UNIFORM WATER, WASTEWATER, AND RECLAIMED WATER SYSTEMS CODE

GENERAL STANDARDS FOR PERMITTING, SYSTEMS DESIGN, CONSTRUCTION, AND MATERIAL SPECIFICATIONS

ORDINANCE 2011-044 APPPROVED JUNE 29, 2011

SARASOTA COUNTY, FLORIDA

Page Blank Intentionally

UNIFORM WATER, WASTEWATER AND RECLAIMED WATER SYSTEMS CODE

TABLE OF CONTENTS

SECTIO)N	PAGE
1	ABBREVIATIONS	5-6
2	DEFINITIONS	
3	RATES, FEES AND SCHEDULES	14-17
4	GENERAL	
5	PLAN REVIEW, APPLICATION SUBMITTAL AND PROJECT COMPLETION FOR UTILITY SYSTEM CONSTRUCTION	
6	GENERAL DESIGN STANDARDS FOR WATER, WASTEWATER AND RECLAIMED WATER	
7	GENERAL CONSTRUCTION STANDARDS FOR WATER, WASTEWATER AND RECLAIMED WATER	50-53
8	EARTHWORK AND EXCAVATION	
9	JACKING AND BORING	61-63
10	DIRECTIONAL DRILLING	64-65
11	CONCRETE STANDARDS AND REQUIREMENTS	
12	POTABLE WATERLINE DESIGN, MATERIALS, INSTALLATION AND CONSTRUCTION	69-89
13	WASTEWATER DESIGN, MATERIALS, INSTALLATION AND CONSTRUCTION	
14	LIFT/PUMP STATION DESIGN STANDARDS SPECIFICATIONS, AND INSTALLATION REQUIREMENTS	116-129
15	RECLAIMED WATER WATERLINE DESIGN, MATERIALS INSTALLATION AND CONSTRUCTION	130-151
16	STANDARD DETAILS	152-153
17	INDEX	

Page Blank Intentionally

ABBREVIATIONS

1.1	AADF	Average Annual Daily Flow
1.2	AASHTO	American Association of State Highway & Transportation Officials
1.3	ACI	American Concrete Institute
1.4	ACLF	Adult Congregate Living Facility
1.5	AADF	Average Annual Daily Flow
1.6	ADF	Average Daily Flow
1.7	AMF	Average Monthly Flow
1.8	ANSI	American National Standards Institute
1.9	ASTM	American Society for Testing of Materials
1.10	AWWA	American Water Works Association
1.11	BOARD	Board of County Commissioners
1.12	CODE	Sarasota County Uniform Water, Wastewater, Reclaimed Water Systems
		Code
1.13	CPP	Concrete Pressure Pipe
1.14	CTS	Copper Tubing Size
1.15	DEP	Department of Environmental Protection (Florida)
1.16	DIP	Ductile Iron Pipe
1.17	DIPRA	Ductile Iron Pipe Research Association
1.18	DIPS	Ductile Iron Pipe Size
1.19	EDU	Equivalent Dwelling Unit
1.20	DOH	Department of Health
1.21	EOR	Engineer of Record
1.22	FAC	Florida Administrative Code
1.23	FDEP	Florida Department of Environmental Protection
1.24	FDOT	Florida Department of Transportation
1.25	FH	Fire Hydrant
1.26	FM	Force Main (Wastewater)
1.27	GM	Gravity Main (Wastewater)
1.28	GPD	Gallons per Day
1.29	GPM	Gallons per Minute
1.30	GV	Gate Valve
1.31	HDPE	High Density Polyethylene
1.32	ID	Inside Diameter
1.33	IPS	Iron Pipe Size
1.34	IW	Industrial Waste
1.35	LB	Pound
1.36	LDR	Land Development Regulations
1.37	LF	Linear Foot

ABBREVIATIONS

1.38	LS	Lift Station
1.39	MAX	Maximum
1.40	MDF	Maximum Daily Flow for Month
1.41	MGD	Million Gallons per Day
1.42	MOT	Maintenance of Traffic
1.43	MUTCD	Manual on Uniform Traffic Control Devices, Part VI
1.44	NAVD	North American Vertical Datum (1988)
1.45	NFPA	National Fire Protection Association
1.46	NGVD	National Geodetic Vertical Datum
1.47	NSF	National Sanitation Foundation
1.48	NTU	Nephelometric Turbidity Unit
1.49	OSHA	Occupational Safety & Health Administration
1.50	POR	Plant Operating Report
1.51	PPM	Parts per Million
1.52	PE	Professional Engineer
1.53	PSIG	Pounds per Square Inch Gage
1.54	PSR	Plant Status Report
1.55	PTR	Permit Tracking Form
1.56	PVC	Polyvinyl Chloride
1.57	RW	Reclaimed Water
1.58	RWM	Reclaimed Water Main
1.59	ROW	Right-of-Way
1.60	S&D	Site and Development
1.61	SWFWMD	Southwest Florida Water Management District
1.62	TGD	Thousand Gallons per Day
1.63	UL/FM	Underwriters Laboratories, Inc. ® Listed / Factory Mutual
1.64	UNI-BELL	Uni-bell PVC Pipe Association
1.65	WEF	Water Environment Federation
1.66	WRF	Water Reclamation Facility
1.67	WTP	Water Treatment Plant
1.68	WWTP	Wastewater Treatment Plant

END OF SECTION

DEFINITIONS

2.1 APPLICANT

Any person, firm, association, corporation or other legal entity or any duly authorized representative proposing to construct a utility system and who submits plans through any County agency for the purpose of obtaining approval thereof. Also see "Developer".

2.2 APPROVED EQUAL

Any material or article, approved by the Engineer of Record, which in their opinion meets the function and specifications imposed by the design criteria.

2.3 APPURTENANCES

Any and all fittings located above and below ground such as valves, hydrants, services, laterals, and other materials, structures, control panels, lighting, fencing and any other item or device which is part of an installation or system for the treatment, distribution and collection of potable water, wastewater, or reclaimed water.

2.4 AVERAGE DAILY FLOW (ADF), AVERAGE MONTHLY FLOW (AMF), AND AVERAGE ANNUAL DAILY FLOW (AADF)

- .1 Total month's flows divided by days of the month = (ADF).
- .2 Total flow for last 12 months divided by 12 = (AMF).
- .3 Total flow for last 12 months divided by 365 = (AADF)

2.5 BOARD

The Board of County Commissioners of Sarasota County, Florida.

2.6 CODE

The Sarasota County Uniform Water, Wastewater, and Reclaimed Water Systems Code.

2.7 CROSS-CONNECTION

Any physical arrangement whereby a public water supply is connected, directly or indirectly, to any other water supply system, sewer, drain, conduit, pool, storage reservoir, plumbing fixture, or other device which contains or may contain contaminated water, wastewater, or other waste or liquid of unknown or unsafe quality, which may be capable of imparting contamination to the public water supply system as a result of backflow or back siphonage. Examples: By-pass arrangements, jumper connections, removable sections, swivel or changeable devices, or other temporary or permanent devices which, or because of which, backflow could occur.

2.8 DEVELOPER

Any person, firm, partnership, association, syndicate, corporation, trust or legal entity engaged in developing or subdividing land under the terms of this CODE. The term

DEFINITIONS

"developer" is intended to include the term "subdivider", even though the persons involved in successive stages of a development project may vary.

2.9 DEVELOPMENT

A subdivision of land or site where improvements are undertaken to provide for residential, commercial, industrial, office, professional, institutional, or recreational use, except for a single family or duplex dwelling on an individual lot or parcel.

2.10 DIRECTOR

The Executive Director of Sarasota County Environmental Services Business Center, or an authorized representative.

2.11 DISTRIBUTION MAIN

Normally a waterline six inches (6") in diameter, or larger, which shall have a primary purpose of distributing water for fire fighting and general public consumption.

2.12 DRYLINE PERMIT

A permit that is issued with special conditions attached, but which cannot be placed into service until all special conditions attached to the permit have been met.

2.13 ENGINEER OF RECORD (EOR)

A Professional Engineer (PE), licensed in the State of Florida, who shall be responsible for the design, signing, and sealing of all proposed project plans for all utility construction work performed within the unincorporated areas of Sarasota County.

2.14 EQUIVALENT DWELLING UNIT (EDU)

The utilization of capacity that represents the potential of creating a system demand equal to that of a single-family residence.

2.15 F.A.C.

Florida Administrative Code

2.16 FIELD DEVIATION

A change in any way during construction from the originally approved drawings, plans, sketches, details, and specifications, not affecting the original design and function of the system being installed.

DEFINITIONS

2.17 FIRE LINE

A waterline, including the backflow assembly, for the exclusive purpose of providing fire protection for fire sprinklers, standpipes, fire hydrants, fire hose stations, or similar devices required for firefighting purposes.

2.18 FIRE MARSHAL

The Sarasota County Municipal Fire Safety Inspector, certified through the Division of State Fire Marshals, who is responsible for the implementation and enforcement of fire flow regulations for the unincorporated areas of Sarasota County.

2.19 FRANCHISEE

An investor–owned Utility that has been issued an exclusive franchise by the County to provide water and/or wastewater service to a designated area of unincorporated Sarasota County.

2.20 INSPECTION

Observation conducted in the field, of the installation and materials used on any utility system for water, wastewater, or reclaimed water, which notes field locations and compliance with the project plans, specifications, and this CODE.

2.21 JURISDICTIONAL AUTHORITY

Any city, district, agency, authority, franchise, individual, or entity, other than those considered private, holding a right to operate a utility, as approved by the Board, State of Florida, or the U.S. Environmental Protection Agency.

2.22 PUMP STATION

A collector of wastewater flows which lifts and regenerates these flows to another gravity system, pumping station, or treatment plant.

2.23 MASTER METER

A metering device owned and maintained by the service provider, through which three (3) or more customers are being served.

2.24 MASTER PLAN

A plan outlining and depicting transmission, distribution, and collection of water, wastewater, and or reclaimed water system(s) for the purpose of showing how service will be provided within a utility service area or franchise.

DEFINITIONS

2.25 MODIFICATION

Any change to a utility system which alters its original permitted design by increasing or decreasing the system flows by an amount greater than one (1) EDU.

2.26 OFF-SITE FACILITIES

All extensions or modifications of water, wastewater, or reclaimed water mains and appurtenances, necessary to provide utility service to residential, commercial, or industrial sites or developments.

2.27 ON-SITE FACILITIES

All extensions, modifications, or improvements of water, wastewater, or reclaimed water mains and appurtenances, installed or modified wholly within a project site or development boundary.

2.28 PLANT

Water and wastewater treatment facilities which process water for consumable purposes, or disposal and/or reuse of wastewater.

2.29 POINT OF CONNECTION

The location in a potable water, reclaimed water or wastewater collection system, where private facilities connect to the County/Franchise Utility System. The Point of Connection shall be shown on the utility construction plans. The Point of Connection is defined at the following locations:

- .1 Metered Water At the outlet side of the meter designated to serve a customer
- .2 Metered Reclaimed Water At the outlet side of the meter designated to serve a customer
- .3 Wastewater At a sanitary sewer cleanout at the property line, public right-of way line or easement line that serves a customer
- .4 Wastewater At the upstream (influent) pipe connection(s) to a sanitary sewer manhole at the property line, public right-of-way line or easement line that serves a customer
- .5 Wastewater At a valve located on a force main or pressurized service line at the property line, public right-of-way line or easement line that serves a customer
- .6 Fire Line At the buried fitting immediately upstream of the fire line backflow preventer

2.30 QUALIFIED RESIDENT PROJECT REPRESENTATIVE (INSPECTOR)

A representative of the EOR whose purpose is to observe utility construction work and

DEFINITIONS

who has the knowledge and capability of all facets of utility construction work, such as reading plans, setting grades and elevations, use of proper equipment, compaction, and related materials, and a working knowledge of this CODE.

2.31 RECLAIMED WATER

Water that has received at least secondary treatment, filtration, and high level disinfection, and is reused after flowing out of a wastewater treatment or water reclamation facility. Water receiving this or additional treatment may be used in public access areas when in compliance with FDEP requirements pursuant to FAC 62-610, Part III. Also known as reclaimed water.

2.32 RECLAIMED WATER MASTER PLAN (Resolution No. 94-277)

The document setting forth the recommendations for the development of a County wide and regional reuse distribution and storage system, adopted by the Board on November 8, 1994, by Resolution No. 94-277, as the same may be amended or replaced from time to time.

2.33 RECLAIMED WATER SERVICE LINE

A flexible pipe or tube at least one inch (1") in diameter, beginning at the reclaimed water distribution main and extending to a point of connection, usually at the meter, property line, or easement line, intended for supplying reclaimed water to a single customer.

2.34 RECORD DRAWINGS

A complete set of permitted construction drawings documenting the actual construction work as installed in the field, including any changes made from the originally approved plans, and certified by an engineer, licensed by the State of Florida. All drawings shall have the engineer's seal, signature, and the words "Record Drawings" affixed to each sheet when submitting them to UTILITIES or Jurisdiction having Authority for approval.

2.35 REPAIR

Utility repair work for in-kind replacement due to wear, unexpected damage or breakdown to any approved utility system.

2.36 RESIDENTIAL SERVICE

The provision of water, wastewater, or reclaimed water service to residential dwellings including single and multi-family homes, apartments, condominiums, trailers and mobile homes.

DEFINITIONS

2.37 SPECIFICATIONS

The directions, provisions, and requirements relating to the method and manner of performing the work and/or to the quantities and qualities of materials and labor to be furnished.

2.38 SURETY

Form of bond or guaranty, given to the County, which contains a promise of a third party to complete or pay for the cost of completion of a construction contract if the construction contractor or applicant defaults; to ensure that the promised improvements, construction, and/or maintenance will be completed as agreed to within a fixed period of time.

2.39 THRUST BLOCKS (REACTION BLOCKING)

Mechanically mixed Portland cement concrete poured in place to support and aid against pipe and fitting separation, shown on approved plans, specifications, or as directed by the Engineer. Defined for terminology only. These devices are **no** longer allowed to be installed in utility systems without justification and prior approval from UTILITIES.

2.40 TRANSMISSION MAIN

A main transferring large quantities of water or wastewater from one point to another, generally serving no individual customers that shall have only connections which serve distribution or collection systems. Normally, waterlines sixteen inches (16") in diameter or greater and wastewater force mains twelve inches (12") in diameter or greater.

2.41 UTILITIES

The entity within Environmental Services Business Center of Sarasota County Government that has the jurisdictional authority over this CODE.

2.42 UTILITIES PERMITTING

Environmental Services Business Center, Water Resources Planning and Regulatory, administrator of this code.

2.43 UTILITY

Any legally authorized or permitted facility or entity providing water, wastewater, and/or reclaimed water service to the public, whether a franchise, non-franchise, public, or private facility or entity.

2.44 UTILITY AVAILABILITY LETTER

A written determination of whether a proposed development is located within

DEFINITIONS

UTILITIES' service area or a Franchisee's service area, and whether UTILITIES or Franchisee has the capacity to serve the proposed development. No fee is required.

2.45 UTILITY LOCATION REQUEST

The formal written request to UTILITIES or by a Franchisee to provide location information of the nearest water, wastewater and/or reclaimed water mains to a proposed development.

2.46 UTILITY SYSTEM/FACILITY

Any real property, attached or detached, including but not limited to, appurtenances, fixtures, elements, impounded water, mains, services, valves, meters, hydrants, plants, wells, pumps, tanks, and reservoirs, used by a utility for obtaining, treating, and supplying water, wastewater, and/or reclaimed water utility service. Also included are land rights, easements, rights-of-way, or other real or personal property used to provide utility service.

2.47 WASTEWATER INFILTRATION/INFLOW

Any water, other than that which is permitted, that enters into a wastewater collection system either through line breakage, open manholes, unauthorized connections, or defective connections above or below ground.

2.48 WASTEWATER SERVICE LINE

A wastewater pipe at least six inches (6") in diameter beginning at the wastewater main and extending to the Point of Connection, usually at the property and/or easement line, intended for the collection of wastewater from residential, commercial and industrial users.

2.49 WATER RESOURCES

A Division of Sarasota County's Environmental Services Business Center, responsible for wastewater permitting and monitoring the day-to-day general operations of wastewater facilities and treatment plants within Sarasota County.

2.50 WATER SERVICE LINE

A flexible pipe or tube at least one inch (1") in diameter, beginning at the water distribution main and extending to a Point of Connection, usually at the meter, property line, or easement line, intended for supplying water to a single customer.

END OF SECTION

RATES, FEES and SCHEDULES

ALL RATES, FEES AND CHARGES APPLICABLE TO THE SARASOTA COUNTY UTILITY SYSTEM SHALL BE ADOPTED BY RESOLUTION OF THE BOARD OF COUNTY COMMISSIONERS.

3.1 PERMIT REQUIREMENTS

.1 County Utilities Construction Permit

Projects that require installation of extensions or modifications to water, wastewater, reclaimed water systems, or facilities, other than system repairs as referenced herein, shall require a County Utilities Construction Permit unless otherwise determined by UTILITIES.

.2 Florida Department of Environmental Protection Permit (FDEP)

All FDEP permits for projects must be issued prior to the issuance of the County Utilities Construction Permit. This includes permits from FDEP or its delegated programs in the Sarasota County Department of Health, and Sarasota County Water Resources.

3.2 UTILITY LOCATION REQUEST

There shall be no fee requesting location of the nearest service lines for a proposed development. All development projects are required to obtain a formal utility location prior to requesting a UTILITIES construction plan review using the form at the end of Section 4.

3.3 UTILITIES' CONSTRUCTION PLAN REVIEW FEE

There shall be a non-refundable review fee for all water, wastewater, and reclaimed water projects submitted to UTILITIES, payable to the Board, upon first submittal for construction plan review and processing.

3.4 UTILITIES CONSTRUCTION PERMIT FEE

There shall be a utility construction permit fee based on the actual utility contract cost, as evidenced by a true copy of the contract. This fee is payable to the Board prior to issuance of the Utilities Construction Permit.

3.5 RE-INSPECTION TEST FEE

There shall be an additional fee, payable in advance, for any site visit, for the purpose of witnessing the re-testing of a Utility System or any of its components.

3.6 CHANGES TO APPROVED PLANS FEE

Should the construction plans be changed, modified, or otherwise altered, after approval and issuance of the Construction permit, unless such changes are requested by a regulatory agency of the State or County, said applicant shall pay an additional plan

RATES, FEES and SCHEDULES

review fee.

3.7 CONSTRUCTION WITHOUT PERMIT FEE

Should the contractor commence construction prior to the issuance of a valid Utilities Construction Permit, the fees for such permit shall be triple that of the established construction permit fee.

BULK WATER USE FEE 3.8

There shall be a UTILITIES bulk water use fee for water used in the filling and flushing of the main. This fee is payable prior to issuance of the Utilities Construction Permit at the rate set forth in Utilities Resolution on Rates and Fees.

FEES FOR NON-STANDARD WORKING HOURS 3.9

The utility contractor shall be responsible for charges incurred by County personnel for hours worked on weekends, holidays, and other non-standard working hours which shall be at a rate set forth in Utilities Resolution on Rates and Fees.

FEE FOR FIRE HYDRANT OR CONSTRUCTION METERS 3.10

Construction meters on Sarasota County Utility systems will be furnished and installed by UTILITIES, after coordination with Utilities Customer Service.

3.11 WET TAP FEES

Costs for taps performed by UTILITIES are calculated by the size of the tap and the type of pipe of the existing water main, payable in advance as set forth in Utilities Resolution on Rates and Fees, coordinated with Utilities Customer Service.

3.12 EQUIVALENT DWELLING UNIT SCHEDULE

		TYPE OF ESTABLISHMENT	EDU	Water GPD	Wastewater GPD
3.13		RESIDENTIAL			
	.1	Single family	1.0	250	200
	.2	Apartment (per unit)	0.7	175	140
	.3	Duplex	1.9	475	380
	.4	Mobile home (per space)	0.5	125	100
	.5	Travel trailer/RV (per space)	0.25	63	50
3.14		ADULT CONGREGATE LIVING FACILITY	(ACLF)		
	.1	Common dining area (per bed)	0.3	75	60
	.2	Separate kitchen in each unit (per unit)	0.7	175	140

RATES, FEES and SCHEDULES

		TYPE OF ESTABLISHMENT	EDU	Water GPD	Wastewater GPD
3.15		GENERAL SERVICE			
	.1 .2 .3	Bar/cocktail lounge (per 10 seats) Barber/beauty shop (per shampoo sink) Banquet room (per 15 seats)	0.6 0.4 0.5	150 100 125	120 80 100
3.16		CAR WASH			
	.1 .2 .3	Full service (recycled water) Drive-through (recycled water) Self-service (per bay)	15.0 3.0 2.0	3750 750 500	3000 600 400
3.17		CHURCH (per 100 seats)	1.2	300	240
3.18		CONVENIENCE STORE			
	.1 .2	Without gas facilities With gas facilities (per restroom)	$\begin{array}{c} 1.0\\ 1.0\end{array}$	250 250	200 200
3.19		GAS STATION (per rest room)	1.0	250	200
3.20		HOSPITAL (per bed)	0.6	150	120
3.21		HOTEL, MOTEL (per room)	0.5	125	100
3.22		LAUNDROMAT (per machine)	1.1	275	220
3.23		WAREHOUSE			
	.1 .2	Mixed use (per 1000 square feet). Bulk storage use (per 1000 square feet)	0.3 0.18	75 45	60 36
3.24		NURSING HOME WITH COMMON DINING AREA (per bed)	0.3	75	60
3.25		OFFICE (per 1000 square feet)	0.6	150	120
3.26		POOL, COMMERCIAL	1.0	250	200
3.27		RESTAURANT			
	.1 .2	Conventional (per 10 seats) Fast food/drive-through (per 10 seats)	1.0 1.0	250 250	200 200

RATES, FEES and SCHEDULES

		TYPE OF ESTABLISHMENT	EDU	Water GPD	Wastewater GPD
	.3	Deli/sandwich shop (per 10 seats) (Paper products, no dishwasher)	0.3	75	60
3.28		RETAIL (per 1000 square feet)	0.3	75	60
3.29		SCHOOL			
	.1 .2 .3	Toilets only (per 35 students) Toilets and kitchen (per 35 students) Toilets, kitchen & gym (per 35 students)	1.0 1.3 2.0	250 325 500	200 260 400
3.30		THEATER (per 75 seats)	0.6	150	120
3.31		NOT APPLICABLE FOR IMPACT FEES			
	.1 .2 .3	Lift Station Wastewater Plant Public Schools			

END OF SECTION

<u>GENERAL</u>

4.1 CENTRAL UTILITIES SERVICE

Sarasota County declares its intention to provide central water, wastewater, and reclaimed water service to the unincorporated areas of the County and to those municipalities and private utilities who enter into bulk service agreements on a uniform and non-discriminatory basis, dependent on service capacity, cost-effectiveness and in accordance with the Sarasota County Comprehensive Land Use Plan.

4.2 SARASOTA COUNTY UNIFORM WATER, WASTEWATER, AND RECLAIMED WATER SYSTEMS CODE

- .1 UTILITIES shall be the County's lead agency in reviewing this CODE and will be required to revise such CODE as needed from time to time. Any revisions will require the Board's approval prior to enactment.
- .2 The Environmental Services Business Center Executive Director may authorize changes in the "Standard Utility Construction" Details to facilitate a timely response to changing construction technology.

4.3 LIMITED DISCRETIONARY POWERS AUTHORIZED

UTILITIES shall be authorized limited discretionary powers, in conformance with the Board's policies, to properly administer a public utility in meeting its minimum municipal standards in its role as a public utility.

4.4 MASTER PLANS

- .1 To assure the public effective and adequate service, each Utility shall develop a Master Plan to address both the technical and financial needs related to facility upgrading or expansion for a five (5) year period, including any upgrading and/or expansion of the Utility System(s).
- .2 The Master Plan shall be updated at least every three (3) years and a copy shall be provided to UTILITIES. Each Utility shall provide, upon request, updated utility maps depicting all utility lines and appurtenances within its system.

4.5 CENTRAL SERVICE REQUIRED

.1 Potable water and wastewater collection systems

This section provides a summary of the processes included in the initial stages of project development and coordination of new developer-installed utility system projects.

a. Central potable water and central wastewater collection systems shall be provided in all new developments. Connection shall be required where an existing system is within a given distance as indicated in TABLE 4.1 from a point on the perimeter of the development closest to the source of service and measured along an accessible right-of-way or easement, provided:

<u>GENERAL</u>

- b. The system has sufficient capacity to allow such a connection; and
- c. Any rules or regulations that govern said systems can be amended to accommodate such a connection.

Approved EDU's within development NUMBER OF EDU's	Central System Connection will be required if within: DISTANCE (feet)		
Up to 15	1,320		
100	2,700		
500	5,500		
1,000	8,000		

TABLE 4.1	

- d. Distance requirements for connection to a potable water system and/or a wastewater collection system shall be prorated within this schedule based upon the number of approved EDU's within the development. Larger developments, i.e., Developments of Regional Impact and Developments of Critical Concern shall be evaluated on an individual basis within the guidelines of all applicable federal, state, and county regulations.
- e. Connections by new developments to potable water systems shall be made in such manner as to maintain and/or improve water quality. These goals shall be achieved by completing a loop in the water system by connecting to two or more existing water lines, or such other method approved by UTILITIES to eliminate dead ends in the water system.
- f. If a county or other existing central water system or central wastewater collection system does not exist within the above requirements, or is not available under (a) (b) or (c) above, the Board may approve a central potable water system and wastewater collection system. Where the developer provides a central potable water system and/or a wastewater collection system, the completed plant(s), lines, and all other appurtenances shall be deeded at no cost to Sarasota County to be operated and maintained by the county, unless dedication is waived by the Board.
- g. Individual wells and on-site systems may be approved subject to the requirements of the Sarasota County Land Development Regulations, Development Improvements Technical Manual, Potable Water and Sanitary Sewerage Systems (Latest Revisions).

<u>GENERAL</u>

4.6 UTILITY LOCATION REQUEST

- .1 All projects requiring Construction plan review shall have a water, reclaimed water, and wastewater availability identification performed prior to submittal.
- .2 Upon written request, UTILITIES will provide a formal response using record information to find the nearest utilities to a site. Developer and/or Engineer of Record shall complete "Request for Utility Location Request" form found at the end of this Section.
- .3 UTILITIES, in coordination with the Developer's Engineer, reserves the right to specify the point of service, the size of service, the type of service, and the general layout of the overall system within the guidelines established in this CODE.
- .4 The mandatory request for utility location requires a formal written letter and a formal response. In order for UTILITIES staff to evaluate a location request, the Developer or the Developer's Engineer must provide the project's location, proposed EDU's (see Section 3.13 through 3.31 for EDU determination), approximate potable water demand, wastewater flow generation, and reclaimed water irrigation demand.
- .5 UTILITIES will send the requesting party a formal written location response identifying the appropriate treatment plant facility for service. The Developer or the Developer's Engineer shall include a copy of the location request with an "Application for Utilities Plan Review" form (see Section 5).
- 4.7 EXISTING DEVELOPMENTS (Residential and Commercial)
 - .1 The Developer/Utility, under the direction of UTILITIES, shall notify in writing all persons when such water, wastewater, and/or reclaimed water mains become accessible to their property due to new construction or utility line extensions.
 - .2 Within 365 days of receipt of Notification of Availability from UTILITIES, all owners of existing dwellings shall be required to connect their dwelling to any newly constructed or existing wastewater line, lift station, or compatible system which is within one hundred feet (100') of the property line and which has capacity to accommodate the dwellings as determined by UTILITIES. Requirements for connection to existing and new central water and wastewater systems shall be in accordance with County ordinances.

4.8 MINIMUM MUNICIPAL LEVEL OF SERVICE REQUIRED

- .1 The CODE requirements shall be incumbent on Sarasota County and on each UTILITY franchised or permitted to provide service by the Board.
- .2 Each UTILITY may require a higher level of service and/or material, provided it is uniform and non-discriminatory.

GENERAL

4.9 UTILITIES AS A SERVICE BUSINESS

UTILITIES is a service-oriented, revenue-producing entity of Sarasota County Government, similar to privately owned/operated utilities, and shall analyze costs and sources as they are generated, and assess such costs to that class of customer receiving the benefit, on a uniform and non-discriminatory basis.

4.10 CONSOLIDATION OF FACILITIES

In an effort to provide central water, wastewater and reclaimed water service to the residents of Sarasota County, it is the policy of the county to consolidate the various water, wastewater, and reclaimed water systems throughout unincorporated Sarasota County. This may be accomplished by means of service extensions, acquisition of existing facilities, or construction of new facilities. To minimize the number of new lift stations in Sarasota County, the EOR shall develop and submit for UTILITIES review a "Lift Station Plan" that identifies each existing lift station location, topography, service area basin and depth of wastewater system as well as any proposed lift stations within the particular project.

GENERAL

SARASOTA COUNTY UTILITIES PLANNING 1001 Sarasota Center Boulevard, Sarasota, FL 34240 Phone 861-0590 Fax 861-0592

UTILITY LOCATION REQUEST To be accompanied by written letter describing utility service request

Property Tax ID No.			
Project Name:		Uni	its:
	Section:	Twn:	Rge:
Owner:		Telephone:	
Address:			
City:	State	ZIP	
Number of Proposed EDU's:	Residential	Commercial	Industrial
Total Lots/Parcels Proposed:	Area	a (Acres)::	
Water Purveyor:	Wastewater	Purveyor:	
Water Facility:	Wastewater	Facility:	
Availability Distance To: Potable Water:	Type/Size:		
Wastewater:	Type/Size:		
Reclaimed	Type/Size:		
Engineer of Record:		License No.	
Company Name:		Telephone:	
Address:			
City:	State:	ZIP:	
Fax No.:	E-mail Address:		
	END OF SECTION		

PLAN REVIEW, APPLICATION SUBMITTAL AND PROJECT COMPLETION FOR UTILITY SYSTEM CONSTRUCTION

5.1 GENERAL

This section outlines and provides the necessary information to install public water, wastewater, and reclaimed water systems in the unincorporated areas of Sarasota County. Sarasota County has governmental, and privately, owned public utility systems.

5.2 PERMIT PROVISIONS

The issuance of utility construction permits for new developments shall be subject to the requirements of Sarasota County's Comprehensive Plan, the Land Development Regulations (Ordinance 97-051), as amended, and the Concurrency Management System (Ordinance 89-103) as amended, with respect to the provision of adequate water and wastewater facility capacity and levels of service.

5.3 PROCEDURES FOR UTILITY CONTRUCTION APPROVAL AND PERMITTING

- .1 PLANS IN ACCORDANCE WITH MASTER PLANS
- .2 PLAN REVIEW
- .3 PLAN APPROVAL
- .4 QUALIFIED CONTRACTOR
- .5 MATERIALS
- .6 PRE-CONSTRUCTION MEETING
- .7 ISSUANCE OF CONSTRUCTION PERMITS
- .8 ONSITE INSPECTIONS
- .9 RECORD DRAWINGS SUBMITTAL FOR ACCEPTANCE
- .10 FINAL INSPECTIONS
- .11 TEST RESULTS
- .12 STATEMENT OF ENGINEER, SYSTEM PASSED ALL TESTS
- .13 STATEMENT OF ENGINEER, LINES INSTALLED IN EASEMENTS
- .14 COMPLETION OF CONSTRUCTION CERTIFICATION
- .15 WARRANTY DOCUMENTS
- .16 AUTHORIZATION TO PLACE SYSTEM IN SERVICE
- .17 ACCEPTANCE BY SERVING UTILITY

5.4 CONSTRUCTION PERMIT JURISDICTION OR APPLICABILITY

- .1 This CODE covers the design, installation, approval, and certification of public water, wastewater, or reclaimed water systems as follows:
 - .a Waterlines two inches (2") in diameter or greater designed and installed to serve two (2) or more customers.
 - .b Waterlines two inches (2") in diameter or greater requiring Department of Health approval.
 - .c All wastewater collection systems of any size.

PLAN REVIEW, APPLICATION SUBMITTAL AND PROJECT COMPLETION FOR UTILITY SYSTEM CONSTRUCTION

- .d Wastewater service lines two inches (2") in diameter or greater for two (2) or more customers.
- .e Wastewater force main, vacuum line, two inches (2") in diameter or greater serving one (1) or more customers connecting to a central wastewater system.
- .f Wastewater lift stations, pumps stations, vacuum stations or combination thereof, of any size connecting to a central wastewater system.
- .g Any repair to a utility system which alters its originally permitted design capacity by increasing or decreasing the system flows by an amount greater than one (1) EDU, will be considered a system modification and requires a Utility Construction Permit and/or DEP Permits.
- .h Reclaimed water distribution or transmission systems of any size.
- .2 Utility Construction Permit Exemptions
 - .a Activities associated with routine system maintenance.
 - .b When utility repair work is for rehabilitation due to wear, unexpected damage, or breakdown, provided the parts and materials to be used are consistent with the original intent of the design. Should the construction methods and materials be inconsistent with the minimum requirements of this CODE, the CODE shall prevail.
 - .c Activities associated with new construction, reconstruction, process or facility work on plants or systems owned by Sarasota County Government.
 - .d Treatment plant activities associated with new construction, reconstruction, treatment process or facility work.
 - .e Fire hydrant installations with piping of less than fifty feet (50') in length, and DOH permit is not required.
- 5.5 PLAN REVIEW AUTHORITY AND CONSISTENCY OF PLANS WITH MASTER PLAN
 - .1 Review of Utility construction plans will be conducted pursuant to Chapter 471, Florida Statutes, and Rule 21H-26.001 FAC, Department of Business and Professional Regulation, "Standards for Supervision of Governmental Employees by Professional Engineers".
 - .2 All plans for utility construction submitted to UTILITIES for compliance review shall be

PLAN REVIEW, APPLICATION SUBMITTAL AND PROJECT COMPLETION FOR UTILITY SYSTEM CONSTRUCTION

reviewed for consistency with this CODE and the County's Master Plan, as defined in this CODE. Findings of inconsistency with this CODE or the Master Plan shall be considered grounds for permit denial, until such time as plans are revised by the applicant and found by UTILITIES to be consistent with said requirements. FRANCHISEES have this authority for systems under their jurisdiction.

5.6 CONSISTENCY OF PLANS WITH CONCURRENCY REQUIREMENTS

The design and installation of all proposed potable water, reclaimed water and wastewater facilities shall be in accordance with the County's Comprehensive Plan and any applicable Concurrency Management System. Where proposed developments will have an adverse impact upon other existing facilities, the EOR may be required to propose off-site system improvements to mitigate these impacts.

5.7 PLAN REVIEW PROCESS AND SUBMITTALS

The applicant or his agent shall submit the following items to UTILITIES when applying for plan review:

- .1 A completed Utilities Plan Review Application.
- .2 A letter from the EOR indicating all utilities or agencies with facilities in the ground, or around the area of proposed construction have been notified of the proposed project, and were sufficiently provided with the project drawings, location, and general layout so as to prevent future conflicts with each other.
- .3 Four (4) sets of signed and sealed twenty-four inch (24") by thirty-six inch (36"), or twenty-two inch (22") by thirty-four inch (34") folded engineering construction drawings (see section 6.3 for additional plan requirements).
- .4 Four (4) completed copies of all FDEP permit application forms for water, wastewater, and/or reclaimed water, with original signatures and seals on all copies. Applications must be complete. If UTILITIES is the purveyor, the information necessary to complete the application must be obtained from Sarasota County.

Should the system be owned and maintained by a private entity, an addendum must be attached to the applications, prepared and signed by the Engineer, and signed by the applicant. This addendum must address the agreement with the receiving public utility, and state the responsible person who will own and provide future maintenance.

- .5 One (1) check for appropriate processing fee, payable to Sarasota County Department of Health, for water systems. UTILITIES will forward all checks, plans, and appropriate forms for waterline construction to the DOH.
- .6 One (1) check for appropriate processing fee, payable to Sarasota Board of County Commissioners, for wastewater systems up to twelve inches (12") inside diameter.

PLAN REVIEW, APPLICATION SUBMITTAL AND PROJECT COMPLETION FOR UTILITY SYSTEM CONSTRUCTION

UTILITIES will forward all checks, plans, and appropriate forms for wastewater and reclaimed water construction to Water Resources. For wastewater systems larger than twelve inches (12") inside diameter, one (1) check for appropriate processing fee, payable to the Florida Department of Environmental Protection, including a transmittal letter to the Southwest District office in Tampa, and packaging and postage as required. Utilities will sign and forward application, and one (1) set of plans or report (when required), to the FDEP.

- .7 One (1) check for appropriate plan review fee made payable to the Board.
- .8 Hydraulic calculations, justifying required fire flows and insuring that maximum water velocities do not exceed eight feet (8') per second, except in hydrant leads where the length is less than one hundred feet (100'). Hydraulic calculations shall be done using Kentucky Pipe (KY Pipe), Cybernet (CB) or comparable program approved by the service provider, using a maximum coefficient factor of 130 for PVC and 120 for DI.
- .9 Hydraulic calculations for lift stations shall be submitted including all pipes, mains and down stream lift stations necessary to convey the proposed projects wastewater from the source to the designated treatment plant.
- .10 During the course of UTILITIES review of construction plans and hydraulic calculations, UTILITIES shall also review for the possibility of increasing the size of main and facilities and/or depth of gravity sewer mains, manholes, and facilities of a proposed development to serve existing or future customers. Such upsizing and/or lowering of mains and facilities may be accomplished through means of a Standard Utility Agreement entered into between Sarasota County and the Developer.

5.8 INADEQUATE PLANS, INCOMPLETE SUBMITTALS

Incomplete submittal packages, including forms, and plans lacking the required information, or plans difficult to read, and/or interpret, will be returned to the applicant or for corrections and resubmission.

5.9 COMPLETION OF REVIEW

- .1 When UTILITIES has reviewed the plans for compliance with this CODE, other applicable ordinances and master plans, a compiled comment sheet will be sent to the EOR. The comment sheet shall include comments related to fire protection, cross connection control, and water meter setting. The EOR may be required to submit four (4) sets of folded signed and sealed revised plans showing requested revisions. These new plans will be distributed to the applicable reviewing agencies and will be compared with previous review comments to be sure that all concerns have been addressed.
- .2 The EOR shall notify UTILITIES in writing if revised plans cannot be returned within ninety (90) days. A request for an extension of up to ninety (90) days can be made. If there is no response to a returned set of documents within ninety (90) days, UTILITIES

PLAN REVIEW, APPLICATION SUBMITTAL AND PROJECT COMPLETION FOR UTILITY SYSTEM CONSTRUCTION

will consider it automatically canceled by the applicant. Re-submittal of the plans after this period will be subject to applicable review fees.

.3 The Applicant or the EOR shall notify UTILITIES when a previously approved project has been canceled.

5.10 CONTRACTOR'S DOCUMENT SUBMITTAL

The utility contractor for the applicant shall submit the following documents to UTILITIES prior to the issuance of a County Utilities Construction Permit:

- .1 A completed Utilities Construction Permit Application;
- .2 Three (3) complete sets of folded construction drawings, twenty-four inch (24") by thirtysix inch (36"), or twenty-two inch (22") by thirty-four inch (34"), as approved in the plan review process, signed and sealed by the EOR;
- .3 A copy of any other required permits, i.e., Right-of-Way use permits;
- .4 Two (2) sets of shop drawings, or materials specifications and standards form, signed and sealed by the EOR;
- .5 A copy of the signed construction contract with a line item materials list showing line item quantities and costs;
- .6 A bulk water fee for utility construction when applicable (construction water);
- .7 The appropriate utility construction permit fee based on the construction contract for the improvements associated with water, wastewater, fire-line, and reclaimed water utility systems.

5.11 PRE-CONSTRUCTION MEETING

- .1 The Contractor or EOR shall have the responsibility of coordinating the pre-construction meeting and shall notify all persons required to attend. The Contractor or EOR shall request UTILITIES to schedule a time and date for the meeting; the request shall be made a minimum of forty-eight (48) hours prior to a desired meeting date.
- .2 The EOR, utility representative, contractor, county, and state inspectors or their authorized representatives shall attend all scheduled meetings, such as pre-construction, field meetings, final inspections, or any test procedure. The contractor shall notify all persons forty-eight (48) hours in advance of scheduled meetings and/or testing.

5.12 PERMIT ACCEPTANCE

PLAN REVIEW, APPLICATION SUBMITTAL AND PROJECT COMPLETION FOR UTILITY SYSTEM CONSTRUCTION

Acceptance of a Utilities Construction Permit shall constitute an agreement by the Permittee to hold UTILITIES and its employees, and the Board of County Commissioners, and the individual members thereof, harmless from the payment of any compensation or damages resulting from the exercise of the privileges or obligations granted by a construction permit.

5.13 PERMIT DURATION

- .1 The construction permit shall remain valid for one (1) year from the date of issuance or as long as work is ongoing, or until one or more of the following circumstances exists:
 - .a Work has not been initiated ninety (90) days after the date of issuance of a Utilities Construction Permit, or work has ceased for sixty (60) days and not resumed. Permit shall automatically become void.
 - .b The applicant has obtained an extension of up to ninety (90) days without payment of an additional fee provided a written request has been submitted to UTILITIES prior to the permit becoming void. Not more than one extension shall be granted.
 - .c The permittee of a utilities construction project, for which no work has been initiated within ninety (90) days of issuance, shall file with UTILITIES a written statement that the project has been canceled. UTILITIES will refund to the Permittee the previously paid Utilities Construction Permit fee, upon receipt of said notice.

5.14 DEVIATIONS FROM APPROVED PLANS

Should the applicant change, modify or otherwise alter the plans, drawings or sketches, after approval and issuance of the Utilities Construction Permit, said applicant shall pay an additional fee equal to one half of the original Utilities Construction Permit fee. Exceptions are allowed for changes required or approved by UTILITIES, or any regulatory agency having jurisdiction for water, wastewater, or reclaimed water utilities and placement thereof.

5.15 CORRECTION OF PLANS/SPECIFICATIONS

UTILITIES reserves the right to require the EOR, contractor, and/or developer to correct or amend any approved plans and/or specifications when such plans are found to include errors and/or omissions, or there is an immediate need to modify such due to regulatory requirements.

5.16 CONSTRUCTION PERMIT SUSPENSION

PLAN REVIEW, APPLICATION SUBMITTAL AND PROJECT COMPLETION FOR UTILITY SYSTEM CONSTRUCTION

- .1 UTILITIES may suspend or revoke entirely, upon written notice to the permittee, any Utilities Construction Permit issued pursuant to this CODE, when it is determined that the permittee is in violation of this CODE.
- .2 It shall be a violation of this CODE for any work to be performed before a permit has been issued, or to perform any work under a Utilities Construction Permit which has been suspended.
- .3 Where an emergency exists, written notice shall not be required, but any verbal suspension/revocation shall subsequently be provided to the permittee in writing.
- .4 UTILITIES may reinstate a suspended permit upon correction of the condition which resulted in suspension of the permit. Reinstatement of a suspended or revoked permit does not preclude UTILITIES from taking further legal action.

5.17 VIOLATION NOTIFICATION

- .1 Any person found in violation of this CODE or any requirement of a Permit issued herein may be served with a written notice stating the nature of the violation and a reasonable time limit for compliance.
- .2 Any such notice given shall be in writing to the contractor on site, and/or a posted stop work order will be placed on the project site.

5.18 PROJECT COMPLETION

- .1 In order for UTILITIES to issue final approval and acceptance of any utility project, including release of any Certificates of Occupancy (COs), the following documents will be required when applicable:
- .2 WATER
 - .a FDEP Certification of Completion form prepared by the EOR;
 - .b Satisfactory bacteriological clearances;
 - .c Certified Pressure test reports;
 - .d Certified density test results;
 - .e UTILITIES approved record drawings;
 - .f Successful fire flow test results;
 - .g Complete set of signed and sealed plans, record mylars, and compact disk (CD) or DVD;
 - .h Engineers signed and sealed statement that all lines have been installed within the prescribed rights-of-way and/or easements;
 - .i Turnover of lines, facilities, and appurtenances.
- .3 WASTEWATER

PLAN REVIEW, APPLICATION SUBMITTAL AND PROJECT COMPLETION FOR UTILITY SYSTEM CONSTRUCTION

- .a FDEP Request For Approval To Place A Domestic Wastewater Collection/Transmission System Into Operation form prepared by the EOR;
- .b Certified Pressure tests and mandrel test reports;
- .c Certified density test results;
- .d TV tapes and test reports;
- .e Lift station start up reports and operation & maintenance manuals (3 sets);
- .f UTILITIES approved record drawings;
- .g Complete set of signed and sealed plans, record mylars, and compact disk (CD) or DVD;
- .h Engineer's signed and sealed statement that all lines have been installed within the prescribed rights-of-way and/or easements;
- .i Turnover of lines, facilities, and appurtenances.

.4 RECLAIMED WATER

- .a Certified Pressure test reports;
- .b Certified density test results;
- .c UTILITIES approved record drawings;
- .d Complete set signed and sealed plans, record mylars, and compact disk (CD) or DVD;
- .e Engineer's signed and sealed statement that all lines have been installed within the prescribed rights-of-way and/or easements;
- .f Turnover of lines, facilities, and appurtenances.

5.19 ENGINEER'S CERTIFICATION SUBMITTAL STANDARDS

The Engineer, not necessarily the EOR, shall submit the following documents to UTILITIES:

- .1 Record Drawings (see requirements herein):
 - .a Approved record drawings shall be submitted to UTILITIES a minimum of fortyeight (48) hours prior to the project's final walkthrough. At the time of the final walk through the drawings shall be field verified by the UTILITIES inspector for accuracy of measurements and to insure that all fieldwork has been completed according to the permitted construction plans.
 - .b The EOR will be notified by UTILITIES in writing of any errors or omissions found on the record drawings. After revisions and/or additions have been made, the record drawings shall be re-submitted until final approval has been given to the EOR.
- .2 Upon approval of record drawings, the EOR will be notified by UTILITIES to submit a reproducible mylar set that shall include all drawing pages originally permitted. The record mylar must be submitted on Diazo 3 mil thick single matte black line mylar or

PLAN REVIEW, APPLICATION SUBMITTAL AND PROJECT COMPLETION FOR UTILITY SYSTEM CONSTRUCTION

Xerographic 4 mil thick polyester film. Sepia paper and/or mylars having a dark background will be rejected.

- .3 A compact disk (CD) or DVD showing the project record drawings shall be provided to UTILITIES. The information shall be in AutoCAD Release 2008 or earlier edition.
- .4 A letter certifying that all the lines, manholes, and other materials have been installed within the easements so provided by instrument or plat.
- .5 A signed and sealed letter certifying compaction requirements have been met for all trench excavation backfill work to finish grade.

5.20 RECORD DRAWING REQUIREMENTS

- .1 Three (3) sets of signed and sealed record drawings, four (4) sets for UTILITIES owned systems, shall be submitted. Each sheet shall be labeled "Record Drawing".
- .2 The record drawings shall be the same drawings in number and kind as the approved construction permit set.
- .3 Record drawings shall include all conflicts and crossings, top of pipe elevations every one hundred feet (100'), location and elevations on all underground appurtenances (bends, fittings, etc.), and two-point swing-ties (maximum distance of two hundred feet (200'). Swing ties shall be shown on each applicable sheet of the record drawings and shall be presented in a tabulation format. For horizontal directional drilled utility mains, the "as-built" top of pipe elevations shall be recorded at every rod length change and shall be plotted on the plan and profile drawing sheets.
- .4 Swing ties shall be measured from permanent reference points, i.e., power or telephone poles (concrete), manholes, storm structures, building corners, fire hydrant bonnets, and other objects not likely to be relocated at a later time.
- .5 Unacceptable reference points shall include valve boxes, fence posts, driveway corners, trees, etc.
- .6 Witness posts shall be installed and used to obtain swing-ties in areas where acceptable reference points are not available.
- .7 Any references to "proposed" shall not show on the record drawings. Items not installed or that are for future phases and shown on the drawings, shall be noted "not installed" or removed from the drawing set.
- .8 Record drawings shall be delivered in mylar, paper, and digital formats. The digital format drawings shall be submitted on CD or DVD media. The submitted digital files shall be DWG, DXF, or DGN format. The CD or DVD shall also contain an ASCII text file that describes the layering system of the

PLAN REVIEW, APPLICATION SUBMITTAL AND PROJECT COMPLETION FOR UTILITY SYSTEM CONSTRUCTION

drawings contained on the disc. The layering system of drawings shall be consistent amongst all the drawings on the submitted CD or DVD.

If such data exists, a survey data file with the positions of utility infrastructure shall be submitted. The file shall be in comma delimited ASCII text format and include a description of the codes used to collect data.

All digital files, including drawings and survey data, shall be submitted in the State Plane Coordinate System, Florida West Zone, NAD83 horizontal datum, and NAVD88, or NGVD29 vertical datum. Both horizontal and vertical units are U.S. Survey Feet. Spatial positioning for the drawings must conform to the Minimum Technical Standards for surveying and mapping as described in Florida Administrative Code 5J17 (old 61G17).

All record drawing sheets and all record drawing formats shall contain a record drawing date. All survey data files shall include the date of data collection.

5.21 TURNOVER OF LINES TO SARASOTA COUNTY UTILITIES

All projects that are served central water, wastewater, and/or reclaimed water by Sarasota County Utilities must complete a turnover of lines package prior to the release of any COs. This package includes the following:

- .1 Bill of sale, affidavit of no liens;
- .2 Certification of no contributions;
- .3 Final cost breakdown (lines, facilities, appurtenances, services);
- .4 Legal description of property served;
- .5 Record plat;
- .6 Warranty and guarantee (one year guarantee by applicant and utility contractor);
- .7 List of customers/spaces/owners/lots with addresses in spreadsheet format for the purpose of identifying service allocations;
- .8 Permanent easement form and legal description for each easement dedication and recording;
- .9 Transfer of all project related reports and utility billing (lift stations, etc.).

The entire "Turnover of Lines Package" will be provided to the engineer/owner at the Utilities pre-construction meeting. Additional packages may be obtained from UTILITIES.

5.22 CERTIFICATES OF OCCUPANCY

In all instances, Certificates of Occupancy will be withheld until all applicable requirements set forth herein have been met.

Connections, taps, gate valve operation (including tie-in valve), and/or water use shall not be

PLAN REVIEW, APPLICATION SUBMITTAL AND PROJECT COMPLETION FOR UTILITY SYSTEM CONSTRUCTION

performed on any utility system unless prior utility approval has been granted. The UTILITIES' Inspector shall be present during the performance of any tap or tie-in to a Utility System.

PLAN REVIEW, APPLICATION SUBMITTAL AND PROJECT COMPLETION FOR UTILITY SYSTEM CONSTRUCTION



ENVIRONMENTAL SERVICES BUSINESS CENTER 1301 Cattlemen Road, Bldg. A, Sarasota, FL 34232 Phone 861-0590 Fax 861-0592 APPLICATION FOR UTILITIES PLAN REVIEW

(FOUR SETS OF ENGINEERING PLANS AND \$100.00 PLAN REVIEW FEE, PAYABLE TO THE BOARD OF COUNTY COMMISSIONERS MUST ACCOMPANY THIS APPLICATION)

OFFICE USE ONLY	7
------------------------	---

FILE NO.: UPS20

DATE RECEIVED:

PROPERTY TAX ID NO.:

PHASE:

PROJECT NAME:

PROJECT LOCATION:

OWNER: ADDRESS: **TELEPHONE NO.** ()

ZIP

NUMBER OF EDU'S: RESIDENTIAL _____ COMMERCIAL _____ INDUSTRIAL

-

TOTAL LOTS/PARCELS SERVED:

WATER PURVEYOR:

WATER FACILITY:

WASTEWATER PURVEYOR:

WASTEWATER FACILITY:

APPLICATION IS HEREBY MADE TO INSTALL THE FOLLOWING FACILITIES:

CITY/STATE:

WATER LINE(S) LIFT STATION FIRE LINE/BACKFLOW ASSEMBLY MASTER WATER METER RECLAIMED WATER LINES WASTEWATER LINES(S) FORCEMAIN MASTER RECLAIMED WATER METER LOW PRESSURE SYSTEM

UNIT:

COMPANY NAME:

FAX NO.: ()

LICENSE NO.

TELEPHONE NO.: ()

ADDRESS:

CITY/STATE:

ZIP

34

PLAN REVIEW, APPLICATION SUBMITTAL AND PROJECT COMPLETION FOR UTILITY SYSTEM CONSTRUCTION

NOTICE: Plan review approvals will expire one year from date of approval, DEP applications should not be submitted until after utility plan approval is obtained.

PLAN REVIEW, APPLICATION SUBMITTAL AND PROJECT COMPLETION FOR UTILITY SYSTEM CONSTRUCTION

REQUIREMENTS FOR UTILITY TURN OVER PACKAGE

FOR PUBLIC IMPROVEMENTS

FOR

DEVELOPMENT

UTILITIES PERMIT NUMBER _____

NOTE: ALLOW 30 DAYS FOR PROCESSING

- 1.) Approval letter from UTILITIES for Engineer's Defect Security Cost Estimate
- 2.) Original Defect Security and **1** copy (i.e. Letter of Credit, Surety Bond, Cashier's Check)
- 3.) Original Warranty (one-year unconditional) and Guarantee (one-year guarantee by applicant and utility contractor) of Required Improvements and **1** copy
- 4.) Approval **memo** of accepted Mylar Reproducible and electronic copy on compact disk of As-Builts for: Water/Wastewater Reclaimed Water from UTILITIES
- 5.) Final Inspection Approval **memo** from Utility Operations
- 6.) List of customers/spaces/owners/lots with addresses in spreadsheet format for the purpose of identifying service allocations
- 7.) Certification of No Contributions
- 8.) Legal documents provided to UTILITIES including:
 - (a) Record plat
 - (b) Permanent Utility Easement form and legal description, Title Certificate (along with mortgage information), Consent to Utility Easement, and Joinder Agreement for each Lift Station, Utility mains, and Appurtenances
 - (c) Bill of Sale, Affidavit of No Liens
 - (d) Legal description of property served
- 9.) Transfer of all project related reports (including Hydrant Flow Test Reports), and utility billing (lift stations, etc.)

After completion and approval of the above items, recommendation will be made to the Sarasota Board of County Commissioners for acceptance of the Defect Security. At that time the public improvements of the subdivision will be recommended for County maintenance. The agreement and security will be monitored by UTILITIES. All inspections to release the agreement/security will be performed by UTILITIES.

END OF SECTION
GENERAL DESIGN STANDARDS FOR WATER, WASTEWATER AND RECLAIMED WATER

6.1 GENERAL

- .1 This section provides general standards and guidelines to engineers, planners, and designers for the minimum design criteria for water, wastewater, and reclaimed water utility systems. Specific standards, details, and specifications for material used in water, wastewater, or reclaimed water systems can be found in Sections 12, 13, 14, and 15 of this CODE.
- .2 All projects requiring plan review shall submit a formal water, sewer, and reclaimed water location request and response as noted in Section 4 performed prior to submittal.

Utilities, in coordination with the Developer's Engineer, reserves the right to specify the point and size of service or connection, and the general overall system within the guidelines established in this CODE.

.3 The design and installation of all proposed water, wastewater, and reclaimed water facilities or systems shall be in accordance with the County's Comprehensive Plan and any applicable Concurrency Management System.

6.2 REFERENCES

- .1 Materials and procedures addressed in standard manuals and regulations (as amended), listed below, are adopted for reference purposes.
 - .a Florida Department of Environmental Protection (FDEP);
 - .b American Water Works Association (AWWA);
 - .c Water Environment Federation (WEF);
 - .d US Environmental Protection Agency (EPA) Manuals of Practice;
 - .e American National Standards Institute (ANSI);
 - .f American Society of Testing Materials (ASTM);
 - .g Recommended Standards for Water & Wastewater Facilities (Ten States Standards);
 - .h Appropriate Federal, State, and County Regulations;
 - .i Manufacturers' manuals for their respective equipment and materials;
 - .j National Fire Protection Association: NFPA No. 1141
 - .k National Electrical Code; NFPA 70
 - .1 National Sanitation Foundation (NSF)
 - .m US & State of Florida Occupation Safety and Health Administration (OSHA)
 - .n Sarasota County Land Development Regulations (LDR);
 - o Standards and Guides for Traffic Controls for Street and Highway Construction, Maintenance, Utility, and Incident Management Operations, Part VI of the Manual on Uniform Traffic Control Devices (MUTCD).
 - .p UL Listed, FM Approved
 - .q Plastic Pipe Institute
 - .r National Pollutant Discharge Elimination System (NPDES)

GENERAL DESIGN STANDARDS FOR WATER, WASTEWATER AND RECLAIMED WATER

.s Best Management Practices (BMP's)

6.3 DESIGN DRAWINGS

- .1 The EOR shall coordinate the location of water, wastewater, and reclaimed water facilities with other utilities (electric, gas, telephone, cable TV, etc.) to minimize and resolve conflicts. UTILITY facilities shall be designed to minimize conflicts with driveways and sidewalks. In the event of conflict with a future driveway or sidewalk, the Developer and/or Builder shall be responsible for resolving the conflict at their expense.
- .2 For Developer-installed systems, UTILITIES will generally consider the following order of precedence in resolving any conflict, error, or discrepancy:
 - 1. Approved final design plans
 - 2. Approved regulatory permits (UTILITIES, FDEP)
 - 3. Approved County/FDOT agency permit requirements
 - 4. Sarasota County Uniform Water, Wastewater and Reclaimed Water Systems CODE
 - 5. UTILITIES Water, Wastewater and Reclaimed Water Standards Manual (Details)
- .3 Three (3) sets of clear and legible design plans that have been signed and sealed by a design engineer registered in the State of Florida shall be submitted on twenty-four inch (24") by thirty-six inch (36"), or twenty-two inch (22") by thirty-four inch (34") sheets. The submitted plans are to be scalable and include a graphic scale(s). The cover sheet shall state the project name, owner's name and address, engineer's name and address, water, wastewater, and/or reclaimed water purveyor, utility permits required, section, township, and range in which project is located, and a key map that clearly depicts the location of the project with respect to major arterial roads, adjacent roads, and established subdivisions. Additional information may include labeling the cover sheet "Utility Construction Plans For [Project Name]", a drawing index, project identifying number, parcel identifying number, and aerials.
- .4 A project Utility Master Plan shall follow the cover sheet to show the entire proposed utility system, and a sufficient portion of the existing system to depict how the wastewater flows will be routed to the treatment facility and water system tie-ins. This plan shall depict the nearest points of tie-in(s) to any other project, line(s), and/or system(s), using a scale that allows full sheet coverage as practical but no smaller than one inch (1") equals two hundred feet (200"). This plan layout of the project site or development must identify half section lines and lots or tracts to be served including named streets. The Utility Master Plan may be more that one sheet where necessary. The Utility Master Plan shall identify all existing on-site and off-site valves necessary for tie-ins to the existing system, and for flushing, and pressure testing of the new lines.

GENERAL DESIGN STANDARDS FOR WATER, WASTEWATER AND RECLAIMED WATER

- .5 A Site Utility Plan of the project area or development, identifying lots or tracts to be served, streets with names, curbs, gutters, sidewalks, drainage swales, channels, ponds, utility poles, and other utilities. This plan view shall also indicate all existing and proposed easements, tracts, vacations, or plats, if recorded, with Official Record Book and page or plat identification. The plan view may be more than one sheet and is normally that drawing furnished for S&D approval.
- .6 Construction plans are a set of scaled drawings depicting the plan and profile of all utility lines proposed, conflicts and crossings, centerline of survey or centerline of construction with stationing provided at one hundred foot (100') intervals, and a benchmark referencing where elevations and construction lines are based. The plan and respective profile are to be on the same plan sheet.
- .7 Construction Plan and Profile Sheets
 - .a Construction plan and profile sheets shall be complete with concise notes, references, restrained joint sections shown, and adequate information on other utilities or infrastructure services. Plan and profile sections shall indicate the distance between the vertical and horizontal separation as well as the exact location and size of the line. Details of conflicts and the information required to avoid disruptions, along with any other information, contacts, and control points required to fully construct the project shall be on these drawings. Scale shall have a minimum horizontal ratio of one inch (1") equals forty feet (40') (1cm = 5 m.; 1:20 metric) and minimum vertical ratio of one inch (1") equals four feet (4') (4 cm = 1 m; 1:25 metric). Construction plans shall be scalable and have a graphic scale on each sheet.
 - .b When there are multiple Plan and Profile sheets within the submitted construction plans, a Key Sheet shall follow the Master Utility Sheet. The Key Sheet is to identify the sheet numbers of the related Plan and Profile sheets and clearly label main roads and cross streets.
 - .c Plan and Profile sheets shall include:
 - .i All potable water, reclaimed water, and wastewater design information, including pipe size, length, material, slope, and manhole rim and invert elevations and appurtenances;
 - .ii Existing and proposed grades;
 - iii The location of new gravity sewers, water lines, reclaimed water lines, and force mains;
 - .iv All crossings (storm water, gravity sewers, reclaimed water lines, force mains, and water lines);

GENERAL DESIGN STANDARDS FOR WATER, WASTEWATER AND RECLAIMED WATER

- .v All additional pertinent information such as trench details, manhole details, joint details, and material specifications;
- .vi Restrained joints;
- .vii A table on the Detail Sheets to show restrained joint lengths for specific fittings. This table should be used to show the proper restrained joint lengths on the Plan and Profile sheets. Accompanying the table should be a list of all assumptions used to calculate the restrained joint lengths in the table;
- viii When available, landscaping plans with the location of proposed utilities shown;
- ix All existing and proposed utility easements and rights-of way including dimensions;
- .x When available, building footprints (for commercial projects), decorative brick walls and paving, entrance signs, fountains, fences, etc. and landscape buffers shown;
- .xi Ownership of the proposed utility system shall be clearly designated as "Sarasota County" or "Private".
- .d Roadway cross sections with utility space allocation depicted, road crossing details for open cuts, jack and bores and directional drills showing all existing utilities with actual surveyed elevations and field verified locations where possible.
- .e The following information is to be included on the design plans:
 - i Site contours shown at two foot (2') maximum intervals.
 - ii Stabilized driveway shown in easements that cross wetlands and include manholes.
 - .iii Minimum finished floor elevations and number of floors.
 - iv Potable water, reclaimed water, and wastewater Plan Submittal Requirements.
- .f In addition to the general plan submittal requirements discussed above, potable water, reclaimed water, and wastewater design plans shall include the following:

GENERAL DESIGN STANDARDS FOR WATER, WASTEWATER AND RECLAIMED WATER

- .i Main elevations at one hundred foot (100') intervals (minimum) and at any grade changes exceeding two feet (2').
- .ii Lift/pump station drawings shall include design calculations, cross sectional view of pump station showing pump station piping and fittings and wet well elevations, pump information including model, impeller diameter, horsepower, motor speed, operating voltage, control panel, and operating point.
- .iii Sarasota County general standard detail sheets when the lift/pump station is to be dedicated to Sarasota County. Where required, the standard site layout may be modified as necessary provided the minimum site dimensions are maintained and all standard general notes are included.
- .g Utility Construction Notes:

The following notes shall be included on all plan submittals. Any deviation from the standards shall be requested by the EOR and shall be approved, in writing, by Sarasota County.

- .i All piping and associated appurtenances, including joint restraints, shall be constructed in accordance with the latest Sarasota County Uniform Water/Wastewater/Reclaimed Water System Code and all applicable state and local regulations.
- ii Minimum horizontal and vertical separation shall conform to the latest FDEP rules.
- .iii For trees, a minimum horizontal separation shall be provided to protect the utilities and the trees. No utilities are to be installed within the "drip line" of a protected tree, unless the pipeline is installed by directional bore or jack and bore construction methods.
- .iv A minimum distance of ten feet (10') or two times the depth over the main, whichever is greater, must be maintained from all buildings, foundations, and the top of bank of all ponds.
- v Potable water, reclaimed water, and wastewater pipes shall be constructed with a minimum thirty-six inches (36") of cover unless otherwise approved by Sarasota County.
- vi Pressure and leakage testing will be performed in accordance with the Sarasota County Uniform Water/Wastewater/Reclaimed Water System Code. See the applicable sections within this Code.

GENERAL DESIGN STANDARDS FOR WATER, WASTEWATER AND RECLAIMED WATER

- .vii Disinfection of the water main shall be performed in accordance with the Sarasota County Uniform Water/Wastewater/Reclaimed Water System Code. See the applicable sections within this Code.
- .viii In the case where contaminated soils are found within the utility work zone, work will be stopped and the proper authorities notified. With the approval of Sarasota County and/or the FDEP, all water mains and service lines (from main to the cross connection device) within the contaminated area shall be ductile iron pipe and fittings with approved solvent resistant gasket material. The ductile iron pipe will extend at least one hundred feet (100') beyond the contaminated area.
- ix. Water meters will not be installed prior to issuance of the Authorization to Place Into Service, for the water and wastewater system. Irrigation meters may be issued at the time of water system clearance.
- x. All taps, to be made by the contractor, shall be noted on the plans and coordinated with the Inspector a minimum of forty-eight (48) hours prior to construction.
- .8 Sarasota County detail sections shall be presented on the last sheets of the construction plan set. These sheets shall show all necessary details, including special details of appurtenances that must be located at fixed locations or elevations, require lengths to be calculated for shop fabrication, or provide dimensions necessary to order cables, floats, rods, pipe, or casings. These special details normally apply to lift stations, special collection structures, and above ground meter and flow control assemblies. Best Management details for Erosion and Sediment Control Plan (ESCP) details are also required to be included in the construction plan sets, although not regulated by UTILITIES.
- .9 All dimensions shall be in feet, hundredths of feet or feet and inches. The dimensions shall be placed horizontally, reading left to right, or vertically, reading from bottom to top.
- .10 All elevations shall be based upon the North American Vertical Datum (NAVD 1988), or National Geodetic Vertical Datum (NGVD1929) with locations and identification of benchmark used, and be in feet and hundredths of feet.
- .11 All revisions noted on plans shall also be noted or tagged at the section or point of the drawing depicting the work.

6.4 EASEMENTS

.1 Water, wastewater, or reclaimed water distribution, collection, or transmission mains shall be installed generally in platted utility tracts or road right(s)-of-way. Where water,

GENERAL DESIGN STANDARDS FOR WATER, WASTEWATER AND RECLAIMED WATER

wastewater, or reclaimed water distribution, collection, or transmission mains will not be installed in platted utility tracts or road right(s)-of-way, a minimum easement of twenty feet (20') in width, ten feet (10') from center line of pipe to edge of easement shall be provided. Pumping and lift stations require access and excavation allowance in excess of the minimum requirements, all stations shall be placed in tracts of land.

- .2 All easements and tracts shall be clearly identified on the plat, and final subdivision plans as depicted on the approved preliminary plan and have their intended use clearly stated.
- .3 All easements, or tracts of land for utility installation shall be dedicated to the serving utility at no expense to the utility. If dedications do not appear in the recorded plat, then a separate instrument must be prepared and recorded prior to construction plan approval and utility permit issuance.
- .4 No permanent structure(s) shall be permitted to encroach upon any utility easement. Any structure constructed within an easement will be at the owner's risk, and the owner shall be liable for any damages or costs incurred by the serving utility system as a result of the encroachment.
- .5 Off-site utility easements are to be reviewed and approved by UTILITIES and recorded prior to S&D approval.

6.5 OFF-SITE IMPROVEMENTS

In order to obtain water, wastewater, or reclaimed water utility service, projects may be required to provide on-site and/or off-site improvements unless otherwise approved by the service provider and UTILITIES.

- .1 The EOR is responsible for reviewing the proposed project's impact upon the utility service provider's existing facilities.
- .2 Projects that increase demand or potential demand on existing facilities may be required to provide off-site improvements as directed by the utility service provider.
- .3 Projects that will impact or have the potential to impact the level of service for existing customers of the system will be required to provide off-site improvements as directed by the utility service provider.

6.6 MINIMUM LINE SIZES

- .1 All facilities shall be sized to provide the development's domestic requirements and fire flows, be of the minimum size shown on TABLE 6.1, or be the same size as existing connection point, or master plan line size, as approved by UTILITIES.
- .2 UTILITY facilities and mains are subject to increases in size and/or depth as part of

GENERAL DESIGN STANDARDS FOR WATER, WASTEWATER AND RECLAIMED WATER

UTILITIES review of the development's construction plans to serve existing or future customers. Such upsizing or lowering of UTILITY facilities will be accomplished through means of a Standard Utility Agreement.

GENERAL DESIGN STANDARDS FOR WATER, WASTEWATER AND RECLAIMED WATER

a.	Water mains not looped Water mains that are looped Water mains on cul-de-sacs (with no	Minimum diameter (8") Minimum diameter (6")
	hydrant at end of line)*	Minimum diameter (4")
b.	Gravity Sewer Mains	Minimum diameter (8")
с.	Wastewater Force Mains	Minimum diameter (4")
d.	Low Pressure Force Mains	Minimum diameter (2")

TABLE 6.1

*Maximum length of 500 feet

6.7 COLOR CODING FOR PIPE

Specific colors shall be used for installation of all piping and appurtenances. The following color codes shall apply (TABLE 6.2):

TABLE 6.2

PVC Waterline & Service Pipe	Blue
DIP (All Piping)**	
DIP Waterline Above Ground	Blue
Water Meter Assembly	Blue
Backflow Assembly (Fire Line)	New Lime Green
Fire Hydrant (Publicly Owned)	New Lime Green
Fire Hydrant (Privately Owned)	Traffic Yellow
Reclaimed Waterline & Service Pipe	Pantone 522 C Purple
Reclaimed Water Meter And Backflow	Pantone 522 C Purple
Assembly	
PVC Wastewater Lines	Green
DIP Wastewater Above Ground	Green
Vacuum Sewer Lines	White
HDPE Water Mains	Black with Blue
	Horizontal Striping
	and/or Blue identification
	tape labeled Water
HDPE Sewer Force Mains	Black with Green
	Horizontal Striping
	and/or Green
	Identification tape labeled
	Sewer

GENERAL DESIGN STANDARDS FOR WATER, WASTEWATER AND RECLAIMED WATER

**All buried DIP piping shall be encased with the appropriate colored-coated polyethylene wrap

6.8 LOCATION MARKINGS

- .1 A three inch (3") wide, color-coded, metallic location tape shall be used in all installations and shall be located eighteen inches (18") below finished grade.
- .2 PVC pressure pipe shall have attached a color-coded (to match pipe color-coding), continuous number twelve (12) AWG copper tracing wire with 30 mils (min.) insulation. The wire shall terminate at all fire hydrants and at the terminal point of service connections. Termination points on force mains shall normally be at valve vaults, air/vacuum release valves, and main valves. A conductivity test will be conducted at the final walk-through of the project.

6.9 FULL ROADWAY FRONTAGE REQUIRED

Provisions for utility service shall include water, wastewater, or reclaimed water mains extended across the full roadway frontage of the project site or property that is to be improved. "Full roadway frontage" means the property line of a project site or property that abuts the adjacent roadway that provides access to the site or property. The full roadway frontage of a corner lot includes the two (2) streets that abut the property. Exemptions to this requirement are where one of the abutting streets is a dead-end that does not have the possibility of looping a utility main to a secondary connection, or where no other properties can be served.

6.10 LINE AND FITTING RESTRAINTS

- .1 Restraints for water mains, wastewater pressure mains, reclaimed water mains, adapter, collars or other devices as shown on the drawings or directed by the EOR, to be installed throughout the unincorporated areas of Sarasota County, shall utilize mechanical restraint methods.
- .2 The use of concrete thrust blocks, or "dead men" are no longer acceptable unless specifically approved by UTILITIES for unique circumstances.

6.11 PIPE DEPTH AND PROTECTION

- .1 Standard cover for utility lines shall be three feet (3') from the top of the pipe to finished grade, and be designed to maintain a set elevation for as long a distance as is possible without deflection. Where the standard cover cannot be maintained, protective concrete slabs (specified herein), thicker wall PVC pipe, and/or DIP may be used on a case by case basis as approved by UTILITIES.
- .2 DIP shall be encased with an appropriate color-coded polyethylene tube, specified herein,

GENERAL DESIGN STANDARDS FOR WATER, WASTEWATER AND RECLAIMED WATER

in areas that are indicated on the construction drawings, or where corrosive soils are encountered, or as determined by the EOR.

- .3 Gravity wastewater lines shall be designed using at least the minimum sizes, slopes, and manhole spacing found in SECTION 13 of this document. The maximum depth of the gravity system shall take into account the excavation space available, disruption to traffic, disturbance of other utilities, and location to structures both above and below ground. In the design stage, the future use of the project areas will help in the determination of depths, horizontal clearances required for installation, and long term maintenance. The utility service provider can furnish additional information on specific requirements.
- 6.12 WATER, WASTEWATER, RECLAIMED WATER, AND STORM WATER CLEARANCE REQUIREMENTS
 - .1 VERTICAL CLEARANCE AT CROSSINGS: Wastewater gravity mains, force mains, or reclaimed water mains, crossing under or over water mains, shall be laid to provide a minimum vertical clearance of twelve inches (12") between the bottom of the upper pipe and the top of the lower pipe. The crossing shall be arranged so that the wastewater joints and water joints will be equidistant from the point of crossing, using a full length of pipe between any two joints. Where the minimum separation cannot be maintained, one of the following methods of protection shall be utilized:
 - .a DR-14 PVC or CL-51 DIP shall be used to construct the water mains where a conflict exists which prevents the minimum separation of twelve inches (12").
 - .b DR-14 PVC shall be used to construct wastewater lines where a conflict exists which prevents the minimum separation of twelve inches (12").
 - .c Where both mains are being installed at the same time, the water and wastewater shall be constructed using DIP, HDPE in Ductile Iron Pipe size (DPS) C906 DR-11 and DR-14 PVC until the proper separation can be achieved.
 - .d At the utility crossings described in paragraphs (a) and (b) above, one full length of water main shall be centered above or below the other main so the water main joints will be equidistant from the other main. Alternatively, at such crossings, the mains shall be arranged so that all water main joints are at least three feet (3') from all joints in vacuum-type wastewater mains, storm water mains, or reclaimed water mains.
 - .2 HORIZONTAL SEPARATION BETWEEN PARALLEL LINES: New or relocated gravity wastewater mains or force mains shall be installed at least six feet (6'), preferably ten feet (10') measured outside to outside horizontally from any existing or proposed water mains. The distance shall be measured outside to outside. In cases where it is not practical to maintain a six foot (6') separation, the water main shall be installed in a separate trench or on an undisturbed earth shelf located on one side of the sewer main,

GENERAL DESIGN STANDARDS FOR WATER, WASTEWATER AND <u>RECLAIMED WATER</u>

and at an elevation so that the bottom of the water main is at least twelve inches $(12^{"})$ above the top of the wastewater line, and the water and wastewater joints shall be staggered. Reclaimed Water lines shall be installed at least three feet (3'), measured center to center horizontally, from any existing or proposed water or wastewater mains. The distance shall be a minimum of three feet (3') outside to outside of pipe. New or relocated water mains shall be laid to provide a horizontal separation of at least three feet (3') between the outside of the water main and the outside of any proposed or existing storm sewer.

.3 SEPARATION BETWEEN WATER MAINS AND SANITARY OR STORM WATER MANHOLES

- .a No water main shall pass through, or come into contact with, any part of a wastewater manhole.
- .b Water mains shall not be constructed or altered to pass through, or come into contact with, any part of a storm water manhole or inlet structure. Exceptions to this requirement are only as noted in FDEP Rule 62-555.314(3)(b), which requires specific approval of FDEP.
- .4 If it is not possible to obtain proper horizontal and vertical separation as described, both the water and wastewater mains must be constructed of slip-on or mechanical joint pipe complying with water supply design standards, and pressure tested to one hundred fifty (150) psig to assure water-tightness before backfilling. The one exception to this would be for gravity collection lines, which will be constructed of ASTM 3034 (DR 26 PVC) centered on the conflict. Testing is to be conducted using normal gravity system standards.
- .5 The vertical clearance and horizontal separation between potable watermains and storm water piping shall be the same as for wastewater piping as noted herein.

6.13 PROTECTIVE REINFORCED CONCRETE SLAB

- .1 Protective concrete slabs shall be installed at ditch crossings and when three feet (3') minimum cover over the top of water and/or wastewater lines cannot be achieved, unless otherwise approved by UTILITIES.
- .2 A minimum concrete thickness of six inches (6") shall be required on all protective slabs installed within roadways, road shoulders, or rights-of-ways that will be subject to vehicular traffic.
- .3 A minimum concrete thickness of four inches (4") may be used in areas not subject to significant load bearing traffic, or as otherwise approved by UTILITIES.
- .4 The slab width shall overlap the actual excavated trench width by two feet (2')

GENERAL DESIGN STANDARDS FOR WATER, WASTEWATER AND RECLAIMED WATER

horizontally on both sides of the trench.

6.14 UTILITY SERVICE LINES

Water, wastewater, or reclaimed water service lines shall not be installed between property lines, shall not run parallel along adjoining lots or shall not come through the rear of a property's lot line in order to provide utility service, unless approved by UTILITIES.

6.15 VALVE AND SERVICE LOCATION MARKERS

- .1 One or more of the following methods shall identify valves and services located outside the roadway:
 - .a The letter "W" for water, "S" for wastewater, or "R" for reclaimed water shall be clearly stamped or etched into the concrete curb directly adjacent to the valve. Etching shall be accomplished with a motorized saw cutter and the saw cut shall be deep enough to be permanent. The minimum size shall be three inches (3") by three inches (3").
 - .b When curbs are not available, aluminum and/or plastic disks, as supplied by National Band and Tag Company or approved equal shall be used. Each tag shall be appropriately color-coded and labeled "Water" (blue), "Wastewater" (green), or "Reclaimed" (purple) and be secured into the pavement by a two inch (2") "PK" survey marker nail or approved adhesive. Footage shall be clearly stamped in the disks indicating the distance in feet to the valve or service.
 - .c When neither curbs nor pavement are available, a six foot (6') long, two inch (2") by four inch (4"), pressure treated stake with four feet (4') above grade and the top twelve inches (12") painted blue for water, green for wastewater, or purple for reclaimed water, shall be placed directly beside the valve pad and/or service outside the roadway, until such time as curbs or pavement are available.
 - .d Service piping shall be color-coded and have attached an appropriate color-coded continuous number twelve (12) insulated tracing wire. The wire shall be securely connected to the wire at the pipeline and terminate at the customer's point of connection.

END OF SECTION

GENERAL CONSTRUCTION STANDARDS FOR WATER, WASTEWATER AND RECLAIMED WATER

7.1 GENERAL

This section contains the minimum standards to be followed by contractors for protection of property, traffic control, construction layout, survey, construction procedures, and field changes associated with utility construction.

7.2 PROTECTION OF PROPERTY

- .1 The Contractor shall not enter upon private property for any purpose, without first obtaining permission of the property owner or their representative. The Contractor shall use every precaution necessary to prevent damage to any public or private property, including trees, fences, monuments, and existing underground structures. The Contractor shall exercise caution at all times for the protection and safety of persons and property.
- .2 The Contractor shall be responsible for all damage or injury to property of any character resulting from any act, omission, neglect, or misconduct in Contractor's manner or method of executing said work, from non-execution of said work, or from defective work or materials. The Contractor shall not be released from said responsibility until the work has been completed and accepted, and all warranty requirements have been met.
- .3 The Contractor shall, at Contractor's own expense, promptly correct any damage to any private property, public road, street, alley, parking area, median strip, easement, trees, fences, monuments, drainage, or the like, or any other facilities related thereto, resulting from construction performed under the permit. The damaged area shall be restored to its original condition or better.

7.3 TRAFFIC CONTROL

- .1 The Contractor shall obtain all permits and licenses, pay all charges and fees, give all required notifications, and submit maintenance of traffic (MOT) schedules prior to working in any right-of-way(s). MOT plans and traffic control devices used on utility construction or maintenance operations shall conform to the applicable specifications of MUTCD.
- .2 The Contractor shall minimize disruption of traffic and shall provide safe bypasses for vehicular and pedestrian traffic at all times, including access to adjacent properties.
- .3 The Contractor shall provide, erect, and maintain effective and well-illuminated traffic barricades during all phases of project construction, for the protection and safety of the public and workers. Flag person(s) shall be provided as required by local regulations, the authority having jurisdiction, or as necessary to fulfill the requirements stated herein.
- .4 No public roads or rights-of-way shall be closed unless previously approved in writing by the County Engineer.

P300D9-99

GENERAL CONSTRUCTION STANDARDS FOR WATER, WASTEWATER AND RECLAIMED WATER

7.4 CONSTRUCTION LAY OUT

- .1 The construction plans shall clearly identify and establish horizontal and vertical control points on the construction drawings. The contractor shall lay out all work in accordance with control points established by a professional land surveyor or engineer, as necessary for the satisfactory completion of the work, in accordance with the plans, specifications, and contract documents comprising the work.
- .2 The EOR shall require that work be suspended at any time when survey marks are not reasonably adequate to permit satisfactory prosecution, control, and inspection of the work.
- .3 Upon request, the Contractor shall provide the personnel necessary to perform all work, provide copies of all field notes, field computations, and other records taken in the field. The Contractor shall furnish swing ties to the EOR, the Utility or Jurisdictional Authority.
- .4 All surveys and staking conducted by the Contractor shall be done under the supervision of a Florida Licensed Professional Land Surveyor. All staking layouts performed by the contractor will be subject to verification by the EOR.
- .5 The Contractor/Developer shall not construct or install any utility lines or services unless survey stakes have been appropriately installed at locations where the EOR has so designated.
- .6 The Contractor shall carefully maintain all bench marks, monuments and other reference points. Survey monuments, bench marks, or other reference points which have to be disturbed by the construction work shall be carefully witnessed before removal, and accurately replaced by a Florida licensed Professional Land Surveyor, at the expense of the Contractor.

7.5 FIELD CHANGES

- .1 UTILITIES, authority having jurisdiction, EOR, and UTILITIES Inspector shall be notified when deviation from the approved plans becomes necessary. Deviations require advance approval from UTILITIES or authority having jurisdiction and/or the designated representative of the EOR before any such work can begin. When a deviation is considered major, the EOR shall provide a letter, sketch, or other information necessary, depicting what the actual deviation entails.
- .2 Emergency field changes may be authorized through UTILITIES and/or the authorized representative of UTILITIES, EOR or authority having jurisdiction on a verbal basis until such time that written notification can be submitted by the EOR. All emergency field deviations shall be reported to UTILITIES within forty-eight (48) hours of the actual work being performed.
- .3 Record Drawings shall reflect all deviations that occur during project construction.

GENERAL CONSTRUCTION STANDARDS FOR WATER, WASTEWATER AND RECLAIMED WATER

7.6 CONSTRUCTION INSPECTIONS, OBSERVATIONS, AND RESPONSIBILITIES

- .1 Inspections or observation to insure compliance with the approved plans, specifications, and construction documents shall be either on a part-time or full-time basis as determined by the EOR. The Contractor shall have his plans noted with the time, date, and name on the plan sheet of the section of work being observed by the EOR or his representative.
- .2 Inspection or observation and acceptance by UTILITIES shall not relieve the Contractor of the responsibility of following the approved construction plans and specifications, providing materials and equipment as specified, and installing materials in accordance with the manufacturers' recommendations and plans. Nor does it relieve the Contractor of any guarantees or warranties expressed or implied.
- .3 All water, wastewater, and reclaimed water facilities shall be tested under the direction of the EOR and in the presence of an authorized representative of UTILITIES, and or serving utility. A minimum of forty-eight (48) hours notice shall be given to UTILITIES, serving utility, or authority having jurisdiction prior to conducting tests.
- .4 The failure to reject defective work or materials prior to or during construction shall not prevent later rejection upon discovery of latent defects.
- .5 The EOR shall, in EOR's absence, appoint a qualified representative to observe the onsite construction and installation of all underground utility lines and appurtenances. Such observations shall be scheduled to determine that the work proceeded in compliance with the approved construction plans, specifications, codes, permit conditions, and application of materials (manufactures' recommended installation procedures).
- .6 It shall be the responsibility of the EOR, or the EOR's qualified site representative to log or have logged, limits of restrained joint pipe and all swing ties for all underground appurtenances before backfill and compaction have been completed.
- .7 All work that has been rejected shall be corrected or repaired to the satisfaction of the EOR and UTILITIES. If it cannot be satisfactorily repaired, it shall be removed and replaced.
- .8 Materials not conforming to the requirements of the specifications shall be removed immediately from the work site.
- .9 When progress of the project requires the periodic presence of a UTILITIES representative during non-normal work hours, the contractor shall be financially responsible for the overtime hours (at overtime rates) with a minimum of four (4) hours overtime plus required travel time.
- .10 Any work performed, or materials used on utility projects that substantially deviate from the approved construction plans and specifications, or alter the design intent, without the approval of the EOR, or a designated representative, and UTILITIES, shall be considered

GENERAL CONSTRUCTION STANDARDS FOR WATER, WASTEWATER AND RECLAIMED WATER

a violation of this CODE.

.11 UTILITIES shall have the right to access all work sites for the purpose of inspecting and observing the materials, methods, and construction procedures for installation of water, wastewater, and reclaimed water mains and facilities.

END OF SECTION

EARTHWORK AND EXCAVATION

8.1 GENERAL

This Section includes requirements for excavation, backfill, compaction, and restoration related to utility construction.

8.2 DESCRIPTION

It is the Contractor's responsibility to obtain all permits, furnish all labor, materials, equipment, and incidentals necessary to perform all excavation, backfill, fill grading, and slope protection required to complete the work shown on the approved construction plans and specified herein. The work shall include, but not necessarily be limited to: excavation for pipe bedding, cutting and excavation of roadways and pavement, all backfilling, fill, and required borrow, grading, disposal of surplus and unsuitable materials, and related work such as sheeting, bracing, and dewatering.

8.3 REFERENCE DOCUMENTS

- .1 Sarasota County Land Development Regulations (LDR);
- .2 FDOT, "Standard Specifications for Road and Bridge Construction";
- .3 American Society for Testing and Materials (ASTM);
- .4 American Association of State Highway Transportation Officials (AASHTO);
- .5 U.S. Department of Labor Occupational Safety and Health Administration (OSHA);
- .6 Florida Trench Safety Act.
- .7 National Pollutant Discharge Elimination System (NPDES)
- .8 Best Management Practices (BMP's)

8.4 MINIMIZING SILTATION AND BANK EROSION

- .1 During all dewatering or other operations involving the use and disposal of water, suitable means shall be provided by the contractor to minimize soil erosion, siltation, and sedimentation of natural or artificial ditches, drainage channels, streams, wetlands, lakes or other waterways. Appropriate erosion and sediment control best management practices (BMP's) shall be employed to protect stormwater conveyances.
- .2 Discharges to the Municipal Separate Storm Sewer System (MS4), or to surface waters of the State of Florida shall be appropriately permitted, and shall comply with all state and local regulations.

8.5 TEMPORARY WORK STOPPAGE

The Contractor shall notify UTILITIES twenty-four (24) hours in advance when work will be temporarily shut down, and also twenty-four (24) hours prior to re-starting utility work that had been previously shut down.

8.6 EXCAVATION

Excavation and backfilling may be either by hand or by machinery except where the

EARTHWORK AND EXCAVATION

engineer decides, or it is specified herein or on the approved construction plans, that hand excavation and/or backfilling is required.

8.7 BORROW

If there is insufficient satisfactory material from the excavations to meet the requirements for fill material, borrow shall be obtained from pits secured by the Contractor/Developer and approved by the EOR. The Contractor/Developer shall be responsible for obtaining permits and meeting the standards, as required by appropriate regulatory agencies.

8.8 DEWATERING

- .1 The Contractor shall construct and place all pipelines, concrete work, backfill, structural fill, bedding rock, or clean native soils in the dry.
- .2 Discharge from dewatering operations shall be disposed in a manner that will not interfere with the normal drainage of the area in which the work is being performed, nor create a public nuisance, nor form ponding. The operations shall not cause injury to any portion of the work completed or in progress, or to the surface of streets, or to private property.
- .3 The Contractor shall at all times during construction, provide and maintain proper equipment and facilities to remove promptly and dispose of properly, all water entering excavations. Excavations shall be dry so as to obtain a satisfactory undisturbed subgrade foundation condition until the fill, structure, or pipes to be built thereon have been completed to such extent that they will not be damaged by hydrostatic pressure from natural groundwater.
- .4 The Contractor shall furnish all materials and equipment and perform all work required to install and maintain the drainage systems proposed for handling ground water and surface water encountered during construction of pipelines, facilities, and compacted fills.
- .5 The Contractor shall be responsible for obtaining permits and meeting the standards, as required, by appropriate regulatory agencies for any dewatering system installed.

8.9 SHEETING AND BRACING

- .1 In order to prevent damage to property, injury to persons, erosion, cave-ins, or excessive trench widths, adequate sheeting and bracing or other trench safety measures shall be provided by the Contractor, if deemed necessary by the EOR, in accordance with the Florida Trench and Safety Act, and OSHA standards for construction, and in accordance with accepted standard practices.
- .2 Sheeting shall be removed when the trench has been backfilled to at least one-half (1/2) its depth or when removal would not endanger the construction of adjacent structures.
- .3 When required, to eliminate excessive trench width or other damage, sheeting, bracing, or shoring shall be left in place and the top cut off at an elevation of two feet (2') six inches

P300D9-99

EARTHWORK AND EXCAVATION

(6") below finished grade, unless otherwise directed by UTILITIES.

- .4 Wood sheeting shall only be left in place when directed by the EOR. All such sheeting shall be pressure treated with a preservative in accordance with the current requirements of the American Wood Preservers Association Manual of Recommended Practices.
- .5 Sheeting and bracing materials shall conform to the standard requirements of the FDOT Standard Specifications for Road and Bridge Construction, when tested in accordance with AASHTO T60. Steel sheeting to be left in place, shall be as specified in ASTM Designation A3212.

8.10 TRENCH GRADE

- .1 Trench widths for installation of utility piping shall be as outlined in the Uni-bell/DIPRA pipe standards guidelines, or as otherwise approved by the EOR and UTILITIES.
- .2 Standard trench grades shall be defined as the bottom surface of the pipelines to be installed or placed within the trench.
- .3 Trench grade for utility lines in rock or other unsuitable material, shall be defined as being six inches (6") below the outside of the bottom of the utility pipe line. The referenced six inches (6") shall be backfilled with approved bedding material. Excavation below trench grade that is done in error shall be backfilled to trench grade and compacted in lifts no greater than six inches (6").
- .4 Where undercutting and granular bedding are involved, the depth at the bottom of the bells of the pipe shall be at least four inches (4") below the bottom of the trench, as excavated.
- .5 In no instance shall the supporting of pipe on blocks or other materials be permitted.

8.11 BACKFILL

- .1 Should bedding be required, primarily to bring the trench up to proper grade level, due to the removal of unsuitable materials, clean Class II or Class III fill shall be properly placed and compacted evenly along the trench bottom in such a manner that the entire pipe lays evenly, without bridging, holes or dips.
- .2 The filling of the trench and the compacting of the backfill shall be carried out simultaneously on both sides of the pipe. This shall be done in such a manner that the completed pipeline will not be disturbed, and injurious side pressures to the pipe do not occur. Particular attention and care shall be exercised in obtaining thorough support for the branch of all service connection fittings.
- .3 Flowable fill will be allowed as an alternative to backfill compaction requirements, at the discretion of UTILITIES. Measures shall be taken to prevent the pipe from floating as the flowable fill is placed. The Contractor shall provide a detail and the EOR shall approve the detail describing the anchor system to be used with the flowable fill prior to

EARTHWORK AND EXCAVATION

construction plan approval.

- .4 Backfill material shall be clean fill approved by the EOR. Backfill materials shall be free of organic material, debris, lumps, broken pavement or any other unsuitable material.
- .5 In all cases walking or working on the completed pipelines, except as may be necessary in tamping or backfilling, shall not be permitted until the trench has been backfilled to a point twelve inches (12") above the top of the pipe.
- .6 Clean fine fill materials shall be carefully placed and tamped around the lower half of the utility line, "the spring line". Backfilling shall be carefully continued in layers not exceeding twelve inches (12") in thickness for the full trench width, until fill is twelve inches (12") above the top of the pipe lines.
- .7 The first lift shall be no more than twelve inches (12") in thickness and shall start twelve inches (12") above utility line. The second lift shall start two feet (2') above utility line and any subsequent twelve inch (12") lifts are to end at finished grade.
- .8 Minimum compaction shall be accomplished by use of a motorized compacting device starting from twelve inches (12") above the main to the top of the trench.
- .9 The minimum compaction shall be 98% for the first three feet (3') under roadways, 95% below three feet (3') under roadways, along road shoulders, and building structures, and ninety-five (95) percent in open, non-load bearing areas, in accordance with AASHTO T-180 standards.
- .10 When directed by the EOR, the Contractor shall add water to the backfill material or dry out the material when needed to attain a condition near optimum moisture content, for the purpose of obtaining maximum density of the material when it is compacted.
- .11 Before final acceptance, the Contractor shall level off all trenches or bring the trench up to the level of the surrounding terrain. The Contractor shall also remove from roadways, right-of-way(s), and/or private property all excess earth or other materials resulting from construction.

8.12 UTIILITY BEDDING

- .1 The bottom of the trench shall be shaped to provide a firm bedding for the utility line. Utility lines shall be firmly bedded in undisturbed firm soil, or hand-shaped unyielding material. The bedding shall be shaped so that the pipe will be in continuous contact along its full length and shall provide a minimum bottom segment support for the pipe equal to sixty percent (60%) of the outside diameter of the barrel (see "Standard Details").
- .2 The trench excavation shall be shaped to conform to the pipe bells or other shape irregularities of special appurtenances.
- .3 Bedding materials shall be three-fourth inch (3/4") maximum diameter and meet FDOT

EARTHWORK AND EXCAVATION

Class B Standards.

8.13 UNSUITABLE MATERIAL BELOW TRENCH GRADE

It shall be the responsibility of the EOR to see that all soil unsuitable for a proper foundation, encountered at or below trench grade, such as rock, muck, or other deleterious material, is removed for the full width of the trench and to the depth required to reach suitable foundation material, unless otherwise approved by UTILITIES.

8.14 SUB-BEDDING MATERIAL

When rock or other unsuitable material is encountered at trench grade, excavation shall be extended to six inches (6") below the outside of the bottom of the utility line. A cushion of sand or suitable crushed rock or shell shall then be provided.

8.15 EXCAVATED MATERIAL

Excavated material to be used for backfill shall be neatly deposited at the sides of the trenches where space is available. Where stockpiling of excavated material is required, the contractor shall be responsible for obtaining the sites to be used. The contractor, in order to maintain safe working conditions, natural site drainage, and to prevent an unsightly appearance of the site, shall provide proper site maintenance.

8.16 MATERIAL DISPOSAL

- .1 Work site cleanup and property restoration shall follow construction operations without delay. Excavation and pipe-laying shall be coordinated to minimize the amount of overnight open trench, pits or materials storage. Construction site maintenance, along with ongoing cleanup and debris removal to maintain an orderly construction site is expected.
- .2 Excess, unsuitable, or cleared and grubbed material shall be removed from the work site and legally disposed of at locations secured by the Contractor/Developer and approved by the applicable authorities. Excess excavated material shall be spread on the disposal site and graded for proper drainage without disturbing the existing drainage conditions.

8.17 RESTORATION

- .1 Work within public thoroughfares shall conform to the requirements of the governmental agency having jurisdiction. Specifically, work within State and County rights-of-way shall be in full compliance with all requirements of the permit drawings, and to the satisfaction of the applicable transportation agency.
- .2 Existing sidewalks and driveways removed, disturbed, or destroyed by construction, shall be replaced or repaired by the Contractor. The finished work shall be equal in all respects to the original and shall be approved by UTILITIES and any other legal entity that may have jurisdiction. Temporary stabilizing materials shall be placed and maintained, by the Contractor, in all crossings until such time as permanent restoration is

EARTHWORK AND EXCAVATION

accomplished.

- .3 As soon as practical after construction is completed, the Contractor shall restore all turf/grass areas disturbed by construction or supportive operations to a condition at least as good as existed prior to commencement of construction. Turf/grass areas shall be restored with the same variety of seed or sod that previously existed or in accordance with special conditions of the permit.
- .4 Prior to seeding or sodding, the affected area shall be cleared of all trash, debris, stones, roots, brush, wood, and any other extraneous matter. The surface shall be graded to conform to the grade existing prior to commencement of construction. After completion of fine grading, the soil shall be raked and scarified to result in a fine friable texture.
- .5 The Contractor shall water seed/sod immediately after installation to prevent excessive drying during progress of the work. As sodding is completed in any one section, the entire area shall be rolled. It shall be thoroughly irrigated to a depth sufficient that the underside of the new sod pad and soil immediately below the sod is thoroughly wet. The Contractor shall be responsible for supplemental watering and other necessary maintenance until the sod is completely established.

8.18 ROADWAY REMOVAL AND REPLACEMENT

- .1 Bituminous pavement shall be removed in clean straight lines by saw cutting. Where bituminous pavement adjoins a trench, the edges adjacent to the trench shall be trimmed to neat straight lines before resurfacing to ensure that all areas to be resurfaced are accessible to rollers or tampers used to compact the sub-grade or paving materials.
- .2 Concrete pavement shall be removed with sawed edges and cut at a minimum depth of one and one-half inches (1 and 1/2"). If a saw cut in concrete pavement falls within three feet (3') of a construction joint, cold joint, expansion joint or edge, the concrete shall be removed to the joint or edge. The edges of existing concrete pavement adjacent to trenches, which had been damaged subsequent to saw cutting of the pavement, shall be saw cut to neat straight lines for the purpose of removing the damaged pavement areas. Such saw cuts shall be parallel to the original saw cuts or shall be cut on an angle which departs from the original saw cut not more than one inch(1") in six inches (6").
- .3 Concrete curb, sidewalk, gutters and driveways shall be removed with neatly sawed edges, cut at a minimum depth of one and one-half inches $(1 \frac{1}{2})$. Concrete sidewalk or driveway to be removed shall be neatly sawed in straight lines parallel to the curb or at right angles to the alignment of the sidewalk. No section to be replaced shall be smaller than four feet (4') in either length or width. If the saw cut in sidewalk or driveway should fall within three feet (3') of a construction joint, expansion joint, or edge, the concrete shall be removed to the joint or edge except that where the saw cut would fall within twelve inches (12'') of a score mark, the saw cut shall be made in and along the score mark. Curb and gutter shall be sawed to a depth of one and one-half ($1\frac{1}{2}$ '') inches in a neat line at right angles to the curb face.
- .4 Materials and methods used by the Contractor for pavement replacement shall conform to

EARTHWORK AND EXCAVATION

the specifications and permit conditions required by FDOT and/or Sarasota County's LDR.

.5 In the event that pavement is not replaced immediately following trench backfilling in streets and highways, the contractor shall be responsible for maintaining the trench surface in a level condition, at proper pavement grade, at all times.

8.19. COMPACTION/DENSITY TESTING

- .1 Density tests for determination of proper compaction shall be a minimum as specified herein, or as specified by the EOR and be made by an independent certified testing laboratory. Bedding, haunching, and compacting shall be done in accordance with AWWA Standards for PVC, ductile iron, or concrete pressure pipe, HDPE, and/or the manufacturers' recommendations. Compaction work shall be certified by an engineer licensed in the State of Florida, for compliance with the approved plans and specifications.
- .2 Test locations shall be determined by the testing firm, the certifying engineer, and/or UTILITIES. Tests shall be made where a trench crosses paved roadways or future paved roadways. If any test results are unsatisfactory, the Contractor shall re-excavate and re-compact the backfill at Contractor's expense, until the desired compaction is obtained.
- .3 Density tests shall be at least 98% of the maximum density as determined by AASHTO T-180 for road crossings and road shoulders.
- .4 Density tests shall be at least 95% of the maximum density as determined by AASHTO T-180 for all unpaved areas.
- .5 Density tests shall be taken within seven (7) days after installation.

END OF SECTION

JACKING AND BORING

9.1 GENERAL

- .1 This section covers the furnishing of labor, equipment, and materials required to perform all jack and boring of pipeline casings and the installation of the pipe therein. Boring and jacking operations shall be performed within the right(s)-of-way and/or easements shown on the drawings.
- .2 Specific crossing requirements shall be obtained in advance from the authority having jurisdiction
- .3 Casing pipes crossing under roadways shall be located at suitable approved alignments and elevations in order to eliminate possible conflict with existing or future utilities and structures. A minimum of thirty-six inches (36") depth of cover is required between the top of the casing pipe and the surface of the roadway.

9.2 MATERIALS

- .1 CASING shall be new prime steel pipe conforming to the requirements of ASTM Designation A-139, Grade B, beveled for field welding. The minimum casing pipe size and wall thickness shall be as shown in TABLE 9.1 for the carrier pipe size indicated. For sizes not included therein, or for special design considerations, approval shall be obtained from the UTILITIES.
- .2 FIELD AND SHOP WELDS of the casing pipes shall conform to the American Welding Society (AWS) standard specifications and AWWA C206. Field welds shall be complete penetration, single-bevel groove type joints. Welds shall be airtight and continuous over the entire circumference of the pipe.
- .3 CARRIER PIPES shall be ductile iron class 51 or AWWA C900, PVC Class 150, DR-18 as required. Pipe and fittings shall comply with the applicable provisions of these standards.
 - .a Pressure type carrier pipes to be installed within the specified casings shall be equipped with restrained joint connections unless otherwise approved by the EOR and UTILITIES.
 - b Gravity carrier pipes shall be installed as noted above with ASTM 3034 DR-26 pipe, minimum.
- .4 Casing spacers (insulators) shall be two (2) piece, stainless steel and be at least twelve inches (12") long, having two inch (2') wide polyethelene or glass reinforced plastic runners. Casing spacers shall be installed using a minimum of three (3) casing spacers per pipe section. Studs, nuts, and washers and any other fastening or locking devices shall be 304 stainless steel. Plastic runners shall be mounted and positioned to the carrier pipe for a centered position. More that three (3) spacers may need to be used as recommended by the spacing or pipe manufacturer or engineer.
- .5 End seals for casing shall be manufactured one-eighth inch (1/8") synthetic rubber as

JACKING AND BORING

manufactured by Cascade, Model CCES, or approved equal. The end seals shall be secured to the casing and carrier pipe with T-304 banding strips.

9.3 JACK AND BORE INSTALLATION

- .1 Excavations shall be stabilized and maintained to the minimum dimension necessary to conduct the work. Said excavations shall be adequately barricaded, sheeted, braced, and de-watered as required.
- .2 Installation of the casing pipe shall be a continuous operation until completed. Extreme care shall be exercised by the Contractor to maintain line and grade during jacking operations. The Contractor shall correct any deviation when deemed necessary by the EOR and/or UTILITIES.
- .3 Casing pipe holes shall be mechanically bored through the soil by a cutting head on a continuous auger mounted inside the pipe. The auger shall extend a minimum distance beyond the end of the casing pipe to preclude formation of voids outside of the pipe shell.
- .4 Add-on sections of casing pipe shall be full-ring welded to the preceding length as specified herein. The casing installation shall produce no upheaval, settlement, cracking, movement, or distortion of the existing roadbed or other facilities.
- .5 The casing pipe shall be adequately protected to prevent crushing or other damage under jacking pressures. Backstops shall be provided for adequately distributing the jack thrust without causing deformation of the soil or other damage.
- .6 Should the casing pipe be damaged, such damaged portion, if not in the hole, shall be replaced. If the casing is already inserted, the encasement pipe shall be filled with grout and abandoned in place.

9.4 CARRIER PIPE INSTALLATION

- .1 The pipe shall be installed in the casing on casing spacers as shown on the standard detail. The pipe bells must not rest directly on the casing, and the pipe must be aligned to grade specified.
- .2 Casing spacers shall be secured to the carrier pipe as shown on the standard detail using a minimum of three (3) spacers per pipe section, or as recommended by the manufacturer. Casing spacers shall be spaced as shown on the standard details or as recommended by the manufacturer, but in no case shall spacing exceed six feet (6').
- .7 Following placement of the carrier pipe within the steel casing, manufactured end seal shall be used to secure casing ends to pipe.

JACKING AND BORING

9.5 MINIMUM PIPE SIZE AND THICKNESS TABLE

IABLE 9.1				
Carrier Pipe Nominal Size	Casing Pipe Inside Diameter	Casing Pipe Wall Thickness		
4 inches	12 inches	0.281 inches		
6 inches	16 inches	0.281 inches		
8 inches	18 inches	0.312 inches		
10 inches	20 inches	0.344 inches		
12 inches	24 inches	0.406 inches		
14 inches	30 inches	0.469 inches		
16 inches	30 inches	0.469 inches		
18 inches	30 inches	0.469 inches		
20 inches	36 inches	0.562 inches		
24 inches	36 inches	0.562 inches		
30 inches	42 inches	0.562 inches		
36 inches	48 inches	0.562 inches		

TABLE 9.1

END OF SECTION

DIRECTIONAL DRILLING

10.1 GENERAL

The work covered by this section involves the furnishing and installation of pipe by means of directional drilling.

10.2 MATERIALS

- .1 HDPE pipe shall be as specified herein, appropriately color-coded, and shall be furnished by a single manufacturer. PVC plain end grooved and spline coupled C900 or other unique or new pipe, conduits, and materials for conveyance will be considered on a case by case basis.
- .2 JOINTS: where HDPE pipe is joined to HDPE pipe, it shall be by thermal butt fusion, meeting the requirements of ASTM F2620-09E1 and ASTM F 905. Thermal fusion shall be accomplished in accordance with the recommendations of the pipe manufacturer and fusion equipment supplier.
- .3 FITTINGS shall be standard mechanical joint (MJ) as specified herein. Joining of HDPE pipe between fittings shall be by mechanical joint utilizing stainless steel pipe stiffeners and pipe restraint systems accomplished in accordance with the recommendations of the pipe and fitting manufacturers. Stainless steel stiffeners shall be of the specific size and standard dimensional ratio SDR of the HDPE pipe as manufactured by JCM, model 230 or an approved equal.
- .4 TRANSITION fittings between plain end HDPE and plain end PVC or DIP shall be by mechanical joint utilizing stainless steel pipe stiffeners and pipe restraint systems accomplished in accordance with the recommendations of the pipe and fitting manufacturers. Stainless steel stiffeners shall be of the specific size and SDR of the HDPE pipe as manufactured by JCM, model 230 or an approved equal.
- .5 RESTRAINTS for HDPE pipe shall be incorporated in the design of the follower gland or by a split clamping ring attached to the mechanical joint by extra long T-Head bolts or all-thread rod. The clamping ring shall have serrations machined on the inside, which lock onto the pipe when the clamping bolts are tightened using a Uni-Flange 1300 or equal. Set screw style restraints will not be permitted.

10.3 DIRECTIONAL BORING INSTALLATION

- .1 Pilot holes shall be drilled to ensure the required vertical clearances from ditch, river, or wetland bottoms, and horizontal clearances from buffers or easement lines are maintained. The contractor shall monitor and record horizontal and vertical boring hole locations at twenty-five foot (25') intervals or any change in line and grade. If the pilot hole exists in buffers or outside of easements the contractor shall be responsible for grouting the hole to the satisfaction of UTILITIES, environmental regulators, and the EOR.
- .2 The bore hole shall be reamed to 120% to 150% larger than the HDPE. Drilling mud shall then be injected into the hole to stabilize the hole and remove soil cuttings. The

DIRECTIONAL DRILLING

contractor shall monitor and record reamed hole locations and depth at the same intervals as the bore hole.

.3 Proper pipe handling, cradling, bending minimization, surface protection, and fusion welding procedures shall be followed.

10.4 TESTING

- .1 Testing shall be accomplished in accordance with the requirements of water, wastewater, or reclaimed waterlines as specified herein.
- .2 All fusion weld pipelines shall remain undisturbed for twenty-four (24) hours to develop complete strength at all joints.
- .3 The HDPE pipe shall be filled with water, pressurized to the required test pressure, and allowed to stabilize according to the pipe manufacturer's recommendations. Pneumatic testing is not allowed.

END OF SECTION

CONCRETE STANDARDS AND REQUIREMENTS

11.1 CONCRETE DESIGN

The design of concrete shall follow the recommended practices and specifications of the American Concrete Institute (ACI), the American Society for Testing of Materials (ASTM), and the Sarasota County Land Development Regulations (LDR) as well as the requirements of this CODE.

11.2 SLUMP

All concrete materials shall be proportioned so as to produce a workable slump between two inches (2") and four inches (4").

11.3 STRENGTH

The minimum twenty-eight (28) day compressive strength of reinforced concrete shall be 3000 pounds per square inch, unless otherwise approved by UTILITIES.

11.4 STORAGE

Immediately upon receipt at the site, cement shall be stored in a dry, weather-tight building, properly ventilated and with provisions for prevention of moisture absorption.

11.5 CEMENT

Cement shall conform to standard specifications for "Portland Cement," ASTM Designation C150, Type II.

11.6 AGGREGATE

Concrete aggregate shall conform to the current specifications for "Concrete Aggregate," ASTM Designation C33.

11.7 WATER

Water used in mixing concrete shall be fresh, clean, and free from injurious amounts of oil, acid, alkali, or organic matter.

11.8 REINFORCING

Bars for concrete reinforcement shall conform to ASTM Designation A615, Grade 60. Wire mesh shall conform to ASTM A185.

11.9 HIGH-EARLY-STRENGTH CONCRETE

.1 Concrete made with high-early-strength Portland cement shall be used only when specifically authorized by the EOR and approved by UTILITIES.

CONCRETE STANDARDS AND REQUIREMENTS

- .2 The seven (7) day compressive strength of concrete made with high-early-strength cement shall be at least equal to the minimum twenty-eight (28) day compressive strength specified previously.
- .3 All provisions of these specifications shall be applicable to high-early-strength concrete except that cement shall conform to ASTM Designation C150, Type III.

11.10 READY-MIXED CONCRETE

- .1 Ready-mixed concrete may be used at the option of the contractor, provided such concrete is machine mixed and meets the requirements of these specifications and of ASTM C94 for "Ready-Mixed Concrete." Concrete shall be mixed at least five (5) minutes after all water has been added and shall be discharged into forms within one and one-half (1 ¹/₂) hours after water is added to the mix.
- .2 Should there be any conflicts between this CODE and ASTM Specifications, the CODE shall govern.

11.11 FORMS

- .1 Forms shall be of wood, steel, or other approved material, securely braced and unyielding, and of sufficient strength to hold the concrete without bulging between supports or without deviation from the neat lines as shown on the plans. Forms shall be designed to withstand the action of vibrators, and the type, shape, size, quality, and strength of all materials used for forms shall be subject to approval by the EOR.
- .2 Forms shall be built to line and grade. Formwork shall be preformed in such a manner that concrete surfaces, upon removal of forms, will be free of excessive ridges and depressions. Snap ties shall be used where the concrete surface will be exposed to weathering or gases, and the void sealed with grout or caulk to the finished surface.
- .3 Forms for exposed surfaces shall be coated with a non-staining mineral oil which shall be applied shortly before the concrete is placed. Forms for unexposed surfaces may be thoroughly wet in lieu of oiling, immediately before the concrete is placed.
- .4 Forms shall be constructed in such a manner as to prevent seepage of concrete or water. Water stops or joint compound may be used if approved by the EOR and/or UTILITIES.

11.12 BONDING AND GROUTING

Before depositing new concrete on or against concrete that has set, existing surfaces shall be thoroughly roughened and cleaned of glaze, foreign matter, and loose particles. An epoxy coating shall be applied for bonding the new concrete to the old. Grout shall be of the non-shrink type.

11.13 MIXING AND PLACING

.1 The methods of mixing and placing shall be subject to the approval of the EOR.

CONCRETE STANDARDS AND REQUIREMENTS

During the placing operation, all concrete shall be thoroughly compacted by a suitable means and shall be thoroughly worked around dowels and into the corners of the forms.

- .2 All concrete shall be placed during daylight hours, allowing sufficient time for adequately finishing the concrete surfaces during daylight hours unless approved by UTILITIES for nighttime construction.
- 11.14 CURING

Concrete used for structural purposes shall be kept moist for proper curing.

11.15 TESTING

When required, test samples and test reports shall be furnished to UTILITIES as directed by the EOR to verify compressive strength of the concrete has been achieved.

END OF SECTION

POTABLE WATERLINE DESIGN, MATERIALS, INSTALLATION AND CONSTRUCTION

12.1 GENERAL

This section is intended to provide minimum standards, details, and specifications for design, material selection, installation, and testing requirements used for new construction and/or modifications to existing potable water systems.

12.2 PRESSURE

All water mains shall be sized after a hydraulic analysis based on flow demands and pressure requirements. The system shall be designed to maintain a minimum pressure of twenty (20) psig at ground level at all points in the distribution system under all conditions of flow. The normal working pressure in the distribution system shall be approximately fifty (50) psig and not less than thirty-five (35) psig.

12.3 VALVES, VALVE LOCATIONS

A sufficient number of valves at appropriate locations shall be provided on waterlines so that inconvenience and sanitary hazards will be minimized during maintenance operations or repairs. Valves shall be installed at intervals so that no break or repair will necessitate shutting down a length of pipe greater than five hundred feet (500') as measured along the street in non-residential and multi-family subdivisions, or greater than one thousand feet (1000') in single family or duplex residential subdivisions. Transmission line valve spacing shall be no greater that three thousand feet (3000') and be located in conjunction with the installation of a fire hydrant.

12.4 WATER SERVICES

- .1 The service line shall serve only one lot or property and be connected to only one meter connection (curb stop fitting), unless otherwise approved by UTILITIES.
- .2 Water service installation shall be as shown in the standard details. The service line is to be minimum one inch (1") PE tubing and shall not be extended more than one hundred feet (100') from the distribution main to the property line or meter.
- .3 Water services crossing roadways shall be placed in casing pipe. The casing pipe shall be watertight and be a minimum of Schedule 40 pipe, class 200 (DR-21) or HDPE, two inches (2") in diameter for single services and four inches (4") in diameter for two (2) service lines. Casing pipe sections shall be sealed on both ends with RubberNek, Ram-Nek, or approved equal.
- .4 Water services greater than two inches (2") in diameter shall be connected to the watermain by a tapping sleeve and valve. Distribution lines two inches (2") and greater shall be connected by tapping saddle and resilient wedge gate valve.

12.5 HYDRANT AND FIRE FLOW REQUIREMENTS

.1 Fire hydrants in single family or duplex residential areas only shall be placed no farther than one thousand feet (1000') apart, so that no structure is farther than five hundred feet (500') in total length from a hydrant using road front footage. Care shall be taken to

POTABLE WATERLINE DESIGN, MATERIALS, INSTALLATION AND CONSTRUCTION

locate hydrants at property corners or intersections. Fire hydrants shall be conspicuous and accessible.

- .2 All other subdivisions, commercial or multi-family complexes shall have fire hydrants located on alternate sides of the roadway no farther than five hundred feet (500') apart so that no building is farther than two hundred-fifty linear feet (250 lf) from a hydrant in total length, using road front footage. Care shall be taken to locate hydrants at property corners or intersections. Fire hydrants shall be conspicuous and accessible.
- .3 Hydrant spacing for lines in undeveloped areas shall be placed at three thousand foot (3000') intervals adjacent to isolation valves, unless otherwise directed by the Fire Marshal.
- .4 All waterlines six inches (6") and greater, other than transmission mains, shall include fire hydrants.
- .5 The minimum fire flow requirement shall be at least one thousand (1000) GPM at a minimum residual pressure of twenty (20) psig with one hydrant flowing at the extreme end of the development or project.
- .6 Complexes, buildings, or additions to existing buildings which cumulatively demands-fire flows in excess of one thousand (1000) GPM shall be provided with built-in fire suppression sprinkler systems. Fire sprinkler flows will be determined by the Insurance Services Office (ISO), Required Fire Flow Tables. The required fire sprinkler system shall be electrically monitored by a fire alarm system with manual, automatic detection, audible and visual devices installed in accordance with NFPA 72. The fire alarm system shall be monitored twenty-four (24) hours a day by a UL listed central station. All required systems shall be maintained in accordance with NFPA 101, NFPA 72 and NFPA 25 as adopted by the State of Florida.
- .7 For design purposes, the engineer will use a measured system operating pressure or fifty (50) psig whichever is less, at a point where adequate flow volume exists to serve the development.

12.6 DEAD ENDS

- .1 In order to provide increased reliability of service and reduce head loss, dead ends shall be minimized by looping lines or making appropriate tie-ins unless otherwise approved by UTILITIES.
 - .a Dead ends shall be mechanically restrained and provided with a fire hydrant or with a blow off for flushing purposes.
 - .b Blow off assembly for flushing purposes, shall be of a single assembly design, nominal two inch (2") design, brass piping, integral valve and body with an operating nut that can be operated with a standard valve key. The blow off assembly shall be maintenance free; traffic and tamper proof, and shall be installed below ground inside a standard five and one-forth inch (5 ¹/₄") valve box. Valve shall open to the left and shall be accessible within the station

POTABLE WATERLINE DESIGN, MATERIALS, INSTALLATION AND CONSTRUCTION

assembly valve box. Blow off assemblies shall be model VB2000B as manufactured by Water Plus Corporation, Pensacola, Florida, TF550 Blow-Off Manufactured by Kupferle Foundry Co. St. Louis, Missouri, or approved equal.

12.7 MATERIALS, PIPE AND FITTINGS

- .1 POLYVINYL CHLORIDE PIPE (PVC): All PVC piping shall be clearly marked indicating pipe size, manufacturer's name, AWWA and/or ASTM specification number, working pressure, and production code, and shall bear the National Sanitation Foundation (NSF) seal for potable water pipe. All PVC water piping shall be color-coded blue.
 - .a PVC pipe two inches (2") and three inches (3") in diameter shall conform to the requirements of ASTM D2241, Class 1120 or 1220 (SDR 21) with a working pressure rating of two hundred (200) psig with integral bell gasketed joints. Pipe is to be manufactured to I.P.S. (steel) standard pipe equivalent outside diameters. Pipe shall be marked NSF-PW approved.
 - .b Schedule 40 PVC, when requested and approved, may be used as an alternative to (.a) above for pipe diameters of two inches (2") and three inches (3"). Schedule 40 shall conform to the requirements of ASTM 1785. Pipe joints shall be solvent welded in accordance with ASTM D 2672 or ASTM D 2466 and D 2564. Pipe is to be manufactured to I.P.S. (steel) standard pipe equivalent outside diameters. Pipe shall be marked NSF-PW approved.
 - .c PVC pipe diameters of 4, 6, 8, and 12 inches shall conform to the requirements of AWWA Standard C900, DR-18, with a working pressure rating of one hundred-fifty (150) psig. The pipe shall have the same outside diameter as ductile iron pipe. Note: ten inch (10") pipe for waterline and reclaimed water systems are no longer acceptable for new systems.
 - .d PVC pipe diameters of fourteen inches (14") to forty-eight inches (48") shall conform to the requirements of AWWA Standard C905, DR-18, with a working pressure rating of two hundred thirty-five (235) psig. The pipe shall have the same OD as ductile iron pipe.
 - .e Elastomeric seals shall meet ASTM F477 and shall be attached to the bell utilizing glue (AWWA and Manufacturer approved type) or "rieber" steel reinforced rubber gasket ring.
- .2 POLYETHYLENE (PE) TUBING one inch (1") and two inch (2") service pipe shall conform to AWWA Standard C901, PE 3408 and be copper tubing size (CTS, SDR-9) with a working pressure rating of two hundred (200) psig.
- .3 POLYETHLENE PRESSURE PIPE (PE) Pipe larger than two inches (2") in diameter (HDPE) pipe shall conform to the requirements of ASTM F-714 and AWWA Standard C906, DR 11, with a working pressure rating of one hundred-sixty (160) psig. HDPE pipe shall have the same OD as ductile iron pipe size (DIPS). See Section 10 of the CODE for required HDPE material specifications (Horizontal Directional Drilling).

POTABLE WATERLINE DESIGN, MATERIALS, INSTALLATION AND CONSTRUCTION

- .4 DUCTILE IRON PIPE (DIP): DIP shall conform to the requirements of AWWA/ANSI C151/A21.51, minimum thickness Class 51, have interior cement lining and seal coating, meeting the requirements of AWWA/ASNI Standard C104/A21.4, and have a minimum of one (1) mil thickness of coal tar enamel seal coat inside and out. Pressure class DIP will be considered on a case by case basis as approved by UTILITIES.
 - .a PUSH ON AND MECHANICAL JOINT DIP shall conform to the requirements of AWWA/ANSI C111/A21.11 minimum Class 51 with a working pressure rating of two hundred-fifty (250) psig Gasket materials for special applications in cases were soil contamination requires impervious piping materials or special fluids are handled must be shown on the plans and in the specifications.
 - .b FLANGED JOINT DIP: All flanged joint DIP shall conform to the requirements of AWWA/ANSI Standard C115/A21.15, minimum Class 53, with a working pressure rating of two hundred-fifty (250) psig All flanges shall have a taper pipe thread (NPT) in accordance with ANSI B2.1. Flanged joint pipe shall be joined utilizing stainless steel nuts and bolts with full-face gaskets or true-ring gaskets.
 - .c BALL JOINT DIP: All ball joint DIP shall conform to AWWA C151. The pipe joints shall be of the ball and socket type, capable of fifteen (15) degrees free deflection in each joint without separation, leakage, or reduction in the pipe waterway. Each joint shall be self-restrained without the use of bolts or similar external locking devices. Locking retainer glands shall be ductile iron or high strength alloy steel.
- .5 PRESTRESSED CONCRETE PIPE: shall conform to AWWA C301 and shall be designed to withstand a working pressure of not less than one hundred-fifty (150) psig, unless otherwise specified or indicated.
- .6 GALVANIZED STEEL PIPE: Galvanized steel pipe is not allowed.
- .7 JOINTS AND FITTINGS:
 - .a MECHANICAL JOINT (MJ) FITTINGS for PVC and DIP shall be ductile iron meeting AWWA C153, up to twenty-four inches (24"), designed to withstand a working pressure of not less than three hundred-fifty (350) psig, and shall conform to the requirements of ANSI Standard A21.51. The coating and lining for fittings shall be as specified herein for ductile iron pipe.
 - .b FLANGED JOINT FITTINGS shall conform to AWWA/ANSI Standard C110/A21.10 with a minimum pressure rating of two hundred-fifty (250) psig, and shall conform to the requirements of ANSI Standard A21.51. The coating and lining for fittings shall be as specified herein for ductile iron pipe. Flanged joint pipe shall be joined utilizing stainless steel nuts and bolts with full-face gaskets or true-ring gaskets.
 - .c CONCRETE PIPE FITTINGS shall conform to AWWA C301 and to the details
POTABLE WATERLINE DESIGN, MATERIALS, INSTALLATION AND CONSTRUCTION

furnished by the manufacturer.

.d POLYETHLENE (PE) FITTINGS three inches (3") and larger in diameter shall conform to AWWA C901/C906, ASTM D2513, ASTM 3035 and must have NSF 61 approval. All fittings shall be designed and produced to ductile iron diameters with uniform dimensions.

.8 RESTRAINTS

- .a RESTRAINTS FOR DIP OR PVC BELL AND SPIGOT JOINTS shall be UL listed and/or FM approved. Restraints shall be EBBA Iron Series 1100, 1600, 2000, 2800, Star Pipe Products, Inc. Series 1100, 1200, Sigma Corporation Series SLD/SLDE, SLC/SLCE and PVP/PWP, or Ford-Uni-Flange Series 1300. Field-Loc or Fast Grip type gaskets shall be UL listed and/or FM approved and will be considered on a case by case basis as approved by UTILITIES.
- .b RESTRAINTS FOR MECHANICAL JOINTS shall be UL listed and/or FM approved and be designed to be used to restrain PVC or ductile iron pipe to mechanical joint valves and fittings. These retainer glands shall be manufactured of ductile iron per ASTM A536. Twist-off torque limiting nuts shall be used to insure proper actuating of the restraining devices. The restraining devices shall be designed with a 2:1 ratio factor of safety with regard to pressure rating and shall be "MEGALUG" Series 1100, 2000 as manufactured by EBBA Iron Inc., Strargrip 3000, Allgrip 3600 Series as manufactured by Star Pipe Products, Inc., Ford-Uni Flange Series 1300, 1400, 1500, Sigma Corporation Series SLD/SLDE and SLC/SLCE, or approved equal. Setscrews will not be permitted on PVC pipe.
- .c RESTRAINING PLAIN END PIPE, Flange adapter shall be MEGAFLANGE 2100 series as manufactured by EBBA Iron Inc., Ford Uni-Flange Series 900, Sigma Corporation Series Sigma Flange Adapter, or approved equal. Setscrews will not be permitted on PVC pipe.
- .d RESTRAINING RODS for piping greater than 3 three inches (3") in diameter shall be a minimum of three-fourth inch (3/4") in diameter and shall be stainless steel or Cor-Ten. Manufacturer's couplings shall be used when rods are being coupled. For each twenty-two thousand pound (22000 lb) thrust, one (1) pair of three-fourth inch (3/4") restraining rods shall be used.
- .9 EXTERNAL CORROSION PROTECTION: DIP watermain, shall be encased with a polyethylene tube in areas that are indicated on the drawings, where corrosive soils are encountered, or as determined by the EOR. The polyethylene tube shall have a minimum thickness of 0.008 inch (8 mil), color-coded blue, and meet the requirements of AWWA/ANSI Standard C105/A21.5.
- .10 VALVES (GENERAL): The following items should be clearly marked on each valve: manufacturer, year manufactured, style, design, size, rating, and flow direction arrow, if applicable. Valves shall open left (counter clockwise). When fully open, the valve shall

POTABLE WATERLINE DESIGN, MATERIALS, INSTALLATION AND CONSTRUCTION

have a clear waterway equal to the ID of the pipe.

Buried valves shall have a two inch (2") square operating nut. Valve stem extensions shall be used when necessary to maintain between eighteen inches (18") and thirty-six inches (36") in depth to the top of the operating nut. Valve stem extensions shall be secured to the operating nut for the valve by stainless steel set screw and have centering ring. Where multiple extensions may be used the extensions shall be secured together by pins or stainless steel bolts and nuts installed completely through the assembly.

- .a RESILIENT WEDGE GATE VALVES two inches (2") and larger shall conform to the requirements of AWWA C509 or C-515, be UL and FM approved, with a working pressure rating of two hundred-fifty (250) psig. The valve shall have a cast iron or ductile iron body, O-ring seals, and factory applied epoxy coated interior and exterior conforming to the requirements of AWWA C550. Valves shall be factory tested for zero leakage past the seal at two hundred-fifty (250) psig. Valves over eighteen inches (18") shall have Bevel Gearing.
- .b RUBBER SEATED BUTTERFLY VALVES shall conform to the requirements of AWWA C504. Wafer type valves conforming to the requirements of AWWA C504 in all respects, but not meeting laying length requirements, will be acceptable if supplied and installed with a spacer, provided the specified laying length is met. Valves shall have factory-applied epoxy coating interior and exterior conforming to the requirements of AWWA C550. Butterfly valves shall be allowed on water mains only with UTILITY approval.
- .c AIR RELEASE VALVES shall have a minimum two inch (2") inlet and shall be of a type that will release air automatically when operating under design pressures. Valves shall be iron body, epoxy coated steel, or stainless steel with bronze or non-metallic trim and stainless steel float. Automatic air/vacuum valves shall be used at the discretion of the operating utility.
- .d TAPPING VALVES shall be resilient wedge gate valves and be furnished with a tapping flange having a raised face or lip designed to engage the corresponding recess in the tapping sleeve flange. Valves shall have factory-applied epoxy coating interior and exterior conforming to the requirements of AWWA C550.
- .11 TAPPING SLEEVES for line sizes twenty-four inches (24") or less shall be a full wrap stainless steel. Sizes larger than twenty-four inches (24") shall be prefabricated steel, epoxy coated, with stainless steel bolts. Test ports shall be supplied on all sleeves or as specified by the utility. Size on size taping sleeves shall be cast iron, mechanical joint, split housing, tapping sleeve, Mueller H615, or pre-approved equal.

Acceptable materials are as follows:

.a Stainless steel tapping sleeves for tapping mains up to twenty-four inches (24") in diameter shall be passivated, full wrap around design with full gasket. Stainless Steel Tapping Sleeves shall be furnished with:

Sleeve Shell - 304 Stainless Steel.

POTABLE WATERLINE DESIGN, MATERIALS, INSTALLATION AND CONSTRUCTION

Lugs, Nuts, Bolts - 304 Stainless Steel drop in bolt style. Washers - 304 Stainless Steel. Flange Gasket - Glued to flange face. Flange - 304 Stainless Steel. Flange, Nuts, bolts – 304 Stainless Steel. Seal Gasket - Full circumference and full length. Test Plug - 304 Stainless Steel, 3/4 inch NPT.

.b Epoxy Coated Steel for tapping mains larger than twenty-four inches (24") in diameter shall be furnished with:

Body - Heavy welded steel, full support body, not strapped. Epoxy Coating – Epoxy resin, free of voids, lamination, or blisters, dry film Thickness of 8-10 mils. Bolts and Nuts - 304 Stainless Steel. Flange - Steel flat face with gasket. Flange, Nuts, bolts – 304 Stainless Steel Test Plug - 304 Stainless Steel, 3/4 inch NPT. Seal Gasket - Water service Buna N.

.c Mechanical joint tapping sleeves shall be furnished with:

Body - Cast Iron (Mueller H615 or equal). Flange - Shall be flat face with gasket. Flange, Bolts and Nuts – 304 Stainless Steel. Body Bolts, Nuts and Gasket - Shall be furnished by sleeve manufacture.

- .12 VALVE BOXES shall be of domestic manufacture and be provided for all buried valves which have no gearing or operating mechanism, or in which the operating mechanism is permanently lubricated and designed for buried service. The valve box shall not transmit shock or stress to the valve and shall be centered and plumb over the operating nut of the valve, with the valve box cover flush with the surface of the finished grade or pavement. Cover shall be marked "water" and be painted blue.
 - .a Valve boxes shall be cast iron adjustable screw type supplied with a twelve pound (12 lb) cover and a minimum of three-sixteenth inch (3/16") wall thickness. Valve boxes shall be supplied by the manufacturer in such lengths as can be adapted, without full extension, to a depth of cover required over the pipe at the valve location.
 - .b Valve stem extensions with centering rings shall be furnished to maintain between eighteen inches (18") and thirty-six inches (36") to the top of the operating nut. The stem extension shall be secured to the operating nut for the valve by a stainless steel set screw and have centering ring. Where multiple extensions may be used the extensions shall be secured together by pins or stainless steel bolts and nuts installed completely through the assembly.
 - .c Portland cement concrete valve pads shall be supplied for all valves located outside paved areas. Valve pads shall be twenty-four inches (24") square by six

POTABLE WATERLINE DESIGN, MATERIALS, INSTALLATION AND CONSTRUCTION

inches (6") thick with four (4), No. 4 reinforcing bars. The concrete shall have a minimum strength of three thousand (3000) psi. Pre-cast concrete valve pads meeting the above requirements will be allowed with the approval of the UTILITY providing service in that area.

.d Valve pads for in line valves shall have a three inch (3") brass nameplate securely embedded into the pad. Etched in the nameplate shall be "Water", the year of valve manufacture, size of the valve, the number of turns necessary to open or close the valve, and an arrow indicating the direction of flow.

.13 FIRE HYDRANTS

Fire hydrants used in the Sarasota County Utilities service areas shall be Kennedy K-81D, American Darling B-84B, Mueller A-423 or AVK, 2700 UL listed, FM approved.

- .a Fire hydrants shall conform to the requirements of the latest revision of AWWA C502, "Dry-Barrel Fire Hydrants". Hydrants shall be designed for two hundred (200) psig working pressure and shop tested to three hundred (300) psig pressure with main valve both opened and closed. Hydrant barrel shall have safety breakage feature above the ground line.
- .b All hydrants shall have national standard thread (NST), a six inch (6") mechanical joint shoe connection, two (2) two and one-half inch $(2 \frac{1}{2}")$ discharge nozzles and one (1) four and one-half inch $(4 \frac{1}{2}")$ pumper nozzle, with caps fitted with cap chains. Connection threads shall conform to National Standard Specifications as adopted by the National Board of Fire Underwriters.
- .c The operating nut shall be a one and one-half inch $(1 \frac{1}{2})$ pentagon, measured from flat to point, and shall open left (counterclockwise) as marked on the bonnet. The main valve shall be solid rubber and have a minimum five and one-fourth inch (5 $\frac{1}{4}$) full opening and be of the compression type, opening against water pressure.
- .d The operating stem shall be equipped with antifriction thrust bearing to reduce operating torque and assure easy opening. Stops shall be provided to limit stem travel. Stem threads shall be enclosed in a permanently sealed lubricant reservoir with O-ring seals to prevent exposure to moisture.
- .e Hydrants shall have a bronze seat ring threaded to a bronze sub-seat (ASTM B-62). The hydrant barrel drain valve and port shall be bronze. The hydrant barrel drain shall be actuated by operation of the main valve stem.
- .f Pressure drop across valve shall be no more than five (5.0) psig at one thousand (1,000) GPM (AWWA C502, UL 246 FM 1512).
- .g The mating surfaces between the hold down nut and the operating nut shall be bronze to bronze. The hydrant shall be fitted with a thrust washer for ease in opening the hydrant.

POTABLE WATERLINE DESIGN, MATERIALS, INSTALLATION AND CONSTRUCTION

- .h Hydrant tops shall be so designed that no part of the threads of the main stem shall be in contact with water.
- i Oil or grease may be used as a lubricant in accordance with manufacturer's recommendations.
- .j Two (2) O-rings shall be used to seal the operating mechanism from water in the barrel.
- .k One (1) O-ring shall be used to seal the upper end of the operating mechanism from atmospheric moisture.
- .1 The carbon steel stem shall be bronze sheathed where it contacts the lower O-rings.
- .m Hydrants shall be so designed that only the bonnet and lubrication chamber, or bonnet and seal plate, need to be removed to change the main valve and seat.
- .n An O-ring seal shall be provided in the valve assembly to insure that water cannot leak from the hydrant boot, or shoe, into the hydrant barrel or drainway.
- .0 The threads of the main valve seat ring shall not be designed as a sealing thread.
- .p The interior surfaces of the boot or shoe, and the main valve bottom plate shall be painted with a minimum four (4) mil. thick epoxy-coating in accordance with AWWA C550. The lower barrel (inside and outside surfaces) and the inside surface of the upper barrel shall be epoxy coated.
- .q For UTILITIES-owned fire hydrants, the outside surface of the upper barrel (top) of the hydrant and all above ground piping shall be primed and then painted "new lime green" known as Sarasota County fire hydrant paint, as manufactured by Scott Paint. On privately owned hydrants the upper barrel and all above ground piping is to be painted Traffic Yellow.
- r The EOR shall perform hydrant flow tests on all hydrants installed under the Project, and record the results in a Hydrant Flow Test Report. Provide three (3) copies of this report to UTILITIES for distribution to Utilities Operations and the Fire Marshal.
- .s Fire hydrant bonnets are to be color coded to meet the gallon per minute (GPM) flow standards established by NFPA 291., based on the above Hydrant Flow Test Reports.
- .t For reasons determined to be in the public interest, hydrants that deviate in any manner from the specifications contained herein are disallowed.

.14 WATER SERVICE CONNECTIONS

.a WATER SERVICE LINES shall be a minimum one inch (1") in diameter.

POTABLE WATERLINE DESIGN, MATERIALS, INSTALLATION AND CONSTRUCTION

Service lines greater than two inches (2") in diameter shall be connected to the water main by a tapping sleeve and resilient wedge gate valve, unless otherwise approved by UTILITIES.

- .b WATER SERVICE LINES up to two inches (2") in diameter shall be colorcoded blue and shall be constructed of polyethylene (PE) tubing as specified herein.
- .c SERVICE SADDLES shall have CC thread and a bronze body with double bronze straps and nuts for pipe sizes four inches (4") and larger. Two (2) piece, bronze body, double strap, hinged service saddle with one inch (1") outlet shall be required for four inch (4") and six inch (6") PVC pipe and optional on eight inch (8") PVC pipe. Saddles shall have a rubber gasket cemented to the body, with compatible threading between the saddle and corporation stop. Saddles shall conform to ANSI/AWWA C800 standards.
- .d DIRECT TAPS are not allowed unless approved by UTILITIES. Two (2) piece, bronze body, double strap, hinged service saddles shall be used for service taps.
- .e CORPORATION STOPS in sizes one inch (1") inch through two inch (2") shall have CC thread, manufactured from cast bronze with machined fitting surfaces, and conform to the requirements of ANSI/AWWA C800 ball type only. The outlet shall be compression joint for PE or copper tubing (CTS) or IPS. The corporation shall be pressure rated at one hundred-fifty (150) psig.
- .f METER (BALL) VALVES shall be one-forth (1/4) turn ball angle meter valve style through one inch (1") with full port, meter nut, and lock wing. Valves larger than one inch (1") shall be one-forth (1/4) turn ball angle meter valves, with a 2bolt elliptical flange. Meter valves shall conform to ANSI/AWWA C800 standards ball type only. The inlet shall be compression joint for PE or copper tubing (CTS) or IPS. All parts shall be manufactured from cast bronze with machined fitting surfaces, and conform to the requirements of ANSI/AWWA C800. The meter (ball) valve shall be pressure rated at one hundred-fifty (150) psig.
- .g METER BOXES shall be as required by UTILITIES or UTILITY having jurisdiction, and shall be of sufficient size to completely enclose the meter and shut off valve or service stop. Box height shall extend from invert of the meter to final grade at the meter location. Cover shall be traffic bearing and have a cast iron hinged meter reading viewing lid.
- .h WATER METERS shall be those specified by the serving utility and shall be installed according to the standard details. Notes indicating this requirement shall be incorporated into the plans and specifications.
- .i CURB STOPS OR VALVES shall be one-forth (1/4) turn ball type for services smaller than two (2) inches in diameter, and shall conform to ANSI/AWWA C800 standards. The inlet and outlet shall be compression joint for PE or copper tubing (CTS) or IPS. Body shall be manufactured from cast bronze with

POTABLE WATERLINE DESIGN, MATERIALS, INSTALLATION AND CONSTRUCTION

machined fitting surfaces, and conform to the requirements of ANSI/AWWA C800. The curb valve shall be pressure rated at one hundred-fifty (150) psig.

.j TRACING WIRE shall be solid number twelve (12) THHN color-coded blue.

12.8 POTABLE WATER SYSTEMS INSTALLATION

.1 GENERAL

See related Sections seven (7) through eleven (11) for general requirements.

- .2 HANDLING AND STORAGE OF MATERIAL
 - .a Pipe shall be handled in accordance with the manufacturer's recommendations and shall not be stacked higher than four feet (4'). Suitable racks, chairs, and other supports shall be provided to protect preformed pipe mating surfaces from damage; bottom tiers shall be raised off the ground.
 - .b PVC piping and other materials not to be installed within two (2) weeks of delivery shall be protected from the sunlight, atmosphere, and weather. The piping and materials shall be stored in suitable enclosures or under appropriate protective wrapping until ready for installation. PVC pipe manufactured more that eighteen (18) months before date of installation shall be rejected and removed from the site.
 - .c Pipe and fitting shall be installed in such a manner to avoid damaging the pipe, scratching or marring machined surfaces, and causing abrasions to of the pipe coating. The lined DIP Pipe and Fittings must be handled only from the outside of the pipe and fittings. No forks, chains, straps, hooks, etc. shall be placed inside the pipe and fittings for lifting, positioning, or installing. If damaged, the material shall be repaired in accordance with the liner manufacturer's recommendations. Any fitting showing a crack and any fitting or pipe which has received a severe blow that may have caused an incipient fracture, even though no such fracture can be seen, shall be marked as rejected and removed at once from the site.

.3 PIPE AND FITTING INSTALLATION

- .a Prior to installation, all pipes shall be inspected, and all materials found to be defective shall be removed from the site.
- .b The interior of the pipe, fittings, valves, and accessories shall be thoroughly cleaned of foreign matter before being lowered into the trench. All pipes shall be kept clean during laying operations and shall be securely plugged watertight when construction stops overnight or for an extended period of time.
- .c Pipe shall be installed with a minimum of thirty-six inches (36") of cover unless otherwise directed by the EOR and approved by UTILITIES.

POTABLE WATERLINE DESIGN, MATERIALS, INSTALLATION AND CONSTRUCTION

- .d Cutting and installation of pipe, fittings, valves, and accessories shall be performed using the recommendations of the manufacturer and in accordance with the best trade practices. Care shall be taken to not injure the material coatings or linings. Damage to linings shall be cause for rejection of the complete section of pipe, fitting, or valve. Damage to exterior coatings shall be corrected to original specifications.
- .e A continuous number twelve (12) gauge location wire, color-coded blue, shall be attached securely to all PVC piping. The wire shall be laid on top of the pipe and be secured with tape at ten foot (10') intervals. The wire shall terminate at fire hydrants, valve boxes, and at the terminal point of service.
- .f Three inch (3") metallic location tape, color-coded blue, shall be located eighteen inches (18") above all waterlines.

.4 FIRE HYDRANT INSTALLATION

- .a Fire hydrants shall be located and installed as shown on the approved drawings.
- .b Each hydrant assembly connected to the main shall have at least as much ground cover as the distribution main.
- .c Hydrants shall be set plumb, with the pumper nozzle facing the roadway and with the center of the lowest outlet not less than eighteen inches (18") above the surrounding finished grade. The hydrant wrench shall not contact the ground when making a full 360 degree turn on any nozzle cap. The hydrant shall be set so the bury line is flush with the surface of the proposed grade and as recommended by the manufacturer. Grade adjustments shall be made by the use of manufactured hydrant extension kits or by utilizing "Gradelok fitting by Assured Flow Sales, Inc., or approved equal.
- .d In order to obtain beneficial use of the hydrant as soon as practical, backfill around hydrants shall be thoroughly compacted to the finished grade line immediately after installation. Where hydrants are located behind swales, culvert crossings, etc., bridging shall be provided for access.
- .e Hydrant valves shall be restrained to the tee and be placed no farther than ten feet (10') from the hydrant. Hydrant valve boxes shall be installed as specified in Section 12.10 and installed to grade level of access crossing in order to allow ease of use when such terrain may be filled with water.
- .f The hydrant shall be painted with two (2) coats of polyurethane high gloss enamel. The color shall be "new lime green", known as Sarasota County fire hydrant paint, as manufactured by Scott Paint, or approved equal. Refer to Section 12.7.11.q in this CODE for privately owned and maintained hydrants.
- .g For location purposes all new fire hydrants shall have a blue reflective pavement marker (RPM) placed in the middle of the center driving lane on the side of the

POTABLE WATERLINE DESIGN, MATERIALS, INSTALLATION AND CONSTRUCTION

street nearest the hydrant. On unpaved streets, the RPM shall be affixed to a post as close as practical to the edge of the roadway, so as to be easily visible.

.5 VALVE AND SERVICE LOCATION MARKERS

- a. All valves and services located outside the roadway shall be identified by one or more of the following methods:
 - i The letter "V" for valve shall be clearly etched or stamped into the concrete curbs directly adjacent to the valve. Stamping or etching shall be deep enough so as to be permanent. The minimum size shall be three inches (3") by three inches (3").
 - .ii When curbs are not available, aluminum and/or plastic disks, blue for water, shall be used, as supplied by National Band and Tag Company, or approved equal. Each tag shall be labeled "Water" and be secured into the pavement by a two inch (2") "PK" survey marker nail. The footage shall be clearly stamped in the disks indicating the approximate distance in feet to the valve or service directly adjacent to the placement of the disks.
 - .iii When neither curbs nor pavement are available, a six foot (6') long, two inch (2") by four inch (4") stake, four feet (4') above grade and the top twelve inches (12") inches painted blue for water, shall be placed directly beside the valve and pad outside the roadway, until such time as one of the above procedures can be implemented.
- b. Blue, color-coded, continuous number twelve (12) gauge insulated copper tracing wire shall be attached securely to the service pipe. The wire shall be secured to the pipe at ten foot (10') intervals, extending from the waterline, terminating at the curb stop.

.6 CONNECTIONS TO EXISTING WATERLINES

- .a Dissimilar pipe connections shall be made using solid sleeves for the joining plain end pipe sections, and for joining pipes of dissimilar materials. The sleeves shall conform to AWWA C110 and be a long pattern type.
- .b Where connections are made between new work and existing mains the connections shall be made to suit the actual conditions. The connection shall be made in a dry trench in a neat and clean manner. All interior pipe and fitting surfaces shall be thoroughly cleaned and swabbed using a chlorine solution. The contractor shall notify the EOR and UTILITIES five (5) working days prior to making the actual connection.
- .c Where connections are made between new work and existing mains, causing disruption of service to any customer, a minimum of five (5) working days notification shall be given to UTILITIES. The Contractor shall coordinate with UTILITIES inspector and utility, referencing the time, date, and duration of the proposed work.

POTABLE WATERLINE DESIGN, MATERIALS, INSTALLATION AND CONSTRUCTION

- .i UTILITIES will prepare customer notification (door hangers), referencing the time, date, and duration of the proposed work.
- .ii UTILITIES inspector or serving utility will deliver to the Contractor a sufficient number of notifications necessary to inform customers of the proposed work.
- .iii The Contractor shall distribute the notices to the customers in the affected service area. The notices shall be distributed to the customers a minimum of two (2) days in advance of the proposed work.
- .d Valves on existing mains, including new valves tied to existing systems, shall be operated by Utility personnel, or under direct supervision of the serving Utility.
- e Prior to the planned work, the Contractor shall have as much material preassemblied as possible in order to minimize the length of service interruption. If preparations are not ready, UTILITIES will postpone the work and have the Contractor reschedule the work for a later time.

.7 WET (LIVE) TAPS

The Contractor shall make the tap while the line is in service by using a tapping sleeve or tapping saddle as shown on the approved construction plans and as specified herein. The tapping of the main shall be done using standard tapping techniques as approved by UTILITIES. The water mains shall be tapped in such a manner that the operation of the main in service is not disturbed and so that the potable water supply is not contaminated. A representative of UTILITIES must be present and witness all live taps.

- .a The Contractor shall be responsible for scheduling and coordinating the work for each tap.
- .b Twenty four (24) hours prior to making the tap the contractor shall pour the concrete sleeve and valve support. The Contractor shall assemble all materials, and have sufficient supervision, labor, tools, and materials necessary to make the tap.
- .c Prior to the tap, the Contractor shall pressure test the tapping sleeve and valve installation under supervision of UTILITIES inspector and/or the EOR. The Contractor shall notify UTILITIES, the EOR, and the UTILITY forty-eight (48) hours prior to the test. The Contractor shall be responsible for properly backfilling and compacting the work area pit after the work is completed.

.d HYDROSTATIC AND LEAKAGE TEST:

After installing a tapping sleeve and valve, and prior to tapping of a pressurized water main, a hydrostatic and leakage test shall be performed. The test will be conducted by introducing water into a tap or test hole located at the neck of the outlet half of the sleeve, on sleeves furnished with said tap, and with the tapping valve in the closed position. Sleeves shall be provided with a test plug. The sleeve and valve shall be capable of maintaining a test pressure

POTABLE WATERLINE DESIGN, MATERIALS, INSTALLATION AND CONSTRUCTION

of 150 psi for 30 minutes duration, with no sign of visible leaks. All leaks shall be repaired by removing and replacing defective items with items free of defects, after which the sleeve and valve shall be retested. Such repair and retesting shall be done until the installation passes the specified test. The Contractor shall furnish and install any necessary temporary restraints, gauges, pumps and other incidental and appurtenant items necessary to complete this work, and shall remove same upon completion of the test. A watertight plug (bronze or stainless steel) shall then be inserted into the test hole.

.e Generally size on size taps are is discouraged. However, some field situations may justify their use. Size on size taps may not be used unless first approved by UTILITIES. If approved a mechanical joint style tapping sleeve is required, using a Mueller H615, or pre-approved equal, and all bolts used with the tapping sleeve must be stainless steel Type 304.

.8 ASBESTOS CEMENT PIPE CONNECTIONS:

Connections between asbestos cement pipe and cast iron fittings, valves, or hydrants shall be made with jointing materials conforming to AWWA C603. In general, the desired action would be removal and legal disposal of the asbestos cement pipe.

12.9 TESTING (GENERAL)

- .1 This section covers testing procedures generally used in various areas of water system construction.
 - .a Upon satisfactory installation new, modified, or extended watermains shall be flushed and subject to hydrostatic, leakage, and bacteriological test procedures as specified herein prior to being placed into service.
 - .b All mains shall be cleaned and flushed to remove all sand and other foreign matter. The Contractor shall be responsible for developing a flushing plan to be submitted to UTILITIES for approval prior to flushing. The Contractor shall dispose of all water used for flushing without causing a nuisance or property damage. Minimum flows for pipe four inches (4") to twelve inches (12") in diameter are as follows:
 - .1 4" Dia. = 98 gpm
 - .2 6" Dia. = 221 gpm
 - .3 8" Dia. = 391 gpm
 - .4 12" Dia. = 880 gpm
 - .c In order to reduce the volume of water used in the pipe line cleaning procedure for water mains sixteen inches (16") and larger, the Contractor shall utilize a hydraulic "pig" per AWWA C600, to remove dirt and debris from the sections of pipe being tested.
 - .d Test procedures not covered by this CODE, such as practices, procedures, or materials new to the industry, shall be considered for use by UTILITIES upon

POTABLE WATERLINE DESIGN, MATERIALS, INSTALLATION AND CONSTRUCTION

written request and reasonable justification by the EOR, provided that all testing materials and procedures meet or exceed the minimum requirements of AWWA, ASTM, latest revision, and the manufacturer's recommended specified testing requirements.

.2 PRE-TEST PROCEDURES

- .a Testing for any utility system within the unincorporated area of Sarasota County shall be conducted in the presence of, but not limited to, the EOR, a UTILITY representative, the Contractor and UTILITIES (or their designated representative).
- .b All persons required to be present for testing shall be notified by the Contractor a minimum of forty-eight (48) hours prior to the commencement of the test. Should any of the required persons not be properly informed, or not be able to attend, the test shall be rescheduled.
- .c After installation of the pipe is complete, all joints properly completed, fire hydrants permanently installed, and the trench backfilled and compacted, the newly laid piping or any valved section of piping shall be tested generally in accordance with AWWA C600, Hydrostatic Testing and Leakage Testing, latest revision.
- .d In advance of the actual testing, the contractor shall insure that all equipment such as pumps, gauges, blow-offs, and valves are in good working order. The lines being tested must be ready for use and free of all excess trapped air, incidental leaks, dirt, and debris.

.3 TEST PREPRATIONS

- .a Only one (1) tie-in point shall be allowed prior to a successful pressure test and bacteriological approval from the DOH. Other tie-ins shall be made only after all testing has been satisfactorily completed and the water lines have been certified and accepted by UTILITIES.
- .b Waterlines to be tested shall be in one thousand foot (1000') sections located between valves or adequate plugs. When authorized by UTILITIES longer sections may be allowed provided each valve is closed against the test pressure; the allowable leakage will be based on the one thousand foot (1000') section. Testing shall not proceed until restraining devices have been installed.
- .c Before applying the specified test pressure, air shall be expelled completely from the pipe, valves, and hydrants. If permanent air vents are not located at all high points, the contractor shall install corporation stops at such points so that the air can be expelled as the line is filled with water. At the satisfactory conclusion of the pressure test, removal of the test cocks shall be as directed by UTILITIES.
- .d The test shall include the application of the specified pressure to the test section,

POTABLE WATERLINE DESIGN, MATERIALS, INSTALLATION AND CONSTRUCTION

by way of a pump taking its supply from a clean, suitable container, adequate for measuring the displaced volume.

.e Hydrostatic and disinfection tests may be conducted concurrently only if there is no physical connection to the existing system, using chemically treated water for disinfection to accomplish the hydrostatic test. If water is lost when treated for disinfection and air is admitted into the section being tested, or if any repair procedure results in contamination of the section being tested, disinfection shall be reestablished.

.4 HYDROSTATIC - LEAKAGE TEST PROCEDURES

- .a A leakage test shall be conducted concurrently with the hydrostatic pressure tests. The duration of each leakage test shall be at least two (2) hours. During the test, the waterline shall be subjected to a testing pressure of one hundred-fifty (150) psig, or as specified by the EOR and/or UTILITIES.
- .b Allowable leakage will be determined by the following formula:

TABLE 12.2

Where	$L = \frac{SD\sqrt{P}}{133,200}$
	L = allowable leakage, in gallons per hour.
	S = length of pipe tested, in feet.
	D = nominal diameter of the pipe, in inches.
	P = average test pressure maintained during the test, in pounds per square inch gauge (psig).
	The test pressure shall be one hundred-fifty (150) psig. For longer waterlines, the maximum length of one thousand feet (1000') shall be used for leakage calculations regardless of the actual total length of pipe tested.

- .c Leakage shall be defined as the quantity of water that must be supplied to the newly installed pipe, or any valved section thereof, to maintain pressure within five (5) psig of the specified test pressure, after the air in the pipeline has been expelled and the pipe has been filled with water.
- .d Leakage shall not be measured by a drop in pressure in a test section over a period of time, but shall be measured for the exact quantity of water lost, in a manner approved by the EOR and UTILITIES.

POTABLE WATERLINE DESIGN, MATERIALS, INSTALLATION AND CONSTRUCTION

- .e Test pressures shall not exceed one hundred-ten percent (110%) of the rated pressure of the valves or system components when the pressure boundary of the test section included closed, resilient seated gate valves or butterfly valves.
- .f When testing against existing closed metal-seated valves, an additional leakage per closed valve of 0.0078 gal/h/in. of nominal valve size shall be allowed. When hydrants are in the test section, the test shall be made against the closed hydrant.
- .g If any test discloses leakage greater than the allowable for each test section, the contractor/developer shall, at their own expense, locate and make repairs as necessary until the leakage is within the specified allowance. All visible leaks are to be repaired regardless of the amount of leakage.

.5 BACTERIOLOGICAL TEST PROCEDURES

- .a Upon satisfactory completion of the hydrostatic pressure and leakage test accepted by the EOR and/or the serving Utility, UTILITIES representative shall notify the Department of Health (DOH) of the satisfactory result. The Contractor shall notify the DOH to schedule a bacteriological test of the constructed waterline(s).
- .b All public distribution water mains are required to be bacteriologically tested and cleared. Private waterlines two inches (2") or larger may be subject to bacteriological testing as determined by the DOH or UTILITIES.
- .c Waterlines must be certified by the EOR to the DOH within thirty (30) calendar days of successful bacteriological testing.
- .d Private water system testing requirements shall be the same as for public water mains, and it shall be the responsibility of the Developer to connect the private water system to the outlet of the master meter assembly. The County's responsibility of ownership and maintenance shall stop at the downstream end of the last control device (master meter), or on the supply side of a backflow device.
- .e Disinfection of all new and/or repaired water mains shall conform to the latest revision of "AWWA Standard for Disinfecting Water Mains", (AWWA C651), and the approved DOH Regulations and Requirements. The contractor shall notify UTILITIES forty-eight (48) hours in advance to schedule an inspection prior to the injection of any disinfectants.
- .f Potable water shall not be used to clean, flush, fill, or construct utility lines unless prior approval from UTILITIES is obtained.
- .g The use of chlorine gas is prohibited. Chlorinating materials shall conform to the following:

POTABLE WATERLINE DESIGN, MATERIALS, INSTALLATION AND CONSTRUCTION

TABLE 12.3

a. Chlorine, Liquid	AWWA B301
b. Calcium Hypochlorite or Sodium Hypochlorite	AWWA B300

.6 MAIN CLEARANCE SCHEDULING & TEST PROCEDURES

- .a Bacteriological testing shall be performed by the DOH and shall be performed on projects where State and County Permits have been issued.
- .b All lines to be bacteriologically sampled shall be flushed thoroughly prior to testing and shall not contain excessive amounts of air.
- .c A chlorine-water mixture shall be uniformly introduced into the pipeline by means of a solution-feed chlorinating device. The chlorine solution shall be introduced at one end of the water line through a tap in such a manner that, as the pipeline is filled with water, the dosage applied will be approximately fifty (50) mg/l. Care shall be taken to prevent the strong chlorine solution in the line being disinfected from flowing back into the line supplying water.
- .d At the time of testing, the free available chlorine residual shall not exceed 4.0 parts per million (ppm), or as otherwise approved by UTILITIES.
- .e Satisfactory samples are required for two (2) consecutive days per sample point.
- .f Sampling points shall consist of a standpipe with a hose bibb a minimum of eighteen inches (18") above grade, with the opening pointing downward.
- .g Location of sampling points shall be as determined by the DOH, or as follows:
 - .1 One sample point every two thousand-five hundred feet (2500') on a straight run of pipe.
 - .2 One sample point every one thousand feet (1000') on a waterline which is not on a straight run of pipe.
 - .3 One sample point at the end of each line.
- .h Unsatisfactory test results shall be retested and subject to further sampling fees.
- .i Upon connection to any existing water line by a means other than a tapping sleeve and valve (live tap), the line shall be bacteriologically tested and approved by the DOH. The Contractor/Developer shall submit to UTILITIES copies of all such test results and pay all necessary fees required to obtain bacteriological clearance.
- .j Upon completion of bacteriological testing, chorine injection, and/or sampling, the Contractor shall remove all pipes, tubes or other devices, close any access valves and plug or cap all access ports.

POTABLE WATERLINE DESIGN, MATERIALS, INSTALLATION AND CONSTRUCTION

END OF SECTION

Page Blank Intentionally

WASTEWATER DESIGN, MATERIALS, INSTALLATION AND CONSTRUCTION

13.1 GENERAL

This section is intended to provide minimum standards, details, and specifications for design, material selection, installation, and testing requirements used for new construction and modifications to existing wastewater systems.

13.2 WASTEWATER FACILITIES

- .1 Wastewater facilities shall be used for normal domestic wastewater only. No storm drain, roof drain, swimming pool, air conditioner condensate, etc., shall be discharged into any domestic or other wastewater system. Industrial wastewater, after pre-treatment, may be discharged into a wastewater system, with the serving UTILITIES prior approval.
- .2 The EOR shall comply with the requirements of this Section, Part II, Section 6 (General Design Standards), the County "Land Development Regulations", the Florida Department of Environmental Protection, and Florida Administrative Codes, Chapters 62-600, 62-604, and 62-610, 62-550, 62-555, 64-E8, and 40-D3 or as amended as it relates to design(s), criteria, location of drinking water and public supply wells and wastewater lines or facilities.
- .3 The criteria set forth in Chapter 30 of the "Recommended Standards for Wastewater Facilities" (most current addition), "Design of Sewers", shall generally be used as a design standards, if not in conflict with State, County, or other regulatory agency requirements. Wastewater pipe systems shall be designed to achieve flow velocities ranging between 2.0 and 6.0 feet per second (fps) unless UTILITIES approves velocities beyond this range under special conditions.

13.3 STANDARD BASE FOR DESIGN FLOWS

The design of the wastewater system shall be based on the development's full build-out as known, or projected. The average daily flow from domestic units shall be calculated at not less than two hundred (200) gallons per EDU, which will normally cover infiltration. Should conditions be unfavorable, such as inadequate flows, an additional allowance shall be included. The average daily flow from other land use types shall be calculated based on the Equivalent Dwelling Unit Schedule in Section No. 3 of this CODE.

13.4 PEAK DESIGN FLOWS

Peak flow rates shall be determined by using Figure one (1), Ratio of Peak Hourly to Design Average Flow, in Chapter 10 of the "Recommended Standards for Wastewater Facilities."

13.5 WASTEWATER GRAVITY LINE SIZE COMPUTATION

.1 Gravity sewer lines shall be sized to provide ample capacity for the required flow rates. The minimum allowable size for any gravity sewer line, other than service connections, shall be eight inches (8") in diameter.

WASTEWATER DESIGN, MATERIALS, INSTALLATION AND CONSTRUCTION

.2 All gravity sewer lines eight inches (8") to twenty-four inches (24") in diameter shall have minimum slopes as shown on TABLE 13.1 of this section. All larger sizes shall be designed at slopes providing minimum velocities of 2.0 feet per second when flowing full or half full. Said computation shall be based on Manning's Formula, using a roughness coefficient ("n") of not less than 0.013.

LINE SIZE	MINIMUM SLOPE (feet/100 feet)			
8 INCH	0.40			
10 INCH	0.28			
12 INCH	0.22			
14 INCH	0.17			
15 INCH	0.15			
16 INCH	0.14			
18 INCH	0.12			
20 INCH	0.11			
21 INCH	0.10			
24 INCH	0.08			

TA	BL	Æ	13	.1
			10	

Manning's formula shall be used on all pipes greater than twenty-four inches (24")

.3 In staff's review of record drawings, a deviation from design slopes of a plus or minus ten percent (10%) shall be considered. No further deviations from design slopes, regardless of how slight, shall be considered.

13.6 WASTEWATER GRAVITY SYSTEMS

This section through section 13.12 covers the design of gravity wastewater collection systems. For material specifications and installation practices see Sections 13.13 and 13.15.

- .1 Gravity Systems shall be designed and be installed with straight alignment and grade between manholes. Manhole spacing shall not exceed four hundred feet (400') for wastewater gravity lines, fifteen inches (15") or less, and five hundred feet (500') for larger sizes. Special provisions may be considered for sizes thirty inches (30") and larger.
- .2 All gravity sewer lines shall terminate at manholes unless otherwise approved by

WASTEWATER DESIGN, MATERIALS, INSTALLATION AND CONSTRUCTION

UTILITIES and FDEP.

- .3 Gravity sewer lines of diverse sizes shall join only at manholes, including the transition between alternate pipe materials.
- .4 In cases where different lines sizes join at the manhole, the lines shall be placed at appropriate elevations so that the crowns of the lines are equal.
- .5 Finished grade elevations of wet wells and valve vaults shall be a minimum of one foot (1') above the lowest rim elevation of the contributing gravity wastewater system.

13.7 MANHOLES

- .1 The minimum allowable inside diameter (ID) of the manhole shall be forty-eight inches (48") for pipe size up to and including fifteen inches (15") straight through. For fifteen inch (15") with change of direction and gravity lines larger than fifteen inches (15") a sixty inch (60") ID manhole shall be required. Larger diameter manholes may be required in special cases where the EOR's design includes other considerations.
- .2 Flow direction changes in excess of ninety (90) degrees shall not be allowed in wastewater gravity Systems without the approval of the EOR and UTILITIES.
- .3 Minimum invert elevation drop of 0.1 foot across the manhole is required.

13.8 DROP MANHOLES

- .1 Drop manhole connections shall be provided for any wastewater lines entering at a vertical distance of two feet (2') or more above the outgoing channel invert. In cases where the vertical distance is less than two feet (2'), a drop pipe is not required, but a channel shall be constructed to guide the flow into the outgoing channel. The bottom drop section shall be integrally cast with the bottom manhole section. All drop manholes shall be lined in accordance with Section 13.13 of this Code.
- .2 Inside drops shall only be permitted when connecting to an existing manhole, and when such connections are approved by UTILITIES and/or utility provider. Inside drop manholes shall be lined in accordance with Section 13.13 of this Code.

13.9 PRECAST MANHOLE PIPE CONNECTION

- .1 Connections between reinforced concrete manhole structures and sewer pipe shall be flexible connectors (neoprene boot or equal) conforming to ASTM C923, latest revision. See 13.13q of this Section for material specifications.
- .2 Additional pipe connections or modification of the existing factory made openings required on new or existing precast concrete manholes shall be performed only by means of core drilling, in accordance with manufacturer's recommendations for installing a neoprene boot, link seal, or equal. Flexible connectors shall conform to ASTM C923,

WASTEWATER DESIGN, MATERIALS, INSTALLATION AND CONSTRUCTION

latest revision.

13.10 MANHOLE FRAME AND COVERS Manhole frames and covers shall be watertight as specified herein. In potential high inflow areas, or areas where industrial waste in-flow or improper disposal may occur, special service manholes may be required.

13.11 SERVICE LATERAL

- .1 Wastewater service lateral installations shall be as shown in the UTILITIES Standard Details. The service lateral shall be at least six inches (6") in diameter or shall be sized two inches (2") larger in diameter than the building service connection. The service shall be extended from the main to the property line or point of connection, terminating in a single or double wye fitting with a cleanout brought to within six inches (6") of the proposed finished grade. In cases where cleanouts require access, a cast iron cleanout frame and cover embedded in a concrete collar at finished grade shall be provided. Wastewater service lines shall not be extended more than one hundred feet (100') from the main to the point of connection, unless otherwise approved by UTILITIES. Cleanouts shall be provided at one hundred twenty-five foot (125') intervals or per the current Sarasota County Building Code requirements.
- .2 The capped or plugged end of the service lateral, at the point of connection, shall be positioned so that the top of pipe is three feet (3') below finished grade at the point of connection. Fittings shall be used to obtain the desired service depth. If longer services are required to serve unusually deep lots, services may be set to a depth accordingly.
- .3 Service laterals shall not be installed directly to manholes unless approved by UTILITIES and/or the UTILITY providing service. Service laterals shall be installed into gravity mains by means of a service wye as shown in the UTILITIES Standard Details.

13.12 FORCE MAINS

.1 Force main systems shall be of adequate size to efficiently transmit the total ultimate maximum hourly flows (MHF) supplied by the connected wastewater lift (Pump) Station(s) to the discharge point. Capacity computations shall be coordinated with the proposed pumping system(s) along with any future flow requirement, if applicable. In order to provide adequate pipeline cleansing, force main velocities at design pumping rates must maintain a minimum velocity of two feet (2') per second where variable frequency pumps and motors are installed, and 3.5 feet per second where constant speed pumps and motors are installed. Friction losses through force mains shall be determined by using the Hazen-Williams formula (C-factor = 120 for "Lined" DIP and 120 for PVC or HDPE pipe) in accordance with FDEP Rule 62.604.300(5)(g). With multiple Pump Station systems or phased development, this requirement shall be subject to UTILITIES review, and the system design shall show special attention regarding cleansing maintenance (pigging ports) before approval is granted.

WASTEWATER DESIGN, MATERIALS, INSTALLATION AND CONSTRUCTION

- .2 Branch Connections:
 - .a Branch connections shall be through forty-five (45) degree wye fittings and be provided with an isolation gate valve on the branch. The minimum allowable connection shall be no less than four inches (4") in diameter except for low-pressure systems, or vacuum systems, which shall have a minimum size of two inches (2") in diameter or such other size as specified by the EOR and approved by UTILITIES.
 - .b Tapping sleeves are allowed upon approval by UTILITIES, where the receiving force main's cross sectional area is greater than four (4) times the proposed branch. Size on size live taps will be approved by UTILITIES on a case by case basis.
 - .c In-line gate valves shall be installed up stream of all branch connections for new work or where fittings are being installed in addition to the branch gate valve. In cases where an up stream in-line valve exists within one hundred feet (100') of a branch fitting, an in-line valve at the branch fitting can be eliminated.
- .3 Clean-out fittings and isolation valves shall be installed on the force main at locations susceptible to sedimentation and clogging. The clean-out access valve shall be of the gate type and can be one size smaller than the force main. The clean-out assembly shall be fully restrained and have a removable cap or plug on the clean-out access.
- .4 When connecting a force main to a manhole, the discharge shall be directed toward the outlet side of the manhole. The discharge end of the line shall be placed to match the crown of the receiving gravity line. The last section of the force main shall rise at least one pipe diameter to avoid draining when the pumps are off.
- .5 Where a discharge is to a manhole, the manhole and next downstream manhole shall be lined with an approved corrosive resistant material per Section 13.13 of this CODE.
- .6 No force main discharges directly into a Lift Station wet well shall be allowed, unless approved by UTILITIES.
- .7 Air release valves shall be provided per FDEP Rule 62.604.

13.13 MATERIALS

- .1 MANHOLES
 - .a Manholes shall be in accordance with ASTM-C478 latest revision, Precast Reinforced Concrete Manhole Sections. The minimum allowable wall thickness shall be six inches (6"). Contractor shall provide UTILITIES a one (1) year unconditional warranty on all materials and installation. Warranty shall include complete replacement and delivery to the site with installation of same to replace defective materials and workmanship.

WASTEWATER DESIGN, MATERIALS, INSTALLATION AND CONSTRUCTION

- b Concrete for base, sections, and top shall be Type II cement with a minimum twenty-eight (28) day compressive strength of four thousand (4000) psig at twenty-eight (28) days. Tests, when required, shall be in accordance with ASTM-C497.
- .c The bases shall be of monolithic cast and consist of a manhole bottom with minimum thickness of six inches (6") and a wall which shall extend a minimum of six inches (6") above the top of the in-flowing sewer
 - .1 Manhole base inverts, channel and benches shall be pre-cast concrete integrally or post cast with the manhole base at the pre-cast manufacturer's facilities. Manhole bases shall be constructed specifically for each manhole. The manhole bottom thickness shall be a minimum of six inches (6") at the invert of the lowest out-flowing sewer. The outlet and inlet holes shall be molded or cored to the size that will accommodate the flexible pipe-to-manhole connectors (neoprene boots or equal).
 - .2 For field repair, manhole base inverts may be of a secondary pour masonry construction to provide for formed invert and bench wall having a minimum distance of four inches (4") between the invert of the lowest out-flowing sewer and floor of the precast base.
 - .3 All inverts shall be smooth and semicircular, "U" in shape following the grades of the pipe entering the manholes. Channel height shall be a minimum sixty percent (60%) of the connecting sewer. Channels shall be shaped and constructed to allow easy placement of television inspection and maintenance equipment. Bench walls shall be pitched a minimum of one inch (1") per foot from the inside periphery of the manhole to the edge of the flow channel.
- .d Lift holes shall be non-penetrating and cast in a manhole exterior side walls. A minimum of two (2) lifting points shall be supplied for each section.
- .e Pre-cast manhole section joints shall be tongue and groove and shall be sealed, continuous "squeeze-out" on each side, with a pre-formed gasket or plastic joint sealer, meeting the Federal Specification SS-S-00210; "Butyl-Lok" as manufactured by A-Lok products, Inc., Tullytown, PA; "RAM NEK" as manufactured by K.T. Snyder Co., Henry Sealants Division, Houston, TX, or "O" Ring rubber gasket, conforming to ASTM C433, shall be allowed, Any deviations must be approved by the EOR, UTILITIES and/or Utility provider.
- .f All outside joints shall be sealed with elastomastic based external concrete joint wrap. The wrap shall be a minimum width of six inches (6"); "Butyl-Lok" as manufactured by A-Lok products, Inc., Tullytown, PA; "RUB-R-NEK" as manufactured by K.T. Snyder Co., Henry Sealants Division, Houston, TX, E-Z Wrap, or approved equal.

WASTEWATER DESIGN, MATERIALS, INSTALLATION AND CONSTRUCTION

- .g Connections between reinforced concrete manholes and sewer pipe (gravity and force main) shall be by use of flexible connections (neoprene boot, etc.) conforming to ASTM C923, latest revision.
 - .1 Materials:

The Neoprene-EPDM materials the connector is manufactured from shall conform to ASTM C923 and shall be a minimum of 3/8 inch (9.4 mm) thick or greater. The materials shall be resistant to ozone, weathering, aging and chemicals, including acids, alkalis, animal and vegetable fats, oils and petroleum products.

.2 Bands:

The stainless steel band and screw assembly shall be a totally non-magnetic series 304 stainless steel.

.3 Connector:

The connector shall be of a size specifically designed to the specified pipe material and size. The connector shall be installed in the manhole wall by the precast manufacturer in strict accordance with the recommendations of the connector manufacturer. During the invert construction stage, the interior annular space between the exterior of the pipe and the interior of the connector shall be filled with a Type II lean cement grout by the Contractor.

.2 MANHOLE SURFACE PROTECTION

- .a Exterior coatings shall be factory applied with three (3) coats of an acrylic polymer-base concrete coating. Acceptable coating is ConSeal CS-55, colors gray or black, as manufactured by Concrete Sealants, New Carlisle, Ohio or equal. The total dry film thickness shall be 3.5 mils. Coating shall be applied to the tongue and groove area of the manhole segments. The coating manufacturer and applicator shall inspect and certify all coatings prior to leaving the pre-caster facility.
- .b Interior coatings other than non-corrosive liners shall be protected with three (3) coats of an acrylic polymer-base concrete coating. Acceptable coatings are ConSeal CS-55 **color gray** as manufactured by Concrete Sealants New Carlisle, Ohio, or equal. The total dry film thickness shall be 3.5 mils. Field application of the coatings for precast units is not acceptable. The coating applicator shall inspect and certify all coatings prior to leaving the precast plant.
- .c Manhole liners are required for intercept manholes located outside of lift stations, manholes accepting force main discharges (including the manhole immediately downstream), and certain drop manholes (as defined in Section 13.8). Additional manhole structures may require protection (liners) from abrasion, acids, chemicals and corrosion attack, prevent infiltration, and where the EOR anticipates the release of hydrogen sulfide gases, or as designated by UTILITIES.

WASTEWATER DESIGN, MATERIALS, INSTALLATION AND CONSTRUCTION

- .1 All manholes non-corrosive protective liners shall be resistant to the chemical environment normally found in gravity wastewater systems. The protective liner placement shall include the manhole top or cone, riser(s) and base sections, and be installed during pre-casting operations in accordance with the liner manufacturer's specifications.
- Liners shall be supplied by one of the following listed manufacturers unless otherwise approved.
 SewperCoat as manufactured by Kernoes Inc., Chesapeake, Va.
 Spray Wall as manufactured by SprayRoq Protective Lining Systems, Birmingham, Al.
 Raven 405 as manufactured by Raven Lining Systems, Tulsa, Ok.
- .3 The approved liner shall be in lengths and nominal inside diameters corresponding to the precast concrete manhole sections. Thickness and anchoring shall be adequate to resist pressures from thirty feet (30') of depth of water between concrete and liner, handling stresses, vertical and horizontal movement due to temperature changes, "drying" shrinkage of concrete and/or uneven settlement of the manhole.
- .4 The approved liner shall be a non-load bearing component installed and adequately anchored inside the new precast concrete manhole section during the precasting process at the manufacturer's facility. The liner must be fully supported during the casting process. The inside liner surfaces shall be free of bulges, dents, and other defects that result in a variation of inside diameter of more than one-half inch (1/2") or thirteen (13) mm. The precast concrete manhole section joint surfaces shall be parallel and free of excess concrete at external and internal joints to insure the proper seal of the structure sections and liner.
- .5 During field assembly and installation of lined precast manhole sections, all internal seams are to be sealed per the liner manufacture's standard specifications and methods to include the use of approved pre-formed gasket or plastic joint sealer(s).
- .6 Interior surfaces of the liner shall be completely free of pinholes, cracks, pits, or defects, which are detrimental to the intended purpose or use of the liner. No liner shall have holes or openings, which permit the passage of liquid or gases through the liner wall to precast concrete surfaces. There shall be no exposed concrete mortar through inside liner surfaces to include (but not limited to) pipe penetrations, precast sections, joints, or cast iron comer ring joints. All mechanical anchor attachments through liner surfaces must be sealed with an elastomeric sealant approved by the liner manufacturer.

WASTEWATER DESIGN, MATERIALS, INSTALLATION AND CONSTRUCTION

.3 MANHOLE FRAMES AND COVERS

Manhole frames and covers shall be water tight, having O-ring seals, non-penetrating pick holes, and a traffic load rating of H-20. The frame and cover shall be manufactured by U.S. Foundry model number 170-CE-ORS, or approved equal. The manhole cover shall be stamped "Sanitary Sewer" in the middle as shown in the UTILITIES Standard Details. In potential high in-flow areas or areas where industrial waste in-flow or improper disposal may occur, special service manhole frame and covers may be required.

.4 MANHOLE FRAME ADJUSTMENT

- .a Manhole ring and cover height adjustment shall be accomplished by using precast concrete adjusting rings (4000 psi minimum, Type II cement), or nonmetallic adjustment rings (the minimum height of the rings shall be two inches (2"). Maximum height adjustment is shall not exceed twelve inches (12").
- .b Adjusting rings shall be clean and laid in a full bed of mortar or synthetic compound per the manufacturer's instructions without requiring subsequent grouting. The outside faces of adjusting rings shall be plastered with mortar and internally joined with applied flexible non cementitious material Flex-Seal, or approved equal.

.5 PVC GRAVITY PIPING AND FITTINGS

.a Pipe for gravity sewage lines shall be polyvinyl chloride (PVC) as shown on the drawings and as herein specified. Pipe to be installed underground shall be PVC push-on joint type. The "depth of cut" shall be defined as the vertical distance from pipe invert to finish grade. Pipe and fittings sizes and applications shall conform to the following chart.

Pipe and Fittings	Pipe Size	Joint Type	Acceptable Bury Depths	Application
PVC DR 14	6 inches and larger	Push- on joint	Any depth	Gravity mains and laterals and jack and bore carrier pipe in R/W and easements
PVC SDR 26	6 inches and larger	Push- on joint	Any depth	Gravity mains and laterals in R/W and easements

.b PVC 1120, Class 160, SDR 26 Pipe:

Pipe shall conform to ASTM D3034 for sizes four inch (4") through fifteen inch (15") diameter pipe and ASTM F679 for eighteen inch (18") through thirty-six inch (36") diameter pipe. The pipe material shall be clean, virgin, National Sanitation Foundation approved, Class 12454-B PVC compound conforming to ASTM resin specification D1784 with wall thickness T-1. Pipe shall have a bell type coupling with a thickened wall section integral with the pipe barrel in accordance with ASTM D3212. Elastomeric seals shall meet ASTM F477 or ASTM F913. The pipe shall be designed to pass without failure a sustained

WASTEWATER DESIGN, MATERIALS, INSTALLATION AND CONSTRUCTION

pressure test of 340 psi in conformance with ASTM D1598 and a quick burst test of 400 psi in conformance with ASTM D1599.

.c Piping materials used at conflict points shall follow specifications as shown in section 6.12 of this CODE.

.6 WASTEWATER FORCE MAIN PIPING

- .a PVC pipe of four inches (4") to twelve inches (12") in diameter shall conform to the requirements of AWWA Standard C900, DR 25, with a working pressure rating of one hundred (100) psig. The pipe shall have the same OD as ductile iron pipe. For conflicts use C900, DR 14 with a working pressure rating of two hundred (200) psig. Pipe shall be color-coded green. Elastomeric seals shall meet ASTM F477.
- .b PVC pipe diameters of fourteen inches (14") and greater in diameter shall conform to the requirements of AWWA Standard C905, DR 25, with a working pressure rating of one hundred sixty-five (165) psig. The pipe shall have the same OD as ductile iron pipe. For conflicts use C905, DR 18 with a working pressure rating of two hundred thirty-five (235) psig. Pipe shall be color-coded green. Elastomeric seals shall meet ASTM F477.
- .c PVC pipe two inches (2") and three inches (3") in diameter shall conform to the requirements of ASTM D2241, Class 1120, or 1220 (SDR 21) with a working pressure rating of two hundred (200) psig with integral bell gasketed joints. Pipe shall be color-coded green.
- .d POLYETHLENE PRESSURE PIPE (PE), FOUR INCHES (4") IN DIAMETER AND LARGER (HDPE): HDPE pipe shall be color-coded green or with green stripes running along the pipe at no more than ninety (90) degree intervals and conform to the requirements of ASTM F-714 and AWWA Standard C906, DR 11, with a working pressure rating of one hundred-sixty (160) psig. HDPE pipe shall have the same OD as ductile iron pipe size (DIPS). See Section 10 of the CODE for material specification requirements.
- .e DUCTILE IRON PIPE (DIP): use of DIP is discouraged and requires the approval of UTILITIES. DIP, when approved, shall conform to the requirements of AWWA/ANSI C151/A21.51, minimum thickness Class 51. DIP shall be provided with a special interior lining of a corrosion resistant material meeting Calcium Aluminate Cement Mortar similar to SewperCoatTM, Amine Cured Novalac Epoxy, Protecto 401TM or a Polyethylene Epoxy composite. Coating materials must be approved on a case by case basis. The exterior of the pipe shall have a minimum of one (1) mil. thickness of coal tar enamel seal coat unless otherwise specified.
- .f RESTRAINED JOINT DIP: All ductile iron pipe shall be "TR FLEX" as manufactured by US Pipe and Foundry, "LOK-FAST" or "LOK-RING" as manufactured by American Cast Iron Pipe ,or approved equal.

WASTEWATER DESIGN, MATERIALS, INSTALLATION AND CONSTRUCTION

.7 FITTINGS:

- .a MECHANICAL JOINT (MJ) FITTINGS for PVC and DIP shall be ductile iron meeting AWWA C110 or C153, with a minimum pressure rating of three hundred-fifty (350) psig up to forty-eight inches (48"), and shall conform to the requirements of ANSI Standard A21.51. The coating and lining for fittings shall be as specified herein for ductile iron pipe.
- .b FLANGED JOINT FITTINGS shall conform to ANSI/AWWA Standard C110/A21.10 with a minimum pressure rating of two hundred-fifty (250) psig and shall conform to the requirements of ANSI Standard A21.51. The coating and lining for fittings shall be as specified herein for ductile iron pipe. Flanged joint pipe shall be joined utilizing stainless steel nuts and bolts.

.8 RESTRAINTS

- .a RESTRAINTS FOR DIP or PVC BELL AND SPIGOT JOINTS shall be UL listed and/or FM approved. Restraints shall be EBBA Iron Series 1100, 1600, 2000, 2800, Star Pipe Products, Inc., Series 1100, 1200, Sigma Corporation Series SLD/SLDE, SLC/SLCE and PVP/PWP, or Ford-Uni-Flange, Series 1300. Field-Loc or Fast Grip type gaskets shall be UL listed and/or FM approved and will be considered on a case by case basis as approved by UTILITIES.
- b RESTRAINTS FOR MECHANICAL JOINTS shall be UL listed and/or FM approved and be designed to be used to restrain PVC or ductile iron pipe to mechanical joint valves and fittings. These retainer glands shall be manufactured of ductile iron per ASTM A536. Twist-off torque limiting nuts shall be used to insure proper actuating of the restraining devices. The restraining devices shall be designed with a 2:1 ratio factor of safety with regard to pressure rating and shall be "MEGALUG" Series 1100, 2000 as manufactured by EBBA Iron Inc., Stargrip 3000, Allgrip Series 3600 as manufactured by Star Pipe Products, Inc., Ford Uni-Flange Series 1300, 1400, 1500, Sigma Corporation Series SLD/SLDE and SLC/SLCE, or approved equal. Setscrews will not be permitted on PVC pipe.
- .c RESTRAINING PLAIN END PIPE, flange adapter shall be MEGAFLANGE 2100 series as manufactured by EBBA Iron Inc., Ford Uni-Flange Series 900, Sigma Corporation Series Sigma Flange Adapter, or approved equal. Setscrews will not be permitted on PVC pipe.
- .d RESTRAINING RODS for piping greater than three inches (3") in diameter shall be a minimum of three-fourth inch (3/4") in diameter and shall be stainless steel. Manufacturer's couplings shall be used when rods are being coupled. For each twenty-two thousand (22,000) pound thrust, one (1) pair of three-fourth inch (3/4") restraining rods shall be used.
- .9 EXTERNAL CORROSION PROTECTION: DIP force mains, when required, shall be

WASTEWATER DESIGN, MATERIALS, INSTALLATION AND CONSTRUCTION

encased with a polyethylene tube in areas that are indicated on the drawings, or where corrosive soils are encountered, or as determined by the Engineer. The polyethylene tube shall have a minimum thickness of 0.008 inches (8 mil), green in color, and meet the requirements of AWWA/ANSI Standard C105/A21.5.

.10 VALVES (GENERAL): The following items should be clearly marked on each valve: manufacturer, year manufactured, style, design, size, rating, and flow direction arrow, if applicable. Valves shall open left (counter clockwise). When fully open, the valve shall have a clear waterway equal to the inside diameter of the pipe.

Buried valves shall have a two inch (2") square operating nut. Valve stem extensions shall be used when necessary to maintain eighteen inches (18") to thirty-six inches (36") in depth to the top of the operating nut. Valve stem extensions shall be secured to the operating nut for the valve by stainless steel set screw and have centering ring. Where multiple extensions may be used the extensions shall be secured together by pins or stainless steel bolts and nuts installed completely through the assembly.

.a RESILIENT WEDGE GATE VALVES two inches (2") and larger shall conform to the requirements of AWWA C509 or C-515, be UL and FM approved, with a working pressure rating of two hundred-fifty (250) psig. The valve shall have a cast iron or ductile iron body, O-ring seals, and factory applied epoxy coated interior and exterior conforming to the requirements of AWWA C550. Valves shall be factory tested for zero leakage past the seal at two hundred-fifty (250) psig. Valves over eighteen inches (18") shall have Bevel Gearing.

.b PLUG VALVES (UTILITIES APPROVAL IS REQUIRED)

- .1 Plug valves four inches (4") and larger shall be of the non-lubricated, resilient seated, eccentric type with Buna "N" neoprene, epoxy, or fusion bonded, nylon faced plugs. They shall have round or rectangular ports with a flow area not less than eighty percent (80%) of the connecting pipe for plug valves twenty inches (20") or less and seventy-five percent (75%) of the connecting pipe size for plug valves twenty-four inches (24") and greater. For wastewater force main applications valves shall be installed with the seat facing the direction of flow of solids (seat on upstream side).
- .2 Drip tight shut-off shall be provided at full rated working pressure in the standard flow direction and twenty-five (25) psig in reverse flow. Valve pressure rating shall be one hundred seventy-five (175) psig through twelve inch (12") and one hundred-fifty (150) psig for valves fourteen inches (14") and larger. Valve body seats shall be ninety percent (90%) pure welded nickel. Plug facing shall be neoprene or hycar suitable for use with wastewater.
- .3 Valves shall have permanently lubricated type 316 stainless steel upper and lower bearings. Valve shaft seals shall be of the multiple V-ring or U-cup type and shall be adjustable and repackable without removing the

WASTEWATER DESIGN, MATERIALS, INSTALLATION AND CONSTRUCTION

valve from service.

- .4 Valves shall be equipped with actuating nuts, cast iron handwheel, chainwheel, or lever handles. Buried valves six inches (6") and smaller shall be furnished with two inch (2") operating nuts. All plug valves eight inches (8") and larger shall be furnished with worm gear operators sized for a minimum of seventy five (75) psig reverse flow pressure. Valves shall be as manufactured by Dezurik Corp., Val-Matic, Inc., McWane, Inc., (Clow, M&H, Kennedy) or approved equal.
- .5 Interior and exterior coating of all valves shall be two (2) part thermosetting epoxy per AWWA C550 standard.

.c CHECK VALVES

- .1 Check valves two inches (2") and smaller shall be all bronze, designed for screwed fittings, and conform to AWWA-C508, as suitable for the application. In low pressure or grinder pump station-applications PVC or CPVC ball type check valves with suitable clearance for solids may be used if installed with unions for ease of maintenance or replacement.
- .2 Check valves larger than two inches (2") shall be iron body and bronze mounted conforming to AWWA C508. Flanged valves shall not be buried; an approved pit shall be provided. Flanges shall conform to ANSI B16.1.
- .3 Check valves shall be iron body, bronze mounted, stainless steel hinge pin, outside lever, and weight, spring/lever weight operated, or internal swing type with straightaway passageway of full pipe area non-slam type, equipped with removable inspection covers. Valves shall be rated for one hundred-fifty (150) psig minimum working pressure and shall permit full flow area equal to that of the connecting pipe.
- .4 Interior and exterior coating of all valves larger than two inch (2") shall be two (2) part thermosetting epoxy per AWWA C550 standard.

.d WASTEWATER AIR RELEASE VALVES

- .1 Valves shall be specially designed for raw wastewater service, sized for the application and flow conditions, and capable of operating at one hundred-fifty (150) psig working pressure. ARI model D-025, with no substitutes.
- .2 Valves shall have a minimum two inch (2") inlet and shall be of a type that will release air automatically under operating conditions and pressures. Valves shall be funnel shaped lower body epoxy coated steel, or stainless steel with flushing valve. All internal parts shall be stainless steel or non-metallic material with high-velocity corrosion resistant self-

WASTEWATER DESIGN, MATERIALS, INSTALLATION AND CONSTRUCTION

cleaning air-release mechanism.

- .3 When an air release valve is placed in a vault, the cover shall include a fifty-three inch (53") lid with a twenty-four inch (24") inspection lid inside.
- .4 Automatic air/vacuum valves shall be used only where specified in the design and approved by the operating Utility and EOR.

.e TAPPING VALVES:

.1 General:

Tapping valves shall be iron body, bronze mounted, resilient wedge gate valves, non-rising stem, open left, resilient seat, and two inch (2") square operating nut. Tapping valves shall be furnished with the tapping flange having a raised face or lip designed to engage the corresponding recess in the tapping sleeve flange. The valve ends shall be mechanical joint for use with ductile iron pipe on one side and standard flanged (Class 125) on the other. Tapping valves eight inches (8") and smaller may be MJ by MJ valve ends to match sleeve (standard MJ gate valve). Valves shall conform to the applicable section of the CODE.

.11 TAPPING SLEEVES for line sizes twenty-four inches (24") or less shall be a full wrap stainless steel. Sizes larger than twenty-four inches (24") shall be prefabricated steel, epoxy coated, with stainless steel bolts. Test ports shall be supplied on all sleeves or as specified by the Utility. Size on size tapping sleeves shall be cast iron, mechanical joint, split housing, tapping sleeve, Mueller H615, or pre-approved equal.

Acceptable materials are as follows:

.a Stainless steel tapping sleeves for tapping mains up to twenty-four inches (24") in diameter shall be passivated, full wrap around design with full gasket. Stainless steel tapping sleeves shall be rated for one hundred-fifty (150) psig minimum operating pressure and two hundred (200) psig minimum test pressure and shall be furnished with:

Sleeve Shell - 304 Stainless Steel, Lugs, Nuts, Bolts - 304 Stainless Steel drop in bolt style, Washers - 304 Stainless Steel, Flange Gasket - Glued to flange face, Flange - 304 Stainless Steel, Flange, Nuts, bolts – 304 Stainless Steel, Seal Gasket - Full circumference and full length, SBR rubber or similar material Test Plug - 304 Stainless Steel, 3/4 inch NPT.

.b Epoxy-Coated Steel for tapping mains larger than twenty-four inches (24") in diameter shall be rated at two hundred (200) psig minimum operating pressure

WASTEWATER DESIGN, MATERIALS, INSTALLATION AND CONSTRUCTION

and shall be furnished with:

Body - Heavy welded steel, full support body not strapped. Epoxy Coating – Epoxy resin, free of voids, lamination, or blisters, dry film thickness of 8-10 mils. Bolts and Nuts - 304 Stainless Steel, Flange - Steel flat face with gasket, Flange – Nuts & bolts – 304 Stainless Steel, Test Plug - 304 Stainless Steel, 3/4 inch NPT, Seal Gasket - Water service Buna N.

.c Mechanical joint tapping sleeves shall be furnished with:

Body - Cast Iron (Mueller H615 or equal), Flange - Flat face with gasket, Flange – Nuts & bolts – 304 Stainless Steel, Body Bolts and Gasket - Furnished by sleeve manufacturer.

.12 VALVE BOXES

GENERAL: Valve boxes shall be provided for all buried valves which have no gearing or operating mechanism, or in which the operating mechanism is permanently lubricated and designed for buried service. The valve box shall not transmit shock or stress to the valve and shall be centered and plumb over the operating nut of the valve, with the valve box cover flush with the surface of the finished grade or pavement. Cover shall be marked "Sewer" and be painted green.

- .a Valve boxes shall be cast iron adjustable screw type supplied with a twelve pound (12 lb) cover and a minimum of three-sixteenth inch (3/16") wall thickness. Valve boxes shall be supplied by the manufacturer in such lengths as can be adapted, without full extension, to a depth of cover required over the pipe at the valve location.
- .b Valve stem extensions with centering ring shall be furnished to maintain between eighteen inches (18") and thirty-six inches (36") to the top of the operating nut. The stem extension shall be secured to the operating nut for the valve by a stainless steel set screw.
- .c Portland cement concrete valve pads shall be supplied for all valves located outside of paved areas. Valve pads shall be twenty-four inches (24") square by six inches (6") thick with four (4), No. 4 reinforcing bars. Pre-cast concrete valve pads meeting the above requirements will be allowed with the approval of the operating Utility.
- .d Valve pads for in line valves shall have a three inch (3") brass nameplate securely embedded into the pad. Etched in the nameplate shall be the year of valve manufacture, size of the valve, the number of turns necessary to open or close the valve, and an arrow indicating the direction of flow.

WASTEWATER DESIGN, MATERIALS, INSTALLATION AND CONSTRUCTION

13.14 INSTALLATION OF WASTEWATER SYSTEMS

.1 GENERAL

See related Sections seven (7) through eleven (11) for general requirements.

.2 HANDLING AND STORAGE OF MATERIAL

- .a Pipe shall be handled in accordance with the manufacturer's recommendations and shall not be stacked higher than four feet (4'). Suitable racks, chairs, and other supports shall be provided to protect preformed pipe matting surfaces from damage; bottom tiers shall be off the ground, and alternate tiers and chock tier. Every care shall be taken in handling and laying pipe and fittings to avoid damaging the pipe, scratching or marring machined surfaces, and abrasion of the pipe coating. The lined pipe and fittings must be handled only from the outside of the pipe and fittings. No forks, chains, straps, hooks, etc. shall be placed inside the pipe and fittings for lifting, positioning, or laying. If damaged, the material shall be repaired in accordance with the liner manufacturer's recommendations, as approved by UTILITIES. Any fitting showing a crack and any fitting or pipe which has received a severe blow that may have caused an incipient fracture shall be marked as rejected and removed at once from the work.
- .b Unless the piping will be installed within two (2) weeks of delivery, all PVC piping and other materials subject to ultraviolet or ozone attack, shall be protected from the sunlight, atmosphere, and weather. The piping and materials shall be stored in suitable enclosures or under appropriate protective wrapping until ready for installation. PVC pipe manufactured more than eighteen (18) months before installation shall not be installed and shall be rejected and removed from the installation site.

.3 PIPE AND FITTING INSTALLATION

- .a Prior to installation, all pipes and fittings shall be inspected, and all materials found to be defective shall be removed from the site.
- .b The interior of pipe, fittings, valves, and accessories shall be thoroughly cleaned of foreign matter before being lowered into the trench. All pipes shall be kept clean during laying operations, and shall be securely plugged watertight when construction stops overnight or for an extended period of time.
- .c Pipe shall be installed with a minimum of thirty-six inches (36") of cover unless otherwise directed by the EOR and/or approved by UTILITIES.
- .d Cutting and installation of pipe, fittings, valves, and accessories shall be performed using the recommendations of the manufacturer and in accordance with the best trade practices. Care shall be taken to not injure the material

WASTEWATER DESIGN, MATERIALS, INSTALLATION AND CONSTRUCTION

coatings or linings. Damage to linings shall be cause for rejection of the complete section of pipe, fittings or valves. Damage to exterior coatings shall be corrected to original specifications.

.e To prevent infiltration/inflow and mud and debris from entering the existing wastewater system, the downstream side of existing manholes where gravity lines are to be extended, shall be securely plugged until completion of construction and testing. If mud and debris enter the existing wastewater system, including lift stations, the Contractor shall be required to clean that part of the existing system to the requirements of the operating utility.

.4 CONNECTIONS TO EXISTING MAINS

- .a Dissimilar pipe connections:
 - .1 On pressure mains, solid sleeves shall be used for joining plain end pipe sections and for joining pipes of dissimilar materials. The sleeves shall conform to AWWA Standard C110 or C153 and be a long pattern type.
 - .2 Transition connections between alternate materials shall be made using manufactured couplings that are ridged and non-shearing.
- .b Where connections are made between new work and existing mains, the connections shall be made by using specials and fittings to suit the actual conditions, and shall be restrained with approved materials. The connection shall be made in a dry trench in a neat and clean manner.
- .c Where connections are made between new work and existing mains, a minimum of five (5) working days notification shall be given to UTILITIES. The Contractor shall coordinate with UTILITIES inspector, referencing the time, date, and duration of the proposed work.
- .d Lift stations and valves on existing mains, including new valves tied to existing systems, shall be operated by the serving Utility personnel or under direct supervision of UTILITIES.
- .e Prior to the planned work the Contractor shall have as much material preassembled as possible in order to minimize the length of service interruption. If preparations are not ready UTILITIES will postpone the work and have the contractor reschedule the work for a later time.

.5 WET (LIVE) TAPS

The Contractor shall make the tap while the line is in service by using a tapping sleeve or tapping saddle, as specified herein. The tapping of the main shall be done using standard tapping techniques as approved by UTILITIES. The force mains shall be tapped in such a manner that the operation of the main in service is not disturbed.

WASTEWATER DESIGN, MATERIALS, INSTALLATION AND CONSTRUCTION

- .a The Contractor shall be responsible for scheduling and coordinating the work for each tap.
- .b Twenty-four (24) hours prior to making the tap, the Contractor shall pour the concrete sleeve and valve support. The Contractor shall assemble all materials and have sufficient supervision, labor, tools, and materials necessary to make the tap.
- .c Prior to the tap, the Contractor shall pressure test the tapping sleeve and valve installation under supervision of UTILITIES inspector and/or the EOR. The Contractor shall notify UTILITIES, the EOR and the serving Utility forty-eight (48) hours prior to the test. The Contractor shall be responsible for properly backfilling and compacting the work area pit after the work is completed.
- .d Hydrostatic and Leakage Test:

Sleeves shall be provided with a test plug. After installing a tapping sleeve and valve, and prior to tapping of a pressurized force main, a hydrostatic and leakage test shall be performed. The test will be conducted by introducing water into a tap or test hole located at the neck of the outlet half of the sleeve, furnished with said tap, and with the tapping valve in the closed position. The sleeve and valve shall be capable of maintaining a test pressure of one hundred-fifty (150) psi for thirty (30) minutes duration with valve in the open position and plugged, with no sign of visible leaks. All leaks shall be repaired by removing and replacing defective items with items free of defects, after which the sleeve and valve shall be retested. Such repair and retesting shall be done until the installation passes the specified test. The Contractor shall furnish and install any necessary temporary restraints, gauges, pumps and other incidental and appurtenant items necessary to complete this work, and shall remove same upon completion of the test hole.

13.15 LOW PRESSURE AND VACUUM SYSTEMS

- .1 It is not the County's policy to utilize low-pressure or alternative wastewater collection (vacuum) systems as a replacement for conventional gravity sewer systems. However, as a means to provide service to an individual lot or a small group of buildings or a developed area being retrofitted and where conventional gravity service cannot be utilized within reason, UTILITIES will allow the use of a low-pressure and/or wastewater vacuum system subject the provisions of this sub-section 13.15 and providing the EOR can show reasonable justification for its use.
- .2 Plans and specifications for alternative (low-pressure, vacuum) wastewater systems shall be submitted to UTILITIES for review and approval. A utility permit shall be secured for each alternative (low-pressure, vacuum) wastewater installation or installation grouping. Approval of low-pressure and/or vacuum wastewater systems as an alternative to conventional wastewater systems shall be in accordance with the conditions listed in (.3)

WASTEWATER DESIGN, MATERIALS, INSTALLATION AND CONSTRUCTION

below, unless other special circumstances justifying their use are affirmatively demonstrated.

.3 CONDITIONS OF APPROVAL

- .a Where build-out has left small parcels of property in precarious locations in relation to the lay of the land or existing infrastructure conditions physically or economically justify a need for alternative systems.
- .b Shallow bedrock.
- .c Unstable soil conditions.
- .d Temporary use, until gravity system construction is completed.
- .e Distant locations from existing gravity sewers.
- .f The use of an alternative (low-pressure, vacuum) wastewater collection system may be evaluated in areas of high built-out, narrow right-of-way, excessive utility congestion, high-water tables, and/or areas where road networks are relatively new or recently resurfaced.
- .4 It will be the responsibility of the applicant to evaluate all potential alternative wastewater collection systems, and justify the selection of the low-pressure sewer system based on engineering and surrounding conditions.
- .5 Based on the information furnished by the applicant, the Engineer and UTILITIES will decide the acceptability, scope, and extent of the low-pressure sewer system to be permitted.
- .6 Low-Pressure Wastewater Systems (County Owned)
 - .a Low-pressure wastewater systems shall be designed to include a fiberglass pump pit, containing the low-pressure pumping unit and accessories, including a three (3) float system, float bracket/cable holder, a fifty foot (50') power/float switch cable, Simplex control panel, and preplumbed pit complete with a 1-1/2-inch PVC ball valve and check valve. The Simplex control panel must be installed on the building, in an area accessible to the County's Operations staff, no more than forty feet (40') from the pump pit. The Simplex control panel requires a 230-volt 60-hz single-phase service in the home's electrical panel. The pump pit shall include sufficient concrete cast-in-place to provide ballast to prevent the structure from floating. The pit shall be set level and plumb, and to proper grade matching the surrounding ground elevation.
 - .b The Contractor (or plumber) shall install the gravity line from the house to the pump pit. Connection of the four inch (4") PVC gravity line to the pit shall be made with a four inch (4") grommet. The Contractor (or plumber) shall cut a hole
WASTEWATER DESIGN, MATERIALS, INSTALLATION AND CONSTRUCTION

in the pump pit for the incoming four inch (4") gravity line using a five inch (5") hole saw, install the grommet, and make the final connection.

- .c Contractor (or plumber) shall install a one and one-half inch (1-1/2") HDPE force main from the pump in the pump pit to the street connection. A valve box with isolation valve (two inch (2") ball valve) shall be located at the right-of-way line prior to connecting into the low-pressure force main.
- .d As with all force main systems, the low pressure force main shall be properly designed in accordance with part 13.12 of this Section 13.
- .e Refer to Low-Pressure Wastewater System details in Sarasota County's Standard Details.
- .7 Vacuum Wastewater Systems:

Vacuum Wastewater Systems will be evaluated, reviewed, and approved by UTILITIES on a case-by-case basis.

13.16 TESTING

.1 This section covers testing procedures generally used in various areas of wastewater system construction.

Testing procedures for materials and wastewater system construction practices not covered by this CODE, such as materials, standards, or manufacturers specifications, and requirements for testing that are new to the industry, or any other testing standards that meet or exceed the specified requirements herein, may be considered upon submittal to UTILITIES for review and final approval.

All new, modified, or extended mains shall be cleaned and flushed to remove all sand and other foreign matter. The contractor shall be responsible for developing a flushing plan to be submitted to UTILITIES for approval prior to flushing. The Contractor shall dispose of all water used for flushing without causing a nuisance or property damage.

.2 PRE-TEST PROCEDURES

- .a Testing for any utility system within the unincorporated area of Sarasota County shall be conducted in the presence of, but not limited to, the EOR, a serving Utility representative (if not the County), the Contractor and UTILITIES.
- .b All persons required to be present for testing shall be notified by the Contractor a minimum of forty-eight (48) hours prior to the commencement of the test. Should any of the required persons not be properly informed, the test shall be rescheduled.
- .c Prior to commencing tests, all manhole installations shall be completed, including the installation of concrete inverts. Lines shall be clean and free of

WASTEWATER DESIGN, MATERIALS, INSTALLATION AND CONSTRUCTION

sand and all foreign matter. It is good practice for the Contractor to perform pretesting and assure line cleanliness prior to scheduling and conducting the official tests. Testing will be canceled if lines are found to be in unsuitable condition, and will need to be rescheduled after the lines have been cleaned.

- .d The Contractor shall, at Contractor's expense, furnish all the necessary labor, water, material, and/or any other items necessary to complete the required testing. Should any test fail, the test shall be repeated until such time that all test requirements have been successfully met.
- .e The Contractor shall insure, in advance of the actual testing, that all equipment such as pumps, gauges, air release valves, and main valves are in good working order. The lines being tested must be ready for use.

.3 TEST PROCEDURES, GRAVITY SYSTEMS

Testing shall be performed in the following sequence: deflection testing (mandrel), air testing, and television testing. Television testing shall be done only when all other tests and/or repairs have been completed.

.a DEFLECTION TESTING

- .1 Mandrel testing shall be performed in accordance with ASTM Standard D3034, latest revision. The mandrel size for testing eight inch (8") gravity sewer pipe shall be 7.37 inches. For all other gravity sewer pipe sizes, the mandrel size for testing shall be ninety-five percent (95%) of the inside diameter. Mandrel testing shall not take place less than thirty (30) days from the date the gravity system construction was completed, including backfilling and compaction, or as directed by UTILITIES.
- .2 The mandrel shall be pulled independently of the television camera. The company performing the deflection test shall furnish the proper size mandrel(s) and true ring(s) for testing the wastewater lines.
- .3 Ductile iron or clay lines are exempt from mandrel testing, but shall be visually tested by lamping, as directed by UTILITIES.
- .4 In County staff's review of record drawings, deviation from design slopes of a plus or minus ten percent (10%) shall be considered. No further deviations from design slopes, regardless of how slight, shall be considered.

.b WATER TIGHTNESS

- .1 Testing by means of a low pressure air test shall be performed on gravity sewer lines.
- .2 Manholes shall be visually inspected to ensure there are no visible leaks.

WASTEWATER DESIGN, MATERIALS, INSTALLATION AND CONSTRUCTION

Any restoration measures must be approved by UTILITIES.

.c INFILTRATION

The maximum allowable inflow rate shall be one hundred (100) gallons per inch of diameter per mile per day. The minimum test time shall be two (2) hours. Test conditions shall be specified by the EOR.

.d AIR TEST GRAVITY LINES AND SERVICES

The maximum pressure drop allowable shall be one (1) pound per square inch (psig); refer to TABLE 13.3 at end of section. The minimum initial test pressure shall be three and half (3 1/2) pounds per square inch (psig) except when testing in areas with high water tables. For every foot of groundwater above the springline of the pipe, increase the test pressure by 0.43 psig. Maximum test pressure shall be nine (9) psig, or not exceeding manufacturer's recommendations.

.e TELEVISION INSPECTION

- .1 Unless approved otherwise by Sarasota County, prior to T-V inspections, all manhole inverts must be built and roadways shall have base laid, primed and have density testing completed. Gravity sewer in easements shall have compacted backfill to final grade. For areas which require "Special Pavement", all base material shall be compacted ready for asphalt pavement prior to TV work.
- .2 Prior to the television inspection of the sanitary sewer line, the pipe to be tested shall be free of any dirt, sand or debris. If the sewer line is found to have dirt, sand or debris, the inspection shall be cancelled and will be rescheduled after the line has been thoroughly flushed and cleaned. The sewer line shall be introduced with water at the high point in the system in the presence of an authorized UTILITIES representative immediately prior to TV inspection. The television camera shall be used in an upstream direction only. The Contractor shall provide a temporary plug and/or by-pass pumping on sewers with active sewer service laterals, if deemed necessary by the UTILITIES representative to assure a quality TV inspection. If required by UTILITIES, the Contractor shall eliminate active flow in sewer laterals by shutting off the water supply service to the contributing house(s). Contractor shall comply with current Sarasota County water outage procedures for shutting off customers' water service. A full report, as to the condition of pipe, type, depth, location of services, length, type joint, and distance between manholes, etc., shall be furnished to the UTILITIES prior to the final acceptance of the main. In addition to the written report, A DVD of the TV inspection shall be provided to UTILITIES for review. Both the written report and the DVD shall identify each pipe run by street name and manhole numbers, and

WASTEWATER DESIGN, MATERIALS, INSTALLATION AND CONSTRUCTION

include the distance to each service wye from the reference manhole. The DVD shall become the property of Sarasota County. Any pipe found to have defects, including but not limited to, leaks, cracks, pipe deflection from external pressures, rolled or pinched gaskets, joint gaps (wider than 1 inch), or holding water greater than the following limits (a "dip") or otherwise defective shall be removed and replaced with new pipe.

A "dip" is defined as any standing water that is retained in a sanitary sewer main with a holding depth which is equal to or greater than the "maximum" depth as listed below. There shall not be more than a one inch (1") "dip" in the sewer main installed between manholes. The defective pipe sections or those- "dip"/sections over the allowable limit, shall be removed and replaced. Each run of pipe, between two manholes, shall be evaluated independently for compliance. Any "dip" which is greater than the "maximum" "dip" depths listed below is not acceptable and shall be removed and replaced. Regardless of the number of "dips" in the line section, if, in the opinion of the UTILITIES inspector, the number and/or location of the "dips" is believed to create an unacceptable operating condition, then the defective pipe section(s) shall be removed and replaced. Any deviation from these "dip" limitations must be approved by UTILITIES and the utility owner.

	Water Holding Depth (inches)					
Pipe Size	Maximum					
8 inch - 15 inch	1.00					
18 inch - 21 inch	2.00					
24 inch and greater	2.50					

The television inspection camera shall be specifically designed and .4 constructed for sewer line inspections, and shall be self-contained audiovisual system complete with winches, (power or mechanical) or be self propelled, with a minimum of five hundred feet (500') of cable, monitor, video tape recorder, and suitable measuring devices accurate to + 1.0%of the total length (e.g. accurate within 5.0 feet for five hundred feet (500') total length) to determine the position of the camera in the line being inspected at all times, and all necessary equipment for the successful completion of the video inspection. The video inspection system shall have the ability to superimpose the measured footage onto the monitor screen and be recorded visually by the video tape recorder. The camera shall be operative in one hundred (100%) percent humidity conditions and shall be capable of producing a full-color picture at a remote monitor. Lighting and camera quality shall be suitable to allow a clear, in-focus picture of a minimum of six linear feet (6 lf) of the entire inside periphery of the sewer pipe. The camera shall have a minimum resolution of three hundred-twenty (320) lines to ensure peak picture quality throughout all conditions encountered during the investigation, a

WASTEWATER DESIGN, MATERIALS, INSTALLATION AND CONSTRUCTION

variable intensity control of the lights and remote control adjustments for focus and iris shall be located at the monitoring station. The camera shall be equipped with a rotating head enabling a view of ninety (90) degrees to the axis to be inspected so that service connections can be properly inspected.

.5 The EOR shall provide to UTILITIES copies of the written and televised test results within thirty (30) working days from the date of testing or ten (10) days before final walkthrough, and shall certify such test.

.4 TEST PROCEDURES, FORCE MAINS

- .a The Contractor shall be responsible for conducting leakage and hydrostatic tests and shall perform all such tests at the completion of all force main systems work. All tests shall be in accordance with the requirements set forth herein. The hydrostatic and leakage tests shall be performed concurrently, after the installation of all restraints. Proper backfilling and compaction shall have been successfully completed prior to the tests.
- .b Before applying the test pressure, all air shall be expelled from the pipe. If necessary, threaded saddle taps shall be made at the points of higher elevation and then closed with brass plugs.
- .c Any faulty pipe fittings, valves, or other accessories, which permit leaks during testing, shall be replaced by the Contractor with sound material, and the test shall be repeated until specific requirements are met.
- .d Amounts of allowable leakage for testing shall be based on maximum sections of one thousand feet (1000') between valves or adequate plugs. The minimum test pressure shall be seventy-five (75) psig, or twice the working pressure, whichever is greater, as directed by the EOR. Test duration shall be two (2) hours and pressure shall not vary more than five (5) pounds plus or minus. Test criteria for force mains eight inches (8") or larger shall be determined by UTILITIES on a case by case basis.
- .e The allowable rate of leakage shall be less than the number of gallons per hour, determined by the following formula:

TABLE 13.2

WASTEWATER DESIGN, MATERIALS, INSTALLATION AND CONSTRUCTION

Where

$$L = \frac{SD\sqrt{P}}{133,200}$$
Where

$$L = \text{allowable leakage, in gallons per hour.}$$

$$S = \text{length of pipe tested, in feet.}$$

$$D = \text{nominal diameter of the pipe, in inches.}$$

$$P = \text{average test pressure maintained during the test, in pounds per square inch gauge.}$$
The test pressure shall be seventy-five (75) psig or twice the system design pressure, whichever is greater. For longer force mains, the maximum length of one thousand feet (1000') shall be used for leakage calculations or sections between valves.}

TABLE 13.3

FROM THE UNI-BELL HANDBOOK OF PVC PIPE SPECIFICATION TIME REQUIRED FOR A 1.0 PRESSURE DROP FOR SIZE AND LENGTH OF PIPE INDICATED The following table shall be used for PVC and DIP:

	1	2	3	4	Specification time for length (L) shown (min:sec)										
	Pipe Diameter (inches)	Minimum Time (Min:Sec)	Length for Minimum (Feet)	Time for Longer (Seconds)		100 ft	. 150 ft.	200 ft.	250 ft.	300 ft.	350 ft.	400 ft.	450 ft.		
-	4 6 8 10 12 15 18 21 24 27 30 33 36	3.46 5.40 7.34 9.26 11.20 14.10 17.00 19.50 22.40 25.30 28.20 31.10 34.00	597 398 298 239 199 159 133 114 99 88 80 72 66	0.380 0.854 1.520 2.374 3.418 5.342 7.692 10.470 13.674 17.306 21.366 25.852 30.768	L L L L L L L L L L L L	3.46 5.40 7.34 9.26 11.20 14.10 17.00 19.50 22.47 28.51 35.37 43.05 51.17	3.46 5.40 7.34 9.26 11.20 14.10 19.13 26.10 34.11 43.16 53.25 64.38 76.55	3.46 5.40 7.34 9.26 11.24 17.48 25.38 34.54 45.34 57.41 71.13 86.10 102.34	3.46 5.40 7.34 9.53 14.15 22.15 32.03 43.37 56.58 72.07 89.02 107.43 128.12	3.46 5.40 7.36 11.52 17.05 26.42 38.27 52.21 68.22 86.32 106.50 129.16 153.50	3.46 5.40 8.52 13.51 19.56 31.09 44.52 61.00 79.46 100.57 124.38 150.43 179.29	3.46 5.42 10.08 15.49 22.47 35.36 51.16 69.48 91.10 115.22 142.26 172.21 205.07	3.46 6.24 11.24 17.48 25.38 40.04 57.41 78.31 102.33 129.48 160.15 193.53 230.46		
a)	 a). For pipe lengths greater than four hundred fifty feet (450') but less than length in column 3, use minimum time in column 2. 						Example: Determine test time for four hundred twenty-five feet (425') of twelve inch (12") PVC.								
b	b) For pipe lengths greater than four hundred fifty feet (450') and greater than length in column 3, subtract length in column 3 from actual pipe length, then multiply difference by time in column 4 and add to time in column 2.						Convert min:sec to seconds (min. X 60) + sec: t400 = 360 s; 450=408s Interpolate t425 = 363s + (408 - 363) X (425 - 400) T425 386 (450 - 400)								
N	Note: Interpolate between values on table as shown in Example for Air Test:							Convert seconds to min:sec (386 sec/60) = 6.43 min. 6.43 min. $= 6$ min. $+ (60 \times 43) \times 425 = 6$ min. 26 sec. Note: For lengths greater than five hundred feet (500') contact the EOR.							

END OF SECTION

LIFT/PUMP STATION DESIGN STANDARDS, SPECIFICATIONS AND INSTALLATION REOUIREMENTS

14.1 GENERAL

- .1 This section includes the general criteria, guidelines, and requirements for the design and installation of wastewater lift and pump stations. All wastewater lift/pump stations within the unincorporated areas of Sarasota County, regardless of size or ownership, shall be approved and permitted by the DEP and UTILITIES.
- .2 Ownership and operation of lift/pump stations shall be as required in Sarasota County Ordinance No. 79-37, as amended.

14.2 DESIGN STANDARDS

- .1 Sarasota County policy is to minimize the number of new lift/pump stations where possible. Developer shall first determine if an adjacent or nearby lift/pump station exists or is proposed which has or can be modified to have sufficient capacity to serve their project. If no alternative is available, a new lift/pump station shall be installed.
- .2 The minimum flow line to a wet well shall be fourteen feet (14') or no more that eighteen feet (18') below finished grade of the proposed lift station site. The maximum overall depth of a wet well shall be no more than twenty-five feet (25'). Alternate designs serving greater areas shall be submitted and approved by UTILITIES.
- .3 All lift/pump stations shall comply with the regulations established by the DEP. Additionally, the criteria provided in Chapter 40, "Wastewater Pumping Stations" of the "Ten State Standards - Recommended Standards for Wastewater Facilities", may generally be utilized as design guidelines, if not in conflict with State, County or other regulatory agency requirements.
- .4 Lift/pump stations shall be installed in readily accessible sites and shall have adequate area provided for operation and maintenance of the facility. The site shall be well drained and not subject to flooding during twenty-five (25) year storm events.
- .5 Finished elevations of wet wells and valve vault tops meeting or exceeding the twentyfive (25) year flood plain requirement of this CODE, in addition shall be a minimum of one foot (1') above the lowest rim elevation of the contributing gravity wastewater system, or six inches (6") above the proposed finish grade, or access road crown, which ever governs. Care shall be taken in the system design to have at least one (1) manhole rim and cover lower than any finished floor elevations as an emergency overflow.
- .6 A site plan, to scale, shall be required and shall include:
 - .a All existing and proposed utilities;
 - .b Site fencing, paving, grading, and drainage with spot topography and proposed contours;

LIFT/PUMP STATION DESIGN STANDARDS, SPECIFICATIONS AND INSTALLATION REOUIREMENTS

- .c Wet well, valve assembly, concrete slab, and control panel with dimensions to the property line;
- .d Elevations of all structures;
- .e Easements including ingress and/or egress where applicable.
- .f UTILITIES owned lift stations shall have a minimum dimension of thirty feet (30') by thirty feet (30') within an "exclusive" easement granted to Sarasota County.
- .7 Detention time should not exceed thirty (30) minutes at ADF, two (2) minute minimum pump run cycle, a maximum five (5) starts per hour, and not exceed eight feet (8') in depth from the influent invert to the bottom of the wet well. To meet the time frames accepted, increasing the diameter of the wet well will be taken into consideration.
- .8 Wastewater hydraulic analysis shall be prepared for the proposed lift/pump station in order to determine the various operational conditions required to pump the collected wastewater to the treatment facility. This wastewater analysis shall include impact on other lift/pump stations, manifolded mains, peak conditions, and full wet well conditions as described in detail in Section 13 of this Code.
 - .a If the station discharges to a manifolded force main system, the hydraulic analysis shall include a pump curve where seventy percent (70%) of the connected stations are operating.
 - .b Hydraulic computations and model analysis shall be in accordance with good engineering practice and include calculations from the pump station to the proposed discharge connection point and/or treatment facility.
 - .c Pipe friction loss shall be calculated by the "Hazen-Williams" formula, or other appropriate formula, using standard friction factors based on the material utilized.
 - .d The "C" factor shall not be greater than one hundred-twenty (120) for PVC and DI per FDEP Rule 62.604.300(8)(a).

.9 SYSTEM DESIGN

Force main systems shall be of adequate size to efficiently transmit the total ultimate peak operational flows supplied by the connected wastewater pumping station(s), to the discharge point. Capacity computations shall be coordinated with the proposed pumping system(s), along with any future flow requirement, if applicable. In order to provide adequate force main cleansing, the force main flow velocity shall not be less than two feet (2') per second at minimum pumping capacity where variable frequency pumps and motors are installed, and 3.5 feet per second where constant speed pumps and motors are installed.

<u>LIFT/PUMP STATION DESIGN STANDARDS, SPECIFICATIONS</u> <u>AND INSTALLATION REQUIREMENTS</u>

See Section 13 of the CODE for wastewater model analysis guidelines.

14.3 WASH-DOWN LINE

All lift/pump stations shall be provided with a metered water service consisting of a one inch (1") service line, five-eighths inch (5/8") by three-fourths inch (3/4") meter and meter box, and a three-forth inch (3/4") horizontally mounted reduced pressure type backflow preventer located at the meter. A brass hose bib and copper riser mounted on a four inch (4") by four inch (4") concrete post shall be provided at a convenient location within the station area to facilitate maintenance and wash-down.

14.4 ACCESS MAINTENANCE AREA

Site preparation, pavement, and walkways shall be provided for all weather operations. The minimum maintenance area for lift stations, exclusive of access road and landscaping, shall be thirty square feet (30').

14.5 FENCING

- .1 It is the intent of this section of the CODE to define the requirements for fencing. Public safety shall be the governing factor in determining fence installations.
- .2 Locking devices shall be provided on wet well access hatches, covers, controls, main disconnects, and any auxiliary devices or equipment with or without the use of fencing.
- .3 Fencing will be required for stations within or up to one hundred feet (100') from a property line of schools, churches, day care centers, parks, recreational centers, commercial, and industrial complexes. Fencing shall be required on all lift/pump stations when it is determined by the EOR that general public safety may be at risk in applications other than the above.
- .4 All lift/pump stations designed to accommodate auxiliary devices or equipment such as odor scrubbers, generators, and chemical feed systems shall be fenced.
- .5 Fences for lift/pump stations-areas shall have a minimum requirement of nine (9) gauge chain link fencing material six feet (6') high. A lockable double gate shall be provided with a twelve foot (12') wide opening located to access the wet well for pump removal and maintenance vehicles. Other fencing materials will be approved on a case by case basis provided they are no taller than eight feet (8'). Special precautions and care are required for the gate materials, which in all cases shall be galvanized steel tube or galvanized steel tube reinforced with heavy-duty hinges and a center closure pin to prevent the gates from swinging when in the closed position. The receiving hole for the closure pin shall be installed and protected by the concrete pad or other means to provide a functioning gate system.

<u>LIFT/PUMP STATION DESIGN STANDARDS, SPECIFICATIONS</u> <u>AND INSTALLATION REQUIREMENTS</u>

.6 Landscaping shall be installed outside of fences or outside the boundary of the station if not fenced, and designed to blend the lift/pump station into the surrounding area. Plant materials such as vines which will attach to fencing shall not be utilized. Refer to Sarasota County Land Development Regulations for further information.

14.6 SIGNAGE AND NOTICES

Lift/pump stations shall have signs identifying the facility by ID number or name, owner, and emergency phone number(s). Signs shall be installed on the fence, or control panel where fencing is not required, and be readily visible. Contractor shall contact UTILITIES to obtain the facility's ID number.

14.7 MATERIALS FOR LIFT/PUMP STATIONS

.1 GENERAL

Wastewater lift/pump stations shall consist of a wet well, above ground valve assembly and concrete slab, no less than two (2) submersible pumps, guide rails with base plates, aluminum access hatches, air vent, piping, control panel with automatic pumping level controls, provisions for lighting maintenance work areas at night, and related appurtenances and wiring. Except as noted above special pump stations and above ground pump systems will be allowed where requested and approved by UTILITIES.

.2 WET WELLS

.a Wet wells shall be a minimum of six feet (6') inside diameter with an eight inch (8") thick wall precast concrete meeting ASTM Standard C478, or latest revision, "Standard Specifications for Reinforced Concrete Manhole Sections".

<u>LIFT/PUMP STATION DESIGN STANDARDS, SPECIFICATIONS</u> <u>AND INSTALLATION REQUIREMENTS</u>

.b The internal walls of wet wells and the first intercepting manhole of the lift/pump station shall be provided with an integrally cast synthetic protective liner resistant to the chemical environment normally found in gravity wastewater systems, per Section 13.13. The protective liner shall be cast into the base, riser, and top slab during pre-casting operations per the manufacturer's instructions and recommendations. A single liner unit field installed in accordance with the liner manufacturer's specifications can be provided as an alternate.

Liners shall be provided by the manufacturers listed below or pre-approved equal:

- SewperCoat as manufactured by Kerneos Inc., Chesapeake, Va.
- Spray Wall, as manufactured by SprayRoq Protective Lining Systems, Birmingham, Al.
- Raven 405, as manufactured by Raven Lining Systems, Tulsa Ok.
- .c Wet wells shall be designed to provide sufficient space for the installation of equipment and to facilitate maintenance. Wet well wall and top slab thickness shall be not less than eight inches (8") thick. Wet well design shall meet ASTM C487 or latest revision, "Standard Specifications for Reinforced Concrete Manhole Sections".
- .d The wet well bottom shall be provided with a hopper section at a slope of not less than one and one and one-half inches $(1 \frac{1}{2})$ vertical to one inch (1) horizontal (1.5:1).
- .e All gravity pipe connections from the first manhole to the wet well, shall be constructed with PVC C900 DR-14 for pipe sizes up to and including twelve inches (12") in diameter, and C905 DR-18 pipe for pipe sizes fourteen inches (14") up to forty-eight inches (48") in diameter. Distances between the first manhole and the wet well shall be no less than ten feet (10') and no more than fifty feet (50') unless otherwise approved by UTILITIES.
- .f A four inch (4"), flanged, schedule 80 PVC vent pipe shall be cast in the top slab section of the wet well on the hinge side of the access hatch(s). A one-forth inch (1/4") stainless steel mesh screen shall be provided between the flanged fittings of the vent assembly to block foreign material from entering the wet well.
- .g Penetrations in precast structures for connections between the wet well and above ground valve assembly shall be provided with flexible connectors (rubber boot type) conforming to ASTM C923, latest revision. Penetrations for conduits and drain pipes shall be cast in place two inch (2") PVC pipe with a two inch (2") schedule 80 coupling on the exterior side for conduit and drain connections.

<u>LIFT/PUMP STATION DESIGN STANDARDS, SPECIFICATIONS</u> <u>AND INSTALLATION REQUIREMENTS</u>

- .h All pipe and fittings within the wet well shall be Class 53 ductile iron pipe (DIP) flanged joint. All DIP and fittings within the wet well shall be lined on the interior with a minimum of forty (40) mils of Protecto 401 ceramic epoxy, or Superior SP 2000W and coated on the exterior with a minimum of twenty-five (25) mils of Ceramawrap Epoxy, or Superior SP 2000W. All other exposed DIP and fittings shall be coated on the exterior with a minimum of 11 mils of Tnemec Series 66 Polyamide Epoxy, or equal. All buried DIP and fittings shall be coated on the exterior with a minimum of 1 mil of standard manufacturers asphalt.
- .i Field penetrations of precast structures shall be performed by core drilling only. Core drilling shall be parallel to the centerline of the proposed pipe that is to pass through the wall. The required core diameter shall be in accordance with the manufacturer's recommendations for installing the neoprene boot or seal.
- .j The wet well piping shall be arranged to prevent pipe line turbulence. The intake pipe shall be designed generally with less than six feet (6') per second flow velocity under operational conditions, with special care taken to prevent damage by cavitation at possible extreme pumping rates.
- .k Special consideration shall be given to the support and restraint of piping systems. This requirement shall apply to both interior and exterior systems, with restraining or flanged pressure piping required where flexible connections are used.

.3 VALVE ASSEMBLIES

- .a Valve assemblies shall be installed above ground on a six inch (6") thick by ten foot (10') square concrete slab, using Type II cement with twenty-eight (28) day compressive strength of 4,000 psi. Concrete slab shall be poured with #4 rebar at twelve inches (12") on center in each direction in center elevation of slab. The concrete slab shall be sloped to drain one quarter inch (1/4") per foot away from the wet well and formed and poured on a minimum of six inches (6") of compacted shell base.
- .b Valve assemblies for all duplex lift/pump stations shall consist of a weighted lever check valve with rubber faced clapper, eccentric operating non-lubricated plug valve, round port, Buna N resilient face seating surface, cast iron body, lever actuated with lever provided as manufactured by Pratt Ballcentric or Milliken Millcentric. Valves shall be epoxy coated inside and out with Armcoat 400, or equal. The epoxy coating shall be a minimum of eight (8) mils inside and four (4) mils outside.
- .c All piping from the pumps through the valve assembly to the buried main cut-off plug valve shall be ductile iron pipe (DIP). All DIP and fittings above ground

LIFT/PUMP STATION DESIGN STANDARDS, SPECIFICATIONS

AND INSTALLATION REQUIREMENTS

shall be Class 53 flanged joint. All buried DIP and fittings shall be Class 150 restrained mechanical joint. All DIP and fittings within the lift station site shall be lined on the interior with a minimum of forty (40) mils of Protecto 401 Ceramic Epoxy, or Superior SP2000W. All exposed DIP and fittings shall be coated on the exterior with a minimum of eleven (11) mils of Tnemec Series 66 Polyamide Epoxy, or equal. All buried DIP and fittings shall be coated on the exterior with a minimum of one (1) mil of manufacturer's standard asphalt. All above ground piping and fittings shall be color coated for wastewater with Tnemec Malachite, PL 19.

- .d An emergency auxiliary pumping connection (by-pass) shall be provided for each lift/pump station. The by-pass shall have a quick coupling connection and a shut off valve. A four (4) inch aluminum male cam lock fitting with cap shall be installed in the valve assembly for by-pass pumping.
- .e An oil-filled stainless steel pressure gauge 0-100 (psig) with diaphragm seal shall be provided for each wastewater lift/pump station. The gauge shall be mounted on the discharge side of the check valve or discharge force main, as shown on the valve assembly details in the Sarasota County Utilities Standard Details. Gauges shall be supplied with a one-half inch (1/2") stainless steel ball type shut off valve and incidental stainless steel piping.
- .f An above ground air release valve (ARV), Val-Matic Model #38, ARI D-020-S, with blow-off hose to atmosphere shall be installed downstream of the emergency by-pass connection, or approved equal. All ARV's to have fusion bonded epoxy inside and out with 316 stainless steel internals, or equal. All ARV's to have two inch (2") inlets, one inch (1") outlets, and 0.25 inch orifices, or comparable. ARV assemblies shall have stainless steel valves for isolation and backwash.
 - .g An isolation plug valve with valve box shall be installed adjacent to and downstream of the valve assembly when the distance from the pump station exceeds one hundred feet (100') to the discharge point, wastewater transmission main, or where a branch isolation valve does not exist on the receiving force main.

.4 ENTRANCE HATCHES

- .a The lift/pump station wet well shall be equipped with a one-fourth inch (1/4"), diamond pattern, aluminum access cover of adequate size to permit easy removal and installation of sewage pumps and equipment. The wet well access cover shall be a minimum thirty-six inch (36") by forty-eight inch (48") single door. Tri-plex stations and other special structures may have multiple or larger access hatch doors as specified by the EOR and approved by UTILITIES.
- .b All access covers shall have a minimum load rating of three hundred (300)

<u>LIFT/PUMP STATION DESIGN STANDARDS, SPECIFICATIONS</u> <u>AND INSTALLATION REOUIREMENTS</u>

pounds per square foot and be equipped with stainless steel hinges, locking hasp, and a device to secure the doors in an open position when the lid is raised.

.5 PUMPS

- .a Each lift station shall have a minimum of two (2), five (5) horse power submersible sewage pumps, 230v, 3-phase, 60hz, Class F insulation, NEMA B design motors for continuous duty at forty (40) degree C ambient temperature and designed for at least ten (10) starts per hour. The pumps shall be equipped with heat sensors and seal failure or moisture sensor devices. The stator housing shall be a watertight casing. Each pump motor shall be of sufficient horsepower as to be non-overloading over the entire length of the pump curve. Motors 25 HP and larger shall be VFD rated including class H winding insulation. Motor bearings shall be anti-friction, permanently lubricated type.
- .b Wastewater pumping units shall be capable of handling raw, unscreened wastewater and shall be capable of passing a sphere of at least three inches (3") in diameter. Pumps shall be of a proven design that has been in service for at least five (5) years.
- .c All pumps shall be equipped with "SO" type power cables and type 316 stainless steel lifting cables and attached to the pump lifting bail using stainless steel shackles.
- .d All submersible pump-mounting systems shall be of the front loading type using a dual rail guide having a minimum of two inch (2") diameter 316 stainless steel pipes for installation and removal of the pumps. Intermediate guide rail brackets shall be used when specified by the pump system supplier or manufacturer. All mounting hardware shall be 316 stainless steel. The pump manufacturer shall furnish a discharge base and elbow for the pumps supplied. The base shall be sufficiently rigid to firmly support the guide rails, discharge piping and pump under all operating conditions. The base shall be suitable for bolting to the floor of the wet well. The face of the discharge nozzle flange. The pump and motor assembly shall be a "quick-disconnect" type connected to and supported by the discharge base and guide rails allowing the pump to be removed from the wet well and replaced without the need for unbolting any flange, lowering the liquid level or requiring operation and maintenance personnel to enter the wet well.
- .e A stainless steel hanger with individual stainless steel hooks shall be installed in each wet well for supporting float balls, pump cables, and other sensors. All fasteners, brackets, and other hardware installed in the wet well and valve vault shall be 316 stainless steel. All nuts and bolts outside of the wet well shall be a minimum of A-307 carbon steel and shall be painted the same color as the pipe. Washers shall be used on all flanged joint bolts, using the same material as the nuts and bolts.

<u>LIFT/PUMP STATION DESIGN STANDARDS, SPECIFICATIONS</u> <u>AND INSTALLATION REQUIREMENTS</u>

- .f Each piece of equipment (pumps, motors, blowers, etc.) shall be provided with a nameplate of non-corrosive metal, securely fastened in place, and permanently inscribed with the manufacturer's name, model or type designation, serial number, impeller diameter, principal rated capacities, electric or other power characteristics, and other appropriate information to identify the equipment. Pump cable assembly shall have a permanently embossed code or legend indicating the cable is suitable for submerged use. Cable sizing shall conform to NEC requirements. The cable shall enter the pumps through a heavy-duty stainless steel assembly with grommet. An epoxy seal may be added to this cable entrance assembly to improve water tightness. The system used shall ensure a watertight submersible seal. Cable shall terminate in a junction chamber and shall be sealed from the motor by a compression seal.
- .g Pump Warranty (Solid Handling and Grinder Pumps):

The following warranty conditions shall also apply to existing lift/pump station pump replacements.

- .1 See Section 5.21.6 of this CODE for warranty and guarantee requirements.
- .2 Verification of guarantees of performance and warranty certificate shall be indicated in the shop drawing submittal and in the Operation and Maintenance manuals to be submitted at the time of project certification.

14.8 PIPE AND FITTINGS FOR VALVE ASSEMBLY AND WET WELL

- .1 Riser pipe shall be Class 53 DIP flanged joint. No meg-a-lug type flange connections will be allowed in the wet well. All flanged fittings in the wet well and valve assembly shall be connected using stainless steel hardware.
- .2 The wet well piping shall be arranged to prevent pipeline turbulence. The intake pipe shall be designed generally with less than five feet (5') per second flow velocity under operational conditions, with special care taken to prevent damage by cavitation at possible extreme pumping rates.
- .3 Special consideration shall be given to the support and restraint of piping systems. This requirement shall apply to both interior and exterior systems, with restraining or flanged pressure piping required where flexible connections are used.
- .4 Fittings and valves used on valve assembly's shall be flanged, ductile iron or PVC, as specified herein. Iron body valves and ductile iron fittings on the valve assembly and wet well shall have a fusion bonded epoxy coating inside and out.
- .5 An oil filled stainless steel pressure gauge 0-100 (psig) with diaphragm seal, shall be

<u>LIFT/PUMP STATION DESIGN STANDARDS, SPECIFICATIONS</u> <u>AND INSTALLATION REQUIREMENTS</u>

provided for each wastewater lift/pump station the gauge shall be mounted on the discharge side of the check valve or discharge force main, prior to leaving the valve assembly. Gauges shall be supplied with a one-half inch (1/2") stainless steel ball type shut off valve and incidental stainless steel piping.

- .6 An emergency auxiliary pumping connection (by-pass) shall be provided for each lift/pump station. The by-pass shall have a quick coupling connection, and a shut off valve. A four inch (4") aluminum male cam lock fitting with cap shall be installed.
- .7 An isolation gate valve with valve box shall be installed adjacent to the valve assembly when the distance from the pump station exceeds one-hundred feet (100') to the discharge point, wastewater transmission main, or where a branch isolation valve does not exist on the receiving force main.

14.9 CONTROLS

- .1 Control panels, SCADA system, and mounting structures for lift/pump stations to be conveyed to UTILITIES for operation and maintenance shall meet UTILITIES requirements. Design drawings and current standards can be obtained from UTILITIES.
- .2 Each lift/pump station shall contain a control system and include a liquid level controller which shall sense the wastewater level in the wet well and provide appropriate signals to the logic circuits to produce the required mode of operation for the pumping facilities.
- .3 Capability shall be provided for manual start-stop control for all pumping units, as well as the normal automatic control from the liquid level sensing and logic circuits.
- .4 An automatic alternator shall be furnished to change the starting sequence on each pump cycle. High water level alarms shall be provided with exterior mounted audio and visual devices such as a horn and light. The light shall be installed and be noticeable from the roadway.
- .5 Submersible station controls shall be housed within a pole mounted or freestanding paneled enclosure. The enclosure will be of NEMA four (4) weather tight construction, with double dead front outer doors fitted with three point locking device with provisions for a padlock. Where the serving Utility requires telemetry equipment, flow meter, or other measurement devices, they shall be furnished and installed by the Developer and/or Contractor as a requirement to receive service.

14.10 HYDRAULIC SURGE CONTROL

Surge control valves, or other approved systems, shall be provided where hydraulic conditions indicate the necessity for such a system.

LIFT/PUMP STATION DESIGN STANDARDS, SPECIFICATIONS AND INSTALLATION REOUIREMENTS

14.11 ODOR CONTROL

Where odor problems are a concern, chlorination, hydrogen peroxide, scrubbers, activated carbon, or other processes, as approved by UTILITIES shall be provided.

14.12 EMERGENCY GENERATORS

An emergency on-site generator shall be provided if a generator is required by FDEP Rule 62.604.300(8)(a). The lift/pump station site shall be sized to accommodate the on-site generator which shall be located to provide access for fueling and maintenance vehicles. All lift/pump stations that require an emergency on-site generator shall be fenced in accordance with part 14.5 of this Section.

All emergency generators shall be self-contained and shall consist of an electric generating unit, which upon interruption of normal power from transformer, will start automatically and, by an automatic transfer switch, will disconnect the load from the normal power supply and connect to the emergency generator. Diesel engine driven electric generator set shall be of the latest commercial type and design with all necessary switch gear and controls. Contractor shall furnish and install fuel tank, generator set enclosure, generator foundation and fuel tank foundation and all accessories necessary for a complete and operable installation. All materials shall be new.

All generator equipment and appurtenances described herein shall be guaranteed against defective parts, workmanship and installation under terms of the manufacturer's and dealer's standard warranty for one (1) year from the date of acceptance of the system and shall include labor and travel time for necessary repairs at the project site.

- 14.13 LIFT STATIONS UNDER 2,000 GPD (Excludes Individual Residential Low Pressure Systems)
 - .1 UTIITIES may allow systems with flows greater than 2,000 GPD to use the following criteria when approved by the Environmental Services Business Center Executive Director. Where approved, lift stations with design flows less than two thousand (2000) GPD flow may use the following design criteria:
 - .a Fiberglass, or concrete wet well with a minimum inside diameter of three feet (3'), a concrete or aluminum top with one-fourth inch (1/4") thick aluminum diamond pattern lockable hatch cover, and a standard four inch (4") diameter PVC vent pipe. Concrete wet wells must meet the lift station CODE requirements for inside and outside wall protective coatings, (see 14.7.2.b).
 - .b Duplex pumps (vortex grinder type).
 - .c Check, plug, or gate type valves located outside the wet well, in a valve or dual valve assembly on reinforced concrete slab or located in a valve vault.

<u>LIFT/PUMP STATION DESIGN STANDARDS, SPECIFICATIONS</u> <u>AND INSTALLATION REQUIREMENTS</u>

- .d Two inch (2") to three inch (3") diameter grinder pump force main lines.
- .e A wet well wash down service line with a reduced pressure backflow preventer assembly shall be provided at each lift station site.

14.14 LOW PRESSURE AND VACUUM SYSTEMS

- .1 It is not the intent of this section of the CODE to utilize low-pressure systems as a replacement for conventional gravity sewer systems. However, as a means to provide service to an individual lot or a small group of buildings where conventional gravity service cannot be utilized within reason, UTILITIES may consider the use of a low-pressure system, providing the EOR can show reasonable justification for its use.
- .2 Plans and specifications for low-pressure and vacuum wastewater systems shall be submitted to UTILITIES for review and approval. A utility permit shall be secured for each low-pressure and vacuum wastewater installation or installation grouping. Approval of low-pressure and vacuum wastewater systems as an alternative to conventional wastewater systems shall be in accordance with the conditions listed in (.3) below, unless other special circumstances justifying their use are affirmatively demonstrated.
- .3 CONDITIONS OF APPROVAL
 - .a Where build-out has left small parcels of property in precarious locations in relation to the lay of the land.
 - .b Shallow bedrock.
 - .c Unstable soil conditions.
 - .d Temporary use, until gravity system construction is completed.
 - .e Distant locations from existing gravity sewers.
- .4 It will be the responsibility of the applicant to evaluate all potential alternative wastewater collection systems, and justify the selection of the low-pressure sewer system based on engineering and surrounding conditions.
- .5 Based on the information furnished by the applicant, the engineer and UTILITIES will decide the acceptability, scope, and extent of the low-pressure sewer system to be permitted.

14.15 SYSTEM DESIGN

Force main systems shall be of adequate size to efficiently transmit the total ultimate peak operational flows supplied by the connected wastewater pumping station(s), to the

<u>LIFT/PUMP STATION DESIGN STANDARDS, SPECIFICATIONS</u> <u>AND INSTALLATION REQUIREMENTS</u>

discharge point. Capacity computations shall be coordinated with the proposed pumping system(s), along with any future flow requirement, if applicable. In order to provide adequate pipeline cleansing, force main flow velocity shall not be less than two feet (2') per second at minimum pumping capacity. However, with multiple pump station systems or phased development, this requirement may be subject to UTILITIES review, and the system design shall show special attention regarding cleaning maintenance (pigging ports) before approval is granted.

END OF SECTION

Page Blank Intentionally

<u>RECLAIMED WATERLINE DESIGN, MATERIALS, INSTALLATION</u> <u>AND CONSTRUCTION</u>

15.1 GENERAL

This section is intended to provide minimum standards, details, and specifications for design, material selection, installation, and testing requirements used for new construction and/or modifications to existing reclaimed water systems within the unincorporated areas of Sarasota County.

15.2 CONSISTENCY OF PLANS WITH RECLAIMED WATER MASTER PLAN

All plans for reuse facilities submitted to UTILITIES for construction permit approval shall be reviewed for consistency with the County's Reclaimed Water Master Plan, as defined in Section 5 of this CODE. Findings of inconsistency with the Reclaimed Water Master Plan shall be considered grounds for permit denial, until such time as the plans are revised by the applicant and found by UTILITIES to be consistent with said Master Plan.

15.3 RECLAIMED WATER IRRIGATION REQUIREMENTS

- .1 All reclaimed water ponds, pump stations, piping, back-up wells, and appurtenances above and below ground, up to the point of service for residential fee simple lots even if on master meter, and point of service or discharge for commercial lands, such as golf courses, parks, multi-family, and recreational areas or similar lands providing public access, shall be designed by a professional engineer, registered in the State of Florida. All facilities and appurtenances shall require permits, review submittal, and approvals from UTILITIES. UTILITIES will review the proposed project for compliance with their FDEP master reclaimed water permit. If the project requires FDEP permitting, the EOR will be so informed.
- .2 All reuse water storage ponds, pump stations, back-up wells, and appurtenances associated with supplying and pressurizing residential, commercial, and industrial reclaimed water systems shall be privately maintained. An isolation gate valve shall be located downstream of the reclaimed water pumping station at the right-of-way line to separate the privately maintained storage and pumping system from the reclaimed water distribution system. If the reclaimed water distribution is intended to be dedicated to UTILITIES for maintenance, the EOR shall follow all requirements for turnover of utility systems as described in Section 5 of this CODE.

15.4 RECLAIMED WATER CONSERVATION REQUIREMENTS

.1 The provisions of this CODE will be applicable at such times as the Southwest Florida Water Management District (SWFWMD) determines that an emergency situation exists in regard to the supply of fresh water due to a prolonged drought affecting the County.

<u>RECLAIMED WATERLINE DESIGN, MATERIALS, INSTALLATION</u> <u>AND CONSTRUCTION</u>

.2 At such time as the SWFWMD declares an emergency situation regarding the supply of fresh water due to a prolonged drought, UTILITIES is authorized to order curtailment of the use of reclaimed water.

15.5 PRESSURE

.1 All reclaimed water mains shall be sized after a hydraulic analysis based on flow demands and pressure requirements. The system shall be designed to maintain a minimum pressure of twenty (20) psig at all points in the distribution system under all conditions of flow. The normal working pressure in the reclaimed water system shall be approximately fifty (50) psig and not less than thirty-five (35) psig.

15.6 VALVES, VALVE LOCATIONS

A sufficient number of valves at appropriate locations shall be provided on reclaimed water mains so that inconvenience and hazards will be minimized during maintenance operations. Valves shall be installed at intervals so that no break or maintenance operations will necessitate shutting down a length of pipe greater than five hundred feet (500') as measured along the street in non-residential and multi-family subdivisions, or greater than one thousand feet (1,000') in single-family or duplex residential subdivisions. Reclaimed water transmission main valve spacing shall be no greater than two thousand feet (2,000').

15.7 RECLAIMED WATER SERVICES

- .1 The reclaimed water service line shall serve only one lot or property and be connected to only one meter connection (curb stop fitting), unless otherwise approved by UTILITIES.
- .2 Reclaimed water service installation shall be as shown in the standard details of this CODE. The service line is to be minimum one inch (1") PE tubing and shall not be extended more than one hundred feet (100') from the distribution main to the property line or meter. Inserts for polyethylene tubing shall be utilized and shall be 316 stainless steel. The use of brass couplings, tees, and wye fittings are acceptable on polyethylene service tubing, if not located under the roadway.
- .3 Reclaimed water service lines greater than two inches (2") in diameter shall be connected to the reclaimed watermain by a tapping sleeve and valve with an above ground meter assembly.
- .4 One inch (1") reclaimed water services crossing roadways shall be placed in casing pipe. The casing pipe shall be watertight and be a minimum of Schedule 40 pipe, Class 200 (DR-21) or HDPE, two inches (2") in diameter for single services and four inches (4") in diameter for two (2) service lines. Casing pipe sections shall be sealed on both ends. The ends shall be sealed with Rubber-Nek, Ram-Nek, or approved equal.

<u>RECLAIMED WATERLINE DESIGN, MATERIALS, INSTALLATION</u> <u>AND CONSTRUCTION</u>

15.8 MATERIALS, PIPE, AND FITTINGS

- .1 POLYVINYL CHLORIDE PIPE (PVC): All PVC piping shall be clearly marked indicating pipe size, manufacturer name, AWWA and/or ASTM specification number, working pressure, production code and date of manufacture. All PVC tubing and pressure pipe shall be color-coded Pantone purple 522-C.
 - .a PVC pipe two inches (2") and three inches (3") in diameter shall conform to the requirements of ASTM D2241, Class 1120 or 1220 (SDR 21) with a working pressure rating of two hundred (200) psig with integral bell gasketed joints. Pipe is to be manufactured to I.P.S. (steel) standard pipe equivalent outside diameters. Pipe shall be marked NSF-PW approved.
 - .b PVC pipe diameters of four inches (4"), six inches (6"), eight inches (8"), and twelve inches (12") shall conform to the requirements of AWWA Standard C900, DR 18, with a working pressure rating of one hundred-fifty (150) psig. The pipe shall have the same OD as ductile iron pipe. Pipe shall be marked NSF-PW approved. **NOTE: Ten inch (10") pipe for waterline or reclaimed water** systems is no longer acceptable.
 - .c PVC pipe diameters of fourteen inches (14") to forty-eight inches (48") shall conform to the requirements of AWWA Standard C905, DR 25, with a working pressure rating of one hundred sixty-five (165) psig. The pipe shall have the same OD as ductile iron pipe. Pipe shall be marked NSF-PW approved.
 - .d Elastomeric seals shall meet ASTM F477 and shall be attached to the bell utilizing glue (AWWA and manufacturer approved type) or rieber ring.

.2 POLYETHYLENE SERVICES

.a POLYETHYLENE (PE) TUBING one inch (1"), one and a half inch (1 ¹/₂"), and two inch (2") service pipe shall conform to AWWA Standard C901, PE 3408 in accordance with AWWA C901, ASTM D1248, ASTM D2239, ASTM D2737, and ASTM D3350 and be copper tubing size (CTS, SDR-9) with a working pressure rating of two hundred (200) psig. PE tubing shall be color-coded Pantone purple 522-C. HDPE pipe shall have ultraviolet (UV) inhibitors for protection against direct sunlight. Tubing shall be approved for use with water by the National Sanitation Foundation (NSF-14) and shall be continuously marked at intervals of not more than four feet (4') with the following:

RECLAIMED WATERLINE DESIGN, MATERIALS, INSTALLATION AND CONSTRUCTION

- .a Nominal size
- .b Pressure rating
- .c NSF seal
- .d Manufacturer's name or trademark
- .e Standard dimension ratio (SDR)
- .f ASTM specification
- .b HIGH-DENSITY POLYETHYLENE PRESSURE PIPE (HDPE) three inches (3") in diameter and larger shall conform to the requirements of ASTM F-714 and AWWA Standard C906, DR 11, with a working pressure rating of one hundred sixty (160) psig. HDPE pipe shall have the same OD as ductile iron pipe size (DIPS). See Section 10 of the CODE for required HDPE material specifications (Directional Drilling).
- .3 DUCTILE IRON PIPE (DIP)

DIP shall conform to the requirements of AWWA/ANSI C151/A21.51, minimum thickness Class 51, have interior cement lining meeting the requirements of AWWA/ASNI standard C104/A21.4, and have a minimum one (1) mil thickness of coal tar enamel seal coat outside. Pressure class DIP will be considered on a case-by-case basis as approved by UTILITIES, but have a minimum pressure class of three hundred-fifty (350) psi for four inch (4") to twelve inch (12") diameter and two hundred-fifty (250) psi for sixteen inch (16") and larger. Each length of pipe shall be clearly marked with the name of the manufacturer, pressure rating, thickness or pressure class, nominal pipe diameter, weight of pipe without lining and length. All pipe furnished by the manufacturer shall be cast and machined at one foundry location to assure quality control and provide satisfactory test data. All buried ductile iron pipe shall be encased in a color-coded purple polyethylene tube installed per manufacturer's recommendation. For larger diameter pipe (twelve inches (12") and greater), a filler gauge may be utilized during the installation to check for rolled gaskets.

- .a PUSH-ON AND MECHANICAL JOINT DIP shall conform to the requirements of AWWA/ANSI C111/A21.11 minimum Class 51 with a working pressure rating of two hundred-fifty (250) psig. Gasket materials for special applications in cases where soil contamination requires impervious piping materials or special fluids are handled must be shown on the plans and in the specifications.
- .b FLANGED JOINT DIP: All flanged joint DIP shall conform to the requirements of AWWA/ANSI Standard C115/A21.15, minimum Class 53, with a working pressure rating of two hundred-fifty (250) psig. All flanges shall have a taper pipe thread (NPT) in accordance with ANSI B2.1. Flanged joint pipe shall be joined utilizing stainless steel nuts and bolts with American Toroseal gaskets or equal.
- .c BALL JOINT DIP: All ball joint DIP shall conform to AWWA C151. The pipe joints shall be of the ball and socket type, capable of fifteen (15) degrees free deflection in each joint without separation, leakage, or reduction in the pipe

RECLAIMED WATERLINE DESIGN, MATERIALS, INSTALLATION AND CONSTRUCTION

waterway. Each joint shall be self-restrained without the use of bolts or similar external locking devices. Locking retainer glands shall be ductile iron or high strength alloy steel.

.d RESTRAINED JOINT DIP: All ductile iron pipe shall be "TR FLEX" as manufactured by US Pipe and Foundry, "LOK-FAST" or "LOK-RING" as manufactured by American Cast Iron Pipe, or approved equal.

.4 GALVANIZED STEEL PIPE:

Galvanized steel pipe is not allowed for reclaimed water supply systems.

.5 JOINTS AND FITTINGS:

- .a Type of joints used shall meet the following specifications or be approved by the EOR prior to installation. Joints shall be made in accordance with approved printed instructions of the manufacturer and shall be absolutely watertight.
- .b PUSH-ON JOINTS
 - .1 DUCTILE IRON:

Push-on joints shall be in accordance with ANSI Standard Specification A21.11 (AWWA Standard C111). All joint material shall be provided by the pipe manufacturer and installation shall be in accordance with the manufacturer's recommended practice.

- .2 POLYVINYL CHLORIDE (PVC): PVC pipe joints shall be the manufacturer's standard push-on bell type with rubber sealing ring in accordance with ASTM Standard D3139. Elastomeric gaskets shall conform to ASTM Standard F477.
- .c MECHANICAL JOINT (MJ) FITTINGS for PVC and DIP up to twenty-four inches (24"), designed to withstand working pressure of not less than three hundred-fifty (350) psig, and shall conform to the requirements of ANSI Standard A21.51. The coating and lining for fittings shall be as specified herein for ductile iron pipe. Compact fittings shall be installed. All fittings shall be UL/FM approved and shall conform to NSF Standard 61 as applicable. Fittings shall have cast on them the pressure rating, nominal diameter of openings, manufacturer's name, and degrees or fraction of the angle of bend as appropriate. Cast letters and figures shall be on the outside of the body of the fitting.
- .d FLANGED JOINT FITTINGS shall conform to AWWA/ANSI standard C110/A21.10 with a minimum pressure rating of two hundred-fifty (250) psig, and shall conform to the requirements of ANSI standard A21.51. The coating and lining for fittings shall be as specified herein for ductile iron pipe. Flanged joint pipe shall be joined utilizing stainless steel nuts and bolts with full-face gaskets or true ring gaskets. Flanges shall be in accordance with ANSI

<u>RECLAIMED WATERLINE DESIGN, MATERIALS, INSTALLATION</u> <u>AND CONSTRUCTION</u>

Specification B16.1, Class 125 with any special drilling and tapping as required to ensure correct alignment and bolting. Screwed flanges shall be screwed-in tight at the foundry by machine before they are faced and drilled. Flanges for flanged joints and flanged specials shall be integrally cast at right angles to the axis, accurately faced, and drilled smooth and true. Gaskets shall be rubber ring type, American Toroseal gasket or equal, minimum thickness of one-eighth inch (1/8") and shall be used on all flanges. The entire gasket, including the retainer and sealing ring, shall be one continuous piece. Retainers glued together will not be accepted. Flanged joints shall be made with bolts, bolt studs with a nut on each end, or studs with nuts where the flange is tapped. The number and size of bolts shall conform to the same ANSI standard as the flanges. Bolts and nuts shall be of Grade B conforming to the ASTM specifications for steel machine bolts and nuts and tap bolts, designation A307. Bolt studs shall be of the same quality as machine bolts. Bolts shall be tightened so as to distribute evenly the stress in the bolts and bring the pipe in alignment. The contractor shall provide suitable filling rings where the layout of the flange piping is such as to necessitate their use. In materials, workmanship, facing and drilling, such rings shall conform to ANSI B16.1 Class 125.

Machined surfaces shall be cleaned and coated with a suitable rust-preventive coating at the shop immediately after being machined.

.e BALL AND SOCKET JOINTS:

Where subaqueous joints are indicated, joints shall be bolted or boltless flexible ball and socket joints conforming to the pressure and thickness requirements of ANSI Standard A21.10 (AWWA Standard C110) and ANSI Standard A21.51 (AWWA Standard C151) and shall be capable of providing a maximum deflection of fifteen degrees at each joint. Joints and gasket material shall be manufacturer's standard. The specific type joint shall be as shown on the drawings and/or as approved by the EOR. Installation shall be in accordance with the manufacturer's recommended practice.

.f HIGH-DENSITY POLYETHLENE (HDPE) FITTINGS Three inches (3") and larger in diameter shall conform to AWWA C901/C906, ASTM D2513, ASTM 3035 with the dimensional ratio (DR) matching the HDPE pipe DR rating and must have NSF 61 approval. All fittings shall be designed and produced to ductile iron diameters with uniform dimensions. See Section 10 (Horizontal Directional Drilling) of this CODE for HDPE material specifications.

.6 RESTRAINTS

.a RESTRAINTS FOR DIP OR PVC BELL AND SPIGOT JOINTS shall be UL listed and/or FM approved. Restraints shall be EBBA Iron "MegaLug" Series 1100, 1600, 2000, 2800, Star Pipe Products, Inc., Series 1100, 1200, Sigma Corporation Series SLD/SLDE, SLC/SLCE and PVP/PWP, Ford-Uni-Flange Series 1300 or approved equal. The restrainer shall be manufactured of ductile iron and shall meet or exceed all the requirements of ANSI A21.11 (AWWA

<u>RECLAIMED WATERLINE DESIGN, MATERIALS, INSTALLATION</u> <u>AND CONSTRUCTION</u>

C111) and ASTM A536. The restrainer shall accommodate the full working pressure rating of the pipe plus surge allowance, or three hundred (300) psi. In the assembly of the restraint device, the Contractor shall tighten the bolts to the correct torque range as recommended by the restraint manufacturer. The restrainers shall be painted black for ductile iron pipe and painted red for PVC pipe applications. The restraining device shall not damage or lower the working pressure of the pipe installed. Restrainers shall be properly stored to minimize sand and debris build-up. Specifically, the twist-off screws and associated threads shall be clean (free of sand) prior to installation.

.b RESTRAINERS SPECIFICALLY FOR DUCTILE IRON PIPE:

Joints may be restrained by utilizing a joint restraint gasket which includes a stainless steel locking segments vulcanized into the rubber gasket. The gasket shall be rated for operating pressures up to two hundred-fifty (250) psi based on the performance requirements of ANSI/AWWA C111/A21.11, Standard for Rubber – Gasket Joints of D.I.P. & Fittings. Pipe manufacturer's restraints for joint restraints designed for operating pressures of up to three hundred-fifty (350) psi with the use of specially designed gaskets will also be acceptable if approved by UTILITIES. Field-Loc or Fast Grip type gaskets shall be UL listed and/or FM approved and will be considered on a case-by-case basis as approved by Sarasota County Utilities.

- .c RESTRAINTS FOR MECHANICAL JOINTS shall be UL listed and/or FM approved and be designed to be used to restrain PVC or ductile iron pipe to mechanical joint valves and fittings. These retainer glands shall be manufactured of ductile iron per ASTM A536. Twist-off torque limiting nuts shall be used to ensure proper actuating of the restraining devices. The restraining devices shall be designed with a 2:1 ratio factor of safety with regard to a pressure rating of three hundred (300) psi and shall be "MEGALUG" Series 1100, 2000 as manufactured by EBBA Iron Inc., Stargrip 3000, Allgrip 3600 Series as manufactured by Star Pipe Products, Inc., Ford Uni-Flange Series 1300, 1400, 1500, Sigma Corporation Series SLD/SLDE and SLC/SLCE, or approved equal. Setscrews will not be permitted on PVC pipe.
- .d RESTRAINING PLAIN END PIPE, Flange adapter shall be MEGAFLANGE 2100 series as manufactured by EBBA Iron Inc., Ford Uni-Flange Series 900, Sigma Corporation Series Sigma Flange Adapter, or approved equal. Setscrews will not be permitted on PVC pipe.
- .e RESTRAINING RODS for piping greater than three inches (3") in diameter shall be a minimum of three-fourth inch (3/4") in diameter and shall be 304 stainless steel. Manufacturer's couplings shall be used when rods are being coupled. For each twenty-two thousand pound (22,000 lb) thrust, one (1) pair of three-fourth inch (3/4") restraining rods shall be used.
- .f FLANGE ADAPTERS: Flange adapters shall be ductile iron manufactured to ASTM A536 standards.

RECLAIMED WATERLINE DESIGN, MATERIALS, INSTALLATION AND CONSTRUCTION

Bolt circles and bolt holes shall meet ANSI B16.1 for one hundred and twentyfive pounds (125 lbs). Adapter flanges shall meet or exceed all test requirements of AWWA C115, ASTM D2241 and ASTM D1599.

- .7 EXTERNAL CORROSION PROTECTION: DIP reclaimed water mains, shall be encased with a polyethylene tube. The polyethylene tube shall have a minimum thickness of 0.008-inch (8 mil), color-coded, and meet the requirements of AWWA/ANSI standard C105/A21.5.
 - .a Installation: Although not intended to be a watertight enclosure, the polyethylene tube shall prevent contact between the pipe and the surrounding backfill. Installation shall be done according to one of the methods described in AWWA C105, subject to approval by the manufacturer and UTILITIES.
- .8 VALVES (GENERAL): The Contractor shall furnish, install and test all gate valves, butterfly valves, check valves and other special valves and appurtenances as shown on the drawings and herein specified. All references to Industry Standards (ASTM, ANSI, AWWA, etc.) shall be to the latest revision unless otherwise stated. Only those materials included in the CODE shall be installed. All materials shall be new unless specifically called for otherwise. If not approved otherwise by UTILITIES, the typical valve spacing shall be one thousand foot (1,000') intervals (maximum) within residential areas and five hundred foot (500') intervals (maximum) within industrial and commercial areas. If possible, gate valves shall be installed nearest a tee or cross fitting (exceptions may include work within DOT right-of-way). The Contractor shall field check all exposed bolts on all valves to ensure that they are tight prior to installation.

.a ROTATION OF OPENING:

All valves shall open by turning to the left or counterclockwise, when viewed from the stem. When fully open, the valve shall have a clear waterway equal to the ID of the pipe.

.b EXTENSION STEMS:

Where extension stems are required to maintain between eighteen inches (18") and thirty-six inches (36") in depth to the top of the operating nut, substantial, adjustable wall brackets and extension stems shall be furnished and located as directed. Extension stems shall be provided on all buried valves when the operating nut is deeper than thirty-six inches (36") below the final grade. Sufficient stem extension shall be provided so that the nut will be no more than thirty-six inches (36") below finished grade. Valve stem extensions shall be secured to the operating nut for the valve by stainless steel set screw and have centering ring. Where multiple extensions may be used, the extensions shall be secured together by pins or stainless steel bolts and nuts installed completely through the assembly.

.c PAINTING OF VALVES AND VALVE BOX LIDS:

The top side of all reclaimed water valve box covers and the inside of the top section of the valve box shall be painted Pantone purple 522-C. In addition to the

<u>RECLAIMED WATERLINE DESIGN, MATERIALS, INSTALLATION</u> <u>AND CONSTRUCTION</u>

above, the inside of the cover for BUTTERFLY valves only shall be painted half Pantone purple 522-C and half red. Oil-based, traffic-rated paint shall be used.

.d LOCATING MARKERS FOR VALVES:

An "R" shall be stamped in the curb closest/adjacent to a below-grade valve. Reclaimed water services serving vacant lots (service not in use) shall include an "R" stamped or etched in the curb (closest to the meter box).

.e WARRANTY:

See Section 5.21.6 of this CODE for warranty and guarantee requirements.

.9 RESILIENT WEDGE GATE VALVES

.a Resilient wedge gate valves two inches (2") and larger shall conform to the requirements of AWWA C509, be UL and FM approved with a working pressure rating of two hundred-fifty (250) psig. The operating nut or wheel shall have an arrow cast in the metal indicating the direction of opening. Each valve shall have the manufacturer's distinctive marking, pressure rating and year of manufacture cast on the body. Prior to shipment from the factory, each valve shall be tested by applying to it a hydraulic pressure equal to five hundred (500) psi (twice the specified working pressure).

.b BURIED VALVES:

Buried gate valves shall be iron body bronze-mounted, rubber-encapsulated, resilient seat, solid wedge, non-rising stem type with operating nuts and adjustable valve boxes and covers. Operating nuts shall be two inches (2") square. Resilient seat or wedge type gate valves shall conform to applicable sections of AWWA Standards C509 (250 psi) and be UL and FM approved. The valve shall have a cast iron or ductile iron body, O-ring seals, and factory applied epoxy coated, interior and exterior conforming to the requirements of AWWA C550. Valves shall be factory tested for zero leakage past the seal at two hundred-fifty (250) psi. Gate valves sixteen inches (16") and larger may be double disc type meeting AWWA C-509 (with roller, scrapers and tracks). All gate valves eighteen inches (18") or larger must be geared for horizontal (bevel) installations.

.c ABOVE GROUND VALVES:

Gate valves located above ground or inside structures shall be hand wheel operated, non-rising stem type with flanged ends and be of the same general construction as buried valves.

.d VALVE JOINTS:

All gate valves shall have mechanical joint ends, flanged ends, or screw joints to fit the pipe run in which they are used, except valves installed on push-on joint pipe shall have mechanical joint ends unless otherwise specified.

RECLAIMED WATERLINE DESIGN, MATERIALS, INSTALLATION AND CONSTRUCTION

.10 RUBBER SEATED BUTTERFLY VALVES

Rubber seated butterfly valves shall conform to the requirements of AWWA C504. Wafer type valves conforming to the requirements of AWWA C504 in all respects, but not meeting laying length requirements, will be acceptable if supplied and installed with a spacer, provided the specified laying length is met. Valves shall have factory-applied epoxy coating interior and exterior conforming to the requirements of AWWA C550. Butterfly valves shall be allowed on reclaimed water mains only with UTILITY approval.

.11 CHECK VALVES:

Check valves shall conform to the requirements of AWWA C508. Check valves larger than two inch (2") nominal size shall be iron body, flanged ends, outside lever, spring loaded, swing-type with straightaway passageway of full pipe area. The valve shall have renewable bronze seat ring and rubber faced disc. Check valves larger than two inches (2") shall be one hundred-fifty (150) psi working pressure. Check valves two inches (2") and smaller nominal size shall be all brass swing check valves, two hundred (200) psi working pressure. Buried check valves shall be installed in an access box with traffic rated cover.

.12 AIR RELEASE VALVE:

Air release valve shall be automatic float operated, with all stainless steel trim and shall be designed for air release only (a check valve on the outlet is required to prevent air from reentering the pressurized reclaimed water main). Valve shall be iron body including two inch (2") inlet (min.), stainless steel compound lever design and compliance with AWWA C- 512. Install air valve with double stainless steel band saddle and corporation stop (connected directly into saddle with no nipples). All two inch (2") and smaller piping associated with this installation shall be "extra heavy" brass pipe per ASTM B43 or stainless steel. Brass fittings shall also be "extra heavy." If the installation of the ARV requires a manhole, then the manhole shall be installed, including off-set piping, support bracket and other appurtenances as shown. Acceptable air valve: Val-Matic Series 15A to 50, Crispin Series, PL, ARI, or Sarasota County Utilities approved equal.

.13 TAPPING VALVES:

.a GENERAL:

Tapping valves shall be iron body, resilient wedge gate valves, non-rising stem, open left, resilient seat, two inch (2") square operating nut, having a raised face or lip designed to engage the corresponding recess in the tapping sleeve flange for vertical mounting in approximately level setting on buried water lines. The valve ends shall be mechanical joint for use with ductile iron pipe on one side and standard flanged (Class 125) on the other. Tapping valves eight inch (8") size and smaller may be MJ by MJ valve ends to match sleeve (standard MJ gate valve). Valves shall conform to the applicable section of the CODE and shall have

RECLAIMED WATERLINE DESIGN, MATERIALS, INSTALLATION AND CONSTRUCTION

a factory applied epoxy coating interior and exterior conforming to the requirements of AWWA C550.

.14 TAPPING SLEEVES:

To be utilized only for live tap applications as approved by UTILITIES. No taps (all sizes) shall be made within five (5) pipe diameters or five feet (5') (which ever is smaller) of a joint.

Tapping sleeves for line sizes twenty-four inches (24") or less shall be a full wrap stainless steel including flanges, bolts and nuts and shall be rated for one hundred-fifty (150) psi minimum operating pressure and two hundred (200) psi minimum test pressure. Sizes larger than twenty-four inches (24") shall be prefabricated steel, epoxy coated, with stainless steel bolts. Test ports shall be supplied on all sleeves or as specified by UTILITIES. Size on size tapping sleeves shall be cast iron, mechanical joint, split housing, tapping sleeve, Mueller H615, or pre-approved equal.

The tapping sleeve shall have a pilot flange recessed for tapping. The pilot flange shall be pressure rated Class D according to AWWA C207 with one hundred twenty-five pound (125 lb) drilling conforming to ANSI B16. Each sleeve shall be supplied with a flanged gasket bonded to the flange. The body gasket shall be a full circle, grid pattern, converting the entire length of the sleeve, cloth reinforced with attached stainless steel bridge to support the gasket at the lugs. The gasket shall be made of SBR rubber or similar material, compounded for use with water, salt solution, mild acids, bases and sewage. The sleeve shall have a three-quarter inch ($\frac{3}{4}$ ") NPT bronze or stainless steel test plug. All welds shall conform to ASTM A380 and shall be fully passivated. Tapping sleeves eight inch ($\frac{8}{7}$ ") and smaller may have outlet connection to fit a mechanical joint tapping valve.

Acceptable materials are as follows:

.a Stainless steel tapping sleeves for tapping mains up to twenty-four inches (24") in diameter shall be passivated, full wrap around design with full gasket. Stainless steel tapping sleeves shall be furnished with:

Sleeve Shell - 304 Stainless Steel, Lugs, Nuts, Bolts - 304 Stainless Steel, Washers - 304 Stainless Steel, Flange Gasket - Glued to flange face, Flange - Meets ASTM A536, latest revision, or 304 Stainless Steel, Flange, Nuts, bolts – 304 Stainless Steel, Seal Gasket - Full circumference and full length, Test Plug - 304 Stainless Steel, 3/4 inch NPT.

b Epoxy Coated Steel for tapping mains larger than twenty-four inches (24") in diameter shall be furnished with:

Body - Heavy welded steel, full support body, not strapped,

RECLAIMED WATERLINE DESIGN, MATERIALS, INSTALLATION AND CONSTRUCTION

Epoxy Coating – Epoxy resin, free of voids, lamination, or blisters, dry film thickness of 8-10 mils, Bolts and Nuts - 304 Stainless Steel, Flange - Steel flat face with gasket, Flange, Nuts, Bolts – 304 Stainless Steel, Test Plug - 304 Stainless Steel, three fourths (3/4) inch NPT, Seal Gasket - Water service Buna N.

.c Mechanical joint tapping sleeves shall be furnished with:

Body - Cast Iron (Mueller H615 or equal), Flange - Shall be flat face with gasket, Flange, Nuts, Bolts – 304 Stainless Steel, Bolts and Gasket - Shall be furnished by sleeve manufacture.

.15 VALVE BOXES

GENERAL: Valve boxes shall be provided for buried valves which have no gearing or operating mechanism, or in which the gearing or operating mechanism is fully protected with a cast iron grease case. The valve box shall not transmit shock or stress to the valve, and shall be centered and plumb over the operating nut of the valve, with the box cover flush with the surface of the proposed grade or finished pavement.

- .a Valve box top section shall be manufactured to accommodate a square valve box cover, or lid. The cover shall be marked reclaimed and be color-coded Pantone purple 522C.
- .b Valve boxes shall be cast iron adjustable screw type supplied with a twelve (12) pound cover and a minimum of three-sixteenth inch (3/16") wall thickness conforming to the ASTM Designation A48, Class 20B, gray iron castings; and shall be smooth, true to pattern, free from blow holes, sand holes, projections, or other harmful defects and shall be coated with a single thin coat of coal tar epoxy. The cover will not rock after it has been seated in any position in its associated jacket. Valve boxes shall be supplied by the manufacturer in such lengths as can be adapted, without full extension, to a depth of cover required over the pipe at the valve location.
- .c Valve stem extensions with centering ring shall be furnished to maintain between eighteen inches (18") and thirty-six inches (36") to the top of the operating nut. The stem extension shall be secured to the operating nut for the valve by a stainless steel set screw and have centering ring. Where multiple extensions may be used the extensions shall be secured together by pins or stainless steel bolts and nuts installed completely through the assembly.
- .d Portland cement concrete valve pads shall be supplied for all valves located outside of paved areas. Valve pads shall be twenty-four inches (24") square by six inches (6") thick, with four (4), No. 4 reinforcing bars. Pre-cast concrete

RECLAIMED WATERLINE DESIGN, MATERIALS, INSTALLATION AND CONSTRUCTION

valve pads meeting the above requirements will be allowed with the approval of UTILITIES.

.e Valve pads for in line valves shall have a three inch (3") nameplate securely embedded into the pad. Etched in the nameplate shall be "Reclaimed", the year of manufacture, size of the valve, the number of turns necessary to open or close the valve, and an arrow indicating the direction of flow.

.10 RECLAIMED WATER SERVICE CONNECTIONS

- .a RECLAIMED WATER SERVICE LINES shall be a minimum of one inch (1") in diameter. Reclaimed water service lines greater than two inches (2") in diameter shall be connected to the reclaimed water main by a tapping sleeve and valve with an above ground meter assembly unless otherwise approved by UTILITIES.
- b RECLAIMED WATER SERVICE LINES up to two inches (2") in diameter shall be constructed of polyethylene (PE) tubing as specified herein, color-coded Pantone purple 522C.
- .c SERVICE SADDLES shall have CC thread and a bronze body with double bronze straps and nuts for pipe sizes eight inch (8") and larger. Two (2) piece, bronze body, double strap, hinged service saddle with one inch (1") outlet shall be required for four inch (4") and six inch (6") PVC pipe and optional on eight inch (8") PVC pipe. Saddles shall have a rubber gasket cemented to the body, with compatible threading between the saddle and corporation stop. Saddles shall conform to ANSI/AWWA C800 standards.

Direct taps for one inch (1") services using CC threaded corporation stops specified herein, may be used on six inch (6") and larger PVC and DIP reclaimed water mains. Two (2) piece bronze body, double strap, hinged service saddles, with one inch (1") outlet must be used on four inch (4") pipe. Saddle shall have CC thread and conform to AWWA C800 standards.

- .d CORPORATION STOPS in sizes one inch (1") through two inches (2") shall have CC thread, be manufactured from cast bronze with machined fitting surfaces, and conform to the requirements of AWWA C800 ball type only. The outlet shall be compression joint for PE for copper tubing (CTS) or IPS. The corporation shall be pressure rated at one hundred-fifty (150) psig.
- .e METER (BALL) VALVES shall be one-fourth (1/4) turn ball angle meter valve style through one inch (1") with full port, meter nut, and lock wing. Valves larger than one inch (1") shall have an angled ball valve one-fourth (1/4) turn with a two (2) bolt elliptical flange. Meter (ball) valves shall conform to ANSI/AWWA C800 standards ball type only. The inlet shall be compression joint for PE or copper tubing (CTS) or IPS. All parts shall be manufactured from cast bronze with machined fitting surfaces, and conform to the requirements of

RECLAIMED WATERLINE DESIGN, MATERIALS, INSTALLATION AND CONSTRUCTION

ANSI/AWWA C800. The meter (ball) valve shall be pressure rated at one hundred-fifty (150) psig.

- .f CURB STOPS OR VALVES shall be one-forth (1/4) turn ball type, and shall conform to ANSI/AWWA C800 standards. The inlet and outlet shall be compression joint for PE or copper tubing (CTS) or IPS. Body shall be manufactured from cast bronze with machined fitting surfaces, and conform to the requirements of ANSI/AWWA C800. The curb valve shall be pressure rated at one hundred-fifty (150) psig.
- .g METER BOXES shall be as required by UTILITIES or the Authority having jurisdiction, and shall be of sufficient size to completely enclose the meter and shut off valve or service stop. Box height shall extend from invert of the meter to final grade at the meter location. Cover shall be color-coded purple, load bearing, with cast iron hinged meter reading viewing lid.
- .h RECLAIMED WATER METERS shall be those specified by the utility and shall be installed according to the standard details.

All reclaimed water meters within UTILITIES service areas shall be obtained from Sarasota County Utilities. Notes indicating this requirement shall be incorporated into the plans and specifications.

15.9 RECLAIMED WATER SYSTEMS INSTALLATION

.1 GENERAL

See related Sections 7 through 11 for general requirements.

- .2 HANDLING AND STORAGE OF MATERIAL
 - .a Pipe shall be handled in accordance with the manufacturer's recommendations and shall not be stacked higher than four feet (4'). Suitable racks, chairs, and other supports shall be provided to protect preformed pipe mating surfaces from damage. Store bottom tiers shall be raised off the ground.
 - .b Unless the piping will be installed within two (2) weeks of delivery all piping and other materials subject to ultraviolet or ozone attack shall be protected from the sunlight, atmosphere, and weather. The piping and materials shall be stored in suitable enclosures or under appropriate protective wrapping until ready for installation. PVC pipe manufactured more than eighteen (18) months before date of installation shall not be installed and shall be rejected and removed from the construction site.
 - .c Pipe and fittings should be handled and laid to avoid damaging the pipe, scratching or marring machined surfaces, and scratching the pipe coating. The lined DIP and fittings must be handled only from the outside of the pipe and

<u>RECLAIMED WATERLINE DESIGN, MATERIALS, INSTALLATION</u> <u>AND CONSTRUCTION</u>

fittings. No forks, chains, straps, hooks, etc. shall be placed inside the pipe and fittings for lifting, positioning, or installing. If damaged, the material shall be repaired in accordance with the liner manufacturer's recommendations. Any fitting showing a crack and any fitting or pipe which has received a severe blow that may have caused an incipient fracture, even though no such fracture can be seen, shall be marked as rejected and removed at once from the site.

.3 PIPE AND FITTING INSTALLATION

- .a Before installation all pipes shall be inspected, and all materials found to be defective shall be removed from the site.
- .b The interior of pipe, fittings, valves, and accessories shall be thoroughly cleaned of foreign matter before being lowered into the trench. All pipes shall be kept clean during laying operations and shall be securely plugged watertight when construction stops overnight or for an extended period of time.
- .c Pipe shall be installed with a minimum of thirty-six (36) inches of cover unless otherwise directed by the EOR and approved by UTILITIES.
- .d Cutting and installation of pipe, fittings, valves, and accessories shall be performed using the recommendations of the manufacturer and in accordance with the best trade practices. Care shall be taken to not injure the material coatings or linings. Damage to linings shall be cause for rejection of the complete section of pipe, fitting, or valve. Damage to exterior coatings shall be corrected to original specifications.
- Water mains shall be constructed of the materials specified and as shown on .e the drawings. All PVC C900/C905 pipe shall be laid in accordance with AWWA C605. Pipe and fittings shall be carefully handled to avoid damage, and if feasible, while they are suspended over the trench before lowering, they shall be inspected for defects and to detect cracks. Each section of the pipe shall rest upon the pipe bed for the full length of its barrel, with recesses excavated to accommodate bells and joints. Any pipe which has its grade or joint disturbed after laying shall be taken up and re-laid. Only suitable soils (no heavy clay) shall be utilized in the backfill operation up to twelve inches (12") above the pipe. The maximum joint deflection shall be limited to seventy-five percent (75%) of the pipe manufacturer's recommendation. All precautions shall be taken to prevent sand or other foreign material from entering the pipe during installation. Any time the pipe installation is not in progress, the open ends of pipe shall be closed by a watertight plug or other method approved by the Engineer. Plugs shall remain in pipe ends until all water is removed from the trench. Any sand or foreign material that enters the pipe shall be removed from the pipe immediately. No pipe shall be installed when trench conditions (standing water, excess mud, etc.) or the weather (rain, etc.) is unsuitable for such work, except by permission of UTILITIES. Any section of pipe already laid
RECLAIMED WATERLINE DESIGN, MATERIALS, INSTALLATION AND CONSTRUCTION

which is found to be defective or damaged shall be replaced with new pipe. The use of 90-degree bends shall be avoided if possible (two (2) 45 degree bends or other method is preferred).

- .f Special Construction Requirements for twenty-four inch (24") and Larger PVC Pipe: For PVC pipe twenty-four inches (24") and larger, unless approved otherwise by UTILITIES, a foundation bed of granular material (57 stone) shall be placed under and around all ductile iron fittings and valves for additional support of heavy system components. A foundation bed of granular material shall be provided for all valves twenty inches (20") and larger. For granular materials, the minimum vertical limit is twelve inches $(12^{"})$ under the fitting or valve, up to 1/3 the overall height of the fitting or valve. The minimum horizontal limits of the granular material shall be twelve inches (12") in all directions beyond the outer edges of the fitting or valve. The compaction of soils below the granular material shall be at ninety-eight percent (98%) of the maximum density (AASHTO T-180 Standards). All spool pieces between twenty-four inches (24") and larger ductile fittings and valves shall be of ductile plain end pipe (no PVC spool pieces allowed). Where possible, a full joint of pipe (no short pipe lengths) shall be connected to all fittings and valves. No joint deflection shall be allowed at the fittings or valves.
- .g All PVC piping shall have a continuous number twelve (12) gauge AWG copperclad carbon steel location wire with thirty (30) mils (minimum) insulation, colorcoded purple, attached securely to the pipe. The wire shall be laid on top of the pipe and be secured with tape at ten foot (10') intervals. The wire shall terminate at fire hydrants, valve boxes, and at the terminal point of service.
- .h Three inch (3") wide location tape, color-coded purple, shall be located eighteen inches (18") above all reclaimed waterlines.

.4 THRUST RESTRAINT:

All non-flanged fittings and valves shall be restrained using the following method:

.a Mechanical restraint at fittings and valves and mechanical restraint along adjacent joints of pipe to a length as specified by the EOR, at a minimum, using an approved restraining device.

.5 VALVE AND SERVICE LOCATION MARKERS

- .a All valves and services located outside the roadway shall be identified by one or more of the following methods:
 - i The letter "R" for reclaimed water shall be clearly stamped or etched into the concrete curb directly adjacent to the valve. Etching shall be accomplished with a motorized saw cutter and the saw cut shall be deep enough so as to be

<u>RECLAIMED WATERLINE DESIGN, MATERIALS, INSTALLATION</u> <u>AND CONSTRUCTION</u>

permanent. The minimum size shall be three inches (3") by three inches (3").

- .ii When curbs are not available, aluminum and/or plastic disks, Pantone purple for reclaimed water, shall be used, as supplied by National Band and Tag Company, or approved equal. Each tag shall be labeled "RECLAIMED" water and be secured into the pavement by a two inch (2") "PK" survey marker nail. The footage shall be clearly stamped in the disks indicating the approximate distance in feet to the valve or service directly adjacent to the placement of the disks.
- .iii When neither curbs nor pavement are available, a six foot (6') long, two inch (2") by four inch (4") pressure treated stake with four feet (4') above grade, and the top twelve inches (12") painted purple for reclaimed water shall be placed directly beside the valve and pad outside the roadway, until such time as one of the above procedures can be implemented.
- .b Service piping shall have a continuous number twelve (12) gauge AWG copperclad carbon steel location wire with thirty (30) mils (minimum) insulation, color coded purple, attached securely to the pipe. The wire shall be laid on top of the pipe and be secured with tape at ten foot (10') intervals. The wire shall terminate at fire hydrants, valve boxes, and at the terminal point of service.

.6 CONNECTIONS TO EXISTING LINES

- .a DISSIMILAR PIPE CONNECTIONS: Solid sleeves shall be used for joining plain end pipe sections and for joining pipes of dissimilar materials. The sleeves shall conform to AWWA C110/C153 and be a long pattern type.
- .b Where connections are made between new work and existing mains the connections shall be made by using specials and fittings to suit the actual conditions, and shall be restrained with approved materials. The connection shall be made in a dry trench in a neat and clean manner. All interior pipe and fitting surfaces shall be thoroughly cleaned. The Contractor shall notify the EOR and UTILITIES forty-eight (48) hours (two (2) working days) prior to making the actual connection.
- .c Where connections are made between new work and existing mains, a minimum of five (5) working days notification shall be given to UTILITIES. The Contractor shall coordinate with UTILITIES inspector, referencing the time, date, and duration of the proposed work.
- .d Valves on existing mains, including new valves tied to existing systems shall be operated by UTILITIES personnel, or under direct supervision of UTILITIES.
- .e Prior to the planned work, the Contractor shall have as much material preassembled as possible in order to minimize the length of service interruption. If preparations are not ready, UTILITIES will postpone the work and have the contractor reschedule the work for a later time.

<u>RECLAIMED WATERLINE DESIGN, MATERIALS, INSTALLATION</u> <u>AND CONSTRUCTION</u>

.7 WET (LIVE) TAPS

The Contractor shall make the tap while the line is in service by using a tapping sleeve or tapping saddle as specified herein. The tapping of the main shall be done using standard tapping techniques as approved by UTILITIES. The reclaimed water mains shall be tapped in such a manner that the operation of the main in service is not disturbed.

- .a The Contractor shall be responsible for scheduling and coordinating the work for each tap.
- .b Prior to making the tap the Contractor shall pour the concrete sleeve and valve support. The contractor shall assemble all materials, and have sufficient supervision, labor, tools, and materials necessary to make the tap.
- .c Prior to the tap, the Contractor shall pressure test the tapping sleeve and valve installation under supervision of the UTILITIES inspector and/or the EOR. The contractor shall notify UTILITIES, the EOR and the utility (if applicable) forty-eight (48) hours prior to the test. The Contractor shall be responsible for properly backfilling and compacting the work area pit after the work is completed.

.d HYDROSTATIC AND LEAKAGE TEST:

After installing a tapping sleeve and valve, and prior to tapping of a pressurized reclaimed water main, a hydrostatic and leakage test shall be performed. The test will be conducted by introducing water into a tap or test hole located at the neck of the outlet half of the sleeve, on sleeves furnished with said tap, and with the tapping valve in the closed position. Sleeves shall be provided with a test plug. The sleeve and valve shall be capable of maintaining a test pressure of one hundred-fifty (150) psi for thirty (30) minutes duration, with no sign of visible leaks. All leaks shall be repaired by removing and replacing defective items with items free of defects, after which the sleeve and valve shall be re-tested. Such repair and re-testing shall be done until the installation passes the specified test. The Contractor shall furnish and install any necessary temporary restraints, gauges, pumps and other incidental and appurtenant items necessary to complete this work, and shall remove same upon completion of the test. A watertight plug (bronze or stainless steel) shall then be inserted into the test hole.

15.10 TESTING (GENERAL)

- .1 This section covers testing procedures generally used in various areas of reclaimed water system construction.
 - .a Upon satisfactory installation, new, modified, or extended reclaimed water mains shall be flushed, and subject to hydrostatic and leakage test procedures as specified herein prior to being placed into service.

<u>RECLAIMED WATERLINE DESIGN, MATERIALS, INSTALLATION</u> <u>AND CONSTRUCTION</u>

- .b All reclaimed water mains shall be cleaned and flushed to remove all sand and other foreign matter. The Contractor shall be responsible for developing a flushing plan to be submitted to UTILITIES for approval prior to flushing. The Contractor shall dispose of all water used for flushing without causing a nuisance or property damage. Minimum flows for pipe four inches (4") to twelve inches (12") are as follows:
 - .1 4" Dia. = 98 gpm
 - .2 6" Dia. = 221 gpm
 - .3 8" Dia. = 391 gpm
 - .4 12" Dia. = 880 gpm
- .c In order to reduce the volume of water used in the pipe line cleaning procedure for reclaimed water mains sixteen inches (16") and larger, the Contractor shall utilize foam "pigs" to remove dirt and debris from the sections of pipe being tested.

.2 PRE-TEST PROCEDURES

- .a Testing for any utility system within the unincorporated area of Sarasota County shall be conducted in the presence of, but not limited to, the EOR, a Utility representative, the Contractor and UTILITIES (or their designated representative).
- .b All persons required to be present for testing shall be notified by the Contractor a minimum of forty-eight (48) hours prior to the commencement of the test. Should any of the required persons not be properly informed, the test shall be rescheduled.
- .c After installation of the pipe is complete, all joints properly completed, appurtenances permanently installed, and the trench backfilled and compacted, the newly laid piping or any valved section of piping, shall be tested generally in accordance with AWWA C600, Hydrostatic Testing and Leakage Testing, latest revision.
- .d The Contractor shall ensure, in advance of the actual testing, that all equipment such as pumps, gauges, blow-offs, and valves are in good working order. The lines being tested must be ready for use and free of all excess trapped air, incidental leaks, dirt, and debris.

.3 HYDROSTATIC TEST PROCEDURES

.a Reclaimed waterlines to be tested shall be within one thousand foot (1000') sections located between valves or adequate plugs. Longer sections will be allowed provided each valve is closed against the test pressure; the allowable

<u>RECLAIMED WATERLINE DESIGN, MATERIALS, INSTALLATION</u> <u>AND CONSTRUCTION</u>

leakage will be based on the one thousand foot (1000') section. Testing shall not proceed until restraining devices have been installed.

- .b Before applying the specified test pressure, air shall be expelled completely from the system. If permanent air vents are not located at all high points, the Contractor shall install corporation stops at such points that the air can be expelled as the line is filled with water. At the satisfactory conclusion of the pressure test, removal of the test cocks shall be as directed by UTILITIES.
- .c The test shall include the application of the specified pressure to the test section, by way of a pump taking its supply from a clean suitable container and adequate for measuring the displaced volume.
- .d The Contractor shall ensure, in advance of the actual testing, that all equipment such as pumps, gauges, blow-offs, and valves are in good working order. The mains being tested must be ready for use and free of all excess trapped air, incidental leaks, dirt, and debris.

.4 HYDROSTATIC - LEAKAGE TEST PROCEDURES

- .a A leakage test shall be conducted concurrently with the hydrostatic pressure tests. The duration of each leakage test shall be at least two (2) hours. During the test, the reclaimed waterline shall be subjected to a testing pressure of one hundredfifty (150) psig or as specified by the EOR and/or UTILITIES.
- .b Leakage shall be defined as the quantity of water that must be supplied to the newly installed pipe, or any valved section thereof, to maintain pressure within five (5) psig of the specified test pressure after the air in the pipeline has been expelled and the pipe has been filled with water.
- .c Leakage shall not be measured by a drop in pressure in a test section over a period of time, but shall be measured for the exact quantity of water lost, in a manner approved by the EOR and UTILITIES.
- .d Test pressures shall not exceed one hundred-ten percent (110%) of the rated pressure of the valves or system components when the pressure boundary of the test section includes closed resilient seated gate valves or butterfly valves.
- .e Allowable leakage will be determined by the following formula:



 $L = \frac{SD\sqrt{P}}{133,200}$ Where L = allowable leakage, in gallons per hour.

RECLAIMED WATERLINE DESIGN, MATERIALS, INSTALLATION AND CONSTRUCTION

- S =length of pipe tested, in feet.
- D = nominal diameter of the pipe, in inches.
- P = average test pressure maintained during the test, in pounds per Square inch gauge.

The test pressure shall be one hundred-fifty (150) psig. For longer reclaimed waterlines the maximum length of one thousand feet (1000') shall be used for leakage calculations regardless of the actual total length of pipe tested.

- .f When testing against existing closed metal-seated valves, an additional leakage, per closed valve, of 0.0078 gal/h/in. of nominal valve size shall be allowed.
- .g If any test discloses leakage greater than the allowable for each test section, the Contractor/Developer shall, at their own expense, locate and make repairs as necessary until the leakage is within the specified allowance. All visible leaks are to be repaired regardless of the amount of leakage.

END OF SECTION

Page Blank Intentionally

Standard Details

Page Blank Intentionally

ACCESS MAINTENANCE AREA (Lift Station)	14.4	Pg-118
ADULT CONGREGATE LIVING FACILITY (A.C.L.F.) (EDU Schedule)	3.13	Pg-15
AGGREGATE (Concrete)	11.6	Pg-66
BACKFILL	8.11	Pg-56
BONDING AND GROUTING (Concrete)	11.12	Pg-67
BORROW	8.7	Pg-55
BULK WATER USE FEE	3.7	Pg-15
CAR WASH: (per stall) (EDU Schedule)	3.15	Pg-16
CARRIER PIPE INSTALLATION	9.4	Pg-62
CEMENT (Concrete)	11.5	Pg-66
CENTRAL SERVICE REQUIRED	4.5	Pg-18
CENTRAL UTILITIES SERVICE	4.1	Pg-18
CERTIFICATES OF OCCUPANCY	5.22	Pg-32
CHANGES TO APPROVED PLANS FEE	3.5	Pg-14
CHURCH (per 100 seats) (EDU Schedule)	3.16	Pg-16
COLOR CODING FOR PIPE	6.7	Pg-45
COMPACTION/DENSITY TESTING	8.19	Pg-60
COMPLETION OF REVIEW	5.9	Pg-26
CONCRETE DESIGN (Concrete)	11.1	Pg-66
CONSISTENCY OF PLANS WITH CONCURRENCY REQUIREMENTS	5.6	Pg-25
CONSISTENCY OF PLANS WITH RECLAIMED WATER MASTER PLAN	15.2	Pg-130
(Reclaimed Water Systems)		C
CONSOLIDATION OF FACILITIES	4.10	Pg-21
CONSTRUCTION INSPECTIONS, OBSERVATIONS AND	7.6	Pg-52
RESPONSIBILITIES		
CONSTRUCTION LAY OUT	7.4	Pg-51
CONSTRUCTION PERMIT JURISDICTION OR APPLICABILITY	5.4	Pg-23
CONSTRUCTION PERMIT SUSPENSION	5.16	Pg-29
CONSTRUCTION WITHOUT PERMIT FEE	3.6	Pg-14
CONTRACTOR'S DOCUMENT SUBMITTAL	5.10	Pg-27
CONTROLS (Lift Station)	14.9	Pg-125
CONVENIENCE STORE (EDU Schedule)	3.17	Pg-16
CORRECTION OF PLANS/SPECIFICATIONS	5.15	Pg-28
CURING (Concrete)	11.14	Pg-68
DEAD ENDS (Waterlines)	12.6	Pg-70
DESCRIPTION (Earthwork and Excavation)	8.2	Pg-54
DESIGN DRAWINGS	6.3	Pg-38
DESIGN STANDARDS (Lift Station)	14.2	Pg-116
DEVIATIONS FROM APPROVED PLANS	5.14	Pg-28
DEWATERING	8.8	Pg-55
DIRECTIONAL BORING INSTALLATION	10.3	Pg-64
DROP MANHOLES	13.8	Pg-92

EASEMENTS	6.4	Pg-42
EMERGENCY GENERATORS	14.12	Pg-126
ENGINEER'S CERTIFICATION SUBMITTAL STANDARDS	5.19	Pg-30
EQUIVALENT DWELLING UNIT SCHEDULE	3.11	Pg-15
EXCAVATED MATERIAL	8.15	Pg-58
EXCAVATION	8.6	Pg-54
EXISTING DEVELOPMENTS (Residential & Commercial)	4.6	Pg-19
FEE FOR NON – STANDARD WORKING HOURS	3.9	Pg-15
FENCING (Lift Station)	14.5	Pg-118
FIELD CHANGES	7.5	Pg-51
FEE FOR FIRE HYDRANT OR CONSTRUCTION METERS	3.10	Pg-15
FORCE MAINS	13.12	Pg-93
FORMS (Concrete)	11.11	Pg-67
FULL ROADWAY FRONTAGE REQUIRED	6.9	Pg-46
GAS STATION (per rest room) (EDU Schedule)	3.18	Pg-16
GENERAL (Directional Drilling)	10.1	Pg-64
GENERAL (Earthwork and Excavation Requirements)	8.1	Pg-54
GENERAL (General Construction Standards for Water, Wastewater and	7.1	Pg-50
Reclaimed Water		U
GENERAL (General Design Standards for Water, Wastewater and Reclaimed	6.1	Pg-37
Water)		
GENERAL (Jacking and Boring)	9.1	Pg-61
GENERAL (Lift/Pump Station Design Standards, Specifications and Installation	14.1	Pg-116
Requirements)	F 1	D 02
GENERAL (Plan Review, Application Submittal and Project Completion for Utility System Construction)	5.1	Pg-23
GENERAL (Potable Waterline Design Materials Installation and Construction)	12.1	Ρ α 60
GENERAL (Pocloimed Waterline Design, Materlans, Instantation and Constitution)	12.1	$P_{\alpha} = 120$
Construction)	13.1	1 g-150
GENERAL (Wastewater, Design, Materials, Installation and Construction)	13.1	Pg-90
GENERAL SERVICE (EDU Schedule)	3 14	Pg-15
HIGH-EARLY-STRENGTH CONCRETE	11.9	Pg-66
HOSPITAL (per bed.) (EDU Schedule)	3 19	Pg-16
HOTEL MOTEL (per room) (EDU Schedule)	3 20	Pg-16
HVDRANT AND FIRE ELOW REOLUREMENTS	12.5	$P_{\sigma} = 60$
HYDRALLI IC SUBCE CONTROL (Lift Station)	12.5	$P_{\alpha} = 125$
INADEOLIATE DI ANS INCOMPLETE SUBMITTALS	5 8	$P_{\alpha} 26$
INSTALL ATION (Directional Drilling)	10.2	1 g - 20
INSTALLATION (Directional Diffing)	10.5	rg-04 Do 142
INSTALLATION (Reclamed water Systems)	13.9	Pg-145
INSTALLATION OF WASTEWATER SYSTEMS	13.14	Pg-105
INSTALLATION, POTABLE WATER SYSTEMS	12.8	Pg-/9
JACK AND BORE (Installation)	9.3	Pg-62
LAUNDROMAT (per machine) (EDU Schedule)	3.21	Pg-16
LIFT STATIONS UNDER 2000 GPD	14.13	Pg-126
LIMITED DISCRETIONARY POWERS AUTHORIZED	4.3	Pg-18
LINE AND FITTING RESTRAINTS	6.10	Pg-46

LOCATION MARKINGS	6.8	Pg-46
LOW PRESSURE AND VACUUM SYSTEMS (Wastewater)	13.15	Pg-107
LOW PRESSURE AND VACUUM SYSTEMS (Lift Station)	14.14	Pg-127
MANHOLE FRAME AND COVERS	13.10	Pg-93
MANHOLES	13.7	Pg-92
MASTER PLANS	4.4	Pg-18
MATERIAL DISPOSAL	8.16	Pg-58
MATERIALS (Directional Drilling)	10.2	Pg-64
MATERIALS (Jacking and Boring)	9.2	Pg-61
MATERIALS (Wastewater)	13.13	Pg-94
MATERIALS FOR LIFT/PUMP STATIONS	14.7	Pg-119
MATERIALS, PIPE AND FITTINGS (Waterlines)	12.7	Pg-71
MATERIALS, PIPE AND FITTINGS (Reclaimed Water Systems)	15.8	Pg-132
MINIMIZING SILTATION AND BANK EROSION	8.4	Pg-54
MINIMUM LINE SIZES	6.6	Pg-43
MINIMUM MUNICIPAL LEVEL OF SERVICE REQUIRED	4.7	Pg-20
MINIMUM PIPE SIZE AND THICKNESS TABLE	9.5	Pg-63
MIXING AND PLACING (Concrete)	11.13	Pg-67
NON-STANDARD WORKING HOURS	3.8	Pg-15
NOT APPLICABLE FOR IMPACT FEES (EDU Schedule)	3.30	Pg-17
NURSING HOME-W/COMMON DINING AREA (per bed) (EDU Schedule)	3.23	Pg-16
ODOR CONTROL (Lift Station)	14.11	Pg-126
OFFICE (per 1000 square feet) (EDU Schedule)	3.24	Pg-16
OFF-SITE IMPROVEMENTS	6.5	Pg-43
PEAK DESIGN FLOWS (Wastewater)	13.4	Pg-90
PERMIT ACCEPTANCE	5.12	Pg-28
PERMIT DURATION	5.13	Pg-28
PERMIT PROVISIONS	5.2	Pg. 23
PERMIT REQUIREMENTS	3.1	Pg-14
PIPE AND FITTINGS FOR VALVE ASSEMBLY AND WET WELL	14.8	Pg-124
PIPE DEPTH AND PROTECTION	6.11	Pg-46
PLAN REVIEW AUTHORITY AND CONSISTENCY OF PLANS WITH	5.5	Pg-24
MASTER PLANS	<i>с</i> л	D 05
PLAN REVIEW PROCESS AND SUBMITTALS	5.7	Pg-25
POOL, COMMERCIAL (EDU Schedule)	3.25	Pg-16
POTABLE WATER SYSTEMS INSTALLATION	12.8	Pg-79
PRECAST MANHULE PIPE CONNECTION	13.9	Pg-92
PRE-CONSTRUCTION MEETING	5.11	Pg-27
PRESSURE (Potable Water Systems)	12.2	Pg-69
PRESSURE (Reclaimed Waterlines)	15.5	Pg-131
PROCEDURES FOR UTILITY CONTRUCTION APPROVAL AND PERMITTING	3.3	Pg-23
PROJECT COMPLETION	5.18	Pg-29
PROTECTION OF PROPERTY	7.2	Pg-50
PROTECTIVE REINFORCED CONCRETE SLAB	6.13	Pg-48
		0

READY-MIXED CONCRETE	11.10	Pg-67
RECLAIMED WATER IRRIGATION REQUIREMENTS	15.3	Pg-130
RECLAIMED WATER CONSERVATION REQUIREMENTS	15.4	Pg-130
RECLAIMED WATER SERVICES	15.7	Pg-131
RECORD DRAWING REQUIREMENTS	5.20	Pg-31
REFERENCE DOCUMENTS	8.3	Pg-54
REFERENCES	6.2	Pg-37
REINFORCING (Concrete)	11.8	Pg-66
RESIDENTIAL (EDU Schedule)	3.12	Pg-15
RESTAURANT (EDU Schedule)	3.26	Pg-16
RESTORATION	8.17	Pg-58
RETAIL (per 1000 square feet) (EDU Schedule)	3.27	Pg-16
RE-INSPECTION TEST FEE	3.5	Pg-14
ROADWAY REMOVAL AND REPLACEMENT	8.18	Pg-59
SARASOTA COUNTY UNIFORM WATER, WASTEWATER AND	4.2	Pg-18
RECLAIMED WATER SYSTEMS CODE		
SCHOOL (EDU Schedule)	3.28	Pg-17
SERVICE LATERAL (Wastewater)	13.11	Pg-93
SHEETING AND BRACING	8.9	Pg-55
SIGNAGE/NOTICES (Lift Station)	14.6	Pg-119
SLUMP (Concrete)	11.2	Pg-66
STANDARD BASE FOR DESIGN FLOWS (Wastewater)	13.3	Pg-90
STORAGE (Concrete)	11.4	Pg-66
STRENGTH (Concrete)	11.3	Pg-66
SUB-BEDDING MATERIAL	8.14	Pg-58
SYSTEM DESIGN (Lift Station Force Main)	14.15	Pg-127
TEMPORARY WORK STOPPAGE	8.5	Pg-54
TESTING (Concrete)	11.15	Pg-68
TESTING (Directional Drilling)	10.4	Pg-65
TESTING (Reclaimed Waterlines)	15.10	Pg-147
TESTING (Wastewater)	13.15	Pg-109
TESTING, GENERAL (Potable Waterlines)	12.9	Pg-83
THEATER (per 75 seats) (EDU Schedule)	3.29	Pg-17
TRAFFIC CONTROL	7.3	Pg-50
TRENCH GRADE	8.10	Pg-56
TURNOVER OF LINES TO SARASOTA COUNTY UTILITIES	5.21	Pg-32
UNSUITABLE MATERIAL BELOW TRENCH GRADE	8.13	Pg-58
UTIILITY BEDDING	8.12	Pg-57
UTILITIES AS A SERVICE BUSINESS	4.8	Pg-20
UTILITIES CONSTRUCTION PERMIT FEE	3.4	Pg-14
UTILITIES CONSTRUCTION PLAN REVIEW FEE	3.3	Pg-14
UTILITY LOCATION REQUEST (General)	4.6	Pg-20
UTILITY LOCATION REQUEST (Rates)	3.2	Pg-14
UTILITY SERVICE LINES	6.14	Pg-49

VALVE AND SERVICE LOCATION MARKERS	6.15	Pg-49
VALVES, VALVE LOCATIONS (Reclaimed Waterlines)	15.6	Pg-131
VALVES, VALVE LOCATIONS (Waterlines)	12.3	Pg-69
VIOLATION NOTIFICATION	5.17	Pg-29
WAREHOUSE (EDU Schedule)	3.23	Pg-16
WASH-DOWN LINE (Lift Station)	14.3	Pg-118
WASTEWATER FACILITIES	13.2	Pg-90
WASTEWATER GRAVITY LINE-SIZE COMPUTATION	13.5	Pg-90
WASTEWATER GRAVITY SYSTEMS	13.6	Pg-91
WATER (Concrete)	11.7	Pg-66
WATER SERVICES	12.4	Pg-69
WATER, WASTEWATER, RECLAIMED WATER AND STORM WATER CLEARANCE REQUIREMENTS	6.12	Pg-47
WET TAP FEES	3.10	Pg-15