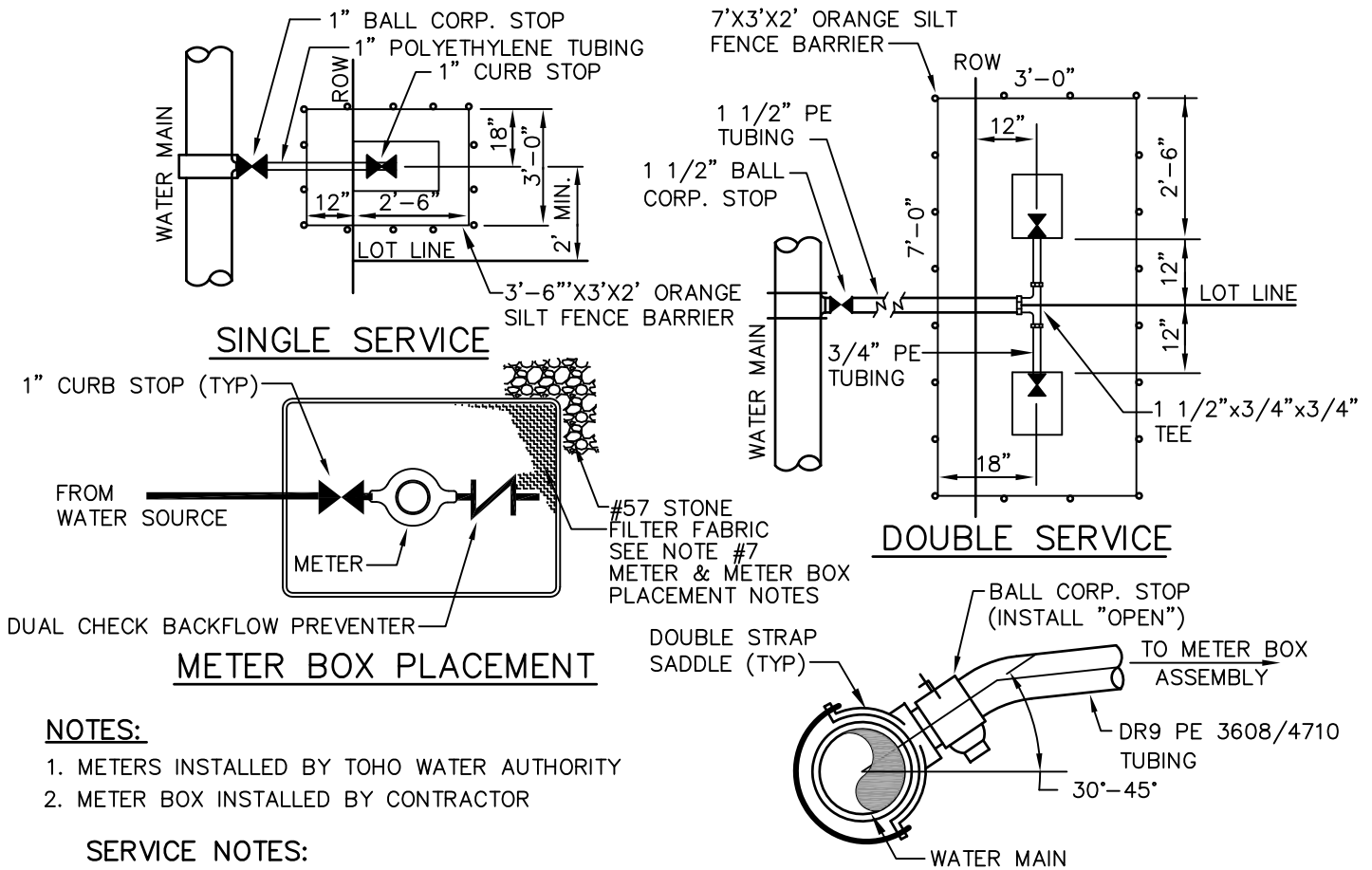


# TOHO WATER AUTHORITY STANDARD DETAILS

2017



951 MARTIN LUTHER KING BLVD  
KISSIMMEE FLORIDA 34741



**NOTES:**

1. METERS INSTALLED BY TOHO WATER AUTHORITY
2. METER BOX INSTALLED BY CONTRACTOR

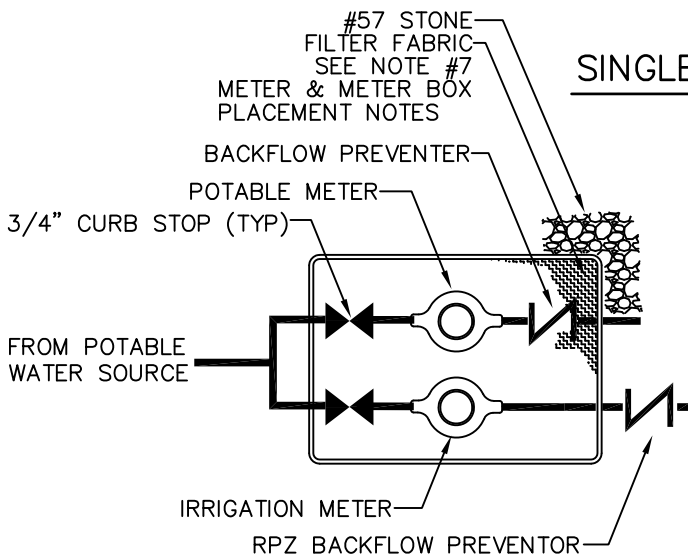
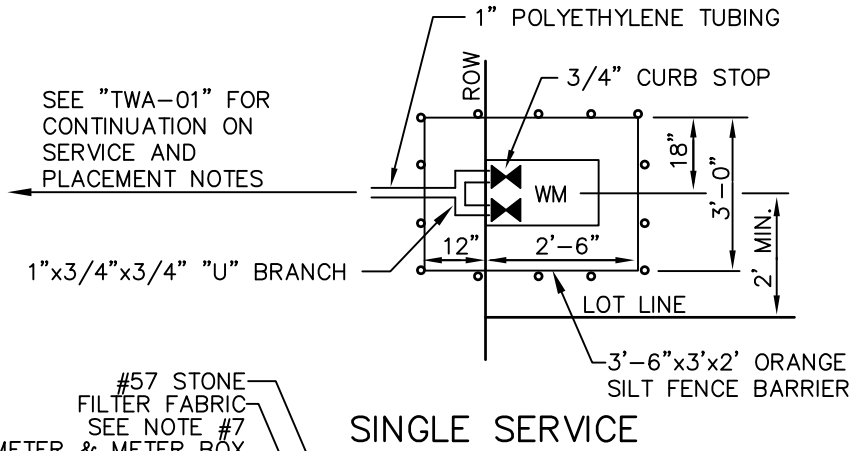
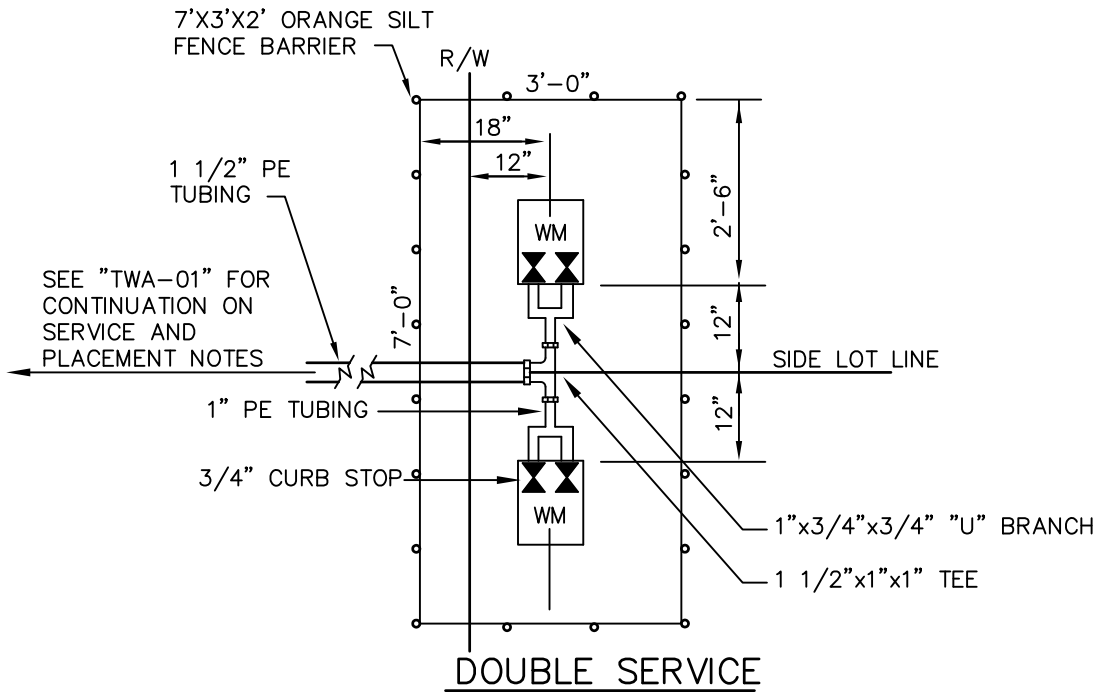
**SERVICE NOTES:**

1. ALL FITTINGS AND STOPS SHALL BE BRASS PACK JOINT TYPE w/CLAMP SCREW RETAINERS.
2. SERVICE SHALL NOT TERMINATE BENEATH PAVEMENT, CURBS, SIDEWALKS OR OTHER STRUCTURES.
3. CURB STOPS SHALL BE LOCKING TYPE, STRAIGHT BALL VALVE WITH OUTLET SIZE AND THREADS TO MATCH INTENDED METER.
4. METER COUPLINGS SHALL NOT BE USED.
5. TAPS SHALL BE A MINIMUM 18" FROM JOINTS, SUCCESSIVE TAPS INTO THE WATER MAIN SHOULD BE SPACED A MINIMUM 18".
6. THE SERVICE LINE SHALL BE CONTINUOUS FROM CORPORATION STOP TO CURB STOP OR TEE BRANCH WITH NO FITTINGS IN BETWEEN.
7. TRACER WIRE SHOULD BE RUN WITH ALL SERVICES A MINIMUM OF 1' BEYOND THE CURB STOP AND TIED INTO THE TRACER WIRE THAT RUNS WITH THE MAIN.
8. NO FITTINGS SHALL BE INSTALLED UNDER AN IMPERVIOUS SURFACE.
9. SERVICE TUBING SHALL BE POLYETHYLENE DR9, 200 PSI. BLUE FOR POTABLE, PURPLE FOR REUSE.
10. ETCH A 3 INCH "W" IN THE CURB. "R" FOR REUSE.
11. THIS DETAIL IS INTENDED FOR SINGLE OR DOUBLE SERVICE CONNECTIONS. SEE DETAIL TWA-03 "MULTIPLE WATER SERVICE CONNECTION" FOR GROUPS OF 3 TO 10 SERVICE CONNECTIONS.

**METER & METER BOX PLACEMENT NOTES:**

1. APPROVED BACKFLOW PREVENTION IS REQUIRED ON ALL SERVICES.
2. BACKFLOW PREVENTERS SHALL BE INSTALLED MINIMUM OF 12" ABOVE FLOOD PLAIN ("DCV" OR RPZ"). "PVB" MUST BE INSTALLED A MINIMUM OF 12" ABOVE THE HIGHEST OUTLET.
3. THE BUILDER SHALL MAKE FINAL HORIZONTAL AND VERTICAL ADJUSTMENTS TO METER ASSEMBLY AND METER BOX. THE METER ASSEMBLY SHALL BE ADJUSTED TO APPROXIMATELY 7" BELOW FINISH GRADE. THE METER BOX SHALL BE CENTERED OVER METER ASSEMBLY, AS SHOWN ABOVE.
4. SINGLE SERVICE METER BOX SHALL BE UNIFORMLY PERPENDICULAR TO THE CURB OR SIDEWALK. DOUBLE SERVICE METER BOXES SHALL BE UNIFORMLY PARALLEL TO THE CURB OR SIDEWALK PER DETAIL TWA-29. TOP OF METER BOX TO BE ADJUSTED FLUSH WITH FINISH GRADE
5. MAINTAIN A MINIMUM OF 3' CLEARANCE FREE OF ALL PLANTINGS & STRUCTURES AROUND METER BOX.
6. METER BOX LIDS SHALL BE SOLID PLASTIC W/NO METAL. BLACK FOR WATER, PURPLE FOR REUSE.
7. PLACE FILTER FABRIC UNDER METER BOX EXTENDING 1' BEYOND ALL DIRECTIONS. BELOW METER BOX PROVIDE #57 STONE A MIN. 6" DEEP EXTENDING BEYOND THE METER BOX 1' IN ALL DIRECTIONS.
8. INSTALL CURB STOP WITH OPERATING NUT FACING UP.
9. METER BOXES ARE TO BE SET AT SOD GRADE.

**TYPICAL RESIDENTIAL WATER SERVICE**



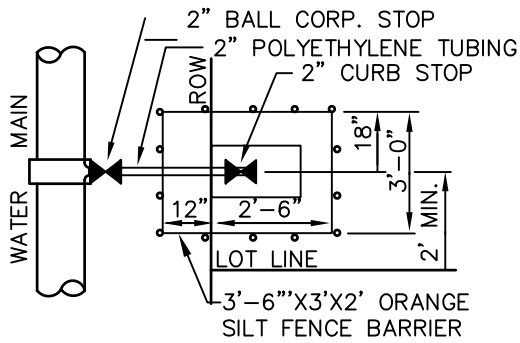
**NOTES:**

1. METERS INSTALLED BY TOHO WATER AUTHORITY
2. METER BOX INSTALLED BY CONTRACTOR
3. METER BOX SHALL BE CENTERED OVER METERS, AS SHOWN, FOR EASY ACCESS
4. SEE "TYPICAL RESIDENTIAL WATER SERVICE FOR SERVICE AND METERS & METER BOX PLACEMENT NOTES.
5. POTABLE IRRIGATION BACKFLOW PREVENTERS SHALL BE INSTALLED MINIMUM OF 12" ABOVE FLOOD PLAIN ("DCV" OR RPZ"). "PVB" MUST BE INSTALLED A MINIMUM OF 12" ABOVE THE HIGHEST OUTLET, MAX. 18" FROM METER.
6. TRACER WIRE SHOULD BE RUN WITH ALL SERVICES A MINIMUM OF 1' BEYOND THE CURB STOP AND TIED INTO THE TRACER WIRE THAT RUNS WITH THE MAIN.
7. PLACE FILTER FABRIC UNDER METER BOX EXTENDING 1' BEYOND ALL DIRECTIONS. BELOW METER BOX PROVIDE #57 STONE A MIN. 6" DEEP EXTENDING BEYOND THE METER BOX 1' IN ALL DIRECTIONS.
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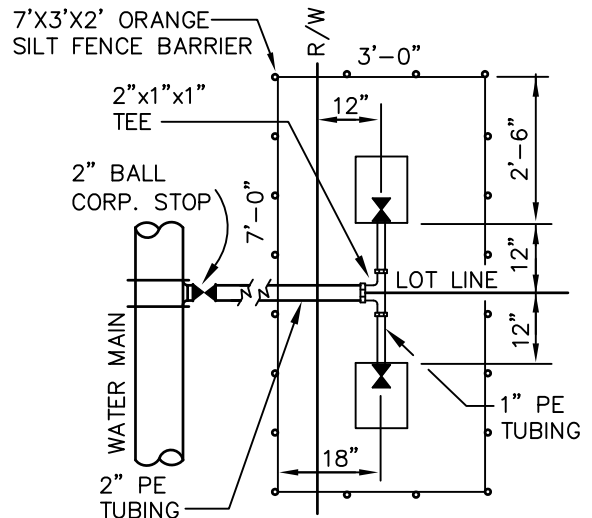
**METER BOX PLACEMENT**

**TYPICAL POTABLE WATER AND IRRIGATION SERVICE**

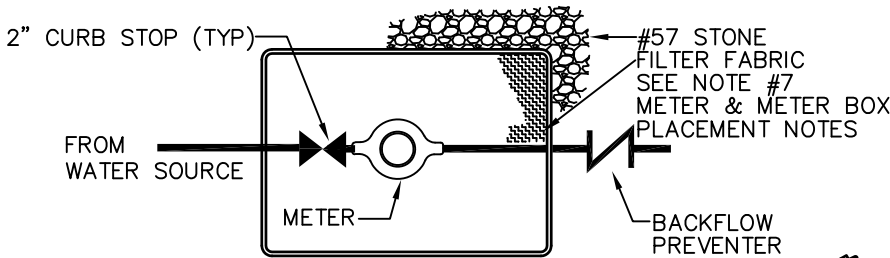
FOR COMMUNITIES WITHOUT REUSE WATER



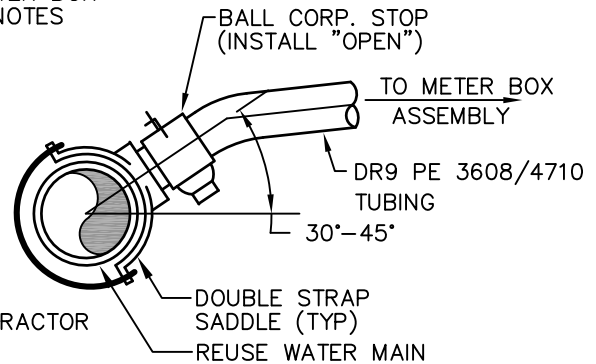
**SINGLE SERVICE**



**DOUBLE SERVICE**



**METER BOX PLACEMENT**



**NOTES:**

1. METERS INSTALLED BY TOHO WATER AUTHORITY
2. METER BOX AND BACKFLOW PREVENTER INSTALLED BY CONTRACTOR

**SERVICE NOTES:**

1. ALL FITTINGS AND STOPS SHALL BE BRASS PACK JOINT TYPE w/CLAMP SCREW RETAINERS.
2. SERVICE SHALL NOT TERMINATE BENEATH PAVEMENT, CURBS, SIDEWALKS OR OTHER STRUCTURES.
3. CURB STOPS SHALL BE LOCKING TYPE, STRAIGHT BALL VALVE WITH OUTLET SIZE AND THREADS TO MATCH INTENDED METER.
4. METER COUPLINGS SHALL NOT BE USED.
5. TAPS SHALL BE A MINIMUM 18" FROM JOINTS, SUCCESSIVE TAPS INTO THE WATER MAIN SHOULD BE SPACED A MINIMUM 18".
6. THE SERVICE LINE SHALL BE CONTINUOUS FROM CORPORATION STOP TO CURB STOP OR TEE BRANCH WITH NO FITTINGS IN BETWEEN.
7. TRACER WIRE SHOULD BE RUN WITH ALL SERVICES A MINIMUM OF 1' BEYOND THE CURB STOP AND TIED INTO THE TRACER WIRE THAT RUNS WITH THE MAIN.
8. NO FITTINGS SHALL BE INSTALLED UNDER AN IMPERVIOUS SURFACE.
9. SERVICE TUBING SHALL BE POLYETHYLENE DR9, 200 PSI. BLUE FOR POTABLE, PURPLE FOR REUSE.
10. ETCH A 3 INCH "W" IN THE CURB. "R" FOR REUSE.
11. THIS DETAIL IS INTENDED FOR SINGLE OR DOUBLE SERVICE CONNECTIONS. SEE DETAIL TWA-03 "MULTIPLE WATER SERVICE CONNECTION" FOR GROUPS OF 3 TO 10 SERVICE CONNECTIONS.

**METER & METER BOX PLACEMENT NOTES:**

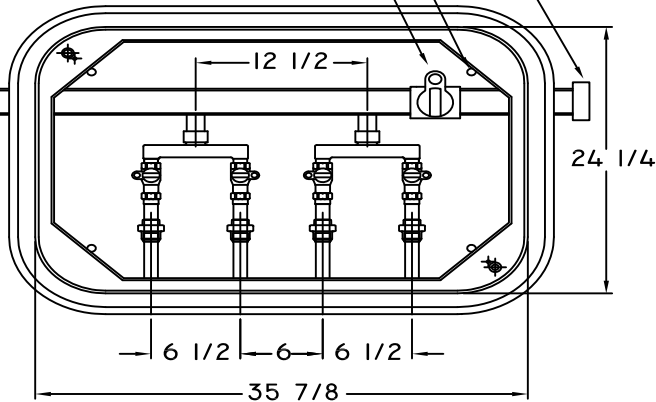
1. APPROVED BACKFLOW PREVENTION IS REQUIRED ON ALL SERVICES.
2. BACKFLOW PREVENTERS SHALL BE INSTALLED MINIMUM OF 12" ABOVE FLOOD PLAIN ("DCV" OR RPZ"). "PVB" MUST BE INSTALLED A MINIMUM OF 12" ABOVE THE HIGHEST OUTLET.
3. THE BUILDER SHALL MAKE FINAL HORIZONTAL AND VERTICAL ADJUSTMENTS TO METER ASSEMBLY AND METER BOX. THE METER ASSEMBLY SHALL BE ADJUSTED TO APPROXIMATELY 7" BELOW FINISH GRADE. THE METER BOX SHALL BE CENTERED OVER METER ASSEMBLY, AS SHOWN ABOVE.
4. SINGLE SERVICE METER BOX SHALL BE UNIFORMLY PERPENDICULAR TO THE CURB OR SIDEWALK. DOUBLE SERVICE METER BOXES SHALL BE UNIFORMLY PARALLEL TO THE CURB OR SIDEWALK PER DETAIL TWA-29. TOP OF METER BOX TO BE ADJUSTED FLUSH WITH FINISH GRADE
5. MAINTAIN A MINIMUM OF 3' CLEARANCE FREE OF ALL PLANTINGS & STRUCTURES AROUND METER BOX.
6. METER BOX LIDS SHALL BE SOLID PLASTIC W/NO METAL. BLACK FOR WATER, PURPLE FOR REUSE.
7. PLACE FILTER FABRIC UNDER METER BOX EXTENDING 1' BEYOND ALL DIRECTIONS. BELOW METER BOX PROVIDE #57 STONE A MIN. 6" DEEP EXTENDING BEYOND THE METER BOX 1' IN ALL DIRECTIONS.
8. INSTALL CURB STOP WITH OPERATING NUT FACING UP.
9. METER BOXES ARE TO BE SET AT SOD GRADE.

1" DIA. DRAIN HOLES IN BOTTOM (4x)

CURB STOP SHALL BE PLACED DOWNSTREAM OF METERS. (TYP)

BRASS CAP

DIRECTION OF FLOW

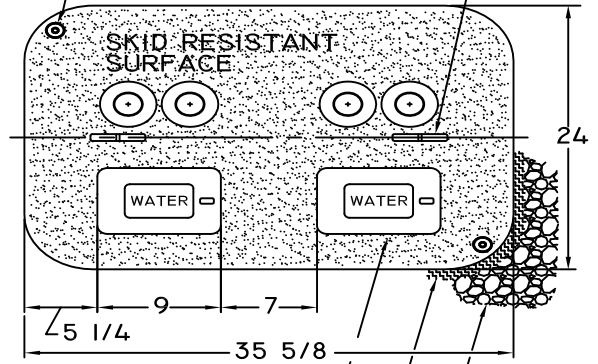


**TOP VIEW**

COVER BOLTDOWN (SEE DETAIL)

5/8x4 LIFT SLOT(2x)

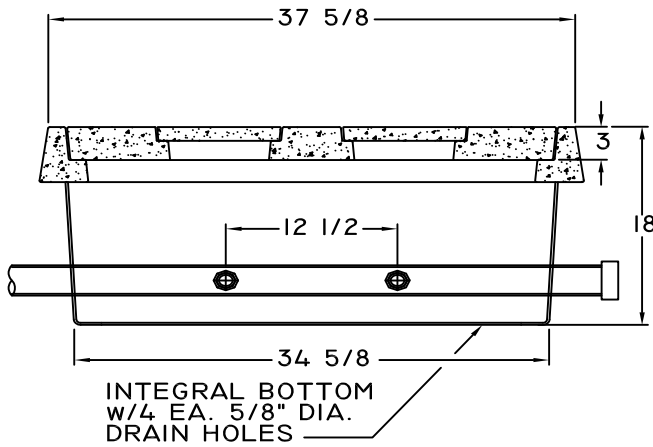
SKID RESISTANT SURFACE



6"x9"x1" DROP IN LID(2x)

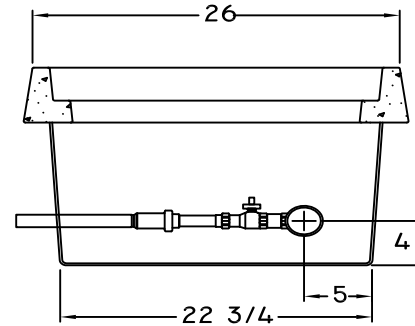
**COVER**

FILTER FABRIC #57 STONE SEE NOTE #7

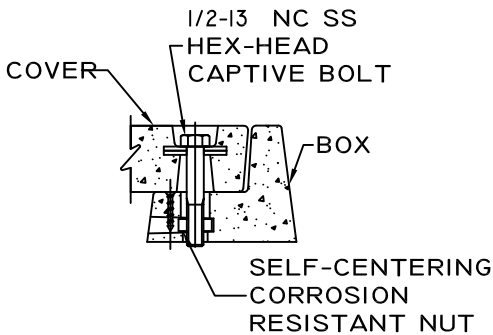


INTEGRAL BOTTOM W/4 EA. 5/8" DIA. DRAIN HOLES

**SECTION**



**SECTION**



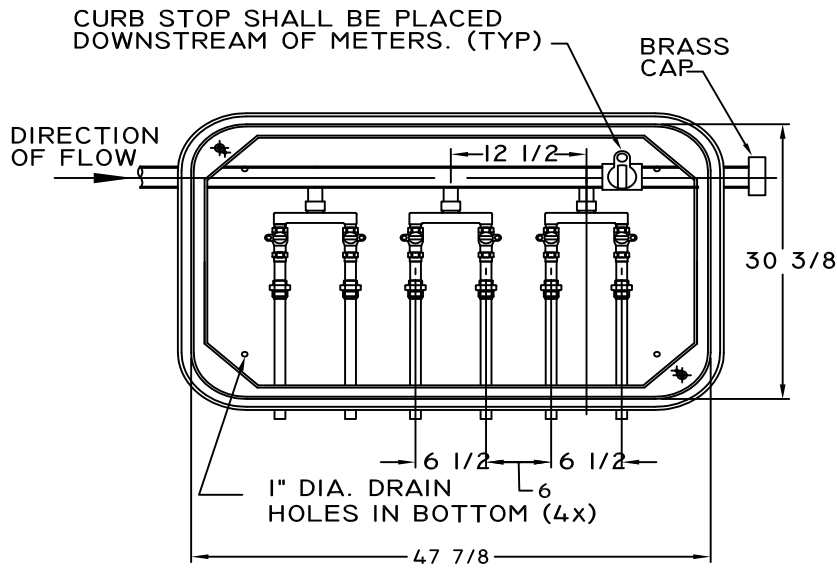
**COVER BOLTDOWN DETAIL**

**NOTES:**

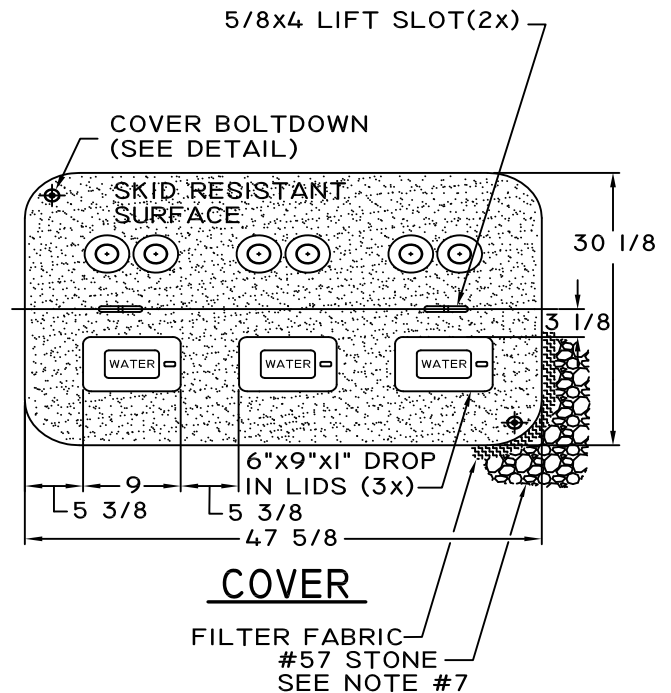
1. THIS DETAIL IS INTENDED FOR GROUPS OF 3-4 SERVICE CONNECTIONS.
2. SEE DETAIL TWA-01 "TYPICAL RESIDENTIAL WATER SERVICE" AND TWA-02 "TYPICAL COMMERCIAL WATER SERVICE" FOR ADDITIONAL REQUIREMENTS.
3. CONTRACTOR SHALL ENSURE THAT THE METER BOX/ES BE CORRECTLY ORIENTED.
4. METER BOX/ES MUST BE ORDERED WITH METER SIZE/S SPECIFIED.
5. BRASS UNION NIPPLE AND CURB STOP TO CONNECT TO SERVICE.
6. TRACER WIRE SHOULD BE RUN WITH ALL SERVICES A MINIMUM OF 1' BEYOND THE CURB STOP AND TIED INTO THE TRACER WIRE THAT RUNS WITH THE MAIN.
7. PLACE FILTER FABRIC UNDER METER BOX EXTENDING 1' BEYOND ALL DIRECTIONS. BELOW METER BOX PROVIDE #57 STONE A MIN 6" DEEP EXTENDING BEYOND THE METER BOX 1' IN ALL DIRECTIONS.
8. INSTALL CURB STOP WITH OPERATING NUT FACING UP.
9. METER BOXES ARE TO BE SET TO SOD GRADE.

• MATERIAL: FIBERGLASS REINFORCED POLYMER CONCRETE & FIBERGLASS REINFORCED POLYMER

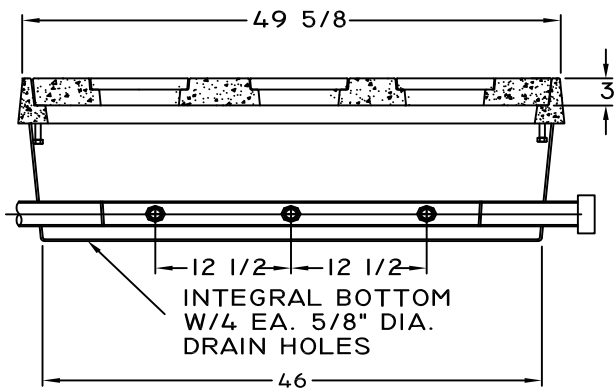
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2017



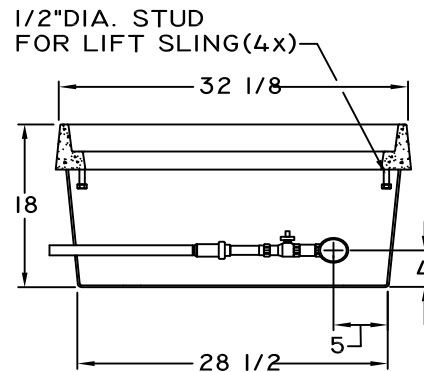
**TOP VIEW**



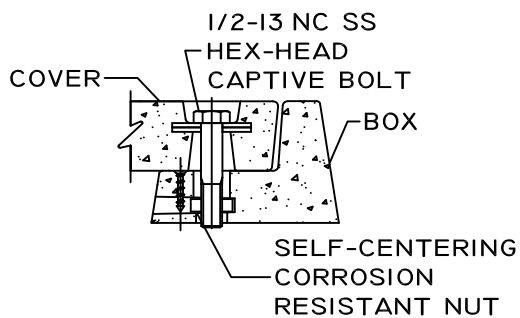
**COVER**



**SECTION**



**SECTION**

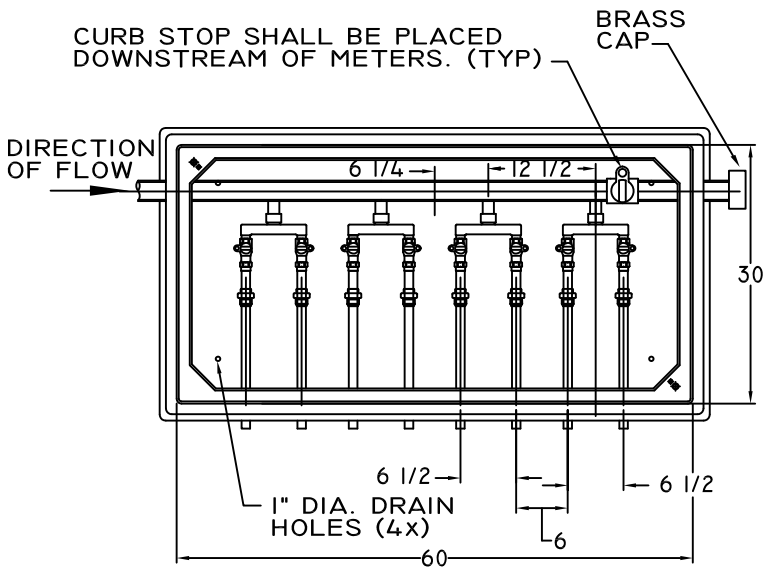


**COVER BOLTDOWN DETAIL**

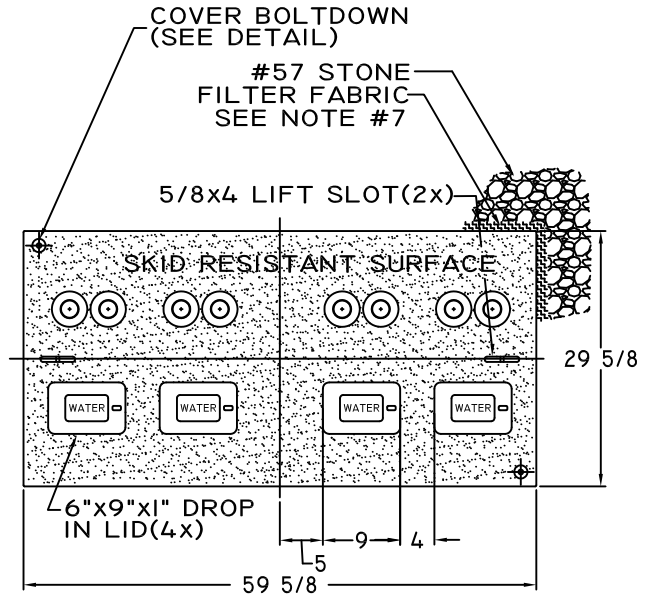
**NOTES:**

1. THIS DETAIL IS INTENDED FOR GROUPS OF 5-6 SERVICE CONNECTIONS.
2. SEE DETAIL TWA-01 "TYPICAL RESIDENTIAL WATER SERVICE" AND TWA-02 "TYPICAL COMMERCIAL WATER SERVICE" FOR ADDITIONAL REQUIREMENTS.
3. CONTRACTOR SHALL ENSURE THAT THE METER BOX/ES BE CORRECTLY ORIENTED.
4. METER BOX/ES MUST BE ORDERED WITH METER SIZE/S SPECIFIED.
5. BRASS UNION NIPPLE AND CURB STOP TO CONNECT TO SERVICE.
6. TRACER WIRE SHOULD BE RUN WITH ALL SERVICES A MINIMUM OF 1' BEYOND THE CURB STOP AND TIED INTO THE TRACER WIRE THAT RUNS WITH THE MAIN.
7. PLACE FILTER FABRIC UNDER METER BOX EXTENDING 1' BEYOND ALL DIRECTIONS. BELOW METER BOX PROVIDE #57 STONE A MIN 6" DEEP EXTENDING BEYOND THE METER BOX 1' IN ALL DIRECTIONS.
8. INSTALL CURB STOP WITH OPERATING NUT FACING UP.
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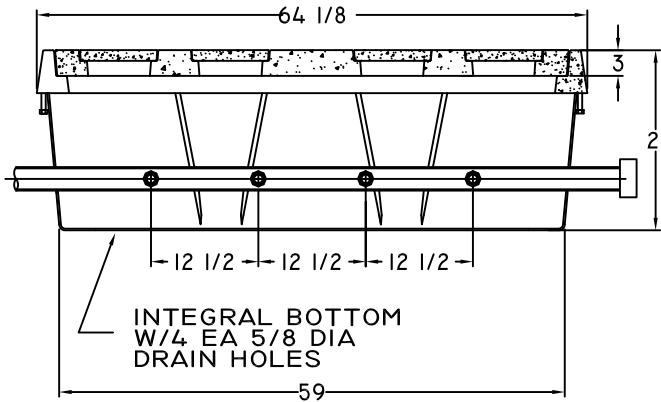
- MATERIAL: FIBERGLASS REINFORCED POLYMER CONCRETE & FIBERGLASS REINFORCED POLYMER



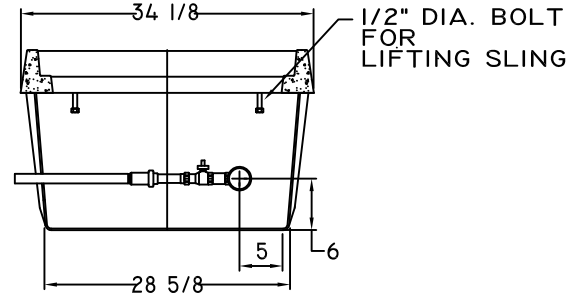
**TOP VIEW**



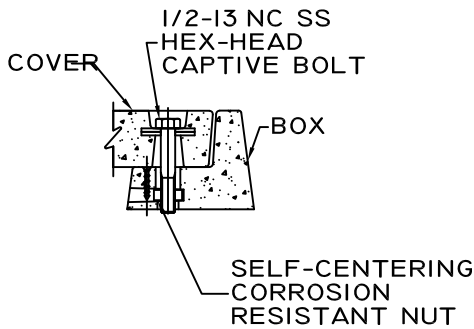
**COVER**



**SECTION**



**SECTION**

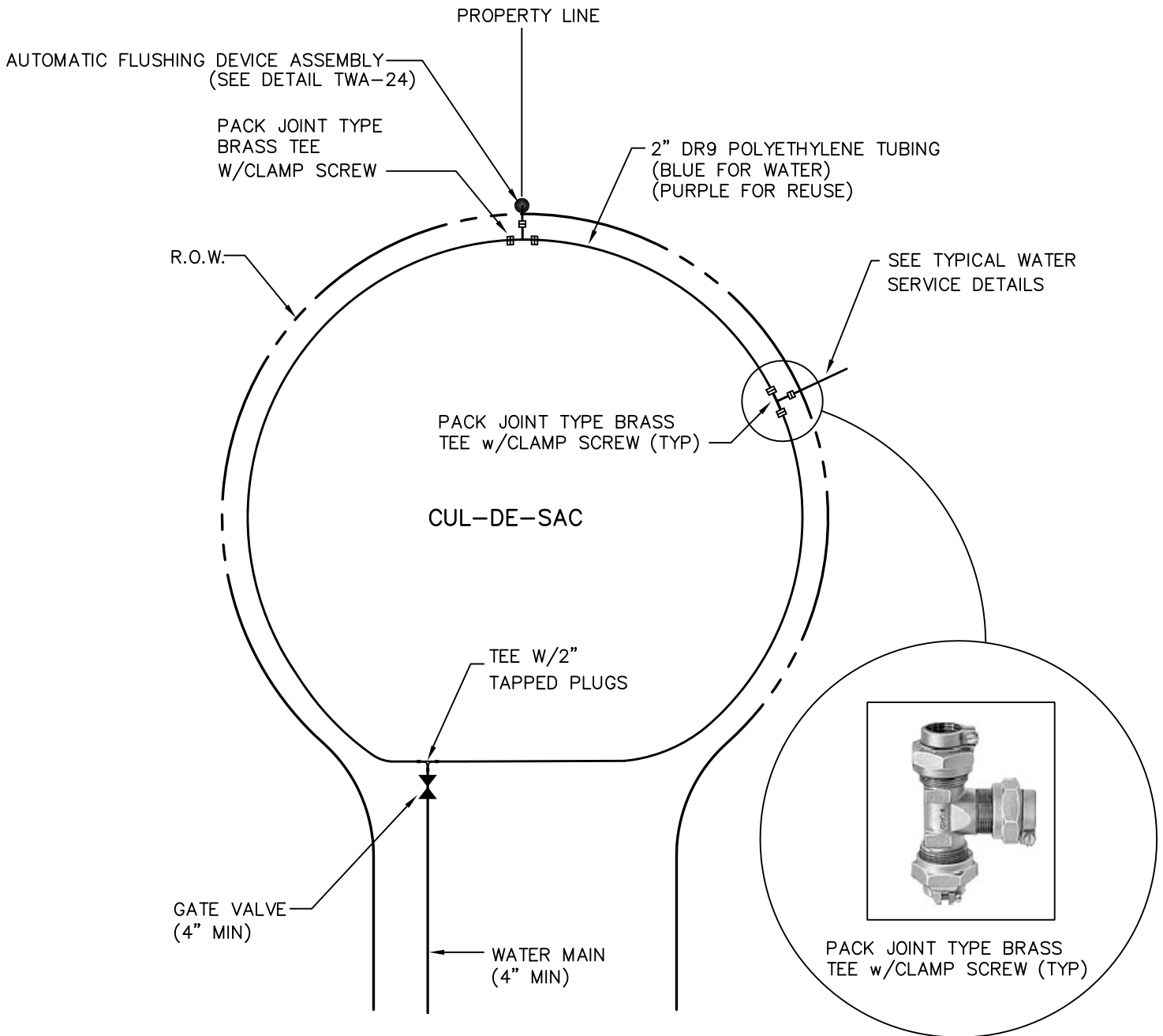


**COVER BOLTDOWN DETAIL**

**NOTES:**

1. THIS DETAIL IS INTENDED FOR GROUPS OF 7-8 SERVICE CONNECTIONS.
2. SEE DETAIL TWA-01 "TYPICAL RESIDENTIAL WATER SERVICE" AND TWA-02 "TYPICAL COMMERCIAL WATER SERVICE" FOR ADDITIONAL REQUIREMENTS.
3. CONTRACTOR SHALL ENSURE THAT THE METER BOX/ES BE CORRECTLY ORIENTED.
4. METER BOX/ES MUST BE ORDERED WITH METER SIZE/S SPECIFIED.
5. BRASS UNION NIPPLE AND CURB STOP TO CONNECT TO SERVICE.
6. TRACER WIRE SHOULD BE RUN WITH ALL SERVICES A MINIMUM OF 1' BEYOND THE CURB STOP AND TIED INTO THE TRACER WIRE THAT RUNS WITH THE MAIN.
7. PLACE FILTER FABRIC UNDER METER BOX EXTENDING 1' BEYOND ALL DIRECTIONS. BELOW METER BOX PROVIDE #57 STONE A MIN 6" DEEP EXTENDING BEYOND THE METER BOX 1' IN ALL DIRECTIONS.
8. INSTALL CURB STOP WITH OPERATING NUT FACING UP.
9. METER BOXES ARE TO BE SET TO SOD GRADE.

- MATERIAL: FIBERGLASS REINFORCED POLYMER CONCRETE & FIBERGLASS REINFORCED POLYMER



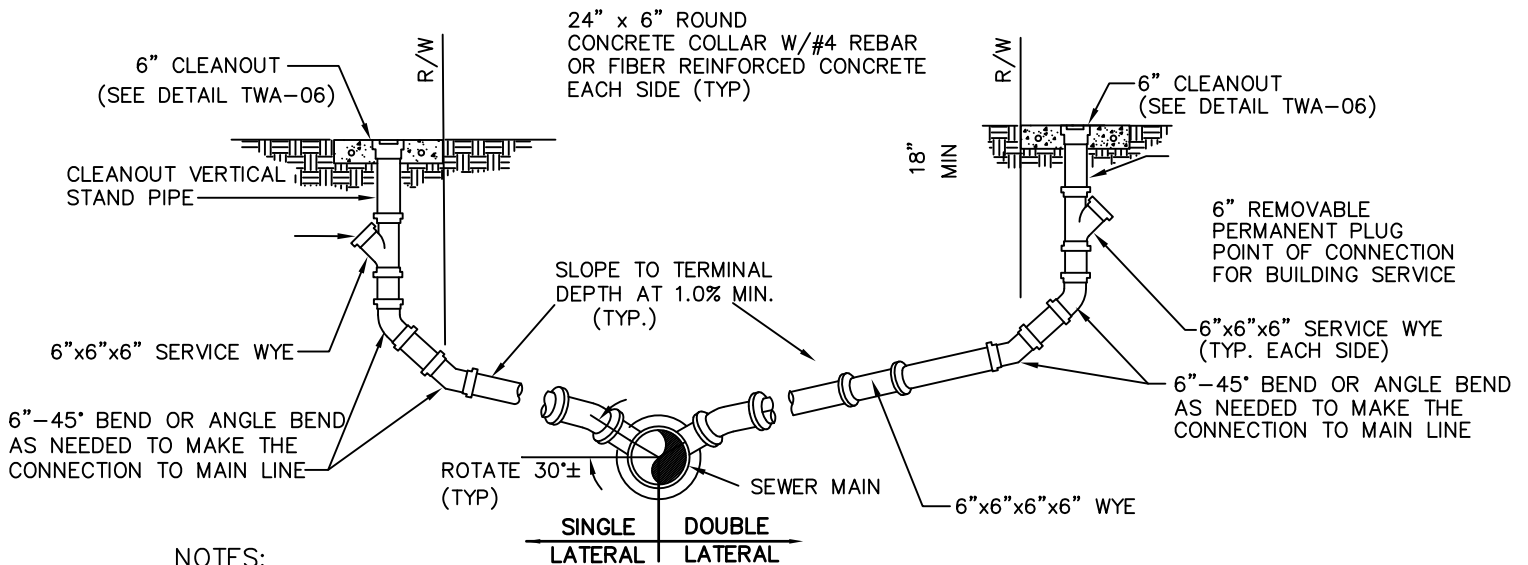
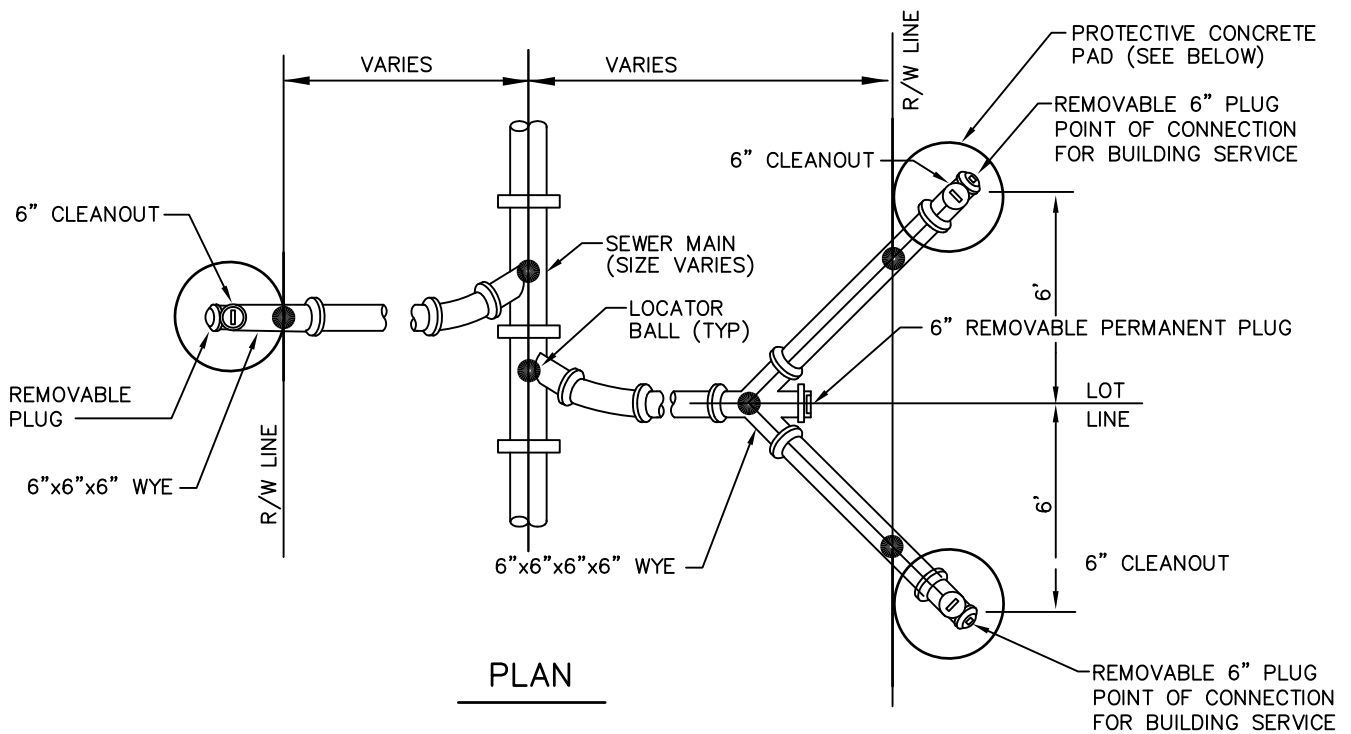
NOTES:

1. THIS DETAIL APPLIES ONLY WHEN THE WATER MAIN CANNOT BE LOOPED AND CONSIDERED ON A CASE-BY-CASE BASIS.
2. AUTOMATIC FLUSHING DEVICE SHALL BE SET BEHIND RIGHT OF WAY LINE AND ON PROPERTY LINE.
3. AUTOMATIC FLUSHING DEVICE SHALL BE INSTALLED ON WATER LOOP ONLY.

**TYPICAL CUL-DE-SAC WATER/REUSE PIPING**

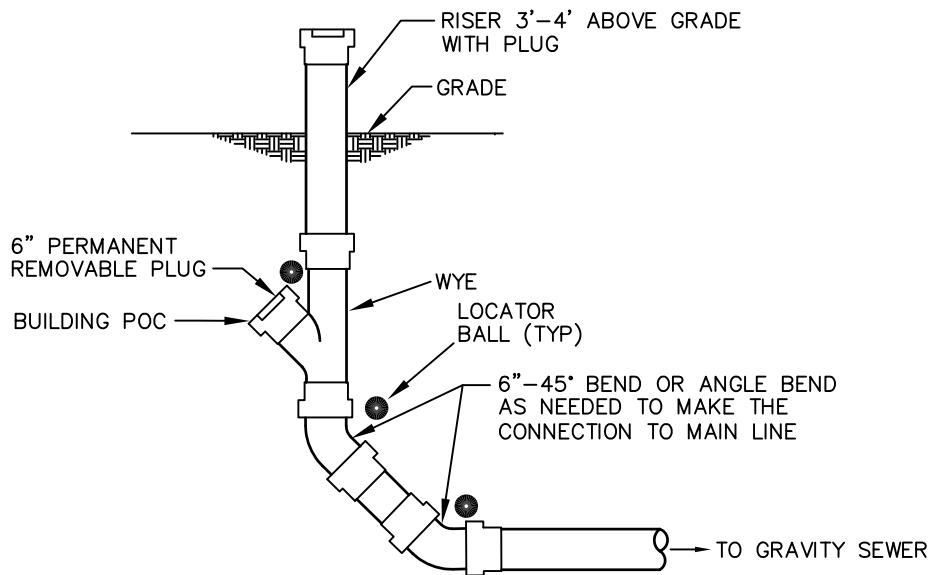
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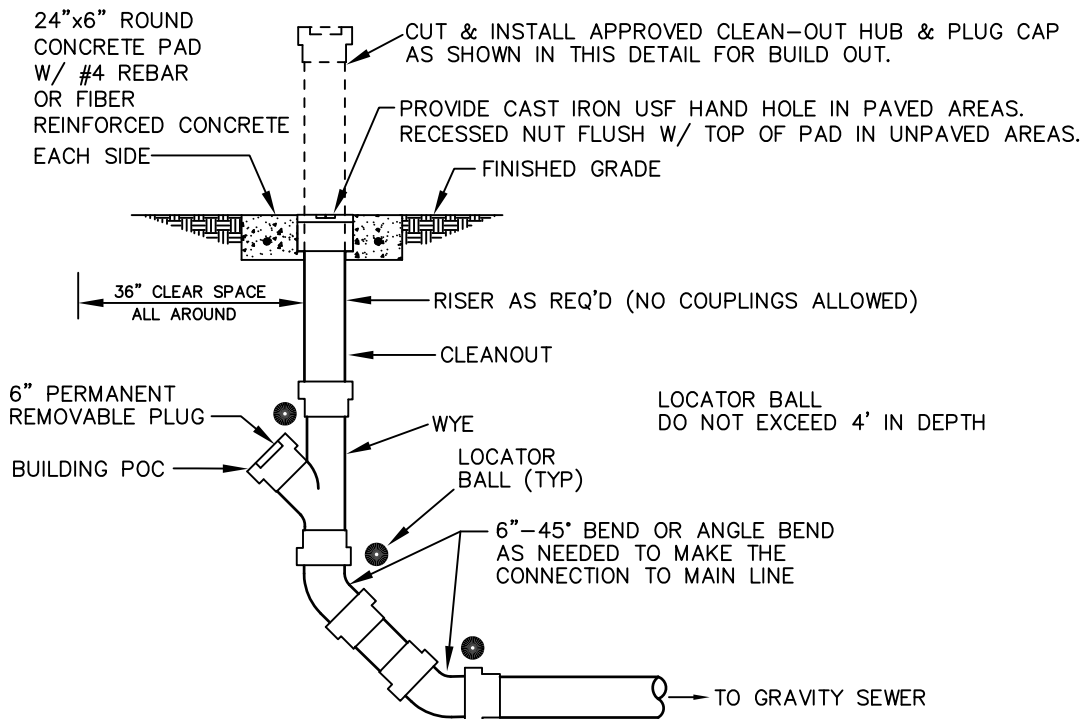


**NOTES:**

1. LOCATE SINGLE LATERAL WITHIN 24" OF LOT LINE.
2. SERVICE LATERALS SHALL BE 6" MINIMUM DIAMETER.
3. BENDS SHALL BE 45° MAXIMUM.
4. RECONNECT ANY EXISTING SERVICES.
5. LENGTH OF SERVICE LATERALS SHALL BE 100' OR LESS.
6. SERVICE WYE, AT CLEANOUT, SHALL HAVE A MINIMUM OF 24" AND A MAXIMUM OF 48" COVER AT R/W TIE-IN.
7. ETCH CURB WHERE LATERAL CROSSES BENEATH CURB WITH "S".
8. 90° CONNECTIONS ARE NOT ALLOWED.
9. SERVICE LATERAL, WYE & CLEANOUT RISER WITH CAP TO BE INSTALLED BY LICENSED UTILITY CONTRACTOR. CLEANOUTS TO BE INSTALLED BY PLUMBER AT FINISHED GRADE.
10. ALL COMMERCIAL AND RESIDENTIAL LATERALS SHALL HAVE 6" CLEANOUTS.
11. THE SITE DEVELOPER SHALL LEAVE THE CLEANOUT RISER 3'-4' ABOVE GRADE AND IT SHALL REMAIN SO UNTIL LOT BUILD OUT. THE RISER SHALL THEN BE CUT WITH CLEAN-OUT HUB AND PLUG INSTALLED AT FINISHED GRADE WITH A CONCRETE PAD, PER TWA-06 DETAIL.
12. CLEAN-OUTS SHALL NOT BE PLACED WITHIN A PUBLIC ROW OR PUBLIC SIDEWALK.
13. ANY PIPING USED TO CONNECT BUILDING SHALL NOT GO VERTICAL WITHIN (36") INCHES OF TWA VERTICAL PIPE TO CLEAN-OUT HUB & PLUG.
14. CLEANOUTS SHALL NOT BE PLACED IN SIDEWALKS.
15. CLEANOUT DENOTES THE END OF TWA MAINTENANCE RESPONSIBILITY.
16. LOCATOR BALLS ARE REQUIRED AT ALL FITTINGS. DO NOT EXCEED 4' IN DEPTH.
17. CONNECTIONS TO THE CLEAN-OUTS VERTICAL STAND PIPE SHALL NOT BE PERMITTED.



**UN-DEVELOPED LOT**

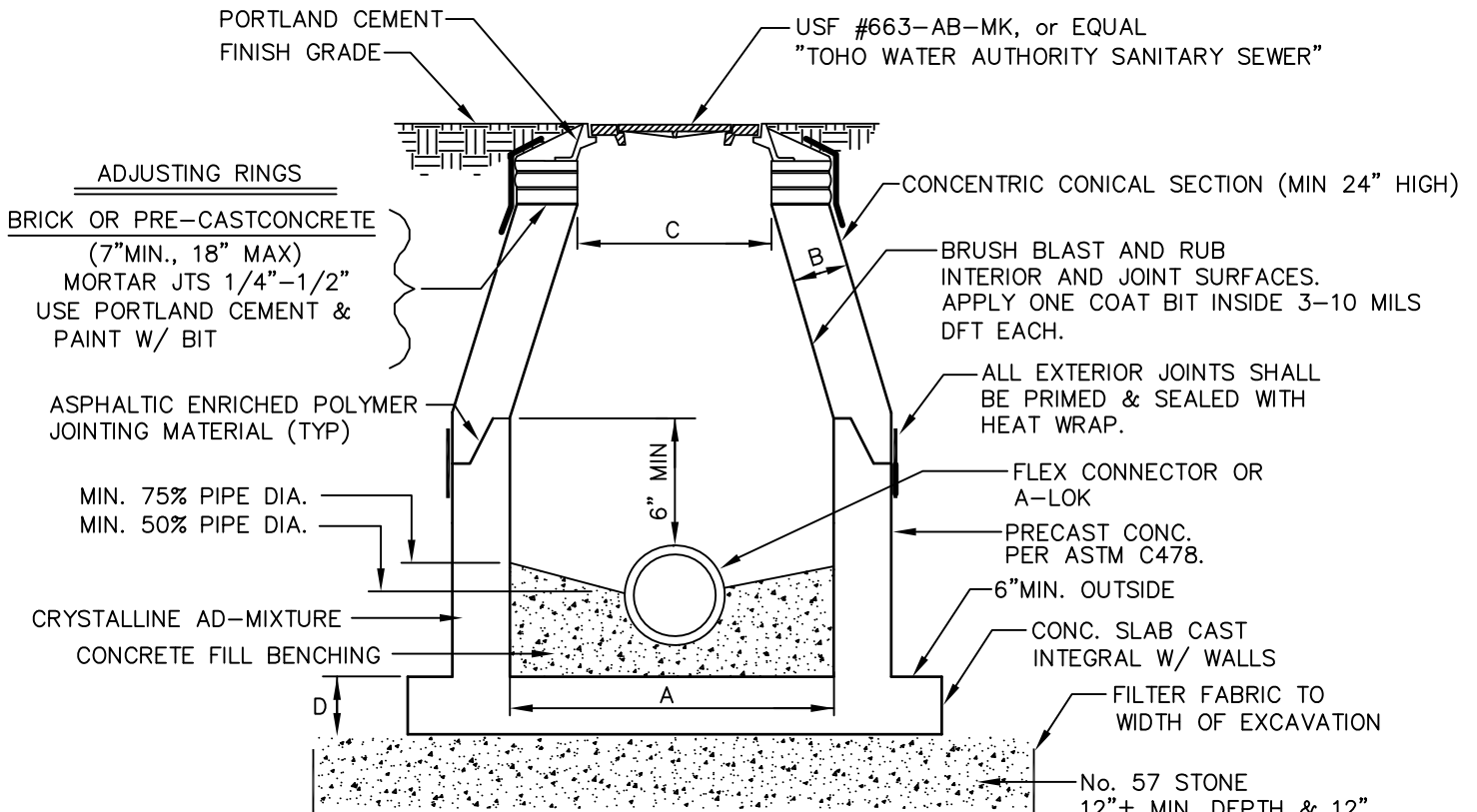


**NOTE:**

**LOT BUILD OUT**

1. THE SITE DEVELOPER SHALL LEAVE THE CLEANOUT RISER 3'-4' ABOVE GRADE AND IT SHALL REMAIN SO UNTIL LOT BUILD OUT. THE RISER SHALL THEN BE CUT AND A CLEAN-OUT HUB AND PLUG INSTALLED AT FINISHED GRADE WITH A CONCRETE PAD.
2. ALL CLEANOUTS AND CONCRETE PADS TO BE FLUSH WITH FINISH GRADE.
3. UTILITY CONTRACTOR TO INSTALL & PRESSURE TEST WYE AND INSTALL CLEANOUT RISER. INSTALL CLEANOUT AND CONCRETE PAD AT LOT BUILDOUT.
4. ETCH CURB WITH 3 INCH "S" WHERE LATERAL CROSSES UNDER CURB.
5. ALL LATERALS SHALL HAVE 6" CLEANOUTS.
6. MAINTAIN A MINIMUM OF 3' CLEARANCE FREE OF ALL PLANTINGS & STRUCTURES AROUND CLEANOUT.
7. CLEANOUT CAPS SHALL BE SLOTTED OR HAVE A RECESSED NUT.
8. CONNECTIONS TO THE CLEAN-OUTS RISER PIPE SHALL NOT BE PERMITTED.
9. ANY PIPING USED TO CONNECT BUILDING SHALL NOT GO VERTICAL WITHIN (36") INCHES OF TWA VERTICAL PIPE TO CLEAN-OUT HUB & PLUG.
10. LOCATOR BALLS DO NOT EXCEED 4' IN DEPTH.

**SANITARY CLEANOUT DETAIL**



**NOTES:**

1. PRECAST CONCRETE SHALL BE TYPE 2 CEMENT 4000 PSI
2. LIFT HOLES NOT PERMITTED THROUGH PRECAST SECTIONS.
3. ALL OPENINGS SHALL BE SEALED WITH PORTLAND CEMENT.
- 3A. IF A-LOK CONNECTOR IS USED DO NOT GROUT CONNECTION AT MANHOLE.
4. INSTALL FLOW CHANNEL INSIDE MANHOLES.
5. SERVICE LATERALS SHALL BE PERMITTED DIRECTLY INTO MANHOLES MATCHING CROWN ELEV. OF OUTFLOW PIPE ONLY. NO DROPS OR FILLETED FLUMES.
6. REINFORCING STEEL PER ASTM C478-CURRENT ADDITION.
7. PROVIDE 5' x 5' x 12" CONCRETE COLLAR AROUND COVER FRAME, W/4 #4 REBAR E.W., IN UNPAVED AREAS WHERE CURBS OR OTHER TRAFFIC BARRIERS DO NOT PROVIDE 100% PROTECTION FROM VEHICULAR TRAFFIC OR FUTURE CONSTRUCTION. SLOPE TOP OF CONCRETE AWAY FROM COVER FRAME PER TWA DETAIL 26.
8. MIN. 12" BETWEEN WALL PENETRATIONS.
9. MIN. 50% UNINTERRUPTED WALL AREA ON ANY HORIZONTAL PLANE.
10. INTERIOR LIFT RING PENETRATIONS REMOVED & GROUTED PRIOR TO PAINTING.
11. MANHOLES THAT RECEIVE FORCEMAINS, LIFT STATION JUNCTION MANHOLES, DROP CONNECTION MANHOLES AND ANY MANHOLE WITHIN 400' UPSTREAM AND DOWNSTREAM OF THESE MANHOLES SHALL REQUIRE A TWA APPROVED LINING SYSTEM.
12. CONNECTIONS FROM 0.3"-1.9' ABOVE OUTFLOW INVERT SHALL HAVE CONVERGING FLUME BUILD.

M.H. DEPTH	A*	B	C	D
UP TO 11.99'	48"	6"	36"	8"
>12', < 17.99'	60"	8"	36"	10"
18' & DEEPER	** 72"	8"	36"	14"

\*ENTIRE DEPTH EXCEPT CONE.

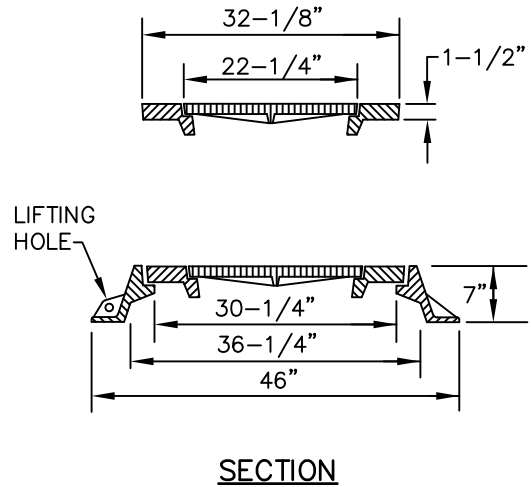
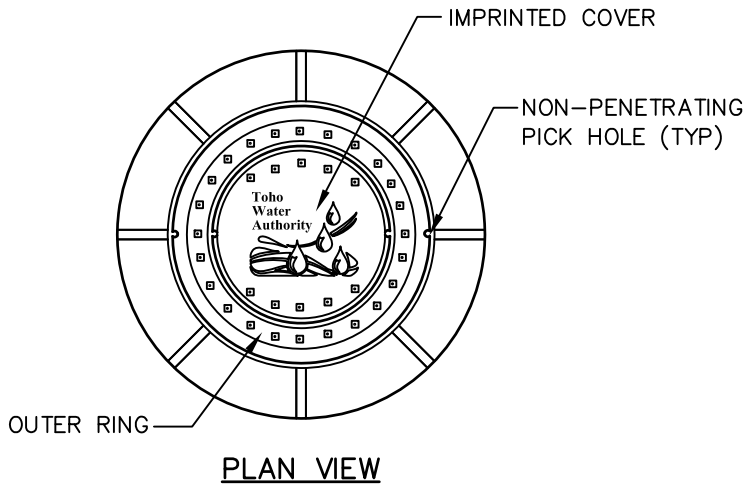
\*\* CONCENTRIC FLAT SLAB TRANSITION TO CONE SECTION IS ACCEPTABLE.

**MANHOLE SIZE:**

(UP TO 12" PIPE = 48"  $\phi$ ), (UP TO 24" PIPE = 60"  $\phi$ ), (OVER 24" PIPE = 72"  $\phi$ ).

**STANDARD MANHOLE DETAIL**

USF #663-AB-MK, or EQUAL  
 "TOHO WATER AUTHORITY SANITARY SEWER"



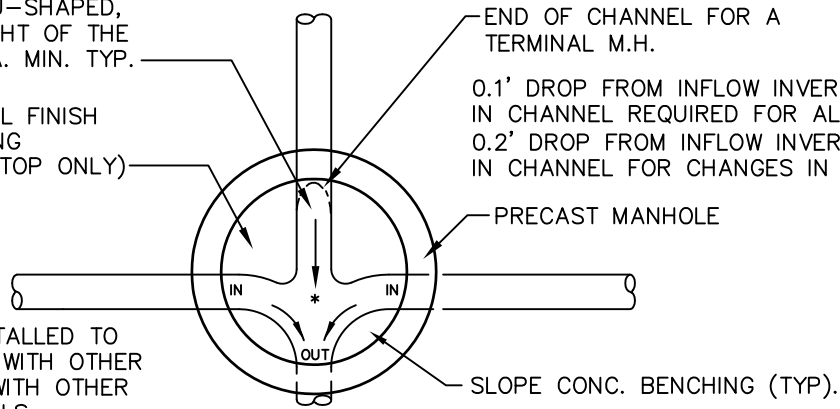
**FRAME AND COVER DETAILS**

CHANNEL TO BE U-SHAPED, SMOOTH, 0.5 HEIGHT OF THE LARGEST PIPE DIA. MIN. TYP.

SLOPED TROWEL FINISH CONC. BENCHING (BIT COATING-TOP ONLY)

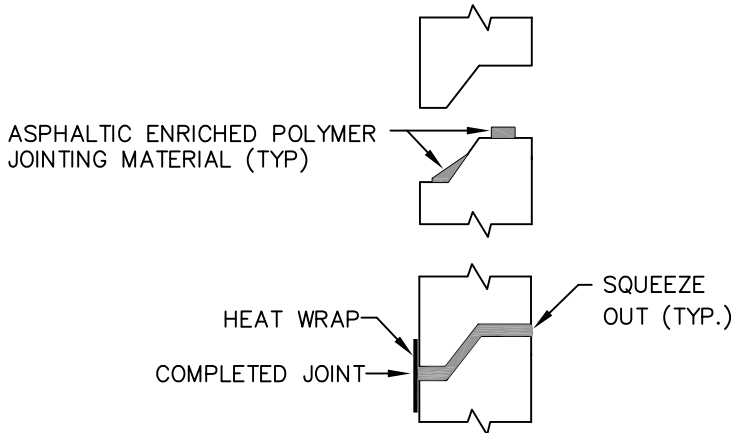
END OF CHANNEL FOR A TERMINAL M.H.

0.1' DROP FROM INFLOW INVERT TO OUTFLOW INV. IN CHANNEL REQUIRED FOR ALL.  
 0.2' DROP FROM INFLOW INVERT TO OUTFLOW INV. IN CHANNEL FOR CHANGES IN EXCESS OF 45°

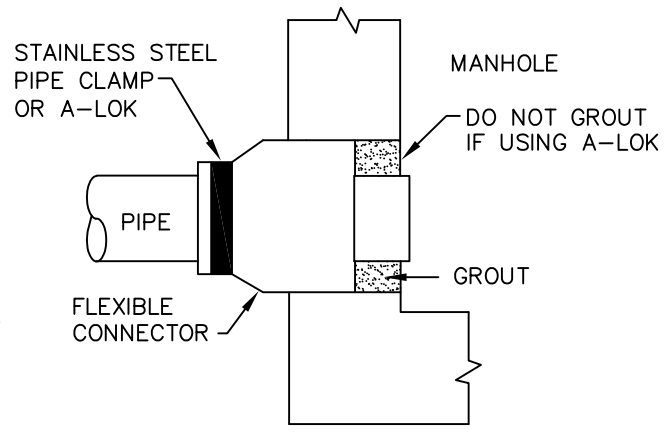


\*FLOW CHANNELS MUST BE INSTALLED TO INSURE ALL FLOWS CONVERGE WITH OTHER FLOWS AND DO NOT COLLIDE WITH OTHER FLOWS OR FLOW CHANNEL WALLS. DO NOT PUT BITUMASTIC IN TRENCH.

**MANHOLE FLOW CHANNEL PLAN**



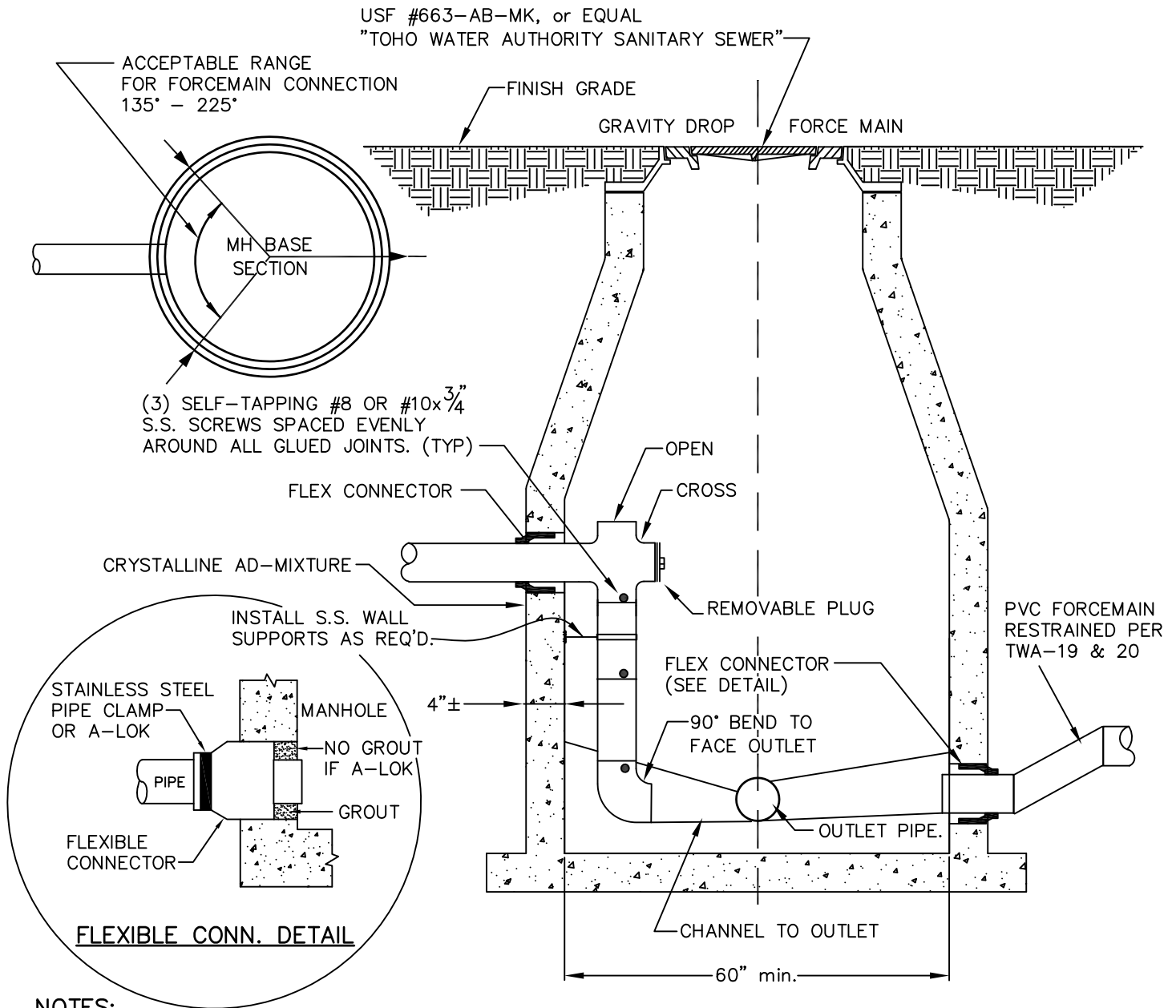
**MANHOLE JOINT DETAIL**



**FLEXIBLE CONN. DETAIL**

1. ALL EXTERIOR JOINTS SHALL BE SEALED.
2. TRIM EXCESS JOINT COMPOUND FROM INTERIOR WALLS.
3. MANHOLES THAT RECEIVE FORCEMAINS, LIFT STATION JUNCTION MANHOLES, DROP CONNECTION MANHOLES AND ANY MANHOLE WITHIN 400' UPSTREAM AND DOWNSTREAM OF THESE MANHOLES SHALL REQUIRE A TWA APPROVED LINING SYSTEM.
4. CONNECTIONS TO BRICK MANHOLES SHALL BE COMPLETED UTILIZING SDR 35/26 SAND COLLAR AND 4000 PSI CONCRETE.
5. A-LOK CONNECTORS SHALL BE GROUTED FROM SPRINGLINE OF PIPE DOWN ONLY.

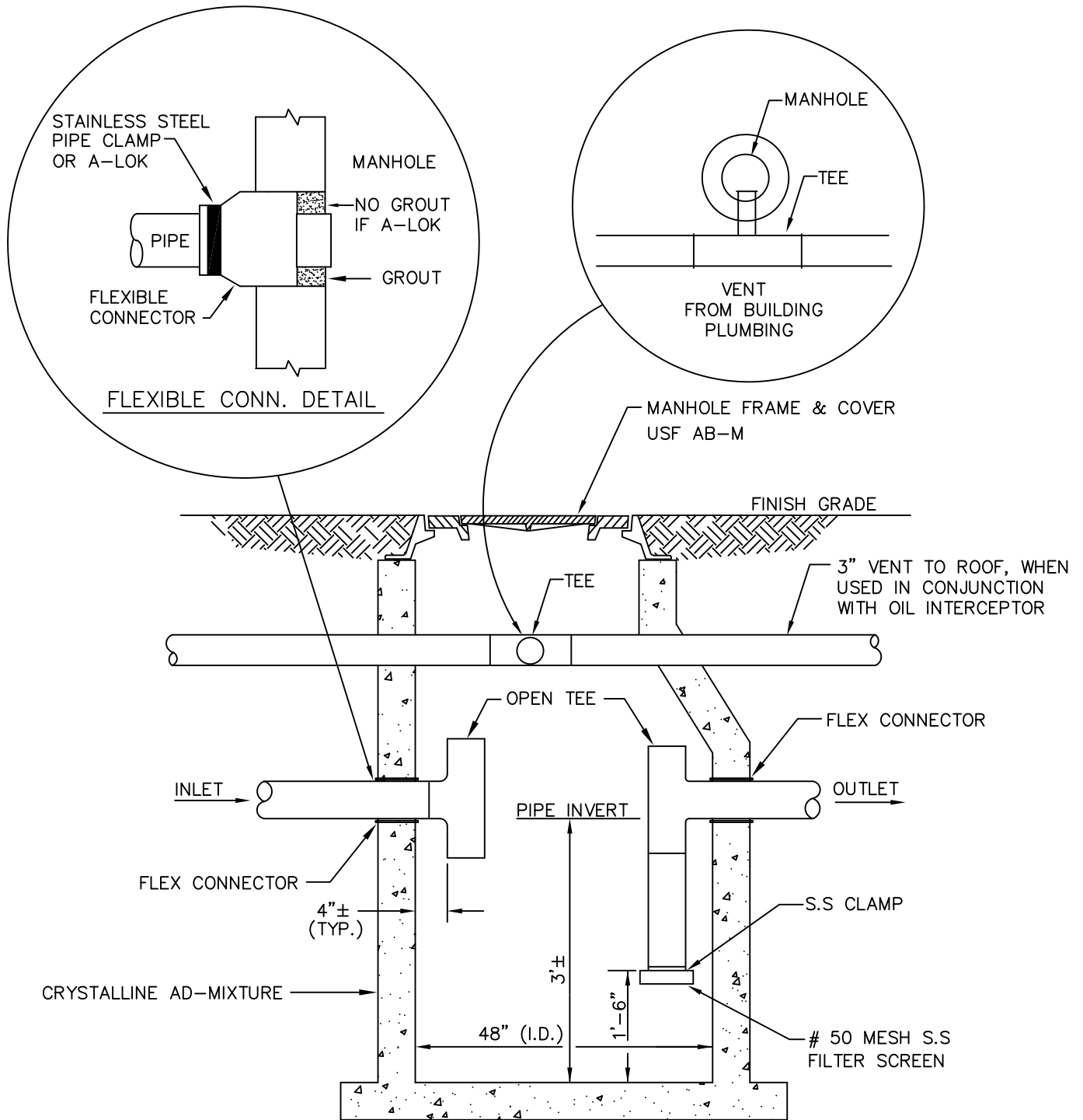
**MISCELLANEOUS MANHOLE DETAILS**



**NOTES:**

1. REFER TO STANDARD PRECAST MANHOLE DETAIL FOR GENERAL REQUIREMENTS.
2. MANHOLE SHALL BE 60" DIAMETER MINIMUM.
3. PIPING THROUGH WALL AND INSIDE OF MANHOLE SHALL BE SCHEDULE 80 P.V.C.P., SOLVENT WELD. SECURE ALL GLUED JOINTS WITH (3) SELF-TAPPING #8 OR #10 x 3/4" S.S. SCREWS SPACED EVENLY AROUND ALL GLUED JOINTS. DUCTILE IRON PIPE TO BE ALLOWED ON A CASE BY CASE BASIS.
4. PIPING LARGER THAN 12" DIA. SHALL HAVE EXTERIOR DROP CONNECTION ASSEMBLY, MADE ENTIRELY OF RESTRAINED JOINT DUCTILE IRON.
5. NO LESS THAN 2 SUPPORTS FOR EACH SECTION OF DROP PIPING SHALL BE REQUIRED AND NO MORE THAN 8' SEPARATION BETWEEN SUPPORTS.
6. WALL SUPPORTS FOR RISER PIPING AS NEEDED TO BE DETERMIND BY THE ENGINEER.
7. MANHOLES THAT RECEIVE FORCEMAINS, LIFT STATION JUNCTION MANHOLES, DROP CONNECTION MANHOLES AND ANY MANHOLE WITHIN 400' UPSTREAM AND DOWNSTREAM OF THESE MANHOLES SHALL REQUIRE A TWA APPROVED LINING SYSTEM.
8. ALL NEW MANHOLES REQUIRING A LINER SHALL BE LINED W/CAST IN PLACE LINERS @ PRE-CASTER. EXISTING MANHOLES SHALL USE TWA APPROVED SPRAY OR TROWEL ON LINER.
9. FORCE MAIN CONNECTIONS SHALL BE ALLOWED @ EFFLUENT INVERT ELEVATION PLUS 0.1' FROM 135 TO 225 DEGREES FROM EFFLUENT OUTLET.
10. A-LOK CONNECTORS SHALL BE GROUTED FROM SPRINGLINE OF PIPE DOWN ONLY.

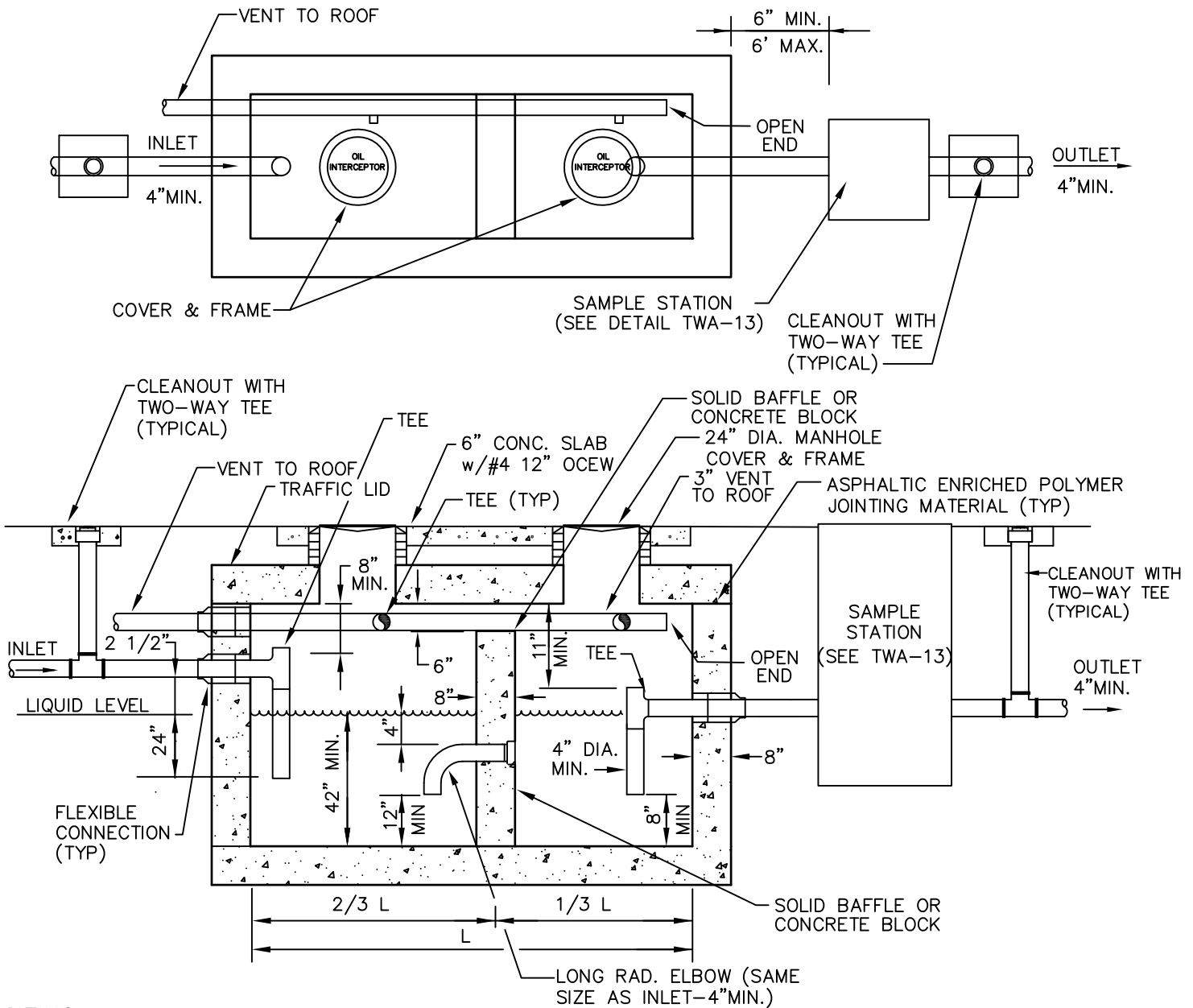
**INSIDE DROP OR FORCE MAIN  
CONNECTION TO MANHOLE**



**NOTES:**

1. REFER TO STANDARD PRECAST MANHOLE DETAIL FOR GENERAL REQUIREMENTS.
2. INSTALL UPSTREAM OF OIL INTERCEPTOR, IF APPLICABLE.
3. A-LOK CONNECTORS SHALL BE GROUTED FROM SPRINGLINE OF PIPE DOWN ONLY.

**SAND AND MUD TRAP**

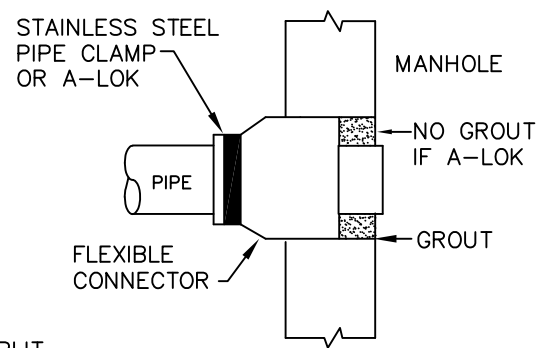


**SIZING**

\*750 GALLON MINIMUM LIQUID CAPACITY (42" LIQUID DEPTH)  
 SIZING SHALL BE PER SECTION 20.6 OF TOHO WATER AUTHORITY SPECIFICATIONS.

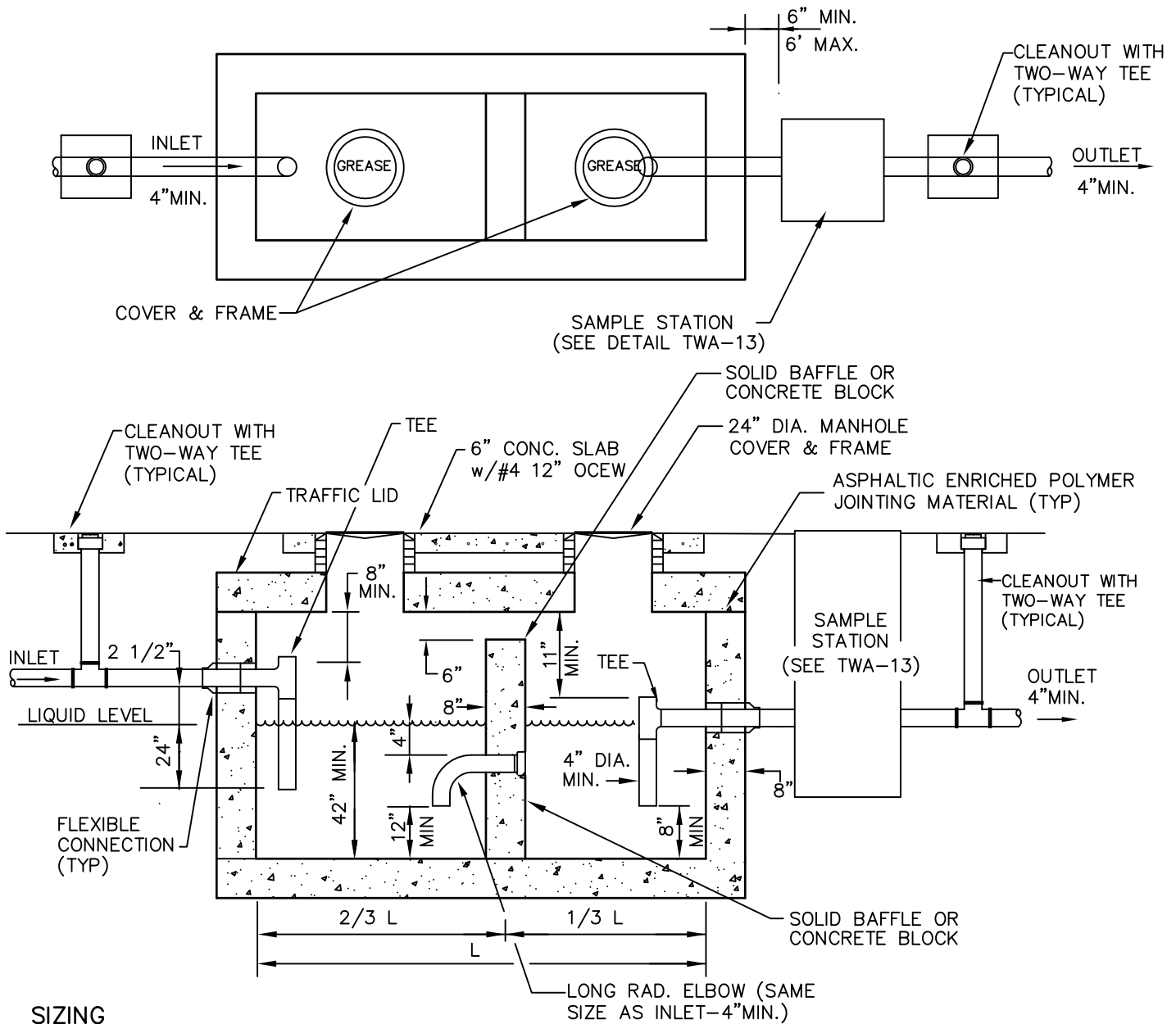
**NOTES:**

1. STRUCTURE SHALL CONFORM WITH F.D.O.T. DESIGN STANDARDS PROVIDE FOR A MINIMUM H-20 LOADING.
2. CAST-IN-PLACE STRUCTURES SHALL BE DESIGNED BY FLORIDA LICENSED ENGINEER.
3. PRECAST STRUCTURES SHALL CONFORM TO ASTM C478
4. OIL INTERCEPTOR SHALL BE 2 COMPARTMENT TYPE WITH A 1/3-2/3 SPLIT.
5. LIDS SHALL BE LABELED "OIL INTERCEPTOR".
6. INSTALLATION SHALL BE IN ACCORDANCE WITH STANDARD PLUMBING CODES.
7. INLET AND OUTLET PIPING REQUIRE A TWO-WAY CLEANOUT TEE.
8. CLEAN-OUTS SHALL BE PROVIDED BETWEEN ALL STRUCTURES WHERE MULTIPLE INTERCEPTORS ARE INSTALLED IN SERIES.
9. SAMPLE STATION SHALL BE INSTALLED DOWNSTREAM OF THE FINAL INTERCEPTOR WHERE MULTIPLE INTERCEPTORS ARE INSTALLED.
10. A-LOK CONNECTORS SHALL BE GROUTED FROM SPRINGLINE OF PIPE DOWN ONLY.



**FLEXIBLE CONN. DETAIL**

**OIL INTERCEPTOR**

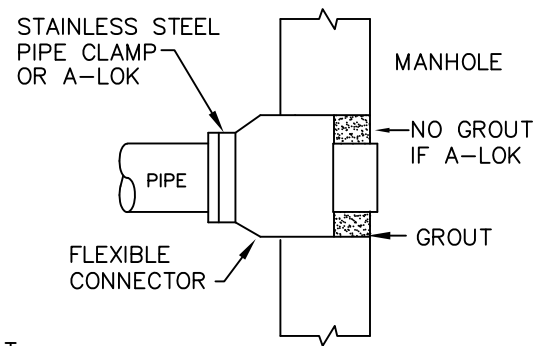


**SIZING**

\*750 GALLON MINIMUM LIQUID CAPACITY (42" LIQUID DEPTH)  
 SIZING SHALL BE PER SECTION 20.6 OF TOHO WATER AUTHORITY SPECIFICATIONS.

**NOTES:**

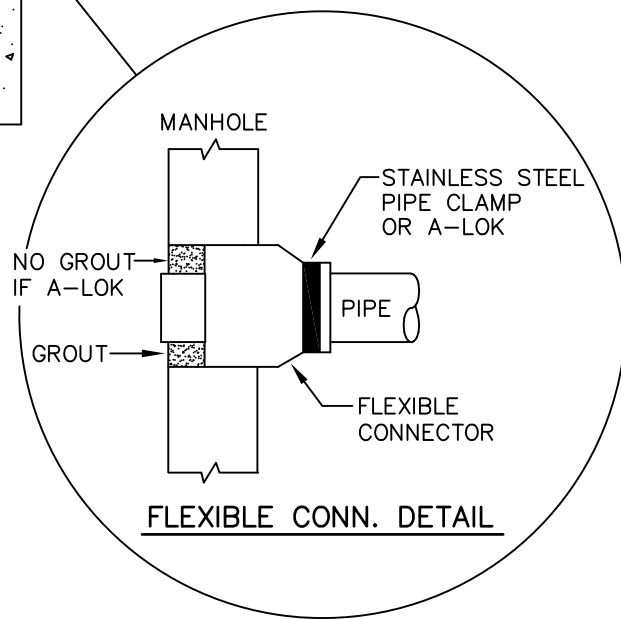
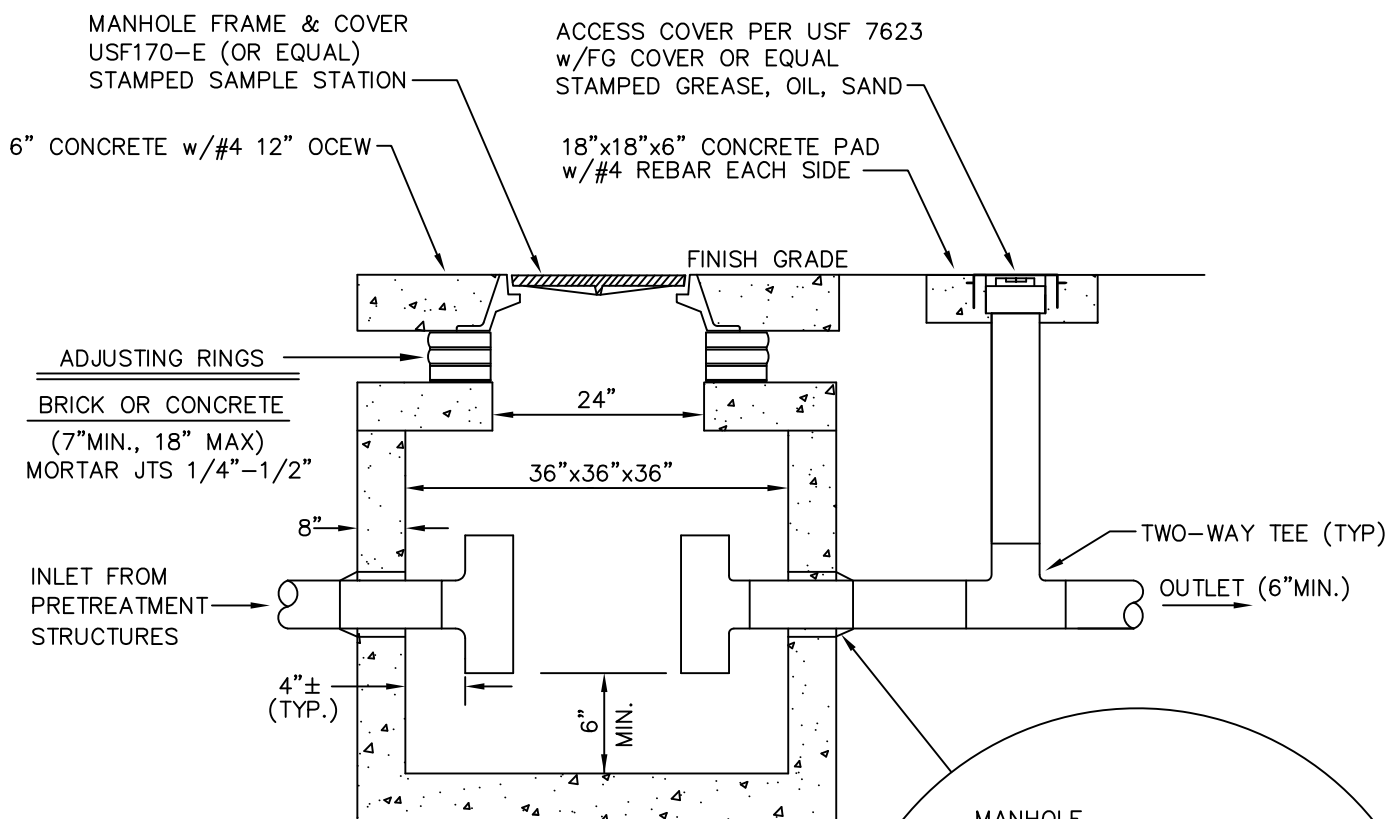
1. STRUCTURE SHALL CONFORM WITH F.D.O.T. DESIGN STANDARDS. PROVIDE FOR A MINIMUM H-20 LOADING.
2. CAST-IN-PLACE STRUCTURES SHALL BE DESIGNED BY FLORIDA LICENSED ENGINEER.
3. PRECAST STRUCTURES SHALL CONFORM TO ASTM C478
4. GREASE TRAP SHALL BE 2 COMPARTMENT TYPE WITH 1/3-2/3 SPLIT.
5. LIDS SHALL BE LABELED "GREASE".
6. INSTALLATION SHALL BE IN ACCORDANCE WITH STANDARD PLUMBING CODES.
7. INLET AND OUTLET PIPING REQUIRE A TWO-WAY CLEANOUT TEE.
8. CLEAN-OUTS SHALL BE PROVIDED BETWEEN ALL STRUCTURES WHERE MULTIPLE INTERCEPTORS ARE INSTALLED IN SERIES.
9. SAMPLE STATION SHALL BE INSTALLED DOWNSTREAM OF THE FINAL INTERCEPTOR WHERE MULTIPLE INTERCEPTORS ARE INSTALLED.
10. A-LOK CONNECTORS SHALL BE GROUTED FROM SPRINGLINE OF PIPE DOWN ONLY.



**FLEXIBLE CONN. DETAIL**

**GREASE INTERCEPTOR**

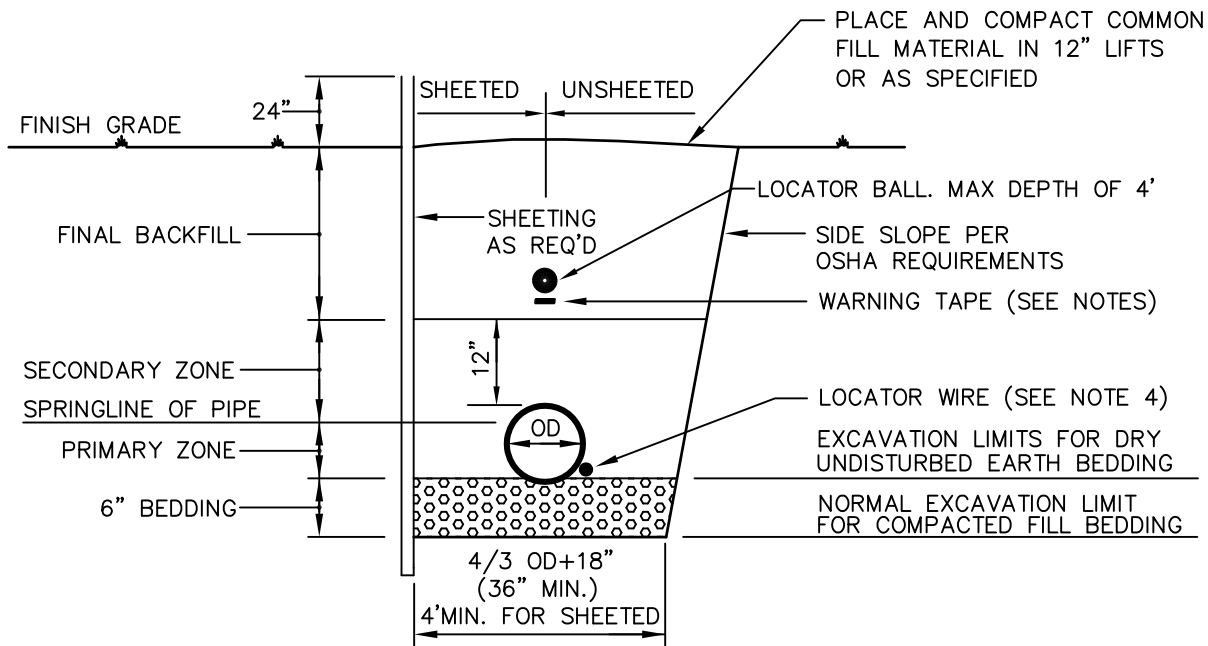




**NOTES:**

1. STRUCTURE SHALL CONFORM WITH F.D.O.T. DESIGN STANDARDS. PROVIDE FOR A MINIMUM H-20 LOADING.
2. CAST-IN-PLACE STRUCTURES SHALL BE DESIGNED BY FLORIDA LICENSED ENGINEER.
3. PRECAST STRUCTURES SHALL CONFORM TO ASTM C478
4. LIDS SHALL BE LABELED "SAMPLE STATION".
5. INSTALLATION SHALL BE IN ACCORDANCE WITH STANDARD PLUMBING CODES.
6. INLET AND OUTLET PIPING REQUIRE A TWO-WAY CLEANOUT TEE.
7. SAMPLE STATION SHALL BE PLACED DOWNSTREAM OF ALL PRETREATMENT STRUCTURES.
8. A-LOK CONNECTORS SHALL BE GROUTED FROM SPRINGLINE OF PIPE DOWN ONLY.

**SAMPLE STATION**

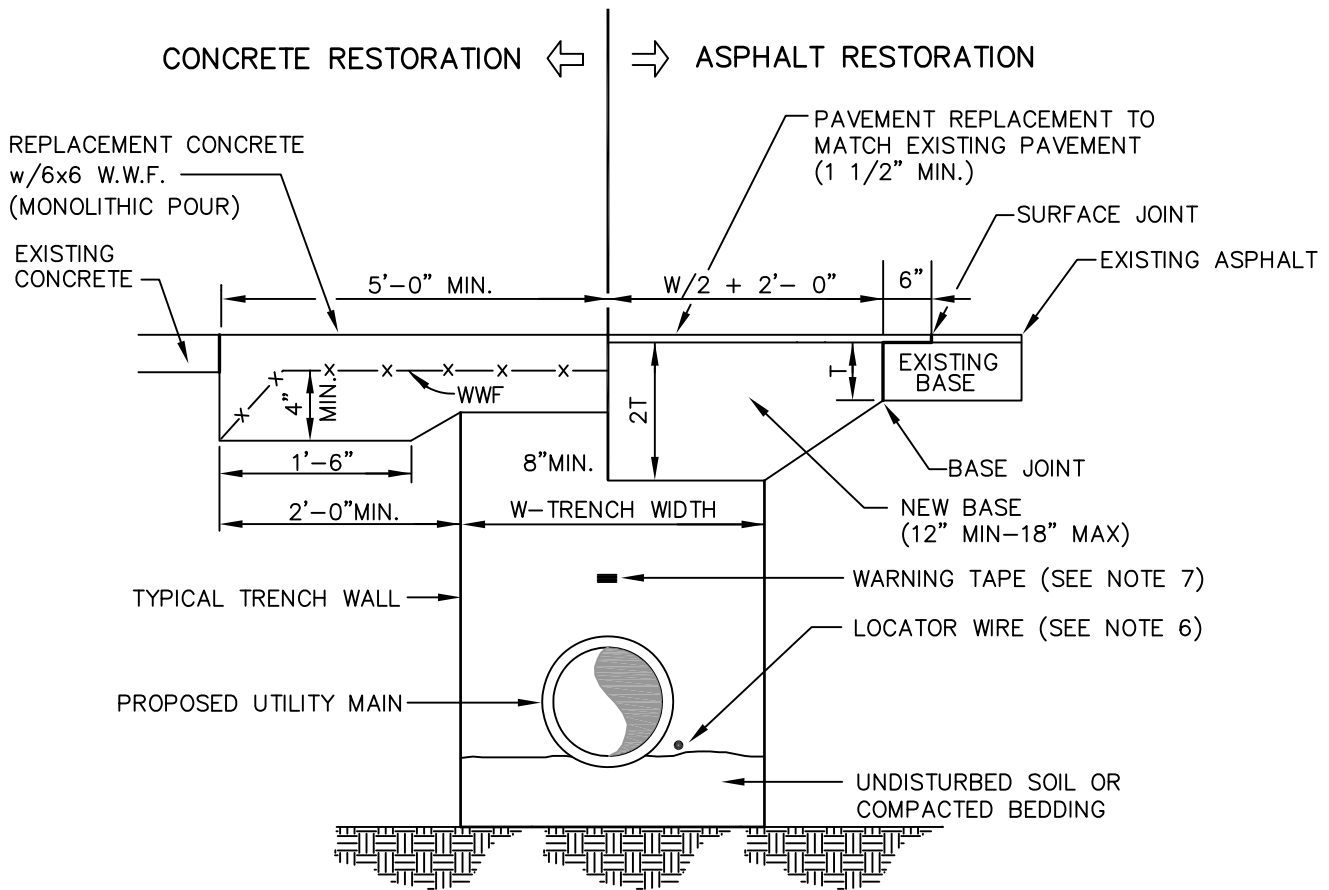


SEE SPECIFICATIONS FOR ADDITIONAL INFORMATION AND REQUIREMENTS.

#### NOTES:

1. BEDDING SHALL BE No. 57 CRUSHED STONE, IF EARTH BEDDING IS YIELDING.
2. PRIMARY AND SECONDARY ZONES SHALL BE INDIVIDUALLY COMPACTED LAYERS OF CLEAN FILL.
3. COMPACTION OF BACKFILL BENEATH STRUCTURES, PAVING AND PARKWAYS, SHALL BE 98% OF AASHTO T-180; ALL OTHER COMPACTION SHALL BE 95%, EXCEPT AS OTHERWISE REQUIRED BY PERMITTING AUTHORITY.
4. INSTALL CONTINUOUS 14 GAUGE INSULATED COPPER WIRE FOR ALL PIPE, EXCEPT GRAVITY SEWERS. TERMINATE THESE LOCATOR WIRES AT TOP OF EACH VALVE PAD WITH 12" OF EXTRA WIRE. CONNECT SPLICED WIRES WITH WIRE NUTS AND SEAL IN WATER-TIGHT SILICONE FILLED JACKET.
5. PLACE APPROVED METALLIC PRINTED WARNING TAPE 12"-18" ABOVE PIPE.
6. SIDE SLOPE AND BENCH PER OSHA REQUIREMENTS.
7. PLACE SEWER LOCATOR BALLS PER TWA-05. DO NOT EXCEED 4' OF DEPTH.

## TYPICAL PIPE TRENCH SECTION



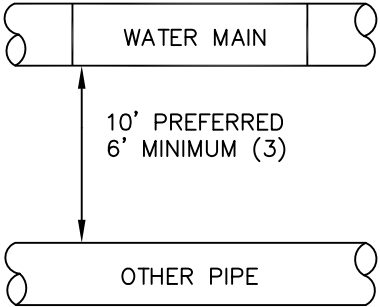
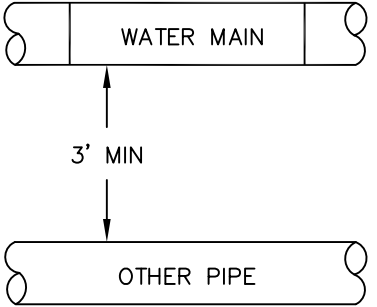
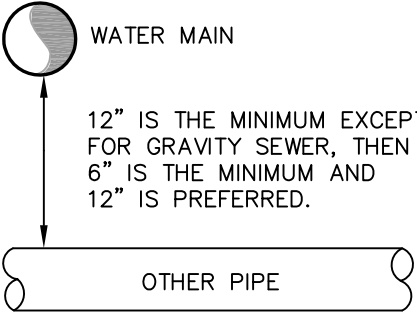
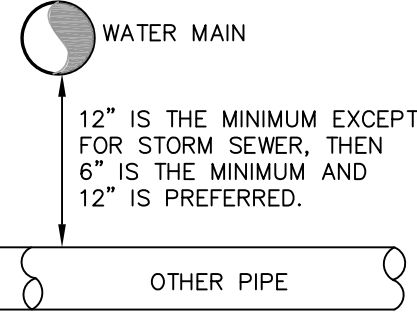
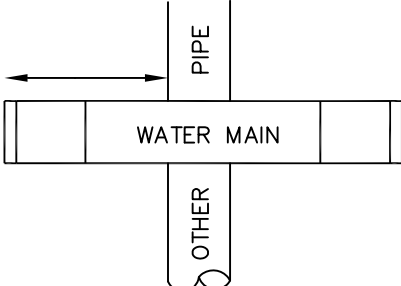
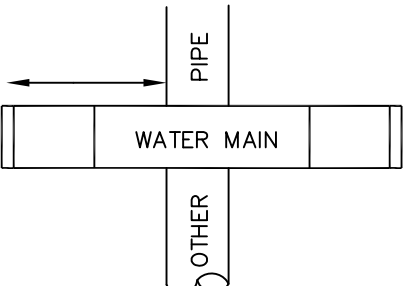
TYPICAL SECTION

NOTES:

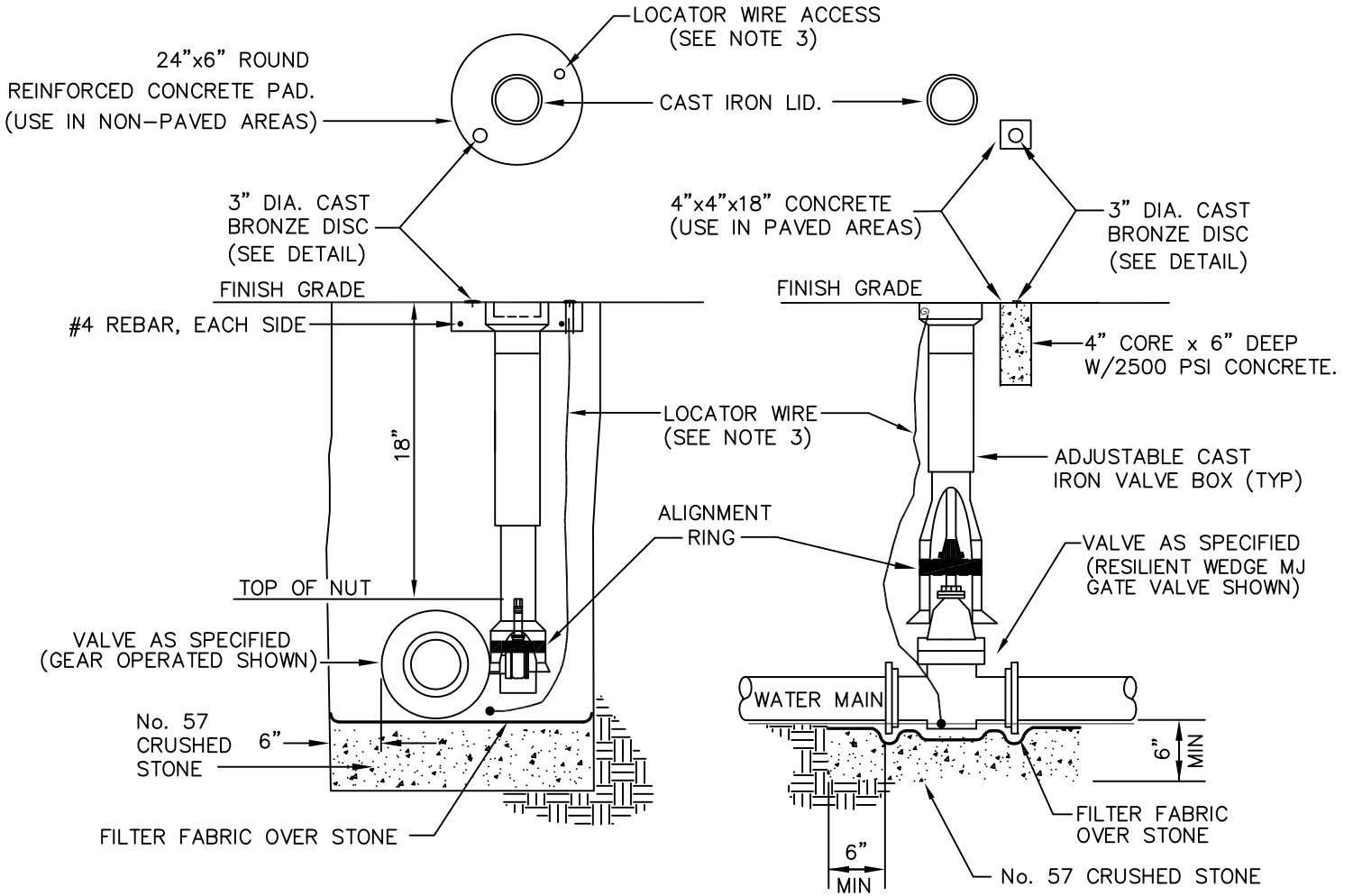
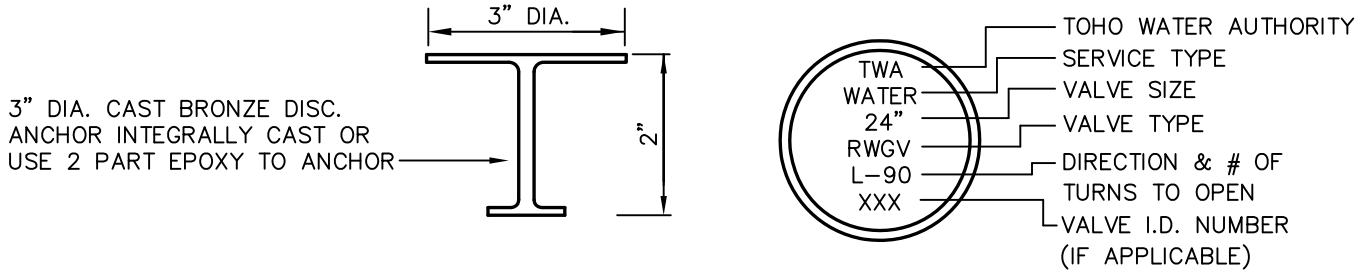
1. SURFACE AND BASE CUTS SHALL BE SAW-CUT.
2. LONGITUDINAL OR DIAGONAL CUTS REQUIRE OVERLAY/RESURFACING COMPLETE WIDTH OF ROAD.
3. CUTS AT INTERSECTIONS REQUIRE COMPLETE OVERLAY/RESURFACING TO END OF ALL RETURN TURNOUTS AND/OR 10FT. BEYOND CUT, WHICHEVER IS GREATER.
4. CUTS THROUGH TURNOUTS AND CUL-DE-SACS REQUIRE OVERLAY/RESURFACING.
5. COMPACTION OF BACKFILL SHALL BE 98% OF AASHTO T-180.
6. INSTALL CONTINUOUS 14 GA. INSULATED COPPER WIRE FOR OF ALL PIPE, EXCEPT GRAVITY SEWERS. TERMINATE THESE LOCATOR WIRES AT TOP OF EACH VALVE PAD w/12" OF EXTRA WIRE. CONNECT SPLICED WIRES WITH WIRE NUTS AND SEAL IN WATER-TIGHT SILICONE FILLED JACKET.
7. PLACE APPROVED METALLIC PRINTED WARNING TAPE 12"-18" ABOVE PIPE.
8. SIDE SLOPE AND BENCH PER OSHA REQUIREMENTS.
9. PUBLIC ROADS SHALL MEET THE REQUIREMENTS OF THE MUNICIPAL OWNER.

**OPEN CUT DETAIL  
(PRIVATE ROADS)**

## HORIZONTAL & VERTICAL SEPARATION FROM OTHER UTILITIES

OTHER PIPE	(a) GRAVITY OR PRESSURE SANITARY SEWER (b) SANITARY SEWER FORCE MAIN (c) RECLAIMED WATER (4)	(a) STORM SEWER, (b) STORMWATER FORCE MAIN, (c) RECLAIMED WATER (2)	ON-SITE SEWAGE TREATMENT & DISPOSAL SYSTEM
HORIZONTAL SEPARATION	 <p style="text-align: center;">10' PREFERRED 6' MINIMUM (3)</p>	 <p style="text-align: center;">3' MIN</p>	10' MIN.
CROSSINGS (1)	 <p style="text-align: center;">12" IS THE MINIMUM EXCEPT FOR GRAVITY SEWER, THEN 6" IS THE MINIMUM AND 12" IS PREFERRED.</p>	 <p style="text-align: center;">12" IS THE MINIMUM EXCEPT FOR STORM SEWER, THEN 6" IS THE MINIMUM AND 12" IS PREFERRED.</p>	—
JOINT SPACING AT CROSSINGS (FULL JOINT CENTERED)	<p style="text-align: center;">ALTERNATE 6 FT MINIMUM</p> 	<p style="text-align: center;">ALTERNATE 3 FT MINIMUM</p> 	—

- (1) WATER MAIN SHOULD CROSS ABOVE OTHER PIPE. WHEN WATER MAIN MUST BE BELOW OTHER PIPE, THE MINIMUM SEPARATION IS 12 INCHES.
- (2) RECLAIMED WATER REGULATED UNDER PART III OF CHAPTER 62-610, F.A.C.
- (3) 3 FT FOR GRAVITY SANITARY SEWER WHERE THE BOTTOM OF THE WATER MAIN IS LAID AT LEAST 6 INCHES ABOVE THE TOP OF THE GRAVITY SANITARY SEWER.
- (4) RECLAIMED WATER NOT REGULATED UNDER PART III OF CHAPTER 62-610, F.A.C.

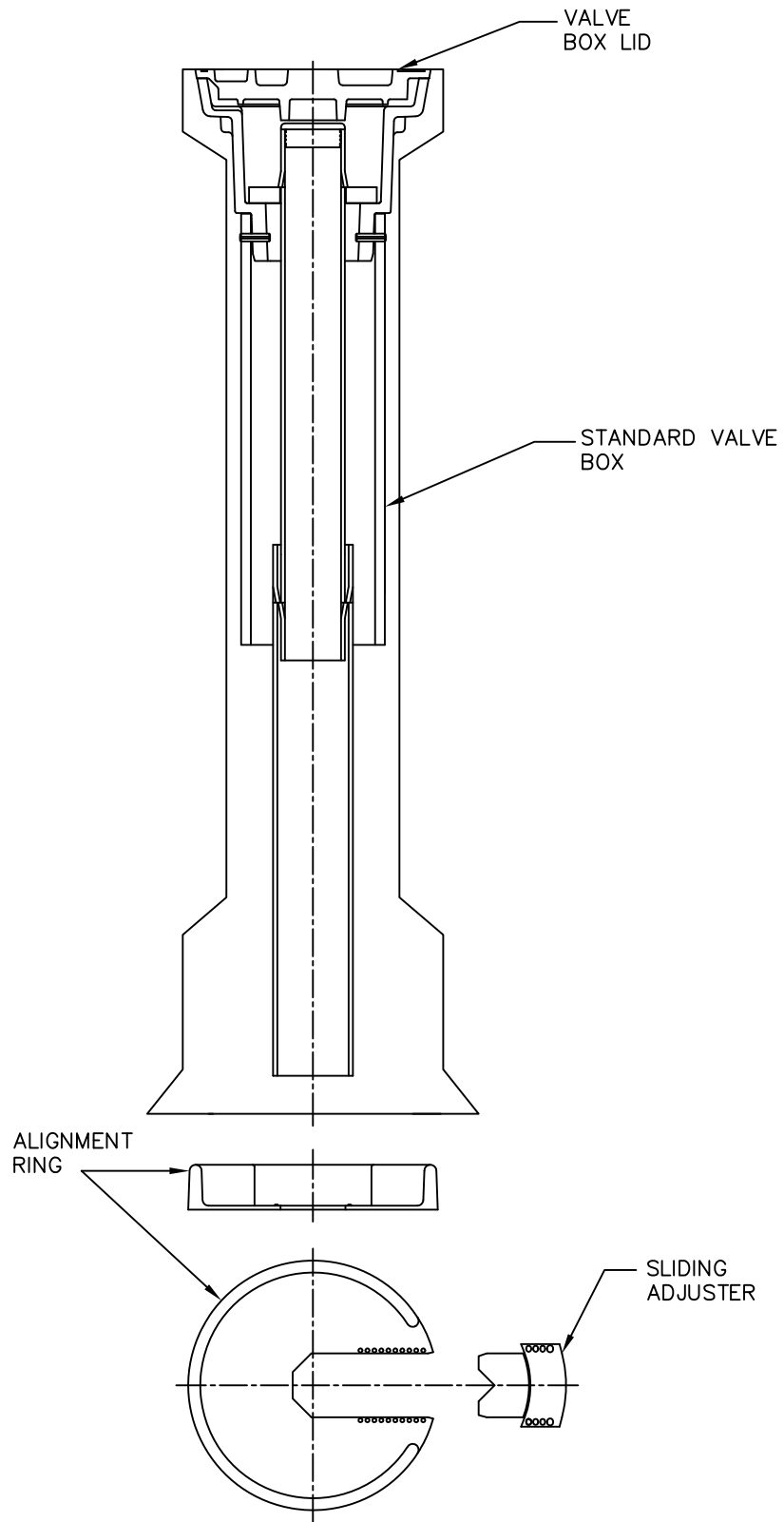


**VALVE BOX IN UNPAVED AREA**

**VALVE BOX IN PAVED AREA**

**NOTES:**

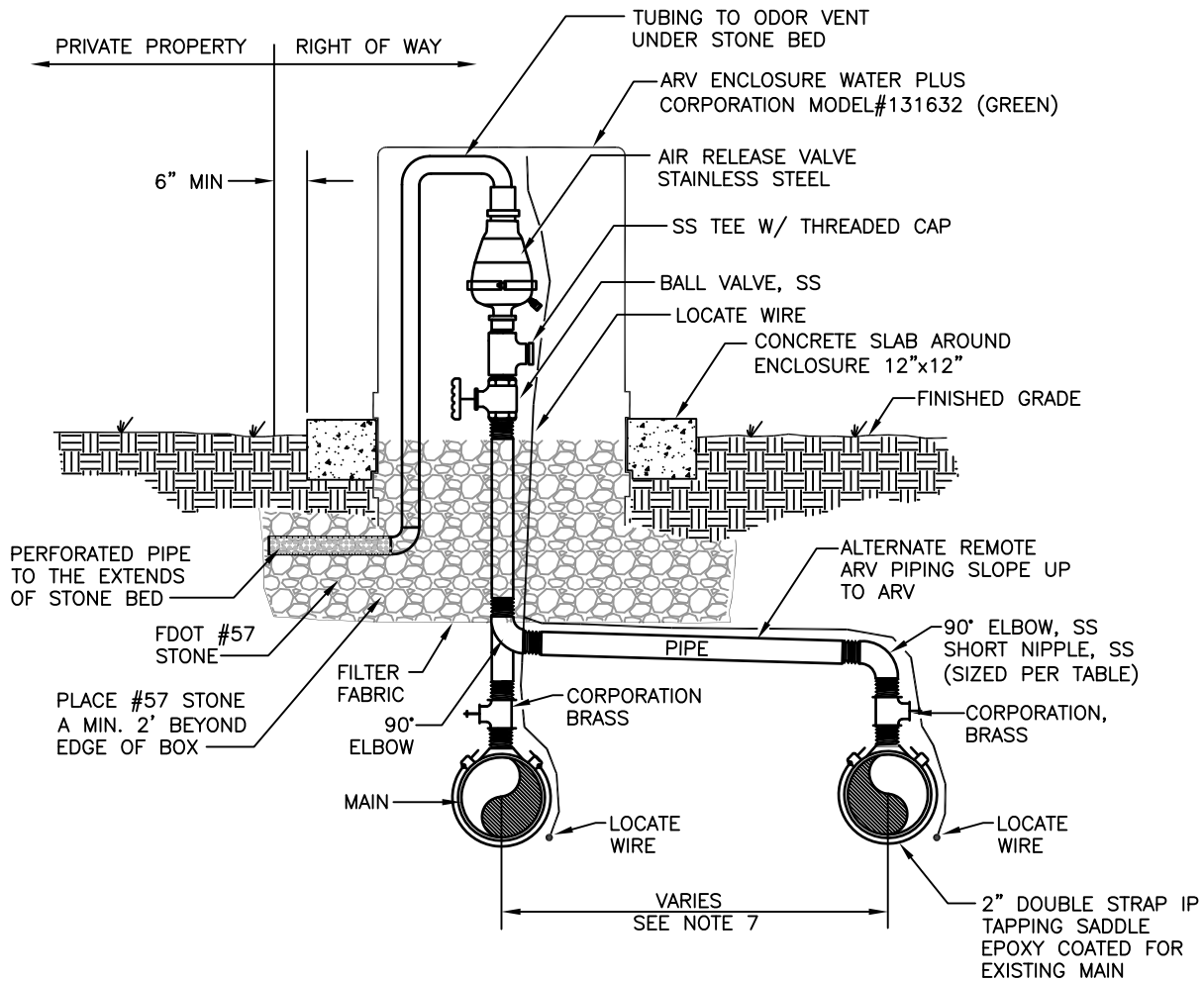
1. CRUSHED STONE BEDDING 6" MINIMUM BELOW VALVE TO BE COVERED WITH FILTER FABRIC.
2. LOCATOR WIRE ACCESS – IN UNPAVED AREA USE 2" SCH80 PVC, FEMALE ADAPTOR COUPLING AND 2" BRASS PLUG w/RECESSED NUT. TERMINATE INSULATED, SOLID 14 GA. COPPER WIRES AT TOP w/12" OF EXTRA WIRE. IN PAVED AREA, TERMINATE SOLID 14 GA. COPPER WIRES INSIDE OF TOP PORTION OF VALVE BOX w/12" OF EXTRA WIRE.
3. MAINTAIN A MINIMUM OF 3' CLEARANCE FREE OF ALL PLANTINGS & STRUCTURES AROUND VALVE BOX.
4. PRIVATELY MAINTAINED WATER SYSTEMS SHALL HAVE "PRIVATE" STAMPED ON BRONZE ID DISC.
5. FIRE LINE VALVES SHALL HAVE "FIRE LINE VALVE" STAMPED ON BRONZE DISC AND VALVE BOX COVER SHALL BE PAINTED RED.
6. OPERATING NUT TO BE BOLTED. SHEER PINS NOT ALLOWED.
7. PVC PIPE OR DUCTILE IRON PIPE EXTENSIONS SHALL NOT BE USED ON VALVE BOX INSTALLATION.
8. SCREW TYPE ADJUSTABLE VALVE BOX ONLY.



NOTES:

1. FOR ALL MAINS 6' DEEP OR GREATER.
2. SCREW TYPE ADJUSTABLE VALVE BOX ONLY.

SEALED VALVE BOX, ADJUSTABLE



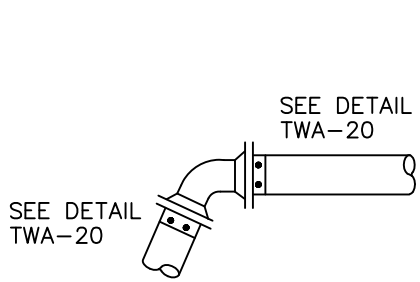
FOR NEW PIPE : SIZE PER SIZE TEE W/ TAPPED PLUG.  
(SEE TABLE BELOW TAP SIZE)

**NOTES:**

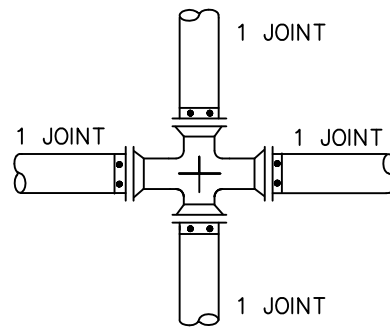
1. PROVIDE ANGLE STOP FOR REMOTE ARV. PIPING.
2. PROVIDE STAINLESS STEEL PIPE WITH STAINLESS STEEL VALVES, STOPS NIPPLES, AND FITTINGS SIZED TO ARV INLET.
3. No. 57 CRUSHED STONE BEDDING TO BE COVERED WITH FILTER FABRIC
4. THE ENCLOSURE VENTS MUST BE CAPABLE OF ALLOWING AT LEAST THE SAME AMOUNT OF AIRFLOW AS THE VALVE.
5. OFFSET DISTANCE TO BE FIELD DETERMINED AND AS CLOSE TO THE RIGHT OF WAY AS POSSIBLE AND CLEAR OF PEDESTRIAN WALKWAYS. IF PIPE IS AT RIGHT OF WAY LINE, NO OFFSET IS REQUIRED.
6. ABOVE DETAIL APPLIES TO A 2" ARV. FOR LARGER ARVS, PIPE DIAMETER AND VALVES SHALL BE EQUAL TO THE SIZE OF THE ARV.
7. LOCATE WIRE TO EXTEND 1' BEYOND ARV.

MAIN DIAMETER	ARV
12" AND UNDER	2"
18"	3"
20" , 24"	4"
30" , 36"	6"

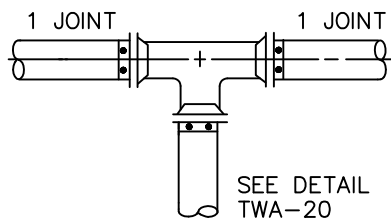
**AIR RELEASE VALVE  
ABOVE GROUND OFFSET PIPE LAYOUT—SEWER ONLY**



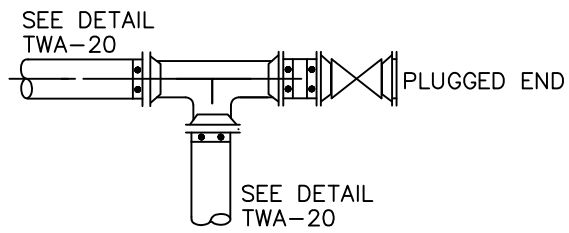
BENDS



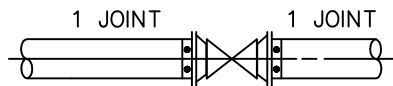
CROSS



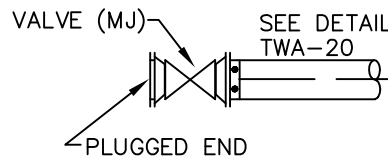
TEE



TEE AND VALVE



IN-LINE VALVE



DEAD END  
WITH OR WITHOUT BLOW-OFF

NOTES:

1. MECHANICAL PIPE RESTRAINING SYSTEMS SHALL BE PROVIDED AS STANDARD. THRUST BLOCKING IS NOT SUITABLE EXCEPT AS SPECIFICALLY ALLOWED. WHERE PVC/P IS USED PROVIDE PVC/MJ RESTRAINER UNIFLANGE SERIES 1300; EBAA IRON OR EQUAL.
2. ALL MECHANICAL JOINTS AT FITTINGS AND VALVES SHALL BE RESTRAINED.
3. RESTRAIN THROUGH VALVES.



USE THIS THRUST RESTRAINT TABLE FOR THESE TRENCH CONDITIONS:

- MIN. 50% SOIL RETAINED ON No. 200 SIEVE.
- MIN. 95% COMPACTION, AASHTO T-180.
- MIN. 3' OF COVER.

NUMBER OF FULL LENGTH RESTRAINED PIPE SECTIONS REQUIRED AT ALL FITTINGS AND VALVE JOINTS

SIZE IN.	BENDS										TEE								
	90°		45°		22-1/2°		11-1/4°		VERTICAL BENDS		DEAD END		CROSS OR VALVE		RUN		BRANCH		
	100 psi	150 psi	100 psi	150 psi	100 psi	150 psi	100 psi	150 psi	100 psi	150 psi	100 psi	150 psi	100 psi	150 psi	100 psi	150 psi	100 psi	150 psi	
4	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1	1	2	2
6	1	2	1	1	1	1	1	1	1	1	2	2	3	1	1	1	1	2	2
8	1	2	1	1	1	1	1	1	1	2	2	2	4	1	1	1	1	2	2
10	2	2	1	1	1	1	1	1	1	2	2	3	4	1	1	1	1	2	2
12	2	2	1	1	1	1	1	1	1	2	3	3	5	1	1	1	1	2	2
14	2	3	1	1	1	1	1	1	1	2	3	4	6	1	1	1	1	2	2
16	2	3	1	1	1	1	1	1	1	2	3	4	6	1	1	1	2	2	3
18	2	3	1	2	1	1	1	1	1	3	4	5	7	1	1	1	2	2	3
20	2	3	1	2	1	1	1	1	1	3	4	5	8	1	1	1	2	2	4
24	3	4	1	2	1	1	1	1	1	3	4	6	9	1	1	1	3	2	5
30	3	4	2	2	1	1	1	1	1	4	5	7	10	1	1	2	4	3	7

WHERE CONDITIONS VARY FROM THOSE STATED ABOVE, HAVE A FLORIDA REGISTERED PROFESSIONAL ENGINEER DETERMINE THE REQUIRED RESTRAINED LENGTH OF PIPING.

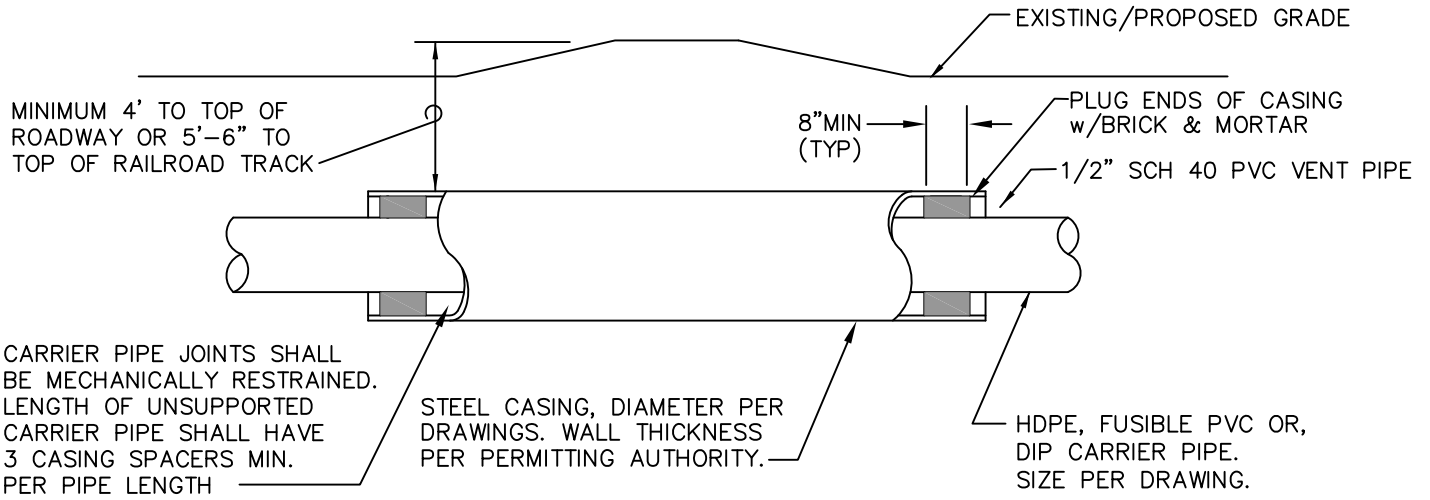
1. WATER MAIN AND REUSE MAIN TEST PRESSURE 150 psi MINIMUM
2. SANITARY FORCE MAIN PRESSURE PIPE 100 psi MINIMUM.
3. RESTRAIN THROUGH VALVING.
4. ALL FITTINGS AND VALVES SHALL BE RESTRAINED AT LEAST ONE (1) FULL LENGTH OF PIPE IN ALL DIRECTIONS.
5. PRESSURE CONNECTIONS SHALL BE TREATED AS A TEE.

NOTE: THIS TABLE INCLUDES A 1.5 SAFETY FACTOR ABOVE THE LISTED TEST PRESSURES.

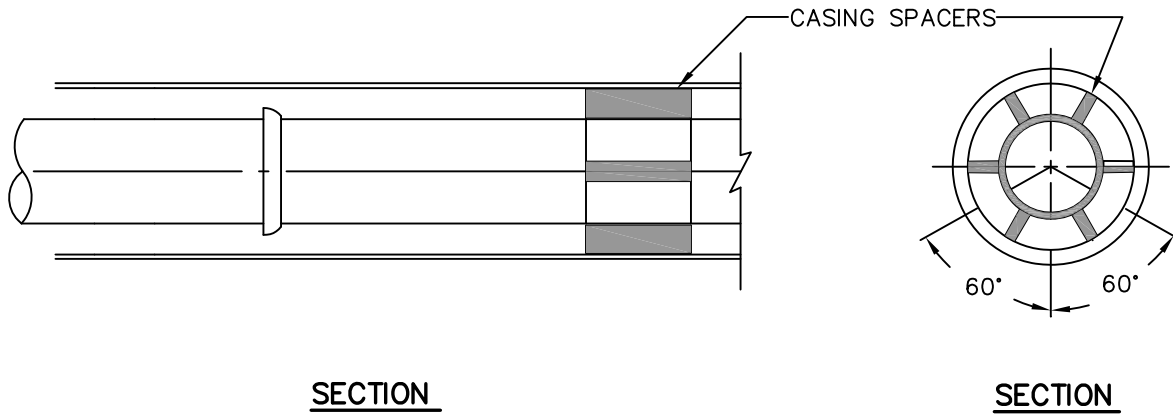
## RESTRAINED JOINT TABLE

TWA-20  
2017

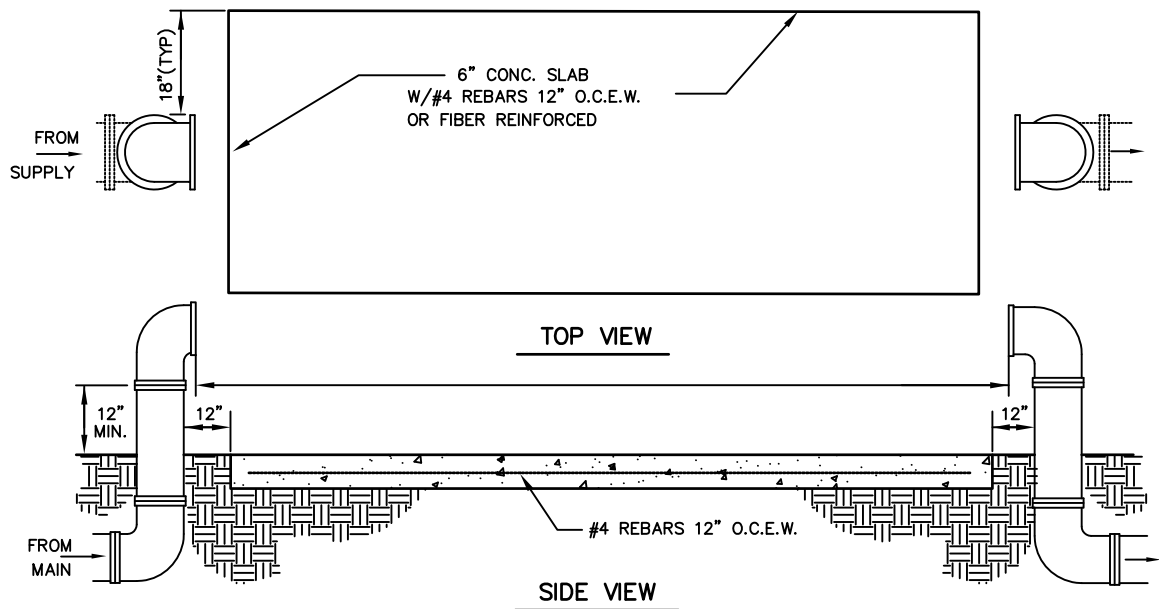
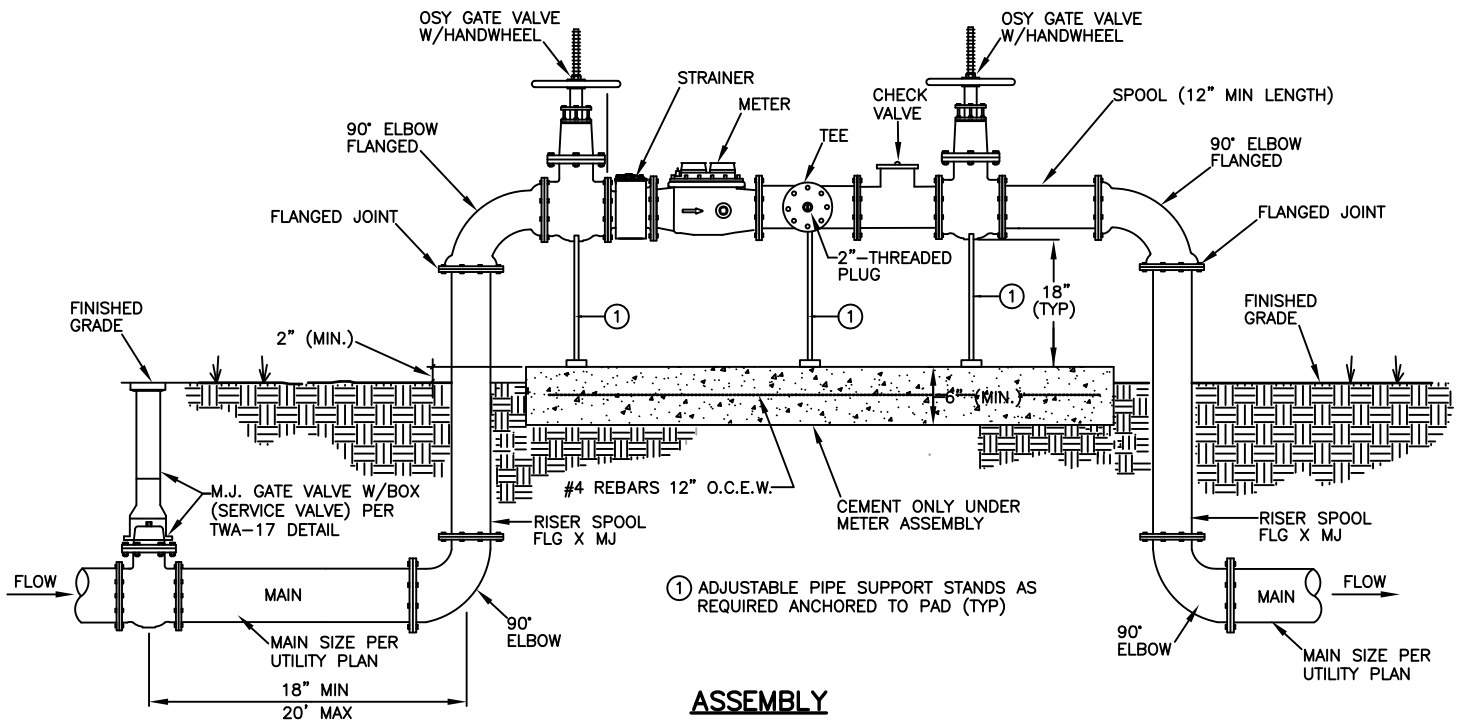
SEE DRAWINGS FOR JACK & BORE LOCATION.



TYPICAL JACK AND BORE SECTION



**JACK AND BORE DETAIL**

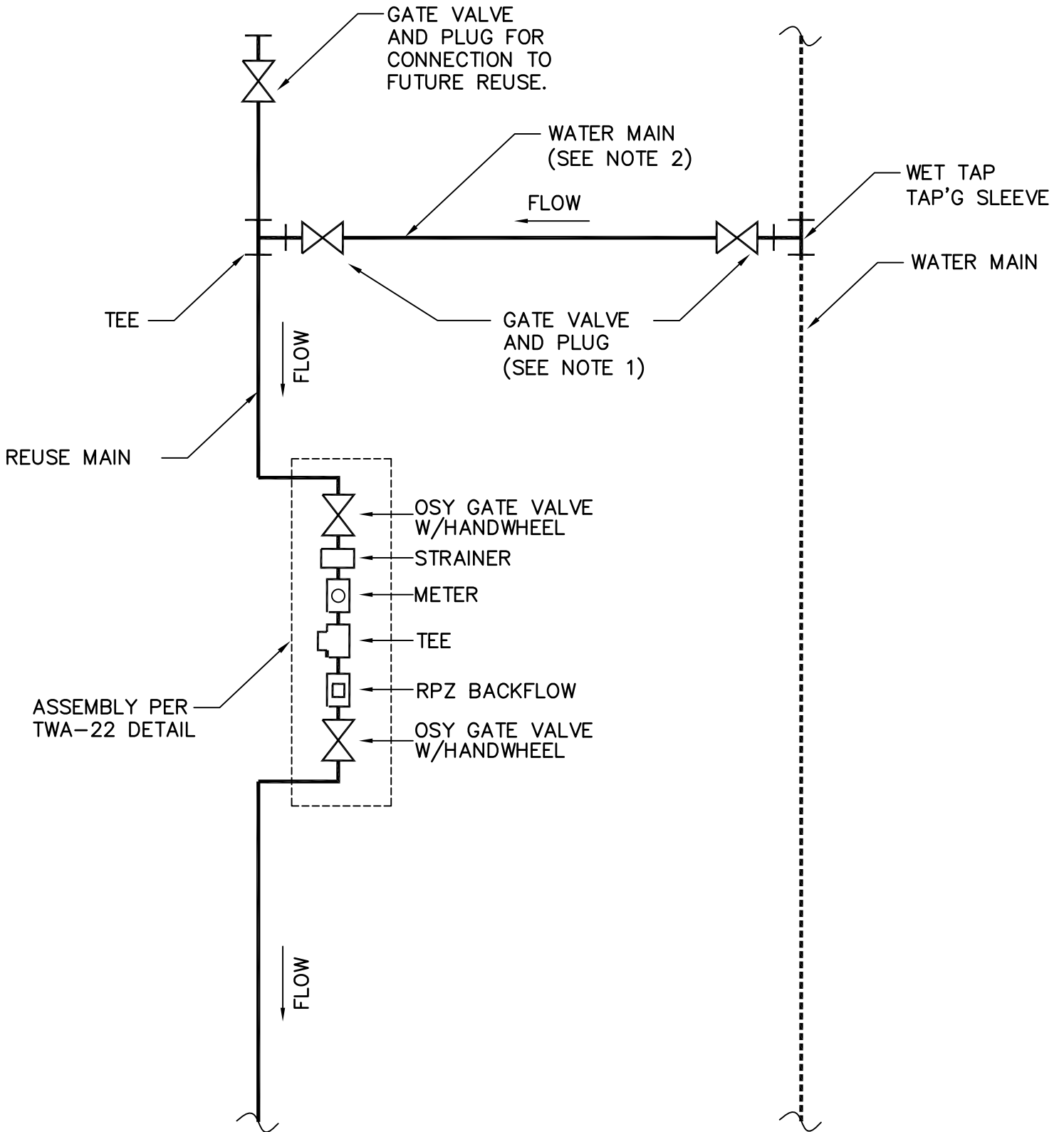


**NOTES:**

1. METER, GATE VALVES, WYE STRAINER, BACKFLOW ASSEMBLY AND PIPE SUPPORTS WILL BE PAID FOR BY DEVELOPER AND INSTALLED BY CONTRACTOR.
2. GALVANIZED PIPE IS NOT ALLOWED
3. INSTALL PROTECTIVE BOLLARD(S) AS REQUIRED BY TOHO WATER AUTHORITY (SEE DETAIL TWA-28).
4. MAINTAIN A MINIMUM OF 3' CLEARANCE FREE OF ALL PLANTINGS & STRUCTURES AROUND METER/BACKFLOW ASSEMBLY.
5. RPZ BACKFLOW REQUIRED IF CHEMICAL INJECTORS USED ON SITE OR IF JUMPED FROM POTABLE WATER.

**TYPICAL REUSE SERVICE  
METER/BACKFLOW ASSEMBLY  
(3" AND LARGER)**

TWA-22  
2017

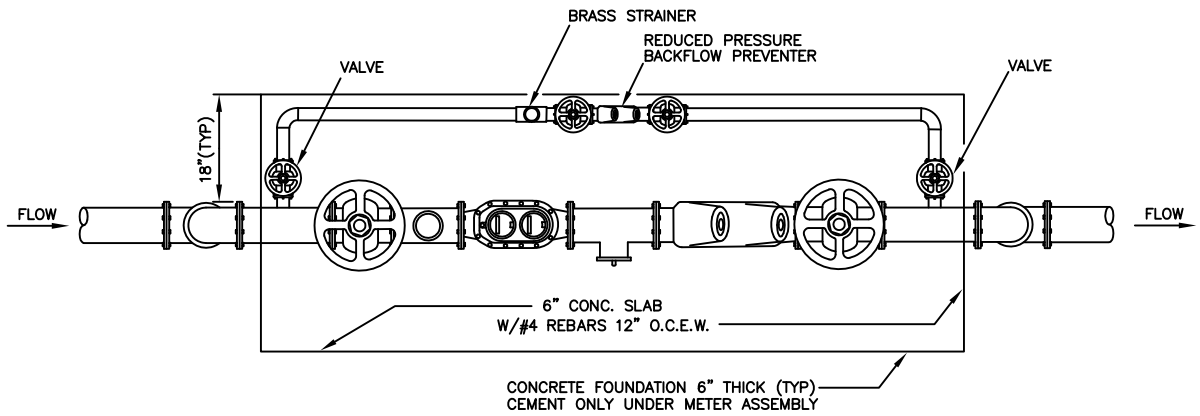


NOTES:

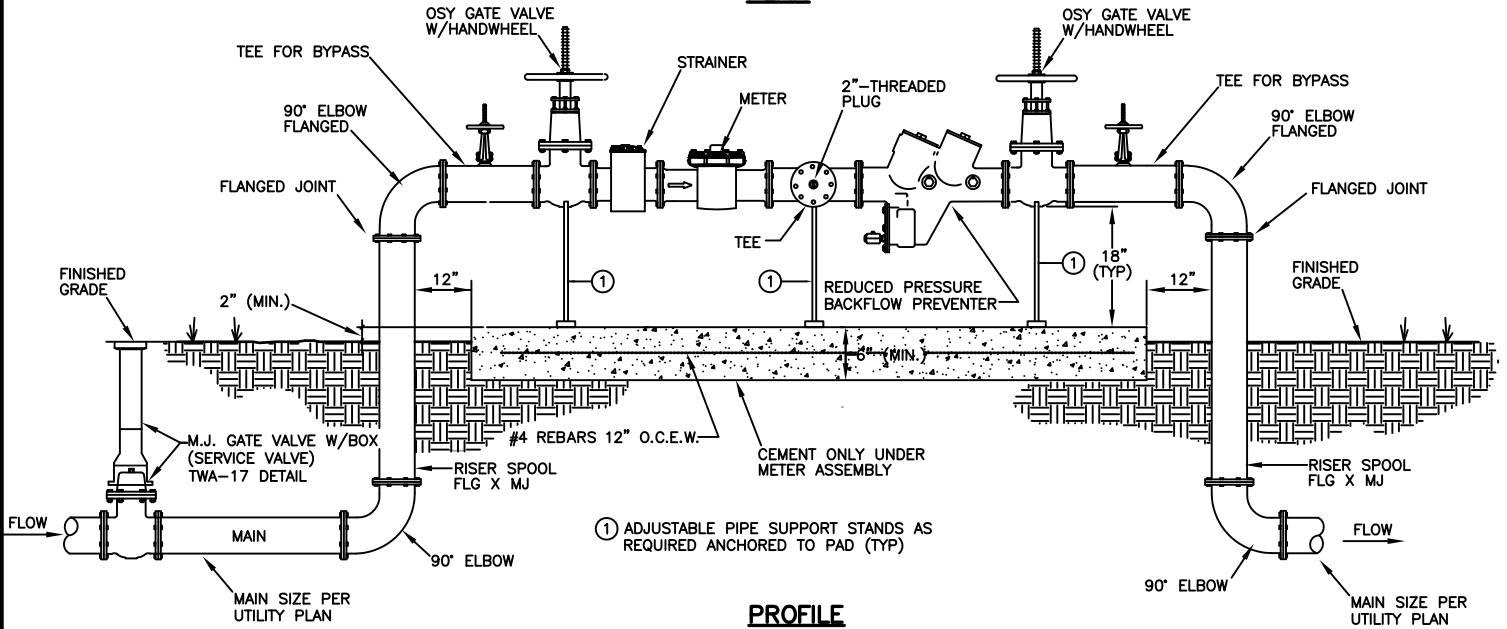
1. BOTH VALVES TO BE CLOSED AND ABANDONED IN PLACE PRIOR TO CONNECTING TO REUSE.
2. PIPE SHALL BE REMOVED OR GROUTED AND ABANDONED IN PLACE PRIOR TO CONNECTING TO REUSE.

**REUSE TO POTABLE WATER JUMPER**

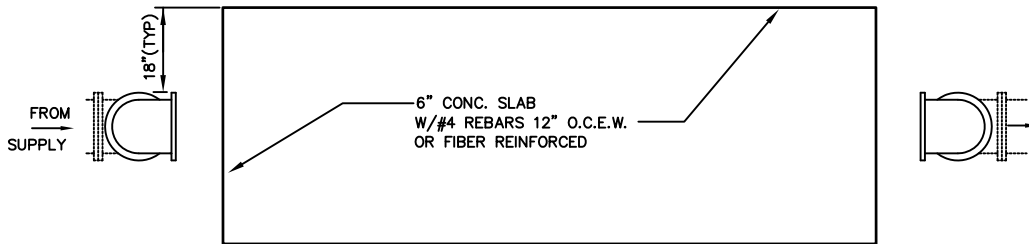
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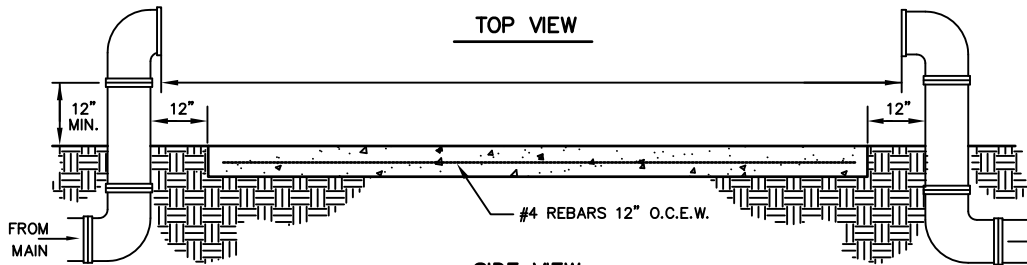
**PLAN**



**PROFILE**



**TOP VIEW**

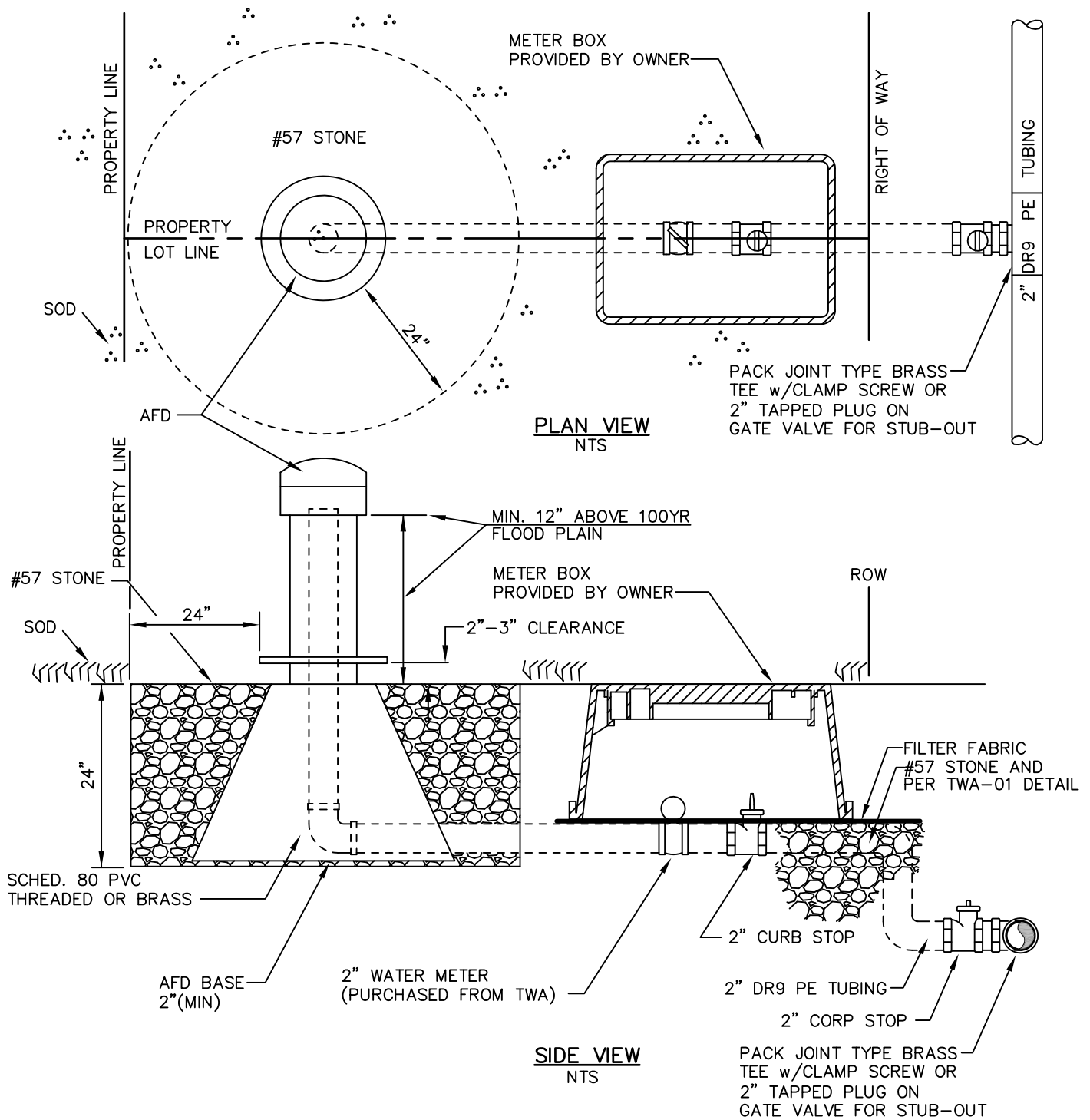


**SIDE VIEW**

**NOTES:**

1. METER, GATE VALVES, WYE STRAINER, BACKFLOW ASSEMBLY AND PIPE SUPPORTS WILL BE PAID FOR BY DEVELOPER AND INSTALLED BY CONTRACTOR.
2. GALVANIZED PIPE IS NOT ALLOWED
3. INSTALL PROTECTIVE BOLLARD(S) AS REQUIRED BY TOHO WATER AUTHORITY (SEE DETAIL TWA-28).
4. MAINTAIN A MINIMUM OF 3' CLEARANCE FREE OF ALL PLANTINGS & STRUCTURES AROUND METER/BACKFLOW ASSEMBLY.

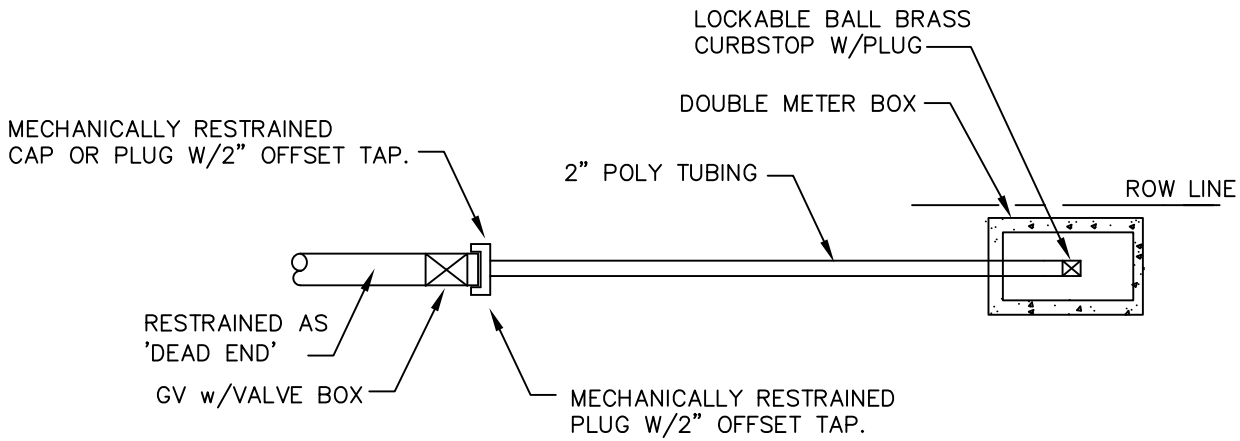
**TYPICAL WATER SERVICE  
METER/BACKFLOW ASSEMBLY  
(3" AND LARGER)**



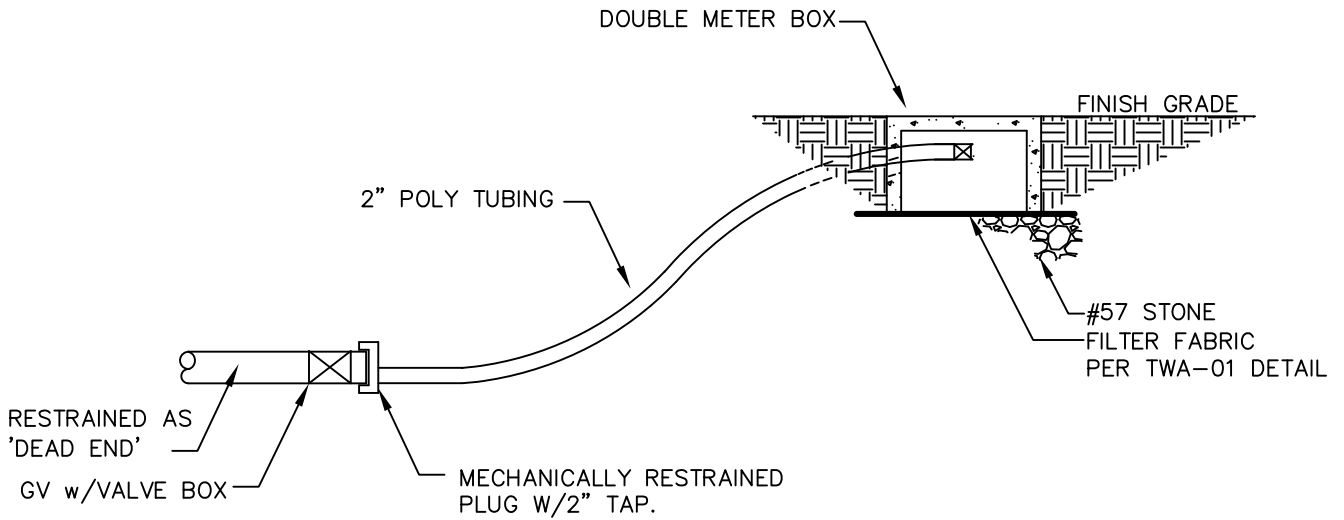
- NOTE:**
- ① MAINTAIN A MINIMUM OF 3' CLEARANCE FREE OF ALL PLANTINGS & STRUCTURES AROUND AUTOMATIC FLUSHING DEVICE.
  - ② BOLLARDS SHALL BE REQUIRED ON A CASE-BY-CASE BASIS.
  - ③ AUTOMATIC FLUSHING DEVICE SHALL BE INSTALLED ON ALL "DEAD END" LINES, PHASE LINES AND CUL-DE-SAC LOOPS.
  - ④ AUTOMATIC FLUSHING DEVICE SHALL BE SET BEHIND RIGHT OF WAY LINE AND ON LOT LINE.
  - ⑤ SODDING MUST BE INSTALLED BEFORE AUTOMATIC FLUSHING DEVICE IS ACTIVATED.
  - ⑥ WATER SERVICE AND METER BOX INSTALL PER TWA-01 DETAIL.
  - ⑦ HYDRO GUARD OR APPROVED EQUIVLANT.

TWA-24.0  
2017

## AUTOMATIC FLUSHING DEVICE (AFD)



PLAN



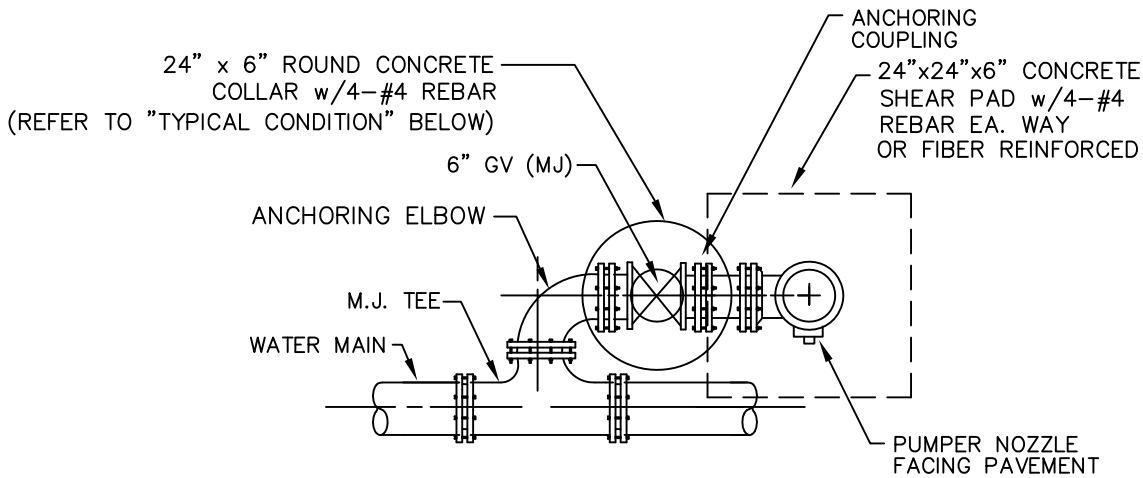
PROFILE

NOTES:

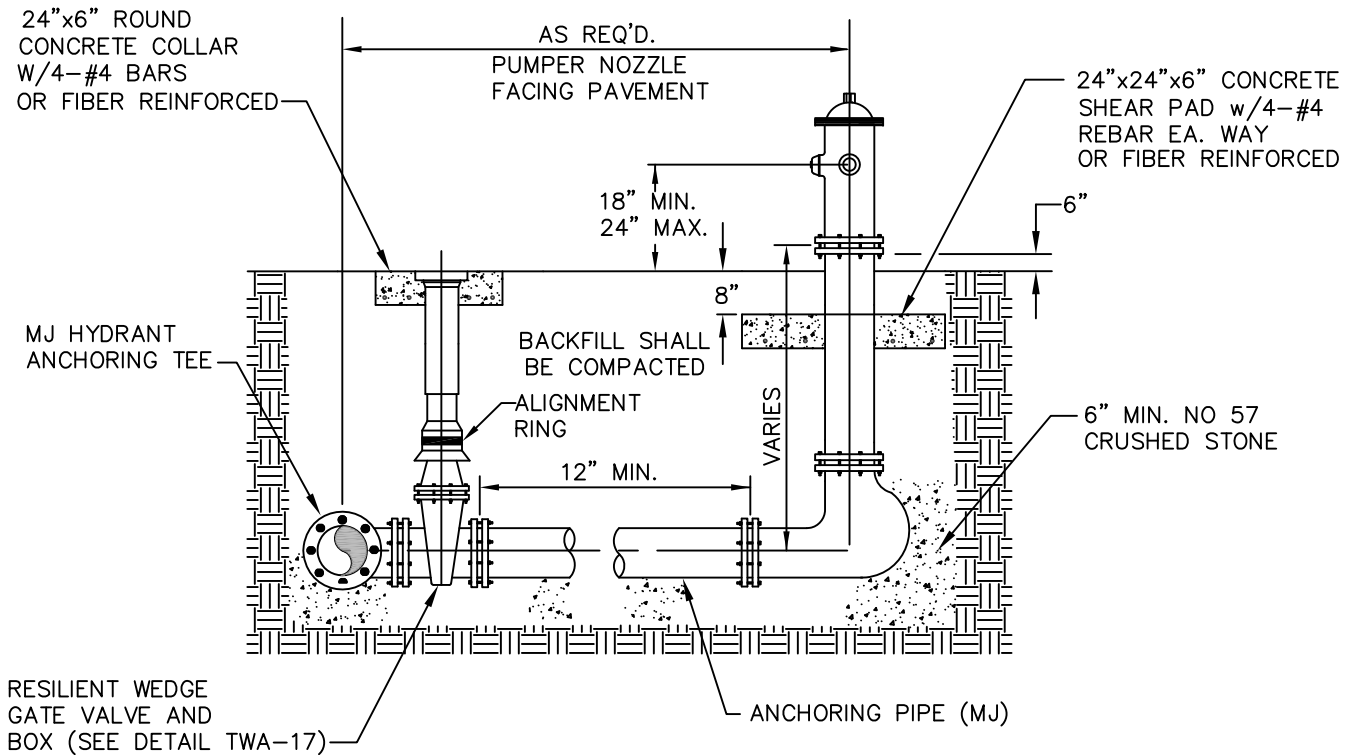
1. SWEEP 2" SDR9 POLYETHYLENE TUBING (BLUE FOR POTABLE, PURPLE FOR REUSE) FROM BOTTOM OF PIPE TO LOCKABLE CURB STOP IN DOUBLE METER BOX.
2. STOP AND FITTINGS SHALL BE BRASS PACK JOINT TYPE CONNECTIONS WITH SCREW CLAMP RETAINERS.
3. PIPING REQUIRES FULL FLUSH PRIOR TO INSTALLING BLOWOFF.
4. NO GALVANIZED STEEL ALLOWED.
5. WATER SERVICE AND METER BOX INSTALL PER TWA-01 DETAIL.

**BLOWOFF DETAIL**

TWA-25  
2017



**LIMITED RIGHT-OF-WAY CONDITION**



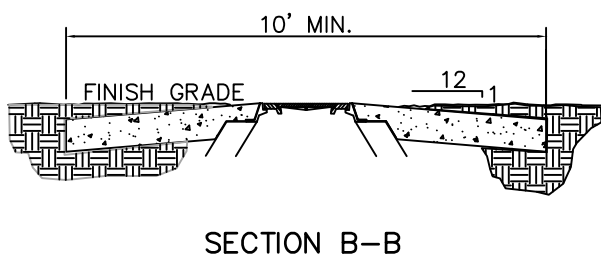
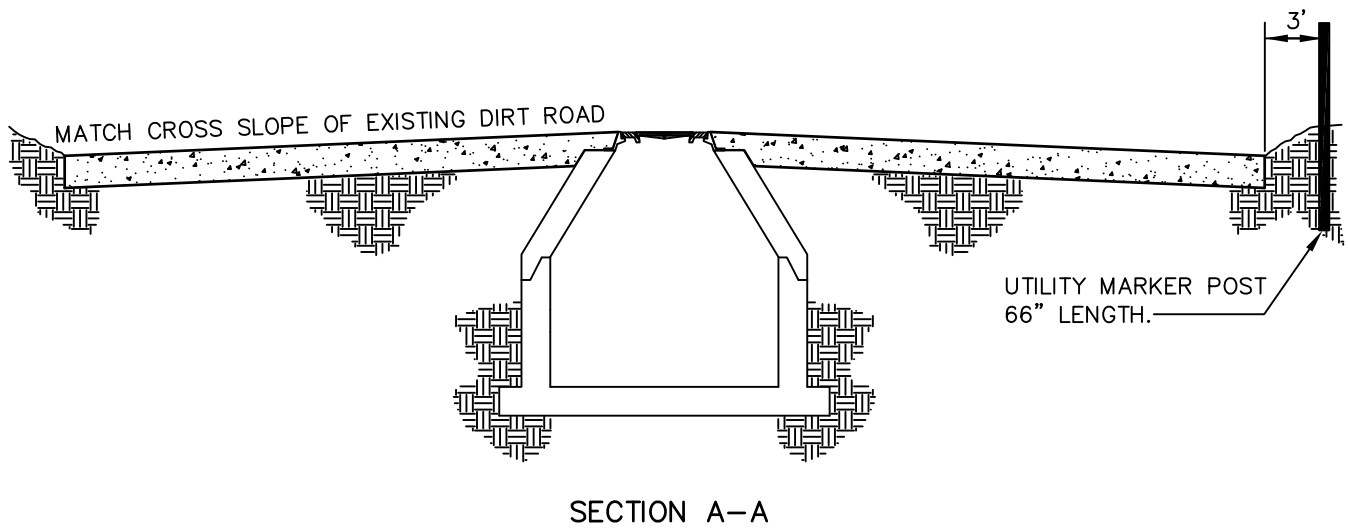
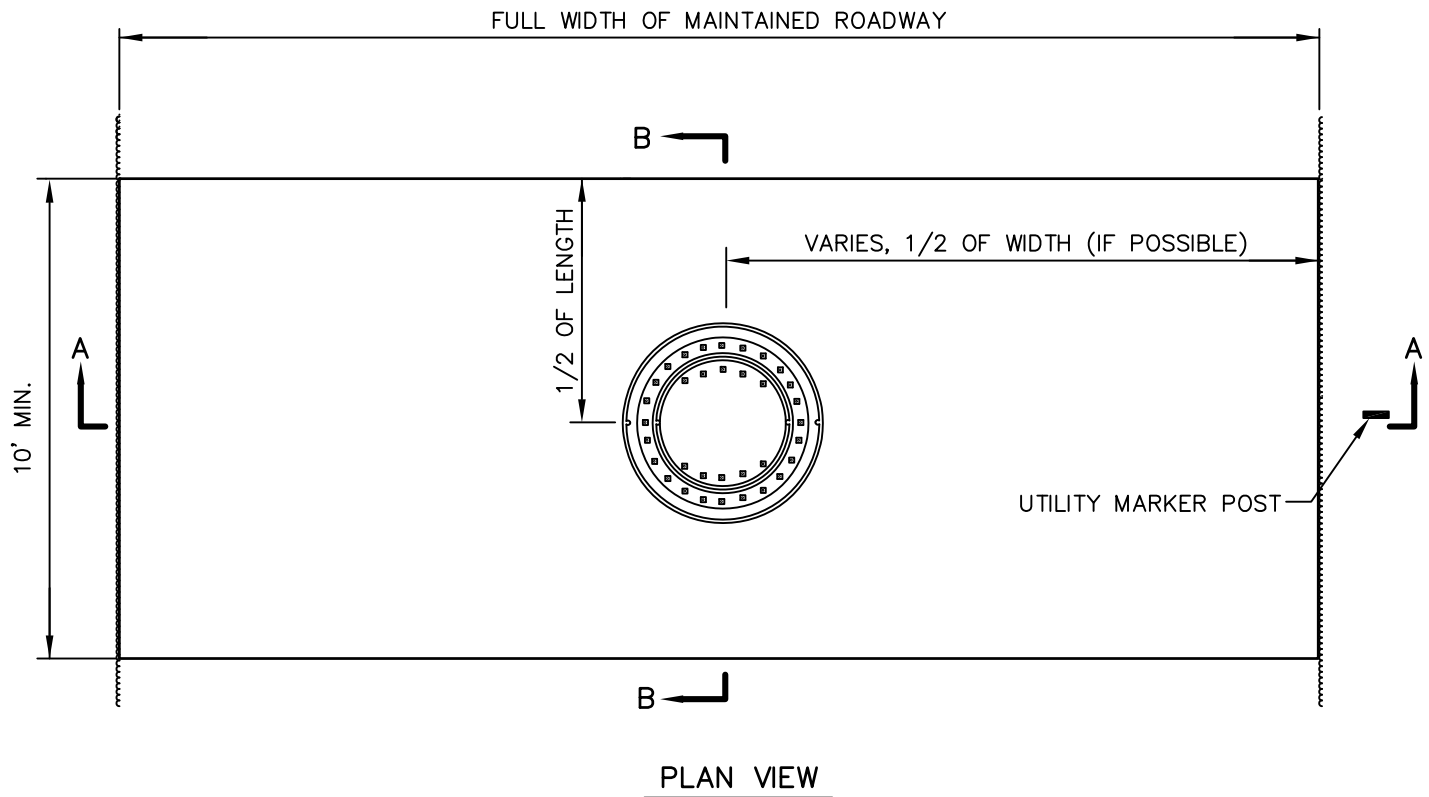
**TYPICAL CONDITION**

**NOTES:**

1. FIRE HYDRANT SHALL BE SUPPLIED WITHOUT A WEEP HOLE OR WITH A PERMANENTLY PLUGGED WEEP HOLE.
2. CLEARANCE BETWEEN BOTTOM OF BOLTS AND FINISH GRADE SHALL BE 6" MINIMUM.
3. VALVE SHALL BE INSTALLED PER THE VALVE AND BOX DETAIL (TWA-17).
4. PLANTING CLEAR AREA PER APPLICABLE FIRE CODE.
5. IF HYDRANT IS PLACED MORE THAN 20' FROM THE MAIN, AN ADDITIONAL VALVE SHALL BE REQUIRED IMMEDIATELY UPSTREAM OF THE HYDRANT ASSEMBLY.

**FIRE HYDRANT DETAILS**

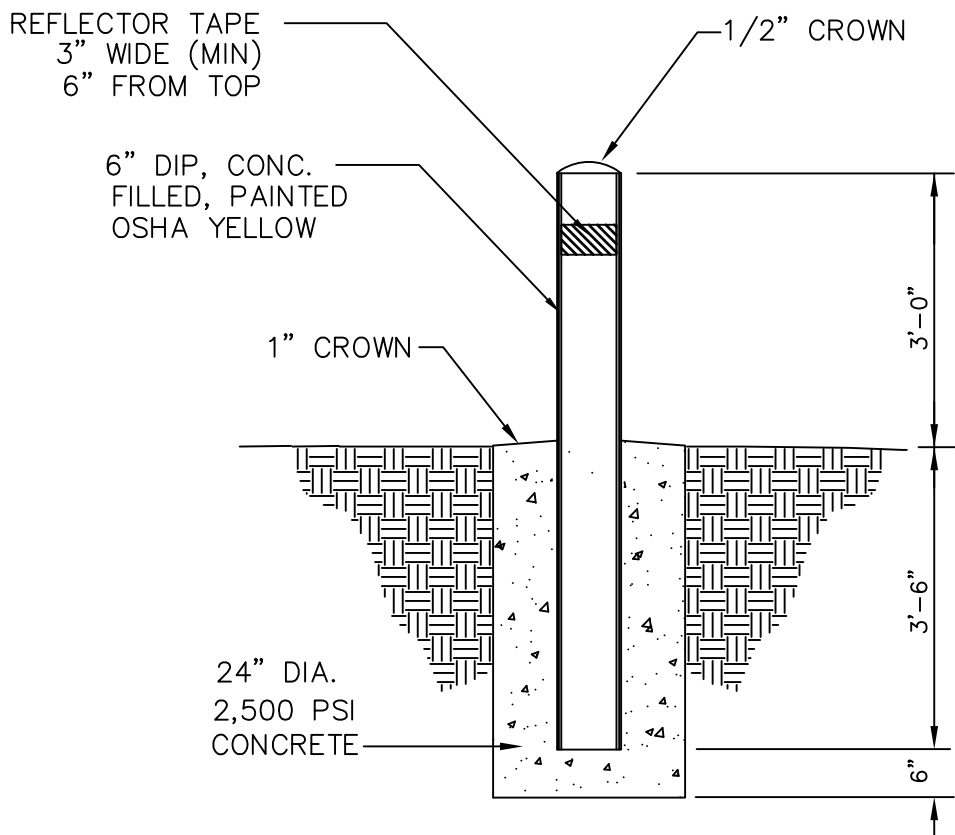




**NOTES:**

1. MINIMUM 8" THICK SLAB.
2. REINFORCING STEEL:  
MINIMUM #4 REBAR, 12" O.C.  
(OR EQUIVALENT WIRE MESH).
3. UTILITY MARKER POST  
SHALL BE PLACED 3' OUTSIDE OF  
ROADWAY. MARKER POST NOT  
TO BE PLACED BEYOND THE ROW.

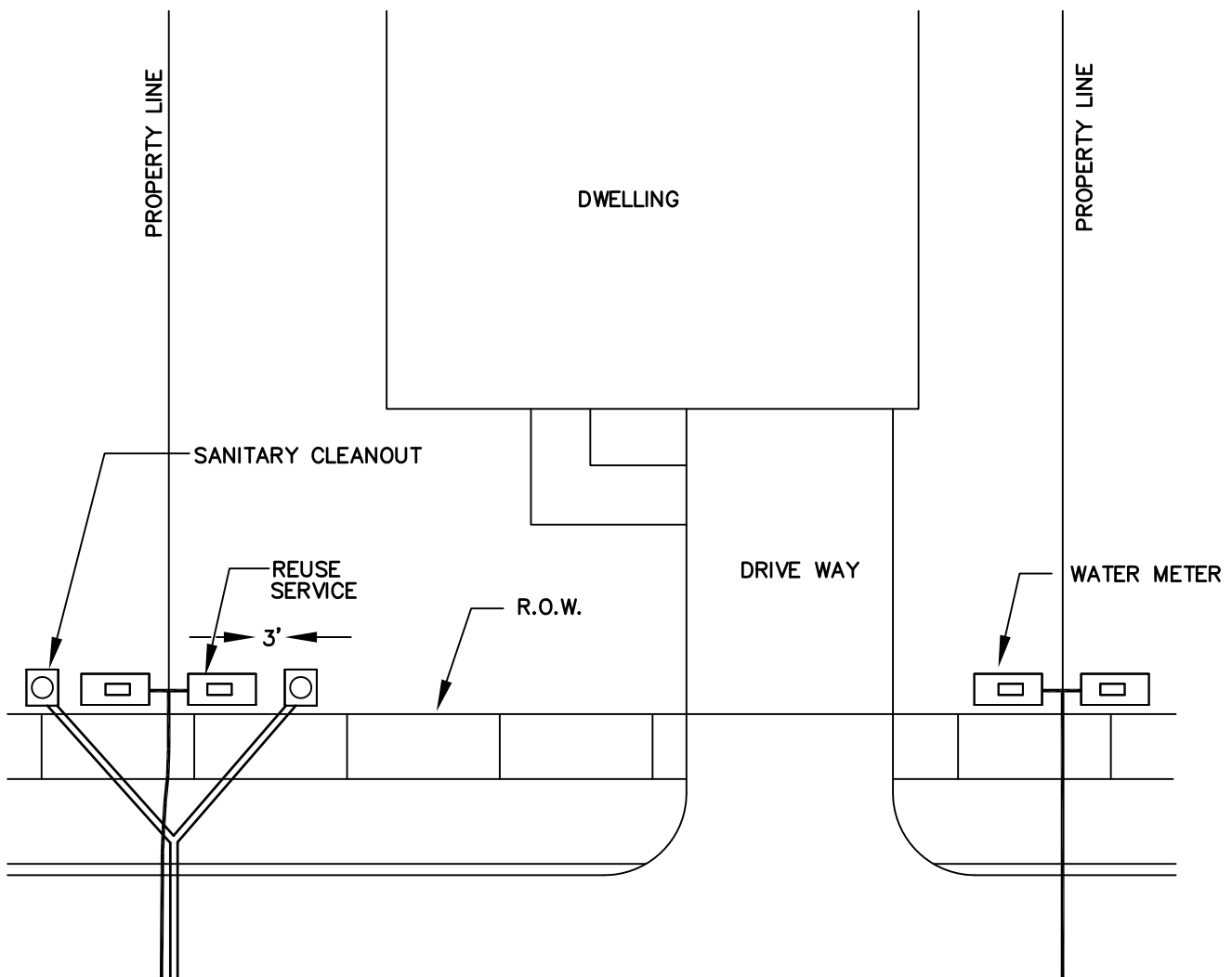
**DIRT ROAD MANHOLE PROTECTOR**



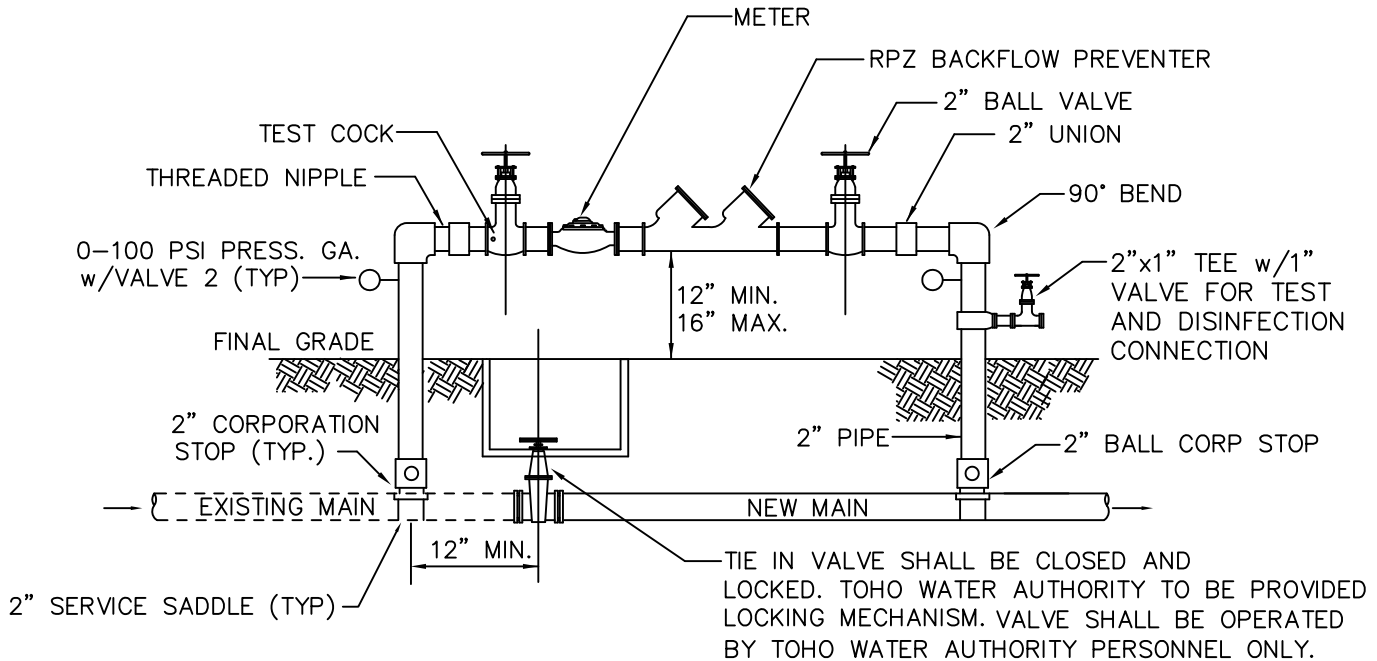
**BOLLARD DETAIL**

TWA-28  
2017

1. PRIOR TO METERS BEING INSTALLED, THE PROPERTY LINES AND BACK OF SIDEWALK ARE TO BE STAKED.
2. ALL METER BOXES SHALL BE ORIENTED PER DETAIL TWA-01.
3. SANITARY CLEAN OUT PADS SHALL BE PARALLEL TO THE SIDEWALK AND SET AT FINISHED GRADE.
4. EXISTING FIRE HYDRANTS, AUTOMATIC FLUSHING DEVICES OR VALVES ARE TO BE MAINTAINED AT FINISHED GRADE BETWEEN THE PROPERTY LINES TO THE CURB. (SEE STANDARD DETAILS FOR WATER AND SEWER INSTALLATIONS).
5. METER BOXES AND CLEAN OUTS SHALL MAINTAIN A MINIMUM SEPARATION OF 36" FROM ELECTRIC TRANSFORMERS, CABLE JUNCTION BOXES, OR ANY OTHER ABOVE GROUND SERVICE FIXTURE OR STRUCTURE.



## WATER, SEWER & REUSE SERVICE LOCATION

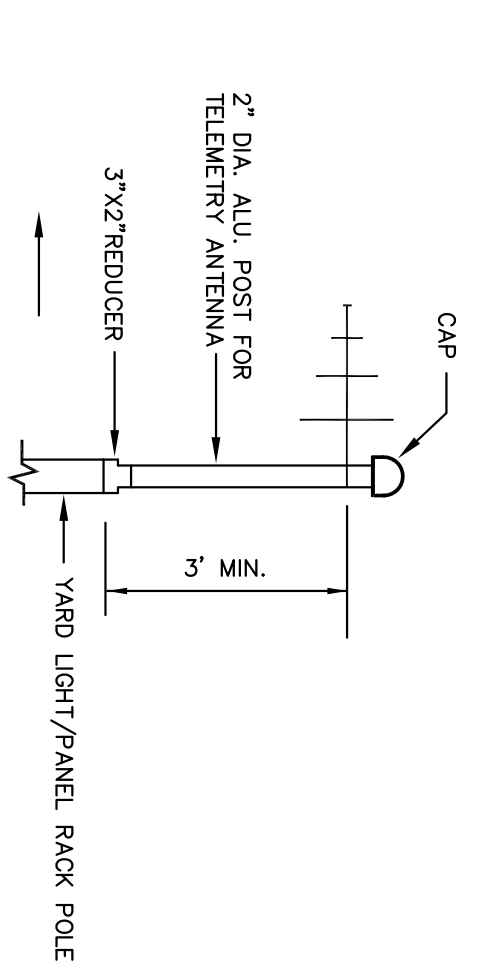


## NOTES

1. PROVIDE TEMPORARY PIPE SUPPORTS AS REQUIRED
  2. DO NOT USE GALVANIZED PIPE OR ACCESSORIES
1. A TEMPORARY JUMPER CONNECTION IS REQUIRED AT ALL CONNECTIONS BETWEEN EXISTING ACTIVE WATER MAINS AND PROPOSED NEW WATER MAIN IMPROVEMENTS.
  2. THE DETAIL SHOWN IS TO BE USED FOR FILLING ANY NEW WATER MAIN OF ANY SIZE FROM EXISTING ACTIVE WATER MAINS AND FOR FLUSHING OF NEW MAINS UP TO 8" DIAMETER (2.5 FPS MIN. VELOCITY) AND FOR PULLING BACTERIOLOGICAL SAMPLES FROM ANY NEW WATER MAIN OF ANY SIZE. THE JUMPER CONNECTION SHALL BE MAINTAINED UNTIL AFTER FILLING, FLUSHING, TESTING AND DISINFECTION OF THE NEW MAIN HAS BEEN SUCCESSFULLY COMPLETED AND CLEARANCE FOR USE FROM FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION (FDEP) AND OTHER PERTINENT AGENCIES HAS BEEN RECEIVED. PIPE AND FITTINGS USED FOR CONNECTION OF THE NEW PIPE TO THE EXISTING PIPE SHALL BE DISINFECTED PRIOR TO INSTALLATION IN ACCORDANCE WITH AWWA C651, CURRENT EDITION. SWAB OR SPRAY THE EXTERIOR OF THE MAIN TO BE TAPPED AND THE TAPPING SADDLE WITH 1% HYPOCHLORITE SOLUTION.
  3. THE CONTRACTOR SHALL EITHER PROVIDE DOCUMENTATION DEMONSTRATING THAT RPZ BACKFLOW PREVENTION DEVICE HAS BEEN TESTED AND IS IN GOOD WORKING ORDER AT TIME OF INSTALLATION.
  4. ALL INSTALLATION AND MAINTENANCE OF THE TEMPORARY JUMPER CONNECTION AND ASSOCIATED BACKFLOW PREVENTIONS DEVICE, FITTINGS AND VALVES, ETC., SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
  5. ABANDONED JUMPER CONNECTION POINTS MUST BE INCLUDED IN THE RECORD DRAWINGS.

## TEMPORARY JUMPER CONNECTION

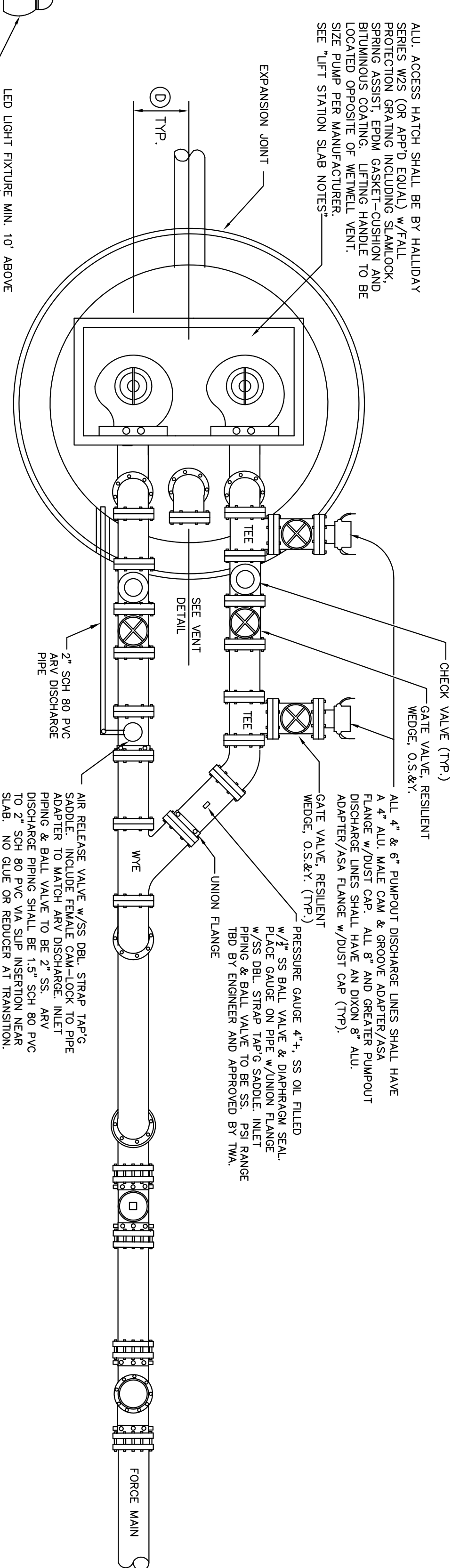
TWA-30  
2017



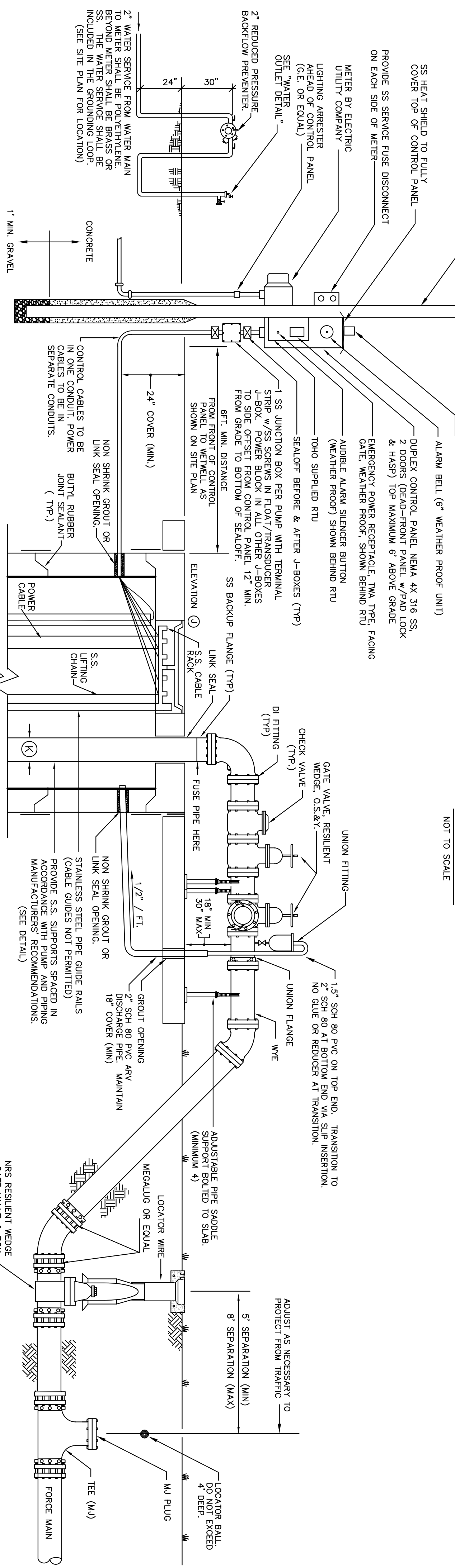
**ALTERNATE ANTENNA DETAIL**  
NOT TO SCALE

NOTE:  
IF SPACE PROHIBITS PLACEMENT OF ANTENNA, THE YARD LIGHT/PANEL RACK POLE WITH WRITTEN PERMISSION FROM TWA.

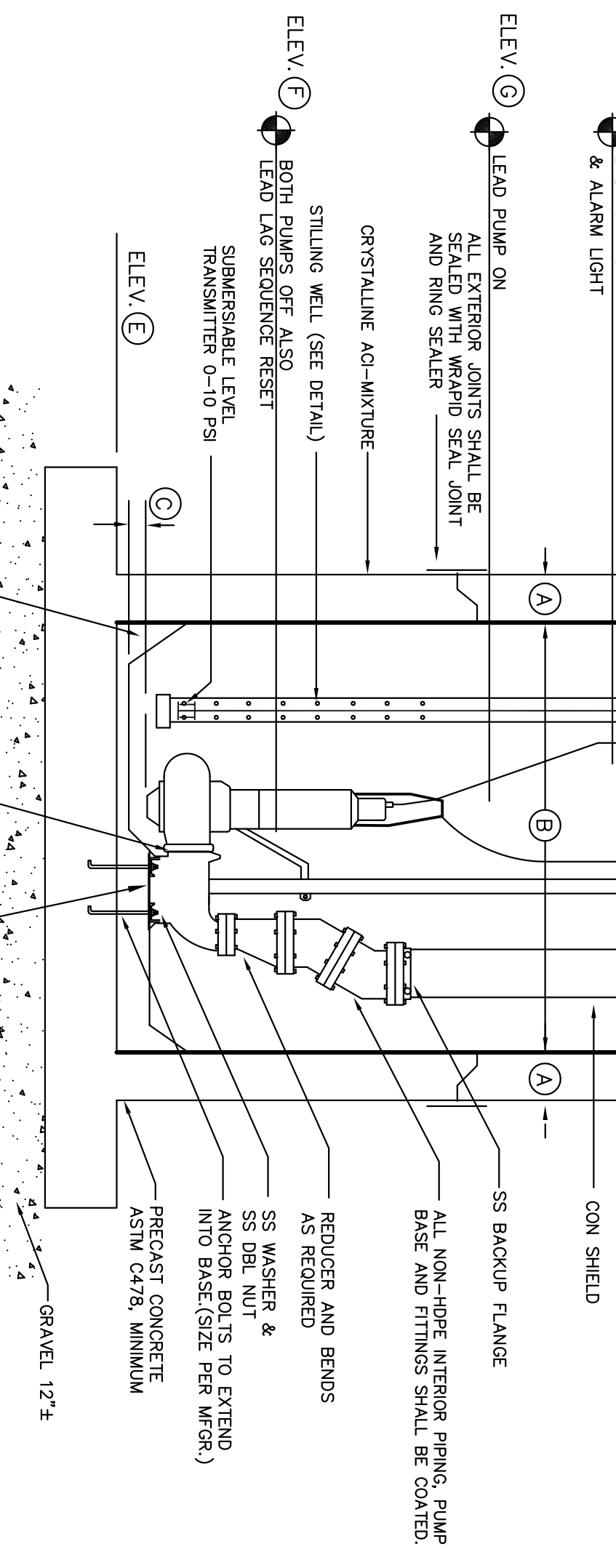
YARD LIGHT/PANEL RACK POLE: 3'-3 1/4" ALU. POSTS EMBEDDED IN CONCRETE TO GRADE. PLACE MIDDLE POST APPROX MIDWAY OF THE TWO END POSTS ON OPPOSITE SIDE OF UNSTRUCTURED.



**PLAN VIEW**  
NOT TO SCALE

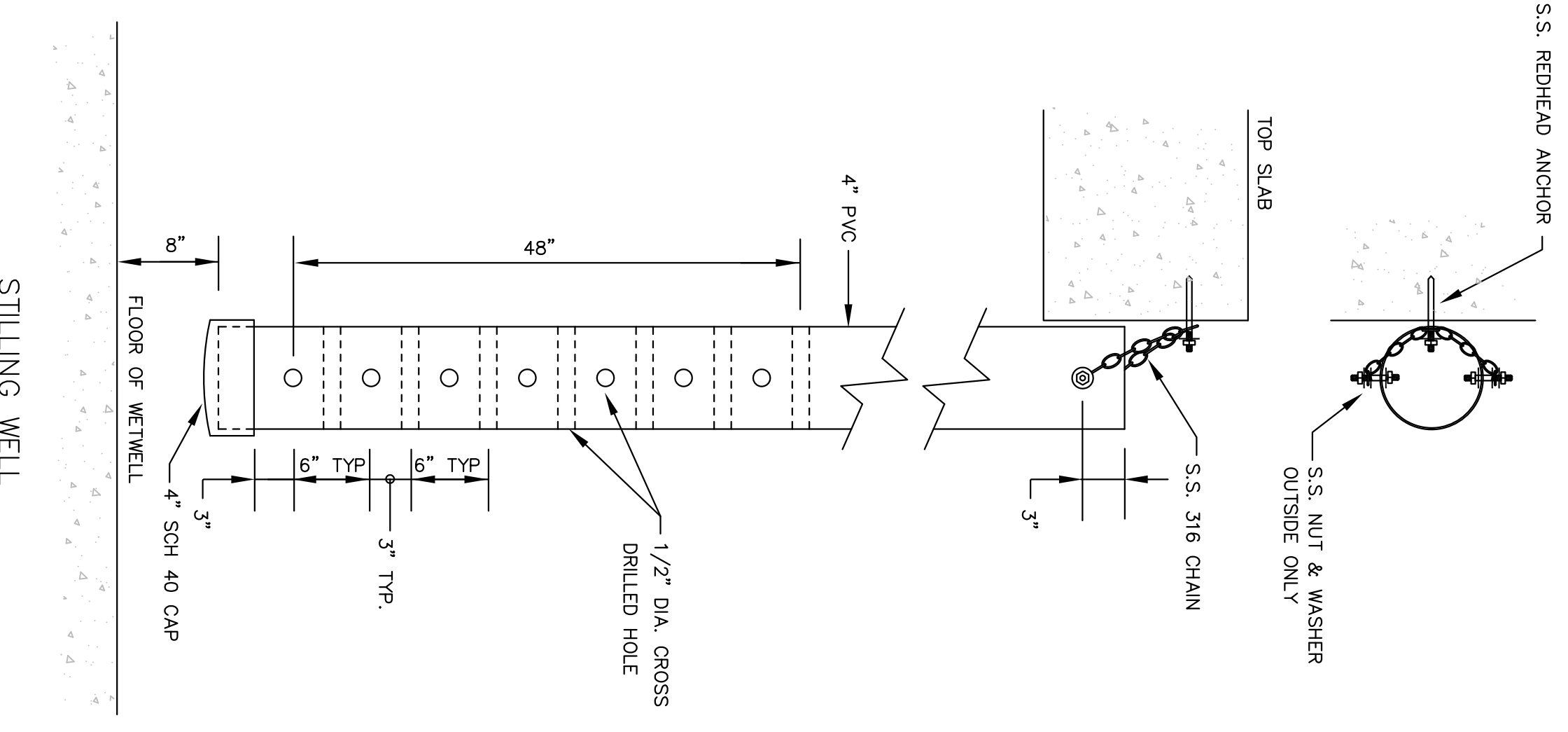


**SECTION VIEW**  
NOT TO SCALE

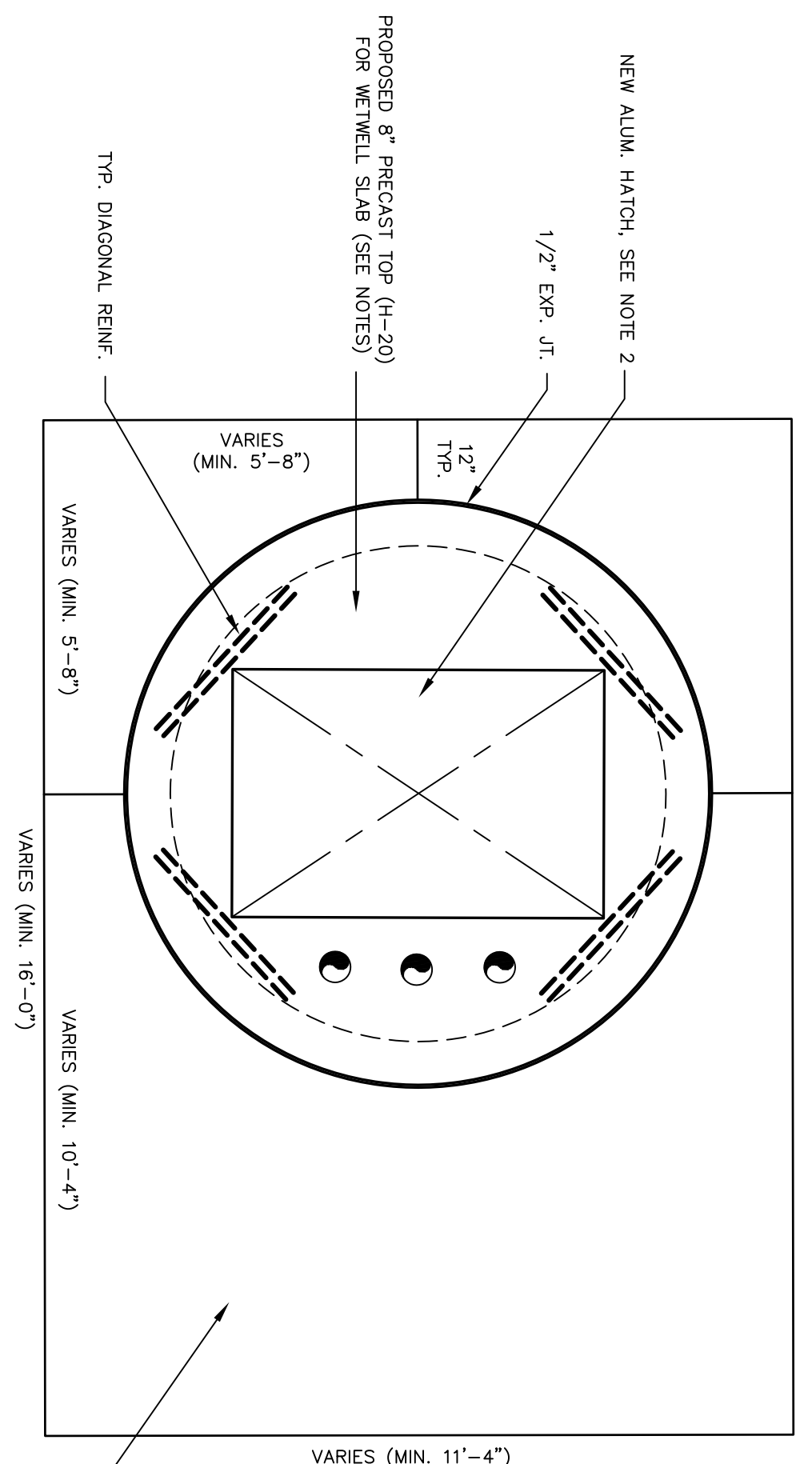


- NOTES:**
1. ALL ITEMS NOT SPECIFIED ON THESE DETAIL SHEETS SHALL MEET TWA STANDARDS AND SPECIFICATIONS.
  2. PRECAST CONCRETE SHALL BE TYPE 2 CEMENT, 4,000 PSI.
  3. NO LIFTING HOLES ARE PERMITTED THROUGH WALLS OR TOP SLAB.
  4. ALL ABOVE GROUND PIPING TO BE FLANGED.
  5. SEE PANEL DRAWINGS FOR TELEMETRY SYSTEM DETAILS.
  6. TELEMETRY SHALL BE FURNISHED, PROGRAMMED AND INSTALLED BY TWA.
  7. ALL TAPS TO BE MADE WITH A SS TAPPING SADDLE.
  8. ALL CONDUIT SHALL BE RIGID ALUMINUM EXCEPT FLEX IS TO BE USED BETWEEN RTU AND CONTROL PANEL. ALLOW SCHEDULE 80 PVC FROM TRANSFORMER TO INLET SIDE OF 2ND DISCONNECT.
  9. ALL ENCLOSURE PENETRATIONS SHALL BE MADE ON THE BOTTOM OF THE TISS. USE METERS HUBS EXCEPT BETWEEN DISCONNECT AND TISS.
  10. ALL BOXES AND ENCLOSURES TO BE NEMA 4X 316 SS.
  11. RACK TO UTILIZE SS STRUT CHANNEL, SS HARDWARE AND VINYL ENDCAPS.
  12. FINISHED GRADE INSIDE THE FENCED AREA SHALL BE MINIMUM OF 6" ABOVE THE 100% FLOOD ELEVATION. LIFT STATION AREA SHALL BE GRADED TO CARRY ALL SURFACE RUNOFF AWAY FROM WETWELL.
  13. INSIDE SHALL BE CON SHIELD.

MARK	DIMENSIONS	DESCRIPTION	COMMENTS
DIM. (A)		WETWELL WALL THICKNESS	8" MINIMUM
DIM. (B)		WETWELL DIAMETER	8' MINIMUM
DIM. (C)		PER PUMP SUBMITTAL DATA	
DIM. (D)		SEE TOP SLAB DETAIL	
DIM. (E)		ELEVATION	BOTTOM OF WETWELL
DIM. (F)		ELEVATION	PUMPS OFF
DIM. (G)		ELEVATION	LEAD PUMP ON
DIM. (H)		ELEVATION	LAG PUMP ON
DIM. (I)		ELEVATION	AUDIBLE ALARM & INVERT
DIM. (J)		ELEVATION	TOP OF SLAB
DIM. (K)		HDPD DRIT DIAMETER	DISCHARGE
DIM. (L)		EQUAL TO DEPTH OF WETWELL.	15' MIN W/ NO ODOR CONTROL, 20' MIN W/ ODOR CONTROL, RECD
FLOOD ZONE DESIGNATION		FLOOD ELEV.	VERT DATUM "NAVD"

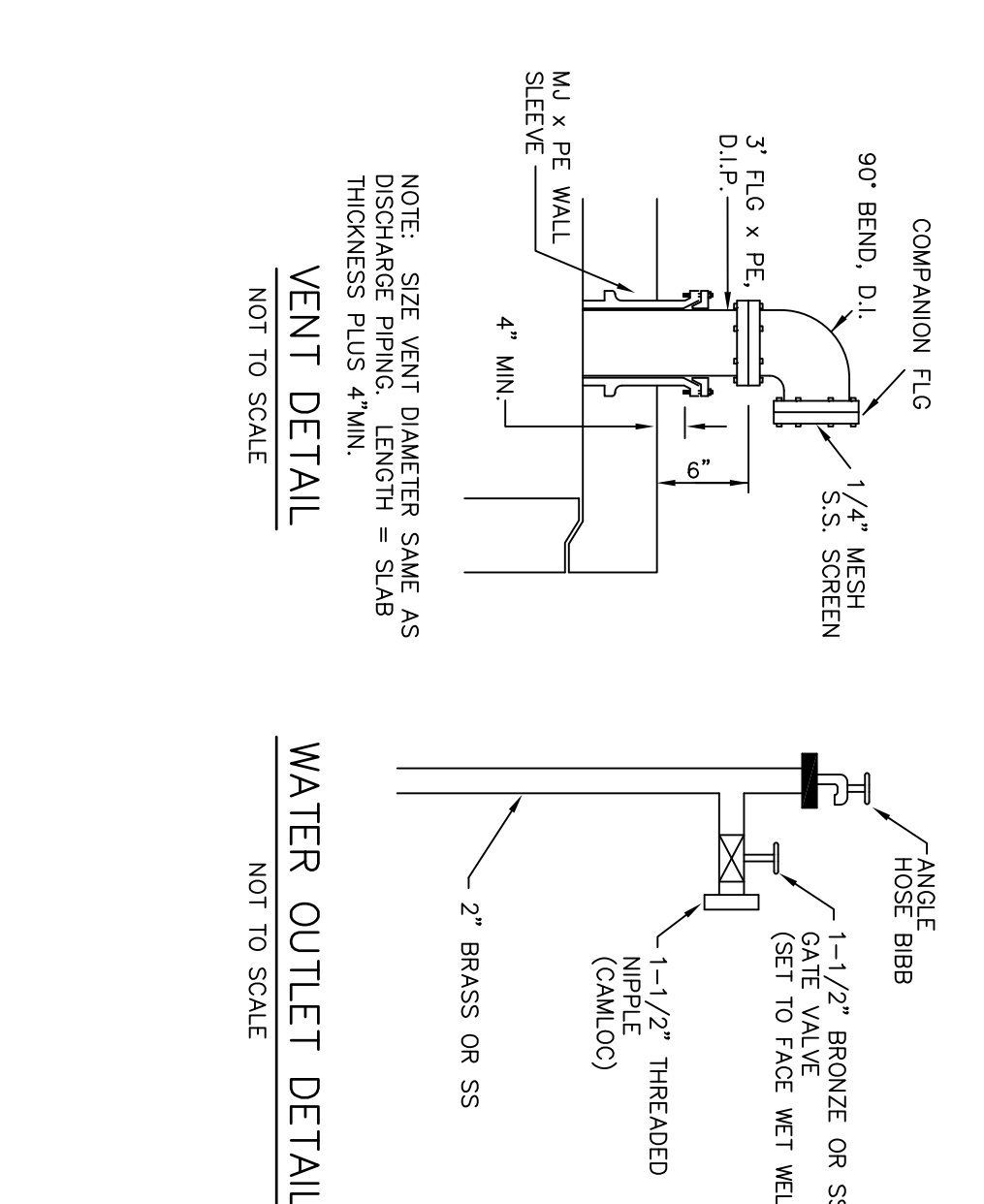


**STILLING WELL**  
NOT TO SCALE

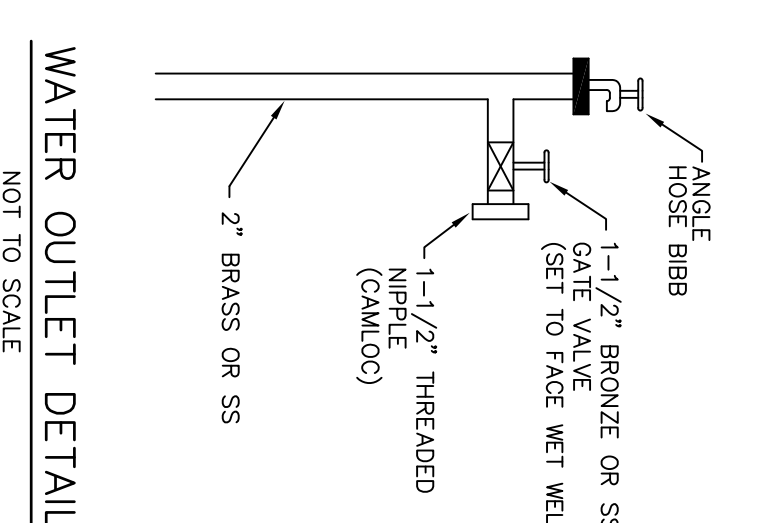


TYPICAL LIFT STATION SLAB DETAIL  
NOT TO SCALE

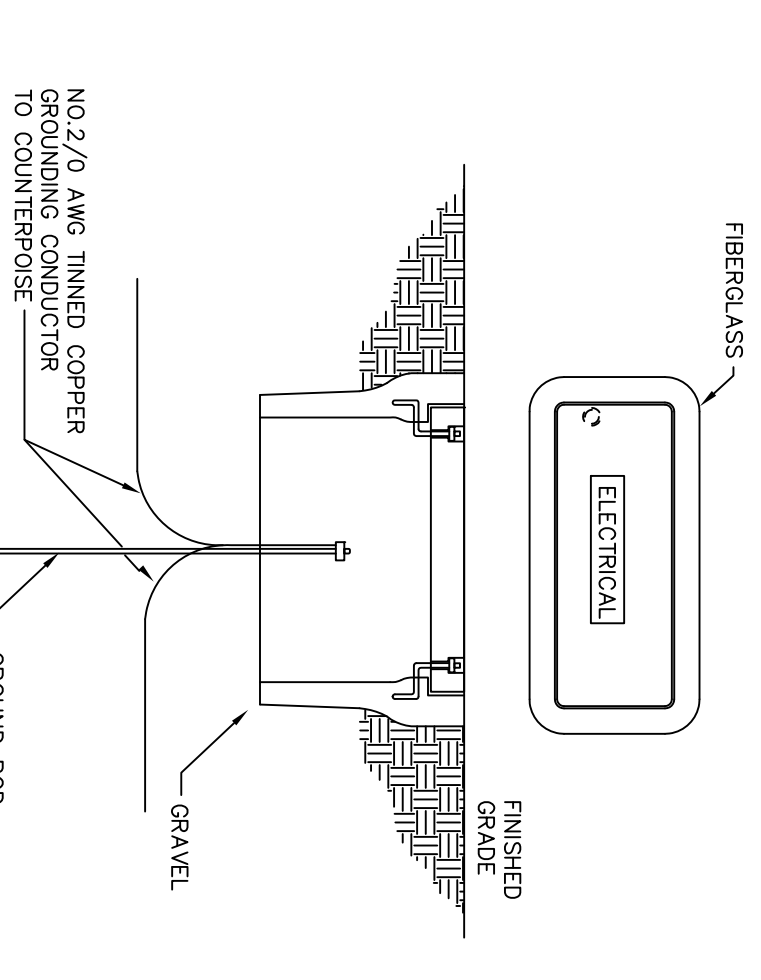
- LIFT STATION SLAB NOTES:
- 1) SAWCUT 2" DEEP JOINT AS SHOWN. SAW CUTTING TO BE PERFORMED IMMEDIATELY AFTER PLACEMENT AS SOON AS THE CONCRETE IS FIRM ENOUGH TO SUPPORT THE SAW AND TO NOT BE TORN OR DAMAGED BY THE BLADE.
  - 2) ALUMINUM ACCESS HATCH SHALL BE BY HALLURY MODEL SERIES WAS WITH AN ALUMINUM FRAME. THE FRAME SHALL BE ANODIZED ALUMINUM WITH BITUMINOUS COATING WHERE ALUMINUM IS IN CONTACT WITH CONCRETE.
  - 3) PROVIDE SAWCUTS EVERY 12' IN LENGTH AND WIDTH OF ACCESS DRIVEWAY AND LIFT STATION SLAB AND AS SHOWN.
  - 4) SEE CIVIL DRAWINGS FOR SLAB LOCATION AND DIMENSIONS.



VENT DETAIL  
NOT TO SCALE



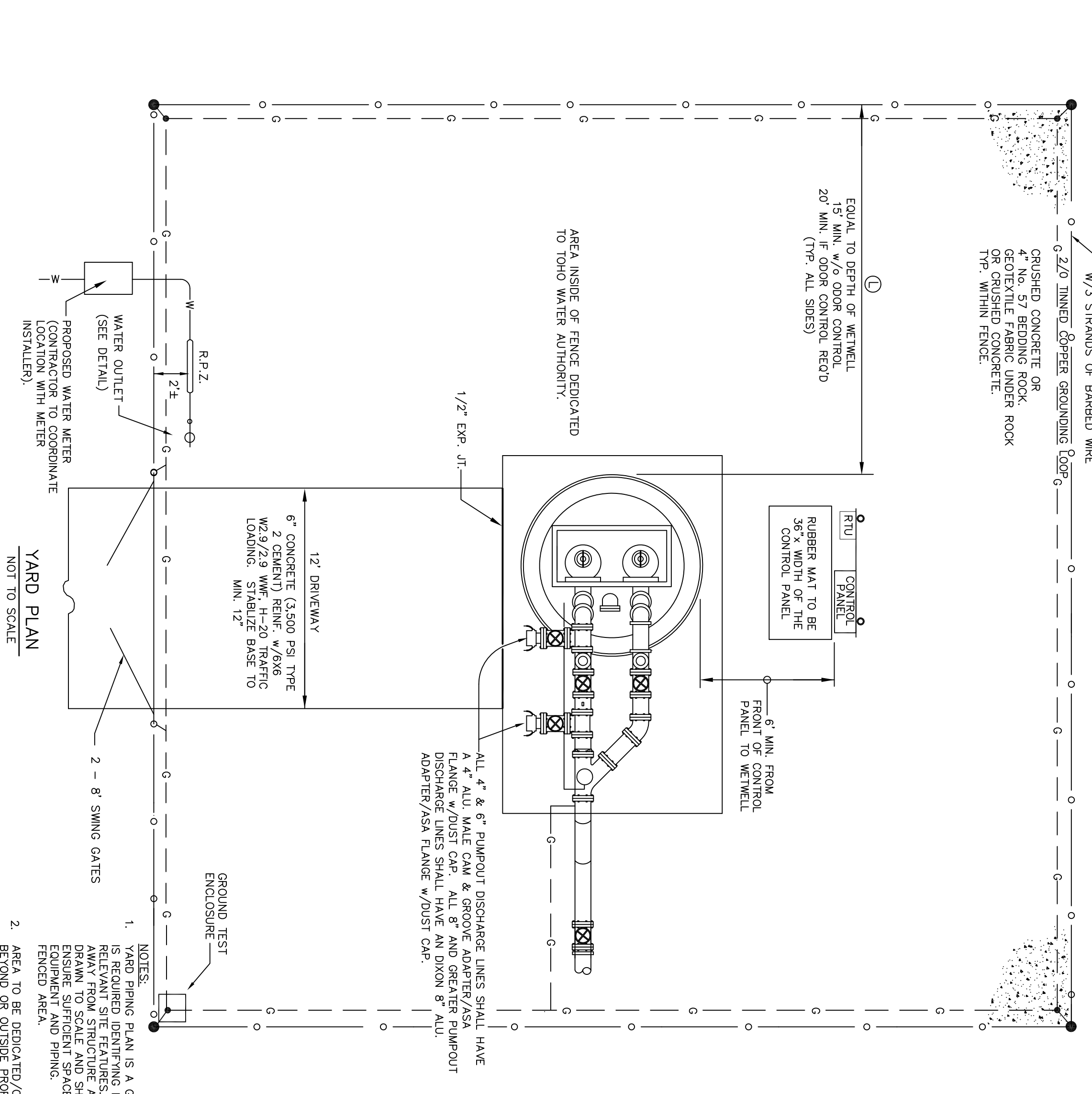
WATER OUTLET DETAIL  
NOT TO SCALE



GROUND TEST ENCLOSURE

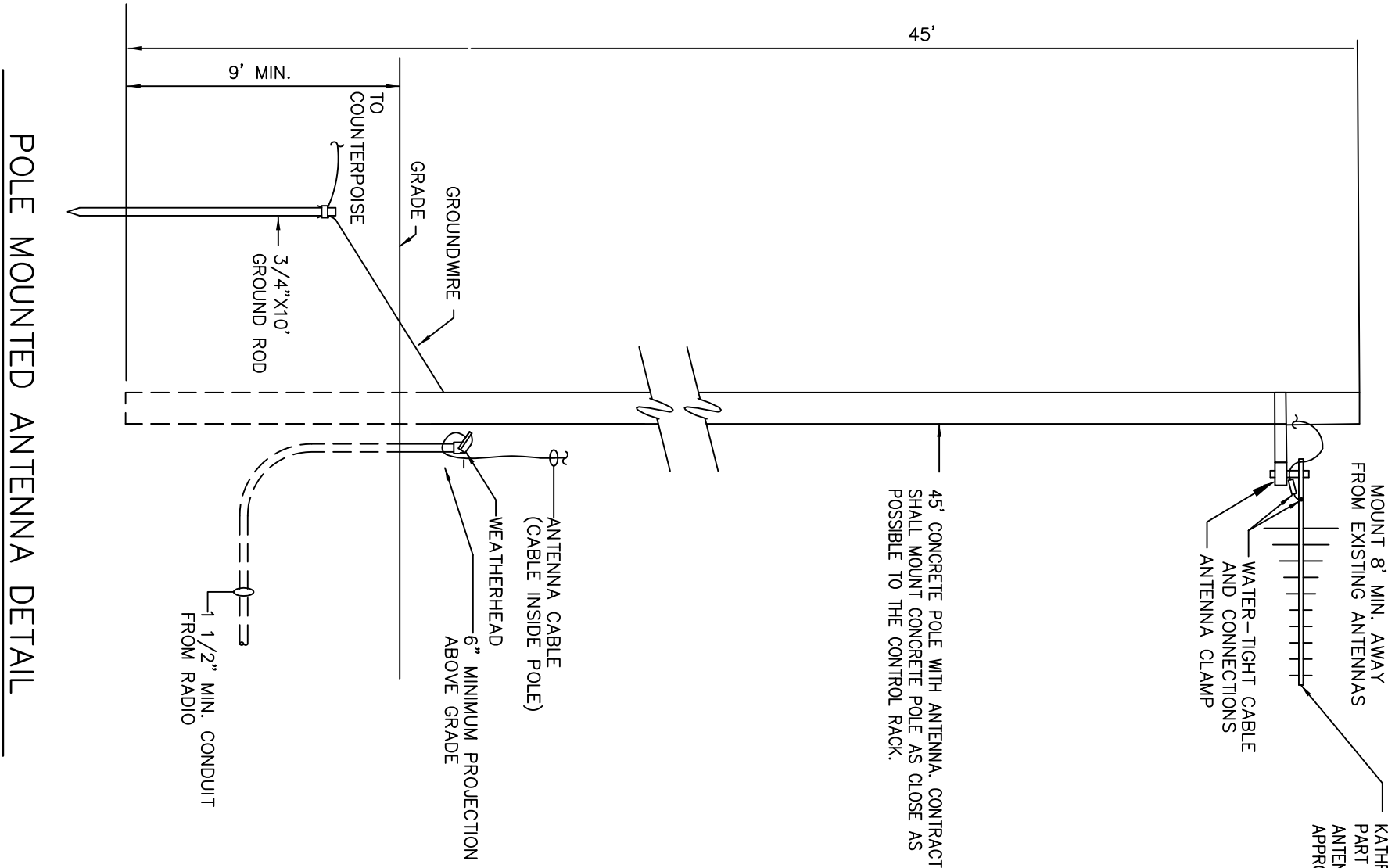
THE GROUNDED COUNTERPOSE LOOP SHALL BE BONDED TO GROUND RODS AND GROUND WIRE TO THE COUNTERPOSE LOOP:

1. CORNER POSTS.
2. GATE POSTS, GATE AND FENCE.
3. UTILITY COMPANY TRANSFORMER.
4. WATER SERVICE.
5. GENERATOR.
6. CONTROL PANEL.
7. GROUND CONTROL.
8. DISCONNECT SWITCH.
9. TELEMETRY MAST.
10. GROUND ROD.
11. MAIN DISCONNECT SWITCH.
12. UTILITY COMPANY TRANSFORMER.
13. GENERATOR.
14. TELEMETRY MAST.

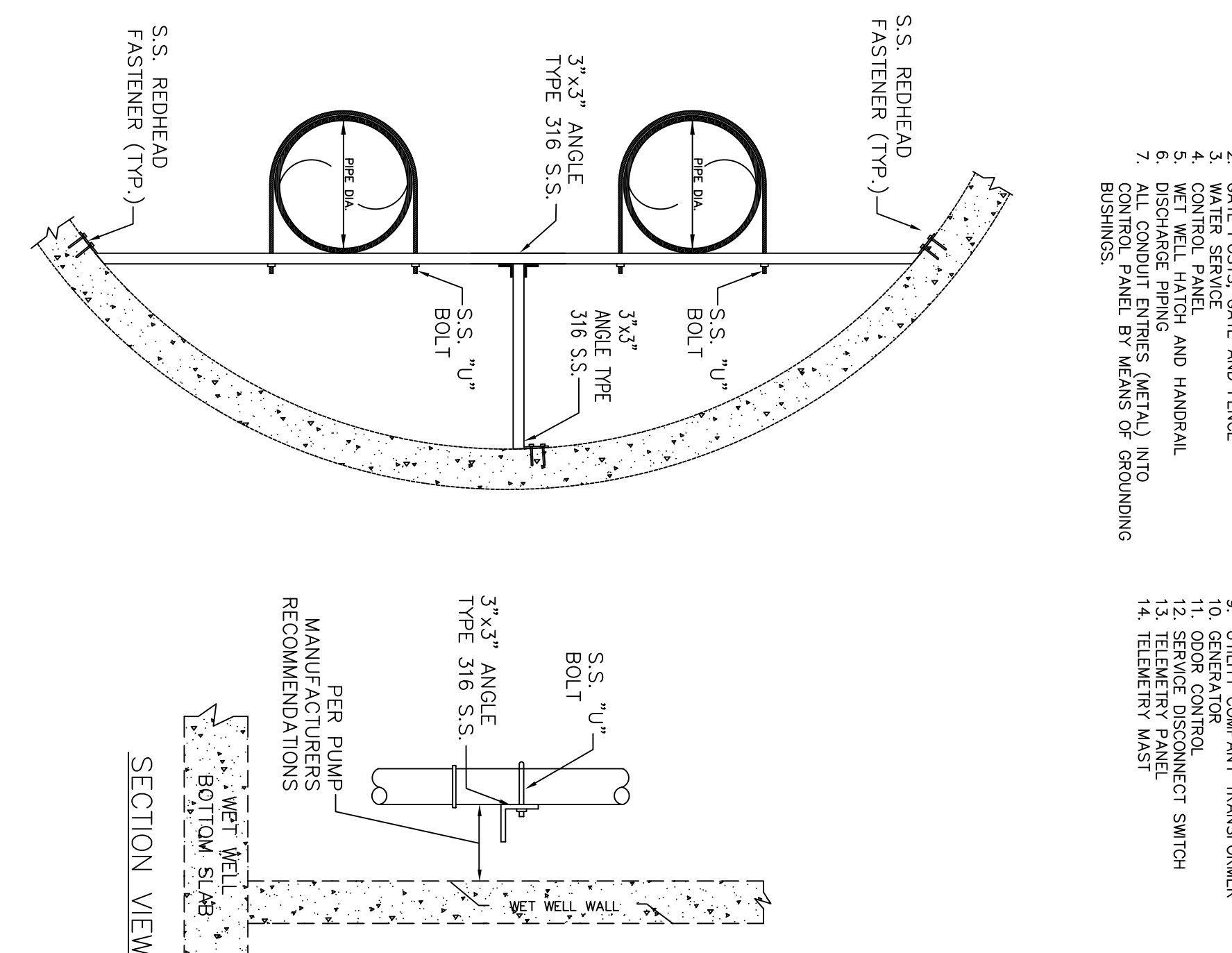


YARD PLAN  
NOT TO SCALE

- NOTES:
1. YARD PIPING PLAN IS A GENERIC PLAN SHOWING REQUIRED PIPING. A SPECIFIC SITE PLAN IS REQUIRED IDENTIFYING LOCATION OF DRIVEWAY/ACCESS ROADS AND ALL OTHER PIPING. THE PIPING PLAN SHALL BE DRAWN BY THE CONTRACTOR AND SHALL BE DRAWN TO SCALE AND SHOW ALL WETWELL PUMPS AND INFLUENT & EFFLUENT PIPING TO ENSURE SUFFICIENT SPACE WITHIN THE WETWELL TO ACCOMMODATE ALL MECHANICAL AND PIPING. ELECTRICAL TRANSFORMERS MUST BE LOCATED OUTSIDE THE FENCED AREA.
  2. AREA TO BE DEDICATED/CONVEYED TO TOHO WATER AUTHORITY SHALL EXTEND MIN. 1.0' BEYOND OR OUTSIDE PROPOSED SECURITY FENCING.
  3. PROPOSED 12' DRIVEWAY TO EXTEND TO PUBLIC/PRIVATE PAVED ROADWAY.
  4. PROVIDE A PROJECT SPECIFIC YARD PLAN DETAIL.

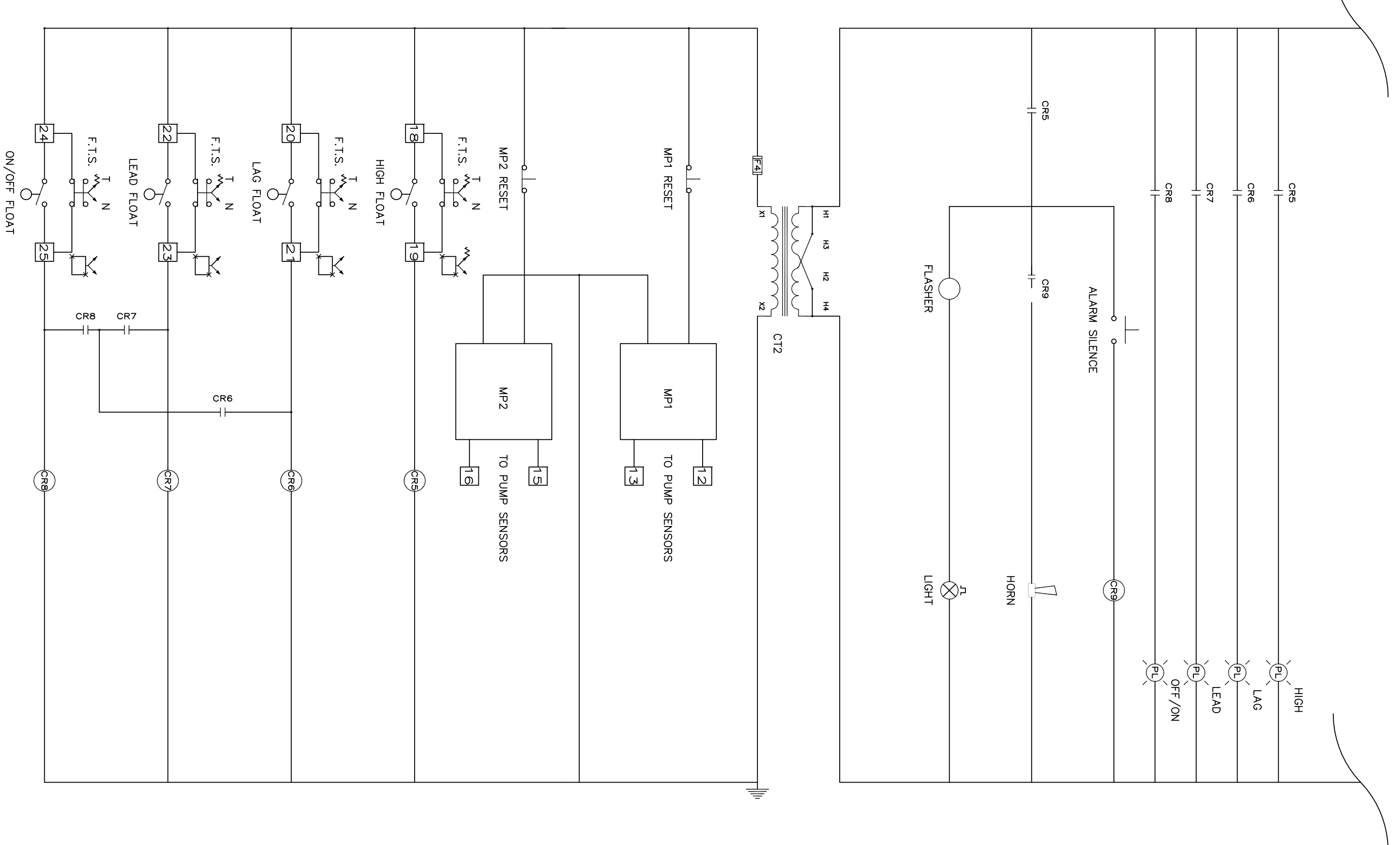
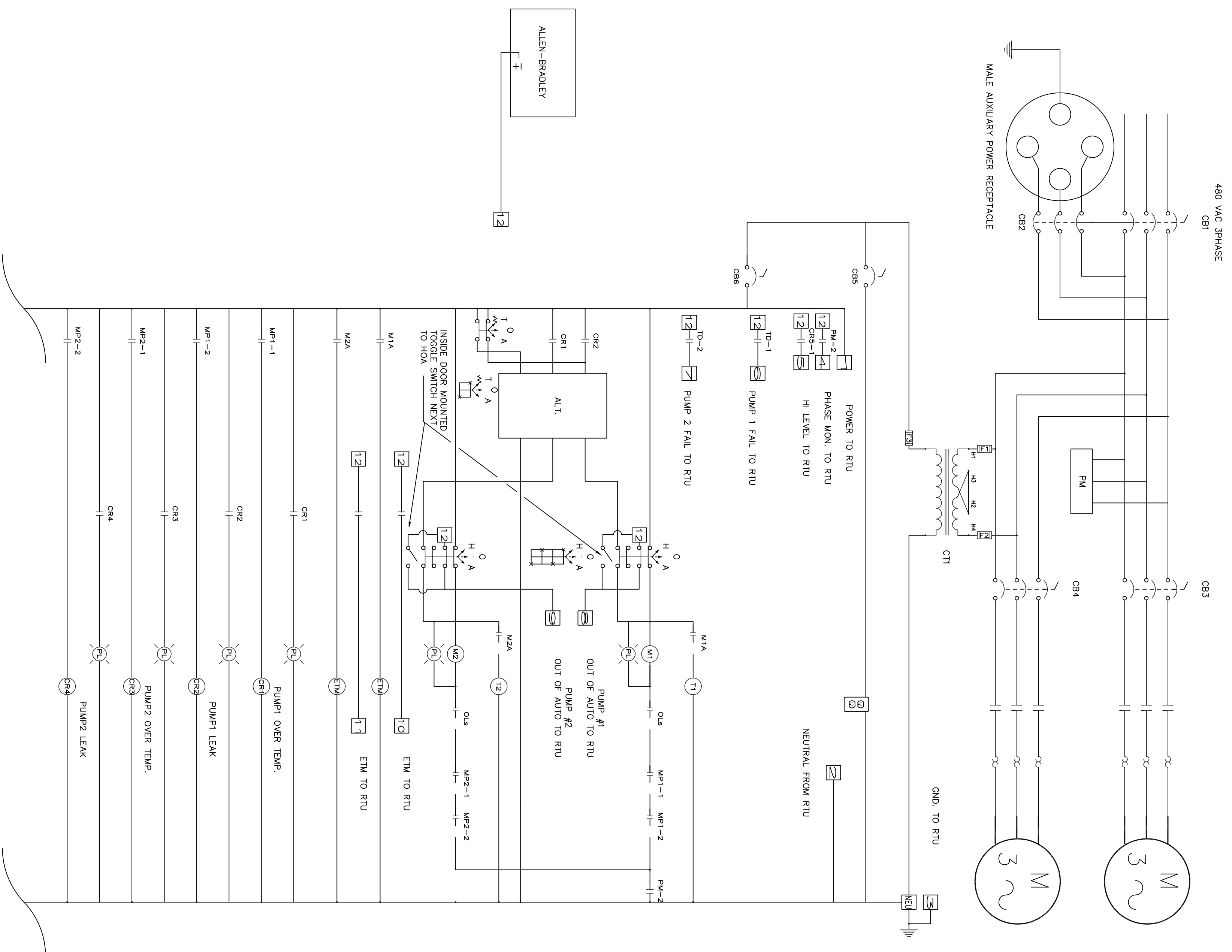


POLE MOUNTED ANTENNA DETAIL  
NO SCALE

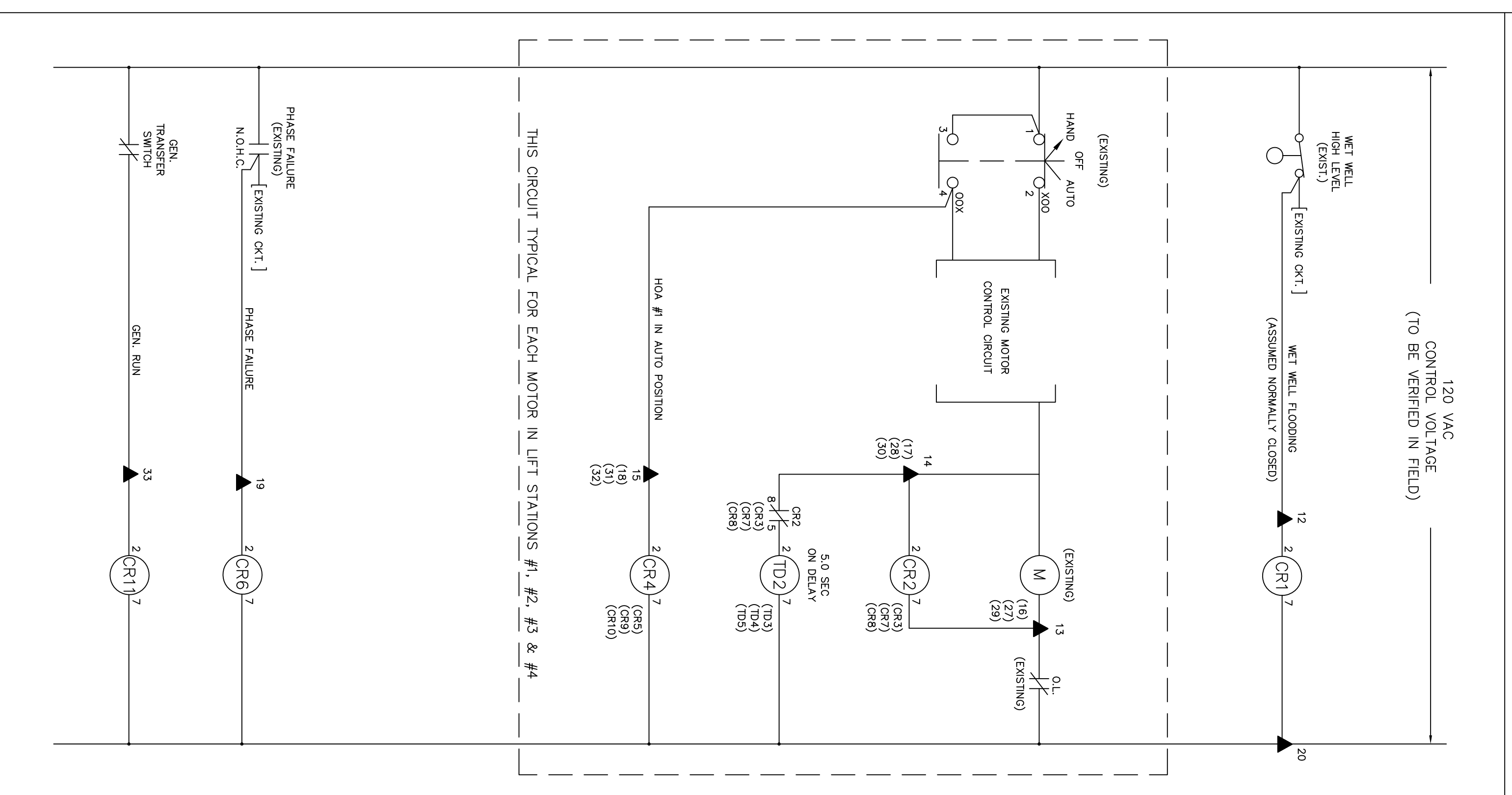


PIPE FASTENING BRACKET  
NOT TO SCALE

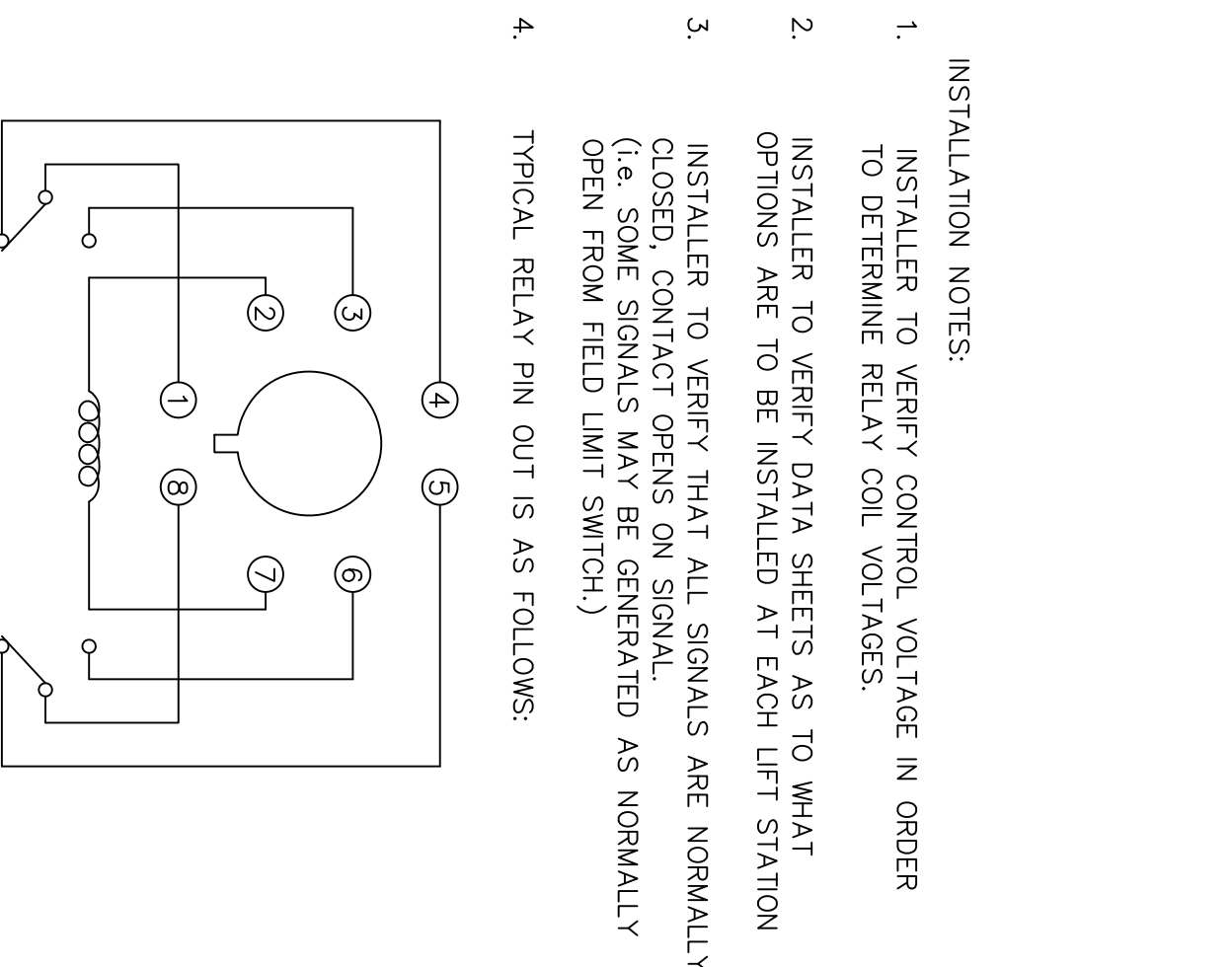
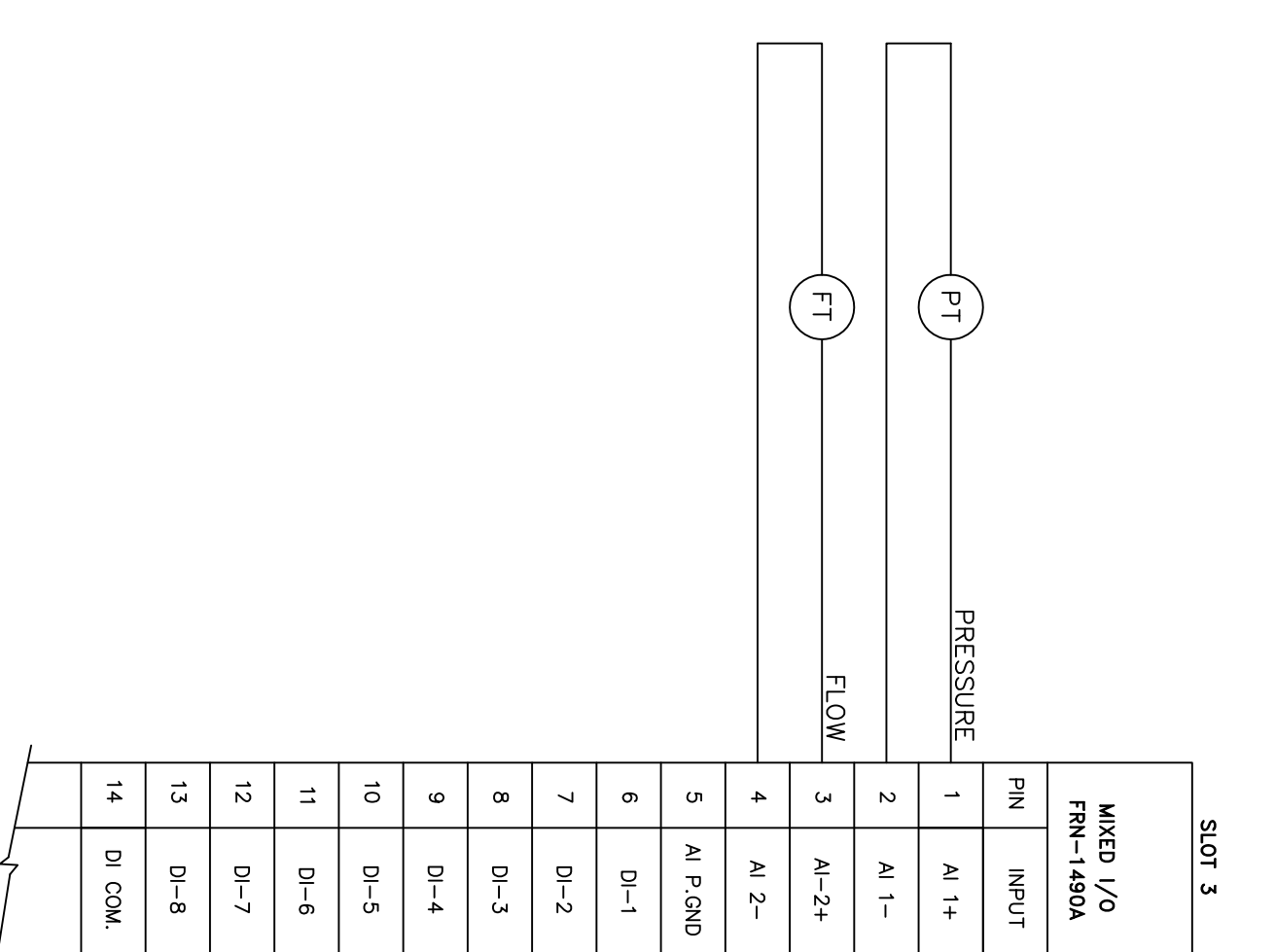
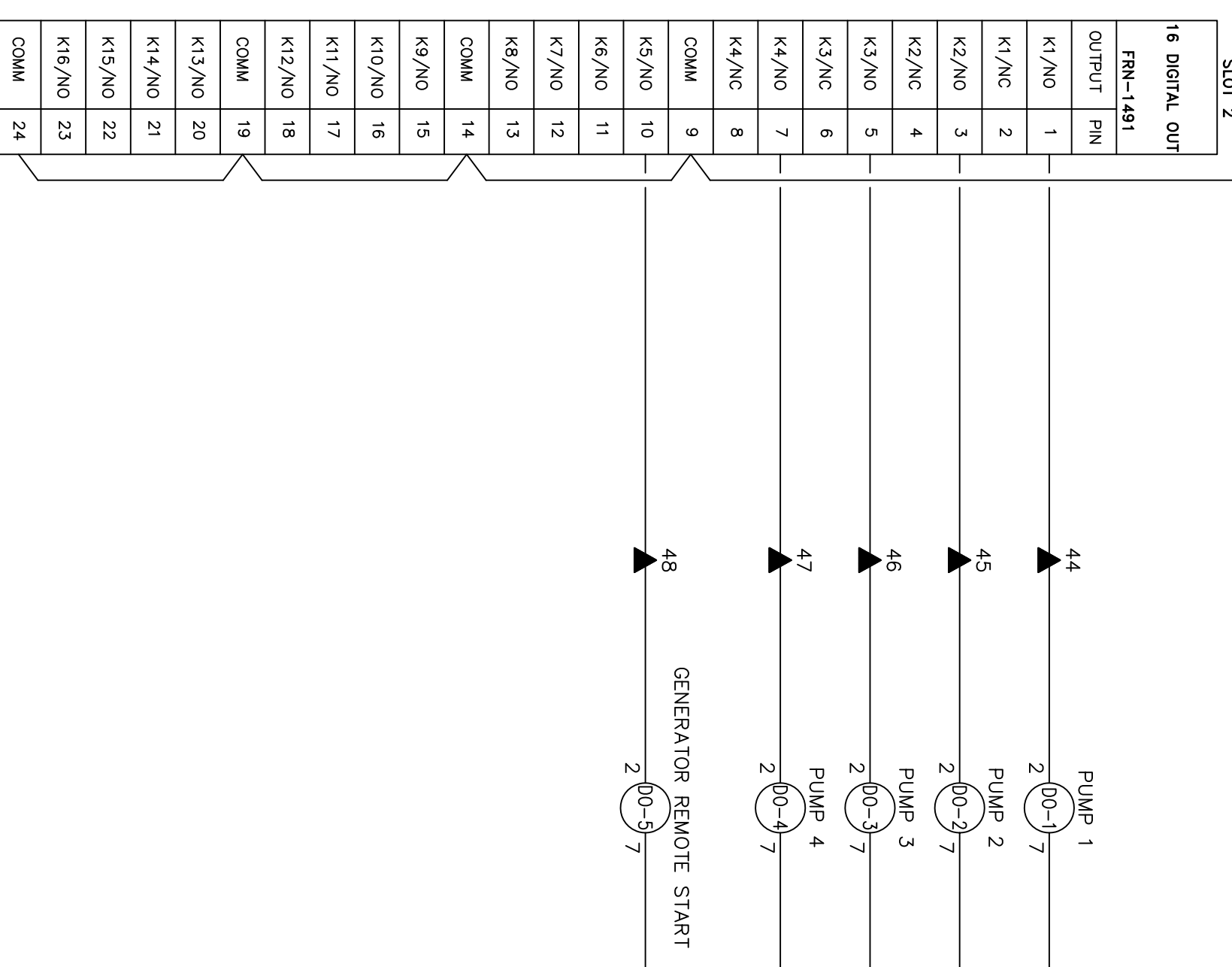
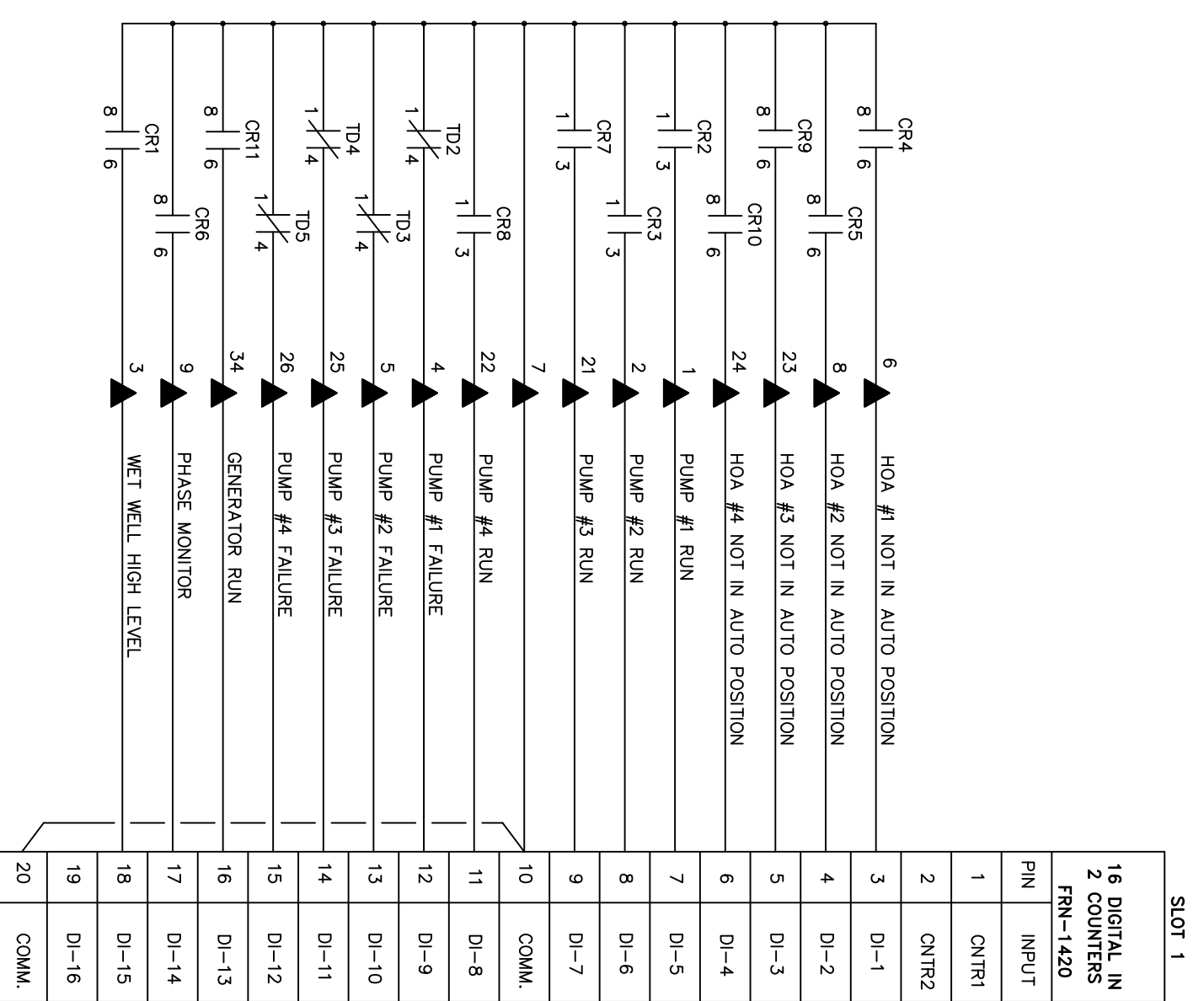
- NOTES:
1. ALL COMPONENTS AND BRACKET ASSEMBLY SHALL BE GRADE 316 STAINLESS STEEL.
  2. BRACKETS SHALL BE SPACED AS INDICATED IN THE CONSTRUCTION DRAWING OR AT THE DIRECTION OF TWA.
  3. PIPE SIZES AND MATERIALS SHALL BE AS INDICATED IN THE CONSTRUCTION DRAWINGS.
  4. A MINIMUM OF 2 BRACKETS REQUIRED. MAX 10' SPACING.
  5. WELD ALL CONNECTIONS EXCEPT U-BOLTS.



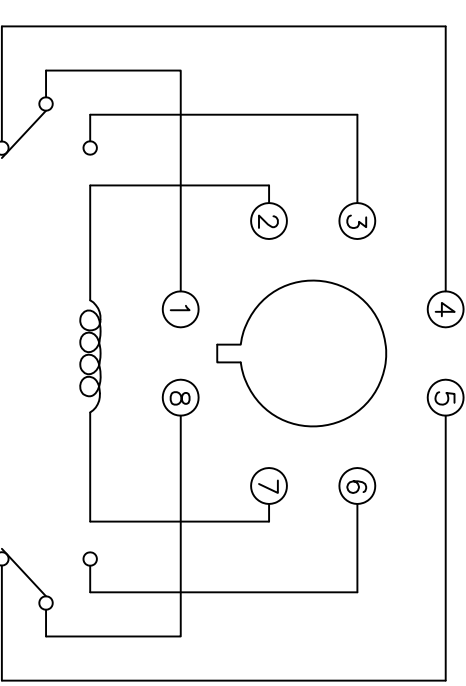
# FIELD SCHEMATIC



# RTU SCHEMATIC (All points connect to TB-3)

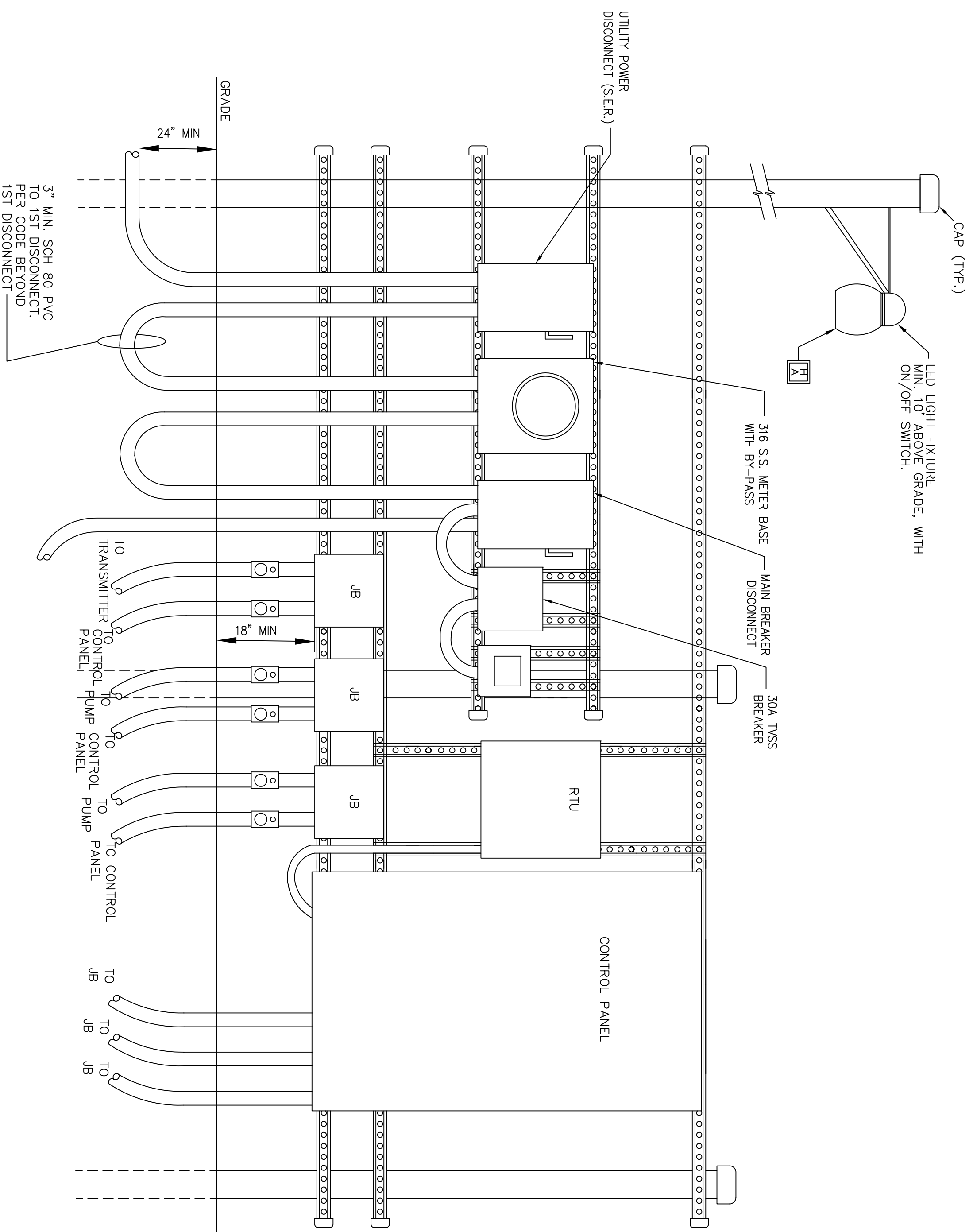


- INSTALLATION NOTES:
1. INSTALLER TO VERIFY CONTROL VOLTAGE IN ORDER TO DETERMINE RELAY COIL VOLTAGES.
  2. INSTALLER TO VERIFY DATA SHEETS AS TO WHAT OPTIONS ARE TO BE INSTALLED AT EACH LIFT STATION
  3. INSTALLER TO VERIFY THAT ALL SIGNALS ARE NORMALLY CLOSED, CONTACT OPENS ON SIGNAL. (IE, SOME SIGNALS MAY BE GENERATED AS NORMALLY OPEN FROM FIELD LIMIT SWITCH.)
  4. TYPICAL RELAY PIN OUT IS AS FOLLOWS:



5. ALL CONTROL RELAYS TO BE P & B #RPP11AN OR EQUAL.
6. ALL TIME DELAY RELAYS TO BE DIGI SWITCH TYPE TDM OR EQUAL.
7. ▲ - TB2 LOCATED IN JUNCTION BOX. TO BE PRE-WIRED IN SHOP.





**RACK MOUNTED  
 EQUIPMENT DETAIL**  
 NO SCALE