TABLE OF CONTENTS

Section 6: Service Lines for Sewer

Section 7: Sewer Permit Process

Section 8: Testing for Acceptance of Utilities

Section 9: Backflow Prevention Plan and Ordinance

Standard Drawings and Details

Section 1: Policies and Procedures

1.1 Applicability or Jurisdiction

All sanitary sewer or water facilities(hereinafter called City Utilities) that connect to the City Sanitary Sewer or Water Systems shall be designed in accordance with all criteria established herein. All materials, construction, and testing of such facilities shall be according to all Sections of this document, regardless of whether such facilities will be dedicated to the City, and shall be subject to inspection by the City as deemed necessary to insure compliance with the requirements contained herein.

Commercial and residential property Owners may propose to construct a pumping station and force main sewer to transport the wastewater from residential or commercial developments to the Pell City Sanitary Sewer System. Because of the continuous costs of maintenance, operation, and utilities, installation of a pump station will be considered as a last alternative to provide sewer service only after all options for gravity sewers have been investigated. If the development requires an expansion of the water and/or sewer system for appurtenances such as pump stations, tanks, treatment facilities, and additional water sources, or if these items are required internal to the proposed development, the City will use its engineer to design and choose the construction method to perform improvement pursuant to these regulations.

These standards represent the approved construction practices and procedures for construction of City Utilities. Any special designs not covered by this document must be submitted to and approved by the City before construction is allowed. The provisions of these Standards are not intended to prevent the use of any method of construction not specifically prescribed by the Standard, provided any such alternative has been approved and its use authorized by the City's Superintendent . The City's Superintendent shall approve any such alternate, provided he finds that the alternate for the purpose intended is at least the equivalent of that prescribed in this Standard in quality, strength, effectiveness, durability, and safety. The City's Superintendent shall require that sufficient evidence or proof be submitted to substantiate any claim that may be made regarding the alternate.

These Standards are subject to change, and interested parties are advised to verify with the City that they are using the latest version of the published document. Updates to these Standards are available at the City Hall.

1.2 Definitions

Wherever the words, forms, or phrases defined or pronouns used in their place occur in this Standard, or any document or instrument herein contemplated or to which these Standards apply, the intent and meaning shall be construed and interpreted as follows. Words not defined below shall have the meaning in Webster's Ninth Collegiate Dictionary, as revised.

ABBREVIATIONS: The following organizations are referred to in these Standards by abbreviations of their titles:

A. ANSI American National Standards Institute

B. ALDOT State of Alabama Department of Transportation

C. ASTM American Society for Testing and Materials

D. ADEM Alabama Department of Environmental Management

E. AWWA American Water Works Association

F. EPA U.S. Environmental Protection Agency

G. NEMA National Electrical Manufacturer's Association

H. OSHA Occupational Safety and Health Administration

I. USGS United States Geologic Survey

AS-CONSTRUCTED DRAWINGS (sometimes termed AS-BUILT DRAWINGS): Construction Drawings that have been revised, based on field surveys of the installed utility and other data, to show significant changes made during construction and to indicate the constructed location of each service connection.

BACKFILL: Soil, rock or other material used to replace, or the act of replacing, soil or rock material removed during excavation and construction.

CONTRACTOR: The person, firm or corporation with whom the Owner has entered into a written agreement, with attached approved project documents, covering the work to be performed.

CITY: The City of Pell City, Alabama and its authorized agents.

CITY CONSTRUCTION INSPECTOR: An authorized representative of Pell City, Alabama assigned to observe the construction of all new utilities, repairs to existing utility lines, connections, and disconnections, and advise the City of the conformance with these Standard Specifications.

DESIGN ENGINEER (ENGINEER): The engineer of record who performs detail design of the utility facility and prepares Construction Drawings and Specifications to be submitted to the City for approval.

DRAWINGS (or PLANS): The official construction drawings or exact reproduction thereof which show and describe the work to be done.

FILL: A soil or broken rock material or embankment used to provide the bulk required to raise the elevation of an area.

FORCE MAIN: A pressurized sewer line intended to carry wastewater from a sewer pumping facility to the point where it can flow by gravity.

INFILTRATION/ INFLOW (I/I): Infiltration shall mean the water entering a sewer system and service connections from the ground, through such means as, but not limited to broken or cracked pipe, defective pipe joints, improper connections, manhole walls etc. Inflow shall mean the water discharged into a sewer system including service connections, from such sources as, but not limited to: roof leaders, cellars, yard and area drains, foundation drains, cooling water discharges, drains from springs and swampy areas, cross connections from storm sewers, surface runoff, etc. The term Infiltration/Inflow (I/I) shall mean the total quantity of water from both infiltration and inflow without distinguishing the source.

MAIN: For sewer, a pipe or conduit eight (8) inches or larger intended to carry wastewater. In water, a pipe or conduit six (6) inches or larger intended to carry potable water. The pipe is located in a public easement or right-of way. In other documents and publications the smaller (8 or 10 inch) main sewers may be referred to as "lateral" sewers, "collector"sewers, and "public" sewers. However the basic criteria is the same; any sewer that is 8" in diameter or larger is a main sewer.

OR EQUAL: Wherever a particular process, material, device, detail, or part is specified herein, followed by these words or by similar or equivalent expressions, such words or expressions shall be understood to mean and permit the use of another process, material, device, detail, or part that the City shall determine is fully equal in suitability, quality, durability, performance, and in all other respects, to the process, material, device, detail, or part herein specified for such use, and is approved for such use in the work. The decision of whether a particular process, material, device, detail or part is considered equal or not is the sole discretion of the City.

OWNER: The term "Owner" shall mean the company, organization, developer, or governmental agency who intends to design and construct the proposed sanitary sewer facilities or improvements. The terms "Developer, Owner/Developer" equal "Owner" and shall be used interchangeably.

PLUMBING INSPECTOR: An authorized representative of the City assigned to observe the installation of the internal plumbing of a building.

SANITARY SEWER: A sewer intended to carry wastewater and to which infiltration/inflow are not intentionally admitted.

SANITARY SEWER SYSTEM: All gravity sewer lines, manholes, force mains, pump stations, and appurtenances that convey wastewater to the wastewater treatment plants.

SERVICE LINE: Any sanitary sewer or water line or conduit located outside the building structure that connects the building's plumbing to the main sewer or water systems. Sanitary sewer service line is usually 4 inches and sometimes 6 inches in diameter, but no larger. In reference to water it is typically a 3/4" line or larger.

SHALL: "Shall" is mandatory; "may" is permissive

SPECIFICATIONS: A part of the documents containing the written directions, provisions,

and requirements for completing the work. Standards for specifying materials or testing which are cited in this document by reference shall have the same force and effect as if set out in full in these standards.

STATE: The State of Alabama.

STATION: A specific point on the centerline of a utility as shown on the drawings or on the survey baseline designating some specific distance from the point of origin. Stations are numbered in terms of one hundred linear feet measured horizontally.

STORM SEWER (sometime termed "STORM DRAIN"): A pipeline intended to carry rainfall surface runoff and/or subsurface waters. There is a distinct difference between storm sewers and sanitary sewers. Storm sewers exclude flow from domestic wastewater and industrial waste.

STORM WATER: Rain water or any sort of runoff that does not come from sanitary sewers.

STUB OUT: A portion of the service line extended from the main water or sewer and then capped or dedicated for later use.

STRUCTURES: Facilities such as bridges, culverts, catch basins, inlets, retaining walls, cribbing, water lines, underdrains, electrical ducts, manholes, lighting fixtures and poles, transformers, flexible and rigid pavements, buildings, vaults, and other manmade features that may be encountered in the work and not otherwise classified herein.
SUPERINTENDENT: The Mayor of Pell City or his authorized agent.

TAP: The actual connection or opening in the main sewer to allow the wastewater from the service line to enter the main sewer.

WASTEWATER: Any liquids containing waste matter, originating from residences, commercial buildings, institutions, and industrial establishments together with any extraneous water that may be present, whether treated or untreated, which is discharged into or permitted to enter the City maintained infrastructures.

WATER SYSTEM: All water lines, tanks, booster pump stations, wells, meter and appurtenances that distributes water to the customers.

1.3 Standard Reference Specifications

The following is a list of publications referenced in these Specifications:

A. State of Alabama Department of Transportation Publications
   1. Alabama Manual on Uniform Traffic Control Devices for Streets, and Highways
   2. Standard Specifications for Highway Construction
   3. Utility Manual

B. Occupational Safety and Health Administration Publications
   1. Safety

C. American Railway Engineering Assoc.
   1. Part 5 Specifications for Pipeline

Any reference in the ANSI/AWWA or ASTM standards or specifications to "Owner" or "purchaser" is to be interpreted as "The City."

1.4 Construction Drawings Review and Approval Process

The City maintains the City Utility Systems and must regulate any proposed additions or changes to the system. Prior approval of any projects affecting the utility system is required. Construction Drawings are required to be prepared for all utility system facilities to be built and connected to the City Utility Systems. In the event a project is to be built that crosses existing City utilities or encroaches in City easements, drawings must be submitted to the City's Utilities Department for approval.

The Owner or the Owner's Design Engineer shall submit Construction Drawings and the complete development (subdivision apartment complex, office complex, etc.) drawings to the following City representatives; City Engineer, Water and Sewer Superintendents, and Fire Chief. A total of two sets will be sent to the City Engineer. The City will review the Drawings submitted and if necessary, will return one (1) set of markup drawings to the Design Engineer for revision and resubmittal. The Design Engineer will provide three (3) corrected sets of original drawings to the City. All plans will bear the seal of a Professional Engineer registered with the State of Alabama.

All water and sewer mains not located in right-of-ways must be located in easements dedicated to the City in accordance with easement requirements herein. Easement deeds will be required for all easements in commercial developments and residential developments that are not dedicated by Record Maps. Easements transferred by Record Map shall be dedicated Easements for the City's general use. Minimum easement width is twenty (20) feet, ten (10) feet each side of the utility centerline. For easements with more than one utility, a minimum 30' width is required. Easement width shall be sufficient to permit excavation of the pipe to meet the minimum OSHA requirements. Ductile iron sewer pipe may be required in areas of difficult accessibility for maintenance. It is the Owner's responsibility to attain all easements. The Owner's Design Engineer will submit one (1) copy of all required deeds for review prior to execution. The Owner or Design Engineer will submit the original executed deeds and right-of-way accommodation permits to the City. Deeds will be reviewed by the City and if acceptable, recorded in Probate Court. The City will not accept deeds recorded by others.

The approval of the Utility Construction Drawings, indicates review of Construction Drawings for conformance with the "Standards for Construction of Commercial and Residential Water and Sanitary Sewer Systems." In no way, does the approval make the City or its agents responsible for technical aspects of the design accuracy of the plans and specifications.

The approval of Construction Drawings is valid for a period of 180 calendar days. If construction has not begun at the end of 180 calendar days the Drawings must be resubmitted for approval prior to starting construction. Drawings over 180 days representing projects for which construction has not yet begun are void unless indicated by an updated approval.

1.5 Inspection

The City will make inspections on the proposed projects while they are under construction. The City will not accept the project nor ownership until a successful field final inspection, including required testing, has been performed. All work shall be complete and in accordance with these Specifications. All easements must be deeded correctly and a final set of "As Constructed Drawings" submitted. The Owner will be responsible for a maintenance period of not less than one (1) year after the final acceptance has been issued. The Owner and Design Engineer will be responsible for the accuracy of the design after the system is operational and shall warrant it satisfactory operation. The Owner's Engineer shall be responsible for inspecting the approved public improvements, and shall certify to the City that all such improvements were installed according to the approved plans and rules and regulations of the City.

Upon completion of construction, the Design Engineer shall have the project surveyed by an Alabama Licensed Surveyor to locate the constructed facilities on the As- Constructed Drawing(s). With information from the survey and from construction records, the Design Engineer or Surveyor will make revisions to the approved Construction Drawings, in accordance with the document, to accurately show the actual facilities that were installed. The Owner and Engineer will supply the City a certification letter on the installation of facilities in accordance with subdivision rules and regulations.

The Contractor shall be responsible for contacting the Water and/or Sewer Superintendent prior to beginning work. The City Construction Inspector or his agent may inspect any portion of the construction work for its conformance to these Rules and Regulations. Any testing required in the Specifications shall be witnessed by the City Construction Inspector or his agent as required.

When an inspection report indicates the work does not meet requirements of these standards, the City will advise the Owner/Developer that the work is being completed at risk of not being accepted. The City reserves the right to withhold future permits if the work is not brought up to standards.

1.6 Miscellaneous

Any proposed sanitary sewer or water facilities not specifically covered herein shall be submitted to the City for its review. Before commencing with the preparation of construction drawings, the City should be consulted, regarding specific design requirements for any non-routine facilities including pressure regulator, any manholes deeper than twenty feet, all tunnels, all bores, creek crossings, all sewer siphons, and any other unique sanitary sewer or water facility.

For any City utility proposed to be installed within State highway right of way, the Alabama Department of Transportation (ALDOT) requires a Right of Way Accommodation Permit. The Design Engineer or Owner/Developer shall prepare, for the City to execute, all required Right of Way Accommodation Permits. Currently the State requires the City rather than any private party or Owner/Developer to submit the application for permit agreements. Accordingly, by submittal of the permit the project Owner/Developer agrees to accept responsibility imposed by the State. The Owner/Developer is responsible for performing all duties imposed on the City by the State. The City's involvement in the process is strictly limited to the submittal of the application. The Design Engineer and/or Owner/Developer is responsible for accuracy of all information conveyed on the permit application. Further, the City is not responsible for the State revoking an Accommodation Agreement after it has been issued.

In the event a proposed City utility is to be located within or crossing an existing railroad right-of-way or utility right-of-way, the Design Engineer or Owner/Developer must contact said

railroad or utility. The Owner/Developer may be required to file for a permit as well as entering into an agreement with the railroad or utility that details all duties that are imposed on the Owner/Developer by said railroad or utility. All documents between Owner/Developer and railroad or utility are to be included with the construction drawings at the time they are submitted for City review and approval. An Owner/Developer should be advised that approval of construction drawings can be delayed and/or denied if any language in the documents between the Owner/ Developer and the railroad or utility is found to restrict the City's ability to properly maintain and operate said proposed facilities, or if the language contains any indemnification or hold harmless clauses the City will be prohibited from entering into. Any costs such as crossing fees imposed by the railroads or utility are to be paid by the Owner/Developer.

Section 2: Requested Extension of Existing System

2.1 General

The City will allow extensions of the water and sewer system from the existing system where adequate pressure and quantity of water and capacity of sewer are available to and within the property boundaries where services is requested provided service is for areas within the City limits and full payment of the cost for the extensions as may be required to render service. Mains can be extended along existing dedicated public roadways where finished grades have been established, or along roadways proposed for dedication to the use of the general public where grades have been established and constructed. Mains may be extended at the discretion of the City along private roadways or easements where grades have been established and constructed subject to the prior execution of a specific easement document giving the City specific rights of access for construction, operation, maintenance, etc. However, no main shall be extended along private roadways or to serve property which directly abuts a public roadway or to serve a single residence or premises. Extensions of mains may be made pursuant to one of the following applicable agreements:

1. Development agreement.
2. Existing residential agreement.
3. Existing commercial agreement.

Contracts for expansions must be made on forms prescribed by the City. The City shall determine the size and type of facility installed and the point of connection to existing mains for the expansion. Expansions and extensions made under this regulation though paid by the applicant will remain the property and under control of the City upon the City's acceptance of facilities. The City may further extend its distribution system beyond the terminus of any expansion made under this regulation.

Contractors hired to do any water and sewer improvements which shall be connected to the City systems must be approved by the City before work begins. When required, the contractor shall present to the City satisfactory evidence that:

1. He has equipment, in good working order, adequate for performance of work.
2. He has within his organization, at the time, the construction management and supervisory personnel available for assignment to the project.
3. The construction management and supervisory personnel are skilled and experienced in the particular type of work to be undertaken on the project.
4. He has performed and completed similar work of similar magnitude in a satisfactory manner.
5. There are no outstanding claims with the City on previous projects.
6. He is licensed under the Alabama Contractor's Licensing Board.

2.2 Development Extensions

For any connection utilizing a water and sewer main to the City water and sewer system, all plans and as-builts shall be submitted to the City for review and approval. Though the general procedures are described below, more specific information are within the Rules and Regulations. Plans will bear the seal of a Professional Engineer registered with the State of Alabama. In general, the plans shall have a cover sheet with a general location map and an overall of the proposed water and sewer system extension showing streets, roads by name, lots, section lines, etc. Plans shall be submitted on standard plan-profile prints (24" x 36").

Copies of the plans will be initially submitted as detailed in Section 1.4. The City will review the plans and respond in writing to the corrections that need to be made. Three (3) sets of corrected plans will then be required by the City along with a review and inspection fee for the proposed project. The Developer's contractor shall obtain an approved set of plans which must remain on the job during construction. Two copies each of the plat layout and the as built drawings as performed by the Developer's contractor and a copy of these drawings on CAD shall be submitted to the City before any use of the mains or building permits are issued. The plat layout shall show all lots, their block and lot numbers, the lot frontage dimension, and all street names.

The plans used for review and the as built drawings shall show on an appropriate scale the proposed connection to the water or sewer systems, storm sewer locations, streets, lot lines, grades, elevations, other utilities such as gas, electrical and telephone, and other pertinent information. Plans will be approved in writing by the City for a period of 180 days. If construction has not begun at the end of the 180 days, the plans shall be resubmitted and the review process and fees shall be repeated. The plans shall show all proposed title transfers to the City and required easements for proper operation and maintenance, both those to be dedicated by plat and those to be dedicated by recorded document. Easements dedicated by plat shall contain the following statement on the plat; "Easements for sanitary sewer or water mains, if not previously dedicated, are hereby dedicated to Pell City, Alabama and its successors and assigns for construction and access in the installation and maintenance of sanitary sewer and water lines and their appurtenances or other uses approved by the City." Easements width shall be sufficient to permit excavation of the pipe to meet the minimum OSHA requirements and to permit maintenance on the line and in no case be less than 20 feet in width. If more than one pipeline is to be placed in an easement, a minimum of 30 feet easement is required and must be approved by the City.

The Developer's contractor and engineer shall notify the City 72 hours in advance of beginning the construction of approved work. The City and/or its agents will make inspections on the proposed project while it is under construction. Once the water and sewer main has been laid and successfully tested and all drawings submitted with all regulations being met by the developer, a letter of acceptance for the project will be issued by the City. If all terms and conditions are met, the City will assume ownership and responsibility of the lines. The Developer and Contractor will be responsible for a maintenance period of not less than one (1) year after the approval letter has been issued. For the first year, repairs if needed will be made by the City and charged to the Developer.

The Developer's engineer is held to be in responsible charge of any job submitted to the City for construction. The City's personnel and/or its agents will make inspections of the job and will bring to the attention of the superintendent on the job and/or the Developer's engineer any discrepancies that he may observe. This will in no way relieve the Developer's engineer and/or contractor from compliance with the City's specifications and generally accepted standards of quality. The City's personnel or its agents reserve the right to require changes or adjustments in the plans if field conditions and/or other conditions so warrant.

If the development requires an expansion of the water and/or sewer system for appurtenances such as pump stations, tanks, treatment facilities, and additional water sources, or if these items are required internal to the proposed development, the City will use its engineer to design and choose the construction method to perform improvements pursuant to the following agreement. Developer shall deposit with the City an amount equal to the estimated cost required to engineer and construct the proposed improvements by a licensed contractor plus any other additional expenses which are likely to be incurred by the City during construction or which are required by the regulations or ordinances of the municipality or county having jurisdiction. This estimated cost shall be adjusted to actual cost when the project is completed by a licensed contractor. Upon completion of the expansion or as soon thereafter as practicable, the City will furnish the depositor a statement of actual costs incurred in the installation of said expansion. In the event depositor's actual cost is less than the amount deposited with the City, the City will refund to the depositor the difference between the deposit and depositor's actual cost. In the event depositor's actual cost exceeds the amount previously deposited, the depositor will be required forthwith to make an additional deposit with the City in the amount of the difference. In the event the City performs the work with its own forces, the developer's initial fee will be the final fee unless changes are added or deleted. Then the developer will be charged additional or rebated a portion of the fee, depending on the change encountered. The rights given the City hereunder are not exclusive and the City shall have the right to pursue any and all legal remedies to collect any amount due the City under the terms of this provision. No interest on deposited monies will be credited to the Developer.

2.3 Existing Residential and Commercial Extensions

Extensions or rerouting utilities for existing residential and commercial establishments shall be designed and contracted to parties under the supervision of the City. The entities requesting utility work shall pay a non-refundable "Extension of System Preparation Fee" per utility extended or rerouted. The fee shall initiate field investigation on the main extension which will include the cost estimate of the project. The fee will be applied toward any advance deposit requirements related to the main extension.

If the entity desiring water and sewer agrees to pay for the main extension, an agreement will be prepared. A deposit with the City in an amount equal to the estimated cost required to design the

proposed improvements will be made at this time. An additional deposit to the City in an amount equal to the estimated cost of construction will be made prior to construction.

Upon completion of the expansion, and if the work was performed by a licensed contractor, the City will furnish the depositor's statement of actual costs incurred in the installation of expansion. In the event the depositor's actual cost is less than the amount deposited with the City, the City will refund to the depositor the difference between the deposit and depositor's actual cost. In the event depositor's actual cost exceeds the amount previously deposited, the depositor will be required forthwith to make an additional deposit with the City in the amount of the difference before service is provided. In the event the City performs the work with its own forces, the depositor's initial fee will be the final fee unless changes are added or deleted. Then the developer will be charged additional or rebated a portion of the fee, depending on the change encountered. The rights given the City hereunder are not exclusive and the City shall have the right to pursue any and all legal remedies to collect any amount due the City under the terms of this provisions. No interest on deposited monies will be credited to the depositor.

Section 3: Design Guidelines for Water and Sanitary Facilities

3.1 General

The Owner shall obtain the services of a Professional Engineer, registered in the State of Alabama, to provide engineering design services. Services shall include both surveying by a Professional Land Surveyor and engineering design by a Professional Engineer. The Owner will select and contract with a qualified general contractor, licensed in the State of Alabama, to be responsible for constructing the project according to the Drawings and Specifications. The Contractor and Design Engineer will be responsible for coordinating inspections of the work as required by the City for final acceptance.

3.2 Surveys, Investigations and Drawings

An actual ground centerline survey of the route of the proposed utility must be performed by the Owner. The Survey must obtain information on existing topography and underground utilities to be shown on the Drawings. Base lines or reference marks must be established in the field. Ground profile data must be field surveyed along the actual alignment for sanitary sewers.

Construction Drawings must be prepared, under the direct supervision of an Alabama Registered Professional Engineer and stamped, sealed, and dated by said registered engineer. Construction Drawings submitted for approval shall be industry standard and contain certain minimum items.

Land ties stamped, sealed and dated by an Alabama Registered Land Surveyor, shall show the location of the easements and right-of-way. Ties made within platted subdivisions may be made to lot lines when the Land Surveyor deems that this is the best and most reproducible tie that can be made. Properties that rely on meets and bounds descriptions should be tied in a manner similar to their deed calls. Direct ties should be made whenever possible. Alignment and property surveys required for right of way acquisitions shall meet the requirements of Rules 1.03-1.06 of the Minimum Technical Standards for Land Surveying in the State of Alabama.

Each drawing sheet shall contain the name of the project, and the name(s), address, and telephone numbers of the Owner/ Developer(s), the Design Engineer, and the Land Surveyor. Drawings shall be prepared using standard drafting practice on 24"x 36" sheets. Sewer drawings shall be on 24"x 36" half plan/profile sheets. Plan and profile of proposed sewer lines shall be on the same sheet, drawn at 1"=50' horizontal and 1"=10' vertical scales. Grades shall be shown in percent (%) and indicated between each manhole. Both invert and existing profile elevations are to be indicated at every 50 ft. station. The flow line elevation of each line entering and exiting a manhole shall also be shown. Stationing shall commence at the left of the sheet and at the lowest point of the sewer and continue upstream to the right across the sheet.

Pipe material shall be shown between each manhole for sewer and on water lines and where a pipe material change occurs. Concrete collars, if required, shall be shown on the Drawings. Horizontal station location of all manholes, deflection angles at manholes, distance between manholes, angles to existing sewers and other system features shall be shown North arrows shall be indicated on each sheet. Temporary Bench Mark elevations shall be based on U.S.G.S. Datum and properly identified on the appropriate sheets for sewer drawings. All topographic features, both existing and proposed, shall be shown. Examples include but are not limited to storm sewers,

drainage ditches, creeks, utilities, etc. In profile the existing ground shall be shown as a dashed line, and the proposed ground shall be shown as a solid line.

All property lines, subdivision block and lot numbers, rights-of-way, and required or utilized easements shall be shown. All easements, both those to be dedicated by record map and those to be dedicated by recorded deed shall be shown. Easements dedicated by plat shall contain the following statement on the plat: "Easements for sanitary sewer or water mains, if not previously dedicated, are hereby dedicated to Pell City, Alabama and its successors and assigns for construction and access in the installation and maintenance of sanitary sewer and water lines and their appurtenances or other

uses approved by the City". Streets shall be shown and named or numbered. Service lines and connections shall be shown and stationed. Final drawings shall require the Contractor to furnish the Engineer with the exact service line location.

3.3 Easements, Right of Way and Property Deed Descriptions

All Easements and/or property required for all types of water and sewer appurtenances which will not be transferred to the City by record map must be described and deeded to the City. Easements for residential construction can be transferred by Record Map. Easements not within the boundaries of said record map shall be transferred by deed to the City. Commercial and apartment property must have deeded easements and cannot be transferred by Record Map. The minimum easement width is twenty (20) feet, ten (10) feet each side of the utility centerline. If more than one pipe line is to be placed in an easement, a minimum of 30 feet easement is required and must be approved by the City. Property descriptions shall be prepared utilizing field surveys (completed by a registered Professional Land Surveyor) of the land tie, properties being transferred, and the project utility alignment.

Property descriptions shall locate the property by commencing with a monumented land tie. It shall then traverse from the land tie to the centerline of the project utility alignment, then along the centerline utility alignment to the point of beginning of the property being described, then along the centerline utility alignment to the point ending the property being described. Strip deeds for right of way and easements shall indicate the property being described relative to the centerline alignment by indicating the right of way width and offset from the centerline. Property parcels for facility sites shall continue with the above utility alignment and then with a closed traverse around the boundary of the parcel. Where lines are curved, the significant elements of the curve shall be described.

Easements may be required by the City to extend a water or sewer line away from the development, i.e., to accommodate future extensions. These easements will follow the same rules as those utilities being installed under an active project.

3.4 As-Constructed Drawings

Upon completion of construction, an actual ground survey shall be performed to verify the constructed facilities. Utility As-Constructed Drawings shall reflect all changes made to the approved Construction Drawings and should accurately show the actual utility facilities that were installed. As-Constructed Drawings shall be submitted on 4 mil polyester 24" x 36" plan/profile drafting film with matte finish on both sides. The profile grid shall be 50' (H) lines and 1' (V) lines. Drawings shall be done with permanent black ink. All drawings shall also be submitted on CAD tape or compact disc compatible with AutoCad programs.

As-Constructed Drawings shall show the constructed location of all sewer service lines in every utility reach as measured and recorded from the constructed location of the first manhole immediately downstream. Valves on water lines and casing for water service lines shall have swing ties made to two (2) permanent geographic or constructed features and recorded on the drawings. Final fire hydrant locations will be shown. Connection details to existing lines and stub-outs for future expansion will be detailed for future reference. As-builts shall show the streets lots, manholes, their invert elevations, the distances between manholes, the sanitary sewer lateral (their measurements off the property line and off the nearest manhole), the type of sanitary sewer pipe material and sanitary sewer lateral material, the exact sanitary sewer easement location, and any other pertinent information as required by the City. The sanitary sewer easements shall show the exact location of the sanitary sewer main within the easement.

The Developer and his engineer will be held responsible for the information submitted on the final as-built plans as well and his technical design. They shall be responsible to make good to the City's satisfaction any discrepancies shown on such as-builts that do not match with actual field conditions, i.e., the Developer's engineer and/or surveyor will be responsible for assuring that each lot in the development has a functioning sanitary sewer lateral and/or water service.

The following note shall be attached to the drawings:

> I (printed name) certify that this is a true and accurate sewer plan and profile and/or water utilities map with all requirements meeting Pell City rules and regulations, as field surveyed after construction.
>
> Signature — Alabama Licensed Engineer or Surveyor Registration Number

3.5 General Design Criteria

All Residential and Commercial utility facilities shall be designed in accordance with these standards. Design flow shall be based on the guidelines of paragraph 3.8.

All sewer manholes shall be designed with a minimum inside diameter of 48 inches. Manholes shall be installed at the end of each line, at all changes in grade, pipe size, alignment, and at all intersections of main sewers. The maximum distance between manholes shall be 400 ft. The maximum deflection angle of sewer alignment at manholes shall be 90 degrees. For differences of in/out invert elevations greater than 2.0 ft., a Memphis Tee drop manhole shall be used. Drop manholes shall be avoided where practical. Bolt down frames and covers shall be required where the proposed manholes are subject to being flooded. Manhole Boots are required for all penetrations of pipe. The minimum depth of all manholes shall be 4'-6". Cones shall be the concentric type. Flat slab and eccentric conical sections are prohibited. Frame and covers shall be in accordance with Standard Specifications and Drawings herein. Manholes deeper than twenty (20) feet require a special design be submitted to the City for approval and the diameter shall be greater than 48 inches. Manholes in a flood area shall be adjusted so that the rim is above the 100 year frequency flood level provided the height above ground does not exceed 3 feet. If necessary in the judgement of the City, a special watertight manhole cover may be required.

Gravity sanitary sewer mains 8 inches to 16 inches in diameter shall be constructed of a minimum of Class 50 Ductile Iron Pipe or ASTM3034 (SDR 35) PVC pipe except as specified

below. PVC pipe shall be allowed where the slope is less than or equal to 14.00% and the cut is less than or equal to 12 ft. Where the slope is greater than 14.00% or the cut is greater than 12 ft., ductile iron sewer pipe shall be used and wall thickness increased to meet cut and backfill conditions. "Cut" is defined as the vertical distance from the finished ground, or surface, to the invert of the pipe. Water lines shall be a minimum of 8" diameter and be constructed with Class 50 Ductile Iron Pipe. In cases where electrical currents could harm ductile iron pipe sections, AWWA C-900 Class 200 (DR-14) PVC can be installed with the approval of the City.

Sewer force mains may be C-900 (DR-14) PVC pressure pipe or ductile iron as approved by the City. Force mains in streets shall be ductile iron.

All sewers under the following circumstances as well as those listed above shall be ductile iron (1) Sanitary sewers crossing storm drains, creeks, or significant ditches; (2) Sanitary sewers that are to be constructed with less than 4 ft. of cover. These shall be submitted to the City for approval on a case by case basis; (3) The upstream line out of a drop manhole shall be ductile iron; or (4) Between the sides of houses on easements. The rear of the house may be plastic if approved by the City.

In areas that have been filled and the proposed water or sewer will be within the fill, ductile iron pipe shall be used. In fills greater than 8 feet restrained joints shall be used. All carrier pipes installed in a bore or tunnel shall be restrained joint ductile iron pipe. All open cut paved areas or areas to be paved shall be backfilled with compacted #57 crushed stone.

Water mains shall be located within the street right-of-way whenever possible but not under a street unless the line is crossing perpendicular to the street. Where possible, water lines shall be looped and dead-end lines eliminated. The water main shall be located on the opposite side of the street from the gas main and underground power. The System may require additional street right-of-way to facilitate the water main location. Standard water main size will be 8 inches and be constructed of ductile iron pipe. Minimum water main sizing may depend upon Fire Department

requirements or the System's desire for an increased size for transmission mains. In a residential cul-de-sac with a dead-end line, a 6 inch main will be allowed past the last fire hydrant shown. The dead end of a main in a cul-de-sac will have a fire hydrant to be used for flushing purposes. All laterals under road will be a minimum 2 inch steel casing 2 feet outside of each curb or ditch. Final size will be based on expected lateral size and number. Pipe will not be installed in uncompacted fills.

Valves shall be installed on property lines near fire hydrants and/or spaced at intersections and key locations. Valves will be required at the intersection of the beginning of a street or cul-de-sac. In general, sufficient valves will be required at each intersection to isolate the water system for the least disturbance to the residents of the area in case of the need for main repair. Valves will be required at the end of the each dead end street or road which could be extended in the future. The valve and plug at a dead end shall be properly blocked and/or rodded. In no case shall a distance of 2000 feet between valves be exceeded.

A valve will be required on each line to a fire hydrant. In a cul-de-sac a fire hydrant shall not be more than 400 feet from the last lot. Fire hydrants shall be shown, if possible, on property lines within the right-of-way of the proposed street, 1 foot more or less from the right-of-way. A fire hydrant shall be shown on the side of the street or intersection that would not interfere with a storm sewer or in a sidewalk. The spacing between fire hydrants in a residential area shall be between 500 to 800 feet as recommended by the Fire Chief. All plans should be coordinated with the Fire Chief for fire hydrant location before review submittal. The spacing between fire hydrants in a commercial area shall be as recommended by the Fire Chief. Fire hydrants shall be a minimum of

40 feet from a structure for fire fighting capability. The above specifications may be more stringent to best suit the needs of the Fire Department serving the main's locations.

Fire service connections will not be authorized by the System until the applicant has furnished detailed drawings of the premises, all appurtenances and the proposed fire service system which the connections will serve, along with the proper authorization to invoice the owner or his agent for all expenses incurred for the installation of the service connection. The applicant shall also furnish to the System on request all information regarding the installation, alternations and operation of the fire service system. Service charges for the fire service system shall be as set forth in the City Fee Schedule.

No water shall be taken through such private fire service connections except for the extinguishment of fire or for testing purposes. A customer must notify the System in advance of conducting tests. Whenever leakage or unauthorized use of water occurs in a private fire service, the customer will be notified by the System to have the leakage repaired or to discontinue the unauthorized use of water. Unauthorized use shall be discontinued immediately; the customer will be given fourteen (14) days from the date of notification to repair a leak. If unauthorized use continues or if leakage continues beyond the date specified to the customer, the street valve will be closed and service will be discontinued. All fire lines shall be valved at the System's main. Fire lines will be required to have a detector check valve and detector check meter.

Ductile iron pipe shall be polyethylene wrapped in all areas determined to be corrosive in nature to the pipe material (i.e., railroad slag areas, swamps, etc.). Steel encasement installed by boring, tunneling or other acceptable means which excludes open cutting is required when crossing existing paved streets or roads, railroads, or those streets which have been completed in the subdivision. Encasements and mains shall cross the roadway and railroads as near as possible to perpendicular of the roadbed. In all cases the permitting agency shall have the final approval of the engineering and construction. All encasements under existing streets shall be bored. All service lines under roads must be encased in a minimum 2 inch I.D. steel pipe.

Casing pipe and joints shall be of leakproof construction and capable of withstanding its design loading. All casing used for crossings shall be steel, welded joint, and large enough to permit the installation and/or removal of the carrier pipe. Carrier pipe shall be restrained joint ductile iron with spacers for support. The minimum diameter for casing shall be as follows:

PIPE SIZE	O.D. BELL	MIN. CASING O.D.	THICKNESS
3"	6.08"	10.50"	.25"
4"	7.22"	12.50"	.25"
6"	9.47"	14"	.25"
8"	12.00"	16"	.25"
10"	14.20"	18"	.25"
12"	16.35"	20"	.375"
14"	19.15"	24"	.375"
16"	21.36"	26"	.375"
18"	23.56"	28"	.375"
20"	25.80"	30"	.375"

3.6 Service Lines

Sewer service lines are 4 and 6 inch lines which are predominately on private property. Due to their importance in elimination of infiltration/inflow, the installation, permitting and inspection of sewer service lines (building laterals) are covered in more detail in Section 6.

Sewers will be designed, where possible, to serve every lot or parcel adjacent to the sewer. A manufactured 90-degree "Tee" fitting shall be installed at every lot or parcel for connecting 4" service lines to the main sewer. Where service lines are allowed to enter manholes, flexible manhole boots are required. All 6" service lines shall enter a manhole,

Each water and/or sewer customer shall be required to sign a Users Agreement prior to the meter being installed. A copy is included herein. Water and sewer service furnished for a given lot shall be used on the lot only.

Where the main line is adjacent to the property to be served, the City or developer will install a service line to the property line. Water service lines from the City main to the meter shall be copper. The City may install its meter at or near the property line or, at the City's option, on the consumer's property within three (3) feet of the property line. A suitable place for the meter shall be provided by the consumer. This place must be unobstructed and accessible at all times to the meter reader. The consumer's piping and apparatus shall be installed and maintained by the consumer in a safe manner. This shall be done in accordance with the City's rules and regulations and in full compliance with ADEM Public Water Supply regulations.

The system reserves the right to refuse service unless the consumer's lines and piping are installed in such a manner as to prevent cross-connections or backflow. See Backflow Prevention Policy in these regulations.

Water furnished by the City shall be used for consumption by the consumer, members of his household and employees only. The consumer shall not sell water to any other person or permit any other person to use said water. Water shall not be used for irrigation, nor other purposes, except when water is available in sufficient quantity without interfering with regular domestic consumption in the area served. Disregard for this rule shall be sufficient cause for the refusal or discontinuance of service.

The consumer and/or property owner shall be held liable for any physical damage done to the City's property caused by any vehicle, construction, excavation, land fill or any other action, whether ordered or controlled by the consumer and/or property owner or not. No action of the above will create an operation and maintenance problem for the City's personnel. Duly authorized agents of the City shall have access at all reasonable hours to the premises of the consumer for the purpose of installing or removing the City's property, inspecting piping, reading and testing meters, or for any other purpose in connection with the City's service and facilities.

SANITARY SEWER SERVICE AGREEMENT

THIS agreement entered into between Pell City, Alabama hereinafter called the "City," and _____ _____ hereinafter call "Customer."

WHEREAS, The Customer hereby applies to City for permission to connect to and/or use the City's sewer system subject to the terms, conditions and provisions herein:

NOW, THEREFORE, In consideration of the mutual promises and agreements herein contained, it is hereby contained, it is hereby understood and agreed by the parties as follows:

1. The City shall allow Customer to connect to and/or use the City's sewer system, subject to the limitations set out in City's Rules and Regulations, now in force, or as may be hereinafter adopted, or later amended from time to time.
2. Customer shall install and maintain at Customer's expense a service line which shall begin at City collection line and extend to the dwelling or other place of use.
3. Customer also agrees to pay the monthly service charges or other fees, and penalty at such rates, time and place as shall be determined by the City. Customer agrees to the imposition of such penalties for noncompliance as are set out in City Rules and Regulations, or which may be hereafter adopted and imposed by the City.
4. City shall have final authority in any question of location of any sewer line connected to its system and method and type thereof.
5. City may disconnect Customer from water and/or sewer for failure to pay any sums due City, or if Customer violates any of City's Rules or Regulations.
6. Customer agrees that no additional use, type or volume of sewage will be allowed except that specifically declared by Customer herein.
7. Any tap/impact fees will be paid by Customer upon acceptance by City of the application, and monthly service charges shall commence on the date service is made available, regardless of when Customer connects to the system.
8. The property to be served is identified as follows:

The exclusive use of said property at such location will be residential, commercial, industrial, other (circle correct use.)

9. Any tap/impact fee assessed to Customer is based on an estimate of the actual daily volume and/or type of discharge to be received into the City system. City reserves the right, at City's option, to meter the actual water uses by Customer. In the event the actual volume is greater than the estimated volume originally made, City shall have the right to charge an additional tap/impact fee based on actual volume, crediting the Customer with the amount previously paid. Customer shall have no right to allow any volume to sewage to enter City's system which exceeds the volume for which Customers has paid a tap/impact fee.
10. Customer shall have the right to cancel this permit upon a thirty (30) day written notice to the City. If applicable, monthly service charges shall be discontinued thirty (30) days after receipt of such notice. Should the Customer cancel this permit, the City shall not be required to refund any portion of the tap/impact fee previously paid to the City.
11. This permit cannot be assigned by the Customer without written consent of the City.

IN WITNESS WHEREOF, we haveunto executed this agreement this the _____day of _____.

Witness Customer

Based upon the representation and agreements made by the Customer herein, this application is hereby approved subject

to the Rules and Regulations of City now in force and effect or as amended, supplemented or changed hereinafter. The initial tap/impact fees is set at $_____, payable immediately.

For Pell City

WATER USER'S AGREEMENT

ACCOUNT NO.

METER NO.

THIS AGREEMENT between Pell City, a City organized and existing under and by virtue of the laws of the State of Alabama, hereinafter called the "City", and the undersigned water user, hereinafter called the "Water User"

WITNESSETH: That, whereas, the Water User desires to purchase water for domestic, commercial, industrial or other uses from the City and to enter into a User's Agreement as required by the By-Laws of the City.

NOW THEREFORE in consideration of the mutual covenants, promises and agreements herein contained, it is hereby understood and agreed:

1. The City shall furnish, subject to the limitations as provided for in the By-Laws and Service Rules and Regulations hereinafter provided for, such quantity of water as the Water User may desire in connection with occupance of property location at _____, Pell City, Alabama.
2. The Water User shall install and maintain at his own expense a service line which shall begin at a point designated by the City at his property line and extend to the dwelling and other portions of this premises.
3. The Water User's service line shall connect with the distribution system of the City at the place designated by the City, provided the City has determined in advance that the City's water system will deliver water to that point.
4. The Water User shall pay for such water at such rates and fees and penalties, time and place as determined by the City. **The City shall have exclusive right to use the cut-off valve and water meter and to turn it on and off for failure to pay water and/or sewer bills.**
5. The City shall make the final determination in any question of location of any service line connection to its distribution system and shall determine the allocation of water to Water User in the event of a water shortage.
6. The City may shut off the water of a Water User who allows a connection or extension to be made to his service line for the purpose of supplying water to another user.
7. The failure of a Water User to pay water charges duly imposed shall result in the automatic imposition of penalties as determined in the existing City Fee Schedule.
8. In the event it becomes necessary for the City to shut off the water from the Water User's property for violation of the Rules and Regulations, a fee will be charged for a reconnection of the service.

* 9. In the event the customer requires a bore beneath the highway to receive service, the City will provide this service. The cost of this service will be charged to the customer in addition to the tap fee.

10. Any tap/impact fees will be paid by Customer upon acceptance by City of the application, and monthly service charges shall commence on the date service is made available, regardless of when Customer connects to the system.
11. Any tap/impact fee assessed to Customer is based on an estimate of the actual daily volume to be furnished by the City system. In the event the actual volume is greater than the estimated volume originally made, City shall have the right to charge an additional tap/impact fee based on actual volume, crediting the Customer with the amount previously paid.

The foregoing notwithstanding, the City reserves the right to make or amend the By-Laws or the Rules and Regulations of the City from time to time, and the Water User agrees to abide by such changes upon notice thereof.

IN WITNESS WHEREOF, we haveunto executed this agreement this the _____day of _

_____.

Witness Customer

Based upon the representation and agreements made by the Customer herein, this application is hereby approved subject to the Rules and Regulations of City now in force and effect or as amended, supplemented or changed hereinafter. The initial tap/impact fees is set at $_____, payable immediately.

For Pell City

3.7 Miscellaneous

Commercial and Residential sewer easements must extend to the upper limits of the drainage basin of a particular property. Easements for water must be allowed for future loop connection and continuation for future water extensions. When the easement is running parallel with a road right-of-way or property line, the easement shall extend to the right-of-way or property line.

Separation between sanitary sewers and water mains shall be a minimum of 10 feet horizontally. When crossing a water main, the top of the sanitary sewer shall be a minimum of 24 inches below the bottom of the water main. If circumstance requires the sanitary sewer to be closer than 10 feet horizontally the sewer must be a minimum of 24 inches below the waterline. The sanitary sewer cannot be installed in the same excavated ditch with a water main.

To allow for maintenance, sewers shall not be laid within 4 feet of concrete curbs or gutters. Sewer line on easements must have a compacted road along easement sufficient for sewer machine access. Water lines shall not run under pavement of any type unless it crosses a road at a perpendicular angle.

To the extent possible, sewers should be at such depth that they can receive the contributed flows by gravity. Deep basements and buildings on land substantially below street level may require individual pumping stations. If installed, these pumping stations shall be owned and maintained by the individual property owner. Depth of sewers along property should provide minimum slope of 1% for building service lines to be installed. All utilities shall have a minimum of 30 inches of cover in non-traffic areas and 36 inches in paved areas subject to vehicular traffic. Proposed sewers with less than 4 feet of cover shall be submitted for approval to be considered on a case by case basis.

All areas to receive fill shall be filled and compacted prior to the installation of any sewer lines or any structure. See paragraph 3.5 for pipe material requirement. The following note shall be indicated on drawings indicating a sewer or water line location in areas of fill:

Note: All areas to receive fill shall be filled and compacted to 95% standard procter density per the utility design drawings prior to the installation of the utility lines or any structures.

At peak flow, the minimum velocity in the sewer shall be 2 fps. The minimum grade for collector and lateral sewers shall be as follows:

Nominal Pipe Diameter –Inches	Minimum Grade – ft./ft.	Percent Grade
8	.0040	.40
10	.0028	.28
12	.0022	.22
16	.0015	.15
18	.0012	.12

Where required, gravity sewers on slopes greater than 14% shall be restrained to prevent separation of pipe joints. When using standard manholes, the maximum grade allowed is 14%. Any slope in excess of 14% requires special pipe restraints and special manholes which must be designed and submitted for approval. The Design Engineer shall make every effort to not exceed the 14%

grade. Inasmuch as the load imposed on utilities built in open cut is a function of the bedding, trench width, backfill material and superimposed load on the ground surface, consideration must be given to all of these elements during design for selection of pipe class and bedding. Where sewers cross roads, railroads, highways or require trenchless installation under the ground surface, tunnels or cased bores may be required. Permitting requirements of the Alabama Department of Transportation Utility Manual, or the American Railway Engineering Association shall be included. If a tunnel is approved, it must be installed in accordance with the City Specifications.

3.8 Design Quantity for Water and Wastewater

The water and sewer capacity to be provided for must be determined from careful analysis of the present and probable future quantities of domestic, commercial, and industrial water and wastewater requirements. Developments having sewer systems and anticipating future growth in upper reaches of the sewer drainage area must develop a long range plan for the installation of sewer facilities. The plan must consider the entire drainage area beyond the limits of the subdivision. Sanitary sewers shall be designed to carry the flow from the estimated ultimate tributary population. Estimated design flows for water and sewer shall be determined and submitted to the City for approval. When data is not known otherwise, the average daily flows shall be calculated using the following criteria:

1. Not less than 100 gallons per person per day calculated for single family residential areas at 7 persons per acre and in apartment complexes at 17 units per acre, 3.5 persons per unit.
2. Average flow from institutional and industrial establishments shall be determined from a study of similar establishments and submitted to the City for review and subsequent approval. Commercial volume of flow shall be computed on the basis of 20 people per acre and 50 gallons per person over a 16-hour period.
3. Allowance shall be made for vacant lots and property in consideration of existing development patterns, trends, and engineering judgement.
4. Potable water for fire flow shall be based on the usage plus an allowance for fire flow. Fire flow will be as recommended by the Fire Chief upon review of the type of development (i.e. residential, commercial, industrial, etc.). In residential developments, the minimum needed fire flow is 750 gpm when attainable. If not attainable as determined by the City Engineer, the developer will take necessary steps to attain the highest fire flow through proper water system design. Regardless of the development, a fire flow of 500 gpm will be the minimum allowed for proper fire protection. System hydraulics is based on the flow from the nearest tank serving the area without dropping residual pressure below 20 psi. Minimum line size for proposed lines within and outside of the proposed development may have to be upgraded which will be the responsibility of the developer.

Gravity sewers shall be designed using Manning's approximation of Kutter's formula, to flow 1/2 full at peak flow. The peak flow shall be calculated by applying a peaking factor of 3 to the Average Daily Flows. Peak flow in the water system will be the fire flow or the average daily usage multiplied by a factor of 2.3, whichever is greater.

3.9 Special Designs

If development requires an expansion which will require items such as wastewater pumping station, water booster stations, tanks, treatment facilities, wells or any other appurtenance which the City deems special, the City will use its engineer to design these facilities to insure compatibility with the City Utilities System. The City will have these items constructed with the Owner financing the project. In no case will the City receive ownership of any facility where this rule is not followed.

If a wastewater pumping station is required to serve a residential development, the station will not be considered for City ownership and maintenance unless it serves 30 lots or more; is designed by the City's engineer; and is properly constructed in accordance with City Standards. For commercial or industrial facilities or lots the City will not own or maintain the pump station unless there is significant flow from the facility or facilities.

3.10 Oversize Facilities

The City may participate in the cost of "Oversized" improvements leading to or within a subdivision (i.e., water or sewer mains, pump stations, etc.,) if it is judged that such oversized improvements are necessary to serve larger areas of land not included in the subdivision or tract and if the cost of such required oversized improvement is an unreasonable burden to the subdivider. In this case, the subdivider shall not be required to pay the total cost of "Oversized" facilities, but shall participate in the cost of these improvements in the amount that the minimum size allowed by these specifications or the size required to serve his subdivision (whichever one is greater) would cost. The City would participate by paying the difference in the required facilities and the oversized facilities.

Section 4: Material Specifications for Utility Lines

Comment: B = .4

4.1 Materials

All material used in the construction shall be new and unused manufactured in the United States. Ductile iron pipe shall meet AWWA and ANSI Specifications C-150, C-151, A 21.50, and A 21.15 respectively. Ductile iron pipe used on water mains and collector sewers shall be tar coated outside and cement lined inside with cement lining conforming to the requirements of ANSI 21.4 (AWWA C104). The only exception is for gravity interceptor sewers which shall have an interior coating of Induron Protecto 401 ceramic epoxy (40 mils thick). Pipe and fittings to be installed in buildings, galleries, other locations where such pipe and fittings will be permanently "exposed" shall have exterior coat of rust inhibitive primer and painted after installation. Ductile iron fittings shall meet AWWA Specifications C-110/A21.10. Fittings shall be ductile iron, Class 250, lined to match pipe, and mechanical joint with retainer glands used on 10" and larger water pipe. All water fittings will be braced with concrete. Flanges shall be equal to those required for connections to equipment and pressures encountered unless specified otherwise. Ductile iron pipe with mechanical or push-on joints shall conform to the requirements of ANSI A21.11 (AWWA C111). Ductile iron pipe with flanged joints shall conform to the requirements of ANSI A21.15. Flanges shall be ductile iron and shall conform to the properties specified for ductile iron fittings in ANSI A21.10.

Restrained joint ductile iron pipe and fitting shall meet specifications in this section and be a boltless restrained connection to protect against separation due to thrust. Pipe sizes 4" through 12" in diameter shall have an allowable deflection of 5°. Restrained joints shall be equal to American "Flex-Ring", U.S. Pipe "TR Flex, or Clow "Superlock". Field lock gaskets will not be accepted.

Under certain conditions, gravity sewer can utilize polyvinyl chloride (PVC) components as described in ASTM D-1784. The sewer pipe and fittings shall meet or exceed the requirements of ASTM D-3034 (SDR 35), Type PSM Polyvinyl Chloride Sewer Pipe and Fittings. Standard laying lengths shall be 13 feet. The bell shall consist of an integral wall section with joints conforming to ASTM D-3212. Gaskets shall be vulcanized and comply with ASTM F-477 for Elastomeric Seals for Joining Plastic Pipe. Each Pipe shall be marked as prescribed by ASTM Standard D-3034 as follows: Pipe size, manufacturer's name and code, cell classification, standard dimension ratio (SDR), use (sewer pipe) and ASTM standard.

Polyvinyl chloride pressure pipe may be used on sewer force mains not buried below streets longitudinally. The pipe shall be made from Polyvinyl Chloride plastic (PVC) as defined in ASTM Specification D-1784. The pipe shall conform to AWWA Specification C-900 and be approved by the National Sanitation Foundation. The pipe shall have water working pressure rating of a minimum of 200 psi (DR14), at 23 degrees C. Polyvinyl chloride pressure pipe may be used on water when electrical currents may create a problem for ductile iron pipe. In these cases and if approved by the City, AWWA C-900, Class 200 pipe may be installed. Fittings shall be ductile iron and mechanical joint. The pipe will be stored away from direct sunlight.

The joints shall be "push-on" or "twin gasketed coupling", meeting ASTM Standards D-3139. Pipe lengths shall not exceed 20 feet. Lubricant shall be nontoxic and have no effects on the gasket or pipe material. Gaskets shall meet ASTM F477 requirements. The gasket manufacturer's mark and year of manufacture shall be molded in the rubber. Gaskets shall be vulcanized natural or synthetic rubber. No reclaimed rubber shall be used. The Owner shall be supplied a certified copy of the manufacturer's quality control report.

As a minimum, the pipe shall have the following data applied to each piece every two feet:

1. Nominal Size
2. Type of Material
3. ASTM Standards
4. Manufacturer
5. National Sanitation Foundation Seal of Approval
6. Quality Control Code
7. Working Pressure Rating

All spigot ends shall be marked to indicate the distance the spigot end should be extended into the bell.

Comment: B = .5

Copper pipe shall be seamless copper water tube meeting the requirements of AWWA Specifications 7S-CR for Type K copper water tube, Type K hard drawn, or of ASTM Specification Designation B88-61 for seamless copper water tube, Type K hard drawn.

4.2 Pipe Bedding, Backfill and Foundation Backfill Material

Aggregates used for pipe bedding and backfill shall be either crushed limestone or crushed dolomite. The use of slag will not be allowed. Crushed stone shall be ASTM D-448 No. 57 stone. No other screening size is acceptable. In no case is "crusher run", (unscreened gradations that include fine material), acceptable unless specifically called for. All sanitary sewer pipe shall be bedded on a minimum of 6 inches crushed stone aggregate meeting these requirements. PVC sewer pipe will be bedded and encased to 8 inches above the pipe for the full width of the trench after the trench box is removed.

Earth backfill shall consist of suitable native materials of low organic content. Stumps, roots, topsoil and other highly organic materials are not acceptable for use as backfill. Earth backfill shall not contain any rocks, stones or boulders which might be large enough to damage or endanger the sanitary sewer pipe. The decision regarding the suitability of a particular material for use as earth backfill will be at the sole discretion of the City Construction Inspector.

Foundation backfill is a term used to describe a coarse stone aggregate which may be used at the direction of the City Construction Inspector to stabilize the bottom of the pipe trench prior to placement of pipe bedding material. Foundation backfill shall be a coarse gradation of either crushed limestone or crushed dolomite. The gradation of stone for foundation backfill shall be determined on a case by case basis.

4.3 Precast Concrete Manholes and Accessories

Precast reinforced concrete manholes shall be used and constructed in accordance with ASTM C-478. Reinforced concrete manholes shall consist of manhole base sections, riser sections, transition sections, and conical sections. The manhole components shall be configured to minimize the number of joints required per manhole. Portland cement concrete used in the precast reinforced concrete manholes shall have a minimum compressive strength of 4,000 psi at 28 days. The concrete shall contain type II Portland cement with a C3A content of 5.5% or less and meet the requirements of ASTM C-478.

Conical Sections shall be wet cast, concentric only. Eccentric sections will not be allowed. Conical sections shall transition from 48" diameter to a 27" clear access opening and be either 24", 36", or 46" high. Where Bolt Down Manhole Frame and Covers are indicated on the Drawings,

Conical Sections shall be supplied with four (4) stainless steel Anchor Bolts. Where required by the City or indicated on the Drawings and in all flood areas, the contractor shall install manhole joint straps to prevent flotation. Bolted together manhole joints shall be permanently strapped utilizing three (3) bitumastic coated steel strap anchors located 120° apart circumferentially. Standard manholes of precast concrete construction, and other manholes of precast concrete construction having entering sewers of 24" diameter or smaller shall have precast openings in the manhole walls for incoming or outgoing sewers as indicated on the Plans.

The top section shall be suitable for mounting cast iron manhole frames and covers. Risers shall be furnished in suitable increments to an elevation not more than 12 inches below the base of the cast iron frame and cover. Maximum elevation of riser shall permit setting top of manhole frame at the finished grade shown on the Drawings. The bottom riser of the manhole shall be provided with cored openings to accommodate the sewers entering and leaving the manhole. The arrangement of the openings shall permit the construction of sewers in accordance with the alignment, elevations, and grades shown on the Drawings. All precast concrete manholes shall be set on a foundation bed of compacted crushed stone, 12" minimum thickness, and covering the bottom of the excavation. If cut is greater than 12', 24" of stone shall be used.

Frames and covers shall conform to the requirements of Gray Iron Casting, ASTM A48-60T, Class 20. The manhole cover shall be the solid indented type with two (2) nonpenetrating pick holes with bearing surface machined to provide solid bearing and prevent rocking. When required, waterproof manhole frames and covers shall have bolted on lid with rubber or neoprene gasket for watertight sealing. Four (4) stainless steel anchor bolts will be used. Frames shall be firmly anchored to top section of manhole. Weight of frames and covers shall be 298 pounds minimum. Cover diameter shall be 23-1/2" with a clear opening in the frame of 22". Gaskets shall be provided and installed on all manhole frames. Gaskets shall be secured to the seating surface of the frame with a non-degrading glue by the manufacturer. Gaskets shall be flat, 1/8" thick, black neoprene with a minimum tensile strength of 2,000 psi.

Manholes of precast concrete construction shall equipped with flexible joints. The joints shall be a complete joint with insert piece precast in wall of manhole and comprised of cast iron insert ring tapped to receive draw bolts, cast iron compression flange, and rubber O-ring gasket, or a complete joint with seal assembly inserted in a hole cored in the manhole wall and comprised of a rubber or neoprene boot, stainless steel seal band, stainless steel pipe clamp.

Manhole and inlet steps shall be made of steel reinforced copolymer polypropylene plastic, model PS1 PF, as manufactured by M.A. Industries, Inc. They shall be installed at maximum 16” intervals. Manhole steps shall conform with rod and pull out ratings meeting OSHA standards.

4.4 Valves

Valves shall close clockwise with 3 turns per inch. Valves shall have mechanical joint or flange ends. Sewer valve operating nuts shall be of a different size and/or shape of water valve nuts as approved by the System. Butterfly valves must be preapproved before using on a project.

Butterfly valves shall be of the rubber seated tight closing type and shall meet AWWA Standards C504 and be Class 250 suitable for underground service. The valve operator shall be suitable for underground service with permanent lubrication. The valve body and disc shall be ductile iron with stainless steel body seat, retainer ring, and screws. Each valve shall be hydrostatically tested in each direction with the disc closed at 250 PSI. The inside of the valve shall be epoxy coated.

Gate valves shall be resilient seated manufactured to meet the requirements of AWWA C509

and be suitable for 250 PSI main pressure. Valves shall have clear, unobstructed water way when fully opened and shall be at least as large as the pipe inside diameter for which it is intended. All internal surfaces shall be coated with epoxy to a minimum thickness of 8 mils. Said coating shall be non-toxic, impart no taste to water and shall conform to AWWA C550. Valves shall be provided with two O-rings located below the stem collar. The area between the O-rings shall be filled with lubrication to provide lubrication to the thrust collar bearing surfaces each time the valve is operated. An anti-friction washer shall be located above the thrust collar. The sealing mechanism shall provide 0 leakage at the water working pressure when installed with the line flow in either direction and shall consist of a cast iron gate with a resilient seal bonded or mechanically attached. Further, it shall be designed such that no sliding of rubber on the seating surfaces is required to compress the rubber. It shall not effect the ability of the valve to seal when pressure is applied to either side of the gate. The gate shall be provided with a drain in the bottom to flush the internal cavity of foreign material each time the valve is opened.

4.5 Fire Hydrants

Fire hydrants shall conform to the specifications of the American Water Works Association, C502. They shall be compression type traffic model with 5-1/4 inch valve opening. Hydrants shall have one 4 1/2 inch and two 2-1/2 inch steamer nozzles with threads to match fire department equipment. Hydrants shall have a bury of 3-1/2 feet or as required by pipe laying conditions. The fire hydrant extensions shall be by the same manufacturer as the fire hydrant type used. Fire hydrants shall be manufactured by M&H and/or match hydrants currently required by the City. Fire hydrants must have 15" clearance from finished grade to the bottom of the 4" outlet.

4.6 Miscellaneous

Rods for connecting valves, fittings, fire hydrants, etc. to each other shall be threaded 3/4 inch steel rods (A-36). The rods shall be galvanized or coal tar epoxy coated. Eye bolts are required when rodding is required.

All concrete, including but not limited to thrust blocking, dead men, etc., shall have a 28 day compression strength of not less than 3000 pounds per square inch. All fittings must be wrapped in plastic before concrete thrust blocks are poured such that concrete is not poured on bolts and other accessories.

All meter pits will be installed by the System and the user shall be charged according to the System's cost or its then existing City Fee Schedule.

Valves for tapping sleeves shall be flanged at one end for bolting to the tapping sleeve and equipped with mechanical joint outlet and meet specifications in this section. Tapping sleeves shall be ductile iron and split for installation on the pipe. Steel tapping sleeves will not be allowed.

The Contractor shall furnish and install valve boxes for all buried valves. Valve boxes shall be cast iron, screw type, with extension pieces as required to make up the length of box required from surface of ground to top of the valve body. Valve box lids shall be marked as to service.

Polyethylene encasement film shall be in tube form complying with ANSI/AWWA C105/A21.5. The polyethylene film shall be Class C.

Section 5: Construction Specifications for Utilities

5.1 General

During installation of water mains, the Contractor will be required to conduct his operations in a safety conscious manner. The Contractor shall comply with all applicable safety requirements in the location of the construction area. The Contractor alone shall be responsible for the safety, efficiency, and adequacy of his plant, appliances, and methods, and for any damage which may result from their failure or their improper construction, maintenance, or operation. The City nor its agents will not inspect for compliance with safety regulations and disclaims any responsibility to ensure the safety of workers employed by the Contractor. The Contractor shall locate all existing utilities before construction and insure the utilities are not damaged during construction.

The requirements of the Alabama State Highway Department "Standards for Accommodating Utilities on Highway Right-of-Ways" are hereby made a part of these specifications for all utility construction within right-of-way for roads or highways under the jurisdiction of the Alabama State Highway Department. For work within the dedicated City or County right-of-way, the Contractor will be required to have the respective permit or license from either of these agencies before construction within these right-of-ways is allowed. The Contractor shall abide by the requirements of these permits. The Contractor shall comply with all local, County and State regulations regarding site preparation, pollution, burning permit, erosion control and stormwater runoff.

The System's personnel and/or agents shall be authorized to inspect all work and all material furnished, including preparations, fabrications and manufacture of the materials to be used. The System's representative shall call the attention of the Contractor or Developer's engineer to any failure of the work or materials to conform to the specifications. He may reject material or suspend the work until any questions at issue can be referred to and decided by the proper authority. The presence of the System's personnel and/or its agents shall in no way lessen the responsibility of the Contractor and/or Developer's engineer. It is the responsibility of the Contractor, Developer and his engineer to provide and assure the City a quality finished product installed in accordance with all supplier's and manufacturer's standard procedure, and these specifications.

All work and materials shall be guaranteed for a minimum one (1) year period after final acceptance. The Owner shall pay the City for any repairs the City has incurred during this time for keeping the system operating during this period. The cost of repairs will be based on prices established by utility contractors, who are licensed by the State of Alabama as if they had performed the work.

Bell holes for bell-and-spigot pipe shall be excavated at proper intervals so that the barrel of the pipe will rest its entire length upon the bedding material. Water and sewer pipe shall be laid with bells upgrade of the excavation. The bottom of the excavation for pipe and structures shall be true to the required shape and elevations shown on the Drawings or as required for installation. Should the Contractor excavate below the elevations shown or specified, he shall fill the void thus made with Pipe Bedding material. No earth backfilling will be permitted under pipe or structures, unless specifically shown on the Drawings. All pipe shall be installed in accordance with the manufacturer's standard procedure.

As the work progresses, the interior of all pipe in place shall be thoroughly cleaned. After each line of pipe has been installed, it shall be carefully inspected and all earth, trash, rags, and other foreign matter removed from the interior.

When muck, quicksand, soft clay, swampy, or other materials unsuitable for foundations or subgrade are encountered which extend below the limits of the excavation, such material shall be removed and replaced with foundation backfill material thoroughly compacted and inspected by the City Construction Inspector. The City Construction Inspector shall have the final decision on whether material is unsuitable for subgrade and shall determine the gradation of the foundation backfill on a case by case basis.

Where excavations are made adjacent to existing buildings or other structures or in paved streets or alleys, the Contractor shall take particular care, subject to OSHA regulations, to sheet, shore and brace the sides of the excavation adequately so as to prevent any undermining of or settlement beneath such structures or pavement. Sheeting, shoring, or bracing materials shall be removed before backfilling unless otherwise directed by the Design Engineer. Such materials shall be removed in a way that will not endanger or damage the new structure or any existing structures or property in the vicinity, either public or private, and so as to avoid cave-ins or slides. In no case shall trench sheeting and bracing be removed until the trench has been backfilled one (l) foot above the top of the pipe.

When water or sewer lines cross open ditches, warning tape will be placed above the pipe for 30' each side of ditch banks. Crossing will maintain minimum cover or be protected with concrete if approved by the City.

Rock encountered in trench excavation for utilities shall be removed for the overall width of the trench and to a depth of 6" minimum below the bottom of the bell of the pipe. The space excavated below the barrel and bell of the pipe shall be backfilled with pipe bedding, as specified herein. All overshot rock must be removed by the Contractor before placing the bedding. If the Contractor excavates below the required trench bottom, the excess space must be filled with ASTM D-448 No. 57 crushed stone.

Backfilling around structures located in paved streets (present or future) shall be done utilizing ASTM D-448 No. 57 stone. All backfilling shall be done in such a manner as will not disturb or injure the pipe. Any pipe injured, damaged, or moved from its proper line or grade during backfilling operations shall be replaced or repaired, inspected and then rebackfilled as herein specified. The Contractor shall replace all surface material and shall restore paving, curbing, sidewalks, gutters, and other surfaces disturbed, to a condition equal to that before the work began, and in accordance with the local government having jurisdiction.

Installation of casing pipe shall be by the Jack and Bore Method with care being exercised to install the casing pipe to the proper line and grade as shown on the Drawings or required. Care shall be taken to avoid loss of ground outside the casing and to insure bearing against the ground all around the casing. Bulkheads shall be built at each end after completion of the casing pipe and insertion of the carrier pipe. The carrier pipe shall be bedded and restrained within the casing pipe. Failed bore attempts requires the casing to be left in placed, filled with sand and capped at exposed ends. Cased bores under railroads may involve special insurance requirements by the railroad company. The Contractor's attention is directed to any agreements between the Owner/Developer and the railroad company. The Contractor shall notify the railroad company, highway department, or other utility affected before beginning any work so that said utility may have a representative present if desired. Carrier pipe shall have supports equal to Cascade.

After the utility is installed and backfilled and a sufficient amount of time has elapsed for backfill to settle, the disturbed area shall be machined to a smooth surface matching the adjacent or adjoining ground surfaces and the ground profile on the Drawings. A vegetative cover will be established for erosion control. Vegetative cover shall match the existing cover before construction began but in no case will the cover be less than established grass.

Areas to receive rip rap, or special slope protection materials, shall be graded to the lines and slopes shown on the Drawings, or as directed by the City Construction Inspector. Any loose material shall be compacted. No rip rap shall be placed on a slope greater than 1:1 nor where slides could occur.

5.2 Installation of Sewer and Manhole

The Contractor is responsible for accurately placing pipe to the exact line and grade shown on the Drawings. The control of vertical and horizontal alignments shall be accomplished by using a laser beam instrument. When a laser is used, the elevation and alignment of the pipe shall be checked by transit or level and level rod at the first joint out of the manhole, and then every 50 feet. Other approved methods of controlling vertical and horizontal alignments may be used if specifically authorized by the City Construction Inspector. All pipe shall be installed in accordance with these specifications and the recommendations of the manufacturer.

Each piece of pipe and special fitting shall be carefully inspected before it is backfilled. Pipe laying shall proceed upgrade, starting at the lower end of the grade and with the bells upgrade. Trench bottoms found unsuitable for foundations shall be undercut and brought to exact line and grade with pipe bedding, concrete cradles, foundation backfill, or as directed by the City Construction Inspector. Under no circumstances shall trench water be allowed to drain into an existing sewer.

A cushion of stone aggregate shall be provided under all sanitary sewers unless other types of construction are shown on the Drawings or directed by the City. Pipe bedding material shall meet the requirements of these Specifications. Pipe bedding shall be placed below the barrel of the pipe, across the full width of the trench, and shall consist of a 6" layer of ASTM D-448 No. 57 crushed stone. Bedding shall be compacted to the exact grade for the full length of the pipe barrel and for the full width of the trench before each pipe is installed. Bedding material shall be thoroughly compacted. PVC pipe shall be bedded entirely in crushed stone to 8" above the top of the pipe.

On all force main sanitary sewers utilizing PVC piping, the Contractor shall install wire suitable for visual identification and electrically tracing below proposed finished grade. The wire shall be #8 copper wire. No breaks of less than 1000 feet are allowed and proper splicing is required. All force mains shall be installed in accordance with the water installation specifications.

Sections of sewer under construction upstream of an existing or recently accepted sewer shall be kept isolated, by means of a plug or semi-permanent bulkhead, until the section under construction has been fully tested and accepted by the City Construction Inspector. The plug or bulkhead may be removed only with the permission of the City Construction Inspector. Sanitary sewage shall not be discharged into any section of sewer upstream of uncompleted or unaccepted sections, unless special arrangements have been made to divert the flow into the City sewer system. Such special arrangements must be approved by the Superintendent before implementation.

Service connection points on new sewer lines shall be constructed with standard manufactured tees. Standard manufactured tees shall be installed in sanitary sewer lines at all points shown on the approved Drawings. If such tees are not to be used immediately, they shall be closed with approved stoppers and shall be physically restrained. Tees shall be installed in sanitary sewers so as to properly serve each existing house and each vacant lot facing or abutting the street, alley or easement in which the sewer is being installed and at such other locations as may be designated by the City. The exact location of each connection shall be recorded by the Contractor before backfilling and said locations recorded on an “As-Constructed” drawing and delivered to the City.

All service lines shall consist of four inch (4") or six (6") nominal diameter pipe, but no

larger sizes. Service line stubouts shall be installed from the tee in the sewer to a point just beyond the right-of-way line. The open end of such stubouts shall be closed with approved stoppers and properly restrained. It shall be the responsibility of the Contractor to install and mark the location of all stubouts. All eight inch diameter lines will be considered main lines dedicated to and maintained by the City. The Contractor must determine the constructed location of all service lines in each sewer by measuring from the first manhole immediately downstream. The information shall be recorded on the As-Constructed Drawings and delivered to the City.

Connections shall be made to all existing sewer lines in the vicinity of the work, as shown on the Drawings or as directed by the City Construction Inspector. Connections shall be made by the construction of a manhole or the use of an existing manhole. Connections to existing manholes shall be made by coring a hole in the wall of the existing structure and inserting a flexible manhole sleeve ("Boot") into the opening. The flexible manhole sleeve shall be Kor-N-Seal or equal. A minimum length of eighteen (18) feet of sewer pipe shall be inserted into the boot, filling around same with non-shrinking grout and troweling the inside and outside surfaces of the joint to a neat finish. Connections of new sewers to existing sewers shall be plugged, and shall remain plugged until final acceptance by the City.

An impervious clay ditch check shall be required on the downstream side of all stream crossings. This ditch check shall be constructed for a length of fifteen (15) feet as measured along the centerline of the pipe and for the full width and depth of the trench excavation.

The depth of the manhole will vary with the location but in all cases it shall be such as will place the cover (or lid) at the finished grade of the pavement or ground surface or as otherwise indicated on the Drawings. In undeveloped or rural areas, manholes shall be finished to a height of two (2) feet above ground. The manholes shall be assembled with the fewest number of sections to makeup required height, thereby reducing the number of joints. The use of more than one 16" riser section per manhole is prohibited. Only concentric cones will be used.

Bases shall be set on a foundation of ASTM D-448 No. 57 compacted stone aggregate, 12-inch minimum thickness, covering the entire bottom of the excavation. Flexible manhole sleeves ("Boots") are required on all pipe 18" and smaller. The flexible sleeve shall be manufactured by Kor-N-Seal and conform to ASTM C 923 and shall be made from ethylene propylene rubber (EPDM). Manhole sleeves shall be secured to pipe by stainless steel clamp and bolt assembly conforming to ASTM C 923. The space between the pipe and manhole opening shall be filled with non-shrinking hydraulic cement inside and out of Boot.

All joints for precast manhole stacks shall be offset tongue and groove type with Tylox Super Seal pre-lubricated gaskets manufactured by Hamilton-Kent or equal. Gaskets shall meet the requirements of ASTM C443, latest revision. Each joint shall also be sealed with Conseal CS-231 waterstop sealant as manufactured by Concrete Sealants or equal. The width and installation of the joint sealant shall be in accordance with the manufacturer's recommendations. When shown on drawings, manhole joints shall be supplied with 3" x 16" x ½" bitumastic coated steel strap anchors and bolts. Three (3) strap anchors, 120^{o} apart circumferentially shall be required per joint.

Where there is a difference in invert elevation of two sewers a standard length of Ductile Iron Pipe shall be installed in the upstream reach to bridge the fill area between the manhole and the undisturbed pipe trench. Where the difference in the invert elevation of two or more sewers, intersecting in one (l) manhole is 2 feet or more, a Memphis Tee Manhole (drop manhole) shall also be constructed. Memphis Tee Manholes shall be similar in construction to the standard manhole, except that a drop connection of a pipe and fittings of the proper size and material shall be constructed outside the manhole and supported by Class A concrete. The manhole and the drop

connection shall be placed on a l2 inch reinforced concrete foundation base. The drop connection piping assembly shall be rodded together as shown on the Standard Drawings.

Base sections shall be precast with the vertical walls of sufficient height to allow entry of the required pipes as called for on the Drawings. Manhole inverts shall be constructed having the same cross-section as the invert of the sewers that they connect. The manhole invert shall be carefully formed to the required size and grade by gradual and even changes in sections. Changes in direction of flow through the sewer shall be made to a true curve with as large a radius as the size of the of the manhole will permit.

Manhole frames and covers shall be provided and installed at each sanitary sewer manhole. Manholes covers shall be of either Standard Type (non-bolted) or Bolt-Down Type, as indicated on the Drawings. If not otherwise indicated, manhole covers shall be Standard Type. The top elevation of manhole frames must be adjusted to grade in areas such as streets, alleys, and parking lots or where shown on the Drawings. A maximum adjustment of 12 inches will be allowed using concrete risers. Adjustments greater than 12 inches must be made by changing precast concrete riser sections.

All manholes shall be tested in accordance with these Specifications.

5.3 Installation of Water Pipe and Appurtenances

The top of the pipe shall be a minimum of 30 inches below the surface. The pipe shall have a uniform bearing. Bell holes shall be dug so that the bell will clear the ground. The pipe shall be swabbed for cleanliness before lowering into the trench. Whenever pipe is cut it shall leave a smooth end at right angles to the axis. The end of the pipe shall be closed when the work is left temporarily. Angles or bends in the line shall be braced against movement by using concrete. Rock or boulders shall be removed to a clearance of at least 6 inches from pipe, valves, and fittings. If the bottom of the trench is found to be unsuitable, the Contractor will remove the material, backfill and compact with a suitable base. If unsuitable material cannot be removed, the Contractor shall construct a foundation for the pipe as directed by the City. Water lines that are installed with less than 30 inches of cover shall have special protection. No lines will have more than 42" of cover without special permission from the City. Pipes having greater than 8 feet of cover from the finished grade to the top of pipe shall be the class and type of pipe as per manufacturer's specifications as well as the System's special rules governing this installation. On taps 4 inches or larger, a ductile iron tapping sleeve will be used when the new pipe being installed is one-half or greater than the diameter of the pipe being tapped.

For pipes layed on steep slopes where erosion of the pipe trench could occur, concrete ditch checks shall be installed every 50' to 100' depending on the slope. See standard drawings for ditch checks.

Air relief will be installed on significant high points in the water system. These will be used when a service line cannot be installed to act as a natural air relief.

Streets shall be graded to within 6 inches of finished grade and the Developer's engineer will locate the back of curb and lot corners before the main is installed. These lot corner stakes must remain intact until the water laterals are installed.

If water service or mains must be shut off at any time during construction, the System must be notified and those residences and businesses that are affected must be given as much advance warning as possible. If necessary, the System may require the Contractor to make main connections during non-working hours i.e. late night, early morning, weekends.

Valves shall be set level on compacted earth and mechanical joints made in accordance with

the manufacturer's recommendations. Valve boxes shall be set flush with the finished grade of the street or road. In nonpaved rural areas the valve boxes shall be slightly higher than the finished grade. A circular 18 inches diameter concrete pad, 4 inches thick shall be placed around it. Valves will be rodded to fittings.

Fittings and fire hydrants regardless of type of bracing shall be blocked with concrete against undisturbed soil. The concrete shall be formed around the fitting in such a manner that the bolts and bolt holes are accessible. Bolts on mechanical joint fittings shall be torqued to the manufacturer's recommendations. Fire hydrants shall be set plumb. The steamer nozzle shall be between 18 inches minimum to 30 inches maximum above the finish grade of the surrounding area (i.e., ground within 10 feet of the fire hydrant). Gravel shall be used around weep holes. The hydrant base shall be blocked with concrete and rods shall connect the main to the valve and then the valve to the fire hydrant.

New water mains and equipment through which water passes must be sterilized as required by the State Board of Health. The Contractor shall not allow any connection until the line has been tested, sterilized, and approved for use. Mains shall be flushed until water has moved through the length of pipe and is clear. To sterilize the system, chlorine shall be used. The chlorinated water shall be drawn off at fire hydrants and ends until an Ortho-Tolidin test shows strong chlorine. After all points show strong chlorination, the system shall remain full for 24 hours and then flushed out with potable water. Samples will be taken and submitted to the State Board of Health for analysis. Approval of samples shall be secured before placing the system in use.

All service taps and meter installations 2 inches and smaller shall be made by the System. On new construction, before the System will change the service account name to the new property owners, the meter box and lines will be set to final grade of property. The System will be paid to raise the meter after the initial installation in accordance with the supplemental regulations.

The System will make all taps and install the service connection. The Contractor will be responsible for adjusting the meter and box to finish grade. The System shall supply a meter box, curb stop, meter loop and/or meter and any other appurtenances as determined by the System for a service connection. All items installed by the System will be owned and maintained by the System. Each pipe must have a shut-off valve and backflow preventer installed by the owner and be placed between the meter and the first outlet in the service pipe for the customer's use. The shut-off valve shall be used for repairing the service pipe or fixtures or to shut off water to prevent freezing.

The System shall not be liable for any damages to the customer's service line, plumbing, fixtures or property alleged to be caused by high pressure, by low pressure, or by fluctuation of pressure. It is the responsibility of the customer to provide at his expense any regulating devices or appurtenances required to adjust the pressure carried in the main serving his premises to a pressure suitable for his requirements. These devices cannot be installed in the System's meter box.

In special cases where PVC water lines are allowed, the Contractor shall install wire suitable for visual identification and electrically tracing below proposed finished grade. The wire shall be #8 copper wire in continuous rolls. No breaks within 1000' are allowed and proper splicing is required.

For the final inspection before acceptance by the System, all valve boxes shall be showing and the valve nuts shall be accessible. The System personnel and/or its agents will be furnished as built drawings and a representative from the Contractor and/or Developer's engineer will check each valve to verify the valve's being in the "on" position. The System shall provide locks for the one (1) inch locking curb stops on cul-de-sacs.

Section 6: Service Lines for Sewer

6.1 Purpose

These Standards represent the recommended construction practices and procedures for sanitary sewer service lines and supersede any other standards that may currently be in use. Any special designs may be submitted and approved in writing on a case by case basis. Minimizing the quantities of infiltration and inflow that enter the sanitary sewer system and minimizing the possibility of sanitary sewer overflows is essential to the long term goals of the City. The major objective of these Standards is to prevent infiltration and inflow (I/I) into future service lines and connections.

All sanitary sewer service lines, which connect to the City sanitary sewer system, shall be designed in accordance with all criteria established herein. All materials, construction, and testing of such facilities shall be in accordance with all Sections of this document.

All sewer service lines, connections, disconnections, and repairs to service lines that connect to the City sanitary sewer system shall be inspected, tested, and approved by a City Construction Inspector. The intent and desire of the City is that all sewer service lines be constructed in such a manner and under such supervision and inspection that the City may be assured that acceptable materials are used and that appropriate construction standards are observed resulting in the installation of a service line that minimizes the amount of infiltration and inflow.

In order to connect to the City sanitary sewer system, a main sewer must be available to the property, which is to be connected. Available shall mean that a main sewer or manhole is located on the subject property or within an adjacent public easement or right-of-way and within the extended property lines. Service lines may not extend across adjacent private properties. Any exception or waiver of these requirements must be approved by the Superintendent in writing.

6.2 Number of Buildings per Service Line

The following is a description of the requirements for the number of buildings allowed to be served per service line or private force main. If a specific case is not covered by the conditions below, the owner or owner's agent must contact the City for a ruling.

1.) Single family dwellings, Houses, Garden homes, Townhouses, Patio homes, Duplexes

An individual service line shall be installed for each single family dwelling, house, garden home, patio home, and each unit of a townhouse or duplex. Generally, once a service line exits from under the foundation of a building, the service line must extend directly to a main sewer with no further connections of other service lines. **This requirement is intended to minimize the number of infiltration and inflow causing joints and fittings. Waivers may be granted on a case by case basis based on site conditions or building configurations that makes the adherence to the policy unfeasible.** The main sewer shall be located in a public easement or right-of-way and be a minimum of eight (8) inches in diameter and approved, designed, and constructed in accordance with these Specifications.

2.) Multiple family dwellings, apartments, and condominiums

The City desires to limit the length of service line located outside of a building footprint, as well as, the number of connections to the 8-inch main. Thus, the City prefers that the plumbing for adjoining units of an apartment or condominium be connected together under the building footprint. However, an individual service line is required for each separate building. Once a service line exits from under the foundation of a building, the service line must extend directly to a main sewer with no further connections of other service lines. The main sewer shall be located within a public easement or right-of-way and be a minimum of eight (8) inches in diameter and be approved, designed, and constructed in accordance with these Specifications.

3.) Commercial Property

The City desires to limit the length of service line located outside of a building footprint, as well as, the number of connections to the 8-inch main. When a commercial building contains several plumbing fixtures which are located in different parts of the building, the City prefers the fixtures be connected together under or in the building foundation, in lieu of exiting from under the building at different locations. If all the plumbing can not be connected under the building footprint, the City will allow service lines from the same building to be connected outside the building footprint provided the goal of minimizing the length of service line and the number of connections to the main is followed. An individual service line is required for each separate building.

4.) Mobile Home Park

An individual service line is required for each separate mobile home or mobile home pad. The service line shall be ductile iron and extend directly from the mobile home pad to a minimum eight (8) inch main with no side connections or joining other service lines. The main sewer shall be located within a public easement or right-of-way and shall be approved, designed, and constructed in accordance with these Specifications. All mobile home pad service lines shall be capped at the foundation pad with an approved permanent removable plug. The plug shall be connected to the service line with a chain to keep it from getting lost. If a mobile home is moved at any time, the connection shall be plugged. A"P" Trap is required at the mobile home pad in accordance with Standard Detail.

6.3 Service Line Size and Material

All gravity flow service lines shall be 4 or 6 inches nominal diameter. Any larger diameter must be approved on a case by case basis by the Superintendent in writing. In most cases, a sanitary sewer line that is 8-inches or larger is considered a main sewer and is required to be located in a sanitary sewer easement dedicated to the City. The City will be responsible for the maintenance of said main sewer line but not the service line regardless of pipe diameter. If the potential peak wastewater flows from a building require an 8-inch or larger service line, the line will be considered

a service line from the building to the first manhole, in the easement, at which point it will be considered a main sewer. The 8-inch service line from the building to the first manhole is not required to be in an easement or right-of-way. All 8-inch or larger service lines shall be approved by the City on a case by case basis.

All service lines located in public street, highway, or roadway right-of-ways shall be ASTM 3034 (SDR35) PVC, Schedule 40 PVC or ductile iron from the main sewer to the right-of-way line, at which point the service line may transition to Schedule 40 PVC if all requirements for its use are met. All service lines in a mobile home park shall be ductile iron from the mobile home pad to the main sewer.

6.4 Service Disconnections and Repairs

Every sewer service line connection shall be considered permanent. Before a building is demolished, the City requires the sewer service line be disconnected before any work commences. If a building is being torn down, relocated, or other reason, that would require the service line to be disconnected from the internal plumbing, the service line shall be disconnected as close to the main sewer as possible. A permit to disconnect and plug the sewer must be obtained and an inspection made by a City Construction Inspector at the time of discontinuance. There is no charge for the permit.

In order to reduce infiltration and inflow, it is the policy of City to require the property Owner to repair service lines that are found to be damaged and contributing to the volume of infiltration and inflow. If during the repair of an existing service line, it is discovered that the service line is constructed of vitrified clay, concrete, or other pipe material deemed unsuitable by the City Construction Inspector, the City may recommend replacing the entire service line from the main sewer to the building plumbing.

Comment: B = 3

The City Sewer Use Ordinance prohibits the connection of storm water, roof drainage, ground water, street drainage, cooling water, basement drainage, pool backwash water, or any other source of drainage water to the sanitary sewer system. If such connections are found, the property owner will be advised in writing and given 30 days to remove such connection.

6.5 Material Specifications for Service Lines and Connections

Gravity sanitary sewer service lines shall be constructed of ductile iron, ASTM 3034 (SDR 35) or Schedule 40 PVC pipe, except as specified below. Force main sewer service lines shall be constructed of ductile iron or Schedule 40 PVC if the diameter of the force main is less than 4 inches.

Under the following conditions ductile iron sewer pipe shall be used and PVC not allowed:

1. In areas which have been filled and the proposed service line will be within the fill. If the service line is placed in an area to be filled and the service line has eighteen (18) inches or less of natural material above the pipe.
2. When the depth of the service line is greater than twelve (12) feet.
3. When making a connection to a manhole.
4. When crossing over or under any storm drains, or water mains.
5. When the sewer service line has less than eighteen (18) inches of permanent cover as measured from the top of pipe to the permanent cover. Bedding and backfill operations shall fully comply with the provisions of these Specifications.

6. Within parking lots, streets, roadways, alleys, or driveways, etc. where the final permanent cover is less than thirty-six (36) inches as measured from the top of pipe to the permanent cover. Bedding and backfill operations shall fully comply with these Specifications.
7. When crossing any creek, stream, ditch, or any other natural or man made terrain feature, which carries or may carry storm water.
8. When a mobile home park sewer service line has less than thirty-six (36) inches of permanent cover as measure from the top of pipe to the permanent cover. Bedding and backfill operations shall fully comply with these Specifications.
9. Ductile iron may be required if deemed necessary by the City Construction Inspector due to field conditions.
10. When the service line goes through casing pipe.

6.6 Construction Specifications for Service Lines and Connections

All specifications herein this document apply to sewer services as well as these specific sewer service specifications. A 6-inch cushion of No. 57 or 67 Stone shall be provided under all sanitary sewer service lines when rock is encountered in the trench excavation. Trench bottoms found to be unsuitable for foundations shall be undercut and brought back to grade with foundation backfill.

The service line shall be installed on a continuous positive grade at a minimum slope of 1% and a maximum slope of 20%. The slope of the service line may be greater if a Connecting Riser is installed. At no time shall straight stacking of the sewer service line be allowed. Bends and down turns of the service line shall be allowed and be limited to 60 degrees as measured from the horizontal.

A clean out shall be installed within thirty (30") inches of the building and at least once on each continuous run of 75 feet and at each change in horizontal or vertical direction greater than 45^{o}. Clean outs within thirty (30") inches of the building may be constructed of Schedule 40 PVC. No rubber cleanout plugs will be allowed. A test tee is required at or near the street right-of-way or easement.

All pipe joints shall be wiped inside and out to remove all dirt, water, or other foreign matter so that their surfaces are clean and dry when the pipes are joined. Joints shall be installed according to the manufacturer's specifications and recommendations.

Comment: B = 5

6.7 Sewer Connections

No person, firm, corporation, or government entity shall connect to the City sewer system unless said connection is made to an approved saddle, stub out, or tee provided for that purpose. No additional tap will be allowed if there is an existing stubout or connection for a particular property, unless the existing stubout or connection is plugged. **No taps or other openings shall be made in the City sanitary sewer system other than machine-made taps made by the City Maintenance Department or by a contractor approved by the City in writing.** The actual tapping and connection to the existing City maintained sewer system shall be performed by the City unless written approval is obtained to use a contractor approved by the City.

Excavations for the sewer tap shall be made by the plumbing contractor and shall be sufficiently large to give ample working room for the tapping crew. The plumbing contractor is solely responsible for safety and conformance with any applicable safety regulations. The excavation shall be made completely around the circumference of the main sewer. If the City's tapping crew or

City Construction Inspector feels the excavation is unsafe, the plumbing contractor shall take the necessary measures to improve the trench conditions to the satisfaction of the City Construction Inspector. The connection shall be left visible for inspection. No backfilling of the connection shall be started until the connection has been inspected and approved by the City Construction Inspector. After approval of the sewer connection, the excavation around the connection and around the main sewer shall be backfilled with No. 57 stone to one (1) foot above the main sewer.

Connections to existing ductile iron, PVC, vitrified clay or concrete sewer lines shall be made with a Romac, Style "CB" Sewer Saddle to be installed by the City. The Plumbing contractor will then connect to the saddle with the required service line and a concrete collar poured around the connection as shown in the Standard Details. The City will provide the saddle for all mains. Connections to ductile iron or PVC mains, which are under construction, shall be performed by installing a standard manufactured push-on joint tee which matches the main line pipe material. A service line shall then be installed to the right-of-way or easement line.

Connection of a service line to a manhole is discouraged and written approval is required to connect. If approval is granted, the following procedures shall be followed:

1. The sewer service line invert shall match the top of the main entering the manhole, but no more than two (2) feet above the manhole invert.
2. The existing manhole shall be cored by a contractor approved by the City.
3. Connections to manholes shall not damage the manhole o-ring. If the core into the manhole is just below a manhole joint, the top of the core shall be, at a minimum 6 inches, below the outside joint.
4. A rubber boot shall be used at the connection (Kor-N-Seal Boot, or approved equal).
5. Non-shrinking grout shall be applied both inside and outside the manhole connection. (Bonsal or Water Plug)
6. An invert shall be formed inside the manhole if one does not exist. If a manhole invert exists, the service line must be brought into the manhole above the invert.

6.8 Connecting Risers

The service line shall be installed on a continuous positive grade at a minimum slope of 1% and a maximum slope of 20%. A connecting riser allows the service line to be installed at a depth less than that required if the minimum and maximum slopes are maintained. Risers shall be installed from the connection to the point of meeting the horizontal run coming from the building. Risers shall not be constructed on an angle exceeding 60 degrees as measured from the horizontal as shown in the Standard Details. Where connecting risers are attached to a tee, using pipe of dissimilar material, an approved coupling is required. A concrete collar shall be required as shown in the Standard Details.

6.9 Creek Crossings and Above Ground Sewers

Sewer service lines crossing streams or creeks shall be installed below the bottom of all ditches and creeks where possible, and shall be ductile iron pipe and extend ten feet on both sides of the ditch or creek. The service line shall be completely encased in concrete on all creek or ditch crossings. If the sewer service line must extend above the ground, prior approval from the City is

required. All aerial sewers shall be ductile iron and shall be restrained joint. If any support should become necessary, it shall be provided by forming and pouring concrete piers with reinforcing steel.

6.10 Private Sewer Service Pump Stations (outside of building footprint)

Use of an existing or new septic tank as a wet well is prohibited. Holding tank or wet well shall be made of prefabricated fiberglass or plastic and shall be vented. Holding tank shall be sealed with resilient gaskets so no subsurface or surface water can leak into the tank. An alarm system is recommended that will alert the owner if the level in the wet well rises above normal operating levels. The tank shall be large enough to allow storage of some wastewater during short power outages.

Private force mains must comply with the same excavation and backfilling requirements as defined in these Specifications. The force main shall be a minimum 2 inches in diameter. The force main shall be made of ductile iron or Schedule 40 PVC. Pressure fittings and couplings must be used. A gate valve, check valve and union must be installed on the force main, downstream of the pump, to facilitate pump replacement.

6.11 Septic Tank Conversion

When converting from a septic tank to the City sewer system, the Owner and plumbing contractor shall be responsible for having the old septic tank pumped and earth back filled. Pumping the septic tank contents into the service line is not allowed. The sewer service line and tap shall be installed prior to disconnecting a building from the septic tank. Sewer Permit and Sewer Connection fees are required prior to connecting a building or home that is presently on a septic tank to the City sewer system.

6.12 Mobile Home Service Line Plugging

All sewer service lines for mobile homes shall have a permanent removable plug on the service line at the mobile home pad. The plug shall be connected to the service line by a chain. In addition, a “P” Trap is required at the mobile home pad in accordance with the Standard Details.

Section 7: Sewer Permit Process

7.1 Permits

A permit from Pell City is required for new sewer service lines and connections, repairs to existing service lines and connections, disconnections, and changes to buildings presently connected to the sewer system. There are two (2) distinct and different permits issued by the City relating to sewer connections.

1.) Sewer Impact Permit
2.) Sewer Connection Permit

Both permits are required for new connections to the sanitary sewer system. Only a Sewer Impact Permit is required if the property is already connected to the sewer system and the work being performed is the addition of plumbing fixtures or restaurant equipment and/or seating and no work is required on the service line. The following sections discuss the requirements and application process for each permit.

7.2 Sewer Impact Permit

If the building does not contain any internal plumbing, plumbing fixtures, or stubouts, then a Sewer Impact Permit is not required, prior to issuance of a Building Permit. In the following cases, a Sewer Impact Permit is required.

1.) If the building contains plumbing, plumbing fixtures, or stubouts then an Impact Permit is required prior to issuance of a Building Permit.
2.) A Sewer Impact Permit is required if an existing building or home is presently on a septic tank system and the Owner desires connection to the City sewer system.
3.) A Sewer Impact Permit is required if an existing building or home is presently connected to the City sewer system and the Owner is installing additional fixtures that will discharge to the sewer system. A Sewer Connection Permit may not be required if no additional service line is required.
4.) A Sewer Impact Permit is required if a restaurant or lounge presently connected to the sewer system is adding seats. A Sewer Connection Permit may not be required in this case.
5.) A Sewer Impact Permit is required if a restaurant or lounge presently connected to the sewer system is changing ownership. There is no charge for the permit as long as the number of seats will not increase over the amount originally paid on the Sewer Impact Permit. A Sewer Connection Permit is not required in this case.
6.) A Sewer Impact Permit is required if a restaurant or lounge is added to a building presently connected to the sewer system.
7.) A Sewer Impact Permit is required if an industry presently connected to the sewer system is adding or changing a process that will increase the volume of flow or change the character of the waste discharged to the sewer system. A Sewer Connection Permit may not be required in this case.

Each application for an Impact Permit, with the required fee, shall be filed with the City on a form furnished for that purpose. The Sewer Impact Permit shall be obtained and signed by the owner or owner's agent. The Sewer Impact Permit shall be obtained prior to commencement of construction of any new building, addition to or remodeling of a building, or service line to an existing building if the Owner desires connection to the County sewer system. **If any fixtures or stubouts for fixtures are installed prior to a permit being obtained, the permit fee shall be double the amount as established in the City Fee Schedule.** The appropriate fees will be calculated in accordance with the current version of the City Fee Schedule.

The Sewer Impact Permit is valid for a period of two (2) years from the date of issuance. The owner must renew the permit after this time limit has expired in order to utilize the permit. There is no charge for renewal of a permit unless the amount of the Impact Fee has changed from the original permit.

Owners of commercial or apartment developments are required to submit drawings in accordance with the Rules and Regulation at the time of application for a Sewer Impact Permit.

The Owner or plumbing contractor shall make arrangements for the building or home to be open at the time of the inspection to allow the City Construction Inspector to count the number of plumbing fixtures indicated on the Sewer Impact Permit. Failure to make such arrangements shall cause future permits to be denied until such arrangements are made.

7.3 Sewer Connection Permit

A Sewer Connection Permit is required (1) if a new building or home is to be connected to the City sewer system; (2) if an existing building or home is presently on a septic tank system and the Owner desires connection to the City sewer system; (3) if a repair or enlargement of an existing service line or connection is needed or required. A Sewer Impact Permit may not be required in this case.

The Sewer Connection Permit shall be obtained prior to starting any excavation for the installation or repair of a service line or connection. The Sewer Connection Permit shall be obtained by the Owner's plumber from the City, and pay the appropriate fee. The fee shall be as shown in the City Fee Schedule. The Sewer Connection Permit shall be obtained and signed by a Master Plumber or his duly authorized representative provided that a letter is on file with the County authorizing that person to be the representative for the firm. The plumbing company shall have a current Bond with the City, and be licensed by the State of Alabama.

Every sewer service line connection shall be considered permanent. Before a building is demolished, the Environmental Services Department requires the sewer service line be disconnected before any work commences. If a building is being torn down, relocated, or other reason, that would require the service line to be disconnected from the internal plumbing, the service line shall be disconnected as close to the main sewer as possible. A permit to disconnect and plug the sewer must be obtained and an inspection made by a City Construction Inspector at the time of discontinuance. There is no charge for the permit and the permit will be issued as a modified Connection Permit. If the demolition contractor damages the service line or main sewer, the contractor will be required to retain a licensed plumber or approved contractor to make the necessary repairs.

A Sewer Connection Permit issued shall be construed to be a license to proceed with the work and shall not be construed as authority to violate, cancel, alter, or set aside any of the provisions of this Standard, nor shall such issuance of a permit prevent the City from thereafter requiring correction of errors in construction, or of violation of this Standard. Any Sewer

Connection Permit issued shall become invalid unless the work authorized has commenced within six months after its issuance, or if the work authorized by such permit is suspended or abandoned for a period of six months after the time the work commenced; provided, that for cause, extensions of time for periods not exceeding six months each, may be allowed in writing by the City; however, maximum number of extensions shall not exceed three (18 months).

7.4 Bonding Requirements

Before the installation or repair of any sewer service line or connection to a main sewer, the Plumbing Contractor shall in addition to the required Masters Plumbers Certificate of Competency, have a business license issued by the Municipal or State authority and shall also deposit with the City and continuously maintain a good and sufficient bond in the sum of Two Thousand Dollars ($2,000.00) and made by a surety company duly authorized to do business in Alabama. Said bond shall be conditioned that the person, firm, or corporation, to be known as the Principal in said bond, shall faithfully observe all ordinances and laws of the City, including the sewer service line standards contained herein for connecting to main sewers, whether now or hereafter enacted, together with all rules and regulations established under the authority of said laws or ordinances; and shall perform in a workmanlike manner all work undertaken by said Principal in the installation of said service line and connection to the main sewer. Said bond shall also provide that it may be canceled by the surety by giving the City fifteen (15) days notice in writing prior to the date of cancellation. Failure to comply with this section is grounds to revoke the business license of the said person, firm, or corporation.

7.5 Revocation of Permits

The City may revoke a permit issued under the provisions of this Standard, in case there has been any false statement or misrepresentation as to a material fact in the application or plans which the permit was based. In all cases permit fees shall not be refunded. The City may revoke a permit or approval in the event that any part of the construction of the service line is in violation of, or not in conformity with, the provisions of this Standard.

7.6 Work Commencing Before Permit Issuance

Any person who commences any work on a service line before obtaining the necessary Sewer Connection Permit shall be subject to an additional payment to cover the actual cost of inspection. The additional payment shall be shown in the City Fee Schedule.

Section 8: Testing for Acceptance of Utilities

8.1 General

Upon completion of all or part of a water or sewer line and appurtenances, the Contractor will be required to test said utility for acceptability. The Contractor shall provide all necessary water, equipment, and instrumentation for water flushing before testing. All tests shall be conducted in the presence of the City Construction Inspector. Preliminary tests not observed by the City Construction Inspector will not be accepted. The City Construction Inspector shall be notified at least 24 hours before any work is to be inspected or tested. All defective utility lines and appurtenances (those not passing the specified test) shall be repaired, or replaced, and retested until acceptable by the City. Repairs shall be made to the standard of quality specified for the entire system.

Sections of the system may be tested separately. However, any defect which may develop in a section previously tested and accepted shall be promptly corrected and retested until acceptable to the City. All piping systems shall be tested in accordance with these test methods. Any other tests required by local plumbing codes or building authorities shall also be conducted independent of these tests.

8.2 Gravity Sewer Testing (Main Lines)

All sewer construction shall be bedded and backfilled to prevent settlement in ditches and having tight joints with gaskets fully compressed. Sewers shall be watertight within the allowable limits, and shall have no visible leaks. Pipe shall be laid so when sighting from manhole to manhole in any section, the whole diameter of the pipe shall be visible throughout the section. Any visible or audible leaks in any section of the sewer or appurtenances shall be repaired. The sewer shall be blocked off in sections totaling approximately 1,000 feet determined by the manhole spacing and tested for infiltration. No infiltration in excess of 200 gallons per mile per inch of pipe diameter per 24 hours will be permitted. Any section of sewer in which the infiltration is greater than that specified above shall be either repaired or replaced until it does meet the requirements specified.

Only lines tested after backfilling to final grade will be considered for acceptability. However, this test may also be used by the installer as a presumptive test to determine the condition of the line prior to backfilling. The Contractor shall furnish all the necessary equipment and be responsible for conducting all low-pressure air tests. In addition, the Contractor is responsible for any necessary repair work on sections that do not pass the test. No sealant shall be used in any newly installed sewer. Using sealant in a sewer is not the equivalent of a sound sewer pipe. Proper structural repair work is required by the City.

The infiltration quantities specified are those permissible when wet weather conditions prevail and the pipe is subject to a high water table. Further, the Contractor shall employ the low-pressure air testing procedure in order to determine the probable acceptability of the sewers when operating under wet weather conditions. The "low-pressure air test" shall generally conform to the procedure that is recommended for testing sanitary sewers and is as follows:

1. The section of pipe to be tested is cleaned and plugged at each end. The end of all branches, laterals and wyes are plugged. Either mechanical or pneumatic plugs (manufactured for the intended use of air testing) may be used. All plugs are to be braced to prevent blow-out. To facilitate test verification by the City Construction

Inspector, all air used shall pass through a single, above ground control panel. The above ground air control equipment shall include a shut-off valve, pressure regulating valve, pressure relief valve, input pressure gauge, and a continuous monitoring pressure gauge having a pressure range from 0 to 10 psi. The continuous monitoring gauge shall be no less than 4 inches in diameter with minimum divisions of 0.10 psi and an accuracy of ±0.04 psi. Two separate hoses shall be used to: (1) connect the control panel to the sealed line for introducing low-pressure air, and (2) a separate hose connection for constant monitoring of air pressure build-up in the line. Plug the upstream end of the line first to prevent any upstream water from collecting in the test line.

2. Add air slowly to the plugged section of the sewer under test until the internal air pressure has been raised to 4.0 psig greater than the average backpressure of any groundwater. After the pre-set pressure has been obtained, allow at least two minutes for air temperature to stabilize, adding only the amount of air required to maintain the pre-set pressure, then close air supply valve.

3. When the pressure decreases to a gauge reading equal to 3.5 psig, start stopwatch. Determine time in seconds marking drop of 1.0 psig of internal air pressure.

4. Refer to the appropriate table below to determine minimum permissible pressure holding time in seconds for particular section of sewer being tested if it contains one pipe size. If the time shown in Table I or Table II for the designated pipe size and length elapses before the air pressure drops 1.0 psig, the section undergoing test shall have passed and shall be presumed to be free of defects. The test may be discontinued once the prescribed time has elapsed even though the 1.0 psig drop has not occurred. If the pressure drops 1.0 psig before the appropriate time shown in Table I or Table II has elapsed, the air loss rate shall be considered excessive and the section of pipe has failed the test.

All installed PVC gravity sewer if required by the City Construction Inspector, shall be tested for deflection by the Contractor. The Contractor shall furnish all equipment, labor, and materials for making the test. Tests shall be made from manhole to manhole. Deflection shall be tested by a "go", "no-go" mandrel or template which is sized to such dimensions that it will not "go" when encountering a deflection greater than permissible. This type of mandrel must be of such design as to minimize the possibility of its being hung up in the pipe by silt or other residues. A mandrel shall be sized to permit up to 5% deflection in pipe having typical maximum dimensional tolerances.

A pull and retrieval rope is required on the mandrel with a marker attached on the rope at the end of the pipe where the mandrel will exit to determine the location of the mandrel in the line. If the mandrel fails to pass through the line, it shall be assumed that the deflection exceeds 5% and the section or sections of pipe shall be corrected to the satisfaction of the City Construction Inspector.

If a section with excessive deflection is located, the Contractor shall uncover and inspect the pipe and replace any damaged pipe. If pipe is not damaged, replace and thoroughly tamp the haunching and initial backfill and replace remainder of backfill. If the section still fails to pass the deflection test, it shall be replaced with pipe which will pass the test. The cost of repair or replacement as well as acceptance retesting shall be borne by the Contractor.

8.3 Acceptance and Vacuum Testing of Manholes

Only manholes tested after backfilling to final grade will be considered for acceptability. However, this test may also be used by the installer as a presumptive test to determine the condition of the manhole prior to backfilling. All main and service line connections which the manhole accommodates shall be 100% completed prior to testing of the manhole. Regardless of vacuum test results, no visible leaks will be allowed in a manhole.

1. Plug all manhole entrances and exits other than the manhole top access using suitably sized pneumatic or mechanical pipeline plugs. Plugs should be inserted a minimum of 12" beyond manhole wall. Make sure such plugs are properly rated for the pressures required for the test. All plugs are to be braced to prevent blow-out.
2. Install the vacuum tester head assembly at the top access of manhole. Adjust the cross brace to insure that the inflatable sealing element inflates and seals against the straight top section of the manhole or the ring assembly, if possible. (If using a "plate" style manhole tester, position the plate on the manhole ring assembly.)
3. Attach the vacuum pump assembly to the proper connection on the test head assembly. Make sure the vacuum inlet/outlet valve is in the closed position. Inflate sealing element to the recommended maximum inflation pressure.

TABLE I
MINIMUM TEST TIME FOR PVC OR D.I. PIPE

1 Pipe Diameter (in.)	2 Minimum Time (min: sec)	3 Length for Minimum Time (ft)	4 Time for Longer Length (sec/ft)	Specification Time for Length (L) Shown (mi						
				100 ft	150 ft	200 ft	250 ft	300 ft		
4	3:46	597	.380 L	3:46	3:46	3:46	3:46	3:46		
6	5:40	398	.854 L	5:40	5:40	5:40	5:40	5:40		
8	7:34	298	1.520 L	7:34	7:34	7:34	7:34	7:36		
10	9:26	239	2.374 L	9:26	9:26	9:26	9:53	11:52		
12	11:20	199	3.418 L	11:20	11:20	11:24	14:15	17:05		
15	14:10	159	5.342 L	14:10	14:10	17:48	22:15	26:42		
18	17:00	133	7.692 L	17:00	19:13	25:38	32:03	38:27		
21	19:50	114	10.470 L	19:50	26:10	34:54	43:37	52:21		
24	22:40	99	13.674 L	22:47	34:11	45:34	56:58	68:22		
27	25:30	88	17.306 L	28:51	43:16	57:41	72:07	86:32		
30	28:20	80	21.366 L	35:37	53:25	71:13	89:02	106:50		
33	31:10	72	25.852 L	43:05	64:38	86:10	107:43	129:16		
36	34:00	66	30.768 L	51:17	76:55	102:34	128:12	153:50		

4. Start the vacuum pump and allow pre-set RPM to stabilize. Open the inlet/outlet ball valve and evacuate the manhole to 10" Hg. (approximately negative 5 PSIG, 0.3 bar).
5. Close vacuum inlet/outlet ball valve and monitor vacuum for specified test period (see Table). If vacuum does not drop in excess of 1" Hg. in the time specified, manhole is considered acceptable and the manhole passes the test. If manhole fails the test, complete necessary repairs and repeat test procedures until satisfactory results are obtained.

VACUUM TEST TIMETABLE
(24" MAXIMUM DEPTH)

DIAMETER (INCHES)	ELAPSED TIME	ADDITIONAL TIME PER 2' OVER 24' DEEP
48"	60 seconds	5.0 seconds
60"	78 seconds	6.5 seconds
72"	96 seconds	8.0 seconds

6. Repeat the above test procedure after backfilling manhole for final acceptance test.

Though the above is a general explanation of testing procedures, the Contractor is responsible for all testing procedures utilized. Testing procedures shall be modified as needed by the Contractor to insure a safe working environment.

8.4 Pressure Sewer (Force Main) Testing

All piping shall be flushed with water to remove construction debris prior to testing. The section being tested will be sealed pressure tight at each end with restrained valves, plugs or caps. The pipe line shall be filled with water and all air removed either at air release valves or through taps into the pipe. Test pressure for pipe and procedure shall be identical to that of water mains.

8.5 Sewer Service Inspection

The intent and desire of the City is that all sewer service lines that connect to the City sanitary sewer system be constructed in such a manner and under such supervision and inspection that the City may be assured that acceptable materials are used and appropriate construction standards observed that will result in the installation of a service line that minimizes the amount of infiltration and inflow. All sewer service lines, connections, repairs to existing lines, and disconnections will be inspected and approved by a City Construction Inspector to insure compliance with all the requirements of this Standard. A representative from the company that obtained the Sewer Connection Permit shall be on site at the time of the inspection and hold, at a minimum, a Journeyman Plumbers card.

The following is a list of the minimum inspection requirements.

1. The plumbing contractor shall install the pipe bedding and service line in

accordance with these Standards. All service lines, connections, repairs, and disconnections shall be visible for inspection. **No backfill shall be placed until the bedding and pipe placement has been approved by the City Construction Inspector**. If any part of the service line has been covered without an inspection, the plumbing contractor shall uncover the pipe for inspection.

2. No concrete collars shall be poured around a connection until the joint or connection has been approved by the City Construction Inspector.
3. Inspection shall be made of the pipe material, joints, alignment and grade, pipe bedding and other items to assure full compliance with these Standards.
4. Inspection shall be made of the complete pipe backfill until one (1) foot of material is placed over the pipe.

For the purpose of testing a sewer service line, it will be required that the sewer service line have a cleanout at the building and a test tee at the main sewer connection. Testing of the sewer service line shall consist of the following:

1.) The sewer service line shall be plugged at the test tee and filled with water at the cleanout at the building with a minimum of 10 feet of head. The water shall be kept in the system for at least fifteen (15) minutes before the inspection starts; the system shall then be inspected for leaks. Should the pipe and/or joints leak, the pipe shall be taken apart, cleaned, reinstalled, and retested.

2.) A wooden sewer ball, not smaller than ½" less in diameter than the inside diameter of the sewer line under test, shall be run from the building cleanout through to the test tee. The test ball shall roll through the service line without the necessity of rodding or assistance of any kind, other than the flushing of five (5) gallons of water. Should the test ball hang or become stopped for any reason, the portion of sewer in which the stoppage occurred shall be removed and replaced and the sewer re-tested.

3.) The slope of the sewer service line shall be tested by the use of a level. The minimum slope allowed is 1%.

No sewer service shall be accepted until it has successfully passed the above mentioned tests. Upon completion and acceptance of the sewer service line by the City Construction Inspector, the pipe shall be properly covered and the ditch backfilled immediately. At no time will the trench be allowed to remain uncovered after acceptance by the City Construction Inspector.

Upon notice from the City Construction Inspector, work on any service line or connection that is being done contrary to the provisions of this Standard shall immediately cease. Such notice shall be in writing and shall be given to the Owner of the property, or to his agent, or to the person doing the work, and shall state the conditions under which work may be resumed. Where an emergency exists, the City Construction Inspector shall not be required to give written notice prior to stopping work.

8.6 Testing of Water Mains (also pressure sewers)

The Contractor shall furnish approved equipment. Testing shall be done in the

presence of the City Construction Inspector. Testing will be 1-1/2 times the normal operating pressure but not less than 150 pounds per square inch. The City Construction Inspector shall determine the test pressure and test sections which shall be limited to a maximum of one mile. Tests with joints uncovered shall be maintained for a period to inspect the section, but in no case for less than two hours. Where the pipeline is backfilled, the test will be maintained for no more than eight (8) hours with hydrostatic test performed in accordance with AWWA C-600. Leakage shall not exceed the following:

Maximum Leakage per
1,000 Feet of Pipe in Gallons per Hour

Pipe Diameter	at 150 psi	at 200 psi	at 250 psi
3 Inches	0.28 GPH	0.32 GPH	0.36 GPH
4 Inches	0.37 GPH	0.43 GPH	0.47 GPH
6 Inches	0.55 GPH	0.64 GPH	0.71 GPH
8 Inches	0.74 GPH	0.85 GPH	0.95 GPH
10 Inches	0.92 GPH	1.06 GPH	1.19 GPH
12 Inches	1.10 GPH	1.28 GPH	1.42 GPH
14 Inches	1.29 GPH	1.48 GPH	1.66 GPH
16 Inches	1.47 GPH	1.70 GPH	1.90 GPH
18 Inches	1.66 GPH	1.91 GPH	2.14 GPH
20 Inches	1.84 GPH	2.12 GPH	2.37 GPH

Tests shall be made with a pressure recording gauge as provided by the City. The Contractor shall provide all piping for installing the gauge.

Section 9: Backflow Prevention Plan and Ordinance

A statement adopted by Board of Directors on January 26, 1970 and Revised June 24, 1979

The American Water Works Association recognises that the water purveyor has a responsibility to provide its customers at the service connection with water that is safe under all foreseeable circumstances. Thus, in the exercise of this responsibility the water purveyor must take reasonable precaution to protect the community distribution system from the hazards originating on the premises of its customers that may degrade the water in the community distribution system.

It is realized that cross-connection control and plumbing inspections on premises of its customers are regulatory in nature and should be handled through the rules, regulations, and recommendations of the health authority or the plumbing-code enforcing agencies having jurisdiction. The water purveyor, however, should be aware of any situation requiring inspection and/or re-inspections necessary to be detect hazardous conditions regulating from cross-connections. If, in the opinion of the utility, effective measures consistent with the degree of hazard have not been taken by the regulatory agency, the water purveyor should take such measures as he may deem necessary to ensure that the community distribution system is protected from contamination. Such action would include the installation of a backflow prevention device, consistent with the degree of hazard, at the service connection, or discontinuance of the service.

1. INTRODUCTION

The City of Pell City, in its operation of a public potable water supply system is required to ensure protection of public health through the provision of minimum requirements and standards for design, construction, operation and maintenance of its system. It is essential that physical cross-connection, which create or have the potential to create an imminent and substantial danger to public health be eliminated from the distribution system and plumbing systems of customers. Backflow can result in the potable water system becoming a transmitter of disease, toxic materials and other hazardous liquids. Therefore, it is necessary to establish and maintain a Cross-Connection Control Program to protect the health of water consumers by the control of actual and/or potential cross connections through methods of containment and/or isolation.

2. AUTHORITY

Alabama Department of Environmental Management Administrative Code Regulations 335-7.
335-7-12-.05 "Responsibility of the Supplier of Water. This rule applies to all NTNC and non-community water system. It is the responsibility of the water system to establish and to operate a cross connection control and backflow prevention program consistent with the extent of the system within the jurisdiction of the utility. This program shall be a continuing inspection program and records of health hazards found and corrective action taken shall be kept for five years and shall be made available to the Department when requested. Community systems must have a formally adopted written cross connection control policy. This policy must meet the provisions of this chapter and shall be provided to customers on request.

Statutory Authority: Code of Alabama 1975. 22-23-33, 22-23-49, 22-22A-5, 22-22A-6.
Effective: January 4, 1989"

3. DEFINITIONS

Air Gap Separation - An unobstructed vertical distance through the free atmosphere between the lowest opening from any pipe or faucet supplying water to a tank, plumbing fixture, or other device and the flood rim of the receptacle, and shall be at least double the diameter of the supply pipe measured vertically above the flood level rim of the vessel. In no case shall the gap be less than one (1) inch. This gap shall also be above the established 100-year flood level.

Atmospheric Vacuum Breaker - A backflow prevention device which is operated by atmospheric pressure in combination with the force of gravity. The unit is designed to work in a vertical plane only. The moving part consists of a poppet valve, which must be carefully sized to slide in a guided chamber and effectively shut-off the reverse flow of water when a negative pressure exists.

Auxiliary Water Supply - Any water supply on or available to the premises other than the purveyor's approved public potable water supply. These auxiliary water supplies may include water from another purveyor's public potable water supply or any natural source(s) such as a well, spring, river, stream, harbor, etc., or "used waters" or "industrial fluids." These waters may be polluted, contaminated, or may be objectionable and constitute an unacceptable water source over which the water purveyor does not have sanitary control.

Backflow - The flow of water or other liquids, mixtures or substances into the distribution pipes of a potable supply of water from any source or sources other than its intended source.

Back Pressure - Backflow caused by a pump, elevated tank, boiler or other means that could create pressure greater than the supply pressure.

Back Siphonage - Backflow due to a negative or subatmospheric pressure within a water system.

Backflow Prevention Device - A device to counteract back pressure or prevent back siphonage.

Backflow Prevention Device - Approved: The term approved backflow prevention device shall mean a device that has met the requirements of one or more of the following standards:

AWWA - C-506	Standard for backflow prevention devices, Reduced pressure principle and Double Check valve types
ASSE - 1001	Atmospheric type vacuum breaker
ASSE - 1011	Hose connection vacuum breakers
ASSE - 1020	Pressure Type vacuum breaker
ASSE - 1024	Dual Check Type backflow preventor (Residential Use Only)
ASSE - 1013	Reduced pressure principle back pressure backflow preventers
ASSE - 1015	Double check valve type back pressure backflow preventors
USC - FCCC	University of Southern California Foundation for Cross-Connection control and Hydraulic Research

Containment - A method of controlling potential and/or confirmed cross-connections by installation of a double check assembly or a reduced pressure principle backflow prevention device.

Cross-Connection - Any physical arrangement whereby a public water supply system is connected, directly or indirectly, with any other water supply system, sewer, drain, conduit, pool, storage reservoir, plumbing fixture or other device which contains or may contain contaminated water, sewage or other waste or liquid of unknown or unsafe quality, which may be capable of imparting contamination to the public water supply system as a result of backflow. Bypass arrangements, jumper connections, removable sections, swivel or change-over devices, or any other temporary or permanent devices through which or because of which backflow could occur are considered to be cross-connections.

Double Check Valve Assembly - An assembly composed of two single, independently acting check valves, including tightly closing shut-off valves located at each end of the assembly and suitable connections for testing the water tightness of each check valve.

Health Hazard - Any conditions, devices, or practices in any water supply system or in its operation which create or may create a danger to the health and well-being of the water consumer.

Isolation - A method of controlling potential and/or confirmed cross-connections by installation of an air gap separation or a vacuum breaker.

Pressure Vacuum Breaker - A pressure vacuum breaker is similar to an atmospheric vacuum breaker except that the checking unit “poppet valve” is activated by a spring. This type of vacuum breaker does not require a negative pressure to react and can be used on the pressure side of a valve.

Public Water Supply - Any system or water supply intended or used for human consumption or other domestic use, including source, treatment, storage and distribution where water is furnished to any community, collection or number of individuals, or is made available to the public for human consumption or domestic use, but excluding supplies serving on single-family residence.

Reduced Pressure Principle Backflow Prevention Device - A device incorporating two or more check valves and an automatically operating differential relief valve located between the two check valves, two shutoff valves and equipped with necessary appurtenances for testing. The device shall operate to maintain the pressure in the zone between the two check valves, less than the pressure of the public water supply side of the device even at cessation of normal flow. In case of leakage of either check valve, the differential relief valve shall operate to maintain this reduced pressure by discharging to the atmosphere. When the inlet pressure is two pounds per square inch or less, the relief valve shall open to the atmosphere, thereby providing an air gap in the device. This air gap shall also be above the 100-year flood level.

4. RESPONSIBILITY

(a) The City of Pell City is responsible for the protection of its public potable water distribution system from backflow of contaminants or pollutants through any water service connection. An approved backflow prevention device is required at the water service connection to any of its customer’s premises for the safety of the users of the water

system and shall be installed at the customer's expense.

(b) Failure, refusal or inability on the part of the customer to meet the City's time schedule for installation of said device or devices shall constitute grounds for discontinuance of water service until such device or devices have been properly installed. Any licensed plumber may install the proper device in the correct manner (Call City Hall if additional information in needed.)

(c) Compliance testing after initial installation of a backflow prevention device shall be performed by the City.

(d) In the event of any known or suspected accidental pollution or contamination of the consumers or the City's potable water system, the consumer shall promptly take steps to confine any further spread of pollution or contamination and shall immediately notify the City of the situation (telephone number 884-3333 24 hours).

5. POLICY

(a) All premises having an auxiliary water supply shall have an approved air gap separation or an approved reduced pressure principle backflow prevention device installed in order to protect the public water supply against backflow.

(b) For all premises where there is water or substances that could be objectionable but not hazardous to health, if introduced into the public water system, the public water system shall be protected by an approved air gap separation, or an approved double check valve assembly, or an approved vacuum breaker.

(c) For all premises where there is an material dangerous to health, which is handled in such a fashion as to create an actual or potential hazard to the public water system, the public water system shall be protected by an approved reduced pressure principle backflow prevention device. Examples of premises where these conditions have been found to exist include sewage treatment plants, sewage pumping stations, chemical manufacturing plants, hospitals, mortuaries, and plating plants.

(d) For all premises where there are "uncontrolled" cross connections, either actual or potential, the public water system shall be protected by an approved air gap separation or an approved reduced pressure principle backflow prevention device.

(e) For all premises where security requirements or other prohibitions or restrictions make it impossible or impractical or perform a complete in-plant cross-connection survey, the public water system shall be protected with an approved air gap separation or an approved reduced pressure principle backflow prevention device.

(f) For all premises more than two stories high (excluding basements), the public water system shall be protected by an approved double check valve assembly.

(g) All backflow prevention devices shall be installed at a location designated by the City of Pell City. Generally, this will be immediately on the customers side of the meter. If circumstances make this location impractical, then the backflow prevention device may be placed further downstream from the meter. However, any piping between the meter and the backflow prevention device must be either exposed or readily accessible for inspection.

(h) The following types of facilities shall normally require the designated backflow prevention devices. This list is presented as a guideline and should not be construed as being final or complete. Each case will be judged on its own merit.

FACILITIES REQUIRING BACKFLOW PREVENTION DEVICES

A.G. - Air Gap Separation
D.C. - Double Check Valve Assembly
R.P. - Reduced Pressure Principle Backflow Prevention Device
V.B. - Vacuum Breaker (type to be designated)

Type of Facility	Type of Protection
Ice Cream & Dairy Products	A.G. or D.C.
Car Wash	A.G. or R.P.
Chemical Plant	A.G. or R.P.
Film Lab or Development	A.G. or R.P.
Food or Beverage Processing Plant	D.C.
Hospitals, Clinics, and Medical Buildings	A.G. or R.P.
Laboratories	A.G. or R.P.
Laundries or Dry Cleaners	D.C.
Machine Tool Plants (health hazard)	A.G. or R.P.
Machine Tool Plants (no health hazard)	D.C.
Metal Plating Plants	A.G. or R.P.
Morgues, Mortuaries or Autopay Facilities	A.G. or R.P.
Multi Storage Buildings	A.G. or D.C.

Type of Facility	Type of Protection
Packing Houses	A.G. or R.P.
Paper Product Plants	A.G. or R.P.
Pesticide & Herbicide Exterminations	A.G. or R.P.
Petroleum Processing Plants	A.G. or R.P.
Petroleum Storage Plant or Yard (health hazard)	A.G. or R.P.
Petroleum Storage Plant or Yard (no health hazard)	D.C.
Pharmaceutical or Cosmetics Plants	A.G. or R.P.
Piers, Docks, or Waterfront Facilities	A.G. or R.P.
Power Plants	A.G. or R.P.
Radioactive Material Plants	A.G. or R.P.
Sand and Gravel Plants	D.C.
Schools with Laboratories	D.C.
Irrigation Systems	D.C.
Irrigation Systems (with chemical feed)	A.G. or R.P.
Swimming Pools	A.G. or R.P.
Sewage Treatment Plants	A.G. or R.P.
Sewer Pumping Stations (health hazard)	A.G. or R.P.
Sewer Pumping Stations (no health hazard)	D.C.
Sewage Pumping Stations (outside hose bibs only)	V.B.
Premises having water recirculating systems and pumps (health hazard)	A.G. or R.P.
Premises having water recirculating systems and pumps (no health hazard)	R.P. or D.C.
Premises having boiler, cooling systems, or hot water heating systems where chemical water conditions are used	A.G. or R.P.
Premises having storage tanks, reservoirs, ponds, etc.	A.G. or R.P.
Veterinary establishments	A.G. or R.P.
Waterfront Property with building	A.G. or D.C.

6. INSPECTION

(a) The City of Pell City shall conduct inspections of customers premises where suspected cross-connections or potential cross-connections may exist. Customers shall be notified in advance of the inspections and the reason for the inspections. Should any cross-connections or potential cross-connections be detected, the customer shall be notified in writing of the appropriate type of backflow prevention device to be installed. Refusal by a customer to allow an inspection shall be considered prima facia evidence of the existence of cross-connections, thereby requiring the installation of an approved reduced pressure principle backflow prevention device or the disconnection of service.

(b) For existing facilities, customers will be asked to complete a questionnaire on their water usage in order to make a preliminary determination of the potential health hazard to the City's distribution systems. When such information or other knowledge indicates a potential health hazard, a survey of the customers water system shall be conducted. Such surveys need not be a detailed inspection of the location or disposition of water lines, but can be confined to establishing the water use on the premises; the existence of any cross-connections; the availability of auxiliary water supplies; the use or availability of pollutants, contaminants, and other liquid, solid or gaseous substances that may be used industrially for stabilization of water supplies and other procedures for determining the degree of health hazard.

(c) All new services shall be classified at the time of application to indicate the degree of hazard anticipated and hence, the type of device required. This information shall be given to the applicant in writing. Any later change in water usage may require a change in the type of device. If no realistic evaluation of the proposed water uses can be determined, the consumer, architect, engineer or other appropriate individual should be advised in writing that eventually circumstances may required the installation of additional backflow protection of the water supply serving the premises.

(d) All water customers of the City shall be required to notify the City, in writing of any changes in their water usage. These changes will be evaluated to determine if there is an increase in the potential health hazard and if such increase requires the installation of a device. If a device is already in place, it will be determined if this device is adequate or if a different type of device is required.

7. RECORDS

Appropriate records shall be maintained by the City of all potential and confirmed cross-connections. Installations and tests of backflow prevention devices shall be recorded and filed for future reference.

8. MAINTENANCE

(a) Routine testing of backflow prevention device(s) shall be performed by the City. The frequency of testing will be dependent upon the type of device installed and the potential health hazard involved.

(b) Customers will be notified in advance of the date and approximate time that any testing will be performed. It will be necessary to shut off the water service for a period not exceeding fifteen (15) minutes and every effort will be made to schedule tests to suit the customers convenience. If the customers operations cannot permit any interruption of service, it will be the customers responsibility to have two approved backflow prevention devices installed in parallel so that one may be used while the other is being tested. Bypasses around backflow prevention devices are expressly forbidden.

(c) If any device tested are found to be faulty, the customer will immediately be notified and will be required to have the device promptly repaired or replaced at his expenses. In high hazard situation, it may be necessary to terminate service until a properly operating device is in place. The customer should notify the City as soon as any faulty device has been corrected so that it may be re-tested.