

Asset Management For Wastewater Utilities

KT Newman

Utility Contractors, LLC.

A red speech bubble graphic with a white outline, containing the text 'Intended Audience'. The bubble has a tail pointing downwards and to the left.

Intended Audience

This discussion on asset management can be applicable to any water and wastewater system and is intended to be a starting point on the basic elements of asset management.

Furthermore whether you are an operator, engineer, policy maker or administrator, you play a vital role in the management of assets for your utility.

A red speech bubble graphic with a white outline, containing the text 'Time of Unprecedented Need'. The bubble has a tail pointing downwards and to the left.

Time of Unprecedented Need

Cost estimates for water and wastewater system needs across the country are in the 10s of billion dollars. Existing state and federal funding sources can only meet a fraction of this need. These sources of funding are not expected to increase, and in many cases, are declining.

What is asset management?

Asset management is a process wastewater utilities can use to make sure that planned maintenance can be conducted and capital assets (pumps, motors, pipes, etc.) can be repaired, replaced, or upgraded on time and that there is enough money to pay for it.

What is asset management?

Asset management is the coordinated activity of an organization to realize value from its assets. More simply put, asset management is doing the right things, in the right order, for the right reasons, to get the right results.

Starting with a focus on the following four key principles of asset management will direct utilities to the right things to do first.

What is asset management?

The most successful wastewater and water providers have been the ones that established effective asset management programs.

Utility asset management can be intimidating, with numerous factors to consider and many pieces of the puzzle to put together. The most common question from utilities is, “Where do we start?”

A decorative background featuring several curved lines in shades of gray, some solid and some dashed, sweeping across the top and bottom of the page. A prominent red callout box with a white border and a downward-pointing tail is positioned on the left side, containing the main title.

Need for Asset Management

Many drinking water and wastewater systems across the country will need to implement new administrative systems and management tools to allow them to adapt to the increased regulatory requirements and environmental complexities they face.

These new tools will allow the systems to operate on a “business model” for long term sustainability to help address the issues of: new and stricter regulatory requirements, growing populations, increased service demands, limited water supplies, a highly variable climate, aging infrastructure, and limited state and federal funding.



Strategic and organizational alignment

A successful asset management program connects the overall mission and strategic outlook to the daily execution of asset care. Establishing this line of sight from the mission to daily work orders is dependent on getting everyone on the same page and working towards the same goals.

Organizational alignment needs to be both vertical from the executive suite to the field level, and horizontal, across all divisions such as purchasing, accounting, operations, legal and

Asset Management Goals

The goal of asset management can be defined as meeting a required level of service in the most cost -effective way through the creation, acquisition, operation, maintenance, rehabilitation, and disposal of assets to provide for present and future customers.

A red speech bubble graphic with a white outline, containing the text 'Asset Management Goals'. The bubble has a tail pointing downwards and to the right.

Asset Management Goals

The intent of asset management is to ensure the long-term sustainability of the water or wastewater utility.

By helping a utility manager make better decisions on when it is most appropriate to repair, replace, or rehabilitate particular assets and by developing a long-term funding strategy, the utility can ensure its ability to deliver the required level of service perpetually.

Benefits of Asset Management

Examples of outcomes that can be realized by utilities through asset management:

- Prolonging asset life and improving decisions about asset rehabilitation, repair, and replacement.
- Meeting consumer demands with a focus on system sustainability
- Setting rates based on sound operational and financial planning

Benefits of Asset Management

- Budgeting focused on critical activities for sustained performance
- Meeting service expectations and regulatory requirements
- Improving responses to emergencies
- Improving the security and safety of assets
- Reducing overall costs for both operations and capital expenditures

The background features several sets of curved lines in the top-left and bottom-right corners. These lines are in shades of light gray and include both solid and dashed styles, creating a sense of motion and depth.

Who should practice asset management?

Asset management is a scalable approach that can be used by systems of any size. Whether running a small drinking water system serving 50 customers or drinking water and wastewater systems of the largest cities, asset management means putting in place a long-term plan to sustain these systems and the services they provide.

What are the elements of asset management practice?

Asset management is centered on a framework of five core questions, which provide the foundation for many asset management best practices:

1. What is the current state of my assets?
2. What is my required "sustainable" level of service?
3. Which assets are critical to sustained performance?
4. What are my minimum life-cycle costs?
5. What is my best long-term funding strategy?

A red speech bubble graphic with a white outline, containing the text 'Asset Inventory'. The bubble has a tail pointing downwards and to the left.

Asset Inventory

The first core component of asset management is the asset inventory.

This component is probably the most straightforward of all. It is also, arguably, the most important as it underlies all other aspects of asset management.

Many asset managers of wastewater utilities systems believe that this step is absolutely critical and feel that completing this component alone can greatly improve a system's management.

What do I own?

The most fundamental question a utility owner, manager, or operator can ask, is what assets do I have? It is absolutely critical for a utility to understand what it owns. It is pretty hard to manage something effectively if you don't know what that "something" consists of.

What is the condition of my assets?

After the assets are determined, it is important to know the condition of the assets. A condition assessment can be completed in many different ways, depending on the capability and resources of the system.

Asset Condition

One of the most important factors in determining an asset's likelihood of failure is the condition of the asset.

As the asset's condition deteriorates, it will become much more likely to fail. It is important, therefore, to make the best attempt possible to give the assets a reasonable condition assessment.

The condition assessment should also be updated over time, so that criticality can likewise be updated.

Asset Condition

It is critical that utilities have a clear knowledge of the condition of their assets and how they are performing. All management decisions regarding maintenance, rehabilitation, and renewal revolve around these two aspects.

Not knowing the current condition or performance level of an asset may lead to the premature failure of the asset, which leaves the utility with only one option: to replace the asset (generally the most expensive option).

There are many ways to assess the condition of the assets. For example, some assets can be visually assessed, water lines can be pressure tested, or leak tested, buildings can be monitored for energy efficiency, etc. Sometimes the only suitable way to assess an asset is to compare its performance (repair history) to its expected life.

What is the remaining life of my assets?

All assets will eventually reach the end of their useful life. Some assets will reach this point sooner than other assets. In addition, depending on the type of asset, it will either reach that point through amount of use or length of service.

For example, a pump will wear out sooner if it is used more and will last longer if it is used less. The actual age of the pump is not as important as the amount of work the pump has done.

On the other hand, pipe assets wear out based more on the length of time in the ground. If a pipe is in the ground for decades it has had considerable time to contact the soil around it and the water within it and may start to corrode.

What is the Value of the Assets?

Generally, when utilities consider the value of assets, they think about the cost of initially installing the assets.

This cost has no other importance than historical information or it can be used by a system that depreciates the costs of assets over time.

However, the installation cost does not have a direct bearing on what it will cost to replace that asset when it has reached the end of its useful life.

Asset Value

Although the idea behind an asset value is relatively simple, obtaining costs for the asset replacement is not as easy. Small utilities may not have the expertise to estimate replacement costs.

In these cases, the utility should either estimate in the best manner possible or leave this portion of the inventory blank for the initial stages of the asset management strategy.

Asset Age

The asset's age can be a factor in determining likelihood of failure, but should not be a sole factor. Over time, assets deteriorate, either from use or from physical conditions such as interaction with water or soil, and are more likely to fail.

Failure History

It is important to monitor when assets fail and record the type of failure that occurred. This information should be as specific as possible to assist the system in understanding its failure modes.

Systems should track when the asset failed (or at least when the failure was discovered), how the failure was determined (customer report, operator observation, lack of service in that part of the system, etc.), type of failure (rupture, mechanical failure, small leak), specific location of failure, and any field observations that may help explain the failure (lack of bedding sand, subsidence of soil, overheating, etc.)

Systems should track failure history on all of the asset categories.

Risk Management

Risk management is central to all aspects of an asset management program. First, identify risk before managing and mitigating it. In effective asset management, leaders should be making risk-based decisions to balance competing demands for maintaining performance, increasing efficiency and avoiding risk.

The ultimate aim of an asset management program is to revise the risk profile of the utility for improved sustainability and resiliency.

Criticality Analysis

A criticality analysis can help identify critical systems and assets and assess the risk associated with them.

This information is essential in deciding whether some assets or systems require capital investment, heightened monitoring, or attention to mitigate risk.

Maximum value from assets

Getting the maximum value from assets is really about applying the best asset strategies to balance cost, risk and performance to extend asset life and maintain service delivery.

Following a criticality analysis, asset managers will have a clear set of priorities for where to target resources for activities like condition assessment, continuous monitoring and preventative maintenance optimization.

Maximum value from assets

To extract maximum value from the assets, it is important to measure success and outcomes as well.

Some helpful metrics to start with include the ratio of cost to repair an asset versus purchasing a new one, minimum performance targets, appropriate monitoring of critical and expensive-to-repair assets and avoiding consequential failures. These KPIs should be added to and refined over time.

It is also very important to maintain a whole lifecycle management outlook to effectively manage the total cost of ownership.



**Leadership
buy-in is key to
success**

- If there is one clear predictor for the ultimate success of asset management programs, it is leadership. When senior leadership is directly involved and supporting the asset management effort, the programs endure and achieve better outcomes. Without executive sponsorship, the effort tends to flounder and lose momentum. MentorAPM has had the privilege of working with some amazing utility leaders who are casting a vision for what their asset management program is going to achieve and who are putting the resources against it.

A red speech bubble graphic with a white outline, containing the text 'Asset management is not software'. The bubble has a tail pointing downwards and to the left.

**Asset
management is
not software**

Software is just a tool to support an overall asset management strategy and program. EAM/CMMS software is only going to be as effective as the asset management plan it supports. This is one of the reasons so many EAM implementations fail or fail to deliver expected results.

A red speech bubble graphic with a white border, containing white text. The bubble has a tail pointing downwards and to the left.

**Asset
management is
not a better
maintenance
plan**

Maintenance is just one part of the asset lifecycle.

Asset management is a coordinated set of business practices that covers the whole lifecycle of an asset from design to acquisition through operation and maintenance to disposition.

Asset management is a strategic discipline that includes the tactical efforts of managing assets, such as maintenance.

A red speech bubble graphic with a white outline, containing the main text. The bubble has a tail pointing downwards and to the left.

**Asset
management is
not condition
assessment**

Too often when a water or wastewater utility talks about their asset management plan, what they are really describing is their condition assessment plan for their network.

Condition assessments are vitally important and deliver an excellent return, but again, they are just one part of the big picture of asset management.

The background features several thin, curved lines in shades of gray, some solid and some dashed, creating a sense of motion or flow. A prominent red speech bubble is positioned on the left side, containing the main title text.

Outcomes to expect from an asset management program

Implementing an asset management program will deliver positive results for a utility. Managers and administrators will be able to make better decisions for better outcomes.

Simply completing a criticality analysis will allow them to make adjustments to O&M plans for almost immediate returns.

In Conclusion

Protecting water quality through adequate wastewater treatment is critical to maintaining economic vitality and quality of life.

The concepts of asset management should provide the tools needed by wastewater systems to actively and consistently analyze current operations and future needs in order to develop robust management systems and well - designed infrastructure to meet the growing challenges of the future.



THANK YOU