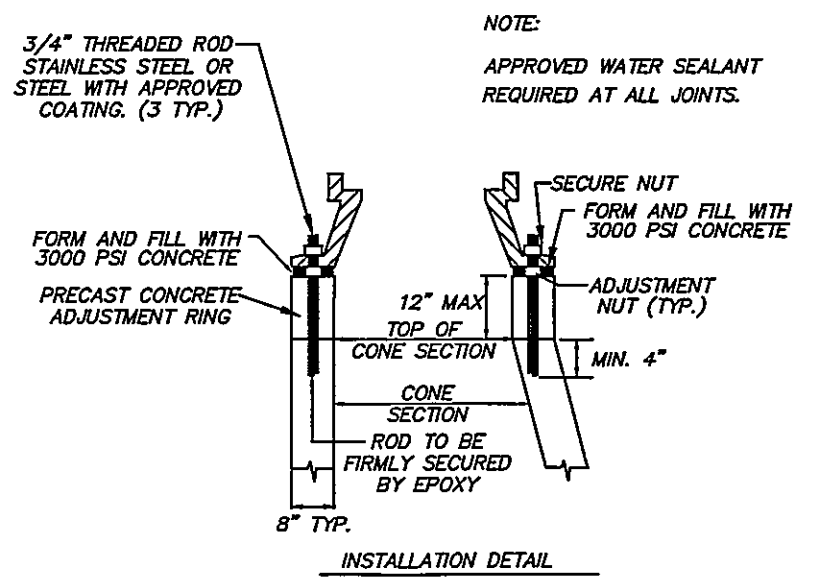
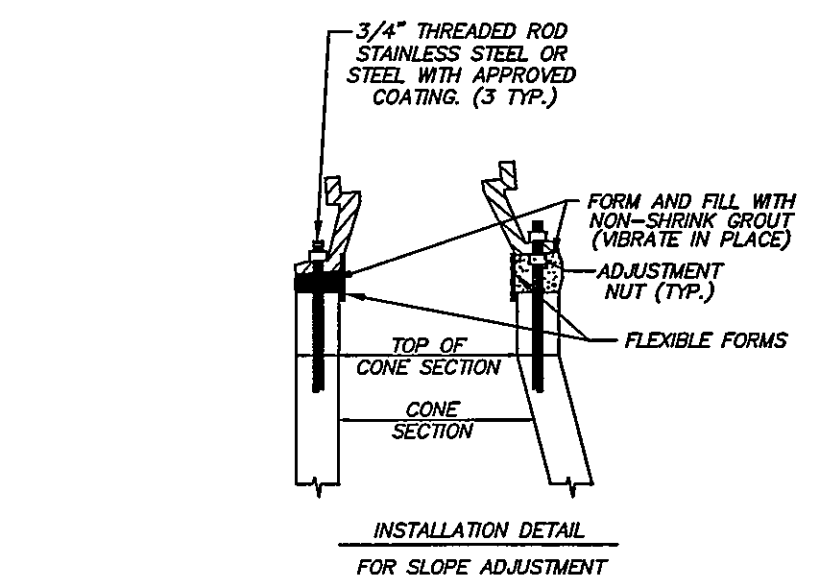
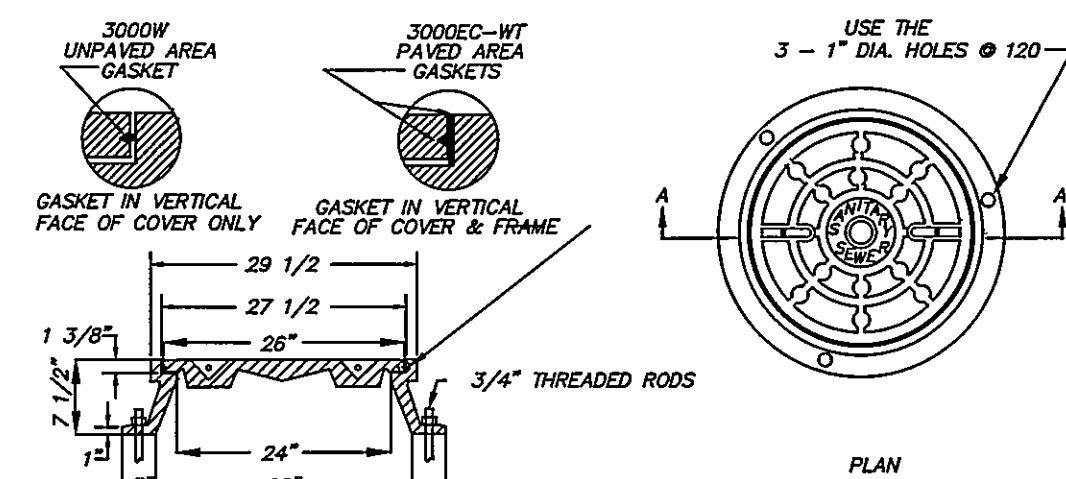


ALTERNATE PIPE SUPPORT IN CASING PIPE

18" LONG TREATED TIMBER SKIDS OF APPROPRIATE WIDTH SO THAT BELLS OR FLANGES DO NOT REST ON CASING WITH MORE THAN 3/4" FREE PLAY. SKIDS TO BE PLACED AT 4'-0" O.C. AND SECURED WITH 2" x 1/4" GALV. STEEL STRAPS OR 1" S.S. BANDS. SOAP-BASED LUBRICANT MAY BE USED FOR SLIDING OF SKID WITH DUCTILE IRON PIPE AND FLAX-BASED LUBRICANT MAY BE USED FOR SLIDING OF SKID WITH PVC PIPE.

NOTE: A 1" DRAIN WILL BE REQUIRED ON THE LOWER END OF THE CASING IF THE CASING ENDS ARE SEALED WITH MORTAR AND BRICK.

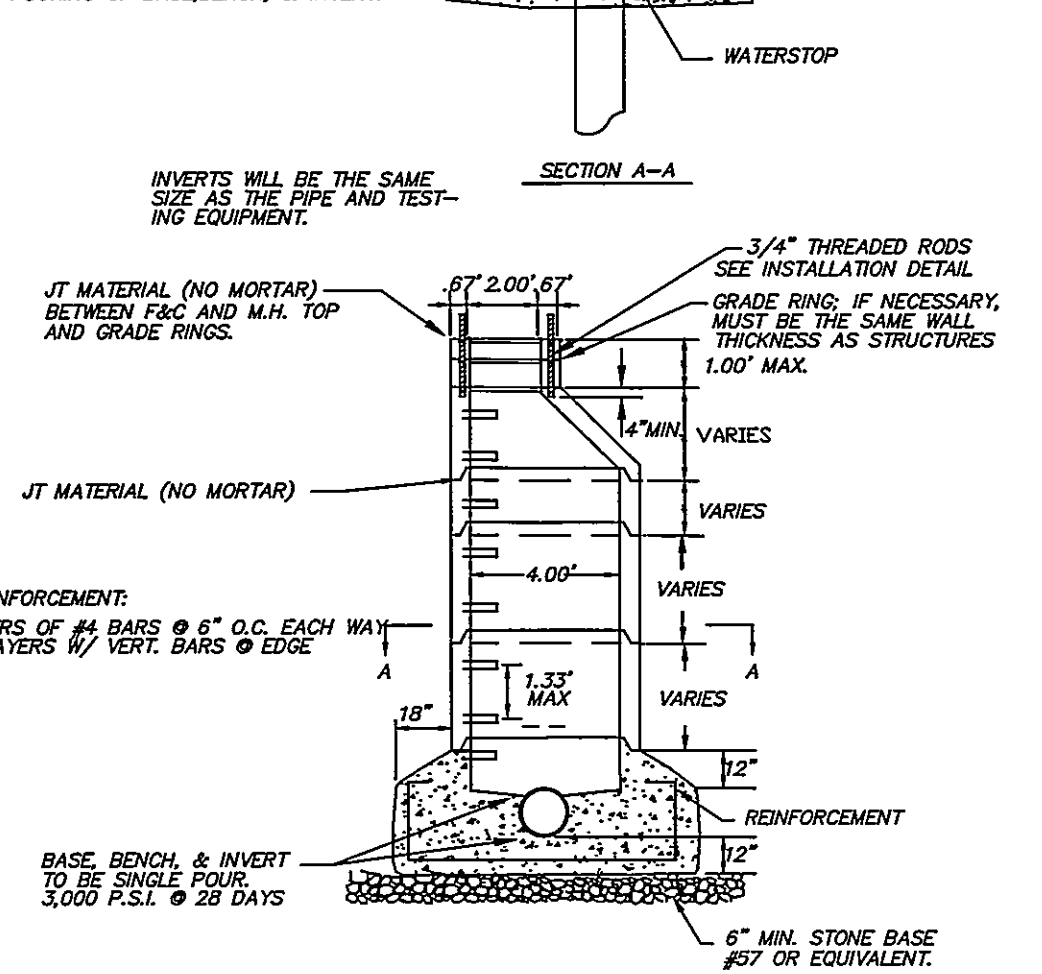
### PIPE SUPPORT IN CASING PIPE



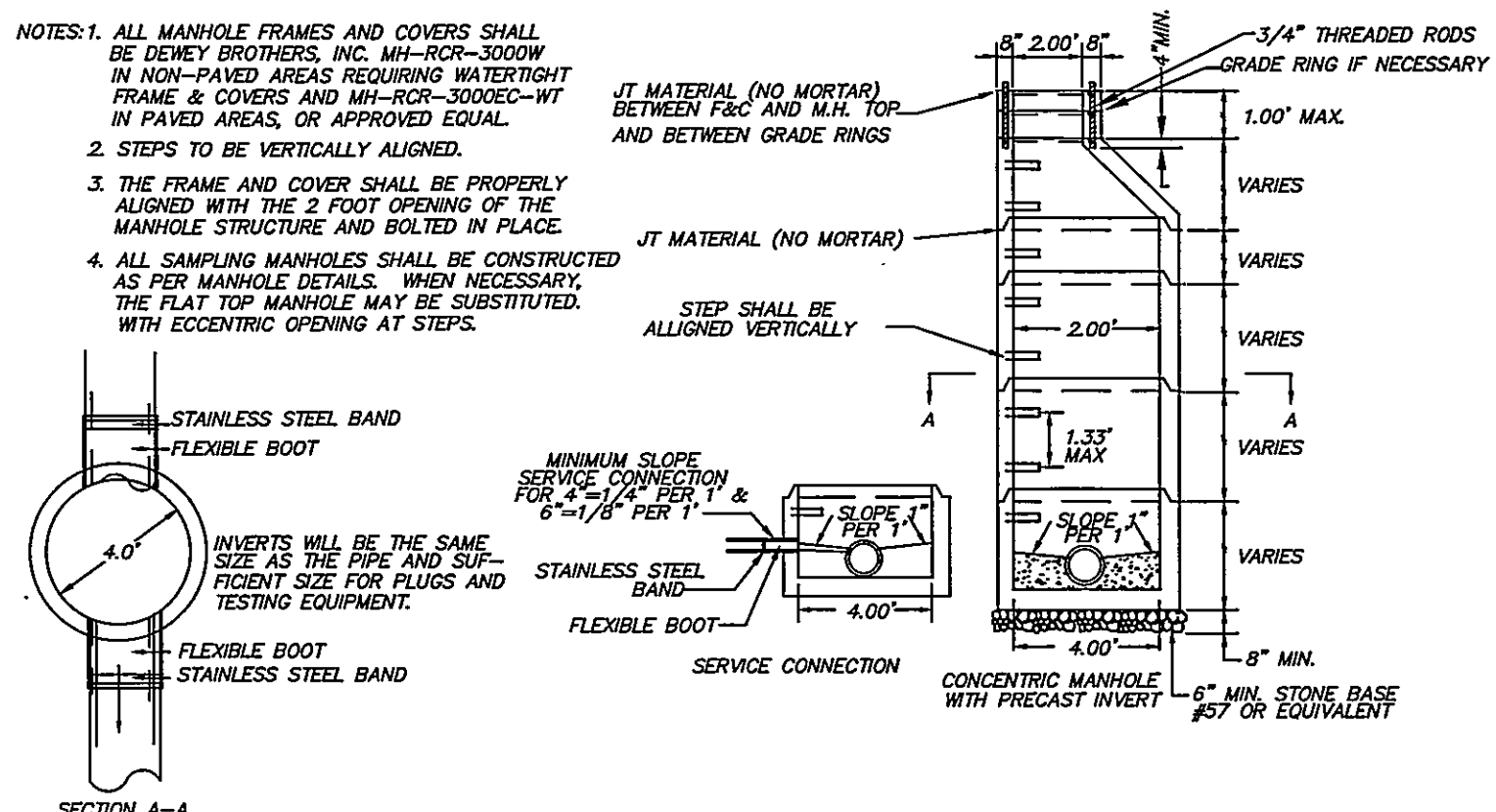
### WATERTIGHT MANHOLE FRAME AND COVER

NOTES:

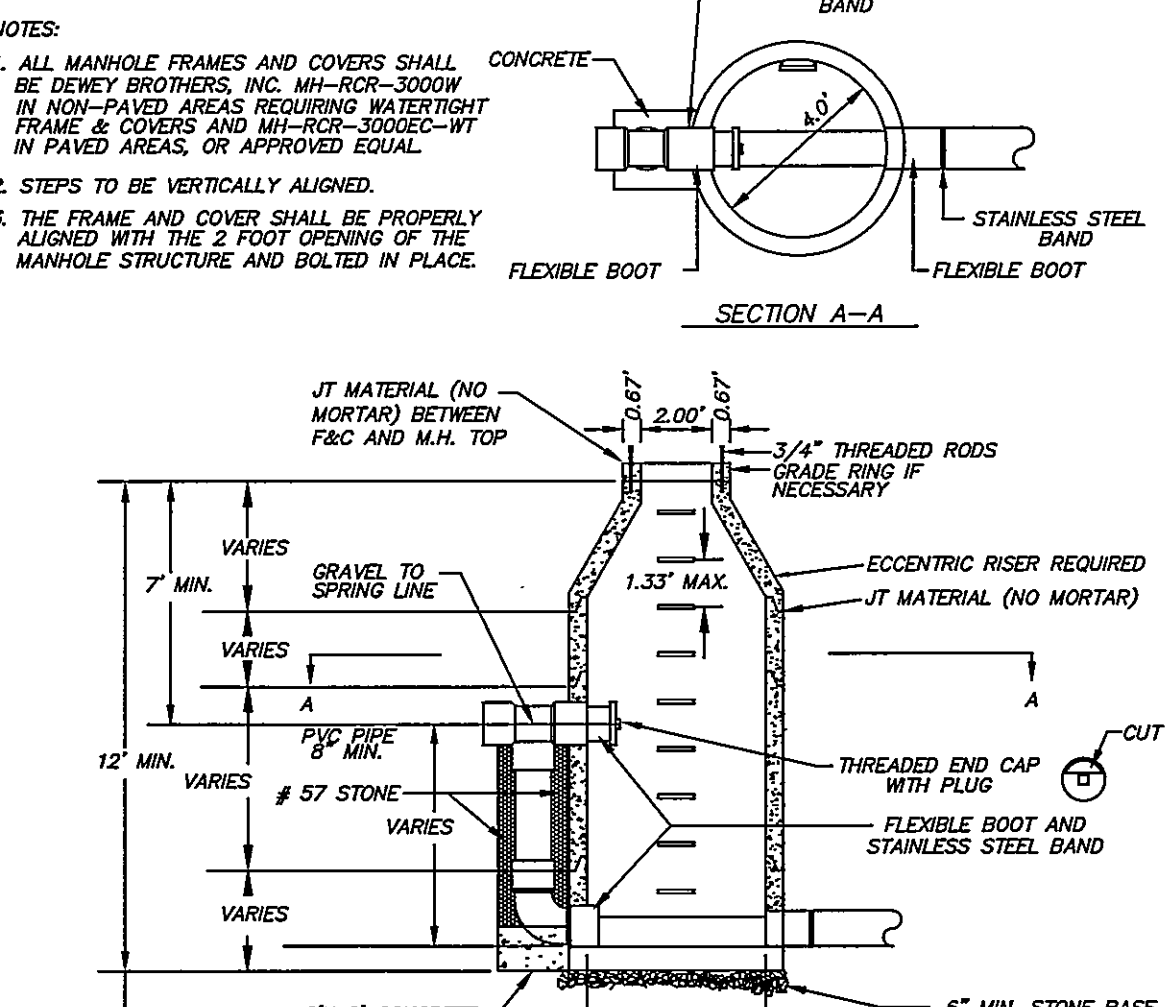
1. ALL MANHOLE FRAMES AND COVERS SHALL BE DENEY BROTHERS, INC. MH-ROR-3000W IN NON-PAVED AREAS REQUIRING WATERSTOP FRAME & COVERS AND MH-ROR-3000C-WT IN PAVED AREAS.
2. STEPS TO BE VERTICALLY ALIGNED.
3. THE DENEY MANHOLE STRUCTURE INCLUDING FRAME & COVER SHALL BE INSTALLED BEING PROPERLY ALIGNED WITH THE 2' FOOT OPENING OF THE MANHOLE STRUCTURE AND BOLTED IN PLACE.
4. THE FRAME AND COVER SHALL BE PROPERLY ALIGNED WITH THE 2' FOOT OPENING OF THE MANHOLE STRUCTURE AND BOLTED IN PLACE.
5. RISER AND OTHER SECTIONS SHALL NOT BE INSTALLED FOR A MINIMUM OF 24 HOURS AFTER POURING OF BASEBENCH, & INVERT.



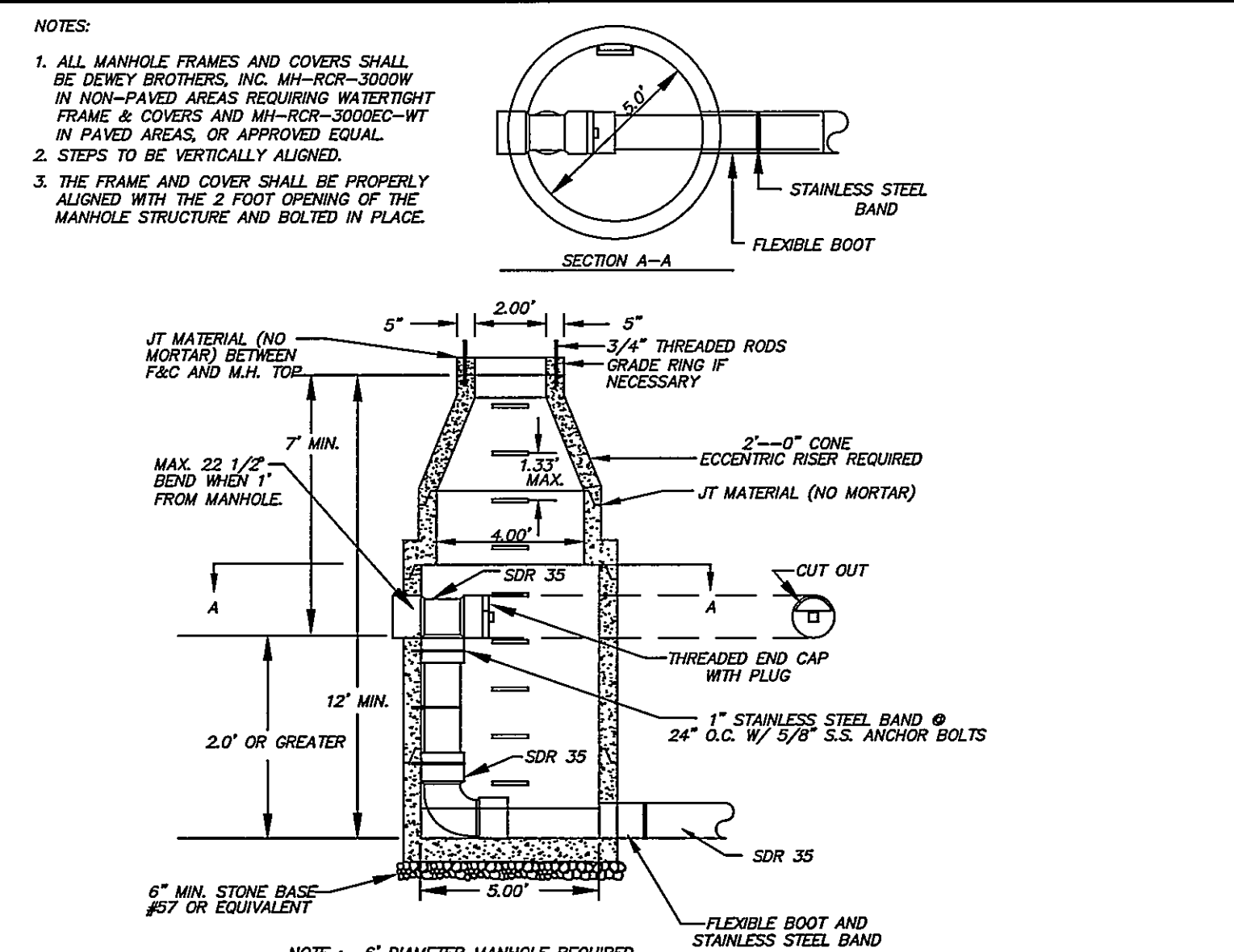
### STRADDLE MANHOLE FOR PIPE 15" OR SMALLER



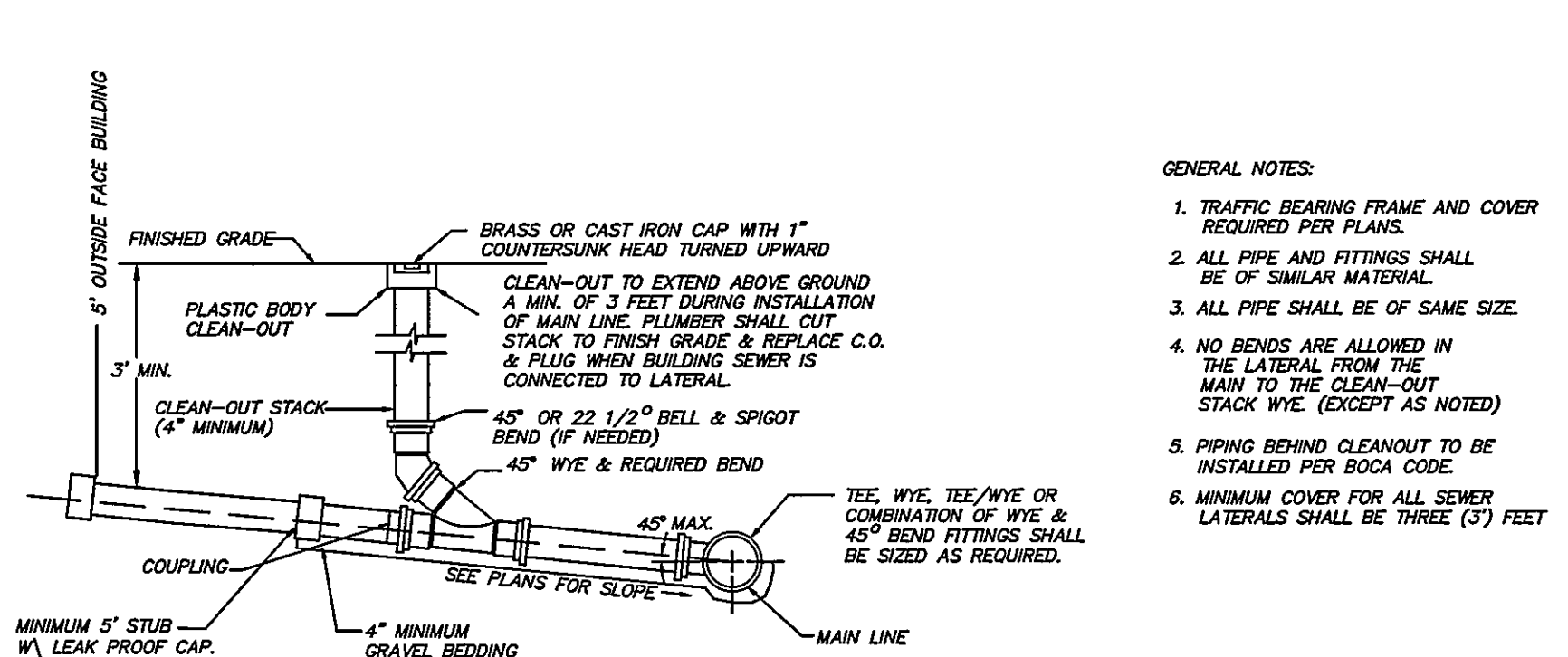
### 4" STANDARD MANHOLE FOR PIPE 15" OR SMALLER



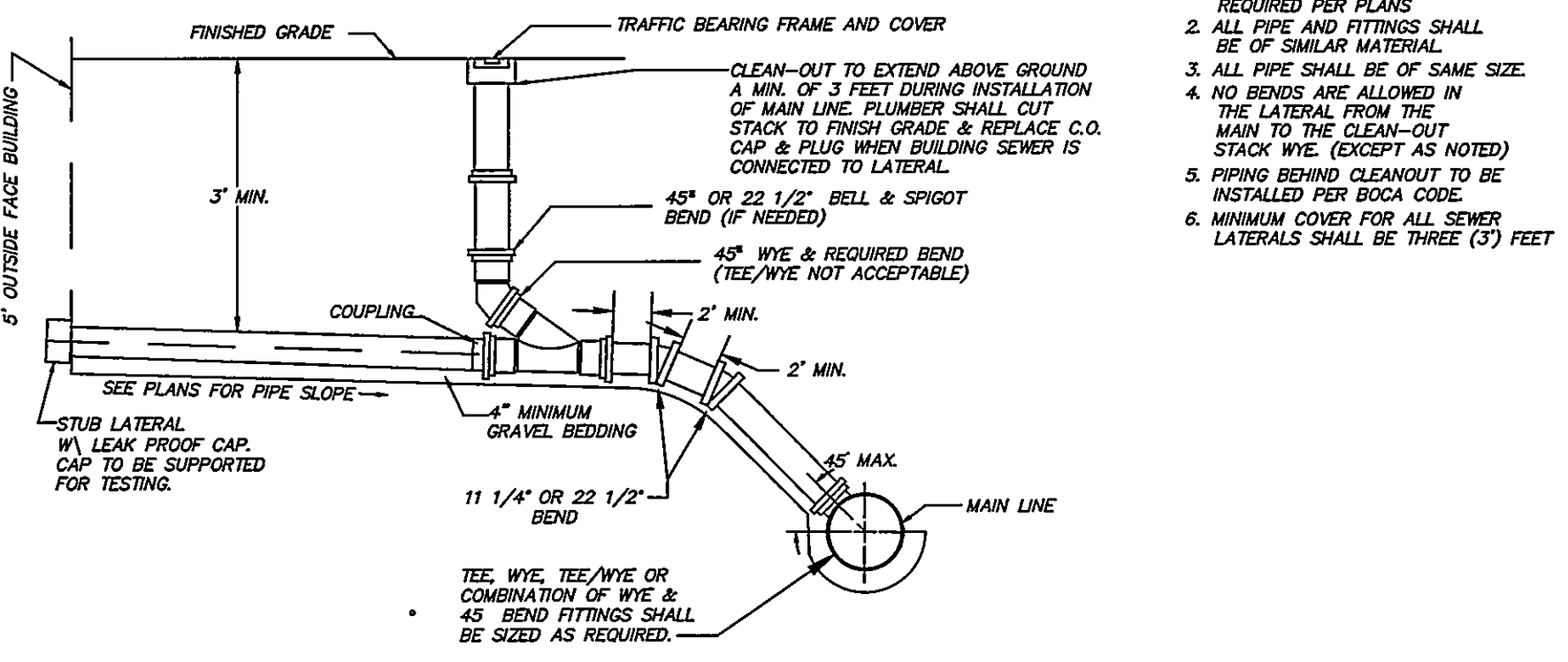
### OUTSIDE DROP MANHOLE (FOR USE WITH PVC PIPE)



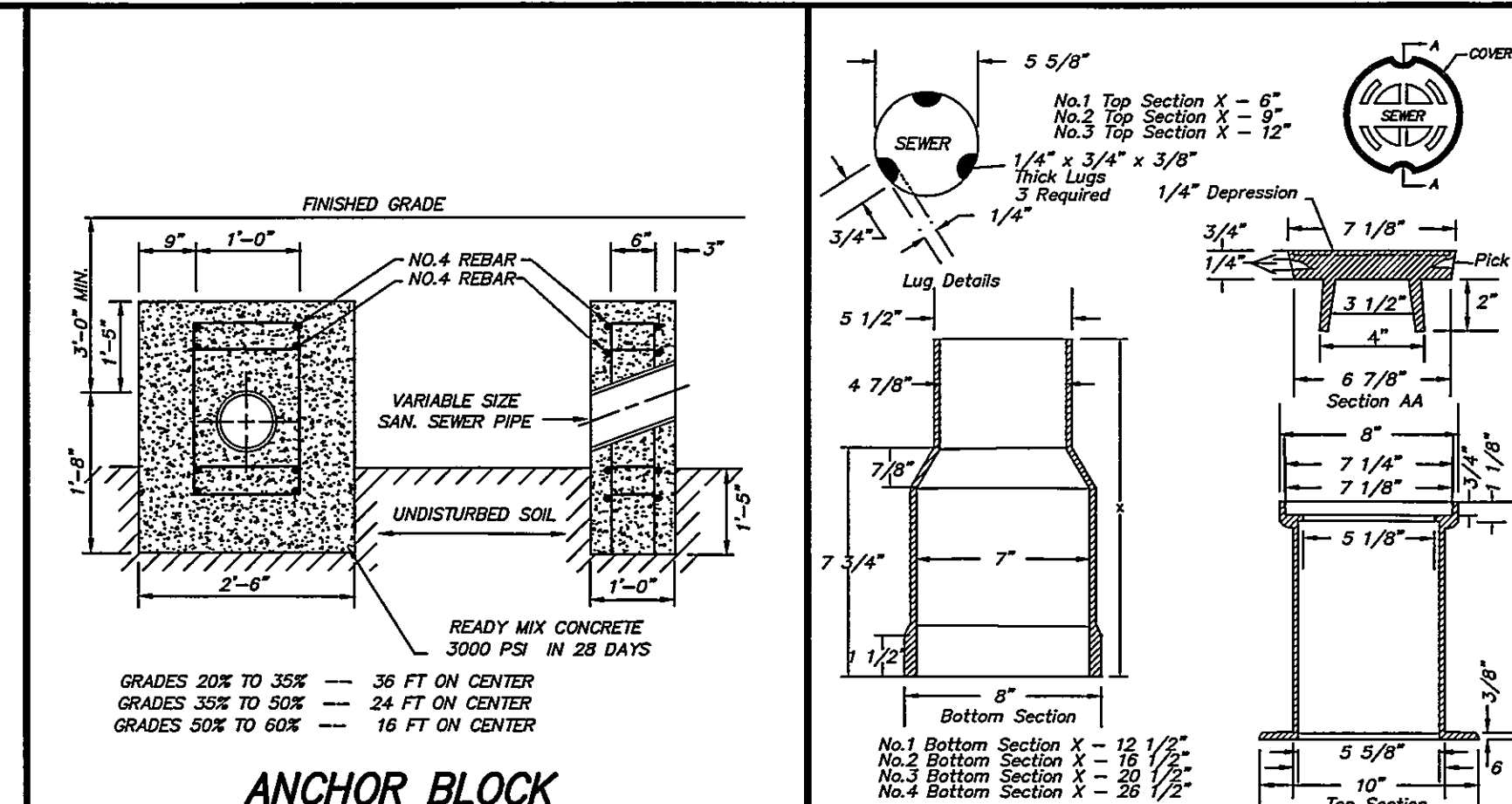
### MAINLINE OR LATERAL DROP MANHOLE (FOR USE WITH PVC PIPE)



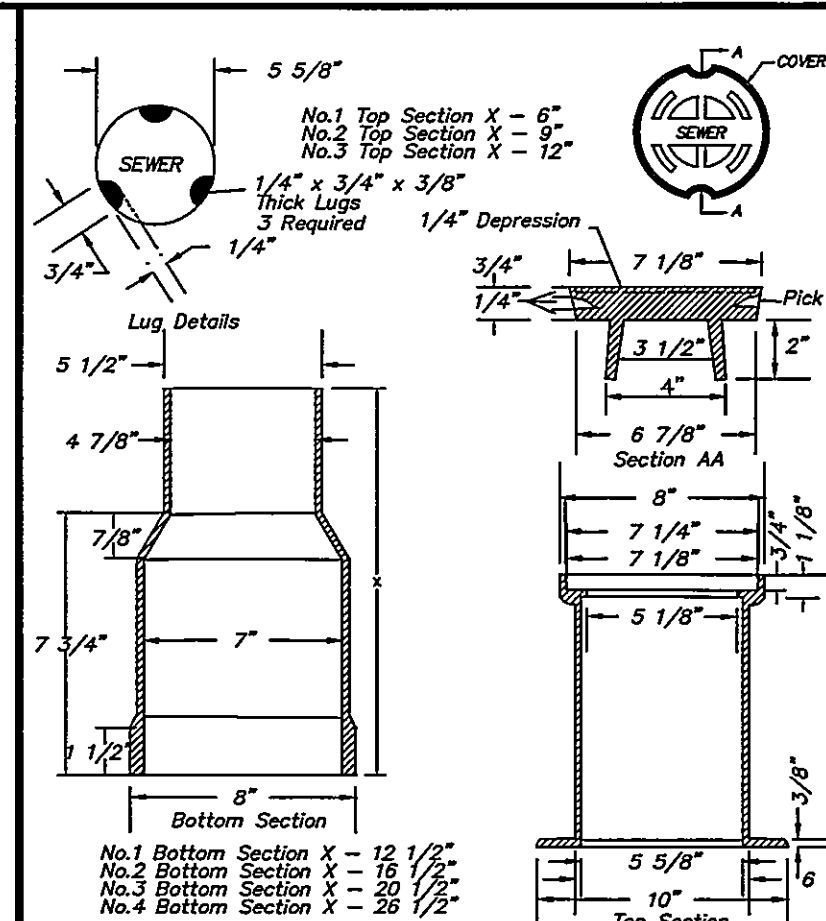
### SANITARY SEWER LATERAL



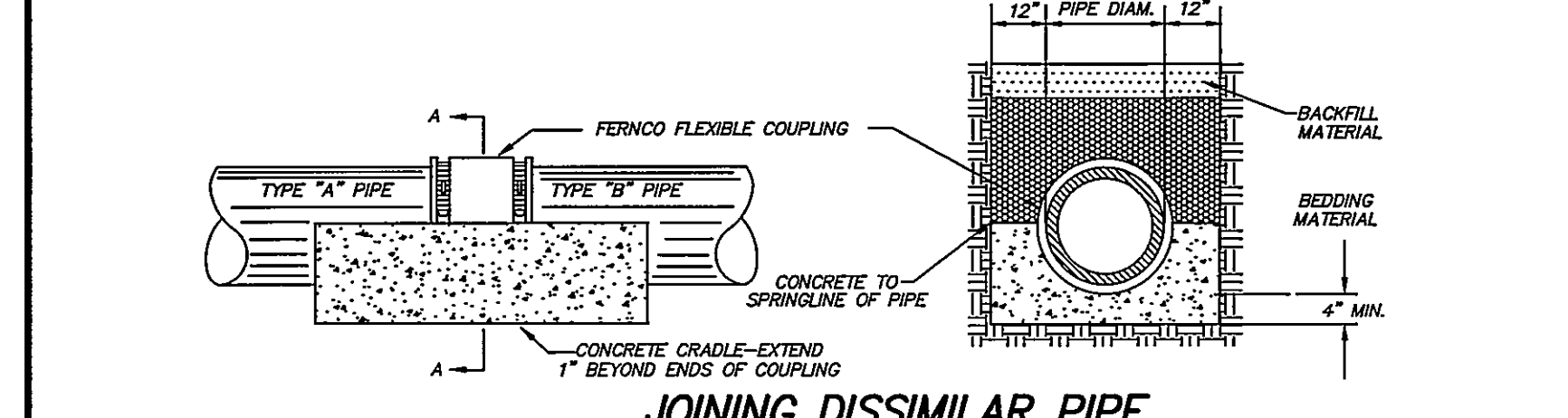
### SANITARY SEWER LATERAL FOR DEEP SEWER



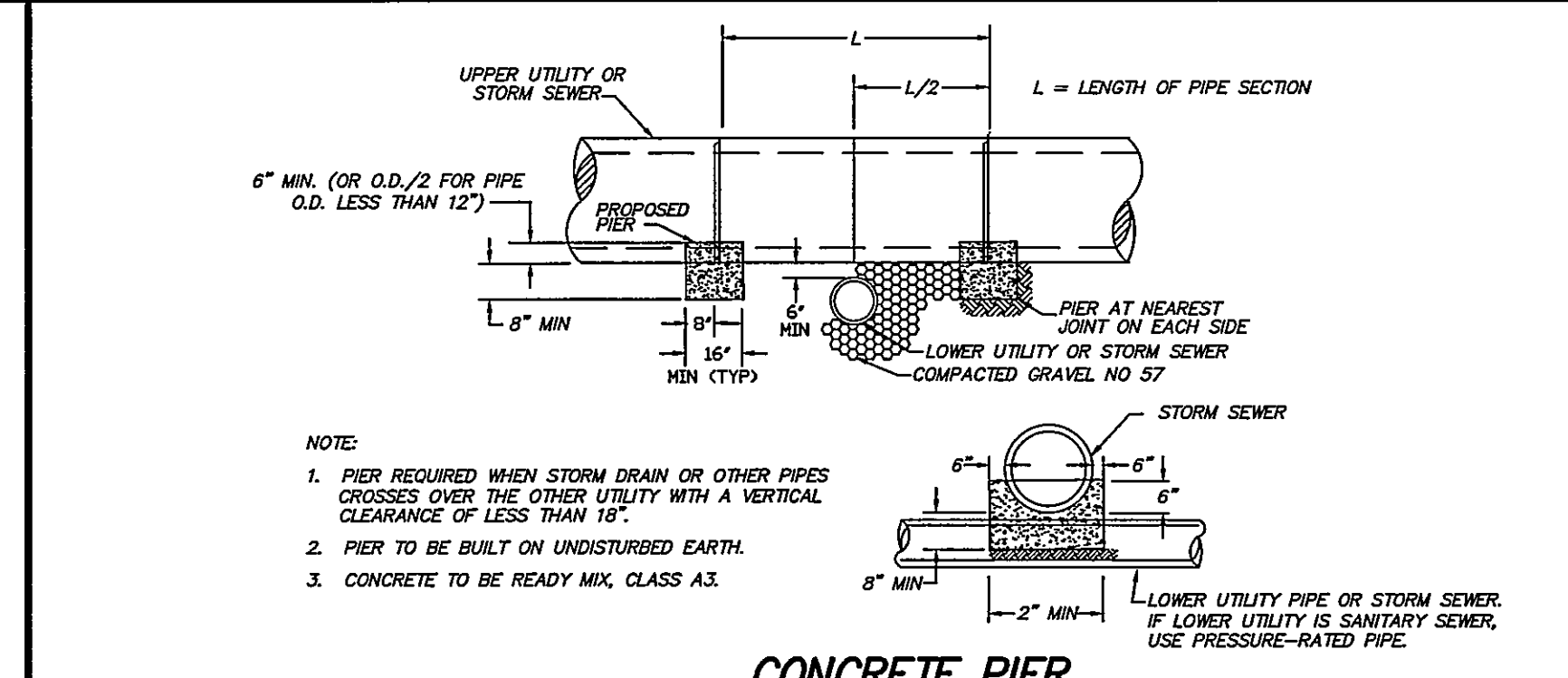
### ANCHOR BLOCK



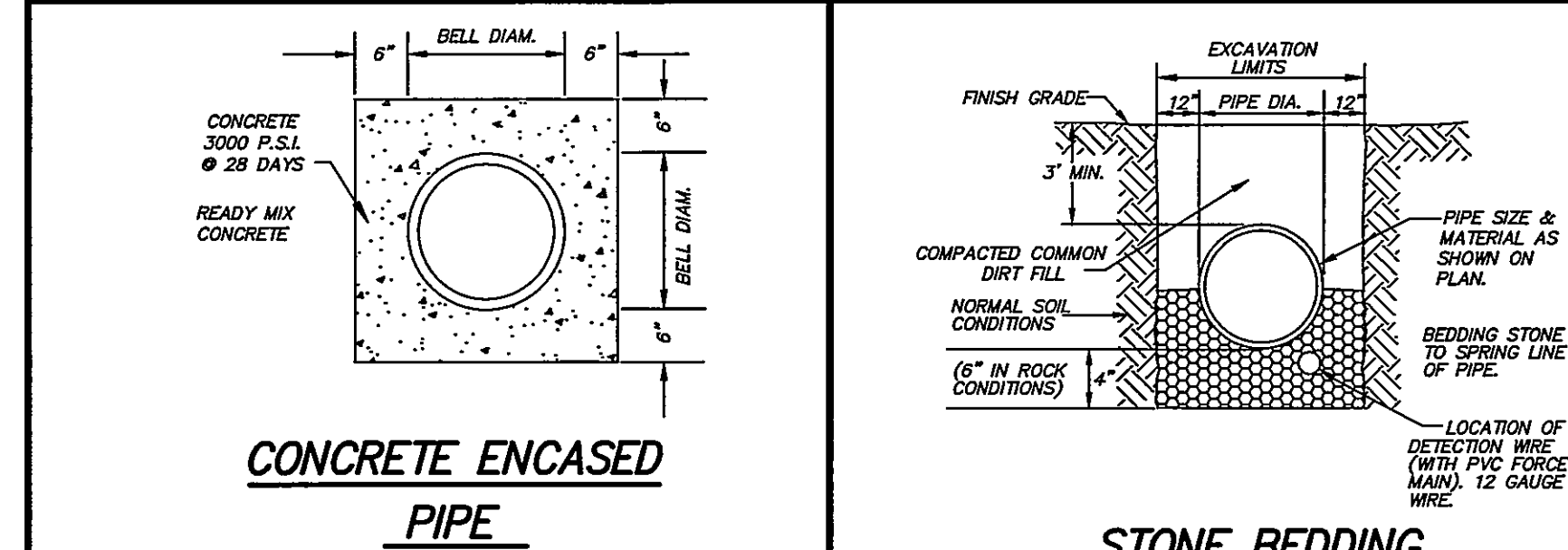
### TRAFFIC BEARING CLEANOUT BOX



### JOINING DISSIMILAR PIPE



### CONCRETE PIER



### STONE BEDDING

### ACCEPTANCE TESTING OF NEW SITE SANITARY SEWERS

GENERAL TESTING REQUIREMENTS

ALL NEW SANITARY SEWER LOCATED 5' OR GREATER FROM THE EXTERIOR FACE OF THE NEW BUILDING SHALL BE TESTED AS SHOWN HEREIN.

1. TESTS FOR DEFLECTION OF FLEXIBLE GRAVITY PIPES

FLEXIBLE GRAVITY DRAINS ARE DRAINS CONSTRUCTED OF PVC GRAVITY PIPES. PIPE-LINES SHALL BE MEASURED FOR VERTICAL RING DEFLECTION WITHIN FIFTEEN (15) DAYS AFTER COMPLETION OF BACKFILL. MAXIMUM RING DEFLECTION OF THE PIPELINE UNDER LOAD SHALL BE LIMITED TO FIVE PERCENT (5%) OF THE VERTICAL INTERNAL PIPE DIAMETER. PIPE EXCEEDING THIS DEFLECTION SHALL BE RE-PAID OR REPLACED, AND RETESTED BY THE CONTRACTOR, AT NO ADDITIONAL COST TO THE OWNER.

TESTS FOR DEFLECTION SHALL BE PERFORMED BY PULLING A 60/NO-GO MANDREL THROUGH THE PIPELINE. THE DIAMETER OF THE MANDREL SHALL BE NINETY-FIVE PERCENT (95%) OF THE UNDEFLECTED INSIDE DIAMETER OF THE PIPE.

2. AIR TESTING METHODS AND ACCEPTABILITY CRITERIA SHALL BE IN ACCORDANCE WITH THE UN-BELL LOW PRESSURE AIR TEST. AIR TESTING OF GRAVITY LINES SHALL BE REQUIRED FOR ALL TYPES AND OF ALL PIPE AND MATERIALS.

3. MANHOLES SHALL BE TESTED BY VACUUM TESTING. INFLATABLE STOPPERS SHALL BE USED TO PLUG ALL LINES INTO AND OUT OF THE MANHOLE BEING TESTED INCLUDING ANY VENT LINE. THE STOPPERS SHALL BE POSITIONED IN THE LINES FAR ENOUGH FROM THE MANHOLE TO INSURE TESTING TO THOSE PORTIONS OF THE LINES NOT AIR TESTED. VACUUM TESTS SHALL BE PERFORMED WITH A VACUUM OF 10" Hg. THE TIME FOR THE VACUUM TO DROP FROM 10" TO 9" Hg MUST BE GREATER THAN SIXTY (60) SECONDS FOR ALL SIZE AND DEPTH OF MANHOLES.

4. THE CONTRACTORS WILL FURNISH WEIRS, STAND PIPES, PIPE PLUGS, WATER, PRESSURE GAUGES, STOP WATCHES, AIR COMPRESSORS, VACUUM PUMP, HOSE AND SUCH MATERIALS AND LABOR AS REQUIRED TO PERFORM THESE TESTS. ALL ACCEPTANCE TESTS SHALL BE CONDUCTED BY THE CONTRACTOR IN THE PRESENCE OF A PROFESSIONAL ENGINEER.

5. ACCEPTANCE TESTS SHALL NOT BE MADE UNTIL THE SANITARY SEWER, MANHOLES AND PROPOSED SEWER SERVICE CONNECTIONS, AS SHOWN ON THE APPROVED SEWER PLANS HAVE BEEN INSTALLED. THE SEWER TRENCHES BACKFILLED AND COMPACTED TO FINISH SUBGRADE. THE CONTRACTOR MAY MAKE ANY TESTS AT ANY TIME HE DEEMS NECESSARY TO SELF CHECK HIS WORK.

6. ALL SANITARY SEWERS, INCLUDING MANHOLES, SHALL BE INSPECTED PRIOR TO ACCEPTANCE TESTING, AND ANY WATER LEAKAGE INTO THE SYSTEM SUFFICIENT TO CONSTITUTE ANY NOTICEABLE TRICKLE OR DRIBBLE, SHALL FIRST BE CORRECTED AND ELIMINATED PRIOR TO UNDERTAKING THE ACCEPTANCE TEST.

7. WHENEVER IT HAS BEEN NECESSARY TO CONSTRUCT UNDERDRAINS OR PLACE GRAVEL UNDER PIPE LINES IN ORDER TO DEWATER THE TRENCH DURING CONSTRUCTION OF THE SEWERS, THE CONTRACTOR SHALL SCHEDULE ALL ACCEPTANCE TESTS WITH A PROFESSIONAL ENGINEER AT LEAST FORTY-EIGHT (48) HOURS IN ADVANCE. EACH SECTION OF COMPLETED SEWER SHALL BE TESTED FROM MANHOLE TO MANHOLE. NO SEWERS OR SEWER SERVICE CONNECTIONS ARE TO BE EXCLUDED FROM THIS TESTING PROCEDURE.

8. THE TEST PROCEDURE SHALL BE CONDUCTED IN THE FOLLOWING MANNER: (VACUUM TESTS OF MANHOLES IS GENERALLY THE INVERSE OF THE LOW PRESSURE AIR TEST OF SEWER LINES)

A. LOW PRESSURE PIPELINE AIR TESTING PROCEDURE:

1. THE CONTRACTOR SHALL THOROUGHLY CLEAN AND REMOVE ALL DEBRIS, SILT, EARTH OR OTHER MATERIALS FROM THE SEWER PRIOR TO ACCEPTANCE TESTING.
2. PREPARED TEST PLUGS SHALL BE SUPPLIED AND INSTALLED BY THE CONTRACTOR WITHIN THE PIPE AT EACH MANHOLE. EACH PLUG MUST BE SELF SUSTAINING AND NO BRACING WILL BE PERMITTED.
3. IF THE PIPE TO BE TESTED IS EXPECTED TO BE BELOW THE GROUND WATER TABLE, THE CONTRACTOR SHALL EITHER:
  - a. INSTALL A SMALL DIAMETER PERFORATED VERTICAL PIPE FROM INVERT ELEVATION OF THE SEWER TO THE SURFACE PRIOR TO BACKFILLING.
  - b. INSERT A PIPE PROBE BY BORING OR DRIVING INTO THE BACKFILLING MATERIAL ADJACENT TO THE INVERT ELEVATION OF THE PIPE, AND DETERMINE THE DEPTH OF THE GROUND WATER LEVEL ABOVE THE PIPE INVERT IMMEDIATELY PRIOR TO ACCEPTANCE TESTING THE SEWER.
  - c. ALL GAUGE PRESSURES IN THE TEST SHALL BE INCREASED BY THE AMOUNT OF THIS BACK PRESSURE DUE TO GROUND WATER OVER THE INVERT OF THE PIPE.
  - d. IN LIEU OF THE ABOVE WATER DEPTH DETERMINATION, THE CONTRACTOR MAY ADD THREE (3) PSI TO THE GAUGE PRESSURE IN THE TESTS.
4. THE CONTRACTOR SHALL ADD AIR SLOWLY TO THE PORTION OF THE PIPE UNDER TEST UNTIL THE INTERNAL AIR PRESSURE IS RAISED TO 4.0 PSI. GAUGE PLUS THE GROUND WATER PRESSURE.
5. AS A SAFETY PRECAUTION, NO ONE SHALL BE ALLOWED IN THE MANHOLE AFTER THE AIR PRESSURE IS INCREASED IN THE SEWER LINE. IF THE INSPECTOR SUSPECTS THAT THE THE TEST PLUG MAY BE LEAKING, THE PRESSURE FIRST SHALL BE RELIEVED BEFORE ANY ADJUSTMENTS ARE MADE TO ELIMINATE AIR LEAKAGE AT THE PLUG.
6. THE CONTRACTOR SHALL ALLOW THE AIR TEMPERATURE TO STABILIZE FOR AT LEAST TWO (2) MINUTES WITH THE PIPE SUBJECTED TO AN INTERNAL PRESSURE OF 4.0 PSI BY ADDING ONLY THE AMOUNT OF AIR TO MAINTAIN THE PRESSURE.
7. AFTER THE TEMPERATURE STABILIZATION, THE TEST WILL BEGIN. IF THE INTERNAL AIR PRESSURE DECREASES, THE TIME REQUIRED FOR THE PRESSURE TO DROP FROM 3.5 TO 2.5 PSI GAUGE WILL BE OBSERVED AND RECORDED. THE TIME INTERVAL SHALL BE COMPARED WITH THE ESTABLISHED STANDARDS IN ACCORDANCE WITH TABLE 1 OF TIME AND LENGTH FOR VARIOUS DIAMETERS OF THE SEWER.
8. IF THE PRESSURE DECREASES, THE TIME REQUIRED FOR THE PRESSURE TO DROP FROM 3.5 TO 2.5 PSI GAUGE WILL BE OBSERVED AND RECORDED. THE TIME INTERVAL SHALL BE COMPARED WITH THE ESTABLISHED STANDARDS IN ACCORDANCE WITH TABLE 1 OF TIME AND LENGTH FOR VARIOUS DIAMETERS OF THE SEWER.

PIPE SIZE (I.D.)	TEST TIME	MINIMUM DURATION OF TEST
4 inches	0.3 MIN./100 L.F.	3 MIN: 46 SEC
6 inches	0.7 MIN./100 L.F.	5 MIN: 40 SEC
8 inches	1.2 MIN./100 L.F.	7 MIN: 34 SEC

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PHASE I

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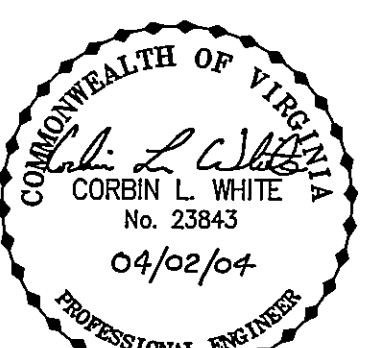
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### Revisions

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Sheet Information

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Job Number 800200.000

Scale As Shown

Drawn C.L. White

Checked

Approved

### Title

### DETAILS-SANITARY SEWER CONSTRUCTION

### Sheet

### C1-403

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