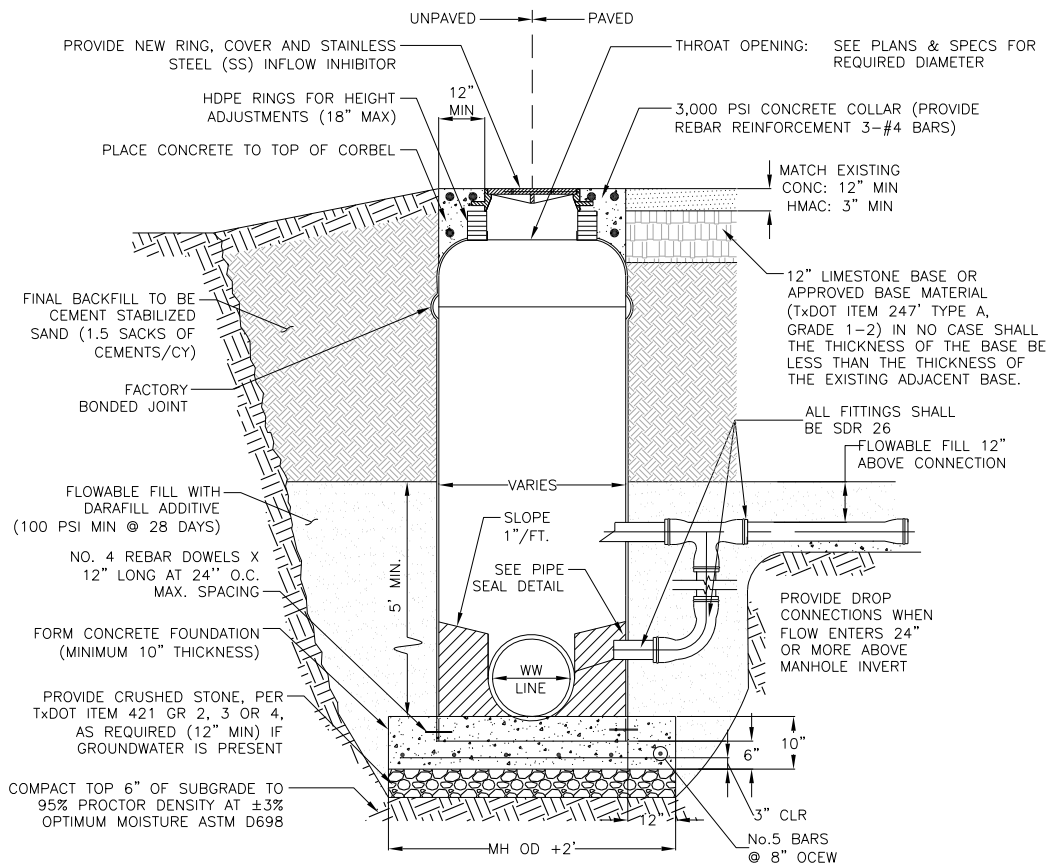
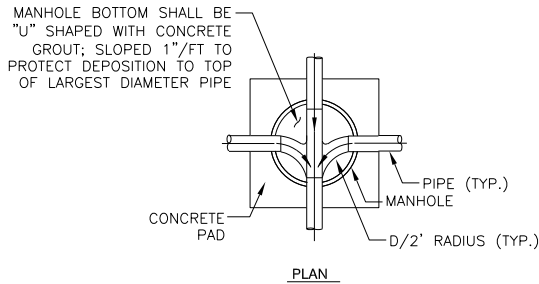




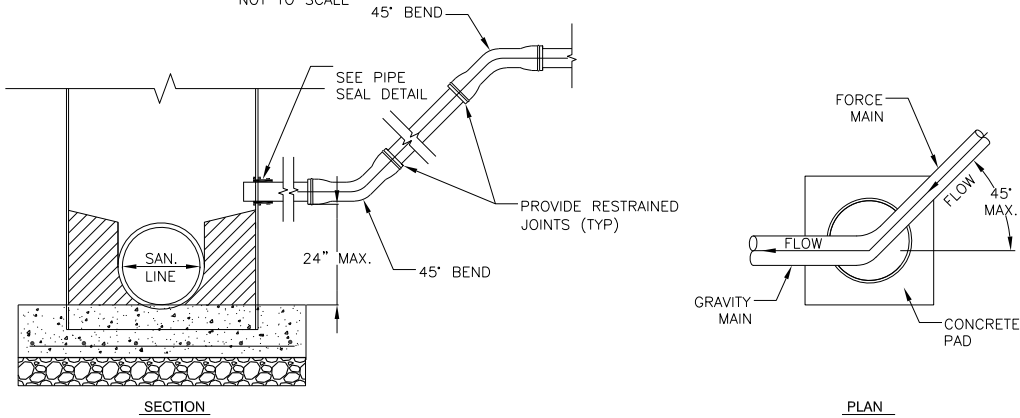
FIBERGLASS MANHOLE

NOT TO SCALE



WASTEWATER MANHOLE (BOTTOM)

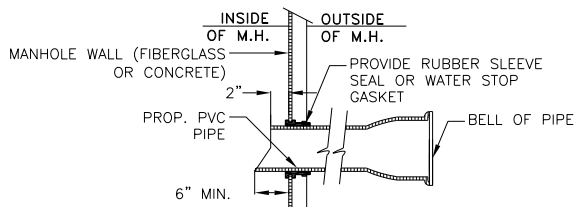
NOT TO SCALE



- NOTES:
- ALL BENDS SHALL BE DUCTILE IRON WITH RESTRAINED JOINTS.
 - INFLUENT FORCE MAIN MUST BE NO MORE THAN 45' FROM PARALLEL WITH DOWNSTREAM FLOW DIRECTION.

FORCE MAIN DISCHARGE MANHOLE DETAIL

NOT TO SCALE



- NOTES:
- INSTALL SEAL IN ACCORDANCE WITH MFGS. SPECS.
 - USE RUBBER SEAL ASSEMBLY APPROVED BY UTILITY DEPARTMENT. (TPSMHA OR PIPECONX OR INSERT A TEE)

PIPE SEAL DETAIL

NOT TO SCALE

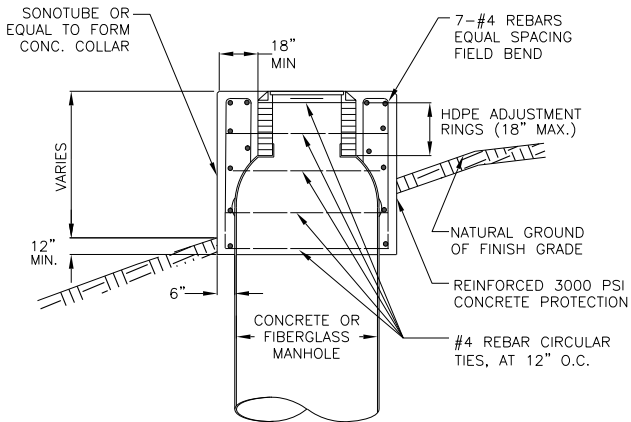
GENERAL WASTEWATER CONSTRUCTION NOTES:

- THE CONTRACTOR SHALL VISIT THE SITE OF THE WORK AND EXAMINE LOCAL CONDITIONS TO BE ENCOUNTERED, IMPROVEMENTS TO BE PROTECTED, AND PERMITS AND FEES TO BE REQUIRED, ALONG WITH OTHER RESEARCH THAT IS NECESSARY TO ENSURE THAT THE CONTRACTOR THOROUGHLY UNDERSTANDS THE PROJECT AND IS FULLY AWARE OF ALL THE CONDITIONS AND CONSTRAINTS THAT MAY BE ENCOUNTERED DURING THE COURSE OF CONSTRUCTION.
- THE CONTRACTOR SHALL ADHERE TO ALL TCEQ REGULATIONS PER 30 TAC CHAPTER 217 AND TRENCH SAFETY FOR EXCAVATIONS.
- THE CONTRACTOR IS RESPONSIBLE FOR ALL TRAFFIC CONTROL AND MUST ADHERE TO THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD).
- ALL FIBERGLASS MANHOLES SHALL BE MONOLITHIC WITH 0.50\"/>
- THE MANHOLE WALL PENETRATIONS FOR PIPE (8\"/>
- FOR FIBERGLASS MANHOLES, THE MANHOLE FOUNDATION MAY BE PRECAST ON GROUND SURFACE. (PROCEDURE MUST BE SUBMITTED TO THE ENGINEERING SERVICES CONSTRUCTION ENGINEER FOR APPROVAL.)
- THE CONTRACTOR SHALL PROVIDE PROTECTIVE COATING ON ALL EXPOSED CONCRETE SURFACES, INCLUDING CORBEL AREA, MANHOLE WALLS AND MANHOLE BENCH.
- FOR FIBERGLASS MANHOLES WITH WATERTIGHT BOTTOM, ADHERE TO ALL MANUFACTURER REQUIREMENTS. FIBERGLASS BOTTOM AND BENCH MUST ALSO BE FACTORY INSTALLED.

MANHOLE REQUIREMENTS	
PIPE DIAMETER	MANHOLE DIAMETER
≤18"	4'
18"< TO ≤36"	5'
36"< TO ≤42"	6'

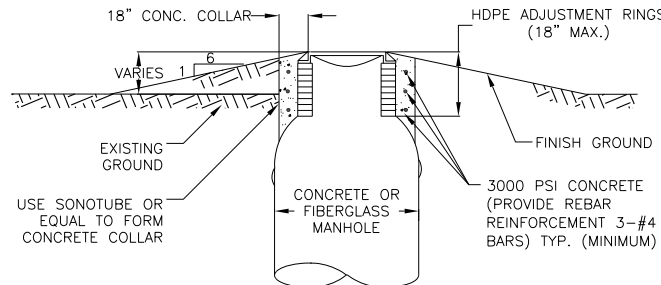
APPROVED COATINGS TABLE	
MANUFACTURER	MODEL NAME
JEFFCOAT	JEFFCOAT 326
RAVEN LINING SYSTEM	RAVEN 405
SHERWIN WILLIAMS	DURAPLATE 5800
CARBOLINE	PHENOLINE 309

NOTE:
COAT ALL CONCRETE SURFACES INCLUDING BENCH & WALLS.



MANHOLE PROTECTION IN UNPAVED AREAS (CULTIVATED/SPECIAL)

NOT TO SCALE



MANHOLE PROTECTION IN UNPAVED AREAS (RESIDENTIAL)

NOT TO SCALE

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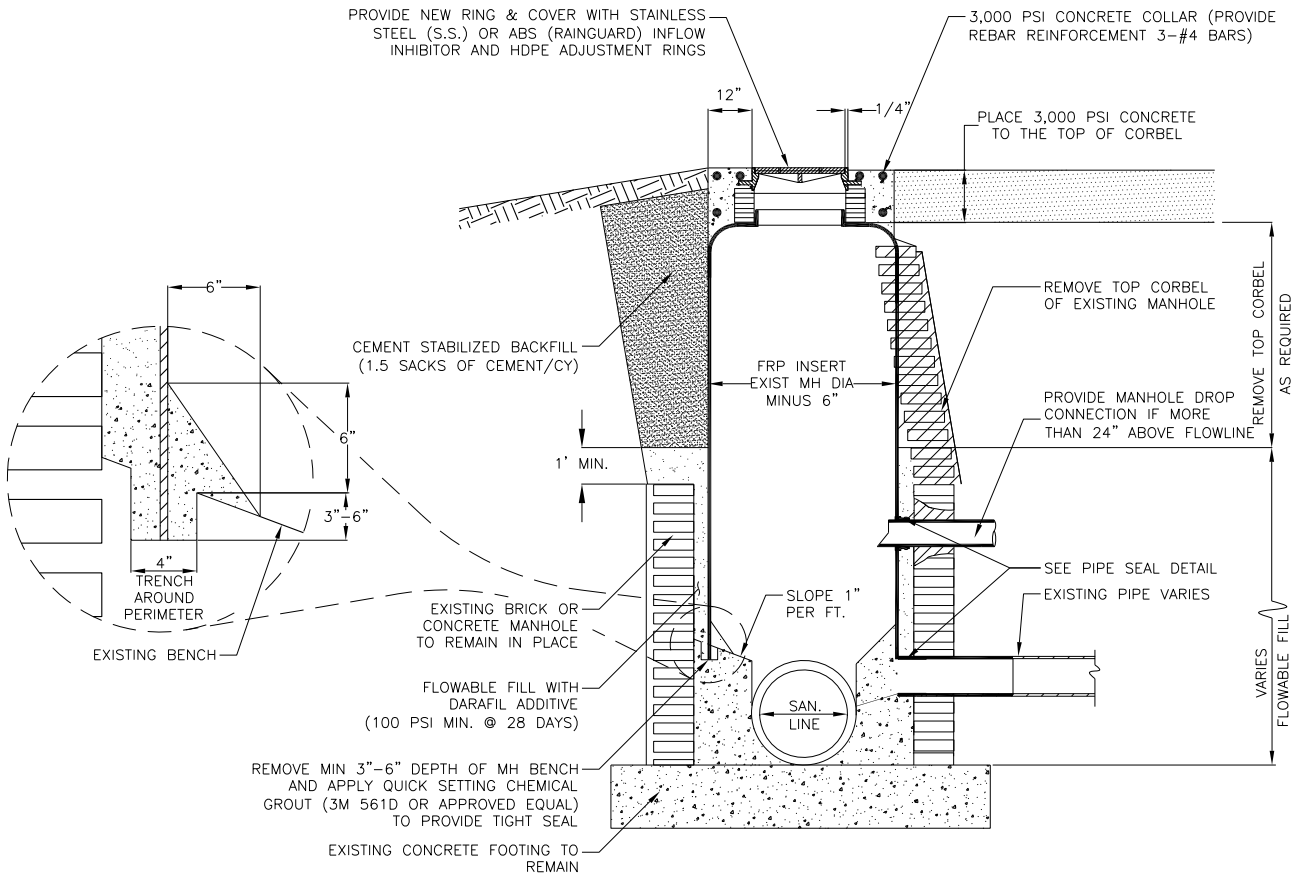
**CITY OF CORPUS CHRISTI**
TEXAS
Department of Engineering Services

CITY OF CORPUS CHRISTI
WASTEWATER STANDARD DETAILS
MANHOLE INSTALLATION

1 OF 4

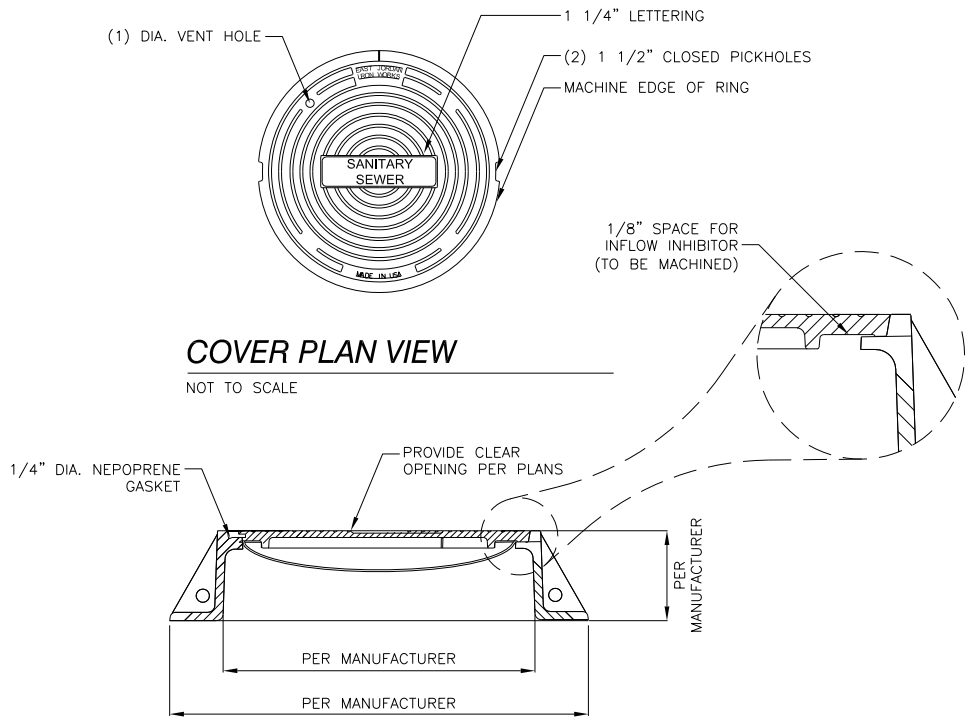
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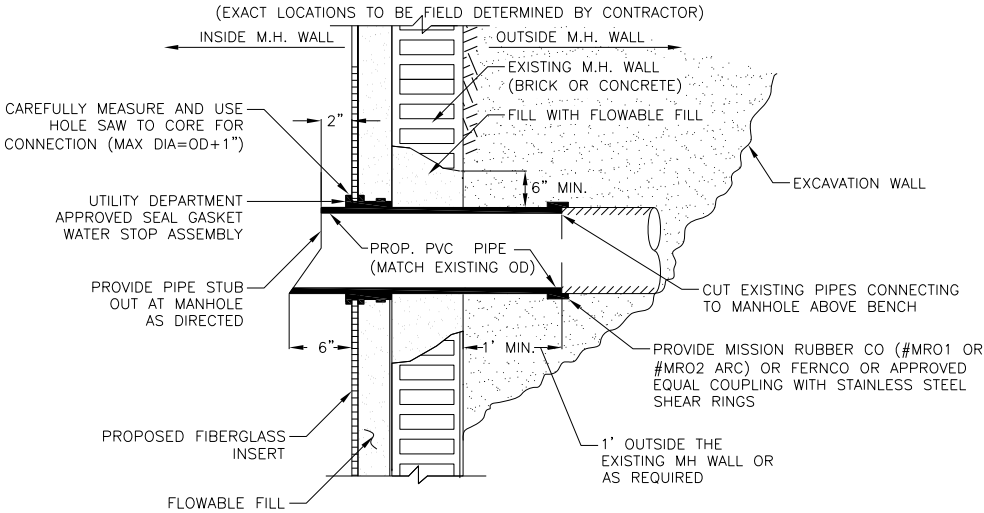
FRP INSERT REHABILITATION OF EXISTING MANHOLE

NOT TO SCALE



FRP INSERT REHABILITATION OF EXISTING MANHOLE NOTES:

1. THE CONTRACTOR SHALL FIELD-VERIFY THE EXISTING MANHOLE DIAMETER, FLOW LINE, RIM ELEVATION, NUMBER OF LATERALS, LOCATIONS, SIZES, AND OTHER INFORMATION NEEDED TO REHABILITATE EACH MANHOLE.
2. PRIOR TO INSTALLING CONTROL OF FLOW OR INITIATING MANHOLE REPAIRS, THE CONTRACTOR SHALL PLACE BARRICADES AND SIGNS TO DIVERT TRAFFIC AND PEDESTRIANS PER THE APPROVED TRAFFIC CONTROL PLAN, AS REQUIRED.
3. THE CONTRACTOR SHALL PREPARE THE INTERIOR OF THE EXISTING FOUNDATION STRUCTURE BY REMOVING ALL DEFECTIVE GROUT AND DEBRIS/BLOCKAGES, MECHANICALLY ROUGHEN THE ENTIRE INVERT, AND CLEAN THE INTERIOR WITH A HIGH-PRESSURE WATER JET.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DISPOSAL OF THE RESULTING SLUDGE AND DEBRIS AT AN APPROVED SITE, ACCORDING TO ALL PERTINENT WASTE DISPOSAL REGULATIONS.
5. THE CONTRACTOR SHALL USE QUICK-SETTING, NON-SHRINK CONCRETE GROUT TO SEAL AND RESHAPE THE BOTTOM. SUBMIT PROPOSED MATERIALS TO BE USED TO THE ENGINEER FOR APPROVAL.
6. PROVIDE COATING TO EXPOSED CONCRETE SURFACES WITH APPROVED SYSTEM TO PREVENT CORROSION.
7. FRP INSERT SHALL COMPLY WITH ASTM D3753 WITH SINGLE PIECE MONOLITHIC BARREL AND CORBEL CONSTRUCTION WITHOUT SEAMS, JOINTS OR SECTIONS. WALL THICKNESS SHALL PROVIDE AN AASHTO H-20 LOAD RATING AND WALL STIFFNESS OF 36 PSI MIN.
8. CUT BOTTOM OF FRP INSERT TO FIT EVENLY ON BENCHES OR CHIP BENCHES OUT TO EVENLY SUPPORT INSERT.
9. SEAL ANNULAR SPACE AROUND EXIST LINES WITH JUTE ROPE AND CHEMICAL GROUT.



FRP INSERT PIPE SEAL DETAIL

NOT TO SCALE

ROADWAY MANHOLE RING AND COVER:

1. THE CONTRACTOR SHALL PROVIDE STAINLESS STEEL (S.S.) INFLOW INHIBITOR WITH SS TETHER SECURED TO MANHOLE WALL, SUCH THAT THE INNER LID IS FLUSH WITH THE OUTER LID.
2. TRAFFIC SHALL BE RESTRICTED FROM MANHOLE FOR 48 HOURS AFTER THE PLACEMENT OF CONCRETE, AND COLLAR SHALL PROVIDE A SUFFICIENT, CLEAR OPENING TO ACCOMMODATE THE SPECIFIED MANHOLE COVER.
3. AASHTO-M-306 (LATEST REVISION) PROOF LOAD TESTING IS REQUIRED (40,000 LBS) AND MUST BE INSPECTED. PRIOR TO INSTALLATION, THE RESULTS OF THE TEST SHALL BE SUBMITTED TO THE CITY.
4. THE MANUFACTURING FACILITIES FOR ALL PROVIDED RING AND COVER ASSEMBLIES SHALL MEET OR EXCEED ALL EPA ENVIRONMENTAL STANDARDS AND OSHA SAFETY STANDARDS. THE CASTINGS SHALL BE MANUFACTURED FROM RECYCLED MATERIALS. THE CONTRACTOR SHALL PROVIDE CERTIFICATION.
5. GRAPHITE COATING SHALL BE APPLIED TO ALL WASTEWATER MANHOLE RING AND COVERS.

CLEAR OPENING	MANUFACTURER (1)	MODEL NUMBER*	INFLOW INHIBITOR
30"	EAST JORDAN IRON WORKS	COVER- V1430 FRAME- V1420	REQUIRED ON ALL INSTALLATIONS PER CITY SPECIFICATIONS
	U.S. FOUNDRY	COVER- #9210048 FRAME- #8021361	
	NEENAH FOUNDRY	DF-1274	

(1) OR APPROVED EQUAL (MADE IN THE USA)

RING & COVER APPROVED LIST

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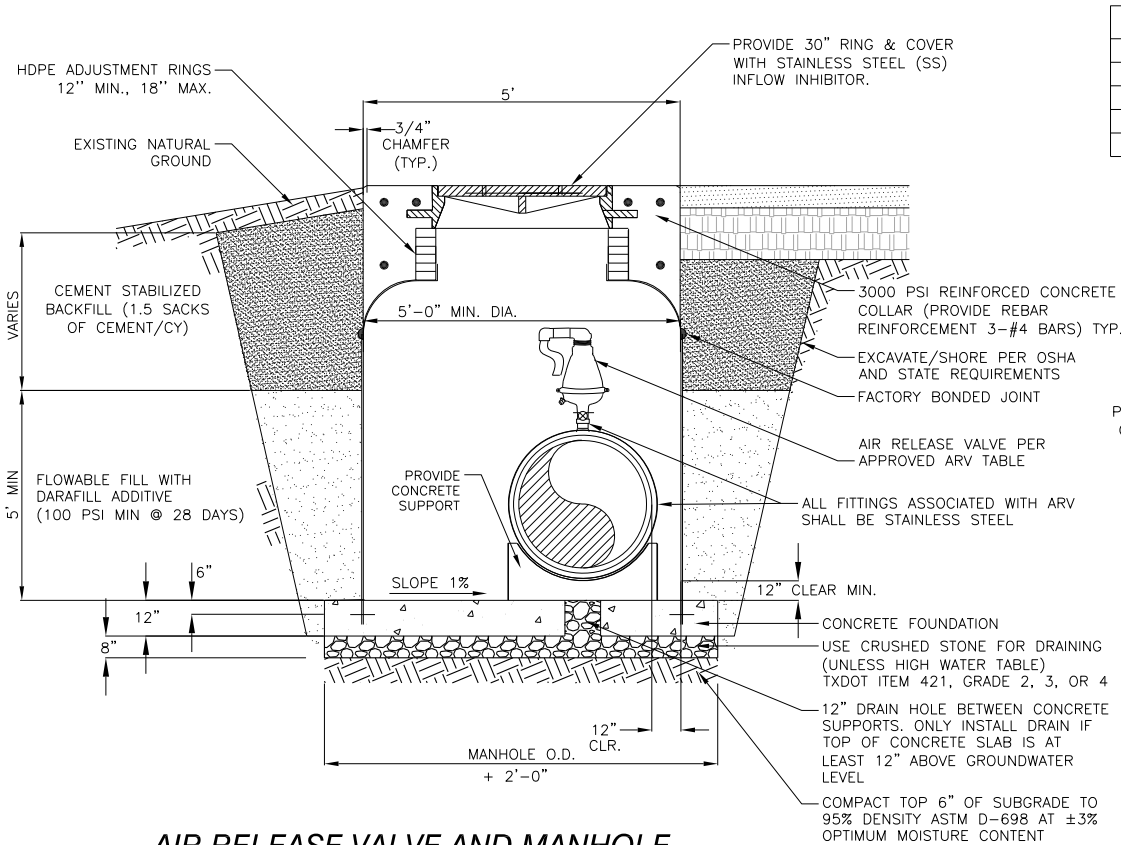
CITY OF CORPUS CHRISTI
TEXAS
Department of Engineering Services



CITY OF CORPUS CHRISTI
WASTEWATER STANDARD DETAILS
REHABILITATION OF EXISTING MANHOLE & MANHOLE RING AND COVER DETAILS
2 OF 4

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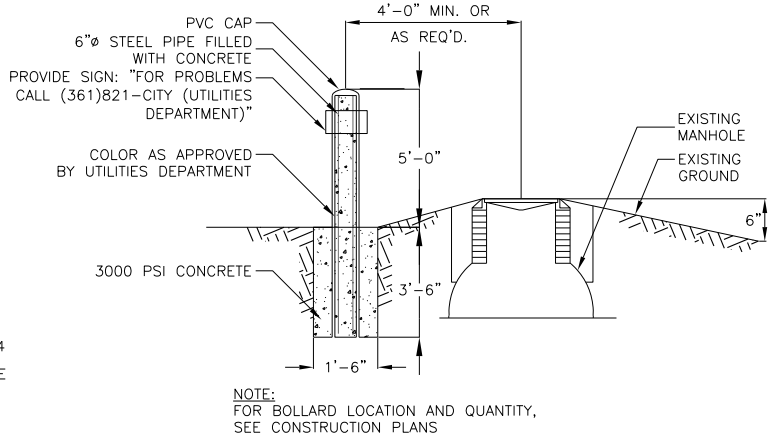
CITY PROJECT #



AIR RELEASE VALVE AND MANHOLE

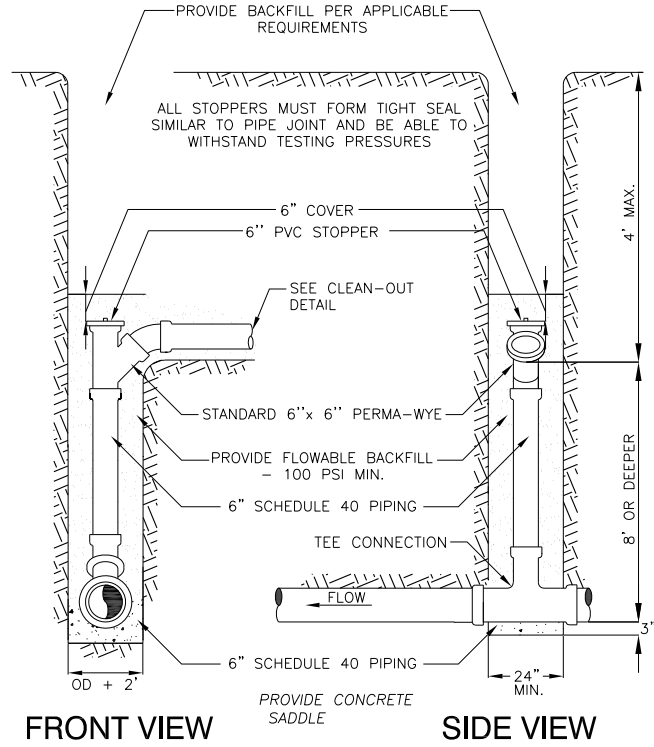
NOT TO SCALE

APPROVED ARVs		
MANUFACTURER	MODEL NAME	MATERIAL
A.R.I.	D-025 OR D-025 SHORT	316 SS
H-TEC	MODEL 986 (SS) AND 988	
VENT OMAT	MODEL RGXII (ST. STEEL)	
VALMATIC	VM 48AS OR VM 49AS	



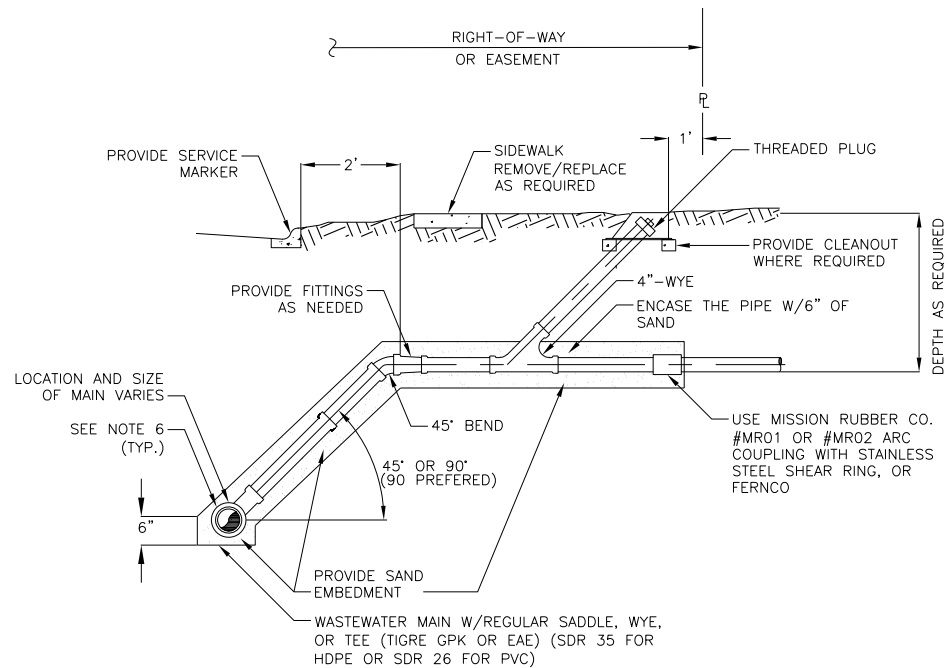
BOLLARD DETAIL

NOT TO SCALE



DEEP CUT SERVICE CONNECTION

NOT TO SCALE

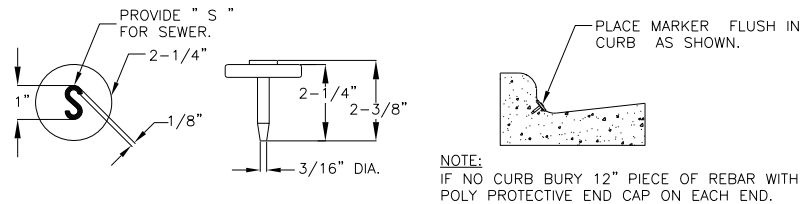


SERVICE CONNECTION DETAILS

NOT TO SCALE

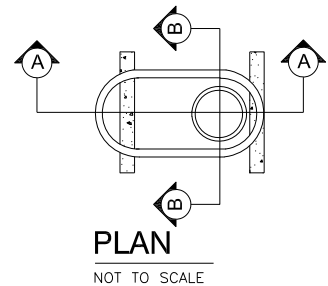
SERVICE CONNECTION NOTES:

- CONTRACTOR TO PROVIDE SERVICE CONNECTION TAP TO THE R.O.W. LINE & CONNECT EXIST. SERVICE LINE OUTSIDE EASEMENT AS SHOWN AND REQUIRED.
- ALL SERVICE PIPE AND FITTINGS TO BE SOLVENT WELD SCH 40 PVC UNLESS SHOWN OTHERWISE IN THE PLANS.
- FOR EXISTING MAIN PIPE MATERIAL - PVC AND/OR VCP USE UTILITY DEPARTMENT APPROVED CONNECTOR.
- FOR NEW PVC MAIN AND SERVICE, USE PVC WYE OR TEE AS DIRECTED AT SERVICE CONNECTION.
- IF PIPE LENGTH, ON SERVICE LINE, IS GREATER THAN 50', USE 6" PVC SCH 40 FROM CLEANOUT WYE TO THE MAIN LINE.



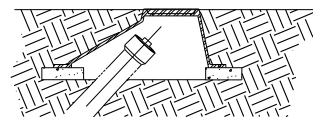
STANDARD SERVICE MARKER

BRASS - ONE REQUIRED EACH SERVICE TAP IN NEW SUBDIVISIONS OR ANY SERVICE PROVIDED FOR FUTURE USE
NOT TO SCALE



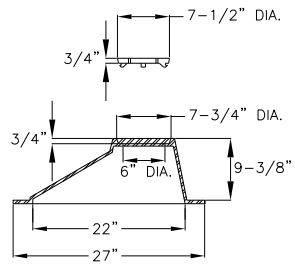
PLAN

NOT TO SCALE



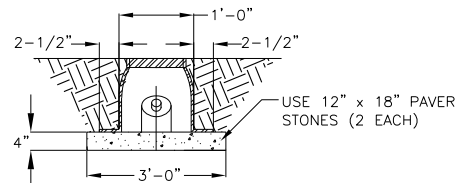
SECTION A-A

NOT TO SCALE



CLEAN-OUT BOOT

NOT TO SCALE



SECTION B-B

NOT TO SCALE

TYPICAL CAST IRON CLEAN-OUT BOOT

NOT TO SCALE

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DESCRIPTION

CITY OF CORPUS CHRISTI
WASTEWATER STANDARD DETAILS
AIR RELEASE VALVE, BOLLARD AND SERVICE CONNECTION DETAILS 3 OF 4

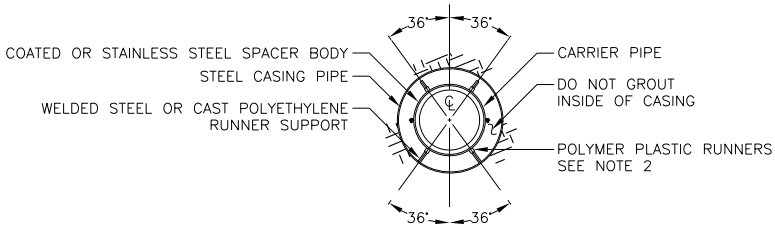
BY

DATE

REVISION NO.

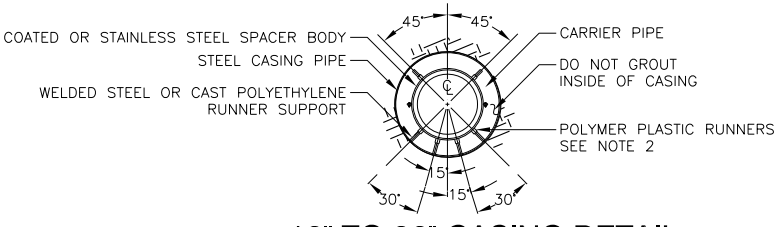
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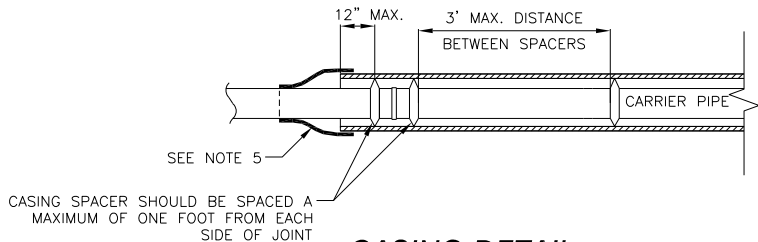
4" TO 10" CASING DETAIL

NOT TO SCALE



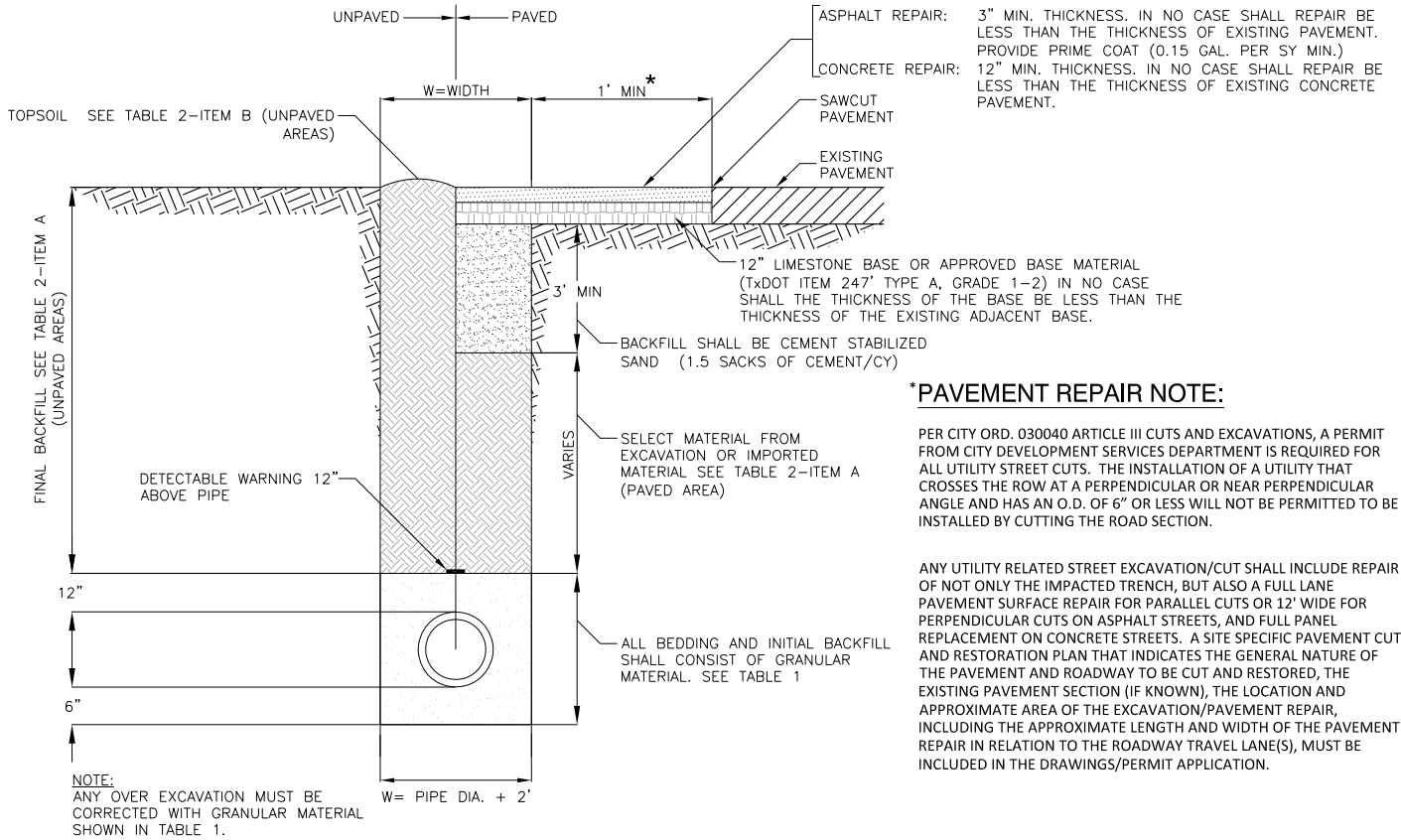
12" TO 36" CASING DETAIL

NOT TO SCALE



CASING DETAIL

NOT TO SCALE



*PAVEMENT REPAIR NOTE:

PER CITY ORD. 030040 ARTICLE III CUTS AND EXCAVATIONS, A PERMIT FROM CITY DEVELOPMENT SERVICES DEPARTMENT IS REQUIRED FOR ALL UTILITY STREET CUTS. THE INSTALLATION OF A UTILITY THAT CROSSES THE ROW AT A PERPENDICULAR OR NEAR PERPENDICULAR ANGLE AND HAS AN O.D. OF 6" OR LESS WILL NOT BE PERMITTED TO BE INSTALLED BY CUTTING THE ROAD SECTION.

ANY UTILITY RELATED STREET EXCAVATION/CUT SHALL INCLUDE REPAIR OF NOT ONLY THE IMPACTED TRENCH, BUT ALSO A FULL LANE PAVEMENT SURFACE REPAIR FOR PARALLEL CUTS OR 12' WIDE FOR PERPENDICULAR CUTS ON ASPHALT STREETS, AND FULL PANEL REPLACEMENT ON CONCRETE STREETS. A SITE SPECIFIC PAVEMENT CUT AND RESTORATION PLAN THAT INDICATES THE GENERAL NATURE OF THE PAVEMENT AND ROADWAY TO BE CUT AND RESTORED, THE EXISTING PAVEMENT SECTION (IF KNOWN), THE LOCATION AND APPROXIMATE AREA OF THE EXCAVATION/PAVEMENT REPAIR, INCLUDING THE APPROXIMATE LENGTH AND WIDTH OF THE PAVEMENT REPAIR IN RELATION TO THE ROADWAY TRAVEL LANE(S), MUST BE INCLUDED IN THE DRAWINGS/PERMIT APPLICATION.

TRENCH BACKFILL FOR WASTEWATER LINES AND PAVEMENT REPAIR FOR UTILITIES

NOT TO SCALE

GENERAL NOTES FOR BACKFILL

TABLE 1 BEDDING AND INITIAL BACKFILL (BELOW PIPE TO 12" ABOVE PIPE)	TABLE 2 FINAL BACKFILL (GREATER THAN 12" ABOVE PIPE)	
	UNPAVED AREAS	PAVED AREAS**
ALL BEDDING AND INITIAL BACKFILL SHALL CONSIST OF THE FOLLOWING OR REFER TO DESIGN ENGINEER REQUIREMENTS: GRANULAR BACKFILL CONSISTING OF EITHER NATURAL SAND OR SANDY GRAVEL, OR MATERIAL PRODUCED BY CRUSHING OF NATURAL STONE OR GRAVEL:	A. FROM 12" ABOVE PIPE TO BOTTOM OF TOPSOIL BACKFILL SHALL BE APPROVED SELECT MATERIAL FROM THE EXCAVATION; OR IMPORTED MATERIAL; ALL TO BE FREE OF ROCKS, DEBRIS, OR ANY CLUMPS GREATER THAN 2" IN DIAMETER; LOOSE LIFTS TO BE PLACED 10" MAX.	A. FROM 12" ABOVE PIPE TO 3' BELOW BOTTOM OF ROAD BASE: BACKFILL SHALL BE SELECT MATERIAL FROM EXCAVATION OR IMPORTED MATERIAL. IN EITHER CASE, ALL MATERIAL SHALL MEET THE FOLLOWING: LL<35 PI 8-20 NO CLUMPS > 2" DIA. MOISTURE - 1 TO +3% COMPACT 95% D698 STD PROCTOR
①. EXCAVATIONS <20 FT. DEEP AND ABOVE WATER TABLE, USE MATERIAL MEETING THE FOLLOWING CRITERIA.	COMPACT MATERIAL TO 95% STD. PROCTOR (D698).	LOOSE LIFTS OF 10" MAX OR IF SELECT MATERIAL FROM EXCAVATION DOES NOT MEET REQUIREMENTS, THEN USE CEMENT STABILIZED SAND. SEE TABLE 2-ITEM B BELOW.
MEETING REQUIREMENTS OF ASTM D2487 FOR: SP GP SW GW SP-SM GP-GM SW-SM GW-GM	MOISTURE TO BE ADJUSTED TO ± 3% OF OPTIMUM.	
AND IN ADDITION: PASSING 1/2" SIEVE - 100% PASSING #4 SIEVE - 30% MINIMUM PLASTICITY INDEX (PI) - NP TO 10 MAX.	B. TOPSOIL TO BE PROVIDED EQUAL OR BETTER THAN EXISTING; AND MATCH EXISTING TOPSOIL DEPTH. COMPACT TO EXISTING ADJACENT TOP-SOIL THICKNESS. (CONSTRUCTION TO BE PERFORMED BY "DOUBLE DITCH" METHOD-TOP SOIL SALVAGED TO BE PLACED ON TOP)	B. FROM 3' BELOW BOTTOM OF ROAD BASE TO BOTTOM OF ROAD BASE: BACKFILL SHALL BE UNIFORMLY MOISTENED AND MIXED CEMENT STABILIZED SAND (1.5 SK/C.Y.) AND SHALL MEET THE FOLLOWING REQUIREMENTS:
②. IN DEEP EXCAVATIONS (>20') OR BELOW WATER TABLE, USE CRUSHED STONE OR CRUSHED GRAVEL MEETING GRADATION OF: A. CONCRETE COARSE AGGREGATE OR CRUSHED LIMESTONE; TxDOT ITEM 421; GRADE 2, 3, OR 4.		SAND GRADATION: % PASSING #4 55-100 #10 40-100 #40 25-100 #200 10-20 PI NP-10
		COMPACT TO 95% OF D698. MOISTURE TO BE ADJUSTED TO (+/-2%) OF OPTIMUM.

** APPLIES IF ANY PORTION OF THE TRENCH FALLS WITHIN 1' OF THE BACK OF CURB.

CASING NOTES:

- CASING DIAMETER, LENGTH, LOCATION, AND WALL THICKNESS SHALL BE PER PROJECT SPECIFIC REQUIREMENTS. (MINIMUM SCHEDULE 40)
- ALL CARRIER PIPES IN INSTALLED CASINGS SHALL BE SUPPORTED BY BOLT-ON STYLE CASING SPACERS ("ADVANCED PRODUCTS" OR APPROVED EQUAL).
- THE CONTRACTOR SHALL PROVIDE MECHANICALLY RESTRAINED JOINTS FOR FORCE MAINS ONLY ON CARRIER PIPES. "MEGALUG" TYPE JOINT RESTRAINTS OR APPROVED EQUAL SHALL BE USED.
- CASING SPACERS SHALL BE SIZED TO SECURELY FASTEN TO THE CARRIER PIPE O.D. AND SHALL BE FURNISHED WITH A MINIMUM RUNNER HEIGHT TO MAINTAIN SEPARATION BETWEEN THE MAXIMUM O.D. OF THE CARRIER PIPE AND THE CASING WALL.
 - POSITIONING OF THE SPACERS SHALL ENSURE THAT THE CARRIER PIPE IS ADEQUATELY SUPPORTED THROUGHOUT ITS LENGTH.
 - SPACERS AT EACH END SHALL NOT BE FURTHER THAN 12" FROM THE END OF THE CASING.
 - CASING SPACERS SHALL BE INSTALLED IN THE CENTER OF THE PIPE SECTION. THE MAXIMUM SPACING OF THE CASING SPACERS SHALL BE 3 FEET.
- THE TWO ENDS OF THE CASING PIPE SHALL BE SEALED WATERTIGHT WITH AN ADVANCED PRODUCTS SYSTEM, INC. MODEL AZ - ZIPPER, PSI MODEL C END SEAL, OR AN APPROVED EQUAL.

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CITY OF CORPUS CHRISTI
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Department of Engineering Services

CITY OF CORPUS CHRISTI
WASTEWATER STANDARD DETAILS
PAVEMENT REPAIR/BACKFILL/GENERAL NOTES/CASING DETAILS
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RECORD DRAWING NO.

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