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Utility Advisory Committee

Drinking Water Utility Infrastructure Renewal and Replacement Cost Forecast

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Title
Drinking Water Utility Infrastructure Renewal and Replacement Cost Forecast

Recommended Action
Receive a briefing on the Drinking Water Utility's evaluation of the renewal and replacement costs for its infrastructure.

Report Issue:
Receive a briefing on the Drinking Water Utility's evaluation of the renewal and replacement costs for its infrastructure.

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Presenters:
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Background and Analysis:
Water utility assets are critical to public health, safety, and the vitality of our community. According to a 2012 report by the American Water Works Association (AWWA), the United States alone must spend $1 trillion over the next 25 years to keep pace with updating aging infrastructure and meeting the demands of a growing population. The water, wastewater and stormwater systems that serve the City of Olympia have worked around the clock for over 100 years. The continued vitality and resiliency of our City relies on this infrastructure.

Delivery of high-quality drinking water and fire protection water has become an "invisible service" often taken for granted because, in our community, water is both reliable and affordable. Other public services (education, public safety, road repairs) garner more attention (and therefore funding) from the public due to their more visible nature.

Development of an asset management plan to provide an economic forecast for the renewal and replacement of utility infrastructure is the responsible thing to do. All of the Water Resources utilities have been working toward this goal. One of the first places to start with managing assets is to know

what assets are owned by the utility and what condition they are in - their current state.

In approximately 2008, the City began migrating its utility mapping to a Geographic Information System (GIS) framework. GIS allowed us to attach data (installation dates, material types, size, length, depth, etc.) to our mapped assets using geodatabases. GIS not only spatially maps infrastructure assets, but also is a powerful tool to analyze an asset's characteristics and their correlation with other mapped information. The mapping continues to be refined on a daily basis.

In approximately 2015, the Drinking Water Utility (the Utility) began using GIS to evaluate the risk of failure for our various assets. In the case of buried assets (pipes and valves), the evaluation looked an asset's age, size, material type, and location (proximity to arterial roadways, structures, associated soil acidity, depth to groundwater, ground slope, and zoning type) to determine their risk of failure. The evaluation helps the Utility to focus on replacement of the highest-risk assets.

In 2019, the Utility implemented the use of CityWorks software for work order and asset management. CityWorks allows us to schedule regular preventative maintenance, document any work performed, and record the condition of pipes, valves, and hydrants each time they are accessed for inspection, repair, or new connections. The information gathered by CityWorks is GIS-based and helps staff to further evaluate and prioritize infrastructure renewal and replacement needs.

The AWWA provides guidelines for utilities to forecast infrastructure renewal and replacement costs. AWWA provides the estimated effective life (EEL) for various asset types. In the case of pipe, the EEL is based regionally on pipe material type. The Utility has combined the known or estimated installation dates for its various assets with the AWWA EELs with determining when assets will exceed their EEL. Figure 1 depicts the miles of drinking water pipe that are expected to exceed their EEL over the next 50 years. Currently, more than 38 miles of pipe in Olympia's water system have exceeded their EEL.

The City's Engineering work section provided the Utility with Olympia-specific estimated unit costs for renewal or replacement of various asset types (pipes by size [including valves], hydrants, service connections [including meters], reservoirs, and pump stations). Utility staff used the provided unit costs to calculate renewal and replacement costs for its assets. Figure 2 depicts the estimated renewal and replacement costs for all applicable drinking water assets over the next 50 years. All values are in 2021 dollars. It is important to note that the unit costs for buried assets (pipes and valves) assumed they will be *replaced* through excavation and ground restoration. Alternative means of pipe *renewal* (rehabilitation) using less expensive trenchless technologies like cured-in-place pipe are becoming more common and may be feasible for pipe over 4-inches in diameter.

This economic forecast demonstrates that significant investment in the renewal and replacement of the drinking water infrastructure is needed. Based on AWWA's EELs, the Utility is currently $150 million dollars behind in renewal and replacement investments and an average investment of $14 million dollars is needed annually over the next 50 years to catch up. The Utility currently puts $1.4 million annually toward capital improvement program funding. This economic forecast is preliminary and will continue to be refined through the Water System Plan update process and over coming years. Regardless, the forecast is valid in helping inform capital funding decisions. It is important that existing customers pay for the normal wear and aging of existing infrastructure.

Water Resources' asset management work has initially been focused on the Drinking Water Utility.

Because the water system is pressurized, failures in the system are often catastrophic and pose a greater risk. However, similar asset management planning is being performed for the Wastewater and Storm and Surface Water utilities. Condition rating of these utilities is simplified by the ability to inspect the inside of pipes and maintenance holes. Economic forecasts for the renewal and replacement of the Wastewater and Storm and Surface Water utilities' infrastructure will be available prior to capital budget discussions in August.

Neighborhood/Community Interests (if known):
Water utility assets are critical to public health, safety, and the vitality of our community. Maintenance of the utilities to provide our customer's level of service expectations is important.

Options:
None at this time. Briefing only. The information will help inform capital budgeting decisions this fall.

Financial Impact:
Infrastructure renewal and replacement is expensive. This economic forecast will help inform budgetary decisions for investments in the maintenance of the Water Resources utilities' infrastructure.

Attachments:
Figure 1. Replacement Forecast (miles of pipe beyond effective life) Graph
Figure 2. Renewal & Replacement Costs by Asset Type