



# Water Loss and Water Distribution System Replacement Prioritization

Lower Colorado Regional  
Water Planning Group Meeting

March 11, 2009



# Estimating Water Loss

Total Pumpage	Authorized Consumption	Billed	<ul style="list-style-type: none"> <li>▶ Metered</li> <li>▶ Unmetered</li> </ul>	Revenue Water
		Unbilled	<ul style="list-style-type: none"> <li>▶ Metered</li> <li>▶ Unmetered</li> </ul>	
	Unauthorized Consumption	Apparent Loss	<ul style="list-style-type: none"> <li>▶ Theft</li> <li>▶ Meter errors</li> <li>▶ Bill credits</li> </ul>	Non-Revenue Water
		Real Loss	<ul style="list-style-type: none"> <li>▶ Reported leaks</li> <li>▶ Unreported leaks</li> </ul>	



# Estimated FY07 AWU Water Loss (in billion gallons)

46.8 Billion Gallons	Authorized: 41.5	Billed: 41.3	▶ Metered: 41.3 ▶ Unmetered: 0.0
		Unbilled: 0.2	▶ Metered: 0.1 ▶ Unmetered: 0.1
	Unauthorized: 5.3	Apparent Loss: 1.7	▶ Theft: .12 ▶ Meter errors: 1.55 ▶ Bill credits: 0.05
		Real Loss: 3.6	▶ Reported leaks: 0.7 ▶ Unreported leaks: 2.9



# Improving Water Accountability

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- ▶ Increase data reliability
  - ▶ Meter accuracy testing
  - ▶ Consistent, accurate loss estimates
  - ▶ Improve departmental reporting or use meters
  
- ▶ Improve response to leaks
  - ▶ Address water leaks promptly
  - ▶ Encourage leak/waste reporting



# How Does Austin Stack Up?

- ▶ AWU has improved since FY05
  - ▶ Better water loss calculation methodology
  - ▶ Improved data collection
  - ▶ Improved leak detection & repair
- ▶ Infrastructure Leakage Index (ILI)
  - ▶ Better than percentages to compare between utilities, national benchmark
  - ▶ AWWA recommends 1 to 3 as best range
- ▶ AWU FY05 ILI: 3.96
- ▶ AWU FY07 ILI: 2.62



# What is AWU Doing?

- ▶ Implementing annual loss calculations
- ▶ Improving leak response times
- ▶ Large meter testing contracts
- ▶ Leak detection contracts
- ▶ Water Accountability steering committee
  - ▶ Leak detection & response subcommittee
  - ▶ Meter & billing subcommittee
  - ▶ Water audit reporting subcommittee
- ▶ Water Distribution Main Replacements



# Goals of Water Distribution Replacement Prioritization

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- Reinvest in drinking water infrastructure
- Reduce water loss
- Reduce AWU's annual maintenance costs by eliminating lines with history of breaks
- Eliminate liability of older lines with higher probability of failures
- Begin initiative to employ trenchless technology for transmission and distribution lines
- Maximize performance of distribution system within budget

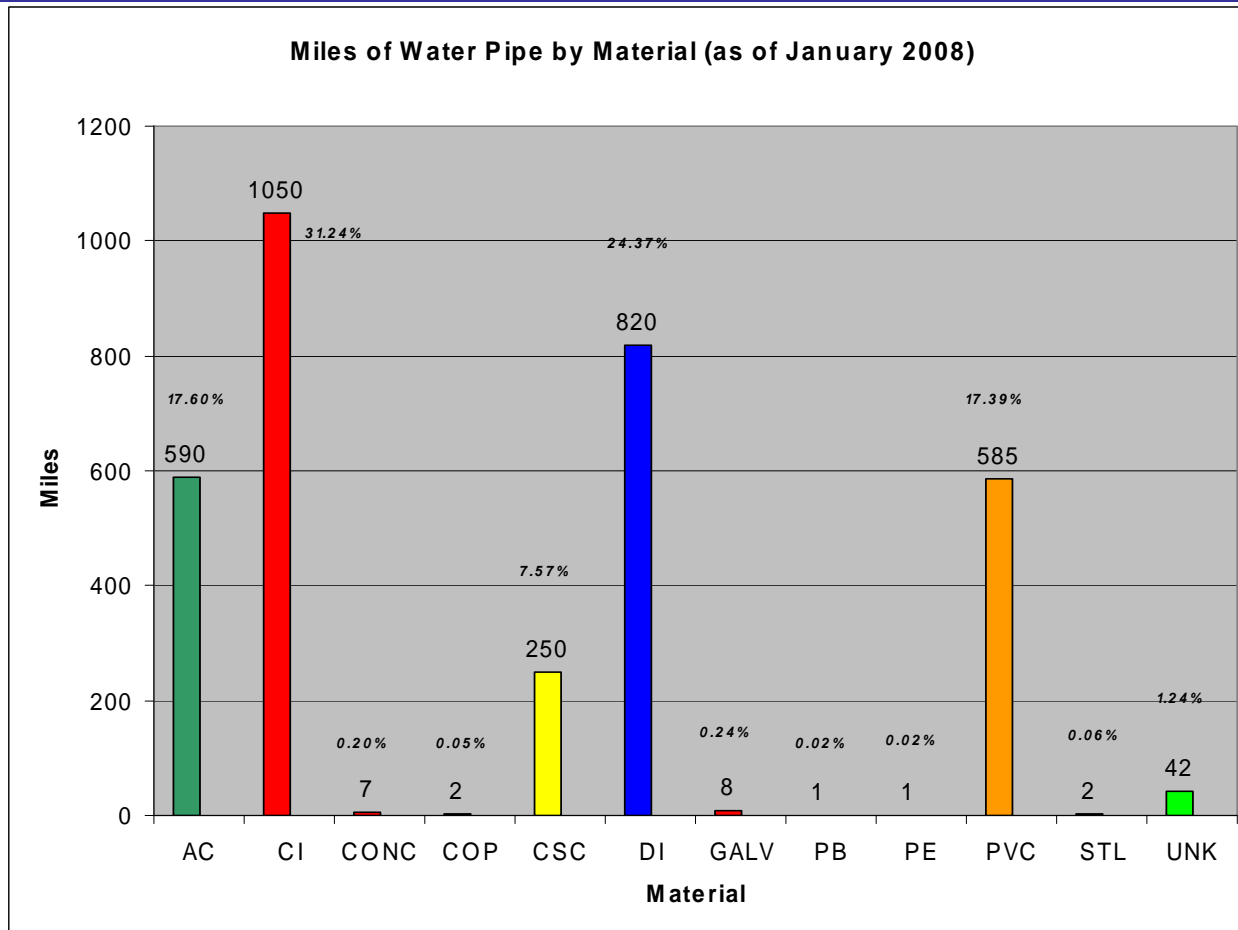


# Objectives

- Prioritize small diameter water line replacement projects
  - Develop an objective and reproducible approach for prioritization
  - Prepare replacement cost estimates
  - Recommend 5-Year CIP Projects



# Pipe Statistics



Total Length: 3,600 miles

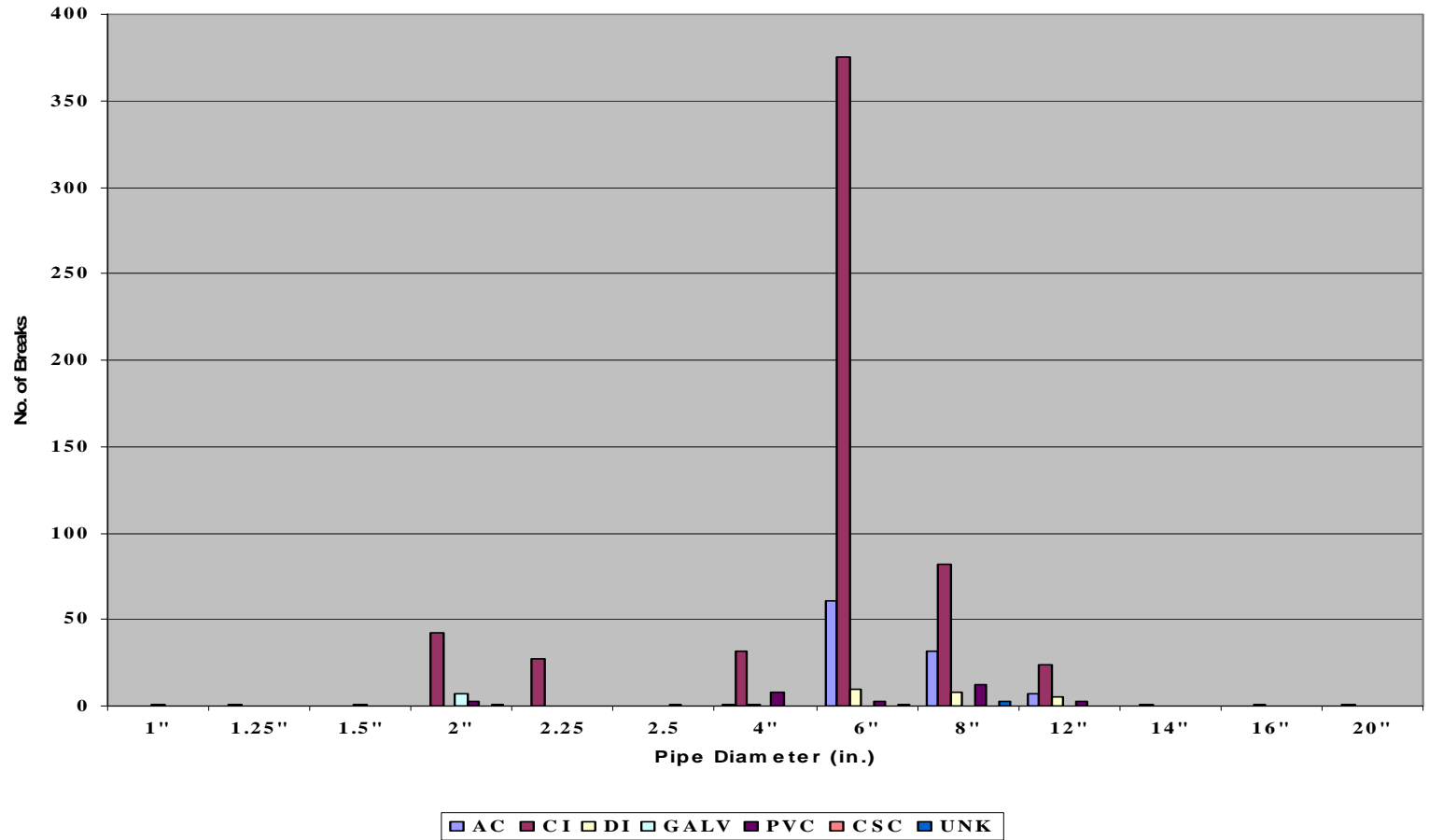
Transmission (16" and greater): 600 miles

Distribution (less than 16"): 3000 miles



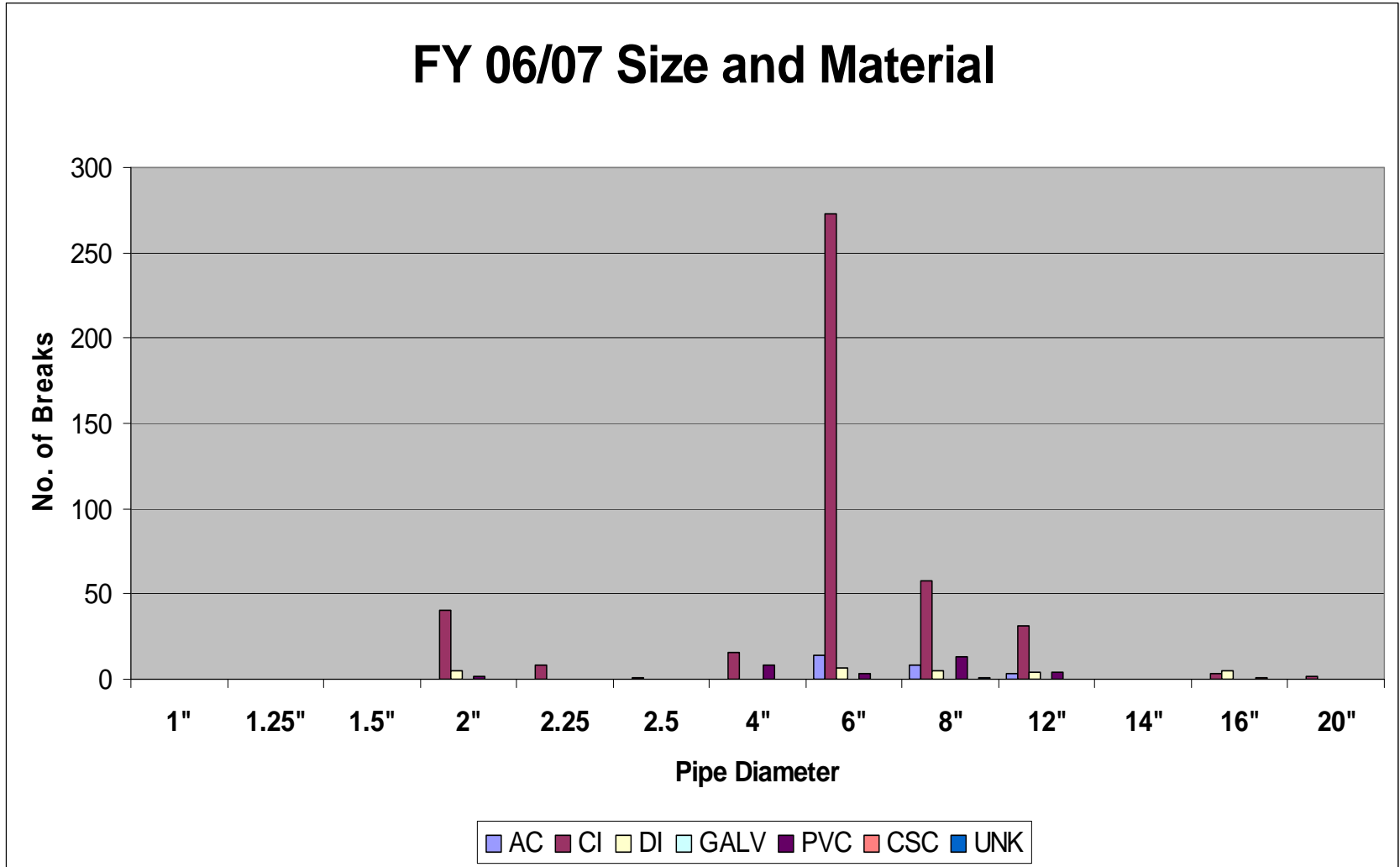
# Water Line Breaks

**FY 2005-2006 by Size and Material**



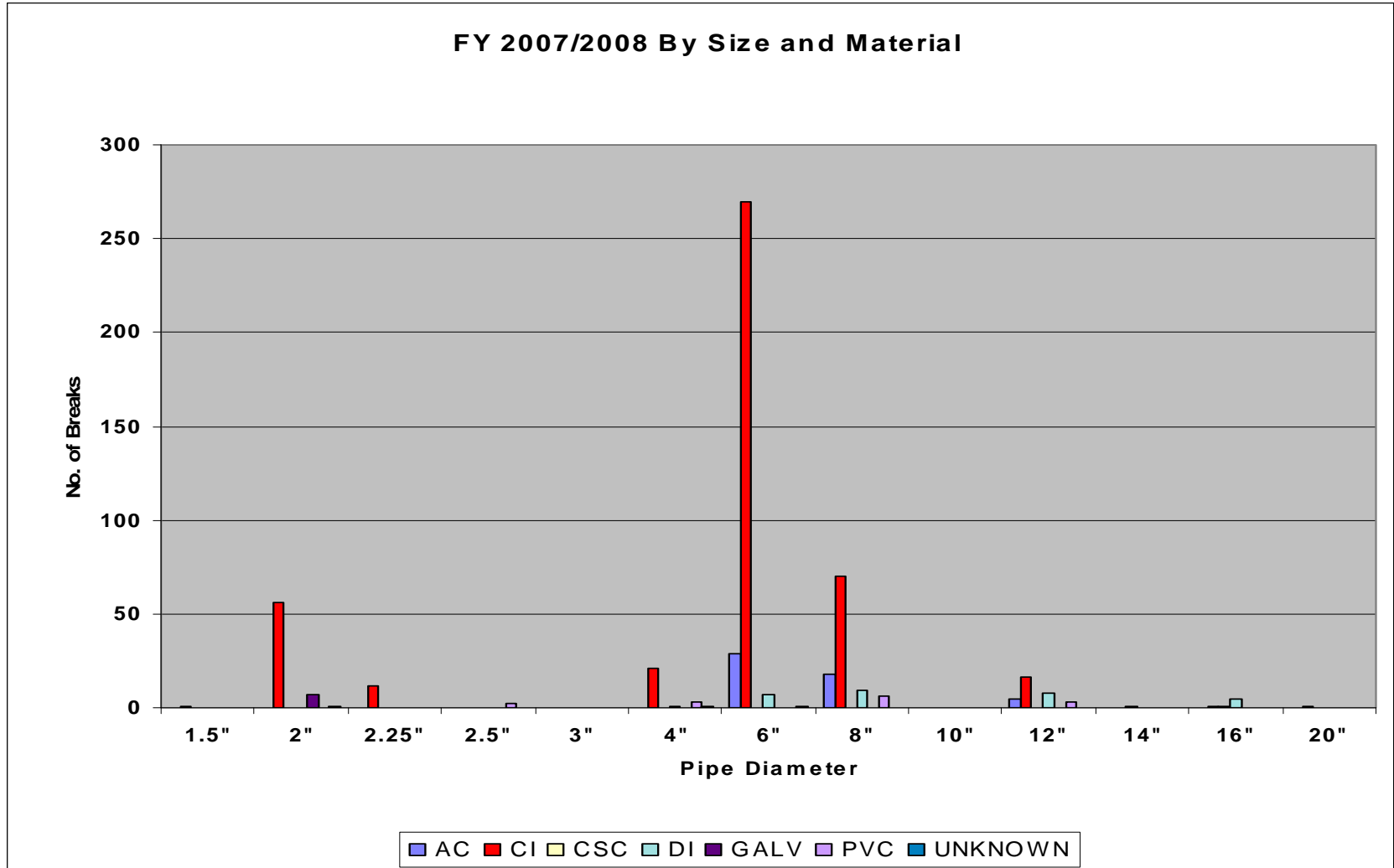


# Water Line Breaks





# Water Line Breaks





# Investment Challenge

## How much should we invest to adequately maintain the existing distribution system?

- Conservative assumption: Every water main will last 100 years
- At a 100 year replacement rate, you need to replace 1% of your system each year.
- At 3,600 miles of pipe, a 1% replacement rate is 36 miles of pipe.
- Each FOOT of main replacement costs approximately \$300 so a modest 1% replacement goal equals nearly \$57M of annual cost



# Prioritization Criteria

- Pipe Material
- Pipe Size
- Total number of breaks per study area
- Total length of deteriorated pipe per study area
- Total number of breaks per acre
- Total length of deteriorated pipe per acre

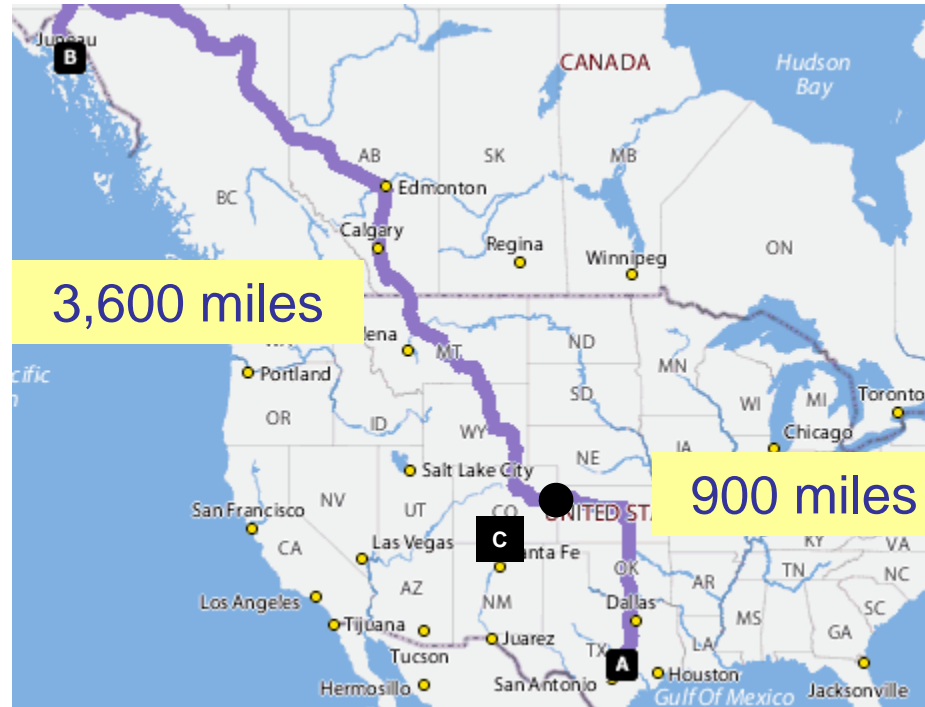
## Other Possible Considerations

- Age of Pipe
- Number of customers in area or per acre
- Total annual usage in area or per acre

Deteriorated Lines are defined as any pipe with a diameter 6-inches or less, is not DI or PVC, is in service and is maintained by City of Austin



# Length Comparisons

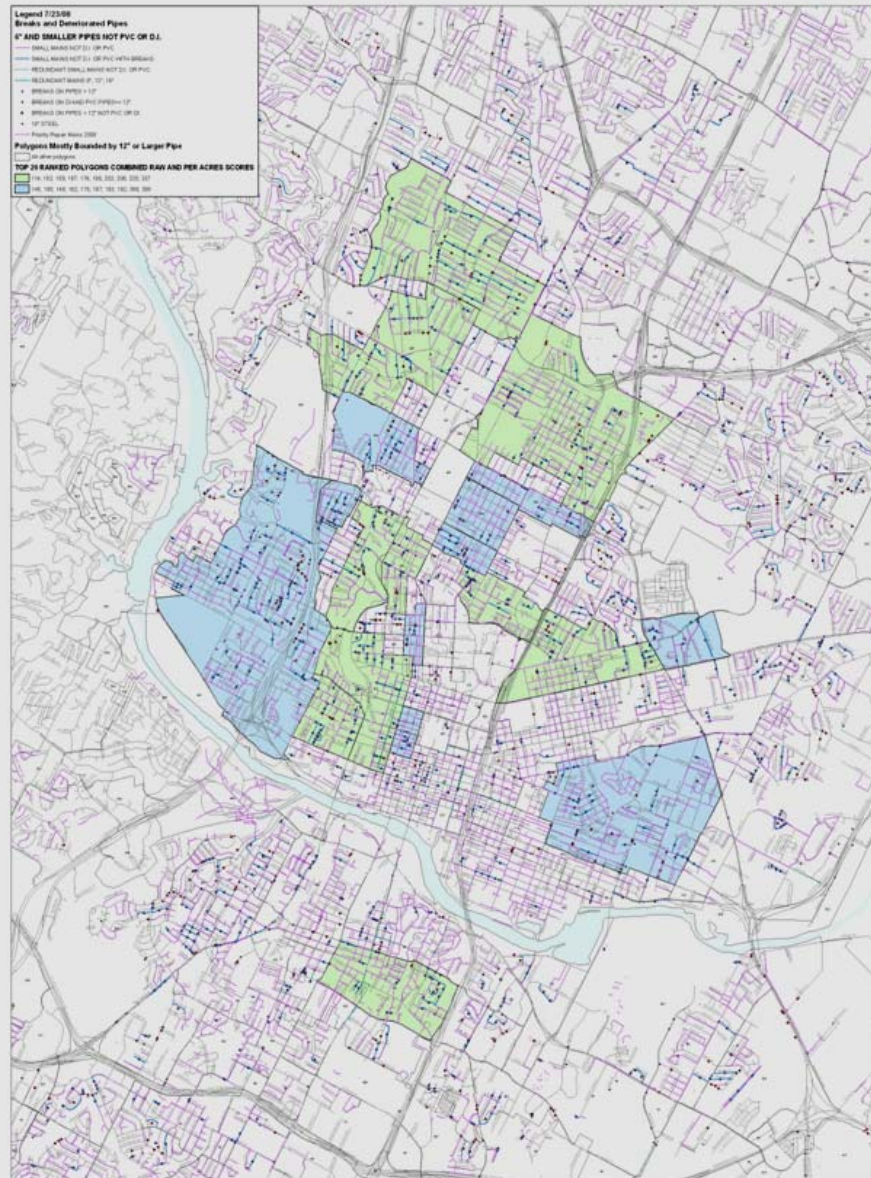


- Total water main length same distance as from Austin to Juneau, Alaska (A to B)
- Deteriorated facilities length Austin to Burlington, Colorado (A to C)

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# Top 20 Identified Areas



March 2009



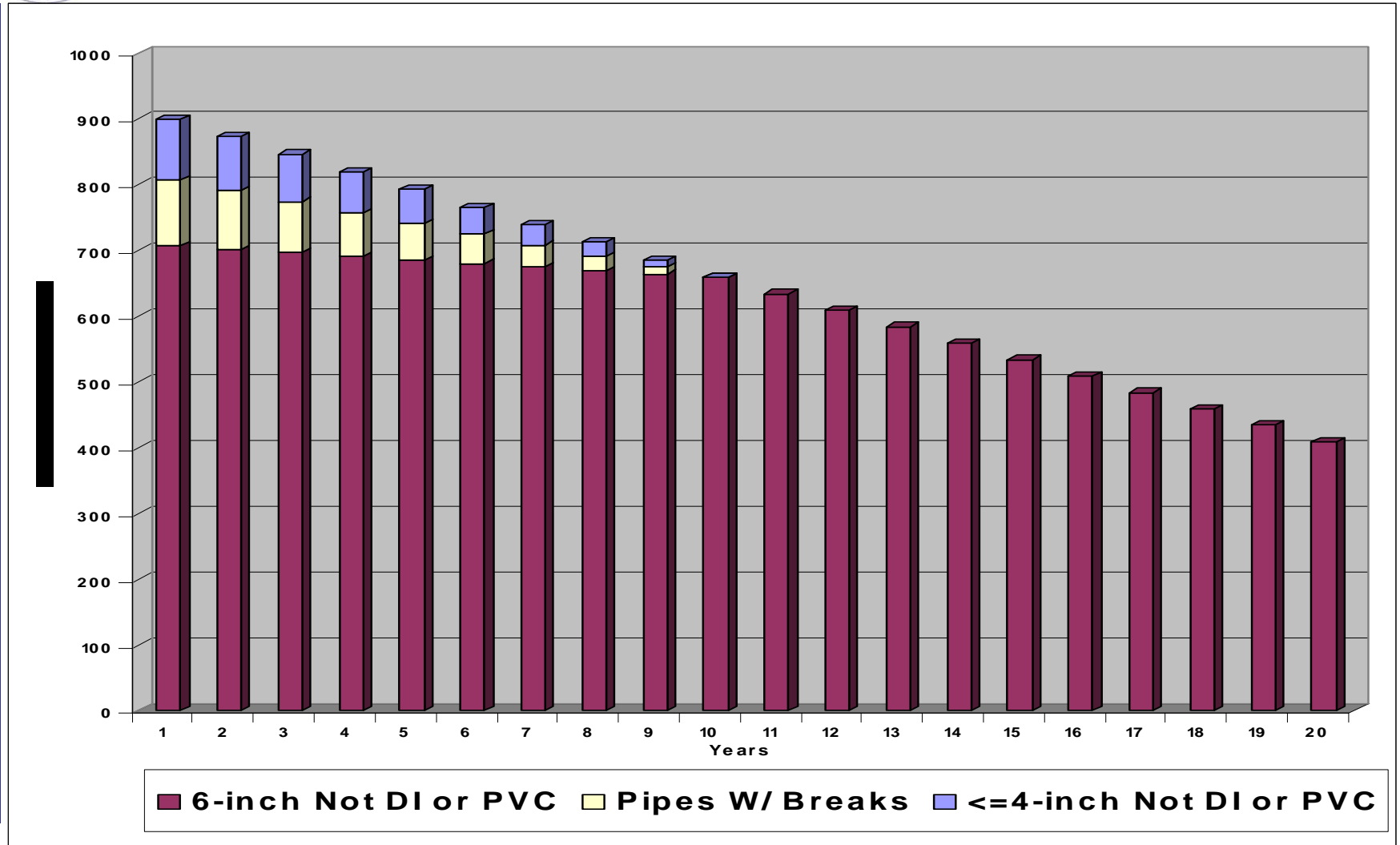


# Water System Improvement Planning

- Total length of lines in the system = 3,600 miles
- Total length of lines for deteriorated lines = 900 miles
  - Total length of high priority deteriorated Lines = 250 miles
    - Total length in high City Council priority areas = 36.5 miles
      - Total length of lines in UNO = 6.5 miles
      - Total length of lines in CBD = 22 miles
      - Total length of lines in Lamar TOD = 3.5 miles
      - Total length of lines in Plaza Saltillo TOD = 3.5 miles
      - Total length of lines in MLK TOD = 1.0 miles

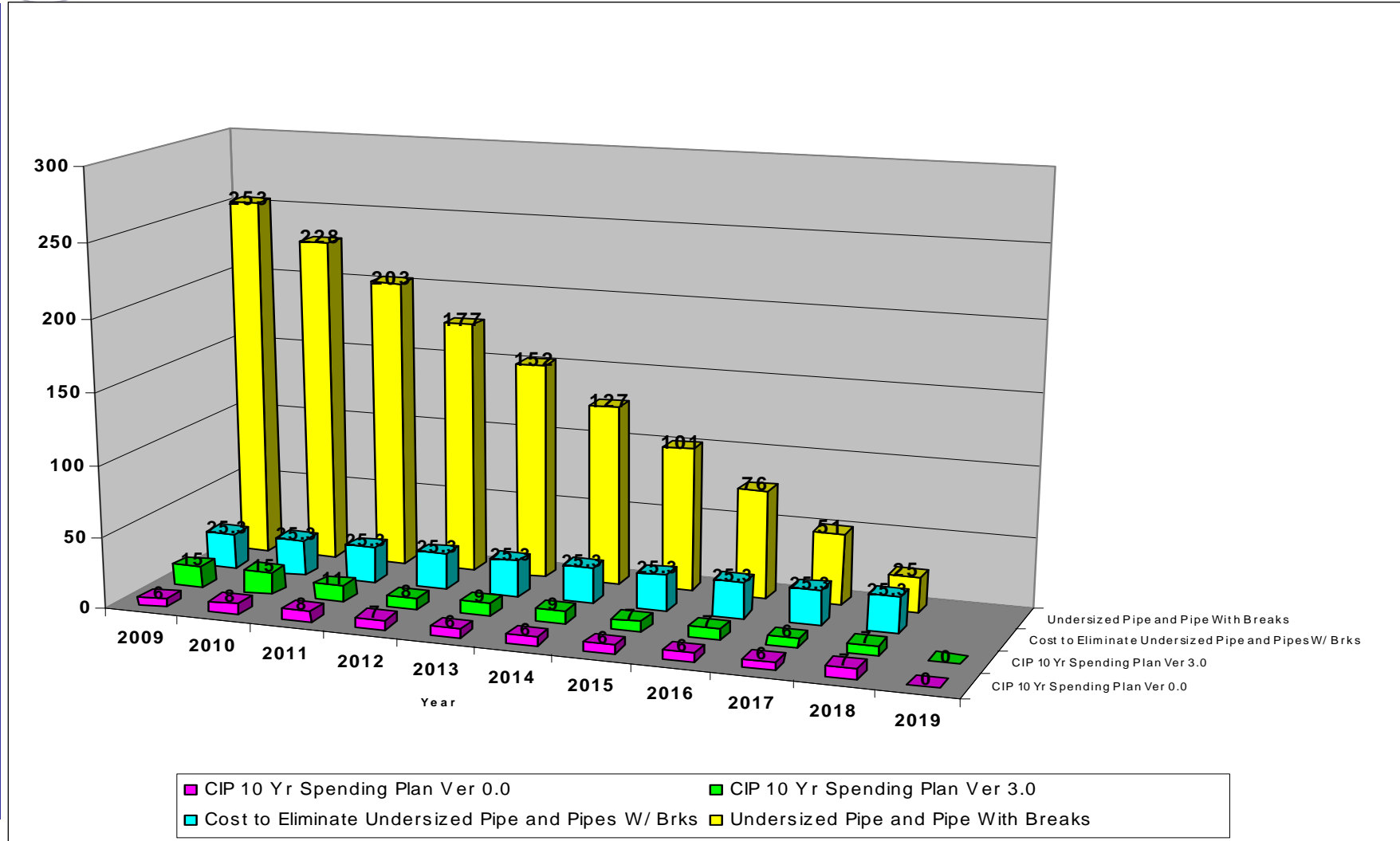


# Proposed Reduction of Deteriorated Pipe



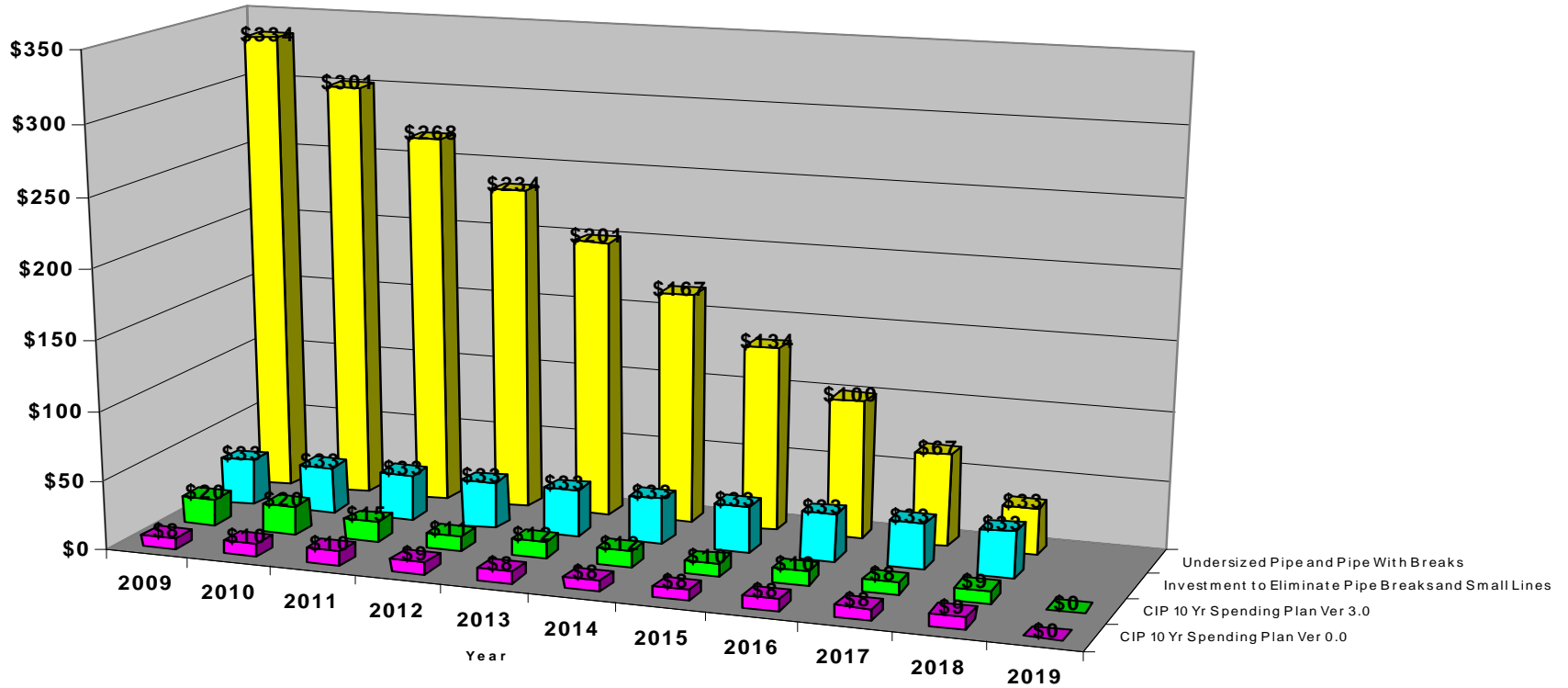


# High Priority Deteriorated Pipe



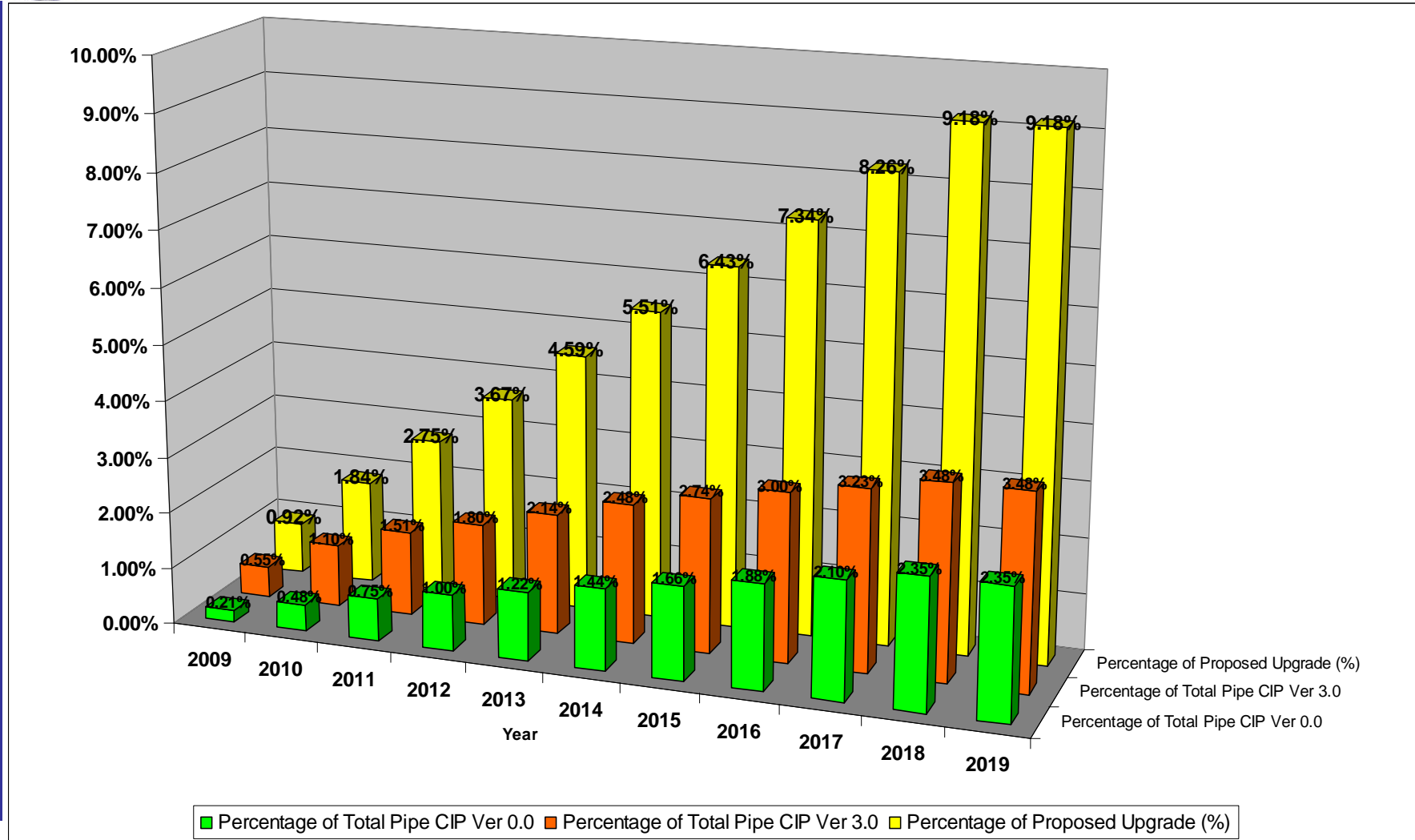


# High Priority Deteriorated Pipe Replacement Cost





# Percentage of Existing Pipe Replaced (12-inch and Smaller)





# Funding For Current Initiatives

Based on Proposed CIP Spending 2010-2019

➤ UNO Deteriorated Facilities	\$14.3M
➤ CBD Deteriorated Facilities	\$16.6M
➤ TOD's Deteriorated Facilities	\$15.0M
➤ System Wide Deteriorated Facilities	\$36.5M



# Pipeline Operations Improvements

Process Improvements have been focused on reducing time to respond and complete repairs.

- Response Time: Two Kaizen Events
  - Priority 1 Leak Response Time
  - Work Order Initiation to Scheduling of Repair
- Repair Completion Time:
  - Improved from 56% to 86% of completing all repairs in 7 days or less.