



**SPECIFICATION 333006:
SEWER EXHIBITS**

SEWER EXHIBITS

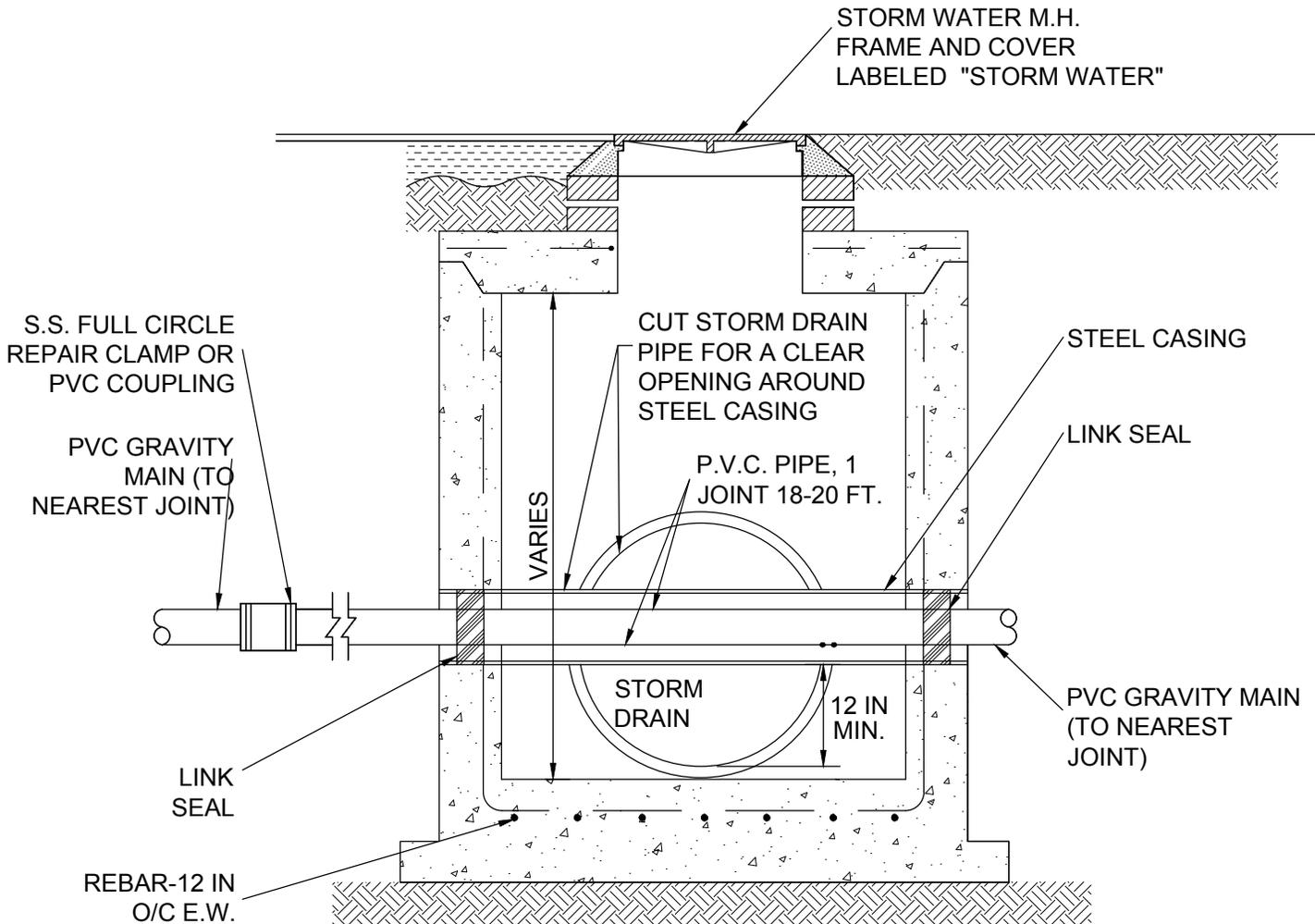
S-1A	CONFLICT MANHOLE-TYPE "A" WASTEWATER AND STORMWATER PIPES
S-1B	CONFLICT MANHOLE-TYPE "B" WASTEWATER AND STORMWATER PIPES
S-2A	TYPICAL PVC SANITARY SEWER NEW CONNECTION w/CLEAN-OUT
S-2B	CLEAN-OUT DETAIL w/VALVE BOX COVER
S-3A	STANDARD 48" PRECAST MANHOLE FOR SEWERS 16" OR LESS IN DIA. (SECTION VIEW)
S-3B	STANDARD 48" PRECAST MANHOLE FOR SEWERS 16" OR LESS IN DIA. (PLAN VIEW)
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S-3D	STANDARD NOTES PRECAST MANHOLES
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S-15	TRENCH DETAIL - BACKFILL AND COMPACTION

LISTING OF SEWER EXHIBITS

10/2015

HILLSBOROUGH COUNTY, FLORIDA

SCALE: N.T.S.

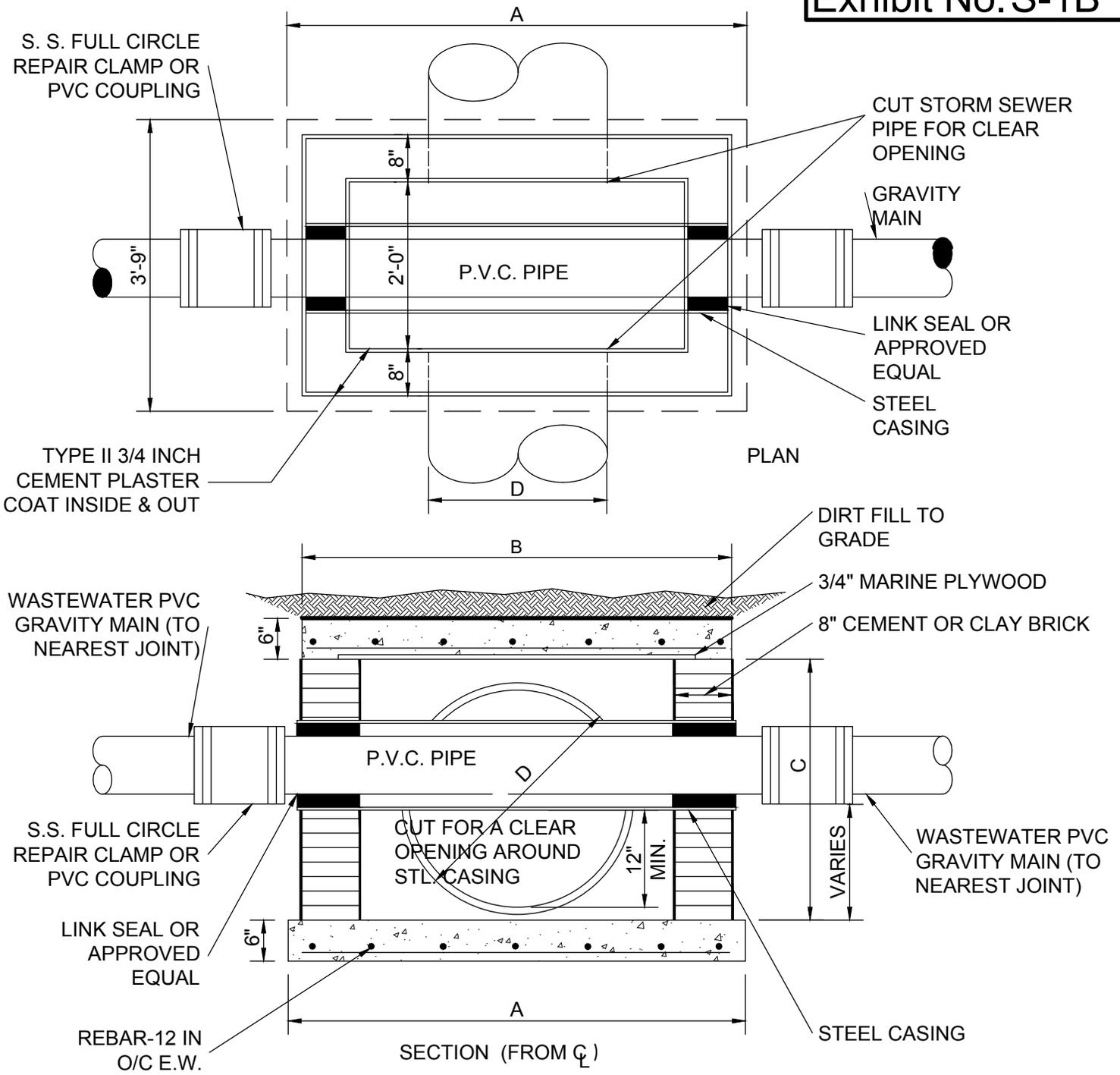


NOTE:

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

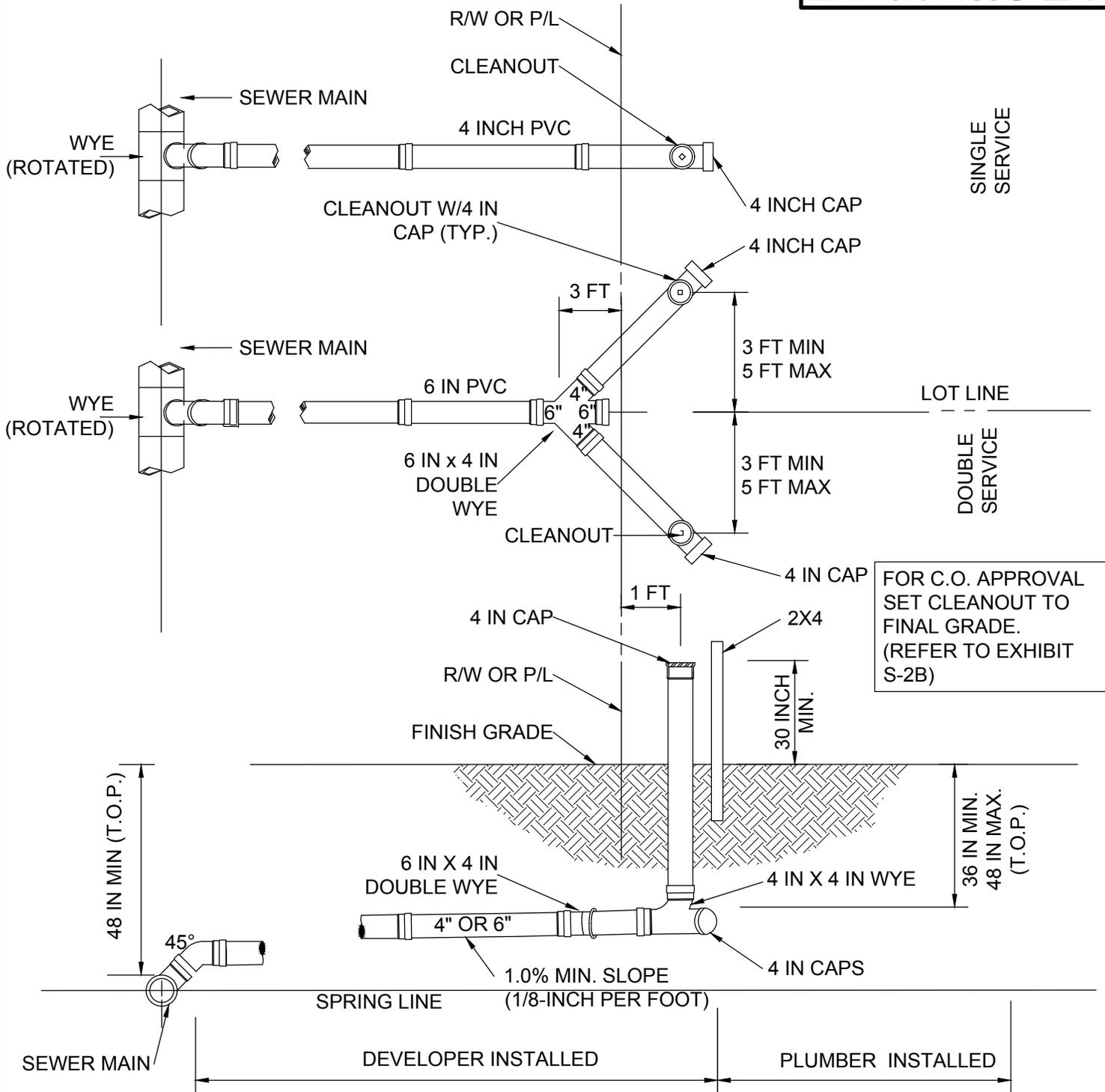
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DIMENSIONS			
A	B	C	D
4'-0"	3'-8"	1'-8"	15"
4'-0"	3'-8"	2'-0"	18"
5'-0"	4'-2"	2'-6"	24"
6'-0"	5'-6"	3'-6"	36"

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

10/2015
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FOR C.O. APPROVAL
SET CLEANOUT TO
FINAL GRADE.
(REFER TO EXHIBIT
S-2B)

NOTES:

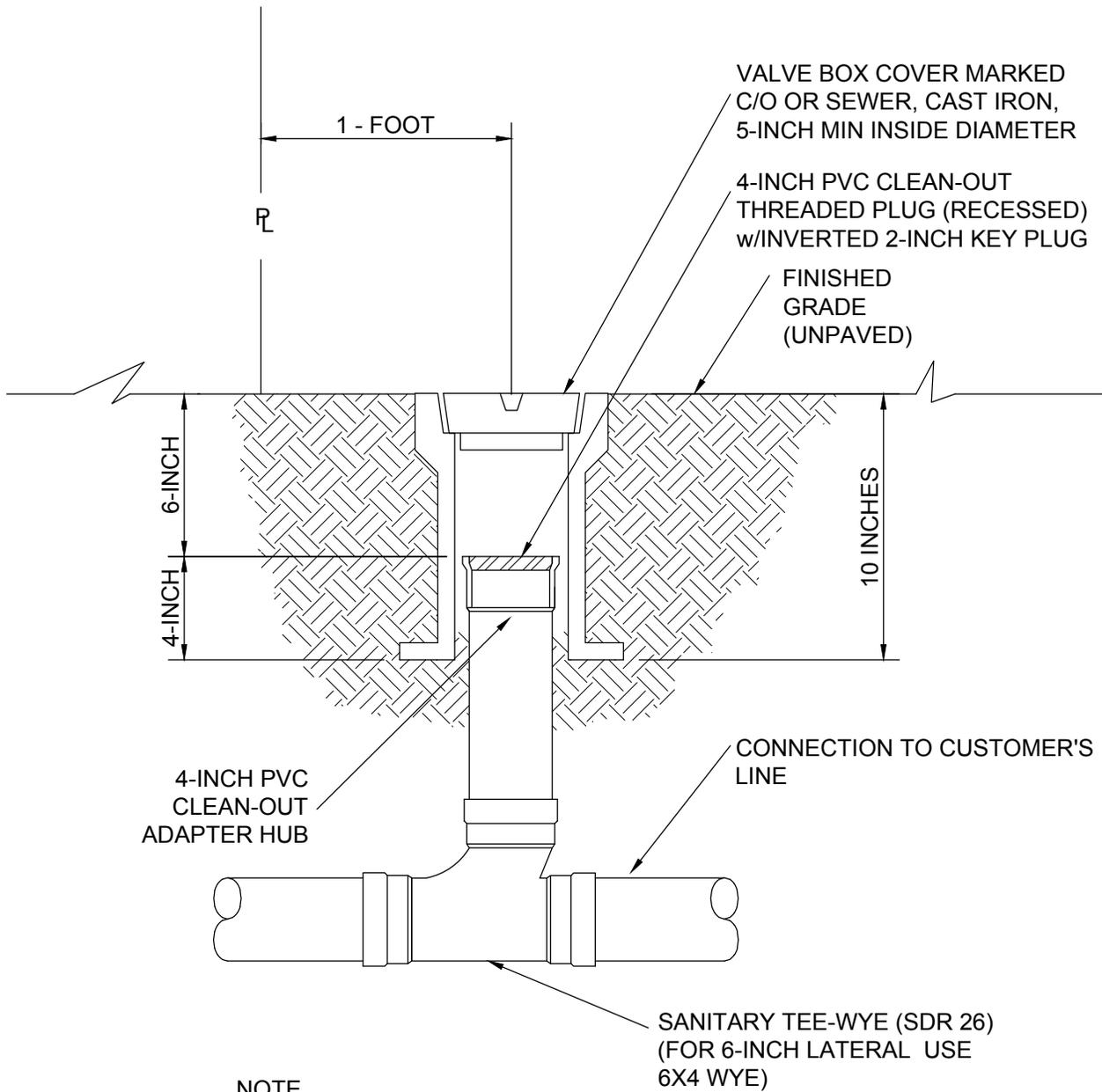
1. CENTER THE DOUBLE WYE FITTING ON THE LOT LINE.
2. INVERT OF SERVICE LATERAL SHALL NOT ENTER SEWER BELOW SPRING LINE.
3. THE TOP OF THE CLEANOUT SHALL TERMINATE 30 TO 40 INCHES ABOVE DESIGN GRADE UNTIL CONNECTION TO A STRUCTURE IS MADE.
4. ALL LATERALS SHALL BE CONSTRUCTED OF SDR 26 PVC.
5. ALL LATERAL LOCATIONS SHALL BE MARKED WITH AN "S" SAW CUT INTO THE TOP OF CURB.

TYPICAL PVC SANITARY SEWER
NEW CONNECTION W/CLEANOUT

HILLSBOROUGH COUNTY, FLORIDA

10/2015

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NOTE

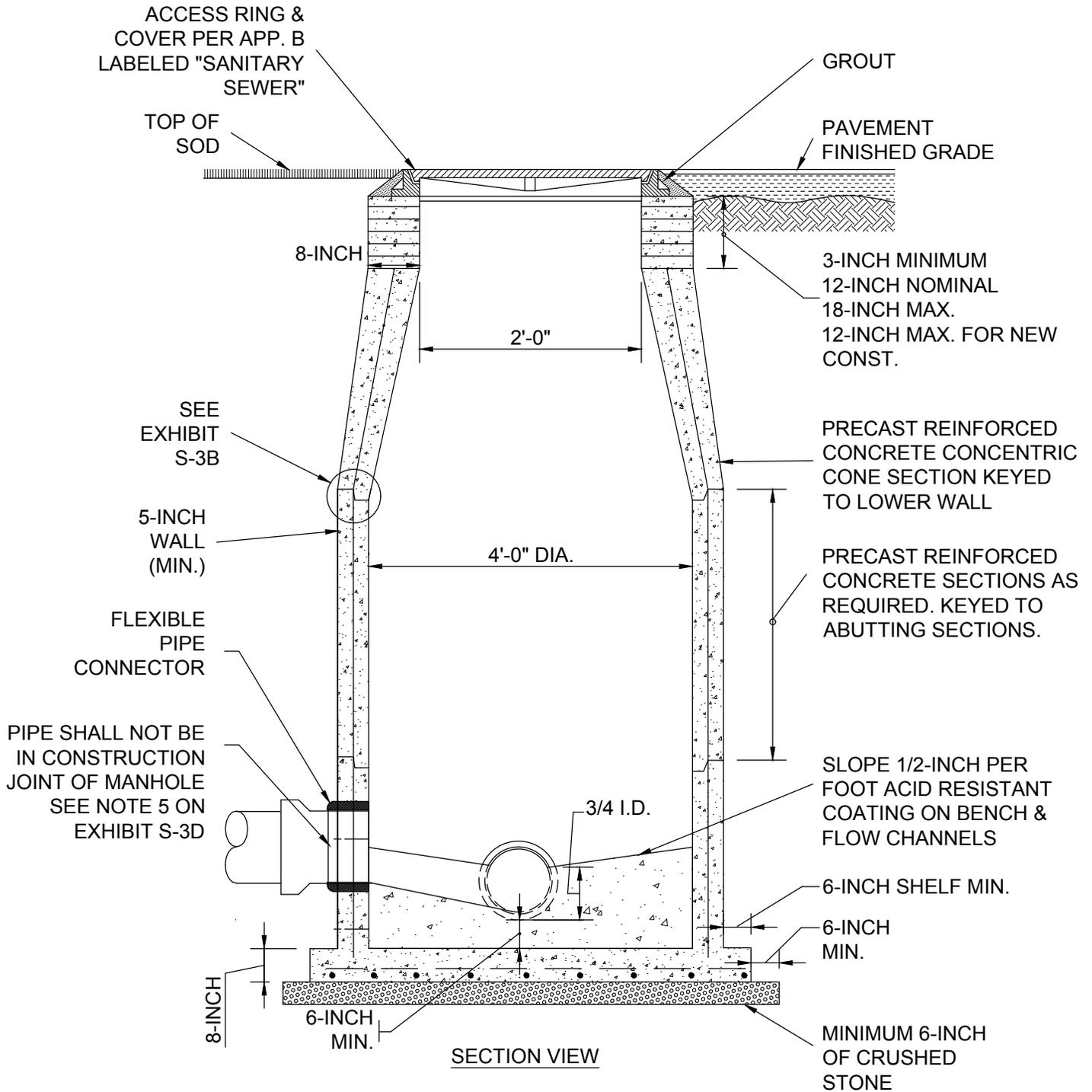
1. ALL PIPING AND FITTINGS TO BE PVC
SDR 26

CLEAN-OUT DETAIL
WITH VALVE BOX COVER

HILLSBOROUGH COUNTY, FLORIDA

10/2015

SCALE: N.T.S.



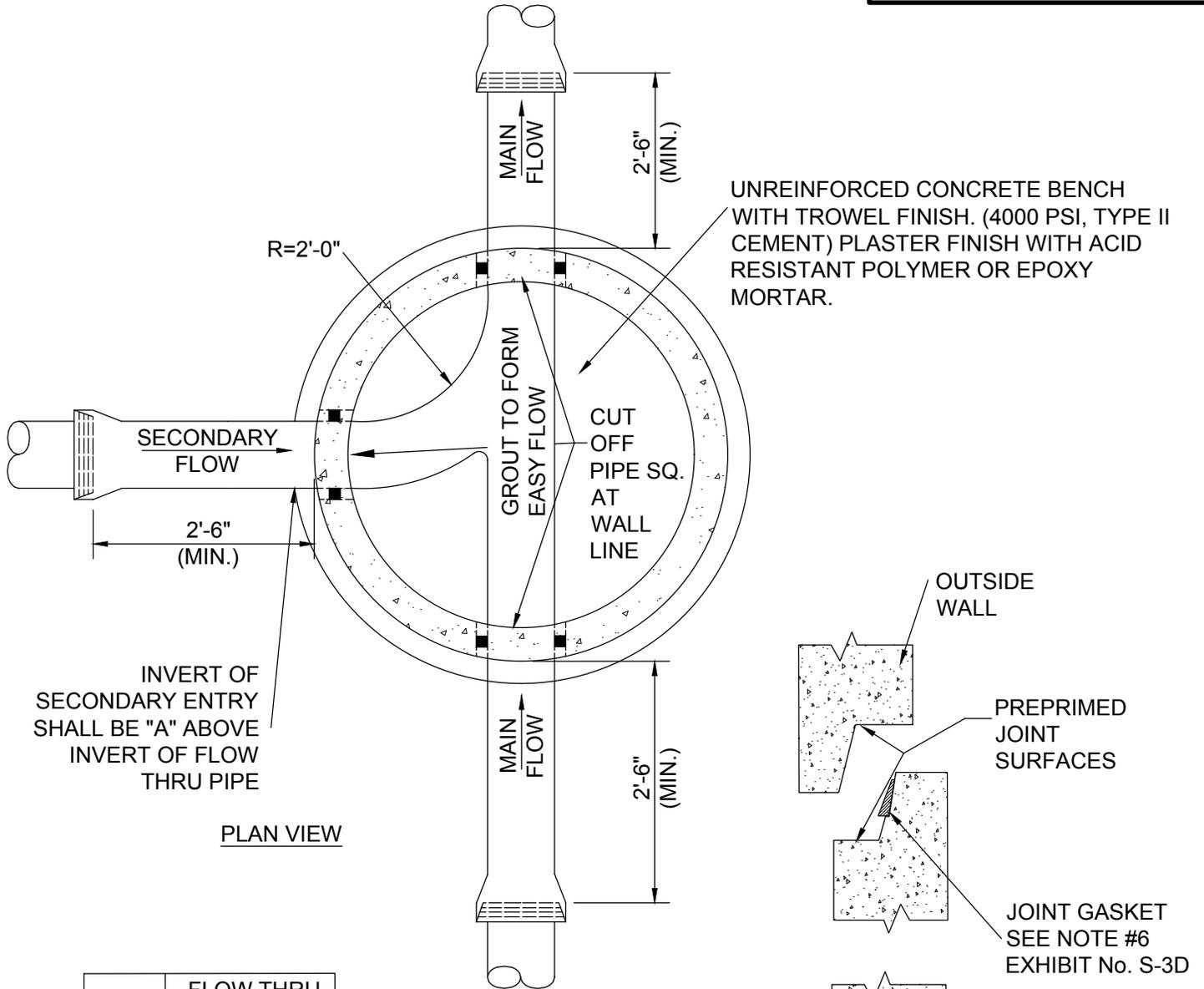
NOTE:

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

10/2015

SCALE: N.T.S.



PLAN VIEW

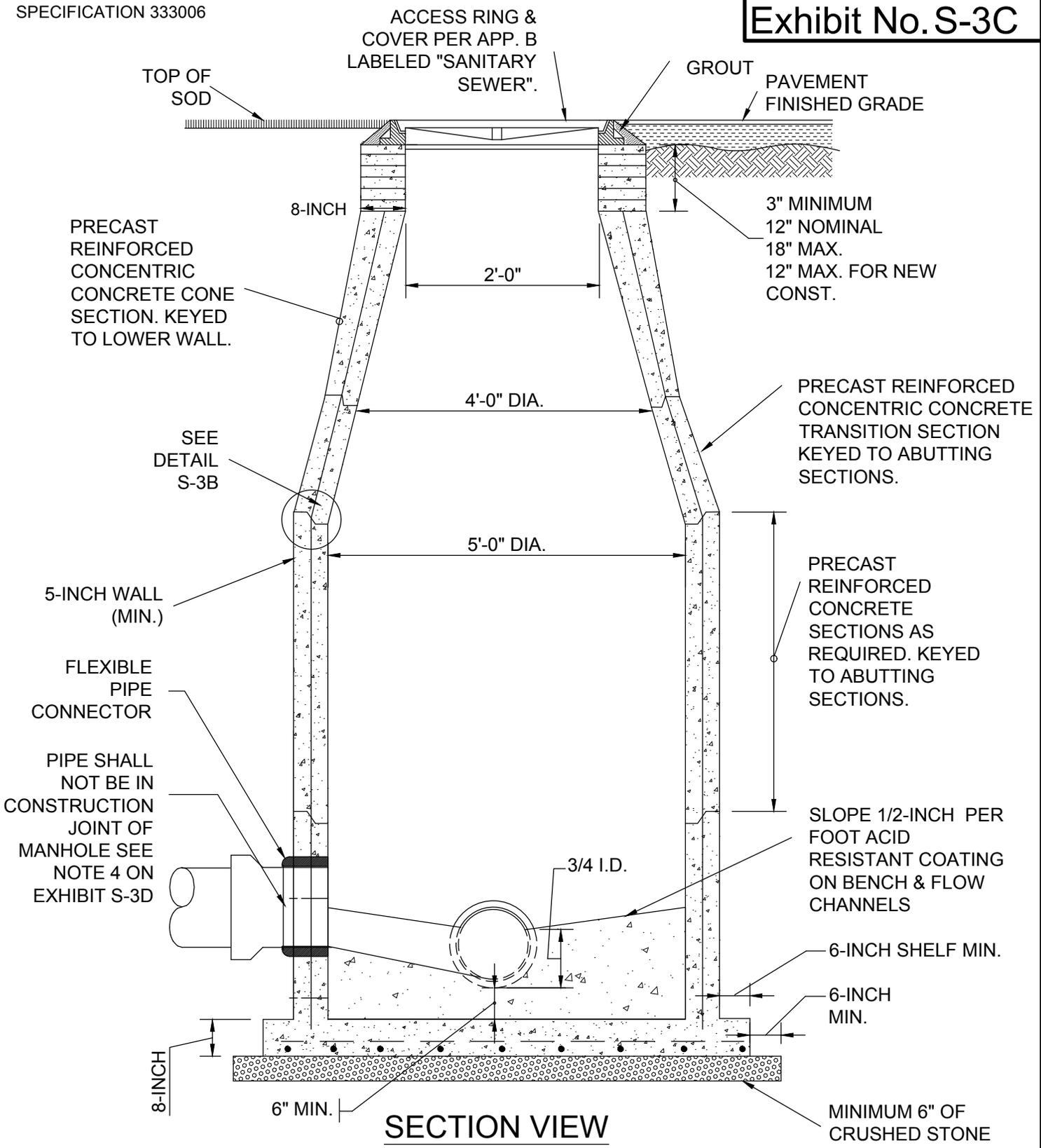
JOINT DETAIL

"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

10/2015
SCALE: N.T.S.



NOTE:
 ALL STANDARD MANHOLE NOTES APPLY. REFER TO EXHIBIT S-3D. DETAIL APPLIES TO MANHOLES WITH DEPTHS GREATER THAN 15 FEET.

**STANDARD 60" PRECAST MANHOLE
 FOR SEWERS >16" IN DIA OR >15' DEEP
 HILLSBOROUGH COUNTY, FLORIDA**

10/2015

SCALE: N.T.S.

NOTES:

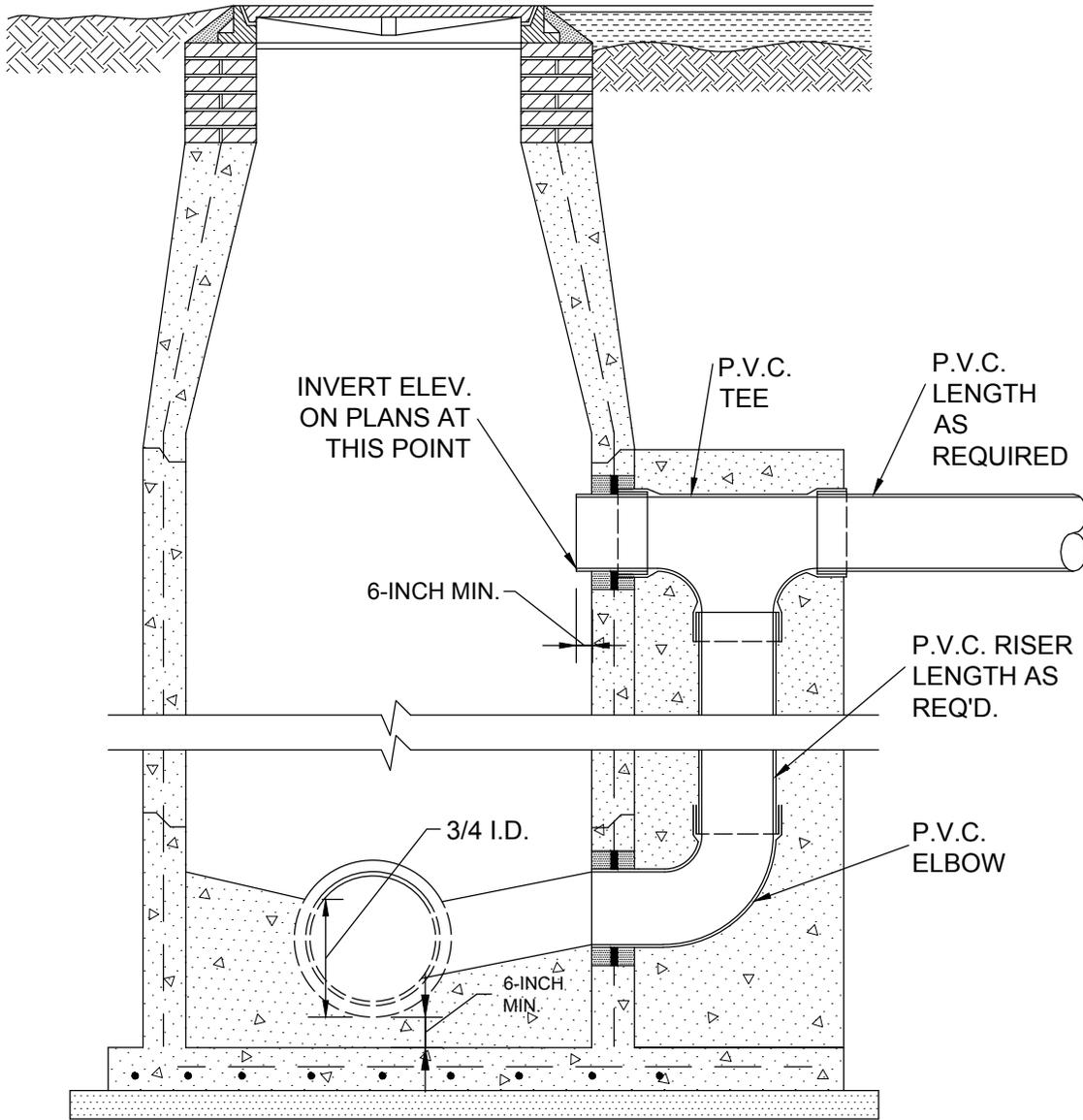
1. PRECAST MANHOLE SECTIONS & BASES SHALL BE MANUFACTURED IN ACCORDANCE WITH LATEST EDITION OF ASTM C478 WITH 4000 P.S.I., TYPE II CEMENT (ASTM C150).
2. CONCRETE PLACED IN MANHOLE INVERTS SHALL HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 4000 P.S.I. AND SHALL UTILIZE TYPE II CEMENT.
3. LIFT HOLES 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 C293) 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 THICK WITH WIDTH AT LEAST 1/2 THE WALL THICKNESS.
7. THE INTERIOR OF THE ADJUSTMENT SECTION (GRADE RINGS) SHALL BE PLASTERED WITH 3/4 INCH ACID RESISTANT MORTAR WHEN CONCRETE IS USED.
8. THE MANHOLE COVER SHALL BE EQUIPPED WITH AN INFLOW PROTECTOR AND SHALL COMPLY WITH SPECIFICATION 333001, PART 3.3.8 THE APPROVED PRODUCTS LIST IN APP. B.
9. BOTTOM BARREL AND BASE OF MANHOLE TO BE MONOLITHICALLY CAST.
10. SERVICE LATERALS SHALL NOT ENTER MANHOLES UNLESS SPECIFIED ON THE PLANS AND THEN MUST BE TREATED AS MAINS (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

10/2015

HILLSBOROUGH COUNTY, FLORIDA

SCALE: N.T.S.



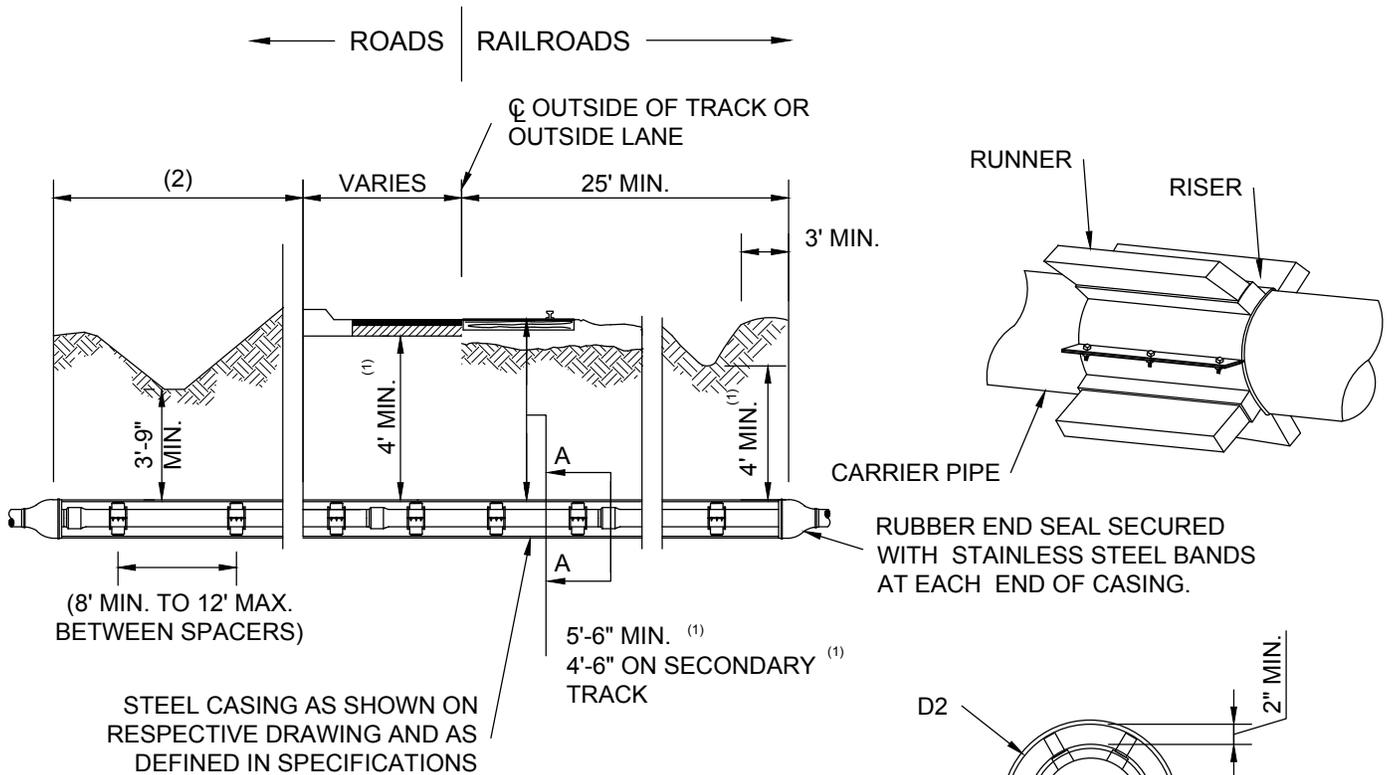
SECTION VIEW

NOTE:
 ALL STANDARD MANHOLE NOTES AND DETAILS
 APPLY. REFER TO EXHIBITS S-5A THROUGH S-5D

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

10/2015

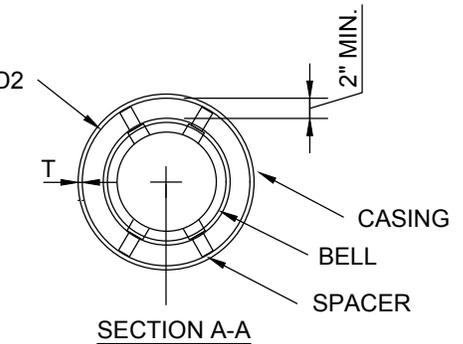
SCALE: N.T.S.



STEEL CASING AS SHOWN ON RESPECTIVE DRAWING AND AS DEFINED IN SPECIFICATIONS

NOTES:

1. VERTICAL DIMENSIONS TYPICAL FOR CASINGS
2. WITH CURB: 6' STATE & 2' COUNTY ROADS MINIMUM
WITHOUT CURB: 8' STATE & 4' COUNTY ROADS MINIMUM
3. STEEL CASING PIPE SHALL CONFORM TO THE REQUIREMENTS OF AWWA C-200 AND ASTM A-139, GRADE B.
4. WHEN CASING IS INSTALLED WITHOUT BENEFIT OF A PROTECTIVE COATING, AND SAID CASING IS NOT CATHODICALLY PROTECTED, THE WALL THICKNESS SHOWN SHALL BE INCREASED TO THE NEAREST STANDARD SIZE WHICH IS A MINIMUM OF 0.063" GREATER THAN THE THICKNESS SHOWN EXCEPT FOR DIAMETERS LESS THAN 12.75".
5. FOR REFERENCE ONLY.



PRESSURE MAIN TO BE RESTRAINED WITH MANUFACTURER'S RESTRAINED JOINTS THROUGH CASING. USE (3) SS CASING SPACER CENTERED ON EACH PIPE LENGTH.

MINIMUM CASING SIZE AND THICKNESS

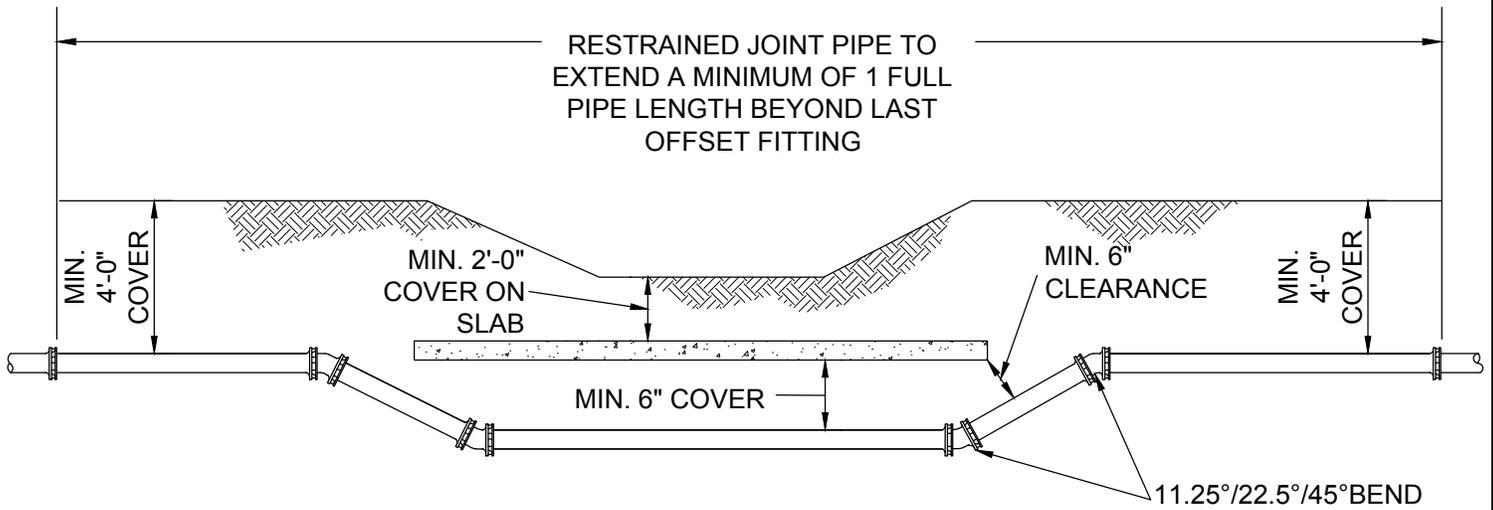
	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"	30"	36"	42"	48"
D.I.P.-M.J.	—	—	4"	6"	—	8"	10"	12"	—	—	14"	16"	18"	20"
D.I.P.-P.O.	—	4"	—	6"	8"	10"	12"	—	—	—	14"	16"	18"	20"
PVC	—	4"	6"	—	8"	10"	12"	—	—	—	—	—	—	—
PVC FUSIBLE	4"	6"	8"	10"	12"	14"	16"	—	18"	20"	—	—	—	—
(3) STEEL CASING PIPE (D2)	10" ⁽⁵⁾	12"	14"	16"	18"	20"	24"	24"	26"	28"	30"	30"	30"	36"
WALL THICKNESS (T) ROADS	.188"	.188"	.250"	.250"	.250"	.250"	.250"	.250"	.312"	.312"	.312"	.312"	.312"	.375"
(4) WALL THICKNESS (T) R.R.	.188"	.188"	.188"	.219"	.250"	.281"	.312"	.312"	.406"	.406"	.406"	.406"	.406"	.469"

CASING DETAILS
JACK & BORE

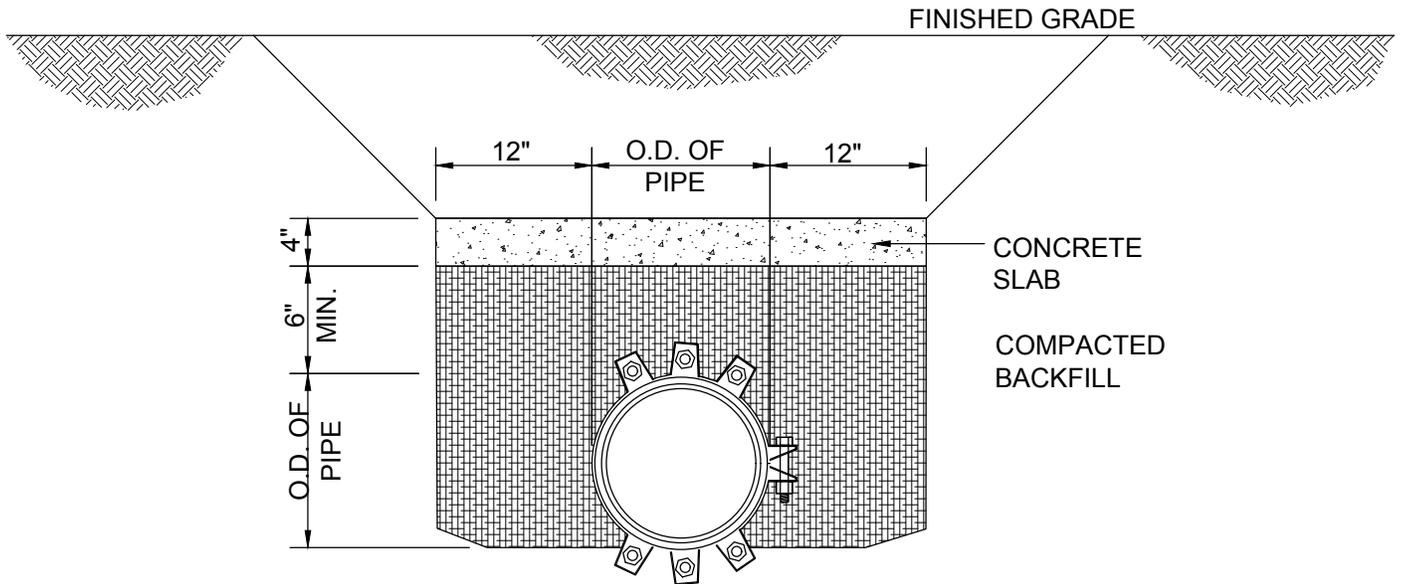
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HILLSBOROUGH COUNTY, FLORIDA

SCALE: N.T.S.



DITCH BOTTOM CLEARANCE DETAIL



CONCRETE SLAB

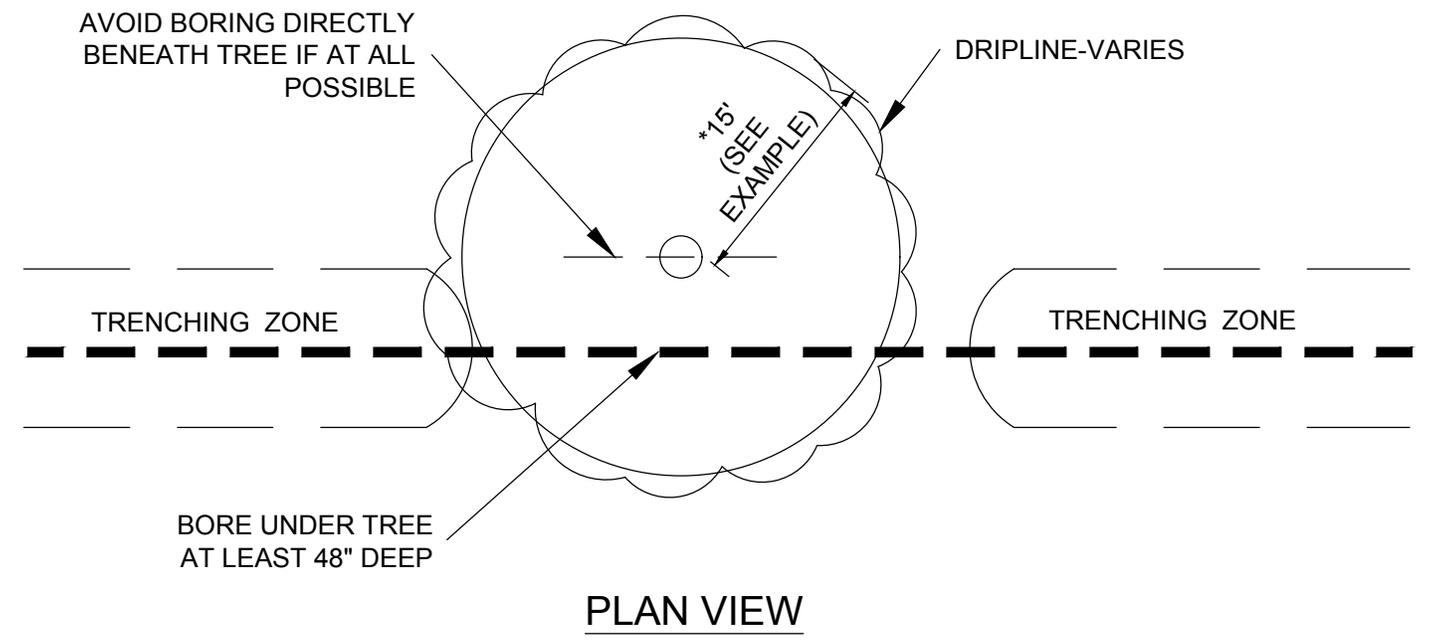
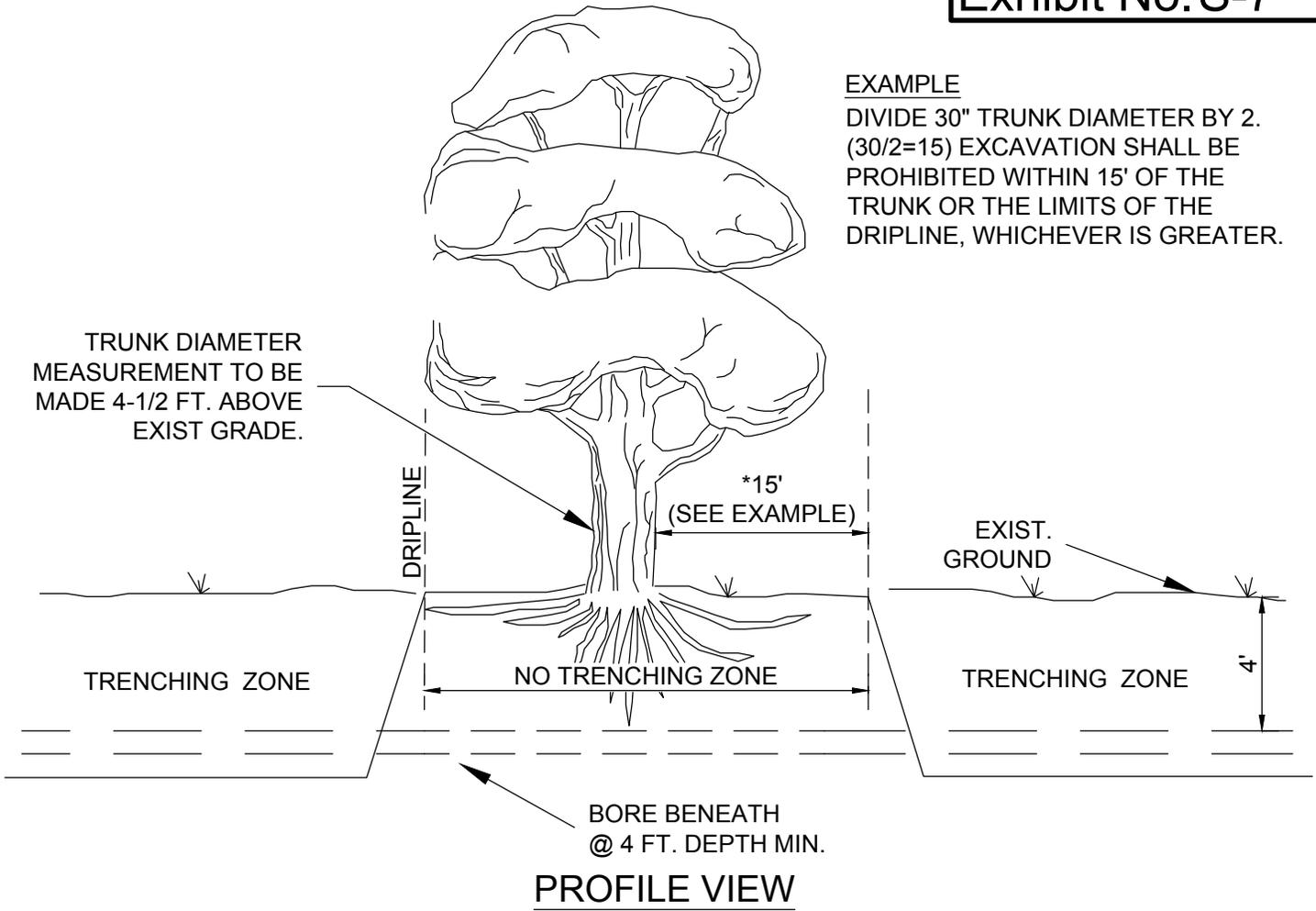
NOTE: SLAB CONCRETE SHALL HAVE A MINIMUM OF 28 DAY COMPRESSIVE STRENGTH OF 3000 psi (min).

DITCH BOTTOM CLEARANCE
AND CONCRETE PROTECTIVE SLAB
HILLSBOROUGH COUNTY, FLORIDA

10/2015

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.

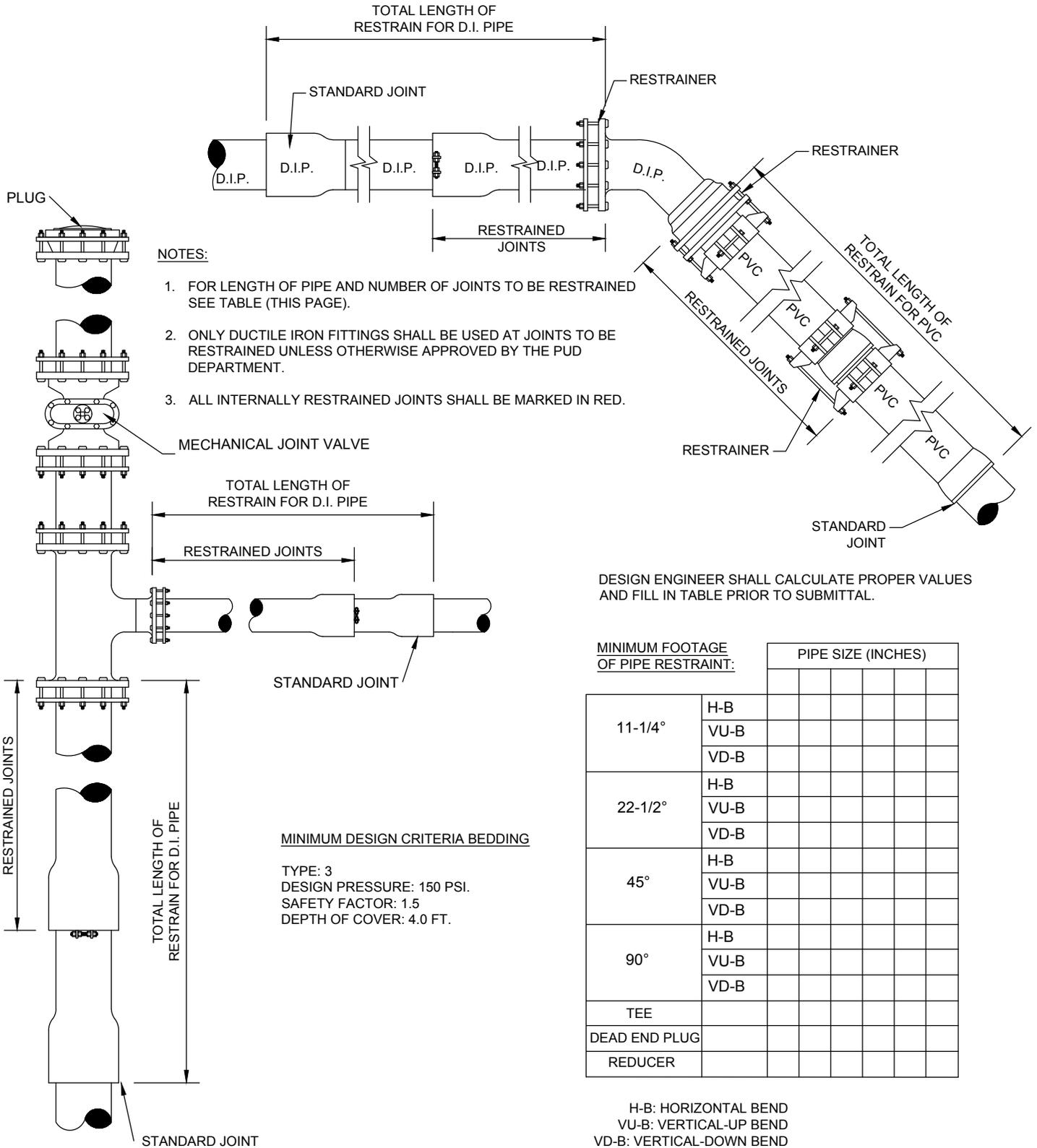


BORING FOR UTILITIES

10/2015

HILLSBOROUGH COUNTY, FLORIDA

SCALE: N.T.S.



NOTES:

1. FOR LENGTH OF PIPE AND NUMBER OF JOINTS TO BE RESTRAINED SEE TABLE (THIS PAGE).
2. ONLY DUCTILE IRON FITTINGS SHALL BE USED AT JOINTS TO BE RESTRAINED UNLESS OTHERWISE APPROVED BY THE PUD DEPARTMENT.
3. ALL INTERNALLY RESTRAINED JOINTS SHALL BE MARKED IN RED.

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						

MINIMUM DESIGN CRITERIA BEDDING

TYPE: 3
 DESIGN PRESSURE: 150 PSI.
 SAFETY FACTOR: 1.5
 DEPTH OF COVER: 4.0 FT.

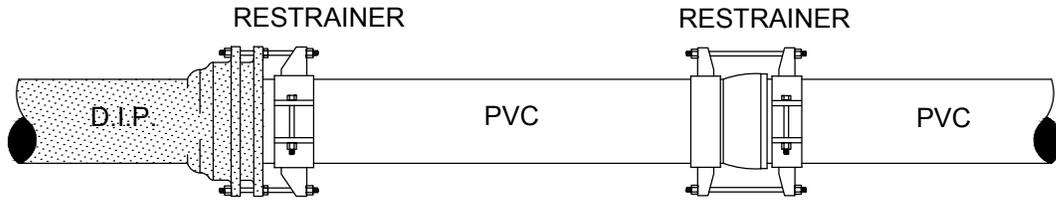
H-B: HORIZONTAL BEND
 VU-B: VERTICAL-UP BEND
 VD-B: VERTICAL-DOWN BEND

RESTRAINED JOINT-STANDARD

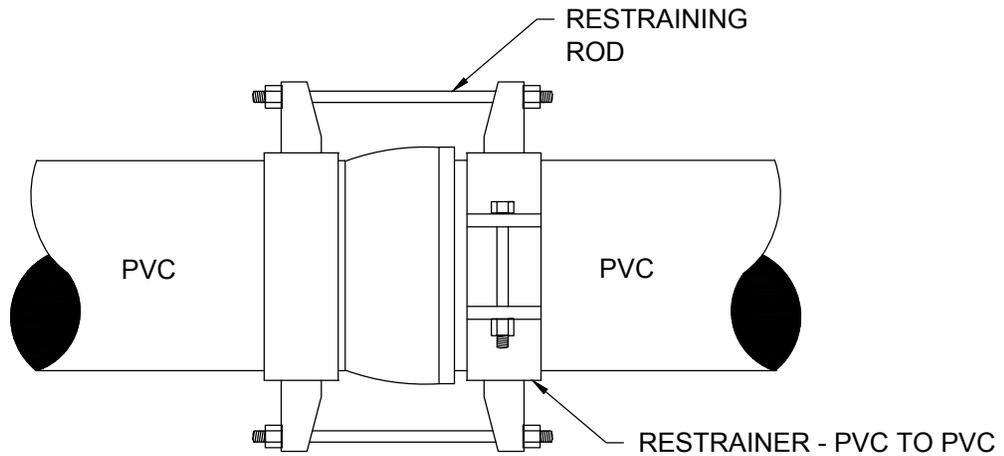
10/2015

HILLSBOROUGH COUNTY, FLORIDA

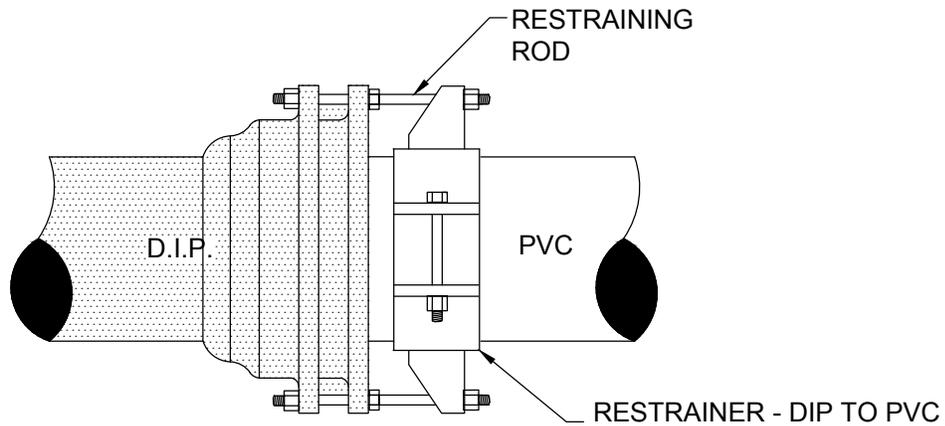
SCALE: N.T.S.



METHOD OF RESTRAINING PUSH-ON JOINT PIPE



DETAIL PUSH-ON JOINT



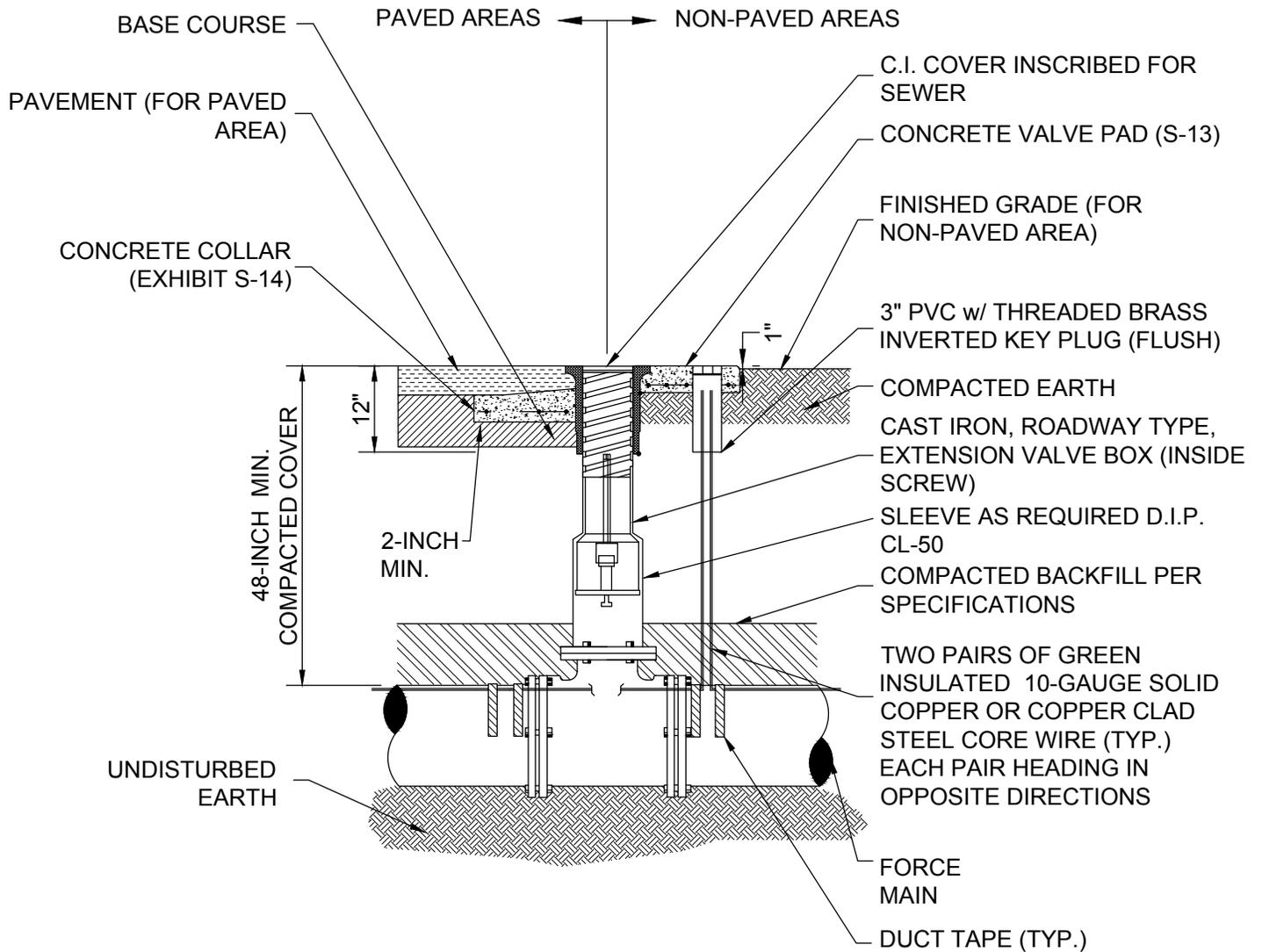
DETAIL M.J. JOINT

RESTRAINED JOINT
FOR PVC C-900 PIPE (4" TO 12")

HILLSBOROUGH COUNTY, FLORIDA

10/2015

SCALE: N.T.S.



NOTES:

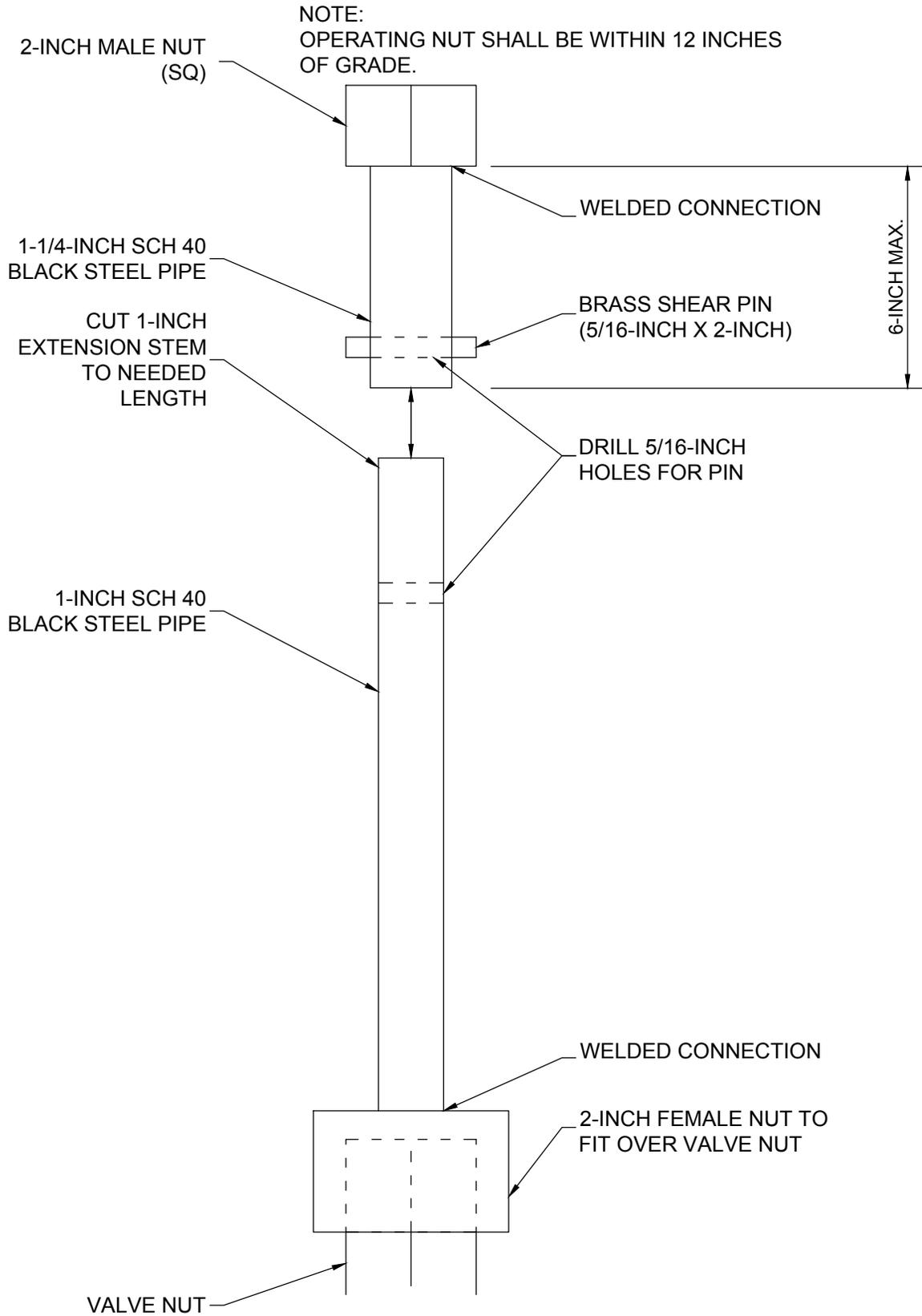
1. EXTENSION ON VALVE BOX SHALL BE SET SO AS TO RESERVE 1/2 OF THE ADJUSTMENT LENGTH FOR FUTURE USE.
2. OPERATING NUT SHALL BE SO AS TO BE WITHIN 12 INCHES OF GRADE. EXTENSION TO BE PROVIDED AS REQUIRED.
3. ALL NON-METALLIC PIPE SHALL REQUIRE TWO INSULATED 10 GAUGE SOLID COPPER OR COPPER CLAD STEEL CORE LOCATING WIRES TAPED WITH 2 INCH WIDE DUCT TAPE AT THE 10:00 AND 2:00 POSITIONS ON THE PIPE AT EVERY JOINT AND 4 TO 5 FEET SPACING. WIRE FOR DIRECTIONAL DRILL APPLICATIONS SHALL BE COPPER CLAD "HARD DRAWN" STEEL CORE WITH A MINIMUM BREAKING STRENGTH OF 1000 PSI.
4. LOCATING WIRES TO TERMINATE 4 INCHES ABOVE THE CONCRETE VALVE PAD AND FOLDED BACK INSIDE THE 3-INCH PVC ACCESS PIPE AND PLUGGED.
5. LOCATING WIRES SHALL BE CAPABLE OF DETECTION BY A CABLE LOCATOR AND PASS A FIELD CONDUCTIVITY TEST THAT IS WITNESSED BY THE COUNTY FROM END TO END OF WIRES.
6. SPLICES SHALL BE CAPABLE OF COMPLETE SUBMERSION.
7. NO MORE THAN ONE SPLICE BETWEEN VALVES IS ALLOWED.

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

10/2015

HILLSBOROUGH COUNTY, FLORIDA

SCALE: N.T.S.

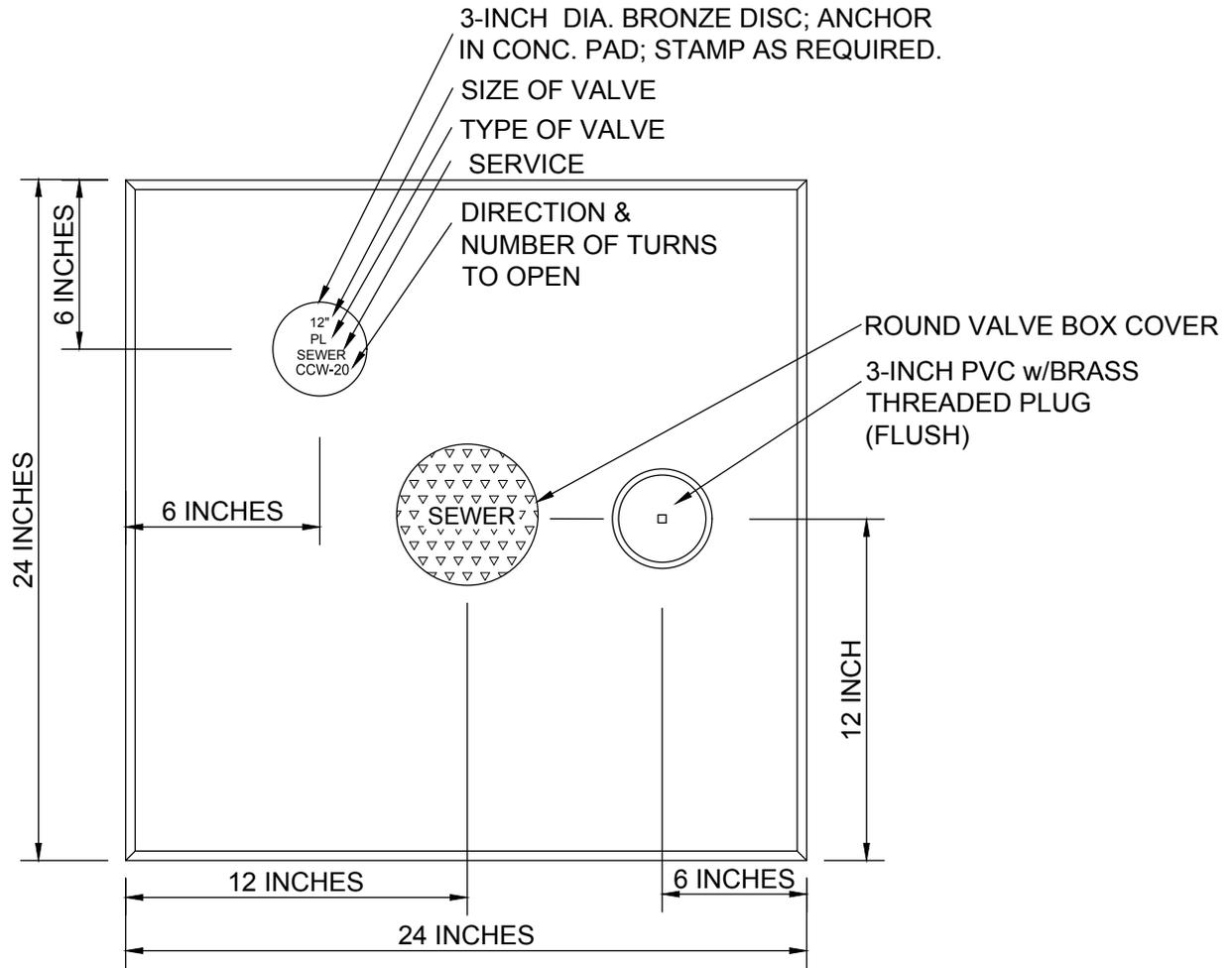
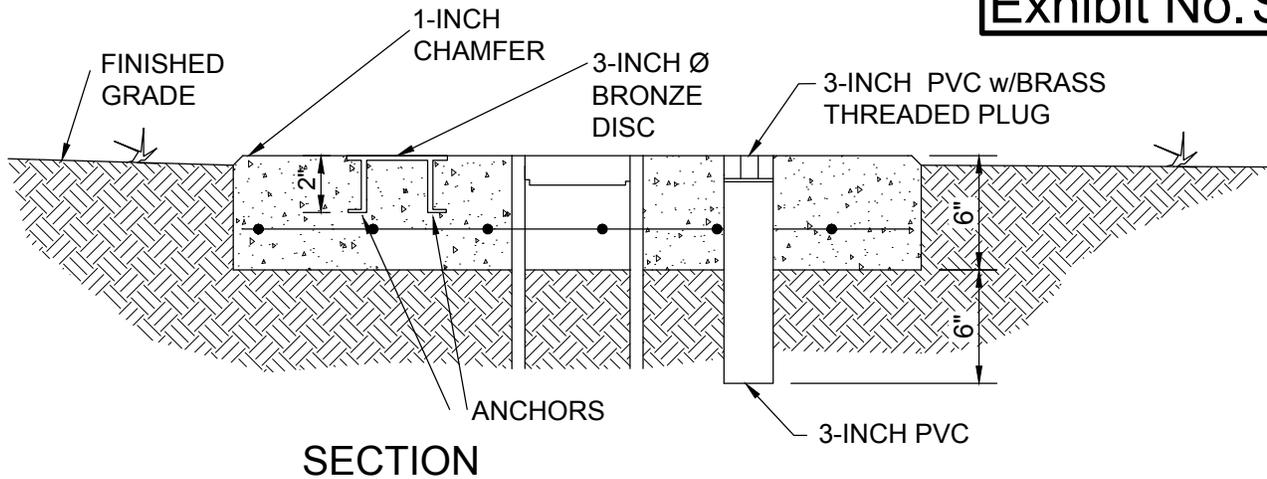


VALVE EXTENSION FOR PLUG VALVES
W/SHEAR PIN

10/2015

HILLSBOROUGH COUNTY, FLORIDA

SCALE: N.T.S.



NOTES:

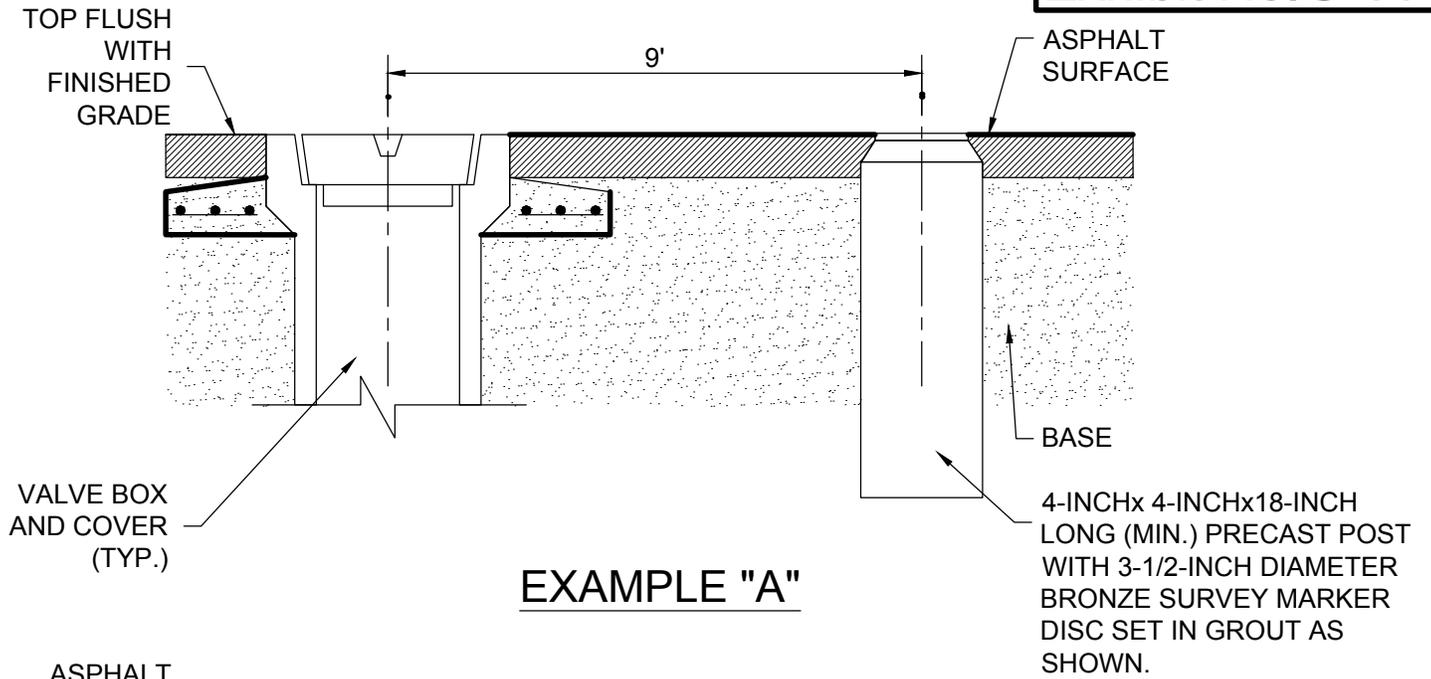
1. CONCRETE TO BE TYPE I GENERAL PORTLAND CEMENT WITH 3/4" TOP SIZE AGGREGATE AND SHALL DEVELOP A 28-DAY STRENGTH OF 3000 P.S.I.
2. REINFORCING STEEL SHALL BE 6x6 - W 1.4xW 1.4 W.W.F.
3. CONCRETE VALVE PAD SHALL BE POURED IN PLACE AND SHALL BE SET 1/2" ABOVE FINISHED GRADE

CONCRETE VALVE PAD
(FOR UNPAVED AREAS)

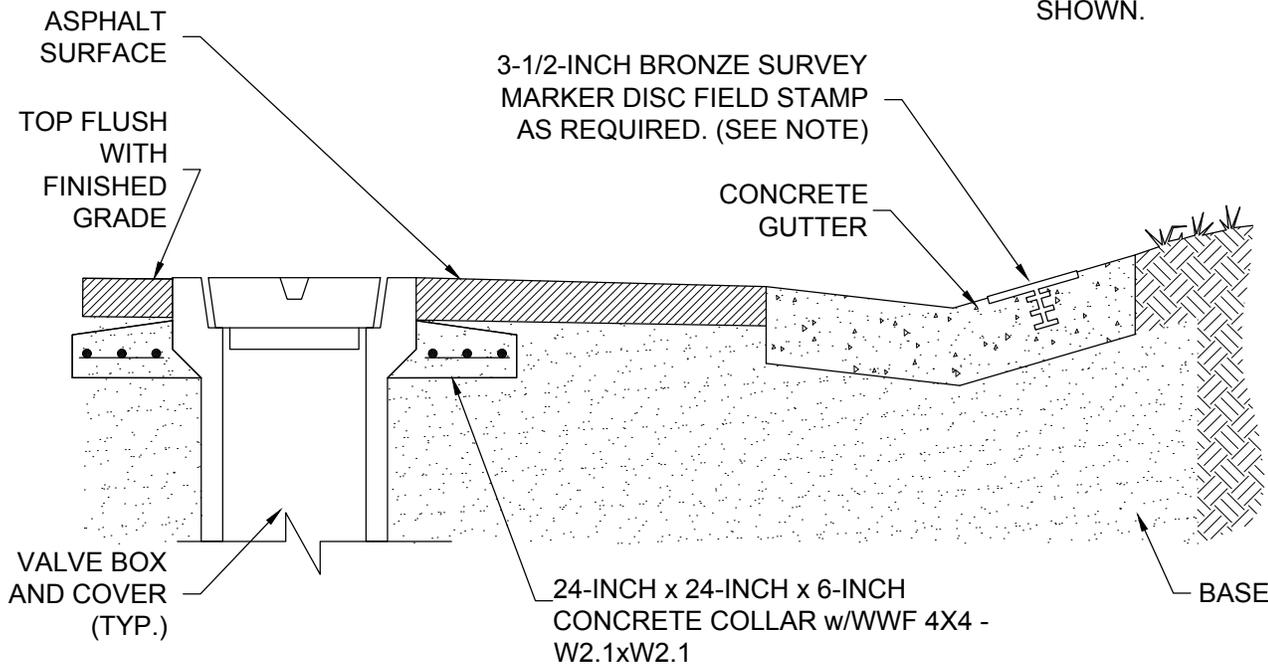
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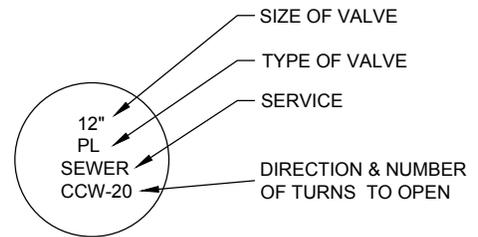


EXAMPLE "A"



EXAMPLE "B"

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



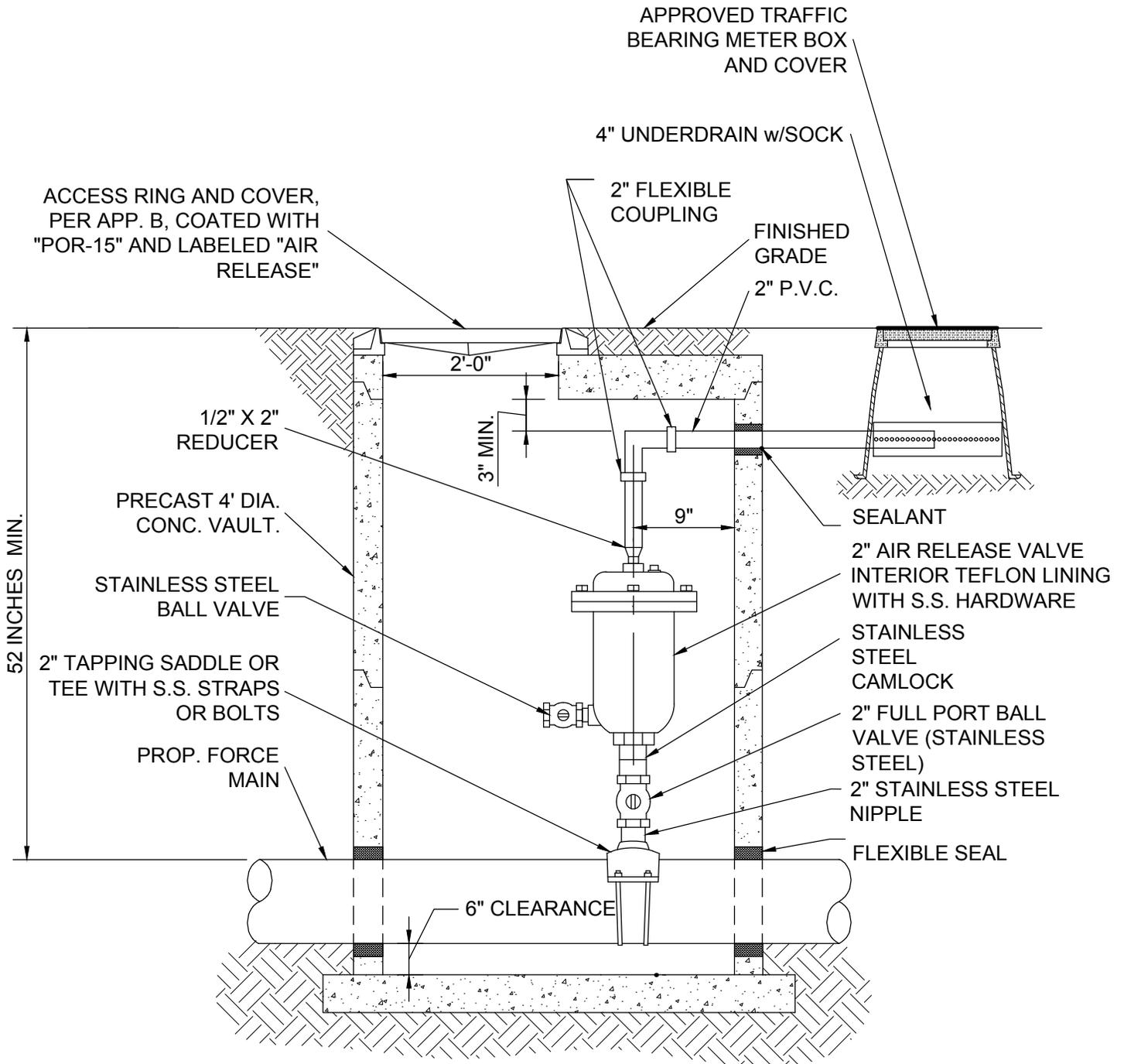
MARKER DISC DETAIL

VALVE BOX AND MARKER INSTALLATION
FOR PAVED AREAS

10/2015

HILLSBOROUGH COUNTY, FLORIDA

SCALE: N.T.S.



NOTES:

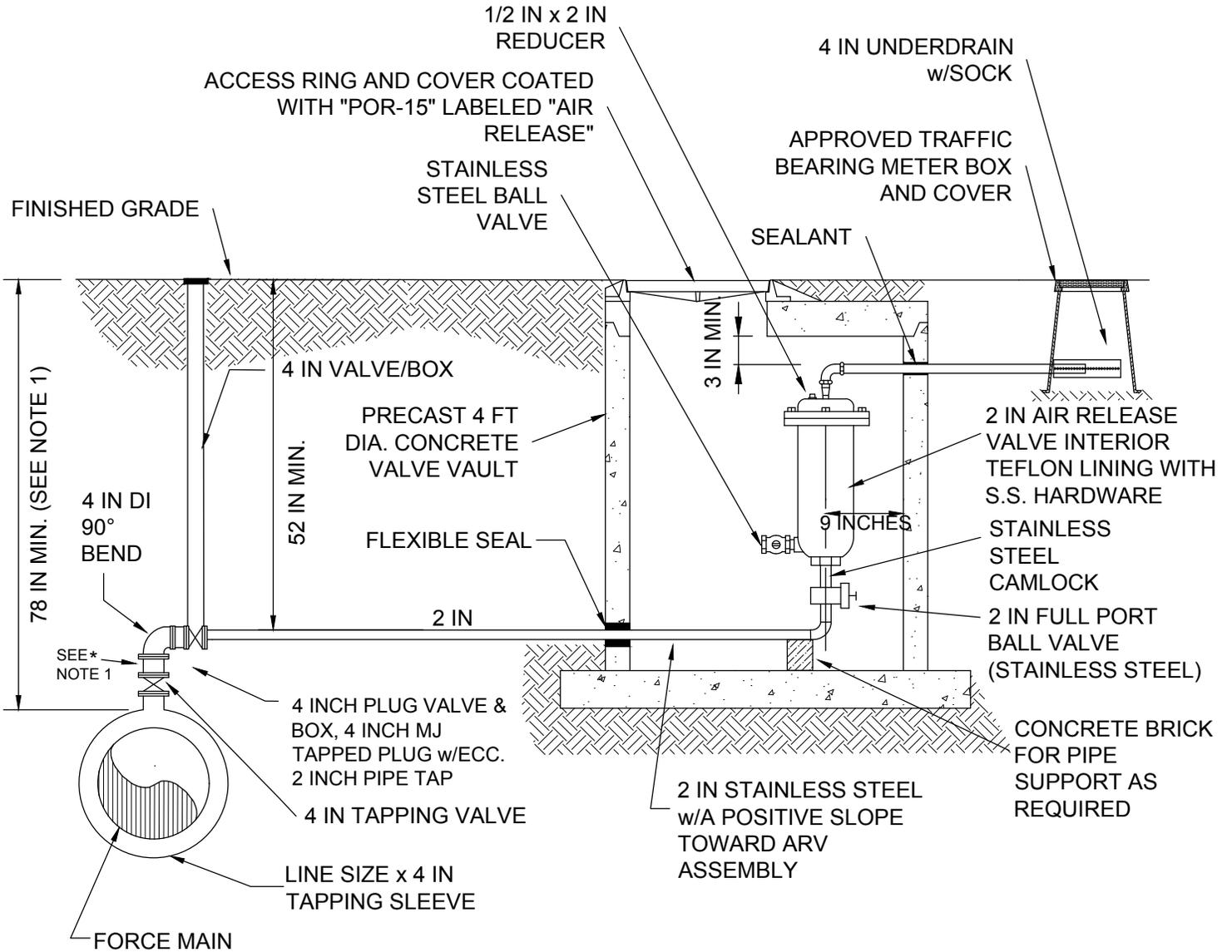
1. ADJUST DEPTH OF PROPOSED FORCE MAIN SO VALVE VAULT CAN BE INSTALLED FLUSH WITH THE PROPOSED GRADE.
2. ENGINEER SHALL SUBMIT FLOTATION CALCULATIONS TO THE COUNTY. VAULT SHALL BE TRAFFIC BEARING (H-20).
3. SEE APPENDIX B FOR APPROVED PRODUCTS.

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

10/2015

HILLSBOROUGH COUNTY, FLORIDA

SCALE: N.T.S.



NOTES:

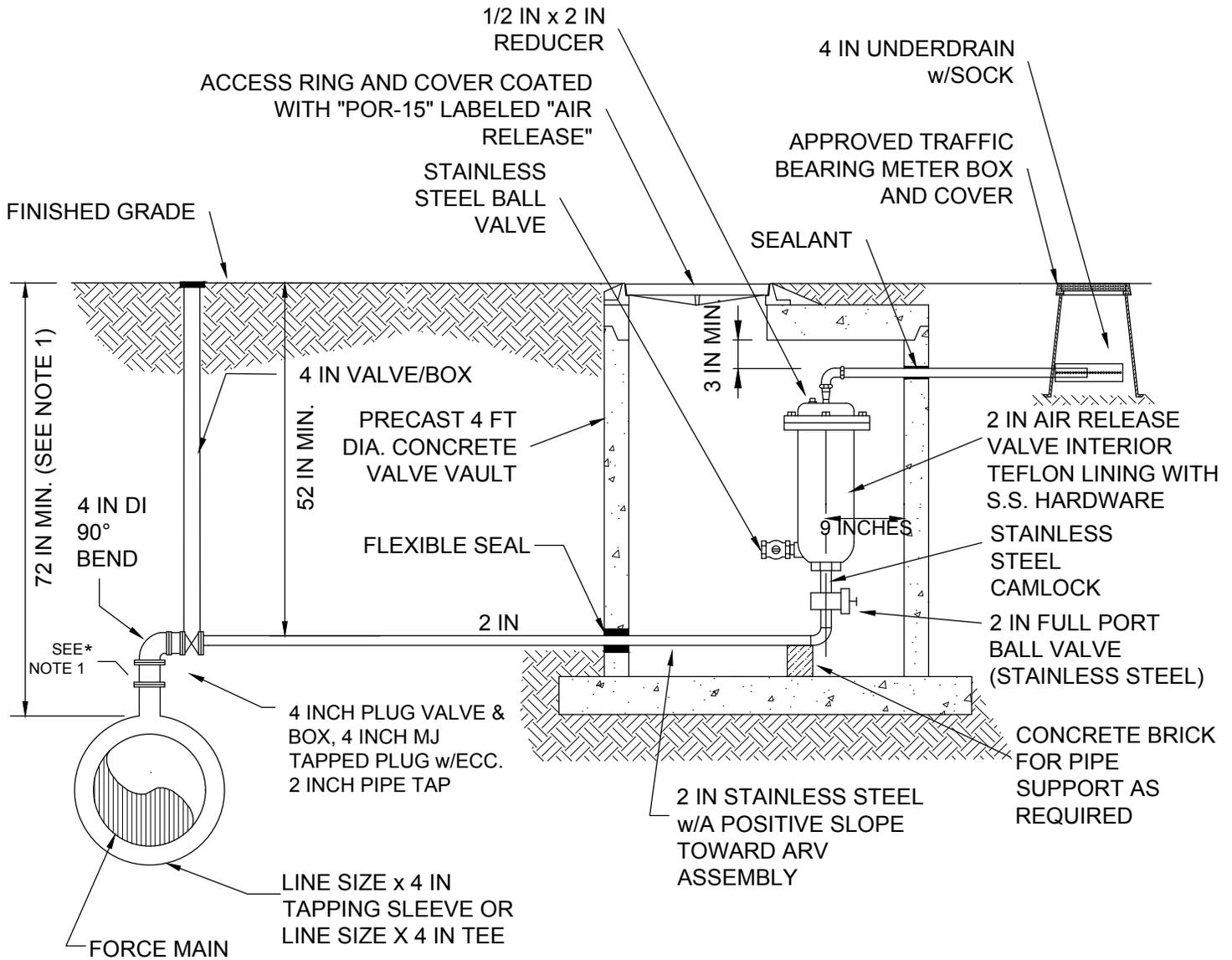
1. THE MINIMUM DEPTH OF THE ENTIRE PROPOSED FORCE MAIN SHALL BE INCREASED AS SHOWN TO ENSURE THE VALVE VAULT FOR AN AUTOMATIC ARV CAN BE INSTALLED FLUSH WITH THE PROPOSED GRADE. * IF A FOSTER ADAPTER IS USED THE DEPTH OF BURY CAN BE REDUCED 10 INCHES
2. ENGINEER SHALL SUBMIT FLOTATION CALCULATIONS TO THE COUNTY. VAULT SHALL BE TRAFFIC BEARING (H-20).
3. SEE APPENDIX B FOR APPROVED PRODUCTS.

**AUTOMATIC AIR RELEASE VALVE
ASSEMBLY - OFFSET**

10/2015

HILLSBOROUGH COUNTY, FLORIDA

SCALE: N.T.S.



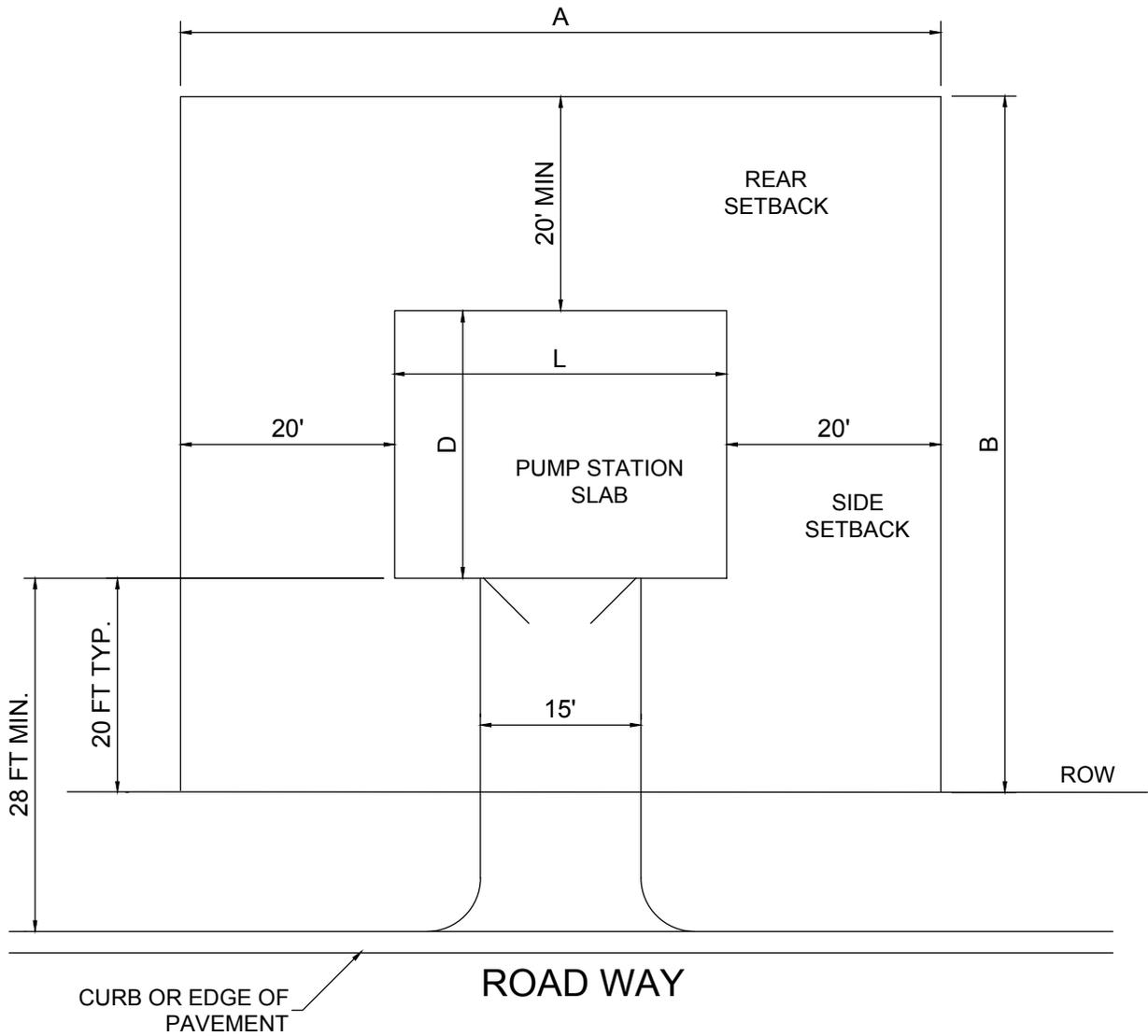
NOTES:

1. THE MINIMUM DEPTH OF THE ENTIRE PROPOSED FORCE MAIN SHALL BE INCREASED AS SHOWN TO ENSURE THE VALVE VAULT FOR AN AUTOMATIC ARV CAN BE INSTALLED FLUSH WITH THE PROPOSED GRADE. * IF A FOSTER ADAPTER IS USED THE DEPTH OF BURY CAN BE REDUCED 10 INCHES
2. ENGINEER SHALL SUBMIT FLOTATION CALCULATIONS TO THE COUNTY. VAULT SHALL BE TRAFFIC BEARING (H-20).
3. SEE APPENDIX B FOR APPROVED PRODUCTS.

NEW CONSTRUCTION (LINE OUT OF SERVICE)
 AIR RELIEF VALVE ASSEMBLY - OFFSET
 HILLSBOROUGH COUNTY, FLORIDA

10/2015

SCALE: N.T.S.



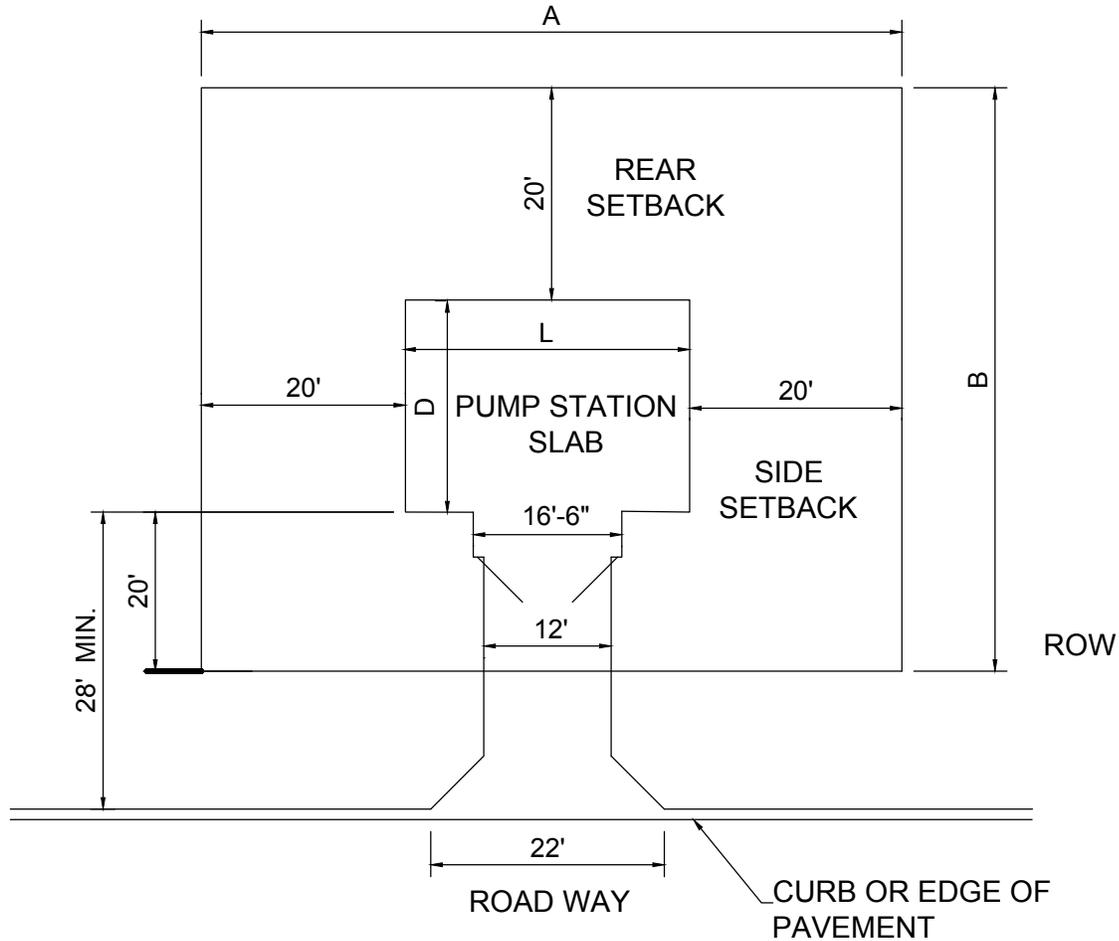
WETWELL DIAM (FT)	MIN. SLAB		MIN PARCEL (FT)	
	L	D	A	B
6	26'-6"	21'	66'-6"	61'
8	28'-6"	22'	68'-6"	62'
10	31'	24'	71'	64'

**STANDARD DUPLEX PUMP STATION
MINIMUM SITE DIMENSIONS**

HILLSBOROUGH COUNTY, FLORIDA

10/2015

SCALE: N.T.S.



WETWELL
DIAM (FT)
6

MIN. SLAB
L D
20'-10" 16'-6"

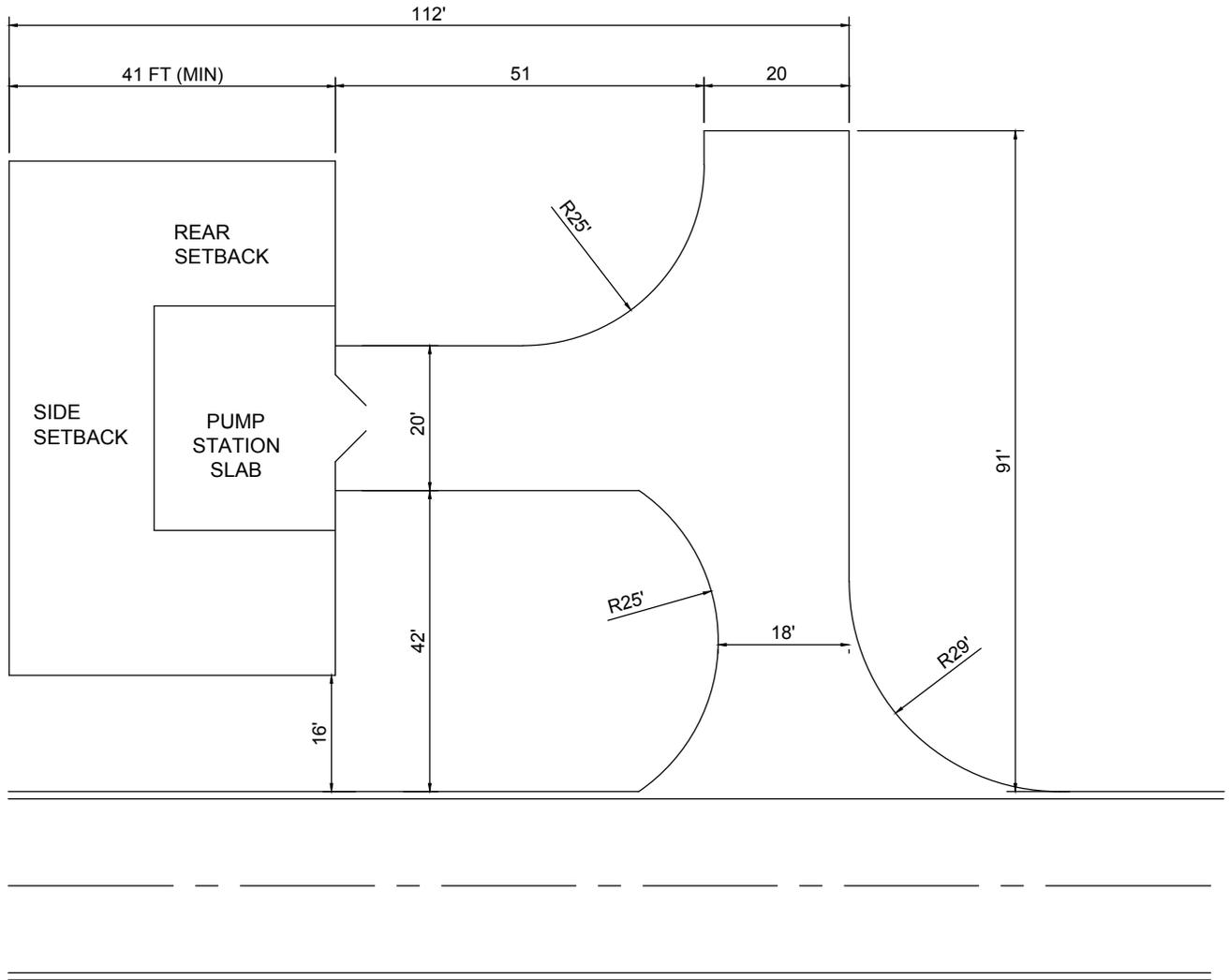
MIN PARCEL
A B
60'-10" 56'-6"

LOW FLOW GRINDER PUMP STATION
MINIMUM SITE DIMENSIONS

HILLSBOROUGH COUNTY, FLORIDA

10/2015

SCALE: N.T.S.



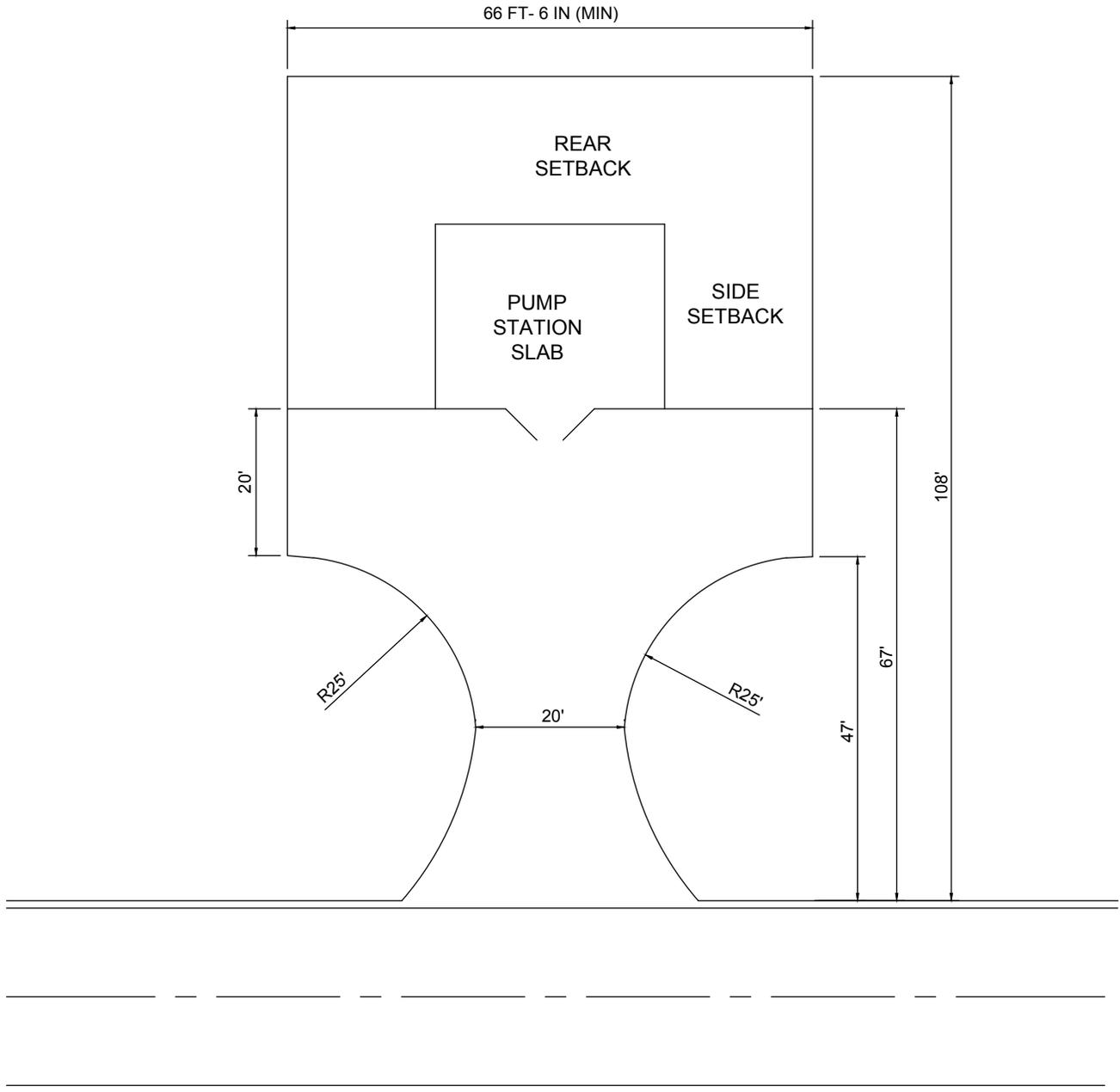
NOTE: THE DIMENSIONS ARE BASED ON THE MINIMUM PUMP STATION LAYOUT AS SHOWN IN EXHIBIT S-13A

TURNAROUND DETAIL
LAYOUT 'A' (WHEN REQUIRED)

HILLSBOROUGH COUNTY, FLORIDA

10/2015

SCALE: N.T.S.



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

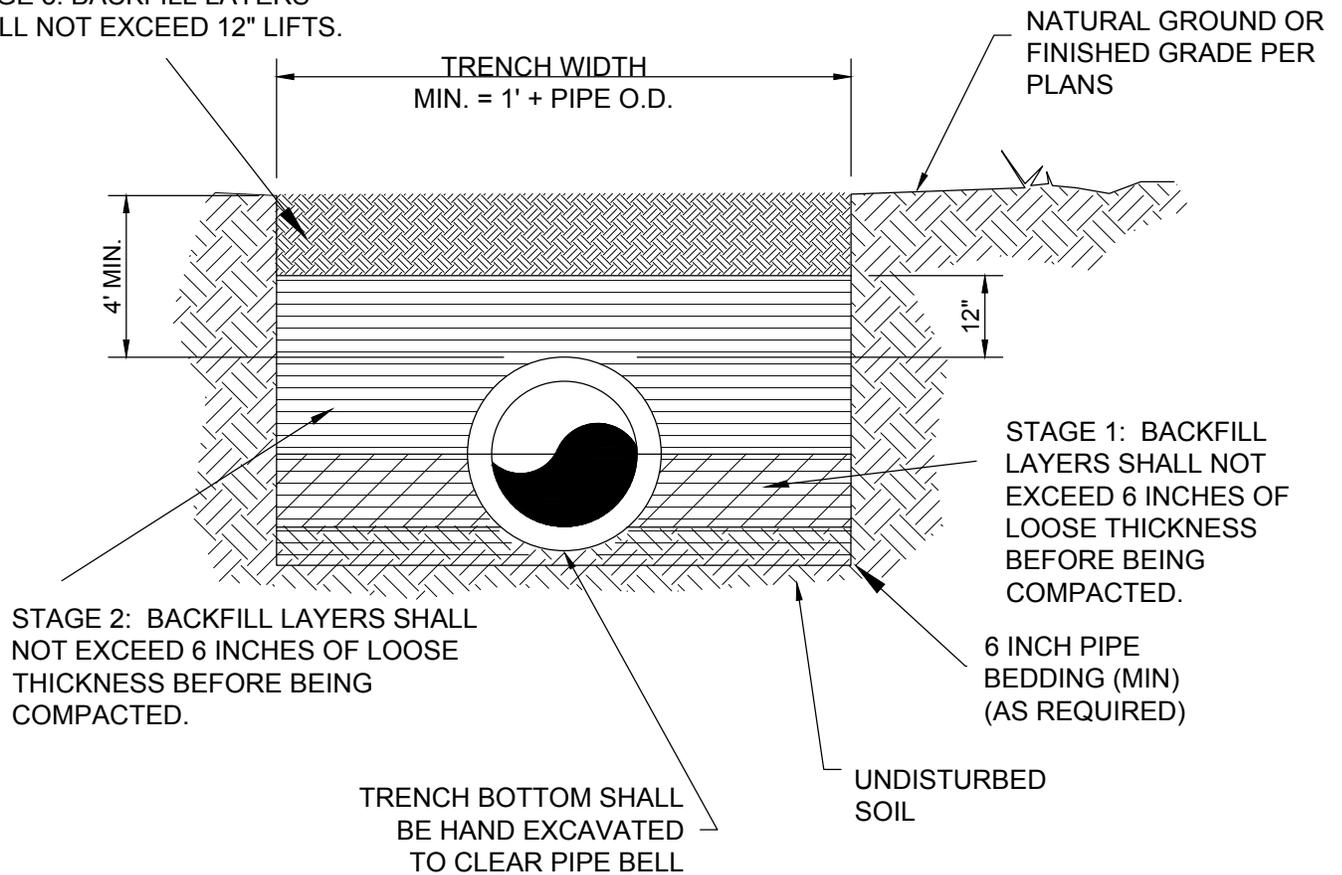
TURNAROUND DETAIL
LAYOUT "B" (WHEN REQUIRED)

HILLSBOROUGH COUNTY, FLORIDA

10/2015

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

10/2015

SCALE: N.T.S.