

ASSET MANAGEMENT

HANDBOOK & TOOLKIT

November 2023



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INTENDED USE

The intent of this handbook and toolkit is to introduce asset management to communities throughout New Hampshire, with a focus on implementation.

The New Hampshire Department of Environmental Services (NHDES) has adopted and built off of EPA’s defined core elements of asset management:

1. What is the current state of the assets?
2. What is the required, sustained level of service?
3. Which assets are critical to sustained performance?
4. What is the best “minimum life cycle cost” capital improvement plan, and operation and maintenance strategies?
5. What is the best long-term financing strategy?

In addition to each of these elements being covered within this document, NHDES also recognizes the need to create an implementation plan with a focus on the importance of communication. This handbook summarizes the core elements that can be used to obtain a deeper understanding of asset management and includes supporting materials in the appendices.

HANDBOOK AND TOOLKIT USES INCLUDE:

- An overview of the asset management process, the objectives, as well as the benefits involved.
- Identification of the core elements of asset management that promote success.
- A description of how to manage information and data for successful asset management and good decision making.
- Suggested implementation practices for asset management.
- Examples and editable tools and templates.

“We don’t have the resources to implement asset management!”

Asset management does not need to be expensive.

Start small with free or inexpensive tools and/or available information and expand from there as needed. Ultimately, asset management will save you money, so money spent should be considered an investment.

For questions on the material provided within this handbook and toolkit, or additional asset management questions, please reach out to:

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1. WHERE TO START?

Wondering where to start is common when beginning to implement an asset management program. A community can start wherever it makes the most sense for the organization based on what's driving the desire to implement asset management and the end goal. If a community is still unsure, a general pathway is shown below, providing guidance on where to start as well as acting as a roadmap for continuous improvement.

GENERAL PATHWAY

Identify a Champion and Build a Team: The champion will be in charge of bringing people together and maintaining progress moving forward. The team should include people who have knowledge about finance, operations, planning, and engineering. The team should also include other departments (operations, highway, and/or IT, and others) to have inclusive representation for the entire community.

Assess Assets: Bring together available information on the assets to obtain a high-level picture of what is owned, the level of service being delivered, assessment of risks, and costs. Compile this information into a central inventory or location. Use the information at hand to get started. The asset data can be improved upon as the process continues and should be evaluated on a regular basis.

Assess Asset Management Practices: As a team, assess the current practices related to understanding services, risks, costs, and making decisions. The practice of asset management may already take place in certain areas. For example, operation crews may have institutional knowledge of the last time an asset was serviced and an approximation of when it needs to occur again.

Identify Priorities for Improvement: Based on the assessment of assets and asset management practices, select priorities for improvement. These might be capital or operational projects to mitigate risk or increase service, or they might be initiatives for improving documentation or understanding of service, risk, or costs and funding.

Implement and Monitor: Implement the work needed to address your top identified priorities. This might include capital projects, conducting maintenance, or developing policies, strategies, or plans. Evaluate and monitor the work needed on a regular basis to continue to appropriately address these top priorities.

ENGAGING DECISION MAKERS

When it comes to engaging with community officials about the topic of asset management, it is critical that these officials be informed and engaged on an ongoing basis using data generated from the asset management program. In many cases, the community officials are the asset owners and may have the final say in major decisions about service, risk and cost. The following topics are important to communicate with decision makers:

- Benefits of asset management, in the specific context of the community.
- Need for asset management as an ongoing practice to inform decision fiscal making.
- Summary of the connections between service, risk, and cost for the community.

Some operators/managers choose to obtain direction on building an asset management program from community officials before investing efforts. Other operators/managers seek an official directive after doing some initial groundwork to understand assets, services, risks and costs in order to highlight the importance of practicing asset management. Either approach is acceptable since the main objective is to have formal endorsement and buy in for building an asset management practice.

Champion

- Someone who can drive asset management forward.
- An individual's department or title doesn't matter.
- This individual needs to have good "people" skills and exceed at bringing people together.

Team

- Supports the champion through a cross departmental team.
- Ideally, the team should include someone from finance, public works, engineering, and planning. Other departments within your organization should be considered as well.

Management & Officials

- Since asset management is ultimately about decision making, success depends on support from management and officials.
- Support may not be available from the very beginning, as some up-front work might be needed to frame the issue and build buy-in. Time and financial investment should be limited until support is gained.

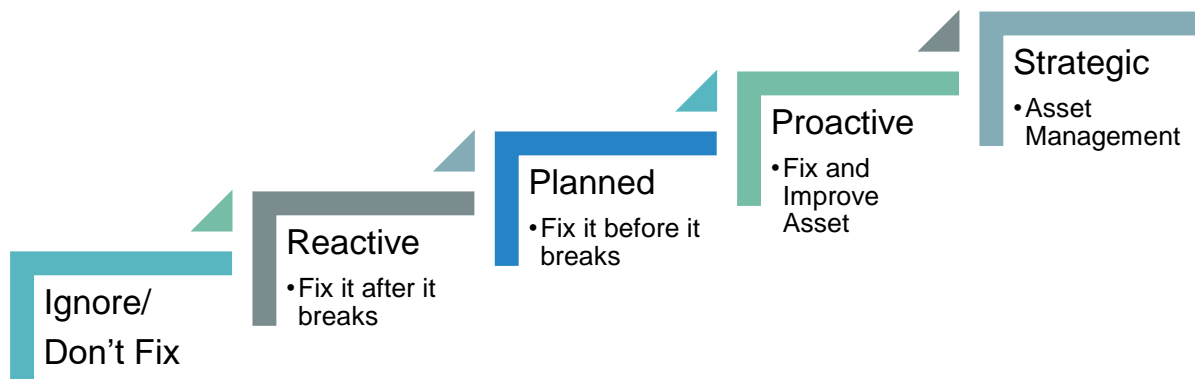
2. WHAT IS ASSET MANAGEMENT?

Asset Management is about delivering a specified level of service to customers at an optimal life cycle cost and an acceptable level of risk with a strategy that ensures long-term sustainability of public assets.

The development and implementation of an asset management program can help reduce operating risks and address infrastructure challenges, such as aging, deteriorating, undersized and oversized infrastructure. The practice of asset management can assist with answering the following questions:

- Which assets should we replace/repair first?
- How much money do we need to put into reserves for asset replacement/repairs?
- How much should we be spending on operation and maintenance?
- What is the optimal repair to extend service life while continuing to maintain the appropriate level of service?
- How often is a particular asset requiring repairs or replacement and is there a better solution to the current way of approaching the problem?
- How are environmental and personnel assets addressed?

The practice of asset management enables a community to examine the criticality for each asset as well as the performance of the assets. Asset management also helps shift from reactive management of assets to proactive management, thereby increasing the benefits and cost effectiveness of investments. The graphic below summarizes the different stages of the asset management journey. Some still ignore or do not address issues with their assets, while others have a strategic asset management program in place.



WHY PRACTICE ASSET MANAGEMENT?

The residents and businesses in communities throughout New Hampshire trust and expect those in charge to be good stewards of the services and infrastructure that they rely on every day. What condition is the infrastructure currently in? Is there room for the community to become more robust or resilient to unexpected changes, and can the community be more sustainable? Can the community improve the use of its resources and extend the life of its existing infrastructure in a financially sustainable way?

BENEFITS OF ASSET MANAGEMENT

- Helps the community confidently evaluate and communicate trade-offs between service, cost, and managing risk.
- Provides a data-driven, defensible way to prioritize projects and resources.
- Aligns the organization to focus on the things that matter most.
- Helps to decide what infrastructure needs to be repaired, replaced or renewed, and how many years of service can be expected from each asset.
- Provides guidance for when to implement which repairs and where to extend the lifetime of certain assets.
- Helps determine how much the community should save for future infrastructure renewal.
- Helps demonstrate need and accountability to community leaders, residents and businesses in the community.

There are lots of ways of approaching asset management, but at even the most basic level, asset management is always about data-informed decisions with an understanding of service, risk and cost. The difference between an entry level approach to asset management and a mature, in-depth approach is not what content is considered, but increased data accuracy, levels of analysis, integration, documentation, and formalization of processes.

“Asset management is a software program, right?”

NO. Asset management is a set of practices to promote good decision making, and it’s an ongoing process. Software can be a useful tool, but it’s not going to replace the need for people to make decisions.

3. VISION STATEMENT & STAKEHOLDERS

Identifying and defining a vision statement and focusing on the identified stakeholder groups as an initial step in the development of an asset management program sets the stage for the overall program.

VISION STATEMENT

The first step in the development of an asset management program is defining a vision that describes what the goals are for the development of the program. When properly crafted, this community-specific vision statement will help communicate to stakeholders, the purpose and overarching goals of what asset management will accomplish for the community.

EXAMPLE VISION STATEMENT

“To provide continuous, reliable, sustainable, high quality service to the community in order to protect its public health, infrastructure, public assets and environment.”

To create an asset management vision statement, think about what the community wants asset management planning to look like. Examples of vision statements from other communities throughout New Hampshire can be found in [Appendix A](#). These examples can be used as a starting point for the asset management team to discuss. The vision statement is unique and should reflect the organization’s goals.

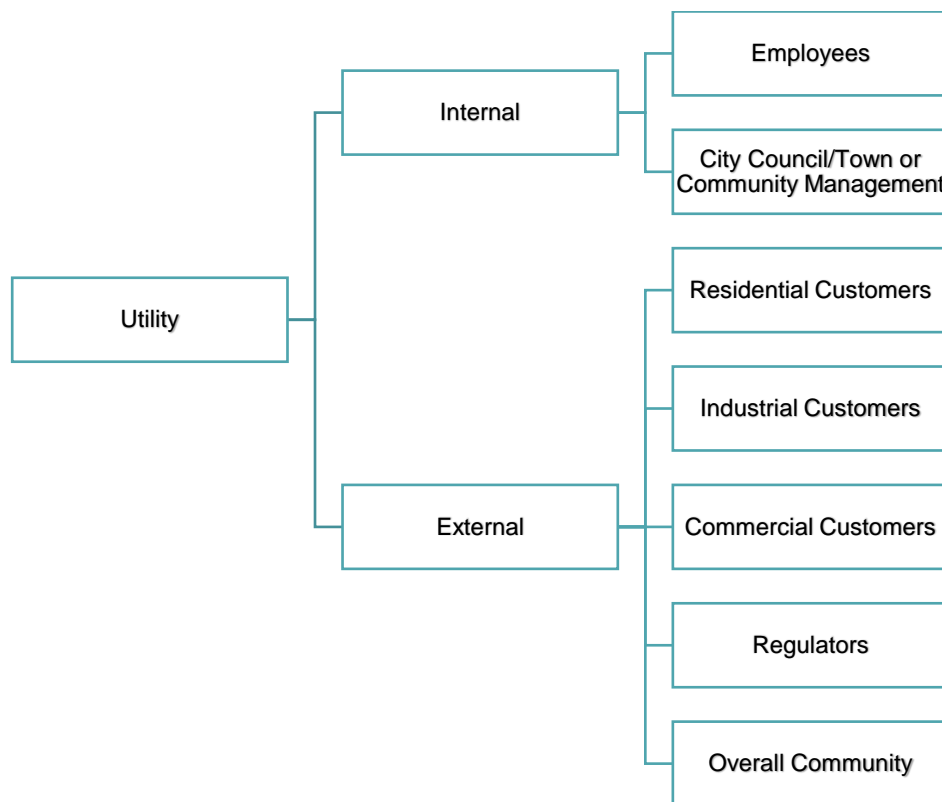
STAKEHOLDERS

Once a community starts involving all stakeholders, implementation of a more effective asset management process can occur. Although essential to asset management, the concept of an organization’s stakeholders is often overlooked or inconsistently applied. A stakeholder is defined as any person or group who affects, is affected by, or perceives themselves to be affected by the activities of the organization. Basically, anyone who impacts or is impacted by the organization is a stakeholder.

Every organization has a distinct list of stakeholders. Most have common stakeholders (ex. regulatory bodies, customers, etc.), while others are unique to the social, cultural, economic, environmental and physical environment in which the organization operates. Identifying the organization’s stakeholders,

particularly those connected to managing assets and understanding their needs and expectations is an important building block to developing and implementing an asset management program. Internal stakeholders refer to the parties within the organization, while external stakeholders represent outside parties, which are affected by the communities' activities.

Involving stakeholders in the process of discovering and documenting needs and expectations has tremendous value, as needs can often be misunderstood or distorted as they pass through layers of management.



Internal stakeholders are as important as external stakeholders. Internal stakeholders, such as a board of directors/commissioners, municipal managers/administrators, owners and operators, and external stakeholders such as customers can all have unique needs and expectations that should be analyzed and addressed. An example of different internal and external stakeholders identified is shown above.

4. LEVEL OF SERVICE

Level of Service defines the way in which the community leaders, managers, and operators want the community's assets to perform over the long-term.

Knowing the required level of service will aid in implementing an asset management program and will help frame communication to stakeholders. **Infrastructure is not inherently valuable; infrastructure is only as valuable as the service it provides to the community.** Rather than jumping straight to pipe breakage rates, it's important to start with defining the service in terms that residents and businesses will understand – like water service outages. This helps to ensure the priorities for limited resources are aligned with what the community values. Benefits of understanding level of service include:

- Staff can seek efficiencies with clear performance targets established.
- Members of the community know what to expect and what they are paying for.
- Projects can be prioritized based on their impact to provide or sustain the agreed upon level of service.
- Consequences of risks can be evaluated in terms of their impacts on the level of service.
- Clear and consistent communication can be presented to the stakeholders about what service levels will be provided, why, and at what cost. Clarification of stakeholder needs should be obtained prior to determining the cost, so aligned decisions can be made.

After defining stakeholder needs, the quantitative and objective performance metrics for each need or expectation should be established. By establishing these metrics, staff can conduct performance monitoring and precise corrective action when needed. These metrics can also connect directly to any stakeholder needs or expectations that are related to asset management objectives. This critical piece in the development of an asset management program is known as defining level of service goals.

Level of Service goals:

- Define performance measures and realistic targets and timeframes to achieve the goals if they are not already being achieved and to document progress.
- Discuss external trends or issues that may affect expected level of service or the community's ability to meet level of service goals (examples can be new permit limits, financial resources or climate change impacts).
- Show current performance relative to the targets set out (usually through the use of a spreadsheet).

When defining your level of service goals, remember to write SMART(ER) goals – Specific, Measurable, Attainable, Relevant, Time Bound, Evaluate and Re-Do. This will allow the community to track its performance, show successes and failures and revise for improvement each year. Goals should be changed or adjusted over time. Goals can also be added or removed from the list.

SPECIFIC

- Well defined.

MEASURABLE

- How will you know if the goal has been achieved? Be able to show progress.

ATTAINABLE

- Is the community/staff capable of achieving the goal?

RELEVANT

- Does the metric fit with the broader goals of the organization?

TIME BOUND

- Provides time frame to achieve goal.

EVALUATE

- Constantly measure how the original goals measure up to reality.

RE-DO

- If the original goals need adjustments, simply update, or re-do them.

Determining level of service goals should not be overwhelming. Keep it simple, develop 10 to 12 goals around the most important aspects for the community. NHDES provides a template for a [level of service goals spreadsheet](#) to help get you started, as well as water, wastewater and stormwater examples to help brainstorm ideas.

5. ASSET INVENTORY

An inventory of assets is essential in order for utilities to operate efficiently. Along with the inventory, you must conduct a condition assessment to have a better understanding of the state of each asset.

The first step in managing assets is identifying their existence and location and knowing their current condition. Many communities do not have a complete inventory of their infrastructure assets that includes essential information like age, condition, and expected life of such assets. To develop the initial inventory, there are a number of resources that can be drawn upon such as:

- As-built drawings.
- Operations and maintenance (O&M) manuals.
- Invoices.
- Staff knowledge.
- Visual observations.
- Interviews with stakeholders and consultants.

Community leaders. Managers and operators should use as many approaches as deemed necessary to get the best initial inventory of assets.

Questions to ask about inventory:

- What assets do I own?
- Where are my assets?
- What condition is each asset in?
- What is the remaining useful life of each asset?
- What is the value of each asset?

A common mistake that many utilities make during this process is getting hung up on making a decision about which software and technology should be used to create the inventory list. While the use of technology is encouraged to create efficiency in collecting and analyzing the data, software is not the only method of achieving this goal. A spreadsheet, or even a handwritten list, could be effective to at least get started. NHDES provides a basic [downloadable Excel-based inventory template](#) which can help start the inventory process.

Inventory Starting Points:

- Identification number (ex. unique number assigned to the asset).
- Asset Name.
- Location (ex. street name and/or address, name of building).
- Asset category (ex. Pump), Asset type (ex. raw water pump).
- Pertinent capacity information (ex. size, length, horsepower, etc.).
- Installation date and estimated remaining useful life.
- Condition.
- Likelihood of failure (LoF).
- Consequence of failure (CoF).
- Overall risk ratings.

6. PRIORITIZATION OF ASSETS

Criticality is the measure of risk associated with an asset. Knowing which assets are more critical than others can aid in determining:

- *how to prioritize the spending of limited funds;*
- *where to deploy limited personnel resources;*
- *how to manage an individual asset or collection of assets over time; and*
- *capital improvement planning decisions.*

Not all assets are equally important. Some assets are highly critical to operations and achieving level of service goals while others have limited criticality. Projects and activities should be prioritized based on the results of a criticality analysis in order to efficiently use limited financial and personnel resources.

To identify which assets are critical, two questions are important:

- How likely is the asset to fail (likelihood or probability of failure)?
- What are the consequences if the asset does fail (consequence or impact of failure)?

There are several modes of failure that assets may have outside of mortality and there are many factors that can impact the likelihood of an asset failing. The factors taken together provide an overall assessment of the asset's likelihood of failure and are commonly represented with a numerical rating scale (1 to 5 or 1 to 10), where the lower number represents lower likelihood of failure and the higher number, a higher likelihood of failure. A zero probability is not used because no asset has zero risk. There is always at least a small chance the asset could fail.

After the likelihood of failure of each asset is determined, the impact of the failure must be evaluated. Determining the consequence of failure involves consideration of several tangible and intangible factors and can also be expressed numerically using a similar rating scale as likelihood of failure.

“Is there more information on factors that can be used to develop risk?”

YES. A [great resource on developing risk](#) was developed by Southwest Environmental Finance Center.

CRITICALITY SCORE

The product of the consequence of failure and likelihood of failure ratings provides the overall criticality score (risk score) for a given asset. The higher the score, the greater risk.



Calculating criticality scores gives a structured approach for comparing risk across asset types. Quantifying risk for each asset type provides an informed prioritization process that not only identifies the highest risk assets, but also allows for the comparison of risk reduction options. The criticality of any given asset will change over time. However, there are ways to reduce risk and utilities should investigate which methods will work best for given assets or asset classes. One example of how to reduce risk would be replacing or rehabilitating the asset.

Once a criticality score has been assigned to each asset, the data should be evaluated to create a prioritization framework. The severity of the risk can also be visualized in a matrix (see the example below where the values represent the number of assets in each risk category). This is a useful tool for communicating asset risks to community officials and/or members who may not understand what a particular criticality score might mean.

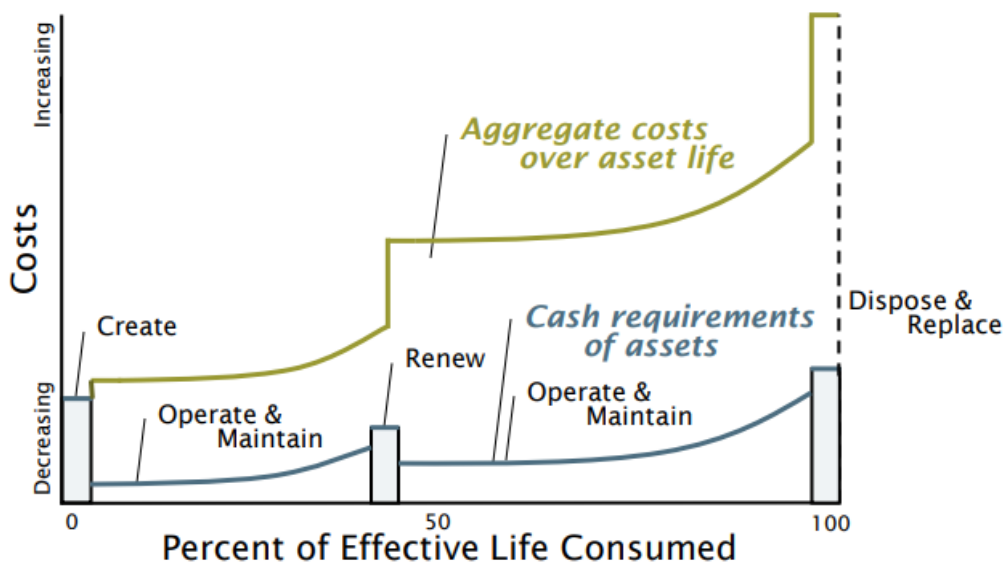
| | | | | | | |
|------------------------------|---|-----------------------------|-----|-------|-----|----|
| Consequence of Failure (COF) | 5 | 0 | 1 | 9 | 2 | 0 |
| | 4 | 0 | 59 | 419 | 295 | 2 |
| | 3 | 0 | 322 | 1,212 | 591 | 11 |
| | 2 | 0 | 15 | 67 | 25 | 0 |
| | 1 | 0 | 0 | 0 | 0 | 0 |
| | | 1 | 2 | 3 | 4 | 5 |
| | | Likelihood of Failure (LOF) | | | | |

7. LIFE CYCLE COSTING

Life cycle costing is a method that provides an estimate of the total capital, operating, and maintenance costs for an asset over its operating life.

This core element in asset management is an important concept because it allows a community to place an emphasis on long-term costs. A community that does not conduct life cycle costing internally only utilizes the benefits of immediate purchase cost. Although a great first step, without conducting life cycle costing, the community may not have the ability to fully understand total costs that will be needed during the asset’s useful life. Without fully accounting for operating costs as well as maintenance costs, the community cannot make a cost effective decision relative to purchasing equipment or other assets. Many communities prefer the lowest upfront expenditure, which is frequently, not the cost effective option over the life cycle of the asset.

To get the most out of asset life cycle costing, key information is required, such as historical data on condition, performance, maintenance, related energy use, risk and capital cost. By collecting and analyzing this data, data-driven decisions about the assets can be made. Start thinking about where existing data is located and where future records should be kept. Understanding each asset’s life cycle improves the effectiveness of long term planning (like Capital Improvement Plans).

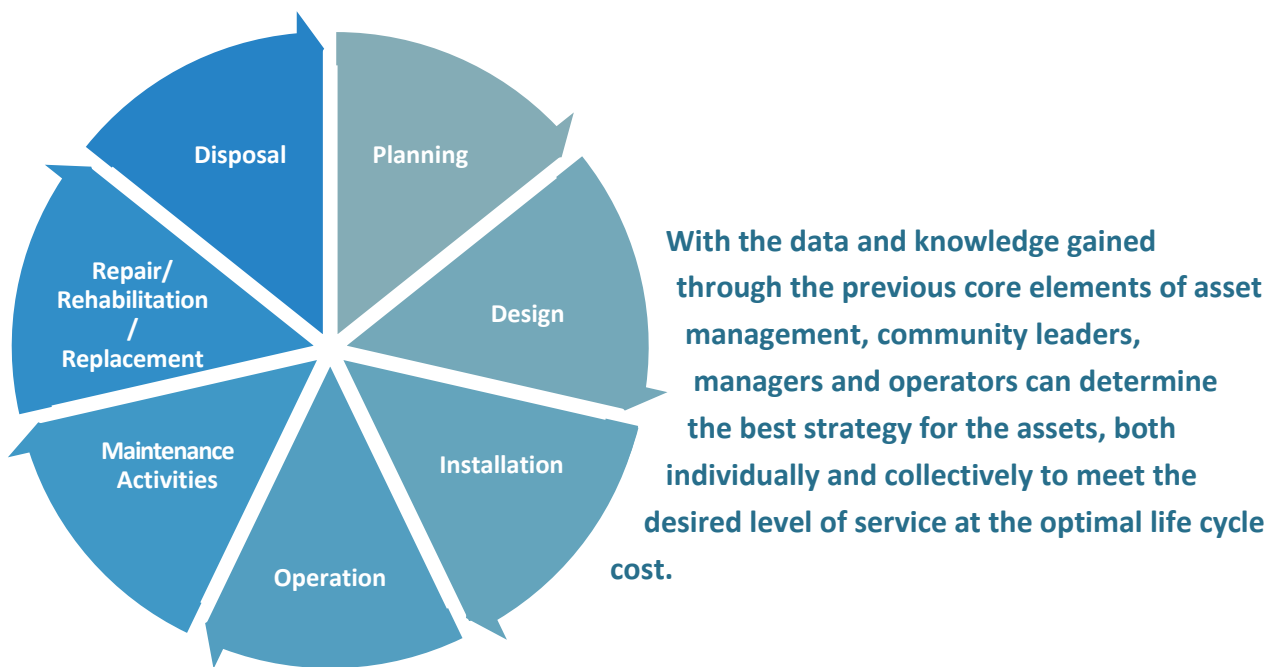


Source: [life cycle and replacement costs \(epa.gov\)](https://www.epa.gov/life-cycle-and-replacement-costs)

Analyzing the life cycle cost of assets include a variety of short-term and long-term benefits, such as:

- Knowledge about total asset costs.
- Ability to prepare maintenance schedules that promote efficiency of staff’s time and resources.
- More accurate maintenance and repair budgets.
- Greater detail when predicting general costs.

The phases of an asset’s life include every time a decision or expenditure is made related to the asset. Throughout the asset’s life sufficient funding to enable the asset to provide the required level of service must be located. Without sufficient funding, community managers and operators may not be able to intervene as needed during the asset’s life and the asset may fail prematurely, creating an emergency situation and reducing the overall cost effectiveness.



The prioritization of assets and criticality analysis covered in the previous section acts as the foundation for decision making for asset O&M as well as for determining when to repair, rehabilitate, or replace a given asset. Prioritization based on criticality identifies those assets that are high, moderate and low risk. Basing decisions on asset criticality allows community leaders, managers and operators to optimize funding and can guide the decision making process in terms of repair, rehabilitation, and replacement.

8. FUNDING STRATEGY

A funding strategy involves determining the best manner in which to allocate funds for the operation, maintenance, repair, rehabilitation and replacement of assets.

In order to prepare long-term financial forecasts, a community must outline the future financial requirements based on all information related to asset creation, maintenance, renewal or rehabilitation, as well as disposals.

When preparing the strategy, four questions can assist:

- What funds are needed to acquire, operate, maintain, renew or rehabilitate and dispose of assets?
- What is the timeline when funds are required?
- Will these funds impact user rates?
- What personnel resources will be required to operate and maintain the assets?

To break things down, there are five expenditure types that a community should plan for. Each of these has an identified typical funding source as well.

| Expenditure Type | Description | Funding Source |
|--|--|--|
| Operational | Expenses which have no effect on the asset condition but are necessary to keep the asset utilized appropriately. | Annual Budget, Rates, Revenue |
| Maintenance | The ongoing day-to-day work required to keep assets operating at required service levels. | Annual Budget, Rates, Revenue |
| Renewal | Significant work that restores or replaces an existing asset towards its original size, condition or capacity. | Annual Budget, Rates, Revenue, Reserve funds, Grants, Loans, Bonds |
| New Work, Development, Capital Projects | Works to create a new asset, or to upgrade or improve an existing asset beyond its original capacity or performance, in response to changes in usage, customer expectations, or anticipated future need. | Annual Budget, Rates, Revenue, Reserve funds, Grants, Loans |
| Disposal | Any costs associated with the disposal of a decommissioned asset. | Annual Budget, Rates, Revenue Reserve funds, Grants, Loans |

Revenues are a major component of an asset management program. The revenues must fund the operation and maintenance of the assets as there generally are no outside funding sources for routine operation and maintenance of water, stormwater or wastewater assets. In addition, the rates will need to fund reserve accounts for emergencies, repairs, and debt service (for any loans).

Community revenues from:

- User fees.
- Hook-up fees.
- Stand-by fees.
- Late fees.
- Penalties.
- Reconnect charges.
- Developer impact fees.

Community reserve funds:

- Emergency reserves.
- Capital improvement reserves.
- Debt reserves.

Community generated replacement funds:

- Bonds.
- Taxes.

Non-Community revenues:

- State grants/loans.
- Federal grants/loans.
- Private grants.

If a community engages in asset management as rates and budgets are set, the rates may increase as the community moves from being traditionally underfunded to being properly funded. However, rates and budgets that are based on sound asset management principles are very defensible to the public and stakeholders. **Asset management brings transparency to the process of rate setting.** The more clearly the rate can be explained using sound data, the more likely the rate is to be accepted by the public and stakeholders.

9. IMPLEMENTATION PLAN

The implementation plan should be a “road map” to detail how the community will do each core element and how it will continue with asset management over the long-term.

Any steps a community undertakes in the area of asset management will improve its overall operation. A community should be able to jump right into asset management and get started with minimal preparation or resources. As time passes, improvements to the program and increases in knowledge base and data quality will be made. A community may wish to increase its sophistication and input a greater degree of resources over time. However, the most important thing is for a community to get started on a more systematic manner of operating. The more sophisticated and cohesive the program, the greater the level of improvement. The implementation plan does not need to be lengthy. The goal is to make asset management implementation easy to understand and usable by the employees or volunteer workers. The implementation plan should provide:

- A baseline for what training is available and how decisions were made.
- Standard operating procedures for how to move forward with the goal of making asset management part of the work culture.

Tips for Developing an Implementation Plan:

- Develop a single document discussing each of the asset management core elements. This approach must be flexible and should contain an explanation of how each component is handled, not the actual data obtained from each component. **The actual data should be in a changeable format that can easily be updated.**
- Written in a format that all levels of the community can readily use. The implementation plan should be readily available to all members of the organization and distributed freely. Also consider making the implementation plan available on the community website for customers of the organization. Sharing this information will increase trust through transparency.

Continuously update the data as operational duties are performed. This type of updating should not require the overall plan to be revised. **The program should be periodically reviewed (annually or biannually) to determine if the overall methodology used for each asset has changed in any way.**

10. COMMUNICATION PLAN

A communication plan should act as a roadmap for communicating data, information and knowledge to both internal and external stakeholders.

Communication is key to building a successful asset management program. This is where content, goals, responsibilities, sources, audience, format and outlet can be identified for a list of planned communications.

By communicating the results of data that was collected, ranked, and identified as critical, the community's needs are made clear to decision makers. A communication plan can also be used to educate and inform the public.

A common and direct method that is widely used throughout New Hampshire is creating a bill stuffer. This can help connect with the target audiences at optimal moments, such as in advance of a rate increase or during the implementation of a new project, either at a facility or within the community. Bill stuffers can be used to effectively communicate the “how” “what” and “why” to help increase public understanding. Additionally, to optimize outreach, consider bill stuffers around/during events and celebrations (examples of which are listed on the next pages).

More than one method of communication should be used for an asset management program communication plan since multiple avenues are needed to reach all internal and external stakeholders. By using multiple messaging platforms, a larger audience can be reached. Communication platforms can include:

- Inserts for water/wastewater bills.
- On-bill messaging to help customers better understand the services they are being billed for.
- Fact sheets, websites and social media posts.
- ESRI StoryMaps.
- Emails to community leaders and key decision makers and customers.
- Press releases, media pitches and videos.
- Local television.

- Kiosks.
- Public speaking and/or information booth opportunities such as town hall meetings, budget meetings, festivals, editorial board meetings, media interviews, etc.


Another method that can be leveraged that your target audience will be familiar with and trust in is radio. With radio stations and/or on-air talent, you can effectively reach, educate and influence community members on a large scale.

Using and posting social media graphics is another way to sustain a connection with the community and continually reinforce key messages. Post and use the graphics on a regular basis and especially during water-centric holidays and celebrations.

Finally, establish a plan that includes the most appropriate communication method for each stakeholder group. Create a plan that provides an update on defined performance metrics. The plan should include the method (how communication will occur), format (how communication will be structured), and cadence (how frequently communication will happen). The communication plan should be agreed upon between the community and each stakeholder group to ensure that communication is occurring frequently and effectively and meeting the needs and goals of the stakeholders.

Events and Celebration Examples:

- Engineers Week (February)
- National Groundwater Awareness Week (March)
- Fix a Leak Week (March)
- World Water Day (March)
- Earth Day (April)
- Drinking Water Week (May)
- Infrastructure Week (May)
- World Water Week (August)
- Protect Your Groundwater Day (September)
- Stormwater Awareness Week (September)
- Septic Smart Week (September)
- Imagine a Day Without Water (October)



Reach out. Contact us through the information provided [at the beginning of this document](#), and we can provide insight on what others throughout New Hampshire are using and contact information.

APPENDIX A - EXAMPLES

Sample Useful Life Data

| Asset | Estimated Useful Life (years) |
|----------------------------|--|
| Storage Tanks | 50 to 80 |
| Treatment Plant Structures | 60 to 70 |
| Treatment Plant Electrical | 15 to 25 |
| Water Lines | 65 to 95 |
| Pumping Station Structures | 60 to 70 |
| Pumping Station Electrical | 25 |
| Intake Structures | 34 to 45 |
| Wells and Springs | 25 to 35 |
| Galleries and Tunnels | 30 to 40 |
| Chlorination Equipment | 10 to 15 |
| Gravity Sewer Lines | 80 to 100 |
| Manholes | 20 to 50 |
| Risers | 25 |

Asset Management

Handbook & Toolkit

| Stormwater Asset | Estimated Useful Life (years) |
|--------------------------------|--|
| Stormwater Pipes (Metal) | 10 to 30 |
| Stormwater Pipes (Brick/Stone) | 50 to 60 |
| Stormwater Pipes (Clay) | 75 to 100 |
| Stormwater Pipes (Plastic) | 75 to 100 |
| Stormwater Pipes (Concrete) | 75 to 100 |
| Stormwater BMPs* | 10-20** |

BMPs are Best Management Practices. EPA's National Menu of BMPs for Stormwater can be found at this website: [National Menu of Best Management Practices \(BMPs\) for Stormwater | US EPA](#)

** Stormwater BMPs are highly dependent on the proper and timely operation and maintenance. There is a lack of research on lifespan on BMPs because they are a relatively new concept. The estimated useful life is based on professional opinion.

Example Unique Identifiers

Example 1: ABC-DEFG1234

ABC = Facility Designation (i.e., which pump station, well, treatment building, etc.)

DEFG = Equipment Type (i.e., description of the equipment, such as pump, blower, well)

1234 = Equipment Numbering

First Number = Process Number (primary treatment, secondary treatment, etc.)

Second through Fourth Numbers = equipment number

AP-PMP2001 is the Atlas Plant Pump in the Pretreatment Building, Number 001

AP = Atlas Pump

PMP = Pump

2 = Pretreatment

001 = Pump Number 1

Example 2: A-BCD-EFG-123

A = Utility Type (water or wastewater)

BCD = Major Category (water - source, treatment, distribution; wastewater - collection, treatment, solids handling, discharge)

EFG = Equipment Type (i.e., description of the equipment, such as pump, blower, well)

123 = Equipment Number

W-TMT-FIL-034 is the Water Treatment Filter number 34

W = Water

TMT = Treatment

FIL = Filter

034 = Number 34

Example 3: M - 1234 - ABCD - 1234

It is also possible to have a numbering scheme that is for a specific asset class, such as manholes.

M= Manhole

1234= House Address

ABCD = Street Abbreviation

1234 = Manhole Number

M-3201-MNTG-0345 is the Manhole near 3201 Montgomery Street, number 345

M = Manhole

3201 = Nearest House Number

MNTG = Montgomery Street

0345 = Manhole Number

Another resource with an example of a developing a numbering system can be found here:

[Developing a Manhole or Catch Basin Numbering System | Eliminating Sanitary Sewer Overflows in New England | US EPA](#)

Vision Statement Examples

Example 1: Use Asset Management to achieve better communication and planning both internally and externally between both Towns' management, wastewater staff and the public.

Example 2: We commit to improving and maintaining the public health protection and performance of our wastewater collection system, while minimizing the long-term cost of operating those assets. We strive to make the most cost-effective renewal and replacement investments and provide the highest-quality customer service possible.

Example 3: Collect institutional knowledge and make it available to staff members and Town management. Effectively communicate buried infrastructure needs to elected officials and members of the public.

Example 4: To provide continuous, reliable, sustainable, high quality service to the community. To protect community's public health, infrastructure, public assets and environment.

Example 5: The Town will meet the generally accepted wastewater industry standard of care for current sewer customers, meet its established level of service goals, facilitate opportunities for additional sewer customers, and balance annual program needs with sustainable customer costs.

Example 6: We commit to improving and maintaining the public health protection and performance of our wastewater facility and distribution/collection utility assets, while minimizing the long-term cost of operating those assets. We strive to make the most cost-effective renewal and replacement investments and provide the highest-quality reliable customer service possible. We promote reasonable growth of the system and will utilize this asset management plan to optimize available funds to maintain the existing assets.

Example 7: Integrate data sources and leverage available information in order to coordinate and streamline reporting and decision-making to optimize system performance.

Example 8: Utilize asset management to achieve improved communication both internally and externally with the Town Select Board and the community.

Example 9: We commit to improving and maintaining the public health protection and performance of our drinking water/wastewater plant and distribution/collection utility assets, while minimizing the long-term cost of operating those assets. We strive to make the most cost-effective renewal and replacement investments and provide the highest-quality customer service possible.

Example 10: Continue to build and expand on the asset management program. Use data-driven approach to support decision-making and facilitate communication between Town staff, elected officials and members of the public.

Example 11: Conversations with Town staff indicate that a desired first step is to identify those areas where improvements to multiple systems are necessary and address those overlapping needs.

Example 12: We commit to improving and maintaining public health protection and performance of our water recovery assets, while minimizing the long-term cost of operating those assets. We strive to make the most cost-effective renewal and replacement investments and provide the highest-quality customer service possible.

Level of Service Examples

Drinking Water

1. Meet Federal Safe Drinking Water Act Primary Drinking Water Standards 100% of the time.
 - a. *Is it measurable? Yes*
 - b. *How often would you measure? Annually*
2. Customers will receive a 24-hour notice for planned outages. Planned outages will last no longer than 8 hours per event 98% of the time.
 - a. *Is it measurable? Yes*
 - b. *How often would you measure? Annually*
3. Utility staff will receive 20 hours of training each year to ensure efficient and effective maintenance is completed.
 - a. *Is it measurable? Yes*
 - b. *How often would you measure? Annually*

Wastewater

1. Utility will meet all state and federal regulatory standards.
 - a. *Is it measurable? Yes*
 - b. *How often would you measure? Monthly Compliance Reports*
2. Less than 10 odor complaints per year.
 - a. *Is it measurable? Yes*
 - b. *How often would you measure? Review customer complaint logs yearly.*
3. Less than 4 sewer back-ups per year.
 - a. *Is it measurable? Yes*
 - b. *How often would you measure? Review log of work orders yearly.*

Stormwater

1. Clean and inspect a minimum of 50% of catch basins and drain manholes.
 - a. *Is it measurable? Yes*
 - b. *How often would you measure? Biannually*
2. Sample outfalls – 0-100% to comply with permit - MS4 IDDE program compliance dry weather inspection and as identified in the Illicit Discharge Detection and Elimination (IDDE) Program Plan.

- a. *Is it measurable? Yes*
- b. *How often would you measure? Sample when no more than 0.1 inches of rainfall has occurred in the previous 24-hour period and no significant snow melt is occurring.*

Inventory Types

Drinking Water

Example Assets:

- Distribution System/Pipes/Mains
- Valves
- Hydrants
- Storage
- Well
- Assets at Treatment Facility
- Assets at Pump house/booster stations
- Meter vaults

Example Information to Collect:

- Diameter
- Age
- Length/miles
- Material
- Manufacturer
- Age
- Capacity/Size
- Materials
- Type
- Appurtenances
- Emergency Power
- Location
- Capacity
- Pump age and type
- Casing size and depth
- O&M History
- Estimated years of service remaining
- Value
- Whether the asset requires energy

Wastewater

Example Assets:

- Primary, secondary, and tertiary treatment units
- Disinfection equipment
- Pumps
- Blowers
- Buildings
- Electronic Components (including control systems)
- Equipment and materials (including gates and valves)
- Piping
- Assets at Pump Stations
- Manholes
- Portable pumps and generators
- Sampling and analysis equipment
- Installation Equipment

Example Information to Collect:

- Brief description
- Location
- Date put into service
- Present operational condition
- Estimated remaining useful life
- Current replacement cost
- Level of redundancy
- Whether the asset requires energy

Stormwater

Example Assets:

- Retention ponds
- Detention ponds
- Catch basins
- Man holes
- Infiltration basins
- Pipes
- Outfalls
- Subsurface gravel filters
- Rain gardens
- Tree box filters
- Vegetated swales
- Permeable pavements
- Vegetated roofs
- Vegetative buffers
- Subsurface gravel wetlands
- Rain gardens
- Cisterns
- Maintenance equipment

Note: This is not an all-inclusive list and all stormwater BMPs should be considered and included.

Example Information to Collect:

- Current condition and location
- Estimated remaining useful life and date of installation
- Historic value (if known) and replacement value
- Whether the asset requires energy
- Descriptive information such as type of material, size, etc.
- Receiving water
- Indicators of potential non-stormwater discharges
- Inspection and O&M schedule
- Track Illicit Discharge Detection and Elimination (IDDE)
- Dry and wet weather samples and analytical results

APPENDIX B - SOFTWARE

Do I Need Software?

Asset Management (AM) and Computerized Maintenance Management System (CMMS) software systems are tools that can assist with managing data, but can also cause issues when staff with specialized training are lost, or don't share the information. Basic asset management in small communities can be conducted with simple spreadsheets and maps. Larger communities tend to want a software program to organize their data. Before jumping right to scheduling software demos, here are some things you should consider before selecting a software system:

- **Know your information and communication needs first.** One example would involve Geographic Information System (GIS) – if you want to access information via GIS but don't have that skillset in house, you might be able to make use of an externally hosted service which could save you a lot of money.
- **Identify existing software programs currently in house within your community and whether they need to be linked to asset management software.** This could range from SCADA to existing GIS. Many communities already have one or more GIS licenses in different departments.
- **Think about staff who will be trained on the software and have access to the system.** What will you do if these people leave? Will job descriptions be modified to include asset management tasks and software experience?
- **The software will need to be maintained.** Generate a plan for who will be responsible for the maintenance of the software as updates occur.

Always keep in mind that asset management is not a software program. Depending on the size of the community, inexpensive programs like Microsoft Excel can be used, but larger communities may want to have a more sophisticated software program developed by a third-party vendor.

So first, does your community need an AM/CMMS software? Smaller communities may be unsure whether software could benefit their operation. Take a moment and ask yourself the questions below to aid in the decision on taking the next step to research software.

- **What does your current data regarding record-keeping look like? Is the data organized or chaotic, with data and materials kept in many different locations? How easily can you locate assets? What data is relevant to those assets?**
 - When record-keeping is unorganized your team could spend more time finding relevant information than making repairs. Asset management software can store everything in a single, searchable database that allows you to make informed data-driven decisions.
- **Are routines moving smoothly? Are these routines as efficient as possible? Are the needs communicated clearly and completed daily?**
 - Planning repairs and service in advance can be challenging, so you may currently be in a reactive stage rather than proactive. Asset management software assists with proactively planning these tasks with standardized processes and set procedures. This will aid in reducing reactive repairs and will free-up valuable time that can then be used on identified critical tasks.

Depending on how you answered the questions above, evaluating software options further may be worthwhile. Usually, software can be a significant investment, both in time and money. Software is available in a variety of prices with an assortment of capabilities. If moving toward software purchase, the next step would be diving into what capabilities you may require or desire from that software. To get started, fill out the questionnaire below and then have the software demonstrate the specific areas requested.

Asset Management

Handbook & Toolkit

| ITEM | REQUIRED | WOULD BE NICE | NOT NEEDED |
|---|----------|---------------|------------|
| Cloud-based platform | | | |
| Ability for local data backup | | | |
| Asset Inventory | | | |
| Ability to add new assets in the future in a user-friendly way | | | |
| Ability to change/modify asset inventory information in a user-friendly way | | | |
| Ability to search for assets in a variety of ways | | | |
| Ability to tie assets to asset ID numbers | | | |
| Ability to assign user-created asset ID numbers | | | |
| Use existing asset hierarchy structure | | | |
| Asset criticality and risk assessment | | | |
| Ability to integrate existing asset risk data | | | |
| Asset risk analysis tools | | | |
| Mechanism to use asset risk to facilitate decision-making | | | |
| Ability to integrate asset useful life estimates | | | |
| Stand-alone capital improvement planning feature | | | |

Asset Management

Handbook & Toolkit

| ITEM | REQUIRED | WOULD BE NICE | NOT NEEDED |
|--|----------|---------------|------------|
| Ability to use asset data to generate a capital improvement plan or suggested list of capital improvements | | | |
| Spare parts inventory | | | |
| Work order system | | | |
| Easy to create work orders (preventive and corrective) | | | |
| Work order status tracking | | | |
| Ability to schedule preventative maintenance work orders based on operational parameters or frequency | | | |
| Ability to track total cost of work order (parts and labor) | | | |
| Ability to use mandatory entry fields for work orders | | | |
| Ability to integrate safety | | | |
| Coordination or integration with ESRI-based GIS | | | |
| Ability to track progress towards key performance indicators (KPIs) and level of service goals | | | |
| Ability to create and display KPI dashboards | | | |
| Mobile applications | | | |
| Compatibility with Android, Apple, or Windows devices | | | |

Asset Management

Handbook & Toolkit

| ITEM | REQUIRED | WOULD BE NICE | NOT NEEDED |
|--|----------|---------------|------------|
| Compatibility with smart phones and tablet | | | |
| Ability to collect data and use applications in online or offline modes | | | |
| Documentation of asset inspections | | | |
| Ability to store photos, videos, and audio recordings | | | |
| Report generation | | | |
| Ability to create and edit data collection and/or productivity-type reports | | | |
| Report customization and guidance included by vendor during installation and configuration | | | |
| Platform for entering/cataloguing business workflow processes | | | |
| Process control data/regulatory data capture | | | |
| Elimination of data input redundancy | | | |
| Ability to add this type of data through mobile devices | | | |
| Customer inquiry/complaint tracking | | | |
| Ability to create standard "form letter" responses to customers | | | |
| Ability to track resource usage | | | |
| Employee time tracking | | | |

Asset Management

Handbook & Toolkit

| ITEM | REQUIRED | WOULD BE NICE | NOT NEEDED |
|---|----------|---------------|------------|
| Vehicle inventory and tracking | | | |
| Tracking both personnel and equipment, including vehicles | | | |
| Integration with closed-circuit television (CCTV) system | | | |
| Ability to store CCTV inspection data | | | |
| Ability to store or link to CCTV videos | | | |
| Ability to tie videos to assets | | | |
| Ability to store CCTV inspection reports/results/ratings | | | |
| Ability to have different levels of user access – read, write, full access, no access | | | |
| Ability to link to/communicate with SCADA | | | |
| Compatibility with other software (mapping and financial software) | | | |
| Ability to facilitate fixed asset inventory audits/updates | | | |
| Ability to easily integrate other departments now or in the future | | | |
| Advanced Options | | | |
| Automatic email alerts | | | |
| Budget Management | | | |
| Document Management | | | |

Asset Management

Handbook & Toolkit

| ITEM | REQUIRED | WOULD BE NICE | NOT NEEDED |
|---------------------|----------|---------------|------------|
| Warranty Management | | | |
| Monitoring | | | |
| Condition | | | |
| Calibration | | | |
| Energy | | | |

APPENDIX C – ADDITIONAL RESOURCES

References / Additional Resources

[Asset Management - A Best Practices Guide.pdf](#)

[SDWLP Principal Forgiveness Points for Asset Management Plans \(wi.gov\)](#)

[Asset Management BC Roadmap - Guide.pdf](#)

[Building Community Resilience Through AM.pdf](#)

[Asset Management Programs for Stormwater and Wastewater Systems: Overcoming Barriers to Development and Implementation \(epa.gov\)](#)

[What are the Key Differences Between CMMS & EAM? \(comparesoft.com\)](#)

[Level of Service: Guidelines, Categories, and Example Goals for Water Systems - Southwest Environmental Finance Center \(unm.edu\)](#)

[Developing a Manhole or Catch Basin Numbering System | Eliminating Sanitary Sewer Overflows in New England | US EPA](#)

[Southwest Environmental Finance Center \(unm.edu\)](#)

[Asset management for stormwater issue brief.pdf \(umd.edu\)](#)

[Reference Guide for Asset Management Tools \(epa.gov\)](#)

[Asset Management Programs for Stormwater and Wastewater Systems: Overcoming Barriers to Development and Implementation \(epa.gov\)](#)

[SCAP-Tool-User-Guide.pdf \(asdwa.org\)](#)

[Capacity Development - ASDWA](#)

[Asset Management – MS4 Resource \(nationalstormwateralliance.org\)](#)

[Asset Management for Water and Wastewater Utilities | US EPA](#)

[Asset Management: A Best Practices Guide, April 2008 \(epa.gov\)](#)

[Asset Management | Southwest EFC \(unm.edu\)](#)

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[Document Display | NEPIS | US EPA](#)

[Asset Management IQ - Environmental Finance Network \(efcnetwork.org\)](#)