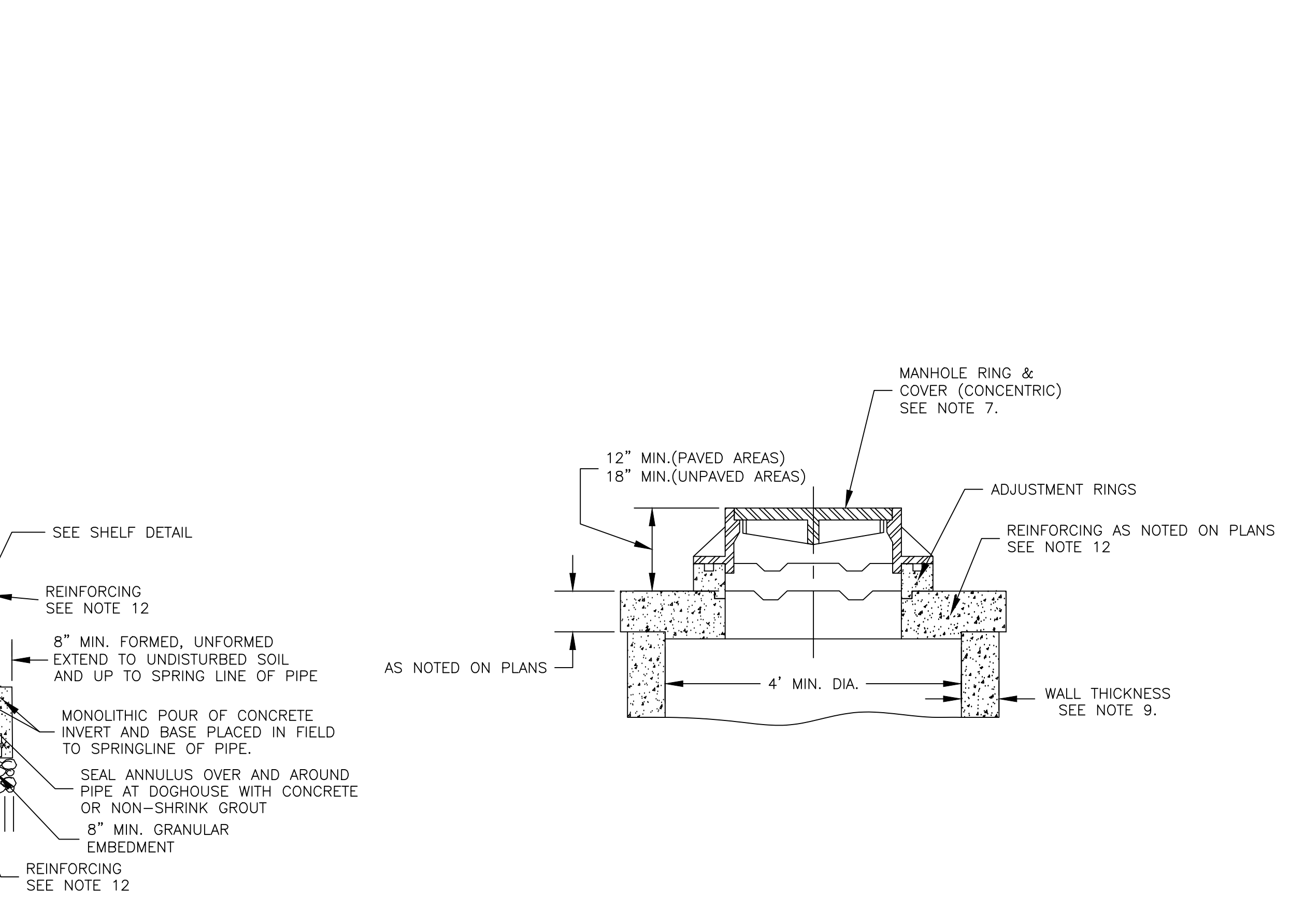
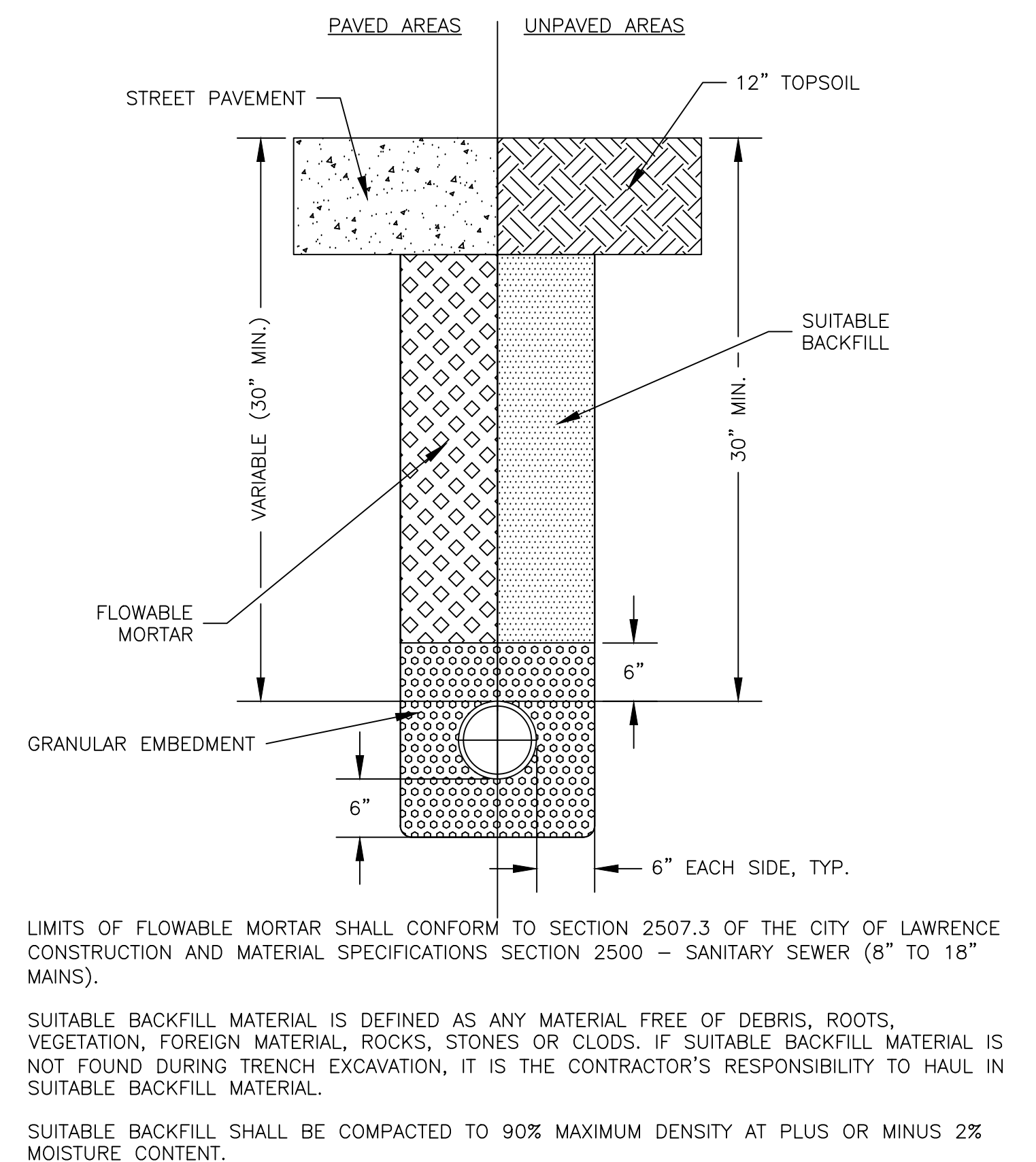


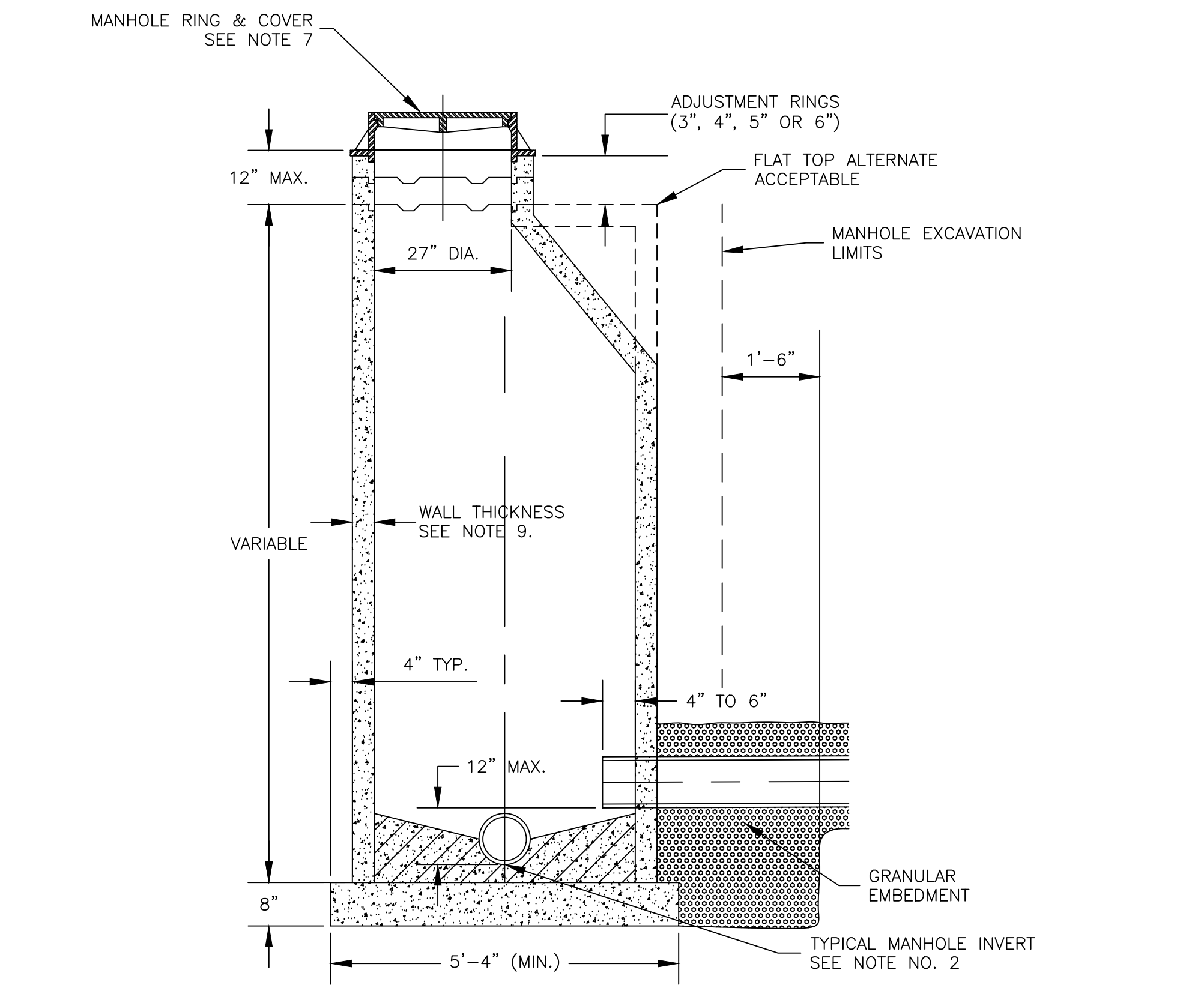
**STANDARD DOGHOUSE MANHOLE**  
N.T.S.



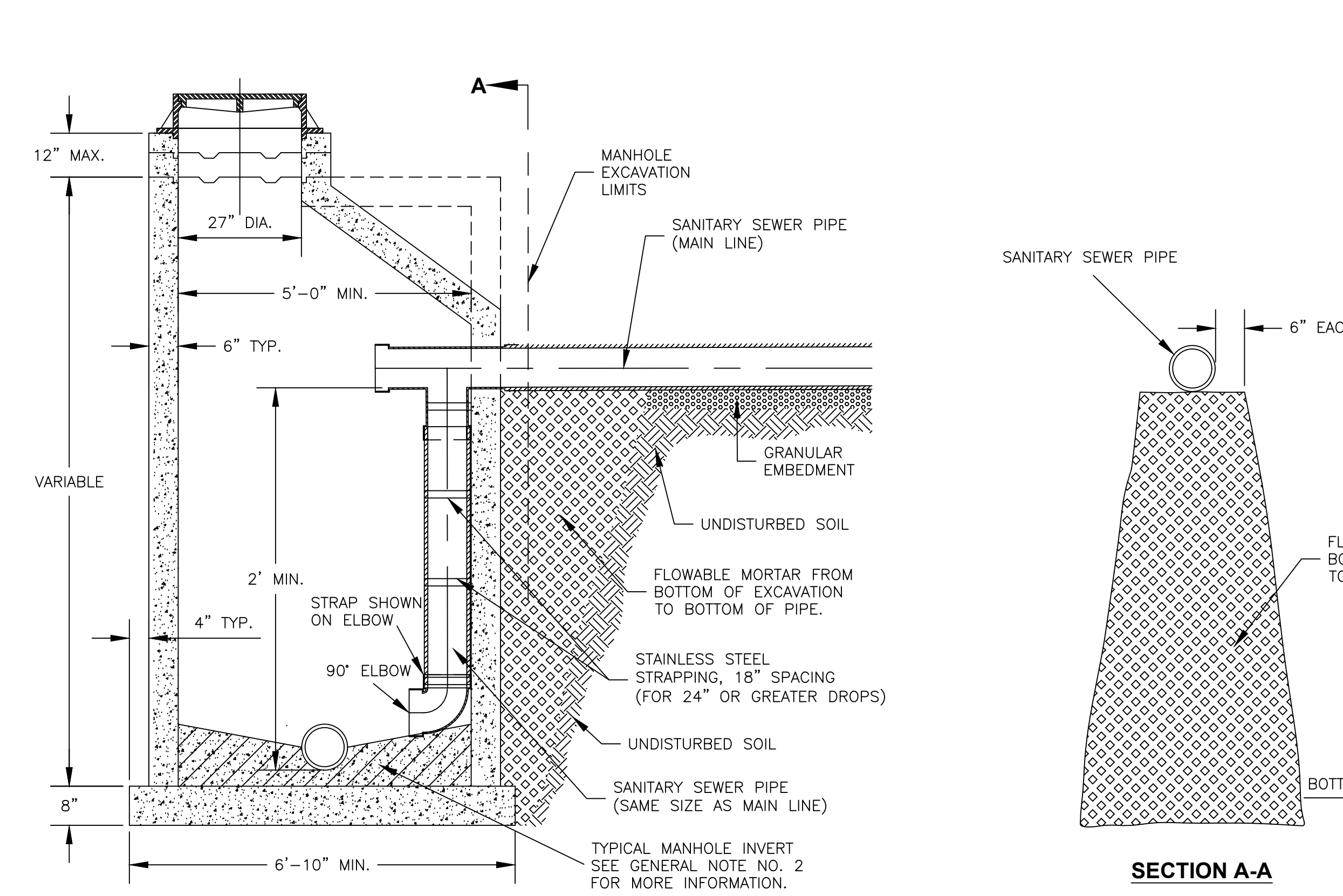
**STANDARD PRECAST MANHOLE (SHALLOW TYPE)**  
N.T.S.



**SANITARY SEWER TRENCH DETAILS**  
N.T.S.



**STANDARD PRECAST MANHOLE (ECCENTRIC CONE)**  
N.T.S.



**STANDARD DROP MANHOLE SECTION (FOR 8\"/>**

- NOTES**
1. PRECAST MANHOLES SHALL CONFORM TO ASTM C-478 AND THE KANSAS DEPARTMENT OF HEALTH AND ENVIRONMENT MINIMUM STANDARDS OF DESIGN.
  2. PIPE(S) SHALL BE TEMPORARILY PLUGGED PRIOR TO FORMING INVERTS. INVERTS SHALL BE FORMED WITH KDOT CLASS A CONCRETE.
  3. STANDARD DEPTH MANHOLE IS 6'-0". LESSER DEPTH TO BE PAID FOR AS STANDARD 6'-0" MANHOLE.
  4. GRANULAR EMBEDMENT SHALL BE PLACED FROM THE OUTSIDE FACE OF THE MANHOLE TO A DISTANCE OF 18" BEYOND THE LIMITS OF EXCAVATION FOR THE MANHOLE, AS SHOWN.
  5. COMPRESSION TYPE PIPE TO MANHOLE CONNECTIONS SHALL BE A-LOK, MANHOLE PIPE CONNECTORS, OR APPROVED EQUAL.
  6. D.I.P., V.C.P., OR TRUSS PIPE TO PIPE CONNECTIONS SHALL BE FERNCO RUBBER GASKET COUPLING OR APPROVED EQUAL.
  7. MANHOLE RINGS AND LIDS SHALL BE CLAY & BAILEY MODEL 2032, NEENAH MODEL R-1736-A, DEETER FOUNDRY MODEL 1048, OR APPROVED EQUAL WITH CASING INSIDE DIAMETER OF TWENTY-FOUR (24) INCHES, LID OUTSIDE DIAMETER OF TWENTY-FIVE AND ONE-QUARTER (25.25) INCHES, AND LID SEATING THICKNESS OF ONE AND ONE-HALF (1.5) INCHES PLUS/MINUS ONE-EIGHTH (0.125) OF AN INCH.
  8. BEFORE FINAL ACCEPTANCE OF THE PROJECT, A 2"x4" PIECE OF LUMBER, 6'-0" TO 8'-0" TALL, OR A STEEL FENCE POST, 5'-0" TO 6'-0" TALL, SHALL BE PLACED ADJACENT TO EACH MANHOLE, IN ORDER TO LOCATE THESE STRUCTURES FOR CONTRACTORS DURING FUTURE DEVELOPMENT.
  9. THE WALL THICKNESS FOR MANHOLES UNDER 16'-0" DEEP SHALL BE 1/12 OF THE INTERNAL SHELL DIAMETER, OR 4", WHICHEVER IS GREATER. THE WALL THICKNESS FOR MANHOLES 16'-0" DEEP OR GREATER SHALL BE 1/12 OF THE INTERNAL SHELL DIAMETER PLUS 1" OR 5", WHICHEVER IS GREATER.
  10. IF THE SANITARY SEWER PIPE HAS A DEFLECTION IN IT, SUCH PIPE SHALL BE ROTATED SO THAT THE DEFLECTION IS ON IT'S SIDE.
  11. ANY SANITARY SEWER PIPE FOUND TO HAVE MORE THAN A 5% DEFLECTION WILL BE REJECTED.
  12. ALL REINFORCING SHALL BE AS NOTED ON PLANS AND/OR SHOP DRAWINGS AND SHALL CONFORM TO CITY OF LAWRENCE UTILITIES DEPARTMENT SPECIFICATIONS FOR SANITARY SEWER, SECTION 2510.3.7.



BY	DATE	REVISION
JDS	12/2010	UPDATE TO DIMENSIONS ON DROP MANHOLE AND TYPICAL TRENCH DETAIL
JDS	12/2011	REVISE REFERENCE TO CA-5 AND CM-H TO GRANULAR EMBEDMENT
JDS	02/2013	ANNUAL UPDATE
TWS	03/2015	ANNUAL UPDATE
TWS	01/2016	ANNUAL UPDATE
TWS	01/2017	ANNUAL UPDATE
SMG	01/2018	ANNUAL UPDATE

**City of Lawrence**  
UTILITIES

**STANDARD SANITARY DETAILS-GRAVITY**

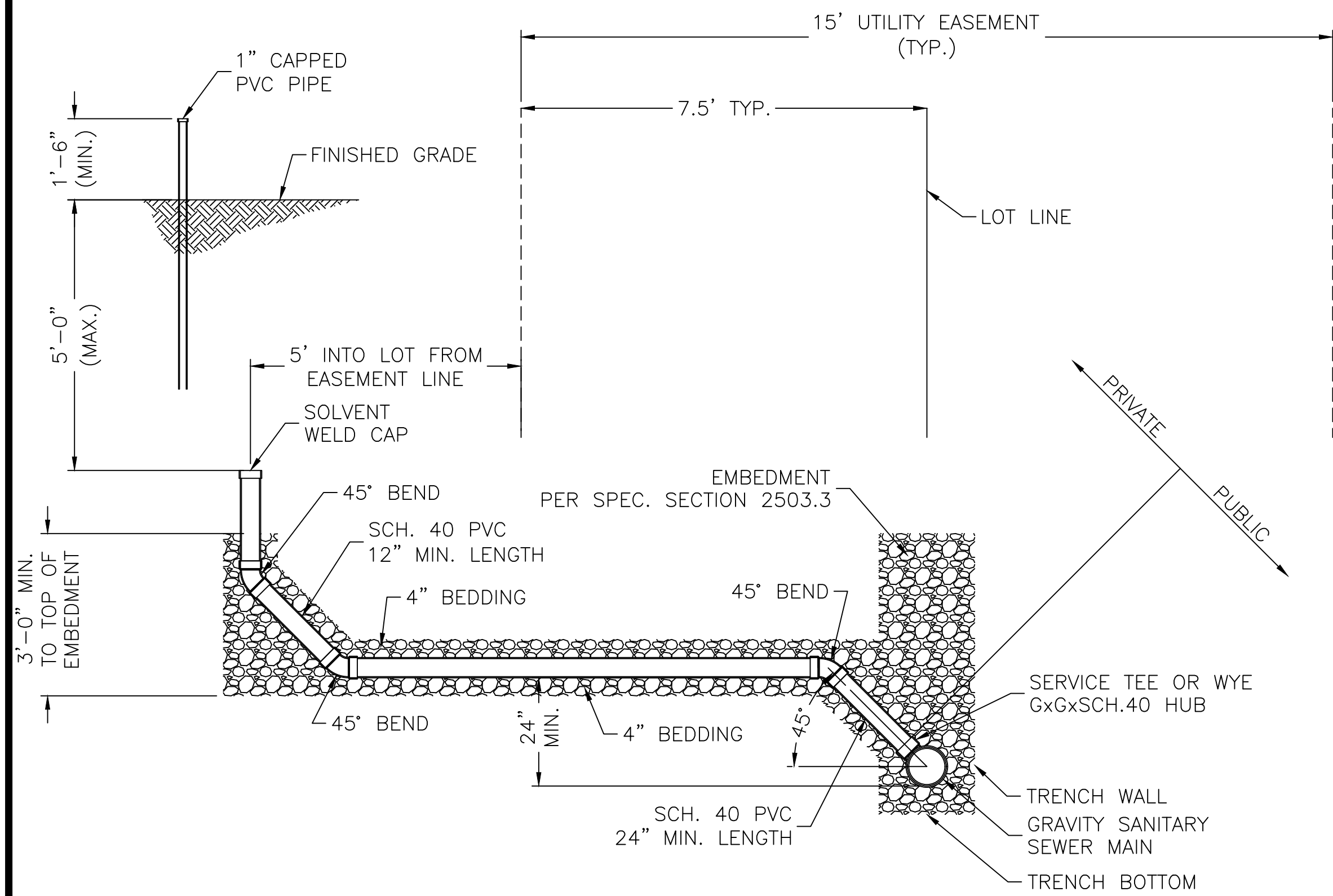
Andrew Ensz  
Project Engineer

THOMAS M. MARKUS  
CITY MANAGER

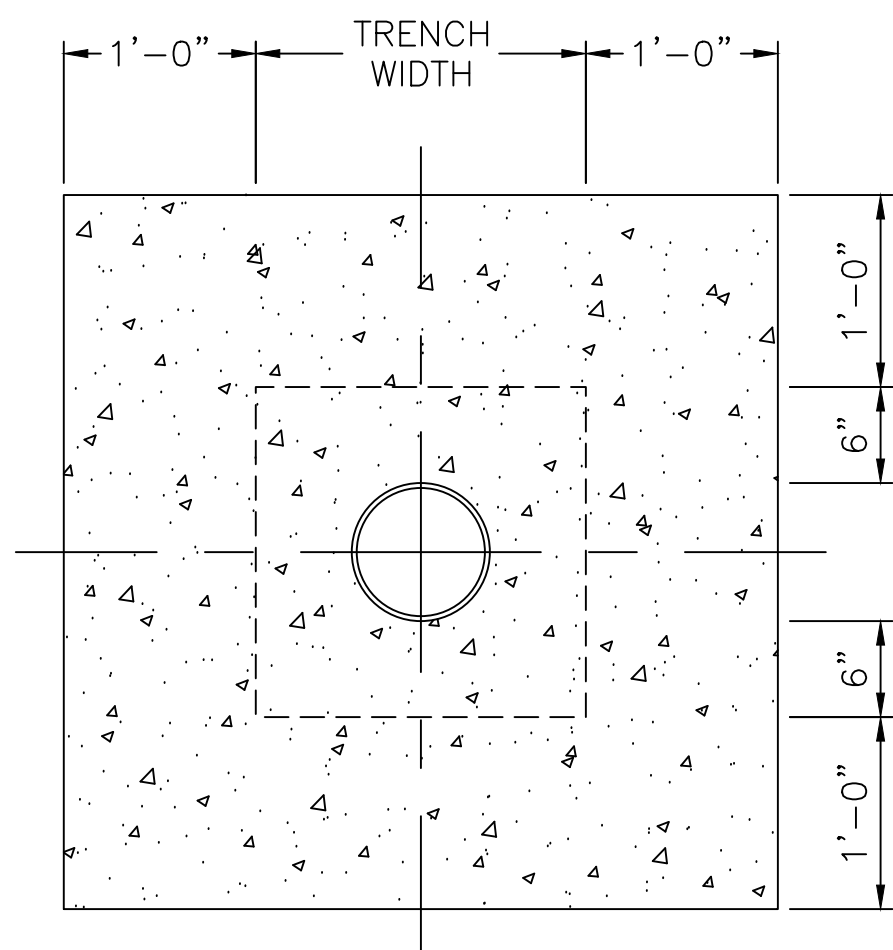


**GENERAL NOTES:**

1. SERVICE TEE OR WYE SHALL BE INSTALLED SO THAT SERVICE CONNECTION IS A MINIMUM OF 45° FROM HORIZONTAL.
2. SOLVENT WELDED CONNECTIONS ARE REQUIRED FOR THE ENTIRE SERVICE CONNECTION FROM THE TEE TO THE CAP.
3. MINIMUM GRADE FOR SERVICE LATERALS ARE 1.00% FOR SIX (6) INCH AND 2.00% FOR FOUR (4) INCH SERVICE LINES.
4. LOCATION OF TEE OR WYE CONNECTION BY STATION AND HORIZONTAL LENGTH OF STUB OUT TO BE NOTED ON CONSTRUCTION DRAWINGS OF SANITARY SEWER MAIN CONSTRUCTION.

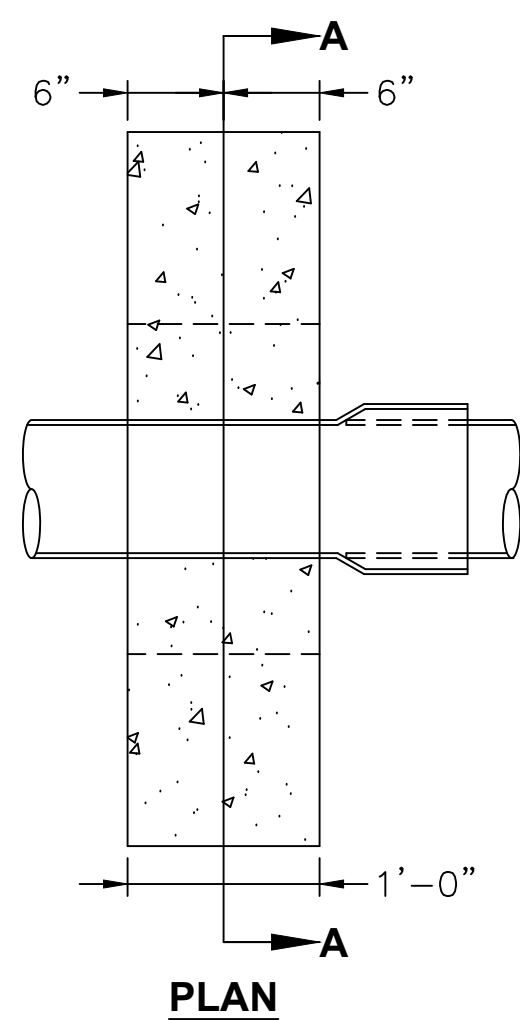


**SANITARY SEWER SERVICE CONNECTION STUB OUT DETAIL N.T.S.**

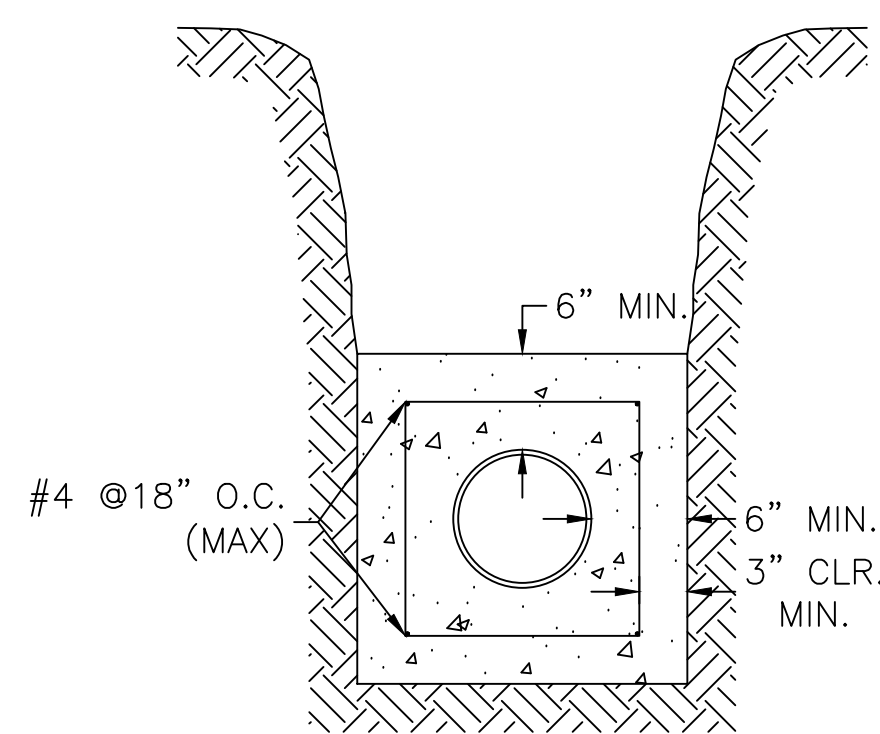


**SECTION A-A**

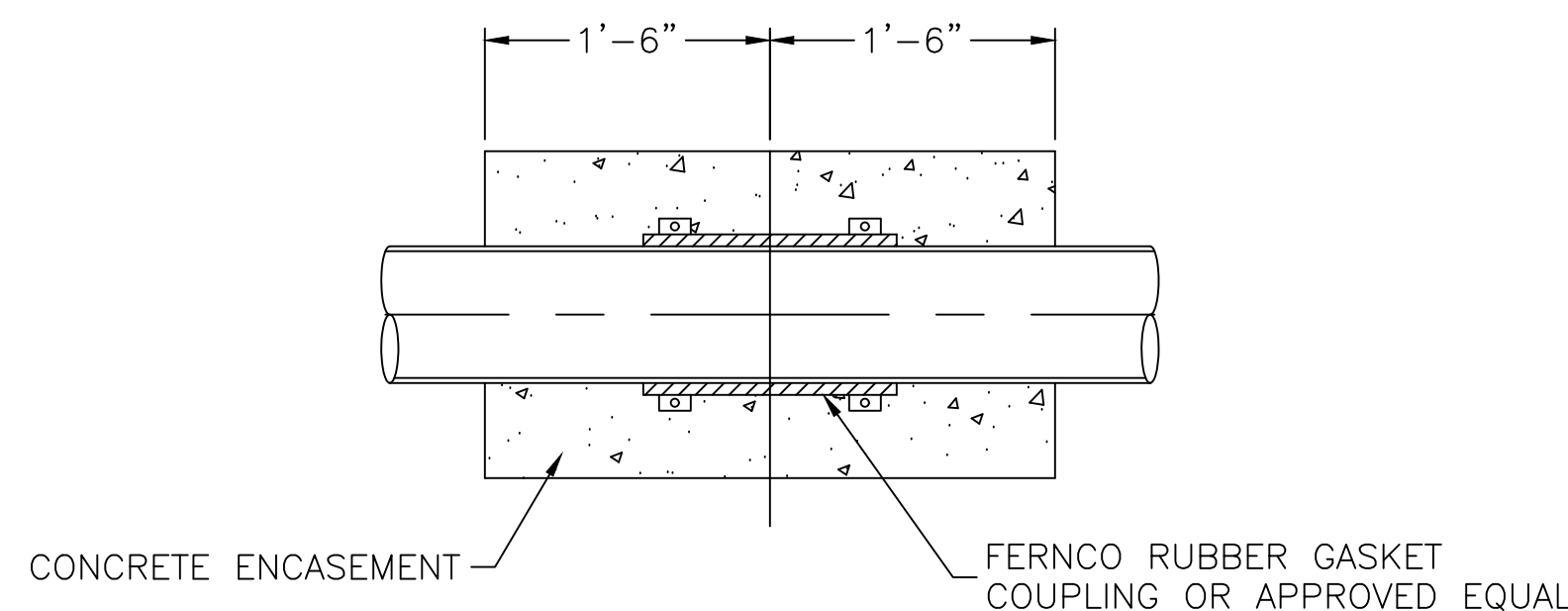
**CONCRETE COLLAR DETAIL N.T.S.**



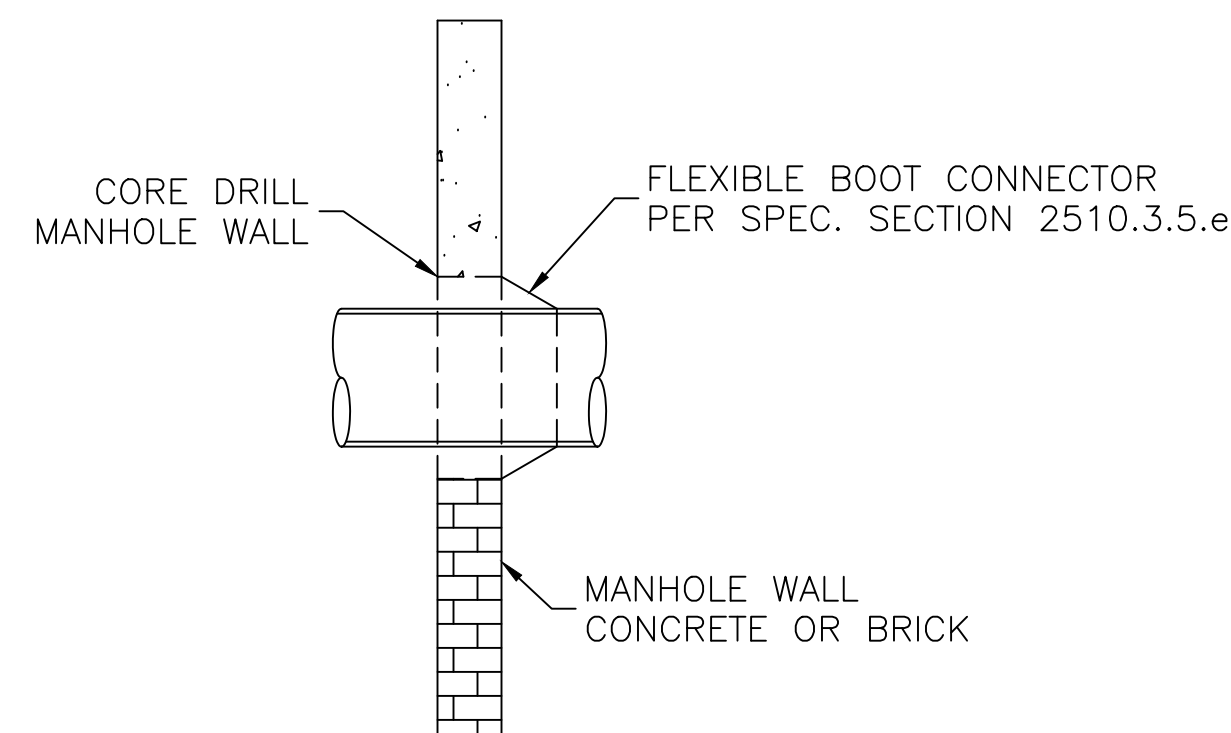
**PLAN**



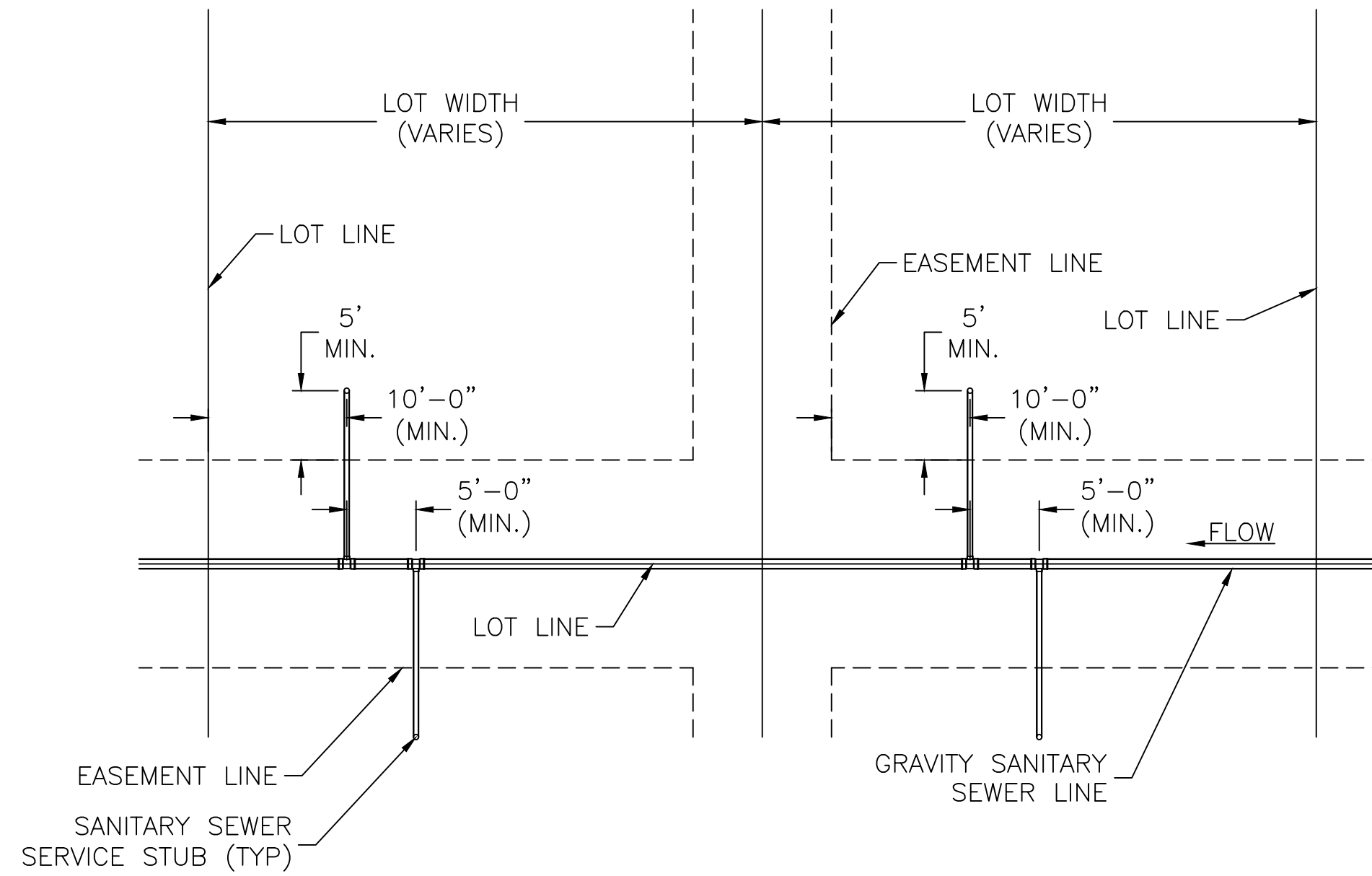
**CONCRETE ENCASMENT DETAIL N.T.S.**



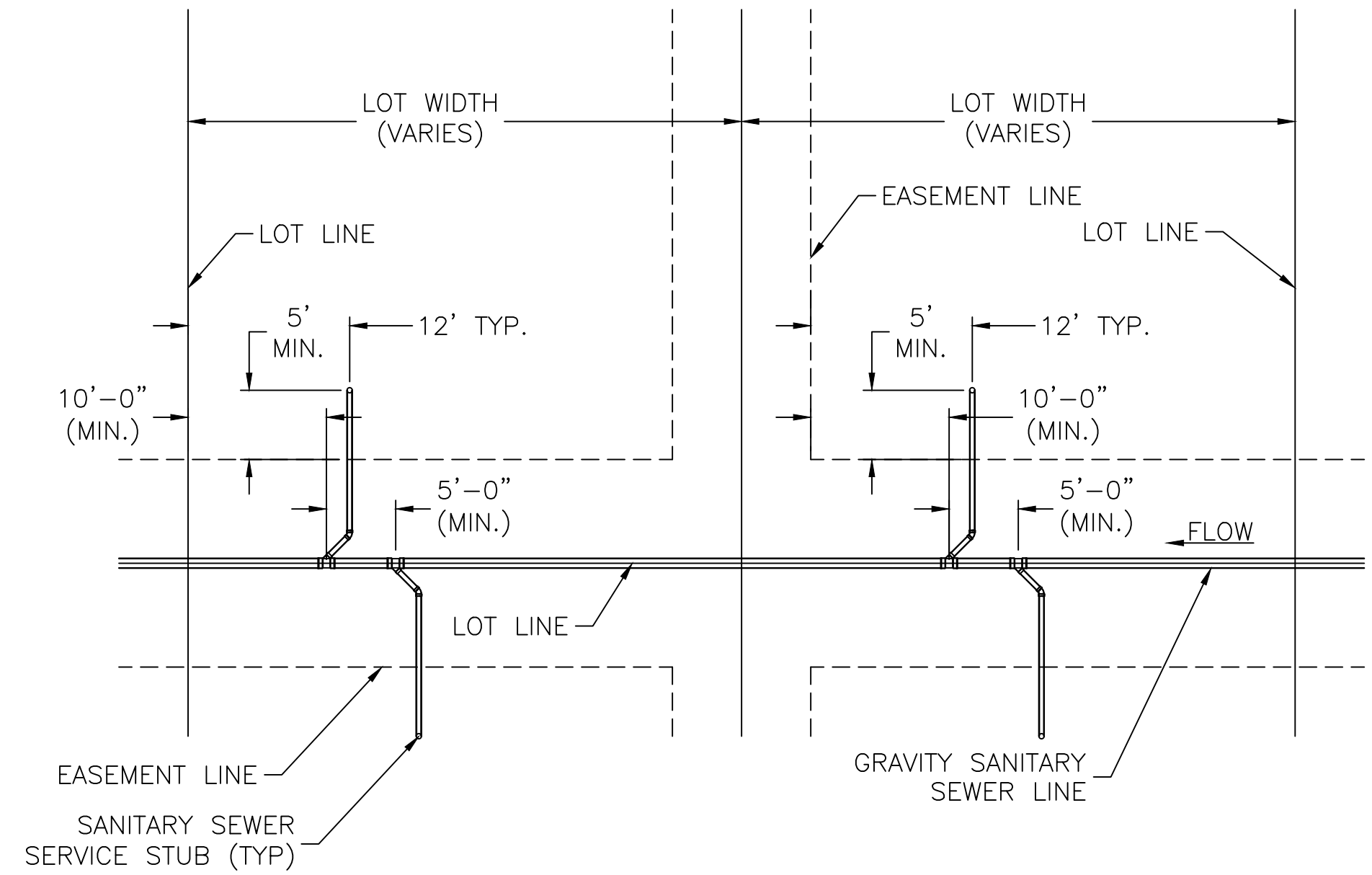
**DIP, VCP OR TRUSS PIPE CONNECTION (REPAIRS ONLY) N.T.S.**



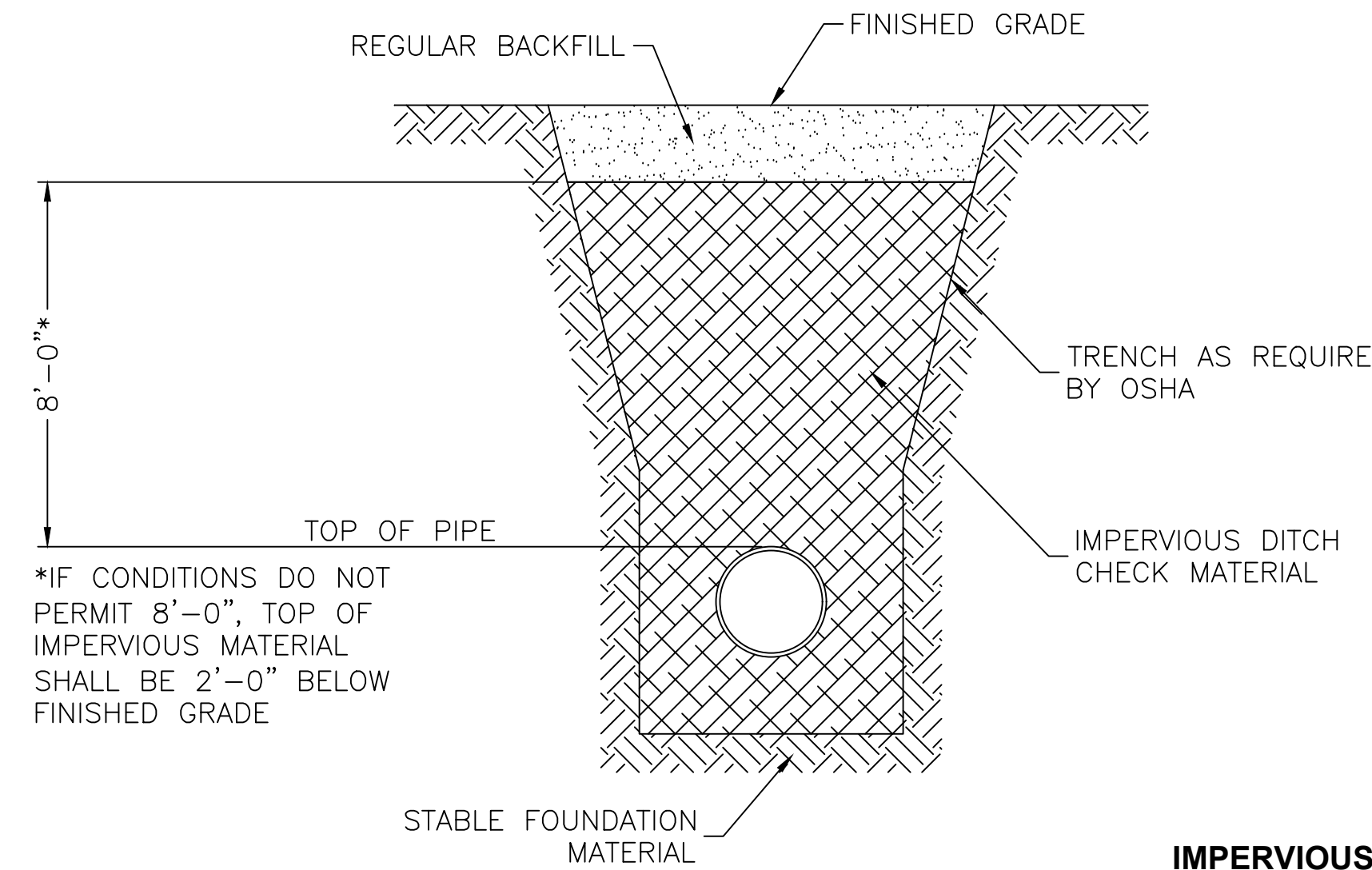
**CONNECTION TO EXISTING MANHOLE N.T.S.**



**PLAN VIEW OF SANITARY SEWER SERVICE TEE CONNECTION STUB OUT LOCATIONS BACK LOT LINE EXAMPLE SHOWN**



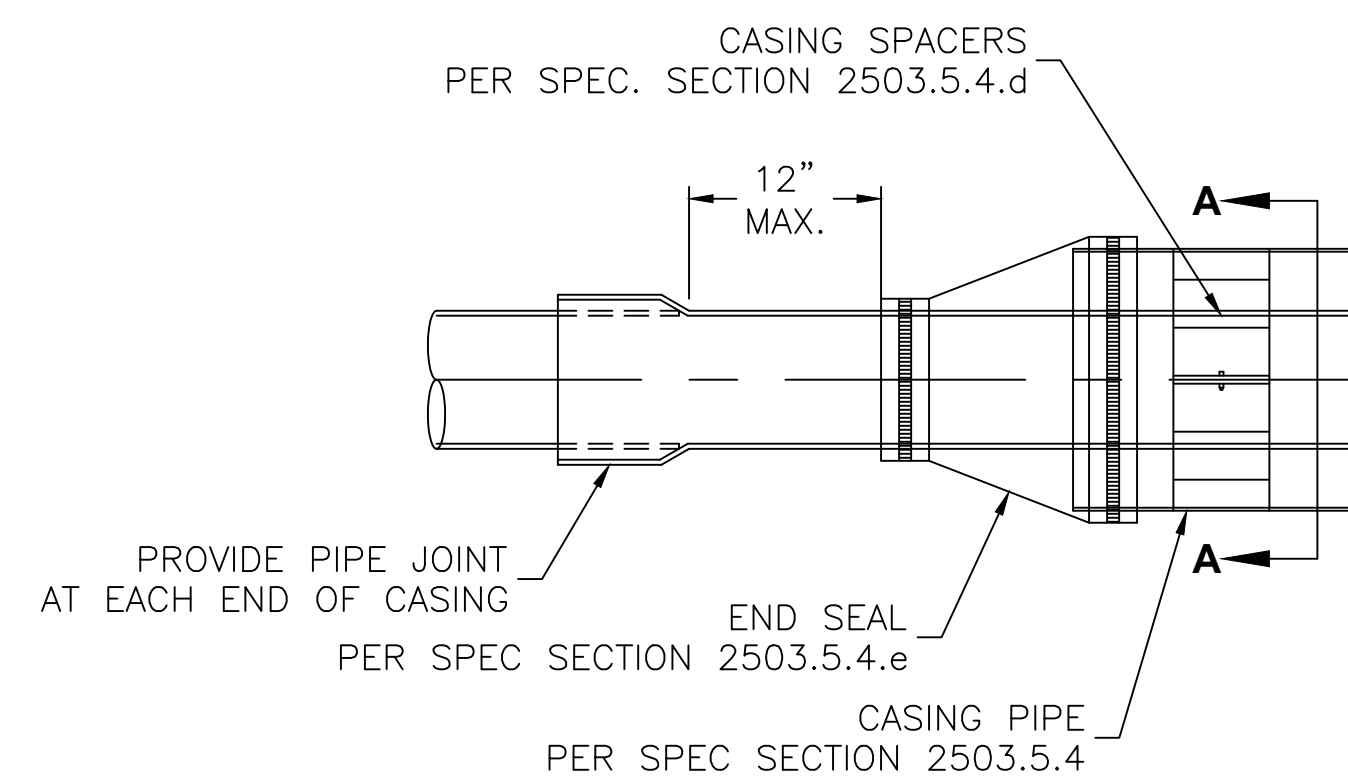
**PLAN VIEW OF SANITARY SEWER SERVICE WYE CONNECTION STUB OUT LOCATIONS BACK LOT LINE EXAMPLE SHOWN**



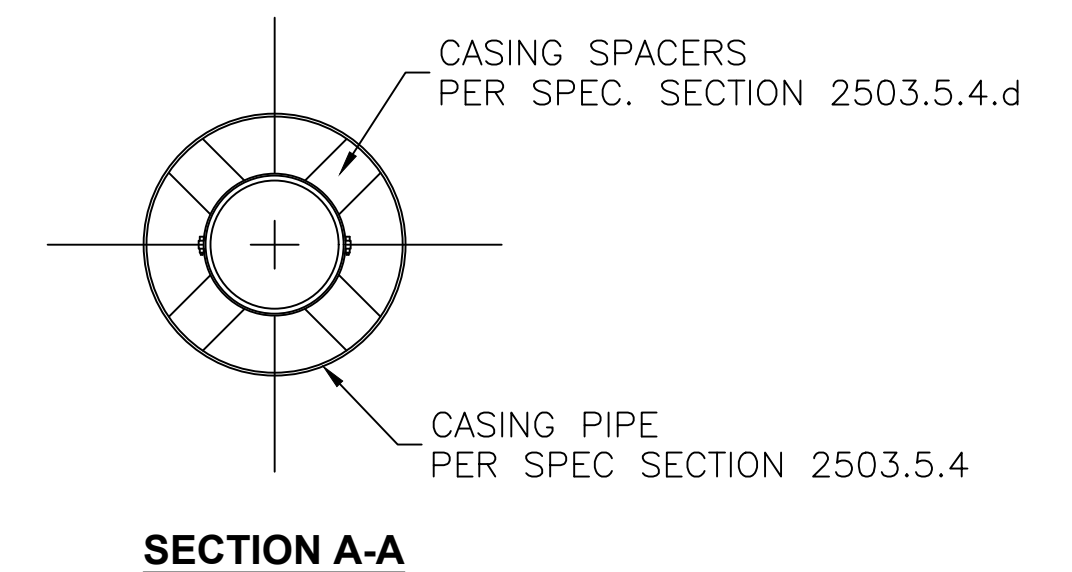
**IMPERVIOUS DITCH CHECK N.T.S.**

**GENERAL NOTES:**

1. IMPERVIOUS DITCH CHECKS SHALL BE PLACED WHERE SHOWN ON THE PLANS. LENGTHS SHALL BE A MINIMUM OF 10 LF. FLOWABLE FILL IS REQUIRED FOR PVC PIPE. FOR OTHER PIPE TYPES, CLAY MATERIAL OR FLOWABLE FILL MAY BE USED AT THE CONTRACTORS OPTION. FLOWABLE FILL MATERIAL TO COMPLY WITH CITY OF LAWRENCE SPECIFICATION SECTION 1100, CURRENT EDITION. CLAY MATERIAL SHALL BE FREE OF CLODS, CLUMPS, DEBRIS, ORGANIC MATERIAL, AND STONES, COMPACTED SO AS TO OBTAIN 90% OF MAXIMUM DENSITY AT OPTIMUM MOISTURE ±2%, AS DETERMINED BY ASTM D698.
2. REGULAR BACKFILL MATERIAL ABOVE DITCH CHECK SHALL BE FREE OF DEBRIS, ORGANIC MATERIALS AND STONES LARGER THAN 6" IN DIAMETER.



**CASING PIPE DETAIL N.T.S.**



**SECTION A-A**

**GENERAL NOTE:**

1. CATHODIC AND CORROSION PROTECTION SHALL BE PROVIDED FOR ALL CASING CONDUITS. ONE 32 LB SACRIFICIAL ANODE PACKAGE PER 100 FEET OF CASING PIPE SHALL BE PROVIDED AT EACH END OF THE CASING. SACRIFICIAL, MAGNESIUM ANODES SHALL BE ATTACHED TO THE CASING PIPE BY A #12 A.W.G. GROUNDING WIRE AT EACH END OF THE CASING



BY	DATE	REVISION
JDS	02/2013	ANNUAL UPDATE
JDS	12/2013	ANNUAL UPDATE
TWS	03/2015	ANNUAL UPDATE
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TWS	01/2017	ANNUAL UPDATE
SMG	01/2018	ANNUAL UPDATE



**STANDARD SANITARY DETAILS - GRAVITY**

Andrew Enszy Project Engineer      THOMAS M. MARKUS CITY MANAGER