

# OUR WATER TRANSFORMED: AN ACTION AGENDA FOR NEW JERSEY'S WATER INFRASTRUCTURE

## APPENDIX

### Asset Management – Background Jersey Water Works Steering Committee Discussion Item

Prepared by the Steering Committee Topic Team (Dan Kennedy, Andy Kricun, Debbie Mans, and Dan Van Abs) and the JWW backbone (Dan Van Abs, consultant; Chris Sturm, staff)

#### I. Problem Statement

Water supply, wastewater and stormwater utilities provide critical services to developed areas throughout New Jersey. These services rely on both physical assets and well-trained personnel. Asset management is the systematic approach utilities use to ensure that their system delivers the optimum level of service through sufficient investment in, and planned maintenance of, the system, and in a manner that minimizes what are known as life-cycle costs – i.e., the assets' costs over their full lifespan.

Despite progress in recent years, effective asset management has not become an established, routine, expected function of many water supply and wastewater utilities.

**Why does this matter?** Many physical assets of New Jersey's drinking water, wastewater and stormwater utilities are near or past the end of their useful life, as evidenced by a variety of crises: breaks, leaks, water losses, flooded streets, permit compliance issues, etc. For example:

- Some cities lose over 40 percent of their treated drinking water before it even reaches customers.
- Some sanitary sewer systems are subject to high levels of water infiltration and stormwater inflow, which strains the collection system capacity, can flood basements or streets, and can stress sewage treatment plants.
- News media routinely report water and sewer line breaks that cause sinkholes in streets, cause water service to fail in hospitals, schools, homes and businesses, threaten public health and even cause major street flooding.
- Malfunctioning and poorly maintained stormwater systems routinely lead to water pollution and beach closings in the back bay areas of the Jersey Shore.
- Storm sewers built to handle moderate storms can be overwhelmed by the more intense storms New Jersey has been experiencing, especially if they are poorly maintained and partially blocked, leading to more street flooding.
- Emergency repairs are well known to cost three to five times, or more, what planned, programmed maintenance would have cost to ensure system integrity. These additional costs do not include financial impacts on businesses, or stress on households without water.

Local utilities may not know enough about the condition of their water systems, whether they are improving or declining, and the cost to upgrade and manage them effectively. Even where the local utilities are aware of the needs, little of that information is available to, or compiled at, the state level to summarize, at least in general terms, the overall status.

## II. System Map

### A. Who benefits from good asset management?

- Utility Customers/Ratepayers – the residents and businesses that drink water and benefit from stormwater and wastewater management, and pay for those services.
- Commerce and quality of life – all of the state benefits from reliable utility services and reduced emergencies, service disruptions and lifecycle costs.
- Environment and Public Health – well-managed utilities provide better and more consistent protection of environmental quality, less stress on water supplies, and reduced harm to public health.

### B. Who provides water infrastructure services in New Jersey and how?

Drinking water supply, wastewater and stormwater utility systems may be owned by governmental entities (e.g., State agencies, regional agencies, county and municipal utility authorities, municipal governments) or the private sector (e.g., investor-owned corporations, private companies). Regardless of ownership, their functions are very similar; especially for drinking water and wastewater services, the utilities are all required to meet the same environmental standards.

	Drinking Water	Wastewater	Stormwater
<b>Number of public community systems (both publicly and privately owned)</b>	582	212 systems with treatment plants, plus additional collection-only systems	All municipalities with significant developed areas, roads, etc.
<b>Served by investor-owned &amp; private systems</b>	Approximately 40% of the population served by PCWS systems <sup>1</sup>	Minimal	Most private office parks, business campuses and gated communities
<b>Function(s)</b>	Water treatment and/or distribution	Sewage collection and/or discharge	Stormwater collection and discharge
<b>Primary revenue source</b>	Usage fees (along with connection fees)	Usage fees (along with connection fees)	No usage fees. Paid for from local govt. budget
<b>Not served by public system</b>	Roughly 14% of NJ population served by wells	Roughly 10% of NJ population on private septic systems	- Private development - Rural areas

### C. What physical assets are we talking about?

- **Drinking water:** reservoirs, intakes and wells; treatment plants; storage tanks and reservoirs, and pipelines and pumping stations.
- **Wastewater:** pipelines and pump stations; treatment plants; diffusers and outfalls.
- **Stormwater:** curb and gutter systems, catch drains, pipelines, retention/detention basins, outfalls, green infrastructure.

### D. What do we know about system conditions in NJ?

<sup>1</sup> Roughly 86% of all New Jersey residents are served by public community water systems (PCWS), whether owned by governmental entities, investor-owned corporations, or private companies.

We have only general or partial information at the state level regarding utility asset conditions, as the detailed compilation of this information has not been a focus of state or federal government.

- The best statewide assessment of system conditions is inferential: a survey of utilities regarding their twenty-year investment needs, which is compiled by NJDEP, reported to USEPA, and published in a national report. The latest survey (2012) shows an \$8 billion cost estimate for drinking water and a \$17 billion cost estimate for wastewater and stormwater. However, unknown needs (which would be an issue wherever a utility lacks a good asset management program) are not reported, and therefore these estimates are likely lower, and perhaps much lower, than the real needs.
- A recent NRDC report estimated that 130 million gallons per day treated drinking water are being lost each day across New Jersey. NRDC extrapolated water loss audit results available from the NJDEP and the Delaware River Basin for part of the state, which confirm that some major utilities can lose as much as one-quarter to one-half of their treated water between the treatment plant and the customer.
- The American Water Works Association published in 2012 a national estimate of drinking water infrastructure needs and estimated a \$1 trillion need over 20 years; the New Jersey share would be \$28 billion if our infrastructure was at the national average of need.
- The costs of Combined Sewer Overflow controls have been estimated at roughly \$5-7 billion; new Long Term Control Plans will provide more detailed estimates by 2020.
- The NJ Chapter of the American Society of Civil Engineers (ASCE-NJ) published its ratings for infrastructure integrity in 2016. The scores for Drinking Water and Wastewater Infrastructure were C and D, respectively, reflecting both what is known and not known.

And then there are the constant news reports...

## E. What is Asset Management?

Utilities undertake asset management so that they can provide desired services at the lowest possible lifetime cost. With an asset management program, a utility can ensure that annual revenue reserves and reinvestment are sufficient to facilitate long-term viability of the system.

Asset Management is a process to ensure that there is sufficient investment in and planned maintenance, needed repair, replacement and upgrade of the physical components of a drinking water or wastewater system. These physical components of the system infrastructure are considered assets.

To achieve effective asset management, a water system must assess the current state of their assets and have a program in place to prioritize investment. Often the prioritization is done through an Asset Management Program and documented in an Asset Management Plan. An Asset Management Plan incorporates detailed asset inventories, operation and maintenance tasks and a long-range financial planning strategy to ensure that annual revenue reserves and reinvestment are sufficient to facilitate long-term viability of the system. *NJDEP website*

The major components of asset management involve answering the following questions:

1. **What are our assets?** Performing an inventory and condition assessment of the system's assets (physical assets at a minimum, but including personnel, administrative, leadership and financial assets is advised);
2. **What services must our system deliver?** Defining level of service goals (including but not limited to regulatory requirements);
3. **What can go wrong and how bad could that be?** Prioritizing assets based on criticality and business risk exposure;
4. **How can we run our operation to most efficiently deliver desired services?** Identifying and developing strategies to achieve minimum life cycle costs;
5. **How will we pay for this?** Developing a long-term funding strategy; and
6. **Let's do it.** Program implementation.

#### ***Why Asset Management?***

- Utility assets represent a major public or private investment;
- Increased knowledge of the system allows better financial and management decisions;
- Enables efficient and cost-effective operation of the system;
- Reliable infrastructure promotes economic development;
- Efficient system operation and maintenance is essential to public health and safety and protection of water quality;
- May provide greater access to financial assistance as some funding sources give applicants higher priority ratings for having an asset management plan or a capital improvement plan.

#### ***Benefits of Asset Management***

- Improved protection of public health / environment;
- Improved service reliability, resiliency, and sustainability;
- Response to existing and future conditions/ long-term system integrity;
- Significant cost savings;
- Improved system security and safety.

*NJDEP website*

The benefits of asset management are most obvious for treatment plants. In general, treatment plants should have close to optimal performance because in many cases capital investments can pay for themselves, because the additional debt service is less than the operations and maintenance savings. The case for investment is less measurable for pipe systems, where one of the major "benefits" of upgraded pipes comes in the in the form of risk prevention, or avoided costs; that said reduced water losses and sewer flows can also have significant financial benefits.

#### **F. How widespread is the use of asset management in New Jersey?**

NJDEP's 2016 survey of drinking water and wastewater utilities showed that considerable progress is being made in developing asset management programs across all utility sizes, but that relatively few programs have reached maturity and even fewer are being implemented through capital program and system optimization approaches.

### **New Jersey Water System Asset Management Assessment Baseline Survey Report September 2016 (Excerpt)**

The survey response rate exceeded 75% and provided valuable insight regarding the status of AM activity amongst those systems responding. Of the systems that responded to the survey, 76% have done some inventorying of their physical assets, and 74% have mapped more than half of their assets. Furthermore, 72% of responding systems have performed a condition assessment and 53% a criticality assessment on more than half of the inventoried assets. Approximately 90% of the responding systems intend to complete some component of AM (inventory, mapping, condition assessment, criticality assessment) during the next three (3) years. In addition, more than 70% of responding systems reported that they have a long-term strategy in place to fund asset management.

Anecdotal information indicates clearly that the nation as a whole is in a similar situation. How states address this issue varies widely. Some have no requirements, while other states have required detailed asset management plans from every utility, resulting in a flood of information that has overwhelmed their ability to approve the programs.

The NJ Legislature is considering actions and legislation to address these issues. In 2016, the Legislature formed the Legislative Task Force on Drinking Water Infrastructure, which has held a series of hearings and anticipates releasing a 2017 report with recommendations. In addition, legislators have proposed bills that would require drinking water systems to conduct water loss audits and to implement asset management plans. Jersey Water Works has developed an “action” for the Sustainable Jersey municipal certification program on water loss audits and is developing one on asset management.

#### **g. Does the State require asset management? How do they help utilities?**

- **Existing State Focus on Water Quality Standards:** State and federal regulations for drinking water focus on ensuring that the delivered water meets the drinking water quality standards, which is achieved through a combination of treatment and protection of the delivery system (e.g., minimum pressure requirements). Wastewater treatment requirements focus on ensuring that discharged effluent meet quality requirements, and that collection systems have no unauthorized discharges (e.g., sanitary sewer overflows).
- **Asset Management Requirements:** NJDEP has the legal authority to require that most if not all water utilities maintain their physical assets in a proper manner. It currently requires asset management planning efforts through two programs: CSO permits and the NJ Environmental Infrastructure Finance Program. Recipients of CSO permits were required to prepare (and have completed) initial asset management plans for their systems by July 2016; the NJDEP is reviewing a sample of these plans to help devise future regulatory and guidance steps. The NJ Environmental Infrastructure Finance Program requires a focused asset management program. However, these requirements are somewhat limited. First, they currently do not provide explicit standards for “sufficient” programs. Also, the borrower for an NJEIFP loan must certify that there is an asset management plan in place (or in development) *for the funded project and closely associated components (emphasis added)*. This is a major limitation since asset management is by definition a systems approach. NJDEP also is beginning to incorporate initial asset management requirements in the municipal separate

storm sewer system (MS4) permits, to ensure that the MS4 municipalities know at least the location and type of stormwater facilities.

- **Asset Management Assistance:** The State (NJDEP and the Environmental Infrastructure Trust) provides technical and financial assistance for asset management, including greatly improved guidance.<sup>2</sup> It provides training for licensed operators, and provides on-site compliance assistance programs for small systems. The NJEIFP allows asset management costs to be financed as part of construction loans, and there are limited “principle forgiveness” (grant) funds for asset management planning, especially for small systems.

**H. Who is responsible for ensuring Asset Management? Which government entity oversees their programs and budgets?**

	<b>Budgetary Authority</b>	<b>Oversight Entity</b>	<b>Oversight Focus</b>
<b>Private utilities*</b>	System owner (e.g., mobile home parks)	none	none
<b>Investor-owned utilities</b>	Corporate management	NJ BPU with input from ratepayer advocate	Rate case (utility’s request for rate increase), including asset management plans as a justification for projects
<b>Governmental Utility Authorities and Commissions</b>	- Board, appointed by governing body(s) or Governor	NJDEP (for CSO permits, NJEIFP loans, and compliance cases) NJ Department of Community Affairs (NJDCA)	NJDEP: Permit conditions, loan requirements, and compliance oversight NJDCA: General budget oversight only
<b>Municipal utilities (not authorities)</b>	- Municipal governing body	NJDEP for CSO permits, NJEIFP loans, and compliance cases NJDCA	NJDEP: Permit conditions, loan requirements, and compliance oversight NJDCA: General budget oversight only
<b>Municipal Separate Storm Sewer System (MS4)</b>	Municipal governing body	NJDEP: MS4 permit requirements NJDCA	NJDEP: Permit conditions and compliance oversight NJDCA: General budget oversight only

\*Private corporations and businesses that are not on the stock market

<sup>2</sup> <http://www.nj.gov/dep/assetmanagement/>

### **III. Gap Analysis: What significant actions are necessary to ensure development and implementation of effective asset management programs? What obstacles exist and why?**

This briefing paper suggests a number of possible obstacles to ensuring that utilities implement and rely upon effective asset management programs to meet desired performance goals cost-effectively. These are not presented in any particular order but are grouped into the following categories:

- A. Awareness
- B. Costs and Perceived Benefits (or Lack Thereof)
- C. Requirements
- D. Structural Issues

#### **A. AWARENESS**

1. **Inadequate awareness of the value of asset management:** Many utilities have historically addressed capital needs as they become obvious, through malfunctions, line breaks, or clear physical degradation. While NJDEP survey results show that most utilities have commenced development of asset management programs, few have fully integrated, comprehensive programs to date and some have not begun work. Some utility managers may not recognize the value of asset management programs, or may not have convinced their utility board or municipal governing body that a good asset management program will provide significant operational and financial benefits over the asset lifetimes, and therefore is worth the up-front costs. In both cases, the public is generally not aware of water infrastructure, much less the current condition and needs or the potential harm of inadequate asset management, until something goes noticeably wrong.
2. **Low public visibility of water systems.** Ratepayers don't see underground water assets, and have no personal experience of their condition until things are seriously awry. Water utilities have traditionally operated with a low public profile, although there are industry leaders that have recently built strong, exciting community relations efforts and positioned infrastructure upgrades to address multiple community objectives. For its part, the public rarely views water utilities as being environmental stewards and has few expectations for the level of service that their systems will provide.

#### **B. COSTS AND PERCEIVED BENEFITS (OR LACK THEREOF)**

3. **Cost: the need for significant staff and/or consulting resources.** Most water and wastewater utilities are small with limited resources. These small water and wastewater utilities have very limited budgets and are therefore challenged to develop and implement thorough asset management programs. Likewise, the State has limited staffing and expertise to manage resulting information. Finally, utilities have had limited interaction to share case studies, information, expertise and mentoring among themselves, though NJDEP and the professional and utility associations have in recent years been placing more emphasis on asset management awareness, training and technology transfer.
4. **Inadequate incentives for good management.** Some model water utilities in both the public and private sector demonstrate exemplary use of best practices. At the same time, some utilities, especially publicly-owned utilities, can get by with relatively poor performance for decades, provided they comply with the (limited) regulations and minimize system

emergencies. Sometimes the obstacle to good management may lie with the elected and appointed officials who face a myriad of challenges, including inadequate knowledge or regular re-election campaigns. Investor-owned utilities have a significant incentive to develop thorough asset management programs, which can be used to justify capital expenditures for approval by the Board of Public Utilities, with specific incentives for drinking water utilities through the Distribution System Investment Charge (DSIC). Nevertheless, many have pipe systems that are in need of significant repair. Stormwater systems are a special case as they are not operated as utility functions, and therefore lack dedicated funding and are not managed by specialized staff.

### C. REQUIREMENTS

5. **Limited state regulatory requirements for asset management:** One way to ensure broader use of asset management is to require it by regulation. NJDEP has greatly improved its guidance for asset management,<sup>3</sup> has directly incorporated some asset management planning requirements into some programs (e.g., CSO permits, NJ Environmental Infrastructure Program), and has the authority to incorporate asset management requirements into other permits.

Issues associated with regulating asset management include the following:

- Regulations currently do not provide explicit **standards for “sufficient” programs**. The lack of explicit standards reflects partly the national state of experience, where there are insufficient studies to generate useful benchmarks for some issues (See #7), but also a recognition that asset management programs must be tailored to each utility. While consensus exists regarding the general concepts and steps, the relative emphasis on each step and the specific actions needed will vary by type, size, capacity, age and location of utilities.
- A major, related issue is how **system optimization** (a process of upgrading equipment, procedures and staff capabilities) can be linked to asset management programs (which focused on management of existing assets) for the most cost-effective approaches; sometimes upgrades are more appropriate than maintaining existing assets.
- Finally, asset management programs also need to address **non-physical assets**, such as administrative, financial and personnel capacity. Developing specific standards for administrative and personnel capacity would be very difficult; financial capacity has been the subject of significant research and general expectations can be defined.

The current requirements can be seen as a work in progress and a learning opportunity, and may well be appropriate given current knowledge.

6. **No explicit state requirements that utilities fund the result of their asset management program:** The NJDCA reviews public-sector water utility budgets to ensure they have adequate cash flow and reserves for operations and debt payments. The BPU reviews private-sector rate cases to ensure that capital expenditures are justified. Neither entity considers whether water utilities provide adequate funding for their capital budget needs as defined in the asset management plan.

---

<sup>3</sup> <http://www.nj.gov/dep/assetmanagement/>

7. **Lack of standardized metrics for water infrastructure condition assessments and the adequacy of capital investment.** One way to facilitate broader use of asset management is to require utilities to report the condition of their systems. Unlike the transportation sector, where there is a national ranking system for the condition of bridges and roads and the performance of intersections, there are few standardized metrics for water infrastructure conditions. Appropriate capital investment rates will differ based on the type of asset, from pipelines with relatively long average lifespans to pumps and other moving parts with significantly shorter lifespans.
8. **Possible limitations of a regulatory approach for asset management.** Although regulations can play an important role in improving asset conditions, it is not clear whether they can effectively compel comprehensive robust asset management, given the complexity of utility management. Regulations may need to be somewhat general in nature, perhaps with increased stringency where performance or integrity indicators show more problems.

### **STRUCTURAL ISSUES**

9. **Stormwater management is not addressed as a utility function:** NJDEP has incorporated the beginnings of asset management planning into the permits for municipal separate storm sewer systems (MS4), primarily the inventory process. A major difficulty is that no fee-based stormwater utilities (which rely on rates from stormwater generation to address management needs) exist and therefore any asset management planning costs will come from the general municipal budget.
10. **Asset management and broader utility and community management and planning are not sufficiently integrated:** Most water utility assets were put in place as areas were developed, in core urban areas, town centers and suburban areas. Now that these assets are aging, insufficient attention is paid to how water utility integrity is related to redevelopment and revitalization efforts in both urban and suburban settings. In addition, capital projects involving water utilities can be much more cost-effective if all other street and below-street capital assets are addressed together. Due to fragmented ownership issues, the water supply, sewer and stormwater lines, roads and other underground infrastructure can all have different owners.