

WPN 23.0110  
WWTA Standard Details and Specifications for Sewer

**APPROVED FOR CONSTRUCTION**

THE DOCUMENT BEARING THIS STAMP HAS BEEN RECEIVED AND REVIEWED BY THE

TENNESSEE DEPT. OF ENVIRONMENT & CONSERVATION

DIVISION OF WATER RESOURCES

AND IS HEREBY APPROVED FOR CONSTRUCTION BY THE COMMISSIONER



06/12/2023

THIS APPROVAL SHALL NOT BE CONSTRUED AS CREATING A  
PRESUMPTION OF CORRECT OPERATION OR AS WARRANTING BY THE  
COMMISSIONER THAT THE APPROVED FACILITIES WILL REACH THE  
DESIGNED GOALS.

APPROVAL EXPIRES FIVE YEARS FROM ABOVE DATE

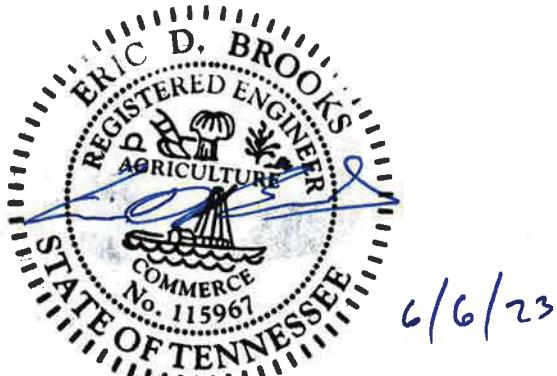


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# STANDARD DETAILS & SPECIFICATIONS FOR THE CONSTRUCTION OF SANITARY SEWERS



Effective Date: March 1, 2023  
TN0021211, SOP-89044, SOP-13025, SOP-15004

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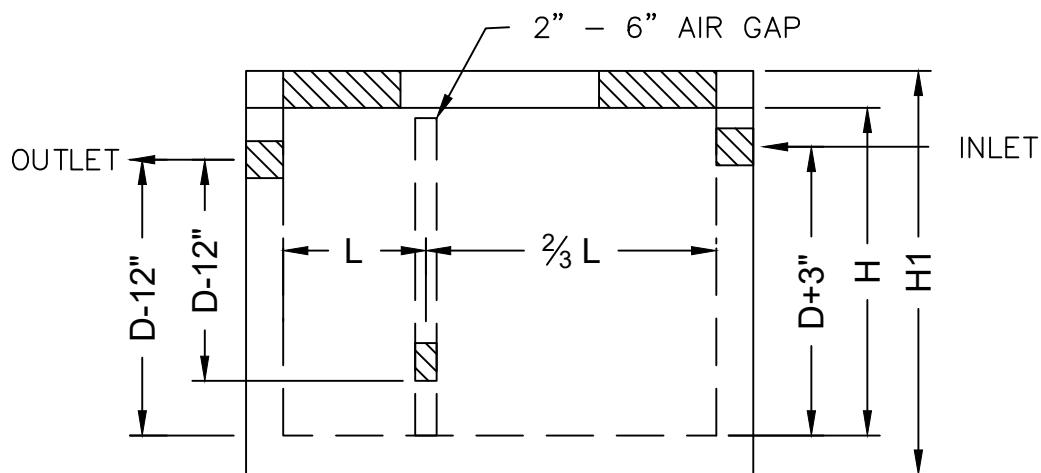
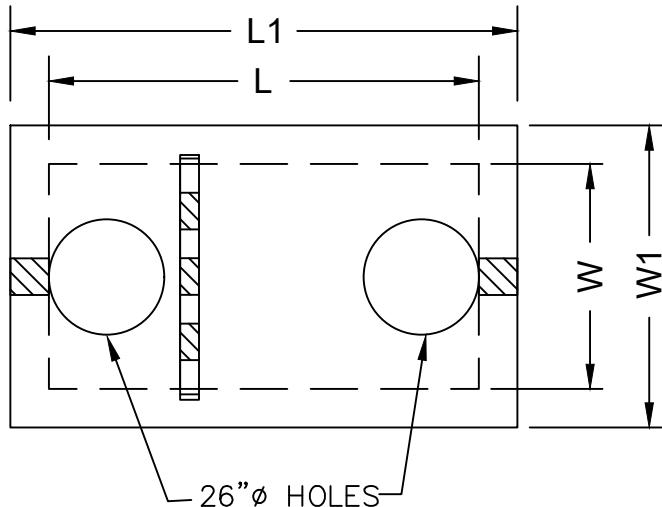
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GENERAL NOTES:

1. MANUFACTURED TO MEET MATERIAL REQUIREMENTS SET FORTH IN ASTM C-931.
2. MIN. CONCRETE STRENGTH 4500 PSI.
3. NO STEPS.
4. BOXES SHALL BE MANUFACTURED TO ACCOMMODATE HS-20 LIVE LOADS.
5. ONE RISER OR GRADE RING CAN BE USED TO MEET REQUIRED FINISH GRADES. SEE SD-MH-8.
6. ADDITIONAL BAFFLES CAN BE USED FOR COMBINATION GRIT AND OIL/WATER SEPARATOR.
7. OPENINGS MAY VARY TO ACCOMMODATE VARIOUS PIPE DIAMETERS.

TANK SIZE	H	H1	L	L1	W	W1	D
2000 GALLON	4.66'	5.50'	12.0'	12.8'	6.00'	6.83'	3.75'
2500 GALLON	5.66'	6.08'	12.0'	12.8'	6.00'	6.83'	4.75'
3000 GALLON	6.50'	7.33'	12.0'	12.8'	6.00'	6.83'	5.58'
3500 GALLON	4.83'	6.16'	16.0'	17.3'	8.00'	9.33'	3.75'
4000 GALLON	5.33'	6.66'	16.0'	17.3'	8.00'	9.33'	4.25'
4500 GALLON	5.83'	7.16'	16.0'	17.3'	8.00'	9.33'	4.75'
5000 GALLON	6.33'	7.66'	16.0'	17.3'	8.00'	9.33'	5.25'

## GREASE CONTROL INTERCEPTOR – PLAN

A. GREASE TRAPS/INTERCEPTORS SHALL BE INSTALLED IN ASSOCIATION WITH COMMERCIAL BUILDINGS, IN ACCORDANCE WITH THE HCWWTA FOG POLICY.

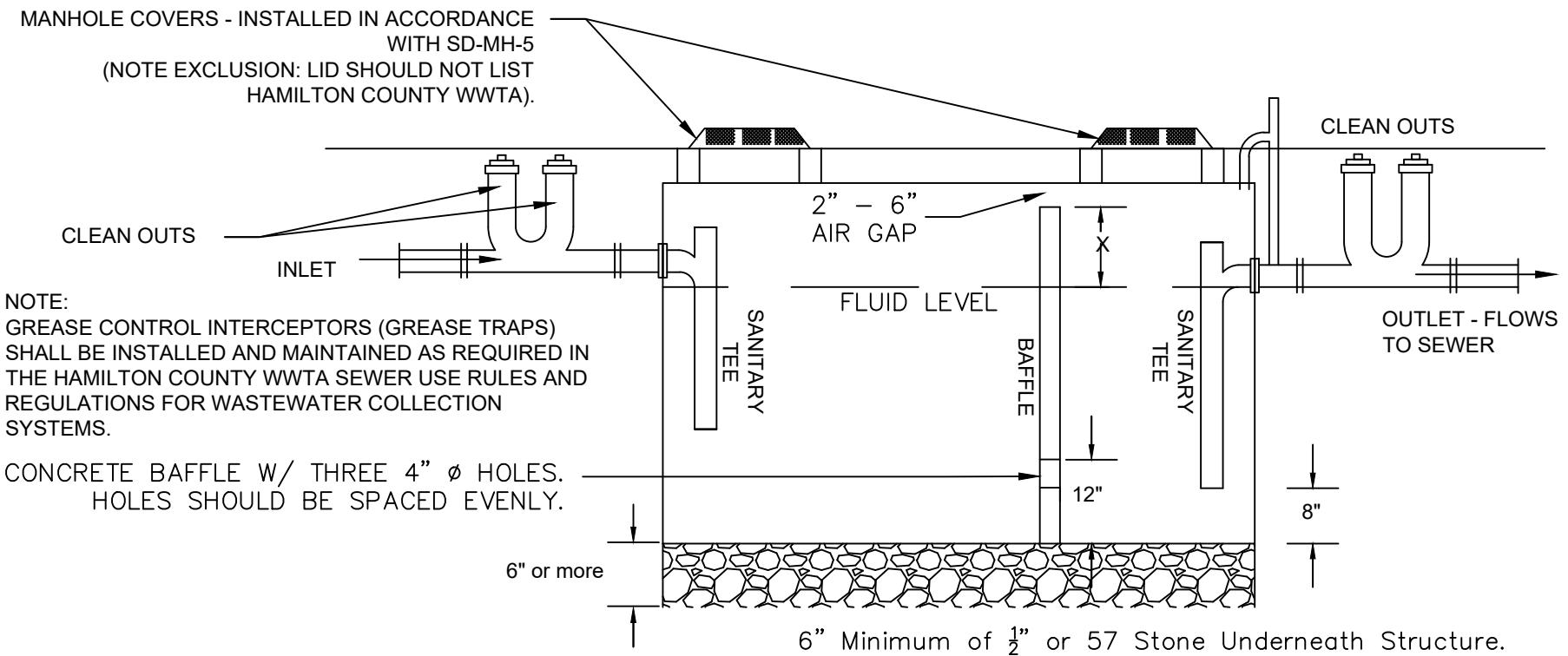
B. GREASE TRAPS SHALL BE CONSTRUCTED TO ENSURE THAT BOTH THE INLET AND OUTLET ARE PROPERLY SUBMERGED TO TRAP GREASE, AND THAT THE DISTANCE BETWEEN THE INLET AND OUTLET IS SUFFICIENT TO ALLOW SEPARATION OF GREASE SO THAT GREASE SOLIDS WILL NOT ESCAPE THROUGH THE OUTLET.

C. FLOW THAT DOES NOT REQUIRE TREATMENT OR SEPARATION SHALL NOT DISCHARGE INTO THE GREASE TRAP OR SEPARATOR.

D. IF PROHIBITED GREASE, SAND, GRAVEL AND OTHER POLLUTANTS ENTER THE PUBLIC SEWER, THE SUPERINTENDENT WILL PERFORM SUCH MAINTENANCE AND REPAIR TO THE SEWER AND CHARGE THE COST THEREOF TO THE PROPERTY OWNER.

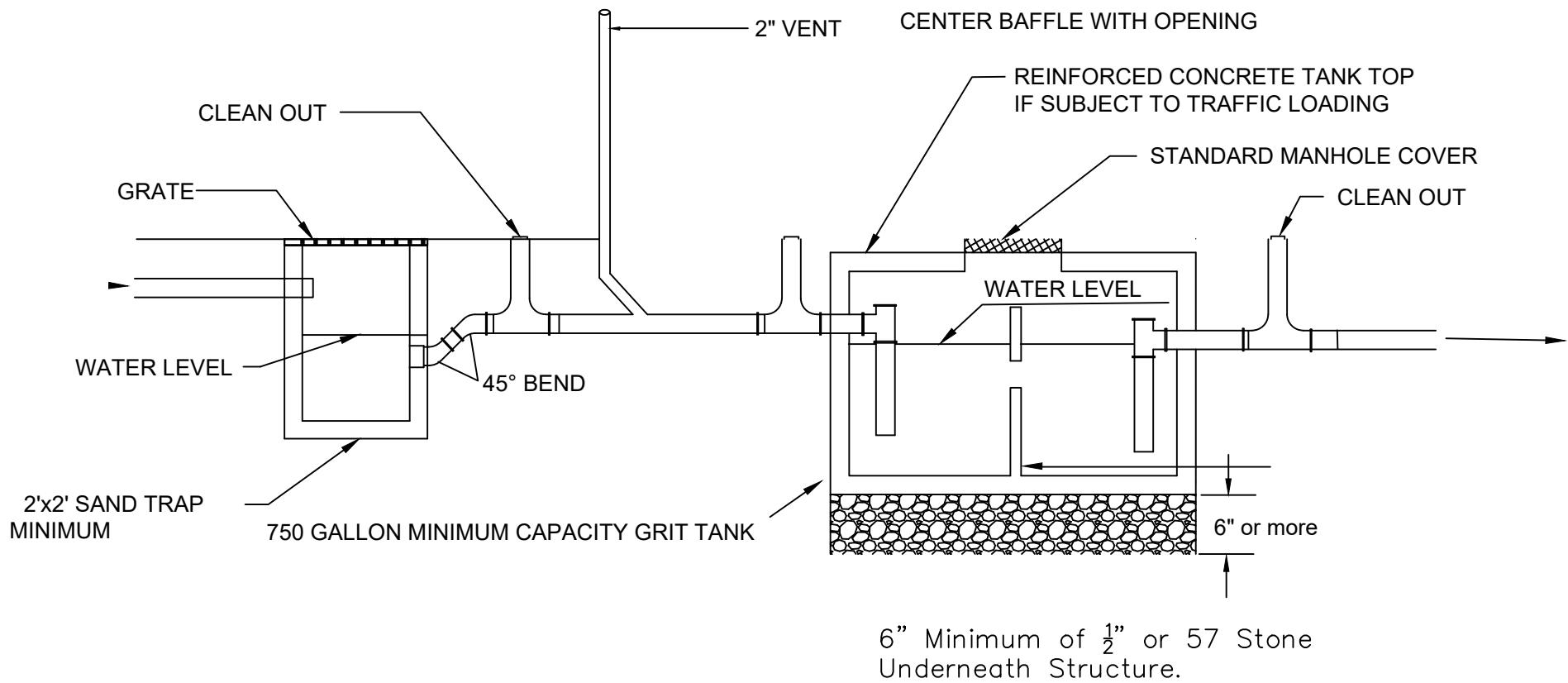
E. THE DISTANCE "X" BETWEEN THE BOTTOM OF THE "AIR GAP" AND THE "FLUID LEVEL" SHOULD NOT EXCEED THE OUTLET PIPE DIAMETER.

SD-MISC-2



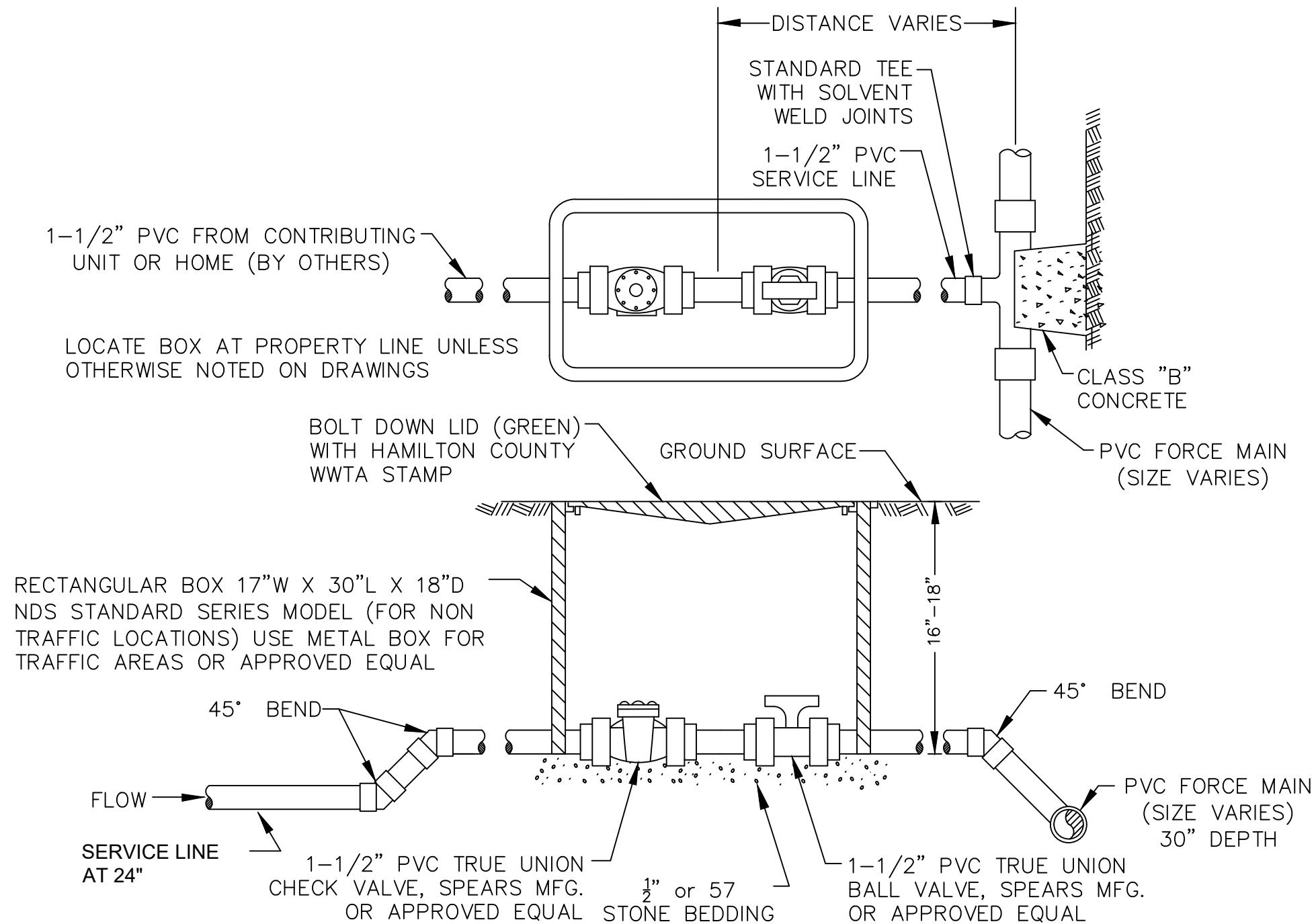
## GREASE CONTROL INTERCEPTOR – DETAIL

HAMILTON COUNTY WATER & WASTEWATER TREATMENT AUTHORITY



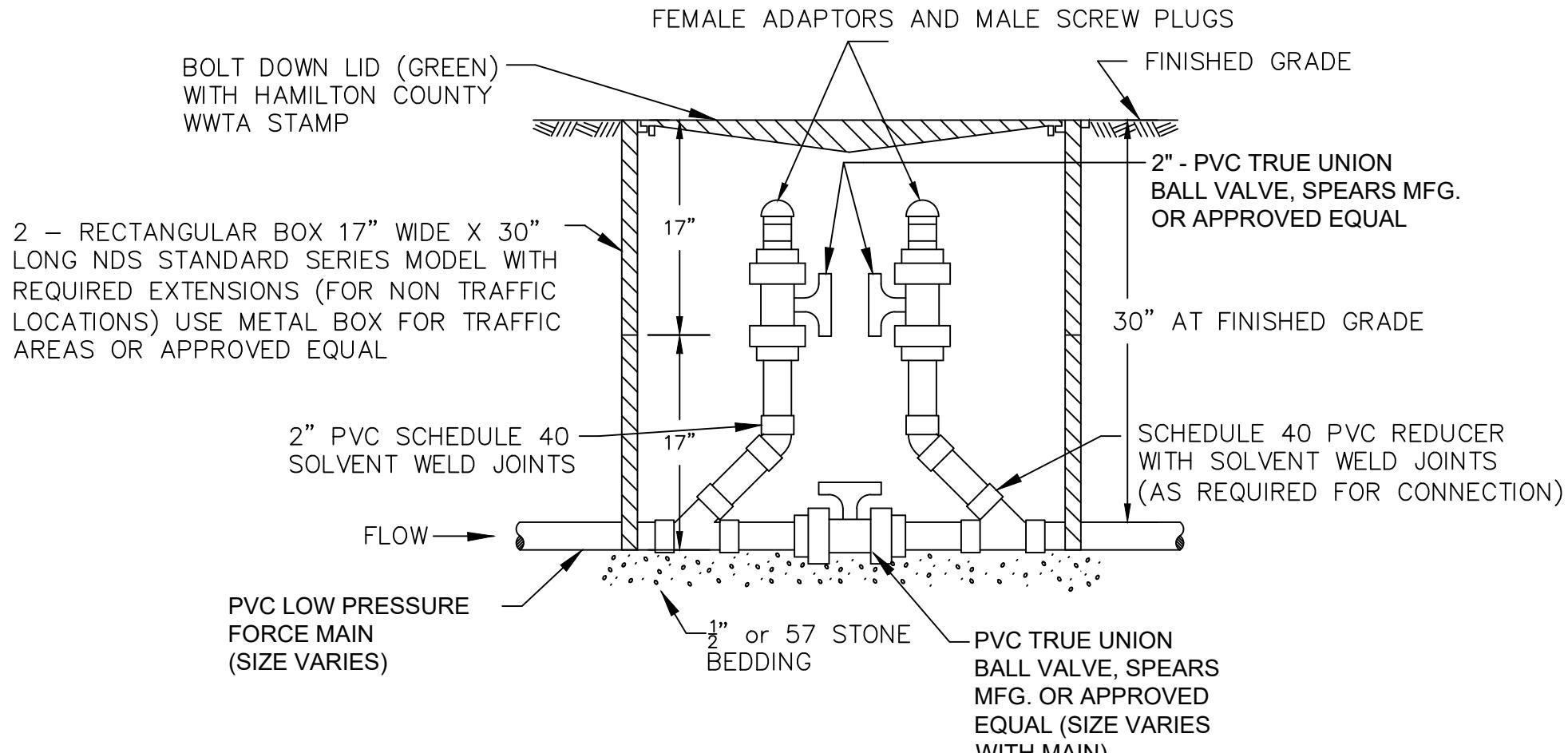
## STANDARD SAND TRAP (GRIT TRAP)

HAMILTON COUNTY WATER & WASTEWATER TREATMENT AUTHORITY



## LOW PRESSURE CONNECTION BOX

HAMILTON COUNTY WATER & WASTEWATER TREATMENT AUTHORITY

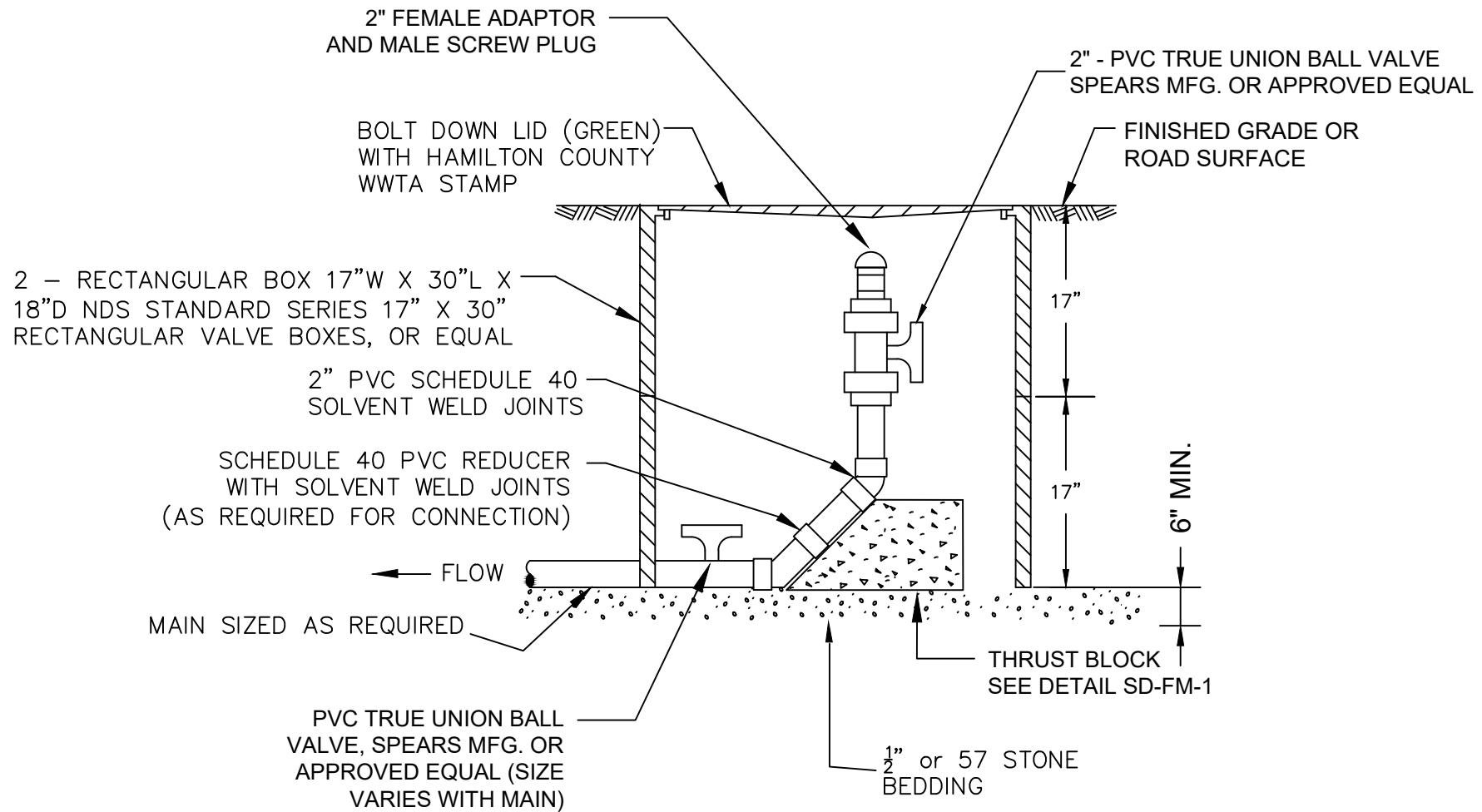


THIS DETAIL IS FOR 2 AND 3 INCH PIPES SIZES ONLY

## LOW PRESSURE INLINE CLEANOUT

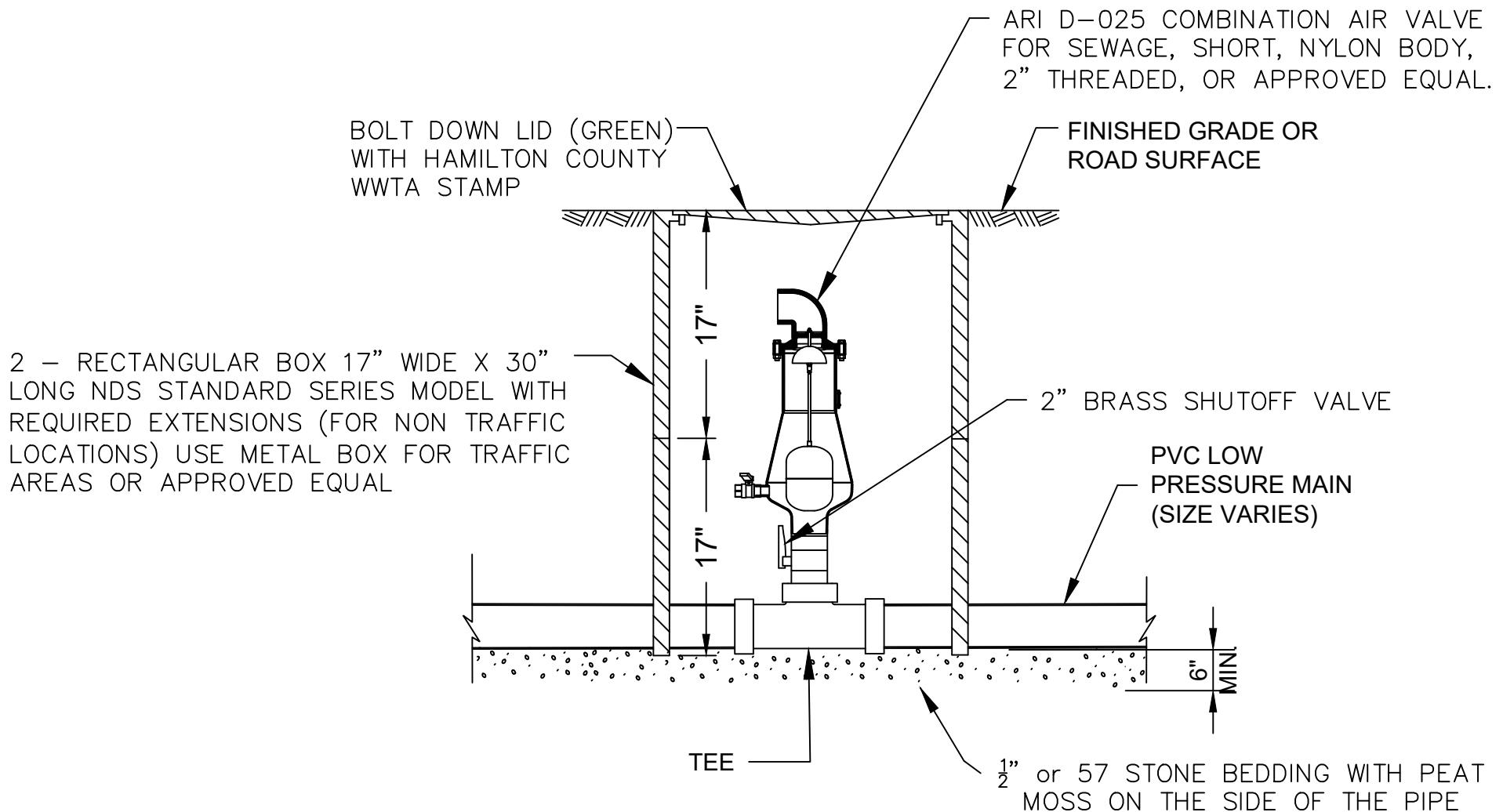
HAMILTON COUNTY WATER & WASTEWATER TREATMENT AUTHORITY

SD-LP-3



## LOW PRESSURE TERMINAL CLEANOUT

HAMILTON COUNTY WATER & WASTEWATER TREATMENT AUTHORITY



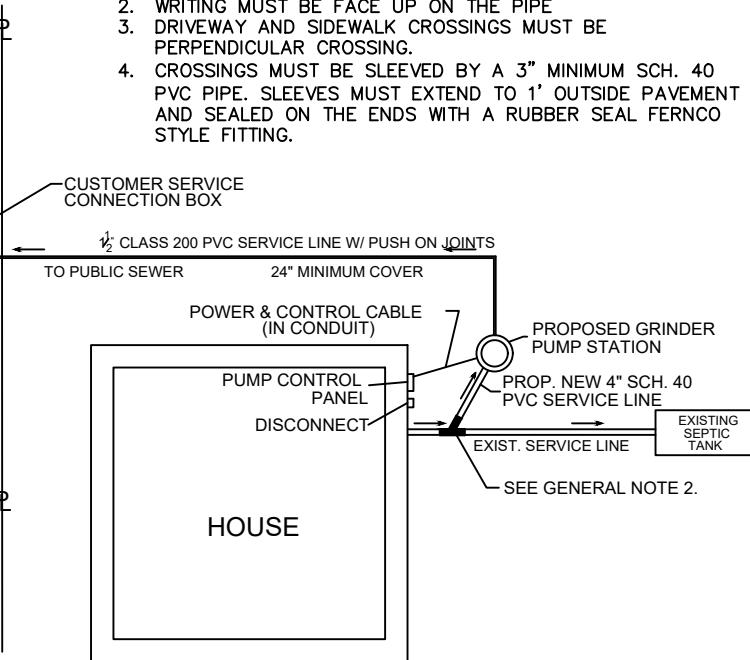
THIS DETAIL IS FOR 2 AND 3 INCH PIPE SIZES ONLY

## LOW PRESSURE AIR RELEASE VALVE

HAMILTON COUNTY WATER & WASTEWATER TREATMENT AUTHORITY

## ADDITIONAL NOTES

1. MAXIMUM DISCHARGE LINE DEPTH OF 3FT
2. WRITING MUST BE FACE UP ON THE PIPE
3. DRIVEWAY AND SIDEWALK CROSSINGS MUST BE PERPENDICULAR CROSSING.
4. CROSSINGS MUST BE SLEEVED BY A 3" MINIMUM SCH. 40 PVC PIPE. SLEEVES MUST EXTEND TO 1' OUTSIDE PAVEMENT AND SEALED ON THE ENDS WITH A RUBBER SEAL FERNCO STYLE FITTING.



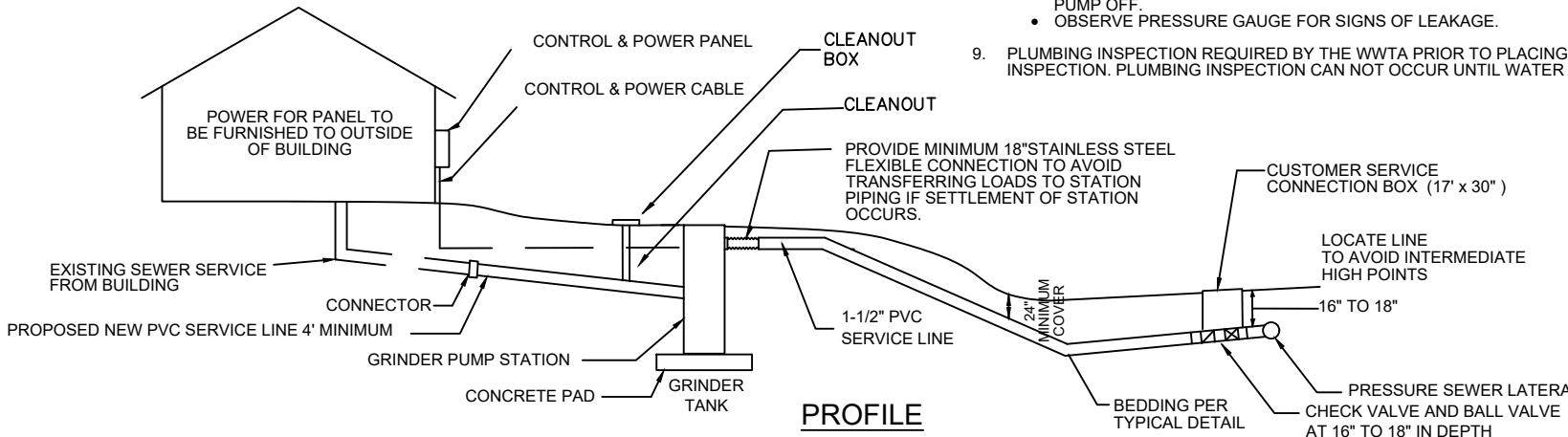
PLAN

## GENERAL NOTES:

1. INSTALL CONTROL PANEL ON SIDE OF HOUSE IN VIEW OF GRINDER PUMP STATION. INSTALL WITH ELECTRICAL DISCONNECT AND RUN DEDICATED 220 VOLT LINE FROM MAIN BREAKER BOX TO DISCONNECT. INSTALLATION REQUIRES LICENSED ELECTRICIAN AND ELECTRICAL PERMIT.
2. IF SEPTIC TANK IS ABANDONED, IT SHALL BE PUMPED CLEAN, FILLED WITH CRUSHED STONE OR FLOWABLE FILL AND DISCONNECTED.
3. INSTALLATION BY A PLUMBER OR CONTRACTOR APPROVED BY THE WWTA.
4. LOCATION OF GRINDER TANK AND CONTROL PANEL TO BE APPROVED BY THE WWTA. TANKS AND CONNECTION BOX MUST NOT BE UNDER DECKS OR STAIRS OR IN CONCRETE/ASPHALT DRIVEWAYS, WALKWAYS, OR PATIOS. THE TANK AND CONNECTION BOX MUST BE A MINIMUM OF 3FT AWAY DRIVEWAYS, TREES, BUSHES, AND GENERAL LANDSCAPING.
5. PLUMBER SHALL WARRANTY ALL INSTALLATION WORK FOR ONE (1) YEAR AFTER FINAL INSPECTION.

## PLUMBER NOTES:

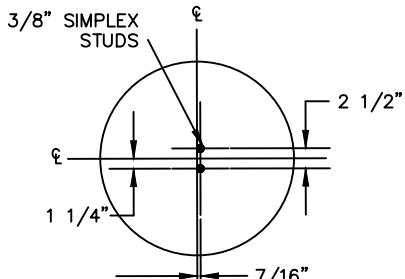
1. INSTALLATION MUST COMPLY, IN GENERAL, WITH THE STANDARD PLUMBING CODE PUBLISHED BY THE SOUTHERN BUILDING CODE CONGRESS INTERNATIONAL, LATEST REVISION, AND WWTA REQUIREMENTS.
2. GRINDER PUMP SYSTEM SHALL BE PURCHASED FROM WWTA APPROVED DEALER/MAUNFACTORER.
3. SERVICE CONNECTION BOX AND TANK LID MUST BE AT GROUND LEVEL AND NOT COVERED. CONNECTION BOX AND LID MUST BE IN GOOD CONDITION TO PASS FINAL INSPECTION.
4. PUMP AND BASIN SHALL BE INSTALLED IN ACCORDANCE WITH THE WWTA SPECIFICATIONS.
5. GRAVITY SEWER LINES SHALL BE INSTALLED IN ACCORDANCE WITH THE WWTA SPECIFICATIONS FOR GRAVITY CONSTRUCTION.
6. PUMP DISCHARGE SERVICE LINES SHALL BE 1 1/2" CLASS 200 PVC WITH PUSH ON JOINTS. NO MALE THREADED FITTINGS OR GASKET JOINTS. ADDITIONAL COUPLINGS MUST BE SOLVENT-WELD ONLY AND HAVE A THRUST-BLOCK.
7. DISCHARGE SERVICE LINES SHALL BE INSTALLED WITH A MINIMUM COVER OF 24" AND A MAXIMUM OF 36".
8. GRINDER PUMP SYSTEM AND DISCHARGE SERVICE LINES SHALL BE TESTED AS FOLLOWS;
  - a. PRIOR TO BACKFILLING;
    - CLOSE ISOLATION BALL VALVE AT PROPERTY LINE.
    - FILL PUMP BASIN WITH WATER.
    - TURN PUMP ON AND OBSERVE OPERATIONS.
    - OBSERVE DISCHARGE SERVICE LINES FOR LEAKS.
  - b. AFTER BACKFILLING;
    - CLOSE ISOLATION BALL VALVE AT PROPERTY LINE.
    - REMOVE CHECK VALVE AT PROPERTY AND INSTALL PRESSURE GAUGE APPARATUS WITH FLUSHING VALVE.
    - FILL PUMP BASIN AND DISCHARGE LINE WITH WATER.
    - TURN ON GRINDER PUMP TO PRESSURIZE LINE. CLOSE PUMP STATION ISOLATION VALVE AND TURN PUMP OFF.
    - OBSERVE PRESSURE GAUGE FOR SIGNS OF LEAKAGE.
9. PLUMBING INSPECTION REQUIRED BY THE WWTA PRIOR TO PLACING SYSTEM IN SERVICE AT THE TIME OF INSPECTION. PLUMBING INSPECTION CAN NOT OCCUR UNTIL WATER LINE IS INSTALLED.



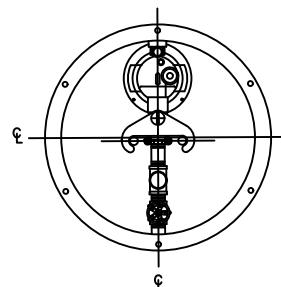
PROFILE

## GRINDER PUMP SERVICE INSTALLATION

HAMILTON COUNTY WATER &amp; WASTEWATER TREATMENT AUTHORITY

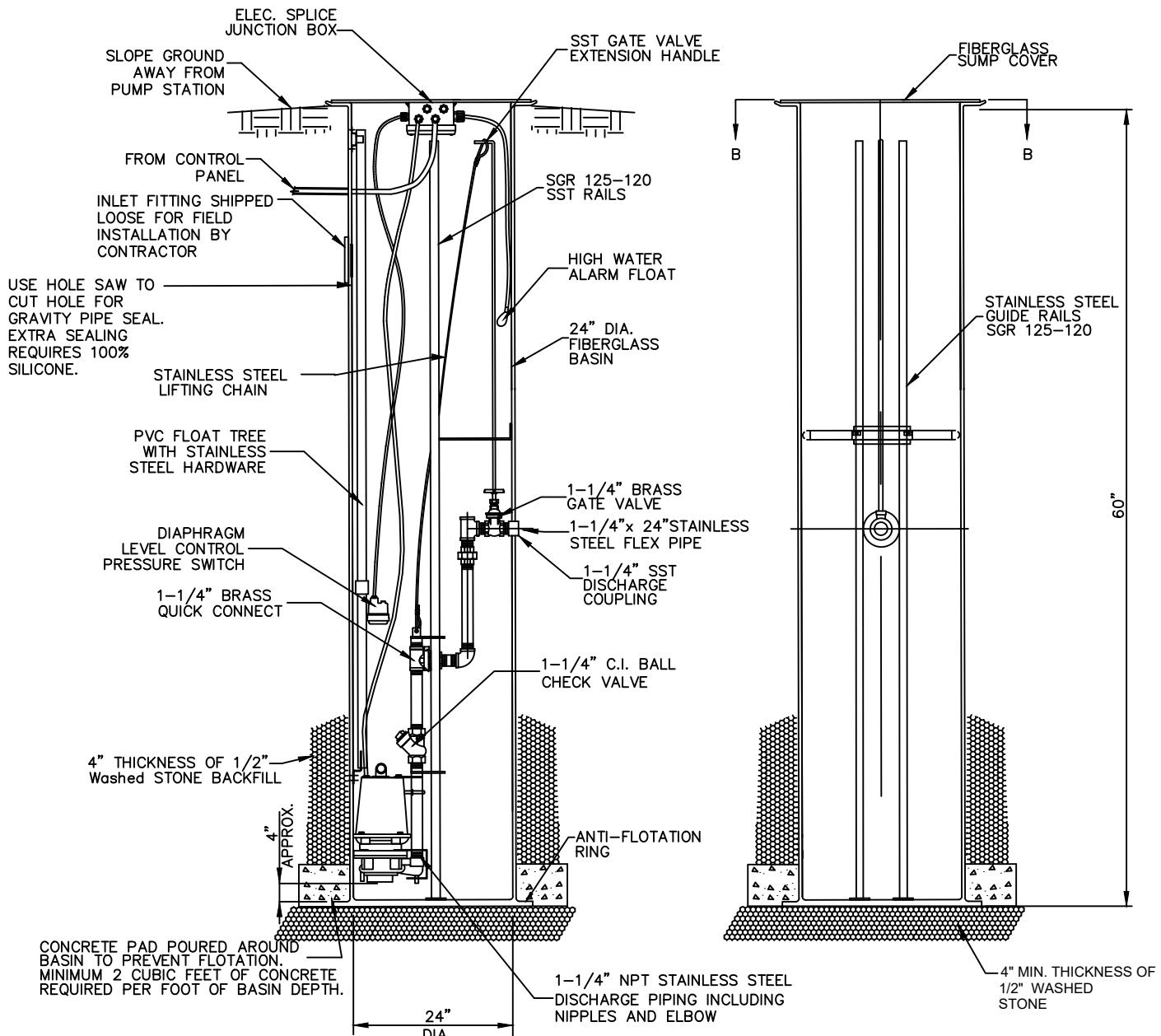


TOP VIEW



SECTION B-B

GENERAL NOTES  
1. IF TANK EXTENSION IS NEEDED,  
MUST BE LESS THAN 2'



\* INLET TO BE MINIMUM OF 36" FROM BOTTOM OF TANK

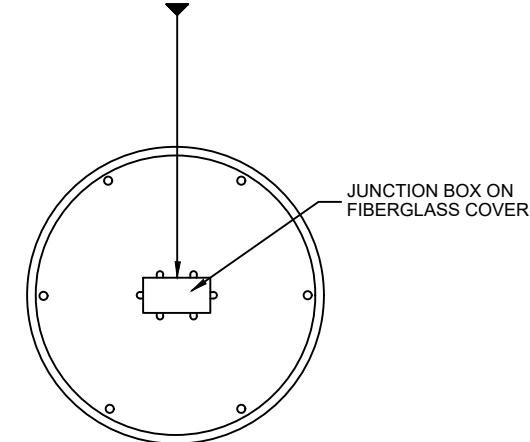
## SIMPLEX GRINDER PUMP STATION

HAMILTON COUNTY WATER & WASTEWATER TREATMENT AUTHORITY  
SD-GP-2

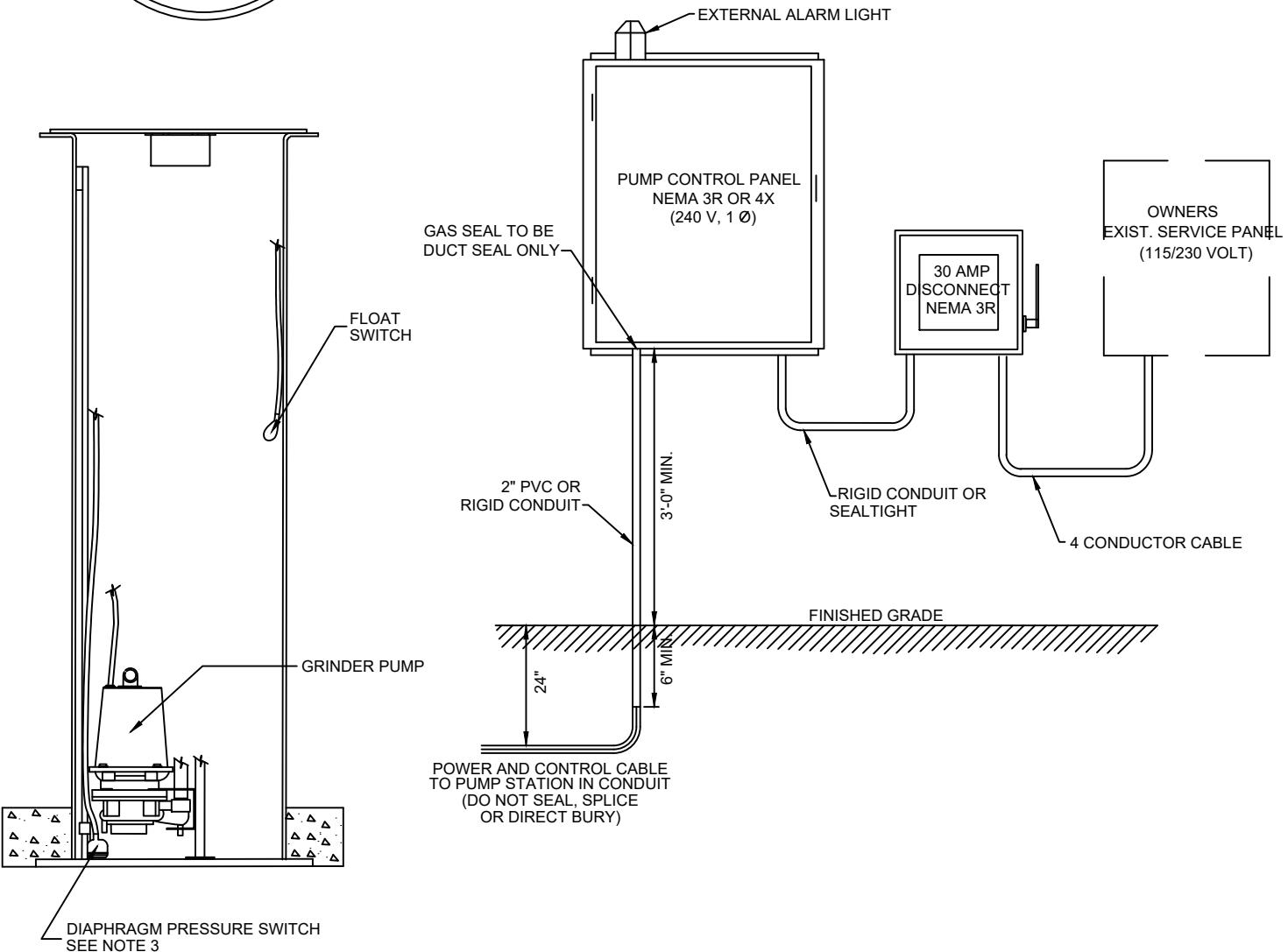
## NOTES:

1. GRINDER PUMP WIRE
2. DIAPHRAGM PRESSURE SWITCH WIRE
3. FLOAT ALARM WIRE

MUST GO THROUGH "J" BOX ON FIBERGLASS COVER.



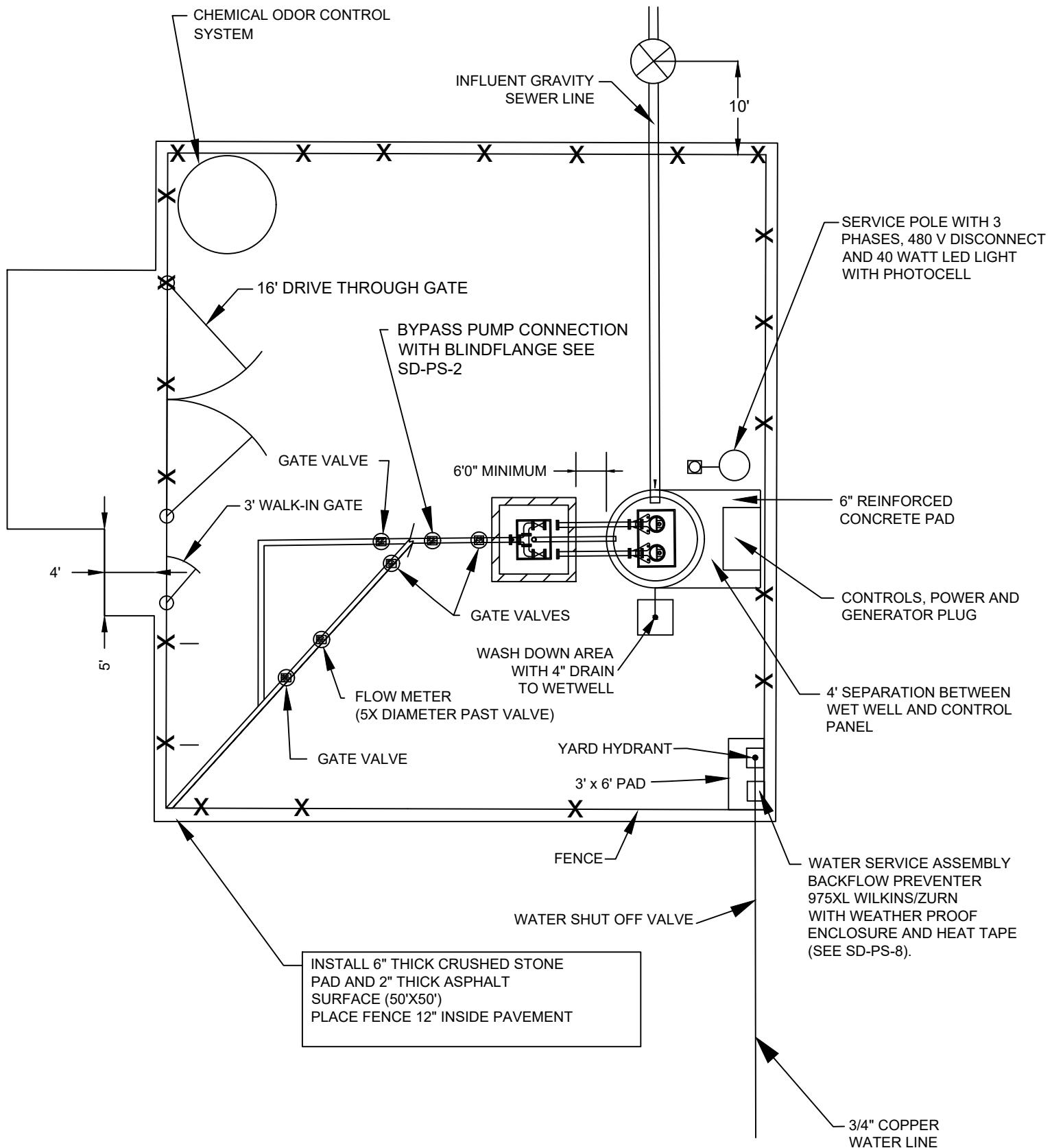
1. GRINDER PUMP WIRE, DIAPHRAGM PRESSURE SWITCH WIRE, AND FLOAT SWITCH WIRE SHALL GO THROUGH THE "J" BOX ON THE FIBERGLASS COVER.
2. THE GRINDER PUMP WIRE SHALL NOT BE SPLICED INSIDE THE "J" BOX. IF THE WIRE LENGTH BETWEEN THE TANK AND THE CONTROL PANEL EXCEEDS THE STANDARD WIRE LENGTH AND IS APPROVED BY WWTA. ELECTRICIAN MUST SUPPLY FLOAT WIRE LONG ENOUGH TO PREVENT SPLICING.
3. DIAPHRAGM PRESSURE SWITCH HAS A 1/8" VENT TUBE WITH THE TWO CONTROL WIRES. THE DIAPHRAGM PRESSURE SWITCH VENT TUBE SHALL EXTEND TO THE TOP OF THE CONTROL PANEL..
4. LAY THE "J" BOX COVER ON THE GROUND ABOUT 1' FROM THE TANK TO ENSURE ENOUGH SLACK IS PROVIDED TO COMPLETELY REMOVE LID.
5. ALL CONNECTIONS FROM THE PUMP AND SWITCHES TO THE "J" BOX AND CONTROL PANEL SHALL COMPLY WITH HAMILTON COUNTY BUILDING INSPECTION, NEC, AND LOCAL CODES.
6. INSTALLATION REQUIRES ELECTRICAL PERMIT AND TAP-ON PERMIT.
7. FINAL INSPECTION TO BE PERFORMED BY WWTA (423-209-7842).
8. MUST RUN 4 CONDUCTOR CABLE FROM SERVICE PANEL TO DISCONNECT.
9. SEAL 2" ELECTRICAL HUB WITH 100% CLEAR SILICONE WITH NO SEALING AT CONDUIT ENDS.



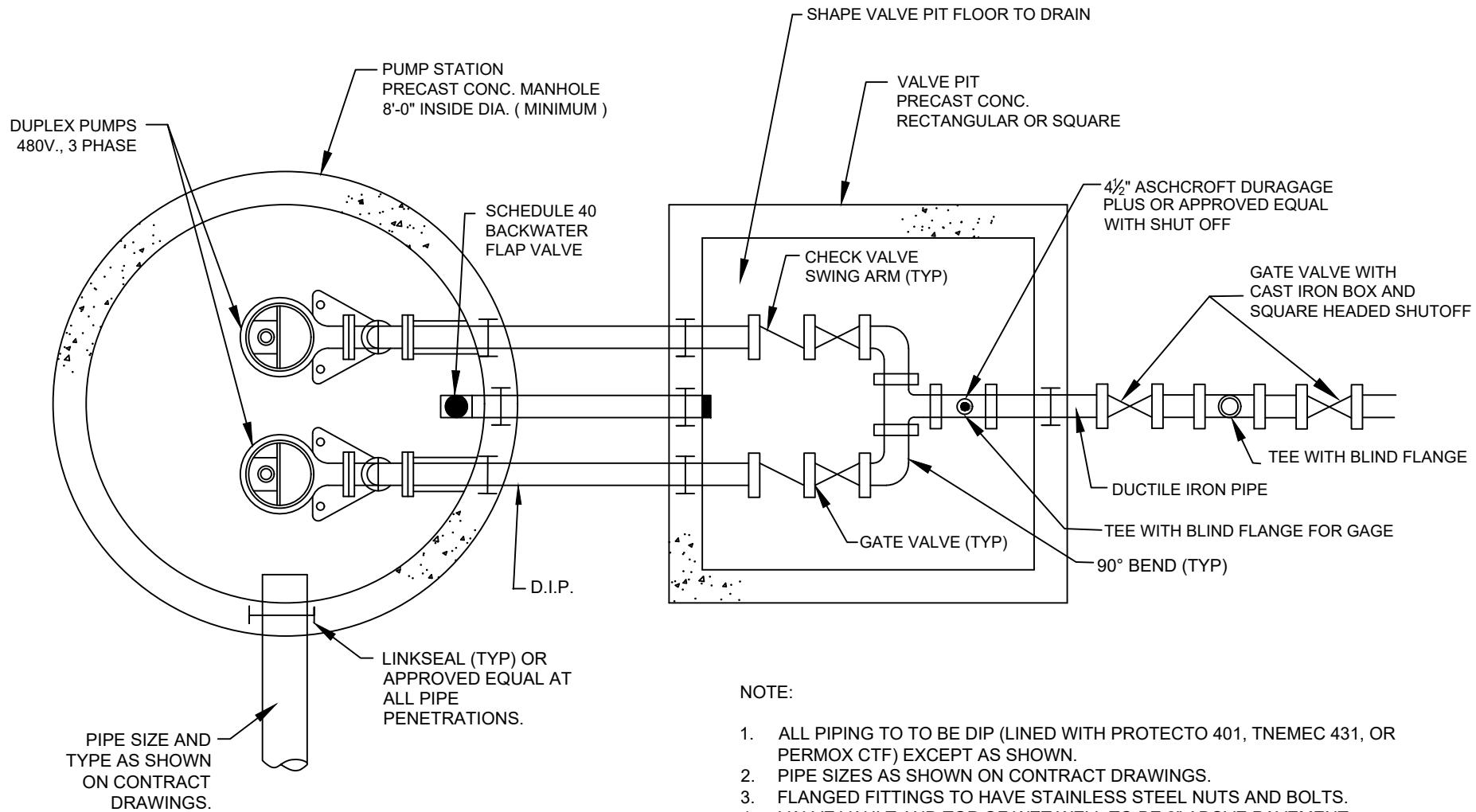
# GRINDER PUMP ELECTRICAL INSTALLATION

HAMILTON COUNTY WATER & WASTEWATER TREATMENT AUTHORITY

SD-GP-3



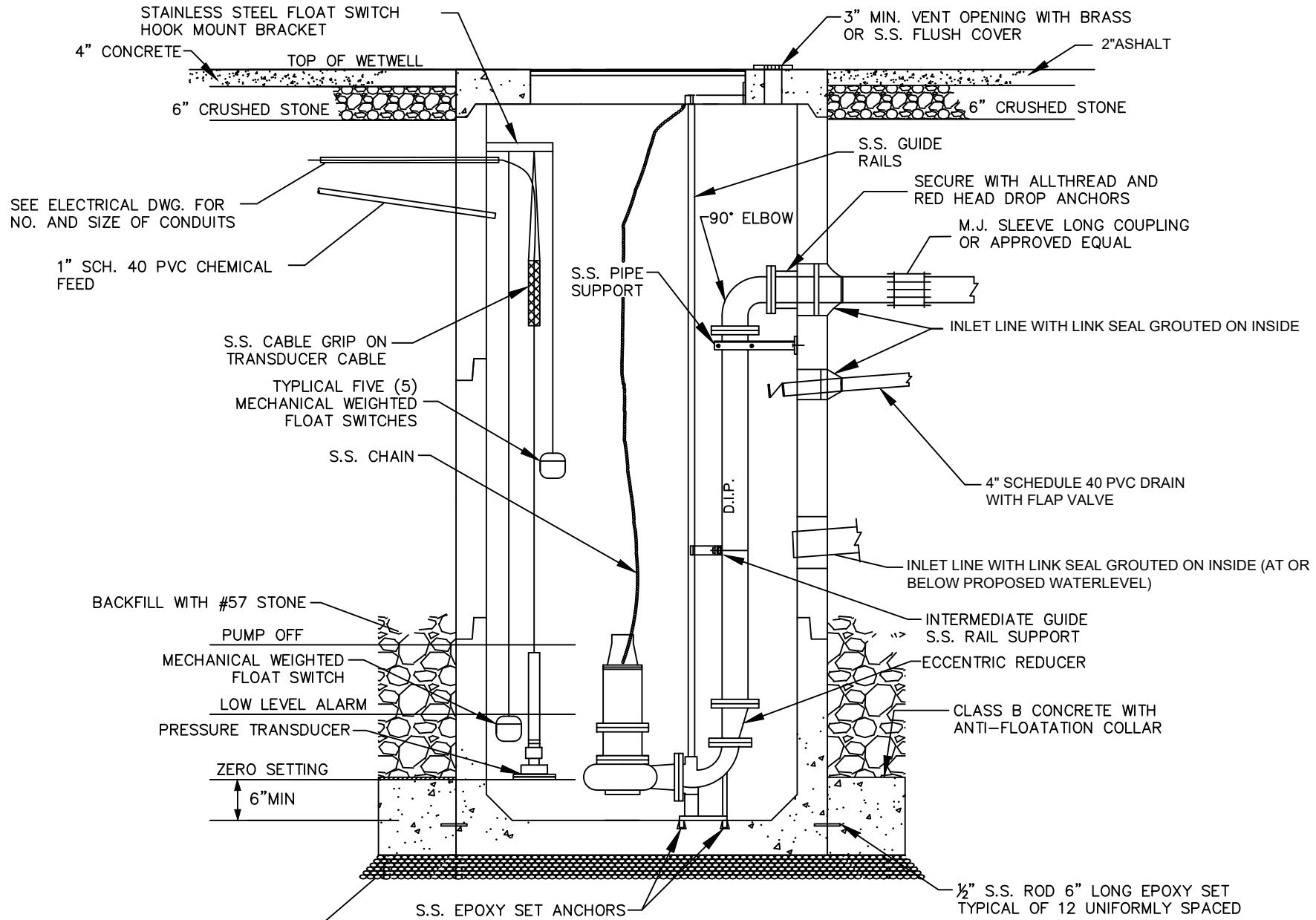
## PUMP STATION LAYOUT PLAN



## PUMP STATION PLAN VIEW

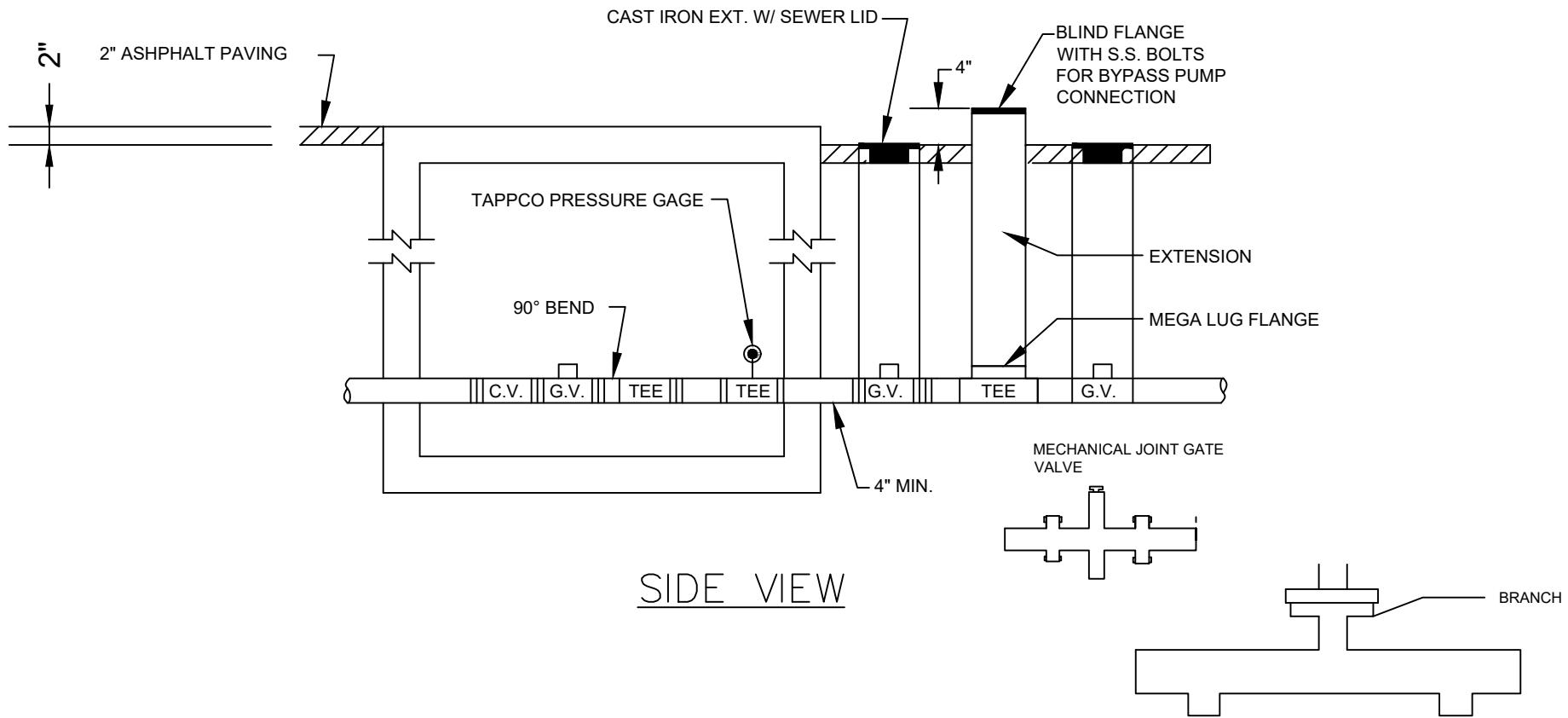
HAMILTON COUNTY WATER & WASTEWATER TREATMENT AUTHORITY

SD-PS-3



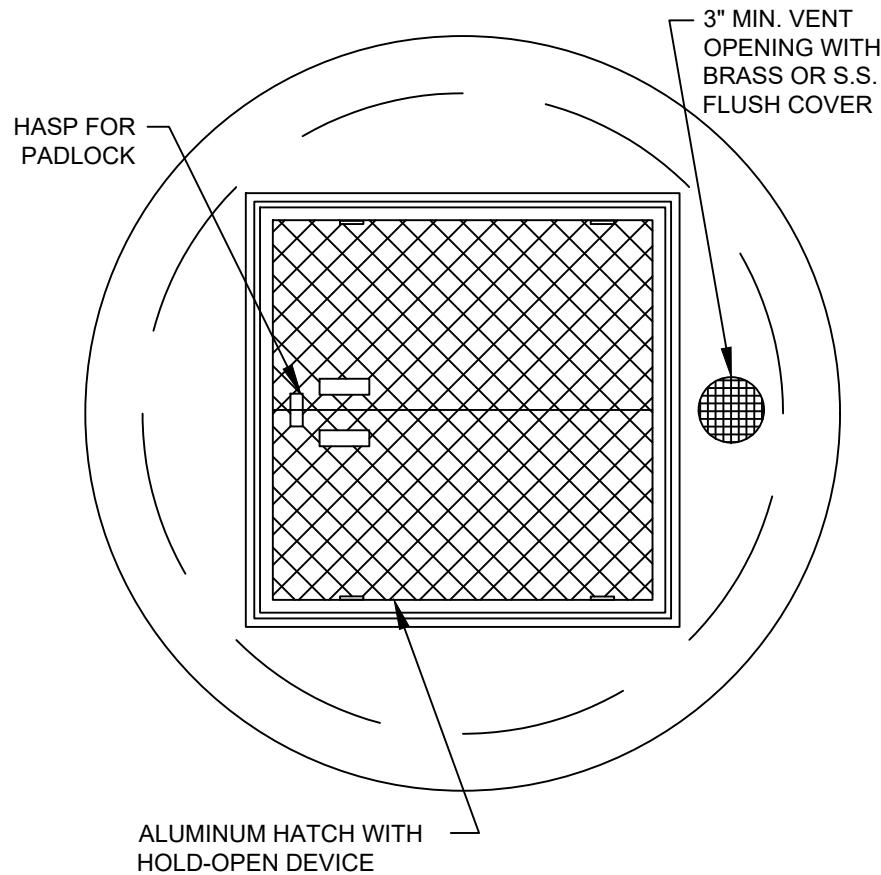
## PUMP STATION WETWELL — CROSS SECTION

NOTE: ALL FITTINGS ARE TO BE D.I. FLANGED FITTINGS WITH STAINLESS STEEL BOLTS



## FORCE MAIN BYPASS DETAIL

HAMILTON COUNTY WATER & WASTEWATER TREATMENT AUTHORITY



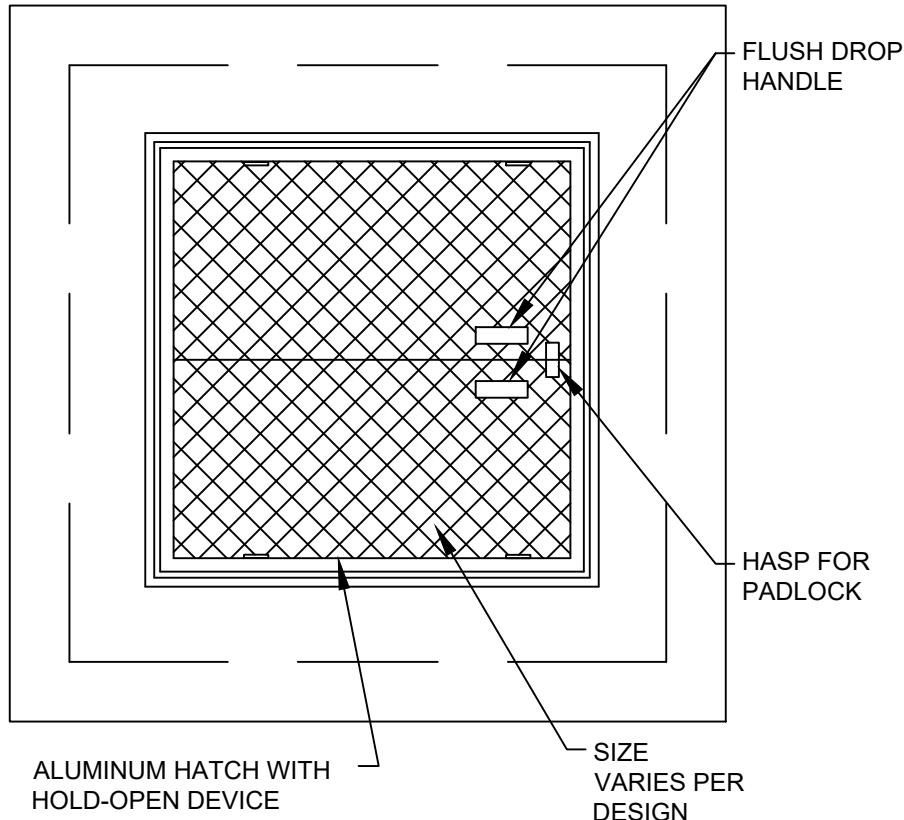
## MINIMUM SIZING FOR PUMP HP:

SHAPE	PUMP HP	WETWELL SIZE	DOOR SIZE
ROUND	1 TO 15	6'	54" x 48"
ROUND	16 TO 65	8'	54" x 48"
ROUND	66 TO 96	10'	60" x 60"
RECT.	97 TO.	OPEN	72" x 60"

NOTE:  
SAFETY GATES MUST BE ADDED UNDER THE HATCH  
(see SD-PS-18)

## PUMP STATION WETWELL HATCH

HAMILTON COUNTY WATER & WASTEWATER TREATMENT AUTHORITY



## MINIMUM SIZING FOR PIPING:

PIPING SIZE	VAULT SIZE ID	DOOR SIZE
4"	62" x 62"	54" x 48"
6"	72" x 72"	54" x 48"
8"	84" x 84"	60" x 60"
10"	96" x 72"	72" x 60"

## 3 PUMP

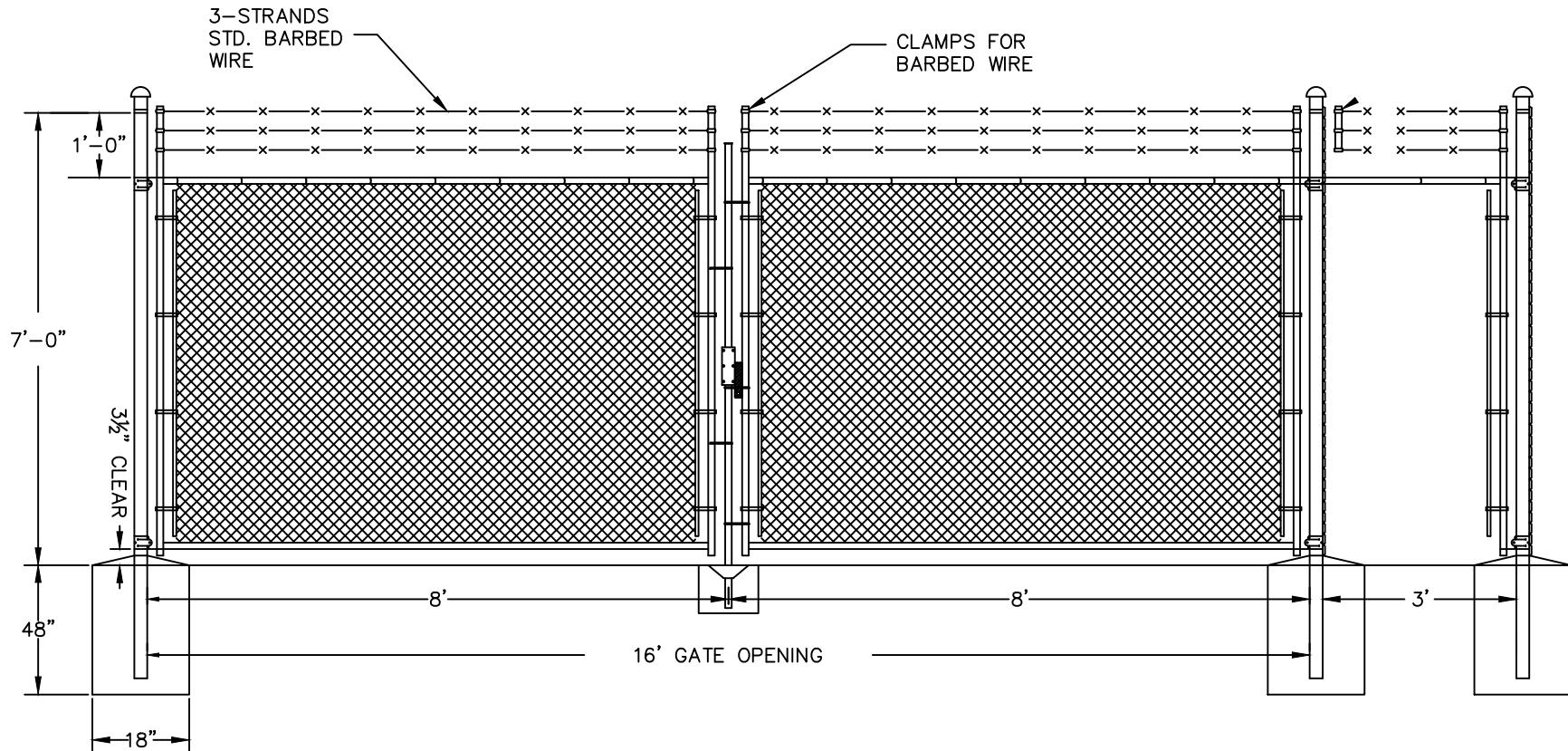
PIPING SIZE	VAULT SIZE ID	DOOR SIZE
6"	108" x 108"	72" x 60"
8"	144" x 84"	120" x 60"
10"	144" x 84"	120" x 60"

## VALVE BOX HATCH

HAMILTON COUNTY WATER & WASTEWATER TREATMENT AUTHORITY

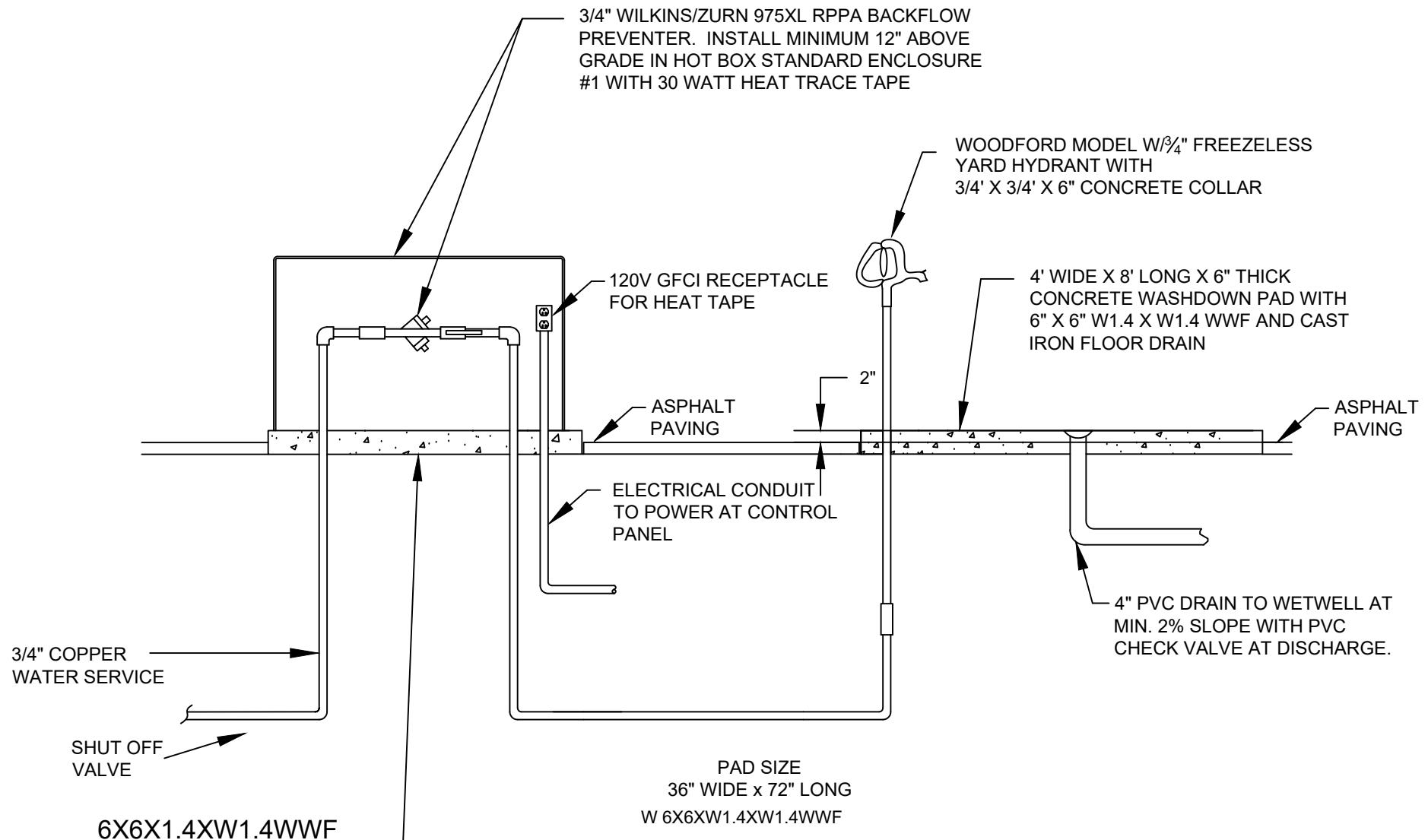
PUMP STATION FENCE, INCLUDING 16' DRIVE THROUGH GATE & 3' WALK IN GATE WILL BE INSTALLED WITH VINYL PRIVACY SLATS, GRAY IN COLOR.

SD-PS-7



## PUMP STATION GATE DETAIL

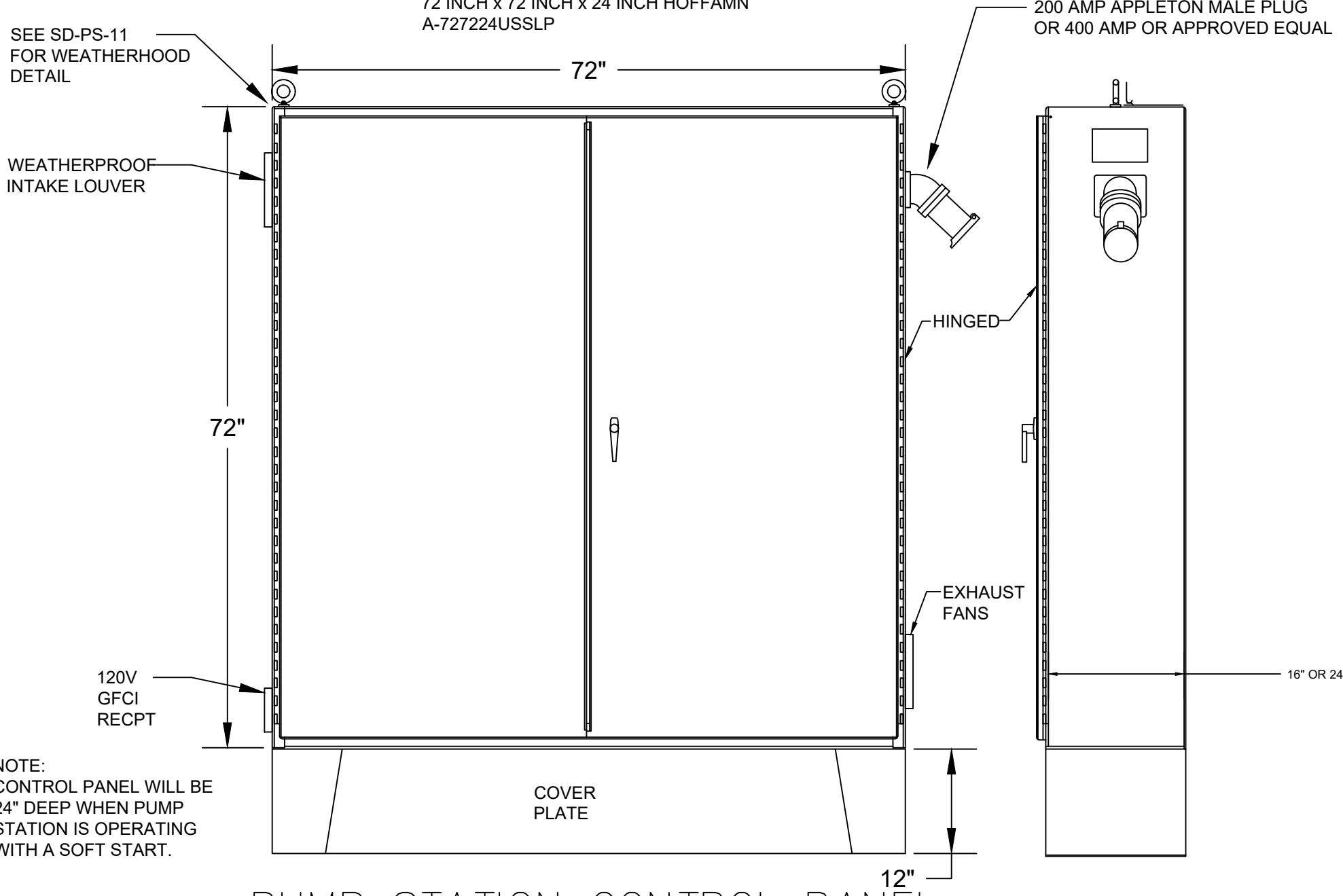
HAMILTON COUNTY WATER & WASTEWATER TREATMENT AUTHORITY



## PUMP STATION WATER SERVICE ASSEMBLY DETAIL

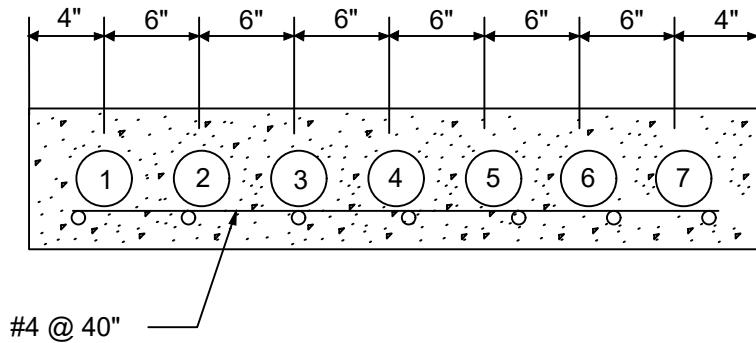
HAMILTON COUNTY WATER & WASTEWATER TREATMENT AUTHORITY

SD-PS-9



## PUMP STATION CONTROL PANEL

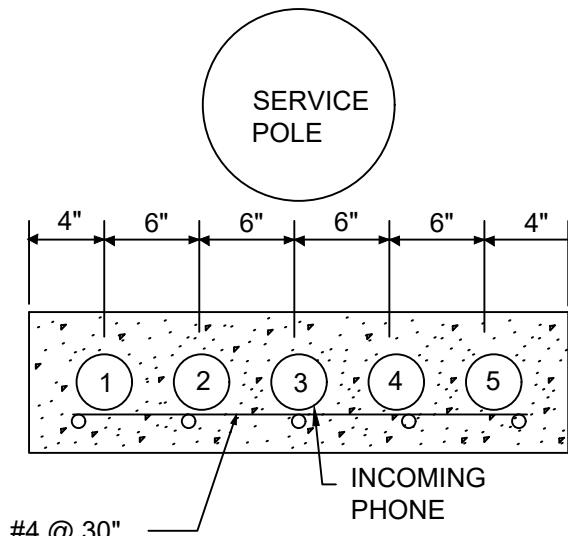
HAMILTON COUNTY WATER & WASTEWATER TREATMENT AUTHORITY



## WETWELL OUT TO CONTROL PANEL

### CONDUIT SCHEDULE

- 1 3" C PUMP TO WETWELL
- 2 3" C PUMP TO WETWELL
- 3 3" C SPARE - PUMP TO WETWELL
- 4 2" C PRESSURE TRANSDUCER TO WETWELL
- 5 2" C FLOAT SWITCH TO WETWELL
- 6 2" C FLOAT SWITCH TO WETWELL
- 7 2" C - SPARE

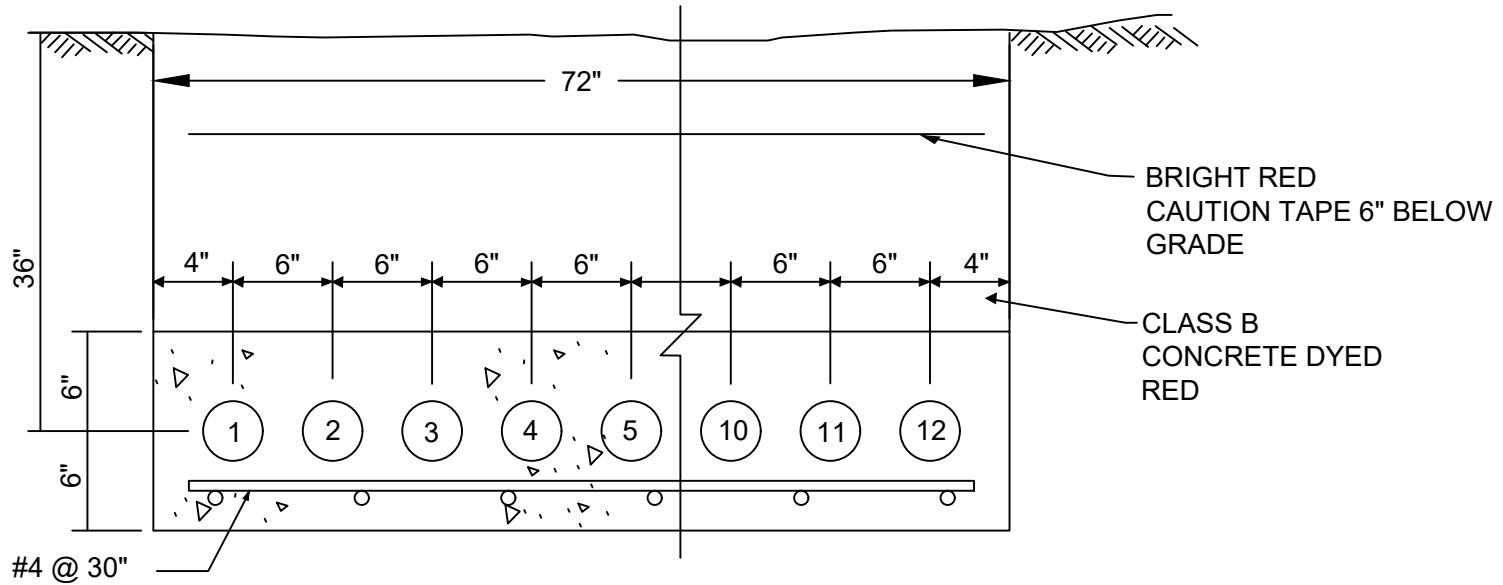


### CONDUIT SCHEDULE

- 1 3" C WITH 3-#4/0 & 1-#1/0 N TO SERVICE POLE
- 2 3" C - SPARE
- 3 1" C (UG. SVC-NO OVERHEAD LINES) - W/PULL WIRE TO SERVICE POLE (TELEPHONE)
- 4 1" C - 3-#12 TO LIGHT ON POLE
- 5 1" C - SPARE

## SERVICE POLE OUT TO CONTROL PANEL

# UNDERGROUND ELECTRICAL DUCTS DETAIL A

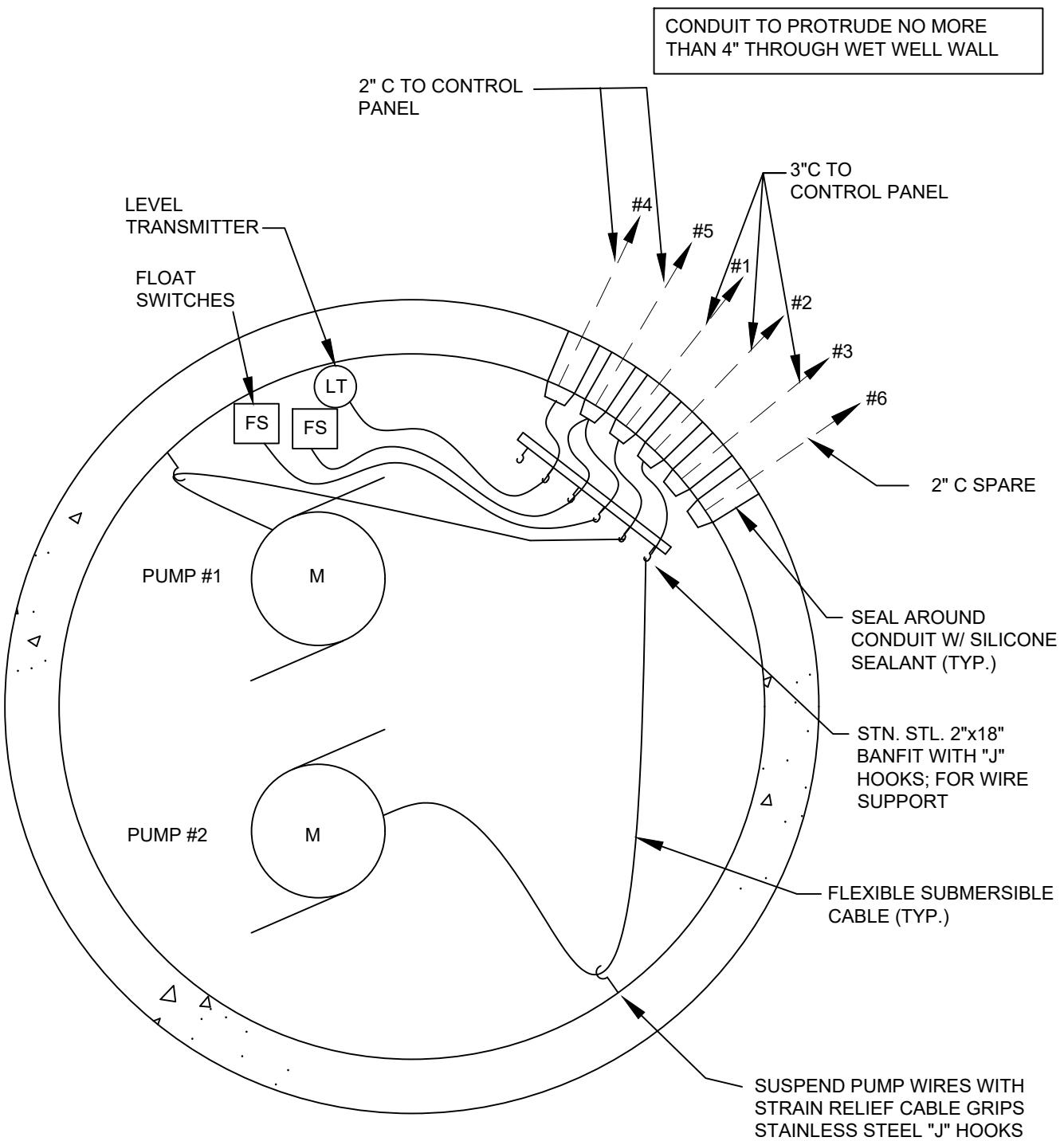


#### CONDUIT SCHEDULE

(1) 3" C PUMP TO WETWELL	(7) 3" C TO SERVICE DISCONNECT
(2) 3" C PUMP TO WETWELL	(8) 2" C TO LIGHT ON SERVICE POLE
(3) 3" C SPARE TO WETWELL	(9) 2" C TO SERVICE POLE (TELEPHONE)
(4) 2" C TRANSDUCER TO WETWELL	(10) 2" C TO FLOWMETER
(5) 2" C FLOAT SWITCHES TO WETWELL	(11) 2" C TO ODOR CONTROL PANEL (IF NEEDED)
(6) 2" C SPARE	(12) 2" C SPARE TO SERVICE POLE

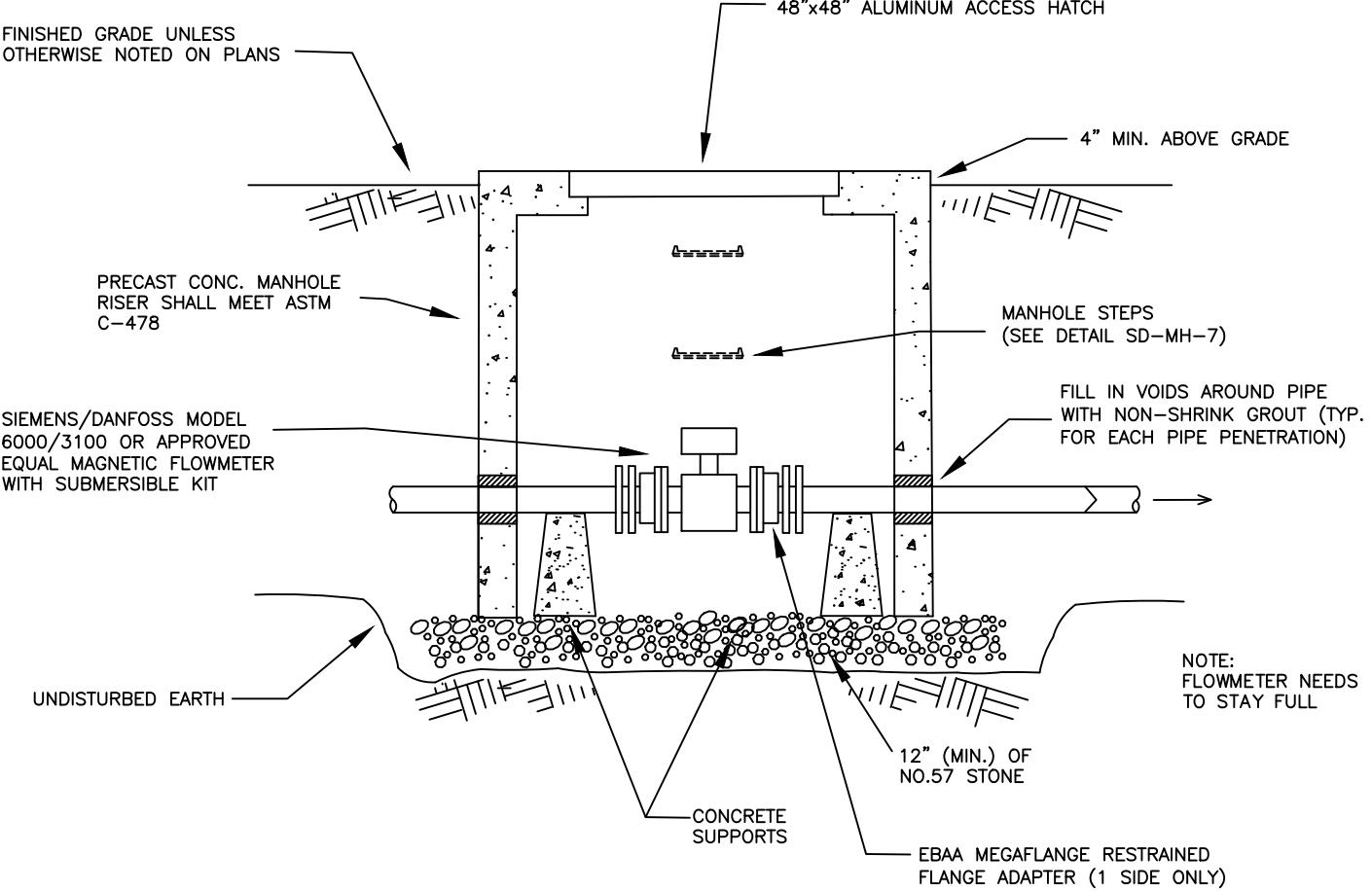
#### CONTROL PANEL OUT

## UNDERGROUND ELECTRICAL DUCTS DETAIL B



## PUMP STATION WETWELL CONDUIT DETAIL

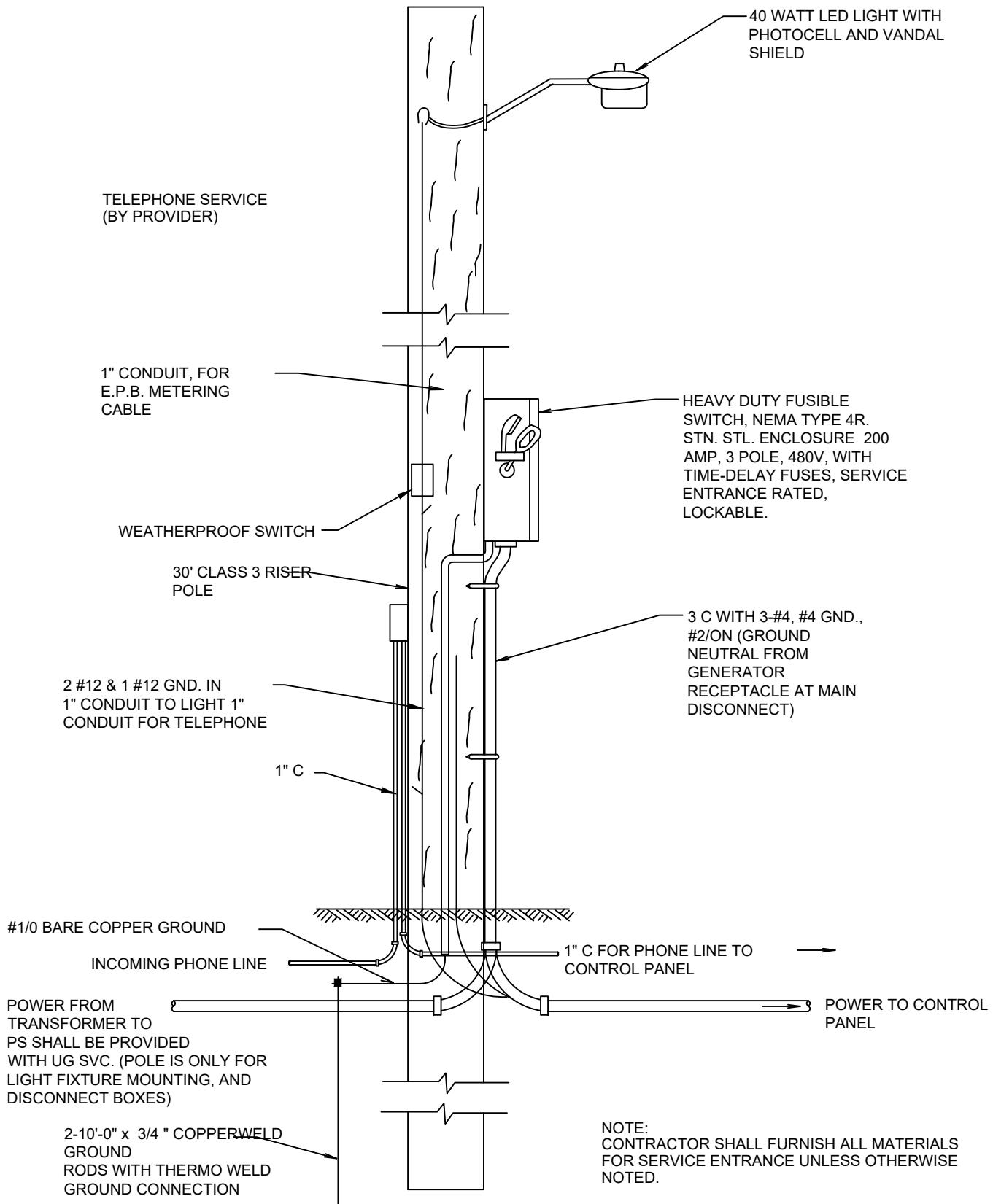
HAMILTON COUNTY WATER & WASTEWATER TREATMENT AUTHORITY  
SD-PS-12



## FLOWMETER DETAIL

HAMILTON COUNTY WATER & WASTEWATER TREATMENT AUTHORITY  
NOT TO SCALE

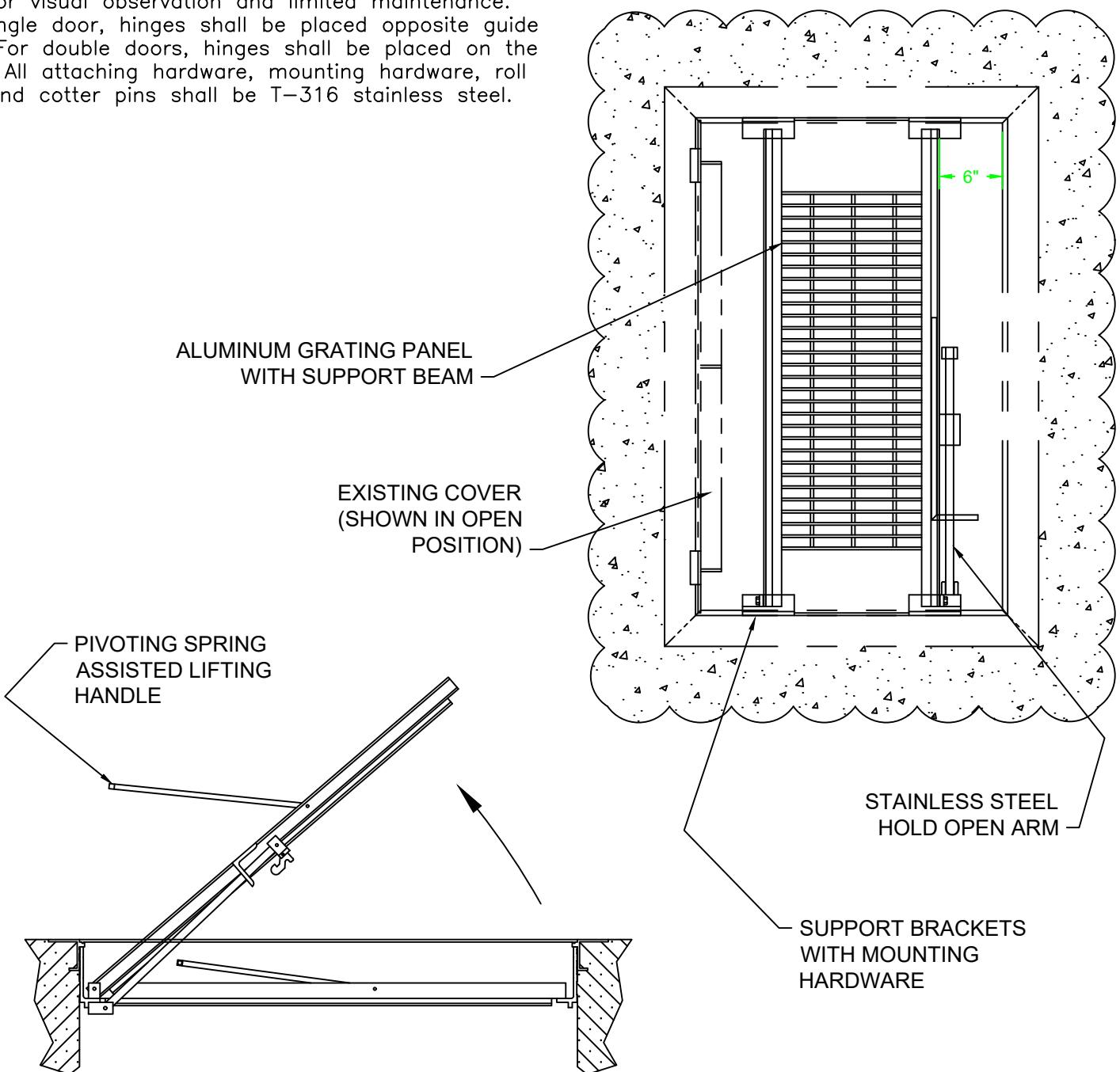
SD-PS-13



## PUMP STATION SERVICE POLE DETAIL

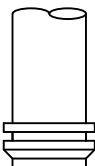
Notes:

The fall-through prevention system shall be a 6061-T6 aluminum grate with 6061-T6 hinges designed to withstand a minimum pedestrian load of 300 lbs. per square foot. The grating panel(s) shall open to 90 degrees and automatically lock with T-316 stainless steel hold-open bar with aluminum release handle. System shall be designed to create an approximate 6 in. (152 mm) viewing area on each side for visual observation and limited maintenance. For single door, hinges shall be placed opposite guide rails. For double doors, hinges shall be placed on the sides. All attaching hardware, mounting hardware, roll pins and cotter pins shall be T-316 stainless steel.

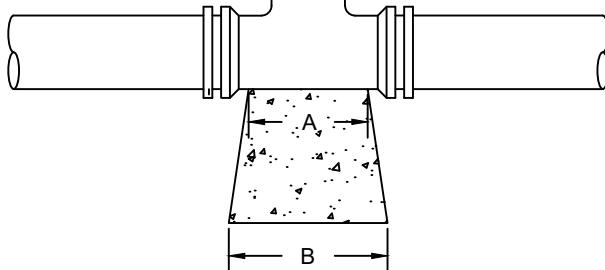


## Fall Prevention/Safety Grate

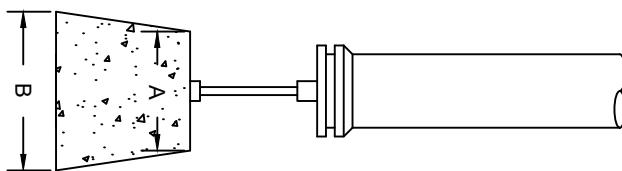
HAMILTON COUNTY WATER & WASTEWATER TREATMENT AUTHORITY



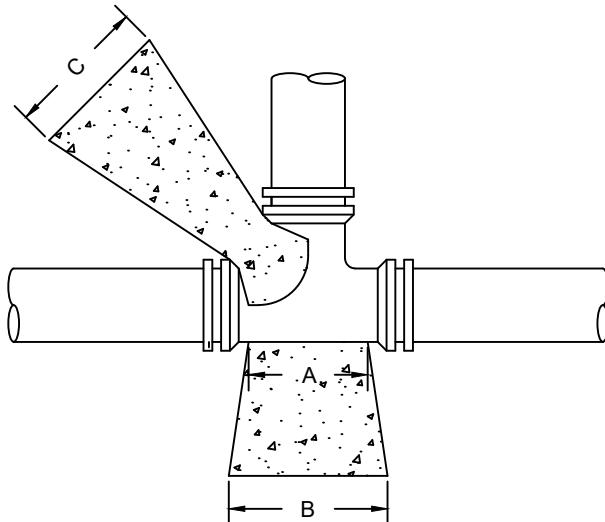
- CONCRETE THRUST BLOCKS SHALL BE 3000 psi CLASS B CONCRETE POURED AGAINST UNDISTURBED EARTH.



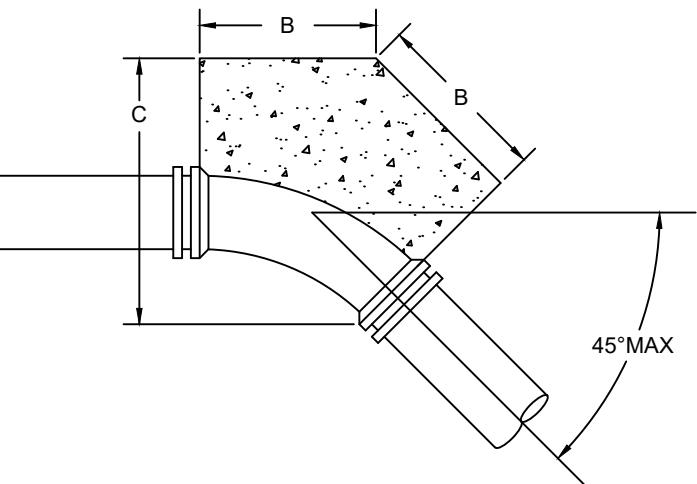
PLAN - TEE



PLAN - DEAD END



PLAN - UNBALANCED TEE



PLAN - TYPICAL VERTICAL BEND

SIZE OF PIPE	TEE			DEAD END			90° BEND & UNBAL. TEE			45° BEND			22 1/2° BEND			11 1/4° BEND		
	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
1-1/2" to 4"	12"	24"	12"	4"	10"	11"	9"	12"	12"	9"	12"	12"	9"	7"	12"	6"	12"	4"
6"	12"	30"	18"	5"	15"	17"	12"	15"	24"	9"	12"	18"	9"	10"	12"	9"	12"	6"
8"	18"	36"	24"	7"	20"	21"	12"	24"	24"	9"	18"	20"	9"	12"	16"	9"	12"	8"
10"	21"	48"	27"	9"	24"	28"	16"	26"	36"	9"	24"	21"	9"	15"	18"	9"	12"	12"
12"	48"	56"	18"	11"	30"	31"	18"	36"	36"	12"	30"	24"	12"	18"	21"	12"	14"	15"
16"	54"	66"	18"	12"	36"	36"	21"	42"	42"	12"	51"	24"	12"	28"	24"	12"	16"	16"

#### NOTE:

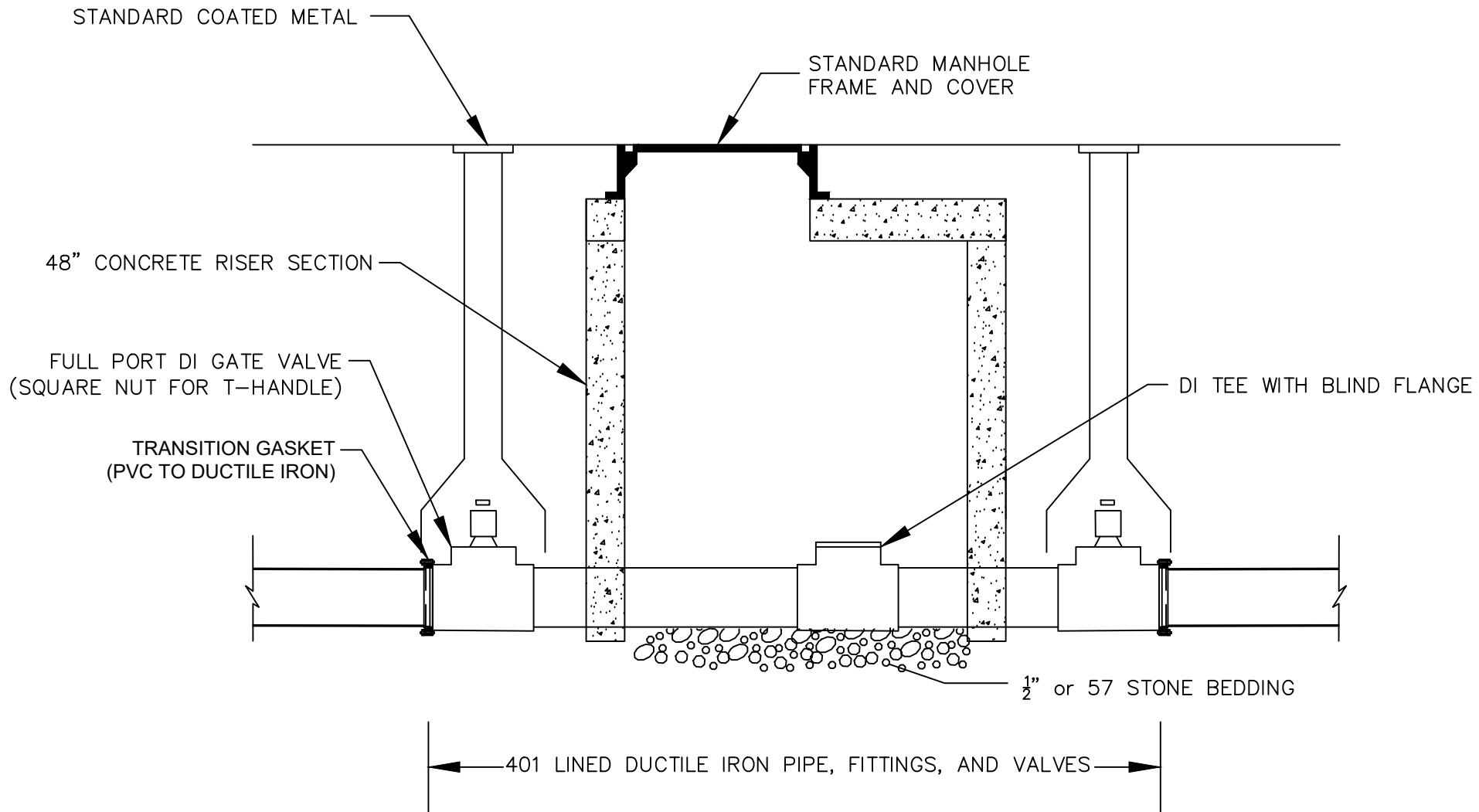
TABLE DIMENSIONS ARE BASED ON SOIL RESISTANCE FOR UNDISTURBED SAND-GRAVEL CEMENTED WITH CLAY. FOR OTHER SOIL CONDITIONS, THE DIMENSIONS SHALL BE INCREASED BY THE FOLLOWING FACTORS:

SAND	2
SAND & GRAVEL	1.33
SHALE	0.4

SOFT CLAY, PEAT, AND MUCK

## CONCRETE THRUST BLOCK

SD-FM-2

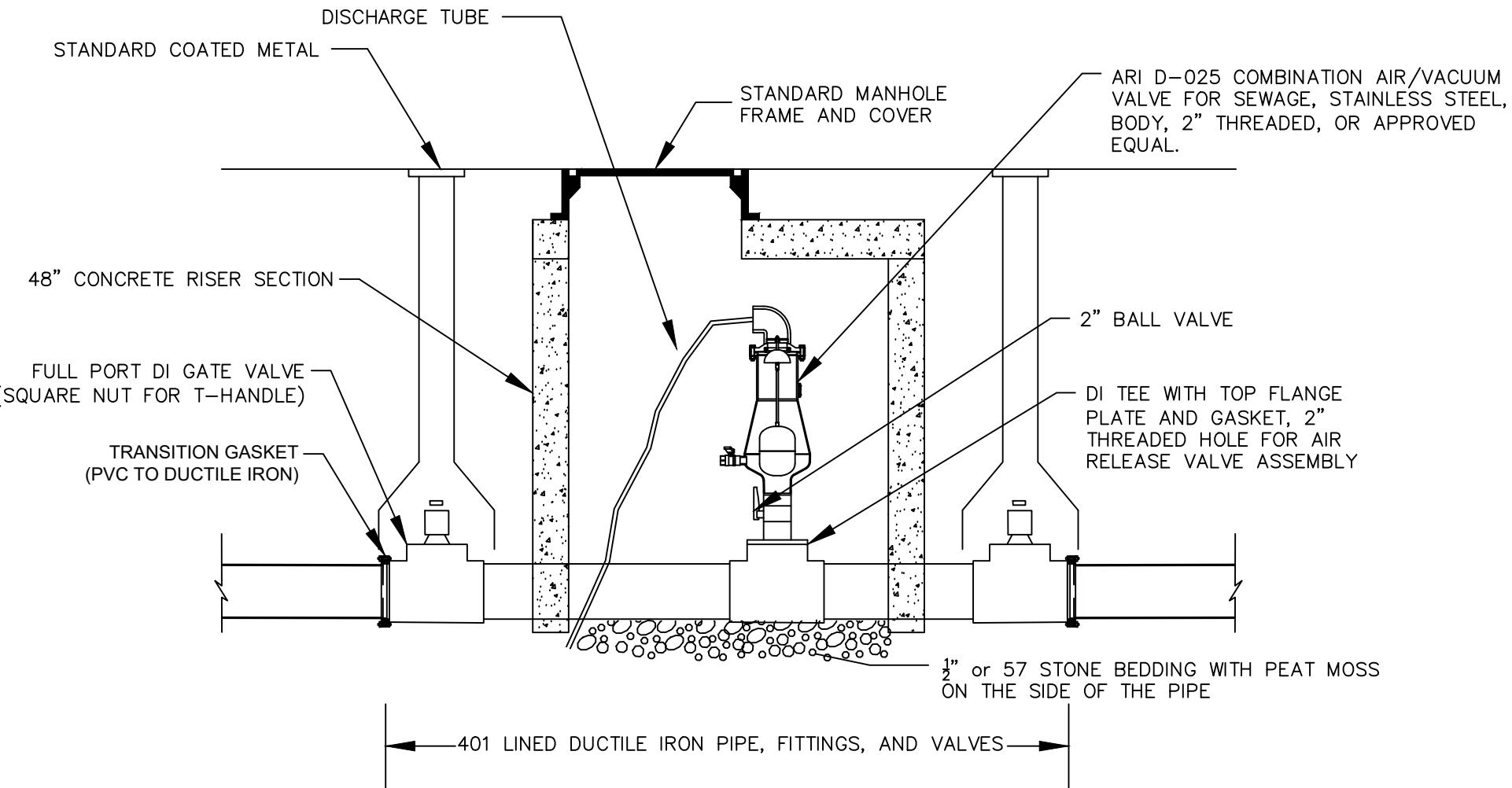


THIS DETAIL IS FOR PIPE SIZES 4-INCHES AND LARGER

## FORCEMAIN CLEANOUT

HAMILTON COUNTY WATER & WASTEWATER TREATMENT AUTHORITY

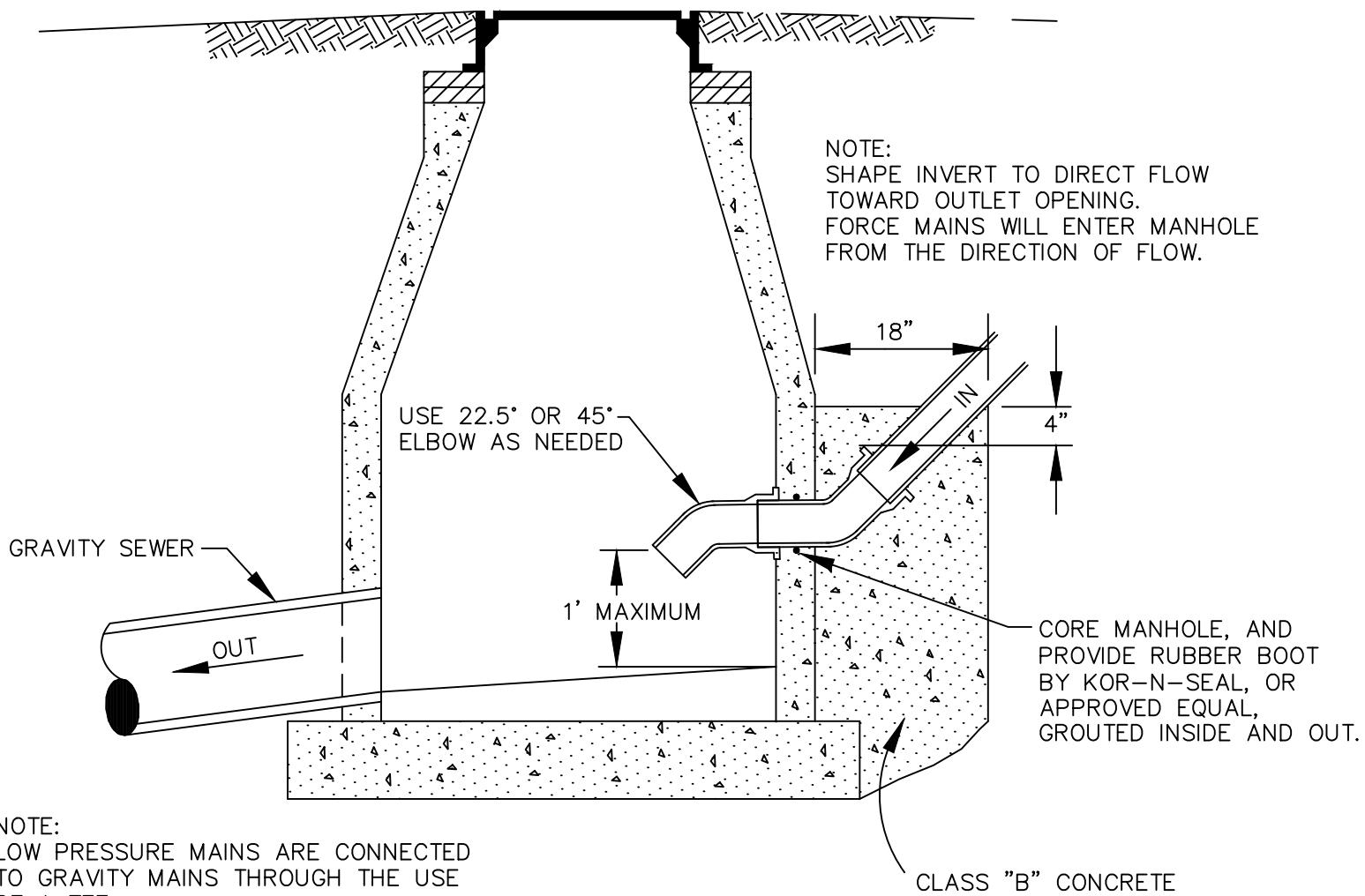
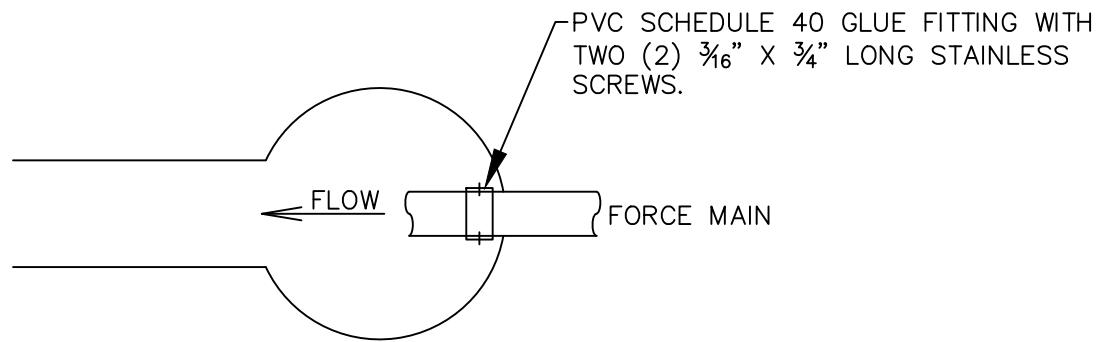
SD-FM-3



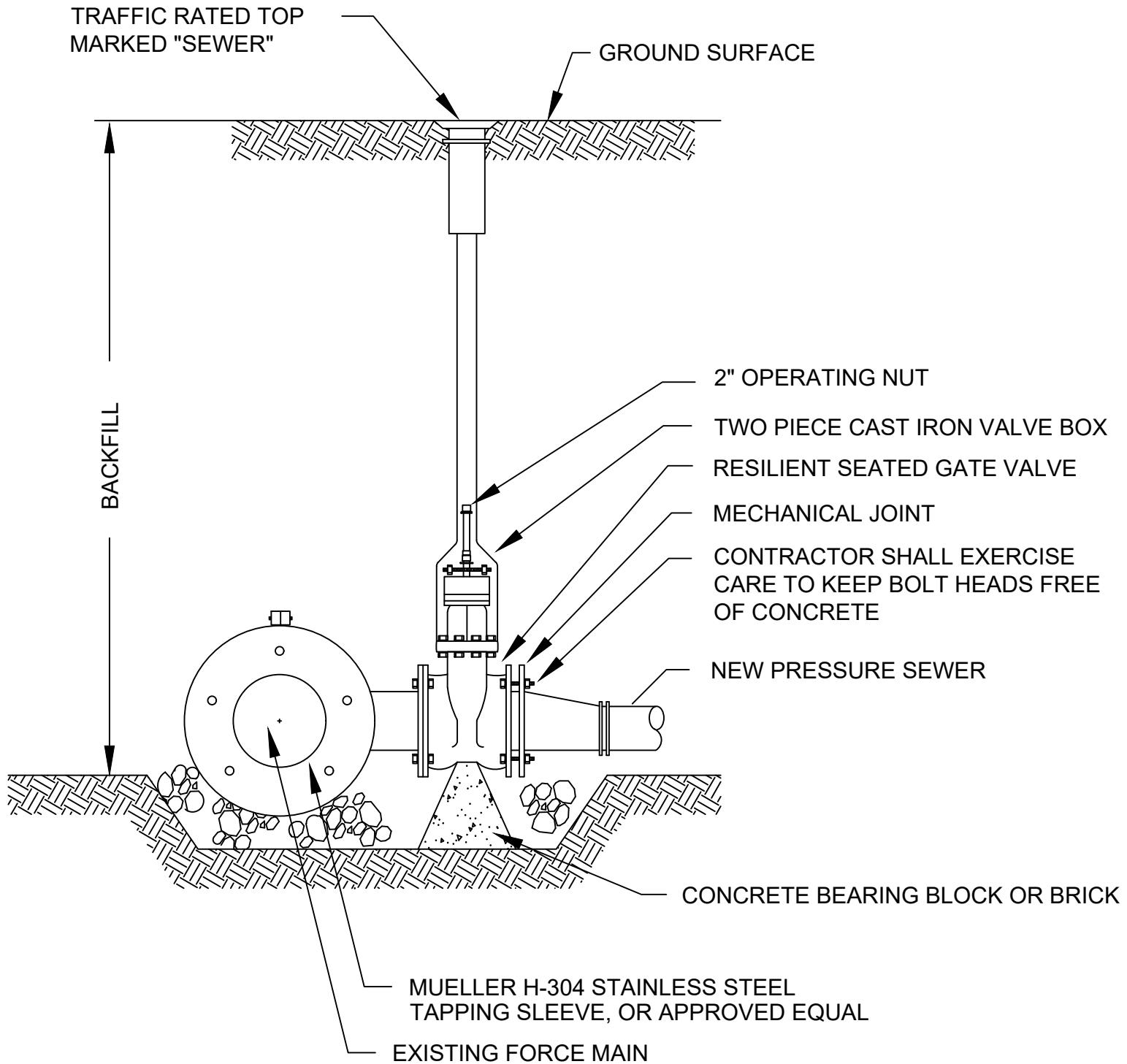
THIS DETAIL IS FOR PIPE SIZES 4-INCHES AND LARGER

## COMBINATION AIR RELEASE VALVE/CLEANOUT

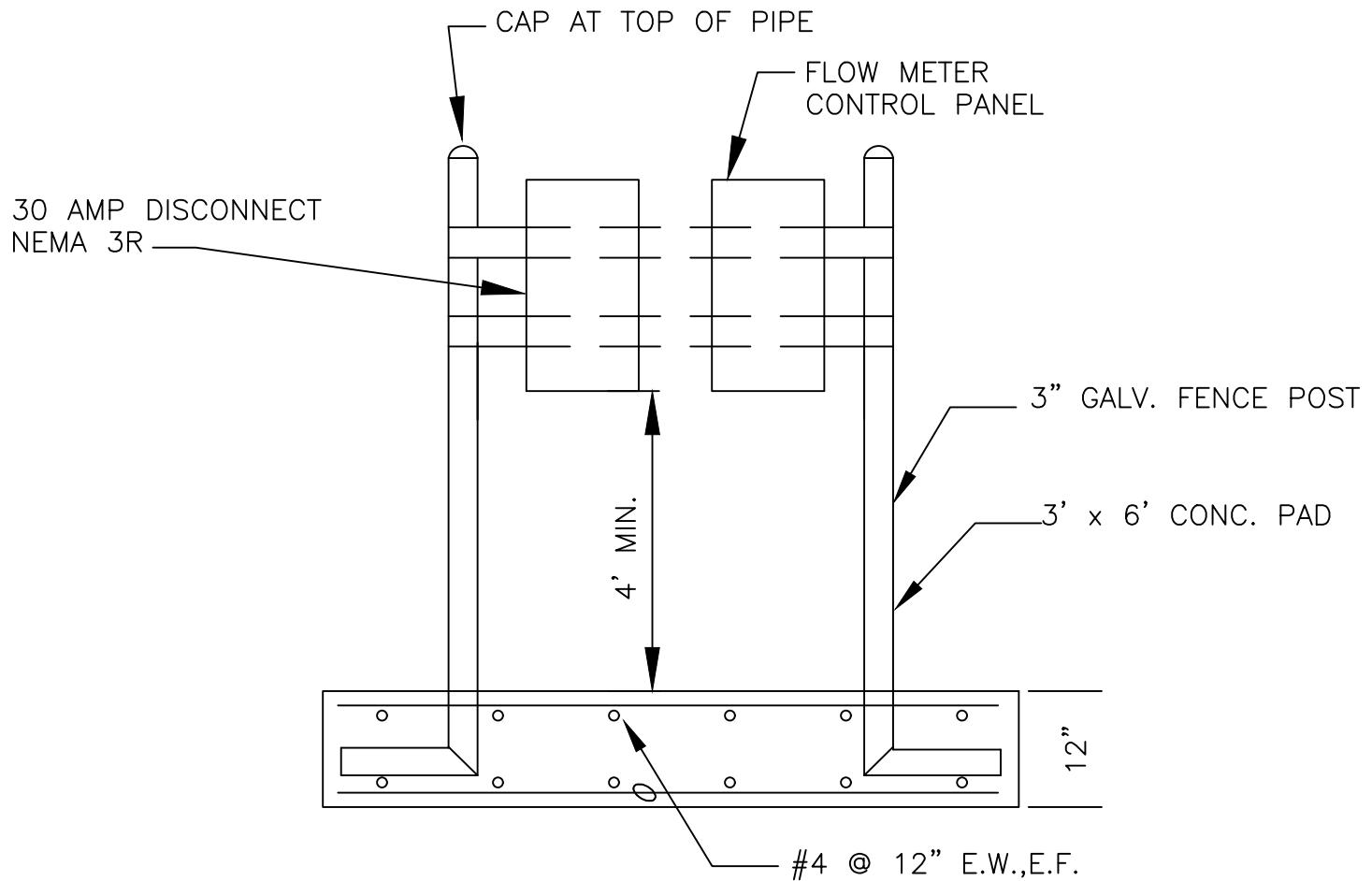
HAMILTON COUNTY WATER & WASTEWATER TREATMENT AUTHORITY



## STANDARD CONNECTION OF FORCE MAIN TO MANHOLE

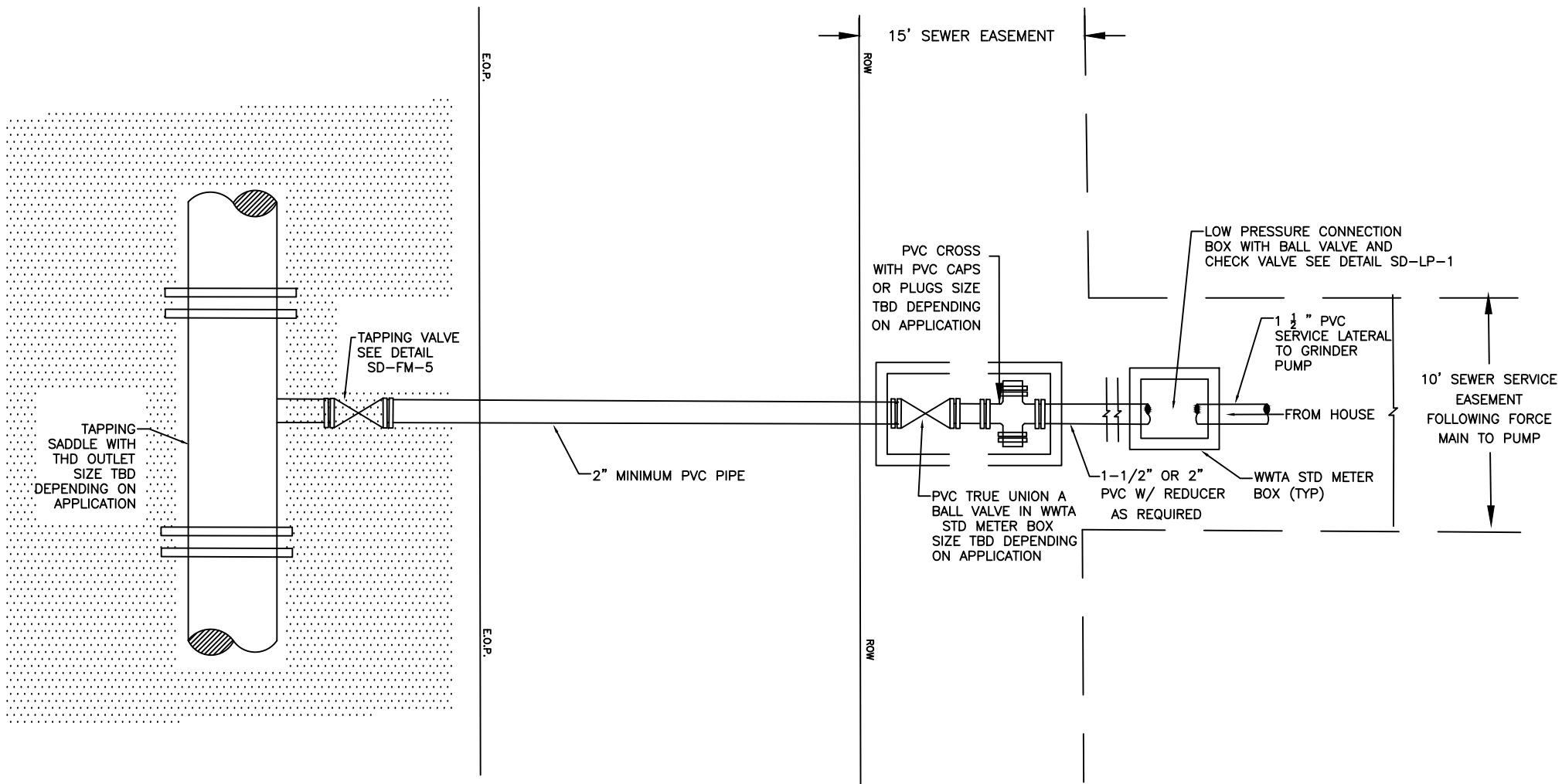


## TAPPING VALVE INSTALLATION DETAIL



## FLOW METER CONTROL PANEL PAD DETAIL

HAMILTON COUNTY WATER & WASTEWATER TREATMENT AUTHORITY  
SD-FM-6  
NOT TO SCALE



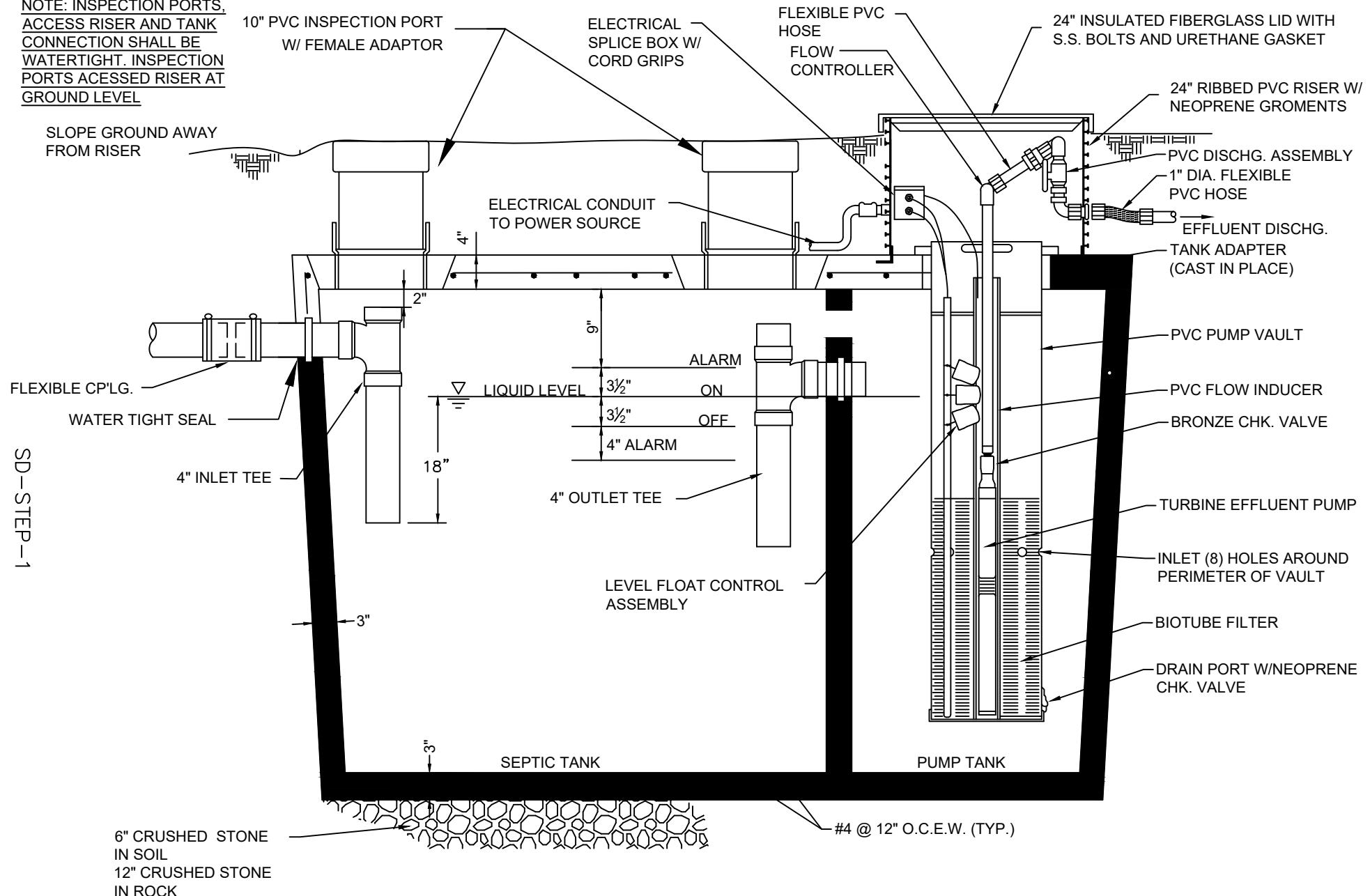
## STANDARD CONNECTION TO FORCE MAIN

NOT TO SCALE

SD-FM-7

NOTE: INSPECTION PORTS, ACCESS RISER AND TANK CONNECTION SHALL BE WATERTIGHT. INSPECTION PORTS ACESSED RISER AT GROUND LEVEL

SLOPE GROUND AWAY FROM RISER

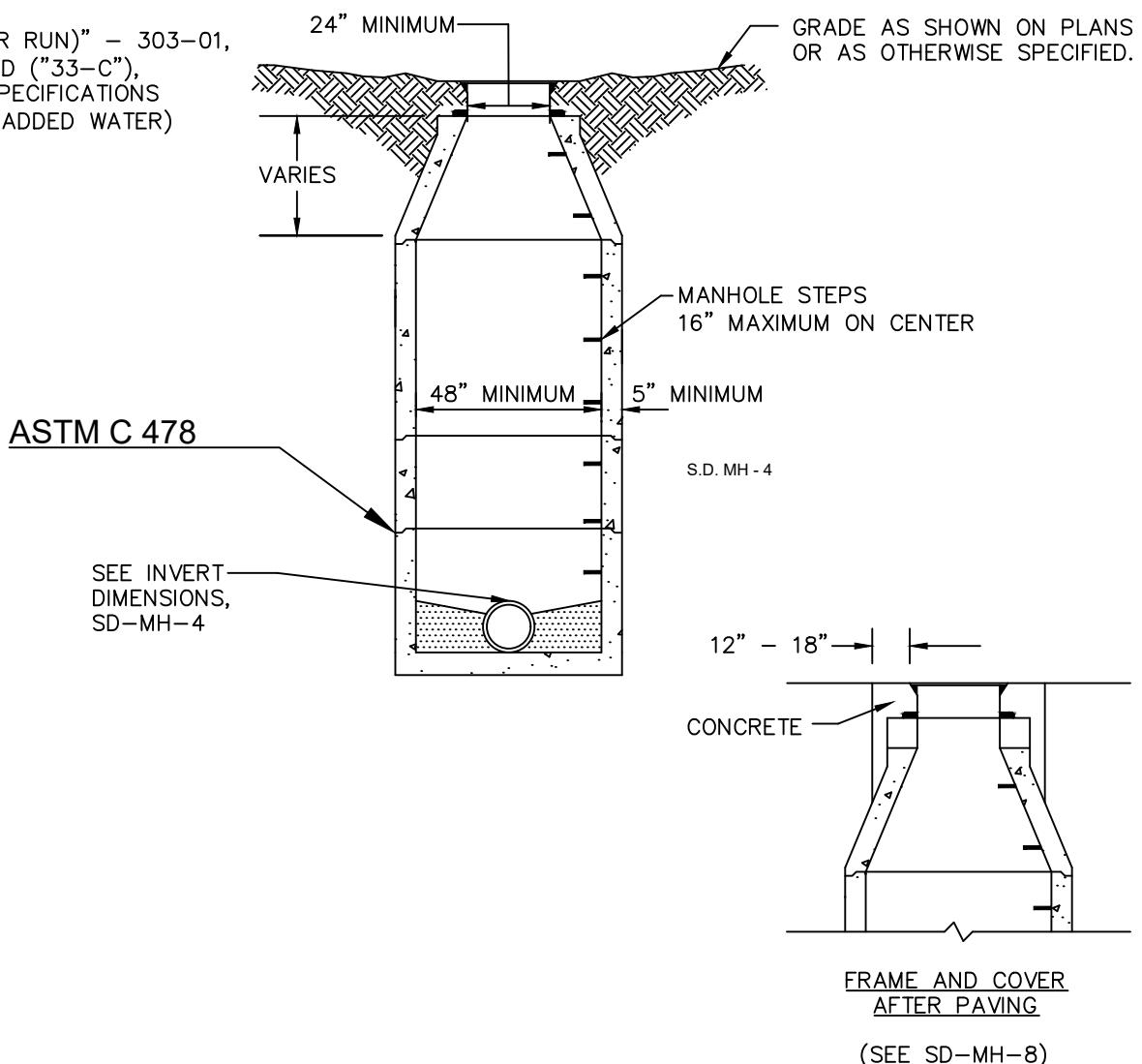


## SEPTIC TANK EFFLUENT PUMP (STEP) INSTALLATION DETAIL

NOTES

1. ALL MATERIALS, DESIGN, MANUFACTURE, PHYSICAL TEST REQUIREMENTS, FINISH, MARKING, INSPECTION, REJECTION, AND REPAIRS TO MEET ASTM C478 FOR PRECAST REINFORCED CONCRETE MANHOLE RISERS AND CONES EXCEPT AS MAY BE MODIFIED IN THESE SPECIFICATIONS.
2. SIZE AND LOCATE PIPE CUTOUTS AS REQUIRED.
3. MANHOLE STEPS – SEE DETAIL OF STANDARD MANHOLE STEPS. SD-MH-7.
4. END-OF-LINE MANHOLES THAT HAVE FUTURE EXTENSIONS AND THAT ARE LOCATED IN PAVEMENT SHALL BE BACKFILLED WITH FLOWABLE FILL OR 33-C\* STONE (CRUSHER RUN). THE BACKFILL SHALL BE COMPAKTED TO 6-INCH LIFTS, AND SHALL EXTEND TEN (10') FEET FROM THE MANHOLE ALONG EACH TRENCH.
5. A MAXIMUM OF ONE CONCRETE RING MAY BE USED FOR FINISHED GRADE ELEVATION ADJUSTMENT OF UP TO 6" ON NEW CONSTRUCTION.
6. FLAT TOP MANHOLES SHALL NOT BE USED.
7. ON STREET GRADES OF 5% OR MORE, RINGS MUST BE POURED IN PLACE ON PROPER GRADE FOR EVEN OR SMOOTH TRANSITION.
8. MANHOLES TO BE LOCATED NO MORE THAN 400 FEET APART

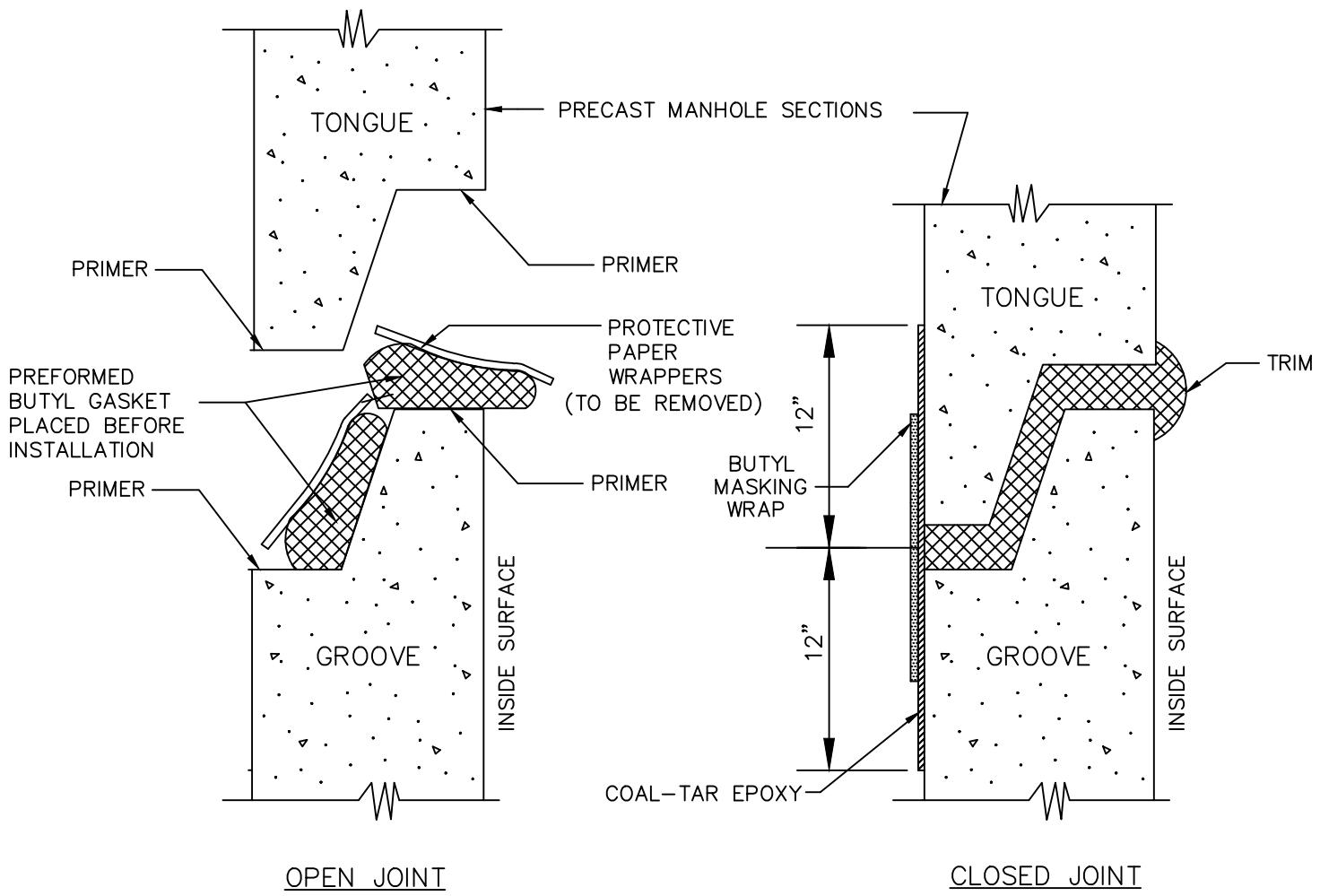
\* "33-C (CRUSHER RUN)" – 303-01,  
TYPE A, GRADING D ("33-C"),  
TENNESSEE DOT SPECIFICATIONS  
("33-P" WITHOUT ADDED WATER)



## STANDARD PRECAST CONCRETE MANHOLES

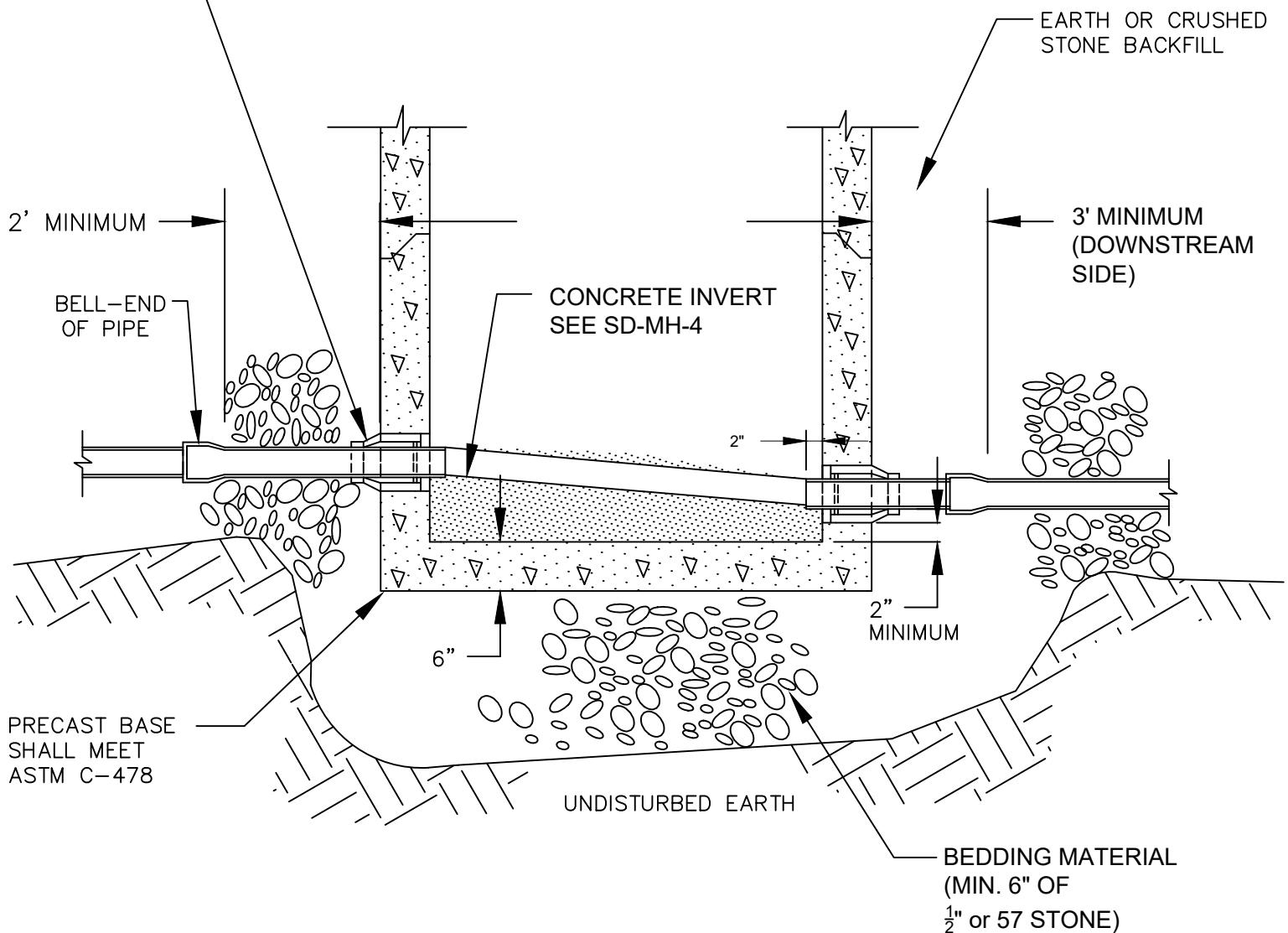
NOTES

1. TRIM PROTRUDING GASKET INSIDE AND OUTSIDE.
2. CLEAN ALL DEBRIS FROM JOINTS PRIOR TO GASKET APPLICATION.



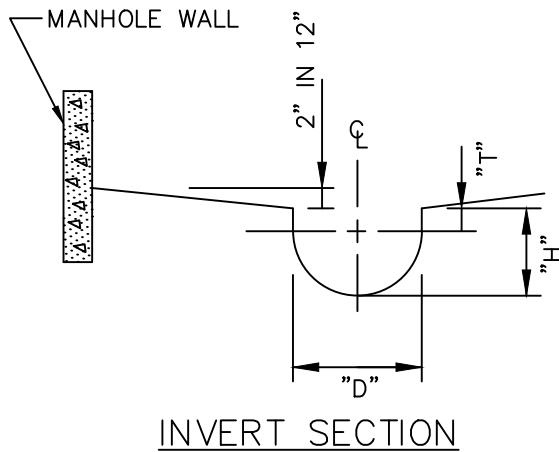
JOINT AND GASKET FOR  
PRECAST MANHOLE SECTIONS

RUBBER BOOT BY KOR-N-SEAL, OR APPROVED EQUAL,  
INSTALLED BY MANHOLE MFGR., HELD IN MANHOLE BY  
STAINLESS STEEL RING, GROUTED INSIDE.



## BOOTED, TUB-BOTTOM MANHOLE

HAMILTON COUNTY WATER & WASTEWATER TREATMENT AUTHORITY  
SD-MH-3



NOTE

"H" AND "T" DIMENSIONS APPLY AT BOTH THE UPSTREAM AND DOWNSTREAM EDGE OF MANHOLE. SEE TABLE 1

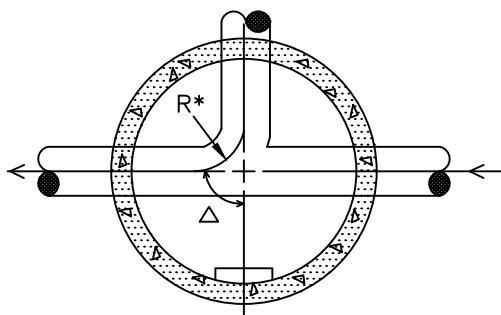
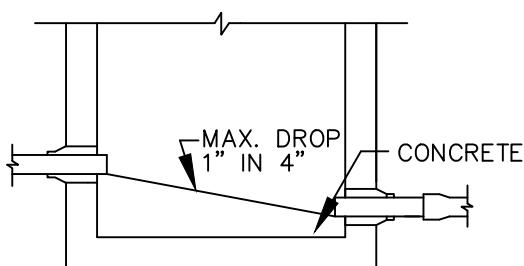


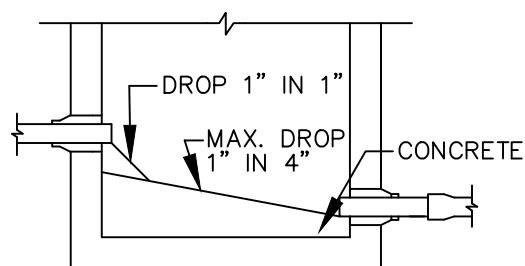
TABLE I		
"D"	"T"	"H"
INSIDE DIA. PIPE	VERTICAL TANGENT	HEIGHT OF H O TABLE
8"	2 1/2"	6 1/2"
10"	3"	8"
12"	3 1/2"	9 1/2"
15"	4 1/2"	12"
18"	5 1/2"	14 1/2"
21"	6 1/2"	17"
24"	7 1/2"	19 1/2"
30"	9"	24"
36"	11"	29"

TABLE II  
GOVERNING DIMENSIONS FOR MANHOLE INVERTS

PIPE SIZE	△ ANGLE	BASE DIA.	R*
8" THRU 12"	0° TO 90	4'	1'-6"
15"	0 TO 60	4'	1'-10"
15"	60 TO 90	4'	1'-10"
18"	0 TO 60	4'	2'-3"
18"	60 TO 90	4'	1'-10"
21"	0 TO 60	4'	2'-7"
21"	60 TO 90	5'	2'-4"
24"	0 TO 45	4'	3'-0"
24"	45 TO 90	5'	2'-3"
30"	0 TO 60	5'	3'-9"
30"	60 TO 90	6'	2'-8"
36"	0 TO 30	6'	4'-6"
36" & LARGER	0 TO 90	CAST IN PLACE MH BASE OR PRE-BED MH BASE & ELBOW UNITS.	

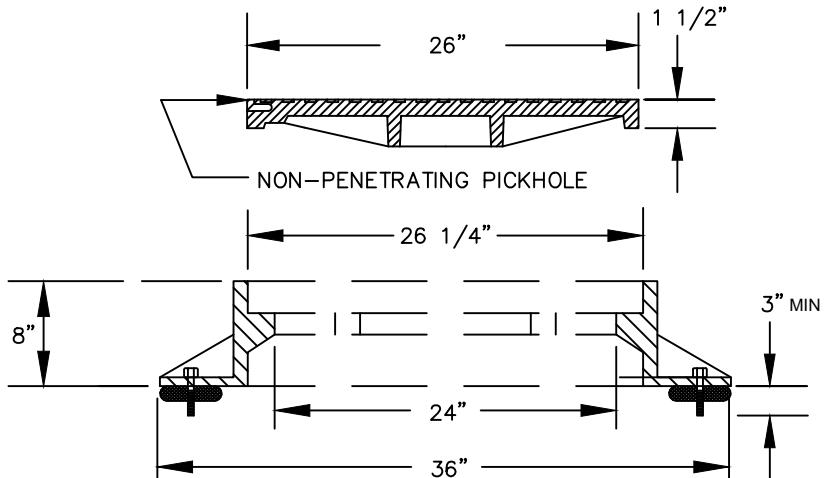


INVERT DETAIL  
(WITH DROP LESS THAN 12")

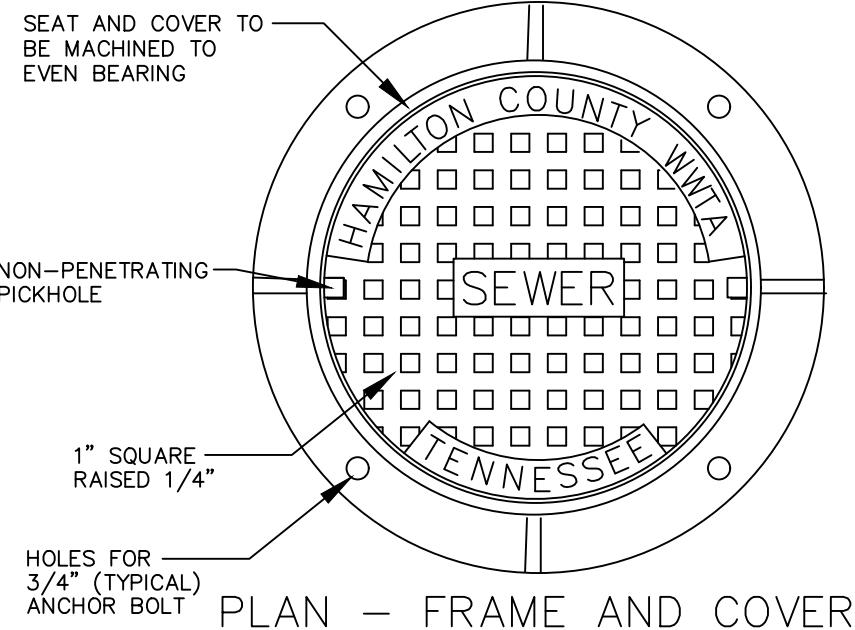


INVERT DETAIL  
(WITH DROP OF 12"  
TO LESS THAN 24")

STANDARD SIZE & INVERT DETAILS

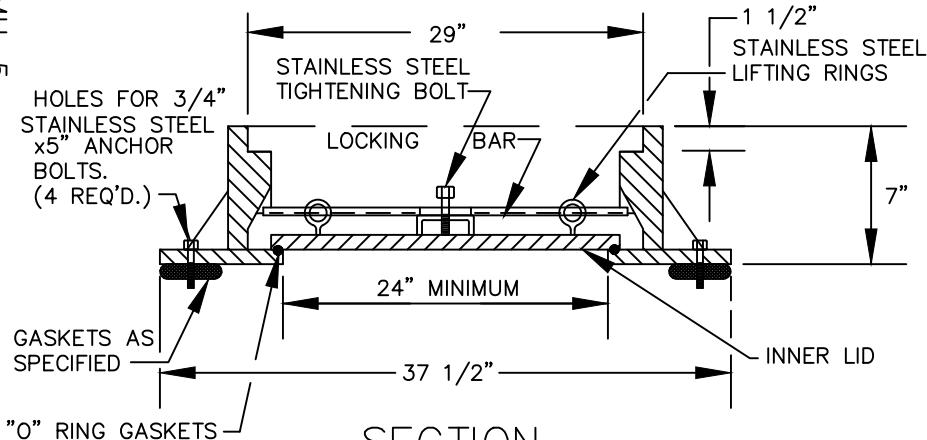


SECTION  
STANDARD FRAME AND COVER



PLAN - FRAME AND COVER

ACHESON FOUNDRY (STANDARD) A-2024-81H  
ACHESON FOUNDRY (WATER-TIGHT) A-2624-71H  
OR APPROVED EQUAL



SECTION  
WATER-TIGHT FRAME AND COVER

SPECIFIED MINIMUM WEIGHTS		
	STANDARD	WATER-TIGHT
COVER	165 LBS. 185 LBS.	190 LBS. 400 LBS.
TOTAL	350 LBS.	590 LBS.

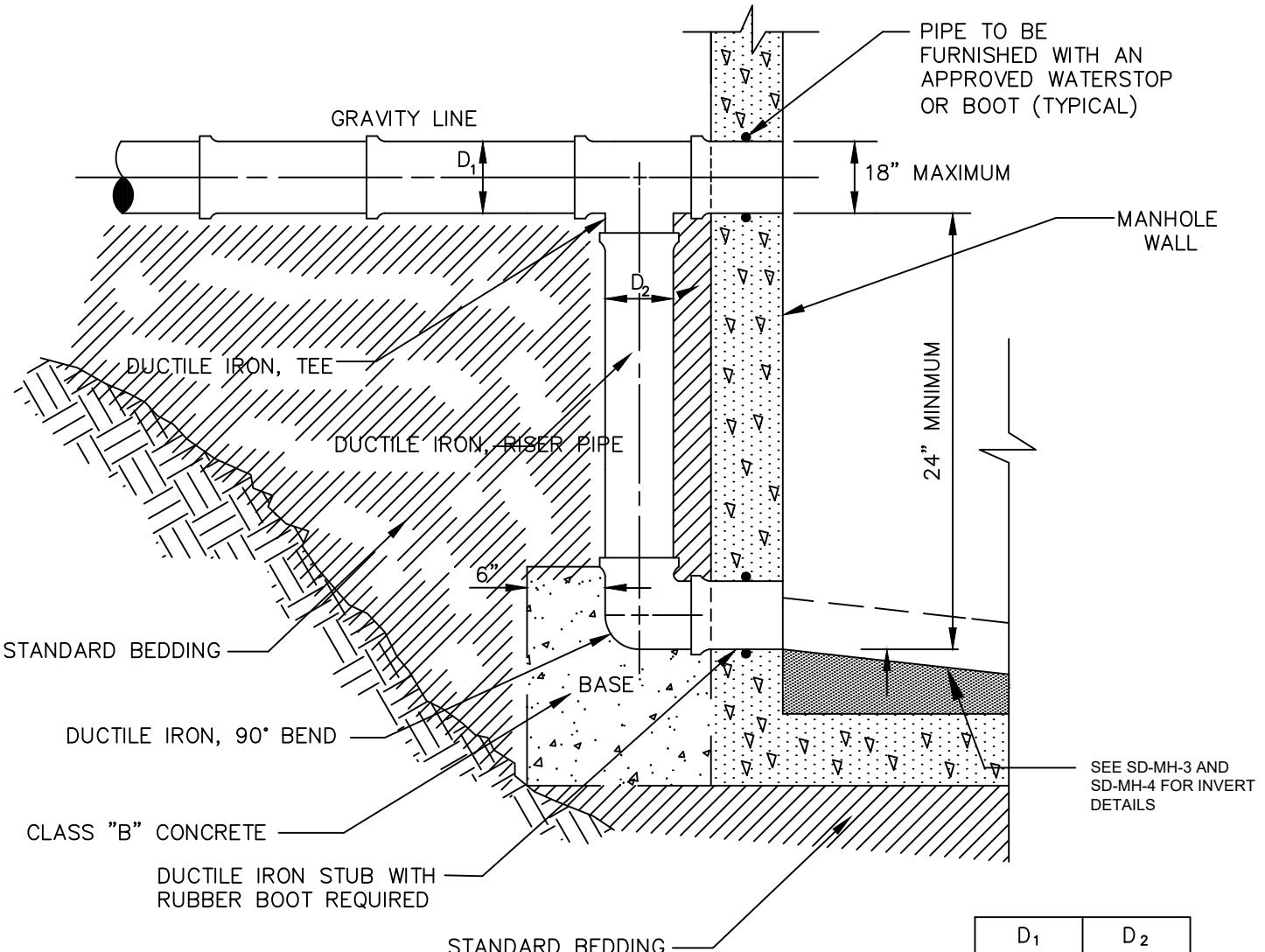
NOTES

1. MANUFACTURER SHALL CERTIFY TRAFFIC BEARING CAPACITY OF FRAMES AND COVERS.
2. MANHOLES IN PAVED AREAS MAY NOT REQUIRE ANCHOR BOLTS.
3. BEARING SURFACES BETWEEN COVER AND FRAME SHALL BE MACHINED TO PREVENT ROCKING.
4. MANHOLES IN EASEMENTS REQUIRE ANCHOR BOLTS.
5. MANHOLES IN TRAFFIC AREAS REQUIRE 4000LB CONCRETE COLLAR
6. MANHOLES LOCATED IN OFFSITE EASEMENTS SHALL HAVE GREEN FIBERGLASS MARKERS

MANHOLE FRAME AND COVER

NOTES

1. SET INLET FROM DROP TO MATCH CROWNS WITH OUTLET EXCEPT THAT MINIMUM FALL ACROSS MANHOLE INVERT MUST BE 3".
2. FOR DETAILS NOT SHOWN, SEE STANDARD MANHOLE DETAILS.
3. THE INCOMING LINE THE TEE, THE RISER PIPE, AND THE BEND SHALL BE CONSTRUCTED OF DUCTILE IRON.
4. ON GRAVITY LINE GRADES OF 12.5% OR GREATER, 11- $\frac{1}{4}$ ° ELBOW MAY BE USED UP TO 24% GRADE; 22- $\frac{1}{2}$ ° ELBOW MAY BE USED UP TO 49% GRADE AND 45° ELBOW MAY BE USED BEYOND 50% GRADE AND ENTIRE DROP SHALL BE DUCTILE IRON.



BASE NOTES:

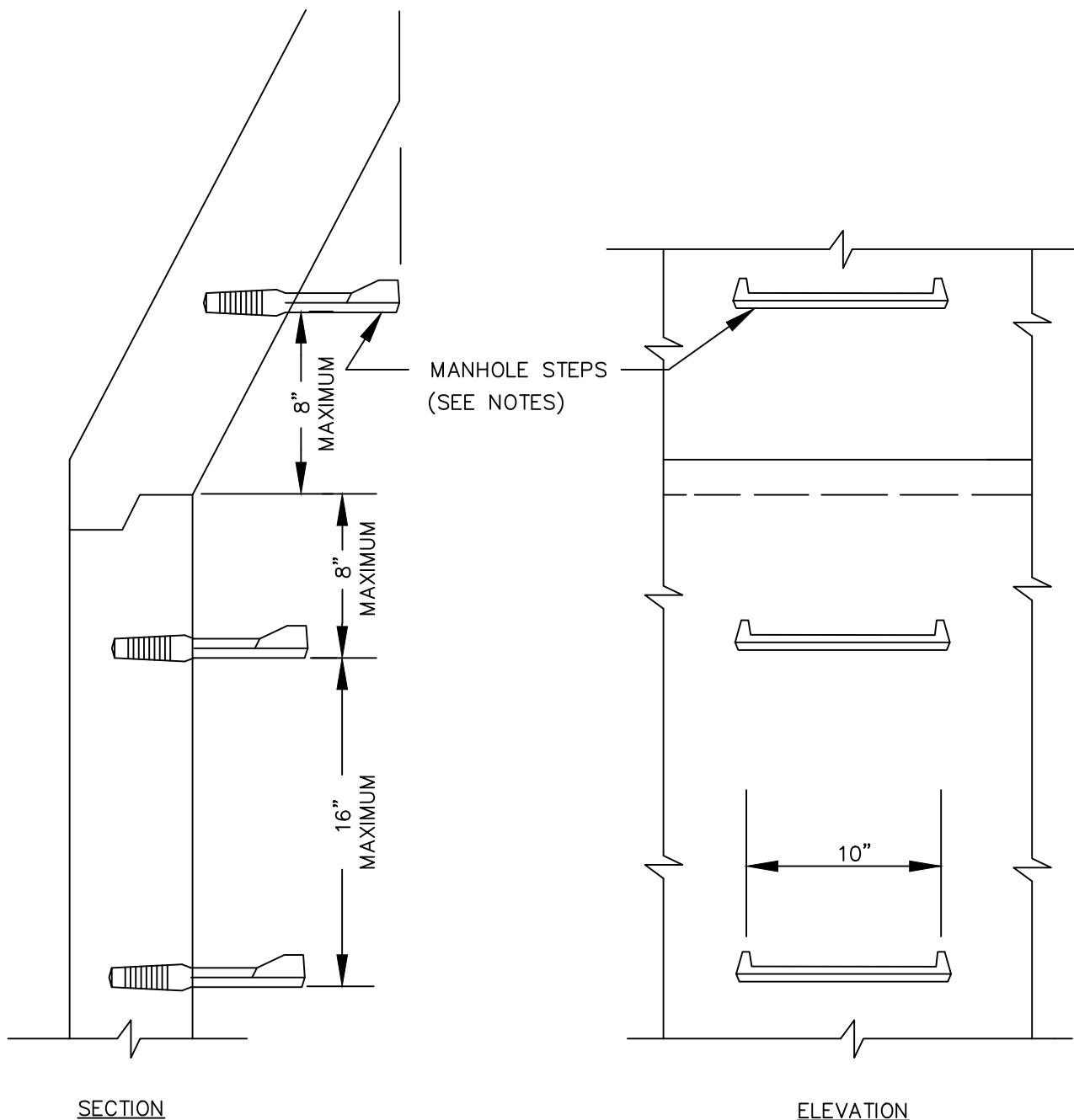
1. MINIMUM DISTANCE BETWEEN BOTTOM OF DI AND MANHOLE BOTTOM IS 8".
2. AT MINIMUM THERE SHOULD BE 12  $\frac{1}{2}$ " TOTAL VERTICAL HEIGHT OF CONCRETE.
3. BASE NEEDS TO BE AT LEAST 36" WIDE FOR SUPPORT OF DI ELBOW.

D <sub>1</sub>	D <sub>2</sub>
8"	8"
10"	8"
12"	10"
15"	12"
18"	12"

## STANDARD DROP MANHOLE

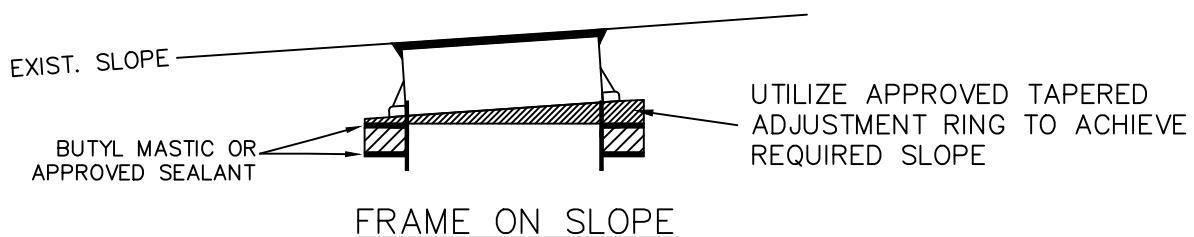
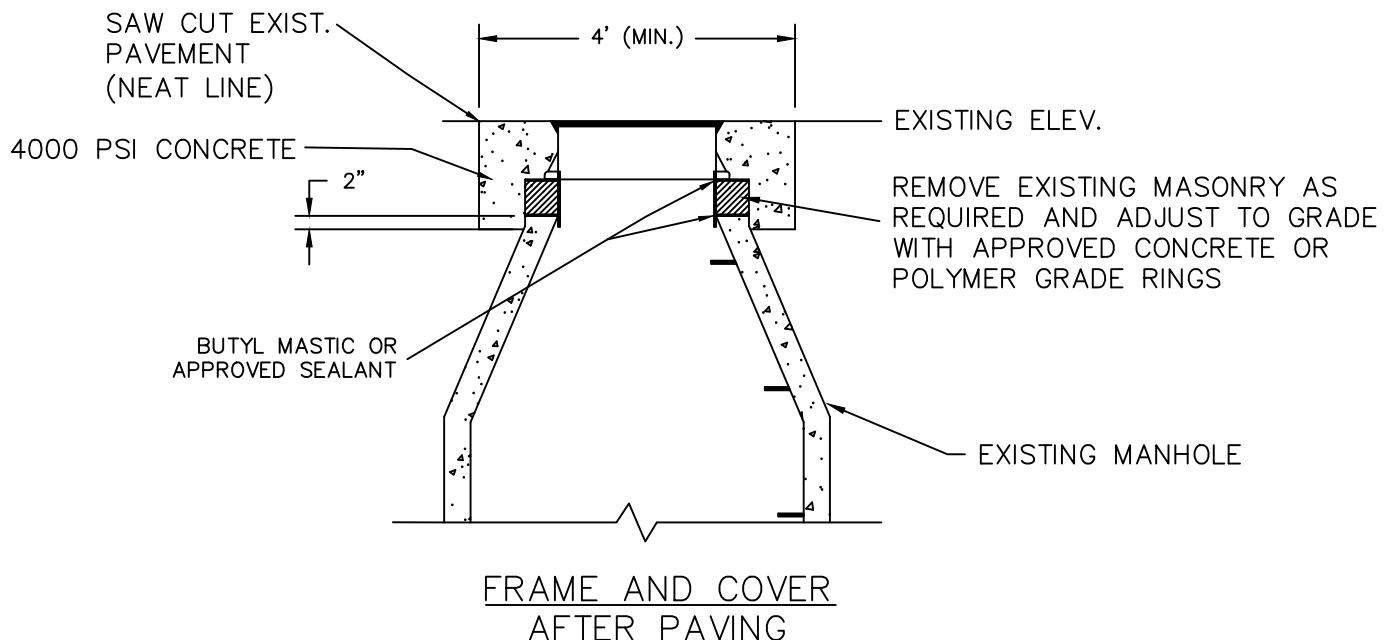
NOTES:

1. STEPS OF 3/8" STEEL REINFORCED ROD ENCAPSULATED IN POLYPROPYLENE PLASTIC.
2. RISER SECTIONS SHALL BE SET SO THAT STEPS ALIGN VERTICALLY, AND DO NOT PROTRUDE BEYOND VERTICAL FACE OF INSIDE MANHOLE CONE.



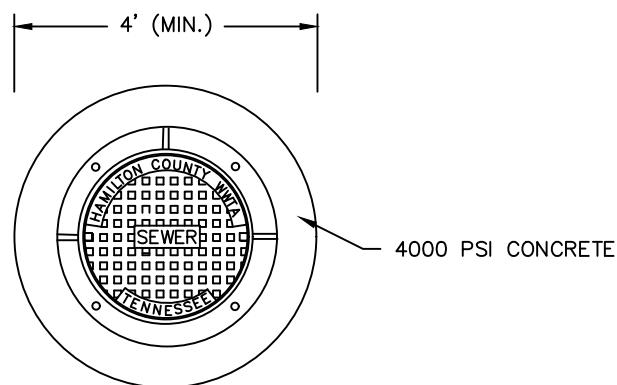
## MANHOLE STEPS

HAMILTON COUNTY WATER & WASTEWATER TREATMENT AUTHORITY  
SD-MH-7



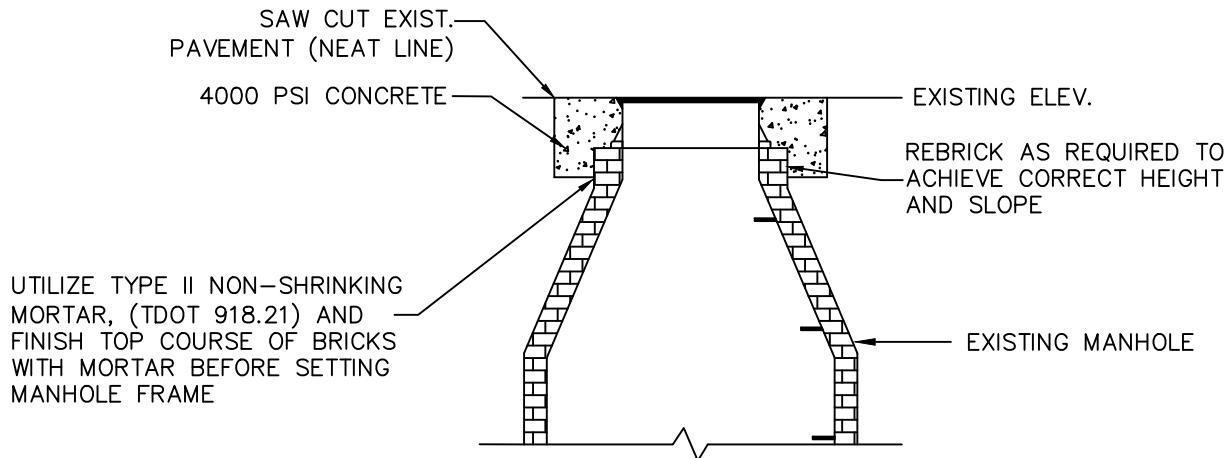
#### PLAN-FRAME AND COVER

ACHESON FOUNDRY (STANDARD) A-2024-81H  
ACHESON FOUNDRY (WATER-TIGHT) A-2624-71H  
OR APPROVED EQUAL

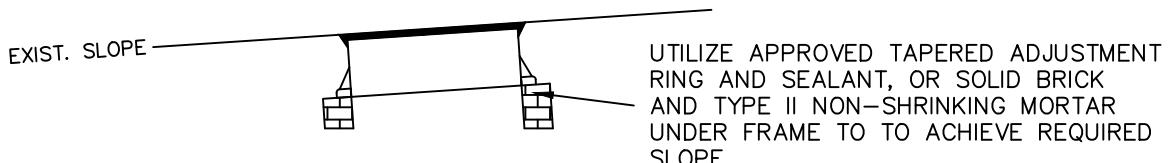


1. CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO ENSURE THAT MORTAR AND CONSTRUCTION MATERIAL DOES NOT DROP INTO MANHOLE OR SEWER LINES
2. CONTRACTOR SHALL MAINTAIN TRAFFIC BARRIERS AND STEEL PLATES AROUND MANHOLE UNTIL CONCRETE CURES
3. THE COMBINED HEIGHT OF STACKED GRADE RINGS SHALL BE A MAXIMUM OF 12 INCHES. ADJUSTMENTS EXCEEDING A HEIGHT OF 12 INCHES REQUIRE THE USE OF A MANHOLE RISER SECTION.

## STANDARD DETAIL FOR MANHOLE FINISHING AND RAISING FRAMES IN TRAFFIC AREAS



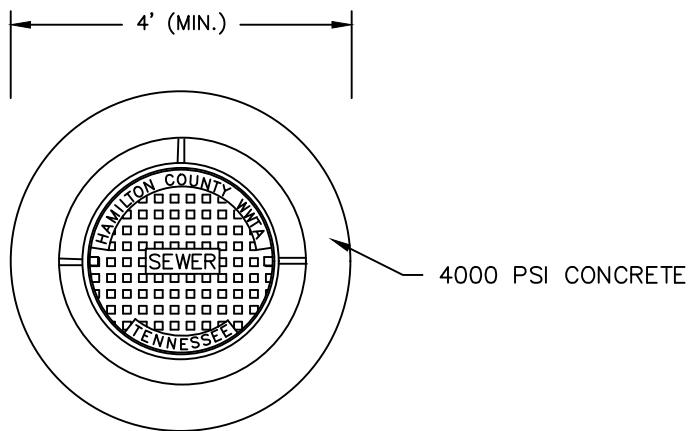
### FRAME AND COVER AFTER PAVING



### FRAME ON SLOPE

### PLAN-FRAME AND COVER

ACHESON FOUNDRY (STANDARD) A-2024-81H  
ACHESON FOUNDRY (WATER-TIGHT) A-2624-71H  
OR APPROVED EQUAL



#### NOTES:

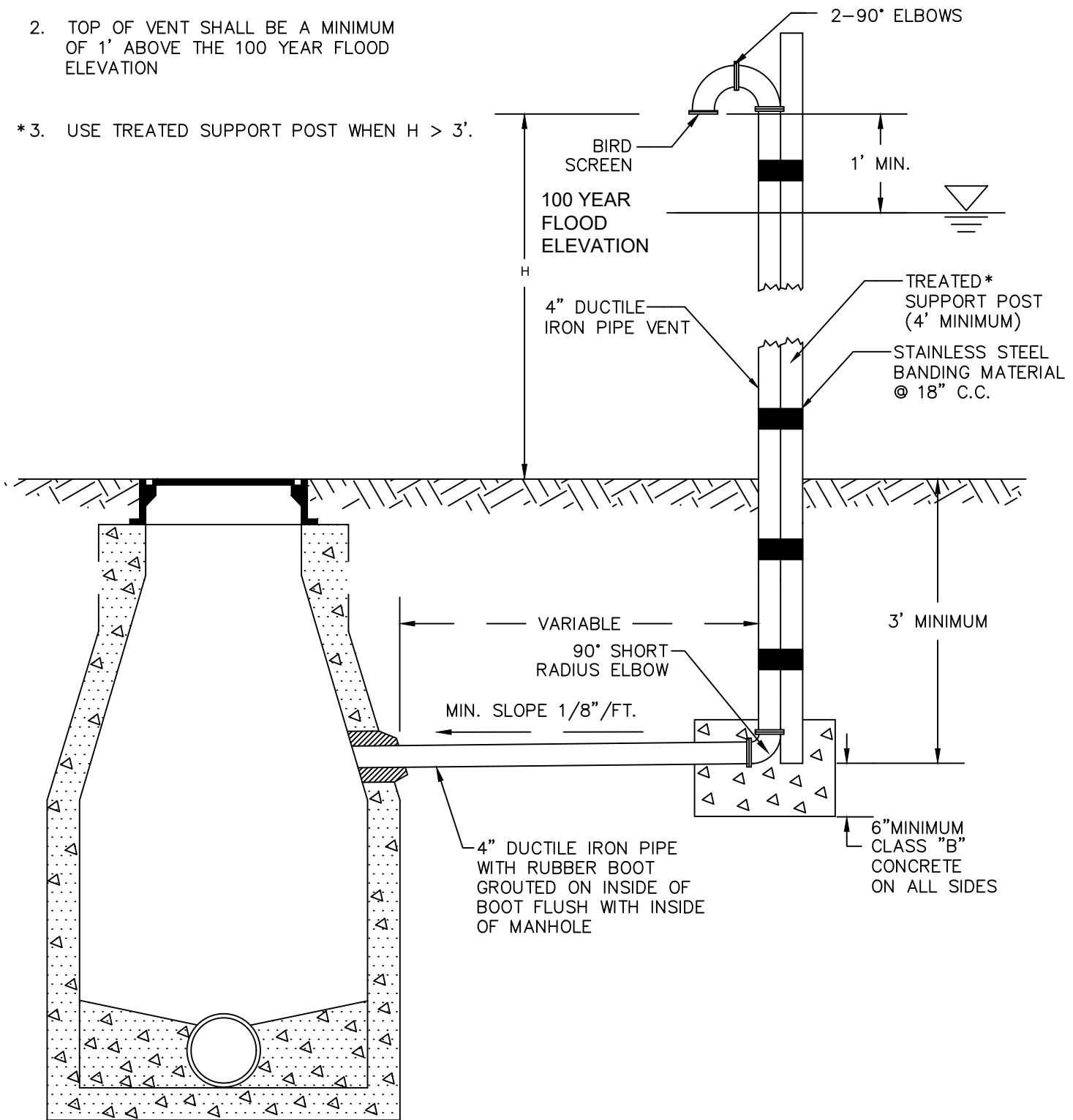
1. CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO ENSURE THAT MORTAR AND OTHER CONSTRUCTION MATERIALS DO NOT DROP INTO MANHOLE OR SEWER LINES
2. CONTRACTOR SHALL MAINTAIN TRAFFIC BARRIERS AND STEEL PLATES AROUND MANHOLE UNTIL CONCRETE CURES

## STANDARD DETAIL FOR RAISING MANHOLE FRAMES ON BRICK MANHOLES

HAMILTON COUNTY WATER & WASTEWATER TREATMENT AUTHORITY  
SD-MH-8A

NOTES

1. LOCATE 4" VENT PIPE OUT OF TRAVELED WAY IN BACK OF CURB OR SIDEWALK OR AS CALLED FOR ON PLANS.
2. TOP OF VENT SHALL BE A MINIMUM OF 1' ABOVE THE 100 YEAR FLOOD ELEVATION
3. USE TREATED SUPPORT POST WHEN  $H > 3'$ .

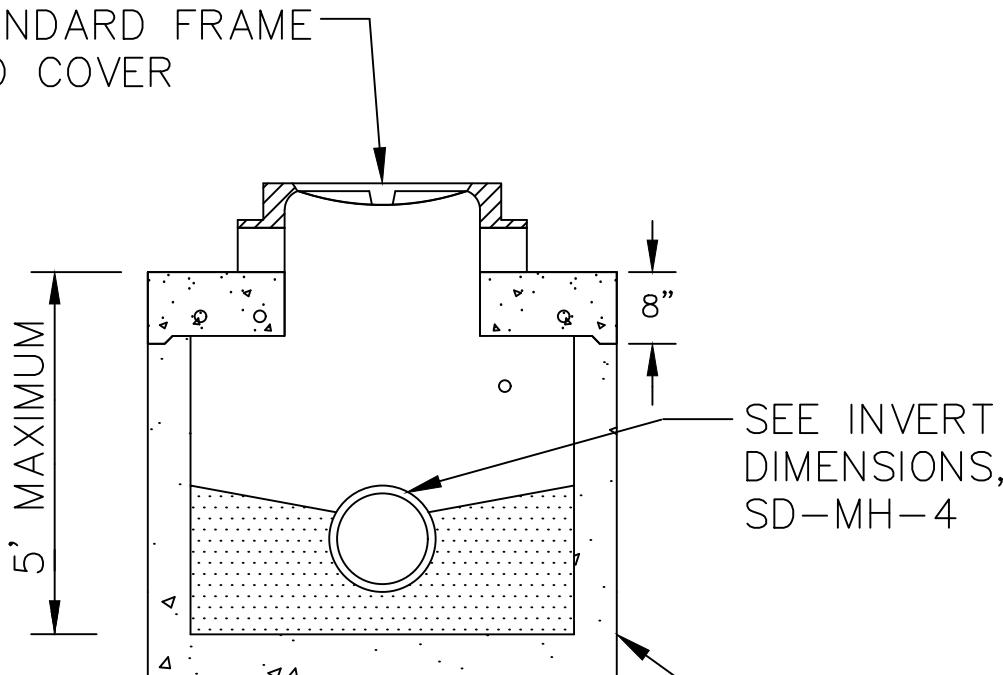


STANDARD MANHOLE VENT

NOTES

1. THE SHALLOW MANHOLE IS ONLY USED WITH SPECIFIC APPROVAL BY WWTA CHIEF ENGINEER OR SUPERINTENDENT.

STANDARD FRAME  
AND COVER



SEE INVERT  
DIMENSIONS,  
SD-MH-4

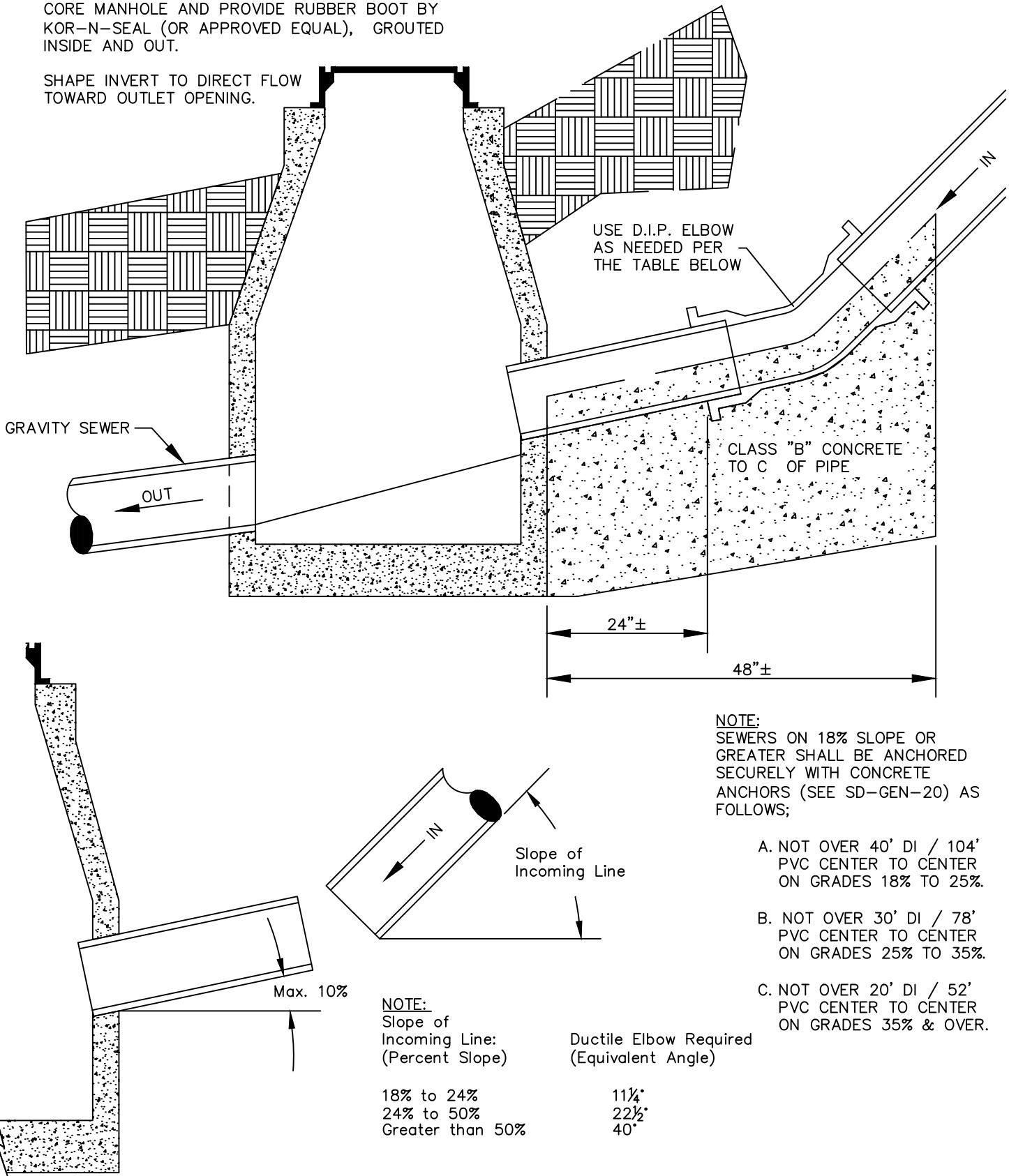
PRECAST  
CONCRETE  
MH BASE  
ASTM C-478

SPECIAL SHALLOW MANHOLE

NOTE:

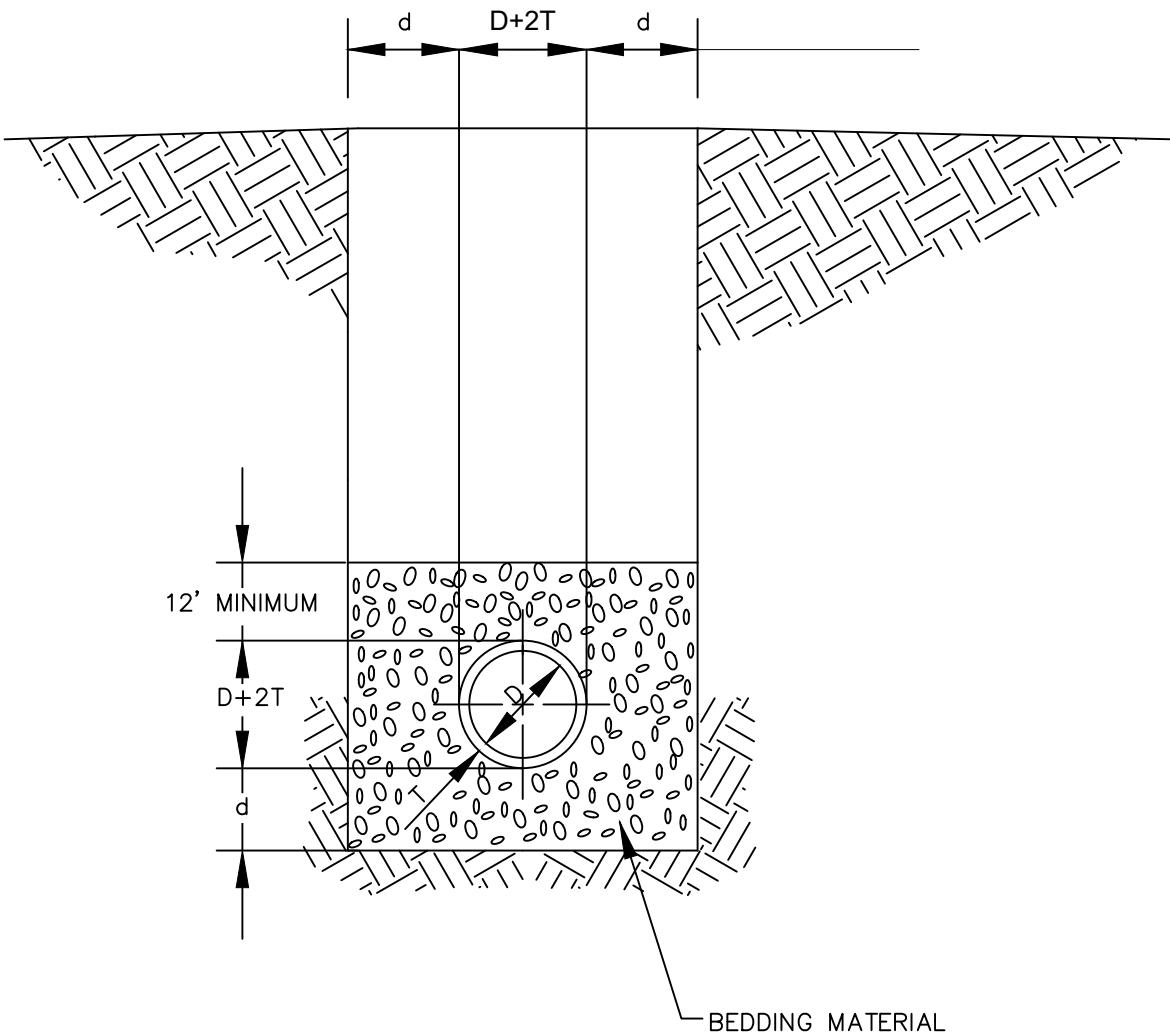
CORE MANHOLE AND PROVIDE RUBBER BOOT BY KOR-N-SEAL (OR APPROVED EQUAL), GROUTED INSIDE AND OUT.

SHAPE INVERT TO DIRECT FLOW TOWARD OUTLET OPENING.



## STEEP GRAVITY CONNECTION TO MANHOLE DETAIL

HAMILTON COUNTY WATER & WASTEWATER TREATMENT AUTHORITY



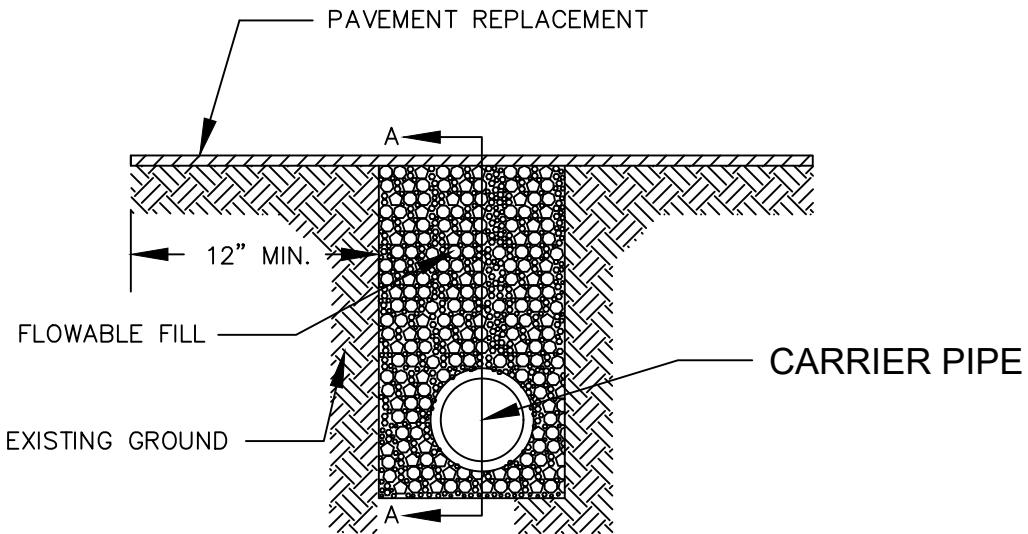
D	d
< 4"	4"
4-6"	6"
8"	6"
10"	8"
12"	8"
15"	8"
18"	8"
21"	10"
24"	10"

TRENCH BEDDING (CLASS "I", ASTM D 2321)

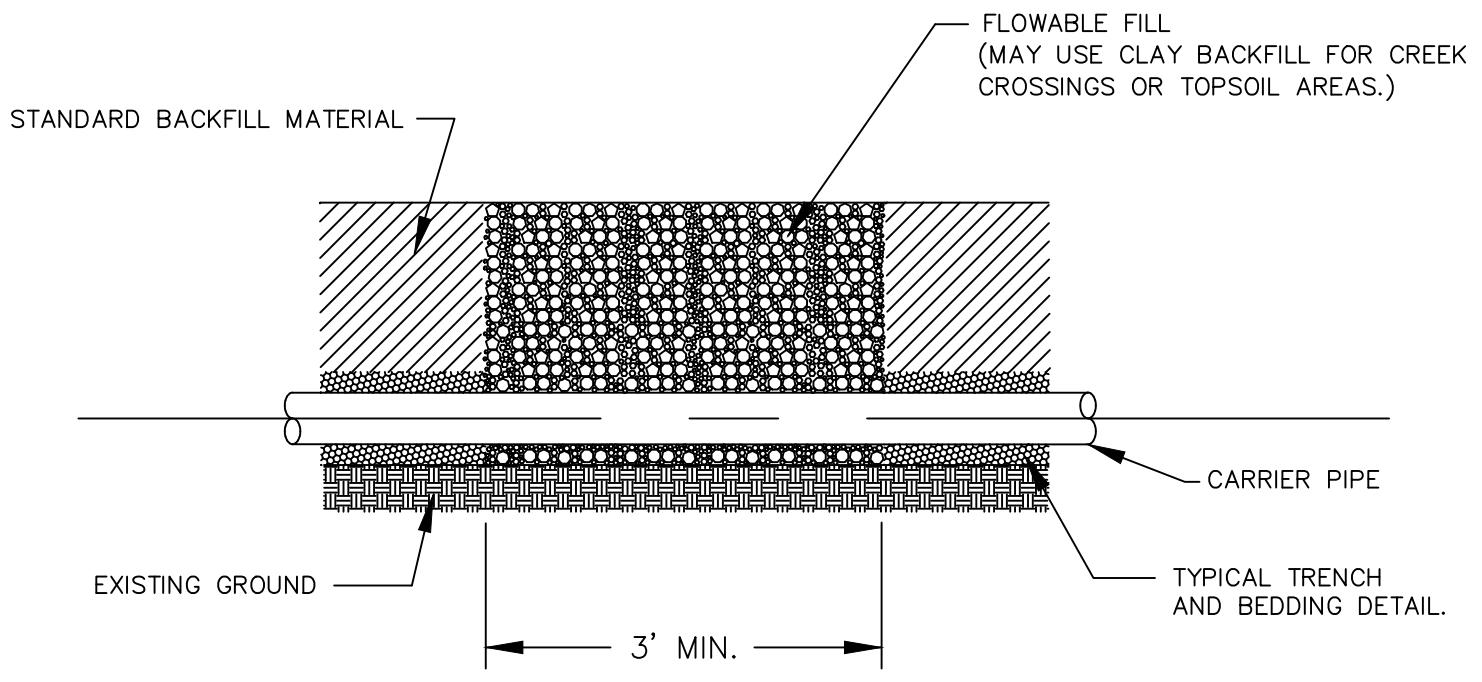
MATERIAL SHALL BE  $\frac{1}{2}$ " or 57 STONE. PAYMENT FOR THE BEDDING SHALL BE INCLUDED IN THE UNIT PRICE BID PER LINEAR FOOT PIPE FOR VARIOUS TYPES, SIZES, AND DEPTHS LISTED IN THE BID SCHEDULE.

## TYPICAL TRENCH AND BEDDING FOR GRAVITY AND FORCE MAIN

HAMILTON COUNTY WATER & WASTEWATER TREATMENT AUTHORITY  
SD-GEN-1



TYPICAL SECTION IN TRENCH CHECK DAM



SECTION A – A

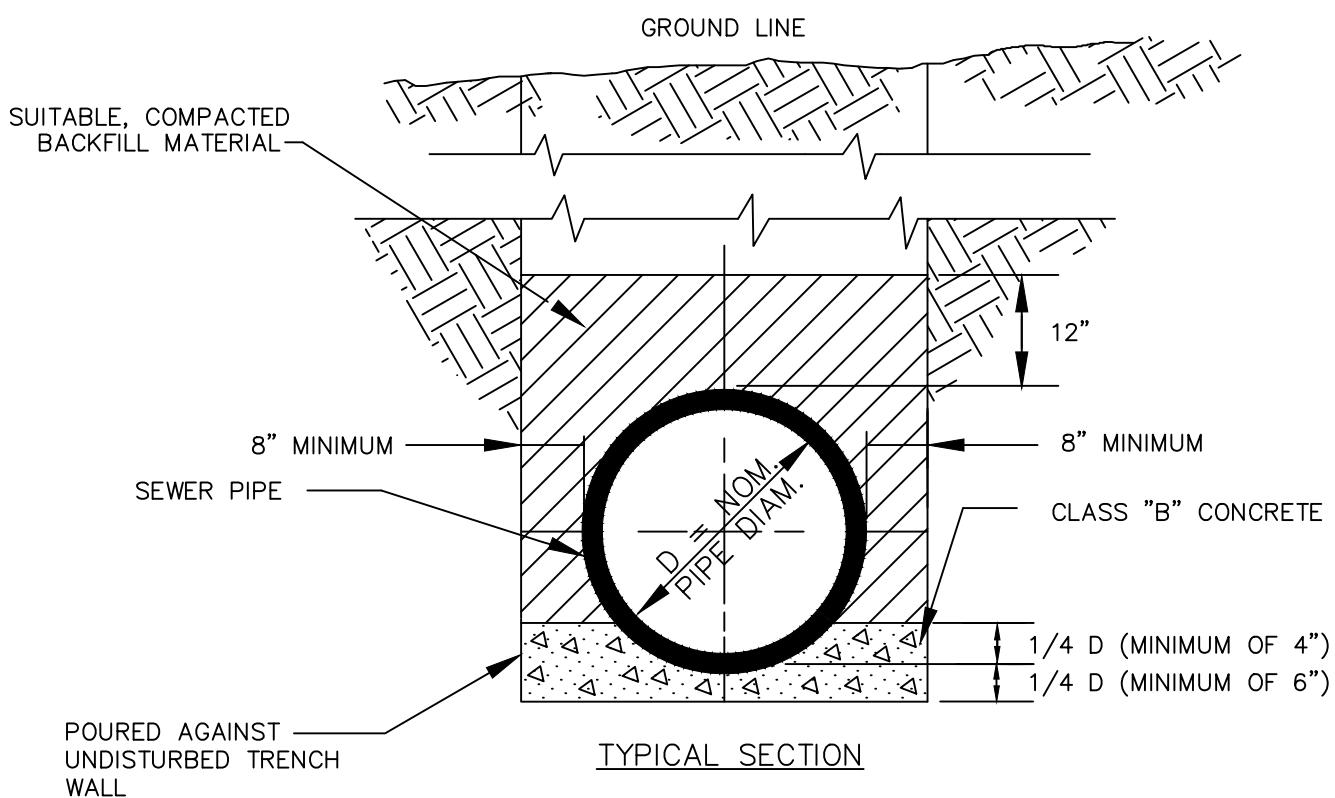
NOTE

A CHECK DAM SHALL BE LOCATED EVERY 500'  
ALONG THE TRENCH UNLESS SHOWN OTHERWISE  
ON THE PLANS.

TRENCH CHECK DAM

NOTES

1. CLASS "B" CONCRETE IS TO BE POURED 16 HOURS BEFORE PLACING BACKFILL, AND IN A MANNER THAT PREVENTS THE FLOATING OF PIPES.
2. PIPES ARE TO BE LAID BEFORE THE CONCRETE HARDENS.



## CONCRETE CRADLE

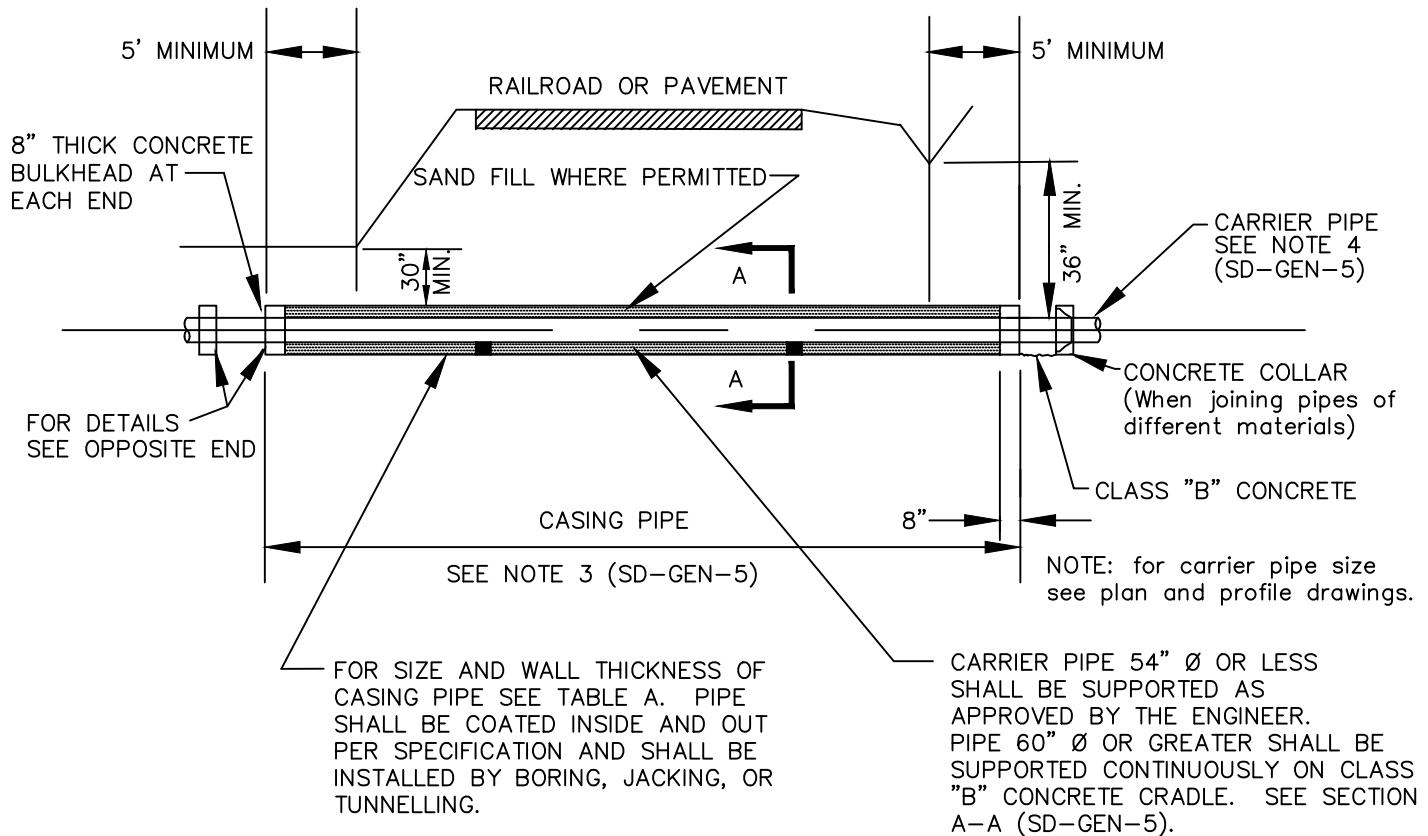


TABLE "A"

CARRIER PIPE (Inches)	PIPE SIZE	
	CASING PIPE Dia. (Inches)	STEEL PIPE Wall Thickness
8	16	1/4"
10	20	5/16"
12	24	3/8"
14-16	30	1/2"
18	36	1/2"
24	36	1/2"
30	54	See Table "B"
36	54	"
42	66	"
48	72	"
54	78	"
60	84	"
66	96	"
72	108	"
84	120	"
96	144	"

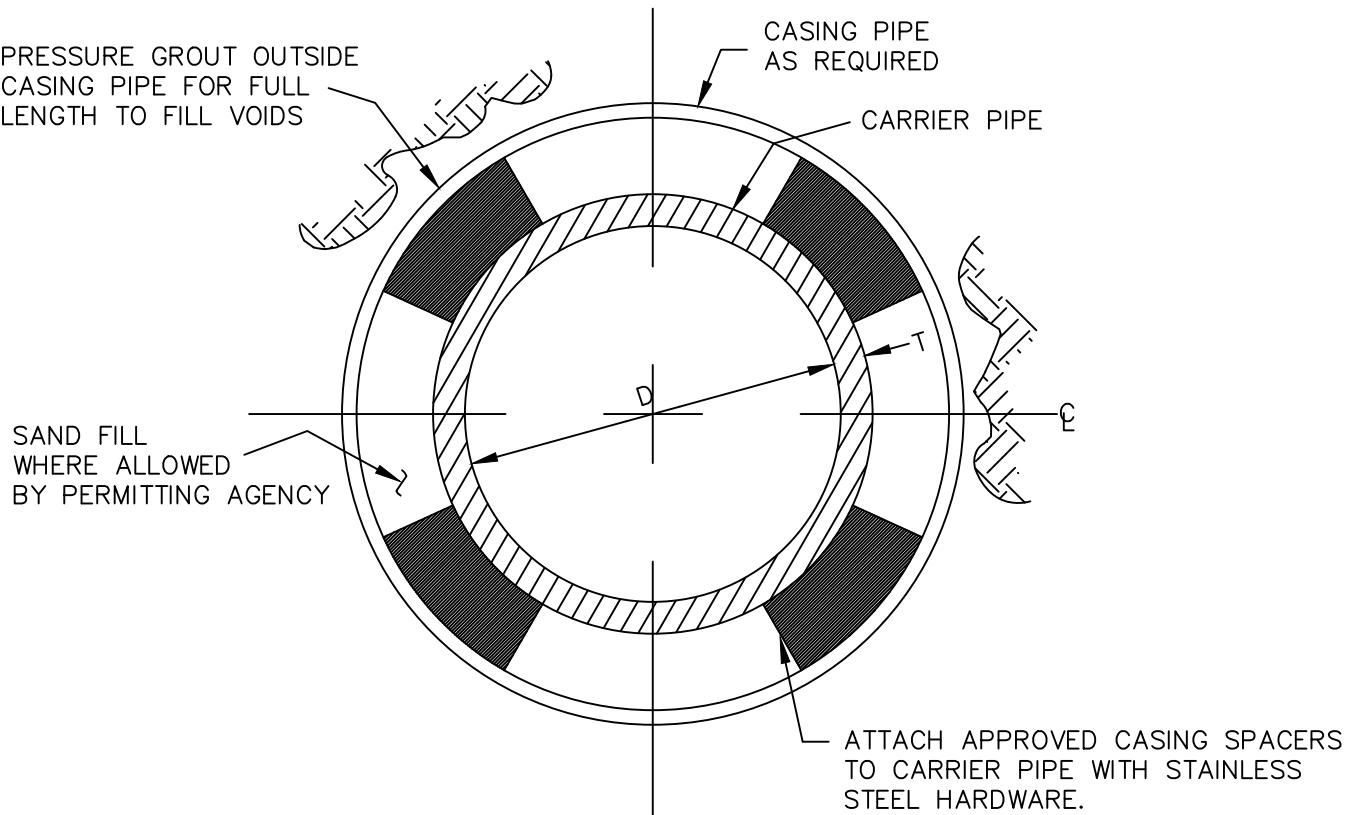
TABLE "B"

Gages of Liner Plate  
For Continuous Load-Carrying Structures

Nominal Dia. (Inches)	Height of Cover (Feet)									
	2-5	6-10	11-15	16-20	21-25	26-30	35	36-40	41-45	
48	12	12	12	12	12	12	12	12	12	10
54	12	12	12	12	12	12	12	12	12	8
60	12	12	12	12	12	12	12	10	8	7
66	12	12	12	12	12	10	8	8	8	5
72	12	12	12	12	12	10	8	7	5	5
78	12	12	12	12	10	8	7	5	5	5
84	12	12	12	10	10	8	5	5	5	5
96	12	10	10	10	10	8	5	5	5	5
108	10	10	10	10	8	7	5	5	5	5
120	10	10	10	8	8	7	5	5	5	3
144	8	8	8	8	5	5	3	1	1	1

CASING PIPE  
SIZE AND THICKNESS OF  
PIPE FOR HIGHWAY CROSSING

## RAILROAD AND HIGHWAY CROSSING DETAIL

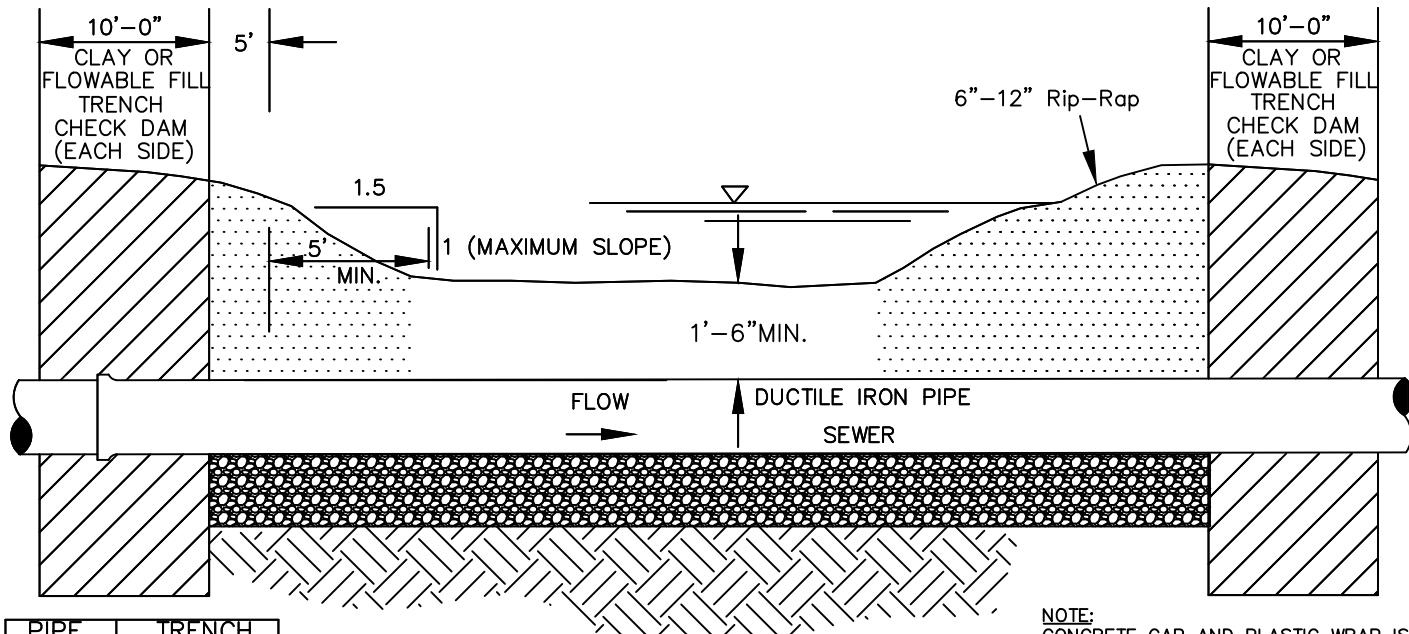


SECTION A-A

RAILROAD AND HIGHWAY CROSSING NOTES FOR PLACING SEWER LINES WITHIN THE RIGHT-OF-WAY OR CROSSING RAILROADS, STATE AND U.S. HIGHWAYS, AND DESIGNATED CITY STREETS

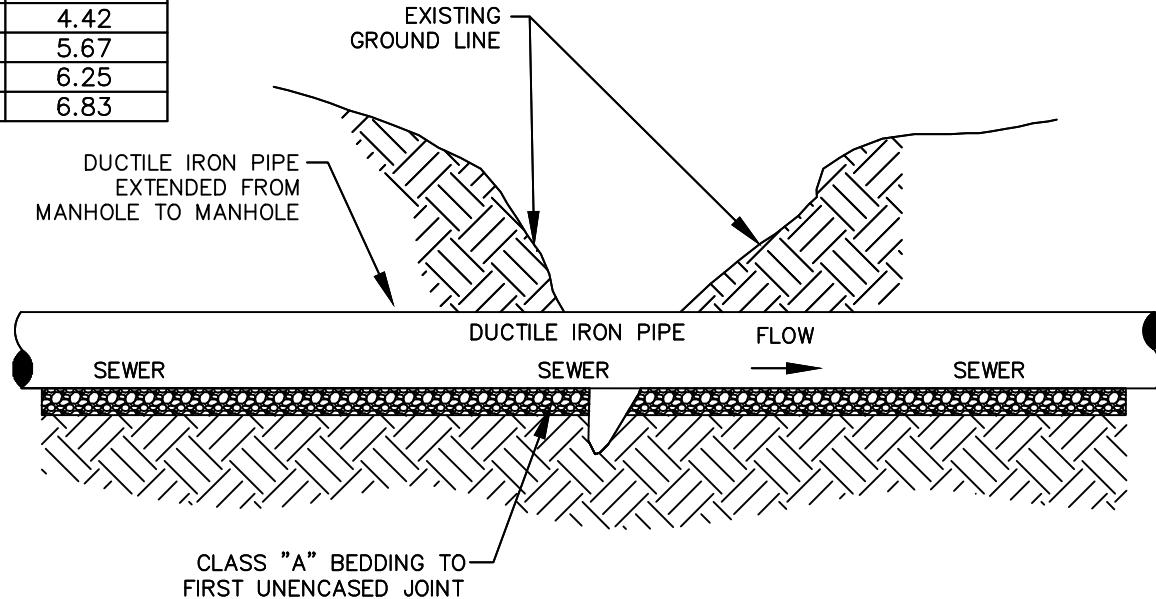
1. LINES CROSSING UNDER RAILROADS, PAVED ROADS, AND PAVED CROSSROADS WITHIN DESIGNATED CITY STREETS AND STATE AND U.S. HIGHWAY RIGHT-OF-WAY SHALL BE ENCASED AND INSTALLED BY BORING, JACKING, OR TUNNELLING. CASING PIPE SHALL EXTEND FROM TOE OF SHOULDER SLOPE TO TOE OF SHOULDER SLOPE. ALL WORK SHALL BE DONE AS SHOWN ON THIS DRAWING.
2. ALL LINES SHALL HAVE A MINIMUM COVER OF 30" EXCEPT WHERE DEEPER COVER IS INDICATED ON THE DRAWINGS. ALL TRENCH EXCAVATION WITHIN THE RIGHT-OF-WAY AND NOT UNDER RAILROAD OR PAVING SHALL BE BACKFILLED BY TAMPING IN 6" LAYERS. ALL SURPLUS MATERIAL SHALL BE REMOVED FROM THE RIGHT-OF-WAY, AND THE EXCAVATION FINISHED FLUSH WITH SURROUNDING GROUND.
3. CASING PIPE SHALL BE EITHER STRAIGHT SCAM WELDED STEEL PIPE OR STEEL LINER PLATE, APPLICABLE AND SUITABLE TO METHOD OF INSTALLATION EMPLOYED (SEE TABLE "A", SD-GEN-4). ALL CASING PIPE SHALL BE COATED INSIDE AND OUT PER SPECIFICATIONS.
4. CARRIER PIPE FOR ALL LINES 6" TO 54" IN DIAMETER SHALL BE PVC, CAST OR DUCTILE IRON PIPE WITH "PUSH-ON" TYPE JOINTS. CARRIER PIPE 60" IN DIAMETER AND LARGER SHALL BE REINFORCED CONCRETE WITH "BELL & SPIGOT" JOINTS. FOR SIZE, SEE PLAN AND PROFILE DRAWINGS.
5. ALL INSTALLATIONS SHALL BE DONE TO LEAVE FREE FLOWS IN DRAINAGE DITCHES, PIPES, CULVERTS, OR OTHER SURFACE WATER DRAINAGE FACILITIES OF THE RAILROAD, HIGHWAY, STREET, OR ITS CONNECTIONS.
6. FOR HIGHWAY CROSSINGS, THE CONTRACTOR SHALL MAKE NECESSARY ARRANGEMENTS FOR TRAFFIC OVER THE CONSTRUCTION AREA DURING SUCH WORK AND SHALL PLACE NECESSARY BARRICADES, WARNING SIGNS, SIGNALS, LIGHTS, AND, IF NECESSARY, WATCHMEN FOR THE TRAVELING PUBLIC.

RAILROAD AND HIGHWAY  
CROSSING SECTION AND NOTES



PIPE SIZE "D" (IN)	TRENCH WIDTH "Bd" (FT)
6	2.00
8	2.33
10	2.50
12	2.67
15	3.00
18	3.25
24	3.83
30	4.42
36	5.67
42	6.25
48	6.83

## CREEK CROSSING DETAIL

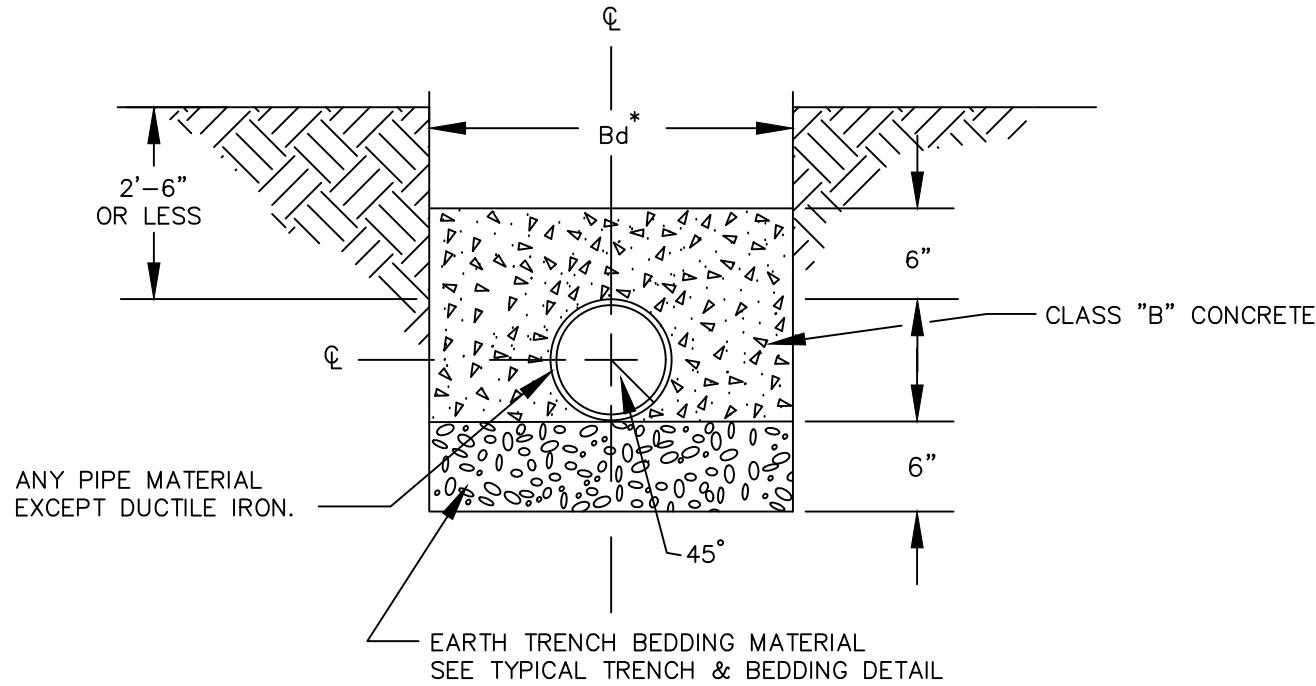


## DITCH CROSSING DETAIL

NOTES

1. CLASS "B" CONCRETE IS TO BE POURED 36 HOURS BEFORE PLACING BACKFILL, AND IN A MANNER THAT PREVENTS FLOATING THE PIPE.
2. CONCRETE ENCASEMENT IS REQUIRED FOR ALL DITCH AND CREEK CROSSINGS. THE CONCRETE ENCASEMENT MUST EXTEND 10' IN EITHER DIRECTION OF THE DITCH OR CREEK CROSSING.
3. WHEN CONCRETE ENCASEMENTS ARE NEEDED FOR UTILITY SEPARATIONS THE CONCRETE ENCASEMENT MUST EXTEND 10' IN EITHER DIRECTION OF THE CROSSING.

SD-GEN-7



Bd\* - SEE SD-GEN-1

## CONCRETE CAP FOR SHALLOW PIPE

HAMILTON COUNTY WATER & WASTEWATER TREATMENT AUTHORITY

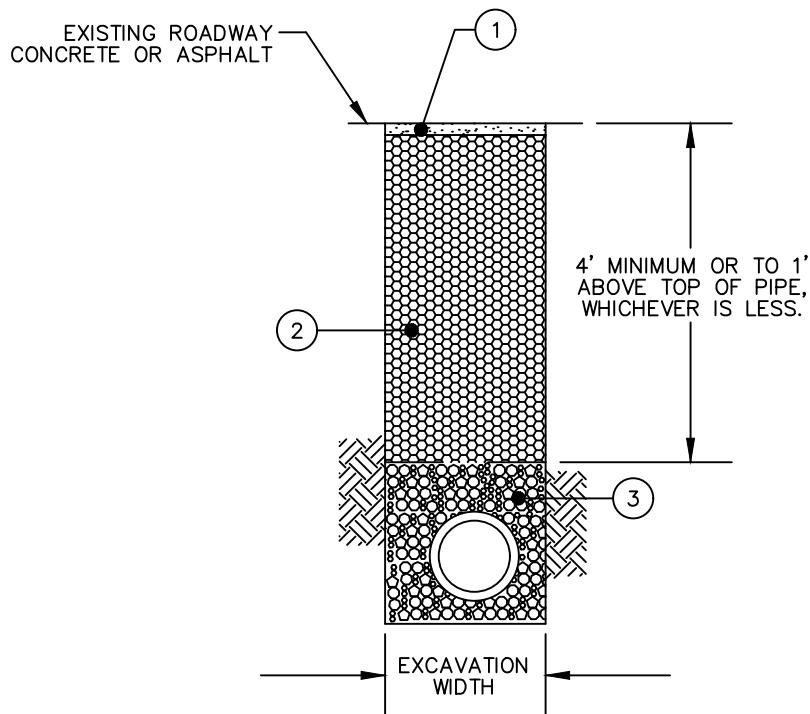
#### GENERAL REQUIREMENTS

1. ALL STREET CUTS MUST BE REPAIRED IMMEDIATELY AFTER BACKFILLING AND ACCORDING TO THIS STANDARD.
2. A ROAD CUT PERMIT AND AN APPROVED TRAFFIC CONTROL PLAN ARE REQUIRED FOR ALL CUTS IN STREETS.
3. WHERE LONGITUDINAL CUTS ARE MADE, THE OWNER RESERVES THE RIGHT TO REQUIRE ADDITIONAL RESURFACING BEYOND THE LIMITS OF THE REPAIR TO ENSURE THE PROPER RIDING CHARACTERISTICS AND THE STABILITY OF THE PAVEMENT.

#### DRAWING NOTES

- 1 2" MINIMUM THICKNESS COLD MIX ASPHALT  
WHEN A TEMPORARY ASPHALT PATCH IS USED, IT SHALL BE PLACED IMMEDIATELY AFTER THE CRUSHED STONE BACKFILL IS PLACED.
- 2 MINERAL AGGREGATE BASE, TYPE A, GRADING D (33-P\*)  
COMPACTED IN 8" LIFTS AND TO A DENSITY OF 95% STANDARD PROCTOR.
- 3 BEDDING MATERIAL - SEE SD-GEN-1

\*LOCAL MUNICIPALITIES RULES FOR  
ROAD REPAIR MUST BE FOLLOWED



## TEMPORARY PAVEMENT REPAIR

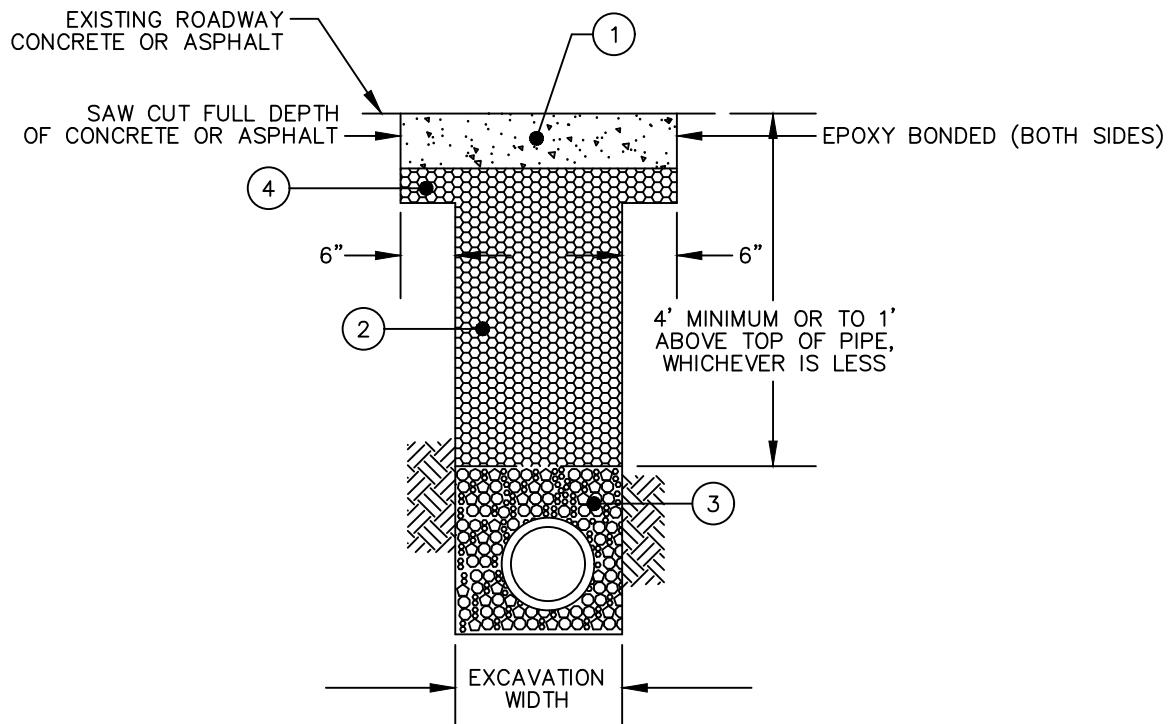
## GENERAL REQUIREMENTS

1. ALL STREET CUTS MUST BE REPAIRED IMMEDIATELY AFTER BACKFILLING AND ACCORDING TO THIS STANDARD.
2. A ROAD CUT PERMIT AND AN APPROVED TRAFFIC CONTROL PLAN ARE REQUIRED FOR ALL CUTS IN STREETS.
3. WHERE LONGITUDINAL CUTS ARE MADE, THE OWNER RESERVES THE RIGHT TO REQUIRE ADDITIONAL RESURFACING BEYOND THE LIMITS OF THE REPAIR TO ENSURE THE PROPER RIDING CHARACTERISTICS AND THE STABILITY OF THE PAVEMENT.

## DRAWING NOTES

- 1) CLASS "A" CONCRETE PAVEMENT (4,000 PSI MINIMUM), 8" MINIMUM THICKNESS, COARSE BROOM FINISH THE CONCRETE SHALL BE COLORED AND STAMPED TO MATCH THE ADJACENT CONCRETE AS REQUIRED.
- 2) FLOWABLE FILL
- 3) BEDDING MATERIAL - SEE SD-GEN-1
- 4) MINERAL AGGREGATE BASE, TYPE A, GRADING D (33-P\*) COMPACTED TO A DENSITY OF 95% STANDARD PROCTOR. THE THICKNESS SHALL BE THE GREATER OF 4' OR THE EXISTING DEPTH OF BASE MATERIAL.

\*LOCAL MUNICIPALITIES RULES FOR ROAD REPAIR MUST BE FOLLOWED



## TRENCH WIDTH PAVEMENT REPAIR

HAMILTON COUNTY WATER & WASTEWATER TREATMENT AUTHORITY  
SD-GEN-9

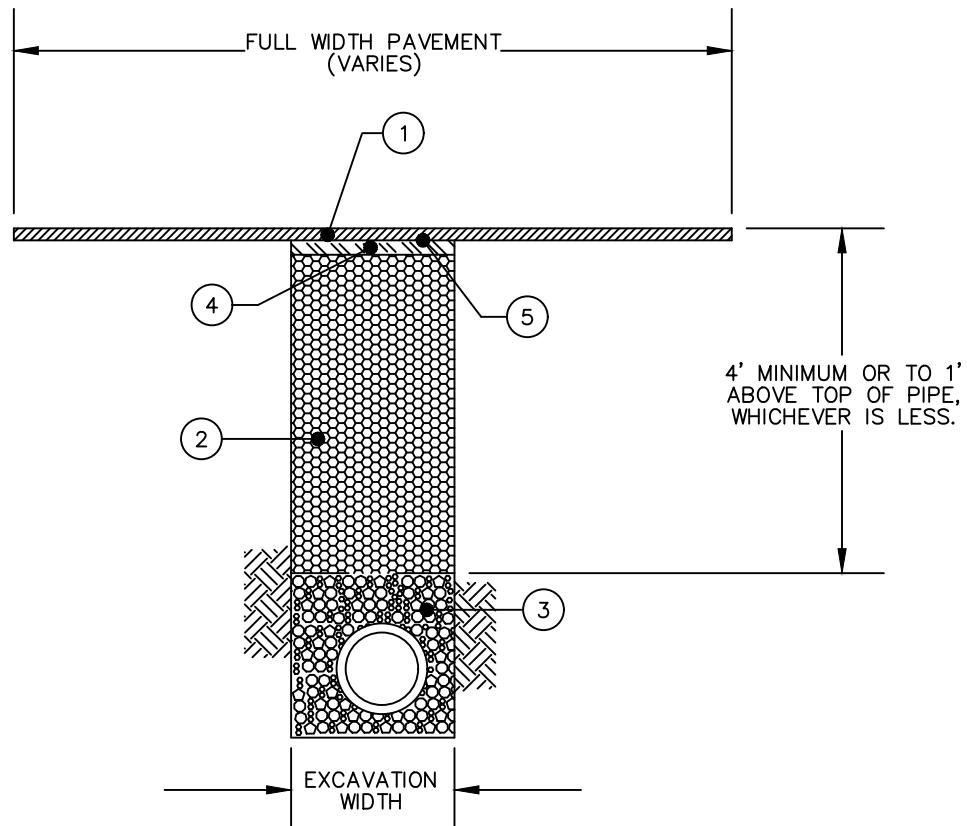
## GENERAL REQUIREMENTS

1. ALL STREET CUTS MUST BE REPAIRED IMMEDIATELY AFTER BACKFILLING AND ACCORDING TO THIS STANDARD.
2. A ROAD CUT PERMIT AND AN APPROVED TRAFFIC CONTROL PLAN ARE REQUIRED FOR ALL CUTS IN STREETS.
3. WHERE LONGITUDINAL CUTS ARE MADE, THE OWNER RESERVES THE RIGHT TO REQUIRE ADDITIONAL RESURFACING BEYOND THE LIMITS OF THE REPAIR TO ENSURE THE PROPER RIDING CHARACTERISTICS AND THE STABILITY OF THE PAVEMENT.

## DRAWING NOTES

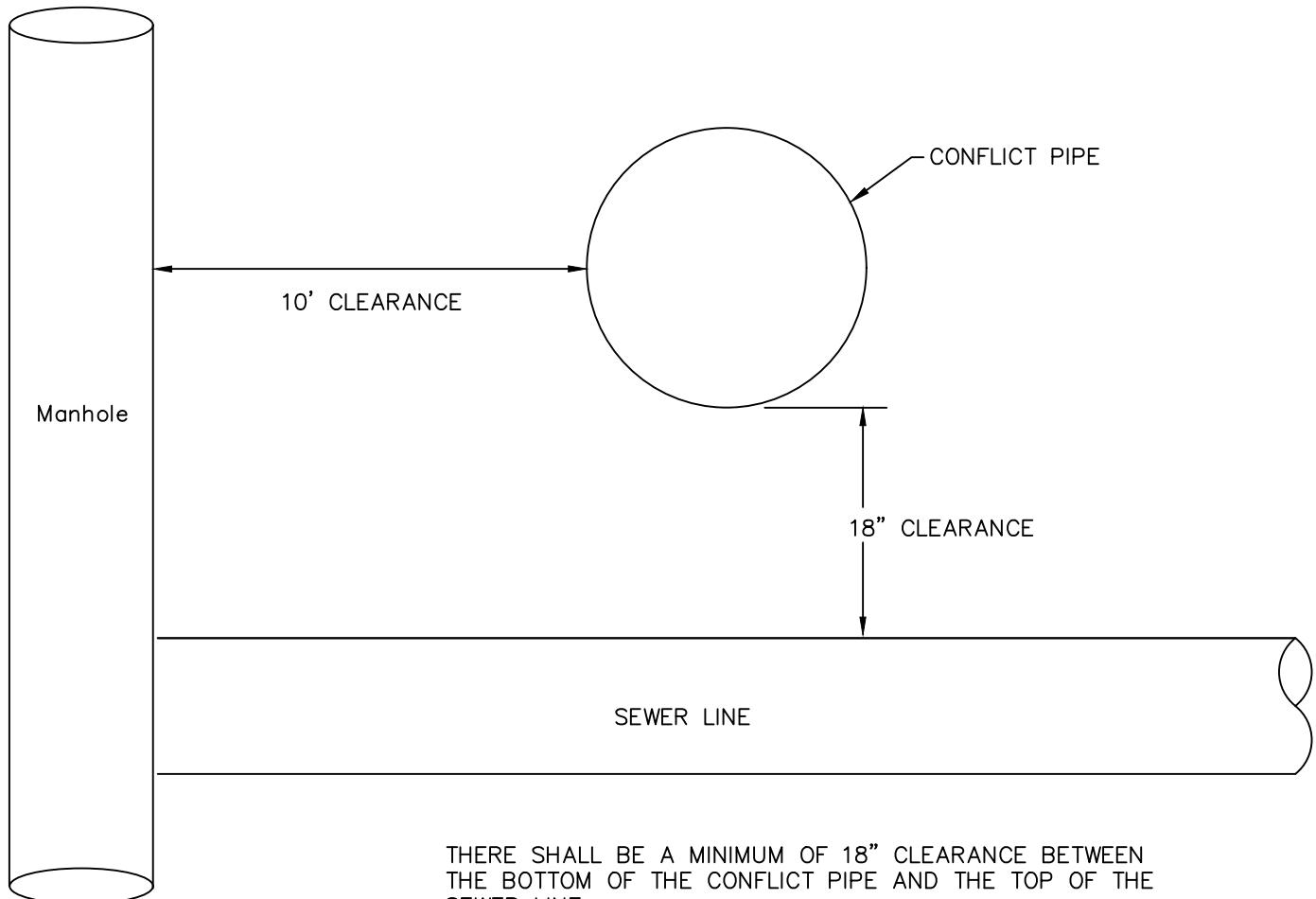
- 1 ASPHALTIC CONCRETE SURFACE COURSE  
1-1/2" THICK, GRADING "E", TDOT SPECIFICATION SECTION 411
- 2 FLOWABLE FILL
- 3 BEDDING MATERIAL - SEE SD-GEN-1
- 4 BINDER COURSE  
2" THICK, GRADING "B", TDOT SPECIFICATION SECTION 402
- 5 BITUMINOUS TACK COAT  
0.05 GAL./SY, TDOT SPECIFICATION SECTION 402

\*LOCAL MUNICIPALITIES RULES FOR  
ROAD REPAIR MUST BE FOLLOWED



## FULL WIDTH PAVEMENT REPAIR

HAMILTON COUNTY WATER & WASTEWATER TREATMENT AUTHORITY  
SD-GEN-10



THERE SHALL BE A MINIMUM OF 18" CLEARANCE BETWEEN THE BOTTOM OF THE CONFLICT PIPE AND THE TOP OF THE SEWER LINE.

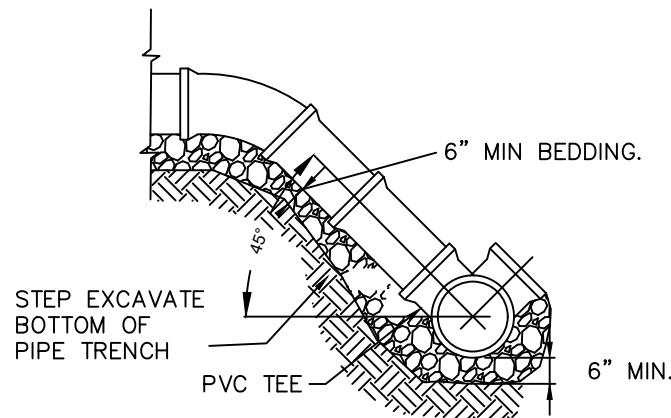
THERE SHALL BE A MINIMUM OF 10' CLEARANCE BETWEEN THE EDGE OF THE CONFLICT PIPE AND THE EDGE OF THE MANHOLE.

NOTES

1. FOR GRAVITY SYSTEMS, IF LESS THAN 18", USE DUCTILE IRON PIPE. DUCTILE IRON PIPE WILL EXTEND FROM MANHOLE TO MANHOLE, AND WILL NOT BE TRANSITIONED WITH MECHANICAL JOINTS.
2. IF PIPE IS COVERED BY 14' OR MORE, USE DUCTILE IRON PIPE. DUCTILE IRON PIPE WILL EXTEND FROM MANHOLE TO MANHOLE, AND WILL NOT BE TRANSITIONED WITH MECHANICAL JOINTS.

## PIPE CROSSINGS

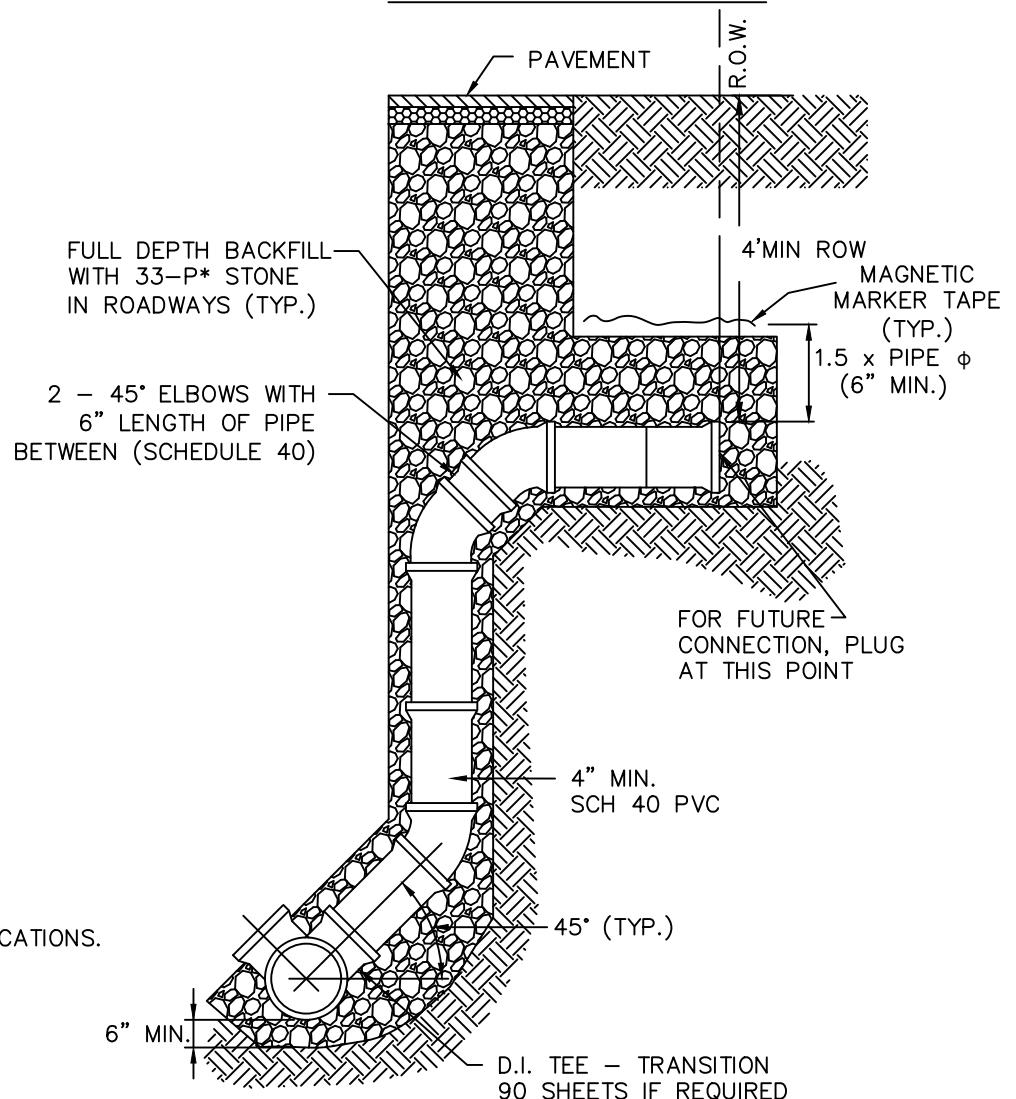
SERVICE CONNECTIONS  
LESS THAN 10' DEEP



NOTES

ALL TEES SET AT MINIMUM OF 5' SPACING.

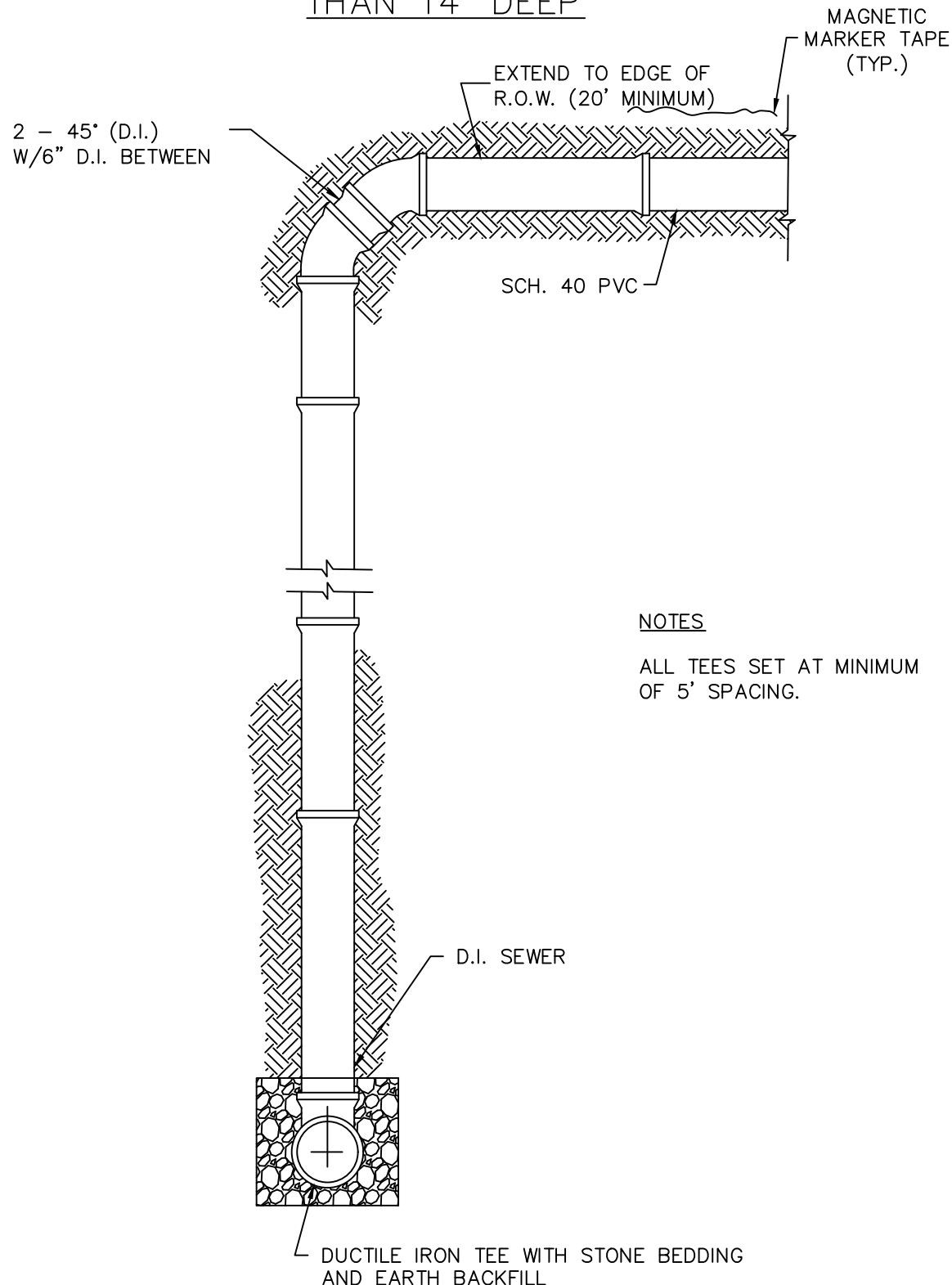
SERVICE CONNECTIONS BETWEEN  
10' AND 14' DEEP



SERVICE CONNECTION  
LESS THAN 14' DEEP

\*33-P (PUG) - 303.01, TYPE A, GRADING D ("33-P") TDOT SPECIFICATIONS.

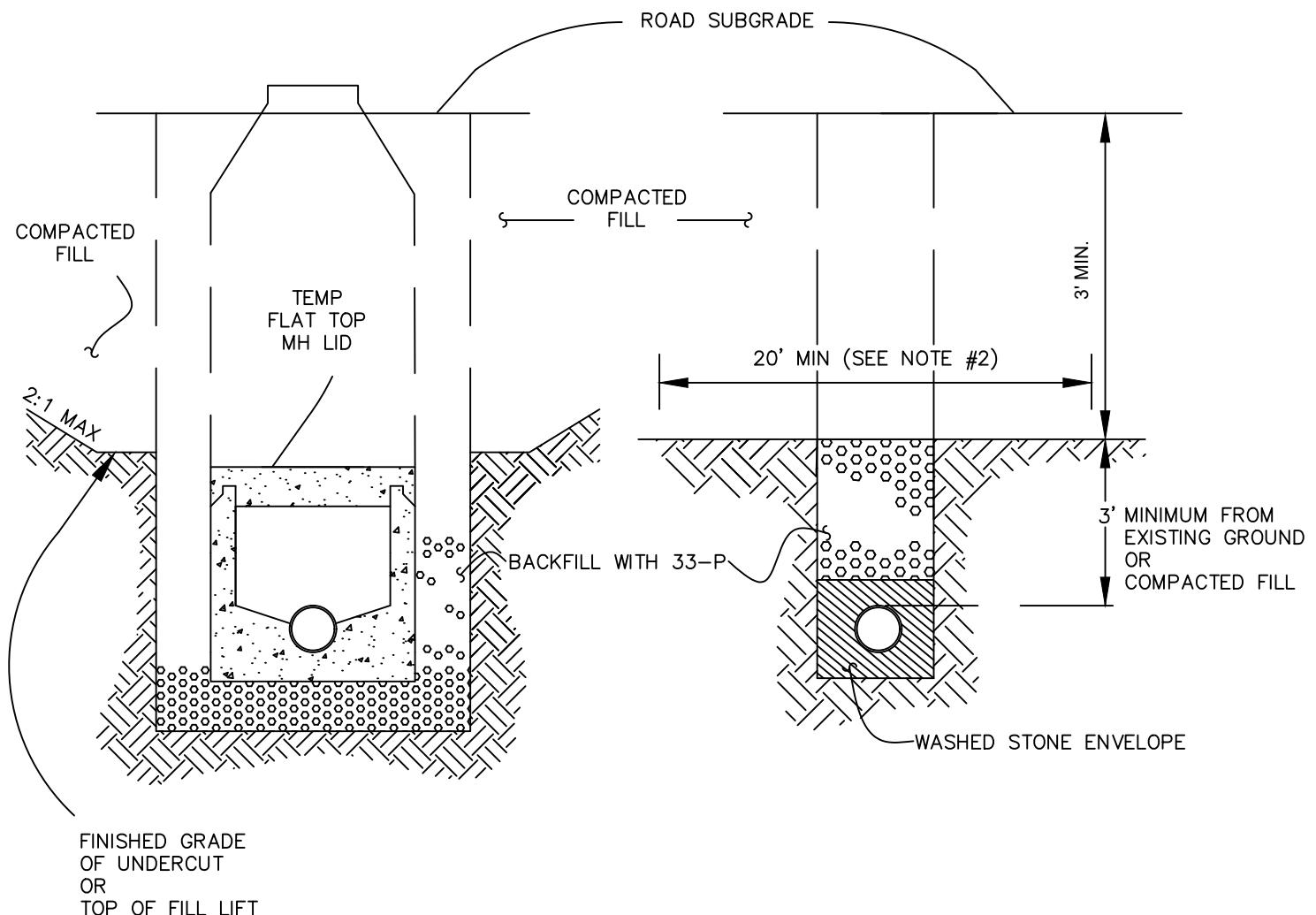
SERVICE CONNECTIONS GREATER  
THAN 14' DEEP



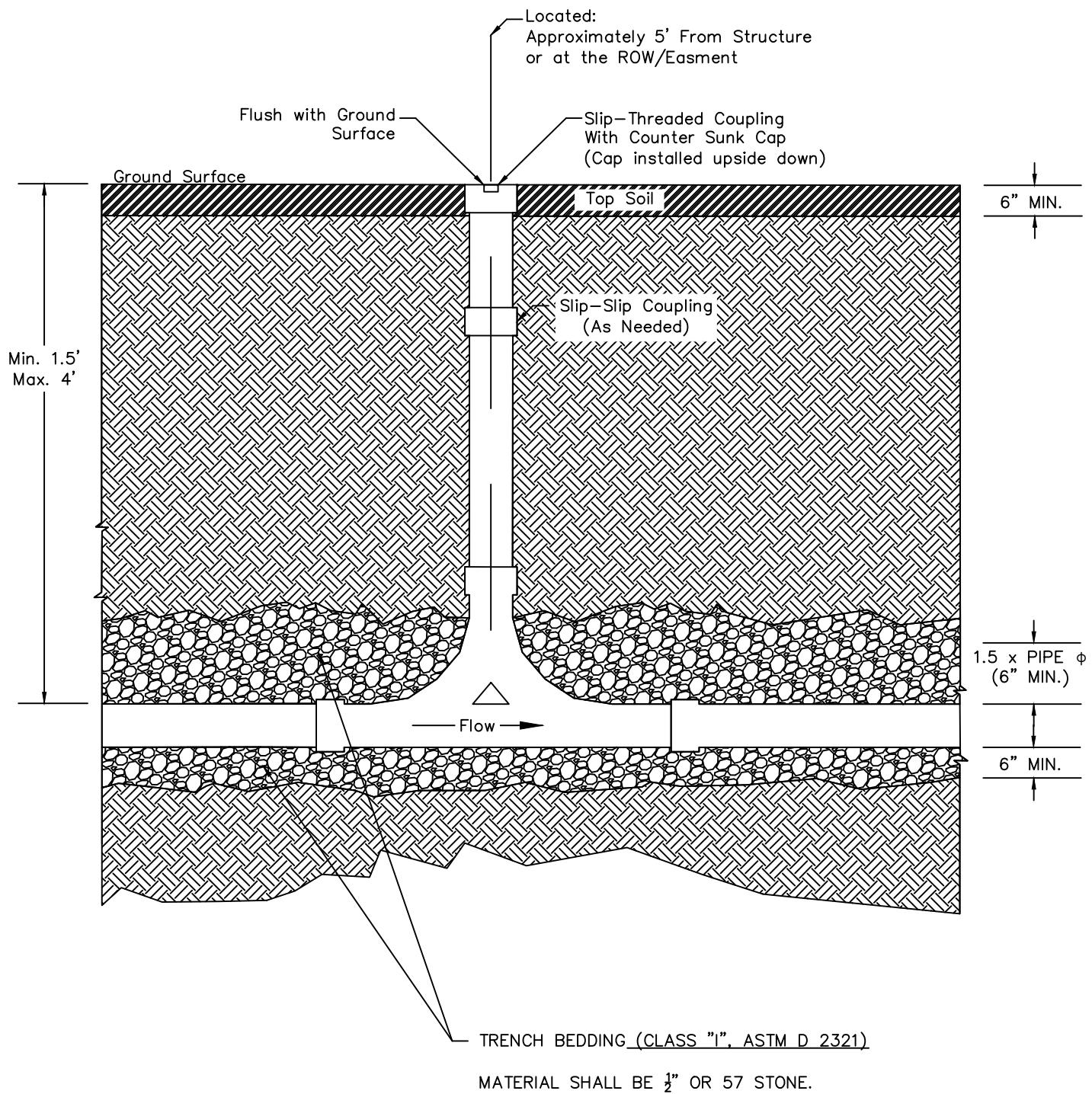
SERVICE CONNECTION  
GREATER THAN 14' DEEP

NOTES

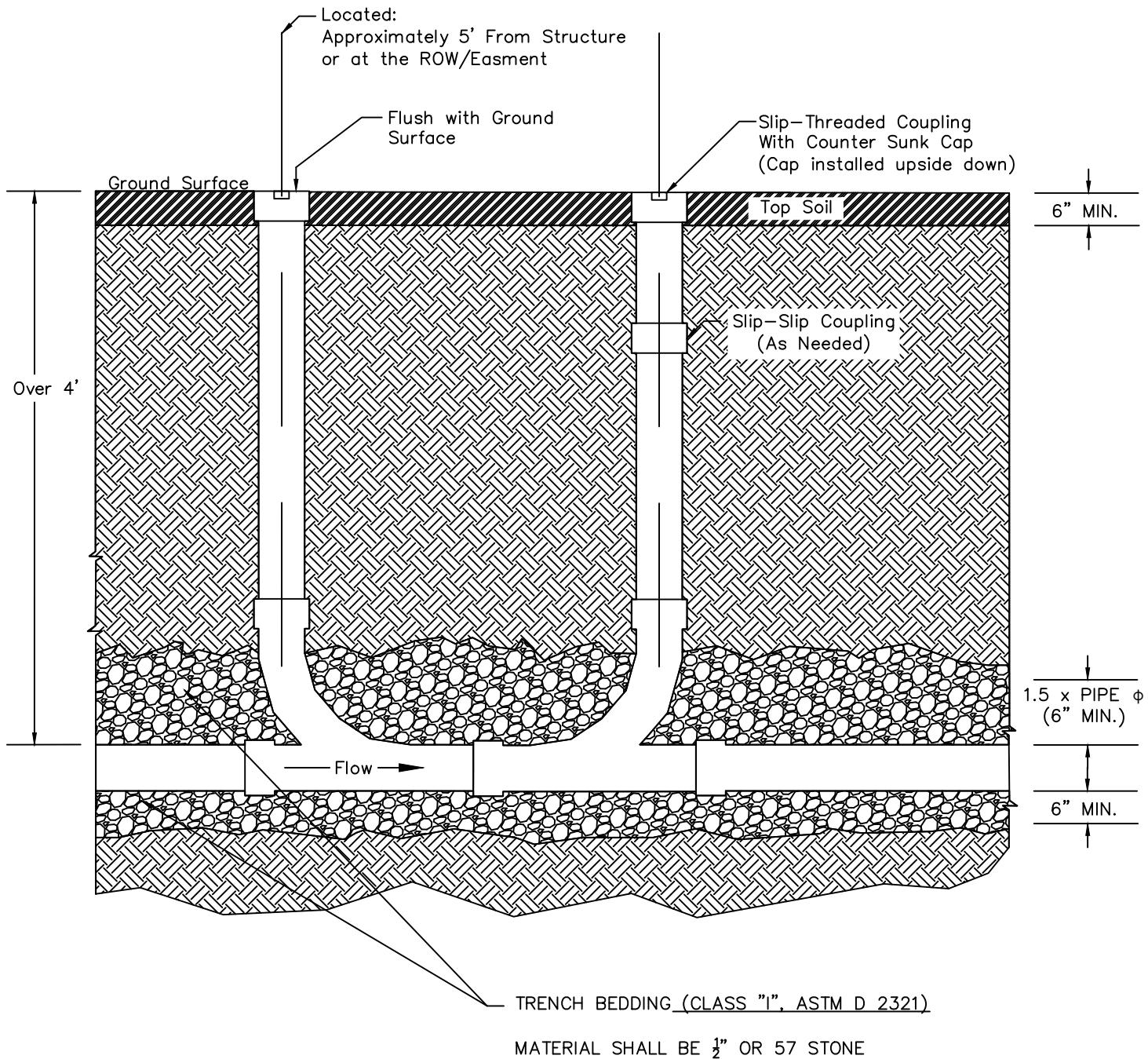
1. CONTRACTOR IS RESPONSIBLE FOR MEETING ANY AND ALL TOSHA REQUIREMENTS.
2. EXCAVATED AREAS SHALL BE 20' MINIMUM WIDTH, 2:1 MAXIMUM SIDE SLOPES.



## INSTALLATION OF SEWERS IN PROPOSED ROADWAYS

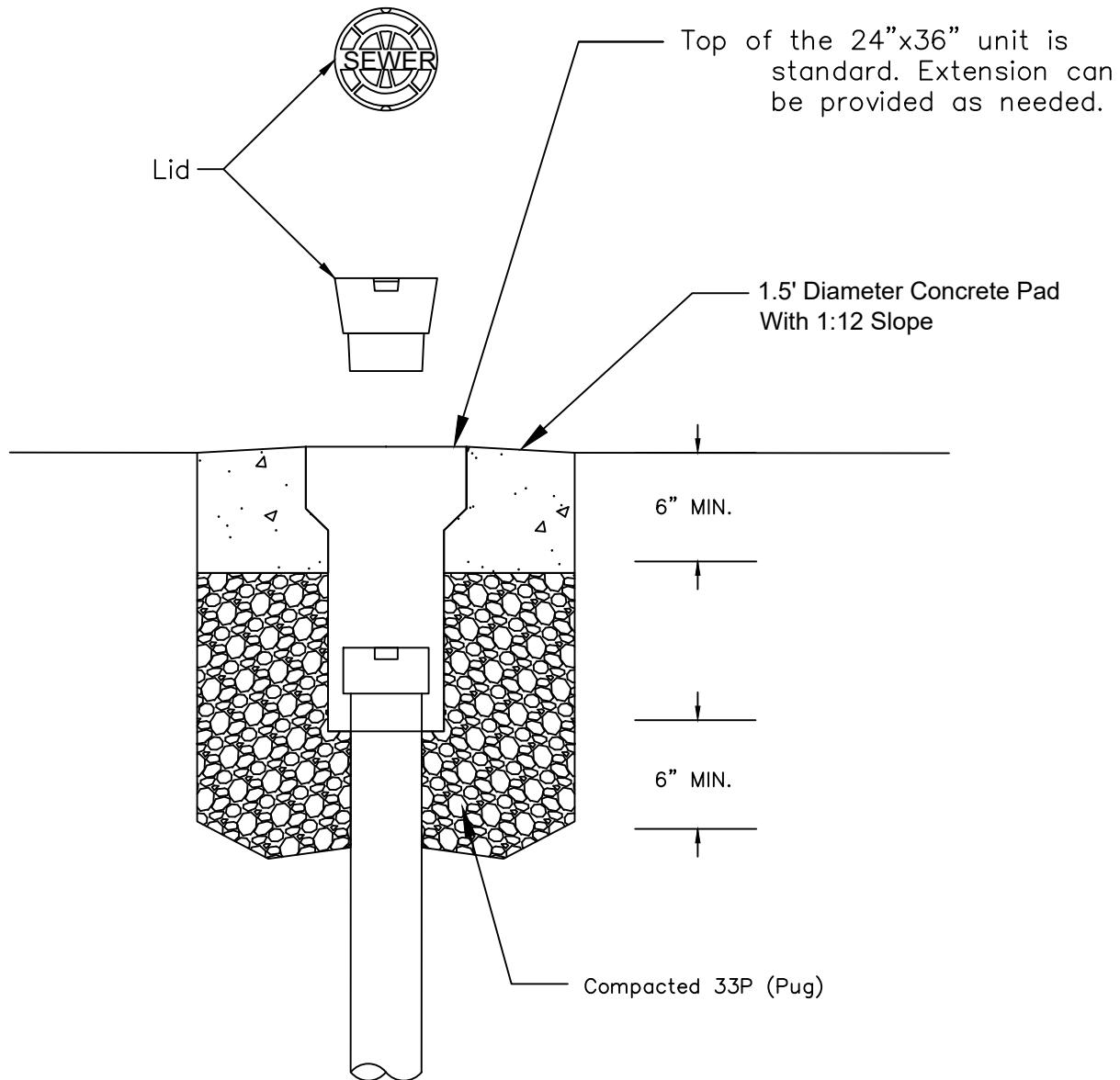


## SERVICE CONNECTION SHALLOW CLEANOUT (TYPICAL)



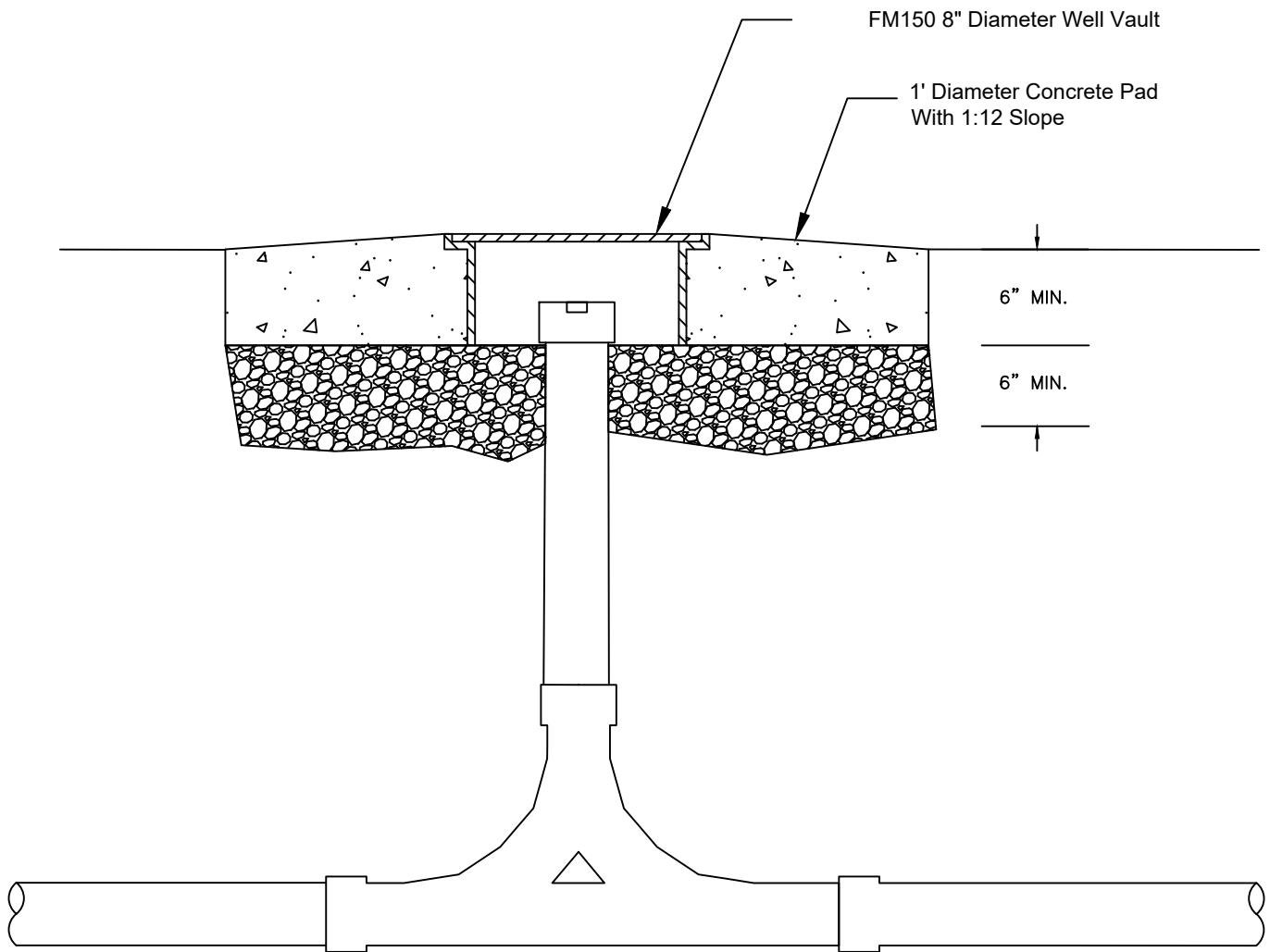
Note: The sweeps should be constructed to avoid a "blind spot" in the lateral.

## SERVICE CONNECTION DEEP CLEANOUT (TYPICAL)



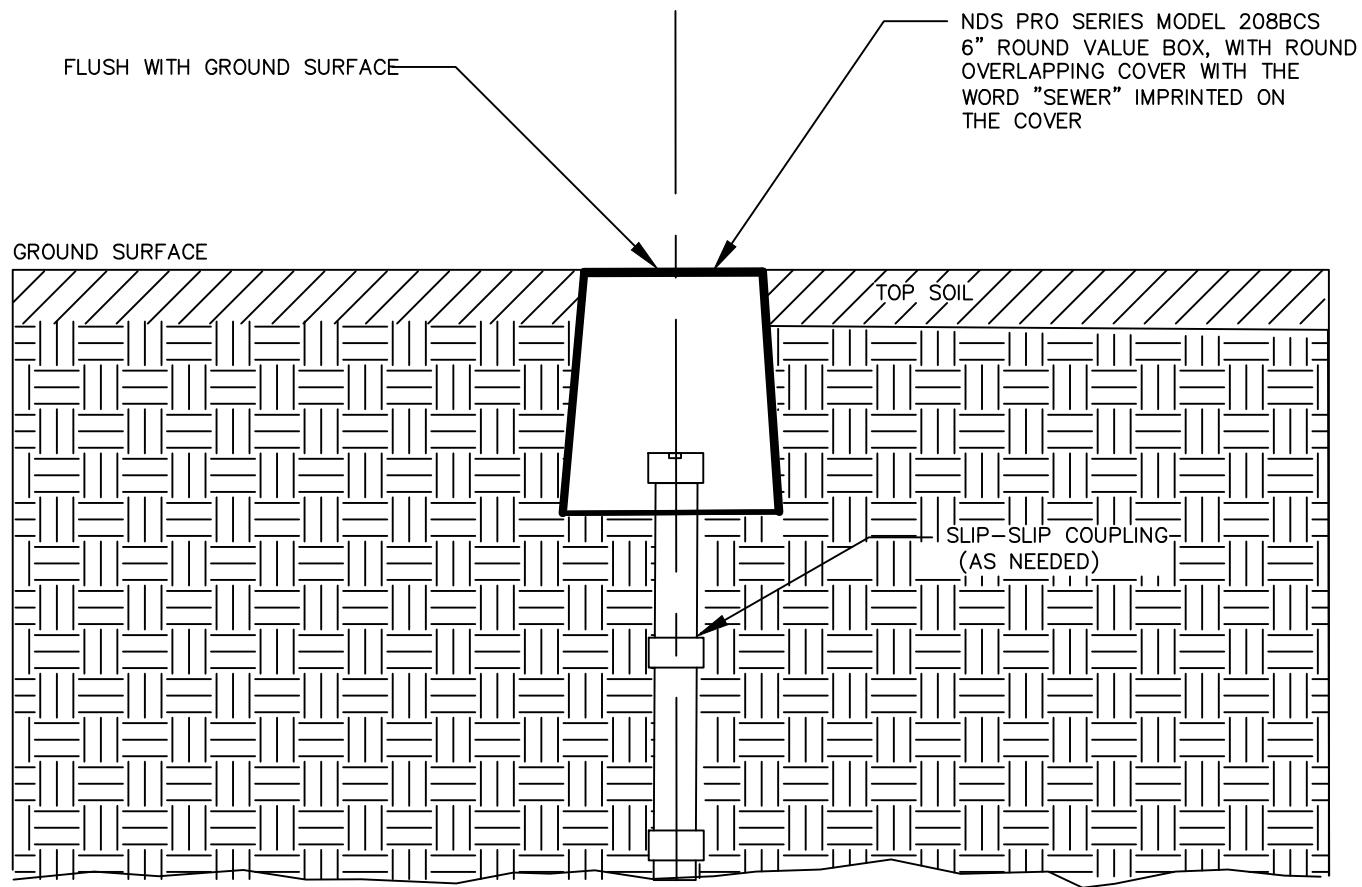
Note: This detail is used for cleanouts required at drives and roadways. If the cleanout can be shifted to avoid a driveway or roadway, it should be.

## CAST IRON TWO-PIECE ADJUSTABLE VALVE BOX (TYPICAL)



MANHOLE  
VALVE BOX (TYPICAL)

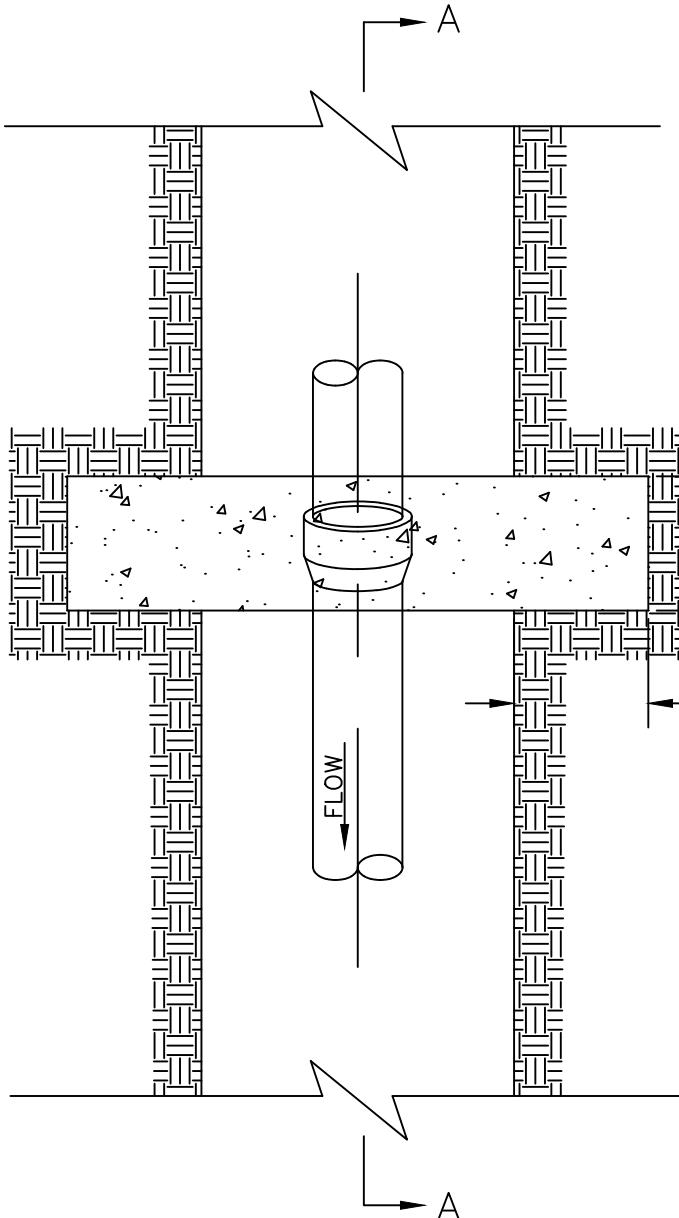
HAMILTON COUNTY WATER & WASTEWATER TREATMENT AUTHORITY  
SD-GEN-18



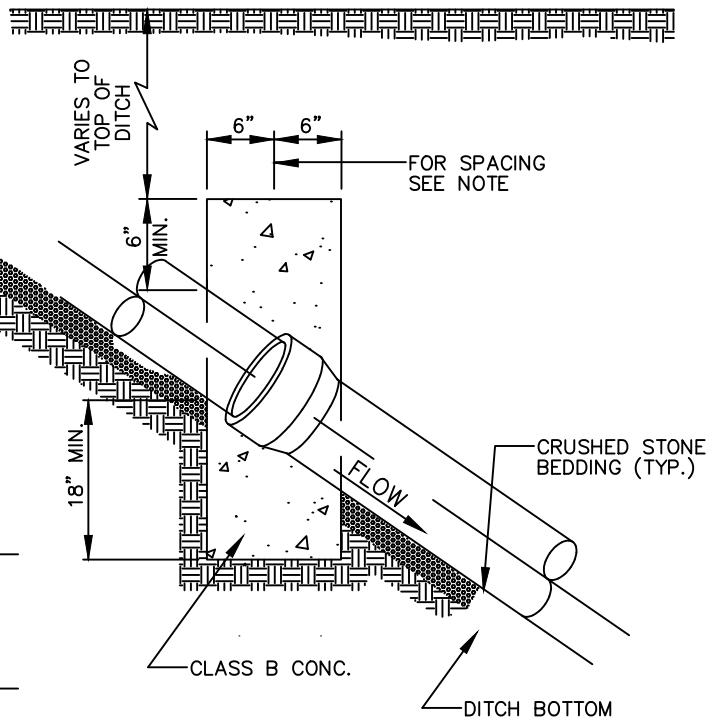
TYPICAL CLEANOUT ACCESS BOX DETAIL  
(FOR USE IN NON-PAVED, NON-CONCRETE,  
AND NON-GRAVELED AREAS)

HAMILTON COUNTY WATER & WASTEWATER TREATMENT AUTHORITY

SD-GEN-19



PLAN



SECTION A-A

**NOTE:**  
SEWERS ON 18% SLOPE OR GREATER SHALL BE  
ANCHORED SECURELY WITH CONCRETE ANCHORS  
AS FOLLOWS;

- A. NOT OVER 40' DI / 104' PVC CENTER  
TO CENTER ON GRADES 18% TO 25%.
- B. NOT OVER 30' DI / 78' PVC CENTER TO  
CENTER ON GRADES 25% TO 35%.
- C. NOT OVER 20' DI / 52' PVC CENTER TO  
CENTER ON GRADES 35% & OVER.

**NOTE:**  
Sewers on steep slopes shall be anchored at  
manholes using an elbow as follows:

Slope of Incoming Line: (Percent Slope)	Ductile Elbow Required (Equivalent Angle)
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18% to 24%	11 1/4°
24% to 50%	22 1/2°
Greater than 50%	40°

## CONCRETE ANCHOR BLOCK DETAIL FOR PIPES ON STEEP SLOPES