
This scope of services is based on City Master Contract #4743/4744, dated June 20, 2024. This Scope of Services is an amendment to include new tasks to City of Saint Paul PO# 19689/BV project 420820.

PHASE 1000 – HYDRAULIC MODELING SERVICES

Add the following to the services related to the following activities:

7. High Service Pressure Zone Calibration/Validation
8. Hillcrest/High Service reservoirs CIP Analysis.
9. On-Call Hydraulic Modeling Services

A. Task 1050 - Project Administration - **Add the following item to this task.**

2. Monthly progress meetings between SPRWS & BV Planning Engineer will be held to discuss progress.

F. Task 1500 – On Call Services Support – Amend the hours for this task from 60 to 100 hours.

Add the following tasks to the scope of services.

G. Task 1700 – High Service Pressure Zone Calibration/Validation

1. Assess GIS data provided by SPRWS. Provide a field testing plan of hydrant pairs/sets and flow test forms to SPRWS for SPRWS to collect field data. Up to 20 hydrant pairs/sets are anticipated. Attend one hour meeting to discuss field testing approach prior to field activities. Meeting to include inspectors performing field testing.
2. Analyze the High Service pressure zone under static conditions to validate the boundary conditions in the model.
3. Perform a C-Factor calibration using the flow test results collected by SPRWS. Attend a one hour meeting to discuss calibration results.
4. Deliverables: Updated C-Factor table (SPRWS user's manual page 15), copy of hydraulic model with updated C-Factors, updated model scripts to assign cohorts & C-Factors.
5. Assumptions: SPRWS will supply the updated hydraulic model (if necessary) to be used in the assessment, SCADA data for the relevant pressure zones at the time of the flow tests. SPRWS will supply GIS data of the distribution system indicating changes made in construction year 2025. This will comprise of either the GIS distribution data OR project area footprints & project description

including pipe diameters & materials. SPRWS is responsible for performing the field testing. B&V will not perform a model update to 2025 GIS data as part of this task. The GIS data will be referenced to ensure testing locations are not impacted by new construction, and to make minor adjustments to ensure overall model operations represent real world conditions.

6. Schedule: Field testing plan to be delivered by March 2026. SPRWS to conduct field testing April 2026 prior to widespread water main construction. Calibration to be complete by September 2026.

H. Task 1800 – Hillcrest/High Service Reservoirs CIP Analysis.

1. Establish boundary conditions of analysis. Attend a two hour meeting to define base year of analysis, assumptions of current/future demand and regional expansions, known water main transmission and facility upgrades to be included in analysis, and performance criteria of SPRWS assets (velocities, pressures, reservoir levels, water age). Meeting to occur April 2026.
2. Update hydraulic model based on defined boundary conditions. One future year model scenario to be developed based on boundary conditions & Met Council 2050 demand projections.
3. Perform analysis to identify deficiencies in SPRWS High Service pressure zone large diameter transmission mains ($\geq 16''$). Specific attention given to transmission to Hillcrest Reservoir, and resultant HGL at Hillcrest Reservoir relative to Dale Street Reservoir and Highland Reservoir 2.
4. Use hydraulic model to propose Capital Improvement Plan (CIP) resolutions to identified deficiencies. Expected CIP projects will include water main transmission projects and/or piping/valving modifications at reservoirs. Attend a one hour meeting to discuss modeling results.
5. Provide technical memorandum summarizing findings, including high level cost estimate.
6. Assumptions: SPRWS will supply the updated hydraulic model (if necessary) to be used in the assessment, SCADA data for the relevant pressure zones for two years. SPRWS will supply GIS data of the distribution system indicating changes made in construction year 2025, and information for any known future CIP transmission project in the High Service pressure zone.
7. Schedule: This task is planned to be completed by October 2026.

I. Task 1900 – Grid Improvements

1. Analyze up to 10 Grid Improvement locations, such as an additional river crossing, or redundant main to Mailand BPS. Each location will be analyzed in a base year scenario to identify project benefits, and in one future year scenario to ensure adequate sizing. Analysis will use performance criteria, and future year scenario established in Task 1800 to quantify effectiveness of grid improvements.
2. Provide technical memorandum summarizing findings. If all grid improvement projects are not initially known, a draft memorandum will be provided to SPRWS. Additional grid analysis projects will be added to the Draft until all

locations are analyzed.

3. Schedule: Analysis to be completed after Future Year scenario developed as part of Task 1800. Analysis of initial known grid improvements to be completed by September 2026. Additional locations to be completed as requested.