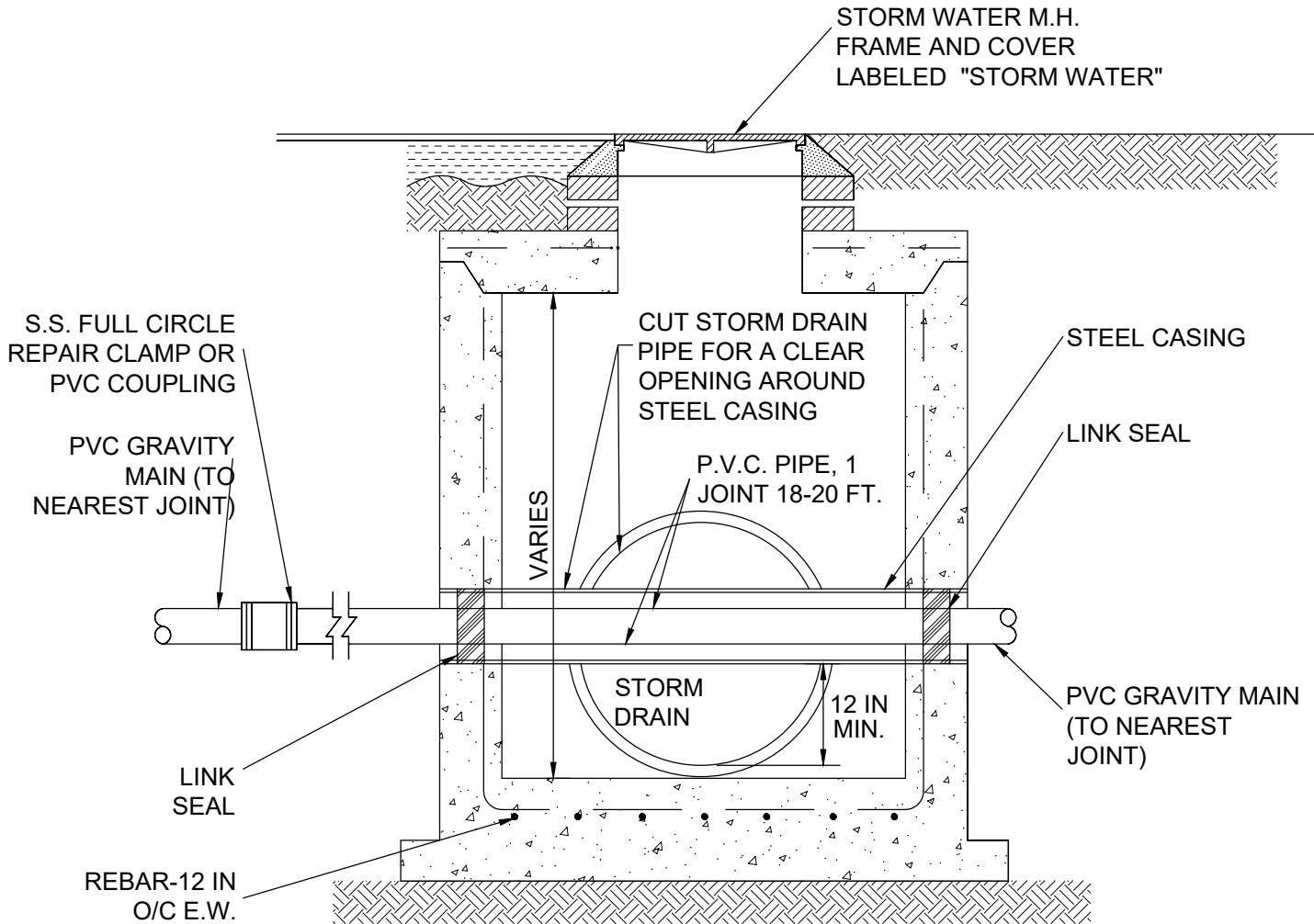


## SEWER EXHIBITS

- S-1A CONFLICT MANHOLE-TYPE "A" WASTEWATER AND STORMWATER PIPES  
S-1B CONFLICT MANHOLE-TYPE "B" WASTEWATER AND STORMWATER PIPES
- S-2A TYPICAL PVC SANITARY SEWER NEW CONNECTION w/CLEAN-OUT  
S-2B CLEAN-OUT DETAIL w/VALVE BOX COVER
- S-3A STANDARD 48" PRECAST MANHOLE FOR SEWERS 16" OR LESS IN DIA. (SECTION VIEW)  
S-3B STANDARD 48" PRECAST MANHOLE FOR SEWERS 16" OR LESS IN DIA. (PLAN VIEW)  
S-3C STANDARD 60" PRECAST MANHOLE FOR SEWERS >16" DIA OR >15 FT DEEP  
S-3D STANDARD NOTES PRECAST MANHOLES  
S-3E SANITARY RING AND COVER
- S-4 TYPICAL DROP MANHOLE-OUTSIDE (GRAVITY TO GRAVITY)
- S-5 CASING DETAILS - JACK AND BORE
- S-6 DITCH BOTTOM CLEARANCE AND CONCRETE PROTECTIVE SLAB
- S-7 BORING FOR UTILITIES
- S-8A RESTRAINED JOINT-STANDARD  
S-8B RESTRAINED JOINT FOR PVC C-900 PIPE (4" TO 12")
- S-9A VALVE AND TRACER WIRE (PAVED OR NON-PAVED AREAS)  
S-9B VALVE EXTENSION FOR PLUG VALVES W/ SHEAR PIN  
S-9C LOCATE/TRACER WIRE MAGNETIZED TEST STATION/ACCESS POINTS
- S-10 CONCRETE VALVE PAD FOR UNPAVED AREAS
- S-11 VALVE BOX AND MARKER INSTALLATION FOR PAVED AREAS
- S-12A AUTOMATIC AIR RELEASE VALVE ASSEMBLY - STANDARD  
S-12B AUTOMATIC AIR RELEASE VALVE ASSEMBLY - OFFSET  
S-12C AUTOMATIC AIR RELEASE VALVE ASSEMBLY - OFFSET (NOT IN SERVICE)  
S-12D AIR RELEASE RING AND COVER
- S-13A STANDARD DUPLEX PUMP STATION MINIMUM SITE DIMENSIONS  
S-13B IN-FILL GRINDER PUMP STATION MINIMUM SITE DIMENSIONS
- S-14A TURNAROUND DETAIL LAYOUT "A" (WHEN REQUIRED)  
S-14B TURNAROUND DETAIL LAYOUT "B" (WHEN REQUIRED)
- S-15 TRENCH DETAIL - BACKFILL AND COMPACTION

<b>LISTING OF SEWER EXHIBITS</b>	<b>10/2021</b>
<b>HILLSBOROUGH COUNTY, FLORIDA</b>	<b>SCALE: N.T.S.</b>

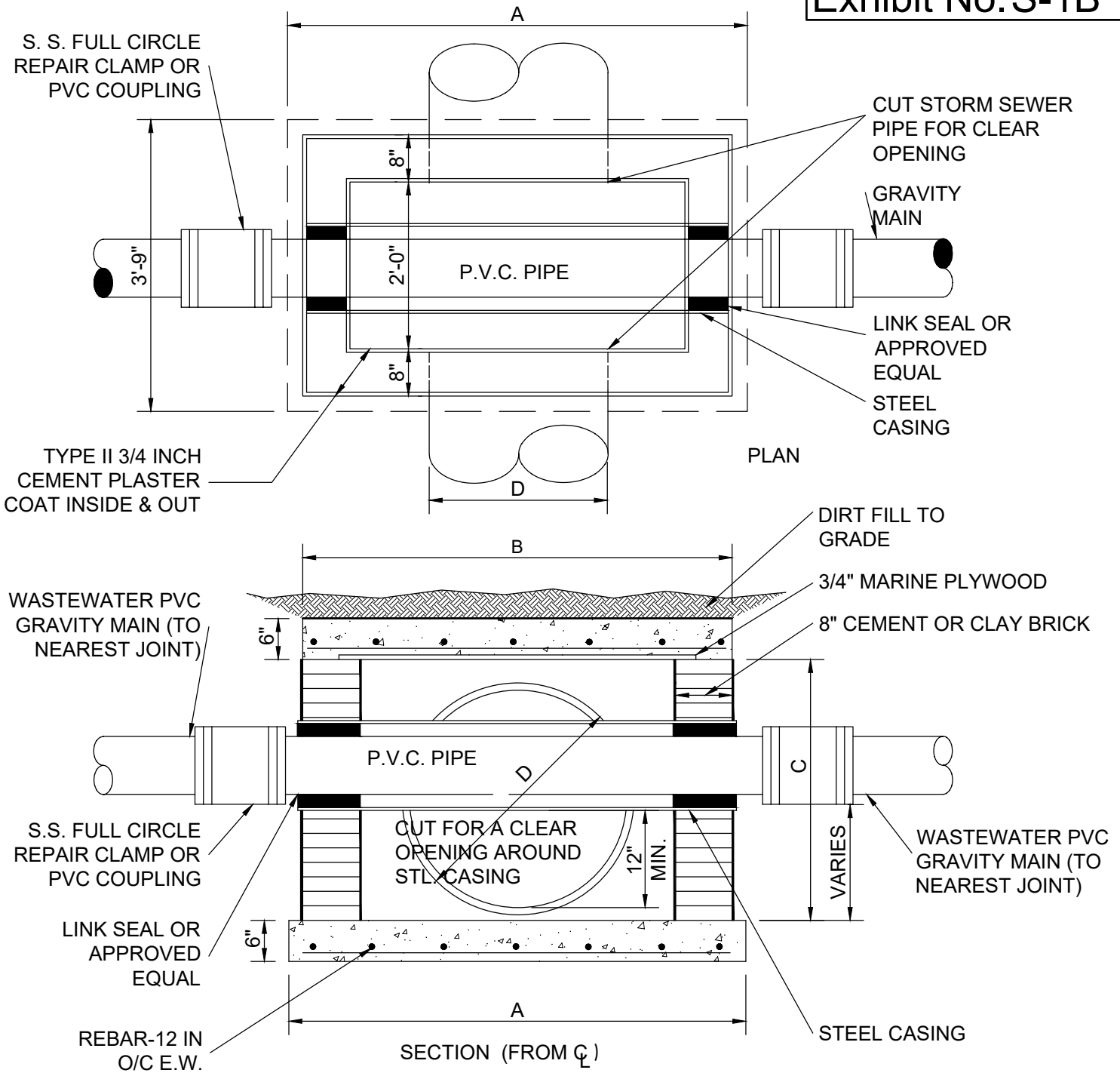


NOTE:

1. NO PIPE JOINT SHOULD BE INSIDE CONCRETE STRUCTURE.
2. MAINTAIN 12-INCH MINIMUM CLEARANCE BETWEEN STORM DRAIN PIPE FLOW CHANNEL AND BOTTOM OF STEEL CASING.

CONFLICT MANHOLE - TYPE 'A'  
 WASTEWATER AND STORMWATER PIPES  
 HILLSBOROUGH COUNTY, FLORIDA

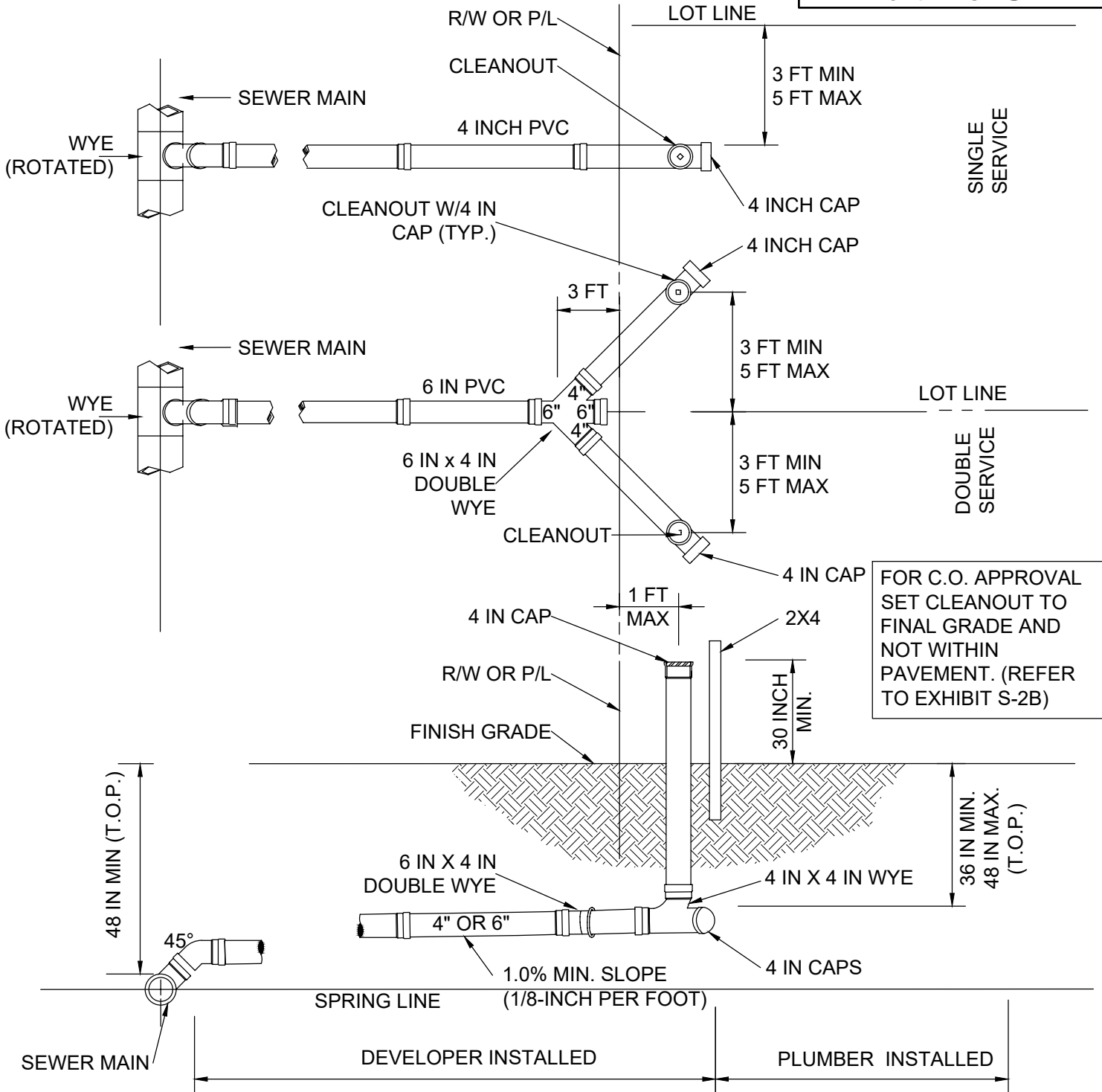
10/2021  
 SCALE: N.T.S.



DIMENSIONS			
A	B	C	D
4'-0"	3'-8"	1'-8"	15"
4'-0"	3'-8"	2'-0"	18"
5'-0"	4'-2"	2'-6"	24"
6'-0"	5'-6"	3'-6"	36"

**CONFLICT MANHOLE - TYPE 'B'**  
**WASTEWATER AND STORMWATER PIPES**  
**HILLSBOROUGH COUNTY, FLORIDA**

10/2021  
 SCALE: N.T.S.



NOTES:

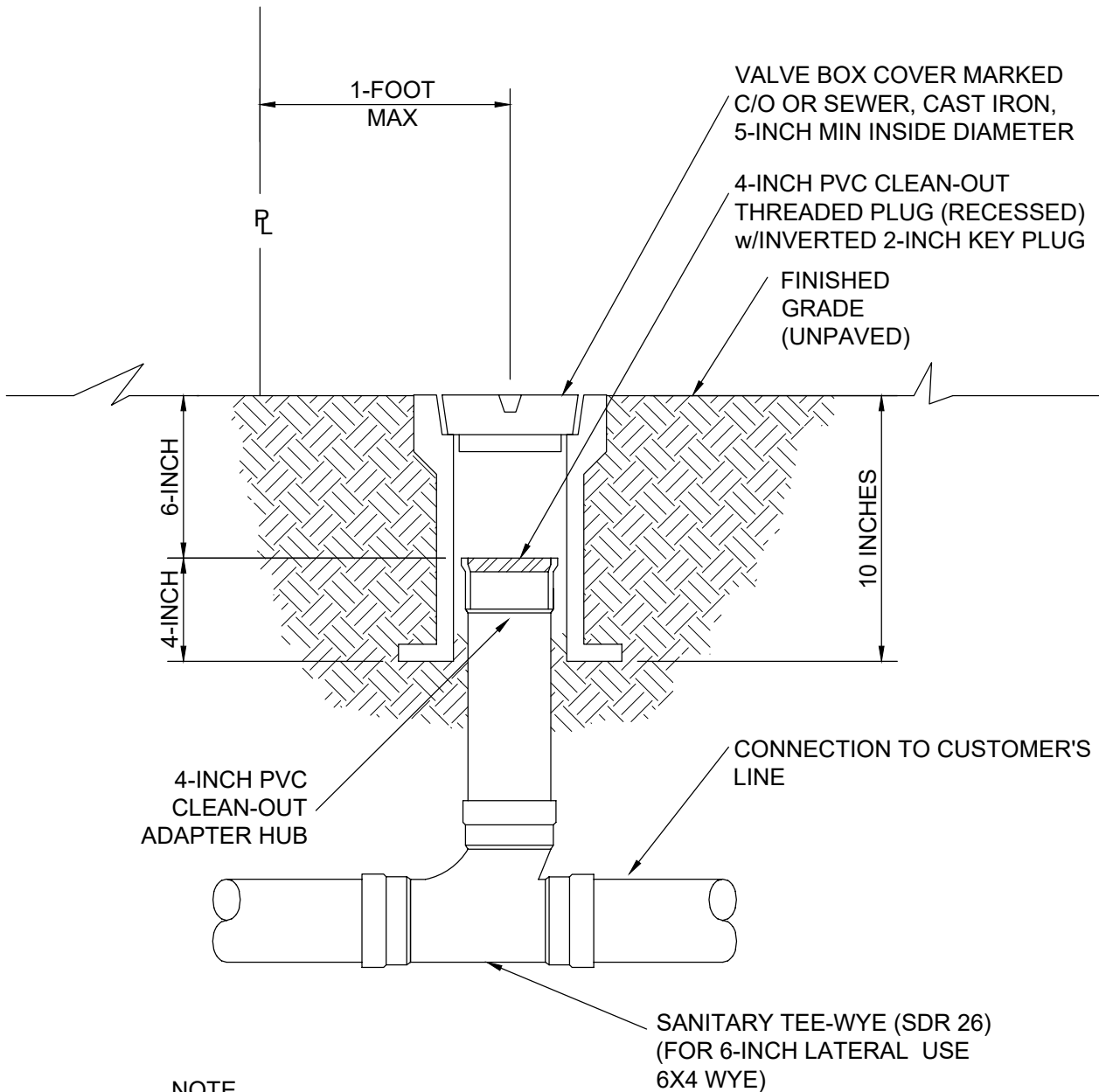
1. CENTER A DOUBLE WYE FITTING ON THE LOT LINE.
2. INVERT OF SERVICE LATERAL SHALL NOT ENTER SEWER BELOW SPRING LINE.
3. THE TOP OF THE CLEANOUT SHALL TERMINATE 30 TO 40 INCHES ABOVE DESIGN GRADE UNTIL CONNECTION TO A STRUCTURE IS MADE.
4. ALL LATERALS PIPING AND FITTINGS SHALL BE GASKETED SDR 26 PVC.
5. ALL LATERAL LOCATIONS SHALL BE MARKED WITH AN "S" SAW CUT INTO THE TOP OF CURB.
6. CLEANOUTS SHALL NOT BE INSTALLED IN CONCRETE (NO DRIVEWAYS OR SIDEWALKS).

TYPICAL PVC SANITARY SEWER  
NEW CONNECTION W/CLEANOUT

HILLSBOROUGH COUNTY, FLORIDA

10/2021

SCALE: N.T.S.



NOTE

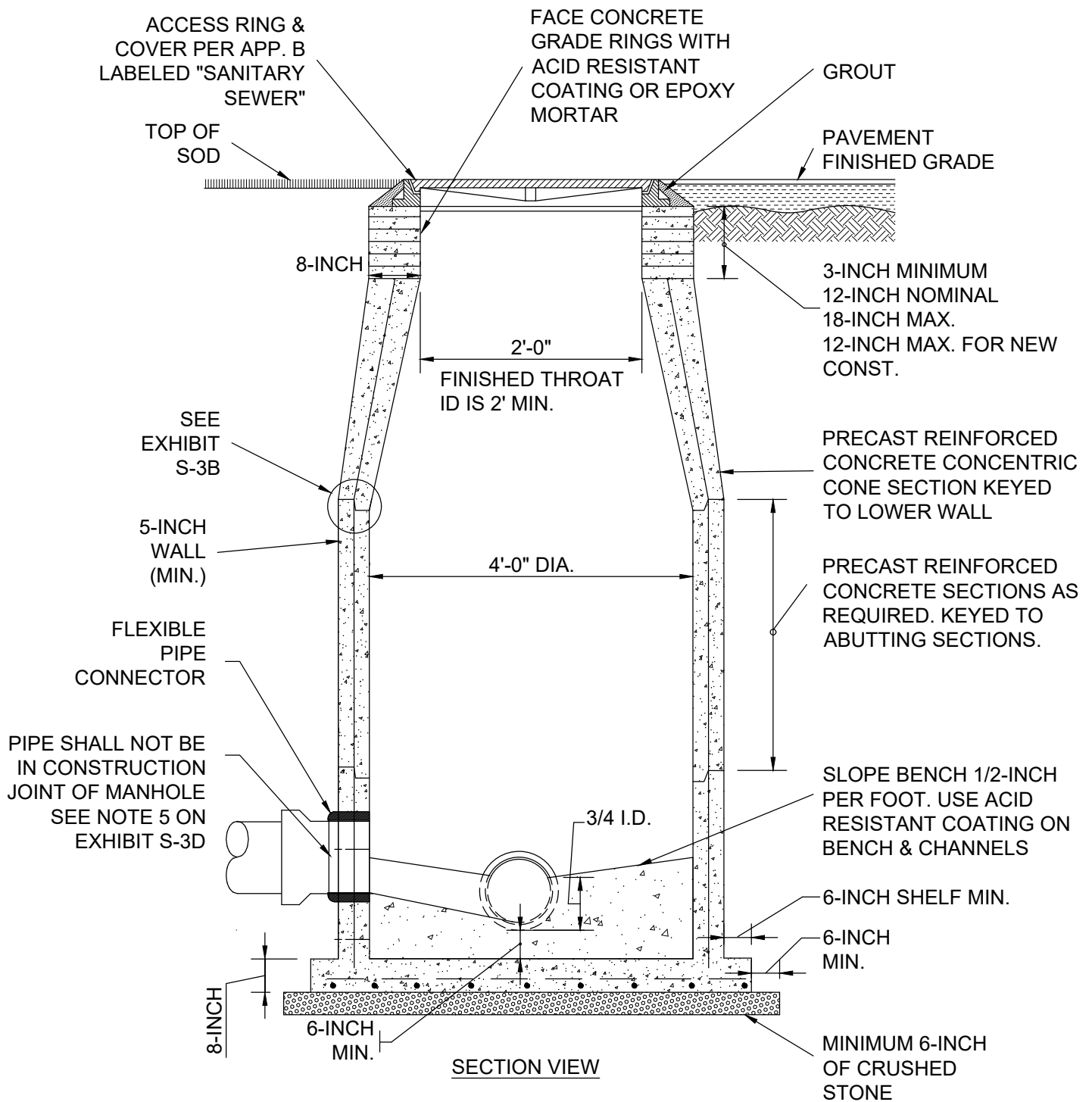
1. ALL LATERALS PIPING AND FITTINGS SHALL BE GASKETED SDR 26 PVC
2. CLEANOUT SHALL NOT BE INSTALLED IN CONCRETE

**CLEAN-OUT DETAIL  
WITH VALVE BOX COVER**

**HILLSBOROUGH COUNTY, FLORIDA**

10/2021

SCALE: N.T.S.

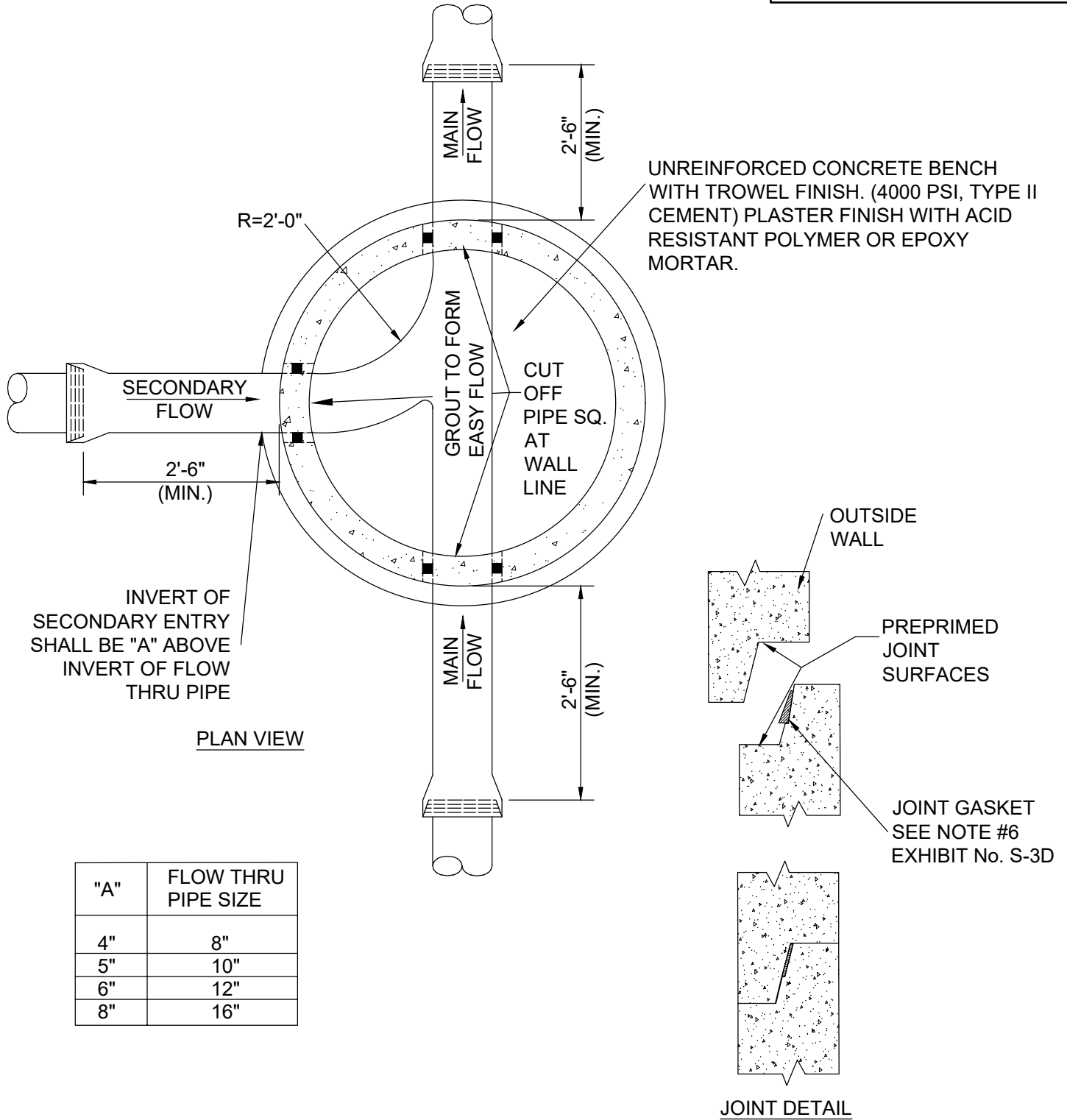


NOTE:  
 ALL STANDARD MANHOLE NOTES APPLY. REFER TO EXHIBIT No. S-3D. THIS DETAIL APPLIES TO MANHOLES WITH DEPTHS OF 5 FT TO 15 FT. IF DEPTH TO INVERT IS LESS THAN 5 FT, DESIGN EXCEPTION APPROVAL BY PUBLIC UTILITIES DEPARTMENT IS REQUIRED

STANDARD 48" PRECAST MANHOLE  
 FOR SEWERS 16" OR LESS IN DIA  
 HILLSBOROUGH COUNTY, FLORIDA

10/2021

SCALE: N.T.S.



INVERT OF SECONDARY ENTRY SHALL BE "A" ABOVE INVERT OF FLOW THRU PIPE

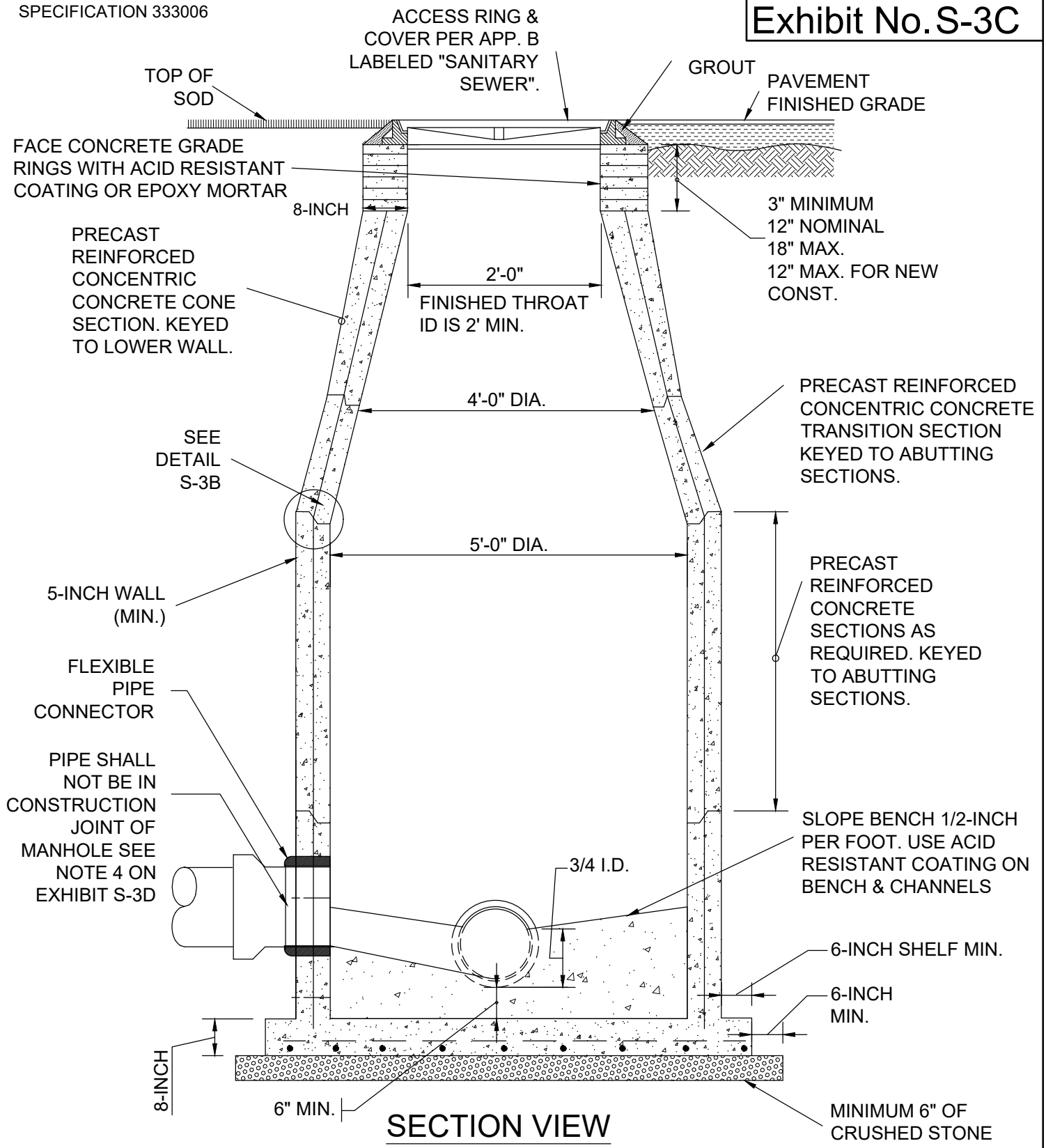
PLAN VIEW

"A"	FLOW THRU PIPE SIZE
4"	8"
5"	10"
6"	12"
8"	16"

NOTE:  
ALL STANDARD MANHOLE NOTES APPLY. REFER TO EXHIBIT No. S-3D.

STANDARD 48" PRECAST MANHOLE  
FOR SEWERS 16" OR LESS IN DIA  
HILLSBOROUGH COUNTY, FLORIDA

10/2021  
SCALE: N.T.S.



NOTE:  
 ALL STANDARD MANHOLE NOTES APPLY. REFER TO EXHIBIT S-3D. DETAIL APPLIES TO MANHOLES THAT MEET THE REQUIREMENTS OF SPEC 333001, 2.9.2.

**STANDARD 60" PRECAST MANHOLE**  
 LINES >16 IN, DEPTHS >15 FT, KING MH, HIGH FLOW MHS  
 HILLSBOROUGH COUNTY, FLORIDA

10/2021  
 SCALE: N.T.S.



## NOTES:

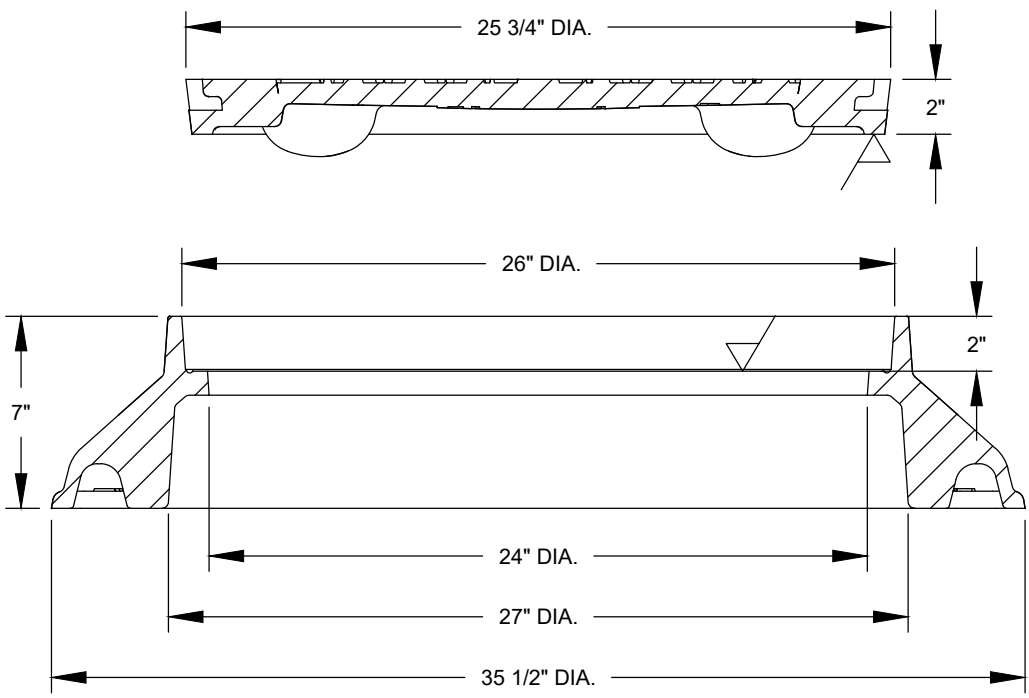
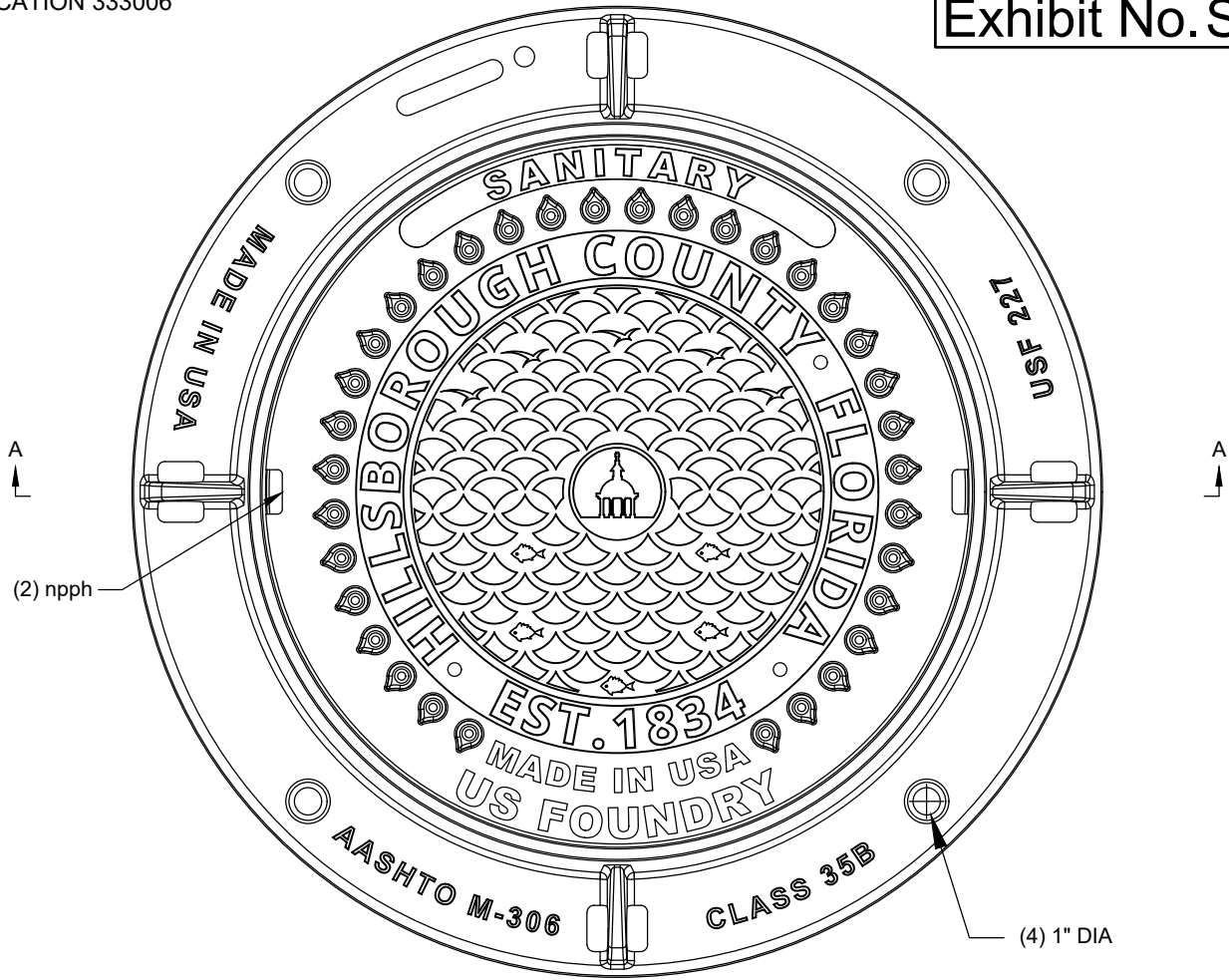
1. PRECAST MANHOLE SECTIONS & BASES SHALL BE MANUFACTURED IN ACCORDANCE WITH LATEST EDITION OF ASTM C478 WITH 4000 P.S.I., TYPE II CEMENT (ASTM C150).
2. CONCRETE PLACED IN MANHOLE INVERTS SHALL HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 4000 P.S.I. AND SHALL UTILIZE TYPE II CEMENT.
3. LIFT HOLES THROUGH PRECAST STRUCTURES ARE NOT PERMITTED.
4. ALL PIPE PENETRATIONS SHALL BE PRECAST OR CORE-DRILLED. THE PERIMETER OF A PENETRATION SHALL NOT BE CLOSER THAN 12 INCHES TO A BARREL SECTION JOINT.
5. FLEXIBLE PIPE CONNECTORS (ASTM C923) SHALL BE USED AT ALL PIPE PENETRATIONS.
6. JOINT CONTACT SURFACES SHALL BE SEALED USING A RUBBER GASKET PER THE MANUFACTURER'S RECOMMENDATION. GASKETS SHALL BE 1/2 INCH MIN. THICK WITH WIDTH AT LEAST 1/2 THE WALL THICKNESS.
7. THE INTERIOR OF THE GRADE RINGS SHALL BE PLASTERED WITH AN ACID RESISTANT COATING, OR EPOXY MORTAR WHEN CONCRETE RINGS ARE USED.
8. THE MANHOLE COVER SHALL BE EQUIPPED WITH AN INFLOW PROTECTOR AND SHALL COMPLY WITH SPECIFICATION 333001, PART 3.3.8 AND THE APPROVED PRODUCTS LIST IN APP. B.
9. BOTTOM BARREL AND BASE OF MANHOLE TO BE MONOLITHICALLY CAST.
10. SERVICE LATERALS SHALL NOT ENTER A MANHOLE UNLESS THE MANHOLE IS A TERMINAL MANHOLE, AND SPECIFIED ON THE PLANS. IF APPROVED, THE LATERAL MUST BE TREATED AS A MAIN (SHOW ELEVATIONS, PRECAST OR CORE-DRILLED PENETRATIONS, FLOW CHANNEL CONSTRUCTION, ETC.).
11. AN OUTSIDE DROP CONNECTION SHALL BE REQUIRED FOR ALL INFLUENT LINES WHICH HAVE AN INVERT 2-FOOT OR MORE ABOVE THE MANHOLE INVERT.
12. FOR NONSTANDARD MANHOLES, THE ENGINEER OF RECORD SHALL DESIGN ALL MANHOLE REINFORCEMENT STEEL AND JOINT DETAILS AND SHALL SUBMIT CALCULATIONS TO THE COUNTY FOR REVIEW.
13. PRECAST OR CORE-DRILLED PENETRATION DIAMETERS SHALL BE PER MANUFACTURER SPECIFICATIONS OR AS FOLLOWS: 12 INCH FOR 8 INCH DIAMETER PIPE. 14 INCH TO 16 INCH FOR 10 INCH DIAMETER PIPE. 16 INCH FOR 12 INCH DIAMETER PIPE.
14. MATERIALS OF CONSTRUCTION, PLACEMENT, AND COMPACTION REQUIREMENTS FOR BEDDING MATERIALS SHALL BE PER COUNTY SPECIFICATIONS.
15. FLOW CHANNELS SHALL BE CONSTRUCTED TO DIRECT INFLUENT INTO THE FLOW STREAM.
16. PROPERLY SHAPED SPILLWAYS SHALL BE CONSTRUCTED BETWEEN PIPES WITH DIFFERENT INVERT ELEVATIONS TO PROVIDE FOR SMOOTH FLOWS.

STANDARD NOTES PRECAST MANHOLES

10/2021

HILLSBOROUGH COUNTY, FLORIDA

SCALE: N.T.S.

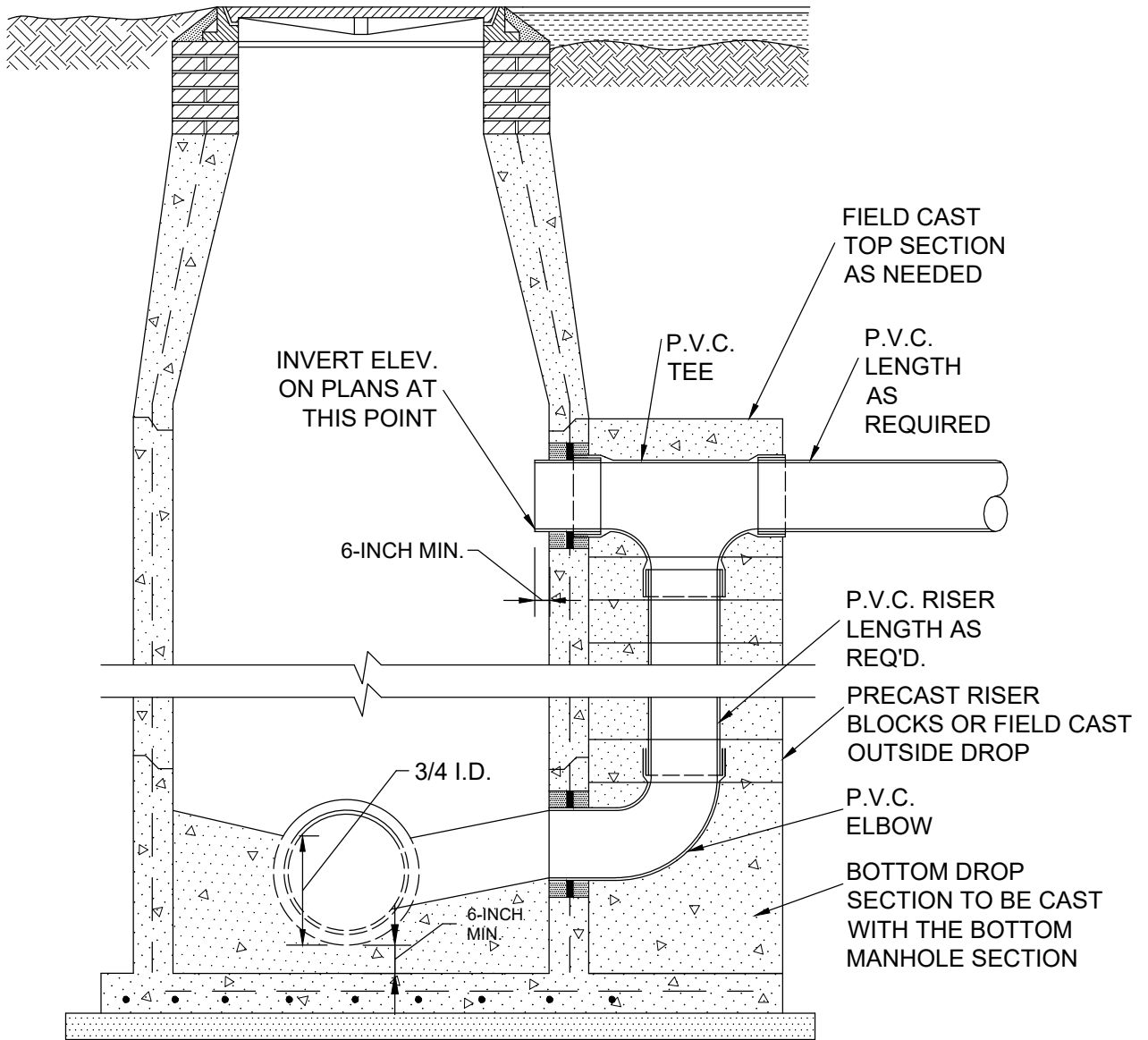


SANITARY RING AND COVER

10/2021

HILLSBOROUGH COUNTY, FLORIDA

SCALE: N.T.S.



SECTION VIEW

NOTES:

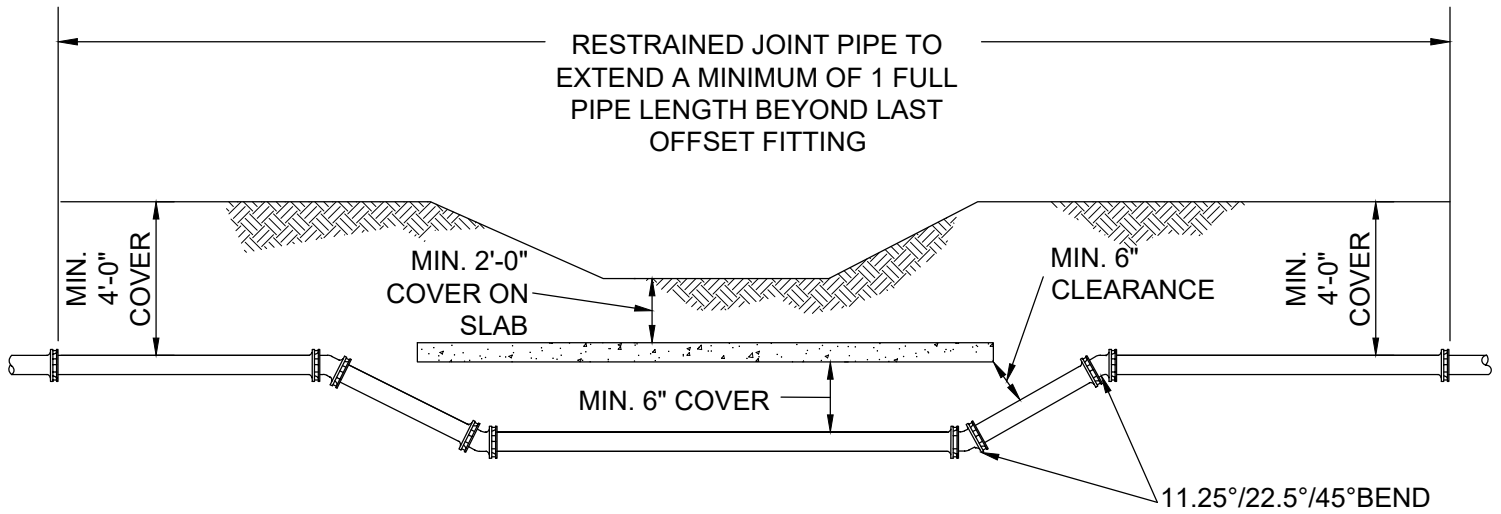
1. ALL STANDARD MANHOLE NOTES AND DETAILS APPLY. REFER TO EXHIBITS S-3A THROUGH S-3D.
2. RISER BLOCKS ARE ACCEPTABLE WHEN PROVIDED BY MH SUPPLIER. OTHERWISE, THE OUTSIDE DROP MUST BE FORMED AND CAST AROUND THE DROP PIPE IN THE FIELD.
3. FILL ANY VOID/OPENING BETWEEN RISER BLOCKS AND MANHOLE WITH CONCRETE.

**TYPICAL DROP MANHOLE - OUTSIDE  
FOR GRAVITY INTO GRAVITY  
HILLSBOROUGH COUNTY, FLORIDA**

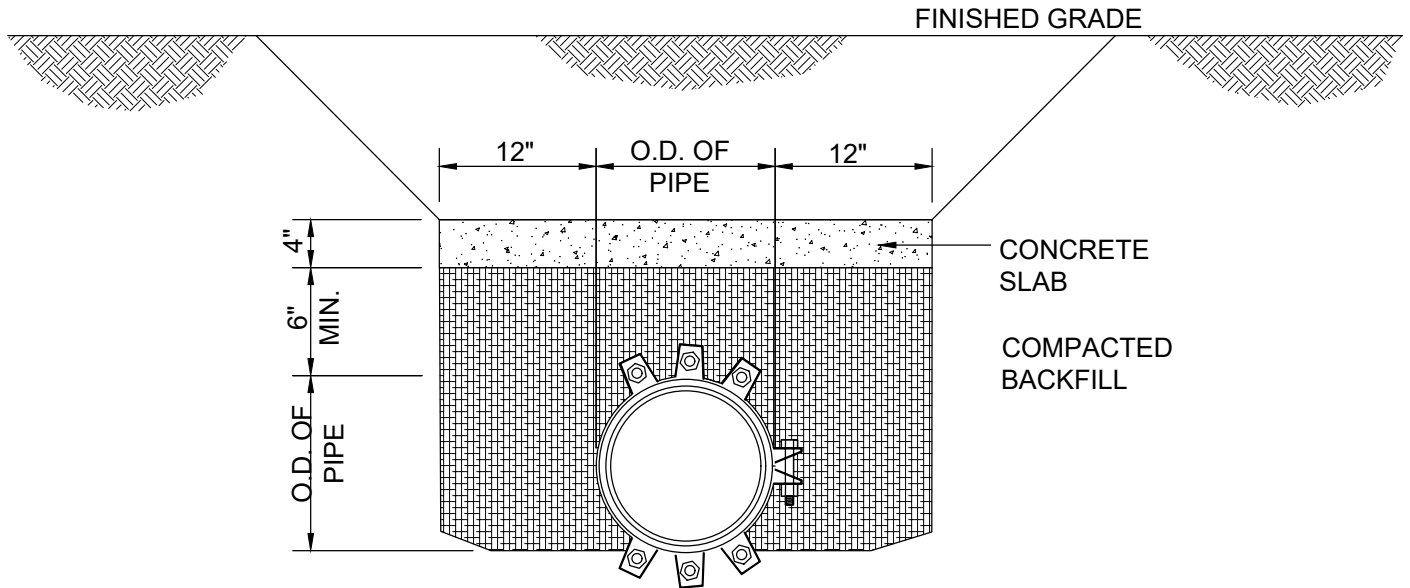
10/2021

SCALE: N.T.S.





DITCH BOTTOM CLEARANCE DETAIL



CONCRETE SLAB

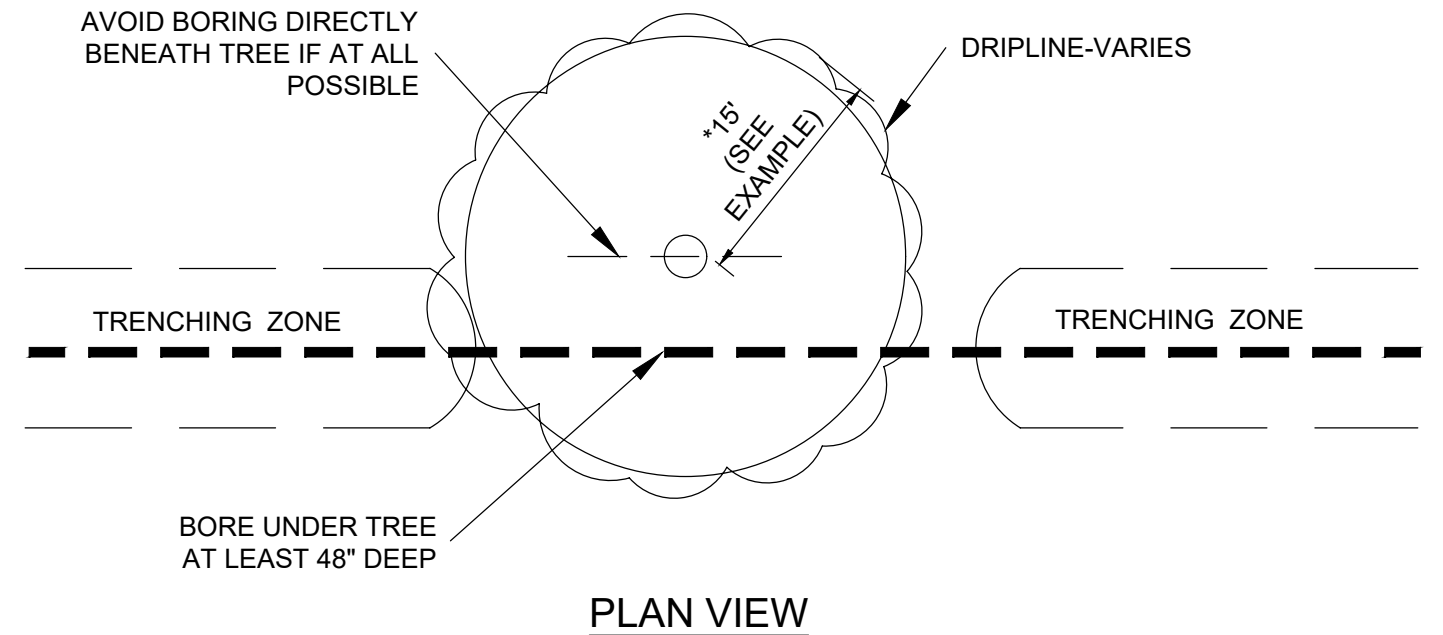
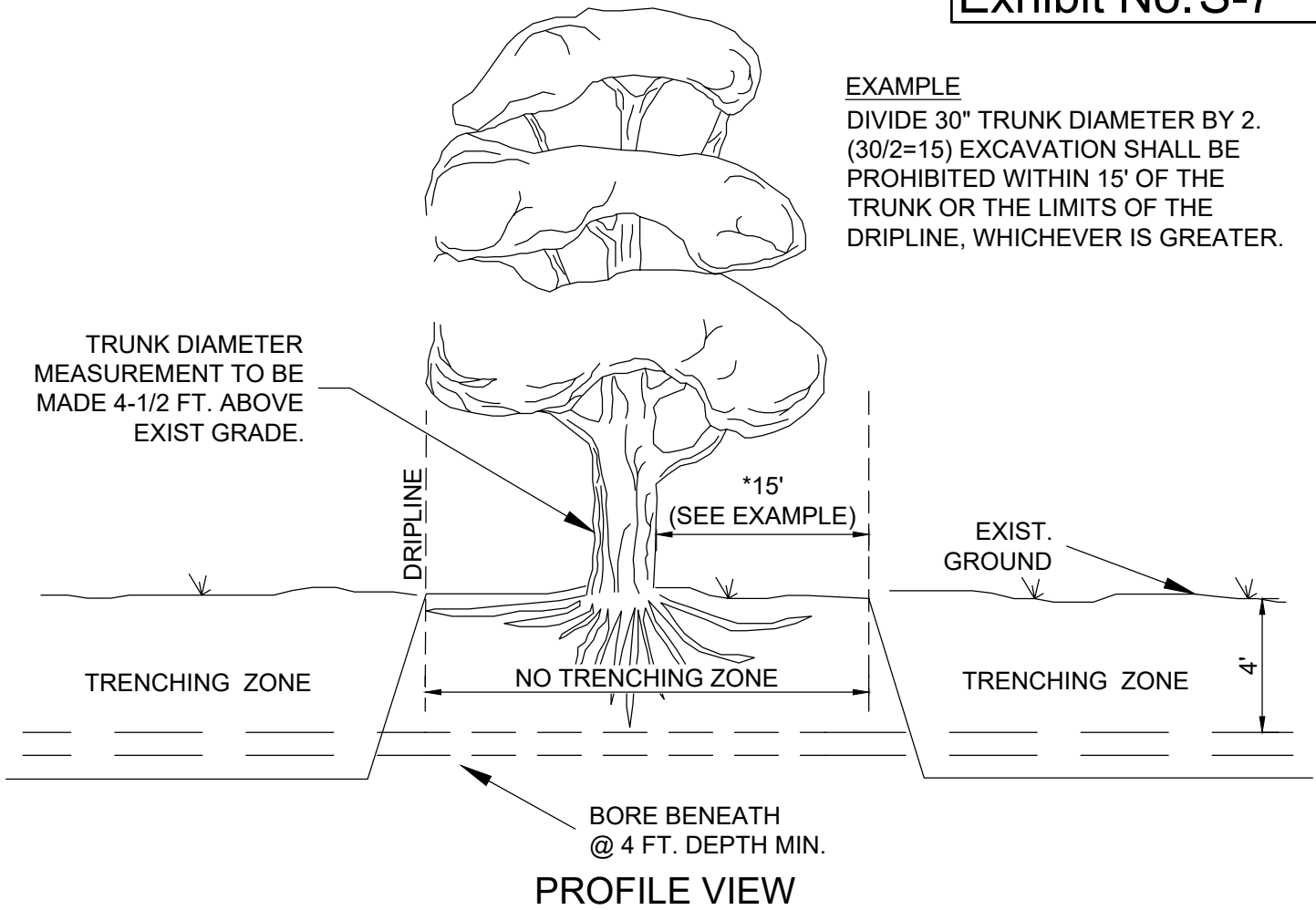
NOTE: SLAB CONCRETE SHALL HAVE A MINIMUM OF 28 DAY COMPRESSIVE STRENGTH OF 3000 psi (min).

DITCH BOTTOM CLEARANCE  
AND CONCRETE PROTECTIVE SLAB  
HILLSBOROUGH COUNTY, FLORIDA

10/2021

SCALE: N.T.S.

**EXAMPLE**  
DIVIDE 30" TRUNK DIAMETER BY 2.  
(30/2=15) EXCAVATION SHALL BE  
PROHIBITED WITHIN 15' OF THE  
TRUNK OR THE LIMITS OF THE  
DRIPLINE, WHICHEVER IS GREATER.

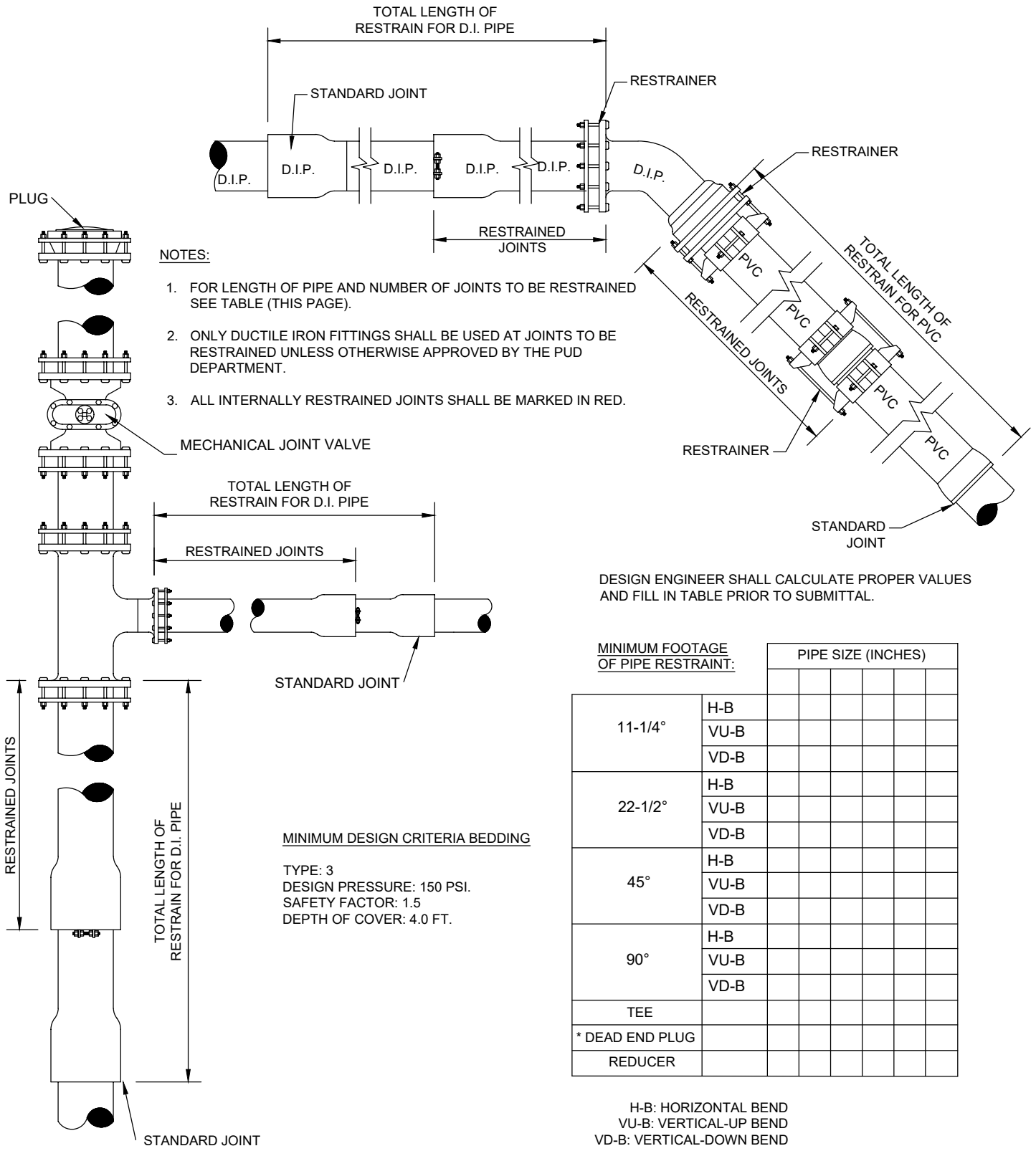


**BORING FOR UTILITIES**

10/2021

**HILLSBOROUGH COUNTY, FLORIDA**

**SCALE: N.T.S.**



DESIGN ENGINEER SHALL CALCULATE PROPER VALUES AND FILL IN TABLE PRIOR TO SUBMITTAL.

MINIMUM FOOTAGE OF PIPE RESTRAINT:

		PIPE SIZE (INCHES)				
		12"	14"	16"	18"	20"
11-1/4°	H-B					
	VU-B					
	VD-B					
22-1/2°	H-B					
	VU-B					
	VD-B					
45°	H-B					
	VU-B					
	VD-B					
90°	H-B					
	VU-B					
	VD-B					
TEE						
* DEAD END PLUG						
REDUCER						

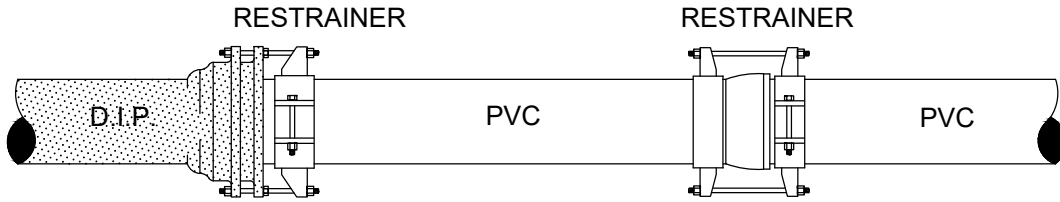
H-B: HORIZONTAL BEND  
 VU-B: VERTICAL-UP BEND  
 VD-B: VERTICAL-DOWN BEND  
 \* CONSIDER VALVES AS BEAD END PLUGS

RESTRAINED JOINT-STANDARD

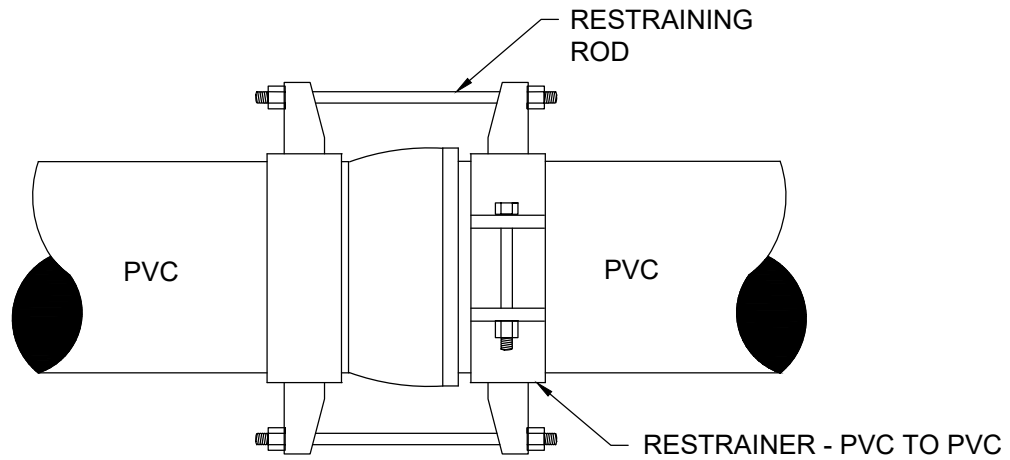
10/2021

HILLSBOROUGH COUNTY, FLORIDA

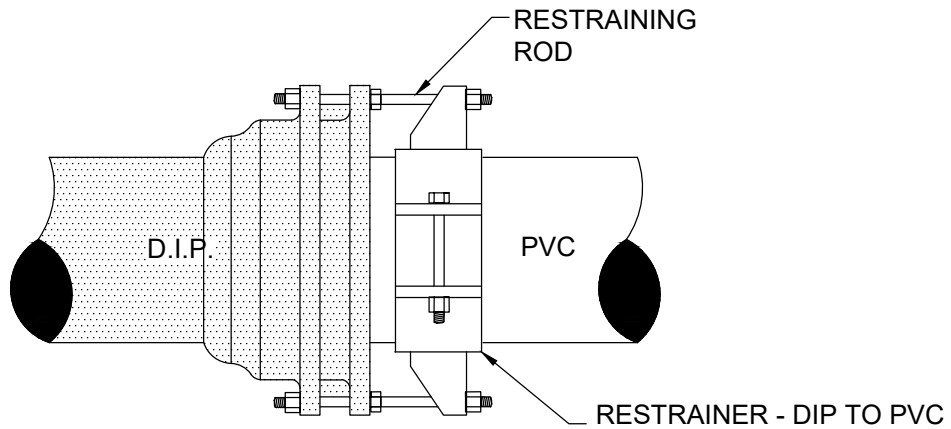
SCALE: N.T.S.



METHOD OF RESTRAINING PUSH-ON JOINT PIPE



DETAIL PUSH-ON JOINT



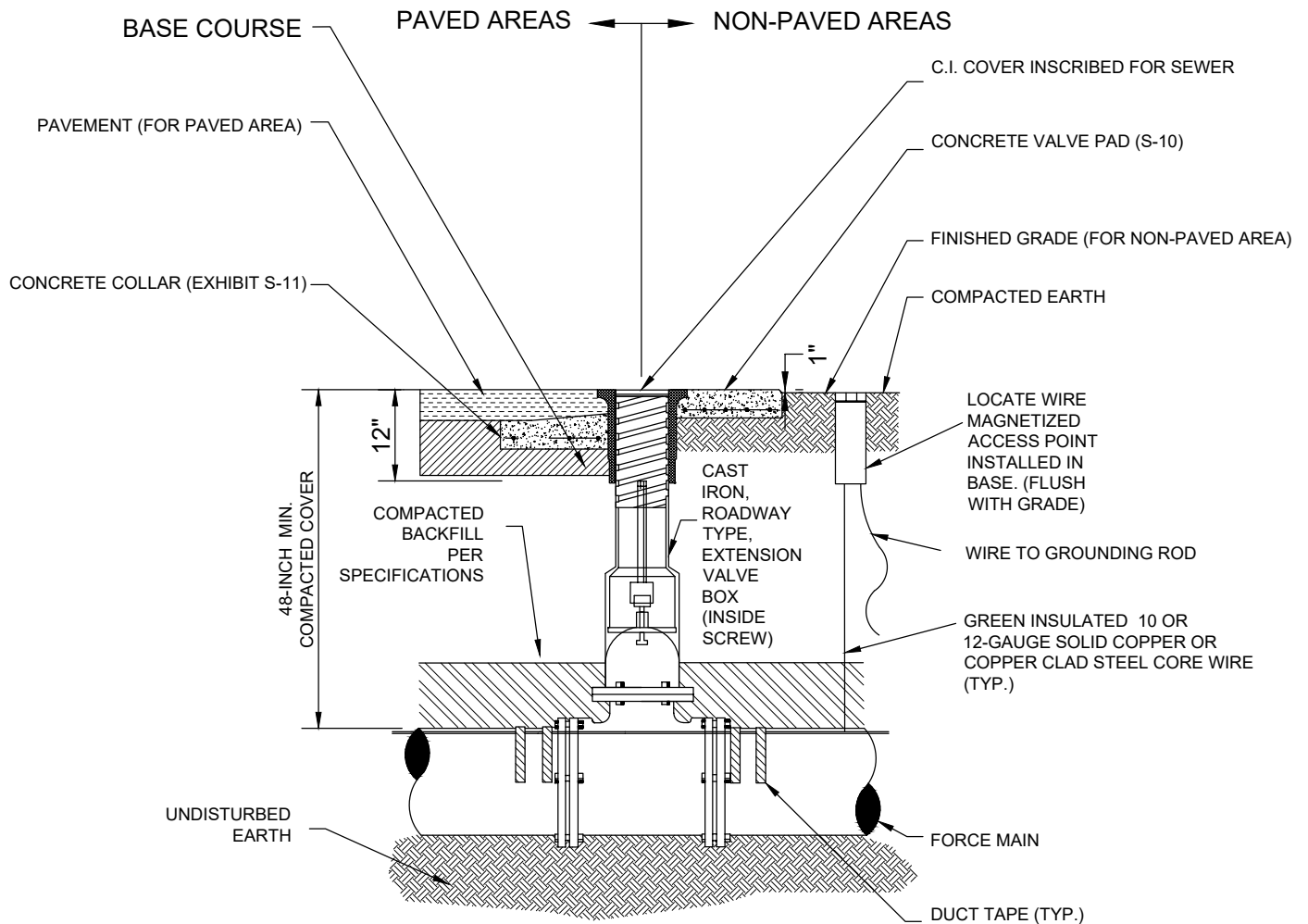
DETAIL M.J. JOINT

RESTRAINED JOINT  
FOR PVC C-900 PIPE (4" TO 12")  
HILLSBOROUGH COUNTY, FLORIDA

10/2021

SCALE: N.T.S.





**NOTES:**

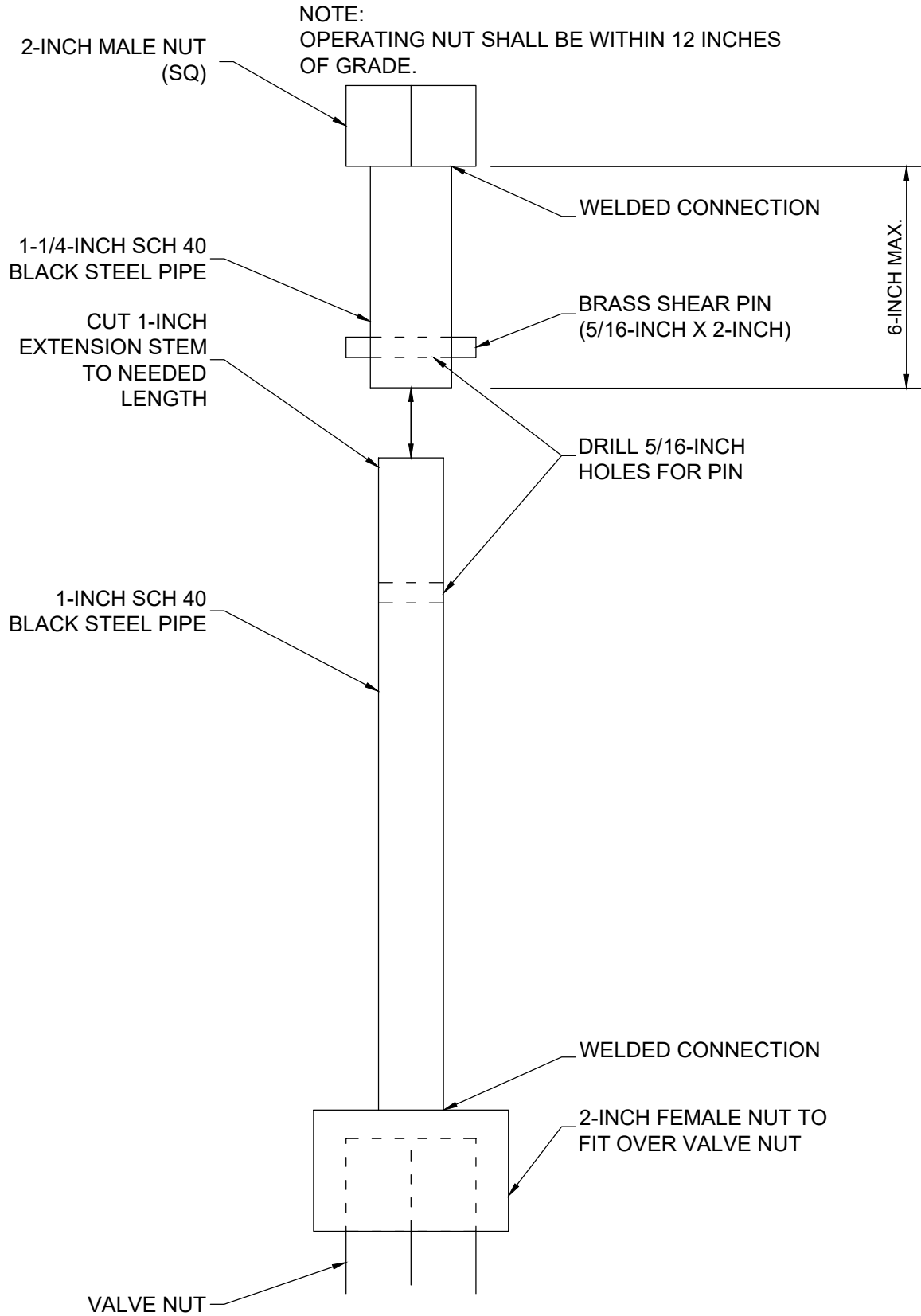
1. EXTENSION ON VALVE BOX MUST BE SET SO AS TO RESERVE 1/2 OF THE ADJUSTMENT LENGTH FOR FUTURE USE. VALVE BOX EXTENSIONS MUST BE CAST IRON.
2. THE VALVE OPERATING NUT MUST BE WITHIN 12 INCHES OF FINAL GRADE. EXTENSION TO BE PROVIDED AS NEEDED. REFER TO EXHIBIT S-9B.
3. ALL PIPE MUST BE INSULATED WITH 10 OR 12 GAUGE SOLID COPPER OR COPPER CLAD STEEL CORE LOCATING WIRE TAPED WITH 2 INCH WIDE DUCT TAPE AT THE 10:00 OR 2:00 POSITION ON THE PIPE AT EVERY JOINT AND 4 TO 5 FEET SPACING. WIRE FOR DIRECTIONAL DRILL APPLICATIONS MUST BE COPPER CLAD "HARD DRAWN" STEEL CORE WITH A MINIMUM BREAKING STRENGTH OF 1000 PSI. REFER TO 333002, PART 4.3.14
4. LOCATING WIRES TO TERMINATE AT GROUND LEVEL MAGNETIZED ACCESS POINTS IN A BASE LOCATED NO MORE THAN OF 1000 LF APART. ACCESS POINTS TO BE TWO TERMINALS (MIN.) AND HAVE A GROUNDING ROD AT EACH ACCESS POINT.
5. LOCATING WIRES SHALL BE CAPABLE OF DETECTION BY A CABLE LOCATOR AND PASS A FIELD LOCATE TEST THAT IS CERTIFIED BY THE ENGINEER OF RECORD OR THEIR REPRESENTATIVE. THE TEST MUST BE BY THE CONTRACTOR OR BY A SUE FIRM.
6. SPLICES SHALL BE CAPABLE OF COMPLETE SUBMERSION.
7. NO MORE THAN 6 SPLICES BETWEEN ACCESS POINTS.

**VALVE AND TRACER WIRE  
PAVED OR NON-PAVED AREAS**

10/2021

**HILLSBOROUGH COUNTY, FLORIDA**

**SCALE: N.T.S.**

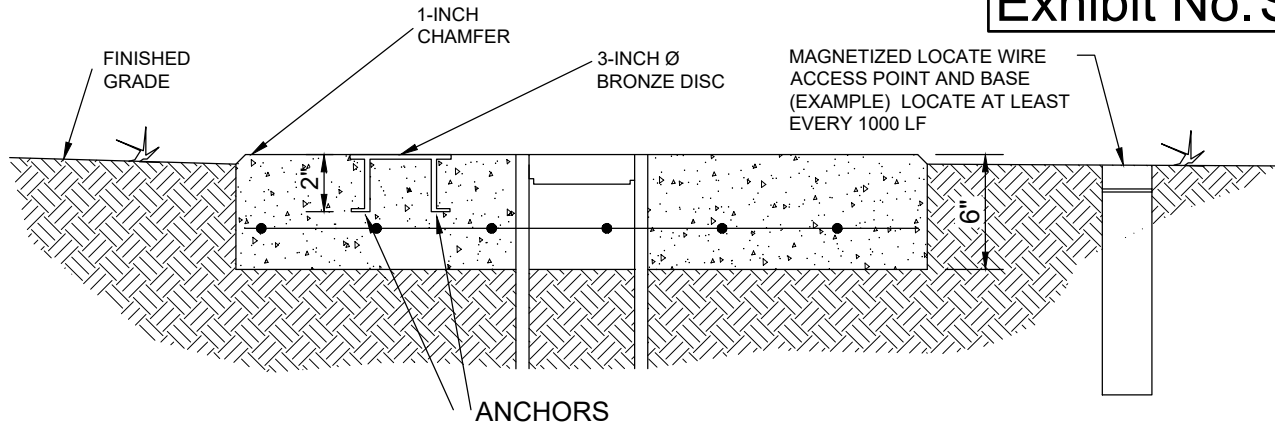


VALVE EXTENSION FOR PLUG VALVES  
W/SHEAR PIN

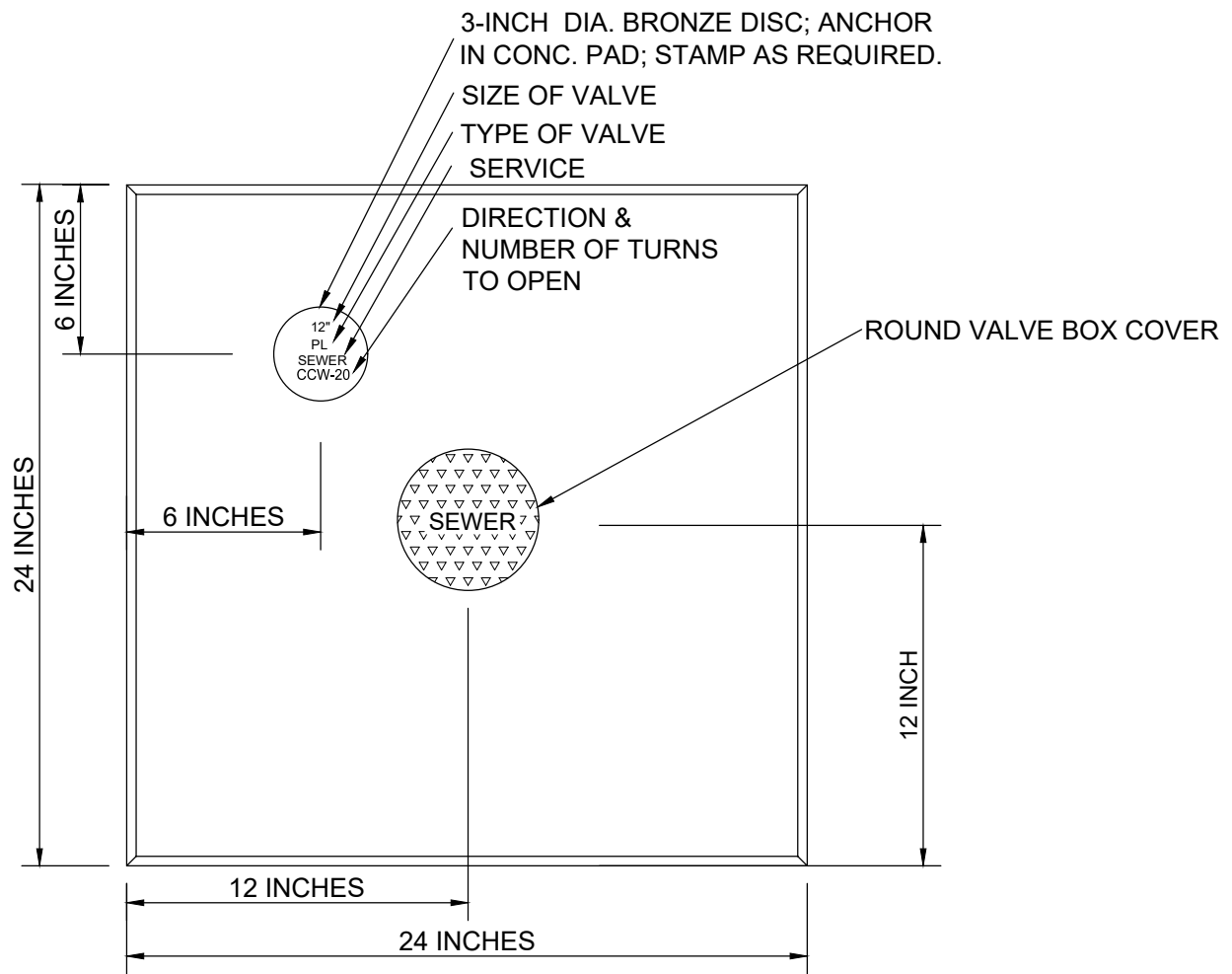
10/2021

HILLSBOROUGH COUNTY, FLORIDA

SCALE: N.T.S.



**SECTION**



**PLAN**

**NOTES:**

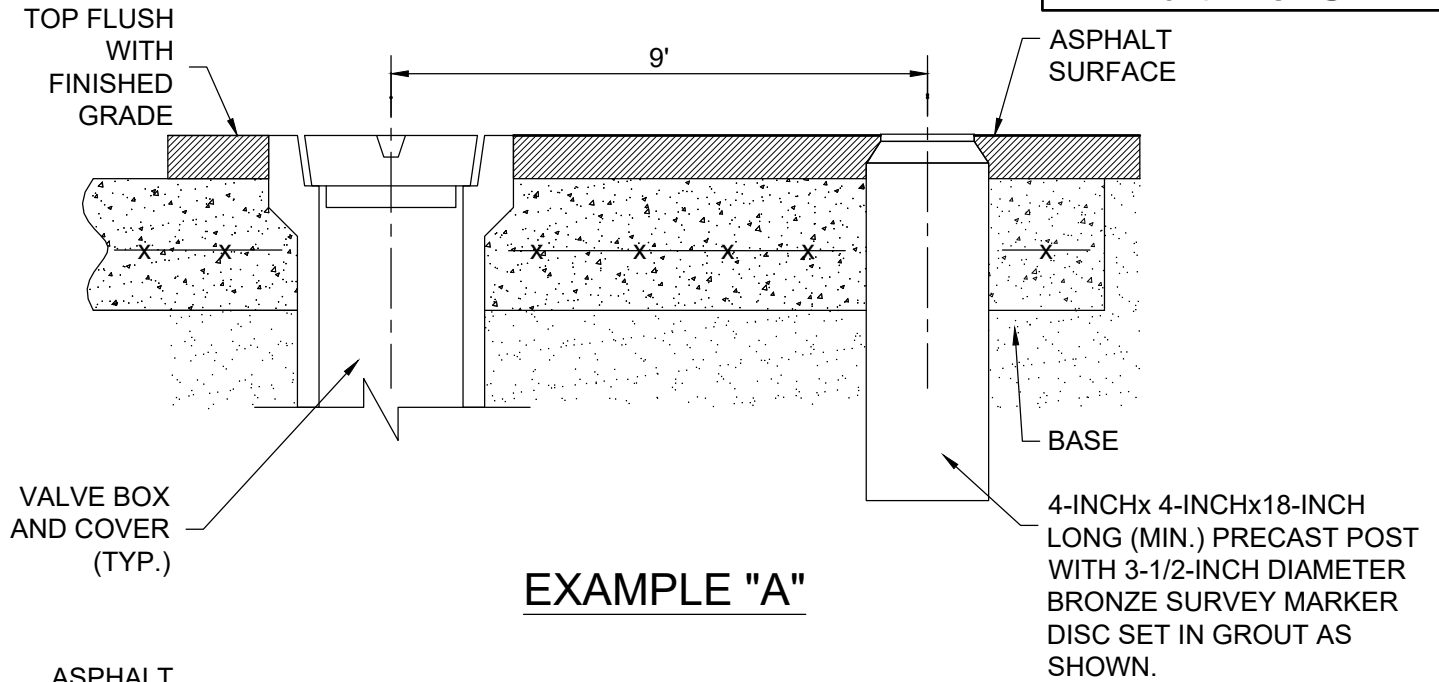
1. CONCRETE TO BE TYPE I GENERAL PORTLAND CEMENT WITH 3/4" TOP SIZE AGGREGATE AND SHALL DEVELOP A 28-DAY STRENGTH OF 3000 P.S.I.
2. REINFORCING STEEL SHALL BE 6x6 - W 1.4xW 1.4 W.W.F.
3. CONCRETE VALVE PAD SHALL BE POURED IN PLACE AND SHALL BE SET 1/2" ABOVE FINISHED GRADE

**CONCRETE VALVE PAD  
(FOR UNPAVED AREAS)**

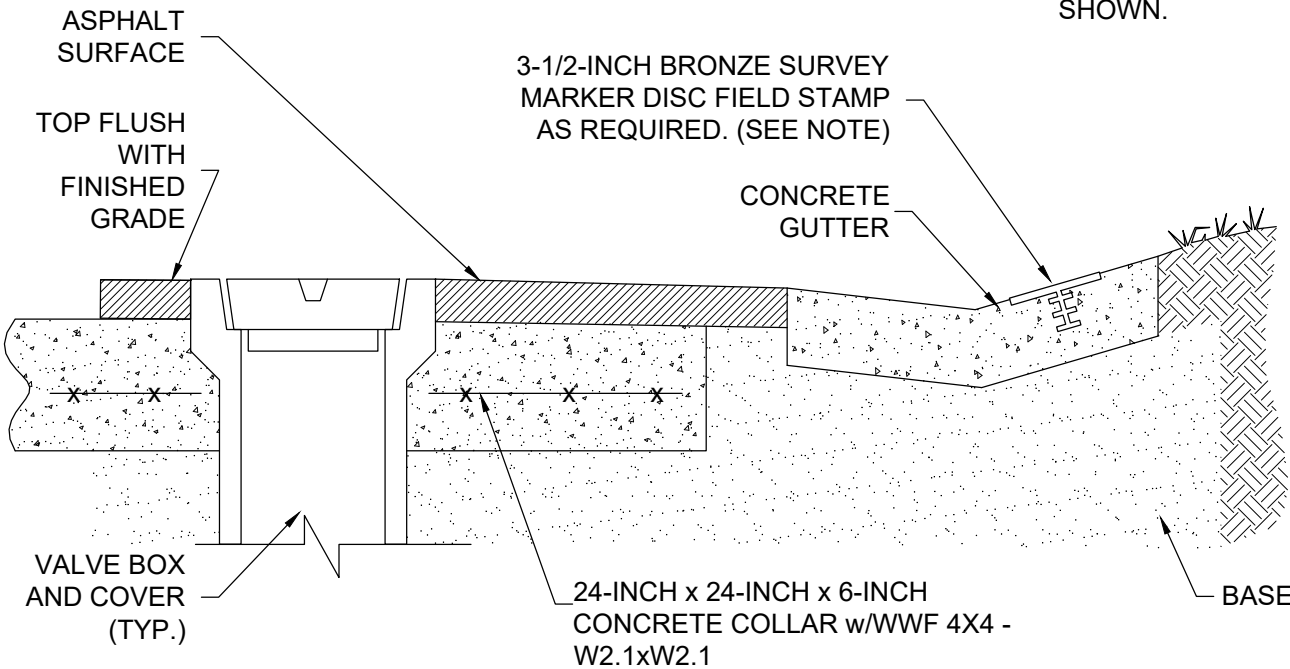
10/2021

**HILLSBOROUGH COUNTY, FLORIDA**

**SCALE: N.T.S.**

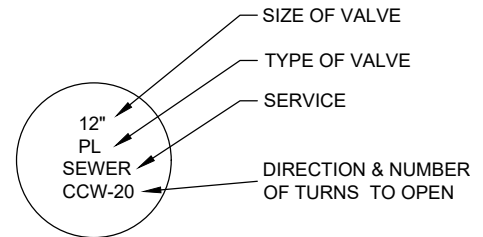


**EXAMPLE "A"**



**EXAMPLE "B"**

NOTE:  
BRONZE IDENTIFICATION DISC SHALL BE  
REQUIRED FOR ALL VALVES.



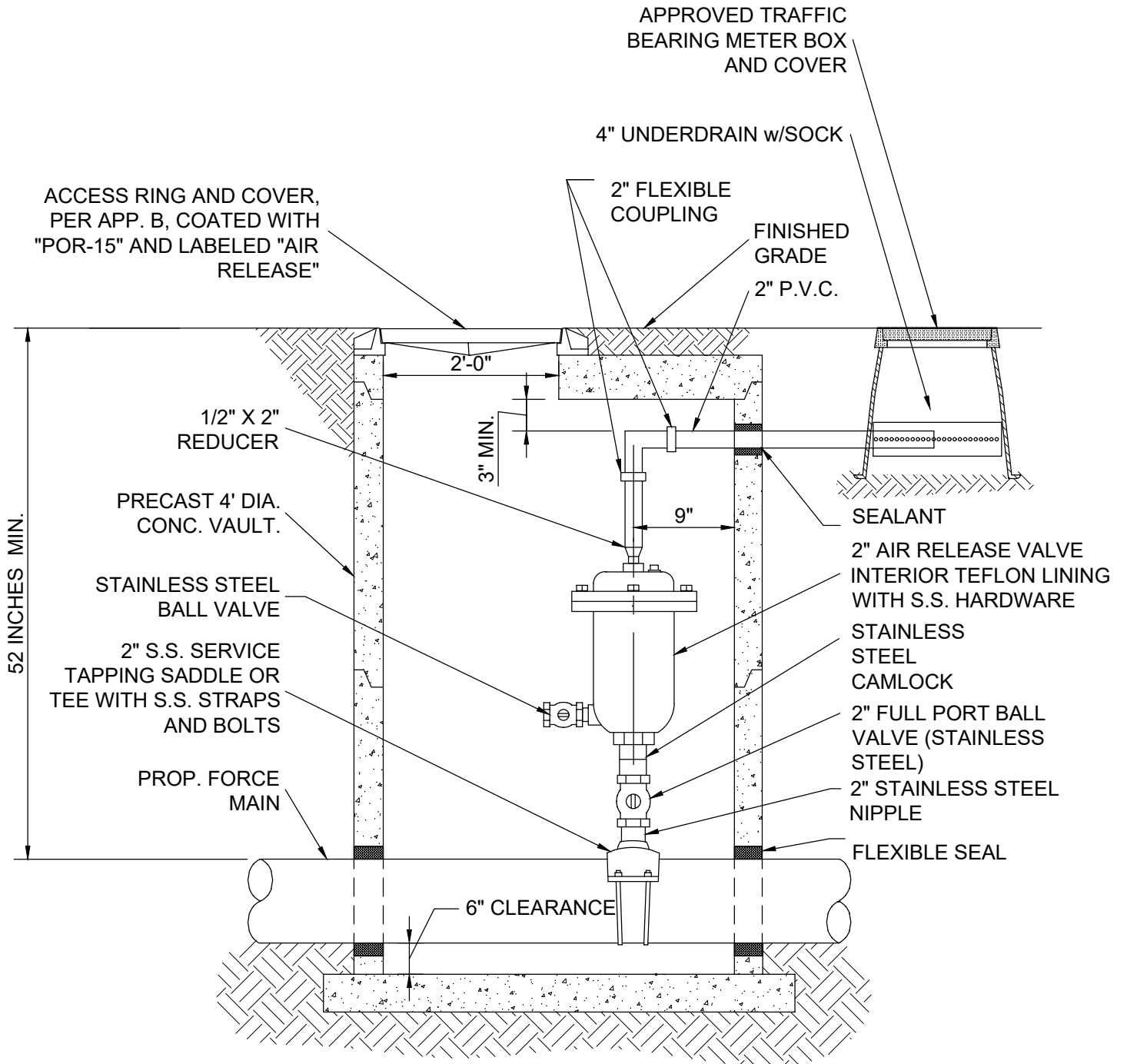
**MARKER DISC DETAIL**

**VALVE BOX AND MARKER INSTALLATION  
FOR PAVED AREAS**

10/2021

**HILLSBOROUGH COUNTY, FLORIDA**

**SCALE: N.T.S.**



NOTES:

1. ADJUST DEPTH OF PROPOSED FORCE MAIN SO VALVE VAULT CAN BE INSTALLED FLUSH WITH THE PROPOSED GRADE.
2. ENGINEER SHALL SUBMIT FLOTATION CALCULATIONS TO THE COUNTY. VAULT SHALL BE TRAFFIC BEARING (H-20).
3. SEE APPENDIX B FOR APPROVED PRODUCTS.

**AUTOMATIC AIR RELEASE VALVE ASS'Y  
W/BOX AND COVER**

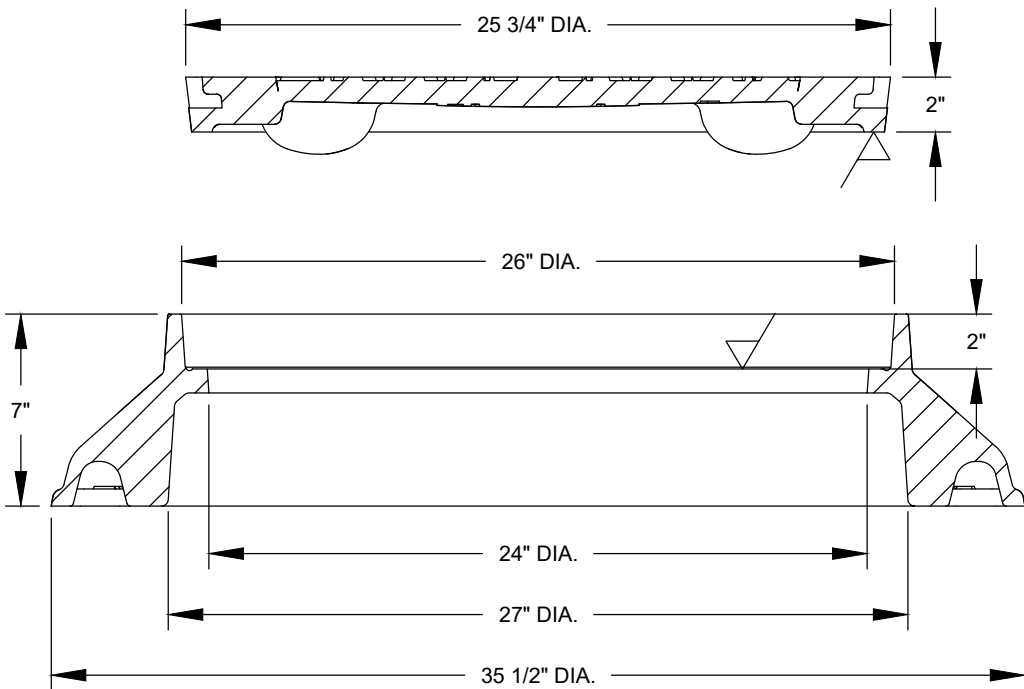
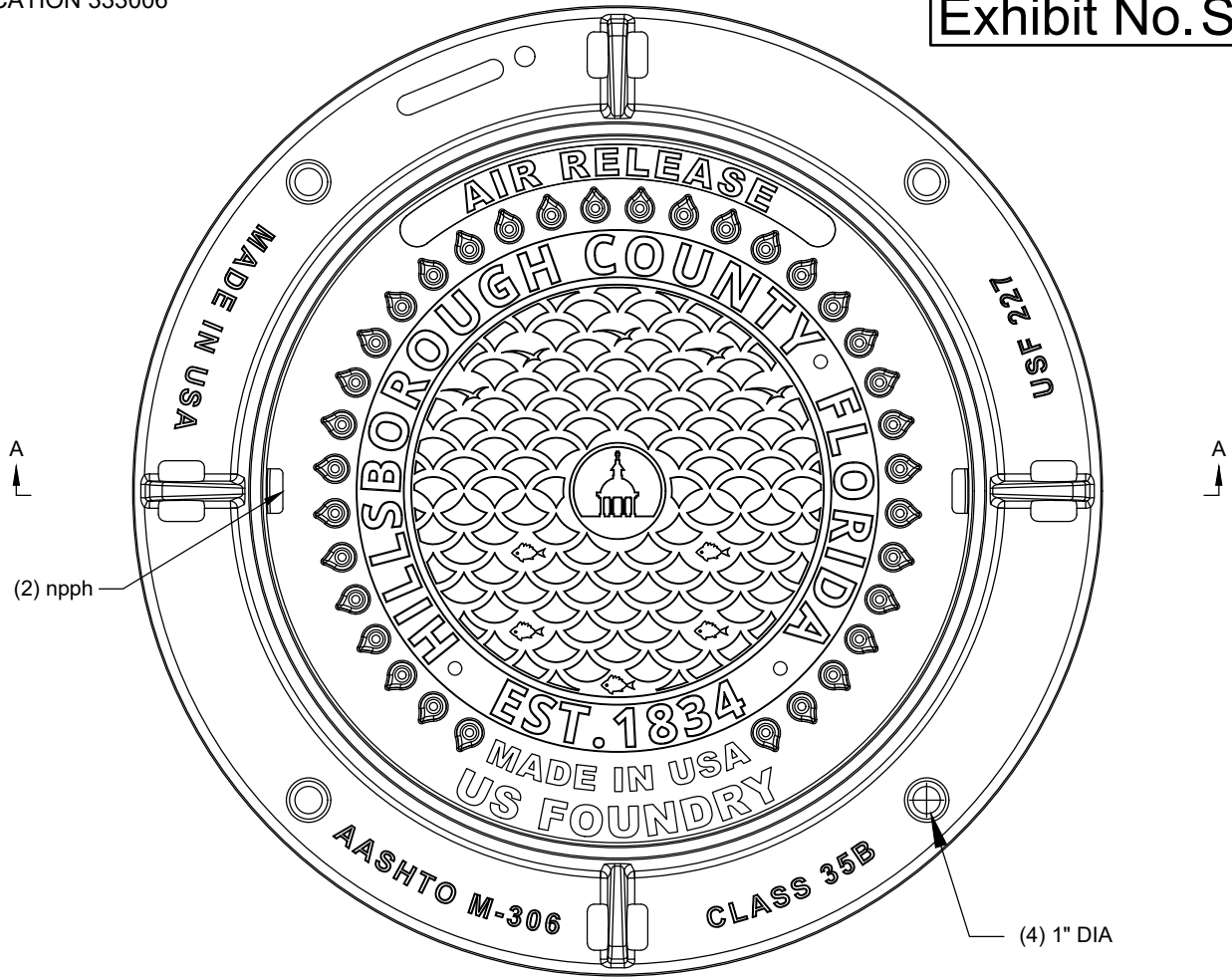
10/2021

**HILLSBOROUGH COUNTY, FLORIDA**

**SCALE: N.T.S.**







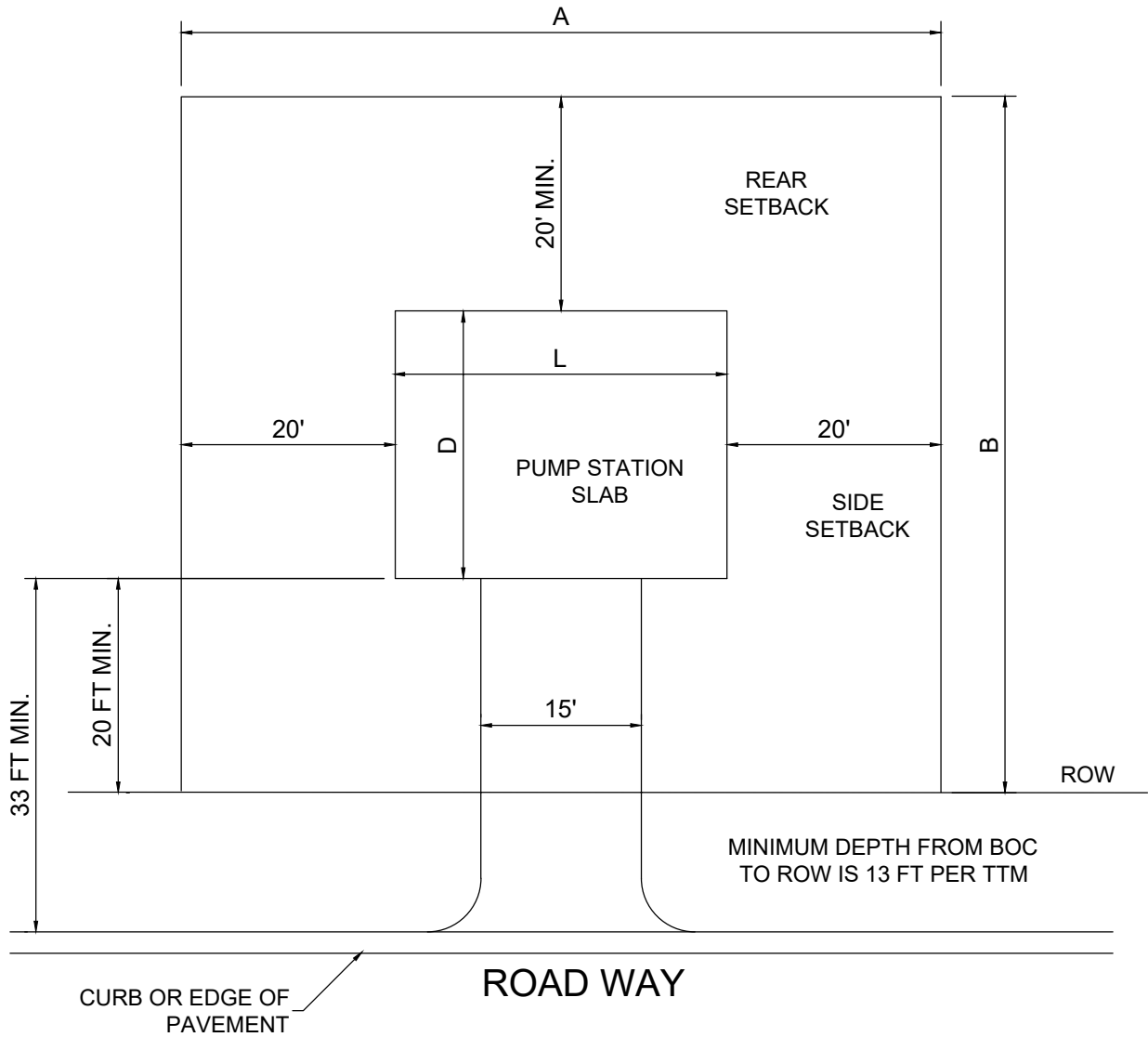
SANITARY RING AND COVER

10/2021

HILLSBOROUGH COUNTY, FLORIDA

SCALE: N.T.S.





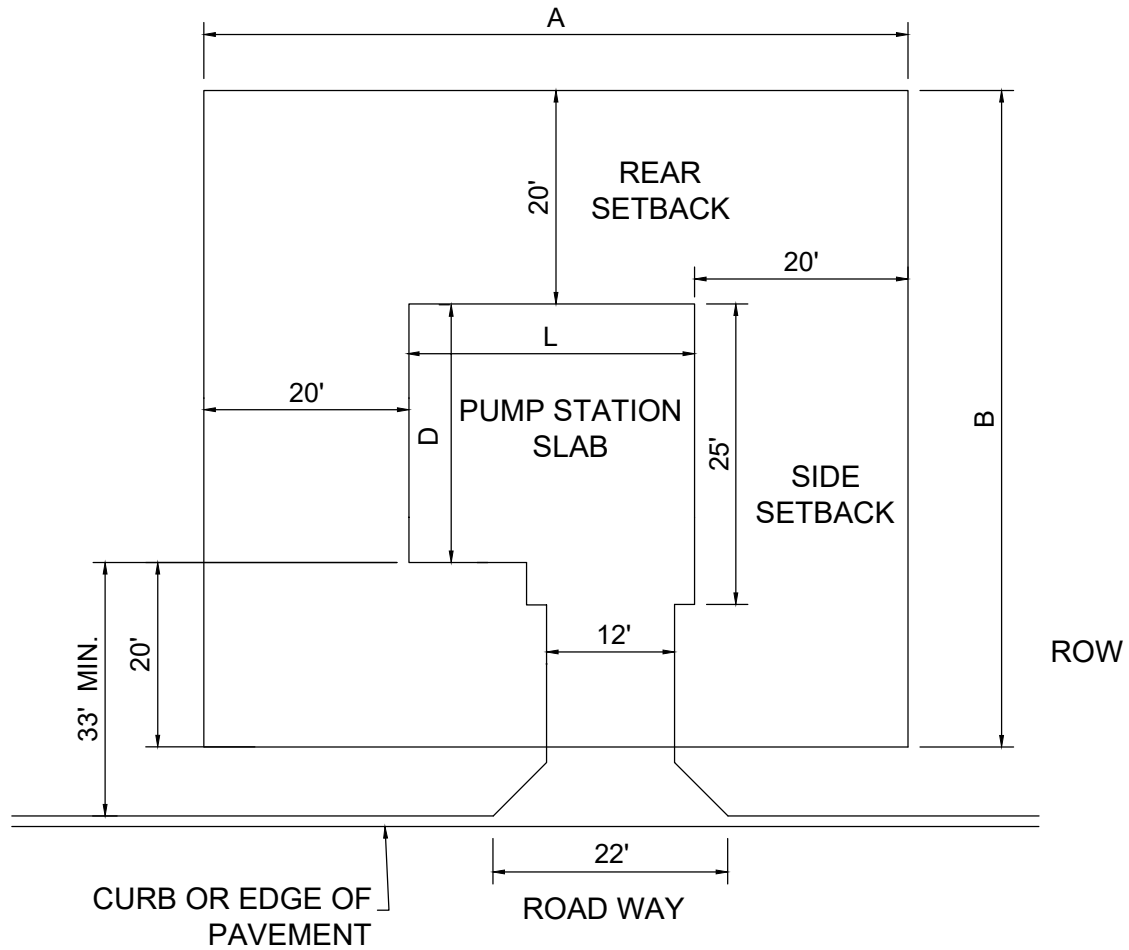
WETWELL DIAM (FT)	MIN. SLAB		MIN. PARCEL (FT)	
	L	D	A	B
6	28'	26'6"	68'	66'6"
8	29'	27'6"	69'	67'6"
10	31'	28'	71'	68'

**STANDARD DUPLEX PUMP STATION  
MINIMUM SITE DIMENSIONS**

**HILLSBOROUGH COUNTY, FLORIDA**

10/2021

SCALE: N.T.S.



WETWELL  
DIAM (FT)  
6

MIN. SLAB  
L      D  
24'    18'

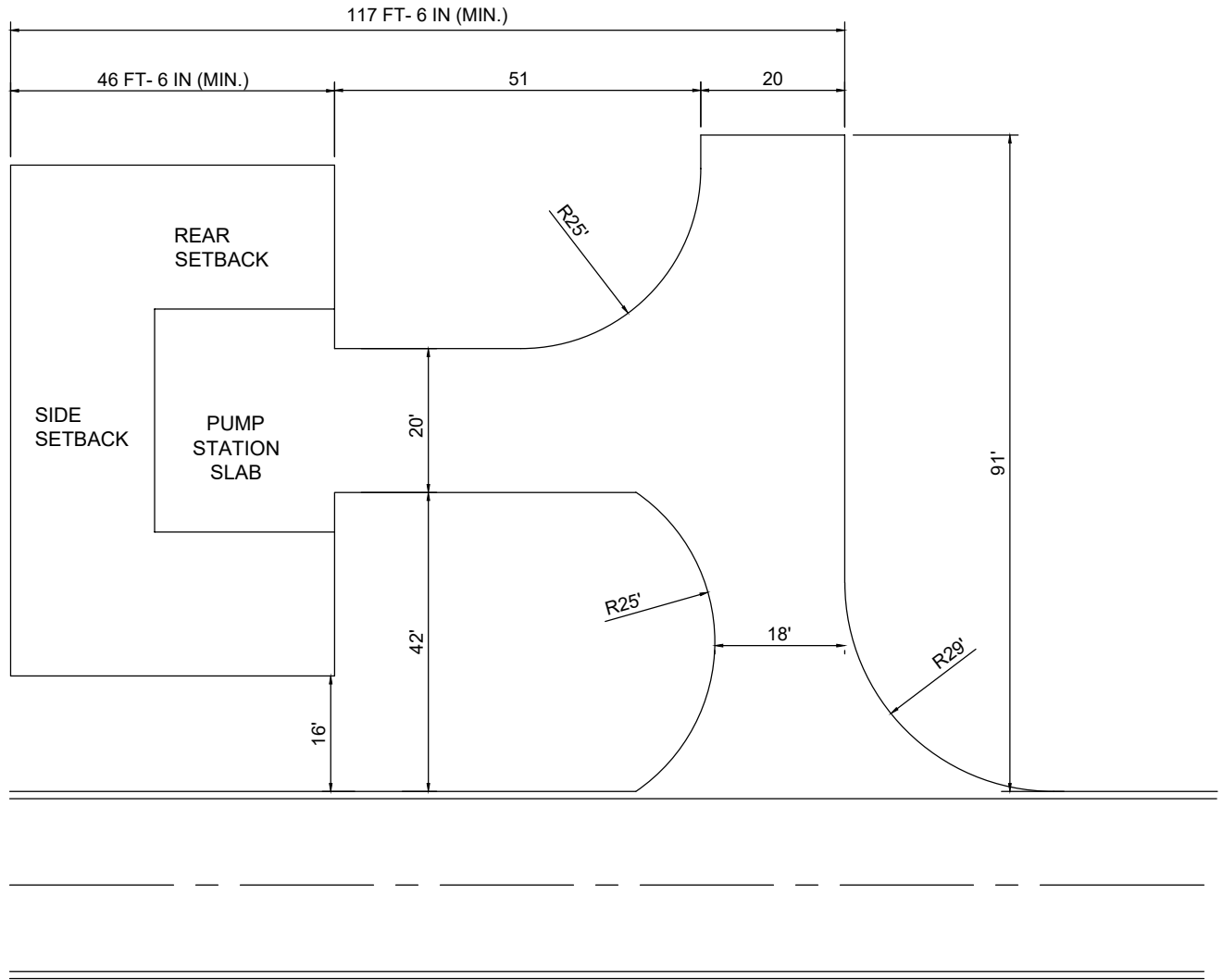
MIN. PARCEL  
A      B  
64'    58'

**IN-FILL GRINDER PUMP STATION  
MINIMUM SITE DIMENSIONS**

**HILLSBOROUGH COUNTY, FLORIDA**

10/2021

SCALE: N.T.S.



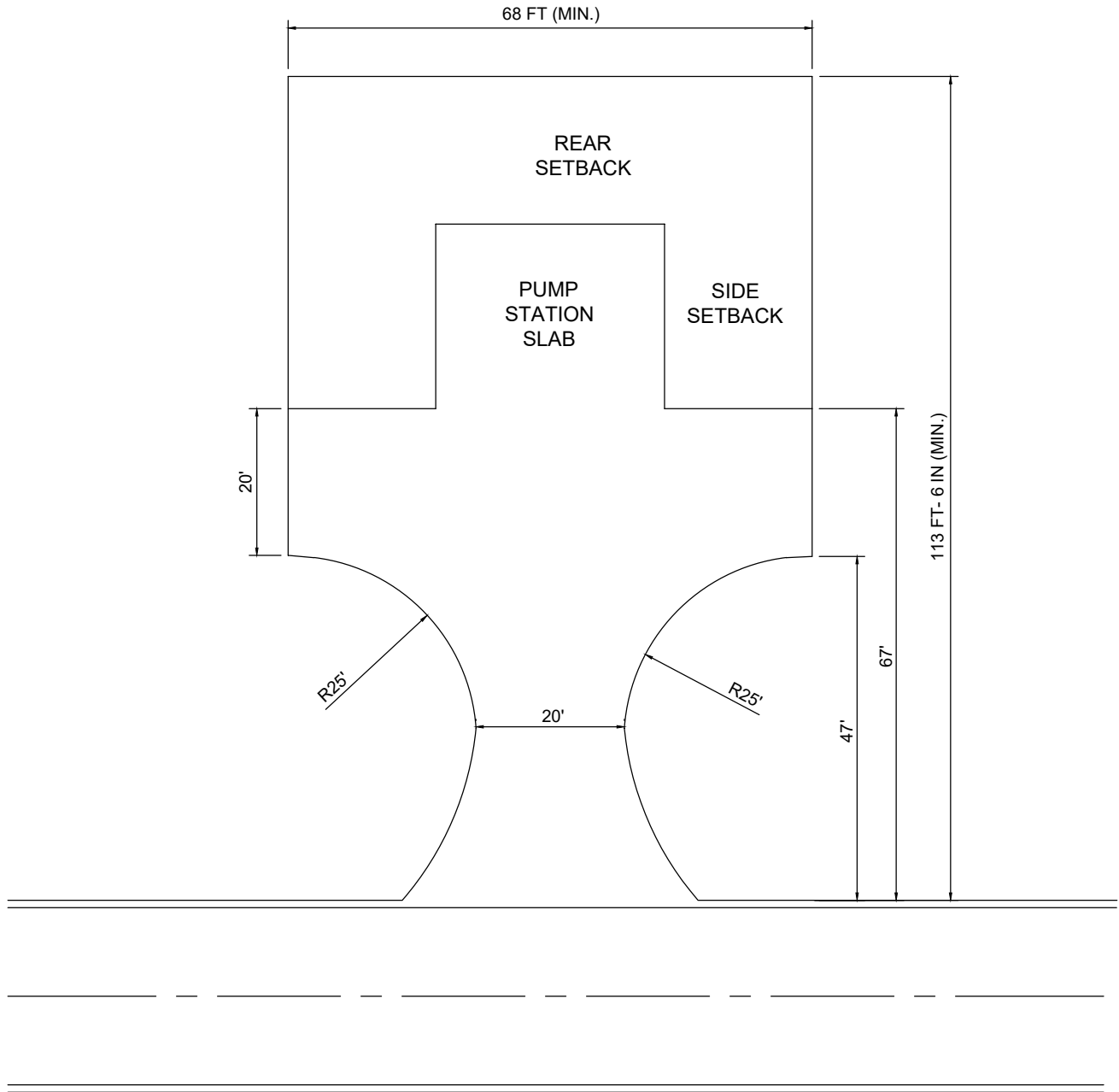
NOTE: THE DIMENSIONS ARE BASED ON THE MINIMUM PUMP STATION LAYOUT AS SHOWN IN EXHIBIT S-13A

TURNAROUND DETAIL  
LAYOUT 'A' (WHEN REQUIRED)

HILLSBOROUGH COUNTY, FLORIDA

10/2021

SCALE: N.T.S.



NOTE: THE DIMENSIONS ARE BASED ON THE MINIMUM PUMP STATION LAYOUT AS SHOWN IN EXHIBIT S-13A

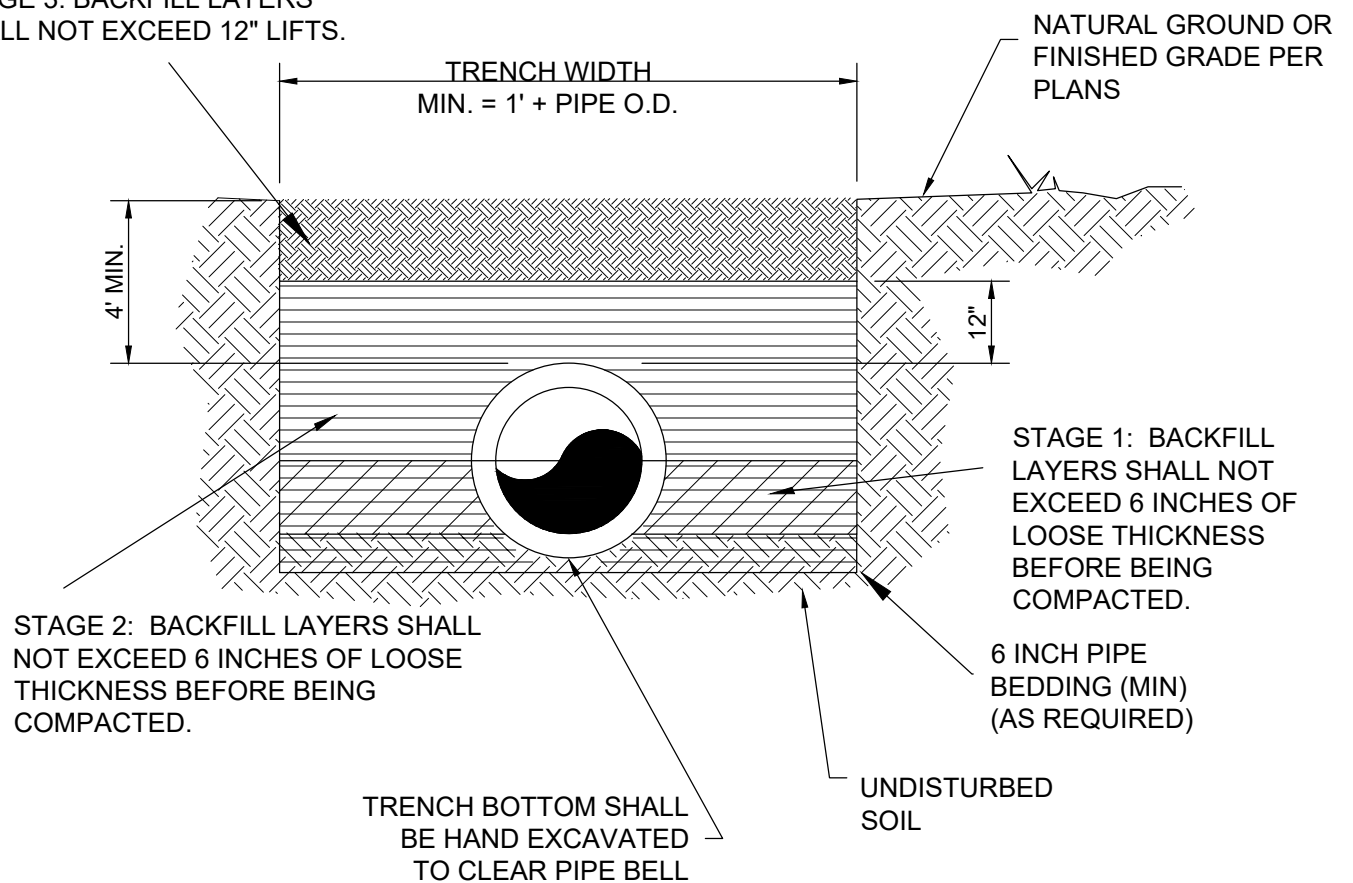
TURNAROUND DETAIL  
LAYOUT "B" (WHEN REQUIRED)

HILLSBOROUGH COUNTY, FLORIDA

10/2021

SCALE: N.T.S.

STAGE 3: BACKFILL LAYERS SHALL NOT EXCEED 12" LIFTS.



STAGE 2: BACKFILL LAYERS SHALL NOT EXCEED 6 INCHES OF LOOSE THICKNESS BEFORE BEING COMPACTED.

STAGE 1: BACKFILL LAYERS SHALL NOT EXCEED 6 INCHES OF LOOSE THICKNESS BEFORE BEING COMPACTED.

6 INCH PIPE BEDDING (MIN) (AS REQUIRED)

TRENCH BOTTOM SHALL BE HAND EXCAVATED TO CLEAR PIPE BELL

UNDISTURBED SOIL

NOTES:

1. TESTING: SEE 333001 or 333002, PART 4.11 FOR TESTING REQUIREMENTS.
2. BEDDING: 6 INCH BEDDING (MIN) AS REQUIRED. IN THE EVENT UNSUITABLE OR UNSTABLE SOIL IS ENCOUNTERED, REMOVE IT AND REPLACE WITH MATERIAL MEETING AASHTO SOIL CLASSIFICATION A-1, A-2, OR A-3. SEE 333001 or 333002 SECTION 4.4.
3. STAGE 1: ADEQUATE COMPACTED FILL SHALL BE PLACED ABOVE THE BEDDING MATERIAL AND BENEATH THE HAUNCHES OF THE PIPE. BACKFILL LAYERS SHALL NOT EXCEED 6 INCHES OF LOOSE THICKNESS BEFORE BEING COMPACTED.
4. STAGE 2: BACKFILL LAYERS SHALL NOT EXCEED 6 INCH OF LOOSE THICKNESS BEFORE BEING COMPACTED. COMPACTION SHALL BE 98% OF THE MAXIMUM DENSITY (AASHTO T-180/ASTM D1557) TO A POINT 1 FT ABOVE THE PIPE (OR AS STATED IN THE SPECIFICATION).
5. STAGE 3: BACKFILL LAYERS SHALL NOT EXCEED 12 INCH LIFTS. COMPACTION SHALL BE 98% OF THE MAXIMUM DENSITY (AASHTO T-180/ASTM D1557) OR AS STATED IN THE SPECIFICATION

TRENCH DETAIL  
BACKFILL & COMPACTION

HILLSBOROUGH COUNTY, FLORIDA

10/2021

SCALE: N.T.S.