

ORDINANCE NO. 19-13

AN ORDINANCE OF THE BOARD OF COUNTY COMMISSIONERS OF MARION COUNTY, FLORIDA, AMENDING THE MARION COUNTY LAND DEVELOPMENT CODE REGARDING UTILITIES IN ARTICLES 6; PROVIDING FOR REPEAL, SEVERABILITY, AND AN EFFECTIVE DATE.

WHEREAS, Chapter 125, Florida Statutes, empowers the Board of County Commissioners to prepare, adopt and enforce land development regulations for development in the unincorporated area of Marion County; and

WHEREAS, Section 163.3202, Florida Statutes, empowers and requires the Board of County Commissioners to adopt and enforce land development regulations that are consistent with and implement the adopted Marion County Comprehensive Plan; and

WHEREAS, the Marion County Land Development Regulation Commission on **June 19, 2019**, at an advertised public hearing, voted to transmit the Land Development Code changes described herein to the Board of County Commissioners recommending adoption; and

WHEREAS, the Board of County Commissioners conducted advertised public hearings on **July 2, 2019 at 5:30 p.m.** and on **July 16, 2019 at 10:00 a.m.** to receive public comment concerning adoption of the changes to the Land Development Code; and

WHEREAS, in the exercise of its authority, the Board of County Commissioners has determined it necessary and desirable to adopt the referenced Land Development Code changes with revisions as directed by the Board during the public hearings, and enforce land development regulations that are consistent with the adopted Marion County Comprehensive Plan;

NOW THEREFORE, BE IT ORDAINED by the Board of County Commissioners of Marion County, Florida:

SECTION 1. PURPOSE AND INTENT. The purpose and intent of this Ordinance is to adopt changes and clarifications to the Land Development Code while remaining consistent with and implementing the adopted Marion County Comprehensive Plan. This Ordinance revises Article 6, Technical Standards and Requirements. The revisions to Article 6 are intended to revise and update Table 6.14-1 of the Technical Standards regarding utilities.

SECTION 2. ADOPTION. The Board hereby adopts the Land Development Code changes regarding Article 6, attached hereto as **Exhibit "A,"** and incorporated herein by reference.

SECTION 3. REPEAL. All Ordinances or parts of Ordinances which are in conflict with this Ordinance are hereby repealed.

SECTION 4. APPLICABILITY. For the purposes of jurisdictional applicability, this ordinance shall apply in all unincorporated areas of Marion County. This ordinance shall apply to all applications for development, including building permit applications and subdivision proposals, submitted on or after the effective date of this ordinance.

SECTION 5. SEVERABILITY. If any provision or regulation of this Ordinance or the Marion County Land Development Code is declared by any court of competent jurisdiction to be void, unconstitutional, or unenforceable, then it is the intent of the Board that such provision or regulation be severable from this Ordinance, and that all remaining provisions and portions of this ordinance or the Land Development Code shall remain in full force and effect.

SECTION 6. COPY ON FILE. A certified copy of this Ordinance as enacted shall be filed by the Clerk of the Board with the Office of the Secretary of State of the State of Florida, and a copy shall be kept on file at the Clerk of the Circuit Court's Commission Records office.

SECTION 7. EFFECTIVE DATE. This Ordinance shall take effect upon receipt of notice that the Ordinance has been received by the Office of the Secretary of State of the State of Florida.

DULY ADOPTED this 16th day of July, 2019

ATTEST:

BOARD OF COUNTY COMMISSIONERS
MARION COUNTY, FLORIDA

DAVID R. ELLSPERMANN, CLERK

Michelle Stone, CHAIRMAN

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Article 6 Technical Standards and Requirements
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- Division 1 General Provisions**
- Division 2 Technical Standards and Requirements**
- Division 3 Final Plat Notes and Certification**
- Division 4 Survey and Mapping**
- Division 5 Environmental Assessment for Listed Species (EALS)**
- Division 6 Habitat Protection**
- Division 7 Tree Protection and Replacement**
- Division 8 Landscaping**
- Division 9 Irrigation**
- Division 10 Karst Topography and High Recharge Areas**
- Division 11 Traffic Management**
- Division 12 Transportation Facilities**
- Division 13 Stormwater Management**
- Division 14 Water and Wastewater Requirements**
- Sec. 6.14.1** Purpose and intent. This section sets forth the general requirements for the uniform design and approval of utility systems.
- Sec. 6.14.2** Connection requirements.
 - A. Connection determination
 - (1) All new and expanding development projects shall contact the MCUD for determination of availability and/or point of connection. Within ten working days, the MCUD shall issue an official written determination advising the applicant if services are available and, if so, shall indicate the potential source, the nearest connection point, and the need for any additional off-site facilities. Potential sources may include MCUD, a PSC-certified utility, a city, a Community Development District, or other entity authorized by the State of Florida to provide water and wastewater services. The written determination shall accompany all applications for building permits and/or other development reviews.
 - (2) Connection distance determinations shall be measured beginning at the nearest property boundary and extend along any legal access eligible for utility installation and/or operation using the shortest distance measurement.
 - (3) When property is within connection distance, the water main shall be extended to the farthest property line. Refer to Sec. 6.15.3.B for fire hydrant installation requirements.
 - B. New Single Family Residential and Duplex Construction
 - (1) Water system
 - (a) New single family residential in the Urban or Rural area shall connect to a centralized water system with available capacity if a water line is within a connection distance of 400 feet.

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- (b) New duplex construction in the Urban or Rural area shall connect to a centralized water system with available capacity if a water line is within a connection distance of 400 feet.
 - (c) Existing single family or duplex residential in the Urban or Rural area shall connect to a centralized water system with available capacity if a water line is within a connection distance of 400 feet and the on-site water supply is no longer functioning or if a new well is required to supply potable water.
- (2) Wastewater system
- (a) Single Family Residential
 - 1. New single family residential in the Urban or Rural area shall connect to a central sewer system if a sewer line from a central sewer system with available capacity is within a connection distance of 400 feet and connection may be made to the existing sewer line using a gravity line or an on-site pumping station; or
 - 2. New single family residential in the Urban or Rural area shall connect to a central sewer system if a sewer line from a decentralized sewer system with available capacity is within a connection distance of 400 feet and permission is obtained by the owner/operators of the decentralized system.
 - (b) Duplex Construction
 - 1. New duplex construction in the Urban or Rural area shall connect to a central sewer system if a sewer line from a central sewer system with available capacity is within a connection distance of 400' and connection may be made to the existing sewer line using a gravity line or an on-site pumping station; or
 - 2. New duplex construction in the Urban or Rural area shall connect to a central sewer system if a sewer line from a decentralized sewer system with available capacity is within a connection distance of 400' and permission is obtained by the owner/operators of the decentralized system.
 - (c) Existing single family or duplex residential in the Urban or Rural Area shall connect to a centralized sewer system with available capacity if a sewer line is within a connection distance of 400 feet and the OSTDS is no longer functioning or if a new OSTDS is required to collect wastewater.
- C. New Development in Urban Areas
- (1) Water System

All new developments shall connect to an existing central water system if a system with available capacity has distribution lines within a distance equal to or less than 400' times the total number of ERCs within the project at build out. Otherwise, the project shall comply as follows:

 - (a) New residential development with 31 lots or more, all multi-family and commercial projects, shall design and construct a decentralized water system in compliance with the requirements of [Division 6.14](#), and construct an onsite WTP sufficient in size to serve the development in compliance with FDEP requirements and other applicable requirements of this Code.
 - (b) New residential developments with less than 31 lots and more than one mile from the nearest existing central water system may use individual onsite wells in compliance with the requirements of FDOH.
 - (2) Wastewater system

All new development shall connect to an existing central sewer system if a system with available capacity has a treatment plant or sewer line within a connection distance of 400' times the total

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number of ERCs within the project at build out. Otherwise, the project shall comply with the following as applicable:

- (a) New residential developments with five or more ERCs shall be serviced by a decentralized wastewater treatment system.
- (b) New residential developments that consist of fewer than five ERCs may use individual OSTDS in conformance with Section 6.14.3, or
- (c) New non-residential site developments with no food preparation that consist of 15 or more ERCs and will discharge only domestic waste, shall design and construct a wastewater treatment system that complies with all applicable requirements of the FDEP, or
- (d) New non-residential site developments with no food preparation that consist of fewer than 15 ERCs and will discharge only domestic waste may use an OSTDS with a minimum effective septic tank capacity of two times the requirements of the FDOH and an approved outlet filter is installed.
- (e) New non-residential site developments which include cooking or food preparation on site may discharge into the systems referenced in [Sections 6.14.2.C\(2\)\(a\) and \(b\)](#) above providing the food preparation wastewater is pretreated and monitored as follows:
 - 1. The facility shall install grease removal systems, providing an effective size of 1.5 times the requirement of FDOH, or 1,200 gallons, whichever is greater.
 - 2. Grease removal systems and traps shall comply with the MCUD Industrial Pretreatment Ordinance, as amended.
 - 3. For OSTDS users, failure to submit an annual maintenance report to MCHD, or the utility provider shall constitute a violation of this LDC.
 - 4. Grease removal systems shall comply with design standards in FAC64E-6.

D. New Development in Rural Areas

(1) Water system

New rural developments with any buildable lot less than two acres in size shall connect to an existing central water system if a system with available capacity has water distribution lines within a connection distance of 400' per each ERC from the project boundary. Otherwise, the developer shall design and construct a decentralized water system in compliance with all applicable FDEP requirements and construct an onsite WTP that meets the needs of the development and complies with all applicable requirements of the FDEP. The project may use individual onsite wells if:

- (a) The project contains 31 units or less with a gross density no greater than one unit per 3.5 acres and a minimum lot size of one acre; or
- (b) All lots contain a minimum buildable area of two acres.

(2) Wastewater system

New rural developments containing any buildable lot less than five acres in size shall connect to an existing central sewer system if a system with available capacity has a treatment plant or sewer line within a distance of 400' times the total number of project ERCs at build out or five miles, whichever is less. Alternatives to this requirement are as follows:

- (a) If all lots are at least one acre in size, the developer shall design and construct a decentralized wastewater treatment system that meets the needs of the development and complies with all applicable requirements of FDEP or FDOH, as applicable, and the County.
- (b) If the project at build out contains less than five lots and all lots are at least one acre in size,

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then the development may utilize OSTDS that meets the requirements of FDOH and Section 6.14.3.

- (c) If all buildable lots at build out are five acres or greater, the development may utilize an OSTDS that meets the requirements of FDOH and [Section 6.14.3](#).

E. Reclaimed Water System

- (1) All new projects which consist of 31 or more ERCs and are required under [Section 6.14.2.A-D](#) above to connect to a central sewer system shall contact MCUD for availability of reclaimed water.
- (2) The project shall connect to the County's reclaimed water system if MCUD determines that incorporation into the system represents a beneficial use of the reclaimed water. If so required, the installation of an appropriate reuse distribution system, and connection to the reclaimed water system shall be a condition precedent to receipt of potable water and wastewater service.

Sec. 6.14.3 Onsite Waste Treatment and Disposal Systems (OSTDS).

The following will apply to new, modified, or repaired OSTDS:

- A. All OSTDS permits shall be issued in conjunction with a notification of mandatory connection to a central sewer system, in accordance with [Section 6.14.2](#).
- B. Nothing set forth herein shall preclude the Board or DRC from requiring Performance Based Treatment System "PBTs" on a case-by-case basis and considering soil conditions, parcel sizes and the proximity to protected springs.
- C. Any OSTDS that is determined to be failing shall be required to be brought into compliance with current DOH standards within 90 days of the inspection date, or sooner if the failing conditions pose an imminent threat to public health and safety, as determined by the MCHD, or the Board.
- D. For any activity related to OSTDS that requires a Repair/Modification Permit from MCHD on or after January 1, 2011, a minimum of 24" separation between the bottom of the drainfield and estimated wettest season water table shall also be required.
- E. Repairs or modification of drainfield components must comply with current FAC regulations for new systems regarding size and construction.

Sec. 6.14.4 Capital charges and flow rates.

- A. One ERC shall have an assigned value of 1.00.
- B. One ERC shall be equal to a flow of 400 gpd for water, and 200 gpd for wastewater.
- C. A single family residence shall have an ERC value of 1.00. Each multifamily unit shall have an ERC value of 0.80.
- D. Units shall be calculated based on the table below as approved by MCUD.
- E. Total capital charges shall be based on ERC units multiplied by the current connection charges as set forth in Ordinance 08-27, as amended.

Table 6.14-1 Estimated flow rates by establishment.

FLOW Type of Establishment Estimated Sewage Flows (gpd)	
Type of Establishment	Estimated Flows (gpd)

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Commercial	
Airports, Bus Terminals, Train Stations, Port & Dock Facilities - Bathroom Waste Only	
a) Per passenger	4
b) Add per employee per 8 hour shift	15
Barber & Beauty Shops per service chair	75
Bowling Alley - Bathroom Waste Only - per lane	50
Country Club	
a) Per resident	100
b) Add per member or patron	25
c) Add per employee per 8 hour shift	15
Doctor and Dentist Offices	
a) Per practitioner	250
b) Add per employee per 8 hour shift	15
Factories - exclusive of industrial wastes - gallons per employee per 8 hour shift	
a) No showers provided	15
b) Showers provided	25
Flea Market open 3 or less days per week	
a) Per non-food service vendor space	15
b) Add per food service establishment using single service articles only per 100 square feet of floor space	50
c) Per limited food service establishment	25
d) For flea markets open more than 3 days per week - estimated flows shall be doubled	
Food Operations	
a) Restaurant operating 16 hours or less per day per seat	40
b) Restaurant operating more than 16 hours per day per seat	60
c) Restaurant using single service articles only and operating 16 hours or less per day per seat	20
d) Restaurant using single service articles only and operating more than 16 hours per day per seat	35
e) Bar or Cocktail Lounge per seat	20
1. Add per pool table or video game	15
f) Drive-in restaurant per car space	50
g) Carry out only, including caterers	
1. Per 100 square feet of floor space	50
2. Add per employee per 8 hour shift	15
h) Institutions per meal	5

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i) Food Outlets - excluding Deli's, Bakery, or Meat Department - per 100 square feet of floor space	10
1. Add for Deli per 100 square feet of Deli floor space	40
2. Add for Baker per 100 square feet of Bakery floor space	40
3. Add for Meat Department per 100 square feet of Meat Department floor space	75
4. Add per water closet	200
Hotels & Motels	
a) Regular per room	100
b) Resort Hotels, Camps, Cottages per room	200
c) Add for establishments with self-service laundry facilities per machine	750
Mobile Home Park or Lot	-
Mobile Home Single Family	200
Office Building	
a) Per employee per 8 hour shift OR per 100 square feet of floor space - whichever is greater	15
Transient Recreational Vehicle Park	
a) Recreational vehicle space for overnight stay - without water and sewer hookup per vehicle space	50
b) Recreational vehicle space for overnight stay - with water and sewer hookup per vehicle space	75
Service Stations per water closet	
a) Open 16 hours per day or less	250
b) Open more than 16 hours per day	325
Shopping centers without food or laundry per square foot of floor space	0.1
Stadiums, Race Tracks, Ball Parks per seat	4
Stores per bathroom	200
Swimming and Bathing Facilities - public - per person	10
Theatres and Auditoriums - per seat	4
Veterinary Clinic	
a) Per practitioner	250
b) Add per employee per 8 hour shift	15
c) Add per kennel, stall or cage	20
Warehouse	
a) Add per employee per 8 hour shift	15
b) Add per loading bay	100
c) Self-storage - per unit (up to 200 units)	1

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1. Add 1 gallon for each 2 units or fraction thereof, for over 200 units, and shall be in addition to employees, offices or living quarters flow rates		
Institutional		
Churches per seat which includes kitchen wastewater flows unless meals are prepared on a routine basis.	3	
a) If meals served on a regular basis - add per meal prepared	5	
Hospitals per bed which does not include kitchen wastewater flows	200	
a) Add per meal prepared	5	
Nursing, Rest Homes, Adult Congregate Living Facilities per bed which does not include kitchen wastewater flows	100	
a) Add per meal prepared	5	
Parks, Public Picnic		
a) With toilets only per person	4	
b) With bathhouse, showers & toilets per person	10	
Public institutions other than schools and hospitals per person which does not include kitchen wastewater flows	100	
a) Add per meal prepared	5	
Schools per student		
a) Day-type	10	
b) Add for showers	4	
c) Add for cafeteria	4	
d) Add for day school workers	15	
e) Boarding-type	75	
Work/construction camps, semi-permanent per worker	50	
WATER AND SEWER FLOWS		
Residential		
Type of Establishment	Estimated Sewage Flows (gpd)	Estimated Water Flows (gpd)
Residences		
a) Single or multiple family per dwelling unit		
1. Single Family	200	400
2. Multiple Family	160	320
Mobile Home Park or Lot		
Mobile Home Single Family	200	400
IRRIGATION WATER FLOWS		
Type of Establishment	Estimated Irrigation Flow (gpd)	

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Non-Residential	
Per irrigated 100 square feet ²	<u>11</u>

- ~~1. For food operations, kitchen wastewater flows shall normally be calculated as 66 percent of the total establishment wastewater flow.~~
- ~~2. Systems serving high volume establishment, such as restaurants, convenience stores and service stations located near interstate type highways and similar high traffic areas, require special sizing consideration due to expected above average sewage volume. Minimum estimated flows for these facilities shall be 3.0 times the volumes determined from the Table 1 figures.~~
- ~~1. Convenience store estimated sewage flows shall be determined by adding flows for food outlets and service stations as appropriate to the products and services offered.~~
- ~~2. Alternatively, an irrigation design analysis may be prepared by an appropriate registered professional and submitted to the County for review to establish the ERC demand for non-residential irrigation.~~

Sec. 6.14.5 Submittal requirements.

A. Plan Sheets

- (1) The entire utility system shall be shown on the utility plan, including the existing water systems and all proposed components within the project area.
 - (2) All on-site and off-site mains proposed by developer shall be drawn in plan and profile. At a minimum, the plan and profile drawings shall include the following information:
 - (a) Profile with elevations at one foot interval, or more frequently if required by good design practice;
 - (b) Horizontal and vertical control in accordance with [Division 6.4](#) of this Code;
 - (c) All conflicts with other utility and drainage systems;
 - (d) Pipe data including size, lengths, material, and slopes;
 - (e) Size and type of fittings, valves, hydrants, air release/vacuum relief, and other related appurtenances;
 - (f) Note stating construction shall not exceed limits of pipe deflection per manufacturer's specifications;
 - (3) Separate plan sheet(s) showing location(s) and general layout of wastewater pump stations with details, working elevations, and schedules;
 - (4) Description and limits of special bedding requirements;
 - (5) Pipe restraint requirements;
 - (6) All manhole locations, rim and invert elevations for manholes outside of paved areas;
 - (7) Description and limits of special exterior coatings;
 - (8) Details of connection to existing systems; and
- B. Construction notes regarding cover, horizontal and vertical control datums, special construction requirements, and references to standard and special details.**
- C. Copies of all related permit applications and issued permits shall be submitted to MCUD.**
- D. Hydraulic analysis**
- (1) Hydraulic analysis shall include all input parameters, supporting calculations, assumptions, documentation for design and results. The project engineer shall submit signed, sealed, and dated design calculations with the plans for all projects.
 - (2) Hydraulic calculations shall show that the distribution system, collection system or treatment facilities mains will have sufficient hydraulic capacity to provide and transport peak hourly flows

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A. Footnotes 1 and 2 would be deleted. Existing footnote #3 would become #1.
B. A new Footnote #2 would state "Alternatively, an irrigation design analysis may be prepared by an appropriate registered professional and submitted to the County for review to establish the ERC demand for non-residential irrigation."

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and the combination of maximum daily flows and fire flows. Head losses through meters and backflow devices shall also be included in calculations for all multi-family, commercial, industrial projects, and residential meters and backflow devices 2" and larger.

Sec. 6.14.6 Design criteria.

- A. All utility systems shall be designed for the estimated tributary population.
- B. All utility systems shall be designed utilizing components with a minimum 30 year life span.
- C. Systems intended to be owned and maintained by MCUD shall be designed for the tributary population and in conformance with the adopted Marion County Utilities Master Plan, as amended.
- D. Water systems shall be designed to satisfy the domestic water demand and fire protection requirements.
- E. All systems to be owned, operated, or maintained by MCUD shall be subject to a pre-design meeting with the MCUD.
- F. All meters less than 4" in size shall be installed underground in an approved meter box. Meters 4" and larger may, at the discretion of MCUD, be installed above ground. Meters larger than 4" shall be located in a meter easement located adjacent to the public right-of-way.
- G. All meters in a MCUD maintained system shall be installed and inspected by the MCUD after receiving payment of applicable fees and charges.
- H. All pipe shall comply with FDEP color standards.
- I. The engineer shall provide the required lengths of mechanically restrained joints in table form on the plans.

Sec. 6.14.7 Construction inspection.

- A. Utility installation projects shall be inspected on an as needed basis by MCUD to determine conformance to the approved plans and specifications.
- B. Non-conformance with approved plans or specifications, or evidence of faulty materials or workmanship shall be called to the attention of the developer or engineer. If deficiencies are not corrected in an expeditious manner, MCUD shall suspend all work on the project or withhold the Certificate of Completion.
- C. A final inspection with MCUD is required prior to final approval for completion.

Sec. 6.14.8 Completion and close out.

- A. As-Built/Record Survey requirements shall be provided for those systems that are owned, operated, or connected to MCUD and shall meet criteria identified in [Division 6.4 and the below requirements](#).
 - (1) Inspection and testing reports of all improvements shall be submitted with the As-Built/Record Survey.
 - (2) Certification of Final Completion: When all required improvements have been constructed, the engineer shall submit a request for final inspection with a certification of final completion. The certification language is available at MCUD. After all work is completed, inspected, and accepted by the County, an approval letter will be issued to the applicant.
 - (3) Three sets of As-Built/Record Survey signed and sealed by a Florida Licensed Professional Surveyor and mapper shall be submitted to MCUD prior to final inspection along with a digital version of the survey and plan set in a format pre-approved by MCUD.
 - (4) All directional drill boring logs shall be submitted with the as-built survey.

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- (5) A Star (*) shall indicate assets constructed and/or installed as designed.
- (6) A Cloud shall indicate assets that were constructed and/or installed differently than designed. Clouded as-built information shall accompany the strikethroughs.
- (7) A Strikethrough shall indicate assets that were not constructed and/or installed.
- (8) An "X" shall be used to indicate abandoned or removed mains and shall be labeled as "abandoned" or "removed".
- (9) Northing and Easting shall be shown on the as-built plan sheets. When a table is used to show the northing and easting, the table shall be placed within the as-built AutoCAD file.
- (10) As-Built Surveys shall be drawn in the Florida State Plane Coordinate System.
- (11) NAVD88 and NAD83 coordinates shall be provided for the following:
 - (a) Water Mains:
 - 1. All vertical changes in the water main – surveyor shall shoot the top of pipe and the ground elevation.
 - 2. All fittings, valves, blow-offs, air release valves, and fire hydrants.
 - a. Fire hydrant coordinates shall include the tee for the connection point on the water main, the valve to the fire hydrant, and the fire hydrant location taken at the top nut of the hydrant.
 - 3. All new water services. Coordinates shall be provided for all meter boxes and taps on the water main.
 - 4. Water Mains shall be surveyed for the top of pipe and the ground elevation at 100-foot intervals. As-Built survey shall indicate the distance from the water main to the right-of-way and/or easement at these locations.
 - 5. All caps and plugs. As-Built survey shall indicate the distance from each cap and/or plug to the nearest valve.
 - 6. Beginning and ending location of all horizontal directional drills.
 - 7. Start of casing, end of casing, and vent locations for all jack and bores.
 - (b) Force Mains:
 - 1. All vertical changes in the force main – surveyor shall shoot the top of pipe and the ground elevation.
 - 2. All fittings, valves, and air release valves and vaults.
 - 3. Force Mains shall be surveyed for the top of pipe and ground elevation at 100-foot intervals. As-Built survey shall indicate the distance from the force main to the right-of-way and/or easement at these locations.
 - 4. All caps and plugs. As-Built survey shall indicate the distance from each cap and/or plug to the nearest valve.
 - 5. All points of connection for manifolded force mains.
 - 6. Beginning and ending location of all horizontal directional drills.
 - 7. Start of casing, end of casing, and vent locations for all jack and bores.
 - (c) Gravity Sewer Mains:
 - 1. All manholes. As-Built survey shall indicate all invert elevations, location of drop outside of the manhole, ground elevation, bottom of manhole elevation, size of manhole cover, type of manhole (in-line or offset), manhole liner and manufacturer, and location of

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manhole shot at the center of the ring and cover.

2. As-Built shall indicate the slope and size of all gravity sewer lines. This information shall be reflected in the As-Built profiles.
 3. All new wastewater services. Coordinates, invert elevation, and ground elevation shall be provided for the end of the service lateral, tap on main, and any horizontal bends installed.
- (d) Reclaim Water Mains:
1. All vertical changes in the reclaim water main – surveyor shall shoot the top of pipe and LDRC 2/8/17 - leave changes as is the ground elevation.
 2. All fittings, valves, air release valves, and blow-offs.
 3. All new reclaim water services. Coordinates shall be provided for all meter boxes and taps on reclaim main.
 4. Reclaim Water Mains shall be surveyed for the top of pipe and the ground elevation at 100-foot intervals. As-Built survey shall indicate the distance from the reclaim water main to the right-of-way and/or easement at these locations.
 5. All caps and plugs. As-Built survey shall indicate the distance from each cap and/or plug to the nearest valve.
 6. Beginning and ending location of all horizontal directional drills.
 7. Start of casing, end of casing, and vent locations for all jack and bores.
 8. All spray nozzles at spray fields.
 9. All discharge locations. As-Built survey shall indicate invert elevations at discharge locations.
 10. Reclaim water pump stations:
 - a. All pump locations. As-Built survey shall indicate pump size, pump model, pump curve, and pump power source.
 - b. All generator locations. As-Built survey shall indicate model number, designation (portable or permanent generator), and size of fuel tank.
- (e) Wastewater Pump Stations:
1. Ground elevation of pump station site.
 2. All pipes, fittings, valves, air release valves, and on-site flowmeter.
 3. Wetwell location shot at the center of the wetwell. As-Built shall indicate pipe invert elevations, bottom elevation of the wetwell, odor control stub-out location and invert elevation, beginning and end points of all conduits, property and/or easement corners, and ground elevations. As-built shall note the type of liner installed and the height of the SCADA tower.
- (f) Water and Wastewater Treatment Plants:
1. All tank locations shot at the center of the tank and at a minimum of four location around the outside perimeter of the tank. As-Built should indicate the all invert elevations, size of tank, height of tank, and floor elevation of tank.
 2. All yard piping, fittings, valves, air release valves, and all conduits.
 3. All well and pump locations. As-Built survey shall indicate well depth, well casing size, top elevation of the wells, and pump model.

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4. All building locations shot at each corner of the building. As-Built shall indicated size of building in square feet. As-Built shall include the finished floor elevation.
 5. Generator location.
 6. Coordinates of all property boundaries, as provided on the engineering plans, shall be verified and fences located.
 7. As-Built survey shall indicate the location of all edges of pavement, storm DRAs, on-site storm piping and structures, rapid infiltration basins, monitoring wells, and irrigation wells.
 8. As-Built survey shall indicate the discharge elevation at the headworks.
- B. A maintenance agreement with a security limited to an irrevocable letter of credit or bond only in the amount of 10 percent of the original construction costs of all constructed and accepted utility systems to be owned and maintained by the County. Such bond or letter of credit shall guarantee maintenance of the constructed and accepted utility systems for a minimum of one year from the date of construction completion, acknowledged by MCUD and shall be released upon acceptance of the constructed systems for maintenance by Marion County.

Sec. 6.14.9 Transfer of facilities to Marion County Utilities.

- A. Prior to plan approval, an executed utility developer's agreement is required. This agreement shall run with the land and be binding on the developer, its successors, assigns and any other subsequent owner of the land, setting forth such reasonable provisions governing developer and MCUD responsibility pertaining to:
- (1) The installation of service facilities;
 - (2) Private plumbing lines with the facilities of MCUD;
 - (3) The manner and method of payment of contributions, fees and charges;
 - (4) Standards of construction or specifications;
 - (5) Regulations, policies, practices and procedures of MCUD;
 - (6) Prohibitions against improper use of MCUD's facilities;
 - (7) Entity responsible for ownership and operation of facilities; and
 - (8) Other matters normally associated with and contained in the utility developer's agreements.
- B. All facilities constructed on the developer's property prior to interconnection with MCUD's existing or proposed facilities shall convey such component parts to MCUD by bill of sale in a form satisfactory to the County Attorney, with the following evidence required by MCUD:
- (1) Facilities proposed to be transferred to MCUD are free of all liens and encumbrances;
 - (2) MCUD has approved the construction of such facilities and accepted the tests to determine that such construction is in accordance with the criteria established by the MCUD;
 - (3) The Board has evidenced its acceptance of such facilities for MCUD's ownership, operation, and maintenance; and
 - (4) The developer shall maintain accurate cost records establishing the construction costs of all utility facilities constructed and proposed to be transferred. Such cost information shall be furnished with the bill of sale and shall be a prerequisite for acceptance.
- C. MCUD may refuse connection and deny service until such time as all transfer requirements have been satisfied by the developer or the developer's successors or assigns.

Division 15 **Water System**

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Sec. 6.15.1 Purpose and intent.

This section sets forth the general requirements for the design of a potable water distribution system.

Sec. 6.15.2 Decentralized systems.

- A. The decentralized water distribution system shall be constructed within public rights-of-way or utility easements and in compliance with this section and Article 7.
- B. The decentralized WTP shall be designed in compliance with the requirements of FDEP and shall be constructed on a dedicated utility site, which will be preserved and protected for the WTP, including protection area surrounding all well sites, until connection to a centralized system is available.
- C. If the decentralized water system is owned, operated or maintained by an entity that has a PSC franchise, such entity must, as a condition of such ownership or operation, agree to terminate or modify the franchise in compliance with the requirements of Section D, below.
- D. A decentralized WTP which applied for a permit from Marion County after August 1, 2009, as per Ordinance 09-17, shall be taken out of service, deeded, or reclassified under any of the following conditions, which may be appealed to the DRC:
 - (1) A centralized system meeting the requirements stated in subsections B and C above, as determined by the owner of such centralized system, is available, at which time the centralized system owner will be responsible for providing the surveying, design, permitting, and construction of all components necessary to connect the decentralized water system to the centralized system. After connection, all components of the water system will be owned, operated, and maintained by the centralized system owner who will also be responsible for the installation and operation of all water metering; or
 - (2) The MCUD Director and a centralized system owner has determined the WTP is suitable for expansion or inclusion into the centralized system owners PSC territory, the WTP property and all improvements shall be deeded to the centralized system owner and reclassified as a centralized system; or
 - (3) If the MCUD Director determines that the size, location, or other factors show the decentralized system is not feasible for connection or inclusion into a franchised territory, the system will be reclassified as a centralized system. The reclassified system must be operated and maintained by an FDEP approved service company.
- E. A decentralized water facility as described in [Section 6.14.2](#), shall not be transferred to a centralized system owner without the project's decentralized wastewater system, if applicable, also being transferred to the centralized system owner. As a condition of the transfer of a project's decentralized water system, the transferee must also accept transfer of the project's decentralized wastewater system.

Sec. 6.15.3 Fire protection.

- A. Fire Flow capacity for water distribution systems and/or water main extensions shall be designed and constructed in accordance with [Division 18](#).
- B. All water main extensions shall consider the placement of fire hydrants; the distance between fire hydrants shall be no more than 1,000 feet as measured along the path of the legal access. Fire hydrants shall be installed on all water main extensions where the nearest fire hydrant is more than 1,000 feet away as measured along the path of legal access.

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Sec. 6.15.4 Water distribution system.

A. Piping

- (1) Water mains shall maintain a consistent alignment with respect to the centerline of the road, when installed in rights-of-way.
- (2) Water mains located outside of dedicated rights-of-way shall require a minimum 20' easement.
- (3) Water mains located adjacent to a road right-of-way shall have a minimum 10' easement. Additional easement widths shall be provided, as needed.
- (4) Water mains shall not be placed under or within ten feet of the high water line of retention ponds, retention pond berms or any vertical structures.
- (5) Water mains shall not be located along side or rear lot lines, except when placed in a dedicated easement.
- (6) No water pipe shall pass through or come in contact with any part of a sanitary sewer manhole.
- (7) Separation of water mains shall be in accordance with § 62-604.400(2)(g),(h),(i) and (3) FAC.
- (8) Requirements for Loop Mains
 - (a) A 6" looped connection shall be required in cul-de-sac areas and low density residential projects, unless a smaller looped connection is authorized by MCUD.
 - (b) Where looping of mains is not practical, minimum 8" mains shall be required, unless detailed calculations are submitted to substantiate the sufficiency of a 6" main.
 - (c) In commercial, industrial, and high density residential areas, minimum 8" looped mains shall be required. Larger size mains shall be required if necessary to allow the withdrawal of the required fire flow while maintaining the minimum residual pressure specified in [Division 6.18](#).
- (9) Location and identification of all water mains and valves shall comply with Article 7.

B. Pressure

- (1) The distribution system shall be designed to maintain a minimum pressure of 20 psi during conditions of maximum daily load plus fire flow.
- (2) The pressure in the distribution system shall be approximately 55 psi. In no case shall pressure be lower than 35 psi downstream of a backflow prevention device.
- (3) For high pressure systems, special design considerations are required.

C. Dead Ends

- (1) Dead end mains shall be minimized by making appropriate tie-ins as determined by MCUD.
- (2) Where dead-end mains occur, a fire hydrant, an approved flushing hydrant, or a blow-off valve shall be provided.

D. Flushing

- (1) Flushing devices shall be sized to provide a velocity of at least 2.5 FPS in the water main being flushed.
- (2) No flushing device shall be directly connected to any sewer.

E. Valves

- (1) Valves shall be located at not more than 500' intervals in commercial, industrial and high density residential areas and at not more than 1,000' intervals in all other areas. The MCUD Director or his designee may approve alternative valve spacing.
- (2) Appropriate valving shall also be provided at all water main intersections to ensure effective isolation of water lines for repair, maintenance, or future extension.

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- (3) Hydrants or automatic air relief valves shall be provided at high points in water mains to remove accumulated air. Automatic air relief valves or hydrants shall not be used where flooding of the manhole or chamber may occur.
- (4) Valves shall comply with Sec. 7.2.8.B, C, and D for water mains.
- F. Drainage chambers, pits or manholes containing valves, blow-offs, air relief valves, meters, or other such appurtenances shall not be connected directly to any storm drain or sanitary sewer.
- G. Disinfection of any part of MCUD water distribution system which has direct contact with finished water and has been out of service for repair, alteration, or replacement shall be as outlined in Article 7 and as specified by DOH.

Sec. 6.15.5 Water services and connections.

- A. No service or connection to a Marion County system shall be made until payment of applicable fees and charges is received by MCUD.
- B. Water services and connections shall conform to the applicable provisions of the code. Where water services greater than 12" are required, dual services shall be provided.
- C. Water services and connections to existing County systems up to 4" are available from MCUD. Services and connections to new water systems, and to existing systems that are 6" and larger, shall be made by the contractor.

Sec. 6.15.6 Water metering.

- A. All water service connections to centralized and decentralized systems shall be metered. The method of metering will follow the guidelines listed below. The engineer must obtain approval from MCUD before finalizing the design of the metering system.
 - (1) Single family and duplex residential units and subdivision lots with public or private rights-of-way or easements shall be individually metered. Single services shall be installed at property lines; double services shall be installed at property corners. Service placements shall not disturb survey monuments, if present.
 - (2) Commercial, industrial, and institutional projects shall be individually metered. Each unit within a structure shall be individually metered.
 - (3) Multi-family, apartments, and condominium projects shall meter each unit.
- B. All commercial irrigation service connections shall be metered separately.
- C. All commercial developments utilizing sewer only services require a water meter to determine flow.
- D. Meters shall be located in the public rights-of-way, or as approved by MCUD.
- E. Meters not located in the public rights-of-way shall require ingress/egress/utility easements. Easements shall be:
 - (1) Recorded with the Marion County Clerk of Court.
 - (2) Minimum of 10 foot ingress/egress.
 - (3) Minimum of 10 feet by 10 feet around the meter location.
- F. Meter boxes shall comply with Sec. 7.2.13.D(7).
- G. Meters shall be provided and installed by MCUD. Meters greater than two (2) inches in size shall be installed and paid for by Developer. All meters greater than two (2) inches in size shall be approved by MCUD.
- H. Size of all meters shall be determined in accordance with current AWWA Standards.

Sec. 6.15.7 Cross connection control and backflow prevention.

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A. General

- (1) All rules, regulations, and procedures embodied herein shall be consistent with the Recommended Practice for Backflow Prevention and Cross-Connection Control, American Water Works Association Manual 14, as amended, and Florida Building Code as adopted by Marion County. Except as otherwise indicated, backflow protection at service connections shall be at least as stringent as recommended in the American Water Works Association Manual 14.
- (2) All reduced pressure principle assemblies and double check valve assemblies shall be tested annually.
- (3) All dual check devices shall be overhauled and/or replaced at least every five years at the customer's expense.
- (4) All costs of installation, maintenance, and testing of backflow prevention devices shall be the responsibility of the customer.
- (5) Any backflow prevention assembly required herein shall be a model and size approved by MCUD.
- (6) If any conflict should exist between a provision of the manual and the provisions of this ordinance, the LDC, the Florida Building Code as adopted by Marion County, the Florida Safe Drinking Water Act, or any other State or County statute, ordinance, rule, or regulation applicable to public water systems, the more restrictive provision shall apply.

B. Applicability. All water service connections to MCUD shall comply with the provisions of this code.

C. Residential backflow prevention requirements.

A backflow preventer shall not be required at service connections to residential premises where the plumbing system complies with current Florida Building Code requirements, and there is no auxiliary or reclaimed water system, no fire protection system, no irrigation system, no solar hot water system, and/or no swimming pool, unless determined necessary by MCUD.

D. Residential auxiliary or reclaimed water system.

- (1) Auxiliary water systems supplied with water from a private well; or reclaimed water systems supplied with reclaimed water from a 'closed' reclaimed water system, shall install one of the four backflow prevention options below:
 - (a) Reduced pressure principle assembly (tested annually);
 - (b) Reduced pressure vacuum assembly (tested annually);
 - (c) Double check valve assembly (tested annually); or
 - (d) Dual check device plus any one of the following measures:
 1. well water testing;
 2. premises inspections;
 3. automated meter reading;
 4. customer agreements; or
 5. managed properties.
- (2) Residential surface auxiliary water system or open reclaimed water system.
 - (a) Auxiliary water systems supplied with surface water; or reclaimed water systems supplied with reclaimed water from an open reclaimed water system, shall install one of the three options below:
 1. Reduced pressure principle assembly;
 2. Double check valve assembly plus any one of the following measures:

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- a. premises inspections;
 - b. automated meter reading;
 - c. customer agreements; or
 - d. managed properties.
 - 3. Dual check device plus any two of the measures from [Section 6.15.7.D\(1\) through 6.15.7.D\(2\)](#).
- (3) Well water testing:
- (a) MCUD shall require the customer to provide a DOH approved laboratory, water quality test on the well water.
 - (b) The water quality test shall analyze for e-coli annually and shall analyze for nitrate/nitrite every five years.
 - (c) The customer shall utilize another dual check sub-option from [Section 6.15.7.D\(1\) through 6.15.7.D\(2\)](#) or install a reduced pressure principle assembly or a double check valve assembly, if water quality tests are positive for e-coli, or exceed the maximum contaminant level for either nitrate or nitrite.
- (4) Premises inspections:
- (a) MCUD shall maintain an agreement with the customer that allows for periodic inspections of the premises and ensure that they inspect premises for cross-connections on a periodic basis not to exceed every five years. MCUD standard deposit receipt and service agreement meet this requirement.
 - (b) MCUD shall have an inspection protocol and an inspection form to be signed by the inspector and shall make completed and signed inspection forms available for review by the FDEP, DOH, the customer, and the public upon request.
- (5) Automated Meter Reading (AMR):
- If the system has installed AMR, or will do so within five years for existing premises, and uses AMR for all new premises, such AMR shall have the ability to detect backflow through the meter and either provide immediate notification of the backflow event or record the backflow data for transmittal or retrieval on at least a monthly basis.
- (6) Customer agreements:
- (a) MCUD and the customer shall sign an agreement that prohibits the customer from cross-connecting the customer's auxiliary or reclaimed water system to the customer's potable water system.
 - (b) The agreement shall stipulate penalties for discovered cross-connections. Penalties may include, but are not limited to, monetary fines, discontinuation of service, and/or a requirement for installation of a more protective back flow preventer.
- (7) Managed Properties:
- The third party's legal instrument establishing the restrictions shall be reviewed and kept on file by MCUD.
- E. Fire Protection Systems.
- (1) A reduced pressure principle assembly shall be required when a fire protection system is also connected to an auxiliary water supply or source or has provisions for introducing chemical additives or antifreeze into the system. Fire service shall be metered. Meter and tap size shall be determined by a Florida Licensed Sprinkler Contractor, Architect, or Engineer. Meter shall be

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installed by MCUD.

- (2) A reduced pressure principle assembly or a double check valve assembly shall be required when a new closed (i.e. non-flow through) wet pipe sprinkler system, or new closed wet stand pipe system has no connections to auxiliary water supplies or sources and has no provisions for adding chemical additives or antifreeze. Fire service shall be metered. Meter and tap size shall be determined by a Florida Licensed Sprinkler Contractor, Architect, or Engineer. Meter shall be installed by MCUD.
 - (3) A reduced pressure principle assembly or double check valve assembly shall be required for an existing closed (i.e. non-flow through) wet pipe sprinkler system, or existing closed wet stand pipe system, that has no connection to an auxiliary water supply or source, and has no provisions for introducing chemical additives or antifreeze into the system. Fire service shall be metered. Meter and tap size shall be determined by a Florida Licensed Sprinkler Contractor, Architect, or Engineer. Meter shall be installed by MCUD.
 - (4) No backflow prevention device shall be required if the sprinkler or stand pipe system is provided with a lead free alarm check valve.
 - (5) Temporary connection to fire hydrants shall be metered and have a dual check valve assembly.
- F. Irrigation Systems.
- (1) A reduced pressure principle assembly shall be required if the irrigation system is connecting to an auxiliary water supply or source or has provisions for introducing chemicals into the system.
 - (2) A reduced pressure principle assembly or a pressure vacuum breaker assembly shall be required for irrigation systems that have no connections to an auxiliary water supply or source, and have no provisions for introducing chemicals into the system.
- G. Solar Hot Water Systems.
- (1) If the solar hot water system is equipped with double wall heat exchanger and leak detection, no additional backflow prevention devices are required.
 - (2) A reduced pressure principle assembly shall be required for all solar hot water systems not having double walled heat exchangers and leak detection.
- H. Multi-story Buildings. All buildings with three or more floors shall install a reduced pressure principle assembly.
- I. Commercial Backflow Prevention Program Requirements.
- (1) All commercial and industrial customers connected to MCUD shall install backflow prevention devices according to the AWWA Manual 14, as amended.
 - (2) Developers are required to coordinate selection of the device with MCUD.
- J. Evaluation Assessment.
- (1) The construction plans shall be reviewed to ensure that backflow prevention has been appropriately addressed in accordance with Florida Building Code, Plumbing Sections 601 through 613.
 - (2) All new service connections shall be assessed before providing water service to the service connections.
 - (3) Existing service connections shall be assessed whenever there is a change in the customer of record.
 - (4) All existing service connections shall be assessed at least once prior to December 31, 2016.
 - (5) Non-community water systems that are reclassified as a public potable water system on or after

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the effective date of this code shall assess all existing service connections at least once within two years after the non-community water system is reclassified as a public potable water system or by December 31, 2016.

- (6) Assessments may be made by use of a questionnaire or inspection as appropriate.
- K. Cross-Connection Control Program Recordkeeping.
 - (1) MCUD shall keep records of service connection assessments as follows:
 - (a) A record of the latest assessment questionnaire or inspection report for each service connection indefinitely;
 - (b) Actual questionnaires or inspection reports may be kept or information may be transferred to tabular summaries.
 - (2) MCUD shall keep an up-to-date inventory of all backflow preventers installed at service connections and at locations where fire protection systems, irrigation systems, and solar hot water systems are connected internally to the customer's potable water system.
 - (3) For each such backflow preventer, the inventory shall include:
 - (a) The location of each backflow prevention device;
 - (b) A description of the hazard being contained or isolated by the device;
 - (c) The type of backflow prevention device;
 - (d) The installation date and date of last repair; and
 - (e) The records of backflow prevention device testing for at least five years with the following information:
 - 1. Identification of the backflow prevention device;
 - 2. The name of the tester; and
 - 3. The test results.
 - (4) Actual test reports may be kept, or information may be transferred to tabular summaries.
 - (5) MCUD shall keep annual cross-connection control program activity reports and backflow incident reports for at least 10 years as required by § 62-555 FAC.
- L. Public Education Procedures.
 - (1) MCUD shall include a brief description of their cross-connection control program in their annual consumer confidence reports, as required by § 62-550.824 FAC.
 - (2) Educational brochures shall be provided to all existing customers prior to December 31, 2016 and to all future applicants for water service.
- M. Incident Response and Investigation Procedures.
 - (1) MCUD shall report by telephone and speak directly to a person at the appropriate FDEP District Drinking Water Office or to MCHD as soon as possible, but no later than noon of the next business day after discovery of a backflow incident or prohibited connection.
 - (2) Within one month after discovery of a backflow incident, public potable water system operators shall prepare and submit to the appropriate FDEP district office or MCHD, a written backflow incident report that includes the following information:
 - (a) The date and approximate time of discovery of the backflow incident;
 - (b) The source and cause, or suspected source and cause of the backflow incident;
 - (c) The type and concentration of contaminants or foreign substances found within the public water distribution system or the customer's potable water system as a result of the backflow

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- incident and the portion of the public water distribution system affected by the incident;
- (d) The precautionary and corrective actions taken in response to the backflow incident and the date and approximate time of completion of each action; and
 - (e) The number and type of illnesses or physical health problems reportedly resulting from the backflow incident, to the extent known by the public potable water system.

N. Prohibited Acts.

- (1) No individual or entity shall complete or maintain any cross-connection to a MCUD system, or cause such a cross-connection to be completed or maintained.
- (2) No connection to a MCUD system shall be performed or maintained by, for, or on behalf of the public potable water system unless the applicable on-site facilities of the customer or of the applicant for such connection are in compliance with the provisions of this Code.
- (3) There shall be no direct or indirect prohibited cross-connections, either existing or potential, between a safe public potable water system and an unsafe, non-potable supply, on the customer's side of the service connection.
- (4) Modification of any backflow prevention assembly shall be prohibited.

O. Inspections.

- (1) Inspection personnel may, with the customer's permission, inspect the private water systems of each customer's service address to determine the degree of hazard existing at the service address, and to ascertain compliance with the provisions of this ordinance and of related codes and regulations.
- (2) If the customer denies inspection personnel reasonable access for such inspections, MCUD may cause the installation, at the customer's expense, of the backflow prevention assembly or device(s) commensurate with the degree of hazard anticipated by inspection personnel for the water service connection.
- (3) If the customer denies reasonable access to perform such installations, MCUD may interrupt potable water service to any private water system connected to its public potable water system until such time that access is granted or a licensed installation or certified inspection is provided by the customer.

Table 6.15-1 Inspection Schedule for Installation of Backflow Preventers

Type of Service	Schedule
New connections with cross-connection hazards	Before service is initiated
Existing connections with WAC 246-290-490* Table 9-type hazards and other high cross-connection hazards	Within 90 days after notification
Existing connections with other than WAC 246-290-490* Table 9-type hazards or other high cross-connection hazards	Within 180 days after notification
Existing fire protection systems using chemicals or supplied by unapproved auxiliary water source	Within 90 days after notification
Existing fire protection systems not using chemicals and supplied by purveyor's water	Within 1 year after notification

*Washington State Administrative Code (WAC)

P. Backflow Prevention Assembly Testing.

- (1) Certification of backflow testers.

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- (a) All approved backflow testers must possess a current AWWA and/or American Backflow Prevention Association (ABPA) Backflow Tester certificate.
 - (b) Any backflow tester performing testing within Marion County shall maintain current status on MCUD's approved tester list. This list is comprised of certified testers that have provided a copy of their current certification and an annual calibration report for their test equipment.
 - (c) Test reports from unapproved backflow testers will not be accepted by MCUD and will not meet the requirements of this ordinance.
- (2) Testing.
- (a) Employees of Marion County are prohibited from testing privately owned backflow devices in the County, except as part of their official duties.
 - (b) Each testable reduced pressure principle assembly or double check valve assembly shall be professionally tested at least annually or as frequently as deemed necessary (for high hazards) by an approved backflow tester.
 - (c) The customer shall have the appropriate test conducted and shall submit the results to MCUD.
 - (d) MCUD shall provide written notice to their customers of the requirement for the test and the date that the test results are due. All testing shall be performed in accordance with the AWWA Manual 14, as amended.
- Q. Backflow Prevention Assembly Repair or Replacement.
- (1) Each testable reduced pressure principle assembly or double check valve assembly found to be functioning improperly shall be repaired or replaced at the customer's expense by a certified backflow installer.
 - (2) If any customer fails to provide the cross-connection control coordinator with proof of a passing certified test after repair or replacement, MCUD shall cause the repairs and test to be performed. Such repairs and testing shall be completed at the customer's expense.
 - (3) If the customer denies reasonable access to perform such repairs and testing, MCUD shall interrupt potable water service to the private water system(s) at the service address until such time that either access for or evidence of the passing certified test is provided by the customer.
- R. Emergency Acts.
- (1) MCUD shall interrupt water service to any private water system when necessary to prevent continued or potential backflow or cross-connection from a prohibited connection, until the requirements of this Code have been met.
 - (2) MCUD shall provide advanced notice of each interruption of service required by this Code, when possible.
 - (3) In the event of known pollution or contamination of a public potable water system or a customer's private water system due to backflow on or from the customer's service address, the customer shall promptly take reasonable steps to confine further pollution or contamination of the public potable water system and shall immediately notify MCUD.
- S. Enforcement.
- (1) The party or parties responsible for a violation of this Code shall be liable for all expenses, losses, or damage, including attorneys' fees and legal costs, incurred by the County by reason of such violation, including all costs and expenses associated with the interruption and restoration of potable water service for the service address where the violation occurred.
 - (2) If MCUD determines that a violation of this Code has occurred, MCUD may:

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- (a) Determine the actions necessary and appropriate to correct such violation;
 - (b) Determine the party or parties responsible either in whole or in part for such violation and require correction thereof;
 - (c) Determine the amount of any expense, loss, or damage incurred by the public potable water system as a result of such violation; or
 - (d) Assess the responsible parties for such amounts.
- (3) In addition to any penalty or remedy provided by law for a violation of the provisions of this Code, the County may petition a court of competent jurisdiction to enjoin, restrain, or otherwise prevent any such violation or to recover expenses, losses, or damages pursuant to [Section 6.15.7.S\(1\)](#).

T. Penalties.

- (1) MCUD shall send a written reminder notifying the owner or authorized agent that the backflow prevention device or devices must be tested.
- (2) The first letter shall give the customer 30 days for the test to be completed.
- (3) Upon failure of the owner or authorized agent of the owner of the building or premises to have the device tested, a second letter shall be sent, via certified mail, explaining that if the test is not completed within 30 days there is a possibility of discontinuance of water service.
- (4) Upon failure of the owner or authorized agent of the owner of the building or premises to have the device or devices tested after the second letter, a third letter shall be sent via certified mail according to the conditions set forth under Ch. 162 FS. The third letter shall contain a date the water service will be discontinued.
- (5) Reconnection shall only be allowed with the submission of the successful backflow performance test results and payment of applicable fees.

Sec. 6.15.8 Water well standards.

A. Well Casings

- (1) Selection of temporary casings used only for construction shall be at the discretion of the contractor unless otherwise specified by the MCUD.
- (2) Permanent well casings shall be continuous and watertight from top to bottom of the casing except for well screens.
- (3) Permanent protective casings shall be provided for all types of well construction.
- (4) All well casings shall be Carbon Steel, unless otherwise required by MCUD.
- (5) All well casing manufacturing shall comply with the applicable ASTM, API, ANSI and AWWA standards.
- (6) Minimum well casing criteria shall comply with latest AWWA Standards (A-100-06).

B. Casing Diameters.

Table 6.15-2 Minimum Casing Diameters

Maximum Horizontal Dimension on Pump Assembly	Minimum Inside Diameter of Well Casing
4"	5"
5"	6"
6"	8"
8"	10"

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10"	12"
14"	16"
16"	18"

- C. Drive shoes.
Special, steel drive shoes shall be heat treated (Rockwell C Hardness 30-32) SAE 1040 steel ring or equal.
- D. Installation.
- (1) Method of installation shall be at the option of the drilling contractor, provided the installation process does not alter the shape, size, configuration, or strength of the casing as called for in this section.
 - (2) Seating or sealing of well casings shall conform to FDEP regulations.
- E. Completion of well sites.
- (1) Contractor shall use reasonable precautions to prevent either tampering with the well or the entrance of foreign material or surface water into the well, at all times during the progress of the work.
 - (2) Contractor shall install a suitable threaded, flanged, or welded cap or compression seal to prevent any surface pollutants from entering the well upon completion of the well.
 - (3) The watertight casing of any well shall extend not less than 24" above the final ground level elevation and not less than 24" above the one percent (100-year) flood level of record, whichever is higher.
 - (4) Any equipment that will permit direct open access to the well shall also meet the height requirements and shall be sealed or screened to prevent entrance of foreign matter, surface water, or contaminants into the well.
 - (5) The ground immediately surrounding the top of the well casing shall be sloped away from the well to prevent surface runoff from entering the completed well.
- F. Well Screens.
- (a) The diameter of the well screen selected shall be the minimum size permitted that will maintain an aperture (slot) entrance velocity of 0.1 -1.5 fps or less and a vertical velocity not greater than 5 fps as determined in conjunction with the screen length formula below, based on the maximum flow in gallons per minute specified. The actual design aperture entrance velocity shall be subject to approval of state and local regulatory agencies.
 - (b) Screen Length.
 1. The minimum length of a well screen shall be determined by the following formula:
$$L = Q / (A_c * V_c * 7.48)$$

Where:
L = Length of screen (feet)
Q= Maximum Flow (gpm)
A_c = effective aperture area per foot of screen in square feet (The effective aperture area shall be taken as one half the total aperture area) (square feet/foot)
V_c = design entrance velocity (fps)
 2. Other factors must be considered specifically for each individual well installation.
 - a. Information on the character of the water-bearing formation must be evaluated for

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- proper well design.
- b. When cost factors have limited the acquisition of additional aquifer data, a more conservative design criteria for entrance velocities is recommended.
 - c. Approach velocities, turbulent versus laminar flow, and velocity distribution, both into the screen and through the aquifer, are not automatically taken into account by the usual screen design criteria.
 - d. Screen length for a highly efficient well is determined by thickness and hydrogeologic character of the aquifer.
- (c) Screen aperture size.
- 1. For naturally developed wells, screen apertures shall be sized in accordance with the following criteria:
 - a. Where the uniformity coefficient of the formation is greater than six, the aperture size shall be that which retains 30 to 40 percent of the aquifer sample;
 - b. Where the uniformity coefficient of the formation is less than six, the aperture size shall be that which retains 40 to 50 percent of the aquifer sample;
 - c. If the water in the formation is corrosive or the accuracy of the sample is in doubt, select a size that will retain 10 percent more than is indicated in the preceding paragraphs; and
 - d. Where fine sand overlies coarse sand, use the fine-sand-size aperture for the top 2' of the underlying coarse sand. The coarse-size aperture shall not be larger than twice the fine-sand size.
 - 2. For gravel-packed wells, the screen-aperture openings shall be of such size to retain between 85 and 100 percent of gravel-pack material.
 - 3. The total aperture area of the well screen shall be that which will result in entrance velocities equal to or less than the casing velocities.
- (d) The well screen and its fittings shall be fabricated of Type 304 stainless steel unless otherwise specified.
- (e) Screens shall be designed to minimize the possibility of damage during installation, development, and use. The contractor shall submit screen strength specifications (for example, collapse and tensile strength) as well as supporting drawings and data to the owner.
- (f) Well screens shall be constructed by one of the methods described below, unless otherwise indicated by MCUD.
- 1. In punched or louvered pipe screens, adjacent openings shall be punched in pipe in such a way that no material is removed from the pipe wall. The spacing and size of openings shall be uniform.
 - 2. Wire-wound, continuous-slot well screen shall be of all-welded construction.
 - a. Special shaped wire shall be helically longitudinal rods and welded at each point of intersection.
 - b. The inlet-slot openings between adjacent turns of the outer wire shall widen inwardly so as to be nonclogging.
 - c. Screen end fittings shall be made of the same material as the screen body and shall be securely welded to each screen section.
 - d. Pipe conforming to the required well casing shall be perforated with uniformly spaced

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and sized round hole openings. Telescoped over this shall be a continuous-slot, Type 304 stainless steel screen.

- (g) Screen Joints and Spacers.
 - 1. Joints between screen sections and blank pipe spacers shall be welded or threaded and shall be sand tight, straight, and as strong as the screen itself.
 - 2. Spacers between screen sections shall be of the same material as that used for the casing if greater than 5' long. If less than 5' in length, they shall be made of the same material as the screen.
 - 3. Joints between the well screen and the casing shall be sand tight and made by any one of the methods below:
 - a. A nonmetallic seal of neoprene or rubber made to fit the casing surrounding the screen shall be attached to the screen or screen casing to affect the seal, and the screen or screen casing shall extend at least 2' into the exterior casing; or
 - b. A lead packer shall be expanded to fill the space between the screen and the casing. This lead packer shall be manufactured for this purpose and be attached to the screen or screen casing; or
 - c. The space between the screen casing and the casing shall be filled with neat cement to form a seal at least 1.5" thick and 3' in length.
 - 4. Where the construction of the well is of the gravel-packed type, the screen casing overlaps at least 50' into the casing above, and the space between the two is filled with gravel, no other seal will be required unless specified by state or federal regulations.
 - 5. When the screen and casing are one continuous unit from the bottom of the well to the top of the well, joints shall be approved by MCUD.
- (h) Sealing the bottom of the screen.
 - 1. The bottom of the deepest screen or screen casing shall be sealed by any one of the methods below:
 - a. A threaded or welded plate shall be installed at the bottom of the screen or well casing extension. The plate shall be made of the same material as that used for the screen or the well casing to which the plate is attached; or
 - b. A self-closing valve shall be installed at the bottom of the screen or casing and shall then be covered by a cement plug at least 1' deep.
- (2) Gravel Pack.
 - (a) Thickness and Location.
 - 1. Selection of the gravel pack thickness surrounding the screen shall depend on individual aquifer characteristics.
 - a. Minimum thickness to allow for proper placement of gravel pack shall be 4";
 - b. The maximum gravel pack thickness shall not exceed 12".
 - 2. Placement of the gravel filter shall be made in locations adjacent to the well screens and shall extend above the screen at least 20'.
 - (b) Material and Impurities.
 - 1. The gravel pack material shall have an average specific gravity of not less than 2.5.
 - 2. Not more than one percent, by weight, of the material shall have a specific gravity of 2.25 or less.

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3. Thin, flat, or elongated pieces of gravel, the maximum length dimension of which shall not exceed three times the minimum width, shall not be in excess of two percent, by weight.
4. Not more than five percent of the gravel shall be soluble in hydrochloric acid.
5. The material shall be washed and free of shale, mica, clay, dirt, loam, and organic impurities of any kind.
6. The materials shall contain no iron or manganese in a form or quantity that will exceed potable water standards.

Sec. 6.15.9 Wellfields and water supply.

- A. Groundwater Protection.
 - (1) The wellhead protection area zones shall comply with § 62.555 FAC and all applicable Marion County requirements.
 - (2) The wellhead protection area zones shall be indicated for the proposed well or wellfield location identifying the existing surrounding uses.
 - (3) Necessary precautions shall be taken to prevent contaminated water, or any other contaminants, from entering the water source, either through the well opening or by seepage through the ground surface.
- B. Surface water intake facilities design.
 - (1) Facilities shall comply with the design and installation requirements as established by Ch. 62.555 FAC. The criteria set forth in the Ten State Standards - Recommended Standards for Water Works should be used as a design guide for the intake structures.
 - (2) Additional design standards and requirements stated in this Code shall also apply.
- C. Investigation of geologic/hydrologic conditions and groundwater quality.
 - (1) Geologic/hydrologic conditions and groundwater quality analysis shall be performed in accordance with FDEP and water management guidelines.
 - (2) All analysis shall be reviewed and approved by a professional engineer or qualified geologist.

Sec. 6.15.10 Water treatment plants.

- A. Non-MCUD water treatment plants shall comply with FDEP and DOH requirements.
- B. MCUD owned water treatment plants shall be designed in accordance with FDEP, DOH, Ten State Standards - Recommended Standards for Water Works, Florida Building Code, Florida Fire Prevention Code, and MCUD specifications. MCUD shall determine the sizing of the plant, water storage requirements, and pumping capacity, on a case-by-case basis, as determined by an engineer.
- C. Hydropneumatic tanks shall be ASME approved and steel construction. The tank and compressed air system shall be as specified by MCUD.

Division 16 **Wastewater Facilities**

Sec. 6.16.1 Purpose and intent.

This division sets forth the general requirements for the design of a wastewater system.

Sec. 6.16.2 Decentralized systems.

- A. The decentralized WWTP shall be designed in compliance with FDEP and FDOH requirements and shall be constructed on a dedicated utility site, which will be preserved and protected for the

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WWTP, until connection to a centralized system is available.

- B. A decentralized WWTP which applied for a permit from Marion County after August 1, 2009, as per Ordinance 09-17, shall be taken out of service, deeded, or reclassified under any of the following conditions, which may be appealed to the DRC:
- (1) The decentralized system owner will be responsible for providing the surveying, design, permitting, and construction of all components necessary to connect the decentralized wastewater system to the centralized system. After connection, all components of the wastewater system will be owned, operated, and maintained by the centralized system owner; or
 - (2) The MCUD Director and a centralized system owner has determined the WWTP is suitable for expansion or inclusion into the centralized system owners Public Service Commission (PSC) territory, the WWTP property and all improvements shall be deeded to the centralized system owner and reclassified as a centralized system; or
 - (3) If the MCUD Director determines that the size, location, or other factors show the decentralized system is not feasible for connection or inclusion into a franchised territory, the system will be reclassified as a centralized system. The reclassified system must be operated and maintained by an FDEP approved service company.

Sec. 6.16.3 Treatment standards.

- A. The treatment standards shall apply to all centralized and decentralized Wastewater treatment facilities (WWTF) in the SPZ.
- B. Any new or expanded WWTF shall meet the following applicable annual average effluent concentrations for Total Nitrogen (TN):

Table 6.16-1 Total Nitrogen

Designed Average Daily Flow (in gallons per day)	Effluent Disposal System		
	RRLA	SRLA	PAR
Primary Protection Zone			
Greater than or equal to 500,000	3 mg/L	3 mg/L	10 mg/L
Less than 500,000 but greater than or equal to 10,000	3 mg/L	6 mg/L	10 mg/L
Less than 10,000	10 mg/L	10 mg/L	10 mg/L
Secondary Protection Zone			
Greater than or equal to 500,000	3 mg/L	3 mg/L	10 mg/L
Less than 500,000 but greater than or equal to 100,000	3 mg/L	6 mg/L	10 mg/L
Less than 100,000 but greater than or equal to 10,000	6 mg/L	6 mg/L	10 mg/L
Less than 10,000	10 mg/L	10 mg/L	10 mg/L

- C. If a facility is permitted by MCHD, then the system shall comply with the requirements under FAC 64E-6, Part IV, and this section, otherwise it shall comply with the requirements of the FDEP and this section.
- D. By January 1, 2019, the owner of an existing WWTF using Rapid-Rate Land Application (RRLA) as a primary disposal system shall:
- (1) Connect to a central sewer system that does not utilize a RRLA disposal system; or

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- (2) Meet a 10 mg/L TN effluent limitation and either convert to a Slow-Rate Land Application (SRLA) system approved by the FDEP (including as an option a subsurface drip Irrigation system); or
 - (3) Convert to a public access reuse (PAR) disposal system; or
 - (4) Meet the following annual average reclaimed water limitations for TN:
 - (a) 3.0 mg/L for facilities having a DADF equal to or greater than 100,000 gpd; or
 - (b) 6.0 mg/L for facilities having a DADF less than 100,000 gpd.
 - (5) A waiver from these limitations may be requested provided the permittee or permit applicant makes an affirmative demonstration, based on relevant water quality data, physical circumstances, or other credible information, that the discharge of reclaimed water has not and will not result in more than a ten percent increase in background groundwater nitrogen concentrations at the disposal location.
- E. An affirmative demonstration shall include a site specific study based upon the following factors:
- (1) The proximity to a spring, and natural and manmade interconnected surface and subsurface features.
 - (2) Ground water flow gradient.
 - (3) Discharge volume.
 - (4) Ground water quality data.
 - (5) Site-specific geological conditions.
- F. Effluent and Residuals Disposal.
- (1) A RRLA system may also be permitted in the Primary SPZ provided the following:
 - (a) The WWTF is designed and permitted to utilize public access reuse and proposes to use a RRLA system only temporarily, until such time that 50,000 gpd or more is being generated, at which point the system shall serve solely as back-up as set forth under subsection b., below; or
 - (b) The system is used solely as back-up to a PAR system. In order to qualify as a back-up system, no more than 30 percent of the total annual flow may be directed to the back-up RRLA system if the WWTF is permitted to meet an annual average TN limitation greater than ten mg/L, and no more than 50 percent of the total annual flow may be directed to the back-up RRLA system if the WWTF is permitted to meet an annual average TN limitation of six mg/L or less.
 - (c) The WWTF is designed and permitted to meet the applicable effluent under subsection B, above.
 - (2) New SRLA systems with restricted public access shall be limited to dedicated sprayfields.
 - (3) All new and existing sprayfields shall be planted to hay or other sod-forming vegetation. During winter months, the sprayfield shall be over-seeded with ryegrass or winter-hardy grass to promote year-round nutrient uptake.
 - (4) Any WWTF that provides PAR shall institute a program to educate the end user about the value and benefits of reuse. The program shall be designed to enable the user to easily calculate the amount of nitrogen was applied to the disposal area and, therefore, promote reduced use of purchased sources of nitrogen. The owners of the WWTF shall coordinate such program efforts with the County.
 - (5) Monitoring.
 - (a) On or before December 31, 2009, the owner or operator of any new or existing WWTF with a

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DADF of 10,000 gallons or more shall test for effluent nitrate as N and TN at the point of discharge.

- (b) Effluent nitrate as N sampling shall be performed at regular (i.e. non-selective) intervals at least monthly, except that TN sampling for facilities with a DADF less than 100,000 gpd may be performed quarterly.
- (c) All test results shall be reported to the Zoning Official. Either the FDEP discharge monitoring report, or document provided by the Zoning Department may be used. This provision shall not be construed to require additional monitoring if the WWTF, as a condition of its FDEP permit, is already required to comply with comparable or more intensive requirements, nor shall this requirement apply to any facility that will, according to a County-approved five-year Capital Improvement Plan, be abandoned and/or connected to a central sewer system.

Sec. 6.16.4 Wastewater collection systems.

A. Design Criteria

- (1) The County will approve plans for new wastewater systems and extensions only when designed as separate systems in which precipitation, runoff and groundwater are excluded.
- (2) Sewers systems shall be designed with the following minimum peak factors.

Table 6.16-2 Minimum Peak Factors*

Flow Range	Peak Factor
Flows to 100,000 GPD	4.0
100,000 GPD to 250,000 GPD	3.0
Flow greater than 1,000,000 GPD	2.5

*Peaking factors less than 2.5 may be considered for ADF above 2 MGD, if substantiated by data provided by an engineer.

- (3) Pipe shall be located in dedicated rights-of-way or utility easements.
- (4) Pipe located outside of dedicated rights-of-way shall require a minimum 20' easement. If a pipe is located adjacent to a road right-of-way, a minimum 10' easement shall be provided. Additional easement widths shall be provided if the pipe size or depth of cover so dictate.
- (5) Gravity sewer shall be located under pavement unless otherwise authorized by MCUD.
- (6) Pipe shall not be placed under or within 10' of retention ponds, retention pond berms, or any vertical structures. Sewers shall not be located along side or rear lot lines.

B. Gravity Sewer

- (1) No gravity sewer main conveying wastewater shall be less than 8" in diameter.
- (2) The minimum cover over gravity sewers shall be no less than 3' calculated from the finished grade. Exceptions to this requirement may be made for a short length of pipe where structural considerations are incorporated in the design.
- (3) All sewers shall be designed and constructed to give minimum velocities, when flowing full, of not less than 2 fps, based on Manning's Formula using an "n" value of 0.013. The following minimum slopes shall be provided:

Table 6.16-3 Minimum Slopes

Sewer Size	Minimum Slope in feet per 100 feet
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8"	0.40
10"	0.28
12"	0.22
14"	0.17
16"	0.14
18"	0.12
20"	0.11
24" and larger	0.08

- (4) Where design velocities greater than 10 fps (only for peak instantaneous flows) are attained, due to topography or other reasons, special provisions shall be provided for sewer protection per Article 7.
- (5) Sewers shall be laid with uniform slope between manholes.
- (6) Size conversion between manholes shall not be allowed. All sewers shall be laid with straight alignments between manholes.
- (7) Main drain and back wash systems for pools and spas and storm drain systems shall not connect to the gravity sewer system.

C. Manholes

- (1) Manholes shall be installed as follows:
 - (a) at the end of each gravity sewer;
 - (b) at all changes in grade, size, or alignment;
 - (c) at all sewer intersections;
 - (d) at distances not greater than 400';
 - (e) a manhole shall be located immediately within the right-of-way to separate private sewer systems from the MCUD sewer system; and
 - (f) where sewer extensions for future connections terminate.
- (2) An outside drop pipe shall be provided for a sewer entering a manhole where the invert elevation is 24" or more above the manhole invert.
- (3) The manhole invert shall be filleted to prevent solids deposition when the difference in elevation between the incoming sewer invert and the manhole invert is less than 24".
- (4) Minimum inside diameter of manholes
 - (a) Sewers 24" in diameter and smaller, the minimum shall be 48".
 - (b) Sewers between 24" and 36", the minimum shall be 60".
 - (c) Sewers larger than 36" in diameter, minimum shall be 72".
- (5) A minimum access cover diameter of 24" shall be provided for all manholes.
- (6) The flow channel through manholes shall be made to conform in shape and slope to that of the sewers. Vertical and/or horizontal flow direction changes in excess of 90° shall not be included in sewer alignments without MCUD approval.
- (7) Manholes, frames, and covers shall be constructed as specified in Article 7.
- (8) A MCUD approved lining shall be required on manholes receiving force mains.
- (9) Inflow prevention lids shall be required for all manholes.
- (10) Access shall be required to all manholes located outside of roadways consistent with Article 7.

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D. Service Connections

- (1) Service connection shall be through a service lateral.
- (2) A cleanout shall be provided at the property line.
- (3) Service laterals and fittings shall be a minimum of 6" in diameter. All service laterals shall be less than 100' in length unless otherwise authorized by MCUD.
- (4) Service laterals shall have a minimum slope of one percent.

E. Wastewater Force Mains

- (1) With the exception of force mains between privately maintained grinder stations and the point of connection, only 4", 6", 8", 10", 12", 16", 20", 24", 30", 36", 42", 48", and 54" diameter force mains shall be permitted.
- (2) At design pumping rates, a cleansing velocity of at least 2.0 fps should be maintained. Maximum velocity at design pumping rates shall be determined by pipe material but in no case shall exceed 8 fps or exceed surge analysis in accordance with AWWA for ductile iron pipe (DIP) or PVC pipe. In no case shall velocity exceed surge allowances as per AWWA.
- (3) Friction losses through force mains shall be based on the Hazen and Williams Formula. In the use of Hazen and Williams Formula, the value for "C" shall be 120 for DIP and 130 for PVC pipe. "C" values greater than 130 shall not be allowed. When initially installed, force mains may have a significantly higher "C" factor. The higher "C" factor should be considered only in calculating maximum power requirements and duty cycle time of the motor.
- (4) The force main and fittings, including all restrained joint fittings and pipe restraints, shall be designed to withstand pump operating pressures and pressure surges, but not less than 100 psi. The design engineer shall determine the minimum length of pipe to be restrained on each side of the fitting.
- (5) Force mains shall enter the gravity sewer system at a manhole not more than 1' above the flow line of the receiving manhole and shall have an MCUD approved liner.
- (6) Valves
 - (a) Valves shall be in a manhole or a valve vault.
 - (b) Valves shall be clearly delineated on the force main profile in the drawings.
 - (c) Valve spacing shall not exceed 2,000'.
 - (d) Valves shall be easily accessible.
 - (e) Valves shall not be subject to flooding.
 - (f) Air release valves, or air/vacuum relief valves, shall be provided as necessary.
 - (g) Plug valves shall be provided at both ends of all crossings so that the section can be isolated for testing or repair.
 - (h) Sufficient plug valves shall be provided on force main systems to facilitate effective isolation of the pipe system for repairs and maintenance as determined by MCUD.
 - (i) Gear actuators shall be in accordance with Article 7.
 - (j) Valves shall comply with Sec. 7.2.8.E, F, and G for wastewater systems.
- (7) Aerial and underwater crossings shall be subject to approval by MCUD.
- (8) Material, installation, and testing shall be determined utilizing provisions of Article 7.
- (9) A means for locating and identifying all force mains and valves shall be provided in accordance with the provisions in Article 7.

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- (10) Provision for the installation of permanent access points into and egress points out of the piping system for pigging and cleaning purposes shall be incorporated into 8" and larger force mains. Pigging ports shall be located and incorporated within the pump station sites as determined by MCUD.

Sec. 6.16.5 Wastewater pump stations. All wastewater pump stations shall be designed by a Licensed Design Professional, approved by FDEP and MCUD, and comply with the following:

- A. Private Pump Stations shall be:
 - (1) Designed by an engineer and approved by FDEP;
 - (2) Not located directly adjacent to public thoroughfares; and
 - (3) Pump stations shall be located on fee simple tracts of land adjacent to rights-of-way, with the exception of private pump stations serving single owner properties.
- B. Private Pump Stations with flow to a MCUD system shall be:
 - (1) Designed by an engineer and approved by FDEP and MCUD per Article 7;
 - (2) Not located directly adjacent to public thoroughfares; and
 - (3) Pump stations shall be located on fee simple tracts of land adjacent to rights-of-way, with the exception of private pump stations serving single owner properties.
- C. Marion County pump stations shall be:
 - (1) Design
 - (a) Pump stations to be dedicated to and operated by MCUD shall be designed to MCUD specifications based on the size of the pump station.
 - (b) Pump stations shall have wet wells designed and constructed to serve the lowest developable point on all adjacent vacant tracts of land surrounding a project by means of gravity flow only. The appropriate sized utilities easement(s) shall be provided by the developer so the gravity wastewater mains from all surrounding tracts of land can easily be connected to the wet well of the pump station.
 - (c) The engineer shall submit the design and calculations for all wastewater pump stations to MCUD for review and approval. Calculations shall include:
 - 1. High head and low head condition system curves plotted on the manufacturer's pump curve;
 - 2. Hydraulic analysis of force main system including all friction and minor losses;
 - 3. Operating cycles with wet well sizing; and
 - 4. Buoyancy calculations.
 - (d) The design basis for all calculations shall provide for 60 percent of all receiving system pumps to be operating at design capacity at the time that the proposed pump station is to be operating.
 - (e) System curves shall verify that the pumps are operating at peak efficiency in accordance with the manufacturer's specifications and are suitable for the design flow application.
 - (f) Pump and motor selection shall be designed on the hydraulic grade line at the point of connection as based on the MCUD Master Plan and approved model for the utility service area affected by the proposed development.
 - (g) Each component of the pump station shall be designed to accommodate the development's design flow at the prevailing system conditions at the time of build out.

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- (h) Pump station structures, electrical equipment, and mechanical equipment shall be designed to be protected from physical damage by a 100-year 24-hour storm event. The bottom of all station control and electrical boxes shall be a minimum of 12 inches above the one percent (100-year) flood plain flood elevation.
 - (i) Wastewater pump stations shall remain fully operational and accessible during a 100-year 24-hour storm event. The top elevation of the wet well shall be a minimum of 12 inches above the one percent (100-year) flood plain flood elevation.
 - (j) The top elevation of the control panel shall not exceed maximum distance from the pump station's concrete pad that is allowed by Code, unless authorized by MCUD.
 - (k) The pump station site design shall ensure that positive stormwater drainage radiates outward from the center of the wet well to the boundaries of the site and away from the pump station site. Access driveways and roadways shall be designed to prevent stormwater conveyance onto the pump station site.
 - (l) The pump station and driveway shall be constructed in accordance with Article 7 and shall be readily accessible by maintenance vehicles during all weather conditions including a 100-year 24-hour storm event.
 - (m) A complete system for the control of odors shall be provided as required and specified by MCUD.
 - (n) A supervisory control and data acquisition capable control panel shall be provided and of type to match pump station configuration as specified by MCUD.
- (2) Pump Station Site
- (a) Site and Location
 1. Pump stations shall be located on fee simple tracts of land adjacent to rights-of-way.
 2. No part of structure on the same side of the roadway, or less than 50' perpendicularly from the intersection of two or more rights-of-way.
 3. Permanent and temporary vehicular access to a pump station shall freely accommodate the turning movements of a 40' long and 9' wide single unit truck vehicle with a 28' wheelbase as specified by the Institute of Transportation Engineers. Vehicular backup distance shall not exceed 60'.
 4. Driveways to pump stations on residential roadways shall not be less than 30' in length from the pump station's gates to the adjacent roadway's edge of pavement or back of curb so as not to totally block both lanes of travel, unless approved by MCUD. The driveway length along all other roadways shall not be less than 45', unless approved by MCUD.
 5. Pump station sites shall be sized as delineated in the standard drawings for duplex and triplex stations per the pump station site plans.
 6. The developer shall dedicate the pump station site and driveway by plat or separate instrument to MCUD. Dedicated easements shall be shown as specified on the pump station site plans in the standard drawings.
 7. A minimum 20' wide utility easement that provides for ingress and egress to the pump station shall be required.
 - (b) Site Layout
 1. Pump Station sites shall be a minimum of fifty feet by fifty feet (50' x 50'), unless otherwise determined by MCUD.

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2. The boundary of all new Lift Stations shall be located a minimum of ten feet (10') away from any vertical structure
 3. Site shall have an eighteen inch by six inch (18" x 6") concrete curb around the perimeter as shown in the standard details in Article 7, except at the gates.
 4. Chain link fencing that complies with Section 7.2.12 shall be set in the centerline of the curb. Pump stations shall be completely fenced to maintain and control access consistent with Article 7.
 5. All pervious area shall be covered with four inches (4") of FDOT #57 stone, with a sixty (60) mil geofabric weed control liner underneath. The stone shall be flush with the wet well elevation.
 6. The concrete vehicle pad shall be fourteen feet (14') wide; six inches (6") thick; three thousand (3,000) psi with six inch by six inch (6" x 6") welded wire fabric.
 7. Gates shall be a minimum of sixteen feet (16') wide, open out, 180 degree swing double gates. Where an open out, 180 degree swing gate cannot be achieved, a slide gate shall be used.
- (c) Access
- Where no paved access is existing to the pump station site, a fourteen feet (14') wide paved asphalt access road and concrete driveway shall be provided by the developer. Where paved access is available to the pump station site, the developer shall provide a fourteen feet (14') wide concrete driveway. The access road and driveway shall conform to the Marion County Office of the County Engineer standards.
- (3) Pump Station Construction Requirements
- (a) Requirements
1. Pump stations to be owned and operated privately shall comply with all applicable Federal, State, and Local regulations for construction and connection to central service.
 2. Pump stations to be conveyed to Marion County Utilities shall comply with all applicable Federal, State, and Local regulations, as well as with the engineered design approved by MCUD.
- (b) Hydraulic Analysis
1. Hydraulic Analysis shall be submitted for all Pump stations.
 2. All Hydraulic Analysis shall comply with 6.14.5.
- (4) Wet Well and Valve Vault
- (a) Access Frames and Covers
1. Both the wet well and the valve vault shall be furnished with an access angle frame and cover as shown in the standard details in Article 7.
 2. Equipment furnished shall include the necessary aluminum access frames, complete with hinged and slide bar equipped covers, aluminum access with integrated safety grating (on wetwell only), Type 316 stainless steel upper guide holder and level sensor cable holder.
 3. The access frames shall be properly aligned and securely mounted to allow removal of the pumps.
 4. Doors shall be of aluminum checkered plate.
 5. Safety grating shall be orange color powder coated aluminum.
 6. The access cover and frame with stainless steel hardware shall be sized as recommended

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by the pump manufacturer.

(b) Structural Bearing

1. All wet wells, valve vaults, and other such buried structures that are not subject to vehicular traffic, including their associated lids and covers, shall be designed utilizing a minimum three hundred (300) pound per square foot load bearing design.
2. All wet wells, valve vaults, and other such buried structures that are subject to vehicular traffic, including their associated lids and covers, shall be designed utilizing a H-20 traffic load bearing design.

(c) Submersible Wastewater Pumps

1. General

- a. The equipment furnished shall be designed, constructed, and installed in accordance with the best practices and methods, and shall operate satisfactorily when installed as shown on the drawings.
- b. The stator casing, oil casing, and volute shall be of gray iron construction, with all parts coming into contact with sewage protected by an MCUD approved coating.
- c. All necessary foundation bolts, plates, nuts, and washers shall be furnished by the equipment manufacturer, and shall be of type 316 stainless steel or better.
- d. Brass or stainless steel nameplates giving the name of the manufacturer, voltage, phase, rated horsepower, speed, and any other pertinent data shall be attached to each pump.
- e. The pumps shall be capable of handling raw unscreened domestic wastewater and minimum three inch (3") diameter solid spheres.
- f. Primary pump operation shall be controlled automatically by 4-20 MA liquid level transducer sensors in the wet well.
- g. Pumps shall be mounted in the wet well as shown on the standard details in Article 7.
- h. Flush valve,(1) per site, shall be provided to flush and clean the pump sump by mixing the wastewater automatically before discharge.
- i. The flush valve shall be mounted on the pump housing.
- j. For each pumping period, the flush valve shall open and water from the pump shall be forced through the valve into the sump as a jet flushing stream.
- k. A regulator shall be provided to adjust the flushing period between twenty (20) and fifty (50) seconds.
- l. The flush valve body shall have an epoxy coating and the closing device shall be a cast iron ball.
- m. The flush valve shall be furnished by the pump manufacturer and installed according to the manufacturer's recommendations.
- n. Pump selection shall be approved by MCUD.
- o. Efficiency of pumps shall be a minimum of thirty percent (30%).

2. Pump Construction Details

a. Shaft

1. The pump shaft shall be of Series 300 or 400 stainless steel or carbon steel.
2. When a carbon steel shaft is provided, the manufacturer shall demonstrate

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that any part of the shaft which will normally come in contact with the wastewater has proven to be corrosion resistant.

3. The shaft and bearings shall be designed to meet the maximum torque required for any start-up or operating condition and to minimize vibration and shaft deflection.
 4. The pump shaft shall rotate on two permanently lubricated bearings. The upper bearing shall be a single row ball bearing. The lower bearing shall be a two row angular contact ball bearing, if required to minimize vibration and provide maximum bearing life.
- b. Impeller
1. The impeller shall be constructed of gray cast iron, ASTM A-48, class 30 or class 35.
 2. All external bolts and nuts shall be of Type 304 stainless steel minimum.
 3. The pump shall be provided with a means to maintain a tight clearance between the impeller and the volute in order to maintain pump efficiency. A replaceable wear ring system or an adjustable impeller or wear plate are acceptable.
- c. Mechanical Seal
1. Each pump shall be provided with a tandem double mechanical seal running in an oil reservoir, composed of two separate lapped face seals, each consisting of one stationary and one rotating ring with each pair held in contact by a separate spring, so that the outside pressure assists spring compression in preventing the seal faces from opening.
 2. The compression spring shall be protected against exposure to the pumped liquid.
 3. The pumped liquid shall be sealed from the oil reservoir by one face seal and the oil reservoir from the air-filled motor chamber by the other. The seals shall require neither maintenance nor adjustment, and shall be easily replaced.
 4. Conventional double mechanical seals with a single springs between the rotating faces, requiring constant differential pressure to effect sealing and subject to openings and penetration by pumping forces shall not be considered equal to tandem seal specified and required.
- d. Guides
1. A sliding guide bracket shall be part of the pump casing or a machined adaptor bolted to the pump face and also a machined connecting flange to connect with a cast iron pump base elbow.
 2. The cast iron pump base elbow shall be bolted to the floor of the wet well with stainless steel anchor bolts and designed to receive the pump discharge flange without the need of any bolts or nuts.
 3. Sealing of the pumps to the pump base elbow shall be accomplished by a simple linear downward motion of the pump with the entire weight of the pumping unit. This motion shall be guided by no less than two Type 316 seamless tubular stainless steel guides which will press it tightly against the discharge connection.

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4. No portion of the pump shall bear weight directly on the floor of the wet well.
 5. No rotary motion of the pump shall be required for sealing at the pump base elbow.
 6. Sealing at the pump base elbow by means of a diaphragm or similar method of sealing will not be accepted as an equal to a metal to metal contact of the pump discharge and pump base elbow.
 7. Approved pump manufacturers shall provide a sliding guide bracket adapter if necessary to meet the above specification.
 8. The design shall be such that the pumps shall be automatically connected to the discharge piping when lowered into place on the pump base elbow.
 9. The pumps shall be easily removable for inspection or service. No bolts, nuts or fastenings shall be removed for this purpose, and no person(s) shall enter the wet well.
 10. Each pump shall be fitted with a Type 316 stainless steel lifting chain of adequate strength.
 11. A Type 316, stainless steel cable, air craft rating, shall be provided between the cable holder and the lifting chain, as specified by the pump manufacturer.
- e. Motors
1. All motors shall be built in accordance with the latest NEMA, IEEE, ANSI, and ABMA Standards, as applicable.
 2. Pump motors shall be housed in an air-filled, water-tight casing and shall have moisture resistant Class F insulated windings.
 3. The motor shall have over temperature sensors set at a maximum of 150°C and shall be NEMA Design B, rated at 155° C maximum. Pump motors shall have cooling characteristics suitable to permit continuous operation, in a totally, partially or non-submerged condition. For dry-pit or variable speed applications, the pump shall be capable of running continuously in a non-submerged condition without damage..
 4. The motor shall be capable of a minimum of five to seven starts per hour. A field running test demonstrating this ability, with twenty four (24) hours of continuous operation under the above conditions, shall be performed for all pumps being supplied, if required by MCUD before final acceptance.
 5. Motors 25 horsepower and below shall be rated 230/480 volt, 3 phase.
 6. Motors greater than 25 horsepower shall be 480 volt, 3 phase.
 7. All motors shall be designed with a 1.15 service factor and no motor shall be less than 5 horsepower unless approved by MCUD. Pumps shall be capable of meeting all pump curve conditions without exceeding their rated horsepower.
- f. Heat and Moisture Sensors
1. Each motor shall incorporate a minimum of one ambient temperature compensated overheat sensing device and one moisture sensing device.
 2. Protective devices shall be wired into the pump controls to automatically shut down the pump if excessive temperature or moisture is detected.
 3. Protective devices shall be replaceable or self-resetting.

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- g. Cables
 - 1. Cables shall be designed specifically for submersible pump applications and shall be properly sealed.
 - 2. The pump cable entry seal design shall preclude specific torque requirements to ensure a water-tight and submersible seal.
 - 3. The cable entry shall be comprised of a single cylindrical elastomer grommet, flanked by washers, all having a close tolerance fit against the cable outside diameter and the entry inside diameter and compressed by the entry body containing a strain relief function, separate from the function of sealing the cable.
 - 4. The assembly shall bear against a shoulder in the pump top.
 - 5. The cable entry junction chamber and motor shall be separated by a stator lead sealing gland or terminal board, which shall isolate the motor interior from foreign material gaining access through the pump top.
 - 6. Secondary sealing systems utilizing epoxy potting compounds may be used. When this type of sealing system is used the manufacturers shall supply a cable cap as part of the spare parts for each pump.
 - 7. All cables shall be continuous, without splices from the motor to the control panel, unless otherwise approved by MCUD.
 - 8. The junction chamber, containing the terminal board, shall be leak proof.
- (5) Pump Station Electrical Power and Control System
 - (a) General
 - 1. This section specifies the electrical power and control system requirements for wastewater pump stations. The requirements apply to duplex pump panels.
 - 2. Similar requirements shall apply when more than two pumps are involved except for the quantity of control equipment and panel size shall be increased accordingly.
 - 3. The control panel manufacturer shall provide data indicating they have a minimum of three years of experience in the building of pump control panels.
 - (b) Control Panel
 - 1. A pump station control panel shall be provided for each wastewater pump station.
 - 2. Panel construction shall follow specifications in details UT 509, 510, and 511 in Article 7.
 - 3. The control panel shall respond to liquid level sensors to automatically start and stop pumps and sound an alarm upon high or low wet well levels.
 - 4. The control panel shall operate two electrical submersible pumps at the power characteristics stipulated.
 - 5. The control function shall provide for the operation of the lead pump under normal conditions.
 - 6. If the incoming flow exceeds the pumping capacity of the lead pump, the lag pump shall automatically start to handle this increased flow. As the flow decreases, pumps shall be cut off at the elevation shown on the pump station plans.
 - 7. Pumps shall alternate positions as lead pump at the end of each cycle. A failure of the alternator shall not disable the pumping system. A secondary float system shall include a safe, convenient method of manual pump down and also have provisions to prevent

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pump engagement without disturbing any wiring. Should the "pump off" regulator fail, the system shall keep the station in operation and provide a visual indication of the regulator failure through the SCADA equipped PLC and bypass float system.

8. The pump controller shall be mounted on the back plane to dead front and cut out for visibility in the control panel for the pump station and wired in accordance with the manufacturer's installation and operating instructions.
9. All power wires shall be insulated stranded copper conductors per NEC. All wiring within the panel enclosure shall be neatly routed by the use of slotted type wiring duct with snap on type covers. Wiring on the rear of the dead front shall be neatly bundled with nylon ties and includes sufficient loop across the hinges to prevent wire damage, with each end of the conductor marked (I.D.), utilizing the power conductor color per NEC.
10. Terminal points of all terminal strips shall be permanently identified. All terminal numbers and identifying nomenclature shall correspond to and be shown on electrical diagrams. All wiring shall be permanently shown on electrical schematic diagrams.
11. All circuit breakers, control switches, indicator pilot lights and other control devices shall be identified with permanently affixed legend plates and lamicoid-type engraved nameplates where applicable.
12. Control panel shall include a designated spot to accommodate the RIO 32 I/O expansion.
13. A surge protector shall be included and wired to protect motors and control equipment from lightning induced line surges. All surge protectors shall be U.L. approved and installed per respective power company requirements and manufacturers' specifications. Surge protectors shall be attached to the main disconnects.
14. Elapsed time meters shall be 115 volt not-reset type and shall totalize pump running time in hours and tenths of hours to 99999.9 hours.
15. A 15 AMP 120 volt, duplex convenience receptacle shall be installed on the face of the inner door unit. It shall be provided with its own single pole, 15 AMP circuit breaker for protection. Ground fault interrupt type shall be required.
16. Control terminal blocks shall be of the clamp screw type, rated for 600 volts. Amperage rating shall accommodate the control circuit amperage. An additional 30 space terminal strip shall be installed in the cabinet for future use with RTU equipment.
17. A control power transformer with a minimum size of 500VA shall provide 120 VAC power, and adequate amps for full panel load plus two 15 amp receptacles. The secondary side shall have one leg fused and the other grounded. This control power transformer is required only on 480 volt control panels.
18. The signal required by the float switches and relays shall be 24VAC. This shall be provided by a 24VAC control power transformer properly sized with a fused secondary.
19. Backup Control Relays shall operate from 24VAC and be wired to a selectable disable/enable switch. They shall be enclosed, plug-in 4 pin type with rectangle-style screw terminal sockets.
20. An electrical schematic diagram shall be permanently affixed to the interior side of the exterior enclosure door and a copy supplied to MCUD personnel at start-up. The schematic diagram shall include the rated amperage and voltage for all components.
21. An 11 pin plug-in type phase monitor shall be provided for all 240 volt stations as primary protection of electrical components due to phase loss. Adequate dummy pin protection shall be provided to prevent accidental interchanging of the 11 pin phase monitor. All 480

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volt stations shall have UL rated surface mount type phase monitors.

(c) Panel Construction

1. The duplex pump panel shall be housed in a NEMA 3R, Type 304, 14 Gauge stainless steel enclosure with thirty percent (30%) extra mounting space for additional equipment.
2. Enclosure shall have provisions for padlocking the door and a dead front inner door unit for mounting controls. All exterior hardware and hinges shall be stainless steel. The enclosure shall be equipped with a stainless steel drip lip and 3 point latch.
3. A nameplate and a ten inch by twelve inch (10" x 12") pocket for log sheet storage shall be permanently affixed to the interior side of the exterior enclosure door. The nameplate shall contain the following information:
 - a. Phase
 - b. Rated horsepower
 - c. Voltage
 - d. Speed
 - e. Date manufactured
 - f. Pump and control panel manufacturer's name, address and telephone number.
 - g. Pump data, including impeller data, operating point and head, KW input, and amps at the operating point and at least two other points on the pump curve.
4. The control panel enclosure shall be UL 50, Type 3R listed.
5. All penetrations and edges shall be smooth and polished.
6. The top surface of the control panel shall not have any penetrations.

(d) Power Supply and Main Disconnect

1. Power supply to the control panel shall be 480 volt, 3 phase, and 4 wire.
2. Minimum service shall be 100 amp.
3. Fusible safety service main disconnects shall be installed at all stations. Disconnect should be installed ahead and after the meter.
4. LED power available surge suppressor indicators shall be supplied on all legs.
5. An Emergency Power Receptacle, submitted and approved by MCUD, shall be required.

(e) Control System

1. The control panel shall consist of main circuit breakers, a motor circuit breaker and generator breaker with mechanical interlock, and emergency power receptacle, a circuit breaker and magnetic starter for each pump motor, and 20 amp, 120 volt circuit breakers as required.
2. For pumps equal to or greater than 20 horsepower, the starter for each pump shall be reduced voltage, solid state, with isolated contactors and phase monitor capability.
3. All pump control operations shall be accomplished by 4-20ma liquid level control system with all control components mounted in one common enclosure.
4. Control switches shall provide means to operate each pump manually or automatically. When operated in the automatic mode, the control assembly shall provide means to manually select or automatically alternate the position of the "lead" and "lag" pumps after each pumping cycle.

(f) Level Transducers

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1. The level control system shall be a 4-20ma liquid level sensor probe in conjunction with a SCADA equipped PLC controller.
 2. Systems using multiple probe devices, bubbler type, mercury float, pressure reducers or ultrasonics are not permitted.
 3. The system shall operate using 24 VDC as a method of determining liquid level.
 4. The exposed surfaces of the 4-20ma level sensor shall be constructed from ABS plastic composite.
 5. The flexible level sensor cable shall be capable of carrying the weight of the probe without the need for additional support and shall be sealed and secured to the tip of the level sensor.
 6. The length of the level sensor cable shall be determined by the design engineer.
 7. The level sensor cable shall be suspended using the supplied mounting equipment and suspended from the supplied stainless steel control mounting bracket. This shall be done in accordance with the manufacturer's instructions.
 8. The level sensor cable shall be routed from the wet well to the control panel via a separate dedicated explosion proof aluminum or schedule 80 PVC 2" conduit. Conduit shall be sealed with an MCUD and manufacturer approved seal-offs.
 9. MCUD approved seal-offs shall be bonded to the control panel by aluminum or stainless steel nipples.
 10. The panel mounted pump controller shall operate in conjunction with the 4-20 ma liquid level sensor by providing 24VDC (4-20ma max) via the level sensor cables. It shall be capable of controlling and monitoring two pumps and alarm by activating the pump starters and alarm device. The pump controller shall incorporate a Front LED indicator panel to monitor status and a keypad to facilitate changes, resets and manual operation of the station.
 11. The front panel of the controller shall include LED indicators for display and mechanical switches to operate or control the following:
 - a. Pump run
 - b. Manual/Off/Automatic
 - c. Keypad operation will control the following functions:
 1. Pump run level
 2. Alarm status (Latch or History)
 3. Pump start delay (On/Off)
 - d. Level sensor sensitivity
 - e. Charge or discharge mode
 - f. Level alarm (Hi or Low)
- (g) Circuit Breakers
1. The panel shall have an inter-lock system between the normal power main breaker and the emergency breaker to ensure only one breaker is in the "on" position at a time. Both breakers shall be equal in size.
 2. All circuit breakers shall be heavy duty molded case breakers. The handle on the circuit breakers shall be operational through the dead front.
 3. Motor Circuit Protectors.

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- a. Each pump motor shall be protected by a 3-pole motor circuit protector.
 - b. The Motor Circuit Protector shall be operated by a switching mechanism that is mechanically trip-free from the handle so that the contacts cannot be held closed against a short circuit and abnormal currents which cause the Motor Circuit Protector to trip.
 - c. Tripping shall be clearly indicated by the handle automatically positioning midway between the normal ON and OFF positions.
 - d. All poles shall be so constructed that they open, close, and trip simultaneously.
 - e. Motor Circuit Protector must be completely enclosed in a high-strength molded case.
 - f. Amp ratings shall be clearly visible.
 - g. Contacts shall be of non-welding silver alloy. Arc extinction must be accomplished by means of arc chutes.
 - h. Each pole of the Motor Circuit Protectors shall provide instantaneous short circuit protection.
- (h) Motor Starter and Selector Switches
- 1. The panel shall contain two motor starters.
 - 2. The motor starter shall be across the line magnetic starter with individual overload protection on each power leg with reset installed through the dead front.
 - 3. The motor starter for pumps equal to or greater than 20 horsepower shall be reduced voltage solid state with insulated contactors and phase monitor capability.
 - 4. Local Power Company Regulations shall govern.
- (i) Lights and Alarms
- 1. A weatherproof red light and horn shall be mounted on the panel for high level alarm as per the standard drawings.
 - 2. An alarm silence push button shall be on the panel side and silence relay which will silence the horn and automatically reset when these signals are restored to normal.
 - 3. The push button shall be weatherproof.
- (j) Testing, Service and Warranty
- 1. An operational test shall be performed after fabrication, in the control panel manufacturer's plant, to check out the entire panel before delivery. Three phase source voltage for which the panel is intended, shall be used for the testing.
 - 2. The manufacturer shall furnish a five year warranty against defects in materials and workmanship covering parts and labor on all items.
- (k) Piping, Valves and Accessories
- 1. Influent piping to the wet well shall meet all requirements of Section 7.2.15. All pipe inside the wet well and the valve vault shall be as shown in the standard details in Article 7.
 - 2. Plug valves shall meet all requirements of Section 7.2.8.
 - 3. Check Valves
 - a. Check valves shall be submitted to MCUD for review and approval before use on a project.
 - b. Check valves for ductile iron pipelines shall be lever and weight swing type, sewer

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epoxy coted inside, and shall meet the material requirements of AWWA C508.

- c. The valves shall be iron body, bronze mounted, single disc, 150 psi working water pressure, non-shock, and hydrostatically tested at 300 psi. Ends shall be 125 pound ANSI B16.1 flanges.
 - d. Check valves shall have bronze seat and body rings, extended bronze hinge pins and stainless steel nuts on the bolts of bolted covers.
 - e. When there is no flow through the line, the disc shall be in a closed position. When open, the disc shall swing clear of the waterway. Valves shall be constructed so that disc and body seat may easily be removed and replaced without removing the valve from the line.
 - f. If pump shut off head exceeds 35psi, then an air cushioned assembly shall be furnished.
4. Pressure Gauges
- a. Pressure gauges shall be installed on each discharge pipe as indicated on the standard details in Article 7.
 - b. Each pressure gauge shall be direct mounted and liquid filled, with isolation glycol membranes, stainless steel case, stainless steel sensing element, a four and one-half inch diameter dial, a clear glass window, and a one-fourth inch shut-off (isolation) valve.
 - c. All gauges shall be weatherproof.
 - d. The dial shall be white faces with black graduations and figures. The dial shall indicate the units of pressure measured in psi, with a 0-60 psi range, unless the operating range of the pump station and force main are higher than 50 psi.
 - e. Pressure gauges shall not be installed until after the substantial completion date unless otherwise requested by MCUD.
- (I) Standby Power Generator System
- 1. . An in-place emergency generator shall be provided for all pump stations per FAC 62-604, or as required by MCUD.
 - a. Pump stations serving critical designations (such as shelters, assisted living facilities, hospitals, schools, etc.) shall have an in-place emergency generator
 - b. Pump stations that are triplex or higher shall have an in-place emergency generator.
 - 2. Generator specification and installation shall comply with the below requirements and Article 7.
 - 3. Generator Set
 - a. The generator set shall consist of a diesel or alternate fuel engine, as required by MCUD, directly coupled to an electric generator. Together with the necessary controls and accessories to provide continuous electric power to the pump station for a minimum duration of 48 hours.
 - b. A complete engine generator system shall be furnished and installed with the following:
 - 1. Battery
 - 2. Battery charger
 - 3. Muffler

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4. Radiator
 5. Engine block heater
 6. Control panel
 7. Remotely mounted automatic transfer switch (part of the control panel)
 8. SCADA reporting I/O to station control panel for monitoring purposes
 9. All other accessories required for an operational system
- c. Materials and Parts
1. All materials and parts of the generator set shall be new and unused.
 2. Each component shall be of current manufacture from a firm regularly engaged in the production of such equipment.
 3. The set shall be a standard model in regular production at the manufacturer's place of business.
 4. Units and components shall be covered by the manufacturer's standard warranty on new machines.
- d. Requirements
1. The emergency generator set and accessories shall comply with the latest edition of the NEC and all applicable State and Local building codes.
 2. The material and workmanship used in the manufacture of this equipment shall be of the highest quality consistent with the current standards for like equipment, and the equipment shall conform to the latest applicable IEEE, ANSI, ISA, NEMA, and EEIA Standards.
 3. The equipment supplier shall be liable for any latent defects due to faulty materials or workmanship in the equipment within one year from the date of equipment start-up.
- e. Tests
1. Equipment shall be completely assembled and tested at the factory prior to shipment. Certified copies of the data obtained during these tests shall be submitted to MCUD.
 2. Final tests shall be conducted at the site, after installation has been completed, in the presence of MCUD's representative. The emergency generator manufacturer shall furnish a service representative to operate the engine during the tests, to check all details of the installation and to instruct MCUD's representatives in proper equipment operation.
 3. Field tests shall include operating the diesel generating set for eight hours, carrying normal pump station loads. The contractor shall refill the main fuel tank at the completion of the tests.
- f. Ratings
1. The rating of the generator shall be as shown in the standard details in Article 7. These ratings must be substantiated by the manufacturer's standard published curves. Special ratings shall not be acceptable.
 2. The diesel generating set shall be capable of supplying the specified usable KW for the specified duration, including the power required for the pump start-up, without exceeding its safe operating temperature.

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- g. Engine
 1. The engine and generator shall be torsionally compatible to prevent damage to either engine or generator.
 2. The engine governor shall be of the isochronous electronic type. Frequency regulation shall not exceed plus/minus 0.25 percent under steady state conditions. The engine shall start and assume its rated load within 10 seconds, including transfer time.
- h. Generator
 1. The generator shall be a three-phase, 60 hertz, single bearing, synchronous type, built to NEMA Standards. Epoxy impregnated Class F insulation shall be used on the stator and the rotor.
 2. The excitation system shall employ a generator-mounted volt per hertz type regulator.
 3. Voltage regulation shall be plus/minus two percent from no load to full load. Readily accessible voltage drop, voltage level and voltage gain controls shall be provided.
 4. Voltage level adjustment shall be a minimum of plus/minus five percent.
- i. Engine Generator Control Panel
 1. A generator mounted NEMA 3R Type 304, vibration isolated, 14 gauge stainless steel control panel shall be provided. Panel shall contain, but not be limited to, the following equipment:
 - a. All necessary exciter control equipment
 - b. Generator voltage regulators
 - c. Voltage adjusting rheostat
 - d. Speed control equipment
 - e. Automatic starting controls
 - f. Automatic safety shut down
 - g. An emergency shut down lever switch shall be provided on the air intake.
 2. Metering equipment shall include 3 ½" meters (dial or digital type frequency meter, two percent accuracy voltmeter, and ammeter and ammeter-voltmeter phase selector switch). The control panel shall also include the engine water temperature, lube oil pressure and hour meter.
 3. Individual press-to-test fault indicator lights for low oil pressure, high water temperature, low water level, overspeed, overcrank, and for day tank high and low fuel level shall be provided.
 4. A four position function switch marked "Auto", "Manual", "Off/Reset", and "Stop" shall be provided.
 5. The battery charger shall be so designed that it shall not be damaged and shall not trip its circuit protective device during engine cranking or it shall be automatically disconnected from battery during cranking period. The charger shall be mounted in the emergency generator control panel.
 6. The battery shall have sufficient capacity to provide 90 seconds total cranking

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time without recharging. The battery shall be adequately rated for the specific generator set. The battery shall be encased in hard rubber or plastic and shall be furnished with proper cables and connectors, together with rack and standard maintenance accessories. The battery shall have a 48 month warranty for the replacement of the battery if found to be defective.

7. Spring-type vibration isolators with a noise isolation pad shall be provided to support the set and its liquids.
 8. All connections to the generator set shall be flexible.
- j. Cooling System
1. The generator set shall be equipped with an engine mounted radiator sized to maintain safe operation at 110 degrees Fahrenheit maximum.
 2. A blower type fan shall direct the air flow from the engine through the radiator.
 3. The entire cooling system shall be filled with the manufacturers' recommended ratio of glycol-water solution.
- k. Fuel System
1. A double walled fuel tank shall be provided in accordance with FDEP requirements.
 2. An above ground, main fuel oil storage tank with float switch and fuel level indication or approved equivalent shall be furnished and installed.
 3. The emergency system shall include low fuel level contacts for remote alarm. A check valve shall be mounted on pump intake if necessary to guard against loss of prime to pump.
 4. The emergency system shall include a float switch, fuel level gauge and standard control panel.
 5. Fuel oil piping, including mounting of any required fuel tanks, shall be furnished and installed by the contractor.
- l. Exhaust System
1. The generator set supplier shall provide a critical-type silencer, with flexible exhaust fittings, properly sized and installed, according to the manufacturer's recommendation. The silencer shall be mounted so that its weight is not supported by the engine.
 2. Exhaust pipe size shall be sufficient to ensure that measured exhaust back pressure does not exceed the maximum limitations specified by the generator set manufacturer.
 3. The exhaust system shall include a flexible, seamless, stainless steel connection between the engine exhaust outlet and the rest of the exhaust system. The exhaust system shall be a part of generator enclosure.
- m. Weatherproof Enclosure
1. Outdoor generators shall have a weatherproof enclosure and all other items shall be designed and built by the equipment manufacturer as an integral part of the entire generator set and shall be designed to perform without overheating in the ambient temperature specified.
 2. Enclosure shall be self-supporting and vibration free in the operating mode.

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3. The enclosure shall be sound attenuating and comply with all sound regulations.
 4. The size of the enclosure shall be large enough to allow personnel to access the equipment for maintenance.
 5. Four hinged doors shall be provided to allow complete access without their removal. Each door shall have at least two latch-bearing points.
 6. Side and rear panels shall provide ease of complete removal for major service access.
 7. Roof shall be peaked to allow drainage of water.
 8. Baked enamel finish with primer and finish coat shall be painted before assembly.
 9. All fasteners shall be rust resistant.
 10. Unit shall have sufficient guards to prevent entrance by small animals. Padlocks shall be provided.
 11. Generators with a base skid greater than 2' elevation shall have aluminum stairs, catwalks and handrails, with fiberglass or aluminum non-skid grating. The catwalks and stairs shall be 48" wide.
 12. Batteries shall be designed to fit inside enclosure and alongside the engine. Batteries under the generator are not acceptable.
 13. Unit shall have coolant and oil drains outside the unit to facilitate maintenance. Each drain line shall have a high quality valve located near the fluid source.
 14. Fuel filter shall be inside the base perimeter and located so spilled fuel cannot fall on hot parts of engine or generator. A cleanable primary fuel strainer shall be used to collect water and sediment between tank and main engine fuel filter.
 15. Crankcase fumes disposal shall terminate in front of the radiator to prevent oil from collection on the radiator core and reducing cooling capacity.
- n. Automatic Transfer Switch
1. The automatic transfer switch shall be part of the control panel assembly.
 2. The transfer switch shall be provided with the following features:
 - a. Complete protection, close differential voltage sensing relays monitoring all three phases (pick-up set for 95 percent of nominal voltage, drop-out set for 85 percent nominal voltage);
 - b. Voltage sensing relay on emergency source (pick-up set for 95 percent of nominal frequency);
 - c. Time delay on engine starting – adjustable from 1 second to 300 seconds (factory set at three seconds). Time delay normal to emergency transfer – adjustable from zero seconds to 300 seconds (factory set at one second). The contractor shall request time delay settings in accordance with the priority rating or their respective loads;
 - d. Time delay emergency to normal transfer – adjustable 30 seconds to 30 minutes (factory set at five minutes), and time delay bypass switch shall be provided on door of the switch cabinet; and

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- e. Unload running time delay for emergency engine generator cooling down – adjustable from zero to five minutes (factory set at five minutes) unless the engine generator control panel includes the cool down timer.
 - 3. Products shall be guaranteed to be free from defects in material and workmanship under normal use and service for a period of one year after start-up.
- (m) Flow Monitoring System
- 1. A flow monitoring system capable of indicating, recording, and totalizing wastewater flows shall be provided consisting of a magnetic flowmeter, with remote reading display as required by MCUD.
 - 2. Contractor shall provide and install monitoring equipment resulting in a completely operational flow monitoring system.
 - 3. Transmitter Requirements
 - a. The transmitter shall contain all the circuitry necessary to produce a 4-20ma DC signal linear with the flow rate.
 - b. The transmitter shall be capable of measuring and totalizing forward and reverse flow.
 - c. The transmitter shall be housed in rust-proof, weatherproof enclosure suitable for wall or panel mounting rated NEMA 4X.
 - d. The transmitter enclosure shall have a clear and visible display indicating instantaneous flow rate and totalized flow information.
 - e. The transmitter shall utilize menu-driven sequencing of the internal functions from the front panel switches without the need or use of external equipment.
 - f. The functions shall include: rate indication, totalization, on-line meter status, self-test, meter identification and tag number, 4-20ma span adjustment, flow damping, 4-20ma zero adjustment, meter re-scale and meter recalibration.
 - g. Meter output shall be isolated 4-20ma signal linearly proportional to the flow rate.
 - h. The transmitter shall be capable of operating on 12VDC continuous or battery back-up.
 - i. The temperature range of the transmitter shall be 10° to 140° F.
 - j. Wastewater treatment plant, installation shall also include an alternative recording method to be located in the operations building.
 - 4. Flowmeter Maintenance
 - a. The flowmeter manufacturer shall incorporate trouble shooting guides with the instruction manuals.
 - b. The meter shall be designed to provide a continuous on line indication of meter status via the display.
 - 5. Warranty and Service
 - a. Products shall be guaranteed to be free from defects in material and workmanship under normal use and service for a period of one year after start-up.
 - b. Service shall be available for in-situ repair of the products. Manufacturer's repair personnel shall be based in Florida to ensure a reasonable response time of not more than two working days.

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(n) Electrical Grounding System

1. General

- a. A grounding system shall be installed as per NEC, Local Codes and Ordinances.
- b. The pump station plans shall clearly show the electrical grounding system.
- c. Depth of ground rods shall be clearly stated along with ohms readings at the time of start-up under normal circumstances.
- d. An underground perimeter cable grounding system shall be installed with connections to all of the following equipment:
 1. Wet well cover
 2. Valve vault cover
 3. Control panels
 4. Generator
 5. Utility company transformer
 6. Main disconnect switch
 7. Fence
2. The pump station plans shall show details of material and installation to construct a completely functional and operational electrical grounding system.

(o) Inspection and Testing

1. A factory representative knowledgeable in pump operation and maintenance shall inspect and supervise a test run at the pump station start-up.
2. A minimum of one working day shall be provided for the inspections.
3. Additional time made necessary by faulty or incomplete work or equipment malfunctions shall be provided as necessary to meet the requirements in this manual at no additional cost to MCUD. Upon satisfactory completion of the test run, the factory representative shall issue the required manufacturer's certificate.
4. The test run shall ensure that all installed equipment meets the following criteria:
 - a. All units have been properly installed.
 - b. The unit operate without overheating or overloading any parts and without objectionable vibration.
 - c. There are no mechanical defects in any of the parts.
 - d. The pumps can deliver the specified pressure and quantity.
 - e. The pumps are capable of pumping the specified material.
 - f. The pump controls perform satisfactorily.

(p) Manufacturers Shop Painting

1. Before exposure to weather and prior to shop painting, all surfaces shall be thoroughly cleaned, dry and free from all mill-scale, rust, grease, dirt, and other foreign matter.
2. All pumps and motors shall be shop coated with a corrosion resistant paint proven to withstand an environment of raw wastewater.
3. All nameplates shall be properly protected during painting.
4. Gears, bearing surfaces, and other similar surfaces obviously not to be painted shall be given a heavy shop coat of grease or other suitable rust-resistant coating. This coating

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shall be maintained as necessary to prevent corrosion during periods of storage and erection and shall be satisfactory to MCUD up to the time of the final acceptance test.

(q) Handling

1. All parts and equipment shall be properly protected so that no damage or deterioration will occur during a prolonged delay from the time of shipment until installation is completed and the units and equipment are ready for operation.
2. Finished surfaces of all exposed pump opening shall be protected by wooden planks, strongly built and securely bolted thereto.
3. Finished iron or steel surfaces not painted shall be properly protected to prevent rust and corrosion.

(r) Warranty

The pump manufacturer shall warrant the units being supplied to MCUD against defects in workmanship and material for a period of five years or 10,000 hours.

(s) Tools and Spare Parts

1. The manufacturer shall furnish the following spare parts for each size pump supplied:
 - a. One set of "O-Rings" or gaskets required for oil changes.
 - b. One set impeller wear ring, and impeller bolt and key (if applicable).
 - c. One cable cap (if applicable) and entry washer/grommet.
 - d. One set of inspection plug washers or 'O' Rings as required for pump oil change.
2. Spare parts shall be properly packaged and labeled for easy identification without opening the packaging and suitably protected for long term storage under humid conditions.
3. The pump supplier shall have a guaranteed parts stock program in the State of Florida. These parts shall include at least one set of the spare parts listed in the above parts list.

(t) Submittals

1. Submittals to MCUD shall include the following:
 - a. Shop and erection drawings showing all important details of construction, dimensions and anchor bolts locations.
 - b. Descriptive literature, bulletins, and/or catalogs of the equipment.
 - c. Data on the characteristics and performance of each pump. Data shall include guaranteed performance curves, based on actual shop tests of similar units, which show that they meet the specified requirements for head, capacity, efficiency, NPSHR, submergence and horsepower. Curves shall be submitted on 8 ½" by 11" sheets, at as large of a scale as is practical. Curves shall be plotted from no flow at shut-off head to maximum manufacturer recommended pump capacity. Catalog sheets showing a family of curves will not be acceptable.
 - d. Complete layouts, wiring diagrams, elementary or control schematics, including coordination with other electrical control devices operating in conjunction with the pump control system. Suitable outline drawings shall be furnished for approval before proceeding with manufacture of any equipment. Standard preprinted sheets or drawings simply marked to indicate applicability will not be acceptable.
 - e. A drawing showing the layout of the pump control panel shall be furnished. The layout shall indicate all devices mounted on the door and in the panel shall be

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completely identified.

- f. The weight of each pump.
- g. Complete motor data including:
 - 1. Nameplate identification
 - 2. No-load current
 - 3. Full load current
 - 4. Full load efficiency
 - 5. Locked rotor current
 - 6. High potential test data
 - 7. Bearing inspection report
- h. Three hard copies of drawings, and an electronic copy on removable media, of the Operations and Maintenance Manual for all equipment furnished.

Sec. 6.16.6 Water reclamation facilities.

The design of water reclamation facilities shall be designed according to FDEP BMPs, current compliance standards, and MCUD requirements.

Division 17 **Reuse Facilities**

Sec. 6.17.1 Purpose and intent.

This division sets forth the general requirements for the design of a reclaimed water system.

Sec. 6.17.2 Applicability.

MCUD shall evaluate the availability of reuse and information provided by the applicant to make a determination if incorporation into MCUD's reclaimed water system represents a beneficial use of the reclaimed water resource. The developer may appeal the determination of MCUD to the DRC.

Sec. 6.17.3 Developer's agreement.

An executed developer's agreement for reuse distribution (irrigation) systems shall be required prior to receipt of potable water and wastewater service, if project is required to connect to MCUD reclaimed water system.

Sec. 6.17.4 Design standards.

- A. Approved and prohibited uses of reclaimed water shall comply with FAC 62-610, Reuse of Reclaimed Water and Land Application, Part III.
- B. The water reuse potential of a project shall be based on the anticipated irrigation demand at an annual average irrigation rate calculated consistent with water management district guidelines.
- C. Reclaimed water systems shall be designed to promote efficient reclaimed water usage and for the estimated ultimate irrigation demand, based on planned development build-out. The developer is responsible for sizing the mains within the development property limits (on-site). Individual single-family homes are exempt from providing design calculations for irrigation systems with one inch or smaller meters.
- D. Reclaimed water mains outside the development limits (off-site) shall be sized using the flow calculations and peak hourly factor below:

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- (1) The weekly reclaimed water flow shall be based on a minimum of 1 inch per week over the proposed irrigated area of the property.
- (2) Peak hourly factor.
 - (a) For commercial developments, the peak reclaimed water flow shall be calculated by dividing the weekly flow by the allowed days of irrigation per week and multiplying the result by a peak hourly factor of six. Irrigation zones shall be provided to uniformly distribute flows so that the maximum peak hourly factor is not exceeded. Alternate irrigation system designs will be evaluated on a case-by-case basis.
 - (b) For single family residential developments, the peak reclaimed water flow shall be calculated by dividing the weekly flow by the allowed days of irrigation per week and multiplying the result by a peak hourly factor of six.

E. Design Calculations

- (1) A registered professional engineer shall submit signed, sealed and dated hydraulic calculations with the master plan and the plans for all reclaimed water distribution projects. Calculations shall show sufficient hydraulic capacity to transport peak flows. All head losses and minor losses shall be included in the calculations.
- (2) An engineering submittal for proposed on-site storage ponds shall be submitted to MCUD for review and approval. The submittal shall include two copies of construction plans and an engineering report supporting the pond design. The submittal must meet the requirements of MCUD, as well as FAC 62-610.

F. Location

- (1) Reclaimed mains shall maintain a consistent alignment with respect to the centerline of the road when installed in rights-of-way.
- (2) Reclaimed mains located outside of dedicated rights-of-way shall require a minimum 20' easement shall be provided if it is not adjacent to the road right-of-way.
- (3) Reclaimed mains located adjacent to a road right-of-way shall have a minimum of a 10' easement.
- (4) Additional easement widths shall be determined by MCUD, when necessary.
- (5) Reclaimed mains shall not be placed under or within 10' of the high water line of retention ponds, retention pond berms, or any vertical structures.
- (6) Reclaimed mains shall not be located along side or rear lot lines, except when approved by MCUD.
- (7) Proposed commercial and residential development offsite mains shall be extended a minimum of 10' beyond the furthest entrance to the development.

Sec. 6.17.5 Reclaimed water metering.

- (1) All reclaimed water service connections shall be metered.
- (2) A master metering system is required when reclaimed water flow dictates installation of a 4" or larger meter. However, the engineer must obtain MCUD approval before finalizing the metering system design.
- (3) Meter boxes shall not be installed in sidewalks, driveways or areas subject to vehicular traffic unless specifically approved by MCUD. Meters subject to vehicular traffic shall be installed in a traffic rated meter box.
- (4) All commercial, industrial, institutional, shopping centers, apartments, and condominium projects shall require installation of one meter to service the entire development.

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- (5) Meters larger than 2" shall be installed by the developer. Installation of meters 2" and smaller will be performed by MCUD. Meters 1" or smaller in size will be installed underground in an approved meter box. Meters that are 1.5" and larger shall be installed above ground, within a utility easement adjacent to the public right of way.
- (6) Size of all meters shall be determined in accordance with current AWWA Standards and MCUD approval.

Sec. 6.17.6 Non-residential irrigation wells.

- A. Existing or proposed wells may be utilized as a back-up supply of irrigation water in the case of an interruption of service from the reclaimed water system.
- B. Existing or proposed wells shall be protected from reclaimed water entering the well by a MCUD approved backflow prevention device.

Sec. 6.17.7 On-site storage.

- A. On-site storage may be required when the supply pipe requirement is 2" or greater. The volume of the on-site storage ponds or tanks shall be equal to or greater than the annual average daily demand during a 24-hour period and MCUD approval.
- B. On-site storage ponds shall be lined, operated and maintained by the pond owner.
- C. The pond shall include a level control device to avoid overflow.
The pond reclaimed water meter assembly shall include a MCUD approved pressure sustaining valve to protect the system pressure.

Sec. 6.17.8 Backflow prevention. Backflow prevention requirements shall be in accordance with [Section 6.15.7](#).

Division 18 Fire Regulations and Prevention

Division 19 Outdoor Lighting