

City of Jefferson Public Utilities

TECHNICAL MANUAL



DECEMBER 2023



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1 POLICIES AND PROCEDURES

1.1 Purpose Statement

1.1.1 Authority and Title

- A. These Design and Construction Standards are adopted by the City of Jefferson Public Utilities under the authority of the Constitution of the State of Georgia. These regulations shall be known as “City of Jefferson Public Utilities Design and Construction Standards,” and may be referred to generally as “Design and Construction Standards.”

1.1.2 Purpose and Intent

- A. The purpose of this document is to set forth the policies, procedures, design requirements, material requirements, and construction requirements of the City of Jefferson Public Utilities for the design, installation, and construction of water distribution and sanitary sewerage systems.

1.1.3 Amendments and Revisions

- A. The City of Jefferson Public Utilities reserves the right to amend and/or revise these “Design and Construction Standards” whenever it is determined to be necessary to improve the performance and integrity of the water distribution and sanitary sewerage systems.

1.2 Definitions

ACI	American Concrete Institute
ANSI	American National Standards Institute
ASTM	American Society for Testing and Materials
AWWA	American Water Works Association
CITY OF JEFFERSON	City of Jefferson Public Utilities
CJPU Engineer	The City of Jefferson Public Utilities’ engineer or authorized representative.
Contractor	Any individual, firm, or corporation with whom a contract is made by the developer or the City of Jefferson for the purpose of constructing the water distribution and/or sanitary sewerage systems described herein.
Developer	Any individual, firm, or corporation who contracts with a contractor to construct a water distribution and/or sanitary sewerage system.
Developer’s Engineer	The engineer who is hired by the Developer and is in responsible charge of the water distribution and/or sanitary sewerage system design. Developer’s engineer must be licensed by the Georgia State Board of Registration for Professional Engineers and Land Surveyors.

DIP	Ductile Iron Pipe
DIPRA	Ductile Iron Pipe Research Association
Domestic Wastewater	Wastewater from sanitary fixtures such as toilets and urinals.
Food Service Facility	Any facility that cuts, cooks, bakes, prepares, or serves food, or which disposes of food-related wastes.
Flow Sensor	An inline device installed at or near the supply point of the landscape irrigation system that produces a repeatable signal proportional to flow rate.
GIS	Geographic Information System
GPD	Gallons per day
GPM	Gallons per minute
Grease	A material composed primarily of fats, oil, and grease from animal or vegetable sources. The terms fats, oil, and grease shall be deemed as Grease by definition. Grease may also include petroleum-based products.
Landscape Irrigation System	An assembly of component parts that is permanently installed for the controlled distribution of water to irrigate landscapes.
Large Landscapes	All landscapes other than those in the yards of one and two-family dwellings.
MGD	Million Gallons per Day
Master Shut-Off Valve	An automatic valve installed at the irrigation supply point which controls water flow into the landscape irrigation system. When this valve is closed, water will not be supplied to the landscape irrigation system.
PCF	Pounds per cubic foot
PSI	Pounds per square inch
PVC	Polyvinyl chloride
Rain Sensor Shut-Off Valve	An electric device that detects and measures rainfall amounts and overrides the cycle of a landscape irrigation system to turn off such a system when a pre-determined amount of rain has fallen.
Sanitary Sewer Lateral	A pipe that extends from a sanitary sewer main to the public street right-of-way or easement to provide sewer service to a parcel.
Sanitary Sewer Main	A gravity sewer line that has one or more sanitary sewer laterals connected to it.
Sanitary Sewerage Systems	A network of pipes, pumps, and force mains for the collection and conveyance of wastewater, or sewage, from a community.
Service Line	The pipe from the public water main to the primary service of a customer

Sewage	Refuse liquids or waste matter usually carried off by sewers.
Sewerage	The removal and disposal of sewage and surface water by sewers.
Sewers	An artificial, usually subterranean conduit to carry off sewage.
SCADA	Supervisory Control and Data Acquisition System
Water Distribution System	A network of pipes, valves, and fittings that convey potable water from a water treatment plant to the customers.
Water Main	An underground pipe greater than 6 inches that is designed to deliver water to multiple customer service lines.
WaterSense Controller	Weather-based irrigation controllers, labeled under the U.S. Environmental Protection Agency's WaterSense Program, which includes stand-alone controllers, add-on devices, and plug-in devices that use current weather data as a basis for scheduling irrigation.

1.3 Development Procedures and Approval Process

1.3.1 Design Phase and Plan Submittal Process

- A. The planning, design and construction of residential, commercial, and industrial developments must be reviewed, approved, and inspected by the City of Jefferson Public Utilities (CITY) to verify their accordance with established development procedures, specifications, requirements, local ordinances, and all other applicable local guidelines prior to final approval and acceptance into the City of Jefferson Water & Sewer System.

1.3.2 Requirements for Plan Presentation

- A. Engineering plans shall be prepared on a minimum of 24-inch x 36-inch sheets of paper. All drawing sheets shall be sealed, signed, and dated by a design professional licensed by the Georgia State Board of Registration for Professional Engineers and Land Surveyors. Sealing of documents shall be in accordance with the current Rules and Regulations of the State of Georgia, Chapter 180-12: Sealing of Documents. Engineering plans shall contain the following drawings and information as applicable:

1. Cover Sheet

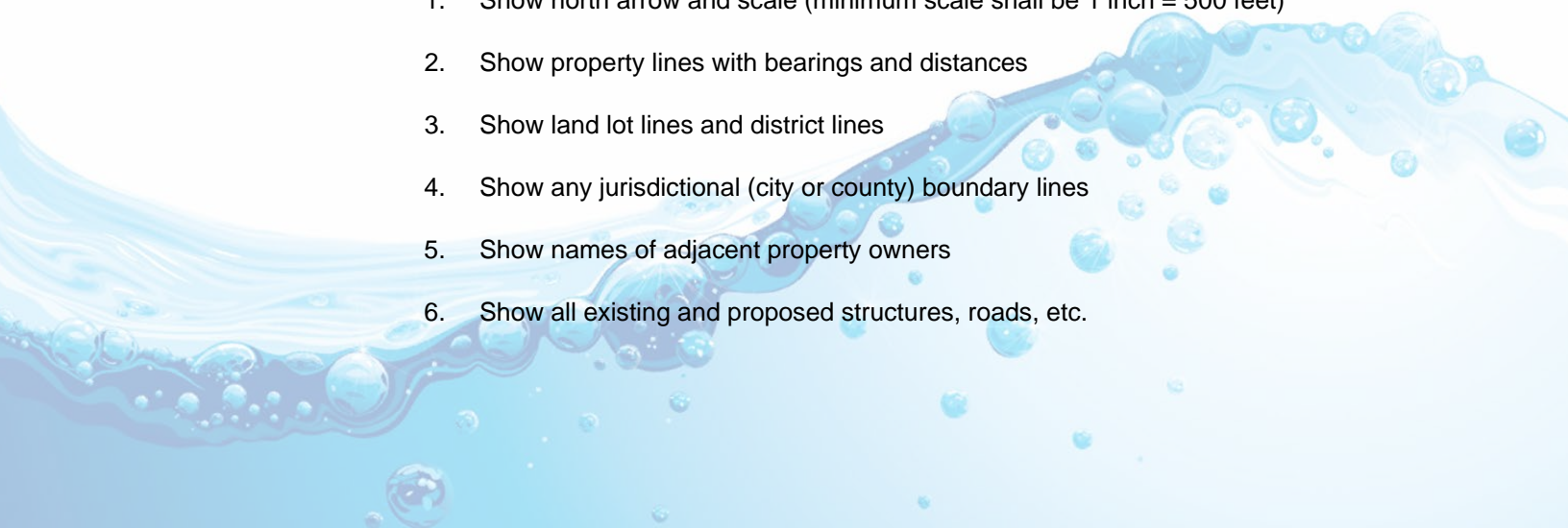
- (a) Show project name
- (b) Show location map with street names, north arrow, and scale (minimum scale shall be 1 inch = 2000 feet).
- (c) Show Developer/Owner's name, address, email address, and telephone number
- (d) Show Engineer's name, address, email address, and telephone number
- (e) Show the name and telephone number of a 24-hour contact person

(f) State land lot number(s) and district number(s) and physical address of proposed development location

(g) The following notes:

- *Approval is based on the information supplied on these drawings. If unknown conditions are encountered or site conditions change, and/or these plans are found to be not representative of site conditions, contact the City of Jefferson Public Utilities. A design revision and plan re-submittal may be required.*
- *City of Jefferson Public Utilities requires that every service connection be equipped with a backflow prevention device. Facilities that, in the opinion of City of Jefferson, may potentially introduce hazardous or toxic substances into the water supply will be required to install a reduced pressure assembly that vents to the atmosphere.*
- *Any modifications and/or changes to an existing or additions to a portion of the water and sanitary sewer systems are required to be inspected and/or reviewed by City of Jefferson (City of Jefferson Public Utilities Phone #706-367-5124 Ext. 3).*
- *Plan approval does not release the Owner, Developer, or Contractor from responsibility for environmental damage, property damage, or endangerment of public health. Responsible parties shall mitigate impacts, repair damage, and compensate affected parties as required by local and state law.*
- *All construction and materials shall be in full accordance with current Ordinances and Design Standards and Specifications published by the City of Jefferson and City of Jefferson Public Utilities. It is the responsibility of each Developer and Contractor to familiarize himself/herself with all current rules and standards.*
- *The City of Jefferson will obtain road bore permits and road cut permits at the State level for all approved projects. Road bore and/or cut work shall not begin until permits are obtained.*

B. Overall Site Plan Sheet(s)

1. Show north arrow and scale (minimum scale shall be 1 inch = 500 feet)
 2. Show property lines with bearings and distances
 3. Show land lot lines and district lines
 4. Show any jurisdictional (city or county) boundary lines
 5. Show names of adjacent property owners
 6. Show all existing and proposed structures, roads, etc.
- 

7. Show all roads adjacent to and within a proposed development
8. Show all streams, lakes, and wetland areas
9. Show all State waters located within 200 feet of the project site
10. Show all undisturbed buffers
11. Show a minimum of two (2) benchmarks referenced to Jackson County GIS for horizontal and vertical control.
12. Coordinate system shall be per GA WEST NAD 83
13. State the total acreage of the development
14. State the total disturbed acreage
15. State the acreage of contributing drainage basins to the proposed development.
16. State the total number of lots or units in the proposed development

C. Grading Plan Sheet(s)

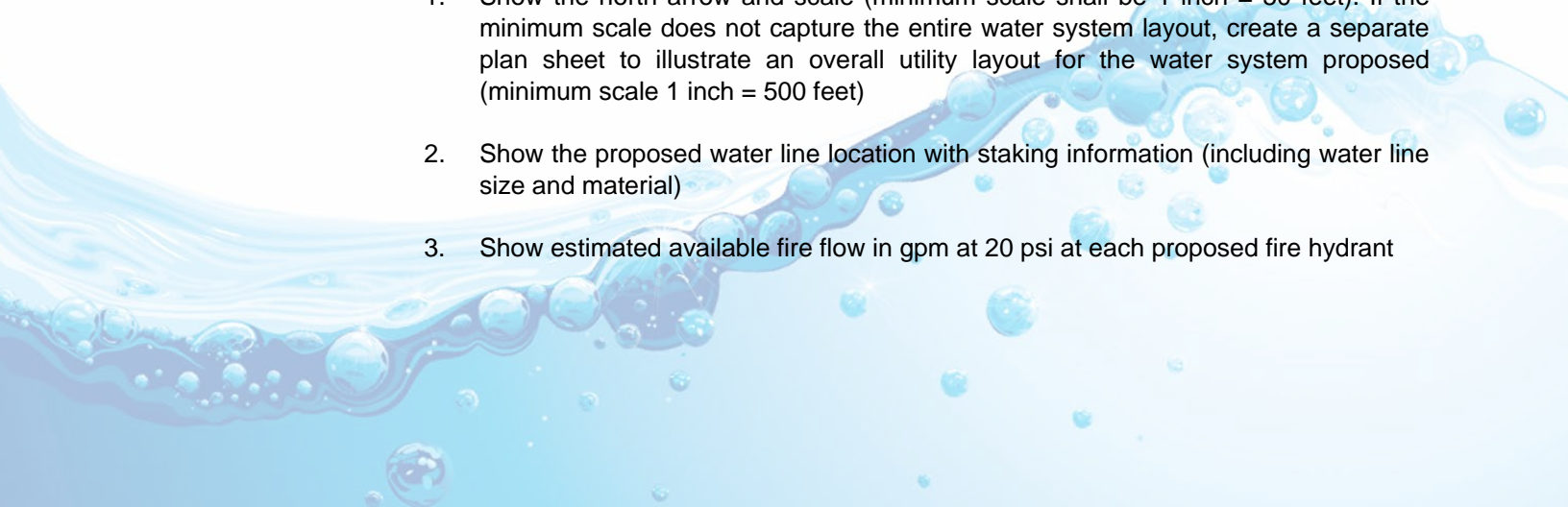
1. Show north arrow and scale (minimum scale shall be 1 inch = 50 feet)
2. Show existing topography (in grayscale) and proposed topography with contour intervals in accordance with the following:

Ground Slope	Contour Interval
Flat (0% to 2%)	0.5 foot or 1 foot
Rolling (2% to 8%)	1 foot or 2 foot
Steep (greater than 8%)	2 foot, 5 foot, or 10 foot

3. Show existing and proposed spot elevations as required
4. Show clearing limits

D. Water Distribution System Plan Sheet(s)

1. Show the north arrow and scale (minimum scale shall be 1 inch = 50 feet). If the minimum scale does not capture the entire water system layout, create a separate plan sheet to illustrate an overall utility layout for the water system proposed (minimum scale 1 inch = 500 feet)
2. Show the proposed water line location with staking information (including water line size and material)
3. Show estimated available fire flow in gpm at 20 psi at each proposed fire hydrant



4. Show grading plan in grayscale
5. Show all existing utilities (in grayscale) and proposed utilities
6. Show all stormwater drain lines and structures in grayscale (include line size, material, and invert data)
7. Show all property lines, right-of-way lines, permanent easement lines and temporary easement lines.
8. Show names of property owners and/or Parcel ID numbers.
9. Show all State water buffers, wetland areas, and 100-year floodplain elevation
10. Show the following standard construction notes:
 - (a) Pre-construction conference is required with the City of Jefferson Public Utilities prior to water/sewer line construction
 - (b) Contractor for the water/sewer line MUST have a Georgia state-approved utility license
 - (c) Water service shall not be activated until all lines, meters, and backflow prevention devices are pressure tested, disinfected, and certified with all public lines and meters being deeded over to City of Jefferson. This includes both fire and domestic water service.
 - (d) All fireline meters shall be new and installed per City of Jefferson standards.
 - (e) Water and Sewer Utility Easements shall be recorded and executed prior to as-built approval.

E. Water Distribution System Detail Sheet(s)

1. Use City of Jefferson standard details located at:
<https://www.cityofjeffersonga.com/documents>

F. Sanitary Sewer System Plan Sheet(s)

1. Show the north arrow and scale (minimum scale shall be 1 inch = 50 feet). If the minimum scale does not capture entire sewer system layout, create a separate plan sheet to illustrate an overall utility layout for sewer system proposed (minimum scale 1 inch = 500 feet). Provide a sheet index key for more than 2 sheets.
2. Show proposed sewer line and manhole locations with staking information (include sewer line size and material)
3. Show grading plan in grayscale
4. Show all existing utilities (in grayscale) and proposed utilities City of Jefferson Public Utilities Standards and Specifications

5. Show all stormwater drain lines and structures in grayscale (include line size, material, and invert data)
6. Show all property lines, right-of-way lines, permanent easement lines, and temporary easement lines
7. Show names of property owners and/or Parcel ID numbers
8. Show the following standard construction notes:
 - (a) Pre-construction conference is required with the City of Jefferson Public Utilities prior to water/sewer line construction
 - (b) Contractor for the water/sewer line MUST have a Georgia state-approved utility license.

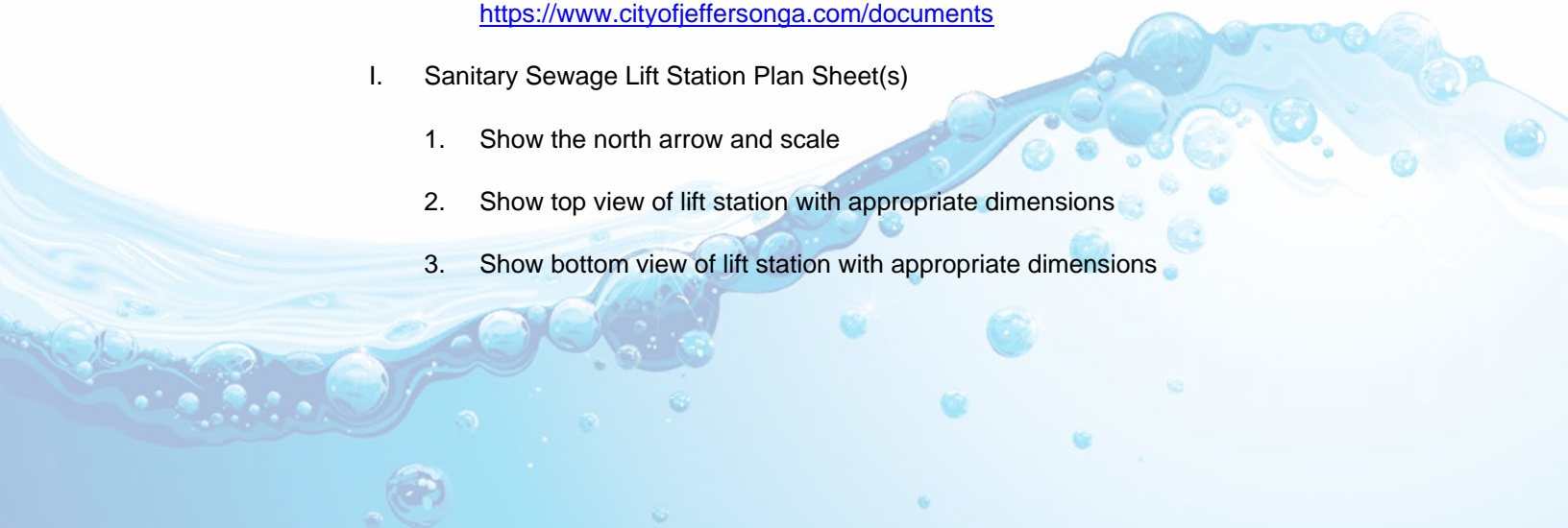
G. Sanitary Sewer System Profile Sheet(s)

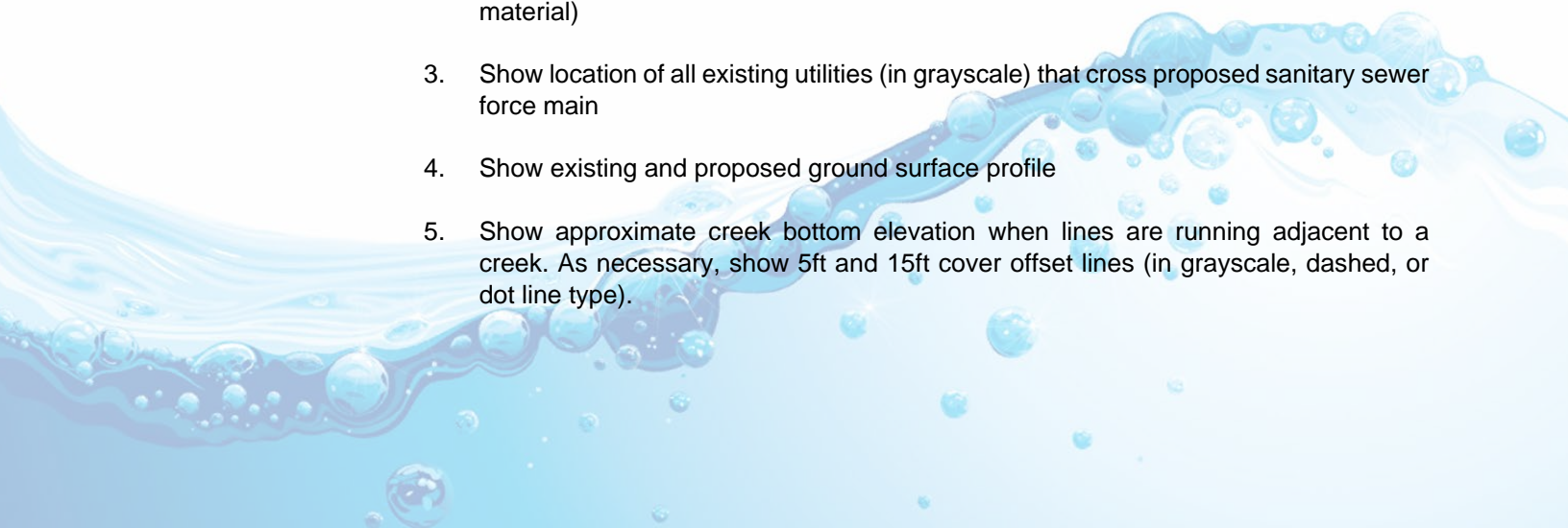
1. Show horizontal and vertical scale (minimum horizontal scale shall be 1 inch= 50 feet; minimum vertical scale shall be 1 inch = 10 feet)
2. Show proposed sanitary sewer profile (include sanitary sewer size and material)
3. Show slope of each section of sanitary sewer
4. Show location of existing utilities that are crossing proposed sanitary sewer
5. Show "invert in," "invert out," and "rim" elevations for each proposed and existing manhole in profile
6. Show existing and proposed ground surface profile
7. Show approximate creek bottom elevation when sewer lines are running adjacent to a creek (creek should be approximately 3 feet below sewer invert)
8. As necessary, show 5-ft and 15-ft cover depth offset lines (in grayscale, dashed, or dot line-type) from the proposed finished grade along the sewer profile.

H. Sanitary Sewer System Detail Sheet(s)

1. Use City of Jefferson standard details located at <https://www.cityofjeffersonga.com/documents>

I. Sanitary Sewage Lift Station Plan Sheet(s)

1. Show the north arrow and scale
 2. Show top view of lift station with appropriate dimensions
 3. Show bottom view of lift station with appropriate dimensions
- 

- J. Sanitary Sewage Lift Station Section Sheet(s)
1. Show pertinent elevation sections
 2. Show pertinent dimensions
 3. Show critical elevations (top of slab, bottom of wet well, etc.)
 4. Show pump control points (high-level alarm, pump on, pump off, low-level alarm, etc.)
 5. Show pump curve and system head curve
 6. Show pump design point
- K. Sanitary Sewer Force Main Plan Sheet(s)
1. Show north arrow and scale (minimum scale shall be 1 inch = 50 feet)
 2. Show proposed sanitary sewer force main location with staking information (including force main size and material)
 3. Show grading plan (in grayscale)
 4. Show all existing utilities (in grayscale) and proposed utilities
 5. Show all stormwater drain lines and structures in grayscale (include line size, material, and invert data)
 6. Show all property lines, right-of-way lines, permanent easement lines, temporary easement lines
 7. Show names of property owners and/or Parcel ID numbers
 8. Show all State water buffers, wetland areas, and 100-year floodplain elevation
- L. Sanitary Sewer Force Main Profile Sheet(s)
1. Show horizontal and vertical scale (minimum horizontal scale shall be 1 inch = 50 feet; minimum vertical scale shall be 1 inch = 20 feet)
 2. Show proposed sanitary sewer force main profile (including force main size and material)
 3. Show location of all existing utilities (in grayscale) that cross proposed sanitary sewer force main
 4. Show existing and proposed ground surface profile
 5. Show approximate creek bottom elevation when lines are running adjacent to a creek. As necessary, show 5ft and 15ft cover offset lines (in grayscale, dashed, or dot line type).
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1.3.3 Plan Review Checklist

A. Permit Fees

1. The City of Jefferson charges a review fee for the initial submittal. The City charges a review fee for all subsequent resubmittals. Payment of permit review fees are due at the time of plan submittal/re-submittal. Final approval will not be issued if review fees have not paid. The current Permit Fee Schedule is located at <https://www.cityofjeffersonga.com/documents>
2. Plats and As-builts are subject to a Review Fee due at the time of submittal.
3. All Plan Review Fees shall be submitted using the standard form located at <https://www.cityofjeffersonga.com/documents>

B. Capacity Fees

1. The City of Jefferson has adopted capacity fees to expand the water and sewer infrastructure and to ensure that adequate public facilities are available to serve new growth and development in the City of Jefferson.
2. Capacity fees provide for new growth and development so that existing water and sewer customers are not burdened with the costs of expanding the water and system.
3. Capacity fees are due at the time when the Land Disturbance Permit is issued except when Zoning Conditions dictate an alternate schedule or at the discretion of the City of Jefferson Public Utilities Department.

C. Plan Submittal

1. Submit five (5) full-size sets of construction drawings.
2. Submit one (1) electronic copy of construction drawings in PDF format through an online portal such as <https://wettransfer.com/> or by submitting a physical media such as a thumb drive.
3. Submit Notice of Intent form with documentation that applicable fees have been paid.
4. Submit Sanitary Sewer Extension Form. Form located at <https://www.cityofjeffersonga.com/documents>
5. The City of Jefferson Public Works will provide the required plan review fees based on the current fee checklist. Make check made out to City of Jefferson. Checklist located at <https://www.cityofjeffersonga.com/forms>
6. Submit all documents to the Permitting Department at City Hall located at 147 Athens Street, Jefferson, Georgia 30549.
7. Each re-submittal shall include the same requirements as "1", "2", and "4" above.

D. Construction Process

1. Plan approval shall be valid for a period of one (1) year.
2. If construction is not substantially underway within one (1) year of approval date, plan re-submission may be required. The City of Jefferson shall make that determination.
3. If construction is substantially underway within one (1) year of approval date, administrative re-issuance of permit will be required. The City of Jefferson shall make that determination.
4. The City of Jefferson review and approval does not relieve the owner, developer, and/or contractor from any responsibility or liability.

E. Expiration of Plan Approval

1. Plan approval is valid for one (1) year or twelve (12) consecutive months. Projects with approved plans that are not initiated within one (1) year of plan approval, or projects that are initiated and then become inactive for a period, shall become invalid. If an approved plan becomes invalid, the City of Jefferson shall determine if the plan can be revalidated, or if a new design and plan submittal is required.

F. Plan Modifications

1. Approved plans shall not be modified, or deviated from, unless approved in writing by the City of Jefferson.

1.4 Easements and Deeded Property

1.4.1 General

- A. All water distribution and/or sanitary sewerage system appurtenances that will be owned by the City of Jefferson and are not located in a public street right-of-way, shall be located in a permanent easement or deeded property that has been conveyed to the City of Jefferson.
- B. All sanitary sewage lift stations shall be located on property that is platted and deeded to the City of Jefferson. Any roads required to access the sanitary sewage lift station from the public street right-of-way shall be included as part of the platted and deeded property or given as an access easement at the discretion of City of Jefferson.
- C. The City of Jefferson will not approve any water distribution and/or sanitary sewerage system construction until all off-site easements and/or deeded property are acquired by the Developer/Owner. A design must be submitted and approved before easement acquisition can begin.

1.4.2 Permanent Easements

- A. A permanent easement is a right granted by an underlying property owner that entitles its holder to a specific use of the property in perpetuity.

B. "On-Site" Permanent Easements

1. "On-site" permanent easements are permanent easements that fall within the boundaries of the current phase of the development and are shown on the final plat. Permanent easements are conveyed by recording the Deed of Conveyance and final plat.
2. The Developer/Owner shall grant to the City of Jefferson, the exclusive right to construct, re-construct, operate, maintain, repair, replace, improve, alter, remove, relocate, and inspect water distribution and/or sanitary sewerage systems that are situated over, across, and under the land wherein the water distribution system and/or sanitary sewerage system lies on the Developer/Owner's property.

C. "Off-Site" Permanent Easements

1. "Off-site" permanent easements are permanent easements that fall outside the boundaries of the current phase of the development and are shown on the final plat. must be provided by the Developer/Owner on a City of Jefferson easement document for each property where an easement is required to install the water distribution and/or sanitary sewerage system. Plans must be submitted and approved along with an easement plat for each property where an easement is required before the Developer/Owner obtains an easement from the property owner.
2. Permanent easements through property owned by the Developer/Owner, including water and sewer lines that will be included in later phases of the same project, shall be treated as routine "off-site" permanent easements. "Off-site" permanent easements shall be negotiated and acquired by the Developer/Owner.
3. Water distribution and/or sanitary sewerage system plans shall not receive final approval until all "off-site" permanent easements required for system completion are approved and acquired.

D. Permanent Easement Requirements

1. Permanent easements for water distribution systems and sanitary sewage force mains shall have a minimum width of 20 feet. Permanent easements for gravity sewer systems shall have a minimum width of 20 feet.
2. The water line or sanitary sewage line shall be located in the center of the permanent easement. Permanent easements shall be accessible from the public street right-of-way. If access from a public street right-of-way is not available, permanent ingress/egress easement(s) shall be provided, as required, to provide City of Jefferson access to the water and/or sewer easement. Enough permanent ingress/egress easements shall be provided so that all portions of the water and/or sewer easement are accessible by the City of Jefferson from the public right-of-way. City of Jefferson will review all proposed easements and deeded property and determine the number and location, if any, of permanent ingress/egress easements required. In some cases, deeded property may be required for ingress/egress in lieu of a permanent easement. City of Jefferson will determine what is required.

3. Permanent easements for water meters and appurtenances shall extend a minimum of 10 feet beyond the outside of the structure on each side.
4. The size and/or width of permanent easements may be increased or decreased at the discretion of the City of Jefferson.

1.4.3 Temporary Easements

- A. A temporary easement is a right granted for a specific period and once it expires, the rights granted return to the property owner. Temporary easements are typically used for the stockpiling of dirt, the maneuvering of equipment, or the storage of materials. The City of Jefferson will determine when necessary.
- B. Deeded Property Requirements
 1. Deeded property is property that is platted and deeded to the City of Jefferson. Deeded property must be provided by the Developer/Owner. The minimum size of deeded property associated with a sanitary sewage lift station is 100 feet by 100 feet square. Sanitary sewage lift station plans shall not receive final approval until deeded property is approved and acquired. The required size of the deeded property may be modified at the discretion of City of Jefferson.

1.5 Installation

1.5.1 General

- A. Water distribution and sanitary sewerage systems shall be constructed in accordance with City of Jefferson approved plans and specifications. A set of City of Jefferson approved plans shall be present on the job site whenever work is being performed on the water distribution and/or sanitary sewerage system, and the plans shall be made available to the City of Jefferson Inspector upon request. Installation of water distribution and/or sanitary sewerage systems shall not commence until City of Jefferson has granted final approval of the construction plans and specifications and the appropriate agency has issued a Development/Land Disturbance Permit.

1.5.2 Approved Utility Contractors

- A. The City of Jefferson does not have a list of pre-approved utility contractors. However, all utility contractors must be licensed by the state of Georgia.

1.5.3 Inspections

- A. A City of Jefferson Inspector will inspect the installation of the water distribution and/or sanitary sewerage system regularly during all phases of construction to ensure that the system is being constructed in accordance with the City of Jefferson approved plans and specifications.
- B. All utility work shall be inspected prior to backfill. It is the Developer/Owner's and/or Utility Contractor's responsibility to schedule inspections and verify that work has been inspected before it is backfilled. Any work that is backfilled prior to inspection shall be exposed when directed by the City of Jefferson Inspector.

- C. The City of Jefferson Inspector will inform the Developer/Owner and/or Contractor when there are deficiencies in workmanship, or when there are deviations from the approved plans and specifications. Developer/Owner and/or Utility Contractor shall address the deficiencies promptly as determined by the City of Jefferson Inspector. Failure to address deficiencies promptly may result in the City of Jefferson issuing a Stop Work order. Failure to address deficiencies and/or disregarding a Stop Work order may result in additional fees and the water distribution and/or sanitary sewerage system will not be permitted to connect to the City of Jefferson system.
- D. Inspection by the City of Jefferson does not relieve the Developer/Owner and/or Utility Contractor of their responsibility for constructing the water distribution and/or sanitary sewerage system in accordance with the approved construction plans and specifications herein. The presence of a City of Jefferson Inspector, or City of Jefferson designated representative, on the site of work shall not be construed, in any manner, to relieve the Developer/Utility Contractor of their responsibility for strict compliance with the approved development plans, and specifications herein.
- E. The City of Jefferson Inspector shall not change or modify the approved water distribution and/or sanitary sewer system plans, or specifications herein, without written approval from the City of Jefferson.

1.5.4 Pre-Construction Meetings

- A. Prior to beginning construction of any water distribution and/or sanitary sewerage system, there is a required pre-construction meeting with the City of Jefferson.
- B. Office Meeting
 - 1. Developer/Owner and/or Utility Contractor shall arrange a pre-construction meeting with City of Jefferson Public Utilities. The pre-construction meeting shall be held at least 72 hours prior to construction and the Developer/Owner's Utility Contractor MUST be present. (Note: Contractors must possess a valid Georgia Utilities Contractor License).
- C. Field Meeting
 - 1. The City of Jefferson Inspector assigned to the project may conduct a separate, second preconstruction meeting with field personnel prior to commencement of work.

1.5.5 Testing

- A. Water distribution and sanitary sewerage systems shall be tested at the expense of the Developer/Owner. Testing methods and practices shall be as specified in the Standard Specifications for Construction Of Water and Sewer Mains.

1.5.6 Warranty

- A. The Developer/Owner shall provide a warranty for the water distribution and/or sanitary sewerage system against all defects in materials and workmanship for one (1) year after Final Acceptance. This warranty shall be backed by a one (1) year Letter of Credit, Maintenance Bond, or Escrow Agreement with City of Jefferson.

- B. A warranty inspection with the owner or appointed designee shall be scheduled approximately nine (9) months from the date of acceptance. If a punch list is necessary, the owner or designee shall work in coordination with City of Jefferson to facilitate resolution of the list items.
- C. During the warranty period, the Developer/Owner shall be responsible for any damage to the water distribution and/or sanitary sewerage system.

1.6 Final Acceptance

1.6.1 General

- A. Prior to Final Acceptance of the water distribution and/or sanitary sewerage system for meter sales and final platting, the City of Jefferson will make a final inspection after all pavement is installed and the Developer/Owner shall provide the following items to the City of Jefferson:
 1. Deed of Conveyance
 2. Contribution of Fixed Assets form
 3. Lien waiver(s)
 4. Corporate Owner's Affidavit
 5. Corporate Contractor's Affidavit
 6. One (1)-year Letter of Credit/Bond/Escrow Agreement with the City of Jefferson
 7. Two (2) hard copies of the Record Drawings and one (1) digital copy of the Record Drawings including PDF, ACAD, and SHP files
 8. Two (2) hard copies of Final Plat and one (1) digital copy of the Final Plat
 9. Sanitary sewer television inspection report and video
 10. Total coliform analysis
 11. All required fees (water testing fees, recording fees, etc.)
 12. Field corrections
 13. Water will not be left on and meters will not be set until all required documents and information are delivered to the City of Jefferson.

1.6.2 Deed of Conveyance

- A. A Deed of Conveyance is a legal document signed, sealed and delivered to effect a transfer of property, and to show the legal right to possess it. A Deed of Conveyance shall be provided for all easements and property to be dedicated to the City of Jefferson.

B. Lien Waivers

1. The City of Jefferson must ensure that all materials being dedicated as public assets have been paid for; therefore, a lien waiver shall be secured from each supplier where materials and/or equipment were purchased.

C. Owner's Affidavit

1. The City of Jefferson must ensure that all labor and materials required to construct a project have been paid for and that there are no liens on the property; therefore, the Developer/Owner shall prepare a Corporate Owner's Affidavit and submit it to the City of Jefferson. A Corporate Owner's Affidavit form can be obtained by visiting the Development page on the City of Jefferson website at www.cityofjeffersonga.com.

D. Contractor's Affidavit

1. The City of Jefferson must ensure that the utility contractor has been paid in full and that there are no liens on the property; therefore, the utility contractor shall prepare a Corporate Contractor's Affidavit and submit it to the City of Jefferson. A Corporate Contractor's Affidavit form can be obtained by visiting the Development page on the City of Jefferson website at www.cityofjeffersonga.com.

E. One-Year Letter of Credit/Bond/Escrow Agreement

1. A Letter of Credit, Bond or Escrow Agreement shall be provided to the City of Jefferson as a warranty for the materials and workmanship for the water distribution and/or sanitary sewerage system. The term of the Letter of Credit, Bond or Escrow Agreement shall be one (1) year and the amount shall be determined by City of Jefferson and based on the amount of infrastructure installed.
2. Prior to the expiration of the Letter of Credit, Bond or Escrow Agreement, a warranty inspection will be conducted by the City of Jefferson. The Developer/Owner will be required to correct any deficiencies that are found. Upon satisfactory repair of any deficiencies that are found, the City of Jefferson will release the Letter of Credit, Bond or Escrow Agreement. A sample Letter of Credit can be obtained by visiting the Development page on the City of Jefferson website at www.cityofjeffersonga.com under Conveyance Package.

F. Construction Record Documents

1. As-Built (Final) Drawings shall be submitted to the City of Jefferson Public Utilities along with appropriate Plan Review Fee detailing the exact location of all Water and/or Sewer Utility System infrastructure including service mains, service taps, valves, manholes and fire hydrants. These As-Built (Final) Drawings shall be produced by the Engineer of Record for the Development and presented on two (2) complete sets of fresh drawings, along with electronic As-builts (in PDF, ACAD, and SHP) on state plane coordinate system, USA, GA, NAD 1983 West Foot.
2. The Engineer of Record must also certify upon the As-Built (Final) Drawings that they (or his/her designated representative under their direct supervision) have made sufficient visits to the development confirming that the said development was

constructed in accordance with City of Jefferson Public Utilities Plans and Specifications as approved.

- (a) *I certify that the plans and specifications of this project were designed in accordance with all applicable standards. I have reviewed the as-built survey for this project and have found the facilities, structures, and utilities as shown on that survey to be in conformance with the design drawings for this project.*
3. The Developer must provide printed name, signature, and certification that the project has been constructed in accordance with City of Jefferson Design and Construction Standards and City of Jefferson Ordinances and that the project has been built as shown on the "As-Built" drawings. The following standard certification language shall appear on each sheet of the "As-Built" drawings, accompanied by the signature of the owner/developer, prior to approval of the drawings by City of Jefferson.
 - (a) *I certify that this project has been constructed in accordance with the City of Jefferson Public Utilities' Design and Construction Standards and Ordinances, latest editions.*
 - (b) *I certify that this project has been built as shown on the "As-Built" drawings. I further certify that I have field-verified all elevations, volumes, and locations as appropriate for the potable water and sanitary sewer infrastructure depicted on these drawings.*
4. Each Certification statement, as listed in this section, shall be accompanied by the appropriate signature and name typed or written legibly below each signature along with the date.
5. The As-Built Drawings must be sealed, signed, and dated by a design professional licensed by the Georgia State Board of Registration for Professional Engineers and Land Surveyors.
 - (a) Shall show all street names, right-of-way widths, easements, lot numbers and addresses, and location, size, and material of all water distribution and/or sanitary sewerage system components. Plan and Profile information shall be provided for gravity sewers and sanitary sewer force mains; and
 - (b) Shall be checked and signed by City of Jefferson Public Utilities Inspector prior to final submittal. Submit two (2) full-size sets of Record Drawings and one (1) digital file.

G. Digital Data Submission Standards

1. Digital Record Drawings shall be prepared in accordance with the City of Jefferson Water and Sewer Standard Specifications Section Field Engineering Section 01 71 23.

H. Final Plat

1. Submit two (2) hard copies and one (1) digital file of the Final Plat.

2. Final Plat shall contain the following note:

- (a) *“Approval of this plat and acceptance of the project represented herein shall be deemed to be an acceptance by City of Jefferson Public Utilities of all dedicated water and sanitary sewer mains, pump stations, and lift stations that serve more than one (1) property owner. As a condition of approval of this plat and acceptance of this project by City of Jefferson, the developer and owner hereby covenant that any future deed conveying all or any portion of the property or lots shown herein shall specifically refer to this plat and incorporate this plat by reference.”*

I. Maintenance Requirements

1. The Owner must maintain all water and sanitary sewer infrastructure accepted by City of Jefferson for one (1) year after acceptance. The City of Jefferson will own and provide maintenance on all accepted infrastructure in perpetuity after this one (1) year period.

J. Fees

1. Inspection fee sheet will be provided by City of Jefferson, and all fees shall be paid prior to the issuance of an Acceptance Letter from City of Jefferson.
2. Water usage for filling and flushing lines will be billed at the current rates, including the base rate, provided at www.cityofjeffersonga.com.

K. Field Corrections

1. A final inspection shall be conducted by the City of Jefferson Public Utilities to assure that these As-Built (Final) Drawings are accurate and that all meter setters, meter boxes, sewer taps, sewer manholes, and all other Water and/or Sewer Utility System infrastructure has been properly installed.
2. Prior to Final Acceptance, Developer/Owner and/or Contractor shall make all corrections to the water distribution and/or sanitary sewerage system as directed by the City of Jefferson Inspector.



2 POTABLE WATER DESIGN STANDARDS

2.1 All water distribution systems that will be connected to the City of Jefferson water system shall be designed in accordance with these standards. Any deviation from these standards shall be approved in writing by the City of Jefferson.

2.2 Water Line Size

2.2.1 Minimum Water Main Size: 8-inch Diameter

2.2.2 Minimum service laterals shall be ¾-inch Diameter

2.3 Pressure

2.3.1 Pressure at Residential Meters: Min 40 psi – Maximum 160 psi

2.4 Fire Flow Requirements

2.4.1 A pre-development fire flow test shall be conducted on the water main that will be used to supply water to the proposed development in addition to a 24-hour static pressure test. A City representative is required to witness the flow test.

2.4.2 Minimum Fire Flow requirements are shown in the table below. The Fire Marshal may determine flows need to be greater.

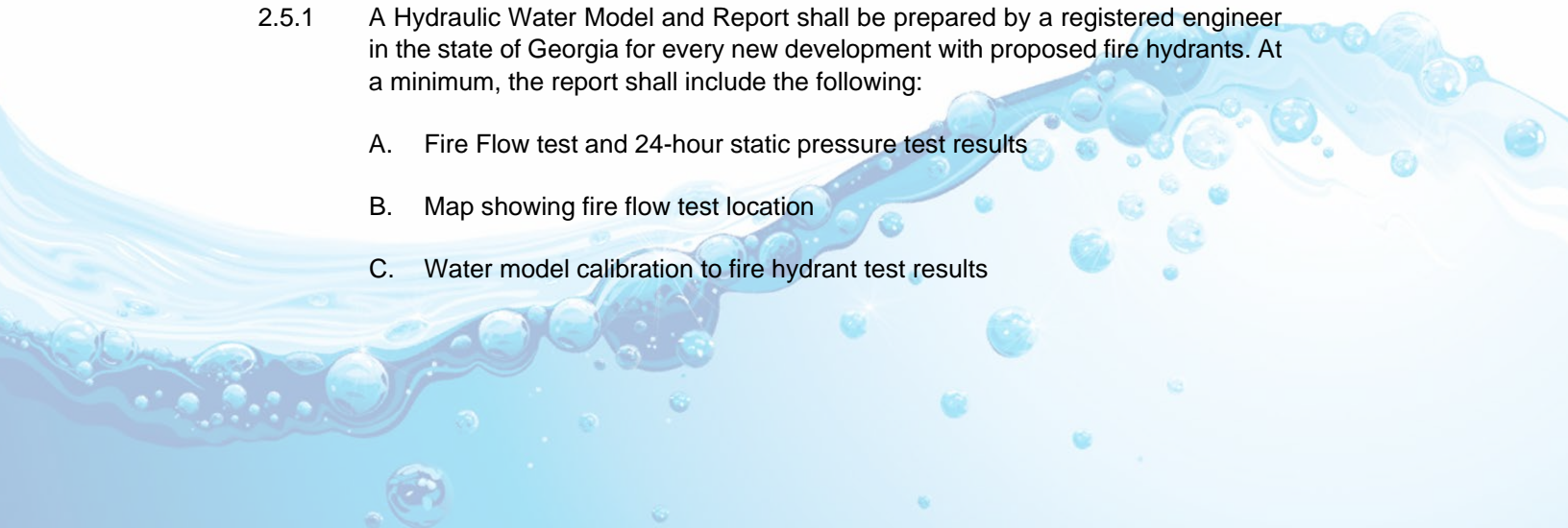
Type of Development	Minimum Required Flow*
Residential	1,000 GPM
Multi-family, Patio Homes, and Developments with Greater than 3 Units Per Acres	1,500 GPM
Shopping Centers	1,500 GPM
Motels, Light Industry	1,500 GPM
Heavy Industry	1,500 GPM

*Determined by the Fire Marshal

2.5 Hydraulic Water Modeling

2.5.1 A Hydraulic Water Model and Report shall be prepared by a registered engineer in the state of Georgia for every new development with proposed fire hydrants. At a minimum, the report shall include the following:

- A. Fire Flow test and 24-hour static pressure test results
- B. Map showing fire flow test location
- C. Water model calibration to fire hydrant test results



- D. Estimated available fire flow at 20 psi at all proposed hydrants in a table
- E. Site plan showing proposed fire hydrants and labels corresponding to table in report
- F. Use lowest sustained pressure during the 24-hour static pressure tests to model fire flows
- G. Recommendations

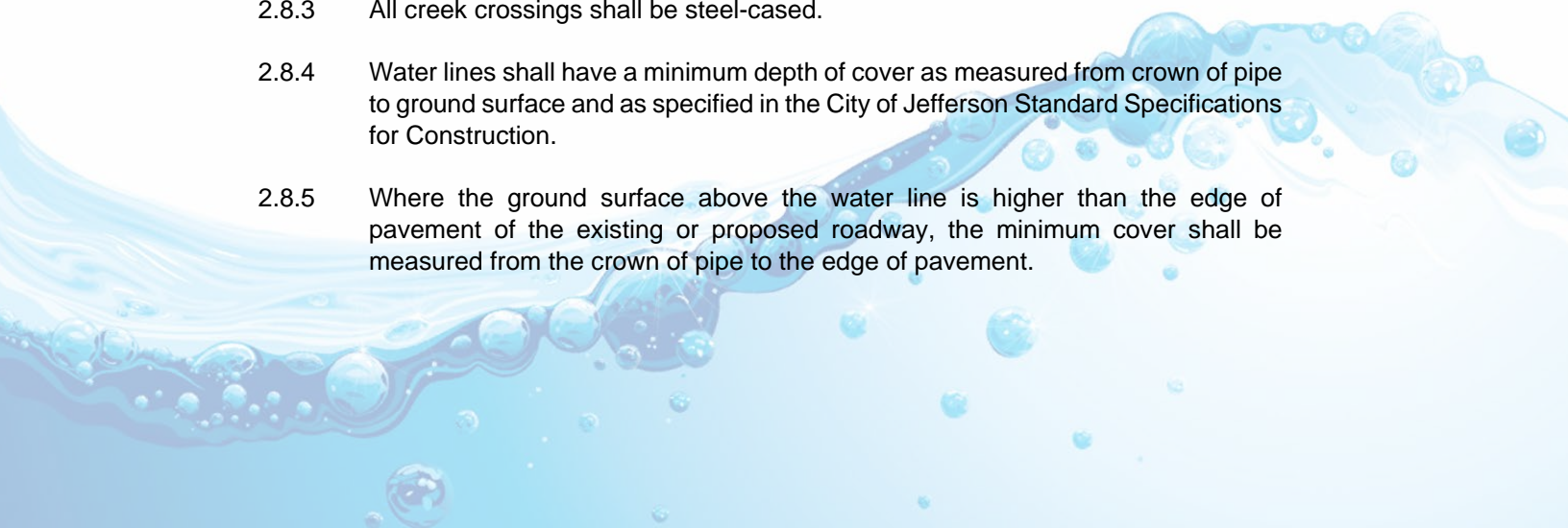
2.6 Water Main Location

- 2.6.1 Locate in right-of-way or in a permanent easement specifically designated for the water line.
- 2.6.2 The proposed water main shall be located on the south and west sides of street unless otherwise approved by City of Jefferson.
- 2.6.3 Use the Standard Detail for right of way when applicable located at: <https://www.cityofjeffersonga.com/documents> .
- 2.6.4 Maximum spacing between valves shall be 1,000 feet or as directed by City of Jefferson.
- 2.6.5 Maximum spacing between hydrants is 500 feet.

2.7 Backflow Prevention

- 2.7.1 Use Standard Detail for Backflow Preventer when applicable located at <https://www.cityofjeffersonga.com/documents>.

2.8 Depth and Material

- 2.8.1 Minimum water main size
 - A. Water Mains: 8-inch Diameter
 - B. Water Services: ¾-inch Diameter
 - 2.8.2 Acceptable Water Main Materials
 - A. Water Mains shall be Ductile Iron Pipe (DIP) pressure class 350 with cement-lining
 - 2.8.3 All creek crossings shall be steel-cased.
 - 2.8.4 Water lines shall have a minimum depth of cover as measured from crown of pipe to ground surface and as specified in the City of Jefferson Standard Specifications for Construction.
 - 2.8.5 Where the ground surface above the water line is higher than the edge of pavement of the existing or proposed roadway, the minimum cover shall be measured from the crown of pipe to the edge of pavement.
- 

2.9 Valves

2.9.1 Blow-Off Valves

- A. Blow-off valves, when required by City of Jefferson, shall be located at critical high points and low points along the water line.
- B. Fire hydrants may be provided in lieu of blow-off valves.
- C. Blow-off valves at high points shall be tapped into the top of the water line.
- D. Blow-off valves at low points shall be tapped into the bottom of the water line.
- E. Blow-off valves shall be a minimum of 2 inches in diameter and must be capable of providing a minimum flushing velocity of 2.5 feet per second in the water line.
- F. Blow-off valves shall not be directly connected to any sanitary sewerage line or storm drainage line nor shall the blow-off be subject to flooding.

2.9.2 Isolation Valves

- A. Gate valves shall be used on water lines.
- B. Locate isolation valves immediately downstream of all 3-way and 4-way connections. No crosses are allowed. Additional valves may be required at the discretion of the City of Jefferson.
- C. Maximum spacing for isolation valves shall be 1,000 feet.

2.9.3 Air Release Valves

- A. Air release valves shall be provided at all locations along the water main deemed appropriate as determined by the design engineer or as directed by City of Jefferson.
- B. Air release valve locations are subject to review by the City of Jefferson.
- C. Air release valves shall be sized in accordance with the manufacturer's recommendations.

2.10 Crossing and Parallel

- 2.10.1 Water mains shall be laid at least 10 feet horizontally from any existing or proposed sanitary sewer or sewer manhole unless otherwise approved by City of Jefferson. Distances shall be measured from outside of pipe to outside of pipe/structure.
- 2.10.2 Water lines that cross an existing or proposed sanitary sewer or storm drain line shall have a minimum clearance of 18 inches vertically, preferably above the top of the sewer line being crossed unless otherwise approved by City of Jefferson.
- 2.10.3 At crossings, one (1) full length of water line shall be located so that both pipe joints will be as far from the sanitary sewer line or storm drain line as possible. Pipes should be restrained as determined by City of Jefferson.

2.11 Jack and Bore Installations

- 2.11.1 Unless otherwise approved, water mains that cross a GDOT roadway, City of Jefferson DOT roadway, or railroad right-of-way shall be installed with cased jack and bores.

2.12 Surface Water Crossings

- 2.12.1 Surface water crossings, both over and under water shall be approved by City of Jefferson before final plans are accepted.
- 2.12.2 Above-water crossings are discouraged and only allowed upon City of Jefferson approval. At above water crossing, the pipes shall be adequately supported and anchored, protected from damage and freezing, and accessible for repairs or replacement.
- 2.12.3 Minimum cover of 2 feet shall be provided.
- 2.12.4 Valves shall be required at both ends of pipe at water crossings. The valve closest to the supply source shall be in a manhole. Valves shall be located out of the 100-year flood plain.

2.13 Irrigation Systems

2.13.1 Universal Landscape Irrigation Requirements

- A. All new landscape irrigation systems except commercial agricultural operations as defined in the Official Code of Georgia Section 1-3-3 and athletic fields, golf courses or public turf grass recreational areas must include:
1. A backflow prevention assembly in accordance with the applicable plumbing code requirements.
 2. A WaterSense controller.
 3. A rain sensor shutoff device is installed in an area that is unobstructed by trees, roof overhangs, or anything else that might block rain from triggering the rain sensor shutoff device.

2.13.2 Large Landscape Irrigation Requirements

- A. As of January 1, 2019, all new large irrigation systems, (greater than one acre or 43,560 sq. ft. and excluding single-family homes) must include:
1. All of the items in Part A of the Universal Landscape Irrigation Requirements.
 2. A master shut-off valve (such as a gate valve, ball valve, or butterfly valve) is installed as close as possible to the point of connection of the water but downstream of the backflow prevention assembly.

3. Pressure-regulating devices such as valve pressure regulators, sprinkler head pressure regulators, inline pressure regulators, or other devices shall be installed as needed to achieve the manufacturer's recommended pressure range at the emission devices for optimal performance.
 4. At least one flow sensor connected to the WaterSense controller will detect and report high flow conditions and shut master valves above.
- B. Homeowner's Associations should add together all of their owned irrigated property to determine if it is a large landscape (greater than one acre).
 - C. Irrigation systems that use water withdrawn from private wells or surface water by an owner or operator of a property do not apply if solely on their property.
 - D. The landscape irrigation system shall be designed, installed, and maintained to prevent runoff from leaving the target landscape due to low-head drainage, overspray, or other similar conditions where water flows onto adjacent property, non-irrigated areas, walks, roadways, parking lots, or structures.

2.13.3 Plan Review Process

- A. All development plans that will result in a new water service connection shall:
 1. Include clear language specifying if such development will or will not include any landscape irrigation systems.
 2. Include sufficient detail through written statements or drawings showing that all landscape irrigation system requirements will be met.
 3. Before initiating service to a new connection, all plans must comply with all landscape irrigation system requirements.

2.14 Fire Hydrants

2.14.1 Location

- A. Locate fire hydrants within the street right-of-way or in a permanent easement.
- B. Locate 2 feet inside right-of-way when possible.
- C. A fire hydrant shall be placed at the end of all cul-de-sacs and dead-end streets.
- D. Fire hydrants shall be as specified by the City of Jefferson.
- E. Bollards may be required per City of Jefferson discretion.

2.14.2 Orientation

- A. Pumper nozzles shall be oriented toward the street unless otherwise approved by the City of Jefferson.

- 2.14.3 Spacing – Unless otherwise determined by the City of Jefferson Fire Marshall.
 - A. Residential: Maximum 500 feet as measured along the edge of pavement
 - B. Commercial: Maximum 400 feet as measured along the edge of pavement
 - C. Show hose lay on utility plan view to demonstrate coverage of entire development.

2.14.4 As-built fire flow tests must be conducted at each new fire hydrant, at the expense of the developer, before City of Jefferson will sign off on the final plat. The water system must be completed before the City of Jefferson accepts the results from an as-built fire flow test. The as-built fire flow test reports on each hydrant must be submitted to City of Jefferson along with the final plat. The test report shall include the information with sample data described in the table below.

A. Sample Fire Flow Data

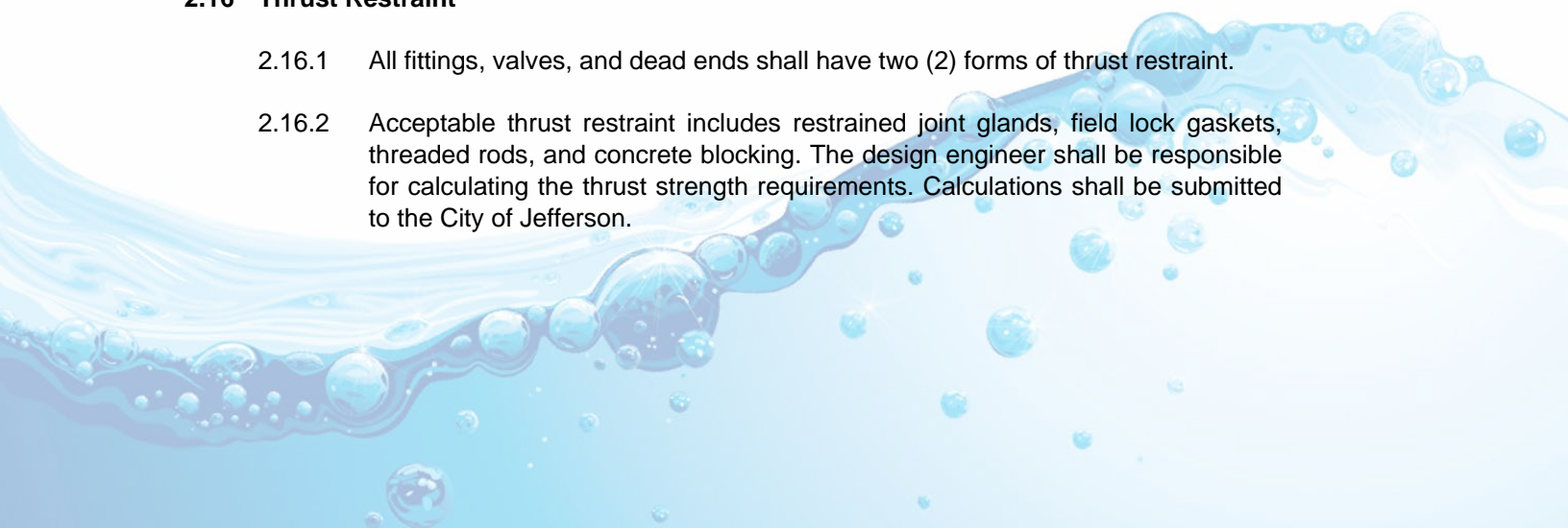
Unique Hydrant ID	FH 1	FH 2
Latitude	34.11223344	34.11223344
Longitude	-84.11223344	-84.11223344
Elevation	1192.45	1192.64
Static pressure (PSI) adjusted to 24-hour minimum	96	97
Residual Pressure or Pitot (PSI) adjusted to 24-hour minimum	65	68
Flow at 20 PSI (GPM)	2,219	2,330
Date of Test	10/22/2023	10/22/2023

2.15 Dead Ends

- 2.15.1 Dead ends shall be minimized by making appropriate tie-ins whenever practical, to provide increased reliability of service and reduce head loss.
- 2.15.2 Dead-end mains shall be equipped with a means to provide adequate flushing. Flushing devices shall be sized to provide flows that will give a velocity of 2.5 feet per second in the water main being flushed. They may be provided with a fire hydrant if flow and pressure are sufficient. No flushing device shall be directly connected to any sewer.

2.16 Thrust Restraint

- 2.16.1 All fittings, valves, and dead ends shall have two (2) forms of thrust restraint.
- 2.16.2 Acceptable thrust restraint includes restrained joint glands, field lock gaskets, threaded rods, and concrete blocking. The design engineer shall be responsible for calculating the thrust strength requirements. Calculations shall be submitted to the City of Jefferson.



2.17 Commercial Connections

- 2.17.1 Commercial service connections shall be a minimum of 1-inch diameter.
- 2.17.2 There shall be one (1) service connection per parcel.
- 2.17.3 A minimum 2-inch PVC or 2½ inch HDPE casing pipe shall be provided under the street on all long-side service connections.

2.18 Water Meters

2.18.1 Residential

- A. Residential water meters will be provided and installed by City of Jefferson (meter fees apply). Assembly and appurtenances are to be provided and installed by contractor for all new development.

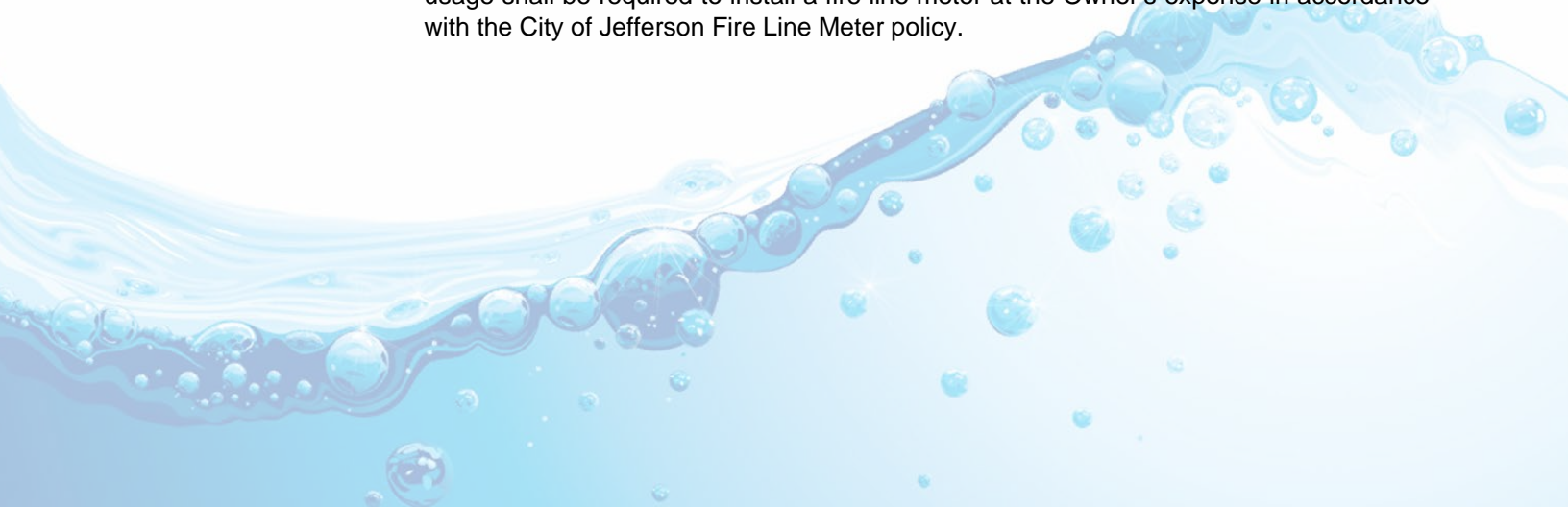
2.18.2 Commercial

- A. Commercial water meters 2 inches in size and smaller will be provided and installed by City of Jefferson (meter fees apply). Assembly and appurtenances to be provided and installed by contractor.

- 2.18.3 Water meters greater than 2-inch size shall be provided by and installed by a licensed Utility Contractor in the state of Georgia.

- 2.18.4 All multi-family buildings (apartments, townhomes, condominiums, etc.) and multi-tenant commercial buildings shall have a master meter installed near the entrance to the development.

2.18.5 Fire Flow

- A. All new fire lines shall be metered with a full-flow fire meter. A meter must also be installed when there are substantial renovations to any existing facility with an unmetered fire line. Meter size shall be determined by required fire line size (i.e. 8" fire line requires an 8" meter).
 - B. Fire flow meters shall be installed by a licensed Utility Contractor in the state of Georgia. Fire Meters shall be purchased through the City of Jefferson.
 - C. Existing fire lines that are unmetered and have more than three consecutive months of usage shall be required to install a fire line meter at the Owner's expense in accordance with the City of Jefferson Fire Line Meter policy.
- 

3 GRAVITY SEWER DESIGN STANDARDS

3.1 General

- 3.1.1 All gravity flow sanitary sewer systems that will be connected to the City of Jefferson sanitary sewage system shall be designed in accordance with these standards. Any deviation from these standards shall be approved in writing by City of Jefferson.

3.2 Flow Monitoring

3.2.1 General

- A. Maximum daily sewage flow based on accepted peaking factors, as provided in the Ten States Standards. If these peaking factors are not used, a peak factor of 4.0 will be used.
- B. Sanitary sewer systems shall be designed and installed, and/or extended, to the uppermost property line of the development being served, or as deemed necessary by the City of Jefferson.

3.2.2 Average Daily Flow Rates

- A. Flows and Loadings shall be as listed in the most recent City of Jefferson Design Wastewater Flows – ERU Schedule and can be found at <https://www.cityofjeffersonga.com/documents>

3.3 Sanitary Sewer location and Manholes

3.4 Hydraulics

- 3.4.1 Sanitary sewer systems shall be designed using Manning's equation.

$$Q = \frac{1.49}{n} (A)(r_h)^{2/3} \sqrt{S}$$

Where:

Q = Flow Rate, ft³/s

n = Manning's Coefficient

A = Pipe Cross-Sectional Area, ft²

r_h = Hydraulic Radius

S = Slope, ft/ft

- 3.4.2 The value of Manning's Coefficient, n, shall be 0.013 for all pipe materials.
- 3.4.3 Sanitary sewer systems shall be designed to carry the Peak Hourly Flow rate at 50 percent of the full depth ($d/d_{FULL} = 0.50$).
- 3.4.4 Sanitary sewers shall be designed with a minimum velocity of 2 ft/s, flowing full, based on Manning's equation and using Manning's Coefficient of 0.013.

3.4.5 The following table presents the minimum allowable slopes for sanitary sewer mains; however, slopes greater than these are desirable.

Nominal Sewer Size	Minimum Slope in Feet per 100 Feet
8-inch	0.50
10-inch	0.29
12-inch	0.22
15-inch	0.17
16-inch	0.14
18-inch	0.12
20-inch	0.11
21-inch	0.10
24-inch	0.08
27-inch	0.07
30-inch	0.06
36-inch	0.05
42-inch	0.04
48-inch	0.04

3.4.6 The maximum slope of a gravity flow sanitary sewer shall be 15 percent unless approved by the City of Jefferson.

3.4.7 Sanitary sewer mains with slopes greater than 15 percent shall be anchored with concrete anchors (dead-mans). The Developer's design professional shall be responsible for calculating the size and spacing of the concrete anchors. Calculations shall be submitted to the City of Jefferson.

3.4.8 Sanitary sewer laterals must have consistent positive flow to the main (minimum of 1% slope typical for 6-inch diameter laterals).

3.4.9 The angle formed between the inlet sewer line and outlet sewer line in a manhole shall be greater than or equal to 90° and less than or equal to 270°.

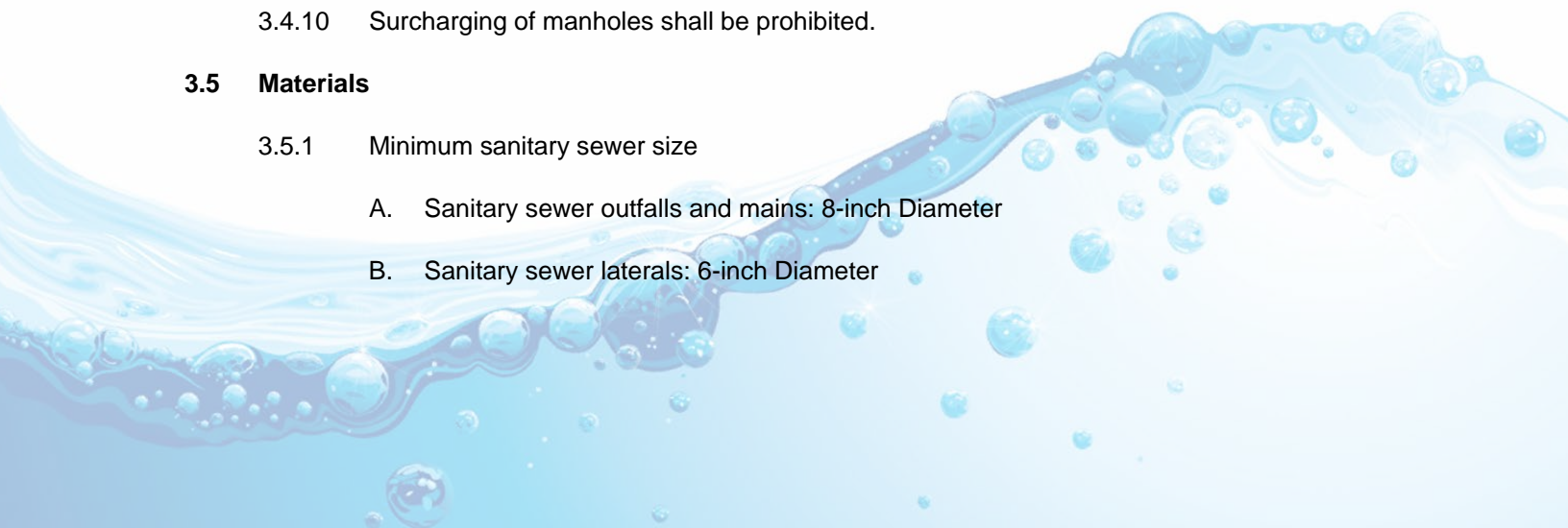
3.4.10 Surcharging of manholes shall be prohibited.

3.5 Materials

3.5.1 Minimum sanitary sewer size

A. Sanitary sewer outfalls and mains: 8-inch Diameter

B. Sanitary sewer laterals: 6-inch Diameter



3.5.2 Acceptable Sanitary Sewer Materials

- A. Gravity sewer shall be C900 PVC DR 18

3.5.3 All creek crossings shall be steel-cased.

3.5.4 All water line and storm water line crossings with less than 2 feet of clearance shall have steel casing extended 10' either side or at centerline of pipe. For crossings with more than 2-ft clearance, steel casing is required as above or certified compaction tests @ 95% compaction provided in 2-ft lifts. Tests must be performed and certified by a P.E. or soil scientist.

3.6 Sanitary Sewer Location

3.6.1 Sanitary sewer lines and specifically manhole lids, located in the right-of-way, under pavement, shall be located as close to the center of the road as possible.

3.6.2 Sanitary sewer lines located in sanitary sewer easements shall be located in the center of the easement.

3.6.3 Sanitary sewer lines running parallel to an existing or proposed water line shall be located a minimum of 10 feet horizontally from the water line unless otherwise approved by the City of Jefferson. Distances shall be measured from outside of pipe to outside of pipe.

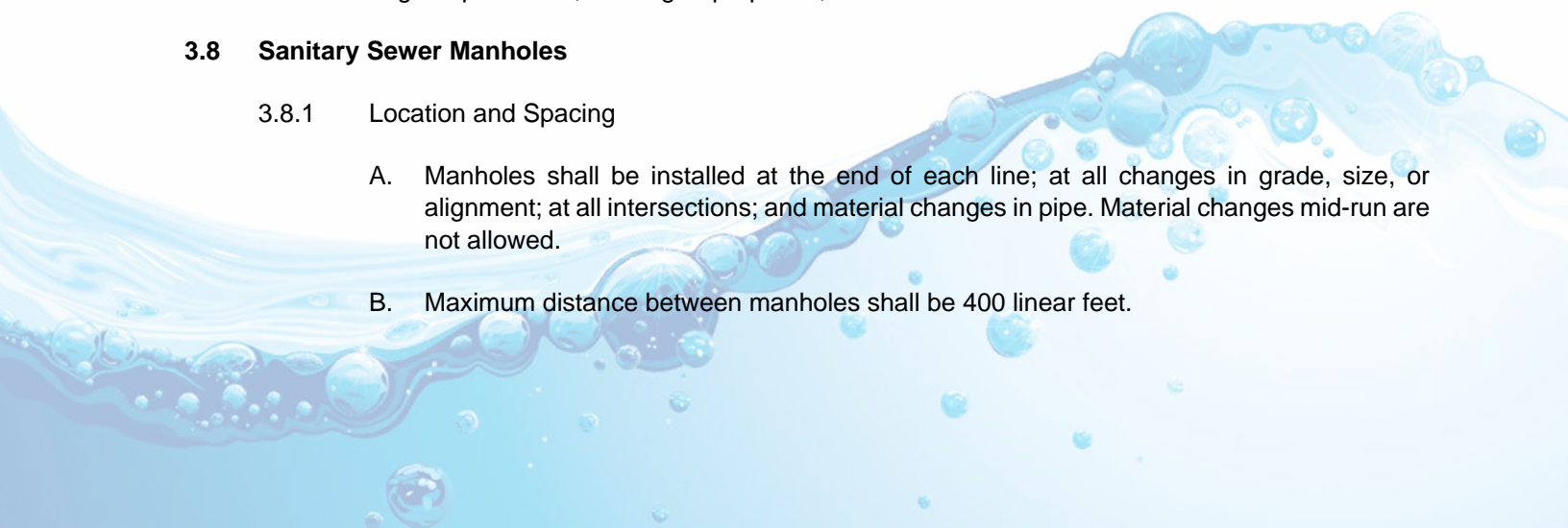
3.6.4 Sanitary sewer lines that cross an existing or proposed water line shall have a minimum clearance of 18 inches vertically above or below the water line unless otherwise approved by the City of Jefferson. At water line crossings, the sanitary sewer line shall cross in the middle of one (1) full length of water line so that both pipe joints on the water line will be as far from the sanitary sewer line as possible. In cases where the City of Jefferson allows a vertical clearance of less than 18 inches, the first two joints on each side of the crossing shall be restrained and the pipe shall be protected as required by the City of Jefferson.

3.7 Sanitary Sewer Bury Depth

3.7.1 Sanitary sewer lines shall have a minimum of 4 feet of cover as measured from crown of pipe to ground surface. Where the ground surface above the sanitary sewer line is higher than the edge of pavement of the existing or proposed roadway, the minimum cover shall be measured from the crown of pipe to the edge of pavement, existing or proposed, whichever is lower.

3.8 Sanitary Sewer Manholes

3.8.1 Location and Spacing

- A. Manholes shall be installed at the end of each line; at all changes in grade, size, or alignment; at all intersections; and material changes in pipe. Material changes mid-run are not allowed.
 - B. Maximum distance between manholes shall be 400 linear feet.
- 

3.8.2 Rim Elevation

- A. Manholes located in the street, on a sidewalk, or in a landscaped area shall have their lids installed flush with grade.
- B. Manholes located outside of streets and sidewalks in non-landscaped areas shall have their lids installed a minimum of 2 feet above grade unless otherwise approved by the City of Jefferson.

3.8.3 Manhole Lids

- A. Manhole lids shall have a minimum clear opening of 22 inches.
- B. All manholes located outside of the pavement that do not require adjustment to grade shall have the frame cast into the cone section by the manufacturer with bolt down, watertight lids.
- C. Manholes that are 2' above grade shall have rotating lids.

3.9 Sewer Laterals.

- 3.9.1 a. Tracer wire shall be installed on all sewer laterals regardless of size.

3.10 Corrosion Protection for Sanitary Sewer Systems

- 3.10.1 Manholes that have a sanitary sewage force main discharging into them and manholes that are subject to corrosion shall be coated in accordance with the City of Jefferson Standard Specifications for Construction.
- 3.10.2 Existing manholes that exhibit corrosion and leakage shall be repaired using polyurethane grouts to stop infiltration and repair mortars to repair the structure prior to coating with an elastomeric polyurethane lining system or City of Jefferson or approved equal.
- 3.10.3 The sanitary sewer lines that connect these coated manholes shall be PVC.

3.11 Sanitary Sewer Flow Meters

- 3.11.1 All developments, both residential and non-residential, that generate an average daily flow rate of 100,000 GPD or more shall provide a sanitary sewer flow meter in the last manhole before the flow leaves the development. The type of flow meter that is used shall be approved by the City of Jefferson.

3.12 Jack and Bore Installations

- 3.12.1 Unless otherwise approved, sanitary sewer lines that cross a GDOT roadway, City of Jefferson roadway, or railroad right-of-way shall be installed with cased jack and bores.

3.13 Creek Crossings

- 3.13.1 All crossings shall be perpendicular to the creek unless otherwise approved.

3.13.2 Jacked casing pipe is required for all creek crossings. The casing shall extend to a minimum of 10 feet beyond the top of the bank.

3.13.3 The minimum depth of cover above the casing pipe shall be 12 inches.

3.14 Aerial Crossings

3.14.1 Aerial crossings shall be avoided whenever possible. Any aerial crossings shall be preapproved by the City of Jefferson.

3.14.2 Any piping system that crosses a perennial or annual stream shall not cause an impedance to navigation or cause water to pool upstream of the pipe.

3.14.3 All pipe used in aerial crossings shall be cased.

3.14.4 Aerial pipe supports shall be designed by a structural engineer licensed by the Georgia State Board of Registration for Professional Engineers and Land Surveyors.

3.14.5 Aerial pipe supports shall be situated on suitable soils. The soils on which an aerial support will be placed shall be tested by a soil testing company for bearing capacity and suitability for construction. A soil report shall be submitted with the construction plans and specifications.

3.14.6 The bottom of the casing shall be no lower than the 50-year Flood Elevation.

4 Sanitary Sewer Force Mains

4.1 General

4.1.1 All sanitary sewer force mains that will be connected to the City of Jefferson sanitary sewer system shall be designed in accordance with these standards. Any deviation from these standards shall be approved in writing by City of Jefferson.

4.2 Hydraulics


4.2.1 Sanitary sewage force mains shall be designed to have a minimum velocity of 2.5 ft/s and a maximum velocity of 6 ft/s.

4.3 Force Main Size and Material

4.3.1 Minimum Sanitary Sewer Force Main Size: 4-inch Diameter, unless otherwise approved by the City of Jefferson.

4.3.2 Acceptable Sanitary Sewer Force Main Materials:

A. Force mains shall be HDPE DIPS DR 11



4.4 Force Main Location

- 4.4.1 Sanitary sewer force mains located in the right-of-way shall be located 5 feet inside the right-of-way and on the opposite side of the road as the water line whenever possible.
- 4.4.2 Sanitary sewage force mains located in sanitary sewer easements shall be located in the center of the easement.
- 4.4.3 Sanitary sewage force mains shall be located a minimum of 10 feet horizontally from any existing or proposed water main and 18 inches vertically below any existing or proposed water main. Distances shall be measured outside of pipe to outside of pipe.
- 4.4.4 Sanitary sewage force mains running parallel to an existing or proposed water line shall be located a minimum of 10 feet horizontally from the water line unless otherwise approved by City of Jefferson. Distances shall be measured outside of pipe to outside of pipe.
- 4.4.5 Sanitary sewage force mains that cross an existing or proposed water line shall have a minimum clearance of 18 inches vertically above or below the water line unless otherwise approved by City of Jefferson. At water line crossings, the sanitary sewage force main shall cross in the middle of one (1) full length of water line so that both pipe joints on the water line will be as far from the sanitary sewage force main as possible. In cases where City of Jefferson allows a vertical clearance of less than 18 inches, the first two joints on each side of the crossing shall be restrained and the pipe shall be protected as required by City of Jefferson.
- 4.4.6 Tracer wire shall be installed on all sanitary sewage force mains.

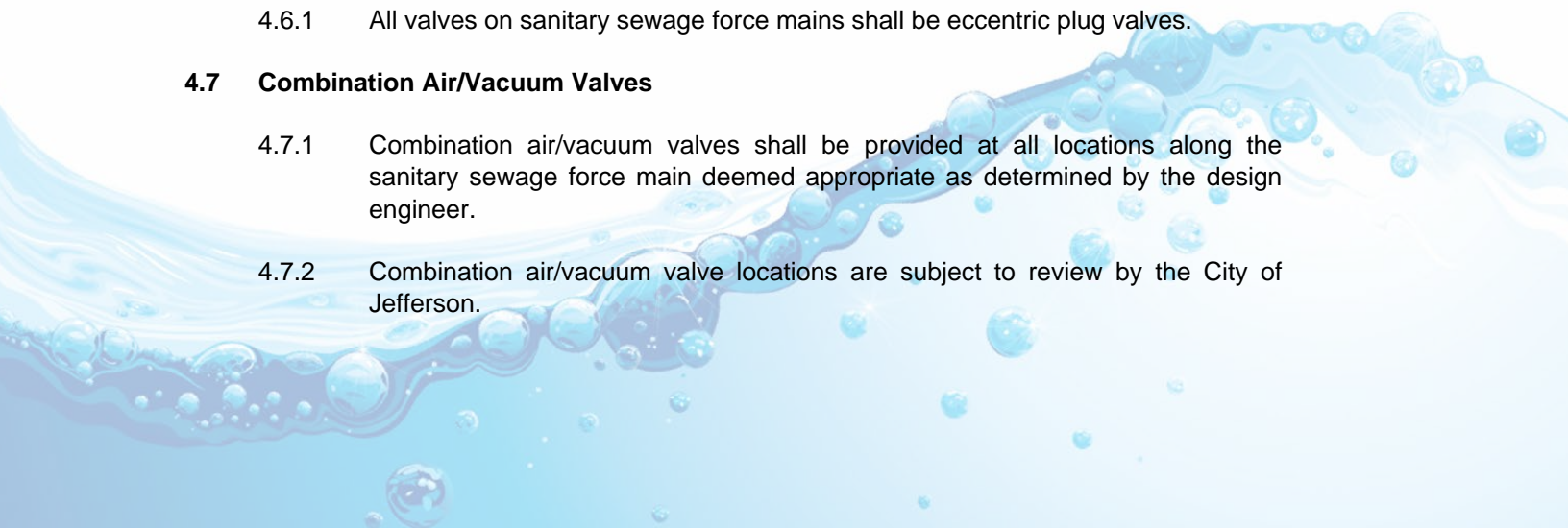
4.5 Force Main Bury Depth

- 4.5.1 Sanitary sewage force mains shall have a minimum cover as specified in the City of Jefferson Standard Specifications for Construction and as measured from crown of pipe to ground surface. Where the ground surface above the sanitary sewage force main is higher than the edge of pavement of the existing or proposed roadway, the minimum cover shall be measured from the crown of pipe to the edge of pavement.

4.6 Isolation Valves

- 4.6.1 All valves on sanitary sewage force mains shall be eccentric plug valves.

4.7 Combination Air/Vacuum Valves

- 4.7.1 Combination air/vacuum valves shall be provided at all locations along the sanitary sewage force main deemed appropriate as determined by the design engineer.
 - 4.7.2 Combination air/vacuum valve locations are subject to review by the City of Jefferson.
- 

- 4.7.3 Combination air/vacuum valves shall be sized in accordance with the manufacturer's recommendations.

4.8 Jack and Bore Installations

- 4.8.1 Unless otherwise approved, sanitary sewage force mains that cross a GDOT roadway, City of Jefferson DOT roadway, or railroad right-of-way shall be installed with cased jack and bores.

4.9 Creek Crossings

- 4.9.1 All pipe used in creek crossings shall be cased. Casing shall run from a 25' to 25' buffer.
- 4.9.2 All crossings shall be perpendicular to the creek unless otherwise approved.
- 4.9.3 City of Jefferson required casing at all state waters and creek crossings. The casing shall extend to the 25-ft State buffer line as measure from wrested vegetation.
- 4.9.4 The minimum depth of cover above the casing pipe shall be 12 inches.

5 SANITARY SEWER LIFT STATIONS

5.1 General

- 5.1.1 This section shall be used as a guideline for the design of sanitary sewage lift stations capable of pumping up to 700 GPM. Pump stations greater than 700 GPM may require additional guidance from the City of Jefferson Public Utilities and will require GA EPD approval.
- 5.1.2 Lift stations are to be avoided whenever possible. The preferred conveyance method for sewage is gravity. Pump stations will not be permitted unless the Developer can demonstrate that the development cannot be served solely by gravity sewer.
- 5.1.3 Lift stations will only be allowed when pre-approved by the City of Jefferson.
- 5.1.4 When sanitary sewage lift stations are allowed/required, the City of Jefferson reserves the right to design and construct the necessary lift station(s), with appropriate charges being made to the Developer/Owner.
- 5.1.5 Where feasible, the lift station shall serve the overall drainage basin, rather than just sizing it to serve the development proposed.
- 5.1.6 The station shall be located at the nearest downstream confluence.
- 5.1.7 If another station can be abandoned, developer shall remove lift station and install gravity to new lift station.

- 5.1.8 A new Lift Station will not be allowed to be located upstream of an existing lift station.
- 5.1.9 Pumps, motors, and associated lift station appurtenances shall be furnished in accordance with the City of Jefferson Public Utilities Standard Specifications.
- 5.1.10 Sanitary sewage lift station shall include a standby power system or standby back-up pump and remote monitoring system in accordance with the City of Jefferson Public Utilities Standard Specifications.
- 5.1.11 In addition to complete construction plans and specifications, the following information shall be submitted to City of Jefferson as part of the sanitary sewage lift station design package.
- A. Average and peak hour design flow rate calculations
 - B. Total head calculations
 - C. System head curve plotted on the manufacturer's pump curve.
 - D. Brake Horsepower (BHP) calculations
 - E. 100-year flood elevation at the proposed sanitary sewage lift station site
 - F. Minimum wet well volume calculations/pump cycle time calculations
 - G. Pump cycle time calculations
 - H. Force main surge calculations
 - I. Wet well buoyancy calculations

5.2 Hydraulics

- 5.2.1 Total head shall be calculated using the following equation.

$$TH = h_s + h_f + h_m + h_p + \frac{v^2}{2g}$$

Where:

h_s = Static Head, ft

h_f = Head Loss due to Friction, ft

h_m = Minor Head Losses, ft

h_p = Pressure Head, ft

$\frac{v^2}{2g}$ = Velocity Head, ft

V = Velocity of the fluid in the piping system, ft/s

g = Acceleration due to Gravity, 32.2 ft/s²

Friction losses shall be calculated using the Hazen-Williams equation.

$$h_f = 10.44 \times \frac{Q^{1.85} \times L}{C^{1.85} \times d^{4.8655}}$$

Where:

h_f = Head Loss due to Friction, ft

Q = Flow Rate, GPM

L = Length of Pipe, ft

C = Hazen-Williams Coefficient

d = Inside Diameter of Force Main, inches

Minor head losses shall be calculated as a fraction of the velocity head.

$$h_m = K \times \frac{v^2}{2g}$$

Where:

h_m = Minor Head Loss, ft

K = Minor Loss Coefficient. The minor loss coefficient is the sum of the head loss coefficients for all of the minor loss elements in the piping system. Use standard published values for "K."

V = Velocity of the fluid in the piping system, ft/s

g = Acceleration due to Gravity, 32.2 ft/s²

Force main surge shall be calculated using the following equation.

$$\Delta H = a\Delta V / g$$

$$\Delta P = (\Delta H + TH) / 2.31$$

Where:

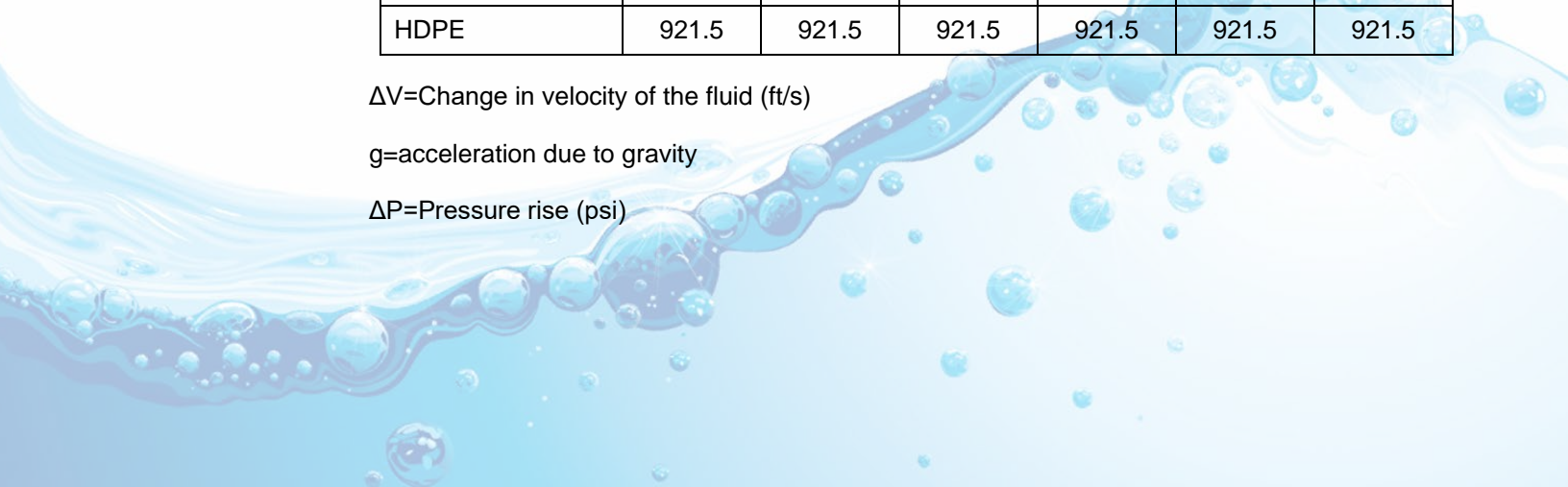
a=Pressure wave velocity (ft/s)

Pipe Material"	4"	6"	8"	10"	12"	16"
HDPE	921.5	921.5	921.5	921.5	921.5	921.5

ΔV =Change in velocity of the fluid (ft/s)

g=acceleration due to gravity

ΔP =Pressure rise (psi)



5.3 Location of Sanitary Sewer Lift Stations

- 5.3.1 The location of all sanitary sewage lift stations shall be coordinated with and approved by City of Jefferson prior to beginning design.
- 5.3.2 Sanitary sewage lift stations shall be accessible during a 100-year storm event.
- 5.3.3 All mechanical components of the sanitary sewage lift station shall be located above the 100-year flood elevation.
- 5.3.4 All electrical components shall be located a minimum of 3 feet above the 100-year flood elevation.

5.4 Sanitary Sewer Lift Station Property and Access

- 5.4.1 Sanitary sewage lift stations shall be located on a minimum 100-foot by 100-foot piece of property. This property shall be platted and deeded to the City of Jefferson at no cost. The City of Jefferson may require a larger piece of property depending on site conditions.
- 5.4.2 Any roads required to access the sanitary sewage lift station from the public street right-of-way shall be included as part of the platted and deeded property or dedicated as an access easement. The minimum width of the access property or easement shall be 30 feet.

5.5 Lift Station Components

5.5.1 General

- A. Pumps shall be Xylem (Flygt) or pre-approved equal.

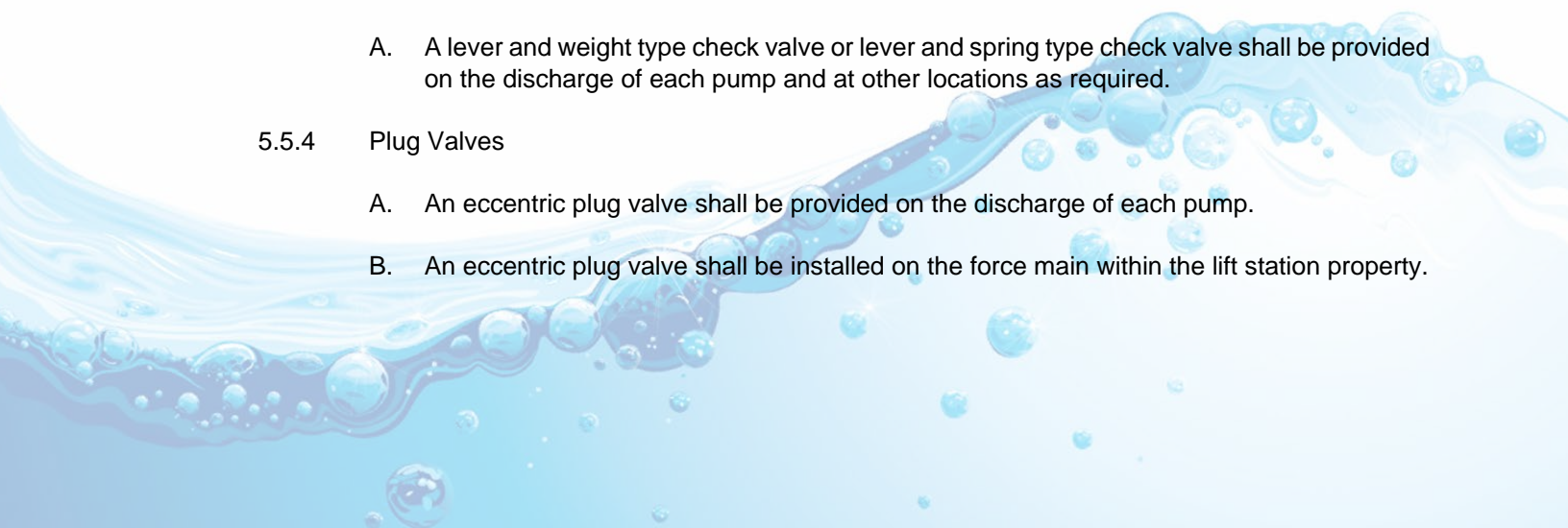
5.5.2 Piping

- A. Piping inside the station fence shall be appropriately sized ductile iron pipe. Minimum diameter shall be 4 inches. All fasteners shall be stainless steel.
- B. A bypass connection shall be provided on the discharge header of the pump station. The size of the discharge connection shall be equal in size to the discharge connection of the pump, but no less than 4 inches.

5.5.3 Check Valves

- A. A lever and weight type check valve or lever and spring type check valve shall be provided on the discharge of each pump and at other locations as required.

5.5.4 Plug Valves

- A. An eccentric plug valve shall be provided on the discharge of each pump.
 - B. An eccentric plug valve shall be installed on the force main within the lift station property.
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5.5.5 Surge Valve

- A. If the pressure rise calculated in section 5.2 is greater than 250 psi, a surge relief valve shall be provided.
- B. Surge Relief Angle Valves shall be normally closed against the system pressure by external spring(s) in compression and shall open quickly to relieve pressure when the system pressure exceeds the pressure relief setting. The pressure relief setting shall be factory set and field adjustable by adjusting the spring compression. The valve will begin to close when the system pressure subsides below the pressure relief setting. The closing speed shall be adjustable to suit the application utilizing infinitely adjustable, lockable flow control valve.
- C. All valves shall be APCO model SRA-3000A Surge Relief Angle Valves as manufactured by DeZURIK or approved equal.

5.5.6 Pressure Gauge

- A. A pressure gauge shall be installed on the discharge header of the sanitary sewage lift station.
- B. Pressure gauges shall be liquid-filled and shall be provided with a diaphragm seal and isolation ball valve.
- C. Pressure gauge shall face up to be read while standing above the valve vault.

5.5.7 Electrical Requirements

- A. All wiring shall be in accordance with NEC standards.
- B. All electrical components shall be mounted in NEMA 4X enclosure(s).
- C. Power shall be 480 V, 3-phase, 60 HZ unless otherwise approved by the City of Jefferson Public Utilities.

5.5.8 Controls

- A. Pump Controls
 - 1. Pump controls shall be designed and provided by the pump manufacturer.
 - 2. Control panels located in non-hazardous locations shall be NEMA 4X, Type 304 stainless steel. Control panels located in hazardous locations shall be NEMA 7, Type 304 stainless steel.
 - 3. Controls shall be provided which will allow the pumps to be operated either manually or automatically.
- B. Level Control
 - 1. A submersible pressure transducer shall be used to measure the water level in the wet well and turn the pumps on and off.

2. Float Switch - A low-level float switch and high-level float switch shall be provided as an emergency backup to the submersible level transducer. A cable weight shall be provided with each float switch.

C. Level Controller

1. MultiSmart controller: 84-8000084 MSU3MP with PumpView communication package,

D. Provide Xylem PumpView CloudGate modem+ Verizon/ATT R/B 14-500145

E. Pumps shall be interlocked to prevent the simultaneous start of two pumps.

F. Provide the following 10amp. 120vac dry contacts for connection to SCADA system:

1. Pump No.1 running
2. Pump No.1 fault
3. Pump No.2 running
4. Pump No.2 fault
5. Control power on
6. Phase monitor alarm
7. High-high level
8. Low-low level
9. Continuous level (4-20ma)
10. Ats normal and emergency position
11. Generator fail and running

5.5.9 Wet Well

- A. Circular wet wells shall have a minimum inside diameter of 72 inches.
- B. Rectangular wet wells shall be minimum of 72 inches by 72 inches square.
- C. The volume between the "Lead Pump On" elevation and the "Pump Off" elevation shall be calculated using the following equation.

$$V_{\min} = Q \times t \times 4$$

Where:

V_{\min} = Minimum Wet Well Volume, gallons

Q = Flow Rate of Largest Pump, GPM

t = Pump Cycle Time, minutes

- D. The minimum pump cycle time, t, shall be 10 minutes (6 starts per hour). A longer pump cycle time, t, shall be used if required by the pump manufacturer.
- E. The gravity sewer line that is connected to the sanitary sewage lift station shall not be included in the minimum wet well volume.
- F. The distance from the bottom of the wet well to the "Pump Off" level shall be per the pump manufacturer's recommendation.
- G. The distance between the "Lead Pump On" elevation and the "Lag Pump On" elevation shall be a minimum of 6 inches.
- H. The distance between the "Lag Pump On" elevation and the "High-Level Alarm" shall be a minimum of 6 inches.
- I. The distance between the "High-Level Alarm" and the invert of the gravity sewer line entering the wet well shall be a minimum of 6 inches.
- J. Wet well walls and piping shall be coated with a corrosion-resistant coating system (SprayRoq, Epoxytec CPP or CITY OF JEFFERSON approved equal).
- K. Wet well buoyancy calculations shall be prepared by the design engineer and submitted to City of Jefferson.
- L. Wet well volume shall be sized to hold a minimum of 3 hours of storage for peak demand flows in the event of power loss.

5.5.10 Fence and Gate

- A. A 6-foot-tall chain link fence shall be installed around the lift station.
- B. Fence shall have three (3) strands of barbed wire.
- C. A 16-foot double gate (two 8-foot wide gate panels) shall be provided.
- D. Fence shall be black vinyl coated.
- E. Privacy fencing may be allowed for decorative reasons in addition to, but not in lieu of, Items A – D above.

5.5.11 Security Light

- A. A security light and light pole shall be provided by the local electrical service provider.

5.5.12 Potable Water Service Line

- A. A potable water service line shall be provided to the lift station property that terminates at a frost-proof yard hydrant.

- B. A reduced pressure zone (RPZ) backflow preventer shall be provided on the potable water line. RPZ backflow preventer shall be protected from freezing.

5.5.13 Landscape

- A. Property outside of the fenced area shall be landscaped.
- B. A landscape plan shall be provided and appropriately designed to screen lift stations in all-weather seasons.

5.5.14 Supervisory Control and Data Acquisition (SCADA) System

- A. Supervisory Control and Data Acquisition (SCADA) shall be required to operate as an autonomous system, monitoring sensors, displaying data, operating controls, activating alarms, and logging information to facilitate and optimize the plant processes and ongoing operations.
- B. SCADA shall be capable of polling, transmitting and receiving data, at high rates of speed, using secure protocols and error avoidance methods.
- C. SCADA shall be capable of remote interrogation and re-configuration, while providing access for remote viewing and control of screens, logs, and files.
- D. The Remote Telemetry Unit (RTU) shall be the controller responsible for acquiring and executing the data.

