



Managing Small Public Water Systems: Part A, Asset Management

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Introduction

This publication is Part A of a five-part series *Managing Small Public Water Systems* (TCEQ publication series RG-501) and includes worksheets and instructions to:

- help you conduct an inventory of your public water system's resources,
- prioritize repairs and replacements of assets,
- plan for future needs, and
- develop a budget.

An electronic version of Part A is available at the TCEQ Small Business and Local Government Assistance Section's Public Water Supply Compliance Tools web page at <www.tceq.texas.gov/goto/help4pws>. A downloadable Microsoft Excel version of the worksheets is also available.

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 web page at <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* (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 512-463-5561. The rules are also available online at <www.tceq.texas.gov/goto/TAC30>.

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 or machinery, and pipes, 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 by prioritizing repairs and budgeting for equipment replacement. It can also help you maintain the financial capacity to make scheduled repairs and planned replacement of assets *before* there is a crisis.

When planning to replace assets, you should consider upgrading to energy-efficient and water-saving equipment and processes. Including these upgrades in your proposed plans may assist you in finding funding for your project. Part B of this series, *Sustainability and Water Source Planning* (RG-501b), further discusses making energy assessments and choosing more efficient equipment.

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 and installation costs
- inflation
- overall age and life span of the infrastructure within your system
- engineering costs

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

How do I practice proper asset management?

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

List all of your assets and prioritize each asset based on how critical it is to the operation of your public water system. This will help you make informed decisions to ensure that you have funds available for the maintenance, repair or replacement of the vital parts of the system.

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. Estimate how much 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 may involve a rate study.

Step 4. Implement your asset-management plan.

Once you complete the initial three steps of your asset-management plan, you need to implement it. Work with your management team—including council or 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 Worksheet 1–System Inventory and Prioritization, 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 drinking-water system'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: *Sustainability and Water Source 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 Worksheet 1—System Inventory and Prioritization

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.

Step 1. Identify your assets.

List each of your public water system's assets, including pumps, chlorinators, wells, tanks, buildings, vehicles, intake structures, booster or pump 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.”

Step 2. Describe the redundancy.

Briefly describe the redundancy of each of the system’s assets. Are there backups? Are there different assets that can do the same job? (Certain equipment redundancy is required by rule for drinking water systems in Title 30, Texas Administrative Code, Chapter 290 [30 TAC 290], Subchapter D.)

Step 3. Fill in the expected useful life.

Use the manufacturer’s recommendations, if available, or the information in Table 1, Estimated Useful Life Span for Standard Equipment, 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. Work orders can help you track your maintenance and repairs. A sample Repair Work Order is located in Part C of this series: *Operations and Maintenance* (RG-501c).

Focus on conditions that may affect its useful life (for example, 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 (such as poor water quality or excessive use), 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 may help to ensure that you are prepared to replace the asset in a worst-case scenario.

Step 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 Equipment

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

Step 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).

Step 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.

Step 7. Calculate the cost to replace.

You can calculate your estimate on the cost of buying and installing a new piece of equipment based on:

- your knowledge from completing similar projects,
- information from a neighboring system that has done similar work, or
- bids from vendors.

When estimating the cost of replacing each asset, bear in mind the expected replacement year, because inflation can affect replacement costs. It is a challenge to place a specific value on future costs, because we cannot predict changes in the economy. For assets that have a remaining useful life of more than 10 years, the system 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 <comptroller.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> and select "Subjects."

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.

Step 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, Prioritization Rating, to determine how each asset should be rated. 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

Description	Prioritization Rating
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.	1
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.	2
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.	3
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.	4
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.	5

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 Worksheet 2–Comprehensive Planning, at the end of this section to generate a cost-management plan for your system’s assets.

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

Fill Out Worksheet 2–Comprehensive Planning

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 water system’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.

Step 1. List your prioritized assets.

List the assets from Worksheet 1, with the highest-priority (lowest numbered) assets first. If you plan to drill a new well, include it as an asset (for example, New Well #5).

Step 2. List repair and replacement activities.

For each asset, list the rehabilitation, repair, 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.

Step 3. Estimate years until action is needed.

For each activity, fill in the number of years before you will need to perform that task. For annual activities, enter “1.” For replacement activities, enter the remaining useful life you estimated in column 5 of Worksheet 1.

Step 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.

Step 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 public water system needs to set aside per year ("Reserve Required per Year" on the worksheet) for that asset.

Step 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.

Step 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>	2	\$6,000	\$3,000
	<i>Purchase redundant unit</i>	3	\$6,000	\$2,000

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)
<p align="center">6. Total Reserve Required in the ____ * Year: *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 Worksheet 3–Annual Budget worksheet at the end of this section to calculate an annual budget for your water system.

Fill Out Worksheet 3–Annual Budget

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 water system 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.

Step 1. List your revenues.

- In the “Revenues” column, 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 water system has other sources of income not listed on the worksheet, enter them in the blank lines below “Other”.
- Calculate your total annual revenue by adding all the revenues you listed. Enter this number in the box labeled “1. Total Annual Revenue.”

Step 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 water system has other general expenses not listed on the worksheet, enter them in the blank lines below “Other”.

- Calculate your total annual expenses by adding all the expenses you listed. Enter this number in the box labeled “2. Total Expenses.”

Step 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.”

Step 4. Enter your net income.

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

Step 5. Enter your total required reserves.

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

Step 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 with the approval of the Public Utility Commission, 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, *Resources* (RG-501e), can help your system identify appropriate funding options.

Step 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, work trucks, or electronics.

By doing this, 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

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

Revenues (Operating Income)		Description
Monitoring and Testing		Include laboratory fees for projected monthly and annual sampling requirements
Insurance and Bonds		Costs of insuring buildings, equipment, etc.
Professional Services		Accounting, legal, engineering & other professional (not related to capital projects)
Training and Licenses		Cost of operator training courses and license renewal fee
Security		Cost of maintaining security related items (i.e., fencing, alarms, etc.)
Debt Repayment		Include interest paid on debt
Transfer to Reserved Funds		For Capital Expenditures
Other:		Itemize other expenses not classified elsewhere
2. Total Expenses	\$	
3. Net Income (Revenue – Expenses)	\$	
Additional Reserves Needed		
4. Net Income (from 3. Net Income)		\$
5. Total Required Reserves (from Worksheet 2– Comprehensive Planning)		\$
6. Additional Reserves Needed (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 implement the plan. This process should help ensure 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 Worksheet 1)
- a list of priority asset repairs and replacements (from Worksheet 1)
- a list of costs associated with the expected repairs or replacements (from Worksheet 2)
- the current budget allotment as well as the projected budgetary requirements (from Worksheet 3)

Prioritize

Discuss each of the items on the priority list and how you plan to address them, creating an action timeline with a projected budget.

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.

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 water system's assets.

Conduct a Rate Study

If you determine that your water system is not bringing in enough money to be sustainable or to complete necessary improvements, you may need to raise your rates.

You will need to contact the Public Utilities Commission (PUC) of Texas for information and assistance with rate increase applications. You can contact the PUC at 888-782-8477 or 512-936-7120 or by e-mail at <customer@puc.texas.gov>. You can also visit the PUC website at <www.puc.texas.gov>.

Need more help?

The TCEQ's Financial, Managerial, and Technical Assistance Program offers free contractor on-site assistance to help you analyze planning options, and help you with all aspects of running and funding your public water system. For more information about the program, visit the web page <www.tceq.texas.gov/utilities/fmt>, call the Water Supply Division at 512-239-4691, or contact the TCEQ small business and local government assistance representative in your region. To find a representative, visit <www.tceq.texas.gov/goto/regions>. You can also call the toll-free, confidential compliance hotline, 800-447-2827.

Many state and federal funding agencies have grants and loans available for planning and development of new water treatment plants and infrastructure improvements. The Texas Water Infrastructure Coordination Committee (TWICC) is a group of local, state, and federal agencies that collaborate to identify issues with water and wastewater infrastructure and compliance, and to seek affordable, sustainable, and innovative funding strategies for the protection of public health and efficient use of government resources in Texas. You can contact TWICC by phone at 512-463-7870, by e-mail at <TWICC@twdb.state.tx.us>, or by fax at 512-475-2086 or visit the website at < www.twicc.org > to learn more information about the program.

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>.