

RECLAIMED WATER MAIN CONFLICT DEFLECTION DETAIL * 11R

DEFLECTION BY FITTING METHOD WITH RECLAIMED WATER MAIN GOING UNDER OR OVER CONFLICT PIPE - SEE NOTES 1, 2 & 4

DEFLECTION BY PIPE JOINT METHOD WITH RECLAIMED WATER MAIN GOING UNDER OR OVER CONFLICT PIPE - SEE NOTES 1, 3, 4 & 5

NOTES:

- DEFLECTION BY FITTINGS AND/OR PIPE JOINT METHODS APPLIES TO RECLAIMED WATER MAIN CROSSING OVER OR UNDER CONFLICT PIPE WITH CROSSING OVER CONFLICT PIPE PREFERRED. WHEN A RECLAIMED WATER MAIN CROSSES OVER A STORM SEWER, WASTEWATER FORCE MAIN, GRAVITY WASTEWATER AND/OR VACUUM GRAVITY WASTEWATER THE RECLAIMED WATER MAIN SHALL BE LAID TO PROVIDE A MINIMUM TWELVE (12) INCH VERTICAL SEPARATION BETWEEN THE BOTTOM OF THE UPPER PIPE AND THE CROWN OF THE LOWER PIPE. WHEN THE MINIMUM OF TWELVE (12) INCH VERTICAL SEPARATION CANNOT BE OBTAINED A MINIMUM SIX (6) INCH VERTICAL SEPARATION IS PERMITTED PROVIDED THAT A TWENTY (20) FOOT SECTION OF RECLAIMED WATER DUCTILE IRON PIPE MAIN IS CENTERED ON THE CROSSING WITH THE LOWER PIPE HAVING A TWENTY (20) FOOT SECTION CENTERED ON THE CROSSING. A RECLAIMED WATER MAIN MUST CROSS UNDER ANY POTABLE WATER MAIN WITH A MINIMUM TWELVE (12) INCH VERTICAL SEPARATION. WHEN THE MINIMUM TWELVE (12) INCH VERTICAL SEPARATION CANNOT BE OBTAINED A MINIMUM SIX (6) INCH VERTICAL SEPARATION IS PERMITTED PROVIDED THAT A TWENTY (20) FOOT SECTION OF POTABLE WATER MAIN IS CENTERED ON THE CROSSING WITH THE RECLAIMED WATER MAIN HAVING A TWENTY (20) FOOT SECTION CENTERED ON THE CROSSING. A RECLAIMED WATER MAIN MAY CROSS OVER A POTABLE WATER MAIN ON A CASE BY CASE BASIS PROVIDED A MINIMUM OF TWELVE (12) INCH VERTICAL SEPARATION IS OBTAINED BETWEEN THE BOTTOM OF THE UPPER PIPE AND THE CROWN OF THE LOWER PIPE AND ONLY WITH PRIOR DEPARTMENT APPROVAL.
- THE PREFERRED PIPE DEFLECTION METHOD IS BY USING MECHANICAL RESTRAINT FITTINGS.
- RECLAIMED WATER DEFLECTION BY PIPE JOINT METHOD REQUIRES DEPARTMENT APPROVAL PRIOR TO THE INSTALLATION OF THE RECLAIMED WATER MAIN.
- DEFLECTION BY PIPE JOINT SHALL NOT EXCEED SEVENTY-FIVE PERCENT (75%) OF MANUFACTURER'S RECOMMENDED MAXIMUM JOINT DEFLECTION FOR DUCTILE IRON PIPE AND PVC PIPE DEFLECTION CAN ONLY BE ALLOWED BY INSTALLING THE APPROPRIATE FITTINGS - NO EXCEPTIONS.

TYPICAL THRUST BLOCKS FOR PRESSURE PIPE 12R

PIPE	THRUST BLOCK AREA REQ'D	REMARKS	NOTE
4"	2.0 SQ. FT.	VALUES ARE FOR 90° BEND, BASED ON 2000 P.S.F. SAFE BEARING LOAD AND PIPE PRESSURE OF 150 P.S.I.	FOR OTHER FITTINGS USE THE FOLLOWING FACTORS:
6"	4.0 SQ. FT.		TEE 100%
8"	6.6 SQ. FT.		45° BEND 71%
10"	10.0 SQ. FT.	FOR OTHER SOILS & PRESSURES THE AREA REQUIRED IS IN DIRECT PROPORTION	22 1/2° BEND 39%
12"	14.0 SQ. FT.		11 1/4° BEND 20%
14"	18.6 SQ. FT.		DEAD END 100%

NOTES:

- CONCRETE THRUST BLOCKS OR THRUST COLLARS MAY BE UTILIZED ONLY IF NECESSARY FOR CONNECTIONS TO AN EXISTING PIPING SYSTEM. OTHERWISE MECHANICAL RESTRAINTS SHALL BE USED. KEEP "T" BOLTS CLEAR OF CONCRETE, WRAPPED IN VISQUEEN FOR FUTURE ACCESS, WITH A MINIMUM OF 1" THICKNESS BETWEEN THE FITTING AND SOIL.
- BEFORE POURING CONCRETE, PLUGS SHALL BE WRAPPED WITH VISQUEEN AND A BOARD PLACED IN FRONT. CONCRETE SHALL BE 2500 P.S.I. MINIMUM.
- THE ENGINEER OF RECORD SHALL SUBMIT A THRUST BLOCK SIZE CALCULATION FOR TEE CONNECTIONS INTO UNRESTRAINED EXISTING MAINS LARGER THAN 14".
- THE ENGINEER OF RECORD SHALL SUBMIT A PIPE RESTRAINT DESIGN FOR IN-LINE EXTENSIONS OF AN EXISTING UNRESTRAINED MAIN IF MECHANICAL JOINT RESTRAINT CAN NOT BE INSTALLED ON THE EXISTING MAIN.

RECLAIMED WATER MAIN SOLID CASING INSTALLATION DETAIL * 13RA

CARRIER PIPE SIZE	STEEL CASING INSIDE DIAMETER (MIN)	MINIMUM WALL THICKNESS (SEE NOTE 2)
4"	12"	.188
6"	14"	.250
8"	20"	.250
10"	20"	.250
12"	24"	.250
14"	24"	.250
16"	30"	.312
18"	30"	.312
20"	36"	.372
24"	42"	.500
30"	48"	.500
36"	54"	.625
42"	60"	.625
48"	72"	.625

NOTES:

- A PROFILE DRAWING TO SCALE FOR EACH JACK AND BORE, DIRECTIONAL DRILL, OR DIRECT BURIED INSTALLATION IS REQUIRED TO BE APPROVED BY THE DEPARTMENT PRIOR TO INSTALLATION. IF A SPLIT CASING IS REQUIRED SEE WUD DETAIL 138R.
- THE RIGHT-OF-WAY OWNER MAY REQUIRE THICKER WALL CASING AND LARGER COVER OVER CASING.
- STEEL CASING SHALL BE COATED OUTSIDE WITH COAL TAR EPOXY (MIN. 16 MILS DFT) AND BE PAINTED WITH A 4" MINIMUM CONTINUOUS STRIPE, PURPLE IN COLOR, ALONG THE TOP SIDE OF THE CASING.
- SPLIT STEEL CASING IS REQUIRED ON ALL EXISTING RECLAIMED WATER INSTALLATIONS WHEN A NEW STORM DRAINAGE OR OTHER UTILITY PIPE IS INSTALLED AND CANNOT ACHIEVE THE PROPER VERTICAL SEPARATION PER WUD STANDARDS ALONG WITH WHEN A NEW FENCE, WALL, OR LANDSCAPE BERM IS INSTALLED OVER AN EXISTING RECLAIMED WATER MAIN. WHEN A SPLIT CASING IS INSTALLED UNDER A FENCE, WALL, OR LANDSCAPE BERM SEE WUD STANDARD DETAIL 48R FOR INSTALLATION REQUIREMENTS.
- NON-SHRINKABLE CEMENT GROUT TO BE INSTALLED TO OBTAIN WATERTIGHT SEAL AT EACH END OF CASING.
- FLAT BARS TO BE SLOTTED WELDED AT 6" LENGTHS TO EDGE OF CASING ON EACH SIDE.
- CASING TO BE ASSEMBLED IN FIELD WITH 1/2" STAINLESS STEEL BOLTS, WASHERS, AND NUTS ON EACH SIDE.
- 1/4" NEOPRENE GASKET MATERIAL, EXTENDING PAST CASING JOINT FOR POSITIVE SEAL ON EACH SIDE.

RECLAIMED WATER MAIN SPLIT CASING INSTALLATION DETAIL * 13RB

NOTES:

- A SHOP DRAWING TO SCALE FOR EACH SPLIT CASING INSTALLATION IS REQUIRED AND TO BE APPROVED BY THE DEPARTMENT PRIOR TO INSTALLATION.
- THE RIGHT-OF-WAY OWNER MAY REQUIRE THICKER WALL CASING AND LARGER COVER OVER CASING.
- STEEL CASING SHALL BE COATED OUTSIDE WITH COAL TAR EPOXY (MIN. 16 MILS DFT) AND BE PAINTED WITH A 4" MINIMUM CONTINUOUS STRIPE, PURPLE IN COLOR, ALONG THE TOP SIDE OF THE CASING.
- SPLIT STEEL CASING IS REQUIRED ON ALL EXISTING RECLAIMED WATER INSTALLATIONS WHEN A NEW STORM DRAINAGE OR OTHER UTILITY PIPE IS INSTALLED AND CANNOT ACHIEVE THE PROPER VERTICAL SEPARATION PER WUD STANDARDS ALONG WITH WHEN A NEW FENCE, WALL, OR LANDSCAPE BERM IS INSTALLED OVER AN EXISTING RECLAIMED WATER MAIN. WHEN A SPLIT CASING IS INSTALLED UNDER A FENCE, WALL, OR LANDSCAPE BERM SEE WUD STANDARD DETAIL 48R FOR INSTALLATION REQUIREMENTS.
- NON-SHRINKABLE CEMENT GROUT TO BE INSTALLED TO OBTAIN WATERTIGHT SEAL AT EACH END OF CASING.
- FLAT BARS TO BE SLOTTED WELDED AT 6" LENGTHS TO EDGE OF CASING ON EACH SIDE.
- CASING TO BE ASSEMBLED IN FIELD WITH 1/2" STAINLESS STEEL BOLTS, WASHERS, AND NUTS ON EACH SIDE.
- 1/4" NEOPRENE GASKET MATERIAL, EXTENDING PAST CASING JOINT FOR POSITIVE SEAL ON EACH SIDE.

RECLAIMED WATER MAIN TRENCH DETAIL * 14R

NOTES:

- BEDDING SHALL CONSIST OF IN-SITU GRANULAR MATERIAL OR WASHED AND GRADED LIMEROCK 3/8" - 7/8" SIZING, UNSUITABLE IN-SITU MATERIALS SUCH AS MUCK, DEBRIS AND LARGER ROCKS SHALL BE REMOVED.
- THE PIPE SHALL BE FULLY SUPPORTED FOR ITS ENTIRE LENGTH WITH APPROPRIATE COMPACTION UNDER THE PIPE HAUNCHES.
- THE PIPE SHALL BE PLACED IN A DRY TRENCH.
- BACKFILL SHALL BE FREE OF UNSUITABLE MATERIAL SUCH AS LARGE ROCK, MUCK AND DEBRIS.
- DENSITY TESTS ARE REQUIRED IN 1 FOOT LIFTS ABOVE THE PIPE AT INTERVALS OF 400' MAXIMUM. MINIMUM 1 SET OF TESTS FOR EACH WASTEWATER GRAVITY MAIN RUN, OR AS DIRECTED BY THE INSPECTOR.
- THE DEVELOPER/CONTRACTOR SHALL BE RESPONSIBLE TO COMPLY WITH ALL TRENCH SAFETY LAWS AND REGULATIONS.
- SEE SEPARATE DETAILS FOR "PIPE INSTALLATION UNDER EXISTING PAVEMENT - OPEN CUT."
- THE AFFECTED AREA SHALL BE RESTORED TO EQUAL OR BETTER CONDITION OR AS SPECIFIED IN PERMIT/CONTRACT DOCUMENTS.
- APPROVED 6" WIDE MAGNETIC TAPE IS REQUIRED ON ALL RECLAIMED WATER MAINS.
- CONTINUOUS FOUR (4) INCH WIDE PURPLE PAINT STRIPPING IS REQUIRED FOR RECLAIMED WATER DUCTILE IRON PIPE (D.I.P.) INSTALLED BELOW GRADE ONLY.
- A CONTINUOUS 4" WIDE PAINTED STRIP (PURPLE) IS REQUIRED FOR ALL DIP RECLAIMED WATER MAINS.
- RECLAIMED WATER MAIN INSTALLATIONS WITHIN PUBLIC ROAD RIGHT-OF-WAYS SHALL BE BY THE SPECIFICATIONS OF THE JURISDICTION GRANTING THE RIGHT-OF-WAY UTILITY PERMIT.
- FOR PIPE INSTALLATIONS IN ROAD RIGHTS-OF-WAY, ROAD OWNER'S PERMIT SPECIFICATIONS SHALL APPLY.

RECLAIMED WATER MAIN TYPICAL UTILITIES CANAL CROSSING - SINGLE PIPE (SINGLE PILES) * 15R

NOTES:

- ALL EXPOSED PIPE SHALL BE DUCTILE IRON OR PREFABRICATED STEEL WITH FLANGED FITTINGS AND PROFILED GASKETS. RETAINER GLANDS AND UNFLANGED TYPE FITTINGS ARE NOT TO BE SUBSTITUTED FITTINGS. PREFABRICATED STEEL PIPE MAY INCORPORATE WELDED ON LONG RADIUS UPPER BENDS. PREFABRICATED FLANGED PIPE SHALL BE FACTORY TESTED.
- SPAN LENGTHS AS REQUIRED BY PERMITTING AGENCY.
- FAN GUARDS ARE REQUIRED. SEE FAN GUARD/PILE CAP DESIGN DETAIL 16R FOR ADDITIONAL REQUIREMENTS. ACCESS PLATFORM AND GATE REQUIRED ON ARV SIDE ONLY.
- ALL STEEL PIPE SHALL HAVE WELDED ON BEARING PADS EXTENDED 1" MINIMUM BEYOND PIPE CRADLE WITH PAD INSTALLED PRIOR TO PAINTING. ALL EXPOSED STEEL PIPING SHALL BE PAINTED AS SPECIFIED IN THE APPROVED MATERIALS LIST WITH ALL HARDWARES BEING PAINTED WITH COAL-TAR EPOXY.
- PILE SHALL BE CRADLED ON 3/8" THICK NEOPRENE (DURONETER GRADE 50.) CURRENT FDOT STANDARDS APPLY. NEOPRENE IS REQUIRED AT ALL STRIPS INSTALLED OVER STEEL PIPE. NEOPRENE SHALL EXTEND MIN. 1" BEYOND THE EDGES OF CRADLE AND STRIPS.
- TIE-DOWN STRAPS MUST PROPERLY FIT AND SECURE PIPE IN CRADLE.
- PIPE CRADLE IN CANAL SHALL CONTACT 3/4" CIRCUMFERENCE OF PIPE. (SEE FAN GUARD DETAIL 16R)
- SHOW EXISTING CANAL CROSS SECTION ULTIMATE CANAL SECTION AND RELEVANT ELEVATIONS AND DISTANCES ON A TO SCALE DETAIL DRAWING.
- PILE LIFT CABLE SHALL BE REMOVED BELOW SURFACE; HOLE SHALL BE FILLED WITH EPOXY CEMENT.
- THREADED AREAS OF BRASS FITTINGS SHALL BE SPIRAL WRAPPED WITH TWO WRAPS OF TEFLON TAPE.
- THE PILES AND CAP DESIGN TO BE ON DETAILED SHOP DRAWINGS. THE REQUIRED PILES SHALL BE 14"x14" MIN. - TYPE 1A PER FLORIDA DOT INDEX PILES. PILE PENETRATION BELOW CANAL BOTTOM SHALL BE 15" MINIMUM WITH EACH PILE LOAD CAPACITY BEING 20 TONS MINIMUM (FDOT STANDARDS APPLY). ALL REQUIRED AERIAL CROSSING SHOP DRAWINGS SHALL BE TO SCALE AND SIGNED AND SEALED BY A STRUCTURAL ENGINEER.
- THE AERIAL CROSSING STRUCTURAL ENGINEER OF RECORD SHALL PROVIDE IN WRITING A SIGNED AND SEALED LETTER CERTIFYING THE AERIAL CROSSING INSTALLATION WAS COMPLETED PER HIS/HER DESIGN AND ALL APPLICABLE STANDARDS AND PERMITS.

FAN GUARD/ PILE CAP DESIGN SINGLE PIPE (SINGLE PILES) * 16R

NOTES:

- FAN GUARDS SHALL BE PLACED AT EACH END OF CANAL CROSSING.
- FAN GUARD WITH HARDWARE SHALL BE FABRICATED FROM DOUBLE HOT DIPPED GALVANIZED STEEL.
- SHOP DRAWINGS FOR FAN GUARDS, CAPS, AND PILES MUST BE SUBMITTED TO PBDW FOR REVIEW AND APPROVAL PRIOR TO PRE-CONSTRUCTION MEETING.
- REINFORCING STEEL SHALL CONFORM TO ASTM A-615, GRADE 60, MIN. 2" CONCRETE COVER OVER ALL STEEL.
- NO WELDING OF REBAR TO REBAR OR REBAR TO PILE STRINGS SHALL BE ALLOWED.
- LONG RADIUS WELDED ON UPPER BENDS ARE ACCEPTABLE FOR STEEL PIPE.
- THE PILE/CAP STEEL CONNECTION SHALL BE WITH A MINIMUM OF 4-#8 REINFORCEMENT BARS. THE BARS SHALL BE DRILLED AND DOWLED (EPOXIED) A MINIMUM OF 14" IN DEPTH INTO THE PILE AND TIED TO THE CAP STEEL.
- ACCESS PLATFORM AND GATE REQUIRED ON ARV SIDE ONLY.
- SEE TYPICAL AERIAL CROSSING DETAIL 15R FOR ADDITIONAL REQUIREMENTS.

RECLAIMED WATER MAIN UNDERGROUND AIR RELEASE VALVE AND VAULT IN NON-TRAFFIC AREAS OUTSIDE OF ROAD R/W 17R

NOTES:

- 4000 P.S.I. TYPE II CONCRETE.
- VAULT SHALL BE PRECAST WITH STEEL REINFORCING. SHOP DRAWING IS REQUIRED TO BE APPROVED BY THE DEPARTMENT PRIOR TO VAULT CONSTRUCTION AND/OR INSTALLATION.
- COMBINATION AIR RELEASE VALVE (ARV) SHALL BE SIZED APPROPRIATE FOR SERVICE INTENDED ALTHOUGH A 2" MINIMUM SIZED ARV IS REQUIRED ON FORCE MAIN INSTALLATIONS.
- ALL OPENINGS SHALL BE SEALED WITH WATERPROOF NON-SHRINKING GROUT.
- ALTERNATE VAULT AND COVER DESIGN MAY BE USED PROVIDED ALTERNATE VAULT AND/OR COVER SHOP DRAWINGS WERE SUBMITTED AND APPROVED BY THE DEPARTMENT PRIOR TO THE VAULT AND/OR COVER BEING INSTALLED.
- AIR RELEASE VALVE AND PIPING TO BE IDENTIFIED AS "RECLAIMED WATER".
- DUCTILE IRON PIPE IS REQUIRED THROUGH THE VAULT. NO PIPE JOINTS ARE ALLOWED IN VAULT.
- THREADED AREAS OF CORPORATION STOP SHALL BE COMPLETELY SPIRAL WRAPPED WITH TWO WRAPS OF TEFLON TAPE.
- LARGER VAULTS WILL BE REQUIRED FOR PIPES LARGER THAN 12".

PIPE SIZE	MIN. VAULT SIZE
16"-24"	4'x5'
30"-42"	4'x6'

RECLAIMED WATER MAIN AIR RELEASE VALVE AND MANHOLE IN PAVED AREAS AND IN ROAD R/W 18R

NOTES:

- PRECAST CONCRETE TYPE # 4000 P.S.I. A SHOP DRAWING IS REQUIRED.
- ALL OPENINGS SHALL BE SEALED WITH A WATERPROOF NON-SHRINKING GROUT.
- LIFT HOLES ARE PERMITTED.
- ALL PIPE HOLES SHALL BE PRECAST OR CORE-DRILLED.
- MANHOLE FABRICATION SHALL BE IN ACCORDANCE WITH A.S.T.M. C-478 LATEST STANDARD.
- CONCRETE COLLAR REQUIRED WHEN MANHOLE IS OUTSIDE PAVEMENT.
- AIR RELEASE VALVE SHALL BE TYPE AND SIZE APPROPRIATE FOR SERVICE INTENDED.
- AIR RELEASE VALVE AND PIPING TO BE IDENTIFIED AS "RECLAIMED WATER".
- DUCTILE IRON PIPE IS REQUIRED THROUGH THE MANHOLE. NO PIPE JOINTS ARE ALLOWED IN MANHOLE.
- THREADED AREAS OF CORPORATION STOP SHALL BE COMPLETELY SPIRAL WRAPPED WITH TWO WRAPS OF TEFLON TAPE.
- FOR PIPES 12" AND SMALLER, AN ALTERNATIVE DESIGN WITH APPROVED 32" DIAMETER HINGED MANHOLE COVERS WILL BE CONSIDERED.
- LARGER MANHOLES WILL BE REQUIRED FOR PIPES LARGER THAN 12".
- MANHOLES IN ROADWAYS SHALL BE LOCATED OUTSIDE OF WHEEL PATHS.

RECLAIMED WATER MAIN PRESSURE TEST CRITERIA 19R

RECLAIMED WATER #2 STANDARD DETAILS

CONSULTANT:

DESIGNED BY: WUD

DRAWN BY: M. BUCKNER Palm Beach County

CHECKED BY: J. LAMMERT Water Utilities Department

APPROVED BY: WUD P.O. Box 16097

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