Water Loss Control Action Plan

Introduction

Over the last six years, the City of Walla Walla has experienced an average Distribution System Leakage (DSL) of approximately 29 Percent for all water that enters the water distribution system. The Washington State Department of Health (DOH) regulations discussed in Chapter 246-290-820(4) of the Washington Administrative Code (WAC) require the completion of a Water Loss Control Action Plan (WLCAP) with the objective of the plan being to reduce distribution system water losses to ten percent or less over a prescribed timeline.

In accordance with the regulations, this WCLAP includes the following:

- Water Loss Control Methods
- Schedule to Achieve State Standard for Distribution System Water Loss
- Budget for Water Loss Control Actions

Water Loss Control Methods

The current and planned methods utilized by the City of Walla Walla for the reduction of water system losses include:

Leak Detection, Repair and Tracking

The City currently maintains a database within Geographic Information System (GIS) that details identified leak locations and the associated work orders created for the actual pipeline repairs. This location and frequency of the repairs are then analyzed to identify pipelines within the distribution system that should be prioritized for potential replacement. The City repairs approximately 150 leaks per year. In 2011, the City purchased 10 acoustic leak detection devices. These devices utilize acoustic monitoring at night and attempt to identify potential leak locations by interpolating the data recorded from increased activity in sounds and vibrations in the pipes.

The City also has immediate access to staff and equipment that can perform manual leak detection functions and repair leaks as soon as discovered. In 2018, the City began contracting out services for additional leak detection, as needed. The City plans to complete a system wide leak detection survey every two years with the most recent being completed in 2018. The City is also pursuing satellite leak detection in late 2019 to greater increase its leak detection ability.

Water Main Replacement Program

The City has steadily increased its investment in replacing water mains. The City initiated an Infrastructure Replacement and Repair Program (IRRP) in 2010 that identifies areas as potential candidates for the repair and/or replacement of all streets, water lines and sanitary sewer lines within a designated boundary to maximize the capital expenditures for the City. The City plans to replace approximately 1 to 1.5 miles of water main line and associated service lines per year utilizing IRPP and Capital Improvement Program (CIP) funding.

Over the past several years, the City has also focused on disconnecting and abandoning 2-inch water lines left in service after the construction of larger, redundant distribution lines. The small diameter lines are no longer hydraulically necessary and due to the age and material may contribute to the overall distribution system leakage seen in the past several years.

Improved Corrosion Protection

Due to silty, corrosive soils identified within the distribution system service limits, the City of Walla Walla now requires the use of wrapped ductile iron pipe for the construction of new or replacement water lines. The use of ductile iron in lieu of the previously used galvanized material will contribute to reduced water losses in the system due to the increased corrosion protection.

Service Line Replacement

A high percentage of the identified distribution system leaks and repairs have been identified as service line leaks on older galvanized lines between the City distribution mains and the water meters. The City plans to use HDPE service pipe to replace all service laterals affected by IRRP or CIP projects until all the galvanized lines have been replaced.

Pressure Management

Pressures in the distribution system currently range from 60 to 120 pounds per square inch (psi). Higher distribution system pressures commonly contribute to distribution system leakage from fittings and main breaks. Reducing system pressure in the different pressure zones by adjusting the settings on pressure reducing valves (PRVs) may aide in reducing overall water losses. The City will consider seasonal modifications to PRV settings to address higher pressures during low demand conditions, while still maintaining pressures during higher demand and fire flow conditions.

Improved Metering

Over the past several years, the City has strived to improve data accuracy and in November 2017, the City began the implementation of an Advanced Metering Infrastructure (AMI) system. The conversion of the entire water system was completed in early 2018. Due to the recent installation of the AMI system, it is thought inconsistencies in the 2017 data may have been created during

the conversion and transition process, but it is overall anticipated to lead to further reductions in distribution system losses. The data collected in the first half of 2018 appears to show a more consistent, reduced water loss each month when compared to previous years.

In 2018, the City started installing meters on dedicated fire service lines for commercial business, educational, governmental and industrial facilities not previously metered enabling them to collect metered data should the connections be used. The data can then be incorporated into the calculations for water usage whereas it previously would have been considered part of the distribution system losses.

The City plans to install temporary flow meters at designated PRVs, particularly during low demand months when water loss percentages are the highest, to proactively track the amount of water entering each pressure zone and compare the data with the source production metering and the cumulative customer meter data gathered from the AMI system. This will assist with identifying specific pressure zones that may be contributing to higher water losses and identify additional targeted projects for distribution system improvements. This will also verify the accuracy of data being collected across the the different metered locations. Some things the City will consider during installation of the temporary flow meters on the PRV stations include:

- Install meters on as many zones as feasible to validate the supply across each zone.
- Meters should be placed at all PRV stations operating in a zone under regular demand conditions. To minimize the number of metered locations, PRV settings could be checked and adjusted to send flow through a limited number of metered PRV vaults, with other PRV locations serving the zone set to meet emergency conditions.
- Processing the AMI records concurrent with the same time period the PRVs are metered to determine consistency and isolate questionable data.

An additional water loss reduction method the City could pursue, if necessary based on the evaluation of the AMI data (as more becomes available) and the results of the zone by zone metering at PRVs, is to determine the accuracy of the source water meters at the raw water intake facility and water treatment plant. If the improved customer meter information still shows significant losses, the calibration of these meters will provide more accurate source water data and may further reduce the percentage of distribution system losses currently being calculated.

Schedule to Achieve State Standard for Distribution System Water Loss

The City's 6-year average distribution system leakage (DSL) is 29.2 percent. The total DSL has decreased over this period for a reduction of 12 percent since 2012, when the previous WLCAP was written and implemented. **Table 1** shows the estimated production and DSL for the years 2011 to 2016.

Table 1
Annual Distribution System Leakage

Year	Water to System (MG)	Water Metered (MG)	DSL (MG)	DSL (Percent)
2011	3,364	2,242	1,121	33.3
2012	3,441	2,281	1,160	33.7
2013	3,453	2,360	1,095	31.7
2014	3,475	2,465	1,009	29.1
2015	3,438	2,556	883	25.7
2016	3,170	2,491	679	21.4
		Average	**991**	**29.2**

General Note:
MG= Million Gallons

The City currently plans to implement the discussed methods and reduce distribution system losses by 1 percent each year until 2028 when they are projected to reach the maximum allowable loss of 10 percent of total water production. At that time, the City will reevaluate its WLCAP methods based on the current conditions and DSL.

Budget for Water Loss Control Actions

The City has worked to develop a budget for projects that directly relate to the reduction of water losses seen in the distribution system. The budget shown below details the long-term monetary plans for water line repair and replacement. Specific details for the projects are in the Water System Capital Improvement Program.

- Water Loss Programs excluding Main Replacement - $500,000 (annual)
- Water Main Replacement (non-IRRP) - $8,500,000 (10-year Plan)
- Water Main Replacement (IRRP) - $17,800,000 (10-year Plan)