City of Washington Est. 1825

Memo

TO: Public Works Committee

FROM: Ed Andrews, Public Works Director

DATE: December 28, 2017

SUBJECT: Capital Planning – Watermain Replacement Optimization

As part of the optimization of watermain replacement and upgrading of sizing for enhanced fire flow protection, Staff has met with CMT to help scope this effort. This would be in conjunction with other Capital Improvements and help establish a template for this planned effort over a number of years.

This matter has been placed on the agenda for the Public Works Committee of January 2, 2018 for review and discussion.

cc: File

City of Washington
Hydraulic Modeling Evaluations

Exhibit A – Scope of Work

A. Evaluate Elimination of Pressure Zones:

Using the newly developed hydraulic model, determine the impacts and resulting improvements required to combine Pressure Zones #1 & #2 into a single pressure zone matching the hydraulic gradeline of Pressure Zone #1.

It will be assumed that the existing Elevated Tank #2 will be converted to a ground storage by the addition of separate fill and discharge piping, a flow control valve on the fill piping and a pump on the discharge piping in order to match the existing hydraulic gradeline of Elevated Tank #1.

The tasks will consist of the following:

- Run the hydraulic model under Maximum Day Demand to determine the pressure and available fire flow in all parts of the system with the two separate pressure zones currently in use.
- Create scenario to run the hydraulic model under Maximum Day Demand with a combined pressure zone including the conversion of elevated Tank #2 and matching the existing hydraulic grade line of Elevated Tank #1 to determine pressure and available fire flow in all parts of the City.
- Compile a spreadsheet comparing the impact to pressures and available fire flow at all junction nodes in the system.
- Determine improvements that may be required to combine the pressure zones and have minimal impact to pressures and available fire flow.
- Look at the ground elevations in the anticipated City buildout areas to determine whether expansion will result in areas of high or low pressure. (Note that for this task, no hydraulic modeling is anticipated. Rather ground elevations will be compared to the hydraulic gradelines of the closest junction node for the hydraulic modeling of the combined pressure zone.)
- Summarize the analysis and results in a letter report.

The estimated effort for the above is 115 man-hours at a resulting cost of $18,000.

B. Evaluate Possible Adjustment of Pressure Zone Separation Boundaries

Currently, the available WTP capacity is each zone is disproportional to the demand in each zone. By adjusting the pressure zone boundaries, the City would then be able to better utilize the Water Treatment Plant capacity in each zone.

The tasks will consist of the following:

- Identify possible pressure zone boundary alternatives (assume 3). Determine demand allocation for each boundary alternative. Present possible alternatives to City for selection of one for further analysis.

- Run the hydraulic model under Maximum Day Demand to determine the pressure and available fire flow in all parts of the system with the two separate pressure zones currently in use.
- Create scenario to run the hydraulic model under Maximum Day Demand with the selected pressure zone boundary adjustment to determine the pressure and available fire flow in all parts of the system. It has been assumed that
- Compile a spreadsheet comparing the impact to pressures and available fire flow at all junction nodes in the system.
- Determine improvements that may be required to adjust pressure zone boundaries and have minimal impact to pressures and available fire flow at all junction node sin the system.
- Summarize the analysis and results in a letter report.

The estimated effort for the above is 99 man-hours at a resulting cost of $15,550.

C. Southeast Planning Area – Distribution System Evaluation

The Southeast Planning Area is roughly described as the area south and east of Main Street and North Street, see attached. The goal of the Southeast Planning Area Distribution System Evaluation will be to have a phased approach to distribution system improvements to address aging infrastructure and limited fire flow availability.

The tasks will consist of the following:

- Utilize existing GIS and leak data to identify watermains in need of replacement.
- Utilize the existing water model to identify required improvements within the Southeast Planning Area that are required to meet the fire flow goal of 1,000 gpm at 20 psi residual pressure throughout the area. For areas where watermain replacement location is flexible, improvements will favor locations of aging infrastructure.
- Develop a capital improvement program, including budgetary cost estimates for the phased implementation of the proposed watermain replacements.
- Summarize the analysis and results in a letter report.

The estimated effort for the above is 98 man-hours at a resulting cost of $15,000.