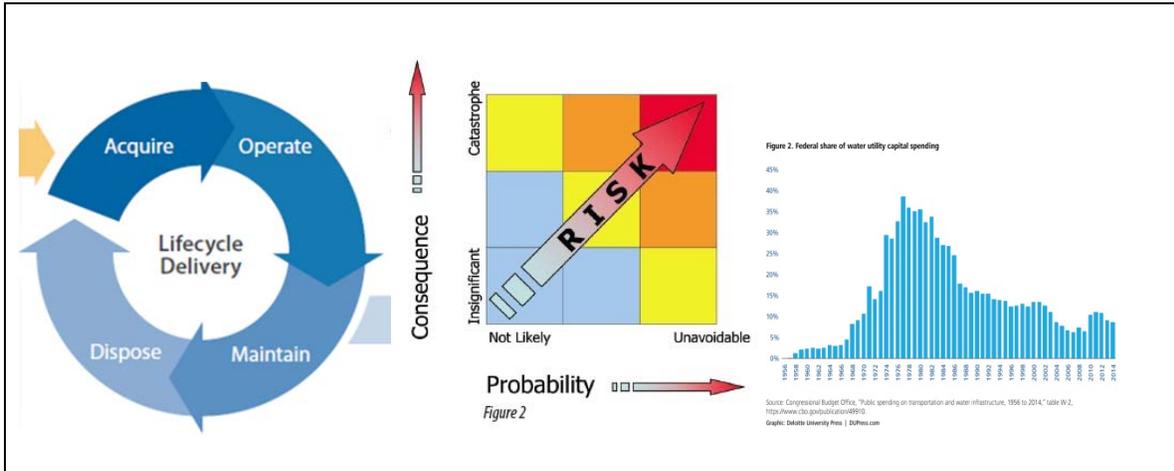


## Plant Asset Management Plan Implementation



**Project Proposer/Champion:** Claudia Haack/William Walker

**Department:** Planning and Strategy

### Project Summary:

The district is currently completing a plant asset management plan using funding authorized in previous capital improvement plans. The project described here is to implement that plan. The project will last through 2024.

Tasks within this project include the implementation of reliability centered maintenance; cleanup and migration of data in the current maintenance management system; development of a utility for in-field condition assessments; integration with the GIS system; improvement of positional accuracy for force mains and interceptors; development of reports and dashboards to monitor asset health; and improvement in tools used for planning maintenance work.

### Project Involvement:

This project will involve the departments of operations and maintenance, engineering, finance, and planning and strategy. External consultants will be needed for several tasks such as reliability centered maintenance implementation, condition assessment, software tool development, and system integration.

### Background on Asset Management:

The district follows the practices of sustainable infrastructure management, a systematic approach to asset management. It uses comprehensive data on asset types, locations, conditions, and consequences of failure to facilitate cost-effective

maintenance and replacement decisions. The primary objective is to meet the level of service requirements while managing risk.

From the beginning, the district has “managed assets” in a general sense. Some asset management principles are inherent in engineering standards and practices, like filing of drawings and plan documents for future reference or considering operating costs when buying equipment. Other principles are inherent in maintenance practices, like carrying a parts inventory and inspecting equipment. Twenty years ago, the district took an early step toward more comprehensive asset management by implementing an early computerized maintenance management system.

However, three factors have raised the need for a modern, integrated approach to asset management. First, federal and state law require the district to have a capacity, management, operation, and maintenance program. (See NR 210.23, Wis. Admin. Code.) This includes asset management elements, like identification of critical parts, a management system to prioritize maintenance activities, and routine preventive operation and maintenance activities. The district meets these requirements through its asset management program.

Second, the district has grown and continues to expand and needs to implement modern processes to meet regulatory requirements, adding many more assets. A larger register of assets requires different methods to maintain and plan for the replacement of these assets.

Third, the district’s infrastructure is aging. This will require increased repair and replacement work. It will also increase the likelihood of asset failures generally. The district’s new integrated approach to asset management provides two benefits for aging infrastructure. One, it supports informed, analytical decisions about when an asset should be repaired or replaced. Too-early replacement discards some of an asset’s productive life. Too-late replacement risks failure, leading to costlier repair or spillover damage to other parts of the system. Two, it helps the district target spending towards assets that are most important to the system. Assets with both a high likelihood and high consequence of failure should receive more attention than assets with neither.

Wise use of dollars is especially important to district ratepayers today. Decades ago, initial construction of current assets was supported by federal and state funding. No such support is available today.

The district’s integrated approach is built around five core asset management questions:

1. What is the current state of each asset? (Age, condition, and special factors.)
2. What is the required level of service or performance of the asset and the system of which it is a part?

3. Which assets are critical to sustained performance of the system?
4. What are the best maintenance and investment strategies for the district considering the points above?
5. What is the best long-term funding strategy for that work? (Routine maintenance budgets, separate projects, debt-funded projects, etc.)

Work to date has focused on the first three questions. This implementation project will focus on the fourth and fifth questions.

### **Project History and Status:**

In 2015, the program completed the development of the sustainable asset management framework and implementation plan. It identified the overall roadmap for integrated asset management at the district. Several notable projects have occurred to date.

- 2016 — Implemented a new database to track data about manholes and their condition.
- 2016 — Developed a unified methodology for condition-assessments, which are critical for the development of an asset management plan.
- 2017 — Completed two pilot asset management plans to test the data and tools that had been developed to that point.
- 2018–2019 — Develop a full asset management plan for the treatment plant.
- 2019-2020 — Update to the collection system facility plan

The asset management framework has also benefited other projects at the district. For example, the liquid process facilities plan included generation of data on asset conditions and estimated replacement costs. It also produced business cases that include a null-alternative, making it easier to evaluate projects. Similarly, the engineering-led force main project is improving the district's approach to obtaining location data and condition information about its force mains. Use of condition data and considering a null-alternative in project decisions are key concepts in asset management, introduced through the program.

In previous capital improvements plans, sustainable infrastructure management has been pursued as an ongoing capital expense, with costs escalating year-over-year to approximate inflation. The program has advanced to the point where it can begin integrating into the normal course of business of the district. As the program matures and new projects are initiated, staff will request project and funding authorization through the operating budget rather than the capital budget.

### **Project:**

This project is to implement the plant asset management plan, which will be completed in 2019. (Funding for that work was authorized in previous capital improvement plans.) The plan provides data on assets, including locations, conditions, and consequences of

failure. To use that data will require tools and procedures, particularly for the maintenance program and capital planning program.

Tasks within this project include cleanup and migration of data in the current maintenance management system; development of a utility for in-field condition assessments; integration with the GIS system; improvement of positional accuracy for force mains and interceptors; and improvement in tools used for planning maintenance work.

**Alternatives:**

Abandoning the district's integrated asset management program is obviously not a realistic alternative considering the federal and state requirements for a capacity, management, operation, and maintenance program. Such an action would also strand the information and process improvements made to date in the plant asset management planning effort.

A minor delay in plan implementation would be possible but would provide no benefit in overall spending or fund management. Delay would allow data on asset conditions to become out of date before implementation.

In the long run, the asset management program will be periodically updated through capital projects, similar to facility planning or capacity projects. These updates are appropriate points to review the overall direction of the program and alternatives.

**Economic Analysis:**

Integrated asset management programs yield benefits in two categories: (a) reduced risk of harmful asset failure; and (b) reduced waste in asset repair and replacement.

Risk reduction is accomplished by first assessing the conditions of assets — age, deterioration, expected life, etc. — and then second estimating the likely consequences if an asset fails — loss of function, spillover damage, injury, permit violation, etc. Reduced spending waste is accomplished by improving the timing and scope of asset repair or replacement. Too-early replacement discards some of an asset's productive life. Too-late replacement increases the risk of failure.

Both effects are uncertain, because they are affected by the randomness of asset failure. As the asset management program gathers data, it is better able to quantify these factors for the district's situation.

Industry-wide figures estimate average annual savings from implementation of asset management to range from 10% to 30% of required renewal and replacement expenditures. With an estimated \$1.5 billion asset base and assuming a 75-year average replacement schedule, renewal and replacement needs are approximately \$20 million

per year on average. A 10% reduction would be \$2.0 million per year, a significant savings compared to annual costs of developing the program.

The \$2.0 million figure represents regular savings. In addition, integrated asset management reduces the risk of catastrophic failure. Avoiding such a failure is not a regular savings. Hopefully, such a failure never occurs. Thus, asset management serves as a form of insurance, reducing the likelihood of a major loss for the price of ongoing program management.

**Financial Summary:**

In previous capital improvements plans, sustainable infrastructure management has been pursued as an ongoing capital expense, with costs escalating year-over-year to approximate inflation. Spending was authorized for only one year at a time and no project end date or total cost were established.

The program has advanced to the point where it can begin integrating into the normal course of business of the district. As a result, asset management in the 2020 capital improvements plan is to be authorized not as an annual expense, but as a project with an end date and total project cost. Annual amounts below are estimates. The project may deviate from those estimates year-to-year as long as total spending remains below that authorized. (The commission could adjust the total authorization in future years if needed.)

As shown in the table below, over the six years of this plan, annual capital spending will decline from just over \$300,000 in 2019 to just over \$100,000 in 2024. The decline reflects more precise estimates of project costs, made possible by progress to date on developing the plant asset management plan. In addition, planning and strategy department salary costs related to the plan will return to the operating fund gradually over the first four years of the plan.

It is possible that additional operating budget authority will be needed in the maintenance group in future years to continue implementing the plan. Exact needs will not be known for a few years. Finally, it is expected that future asset management capital projects will be needed, including condition assessments and updates to plans. Such projects will be proposed separately.

**Plant Asset Management Plan Implementation**

Anticipated Spending Per Year with Total Authorized Project Spending (2019\$)

<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>
\$ 317,000	\$ 314,000	\$ 250,000	\$ 173,000	\$ 167,000	\$ 124,000