPP	APPROVED REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTOR
MAIN-AV12	AIR VALVE INSTALLATION
MAIN-AV2	AIR VALVE INSTALLATION
MAIN-BO	TYPICAL BLOW-OFF ASSEMBLY INSTALLATION
MAIN-HYD	STANDARD FIRE HYDRANT INSTALLATION
MAIN-HYDP	TYPICAL FIRE HYDRANT PLACEMENTS
MAIN-AFH	AUTOFLUSH HYDRANT
MAIN-LOW	TYPICAL WATER MAIN LOWERING - UTILITY CROSSING
MAIN-BRG	ROAD BORING AT HIGHWAY CROSSING
MAIN-CC	CONCRETE CAP ON SHALLOW MAINS
MAIN-CSG	CASING DETAIL
MAIN-LAB	INLINE ANCHOR BLOCK

MAIN-MP	MARKER POST DETAIL
MAIN-RPR	RESTRAINED PIPE REPAIR
MAIN-ST	SLOPED TRENCH DETAIL
MAIN-TRN	PIPE TRENCH DETAIL
MAIN-VB	VALVE BOX INSTALLATION
MAIN-VBK	VALVE BANK INSTALLATION
TB-HP	THRUST BLOCKING
TB-STD	THRUST BLOCKING
SER-58-34	SERVICE
SER-1	SERVICE
SER-1.5B	SERVICE WITH BYPASS
SER-2B	SERVICE WITH BYPASS
SER-3B	SERVICE WITH BYPASS
SER-4B	SERVICE WITH BYPASS
SER-6B	SERVICE WITH BYPASS
SER-8B	SERVICE WITH BYPASS
SER-DUAL	TYPICAL DUAL SERVICE INSTALLATION
SER-LT	LONG SERVICE
SER-FCSL	TYPICAL FIRE SERVICE AND COMMERCIAL SERVICE LAYOUT
GATE-16	TYPICAL 16 FT WIDE GATE

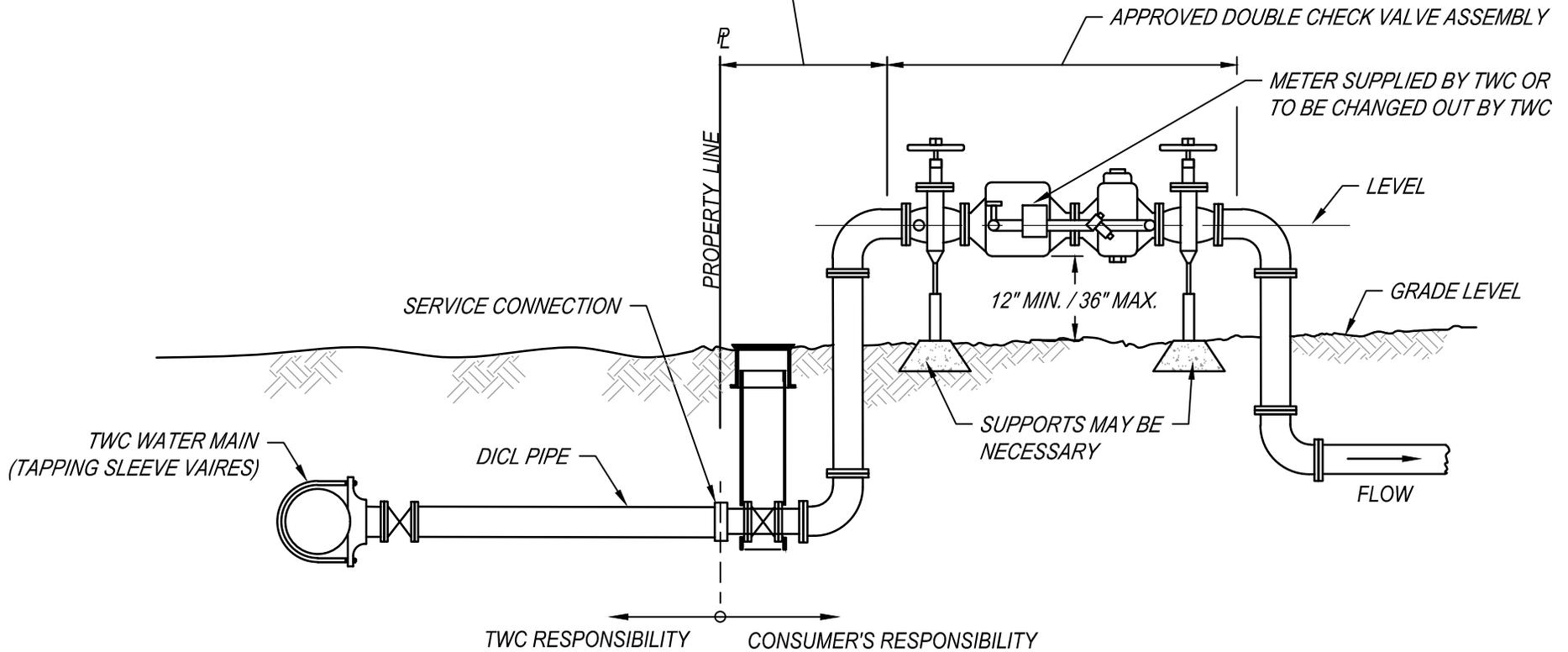


VENT & OVERFLOW TABLE

SERVICE PIPE SIZE	MIN. DIMENSIONS	
	X	Y
3/4"	4"	3"
1"	4"	4 1/2"
1 1/2"	5"	6"
2"	6"	7"
3"	7"	10"
4"	7"	10"
6"	7"	15"

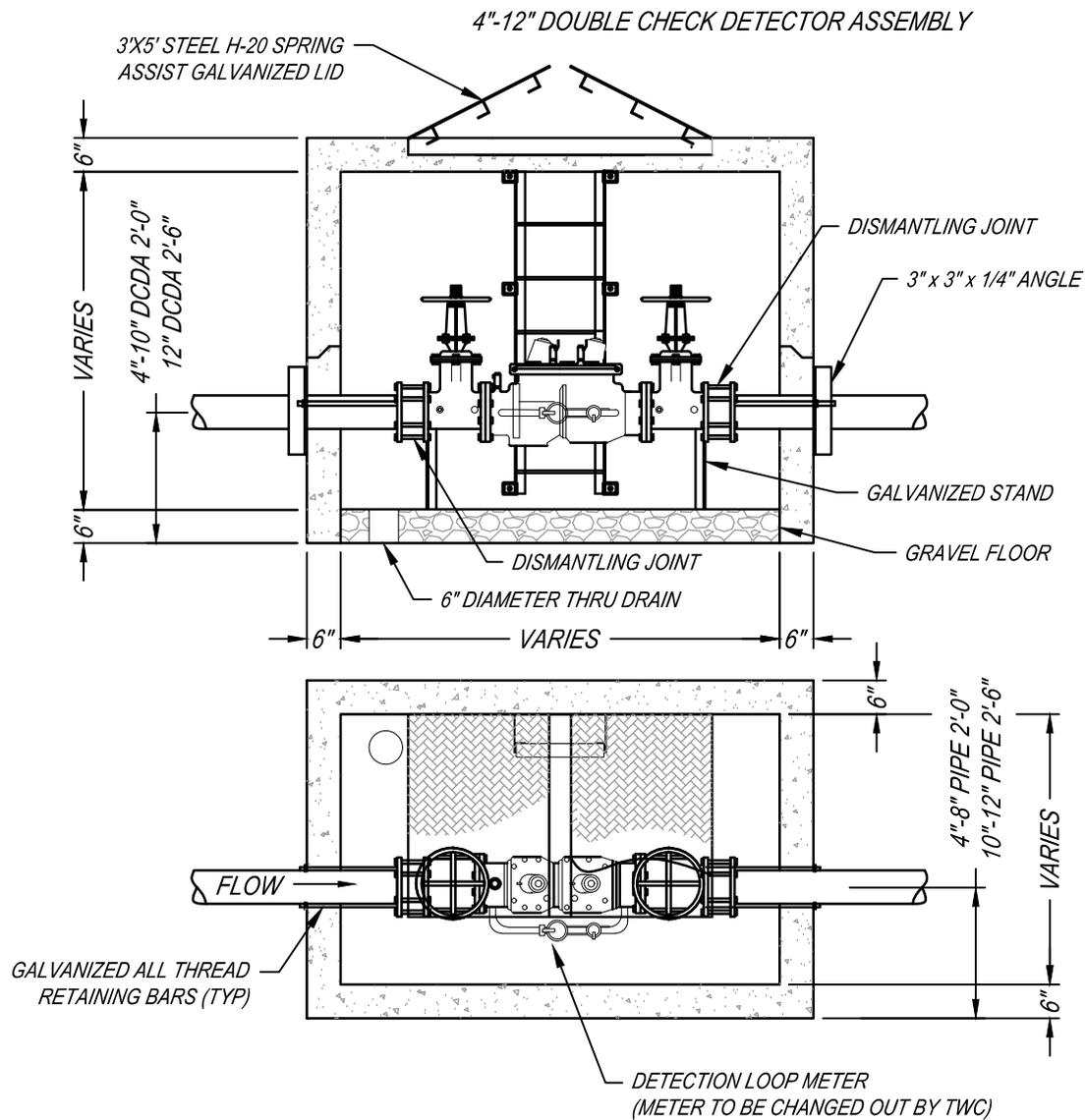
- NOTES:**
- DESIGN, FABRICATION, INSTALLATION AND OPERATION MUST COMPLY WITH STANDARDS OF THE AMERICAN WATER WORKS ASSOCIATION (AWWA) AND ALL FEDERAL, STATE AND LOCAL LAWS, RULES, REGULATIONS, ORDERS, CODES AND ORDINANCES.
 - THE AIR GAP SEPARATION SHALL BE INSTALLED SUBJECT TO THE APPROVAL OF TWC. ANY DEVIATION FROM THE METHODS DESCRIBED HEREON MUST RECEIVED APPROVAL PRIOR TO INSTALLATION.
 - NO CONNECTIONS SHALL BE MADE BETWEEN METER AND CONSUMER'S TANK.
 - THE OVERFLOW OPENING AND SCREEN SIZE SHALL BE AS SHOWN HEREON OR OF GREATER CAPACITY AS REQUIRED TO MAINTAIN THE SPECIFIED AIR GAP SEPARATION.

LOCATION SHALL BE APPROVED PRIOR TO INSTALLATION



NOTES:

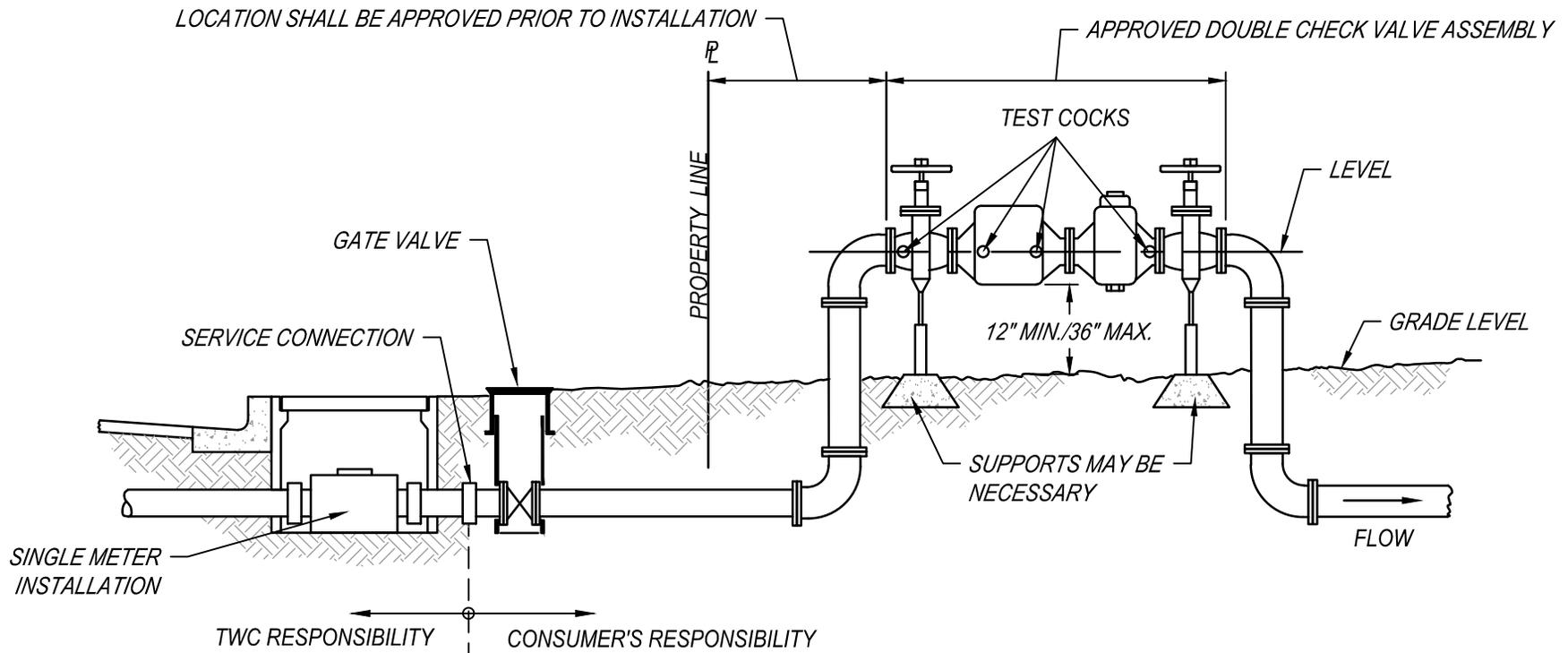
1. APPROVED ASSEMBLIES ARE REQUIRED TO HAVE RESILIENT SEATED SHUT-OFF VALVES AND TEST COCKS AS INTEGRAL PARTS OF THE ASSEMBLIES OTHERWISE THE APPROVAL IS VOIDED.
2. ASSEMBLY MUST BE ACCESSIBLE FOR TESTING AND MAINTENANCE.
3. PROTECTION FROM FREEZE DAMAGE MAY BE REQUIRED IN EXPOSED AREAS.
4. NO CONNECTIONS OR TEES WILL BE ALLOWED BETWEEN METER AND ASSEMBLY.
5. INSTALLATION AND OPERATION MUST COMPLY WITH STANDARDS SET FORTH BY A.W.W.A. AND ALL FEDERAL, STATE, AND LOCAL LAWS, RULES, REGULATIONS, ORDERS, CODES, AND ORDINANCES.
6. THE D.C.V. ASSEMBLY SHALL BE INSTALLED AS CLOSE TO THE METER AS PRACTICAL. ANY DEVIATION FROM THIS METHOD MUST BE APPROVED BY TWC PRIOR TO INSTALLATION.
7. ASSEMBLY MAY BE INSTALLED BELOW GRADE WITH APPROVAL BY TWC.



NOTES

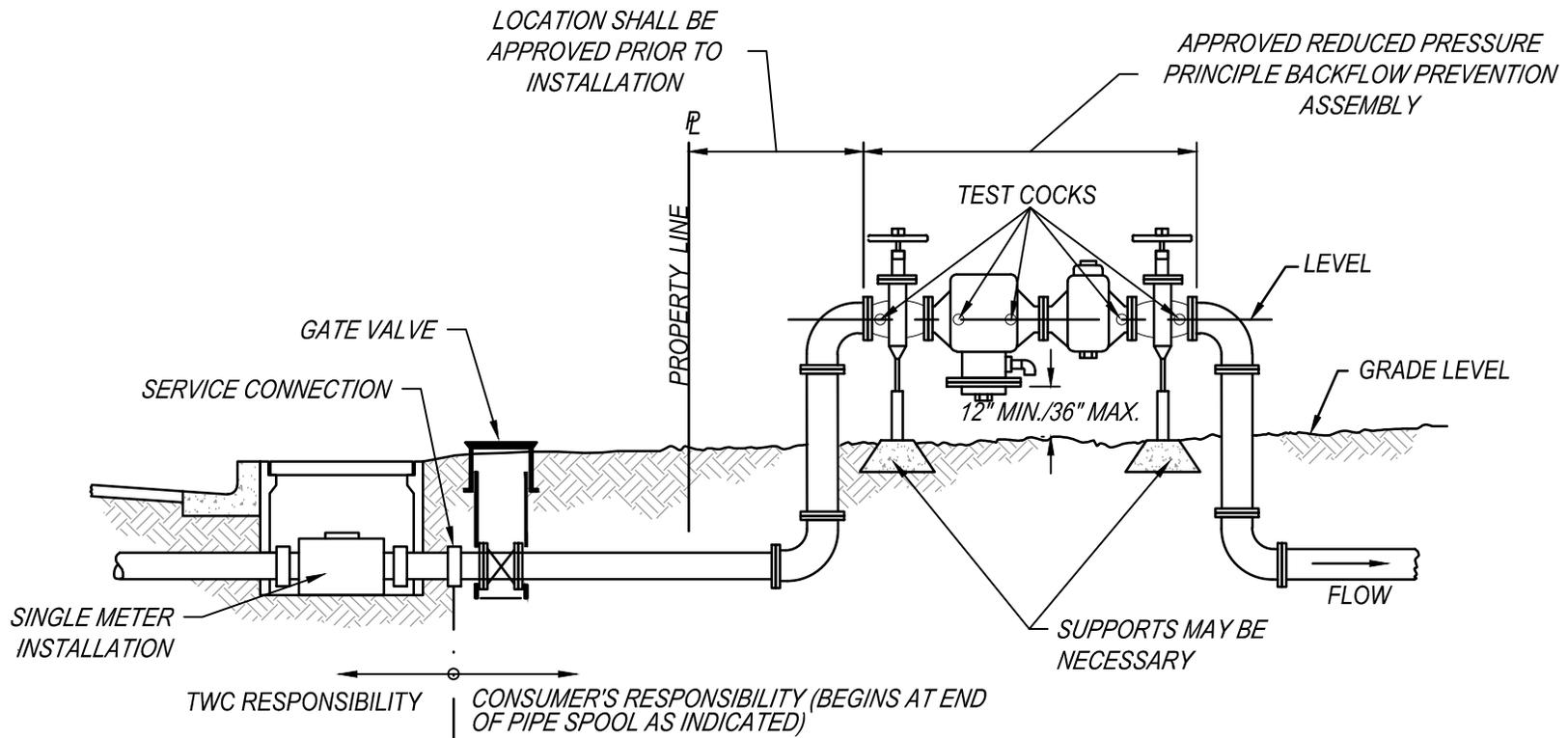
- 1) APPROVED ASSEMBLIES ARE REQUIRED TO HAVE RESILIENT SEATED SHUT-OFF VALVES AND TEST COCKS AS INTEGRAL PARTS OF THE ASSEMBLIES OTHERWISE THE APPROVAL IS VOIDED.
- 2) ASSEMBLY MUST BE ACCESSIBLE FOR TESTING AND MAINTENANCE.
- 3) INSTALLATION AND OPERATION MUST COMPLY WITH STANDARDS SET FORTH BY A.W.W.A. AND ALL FEDERAL, STATE, AND LOCAL LAWS, RULES, REGULATIONS, ORDERS, CODES AND ORDINANCES.
- 4) DCDA MUST MEET CURRENT CLWSC STANDARDS FOR BACKFLOW PREVENTION DEVICES. CONTACT TWC FOR LIST OF APPROVED DEVICES.
- 5) CONTRACTOR SHALL SUBMIT SHOP DRAWINGS AND OTHER INFORMATION AS NECESSARY FOR VAULT AND BACKFLOW DEVICE FOR APPROVAL PRIOR TO INSTALLATION.
- 6) THE FOLLOWING MANUFACTURES ARE PRE-APPROVED FOR BOTH VAULT AND BACKFLOW DEVICE REQUIREMENTS: CAPITAL PRECAST, INC. 6905 S. OLD BASTROP HWY SAN MARCOS, TX 78666 (830)-606-6200

VAULT SIZE AND DIMENSION (ID)			
DCDA SIZE	Width	Length	Height
4"DCDA	4'-0"	6'-6"	5'-0"
6"DCDA	4'-0"	6'-6"	5'-0"
8"DCDA	4'-0"	6'-6"	5'-0"
10"DCDA	5'-0"	7'-0"	6'-0"
12"DCDA	5'-0"	10'-0"	7'-0"



NOTES:

1. APPROVED ASSEMBLIES ARE REQUIRED TO HAVE RESILIENT SEATED SHUT-OFF VALVES AND TEST COCKS AS INTEGRAL PARTS OF THE ASSEMBLIES OTHERWISE THE APPROVAL IS VOIDED.
2. ASSEMBLY MUST BE ACCESSIBLE FOR TESTING AND MAINTENANCE.
3. PROTECTION FROM FREEZE DAMAGE WILL BE REQUIRED IN EXPOSED AREAS.
4. NO CONNECTIONS OR TEES WILL BE ALLOWED BETWEEN METER AND ASSEMBLY.
5. INSTALLATION AND OPERATION MUST COMPLY WITH STANDARDS SET FORTH BY A.W.W.A. AND ALL FEDERAL, STATE, AND LOCAL LAWS, RULES, REGULATIONS, ORDERS, CODES, AND ORDINANCES.
6. THE D.C.V. ASSEMBLY SHALL BE INSTALLED AS CLOSE TO THE METER AS PRACTICAL. ANY DEVIATION FROM THIS METHOD MUST BE APPROVED BY TWC PRIOR TO INSTALLATION.
7. IN NO CASE SHALL THIS ASSEMBLY BE INSTALLED BELOW GRADE WITHIN A VAULT OR IN A PIT.



NOTES:

1. APPROVED ASSEMBLIES ARE REQUIRED TO HAVE RESILIENT SEATED SHUT-OFF VALVES AND TEST COCKS AS INTEGRAL PARTS OF THE ASSEMBLIES OTHERWISE THE APPROVAL IS VOIDED.
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6. THE R.P.P. ASSEMBLY SHALL BE INSTALLED AS CLOSE TO THE METER AS PRACTICAL. ANY DEVIATION FROM THIS METHOD MUST BE APPROVED BY TWC PRIOR TO INSTALLATION.
7. IN NO CASE SHALL THIS ASSEMBLY BE INSTALLED BELOW GRADE WITHIN A VAULT OR IN A PIT.

ALTERNATE W/ VENT
FOR AIR AND VACUUM

PLASTIC METER BOX AND LID

FINISHED GRADE

1/2" APCO #50

1" X 3/4" ANGLE METER STOP

PLACE #6 PEA GRAVEL
TO ENSURE ADEQUATE DRAINAGE

1" x 1/2" RDCR

1" STREET ELL 9033/64

1" X 2 1/2" STD.
SCH 80 NIPPLE THREADED
(WITH 1" ANGLE STOP USE 1 1/4" SCH 80 NIPPLE)

1" 200 PSI POLY PIPE

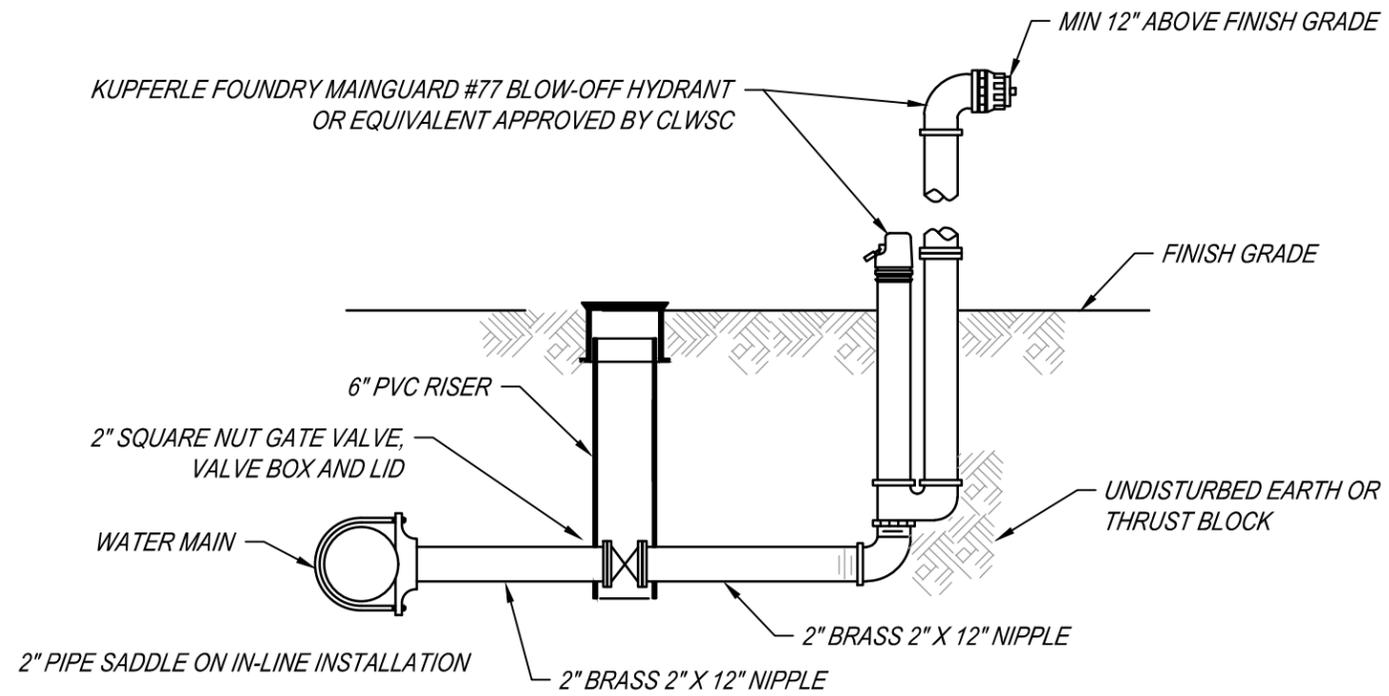
HIGH POINT OF PIPE

1" CORP STOP
WITH FORD GRIP JOINTS

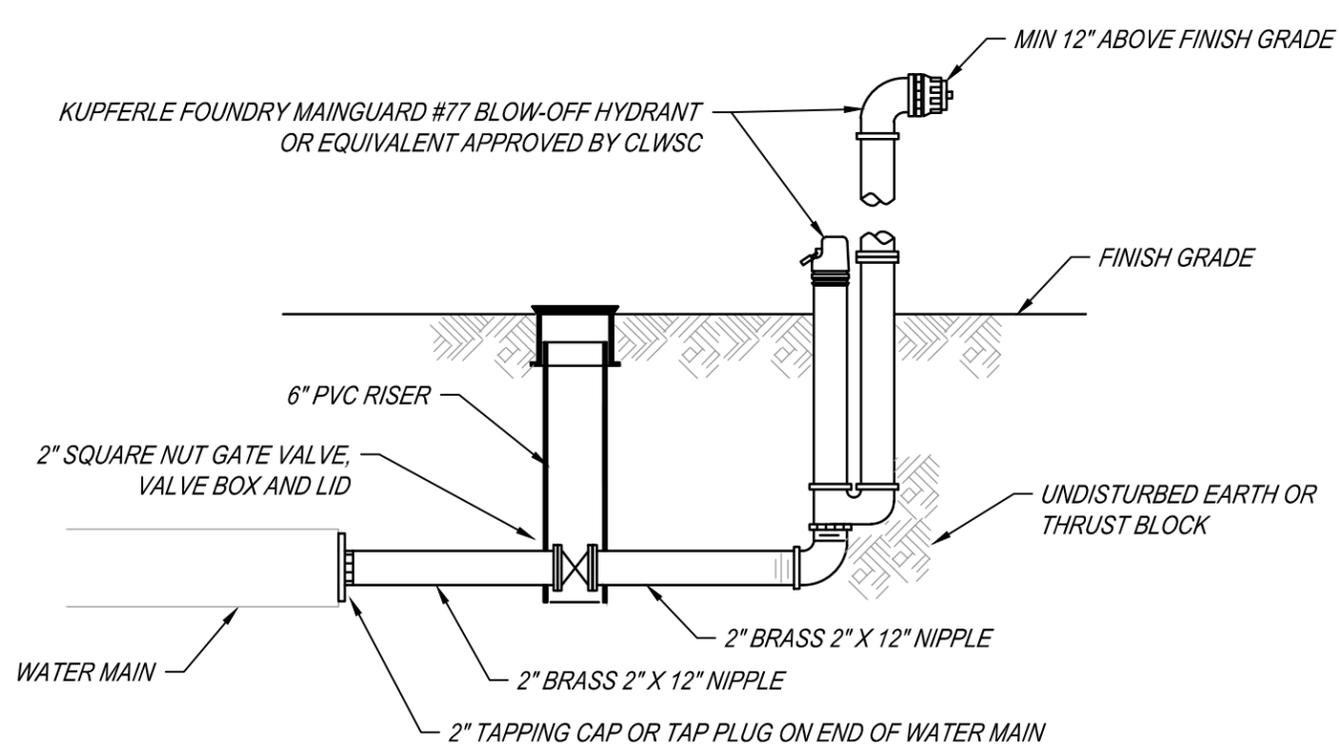
PIPE CONNECTION
(SEE TAPPING SCHEDULE)

NOTES:

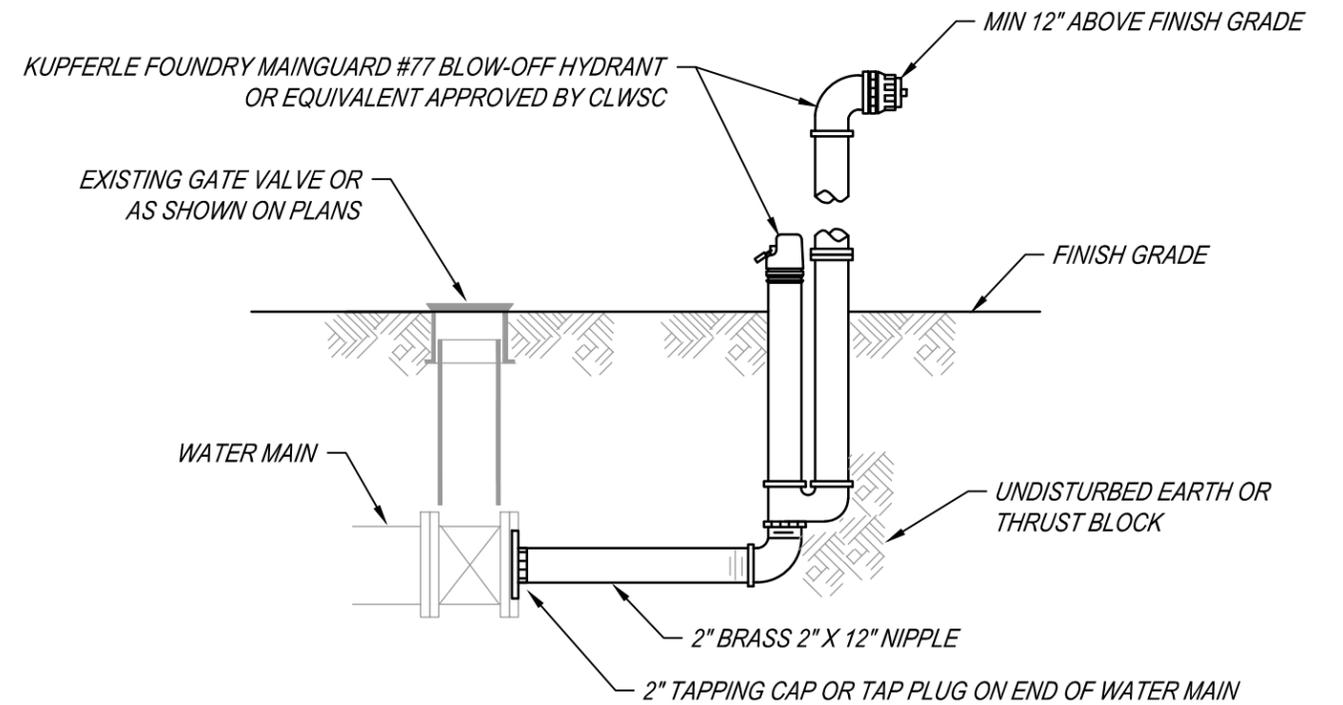
1. ALL CORPS AND ANGLE STOPS TO BE LEFT OPEN.
2. BLOW OFF MAIN BEFORE INSTALLING AIR VALVE.
3. AIR RELEASE ONLY, NOT VACUUM.



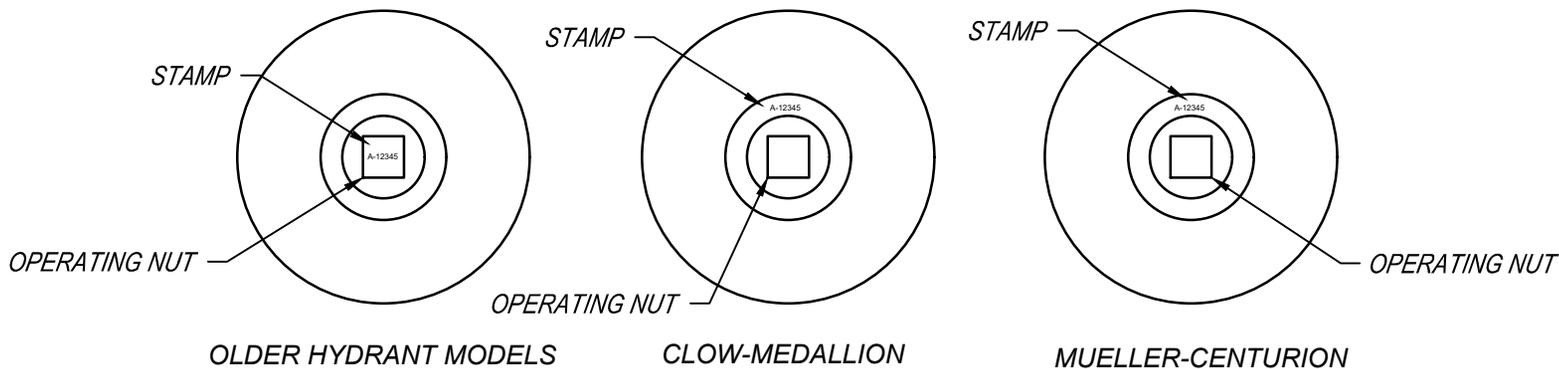
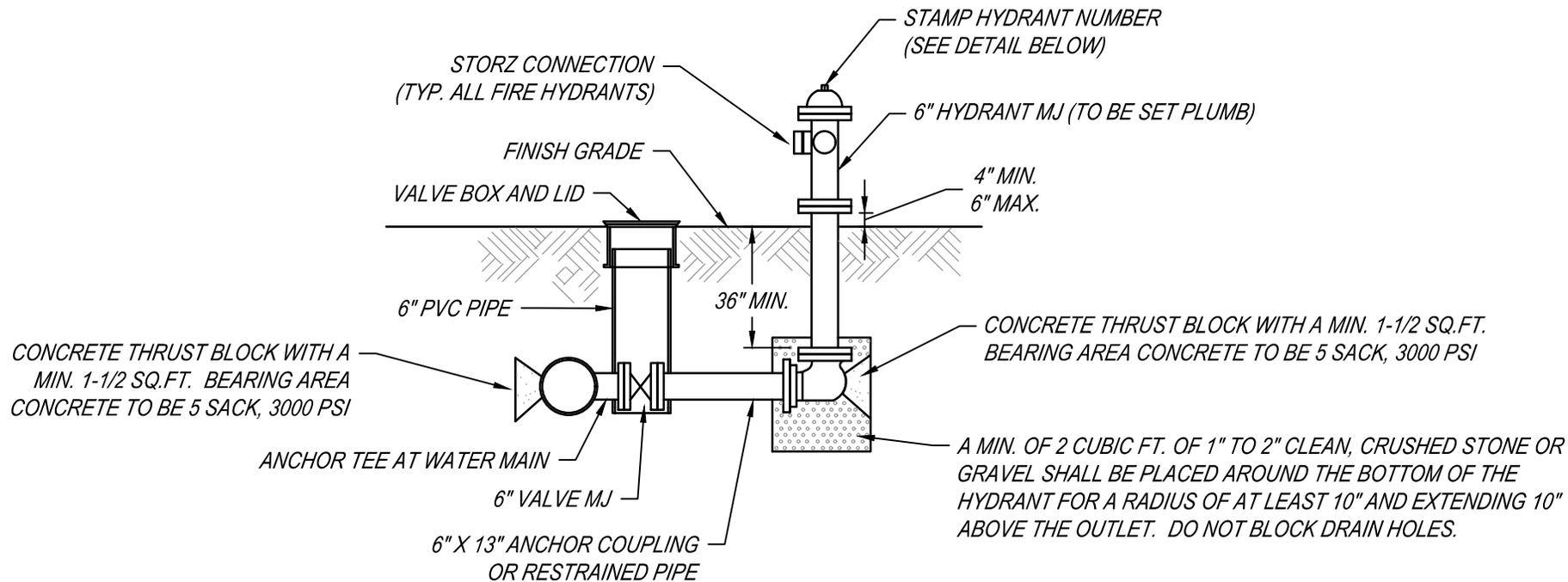
TYPE 1



TYPE 2



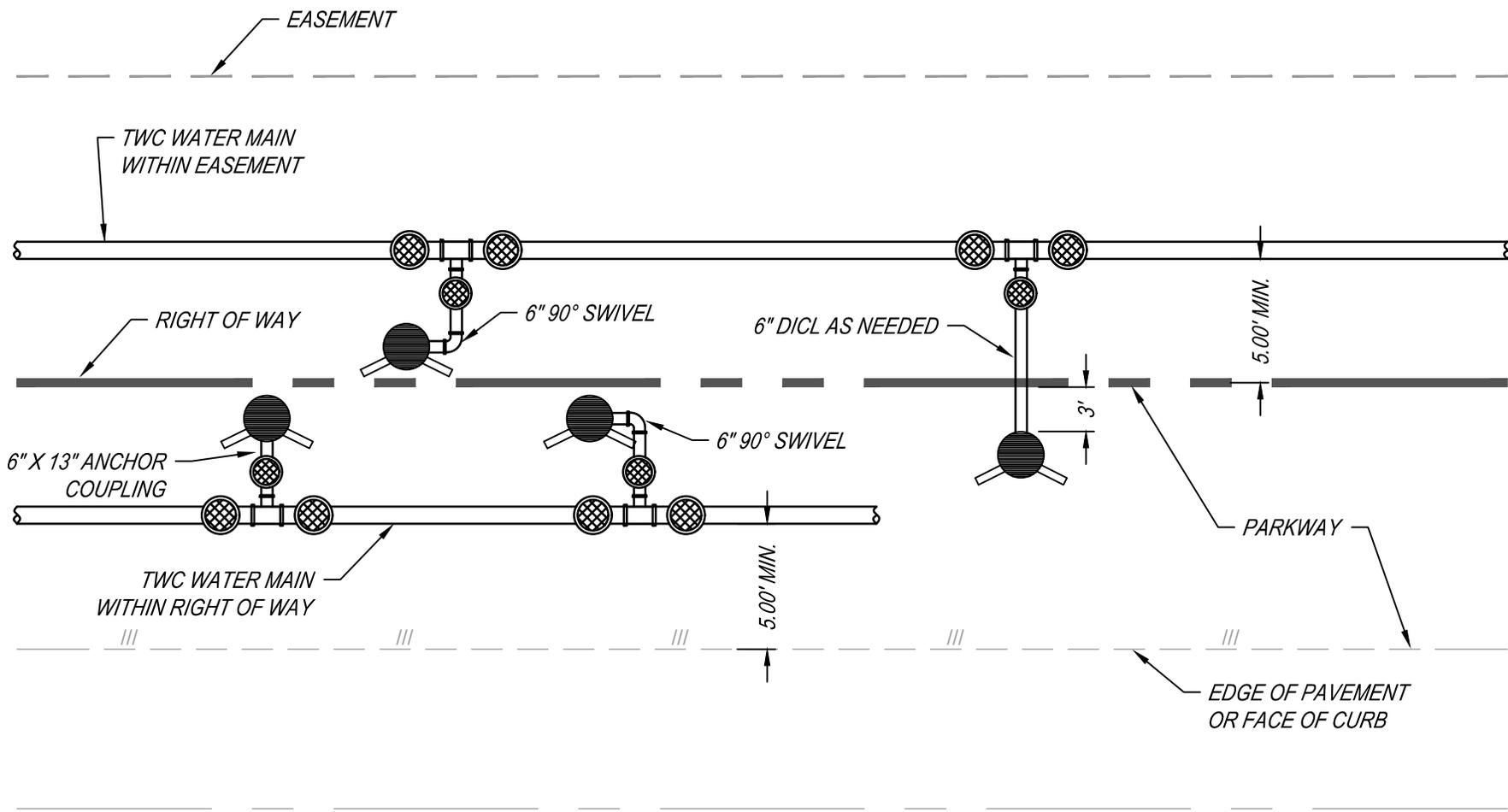
TYPE 3



HYDRANT NUMBER LOCATION TOP VIEW

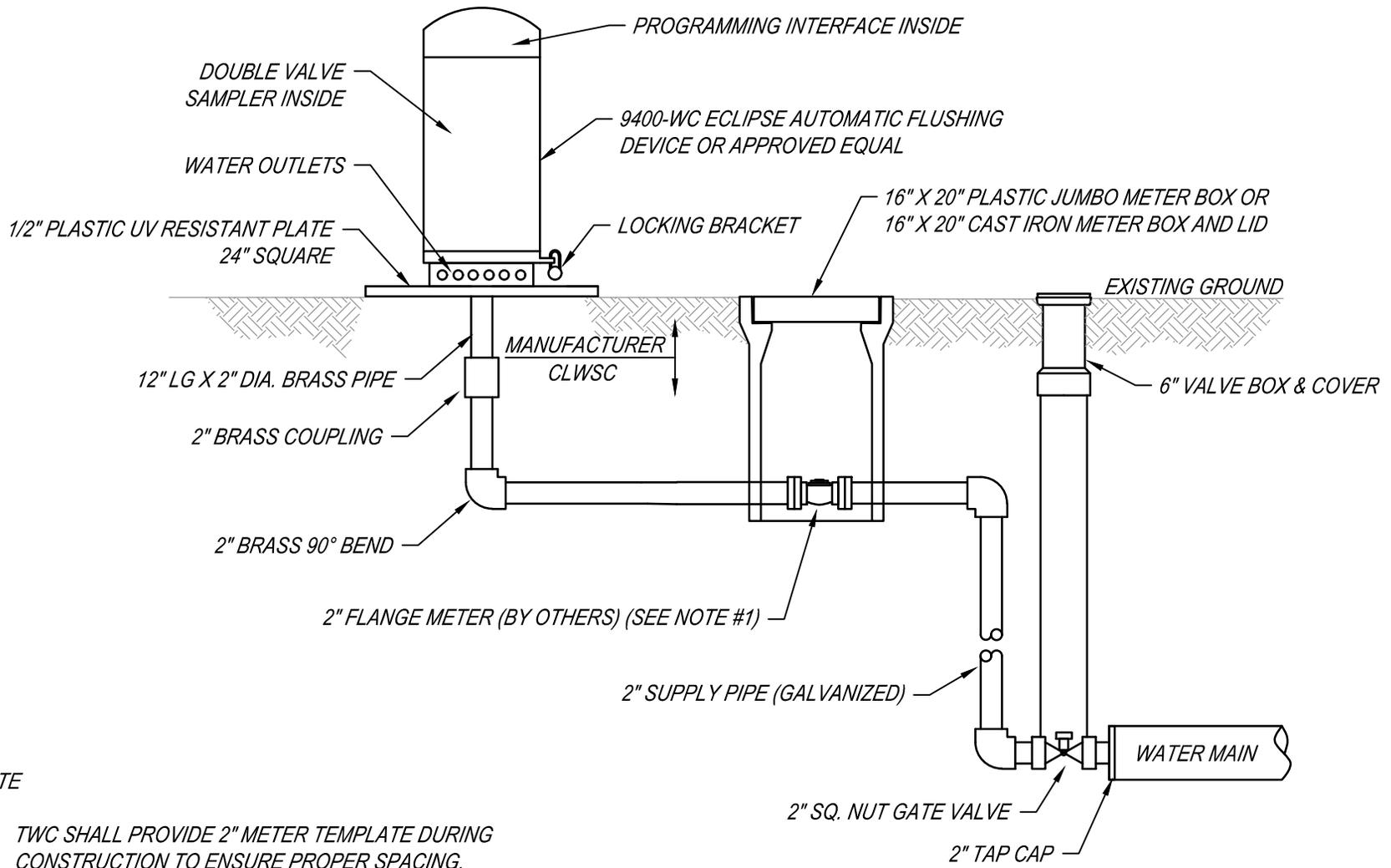
NOTE:

1. ALL HYDRANTS SHALL BE TURN LEFT TO OPEN.
2. FIRE HYDRANTS SHALL BE INSTALLED WITH STORZ TYPE CONNECTION, INTEGRAL CONNECTION OR STORZ ADAPTORS SHALL BE REQUIRED ON ALL FIRE HYDRANTS.
3. SEE STD. DWG. MAIN-VB FOR VALVE BOX INSTALLATION



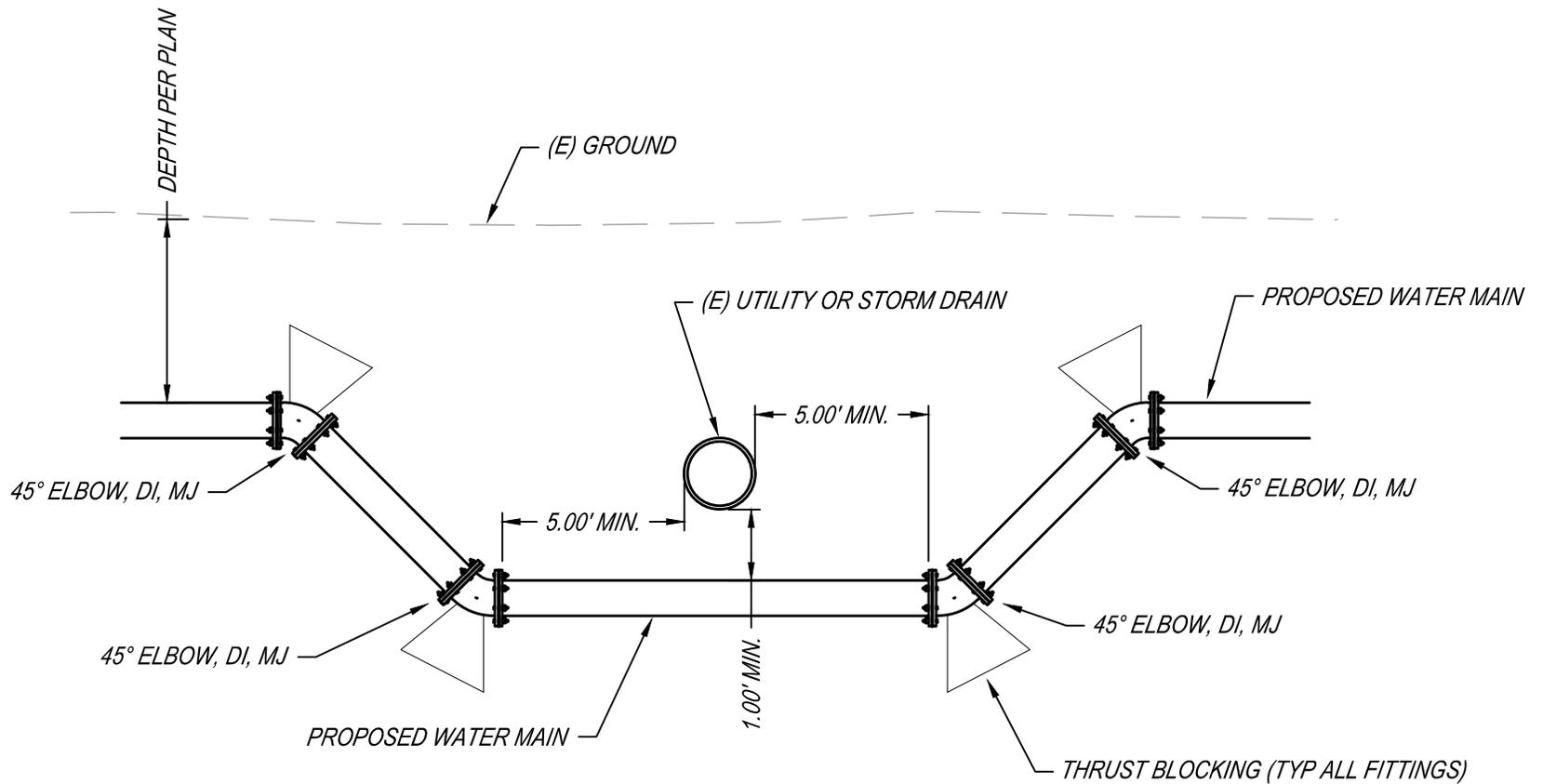
NOTES:

1. SEE TWC STANDARDS FOR VALVE BOX INSTALLATION.
2. SEE TWC STANDARDS FOR FIRE HYDRANT INSTALLATION



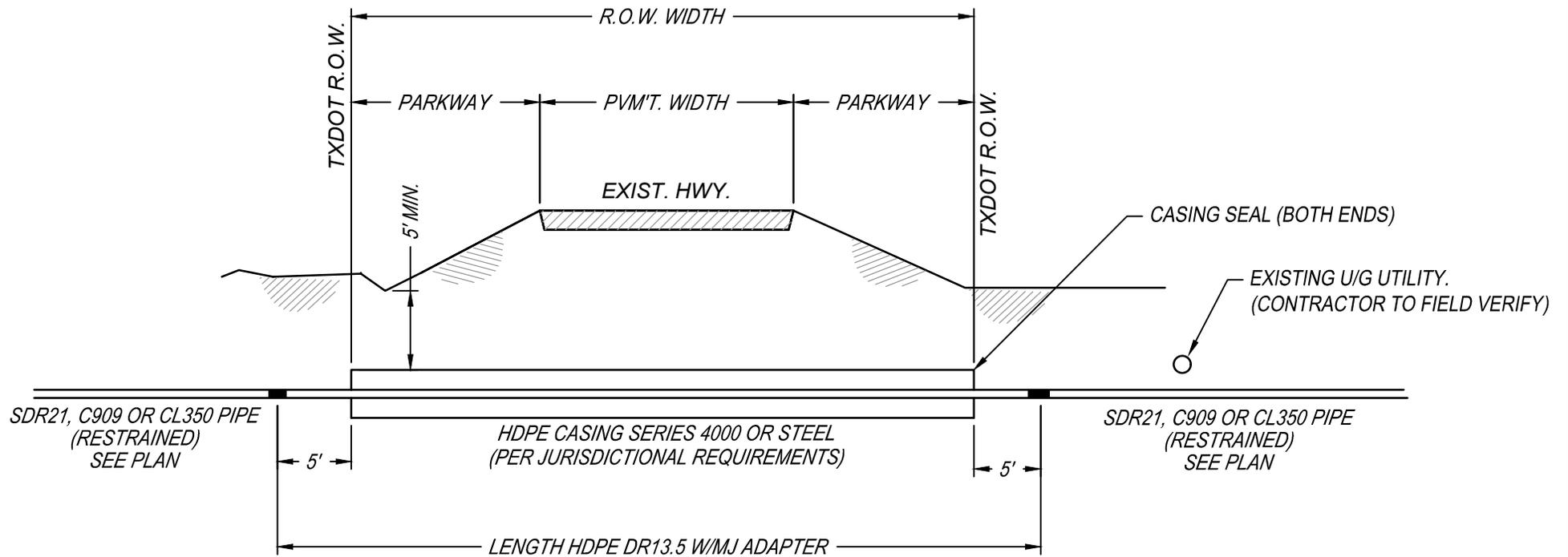
NOTE

1. TWC SHALL PROVIDE 2" METER TEMPLATE DURING CONSTRUCTION TO ENSURE PROPER SPACING.



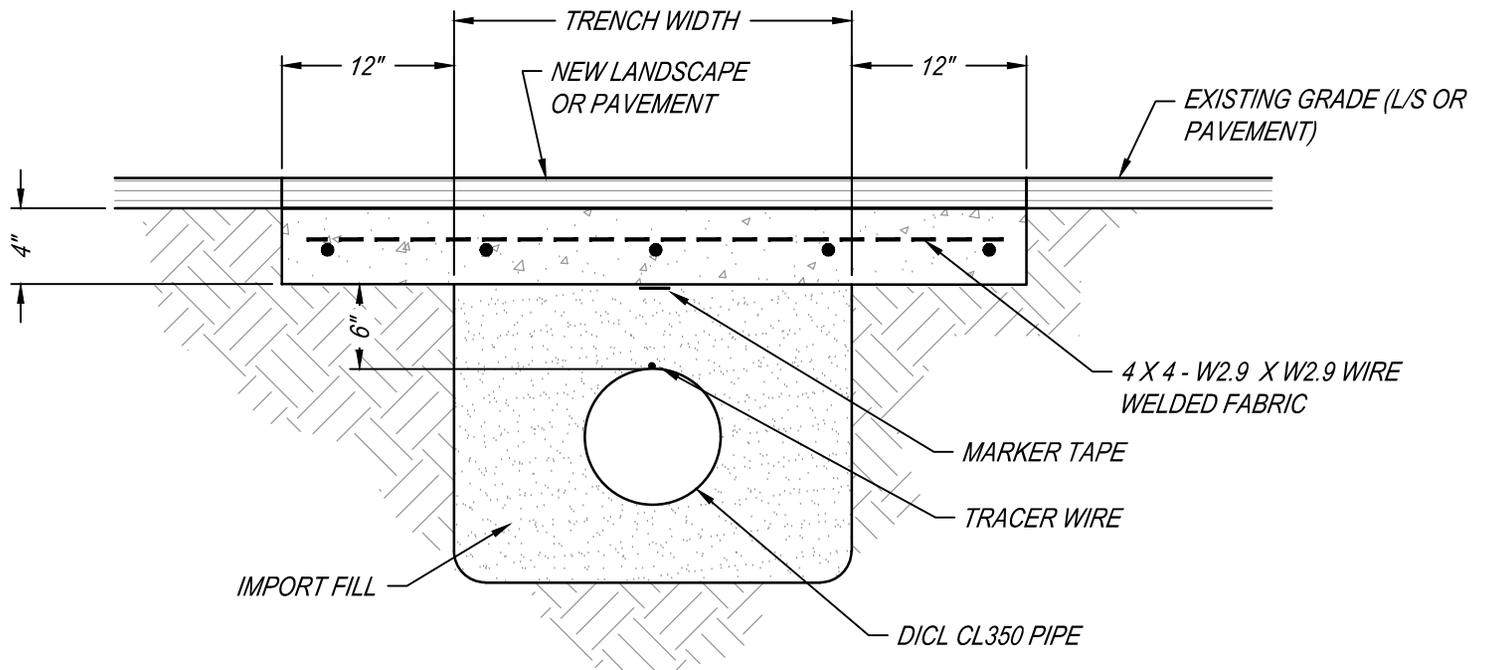
NOTES:

1. ALL MATERIAL SHALL BE DICL FOR WATER LOWERING.
2. ALL JOINTS SHALL BE RESTRAINED.



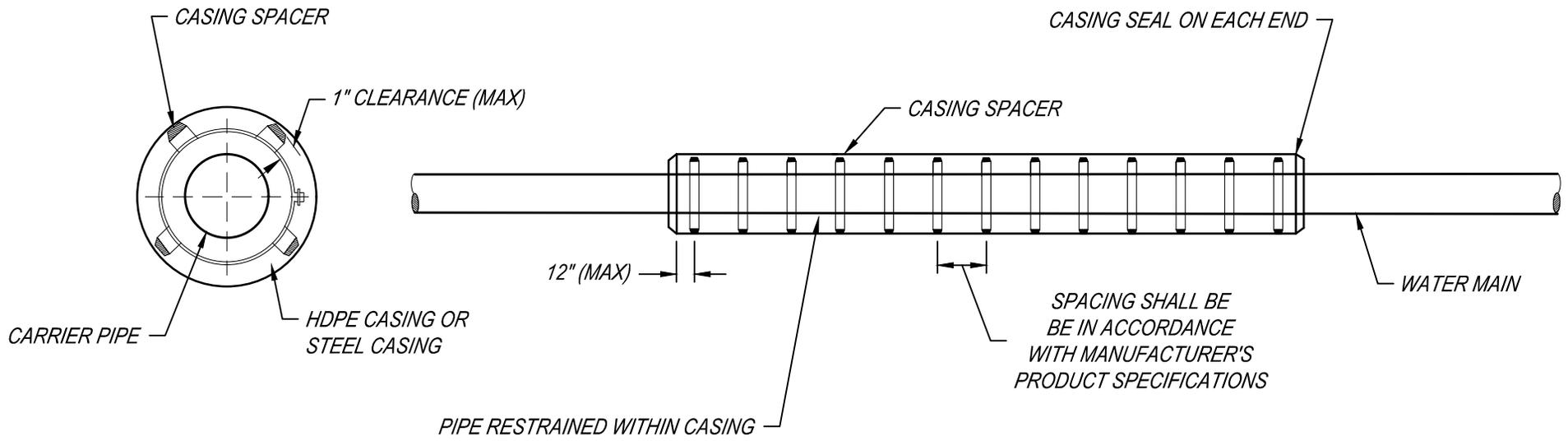
NOTE:

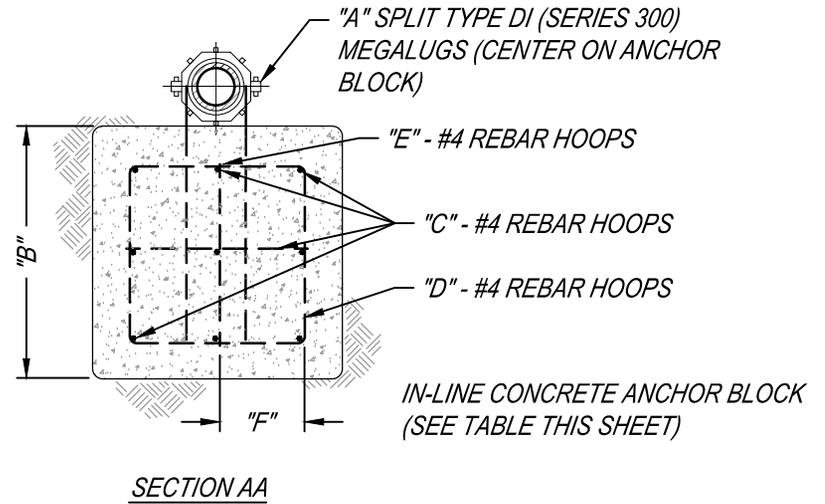
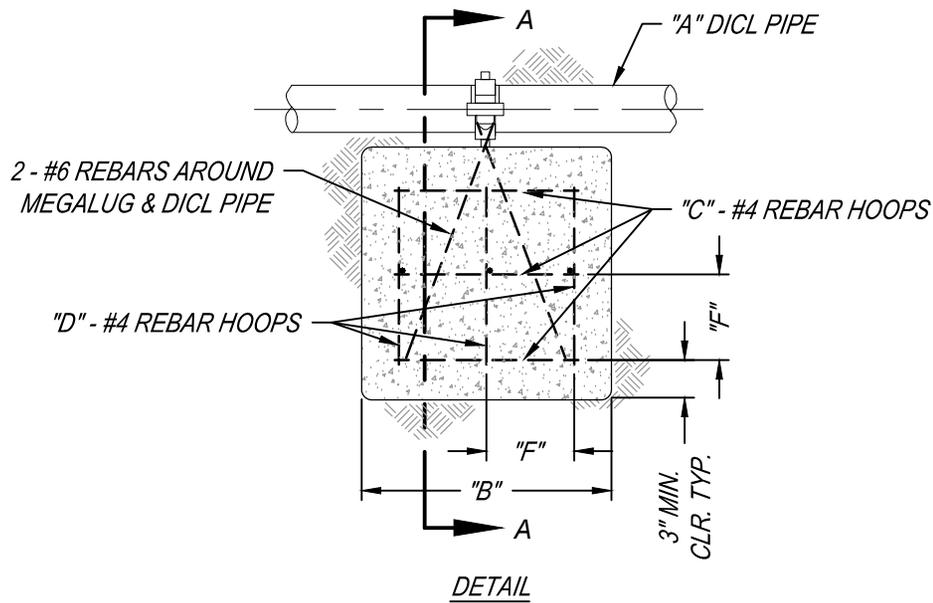
1. SEE TWC STANDARDS FOR CASING SPACER REQUIREMENTS.



NOTE:

1. INSTALL CONCRETE CAP WHERE MAIN IS LESS THAN 30" COVER.

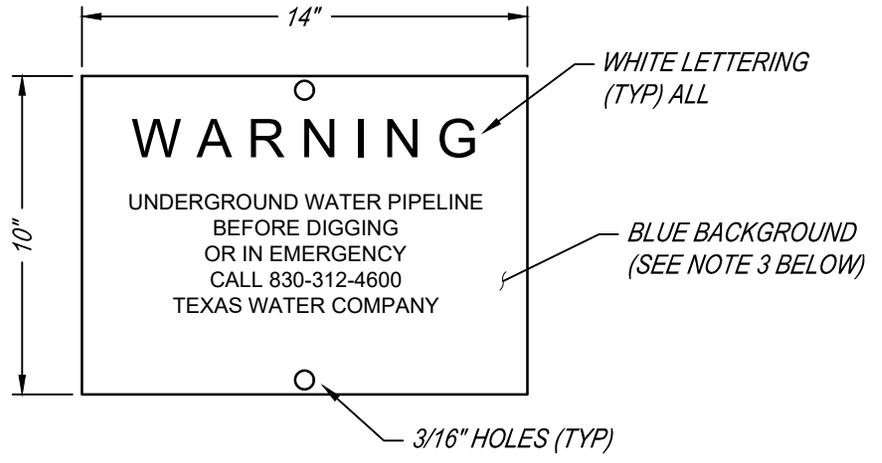
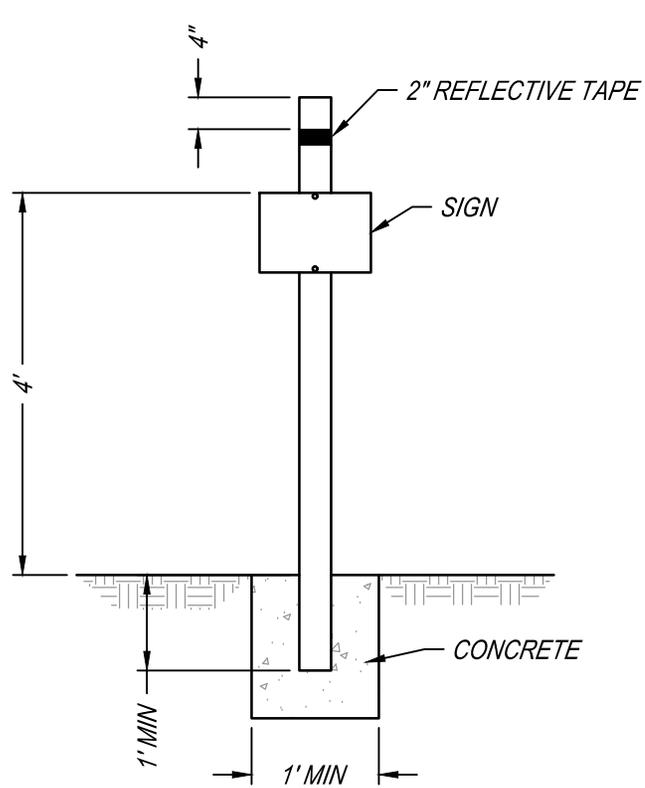




NOTES:

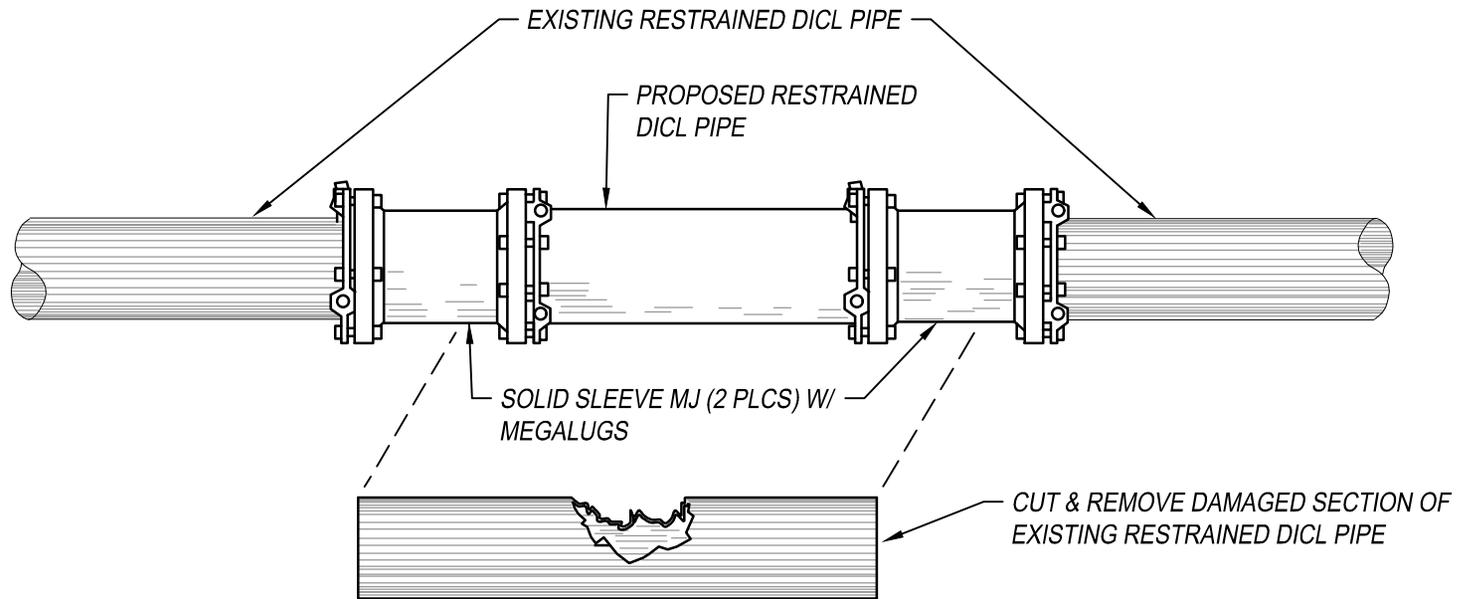
1. IN-LINE ANCHOR BLOCK SHALL BE POURED AGAINST UNDISTURBED GROUND.
2. APPLY TWO COATS OF SUPER TANK SOLUTION ON ALL METAL EXPOSED TO SOIL.
3. ANCHOR BLOCK SIZES ARE BASED ON 150 PSI WORKING PRESSURE (SAFETY FACTOR OF 1.5) AND 2000 LBS./SQ. FT. BEARING SOIL.
4. CONCRETE SHALL BE KEPT CLEAR OF FLANGES, NUTS, AND BOLTS.

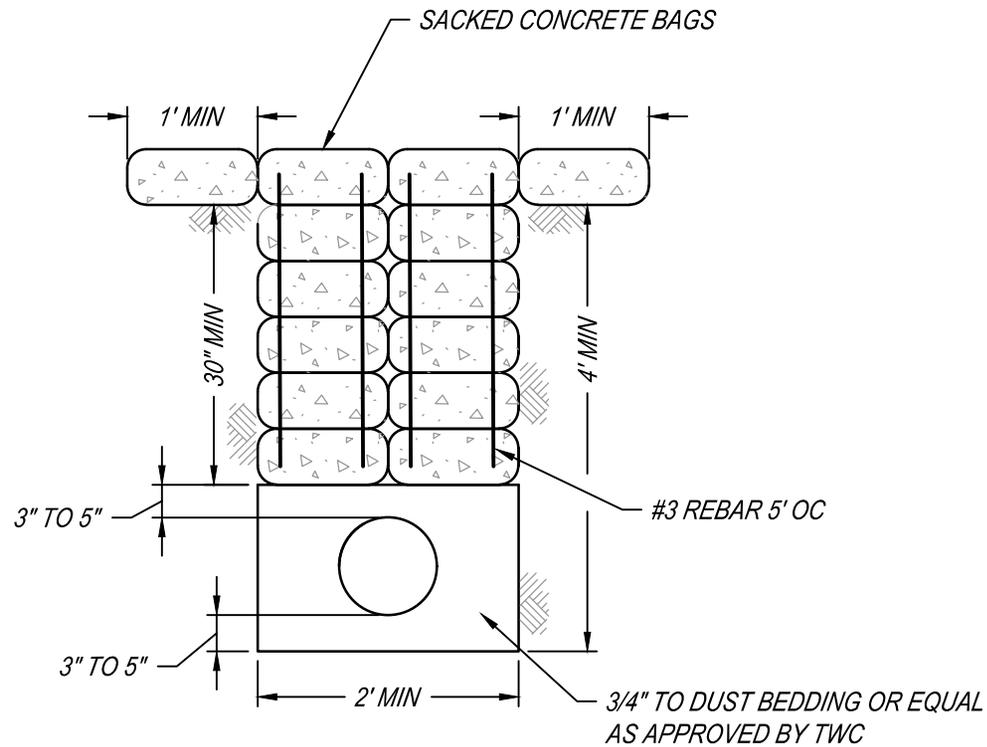
"A" NOMINAL SIZE (IN)	"B" LENGTH OF ONE SIDE OF ANCHOR BLOCK (IN)	"C" QUANTITY OF HORIZONTAL REBAR HOOPS	"D" QUANTITY OF REBAR HOOPS	"E" QUANTITY OF VERTICAL REBAR HOOPS	"F" APPROX. CENTER DIS. BETWEEN REBARS (IN)
4"	30"	3	3	1	12"
6"	39"	4	4	2	11"
8"	45"	4	4	2	13"
10"	54"	5	5	3	12"
12"	60"	6	6	4	11"



NOTES:

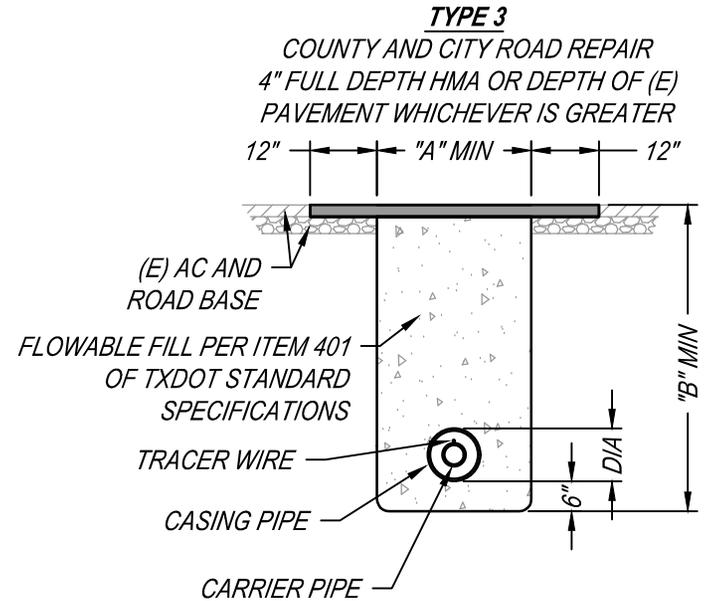
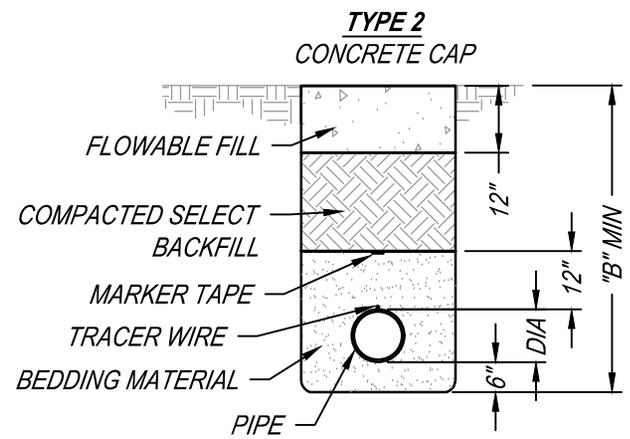
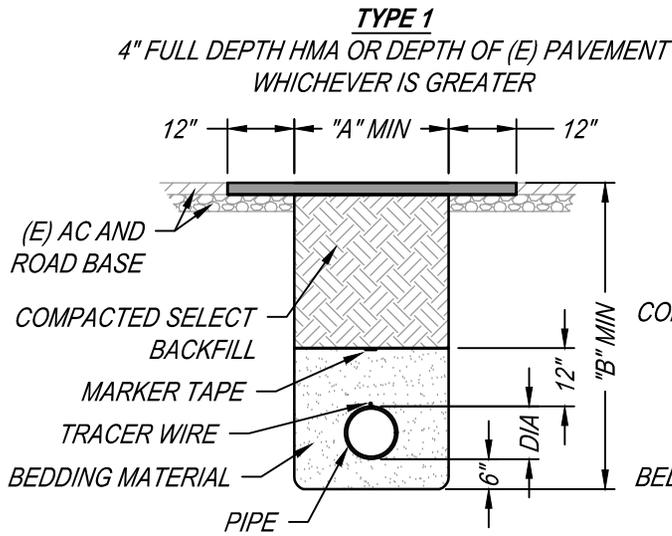
1. MARKERS TO BE PAINTED 0.08" THICK ALUMINUM WITH STANDARD NO DIG SYMBOL.
2. INSTALL MARKER POST AT LOCATIONS INDICATED ON THE PLANS OR AS DIRECTED BY TWC.
3. COLORS AND LABELS SHOWN ARE FOR POTABLE WATER. WASTEWATER BACKGROUND SHALL BE GREEN AND LABELED "SEWER". RECLAIMED BACKGROUND SHALL BE PURPLE AND LABELED "RECLAIMED"





NOTES:

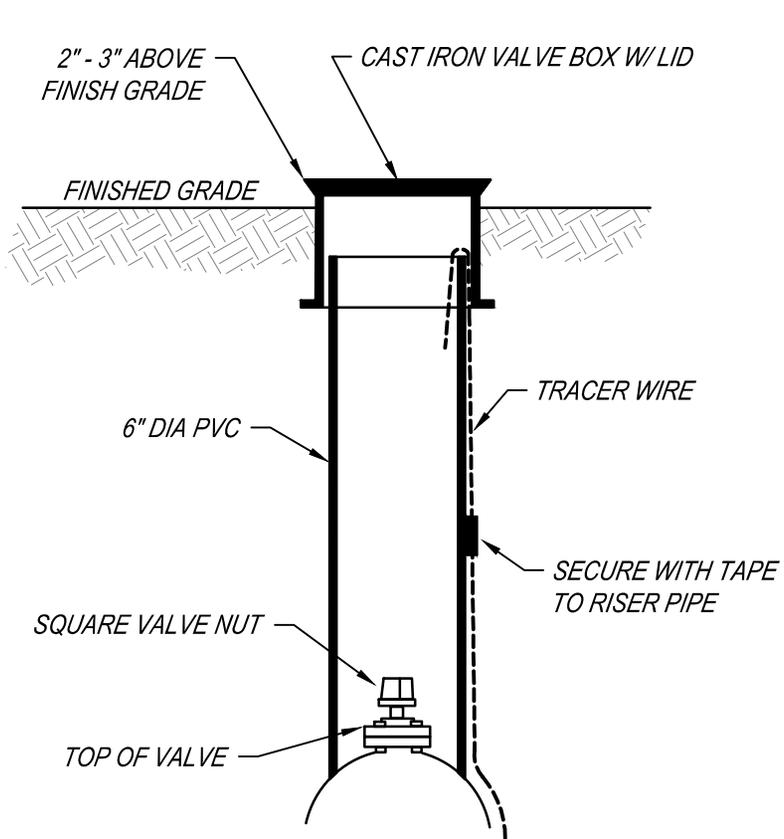
1. *DETAIL TO BE USED WHERE EXISTING SLOPE AT GRADE IS > 10%.*
2. *TOP ROW OF SACKED CONCRETE TO BE ANGLED TO DIVERT WATER TO THE DOWNWARD NATURAL CROSS SLOPE DIRECTION WHERE POSSIBLE.*
3. *PLACEMENT OF CONCRETE BAGS TO BE AT 36' TO 45' INTERVALS, MAINTAIN AT LEAST 4' CLEARANCE FROM PIPE JOINTS.*



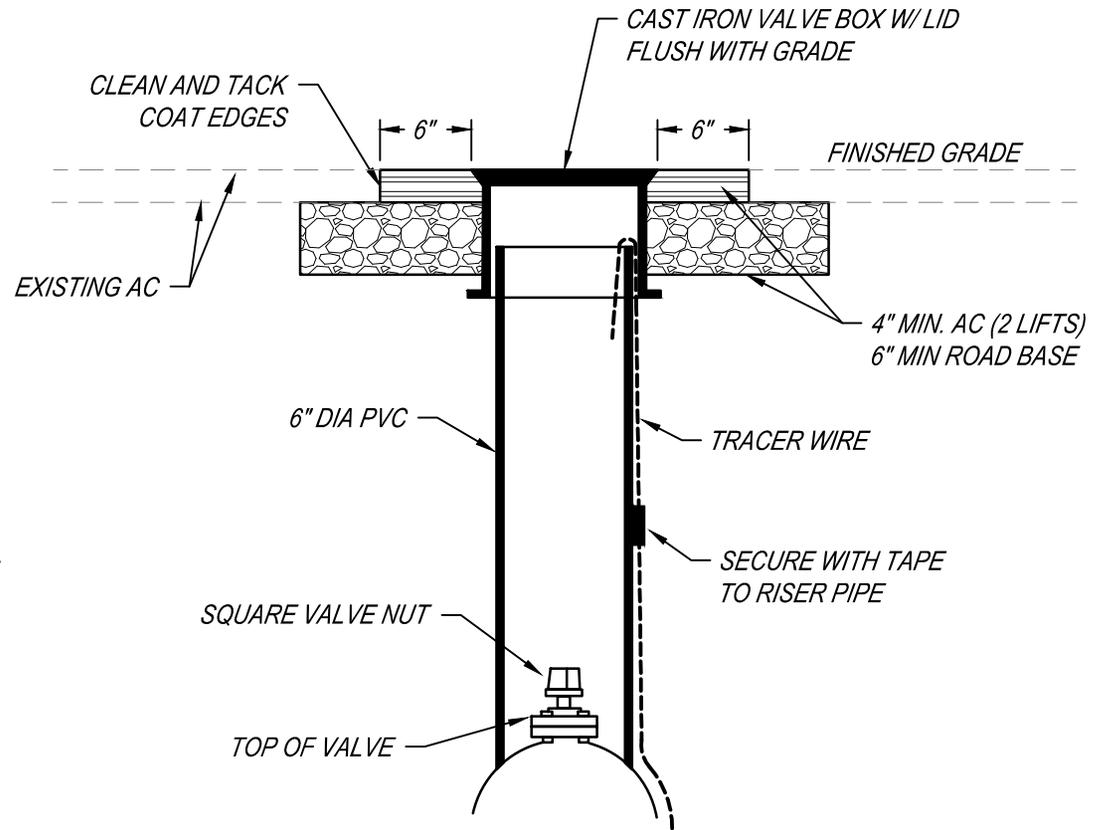
NOTES:

PIPE DIA	WIDTH "A"	DEPTH "B"
4"	16"	36"
6"	18"	42"
8"	20"	44"
12"	30"	52"
16"	36"	56"
>16"	DIA + 24"	DIA + 40"

- SEE GENERAL NOTES CONCERNING BEDDING AND COMPACTION.
- ALL TRENCHES UNDER OR WITHIN 5 FEET OF PAVEMENT OR STRUCTURES SHALL BE FILLED IN MAXIMUM 6 INCH LIFTS, COMPACTED TO 95% STANDARD PROCTOR DENSITY. TRENCHES IN OTHER AREAS TO BE COMPACTED TO THE DENSITY OF THE ADJACENT UNDISTURBED SOIL.
- ALL ASPHALT MATERIAL SHALL BE TYPE C GRADATION, USING AC-10 OIL AND SHALL BE COMPACTED TO AT LEAST 97% OF MAXIMUM DENSITY.
- MARKER TAPE ATTACHED TO THE TOP OF PIPE WITH DUCT TAPE.
- INSULATED 12 AWG SOLID DIRECT BURIAL RATED (30 MIL POLYETHYLENE JACKET MINIMUM) COPPER TRACER WIRE SHALL BE INSTALLED ABOVE AND ALONG ALL WATER LINES.
- SEE TEST STATION DETAIL FOR TRACER WIRE TERMINATION.



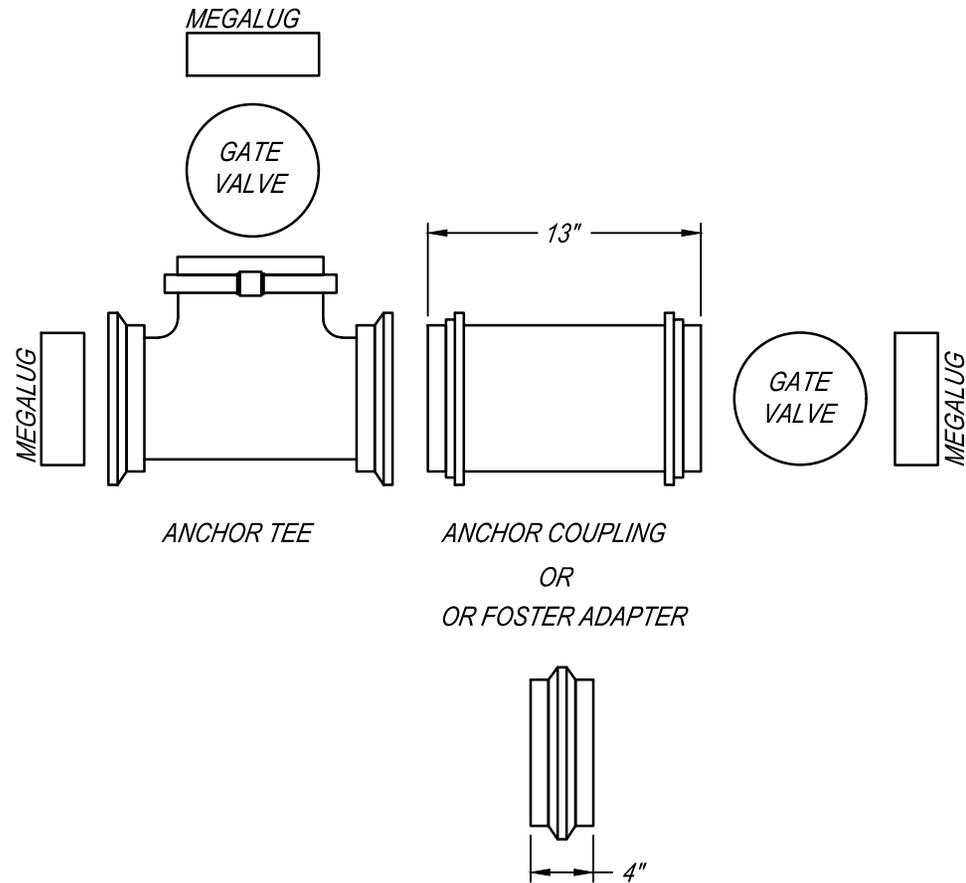
VALVE BOX IN UNIMPROVED AREA



VALVE BOX IN ASPHALT AREA

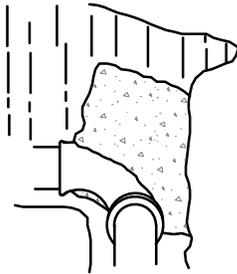
NOTES:

1. ALL ASPHALT MATERIAL SHALL BE TYPE C GRADATION, USING AC-10 OIL AND SHALL BE COMPACTED TO AT LEAST 97% OF MAXIMUM DENSITY.
2. VALVE BOX SHALL BE CENTERED ON VALVE.

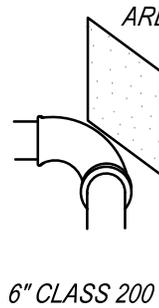


TYPICAL BLOCKING FOR 90° BEND

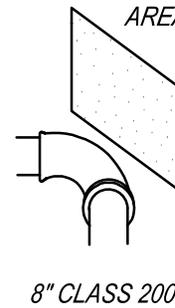
AREA IN SQ. FT. FOR EACH OF THE FOLLOWING PIPE SIZES.



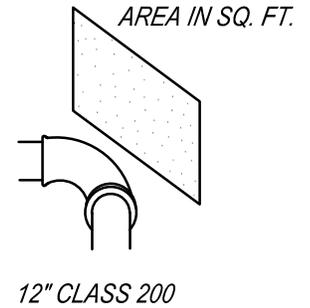
2 SQ. FT. IN ROCK & 4 SQ. FT. IN OTHER SOILS



4 SQ. FT. IN ROCK & 6 SQ. FT. IN OTHER SOILS



9 SQ. FT. IN ROCK & 14 SQ. FT. IN OTHER SOILS



SQ. FT. OF BLOCKING REQUIRED FOR OTHER THAN ROCK EXCAVATION

PIPE SIZE	TEES & DEAD ENDS	90° BENDS	45° BENDS	22.5° BENDS
6"	3	4	2	1
8"	4	6	4	2
12"	10	14	8	4
16"	18	25	14	7

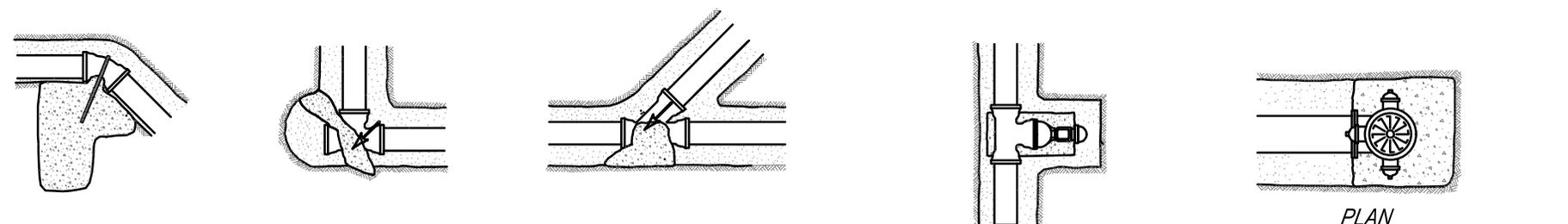
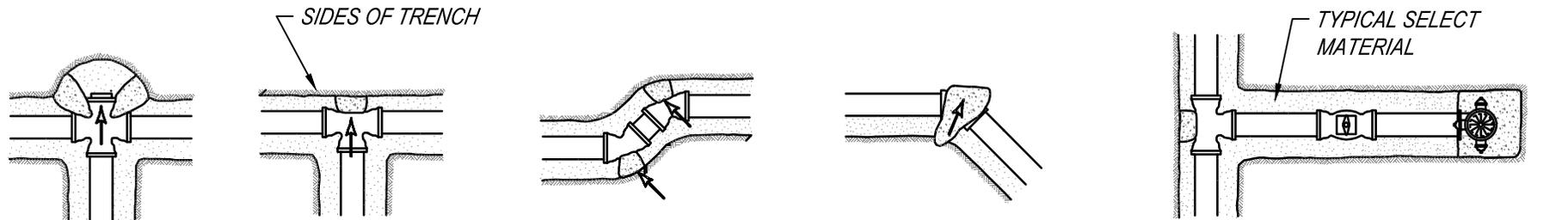
SQ. FT. OF BLOCKING REQUIRED FOR OTHER THAN ROCK EXCAVATION

PIPE SIZE	TEES & DEAD ENDS	90° BENDS	45° BENDS	22.5° BENDS
6"	2	2	1	1
8"	3	4	2	1
12"	6	9	5	2
16"	11	15	8	4

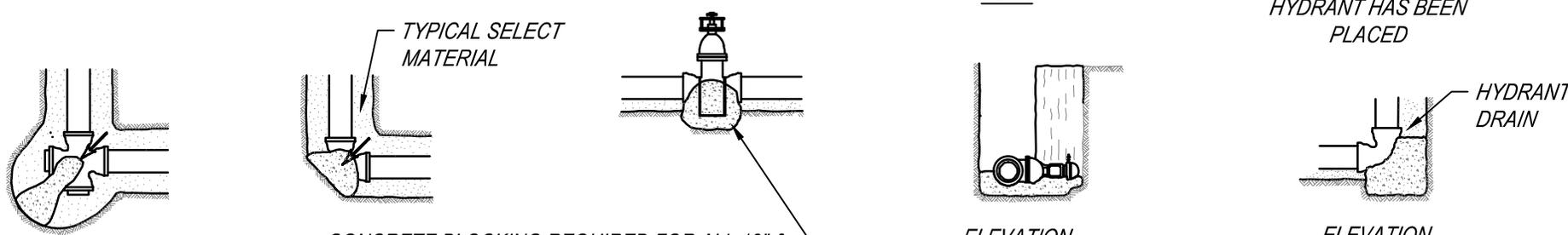
ON BASIS OF 200 PSI WATER PRESSURE USED FOR TESTS, THE BLOCKING REQUIRED FOR TWO TYPES OF SOILS ARE NOTED BELOW. IN ONE CASE, A SOIL PRESSURE OF 5000 PSI IS USED FOR ROCK EXCAVATION AND FOR SOILS OTHER THAN ROCK A 3000 PSI BEARING SOIL PRESSURE IS USED. THE DISTRIBUTION ON SYSTEM IS DESIGNED TO OPERATE WITH A MAXIMUM WATER PRESSURE OF 175 PSI ALL CALCULATIONS APPLY TO ALL TYPES OF PIPE APPROVED FOR USE BY TWC AND MEETING TWC SPECIFICATIONS AND STANDARDS.

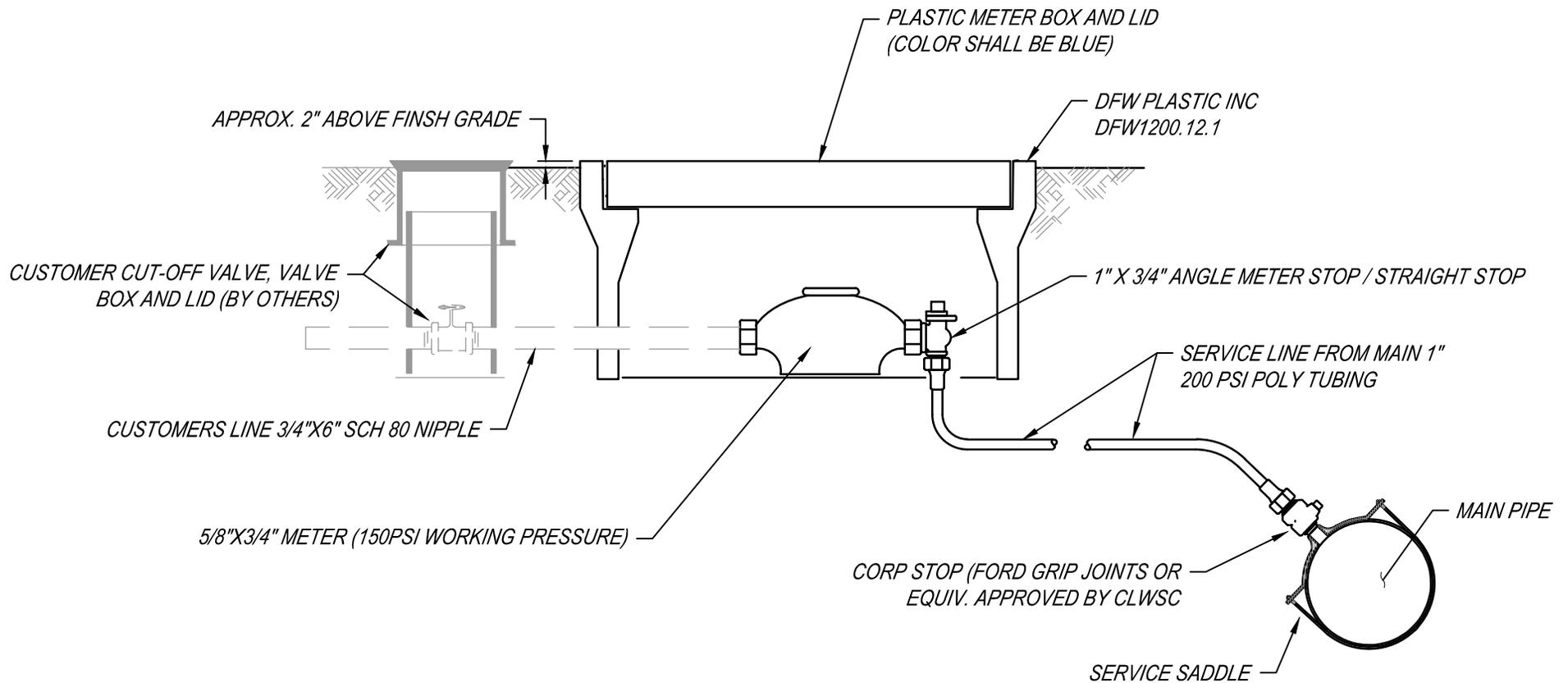
TRANSIT 2500 PSI CONCRETE MIX SHALL BE USED HOWEVER FOR SMALL VOLUME REQUIREMENTS CONCRETE MIXED AT JOB SITE WILL BE ACCEPTABLE ONLY IF A CONCRETE MIXER IS USED, ALL AGGREGATE SHALL BE CLEAN AND THE FIELD MIX SHALL BE IN THE RATIO OF 1:3:4 AND CONTAIN NOT LESS THAN 4 SACKS OF CEMENT PER CUBIC YARD.

BLOCKING AREA FOR 200 PSI TESTS AND 175 PSI WORKING PRESSURE



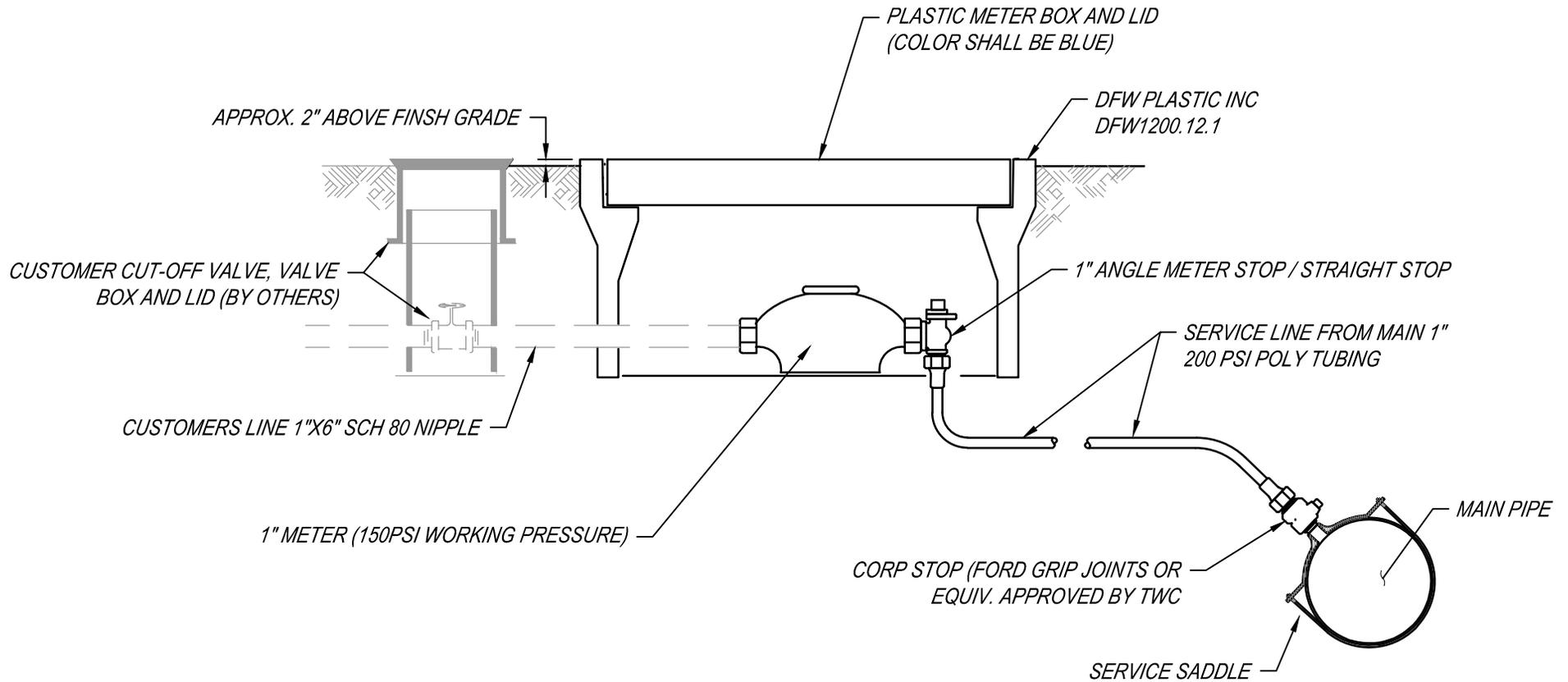
POUR BASE AFTER
HYDRANT HAS BEEN
PLACED





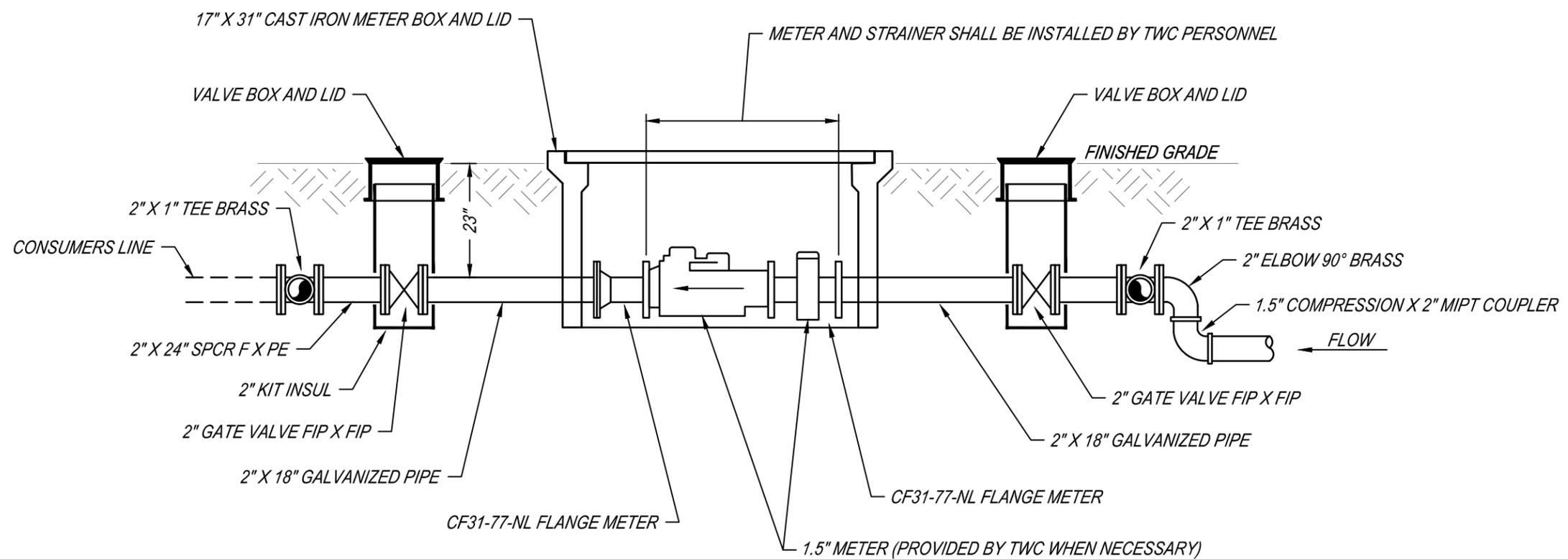
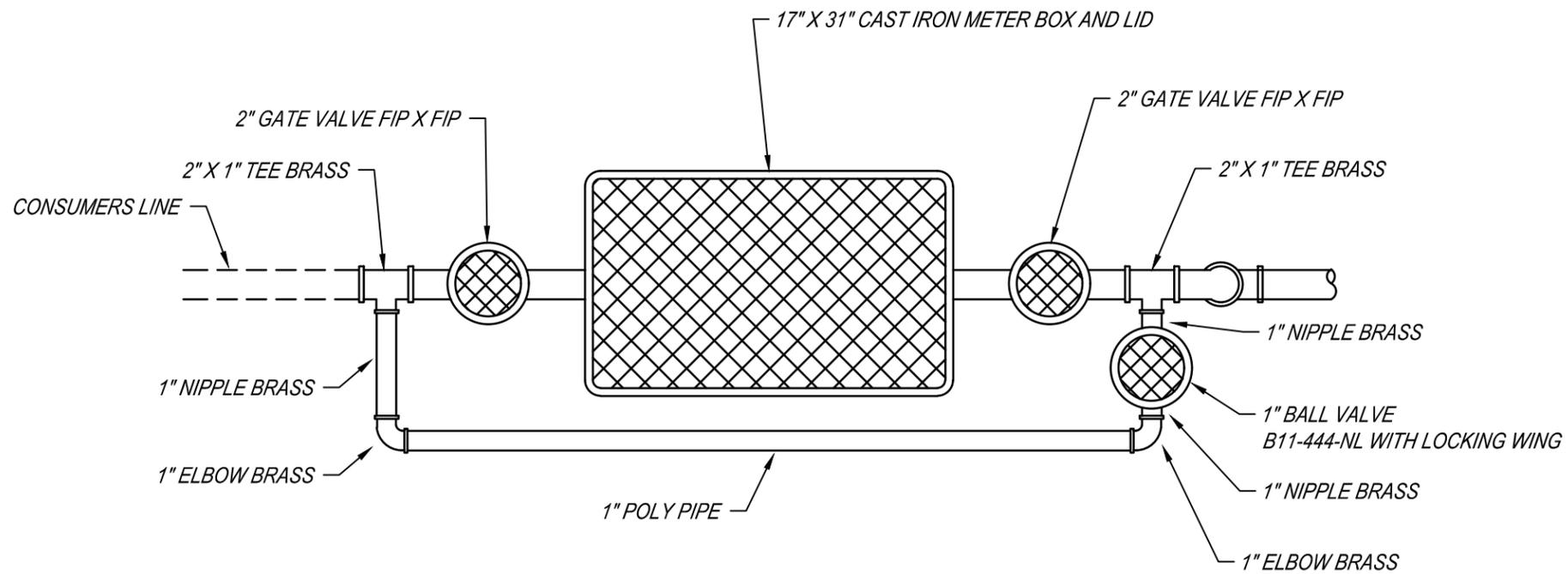
NOTES:

1. SERVICE SADDLES SHALL BE WRAPPED COMPLETELY WITH 8 MIL. POLYETHYLENE FILM.
2. PIPING AND TUBING SHALL BE BEDDED IN GRANULAR MATERIALS AS REQUIRED IN THE SPECIFICATIONS.
3. METERS SUPPLIED BY TWC.



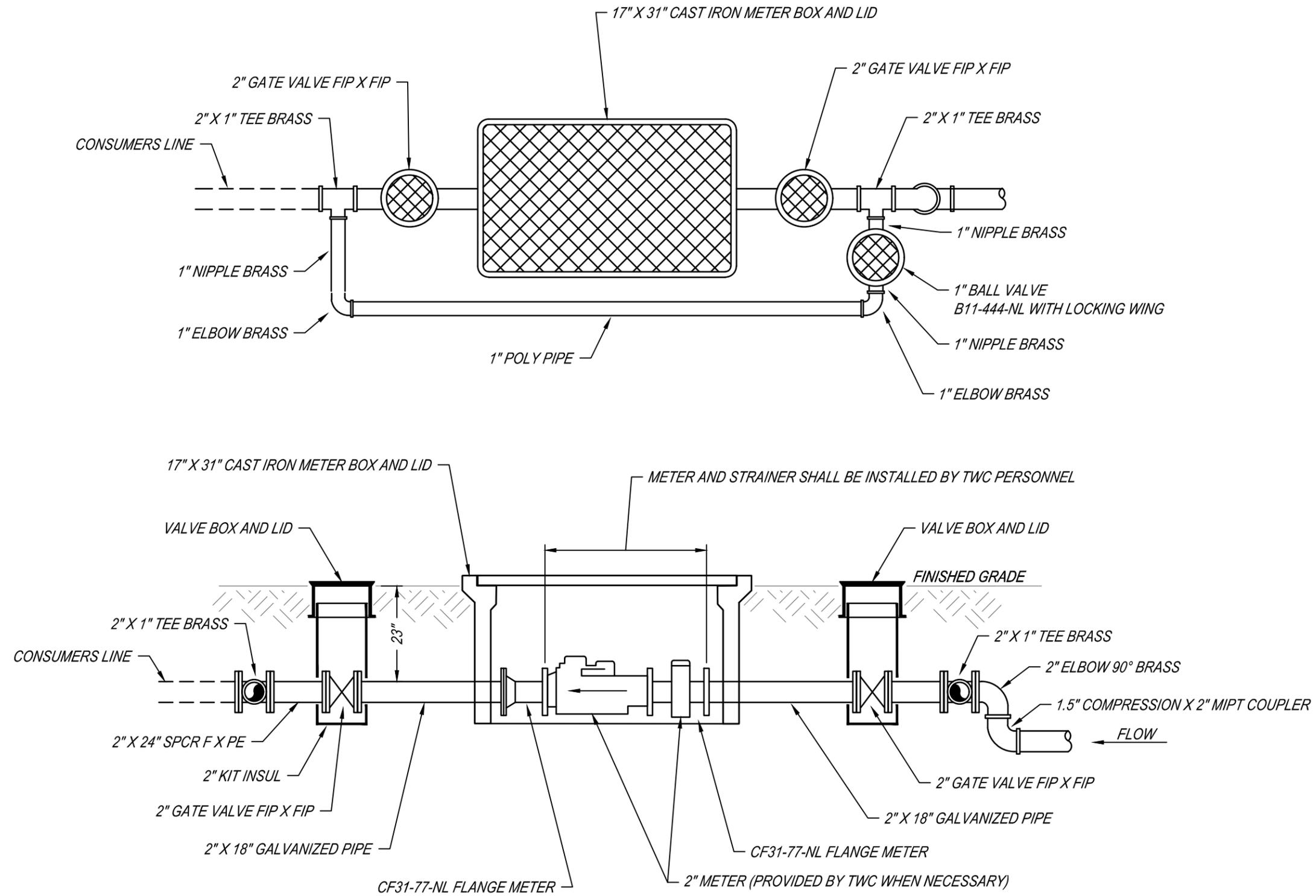
NOTES:

1. SERVICE SADDLES SHALL BE WRAPPED COMPLETELY WITH 8 MIL. POLYETHYLENE FILM.
2. PIPING AND TUBING SHALL BE BEDDED IN GRANULAR MATERIALS AS REQUIRED IN THE SPECIFICATIONS.
3. METERS SUPPLIED BY TWC.



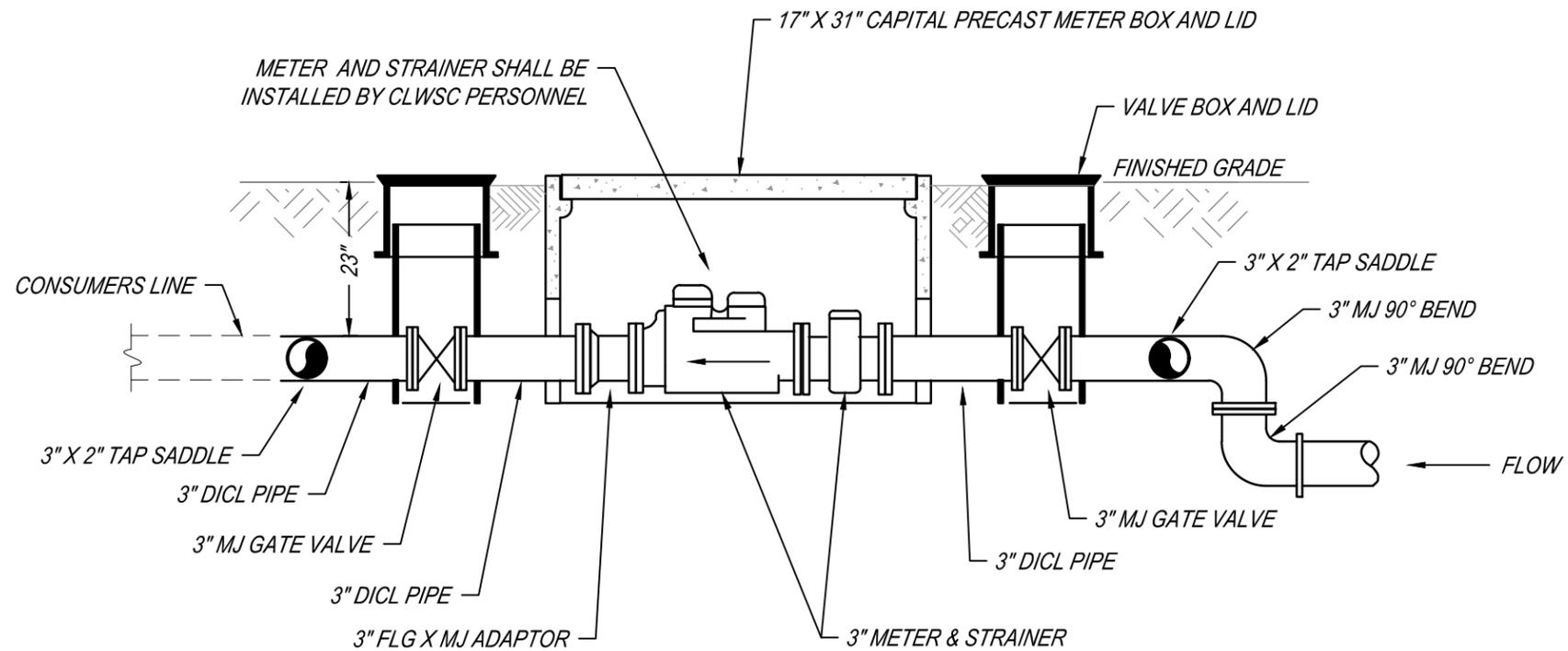
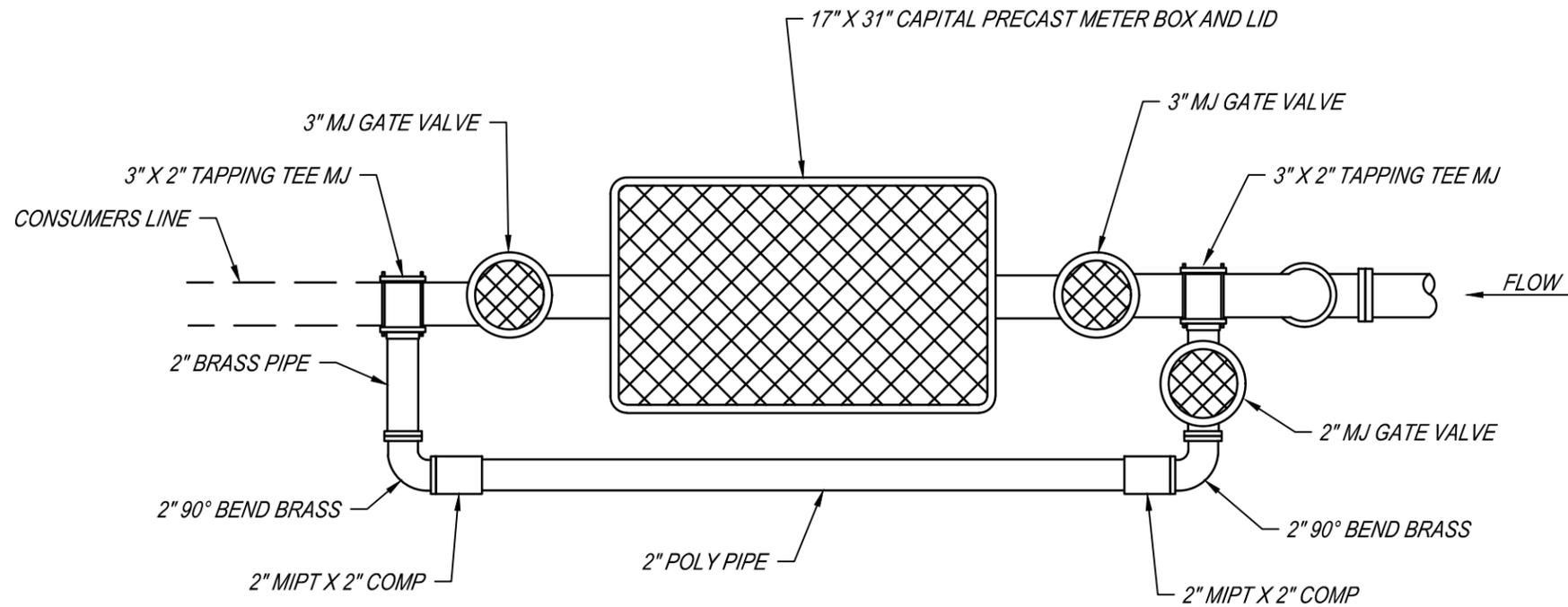
NOTES:

1. USE TRAFFIC RATED BOXES FOR METERS INSTALLED WITHIN DRIVEWAYS OR SIDEWALKS.
2. METER SUPPLIED BY TWC.



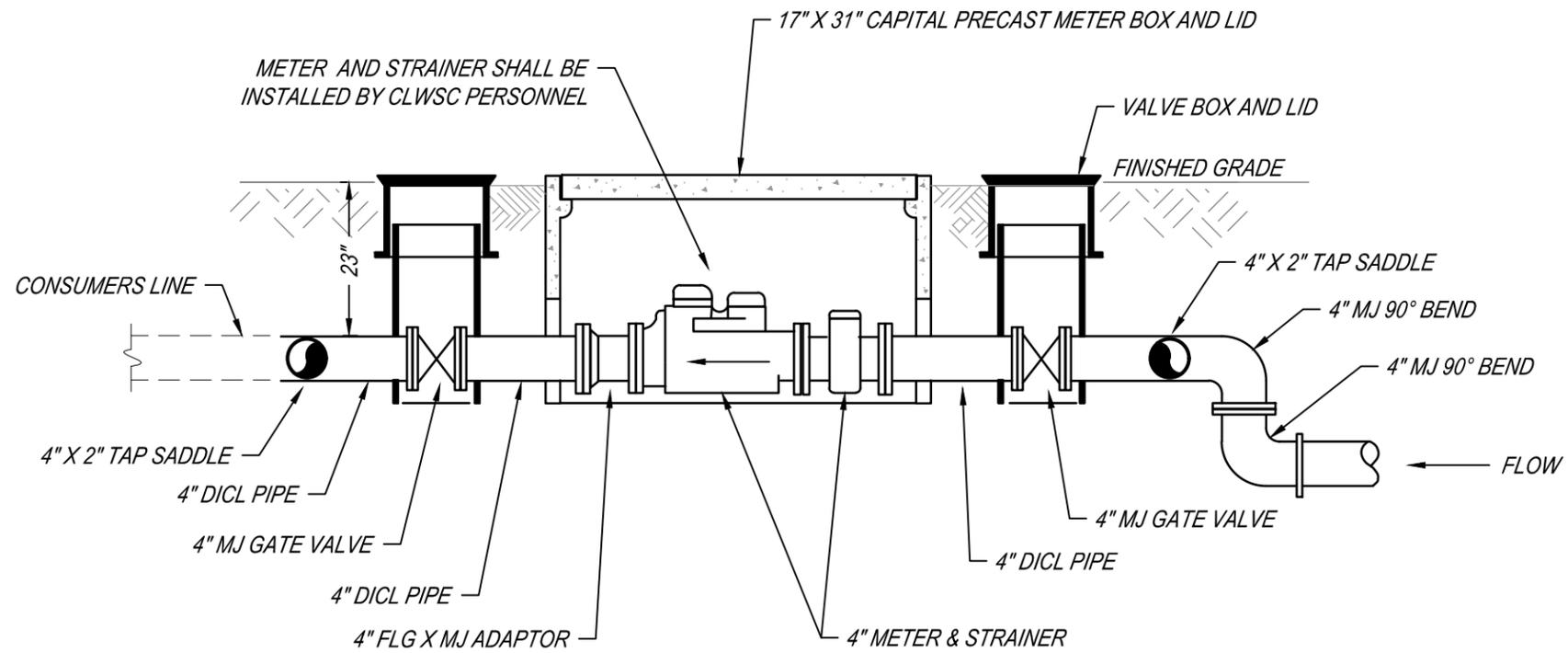
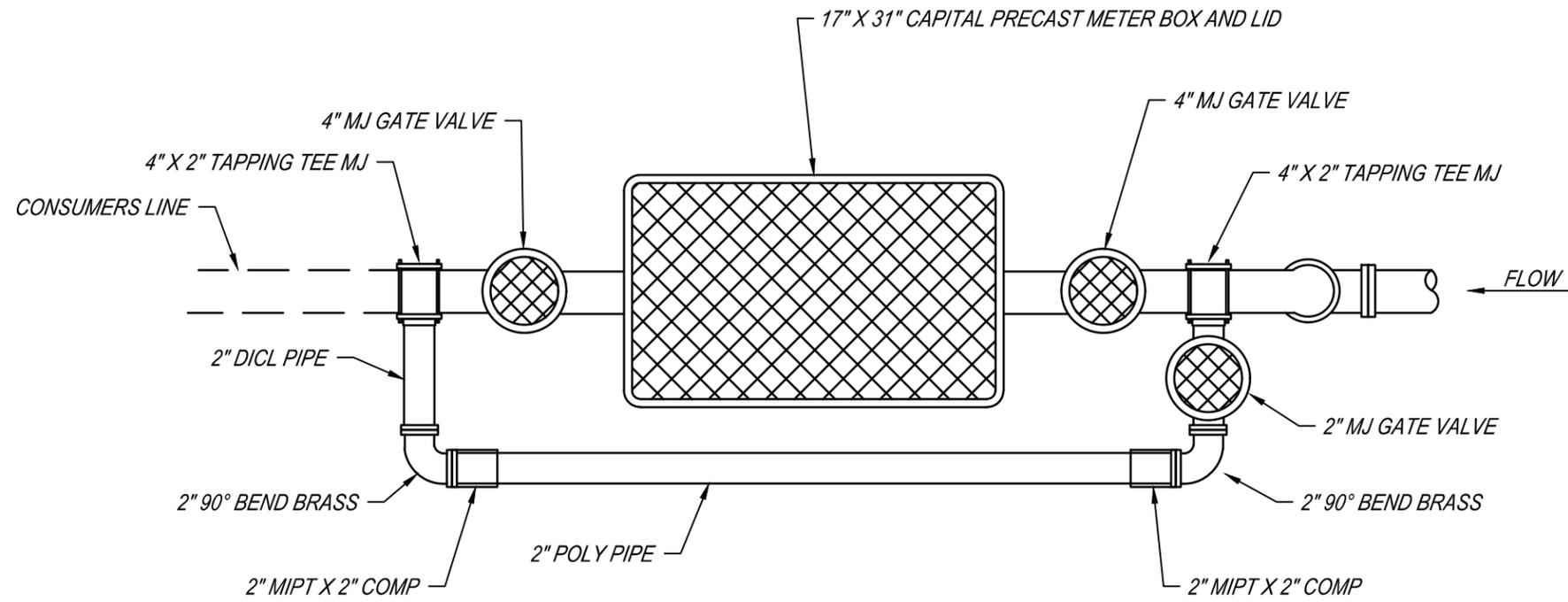
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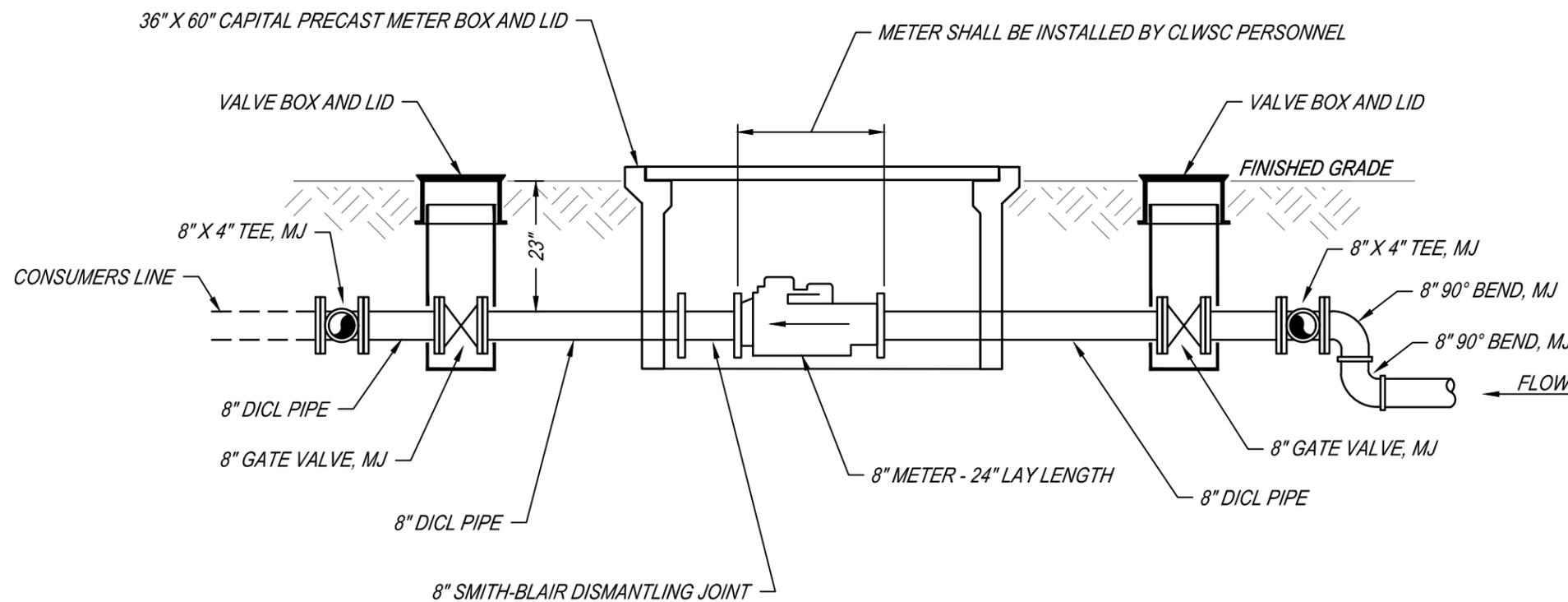
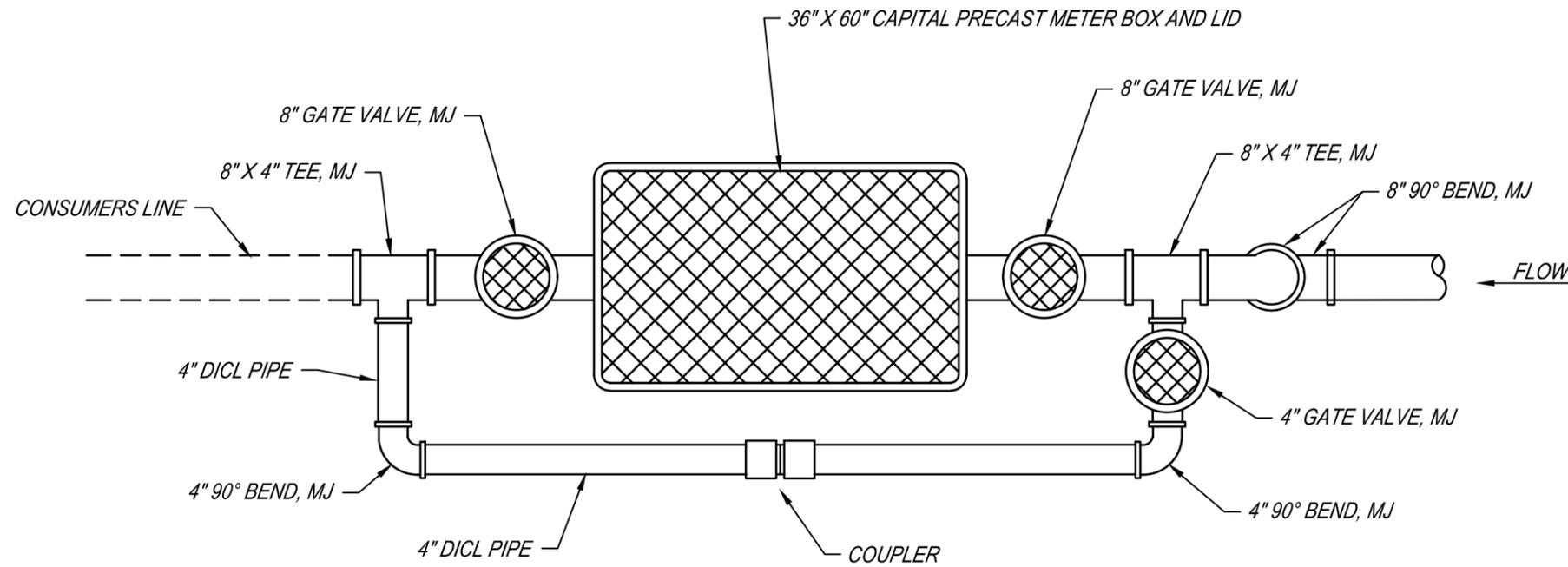
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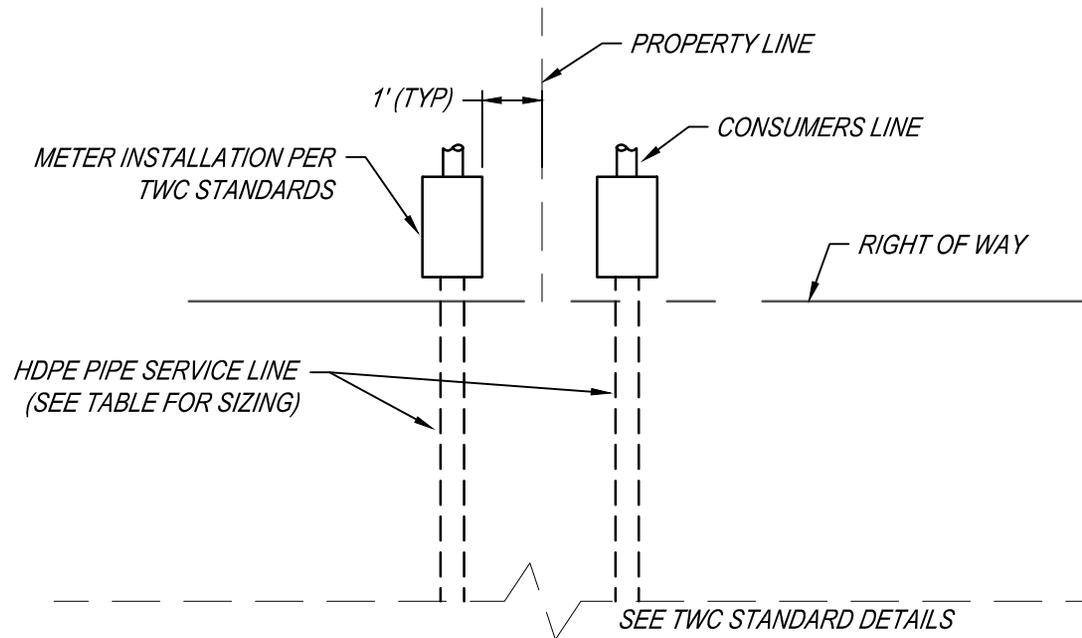
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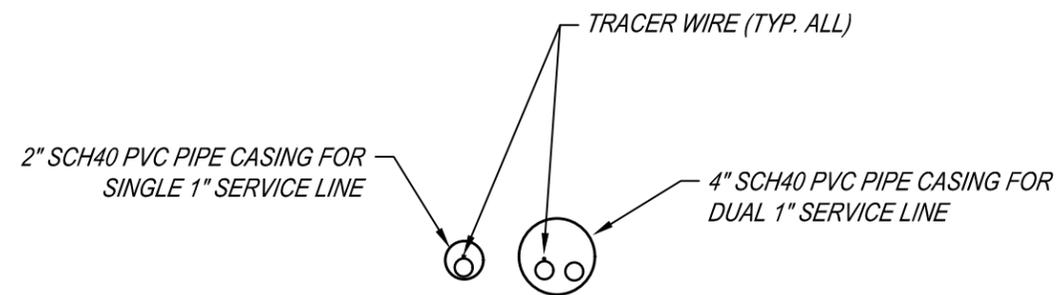
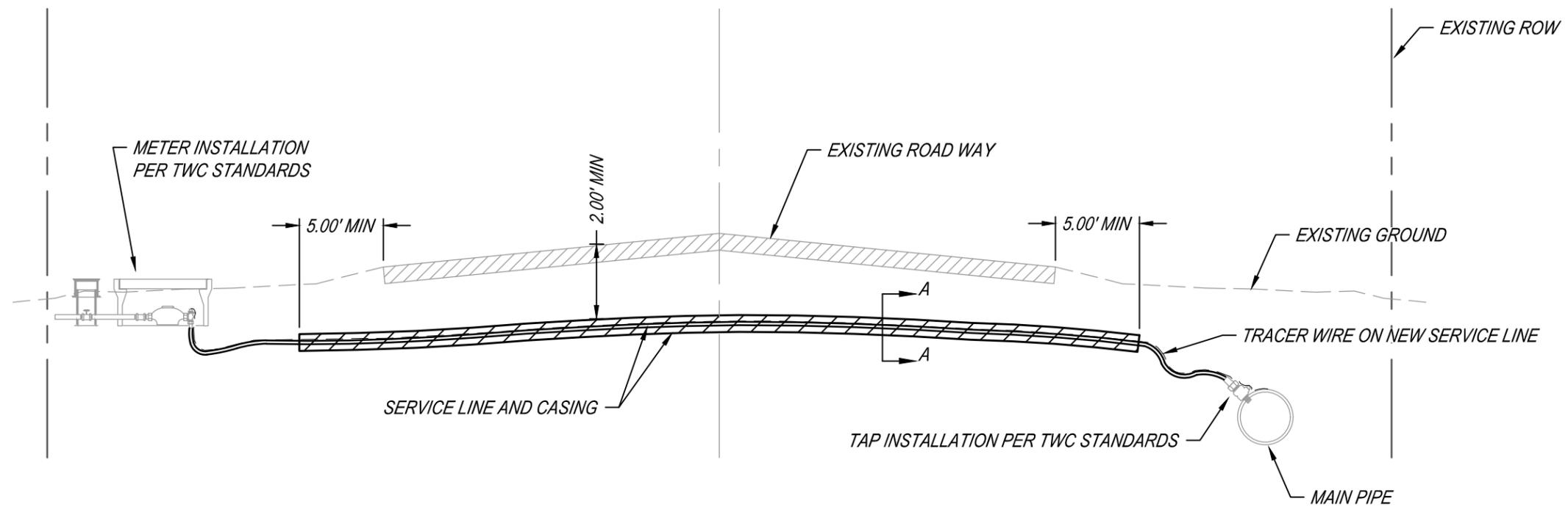
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NOTES

- 1) ALL HDPE SERVICE PIPE SHALL BE 200 PSI SDR9 CTS.
- 2) ALL METERS SHALL BE PLACED WITHIN EASEMENT OR EXISTING CITY/COUNTY RIGHT OF WAY.

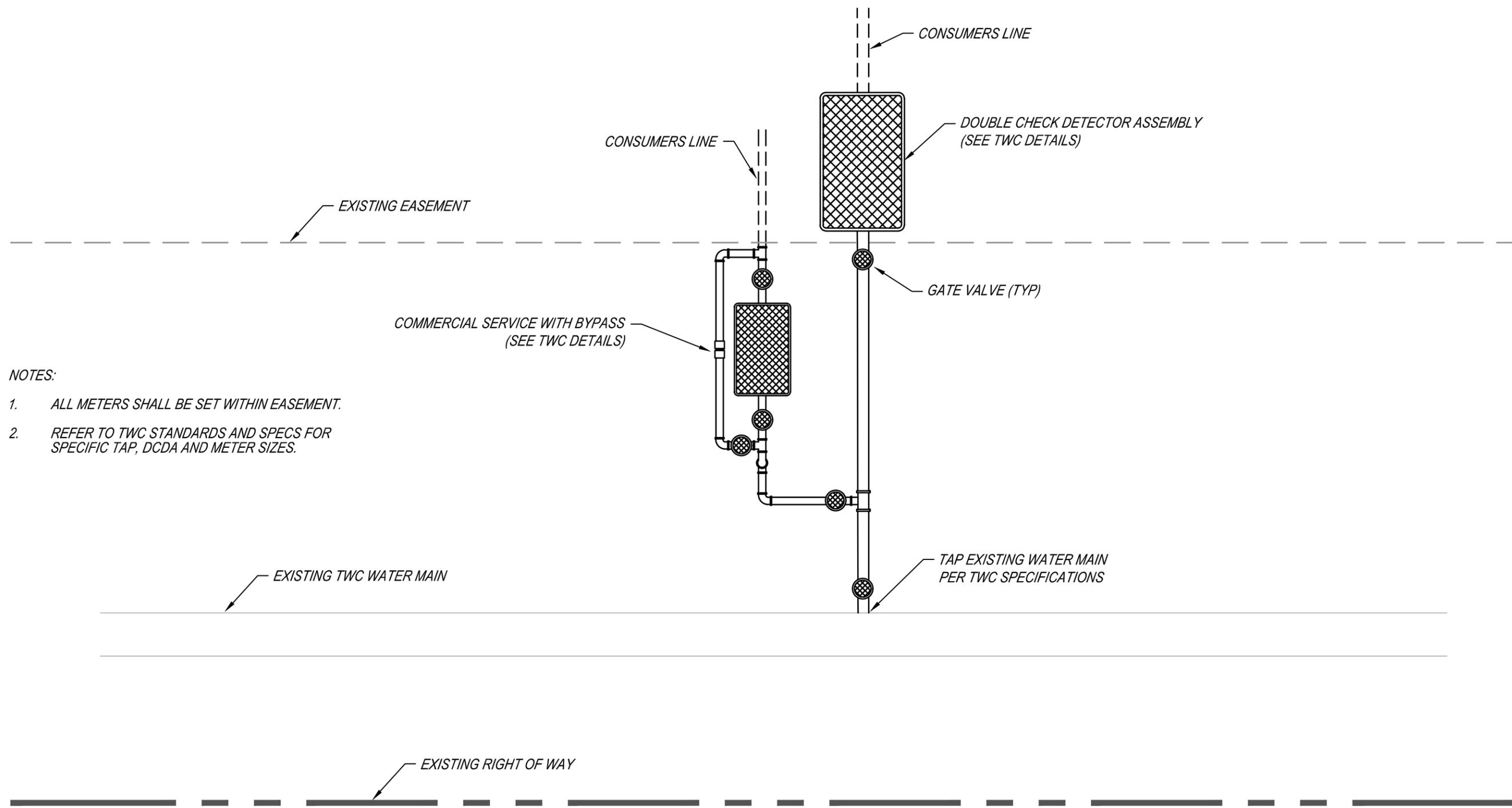
SERVICE SIZING	
HDPE PIPE SIZE	METER SIZE
1"	5/8" / 3/4"
1"	1"



NOTES

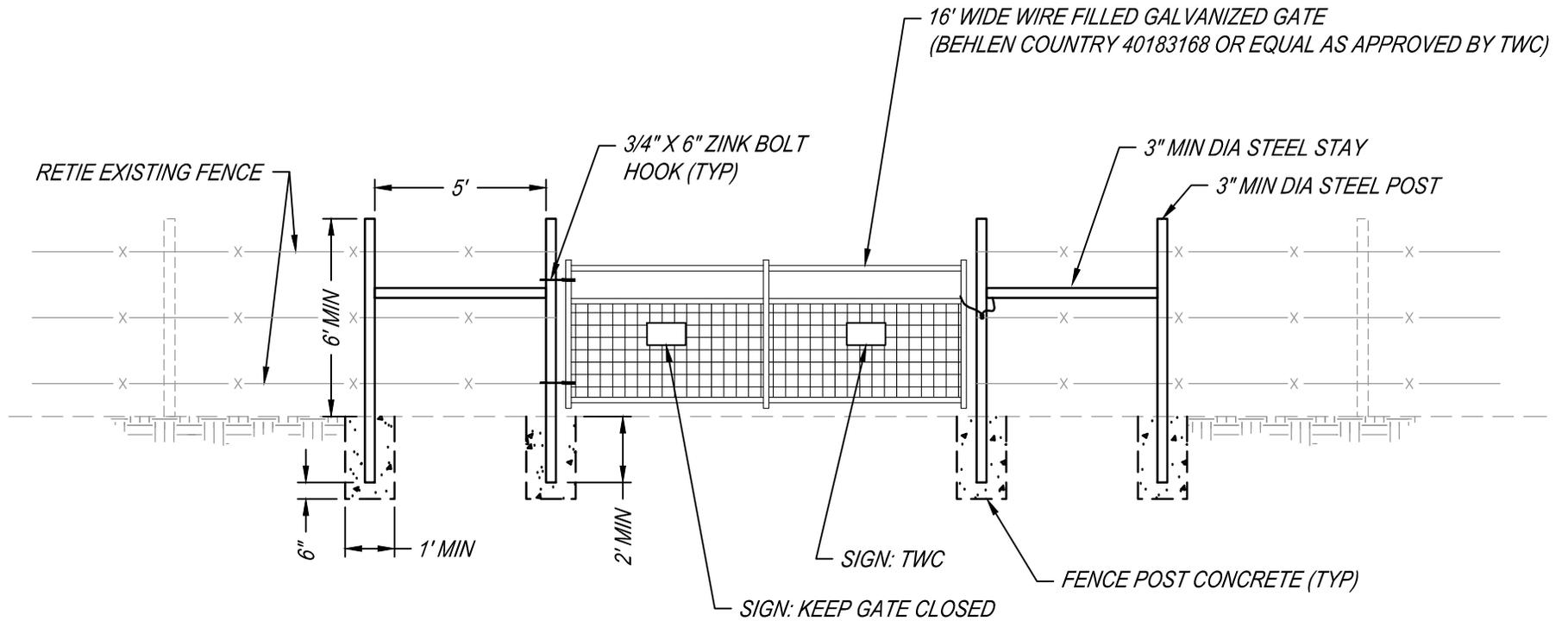
- 1) ALL HDPE SERVICE PIPE SHALL BE 200 PSI.
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SECTION A - A
NOT TO SCALE



NOTES:

1. ALL METERS SHALL BE SET WITHIN EASEMENT.
2. REFER TO TWC STANDARDS AND SPECS FOR SPECIFIC TAP, DCDA AND METER SIZES.



NOTES:

1. LOCK TO BE FURNISHED BY TWC.
2. ALL STEEL POST SHALL BE PRIMED AND FINISH PAINTED WHITE.