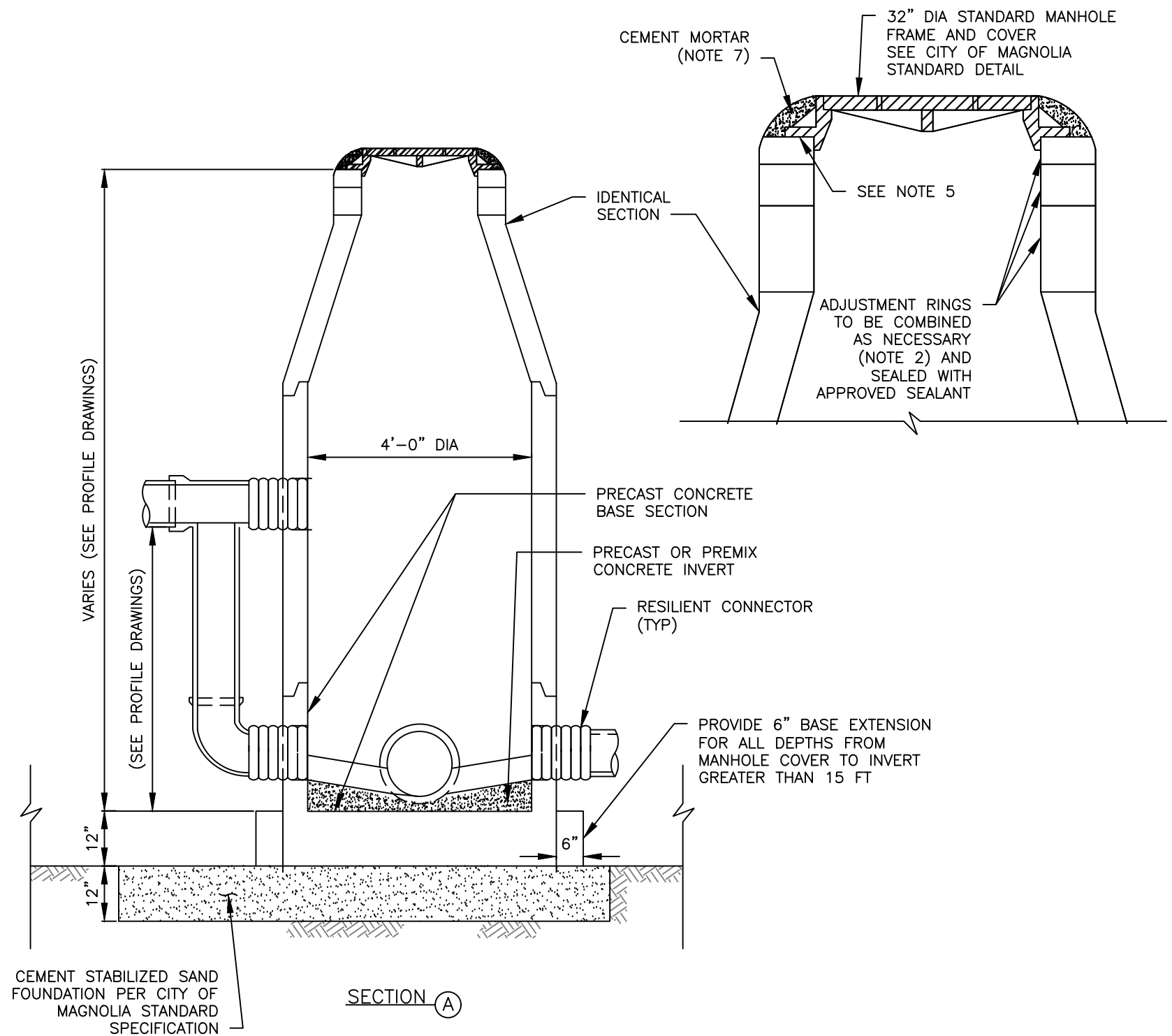


NOTES:

1. DEPTH OF MANHOLE DETERMINES SECTIONS REQUIRED.
2. PRECAST CONCRETE RINGS SHALL BE PROVIDED FOR A COMBINED ADJUSTMENT HEIGHT OF AT LEAST 12". THE TOTAL HEIGHT OF THE ADJUSTMENT RINGS SHALL NOT EXCEED 1'-6".
3. MANHOLE WALL THICKNESS FOR DEPTH EXCEEDING 12'-0" SHALL BE DETERMINED TO MEET LOADING CONDITIONS. MIN THICKNESS 5".
4. MANHOLE DROP AND INTERSECTING PIPES SHALL BE INSTALLED ONLY WHEN CALLED FOR IN PLAN AND PROFILE DRAWING.
5. SEAT MANHOLE FRAME IN SEALANT. SEALANT SHALL BE HYDROPHILIC ELASTIC SEALANT WHICH ADHERES TO BOTH CONCRETE AND METAL. APPLIED PER MANUFACTURER GUIDELINES.
6. ECCENTRIC PRECAST CONCRETE MANHOLE MAY BE USED.
7. OMIT CEMENT MORTAR WHEN MANHOLE IS LOCATED IN PAVED AREAS.
8. MIN REINFORCING IN THE PRECAST CONCRETE BASE SHALL BE # 5 @ 8 EW.



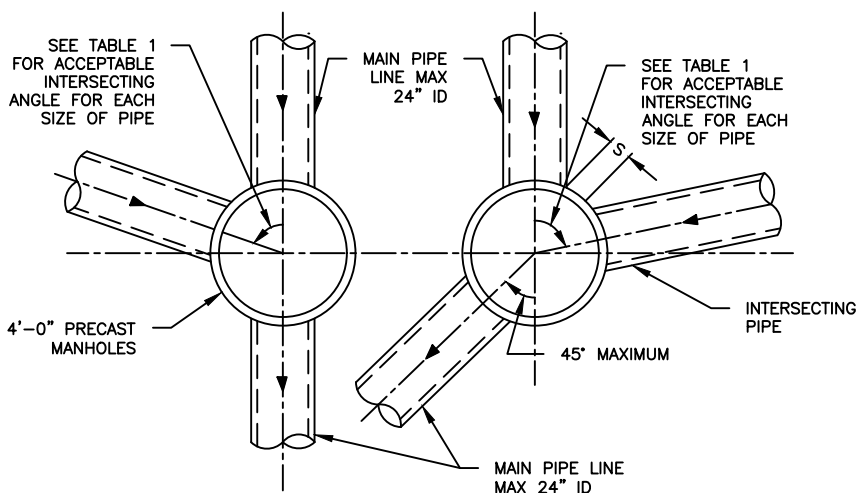
**SANITARY SEWER 4'-0" DIAMETER
PRECAST CONCRETE MANHOLE**

CITY OF MAGNOLIA STANDARD DETAIL

DETAIL NO.

SAN-001

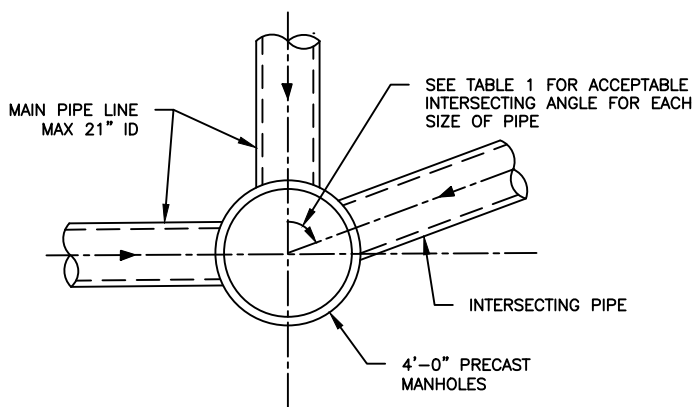
EFFECTIVE DATE: 8/3/2022



NOTES TO SPECIFIER:

1. "-" INDICATES THAT A SPECIAL DESIGN OR THE NEXT LARGER MANHOLE SIZE SHALL BE USED.
2. TABLE 1 IS BASED ON A MIN SEPARATION DISTANCE "S" OF 15.5" OR INTERSECTION PIPE OD/2, WHICHEVER IS GREATER, BETWEEN MAIN AND INTERSECTING PIPES ALONG THE MANHOLE INSIDE WALL ARC.
3. PIPE WALL THICKNESS USED IN TABLE 1 ARE BASED ON RCP. THE DESIGN ENGINEER MAY CALCULATE TO SEE IF THINNER WALL PIPES CAN MEET THE SEPARATION CRITERIA FOR ANGLES SMALLER THAN THE TABLE ALLOWS.

MAX 24" ID MAIN PIPE ALLOWED FOR STRAIGHT THROUGH TO 45° DEFLECTION
NTS



MAX 21" ID MAIN PIPE ALLOWED FOR 45° TO 90° DEFLECTION
NTS

TABLE 1

MINIMUM ANGLE AND INTERSECTING PIPE SIZES FOR A 4'-0" DIA MANHOLE

INTERSECTING PIPE SIZE (INCHES)	MIN INTERSECTING ANGLE IN DEGREES FOR VARIOUS MAIN PIPE SIZES IN INCHES							
	6"	8"	10"	12"	15"	18"	21"	24"
6	55	58	60	65	70	75	80	85
8		60	63	68	73	77	82	87
10			66	71	75	80	85	90
12				76	80	85	90	-
15					85	90	-	-
18						-	-	-
21							-	-
24								-

NOT APPLICABLE
UNLESS HYDRAULICS DICTATE
(INTERSECTING PIPE > MAIN PIPE)



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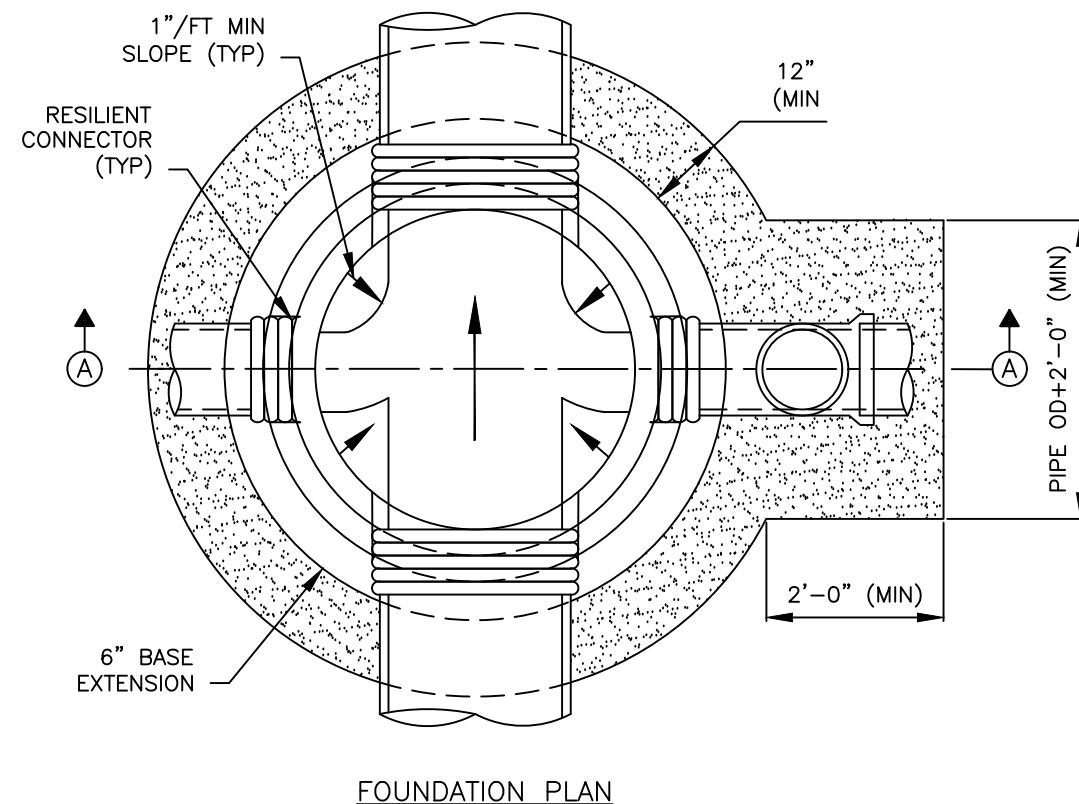
SANITARY SEWER 4'-0" DIAMETER PRECAST CONCRETE MANHOLE NOTES

CITY OF MAGNOLIA STANDARD DETAIL

DETAIL NO.

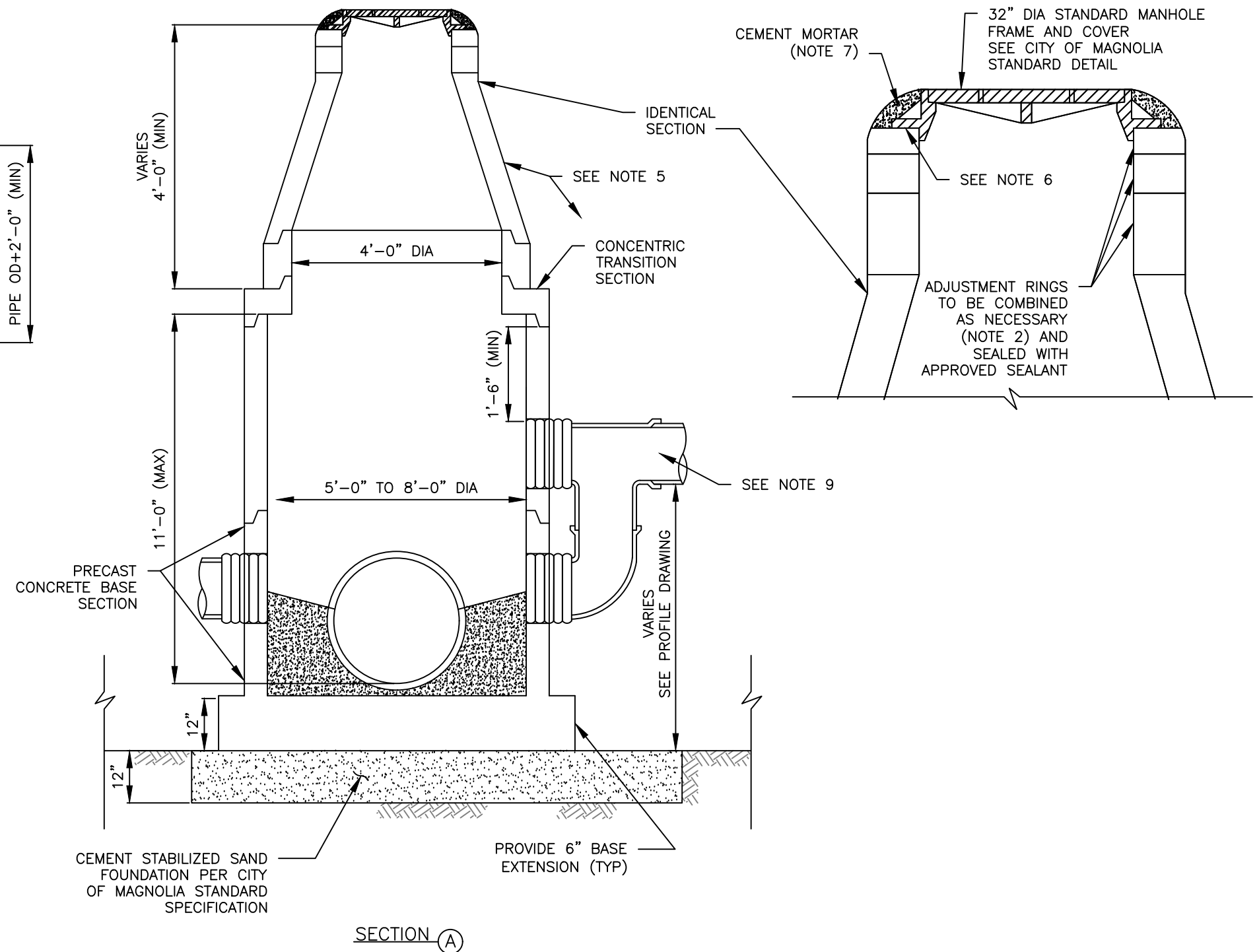
SAN-002

EFFECTIVE DATE: 8/3/2022



NOTES:

1. DEPTH OF MANHOLE DETERMINES SECTIONS REQUIRED.
2. PRECAST CONCRETE RINGS SHALL BE PROVIDED FOR A COMBINED ADJUSTMENT HEIGHT OF AT LEAST 12". THE TOTAL HEIGHT OF THE ADJUSTMENT RINGS SHALL NOT EXCEED 1'-6".
3. MANHOLE WALL THICKNESS FOR DEPTH EXCEEDING 12'-0" SHALL BE DETERMINED TO MEET LOADING CONDITIONS. MIN THICKNESS 5".
4. MANHOLE DROP AND INTERSECTING PIPES SHALL BE INSTALLED ONLY WHEN CALLED FOR IN PLAN AND PROFILE DRAWING.
5. ALTERNATE ECCENTRIC CONE AND/OR TRANSITION SECTION MAY BE USED.
6. SEAT MANHOLE FRAME IN SEALANT. SEALANT SHALL BE HYDROPHILIC ELASTIC SEALANT WHICH ADHERES TO BOTH CONCRETE AND METAL. APPLIED PER MANUFACTURER GUIDELINES.
7. OMIT CEMENT MORTAR WHEN MANHOLE IS LOCATED IN PAVED AREAS.
8. MIN REINFORCING IN THE PRECAST CONCRETE BASE SHALL BE # 5 @ 8 EW.
9. WHERE DIMENSIONAL RESTRICTIONS DICATE, THE MANHOLE BASE HEIGHT SHALL BE ADJUSTED TO HAVE THE UPPER INLET PIPE OF THE DROP ENTER INTO THE 4'-0" DIAMETER RISER SECTION.

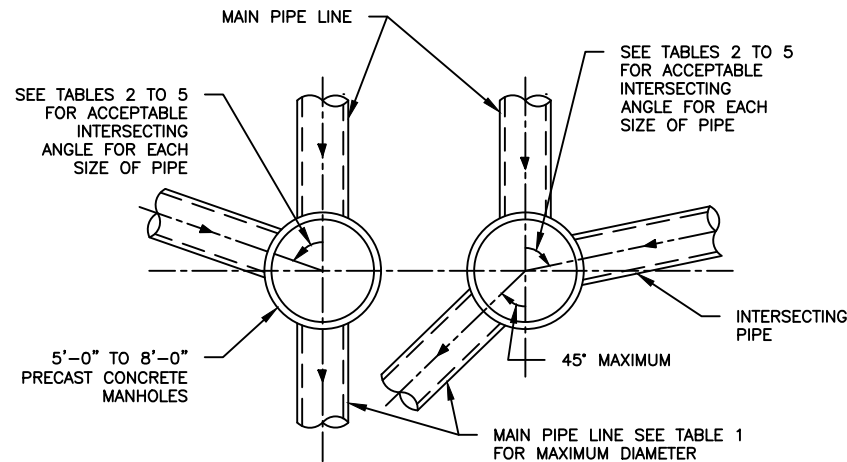


**SANITARY SEWER
5'-0" TO 8'-0" DIAMETER
PRECAST CONCRETE MANHOLE**

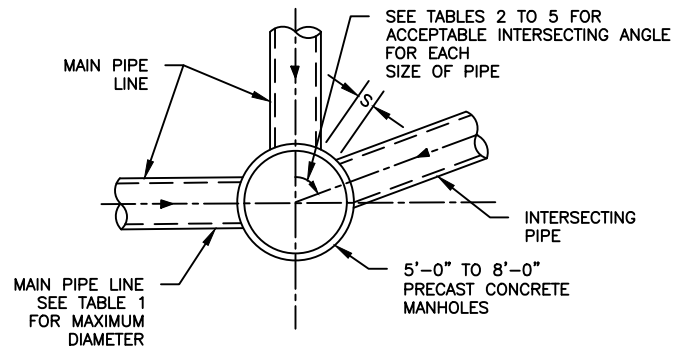
CITY OF MAGNOLIA STANDARD DETAIL

DETAIL NO.
SAN-003

EFFECTIVE DATE: 8/3/2022



FOR MAIN PIPES FROM STRAIGHT THROUGH TO 45° DEFLECTION
NTS



FOR MAIN PIPE WITH 45° TO 90° DEFLECTION
NTS

TABLE 1 MAXIMUM MAIN PIPE DIAMETER (ID) IN INCHES			
MANHOLE DIAMETER	STRAIGHT THROUGH TO 45° DEFLECTION	WITH 90° DEFLECTION	TABLE TO BE USED
5	36	27	2
6	42	33	3
7	48	36	4
8	60	42	5

TABLE 2 MINIMUM ANGLE AND INTERSECTING PIPE ID SIZES FOR A 5'-0" DIAMETER MANHOLE											
INTERSECTING PIPE ID SIZES (INCHES)	MINIMUM INTERSECTING ANGLE IN DEGREES FOR VARIOUS MAIN PIPE ID SIZES IN INCHES										
	8"	10"	12"	15"	18"	21"	24"	27"	30"	33"	36"
8	49	50	54	58	61	66	69	73	77	82	86
10		53	57	61	64	68	71	76	79	84	88
12			61	65	68	72	75	80	83	88	-
15				68	71	75	79	83	87	-	-
18					75	79	82	87	90	-	-
21						83	86	90	-	-	-
24							90	-	-	-	-
27								-	-	-	-
30									-	-	-
33										-	-
36											-

TABLE 3 MINIMUM ANGLE AND INTERSECTING PIPE ID SIZES FOR A 6'-0" DIAMETER MANHOLE												
INTERSECTING PIPE ID SIZES (INCHES)	MINIMUM INTERSECTING ANGLE IN DEGREES FOR VARIOUS MAIN PIPE ID SIZES IN INCHES											
	8"	10"	12"	15"	18"	21"	24"	27"	30"	33"	36"	42"
8	40	42	45	49	51	54	57	61	63	67	70	78
10		44	47	50	53	56	59	62	65	69	72	79
12			50	54	56	60	62	66	68	72	75	83
15				57	59	62	65	69	71	75	78	85
18					62	65	68	71	74	78	81	88
21						68	71	74	77	81	84	-
24							74	77	80	84	87	-
27								83	85	89	-	-
30									-	-	-	-
33										-	-	-
36											-	-
36												-

TABLE 4 MINIMUM ANGLE AND INTERSECTING PIPE ID SIZES FOR A 7'-0" DIAMETER MANHOLE													
INTERSECTING PIPE ID SIZES (INCHES)	MINIMUM INTERSECTING ANGLE IN DEGREES FOR VARIOUS MAIN PIPE ID SIZES IN INCHES												
	8"	10"	12"	15"	18"	21"	24"	27"	30"	33"	36"	42"	48"
8	35	36	39	42	44	47	49	52	54	57	59	65	71
10		38	40	43	45	48	50	53	55	59	61	67	73
12			43	46	48	51	53	56	58	61	64	70	76
15				48	50	53	55	58	61	64	66	72	78
18					58	56	58	61	63	66	69	74	81
21						58	60	63	66	69	71	77	83
24							63	66	68	71	74	79	86
27								70	72	76	78	84	90
30									78	81	83	89	-
33										86	88	-	-
36											-	-	-
42												-	-
48													-

TABLE 5 MINIMUM ANGLE AND INTERSECTING PIPE ID SIZES FOR A 8'-0" DIAMETER MANHOLE															
INTERSECTING PIPE ID SIZES (INCHES)	MINIMUM INTERSECTING ANGLE IN DEGREES FOR VARIOUS MAIN PIPE ID SIZES IN INCHES														
	8"	10"	12"	15"	18"	21"	24"	27"	30"	33"	36"	42"	48"	54"	60"
8	30	32	34	36	38	41	43	45	47	50	52	56	61	67	74
10		33	35	38	40	42	44	46	48	51	53	58	63	68	77
12			38	40	42	44	46	49	51	53	55	60	65	71	79
15				42	44	47	48	51	53	56	58	62	67	73	81
18					46	49	51	53	55	58	66	64	70	75	83
21						51	53	55	57	60	62	67	72	77	85
24							55	57	59	62	64	69	74	79	89
27								61	63	66	68	73	78	83	-
30									67	70	72	77	82	87	-
33										74	76	81	86	-	-
36											81	86	-	-	-
42												-	-	-	-
48													-	-	-
54														-	-
60															-

NOTES TO SPECIFIER:

1. "-" INDICATES THAT A SPECIAL DESIGN OR THE NEXT LARGER MANHOLE SIZE SHALL BE USED.
2. TABLE 2 TO 5 ARE BASED ON A MIN SEPARATION DISTANCE "S" OF 15.5" OR INTERSECTION PIPE OD/2, WHICHEVER IS GREATER, BETWEEN MAIN AND INTERSECTING PIPES ALONG THE MANHOLE INSIDE WALL ARC.
3. PIPE WALL THICKNESS USED IN TABLES 2 TO 5 ARE BASED ON RCP. THE DESIGN ENGINEER MAY CALCULATE TO SEE IF THINNER WALL PIPES CAN MEET THE SEPARATION CRITERIA FOR ANGLES SMALLER THAN THE TABLES ALLOW.
4. LIMITATIONS TO BASE HEIGHT ARE BASED ON RESISTING BUOYANT UPLIFT FORCES BASED ON WATER AT GROUND SURFACE AND A SAFETY FACTOR OF 1.20.
5. A SPECIAL DESIGN IS REQUIRED IF MANHOLE ID IS GREATER THAN 8 FT.

* NOT APPLICABLE (INTERSECTING PIPE GREATER THAN MAIN PIPE).



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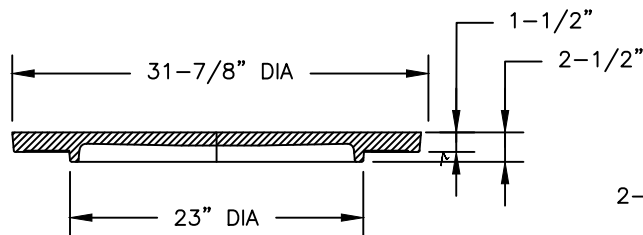
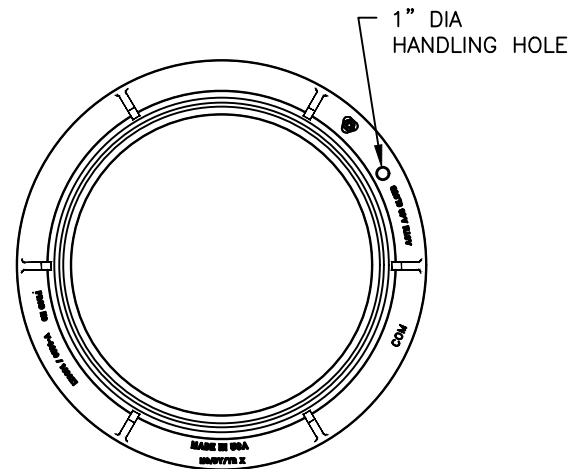
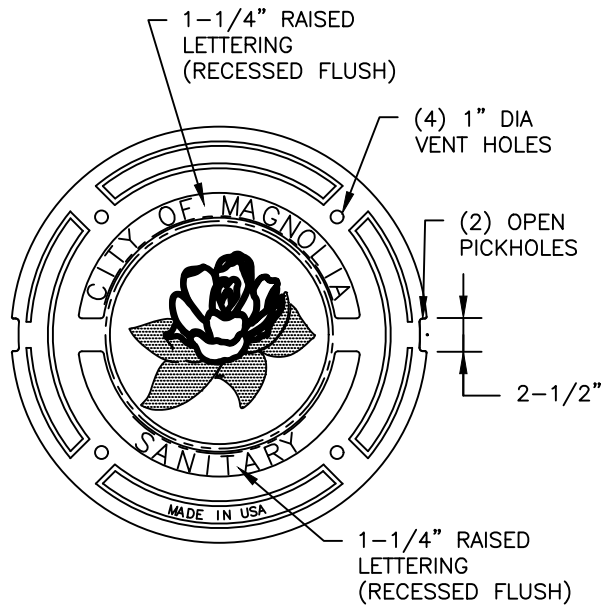
SANITARY SEWER 5'-0" TO 8'-0"
DIAMETER PRECAST
CONCRETE MANHOLE NOTES

CITY OF MAGNOLIA STANDARD DETAIL

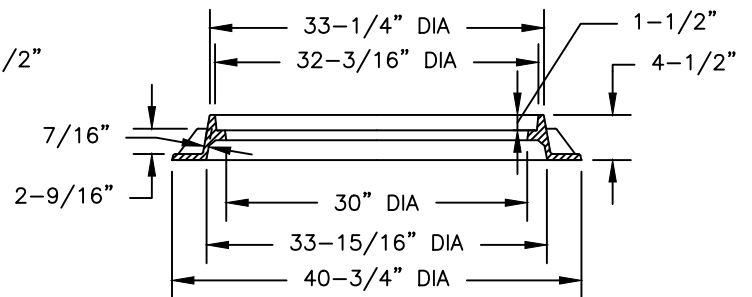
DETAIL NO.

SAN-004

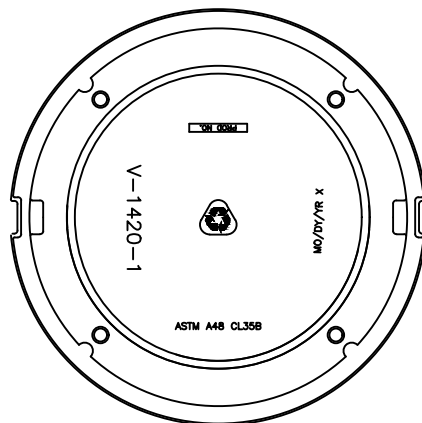
EFFECTIVE DATE: 8/3/2022



COVER SECTION



FRAME SECTION



BOTTOM VIEW

COVER

ALL PRODUCTS TO BE CERTIFIED AS MANUFACTURED/MADE IN THE USA.

NOTES:

1. APPROXIMATE WEIGHTS:
FRAME - 170 LBS (77kg)
COVER - 275 LBS (125kg)
UNIT - 445 LBS (202kg)
2. MATERIALS - GRAY CAST IRON ASTM A48 CL35B.
3. CASTING TO MEET PROOF LOAD SPECIFICATION.
4. EAST JORDAN IRON WORKS V-1420 ASY OR APPROVED EQUAL.
5. MACHINED SURFACE.



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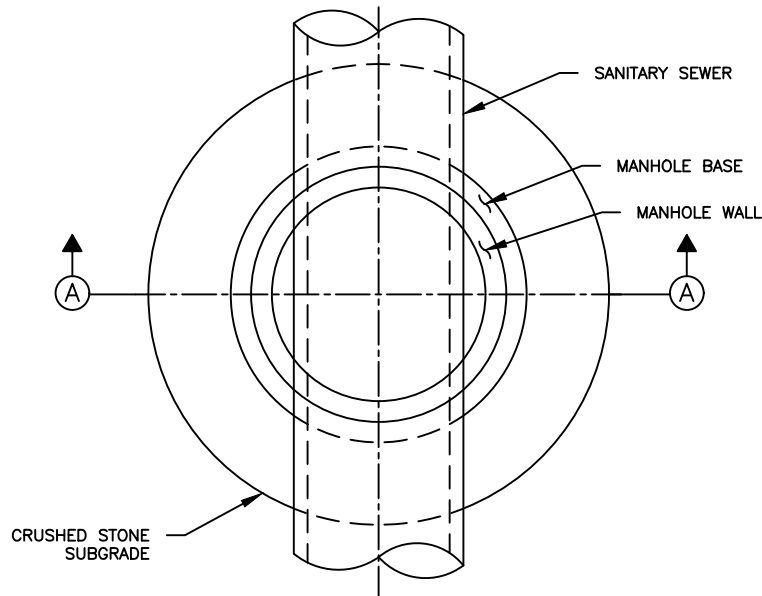
**32-INCH SANITARY SEWER
MANHOLE COVER AND
FRAME (TYP)**

CITY OF MAGNOLIA STANDARD DETAIL

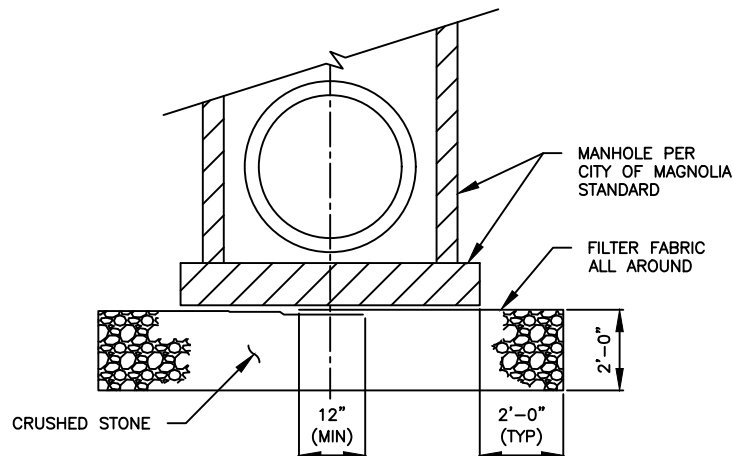
DETAIL NO.

SAN-005

EFFECTIVE DATE: 8/3/2022



PLAN



SECTION A

NOTES:

1. CRUSHED STONE SUPPORT UNDER A MANHOLE BASE SHALL BE INSTALLED AT LOCATIONS WHERE REQUIRED SUBGRADE COMPACTION OR DEWATERING CANNOT BE ACHIEVED.
2. WHERE HEAVING SUBGRADE CONDITIONS OCCUR, AS DETERMINED BY THE CITY ENGINEER, A PILE SUPPORTED MANHOLE SHALL BE PROVIDED.

NOTES TO SPECIFIER:

1. INCLUDE THIS DETAIL ONLY IF THE GEOTECHNICAL REPORT INDICATES THAT AN UNSTABLE FOUNDATION (ONE WHICH WILL NOT ALLOW COMPACTION OR DEWATERING AS SPECIFIED) IS POSSIBLE. IF THIS CONDITION IS REPORTED BY THE GEOTECHNICAL ENGINEER, NOTIFY THE CITY'S PROJECT MANAGER.
2. ALWAYS INCLUDE COMPANION STANDARD DETAIL FOR PILE SUPPORTED MANHOLE FOR UNSTABLE SUBGRADE WITH THIS DETAIL, IF GEOTECHNICAL REPORT INDICATES HEAVING SUBGRADE IS LIKELY.



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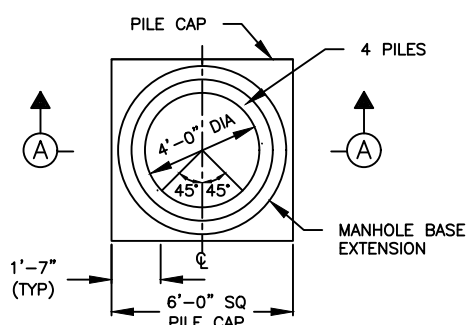
**SANITARY SEWER
CRUSHED STONE SUPPORTED
MANHOLE FOR WET STABLE TRENCH**

CITY OF MAGNOLIA STANDARD DETAIL

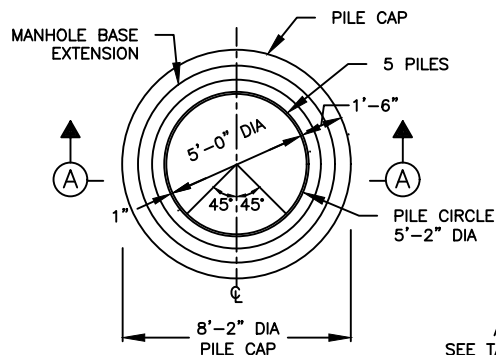
DETAIL NO.

SAN-006

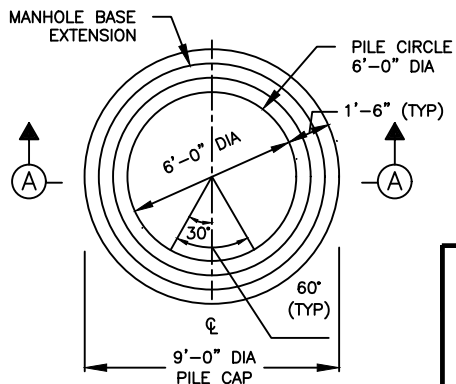
EFFECTIVE DATE: 8/3/2022



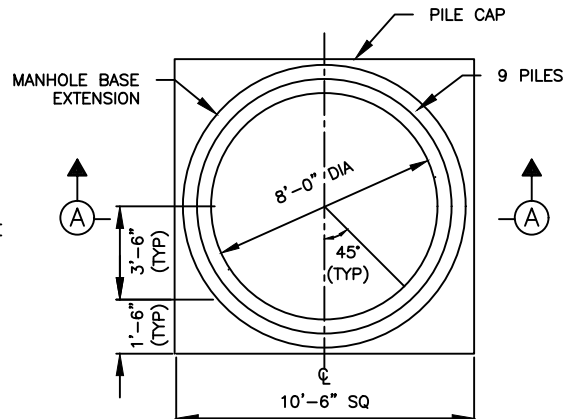
6 PILE PLAN
4'-0" ID MANHOLE



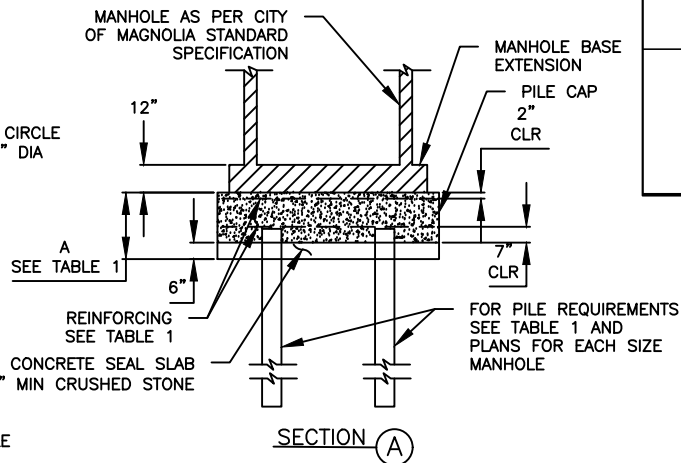
PLAN
5'-0" ID MANHOLE



6 PILE PLAN
6'-0" ID MANHOLE



9 PILE PLAN
8'-0" MANHOLE



NOTES:

1. PILING SUPPORT SHALL BE INSTALLED AT ALL LOCATIONS WHERE HEAVING SUBGRADE CONDITIONS ARE LIKELY TO OCCUR, AS DETERMINED BY THE CITY ENGINEER.
2. THE CITY ENGINEER WILL PROVIDE THE SIZE, LENGTH, AND MATERIAL OF PILE NEEDED TO CARRY THE CAPACITY SHOWN ON TABLE 1 BASED ON ACTUAL CONDITIONS REVEALED AT TIME OF CONSTRUCTION.

TABLE 1

PILE REQUIREMENTS

MANHOLE ID (FT)	NUMBER OF PILES	DEPTH TO INVERT (FT)	CAPACITY / PILE (TONS) MINIMUM	PILE CAP DIMEN A (FT)	PILE CAP REINF (EW, T&B)
4	4	10	9	1'-9"	# 6 @ 6"
		12	10		
		15	11		
		20	13		
		25	15		
		30	17		
5	5	10	10	1'-9"	# 6 @ 6"
		12	11		
		15	12		
		20	15		
		25	17		
		30	20		
6	6	10	9	2'-0"	# 6 @ 6"
		12	10		
		15	12		
		20	15		
		25	17		
		30	20		
8	9	10	8	2'-0"	# 7 @ 6"
		12	9		
		15	10		
		20	13		
		25	16		
		30	18		

NOTES TO THE SPECIFIER:

1. INCLUDE THIS DETAIL ONLY IF THE GEOTECHNICAL REPORT INDICATES THAT AN UNSTABLE FOUNDATION (ONE WHICH WILL NOT ALLOW COMPACTION AND/OR DEWATERING AS SPECIFIED) IS POSSIBLE. IF THIS CONDITION IS REPORTED BY THE GEOTECHNICAL ENGINEER, NOTIFY THE CITY'S PROJECT MANAGER.
2. ALWAYS INCLUDE COMPANION STANDARD DETAIL SHOWING CRUSHED STONE SUPPORTED MANHOLE FOR UNSTABLE SUBGRADE WITH THIS DETAIL.
3. WHERE SOIL BORINGS ARE MADE AT MANHOLE LOCATIONS AND THE GEOTECHNICAL ENGINEER BELIEVES THAT THE CONDITIONS REQUIRING THIS DETAIL ARE LIKELY TO EXIST, PROVIDE PILE DESIGN INFORMATION DETERMINED BY THE GEOTECHNICAL ENGINEER FOR EACH SUCH MANHOLE. ADJUST NOTE #2 TO INDICATE THAT THE PILE INFORMATION PROVIDED MAY NEED TO BE ADJUSTED OR THE PILES ELIMINATED AND THAT OTHER MANHOLE LOCATIONS NOT SHOWN AS PILE SUPPORTED MAY NEED PILES DEPENDING ON ACTUAL CONDITIONS.
4. PROVIDE APPROPRIATE PILE SPECIFICATIONS.



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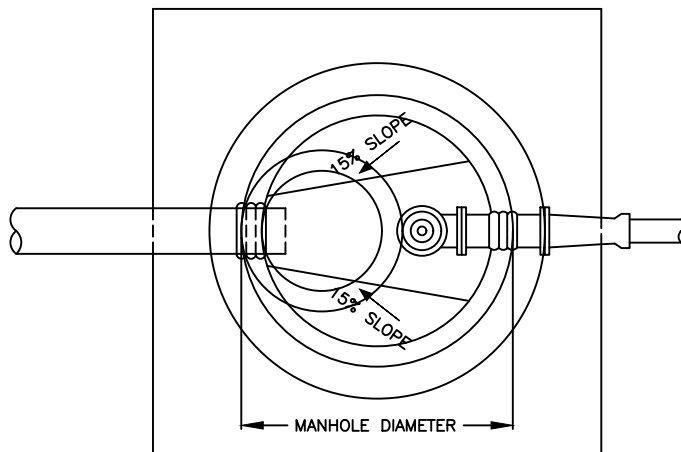
**SANITARY SEWER
PILE SUPPORTED MANHOLE FOR
UNSTABLE SUBGRADE**

CITY OF MAGNOLIA STANDARD DETAIL

DETAIL NO.

SAN-007

EFFECTIVE DATE: 8/3/2022



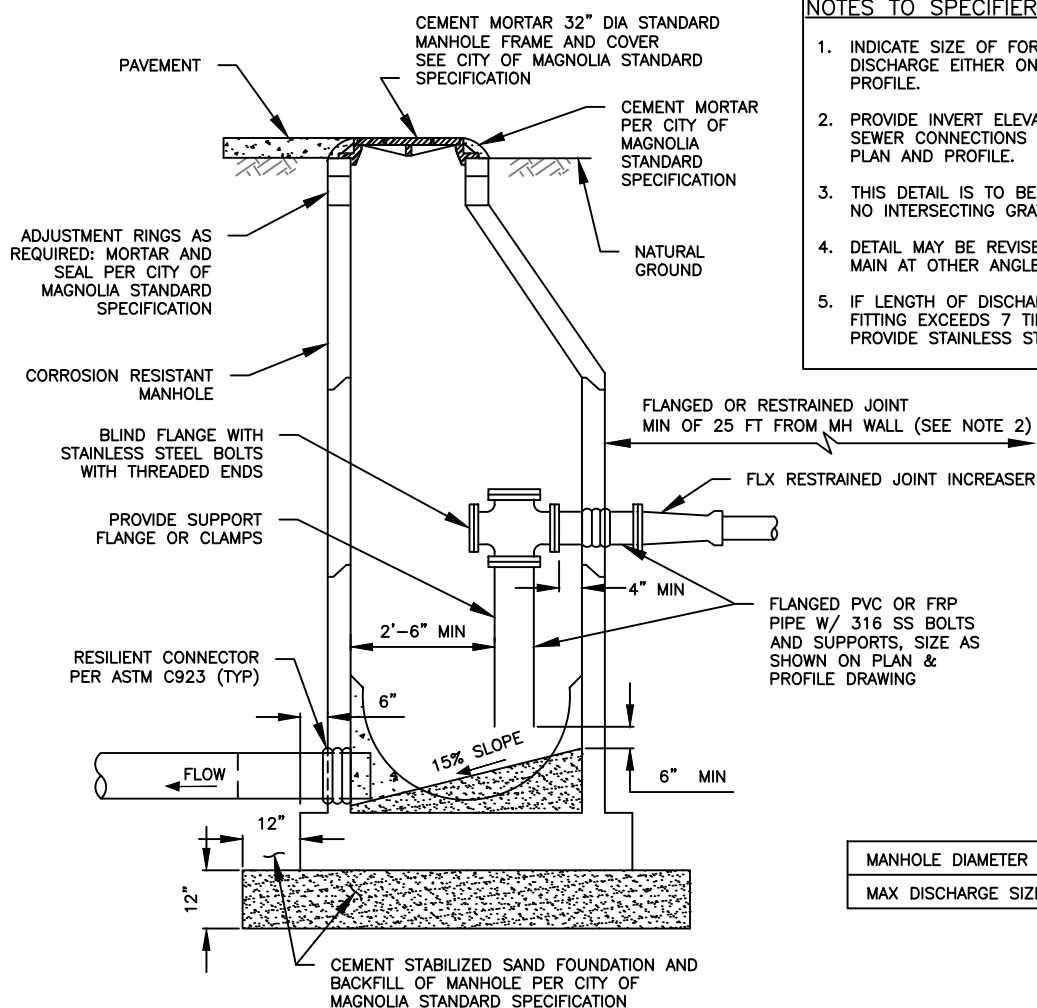
PLAN VIEW

NOTES:

1. SEAT MANHOLE FRAME IN SEALANT PER CITY OF MAGNOLIA STANDARD SPECIFICATION.
2. IF FORCE MAIN HAS BENDS WITHIN 25 FT OF MANHOLE, EXTEND RESTRAINED JOINTS TO 25 FT MINIMUM UPSTREAM OF BEND.
3. OMIT CEMENT MORTAR WHEN MANHOLE IS LOCATED IN PAVED AREA.
4. MINIMUM REINFORCING IN BASE SHALL BE #5 @ 8 EW.
5. PRECAST RINGS SHALL BE PROVIDED FOR A COMBINED ADJUSTMENT HEIGHT OF AT LEAST 12". THE TOTAL HEIGHT OF THE ADJUSTMENT RINGS SHALL NOT EXCEED 1'-6".
6. DISCHARGE ELBOW FLOWLINE SHALL NOT BE CONSTRUCTED BELOW DOWNSTREAM GRAVITY FLOWLINE.
7. APPLY PROTECTIVE COATING CAPABLE OF WITHSTANDING CORROSION, CONSTANT INTERMITTENT EXPOSURE TO RAW WASTEWATER, PERMEATION FROM HYDROGEN SULFIDE AND OTHER SEWER GASES, AND ATTACK FROM ORGANIC ACIDS GENERATED BY MICROBIAL SOURCES, WITH NO ADVERSE EFFECTS.

NOTES TO SPECIFIER:

1. INDICATE SIZE OF FORCE MAIN, INCREASER AND DISCHARGE EITHER ON THIS DETAIL OR ON PLAN AND PROFILE.
2. PROVIDE INVERT ELEVATIONS OR FORCE MAIN AND SEWER CONNECTIONS TO MANHOLE, ON THIS DETAIL OR PLAN AND PROFILE.
3. THIS DETAIL IS TO BE USED ONLY WHEN THERE ARE NO INTERSECTING GRAVITY SEWERS.
4. DETAIL MAY BE REVISED TO ORIENT INCOMING FORCE MAIN AT OTHER ANGLES RELATIVE TO GRAVITY SEWER.
5. IF LENGTH OF DISCHARGE DROP BELOW FLANGED TEE FITTING EXCEEDS 7 TIMES DISCHARGE DIAMETER, PROVIDE STAINLESS STEEL OR FRP PIPE SUPPORT.



ELEVATION VIEW

MANHOLE DIAMETER	4'-0"	5'-0"	6'-0"
MAX DISCHARGE SIZE	6"	14"	24"



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**SANITARY SEWER
CORROSION RESISTANT MANHOLE
FOR FORCE MAIN DISCHARGE**

CITY OF MAGNOLIA STANDARD DETAIL

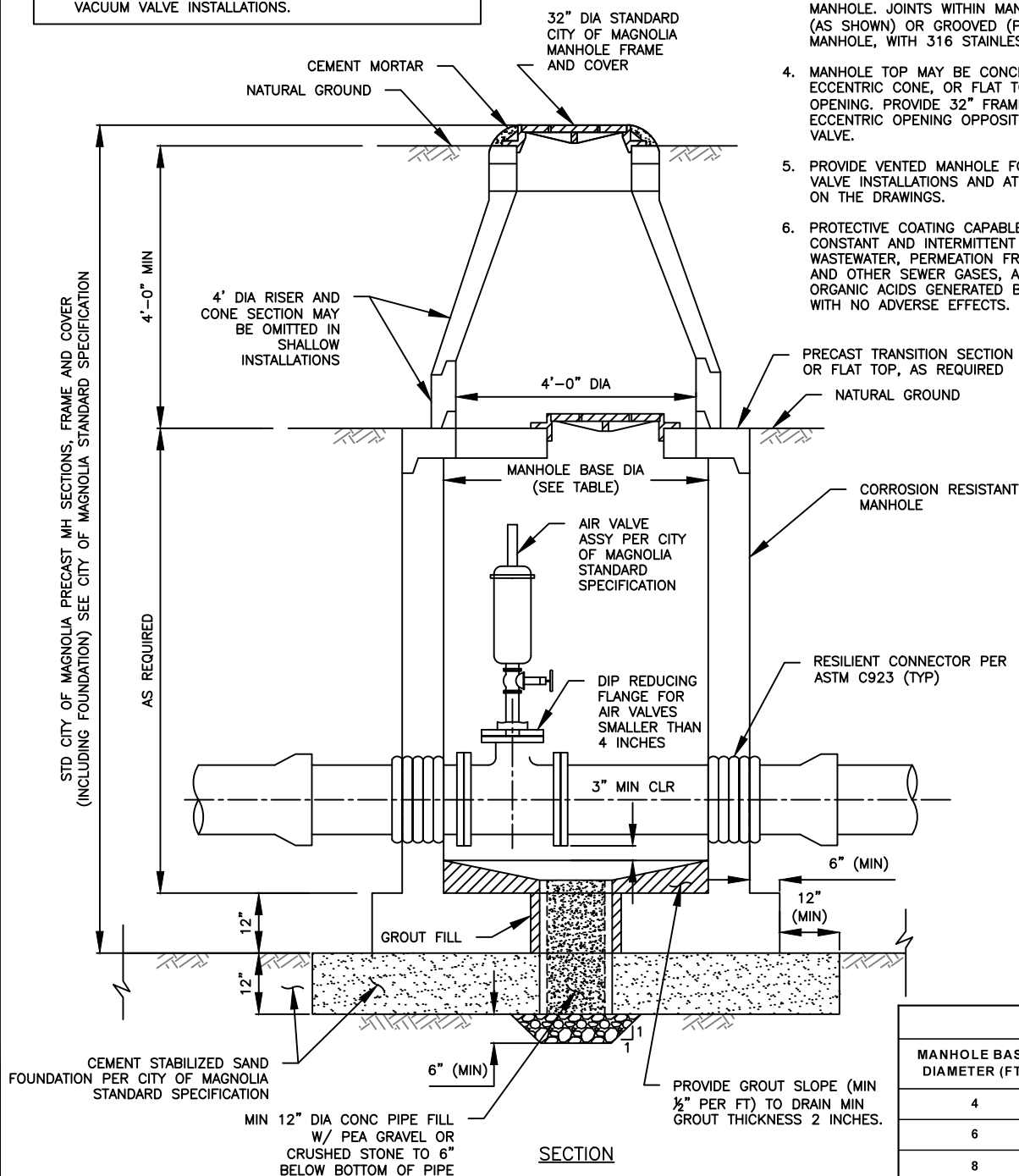
DETAIL NO.

SAN-008

EFFECTIVE DATE: 8/3/2022

1. CHECK THAT FORCE MAIN BURIAL DEPTH AT AIR VALVE MANHOLE WILL PROVIDE 1'-0" CLEAR SPACE OVER VALVE INSIDE MANHOLE.
2. SHOW STATION LOCATION OR MANHOLE, TOP ELEVATION, AND VALVE SIZE ON PLAN AND PROFILE.
3. INCLUDE ALSO VENTED MANHOLE DETAIL FOR AIR AND VACUUM VALVE INSTALLATIONS.

1. AIR VALVE MAY BE AIR RELEASE OR AIR AND VACUUM RELEASE VALVE AS NOTED ON PLAN AND PROFILE SHEET.
2. SEE CITY OF MAGNOLIA STANDARD SPECIFICATION FOR AIR VALVE ASSEMBLY REQUIREMENTS.
3. PROVIDE LINED DUCTILE IRON PIPE, THICK CLASS 53, FOR FORCE MAIN WITHIN 12" OF OUTSIDE FACE OF MANHOLE. JOINTS WITHIN MANHOLE MAY BE FLANGED (AS SHOWN) OR GROOVED (PER ASTM 606) WITHIN MANHOLE, WITH 316 STAINLESS STEEL BOLTS.
4. MANHOLE TOP MAY BE CONCENTRIC CONE, ECCENTRIC CONE, OR FLAT TOP WITH ECCENTRIC OPENING. PROVIDE 32" FRAME & COVER. ORIENT ECCENTRIC OPENING OPPOSITE SIDE FROM AIR VALVE.
5. PROVIDE VENTED MANHOLE FOR AIR AND VACUUM VALVE INSTALLATIONS AND AT LOCATIONS INDICATED ON THE DRAWINGS.
6. PROTECTIVE COATING CAPABLE OF WITHSTANDING CONSTANT AND INTERMITTENT EXPOSURE TO RAW WASTEWATER, PERMEATION FROM HYDROGEN SULFIDE AND OTHER SEWER GASES, AND ATTACK FROM ORGANIC ACIDS GENERATED BY MICROBIAL SOURCES, WITH NO ADVERSE EFFECTS.



SECTION

TABLE	
MANHOLE BASE DIAMETER (FT)	MAX FORCE MAIN DIAMETER (IN)
4	8
6	16
8	36



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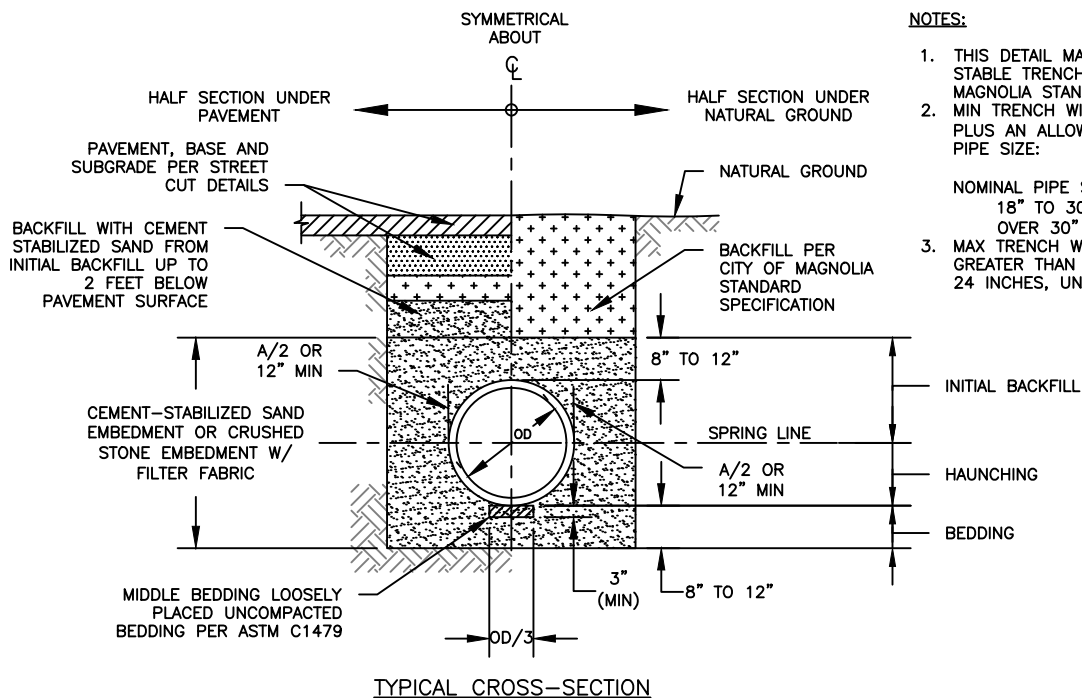
**SANITARY SEWER
AIR RELEASE OR AIR/VACUUM
RELEASE VALVE MANHOLE**

CITY OF MAGNOLIA STANDARD DETAIL

DETAIL NO.

SAN-009

EFFECTIVE DATE: 8/3/2022

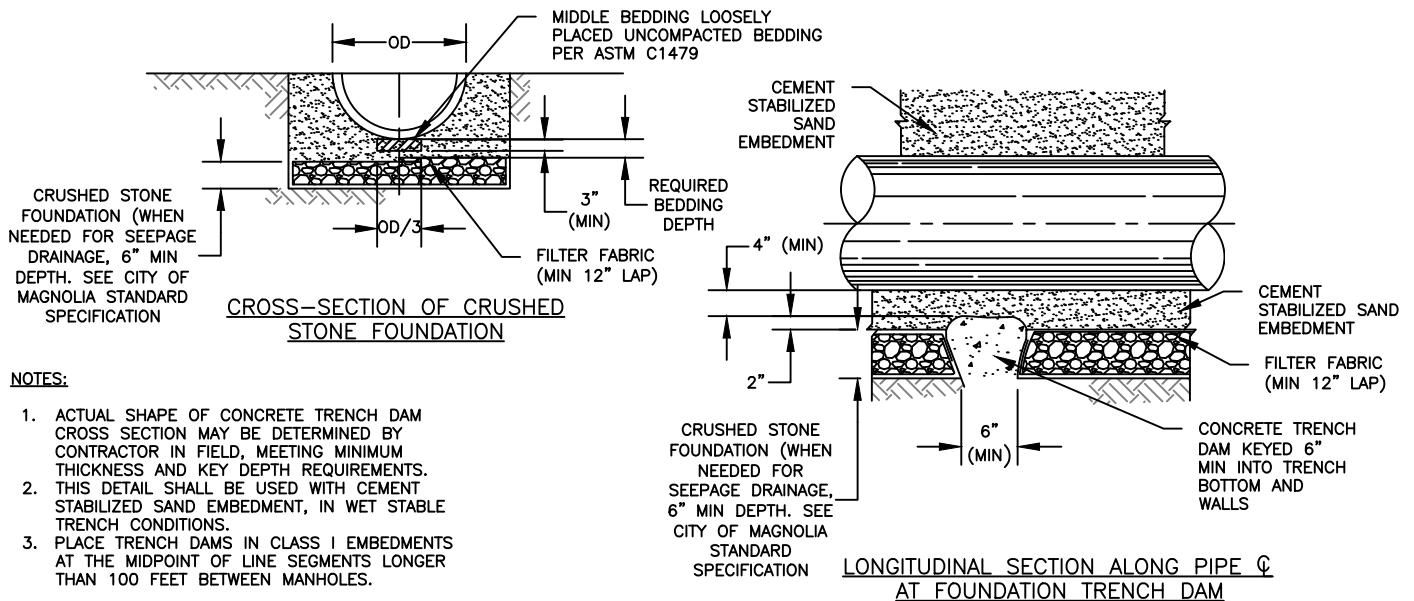


NOTES:

- THIS DETAIL MAY BE USED ONLY FOR DRY STABLE TRENCH CONDITIONS PER CITY OF MAGNOLIA STANDARD.
- MIN TRENCH WIDTH SHALL BE PIPE OD PLUS AN ALLOWANCE "A" FOR THE NOMINAL PIPE SIZE:

NOMINAL PIPE SIZE	"A"
18" TO 30"	24"
OVER 30"	36"
- MAX TRENCH WIDTH SHALL BE NOT GREATER THAN MIN TRENCH WIDTH PLUS 24 INCHES, UNLESS OTHERWISE NOTED.

SANITARY SEWER BEDDING AND BACKFILL FOR DRY STABLE TRENCH NTS



NOTES:

- ACTUAL SHAPE OF CONCRETE TRENCH DAM CROSS SECTION MAY BE DETERMINED BY CONTRACTOR IN FIELD, MEETING MINIMUM THICKNESS AND KEY DEPTH REQUIREMENTS.
- THIS DETAIL SHALL BE USED WITH CEMENT STABILIZED SAND EMBEDMENT, IN WET STABLE TRENCH CONDITIONS.
- PLACE TRENCH DAMS IN CLASS I EMBEDMENTS AT THE MIDPOINT OF LINE SEGMENTS LONGER THAN 100 FEET BETWEEN MANHOLES.

LONGITUDINAL SECTION ALONG PIPE CL AT FOUNDATION TRENCH DAM NTS



CITY OF MAGNOLIA
18111 BUDDY RILEY BOULEVARD
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SANITARY SEWER CRUSHED STONE BEDDING AND BACKFILL FOR WET AND DRY STABLE TRENCH

CITY OF MAGNOLIA STANDARD DETAIL

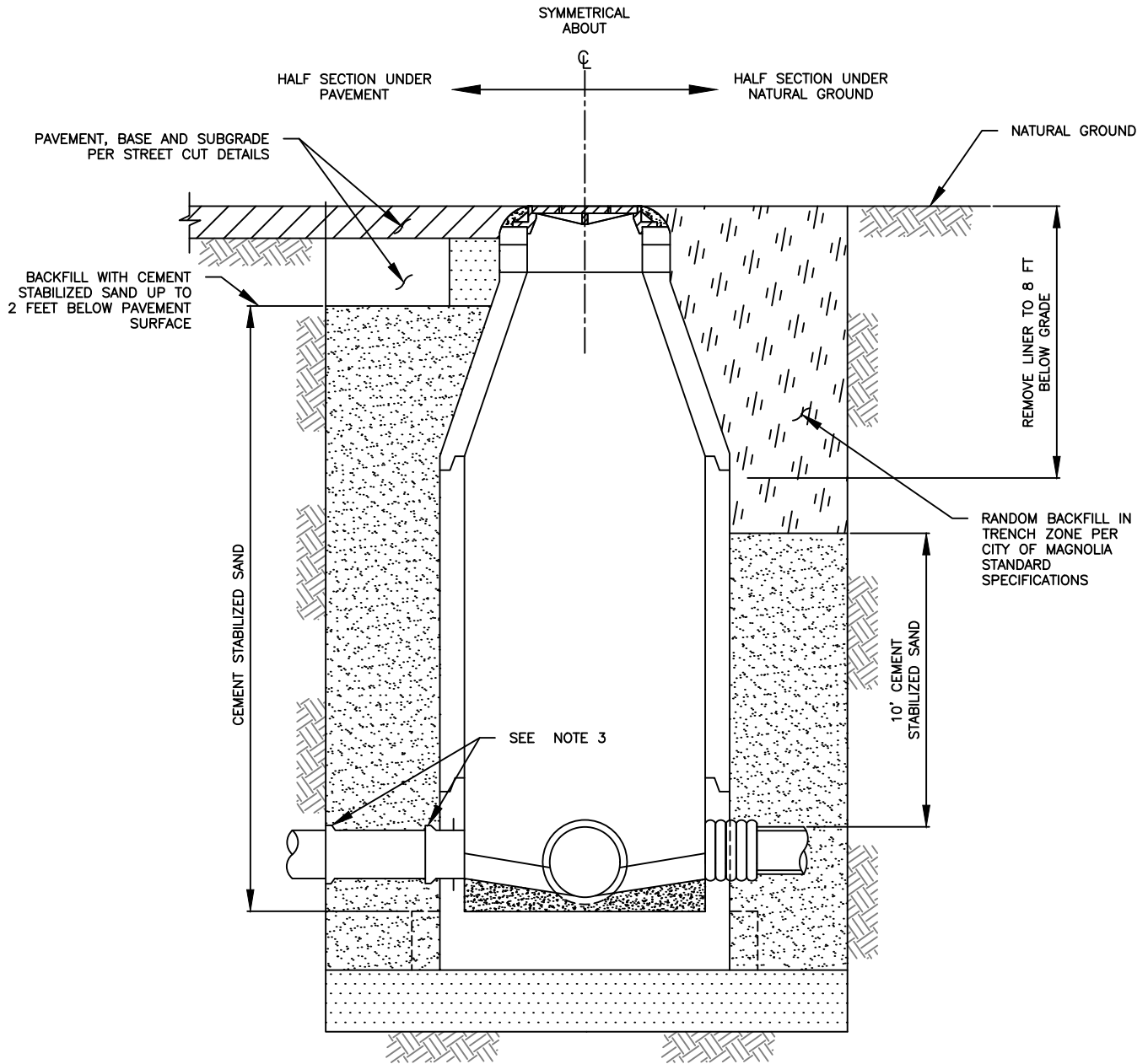
DETAIL NO.

SAN-010

EFFECTIVE DATE: 8/3/2022

NOTES:

1. GROUTING OF MANHOLE STRUCTURE ANNULAR SPACE WILL BE PERMITTED IN CASES WHERE INSUFFICIENT WORK SPACE EXISTS FOR PLACEMENT AND COMPACTION OF CEMENT STABILIZED SAND, PER CITY OF MAGNOLIA STANDARD SPECIFICATION 02730.
2. THIS DETAIL ALSO APPLIES TO BACKFILL OF SHAFTS WITHOUT STRUCTURES.
3. ARRANGE PIPE JOINTS AS SHOWN WHEN USING RIGID CONNECTION TO CAST IN PLACE MANHOLE BASE.
4. INSTALL TRACER WIRE ADJACENT TO MANHOLE. SEE TRACER WIRE STANDARD DETAIL.



TYPICAL CROSS-SECTION



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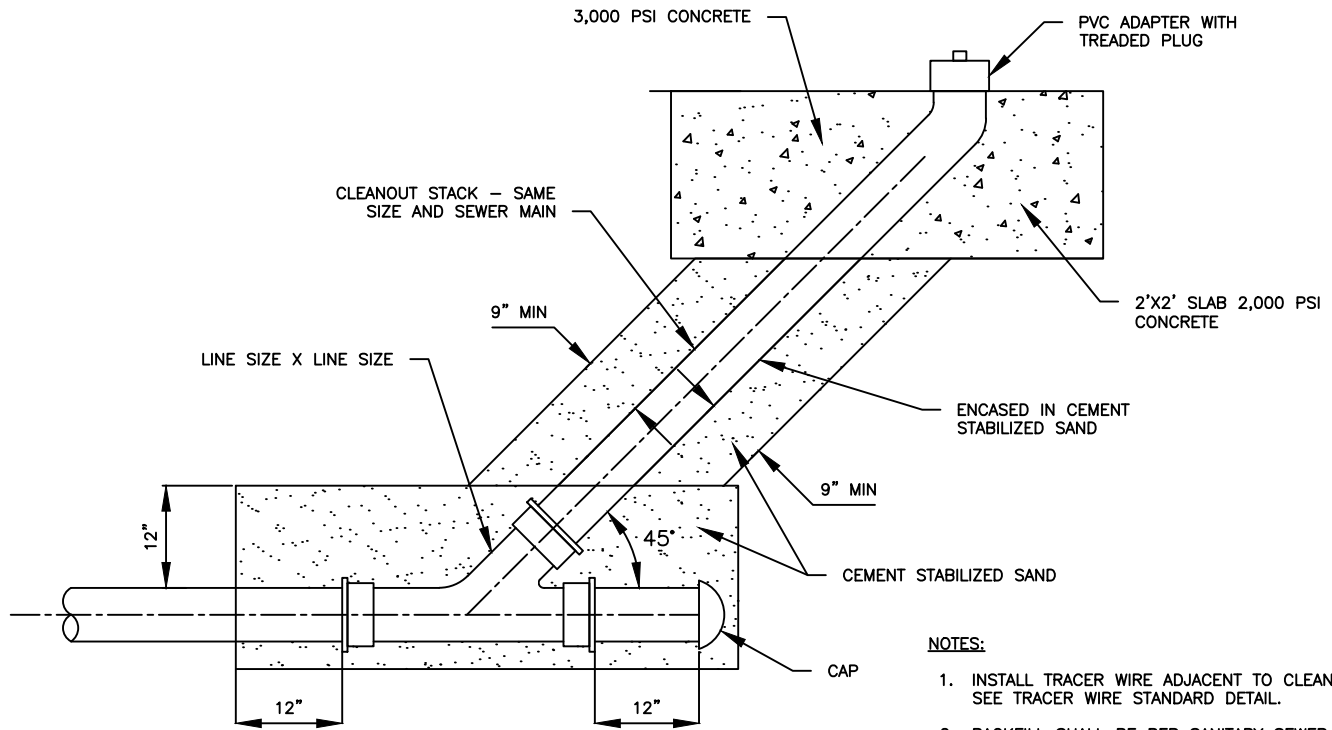
**SANITARY SEWER
BACKFILL OF SHAFTS**

CITY OF MAGNOLIA STANDARD DETAIL

DETAIL NO.

SAN-011

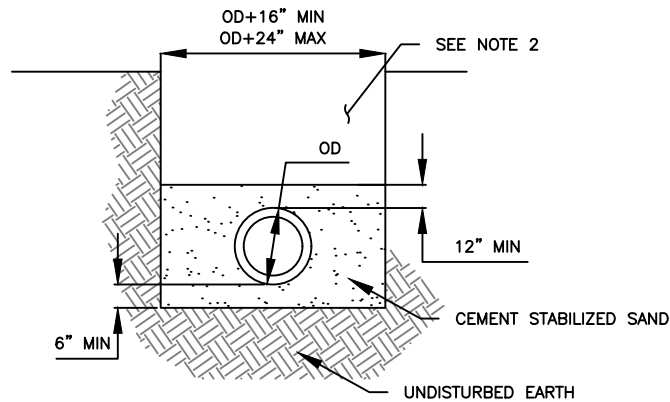
EFFECTIVE DATE: 8/3/2022



NOTES:

1. INSTALL TRACER WIRE ADJACENT TO CLEANOUT, SEE TRACER WIRE STANDARD DETAIL.
2. BACKFILL SHALL BE PER SANITARY SEWER BACKFILL DETAIL.

STANDARD CLEANOUT
NTS



EMBEDMENT CROSS SECTION
FOR PVC PIPE
NTS



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MAGNOLIA, TEXAS 77354

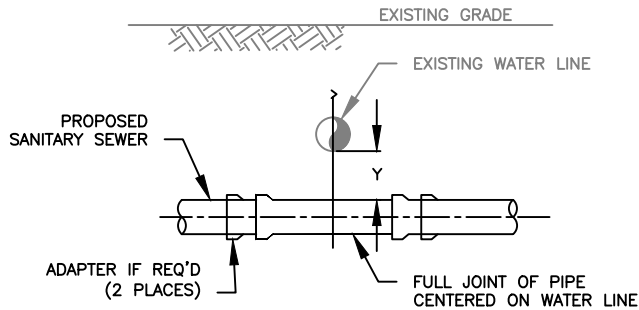
STANDARD CLEANOUT AND
EMBEDMENT CROSS SECTION
FOR PVC PIPE

CITY OF MAGNOLIA STANDARD DETAIL

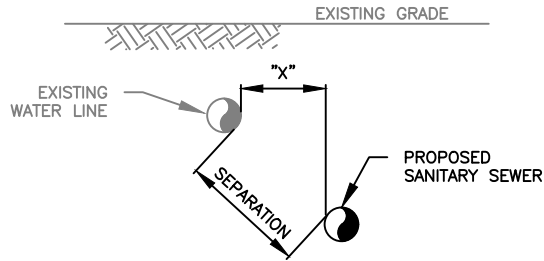
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SAN-012

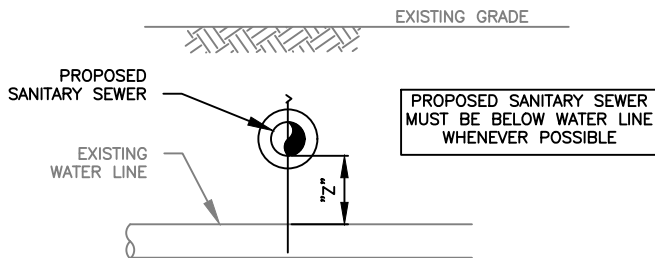
EFFECTIVE DATE: 8/3/2022



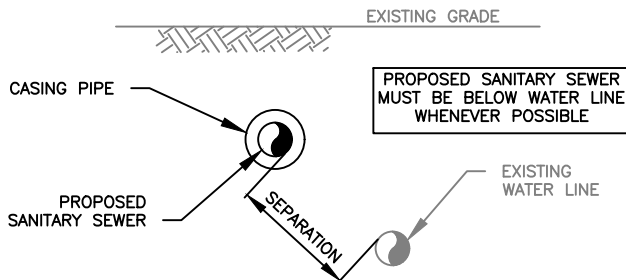
**PROPOSED SANITARY SEWER
CROSSING EXISTING WATER LINE**
(WHEN PROPOSED SANITARY SEWER IS BELOW EXISTING WATER LINE)



**PROPOSED SANITARY SEWER
PARALLEL TO EXISTING WATER LINE**
(WHEN PROPOSED SANITARY SEWER IS BELOW EXISTING WATER LINE)



**PROPOSED SANITARY SEWER
CROSSING EXISTING WATER LINE**
(WHEN PROPOSED SANITARY SEWER IS ABOVE EXISTING WATER LINE)



**PROPOSED SANITARY SEWER
PARALLEL TO EXISTING WATER LINE**
(WHEN PROPOSED SANITARY SEWER IS ABOVE EXISTING WATER LINE)

NOTES:

1. EACH PORTION OF THE SANITARY SEWER PIPE WITHIN NINE FEET OF THE WATER LINE MUST BE ENCASED IN A CASING PIPE.
2. THE CASING PIPE MUST BE CONSTRUCTED OF AT LEAST 150 PSI PRESSURE CLASS AND IS SEALED AT BOTH ENDS WITH MANUFACTURED WATERTIGHT SEAL.
3. THE CASING PIPE SHALL BE AT LEAST TWO NOMINAL SIZES LARGER THAN THE SANITARY SEWER PIPE. THE CARRIER PIPE SHALL BE SUPPORTED BY SPACERS AT A MAXIMUM OF FIVE-FOOT INTERVALS.
4. AS AN ALTERNATE TO ENCASED SANITARY SEWER PIPE, A SANITARY SEWER PIPE THAT MEETS THE FOLLOWING SPECIFICATION CAN BE CONSTRUCTED WITHOUT CASING: SANITARY SEWER PIPE CONSTRUCTED OF AT LEAST 150 PSI PRESSURE CLASS, CORROSION-RESISTANT, NON-BRITTLE PIPE AND USES MANUFACTURER-APPROVED ADAPTERS, GASKETED JOINTS, COMPRESSION JOINTS, AND OTHER NON-BONDED JOINTS MUST BE DESIGNED TO SEAL AT ATMOSPHERIC PRESSURE.
5. SANITARY SEWER PIPE CONSTRUCTED WITHOUT CASING SHALL BE LOCATED AT LEAST SIX VERTICAL INCHES BETWEEN THE OUTSIDES OF THE SANITARY SEWER PIPE AND THE WATER LINE, CENTERED ON THE CROSSING, AND BE AT LEAST 18 FEET LONG.
6. A SANITARY SEWER PIPE CONSTRUCTED OF ANY MATERIAL, OR PIPE WITH A PRESSURE CLASS OF LESS THAN 150 PSI, SHALL HAVE AT LEAST TWO FEET OF SEPARATION BETWEEN THE OUTSIDES OF THE PIPES AND BE ENCASED IN CEMENT-STABILIZED SAND BACKFILL. CEMENT STABILIZED SAND SHALL INCLUDE AT LEAST 160 POUNDS OF CEMENT FOR EVERY CUBIC YARD OF SAND. CEMENT STABILIZED SAND SHALL BE PLACED AT LEAST BEGINNING ONE-QUARTER PIPE DIAMETER BELOW THE PIPE TO ONE FULL PIPE DIAMETER ABOVE THE TOP OF THE SANITARY SEWER PIPE, OR 12 INCHES ABOVE THE TOP OF THE SANITARY SEWER PIPE, WHICHEVER IS GREATER.

NOTES:

1. EACH PORTION OF THE SANITARY SEWER PIPE WITHIN NINE FEET OF THE WATER LINE MUST BE ENCASED IN A CASING PIPE.
2. THE CASING PIPE MUST BE CONSTRUCTED OF AT LEAST 150 PSI PRESSURE CLASS AND IS SEALED AT BOTH ENDS WITH MANUFACTURED WATERTIGHT SEAL.
3. THE CASING PIPE SHALL BE AT LEAST TWO NOMINAL SIZES LARGER THAN THE SANITARY SEWER PIPE. THE CARRIER PIPE SHALL BE SUPPORTED BY SPACERS AT A MAXIMUM OF FIVE-FOOT INTERVALS.
4. AS AN ALTERNATE TO ENCASED SANITARY SEWER PIPE, A SANITARY SEWER PIPE THAT MEETS THE FOLLOWING SPECIFICATIONS CAN BE CONSTRUCTED WITHOUT CASING: SANITARY SEWER PIPE CONSTRUCTED OF AT LEAST 150 PSI PRESSURE CLASS, CORROSION-RESISTANT, NON-BRITTLE PIPE AND USES MANUFACTURER-APPROVED ADAPTERS. GASKETED JOINTS, COMPRESSION JOINTS, AND OTHER NON-BONDED JOINTS MUST BE DESIGNED TO SEAL AT ATMOSPHERIC PRESSURE.
5. SANITARY SEWER PIPE CONSTRUCTED WITHOUT CASING SHALL BE LOCATED AT LEAST TWO VERTICAL FEET BELOW AND FOUR HORIZONTAL FEET AWAY FROM THE WATER LINE.

NOTES:

1. EACH PORTION OF THE SANITARY SEWER PIPE WITHIN NINE FEET OF THE WATER LINE MUST BE ENCASED IN A CASING PIPE.
2. THE CASING PIPE MUST BE CONSTRUCTED OF AT LEAST 150 PSI PRESSURE CLASS AND IS SEALED AT BOTH ENDS WITH MANUFACTURED WATERTIGHT SEAL.
3. THE CASING PIPE SHALL BE AT LEAST TWO NOMINAL SIZES LARGER THAN THE SANITARY SEWER PIPE. THE CARRIER PIPE SHALL BE SUPPORTED BY SPACERS AT A MAXIMUM OF FIVE-FOOT INTERVALS.
4. AS AN ALTERNATE TO ENCASED SANITARY SEWER PIPE, A SANITARY SEWER PIPE THAT MEETS THE FOLLOWING SPECIFICATIONS CAN BE CONSTRUCTED WITHOUT CASING: SANITARY SEWER PIPE CONSTRUCTED OF AT LEAST 150 PSI PRESSURE CLASS, CORROSION-RESISTANT, NON-BRITTLE PIPE AND USES MANUFACTURER-APPROVED ADAPTERS. GASKETED JOINTS, COMPRESSION JOINTS, AND OTHER NON-BONDED JOINTS MUST BE DESIGNED TO SEAL AT ATMOSPHERIC PRESSURE.
5. SANITARY SEWER PIPE CONSTRUCTED WITHOUT CASING SHALL BE LOCATED AT LEAST TWO VERTICAL FEET BETWEEN THE OUTSIDES OF THE SANITARY SEWER PIPE AND THE WATER LINE, CENTERED ON THE CROSSING, AND BE AT LEAST 18 FEET LONG.

NOTES:

1. EACH PORTION OF THE SANITARY SEWER PIPE WITHIN NINE FEET OF THE WATER LINE MUST BE ENCASED IN A CASING PIPE.
2. THE CASING PIPE MUST BE CONSTRUCTED OF AT LEAST 150 PSI PRESSURE CLASS AND IS SEALED AT BOTH ENDS WITH CEMENT GROUT OR A MANUFACTURED SEAL.
3. THE CASING PIPE SHALL BE AT LEAST TWO NOMINAL SIZES LARGER THAN THE SANITARY SEWER PIPE. THE CARRIER PIPE SHALL BE SUPPORTED BY SPACERS AT A MAXIMUM OF FIVE-FOOT INTERVALS.



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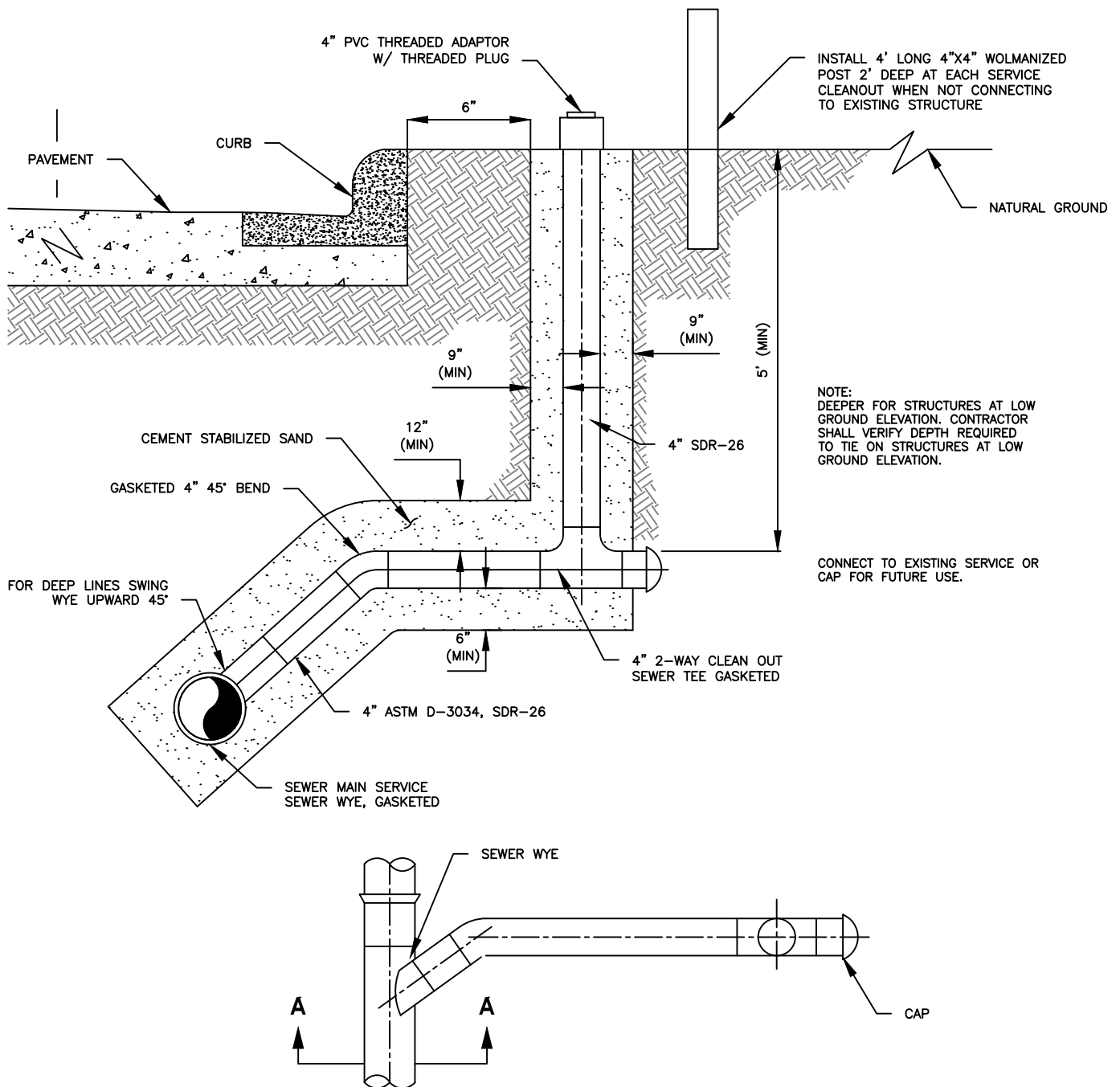
**SANITARY SEWER AND WATER LINE
CROSSING SPECIFICATIONS**

CITY OF MAGNOLIA STANDARD DETAIL

DETAIL NO.

SAN-013

EFFECTIVE DATE: 8/3/2022



NOTES:

1. ALL SERVICE LINES SHALL BE 4" SDR-26 PVC PIPE.
2. SERVICE TAPS ON VITRIFIED CLAY PIPE SHALL BE MADE WITH A 4" 'Y' TAP SADDLE DICKEY MODEL No YT0400003 OR EQUAL. A 4" ETCO ADAPTER DICKEY MODEL No 442 ZE 042000 OR APPROVED EQUAL SHALL BE USED TO ADAPT FROM THE ABOVE TAP SADDLE TO 4" SDR-26 PVC PIPE.
3. SERVICE TAPS ON DUCTILE IRON PIPE SHALL BE MADE WITH A 4" PVC SADDLE AS MANUFACTURED BY GPK PRODUCTS OF FARGO, ND OR EQUAL.
4. SERVICE CONNECTIONS FOR PVC PIPE SHALL BE MADE WITH SERVICE WYES OF THE SAME ASTM DESIGNATION AS THE MAIN LINE.
5. BID ITEMS FOR SERVICE WYES SHALL INCLUDE WYES FOR 6" THROUGH 15" PIPE AND SADDLES FOR 18" AND LARGER DIAMETER PIPES.
6. ALL SERVICE WYES AND PVC SERVICE LINES SHALL BE ENCASED IN SAND OR GRAVEL WITH FINES.



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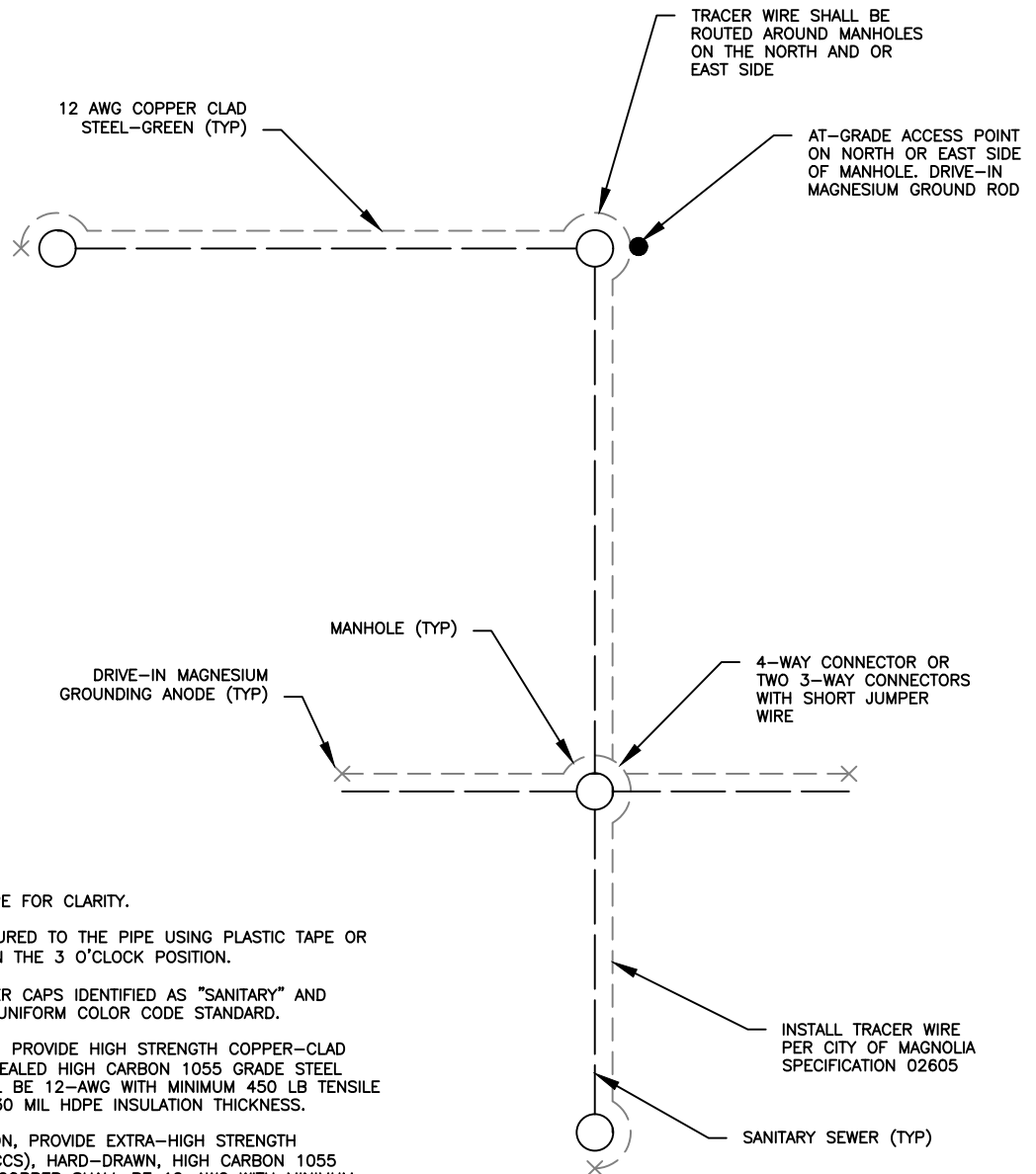
**SANITARY SEWER
SERVICE CONNECTION (TYP)**

CITY OF MAGNOLIA STANDARD DETAIL

DETAIL NO.

SAN-014

EFFECTIVE DATE: 8/3/2022



NOTES:

1. WIRE SHOWN AWAY FROM PIPE FOR CLARITY.
2. TRACER WIRE SHALL BE SECURED TO THE PIPE USING PLASTIC TAPE OR TIES AT 5 FEET INTERVALS IN THE 3 O'CLOCK POSITION.
3. PROVIDE ACCESS POINT COVER CAPS IDENTIFIED AS "SANITARY" AND COLOR CODE AS PER APWA UNIFORM COLOR CODE STANDARD.
4. FOR OPEN CUT INSTALLATION, PROVIDE HIGH STRENGTH COPPER-CLAD STEEL (HS-CCS), FULLY ANNEALED HIGH CARBON 1055 GRADE STEEL TRACER WIRE. COPPER SHALL BE 12-AWG WITH MINIMUM 450 LB TENSILE BREAK LOAD, AND MINIMUM 30 MIL HDPE INSULATION THICKNESS.
5. FOR TRENCHLESS INSTALLATION, PROVIDE EXTRA-HIGH STRENGTH COPPER-CLAD STEEL (EHS-CCS), HARD-DRAWN, HIGH CARBON 1055 GRADE STEEL TRACER WIRE. COPPER SHALL BE 12-AWG WITH MINIMUM 1,150 TENSILE BREAK LOAD, AND MINIMUM 45 MIL HDPE INSULATION THICKNESS.
6. THERMOPLASTIC WIRE, NYLON JACKETS OR COATINGS SHALL NOT BE USED.
7. TRACE WIRE SHALL BE GROUNDED USING A 15-LB, DRIVE-IN MAGNESIUM GROUND ROD WITH MINIMUM 20-Feet RED #12 AWG COPPER-CLAD STEEL (CCS) WIRE WITH 30 MIL HDPE INSULATED JACKET CONNECTED TO THE ANODE SPECIFICALLY MANUFACTURED FOR GROUNDING PURPOSE AND BURIED AT THE SAME ELEVATION AS THE UTILITY. BRASS, STEEL, OR COPPER GROUND RODS SHALL NOT BE USED.



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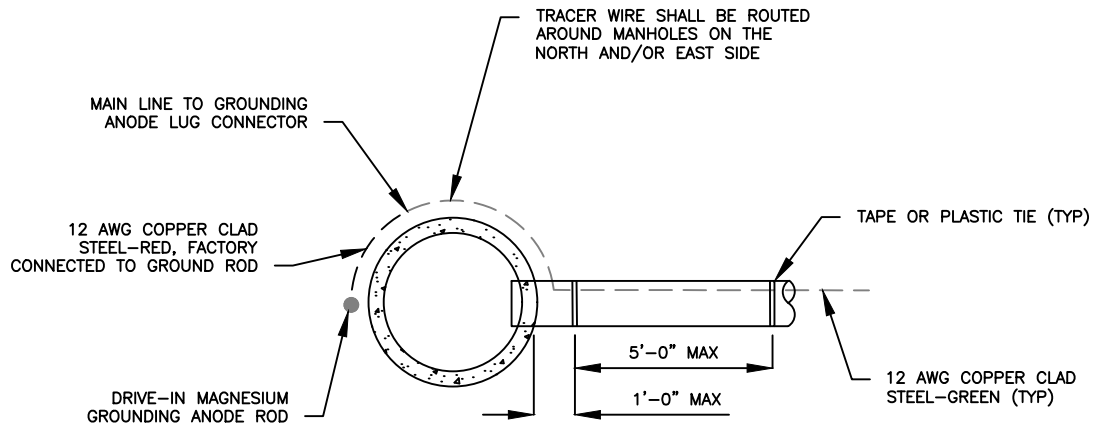
**SANITARY SEWER
TRACE WIRE DETAIL**

CITY OF MAGNOLIA STANDARD DETAIL

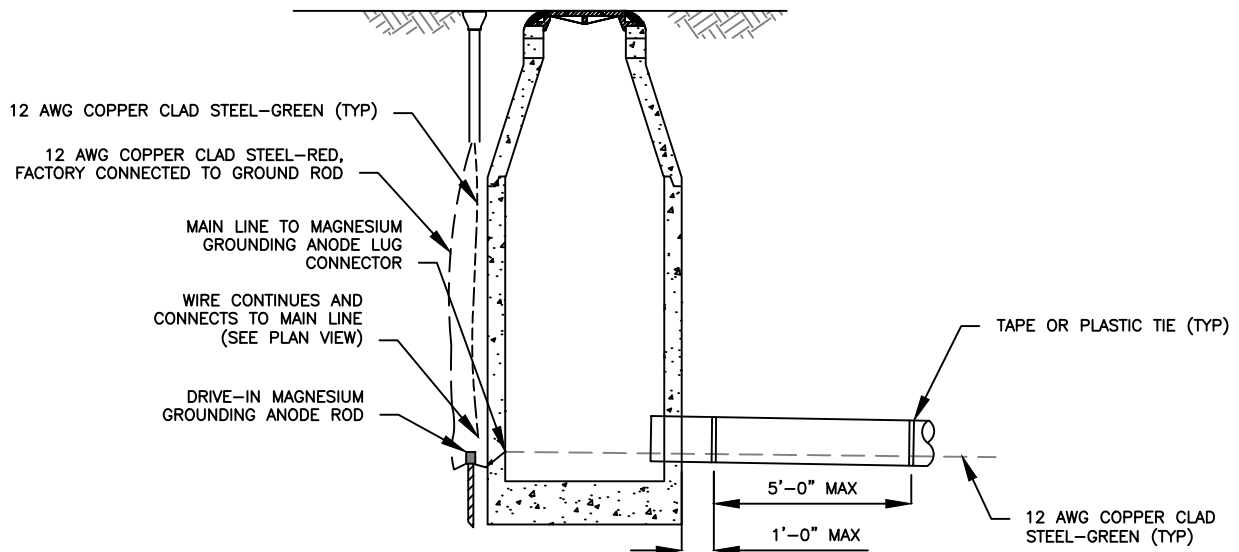
DETAIL NO.

SAN-015

EFFECTIVE DATE: 8/3/2022



SANITARY SEWER MANHOLE PLAN VIEW
NTS



SANITARY SEWER MANHOLE SECTION VIEW
NTS



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SANITARY SEWER MANHOLE TRACE WIRE DETAIL

CITY OF MAGNOLIA STANDARD DETAIL

DETAIL NO.

SAN-016

EFFECTIVE DATE: 8/3/2022