

**CITY OF WINTER GARDEN – GENERAL NOTES:**

- ALL UTILITY SYSTEMS AND IMPROVEMENTS CONSTRUCTED IN THE CITY OF WINTER GARDEN SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE MANUAL OF STANDARDS AND SPECIFICATIONS FOR UTILITY CONSTRUCTION FOR THE CITY OF WINTER GARDEN, TO BE REFERRED TO AS MSS/CWG. THE LATEST EDITION AT THE TIME PERMITS ARE APPROVED SHALL BE EFFECTIVE FOR THE DURATION OF THE SUBJECT WORK OR PROJECT DEVELOPMENT.
- THE CITY OF WINTER GARDEN GENERAL NOTES AND DETAILS ARE PROVIDED FOR THE CONVENIENCE OF FIELD PERSONNEL. THEY DO NOT INCLUDE ALL REQUIREMENTS OF THE MSS/CWG. THE CONTRACTOR SHALL REFER TO THE FULL TEXT OF THE MSS/CWG FOR FURTHER DETAIL AND CLARITY WHEN NEEDED.
- ANY REQUEST FOR VARIANCE OR NONCOMPLIANCE FROM THE MSS/CWG NOTED ABOVE MUST BE APPROVED BY THE CITY ENGINEER OR UTILITIES DIRECTOR.
- THE CONTRACTOR SHALL EXERCISE EXTREME CAUTION WHEN EXCAVATING IN CLOSE PROXIMITY TO WATER, WASTEWATER, RECLAIMED WATER AND OTHER UTILITY SYSTEMS. THE CONTRACTOR SHALL COORDINATE UTILITY LOCATIONS WITH RESPECTIVE UTILITY OWNERS AND/OR CALL "SUNSHINE ONE CALL", 1-800-432-4770 A MINIMUM OF 72 HOURS IN ADVANCE.
- CONTRACTOR'S DAMAGE OF WINTER GARDEN UTILITY SYSTEM: THE CONTRACTOR SHALL IMMEDIATELY NOTIFY AND REPORT DAMAGE TO THE CITY OF WINTER GARDEN UTILITY DIVISION, (NO MESSAGE) PHONE # 407-656-4100.
- IMMEDIATE REPAIR OF DAMAGED UTILITY SYSTEM: THE CONTRACTOR SHALL IMMEDIATELY REPAIR ANY DAMAGE TO THE CITY OF WINTER GARDEN UTILITY SYSTEM AS REQUIRED BY THE UTILITY OWNER AT CONTRACTOR'S COST. IN CASE OF UNRESPONSIVE ACTION BY THE CONTRACTOR, THE CITY RESERVES RIGHT TO REPAIR DAMAGE. THE CONTRACTOR SHALL REIMBURSE THE CITY OF WINTER GARDEN OF ALL REPAIR COST.
- ADVANCE NOTIFICATION OF CONSTRUCTION: THE CONTRACTOR SHALL NOTIFY CITY OF WINTER GARDEN, UTILITY DIVISION, PH.# 407-656-4100, AT LEAST SEVEN (7) CALENDAR DAYS PRIOR TO COMMENCEMENT OF CONSTRUCTION ACTIVITY.
- ADVANCE NOTIFICATION OF UTILITY CONNECTION: THE CONTRACTOR SHALL NOTIFY THE CITY OF WINTER GARDEN AT LEAST SEVEN CALENDAR DAYS IN ADVANCE TO SCHEDULE CONNECTIONS TO UTILITY SYSTEM.
- UTILITY VALVE OPERATION: ONLY CITY OF WINTER GARDEN UTILITY PERSONNEL SHALL OPERATE VALVES AND FIRE HYDRANTS. THE CONTRACTOR, WHEN NEEDED, SHALL CALL THE CITY TO REQUEST VALVE OPERATIONS AT LEAST TWO (2) DAYS IN ADVANCE OF CONSTRUCTION WORK.
- OPERATIONS INVOLVING WATER OR WASTEWATER FACILITIES INCLUDING PUMPING STATIONS: THE CONTRACTOR SHALL COORDINATE AT LEAST TWO (2) WEEKS IN ADVANCE, ANY CONSTRUCTION OPERATION THAT MAY REQUIRE THE DISCONTINUATION OF SERVICE OR OPERATION OF A FACILITY. THE CITY WILL PROVIDE PERSONNEL TO OPERATE THE CITY FACILITIES.
- REQUIRED TESTING BY CONTRACTOR: THE CONTRACTOR SHALL NOTIFY THE CITY OF WINTER GARDEN AT LEAST TWO (2) DAYS PRIOR TO SAMPLING ACTIVITIES FOR PURPOSE OF TESTING AS REQUIRED BY THE CITY. THE CONTRACTOR SHALL NOT TEST OR SAMPLE WITHOUT OBSERVATION BY CITY INSPECTION PERSONNEL.
- TEMPORARY OR CONSTRUCTION WATER SERVICE CONNECTIONS PROVIDED BY FIRE HYDRANT CONNECTION: THE CITY WILL PROVIDE METER ON FIRE HYDRANT. THE CONTRACTOR SHALL PROVIDE NON-REFUNDABLE ACCOUNT INITIATION FEE, A REFUNDABLE SECURITY DEPOSIT FOR THE METER APPARATUS AND PAY ALL COST FOR WATER USED.
- ALL AS BUILT MEASUREMENTS & ELEVATIONS ARE TO BE MADE BY A LICENSED LAND SURVEYOR.

**CoWG WATER SYSTEM NOTES:**

- THE CONTRACTOR SHALL PROVIDE AND INSTALL A CITY APPROVED BACKFLOW DEVICE ASSEMBLY AT EACH CONNECTION POINT TO THE CITY WATER SYSTEM.
- REPAIRS TO NEW WATER LINES, TO OBTAIN SPECIFIED PRESSURE TEST, WILL BE ALLOWED ONLY UP TO A NUMBER EQUAL TO 10% OF THE TOTAL NUMBER OF JOINT CONNECTIONS.
- THE CONTRACTOR SHALL HYDROSTATICALLY TEST ALL WATER MAINS AND SERVICE LATERALS AT 150 PSI FOR A TWO HOUR PERIOD. TESTING MUST BE OBSERVED BY A CITY INSPECTOR.
- THE CONTRACTOR SHALL INSTALL WARNING TAPE OVER ALL NEW WATER MAINS. WARNING TAPE SHALL BE AS FOLLOWS: NON-DETECTABLE, SIZE 2" WITH "WATER LINE BELOW" MUST BE PLACED 8" TO 12" BELOW FINISHED GRADE ON ALL PVC WATER MAINS, LATERALS AND HEADER TEES. NUMBER 10 GAUGE TRACER WIRE SHALL BE ATTACHED TO THE TOP OF THE PIPE WITH DUCT TAPE, AT LEAST FIVE TIMES PER JOINT. THE TRACER WIRE SHALL ALSO BE ATTACHED TO ALL PVC LATERALS AND ATTACHED TO THE OUTSIDE OF EACH VALVE BOX SO THAT A PIPE LOCATOR CAN BE CONNECTED TO IT.
- THE CONTRACTOR SHALL INSTALL WATER MAINS PER MoSS/CoWG SPECIFICATIONS. SOLVENT CEMENTED JOINTS AND THRUST BLOCKS ON PIPING SYSTEMS SHALL NOT BE ALLOWED.
- THE CONTRACTOR SHALL INSTALL ALL WATER MAINS TO A MINIMUM DEPTH OF 36 INCHES AND A MAXIMUM DEPTH OF 42 INCHES BELOW FINAL GRADE.
- THE CONTRACTOR SHALL INSTALL ALL SERVICE LATERALS A UNIFORM DISTANCE APART, LOCATED ON PROPERTY LOT LINE AT 90° FROM THE WATER MAIN. SERVICE LATERALS SHALL BE SEPARATELY CONNECTED TO THE WATER MAIN, NOT SPLICED TOGETHER.
- THE CONTRACTOR SHALL CUT A "W" INTO CONCRETE CURB, LOCATED INSIDE OF A PAINTED BLUE SQUARE, LOCATED DIRECTLY IN FRONT OF EACH SERVICE LATERAL.
- THE CONTRACTOR SHALL INSTALL CURB STOP, IN METER BOX, CURB STOP SHALL BE SET 8" BELOW FINISHED GRADE.
- THE CONTRACTOR SHALL PROVIDE AND INSTALL IN-LINE VALVES ON WATER MAINS AT 1,000 FOOT MAXIMUM SPACING BETWEEN VALVES. VALVES SHALL BE LOCATED ON ALL TEES AND CROSSES. WATER MAINS SHALL BE PLACED UNDER SIDEWALKS WHERE POSSIBLE.
- ALL WATERMANS SHALL BE CLEANED BY PIGGING THE LINE WITH A FOAM PIG (MINIMUM OF 2 TIMES). A FULL BORE FLUSH MAY BE REQUIRED AFTER PIGGING TO ENSURE THE PIPE IS CLEAN AND READY FOR SERVICE. THE CONTRACTOR SHALL COORDINATE LINE PIGGING AND FULL BORE FLUSH WITH THE CITY INSPECTOR.
- THE CONTRACTOR SHALL DEMONSTRATE THAT LOCATOR WIRE INSTALLED OVER ALL WATER MAINS IS IN WORKING CONDITION AT TIME OF ACCEPTANCE BY THE CITY.
- ALL NEW SUBDIVISION CONSTRUCTION SHALL INSTALL DOUBLE POTABLE WATER SERVICES AT THE PROPERTY LINES.

**CoWG – WASTEWATER SYSTEM NOTES:**

- SANITARY SEWER MAINS AND SERVICES SHALL BE PVC SDR-26 (MINIMUM). FITTINGS SHALL BE SDR-26. DUCTILE IRON IS NOT APPROVED FOR SANITARY SEWERS.
- ALL SERVICES SHALL BE 6" (MINIMUM) DIAMETER AND TERMINATE AT THE PROPERTY LINE WITH 6" CLEAN OUT. (36" TO 48" DEEP AT LOT LINE)
- MAGNETIC TAPE MUST BE PLACED 2' ABOVE THE TOP OF PIPE FOR THE ENTIRE LENGTH OF ALL MAINS AND SERVICES.
- ALL SANITARY MANHOLES SHALL BE PAINTED INSIDE AND OUT WITH "BITUMASTIC SUPER SERVICE BLACK", BY KOPPERS OR APPROVED EQUAL. MANHOLES RECEIVING FLOW FROM FORCE MAINS SHALL BE LINED WITH FIBERGLASS OR HDPE AT THE PRECASTERS FACILITY.
- ALL PIPE CONNECTIONS TO PRE-CAST MANHOLES SHALL BE MADE USING A FLEXIBLE EPDM RUBBER BOOT AND STAINLESS STEEL STRAP OR CAST IN BOOT BY A-LOK, 2"-LOK OR EQUAL.
- CONNECTIONS MADE TO EXISTING MANHOLES SHALL BE CORE BORED WITH A MINIMUM 6" BORE AND CONNECTION SEALED WITH FLEXIBLE BOOT AND STAINLESS STEEL CLAMP.
- DEAD END MANHOLES SHALL HAVE A MINIMUM OF 5 FEET OF COVER FROM FINISHED GRADE TO OUTLET PIPE INVERT.
- ALL PRECAST SEWER MANHOLES SHALL HAVE A 4 FOOT MINIMUM HIGH BARREL CONE SECTIONS SHALL BE 3 FOOT MAXIMUM. CONCRETE DONUTS FOR EXTENDING ARE ACCEPTABLE TO RAISE MANHOLES UP TO 1 FOOT MAXIMUM.
- THE CONTRACTOR SHALL PROVIDE AND INSTALL BALLCENTRIC PLUG VALVES IN FORCE MAINS AT 1000 FOOT MAXIMUM SPACING BETWEEN VALVES. VALVES SHALL BE LOCATED AT ALL TEES AND CROSSES.
- THE CONTRACTOR SHALL CUT A "S" INTO CONCRETE CURB LOCATED INSIDE OF A PAINTED GREEN SQUARE BOX, IN FRONT OF EACH SERVICE LOCATOR.
- THE CONTRACTOR SHALL PROVIDE TV INSPECTION OF ALL SANITARY SEWER MAINS AFTER SYSTEM IS COMPLETED, THOROUGHLY CLEANED, DRAINED AND FULLY VISIBLE. TV INSPECTION SHALL BE PERFORMED IN ACCORDANCE WITH SPECIFICATIONS. FAULTY INSPECTION DUE TO POOR CONDITIONS WILL REQUIRE REINSPECTION BY CONTRACTOR.
- THE CONTRACTOR SHALL PROVIDE A (WARRANTY) TV INSPECTION AT THE TWO YEAR IN SERVICE MILESTONE FOR EACH SYSTEM.
- THE CONTRACTOR SHALL PROVIDE SANITARY SEWER TESTING, EXFILTRATION OR AIR, AS REQUIRED BY DESIGN ENGINEER AND SUBMIT CERTIFIED RESULTS TO THE CITY ENGINEER.
- GRAVITY SEWERS DEPTHS SHALL NOT EXCEED 18 FEET.
- THE DESIGN ENGINEER SHALL PROVIDE A MINIMUM OF ONE FOOT OF FREEBOARD BETWEEN THE LOWEST FINISHED FLOOR ELEVATION AND THE TOP ELEVATION OF THE WET WELL.
- ALL PENETRATIONS INTO CONCRETE STRUCTURES SHALL BE PRE-CAST OR CORE-DRILLED.
- WARRANTY – ALL MATERIALS & EQUIPMENT TO BE FURNISHED AND/OR INSTALLED BY THE CONTRACTOR SHALL BE WARRANTED FOR A PERIOD OF TWO YEARS FROM THE DATE OF FINAL ACCEPTANCE THEREOF AGAINST DEFECTIVE MATERIALS, DESIGN, AND WORKMANSHIP. UPON RECEIPT OF NOTICE FROM THE CITY OF FAILURE OF ANY PART OF THE WARRANTED EQUIPMENT OR MATERIALS DURING THE WARRANTY PERIOD, THE AFFECTED PART, PARTS, OR MATERIALS SHALL BE PROMPTLY REPLACED BY THE CONTRACTOR WITH NEW PARTS OR MATERIALS AT NO EXPENSE TO THE CITY. IN THE EVENT THE CONTRACTOR FAILS TO MAKE THE NECESSARY REPLACEMENT OR REPAIRS IMMEDIATELY AFTER NOTIFICATION, THE CITY MAY ACCOMPLISH THE WORK AT THE EXPENSE OF THE CONTRACTOR.

**CLOSED CIRCUIT TELEVISION (CCTV) INSPECTION OF SEWER LINES**

**GENERAL:**

- ALL NEW SANITARY SEWER LINES, PRIVATE OR CITY MAINTAINED, IN THE CITY OF WINTER GARDEN'S SERVICE AREA SHALL BE INSPECTED BY CLOSED CIRCUIT TV INSPECTION BY THE CONTRACTOR WITH A CITY INSPECTOR PRESENT PRIOR TO BEING ACCEPTED BY THE CITY.

**REQUIREMENTS PRIOR TO INSPECTION RELEASE:**

- ALL ELEMENTS OF THE SEWER SYSTEM MUST BE INSTALLED AND BE COMPLETELY FINISHED, INCLUDING MAIN SEWER LINES, LATERALS, CLEAN OUTS, AND MANHOLES PRIOR TO CCTV INSPECTION.
- ALL SEWER LINES SHALL BE COMPLETELY CLEANED OF ALL DEBRIS, SAND, WATER, ETC. PRIOR TO THE CCTV INSPECTION. ANY OBJECT OR MATTER THAT PREVENTS CCTV INSPECTION FROM VIEWING CONDITION OF PIPELINE IS CONSIDERED AN OBSTRUCTION REQUIRING ADDITIONAL CLEANING. WHEN CCTV VIEW IS OBSTRUCTED, INSPECTION SHALL BE TERMINATED. THE CONTRACTOR SHALL CLEAN THE SEWER SYSTEM COMPLETELY AND RESCHEDULE CCTV RE-INSPECTION WITH THE CITY.
- A HYDRAULIC SEWER CLEANER SHALL NOT BE USED DURING THE CCTV INSPECTION, IF LINES ARE FOUND TO BE OBSCURED BY WATER OR DEBRIS DURING THE CCTV INSPECTION, THE INSPECTION SHALL BE TERMINATED AND RESCHEDULED TO A TIME WHEN SEWER CLEANING IS COMPLETE.
- WHEN A SEWER LINE IS UNDER A PAVED AREA, THE AREA SHALL BE COMPACTED AND PRIMED BEFORE THE SYSTEM SHALL BE RELEASED FOR TV INSPECTION.

**TELEVISION EQUIPMENT MINIMUM REQUIREMENTS:**

- THE CLOSED CIRCUIT TV CAMERA SHALL PRODUCE A CLEAR COLOR PICTURE ON THE MONITOR AND ON THE DVD RECORDING. THE CAMERA SHALL BE ABLE TO SHOW DETAIL TO THE POINT THAT ALL JOINTS AND ANY DEBRIS MAY BE READILY SEEN AT THE TIME OF THE INSPECTION. THE CAMERA SHALL STOP AND PAN AT EACH JOINT FOR COMPLETE 360 DEGREE INSPECTION.
- REFER TO APPENDIX B OF THE REFERENCED STANDARDS FOR SPECIFICATION OF CLOSED CIRCUIT TELEVISION INSPECTION EQUIPMENT.
- THE VIDEO RECORDER SHALL PRODUCE A NO NOISE STILL PICTURE, AND PROVIDE BOTH AUDIO AND VIDEO DURING THE INSPECTION.
- A MEASURING DEVICE, APPROVED BY THE CITY, TO CHECK THE GRADE OF THE PIPE DURING THE INSPECTION, SHALL BE REQUIRED. GAUGE DEPTH, 0" TO 2" MIN. WITH 1/2" MARKINGS.
- AUDIO OF THE INSPECTION SHALL BE SIMULTANEOUSLY RECORDED ON DVD DISC. THE AUDIO SHALL CONSIST OF ORDINARY DESCRIPTION AND COMMENTARY. A TAPE WILL BE GIVEN TO THE INSPECTOR ON SITE AT THE END OF THE DAY.

**PROCEDURE FOR TELEVISION**

- THE CITY'S ENGINEERING INSPECTION DIVISION SHALL BE GIVEN AT LEAST THREE (3) BUSINESS DAYS NOTICE PRIOR TO THE TIME PLANNED FOR THE TV INSPECTION TO COMMENCE. A DEFINITE TIME AND DATE WILL BE AGREED UPON BY THE CONTRACTOR AND INSPECTOR AT THAT TIME.
- NO INSPECTION SHALL COMMENCE WITHOUT THE PRESENCE OF THE INSPECTOR, EXCEPT WHEN PRIOR ARRANGEMENTS HAVE BEEN MADE BETWEEN THE CONTRACTOR, INSPECTOR, AND THE CITY. TV INSPECTION SHALL BE PERFORMED BY THE CONTRACTOR AT THE EXPENSE OF THE CONTRACTOR.
- ALL CCTV INSPECTIONS SHALL COMMENCE UP STREAM OF THE SYSTEM TO PREVENT FOREIGN SUBSTANCES FROM ENTERING A SECTION PREVIOUSLY TELEVIEWED. THE CAMERA SHALL BE STARTED FROM THE DOWNSTREAM MANHOLE AND PROCEED UPSTREAM IN DIRECTION OPPOSING THE NORMAL FLOW IN THE LINE. THIS PROCEDURE WILL ALLOW FOR THE VIEWING OF THE SERVICE LATERALS.
- BEFORE THE CAMERA IS PLACED IN THE SEWER LINE, WATER WITH YELLOW OR ORANGE DYE SHALL BE PUT INTO THE UPSTREAM MANHOLE OF THE SECTION BEING TELEVIEWED. CAMERA WILL HAVE A GAUGE SHOWING 1/2" MARKS FROM 1/2" TO 2-1/2". THIS WILL ENABLE THE CAMERA TO DETECT ANY CHANGES IN GRADE THAT MAY BE PRESENT IN THE SYSTEM.
- THE CCTV AND DVD RECORDER SHALL BE TURNED ON BEFORE THE CAMERA IS PLACED IN THE MANHOLE FOR INSPECTION AND SHALL NOT BE TURNED OFF UNTIL THE CAMERA IS REMOVED FROM THE MANHOLE. THE CAMERA SHALL BE MOVED THROUGH THE LINE UNDER THE CONTROL OF THE CCTV CAMERA OPERATOR. THE CAMERA SHALL BE DRAWN THROUGH THE LINE AT A RATE NOT TO EXCEED THIRTY (30) FEET PER MINUTE AND SHALL STOP AT ALL SERVICE CONNECTIONS AND PIPE JOINTS IN THE PIPELINE.
- A DVD RECORDING SHALL BE MADE OF THE ENTIRE SYSTEM BEING TELEVIEWED. THIS SHALL BECOME THE PROPERTY OF THE CITY UPON COMPLETION OF THE TV INSPECTION (NOT A COPY). THE TAPE(S) SHALL BE LABELED IN SUCH A MANNER THAT STATES THE PROJECT NAME, DATE OF INSPECTION AND LINE SECTION ACCORDING TO CONSTRUCTION PLANS CONTAINED ON EACH TAPE. A WRITTEN REPORT SHALL ACCOMPANY THE DVD DISC.

**CoWG RECLAIMED WATER SYSTEM GENERAL NOTES:**

- ALL PRIVATE RECLAIMED WATER SYSTEMS SHALL HAVE A CITY APPROVED BACKFLOW DEVICE ASSEMBLY AT EACH CONNECTION POINT TO THE CITY WATER SYSTEM.
- REPAIRS TO NEW WATER LINES, TO OBTAIN SPECIFIED PRESSURE TEST, WILL BE ALLOWED ONLY UP TO A NUMBER EQUAL TO 10% OF THE TOTAL NUMBER OF JOINT CONNECTIONS.
- ALL MAINS AND SERVICE LATERALS SHALL BE HYDROSTATICALLY TESTED AT 150 PSI FOR A TWO HOUR PERIOD.
- WARNING TAPE, NON-DETECTABLE, SIZE 2" WITH "REUSE WATER LINE BELOW", MUST BE PLACED 8" TO 12" BELOW FINISHED GRADE ON ALL PVC WATER MAINS, LATERALS AND HEADER TEES. NUMBER 10 GAUGE TRACER WIRE SHALL BE ATTACHED TO THE TOP OF THE PIPE WITH DUCT TAPE, AT LEAST FIVE TIMES PER JOINT. THE TRACER WIRE SHALL ALSO BE ATTACHED TO ALL PVC LATERALS AND ATTACHED TO THE OUTSIDE OF EACH VALVE BOX SO THAT A PIPE LOCATOR CAN BE CONNECTED TO IT. THE CONTRACTOR SHALL DEMONSTRATE THE LOCATE WIRE TO BE IN WORKING CONDITION AT PROJECT COMPLETION.
- THE CONTRACTOR SHALL INSTALL RECLAIMED WATER MAINS PER MoSS/CoWG. SOLVENT CEMENTED JOINTS AND THRUST BLOCKS SHALL NOT BE ALLOWED.
- REUSE WATER MAIN SHALL BE BURIED TO A MINIMUM DEPTH OF 36" AND A MAXIMUM DEPTH 42" BELOW FINAL GRADE.
- SERVICE LATERALS MUST BE LOCATED A UNIFORM DISTANCE APART AND ALIGNED TO PROPERTY LOT LINE AT 90° FROM THE RECLAIMED WATERMAIN.
- CUSTOMER SERVICE LATERALS SHALL NOT BE SPLICED TOGETHER BETWEEN THE WATER MAIN AND CURB STOP.
- THE CONTRACTOR SHALL CUT CURB A "RW" INTO CONCRETE CURB LOCATED INSIDE OF A PAINTED SQUARE (PURPLE), DIRECTLY IN FRONT OF EACH SERVICE LATERAL AND VALVE.
- THE CONTRACTOR SHALL SET DEPTH OF CURB STOP, IN METER BOX, 8" BELOW FINISHED GRADE.
- THE CONTRACTOR SHALL INSTALL VALVE(S) IN MAIN, NO MORE THAN 1,000 FEET APART IN BETWEEN TEES AND CROSSES. VALVES SHALL BE PROVIDED AT EACH TEE OR CROSS LOCATED IN MAIN LINE.
- RECLAIMED WATER MAINS MAY BE LOCATED UNDER SIDEWALKS. RECLAIMED MAINS LOCATED UNDER PAVEMENT SHOULD BE MINIMIZED.
- ALL WATERMANS SHALL BE CLEANED BY PIGGING THE LINE WITH A FOAM PIG (MINIMUM OF 2 TIMES). A FULL BORE FLUSH MAY BE REQUIRED AFTER PIGGING TO ENSURE THE PIPE IS CLEAN AND READY FOR SERVICE. THE CONTRACTOR SHALL COORDINATE LINE PIGGING AND FULL BORE FLUSH WITH THE CITY INSPECTOR.
- RECLAIMED WATERMAIN MAINS SHALL BE 8 INCH DIAMETER MINIMUM. 4 INCH IS ALLOWED ON DEAD END RUNS SERVING LESS THAN 20 HOMES. THE DESIGN ENGINEER SHALL SUBMIT HYDRAULIC CALCULATIONS THAT DEMONSTRATE THE PROPOSED SYSTEM WILL PROVIDE REQUIRED FLOWS AND MAINTAIN SYSTEM ABOVE MINIMUM PRESSURE. PEAK IRRIGATION RATE SHALL BE SIX(6) TIMES GREATER THAN THE AVERAGE IRRIGATION RATE OF FLOW.
- RECLAIMED WATER SYSTEM COMPONENTS INCLUDING PIPE, VALVE BOX TOPS AND METER BOX TOPS SHALL BE RECLAIMED PURPLE IN COLOR.

**CoWG – THRUST RESTRAINT TABLE**

RESTRAINED FORCE MAIN PIPE TABLE									
MINIMUM LENGTH(FT) TO BE RESTRAINED ON EACH SIDE OF FITTING(S)	PIPE SIZE								
	6"	8"	10"	12"	16"	20"	24"	30"	36"
90° BEND	19	25	30	34	44	52	60	70	80
45° BEND	8	10	12	14	18	21	25	30	34
22-1/2° BEND	4	5	6	7	9	10	12	14	16
11-1/4° BEND	2	3	4	5	6	7	8	9	10
PLUG, DEAD END OR BRANCH OF TEE	40	52	63	72	93	111	130	155	178
VALVE	20	25	32	36	47	56	78	116	89

RESTRAINED WATER AND RECLAIMED PIPE TABLE									
MINIMUM LENGTH(FT) TO BE RESTRAINED ON EACH SIDE OF FITTING(S)	PIPE SIZE								
	6"	8"	10"	12"	16"	20"	24"	30"	36"
90° BEND	29	37	44	51	65	77	89	105	120
45° BEND	12	15	18	21	27	32	37	44	50
22-1/2° BEND	6	7	9	10	13	15	18	21	24
11-1/4° BEND	3	4	5	6	7	8	9	10	12
PLUG, DEAD END OR BRANCH OF TEE	59	77	93	108	138	166	194	231	265
VALVE	59	77	93	108	138	166	194	231	265

**CoWG THRUST RESTRAINT NOTES:**

- THE TABLES INDICATE MINIMUM LENGTHS OF RESTRAINED JOINTS ON EACH SIDE OF FITTINGS AND CHANGES IN DIRECTION. WHERE PRACTICAL, FULL LENGTHS OF RESTRAINED PIPE SHALL BE LAID TO ACHIEVE THE REQUIRED MINIMUM RESTRAINT.
- WHERE COMBINATIONS OF FITTINGS ARE USED, THE PIPING BETWEEN THE FITTINGS SHALL BE RESTRAINED. THE MINIMUM RESTRAINED LENGTH OF PIPE, REQUIRED UPSTREAM AND DOWNSTREAM OF THE COMBINATION OF FITTINGS SHALL BE DETERMINED ON THE BASIS OF ONE EQUIVALENT FITTING (I.E., 2-45 DEGREE BENDS WILL BE CONSIDERED AS THOUGH A 90° BEND WERE LOCATED MIDWAY BETWEEN THE TWO 45° BENDS).
- FOR PIPE THAT IS ENCASED IN POLYETHYLENE, RESTRAINED JOINTS MINIMUM LENGTHS SHALL BE INCREASED BY 50 PERCENT.
- FOR FITTINGS OTHER THAN THOSE PRESENTED IN THE ABOVE TABLES, RESTRAINED JOINT LENGTHS SHALL BE DETERMINED IN ACCORDANCE WITH "THRUST RESTRAINT DESIGN FOR DUCTILE IRON PIPE" BY THE DUCTILE IRON PIPE RESEARCH ASSOCIATION. RESTRAINED JOINT LENGTHS FOR A GIVEN PRESSURE RANGE SHALL BE BASED ON THE MAXIMUM PRESSURE FOR THE TEST PRESSURE RANGE. SM (SAND SILT) SOIL, 3- FEET DEPTH, LAYING CONDITION NO. 3 AND FACTOR OF SAFETY OF 1.5.
- IN-LINE VALVES: PROVIDE MECHANICAL RESTRAINT ON EACH SIDE OF THE VALVE.
- ALL RECLAIMED WATER PIPING SHALL BE HYDROSTATICALLY TESTED AT A PRESSURE OF 150 PSI. ALL WASTEWATER PIPING SHALL BE HYDROSTATICALLY TESTED AT A PRESSURE OF 100 PSI.

HORIZONTAL & VERTICAL SEPARATION REQUIREMENTS											
PROPOSED UTILITY	POTABLE WATER		RECLAIMED WATER*		SANITARY SEWER (GRAVITY )		SANITARY SEWER (FORCEMAIN)		STORM WATER		ACCEPTABLE VARIANCES
	HORIZ.	VERT.	HORIZ.	VERT.	HORIZ.	VERT.	HORIZ.	VERT.	HORIZ.	VERT.	
POTABLE WATER	-	-	3'	12"	6'	12"	6'	12"	3'	6" A 12" B	SEE GENERAL NOTES: NO. 4 & 5
RECLAIMED WATER*	3'	12"	-	-	3'	6" A 12" B	3'	12"	-	-	
SANITARY SEWER (GRAVITY)	6'	12"	3'	6" A 12" B	-	-	-	-	-	-	
SANITARY SEWER (FORCEMAIN)	6'	12"	3'	12"	-	-	-	-	-	-	

**GENERAL NOTES:**

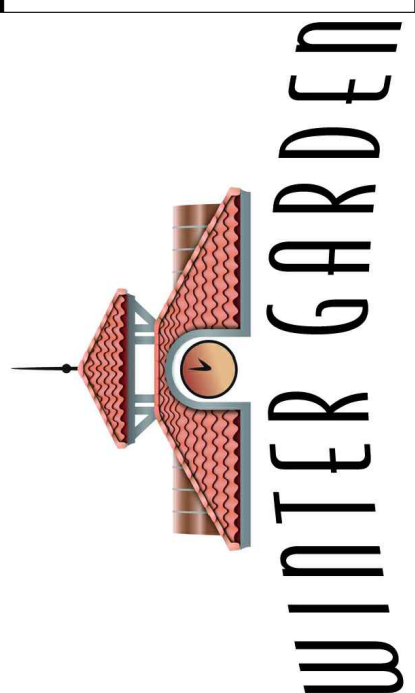
- THE TABLE REPRESENTS THE MINIMUM SEPARATION REQUIREMENTS AS DESCRIBED IN F.D.E.P. RULES OF THE FLORIDA ADMINISTRATION CODE (F.A.C.), THESE SEPARATION REQUIREMENTS SHALL APPLY BETWEEN NEWLY PROPOSED UTILITY LINES AND EXISTING OR PROPOSED UTILITY LINES AND EXISTING OR PROPOSED UTILITY LINES.
- \* FOR THE PURPOSE OF THIS TABLE, RECLAIMED WATER SHALL MEAN UNRESTRICTED PUBLIC ACCESS REUSE WATER AS DEFINED BY F.A.C. 162-610, CHAPTER III. OTHER TYPES OF RECLAIMED WATER ARE CONSIDERED RAW SEWAGE AND SEPARATIONS LISTED FOR SANITARY SEWER SHALL APPLY.
- ALL SEPARATION DISTANCES ARE FROM OUTSIDE OF PIPE TO OUTSIDE OF PIPE UNLESS OTHERWISE SPECIFIED. CRITERION PROVIDING GREATER CLEARANCE SHALL BE USED.
  - A - DENOTES POTABLE WATER ABOVE RECLAIMED WATER, SANITARY SEWER OR STORM WATER; OR RECLAIMED WATER ABOVE SANITARY SEWER.
  - B - DENOTES POTABLE WATER BELOW RECLAIMED WATER, SANITARY SEWER OR STORM WATER; OR RECLAIMED WATER BELOW SANITARY SEWER.
- UTILITY SEPARATION – VERTICAL CLEARANCE MITIGATION
  - A. WHERE WATER AND GRAVITY SANITARY SEWER MAINS CROSS WITH LESS THAN REQUIRED VERTICAL CLEARANCE OR THE SEWER MAIN IS ABOVE THE WATER MAIN, THE SANITARY SEWER WILL BE 20 FEET OF EITHER:
    - DUCTILE IRON PIPE, CENTERED ON THE POINT OF CROSSING, OR;
    - CONCRETE ENCASED VITRIFIED CLAY, OR;
    - PVC PIPE UPGRADED TO WATER MAIN STANDARDS AND PRESSURE TESTED.
  - B. WHERE WATER MAINS AND STORM SEWER PIPES CROSS WITH LESS THAN REQUIRED VERTICAL CLEARANCE, THE WATER MAIN SHALL BE 20 FEET OF DUCTILE IRON PIPE CENTERED ON THE POINT OF CROSSING.
  - C. SEPARATION REQUIREMENTS BETWEEN FORCE MAINS AND POTABLE WATER MAINS MUST BE MAINTAINED UNLESS APPROVED IN ADVANCE BY THE DEPARTMENT.
- UTILITY SEPARATION – HORIZONTAL SEPARATION MITIGATION
  - A. WHEN A WATER MAIN PARALLELS A GRAVITY SANITARY SEWER MAIN, A SEPARATION (MEASURED EDGE TO EDGE) OF AT LEAST SIX FEET SHOULD BE MAINTAINED. WHERE THIS SEPARATION IS NOT MET, ONE OF THE FOLLOWING MUST OCCUR:
    - THE WATER MAIN IS LAID IN A SEPARATE TRENCH OR ON AN UNDISTURBED EARTH SHELF LOCATED ON ONE SIDE OF THE SEWER AT SUCH AN ELEVATION THAT THE BOTTOM OF THE WATER MAIN IS AT LEAST 6 INCHES ABOVE THE TOP OF THE SEWER, OR;
    - IF BOTH SANITARY SEWER AND POTABLE WATER MAINS ARE PROPOSED AND THE ABOVE (1.) IS NOT MET, THE SANITARY SEWER PIPES SHALL BE UPGRADED TO THE EQUIVALENT PIPE MATERIAL AS THE WATER MAIN AND PRESSURE TESTED.
    - IF THE SANITARY SEWER IS EXISTING AND THE POTABLE WATER MAIN IS PROPOSED, THE WATER MAIN SHALL, AT A MINIMUM, BE UPGRADED TO DUCTILE IRON PIPE, CONSTRUCTED IN SEPARATE TRENCHES, LAID AT A HIGHER ELEVATION THAN THE SANITARY SEWER, AND UTILIZE STAGGERED JOINTS.
  - B. SEPARATION REQUIREMENTS BETWEEN FORCE MAINS AND POTABLE WATER MAINS MUST BE MAINTAINED UNLESS APPROVED IN ADVANCE BY THE DEPARTMENT.
  - NO WATER PIPE SHALL PASS THROUGH OR COME IN CONTACT WITH ANY PART OF A SANITARY OR STORM WATER MANHOLE OR STRUCTURE.

**WINTER GARDEN STANDARDS INCORPORATED WITH DESIGN ENGINEERS DOCUMENTS:**

THE DETAILS, NOTES AND SPECIFICATIONS SHOWN ON THIS SHEET REPRESENT THE NOTED STANDARDS OF THE CITY OF WINTER GARDEN FOR CONSTRUCTION OF PUBLIC WORKS AND UTILITY INFRASTRUCTURE. BY INCLUDING THE STANDARDS, THE DESIGN ENGINEER HAS ACKNOWLEDGED THAT THEY ARE EFFECTIVE TO THE PROJECT AND THAT DETAILS, NOTES, OR SPECIFICATIONS ARE AS PROVIDED BY THE CITY AND HAVE NOT BEEN REVISED OR MODIFIED WITHOUT WRITTEN APPROVAL FROM THE CITY ENGINEER OR UTILITY DIRECTOR.

DATE	ITEM	REVISION
4/4/14	General Notes	1
4/4/14	Revised Water & Reuse Notes	2

CITY OF WINTER GARDEN, FLORIDA  
STANDARDS AND SPECIFICATIONS  
For Utilities Construction



STANDARD DETAILS  
FOR  
UTILITIES SYSTEMS

DATE  
JANUARY 2008

SHEET  
1