Water Infrastructure: Asset Management Is Happening!

Daniel J. Van Abs, PhD, PP/AICP
Associate Professor of Practice for Water, Society and Environment
Department of Human Ecology
SEBS-Rutgers
If we don’t pay attention, it is still a problem
Infrastructure

- Key Growth Periods
- Aging Distribution and Conveyance Systems
- Wastewater Treatment Plants
- Water Supply Treatment Plants
The Inevitable Future of Stuff
### Figure 4: Historic Production and Use of Water Pipe by Material

<table>
<thead>
<tr>
<th>Pipe Material</th>
<th>Joint Type</th>
<th>Internal Corrosion Protection</th>
<th>External Corrosion Protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel</td>
<td>Welded</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Steel</td>
<td>Welded</td>
<td>Cement</td>
<td>None</td>
</tr>
<tr>
<td>Cast Iron (Pit Cast)</td>
<td>Lead</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Cast Iron</td>
<td>Lead</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Cast Iron</td>
<td>Lead</td>
<td>Cement</td>
<td>None</td>
</tr>
<tr>
<td>Cast Iron</td>
<td>Leadite</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Cast Iron</td>
<td>Leadite</td>
<td>Cement</td>
<td>None</td>
</tr>
<tr>
<td>Cast Iron</td>
<td>Rubber</td>
<td>Cement</td>
<td>None</td>
</tr>
<tr>
<td>Ductile Iron</td>
<td>Rubber</td>
<td>Cement</td>
<td>None</td>
</tr>
<tr>
<td>Ductile Iron</td>
<td>Rubber</td>
<td>Cement</td>
<td>PE Encasement</td>
</tr>
<tr>
<td>Asbestos Cement</td>
<td>Rubber</td>
<td>Material</td>
<td>Material</td>
</tr>
<tr>
<td>Reinforced Conc.</td>
<td>Rubber</td>
<td>Material</td>
<td>Material</td>
</tr>
<tr>
<td>Prestressed Conc.</td>
<td>Rubber</td>
<td>Material</td>
<td>Material</td>
</tr>
<tr>
<td>Polyvinyl Chloride</td>
<td>Rubber</td>
<td>Material</td>
<td>Material</td>
</tr>
</tbody>
</table>

**Source:** American Water

**AWWA. 2012. Buried No Longer**
The Infrastructure Dilemma

- Public demands high quality services and environmental protection

- Public often (but not always) opposes rate increases
- Most water infrastructure not visible – no potholes!
- Result – system disinvestment and decay
- Result – catastrophic failures (e.g., sinkholes, geysers)
- Result – higher costs due to emergency repairs
- Result – higher energy costs due to old technology
- **Lesson** – Pay now, or pay later, but pay we will!
Utility Costs v Inflation

[Graph showing the changes in utility costs compared to inflation from 1970 to 2010 for various items like Garbage collection, Cable television, Water/sewer maintenance, Local telephone service, All items, Electricity, Natural gas, Interstate telephone service. The graph indicates an increase in costs over time for all items, with some fluctuation in specific categories.]

Source: USEPA
We are faced with insurmountable opportunities

Pogo
(the cartoon character)
Jersey Water Works

A Collaborative – not an organization

- Community groups
- Environmental groups
- Planning groups
- Water utilities
- Governments from local to federal
- Other interests
NJDEP Asset Management

- **Guidance**: Asset management program guidance, WWTP O&M guidance, etc.

- **Survey**: 440 systems responded, of 580. Far more completion of AM planning steps than anticipated, but relatively few are complete.

- **Requirements**: CSO permits, new NJEIFP financing, problematic systems, future permits

- **Funding**: a critical issue. Proposed Intended Use Plan provides grants for small system asset management programs, and increases CSO and GI funding.

- **Ratepayers**: Will cover most costs, so cost efficiencies are a critical component of AM. Optimization.
Asset Management Steps

1. Performing an **inventory and condition assessment** of the assets (entire utility or for high-priority components)
2. **Defining level of service goals**, based on community goals
3. **Identifying critical assets** – those that have a high risk of failure and/or major consequences if they do fail.
4. **Establishing life-cycle costs**, including operations and maintenance, personnel and capital expenses.
5. **Developing an implementation strategy**, including funding, staffing, a schedule of prioritized short- and long-term actions, public communications, and responsible parties.
Percentage of responding drinking water (DW) systems that have completed an aspect of the following AM components

- **Inventory**
  - Small: 60%
  - Medium: 65%
  - Large: 78%

- **Mapping**
  - Small: 85%
  - Medium: 91%
  - Large: 91%

- **Condition Assessment**
  - Small: 59%
  - Medium: 76%
  - Large: 71%

- **Criticality Assessment**
  - Small: 47%
  - Medium: 51%
  - Large: 51%

**Total DW Surveys Received By Size of System:**
- Small = 120
- Medium = 99
- Large = 224
- TOTAL = 443 Respondents

**Note:** The size of the DW Systems are based on the population served by that system:
- Small = 501-3,300 people served
- Medium = 3,301-10,000
- Large = 10,001 or more
Percentage of responding wastewater (WW) systems that have completed an aspect of the following AM components:

<table>
<thead>
<tr>
<th>Component</th>
<th>Small</th>
<th>Medium</th>
<th>Large</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inventory</td>
<td>79%</td>
<td>88%</td>
<td>84%</td>
</tr>
<tr>
<td>Mapping</td>
<td>81%</td>
<td>42%</td>
<td>91%</td>
</tr>
<tr>
<td>Condition</td>
<td>75%</td>
<td>71%</td>
<td>83%</td>
</tr>
<tr>
<td>Criticality</td>
<td>79%</td>
<td>62%</td>
<td>46%</td>
</tr>
</tbody>
</table>

**Total WW Surveys Received By Size of System:**
- Small = 70
- Medium = 58
- Large = 154
- TOTAL = 282 Respondents

Note: The size of the WW Systems is determined by the average daily flow handled in million gallons per day (MGD) by the processing plant:
- Small = Less than 0.1 MGD
- Medium = Greater than or equal to 0.1 MGD and less than 1.0 MGD
- Large = Greater than 1.0 MGD
Overview

Many of New Jersey’s Water Systems have components that are nearing, or in some cases have surpassed, the end of their expected life. There is broad recognition of the need for consistent reinvestment in New Jersey’s aging water system infrastructure both to ensure that it will continue to serve the needs of our State and reduce the risk to the environment, economy, and public health.

See: www.nj.gov/dep/assetmanagement/index.html
AM and Sustainable Jersey

- Jersey Water Works will propose new actions that help municipalities be part of asset management

Possible actions:
- Municipal goals for asset management, regarding municipal utilities and MUAs
- Training for municipal officials and staff
- Engage public in Level of Service and other AM issues
- Publishing and communicating AM results and trends
- Incorporating key AM issues in the utility elements of municipal master plans
The Utility Role

• “Public utilities” need to be public – educate municipal officials, customers, etc. You are valuable, and unseen.

• Incorporate asset management into broader utility management efforts, such as system optimization

• Don’t just be competent – show it!

• Help people understand the connection between utility services, public health and economic vitality

• Help municipalities engage in Sustainable Jersey
Contact Information

Daniel J. Van Abs, PhD, PP/AICP
Associate Professor of Practice for Water, Society & Environment
Department of Human Ecology
School of Environmental & Biological Sciences
Rutgers-The State University of New Jersey
55 Dudley Road, New Brunswick, NJ 08903
vanabs@sebs.rutgers.edu
www.danvanabs.com