



RIVERSIDE PUBLIC UTILITIES

UTILITY 2.0

WATER INFRASTRUCTURE ROAD MAP

JULY 13, 2015

WATER | ENERGY | LIFE



RiversidePublicUtilities.com

ROAD MAPS – INFRASTRUCTURE IMPROVEMENT – WATER

Executive Summary Details



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- System History/Background
- System Assessment
- Findings
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 - Technology
 - Workforce
- Investment Options
- Sample Recommendations

WORKFORCE DEVELOPMENT

INFRASTRUCTURE IMPROVEMENT
EXECUTIVE SUMMARY

—

THRIVING FINANCIALLY

ADVANCED TECHNOLOGIES

ROAD MAPS – INFRASTRUCTURE IMPROVEMENT – WATER - GOALS

WATER INFRASTRUCTURE

- Address aging infrastructure.
- Improve system safety and reliability.
- Increase the use of technology to inform future planning and increase conservation.
- Use financial pro forma to strike investment balance.

THE PLANS

RECYCLED WATER

WATER INFRASTRUCTURE

INTEGRATED WATER

WORKFORCE DEVELOPMENT

FACILITIES PLAN

RPS POWER IMPLEMENTATION

INTEGRATED POWER RESOURCES

ELECTRIC INFRASTRUCTURE

TRANSMISSION RELIABILITY

FIBER BUSINESS

TECHNOLOGY

CONSERVATION AND EFFICIENCY

FINANCIAL PRO FORMA - 10 YR

Water Infrastructure Assessment

Water System:

- Significant improvement have been made through the CIP process, but areas of criticality remain.
- Significant pipeline replacement needed.

Technology:

- Leverage technology to realize increased efficiency and effectiveness.
- Improve SCADA and network communication to further enhance security.

Workforce:

- Workforce needs training to have Utility 2.0 skill sets.
- Knowledge transfer needed for aging workforce.

Financials:

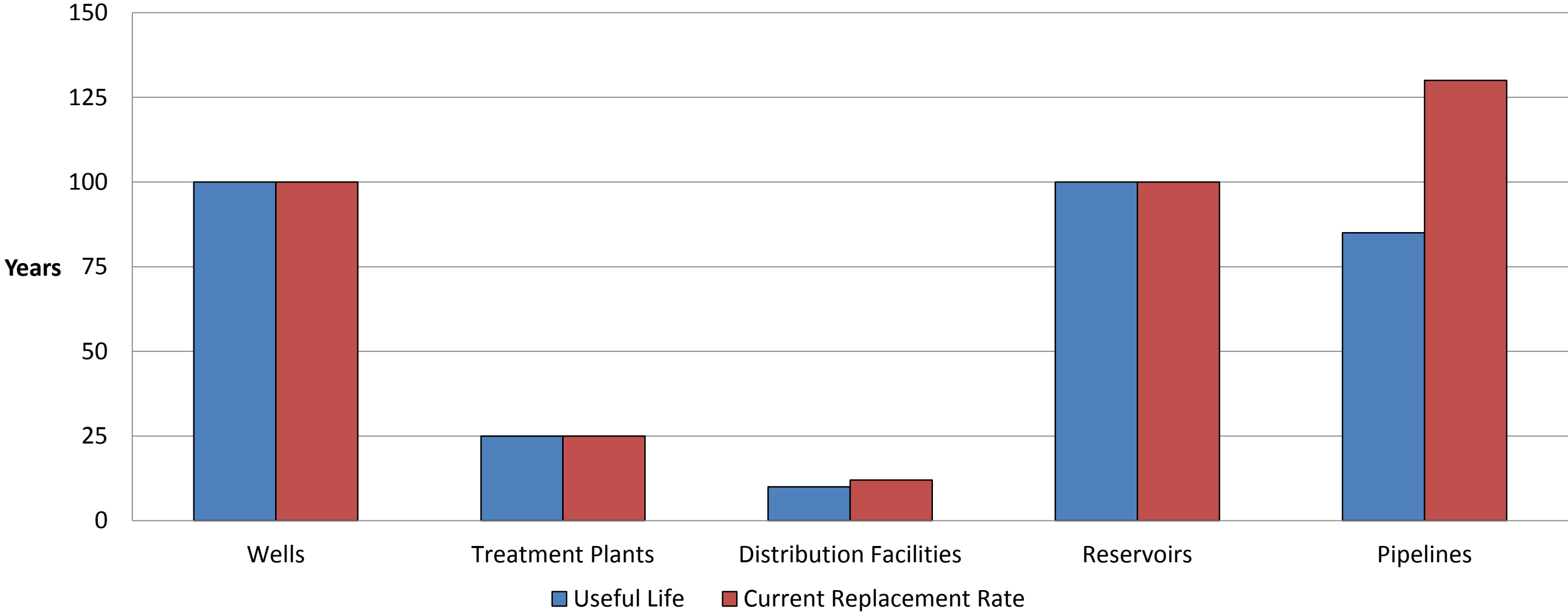
- Strong Financial Position
- Continue efficiency improvements

Infrastructure Assessment

Asset	Criticality	Last 10 Years	Status	Next 10 Years
Wells		\$20 Million	On target	\$21-\$29 Million
Treatment Plants		\$30 Million	On target	\$19-\$27 Million
Distribution Facilities		\$15 Million	On target	\$6-\$10 Million
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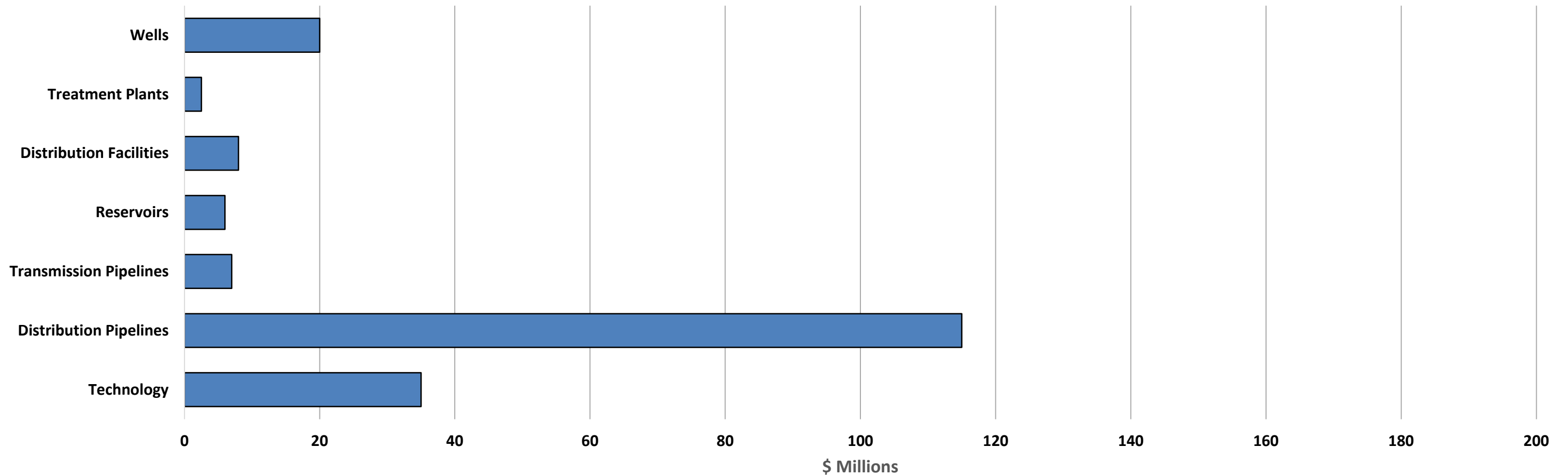
Criticality:	High		Moderate		Low	
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Useful Life vs. Replacement Rate



Option 1: Stay the Same (reactive mode), but fall behind as costs rise.

Option 1: Status Quo



Option 1 = \$170-\$216 Million

Option 2 = \$226-\$293 Million

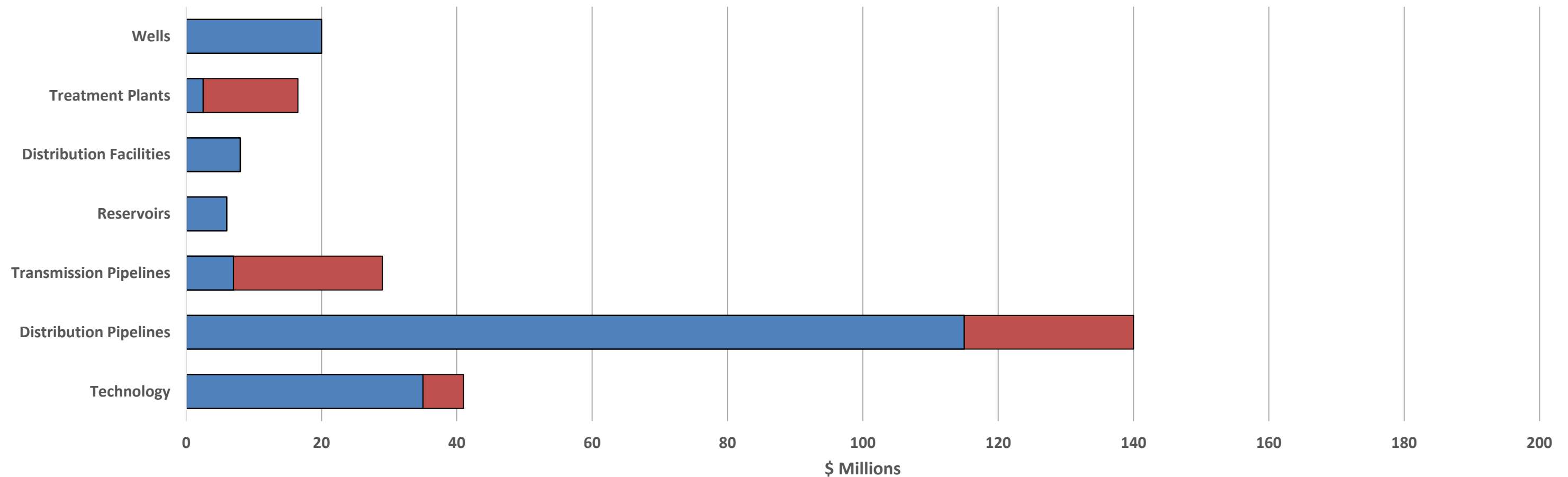
Option 3 = \$279-\$357 Million

Option 4 = \$342-\$437 Million

Option 1: Existing programs continue. Distribution pipeline at 130 year replacement cycle. Basic RPU technology improvements with ODMS and asset management.

Cost to Address Major Deficiencies

Option 2: Major Deficiencies



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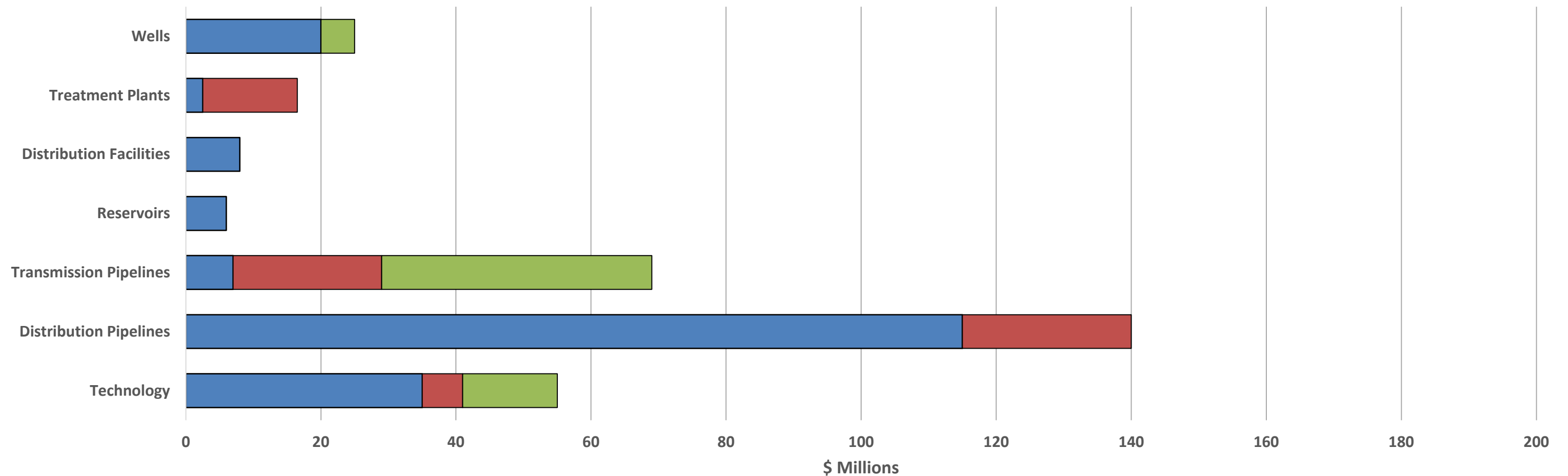
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Option 2: Replace Techite pipe, no upsizing. Replace Distribution Pipeline at a 100-year life cycle. Construct North Waterman Treatment Plant. Upgrade SCADA System and automate distribution system.

Cost to Address Operational Deficiencies

Option 3: Operational Deficiencies



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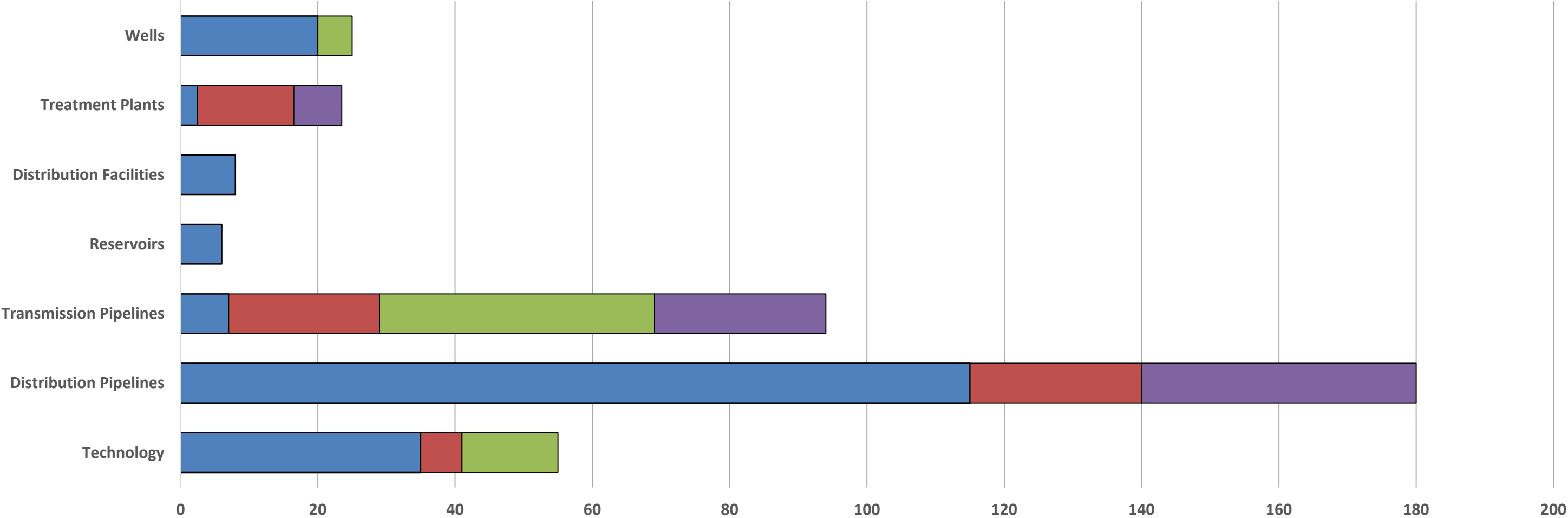
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Cost for Aggressive Program

Option 4: Aggressive Program

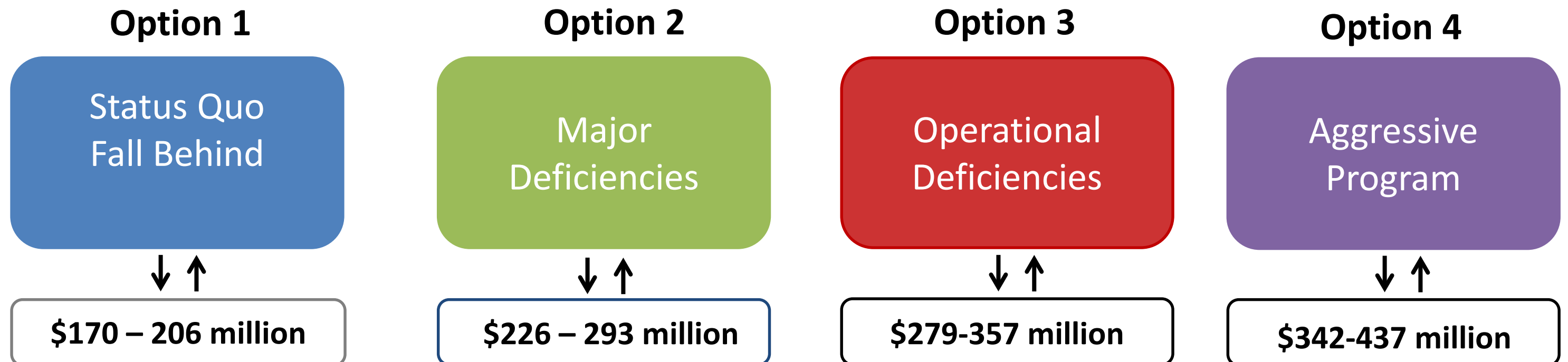


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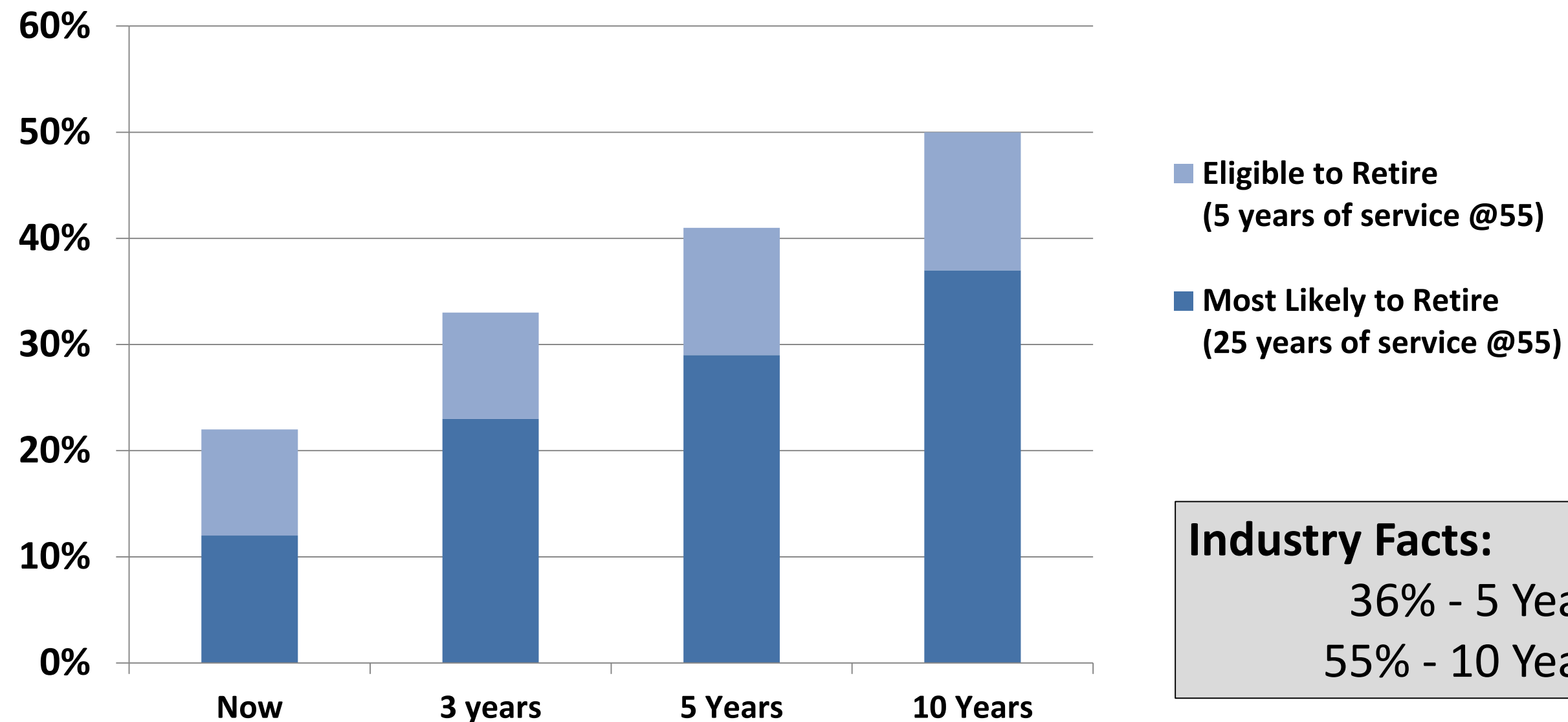
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Summary of Investment Options

Additional financial investment is required to address current backlog and improve maintenance.



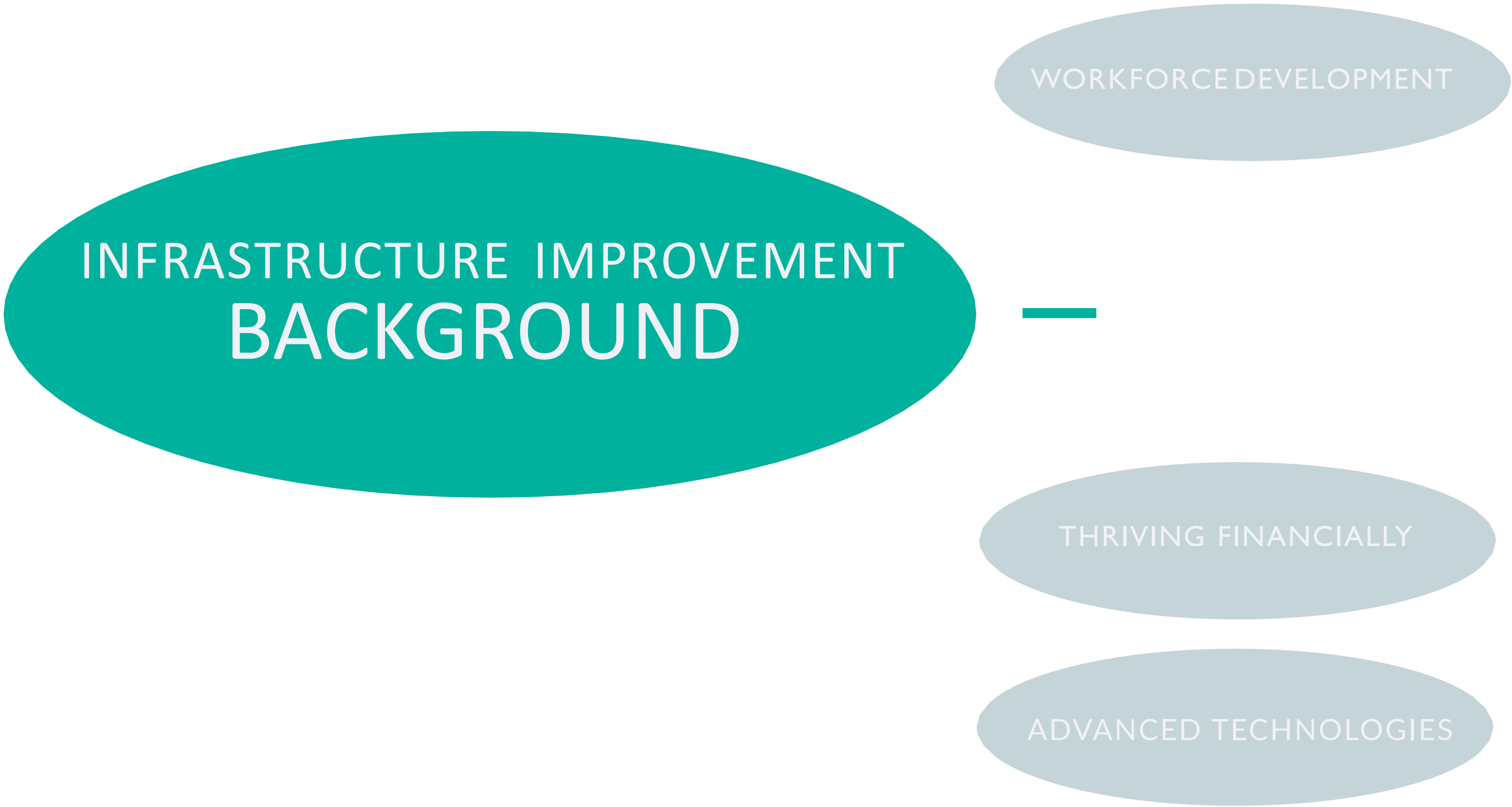
RPU Retirement Projections



Employees eligible to retire now and future

Industry Facts:

36% - 5 Years
55% - 10 Years



Background

- City acquired water system in 1913
- Serve population over 300,000
- System replacement cost over \$2 Billion
- Annual revenues over \$60 Million



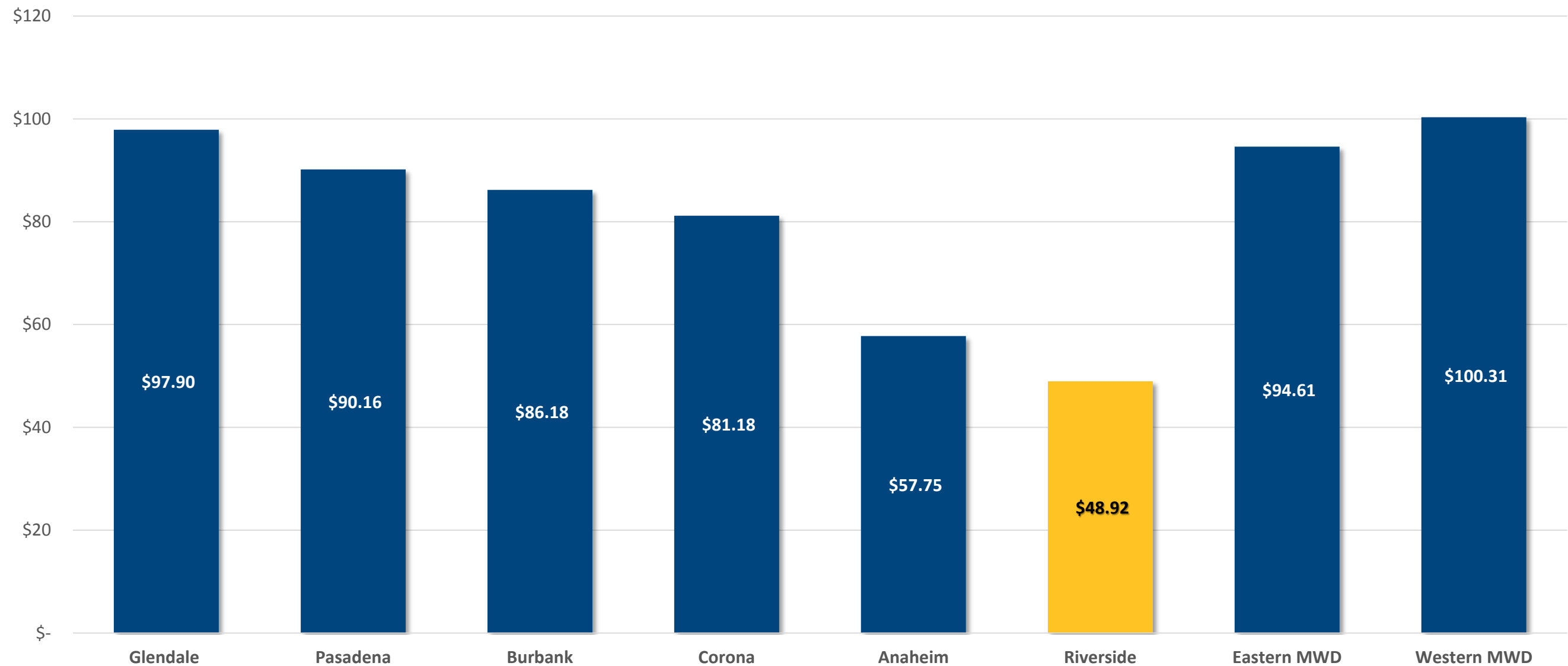


An Irrigating Canal

Safe W.A.T.E.R. Plan (2006)

- Invested \$250,000,000
- Age based replacement
- Last rate increase 2010
- Purchasing power has diminished
- Good work done / more needed

Affordable Water Rates



**AVERAGE RESIDENTIAL RATE FOR 25 CCF PER MONTH
(AS OF SEPT. 30, 2014)**

RiversidePublicUtilities.com



ROAD MAPS – INFRASTRUCTURE IMPROVEMENT -
ELECTRIC



RPU Water System

- 49 active domestic wells
- 16 storage reservoirs (109 MG)
- 11 treatment plants
- 3 imported water connections
- 41 booster stations
- 8 emergency inter-ties
- 46 Hydraulic Zones (925–1750)
- 954 miles pipeline (4–72 inch)
- Riverside Canal and Gage Exchange system

Estimated Replacement Value

Item	Quantity		Unit Price		Total
Water Supply Mains	180,000	ft..	\$ 810	/ft..	\$ 145,800,000
Transmission Pipelines	516,900	ft.	\$ 650	/ft.	\$ 335,985,000
Distribution Pipelines	4,342,300	ft.	\$ 250	/ft.	\$ 1,085,575,000
Service Laterals	67,500	ea.	\$ 2,000	ea.	\$ 135,000,000
Meters	67,500	ea.	\$ 250	ea.	\$ 16,875,000
Reservoirs	109	MG	\$ 1,000,000	/MG	\$ 108,500,000
Pump Stations	10,860	HP	\$ 4,000	/HP	\$ 43,440,000
Domestic Wells	49	ea.	\$ 3,000,000	ea.	\$ 147,000,000
Pressure Stations	60	ea.	\$ 300,000	ea.	\$ 18,000,000
Treatment Plants	6	ea.	\$ 12,000,000	ea.	\$ 72,000,000
Chlorination Facilities	6	ea.	\$ 1,200,000	ea.	\$ 7,200,000
Riverside Canal Facilities	14	miles	\$ 2,000,000	mi.	\$ 28,000,000
Control Systems		LS	\$10,000,000	LS	\$ 10,000,000
Total System Valuation					\$ 2,153,375,000

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Buried Assets = 80%

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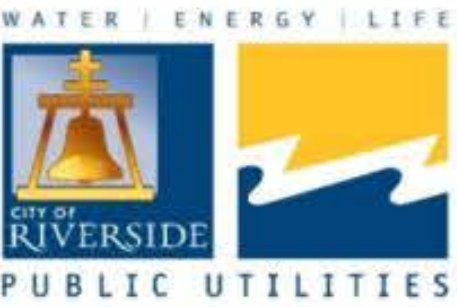
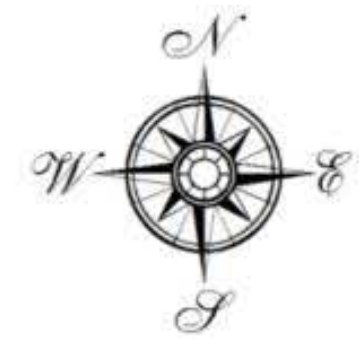
Well Production Assessment

- \$20 Million Invested
 - 10 wells in last 10 years (20% of capacity)
 - 5 built or financed by others
- \$21-29 Million Needed
 - Replace 1 well every other year
 - Rehab 5 wells per year
 - Replace 2 irrigation wells
- On Target

Treatment Assessment

- \$30 Million Invested
 - JW North
 - Gas Cl_2 to sodium hypochlorite conversion
- \$19-\$27 Million Needed
 - Maintain JW North
 - Build North Waterman Treatment Plant (Perchlorate)
 - Build Riverside Canal Treatment Plant
- On Target

**STATUS MAP
BUNKER HILL
PLUMES**



Map Developed By:
Riverside Public Utilities
Water Resources
April 2015

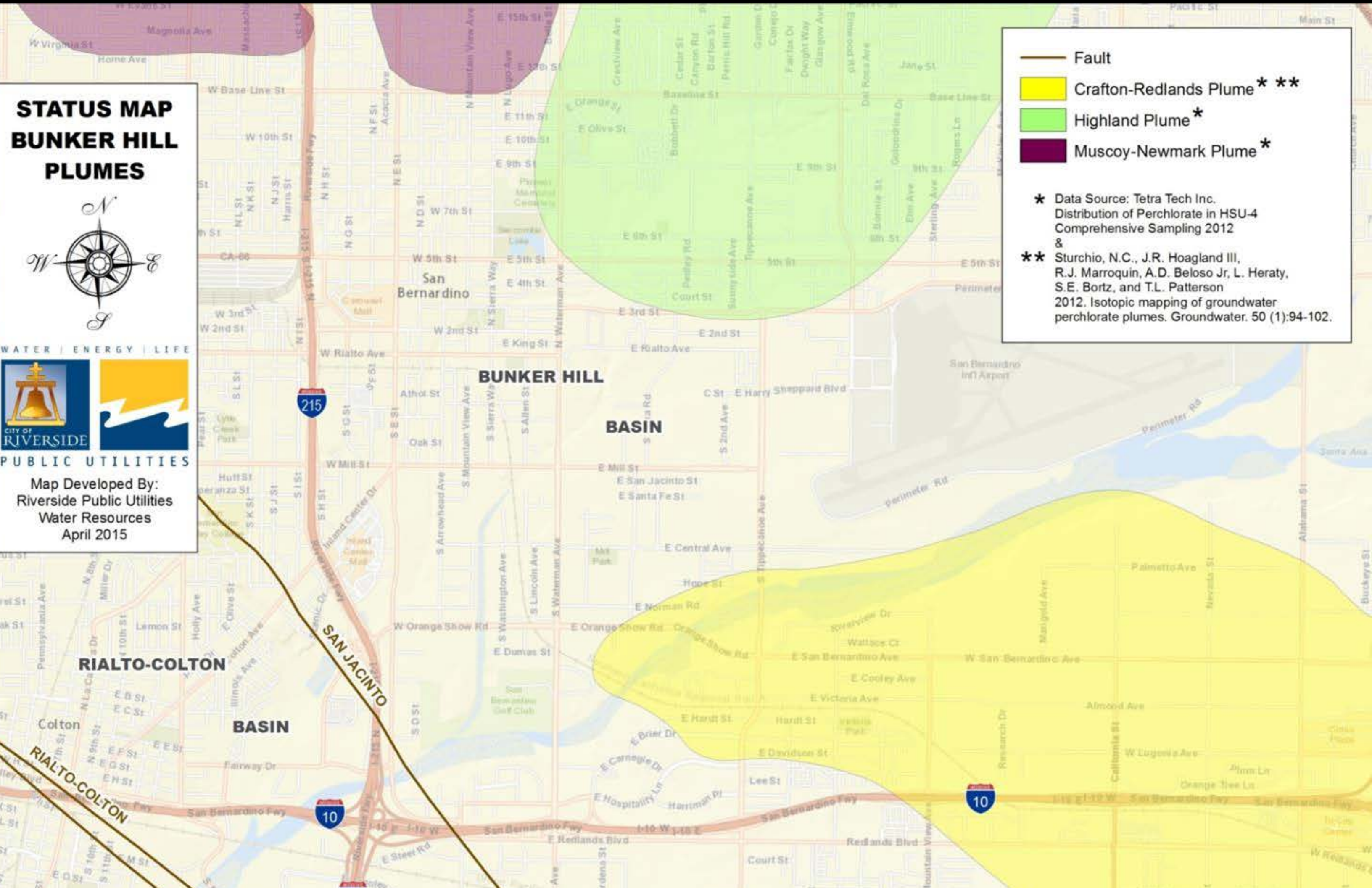
Fault

Crafton-Redlands Plume* **

Highland Plume*

Muscoy-Newmark Plume*

Data Source: Tetra Tech Inc.
Distribution of Perchlorate in HSU-4
Comprehensive Sampling 2012
&
** Sturchio, N.C., J.R. Hoagland III,
R.J. Marroquin, A.D. Beloso Jr, L. Heraty,
S.E. Bortz, and T.L. Patterson
2012. Isotopic mapping of groundwater
perchlorate plumes. Groundwater. 50 (1):94-102.



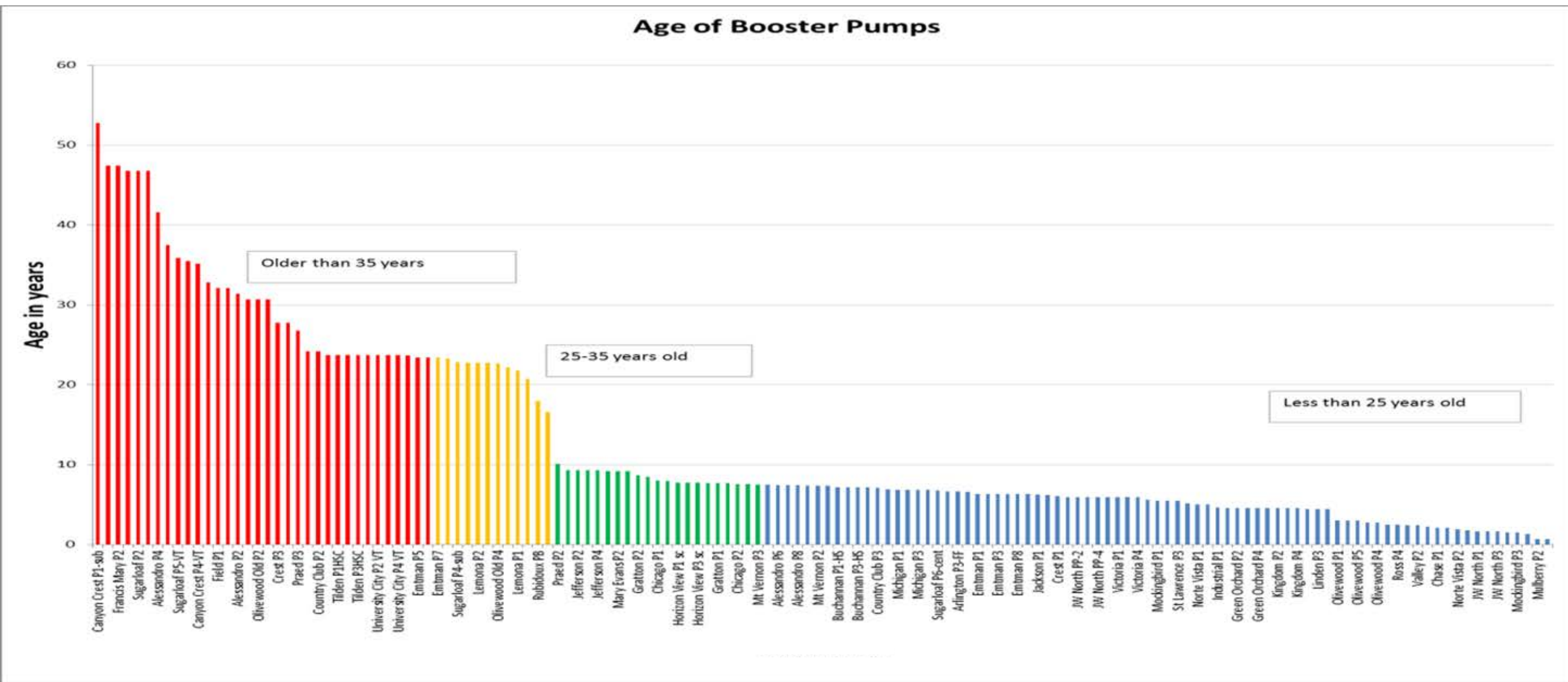
Distribution Facilities Assessment

- \$15 Million Invested
- Booster Stations
 - 18 of 38 stations are new or rebuilt
- Pressure Reducing Stations
 - 14 of 27 stations are new or rebuilt
- Meters
 - 35,000 of 64,000 replaced
- On Target

Distribution Facilities Assessment

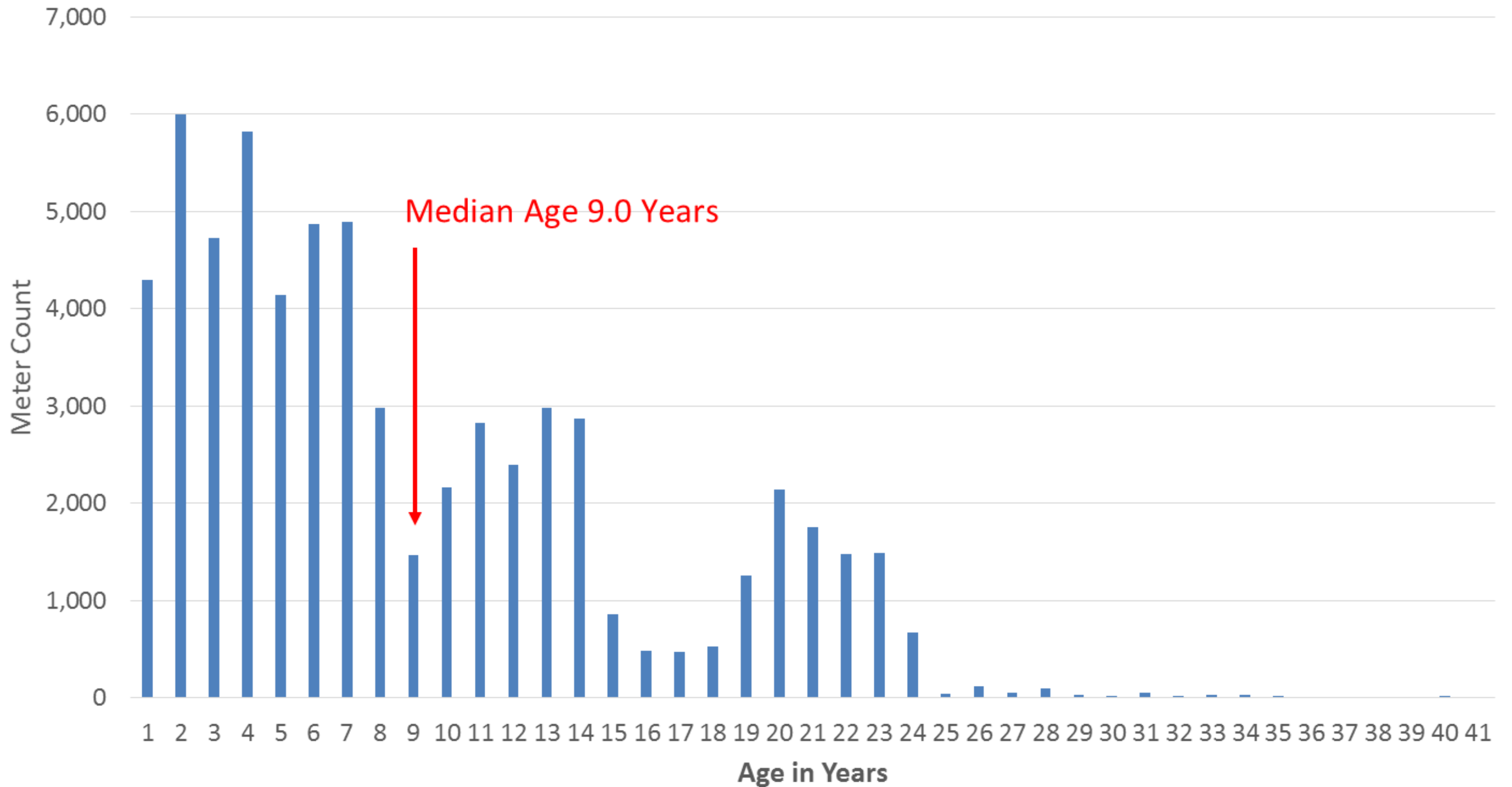
- \$6-\$10 Million needed
 - 2 booster station replacements
 - 1 pressure reducing station replacement
 - 4,500 meter replacements / year

Booster Pumps by Year



Meters by Age

Meter Count by Age (3/4" – 2")



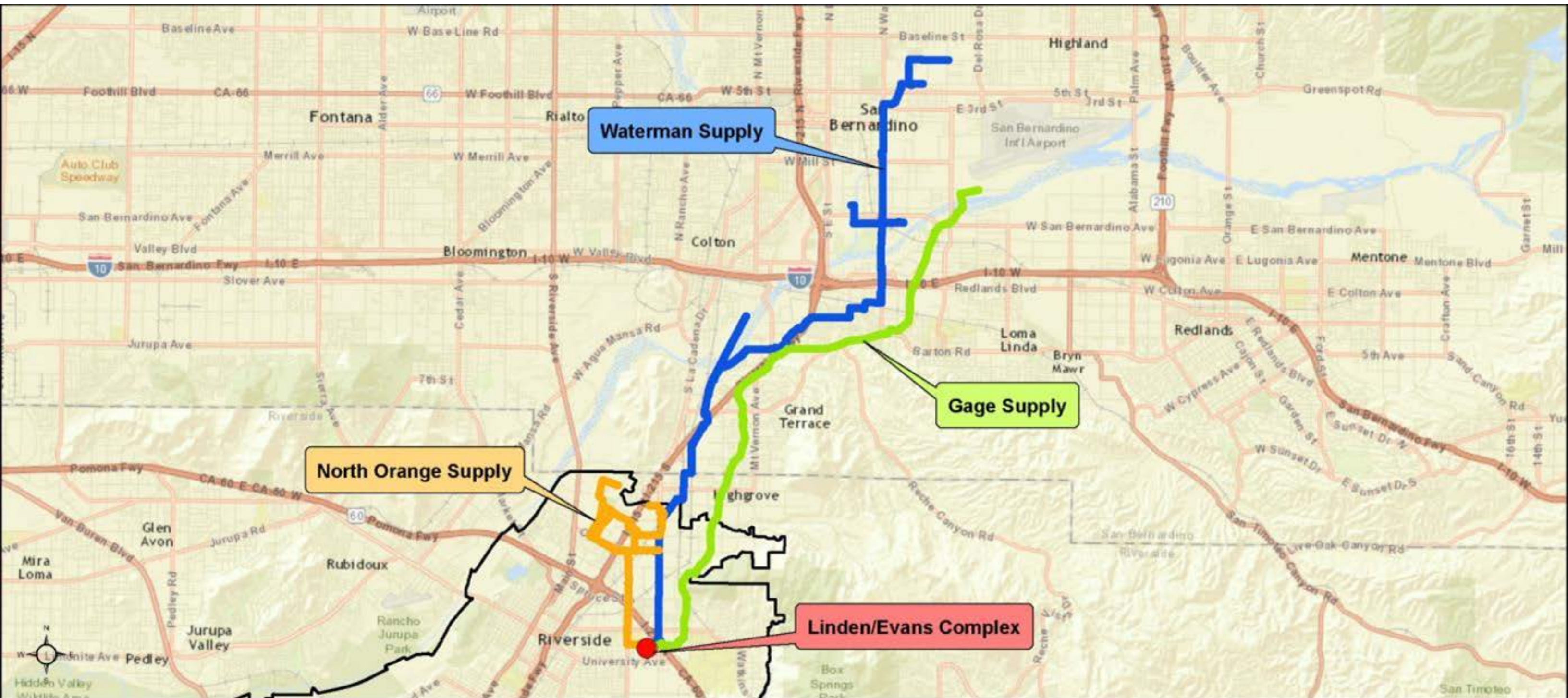
Storage Reservoir Assessment

- \$45 Million Invested
 - Evans, Whitegates I and Whitegates II rebuilt
 - Linden Roof replacement
- Most reservoirs are in good condition
- \$5-\$7 Million needed
 - Maintenance
- On Target

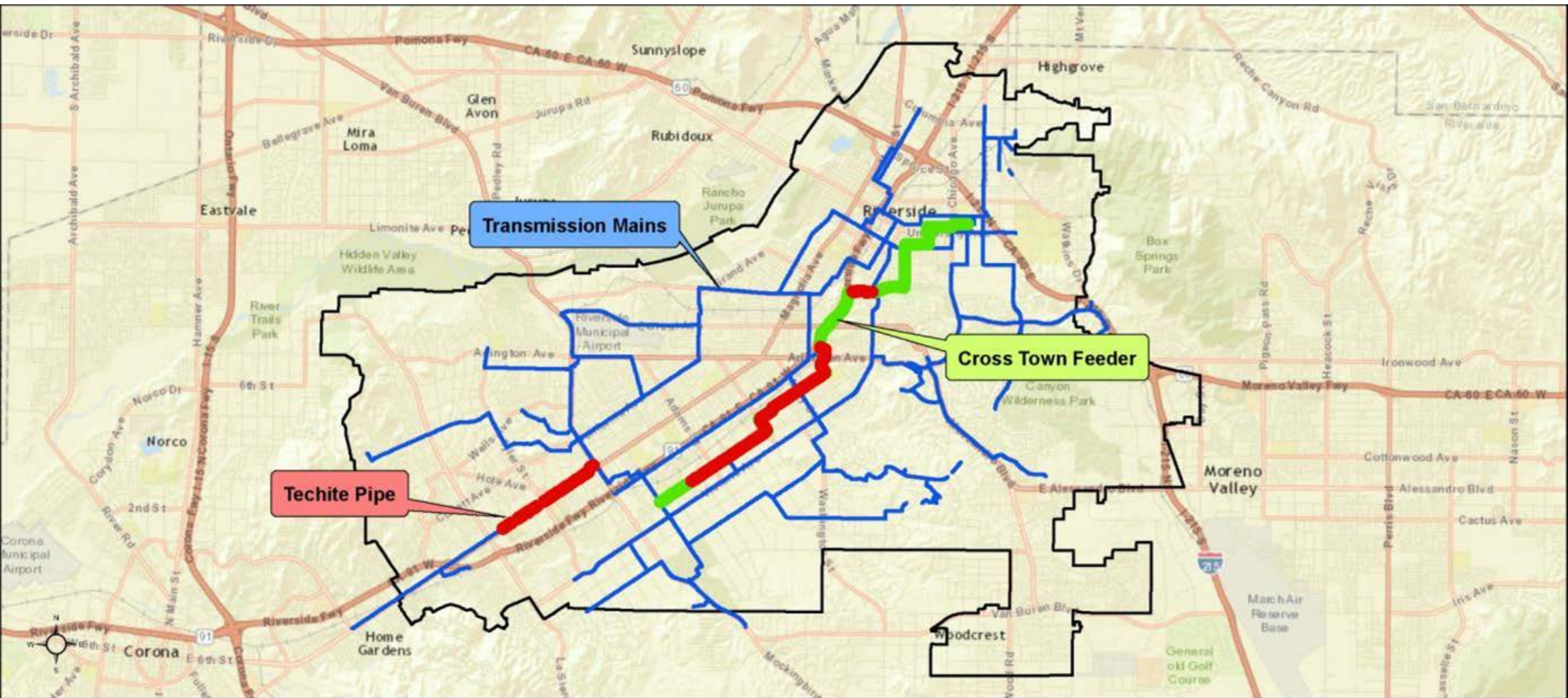
Transmission Mains Assessment

- \$35 Million Invested
 - San Bernardino TM replacements (9 projects)
 - Short segment of Cross town feeder (SR-91 widening)
- \$84-\$102 Needed
 - Techite Pipe should be replaced
 - Old and undersized pipelines
 - Operational deficiencies
- Deficient

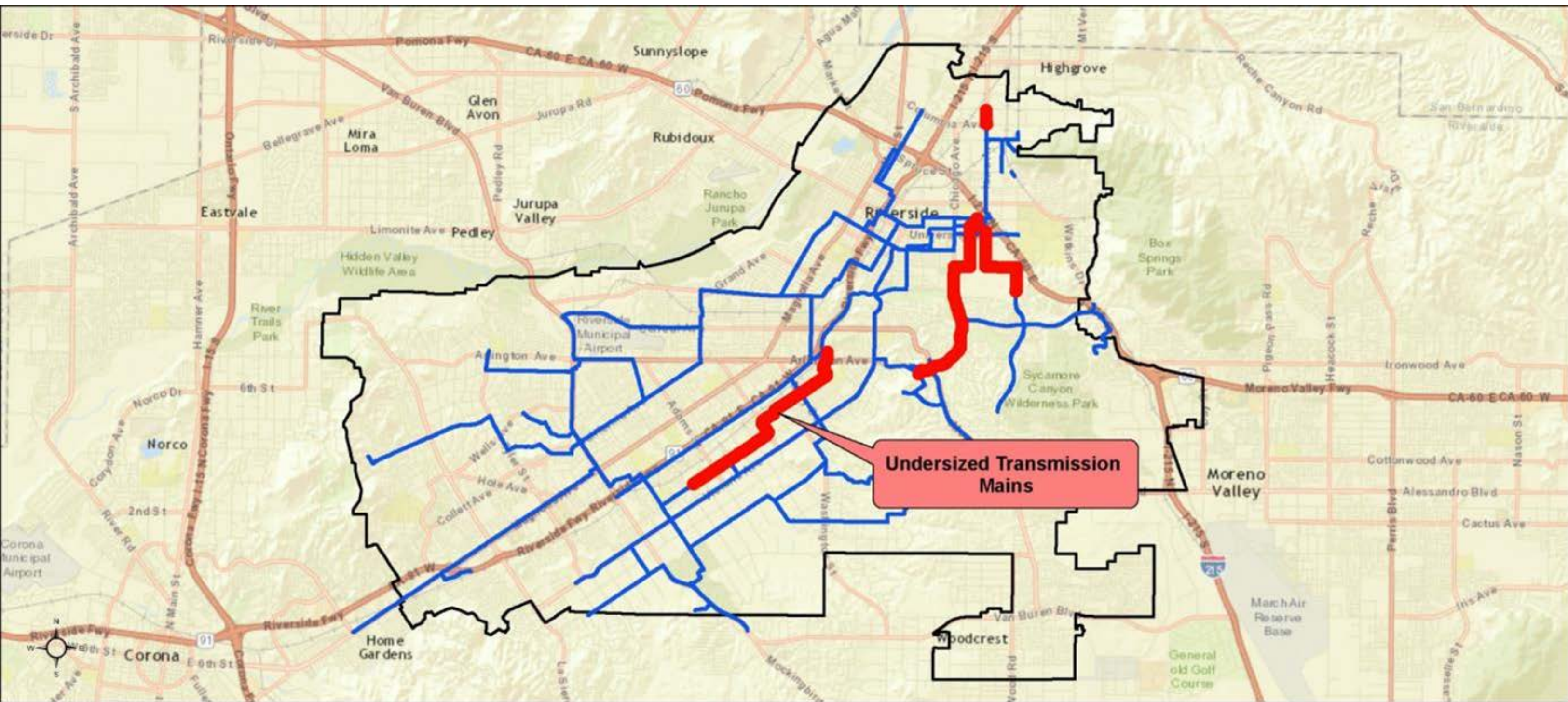
Supply Transmission Mains Map



Distribution Transmission Mains Map



Distribution Transmission Mains Map (undersized)



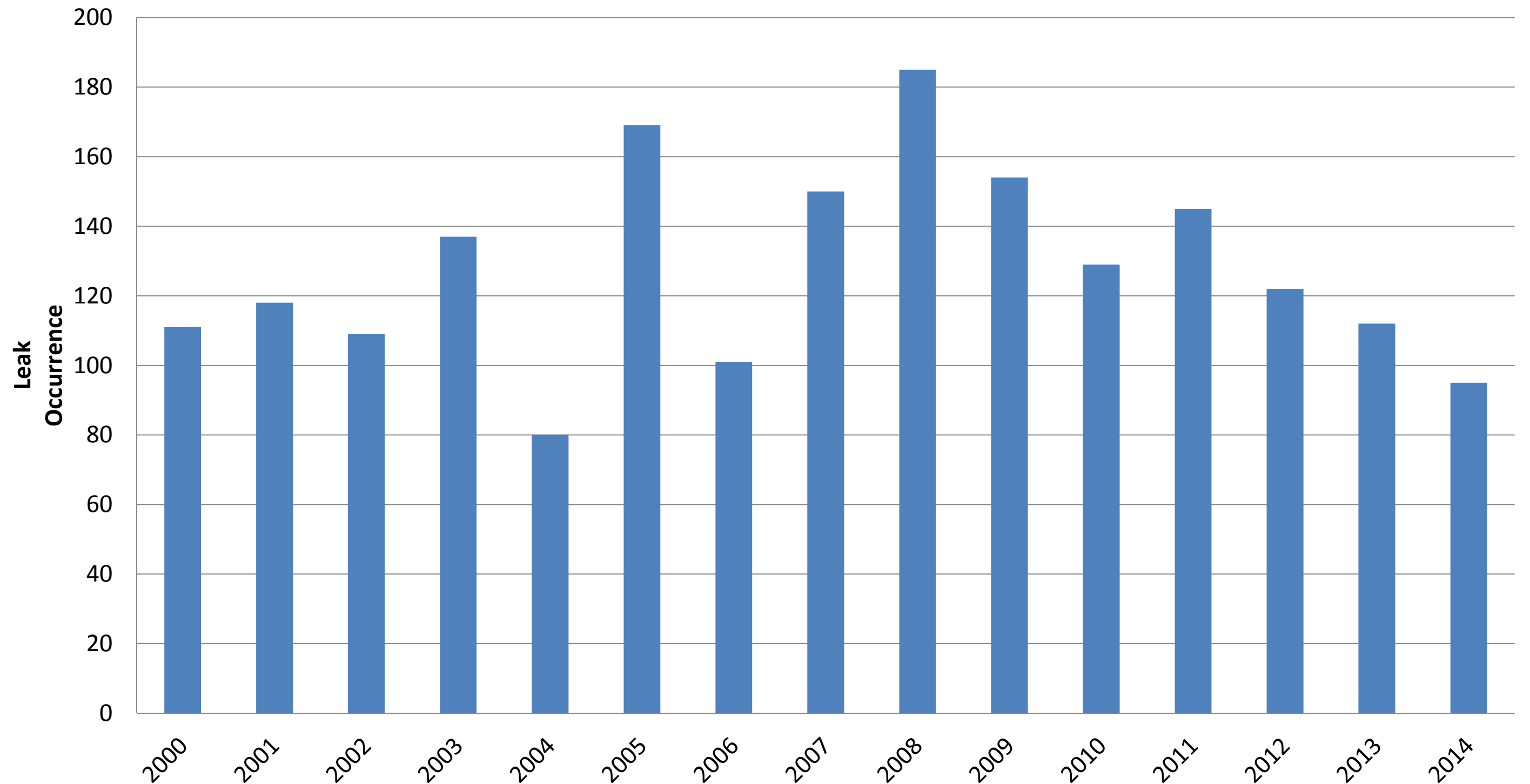
Techite Pipe



Distribution Pipelines Assessment

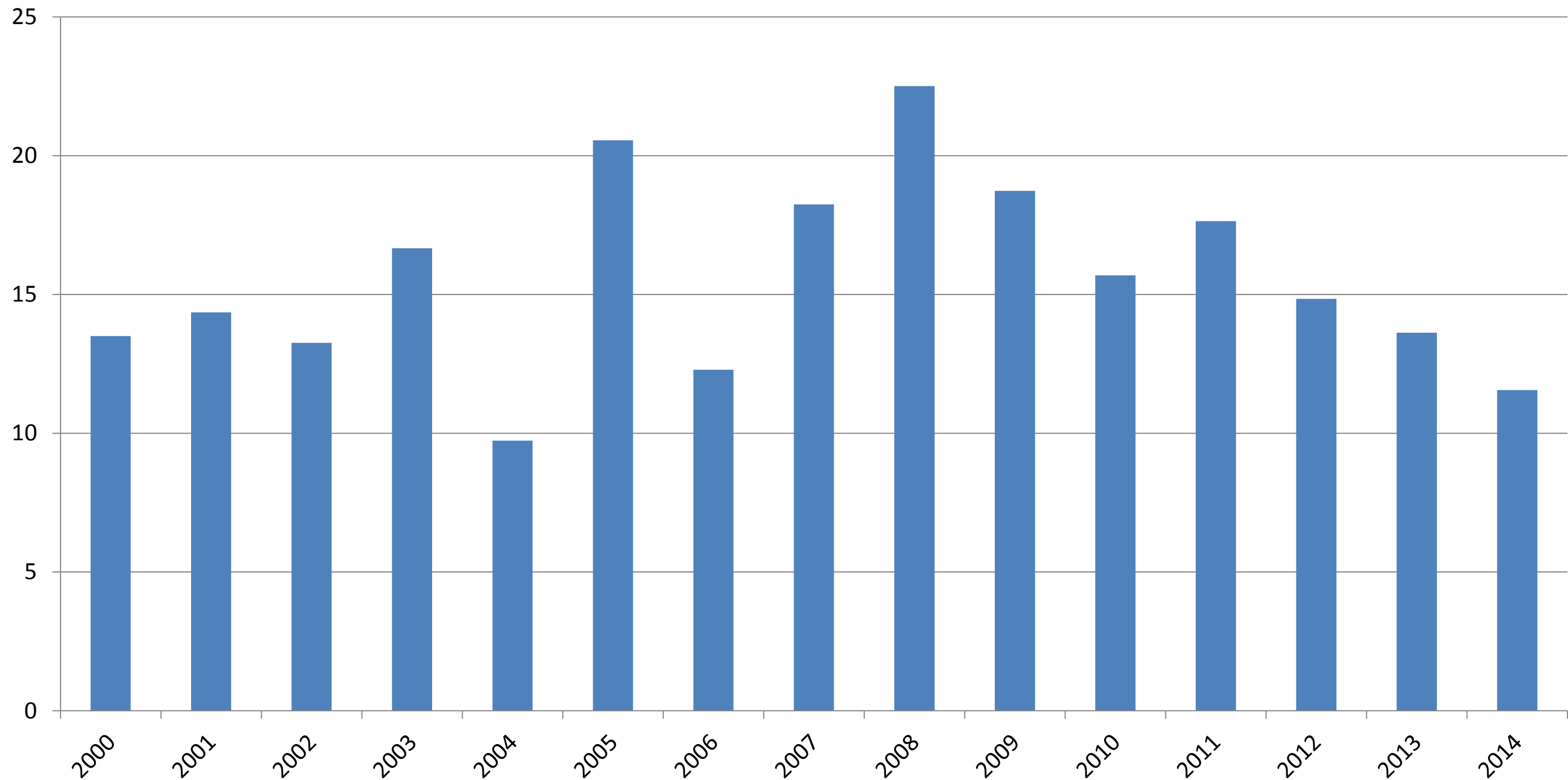
- \$90 Million Invested
 - 60 Miles replaced (\$63 Million)
 - 130 year replacement cycle
 - System expansion, Public Works projects
- \$107-\$198 Million needed
 - Approaching “Tsunami” of Cast Iron pipe
 - Develop improved assessment methods
- Deficient

Annual Distribution Line Leaks

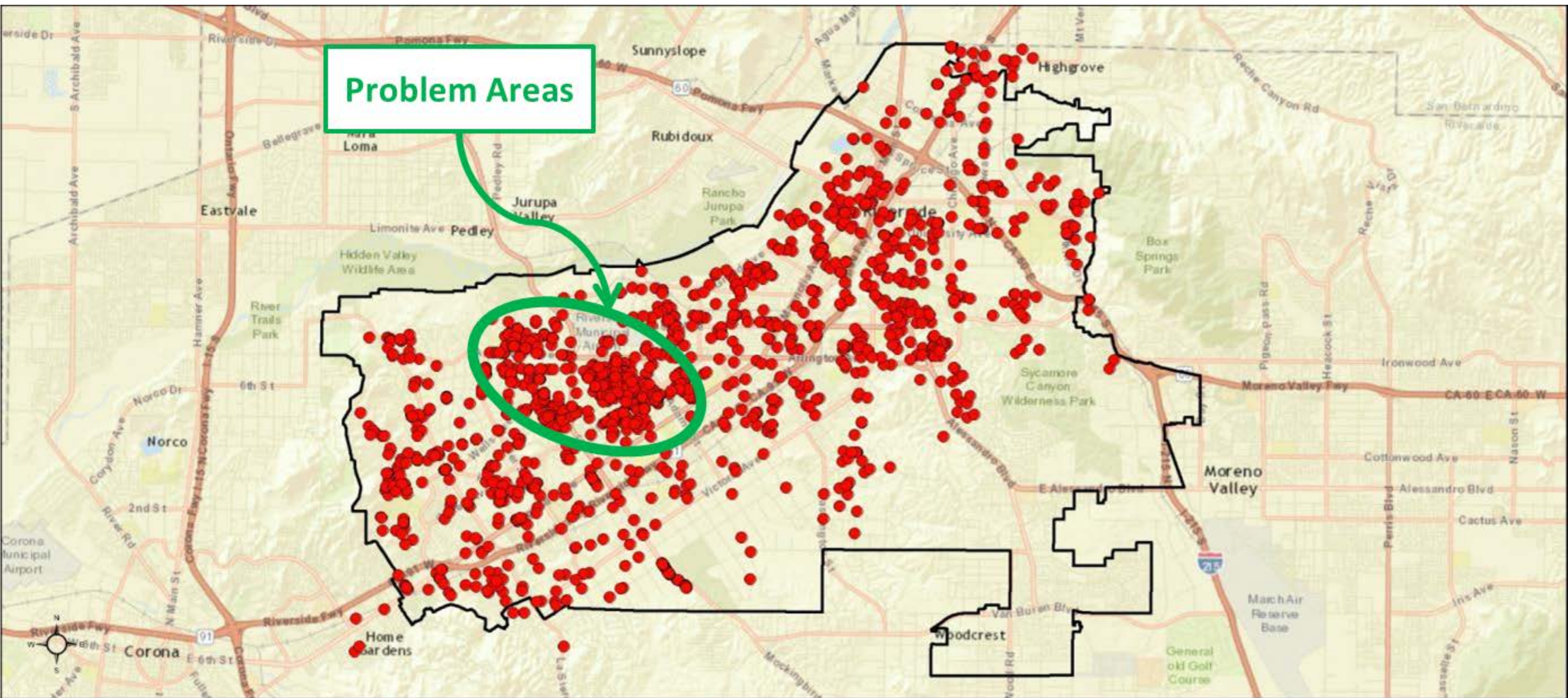


Normalized Leak Rating

Distribution Line Leaks per 100 miles of pipeline per year



Active Leaks Map

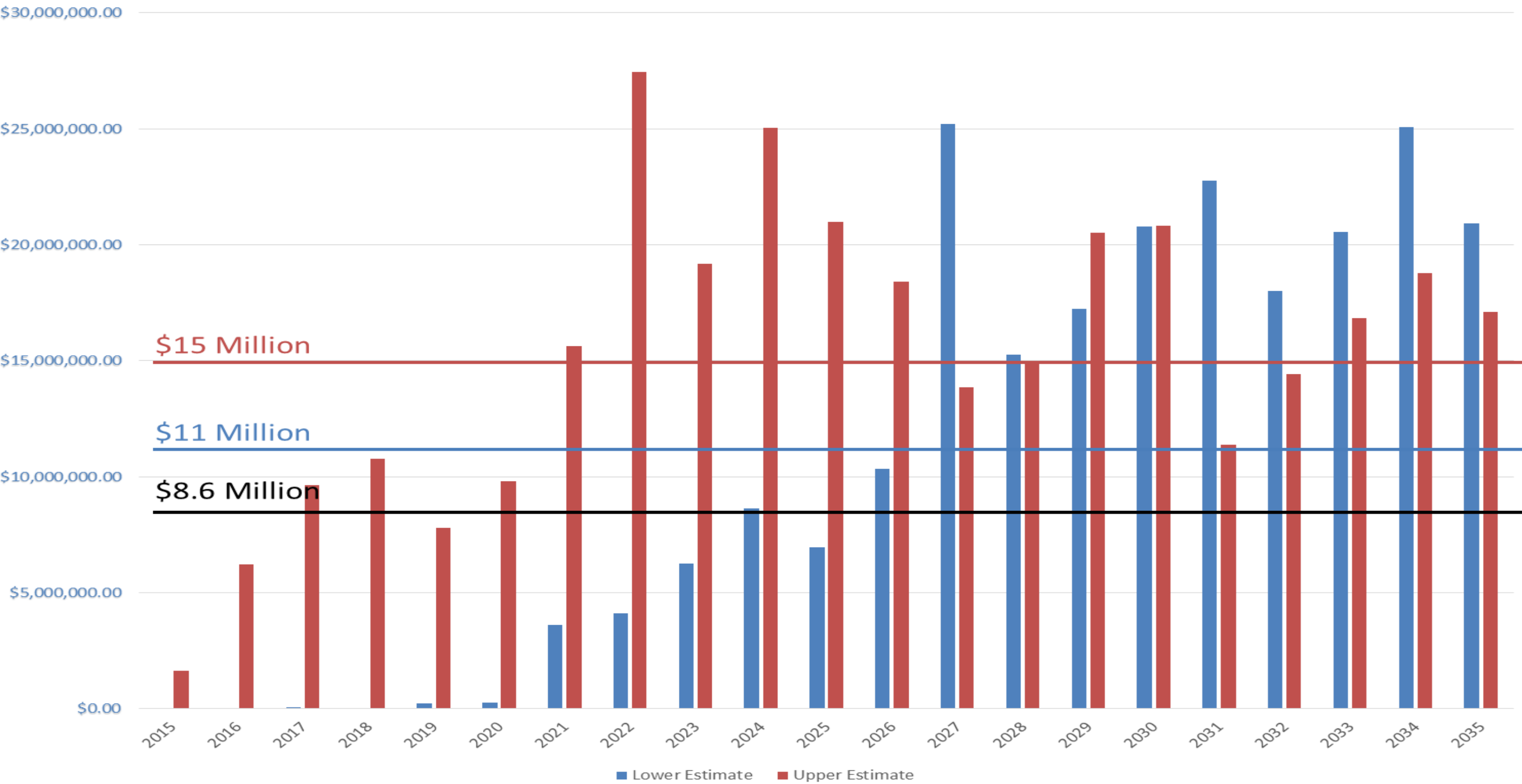


Premature Distribution Pipeline Failure



Failed Cast Iron Distribution mains removed from service December 2014. Installed c. 1950.

Distribution Pipeline Replacement Needs



Distribution Main Replacement Rate

- \$8.6 Million/year
 - 6.5 Miles (130-year cycle)
- \$11 Million/year
 - 8.5 Miles (100-year cycle)
- \$15 Million/year
 - 11 Miles (75-year cycle)

Infrastructure Assessment Summary

Significant Progress with CIP

- Most areas are making good progress
 - Wells, Treatment Plants, Distribution Facilities, Reservoirs

Some areas need attention (10 years)

- Transmission Mains (\$84-\$102 Million)
- Distribution Pipelines (\$107-\$198 Million)

ROAD MAPS – INFRASTRUCTURE IMPROVEMENT - ELECTRIC

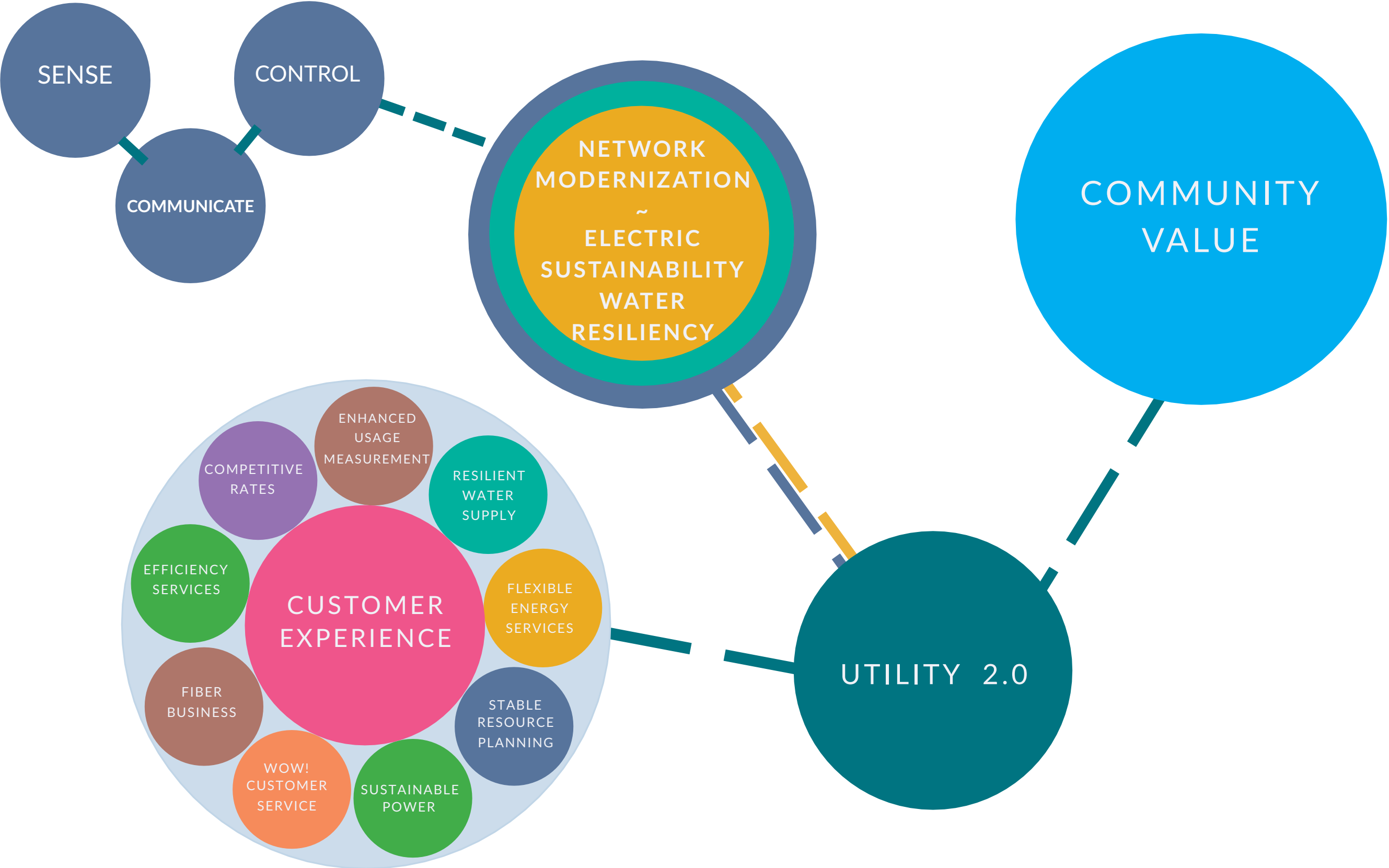
INFRASTRUCTURE IMPROVEMENT
TECHNOLOGY ASSESSMENT

WORKFORCE DEVELOPMENT

THRIVING FINANCIALLY

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HOW TECHNOLOGY HELPS THE WATER INFRASTRUCTURE REACH 2.0



Technology Assessment

- \$15 Million Invested
 - Replaced SCADA system (10 years old)
 - Well automation/SCADA expansion
 - ODMS
- \$44-\$64 Million needed
 - Information gathering/storage/extraction/analysis
 - Real time and efficient system operation

Technology Master Plan

CUSTOMER FOCUSED

Directly influence customer experience and provide customer interaction

- Customer Information System (CIS)
- Customer Relationship Management (CRM)
- Customer Web Portal (CWP)
- Interactive Voice Recognition (IVR)

INFORMATION BASED

Decision and analysis, data management and process implementation based primarily on large databases

- Meter Data Management (MDM)
- Geographic Information Systems (GIS)
- Operational Data Management System (ODMS)
- Work Management System (WMS)
- Asset Management System (AMS)
- Warehouse Inventory System (WIS)

REAL-TIME OPERATIONAL

Used in real-time operations and control of water and energy delivery systems

- Advanced Metering (AMI)
- Automated Vehicle Loading (AVL)
- Network Communications System (NCS)
- Land Mobile Radio (LMR)
- Distribution Automation (DA)
- Substation Automation (SA)
- Outage Management System (OMS)
- Distribution Management System (DMS)
- Supervisory Control and Data Acquisition System (SCADA)

Technology Assessment

- ODMS
 - Underway
 - Store operational data
 - Interact with multiple databases
 - Platform for dashboards
 - Segue way for advanced analysis and decision making
- Asset Management
 - Underway
 - Fully utilize existing software
 - Automate gathering of field data
 - Streamline maintenance
 - Refine CIP program

Technology Assessment

- Communication Upgrade
 - Remote facilities
 - High failure rate
 - Low bandwidth
- Distribution Automation
 - Optimize system operation
 - Added level of reliability
 - Reduce energy costs
- Advanced Metering Infrastructure (AMI)
 - Enhance customer service
 - Leak detection
 - Real time monitoring of system
 - Non-revenue water detection
 - Advanced meters

ROAD MAPS – INFRASTRUCTURE IMPROVEMENT -
ELECTRIC



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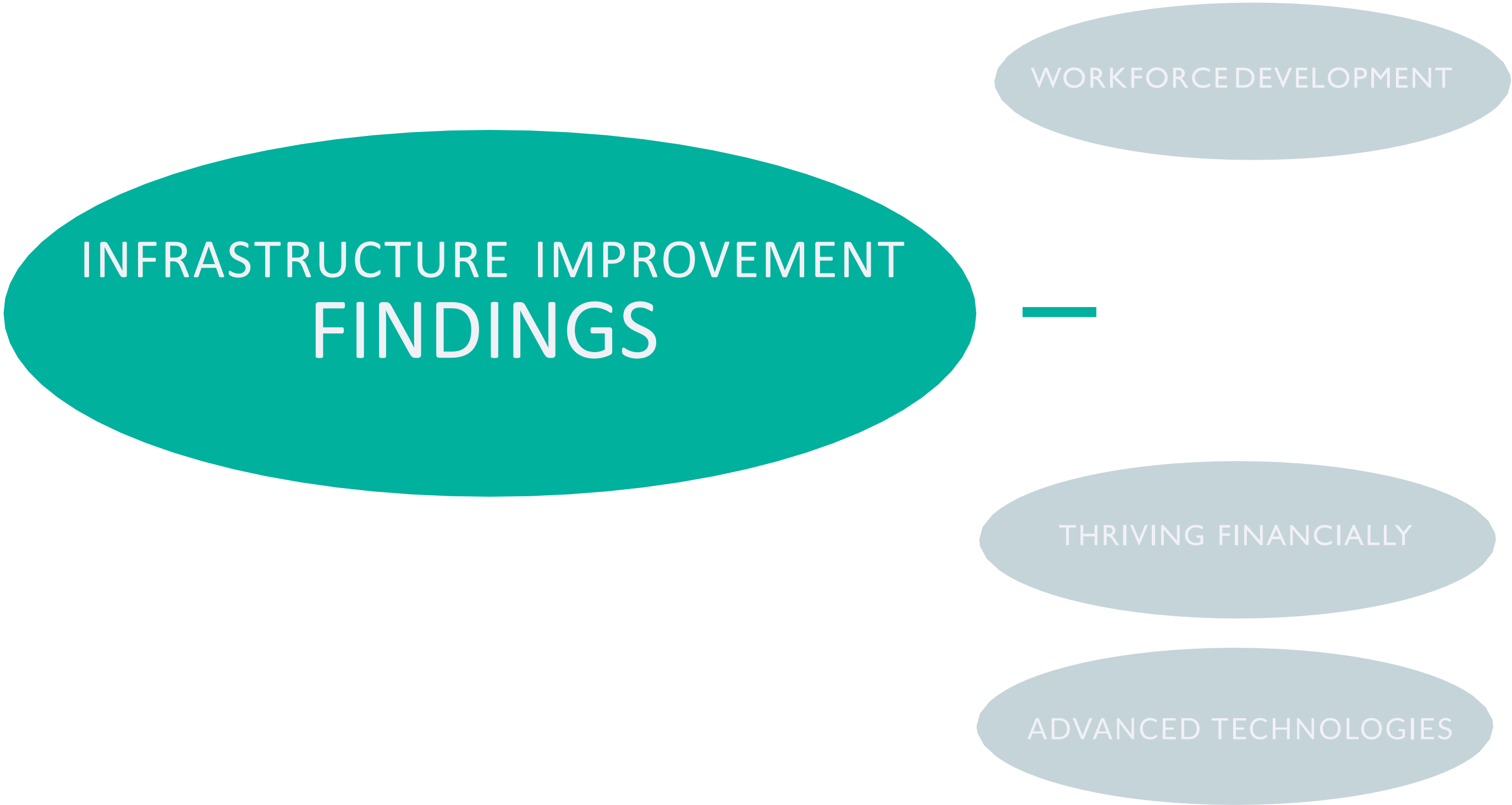
Workforce Assessment

- RPU has strong competency for today's needs
- Improved processes may require new skillsets
 - Changes in workforce make-up?
- Retiring employees
- Onboard/train incoming staff
- Continuous education

Workforce Assessment Summary

- Participate in Utility 2.0 development
- Provide continuous training
 - Water University (technical staff)
 - Soft skills development (supervisors, managers)
 - Technology utilization skills
- Increased CIP?
 - Reduce 20% vacancy rate

ROAD MAPS – INFRASTRUCTURE IMPROVEMENT - WATER

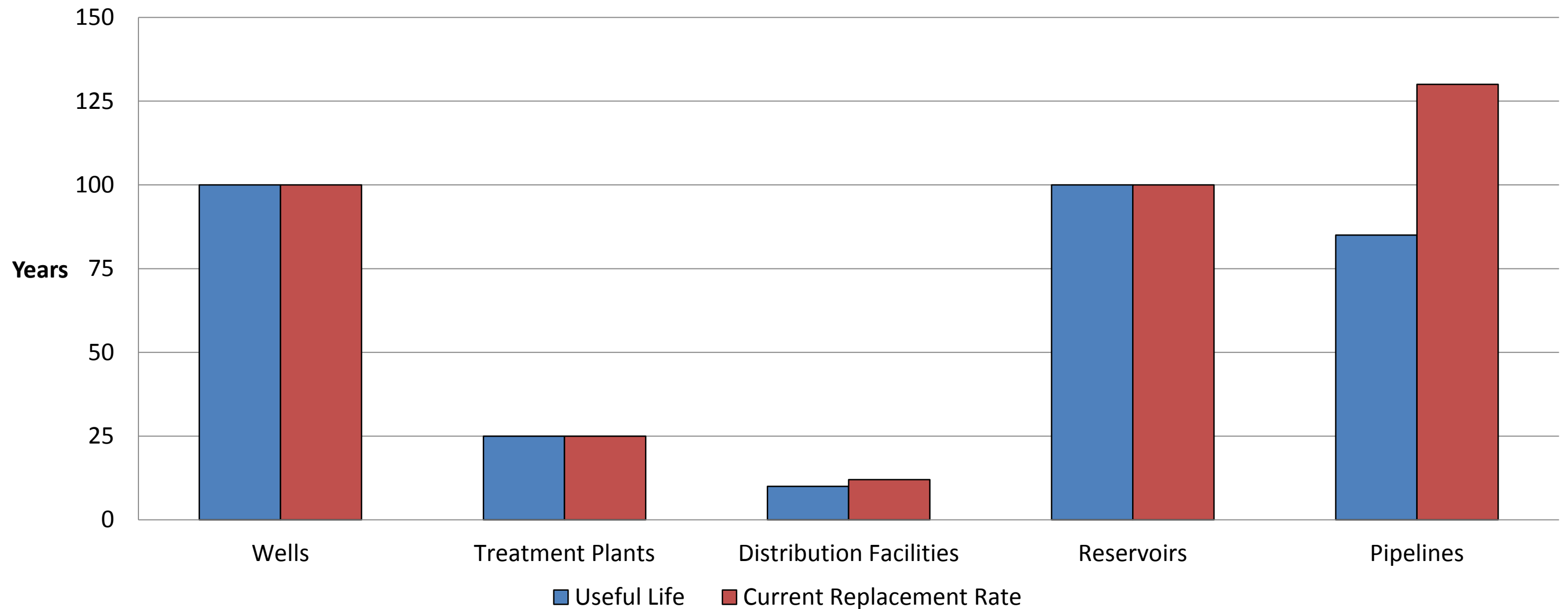


Infrastructure Assessment

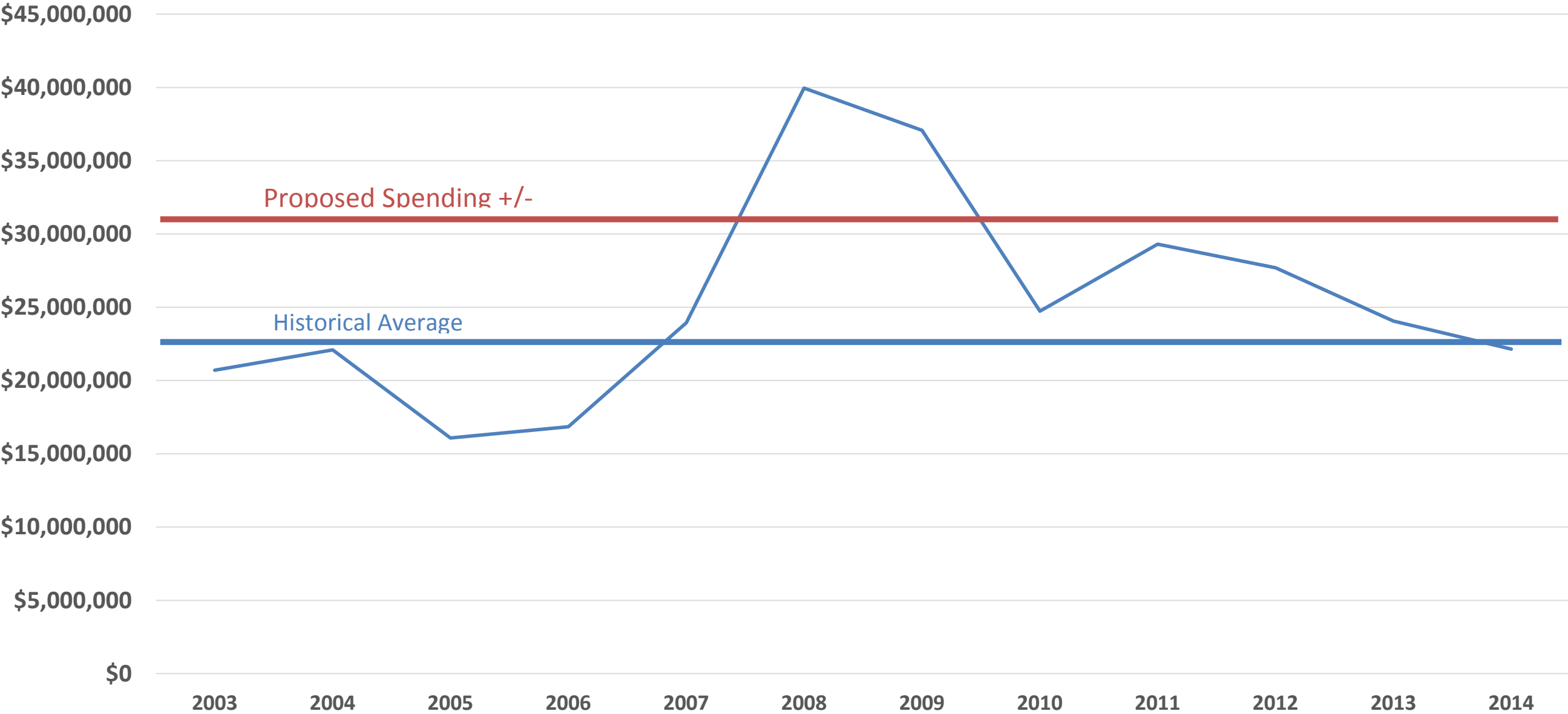
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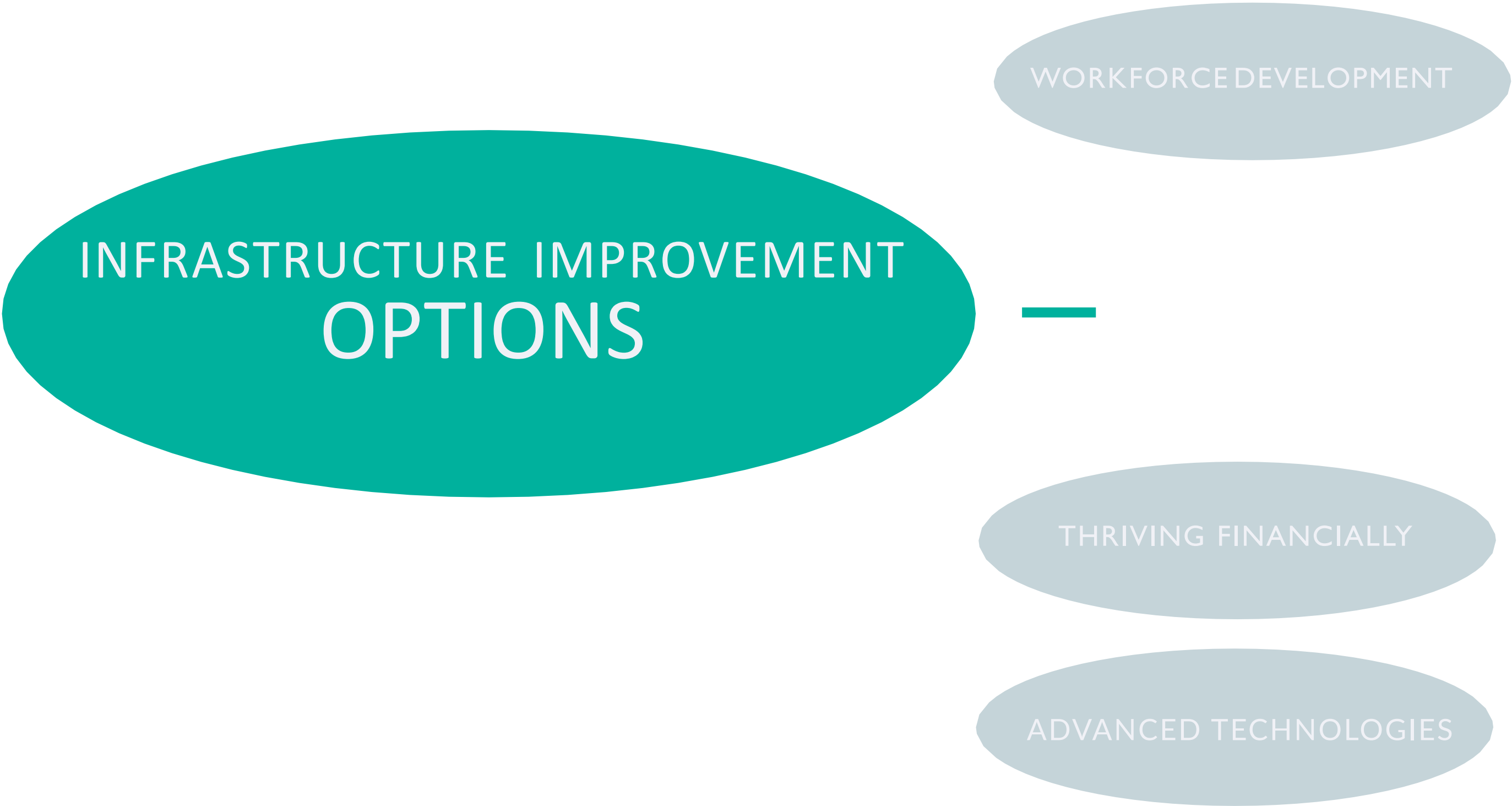
Useful Life vs. Replacement Rate



Historical and Proposed CIP Spending

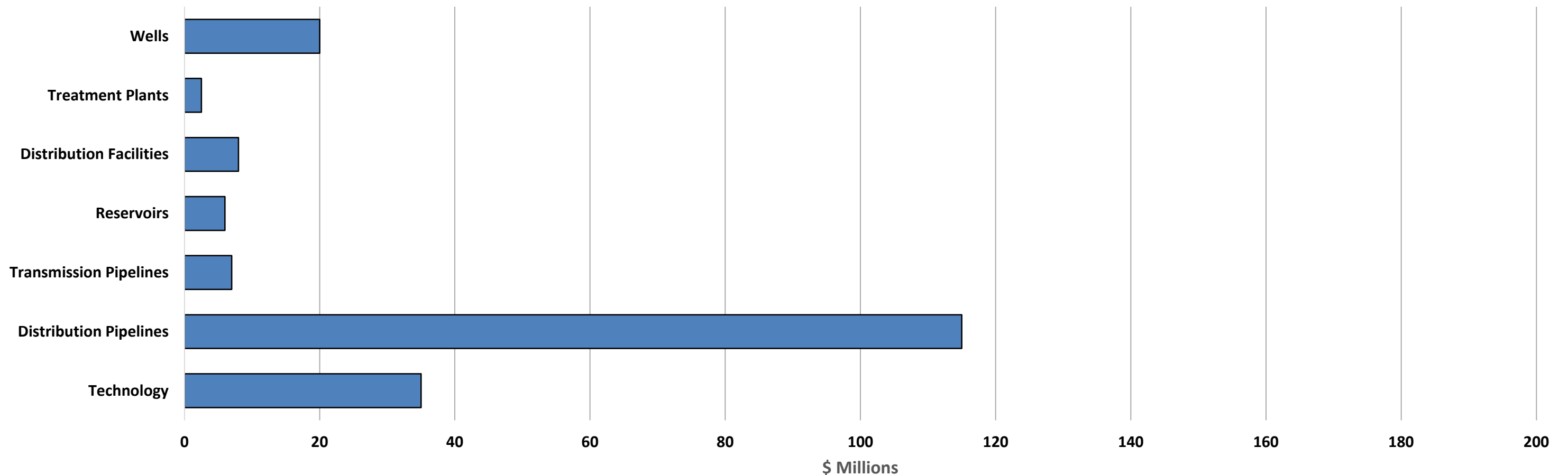


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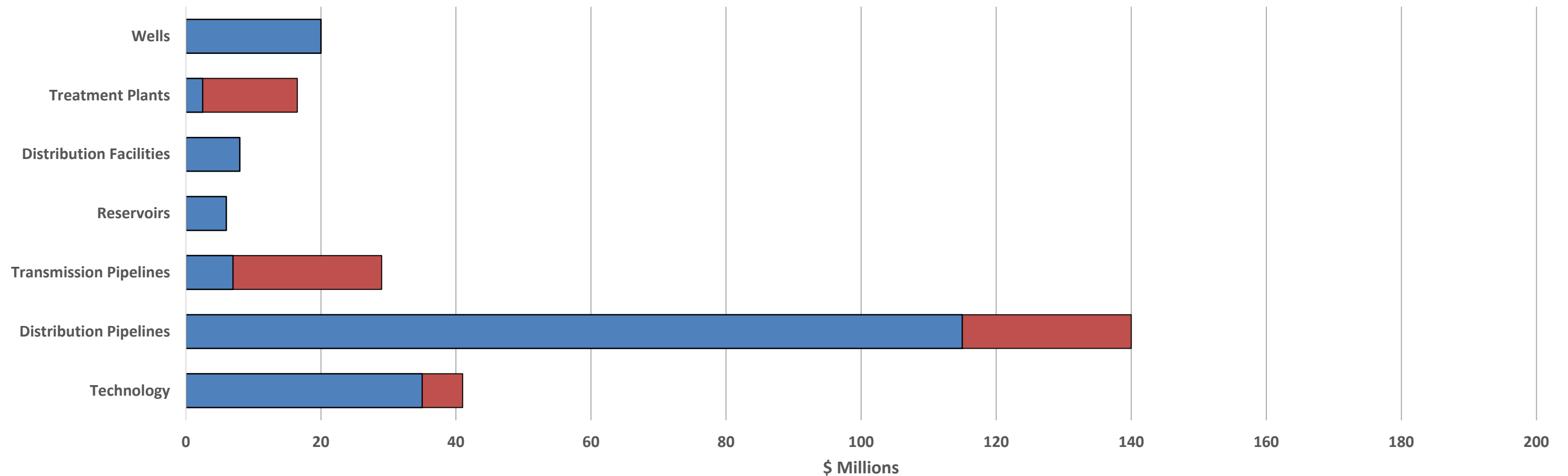
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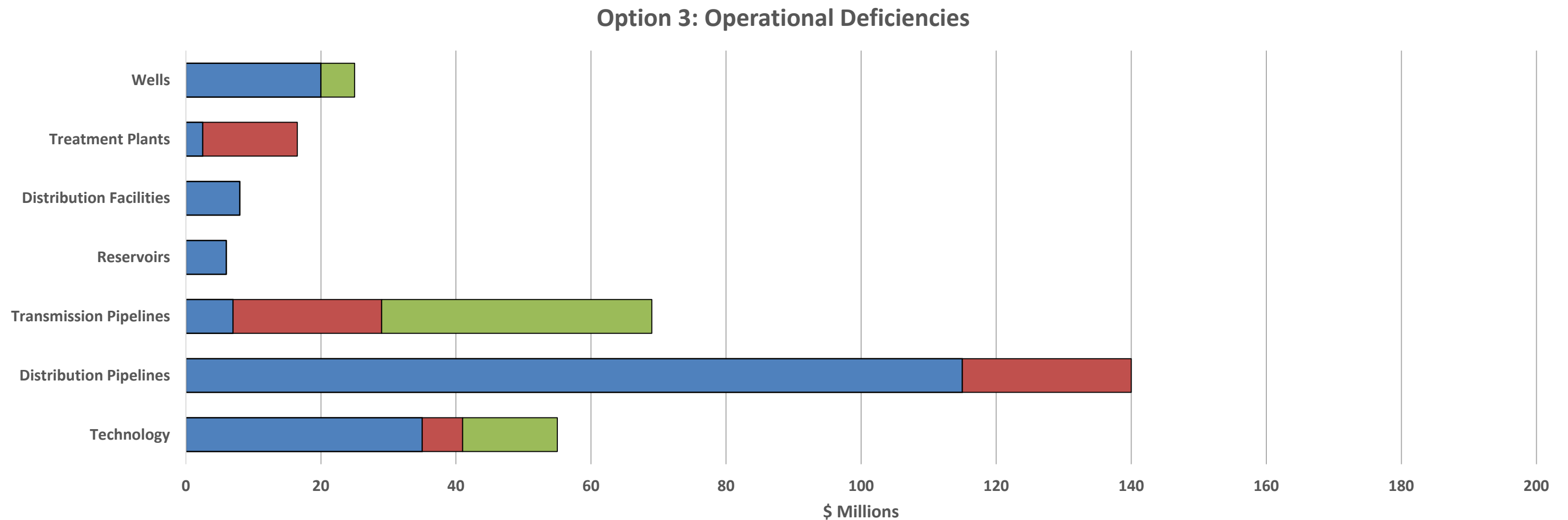
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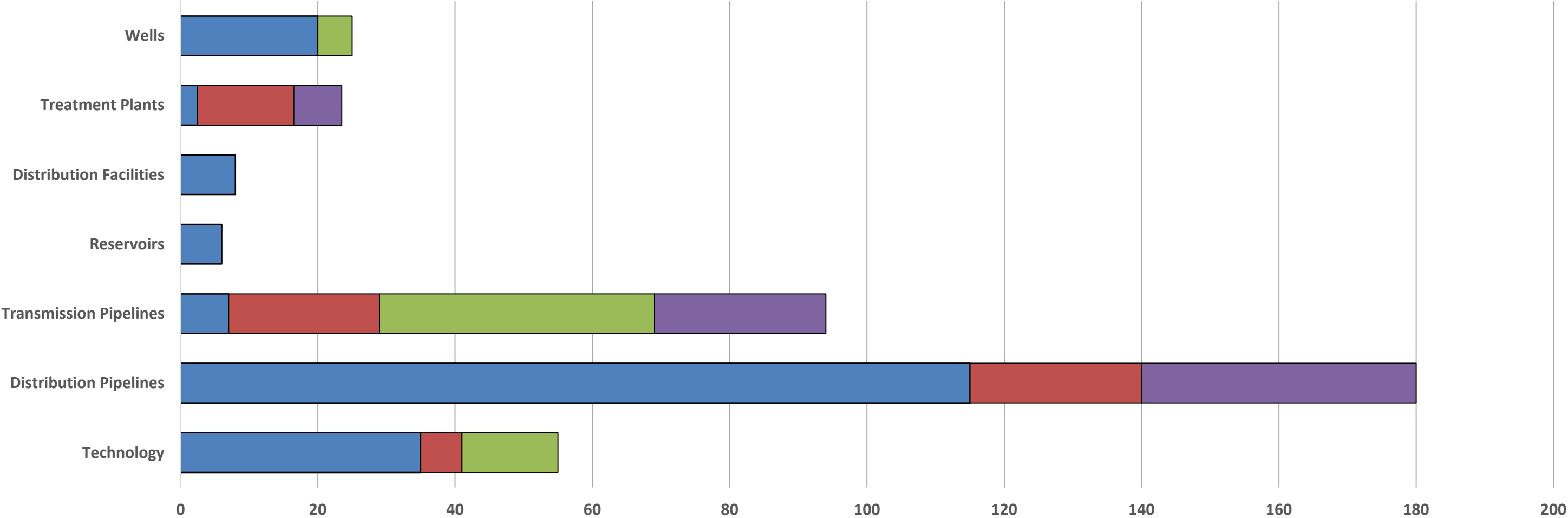
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Option 4: Aggressive Program

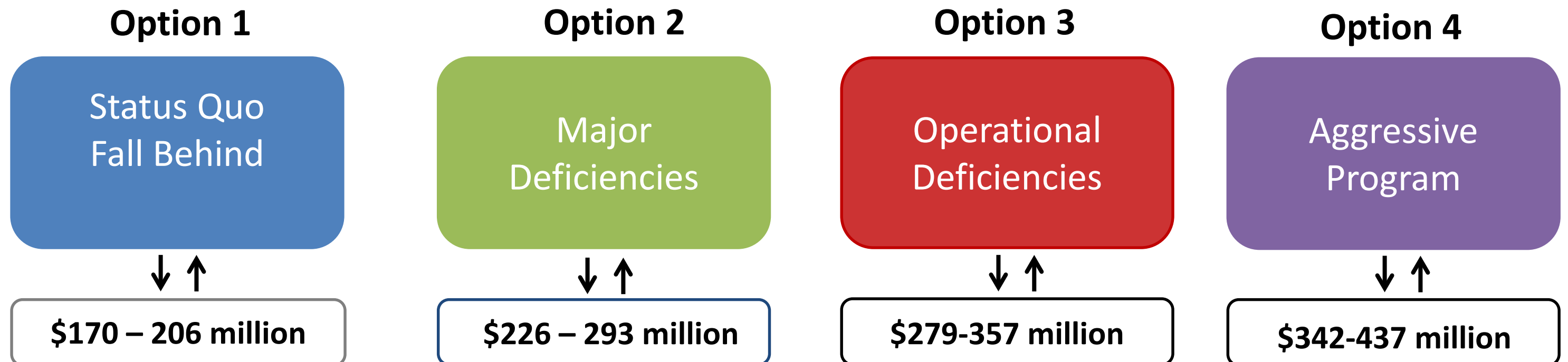


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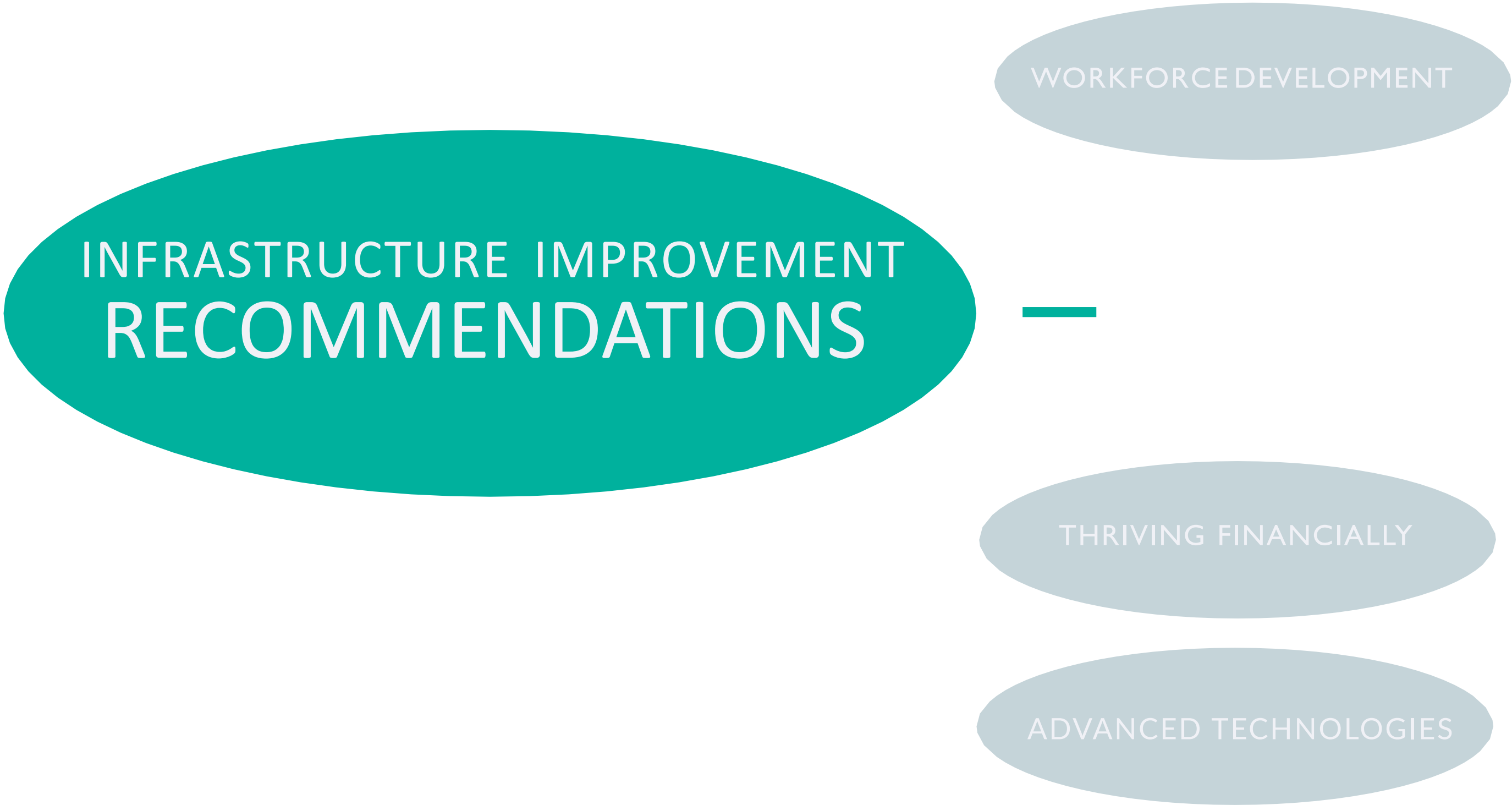
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Summary of Investment Options

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Sample Short-Term Recommendations – Year 1

Water Infrastructure	• Continue with current asset replacement program • Finalize plans and rollout timing of Recycled Water System • Rubber Dam EIR and permitting process
Technology Infrastructure	• Initial ODMS rollout • Initiate SCADA and communications upgrades • Input facilities into OWAM and begin automated capturing of field data • Refine and implement five dashboards
Workforce	• Assess personnel needs to implement Water Utility 2.0

Sample Mid-Term Recommendations – Years 2-5

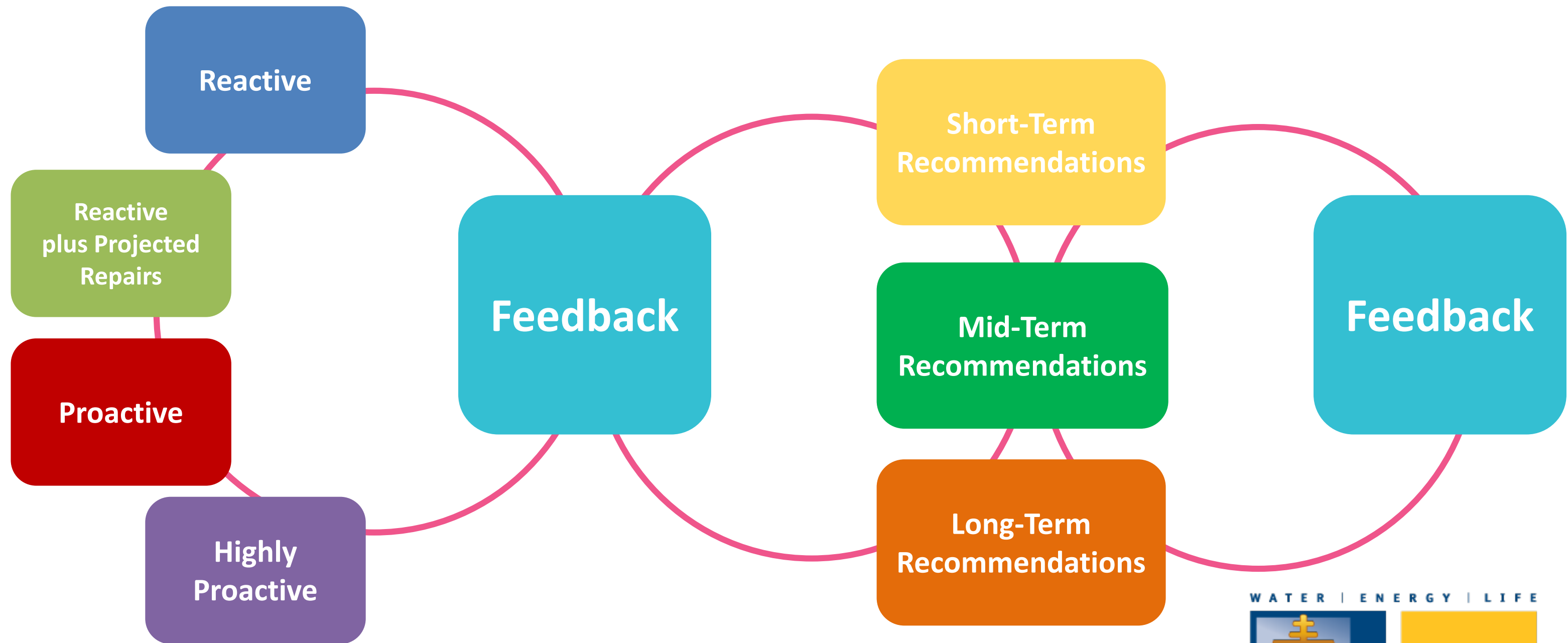
Water Infrastructure	• Identify and utilize advanced pipeline characterizations to refine replacement program • Replace and upsize Crosstown Feeder and Magnolia Main (Techite) • Complete phase I of recycled water program. • Complete Rubber Dam • Study and pilot test the North Waterman Treatment Plant
Technology Infrastructure	• Rollout AMR/AMI system • ODMS to interface with all major systems • Complete GIS and SCADA and communication upgrades • Fully implement automated field data gathering • Fully operational asset management system • Automate production/distribution system
Workforce	• Implement continuous technical, technological and soft skills training • Revise job classifications and employee allocations for Utility 2.0



Sample Long-Term Recommendations – Years 6-10

Water Infrastructure	• Reassess and refine asset management program for the next 10 year timeframe • Review/revise all planning studies
Technology Infrastructure	• Databases to become more connected • Prepare for Utility 3.0
Workforce	• Expand training provided to staff on advanced technology equipment and software

Options & Recommendations Decided from Feedback



Next Steps

- Incorporate Comments
- Formulate Detailed recommendations
- Review
- Report Back