

Lincoln Water System Facilities Master Plan Update

by Black & Veatch / Olsson Assoc

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Nick McElvain, PE

Project Manager

Facilities Master Plan

- Update required every 5 years by Bond Covenants
- Focus on Distribution System
- Plan for growth of community
- Look for deficiencies in existing system
- Involvement of Planning, Wastewater, Watershed Mgt, Engineering Services, County Engineer

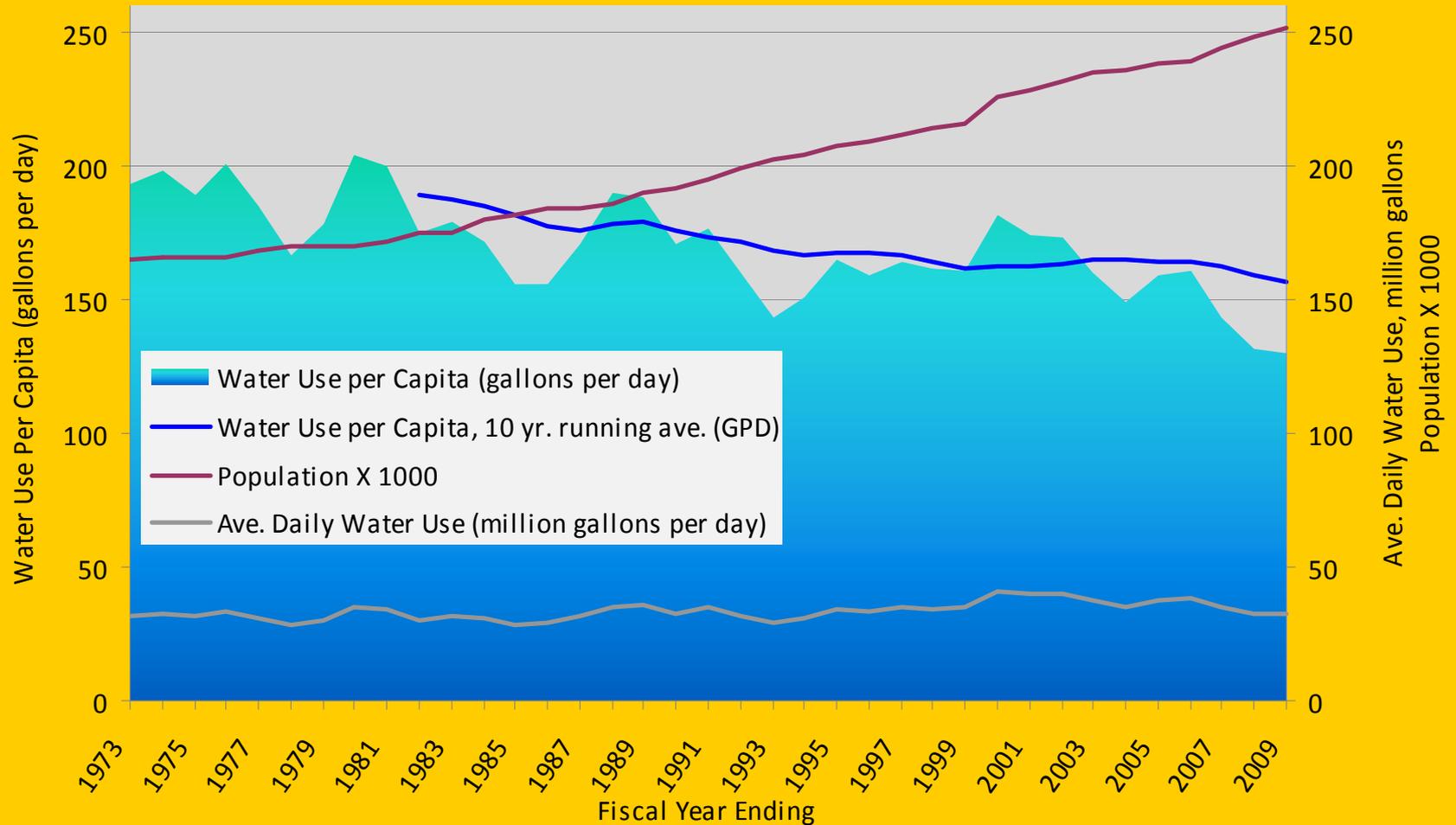
Study Area and Population Projections

- Long-term Plan looked at major transmission and distribution concepts for 50 Years - 2057
- Phased Improvement Plan developed for first 25 years
- More land available in Tier I than is required for the projected population in 25 years
- Results in potential higher CIP costs to provide service to growth areas & necessary information to evaluate options in Comp Plan

Water Demand Projections

- Water demands projections from the 2002 Facilities Master Plan.
- Those design criteria were used for this 2007 Update with minor adjustments based on recent usage data.
- 20 year downward trend in per person usage.

City of Lincoln Water Use Trends



Risk Analysis

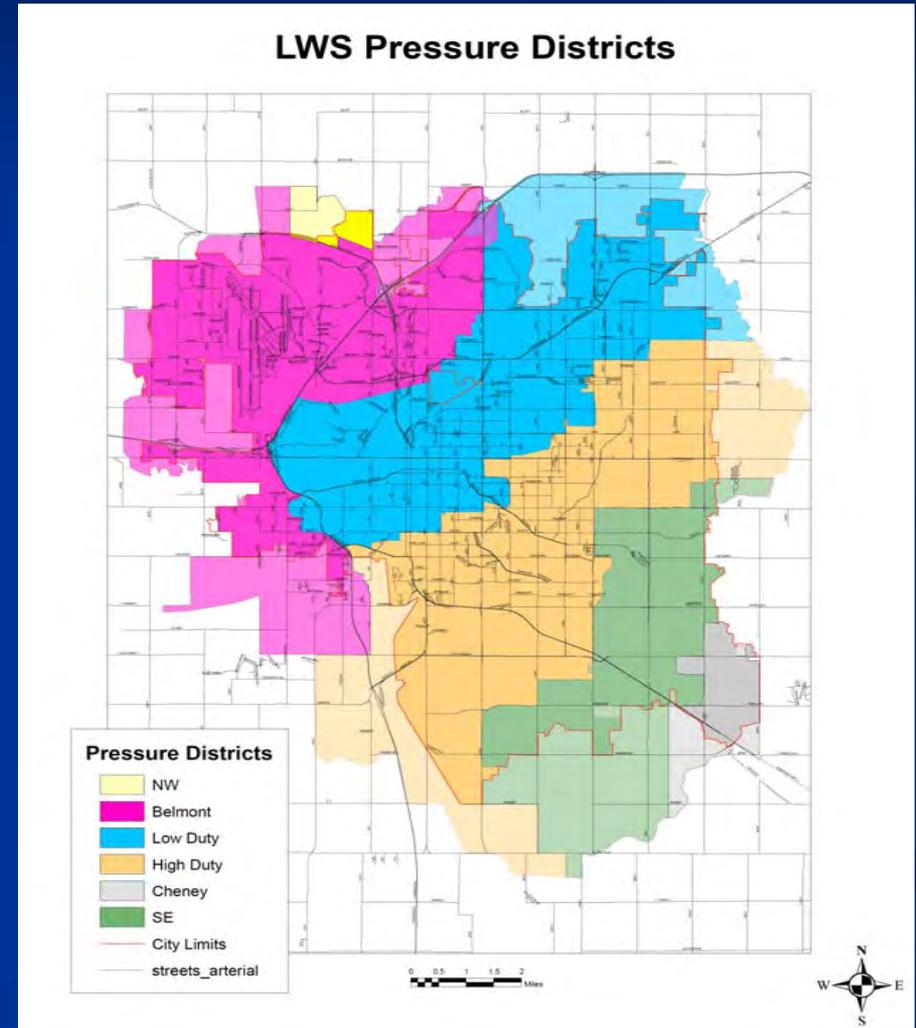
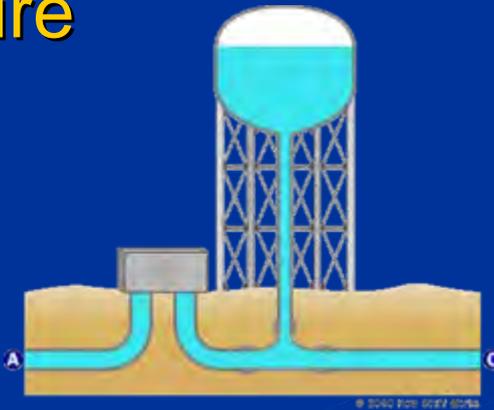
- Design for Potential Shortage Once Every 12 Years
- “...developing or affording water systems capable of fully supplying demands during a serious dry year conditions may be unrealistic.”
 - AWWA – Drought Management Handbook; Copyright – 2002
- LWS’s Water Management Plan Addresses How to Manage Shortages

Hydraulic Model and Analyses

- Computer model of nearly 10,000 pipes
- Evaluated system performance under various emergency conditions, equipment failures, etc
- Fire flow analyses
- Water age analysis for operations, as well as improvement needs
- Results:
 - Pipe sizes & locations for future growth
 - Identifies deficiencies in existing system

Pressure Districts

- o Ground Elevations from Lowest to Highest is Almost 300 Feet – 1150 to 1440
- o 100 Feet of Water Depth is 43 PSI Pressure



Water System Demands

All Numbers Shown are MGD (Million Gallons per Day)

o Average Day

- o Historical Peak 41.2
- o 2032 Design Year 57.3

o Maximum Day

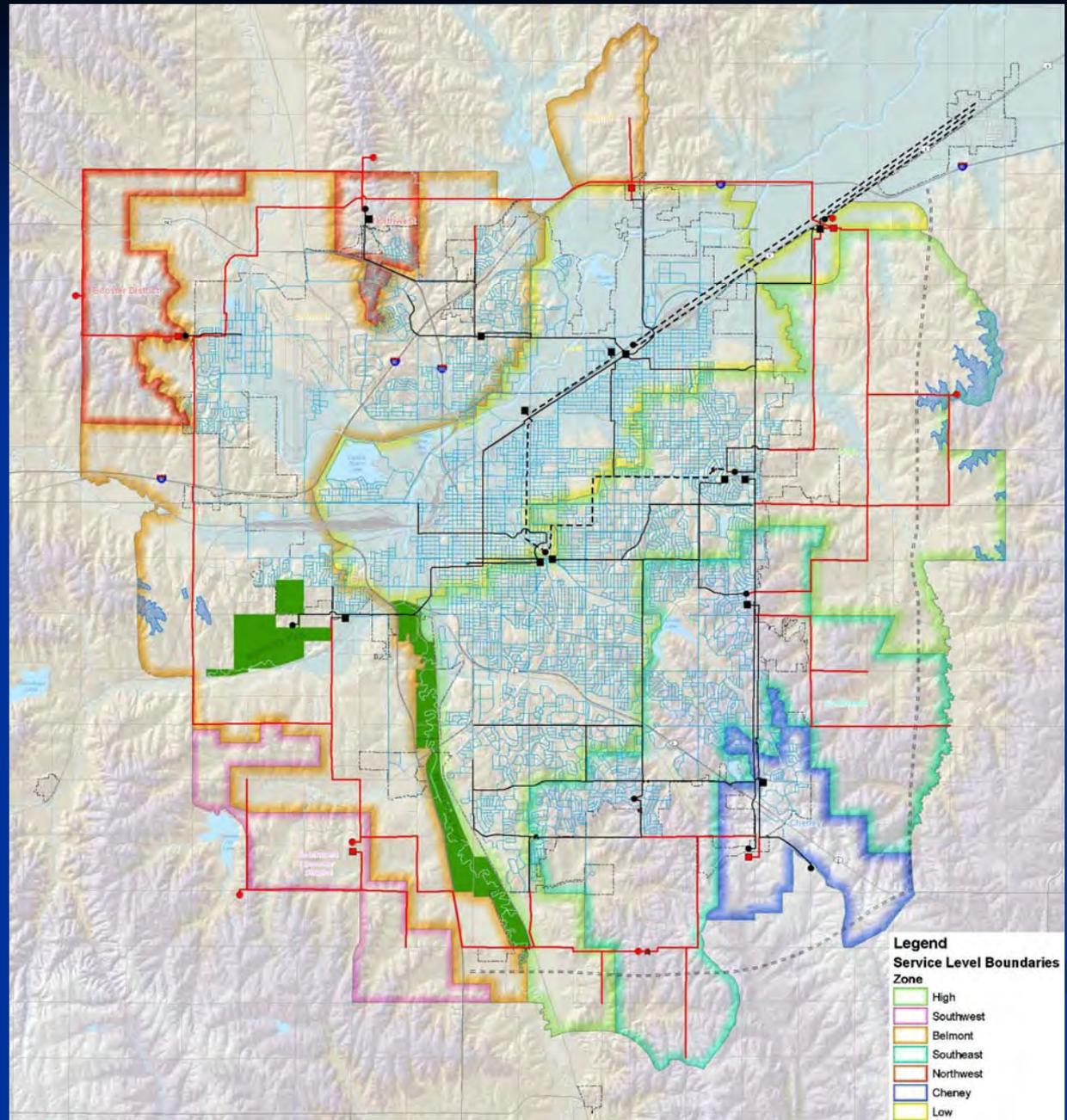
- o Capacity 100
- o Historical Peak 90.4
- o 2032 Design Year 154.7

o Maximum Hour

- o Capacity 180
- o Historical Peak 151.6
- o 2032 Design Year 252.0



Long Range Plan



Cost of Growth

Distribution Improvements Only

- Phase I & II \$67 Million
 - Phase III \$66 Million
 - Tier I Total - \$133 Million
-
- Phase I – Immediate Improvements
 - Phase II – Short-term Improvements -12 year plan
 - Phase III – Mid-term Improvements - 25 year plan
 - Long-term Improvements - After 2032.

**Table 8-5
Summary Recommended Improvements**

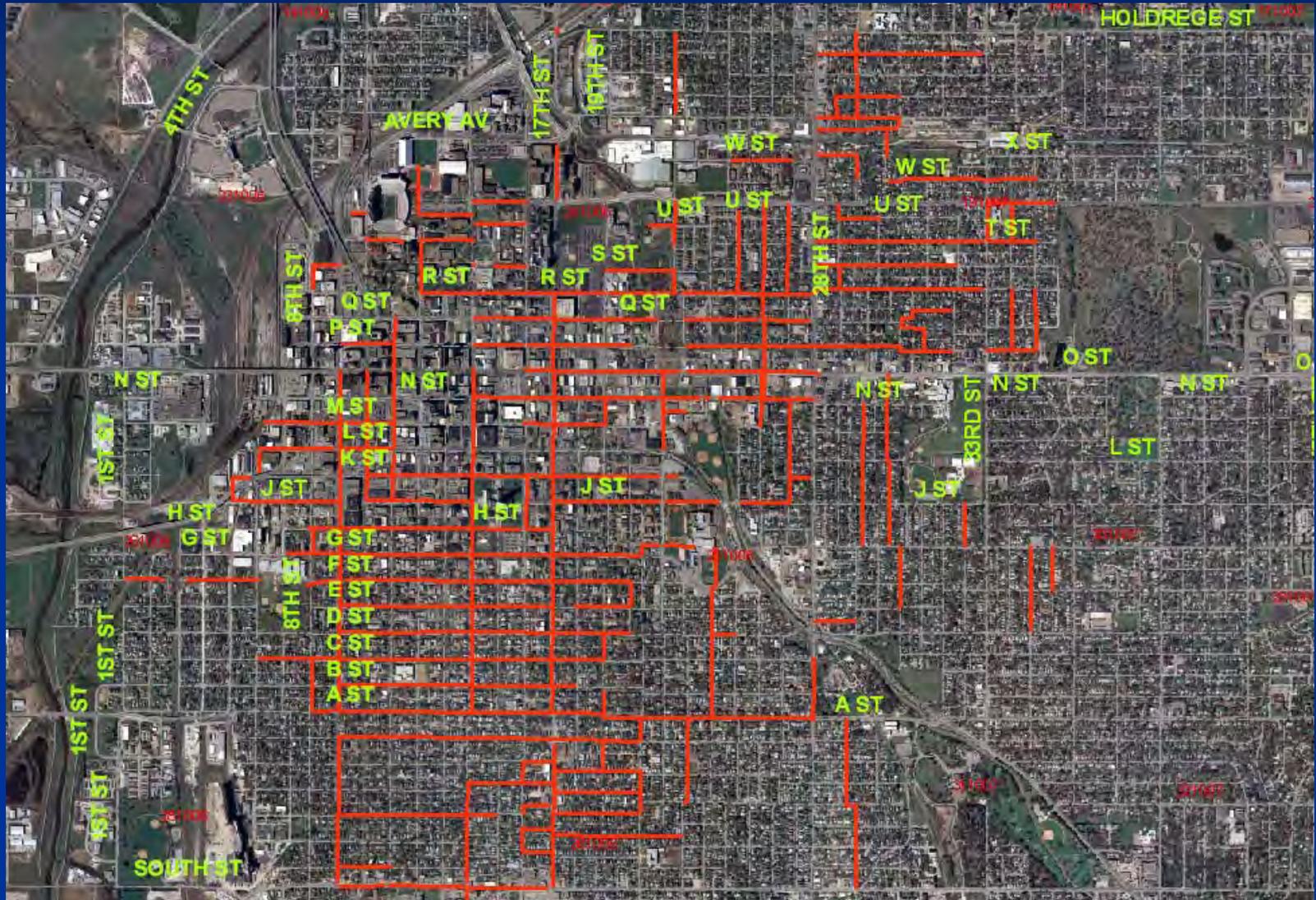
Description	Project Cost by Phase		
	Phase I Immediate Improvements	Phase II Short-term By Year 2019	Phase III Mid-term By Year 2032
Fire Flow Improvements (see table 8-1)	\$460,000		
3.6 mgd Booster Pumping Station at I-80 west of N. 56 th St ⁽³⁾	\$1,290,000		
Control Valve in Pioneers Pumping Station	\$50,000		
All Phase I Main Extensions	\$11,010,000		
New 20 mgd pump at Vine PS to Southeast SL		\$1,000,000	
New 10 mgd "A" Satellite Pumping Station to Low SL		\$2,300,000	
New 20 mgd WTP High Service Pump No. 13		\$1,000,000	
Pressure Monitoring Stations		\$100,000	
All Phase II Main Extensions		\$49,800,000	
Replace Pump SE1 at Vine Southeast Pumping Station with 20 mgd Pump			\$1,000,000
Add 5 mgd Pump No. 4 at Pioneers Pumping Station			\$200,000
Replace Pump No. 10 at WTP with 20 mgd Pump			\$1,000,000
Construct New High Service Pumping Station and add 20 mgd Pump No. 14 (include space for three units)			\$4,600,000
8.0 mgd Yankee Hill Pumping Station ⁽³⁾			\$1,840,000
Additional Northeast Storage Capacity (10 MG buried below-grade)			\$15,000,000
Saltillo Reservoir for High SL (4 MG above-grade)			\$4,000,000
Southwest Reservoir for Belmont SL (5 MG above-grade)			\$5,000,000
Northwest Reservoir for Northwest SL (1 MG elevated)			\$2,000,000
All Phase III Main Extensions			\$31,600,000
Total by Phase	\$12,810,000	\$54,200,000	\$66,240,000

Water Main Replacement Program

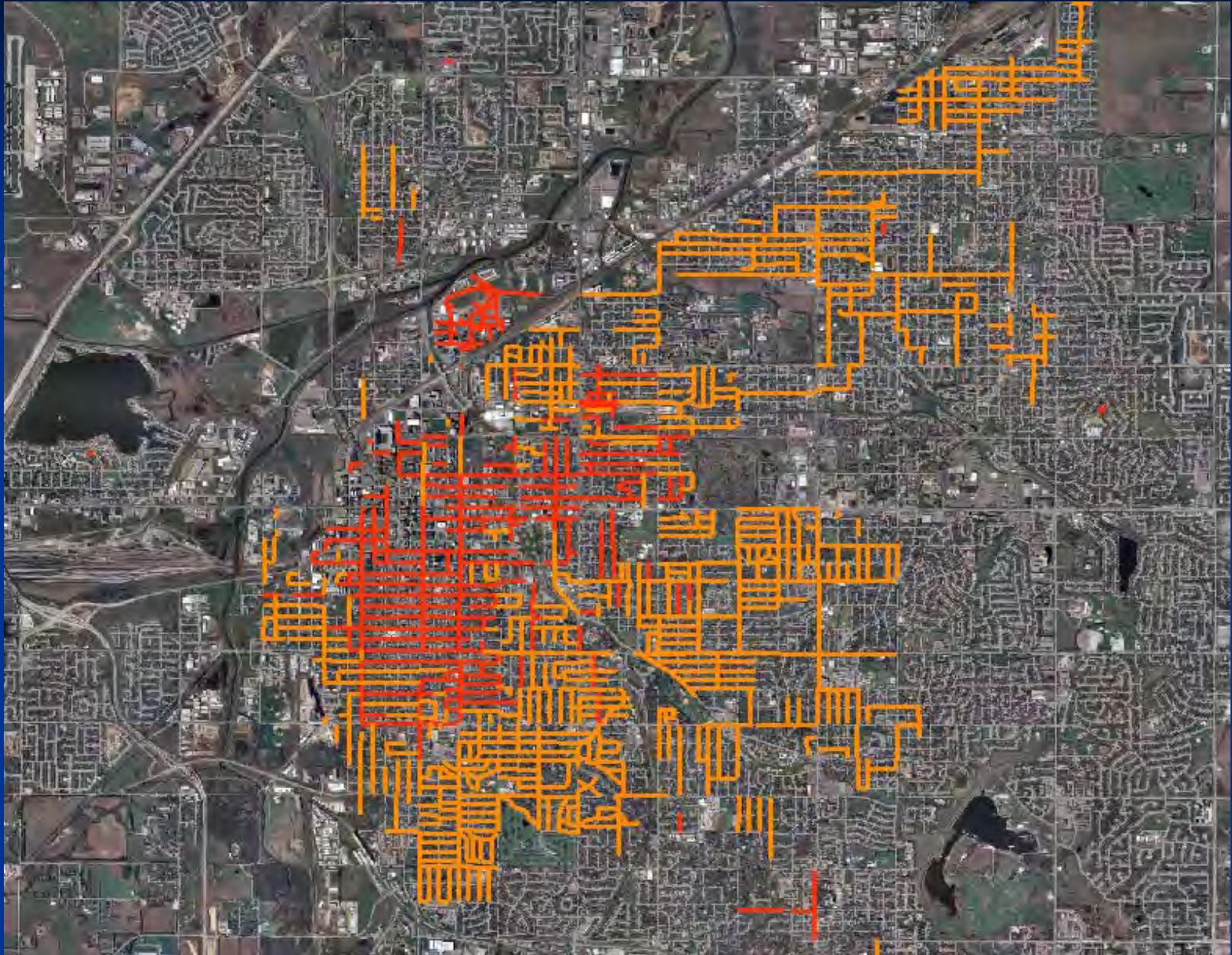
- Review of historical main break information
- Evaluate current main replacement program
- General recommendations:
 - Consider increasing the annual funding of the main replacement program
 - Developing a pipeline inspection program for large diameter mains

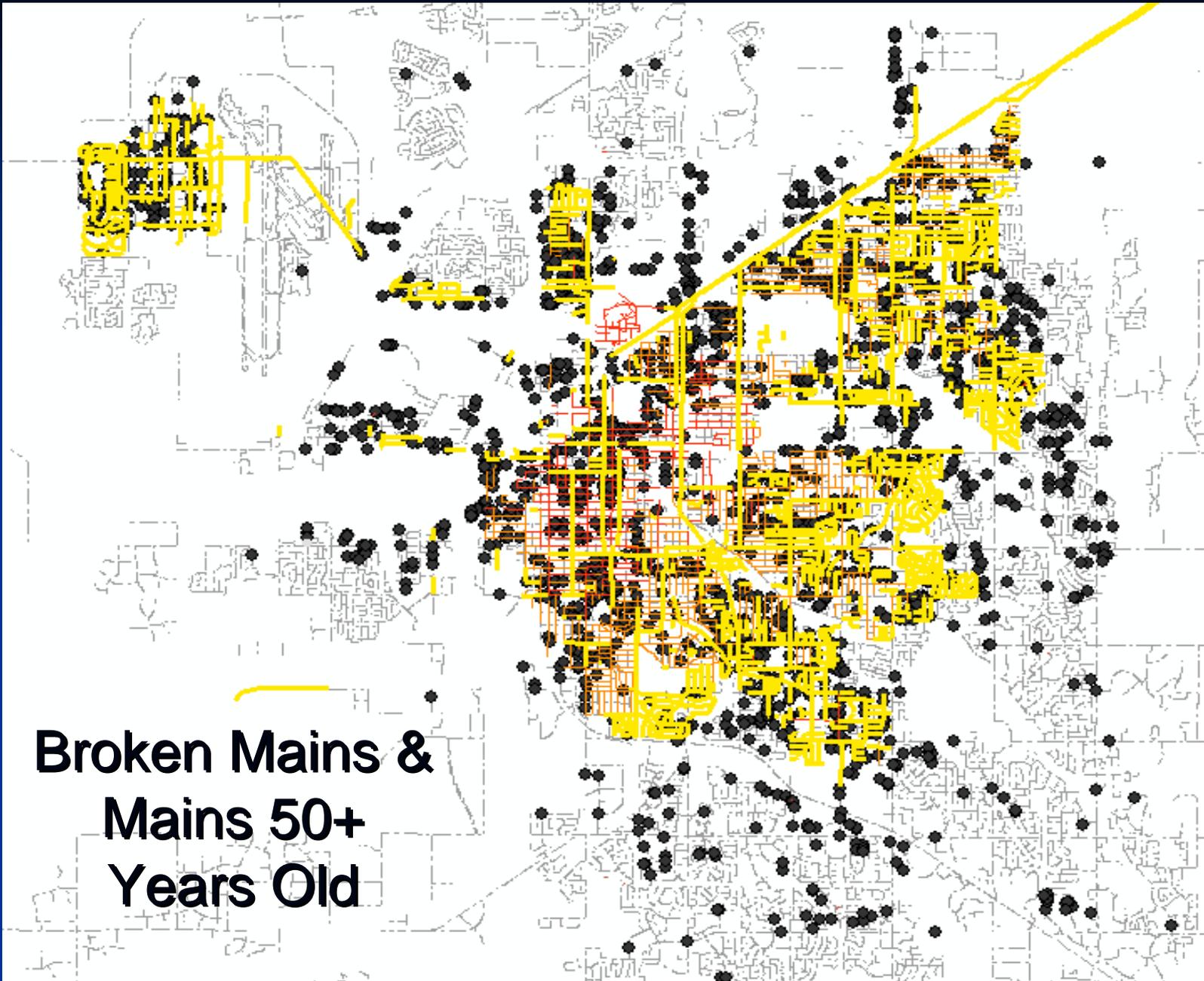
Lincoln's Aging Infrastructure

Red - 100 Year Old Mains - 45 miles

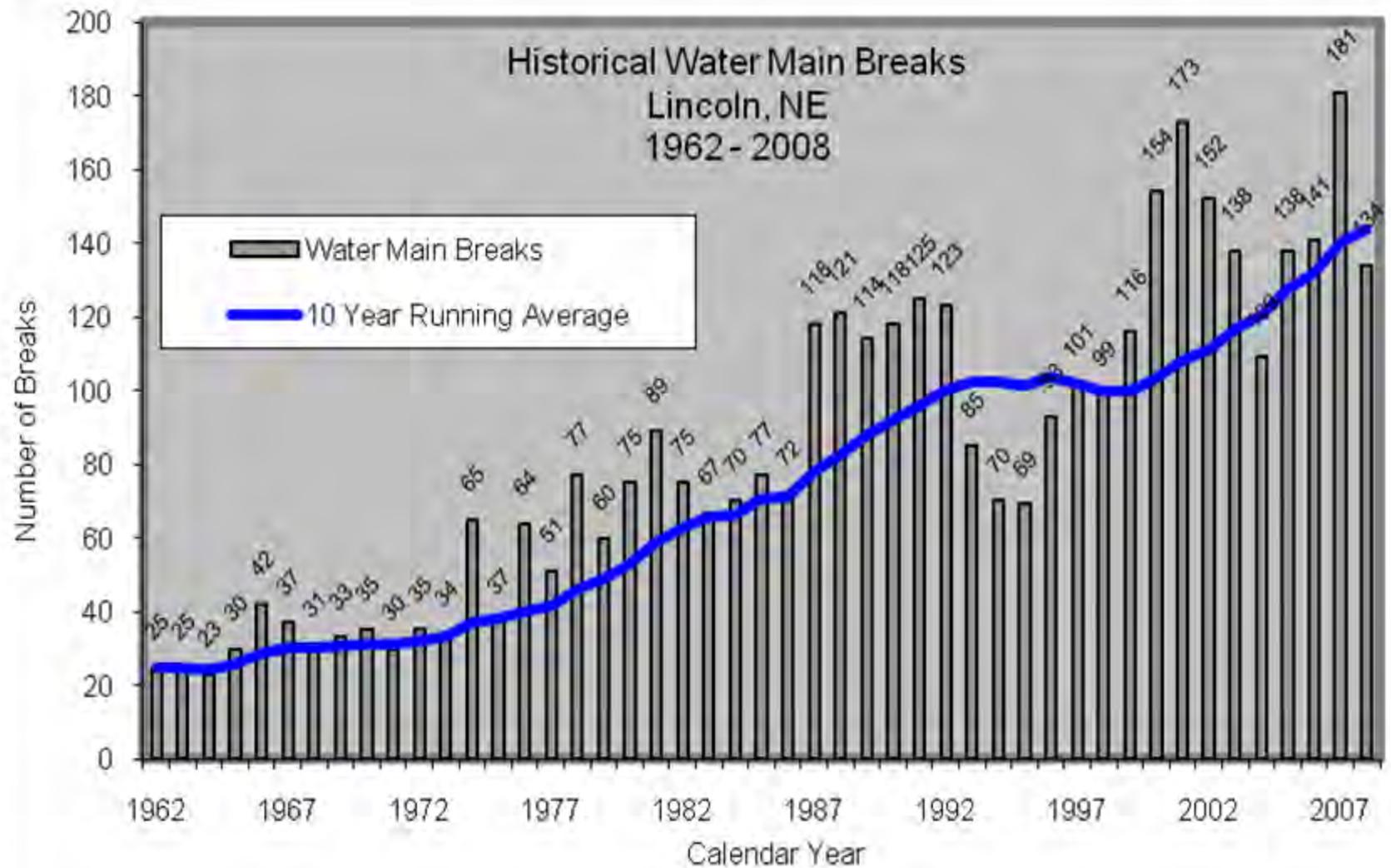


Orange - 80 - 100 Year Old Mains – 115 miles





**Broken Mains &
Mains 50+
Years Old**



Repair of Broken Main



Master Plan to CIP

o Current Projects in Past Master Plans

- o 60" Transmission Main - \$23 million
- o Ozone System Upgrade - \$6 million
- o SCADA System Replacement - \$1.5 million
- o Cheney District Elevated Reservoir - \$3 million



Master Plan to CIP (con't)

- Future CIP Projects
 - Enhanced Main Replacement Program
 - Infrastructure Rehab & Replacements
 - Water Distribution Mains for Growth
 - Additional Wells at Ashland
 - Transmission Main NE Pump Sta to 88th & Holdrege
 - Treatment Plant Expansion at Ashland
 - New Well Field Site for 2040/50 In Service Date

LWS Observations

- Looking Further Ahead than Ever Before
- Average Per Person Use is Down More than 10%
 - Conservation Efforts are Paying Off
 - Peak Customer Use Shifting from PM to AM
- Reliable, Sustainable Delivery of Water Depends on -
 - Climate Conditions
 - Condition of Infrastructure
 - Capacity and Reliability of the System
 - Well Equipped & Trained Staff
- LWS Needs to Further Develop Information & Technology to Better Manage Infrastructure Assets
- Number of Broken Mains on Pipes less than 50 years
- Security of Information Essential

Summary

- Facilities Master Plan is a Roadmap for the Future of the Community
- Stable Financial Plan & Rate Structure Needed to Sustain Built Environment & Provide for Growth
 - O&M Costs
 - Debt Service
 - Rehab & Replacement Costs
 - Growth Costs
- Comprehensive Asset Management Plan to Provide Least Possible Life Cycle Cost of Ownership of Water Assets

Water is Essential for Life!

