



# Managing Small Public Water Systems: Part A, Asset Management

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# Introduction

Part A of the *Managing Small Public Water Systems* series includes worksheets and instructions to help you conduct an inventory of your utility's resources; prioritize repairs and replacements of assets; plan for future needs; and develop a budget. As an addendum to this part of the guide, we have also developed an electronic workbook that contains all the worksheets and instructions that are included in Part A, Asset Management. An electronic version of Part A is available at the SBLGA's Public Water Supply Compliance Tools Web page: <[www.tceq.texas.gov/goto/help4pws](http://www.tceq.texas.gov/goto/help4pws)>.

As you work through Part A, you may find it beneficial to review other parts of the series to help you prepare a comprehensive asset management plan. To view or download the complete series go to the TCEQ Small Business and Local Government Assistance section's Web page Public Water Supply Compliance Tools at <[www.tceq.texas.gov/goto/help4pws](http://www.tceq.texas.gov/goto/help4pws)>. If you do not have Internet access, call the SBLGA's hotline number 800-447-2827 for a paper copy of the complete series *Managing Small Public Water Systems* (publication RG-501).

*Note:* This publication is not a substitute for the actual rules. To obtain the most current, official copy of state rules, contact the Secretary of State's office at 512-305-9623. The rules are also available online at <[info.sos.state.tx.us/pls/pub/readtac\\$ext.ViewTAC?tac\\_view=3&ti=30&pt=1](http://info.sos.state.tx.us/pls/pub/readtac$ext.ViewTAC?tac_view=3&ti=30&pt=1)>.

## Asset Management: The Basics

### What is asset management?

Asset management can be defined as “a planning process that ensures that you get the most value from each of your assets and have the financial resources to rehabilitate and replace them when necessary.” This includes “developing a plan to reduce costs while increasing the efficiency and the

reliability of your assets.”\* For a water system, an “asset” includes the source of water (aquifer or surface water), along with any building, tool, piece of equipment, furniture, pipe, and machinery used in the operation of the system.

Asset management can help you—the manager or operator—get the most value out of the assets that make up your water system. It can also help you maintain the financial capacity to make scheduled repairs and planned replacement of assets *before* there is a crisis.

This guide includes instructions and worksheets to help you complete each of the four steps of asset management. You should adjust your plan based on your own experience and the particular characteristics of your system. You should also reevaluate your plan every year, updating each of the worksheets provided in this booklet. Your plan is useful only as long as it reflects the current conditions of your water system.

To ensure your system is sustainable for the next five to 30 years, it is important to evaluate immediate needs along with future needs. For successful asset management planning to occur, you must consider:

- potential growth or decline in population served
- equipment cost
- inflation
- overall age and life span of the infrastructure within your system

## **How do I practice proper asset management?**

### **Step 1. Take an inventory of your system and prioritize your assets.**

Document what assets you have and determine how critical each of your inventoried assets is to your plant operations. This will help you make informed decisions to ensure that you have funds available for the repair or replacement of the vital parts of the system.

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\* *Asset Management: A Handbook for Small Water Systems*. U.S. Environmental Protection Agency, 2003, page 5.

**Step 2. Develop a comprehensive plan for managing your assets.**

Based on your prioritization in Step 1, identify the repairs and replacements you expect to make in the next five years and the estimated amount of money your system needs to set aside or reserve for these expenses.

**Step 3. Develop a budget for managing your assets.**

Based on your comprehensive plan from Step 2, identify your expected revenues for the next five years—and compare them to your expected expenses. This process may involve conducting a rate study.

**Step 4. Implement your asset-management plan.**

Once you have completed the initial three steps of your asset-management plan you need to implement it. Work with your management team—including council and board members, if appropriate—to complete your identified repairs and maintenance, and to make sure that you have the technical and financial means necessary to provide reliable service.

# 1. Inventory Your System and Prioritize Your Assets

Use the System Inventory and Prioritization Worksheet at the end of this section to create a comprehensive inventory of your system and to prioritize your assets. Developing an accurate inventory of your system's assets is important to overall asset management, as all other steps will refer back to the data gathered during this step. It will also help you to establish the relative importance of the equipment and components of your system, and especially to identify the assets that are most critical to operations. A utility's assets include the facilities that make up the water system as well as all the equipment and supplies that are used to operate the plant.

The most significant asset of a water system is the water source. A well-run system is worthless without a reliable water source and delivery system. If you have not assessed the health and sustainability of your water source and you are not maintaining water-availability data, you should complete

Part B of this series: *Source Assessment and Planning* (publication 501b). You may find it necessary to make adjustments to your budget if you need to drill a new well or make an interconnection with another system.

You will need to assess your source to ensure that it is reliable for the long term and that your well field or surface water intake is adequate to provide water to your system. If you have assessed your source and you know your source is reliable for the long-term, you may not need to include expenditures for well drilling or rehabilitation in this year's budget. However, it is a good idea to assess your source annually to ensure that your system maintains an adequate water supply.

## **Fill Out the System Inventory and Prioritization Worksheet**

Before you begin to fill in the columns on the worksheet, fill in the date and check the appropriate box to indicate whether you are making the first inventory of your system or updating an existing inventory. You should update this worksheet at least once a year. You can either make minor adjustments to the worksheet as the condition of your assets changes, or start a new worksheet each year.

### **1. Identify your assets.**

List each of your utility's assets, including pumps, chlorinators, wells, tanks, buildings, vehicles, intake structures, lift stations, water mains, and all other physical assets and the year of installation. Be as specific as possible by providing the location, manufacturer, material composition, horsepower (hp), gallon-per-minute (gpm) capacity, or other identifying characteristics for each asset; or refer to this information if it is included in your operations and maintenance manual. This information will be useful when calculating replacement costs in step 7. For example, you might list a piece of equipment as "Well 1 pump (25 hp, 200 gpm), 2003" or a section of your distribution system as "10-inch PVC on Main St."

### **2. Describe the redundancy.**

Briefly describe the redundancy of each of the system's assets (certain equipment redundancy is required by rule for drinking water systems

in Title 30, Texas Administrative Code, Chapter 290 [30 TAC 290], Subchapter D). Are there backups? Are there different assets that can do the same job?

### **3. Fill in the expected useful life.**

Use the manufacturer's recommendations, if available, or the information in Table 1 to enter the expected useful life for each asset. Table 1 provides the estimated useful life span for many standard pieces of equipment, assuming proper maintenance has been conducted. For new equipment, use the higher end of the expected useful life.

Keep in mind the current condition of each asset as well as routine maintenance activities, repairs and rehabilitation. Refer to the Repair Work Order Worksheet in Part C of this series: *Operations and Maintenance* (RG-501c). Focus on conditions that may affect its useful life (e.g., rust or broken parts). If your asset is in poor condition, has not been maintained according to the manufacturer's recommendations, or operates under challenging circumstances (poor water or soil quality, excessive use, etc.), then the expected useful life is likely to be on the lower end of the range. If the asset is in good condition and has been properly maintained according to the manufacturer's recommendations, use the higher end of the expected useful life. Choosing the lower end of the useful-life range will produce a more conservative estimate, which will help to ensure that you are prepared to replace the asset in a worst-case scenario.

The expected useful life is affected by several factors, such as the quality of the maintenance and the location of the utility. For example, utilities in areas of the state with corrosive environments, such as near the Gulf of Mexico may need to replace their equipment more frequently.

### **4. Record the age.**

For each asset, fill in how long it has been in use. If an asset has been previously used by another system, you should list the total age, not just the length of time your system has used it.

**Table 1. Estimated Useful Life Span for Standard Pieces of Equipment**

<b>Asset</b>	<b>Expected Useful Life (years)</b>
Backflow prevention	8–15
Blow-off valves	35–40
Buildings	~30
Chlorination equipment	10–15
Computers	5
Distribution pipes	35–40
Electrical systems	7–10
Fencing	10–20
Galleries and tunnels	30–40
Generators	10–20
Hydrants	~40
Intake structures	35–45
Lab and monitoring equipment	5–7
Landscaping and grading equipment	~40
Meters	10–15
Office furniture and supplies	10
Other treatment equipment	10–15
Pumps	10–15
Service lines	~30
Storage tanks	~30
Tools and shop equipment	10–15
Transmission mains	35–40
Transportation equipment	10
Valves	35–40
Wells and springs	25–35

## **5. Calculate the remaining useful life.**

For each asset, calculate the remaining useful life by subtracting its age (column 4) from its adjusted useful life (column 3).

## **6. Calculate the expected replacement year.**

For each asset, calculate the expected replacement year by adding the remaining useful life (column 5) to the current year.

## **7. Calculate the cost to replace.**

You can base your estimate on the cost of buying and installing a new piece of equipment (by contacting vendors, getting bids, etc.), on your system's knowledge from completing similar projects, or on information from a neighboring system that has done similar work.

When estimating the cost of replacing each asset, you want to take into account the expected replacement year because inflation can affect replacement costs. It is a challenge to place a specific value on future costs, since we cannot predict changes in the economy. For assets that have a remaining useful life of more than 10 years, the utility should consider the average inflation rate over a 10-year period, or set aside some reserve funding to account for inflation.

Generally the best way to obtain an estimate of the inflation cost per year is to use a federal, state or locally established inflation rate, if available. Local economic-development corporations, along with local universities, are a good source for local inflation rates. The Texas comptroller's website, at <[www.window.texas.gov](http://www.window.texas.gov)>, has information on inflation rates, as does the U.S. Bureau of Labor Statistics, on its Consumer Price Index Web page at <[www.bls.gov/cpi](http://www.bls.gov/cpi)>.

If you are unable to obtain this information from your local economic-development corporation or those government sources, we suggest you use an average inflation rate of 5 percent per year.

## **8. Set the priority level.**

For each asset, consider how critical it is to the operation of your system, its remaining useful life, the availability of other assets to replace it or be used as a backup for it, its maintenance history, and any other factors



important in evaluating its priority for receiving funding. Rank each asset from “1” to “5,” where “1” is the highest priority and “5” is the lowest. Use the information provided in Table 2 to determine how each asset should be rated. Table 2 descriptions on each prioritization rating. Because there are only five priority levels, some assets will have the same priority level.

When ranking assets, keep in mind that assets in the following three categories should be assigned a higher priority:

- Assets with a shorter remaining useful life, because you will need to rehabilitate or replace them relatively soon. How likely is it that the asset will fail? Base this evaluation on the asset’s age, condition, and failure history.
- Assets that are *critical* to your operation, because of the system’s responsibility for protecting public health.
- Assets for which your system has less redundancy, because the system would have trouble operating without them.

**Table 2. Prioritization Rating**

<b>Description</b>	<b>Prioritization Rating</b>
Effective life exceeded and/or excessive maintenance cost incurred. A high risk of breakdown or imminent failure with serious impact on performance. No additional life expectancy; immediate replacement or rehabilitation needed. Asset is highly critical to infrastructure of system and in providing safe drinking water and maintaining compliance.	<b>1</b>
Very near end of physical life. Substantial ongoing maintenance with short, recurrent maintenance levels required to keep the asset operational. Unplanned corrective maintenance is common. Renewal (refurbishment or replacement) is expected within the next year or two.	<b>2</b>
Asset functions but requires a sustained high level of maintenance to remain operational. Shows substantial wear and is likely to cause significant performance deterioration. Renewal (refurbishment or replacement) is expected within the next two to three years.	<b>3</b>
Asset is sound and well-maintained but may be showing some signs of wear. Delivers full efficiency with little or no performance deterioration. Virtually all maintenance is planned and preventive. At worst, only minor repair might be needed at this time.	<b>4</b>
Asset is like new, fully operable, and well-maintained, and performs consistently at or above current standards. Little wear shown and no further action required.	<b>5</b>

## MANAGING SMALL PUBLIC WATER SYSTEMS: ASSET MANAGEMENT

### Worksheet 1. System Inventory and Prioritization

This worksheet is designed to help you inventory and prioritize your water system's assets.  
Make copies if additional pages are needed.

Date \_\_\_\_\_

Initial Inventory

Update

1. Asset and Year Installed	2. Redundancy	3. Expected Useful Life (years)	4. Age (years)	5. Remaining Useful Life (years)	6. Expected Replacement Year	7. Cost to Replace (\$)	8. Priority (1 to 5, high-low)
<i>Example: Well 1 pump (25 hp, 200 gpm), 2003</i>	<i>Backup pump (25 hp, 200 gpm)</i>	<i>15</i>	<i>9</i>	<i>6</i>	<i>2019</i>	<i>\$35,000</i>	<i>4</i>

1. Asset and Year Installed	2. Redundancy	3. Expected Useful Life (years)	4. Age (years)	5. Remaining Useful Life (years)	6. Expected Replacement Year	7. Cost to Replace (\$)	8. Priority (1 to 5, high-low)

## 2. Develop a Comprehensive Plan

Use the Comprehensive Planning Worksheet at the end of this section to generate a cost-management plan for your system's assets.

Adapted from an EPA worksheet, our Comprehensive Planning Worksheet is a tool designed to assist in identifying the funding and other resources required for long-term, continued operation.

### Fill Out the Comprehensive Planning Worksheet

Before you begin to fill in the columns on the worksheet, fill in the date, and check the appropriate box to indicate whether you are generating the first comprehensive plan for your utility's assets or updating an earlier plan. You should update this worksheet at least once a year. You can either make minor adjustments to the worksheet as the condition of your assets change, or start a new worksheet each year.

#### 1. List your prioritized assets.

List the assets from the System Inventory and Prioritization Worksheet, as prioritized in column 8. List the assets in order, with the highest-priority assets (lowest number) first. If you plan to drill a new well, include it as an asset (for example, New Well #5).

#### 2. List repair and replacement activities.

For each asset, list the rehabilitation and replacement activities that you expect to perform over the next five years. If you plan to drill a new well, state "drill a new well." Include enough detail for each activity so that you can determine its cost. Be sure to include anticipated employee costs.

#### 3. Estimate years until action is needed.

For each activity, fill in the number of years before you will need to perform it. For annual activities, enter "1." For replacement activities, enter the remaining useful life you estimated in column 5 of the System Inventory and Prioritization Worksheet.

#### **4. Estimate cost.**

Fill in the expected cost for each activity. Make sure it's the complete cost, including preparation, cleanup, removal, and disposal of any waste.

If you expect to sell an asset at the end of its useful life, subtract the estimated sale price from the cost of a new item, and enter the difference.

#### **5. Calculate the financial reserve required per year.**

For each asset, calculate the reserve required by dividing the cost by the years until the action will be needed. This is the estimated amount of money that your utility needs to set aside per year ("Reserve Required per Year" on the worksheet) for that asset.

#### **6. Calculate the total financial reserve required in the current year.**

Add the reserves required per year for each item to calculate the total reserve required in the current year. This is the estimated amount of money that your system needs to set aside, starting this current year, in order to pay for all of the rehabilitation and replacement.

#### **7. Repeat the process for the next four years.**

To create a five-year plan, you should complete a separate comprehensive planning worksheet for each of the next four years. This will allow you to compare how much reserve money will be required if the cost is spread out over a longer period of time.

You can then use this information to determine whether a potential rate increase, customer surcharge, state or federal grant or loan, or other source of funding will be required.

## MANAGING SMALL PUBLIC WATER SYSTEMS: ASSET MANAGEMENT

### Worksheet 2. Comprehensive Planning

[This worksheet is designed to help you generate a comprehensive plan for maintaining your water system's assets. Make copies if additional pages are needed.]

Date \_\_\_\_\_

Initial Plan

Update

1. Asset (list from highest to lowest priority)	2. Activity	3. Years until Action Is Needed	4. Cost (\$)	5. Reserve Required per Year (\$) (No. 4 / No. 3)
<i>Example:</i> 1. Chlorinator	<i>Replace</i>	<i>2</i>	<i>\$6,000</i>	<i>\$3,000</i>
	<i>Purchase redundant unit</i>	<i>3</i>	<i>\$6,000</i>	<i>\$2,000</i>

<b>1. Asset</b> (list from highest to lowest priority)	<b>2. Activity</b>	<b>3. Years until Action Is Needed</b>	<b>4. Cost (\$)</b>	<b>5. Reserve Required per Year (\$)</b> (No. 4 / No. 3)
<p align="center"> <b>6. Total Reserve Required in the _____ * Year:</b>                      *Fill in the blank as to whether this is the reserve required for the 1st, 2nd, 3rd, 4th, or 5th year of your comprehensive plan                 </p>				



## 3. Calculate Your Budget

Use the worksheet at the end of this section to calculate an annual budget for your water system.

### Fill Out the Budget Worksheet

Before you begin to fill in the columns on the worksheet, fill in the date, indicate the fiscal year that the budget covers, and check the appropriate box to indicate whether you are generating the first budget for your utility or updating an earlier budget. You should update this worksheet at least once a year. You can either make minor adjustments to the worksheet as the condition of your assets changes, or start a new worksheet each year.

#### 1. List your revenues.

In the “revenues” column provided, list all your water system’s revenue sources and the dollar amount each source is expected to provide in the coming fiscal year. In the space labeled “Water Charges,” enter the revenue you expect to generate from the sale of water. For “Fees and Service Charges,” list all late fees, fees for establishing and transferring service, impact fees, and other fees. In the “Interest” space, enter any interest you expect to accrue on the water system’s investments. If your utility has other sources of income not listed on the worksheet, enter them in the blank lines provided (below “Other”). Calculate your total annual revenue by adding all the revenues you listed. Enter this number in the box labeled “1. Total Revenue.”

#### 2. List your expenses.

In the “expenses” column, list the sources of your water system’s expenses and the dollar amount each source is expected to draw in the coming fiscal year. If your utility has other general expenses not listed on the worksheet, enter them in the blank lines provided (below “Other”). Calculate your total annual expenses by adding all the expenses you listed. Enter this number in the box labeled “2. Total Expenses.”

### **3. Calculate your net income.**

Calculate your net income by subtracting your expenses from your revenue. Enter this number in the boxes labeled “3. Net Income.”

### **4. Enter your net income.**

Transfer the result of box 3 to the box labeled “4. Net Income.”

### **5. Enter your total required reserves.**

In the “Total Required Reserves” (box 5), insert the amount of total reserves in the current year from the Comprehensive Planning Worksheet 2 (line 6).

### **6. Calculate additional reserves needed now and into the future.**

Subtract your total required reserves (box 5) from your net income (box 4). Enter this number in the box labeled “6. Additional Reserves Needed.”

If the result is a positive number, you have no shortfall to make up for and can set aside the required funds in a reserve account. If the result is a negative number, you should start planning ways to make up for the shortfall.

To make up for the needed resources, you might increase rates, charge customers a surcharge, or seek state or federal funding through grants or loans. The Texas Water Infrastructure Coordination Committee, described in Part E of this series, can help your system identify appropriate funding options.

### **7. Plan for the future.**

To get a picture of future financial needs, complete the budget worksheet for the next four years—or longer, depending on the system’s needs. This will allow you to forecast expenditures for expensive repairs or replacement items, such as storage tanks, utility trucks, or electronics. Therefore, you can avoid drastic increases in rates, surcharges, or loans that the system may have to pay back for many years to come.

MANAGING SMALL PUBLIC WATER SYSTEMS: ASSET MANAGEMENT  
**Worksheet 3. Annual Budget**

[This worksheet is designed to help you identify your water system's revenues and expenses  
and calculate your budget. Make copies if additional pages are needed.]

**Date** \_\_\_\_\_ **Fiscal Year of Budget** \_\_\_\_\_

**Initial Budget**       **Update**

<b>Revenues (Operating Income)</b>		<b>Description</b>
<b>Water Charges</b>		Revenue from the sale of water—include all customers (actual or projected receipts)
<b>Usage Fees and Service Charges</b>		Include late payments, forfeited deposits, surcharges, impact fees, tap fees, etc.
<b>Reserve Interest Earned</b>		Interest accrued from reserve accounts or other investments
<b>Other Income:</b>		Itemize other income not elsewhere classified
<b>1. Total Annual Revenue</b>	<b>\$</b>	
<b>Expenses (Operating Costs)</b>		
<b>Regular Maintenance and Repair</b>		Cost of performing regular or routine maintenance and repair on equipment
<b>Utilities, Rent, and Other Overhead</b>		Other overhead may include billing, building maintenance, cleaning, etc.
<b>Salaries and Benefits</b>		Include administrative and operations staff
<b>Operating Supplies</b>		Operating supplies not classified elsewhere
<b>Equipment Leases</b>		Include all equipment leases
<b>Chemicals</b>		Chemicals expensed in prior years, but not used, should be included for initial budgets

<b>Monitoring and Testing</b>		Include laboratory fees for projected monthly and annual sampling requirements
<b>Insurance and Bonds</b>		Costs of insuring buildings, equipment, etc.
<b>Professional Services</b>		Accounting, legal, engineering & other professional (not related to capital projects)
<b>Training and Licenses</b>		Cost of operator training courses and license renewal fee
<b>Security</b>		Cost of maintaining security related items (i.e., fencing, alarms, etc.)
<b>Debt Repayment</b>		Include interest paid on debt
<b>Transfer to Reserved Funds</b>		For Capital Expenditures
<b>Other:</b>		Itemize other expenses not classified elsewhere
<b>2. Total Expenses</b>	\$	
<b>3. Net Income</b> (Revenue – Expenses)	\$	
<b>Additional Reserves Needed</b>		
<b>4. Net Income</b> (from 3. Net Income)		\$
<b>5. Total Required Reserves</b> (from Comprehensive Planning Worksheet 2)		\$
<b>6. Additional Reserves Needed</b> (Net Income – Total Required Reserves) (-/+)		\$

## 4. Implement Your Asset-Management Plan

Congratulations! You have completed the initial three steps of your asset-management plan: inventory development and asset prioritization, comprehensive planning, and budget building. Now you must work with your management team, including council and board members, if appropriate, to complete your identified repairs and maintenance and to make sure that you have the technical and financial means necessary to offer reliable service. Ideally, you should create a plan for at least the next five years.

### Hold a Meeting

Arrange a meeting with your management team. Give the following items to each member.

- a map of the system
- a list of current assets, identifying for each the value, or cost to replace, and the remaining useful life (from the System Inventory and Prioritization Worksheet)
- a list of priority asset repairs and replacements (from the System Inventory and Prioritization Worksheet)
- a list of costs associated with the expected repairs or replacements (from the Comprehensive Planning Worksheet)
- the current budget allotment as well as the projected budgetary requirements (from the Budget Worksheet)

### Prioritize

You may find that your current budget will cover only one or two of your priority needs. Explain why these items are priorities and the manner in which you plan to take care of them. Discuss each of the items on the priority list and how you plan to address them, creating an action timeline with a projected budget. If the current budget is lower than what you need to take care of priority items, discuss potential funding options for management input and approval, and develop a plan to obtain needed funding.

## Communicate Regularly

Keep your management team updated with quarterly progress reports. This will reinforce your dedication to the plan, and help make certain that your system is functioning optimally. It will also ensure that you maintain management support throughout the implementation process.

## Update Changes

Keep up with the changes that occur as your plan is implemented, including changes in the system's equipment, finances, and personnel. This will help ensure that you successfully manage your utility's assets.

## Conduct a Rate Study

If you determine that your utility is not bringing in enough money to be sustainable or to complete necessary improvements, you may need to raise your rates. The process will depend on what type of utility you are. For example, an investor-owned utility applies for a rate change through the TCEQ, whereas a municipality would change rates through the city council. For assistance with rate application, contact the TCEQ Utilities and Districts Team at 512-239-4691. *As of September 1, 2014, the powers, duties, functions, programs, and activities of the TCEQ relating to economic regulation of water and sewer service will be handled by the Public Utilities Commission of Texas. You will need to contact the PUC at 888-782-8477 or visit its Web site at <[www.puc.texas.gov/](http://www.puc.texas.gov/)>.*

Regardless of the process, you will need to conduct a rate study before raising your rates. Rate studies are very complicated and may require professional help. You may decide to hire a consultant; apply for financial, managerial, or technical assistance through the TCEQ; or request the assistance of an EnviroMentor through the TCEQ's SBLGA section.

**For More Information**

For confidential assistance with environmental compliance, contact the Small Business and Local Government Assistance Hotline at 800-447-2827, or visit <[www.TexasEnviroHelp.org](http://www.TexasEnviroHelp.org)>.