



Water, Sewer and Reclaimed Water Design Guidelines

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JEA Water, Sewer, and Reclaimed Water Design Guidelines

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Section 1.0 General Information

1.0 General

The JEA new development team consists of the JEA Director, Managers, Engineers, Technicians, and Coordination staff.

JEA team members are trained to assist in the project management, coordination with planning, system availability, hydraulic analysis, design review, construction inspection, as-built review, and acceptance processes of developer installed utility systems.

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

1.1 Preliminary Information Requests

1.1.1 Water and Sewer As-built Drawing Request

For best available information of existing sewer and water mains or locations of sewer and water taps, an as-built drawing request may be obtained from JEA's Record Department. Generally requests for sewer and water tap locations are completed within 2 (two) business days and 5 (five) business days for all other requests. These requests must be obtained in writing.

Here are the ways that you can submit your request:

- Fill out and submit an [online records request](#).
- E-mail your request to recordsrequests@jea.com. Please provide as much information as possible.
- Download the printer-friendly form and fax or mail it to our office:

Our fax number is (904) 665-5713

Our mailing address is:
JEA Records Department
21 W. Church Street
Jacksonville, FL 32202

Web Site: www.jea.com/business/services/contractor/asbuilts.asp

1.1.2 Service Availability Request

Prior to submitting for a building permit with local county agencies, an [Availability Request Form](#) shall be submitted to JEA. This form can be completed on-line at www.jea.com/business/services/devandbuild/avail_instructions.asp. Service availability requests are reviewed by JEA's Water and Sewer System Planning Team to determine the nearest point of connection. Requests are normally completed within 7 (seven) business days. Responses from JEA are in the form of an availability letter. The availability has an expiration of 1 (one) year from the date written and contains a tracking number known as the availability number. This number will be the reference number used throughout the project's lifecycle.

In its evaluation of availability requests, JEA will rely upon JEA utility system records for the accuracy of existing JEA utilities. It shall be the sole and exclusive responsibility of the applicant and/or its affiliated parties to determine the suitability and accuracy of the record information and locate through field verification (including but not limited to sub-surface utility investigations, open excavation, ground penetrating radar etc.) during the design process. Should field verification of existing utilities not match the availability response, the applicant shall notify JEA immediately so a new point of connection can be identified.

All applicants shall follow the design review process, except for single residential lots and existing commercial properties that do not require a force main connection. Applicants requiring force main connections or new commercial buildings shall follow the design review process. All connections to JEA's system shall be considered new development requiring completion of the JEA acceptance checklist (ex. As-built, copy of receipt of capacity fee(s) payment, etc.).

During the plan review process, the applicant may be contacted and directed to the Water & Sewer counter if the proposed plan denotes a simple six-inch lateral sewer tap. The plan reviewer may observe unusual conditions (ex. Additional costs due to FDOT right-of-way requirements, a conflict with City of Jacksonville resurfacing schedule, or other unusual connection requirements) and add comments to the submitted drawing set so to alert the applicant to make application for service (at the Water & Sewer counter) at its earliest convenience to ascertain magnitude of cost for the tap construction.

Once a project has been accepted by JEA, no further revisions are allowed and the developer or its engineer must resubmit for a new availability number to make changes.

1.2 Multi Phased Developments

For large development projects which will be constructed in several phases, JEA shall be provided with a phased master plan. JEA Planning will review, and if acceptable, will assign separate JEA availability numbers to each construction phase.

1.3 Pre-Design Meeting

It is strongly recommended that the applicant schedule a pre-design meeting with JEA Plan Review Representatives to discuss conceptual water and sewer requirements for any project that will be served by an internal collection and distribution system.

Section 2.0 Design Guidelines

2.0 General

This section applies to all new residential, commercial or industrial developments requiring or requesting a new or modified water, reclaimed water and/or sanitary sewer service or main construction. For these new developments, a JEA Plan Review is required. To initiate a JEA Plan Review, the developer must first obtain a JEA Water and Sewer Availability, which defines the JEA point of service. The availability number is utilized for tracking the project from start to finish. The developer or engineer submits proposed construction plans, permits and other applicable data to JEA's Plan Review Department for JEA water and sewer utility review. This Plan Review process typically involves two submittals (a preliminary and final plan review) as described below.

JEA, in coordination with the Developer's Engineer, reserves the right to specify the point of service, the size of service, the type of service, and the general layout of the overall system within the guidelines established in this manual.

Water, reclaimed water, and sewer distribution and collection systems shall be designed and constructed according to the most current editions of the following publications:

Documents	Web Address (Link)
JEA Water & Sewer Reclaimed Water Design Guidelines	http://www.jea.com/business/services/devanbuild/wsrguide.asp
Industrial Pretreatment Requirements	http://www.jea.com/business/services/industrialpre/index.asp
JEA Rules & Regulations for Electric Service	http://www.jea.com/about/pub/downloads/RulesRegs-Elec.pdf
JEA Rules & Regulations for Water , Sewer and Reclaimed Water Service	http://www.jea.com/about/pub/downloads/RulesRegs-WS.pdf
JEA Water and Sewer Standards Manual	http://www.jea.com/business/services/contractor/standards.asp
The Recommended Standards for Sewage Works (Ten State Standards)	
FDEP and other applicable federal, state and local requirements	http://www.dep.state.fl.us/
JEA Self Permitting	http://www.jea.com/business/services/devanbuild/ws.permit

For utility work outside of Duval County, the location of water valves, meter boxes and the type and location of fire hydrants shall comply with the local (County) design and construction utility standards.

The engineer shall coordinate the location of water, reclaimed water and sewer facilities

with other utilities (electric, gas, telecommunication, drainage and cable) to minimize conflicts. Facilities shall be designed such that conflicts with driveways and sidewalks are minimized. In the event of conflict with a future driveway or sidewalk, the Developer and/or Builder shall be responsible to resolve the conflict at its expense.

For private water distribution systems involving two or more units which are connected to the JEA water distribution system (such as a master meter arrangement), the owner or its engineer shall ensure that the above rules and standards are complied with during the design and construction phase of the project. Although a JEA Plan Review and/or a regulatory permit may not be required, it is the responsibility of the owner or engineer to maintain the public drinking water standards by complying with the above applicable rules and standards including, but not limited to utility separation requirements, pressure and leakage testing and private bacteriological clearance testing. It should also be noted, in some cases, the private water distribution system may require a plumbing permit from the City or County having jurisdiction.

2.1 Order of Precedence

JEA will use the following order of precedence in resolving any conflict, error, or discrepancy for all installed systems:

1. Approved regulatory permits (JEA, FDEP)
2. Approved final design plans
3. Approved County/FDOT agency permit requirements
4. JEA Water and Sewer Standards Manual
5. JEA Rules & Regulations for Water, Sewer and Reclaimed Water Services
6. JEA Water, Sewer and Reclaimed Water Design Guidelines

2.2 JEA Plan Review Effective Dates

The date of JEA Plan Review Approval will be provided on the cover sheet of the approved construction plans. This approval date will define the acceptable JEA construction standards which will be utilized during the construction period. Also this date is the starting date for the duration of the approved plans as defined below:

2.2.1 Projects with no JEA/FDEP Permit

For projects which do not include a JEA or FDEP environmental construction permit, JEA Plan Review Approval will be effective for a 2 year period. If requested by the developer, three 1-year extensions may be approved by JEA. The developer shall obtain an updated JEA availability response, prior to JEA considering granting any extensions.

2.2.2 Projects with a JEA Permit

For projects that include a JEA environmental construction permit, JEA Plan Review Approval will be effective for the same effective dates as the permit (2 years). During the permit approval process, the lag time between JEA Plan Review Approval date and the date of issuance of an approved JEA environmental permit shall not exceed 6 months. If requested by the developer, three 1-year extensions of the JEA environmental permit may be approved by JEA. The developer shall obtain an updated JEA availability response and an updated JEA Plan Review Approval prior to this extension.

2.2.3 Projects with a FDEP Permit

For projects that include a FDEP environmental construction permit, JEA Plan Review Approval will be effective for the same effective dates as the permit (5 years). During the permit approval process, the lag time between JEA Plan Review Approval and issuance of an approved FDEP environmental permit shall not exceed 6 months. If requested by the developer, a FDEP permit extension may be approved by the FDEP. Prior to this extension of FDEP environmental permits, the applicant shall obtain a new JEA availability response and a new JEA Plan Review Approval.

2.2.4 Maximum Plan Review Approval Duration

In no case shall a JEA Plan Review Approval exceed a 5 year period.

2.3 Preliminary Design Review

2.3.1 General Plan Submittal Requirements

Two sets of clear and legible design plans that have been signed and sealed by a professional engineer registered in the state of Florida shall be submitted on 24" by 36" sheets for the preliminary plan review by JEA. As a minimum requirement, the following shall be included on the design drawings:

- a. A north arrow with scale indicated,
- b. A vicinity map,
- c. Lot numbers, street names and street address (if available - especially for in-filled areas),
- d. A permanent benchmark or temporary benchmark (referenced to a permanent benchmark)referenced to State Plane Coordinates,
- e. The engineer's name, project name and all phases to be planned, designed, and constructed on all sheets,
- f. Developer's name and contact number,
- g. All materials shown and clearly labeled (pipe, valves, fire hydrants, fire sprinkler lines, water meters, fittings, manholes, services) with associated elevations, sizes, types, composition, slopes, and appurtenances,
- h. Topographical location of existing utilities within the right-of-way including water mains, reclaimed water mains, force mains, gravity sewers, storm sewers, electric, gas, fiber optic, cable, and telephone,
- i. Where connecting to an existing utility line, both horizontal and vertical field verification of the main location,
- j. Elevations (manhole tops and inverts) of all existing sewer facilities within the right-of-way and easements. Contact JEA to pump down manholes which are surcharged or full of sediment at 665-4723,
- k. A site plan indicating any required grease, oil, sand, or lint separators and/or other required pretreatment systems such as dumpster pad run off,
- l. A master paving and drainage plan showing all storm water facilities, retention or detention ponds with elevations, the design high water and 100 year flood elevations and site contours shown at 2' maximum intervals,
- m. Utility Master Site Plan drawn with proposed phases clearly indicated.

Updates provided as revisions are made,

- n. Match lines, when applicable, shall be indicated on all plan sheets,
- o. When available, preliminary plat shall be submitted on all platted projects in order for JEA to provide electric, water, or sewer services to the development,
- p. Design plan shall include station numbers along proposed roadways for all projects,
- q. For commercial or residential subdivisions, plan only sheets drawn at a maximum horizontal scale of 1" = 60' (40' preferred). For commercial and residential subdivisions, plan and profile sheets drawn at a maximum horizontal scale of 1" = 40' (1" = 20' preferred) and a maximum vertical scale of 1" = 5', (1" = 2' preferred). Exception: If requested and approved by JEA, certain projects may be designed using up to 1"=100' scale provided that the information on the plans is legible and approved by JEA,
- r. Design plan shall include JEA availability number and city development number on cover sheet submittal,
- s. Roadway cross sections with proposed and existing utilities depicted, road crossing details for open cuts, profiles for jack and bores and directional drills showing all existing utilities with actual surveyed elevations and field verified locations where possible,
- t. Plan and profile sheets shall include all sewer design information including pipe size, length, material, slope, manhole top and invert elevations, existing and proposed grades, the location of new gravity sewers and force mains, all crossings (storm water and water mains) and all additional pertinent information such as trench details, manhole details, joint details, and material specifications. Profiles may not be required for sewer force main projects which involve less than 50 LF,
- u. When available, landscaping plans with location of proposed utilities shown,
- v. All existing and proposed utility easements and rights-of way with dimensions, locations and grantee,
- w. When available, building footprints (for commercial projects), minimum finished floor elevations and number of floors, decorative brick walls and paving, entrance signs, fountains, fences, and landscape buffers shown,
- x. Ownership of the proposed utility system shall be clearly designated as "JEA" or "Private",
- y. Stabilized driveway shown in easements crossing wetlands and in manholes,

2.3.2 Sewer Plan Submittal Requirements

In addition to the general plan submittal requirements discussed above, sewer design plans shall include the following:

- a. Force main elevations every 100' minimum and at any grade changes exceeding 2 feet,
- b. Pump station drawings shall include, cross sectional view of pump station showing pump station piping and fittings and wet well elevations, pump information including model, impeller diameter, horsepower, motor speed,

- operating voltage, control panel, and operating point,
- c. JEA general standard detail sheets where the pump station is to be dedicated to JEA. Where required, the standard site layout may be modified as necessary provided the minimum site dimensions are maintained and all standard general notes are included,

2.3.3 Reclaimed Water Plan Submittal Requirements

In addition to the general plan submittal requirements discussed above, reclaimed water design plans shall include the following:

1. Location of all potable water wells within 500’,
2. All existing and proposed reclaimed water storage ponds including any connection to the storm water management system and/or waters of the State,
3. All backflow prevention required in accordance with the JEA cross connection control program,
4. A plan sheet(s) showing a reclaimed water signage plan consistent with JEA Rules and Regulations for Water, Sewer and Reclaimed Water Service.

2.3.4 Utility Construction Notes

The following notes, at a minimum, shall be included on all plan submittals. Any deviation from the standards shall be requested by the Developer’s Engineer and shall be approved, in writing, by JEA:

1. All water, reclaimed water and sanitary sewer work shall be constructed in accordance with the latest JEA Water and Sewer Standards Manual, all applicable local and state regulatory rules & regulations and other applicable JEA rules.
2. All water, reclaimed water and sanitary sewer construction shall be provided by a contractor qualified as required under the current Florida Statute or by an underground utility contractor, licensed under the provisions of Chapter 489 FS.
3. The contractor shall be responsible for obtaining City or County Right-Of-Way permits for work in the City R/W, County R/W or a FDOT permit for work in the FDOT R/W.
4. The contractor shall contact the JEA field inspector and schedule a "Pre-Construction Meeting" 48 hours prior to initiating the JEA water and sewer utility work, including all utility main taps by the constructor.
5. JEA water and sewer tap fees, JEA water and sewer capacity fees and JEA meter fees shall be paid prior to the water meter installation. Contact the JEA Service Counter at 665-5260 (jea.com) for additional information. Water meters will not be installed prior to the issuance of a regulatory clearance letter (COC) for the water and sewer improvements, completion and approval of Final Inspection and approved as-built drawings.
6. Final connection to the JEA system may be contingent upon the construction, dedication and final acceptance (transfer of ownership/maintenance) of the JEA off-site utilities.
7. The minimum horizontal and vertical separation requirements for the water,

reclaimed water and sewer improvements shall conform to the latest JEA and FDEP rules. The minimum horizontal separation requirements between the proposed water and sewer utilities and ponds or structures shall conform to the latest JEA Water and Sewer Standards Manual.

8. Water and sewer pipes shall be constructed with a minimum 30" cover in unpaved areas and a minimum of 36" cover in paved areas. The maximum cover for utilities utilizing Horizontal Directional Drill methods shall comply with the latest JEA Water and Sewer Standards Manual.
9. Water and sewer pressure mains and services shall pass a JEA pressure and leakage test at 150 psi for 2 hours. In addition, water mains shall be disinfected and pass a bacteriological analysis. All tests shall conform to JEA and FDEP rules and regulations and AWWA C-651. The JEA Inspector shall be notified 48 hours (min) prior to performing these tests. No final connection(s) to existing potable water mains shall be made until the new main is pressure tested, disinfected, and cleared for service.
10. In the areas where solvent contamination is found in the trench, work shall be stopped and the proper regulatory authorities notified. A revised construction plan shall be approved by JEA and FDEP which complies with all regulatory rules. The revised construction plan for the JEA water main system including water service lines may involve galvanized or ductile iron pipe with special solvent resistant (fluorocarbon type) gaskets which extend 100 feet beyond the contaminated areas.
11. The contractor shall minimize service interruptions to existing JEA water and sewer customers. If JEA approves a service interruption, then the contractor will be responsible for notifying the affected customers in accordance with the latest JEA rules.
12. Residential services using reclaimed water for irrigation must have a JEA approved backflow preventer installed on each potable water service prior to the installation of a JEA reclaimed water meter. The installation of a backflow preventer shall be in accordance with the JEA Rules and Regulations for Water, Sewer, and Reclaimed Water Services, appendix B, Cross Connection Control Policy.
13. For developments utilizing reclaimed water, a JEA approved reclaimed water signage plan shall be implemented prior to the installation of the reclaimed water meters.

2.4 Additional Submittal Documents

In addition to the plans, the following documents shall be submitted for review:

1. A copy of the approved JEA availability letter shall be submitted. Plans submitted for review depicting a point of connection other than that identified in the availability response shall require a revised availability response supporting the design plans.
2. Sewer hydraulic calculations, signed and sealed by the Florida registered professional engineer, including influent flow data, hydraulic analysis of the system, pump information with the operating point indicated on a manufacturer's supplied pump curve, buoyancy calculations for the wet well (not required if wet well is existing

- structure), and the power requirements (amps, volts, horsepower) for the pumps.
3. Hydraulic calculations supporting fire flows on all new hydrants located in the right-of-way or JEA easement. Fire hydrant flow test results should be included with these fire flow calculations. Fire Flow Test may be requested at 665-5260 for fee of \$82 per each request. If existing data is available, the information will be provided at no cost.
 4. All JEA utility easement(s) interests and temporary or permanent utilization of JEA easements including JEA transmission line corridors.

2.5 Final Design Review

Final design plans which have been revised and re-submitted for final review shall have the revisions listed in revision block on all affected sheets and the revisions “clouded” to bring attention to the proposed changes.

Any changes to the development following final plan approval which may result in changes to any system design will require additional plan review and approval by the JEA Team.

JEA requires and keeps three approved sets of 24” by 36” design plans that have been signed and sealed. Design Engineer is encouraged to submit sufficient number of plans in order to meet JEA’s and the owner’s requirements, e.g. if owner requires one copy returned, then four (4) sets would have to be submitted.

The following documents are necessary for the completion of the final design review process.

- a. Electronic submittal of drawings, in AutoCAD or Micro Station format, for all platted residential and commercial subdivisions.
- b. Required Document Submittal (All that Apply)
 - Letter of Intent to Dedicate
 - Developer Agreements
 - FDEP/JEA permit applications (water and sewer permit)
 - JEA Right-of-way permit applications (JEA land use request)
 - Cost Participation (Commitment Letter)
 - Deposits or Fees Paid (Cost recovery or other fees)
 - Final Engineering Calculations
 - Ownership and Easement Report/ Opinion of Title
 - Agent of Letter Authorization
 - Division of Corporation Documentation (Sunbiz)
 - Easements approved by JEA then recorded
 - Warranty Deed for lift stations
 - Hold Harmless Agreement
 - Preliminary Plat
 - Addresses for all lots
 - Other documents requested by JEA

2.6 Permits

Water and/or sewer mains 12" inside diameter and smaller located in Duval County may be permitted through JEA's self permitting process.

The Engineer shall submit completed JEA Water and/or Sewer Design and Construction Permit Applications www.jea.com/business/services/devandbuild/selfpermitprocess.asp. The Developer's Engineer shall fill out the permit checklists and submit with all pertinent data on the permit forms.

The Developer and Engineer are responsible for ensuring that all permits, permit criteria, permit fees, forms and other permitting requirements are met for the proposed project.

All water and sewer mains located outside of Duval County must be permitted through the FDEP. In addition, all water and/or sewer mains within Duval County exceeding 12" in diameter will require a FDEP permit. All private sewer facilities shall be permitted through FDEP or if applicable, the Environmental Quality Division of the City of Jacksonville.

The Developer and Engineer are responsible for ensuring that all permits, permit criteria, permit fees, forms and other permitting requirements are met for the proposed project.

Right of Way permits are required for work within the city, county and state rights-of-way. Contact the appropriate agency for R/W permitting requirements.

2.7 Pre-Construction Meeting

Upon final plan approval, the developer or its agent shall schedule a pre-construction conference with the JEA Construction Inspector.

Refer to JEA Water, Sewer and Reclaimed Water Inspection Guidelines.

2.8 Construction and Inspection

With distribution of the final design drawings, the project will be turned over to the Developer's Engineer for coordination of construction. JEA will assign a Construction Inspector who shall be responsible for JEA's inspection activities of any facilities constructed for dedication to JEA. The Inspector will maintain communication with JEA's engineering team as well as the Developer's Engineer throughout the project construction.

Refer to JEA Water, Sewer and Reclaimed Water Inspection Guidelines.

2.9 Project Installation

The utility system shall be installed as depicted on the approved project drawings and in accordance with the latest JEA Water and Sewer Standards Manual.

Any utility adjustments resulting from finish grade changes made after plan approval will be approved by JEA Inspector and shall be the sole responsibility of the Developer. In no case shall maximum or minimum slopes or depth of bury be exceeded as a result of field finish grade changes.

Refer to JEA Water, Sewer and Reclaimed Water Inspection Guidelines.

2.10 Shop Drawings

Any specialty pump station structures, pumps, panels, or materials not included in the JEA Water and Sewer Standards Manual will require two complete sets of shop drawings to be submitted for review and approval prior to ordering materials. The JEA availability number

associated with the project shall be shown on the shop drawings. The Developer's Engineer shall review and approve shop drawings prior to submittal to JEA for review and approval.

Refer to JEA Water, Sewer and Reclaimed Water Inspection Guidelines.

2.11 As-Built Drawings

Upon completion of the project and prior to dedication of utilities to JEA or final payment under a contract with JEA, the Contractor shall furnish to JEA an electronic file and 2 sets of the as-built drawings revised in accordance with the JEA Water and Sewer Standards Manual Section 501. The Contractor shall deliver initial as-built within 30 days of substantial completion. JEA shall review the documents to ensure accuracy with respect to actual construction and JEA Standards. JEA shall review the plat to ensure all easements are provided (as-built drawing must include recording document number) and all utility work is located within the right-of-way or easements. In the event data is missing, the Contractor will be notified and provided a marked-up copy showing the required changes within 5 working days of receipt. Within 30 days, the contractor shall furnish the corrected signed and sealed plans along with two copies and an electronic file on CD to JEA for approval. Upon approval, an approval letter shall be issued to the contractor submitted within 3 working days with copies distributed to the appropriate segments within JEA.

Refer to JEA Water, Sewer and Reclaimed Water Inspection Guidelines.

2.12 Acceptance of the System

Upon completion of the project in accordance with JEA Water, Sewer and Reclaimed Water Inspection Guidelines and JEA Water and Sewer Standards Manual, the transfer of ownership and maintenance of the constructed infrastructure per approved plans is commenced. For a list of items required prior to accepting any utility system refer to www.jea.com.

2.13 System Warranty

All portions of the installed utility system shall be unconditionally guaranteed, in accordance with the JEA Water and Sewer Standards Manual, against material defects or improper workmanship for 12 months after the substantial project completion date, five (5) years for Sewage Submersible Pump and motor, and two (2) years for High Density Polyethylene or fusible PVC. The Developer shall repair and/or replace defective material and/or installations at no cost to JEA. In the event of failure by the Developer to provide complete replacement, delivery to the site of materials and installation of same to replace defective materials or defective workmanship with new materials/workmanship conforming to the JEA Water and Sewer Standards Manual, or during emergency events or in the event of imminent danger to JEA facilities or customers, repairs may be made by JEA at the Developer's expense.

If any facilities, including service lines that are installed and do not conform to the final lot layout, it shall be considered a misplacement of the installed system and all costs incurred by JEA for relocation shall be paid in advance by the Developer, or its successor.

2.14 JEA Capacity Fees

JEA Capacity fees for water and sewer must be paid in full before acceptance of the system and before installation of temporary or permanent water meters.

2.15 Dedication of Existing Privately-Owned Systems

JEA will not accept existing privately owned, operated and maintained systems for dedication. These systems include, but are not limited to, the following:

- a. Existing master metered onsite water distribution systems.
- b. Existing private pump stations.
- c. Existing private onsite gravity sewer collection systems.

On a case by case basis, JEA may consider exceptions to the above given one or more of the following criteria are met.

- a. JEA's system reliability or capacity may be improved or increased as a result of system dedication.
- b. Additional customers who currently are not served will be provided service via the dedicated facilities.
- c. Dedication of the system is warranted to eliminate or prevent potential environmental damage.

In the event JEA agrees to accept a privately-owned system, the following events shall occur:

- a. JEA will evaluate the system, at the Owner's expense, to determine repairs and/or upgrades needed to bring the system into compliance with current JEA standards and regulatory requirements.
- b. System owner shall, at no cost to JEA, repair or improve the system accordingly.
- c. Repairs or improvements shall be designed and permitted in accordance with all Local and State rules and regulations.
- d. Repairs and improvements shall be inspected by JEA during construction.
- e. System shall be tested by owner's contractor and witnessed by JEA. This includes, but is not limited to; water and sewer pressure tests, gravity sewer television inspection and pump station start up testing.
- f. The system owner shall prepare an as-built of the system and submit to JEA for approval.
- g. The system owner shall submit a dedication package to JEA.
- h. The system owner shall provide or obtain any easements required for JEA to own and operate the system.

Once these items are complete, JEA will submit a written letter of system acceptance to the owner informing them that JEA has accepted the system for ownership and maintenance.

2.16 Public and Private Point of Service

A customer's point of service is defined by JEA as the location of the connection points identified in the JEA Water and Sewer Availability response. Points of connection provided by JEA are located in either Right-of-Way or approved JEA utility easement.

From the customer's point of service, JEA is obligated to own, operate and maintain only those utilities which will be constructed in existing or proposed Right-of-Way. Proposed utilities which will be constructed in approved JEA utility easement must be located

adjacent to or abut existing or proposed Right-of-Ways.

With the exception of proposed dedicated Right-of-Ways, JEA is under no obligation to accept ownership, operations or maintenance responsibilities associated with utilities which will be constructed on private property and in those cases, developers and their engineers should design their projects with private utilities which meet or exceed their service requirements.

Utilities shall not be located in easements unless approved by JEA. Approval shall be requested at the pre-design meeting (prior to plan review submittal)

Gravity sewer mains within easements and between lots are allowable only with prior approval from JEA.

Easements where allowed, on sidelines and between structures shall be identified as unobstructed and shall have a minimum width of 20' for water only or as shown in Table 2.

Landscaping, other than grass, is considered to be an obstruction.

Gravity sewer mains located adjacent to retention pond areas shall be designed with sufficient easement to avoid side slope collapse based on 3 to 1 side slopes and depth of bury. JEA reserves the right to require casing pipe as necessary to maintain the gravity sewer.

A Hold Harmless Agreement may be required when installing special landscaping or paving in right-of-way or easements.

Table 2: Easement Width

PIPE DEPTH, ft	EASEMENT WIDTH, ft		
	One Utility	Two Utilities	Three Utilities
0 – 6	20	25	30
6 – 8	25	35	40
8 – 10	30	40	45
10 – 12	35	45	50
Greater than 12	N/A	N/A	N/A

Gravity sewer greater than 12' deep shall not be located within easements.

When easements are adjacent to and parallel to a public right-of-way, the minimum easement width shall be 10' for water only or 20' for both water and sewer mains.

A Water/Sewer easement with a minimum width of 5' is required opposite JEA electric easements in residential subdivision with 50' right-of-way.

Section 3.0

Potable Water and Reclaimed Water Design Guidelines

3.0 General

This section provides the minimum guidelines for the design of potable water and reclaimed water transmission and distribution systems. The method of design and/or construction shall be according to accepted engineering practices, this manual, the most current JEA Water and Sewer Standards Manual, the American Water Works Association (AWWA), Chapter 62-555 and 62-610 of the Florida Administrative Code and all applicable Sections of the Florida Department of Environmental Protection Rules and Regulations for Water and Sewer Systems as well as all applicable federal, state, and local requirements.

3.1 Design Flows

All systems should be sized to provide at least maximum day domestic requirements plus fire flow at residual pressures of not less than 20 psi at all points in the system.

3.1.1 Average Daily Flow (ADF)

The developer's submittal to JEA should clearly state the basis for the design flows.

3.1.2 Single Family Residential

An Equivalent Residential Connection (ERC) is the equivalent flow that can be anticipated from one residential connection. In the absence of historical data to the contrary, assume 100 gallons per capita per day (gpcd) or per bedroom or 350 gpd/ERC to calculate the average daily flow (ADF).

3.1.3 Multifamily Residential, Commercial, and Industrial

Flows from these sites should be estimated on an individual case-by-case basis. When possible, actual historical data should be used. In the case where one utility is already served, this may be in the form of a 12 month average of the billing history. If billing for the proposed project does not exist, the average billing from a like-for-like project may be used. Design flows for new water distribution systems may be based upon Table 1 of the State of Florida Department of Health (FDOH), Chapter 64E-6.08 F.A.C., Standards for Onsite Sewage Treatment and Disposal Systems or other approvable method where historical data is not available.

3.1.4 Reclaimed Water

The design daily water demand for a typical residential reclaimed water service shall be 600 gpd minimum. Water mains shall be sized utilizing 5 gpm/residential units (at a minimum). This water main design rate shall be utilized for all residents in the development which already takes into consideration the even-odd day irrigation schedule. Multifamily residential, commercial and industrial flow demand shall be estimated on an individual case by case basis. Per Chapter 752 Jacksonville reclaimed water and reclaimed water program, a minimum average daily irrigation rate of 3,900

gpd per acre of irrigable areas during Daylight Savings Time is acceptable unless deemed otherwise by State WMD, FDEP or JEA.

3.2 Fire Flow

The Developer shall furnish calculations from a registered Professional Engineer licensed to practice in the State of Florida supporting fire protection requirements in accordance with applicable county codes. The County Fire Marshall's Office shall perform its own review.

3.2.1 Single Family Residential

For fire protection purposes, single family residential is defined as detached buildings of no more than one living unit. In single-family residential developments, the developer's engineer shall design for fire flows of at least 1000 gpm at a minimum residual pressure of 20 psi at the hydrant. If automatic sprinklers are used, than 500 gpm at a residual pressure of 20 psi is acceptable.

3.2.2 Multi-Family Residential

Buildings containing two or more units are defined as multi-family. In multi-family developments, the developer's engineer shall design for fire flows of at least 1500 gpm from two fire hydrants with a residual pressure of at least 20 psi at the hydrant.

3.2.3 Manufactured Home Communities

In Manufactured Home Communities, design for fire flows of at least 750 gpm at a residual pressure of at least 20 psi at the hydrant.

3.2.4 Commercial and Industrial

Minimum fire flow requirements for commercial and industrial developments are the same as for multi-family residential developments. The developer's engineer shall design for fire flows of at least 1500 gpm from two fire hydrants with a residual pressure of at least 20 psi at the hydrant.

3.2.5 Fire Hydrant Test Data

JEA will perform a fire hydrant test on an existing JEA fire hydrant for a fee of \$82 per request. All inquires contact JEA at 665-5260.

The results of hydrant flow tests are used primarily to evaluate the distribution system's capacity to provide water for fighting fires. The standard formula for converting the test flow to the distribution capacity at some desired residual pressure – usually 20 psi – was developed by the Insurance Services Office (1963), and is given on AWWA M-17 (1989) as:

$$Q_r = Q_t ((P_s - P_r)/(P_s - P_t))^{0.54}$$

Q_r = fire flow at residual pressure P_r (gpm)

Q_t = hydrant discharge during test (gpm)

P_s = static pressure (psi)

P_r = desired residual pressure (psi)

P_t = residual pressure during test (psi)

The value of Q_r is referred to as the distribution main capacity in that location, and is used in evaluation of water systems for JEA and insurance purposes. This Q_r value is provided in all JEA fire hydrant test reports. This equation can also be rearranged to provide a rough estimate of residual pressure for some future flow (typically 1500 gpm), given hydrant flow test results according to:

$$P_r = P_s - (P_s - P_t)(Q_r / Q_t)^{1.85}$$

Q_r = the estimated flow (usually 1500 gpm)

P_r = the pressure that will exist at that flow rate, given that all other conditions remain the same.

Minimum fire flow requirements for commercial and industrial developments are the same as for multi-family residential developments. The developer's engineer shall design for fire flows of at least 1500 gpm from two fire hydrants with a residual pressure of at least 20 psi at the hydrant.

3.3 Sizing Water Mains

The pipe sizes as listed herein represent the approximate inside diameter (ID). For HDPE piping, the pipe size will require "up-sizing" to maintain the ID.

3.3.1 Major Transmission Mains

Size of major transmission mains shall conform to JEA Water Master Plan and JEA Water and Sewer Standards Manual, where applicable. HDPE pipe must be upsized to maintain the ID.

3.3.2 Distribution Mains

In non-residential areas, distribution mains shall be a minimum of 12" in diameter, unless they are in a closely interconnected grid, in which case they shall be a minimum of 8" in diameter.

It is preferred that residential subdivisions are designed with two feeds from distribution mains external to the subdivision to increase hydraulic reliability. Without two feeds from distribution mains external to the project, water mains serving hydrants in residential developments shall be a minimum of 6" in diameter arranged so that they form a closely interconnected grid.

Single main extensions supplying a looped grid or long lengths of dead end mains (greater than 1000') serving more than one hydrant shall not be less than 8" in diameter.

2" dead end water mains shall be a maximum of 600' and shall serve no more than 5 EDU's. The use of dead end mains shall be minimized where possible.

All reclaimed water mains shall be sized after hydraulic analysis based upon estimated flow demands and available system pressures. The reclaimed water distribution system shall be designed to maintain 30 psi at a minimum.

Dead end water mains shall terminate with a JEA standard stub-out and a 2" flushing hydrant or 6" fire hydrant.

3.3.3 Velocities

Velocities shall be less than 5 fps at peak hour.

3.3.4 “C” Factor

Use the following Hazen-Williams roughness coefficients for new construction:

Pipe Size / Type	Coefficient of Roughness
16” diameter and larger cement-lined ductile iron pipe	120
Less than 16” diameter cement-lined ductile iron pipe	130
PVC (all sizes including HDPE)	140

3.4 Water Main and Reclaimed Water Main Materials

Materials for potable water mains and reclaimed water mains shall be in accordance with the most recent JEA Water and Sewer Standards Manual.

3.5 Water Main and Reclaimed Water Main Bury Depths

All water mains less than 24” in diameter shall be designed meeting minimum depth of cover requirements of 30” in unpaved areas and 36” in paved areas with a maximum of 60” in arterial or collector roadways where reconstruction is anticipated. Water mains of 24” or greater diameter shall be designed meeting minimum depth of cover requirements of 36” (paved and unpaved areas) unless approved otherwise by JEA. Cover for pipe under pavement shall be measured from finished grade. In cases of a 16” or larger water main, side actuated valve operators may be required to minimize the depth of bury of the main.

If a utility conflict is encountered and is located in a non-traffic area (no traffic loads) and the new pipe is D.I., the minimum cover may be reduced to 24” only in the area of the conflict.

In FDOT and railroad rights-of-way, the minimum cover shall be established by the FDOT and railroad, respectively.

3.6 Water Main and Reclaimed Water Main Locations

Preferred utility locations within the City of Jacksonville, St Johns County, Nassau County or Clay County rights-of-ways are to be as established by the City/County Department of Public Works. Water mains shall be designed to be a minimum 3' from right-of-way lines depending on size and depth and a minimum 3' from outside of edge of pavement. Exceptions may be granted as appropriate by JEA provided the City/County agencies are in agreement with the proposed location.

Water mains shall have a minimum 3' of horizontal distance between the outside of the water main and the outside of any other parallel underground utility or structures unless otherwise defined below under paragraph titled "Water Main Separation Requirements".

Where possible water mains shall not be designed below open ditch bottoms due to difficulties with utility access and potential damage from future dredging of the ditch.

Water mains shall be designed to be located above box culverts & drainage pipes. DIP shall be required if the minimum cover is not possible and approved by JEA (case by case basis).

Parallel water mains are not allowed. If a proposed water main is to be constructed in a right-of-way or easement where there is an existing JEA water main, the existing main must be abandoned for the length of the new main being installed. All effected services and fire hydrants shall be transferred to the new main and the remaining portion of the existing main shall be connected to the new main.

Water mains shall be located outside of paved areas except at roadway crossings. Exceptions to this requirement may be considered within town home, multi-family or commercial development projects provided the mains do not lie under parking areas.

3.7 Water Main Separation Requirements

Water main separation (other utilities, structures and hardwood trees) shall be accordance with FAC Chapter 62-555, 62-604, 62-610 and sections 350, 428 and 429 of the JEA Water and Sewer Standards Manual (including JEA Standard Construction Details W-10, W-11, S-26 and S-27).

3.8 System Connections

Connections and ties to the JEA Water System and transfer of services shall be performed by a licensed master plumber or underground utility contractor under supervision of JEA. Taps shall be scheduled at least 48 hours in advance by contacting the JEA inspector.

JEA will install a temporary or permanent meter , as applicable, upon application and payment of all fees by the requestor at JEA Water and Sewer Counter, 21 West Church Street, 1st Floor, Customer Service Building (phone #665-5260).

Unless approved by JEA, size-on-size taps are limited on PVC mains to 12 inch and smaller. Size-on size taps are acceptable on DIP (all sizes). For size-on-size taps, on 8" and larger mains, the actual tap hole size shall be reduced by 1 inch.

No taps shall be made within 5' of a joint.

When connecting a 2" main to an existing main, a minimum 4" gate valve shall be used with a 4" by 2" reducer. No 2" main valves will be allowed.

Taps requiring meter installations of size 2" and smaller shall include the service pipe, meter box, and corporation stop sized ready to accept the meter installation by JEA. (JEA Water Standard Construction Detail W-2).

Taps requiring meter installation of size 3" and larger must include the service pipe and meter vault. For meters 3" and larger, JEA will build and install the meter assembly. After installation, JEA will install the meter vault (furnished by the developer's contractor) to grad. (JEA Water Standard Construction Detail W-6). For reclaimed water 3" and larger, the construction requirements will be similar to detail W-6, but without the bypass piping.

Taps shall be piped straight through where the meter is to be set according to the

following laying lengths as measured between the control valve and the backflow prevention device:

- Meters size 3" to 4" shall have a laying length of at least 14'.
- Meters size 6" to 8" shall have a laying length of at least 20'.
- Meters size 10" shall have a laying length of at least 24'.

3.9 Fire Hydrant Locations

3.9.1 General

Hydrants shall be painted and installed in accordance with the applicable county fire codes. Private fire hydrants shall be painted red unless otherwise specified in the local county's standards. (See JEA Water Standard Construction Details W-12, W-13 and W-14).

Fire hydrants shall not be connected to reclaimed water mains.

Fire hydrants shall be constructed on the same side of the road as the water main. Exceptions may be approved depending on a specific situation.

Fire hydrants shall be located in easily visible and accessible locations. They should be located at entrances and intersections whenever possible or between lot lines.

Fire hydrants should be located at property corners just inside the right-of-way. Fire hydrants should not be located at the same corners as water meters or electric transformers.

Fire hydrants should have a minimum clearance of 3' from the edge of pavement or the back of curb.

New or relocated fire hydrants shall be located so that the hydrants are at least 3' from any existing or proposed storm sewer, force main, or reclaimed water main; at least 3', and preferably 10', from any existing or proposed vacuum-type sanitary sewer; and at least 6', and preferably 10', from any existing or proposed gravity or pressure-type sanitary sewer or sewer force main.

Fire hydrants shall be located with the steamer nozzle (largest opening) directed towards the street or parking area.

There shall be no trees or permanent structures within 10' of any hydrant. There shall be no obstructions (fences, landscaping, signs, etc.) within 5' of each hydrant.

3.9.2 Single Family Residential

Single family residential areas shall have fire hydrants located not more than 600' apart when measured along streets or acceptable access ways, except in a cul-de-sac or dead-end street where a fire hydrant shall be located not more than 600' from the center of the turnaround. Single family detached residential property shall have a fire hydrant located within 600' of each building location. No more than one (1) fire hydrant shall be provided on a dead end six inch water main.

3.9.3 Commercial, Industrial and Multi-Family Residential

Fire hydrants in commercial, industrial, or multi-family residential areas shall be located not more than 500' apart when measured along streets or acceptable access ways, and shall be within 500' of the most distant corner of each commercial or multifamily structure.

All fire hydrants and independent valves are to be located within the street right-of-way or easement.

Multiple fire hydrants within commercial and multi-family residential projects shall be served with a minimum 8" water main.

If the proposed project is to be served by a well, fire protection must be addressed and approved per the Fire Marshal's requirements and indicated on the design plans. The Fire Marshal will require an on-site water storage tank or alternate water source.

All fire hydrant locations must be approved by the Fire Marshal.

3.9.4 Open Rural Areas

For open rural areas with few services (excluding the service areas described above), water mains larger than 6" shall include a fire hydrant every 1000 LF (max) for JEA line maintenance, unless otherwise approved by JEA.

3.10 Valves

There shall be a sufficient number of valves designed such that single mains in the network can be isolated from the remainder of the system thereby providing flexibility for operation and maintenance while minimizing number of customers out of service.

Valves shall be provided at 800' (maximum) intervals within residential areas.

Valves shall be provided at 500' (maximum) intervals within multi-family residential projects as well as industrial and commercial areas.

On transmission mains less than or equal to 16" in diameter with a limited number of service connections, valves shall be installed at a maximum of 1,000' intervals and at distribution branches. On transmission mains greater than 16" in diameter, valves shall be located at a maximum of 2500' intervals and at distribution branches. Where applicable, valves on transmission mains should be located next to the fire hydrant tees to facilitate field location.

Valves shall be installed on all water main branches as follows: two directions on a tee and three directions on a cross.

A 4" valve shall be required on a wrapped cul-de-sac at the point of transitioning to 2" PVC where an outage could affect 20 or more customers.

Valves should be located so as not to conflict with curb and gutter or be in the normal path of tires and should be located nearest the tee or cross fitting.

Valves shall be marked with a "V" scribed in the curb closest/adjacent to the below grade valves. The "V" cut shall be painted blue for potable water or pantone purple for reclaimed water.

3.11 Flushing Hydrants and Sample Points

A 2" flushing hydrant assembly or a 6" fire hydrant shall be provided at the end of all dead-end, non-circulating water mains and stub-outs. 1" temporary sample points shall be provided, at minimum:

- at the end of all water mains and stub-outs of 40' or greater,
- at 1000' maximum intervals on long main extensions,
- on all looped mains,
- in accordance with permit conditions,
- at the point of connection to the existing water main

Fire hydrants shall not be used as sample points. The contractor shall remove all temporary sample points after clearance from JEA and DEP.

3.12 Services

Water services shall be provided to each lot, building, or parcel requiring a separate water meter.

Single long and short side water services shall be 1" for single-family residential subdivisions and shall be located at adjacent property lines along the front of the property to be served as shown in JEA Water Standard Construction Detail W-1 of the JEA Water and Sewer Standards Manual.

Double 1 ½" long side services and gang water services may be utilized and shall terminate with a 1" service for two adjacent lots per JEA Water Standard Construction Detail W-1 of the JEA Water and Sewer Standards Manual.

No more than 5 domestic service connections are allowed on a 2" water main in a new subdivision.

Gang water services (3 or more services in one area) are acceptable if constructed in accordance with JEA Water Standard Construction W-1 of the JEA Water and Sewer Standards Manual.

The service size shall be smaller than or equal to the main size to which it is connecting.

No service shall be allowed beyond the valve on a phase line water main stub-out.

No 2" or smaller water service taps shall be permitted on water mains which are greater than or equal to 20" in diameter.

The maximum length of a water service (distance from the connection at the main to the water meter) shall be 100' unless approved otherwise by JEA.

Service locations shall be marked with a "W" scribed in the curb and painted blue. ("R" painted purple for reclaimed water)

Residential services using reclaimed water for irrigation must have a JEA approved backflow preventer installed on each potable water service prior to the installation of a JEA reclaimed water meter. The installation of a backflow preventer shall be in accordance with the JEA Rules and Regulations for Water, Sewer, and Reclaimed Water Services, appendix B, Cross Connection Control Policy.

3.13 Water Meters

3.13.1 General

All water meters shall be located in accordance with the JEA Water and Sewer Standards Manual unless otherwise approved. For typical residential layout, refer to JEA Water Standard Construction Detail W-1. This location varies in St. Johns and Nassau Counties. Contact the appropriate County Engineering department for correct water meter location criteria. Water meter installation shall be in accordance with the latest JEA Water and Sewer Rules and Regulations. (See section 3 of the Rules and Regulations). In accordance with these Rules and Regulations, the installation of 2 or more meters in lieu of one large meter serving a single service is prohibited (potable or reclaimed water meters).

For non-active services, the meter box shall be located adjacent to the right of way at the property, lot, or parcel which it is serving and clearly marked with a 2"x4"x4' pressure treated post.

Water meter boxes shall not be located within driveways or sidewalks. Exceptions may be approved by JEA on a case by case basis.

JEA policy does not allow the installation of sewer deduct meters. In order to achieve a metering/billing arrangement that would reduce sewer charges when fewer sewers enters the JEA system than water consumed, the site can be designed with irrigation or water only meters or a separate sewer flow meter to correctly establish metering/billing service. Examples of this type of service include: cooling tower evaporation, industrial process water, etc. All sewer flow metering designs shall conform to JEA Commercial Meter Services, Sewer Flow Metering Design Guidelines (Contact JEA Industrial Pre-Treatment Section).

3.13.2 Water Meter Sizing

JEA utilizes SENSUS meters (www.sensus.com) for both potable and reclaimed water use. The meter size shall be selected by the design engineer based upon many design factors including the average daily flow and the associated meter size as listed below:

Meter Size	ADF (gpm)
3/4"	15
1"	25
1 1/2"	50
2"	80
3"	250
4"	500
6"	1,000

3.13.3 Temporary Water Meters

Temporary water meters, if necessary for construction, will be required for on-site and building construction water consumption. Portable fire hydrant meters will not be allowed for these purposes. JEA Capacity fees, water meter fees and water or sewer service special fees for both water and sewer must be paid in full before installation of temporary or permanent water meters.

The minimum base charge and usage fees will be assessed upon installation of the temporary construction meter in accordance with JEA's Water and Wastewater Tariff. The monthly charges will include water consumption (determined by regular meter readings and based on meter size), a monthly base fee (determined by meter size), utility tax and late fees (if incurred). Temporary Construction Meters will be allowed until the customer completes the project. Immediately following COC (Certificate of Clearance) "FINAL", the service is converted to reflect permanent service and usage fees will be assessed in accordance. Failure to comply with the Temporary Water Meter policy may result in disconnection of the water supply.

3.13.4 Portable Fire Hydrant Meters for Construction Activities

Portable fire hydrant meters will not be issued for building construction sites where the water system has not been accepted for operation and maintenance by JEA. A portable fire hydrant meter provided by JEA consists of a 2-inch meter and backflow device.

Fire hydrant meters shall be issued to the specific party who will utilize the meter and who will be responsible for the meter and payment for water usage. Hydrant meters are issued by JEA and can be used in Duval County, parts of St. Johns County to include Ponte Vedra and some parts of St. Augustine around the area of CR210 and Nassau County. (JEA Service Territory). Meters are issued for periods of six months. At the end of the six month period, the meter must be returned and a new meter issued. Failure to exchange the backflow assembly within the specified time period is a violation of JEA's Cross Connection Control Program Policy (Chapter IV, 4.04(7)). JEA shall have the authority to refuse service to customers who are found to be chronic violators of the Fire Hydrant Meter Policy. Violations include the failure to report meter readings, exchange the meters on time and make regular invoice payments.

3.13.5 Multi-Family or Commercial Development Metering

For multi-family developments and commercial developments serving multiple tenants where the entire project is to remain under single ownership, the entire site will be master metered with all on-site utilities remaining under private ownership and operation unless otherwise approved by JEA.

When approved by JEA, on-site utilities for projects under single ownership serving multiple tenants (individually metered) may be accepted for operation and maintenance provided that a minimum right-of-way quality dedicated, unobstructed, exclusive JEA utility easement is provided and sized.

Proposed development main extensions required to achieve connection to the point of service identified in the JEA Availability response shall be designed within existing or proposed public right-of-way.

For multi-family and commercial projects, water meters shall be located in accessible areas, outside of landscaped and paved areas, a minimum of 5' from buildings, behind sidewalks, and generally adjacent to parking areas or roadways and a minimum of 3' from the edge of pavement.

For water meters greater than 2", the engineer shall submit a detailed water demand estimate with the average daily flow and peak hourly demand indicated for review (signed and sealed by registered engineer) and approval by JEA.

A 3" or larger meter shall be located in a 15' by 20' minimum easement provided adjacent to the right-of-way line.

3.14 Backflow Preventers

A metered detector check backflow preventer shall be required on all projects requiring automatic sprinkler (AS) system services and/or the use of on-site private fire hydrants for fire protection.

Backflow preventers shall be in accordance with JEA Rules and Regulations for Water, Sewer and Reclaimed Water Services, appendix B, Cross Connection Control Policy and shall be located on private property within 10' of the meter. Alternative locations must be approved by JEA prior to installation.

A backflow device is required on all potable water services installed on private property after the meter where reclaimed water is available. (See JEA Water Standard Construction Detail W-15).

Freeze protection may be required on a backflow device associated with fire mains. The design engineer shall consult with the local Fire Marshall to determine if freeze protection is required. JEA recommends freeze protection on all backflow devices.

A backflow device is not required on any reclaimed water service unless deemed otherwise by JEA.

3.15 Water Treatment Plants

JEA requires water treatment plants to be dedicated on an individual basis. It is the developer's responsibility to contact JEA in the planning stage for direction.

Section 4.0 Sewer Design Guidelines

4.0 General

This section provides the minimum guidelines for the design of sanitary sewer collection and force main systems. The method of design and/or construction shall be according to accepted engineering practices, this manual, the most current JEA Water and Sewer Standards Manual, the latest edition of the Recommended Standards for Sewage Works (Ten State Standards), and all applicable Sections of the Florida Department of Environmental Protection Rules and Regulations for Water and Sewer Systems.

4.1 Design Flows

4.1.1 Average Daily Flow (ADF)

Design flows for new sewage collection systems shall be based upon Table I of the State of Florida Department of Health (FDOH), Chapter 64E-6.008 F.A.C., Standards for Onsite Sewage Treatment and Disposal Systems or other approvable method where historical data is not available.

4.1.2 Equivalent Dwelling Units

An Equivalent Dwelling Unit (EDU) is the equivalent flow that can be anticipated from one residential connection. In all JEA sewage treatment areas, except Mandarin, assume 100 gallons per capita per day (gpcd) to calculate the average daily flow (ADF). For the Mandarin sewer treatment area, calculate the ADF using 71 gpcd (sewer only). To calculate the ADF from a single EDU, multiply the gpcd by 3.5.

4.1.3 Peak Flow

Sewer systems and facilities shall be designed for peak flows calculated in accordance with the Recommended Standards for Sewage Works, latest edition (Ten State Standards), and as shown below.

Peak Flow = Peaking Factor * Average Daily Flow (ADF)

Peaking Factor = $[18 + (\text{Population}/1000)^{0.5}] / [4 + (\text{Population}/1000)^{0.5}]$

4.2 Sizing Gravity Sewer Mains

4.2.1 Pipe Diameter

Design all sewer mains to carry peak design flow when flowing full (no hydraulic head allowed). Peak design flow may not exceed pipe capacity.

Gravity sewer mains shall be a minimum 8" diameter in the JEA right-of-way (R/W) and/or private R/W (easements).

Gravity sewer mains shall be installed on a uniform alignment and grade between manholes.

Collection systems serving more than two buildings, lots or parcels shall be 8" gravity mains with manholes.

4.2.2 Slope Requirements

Gravity sewer mains shall be designed in accordance with the preferred slopes shown in Table 1. A Developer must obtain JEA approval, in writing, for any deviation from the preferred slope. All mains approved for construction less than preferred slope shall be PVC SDR 26 material. Minimum slope is only to be used (limited use) when no other engineering or economic solution is possible. The maximum slope for all pipe diameters shall be such that the velocity in the pipes does not exceed 5 fps when calculated using Manning's Equation. Maximum slope may be used on terminal pipe runs only unless otherwise approved by JEA. The maximum slope may be exceeded on the final run of gravity sewer between the junction manhole and the pump station structure. JEA reserves the right to require specific slopes as needed to insure future service and maintenance needs.

Table 1: Gravity Sewer Slope

Pipe Diameter (inch)	Preferred Slope (ft/ft)	Minimum Slope (ft/ft)	Max Slope @ 5 FPS (ft/ft)
8	0.0040	0.0035	0.018
10	0.0028	0.0026	0.014
12	0.0022	0.0021	0.011
15	0.0015	0.0015	0.009
16	0.0014	0.0013	0.0075
18	0.0012	0.0011	0.0070
21	0.0010	0.0009	0.0050
24	0.0008	0.0008	0.0045
30	0.0006	0.0005	0.0032
36	0.0005	0.0004	0.0024

4.3 Gravity Sewer Main Materials

Materials shall be in accordance with the most recent JEA Water and Sewer Standards Manual, Section 428.

The type, class, grade, and alignment of sewer pipe may be changed only at manholes.

JEA requires gravity mains constructed at a depth of 12' or greater or within easements to be PVC SDR-26 heavy wall sewer pipe.

DIP pipe is not allowed for gravity sewer unless approved by JEA and only where the mains or laterals are above ground or otherwise exposed as in bridge crossings or ditch crossings. Installing a PVC gravity sewer main within a steel casing is preferred. Gravity sewer mains within casings shall be PVC pressure pipe and shall be installed with approved joint restraints and spacers.

4.4 Gravity Sewer Main Depth

Gravity sewer mains shall be designed for minimum depth requirements of 30 inches in unpaved areas and 36" in paved areas.

No gravity sewer main with sewer service laterals shall be constructed with a "depth of cut" greater than 14'. Sewer service laterals associated with gravity sewer mains which are deeper

than 14', must be routed to a gravity sewer high-line, a manhole, or other JEA approved method (see JEA Sewer Standard Construction Detail S-5 for manholes with highline connections). All proposed sewer high lines shall be reviewed and approved by City of Jacksonville, Public Works Department (allow for a 5 day city review period).

No gravity sewer main shall be constructed with a "depth of cut" greater than 20 feet.

4.5 Gravity Sewer Main Location

Gravity sewer mains shall be designed for installation on the centerline of roadways where possible. On curved roads, the sewer main and manholes shall be located such that the pipe and manholes remain within the limits of the paved area.

Install gravity sewer mains with a straight alignment between manholes.

Locate centerline of gravity sewer manholes at a minimum distance of 4' off the face of the curb.

Locate trunk sewers 24" and larger to 5' west of, or 5' south of the centerline of the public rights-of-way or private rights-of-way (easements), unless approved otherwise by JEA.

A horizontal distance of 3' minimum (6' preferred) shall be maintained from all gravity sewer mains to drainage structures, telephone duct banks, electrical transformers, signal relays, power poles and other structures in the right-of-way as well as any other parallel underground utility with the exception of water mains. Where gravity mains cross other underground utilities with the exception of water mains, a minimum vertical separation of 6" shall be maintained. (See below for water main and gravity sewer main separation requirements.) All distances shall be measured from the outside edge of the pipes.

Distance from building foundations, or tops of banks, to gravity sewer mains must be a minimum distance of 2 times the vertical depth of the deepest portion of the manhole-to-manhole sewer run.

In locations where gravity sewer mains cross under a box-culvert or 48" diameter and larger storm water main, JEA will require an approved flowable fill material surrounding the sewer main. In these cases, provide 12" of flowable fill around the outside of the sewer main, approximately 10 feet in each direction from the crossing point.

Gravity main stub-outs shall be extended to the property line, plat line or phase line and shall extend a minimum of 10' past the edge of pavement or a distance of 1.5 times the sewer depth which ever is greater and terminate with a manhole, to allow for future sewer main extension.

4.6 Sewer Main Separation Requirements

Sewer main separations (from other utilities, structures and hardwood trees) shall be in accordance with FAC Chapters 62-555, 62-604, 62-610 and sections 350, 428 and 429 of the JEA Water and Sewer Standards Manual including JEA Standard Construction Details W-10, W-11, S-26 and S-27.

The table below provides the minimum horizontal separation requirements between the proposed utility and structures (see notes).

Pressure Main (water & sewer) Nominal Size (inches)	Horizontal Separation Requirements (min) (See note 1)
up to 6"	10 feet
8"	14 feet
10"-12"	18 feet
14" and larger	See note 3
For gravity sewer mains, see note 2.	

Notes:

1. The table above provides the minimum horizontal separation requirements between the proposed JEA maintained utilities (including water mains, reclaimed water mains, water service laterals, meter boxes and sewer force mains) and existing, proposed and future structures (including above ground structures, concrete footers and top of bank of ponds).
2. For gravity sewer mains, the horizontal separation from existing, proposed and future structures (including above ground structures, concrete footers and top of bank of ponds) shall be a minimum of 2 times the vertical depth of the deepest portion of the manhole to manhole sewer run.
3. Pressure mains 14 inch and larger will require additional horizontal separation as reviewed and approved by JEA.

4.7 Services

In areas where on-site sewage disposal systems exist, new gravity service termination at the right-of-way shall be established by the designer to accommodate rerouting of yard piping to the service termination elevation via gravity flow; otherwise, an on-site permitted private pump station will be required.

JEA shall not connect any customer that does not abut Water/Sewer/Reclaimed Water mains without requiring the construction of a main line extension. Single gravity services shall be provided to each lot, building, or parcel provided that adequate and unobstructed easements are dedicated to JEA for maintenance. Easements must be approved by JEA.

New 6" sewer service laterals which tap into an existing JEA manholes or existing JEA sewer collection mains shall be constructed by JEA only, unless approved otherwise by JEA.

No 6" gravity sewer service connection is permitted on JEA gravity sewer mains which are 16" size or larger. A high-line may be acceptable for these situations.

If a project site is currently served by a private well for potable water supply, a JEA approved water meter, reading in gallons must be installed on the service side of the well for the purpose of sewer billing. Upon receipt of a Private Well Meter Application along with payment of fees, the JEA approved meter will be delivered and installed by a licensed plumber contracted by the property owner. Upon completion of the installation, JEA shall be contacted to perform an inspection of the installation to ensure compliance with JEA standards.

Single gravity services shall not exceed the size of the gravity main. For eight (8) inch connections to an 8" main, provide manhole at connection to main. Saddle manholes are not allowed.

Single services shall be 6" minimum diameter at 1/8" per foot minimum slope.

Stub-outs for services shall be marked with a 2"x4"x4' pressure treated pine post painted green. Services shall be marked with an "S" scribed in the curb and painted green.

Double services or multiple connected sewer services (gang services) are not acceptable. However, they may be used for privately owned and maintained commercial and multi-family systems under single ownership. Double or multiple services may be allowed in the case of a condominium project where the onsite sewer systems are the property of the condominium association (see JEA Standard Construction Detail S-51).

Private clean-outs shall not be installed in the R/W or JEA easement. Private clean-outs if installed must be installed on private property and shall be maintained by the customer.

Services shall be designed with 36" minimum cover and shall terminate 36" to 60" deep at the R/W line where not in conflict with water mains, drainage pipes, and other existing utilities or buried electric.

A service shall be designed to connect to the gravity main with a tee fitting rotated 45 degrees up. The invert elevation of the service at the main shall be at or above the crown of the mainline pipe. (See JEA Standard Construction Details S-19 and S-20).

Gravity sewer service laterals shall be provided to all undeveloped property and future phases of the project in accordance with the sewer master plan for the private collection system service area. The location and length of sewer service lateral shall be designed to minimize future MOT, roadway repairs and restoration work. Sewer service lateral shall be 35 LF at a minimum and extend at minimum grade from the bottom of the manhole.

4.7.1 Single Family Residential Services

Single services shall be installed at the center of the lot and front the property being served. Services shall be installed perpendicular to the sewer main. Deviations from this criterion must be pre-approved in writing by JEA.

6" single services shall be limited to 60' maximum length (length between sewer main or manhole and the customer's property line).

4.7.2 Commercial and Multi-family Services

6" services shall serve no more than 6 multi-family units as shown on JEA Standard Construction Detail S-51.

All 8" and larger sewer services shall be connected into manholes (not the sewer main).

Wastewater inflow from a general dumpster area less than 250 SF is acceptable to enter JEA sewer system if a grease trap is installed.

Service Connections to manholes are allowed as follows:

- a. Inline manhole connections are limited to 2 (8" diameter and larger) services, one (1) from each side of the street.

Terminal manholes located in residential cul-de-sacs are allowed 3 service connections (6" diameter maximum) provided the 0.80 point of the service

connection and lateral sewer main are matched.

Services shall not be connected to stub-outs without a manhole.

4.7.3 Sewer Service Locates

JEA will perform a physical locate of a sewer connection point for a fee of \$491 per request. All inquires contact JEA at 665-5260. If no connection point is located, the fee of \$491 may be credited towards the installation cost of a sewer connection approved on a case by case basis.

4.8 Sewer Meters

JEA policy does not allow the installation of sewer deduct meters. In order to achieve a metering/billing arrangement that would reduce sewer charges when fewer sewers enters the JEA system than water consumed, the site can be designed with irrigation or water only meters or a separate sewer flow meter to correctly establish metering/billing service. Examples of this type of service include: cooling tower evaporation, industrial process water, etc. All sewer flow metering designs shall conform to JEA Commercial Meter Services, Sewer Flow Metering Design Guidelines. (Contact JEA Industrial Pre-Treatment Section).

4.9 Sewer Manholes

Manholes shall be installed at the end of each main and at all changes in grade, pipe size, pipe material, or alignment and at all pipe intersections.

Manholes where main pipe size changes occur shall place the 0.8 depth point of both sewers at the same elevation.

The maximum spacing of manholes shall be 400' for sewer mains less than or equal to 16" diameter and 500' for sewer mains greater than 16". A gravity main exceeding the maximum length may be allowed, with prior written approval from JEA, if it is required to complete a terminal run. If this occurs, a note shall be added instructing the contractor "not to exceed the additional length required to complete the run".

Manholes shall be located along the centerline of city or private roadways (including parking lots), out of the tire lane and a minimum of 4' from the edge of the manhole to the curb and gutter.

Manholes shall not be installed in the flow line of inverted crown roads or within the design high water limits of gutters, swales, storm water ditches or retention/detention areas.

Terminal manholes may be required on stub-outs for the purpose of inspection and maintenance or future extension of the system.

4.9.1 Invert and Rim Elevations

Manholes located within easements shall have the ring and cover at final grade level.

Design depth for all terminal manholes is to be at no less than four (4)' from the top of the manhole to the pipe invert, plus one course of manhole adjustments should be added as shown in JEA Standard Construction Detail S-6.

4.9.2 Drop Connections

Outside drop connections are only allowed for 12" drop pipe size and larger per JEA Standard Construction Detail S-7.

Inside drop construction is required for 2' or greater drops and shall be constructed per JEA Standard Construction Detail S-4.

4.9.3 Lining

All junction manholes (manholes located closest to the pump station wet well), manholes which include a 24" or larger pipe and manholes receiving a force main shall be coated internally as outlined in Section 446 of JEA Water and Sewer Standards Manual.

4.10 Force Mains

4.10.1 Pipe Diameter

Force mains shall be a minimum 4" diameter in the right-of-way or within JEA easement if the main is to be dedicated. Exceptions may be granted for low pressure systems or low flow pump stations which discharge directly into a gravity sewer system.

Force mains shall be sized for peak flow at a minimum velocity of 2.0 fps (feet per second) and a maximum velocity of 5.0 fps. If approved by JEA, 4-inch force mains may be initially size at less than 2 FPS. Exceptions may be made on a case by case basis during the plan review process.

A plan and profile shall be provided for all 6" and larger horizontal directional drill (HDD) pipe and for all other force mains (open-cut) 12" and larger.

4.10.2 Depth of Bury

Force mains less than 24" in diameter shall be designed meeting minimum depth requirements of 30" in unpaved areas and 36" in paved areas with a maximum of 60" in arterial or collector roadways where reconstruction is anticipated, unless approved otherwise by JEA. Force mains of 24" or greater diameter shall be designed with minimum depth requirements of 36" (paved and unpaved areas) unless approved otherwise by JEA. Cover for pipe under pavement shall be measured from finished grade.

Where conflicts require a deflection, a minimum cover of 24" may be allowed to design over the conflict using PVC DR18 pipe to clear the conflict before deflecting back to 36" depth. Any reduction in pipe cover will require written approval from JEA.

Force mains shall be designed so as to reduce or minimize the number of high points. Changes in elevation which exceed two feet will require an air release valve. (See JEA Standard Construction Detail S-29).

4.10.3 Material and Fittings

Materials shall be in accordance with the most recent JEA Water and Sewer Standards Manual Section 429 and 430. For 6" and larger HDPE pipe, the pipe size shall require up-sizing to maintain a consistent inside diameter of the main.

Force mains shall have restrained joints for changes in direction. Bends 45 degrees

or less should be used in lieu of 90 degree bends unless otherwise approved.

All proposed force main extensions shall terminate with a JEA standard stub-out past the proposed project connection and shall consist of 40' of pipe, a resilient seat gate valve or plug valve installed adjacent to the last tee or tapping sleeve and a plug. The plug fitting shall include a 2" (bronze) corporation stop (MIP) on the dead end. The length of the stub-out may be reduced to 20' (minimum) if approved by JEA to avoid installation conflicts in the right-of-way. See JEA Standard Construction Detail S-44.

4.10.4 Location

Install force mains, where feasible, on the opposite side of the street from the water main unless otherwise approved by JEA.

A horizontal distance of 3' minimum (6' preferred) shall be maintained from all force mains to drainage structures, telephone duct banks, electrical transformers, signal relays, power poles, and other structures in the right-of-way as well as any other parallel underground utility with the exception of water and reclaimed water mains. Where mains cross other underground utilities with the exception of water and reclaimed water mains, a minimum vertical separation of 6" shall be maintained. (See below for water main and force main separation requirements.) All distances shall be measured from the outside edge of the pipes.

Force main connections to manholes shall connect at the bottom of the manhole matching the crown of the existing pipe as shown in JEA Standard Construction Detail S-18. The angle between influent force main and effluent gravity pipe shall be between 130 degrees and 180 degrees unless approved otherwise by JEA. The flow from the force main should be directed into the effluent gravity pipe of the manhole in an effort to reduce turbulence.

Force mains shall not be constructed below open ditch bottoms unless no other location is available due to crowded corridor conditions such as other utilities.

Sewer force mains shall be located outside of paved areas except at roadway crossings. Exceptions to this pavement rule may be considered within commercial development projects provided the mains do not lie under parking areas.

4.10.5 Force Main Separation Requirements

Force main separation (other utilities, structures and hardwood trees) shall be in accordance with FAC Chapters 62-555, 62-604, 62-610 and Sections 350 and 429 of the JEA Water and Sewer Standards Manual including JEA Standard Construction Details W-10, W-11, S-26 and S-27.

4.10.6 Valves

Valves and appurtenances shall conform to JEA Water and Sewer Standards Manual, Section 430. Unless approved otherwise by JEA, size-on-size taps are limited on PVC mains to 12 inch size and smaller. Size-on-size taps are acceptable on DIP (all sizes). For size-on-size taps, on 8" and larger mains, the actual tap hole shall be reduced by 1-inch. Taps on existing JEA force mains larger than 12" size must be pre-approved by JEA. In these cases, some restrictions may apply.

Valves shall be marked with a "V" scribed in the curb closest/adjacent to the below

grade valves. The “V” cut shall be painted green.

On force mains less than or equal to 12" in diameter, resilient seat gate valves shall be installed at a maximum of 1,000' intervals and at branches of intersecting force mains on tees and wyes, and at force main stubs.

On force mains greater than 12" in diameter, valves shall be located at a maximum of 2500' intervals.

A resilient seat gate valve shall be provided on the force main in the right-of-way adjacent to the discharge manhole. (See JEA Standard Construction Detail S-18).

Generally, resilient seat gate valves are preferred on sewer force mains (main valves and tapping valves), but must be in the vertical position (stem in vertical position). If a gate valve must be in the horizontal position (stem horizontal), then a double disc gate valve must be utilized. Horizontal valves are to be utilized only in extreme cases and as approved by JEA. In cases where gate valves are not practical, plug valves may be utilized. Plug valve 8" and larger must be equipped with worm-gear actuators.

Control Valves shall be located so as not to conflict with curb and gutter, not be located in the tire tracks and shall be located outside of pavement when possible.

For private pump stations with JEA dedicated off-site force mains, a JEA pump-out box is required for all force main pipe which exceeds 15' within the City right-of-way per JEA Standard Construction Detail S-46. A 4" (minimum) gate valve is required at the right-of way-line, adjacent to the pump out box. The gate valve is not required on force main piping where the connection at the JEA main is located on the same side of the street as the pump-out box and consists of 15' or less within the City right-of-way area. This gate valve defines the “JEA Point of Service”. If no gate valve exists, the right-of-way line defines the “JEA Point of Service”.

Air release valve assemblies (2") with manholes shall be provided at all force main high points and when change of elevation is 2' or greater. The design engineer may utilize larger air release valves if hydraulically justified. Air release valves on force mains hung from bridges should be manual if accessible. Air release valves shall be constructed as per JEA Standard Construction Detail S-29. Combination valves (air release and vacuum valves) shall only be utilized if a major vacuum condition exists as specified by the design engineer.

4.10.7 Force Main Connections to Existing Force mains (>12 inch Diameter)

Approval by JEA for a new force main connection to an existing force main (greater than 12 inch diameter) is based on each individual development project. Developer shall request a pre-application meeting. JEA will perform a site visit to determine upstream and downstream mainline valve locations, and to verify the main line can be isolated by operating the valves. If valves are unable to be located, are inoperable, or spacing is not a reasonable distance (depends on number of manifold stations, size of main, location, etc.), Developer may be required to provide an insert a-valve(s) as required by JEA to make the connection.

4.10.8 Access Road

Long runs of gravity sewer located in easements that cross wetlands, which shall be restored as wetlands, shall be encased in a steel casing. Those runs which include manholes, located across wetlands, shall be accessible to vehicles. A stabilized access road, 12' wide with a minimum Limerock Bearing Ratio (LBR) of 30 shall be provided and indicated on the drawings for easement requiring multiple manholes. The access road should be designed to provide adequate drainage and to prevent erosion from storm runoff. A truck turnaround area should be provided at the end of all access roads.

Section 5.0

Pump Station Design Guidelines

5.0 JEA Dedicated Pump Stations

5.0.1 General

Design sewer pump stations in accordance with applicable sections of the Department of Environmental Protection Rules and Regulations, Recommended Standards for Sewage Works (Ten State Standards), JEA Water and Sewer Standards Manual, latest editions, and as specified herein.

Pump stations shall be designed specifically to pump domestic sewage containing solids and fibrous materials.

Pump stations shall be designed and located on the site so as to minimize the effects resulting from odor, noise, and lighting.

Pump stations shall be designed to pump at minimum the anticipated peak hourly flow with the one pump out of service.

If approved by JEA, a “reduced capacity” pump station may be used if the following criteria are met:

1. Development does not exceed 30 EDU’s (Equivalent Dwelling Units)
2. Development is located such that no other developable areas are adjacent to the property
3. The off-site force main does not parallel a proposed force main route identified by the sewer master plan, 2010 comprehensive plan or any other regulatory, planning, or design document.
4. Sewer force main discharges to a gravity sewer system and is located such that no other force mains could manifold in the future.

5.0.2 Site Plan

The pump station site is to be located outside of the street right-of-way (R/W) and/or private R/W (easement), but contiguous thereto, on a parcel of property indicated on the record plat or dedicated to JEA by Warranty Deed.

The pump station site plan shall conform to the JEA Pump Station Site Plan Detail sheet unless otherwise approved.

On-site elevations shall be indicated to establish that the concrete on-site is sloped to allow for drainage toward the City R/W. The site elevation shall be set at a minimum of 1' above the design high water level or 100 year flood elevation of adjacent storm water areas. The driveway shall be designed with a tee for turning around when, in the opinion of JEA, the station location and the roadway traffic conditions prohibit backing in and out of the site safely. The paved driveway should have a uniform elevation along the wet well and, if possible, should slope at 1/8” per foot away from the station.

The trees and ground cover to be used at the site shall be identified on the site plan.

No catch basin shall be located within the pump station site.

5.0.3 Junction Manhole

Pump stations shall be equipped with a junction manhole with only one influent main to the wet well to facilitate bypass pumping.

The junction manhole shall be located on the same side of the driveway as the pump-out connection within 60' of the wet well as accessed from the entrance gate.

At a minimum, there should be 1' of separation for every 1' of wet well depth between the junction manhole and the wet well to avoid disturbing both structures if construction work on either is necessary in the future.

The junction manhole shall not be located in the driveway or in the traffic lane of the street.

An approved JEA liner shall be installed on all junction manholes.

5.0.4 Wet Well – Duplex

The wet well shall have a minimum diameter of 8', unless written approval is granted. The wet well for a Reduced Capacity Pump Station shall vary based on design flow but shall be large enough to accommodate duplex pumps and the appropriate centerline offset required stated by the pump manufacturer.

No wet well shall exceed 27' in depth unless pre-approved in writing by JEA.

The wet well shall have only one influent main.

The wet well's operating water levels shall be arranged to insure pump operation without cavitations and insure the gravity sewer system is not surcharged.

The wet well's storage volume shall be calculated assuming a 12 minute cycle time, without considering pump alternation, for the pump rate at run-out condition. If JEA has approved an "initial/ultimate" station design, the storage volume must be sized for the ultimate pumps and flows.

The storage height (distance between "Lead Pump On" and "Pumps Off" elevations) should be calculated and rounded up to the next highest increment divisible by 0.25'. If JEA has approved an "initial/ultimate" station design, the storage height should be designed for the initial pumps.

The Mercoird Operating Level (emergency high level alarm) should be set at 0.5' above the invert elevation.

The operating levels for High Water Level, Lag Pump On, and Lead Pump On are established in 0.5' increments as follows:

$$\text{High Water Level Alarm} = \text{Virtual Invert Level} - 0.5'$$

$$\text{Lag Pump On} = \text{High Water Level Alarm} - 0.5'$$

$$\text{Lead Pump On} = \text{Lag Pump On} - 0.5'$$

The "Both Pumps Off Level" is established by subtracting the Storage Height from the Lead Pump On elevation and shall be equal to the invert elevation of the influent pipe.

The wet well bottom elevation should be set at 3' below the "Pumps Off" elevation.

Where JEA has approved an “initial/ultimate” design, the wet well is sized for the ultimate pumps whereas the storage height is established for the initial pumps. For “initial/ultimate” stations, the operating levels are established as follows:

$$\text{High Water Level Alarm} = \text{Lag Pump On} + 0.5'$$

$$\text{Lag Pump On} = \text{Lead Pump On} + 0.5'$$

$$\text{Lead Pump On} = \text{Pumps Off} + \text{Storage Height for Initial Pumps}$$

$$\text{Pumps Off} = \text{Bottom Elevation} + 3' = \text{Invert Elevation of Influent Pipe}$$

An approved JEA liner shall be installed on all wet well concrete surfaces, including the underside of the concrete top slab, exposed to sewage or sewer gases.

5.0.5 Wet Well – Triplex

The wet well shall have a minimum inner diameter of 10' for 8" and smaller pump discharge size and 12' for greater than 10" pump discharge size, unless otherwise approved.

No wet well greater than 25' deep shall be allowed unless approved otherwise by JEA.

The wet well shall have only one influent main.

The wet well's operating water levels shall be arranged to insure pump operation without cavitations, provide cycle times not less than the manufacturer's recommendations, and insure the gravity sewer system is not surcharged.

The wet well's storage volume should be calculated assuming a 12 minute cycle time, without considering pump alternation, for the pump rate at run-out condition. The storage volume is determined as shown below:

$$SV_1 = (Q_{1\text{pump@run-out}}) (\text{Cycle Time}/4) = (Q_{1\text{pump@run-out}}) (3 \text{ min})$$

$$SV_2 = (Q_{2\text{pumps@run-out}} - Q_{1\text{pump@run-out}}) (\text{Cycle Time}/4) \\ = (Q_{2\text{pumps@run-out}} - Q_{1\text{pump@run-out}}) (3 \text{ min})$$

Where:

SV_1 = Volume between pumps off and lead pump on

SV_2 = Volume between lead pump on and #1 lag pump on

$Q_{1\text{pump@run-out}}$ = Flow of One Pump Run-Out Condition

$Q_{2\text{pumps@run-out}}$ = Flow of Two Pumps Run-Out Condition

The storage height₁ (distance between “Lead Pump On” and “Pumps Off” elevations) should be calculated by dividing the SV_1 by the wet well area and rounding up to the next highest increment divisible by 0.25'. The storage height₂ (distance between “Lead Pump On” and “#1 Lag Pump On” elevations) should be calculated by dividing the SV_2 by the wet well area and rounding up to the next highest increment divisible by 0.25'.

The Mercoid Operating Level (emergency high water level alarm) should be set at 0.5' above the virtual invert elevation.

The operating levels are established in 0.5' increments as follows:

$$\text{High Water Level Alarm} = \text{Virtual Invert Level} - 0.5'$$

#2 Lag Pump On = High Water Level Alarm – 0.5'

#1 Lag Pump On = #2 Lag Pump On -0.5'

The “Lead Pump On” elevation is established by subtracting the Storage Height₂ from the #1 Lag Pump On elevations.

The “All Pumps Off Level” is established by subtracting the Storage Height₁ from the Lead Pump On elevation and is equal to the invert elevation of the influent pipe.

The wet well bottom elevation should be set at 3' below the “Pumps Off” elevation.

If two pumps are to be installed initially (3rd pump to be installed in the future), piping and valves for the third pump must still be installed complete through the base elbow.

An approved JEA liner shall be installed on all wet well concrete surfaces, including the underside of the concrete top slab, exposed to sewage or sewer gases.

5.0.6 Pumps

Pumps shall be in accordance with the latest version of the JEA Water and Sewer Standards Manual.

The pump impeller shall be a non-clog design capable of passing a minimum 3" solid (minimum 1¾" solid for reduced capacity stations). Screw impellers are not acceptable.

Pump motors shall be of sufficient horse power to be non-overloading throughout the curve. Pump motors shall be a minimum 3 Hp unless otherwise approved.

All motors shall be suitable for operation with a 3-phase electric supply. Any special exception for single phase motors must be pre-approved through JEA.

Shutoff and check valves shall be provided on the discharge main of each pump. The check valve shall be between the shutoff valve and the pump's discharge. The check valve shall not be placed in the vertical position. Valves shall be accessible above ground. No valves shall be located inside the wet well.

All pump stations shall be equipped with an easily accessible pump out connection assembly for use with portable pumps to allow bypass operation of the pump station.

Where JEA has approved the station to be designed as “initial/ultimate”, the pump's base elbow should be sized for the ultimate pumps. The pump manufacturer shall provide an adapter plate for the initial pumps.

Pump access covers shall be suitably sized to provide adequate clearances for installation and removal of the pumping units. Hatches shall be sized for the ultimate pump design. The access hatch shall be designed for a minimum width of 36" or 6" beyond the manufacturer's minimum required width, whichever is greater. The minimum hatch length should be 48" for standard duplex stations and 96" for triplex stations or the sum of the pump width, centerline pump separation, and 12", whichever is greater. If JEA has approved an “initial/ultimate” pump station design, the hatches should be sized for the “ultimate” pump design. Reduced capacity station hatches shall be sized to adequately remove the pumps and shall not be required to adhere to the minimum requirements.

5.0.7 Electrical Control Panel

The panel and all electrical components shall be in accordance with the latest version of the JEA Water and Sewer Standards Manual.

The enclosure shall be sized to enable all breakers and controls to be located not more than 5' above the walkway.

If the chosen pump has a motor greater than or equal to 20 Hp, a 480 volt service must be used. If a pump motor is less than 20 Hp, but the kilo-volt-amperes (kVA) as determined by the equation $kVA = (\text{Total Load}) \times (\text{Voltage}) \times (1.73/1000)$ is greater than 150, a 480 volt service may be used. Otherwise, a 230 volt service should be used.

If the pump motor is less than 25 Hp, across the line starters can be used. Therefore, pump breakers are sized by multiplying the full load amperage (FLA) for the specific motor at the appropriate voltage by 300% and rounding up to the nearest breaker size.

If the pump motor is over 25 Hp, Soft Starts are required. Therefore, pump breakers are sized by multiplying the full load amperage (FLA) for the specific motor at the appropriate voltage by 200% and rounding up to the nearest breaker size.

If JEA has approved the station to be designed as an “initial/ultimate” station, the pump breakers should be sized for the initial pumps, but a note should be added to the drawings stating: “Pump breakers should be spaced to accommodate future pump breakers.”

The Main and Emergency breaker sizes are determined by adding the pump breaker size, the FLA of additional pump motors (beyond the one), and any auxiliary loads and rounding down to the nearest breaker size. If the total load for a 240-volt service is less than or equal to 100 Amps, 100 Amp emergency and main breakers should be used. If the total is greater than 100 and less than 200 Amps, round down to the nearest available breaker size, but, set the service size to 200 Amps. If the total is greater than 200 Amps, the service size shall be the same as the emergency and main breaker size. Where JEA has approved an “initial/ultimate” station, the main and emergency breakers, as well as service size shall be designed for ultimate design conditions.

Starters should be sized corresponding to the NEMA ratings shown in the table below. Use the pump manufacturer’s catalog to determine the full load amperage (FLA) corresponding to the appropriate voltage.

NEMA Ratings for Starters:

Max FLA	9	18	27	45	90	135	270	540
Starter Size	0	0	1	2	3	4	5	6

If JEA has approved the station to be designed as an “initial/ultimate” station, the starters should be sized for the ultimate pumps with a note added to the drawings stating: “Heater coil should be sized to protect the initial pumps.”

5.0.8 Emergency Power

Pump stations with a design capacity of greater than or equal to 500 equivalent dwelling units (EDUs) shall be equipped with an automatic generator set.

Where required, the generator shall be supplied by the Ring Power Corporation in accordance with the existing purchase order between Ring Power and JEA. Under this purchase order, JEA and the contractor shall be entitled to special rates and purchase price of equipment and services. The contractor shall be responsible for all costs associated with the installation of the generator system. The generator system shall conform to the JEA Water and Sewer Standards Manual, Section 472.

The generator installation must be completed in conjunction with whichever phase of a project that causes the pump station influent flow to exceed 500 EDU's.

Pump stations with a design capacity less than 500 EDUs shall be equipped with a generator receptacle for use with a portable generator. Generator receptacles, where used, should be specified as indicated below:

Service Size	Generator Receptacle
100 Amps	JRFB1044FR
200 Amps	JRFB2044FR
>200 Amps	DF4521FRA

5.0.9 Water Service

Water service piping for the pump station site shall be 1 ½" diameter (minimum) and shall meet material and installation standards for water service construction as detailed in JEA Water and Sewer Standards Manual.

The water meter shall be 1 ½" diameter (maximum) and will be supplied and installed by JEA.

When available, reclaimed water service shall be provided for irrigation to landscape areas.

5.1 Private Pump Stations

All private pump stations discharging to the collection or treatment systems owned by JEA must be designed in accordance with FDEP Regulations and EPB Rule 3 criteria.

Pump stations shall be designed specifically to pump domestic sewage containing solids and fibrous materials.

Pump stations shall be designed and located on the site so as to minimize the effects resulting from odor, noise, and lighting.

The pump station shall have a minimum of 2 pumps with each pump being of the same capacity.

The pump station should be designed to pump the design peak hourly flow with one pump out of service.

The pump station must be designed to withstand floatation when empty.

The pump stations shall be equipped with an audible and visible high water level alarm.

A 24-hour emergency contact number should be posted at the station.

Pump station should have locked fence or other appropriate features (such as locking hasps for wet well, control panel, and valve box) to discourage unauthorized entry.

Control panel shall be equipped with lightning arrestors, surge capacitors, and phase protection.

Pump stations serving 500 EDUs or greater shall have provisions for continual operation. Auxiliary power in the form of an on-site generator is required.

Pump stations serving less than 500 EDUs shall be equipped with a generator receptacle.

A shut-off valve shall be provided on the suction main of a dry pit pump.

A shut-off and check valve shall be provided in the discharge main of each pump. The check valve shall be between the shut-off valve and the pump's discharge. The check valve shall not be placed in the vertical position. Valves shall be accessible either above ground or in a dry valve pit.

No valves shall be located inside the wet well.

A pump out at the station shall be required. A pump out is an appropriate coupling device and valving to the discharge pipe to allow for connection of portable pumps. If the station is within 25' of the JEA required pump-out at the right-of-way, an additional pump-out at the station shall not be required.

Private pump stations man folding with force mains owned or to be owned by JEA shall require the installation of a check valve, pump out tee, and shut-off valve in a valve pit located on the property adjacent to the right-of-way as per Detail No. S-46 of the JEA Water and Sewer Standards Manual. This pump out shall be accessible to JEA at all times. Operation and Maintenance of this pump out shall be the private owner's responsibility.

5.2 Low Pressure Systems

For the purposes of this document, a Low Pressure Sewers System (LPS) is defined as a Pressure Sewer System. The Environmental Protection Agency defines a Pressure Sewer as: An alternative wastewater collection system in which household wastewater is pretreated by a septic tank or grinder and pumped through small plastic sewer pipes buried at shallow depths to either a conventional gravity sewer or a treatment system. Low Pressure Sewer Systems shall be in accordance with the JEA Water and Sewer Standards Manual.

Low pressure sewer systems are not allowed for new developments. Exceptions may be approved on a case by case basis by JEA's LPS Committee.

It is the policy of JEA to construct gravity wastewater collection systems to serve customers within the JEA's service territory. Low-Pressure Sewer Systems shall only be allowed when the project meets all of the following criteria:

A gravity wastewater collection system, designed in accordance with JEA standards, will be placed at a depth greater than fourteen feet (14') with service laterals or at a depth greater than twenty feet (20') without service laterals.

There are less than 10 customers that will be served by the low-pressure system.

The surrounding land is fully developed or cannot be developed due to environmental

constraints and a gravity sewer system would not be economically feasible.

A gravity wastewater collection system with a low flow lift station cannot be constructed.

An on-site sewage treatment system can be constructed but would not be in the best interest of JEA.

A low pressure pump station shall not be allowed to connect into a JEA force main per FDEP and EPB Rule No. 3. No exceptions will be allowed.