

The following Standards section is in draft form. Several requirements stipulated below will be revised and finalized through working groups held with the key stakeholders. This information is being provided to give a general idea of the future proposed water modeling process, to stimulate discussion on specific content present, and to identify any missing information.

4.01 Hydraulic Analysis Required

- (a) **General Requirement.** Springs Utilities may require the Applicant to submit a Hydraulic Analysis Report to assess the impacts and system demands of the proposed development on the water distribution system. The Applicant is required to fill out a Water Planning Data Request Form for any development that proposes the construction of new water mains or fire hydrants. The Form can be submitted any time prior to or concurrent with Development Plan Submittal by the Developer to determine if a Hydraulic Analysis Report is required. The Applicant shall submit the form to Water Planning and Design by email, fax, or mail. The form shall contain general information regarding the type and acreage of development, water service demands, fire flow demands, and adjacent existing system information. The form shall be accompanied by a site map identifying the location and boundaries of the proposed development with street names labeled. Springs Utilities shall review the information and inform the Applicant if a Hydraulic Analysis Report is required. Springs Utilities will provide the necessary system information for the Applicant to complete the Hydraulic Analysis Report for the proposed development. The Applicant is responsible for determining Fire Department requirements for use in the hydraulic model. City Planning Department approval of Development Plans does not exempt the Applicant from this requirement. (See City Code 7.5.502-Development Plans and Minor Development Plans)

The Hydraulic Analysis Report shall be prepared by a professional engineer licensed in Colorado, and shall include a technical report and a preliminary plan as outlined below. Two (2) hardcopies and one digital copy (Adobe PDF Format) of the completed Hydraulic Analysis Report shall be submitted to Utilities Development Services prior to or with the initial submittal of the Construction Plans.

- 4.02 Hydraulic Analysis Report Contents.** The Hydraulic Analysis Report shall provide an overview of the proposed project or development, proposed water utility improvements, water service demands, fire flow demands, and adjacent existing system information. Two hard copies of the report shall be submitted to the Water Planning and Design Department along with one electronic copy of the report and model. The Applicant shall request an HGL from Water Planning and Design Department prior to submittal of the Report. The Engineer must include the following:

(a) General

- (1)** Project name and the associated project numbers as assigned by the City Planning Department.
- (2)** Developer name, address, phone number, fax number, and email address.
- (3)** Engineer name, address, phone number, fax number, and email address. The report and plans must be signed and sealed by a Professional Engineer registered in the State of Colorado with professional experience in hydraulic analyses.
- (4)** All pages shall be numbered.
- (5)** Include the name and version of hydraulic modeling software used in the analysis.

(b) Project Description

- (1) Service Area.** A description of the initial and ultimate area, measured in acres, which could be served by the main extension. Discuss any phasing plans in the report. The report shall include a site map showing the project boundaries. Include any off-site areas that would ultimately be served by the proposed extension. This is a requirement to ensure the system is sized adequately for future development. Springs Utilities may require up-sizing of the proposed facilities or offsite existing system to accommodate proposed or future development. Cost recovery may be available when the Applicant is required to upsize for future demands
- (2) Water Demands.** A breakdown of land uses by acreage, with associated water demand and fire flow requirements.
- (3) System Layout.** A description of the proposed system layout, including proposed fire hydrant nodes and proposed connection points to the existing water distribution system. Provide a node map clearly delineating pipeline alignments, connection points, and fire hydrant locations with flange elevations. Identify elements with node and pipe ID and include street names where the main is proposed to be installed.

(c) Source HGL and Demand Calculations.

- (1) Source HGL.** Clearly show the node representing the HGL on the node map. Provide the letter issued by SU with the source HGL information. Source HGL information shall be requested from the Water Planning and Design Department using the request form located

- (2) **Head Losses.** Provide table of C values used, and minor head loss criteria used.
 - (3) **Fire flow Requirements.** Provide fire department requirements regarding number of hydrants and minimum capacity required. If this information is unknown provide conservative assumptions.
 - (4) **Water Demand Calculations.** The model shall be run for the following scenarios for both onsite and projected offsite water demand. Use the most conservative average day demand rates from Table X.
 - (1) **Max Day Demand.** Apply maximum day demand factors to the average day demands. Max day demand factors are shown in Table Y.
 - (2) **Max Day Demand + Fire Flow.** The applicant shall model the most conservative fire fighting scenario at max day conditions.
 - (3) **Peak Hour Demand.** The following factors shall be applied to site demand rates:
- (d) **Input Data Tables.**
- (1) **Pipes.** Provide input data tables for all pipes modeled. Pipe data tables shall include, at a minimum, pipe ID as shown on the node map, beginning and ending nodes, lengths in feet, diameter in inches, coefficient of friction, and other pertinent information.
 - (2) **Nodes.** Provide input data tables for all nodes modeled. Node data tables shall, at a minimum, include node ID as shown on the node map, elevation in feet for all nodes using NGVD '29 (FIMS Datum), node demand in gpm, connecting pipes, and other pertinent information. All elevations shall be based on proposed ground elevation.
- (e) **Analysis.** The Report shall include a description of assumptions made when determining the input variables. Provide any comments necessary to expedite the review of the report.
- (f) **Output Data Tables**
- (1) **Pipes.** Provide output data tables which shall include, at a minimum, pipe IDs as shown on the node map, flow rate in gpm, flow velocity in ft/sec, head loss in feet, and other pertinent information.

- (2) **Nodes.** Provide output data tables which shall include, at a minimum, node IDs as shown on the node map, hydraulic grade in feet, node pressure in psi, elevation in feet, demand in gpm, and other pertinent information.
 - (3) **Summary table.** The Applicant shall provide a summary table, for each phase of development, showing the minimum and maximum residual pressure for each scenario and the minimum and maximum static pressure for the site.
- (g) **Water Quality Mitigation Plan.** A Water Quality Mitigation Plan may be required with the Hydraulic Analysis Report if the project is proposing an oversized main, is at the fringes of the water supply system, is to be phased, or has other conditions that may negatively impact the water quality of the water supply system. Water Quality Mitigation Plan shall include the following:
- (1) **Initial Chlorine Residual.** To be provided by the Water Planning and Design Department at the request of the Applicant.
 - (2) **System Low Use Water Demand.** To be provided by the Water Planning and Design Department at the request of the Applicant.
 - (3) **Site Demand.** The Applicant shall calculate the site demand for each phase, including startup, to determine the required water use to maintain acceptable chlorine residuals in the main. Methods of consumption include but are not limited to construction watering, an established flushing schedule, and irrigation.
- (h) **Summary and Recommendations Section.** The report shall include a summary and recommendation section including, but not limited to, discussion of proposed pipe sizing to support the development and future development needs, material choice to address maximum pressure on site, water quality for critical sites, and the need to install, upgrade, and/or add links in the existing system.
- (i) **Miscellaneous.** The Applicant shall refer to the most current *Water Line Extension Service Standards* for design criteria. Designs that do not meet SU's criteria regarding alignment and looping will be returned to the Applicant. SU reserves the right to request additional information from the Applicant.