

Engineering Design Manual for Water and Sewer Facilities

Prepared by:

City of Tallahassee

Your Own UtilitiesSM

Water Resources Engineering Division
408 North Adams Street
Tallahassee, Florida 32301

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1.1 General

The purpose of this section is to outline the sequence of contract plans preparation, assembly, and related submittal requirements, as well as the information required to be presented on the various plan sheets which are to be included in all water and sewer infrastructure projects design phase submittals to the City of Tallahassee, Water Resources Engineering Division (WRE).

This document is not intended to be all-inclusive, but rather it is intended to supplement the proposals for professional engineering services for water and sewer infrastructure projects and shall become an integral part of the requirements for each project.

1.2 Design Phase Submittals

Standard design phase submittals and a brief description of content are as follows:

- Phase I – Existing topography, rights-of-way, easements, and utilities; and preliminary layout of the proposed improvements.
- Phase II – Detailed information for construction of improvements, proposed utility adjustments, and preliminary design documents.
- Phase III – Substantially complete construction plans and design documentation.
- Phase IV – Final plans and final design documentation.

The plans sheet status for each submittal is summarized in Figure 1.

Minor projects may have fewer phase reviews, as approved by the City and as defined in the project specific proposal.

Prior to submitting plans for a formal Phase review by the City, the design consultant shall conduct an internal quality assurance (QA) review to ensure technically correct and sufficiently complete plans for each Phase. Any revision or corrections noted during the review shall be incorporated into the plans before submittal for the formal Phase review. Concurrent QA reviews by the design consultant are discouraged and not allowed for Phase III and Phase IV submittals; however, they may be considered for Phase I and Phase II submittals at the discretion of the City's Project Manager.

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Figure 1 – Summary of Plan Sheet Status for Phase Submittals

<u>Item</u>	<u>Phase I</u>	<u>Phase II</u>	<u>Phase III</u>	<u>Phase IV</u>
Cover Sheet	P	P	C	F
General Notes		P	C	F
Legend & Abbreviations		P	C	F
Special Purpose Survey (Boundary, Existing Conditions & Topography)	C	C	C	F
Project Layout Plan & Key Sheet	P	P	C	F
Subsurface Utility & Geotechnical Data (O)		P	C	F
Erosion & Sedimentation Control Plan		P	C	F
Demolition & Tree Protection / Removal		P	C	F
Utility Plan & Profiles	P	P	C	F
Special Construction Details (O)		P	C	F
Pump Station Site Plan (O)	P	P	C	F
Pump Station Sections (O)		P	C	F
Pump Station Details(O)		P	C	F
Architectural Plans (O)		P	C	F
Structural Plans (O)			C	F
Electrical Plans (O)			C	F
Traffic Control Plans (O)			C	F
Signing and Pavement Marking Plans (O)			C	F
Landscape & Irrigation Plans (O)			C	F
Design Notebook			C	F

Status Key:

P – Preliminary

C – Complete but subject to change

F – Final

O – Optional, to be included as needed by project or at the discretion of the City’s Project Manager.

1.3 Requirements for Phase I and Phase II Submittals

Standard Phase I and Phase II design submittals and a brief description of content are as follows:

1.3.1 Cover Sheet (Template provided by WRE)

Phase I	Phase II
Project Name City Project Number / Work Assignment Underground Utilities Logo Reference City of Tallahassee, Water Resources Engineering Division Project location map and north arrow Index of Sheets Governing Specifications and Design Standards Consultant's name, address and engineering business number	Update index of sheets

1.3.2 General Notes

Phase I	Phase II
N/A	Notes governing construction of the project (standard notes provided by WRE)

1.3.3 Legend & Abbreviations

Phase I	Phase II
N/A	List of standard symbols, line types, and abbreviations used for the project

1.3.4 Existing Conditions & Topography

Phase I	Phase II
Special purpose survey with sufficient detail to accurately depict the existing physical conditions for the project. Rights-of-way, property lines, easements, flood hazard delineation	Update as required

Level of detail shall be as defined in the scope of work in approved proposal	
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1.3.5 Project Layout Plan & Key Sheet

Phase I	Phase II
List of coordinates for survey control and key reference points Station Equations Survey baseline, permanent and temporary bench marks Utility Plan-Profile Key Map	Update Utility Plan-Profile Key Map Horizontal location of construction baseline Locations of all excavations for utility locations (SUE Quality Level “A”) and soil borings for geotechnical investigations

1.3.6 Subsurface Utility Engineering (SUE)

Phase I	Phase II
N/A	Tabular and graphical results of subsurface utility location efforts

1.3.7 Erosion & Sedimentation Control

Phase I	Phase II
N/A	North arrow and scale Street names Existing topography, utilities & structures Proposed improvements Location and type of erosion control devices Location of soil tracking device (if applicable) Identify construction staging and stockpile areas

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1.3.8 Demolition & Tree Removal / Protection

Phase I	Phase II
N/A	North arrow and scale Street names Existing topography, utilities, & structures Location & identification of existing utilities and infrastructure proposed to be removed, relocated, and/or abandoned Locate & identify trees by size & type and graphically identify those trees which are to be protected or removed Tree debit/credit table with I.D. No., quantity, common & scientific species name, proposed impact (protected, removed, arboricultural mitigation, etc.), and debit or credit status.

1.3.9 Utility Plan-Profile – Plan View

Phase I	Phase II
North arrow and scale Design survey information Benchmark location with ID Preliminary alignment of primary utility improvements	Station ties Existing structures with City GIS ID numbers Proposed structures with ID numbers Proposed utilities with length, size and material type Proposed services locations Proposed R/W, easement and property lines

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1.3.10 Utility Plan-Profile – Profile View

Phase I	Phase II
<p>Scale (horizontal & vertical) Existing ground profile (construction baseline) Existing ground profile (utility alignment) Existing structures, pipes, and utilities with known invert elevations and materials Preliminary alignment of primary utility improvements with size and flow line</p>	<p>Proposed water, reuse, and sewer force main pressure pipes with sizes and materials Proposed sewer and storm drain pipes with size, material, and flow direction Proposed utility structures with construction ID numbers Utility relocations, adjustments, and conflict resolutions. If the utility information cannot be clearly shown on the plan and profile sheets, then this information will be shown separately on Special Construction Details sheets.</p>

1.3.11 Special Construction Details (O)

Phase I	Phase II
<p>N/A</p>	<p>Project specific details that provide additional information for the construction of non-standard elements that are not covered in the Standard Specifications booklet or elsewhere in the plan set. Cross sections shall include pertinent Plan and Profile information as required above.</p>

1.3.12 Pump Station – Site Plan

Phase I	Phase II
<p>North arrow and scale Existing topography, utilities & structures Preliminary location and identification of pump station structures, equipment, and site improvements.</p>	<p>Grading requirements, proposed contours, slopes, and elevations Setback requirements, existing and proposed easements Fences, gates and security Relevant dimensions Site data table</p>

1.3.13 Pump Station Sections

Phase I	Phase II
N/A	Scale Section drawings illustrating details of structures, piping, appurtenances, and pump station controls Relevant dimensions

1.3.14 Pump Station Details

PHASE I	PHASE II
N/A	Special construction details specific to pump station, including structures, piping, controls Pump design criteria, including pump curve, electrical requirements, and operational settings Bypass pumping provisions

1.3.15 Architectural Plans

Phase I	Phase II
N/A	Preliminary floor plans including pertinent dimensions and elevations Proposed Life Safety Plan with exits and dimensions Proposed building elevations Proposed building materials and finishes

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1.3.16 Soil Survey & Geotechnical Data (O)

Phase I	Phase II
N/A	North arrow and scale Construction centerline R/W, easement and property lines Plan view showing relevant existing topography, utilities and proposed improvements Boring locations and logs Soils test results, classifications, mechanical properties & water table

1.3.17 Stormwater Pollution Prevention Plan

Phase I	Phase II
N/A	Narrative description of the sediment and erosion control devices to be utilized during each construction phase, including tree removal, clearing and grubbing, and handling and hauling of excavated materials and backfill. The plan also will detail the erosion control measures to be employed at all stockpile and construction staging areas and will define the maximum limits of all active construction zones.

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1.4 Requirements for Phase III and Phase IV Submittals

Phase III and Phase IV submittals shall include finalizing the sheets generated Phase I and Phase II as described above, as well as incorporating the following sheets as required by the project:

1.4.1 Structural Plans (O)

Phase III	Phase IV
Project specific structural details for the construction of non-standard structural components Consultants name, address & business telephone number, if applicable	Final

1.4.2 Electrical Plans (O)

Phase III	Phase IV
Project specific electrical details for the construction of non-standard electrical components Consultants name, address & business telephone number, if applicable	Final

1.4.3 Landscape & Irrigation Plans (O)

Phase III	Phase IV
All relevant topographic features, to include underground and overhead Plant placement by symbol Legend for plant symbols Project specific tabulation of quantities Applicable standard details Irrigation system design and details, including pipe sizes, irrigation zones, flow rates, and details Tree debit/credit table (see Demolition, Tree Removal & Protection) Consultants name, address & business telephone number, if applicable	Final

1.4.4 Traffic Control Plans (O)

Phase III	Phase IV
Traffic control plan Detour plan (if applicable) Phasing plan Location of advance warning signs, temporary barriers, temporary pavement markings, temporary drainage devices, special devices such as arrow boards and variable message signs, detours, regulatory speeds, and methods of access by construction vehicles and personnel.	Final

1.4.5 Signage & Pavement Markings (O)

Phase III	Phase IV
North arrow and scale Basic roadway planimetrics Roadway centerline with stationing Pavement markings Begin and end stations Sign type and location Tabulation of quantities Project specific narrative and notes	Final

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1.5 Supporting Documentation

1.5.1 Pump Station Notebook

For projects with pump stations, a separate notebook shall be created specific to each pump station. This pump station notebook shall include all pertinent data regarding the pump station design in accordance with this document and the project specific scope of services.

Phase III	Phase IV
<p>Pertinent information concerning the pump station property, including Parcel I.D., legal description, ownership, zoning, flood hazard, easements, etc.</p> <p>Physical attributes, including materials, dimensions, elevations, equipment, electrical controls, emergency power, pipe fittings, valves, and appurtenances</p> <p>Force main attributes, including pipe size, materials, linings, pipe profile with elevations, air release/air vacuum valve sizing, selection, and locations.</p> <p>Pump station design criteria, including flow rate calculations, storage volumes, pump cycle times, static and dynamic head calculations, force main hydraulics, system curves, buoyancy calculations, etc.</p> <p>Pump data, including manufacturer, model, pump curve, impeller size, electrical data, motor HP, efficiency, NPSH, etc.</p>	<p>Final</p>

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1.5.2 Design Notebook

At each Phase Review, design documentation shall be submitted supporting the design shown in the submittal. The data will be indexed and bound in a spiral-type binder for delivery to the City. The bound dimensions of all sheets will not exceed 8.5” x 11” (larger sheets must be folded to meet this format). Alternate submittal formats such as unbound documents (for filing) or electronic files (PDF) may be considered at the discretion of the City’s Project Manager.

Phase I	Phase II
N/A	Design notes and computations to document the design and decisions reached during development of the project. Design notes and computations will be organized, labeled, fully titled, numbered, dated, and initialed by the designer and checker.

1.5.3 Pay Items

Prior to the Phase III submittal, the consultant shall prepare and submit to the WRE a preliminary list of pay items. WRE will review and approve the list prior to the preparation of pay item notes and quantity take-offs to be included with the Phase III submittal.

Phase III	Phase IV
Detailed quantity take-offs, method of measurement, basis of payment, and construction cost estimates in the City’s bid proposal format for each bid item.	Final

1.5.4 Contract Time

Phase III	Phase IV
Engineers preliminary estimate of contract construction time	Final

END OF DESIGN SECTION 1

2.1 Topographic Survey Requirements

2.1.1 General

The purpose of the topographic survey is to locate and document all information that is pertinent to the design and construction of water, sewer, and reclaimed water utility construction projects.

All firms to provide surveying services to the City of Tallahassee Underground Utilities shall have a Florida registered Professional Land Surveyor (PLS), current and in good standing with the Florida Board of Professional Regulation, as a full-time employee to act as the Surveyor of Record.

All surveying must be performed in accordance with the Minimum Technical Standards required by the Florida Administrative Code under the direct supervision of the designated Surveyor of Record. Should the Surveyor of Record become unable to perform the required duties, work on the project will cease immediately and the City shall be notified. Any work performed on the project when the Surveyor of Record is unavailable to perform the required duties may be deemed unacceptable and be rejected by the City.

2.1.2 Records Search

The Surveyor of Record shall research all boundaries, subdivision plats, rights-of-way, easements and other available survey elements, which may affect the physical boundaries of the project. All the easements with book and page numbers shall be identified and labeled on the survey. Research shall include all public record resources, which may include the following:

- City and County public records;
- Florida Department of Transportation (FDOT) right-of-way records;
- Private utility service providers records for gas, telephone, electric, cable, fiber optics, and other utilities; and
- Ownership or Easement Records, as available.

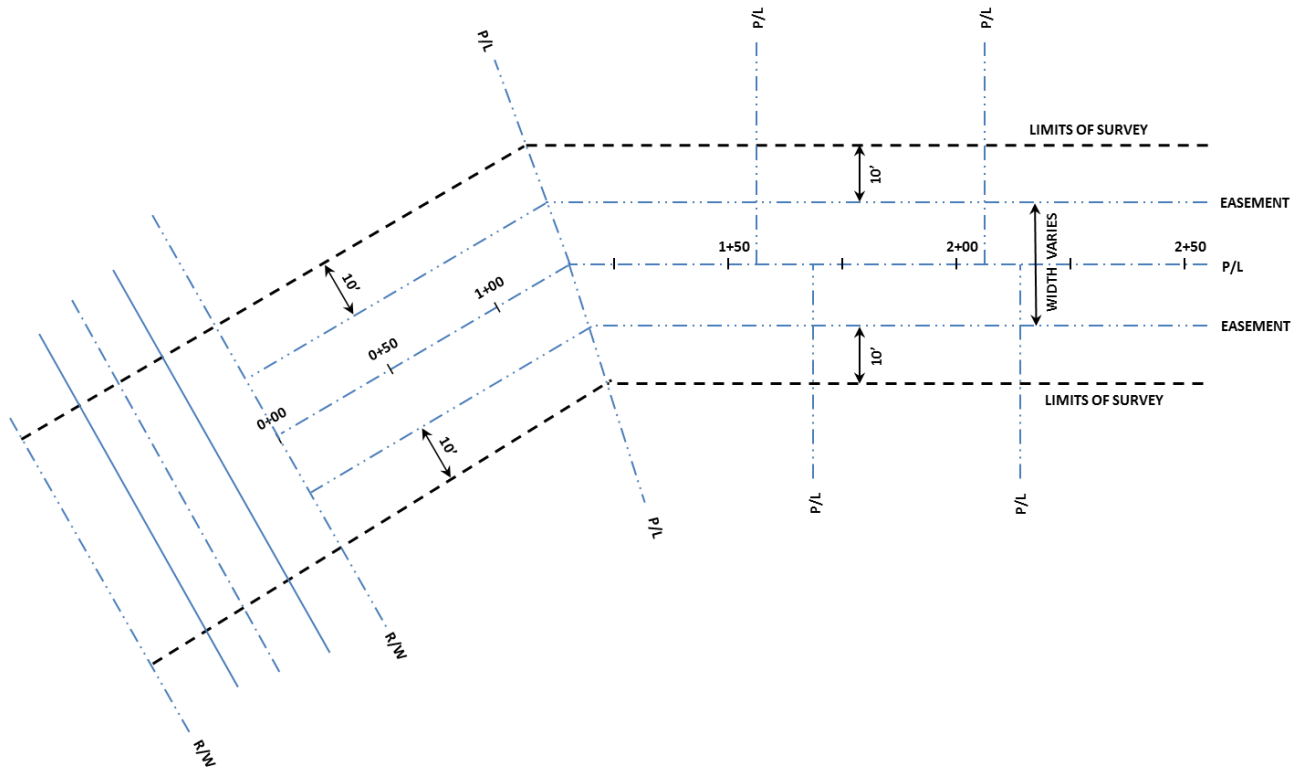
2.1.3 Utility Location and Coordination

The Surveyor of Record shall request a design ticket from the Sunshine State One Call of Florida, Inc. (Sunshine 811) to determine which utility service providers are located within the project boundary, then contact each utility representative to determine the location of their utility infrastructure so that it may be identified in the survey.

2.1.4 Limits of Survey

For easements, the topographic survey shall extend at least 10-feet beyond the minimum easement width for the full length of the alignment, as shown in Figure 1.

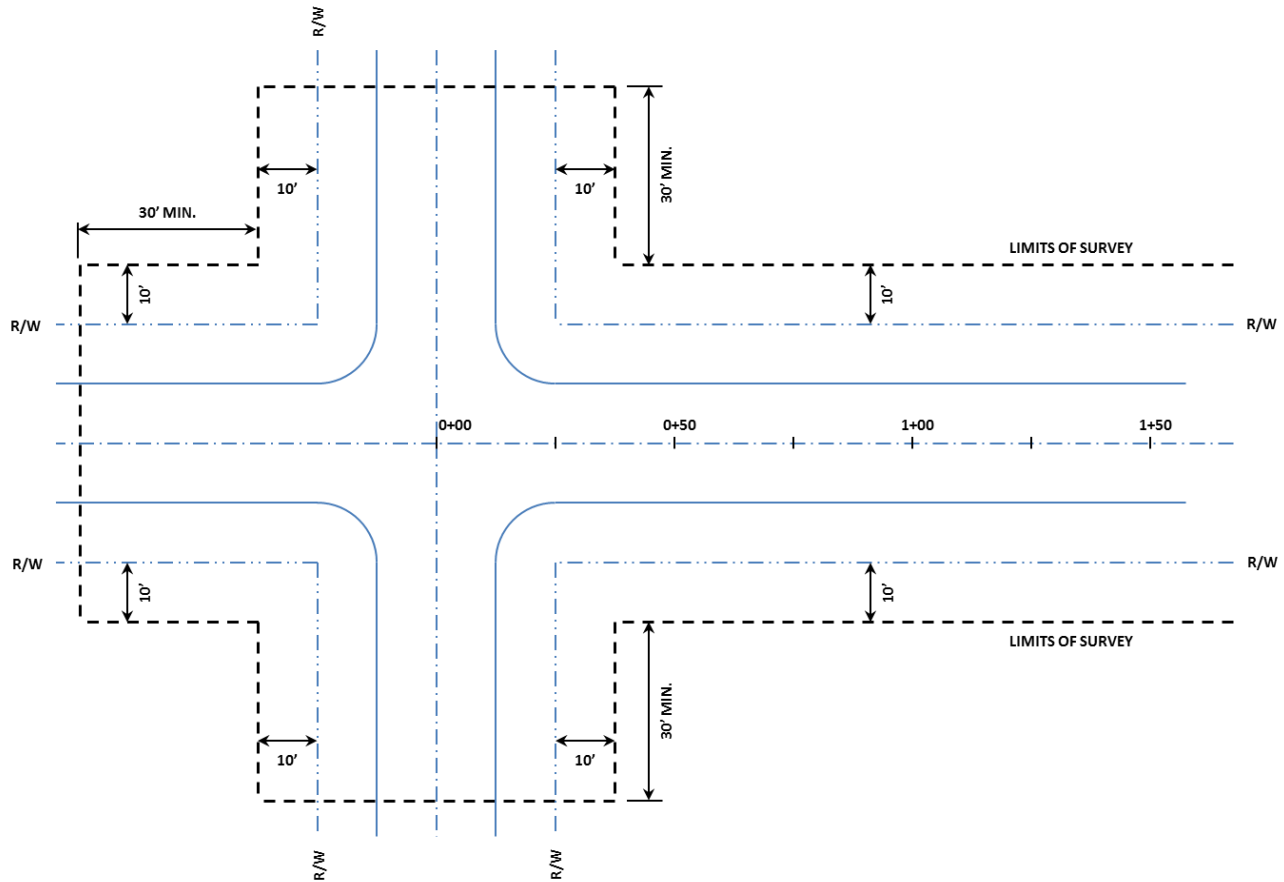
Figure 1 – Typical Survey Limits for Easements (SAMPLE)



For streets and public rights-of-way, the topographic survey shall extend at least 10-feet beyond the right-of-way for the full length of the alignment, and at least 30-feet beyond the right-of-way on all side streets and terminal ends of the survey, as shown in Figure 2.

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Figure 2 – Typical Survey Limits for Streets and Public Rights-of-Way (SAMPLE)



2.1.5 Survey Controls

2.1.5.1 Horizontal Control

The horizontal datum is North American Datum 1983 (NAD83), with 1990 Florida adjustment (NAD83/90); or for Global Positioning System (GPS) survey control, the horizontal datum is NAD83, with the National Spatial Reference System (NSRS) 2007 National Readjustment (NAD83/NSRS2007), as defined by the National Geodetic Survey (NGS). The applicable State Plane Coordinate zone is Florida North-Zone 3576, FIPS 903.

2.1.5.2 Vertical Control

Vertical control datum is North American Vertical Datum 1988 (NAVD88), as defined by the NGS.

2.1.5.3 Survey Baseline

Establish survey base line for linear infrastructure construction using centerline of street or right-of-way. Provide survey monuments at 100-foot intervals along the survey baseline, including points of curvature (PC), points of tangency (PT), and points of intersection (PI). Use PK or MAG nails set through stainless steel discs imprinted with the Survey of Record PLS Number and “Survey Baseline.”

2.1.5.4 Survey Benchmarks

Establish benchmarks (BMs), or control points (CPs), at each end of the project, with intermediate locations spaced about every 500 feet. Benchmarks are to be reasonably permanent, easily identifiable, and at a sufficient distance outside the limits of construction so as not to be damaged or destroyed. Provide a minimum of two BMs on each project, including northing, easting, elevation, and description information.

2.1.6 Field Data Collection

The information provided below is typical of what elements can be expected for a topographic survey field data collection, but is not intended to be a comprehensive list. The Surveyor of Record shall be responsible for identifying and locating all above ground features within the limits of the survey, as well as above and below ground utilities that have been marked by others and that may be required for design consideration.

2.1.6.1 Topography and Natural Features

Establish a spot elevation grid with sufficient data to accurately generate a 3-dimensional surface model with 1-foot (maximum) contours within the limits of survey. Locate and describe all natural features, including water bodies, wetlands, significant slopes, and other natural features required by local Code for permitting.

2.1.6.2 Right-of-Way, Property Lines, and Easements

Locate and tie all existing rights-of-way, property lines and easements including type, size, bearing, book and page, as necessary. Show lot, block, subdivision, and dimensions with adjacent street names.

2.1.6.3 Roadways and Railways

Identify roadways, driveways, alleys and sidewalks with pavement type. Show centerlines and angles of intersection of the side street(s) with main roadway centerline, as necessary. Show all mail boxes, road signs and signal posts. Identify all existing or abandoned railways with company names, if available.

2.1.6.4 Trees, Shrubs, Landscaping, and Hardscaping

Locate all trees, vegetation lines, landscaping, and hardscaping features. Provide descriptions for bushes, shrubs or other landscaping plants. Provide locations and descriptions of other landscaping and hardscaping features such as grass lawns, gravel beds, rock structures, sculptures, irrigation devices, etc., within the limits of the survey.

Provide common name, scientific name, tree size (diameter at breast height, DBH), and critical protection zone (CPZ) for all trees over 2-inches DBH, unless otherwise directed by the City. In lieu of providing the common name, scientific name, and tree size information graphically, the Surveyor of Record may provide a reference table with the information above and a reference number linking the table to the tree location on the survey. The CPZ must be shown graphically in relation to tree on the survey.

2.1.6.5 Fences and Walls

Provide locations and descriptions of all fences and walls within the limits of the survey.

2.1.6.6 Drainage Features

Provide locations and descriptions of all drainage features within the limits of the survey. Typical features include swales, ditches, ponds, aprons, culverts, headwalls, rip-rap, mitered-end sections, and other drainage features. Identify all tops of banks and toes of slopes with elevations at sufficient intervals to define the drainage feature. Provide size, material, and invert elevations of all culverts. Provide top and invert elevations of all headwalls, and mitered-end sections.

2.1.6.7 Utilities

Provide locations and descriptions, including type, size, materials, and elevations (if possible) of all existing above and below ground utilities within the limits of the survey. **It is critical that storm and sewer manhole type (brick, precast, fiberglass, etc.), size, and critical elevations are accurately identified and documented at the time of survey. Digital photograph(s) shall be provided for each structure to illustrate the physical conditions at the time of survey. The photograph shall be linked to the survey data so that the information can be accurately cross-referenced.**

2.1.6.7.1 Water System

Typical water system features include water distribution pipe, valves, hydrants, services, meters, and backflow devices.

2.1.6.7.2 Wastewater Collection and Transmission Systems

Typical wastewater collection and transmission system features include collection system piping, manholes, laterals, and cleanouts; sewer pumping stations, force main piping, valves, and air valves.

2.1.6.7.3 Storm Drain Systems

Typical storm drain system features include storm drain piping, manholes, and inlets. Include detailed information for special features such as baffles, skimmers, weirs, and throat lengths.

2.1.6.7.4 Gas

Typical gas system features include piping (indicate high or low pressure, if available), regulating facilities, valves, and meters.

2.1.6.7.5 Electric

Typical electric system features include conduits, duct banks, pedestals, pull boxes, transformers, poles, and guy wires. Include voltage information and service provider, if available.

2.1.6.7.6 Telephone and Cable

Typical telephone and cable system features include conduits, duct banks, pedestals, pull boxes, and cable type and size (fiber optic, no. of pairs, etc.). Include service providers, if available.

2.1.7 Digital Data

Produce all digital drawings in AutoCAD Civil 3D 2012 format, or newer. Provide a survey data point file showing point number, northing/easting, elevation, and description of all survey data points. Provide electronic plot (not scan) of final survey in Adobe PDF file format.

2.2 Boundary Survey Requirements

2.2.1 General

The purpose of the boundary survey is to locate and prepare legal descriptions for fee title conveyance, and right-of-way, easement, and lease agreement acquisition or abandonment.

All firms to provide surveying services to the City of Tallahassee Underground Utilities shall have a Florida registered Professional Land Surveyor (PLS), current and in good standing with the Florida Board of Professional Regulation, as a full-time employee to act as the Surveyor of Record.

All surveying must be performed in accordance with the Minimum Technical Standards required by the Florida Administrative Code under the direct supervision of the designated Surveyor of Record. Should the Surveyor of Record become unable to perform the required duties, work on the project will cease immediately and the City shall be notified. Any work performed on the project when the Surveyor of Record is unavailable to perform the required duties may be deemed unacceptable and be rejected by the City.

2.2.2 Title and Record Search

The Surveyor of Record shall assume the responsibility for adequate title research to support the determination of the location of intended boundaries of the land parcel surveyed. The title must be searched back in time sufficiently far enough to uncover all the pertinent information. In many cases, this may be to the sovereignty of the soil. Research shall include all public record resources, which may include the following:

- City and County public records;
- Florida Department of Transportation (FDOT) right-of-way records;
- Private utility service providers records for gas, telephone, electric, cable, fiber optics, and other utilities; and
- Ownership or easement records.

2.2.3 Survey Controls

Use the same horizontal and vertical survey controls as those defined for topographic surveys above.

2.2.4 Monumentation

Set monuments using a minimum of 5/8" diameter x 18" iron rods capped with Surveyor of Record name and registration number or survey company name. The Surveyor of Record shall determine whether Letters of Permission granting access to private property for surveying

purposes will be required. The City Project Manager shall be informed of the need for this task, and kept informed of its progress.

2.2.5 Field Notes

Field notes, for the use in preparing a boundary survey, are worded metes and bounds descriptions of the results of the on-the-ground survey of real property. Provide sufficient information to identify the location, boundaries, monumentation, and area of the described tract of land, as well as the relationship to any parent tract of land or adjacent tracts. Accompany each metes and bounds description with a drawing graphically depicting the worded description.

END OF DESIGN SECTION 2

3.1 Water System - General

3.1.1 Scope of Work

Define engineering design criteria for potable water supply and distribution systems.

3.1.2 References

The design engineer is referred to the City of Tallahassee Underground Utilities Technical Specifications for Water and Sewer Construction, which provides Contractors with product details and installation procedures to be used when constructing water and sewer system components. The design engineer shall be familiar with products and procedures acceptable to the City for construction of new facilities.

Water system design shall proceed in accordance with the applicable provisions of the Florida Department of Environmental Protection (Chapter 62-555 F.A.C.), and AWWA Manual M31.

3.2 Water System - Design

3.2.1 Demand Criteria

3.2.1.1 Average Day Demand

The average day demand is defined as the total volume delivered over a defined period of time (i.e. monthly, quarterly, annually, etc.) divided by the number of days in that time period. This rate can vary significantly monthly, seasonally, and annually depending on factors such as weather patterns and rainfall amounts.

In the absence of verified historical data, calculate the average day demand for potable water using the rates indicated for the types of development or establishments included in Appendix B, assuming full build-out or full occupancy. Include ancillary potable water uses (i.e. irrigation, cooling water, etc.) in the calculations for the average day demand.

3.2.1.2 Maximum Day Demand

Maximum day demand is defined as the maximum quantity of water used on any day of the year. Calculate the maximum day demand based on the average day demand, for the size and type of development under full build-out conditions, multiplied by an appropriate peaking factor.

In the absence of verified historical data, maximum day demand means 1.5 times the average daily demand of the system.

3.2.1.3 Peak Hour Demand

Peak hour demand is defined as the highest hourly rate of water used during the maximum day demand period. Calculate the peak hour demand based on the maximum day demand, for the size and type of development under full build-out conditions, multiplied by an appropriate peaking factor.

In the absence of verified historical data, peak hour demand means 2.5 times the maximum day demand of the system.

3.2.1.4 Fire Flow

Design water distribution systems in accordance with the fire protection requirements of the Insurance Services Office (ISO), as outlined in AWWA Manual M31. For single-family or duplex residential development not exceeding two stories in height, meet or exceed the following minimum fire flow criteria, while maintaining a minimum residual system pressure greater than 20 PSI at all points in the system:

Distance Between Single-Family Residential Buildings (FT)	Minimum Fire Flow Rate (GPM)	Minimum Main Size (inches)
>100	500	6
31 – 100	750	8
11 – 30	1000	8
10 or less	1500	8

For multi-family, institutional, commercial, industrial, or other special developments, establish the water distribution system capacity to satisfy the minimum fire flow requirements of the development in accordance with the Insurance Services Office (ISO), and as outlined in AWWA Manual M31.

The design engineer shall be required to obtain fire hydrant flow test results to verify available water system capacity to serve the development area. Hydrant flow tests shall be performed in accordance with AWWA M17, latest edition. Results shall be certified by a Florida licensed Professional Engineer or Florida licensed Fire Protection Contractor. All hydrant flow tests shall be coordinated through the City of Tallahassee Underground Utilities Department.

3.2.2 Distribution System Sizing

Size the water distribution system in accordance with the approved master plan established for that area. In the absence of an approved master plan, size the water distribution system to deliver the design demand - the sum of the maximum day demand plus the needed fire flow, while maintaining a minimum residual system pressure greater than 20 PSI at all points in the system - for the full build-out conditions.

The target maximum water system head loss is 1 foot of head loss per 1,000 feet of pipe under average day demand conditions, using a Hazen-William friction factor (C-factor) of 120 for design purposes. The target maximum fluid velocity range is 5-8 FPS under maximum day demand conditions. In all cases, the minimum water system pressure shall not drop below 20 PSI for the maximum day demand plus needed fire flow, or the peak hour demand.

The preferred minimum distribution system pipe size is 8-inches, excluding cul-de-sacs, fire hydrant connections, fire lines, or water services. For these exceptions, the following guidelines shall apply:

Water mains on residential cul-de-sacs serving up to six single-family homes and less than 500 feet in length may be 6-inches.

Water mains on residential cul-de-sacs serving more than six single-family homes or greater than 500 feet in length shall be 8-inch minimum.

Fire hydrant connections shall be 6-inch diameter up to 50 feet in length. Hydrant connections longer than 50 feet shall be submitted to the City of Tallahassee Underground Utilities Development Review Coordinator for review.

Fire lines shall be sized by the design engineer for the intended application and needed fire flow demand in accordance with Insurance Services Office (ISO), as outlined in AWWA Manual M31.

Water services shall be sized by the design engineer for the intended application, including irrigation demand and other incidental demands, in accordance with AWWA Manual M22. In no case shall a water service line be smaller than 1-inch diameter.

Make design computations using hydraulic modeling software, such as Innovyze InfoWater, Bentley WaterCAD, or EPANet. Submit calculations/modeling results to the City of Tallahassee Underground Utilities Development Review Coordinator for review.

3.2.3 Placement of Water System Piping and Appurtenances

3.2.3.1 Piping

Install water system piping for new development in accordance with the Tallahassee Area Utilities Coordinating Committee – Recommended Guide for Utility Placement, as provided in the Appendix A, whenever possible. Exceptions from this guide must be approved by the City and/or County, when applicable.

Loop the water distribution system piping, whenever possible. Avoid dead-end water mains, except when the design engineer can demonstrate that looping is not possible. When required, such as in a cul-de-sac, dead-end mains must have a hydrant located at the end of the main for flushing.

3.2.3.2 Valves

Provide valves to isolate water system piping for repair and maintenance. The number of valves provided depends on the configuration of the distribution network. Ideally, each pipe should have at least one valve. For more critical pipes, such as those with large number of customer or substantial demand requirements, multiple valves may be warranted.

As a general rule, use the “N-1” valve place scheme at junctions, where “N” is the number of pipes at a junction (tees and crosses). For example, a tee has three pipes connecting at the junction; therefore, two valves should be installed ($3 - 1 = 2$). As a general rule, the placement of the valves at a junction should be downstream from the source of water.

Place valves on all new fire hydrant stubs; at both ends of all jack and bore crossings; and at both ends of crossings of those streets classified as major collectors, arterial roads, or with 3 or more thru lanes of traffic.

Place valves on straight runs of pipe (no branches) at intervals no greater than 500 feet for pipe sections with customer services, or at intervals of 1,000 feet for pipe section without customer services.

3.2.3.3 Fire Hydrants

Provide fire hydrants according to the following spacing requirements:

Type of Development	Max. Distance Between Fire Hydrants (feet)
Single Family Residential	600
Multi-Family Residential, Institutional, Commercial, or Industrial	300

Install fire hydrants on straight runs of pipe (no branches) at intervals no greater than 1,000 feet for pipe sections without services.

3.2.4 Thrust Restraint

Pressure piping fittings require that adequate means of restraining unbalanced thrust forces is provided in accordance with AWWA Manual M23 and the recommendations of the manufacturer. Thrust restraint may be provided by mechanical devices or cast-in-place concrete blocking (if approved by the City). Mechanical thrust-restraint devices must be pressure-rated by their manufacturers and must not exert forces that will cause failure when assembled on the pipe or fitting.

The minimum number of restrained joints required for resisting thrust forces shall be determined by the pipe size, material, type of valve or fitting, operating conditions, pipe trench, and soil type. Minimum restrained lengths for many typical applications are provided in the Standard Construction Details, which have been calculated for various pipe material and fittings based on the following minimum design parameters:

- Unified Soil Classification: SM Soil Type
- Safety Factor: 1.5
- Trench Type: Type 2
- Depth of Bury: 3 Feet
- Test Pressure: 150 PSI

The Engineer of Record will verify the above design parameters are suitable for the proposed installation. Any reductions in minimum restrained lengths provided in the Standard Construction Details and the design parameters above shall be requested in writing by an active Florida Licensed Professional Engineer, in good standing with Florida Board of Professional Engineers. Such requests shall include suggested changes to design parameters, supporting documentation, and new restrained length calculations, signed and sealed by the Professional Engineer.

3.3 Permitting

3.3.1 Local Regulation Authority

Pursuant to Chapter 403-Section 1815, Florida Statutes, the City of Tallahassee has been granted local regulation authority by FDEP for the construction of water distribution piping systems not exceeding 12-inches in diameter and designed in accordance with Chapter 62-555. As such, qualifying projects shall be exempt from FDEP Permit requirements. This exemption does relieve any requirement to obtain necessary permits for construction activities in waters of the state or U.S., or from complying with other governing agency requirements. Also, this exemption does not apply to any connection to any water system which the Department has determined to be in substantial non-compliance with applicable laws and standards if the Department has so notified the respective municipality.

3.3.2 Reporting

As part of the local regulation authority, the City of Tallahassee is required to submit annually an updated map of all new connections to the City’s water system granted under this authority, accompanied by a description of the distribution system modifications, including the size and length of water mains, number and size of meter connections, and design flow information.

To facilitate this reporting, the City of Tallahassee Underground Utilities requires submission of the following documents:

- Local Regulation Authority Reporting Form – Water Distribution System
- Proposed Construction Plans (Utility layers) in AutoCAD (State Plane Coordinate System)
- As-Built Drawings in AutoCAD (State Plane Coordinate System)

3.3.3 Non-Exempt Permitting

Water distribution system components that do not qualify for FDEP permit exemption shall require the use of standard FDEP Forms available on the www.fdep.state.fl.us website for the intended utility application.

END OF DESIGN SECTION 3

4.1 Sewer Collection System - General

4.1.1 Scope of Work

Define engineering design criteria for sanitary sewer collection systems.

4.1.2 References

The design engineer is referred to the City of Tallahassee Underground Utilities Technical Specifications for Water and Sewer Construction, which provides Contractors with product details and installation procedures to be used when constructing water and sewer system components. The design engineer shall be familiar with products and procedures acceptable to the City for construction of new facilities.

Sewer collection system design shall proceed in accordance with the applicable provisions of the Florida Department of Environmental Protection (Chapter 62-604 F.A.C.) and the most current edition of the Recommended Standards for Wastewater Facilities, commonly referred to as “10 States Standards.”

4.2 Sewer Collection System - Design

4.2.1 Demand Criteria

4.2.1.1 Average Day Flow

Calculate the average day flow for sanitary sewer at 80 percent of the water demand rates indicated in Appendix B.

4.2.1.2 Peak Hour Flow

Peak hour flow is defined as the highest hourly rate of wastewater flow during the maximum day demand period. Calculate the peak hour demand based on the average day demand, for the size and type of development under full build-out conditions, multiplied by an appropriate peaking factor. In the absence of verified historical data, peak hour demand should be calculated using the following peaking factors:

Average Daily Flow Range	Peak Factor
0.00 to 0.05 MGD	4.0
0.05 to 0.25 MGD	3.0
0.25 to 2.00 MGD	2.5

4.2.2 Collection System Sizing

Size the sanitary sewer collection system in accordance with the approved master plan established for that area. In the absence of an approved master plan, size the collection system to convey the peak hour flow from the contributing area for the full build-out conditions, plus any flow received from other pumping stations.

The minimum nominal sewer pipe size allowed shall be 8 inches for sewer mains (mains that serve more than one resident or facility) and 4 inches for sewer service connections.

Sewer collection system piping shall not be over-sized to reduce the pipe slope.

4.2.3 Sewers

4.2.3.1 Slopes

Design pipe slopes to achieve a target minimum sewer flow velocity of 2.5 FPS (feet per second) at 95 percent full flow, using a Manning Roughness Coefficient (n-value) of 0.013. This target slope is required to ensure scouring velocity upon completion of construction. When target design slopes are not achievable, the absolute minimum pipe slope shall be in accordance with the most current edition of the Recommended Standards for Wastewater Facilities, commonly referred to as “10 States Standards.” Recommended pipe slopes for design of common sewer sizes are provided in the table below:

Sewer Nominal Diameter (inches)	Target Design Slope (ft/100 ft or % Slope)	10- States Stds. Minimum Slope (ft/100 ft or % Slope)
4 or 6	2.00	n/a
8	0.45	0.40
10	0.33	0.28
12	0.26	0.22
15	0.195	0.15
18	0.153	0.12
21	0.125	0.10
24	0.105	0.08
30	0.078	0.058
36	0.061	0.046
42	0.050	0.037

Calculate slope using center-to-center distances of manhole structures (for mains) or fittings (for services).

4.2.3.2 Location and Alignment

Install sewer lines for new development in accordance with the Tallahassee Area Utilities Coordinating Committee – Recommended Guide for Utility Placement, as provided in the Appendix A, whenever possible. Exceptions from this guide must be approved by the City and/or County, when applicable.

Sewer lines shall be designed with straight alignment and grade between manholes.

4.2.3.3 Connections to Manholes

Where sewers connect to manholes, design the upstream sewer crown elevations to match the downstream sewer crown elevation, when possible. When upstream sewers cannot match the downstream crown elevation, the maximum drop between the connecting sewer invert elevation and the manhole bench shall be less than 24 inches; or provide an outside drop connection to the manhole.

4.2.3.4 Depth

The minimum depth of mains will be 6-feet and the maximum depth will be 16-feet, as measured from finished grade above the sewer to the invert elevation of the pipe. Exceptions to this minimum depth requirement must be approved in writing by the City.

4.2.3.5 Service Laterals

Sewer service laterals shall connect directly to the sewer main using approved sewer fittings. Sewer service connections to manholes shall not be allowed unless approved in writing by the City. The minimum depth of the sewer services at the property line will be 5-feet, with a maximum depth of 8-feet, unless otherwise approved by the City. Cleanouts shall be provided at the right-of-way line for all sewer service lines. Prior to final inspection of the sewer, the cleanout will be installed 2 feet above ground level. After final acceptance of the sewer the cleanout shall be installed flush to grade, with an EMS location marker buried directly next to it.

4.2.4 Manholes

Provide sanitary sewer manholes for all sewers 8 inches and larger at all roadway intersections, sewer junctions, terminal ends, changes in alignment, changes in slope, and changes in pipe size. Maximum distance between manholes, measured center to center, shall be as follows:

Sewer Pipe Size Nominal Diameter	Maximum Distance Between Manholes
15" or less	400 feet
18" to 30"	500 feet
Greater than 30"	>500 feet requires approval by City

All manholes in easements will be left a minimum of 18-inches above grade. If within a 100-year flood plain, manholes will be 1-foot above the flood plain elevation. Manholes subject to flooding will have watertight lids or rain dishes. Manholes installed in unpaved streets will remain 1-foot below grade.

4.3 Permitting

4.3.1 Local Regulation Authority

Pursuant to Chapter 403-Section 1815, Florida Statutes, the City of Tallahassee has been granted local regulation authority by FDEP for the construction of wastewater collection system piping systems not exceeding 12-inches in diameter and designed in accordance with Chapter 62-604. As such, qualifying projects shall be exempt from FDEP Permit requirements. This exemption does relieve any requirement to obtain necessary permits for construction activities in waters of the state or U.S., or from complying with other governing agency requirements. Also, this exemption does not apply to any connection to any wastewater system which the Department has determined to be in substantial non-compliance with applicable laws and standards if the Department has so notified the respective municipality.

4.3.2 Reporting

As part of the local regulation authority, the City of Tallahassee is required to submit annually an updated map of all new connections to the City’s wastewater collection systems granted under this authority, accompanied by a description of the collection system modifications, including the size and length of gravity mains, number and size of sewer service connections, and design flow information.

To facilitate this reporting, the City of Tallahassee Underground Utilities requires submission of the following documents:

- Local Regulation Authority Reporting Form – Wastewater Collection and Transmission Systems
- Proposed Construction Plans (Utility layers) in AutoCAD (State Plane Coordinate System)
- As-Built Drawings in AutoCAD (State Plane Coordinate System)

4.3.3 Non-Exempt Permitting

Wastewater collection system components that do not qualify for FDEP permit exemption shall require the use of standard FDEP Forms available on the www.dep.state.fl.us website for the intended utility application.

END OF DESIGN SECTION 4

5.1 Sewer Force Main - General

5.1.1 Scope of Work

Define engineering design criteria for sewer force main systems.

5.1.2 References

The design engineer is referred to the City of Tallahassee Underground Utilities Technical Specifications for Water and Sewer Construction, which provides Contractors with product details and installation procedures to be used when constructing water and sewer system components. The design engineer shall be familiar with products and procedures acceptable to the City for construction of new facilities.

Sewer force main system design shall proceed in accordance with the applicable provisions of the Florida Department of Environmental Protection (Chapter 62-604 F.A.C.) and the most current edition of the Recommended Standards for Wastewater Facilities, commonly referred to as “10 States Standards.”

5.2 Sewer Force Main - Design Criteria

5.2.1 Force Main Sizing

Size the sewer force main system in accordance with the approved master plan established for that area. In the absence of an approved master plan, size the force main system to deliver the design peak hour flow for the full build-out conditions from all connected sewer collection system piping and other pumping stations to the point of discharge. Consideration shall be given to possible future connecting pumping stations. Capacity computations shall be coordinated with the proposed pumping system(s), along with any future flow requirements.

Design sewer force mains to achieve a minimum fluid velocity of 2.5 FPS, and a maximum velocity of 6 FPS, using a Hazen-William friction factor (C-factor) of 120 for design purposes.

The minimum nominal force main pipe size is 4-inches diameter. For systems with multiple pumping stations, or phased developments, special design considerations may be required to maintain adequate flow velocity throughout the phases of development.

Make design computations using hydraulic modeling software, such as Innovyze InfoSWMM, Bentley WaterCAD, SewerCAD, or EPANet.

5.2.2 Air and Vacuum Venting

Where the force main profile is such that air pockets or entrapment should occur resulting in flow blockage, provisions for air release shall be provided. Where free flow will occur during operation or after pumping stops, combined air release and vacuum relief valve assemblies, or other means, shall be provided. Sizing and location of air and/or vacuum release valves shall be in accordance with the latest manufacturers recommendations.

In locations where air release valves, air vacuum valves, or combination air valves are required, provide a minimum of 60-inches cover over the force main to accommodate the valve assembly. All air valves shall be located directly over the sewer force main unless otherwise approved in writing by the City.

During the design phase, the Engineer of Record shall submit to the City the air valve sizing calculations and detailed pipeline profiles clearly identifying the location of all air valves. The Engineer shall take into account the overall height of each air valve assembly and the minimum cover requirements when creating the pipeline profiles. The Contractor shall notify the City of any deviations from the proposed pipeline profile during construction so that the air valve design can be reviewed and adjusted, if needed, to accommodate the actual installation conditions.

5.2.3 Force Main Location

Install sewer force main piping for new development in accordance with the Tallahassee Area Utilities Coordinating Committee – Recommended Guide for Utility Placement, as provided in the Appendix A, whenever possible. Exceptions from this guide must be approved by the City and/or County, when applicable.

5.2.4 Valve Locations

Install resilient wedge gate valves on all force mains at the pumping station and on branches of intersection force mains, such that one branch may be shut down for maintenance and repair without interrupting the flow of the other branches. Provide valves on force main stub-outs, placed in anticipation of future connections, to allow such connection without interruption of service.

Place valves on straight runs of pipe (no branches) at intervals no greater than 1,000 feet.

Place valves at both ends of all jack and bore crossings; and at both ends of crossings of those streets classified as major collectors, arterial roads, or with three or more thru lanes of traffic.

5.2.5 Thrust Restraint

Pressure piping fittings require that adequate means of restraining unbalanced thrust forces is provided in accordance with AWWA Manual M23 and the recommendations of the manufacturer. Thrust restraint may be provided by mechanical devices or cast-in-place concrete blocking (if approved by the City). Mechanical thrust-restraints devices must be pressure-rated by their manufacturers and must not exert forces that will cause failure when assembled on the pipe or fitting.

The minimum number of restrained joints required for resisting thrust forces shall be determined by the pipe size, material, type of valve or fitting, operating conditions, pipe trench, and soil type. Minimum restrained lengths for many typical applications are provided in the Standard Construction Details, which have been calculated for various pipe material and fittings based on the following minimum design parameters:

Unified Soil Classification: SM Soil Type
Safety Factor: 1.5
Trench Type: Type 2
Depth of Bury: 3 Feet
Test Pressure: 150 PSI

The Engineer of Record will verify the above design parameters are suitable for the proposed installation. Any reductions in minimum restrained lengths provided in the Standard Construction Details and the design parameters above shall be requested in writing by an active Florida Licensed Professional Engineer, in good standing with Florida Board of Professional Engineers. Such requests shall include suggested changes to design parameters, supporting documentation, and new restrained length calculations, signed and sealed by the Professional Engineer.

5.2.6 Terminal Discharge

Where force mains enter a gravity system manhole the invert elevation of the force main at the point of connection to the manhole shall not be higher than the crown elevation of the gravity main exiting the manhole. Should an elevation drop be required to obtain the outlet connection, it shall not exceed 20 feet, and the prior down-slope of the force main shall not exceed 45 degrees. Adequate air venting shall be provided at the profile break-point.

In the manhole receiving the force main discharge, all exposed surfaces shall be lined with a protective coating in accordance with the Technical Specifications. Liners shall be shown, labeled, and dimensioned on the plans for approval by the City.

5.3 Permitting

5.3.1 Local Regulation Authority

Pursuant to Chapter 403-Section 1815, Florida Statutes, the City of Tallahassee has been granted local regulation authority by FDEP for the construction of wastewater force main piping systems not exceeding 12-inches in diameter and designed in accordance with Chapter 62-604. As such, qualifying projects shall be exempt from FDEP Permit requirements. This exemption does relieve any requirement to obtain necessary permits for construction activities in waters of the state or U.S., or from complying with other governing agency requirements. Also, this exemption does not apply to any connection to any wastewater system which the Department has determined to be in substantial non-compliance with applicable laws and standards if the Department has so notified the respective municipality.

5.3.2 Reporting

As part of the local regulation authority, the City of Tallahassee is required to submit annually an updated map of all new connections to the City's wastewater force main systems granted under this authority, accompanied by a description of the collection system modifications, including the size and length of transmission mains, number and size of sewer service connections, and design flow information.

To facilitate this reporting, the City of Tallahassee Underground Utilities requires submission of the following documents:

- Local Regulation Authority Reporting Form – Wastewater Collection and Transmission Systems
- Proposed Construction Plans (Utility layers) in AutoCAD (State Plane Coordinate System)
- As-Built Drawings in AutoCAD (State Plane Coordinate System)

5.3.3 Non-Exempt Permitting

Wastewater transmission system components that do not qualify for FDEP permit exemption shall require the use of standard FDEP Forms available on the www.dep.state.fl.us website for the intended utility application.

END OF DESIGN SECTION 5

6.1 Sewage Pump Station - General

6.1.1 Scope of Work

Define engineering design criteria for sewage pumping stations.

6.1.2 References

The design engineer is referred to the City of Tallahassee Underground Utilities Technical Specifications for Water and Sewer Construction, which provides Contractors with product details and installation procedures to be used when constructing water and sewer system components. The design engineer shall be familiar with products and procedures acceptable to the City for construction of new facilities.

Sewage pumping station design shall proceed in accordance with the applicable provisions of the Florida Department of Environmental Protection (Chapter 62-604 F.A.C.) and the most current edition of the Recommended Standards for Wastewater Facilities, commonly referred to as “10 States Standards”.

6.2 Sewage Pump Station - Design

6.2.1 General

The Engineer of Record shall complete the Pump Station Design Checklist provided at the end of this section for all new pump station designs and retrofits and submit to the City for review and acceptance prior to completion.

6.2.2 Sewage Pump Station Sizing

Sewage pumping stations shall be sized to accommodate the maximum expected flows from the developed contributory area under full build-out conditions. The maximum pumping capabilities required shall be the product of the peaking factors noted below times the average daily flow rate:

Average Daily Flow Range	Peak Factor
0.00 to 0.05 MGD	4.0
0.05 to 0.25 MGD	3.0
0.25 to 2.00 MGD	2.5

Pump stations to handle flows in excess of 2 MGD ADF shall receive special evaluation in the selection of peak factors less than 2.5.

6.2.3 Location

Sewage pumping stations shall be located outside of City and County rights-of-way, on dedicated parcels of land or easements. They shall be placed to permit continuous maintenance access, and to prevent damage by flooding. Pump stations shall be designed to include measures to adequately oppose flotation forces (when empty) due to high ground water elevation. The electrical and mechanical equipment shall be protected from physical damage for the 100-year flood.

6.2.4 Type

Sewage pumping stations shall be of the submersible type. Water Resources Engineering Division may consider deviations from the submersible type on a case-by-case basis.

6.2.5 Wet Well Design

The wet well shall be sized such that with any combination of inflow and pumping, the cycle of operation for each pump will be not less than 5 minutes and the maximum retention time in the wet well will not average more than 30 minutes.

All exposed surfaces of the wet well shall be lined with a protective coating in accordance with the Technical Specifications. Liners shall be shown, labeled, and dimensioned on the Plans for approval by the City.

Wet wells shall be vented to the atmosphere. The well shall be provided with an approved non-corrosive man way hatch which can support expected loadings, and sized to allow adequate space for equipment removal and replacement.

6.2.6 Pumping Systems

Pump systems shall have the minimum capability of pumping the peak design flow against the maximum computed system total dynamic head (TDH).

A minimum of two pumps shall be provided. Where influent flows exceed 1 MGD, a minimum of three pumps shall be provided. All pumps residing in a station shall be of the same manufacture, electrical rating, inlet/outlet size, horsepower, and impeller size.

Pump intakes shall be capable of passing spheres of not less than 3-inches in diameter.

Pump motors shall be non-overloading, throughout the entire operating range of the pumps. Thermal overloads shall be provided to shut off pump motor and initiate alarm for motor over temperature condition.

Each pumping station control system shall include a liquid level controller, which shall sense the sewage level in the wet well and provide appropriate signals to the logic circuits to produce the required mode of operation for the pumping facilities. Capability shall be provided for manual start-stop control for all pumping units, as well as the normal automatic control from the liquid level sensing and logic circuits. An automatic alternator shall change the starting sequence on each pump cycle. A high and low water level alarm system shall be provided.

Each sewage pump shall be provided with an elapsed time meter to indicate pump-running times. Exterior station controls shall be housed within a panel, either pole mounted, or with a freestanding enclosure. At minimum, the panel will be stainless steel of NEMA 3R weather tight construction, with hasp and padlock. Electrical materials and methods shall comply with National Electrical Code requirements.

A common provider shall furnish all pumps and corresponding electrical control system. The provider's representative shall conduct system start-up services to be performed in the presence of the inspector.

Pump stations of 1 MGD or more will be provided with flow recording meters.

System curve and pump performance curves shall be included in construction drawing.

6.2.7 Valves

Both isolation valves and check valves shall be placed on the discharge line of each pump to afford pump isolation and bypassing. The check valves shall be located between the isolation valves and the pump. Check valves shall be suitable for the material being handled. An isolation valve shall also be provided on the common force main in the pump station.

6.2.8 Emergency Equipment

Emergency pumping capabilities shall be provided for all pump stations. Pumping capacity shall be provided as follows:

1. Pump stations that receive flow from one or more pump stations through a force main or pump stations discharging through pipes 12 inches or larger shall provide for uninterrupted pumping capabilities, including an in-place emergency generator.
2. For pump stations not addressed in "1" above, emergency pumping capability may be accomplished by providing a connection for portable generating equipment.
3. Regardless of the type of emergency standby system provided, a riser from the force main with rapid connection capabilities and appropriate valves shall be provided for all pump stations to hook up portable pumps. All pump station reliability design features shall be compatible with the available temporary service power generating and pumping

equipment of the authority responsible for operation and maintenance of the collection/transmission system.

6.2.9 Miscellaneous

1. Pumping stations shall be enclosed with a fence or otherwise designed with appropriate features that discourage the entry of animals and unauthorized persons. An unobstructed sign made of durable weather resistant material shall be posted at a location visible to the public with a telephone number for a point of contact in case of emergency.
2. Pumping stations shall be protected from lightning and transient voltage surges. As a minimum, stations shall be equipped with lightning arrestors, surge capacitors or other similar protection devices, and phase protection.
3. Pumping stations shall be designed and located on the site so as to minimize adverse effects resulting from odors, noise, and lighting.

6.3 Permitting

6.3.1 Local Regulation Authority

Pursuant to Chapter 403-Section 1815, Florida Statutes, the City of Tallahassee has been granted local regulation authority by FDEP for the construction of wastewater pumping stations with a discharge force main piping not exceeding 12-inches in diameter and designed in accordance with Chapter 62-604. As such, qualifying projects shall be exempt from FDEP Permit requirements. This exemption does relieve any requirement to obtain necessary permits for construction activities in waters of the state or U.S., or from complying with other governing agency requirements. Also, this exemption does not apply to any connection to any wastewater system which the Department has determined to be in substantial non-compliance with applicable laws and standards if the Department has so notified the respective municipality.

6.3.2 Reporting

As part of the local regulation authority, the City of Tallahassee is required to submit annually an updated map of all new connections to the City's wastewater pumping systems granted under this authority, accompanied by a description of the pumping station, including the force main size and length and design flow information.

To facilitate this reporting, the City of Tallahassee Underground Utilities requires submission of the following documents:

- Local Regulation Authority Reporting Form – Wastewater Collection and Transmission Systems

- Proposed Construction Plans (Utility layers) in AutoCAD (State Plane Coordinate System)
- As-Built Drawings in AutoCAD (State Plane Coordinate System)

6.3.3 Non-Exempt Permitting

Wastewater pumping stations that do not qualify for FDEP permit exemption shall require the use of standard FDEP Forms available on the www.dep.state.fl.us website for the intended utility application.

END OF DESIGN SECTION 6

7.1 Reclaimed Water System - General

7.1.1 Scope of Work

Define engineering design criteria for reclaimed water system design.

7.1.2 References

The design engineer is referred to the City of Tallahassee Underground Utilities Technical Specifications for Water and Sewer Construction, which provides Contractors with product details and installation procedures to be used when constructing water and sewer system components. The design engineer shall be familiar with products and procedures acceptable to the City for construction of new facilities.

Reclaimed water system design shall proceed in accordance with the applicable provisions of the Florida Department of Environmental Protection (Chapter 62-610, F.A.C.; Chapter 62-555 F.A.C.) and the most current edition of the U.S. EPA Guidelines for Water Reuse (EPA/625/R04/108, at time of printing).

7.2 Reclaimed Water System - Design

7.2.1 Reclaimed Water System Sizing

Size the reclaimed water distribution systems in accordance with the approved master plan established for that area. In the absence of an approved master plan, size the reclaimed water distribution system to deliver the design demand while maintaining a minimum residual system pressure greater than 20 PSI at all points in the system for the full build-out conditions.

The target maximum reclaimed water system head loss is 1 foot of head loss per 1,000 feet of pipe under average day demand conditions, using a Hazen-William friction factor (C-factor) of 120 for design purposes. The target maximum fluid velocity range is 5-8 FPS under maximum day demand conditions.

Make design computations using hydraulic modeling software, such as Innowyze InfoWater, Bentley WaterCAD, or EPANet. Submit calculations/modeling results to the City of Tallahassee Underground Utilities Development Review Coordinator for review.

7.2.2 Placement of Reclaimed Water System Piping and Appurtenances

7.2.2.1 Piping

Install reclaimed water system piping for new development in accordance with the Tallahassee Area Utilities Coordinating Committee – Recommended Guide for Utility

Placement, as provided in the Appendix A, whenever possible. Exceptions from this guide must be approved by the City and/or County, when applicable.

Loop the reclaimed water distribution system piping, whenever possible. Avoid dead-end mains, except when the design engineer can demonstrate that looping is not possible. When required, such as in a cul-de-sac, dead-end mains must have a flush stand located at the end of the main for flushing.

7.2.2.2 Valves

Provide valves to isolate reclaimed water system piping for repair and maintenance. The number of valves provided depends on the configuration of the distribution network. Ideally, each pipe should have at least one valve. For more critical pipes, such as those with large number of customer or substantial demand requirements, multiple valves may be warranted.

As a general rule, use the “N-1” valve place scheme at junctions, where “N” is the number of pipes at a junction (tees and crosses). For example, a tee has three pipes connecting at the junction; therefore, two valves should be installed ($3 - 1 = 2$).

Place valves on at both ends of all jack and bore crossings; and at both ends of crossings of those streets classified as major collectors, arterial roads, or with 3 or more thru lanes of traffic.

Place valves on straight runs of pipe (no branches) at intervals no greater than 500 feet for pipe sections with customer services, or at intervals of 1,000 feet for pipe section without customer services.

7.2.3 Thrust Restraint

Pressure piping fittings require that adequate means of restraining unbalanced thrust forces is provided in accordance with AWWA Manual M23 and the recommendations of the manufacturer. Thrust restraint may be provided by mechanical devices or cast-in-place concrete blocking (if approved by the City). Mechanical thrust-restraint devices must be pressure-rated by their manufacturers and must not exert forces that will cause failure when assembled on the pipe or fitting.

The minimum number of restrained joints required for resisting thrust forces shall be determined by the pipe size, material, type of valve or fitting, operating conditions, pipe trench, and soil type. Minimum restrained lengths for many typical applications are provided in the Standard Construction Details, which have been calculated for various pipe material and fittings based on the following minimum design parameters:

Unified Soil Classification: SM Soil Type
Safety Factor: 1.5
Trench Type: Type 2
Depth of Bury: 3 Feet
Test Pressure: 150 PSI

The Engineer of Record will verify the above design parameters are suitable for the proposed installation. Any reductions in minimum restrained lengths provided in the Standard Construction Details and the design parameters above shall be requested in writing by an active Florida Licensed Professional Engineer, in good standing with Florida Board of Professional Engineers. Such requests shall include suggested changes to design parameters, supporting documentation, and new restrained length calculations, signed and sealed by the Professional Engineer.

7.3 Permitting

7.3.1 Local Regulation Authority

Reclaimed water infrastructure does not qualify for FDEP permit exemption under Chapter 403-Section 1815, Florida Statutes. As such, all reclaimed water infrastructure projects shall require the appropriate FDEP Permit, as well as any necessary permits for construction activities in waters of the state or U.S., and other governing agency requirements.

END OF DESIGN SECTION 7

Appendix A

Recommended Guide for Utility Placement

Prepared by:

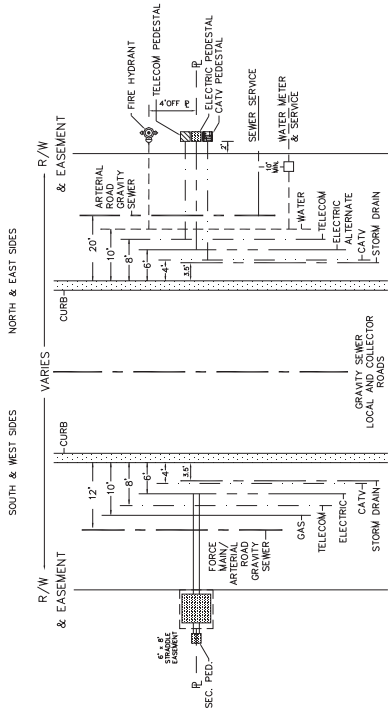


City of Tallahassee
Your Own UtilitiesSM

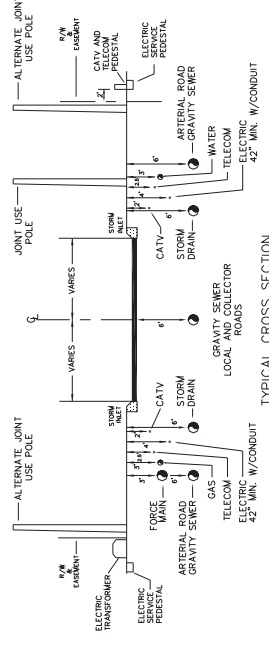
Water Resources Engineering Division
408 North Adams Street
Tallahassee, Florida 32301

October 2018

RECOMMENDED GUIDE FOR UTILITY PLACEMENT
RIGHT-OF-WAY AND EASEMENT WITH CURB AND GUTTER



TYPICAL PLAN

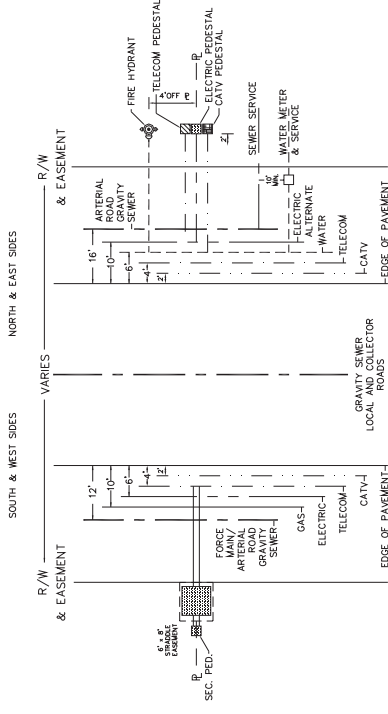


TYPICAL CROSS SECTION

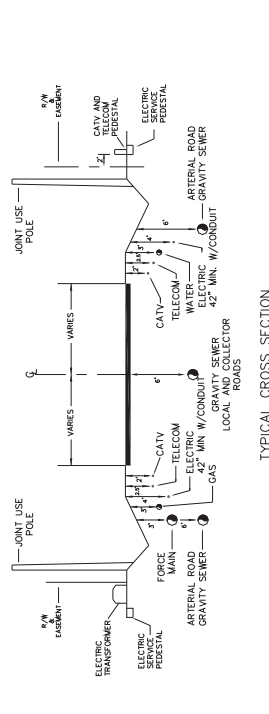
NOTE:
THESE PLANS APPLY TO ALL STREET R/W AND EASEMENT PLACEMENTS BETWEEN EDGE OF PAVEMENT AND R/W IS NOT AVAILABLE OR OTHER FED. OR STATE REGS. APPLY.

FIG. 1
DRAWINGS NOT TO SCALE
REVISED 07/17/94
REVISED 12/16/94

RECOMMENDED GUIDE FOR UTILITY PLACEMENT
RIGHT-OF-WAY AND EASEMENT WITHOUT CURB AND GUTTER



TYPICAL PLAN



TYPICAL CROSS SECTION

NOTE:
THESE PLANS APPLY TO ALL STREET R/W AND EASEMENT PLACEMENTS BETWEEN EDGE OF PAVEMENT AND R/W IS NOT AVAILABLE OR OTHER FED. OR STATE REGS. APPLY.

FIG. 2
DRAWINGS NOT TO SCALE
REVISED 07/17/94
REVISED 12/16/94



Tallahassee Area Utilities Coordinating Committee

Appendix B

Potable Water Demand Calculation Rates

Prepared by:



Water Resources Engineering Division
408 North Adams Street
Tallahassee, Florida 32301

October 2018

Potable Water Demand Calculation Rates	
TYPE OF DEVELOPMENT / ESTABLISHMENT	Average Day Demand (GPD)
COMMERCIAL FACILITIES	
Airports, bus terminals, train stations, port & dock facilities, bathroom use only	
Per passenger	5
Add per employee per 8-hour shift	18
Barber & beauty shops per service chair	90
Country Club	
Per resident	125
Add per member or patron	30
Add per employee per 8-hour shift	18
Factories, exclusive of industrial use, per employee per 8-hour shift, when	
Showers provided	30
No showers provided	18
Food Service Operations	
Restaurant operating 16 hours or less per day per seat	50
Restaurant operating more than 16 hours per day per seat	75
Restaurant using single service articles only and operating 16 hours or less per day per seat	25
Restaurant using single service articles only and operating more than 16 hours per day per seat	45
Bar and cocktail lounge per seat	25
Add per pool table or video game	18
Drive-in restaurant per car space	60
Carry out only, including caterers	
Per 100 square feet of floor space	60
Add per employee per 8 hour shift	18
Institutions per meal served	6
Food Outlets/Grocery per 100 square feet of floor space	12
Add for deli per 100 square feet of deli floor space	50
Add for bakery per 100 square feet of bakery floor space	50
Add for meat department per 100 square feet meat dept. floor space	94
Add per water closet	250
Hotels & motels per room	125
Resort hotels, camps, cottages per room	250
Add for establishments with self-service laundry facilities per machine	900
Medical Offices, Doctor, Dentist, etc.	
Per practitioner	300
Add per employee per 8-hour shift	18

Potable Water Demand Calculation Rates	
TYPE OF DEVELOPMENT / ESTABLISHMENT	Average Day Demand (GPD)
COMMERCIAL FACILITIES (CONTINUED)	
Office building per 100 square feet or per employee per 8 hour shift, whichever is greater	18
Transient Recreational Vehicle Park per overnight RV space	
Without water and sewer hookup per vehicle space	60
With water and sewer hookup per vehicle space	90
Service stations per water closet	
Open 16 hours per day or less	300
Open more than 16 hours per day	400
Retail shopping centers, without food or laundry, per square foot of floor space	0.125
Sports stadiums, ball parks, race track per seat	5
Stores per bathroom	125
Swimming and bathing facilities (public) per person	12
Theatres and Auditoriums per seat	5
Veterinary Clinic	
Per practitioner	300
Add per employee per 8-hour shift	18
Add per kennel, stall or cage	25
Warehouse	
Add per employee per 8-hour shift	18
Add per loading bay	125
Self-storage, per unit (up to 200 units)	1
INSTITUTIONAL FACILITIES	
Churches, including kitchen flows	
Per seat, if meals are not served on a regular basis	4
Add per meal prepared if meals are prepared on a routine basis	6
Hospitals	
Per bed, not including kitchen flows	250
Add per meal prepared	6
Nursing homes, adult congregate facilities	
Per bed, not including kitchen flows	125
Add per meal prepared	6
Parks, public picnic	
With toilets only, per person	5
With bathhouse, showers & toilets, per person	12
Public institutions other than schools and hospitals	
Per person	125
Add per meal prepared	6

Potable Water Demand Calculation Rates	
TYPE OF DEVELOPMENT / ESTABLISHMENT	Average Day Demand (GPD)
INSTITUTIONAL FACILITIES (CONTINUED)	
Schools, day-type, per student	12
Add for showers	5
Add for cafeteria	5
Add for day school faculty and staff	18
Schools, boarding-type, per student	90
RESIDENTIAL	
Single or multiple-family dwelling unit	
Per bedroom	125
Collegiate student housing per bedroom	125
Fraternity or sorority housing, per bed	125
Mobile Home Facility	
Per single-wide mobile home space	300
Per double-wide mobile home space	375

Footnotes:

1. For high volume facilities or establishments, such as restaurants, convenience stores, and service stations located near interstate highways or similar high-traffic areas, additional demand factors should be considered. At a minimum, the estimated flows for these facilities shall be 3.0 times the volumes determined from Table 2.1 above.
2. For multi-service facilities, such as convenience stores, the estimated water demand shall be determined by adding demands for food outlets, or other type of service stations, as appropriate to the products and services offered.
3. For developments or establishments not specifically identified in Table 2.1 above, the design engineer shall submit the proposed demand calculation criteria to the City for review and approval.

Appendix C

Local Regulation Authority

Reporting Forms

Prepared by:

City of Tallahassee
Your Own UtilitiesSM

Water Resources Engineering Division
408 North Adams Street
Tallahassee, Florida 32301

October 2018

Clearance Date: _____ Permit No.: _____

I. ENGINEER INFORMATION

Name of Project: _____
Date Submitted to Water Resources Engineering (WRE) Division: _____
Engineering Company: _____
Street Address: _____
City: _____ State: _____ Zip: _____
Engineer of Record: _____ Email: _____ Phone: _____

II. DEVELOPER INFORMATION

Development Company: _____
Street Address: _____
City: _____ State: _____ Zip: _____
Developer Name: _____ Email: _____ Phone: _____

III. WATER DISTRIBUTION SYSTEM INFORMATION

Water Main Length(s) & Size(s): _____
Number & Size(s) of Water Meter(s): _____
Design Flow: Avg. Day: _____ (gpm) Peak Hour: _____ (gpm)
Max Day: _____ (gpm) Fire: _____ (gpm)
Has a Fire Hydrant Flow Test been performed to verify water system capacity: Yes No
Observed Flow Rate: _____ (gpm) Calculated Flow Rate at 20 PSI Residual: _____ (gpm)

IV. CERTIFICATION STATEMENT BY ENGINEER OF RECORD

This is to certify that the engineering design of this water system has been designed by me, or under my direct supervision, in accordance with 62-555, FAC and the City of Tallahassee Technical Specifications for Water and Sewer Construction.

Signature (Engineer of Record)
(Affix Seal)

Florida P.E. License No.

Date

V. CERTIFICATION STATEMENT BY UTILITY (to be completed by Water Resources Engineering Division)

The undersigned representative states that the City of Tallahassee has been granted local regulation authority by the Florida Department of Environmental Protection (Chapter 403-1815, Florida Statutes) to allow construction of the water distribution facilities described herein, and in accordance with 62-555, FAC; and that the water supply and distribution system has sufficient available capacity to provide the potable water demand indicated above.

This water system will will not be accepted by the City of Tallahassee for operation and maintenance.

Printed Name Signature Date

**WASTEWATER COLLECTION & TRANSMISSION
SYSTEM CONSTRUCTION
LOCAL REGULATION AUTHORITY REPORTING FORM**

Clearance Date: _____ Permit No.: _____

I. ENGINEER INFORMATION

Name of Project: _____
 Date Submitted to Water Resources Engineering (WRE) Division: _____
 Engineering Company: _____
 Street Address: _____
 City: _____ State: _____ Zip: _____
 Engineer of Record: _____ Email: _____ Phone: _____

II. DEVELOPER INFORMATION

Development Company: _____
 Street Address: _____
 City: _____ State: _____ Zip: _____
 Developer Name: _____ Email: _____ Phone: _____

III. SEWER COLLECTION & TRANSMISSION SYSTEM INFORMATION

Gravity Main Length(s) & Size(s): _____
 Force Main Length(s) & Size(s): _____
 Number & Size(s) of Sewer Service(s): _____
 Design Flow: Avg. Day: _____ (gpm) Peak Hour: _____ (gpm)
 Pump Station Capacity: _____ gpm @ _____ feet TDH (w/ _____ feet static head)

IV. CERTIFICATION STATEMENT BY ENGINEER OF RECORD

This is to certify that the engineering design of this sewer collection and transmission system has been designed by me, or under my direct supervision, in accordance with 62-604, FAC and the City of Tallahassee Technical Specifications for Water and Sewer Construction.

 Signature (Engineer of Record)
(Affix Seal)

 Florida P.E. License No.

 Date

V. CERTIFICATION STATEMENT BY UTILITY (to be completed by Water Resources Engineering Division)

The undersigned representative states that the City of Tallahassee has been granted local regulation authority by the Florida Department of Environmental Protection (Chapter 403-1815, Florida Statutes) to allow construction of the sewer collection and transmission facilities described herein and in accordance with 62-604 FAC; that the wastewater collection, transmission, and treatment systems have sufficient available capacity for the demand indicated above; and that the treatment plant will operate in compliance with Chapter 62-601 through 62-660, FAC.

This sewer system will will not be accepted by the City of Tallahassee for operation and maintenance.

 Printed Name Signature Date

