



City of Independence Water Department

*Water Distribution System
Main Replacement*

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Water Distribution System

Introduction

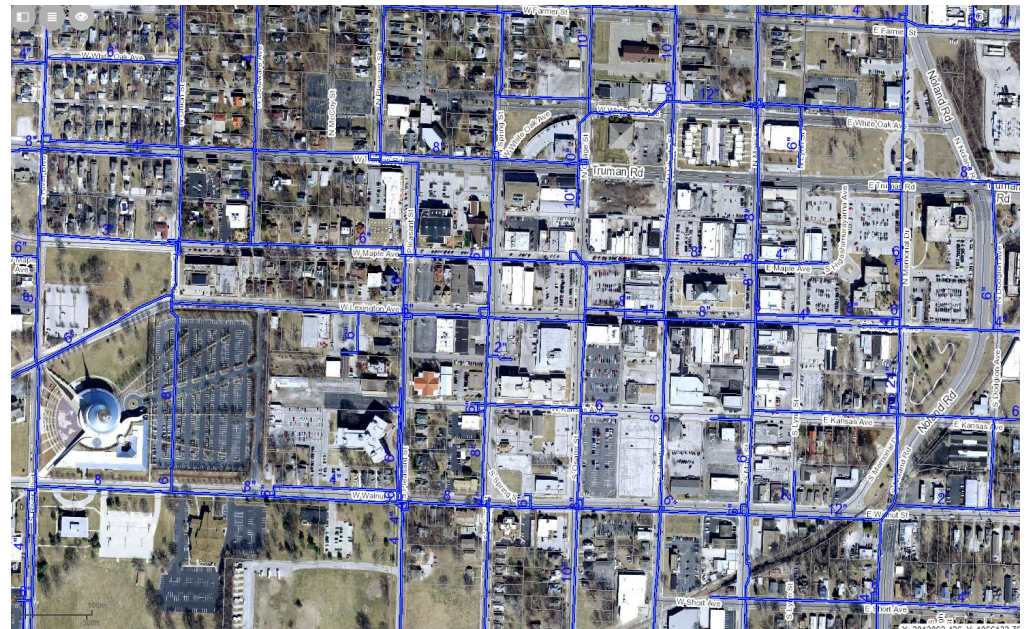
- General Overview
- Water Main Leaks and Breaks
- Industry Water Main Break Rates and Main Replacement Goals
- Water Main Replacement
 - Identifying and Prioritizing Projects
 - Construction Documents and Administration
 - Current and Future Costs



Water Distribution System

General Overview

- Approximately 766 Miles of Water Main
- Pipe Sizes Range from 2" to 36" Diameters
- Five Main Pump Stations and Five Water Storage Facilities
- Four Emergency Interconnects with Kansas City
- Approximately 48,400 Retail Customers and 12 Wholesale Customers



Water Distribution System

Water Main Leaks and Breaks

- Approximately five breaks or leaks per week, on average.
- Breaks occur any time of day - any day of the week.
- Immediate repairs are often required.
- Site restoration is required following the repairs.



Water Main Replacement

Industry Break Rates and Replacement Goals

Item Description	Miles / Water Main Breaks Per Mile Per Year
City of Independence Water Distribution System	766
Average Number of Water Main Breaks in City of Independence Water Distribution System	0.34
Average Number of Water Main Breaks in North America	0.25
Typical Annual Distribution System Replacement	1 to 2
Annual Distribution System Replacement - 1% Goal	7.66

- Ductile Iron Pipe Research Association - Properly Designed and Installed Ductile Iron Pipe has a 100-Year Service Life
- Water Main Break Rates in the USA and Canada: A Comprehensive Study
 - Pipe Replacement Rates Should be Between 1% and 1.6% Per Year
 - Average of 0.25 Water Main Breaks Per Mile Per Year in North America

Water Main Replacement

Reaching Our Goal

- Identifying and Prioritizing Main Replacement Projects
- Using a Balance of In-House Engineering Services and Outside Engineering Consultants
- Using the Most Cost Efficient Combination of Contracted and Self-Performed Work
- Planning and Budgeting for the Anticipated Increase in Annual Capital Improvement Costs



Water Main Replacement

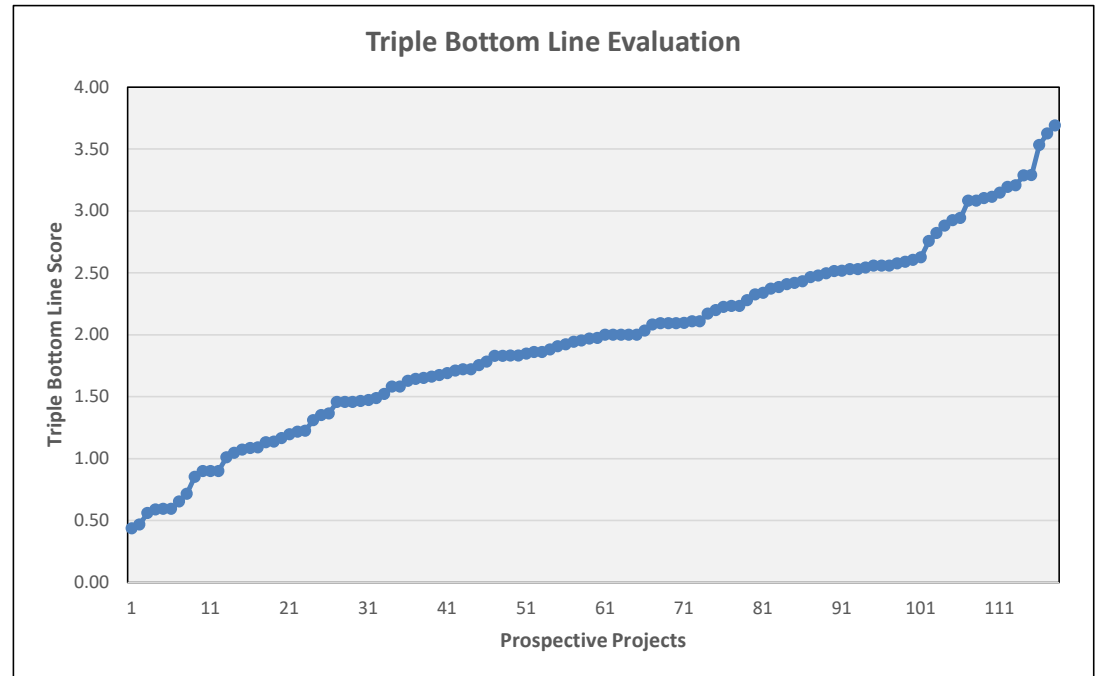
Identifying and Prioritizing Projects

Triple Bottom Line Evaluation									
Evaluation Factor	Category Weight Factor	Proposed Main Replacement Projects							
		2nd St. N. (Peck Dr. to Kendall Dr.)	3rd St. (E. of Gilbert)	5th St. N. (Jennings Rd. to Dover Dr.)	11th St. (11th St. and Norwood)	32nd (Hunter - Bird)	35th St. (Arlington to Pittman)	35th St (Blue Ridge to Northern)	
Likelihood of Failure	65%								
		1.25	2.18	2.32	0.70	2.79	1.21	2.00	
Consequence of Failure	25%								
		0.38	0.38	0.50	0.25	0.50	0.38	0.38	
Benefit of Replacement	10%								
	100%	0.00	0.00	0.00	0.10	0.00	0.00	0.00	
		1.63	2.56	2.82	1.05	3.29	1.58	2.37	
Scores: 5 = Most Favorable, 1 = Least Favorable									

Water Main Replacement

Identifying and Prioritizing Projects

- Likelihood of Failure currently has the highest weight factor.
- Evaluation Factors and Category Weight Factors will be reviewed and revised during annual project and budget planning.
- Reducing the number of main breaks will enable staff to focus on proactive tasks.



Water Main Replacement

Construction Documents and Administration

- Most projects are currently designed, bid and administered by Water Department staff.
- Engineering consultants will need to be utilized to achieve replacement of 1% of our water distribution system annually.
- The majority of main replacement projects have been contracted in recent years.
- Adding a dedicated construction crew to self-perform water main replacement projects, in addition to the contracted work, is being evaluated by the Department.

Water Main Replacement

Current and Future Annual Capital Improvement Costs

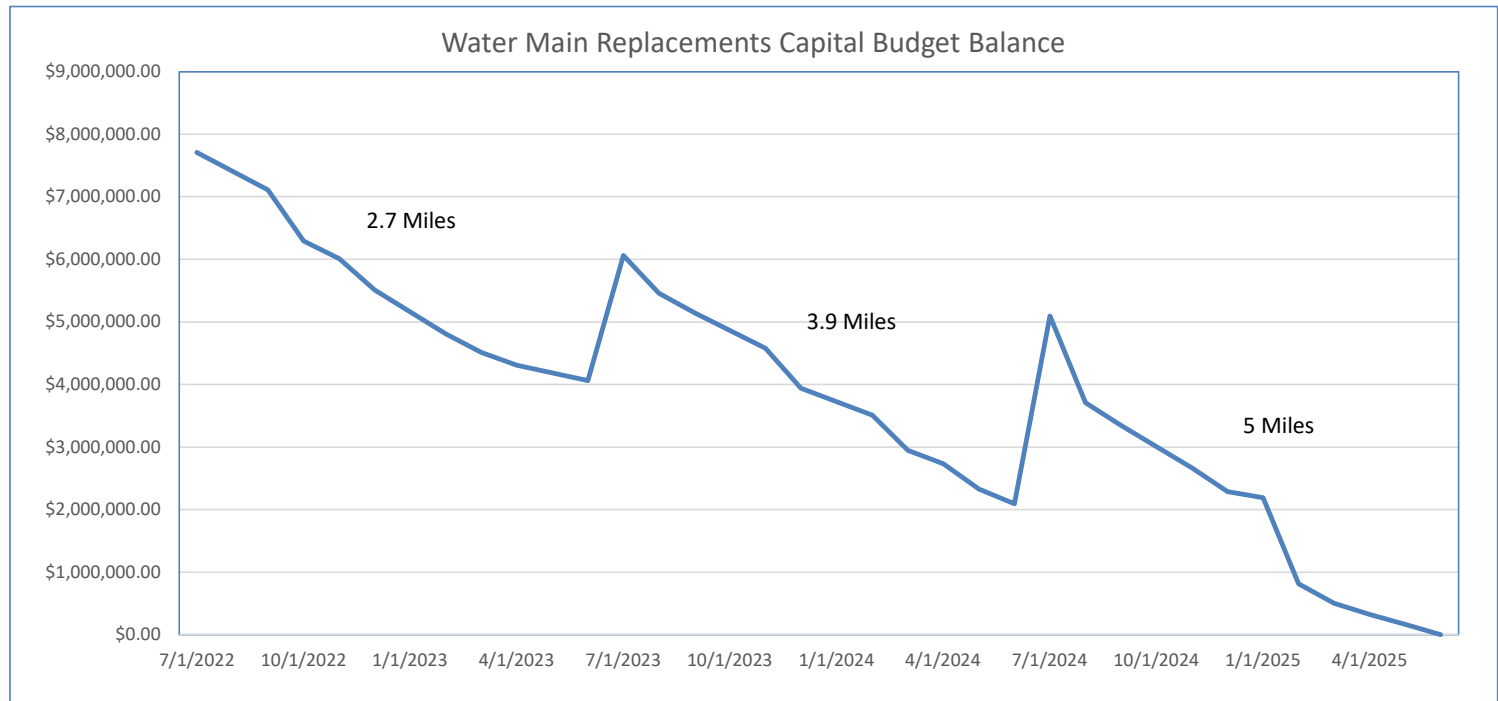
- Currently replace one to two miles of water main per year.
- Goal of 7.66 miles replaced annually based on industry recommendations.
- Average cost of water main replacement historically has been around \$1,000,000 per mile. Construction costs have been rising recently due to increased material costs.
- Anticipated annual budget for water main replacement:
 - Current - \$2,000,000
 - Future - \$7,660,000 - \$9,160,000



Water Main Replacement

Capital Budget Balance

- Based on identified and prioritized projects.
- A significant increase to the capital budget will be needed in the next three to four years.



Water Distribution System

Summary

- The number of water main breaks in our distribution system is above average for North America.
- We are currently replacing less than the industry recommended percentage of our distribution system annually.
- We have a system in place to identify and prioritize main replacement projects.
- We are currently evaluating the most cost effective and beneficial ways to increase the amount of the water distribution system that is replaced annually.
- Reaching our replacement goal will require a significant increase to our annual capital improvement budget in the next three to four years.

Questions?

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