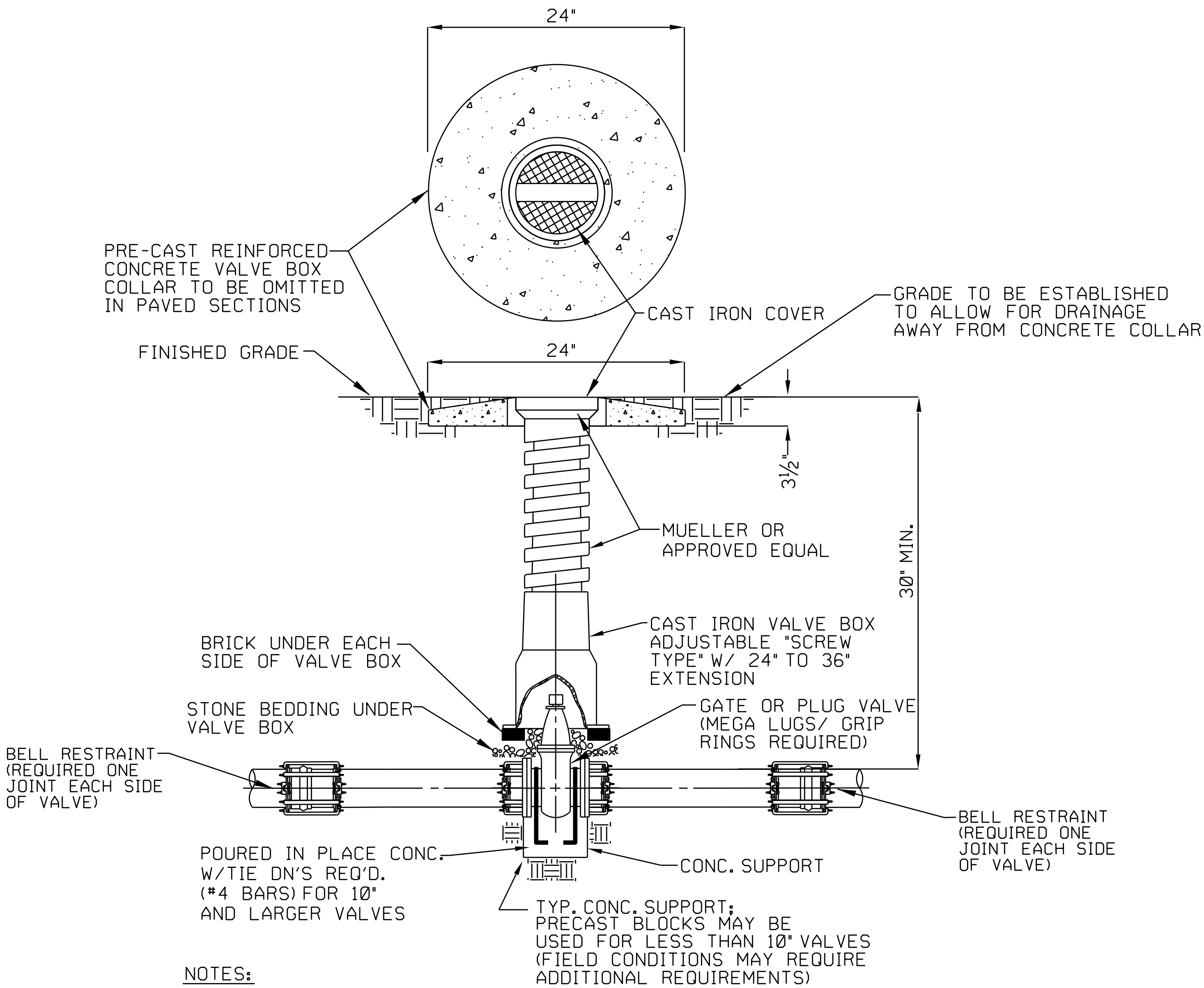


NOTES:

(1) SEE "TYPICAL FITTING AND JOINT RESTRAINT" DETAIL FOR VALVE RESTRAINTS.

(2) TOP OF VALVE BOX AND COLLAR SHALL BE PAINTED GREEN FOR SEWER FM AND BLUE FOR WATER.

(3) EXTENSION STEM WILL BE REQUIRED TO BE WITHIN 2 FT. OF THE SURFACE IF OPERATING NUT IS OVER 5 FT. BELOW GRADE. EXTENSIONS SHALL BE PERMANENTLY ATTACHED TO VALVE NUT AND SHALL BE PROVIDED WITH HORIZONTAL SPACERS FOR BERTICLE ALIGNMENT WITHIN THE VALVE BOX.

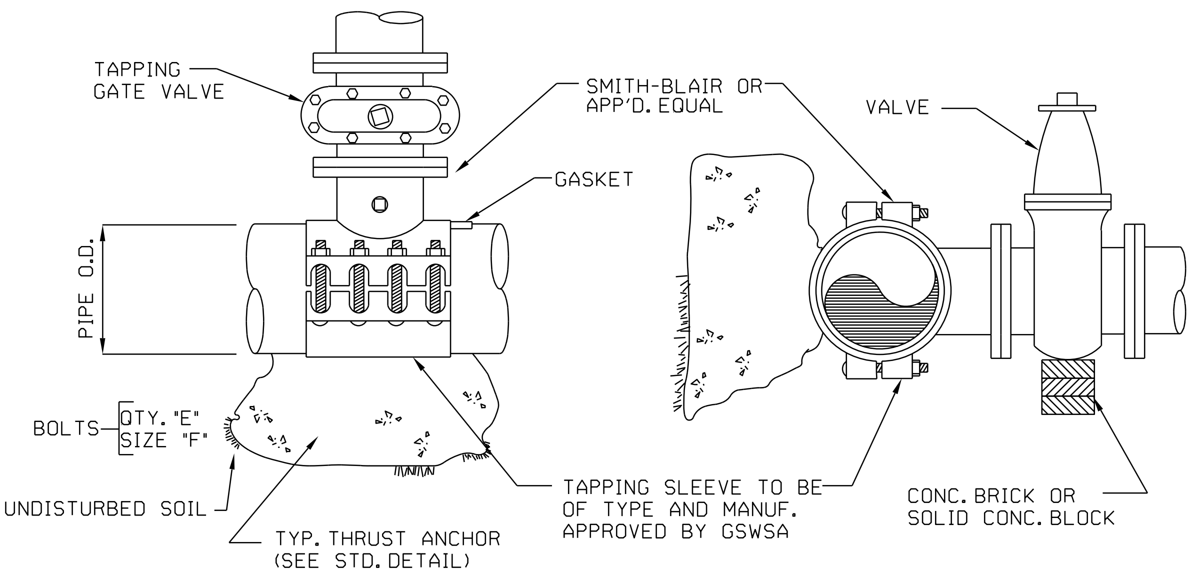
(4) PER GSWSA STANDARDS, MATERIAL APPROVAL THRU THE SUBMITTAL PROCESS ARE REQUIRED PRIOR TO ANY INSTALLATIONS.

TYPICAL VALVE AND VALVE BOX

WS1

LATEST REVISION:
08/28/06 DRT DELETED "GROUT ANNULAR SPACE" NOTE FOR AREA BETWEEN VALVE BOX AND VALVE COLLAR.

TYPICAL VALVE AND VALVE BOX	
SEWER ONLY UPDATED: 08/28/06	WS1
GRAND STRAND WATER & SEWER AUTHORITY	

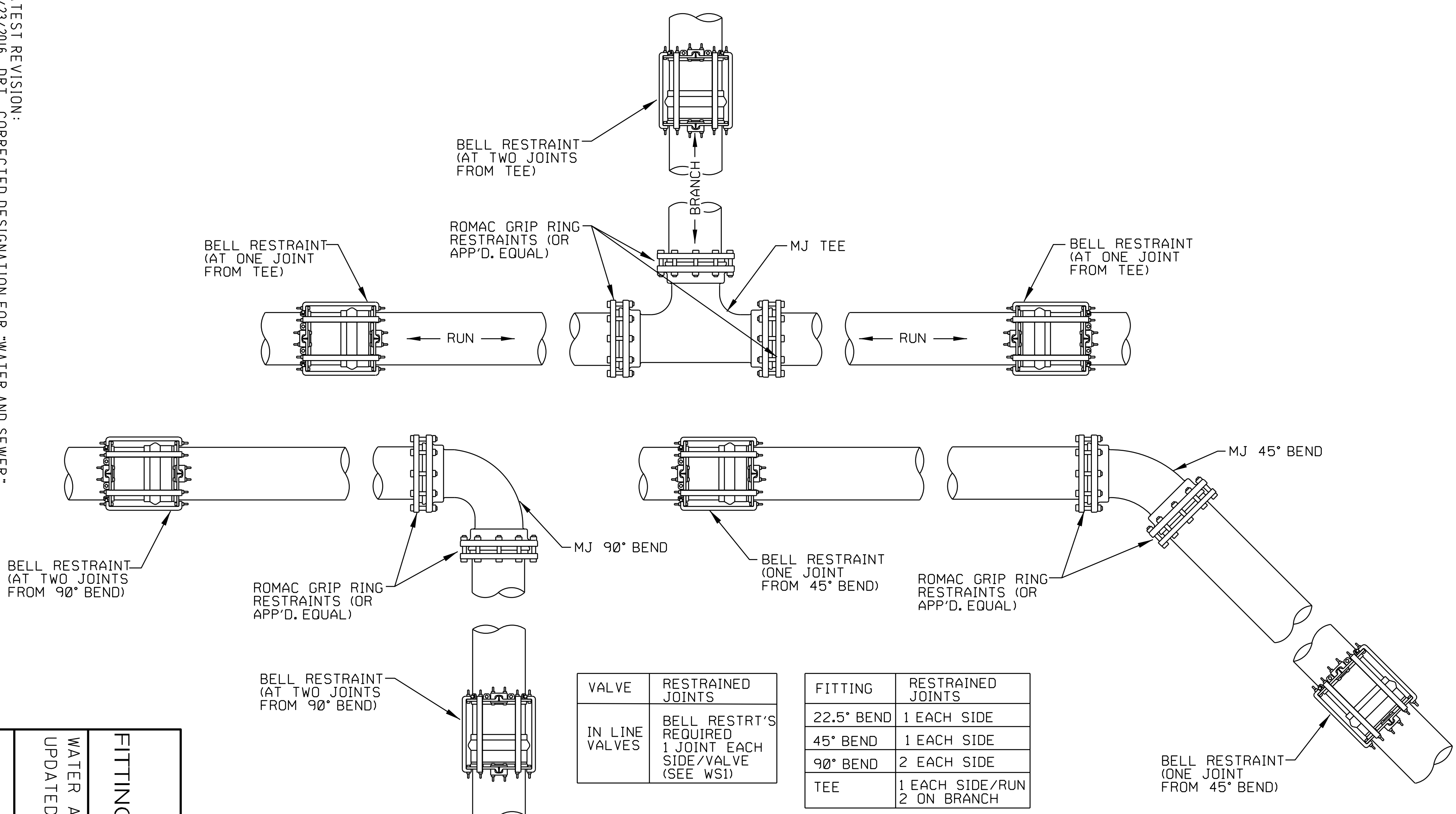


TYPICAL TAPPING SLEEVE

(FOR WATERLINE OR SEWER FORCEMAIN)

WS2

TYPICAL TAPPING SLEEVE	
WATER OR SEWER UPDATED: 2/16/98	WS2
GRAND STRAND WATER & SEWER AUTHORITY	



VALVE	RESTRAINED JOINTS
IN LINE VALVES	BELL RESTRT'S REQUIRED 1 JOINT EACH SIDE/VALVE (SEE WS1)

FITTING	RESTRAINED JOINTS
22.5° BEND	1 EACH SIDE
45° BEND	1 EACH SIDE
90° BEND	2 EACH SIDE
TEE	1 EACH SIDE/RUN 2 ON BRANCH

NOTES:

1. TABLE OF NO. OF RESTRAINT'S REQUIRED ARE FOR SIZES THROUGH 12"; FOR LARGER THAN 12" NO. REQUIRED IS TO BE DETERMINED BY GSWSA.
2. PER GSWSA STANDARDS, MATERIAL APPROVAL THRU THE SUBMITTAL PROCESS ARE REQUIRED PRIOR TO ANY INSTALLATIONS.
3. PIPE BELL RESTRAINTS ARE REQUIRED TO BE INSTALLED ON THE TWO JOINTS (MINIMUM) IMMEDIATELY FOLLOWING THE PE/MJ ADAPTERS ON EACH END OF HDPE PIPE.

TYPICAL FITTING AND JOINT RESTRAINT

WS3

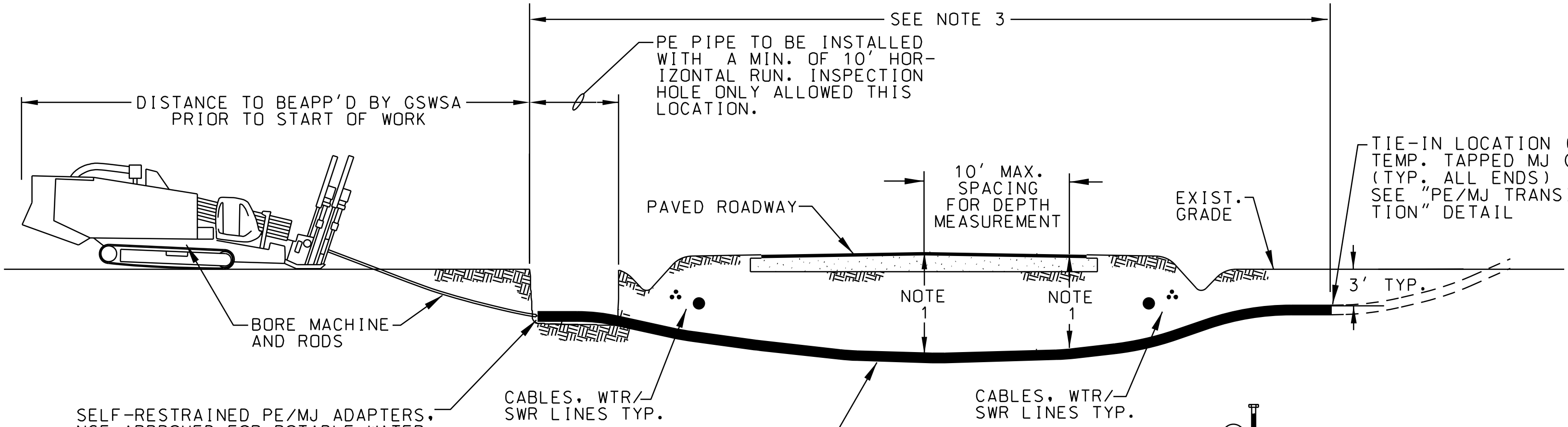
LATEST REVISION:
05/23/2016 DRT CORRECTED DESIGNATION FOR "WATER AND SEWER"

TYPICAL
FITTING AND JOINT RESTRAINT

WATER AND SEWER
UPDATED: 5/23/2016

WS3

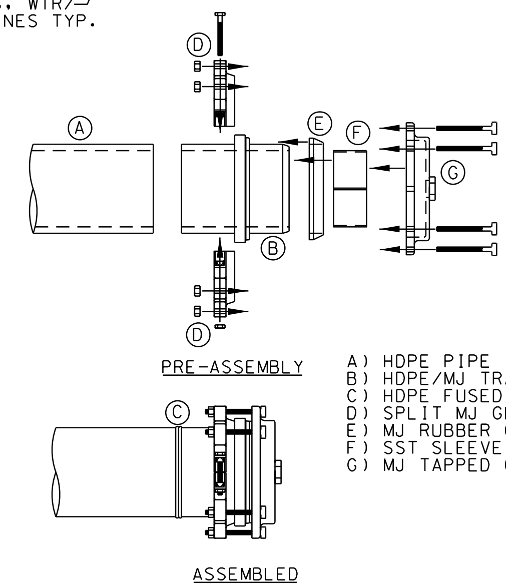
GRAND STRAND
WATER & SEWER AUTHORITY



SELF-RESTRAINED PE/MJ ADAPTERS, NSF APPROVED FOR POTABLE WATER WITH SST SLEEVE INSERTS AS MANUF. BY JCM OR APP'D EQUAL. ADAPTER BY CENTRAL, DRISCO, FIFE OR APP'D EQUAL; ADAPTERS TO BE SDR 17 (TYP. BOTH ENDS). SEE "PE/MJ TRANSITION" DETAIL.

NOTES:

1. AN ELECTRONICALLY-DEVELOPED PROFILE AND PLAN SHALL BE PROVIDED FROM ENTRY TO EXIT FOR EACH DIRECTIONAL BORE SECTION BY THE DIRECTIONAL BORE CONTRACTOR. THIS SHALL INCLUDE ACCURATE HORIZONTAL AND VERTICAL DIMENSIONS.
2. ALL BORE SECTIONS SHALL BE HYDROSTATICALLY TESTED PER GSWSA STANDARDS BOTH UPON COMPLETION OF THE ABOVE-GROUND FUSION OPERATION AND AGAIN AFTER INSTALLATION, WHICH IS PRIOR TO CONNECTION TO THE MAIN PROJECT WATER/SEWER LINE. A FINAL TEST WILL BE A PART OF THE TOTAL MAIN LINE SYSTEM TEST.
3. LENGTH OF CROSSING, LOCATION OF INSPECTION/OBSERVATION EXCAVATION, NUMBER OF P.E. PIPE JOINTS, LOCATION OF BORE MACHINE, AUGER ENTRANCE LOCATION AND TIE-IN POINTS ARE TO BE APPROVED BY GSWSA PRIOR TO ANY START OF WORK OR ORDERING OF MATERIALS.
4. THIS DETAIL IS ALSO APPLICABLE TO STREAMS, WETLANDS, LARGE STORM DRAINS AND SIMILAR APPLICATIONS FOR DIRECTIONAL BORE WITH POLYETHYLENE PIPE.
5. THE BORE DEVELOPED FOR THE LEAD END OF THE PIPE SHALL BE KEPT AT A MINIMUM DIAMETER FOR THE PIPE INSTALLATION. THE AUGER HEAD SIZE SHALL BE APPROVED BY THE AUTHORITY PRIOR TO THE START OF WORK. THE LEADING END SHALL BE PULLED THROUGH WITHOUT THE D.I. M.J. RING FLANGE ATTACHED FOR LARGER THAN 6" PIPE INSTALLATIONS. THE D.I. M.J. RING FLANGE FOR SAID LEADING END SHALL BE INSTALLED AFTER THE PIPE INSTALLATION WITH THE USE OF A SPLIT D.I. M.J. FLANGE PER THE DETAIL DRAWING.
6. THE MANUFACTURER AND TYPE OF DRILLERS MUD SELECTED FOR USE SHALL BE APPROVED BY THE AUTHORITY PRIOR TO THE START OF WORK.
7. PIPE BELL RESTRAINTS ARE REQUIRED TO BE INSTALLED ON THE TWO JOINTS (MINIMUM) IMMEDIATELY FOLLOWING THE PE/MJ ADAPTERS ON EACH END OF HDPE PIPE.
8. HDPE MJ TRANSITION ADAPTERS TO BE SIZE-ON-SIZE. ANY REQUIRED CHANGE IN PIPE DIAMETER SHALL BE MADE USING DUCTILE IRON (D.I.) MJ FITTING WITH RESTRAINTS. HDPE REDUCERS ARE NOT ALLOWED.
9. HDPE MJ TRANSITION ADAPTER "DR" TO MATCH "DR" OF HDPE BORE PIPE BEING INSTALLED.



A) HDPE PIPE
B) HDPE/MJ TRANSITION FITTING
C) HDPE FUSED JOINT
D) SPLIT MJ GLAND, D.I.
E) MJ RUBBER GASKET
F) SST SLEEVE INSERT
G) MJ TAPPED CAP

PE/MJ TRANSITION ASSEMBLY

TYPICAL HDPE DIRECTIONAL BORE

WS4

LATEST REVISIONS:
05/23/2016 DRT ADDED NOTE #9
06/27/2016 DRT REVISED TITLE

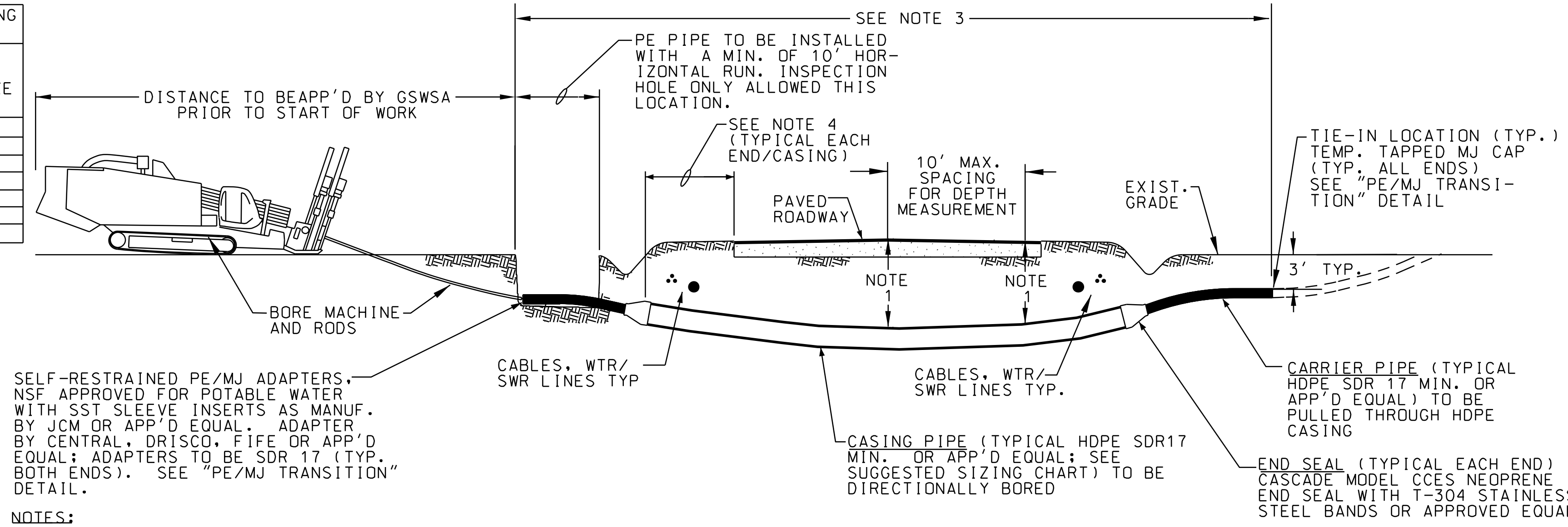
TYPICAL
HDPE DIRECTIONAL BORE

WATER OR SEWER
UPDATED: 6/27/2016

WS4

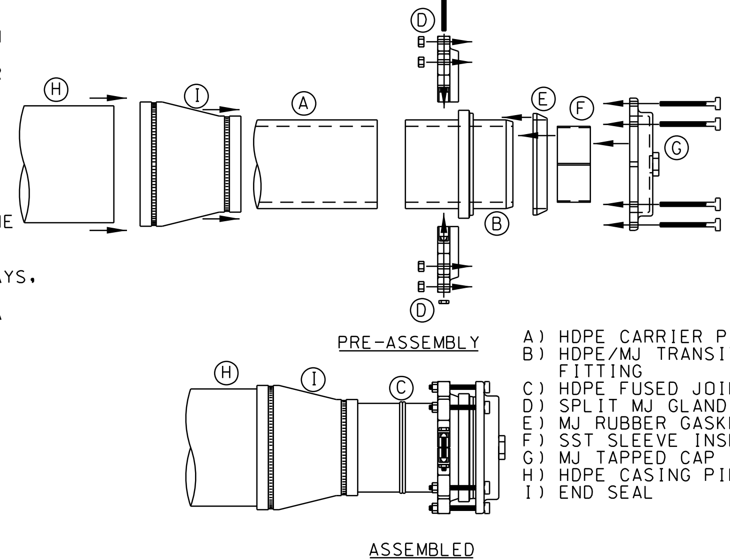
GRAND STRAND
WATER & SEWER AUTHORITY

SUGGESTED PIPE SIZING (HDPE SDR17)	
NOMINAL CARRIER PIPE SIZE (IN.)	NOMINAL CASING PIPE SIZE (IN.)
3	6
4	8
6	10
8	12
10	16
12	18
14	20



NOTES:

1. AN ELECTRONICALLY-DEVELOPED PROFILE AND PLAN SHALL BE PROVIDED FROM ENTRY TO EXIT FOR EACH DIRECTIONAL BORE SECTION BY THE DIRECTIONAL BORE CONTRACTOR. THIS SHALL INCLUDE ACCURATE HORIZONTAL AND VERTICAL DIMENSIONS.
2. ALL BORE SECTIONS SHALL BE HYDROSTATICALLY TESTED PER GSWSA STANDARDS BOTH UPON COMPLETION OF THE ABOVE-GROUND FUSION OPERATION AND AGAIN AFTER INSTALLATION, WHICH IS PRIOR TO CONNECTION TO THE MAIN PROJECT WATER/SEWER LINE. A FINAL TEST WILL BE A PART OF THE TOTAL MAIN LINE SYSTEM TEST.
3. LENGTH OF CROSSING, LOCATION OF INSPECTION/OBSERVATION EXCAVATION, NUMBER OF P.E. PIPE JOINTS, LOCATION OF BORE MACHINE, AUGER ENTRANCE LOCATION AND TIE-IN POINTS ARE TO BE APPROVED BY GSWSA PRIOR TO ANY START OF WORK OR ORDERING OF MATERIALS.
4. ON CONVENTIONAL HIGHWAYS, AS A MINIMUM, THE CASING PIPE SHALL EXTEND TO THE SHOULDER BREAK OR 6 FEET BEYOND THE EDGE OF PAVEMENT ON FILL SLOPES, WHICHEVER IS THE GREATER; 3 FEET BEYOND THE DITCH LINE IN CUTS; AND ON CURBED SECTIONS TO THE BACK OF THE SIDEWALK AREA. ON FREEWAYS, EXPRESSWAYS, AND OTHER CONTROLLED ACCESS HIGHWAYS, THE ENCASEMENT WILL BE REQUIRED TO EXTEND TO THE ACCESS CONTROL LINES, TO THE OUTSIDE OF FRONTAGE ROADS, OR A SUFFICIENT DISTANCE TO ALLOW FOR FUTURE HIGHWAY IMPROVEMENTS. EXCEPTIONS TO THE ABOVE DEFINED ENCASEMENT LIMITS MUST BE JUSTIFIED BY THE UTILITY COMPANY AND APPROVED BY THE SCDOT ENGINEER.
5. THE BORE DEVELOPED FOR THE LEAD END OF THE CASING PIPE SHALL BE KEPT AT A MINIMUM DIAMETER FOR THE PIPE INSTALLATION. THE AUGER HEAD SIZE SHALL BE APPROVED BY THE AUTHORITY PRIOR TO THE START OF WORK. THE LEADING END OF THE CARRIER PIPE SHALL BE PULLED THROUGH WITHOUT THE HDPE/MJ TRANSITION FITTING AND D.I. M.J. RING FLANGE ATTACHED. THE HDPE/MJ TRANSITION FITTING AND D.I. M.J. RING FLANGE FOR SAID LEADING END SHALL BE INSTALLED AFTER THE CARRIER PIPE INSTALLATION WITH THE USE OF A SPLIT D.I. M.J. FLANGE PER THE DETAIL DRAWING.
6. THE MANUFACTURER AND TYPE OF DRILLERS MUD SELECTED FOR USE SHALL BE APPROVED BY THE AUTHORITY PRIOR TO THE START OF WORK.
7. PIPE BELL RESTRAINTS ARE REQUIRED TO BE INSTALLED ON THE TWO JOINTS (MINIMUM) IMMEDIATELY FOLLOWING THE PE/MJ ADAPTERS ON EACH END OF HDPE PIPE.
8. HDPE MJ TRANSITION ADAPTERS TO BE SIZE-ON-SIZE. ANY REQUIRED CHANGE IN PIPE DIAMETER SHALL BE MADE USING DUCTILE IRON (D.I.) MJ FITTING WITH RESTRAINTS. HDPE REDUCERS ARE NOT ALLOWED.
9. HDPE MJ TRANSITION ADAPTER "DR" TO MATCH "DR" OF HDPE BORE PIPE BEING INSTALLED.



A) HDPE CARRIER PIPE
B) HDPE/MJ TRANSITION FITTING
C) HDPE FUSED JOINT
D) SPLIT MJ GLAND, D.I.
E) MJ RUBBER GASKET
F) SST SLEEVE INSERT
G) MJ TAPPED CAP
H) HDPE CASING PIPE
I) END SEAL

PE/MJ TRANSITION ASSEMBLY AND END SEAL

TYPICAL HDPE-ENCASED HDPE DIRECTIONAL BORE

WS4-A

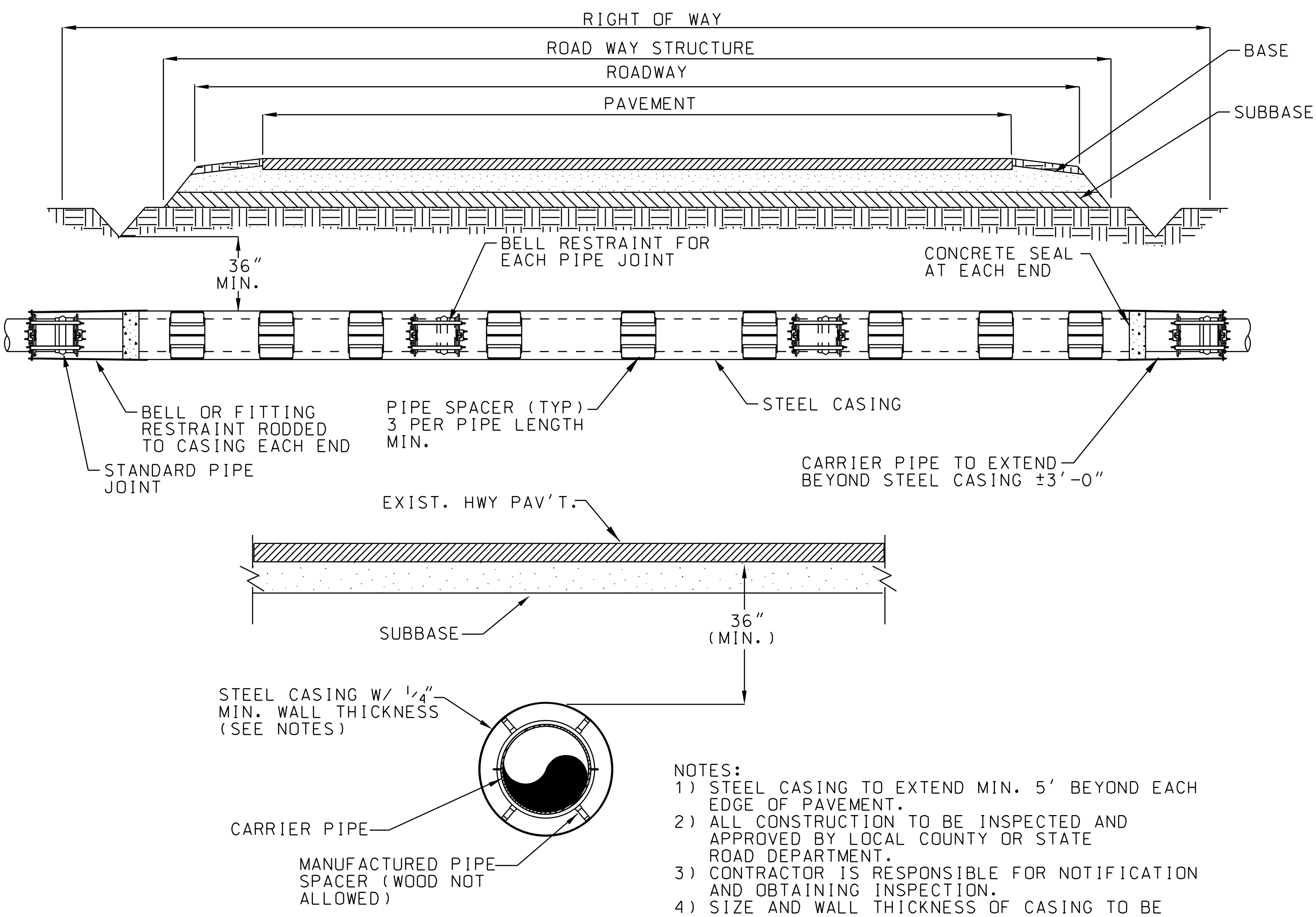
LATEST REVISIONS:
05/23/2016 DRT ADDED NOTE #9
06/27/2016 DRT REVISED TITLE

TYPICAL HDPE-ENCASED HDPE DIRECTIONAL BORE

WATER OR SEWER
UPDATED: 6/27/2016

WS4-A

GRAND STRAND WATER & SEWER AUTHORITY



NOTES:
1) STEEL CASING TO EXTEND MIN. 5' BEYOND EACH EDGE OF PAVEMENT.
2) ALL CONSTRUCTION TO BE INSPECTED AND APPROVED BY LOCAL COUNTY OR STATE ROAD DEPARTMENT.
3) CONTRACTOR IS RESPONSIBLE FOR NOTIFICATION AND OBTAINING INSPECTION.
4) SIZE AND WALL THICKNESS OF CASING TO BE APPROVED BY GSWSA AND ROAD DEPARTMENT.
5) PIPE SPACERS TO BE BY SPIDER MANUFACTURING, BOYD'S FABRICATION OR APP'D EQUAL. MINIMUM THREE (3) SPACERS PER PIPE LENGTH.
6) ALL CARRIER PIPING SHALL BE RESTRAINED AT EACH JOINT WITHIN THE CASING PIPE.

TYPICAL ROADWAY BORE & JACK

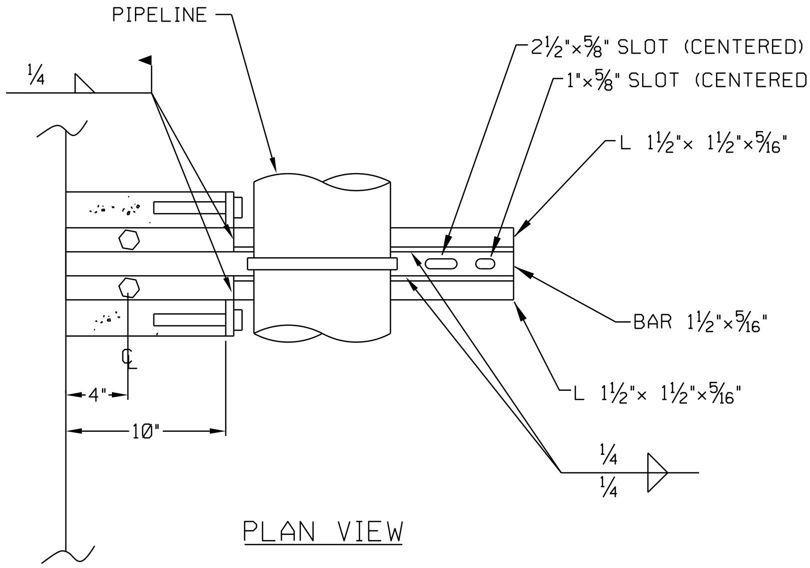
WS5

TYPICAL
ROADWAY BORE & JACK

WATER OR SEWER
UPDATED: 8/3/2010

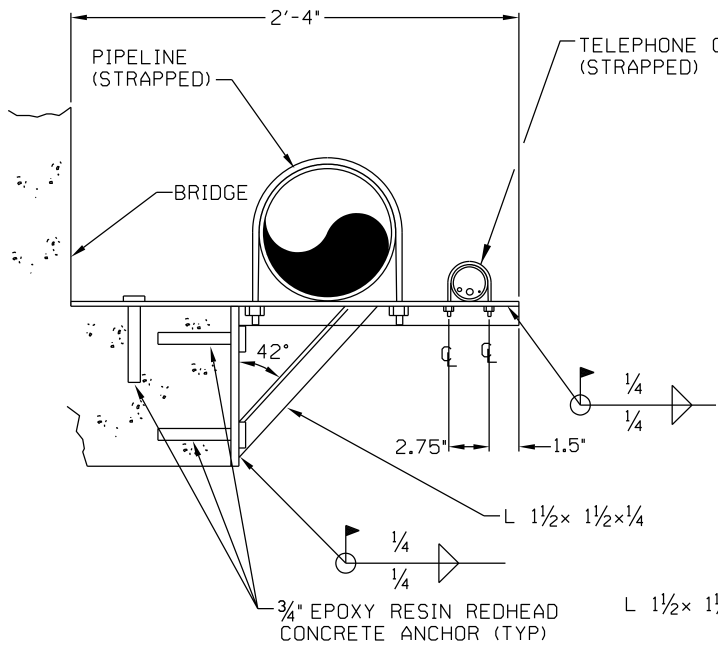
WS5

GRAND STRAND
WATER & SEWER AUTHORITY

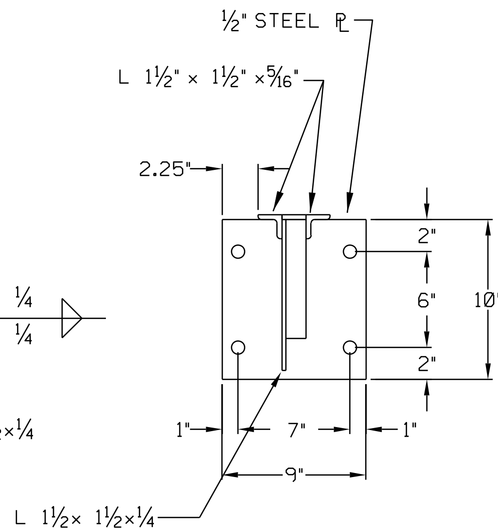


PLAN VIEW

NOTES:
1) APPROX. 30 LBS. PER ASSEMBLY (LOAD-RATED FOR 2000 LBS.). ACTUAL WEIGHT OF PIPE AND CONTENTS ±1000 LBS. PER 20' SECTION (PER MANUFACTURER'S RECOMMENDATIONS).
2) BRIDGE ATTACHMENT SPACING TO BE DETERMINED BY ENGINEER AND APPROVED BY GSWSA.
3) ALL STEEL AND BOLTED ASSEMBLY SHALL BE HOT-DIPPED GALVANIZED.



SIDE VIEW

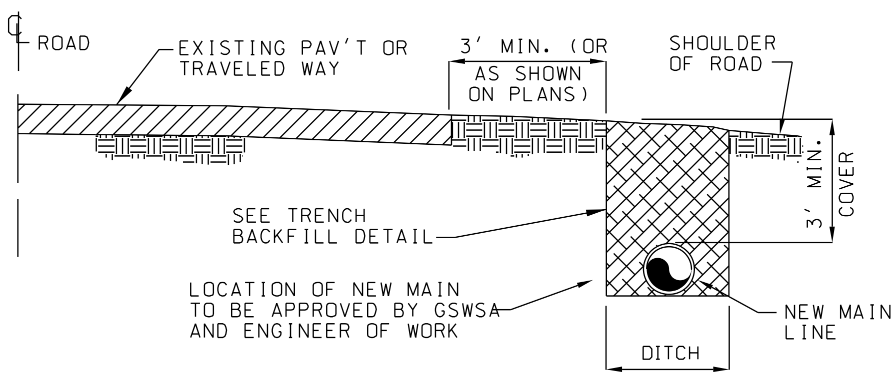


FRONT VIEW

TYPICAL BRIDGE ATTACHMENT

WS6

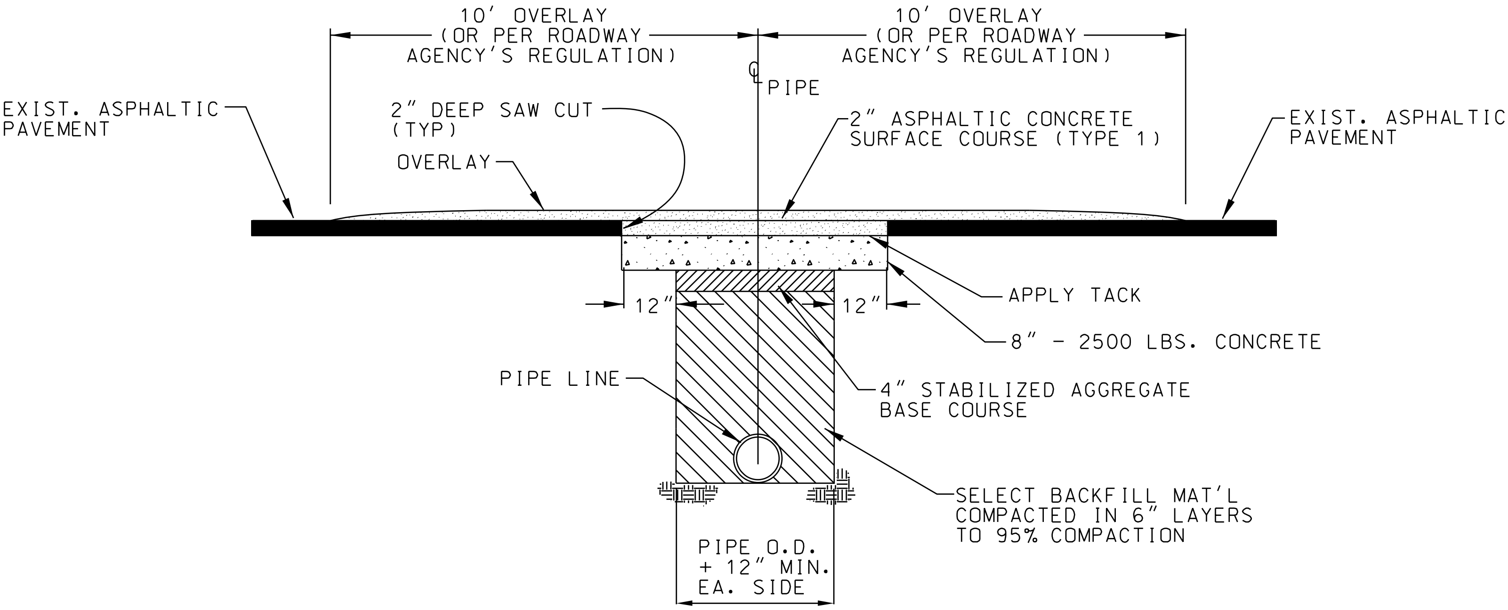
TYPICAL BRIDGE ATTACHMENT	
WATER OR SEWER UPDATED: 2/11/98	WS6
GRAND STRAND WATER & SEWER AUTHORITY	



TYPICAL MAIN LINE LOCATION IN EDGE OF TRAVEL WAY

WS7

TYPICAL MAIN LINE LOCATION IN EDGE OF TRAVEL WAY
SEWER ONLY UPDATED: 2/23/01 — WS7
GRAND STRAND WATER & SEWER AUTHORITY



NOTES:

1) PAVEMENT CUT TO EXTEND 12" BEYOND EDGES OF TRENCH AS SHOWN. PAVEMENT SHALL BE CUT TO TRUE LINE AND REMOVED BEFORE TRENCH IS CUT. ALL PAVEMENT REPAIRS TO BE IN ACCORDANCE WITH ROAD AGENCY SPECS.
2) IF PAVEMENT CUT IS ON A HIGH VOLUME MAIN ROAD NEAR A PAVED INTERSECTION, AND THE EDGE OF THE INTERSECTING ROAD IS ONLY A FEW FEET BEYOND THE NORMAL 5' (ONE SIDE DIMENSION) OVERLAY, THE OVERLAY IS TO BE EXTENDED TO THE EDGE OF THE INTERSECTING ROAD.

OPEN CUT REPAIR FOR HIGH VOLUME ASPHALT PAVEMENT

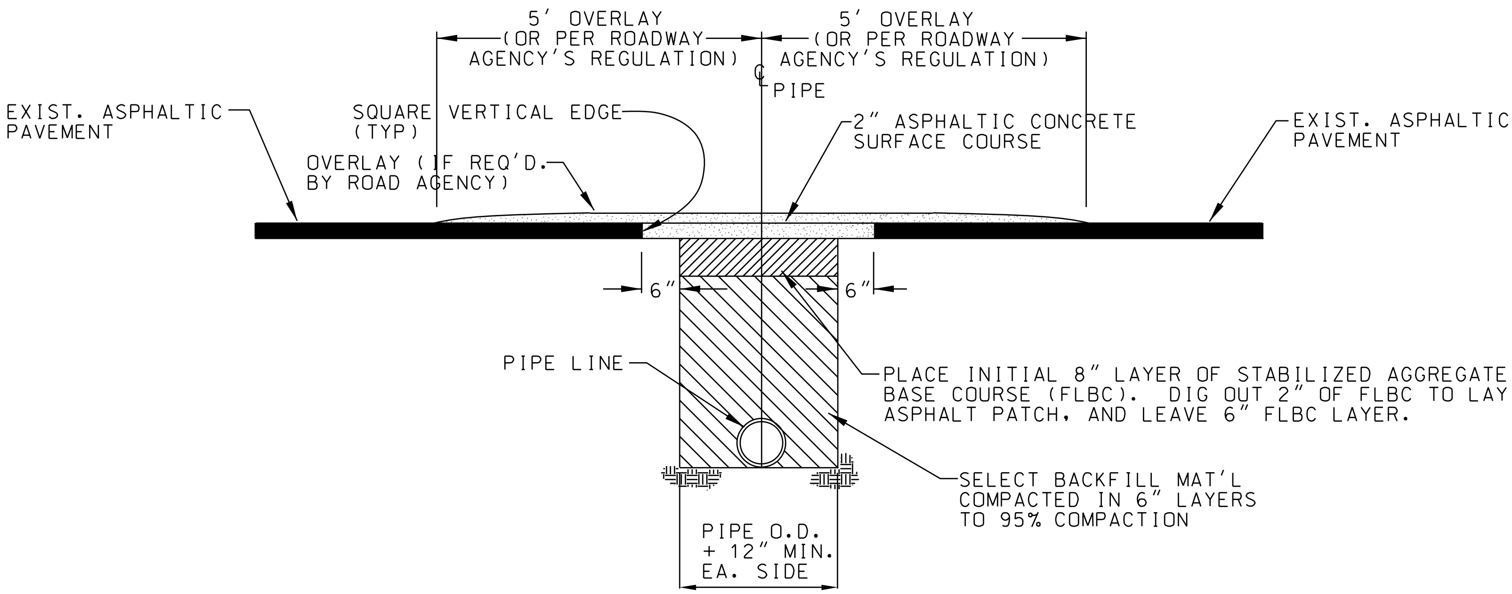
WS8

OPEN CUT REPAIR FOR
HIGH VOLUME
ASPHALT PAVEMENT

WATER OR SEWER
UPDATED: 12/26/97

WS8

GRAND STRAND
WATER & SEWER AUTHORITY



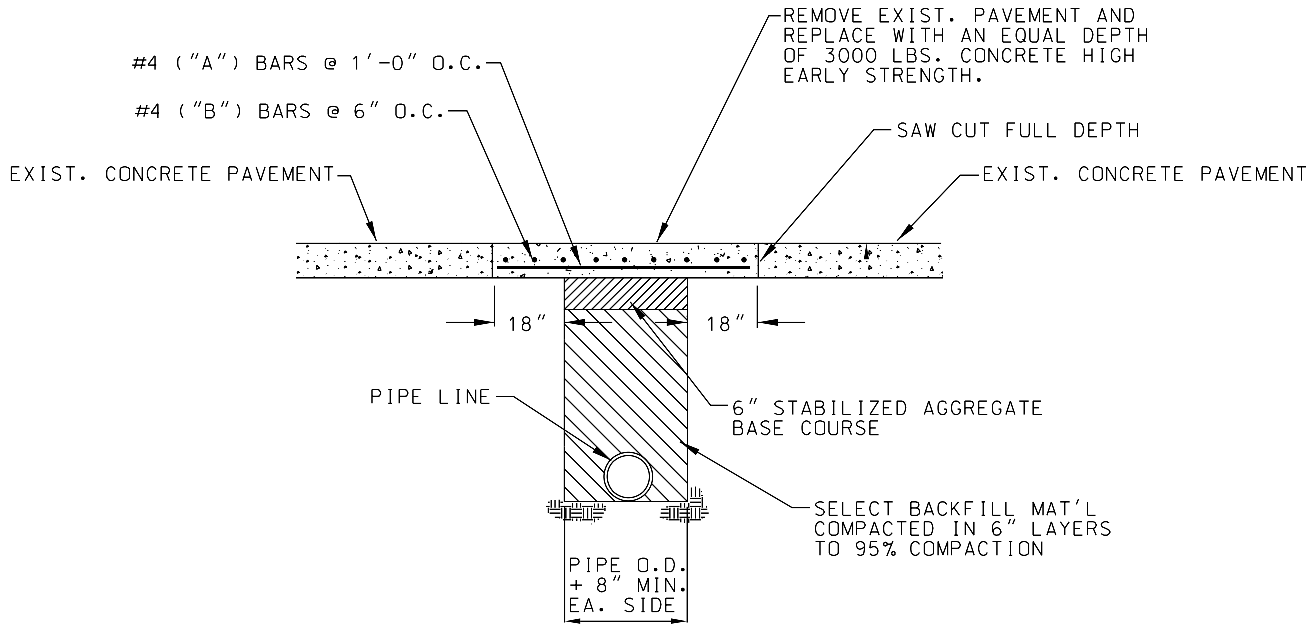
NOTES:

1) PAVEMENT CUT TO EXTEND 6" BEYOND EDGES OF TRENCH AS SHOWN. PAVEMENT SHALL BE CUT TO TRUE LINE AND REMOVED BEFORE TRENCH IS CUT. ALL PAVEMENT REPAIRS TO BE IN ACCORDANCE WITH ROAD AGENCY SPECS.
2) ROAD AGENCY MAY REQUIRE A CUT & PATCH OF TRENCH AREA AND AN OVERLAY OF ENTIRE APRON OR ENTRANCE FROM THE EDGE OF THE MAIN ROAD TO THE EDGE OF THE ROAD RIGHT-OF-WAY (SEE ENCROACHMENT PERMIT).
3) WHERE EXISTING PAVEMENT IS INSUFFICIENT THICKNESS TO DEVELOP TIGHT SEAL WITH NEW SURFACE, NEW PAVEMENT SHALL LAP EXISTING SURFACE WITH AT LEAST A 10' OVERLAP ON BOTH SIDES FOR SMOOTH TRANSITION OR AS PER SPEC'S. OF ROAD AGENCY.

OPEN CUT REPAIR FOR LOW VOLUME ASPHALT PAVEMENT

WS9

OPEN CUT REPAIR FOR LOW VOLUME ASPHALT PAVEMENT	
WATER OR SEWER UPDATED: 12/26/97	WS9
GRAND STRAND WATER & SEWER AUTHORITY	

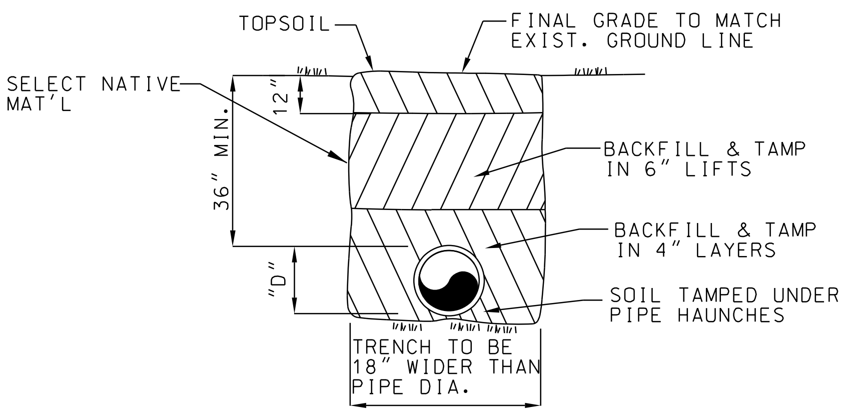


NOTE:
PAVEMENT CUT TO EXTEND 18" BEYOND EDGES OF TRENCH AS SHOWN. PAVEMENT SHALL BE CUT TO TRUE LINE AND REMOVED BEFORE TRENCH IS CUT. ALL PAVEMENT REPAIRS TO BE IN ACCORDANCE WITH ROAD AGENCY SPECS.

OPEN CUT REPAIR FOR CONCRETE PAVEMENT

WS10

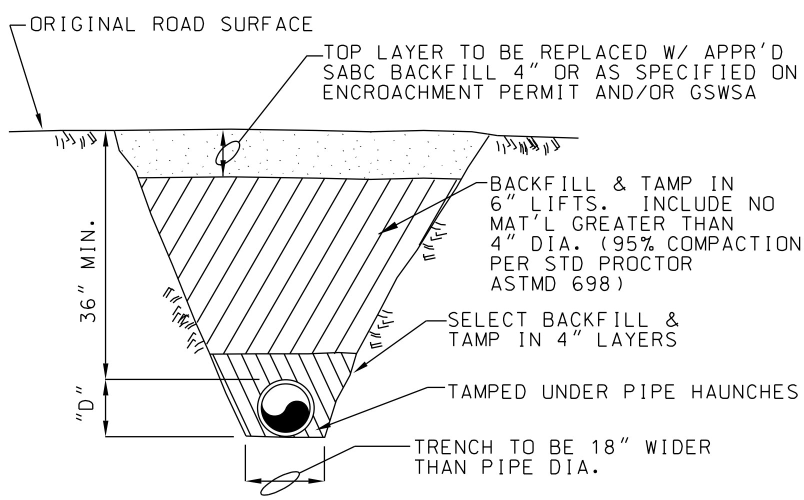
OPEN CUT REPAIR FOR CONCRETE PAVEMENT
WATER OR SEWER UPDATED: 12/26/97 — WS10
GRAND STRAND WATER & SEWER AUTHORITY



TYPICAL PIPE BEDDING DETAIL

WS11

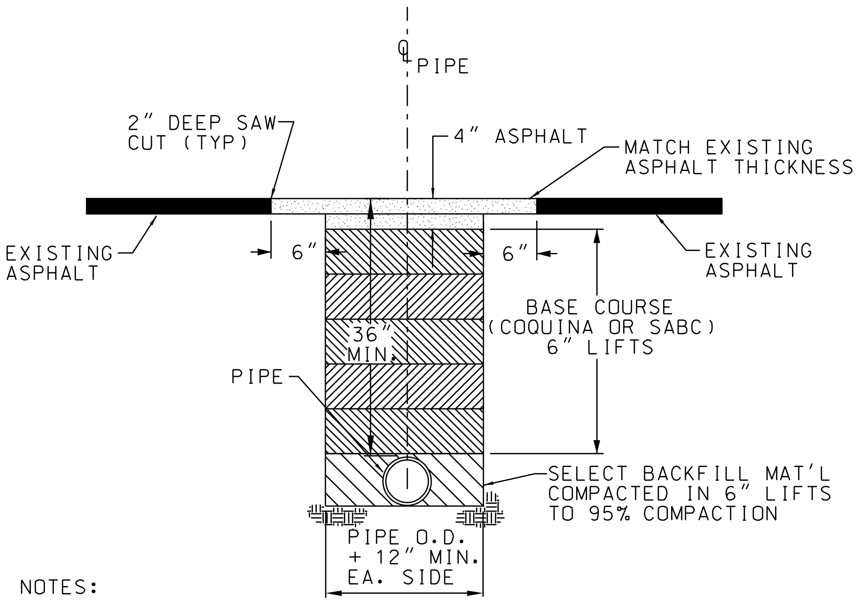
TYPICAL PIPE BEDDING DETAIL	
WATER OR SEWER UPDATED: 12/26/97	WS11
GRAND STRAND WATER & SEWER AUTHORITY	



UNPAVED ROADWAY BEDDING DETAIL

WS12

UNPAVED ROADWAY BEDDING DETAIL	
WATER OR SEWER UPDATED: 12/26/97	WS12
GRAND STRAND WATER & SEWER AUTHORITY	



NOTES:

1) PAVEMENT CUT TO EXTEND 6" BEYOND EDGES OF TRENCH AS SHOWN. PAVEMENT SHALL BE CUT TO TRUE LINE AND REMOVED BEFORE TRENCH IS CUT. ALL PAVEMENT REPAIRS TO BE IN ACCORDANCE WITH ROAD AGENCY SPECS.

2) THIS DETAIL IS PER HORRY COUNTY ENGINEER'S OFFICE SPECIFICATIONS (2/2/01).

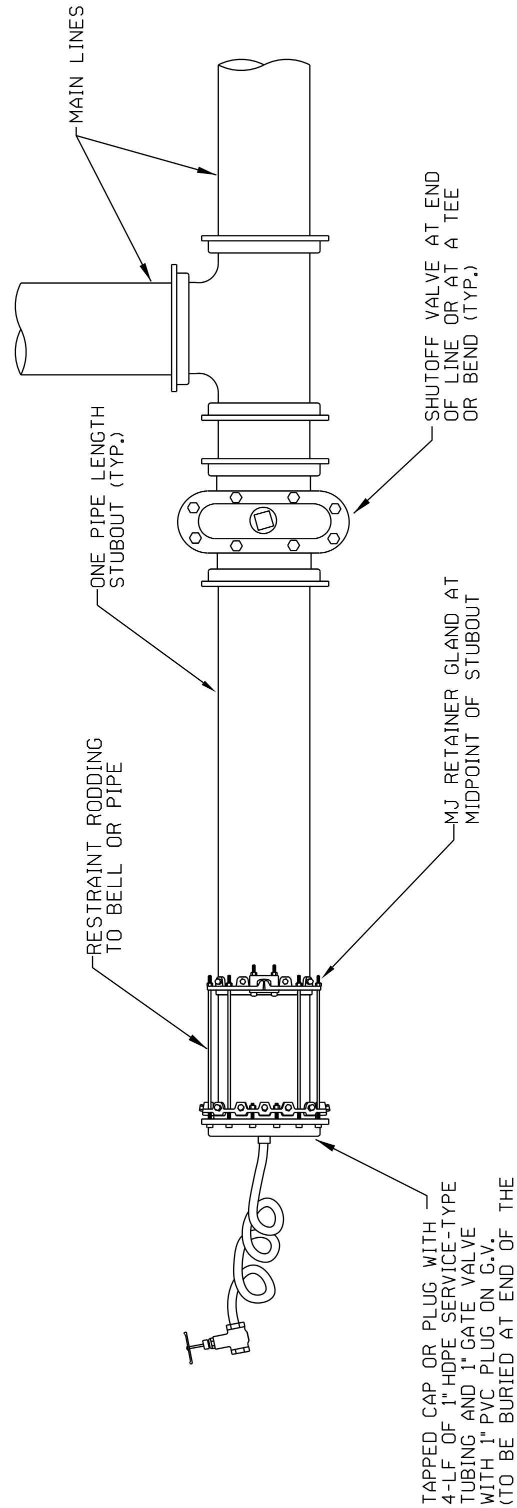
OPEN CUT REPAIR FOR COUNTY ASPHALT ROADWAY

WS13

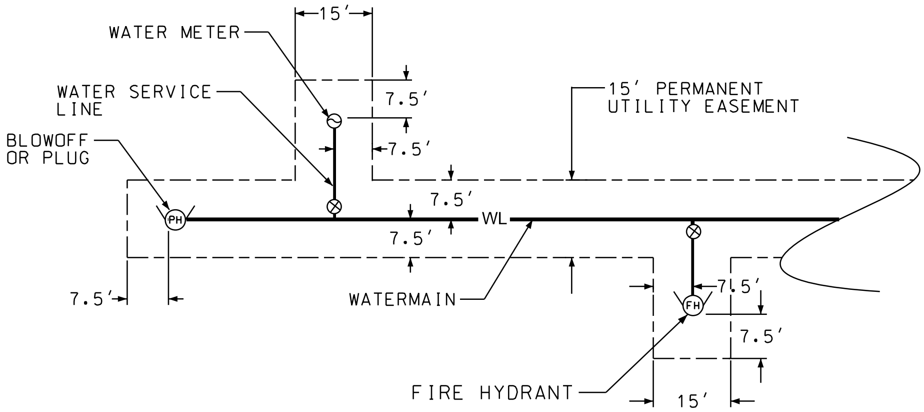
OPEN CUT REPAIR FOR COUNTY ASPHALT ROADWAY	
WATER OR SEWER UPDATED: 2/2/01	WS13
GRAND STRAND WATER & SEWER AUTHORITY	

TYPICAL FUTURE WATERLINE OR FORCEMAIN STUBOUT

WS14



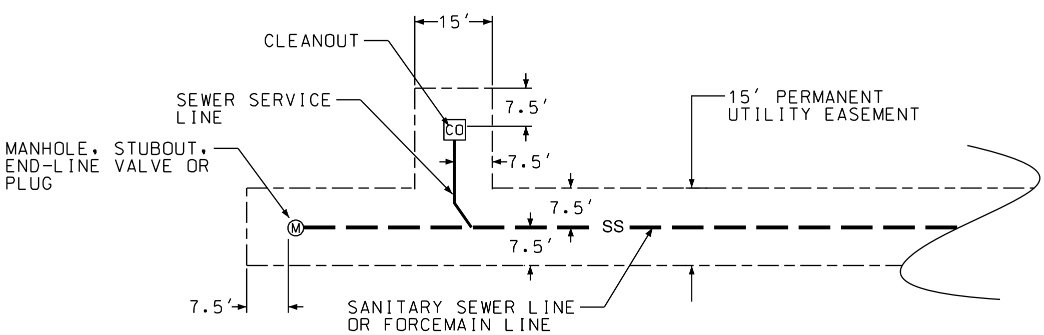
TYPICAL FUTURE WATERLINE OR FORCEMAIN STUBOUT	
WATER OR SEWER UPDATED: 5/13/02	WS14
GRAND STRAND WATER & SEWER AUTHORITY	



NOTE:
ALL UTILITY EASEMENTS TO BE CONVEYED OVER WATERLINES AND WATER SERVICE LINES SHALL BE 15' IN WIDTH AND 7.5' BEYOND FIRE HYDRANT, WATER METER OR PLUG

TYPICAL GSWSA WATER UTILITY EASEMENT FOR DEVELOPER PROJECTS

WS15



NOTE:
ALL UTILITY EASEMENTS TO BE CONVEYED OVER SEWER LINES AND SEWER SERVICE LINES SHALL BE MINIMUM 15' IN WIDTH AND 7.5' BEYOND MANHOLE, STUBOUT, PLUG OR CLEANOUT. THE WIDTH OF THE EASEMENT SHALL BE BASED ON A 1:1 SLOPE AS MEASURED FROM THE BOTTOM OF THE PIPE IN 5' INCREMENTS (SEE CHART).

EASEMENT CHART

UTILITY DEPTH	EASEMENT WIDTH
0'-7.5'	15'
7.6'-10'	20'
10.1'-12.5'	25'
12.6'-15'	30'
15.1'-17.5'	35'
17.6'-20'	40'

TYPICAL GSWSA SEWER UTILITY EASEMENT FOR DEVELOPER PROJECTS

WS15

TYPICAL WATER & SEWER UTILITY EASEMENT FOR DEVELOPER PROJECTS

WATER OR SEWER
UPDATED: 06/19/08

WS15

GRAND STRAND WATER & SEWER AUTHORITY