

AN ORDINANCE TO SET DEVELOPMENT STANDARDS FOR DESIGN AND INSTALLATION
OF WATER AND SEWERAGE SYSTEMS FOR CITY OF HAMPTON.

ORDINANCE # 89

CITY OF HAMPTON, GEORGIA

DEVELOPMENT STANDARDS
FOR DESIGN AND INSTALLATION OF
WATER AND SEWERAGE SYSTEMS
CITY OF HAMPTON, GEORGIA

CITY OF HAMPTON
WATER AND SEWER DEPARTMENT
P. O. BOX 400
HAMPTON, GEORGIA 30228

MAY, 1996

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STATEMENT OF NECESSITY

It is hereby determined necessary for the protection of the public health, safety, welfare, and convenience of the citizens of City of Hampton, and for the orderly development of city water distribution and sewage collection and transportation systems, to provide development standards and procedures for the installation of water and sewerage systems, assigning the cost for the installation of said facilities pursuant to the authority granted by Article IX, Section III of the constitution of Georgia as amended.

PURPOSE

It is the purpose of these standards and procedures to insure that all water distribution and sewage collection and treatment systems, constructed in the City of Hampton, satisfy all existing and future City of Hampton, State, and Federal regulations.

After the passage of this resolution, water and sewer systems in the service areas of the City of Hampton, Georgia, shall be constructed only after the plans have been approved as outlined in these standards. Only systems constructed in accordance with these standards will be allowed to connect to the City of Hampton Water or Sewer System either immediately following construction or at any time in the future.

PROCEDURE FOR APPROVAL AND ACCEPTANCE

Prior to the design stage of a project, both developers and engineers are encouraged to discuss the water distribution and sewage collection needs with the Water and Sewer Department to assure compatibility with City of Hampton plans, and to review the requirements as documented in these Development Standards. The City of Hampton may require the upgrade of existing facilities to meet requirements of these development standards prior to the preliminary approval of any addition or modification to said existing facilities. All construction plans for water and sewer systems must be prepared by a Professional Engineer registered in the state of Georgia.

Initially, the developers and engineers shall submit two (2) copies of preliminary plans, in accordance with the checklist included in these standards, for review by the Water and Sewer Department. A review fee will be charged for each water and sewer plan submitted (Appendix F). The Water and Sewer Department may, in its discretion, based upon the size and complexity of the proposed project retain outside consultants to review portions of the plans. The expense of any such outside consultants shall be charged to the Applicant in addition to the review fee. One (1) set of the preliminary plans will be returned with appropriate comments.

Prior to final plans being submitted for review, the developers and engineers shall make the required revisions to the plans and prepare other permits and approvals to be submitted to the Georgia Department of Transportation and other necessary agencies.

Plans submitted for final review shall include three (3) copies of the revised plans for Water and Sewer Department Review, in accordance with these standards and the latest edition of the Georgia D.O.T. Utility Accommodations Manual. Additional sets may be required if other agencies are involved in the approval process.

When the final, revised plans are submitted to the Water and Sewer Department, a final review will be made prior to submitting the plans to outside agencies for further approval. If additional reviews are necessary due to neglect of the initially reviewed plans, an additional \$25.00 review fee will be required. If the final review is approved by the Water and Sewer Department, the additional plans will be submitted to the outside agencies for further approval. When approval is received from those agencies, and connection fees are paid by the developer, the Water and Sewer Department will approve the plans for construction. Approval shall be valid for a period of one (1) year. If construction has not begun within one (1) year, the approval shall be invalid and the plans and specifications must be resubmitted as stated above.

Prior to beginning construction, the developer shall give forty-eight (48) hour notice to the Water and Sewer Department. Authorized representatives of the Water and Sewer Department shall have access to the work for inspection. When all water and/or sewer construction has been completed, the developer or his representative shall meet with a representative of the Water and Sewer Department at the job site. All permits, drawings and construction will be examined at this time to insure that the work has been completed in accordance with the approved plans and these standards. If additional work is required by the developer, it will be noted at this time and reinspected upon completion. If additional trips are required following this reinspection, due to negligence by the developer, a reinspection fee will be required. When the construction has been completed and passes the final inspection by the Water and Sewer Department, the developer shall submit to City of Hampton transfer of ownership documents and a reproducible mylar (24" x 36") set of as-built plans for future reference. All Utility Contractors must hold a State Utility Contractor License and must be on current approved Contractors List of the City of Hampton. Please refer to Form H-101.

The City of Hampton Water and Sewer Department will, upon receipt of the as-built plans, issue a letter of acceptance contingent upon the Developer issuing a Letter of Credit to start on first day of the first water or sewer tap, thus beginning the one (1) year warranty period.

The following guide is a typical process by which a project would proceed from initial contact with the developer and/or his engineer through the final acceptance of the utility by the Water and Sewer Department.

DEFINITIONS

The definitions of terms used in the Development Standards shall be as interpreted in the Georgia Safe Water Drinking Act of 1977 and Chapter 391-3-5 of the Official Compilation of Rules and Regulations of the State of Georgia, "Rules for Safe Drinking Water".

1. "Authority" - the individual, official, board, department or agency established and authorized by county, city and/or other political subdivision created by law to administer and enforce the provisions of the Plumbing Code, the Federal and State Safe Drinking Water Acts, and the Ordinances, Rules, Regulations, and Policies of City of Hampton, in the State of Georgia.
2. "Authorized Water and Sewer Department Representative" - any individual employed by the City of Hampton Water and Sewer Department given direct authorization, from the Superintendent of the City of Hampton Water and Sewer Department to act as a department representative.
3. "Backflow" - a reverse flow in a water system from the normal or intended direction.
4. "Backflow Preventer (BFP)" - a device designed to prevent reverse flow in a water system. The term should normally be used where backpressure-type backflow is implied.
5. "Branch Sewer" - a sewer which receives sewage from a relatively small area, and discharges into a main sewer.
6. "Contaminant" - means any physical, chemical, biological, or radiological substance or matter in water that could cause a public health hazard.
7. "Customer" - shall mean every person who is responsible for contracting (expressly or implicitly) with the City of Hampton Water and Sewer Department in obtaining, having, or using sewer connections with, or sewer tap to, the sewer system of the City of Hampton Water and Sewer Department and in obtaining, having, or using water and other related services furnished by the City of Hampton Water and Sewer Department for the purpose of water supply or sewage disposal through said system.
8. "Department" - City of Hampton Water and Sewer Department. In the absence of any other designated department, the term shall refer to the City Superintendent and the staff under his supervision.

9. "Developer" - Any person or entity, including their agent or construction contractor, who wishes to construct new water or sewerage lines for new subdivisions or other development.
10. "Drinking water" - water supplied for domestic use or human consumption, meeting the maximum contaminant levels established by the State.
11. "Easement" - shall mean an acquired legal right for the specific use of land owned by others.
12. "EPD" - shall mean the Environmental Protection Division of the Department of Natural Resources of the State of Georgia.
13. "Force main" - a pipe for delivering wastewater from a pumping station to its destination which may be a treatment plant or a higher point in the sewerage system.
14. "Government Owned Public Water System" - system to provide piped water to the public for human consumption. Such term includes (1) any collection, treatment, storage, and distribution facility, located in the service areas of the City of Hampton, and owned by City of Hampton.
15. "Health Officer" - shall mean the director of the County Board of Health or other person designated by the City of Hampton and their duly appointed assistants.
16. "House Sewer or Service Line" - a pipe conveying sewage from a single building to a common sewer or point of immediate disposal.
17. "Industrial wastes" - shall mean the wastewater from industrial processes as distinct from domestic or sanitary wastes.
18. "Infiltration/Inflow" - shall mean groundwater and surface water which leaks into the sewers through cracked pipes, joints, manholes, or other openings.
19. "Inspector" - an individual qualified in a vocation and authorized to make inspections, interpret codes, regulations, and procedures.
20. "Interceptor Sewer" - a sewer which receives flow from a number of main sewers and normally does not have service line connections.
21. "Main Sewer" - a sewer to which one or more branch sewers are tributary. Also called a Trunk Sewer.
22. "Manager" - the person responsible for the maintenance and operation of the water system.

23. "May" - is permissive.
24. "Outfall Sewer" - a Sewer which receives the sewage from a collecting system and carries it to a point of treatment or pumping station.
25. "Person" - shall mean any individual, firm, company, association, society, corporation, or group.
26. "Pollutant" - any substance that, if introduced into the potable water system, could be objectionable but could not create a health hazard.
27. "Pollution" - the man-made or man-induced alteration of the chemical, physical, biological, and radiological integrity of water.
28. "Potable Water" - any water that, according to recognized standards, is safe for human consumption.
29. "Privately Owned Public Water System" - any system to provide piped water to the public for human consumption. Such term includes any collection, treatment, storage, and distribution facility, designed to serve fifteen (15) or more units from any source other than City of Hampton, being owned and operated by any entity other than City of Hampton.
30. "Professional Engineer" - a person registered to practice professional engineering in the State of Georgia in accordance with the provisions of the Act governing the practice of professional engineering in Georgia.
31. "Public sewer" - shall mean a common sewer controlled by a governmental agency or public utility.
32. "Public Water Supply/System" - a water system (including but not limited to supply, treatment, transmission and distribution facilities and appurtenances) operated as a Public Utility that supplies potable water to the service-connection of the Consumer's water system. Herein defined, as the City of Hampton potable water supply/system as operated by the Water and Sewer Department.
33. "Representative" - a person authorized to represent the Superintendent of the City of Hampton Water and Sewer Department.
34. "Sanitary Sewer" - A sewer pipe which carries sewage and to which storm, surface, and ground waters are not intentionally admitted.

35. "Service-Connection" - the point of delivery of water to a premises: the normal location of the meter. It is the end of the water purveyor's jurisdiction and the beginning of the Plumbing Official's and the Consumer's, and defined as follows:
- Dedicated - a single service connection that is designated for one use only; (i.e., domestic, fire protection, or irrigation.)
- Combination - a single service connection that is designated for more than one use; (i.e., domestic and fire protection.)
36. "Sewage" - is the spent water of a community. (See Wastewater)
37. "Sewage works" - (sewerage) shall mean all facilities for collecting, pumping, treating, and disposing of sewage. (See Wastewater Facilities)
38. "Sewer" - a gravity flow pipe or conduit, normally not flowing full, for carrying storm water, sewage and other waste liquids.
39. "Shall" - is mandatory.
40. "Source of water supply" - the waters of the State from which raw water is taken into a public water system to be treated and distributed.
41. "Spring" - a surface water where water naturally issues forth for the first time from rock or soil onto the land or into a body of water.
42. "Spring Line" - the horizontal line on a section of pipe located at O.D./2.
43. "Standard methods" - "Standard Methods for the Examination of Water and Sewage", as published jointly by the American Public Health Association, the American Water Works Association and the Water Pollution Control Federation or with any other analytical procedure approved by the Commission.
44. "Storm drain" (sometimes termed "storm sewer") - shall mean a drain or sewer for conveying water, groundwater, subsurface water, or unpolluted water from any source and excluding sewage and industrial wastes other than unpolluted cooling water. (See Storm Sewer)

45. "Storm Sewer" - a sewer which carries storm water and surface water, street wash and other wash waters, or drainage, but excludes sewage and industrial wastes. Also called a storm drain.
46. "Storm water" or "Runoff" - any flow occurring during or following any form of natural precipitation and resulting therefrom.
47. "Supplier of water" or "Supplier" - any person who owns or operates a public water system.
48. "Surface waters" - includes any and all rivers, streams, branches, creeks, ponds, tributary streams and drainage basins, natural lakes, artificial reservoirs or impoundments.
49. "Ultimate Tributary Capacity" - the potential amount of sanitary sewer that a particular drainage basin may eventually convey to a lift station or a water pollution control facility.
50. "Unpolluted water" - is water of quality equal to or better than the effluent criteria in effect or water that would not cause violation of receiving water quality standards and would not be benefitted by discharge to the sanitary sewers and wastewater treatment facilities provided.
51. "Wastewater" - shall mean the spent water of a community. From the standpoint of source, it may be a combination of the liquid and watercarried wastes from residences, commercial building, industrial plants, and institutions, together with any groundwater, surface water, and stormwater that maybe present. (See Sewage)
52. "Wastewater facilities" - shall mean the structures, equipment, and processes required to collect, carry away, and treat domestic and industrial wastes and dispose of the effluent. (See Sewage Works)
53. "Watercourse" - shall mean a natural or artificial channel for the passage of water either continuously or intermittently.
54. "Well" - any excavation that is cored, bored, drilled, jetted, dug, or otherwise constructed for the purpose of locating, testing, or withdrawing ground water.

1. WATER SYSTEM DESIGN REQUIREMENTS

1.1 General Design Requirements

The following shall establish the general design requirements for both publicly owned and privately owned public water systems serving fifteen (15) or more units, installed, operated, and maintained in the service areas of the City of Hampton. It shall be understood that these standards reflect the minimum requirements necessary to obtain construction plan approval.

1. The developers shall be required to provide the design and installation of an adequate water supply system through the entire development at no cost to City of Hampton. The water system shall be designed to provide a minimum of 1,000 GPM to all fire hydrants in the proposed development. When the available flows at the connection point are not in excess of 1,100 GPM, the proposed system should be designed to provide residual pressure to all fire hydrants in the proposed development within 40 lbs. of the residual pressure at the connection point using a calculation flow of 1,000 GPM. Calculated residual pressure shall be a minimum of 20 psi. (Supporting documentation for line sizing will be required.)

2. In the event that water mains are proposed outside street right-of-ways, the water mains shall be installed along the center of easements dedicated to the City. Easements shall be forty (40) feet in width for the duration of construction, reducing to a twenty (20) foot permanent easement thereafter. The easement shall be improved to provide an all weather gravel road. The design of the gravel road shall be submitted indicating plan and profile, drainage, etc. The City shall be provided with the necessary means to access the easement at all times, including without limitation, gates, keys and access codes.

3. When water mains are extended along existing frontage roads, proposed main thoroughfares to serve a proposed development, the developer shall extend a water main, of a size consistent with the overall city distribution plan, from the tie-in location to a point along the frontage of the development property and beyond all proposed entrances.

4. All water mains shall be six inches in size except where a larger size is required as determined by the City Water and Sewer Department.

5. Dead end lines shall be minimized by looping of all mains when possible.

6. Minimum horizontal distance between water lines and sanitary sewer lines shall be ten (10) feet. Minimum distance for all other underground utilities or structures shall be two (2) feet radius.

7. Unless otherwise approved by the Water and Sewer Department, all creek crossings shall be accomplished by encasing a D.I.P. water main in steel casing and sufficiently blocking each end of the casing to secure its position. The minimum depth from the existing creek bed to the top of the casing pipe shall be two (2) feet.

8. All crossings of existing and proposed paved streets shall be by the bore and jack method, unless approved otherwise prior to installation. A county road shall be open cut only after written permission has been received from the City of Hampton Water and Sewer Department. All pipe placed under county roads shall be encased in steel casing. All pipe under roads shall have a minimum cover of four (4) feet from finish grade to top of pipe.

9. Crossings of driveways may be by means of uncased bore or open cut as may be determined by the Water and Sewer Department. Pipe over 10 inches in diameter shall be open cut unless casing is provided with the bore or approved otherwise prior to installation. Where open cut method is allowed, existing concrete and asphalt driveways shall be sawed and the debris removed prior to trenching. When pipe installation is complete, the driveway shall be backfilled, compacted to 95% standard proctor density, and damaged area replaced with material consistent with the existing driveway within five (5) working days. Driveway installation shall be in accordance with these standards.

10. Tees, crosses, valves, and other necessary fittings shall be provided at all major intersections to provide for future expansion.

11. Continuous copper wire shall be placed directly over all nonmetal pipe at a maximum depth of 2 feet from finished grade.

12. Fire hydrants serving residential areas shall be located at intervals not to exceed 500 L. F. along the street right-of-way and must be located within 500 L. F. of all property improvements, less than 500 L. F. from right-of-way line. Minimum valve opening shall be 4½".

13. Fire hydrants serving commercial, industrial, or multi-family residential areas shall be located at intervals not to exceed 500 L. F. along the street right-of-way. Minimum valve opening shall be 5¼".

14. Fire hydrants are to be located on the right-of-way line, and shall have a gate valve installed between the main and the fire hydrant.

15. All fire service lines and connections with private fire hydrants, hand hose connections, sprinkler heads, and any other supply including domestic lines will be required to have a USCCCCCCF approved double detector check valve assembly in accordance with paragraph 1.2.21 of these standards.

16. Shutoff valves shall be located along the main line at intervals not greater than every three fire hydrants.

17. Shutoff valves shall be located on all branch lines as well as on each side of the branch as close to the intersection as possible.

18. All fittings (valves, tees, crosses, bends, reducers) shall be restrained in a method approved by the Water and Sewer Department.

19. Shutoff valves shall be located on each side of all stream crossings within 100' of the stream.

20. Fire hydrants shall be required on all dead end water mains.

21. Each valve 2 inches or larger, except fire hydrant valves, shall have a valve marker 5" square by 4'-6" long with four (4) #2 reinforcing rods placed directly behind the valve.

22. Each underground valve shall include a valve box placed vertically to allow operation of the valve. Valve boxes not located in roadways shall have a precast concrete collar placed level around the top for protection.

23. Single Service lines shall be provided from the water main to each residential lot in the proposed development. Lines shall normally be 1" minimum diameter and furnished with curb stops, corporation stops and meter boxes. Meter boxes shall be placed directly over the water main or as directed by GA DOT and installed on a 6" gravel base. Double services will not be accepted.

24. The Developer of a privately owned public water system shall be required to install an approved meter, meter box and backflow preventer for each residence prior to occupancy. In addition all fire hydrants in a privately owned public water system shall be tagged in a manner and with a message approved by the Water and Sewer Department indicating non-department responsibility. These requirements apply to all privately owned public water systems in unincorporated City of Hampton.

25. Water services for commercial, industrial, or multi-family residential shall be adequate to provide for the specific needs of the installation including adequate fire protection. Backflow prevention devices shall be in accordance with City of Hampton requirements.

26. The location of service laterals shall be indicated precisely on drawings and marked in the field by sawing a "W" in the curbing and placing a 2" PVC pipe vertically and adjacent to an iron pin immediately behind the curb or at the edge of the pavement. The meter box extending 3' above final grade and painted blue as per standardized color. Meter stops shall be placed inside meter boxes at the end of all service lines.

27. All temporary and interim water connections connected to city water sources shall be approved prior to installation. Connections shall be metered and billed in accordance with the rates established by the Water and Sewer Department.

28. Water mains that are installed crossing or immediately parallel to existing gas lines, sewer lines, or storm drains shall be ductile iron pipe as required by the Water and Sewer Department and/or the Owner of the affected utility.

29. When roadways and streets are proposed to be constructed over existing water lines, the Developer will be required to install nestable corrugated steel casing pipe around the existing water main as required by the Water and Sewer Department.

30. The developer shall be required to ensure that none of the water mains, service lines, and the structures that are going to be connected to these water lines are being located on or in close proximity of an abandoned landfill site or any other site used for waste disposal.

1.2 Materials of Construction

1.2.1 General Material Requirements

All materials shall be as specified herein or approved equal by the City of Hampton Water and Sewer Department and/or these standards.

1.2.2 Pipe

1.2.2.1 Ductile Iron Pipe (Required Over 8")

Pipe shall be Pressure Class 350 with slip joints conforming to ANSI Specifications A-21.5, latest designation.

Pipe shall have an exterior coating of coal tar varnish and an interior cement mortar lining with bituminous seal coat conforming to ANSI A-21.4, latest designation.

The seal coat for the lining shall not impair the potability or impart color, taste, odor, phenols, toxicity, caustic alkalinity, or have deleterious effect to the Water. Each pipe shall bear a mark denoting the class to which it belongs. All pipe shall be manufactured within the limits of the continental United States.

1.2.2.2 Polyvinyl Chloride Pipe (Maximum 8")

Pipe shall be American Water Works Standard AWWA C-900, latest designation, made from compounds meeting standard code designation PVC 1120. Couplings, bells, gaskets and lubricants to be used with PVC pipe shall conform to AWWA C-900 requirements. Pipe shall have ductile iron equivalent outside diameters. Each joint of pipe shall be marked with the nominal size, base material, material code designation, dimension ratio number, AWWA Pressure Class, AWWA designation number, manufacturer's name or trademark, production record code, and

seal of the National Sanitation Foundation (nSf) verifying the suitability of the pipe material for potable water service. Gaskets and lubricants shall be of proper size and shape and suitable for potable water.

At the request of the Water and Sewer Department, the developer shall furnish manufacturer's affidavit certifying that the pipe meets AWWA-C-900, latest designation standards. Of this pipe, only AWWA Pressure Class 150 or greater will be accepted.

1.2.2.3 Steel Casing Pipe

Pipe shall be of steel construction of the size and wall thickness below with lengths called for on the approved plans.

<u>Water Main Size</u>	<u>Casing Size*</u>	<u>Casing Size+</u>	<u>Wall Thickness</u>
4"-6"	10"	12"	.188
8"	12"	14"	.250
10"	14"	16"	.250
12"	16"	18"	.250
16"	24"	24"	.344
20"			
24"			

* C-900 CL150 & CL50 Slip Joint DIP Applications
 + M.J. DIP Applications

Special considerations should be given by developers to additional requirements of Railroads and the Georgia Department of Transportation requirements.

1.2.2.4 Nestable Corrugated Steel Casing Pipe

Pipe shall consist of matching half-round segments of 14 gauge corrugated galvanized steel casing pipe which when assembled, become lengths of full-round corrugated steel pipe. Feasible alternatives will be considered by the Water & Sewer Dept.

1.2.2.5 Service Pipe

Pipe shall be polyethylene of the size and O.D. designated in the proposal or drawing, with tolerances conforming to values set forth in ASTM-D-3287 standards. The pipe shall be polybutylene water service pipe rated at 200 p.s.i., as manufactured by Trojan or approved equal. Pipe shall have the National Sanitation Foundation seal of approval and twenty-four (24) year cost of replacement warranty.

1.2.2.6 Service Pipe Encasement - See Insert

Service piping encasement installed following curb and gutter construction shall be 2" polybutylene or approved equal. If encasement is placed prior to curb and gutter construction, 2" class 200 PVC will be allowed.

1.2.3 Joints and Gaskets

1.2.3.1 Mechanical Joint Ductile Iron Pipe

Mechanical joint ductile iron pipe shall be furnished with mechanical joint retainer glands, complete with rings, gaskets, bolts, and joint materials conforming to ANSI A-21.11, latest designation.

1.2.3.2 Slip Joint Ductile Iron Pipe

Gaskets shall conform to ANSI A-21.11, latest designation. Use lubricants and gaskets of proper size, shape, and composition as recommended by the pipe manufacturer.

1.2.3.3 Polyvinyl Chloride Pipe

Pipe shall be furnished complete with push type bell and spigot joints conforming to ASTM D-3139, latest designation. Gaskets shall be elastomeric seals conforming to ASTM F-477, latest designation designed for joining plastic pipe.

1.2.3.4 Nestable Corrugated Steel Casing Pipe

Pipe shall be joined in strict accordance with manufacturer's recommendations for the size required.

1.2.3.5 Polybutylene Service Pipe

Pipe shall be joined with brass fittings as specified herein.

1.2.4 Pipe Fittings and Specials

1.2.4.1 Specials

Specials shall be short body Class 250 ductile iron conforming to ANSI A-21.1 and A-21.10. Fittings shall be epoxy resin lined and conform to ANSI A-21.11. Ductile iron fitting shall be as manufactured by the Ductile Iron Company of America, or equal. Fittings and Specials shall be complete with rings, bolts, gaskets, etc., for joints.

1.2.5 Valves

1.2.5.1 Twelve (12) Inch and Larger Valves

Twelve inch and larger valves shall be Butterfly Type Dresser Style 450, Mueller, Pratt or approved equal for underground service with a two (2) inch square operating nut. Connections shall be mechanical joint with retainer glands.

1.2.5.2 Ten (10) Inch and Smaller Valves

Ten (10) inch and smaller valves shall be Resilient Seat Gate Type Dresser Style 3067-01 Mueller or approved equal for underground service with a two (2) inch square operating nut. Connections shall be mechanical joint with retainer glands.

1.2.5.3 Air Release Valves

Air release valves shall be Apco No. 200A or approved equal with ball check valve on vent to prevent return of air into water main.

1.2.5.4 Check Valves and Backflow Preventers

Are required in all new construction and shall be in accordance with City of Hampton requirements.

1.2.5.5 Tapping Sleeves, Crosses and Valves

Tapping sleeves, crosses, and valves shall be mechanical joints and of the proper type for the pipe material to be tapped.

1.2.6 Valve Boxes

Valve boxes shall be of the roadway extension type, of proper length and base size with suitable detachable cover, coated inside and out with a good asphaltum paint. Boxes shall be manufactured of ductile iron, be 5-1/4 inch inside diameter, "Standard Telescopic Valve Box" as manufactured by Griffin Foundry and Mfg. Company, Rome, Georgia, or approved equal. Cover shall be marked "Water" in raised cast letters. All boxes not located in roadway shall have a 24" diameter precast concrete collar placed level around the top for protection.

1.2.7 Fire Hydrants

Fire hydrants shall be cast iron, bronze mounted, left opening with tamper proof operating nuts and mechanical joint end connections. Hydrants shall have two (2) 2-1/2 inch hose nozzles and one (1) 4-1/2 inch steamer nozzle. Hydrants shall have 30 to 36 inches above grade. Hydrants shall be Dresser M & H Style 129, American Darling MK73, or Mueller Centurion, dry tap, traffic model meeting all AWWA Standard Specifications, conforming to Georgia Fire Insurance Commission Standards. Hydrants installed in commercial and industrial areas and multi-family shall have a 5-1/4 inch minimum valve opening. For R-1 residential installations, 4-1/2 inch valve openings will be allowed. Fire hydrants shall be spaced not greater than 500 feet apart for a residential subdivision and 500 feet apart for commercial or industrial development. Fire hydrants shall be installed at all street intersections and cul-de-sacs.

1.2.8 Service Saddles

Service saddles shall be Double Strap as manufactured by Rockwell, Baker, or Mueller for each specific piping material.

1.2.9 Service Pipe Couplings

Shall be as follows:

<u>Size</u>	<u>Mueller</u>	<u>McDonald</u>	<u>Ford</u>
3/4"	H-15403	4758T	C4433
1"	H-15403	4758T	C4444
2"	H-15403	4758T	C4477

1.2.10 Corporation Stops

Shall be as follows:

<u>Size</u>	<u>Mueller</u>	<u>McDonald</u>	<u>Ford</u>
3/4"	H-15008	4701-T	F1000
1"	H-15008	4701-T	F1000
2"	H-15013	4701-T	FB1000

1.2.11 Meter Stops

Shall be as follows:

<u>Size</u>	<u>Mueller</u>	<u>McDonald</u>	<u>Ford</u>
3/4"	H-14350	6100-T	B43-232W
1"	H-14350	6100-T	B43-444W
2"	-	6100-T	BF43-777W

1.2.12 Meter Coupling/Backflow Preventer

Shall be as follows:

<u>Size</u>	<u>Watts</u>	<u>Ford</u>	<u>Conbraco</u>
3/4"	7-U4-2	BF43	40-3C5-5A
1"	-	HHC 38323 Male Outlet	40-105-01
2"	-	HHC 31323 Female Outlet	40-108-01

1.2.13 Service Meters

1.2.13.1 House Service Meters

House service meters shall be Sensus 5/8" x 3/4" x 7-1/2" with volume measured in gallons.

1.2.13.2 Commercial and Industrial Meters

Commercial and Industrial meter installations shall be dependent upon the industry served, service line size, fire protection, and other factors related to each location. Meters 3" thru 6" in size shall be Rockwell Single Register Magnetic Compound Water Meters with volume measured in gallons. Meter installations shall be reviewed and approved by the Water and Sewer Department prior to installation. A certification of meter calibration and test of Backflow Prevention device shall also be provided.

1.2.14 Meter Boxes and Enclosures

1.2.14.1 Residential Meter Boxes

Meter boxes shall be installed at the property line of lot to be served. Meter boxes for residential use shall be Aqua Pioneer, series 20, type A, stretch yokebox designed for 5/8" x 5/8" x 3/4" AWWA 20 GPM water meter with option L and A or approved equal.

1.2.14.2 Commercial and Industrial Meter Enclosures

Commercial and Industrial Meter Enclosures may be Composolite as manufactured by Quazite Corporation or approved equal Composolite. Enclosures shall be rated for no less than 5,000 pounds over a 10" x 10" area and be designed and tested to temperatures of -50°F. Material compressive strength should be no less than 11,000 p.s.i. Covers shall have a minimum co-efficient of friction of .5. Boxes shall be stackable for extra depth. Enclosures may also be constructed of reinforced concrete block or poured concrete construction. If block or concrete construction is used, a waterproof, lockable, aluminum access hatch shall be provided.

1.2.15 Manhole Covers, Frames, and Steps

Manhole Covers, Frames, and Steps shall conform to Federal Specifications NQ-1-652, free from scale, lumps, blisters, sand holes, plugs, or other defects. Covers and Frames shall be tough, strong even grained, Griffin type "R" Nennah, Higgins, or approved equal.

1.2.16 Concrete Manholes

Concrete manholes shall conform to ASTM-C-478, latest designation.

1.2.17 Manhole Joints and Gaskets

Manhole joints shall be "O" ring gaskets. Ring shall be sealed with Igas, Sika Seal, or equal. Joints shall also be mortar plastered inside and outside.

1.2.18 Pressure Regulators

Pressure regulators shall be Cash-Acme Type, EU Series 3 or approved equal.

1.2.19 Valve Markers

Valve markers shall be precast reinforced concrete, five inches square by 4'-6" long with four #2 reinforcing bars.

1.2.20 Underground Detection Wire

Copper wire shall be placed on top of all pipeline and attached to all valves, fire hydrants and water meters to provide continuity.

1.2.21 Residential Backflow Preventers

Shall be installed on all new residential service lines as specified in paragraph 1.2.12. It shall be installed within the meter box on the customer side of the meter.

1.2.22 Commercial and Industrial Backflow Preventers

Shall be installed on all connections to the City water main. The backflow prevention device shall generally be a Double Check type. The actual selection of the device to be installed will be approved on a case-by-case basis. The device shall be installed in the meter vault, in a separate vault or immediately inside the building served as applicable for the type device. All commercial or industrial businesses shall submit certification of installation of the backflow preventor as a condition to obtaining a City business license.

2. SEWER SYSTEM DESIGN REQUIREMENTS

2.1 General Design Requirements

The following shall establish the design requirements for all sewage collection systems installed, operated, and maintained in the sewer service areas of the City of Hampton. It shall be understood that these standards reflect the minimum requirements necessary to obtain construction plan approval.

1. In areas which are accessible to City sewage, the developer shall be required to install an adequate sewage collection system through the entire development with stub outs to each lot.
2. Minimum horizontal distance between water lines and sanitary sewer lines shall be ten (10) feet. Minimum vertical distance shall be two (2) feet.
3. Minimum cover and clearance from drainage piping for sanitary sewer PVC piping shall be 30 inches.
4. Creek crossings shall generally be accomplished by encasing the carrier piping in steel casing and sufficiently blocking each end to secure the pipe. Minimum depth from existing creek bed to top of casing pipe shall be two (2) feet.
5. Maximum turning angle for sewage flow shall be 90 degrees.
6. All crossings of paved streets shall be by the installation of steel casing by the jack and bore method, unless approved otherwise prior to installation. At the discretion of the City's Water & Sewer engineer or his designate, dependent upon site or specific conditions ductile iron piping may be required as carrier piping.
7. Crossings of driveways may be made by means of open cut or cased bores. The existing concrete and asphalt paving shall be sawed and the debris removed prior to trenching. When pipe installation is complete the driveway shall be backfilled, tamped, and damaged area replaced with material consistent with the driveway as soon as possible. Installation shall be accordance with Section 5 of these standards.
8. The City of Hampton reserves the right to require developers to provide the easements, for future use, necessary to install a sewage collection system through the entire development.

2.1.1 Gravity Flow Systems

2.1.1.1 Location

Sewer lines/mains for residential subdivisions shall typically be constructed along the center of the street (along drainage features) with an individual service connection or stub extending from the service lateral to the edge of the right of way of each lot. The services shall be located at elevations and locations compatible with the best service for each lot. When drainage features make it impractical to install sewers within street right of ways, the sewers shall be installed along the center of easements dedicated to the city. Easements shall be forty (40) feet in width for the duration of construction, then reducing to a thirty (30) foot permanent easement thereafter.

2.1.1.2 Design Factors

Sewer systems shall be designed for the ultimate tributary capacity. In determining the required capacities of the sanitary sewers the following factors should be considered:

1. Peak hourly domestic sewage flow;
2. Additional maximum sewage or waste flow from industrial plants;
3. Inflow and groundwater infiltration;
4. Topography of area;
5. Location of sewage treatment plant;
6. Depth of excavation;
7. Pumping requirements;

The design calculation for sewer projects shall accompany plan documents as requested by the Water and Sewer Department.

2.1.1.3 Minimum Line Sizes

All sewer mains shall be sized to adequately serve the drainage basin where the sewer is located. Gravity sewer mains shall be a minimum of eight (8) inches in diameter. Service lines shall be six (6) inch diameter or larger in size.

2.1.1.4 Depth

Sewer lines installed from 12 to 18 feet will be considered on a case by case basis at the discretion of the Water and Sewer Department's engineer or designate. The decision will be made on site or condition specific situations with special consideration given to soil types and potential future use of sanitary sewer easements or right-of-ways.

2.1.1.5 Slope

Sewers shall be installed on a minimum slope of 0.40%. When slopes of twenty percent (20%) or greater are necessary, lines shall be anchored securely with concrete anchors to prevent movement.

2.1.1.6 Manholes

Manholes shall be installed at the end of each sewer main; and at changes in grade, size, or alignment; and at all pipe intersections. Additional control manholes will be required on service line serving commercial and industrial facilities. For observation, sampling and measurement of wastes, such manhole shall be conveniently and safely located. The property owner shall be required to maintain the manhole in a safe and accessible condition at all times. Maximum spacing for manholes shall be 350 feet. Spacing of greater than 300 feet will not be allowed when the slope exceeds ten percent (10%). Clean-outs may be used only when special conditions are approved by the Water and Sewer Department.

2.1.2 Pump Stations

2.1.2.1 Location

Pump stations shall be located on property purchased or owned by the developer and dedicated to City of Hampton when the construction project is complete. The pump station shall be protected by an eight (8) foot cyclone fence with a three (3) strand barb wire security extension. The pump station shall be designed and constructed to fully operate during the 100 year flood. Pump stations shall be readily accessible by maintenance vehicles during all weather conditions.

2.1.2.2 Design Requirements

Pumping stations shall be designed for the ultimate tributary capacity. In determining the required capacities of the pumping stations the following factors should be considered:

- 1. Peak hourly domestic sewage flow;**
- 2. Additional maximum sewage or waste flow from industrial plants;**
- 3. Inflow and groundwater infiltration;**
- 4. Total dynamic head;**
- 5. Location of sewage treatment plant;**
- 6. Pipe friction;**
- 7. Pumping requirements;**

The design calculations for all pumping stations shall accompany plan documents as requested by the Water and Sewer Department. Pumping stations designed for a peak hourly flow of 500 gallons per minute or less shall be submersible type pump stations designed specifically for raw sewage use, including totally submerged operation during a portion of the pumping cycle. When design flows exceed 500 gallons per minute, alternate designs shall be considered. If a divided well type system is required, the City of Hampton Water and Sewer Department should be consulted prior to preliminary station design. All pumping stations shall meet the requirements of the latest edition of "Ten State Standards."

2.1.2.3 Structures

Structures for pump stations shall be water tight concrete designed specifically for the intended application.

2.1.2.4 Submersible Pump

Submersible pumps shall be designed for pumping sewage in accordance with Section 2.2.

2.1.2.5 Shutoff and Check Valves

Shutoff and check valves shall be placed on the discharge line of each pump. The check valve shall be placed between the shutoff valve and the pump.

2.1.2.6 Equipment Removal

Provisions shall be made for the removal and replacement of pumps, motors, and other mechanical equipment without dewatering the wet well or disconnecting any piping in the wet well. A jib crane shall be provided to lift heavy mechanical equipment from wet wells as required by the Water and Sewer Department.

2.1.2.7 Electrical Supply and Control

Electrical supply shall be designed to provide adequate power to pumps, alarm, and other appurtenances. Pumping stations should be provided with a dual power source, either supplied from a second power substation or by an emergency portable generator dedicated to the city with each pumping station. All electrical supply and control systems shall meet the requirements of the National Electrical Code. A motor control center shall be located outside the wet well and be protected by a Nema 4 enclosure.

2.1.2.8 Alarm Systems

Alarm systems shall be installed in each pump station. The alarm shall be activated in cases of power failure, pump failure, or any cause of pump malfunction. Alarms shall consist of a sound alarm and pole mounted light to notify personnel or area residents of problems.

2.1.2.9 Emergency Operation

Provisions shall be made to connect pump stations to emergency power generation in order to prevent sewage backup. Electrical connection shall be installed as recommended by the Water and Sewer Department before pump station begins operation.

2.1.3 Force Mains

2.1.3.1 Force Main Locations

Force mains shall be installed in right of ways or along the center of easements dedicated to the city. Easements shall be forty (40) feet in width for the duration of construction, then reducing to a thirty (30) foot permanent easement thereafter. Whenever possible, a ten (10) foot separation between water mains and sewer force mains is to be maintained. The installation of sewage force mains

and water mains in a single ditch will not be permitted.

2.1.3.2 Force Main Identification

When PVC force mains are installed, either in right-of-ways or permanent easements, a magnetic detection wire shall be placed on top of all pipeline and attached to all valves or other appurtenances to provide continuity.

2.1.3.3 Velocity

Force mains shall be designed to flow at a velocity of at least two (2) feet per second when volumes are equal to the ultimate average daily flow.

2.1.3.4 Design Volume

Force mains shall be designed to carry sewage volume at least equal to the ultimate tributary capacity.

2.1.3.5 Design Pressure

Force mains and fittings shall be designed to withstand all internal and external pressures and surges.

2.1.3.6 Air Release and Vacuum

Automatic air vacuum relief valves shall be installed at locations along the force mains where high elevations may cause air locking.

2.1.4 Service Lines

- Minimum Line Sizes - 6 inches
- Depth - Two (2) feet
- Slope - 1%

2.2 Materials of Construction

2.2.1 General Material Requirements

All materials shall be as specified, or approved equal, by the City of Hampton Water and Sewer Department and/or these standards.

2.2.2 Piping

2.2.2.1 For Gravity Flow Sewers

Piping material used for gravity flow sewers, sizes 8" through 12" shall be ASTM 3034, SDR 26 (heavy wall) PVC, PC 350 Ductile Iron. Material for gravity sewer mains larger than 12" in diameter shall be determined by the Water and Sewer Department. Ductile Iron Pipe shall be used for depths greater than 12 feet.

2.2.2.2 For Sewage Force Mains

Piping used for pressurized force mains, sizes 4" through 8", shall be AWWA C900 Pressure Class 150, or PC 350 Ductile Iron Pipe. Sizes larger than 8" in diameter shall be PC 350 Ductile Iron Pipe.

2.2.2.3 Ductile Iron Pipe

All Ductile Iron Pipe shall be in accordance with the (A.N.S.I. A-21.51 or AWWA Standard C-151) latest revision.

2.2.2.4 Polyvinyl Chloride Pipe

Pipe for gravity flow systems shall be ASTM 3034, SDR 26 (Heavy Wall) PVC, latest designation.

For force main construction the pipe shall be American Water Works Association AWWA C-900, Class 150 PVC, latest designation.

All PVC Piping shall be made from compounds meeting standard code designation PVC 1120. Fittings, bells, gaskets, and lubricants to be used with PVC Pipe shall also conform to AWWA C-900 requirements. Each joint of pipe shall be marked with the nominal size, base material, material code designation, dimension ratio number, Pressure Class, designation

number, Manufacturer's name or trademark, and production record code. Gaskets and lubricants shall be of proper size and shape and be furnished as required by the pipe manufacturer.

2.2.2.5 Steel Casing Pipe

Pipe shall be of steel construction of the size and wall thickness below with lengths called for on the approved plans.

<u>Water Main Size</u>	<u>Casing Size*</u>	<u>Casing Size+</u>	<u>Wall Thickness</u>
4"-6"	10"	12"	.188
8"	12"	14"	.250
10"	14"	16"	.250
12"	16"	18"	.250
16"	24"	24"	.344
20"			
24"			

* C-900 CL150 & CL50 Slip Joint DIP Applications
+ M.J. DIP Applications

Special considerations should be given by developers to additional requirements of Railroads and the Georgia Department of Transportation requirements.

2.2.2.6 Nestable Corrugated Steel Pipe

Pipe shall consist of matching half round segments of 14 gauge corrugated galvanized steel casing pipe which when assembled, become lengths of full-round corrugated steel pipe.

2.2.3 Pipe Fittings and Specials

2.2.3.1 Ductile Iron Pipe

Specials shall be short body Class 250 Cast Iron Ductile or Ductile Iron conforming to ANSI A-21.10 and A-21.10. Cast iron fittings shall be cement lined and ductile iron fittings shall be epoxy resin lined all conforming to ANSI-21.11. When directed by the Water and Sewer Department, for special connections, bell and spigot cast iron specials conforming with AWWA specifications for Class D fittings shall be furnished.

2.2.3.2 Polyvinyl Chloride Fittings

PVC sewer fittings shall typically be DR 26. When specific fittings are unavailable because of manufacturing restrictions, fittings shall conform to the requirements of ASTM D-3034 specification with a minimum wall thickness of SDR 35 as defined in section 7.4.1. Fittings in sizes through 8" shall be molded in one piece with elastomeric joints and minimum socket depths as specified in sections 6.2 and 7.3.2. Fittings 10" and larger shall be molded or fabricated in accordance with section 7.11 with manufacturers standard pipe bells and gaskets. Gaskets shall have a minimum cross sectional area of 0.20 sq. in. and conform to ASTM f-477 specification. PVC material shall have a cell classification of 12454-b or C as defined in ASTM D-1748. Fittings shall be manufactured by Harco or approved equal.

2.2.4 Joints and Gaskets

2.2.4.1 Ductile Iron Pipe

Ductile iron pipe joints shall be mechanical joint Type III or approved push on joints Type II conforming to ASA A-21.11 latest designation. Gaskets shall be suitable for use in contact with sewage.

Lubricants and gaskets of proper size, shape, and composition shall be used in strict accordance with the manufacturer's recommendations.

2.2.4.2 Polyvinyl Chloride Pipe

Pipe shall be furnished complete with push type bell and spigot joints conforming to ASTM D-3139, latest designation. Gaskets shall be elastomeric seals conforming to ASTM F-477 latest designation designed for joining plastic pipe.

2.2.4.3 Transition Joints

The transition between sewer pipes of different materials shall be made by either concrete collars or by special adapters made for that purpose. The transition between clay pipe and cast or ductile iron pipe shall be by a rubber coupling with ring adapters and stainless steel bands as manufactured by Mission, Femco, or equal. Adapters between ductile iron pipe and pipe of materials other than clay must be accepted by the Water and Sewer Department prior to installation.

2.2.5 Manholes

Manholes shall be of precast concrete construction meeting specification ASTM C-478, latest designation. Minimum inside diameter shall be four (4) feet.

2.2.5.1 Manhole Frames and Covers

Manhole frames and covers in non flood plain areas shall be Class 250 Ductile Iron, Traffic Rated, Locking Key, as manufactured by Certain Teed Corporation or approved equal. Covers shall be equipped with an anti-theft locking key. Frames shall be free from scale, lumps, sand holes, plugs or other defects. Minimum frame opening shall be 22 inches. In flood plain areas, the frame and cover shall be of watertight design.

2.2.5.2 Manhole Steps

Manhole steps shall conform to the applicable provisions of ASTM Specification C478, latest edition, such as aluminum 14967 as manufactured by Alcoa or plastic steps manufactured by M. A. Industries, Inc., or equal. Manhole steps shall be factory built into the precast sections. Steps shall be aligned during installation.

2.2.5.3 Manhole Joints

Manhole joints shall be "O" ring gasket, lock joint gasket suitable for use with sewage of Igas, Sika Seal, or equal. Manhole interior and exterior joints and walls shall be sealed using a grout mixture as specified elsewhere herein.

2.2.5.4 Manhole Connections to Pipe

Connections to piping at the manhole shall be completed by using a rubber flexible sleeve (boot) designed to be used for this purpose unless otherwise approved by the Water and Sewer Department. The sleeve size shall be as manufactured for the specific size and pipe material installed.

Connections to existing manholes shall be accomplished by coring of the existing manhole and installation of a flexible boot as specified.

2.2.5.5 Manhole Bedding

Manholes shall be bedded on a foundation of #57 crushed stone, 12 inches thick.

2.2.5.6 Manhole Brick

Brick used for any reason during manhole installation shall be best grade hard burned common brick. Absorption shall not be more than ten percent (10%) of their weight in water when submerged twenty-four (24) hours.

2.2.5.7 Mortar

Mortar shall consist of one (1) part Portland Cement and three (3) parts sand conforming to the following specifications:

- A. Portland Cement.
- B. Sand - Clean, sharp, and well graded; free from clay, loam, or organic matter; pass a 1/4" screen.
- C. Water - Clean, free from vegetable, sewage, or organic matter.

2.2.5.8 Drop Manholes

The maximum allowable inside drop shall be 1.9 feet. All drops greater than the maximum allowable shall be an outside drop. Outside drop manholes shall be constructed in conformance with Detail SS-0002.

2.2.5.9 Monitoring Manholes

When specifically required by the Water and Sewer Department, monitoring manholes shall be provided for commercial or industrial discharges to provide means of sampling and flow monitoring. Specific requirements will be established on a case-by-case basis.

2.2.6 Service Lines

Service lines shall be a minimum of 6-inch diameter and of the materials specified previously for sewer mains.

2.2.6.1 Service Line Connections

Service line connections to sewer mains shall be completed by using a tee or a wye installed along the sewer main. The tee or wye shall be of a material designed for this purpose and accepted by the Water and Sewer Department. Services shall extend from the sewer main to the property line of each lot.

2.2.6.2 Service Line Clean-Out

Service lines shall have a clean-out at the right-of-way using a 4" minimum PVC pipe placed vertically and extending 3' above final grade temporary capped. This temporary riser pipe shall be cut off and capped (threaded cap or equal at final grade after the service line is tied in and final grading is completed.

2.2.7 Pump Stations

2.2.7.1 Submersible Pumps

Submersible pumps, electrical cables, and accessories shall be manufactured by Flygt Corporation unless otherwise approved by the Water and Sewer Department.

2.2.7.2 Pump Test

The pump manufacturer shall perform the following inspections and test on each pump before shipment from factory:

1. Impeller, motor rating and electrical connections shall first be checked for compliance to the customer's purchase order.
2. A motor and cable insulation test for moisture content or insulation defects shall be made.

3. Prior to submergence, the pump shall be run dry to establish correct rotation and mechanical integrity.
4. The pump shall be run submerged, a minimum of 6 feet under water.
5. After operational test No. 4, the insulation test (No. 2) is to be performed again.

A written report stating the foregoing steps have been done shall be supplied with each pump at the time of shipment.

2.2.7.3 Pump Warranty

The pump manufacturer shall warrant the units being supplied to the owner against defects in workmanship and material for a period of five (5) years or 10,000 hours under the Municipal Wastewater-Permanent Installation Warranty Policy under normal use, operation and service.

2.2.7.4 Documentation

The Developer, shall supply up to five (5) sets of standard Submittal Drawings, Operating and Maintenance Instruction Manuals and Parts Lists.

Standard submittals will consist of:

- a). Pump Outline Drawing
- b). Control Data
- c). Access Frame
- d). Typical Installation Guides
- e). Technical Manuals
- f). Parts Lists

2.2.7.5 Access Frame and Cover

Provide aluminum frames and covers manufactured with 1/4" thick, one piece aluminum extruded frame, with a continuous concrete anchor as part of the one piece extrusion. The door panels shall be 1/4" thick aluminum diamond plate, designed to withstand a live load of 60 lbs. per square foot, with a safety factor of times 3. The doors shall be provided with stainless steel hinges with tamper-proof fasteners. All hardware shall be stainless steel. The doors shall open to 90°, lock automatically in that position with a stainless steel positive locking arm and a stainless steel release handle. Doors shall be provided with a stainless steel lifting handle, stainless steel locking bar, or stainless steel snap-lock with removable key handle. The doors will close flush with the top of the frame, resting on a 1/2" wide lip around the entire inside of the frame for added support. Guide bars shall be of at least standard weight galvanized steel pipe.

2.2.7.6 Controls

Provide an automatic pump control center in Nema 4 enclosure for each pump station installation. For each pump motor, there shall be included: A combination circuit breaker/overload unit providing overload protection, short-circuit protection, reset and disconnect for all phases; across-the-line or reduced voltage starter; hand/off/automatic pump operations selector switch; 120 volt control panel pilot circuitry. A 24 volt control circuit transformer with disconnect circuit breaker and overload protection, for external pilot circuitry shall be included with an automatic electric alternator for two pump stations (providing alternating operation of pumps under normal conditions, or in cases of high level, allowing both pumps to operate simultaneously). Pumping stations shall have three step autotransformer reduced voltage connected at the 50% tap.

Each enclosure shall also include one (1) manual transfer switch for operation on a portable standby power supply which shall be connected by means of a weatherlight connection through the enclosure wall. Furnish one male connection compatible with all pumping stations to be connected to standby power cable.

A grounding type convenience outlet shall be provided on the side of the enclosure for operation of 120 volt, 20 amp, A.C. devices protected by a ground fault breaker.

2.2.7.7 High Water Alarm

Furnish and install a high water alarm horn and light that will sound and flash when the water level in the wet well reaches a high level condition. In the event the high level recedes, the horn will cease sounding, and the light will continue to flash to show that there has been such a condition, until the reset is activated in the control center. The unit shall be factory constructed on a suitable mounting panel. The unit shall consist of a loud audible horn or bell with manual adjustment for pitch; a flashing red, including a 100 watt bulb, red vapor proof globe and guard; and a Watertight Control Center with horn silencer and reset and test switches.

2.2.8 Valves

2.2.8.1 Air Release Valve

Air Release Valves shall be of the type that automatically releases air, gas, or vapor under pressure during system operation. The valves shall have a 3" NPT inlet with a 1/2" NPT outlet and a 3/16" venting orifice for a maximum working pressure of 150 p.s.i.. Valves shall be constructed of cast iron body and cover, stainless steel trim and float, with an adjustable viton orifice button to insure positive seating. Back wash accessories shall be furnished and assembled to the valve, consisting of an inlet shut-off valve, blow-off valve, clear water inlet valve, rubber supply hose and quick disconnect couplings. Air release valves shall be equal to Apco 401 Sewage Valve #142 air and vacuum valve.

2.2.8.2 Plug Valves

Eight-inch and smaller valves shall be Dresser X-Centric, DeZuric, ACF, or equal, with 100% (percent) opening.

Ten-inch and larger valves shall be Dresser X-Centric, DeZuric, ACF, or equal, with worm gear operator and 100% (percent) opening.

Furnish three-foot long "T" type operating wrench for valves installed.

2.2.8.3 HDL Ball Check Valve

Furnish and install Flygt HDL Ball Check Valve. The valve shall consist of just three (3) components; body, cover and ball (one moving part). The design of the valve shall be such that it keeps solids, stringy material, grit, rags, etc., moving without the need for back flushing. In the operating mode, the ball shall not impede flow through the valve. The operating flow area shall be equal to the nominal size of the valve. There shall not be outside levers, weights, springs, dash pots or other accessories required for a swing (clapper) type check valve. The ball shall be hollow steel with an exterior of nitrile rubber, it shall be resistant to grease, petroleum products, animal and vegetable fats, diluted concentrations of acids and alkalines (ph 4-10), tearing and abrasion. The body and cover shall be of gray cast iron. Flange drilling shall be according to AISI B16.1, Class 125.

2.2.9 Valve Vaults

Valve vaults shall be provided to house valving outside of submersible pump station wetwells. Check valves, gate or plug valves, duplex discharge transition to the forcemain, and a pressure gage shall be installed within the valve vault. The valve vault shall be of precast or poured-in-place reinforced concrete. Access shall be by an aluminum hatch, hinged and hasped, minimum size 30 inches square.

3. GENERAL CONSTRUCTION REQUIREMENTS

3.1 General

The following shall establish the general construction requirements for the installation of all water and sewer piping and pumping facilities as well as clearing and grubbing of right-of-ways and easements, and paving and grassing of areas behind curb lines as required for installation, maintenance, and repair of water and sewer systems in the service areas of the City of Hampton.

It shall be understood that these standards reflect the minimum requirements necessary for final acceptance of the utility by the water and sewer department.

1. It shall be the responsibility of the Developer to notify all utility companies prior to any excavation.
2. The Developer shall notify the City of Hampton Water and Sewer Department forty-eight (48) hours prior to beginning construction. This department may request a pre-construction conference with the Developer and his Contractor before beginning construction.
3. All construction shall be subject to inspection by authorized representatives of the Water and Sewer Department at any time, and at their request no dirt cover shall be placed on any portion of completed water or sewer system until it has been inspected and approved by the Water and Sewer Department Inspector.
4. It shall be the responsibility of the Developer to coordinate all construction and insure that these standards are adhered to. Any work not meeting these standards shall be corrected immediately by the Developer, after notification by the City Water and Sewer Department Representative. Should the work not be corrected after verbal notification, a written stop work order shall be issued by the Water and Sewer Department until the deficiencies have been corrected.
5. The Developer shall employ a Utility Contractor with a valid STATE UTILITY CONTRACTOR license and shall have a competent supervisor on site employed by the Contractor.
6. All construction shall be appropriately flagged prior to construction.

3.2 Erosion Control And Sedimentation

3.2.1 General

Developer shall be responsible for maintaining proper control measures on the construction site and adjacent areas for the duration of the project. Sediment control barriers, temporary sediment traps, sediment basins, grass, mulch, etc., as may be required to adequately control erosion and prevent sedimentation will be required. All measures shall be in accordance with procedures of the Georgia Soil Erosion & Sedimentation Act.

3.2.2 Materials

All materials shall be as specified or approved equal.

3.2.2.1 Sediment Barriers

Barriers shall be approved silt, fencing, or stacked hay bales which will allow water seepage while filtering solids.

3.2.2.2 Mulch

Shall be baled wheat, oat, or rye.

3.2.2.3 Fertilizer

Fertilizer shall be FSO-F-241, type I, Grade B, with a formulation of 5-10-5.

3.2.2.4 Grass Seed

Seed shall be clean, dry, new crop Common, Bermuda, or Winter Rye with 98 Percent (98%) purity and 85 percent (85%) germination.

3.2.2.5 Sprigs

Sprigs shall be healthy, living Bermuda or Common Stolons native to the locality of the project.

3.2.3 Execution

3.2.3.1 Sediment Barriers

Silt fencing shall be properly toed in. Silt fencing or hay shall be placed prior to and maintained in place until grass seed is planted.

3.2.3.2 Mulch

Mulch shall be applied to the grassed areas to contain grass seed.

3.2.3.3 Fertilizer

Fill fertilizer into the top two (2) inches of soil at a rate of 1,000 lbs. per acre. Dry areas should be watered to a depth of four (4) inches, at least forty-eight (48) hours prior to seeding to obtain a loose friable seed bed.

3.2.3.4 Grass Seed

Seed shall be broadcast by hand or mechanical spreader. Broadcast half of seed in one direction, then broadcast other half at right angles to the first seeding pattern. Seeded area shall be rolled immediately after seeding. Erect signs to protect seeded areas from traffic until grass is established.

3.2.3.5 Sprigs

Sprigs shall be separated or shredded and broadcast over the area prepared for planting at a rate of one bushel per 200 sq. ft.. Sprigs shall then be harrowed into ground with harrow disc turned straight.

3.2.3.6 Watering

Watering shall be required to provide adequate soil moisture during the germination period as well as sprinkled throughout construction area to maintain dust control.

3.3 Clearing And Grubbing

3.3.1 General

The clearing and disposal of all trees, bushes, shrubbery, and miscellaneous debris as outlined in project plans and specifications shall be the sole responsibility of the Developer subject to the approval of the City of Hampton Water and Sewer Department.

3.3.2 Clearing

Clearing operations shall be performed so as to prevent damage to existing trees and other property located on property other than that of the Developer. Safety of employees and others should be considered throughout the operation. No clearing should be performed on property not owned by the Developer without first obtaining written permission from the Owner.

3.3.3 Grubbing

It shall be the responsibility of the Developer to remove all debris from fill material in areas to be excavated, areas to be stripped of topsoil, and areas to receive fill.

3.3.4 Disposal

All cleared, and grubbed material shall be disposed of in a manner satisfactory to the Water and Sewer Department. Burning shall not be allowed, unless specifically permitted by the County Fire Marshall.

3.3.5 Bench Marks and Monuments

All established bench marks, property pins, monuments, and other reference points shall be maintained; if destroyed or disturbed, they shall be replaced as directed by the Water and Sewer Department.

3.4 Traffic Control

The Developer shall conduct his operations so that there will be a minimum of interference with or interruption of traffic upon and of the roadway. This applies to both the initial installation and the continuing maintenance and operation of facilities. Whenever construction is conducted along a highway, utility construction signs shall be provided at 1,500 feet, 1,000 feet, and 500 feet along the effected roadway prior to construction. In the case of single lane closings, a flagman shall also be provided on each side of the construction site to direct traffic. Lane closings shall not be permitted without prior approval of the Water and Sewer Department. Traffic cones shall also be placed, along the closed lane, at a distance, in feet, not to exceed the maximum speed limit, in miles per hour, of the effected roadway. Road closings shall be protected by effective barricades, and obstructions shall be lighted during hours of darkness, Flagmen and suitable warning signs shall be provided as may be required to properly control and direct traffic. Safety of both motorists and the General Public, shall be provided at all times.

4. WATER SYSTEM CONSTRUCTION STANDARDS

4.1 Installation Procedures

4.1.1 General

The following shall establish the general construction requirements for the installation of water distribution systems, installed, operated, and maintained in the service areas of the City of Hampton. It shall be understood that these standards reflect the minimum requirements necessary for final acceptance of the utility by the Water and Sewer Department.

1. It shall be the responsibility of the Developer to notify all utility companies prior to any excavation. Any pipe, solder or flux used in the installation or repair of water service lines or water mains must be lead-free. Pipe and fittings must not contain more than 8.0% lead and solders and flux must not contain more than 0.2% lead.

2. The Developer shall notify the City of Hampton Water and Sewer Department forty-eight (48) hours prior to beginning construction. This department may request a pre-construction conference with the Developer and his Contractor before beginning construction.

3. All construction shall be subject to inspection by authorized representatives of the Water and Sewer Department at any time, and at their request no dirt cover shall be placed on any portion of installed facilities until it has been inspected and approved by the Water and Sewer Department Inspector.

4. It shall be the responsibility of the Developer to coordinate all construction and insure that these standards are adhered to. Any work not meeting these standards shall be corrected immediately by the Developer, after notification by the City Water and Sewer Department Representative. Should the work not be corrected after verbal notification, a written stop work order shall be issued by the Water and Sewer Department until the deficiencies have been corrected.

4.1.2 Trench Construction

4.1.2.1 Trench Description

Trench may be open cut from the ground surface where designated on the plans or approved by the Water and Sewer Department. Boring may be required to protect certain surface improvements and to satisfy requirements of the Georgia Department of Transportation and/or the railroad companies. Minimum width shall be the nominal diameter of the pipe plus twelve inches and minimum cover on pipe shall be 48 inches. Bottom of the trenches shall be hand dressed so that the pipe has even bearing

on solid undisturbed earth throughout its entire length between bell holes. Bell holes of sufficient size for making perfect joints shall be provided. Changes in grade shall be gradual.

4.1.2.2 Alignment

Alignment shall be as indicated on the approved plans. When an obstruction is encountered, make necessary changes in alignment or grade as approved by the Water and Sewer Department. Injury or damage to adjacent structures, water, sewer, gas line, or other utilities should be avoided. See Detail TUP-0001

4.1.2.3 Excavation

Excavation shall consist of removing earthwork for the satisfactory placement of water mains and appurtenances. This includes vegetation, brush and debris, soil, rock, pavements, etc., for the intent and purpose of constructing the work to required lines and grades, including sheathing, bracing and dewatering of excavations, trench bed stabilization, and such other incidentals necessary to comply with plans and specifications.

Plans direct sections where jack and bore methods are required under certain pavements and/or railroads.

4.1.2.4 Trenching

Except as specified for jack/bore procedures under pavements and railroads, all excavation shall be made by open cut, unless otherwise authorized by the Water and Sewer Department.

All work within right-of-way of railroads and state highways, shall be subject to an approval permit for construction (processed through the Owner), and all rules and regulations of those authorities shall be required. It shall be the responsibility of the developer to prepare the applications for the required permits.

It is preferable that all trenching be done by a trencher made specifically for such purposes, however, a backhoe or other equipment will be acceptable.

Where excessive excavation results, the Contractor shall construct special foundations or use special backfill methods. Overdepth excavation will be required to remove material unsuitable to support the pipe.

4.1.2.5 Sheathing and Bracing

When trench sides must be kept as nearly vertical as possible, it may be necessary to sheath, brace, or support trench sides.

When trench depth excavation exceeds five (5) feet, sheathing and bracing shall be required to protect the pipe crew from injury, irrespective of the visible judgement of soil conditions by the Contractor. In event the sheathing cannot be removed without injury to the pipe or adjoining structures, it shall be left in place or cut, and the upper part then removed. All trenching, sheathing, bracing, side sloping, etc., shall conform to the regulations of the Occupational Safety and Health Administration of the U. S. Department of Labor (OSHA). Side sloping in accordance with OSHA regulations is acceptable where conditions permit. It shall be the responsibility of the Contractor to insure that all safety measures are met.

4.1.2.6 Stabilization and Bedding

Subgrade stabilizer is to be used where required by the Water and Sewer Department. In soft ground, quicksand, or in areas where soil conditions are such that pipe alignment, or grade is endangered, the trench shall be excavated below grade and then brought back to grade with stone stabilizer material. Stone stabilizer material shall be A.S.T.M. #57 crushed stone. Depth of stone shall be 6 inch min. or as directed by the Water and Sewer Department.

4.1.2.7 Excavated Material

All excavated material shall be placed on one side of the trench in a manner to prevent blockage of surface drainage patterns and traffic. It shall be so placed as to not endanger the work, allowing at all times free access to the trench, and all existing utilities publicly or privately owned, particularly fire hydrants.

Where necessary, wood fencing or retainers shall be erected to retain the excavated material within narrow limits to prevent obstruction of traffic and/or encroachment upon pavements or other areas restricted by property owners. Included shall be protection of hedges, walls, flower/rock gardens, shade trees, fruit trees, and vegetable gardens. Satisfactory provisions shall be made for travel on sidewalks, crosswalks, streets, railroads, bridges, private ways, railings, barriers, etc. All drains, gutters, culverts, and sewers for surface drainage shall be kept open, or if it is evident they must be temporarily closed then all requirements of the Owner must be met prior to such closing.

Excavated material shall not, in any case, be placed upon the pavement surfaces of public roads or streets, owned by the city, county or state, unless prior approval is given by the proper authority having jurisdiction. In periods between dusk and daylight, and during inclement weather when visibility is limited, caution lights and barricades shall be placed at each end and along the excavated material. Each building, wall, fence, pile, bridge, railroad, sidewalk, driveway, tree, lawn, garden, or any other improvement encountered is to be properly protected from injury. In event of damage during the work, prompt repairs satisfactory to the Water and Sewer Department and the property owner shall be made by the Contractor.

4.1.2.8 Limit of Open Trench

The length of the trench to be opened or the area of surface to be disturbed and restored at any one time shall be limited to that which the Contractor can complete in one day's work, or less in event of apparent inclement weather, or not to exceed 100 feet.

It shall be the Contractor's responsibility to provide adequate barricades, warning signs, flagmen, flashing lights, etc., as necessary to safeguard the public. All trenches must be backfilled by the close of each work day.

4.1.2.9 Disposition of Water

Keep trenches free of water. The Contractor shall furnish all equipment and labor necessary to remove any water found or accumulated in the trench. Other excavation shall be kept clear of water while pipe is being laid or concrete or masonry is being placed. No pipe shall be laid in water and water must not be permitted to flow over or rise upon any masonry or pipe until the work has been accepted to prevent flow-in of silty water and thus prevent buildup of foreign matter in the pipe.