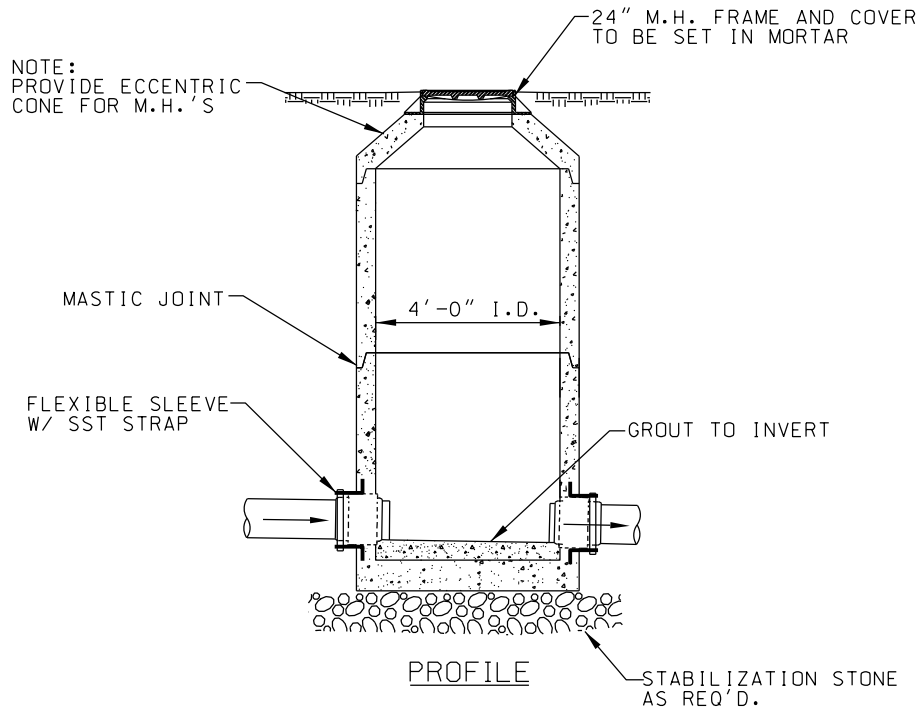


PLAN



TYPICAL SECTION OF
PRECAST SANITARY MANHOLE

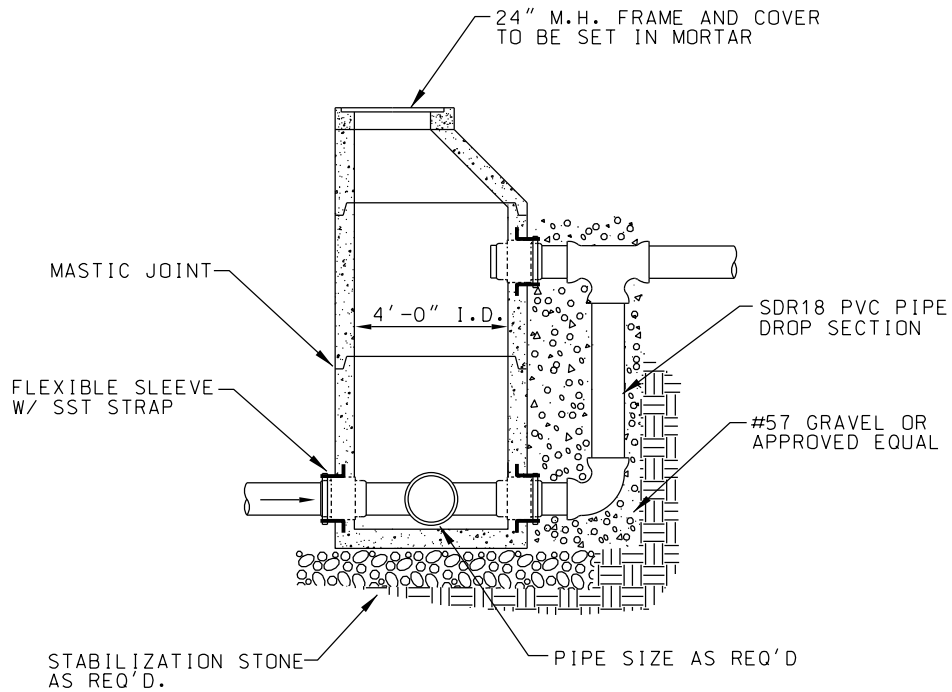
S1

TYPICAL
SECTION OF
PRECAST SANITARY MANHOLE

SEWER ONLY
UPDATED: 7/6/2012

S1

GRAND STRAND
WATER & SEWER AUTHORITY

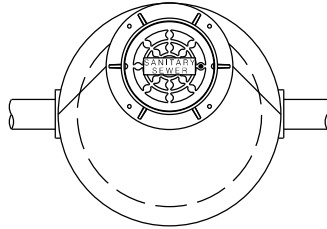


TYPICAL SECTION OF PRECAST
SANITARY SEWER DROP MANHOLE

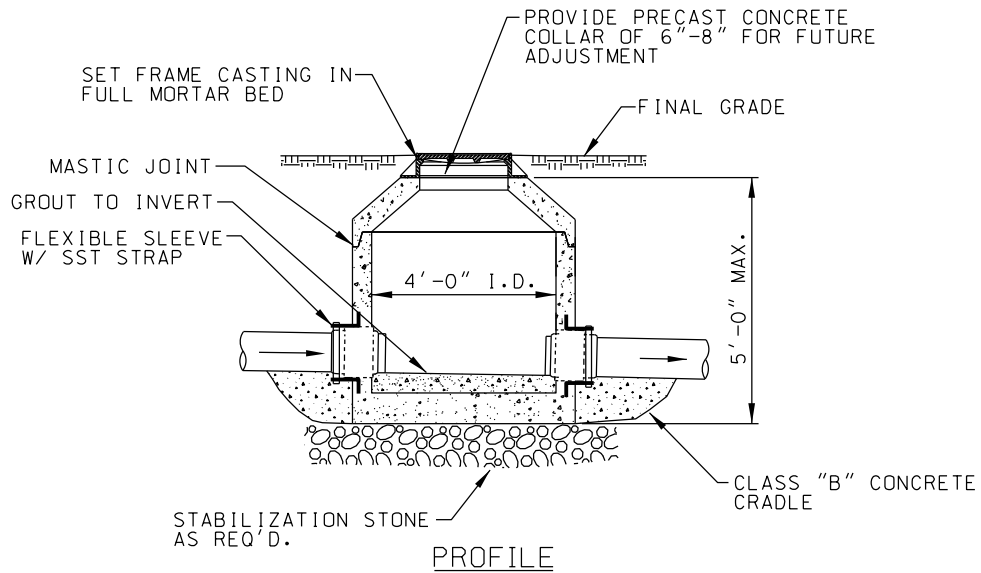
S2

TYPICAL SECTION OF PRECAST SANITARY SEWER DROP MANHOLE	
SEWER ONLY UPDATED: 08/28/06	S2
GRAND STRAND WATER & SEWER AUTHORITY	

LATEST REVISION:
08/28/06 DRT REVISED TO SHOW "#57 GRAVEL OR APPROVED EQUAL" RATHER
THAN "CONCRETE BLOCKING FOR DROP PIPE SUPPORT".



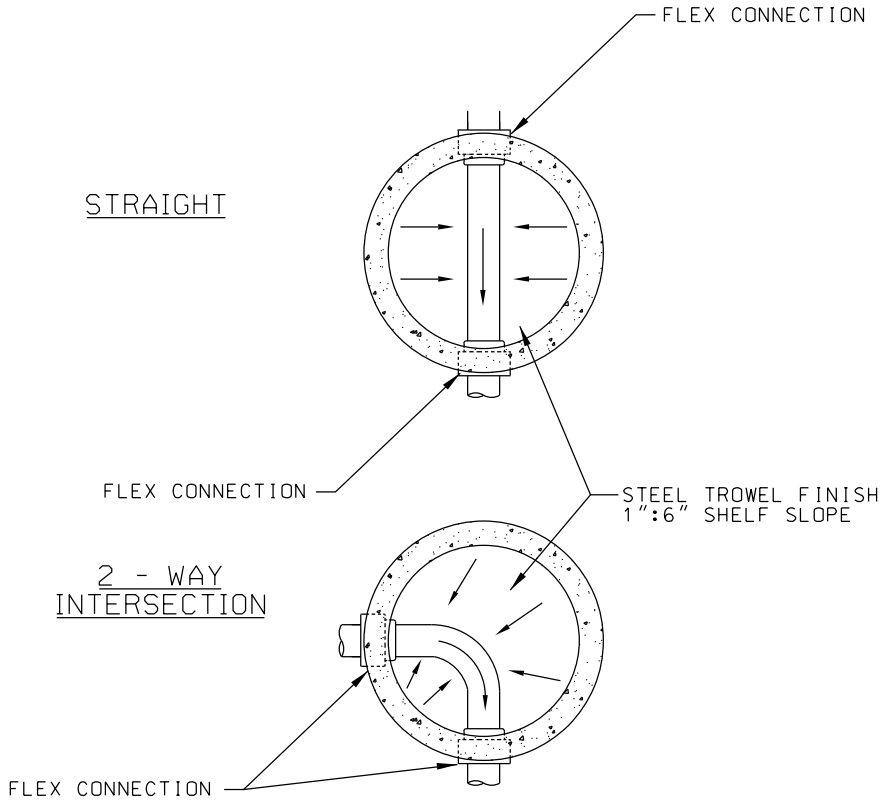
PLAN



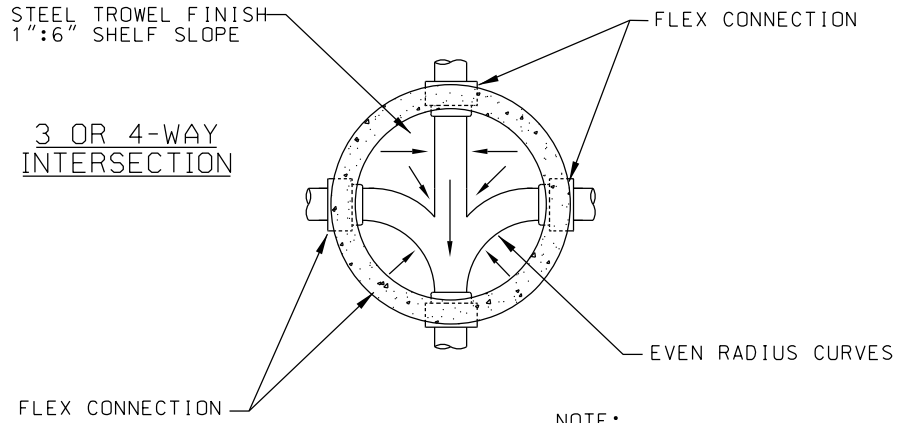
TYPICAL SECTION OF PRECAST
SANITARY SEWER SHALLOW MANHOLE

S3

<p>TYPICAL SECTION OF PRECAST SANITARY SEWER SHALLOW MANHOLE</p>	
<p>SEWER ONLY UPDATED: 7/6/2012</p>	<p>S3</p>
<p>GRAND STRAND WATER & SEWER AUTHORITY</p>	



NOTE:
SHAPE INVERT TO 1/2 PIPE
DIAMETER IN ALL CASES

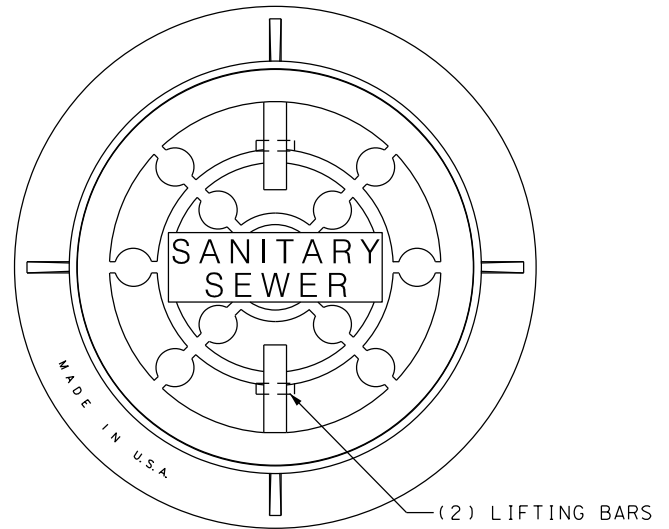
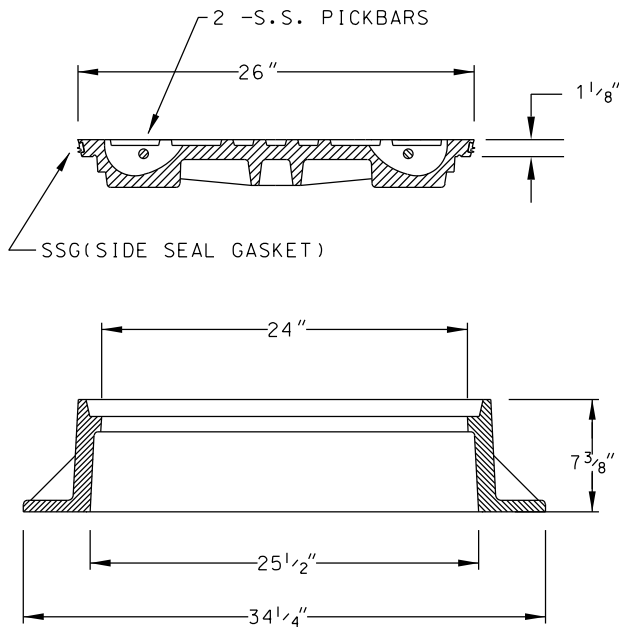


NOTE:
SEE TYPICAL MANHOLE SECTION
DETAIL FOR CONTINUATION OF
MANHOLE CONSTRUCTION

TYPICAL MANHOLE INVERTS

S4

TYPICAL MANHOLE INVERTS	
SEWER ONLY UPDATED: 12/26/97	S4
GRAND STRAND WATER & SEWER AUTHORITY	



- NOTES:
1. MATERIAL: ASTM-A48 CLASS 35B GRAY IRON.
 2. RING WT: 250 LBS. APP.
 3. COVER WT: 175 LBS. APP.
 4. POLYETHYLENE (H.D.P.E.) ADJUSTING RINGS AS MANUFACTURED BY LADTECH, INC. MAY BE USED FOR LEVELING AND FINAL GRADE OF MANHOLE FRAME AND COVER.
 5. SEE MANHOLE SELECTIONS FOR FRAME SETTING DETAILS.
 6. USE U.S. FOUNDRY 579-DC-SSG FRAME AND COVER OR APPROVED EQUAL.

TYPICAL WATERPROOF MANHOLE FRAME & COVER

S6

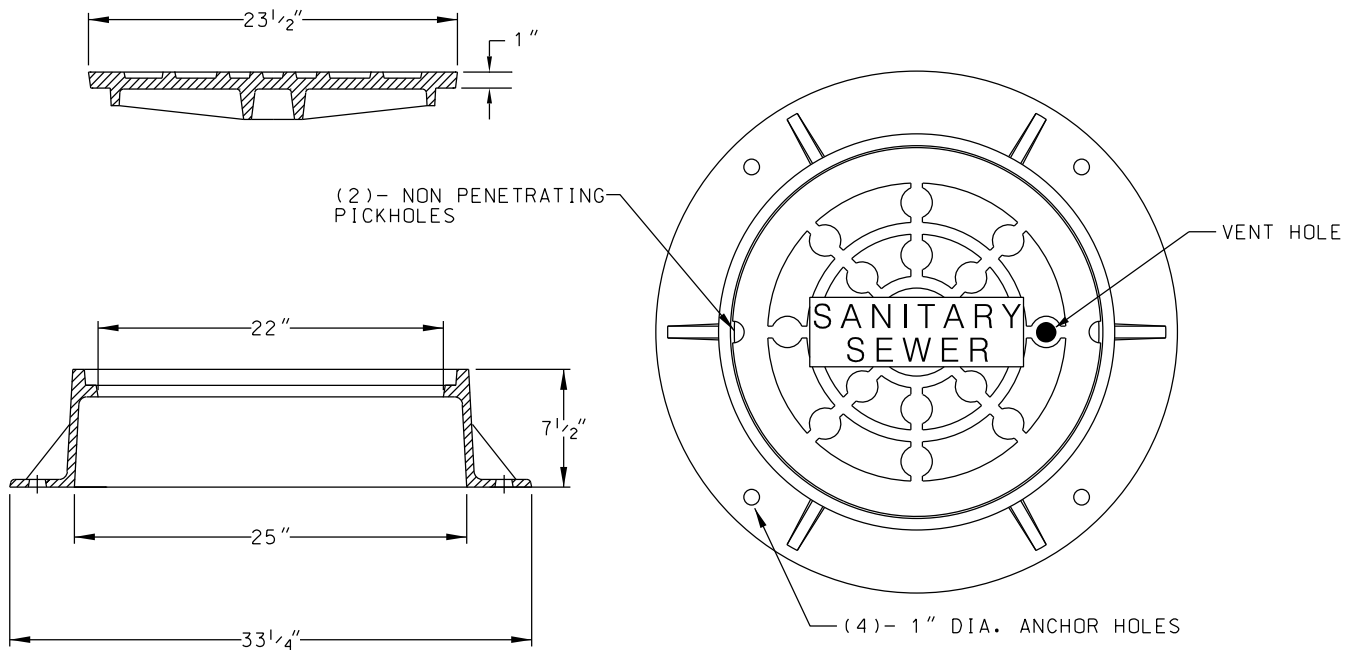
LATEST REVISION:
10/21/08 DRT CHANGED LETTERING FROM "S" TO "SANITARY SEWER"
ON MANHOLE COVER

TYPICAL
WATERPROOF MANHOLE
FRAME & COVER

SEWER ONLY
UPDATED: 10/21/2008

S6

GRAND STRAND
WATER & SEWER AUTHORITY



- NOTES:
1. MATERIAL: ASTM-A48 CLASS 35B GRAY IRON.
 2. RING WT: 160 LBS. APP.
 3. COVER WT: 125 LBS. APP.
 4. POLYETHYLENE (H.D.P.E.) ADJUSTING RINGS AS MANUFACTURED BY LADTECH, INC. MAY BE USED FOR LEVELING AND FINAL GRADE OF MANHOLE FRAME AND COVER.
 5. USE U.S. FOUNDRY 668-KL-1 "VENT" FRAME AND COVER OR APPROVED EQUAL.

TYPICAL MANHOLE FRAME & COVER

S7

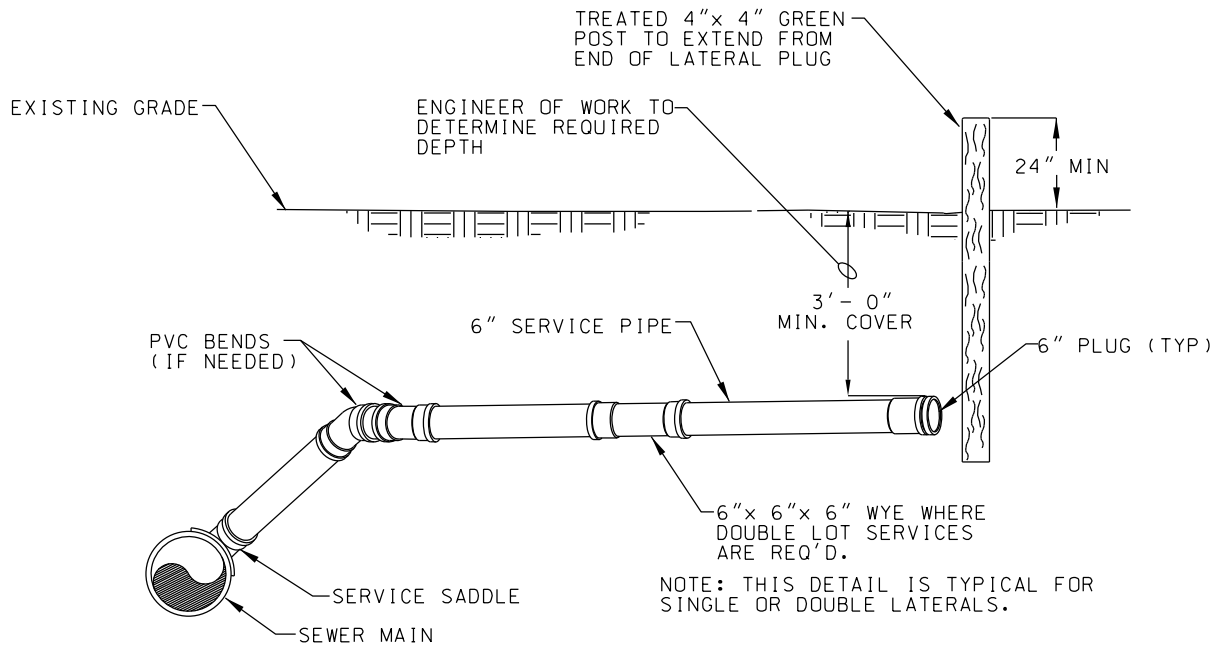
TYPICAL
MANHOLE FRAME & COVER

SEWER ONLY
UPDATED: 10/21/2008

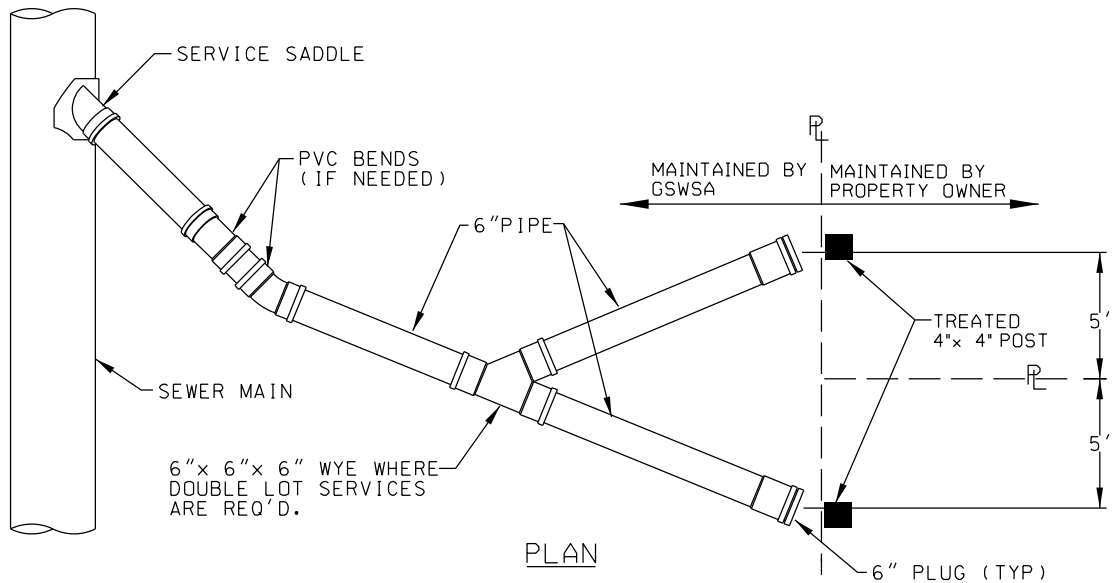
S7

LATEST REVISION:
10/21/08 DRT CHANGED LETTERING FROM "S" TO "SANITARY SEWER"
ON MANHOLE COVER

GRAND STRAND
WATER & SEWER AUTHORITY



ELEVATION



PLAN

TYPICAL SEWER SERVICE CONNECTION

S8

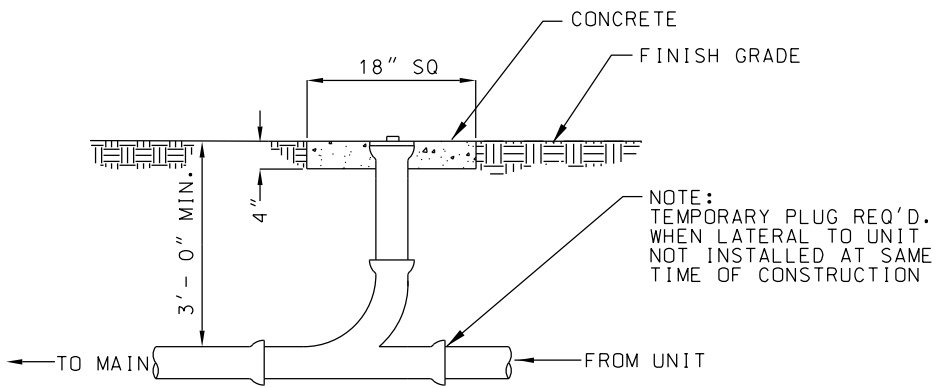
TYPICAL SEWER SERVICE CONNECTION

SEWER ONLY
 UPDATED: 08/28/06

S8

GRAND STRAND
 WATER & SEWER AUTHORITY

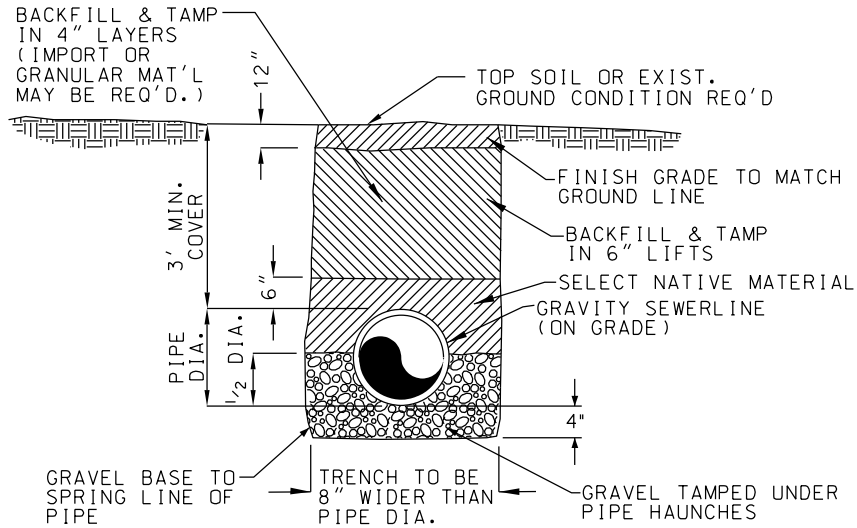
LATEST REVISION:
 08/28/06 DRT ADDED THE WORD "GREEN" FOR 4" x 4" POST MARKER DESCRIPTION.



TYPICAL SEWER CLEANOUT

S9

TYPICAL SEWER CLEANOUT	
SEWER ONLY UPDATED: 12/26/97	S9
GRAND STRAND WATER & SEWER AUTHORITY	



NOTES FOR ALL TRENCH DETAILS

1. TRENCH SHALL BE BACKFILLED AND THOROUGHLY TAMPED WITH SUITABLE MATERIAL TO LEVEL OF STONE. STONE & PAV'T TO BE PLACED BY CONTR. WITH LEAST INTERFERENCE WITH TRAFFIC.
2. ALL CONSTRUCTION TO BE INSPECTED AND APPROVED BY LOCAL COUNTY OR STATE ROAD DEPT.
3. CONTRACTOR IS RESPONSIBLE FOR NOTIFICATION AND OBTAINING INSPECTION.
4. GRAVEL BASE SHALL BE 4" MIN., AND EXTEND UP TO SPRING LINE OF PIPE. GRAVEL SHALL NOT EXCEED 3/4 DIA.

TYPICAL TRENCH SECTION IN
NATIVE GROUND CONDITION
FOR GRAVITY SEWERLINE

S10

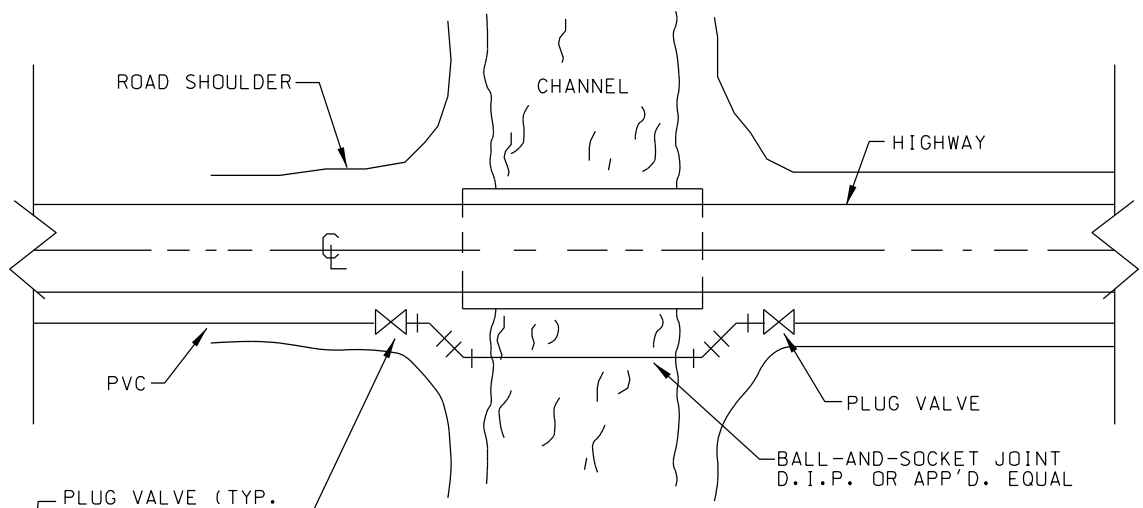
LATEST REVISION:
08/28/06 DRT CORRECTED TO SHOW 4" OF GRAVEL FROM TRENCH BOTTOM
TO BOTTOM OF PIPE.

TYPICAL TRENCH SECTION IN
NATIVE GROUND CONDITION
FOR GRAVITY SEWERLINE

SEWER ONLY
UPDATED: 08/28/06

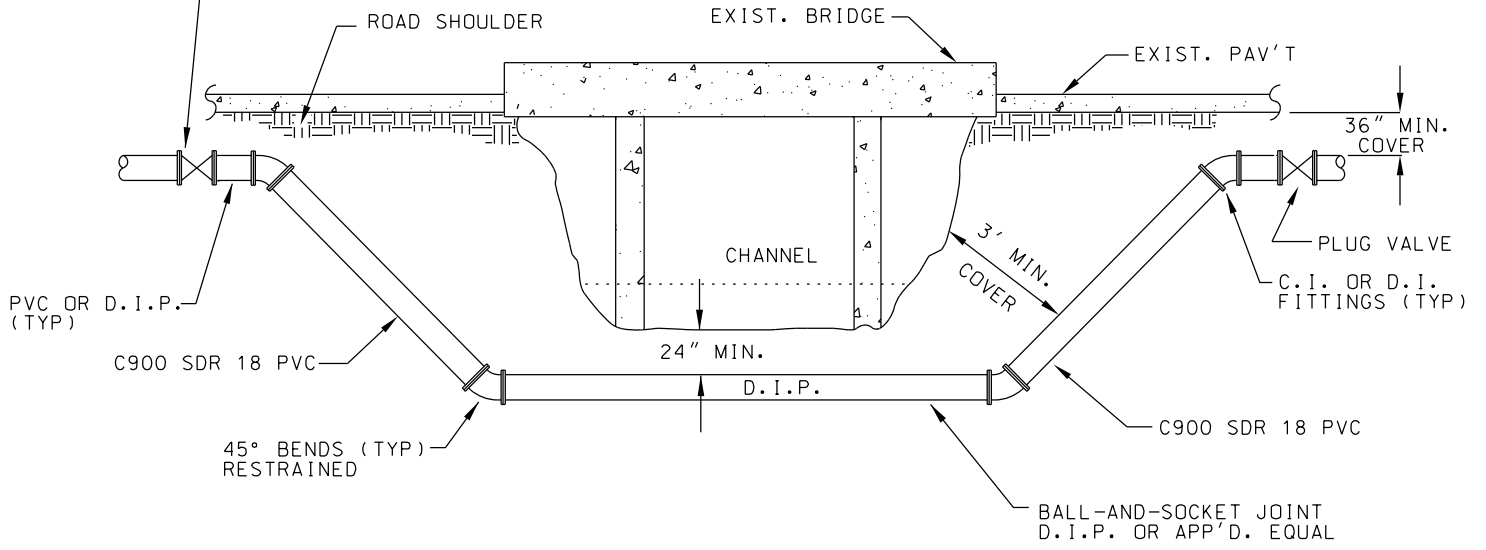
S10

GRAND STRAND
WATER & SEWER AUTHORITY



PLUG VALVE (TYP. EA. SIDE OF WATER COURSE WIDER THAN FIFTEEN (15) FEET

PLAN



NOTE: PIPE TO BE INSTALLED IN SUCH A MANNER THAT JOINTS WILL BE ON UNDISTURBED SOIL.

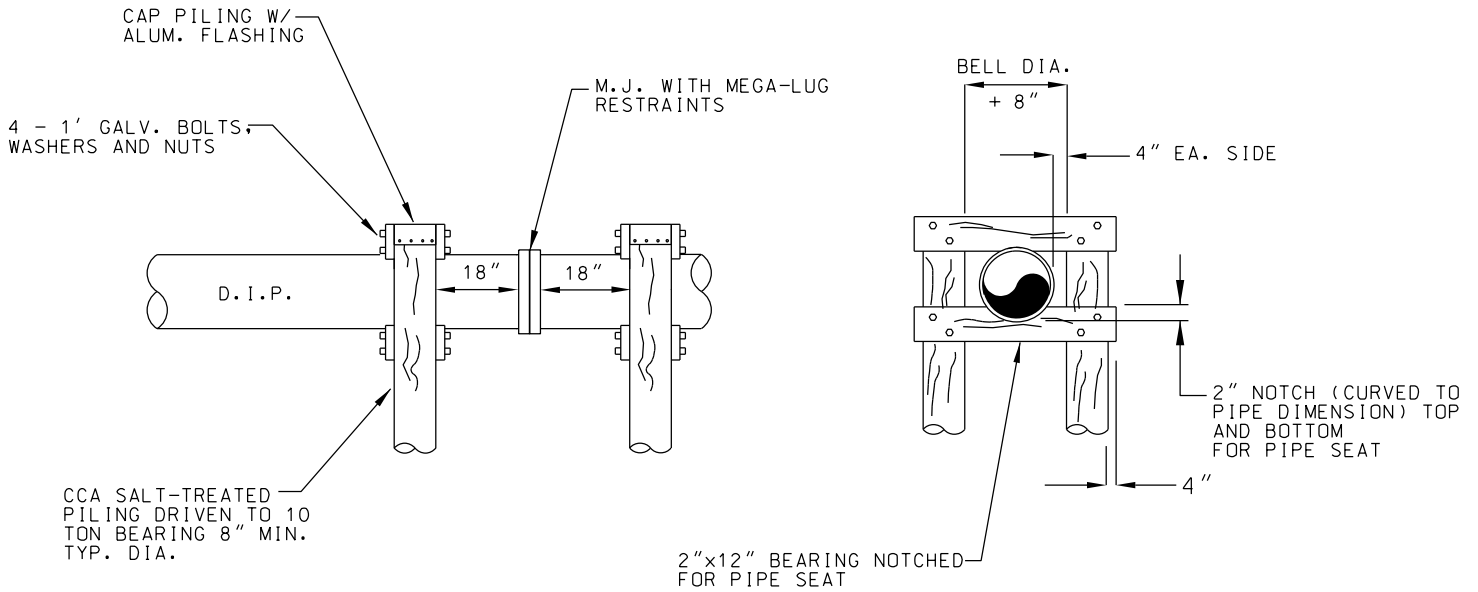
PROFILE

NOTE: ALL JOINTS TO BE RESTRAINED.

TYPICAL UNDER CHANNEL CROSSING AT BRIDGE

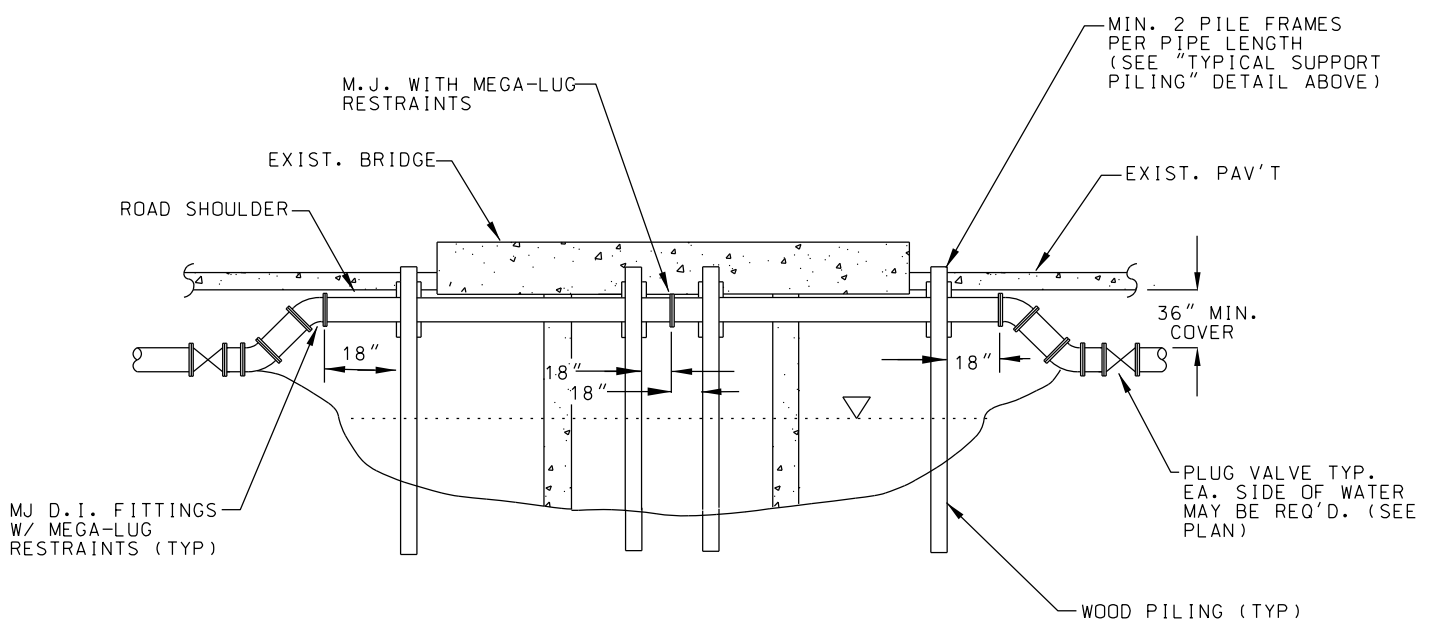
S11

TYPICAL UNDER CHANNEL CROSSING AT BRIDGE	
SEWER ONLY UPDATED: 2/11/98	S11
GRAND STRAND WATER & SEWER AUTHORITY	



TYPICAL SUPPORT PILING

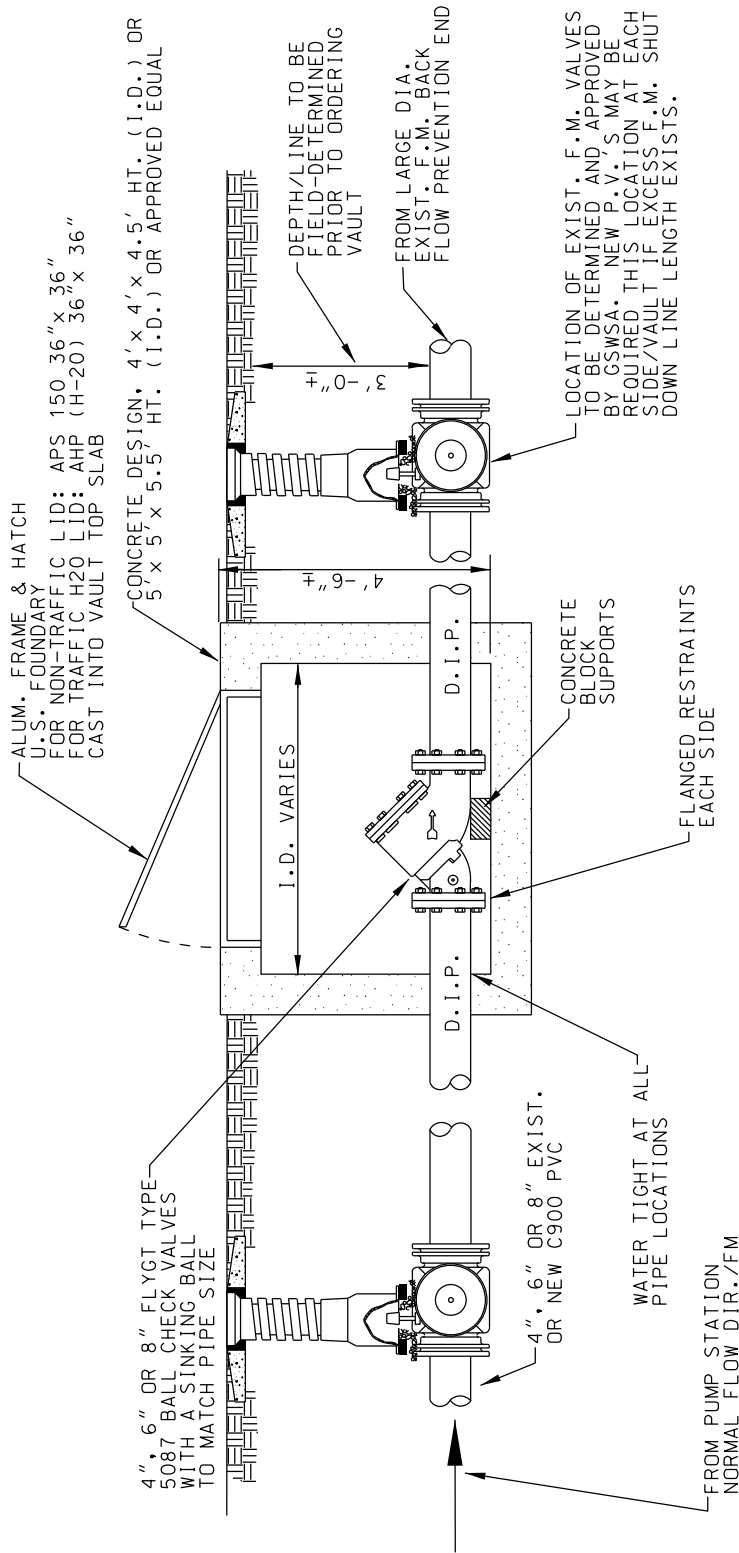
NOTE: GSWA TO APPROVE CONTRACTORS PROPOSED LOCATION OF PILE FRAMES PRIOR TO INSTALLATION



TYPICAL ABOVE CHANNEL CROSSING AT BRIDGE

S12

TYPICAL ABOVE CHANNEL CROSSING AT BRIDGE	
SEWER ONLY UPDATED: 12/26/97	
S12	GRAND STRAND WATER & SEWER AUTHORITY



TYPICAL SEWER FORCEMAIN
CHECK VALVE VAULT

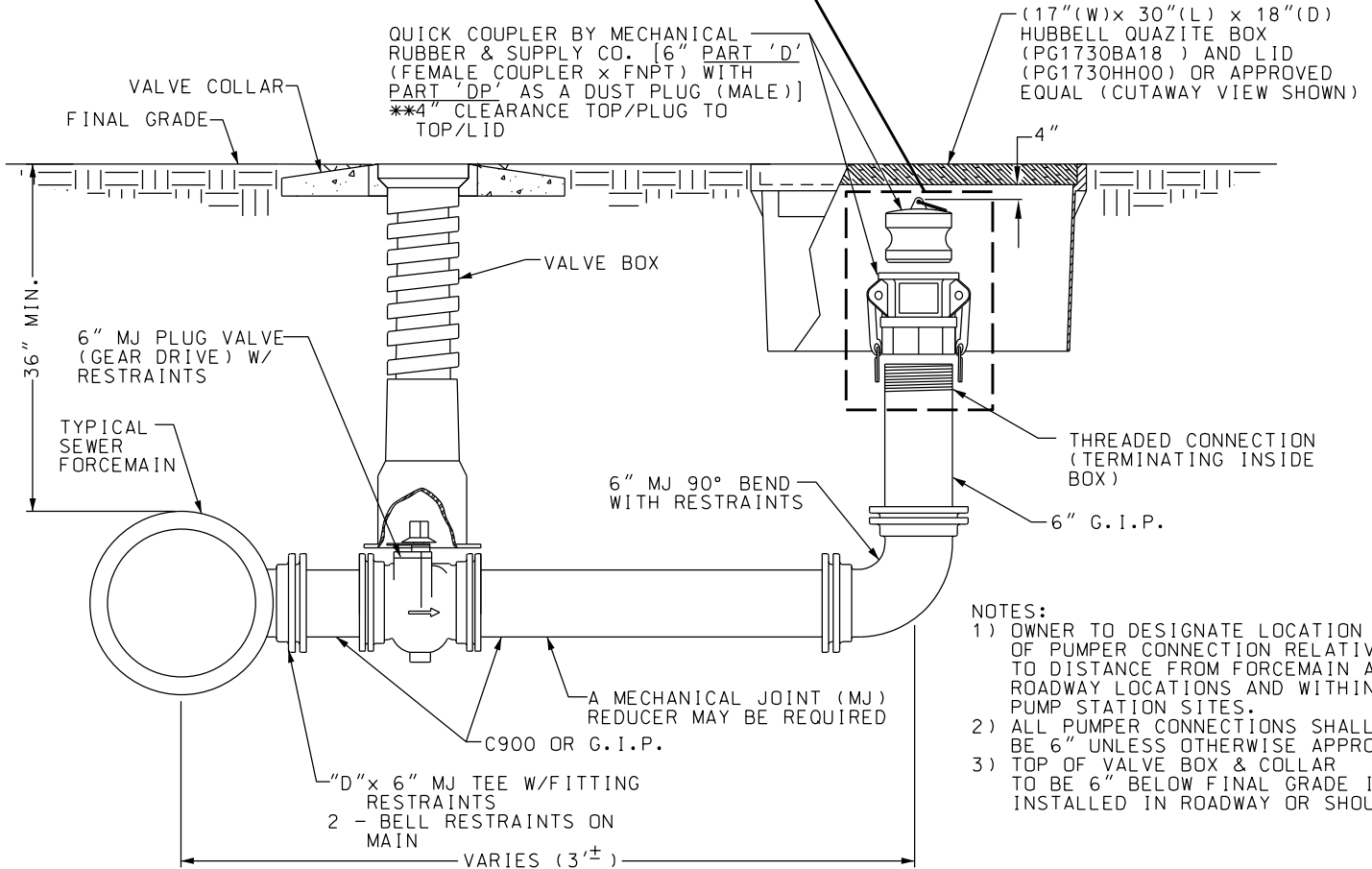
S13

LATEST REVISION:
07/6/2012 DRT PRESCRIBED D.I.P. FOR VAULT PIPING, AND REDIRECTED NOTE FOR PVC PIPING
BETWEEN P.S. AND PLUG VALVE.

TYPICAL SEWER FORCEMAIN CHECK VALVE VAULT	
SEWER ONLY UPDATED: 7/6/2012	S13
GRAND STRAND WATER & SEWER AUTHORITY	

ENCLOSURE BOX AND LID SHALL BE
 MINIMUM "TIER 22" LOAD RATING:
 VERTICAL: 22,500 LBS (DESIGN) / 33,750 LBS (TEST)
 LATERAL: 800 LBS/SF (DESIGN) / 1,200 LBS/SF (TEST)
 (DRIVEWAY, PARKING LOT, AND OFF-ROADWAY APPLICATIONS
 SUBJECT TO OCCASIONAL NON-DELIBERATE HEAVY
 VEHICULAR TRAFFIC)

SHOWN PREASSEMBLED



- NOTES:
- 1) OWNER TO DESIGNATE LOCATION OF PUMPER CONNECTION RELATIVE TO DISTANCE FROM FORCEMAIN AT ROADWAY LOCATIONS AND WITHIN PUMP STATION SITES.
 - 2) ALL PUMPER CONNECTIONS SHALL BE 6" UNLESS OTHERWISE APPROVED.
 - 3) TOP OF VALVE BOX & COLLAR TO BE 6" BELOW FINAL GRADE IF INSTALLED IN ROADWAY OR SHOULDER.

**TYPICAL PUMPER CONNECTION
 FOR FORCEMAIN FLUSHING**

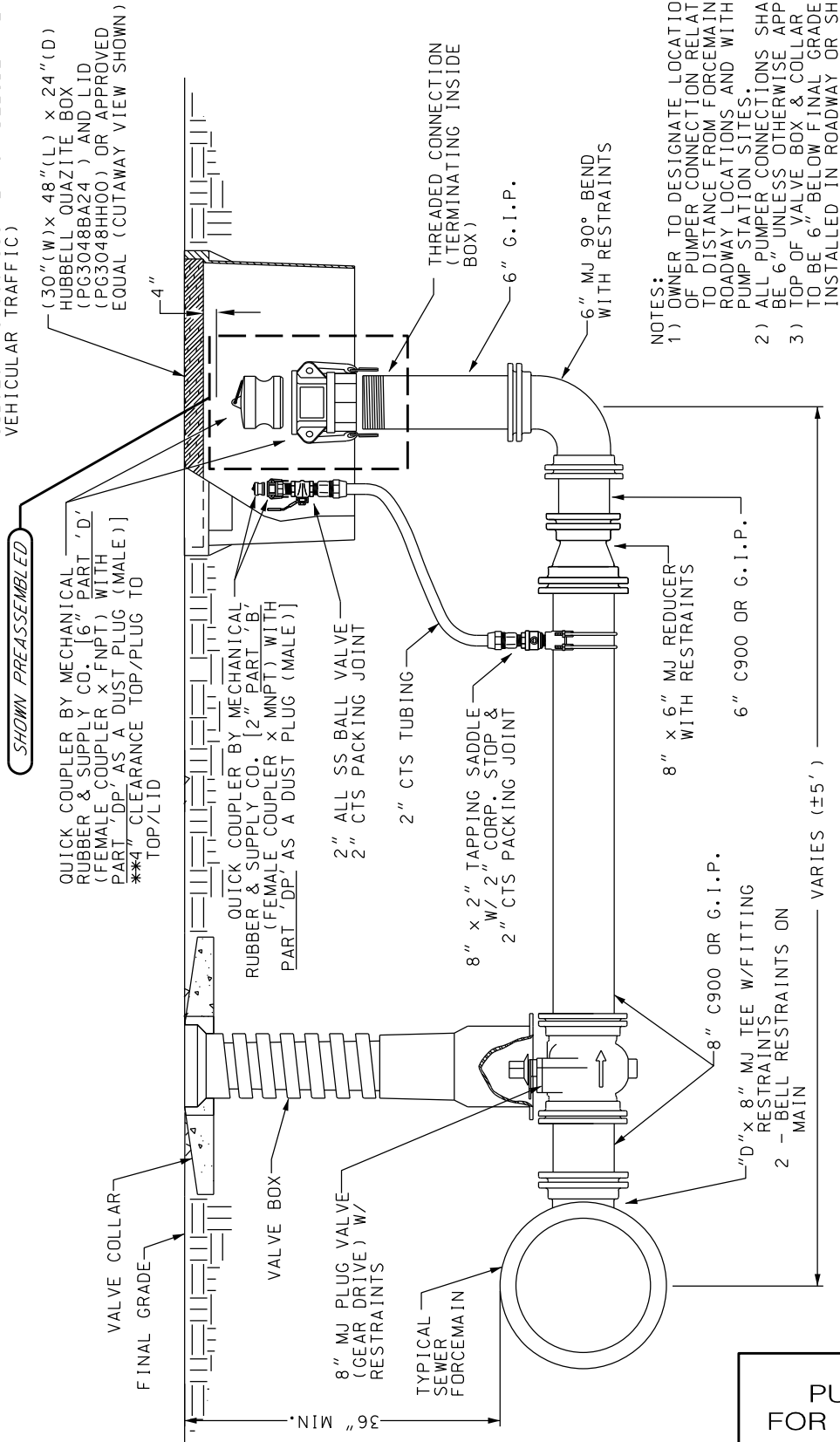
S14

LATEST REVISION:
 07/6/2012 DRT CORRECTED FLOW ARROW DIRECTION ON PLUG VALVE.
 12/02/2013 DRT ADDED NOTE FOR TIER 22 ENCLOSURE BOX AND LID.

TYPICAL PUMPER CONNECTION FOR FORCEMAIN FLUSHING	
SEWER ONLY UPDATED: 12/02/2013	
GRAND STRAND WATER & SEWER AUTHORITY	

S14

ENCLOSURE BOX AND LID SHALL BE MINIMUM TIER 22 LOAD RATING: VERTICAL: 22,500 LBS (DESIGN) / 33,750 LBS (TEST) LATERAL: 800 LBS/SF (DESIGN) / 1,200 LBS/SF (TEST) (DRIVEWAY, PARKING LOT, AND OFF-ROADWAY APPLICATIONS SUBJECT TO OCCASIONAL NON-DELIBERATE HEAVY VEHICULAR TRAFFIC)



- NOTES:
- 1) OWNER TO DESIGNATE LOCATION OF PUMPER CONNECTION RELATIVE TO DISTANCE FROM FORCEMAIN AT ROADWAY LOCATIONS AND WITHIN PUMP STATION SITES.
 - 2) ALL PUMPER CONNECTIONS SHALL BE 6" UNLESS OTHERWISE APPROVED.
 - 3) TOP OF VALVE BOX & COLLAR TO BE 6" BELOW FINAL GRADE IF INSTALLED IN ROADWAY OR SHOULDER.

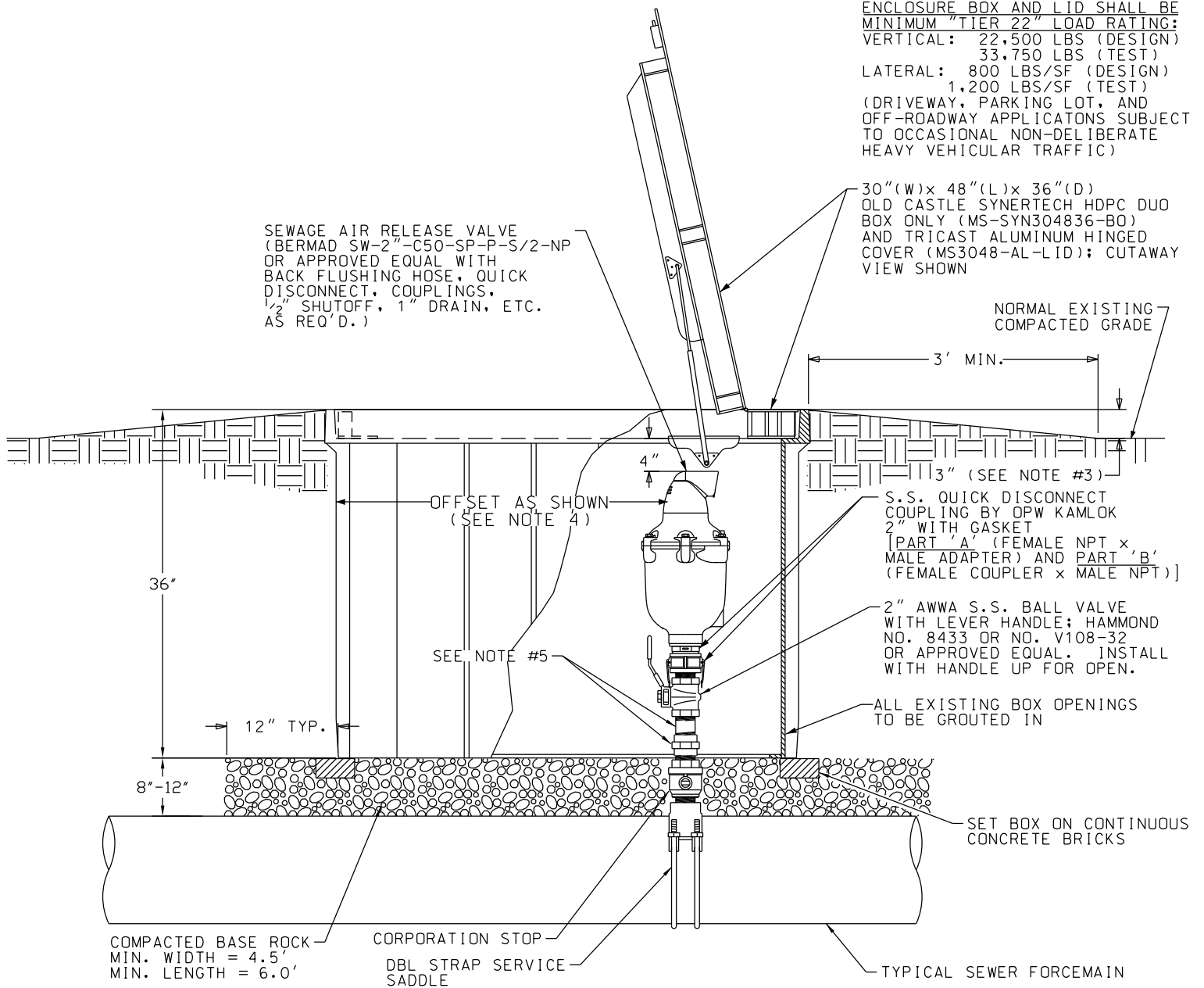
**PUMPER CONNECTION FOR
FORCEMAIN FLUSHING
(FOR IN-LINE BOOSTER PUMPING LOCATIONS)**

S14-A

TYPICAL PUMPER CONNECTION FOR FORCEMAIN FLUSHING (10" AND LARGER)	
SEWER ONLY	S14-A
ADDED: 02/20/2012	
UPDATED: 12/02/2013	
GRAND STRAND WATER & SEWER AUTHORITY	

LATEST REVISION:
 07/06/2012 DRT ADDED "FOR IN-LINE BOOSTER PUMPING LOCATIONS" TO TITLE.
 06/28/2013 DRT CHANGED QUAZITE BOX LID SPECIFICATION.
 12/02/2013 DRT CHANGED LID TO "HH" (TIER 22) AND ADDED NOTE FOR TIER 22 ENCLOSURE BOX AND LID.

ENCLOSURE BOX AND LID SHALL BE
 MINIMUM "TIER 22" LOAD RATING:
 VERTICAL: 22,500 LBS (DESIGN)
 33,750 LBS (TEST)
 LATERAL: 800 LBS/SF (DESIGN)
 1,200 LBS/SF (TEST)
 (DRIVEWAY, PARKING LOT, AND
 OFF-ROADWAY APPLICATIONS SUBJECT
 TO OCCASIONAL NON-DELIBERATE
 HEAVY VEHICULAR TRAFFIC)



SEWAGE AIR RELEASE VALVE
 (BERMAD SW-2"-C50-SP-P-S/2-NP
 OR APPROVED EQUAL WITH
 BACK FLUSHING HOSE, QUICK
 DISCONNECT, COUPLINGS,
 1/2" SHUTOFF, 1" DRAIN, ETC.
 AS REQ'D.)

30"(W) x 48"(L) x 36"(D)
 OLD CASTLE SYNERTECH HDPC DUO
 BOX ONLY (MS-SYN304836-B0)
 AND TRICAST ALUMINUM HINGED
 COVER (MS3048-AL-LID); CUTAWAY
 VIEW SHOWN

NORMAL EXISTING
 COMPACTED GRADE

3' MIN.

OFFSET AS SHOWN
 (SEE NOTE #4)

S.S. QUICK DISCONNECT
 COUPLING BY OPW KAMLOK
 2" WITH GASKET
 [PART 'A' (FEMALE NPT x
 MALE ADAPTER) AND PART 'B'
 (FEMALE COUPLER x MALE NPT)]

2" AWWA S.S. BALL VALVE
 WITH LEVER HANDLE; HAMMOND
 NO. 8433 OR NO. V108-32
 OR APPROVED EQUAL. INSTALL
 WITH HANDLE UP FOR OPEN.

ALL EXISTING BOX OPENINGS
 TO BE GROUTED IN

SET BOX ON CONTINUOUS
 CONCRETE BRICKS

COMPACTED BASE ROCK
 MIN. WIDTH = 4.5'
 MIN. LENGTH = 6.0'

CORPORATION STOP
 DBL STRAP SERVICE
 SADDLE

TYPICAL SEWER FORCEMAIN

NOTES:

- 1) USE AN APPROVED JOINT COMPOUND ON ALL THREADED CONNECTIONS.
- 2) ROTATION & LOCATION OF BOX SETTING TO BE APPROVED BY THE INSPECTOR PRIOR TO INSTALLATION.
- 3) ARV ASSEMBLIES INSTALLED IN ROAD RIGHTS-OF-WAY MUST BE FLUSH WITH EXISTING SHOULDER GRADE. INSTALLATIONS IN EASEMENT AREAS SHALL BE RAISED ABOVE EXISTING GRADE AS SHOWN IN DETAIL.
- 4) ARV ASSEMBLY SHOULD BE OFFSET TO ONE SIDE OF THE BOX AS SHOWN TO ALLOW EASIER ACCESS TO QUICK DISCONNECT AND BALL VALVE HANDLE.
- 5) 2" S.S. NIPPLES AND COUPLINGS SHALL BE USED IF NEEDED.

TYPICAL SEWER FORCEMAIN AIR RELEASE VALVE ASSEMBLY

S15

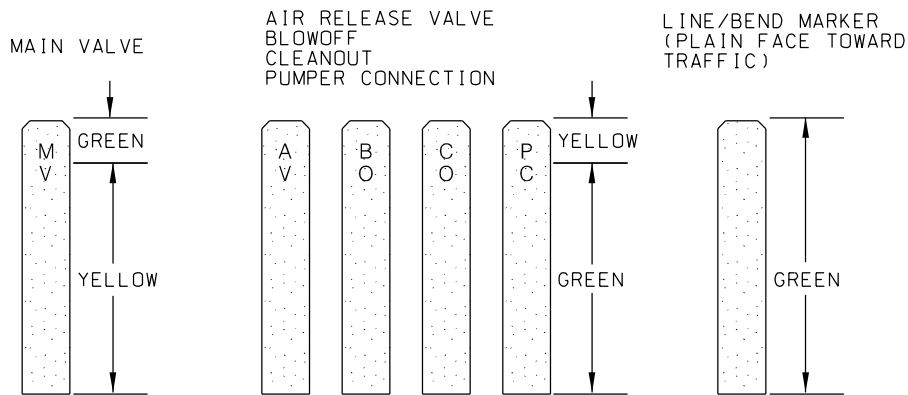
LATEST REVISION:
 07/18/2008 DRT
 07/08/2008 DRT

06/28/2013 DRT
 09/10/2013 DRT
 12/02/2013 DRT

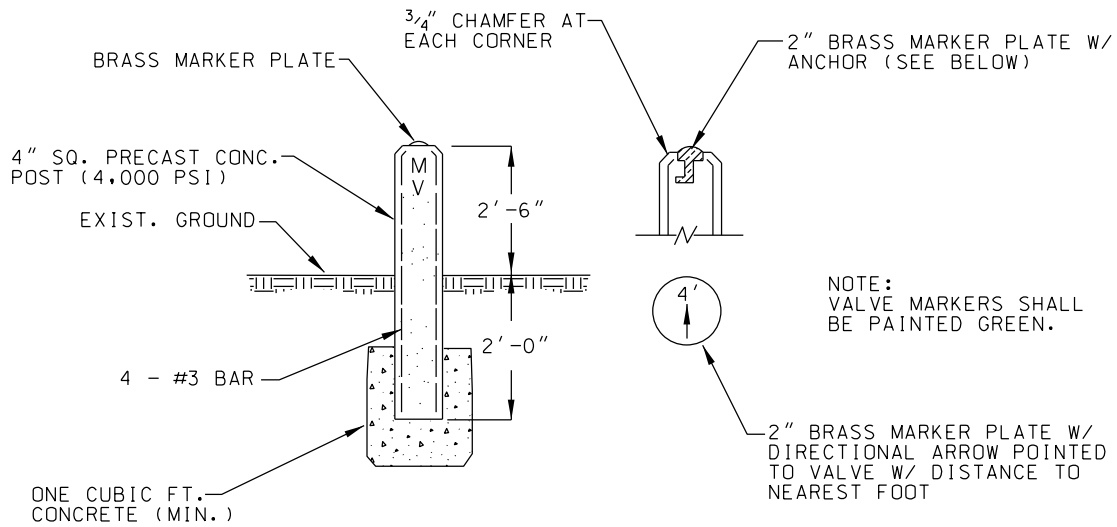
06/01/2018 DRT
 12/17/2018 DRT

DESCRIBED PARTS 'A' & 'B' FOR QUICK DISCONNECT. SPECIFIED LARGER ENCLOSURE AND CHANGED SUPPLIER FROM STRONGWELL TO HUBBELL. REMOVED NOTE FOR STABILITY BLOCKING INSIDE
 CHANGED QUAZITE BOX LID SPECIFICATION.
 CHANGED QUAZITE BOX SPECIFICATION (DEPTH).
 CHANGED LID TO "HH" (TIER 22) AND ADDED NOTE FOR TIER 22 ENCLOSURE BOX AND LID. DELETED "H12 LOADING LID REQUIRED" NOTE.
 CHANGED BOX (OLD CASTLE SYNERTECH) AND LID (TRICAST ALUMINUM HINGED COVER) SPECIFICATIONS.
 CHANGED ARV TO "BERMAD SW-2"-C50-SP-P-S/2-NP OR APPROVED EQUAL."

TYPICAL SEWER FORCEMAIN AIR RELEASE VALVE ASSEMBLY	
SEWER ONLY UPDATED: 12/17/2018	S15
GRAND STRAND WATER & SEWER AUTHORITY	



CONCRETE MARKER PAINT CODES



TYPICAL CONCRETE MARKERS

(VALVE, ARV, BLOWOFF, CLEANOUT, PUMPER CONNECTION, LINE/BEND)

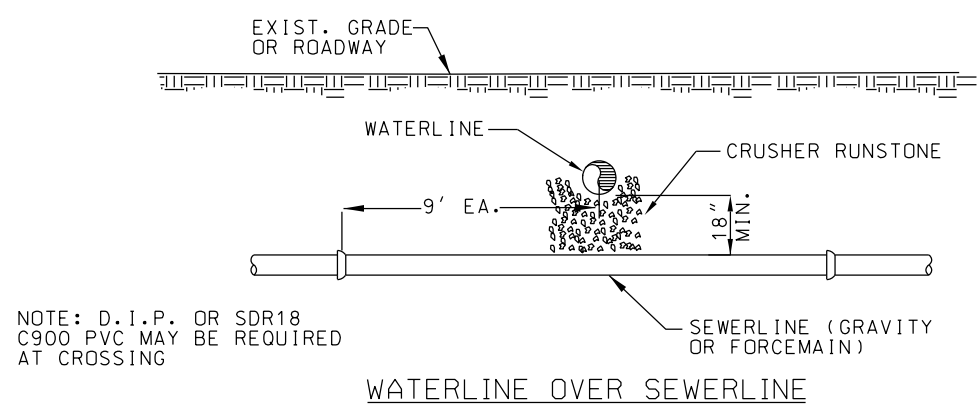
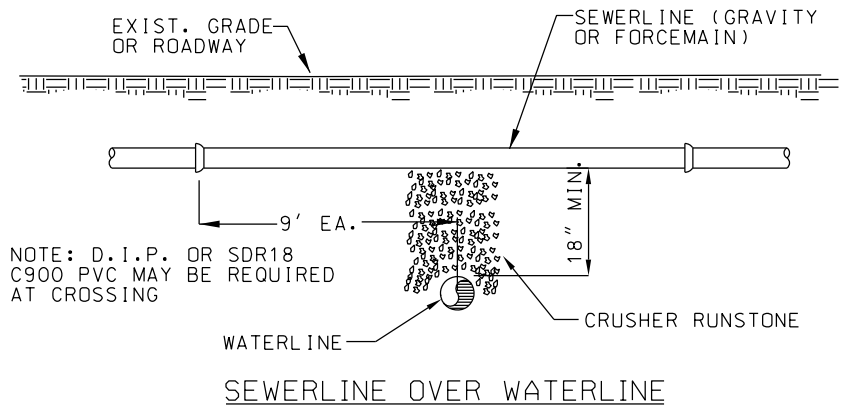
S16

TYPICAL CONCRETE MARKERS

SEWER ONLY
 UPDATED: 5/13/02

S16

GRAND STRAND
 WATER & SEWER AUTHORITY

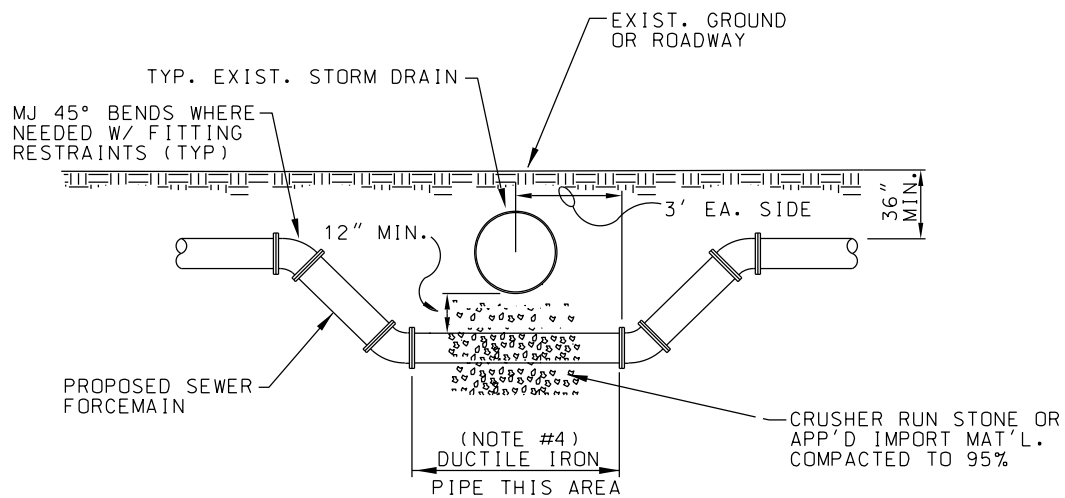


WATERLINE CROSSINGS

S17

WATERLINE CROSSINGS	
SEWER ONLY UPDATED: 08/28/06	S17
GRAND STRAND WATER & SEWER AUTHORITY	

LATEST REVISION:
08/28/06 DRT CORRECTED THE NOTE ABOUT PIPE MATERIAL POSSIBLY
REQUIRED FOR WATERLINE CROSSINGS.



NOTES:

- 1) IN CASES WHERE D.I.P. FORCEMAIN IS NEEDED AT STORM DRAIN, D.I.P. SECTION MUST BE AT A SUFFICIENT ELEVATION TO KEEP IT FULL AT ALL TIMES. IF SECTION OF FORCEMAIN CALLING FOR D.I.P. DOES NOT MEET THIS REQUIREMENT, THEN C900 SDR 18 PVC PIPE SHALL BE USED INSTEAD.
- 2) DEPRESS FORCEMAIN WHENEVER POSSIBLE TO ACCOMPLISH CLEARANCE WITHOUT USE OF FITTINGS.
- 3) SEWER FORCEMAIN MAY BE PLACED ABOVE STORM DRAIN IF THERE IS 12" MIN. CLEARANCE OF STORM DRAIN, 30" GROUND COVER ABOVE AND AROUND, AND IT MEETS REQUIREMENT OF NOTE #1.
- 4) SEE PROJECT DRAWINGS FOR USE OF DR18 C900 PVC WHERE APPLICABLE.

TYPICAL STORM DRAIN CROSSING

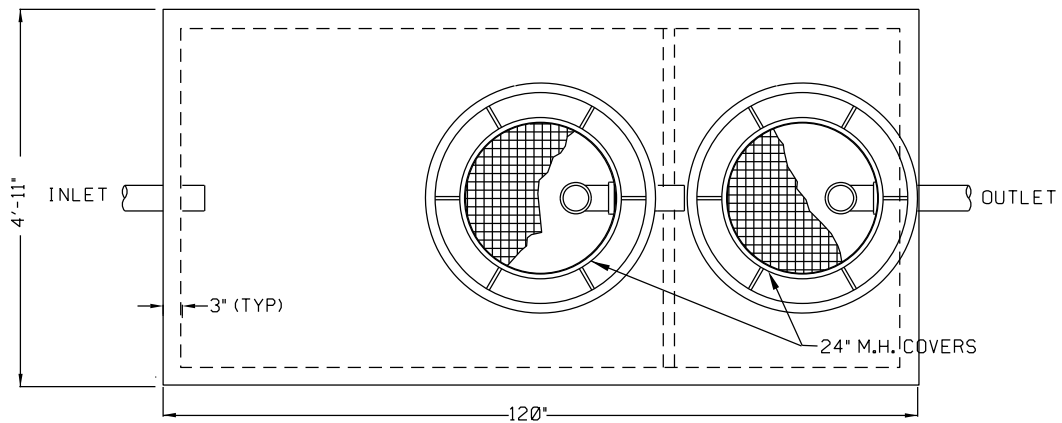
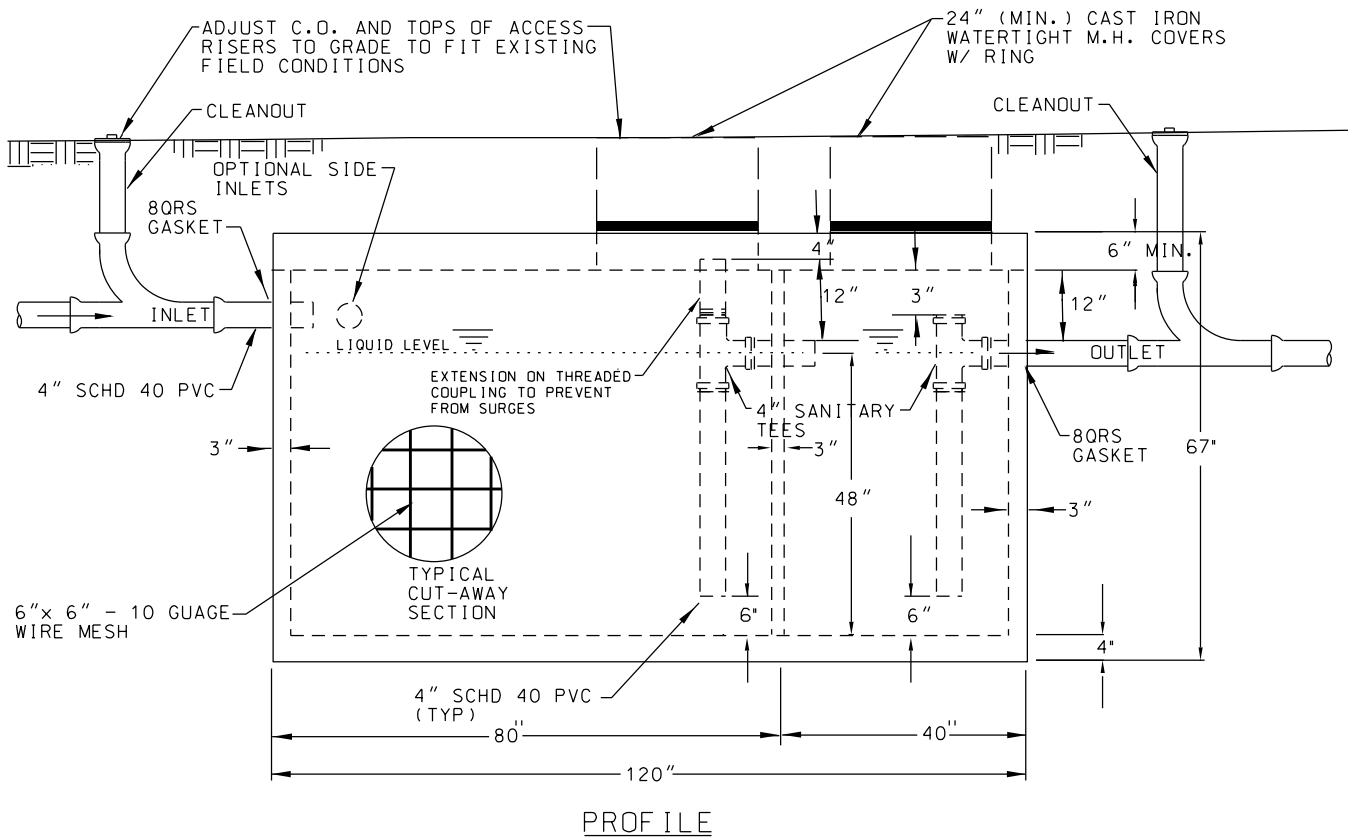
S18

TYPICAL
STORM DRAIN CROSSING

SEWER ONLY
UPDATED: 08/28/06

S18

GRAND STRAND
WATER & SEWER AUTHORITY



CONCRETE - 4000 PSI
 REINFORCEMENT - 6"x 6" - 10 GAUGE WIRE MESH
 LENGTH TO WIDTH RATIO - 2:1
 LOAD DESIGN - 150 LBS. PER SQUARE FOOT

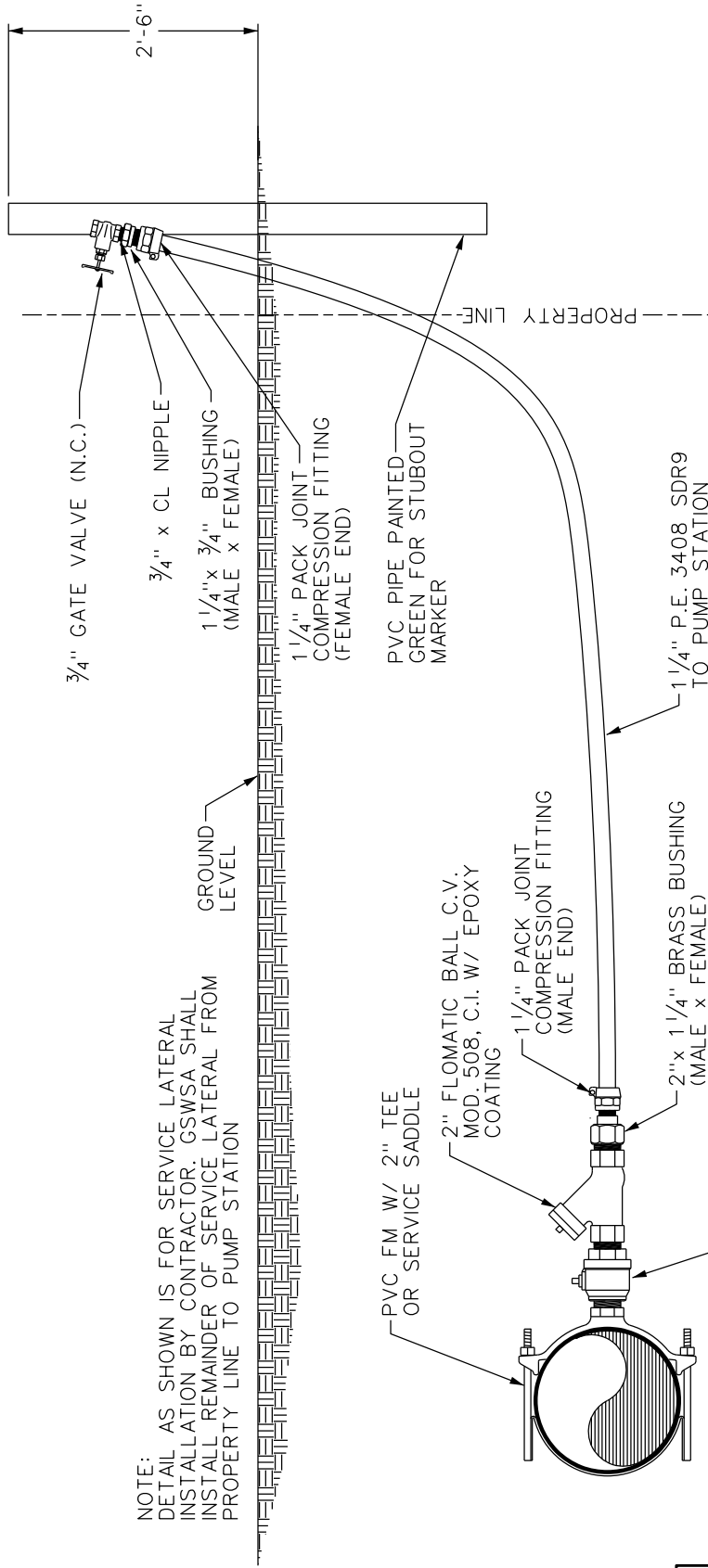
PLAN

LIFTING HOOKS TO BE SUPPLIED.
 LID ON TANK TO BE SUPPLIED FOR TRAFFIC
 LOADING.

GREASE TRAP (1,000 GAL. CAP.)

S19

TYPICAL GREASE TRAP	
SEWER ONLY UPDATED: 5/13/02	S19
GRAND STRAND WATER & SEWER AUTHORITY	



NOTE:
 DETAIL AS SHOWN IS FOR SERVICE LATERAL
 INSTALLATION BY CONTRACTOR. GSWA SHALL
 INSTALL REMAINDER OF SERVICE LATERAL FROM
 PROPERTY LINE TO PUMP STATION

**FORCEMAIN – LATERAL DETAIL
 FOR E-1 OR S.T.E.P. TANK INSTALLATIONS**

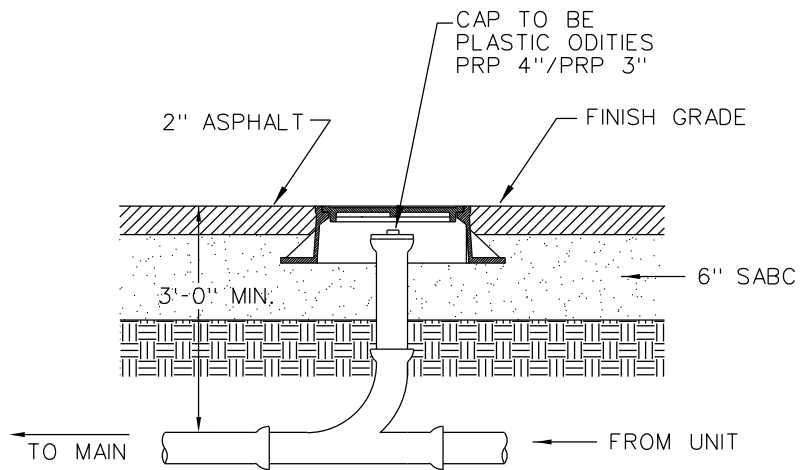
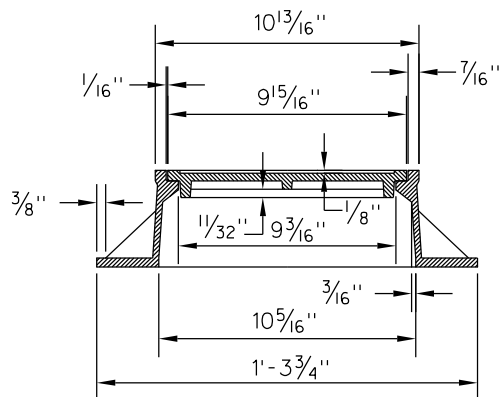
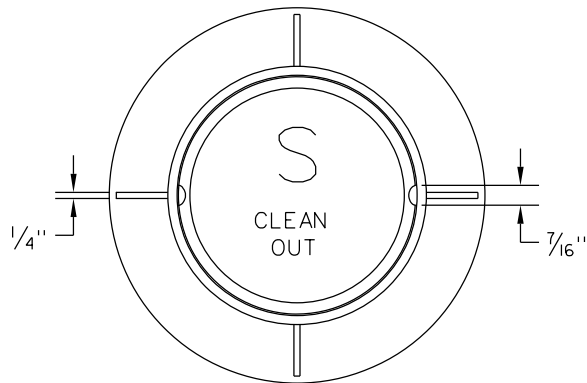
S20

TYPICAL
 FORCEMAIN LATERAL
 FOR E-1 OR S.T.E.P. TANK

SEWER ONLY
 UPDATED: 5/20/08

S20

GRAND STRAND
 WATER & SEWER AUTHORITY

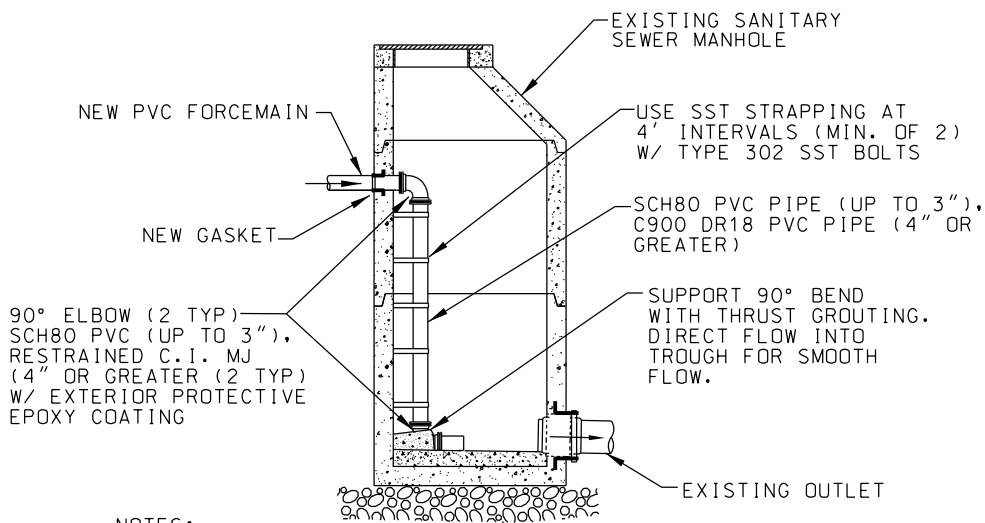


SEWER SERVICE CLEAN-OUT
WITH TRAFFIC-DUTY
MINI-MANHOLE COVER

TRAFFIC-DUTY MINI-MANHOLE COVER
FOR SEWER CLEANOUT

S22

MINI MANHOLE COVER	
SEWER ONLY UPDATED: 9/1/98	S22
GRAND STRAND WATER & SEWER AUTHORITY	



NOTES:

- 1) CORE-DRILL EXISTING MANHOLE WALL FOR NEW FM INSERTION. FILL ANNULAR SPACE AROUND PIPE WITH EXPANDING MORTAR.
- 2) ALL PIPE ENTERING MANHOLE WALL OR INSIDE MANHOLE SHALL BE SCH80 PVC (UP TO 3'') OR C900 DR18 PVC (4'' OR GREATER).
- 3) SPECIAL AND SPECIFIC APPROVAL FOR THE USE OF THIS INSIDE DROP CONDITION MUST BE OBTAINED FROM THE AUTHORITY PRIOR TO INCLUDING IT WITHIN ANY INSTALLATION.
- 4) MANHOLE TO BE COATED PER SECTION 7.1.7 OF THE GSWA SEWER SYSTEM STANDARDS AND SPECIFICATIONS.

TYPICAL INSIDE DROP MANHOLE
FOR FORCEMAIN TIE-IN TO
EXISTING SANITARY MANHOLE

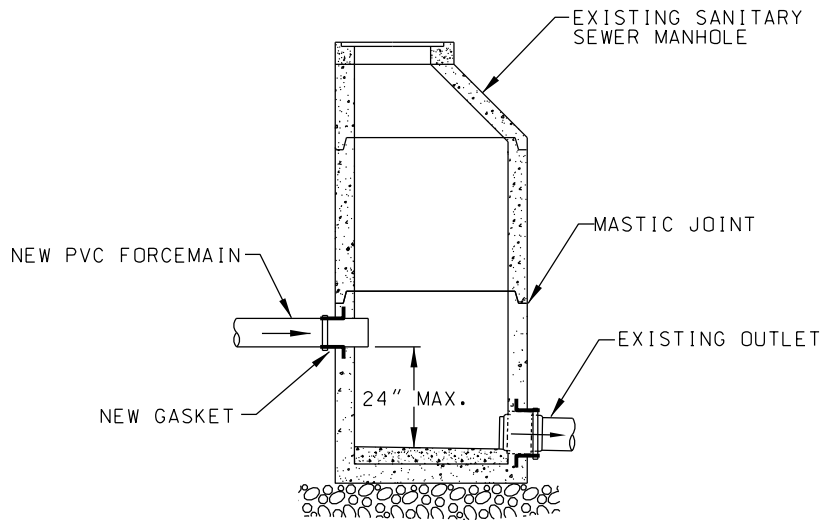
S23

TYPICAL INSIDE DROP MANHOLE
FOR FORCEMAIN TIE-IN TO
EXISTING SANITARY MANHOLE

SEWER ONLY
UPDATED: 5/21/2015

S23

GRAND STRAND
WATER & SEWER AUTHORITY



NOTES:

- 1) CORE-DRILL EXISTING MANHOLE WALL FOR NEW FM INSERTION. FILL ANNULAR SPACE AROUND PIPE WITH NON-SHRINK GROUT. FINISHED NEW PIPE ENTRANCE TO BE WATERTIGHT.
- 2) PIPE ENTERING MANHOLE WALL SHALL BE SCH80 PVC (UP TO 3") OR C900 DR18 PVC (4" OR GREATER).

TYPICAL FORCEMAIN TIE-IN TO EXISTING SANITARY MANHOLE

S24

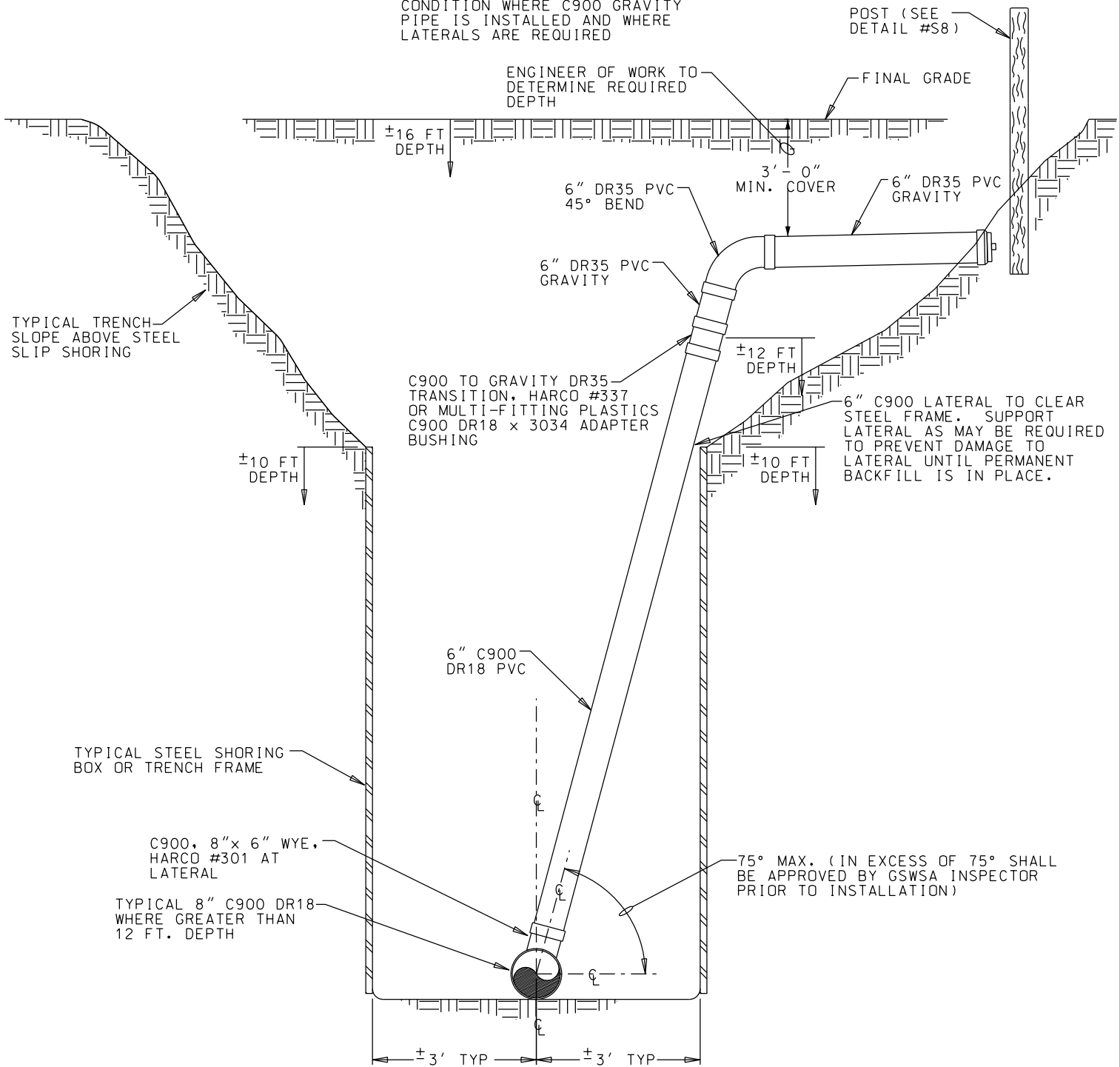
TYPICAL FORCEMAIN TIE-IN TO EXISTING SANITARY MANHOLE

SEWER ONLY
 UPDATED: 5/30/02

S24

GRAND STRAND
 WATER & SEWER AUTHORITY

CONDITION WHERE C900 GRAVITY PIPE IS INSTALLED AND WHERE
 LATERALS ARE REQUIRED



**TYPICAL GRAVITY SEWER
 IN EXCESS OF 12' DEPTH
 (USE OF C900 PIPE & LATERAL CONNECTION)**

S25

TYPICAL GRAVITY SEWER
 IN EXCESS OF 12' DEPTH
 (USE OF C900 PIPE & LATERAL
 CONNECTION)

SEWER ONLY
 UPDATED: 07/03/19

S25

GRAND STRAND
 WATER & SEWER AUTHORITY

LATEST REVISION:
 07/03/2019 DRT ADDED 36" COVER NOTE.