

SECTION 5.0

SUBMITTALS FOR WATER AND WASTEWATER SYSTEM EXTENSIONS

5.1 GENERAL

This section shall define and describe the submittals required by the Commission prior to the approval of the Contract Documents for any water and sewer system extension, and the permits and other data which must be approved by or submitted to the Commission prior to construction of water and wastewater system extensions.

5.2 ENGINEERING DESIGN CALCULATIONS

All Contract Documents submitted to the Commission for approval must be accompanied with the necessary design calculations as specified herein. The calculations must be prepared either by a Professional Engineer or by an individual under their direct supervision. All data upon which the design calculations are based shall be referenced as to its origin. The calculations shall be submitted in duplicate in a neat and orderly fashion with all steps shown such that the logic and the procedure used may be clearly understood. All calculations shall be bound with a title sheet bearing the seal and signature of the engineer responsible for the calculations.

5.2.1 Water Design Calculations

The following calculations shall be included in the submittals required for water extension projects. The Commission will furnish the designer with information regarding the available flow and pressure to the project.

5.2.1.1 Minimum Pressure Requirements:

Calculations shall be submitted which demonstrate that the water main extension as planned will provide a minimum residual pressure of 20 psi at its termination and at all critical points calculated at peak user demand plus fire flow. The calculations shall be based upon an energy balance accounting for friction losses and minor losses. Friction losses shall be estimated using the Hazen-Williams formula with the C-factor equal to 120.

5.2.1.2 Minimum Fire Flow:

Calculations demonstrating that the new extension will provide the minimum required fire flow plus peak user demand in accordance with Section 3.3.5 shall be submitted. The calculations shall demonstrate that each phase of a project is designed to provide the minimum fire flow. The calculations shall be based upon an energy balance taken from the origin at the existing line to the termination or critical high points of the proposed extension. The friction losses shall be based upon the Hazen-Williams formula with a C-factor of 120.

5.2.2 Sewer Design Calculations

The following calculations shall be included in the submittals required for wastewater system extensions.

- 5.2.2.1 Gravity Sewers: Gravity sewers shall be shown to have adequate capacity to serve the entire contributing area in accordance with the requirements of Section 4.3.1. The calculations shall be based upon the Manning Formula using an “n” factor of 0.013.
- 5.2.2.2 Pump Station Capacity and Force Mains: Pump stations shall be shown to have adequate capacity in accordance with Section 4.3.3.1. The total dynamic head for the pumps shall be determined by use of the Hazen-Williams formula with the C-factor of 120. Minor losses shall also be accounted for. The pump station cycle time shall be shown to be in accordance with Section 4.3.3.2. Both pump-on and pump-off times per cycle shall be shown. The average flow velocity within the force main shall be calculated and shown. The capacity of the receiving collection system must be shown to have adequate capacity for the additional discharge due to the pump station. The hydraulic grade line and the profile of the force main shall be submitted.
- 5.2.2.3 The pump station documentation must also include the benefit/cost comparison described in Section 4.3.4. The cost analysis shall compare the cost of constructing and maintaining the station and constructing and maintaining a gravity sewer extension. This analysis shall be a present worth cost comparison using an interest rate of three percent (3%).

The actual interest rate available at the time of the comparison may be used in lieu of the three percent (3%) rate provided inflation is accounted for.

5.3 CONTRACT DOCUMENTS

5.3.1 General

The submittal of complete detailed Contract Documents is required for all water or wastewater system extensions of the Commission's existing facilities. Contract Documents shall contain the following forms unless otherwise permitted or required by the Commission.

- i. Specifications with title sheet
- ii. Drawings (Plans)*
- iii. Modifications

*Drawings on projects for which a Preliminary Subdivision Plat was required shall include a copy of the Approved (signed) Preliminary Plat.

5.3.2 General Requirements for Drawings

5.3.2.1 The plan and profile drawings shall be prepared by a Professional Engineer. Each sheet shall bear the date, sheet number, and the seal and signature of the Professional Engineer. Project phases must be shown. Contract Documents for projects which do not indicate phases shall be subject to revision if the project is constructed in phases.

5.3.2.2 A letter of transmittal must be included with the drawings indicating the project name and location and the design engineer.

5.3.2.3 The drawings shall have a title page with the name of the project, the Engineer, the date, an index of the plan sheets, revision block, and the project phase, if any.

5.3.2.4 The drawings shall utilize standard drafting practice and include standard symbols for which a legend shall be provided on the title sheet or other prominent location on the plans.

- 5.3.2.5 The drawings shall include a location map with the site clearly indicated.
- 5.3.2.6 The drawings shall include the layout of the new extension and its relationship to other utilities, roadways, and other pertinent structures and vegetation.
- 5.3.2.7 The profile for a particular section of the planned extension shall be included on the same sheet as the plan view with a horizontal scale of one-inch (1" = fifty feet (50') or larger for projects consisting of sewer and water or sewer extensions. The horizontal scale for projects consisting of water extension only shall be one-inch (1" = one hundred feet (100') or larger scale. The vertical scale for profiles shall be one-inch (1" = five feet (5') or larger.
- 5.3.2.8 The drawings shall include a note stating that the Contractor shall verify all existing elevations and all existing utilities in the field prior to commencement of work.
- 5.3.2.9 The 100-year flood elevation shall be shown on all plan drawings.
- 5.3.2.10 The plan drawings shall be placed on 24-inch x 36-inch plan and profile paper.
- 5.3.2.11 Projects which include new pump station(s) shall include a plot plan for each station with topographic lines of one foot (1') contour intervals.
- 5.3.2.12 Each plan sheet shall have a title block with a title which is descriptive of the contents of the sheet.
- 5.3.2.13 Profiles for gravity sewer shall clearly indicate the actual plan slope of each reach of line given in percent slope. The actual length of each reach of gravity line shall be used to calculate pipe slope. This length shall be the distance between manhole centerlines minus the inside radius of both manholes as measured horizontally.

Designs in which the distances between manhole centerlines are used as the pipe length in the calculation of pipe slopes will not be approved.

5.3.2.14 The length of each reach of gravity sewer shall be clearly indicated on the drawings. This length shall be the manhole centerline to centerline length as measured horizontally.

5.3.3 General Requirements for Specifications

5.3.3.1 The specifications shall be prepared by a Professional Engineer.

5.3.3.2 The specifications and all other documents listed in Section 5.3.1, with the exception of the drawings, shall be bound in a single booklet with a title page bearing the project name and location, the Engineer, the date, and the seal and signature of the Professional Engineer who developed the documents. The title sheet shall also include a revision block.

5.3.3.3 As-built drawings shall be submitted with monthly pay estimates to the owner's engineer.

5.3.4 Required Permits for Construction

All water and sewer system extension plans must be granted the permits and encroachment agreements described herein (where applicable) PRIOR TO ANY CONSTRUCTION. The application forms for the following permits shall be obtained from the agency granting the permit and shall be completed except for signatures and notarization. All applications shall be signed by the General Manager of Greenville Utilities Commission or his designated representative.

5.3.4.1 Water System Extensions

An "Application for Approval of Plans and Specifications" is required for any extension of water distribution systems. The form may be obtained from the NCDEH. Three (3) copies of the application form shall be submitted to the Commission with the Contract Documents. There is no fee for this permit.

5.3.4.2 Wastewater System Extensions

A "Nondischarge Permit" from NCDWQ is required for any wastewater system extension. If the plans include a new wastewater pump station or modification of an existing pump station, pump station calculations are required. The NCDWQ requires a processing fee for all wastewater system extension plans or existing wastewater system modifications. The required fee, one original and the appropriate number of copies of the NCDWQ "Non-discharge Permit" application form, and necessary supplements shall be submitted with the Contract Documents. Copies of the required "Nondischarge Permit" applications are included in Appendix C of this Manual.

5.3.4.3 NCDOT Encroachment Agreements

A water or sewer extension which shall encroach upon any NCDOT right-of-way, shall require an encroachment agreement to be executed prior to approval of the plans. In this case, six (6) sets of drawings (1 full size and 5 reduced maximum size 11"x17") and six (6) copies of the NCDOT Encroachment Agreement Form shall be submitted to the Commission in addition to the copies of Contract Documents required for review under Section 5.4.2 of the Manual. If applicable, a letter from the Land Quality Section of the DENR approving the Erosion Control Plan must be submitted to GUC for forwarding to NCDOT prior to their approval of the encroachment agreement.

5.3.4.4 Erosion and Sedimentation Control Plan

An erosion and sedimentation control plan must be submitted to the DENR Land Quality Section at least 30 days before land disturbance begins on any site one acre or larger.

5.3.4.5 Railway Encroachment Agreements

Whenever a proposed water or sewer extension encroaches upon a railway right-of-way, an encroachment agreement shall be executed prior to construction. The Engineer shall submit for approval copies of the Contract Documents and the encroachment agreement forms to the Commission. Fees shall be determined by the right-of-way owner, after submission of the proposed agreement, and paid by the developer.

Indemnification and Hold Harmless Agreement

Whenever construction of, or other activities associated with, water and sewer facilities for the Commission encroach within the right-of-way of any City or DOT street or highway, the Contractor shall provide to the Commission, prior to scheduling a preconstruction conference, a fully executed, "Indemnification and Hold Harmless Agreement". A copy of the agreement is included in Appendix G of this Manual.

5.4 REQUIRED COPIES OF CONTRACT DOCUMENTS

5.4.1 The Engineer should submit to the Commission two (2) sets of Contract Documents, pertinent calculations, and applicable permits, for a preliminary review prior to submission of all Contract Documents necessary. Preliminary submittals, which do not contain the required calculations and permits, will be returned as incomplete. The Department Engineer and his staff shall review such plans and make the appropriate notes and return one (1) copy of the drawings to the Engineer marked so that the necessary corrections can be made and the Contract Documents may be submitted for the approval of the Commission and the appropriate state agencies.

5.4.2 The Commission shall require submission of the following number of sets of Contract Documents for the approval of the Commission and the appropriate state agencies.

TABLE 5-1

REQUIRED SETS OF PLANS AND SPECIFICATIONS FOR STATE AGENCY APPROVALS

Type of Project	No. of Copies of Drawings	No. of Copies of Specs.	Permit Originals	Permit Copies
Sewer Ext. Only Fast Track Form FTA 6/00	4	4	1	1
Sewer Ext. Only PSFMGSA 10/99	7	4	1	3
Water and Sewer Ext. Fast Track Form FTA 6/00	7	4	3 Water 1 Sewer	1 Sewer
Water and Sewer Ext. PSFMGSA 10/99	10	4	3 Water 1 Sewer	3 Sewer
Water Ext. Only	7	4	3	
NCDOT Encroachment	6	0	6	

5.4.3 The Engineer shall submit all required encroachment application forms, State approval forms, and appropriate fees as outlined above with the necessary copies of Contract Documents when making a formal submission for approval.

5.5 SHOP DRAWINGS

The Engineer's specifications shall include a requirement for the submittal of shop drawings and certifications for the materials, equipment and prefabricated structures used in water or sewer extension projects. The Engineer shall provide the Commission copies of approved shop drawings upon request.

5.6 SURVEY DATA

5.6.1 General

The locations of all benchmarks and control points shall be included in the plans. Benchmarks shall be located in areas which shall not be disturbed by the construction. The Engineer or Developer shall provide all surveys necessary for the work. Survey data shall be made available for the Commission's review upon request.

5.6.2 Vertical Control

The elevations given in the Contract Documents and all benchmarks shall be referenced to USGS elevations. The elevations of all construction benchmarks shall be looped to verify the accuracy of the level work. All construction benchmarks shall be clearly marked on the drawings using standard drafting symbols and shall have their elevations shown.

5.7 EASEMENTS AND RIGHTS-OF-WAY

All required easements and rights-of-way shall be provided to the Commission by one of the two following methods.

5.7.1 Recorded Final Plat

The Developer or Engineer may submit a recorded (20" x 24") final plat of the property to be served with all easement and right-of-way widths shown.

The plat must be recorded at the Pitt County Registry and bear the seal, signature and certification of a Registered Land Surveyor.

5.7.2 Standard Easement Form

The Engineer or Developer may submit a completed standard easement form, included in Appendix E of this Manual, accompanied with a map of each easement acquired. Additional blank copies of the easement form are available upon request from the Commission.

Easement maps accompanying standard easement forms shall be 8-1/2" X 14". They shall be drawn at a scale of 1" = 200 (or less) feet, utilizing standard drafting techniques. The maps shall include the following: (1) Name of the property owner, (2) map book and page number of the recorded property deed, (3) the name of the person(s) or company who prepared the map, (4) Certificate stating the map was prepared under the direct supervision of a registered land surveyor, (5) date of preparation, (6) scale, (7) north arrow (if magnetic, state year), and (8) all other pertinent information including existing rights-of-way, property lines, monuments, etc. Maps submitted as two or more sheets shall have match lines which clearly indicate how the sheets fit together. Drawings which have been photographically reduced shall not be acceptable unless all the information thereon is clearly legible and all other requirements have been met.