

DRAWING NUMBER	DETAIL DESCRIPTION	SHEET NUMBER	ISSUED DATE
600 SANITARY SEWER STANDARD DETAIL INDEX		600	8/10/2023
601 SANITARY SEWER LINE INSTALLATION			
601.01	PIPE INSTALLATION DETAIL	601	8/10/2023
602 SEWER SERVICE CONNECTION			
602.01	SERVICE CONNECTION INSTALLATION	602	8/10/2023
604 ABANDONING SEWER			
604.01	ABANDONING SEWER	601	8/10/2023
616 SANITARY SEWER MANHOLE			
616.01	REINFORCED CONC. PRECAST MANHOLE TRANSITION SECTION	616.A	8/10/2023
616.02	REINFORCED CONC. PRECAST MANHOLE BASE SECTION	616.A	8/10/2023
616.03	REINFORCED CONC. PRECAST MANHOLE CONE SECTION	616.A	8/10/2023
616.04	REINFORCED CONC. PRECAST MANHOLE WALL DETAIL	616.A	8/10/2023
616.05	REINFORCED CONC. PRECAST MANHOLE SLAB MANHOLE TOP	616.B	8/10/2023
616.06	CAST IN PLACE CONCRETE MANHOLE BASE SECTION	616.B	8/10/2023
616.07	MANHOLE PIPE CONNECTION FOR CAST IN PLACE	616.B	8/10/2023
616.08	DROP MANHOLE - PLAN VIEW & SECTION A-A VIEW	616.C	8/10/2023
616.09	PIPE PENETRATION DETAIL	616.C	8/10/2023
616.10	STRAP DETAIL	616.C	8/10/2023
616.11	REVERSIBLE MANHOLE RING (PAVED SECTION)	616.D	8/10/2023
616.12	REVERSIBLE MANHOLE RING (NON-PAVED SECTION)	616.D	8/10/2023
616.13	VENTED MANHOLE COVER	616.D	8/10/2023
616.14	NON-VENTED MANHOLE COVER	616.E	8/10/2023
616.15	HINGED MANHOLE COVER (TOP FLANGE)	616.E	8/10/2023
616.16	HINGED MANHOLE COVER (BOTTOM FLANGE)	616.E	8/10/2023
618 MANHOLE REHABILITATION			
618.01	REBUILDING MANHOLES DETAIL	618	8/10/2023
629 ABANDONING/ REMOVING MANHOLE			
629.01	ABANDONING MANHOLES DETAIL	618	8/10/2023
635 STEEL CASING PIPE			
635.01	BORE AND ENCASEMENT DETAIL	635	8/10/2023
640 PIPE ENCASEMENT AND COLLAR			
640.01	CONCRETE COLLAR WITH SPREAD FOOTING	640	8/10/2023
641 AERIAL CROSSING			
641.01	STEEL CARRIER SIZES AND SPAN	641	8/10/2023
641.02	PIER TYPE 1	641	8/10/2023
641.03	PIER TYPE 2	641	8/10/2023

THESE UTILITIES DEPARTMENT STANDARD DETAILS AS REVISED AND ISSUED ON SEPTEMBER 26, 2023, APPLY TO PROJECTS WHERE: (1) OCWUT, (2) THE CITY OF OKLAHOMA CITY, OR (3) A TRUST OF WHICH THE CITY OF OKLAHOMA CITY IS A BENEFICIARY, IS THE CONTRACTING ENTITY. THE PREVIOUS VERSION OF THE STANDARD DETAILS, ISSUED IN 2014, WILL CONTINUE TO APPLY TO PRIVATE DEVELOPMENT PROJECTS UNTIL THE ISSUANCE OF THE PRIVATE DEVELOPMENT WATER AND WASTEWATER DESIGN REQUIREMENTS.

THESE UTILITIES DEPARTMENT STANDARD DETAILS WILL GOVERN ALL CONNECTIONS AND EXTENSIONS TO THE OKLAHOMA CITY WATER AND WASTEWATER SYSTEMS UNLESS (1) EXPRESSLY STATED IN THE SPECIAL PROVISIONS FOR A PROJECT TO WHICH THE OCWUT IS A CONTRACTING ENTITY, OR (2) EXPRESSLY STATED IN WRITING ON FINAL PLANS APPROVED BY THE UTILITIES DIRECTOR OR A PROFESSIONAL ENGINEER DESIGNATED BY THE UTILITIES DIRECTOR TO REVIEW OF SUCH PLANS.

THESE UTILITIES DEPARTMENT STANDARD DETAILS SUPPLEMENT THE STANDARD SPECIFICATIONS FOR CONSTRUCTION OF PUBLIC IMPROVEMENTS.

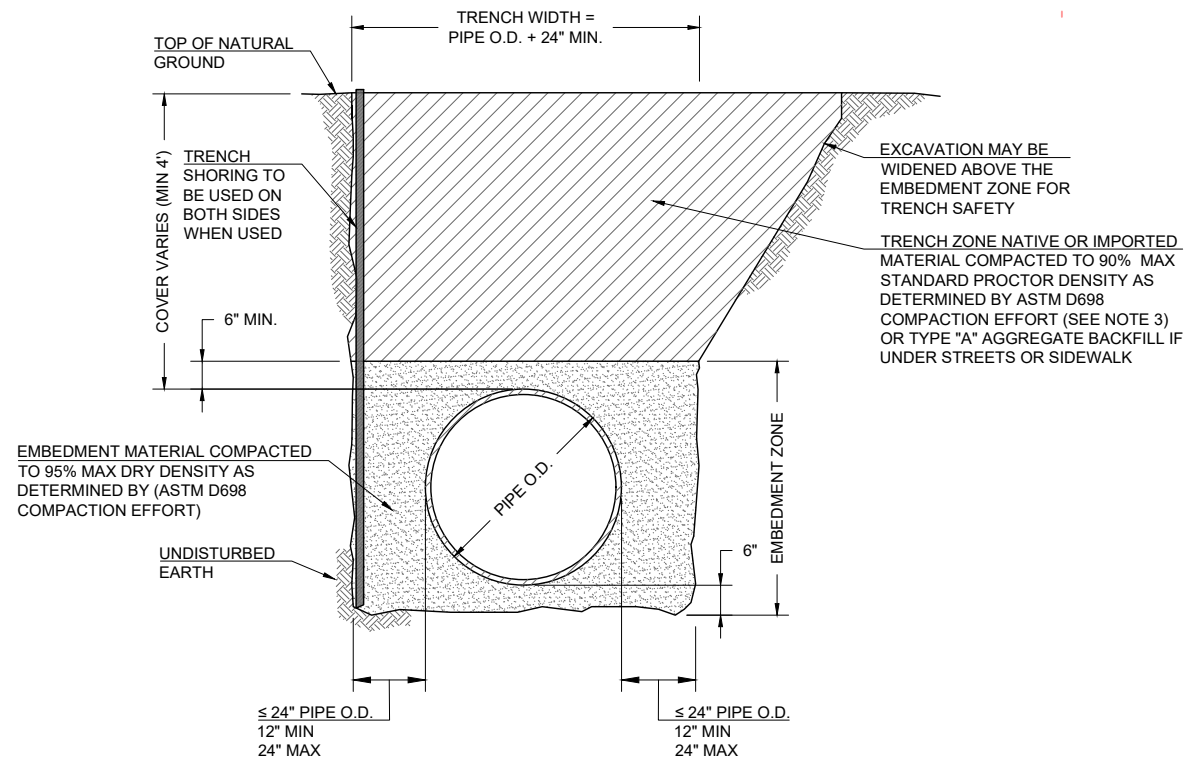
WHERE THESE UTILITIES DEPARTMENT STANDARD DETAILS AND THE STANDARD SPECIFICATIONS FOR CONSTRUCTION OF PUBLIC IMPROVEMENTS CONFLICT THESE UTILITIES DEPARTMENT STANDARD DETAILS SUPERSEDE AND TAKE PRECEDENCE OVER THE STANDARD SPECIFICATIONS FOR CONSTRUCTION OF PUBLIC IMPROVEMENTS.

ANY INTERPRETATION OF THE APPLICATION OF THESE UTILITIES DEPARTMENT STANDARD DETAILS WILL BE MADE BY THE UTILITIES DIRECTOR OR A PROFESSIONAL ENGINEER DESIGNATED BY THE UTILITIES DIRECTOR TO REVIEW OF SUCH PLANS.

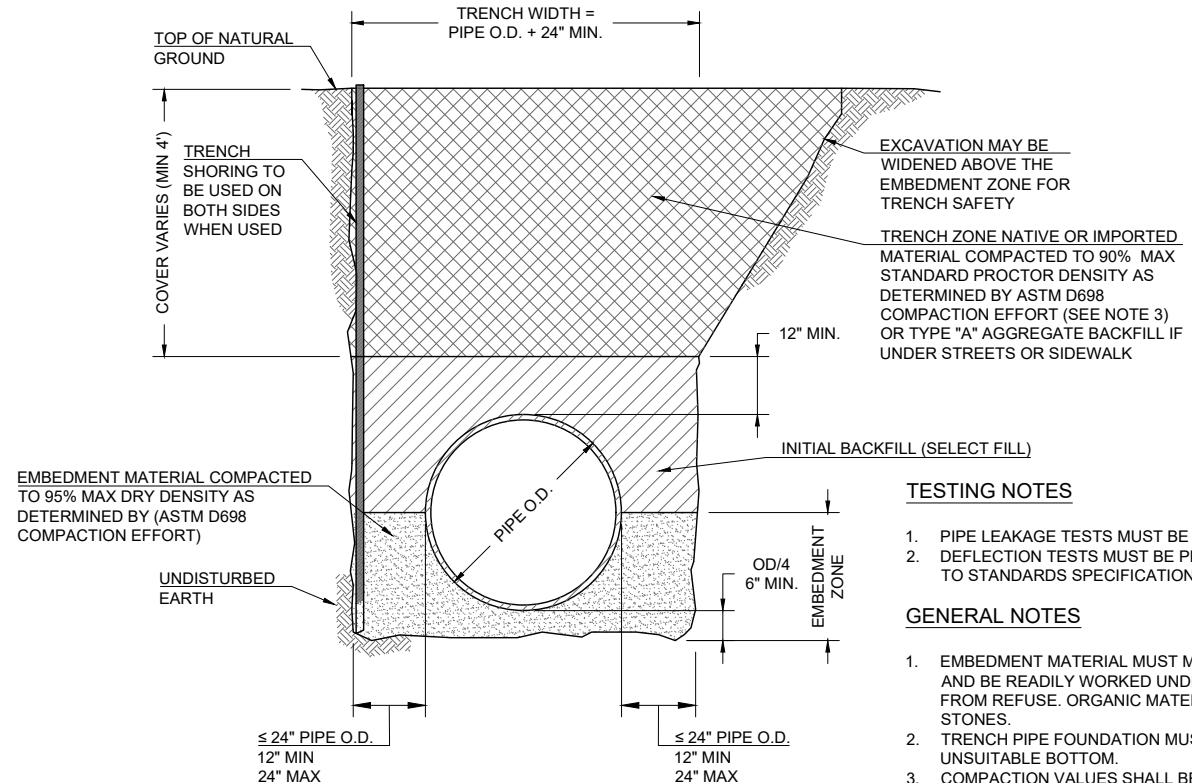
THE OFFICIAL COPIES OF THE UTILITIES DEPARTMENT STANDARD DETAILS ARE AVAILABLE ON THE UTILITIES DEPARTMENT WEBSITE.



APPROVED BY: *Deborah K. Miller* 10/16/2023
 DEBORAH K. MILLER, P.E., INTERIM CITY ENGINEER DATE: 10/16/2023
Chris Browning 10/10/2023
 CHRIS BROWNING, GENERAL MANAGER DATE: 10/10/2023
Will Huggins 10/10/2023
 WILL HUGGINS, P.E., DEPUTY DIRECTOR DATE: 10/10/2023
 UTILITIES ENGINEERING



FLEXIBLE PIPE INSTALLATION DETAIL (HDPE, PVC & RFP)



RIGID PIPE INSTALLATION DETAIL (RCP)

01
601 **PIPE INSTALLATION DETAIL**
Scale: N.T.S.

EXCAVATION MAY BE WIDENED ABOVE THE EMBEDMENT ZONE FOR TRENCH SAFETY

TRENCH ZONE NATIVE OR IMPORTED MATERIAL COMPACTED TO 90% MAX STANDARD PROCTOR DENSITY AS DETERMINED BY ASTM D698 COMPACTION EFFORT (SEE NOTE 3) OR TYPE "A" AGGREGATE BACKFILL IF UNDER STREETS OR SIDEWALK

EXCAVATION MAY BE WIDENED ABOVE THE EMBEDMENT ZONE FOR TRENCH SAFETY

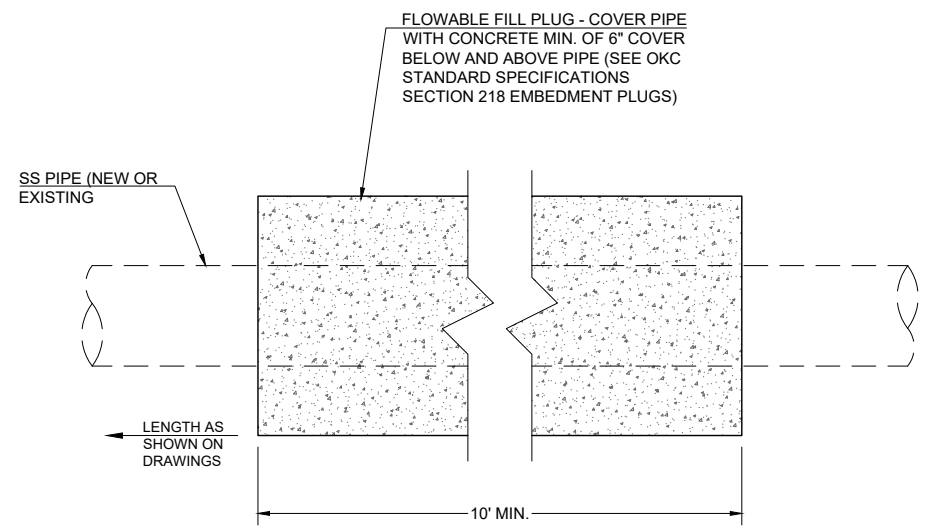
TRENCH ZONE NATIVE OR IMPORTED MATERIAL COMPACTED TO 90% MAX STANDARD PROCTOR DENSITY AS DETERMINED BY ASTM D698 COMPACTION EFFORT (SEE NOTE 3) OR TYPE "A" AGGREGATE BACKFILL IF UNDER STREETS OR SIDEWALK

TESTING NOTES

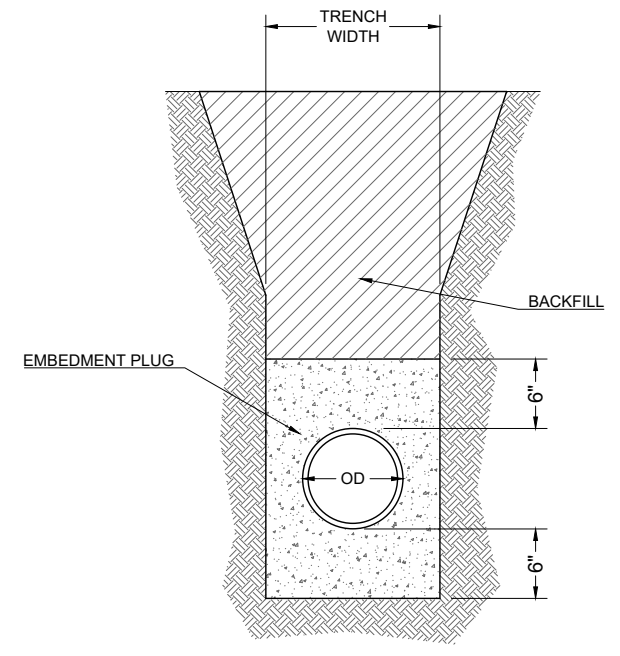
1. PIPE LEAKAGE TESTS MUST BE PERFORMED PER STANDARDS SPECIFICATIONS.
2. DEFLECTION TESTS MUST BE PERFORMED ON ALL FLEXIBLE PIPE ACCORDING TO STANDARDS SPECIFICATIONS.

GENERAL NOTES

1. EMBEDMENT MATERIAL MUST MEET THE REQUIREMENTS OF ASTM C33 NO. 67 AND BE READILY WORKED UNDER THE SIDES OF THE PIPE. IT MUST BE FREE FROM REFUSE, ORGANIC MATERIAL, COBBLES, BOULDERS, LARGE ROCKS OR STONES.
2. TRENCH PIPE FOUNDATION MUST BE FREE OF STANDING WATER, NOT SOFT UNSUITABLE BOTTOM.
3. COMPACTION VALUES SHALL BE RELATIVE TO ASTM D698 AND CONFIRMED BY ASTM D6938.
4. POLYVINYL CHLORIDE (PVC) PIPES MUST CONFORM TO ASTM F-794 FOR OPEN PROFILE PIPE AND ASTM F-1803 FOR CLOSED PROFILE PIPE. REGARDLESS OF SIZE, OPEN PROFILE WALL PIPE WILL BE ALLOWED ONLY ON SECTIONS OF PIPE WHERE THERE ARE NO APPARENT SERVICE CONNECTIONS, AND AS APPROVED BY THE ENGINEER.
5. SANITARY SEWER PIPE MUST SATISFY THE MINIMUM HORIZONTAL AND VERTICAL CLEARANCES FROM WATER, WELLS, AND PETROLEUM STORAGE TANKS AS ESTABLISHED BY THE ODEQ.
6. BEDDING CLASS: "B" - LOAD FACTOR = 1.9



PROFILE VIEW



SECTION VIEW

NOTE:

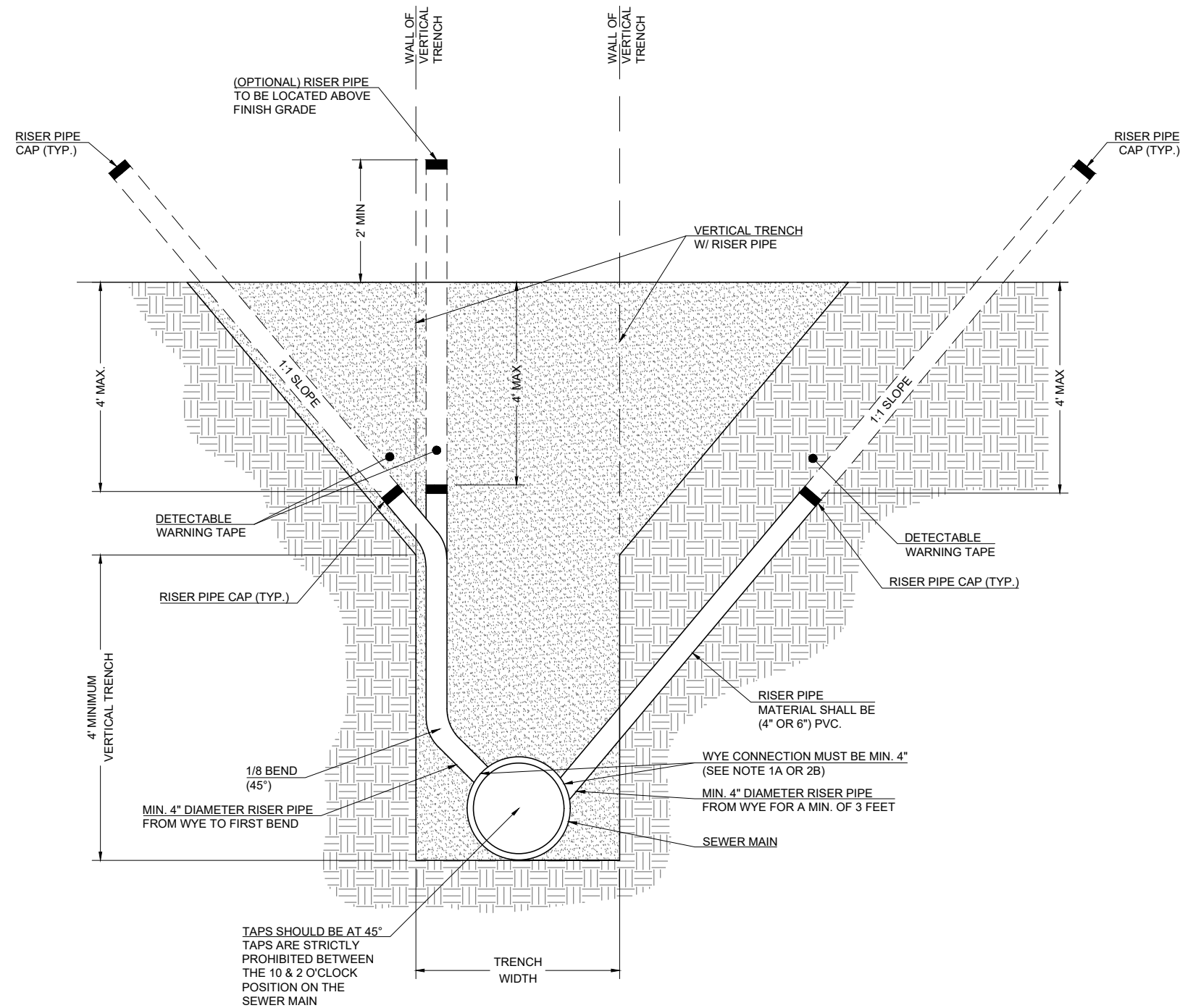
1. FLOWABLE FILL PLUGS SHALL CONSIST OF A PORTLAND CEMENT GROUT HAVING A MINIMUM TWENTY-EIGHT (28) DAY COMPRESSIVE STRENGTH OF FIVE HUNDRED (500 PSI) POUNDS PER SQUARE INCH.

01
604 **EMBEDMENT TRENCH PLUG**
Scale: N.T.S.

APPROVED BY: *Deborah K. Miller*
DEBORAH K. MILLER, P.E., INTERIM CITY ENGINEER
DATE: 10/16/2023

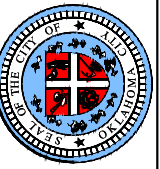
Chris Browning
CHRIS BROWNING, GENERAL MANAGER
DATE: 10/10/2023

Will Huggins
WILL HUGGINS, P.E., DEPUTY DIRECTOR
UTILITIES ENGINEERING
DATE: 07/10/2023

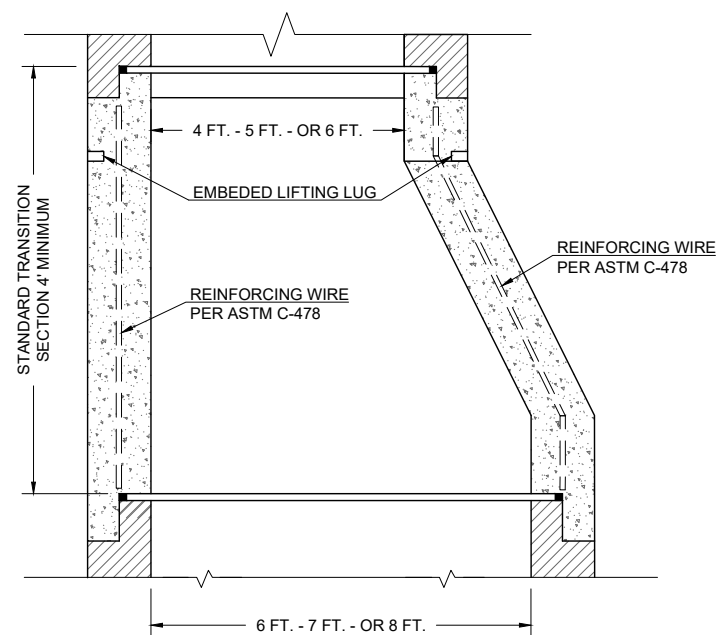


01 SERVICE CONNECTION DETAIL
602
Scale: N.T.S.

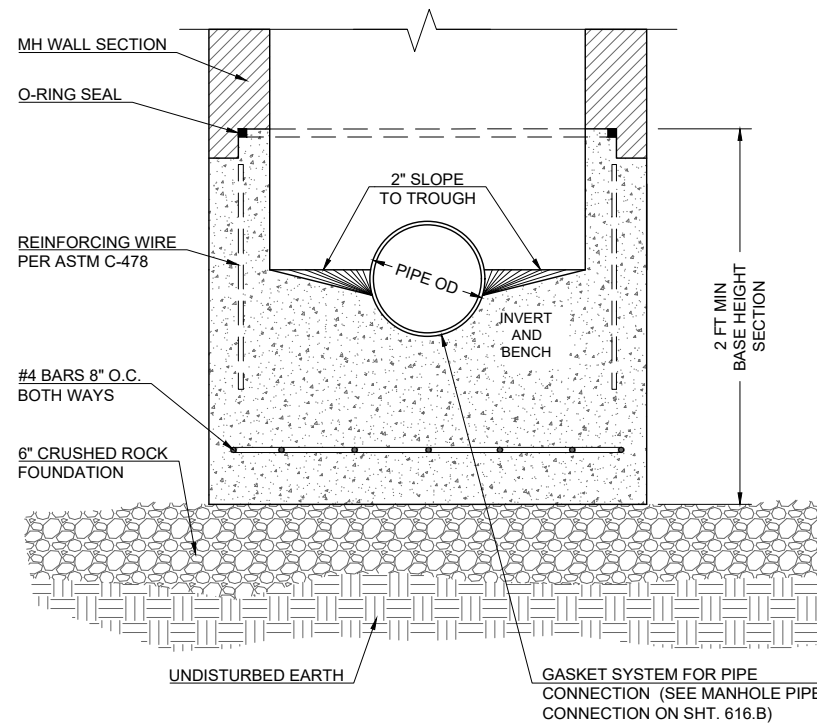
1. EXTERNAL CONNECTIONS FOR NEW CONSTRUCTION
 - A. WYE BRANCHES -- FOR NEW CONSTRUCTION, WYE BRANCHES MUST BE INSTALLED PER THE SIZE AND TYPE SHOWN ON THE PLANS, NO LESS THAN FOUR (4") INCH OPENINGS, AND AT LOCATIONS SHOWN ON THE PLANS OR AS DESCRIBED BY THE ENGINEER.
 - B. ELECTRO FUSION BONDED SADDLES -- FOR NEW CONSTRUCTION USING "TRENCHLESS CONSTRUCTION" TECHNOLOGY WITH HDPE PIPE, SERVICE CONNECTIONS MUST BE INSTALLED WITH AN ELECTRO FUSION BONDED SADDLE.
2. EXTERNAL CONNECTION TO EXISTING MAIN -- CONNECTIONS TO EXISTING MAIN MAY BE ACCOMPLISHED AS FOLLOWS:
 - A. SADDLES -- CONNECTIONS MAY BE MADE BY EXCAVATING THE EXISTING MAIN AND CUTTING A HOLE USING APPROVED EQUIPMENT AND INSTALLING A SADDLE. SEWER SERVICE CONNECTIONS CONSTRUCTED WITH SADDLES MUST INCLUDE STRAPS, A ONE-EIGHTH (1/8") DEGREE BEND, AND A CLOSURE PIECE. WHEN EXISTING MAIN HAS BEEN REHABILITATED BY TRENCHLESS METHOD OF CONSTRUCTION, THE SADDLE CONNECTION MUST BE MADE TO THE PIPE WITH ELECTRO FUSION BONDING OR WITH STAINLESS STEEL STRAPS AND A CLOSURE PIECE.
 - B. WYE BRANCH -- CONNECTIONS MUST BE MADE BY REMOVING A SECTION OF EXISTING PIPE AND INSTALLING A WYE BRANCH. FITTINGS AND CLOSURE ASSEMBLY MUST BE USED TO MAKE THE CONNECTION AND MUST BE SUPPLIED IN A NORMAL DIAMETER OF AT LEAST FOUR (4") INCHES. THE EXTERNAL CONNECTION MUST BE CONSIDERED COMPLETE WHEN BACKFILLING AND SURFACE RESTORATION IS COMPLETE. SERVICE CONNECTIONS CONSTRUCTED WITH WYE BRANCHES MUST INCLUDE A ONE-EIGHTH (1/8") DEGREE BEND, ELBOW, AND WHEN REQUIRED, A CLOSURE PIECE.
 - C. HDPE SERVICE CONNECTIONS -- WHERE HDPE PIPE IS USED IN "TRENCHLESS" CONSTRUCTION, THE SERVICE CONNECTIONS SHALL BE MADE USING ELECTROFUSION BONDED GASKETED SEWER SADDLES. SERVICE CONNECTIONS ON NEW PVC PIPE INSTALLED USING "OPEN CUT" CONSTRUCTION SHALL BE MADE USING WYE BRANCH FITTINGS. ALL SERVICE CONNECTIONS FOR HDPE OR "OPEN CUT" SHALL BE DONE EXTERNAL TO THE PIPE. NO INTERNAL CONNECTIONS SHALL BE ALLOWED FOR HDPE OR "OPEN CUT".
3. RISER
 - A. INSTALLATION -- THE PIPE MAY BE INSTALLED IN ONE OF THREE WAYS SHOWN ON "SERVICE CONNECTION DETAILS." VERTICAL INSTALLATION IS ONLY IF APPROVED BY THE ENGINEER.
 - B. SIZE AND MATERIAL -- THE RISER PIPE MUST BE AT LEAST FOUR INCH (4") PVC.
 - C. ALL RISER PIPE CAPS ABOVE FINISHED GRADE MUST BE GLUED.
 - D. THE SERVICE CONNECTION SHALL BE INSTALLED TO THE EDGE OF RIGHT OF WAY OR EASEMENT.
4. CURED IN PLACE PIPE (CIPP)
 - A. CURED IN PLACE PIPE (CIPP) SERVICE CONNECTIONS -- WHERE CIPP IS USED IN "TRENCHLESS" CONSTRUCTION, THE SERVICE CONNECTIONS SHALL BE MADE INTERNALLY. THE SERVICE CONNECTION SHALL BE LINED WITH A CURED IN PLACE LINER TO THE EDGE OF RIGHT OF WAY OR EASEMENT, OR TO DISTANCE OF 8 FEET UP THE LATERAL FROM THE MAIN. LATERAL SEAL TO MAIN CONNECTION (I.E. TOP HAT, LATERAL CONNECTION REPAIR, STUBBY CONNECTION, ETC) MUST BE APPROVED BY THE ENGINEER. ALL INTERNAL LATERAL CONNECTION MUST PROVIDE A WATER TIGHT CONNECTION FROM THE MAIN TO THE LATERAL.



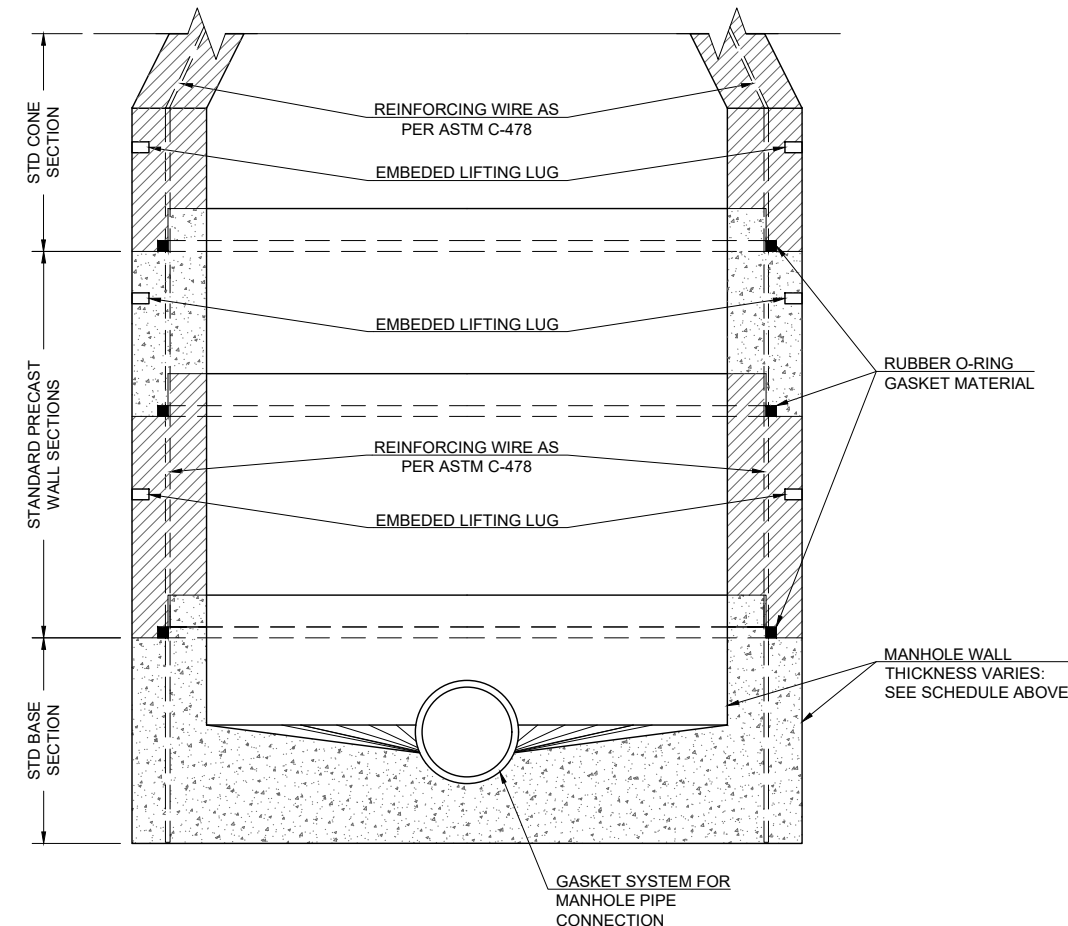
APPROVED BY: *Deborah K. Miller* DATE: 10/16/2023
 DEBORAH K. MILLER, P.E., INTERIM CITY ENGINEER
Chris Browning DATE: 10/10/2023
 CHRIS BROWNING, GENERAL MANAGER
Will Huggins DATE: 10/10/2023
 WILL HUGGINS, P.E., DEPUTY DIRECTOR
 UTILITIES ENGINEERING



01
616 **REINFORCED CONCRETE PRECAST MANHOLE TRANSITION SECTION** Scale: N.T.S.



02
616 **REINFORCED CONCRETE PRECAST MANHOLE BASE SECTION** Scale: N.T.S.

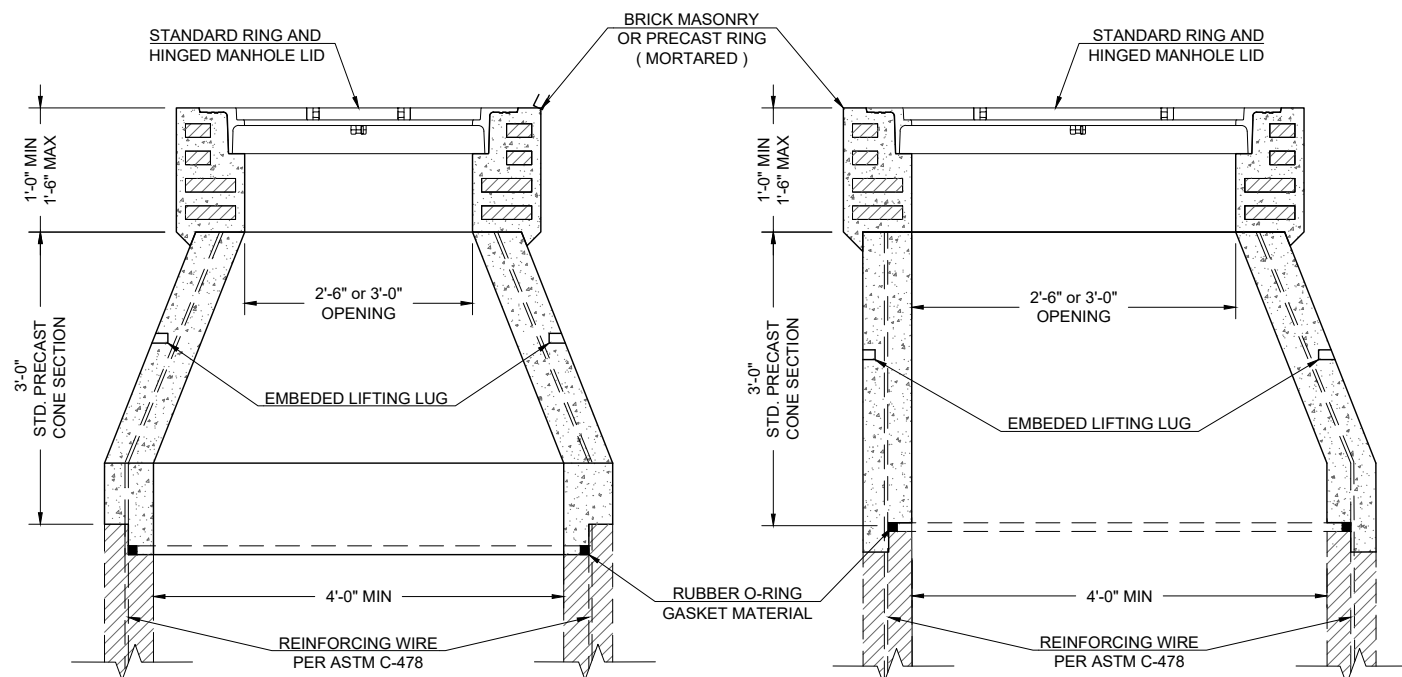


04
616 **REINFORCED CONCRETE PRECAST MANHOLE WALL DETAIL** Scale: N.T.S.

MANHOLE INTERNAL DIAMETER (FEET)	MINIMUM WALL THICKNESS (INCHES)
4	5
5	5
6	6
7	7
8	8

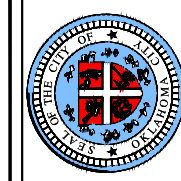
NOTES:

- ALL CONCRETE FOR MANHOLE STRUCTURE AND BASE MUST HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4,000 PSI.
- MANHOLES MUST BE CONSTRUCTED AS SPECIFIED IN ASTM C-478.
- THE MINIMUM WALL THICKNESS IS SPECIFIED IN THE FOLLOWING TABLE AND MUST NOT BE LESS THAN ONE-TWELFTH (1/12) OF THE INTERNAL DIAMETER OF THE LARGEST CONE OR RISER OF FIVE-INCHES (5") WHICHEVER IS GREATER.
- ALL LIFTING HOLES PROVIDED IN EACH SECTION MUST BE REPAIRED WITH A MIXTURE OF CEMENT & SAND GROUT FIRMLY PACKED INTO ENTIRE ORIFICE.
- CONTRACTOR OR MANUFACTURER MUST PREPARE INTERIOR SURFACES OF MANHOLE AND INSTALL ONE OF THE FOLLOWING PROTECTIVE COATINGS AT THE SPECIFIED THICKNESS PER THE MANUFACTURERS RECOMMENDATIONS.
SAUERISEN NO. 210S (100MIL) OR NO. 210T (100 MIL) OR RAVEN 405 (100 MIL) OR TNEMEC PERMA-SHIELD G436 (100 MIL)
- WHEN DIRECTED BY THE ENGINEER, A SET OF THREE (3) CYLINDERS, THREE-INCHES (3") IN DIAMETER MUST BE CUT FROM RANDOMLY SELECTED MANHOLES AND TESTED FOR COMPRESSIVE STRENGTH.
- ACCEPTANCE OF THE MANHOLE STRUCTURE MUST BE BASED ON THE CONFORMANCE AND PERFORMANCE OF MATERIALS REQUIRED IN ASTM C-478 AND THE ENGINEER'S INSPECTION OF THE INSTALLED PRODUCT.
- A 3-FOOT CLEAR OPENING IS REQUIRED FOR HINGED MANHOLE LIDS.

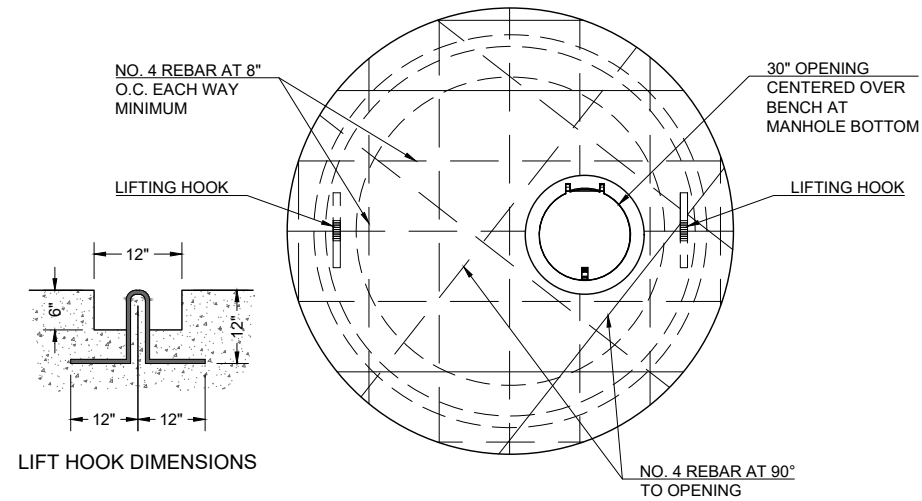
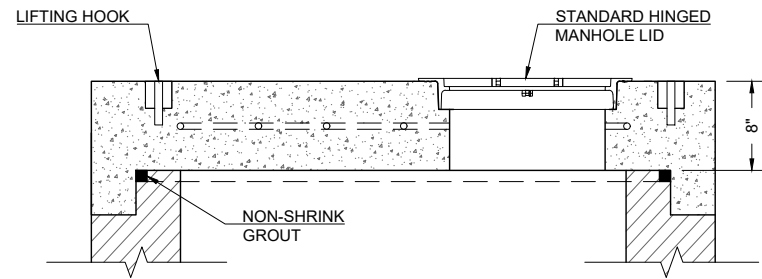


CONCENTRIC CONE **ECCENTRIC CONE**

03
616 **REINFORCED CONCRETE PRECAST MANHOLE CONE SECTION** Scale: N.T.S.

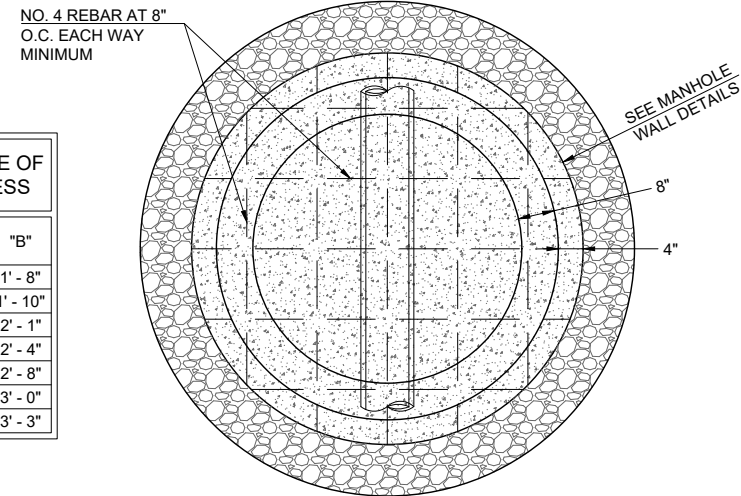
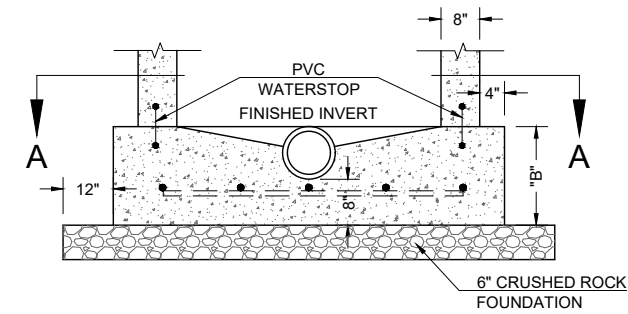


APPROVED BY: *Will Huggins*
DEPUTY CITY ENGINEER
DATE: 10/16/2023
Chris Browning
GENERAL MANAGER
DATE: 10/10/2023
Will Huggins
DEPUTY DIRECTOR
DATE: 10/10/2023
UTILITIES ENGINEERING



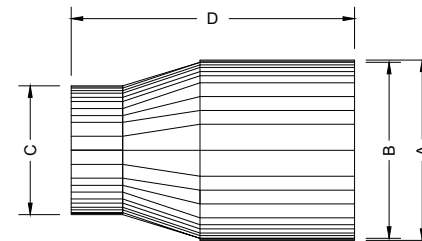
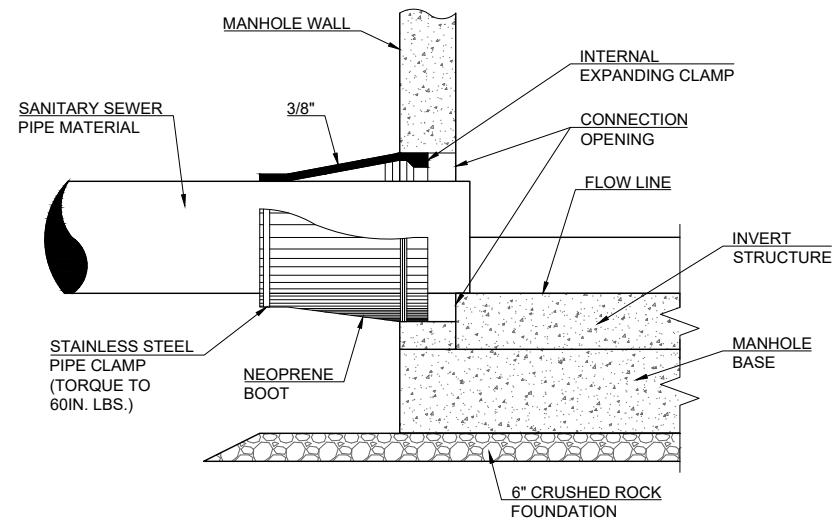
LIFT HOOK DIMENSIONS

05 REINFORCED CONCRETE PRECAST SLAB MANHOLE TOP
616 Scale: N.T.S.



SCHEDULE OF THICKNESS	
PIPE DIAMETER	"B"
8"	1' - 8"
10"	1' - 10"
12"	2' - 1"
15"	2' - 4"
18"	2' - 8"
21"	3' - 0"
24"	3' - 3"

06 CAST IN PLACE CONCRETE MANHOLE BASE SECTION
616 Scale: N.T.S.



NOTES:

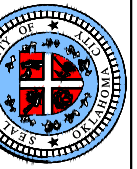
1. ALL PIPE CLAMPS MUST BE STAINLESS STEEL.
2. NEOPRENE EPDM BLENDED COMPOUND BOOT MUST MEET ASTM C-923.

PIPE O.D. RANGE (IN.)	HOLE & BOOT DIAMETER DIMENSIONS			
	A	B	C	D
3 1/2" - 4 1/2"	7"	6 1/8"	4 1/4"	6"
5 3/8" - 7"	12"	10 7/8"	6 1/2"	8"
7" - 8 1/2"	12"	10 7/8"	8"	8"
8 3/16" - 9 3/4"	12"	10 7/8"	9 1/4"	8"
9 1/4" - 11"	16"	14 7/8"	10 1/2"	8"
10 1/4" - 12"	16"	14 7/8"	12"	8"
12" - 13 3/4"	16"	14 7/8"	13 1/4"	8"
14 1/2" - 16 1/4"	20"	18 7/8"	15 3/4"	8"
15 3/4" - 17 1/2"	20"	18 7/8"	17"	8"
19 1/2" - 21 1/4"	24"	22 7/8"	20 3/4"	8"

NOTES:

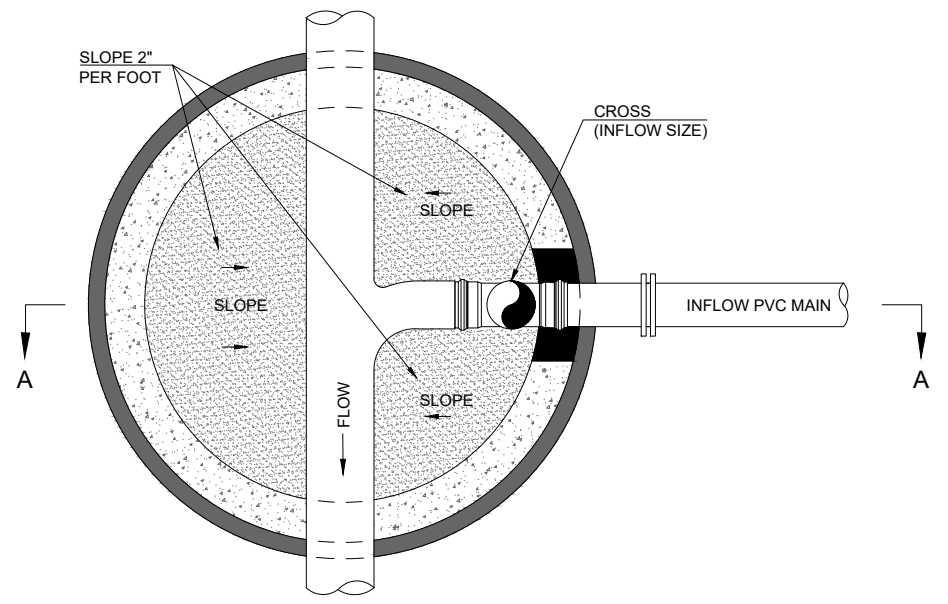
1. MANHOLE TOPS MUST BE CONSTRUCTED IN ACCORDANCE WITH ASTM C-478. LIFTING HOOKS MUST BE CONSTRUCTED AS PER MANUFACTURERS RECOMMENDATION.
2. CONTRACTOR MUST PREPARE INTERIOR SURFACES OF MANHOLE AND INSTALL ONE OF THE FOLLOWING PROTECTIVE COATINGS AT THE SPECIFIED THICKNESS PER THE MANUFACTURERS RECOMMENDATIONS.
SAUREISEN NO. 210S (100MIL) OR NO. 210T (100 MIL) OR RAVEN 405 (100 MIL) OR TNEMEC PERMA-SHIELD G436 (100 MIL)
3. WHEN DIRECTED BY THE ENGINEER, A SET OF THREE (3) CYLINDERS, THREE-INCHES (3") IN DIAMETER MUST BE CUT FROM RANDOMLY SELECTED MANHOLE TOPS AND TESTED FOR A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI.
4. ACCEPTANCE OF THE MANHOLE TOP STRUCTURE MUST BE BASED ON THE CONFORMANCE AND PERFORMANCE OF MATERIALS REQUIRED IN ASTM C-478 AND THE ENGINEER'S INSPECTION OF THE INSTALLED PRODUCT.

07 MANHOLE PIPE CONNECTION FOR CAST IN PLACE
616 Scale: N.T.S.

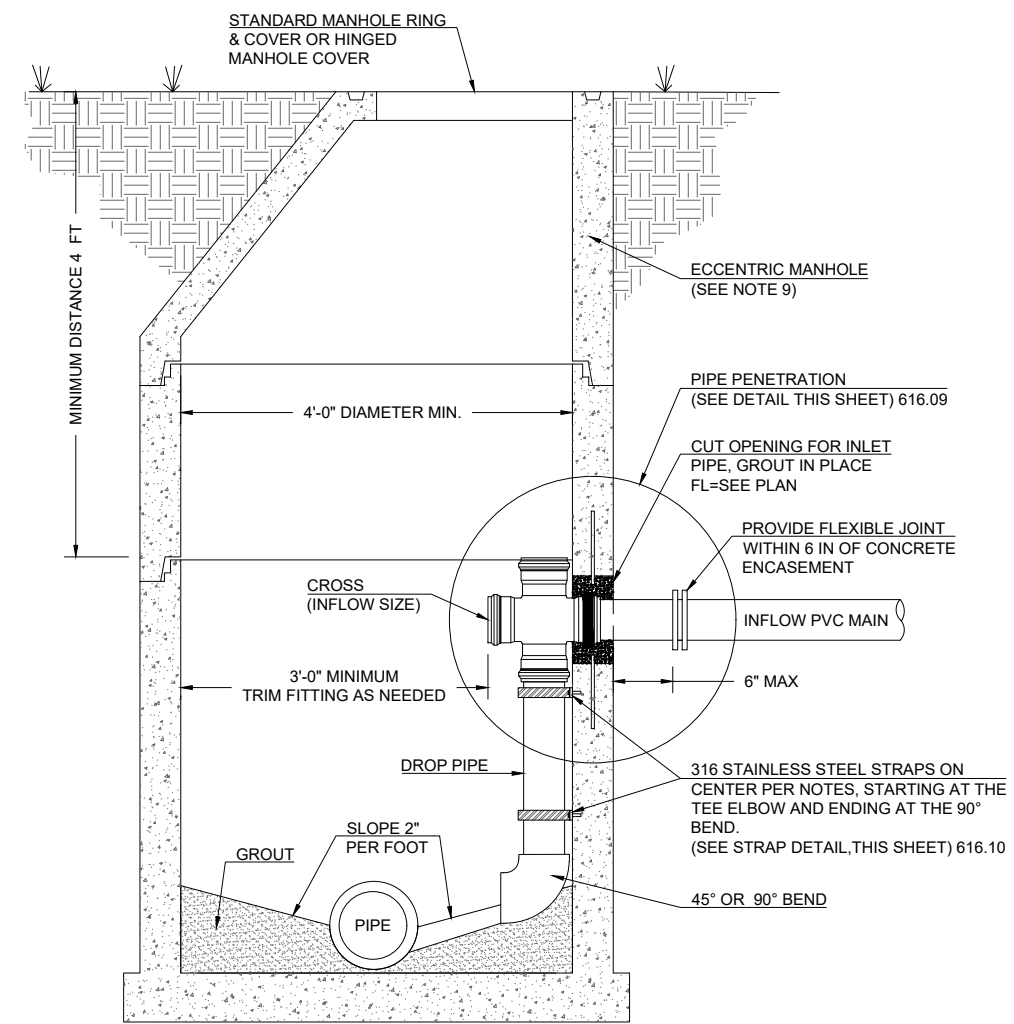


APPROVED BY: *Chris Browning*
DEBORAH K. MILLETT, P.E., INTERIM CITY ENGINEER
DATE: 10/16/2023
Chris Browning
CHRIS BROWNING, GENERAL MANAGER
DATE: 10/10/2023
Will Huggins
WILL HUGGINS, P.E., DEPUTY DIRECTOR
DATE: 07/10/2023
UTILITIES ENGINEERING

SANITARY SEWER STANDARD DETAILS
SANITARY SEWER MANHOLE
DETAILS 616.05 TO 616.07

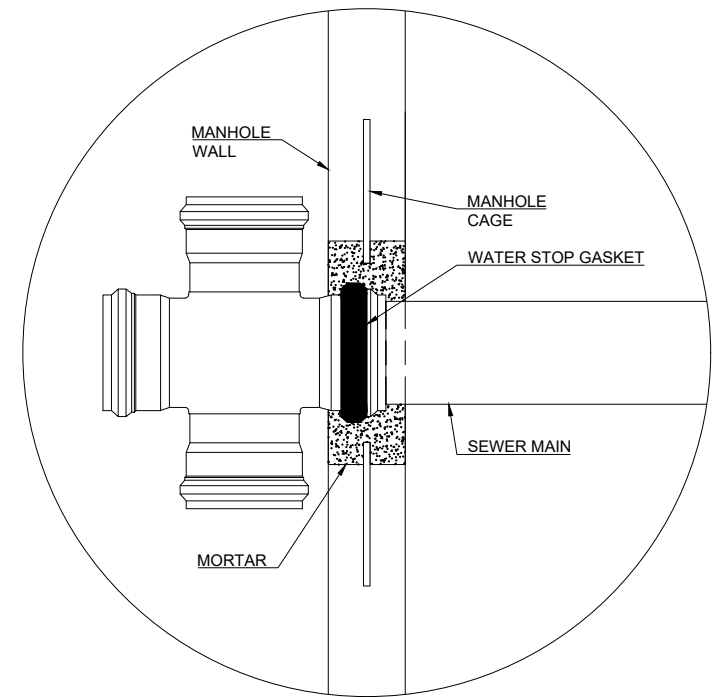


PLAN VIEW



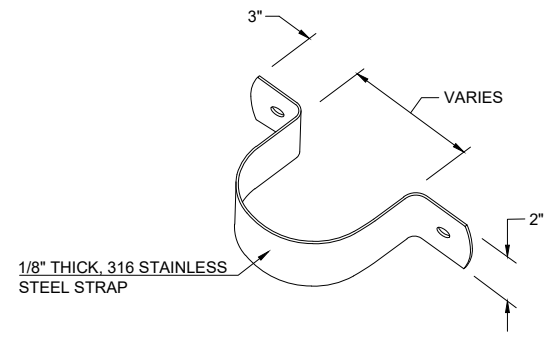
SECTION A-A

08
616
DROP MANHOLE
Scale: N.T.S.



(DETAIL 626.08 - SECTION A-A)

09
616
PIPE PENETRATION DETAIL
Scale: N.T.S.

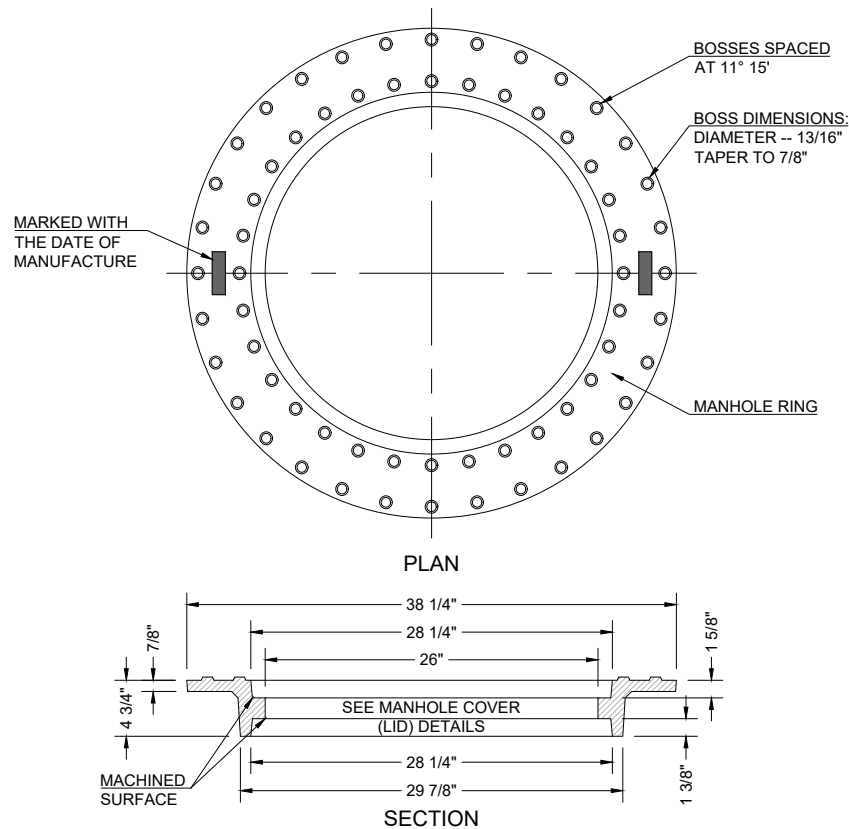


(DETAIL 626.08 - SECTION A-A)

10
616
STRAP DETAIL
Scale: N.T.S.

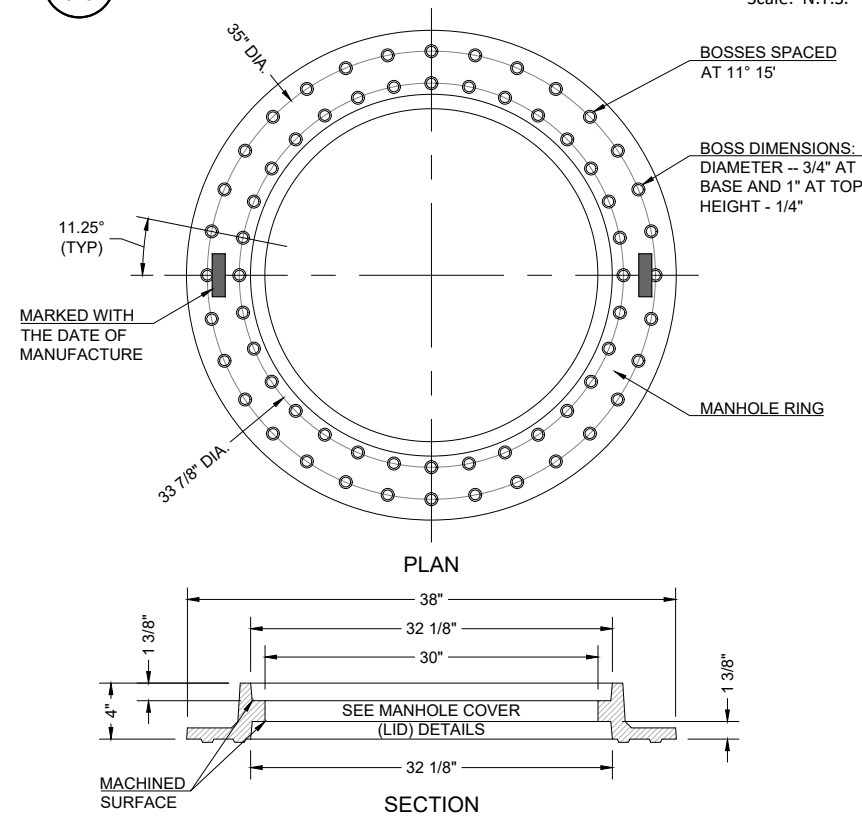
NOTES:

1. DROP MANHOLE IS MANDATORY WHEN THE DIFFERENTIAL BETWEEN INVERTS IS GREATER THAN 24 INCHES.
2. ONLY ONE DROP CONNECTION ALLOWED PER MANHOLE.
3. PIPE SIZE FOR DROP TO EQUAL INFLOW SEWER PIPE SIZE.
4. ALL MANHOLE CONNECTIONS MUST BE CORED.
5. STRAP INTERVALS OF TWENTY-FOUR INCHES (24") MUST BE USED ON ALL DROPS GREATER THAN FIVE FEET (5'-0"), STRAPS SHALL BE SPACED A MAXIMUM OF THIRTY-SIX INCHES (36") ON CENTER FOR ALL DROPS LESS THAN FIVE FEET (5'-0").
6. USE HALF INCH (1/2") DIAMETER EXPANSION TYPE 316 STAINLESS STEEL CINCH BOLTS WITH STAINLESS STEEL WASHERS AND NUTS TO ATTACH STRAPS.
7. MINIMUM MANHOLE DIAMETER WITH DROP CONNECTION MUST BE FOUR FEET (4'-0") OR FORTY-EIGHT INCHES (48").
8. FOR FURTHER DETAILS ON REINFORCED CONCRETE PRECAST MANHOLE CONES, SEE DETAIL ON OKLAHOMA CITY UTILITIES STANDARD 616.A. CONCENTRIC PRECAST MANHOLE CONE MAY BE USED IN PLACE OF ECCENTRIC PRECAST CONE. DROP CONNECTIONS MUST BE BENEATH MANHOLE OPENING, UNLESS OTHERWISE APPROVED.
9. REFER TO MANHOLE DETAILS ON STANDARD DETAIL SHEET 616 FOR INTERIOR COATING OF MANHOLES.
10. CROSS MUST REMAIN OPEN ON ALL SIDES.



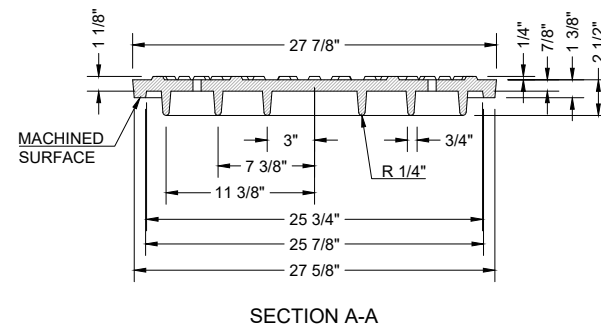
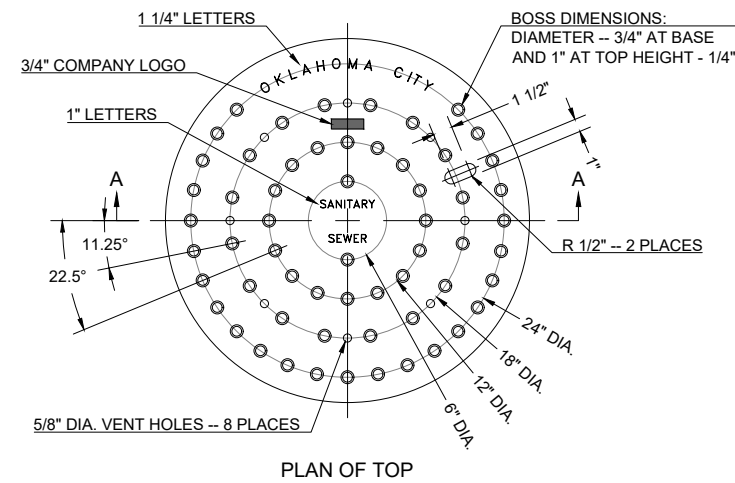
- NOTES:
1. FURNISHED WITH MACHINED HORIZONTAL BEARING SURFACE.
 2. MANHOLE RING IS REVERSIBLE.

11 REVERSIBLE MANHOLE RING (PAVED SURFACE)
616 Scale: N.T.S.

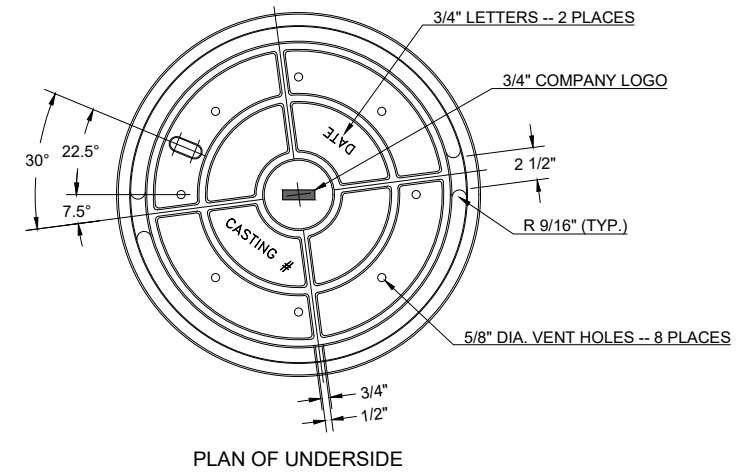


- NOTES:
1. FINISH EXCESS IRON AND FINIS; MACHINE SEATING SURFACES FLAT TO NOTE DIMENSIONS.
 2. FILLETS MUST BE 1/4" UNLESS OTHERWISE SPECIFIED.
 3. UNLESS OTHERWISE SHOWN, ALL DIMENSIONS ARE IN INCHES.

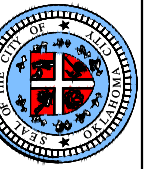
12 REVERSIBLE MANHOLE RING (NON-PAVED SURFACE)
616 Scale: N.T.S.



13 VENTED MANHOLE COVER
616 Scale: N.T.S.

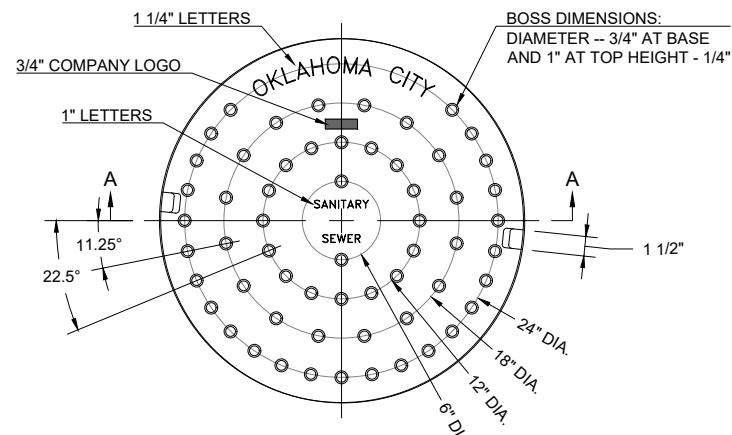


- NOTES:
1. FINISH EXCESS IRON AND FINIS; MACHINE SEATING SURFACES FLAT TO NOTE DIMENSIONS.
 2. FILLETS MUST BE 1/4" UNLESS OTHERWISE SPECIFIED.
 3. UNLESS OTHERWISE SHOWN, ALL DIMENSIONS ARE IN INCHES.

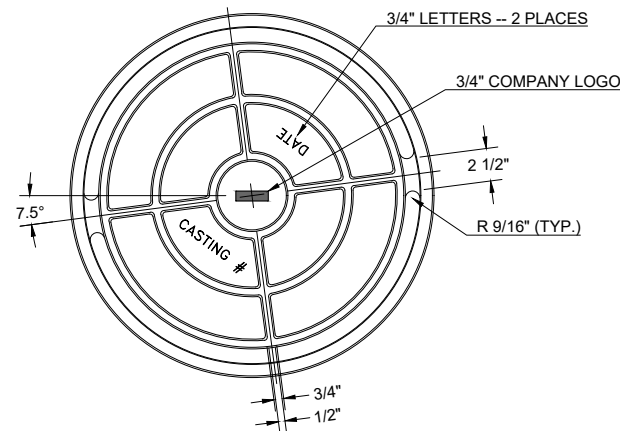


APPROVED BY: *Deborah K. Miller*
DEBORAH K. MILLER, P.E., INTERIM CITY ENGINEER
DATE: 10/16/2023
Chris Browning
CHRIS BROWNING, GENERAL MANAGER
DATE: 10/10/2023
Will Huggins
WILL HUGGINS, P.E., DEPUTY DIRECTOR
DATE: 10/10/2023
UTILITIES ENGINEERING

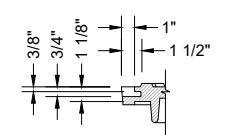
SANITARY SEWER STANDARD DETAILS
SANITARY SEWER MANHOLE
DETAILS 626.11 TO 626.13



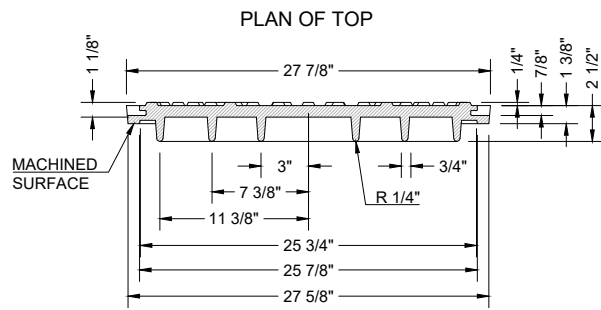
BOSS DIMENSIONS:
DIAMETER -- 3/4" AT BASE
AND 1" AT TOP HEIGHT - 1/4"



PLAN OF UNDERSIDE



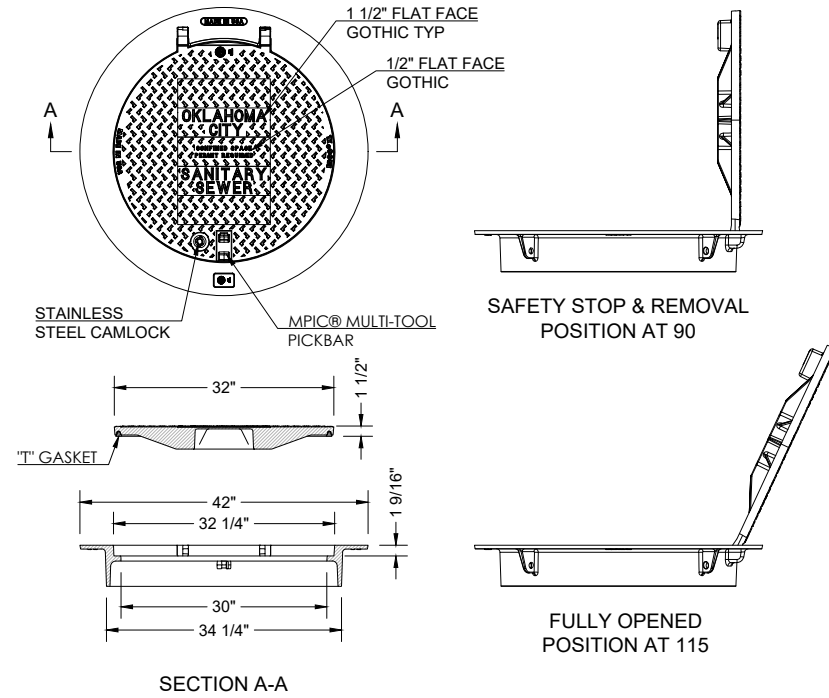
SECTION THRU PICK SLOT



SECTION A-A

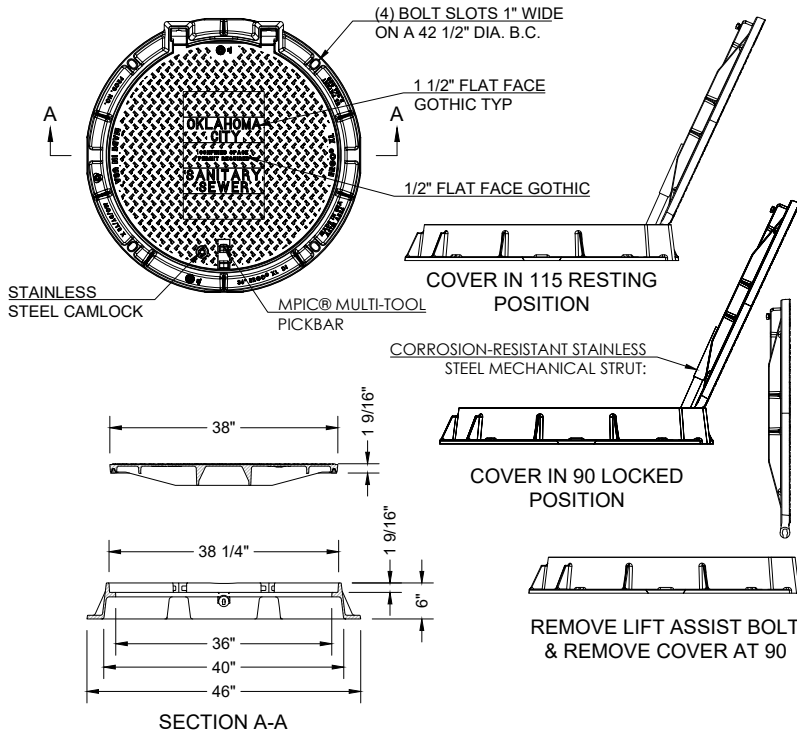
- NOTES:
1. FINISH EXCESS IRON AND FINIS; MACHINE SEATING SURFACES FLAT TO NOTE DIMENSIONS.
 2. FILLETS MUST BE 1/4" UNLESS OTHERWISE SPECIFIED.
 3. UNLESS OTHERWISE SHOWN, ALL DIMENSIONS ARE IN INCHES.

14 NON-VENTED MANHOLE COVER
616 Scale: N.T.S.



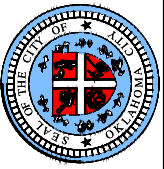
SECTION A-A

15 HINGED MANHOLE COVER (TOP FLANGE)
616 Scale: N.T.S.



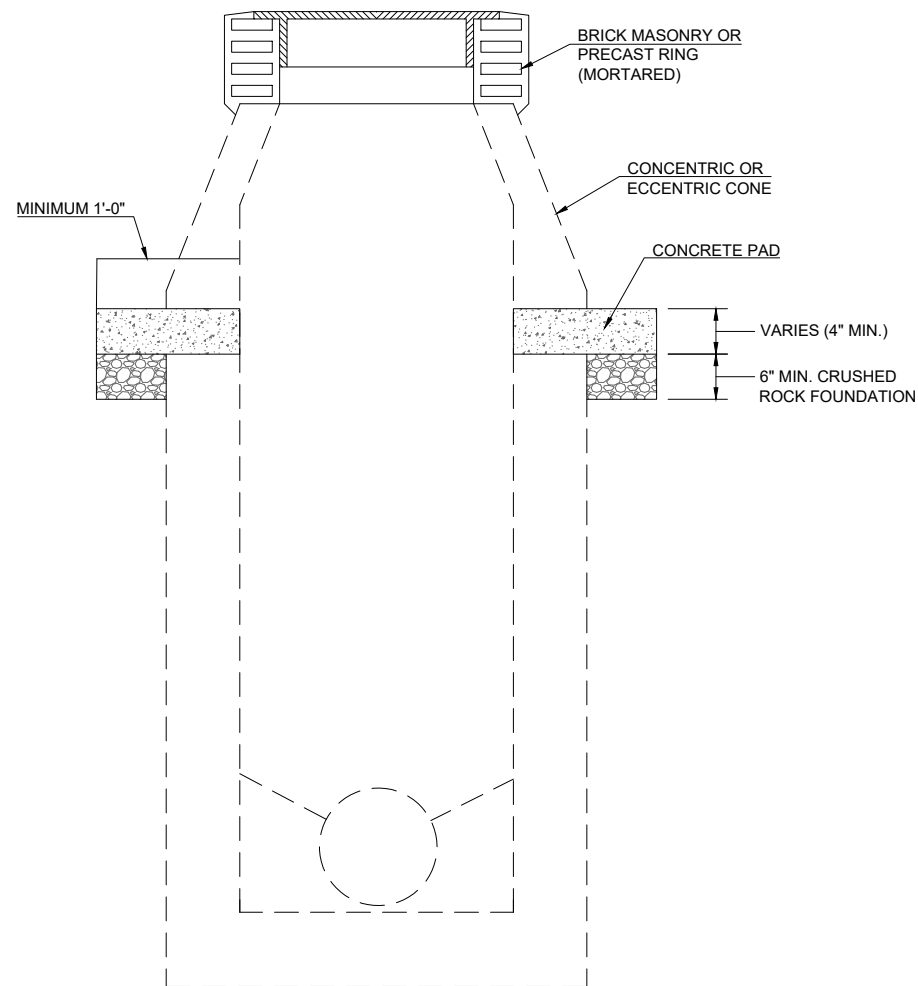
SECTION A-A

16 HINGED MANHOLE COVER (BOTTOM FLANGE)
616 Scale: N.T.S.



APPROVED BY: *Will Huggins*
DEBORAH K. MILLER, P.E., INTERIM CITY ENGINEER
DATE: 10/16/2023
CHRIS BROWNING, GENERAL MANAGER
DATE: 10/10/2023
WILL HUGGINS, P.E., DEPUTY DIRECTOR
DATE: 01/01/2023
UTILITIES ENGINEERING

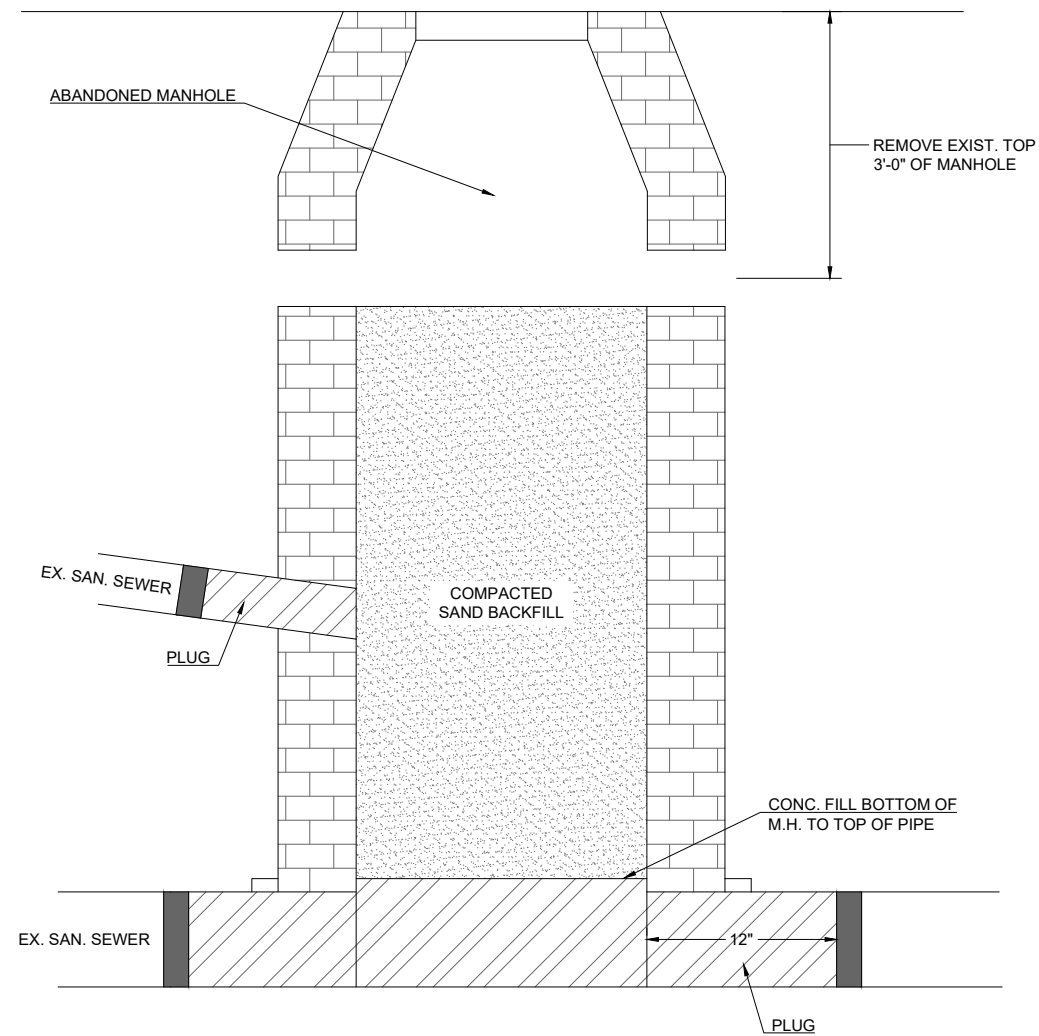
SANITARY SEWER STANDARD DETAILS
SANITARY SEWER MANHOLE
DETAILS 616.14 TO 616.16



NOTES:

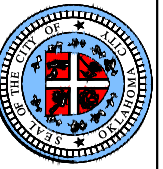
1. CAST-IN-PLACE NON-REINFORCED CONCRETE AND BRICK MANHOLES:
THE EXISTING CONE AND WALL, IF NECESSARY, MUST BE REMOVED TO A LEVEL WHICH WILL ALLOW INSTALLATION OF NEW CONE TO THE PROPER GRADE. THE EXPOSED CUT-OFF SURFACES OF THE EXISTING MANHOLE WALL MUST BE CLEANED BY REMOVING LOOSE MATERIAL AND WETTED, PRIOR TO CONSTRUCTION OF CONCRETE PAD. ALL LOOSE BACKFILL AROUND THE MANHOLE WALL MUST BE REMOVED AND REPLACED WITH COMPACTED ASTM C-33 NO. 67. THE NEW CONCRETE PAD MUST BE CONSTRUCTED, AND A NEW CONE MUST BE FORMED OR PLACED TO THE PROPER GRADE USING FIFTEEN THOUSAND (1500 PSI) POUNDS PER SQUARE INCH MORTAR.
2. PRECAST REINFORCED CONCRETE MANHOLES:
PRECAST SECTIONS MUST BE REMOVED TO A LEVEL WHERE THE NEW CONE CAN BE INSTALLED TO THE DESIRED GRADE. INSTALLATION MUST BE IN ACCORDANCE WITH THE APPROPRIATE STANDARD DETAIL FOR PRECAST MANHOLE CONES. A NEW RUBBER GASKET MUST BE USED TO SEAL EACH SECTION.

01
618 **REBUILDING MANHOLE DETAIL**
Scale: N.T.S.

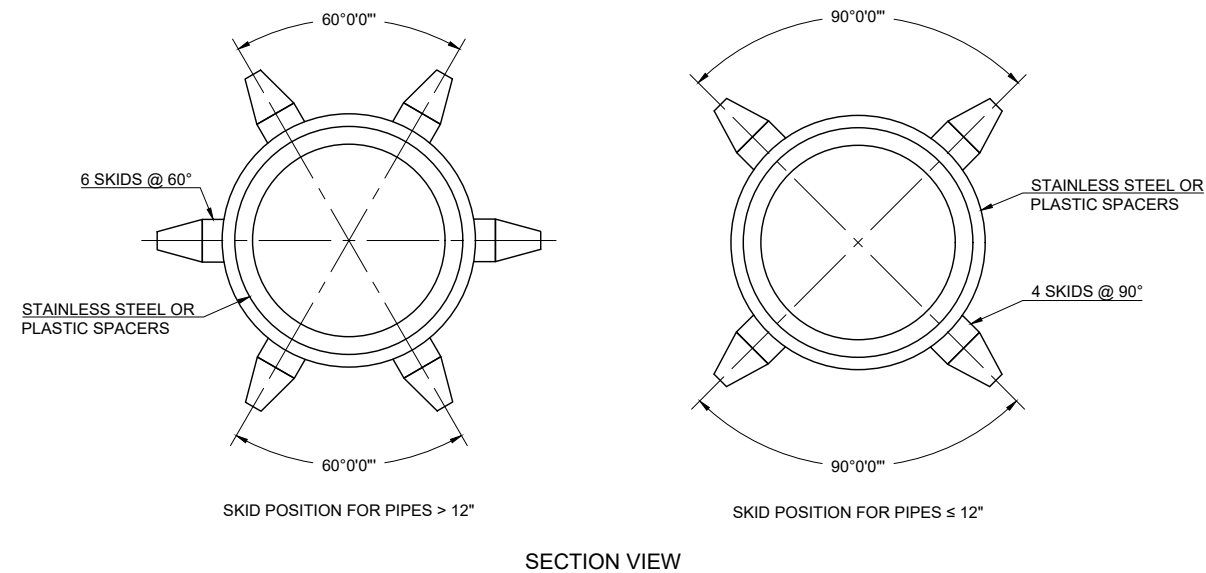
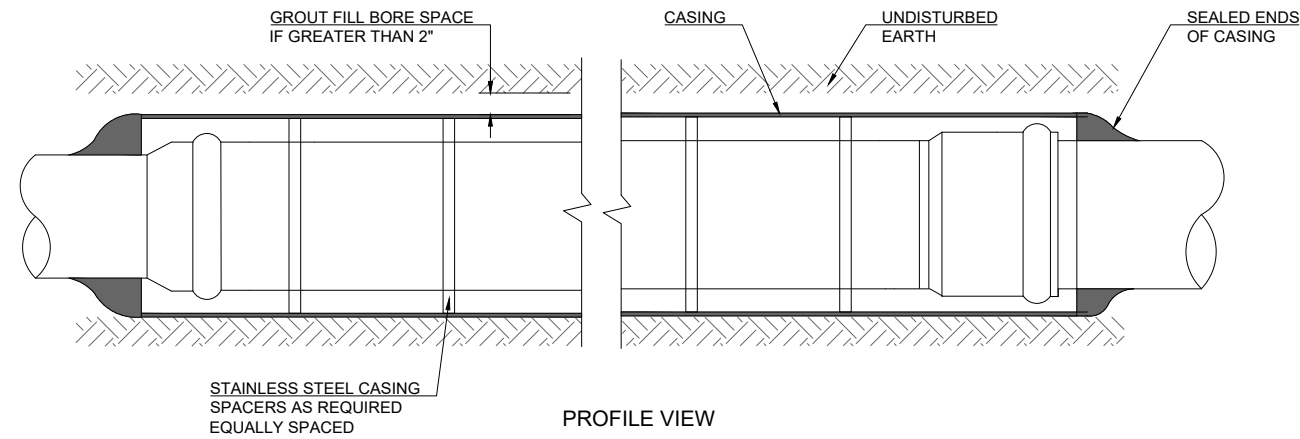


NOTE:
RING AND COVER OF ABANDONED MANHOLE MUST BE SALVAGED AND DELIVERED TO THE LINE MAINTENANCE DIVISION OF THE WATER AND WASTEWATER UTILITIES DEPARTMENT.

01
629 **ABANDONING MANHOLE DETAIL**
Scale: N.T.S.



APPROVED BY:
10/16/2023 DATE: _____
DEBORAH K. MILLER, P.E., INTERIM CITY ENGINEER
10/10/2023 DATE: _____
CHRIS BROWNING, GENERAL MANAGER
WILL HUGGINS, P.E., DEPUTY DIRECTOR
07/10/2023 DATE: _____
UTILITIES ENGINEERING



01 BORE AND ENCASEMENT DETAIL
635 Scale: N.T.S.

NOTES:

1. PLUGGED PIPE ENDS
OPTION A - GROUT -- BOTH ENDS OF THE CASING PIPE SHALL BE PLUGGED WITH A GROUT OR CONCRETE HAVING A MINIMUM COMPRESSIVE STRENGTH OF TWENTY-FIVE HUNDRED (2500 PSI) POUNDS PER SQUARE INCH OR GROUTED MASONRY. EACH PLUG SHALL BE A MINIMUM LENGTH OF EIGHTEEN (18) INCHES. THE GROUTING PRESSURE SHALL BE IN ACCORDANCE WITH THE PIPE MANUFACTURE'S RECOMMENDATIONS.
OPTION B - SEALS -- BOTH ENDS SHALL BE SEALED WITH NEOPRENE RUBBER SEALS WITH STAINLESS STEEL BANDINGS.

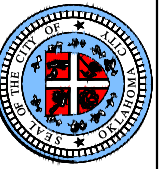
2. CASING PIPE SIZE -- STEEL CASING PIPE MUST HAVE THE FOLLOWING MINIMUM DIAMETERS:

PIPE NOMINAL SIZE (inches)	SUGGESTED CASING PIPE INSIDE DIAMETER (inches)
4	8 to 10
6	10 to 12
8	14 to 16
10	16 to 18
12	18 to 20
15	20 to 22
18	24 to 26
24	31 to 33
27	33 to 36
30	36 to 42
36	42 to 48
42	54 to 60
48	60 to 66

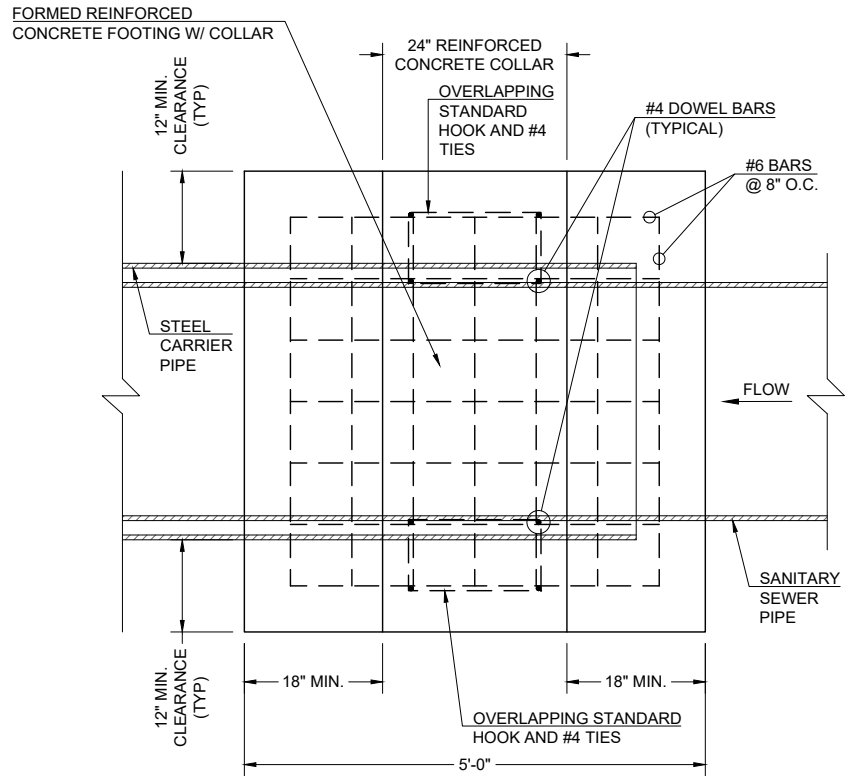
3. CASING PIPE THICKNESS -- STEEL CASING PIPE MUST HAVE THE FOLLOWING MINIMUM THICKNESS(ES), IN INCHES, FOR THE INDICATED MAXIMUM DEPTH OF COVER(S), IN FEET OR AS REQUIRED BY THE RAILROAD AT THE TIME OF CONSTRUCTION:

OUTSIDE DIAMETER (INCHES)	UNDER HIGHWAY		UNDER RAILROAD		
	WALL THICKNESS (INCHES)	MAXIMUM COVER (FEET)	BNSF (UNCOATED) WALL THICKNESS (INCHES)	UNION PACIFIC WALL THICKNESS (INCHES)	MAXIMUM COVER (FEET)
≤ 12	0.1880	30	0.2500	0.2500	30
16	0.2500	30	0.3125	0.3125	30
18	0.2500	30	0.3125	0.3125	30
20	0.2500	30	0.3750	0.3750	30
24	0.2500	30	0.4375	0.4375	30
30	0.3220	30	0.5000	0.5000	30
36	0.3750	30	0.5625	0.5625	30
42	0.3750	25	0.5625	0.5625	30
48	0.4380	25	0.6250	0.6250	25
54	0.4380	25	OVER 48" MUST BE APPROVED BY BNSF RR	OVER 48" MUST BE APPROVED BY U.P.R.R.CO.	20
60	0.4380	25			20
66	0.4380	20			20

4. CASING MATERIAL -- STEEL CASING PIPE SHALL CONFORM WITH ASTM A-139, STANDARD SPECIFICATION FOR ELECTRIC-FUSION (ARC)-WELDED STEEL PIPE (NPS4 AND OVER). THE STEEL MATERIAL SHALL BE NEW, SMOOTH WALL, CARBON STEEL, GRADE B, WITH A MINIMUM TENSILE STRENGTH, AND MINIMUM THIRTY-FIVE-THOUSAND (35,000 PSI) POUNDS PER SQUARE INCH YIELD STRENGTH.

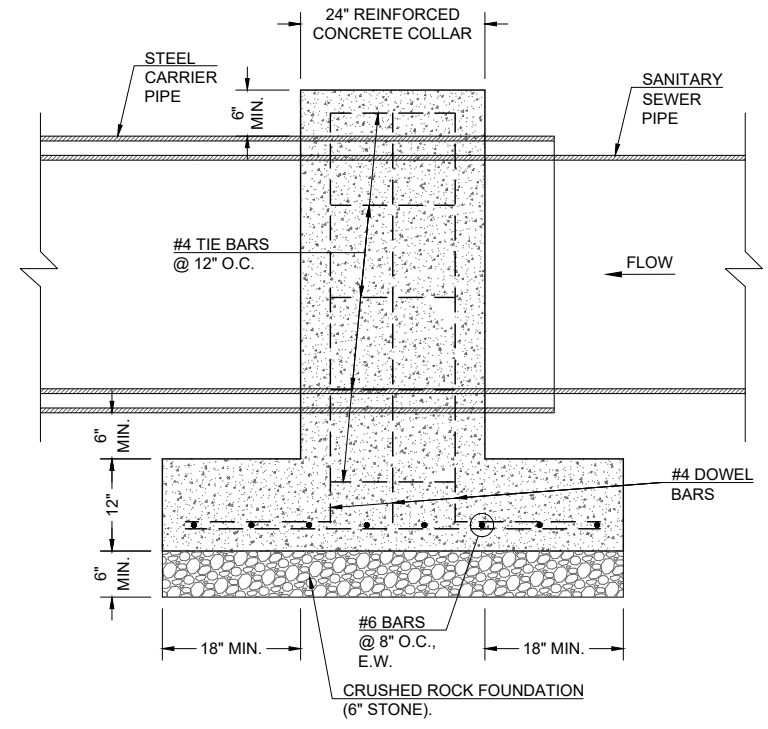


APPROVED BY: *Chris Browning*
 DEBORAH K. WILHELM, P.E., INTERIM CITY ENGINEER
 DATE: 10/16/2023
Chris Browning
 CHRIS BROWNING, GENERAL MANAGER
 DATE: 10/10/2023
Will Higgins
 WILL HIGGINS, P.E., DEPUTY DIRECTOR
 UTILITIES ENGINEERING
 DATE: 10/10/2023



PLAN VIEW

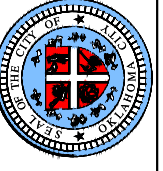
NOTE:
THE FOLLOWING DETAIL IS TO BE USED ONLY FOR STEEL
CARRIER PIPE NOT GREATER THAN 42" IN DIAMETER.



ELEVATION VIEW

NOTE:
MINIMUM STEEL BAR REINFORCEMENT COVER IS 3" (INCHES).

01 CONCRETE COLLAR WITH SPREAD FOOTING
640 Scale: N.T.S.

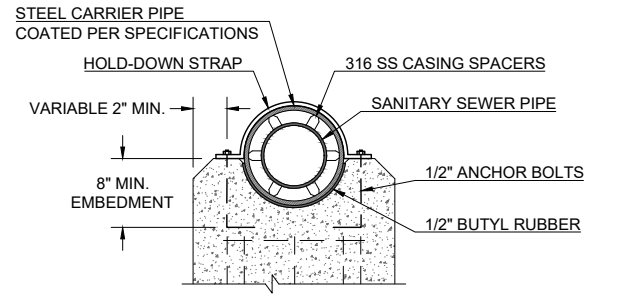
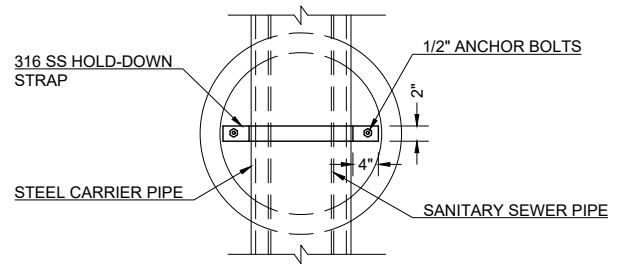


APPROVED BY:
 10/16/2023 DATE: *Deborah K. Miller*
 DEBORAH K. MILLER, P.E., INTERIM CITY ENGINEER
 10/10/2023 DATE: *Chris Browning*
 CHRIS BROWNING, GENERAL MANAGER
 10/10/2023 DATE: *Will Huggins*
 WILL HUGGINS, P.E., DEPUTY DIRECTOR
 UTILITIES ENGINEERING

SANITARY SEWER STANDARD DETAILS
PIPE ENCASUREMENT AND COLLAR
DETAIL 640

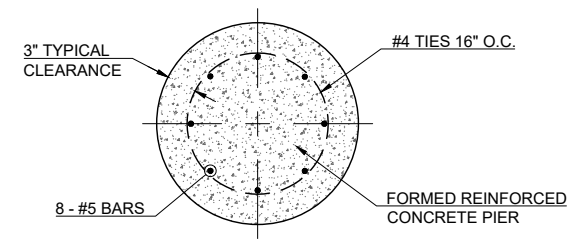
TABLE OF STEEL CARRIER PIPE SIZES										
Nominal Size [in]	Wall Thickness [in]									
	3/16	1/4	5/16	3/8	7/16	1/2	5/8	3/4	7/8	1
Span Length - [ft]										
6	36	40	44							
8	38	42	45							
10	39	43	46							
12	40	44	47							
14	40	44	47							
16	41	45	48							
18	41	46	49	52						
20	42	46	50	53						
22	42	46	51	54						
24	42	48	52	55	58	60				
26	43	48	52	56	59	61				
28	43	48	53	56	59	62				
30	43	49	53	57	60	63				
32	44	49	54	57	61	64				
34	44	49	54	58	61	64				
36	44	50	54	58	62	65	70			
38	44	50	55	59	62	65	70			
40	44	50	55	59	63	66	71			
42	44	50	55	59	63	66	72			
45		51	55	60	63	67	72			
48		51	56	60	64	67	73	78		
51		51	56	60	64	68	74	79		
54		51	56	61	65	68	74	79		
57		51	57	61	65	69	75	80		
60		51	57	61	65	69	75	80		
63		52	57	62	66	69	76	81		
66		52	57	62	66	70	76	81	86	90
72		52	58	62	66	70	77	82	87	92

01 STEEL CARRIER SIZES AND SPAN
641 Scale: N.T.S.

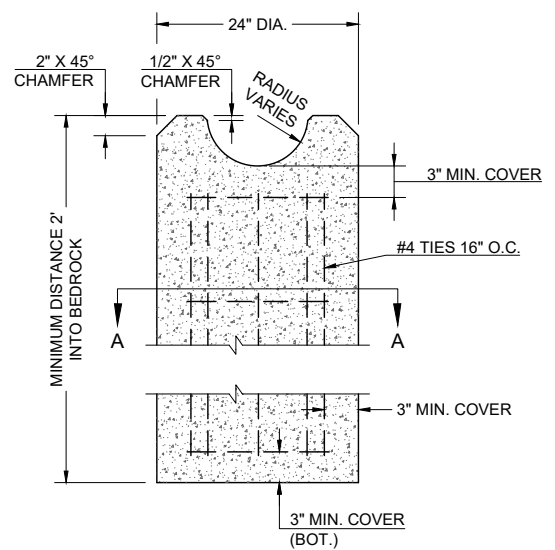


PIPE SADDLE & HOLD-DOWN STRAP

NOTE:
FOR SANITARY SEWER PIPE LESS THAN OR EQUAL TO 15-IN

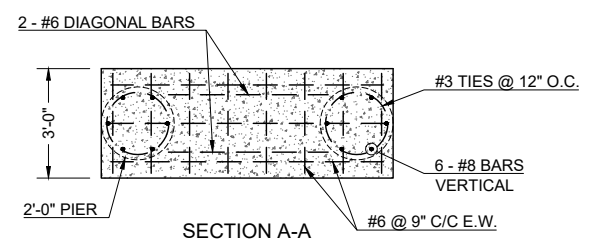


SECTION A-A

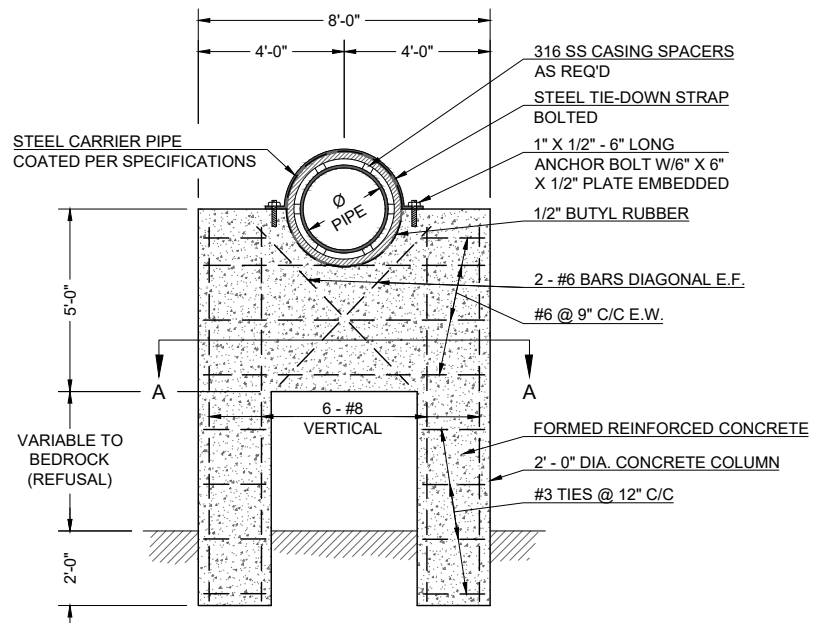


ELEVATION VIEW

02 PIER TYPE 1
641 Scale: N.T.S.



SECTION A-A



03 PIER TYPE 2
641 Scale: N.T.S.

APPROVED BY:
DEBORAH K. WILHELM, P.E., INTERIM CITY ENGINEER
CHRIS BROWNING, GENERAL MANAGER
WILL HUGHINS, P.E., DEPUTY DIRECTOR
UTILITIES ENGINEERING

DATE: 10/16/2023
DATE: 10/10/2023
DATE: 01/10/2023

SANITARY SEWER STANDARD DETAILS
AERIAL CROSSING
DETAILS 641.01 TO 641.03