
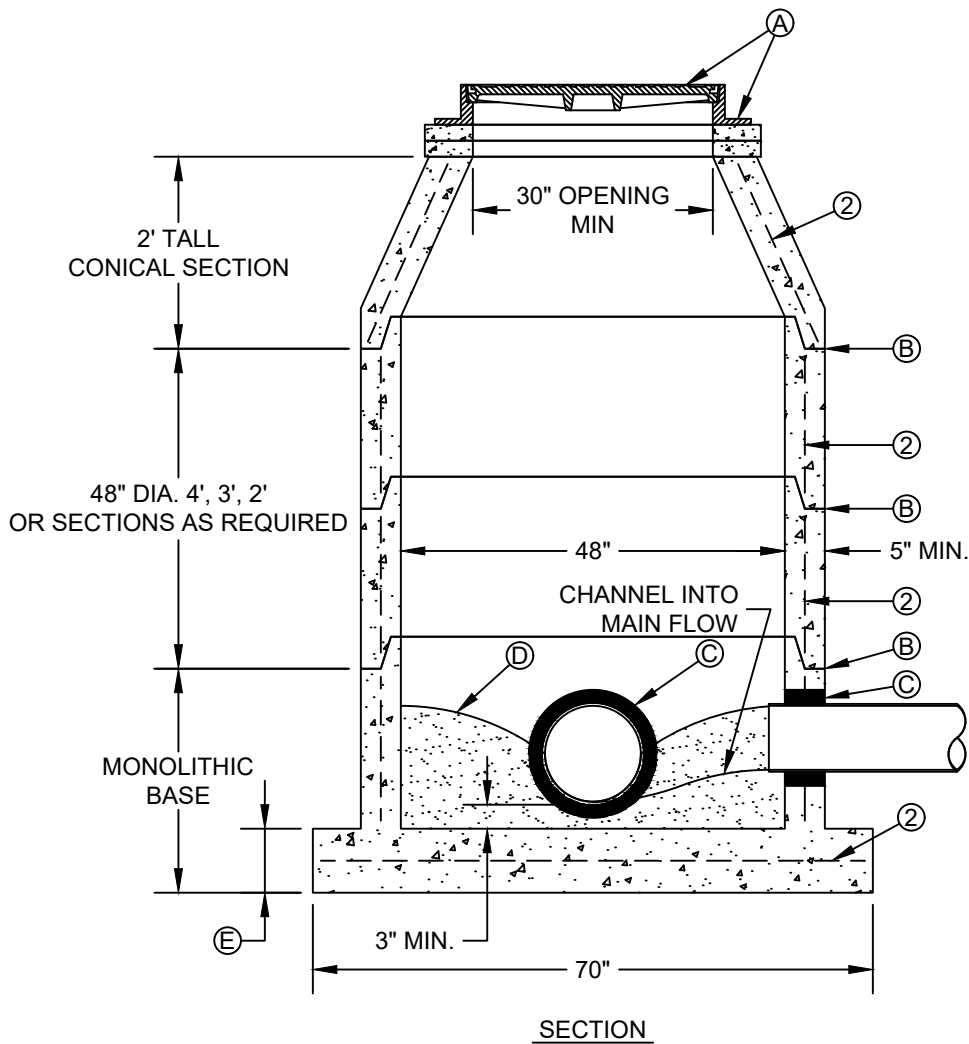


1. ALIGNMENT, CENTERLINE CURVE DATA, AND STATIONING TO BE DETERMINED FROM APPROVED, RECORDED SUBDIVISION PLAT OR ROAD RIGHT-OF-WAY.
2. SEWER MAINS, MANHOLES AND LIFT STATIONS ARE TO BE DESIGNED, TO BE CONSTRUCTED AND TESTED IN ACCORDANCE WITH CITY OF HUNTSVILLE STANDARDS AND TCEQ TITLE 30 CHAPTER 317 OF THE TEXAS ADMINISTRATIVE CODE.
3. TAC 317.2 REQUIRES LOW-PRESSURE AIR TESTS TO CONFORM TO THE PROCEDURE DESCRIBED IN ASTM C828, C924, F-1417 OR OTHER APPROPRIATE PROCEDURES. FOR SAFETY REASONS, AIR TESTING OF SECTIONS OF PIPE SHALL BE LIMITED TO LINES LESS THAN 36-INCH AVERAGE INSIDE DIAMETER. LINES 36-INCH IN DIAMETER OR LARGER MAY BE AIR TESTED AT EACH JOINT.
4. DEFLECTION TESTING OF ALL FLEXIBLE AND SEMI-RIGID PIPE SHALL BE CONDUCTED AFTER THE FINAL BACKFILL HAS BEEN IN PLACE FOR AT LEAST 30 DAYS. NO PIPE SHALL EXCEED A DEFLECTION OF 5%. THE DEFLECTION TEST IS TO BE RUN USING A RIGID MANDREL AND SHALL HAVE A DIAMETER EQUAL TO 95% OF THE INSIDE DIAMETER OF THE PIPE. TEST SHALL BE PERFORMED WITHOUT MECHANICAL PULLING DEVICES. ALL TESTS TO BE WITNESSED AND APPROVED BY THE CITY OF HUNTSVILLE.
5. MAINTAIN 12-INCH MINIMUM CLEARANCE AT CROSSINGS BETWEEN ALL OTHER UTILITY LINES, STORM SEWERS, AND CULVERTS UNLESS OTHERWISE NOTED.
6. SEWER TRENCHES UNDER OR WITHIN THREE (3) FOOT OF PROPOSED OR FUTURE PAVEMENT TO BE BACKFILLED WITH CEMENT SAND (1.5 SACKS PER TON) BACKFILL AS SPECIFIED, TO WITHIN ONE (1) FOOT OF SUBGRADE, BEDDING WILL BE CLASS AA, WHERE CEMENT-SAND BACKFILL IS USED FOR SANITARY SEWERS. INCLUDE COST OF BACKFILL IN UNIT PRICE BID PER LINEAR FOOT OF PIPE.
7. ALL PROPOSED GRAVITY SANITARY SEWER LINES WILL BE SDR 26 PVC PIPE AND EIGHT (8) INCH MINIMUM ID, UNLESS APPROVED OTHERWISE. DUCTILE IRON MAY BE USED, BUT MUST BE APPROVED BY THE CITY ENGINEER ON A CASE BY CASE BASIS.
8. BEDDING FOR ALL TYPES OF SANITARY SEWER PIPE SHALL BE BELOW, AROUND & ABOVE PIPE. ALL SEWER LINES TO BE INSPECTED BY THE CITY OF HUNTSVILLE PRIOR TO BACKFILL. ADDITIONAL BACKFILL SHALL BE SELECT BACKFILL COMPACTED IN 6" LIFTS.
9. FOR PVC PIPE, USE MANHOLE WATERSTOP GASKET AND CLAMP ASSEMBLY AT MANHOLE CONNECTIONS (NO SEPARATE PAY).
10. SANITARY SEWER MANHOLES SHALL BE PRECAST OR POURED IN PLACE MONOLITHIC CONCRETE AND BACKFILLED WITH CEMENT- SAND AS SPECIFIED (NO SEPARATE PAY). MANHOLES WILL BE EXFILTRATION TESTED AS SPECIFIED BY THE CITY OF HUNTSVILLE.
11. ALL FAR-SIDE LEADS SHALL BE FOUR (4) INCHES OR SIX (6) INCHES AT 1.0% MIN. SLOPE. SIX (6) INCH ABS WILL NOT BE ACCEPTABLE. ALL FAR SIDE LEADS (OPEN-CUT OR BORED AND JACKED) SHALL BE 150 PSI THICKNESS CLASS 50, PVC, DR-18, SDR 26, OR SCHEDULE 40 (PLUMBING REQUIRES SCHEDULE 40).
12. ALL PRECAST CONCRETE AND POURED-IN-PLACE CONCRETE MANHOLES SHALL HAVE THE TOP EIGHTEEN (18) INCHES CONSTRUCTED OF PRECAST RINGS AND TO EXTEND THREE (3) TO SIX (6)" ABOVE NATURAL GRADE.
13. THE INTERIOR OF ALL MANHOLES SHALL HAVE A PROTECTIVE COATING. THIS COATING SHALL BE AS DESCRIBED BELOW OR BE AN ALTERNATE COATING PROVIDING THE SAME OR BETTER LEVEL OF PROTECTION, AS APPROVED BY THE CITY ENGINEER. THE INTERIOR MANHOLE COATING SYSTEM SHALL CONSIST OF A HEAVY COAT OF A HEAVY COAT OF A MODIFIED POLYAMINE EPOXY (TNEMEC SERIES 435 PERMA-GLAZE OR ACCEPTED EQUIVALENT) APPLIED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. MINIMUM TOTAL DRY FILM THICKNESS SHALL BE 15 MILS. THE EXTERNAL MANHOLE COATING SHALL CONSIST OF A BITUMINOUS COATING.
14. STUBS OR LEADS SERVING TWO LOTS SHALL HAVE A MINIMUM 6"SERVICE WYE AND CLEANOUT WITH PLUGS (NO SEPARATE PAY). THE WYE SHALL BE LOCATED WITHIN THE STREET RIGHT-OF-WAY OR AN ADJOINING UTILITY EASEMENT. THE 6" SERVICE LINE WITH A 6" DUAL 4" WYE SHALL HAVE A 6" CLEANOUT.
15. STACKS SERVING NEAR-SIDE AND FAR-SIDE LOTS SHALL HAVE A SERVICE WYE AND CLEANOUTS WITH PLUGS FOR THE NEAR-SIDE LOT (NO SEPARATE PAY).
16. ALL DUCTILE IRON PIPE & FITTINGS SHALL BE 150 PSI THICKNESS CLASS 50 WITH EIGHT (8) MIL BLACK VIRGIN POLYETHYLENE WRAP AS SPECIFIED. ALL PVC PIPE SHALL HAVE RUBBER GASKET JOINTS.
17. MANHOLE RIMS IN NONPAVED AREAS ARE TO BE SET AT THE ELEVATIONS SHOWN ON THE PLANS INITIALLY, AFTER PAVING AND GRADING IS COMPLETED, RIMS ARE TO BE ADJUSTED TO THREE (3) TO SIX (6) INCHES ABOVE FINAL GRADE AND BLACK DRESS DIRT TO PROVIDE DRAINAGE AWAY FROM MANHOLE.
18. ALL PVC PIPE SHALL HAVE RUBBER GASKET EQUIPPED BELL AND SPIGOT JOINTS. SOLVENT WELDED JOINTS WILL NOT BE APPROVED FOR THIS PROJECT.
19. ALL GRADE CHANGES AT MANHOLES IN EXCESS OF 2-FEET SHALL BE ACCOMPLISHED WITH DROP MANHOLE CONNECTIONS, REFERENCE CITY DETAILS.
20. THE UTILITY CONTRACTOR IS RESPONSIBLE FOR LOCATING AND MARKING -ALL STACKS AND FAR-SIDE LEADS AFTER THE PAVING IN THIS SECTION IS COMPLETE.
21. A ¼ -INCH DEEP NOTCH SHALL BE CUT IN THE CURB AND PAINTED WITH A RED LINE ADJACENT TO THE STACK OR LEAD.
22. IF STAKES ARE LEFT IN THE GROUND AT THE STACKS AND LEADS AFTER CONSTRUCTION OF UTILITIES, THEN AN EFFORT WILL BE MADE TO PRESERVE THEM DURING PAVING CONSTRUCTION. HOWEVER, IF THESE STAKES ARE KNOCKED OUT FOR ANY REASON, THE UTILITY CONTRACTOR REMAINS RESPONSIBLE FOR LOCATING AND MARKING THE FACILITIES AS DESCRIBED ABOVE.
23. CONTRACTOR SHALL PROVIDE THE CITY OF HUNTSVILLE ONE SET OF (RECORD) DRAWINGS.

ENGINEERING DEPARTMENT			CITY OF HUNTSVILLE STANDARD DETAILS				
CITY OF HUNTSVILLE, TEXAS			SANITARY SEWER CONSTRUCTION NOTES				
NAME: SS CONSTRUCTION NOTES CATEGORY: SEWER DRAWN DATE: 11/07/2016 DRAWN BY: WLSIII SCALE: N.T.S. APPROVED BY: YSR		<div>City Service Center 448 State Highway 75 Huntsville, TX 77320</div>	REV#	ISSUER	DATE	APPROVER	SHEET 1 OF 1
			0	MAM	07/10/2018		
			1	MAM	08/02/2019	RAM	
			2	MAM	09/30/2019	RAM	SS-01
			3	MAM	03/17/2021	RAM	
			4	KSJB	06/28/2022	KSJB	



CONSTRUCTION KEY NOTES:

- A. MANHOLE RING AND COVER. SET FRAME AND COVER FLUSH WITH ROADWAY SURFACE OR FINISHED GRADE.
- B. ALL JOINTS TO BE TONGUE, GROOVE AND SEALED WITH RAM-NEK OR APPROVED EQUAL.
- C. PIPE OPENINGS/KNOCKOUTS AS REQUIRED TO FIT PIPE SIZE AND SHALL HAVE FLEXIBLE PIPE TO MANHOLE CONNECTORS (COMPRESSION TYPE ASTM-923), "KOR-N-SEAL" OR APPROVED EQUAL.
- D. GROUT AS REQUIRED.
- E. CONCRETE BASE SHALL BE 8" FOR MH's UP TO 12' DEEP AND 12" FOR DEPTHS GREATER THAN 12'.

NOTES:

1. MANHOLE TYPE "A" SHALL BE USED FOR LINES 21" AND SMALLER.
2. PRE-CAST MANHOLE SECTIONS SHALL BE OF REINFORCED CONCRETE CONFORMING TO ASTM C-478 AND SHALL MEET HS-20 LOADING. PROVIDE REINFORCEMENT WITHIN 3" @ OPENINGS OR KNOCKOUTS, OPENINGS (UP TO 8") MADE IN FIELD SHALL BE CORE DRILLED.
3. CEMENT SHALL BE TYPE I-II, PER ASTM C-150, AND MUST CONTAIN A MINIMUM OF 4% FLY ASH OF THE TOTAL MANHOLE WEIGHT.
4. THE BASE & RISER SHALL BE INTEGRALLY CAST. CONCRETE SHALL BE MIN. 28 DAY COMPRESSIVE STRENGTH 4000psi.
5. MANUFACTURER TO PROVIDE LIFTERS OF ADEQUATE SIZE AS NEEDED.
6. THE SUBGRADE UNDER THE BASE SHALL BE COMPACTED TO 95% DENSITY IN ACCORDANCE WITH ASTM D-1557.
7. THE INTERIOR MANHOLE COATING SHALL CONSIST OF A HEAVY COAT MODIFIED POLYAMINE EPOXY (TNEMEC SERIES 435 PERMA-GLAZE OR ACCEPTED EQUIVALENT) APPLIED IN STRICT ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS. MINIMUM TOTAL DRY FILM THICKNESS FOR 4" DIAMETER MANHOLE SHALL BE 15 MILS. MINIMUM TOTAL DRY FILM THICKNESS FOR WET WELLS SHALL BE 60 MILS. THE EXTERNAL MANHOLE COATING SHALL CONSIST OF A BITUMINOUS COATING.

ENGINEERING DEPARTMENT

CITY OF
HUNTSVILLE, TEXAS

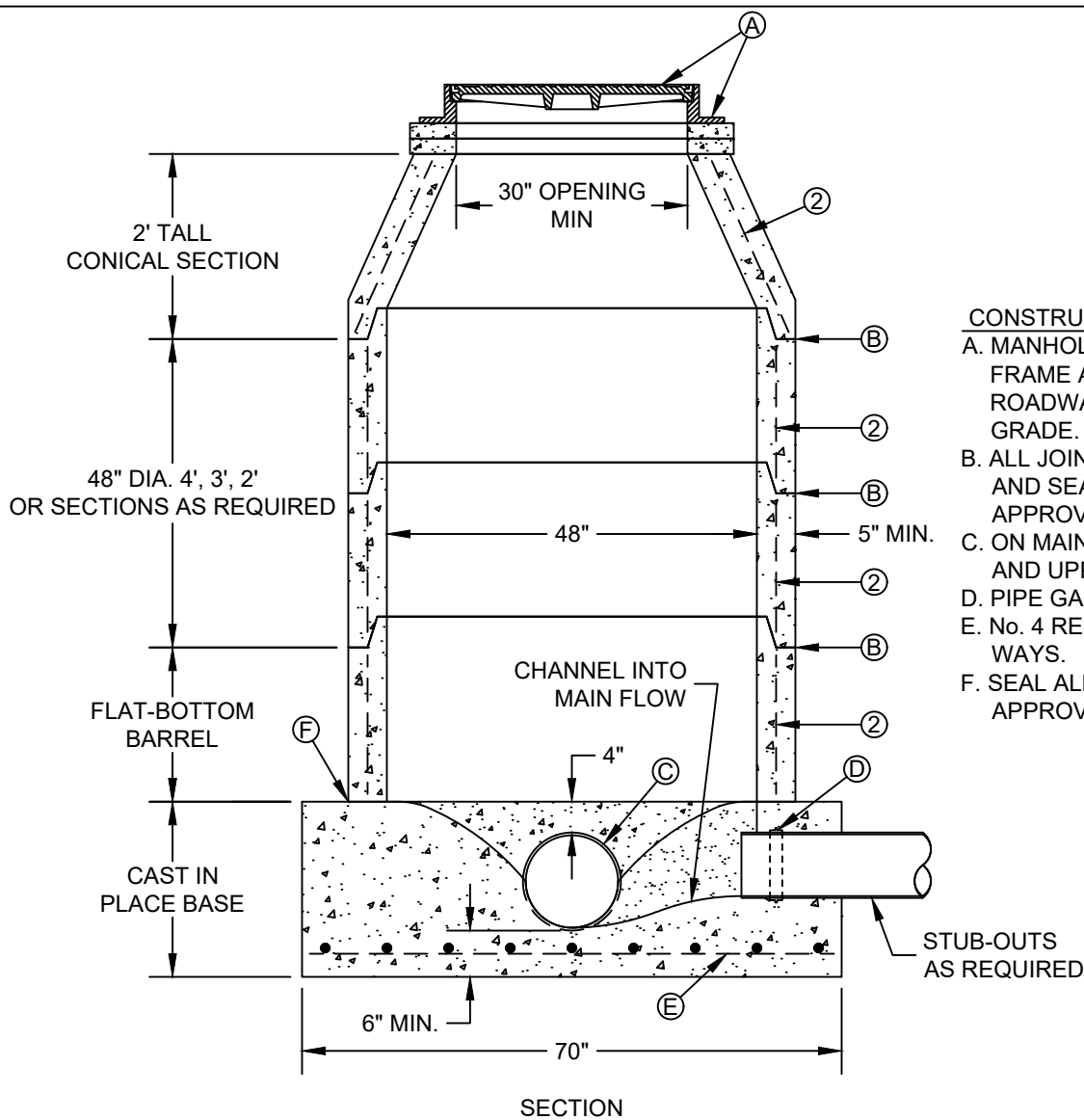


City Service Center
448 State Highway 75
Huntsville, TX 77320

CITY OF HUNTSVILLE STANDARD DETAILS
MANHOLE TYPE "A"

NAME: MANHOLE TYPE "A"
CATEGORY: SEWER
DRAWN DATE: 11/02/2016
DRAWN BY: WLSIII
SCALE: N.T.S.
APPROVED BY: YSR

REV#	ISSUER	DATE	APPROVER	SHEET 1 OF 1
0	MAM	08/10/2018		
1	MAM	08/02/2019	RAM	SS-02



- CONSTRUCTION KEY NOTES:**
- A. MANHOLE RING AND COVER. SET FRAME AND COVER FLUSH WITH ROADWAY SURFACE OR FINISHED GRADE.
 - B. ALL JOINTS TO BE TONGUE, GROOVE AND SEALED WITH RAM-NEK OR APPROVED EQUAL.
 - C. ON MAINLINE, PIPE IS TO BE LAID THRU AND UPPER HALF CUT OUT.
 - D. PIPE GASKET.
 - E. No. 4 REBARS 8" ON CENTER, BOTH WAYS.
 - F. SEAL ALL AROUND WITH RAM-NEK OR APPROVED EQUAL.

SECTION

NOTES:

1. MANHOLE TYPE "A1" SHALL BE USED FOR LINES 21" AND SMALLER. NOT TO BE USED IN GROUNDWATER CONDITIONS.
2. PRE-CAST MANHOLE SECTIONS SHALL BE OF REINFORCED CONCRETE CONFORMING TO ASTM C-478 AND SHALL MEET HS-20 LOADING.
3. CEMENT SHALL BE TYPE I-II, PER ASTM C-150, AND MUST CONTAIN A MINIMUM OF 4% FLY ASH OF THE TOTAL MANHOLE WEIGHT.
4. THE BASE SHALL BE CAST IN PLACE CONCRETE (MINIMUM 28 DAY COMPRESSIVE STRENGTH 4000 PSI.) POURED ON UNDISTURBED OR THOROUGHLY COMPACTED SUB-BASE.
5. MANUFACTURER TO PROVIDE LIFTERS OF ADEQUATE SIZE AS NEEDED.
6. THE SUBGRADE UNDER THE BASE SHALL BE COMPACTED TO 95% DENSITY IN ACCORDANCE WITH ASTM D-1557.
7. THE INTERIOR MANHOLE COATING SHALL CONSIST OF A HEAVY COAT MODIFIED POLYAMINE EPOXY (TNEMEC SERIES 435 PERMA-GLAZE OR ACCEPTED EQUIVALENT) APPLIED IN STRICT ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS. MINIMUM TOTAL DRY FILM THICKNESS FOR 4" DIAMETER MANHOLE SHALL BE 15 MILS. MINIMUM TOTAL DRY FILM THICKNESS FOR WET WELLS SHALL BE 60 MILS. THE EXTERNAL MANHOLE COATING SHALL CONSIST OF A BITUMINOUS COATING.

ENGINEERING DEPARTMENT

CITY OF
HUNTSVILLE, TEXAS

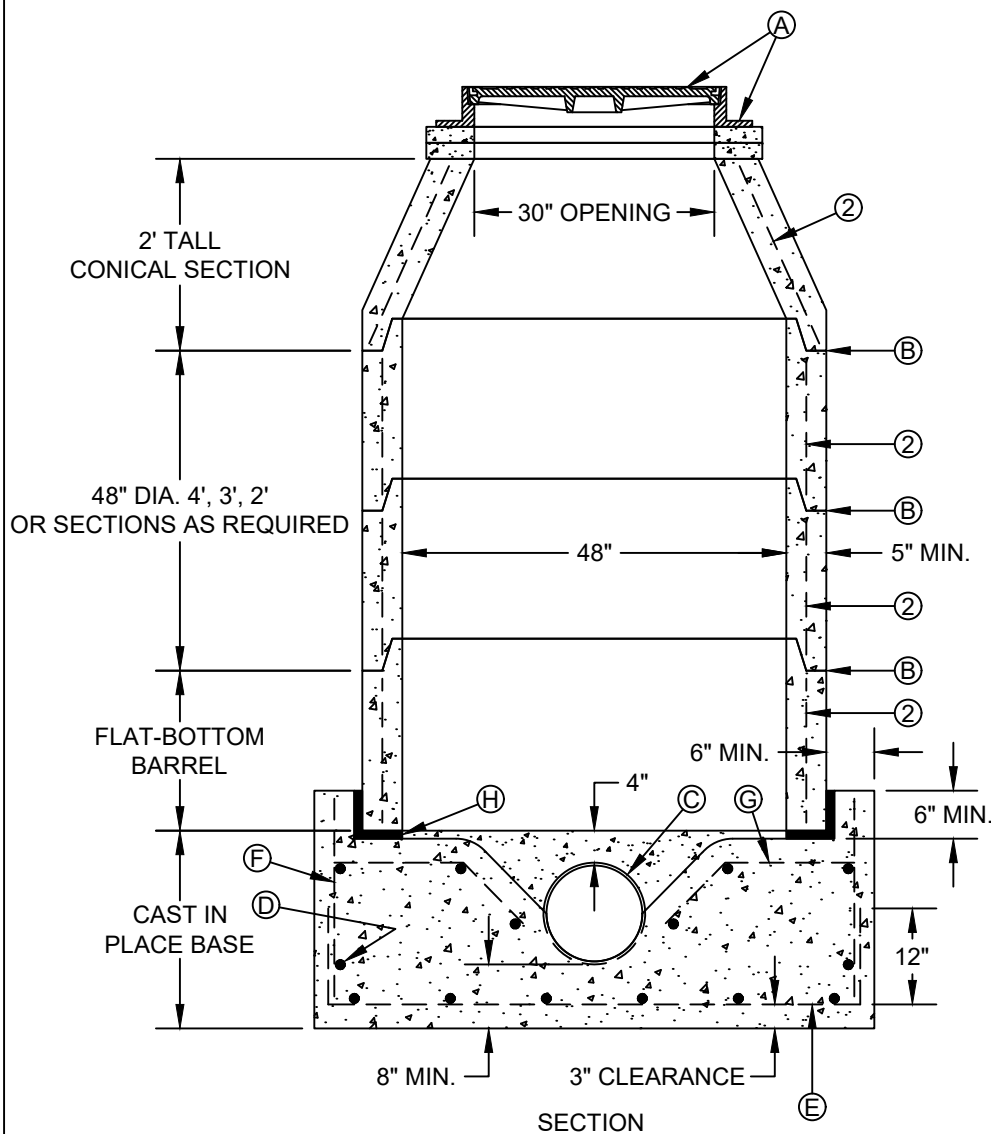


City Service Center
448 State Highway 75
Huntsville, TX 77320

CITY OF HUNTSVILLE STANDARD DETAILS
MANHOLE TYPE "A1"

NAME: MANHOLE TYPE "A1"
CATEGORY: SEWER
DRAWN DATE: 11/02/2016
DRAWN BY: WLSIII
SCALE: N.T.S.
APPROVED BY: YSR

REV#	ISSUER	DATE	APPROVER	SHEET 1 OF 1
0	MAM	08/10/2018		
1	MAM	08/02/2019	RAM	SS-03



CONSTRUCTION KEY NOTES:

- A. MANHOLE RING AND COVER. SET FRAME AND COVER FLUSH WITH ROADWAY SURFACE OR FINISHED GRADE.
- B. ALL JOINTS TO BE TONGUE, GROOVE AND SEALED WITH RAM-NEK OR APPROVED EQUAL.
- C. ON MAINLINE, PIPE IS TO BE LAID THRU AND UPPER HALF CUT OUT.
- D. No. 4 AT 12" ON CENTER CIRCUMFERENTIAL BAR, LAP END 12".
- E. No. 4 AT 12" ON CENTER EACH WAY, TYPICAL.
- F. No. 4 AT 2" ON CENTER VERTICAL.
- G. No. 4 AT 12" ON CENTER.
- H. 1" TO 2" GROUT SPACING.

NOTES:

1. MANHOLE TYPE "A2" SHALL BE USED FOR LINES 21" AND SMALLER, WHEN SPECIAL SOIL CONDITIONS REQUIRE FOUNDATION TO BE STABILIZED.
2. PRE-CAST MANHOLE SECTIONS SHALL BE OF REINFORCED CONCRETE CONFORMING TO ASTM C-478 AND SHALL MEET HS-20 LOADING. PROVIDE REINFORCEMENT WITHIN 3" @ OPENINGS OR KNOCKOUTS, OPENINGS (UP TO 8") MADE IN FIELD SHALL BE CORE DRILLED.
3. CEMENT SHALL BE TYPE I-II, PER ASTM C-150, AND MUST CONTAIN A MINIMUM OF 4% FLY ASH OF THE TOTAL MANHOLE WEIGHT.
4. THE BASE SHALL BE CAST IN PLACE CONCRETE (MINIMUM 28 DAY COMPRESSIVE STRENGTH 4000 PSI.) POURED ON UNDISTURBED OR THOROUGHLY COMPACTED SUB-BASE.
5. MANUFACTURER TO PROVIDE LIFTERS OF ADEQUATE SIZE AS NEEDED.
6. THE SUBGRADE UNDER THE BASE SHALL BE COMPACTED TO 95% DENSITY IN ACCORDANCE WITH ASTM D-1557.
7. DEPTHS OVER 14' SHALL HAVE STRENGTHENED WALLS (REFER TO CONTRACT DRAWINGS OR SPECIFICATIONS).
7. THE INTERIOR MANHOLE COATING SHALL CONSIST OF A HEAVY COAT MODIFIED POLYAMINE EPOXY (TNEMEC SERIES 435 PERMA-GLAZE OR ACCEPTED EQUIVALENT) APPLIED IN STRICT ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS. MINIMUM TOTAL DRY FILM THICKNESS FOR 4" DIAMETER MANHOLE SHALL BE 15 MILS. MINIMUM TOTAL DRY FILM THICKNESS FOR WET WELLS SHALL BE 60 MILS. THE EXTERNAL MANHOLE COATING SHALL CONSIST OF A BITUMINOUS COATING.

ENGINEERING DEPARTMENT

CITY OF
HUNTSVILLE, TEXAS

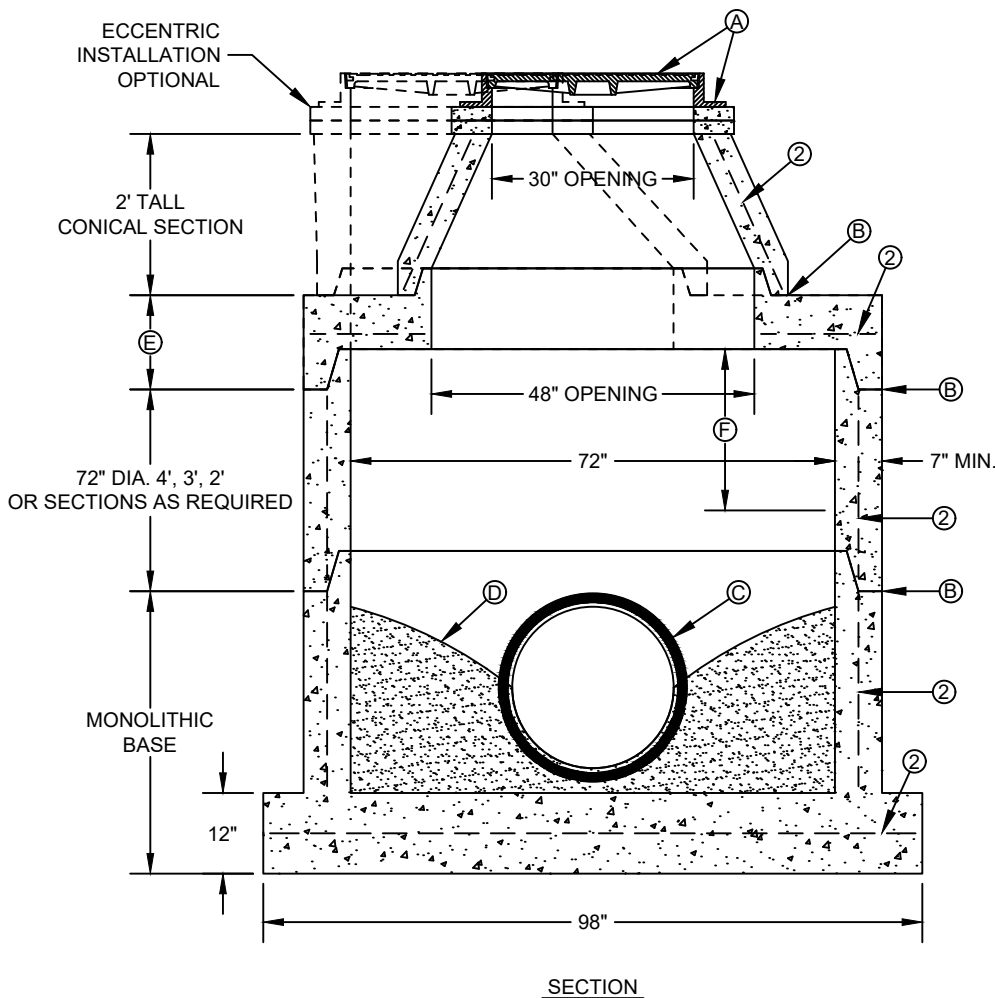


City Service Center
448 State Highway 75
Huntsville, TX 77320

CITY OF HUNTSVILLE STANDARD DETAILS
MANHOLE TYPE "A2"

NAME: MANHOLE TYPE "A2"
CATEGORY: SEWER
DRAWN DATE: 11/02/2016
DRAWN BY: WLSIII
SCALE: N.T.S.
APPROVED BY: YSR

REV#	ISSUER	DATE	APPROVER	SHEET 1 OF 1
0	MAM	08/10/2018		
1	MAM	08/02/2019	RAM	SS-04



CONSTRUCTION KEY NOTES:

- A. MANHOLE RING AND COVER. SET FRAME AND COVER FLUSH WITH ROADWAY SURFACE OR FINISHED GRADE.
- B. ALL JOINTS TO BE TONGUE, GROOVE AND SEALED WITH RAM-NEK OR APPROVED EQUAL.
- C. PIPE OPENINGS/KNOCKOUTS AS REQUIRED TO FIT PIPE SIZE AND SHALL HAVE FLEXIBLE PIPE TO MANHOLE CONNECTORS (COMPRESSION TYPE ASTM-923), "KOR-N-SEAL" OR APPROVED EQUAL.
- D. GROUT AS REQUIRED.
- E. ECCENTRIC/CONCENTRIC LID (CONCENTRIC SHOWN BOLD) WITH KEYED TOP, 8" THICK.
- F. MINIMUM 24" DISTANCE FROM BOTTOM OF LID TO TOP OF PIPE FOR DROP CONNECTION.

NOTES:

1. MANHOLE TYPE "B" SHALL BE USED FOR LINES 24" AND LARGER OR WHEN SEWER MONITORING EQUIPMENT IS REQUIRED.
2. PRE-CAST MANHOLE SECTIONS SHALL BE OF REINFORCED CONCRETE CONFORMING TO ASTM C-478 AND SHALL MEET HS-20 LOADING. PROVIDE REINFORCEMENT WITHIN 3" @ OPENINGS OR KNOCKOUTS, OPENINGS (UP TO 8") MADE IN FIELD SHALL BE CORE DRILLED.
3. CEMENT SHALL BE TYPE I-II, PER ASTM C-150, AND MUST CONTAIN A MINIMUM OF 4% FLY ASH OF THE TOTAL MANHOLE WEIGHT.
4. THE BASE & RISER SHALL BE INTEGRALLY CAST. CONCRETE SHALL BE MIN. 28 DAY COMPRESSIVE STRENGTH 4000psi.
5. MANUFACTURER TO PROVIDE LIFTERS OF ADEQUATE SIZE AS NEEDED.
6. THE SUBGRADE UNDER THE BASE SHALL BE COMPACTED TO 95% DENSITY IN ACCORDANCE WITH ASTM D-1557.
7. CONE SECTION REINFORCEMENT IN ACCORDANCE WITH ASTM C-478 (ECCENTRIC CONE APPLICATION SHOWN DASHED).
8. OTHER UTILITIES SHALL NOT BE INSTALLED ADJACENT TO THE CONE SECTION AND DIRECTLY ABOVE THE MANHOLE.
7. THE INTERIOR MANHOLE COATING SHALL CONSIST OF A HEAVY COAT MODIFIED POLYAMINE EPOXY (TNEMEC SERIES 435 PERMA-GLAZE OR ACCEPTED EQUIVALENT) APPLIED IN STRICT ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS. MINIMUM TOTAL DRY FILM THICKNESS FOR 4" DIAMETER MANHOLE SHALL BE 15 MILS. MINIMUM TOTAL DRY FILM THICKNESS FOR WET WELLS SHALL BE 60 MILS. THE EXTERNAL MANHOLE COATING SHALL CONSIST OF A BITUMINOUS COATING.

ENGINEERING DEPARTMENT

CITY OF
HUNTSVILLE, TEXAS

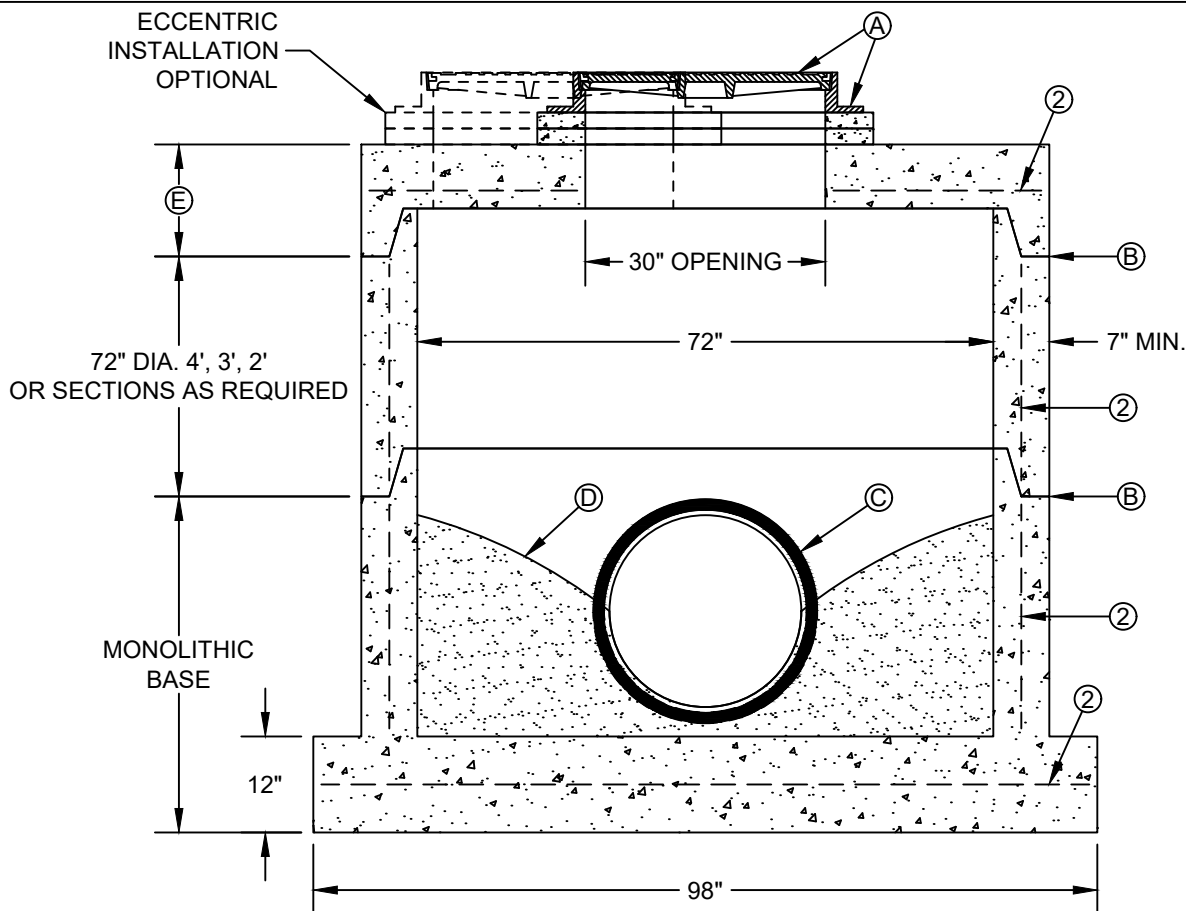


City Service Center
448 State Highway 75
Huntsville, TX 77320

CITY OF HUNTSVILLE STANDARD DETAILS
MANHOLE TYPE "B"

NAME: MANHOLE TYPE "B"
CATEGORY: SEWER
DRAWN DATE: 11/02/2016
DRAWN BY: WLSIII
SCALE: N.T.S.
APPROVED BY: YSR

REV#	ISSUER	DATE	APPROVER	SHEET 1 OF 1
0	MAM	08/10/2018		
1	MAM	08/02/2019	RAM	SS-05



SECTION

CONSTRUCTION KEY NOTES:

- A. MANHOLE RING AND COVER. SET FRAME AND COVER FLUSH WITH ROADWAY SURFACE OR FINISHED GRADE.
- B. ALL JOINTS TO BE TONGUE, GROOVE AND SEALED WITH RAM-NEK OR APPROVED EQUAL.
- C. PIPE OPENINGS/KNOCKOUTS AS REQUIRED TO FIT PIPE SIZE AND SHALL HAVE FLEXIBLE PIPE TO MANHOLE CONNECTORS (COMPRESSION TYPE ASTM-923), "KOR-N-SEAL" OR APPROVED EQUAL.
- D. GROUT AS REQUIRED.
- E. ECCENTRIC/CONCENTRIC LID (CONCENTRIC SHOWN BOLD), 8" THICK.

NOTES:

1. MANHOLE TYPE "B1" SHALL BE USED FOR LINES 24" AND LARGER AND SPECIAL LOADING CONDITIONS.
2. PRE-CAST MANHOLE SECTIONS SHALL BE OF REINFORCED CONCRETE CONFORMING TO ASTM C-478 AND SHALL MEET HS-20 LOADING. PROVIDE REINFORCEMENT WITHIN 3" @ OPENINGS OR KNOCKOUTS, OPENINGS (UP TO 8") MADE IN FIELD SHALL BE CORE DRILLED.
3. CEMENT SHALL BE TYPE I-II, PER ASTM C-150, AND MUST CONTAIN A MINIMUM OF 4% FLY ASH OF THE TOTAL MANHOLE WEIGHT.
4. THE BASE & RISER SHALL BE INTEGRALLY CAST. CONCRETE SHALL BE MIN. 28 DAY COMPRESSIVE STRENGTH 4000psi.
5. MANUFACTURER TO PROVIDE LIFTERS OF ADEQUATE SIZE AS NEEDED.
6. THE SUBGRADE UNDER THE BASE SHALL BE COMPACTED TO 95% DENSITY IN ACCORDANCE WITH ASTM D-1557.
7. THE INTERIOR MANHOLE COATING SHALL CONSIST OF A HEAVY COAT MODIFIED POLYAMINE EPOXY (TNEMEC SERIES 435 PERMA-GLAZE OR ACCEPTED EQUIVALENT) APPLIED IN STRICT ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS. MINIMUM TOTAL DRY FILM THICKNESS FOR 4" DIAMETER MANHOLE SHALL BE 15 MILS. MINIMUM TOTAL DRY FILM THICKNESS FOR WET WELLS SHALL BE 60 MILS. THE EXTERNAL MANHOLE COATING SHALL CONSIST OF A BITUMINOUS COATING.

ENGINEERING DEPARTMENT

CITY OF
HUNTSVILLE, TEXAS

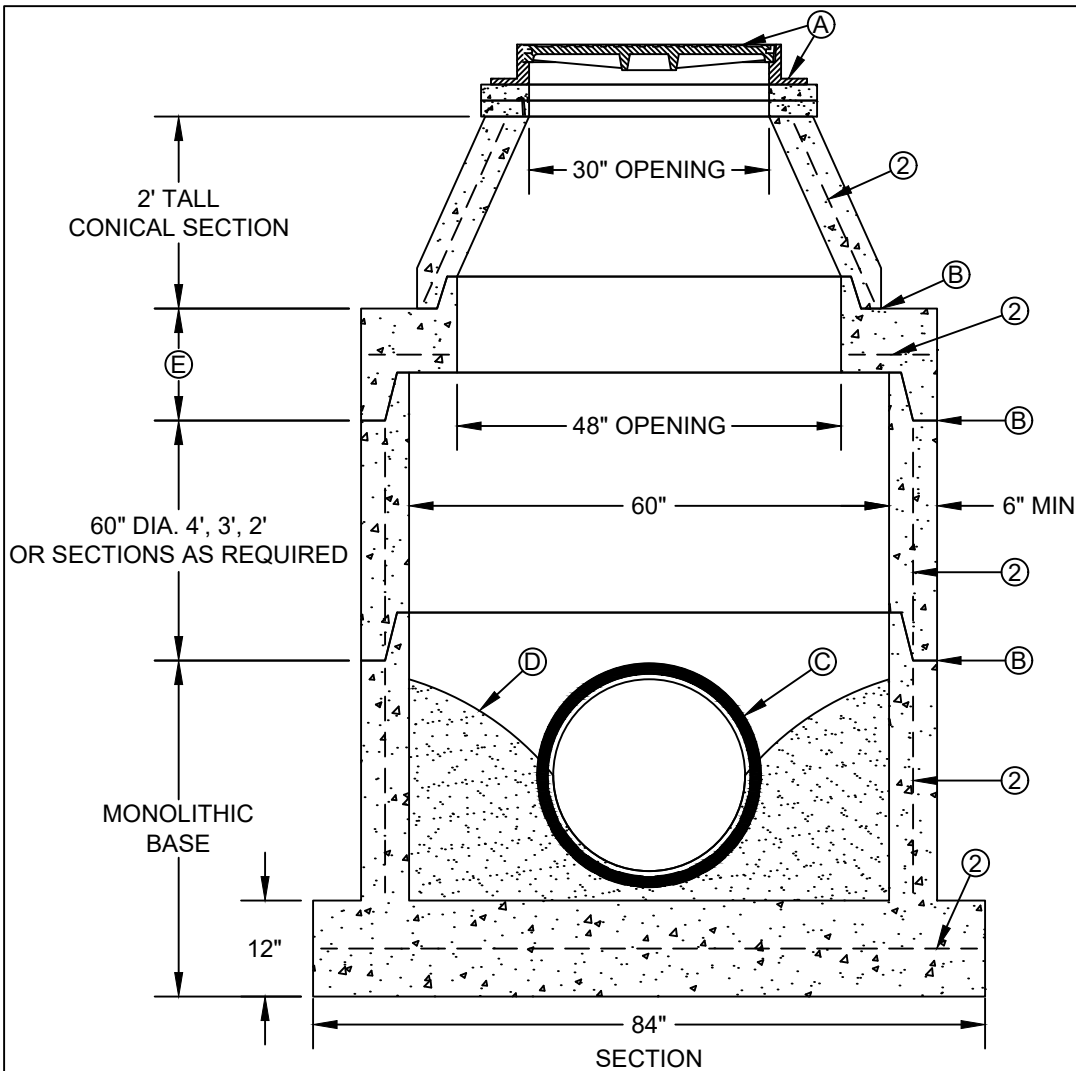


City Service Center
448 State Highway 75
Huntsville, TX 77320

CITY OF HUNTSVILLE STANDARD DETAILS MANHOLE TYPE "B1"

REV#	ISSUER	DATE	APPROVER	SHEET 1 OF 1
0	MAM	08/10/2018		
1	MAM	08/02/2019	RAM	SS-06

NAME: MANHOLE TYPE "B1"
CATEGORY: SEWER
DRAWN DATE: 11/02/2016
DRAWN BY: WLSIII
SCALE: N.T.S.
APPROVED BY: YSR



- CONSTRUCTION KEY NOTES:**
- A. MANHOLE RING AND COVER. SET FRAME AND COVER FLUSH WITH ROADWAY SURFACE OR FINISHED GRADE.
 - B. ALL JOINTS TO BE TONGUE, GROOVE AND SEALED WITH RAM-NEK OR APPROVED EQUAL.
 - C. PIPE OPENINGS/KNOCKOUTS AS REQUIRED TO FIT PIPE SIZE AND SHALL HAVE FLEXIBLE PIPE TO MANHOLE CONNECTORS (COMPRESSION TYPE ASTM-923), "KOR-N-SEAL" OR APPROVED EQUAL.
 - D. GROUT AS REQUIRED.
 - E. CONCENTRIC LID WITH KEYED TOP, 8" THICK.

NOTES:

1. MANHOLE TYPE "C" SHALL BE USED FOR LINES 24" AND LARGER WITHIN TXDOT ROW. TYPE "C" SHALL BE LARGEST ALLOWABLE MANHOLE SIZE WITHIN TXDOT ROW.
2. PRE-CAST MANHOLE SECTIONS SHALL BE OF REINFORCED CONCRETE CONFORMING TO ASTM C-478 AND SHALL MEET HS-20 LOADING. PROVIDE REINFORCEMENT WITHIN 3" @ OPENINGS OR KNOCKOUTS, OPENINGS (UP TO 8") MADE IN FIELD SHALL BE CORE DRILLED.
3. CEMENT SHALL BE TYPE I-II, PER ASTM C-150, AND MUST CONTAIN A MINIMUM OF 4% FLY ASH OF THE TOTAL MANHOLE WEIGHT.
4. THE BASE & RISER SHALL BE INTEGRALLY CAST. CONCRETE SHALL BE MIN. 28 DAY COMPRESSIVE STRENGTH 4000psi.
5. MANUFACTURER TO PROVIDE LIFTERS OF ADEQUATE SIZE AS NEEDED.
6. THE SUBGRADE UNDER THE BASE SHALL BE COMPACTED TO 95% DENSITY IN ACCORDANCE WITH ASTM D-1557.
7. THE INTERIOR MANHOLE COATING SHALL CONSIST OF A HEAVY COAT MODIFIED POLYAMINE EPOXY (TNEMEC SERIES 435 PERMA-GLAZE OR ACCEPTED EQUIVALENT) APPLIED IN STRICT ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS. MINIMUM TOTAL DRY FILM THICKNESS FOR 4" DIAMETER MANHOLE SHALL BE 15 MILS. MINIMUM TOTAL DRY FILM THICKNESS FOR WET WELLS SHALL BE 60 MILS. THE EXTERNAL MANHOLE COATING SHALL CONSIST OF A BITUMINOUS COATING.
8. DEPTHS OVER 14' SHALL HAVE STRENGTHENED WALLS (REFER TO CONTRACT DRAWINGS OR SPECIFICATIONS).

ENGINEERING DEPARTMENT

CITY OF
HUNTSVILLE, TEXAS

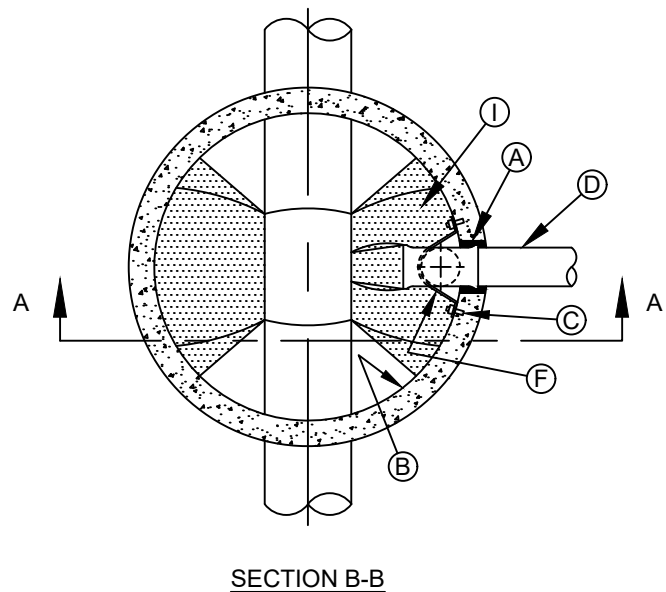
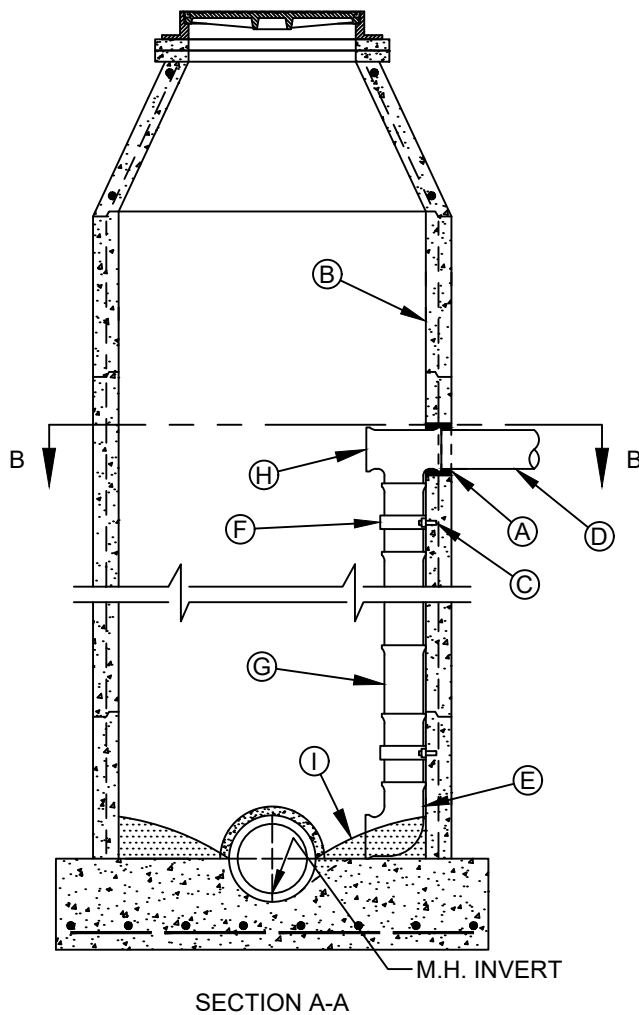


City Service Center
448 State Highway 75
Huntsville, TX 77320

CITY OF HUNTSVILLE STANDARD DETAILS
MANHOLE TYPE "C"

NAME: MANHOLE TYPE "C"
CATEGORY: SEWER
DRAWN DATE: 11/02/2016
DRAWN BY: WLSIII
SCALE: N.T.S.
APPROVED BY: YSR

REV#	ISSUER	DATE	APPROVER	SHEET 1 OF 1
0	MAM	08/10/2018		
1	MAM	08/02/2019	RAM	SS-07



CONSTRUCTION KEY NOTES:

- A. PIPE OPENINGS IN MANHOLE RISERS SHALL HAVE COMPRESSION TYPE FLEXIBLE PIPE TO MANHOLE CONNECTORS (A.S.T.M.- C923) "KOR-N-SEAL" OR APPROVED EQUAL.
- B. MANHOLE WALL
- C. 1/2" STAINLESS STEEL EXPANSION BOLT TO HAVE 2" MIN. ANCHORAGE INTO MANHOLE.
- D. 6" OR GREATER INFLUENT SEWER PIPE.
- E. 6" OR GREATER-90° BEND (P.V.C.)
- F. 2" WIDE X 3/16" THICK STAINLESS STEEL (T316) STRAP @ 4' O.C. (AS REQUIRED)
- G. 6" OR GREATER P.V.C. PIPE (SDR. 35)
- H. 6" X 6" P.V.C. TEE OR GREATER
- I. USE GROUT TO FORM A SMOOTH CHANNEL TO MANHOLE INVERT

NOTES:

1. DROP CONNECTION SHOWN IS FOR 8" INFLUENT PIPE. FOR LARGER SIZE COLLECTOR LINE, MANHOLE SIZE SHALL BE INCREASED AS NECESSARY TO PROVIDE ADEQUATE CLEARANCE BETWEEN MANHOLE WALL & DROP CONNECTION PIPING AND SHALL ACCOMMODATE THE CITY OF HUNTSVILLE CONFINED SPACE ENTRY PERMIT PROGRAM.
2. VERIFY MANHOLE STRUCTURAL INTEGRITY (I.E. BRICK TYPE MANHOLES) PRIOR TO INSTALLATION OF ANCHOR STRAPS & EXPANSION BOLTS (SEE NOTES "C" & "F" ABOVE)
3. ANCHOR STRAPS & BOLTS, SHALL HAVE ONE HEAVY COAT OF POLYAMIDE CURED COAL TAR EPOXY TO PREVENT CORROSION.
4. DROP CONNECTION TO BE CONSTRUCTED WHEN INVERT ELEVATION OF INFLUENT PIPE IS 2 FEET (OR GREATER) ABOVE THE MANHOLE INVERT FOR 6" OR GREATER.
5. THE INTERIOR MANHOLE COATING SHALL CONSIST OF A HEAVY COAT MODIFIED POLYAMINE EPOXY (TNEMEC SERIES 435 PERMA-GLAZE OR ACCEPTED EQUIVALENT) APPLIED IN STRICT ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS. MINIMUM TOTAL DRY FILM THICKNESS FOR 4" DIAMETER MANHOLE SHALL BE 15 MILS. MINIMUM TOTAL DRY FILM THICKNESS FOR WET WELLS SHALL BE 60 MILS. THE EXTERNAL MANHOLE COATING SHALL CONSIST OF A BITUMINOUS COATING.

ENGINEERING DEPARTMENT

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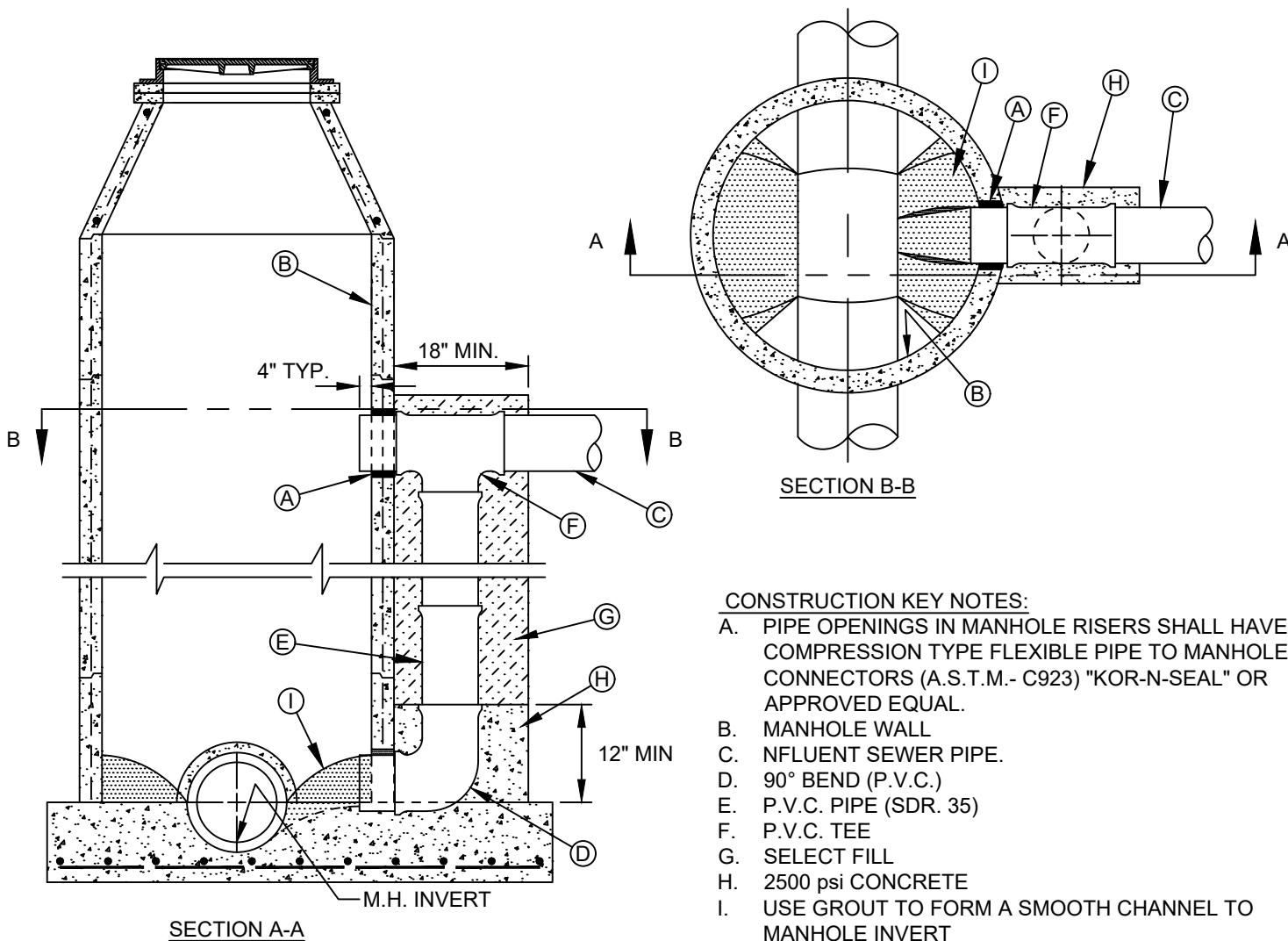
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CITY OF HUNTSVILLE STANDARD DETAILS
DROP CONNECTION
INTERNAL MANHOLE INSTALLATION

NAME: DROP CONNECTION INTERNAL
CATEGORY: SEWER
DRAWN DATE: 11/02/2016
DRAWN BY: WLSIII
SCALE: N.T.S.
APPROVED BY: YSR

REV#	ISSUER	DATE	APPROVER	SHEET 1 OF 1
0	MAM	08/10/2018		
1	MAM	08/02/2019	RAM	

SS-08



NOTES:

1. DROP CONNECTION SHOWN MAY BE USED ON ALL MANHOLE TYPES (NOT RECOMMENDED IN GROUND WATER CONDITIONS).
2. DROP CONNECTION TO BE CONSTRUCTED WHEN INVERT ELEVATION OF INFLUENT PIPE IS 3 FEET (OR GREATER) ABOVE THE MANHOLE INVERT.
3. THE INTERIOR MANHOLE COATING SHALL CONSIST OF A HEAVY COATED MODIFIED POLYAMINE EPOXY (TNEMEC SERIES 435 PERMA-GLAZE OR ACCEPTED EQUIVALENT) APPLIED IN STRICT ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS. MINIMUM TOTAL DRY FILM THICKNESS FOR 4" DIAMETER MANHOLE SHALL BE 15 MILS. MINIMUM TOTAL DRY FILM THICKNESS FOR WET WELLS SHALL BE 60 MILS. THE EXTERNAL MANHOLE COATING SHALL CONSIST OF A BITUMINOUS COATING.

ENGINEERING DEPARTMENT

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NAME: DROP CONNECTION EXTERNAL
CATEGORY: SEWER
DRAWN DATE: 11/02/2016
DRAWN BY: WLSIII
SCALE: N.T.S.
APPROVED BY: YSR

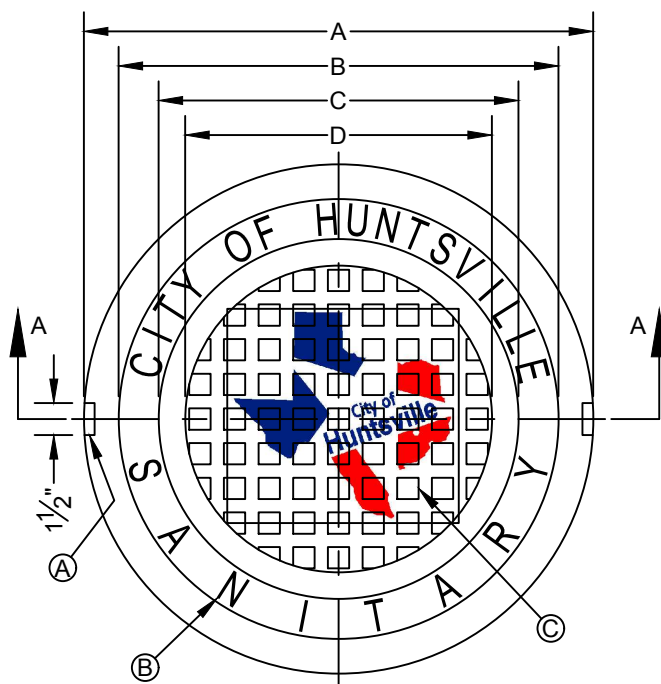


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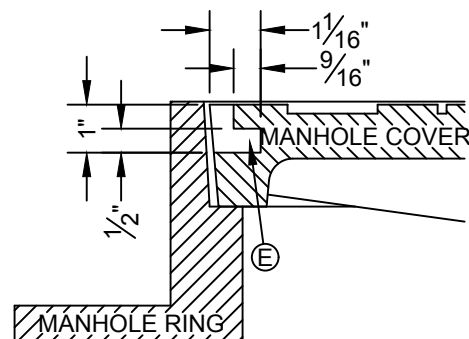
CITY OF HUNTSVILLE STANDARD DETAILS

DROP CONNECTION
EXTERNAL MANHOLE INSTALLATION

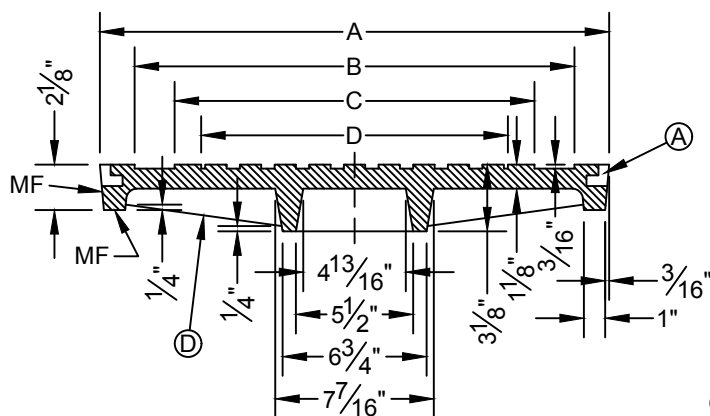
REV#	ISSUER	DATE	APPROVER	SHEET 1 OF 1
0	MAM	08/10/2018		
1	MAM	08/02/2019	RAM	SS-09



TOP VIEW



LIFTING NOTCH



A-A

CONSTRUCTION KEY NOTES:

- A. LIFTING NOTCH.
- B. $\frac{3}{16}$ " RAISED LETTERING.
- C. 1" SQUARES ($\frac{3}{16}$ " TALL) WITH $\frac{5}{8}$ " SPACE BETWEEN.
- D. REINFORCING RIBS.
- E. SLOT.

NOTES:

- 1. MATCHING SURFACES MARKED "MF" TO BE FINISHED OF ANY IRREGULARITIES THAT WOULD PREVENT A SNUG FIT.
- 2. CASTING TO BE SMOOTH & VOID OF AIR HOLES.
- 3. CASTING MUST MEET REQUIREMENTS OF AASHTO M306-07.
- 4. AS-CAST DIMENSIONS MAY VARY $\frac{1}{16}$ " \pm PER FOOT (AASHTO M306-07).
- 5. WEIGHT MAY VARY 5% \pm (AASHTO M306-07).

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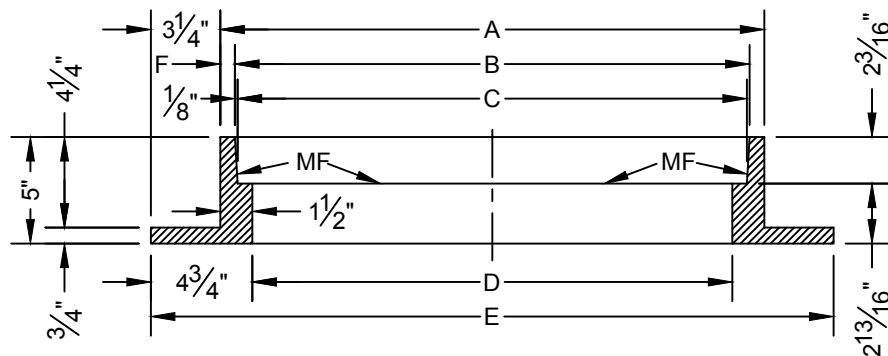
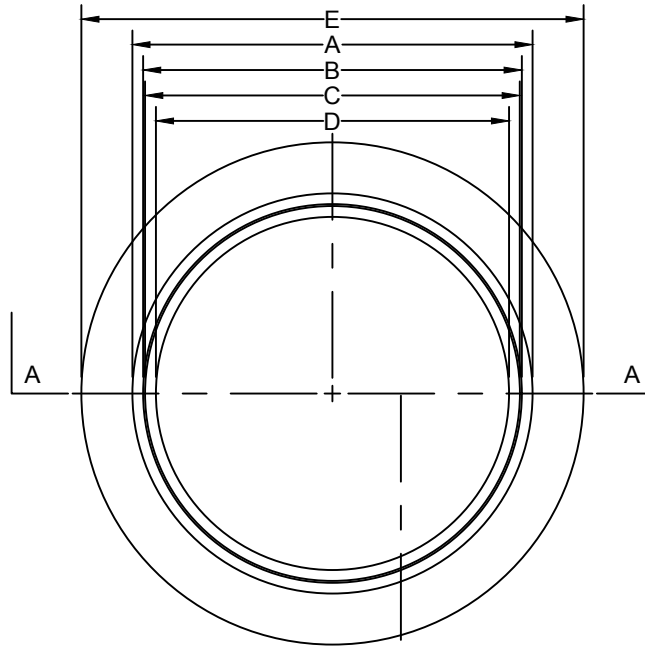


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CITY OF HUNTSVILLE STANDARD DETAILS
SEWER MANHOLE COVER

REV#	ISSUER	DATE	APPROVER	SHEET 1 OF 1
0	MAM	08/10/2018		
				SS-10

NAME: MANHOLE COVER
CATEGORY: SEWER
DRAWN DATE: 11/02/2016
DRAWN BY: WLSIII
SCALE: N.T.S.
APPROVED BY: YSR



- NOTES:
1. MATCHING SURFACES MARKED "MF" TO BE FINISHED OF ANY IRREGULARITIES THAT WOULD PREVENT A SNUG FIT.
 2. CASTING TO BE SMOOTH & VOID OF AIR HOLES.
 3. CASTING MUST MEET REQUIREMENTS OF AASHTO M306-07.
 4. AS-CAST DIMENSIONS MAY VARY $\frac{1}{16}$ " \pm PER FOOT (AASH TO M306-07).
 5. WEIGHT MAY VARY 5% \pm (AASH TO M306-07).

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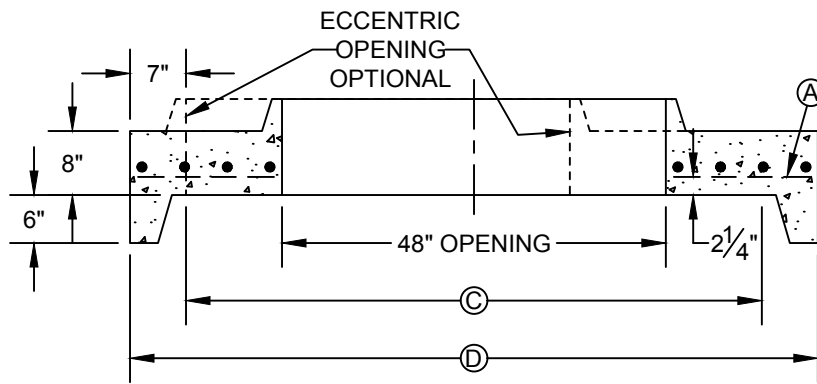


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CITY OF HUNTSVILLE STANDARD DETAILS
MANHOLE RING

REV#	ISSUER	DATE	APPROVER	SHEET 1 OF 1
0	MAM	08/10/2018		
				SS-11

NAME: MANHOLE RING
CATEGORY: SEWER
DRAWN DATE: 11/02/2016
DRAWN BY: WLSIII
SCALE: N.T.S.
APPROVED BY: YSR

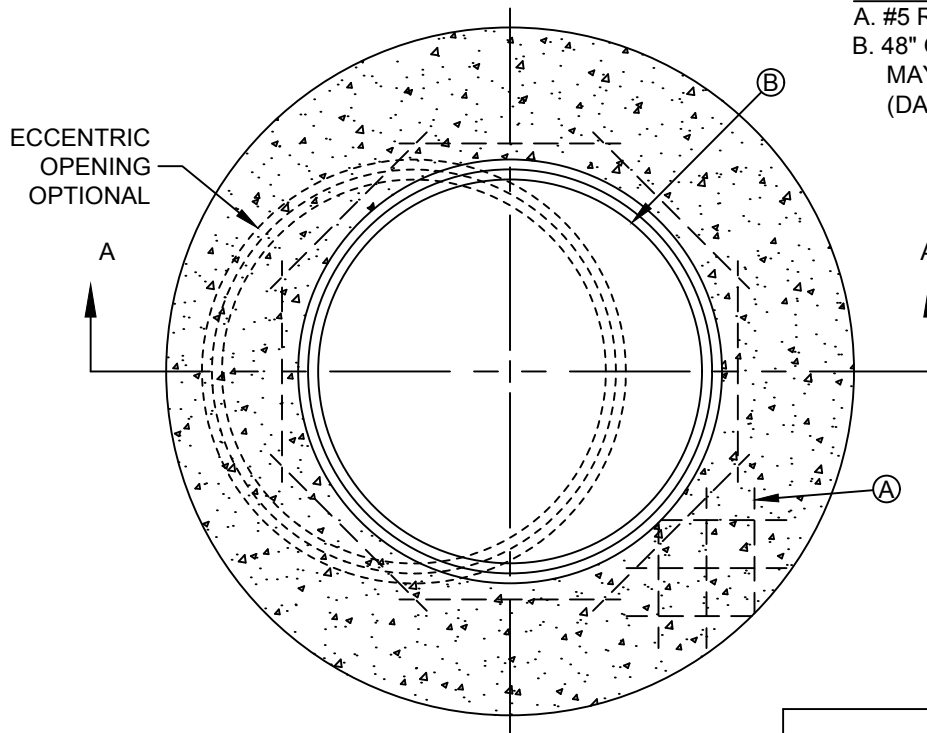


SECTION A-A

CONSTRUCTION KEY NOTES:

A. #5 REBAR 6" O.C./E.W.

B. 48" OPENING, OPTIONAL PLACEMENT OF OPENING MAY BE CONCENTRIC (BOLD) OR ECCENTRIC (DASHED).



MANHOLE LID FOR TYPE "B" & "C"

MANHOLE LID	MANHOLE TYPE "B"	MANHOLE TYPE "C"
C	72" I.D.	60" I.D.
D	86" O.D.	72" O.D.

NOTES:

1. FLAT TOP MANHOLE LID WITH KEYED TOP SHALL BE OF REINFORCED CONCRETE CONFORMING TO ASTM C-478. CEMENT SHALL BE TYPE I-II, PER ASTM C-150, AND MUST CONTAIN A MINIMUM OF 4% FLY ASH OF THE TOTAL LID WEIGHT.
2. CONCRETE SHALL BE MIN. 28 DAY COMPRESSIVE STRENGTH 4000psi.
3. MANUFACTURER TO PROVIDE LIFTERS OF ADEQUATE SIZE AS NEEDED.
4. REINFORCING SHALL MEET A.S.T.M. C478-87 AND TRAFFIC LOADING (HS-20).

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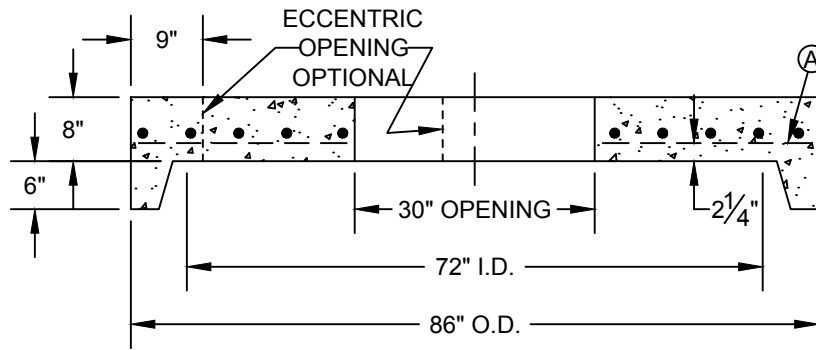


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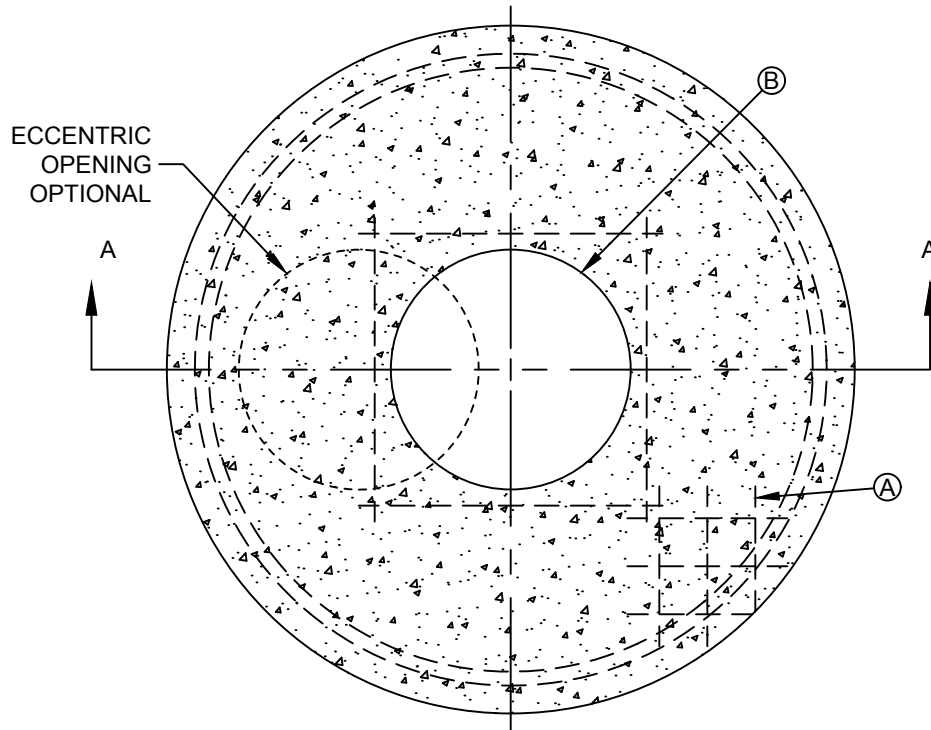
CITY OF HUNTSVILLE STANDARD DETAILS
MANHOLE CONCENTRIC CONCRETE LID
FOR TYPE "B" AND "C" MANHOLES

REV#	ISSUER	DATE	APPROVER	SHEET 1 OF 1
0	MAM	08/10/2018		
				SS-12

NAME: MANHOLE CONCENTRIC LID
CATEGORY: SEWER
DRAWN DATE: 11/02/2016
DRAWN BY: WLSIII
SCALE: N.T.S.
APPROVED BY: YSR



SECTION A-A



MANHOLE LID FOR TYPE "B1"

CONSTRUCTION KEY NOTES:

- A. #5 REBAR 6" O.C./E.W.
- B. 30" OPENING, SIZE TO ACCOMMODATE MANHOLE RING (SEE DETAIL 377). OPTIONAL PLACEMENT OF OPENING MAY BE CONCENTRIC (BOLD) OR ECCENTRIC (DASHED).

NOTES:

1. FLAT TOP MANHOLE LID SHALL BE OF REINFORCED CONCRETE CONFORMING TO ASTM C-478. CEMENT SHALL BE TYPE I-II, PER ASTM C-150, AND MUST CONTAIN A MINIMUM OF 4% FLY ASH OF THE TOTAL LID WEIGHT.
2. CONCRETE SHALL BE MIN. 28 DAY COMPRESSIVE STRENGTH 4000psi.
3. MANUFACTURER TO PROVIDE LIFTERS OF ADEQUATE SIZE AS NEEDED.
4. REINFORCING SHALL MEET A.S.T.M. C478-87 AND TRAFFIC LOADING (HS-20).
5. RING & COVER OR SPECIAL LIDS TO MEET REQUIREMENTS, MAY BE CAST IN PLACE..

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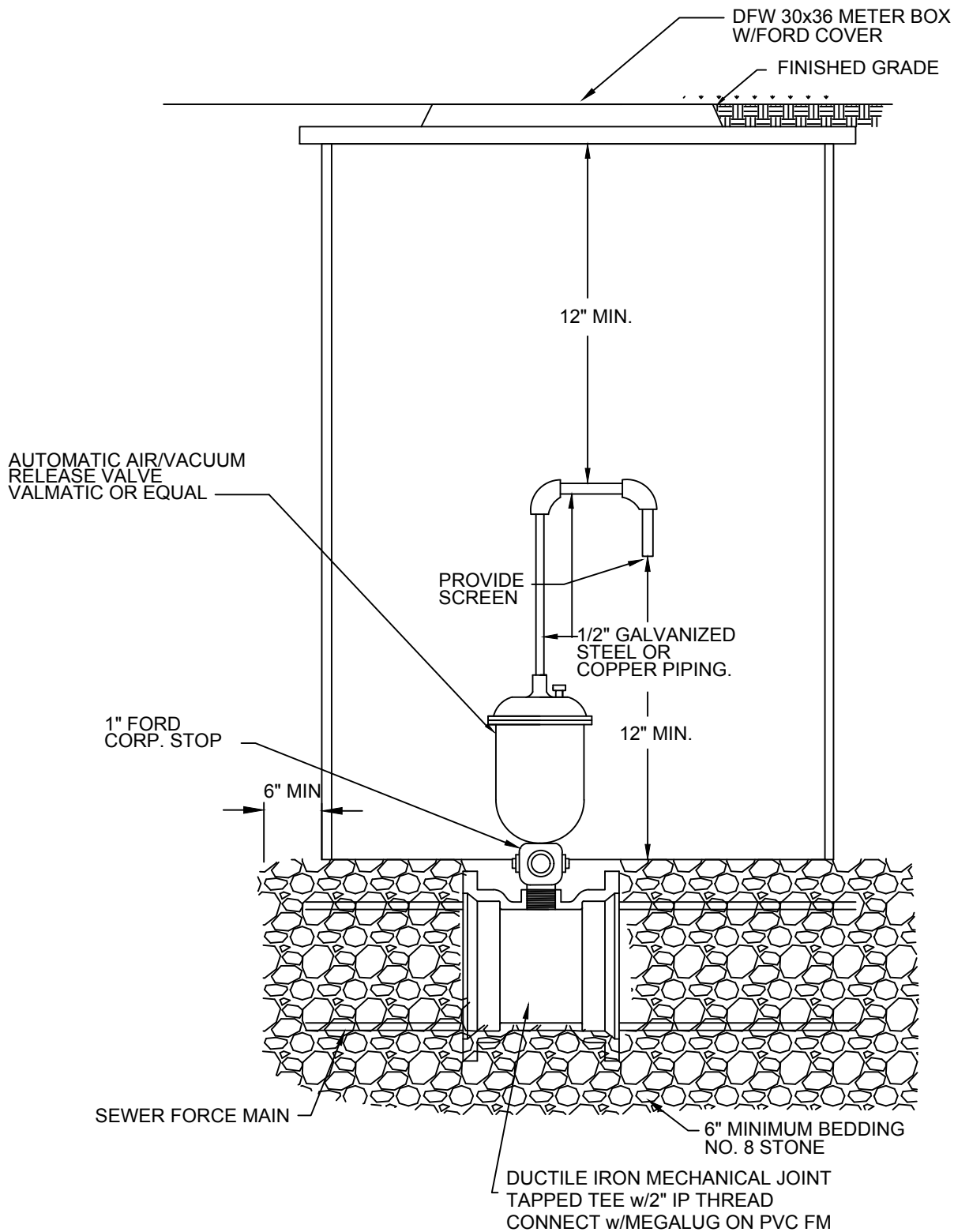


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CITY OF HUNTSVILLE STANDARD DETAILS
MANHOLE ECCENTRIC/CONCENTRIC CONCRETE LID
FOR TYPE "B1" MANHOLES

REV#	ISSUER	DATE	APPROVER	SHEET 1 OF 1
0	MAM	08/10/2018		
				SS-13

NAME: MANHOLE ECC./CONC. LID
CATEGORY: SEWER
DRAWN DATE: 11/06/2016
DRAWN BY: WLSIII
SCALE: N.T.S.
APPROVED BY: YSR



NOTES:
1. NONE.

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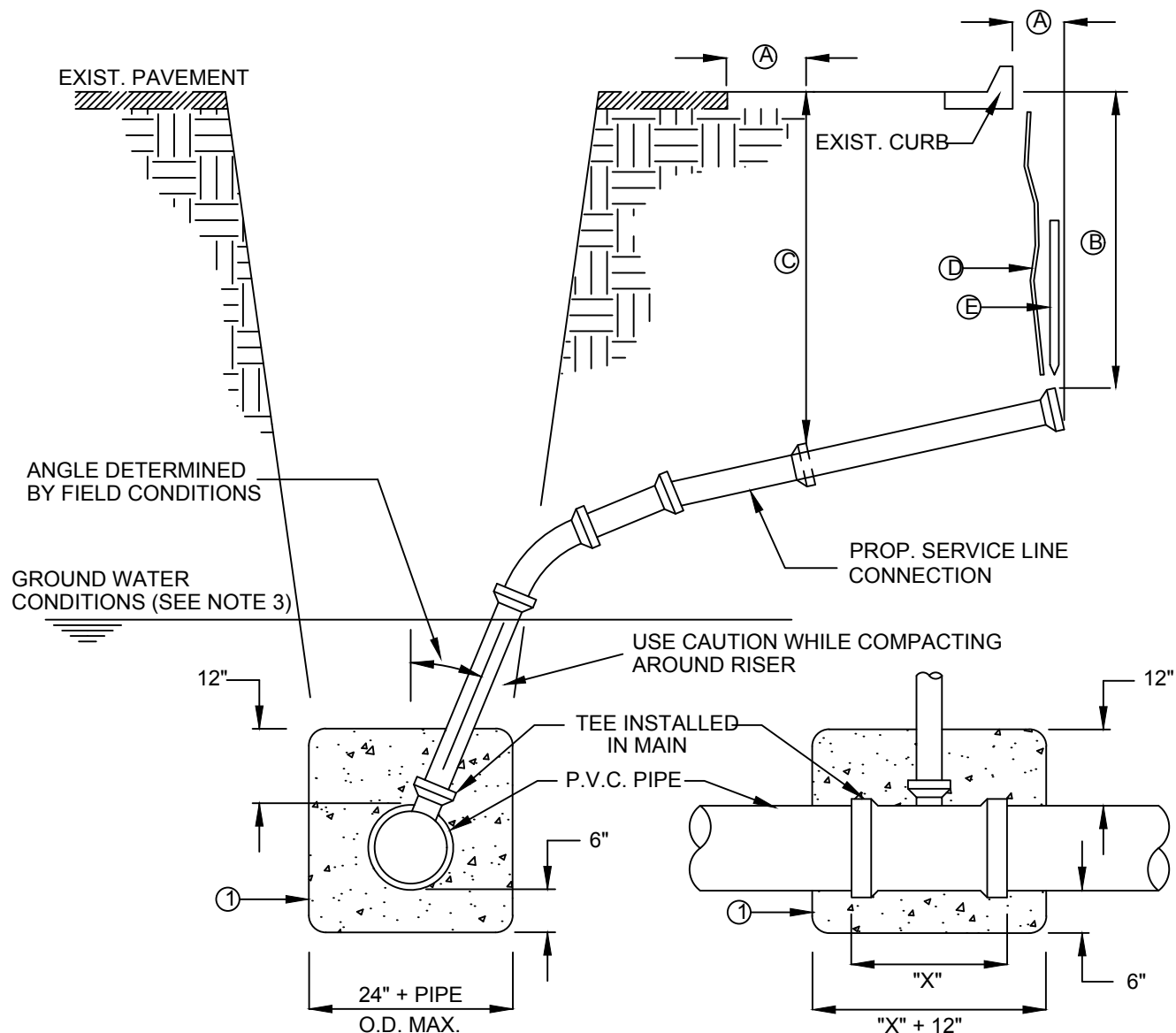


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CITY OF HUNTSVILLE STANDARD DETAILS
AUTOMATIC AIR/VACUUM RELEASE ASSEMBLY
FOR USE ON FORCE MAIN

REV#	ISSUER	DATE	APPROVER	SHEET 1 OF 1
0	MAM	07/10/2018		
				SS-14

NAME: FM AIR/VACUUM RELEASE
CATEGORY: SEWER
DRAWN DATE: 11/07/2016
DRAWN BY: WLSIII
SCALE: N.T.S.
APPROVED BY: YSR



CONSTRUCTION KEY NOTES:

- A. CONTRACTOR TO INSTALL SEWER SERVICE LINE FROM THE MAIN TO A LOCATION 6" BEHIND THE CURB OR 18" BEYOND THE EDGE OF PAYMENT, UNLESS CONDITIONS REQUIRE OTHERWISE.
- B. 18" FOR STANDARD SUBDIVISION, 3.5' FOR SUBDIVISIONS WITH ON-SITE PONDING OR FLAT TERRAIN.
- C. RISERS OR LATERALS EXTENDING BEYOND EXISTING PAVING SHALL BE INSTALLED TO 3.5' MINIMUM TOP OF GROUND OR PAVEMENT, UNLESS CONDITIONS REQUIRE OTHERWISE.
- D. PLASTIC METALLIC MARKING TAPE RISING TO WITHIN 6" OF GROUND SURFACE OR METALLIC DISK.
- E. WOODEN STAKE (1"x2"x36") VERTICALLY PLACED AT PLUGGED END OF PROPOSED SERVICE LINE.

NOTES:

1. IN GROUNDWATER CONDITIONS ONLY, P.V.C. SADDLES OR TEES ARE TO BE ENCASED WITH CLASS B CONCRETE.
2. UNDER CERTAIN CONDITIONS FIELD INVESTIGATIONS WILL BE REQUIRED TO DETERMINE THE ADEQUACY OF THE DEPTH ON THE LATERAL.
3. WHEN GROUND WATER IS ENCOUNTERED SERVICE RISER SHALL BE EXTENDED ABOVE ANTICIPATE WATER TABLE LEVEL.

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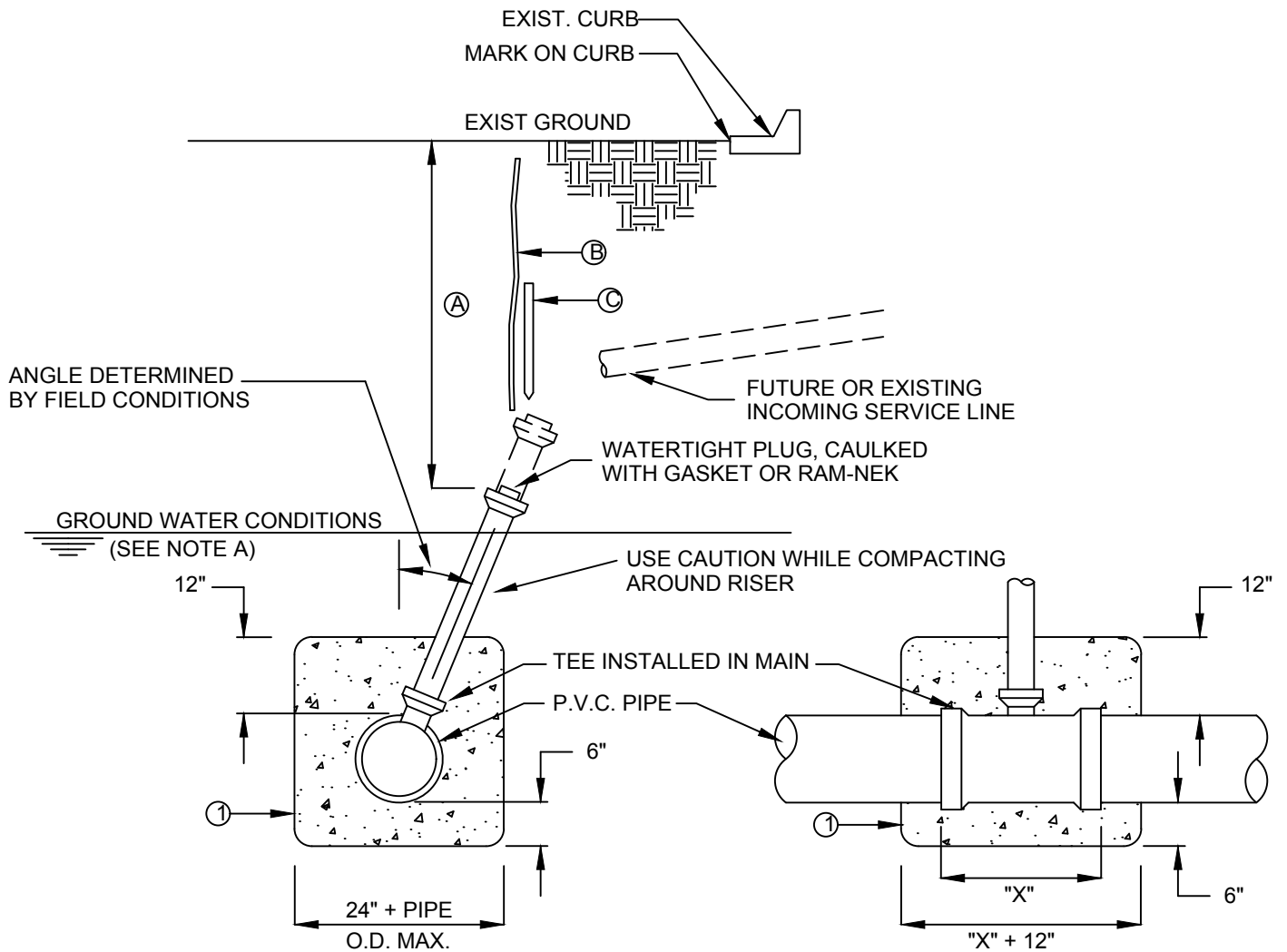


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CITY OF HUNTSVILLE STANDARD DETAILS SEWER SERVICE RISER AND SERVICE LINE CONNECTION

REV#	ISSUER	DATE	APPROVER	SHEET 1 OF 1
0	MAM	07/10/2018		
				SS-15

NAME: SERVICE RISER AND LINE
CATEGORY: SEWER
DRAWN DATE: 11/02/2016
DRAWN BY: WLSIII
SCALE: N.T.S.
APPROVED BY: YSR



CONSTRUCTION KEY NOTES:

- A. SERVICE LINE TO BE EXTENDED ABOVE GROUND WATER LEVEL OR TO A DEPTH OF THE INTERSECTING SERVICE LINE, OR TO WITHIN 6' OF SURFACE (WHICH EVER IS APPROPRIATE & SAFER).
- B. PLASTIC METALLIC MARKING TAPE RISING TO WITHIN 6" OF GROUND SURFACE OR METALLIC DISK.
- C. WOODEN STAKE (1"x2"x36") VERTICALLY PLACED AT PLUGGED END OF RISER.

NOTES:

1. IN GROUNDWATER CONDITIONS ONLY, P.V.C. SADDLES OR TEES ARE TO BE ENCASED WITH CLASS B CONCRETE.
2. UNDER CERTAIN CONDITIONS FIELD INVESTIGATIONS WILL BE REQUIRED TO DETERMINE THE ADEQUACY OF THE DEPTH ON THE LATERAL.

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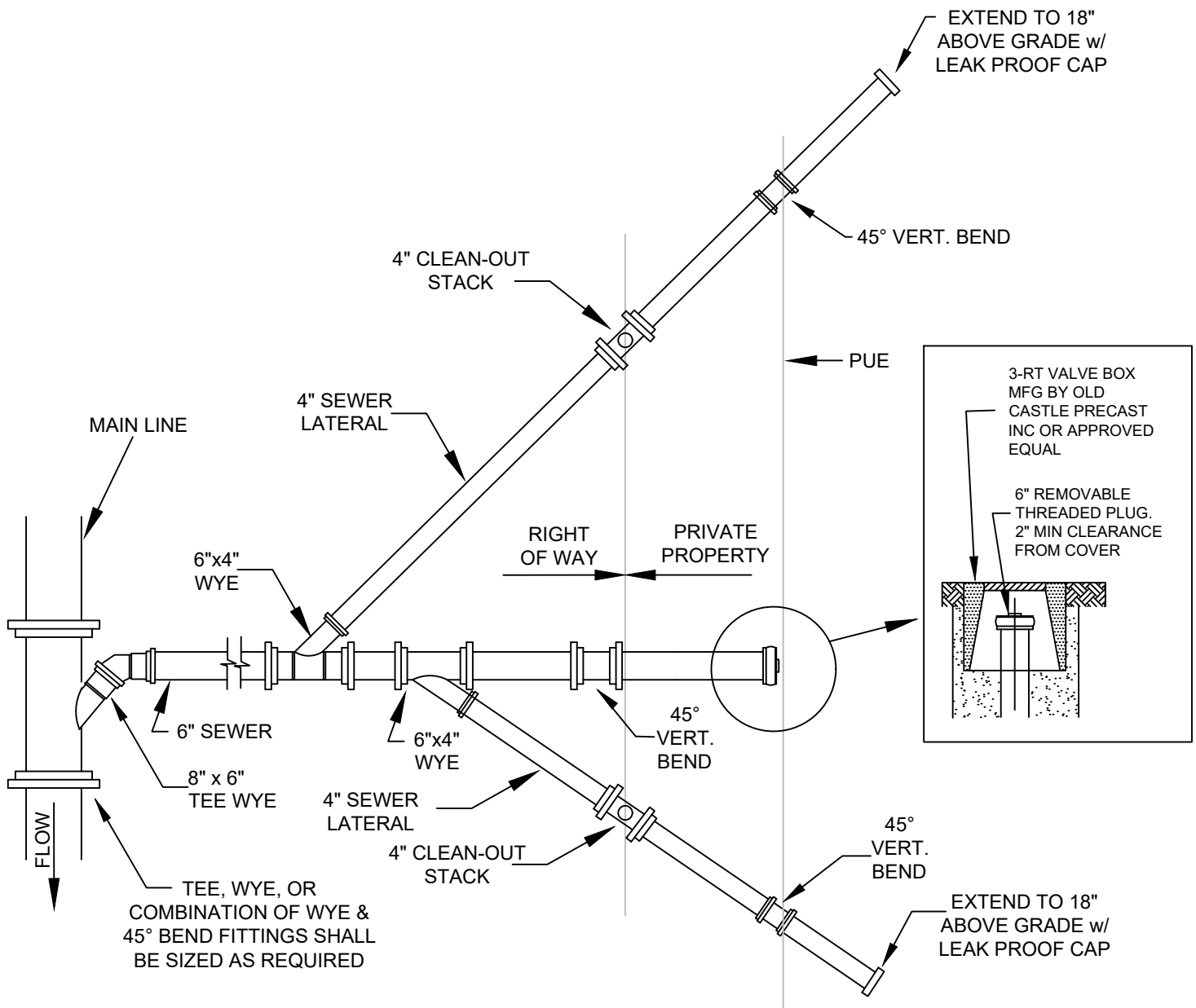


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**CITY OF HUNTSVILLE STANDARD DETAILS
SEWER SERVICE RISER CONNECTION**

REV#	ISSUER	DATE	APPROVER	SHEET 1 OF 1
0	MAM	07/10/2018		
				SS-16

NAME: SERVICE RISER CONNECTION
CATEGORY: SEWER
DRAWN DATE: 11/02/2016
DRAWN BY: WLSIII
SCALE: N.T.S.
APPROVED BY: YSR



NOTES:

1. TRAFFIC BEARING BOX REQUIRED IN TRAFFIC AREAS.
2. ALL PIPE AND FITTINGS SHALL BE OF SIMILAR MATERIAL.
3. ALL PIPE SHALL BE OF SIZE SHOWN.
4. NO BENDS ARE ALLOWED IN THE LATERAL FROM THE MAIN TO THE CLEAN-OUT STACK WYE (EXCEPT AS NOTED).
5. ALL MAIN LINE TAPS ON ACTIVE MAINS WILL BE PERFORMED BY CONTRACTOR AND INSPECTED BY THE CITY.
6. PIPING BEHIND CLEANOUT TO BE INSTALLED PER CITY OF HUNTSVILLE CODE.
7. MINIMUM COVER FOR ALL SEWER LATERALS SHALL BE THREE (3') FEET.
8. PROPERTY OWNER RESPONSIBLE FOR INSTALLING CLEANOUT ON PROPERTY LINE WHEN MAINTENANCE OCCURS.

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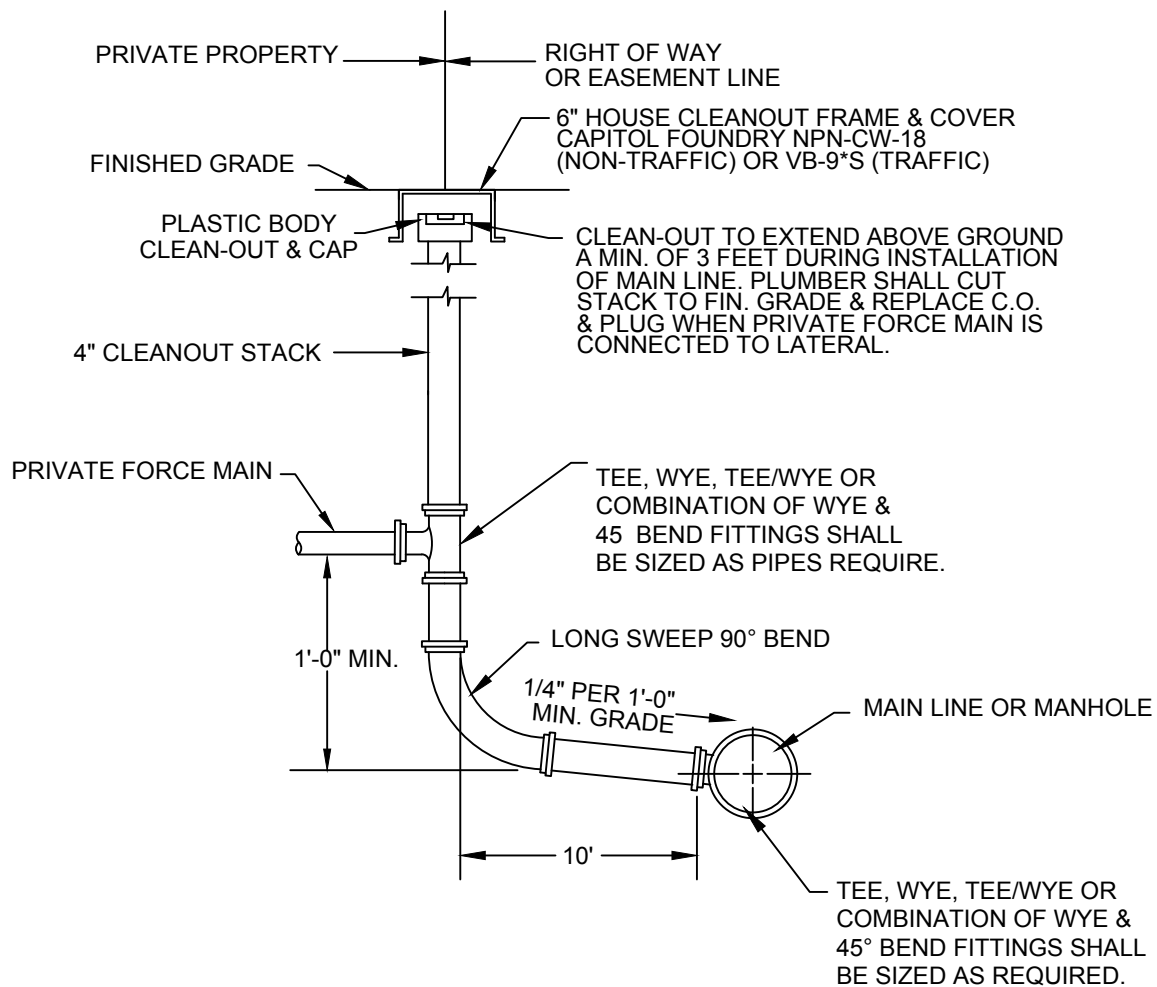


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CITY OF HUNTSVILLE STANDARD DETAILS COMBINED 6" BY 4" LATERALS

REV#	ISSUER	DATE	APPROVER	SHEET 1 OF 1
0	MAM	07/10/2018		
1	MAM	01/23/2020		SS-17

NAME: COMBINED LATERALS
CATEGORY: SEWER
DRAWN DATE: 11/04/2016
DRAWN BY: WLSIII
SCALE: N.T.S.
APPROVED BY: YSR



NOTES:

1. TRAFFIC BEARING BOX REQUIRED IN TRAFFIC AREAS.
2. ALL PIPE AND FITTINGS SHALL BE OF SIMILAR MATERIAL.
3. ALL PIPE SHALL BE OF SAME SIZE.
4. NO BENDS ARE ALLOWED IN THE LATERAL FROM THE MAIN TO THE CLEANOUT STACK WYE (EXCEPT AS NOTED).
5. ALL MAINLINE TAPS ON ACTIVE MAINS WILL BE PERFORMED BY THE CONTRACTOR AND INSPECTED BY THE COUNTY.
6. MINIMUM COVER FOR ALL SEWER LATERAL SHALL BE 3 FEET.
7. GRAVITY SECTION AND CLEANOUT SHALL BE 6" DIAMETER FOR PUBLIC FORCE MAINS AND 4" DIAMETER FOR PRIVATE FORCE MAINS.
8. PUBLIC FORCE MAINS SHALL CONNECT TO SEWER MANHOLES.
9. PROPERTY OWNER IS RESPONSIBLE FOR INSTALLING CLEANOUT ON PROPERTY LINE WHEN MAINTENANCE OCCURS.

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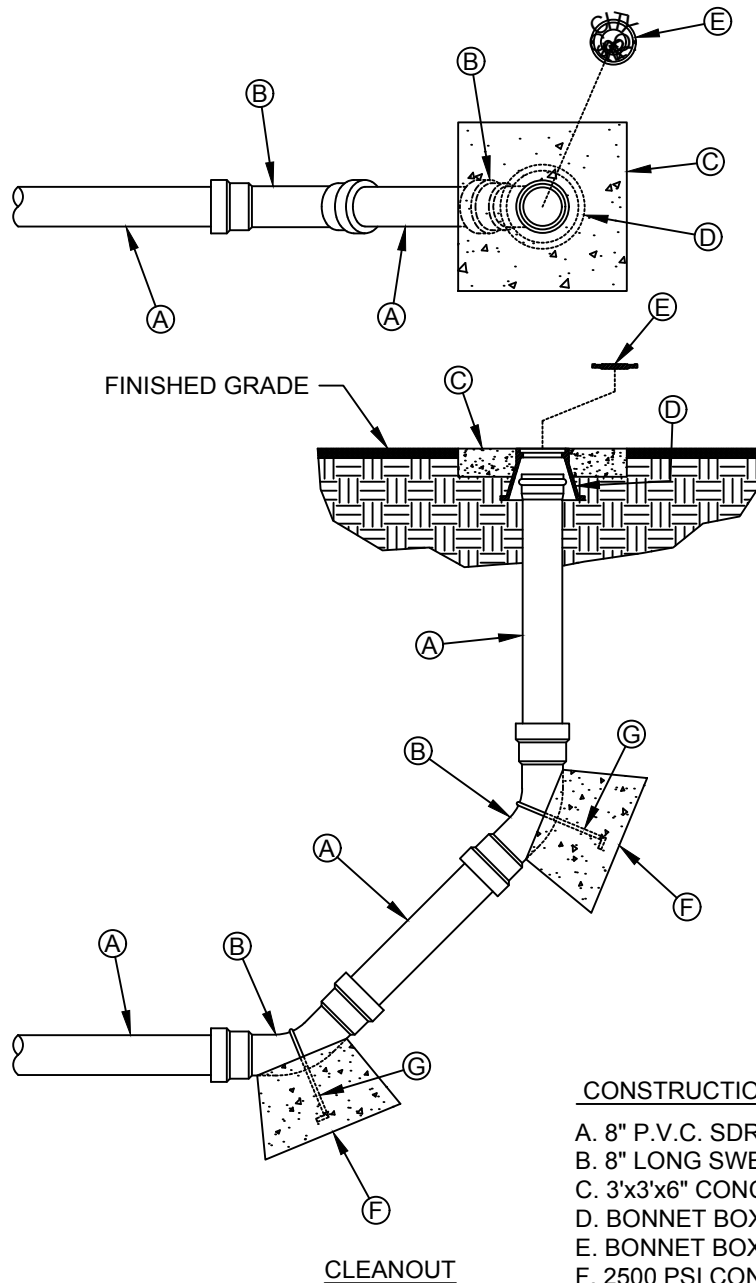


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CITY OF HUNTSVILLE STANDARD DETAILS
PRIVATE FORCE MAIN TO
GRAVITY LATERAL CONNECTION

REV#	ISSUER	DATE	APPROVER	SHEET 1 OF 1
0	MAM	07/10/2018		
				SS-18

NAME: PRIVATE FORCE MAIN
CATEGORY: SEWER
DRAWN DATE: 11/07/2016
DRAWN BY: WLSIII
SCALE: N.T.S.
APPROVED BY: YSR



CONSTRUCTION KEY NOTES:

- A. 8" P.V.C. SDR 35 (LENGTHS VARY)
- B. 8" LONG SWEEP BEND 45°
- C. 3'x3'x6" CONCRETE COLLAR
- D. BONNET BOX (SEE DET 396)
- E. BONNET BOX COVER
- F. 2500 PSI CONCRETE THRUST BLOCKING
- G. No. 5 REBAR HAIR PIN. PAINT UNEMBEDDED PORTION OF REBAR WITH TWO COATS OF COAL TAR EPOXY.

NOTES:

1. CLEANOUT TO BE USED AT END OF LINES & AT CUL-DE-SACS (AS SPECIFIED ON PLANS).
2. DOUBLE WYES TO BE USED AS NECESSARY ON CUL-DE-SACS.
3. SPOOL LENGTHS AND DEPTHS WILL VARY.
4. BONNET BOX & CONCRETE COLLAR TO BE FLUSH WITH FINISHED GRADE.
5. CLEANOUT NOT TO BE USED MORE THAN 300' AWAY FROM LAST MANHOLE IN LINE.

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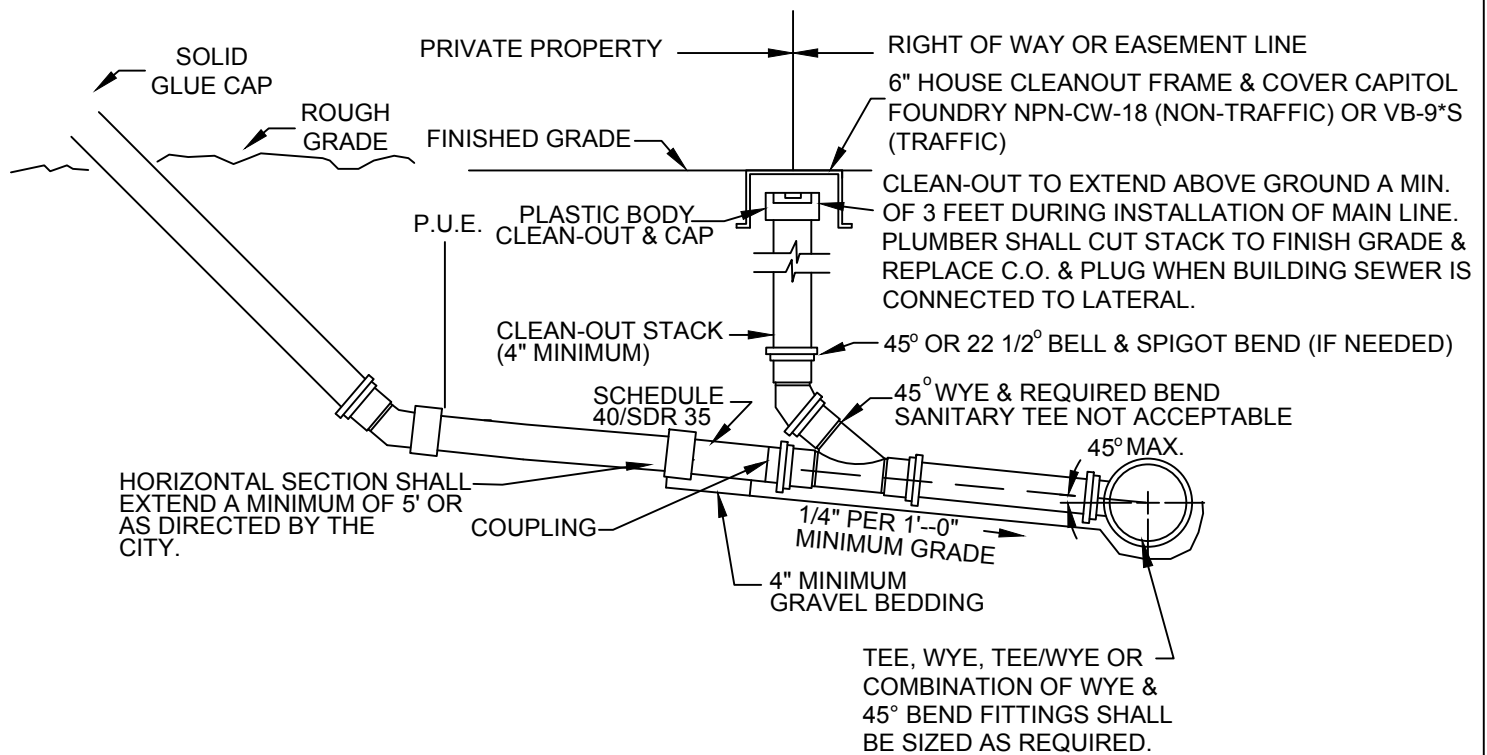


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CITY OF HUNTSVILLE STANDARD DETAILS
END OF SEWER LINE CLEANOUT

REV#	ISSUER	DATE	APPROVER	SHEET 1 OF 1
0	MAM	07/10/2018		
				SS-19

NAME: END OF SEWER CLEANOUT
CATEGORY: SEWER
DRAWN DATE: 11/02/2016
DRAWN BY: WLSIII
SCALE: N.T.S.
APPROVED BY: YSR



NOTES:

1. TRAFFIC BEARING BOX REQUIRED IN TRAFFIC AREA.
2. ALL PIPE FITTINGS SHALL BE OF SIMILAR MATERIAL.
3. ALL PIPE SHALL BE OF SAME SIZE.
4. NO BENDS ARE ALLOWED IN THE LATERAL FROM THE MAIN TO THE CLEANOUT STACK WYE (EXCEPT AS NOTED).
5. ALL MAINLINE TAPS ON ACTIVE MAINS WILL BE PERFORMED BY CONTRACTOR AND INSPECTED BY THE CITY.
6. PIPING BEHIND CLEANOUT TO BE INSTALLED PER CITY OF HUNTSVILLE CODE.
7. MINIMUM LATERAL SIZE: 4" FOR RESIDENTIAL SERVICE AND 6" FOR NON-RESIDENTIAL SERVICE.
8. MINIMUM COVER FOR ALL SEWER LATERALS SHALL BE 3 FEET.
9. PROPERTY OWNER RESPONSIBLE FOR INSTALLING CLEANOUT ON PROPERTY LINE WHEN MAINTENANCE OCCURS.

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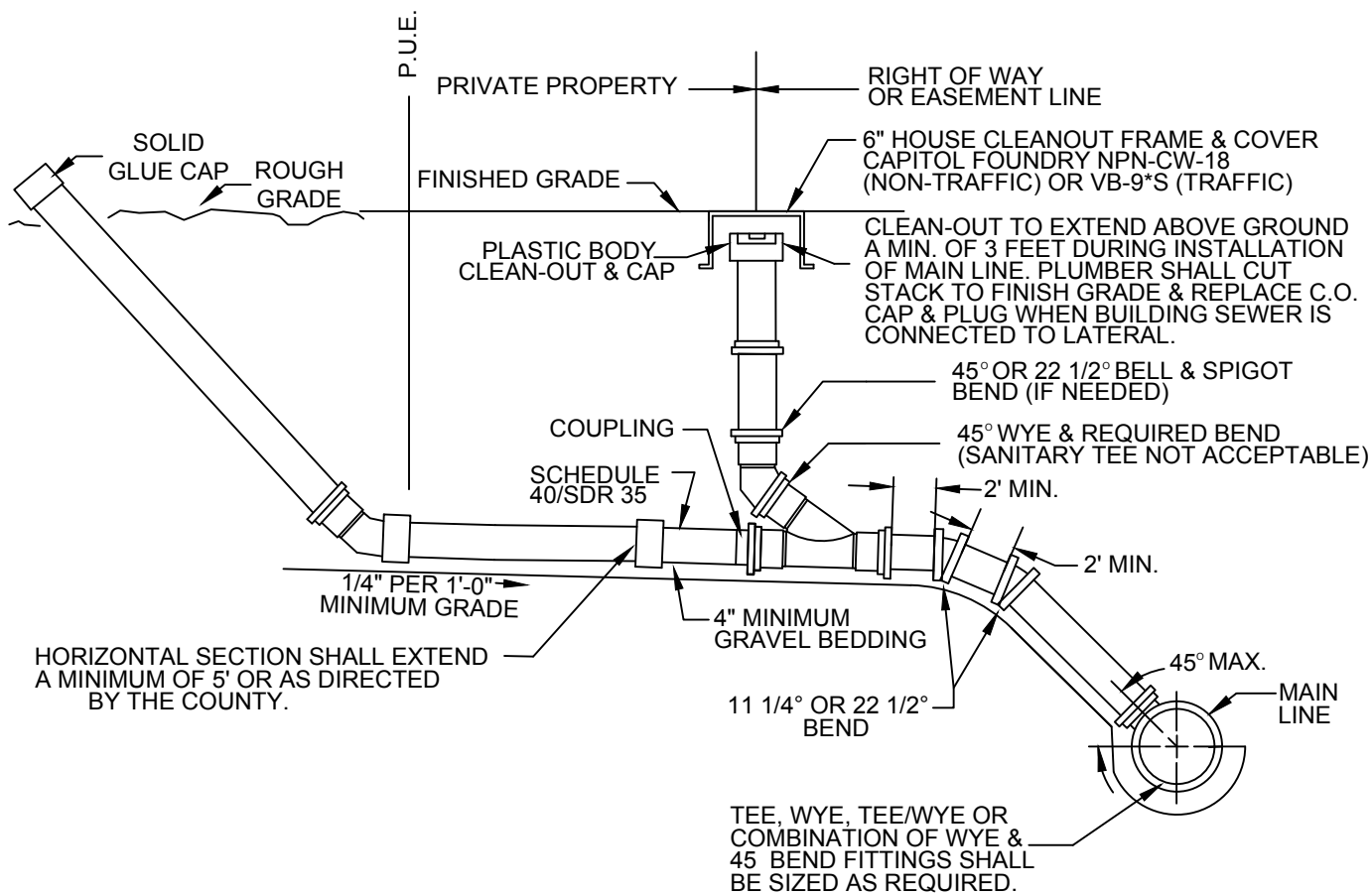


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CITY OF HUNTSVILLE STANDARD DETAILS TYPICAL SEWER LATERAL

REV#	ISSUER	DATE	APPROVER	SHEET 1 OF 1
0	MAM	07/10/2018		
				SS-20

NAME: TYPICAL SEWER LATERAL
CATEGORY: SEWER
DRAWN DATE: 11/07/2016
DRAWN BY: WLSIII
SCALE: N.T.S.
APPROVED BY: YSR



NOTES:

1. TRAFFIC BEARING BOX REQUIRED IN TRAFFIC AREA.
2. ALL PIPE FITTINGS SHALL BE OF SIMILAR MATERIAL.
3. ALL PIPE SHALL BE OF SAME SIZE.
4. NO BENDS ARE ALLOWED IN THE LATERAL FROM THE MAIN TO THE CLEANOUT STACK WYE (EXCEPT AS NOTED).
5. ALL MAINLINE TAPS ON ACTIVE MAINS WILL BE PERFORMED BY CONTRACTOR AND INSPECTED BY THE COUNTY.
6. PIPING BEHIND CLEANOUT TO BE INSTALLED PER CITY OF HUNTSVILLE CODE.
7. MINIMUM LATERAL SIZE: 4" FOR RESIDENTIAL SERVICE AND 6" FOR NON-RESIDENTIAL SERVICE.
8. PROPERTY OWNER RESPONSIBLE FOR INSTALLING CLEANOUT ON PROPERTY LINE WHEN MAINTENANCE OCCURS.

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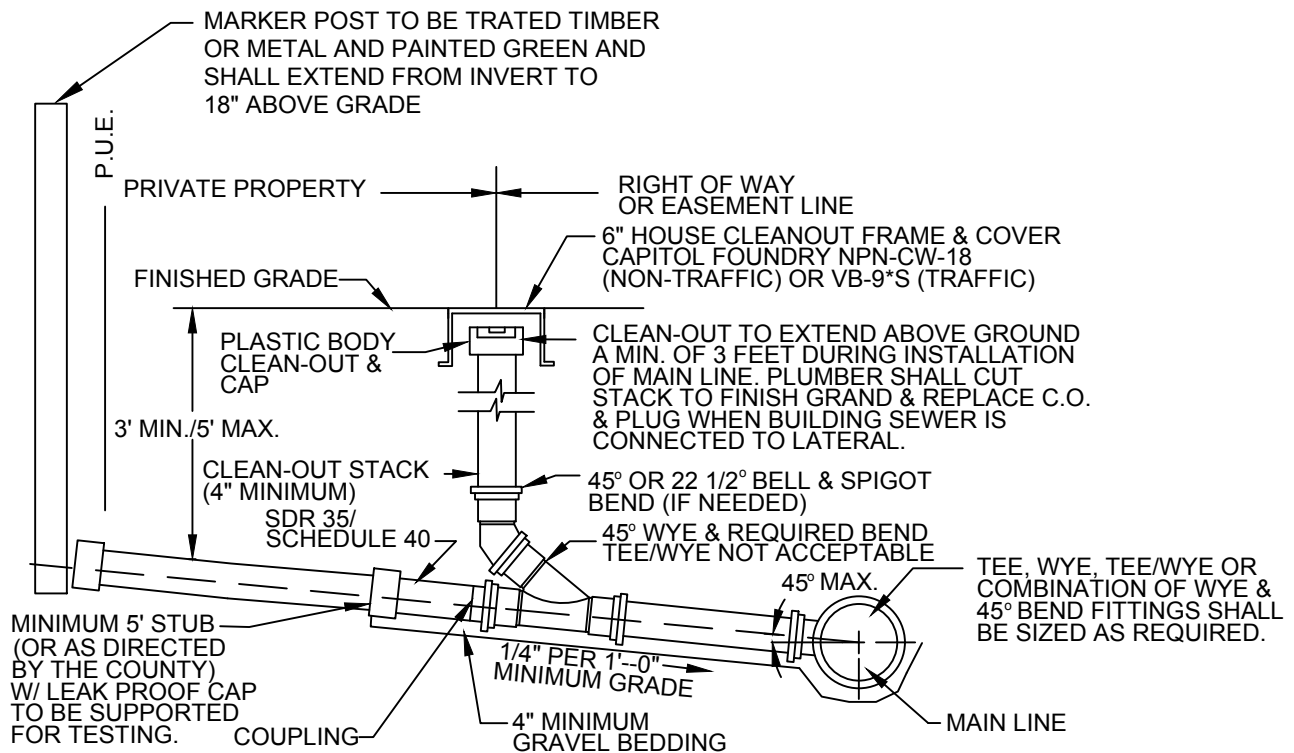


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CITY OF HUNTSVILLE STANDARD DETAILS LATERAL FOR DEEP SEWERS

REV#	ISSUER	DATE	APPROVER	SHEET 1 OF 1
0	MAM	07/10/2018		
				SS-21

NAME: DEEP SEWER LATERAL
CATEGORY: SEWER
DRAWN DATE: 11/07/2016
DRAWN BY: WLSIII
SCALE: N.T.S.
APPROVED BY: YSR



NOTES:

1. THIS CONFIGURATION MAY ONLY BE USED IN SPECIAL CASES WHEN SPECIFICALLY DESIGNED BY THE PROJECT ENGINEER AND INDICATED ON SITE PLANS.
2. ALL PIPE AND FITTINGS SHALL BE OF SAME MATERIAL.
3. ALL PIPE SHALL BE OF SAME SIZE.
4. NO BENDS ARE ALLOWED IN THE LATERAL FROM THE MAIN TO THE CLEANOUT STACK WYE (EXCEPT AS NOTED).
5. ALL MAINLINE TAPS ON ACTIVE MAINS SHALL BE PERFORMED BY CONTRACTOR AND INSPECTED BY THE COUNTY.
6. PIPING BEHIND CLEANOUT TO BE INSTALLED PER CITY OF HUNTSVILLE CODE.
7. MINIMUM LATERAL SIZE: 4" FOR RESIDENTIAL SERVICE AND 6" FOR NON-RESIDENTIAL SERVICE.
8. MINIMUM COVER FOR ALL SEWER LATERALS SHALL BE 3 FEET.
9. PROPERTY OWNER IS RESPONSIBLE FOR INSTALLING CLEANOUT ON PROPERTY LINE WHEN MAINTENANCE OCCURS.

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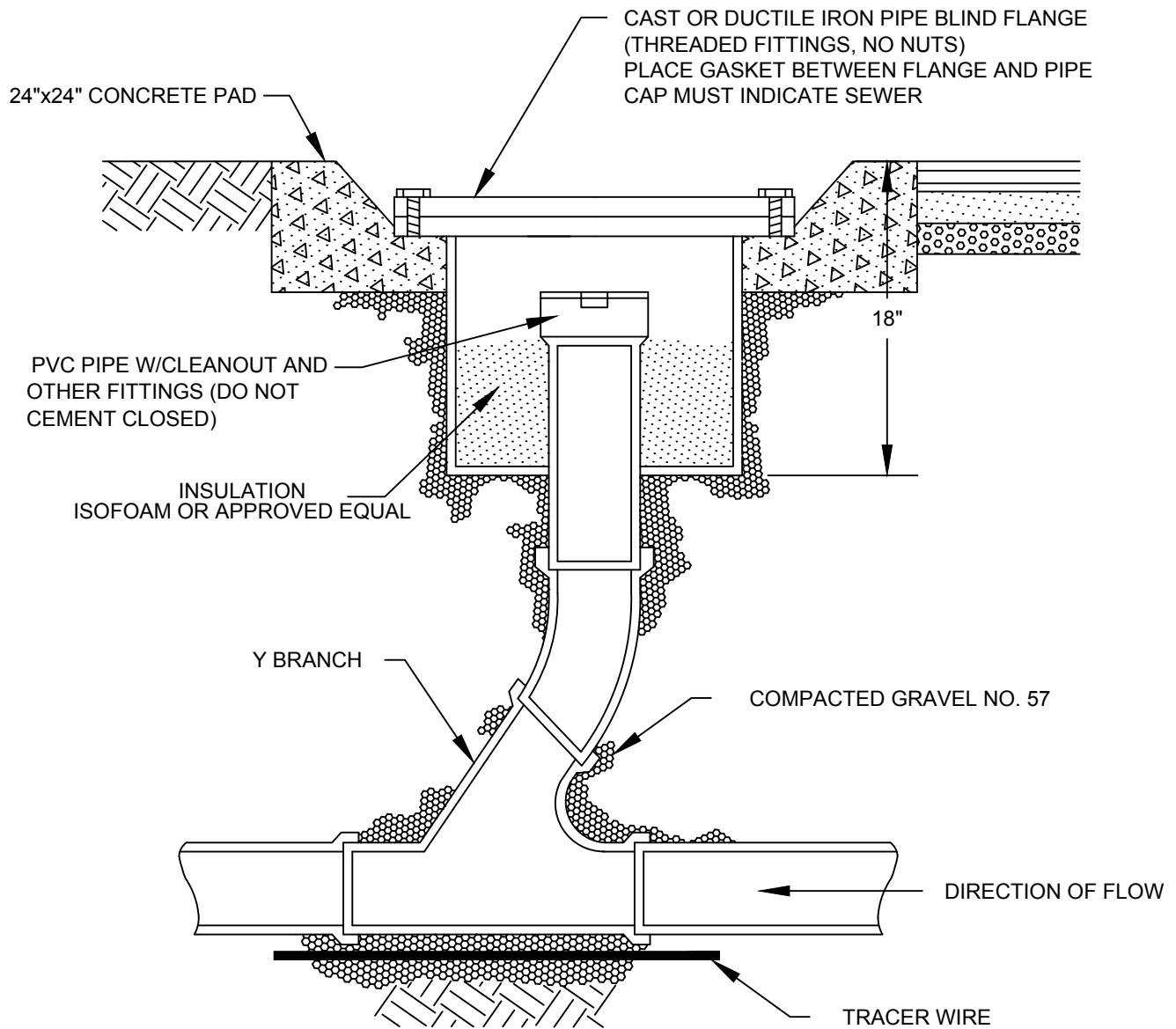


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CITY OF HUNTSVILLE STANDARD DETAILS SPECIAL CASE SEWER LATERAL

NAME: SPECIAL CASE LATERAL
CATEGORY: SEWER
DRAWN DATE: 11/07/2016
DRAWN BY: WLSIII
SCALE: N.T.S.
APPROVED BY: YSR

REV#	ISSUER	DATE	APPROVER	SHEET 1 OF 1
0	MAM	07/10/2018		
				SS-22



NOTES:

1. PVC PIPE TO BE OF AWWA C-909, SDR-21, CLASS 100 SPECIFICATION.

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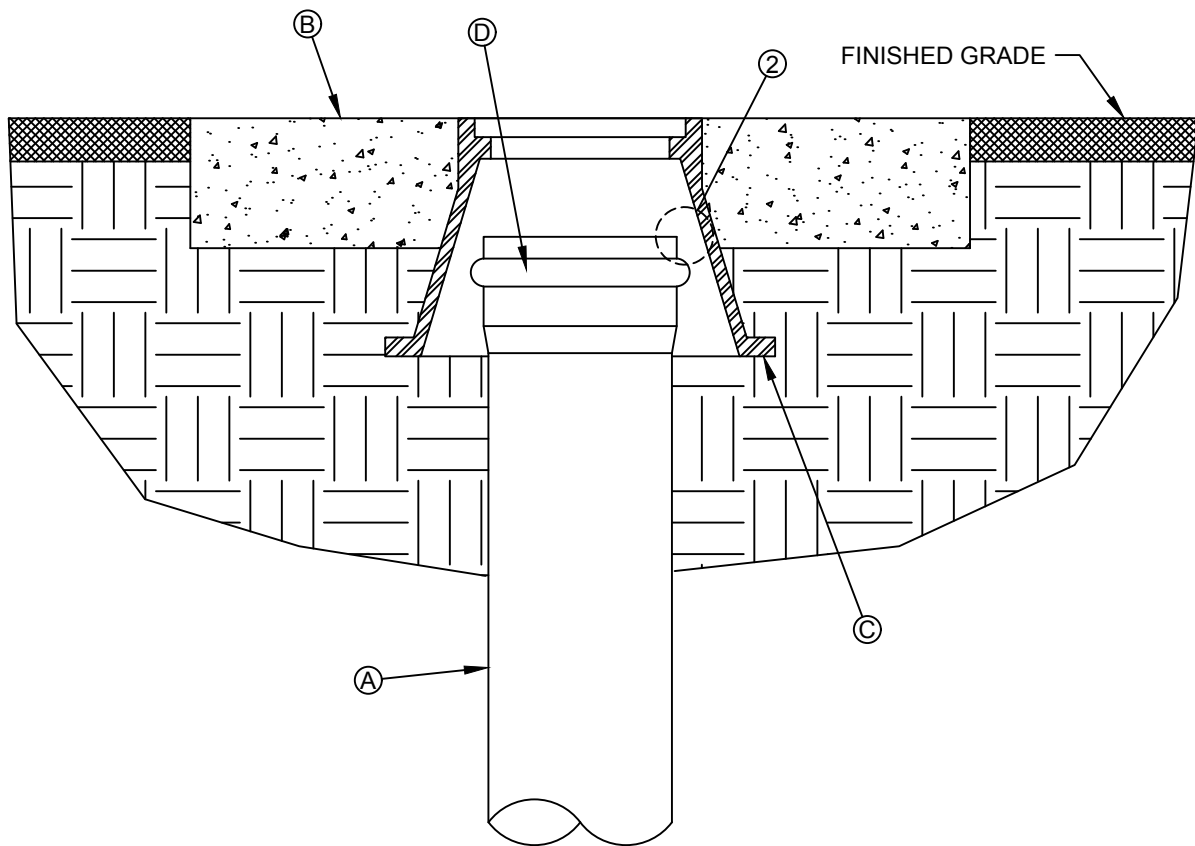


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CITY OF HUNTSVILLE STANDARD DETAILS
PVC FORCE MAIN CLEANOUT

REV#	ISSUER	DATE	APPROVER	SHEET 1 OF 1
0	MAM	08/10/2018		
				SS-23

NAME: PVC FM CLEANOUT
CATEGORY: SEWER
DRAWN DATE: 11/07/2016
DRAWN BY: WLSIII
SCALE: N.T.S.
APPROVED BY: YSR



BONNET BOX

CONSTRUCTION KEY NOTES:

- A. 8" P.V.C. SDR 35
- B. 3'x3'x6" CONCRETE COLLAR
- C. BONNET BOX
- D. 8" BELL END

NOTES:

1. PIPE BELL END TO FIT SNUG AGAINST INTERIOR OF BONNET BOX.

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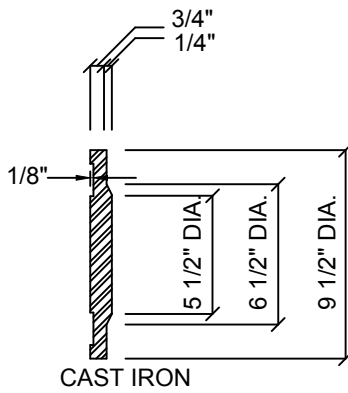


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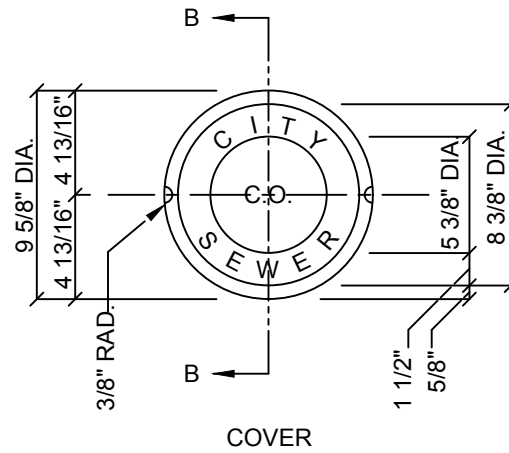
CITY OF HUNTSVILLE STANDARD DETAILS
BONNET BOX FOR CLEANOUT

REV#	ISSUER	DATE	APPROVER	SHEET 1 OF 1
0	MAM	07/10/2018		
				SS-24

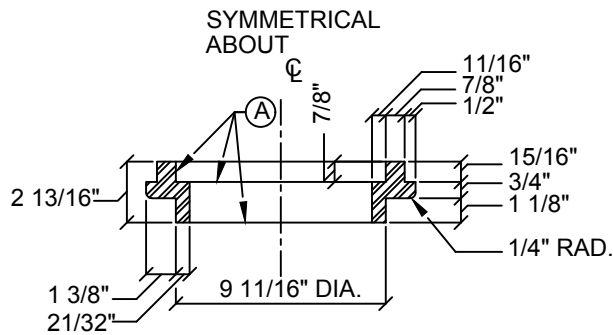
NAME: BONNET BOX FOR CLEANOUT
CATEGORY: SEWER
DRAWN DATE: 11/02/2016
DRAWN BY: WLSIII
SCALE: N.T.S.
APPROVED BY: YSR



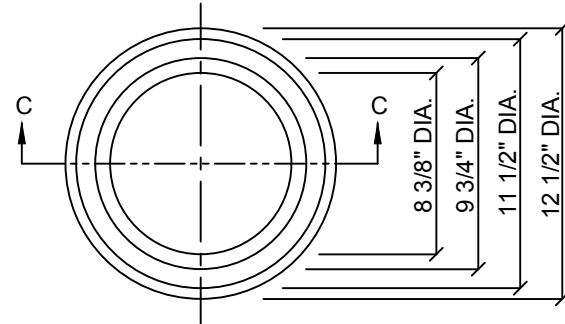
SECTION B-B



COVER



SECTION C-C



TOP VIEW

CONSTRUCTION KEY NOTES:

- A. TO BE ROUGH GROUND OF ANY IRREGULARITIES THAT WOULD PREVENT A SNUG FIT.

NOTES:

1. CASTINGS TO BE SMOOTH AND VOID OF AIR HOLES.
2. WEIGHT OF BONNET BOX EXTENSION IS 25 POUNDS.
3. WEIGHT OF COVER IS 10 POUNDS.

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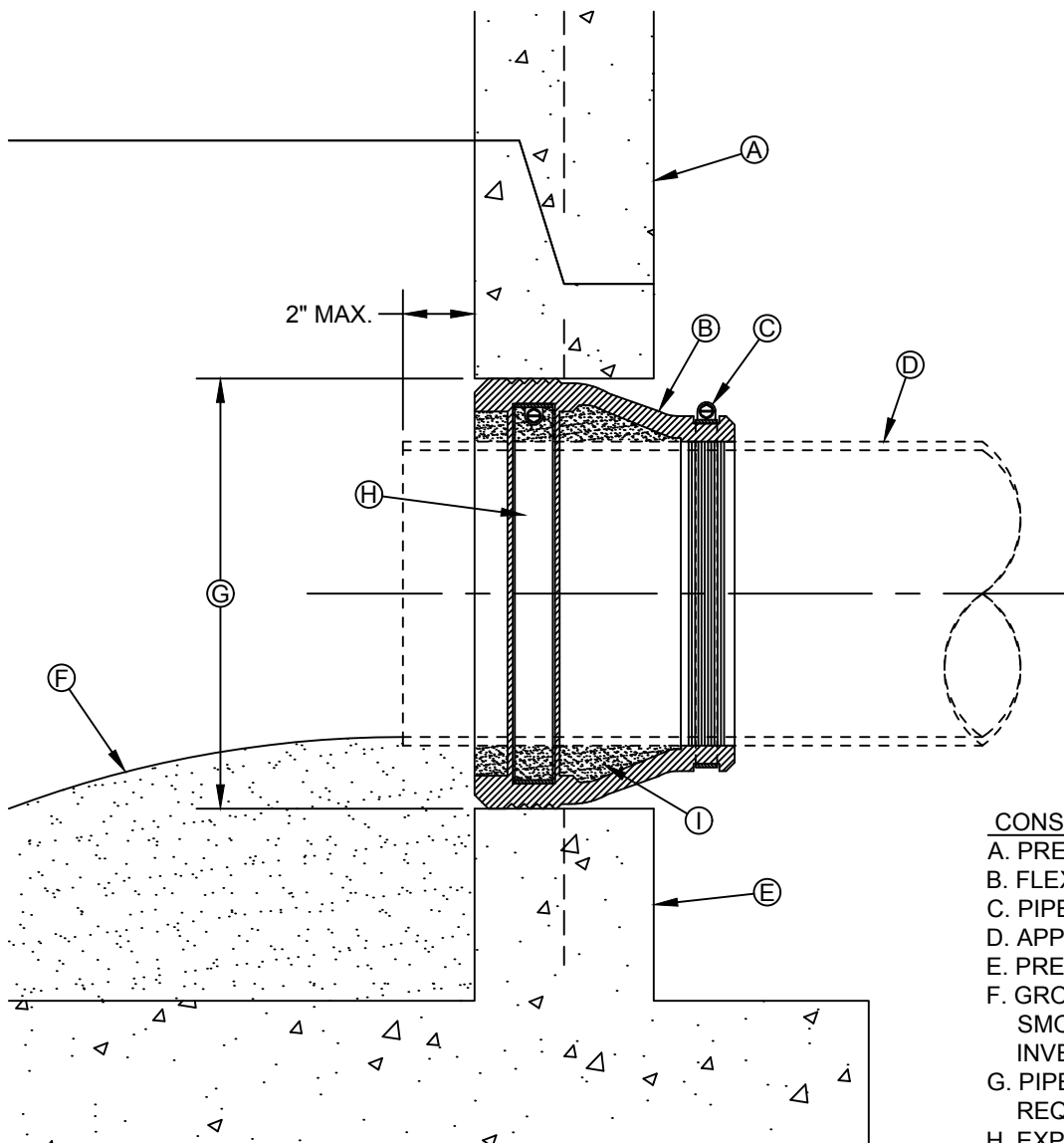


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CITY OF HUNTSVILLE STANDARD DETAILS
BONNET BOX COVER
AND EXTENSION FOR CLEANOUT

REV#	ISSUER	DATE	APPROVER	SHEET 1 OF 1
0	MAM	07/10/2018		
				SS-25

NAME: BONNET BOX/EXTENSION
CATEGORY: SEWER
DRAWN DATE: 11/02/2016
DRAWN BY: WLSIII
SCALE: N.T.S.
APPROVED BY: YSR



SECTION

- CONSTRUCTION KEY NOTES:**
- A. PRECAST MANHOLE BARREL.
 - B. FLEXIBLE CONNECTOR.
 - C. PIPE CLAMP SS 316.
 - D. APPROVED PIPE.
 - E. PRECAST MANHOLE BASE.
 - F. GROUT AS REQUIRED TO FORM SMOOTH CHANNEL TO MANHOLE INVERT.
 - G. PIPE OPENINGS/KNOCKOUTS AS REQUIRED TO FIT PIPE SIZE.
 - H. EXPANSION BAND SS 316.
 - I. FILL SPACE WITH GROUT.

NOTES:

1. MANHOLE CONNECTOR SHALL BE KOR-N-SEAL OR EQUAL MEETING THE REQUIREMENTS OF ASTM C-923. CONNECTOR SHALL BE FURNISHED BY CONTRACTOR.

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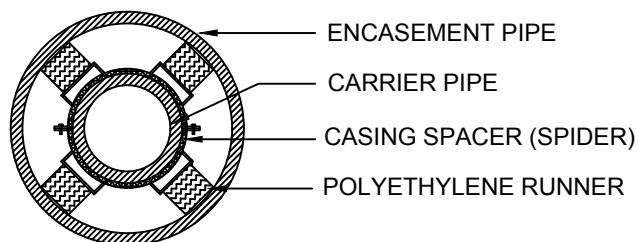
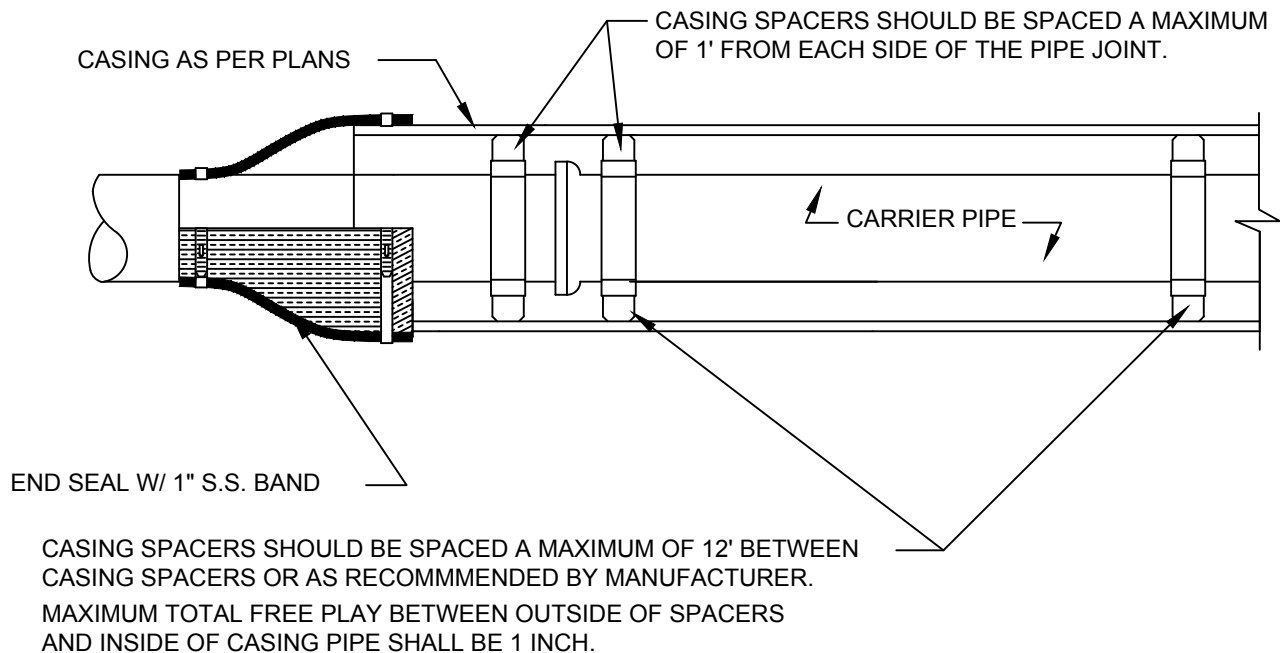


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CITY OF HUNTSVILLE STANDARD DETAILS
PIPE CONNECTION TO MANHOLE

REV#	ISSUER	DATE	APPROVER	SHEET 1 OF 1
0	MAM	07/10/2018		
				SS-26

NAME: PIPE CONNECT TO MANHOLE
CATEGORY: SEWER
DRAWN DATE: 11/02/2016
DRAWN BY: WLSIII
SCALE: N.T.S.
APPROVED BY: YSR



NOTES:

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

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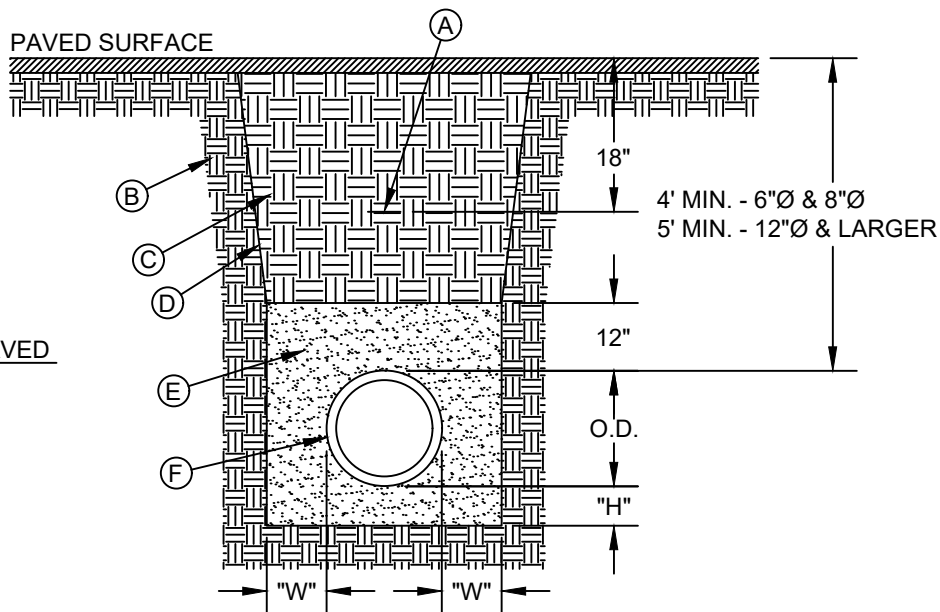


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CITY OF HUNTSVILLE STANDARD DETAILS
PIPE SUPPORT IN CASING PIPE

NAME: PIPE SUPPORT IN CASING PIPE
CATEGORY: SEWER
DRAWN DATE: 11/07/2016
DRAWN BY: WLSIII
SCALE: N.T.S.
APPROVED BY: YSR

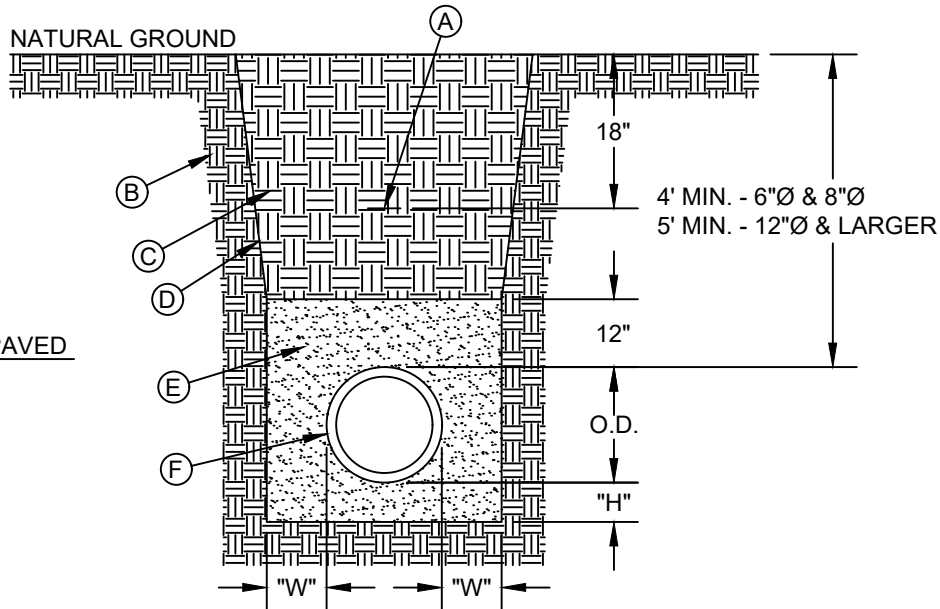
REV#	ISSUER	DATE	APPROVER	SHEET 1 OF 1
0	MAM	07/10/2018		
				SS-27



CONSTRUCTION KEY NOTES

- A. APPROVED MARKING TAPE.
- B. UNDISTURBED STABLE MATERIAL
- C. BACKFILL
1. PAVED CONDITION: STABILIZED SAND
 2. UNPAVED CONDITION: NATIVE MATERIAL, COMPACT TO 85% DENSITY PER ASTM D-1557 MODIFIED PROCTOR. (SEE NOTE # 4 IF THESE PREVIOUS CONDITIONS CANNOT BE MET.)
- D. SLOPE TRENCH IN SANDY SOIL CONDITIONS.
- E. PRESSURE PIPE: USE CLASS II OR CLASS III SAND PER ASTM D-2487. NATIVE MATERIAL OR IMPORTED SELECT MATERIAL MEETING OR EXCEEDING THIS REQUIREMENT MAY BE USED. COMPACT TO 85% DENSITY PER ASTM D-1557 MODIFIED PROCTOR (OR 90% D-698 STANDARD PROCTOR).
- GRAVITY PIPE: USE STABILIZED SAND 1 ½ SACK.
- F. APPROVED PIPE.
- G. TRENCH DIMENSIONS AS FOLLOWS:

PIPE DIAMETER	"H"
6"-30"	6"
>30"	6"
PIPE DIAMETER	"W"
6"-30"	12"
>30"	12"



NOTES:

1. BEDDING FOR PRESSURE AND GRAVITY PIPE IN DRY CONDITIONS.
2. PROVIDE TRENCH SAFETY SYSTEM FOR TRENCH DEPTHS GREATER THAN 5 FEET.
3. IF THE NATIVE MATERIAL EXCAVATED FROM THE TRENCH IS UNSUITABLE AS BACKFILL MATERIAL, OR THE REQUIRED COMPACTION IS UNATTAINABLE, THE CONTRACTOR SHALL, AT HIS EXPENSE, IMPORT SELECT MATERIAL TO BE MIXED WITH OR USED IN PLACE OF THE NATIVE MATERIAL. SELECT MATERIAL MUST BE APPROVED BY THE CITY OF HUNTSVILLE. SUBSTITUTE SOIL CEMENT SLURRY (1-SACK) IF REQUIRED IN SPECS.

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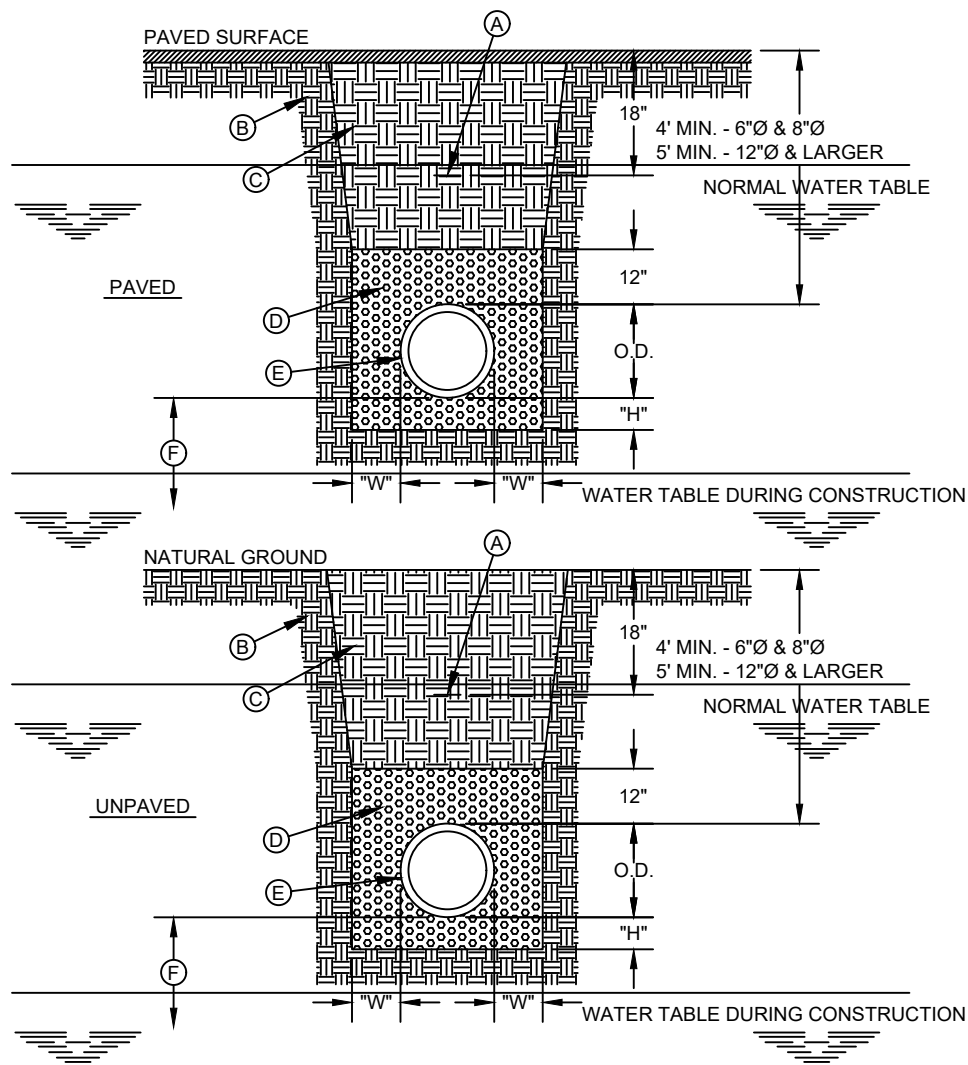


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CITY OF HUNTSVILLE STANDARD DETAILS
EMBEDMENT CLASS "A" FOR
PRESSURE AND GRAVITY PIPE - DRY CONDITIONS

REV#	ISSUER	DATE	APPROVER	SHEET 1 OF 1
0	MAM	08/10/2018		
1	MAM	10/16/2019	RAM	SS-28
2	KSJB	06/21/2022	KSJB	

NAME: EMBEDMENT CLASS "A" - DRY
CATEGORY: SEWER
DRAWN DATE: 11/07/2016
DRAWN BY: WLSIII
SCALE: N.T.S.
APPROVED BY: YSR



CONSTRUCTION KEY NOTES

- A. APPROVED MARKING TAPE.
- B. UNDISTURBED STABLE MATERIAL
- C. BACKFILL
 1. PAVED CONDITION: STABILIZED SAND
 2. UNPAVED CONDITION: NATIVE MATERIAL, COMPACT TO 85% DENSITY PER ASTM D-1557 MODIFIED PROCTOR. (SEE NOTE # 4 IF THESE PREVIOUS CONDITIONS CANNOT BE MET.)
- D. USE CLASS II OR CLASS III SAND PER ASTM D-2487. NATIVE MATERIAL MEETING OR EXCEEDING THIS REQUIREMENT MAY BE USED. COMPACT TO 85% DENSITY PER ASTM D-1557 MODIFIED PROCTOR (OR 90% D-698 STANDARD PROCTOR).
- E. APPROVED PIPE (WRAP PVC PIPE IN APPROVED POLYETHYLENE SHEETING, MINIMUM 6 MIL THICKNESS).
- F. 18" MINIMUM UNLESS OTHERWISE SPECIFIED.
- G. TRENCH DIMENSIONS AS FOLLOWS:

PIPE DIAMETER	"H"
6"-30"	6"
>30"	6"
PIPE DIAMETER	"W"
6"-30"	12"
>30"	12"

NOTES:

1. BEDDING FOR PRESSURE PIPE IN WET CONDITIONS.
2. PROVIDE TRENCH SAFETY SYSTEM FOR TRENCH DEPTHS GREATER THAN 5 FEET.
3. A DRY TRENCH MUST BE MAINTAINED WHILE PLACING BEDDING.
4. IF THE NATIVE MATERIAL EXCAVATED FROM THE TRENCH IS UNSUITABLE AS BACKFILL MATERIAL, OR THE REQUIRED COMPACTION IS UNATTAINABLE, THE CONTRACTOR SHALL, AT HIS EXPENSE, IMPORT SELECT MATERIAL TO BE MIXED WITH OR USED IN PLACE OF THE NATIVE MATERIAL. SELECT MATERIAL MUST BE APPROVED BY THE CITY OF HUNTSVILLE. SUBSTITUTE SOIL CEMENT SLURRY (1-SACK) IF REQUIRED IN SPECS.

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CITY OF
HUNTSVILLE, TEXAS

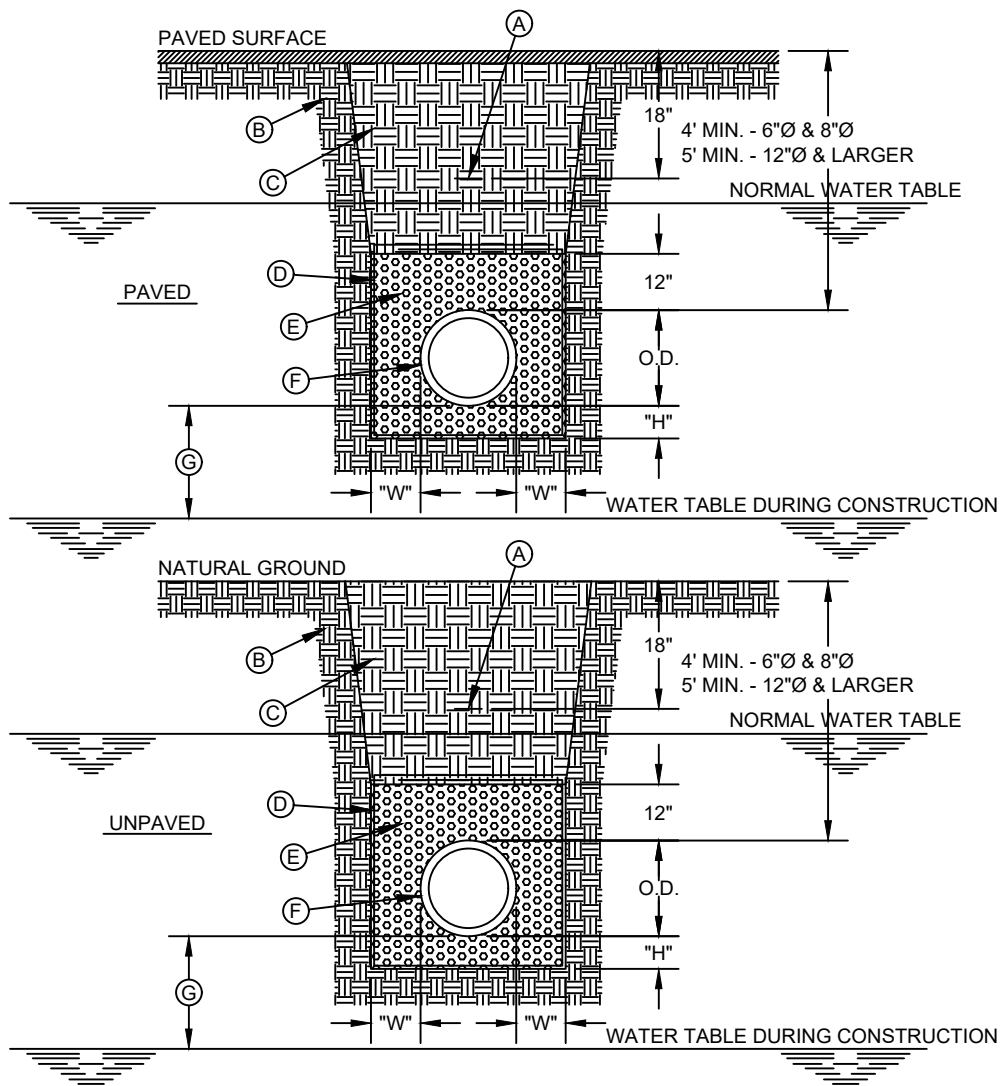


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CITY OF HUNTSVILLE STANDARD DETAILS
EMBEDMENT CLASS "B" FOR
PRESSURE PIPE - WET CONDITIONS

NAME: EMBEDMENT CLASS "B" - WET
CATEGORY: SEWER
DRAWN DATE: 11/07/2016
DRAWN BY: WLSIII
SCALE: N.T.S.
APPROVED BY: YSR

REV#	ISSUER	DATE	APPROVER	SHEET 1 OF 1
0	MAM	08/10/2018		
1	MAM	10/16/2019	RAM	SS-29



CONSTRUCTION KEY NOTES

- A. APPROVED MARKING TAPE.
- B. UNDISTURBED STABLE MATERIAL
- C. BACKFILL
 - 1. PAVED CONDITION: STABILIZED SAND
 - 2. UNPAVED CONDITION: NATIVE MATERIAL, COMPACT TO 85% DENSITY PER ASTM D-1557 MODIFIED PROCTOR. (SEE NOTE # 4 IF THESE PREVIOUS CONDITIONS CANNOT BE MET.)
- D. APPROVED GEOTECHNICAL FABRIC WITH A STANDARD OVERLAP THAT IS 2 FEET EXCEPT WHERE TRENCH WIDTH EXCEEDS 3 FEET. THE OVERLAP AT TOP SHALL BE 3 FEET.
- E. USE CLASS I GRAVEL PER ASTM D-2321 AND D-2487. NO COMPACTION REQUIRED. USE MINIMAL TAMPING, RODDING OR HAUNCH SLICING CAREFULLY IN THE EMBEDMENT ZONE. IF REQUIRED BY THE ENGINEER, TEST PER ASTM D-4254 PERCENT OF RELATIVE DENSITY.
- F. APPROVED PIPE.
- G. 18" MINIMUM UNLESS OTHERWISE SPECIFIED.
- H. TRENCH DIMENSIONS AS FOLLOWS:

PIPE DIAMETER	"H"
6"-30"	6"
>30"	6"
PIPE DIAMETER	"W"
6"-30"	12"
>30"	12"

NOTES:

1. BEDDING FOR PRESSURE PIPE IN WET CONDITIONS.
2. PROVIDE TRENCH SAFETY SYSTEM FOR TRENCH DEPTHS GREATER THAN 5 FEET.
3. A DRY TRENCH MUST BE MAINTAINED WHILE PLACING BEDDING AND GEOTECHNICAL FABRIC.
4. IF THE NATIVE MATERIAL EXCAVATED FROM THE TRENCH IS UNSUITABLE AS BACKFILL MATERIAL, OR THE REQUIRED COMPACTION IS UNATTAINABLE, THE CONTRACTOR SHALL, AT HIS EXPENSE, IMPORT SELECT MATERIAL TO BE MIXED WITH OR USED IN PLACE OF THE NATIVE MATERIAL. SELECT MATERIAL MUST BE APPROVED BY THE CITY OF HUNTSVILLE. SUBSTITUTE SOIL CEMENT SLURRY (1-SACK) IF REQUIRED IN SPECS.

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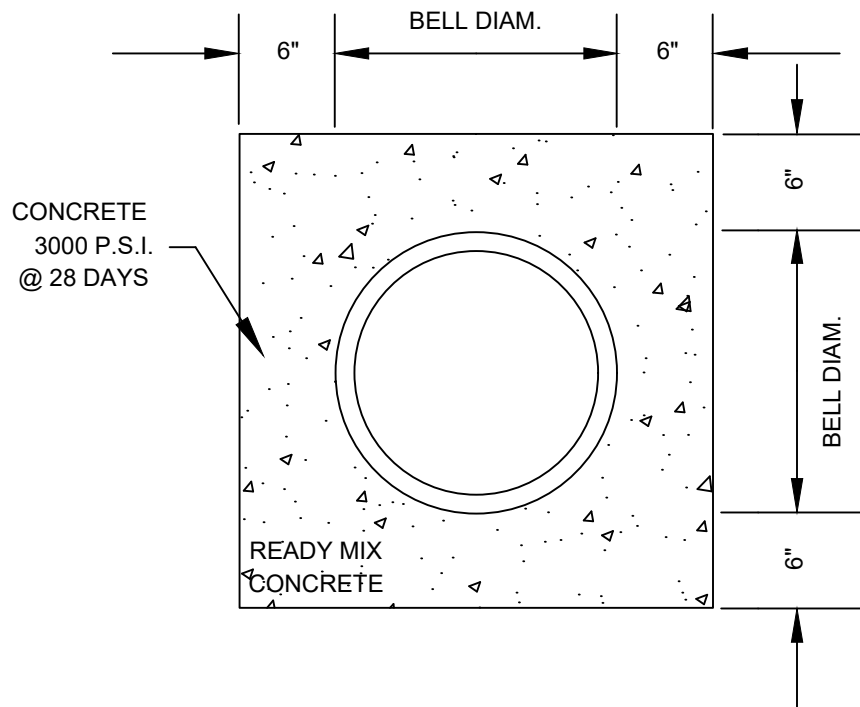
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CITY OF HUNTSVILLE STANDARD DETAILS
EMBEDMENT CLASS "C" FOR
GRAVITY PIPE - WET CONDITIONS

NAME: EMBEDMENT CLASS "C" - WET
CATEGORY: SEWER
DRAWN DATE: 11/07/2016
DRAWN BY: WLSIII
SCALE: N.T.S.
APPROVED BY: YSR

REV#	ISSUER	DATE	APPROVER	SHEET 1 OF 1
0	MAM	08/10/2018		
1	MAM	10/16/2019	RAM	

SS-30



NOTES:

1. WHEN WATER LINE IS LOCATED BELOW A SEWER LINE, THE SEWER LINE IS TO BE ENCASED ALONG ITS LENGTH CENTERED ON CROSSING, 10' EACH WAY.
2. SEWER LINES CROSSING STREAMS MUST BE CONCRETE ENCASED.

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CITY OF HUNTSVILLE STANDARD DETAILS
CONCRETE ENCASED SEWER PIPE

NAME: CONCRETE ENCASED SEWER
CATEGORY: SEWER
DRAWN DATE: 11/07/2016
DRAWN BY: WLSIII
SCALE: N.T.S.
APPROVED BY: YSR

REV#	ISSUER	DATE	APPROVER	SHEET 1 OF 1
0	MAM	08/10/2018		
1	MAM	10/16/2019	RAM	SS-31