WATER *WISE*

EFFICIENCY PLANNING AND WATER CONSERVATION PLAN WORKBOOK FOR WATER AND WASTEWATER UTILITIES

Developed by the
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WATER *WISE*

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PREFACE -- HOW TO USE THIS HANDBOOK

This handbook is intended to provide an introduction to water efficiency and conservation planning as part of overall system management. Along with the workbook in Appendix A, this handbook aims to assist utilities develop water conservation plans and increase both water and energy efficiencies.

This handbook updates a previous publication, *Water Wise – Water Efficiency Planning Capacity Development for Water and Wastewater Utilities*, published in 2002 by the Iowa Association of Municipal Utilities and the Iowa Energy Center. The updated information discusses water shortages and emergencies and state-mandated conservation measures.

For more information or to request a printed copy please contact IAMU at webmaster@iamu.org or 800-810-4268.

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INTRODUCTION

What determines a water or wastewater system's capacity to deliver services? First, its technical capacity: Does it have adequate source water and well-functioning infrastructure? Second, its managerial capacity: Are staff and managers knowledgeable and well-trained? And third, its financial capacity: Does the system have sufficient revenues and adequate fiscal management and controls?

Water efficiency and conservation are integral parts of a water or wastewater system's capacity development and overall utility operational efficiency. Strategic use of water efficiency and conservation can help a system:

- Defer or reduce the need for expanded water supply facilities or wastewater treatment facilities;
- Reduce utility operating costs; and
- Reduce water withdrawals, protecting water resources.

This handbook uses two terms – "efficiency" and "conservation." These terms do not mean the same thing, but can complement each other in an integrated resource plan. "Conservation" means a reduction in water use. "Efficiency" means using the minimal amount of resources necessary to accomplish a goal. Sometimes "conservation" carries the connotation of sacrificing or doing without.

Although at times pure conservation measures may be called for, we have emphasized efficiency to promote the idea that it is possible to reduce quantity without sacrificing quality. That is, the same "quality of life" can be achieved, at a lower cost, by careful examination of the nature of water use within utility systems.

Water efficiency and conservation can provide alternatives for meeting drinking water needs or need for wastewater treatment. Here are some hypothetical examples:

- For a small water utility, construction of a main for purchasing wholesale water from a nearby community is the most affordable option. However, quantities of available water are limited. A comprehensive water conservation program that reduces water requirements could make the wholesale option feasible and defer new facilities.

- A medium-sized water utility experiences extreme peaks every summer due to lawn watering although average daily demand is within the system's capacity. The community's older water treatment facility is being replaced. A water conservation program focusing on water-efficient landscaping education and seasonal rate adjustments would allow the utility to optimize the size and design of the new facility and allow for growth.

- A community's wastewater system is increasingly short of capacity and faces potential violations of discharge permits. The water utility and wastewater utility could work together to encourage accelerated use of water-saving toilets, showerheads, and washing machines, deferring the need for new waste treatment capacity.

Water and wastewater utilities can incorporate water efficiency into their planning whether or not they are facing shortages. Water conservation has previously been viewed as a temporary strategy enforced during times of drought or other emergencies. This view has changed. First, there is a growing recognition of the cyclical nature of drought events. Second, water and wastewater managers increasingly are viewing basic water efficiency and conservation as part of prudent, on-going, utility sustainability.

Water conservation clearly fits into the broad concept of sustainability. Water conservation and energy are linked in the concept of sustainability because pumping water takes energy; energy costs money; thus, saving water saves money. Reductions in overall demand from best available conservation technologies among all beneficial user types promotes sustainability and greater potential use of the resource.

Water and wastewater utilities are beginning to adopt an integrated resource planning approach. Electric utilities have been using this approach for many years, doing least-cost analyses of the contributions of both the supply and the demand side to system capacity.

Endorsed by the American Water Works Association and the U.S. Environmental Protection Agency (EPA), the integrated resource planning approach considers the cost-effectiveness and reliability of water conservation measures to reduce demand. Even the smallest water or wastewater facilities can use parts of an integrated resource approach to plan for meeting current and future needs.

Furthermore, the EPA's guidelines for water conservation plans can provide a basis for integrated resource planning. These guidelines can be used by all systems. The water conservation plan guidelines can be directly linked to the three elements of planning – technical, managerial, and financial -- as shown on the following page.

Common Elements of Water Conservation Planning

Category	Elements of Conservation Planning	Elements of Basic Water Conservation
Technical	▪ Source water adequacy ▪ Infrastructure adequacy ▪ Technical knowledge and implementation	Universal metering ▪ Source water metering ▪ Service-connection metering and reading ▪ Meter public-use water Water accounting and loss control ▪ Account for water ▪ Repair known leaks
Managerial	▪ Staffing and organization ▪ Effective external linkages ▪ Ownership accountability	Information and education ▪ Understandable water bill ▪ Information available
Financial	▪ Revenue sufficiency ▪ Fiscal management and control ▪ Credit worthiness	Costing and pricing ▪ Cost-of-service accounting ▪ User charges ▪ Metered rates
Adapted from: U.S. Environmental Protection Agency, Water Conservation Plan Guidelines, *August 6, 1998*		

All utilities are required to have water conservation plans by the State of Iowa under Chapter 52.9(3). These plans are extremely important for the issuance of water allocation permits or permit renewals. They are also part of the criteria used for the State Revolving Loan Fund (SRF). There is a small scoring bonus for communities that have passed water conservation ordinances and implemented programs. Some communities have taken advantage of this provision to gain extra points on their loan fund applications.

WATER EFFICIENCY AND CONSERVATION PLANNING

In addition to meeting the Iowa Department of Natural Resources requirement; the preparation of a water efficiency and conservation plan meets several objectives, including:

- To create strategies for more efficient operation of a water or wastewater system.
- To address water shortages or emergencies.
- To qualify the utility for bonus points in the scoring of an application for the State Revolving Loan Fund (SRF) through the DNR.
- To show that the utility meets viability criteria, which require a water conservation plan.

CONSERVATION PLANNING

There are 5 Steps to the water conservation planning process. The steps include setting utility goals, developing a system profile, preparing a demand forecast, identifying and evaluating conservation measures, and developing a living work plan.

These steps that are described below are part of the U.S. Environmental Protection Agency (EPA)'s 1998 basic guidelines for conservation planning for smaller utilities. For communities larger than 10,000 people, or those utilities seeking more detail, a link to the intermediate guidelines is included as well.

Each of the 5 step planning process has a corresponding page or worksheet in Appendix A – Water Conservation Plan Workbook

EPA Part 3 – Basic Guidelines for Preparing Water Conservation Plans
EPA Part 4 – Intermediate Guidelines for Preparing Water Conservation Plans

Goals
The first step in preparing a plan is to decide on the utility's goals. Water efficiency and conservation planning goals could include some of the following:

- Eliminating, downsizing, or postponing the need for capital projects;
- Improving the utilization and extending the life of existing facilities;
- Lowering variable operating costs;
- Avoiding new source development costs;
- Improving drought or emergency preparedness;
- Educating customers about the cost and value of water and wastewater treatment;
- Improving reliability and margins of safe and dependable yields; and
- Protecting and preserving water resources.

The process of developing goals should include input from stakeholders in the community. This input could come from a few town meetings or brainstorming sessions, or from more extensive community research and involvement. A major benefit of including the community is the public education and information aspect. "Getting the word out" about new community conservation practices can be an important function of the stakeholder group.

Utilities should revisit and review the goals section periodically. As a system works toward achieving goals, new ones can be set.

System Profile
The next step in the plan is to develop a system profile that will assess current conditions and inventory existing resources. It should also consider future needs. Water Conservation Planning Workbook in Appendix A contains Worksheet A-1 "Water System Profile" from the USEPA Water Conservation Plan Guidelines. This sheet can be used to build a profile using existing system information.

Also included in this worksheet are sections for a utility to include information that may affect the planning process and to state the current conservation efforts a system is maintaining.

Prepare a Demand Forecast
Step three is to prepare a demand forecast. Demand forecasting is predicting water use based on projected population growth. For five and ten-year periods, a utility should include forecasts for the entire system as well as for separate user classes. Demand forecasts should include the effects of current conservation activities. This element of conservation planning is not necessary for systems growing at 2% or less per year. Worksheet A-3 "Water Demand Forecast" provided in Appendix A is a simple water demand forecasting methodology based on population. Projected water use is compared to a system's capacity to show the shortage or surplus. If a system anticipates an increase in non-residential demand Worksheet 4-4 from the USEPA Water Conservation Plan Guidelines – Intermediate Guidelines can be used. A link to that document is provided on page 7. Some utilities may have more precise methods already in place for demand forecasting.

Identify and Evaluate Conservation Measures
Step four involves identifying and evaluating conservation measures. The U.S. EPA identifies three levels of measures that utilities can implement. Level 1 measures are practices that all utilities should implement.

Level 1 measures include:

- Universal metering – source-water metering, service-connection metering, metering public-use water
- Water accounting and loss control – accounting for water, repairing known leaks
- Costing and pricing – cost-of-service accounting, user charges, metered rates
- Information and education – understandable water bills, conservation information available

Level 2 and 3 measures may be appropriate and cost-effective for systems whose goals include making significant improvements in water efficiency and conservation. Level 2 measures include:

- Water-use audits
- Retrofits, such as showerheads, toilets, etc.
- Pressure management
- Landscape efficiency

Level 3 measures include:

- Replacements and promotions
- Reuse and recycling
- Water-use regulation
- Integrated resource management

Water utilities should consider partnering with energy utilities to offer end-user conservation measures and to make their own systems operate as efficiently as possible. Measures may include low-flow showerheads and toilets, high efficiency clothes washers, and faucet aerators.

A cost-effectiveness analysis can be performed for each measure chosen, in order to compare various measures in terms of dollars per gallon of water saved. Table A-4 "Benchmarks for Savings from Selected Conservation Measures", which lists various conservation measures and anticipated savings, and Worksheet A-3 "Selection of Conservation Measures" both found in Appendix A, can help planners establish a budget that will allow the utility to meet its conservation goals.

Living Work Plan

The fifth and final step is to develop a living work plan. This part of the process is to specify strategies and timetables for implementing the plan. Some questions to be answered are:

- What issues need to be addressed before the plan can be implemented?
- What specific actions will the utility take to carry out its conservation measures?
- What will the utility do to address the impact of conservation on revenues?
- How will the utility gain support from key stakeholders and policy-makers?

Another part of this step is to consider how the success of the plan implementation will be measured. The utility should think about:

- What data will be available?
- What new kinds of data will need to be collected?
- Where will the data be stored/retained?
- Who will collect data?
- How will the results of the water conservation program be incorporated into future demand forecasting?
- What will be the means of adjusting the conservation program if needed?
- How will the results of the program be communicated to the public?

The following sections of the handbook provide more detail about specific efficiency and conservation measures and how to incorporate them into a water efficiency and conservation plan.

Up-to-Date Emergency Response Plan

One item that we haven't included as part of the 5-step conservation planning process is completing an emergency plan. This section will serve as a reminder that each water system should <u>always</u> have a current emergency response plan in place.

Every water utility is in business to provide safe, quality drinking water to their community. Customers expect to receive high quality water -- even during emergencies. To meet these expectations, water utilities must prepare for situations that might prevent them from delivering the water their customers rely upon. Planning for emergencies and knowing how to respond in an emergency situation is just as important as hiring workers, preparing budgets, and all the other tasks performed every day to meet the needs of consumers.

The primary purpose of an emergency plan is to promote advanced planning. It also is a guide, once completed, for utility personnel and community officials to follow *during* emergency situations.

Below is a link for an emergency preparedness plan that was prepared for the Iowa Department of Natural Resources. It is a lengthy document, but necessary to have a working plan that can be utilized during an emergency.

IDNR Model Emergency Response Plan

You may also use AWWA's updated guidance on emergency response planning: M19: Emergency Planning for Water Utilities. At a minimum, it is necessary to pay close attention to your contact list. Be sure your emergency response plan contains current names, numbers, email addresses, etc.

Many utilities have had to use their emergency response plan in the past ten years. It is crucial to update this plan frequently to avoid having critical information in one employees head. The emergency response plan must be a written document for staff to use and update. It is good practice to identify one staff person to update the plan yearly.

WATER ACCOUNTING

Water efficiency and conservation starts not on the customer side of the meter but on the utility side. The first step in addressing water efficiency on the supply side is to implement a system of water accounting. Without accurate water accounting, water loss cannot be estimated or controlled.

When all water services are metered and recorded, the difference between the water produced and the total water metered in the system is called water loss or unaccounted water. Unaccounted water includes water that is metered but not billed, as well as all unmetered water.

Water that is metered but not billed may be used by city departments for authorized uses such as main flushing, storm drain flushing, street cleaning, public areas landscaping, swimming pools, and other public uses.

Some unmetered water may be used for the authorized public purposes listed above. The American Water Works Association Committee on Unaccounted-for Water recommends that no more than one percent of total annual pumpage be used to cover these uses.

Unmetered water may also be consumed through illegal connections and water leaks. Malfunctioning system controls, inaccurate meters, or accounting system errors may be preventing the utility from metering and billing some water.

The Water Accounting and Loss Control Worksheet A-2 provided in Appendix A is a simple means of water accounting. For a more detailed program to accurately calculate you can download the AWWA Water Audit Software through the link provided below.

AWWA Water Audit Software

With an accurate picture of the system's financial conditions through a water accounting process, the utility can more accurately figure the cost of water and convey that cost, through pricing, to the customers.

Water and wastewater utilities can track the efficiency of their system by developing baseline information and periodically monitoring their numbers. These numbers may be useful when budgeting and projecting forecasts for your system. The Alliance to Save Energy studied the way water utilities around the world track system efficiency and developed a set of typical metrics for what they call" watergy" –water and energy efficiency. Some of these useful metrics are presented in the table below.

Watergy Table: Typical Metrics for Tracking Watergy Efficiency		
Cost	Supply	Demand
Total Water Delivered Total Cost* *Example: gallons per dollar*	**Total Water Delivered** Total amount of Energy Used *Example: gallons per kWh*	**Total Water Delivered** Total Population *Example: gallons per person*
Total Cost Total Water Delivered *Example: dollars per gallon*	**Total Cost** Total Input Water *Example: dollars per gallons entering system*	**Total Cost** Number of Connections *Example: dollars per connection*
*Including energy, water, capital depreciation, and maintenance		
Source: Alliance to Save Energy. Watergy: Taking Advantage of Untapped Energy and Water Efficiency Opportunities in Municipal Water Systems. Washington D.C. 2002.		

Watergy – Energy & Water Efficiency in Municipal Water Supply & Wastewater Treatment

COSTING AND PRICING

Pricing can be an important part of a water conservation plan when it helps customers place a true value on the water they consume.

There are several basic principles that systems should follow in developing their rate structures:

- Rates should cover the full costs of production, treatment, storage, and distribution of water;
- Rates should be fair and equitable; and
- The rate structure should be easy to understand and customers should know and understand the justifications for rates.

There are four basic types of rate structures:

- Uniform flat rate, in which customers pay the same amount regardless of quantity used;
- Single block rate, in which customers are charged a constant price per gallon regardless of quantities used;
- Decreasing block rate, in which the price of water declines as the amount used increases; and
- **Increasing block rate, in which the price of water increases as the amount used increases**. (IAMU encourages using this rate structure)

If the utility's goal is to encourage water efficiency and conservation, only the last rate structure, the increasing block rate, will be effective. The other types of rate structures actually encourage high consumption.

More complex methods of advanced pricing can be used to fine-tune the ability of the rate structure to encourage conservation. Advanced pricing can include factors such as seasonal usage, time of use, dual meters so nonsewage use is not penalized, customer classes, marginal costs, and cost-recovery mechanisms. Appendix B contains a template ordinance for implementing seasonal water rates.

Utilities should not ignore the issue of the impact of efficiency and conservation on their revenue streams. Conservation will help the water utility reduce variable costs (such as energy, chemical, and purchased water costs) and could allow for better accounting. In the long term, conservation also will help the utility reduce fixed costs (associated with new capital facilities). In the short term, however, reductions in water use can lead to a shortfall in revenues needed to cover fixed costs and sustain the financial viability of the water system.

Rate design should allow the system to achieve demand reductions while still recovering water system costs. When rate increases are offset by usage reductions, customer bills and utility revenues can be maintained.

Price vs. Non-Price Water Conservation Policies

There are two types of water conservation policies: price and non-price. Price measures use an increase in water rates to reduce water demand while non-price policies use voluntary or mandatory conservation measures to reduce demand.

Studies show that implementing a 10% increase to the price of water can produce a 3-4% decrease in demand in the residential sector (Olmstead, Stavins, 2006). This type of price measure also allows consumers to choose where their water savings comes from. One residential customer may choose to cut back on shower time or other areas each day to be able to water a vegetable garden, new landscaping or wash their vehicle. Raising rates is political and sometimes difficult to accomplish, but has little to no costs associated with it.

Non-price conservation policies (voluntary and mandatory) can include watering restrictions, education programs, low-flow fixture subsidies, etc. These measures can also have an impact on water demand, but are more difficult to quantify. Estimated savings can range from no savings to significant savings. Mandatory policies have a higher impact on demand than voluntary ones. Non-price policies typically require significant monitoring and enforcement and can have high start-up or implementation costs.

A utility should examine both options prior to a shortage or emergency to determine which method would produce the desired reduction in demand most cost effectively.

SYSTEM IMPROVEMENTS

Unaccounted-for water in a system, including municipal uses, should not exceed 15 percent. One area to target is water loss through leaks. Any amount of water loss may have adverse effects on operation and revenue. Many systems believe that fixing the larger leaks, those that can be visibly identified when they bubble to the surface, is sufficient. However, smaller leaks are just as big of a concern. A ¼ inch diameter hole in a main will probably not have enough force to surface, but it may cause a water loss of over 8,400 gallons of water per day and over 261,000 gallons per month (at 60 psi).

Not only do leaking pipes cause water loss, but they also create openings for contamination in the distribution system. 30% of the water-borne disease outbreaks reported in community water supplies between 1971-2006 were not caused by poor treatment but by contaminants that entered vulnerable parts of water distribution systems. (Craun et al, 2010)

A leak detection survey should be routinely budgeted for and performed to minimize water loss. Leak detection strategies may include regular on-site testing using electronic-assisted leak detection equipment, a sonic leak-detection survey, water audits, or other methods for detecting leaks along water distribution mains, valves, services, and meters. The Iowa Association of Municipal Utilities has information on leak detection methods and services.

Pilot Study

In 2010, the City of Dubuque replaced its water meters with smart water meters and partnered with IBM on a pilot study to offer a web portal showing dynamic water usage to some of Dubuque's residents. The pilot study found that these customers conserved on average 6.6% of their water usage, and were almost 10 times more likely to report leaks. For more information on this report: http://www.cityofdubuque.org/index.aspx?nid=1348

Meter calibration, repair, and replacement is another important part of a water efficiency and conservation strategy. Inaccurate meters can be a significant contributor to unaccounted for water, since meters seldom over-register but will generally under-register or run slower. Meters may also be improperly sized.
Some meters on larger customers may need more routine inspection and calibration for accuracy. A meter replacement program should be an important strategy for any utility.

System efficiency is also important for wastewater systems. Inflow and infiltration into the system, causing flows to increase, can tax the system's capacity. Increased inflow and infiltration flows result from groundwater seeping into the collection mains through loose joints, main breaks or cracks, runoff from rainfall events that enters manholes, or illicit connections from sump pumps or others.

Replacing cracked mains found through camera inspections and fixing manholes to reduce inflow and infiltration will reduce flows into the system, allow the system to operate more efficiently, and possibly forestall the need for additional capacity. Routine

inspections of customer meters and piping might turn up unmetered connections or improper discharges, such as residential sump pumps, to sewer lines.

It is also important not to overlook the potential for energy and dollar savings in the operation of water and wastewater treatment and distributions systems. Pumping systems alone comprise 70-90% of electrical energy costs for municipal water and wastewater systems. In the United States as a whole, municipal water pumping accounts for nearly 2.5% of national electric use. In its 2010"Whole Town Audit" study, IAMU found that municipal utilities used on average 1/3 of their municipal energy expenditures for water and wastewater treatment. Pumping was the majority of these costs.

In wastewater facilities, energy use increases with the level of needed treatment. Ponds and lagoons are relatively low energy users, while activated sludge, oxidation ditch, and extended aeration plants are more energy intensive.

A system approach should be taken to addressing concerns about energy use and identifying improvements. The ultimate goal of the process should be to maximize the overall efficiency of the system.

Cost-saving measures in wastewater facilities may come in the form of energy efficiency and/or load management measures. Energy efficiency measures reduce energy consumption, while load management shifts energy use into off-peak periods. The most important areas to examine in a wastewater facility are:

- **Pumping system efficiency**. This includes pump sizing and selection of high efficiency motors, impellor efficiency, and pump system design (e.g parallel pumping).

- **Control systems**. Many wastewater facilities use control systems to continuously monitor the system and to assist with load management.

- **Variable frequency drives**. VFDs enable motors to accommodate fluctuating demand, running equipment at lower speeds and drawing less energy while meeting lower pumping needs. They can be used to vary flow more efficiently than valve positioning.

- **Regular maintenance**. Routine maintenance of pumping systems and other equipment can cut energy use and prolong operational life.

- **Treatment processes**. Identifying more energy efficient processes can present sizable cost savings in some systems.

- **Sludge processing**. Analysis of sludge processing options should include the energy costs of each option. In the case of land disposal, this should include transportation costs.

- **Disinfection**. There are cost and environmental tradeoffs with different types of disinfection. Although chlorination is less energy intensive, there are concerns about chlorine residuals in treated wastewater. Ozonation and UV irradiation are options that are becoming more common.

- **Co-generation**. Anaerobic digesters for sludge stabilization produce biogas that can be burned to heat facilities or generate electricity.

In water systems, the primary energy use is in pumping. Therefore, the first place to look for energy savings in an existing water system is in the pumps and motors used. Other places to look for savings include control systems, the disinfection process, and distribution system design.

Greater efficiency in pumping and motor use can be achieved by using variable speed pumps and motors, using the highest efficiency equipment that can be considered cost-effective, and keeping pumps and motors maintained.

Adjustable speed pumping increases efficiency by matching flows with pump operation. Adding variable frequency drives can reduce costs and increase the efficiency of system operation.

Premium efficiency motors used to drive pumps in water systems cost more than typical motors, but can often have a payback of two to ten years.

Control systems in water facilities can help manage energy use by controlling pump operation, monitoring pump efficiencies, shifting loads to off-peak periods, and controlling variable speed drives or pumps.

MUNICIPAL WATER EFFICIENCY AND CONSERVATION

Utility and city governments can initiate water-efficient practices, saving water and setting an example for customers. Some of the areas cities can explore include swimming pools, landscaping, and water consumption in public facilities.

Municipal swimming pools and recreation centers, whether indoor or outdoor, are large water users but can save water through some simple techniques. Saving water can add up to energy and cost savings for the city as well.

The major source of water and heat loss from swimming pools is from evaporation. For both indoor and outdoor pools, evaporation accounts for 70% of total energy loss. An average uncovered outdoor pool loses about an inch of water a week during the summer.

Covering the pool is the single most effective way of reducing water and heat loss. On a typical municipal pool, a manually operated pool cover will pay for itself in water and energy savings in less than one year. The more expensive automated covers have paybacks of about 4-5 years. For indoor pools, pool covers have the added benefits of reducing the need for ventilation and decreasing the amount of chemicals and cleaning.

Energy Smart Tips for Swimming Pools

RSPEC Fact Sheets for Swimming Pools

Iowa Department of Public Health – Swimming Pools and Spas

Another area municipalities can address to demonstrate water efficiency and conservation is in landscaping of city facilities, public parks and golf courses. A typical public golf course uses more than 8,000 gallons of water per day, about the same as an average hospital. Water-wise landscaping can save water and money.

Water-efficient landscaping for cities typically means three things:

- Reducing the amount of turf areas that are needed;
- Using native plantings where possible; and
- Keeping irrigation to a minimum and making sure it's efficient.

The benefits of landscape water conservation for cities include:

- Lowering the peak water demand for the water utility;
- Lowering the cost of installing and maintaining city landscaping;
- Reducing the use of lawn chemicals; and
- Creating attractive and diverse natural areas.

Landscaping and open spaces maintained by cities have typically focused on expanses of turf grass. Unfortunately, turf grass is not well adapted to the Iowa climate and thus takes large amounts of water, chemicals, and labor to maintain. If turf grass can be limited to only practical uses, cities can significantly reduce landscape water use.

This idea of "practical turf areas" can be incorporated into city design and operation of landscaping around buildings and on city streets, in parks, and on golf courses. Turf grass can probably be completely eliminated where it's hard to mow or water, on steep slopes, and in densely shaded areas. Turf areas should be large enough to be functional and as small as possible. For example, a small area of turf grass outside the public library could hold a table or benches for reading, surrounded by a butterfly garden established on the rest of the lawn area.

City parks can provide open, grassy spaces needed for playgrounds, picnic areas, and ball playing, with other areas converted to native plantings. Golf courses also could convert turf grass outside playing surfaces to native plantings or groundcovers, increasing the challenge of the course at the same time they are saving water.

By limiting turf grass to "practical turf areas" and installing native landscaping where appropriate, irrigation can be kept to a minimum. Where watering is needed, following the practices below will make it as efficient as possible.

- Group plants with similar watering needs so that some are not over-watered while others are under-watered.
- Schedule irrigation for early morning or evening hours to reduce water wasted through evaporation during the day.
- Use drip irrigation or bubbler/soaker systems.
- Maximize the efficiency of irrigation systems through use of controllers, rain shutoff devices, and soil moisture sensors. Make sure the system is operating properly. Check for misdirected or blocked sprays; broken heads, seals, pipes, or valves; and clogged or stuck heads.
- Reuse reclaimed water for irrigation.

Natural Landscaping for Public Officials

Cities can also set an example for citizens by using water conservation practices in community facilities. The municipal government can implement some of the same measures recommended for its residents and businesses, and reap the same rewards in cost-savings. Another benefit is these practices may be noticed immediately by citizens who then, may choose to follow the lead.

First, the city should determine where its water is being used. If the city has carried out a water accounting process, staff will have a good idea of the types and amounts of public water consumption.

Next, the city should implement the appropriate efficiency and conservation measures. Some of the steps to implementation include:

- Appointing a senior staff member to be responsible for water efficiency in city facilities;
- Preparing a water-efficiency maintenance plan based on the city's goals for saving water;

- Regularly checking equipment, piping, and connections to identify leaks and make repairs promptly;
- Installing water-saving devices in community facilities, including low-flush toilets, low-flow showerheads, and faucet aerators;
- Regularly inspecting plumbing fixtures for leaks and drips;
- Minimizing water used for washing vehicles, driveways, or sidewalks; and
- Educating city staff and residents about the city's efforts to use water wisely.

Additional information on efficiency and conservation technologies and measures appropriate for city facilities is contained in the chapters on the residential and commercial sectors.

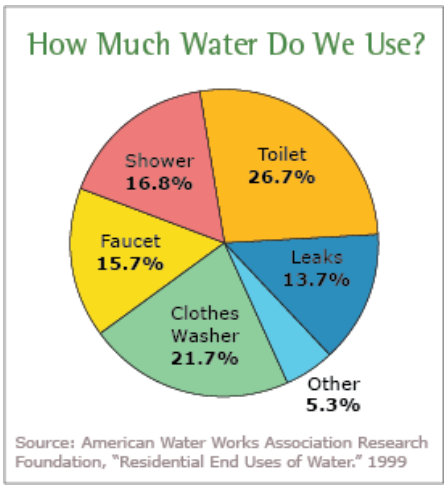
RESIDENTIAL WATER EFFICIENCY

In Iowa, the average expected per capita per day usage of water is 150 gallons, according to the Department of Natural Resources. About one-half to two-thirds of that water is used indoors, with the remainder going to outdoor uses. For most public water systems in the U.S., residential water use typically represents 50 to 80% of billed water demand.

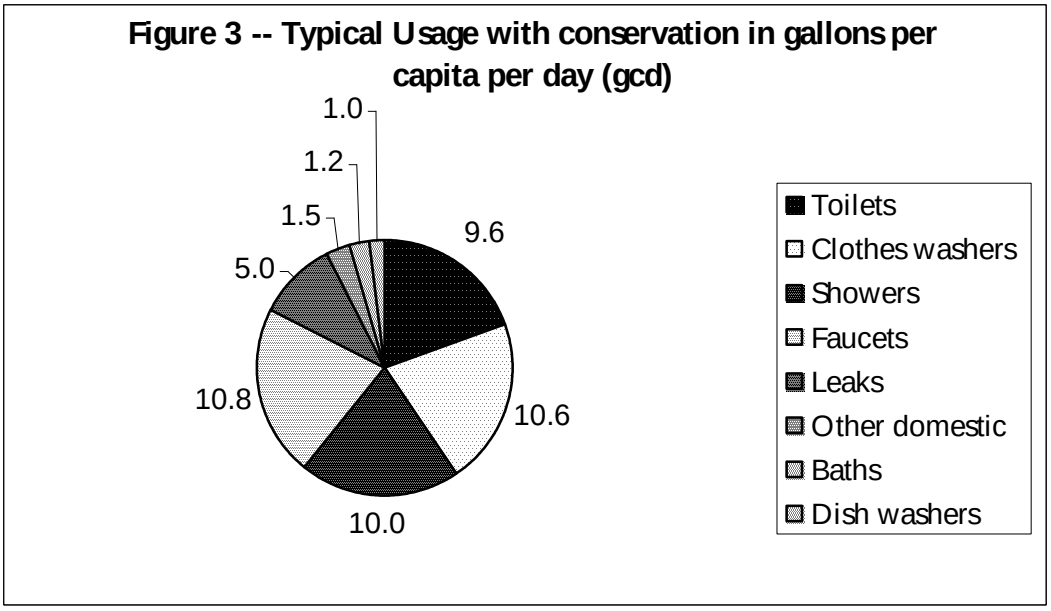
The chart below shows the results of a national survey conducted by the American Water Works Association. Actual flow measurements were collected on 1,188 single family homes in North America. Without conservation measures, a total of 72.5 gallons per capita per day are consumed in indoor uses in a typical home.

Primary users are, in gallons per capita per day (gcd):

Toilets	20.1 gcd
Clothes washers	15.1 gcd
Showers	12.6 gcd
Faucets	11.1 gcd
Leaks	10.1 gcd
Other	3.7 gcd



The AWWA study also projected possible typical water savings through conservation measures. According to the study, the average home can reduce inside water use by approximately 32% or by 22.9 gallons per capita per day. The chart below shows where possible savings can be achieved.



Source: American Water Works Association, " Water Use Inside the Home," Waterwiser web site at www.waterwiser.org

The conservation measures needed to achieve the savings above include:

- Installing toilets that use 1.6 gallons per flush;
- Using low-flow showerheads rated at 2.5 gallons/minute;
- Using 2.2 gallons/minute faucets;
- Replacing standard clothes washers with high efficiency clothes washers that use 30% less water; and
- Practicing routine, common sense leak detection and control.

The savings figures above show changes from a case of no conservation to a full range of conservation measures. In reality, many homes have some conservation measures already installed, particularly if they have new or recent replacement fixtures. There have been steady improvements in the efficiency of plumbing fixtures and appliances since the 1980s. In 1992, the Energy Policy Act established national maximum allowable water-flow rates for toilets, urinals, showerheads, and faucets.

The efficiency of clothes washers and dishwashers is also improving as new models reach the market. Energy Star, a national standard and marketing program, allows consumers to easily choose the most efficient models. Saving heated water provides consumers with a double benefit in water and energy savings.

Utilities that need to reduce long-term water consumption or flows at wastewater facilities can find savings through residential conservation measures. A combination of public education, retrofit and replacement programs, and pricing signals is usually required to be effective.

A public education campaign can use news releases, social media, utility publications, flyers, brochures, TV and radio advertising, door hangers, community presentations, and many other means to reach customers with information about water conservation.

Retrofit and replacement programs target certain measures and provide incentives to customers to adopt them. Retrofit and replacement programs can include giveaways of lower cost items such as showerheads, faucet aerators, and toilet dams; rebates on higher efficiency appliances; and direct installation programs.

The following table shows some of the potential savings from retrofits and replacements of existing toilets, showerheads, faucets, clothes washers, and dishwashers with more efficient devices or models. These figures are based on assumptions about the age and condition of existing fixtures and appliances and actual savings can vary substantially.

Figure 4 – Potential for Water Savings from Selected Measures

Measure	Reduction in water use in gallons per capita per day (gcd)	Life span (years)
Toilet tank dam/displacement device	2-3 gcd	1.5
Showerhead retrofit (aerator)	4 gcd	1-3
Faucet retrofit (aerator)	5 gcd	1-3
Residential toilet replacement (1.6 gallon/flush)	16-20	15-25
Showerhead replacement (2.5 gallons/minute)	8.1 gcd	2-10
Faucet replacement (2.2 gallons/minute)	6.4 gcd	10-20
Residential clothes washer (Energy Star model)	4-12 gcd	12
Residential dishwasher	1 gcd	12
Source: U.S. Environmental Protection Agency, Water Conservation Plan Guidelines*, August 6, 1998*		

Some of the factors that should be included when planning a retrofit or replacement program are:

- **What is the current penetration of high efficiency measures in your community?** What types of conservation measures are already being used by your customers?

- **Availability of high efficiency appliances**. Are they available through local vendors or will the utility have to supply them?

- **Training of local contractors**. Are local contractors knowledgeable about the installation and operation of high efficiency appliances or will the utility need to provide some training and support?

- **Determining incentives**. What rebate amount will be necessary to achieve the needed participation and savings?

- **Cost-effectiveness**. Will the cost of the program be outweighed by its benefits to the utility and its customers?

- **Partnering.** Who are the potential partners that can support or enhance the water or wastewater utility's efforts?

Many electric and gas utilities in Iowa have given away or heavily discounted low-flow showerheads and faucet aerators to promote both water and energy savings. A few utilities are also rebating high efficiency clothes washers. Water or wastewater utilities could consider partnering with their gas or electric utility to offer additional water-saving measures.

The use of pricing may be necessary to change customers' water use behaviors beyond the use of other voluntary incentives. The previous chapter on *Accounting, Costing, and Pricing* provides more information on conservation pricing strategies.

Outdoor water use varies greatly by the season, climate zone, and amount of rainfall each year. On average, outdoor water use by single-family homes in the U.S. is 31.7 gallons per capita per day, according to a study by the American Water Works Association. The vast majority of that use is for watering lawns, plants, and gardens.

Outdoor water use has typically become an issue in Iowa communities only during times of drought or other water constraints (see the chapter on *Water Shortages and Emergencies* for more information). However, encouraging different landscaping practices in order to reduce water demand long-term may also be part of a utility's water efficiency and conservation planning.

As discussed in the previous chapter on *Municipal Water Efficiency and Conservation*, cities can promote the use of native landscaping, practical turf areas, and efficient irrigation in residential areas. Municipal officials can help remove some of the barriers to native landscaping through weed ordinances.

According to the U.S. Environmental Protection Agency's *Sourcebook on Natural Landscaping for Public Officials* there are three main approaches to crafting or modifying a weed law:

- **Require a setback**. This addresses concerns about height and appearance of native plants by requiring that a setback or buffer strip on the periphery of the property be maintained at a maximum height (such as 12 inches). Vegetation behind the setback and within the yard is unregulated except for control of listed noxious weeds.
- **Include broadly worded exceptions for natural landscaping**. These exceptions may accommodate plantings that achieve the following positive outcomes: Native plantings, wildlife plantings, erosion control, soil fertility building, biological control, and public education.
- **Encourage natural landscaping for homeowners** through design assistance, selling native plants and seeds, specifically targeting certain neighborhoods, creating recognition programs, and others.

Indoor/Outdoor Water Consumption
Water Consumption Calculator
Alliance for Water Efficiency – Residential End Uses of Water Study
EPA Water Sense – Simple Steps to Save Water
EPA Water Sense – Using Water Efficiently
EPA Water Sense – Calculate Water Savings

COMMERCIAL/INDUSTRIAL WATER EFFICIENCY

This section will examine the potential for saving water in small and large commercial businesses, industry, and institutional facilities. The commercial/industrial sector typically makes up 20 to 40% of billed water demand for a municipal utility. On a per-customer basis, though, commercial/industrial facilities are significant water users.

While there are some similarities in water use and equipment across the commercial/industrial sector, generally different types of commercial/industrial facilities have different water-use characteristics and different opportunities for conservation and efficiency.

For commercial customers, which provide or distribute a retail service or product, water is typically used for domestic purposes, cooling and heating, cleaning and sanitation, and landscape irrigation. Hotels and motels are large water users, for example and can also benefit by installing water-saving measures.

Industrial customers, involved in manufacturing and processing activities, use water for heating and cooling, processing, washing, landscape irrigation, for domestic use, and as an ingredient.

Institutional customers are government facilities, schools, colleges and universities, hospitals and clinics, prisons, military installations, and places of worship. They use water primarily for heating and cooling, domestic purposes, and landscape irrigation.

Some residential-type water conserving fixtures and appliances, such as toilets, showerheads, faucets, clothes washers, and dishwashers, are also applicable in commercial, industrial, or institutional settings. In fact, the greatest water and cost savings in some facilities may come from plumbing fixtures – more efficient toilets, urinals, showerheads, and faucets.

Some of the other common ways that businesses, industries, and institutions can conserve water and/or impact sewage flows are:

- **Determining where water is used**. Sub-metering may be needed to determine specific uses and costs.

- **Leak detection and repair**. Periodic shutdown may be needed to identify leaks and fix them.

- **Water reuse and recycling**. Water reuse is the use of wastewater or reclaimed water from another application.

- **Cooling water recirculation**. The use of water for cooling in industrial applications represents one of the largest water uses in the U.S. Recycling water with a recirculating cooling system can reduce water use by using the same water to perform several cooling operations. Technologies include evaporative cooling, ozonation, and air heat exchange.

- **Water efficient landscaping.** Reducing turf grass and replacing it with low-maintenance native plantings can significantly impact the need for watering.

In some cases, particularly in process-oriented industries, a customized approach may be necessary. A water audit conducted by a trained engineer or technician can help larger or more specialized facilities identify problems, calculate savings, develop a facility water conservation plan, and monitor results.

Denver Water – Commercial Conservation Tips
EPA Water Sense – Commercial
Johnson Controls – 10 Tips to Conserve Water

WATER SHORTAGES AND EMERGENCIES

The earlier portions of this handbook laid out the case for incorporating water efficiency and conservation into the day-to-day as well as long-term operations of water and wastewater utilities. There may occur, however, immediate water emergencies that necessitate quick action and measures to conserve.

What constitutes a water shortage or emergency? A water shortage or emergency can result from a lack of raw water supplies or lack of pumping capacity from a treatment plant. Contamination of the water supply or equipment failure can also result in a water emergency. Any of these can require the timely implementation of water conserving measures.

Discussed below are three basic plans, based on the severity of the shortage or emergency, for addressing quick action for water conservation in your community.

The level at which your system is operating can serve as a threshold to determine the appropriate level of conservation required from your customers.

- 75% of pumping capacity – "Water Watch." At this point, voluntary conservation may be implemented as described in Action Plan 1.

- 85% of pumping capacity – "Water Warning." At this point, restricted water use may be implemented as described in Action Plan 2.

- 95% of pumping capacity – "Water Emergency." At this point, water rationing may be implemented as described in Action Plan 3.

Indicators of a declining raw water supply include:

- Decrease in the normal pumping water level of the well
- Declining water recovery rate of water level in well
- Decreasing reservoir levels measured in number of feet below spillway
- Decreasing reservoir levels measured in number of feet above intake

When indicators move back into safe ranges, conservation controls can be eased or lifted.

Action Plan 1 – "Water Watch"

Action Plan 1 uses a voluntary approach to gaining cooperation, with a goal of reducing water use by 10%. Early voluntary cooperation can protect your utility against a worsening situation. Customer education and information is crucial to making this approach work.

Step 1: Assess System Conditions

- Determine specific capacities of your constrained system, whether water or wastewater or both.
- Review usage patterns of residential customers.
- Review usage patterns for commercial and industrial customers.
- Alert the utility governing body to the potential for a water emergency.

Step 2: Initiate Water Conserving Practices

- Keep pumps and other equipment in good working condition. Keep good records of what types of pumps are used, who the suppliers of the pumps are, where the pumps can be repaired in a short time, and where available parts are in inventory. An "open" purchase order, for use only under emergency conditions, will allow repairs without going through the purchasing agent for repair parts.
- Initiate leak detection and repair for your distribution system.
- Encourage the use of water saving equipment appropriate for addressing the particular area of shortage.
- Work with other city departments to conserve water, such as water used for maintenance.
- Meet directly with your largest customers, review their water use patterns, and assist them to create voluntary conservation programs.

These activities can increase the amount of water conserved and help you address the system constraint.

Step 3: Initiate a Public Information Program for Your Customers
A customer education and information campaign will help your customers understand the need for voluntary conservation. Their understanding is crucial to gain their support and compliance. Some of the ways to publicize the need for conservation include:

- Including information with customers' bills
- Publishing ads in local newspapers or shoppers
- Posting reminders around the community
- Advertising on local radio or TV stations or on local cable access
- Printing information in community publications
- Making presentations to community groups
- Involving the local leaders, such as school administrators, church leaders, organization presidents, and others

Action Plan 2 – "Water Warning"

If the situation addressed in Action Plan 1 worsens, or the actions taken are not adequate, Action Plan 2 is the next step. This plan does not require rationing, but it does involve mandatory restrictions on the way customers use water. The goal of the measures in Action Plan 2 is to reduce water use by an additional 11-20%.

A list of restricted water use activities is included in Action Plan 2. These activities are grouped according to the severity of the water or wastewater emergency. Your utility should only adopt those restrictions which are appropriate to the problem and to your community.

The elements of Action Plan 2 are:

- Implement and evaluate Action Plan 1 measures
- Reassess system conditions
- Analyze and establish appropriate restricted water use activities through board or council resolution
- Establish penalties and appeal procedures
- Educate and inform utility customers

The following is a list of activities that could be prohibited during a water or wastewater shortage or emergency. The first tier of activities addresses moderate to serious situations, and the second tier addresses severe system emergencies.

Tier I Restricted Activities – Moderate to Serious Shortage or Emergency

- Watering or irrigation of lawns and all other outside vegetation except that direct applications of water not exceeding 1 inch per week are permitted before 8:00 a.m. and after 8:00 p.m. on flower and vegetable gardens, trees and shrubs less than 4 years old, and areas which were newly seeded or sodded prior to issuance of the emergency resolution.

- Washing of cars, trucks, trailers, boats, and other mobile vehicles or equipment except at commercial establishments which provide that service.

- Washing of outdoor surfaces including buildings, sidewalks, driveways, patios, and porches.

- Nonessential cleaning of commercial and industrial equipment, machinery, and interior spaces.

- Filling, re-filling, or adding of water to provide swimming pools, wading pools, reflecting pools, ornamental fountains, or any other structure making similar use of water.

- Permitting the loss of water through defective plumbing or fixtures, except where the customer can provide proof of prompt repair of the defect.

- Serving water by restaurants except when it is specifically requested by customer.

None of these restricted activities would apply when water has been reclaimed or recycled after an essential primary use.

Tier II Restricted Activities – Severe Water Shortages

- All outside water use except for domestic, sanitation, and fire.
- All commercial and industrial uses of water not essential in providing products and services.
- Irrigation of agricultural crops that may pose an immediate threat to the utility's available supply.
- Recreational and leisure water uses including lawn and golf course watering.
- Water used but not necessary for the preservation of life or the general welfare of the community.

Penalties for Violating Restricted Activities

Penalties for use of metered water in violation of the restricted water use activities need to be established by council ordinance.

When restricted water use activities have been adopted by council ordinance, penalties for violations can take the form of a city fine. These violations are called "municipal infractions."

Interruption of service is another option for enforcement of restricted water use activities. For example, if after first and second offense penalties have been levied, the customer continues to violate the restrictions, the utility can initiate immediate interruption of service. Reconnection would be scheduled only after payment of a reconnection fee.

Because health and safety issues are of specific concern, reducing water flow to a minimum should be the alternative to disconnection. This can be done at the shut-off valve or by installing a flow restrictor on the customer's supply line.

Enforcement and Appeal Procedures

Standard enforcement procedures for interruption of service should be established. When restricted water use activities have been adopted through city ordinance, violations can be charged as municipal infractions. Local law enforcement personnel can then be called upon to assist in enforcing civil penalties.

When a violation is charged as a municipal infraction, it is tried in the district court. For other sanctions imposed by the utility, an appeal procedure must be established. For

example, an Appeal Board may consist of one member from your utility's governing board, the mayor or city manager, and three citizens.

Public Notice

Information on the restricted water use activities and the reasons the city is implementing them, should be part of a public education effort similar to the one in Action Plan 1. Customers should be notified of the restrictions, the penalties for violations, and the appeal process. Direct notification to customers should be used in addition to other information methods.

Action Plan 3 – "Water Emergency"

In Action Plan 3, water is rationed to customers according to class of service. This plan requires that all customers be allocated a monthly water allotment and that regular meter readings be taken to determine customer compliance. The quantity allotted is generally considered to be the minimum required for interior use.

Like in Action Plan 1, voluntary cooperation and voluntary conservation are still essential. The Tier I and Tier II restricted water use activities from Action Plan 2 can also be incorporated into a water allocation approach.

The elements of Action Plan 3 are:

- Implement Action Plan 1 activities.
- Establish restricted water use activities as described in Action Plan 2.
- Establish penalties and appeal procedures as described in Action Plan 2.
- Determine customer classes and base allocations.
- Determine premium charges.
- Adopt and publish final plan.

Monthly meter readings will be necessary for a water rationing program. Among your largest users, weekly meter reading will be useful. Access to service connections and water meters must be assured at all times.

Base Allocation Determination

A base allocation amount for each customer class must be determined. Classes may be generally divided into residential, commercial, and industrial.

Special classes for nursing homes, hospitals, motels, car washes, and other businesses where water is basic to the operation will need to be identified. You may want to offer the largest customers off-peak incentives to delay high usage during peak hours.

Two types of base allocation are:

1. Base allocation is a percentage of a typical winter month's usage, e.g. March billing, or the corresponding month's usage from the previous year.
    a. Residential single-family (80% of previous usage)
    b. Commercial (90% of previous usage)
    c. Industrial (demonstrate conservation activities)
    d. Nursing homes/hospitals (90% of previous usage)
    e. Motels (90% of peak season usage)

2. Base allocation is per household amount, e.g. 3,000 gallons per month per single family household. Allotments given to all other classes of service are based on individual water-use histories.

Base Allocation Notice and Appeal Process

A notification process will be necessary to advise customers of their base allocations and penalties for overuse of water. See Action Plans 1 and 2 for background on public notification.

An appeal process allowing adjustment of the base allocation is also necessary. The appeal board discussed in Action Plan 2 may be designated to hear allocation appeals. For example, allocation adjustments may be needed for large families or changes in the number of building occupants. Adjustments may also be needed for commercial and industrial customers with conservation practices already in place, since the capacity for additional conservation may be limited.

Premium Rate Surcharge

A premium rate surcharge for metered water consumption in excess of the base allocation should be established. An example would be a surcharge of $1.00 per 100 gallons of water used in excess of the base allocation.

Adjustment of the premium rate may be allowed. This would occur in the case of a mechanical error such as leaky pipes or malfunctioning meters. The customer, however, must provide proof of repair such as a plumber's statement or materials receipt. The adjusted rates would apply only to the billing period prior to the correction of the failure.

A model water conservation ordinance has been included in Appendix B. Please use this as a guide for your own system.

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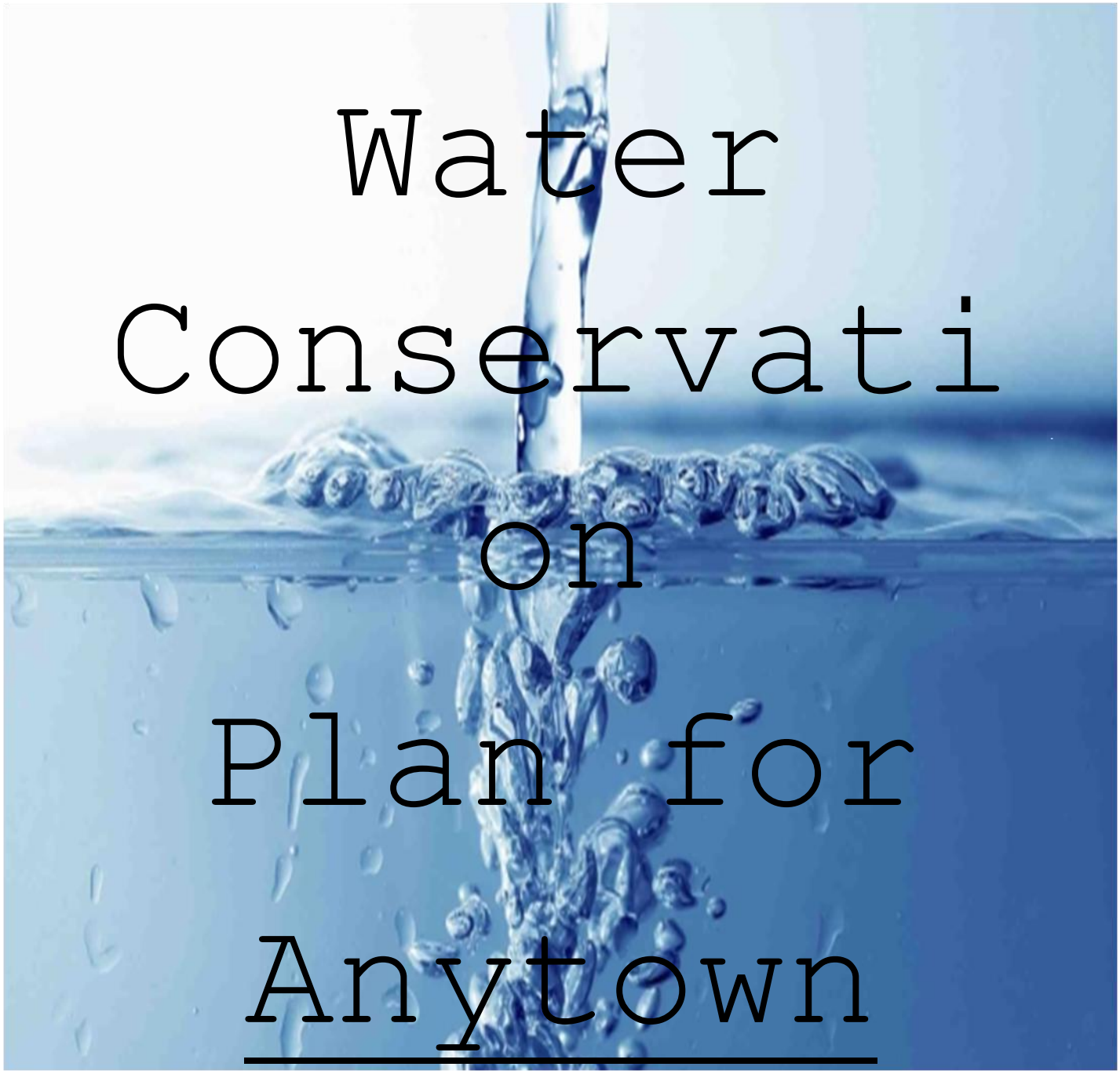
Appendix A

Water Conservation Plan Workbook



Water Conservation Plan for Anytown

Prepared by:

Month , 20XX

Water Conservation Plan Workbook

Instructions

This workbook is for use with the Waterwise Water Conservation Manual. It was designed to be an easy, fill in the blank guide to assist you in putting your Water Conservation Plan into place in your community.

Public Water Supply Information: This section contains basic information for public water supplies and also the required information for a water conservation plan per State of Iowa Chapter 52.9(3). Please Adjust the years accordingly to include 5 years of data (current year and previous 4)

Water Conservation Goals: In this section you can list the high-level conservation goals your system would like to meet.

Water System Profile: In this section you will assess the current condition of the system and inventory existing resources. Also, there is space to include the conservation efforts currently in place.

Demand Forecast: Use the worksheet provided in this section to predict future water use based on projected population growth. If your system has no projected growth you may not need to complete this section.

Identify & Evaluate Conservation Measures: Included in this section is a worksheet to assist your system in choosing new conservation measures to implement to meet the goals laid out in the earlier section.

Water Conservation Workplan: Finally, the last section is where your system can set the strategies to implement the plan.

Include: progress made, timeframe, designate responsible person, and the goal this strategy meets.

TABLE OF CONTENTS

Public Water Supply Information

Name of System:					PWSID:		
# of Connections:					Total Population Served:		
System Address:							
Operator Name:					Phone #:		
Name/Location of Water Source:							
Well Depth (ft):		Pumping Rate:		gal/min	Install. Date:		
Name/Location of Water Source:							
Well Depth (ft):		Pumping Rate:		gal/min	Install. Date:		
Name/Location of Water Source:							
Well Depth (ft):		Pumping Rate:		gal/min	Install. Date:		
Backup Water Source :							
Contact Name and #:							
Maximum Daily Demand:			Average Daily Demand:				
95% of pumping capacity							
85% of pumping capacity							
75% of pumping capacity							
Unaccounted for Water (%)		Water Conservation Ordinance		Yes/No			
Map of Distribution System	Yes/No	Location of Map:					
Description of Wastewater Discharge:							
Discharge Frequency:		Location of Discharge:					
Means of identifying impending water shortage problems (e.g. water level in wells or a reservoir decline to a certain level or stream flows fall to a certain rate:							

Monthly Withdrawal Amounts (each source)

Source:

Year	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec
2009												
2010												
2011												
2012												
2013												

Source:

Year	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec
2009												
2010												
2011												
2012												
2013												

Source:

Year	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec
2009												
2010												
2011												
2012												
2013												

*Add more “source” tables as necessary

Monthly Total Water Withdrawal Amount

Year	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec
2009												
2010												
2011												
2012												
2013												

Monthly Total Waste Water Discharge Amount

Year	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec
2009												
2010												
2011												
2012												
2013												

Quarterly Breakdown of Total Water Use and Estimated Consumptive Water Use (in gallons or cubic feet)

Year 2009

	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Water Conveyed Across State Boundaries				
Water Used Primarily for Recreational or Aesthetic Purposes				
Irrigation of any General Crop				
Irrigation of any Specific Crop				
Manufacturing or other Industrial Processes				
Water used for Generation of Electrical Power for public consumption				
Water used for Livestock production				
Used for Human consumption and sanitation supplied by a PWS				
Used for human consumption and sanitation supplied by a private water supply				

Year 2010

	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Water Conveyed Across State Boundaries				
Water Used Primarily for Recreational or Aesthetic Purposes				
Irrigation of any General Crop				
Irrigation of any Specific Crop				
Manufacturing or other Industrial Processes				
Water used for Generation of Electrical Power for public consumption				
Water used for Livestock production				
Used for Human consumption and sanitation supplied by a PWS				
Used for human consumption and sanitation supplied by a private water supply				

Year 2011

	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Water Conveyed Across State Boundaries				
Water Used Primarily for Recreational or Aesthetic Purposes				
Irrigation of any General Crop				
Irrigation of any Specific Crop				
Manufacturing or other Industrial Processes				
Water used for Generation of Electrical Power for public consumption				
Water used for Livestock production				
Used for Human consumption and sanitation supplied by a PWS				
Used for human consumption and sanitation supplied by a private water supply				

Year 2012

	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Water Conveyed Across State Boundaries				
Water Used Primarily for Recreational or Aesthetic Purposes				
Irrigation of any General Crop				
Irrigation of any Specific Crop				
Manufacturing or other Industrial Processes				
Water used for Generation of Electrical Power for public consumption				
Water used for Livestock production				
Used for Human consumption and sanitation supplied by a PWS				
Used for human consumption and sanitation supplied by a private water supply				

Year 2013

	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Water Conveyed Across State Boundaries				
Water Used Primarily for Recreational or Aesthetic Purposes				
Irrigation of any General Crop				
Irrigation of any Specific Crop				
Manufacturing or other Industrial Processes				
Water used for Generation of Electrical Power for public consumption				
Water used for Livestock production				
Used for Human consumption and sanitation supplied by a PWS				
Used for human consumption and sanitation supplied by a private water supply				

Describe any previous water shortage problem(s), including the cause, frequency, other affected parties, and how it was resolved:

Shortage Issue	Cause (if known)	Date/for how long?	Others affected? Who?	Resolution

WATER CONSERVATION PLAN GOALS

-
-
-
-
-
-
-
-

Worksheet A-1

Water System Profile

SUMMARIZE SYSTEM CHARACTERISTICS

A	SERVICE CHARACTERISTICS		Number
1	Estimated service population		
2	Estimated service area (square miles)		
B	**ANNUAL WATER SUPPLY**	**Annual volume**	**Percent metered**
3	Total annual water supply		%
C	**SERVICE CONNECTIONS**	**Connections**	**Percent metered**
4	Residential, single-family		%
5	Other		%
6	Total connections		%

C	WATER DEMAND	Annual volume	Percent of total	Per connection
7	Metered residential sales			
8	Metered nonresidential sales			
9	Other metered sales			
10	Unmetered sales			
11	Nonaccount water [a]			
12	Total system demand (total use)			
D	**AVERAGE & PEAK DEMAND**	**Volume**	**Total supply capacity**	**Percent of total capacity**
13	Average-day demand			%
14	Maximum-day demand			%
F	**PRICING**	**Rate structure [b]**	**Metering schedule [c]**	**Billing schedule [c]**
15	Residential rate			
16	Nonresidential rate			
17	Other rate			
G	**PLANNING**	**Prepared a plan**	**Date**	**Filed with state?**
18	Capital, facility, or supply plan			
19	Drought or emergency plan			
20	Water conservation plan			

SUMMARIZE SYSTEM CONDITIONS

H	PLANNING QUESTIONS	Yes	No	Comment
21	Is the system in a designated critical water supply area?			
22	Does the system experience frequency shortages or supply emergencies?			
23	Does the system have substantial unaccounted-for and lost water?			
24	Is the system experiencing a high rate of population and/or demand growth?			
25	Is the system planning substantial improvements or additions?			

SUMMARIZE CURRENT CONSERVATION ACTIVITIES

Water conservation measures	Approximate annual water savings (if known)	Implemented since (date)	Is continued implementation planned?

[a] Nonaccount water is water not metered and sold to customers (including authorized and unauthorized uses).
See Appendix A, figure A-7 and Worksheet A-2.

[b] Uniform, increasing-block, decreasing-block, seasonal, or other.

[c] Quarterly, monthly, or other.

Worksheet A-2: Water Accounting and Loss Control

Line	Item	Volume (gallons)	% of Amount in Line 1
1	**Total Source Withdrawals and Purchases**		100%
2	*Adjustments to source water supply [a]*		
2A	Adjustment for source meter error (+ or -)		
2B	Adjustment for change in reservoir or tank storage (+ or -)		
2C	Adjustment for transmission line losses (-) [a]		
2D	Adjustments for other source contributions or losses (+ or -) [a]		
3	Total adjustments to source water (add lines 2A through 2D))		
4	**Adjusted Source Water (subtract line 3 from line 1)**		%
5	*Metered Water Sales*		
5A	Metered residential sales		
5B	Metered commercial sales		
5C	Metered industrial sales		
5D	Metered public sales		
5E	Other metered sales		
6	Total metered sales (add lines 5A through 5D)		
7	Adjustment for meter reading lag time (+ or -)		
8	Adjustment for meter errors (+ or -) [a]		
9	Adjusted total meter sales (add lines 6 through 8)		
10	**Nonaccount Water (subtract line 9 from line 4)**		%
11	*Metered and accounted-for but not billed*		
11A	Public-use water metered but not billed		
11B	Other water metered but not billed		
12	*Authorized unmetered water: operation and maintenance*		
12A	Main flushing		
12B	Process water at treatment plant		
12C	Water quality and other testing		
13	*Authorized unmetered water: public use*		
13A	Storm drain flushing		
13B	Sewer cleaning		
13C	Street cleaning		
13D	Landscaping in large public areas		
13E	Firefighting, training, and related maintenance		
14	*Other authorized unmetered use*		
14A	Swimming pools		
14B	Construction sites		
14C	Other unmetered uses		
15	Total authorized unmetered water (add lines 11A through 14C)		
16	**Total Unauthorized Losses (subtract line 15 from line 10)**		%

17	*Identifiable water losses and leaks*			
17A	Accounting procedure errors [a]			
17B	Malfunctioning distribution system controls			
17C	Illegal connections and theft			
17D	Meter inaccuracy			
17E	Unavoidable water leaks			
17F	Avoidable water leaks			
18	Total identifiable water losses and leaks (add lines 17A through 17F)			
19	**Unaccounted-For Water (subtract line 18 from line 16)**			%

[a] Methodology subject to industry and regulatory standards.

Worksheet A-3: Water Demand Forecast [a]				
Line	Item	Current Year	5-Year Forecast	10-Year Forecast
A	**TOTAL ANNUAL WATER DEMAND**			
1	Current total annual water demand (from Worksheet 3-1) [a]			
2	Current population served [b]			
3	Total water demand per capita (line 1 divided by line 2) [b]			
4	Projected population [b]			
5	Projected total annual water demand (line 3 multiplied by line 4)			
6	Adjustments to forecast (+ or -) [c]			
7	Adjusted total annual water demand (line 5 plus line 6)			
8	Current annual demand (line 1) and adjusted annual water demand forecast (line 7 for forecast years)			
9	Current and projected annual supply capacity (from Worksheet 3-1) [d]			
10	Difference between total annual water demand and total annual supply capacity (+ or -) (subtract line 8 from line 9)			
B	**AVERAGE-DAY AND MAXIMUM-DAY DEMAND**			
11	Current and forecast average-day demand (line 8 divided by 365)			
12	Current maximum-day demand (from Worksheet 3-1)			
13	Maximum-day to average-day demand ratio (line 12 divided by line 11)			
14	Projected maximum-day demand (line 13 multiplied by line 11 for all forecast years)			
15	Adjustment to maximum-day demand forecast [c]			
16	Current (line 12) and adjusted maximum-day demand forecast (add lines 14 and 15)			
17	Daily supply capacity (line 9 divided by 365)			
18	Ratio of maximum-day demand to daily supply capacity (line 16 divided by line 17)			

[a] Separate forecasts should be prepared for large-volume users, as well as for nonaccount water (water not billed to customers) if nonaccount water is a significant amount (such as more than 10% of total production).
[b] Managers can use connections instead of population and per-connection water use instead of per-capita water use.
[c] Please explain adjustments to your forecast (lines 6 and 15), including effects of installed conservation measures and rate changes.
[d] Supply capacity should take into account available supplies (permits), treatment capacity, or the distribution system capacity and reflect the practical total supply capacity of system, including purchased water.

Worksheet A-4: Selection of Conservation Measures

Line	Measure	Already Implemented	Plan to Implement	Primary criteria for selecting or rejecting the conservation measure for implementation [a]
Universal metering [B]				
1	Source-water metering			
2	Service-connection metering			
3	Meter public-use water			
Water accounting and loss control [A]				
4	Account for water			
5	Repair known leaks			
Costing and pricing [B]				
6	Cost-of-service accounting			
7	User charges			
8	Metered rates			
Information and education [B]				
9	Understandable water bill			
10	Information available			
Other Measures [b]				
11				
12				
13				
14				
15				

[a] This space may also be used to note special issues related to this measure, including legal or obstacles to its use that preclude further consideration.

[b] See Appendix A for additional information on water conservation measures.

[A] = measure affects average-day demand

[P] = measure affects maximum-day (peak) demand)

[B] = measure affects average and peak demand

Table A-4: Benchmarks for Savings from Selected Conservation Measures

Category	Measure	Reduction in end use	Life span (years)
LEVEL 1 MEASURES			
Universal metering	Connection metering	20 percent	8 to 20
	Submetering	20 to 40 percent	8 to 20
Water accounting and loss control	System audits and leak detection	Based on system	na
Costing and pricing	10% increase in residential prices	2 to 4 percent	na
	10% increase in nonresidential prices	5 to 8 percent	na
	Increasing-block rate	5 percent	na
Information and education	Public education and behavior changes	2 to 5 percent	na
LEVEL 2 MEASURES			
End-use audits	General industrial water conservation	10 to 20 percent	na
	Outdoor residential use	5 to 10 percent	na
	Large landscape water audits	10 to 20 percent	na
Retrofits	Toilet tank displacement devices (for toilets using > 3.5 gallons/flush)	2 to 3 gpcd	1.5
	Toilet retrofit	8 to 14 gpcd	1.5
	Showerhead retrofit (aerator)	4 gpcd	1 to 3
	Faucet retrofit (aerator)	5 gpcd	1 to 3
	Fixture leak repair	0.5 gpcd	1
	Governmental buildings (indoors)	5 percent	na
Pressure management	Pressure reduction, system	3 to 6 percent of total production	na
	Pressure-reducing valves, residential	5 to 30 percent	na
Outdoor water-use efficiency	Low water-use plants	7.5 percent	10
	Lawn watering guides	15 to 20 percent	na
	Large landscape management	10 to 25 percent	na
	Irrigation timer	10 gpcd	4
LEVEL 3 MEASURES			
Replacements and promotions	Toilet replacement, residential	16 to 20 gpcd	15 to 25
	Toilet replacement, commercial	16 to 20 gpcd	10 to 20
	Showerhead replacement	8.1 gpcd	2 to 10
	Faucet replacement	6.4 gpcd	10 to 20
	Clothes washers, residential	4 to 12 gpcd	12
	Dishwashers, residential	1 gpcd	12
Water-use regulation	Landscape requirements for new developments	10 to 20 percent in sector	na
Graywater reuse, residential	20 to 30 gpcd	na	
	Hot water demand units	10 gpcd	na
Reuse and recycling	Cooling tower program	Up to 90 percent	na
Integrated resource management	Planning and management	Energy, chemical, and wastewater treatment costs	Na

Source: USEPA Water Conservation Plan Guidelines

Water Conservation- Work Plan

-update work plan as progress is made-

STRATEGIES	GOAL MET?	Name of Responsible Party	Fully Implemented? Date?	Progress

Appendix B

Model Water Conservation Ordinance
Model Summer Rate Ordinance

The following ordinances have been developed by IAMU as guidance and will require further editing to be applicable to your community/water system. We also recommend your city attorney or contracted legal counsel review the final version of the ordinances before they are passed and approved. Please contact IAMU for assistance or questions.

This Model Ordinance seeks to achieve the goals of conservation to meet a water emergency by education and encouragement to act as a united community. A Proclamation allows the public to be informed immediately as a newsworthy event and sets a tone for the Community. Enforcement is by using the practices already available to a water utility in the normal course: recognizing the increased cost and value of water, increased administrative fees and disconnection of service to water violators. Municipal criminal code enforcement and penalties are not recommended or included; such actions are out of the normal scope for a utility and frequently misdirect the time and resources of staff and can present a public relations issue.

ORDINANCE 2013-XX

AN ORDINANCE ESTABLISHING A WATER CONSERVATION PLAN

WHEREAS, The City Council of the City of Anytown, Iowa, recognizes that supplies of potable water are essential for the health, safety and welfare of its citizens; and

WHEREAS, the Water Utility has limited capacity and from time to time during and following drought conditions or due to equipment failure, the City's water supply may become significantly and seriously depleted such that there is an insufficient supply of water to meet all customary and usual demands; and

WHEREAS, the City of Anytown, Iowa, deems it essential to protect the safety of its citizens in the event that the limited capacity of the Water Utility may be threatened;

LET IT THEREFORE BE ORDAINED:

Definitions:

Customer: any person, company, or organization using processed potable water supplied by the City of Anytown

Consumed: water that has passed through a customer's meter or is otherwise furnished by the water utility

Domestic water use: water use for personal needs or for household purposes such as drinking, bathing, heating, cooking, sanitation,

Commercial and industrial use: water used to produce goods or to furnish services by any establishment having financial profit as a primary aim.

1.01 WATER SHORTAGES. Under the conditions set forth in this Ordinance, the City Council, in consultation with the Water Superintendent, may find, and by Proclamation declare, a public Water Watch, Water Warning or Water Emergency, during which time the following measures and provisions shall be in effect to prevent depleting the water supply for human consumption and sanitation and to produce an orderly and equitable reduction of water consumption.

Immediately upon the issuance of such a Proclamation, regulations and restrictions set forth under this Ordinance shall become effective and remain in effect until the water shortage is terminated and the Proclamation rescinded.

Water uses, regulated or prohibited under the Ordinance, are considered to be non-essential and continuation of such uses during time of water shortage is deemed to constitute a waste of water, subjecting the users to surcharges, disconnection costs and excess consumption fees.

1.02 CONDITIONS.

1. "Water Watch"- A Water Watch may be declared when a water shortage or equipment failure poses a potential threat to the ability of the water system to meet the needs of its customers currently or in the foreseeable future. Indicators of the need to impose a Water Watch include:

   A. System operating at 75% of pumping capacity;

   B. Moderate decrease in the pumping water level of wells;

   C. Moderate decrease in recovery rate of water level in wells.

2. "Water Warning" – A Tier I or Tier II Water Warning may be declared when a water shortage or equipment failure poses a serious threat to the ability of the water system to meet the needs of its customers currently and in the foreseeable future. Indicators of the need to impose a Tier I Water Warning include:

   A. System operating at 85% pumping capacity; or

   B. Significant decrease in the pumping water level of wells; or

   C. Significant decrease in recovery rate of water level in wells.

   Indicators of the need to impose a Tier II Water Warning include:

   A. Severe system emergencies such as a chemical spill; or

   B. Major system failure in feeder mains or treatment plant: or

   C. Other factors which pose a significant threat to the ability of the Utility to furnish adequate supplies of potable processed water.

3. "Water Emergency" – A Water Emergency may be declared when a water shortage or equipment failure poses a severe and immediate threat to the ability of the water system to meet the needs of its customers. Indicators of the need to impose a Water Emergency include:

A. System operation at 95% of pumping capacity; or

B. Serious decrease in recovery rate of water level in wells.

1.03 GENERAL PROCEDURE. In the time during or following drought conditions or equipment failure, the following procedures shall be followed:

1. Water Watch. Under a Water Watch, all customers of the municipal water service are encouraged to limit or curtail all nonessential uses of water in order to conserve precious water resources during the time of shortage.

   A. No watering of lawns, shrubs or gardens between the hours of 8:00 a.m. and 8:00 p.m.

   B. No water should be used to fill private swimming pools, children's wading pools or any other outdoor pool or pond.

   C. No water should be used to wash streets, parking lots, driveways, sidewalks or building exteriors.

   D. No water should be used for nonessential cleaning of commercial and industrial equipment, machinery and interior spaces.

   E. Water should be served at restaurants only upon the request of the customer.

2. Water Warning- Tier I. Under a Tier I Water Warning, no person shall use potable processed water of the municipal water service in any manner contrary to the following:

   A. Outdoor watering or irrigation of lawn is prohibited.

   B. Outdoor watering of any kind is prohibited between the hours of 8:00 a.m. and 8:00 p.m. daily.

   C. Watering or irrigation of flower and vegetable gardens, trees and shrubs less than four (4) years old and new seedlings or sod is permitted once per week with an application not to exceed one inch (1").

   D. Car washing is prohibited except in commercial establishments that provide that service.

   E. No water shall be used to fill private swimming pools, children's wading pools, reflecting pools or any other pool or pond.

F. No water shall be used to wash streets, parking lots, driveways, sidewalks or building exteriors.

G. No water shall be used for nonessential cleaning of commercial and industrial equipment, machinery and interior spaces.

H. Water shall be served at restaurants only upon the request of the customer.

I. Tankload water sales may be curtailed or eliminated.

Water reclaimed or recycled after some other primary use, such as water that has been used for washing or cooling, may be used without restriction. Additionally, water derived from sources other than the City water utility, such as water condensed from the atmosphere by air conditioners or collected from rain or snow, may be used without restriction.

3. Water Warning- Tier II. Under a Tier II Water Warning, no person shall use potable processed water of the municipal water service in any manner contrary to the following:

A. All outside water use, except for domestic, sanitation, and fire is prohibited.

B. All commercial and industrial uses of water not essential in providing products or services are prohibited.

C. Irrigation of agriculture crops is prohibited.

D. Recreational and leisure water use, including lawn and golf course watering and other incidental or recreational use is prohibited.

E. Water use not necessary for the preservation of life or the general welfare of the community is prohibited.

4. Water Emergency. Under a Water Emergency, Tier I Water Warning use restrictions will be in effect and, in addition, each customer will be afforded a monthly allocation of water.

A. Base Allocation. The base allocation of water for residential use shall be 3,000 gallons per household per month. For commercial, industrial or institutional use, the base allocation shall be established by resolution as a percentage of the average water used during the previous winter (November through April).

B. Appeal and Adjustment of the Base Allocation. Any person may file an appeal with the Water Appeal Board to adjust the base allocation amount. The Water Appeal Board may grant an adjustment to the appellant based on the following criteria:

(1) For single-family residential use, the base allocation may be increased by 1,000 gallons per person per month for all individuals residing at the appellant's residence for a period of more than thirty (30) days.

(2) For commercial, industrial, institutional or other residential uses, the base allocation may be increased based upon factors appropriate to the individual customer, such as usage, production, service and occupancy data provided by the customer.

(3) The appeal must identify the purpose of the increased water allocation requested, the specific harm that will be incurred by the customer if the allocation increase is not granted, the economic loss that will be incurred, the alternatives available to the customer and the value of the increased water allocation.

C. Premium Rate for Imprudent Consumption. Customers may be encouraged to comply with the following standards through the use of surcharges as set forth in this Ordinance.

In addition to the water rates duly enacted by the City Council, any customer who uses or consumes water in excess of the base allocation shall pay a premium rate of $X.XX per 100 gallons of water consumed..

D. Adjustment of Premium Rate Charges. Any person may file for adjustment of the premium water charge for imprudent water consumption with the Water Appeal Board. The Water Appeal Board may grant an adjustment of the premium rate charges in accordance with the following criteria:

(1) Adjustments may be granted for over-consumption due to mechanical failures such as broken or leaky pipes or fixtures but not for over-consumption due to human carelessness.

(2) The applicant shall furnish proof that the mechanical failure was repaired promptly. This should be in the form of a licensed plumber's invoice or statement or a materials receipt.

(3) The adjustment shall be granted only for the billing period prior to the correction of the failure.

(4) For those accounts granted an adjustment of the premium rate charges, the minimum adjusted rate shall be forty percent (40%) of the actual bill, which shall include the premium rate charges and sales tax.

1.04 SURCHARGES. The following surcharges shall be applied for violations of water warning use restrictions imposed under this chapter.

A. First Violation. For a first violation, the utility shall issue a written notice of violation to the water user violating the water use restrictions imposed during a Water Watch, Water Warning or Water Emergency.

B. Second Violation. For a second violation within a twelve-month period, an administrative surcharge shall be imposed on the customer's account in an amount equal to two hundred percent (200%) of the previous month's water bill.

C. Subsequent Violations. For any subsequent violation within a twelve-month period, an administrative surcharge shall be imposed in an amount equal to two hundred percent (200%) of the previous month's water bill, and, in addition, the utility shall interrupt water service to the customer at the premises at which the violation occurred. Service shall not be restored until the customer has paid the surcharge and the reconnection fee and has provided reasonable assurance that future violations of Water Watch, Water Warning or Water Emergency use restrictions will not occur.

Any customer charged with a violation of the Water Watch, Water Warning or Water Emergency use restriction may request a hearing before the Water Appeal Board. The Water Appeal Board may conclude that a violation did not occur or that the circumstances under which the violation occurred warrant a complete or partial mitigation of the administrative surcharge.

1.05 WATER APPEAL BOARD. A Water Appeal Board shall be appointed during any Water Watch, Water Warning or Water Emergency. The Water Appeal

Board shall consist of the Mayor, the Superintendent and one Council member who shall be appointed by the Mayor. The Water Appeal Board shall hear appeals of any action taken pursuant to a Water Watch, Water Warning or Water Emergency; however, if a customer is charged with a municipal infraction relating to this ordinance, that proceeding shall be conducted pursuant to Section 364.22 of the Code of Iowa.

1.06 REDUCTION IN FLOW OF WATER TO ANY PERSON. The Superintendent is authorized, after giving notice and opportunity for hearing before the Water Appeal Board, to reduce or disconnect the flow of water to any customer determined to be using water in any manner not in accordance with this ordinance during a Water Watch, Water Warning or Water Emergency.

1.16 REPEALER CLAUSE.

All ordinances or parts of ordinances in conflict herewith are hereby repealed.

1.17 SEVERABILITY CLAUSE.

If any section, provision, or part of this ordinance shall be adjudged invalid or unconstitutional, such adjudication shall not affect the validity if the ordinance as a whole or any section, provision or part thereof not adjudged invalid or unconstitutional.

1.18 EFFECTIVE DATE.

This ordinance shall be effective from and after the final passage, approval and publication as provided by law.

PASSED AND APPROVED this ____ day of _____, 2013.

_____

ATTEST: Mayor

_____

City Clerk

Ordinance 2013-XX

An Ordinance Setting Rates for Water Service

WHEREAS, the City of Anytown, Iowa operates a water utility, and;

WHEREAS, in order for the water utility to be financially viable and in compliance with Iowa Code Sec. 384.84 and to encourage the conservation of water;

NOW THEREFORE IT IS HEREBY ORDAINED by the City Council of Anytown, Iowa:

1.01 DEFINITIONS.

The following terms are defined for use in this ordinance.

1. "Billing Agency" means the City of Anytown Municipal Utilities Department or any other agency designated by the City to maintain customer accounts, read meters, prepare and mail bills or other correspondence, and account for utility payments.

2. "Monthly Charge" means that monthly charge to the customer composed of both the service availability charges and the metered usage along with any other taxes, service charges, meter rent, etc. The monthly payment shall be payable to the City's billing agency.

3. "Service Availability Charge" means a fixed charge imposed on each separately metered residential, commercial, industrial, or educational premises which is physically connected to the utility, consisting of the Monthly Equivalent Meter Cost, based on the water size at the premises, plus the Billing Cost.

4. "Usage Charge" means the metered charge imposed for the consumption of water, pursuant to Section 1.02.

1.02 RATES FOR SERVICE.

The City Council shall annually review the rates charged for water service within the City to insure that such rates shall produce gross revenue at least sufficient to pay the expenses of operation, maintenance and replacement of the water utility, and will leave a balance of new revenues sufficient at all times to pay the principal of, and interest on any outstanding revenue bonds and pledge orders as they become due, and will maintain a

reasonable reserve for the payment of principal and interest. To insure sufficient gross revenues for such purposes, the following schedule of rates and charges is imposed.

1. For bills due and payable on or after July 1, 20XX, the following rates apply:

A. Service Availability Charge. There is imposed for each billing period a service availability charge to each separately metered residential, commercial, industrial or educational premises, directly or indirectly served by a connection to the waterworks system, based on the following:

Meter Size	Monthly Charge
5/8"	$X.XX
3/4"	$X.XX
1"	$X.XX
1 ½"	$X.XX
2"	$X.XX
3"	$X.XX
4"	$X.XX
6"	$X.XX
8"	$X.XX

B. Water Use Rates. In addition to the service availability charge, there are imposed the following water rate charges based on actual metered usage during the billing period for which such charges are assessed:

(1) For bills mailed on or between July 1 and October 31 (summer period):

a. $X.XX for the first 1,000 gallons used
$X.XX per gallon for the next 2,000 gallons used
$X.XX per gallon for all usage over 3,001 gallons

(2) For bills mailed on or between November 1 and June 30 (winter period):

a. $X.XX per 1,000 gallons.

1.03 RATES OUTSIDE THE CITY

Water service shall be provided to any customer located outside the corporate limits of the City which the City has agreed to serve at the rates one hundred fifty percent (150%) of the rates provided in Section 1.04. No such customer, however, will be served unless the customer shall have signed a service contract agreeing to be bound by the ordinances, rules and regulations applying to water service established by the City Council.

1.04 BILLING FOR WATER SERVICE.

Water service shall be billed as part of a combined service account, payable in accordance with the following:

(Code of Iowa, Sec. 384.84)

1. Bills Issued. The billing agency shall prepare and issue bills for combined service accounts each month.

2. Bills Payable. Bills for combined service accounts shall be due when billed and payable at the office of the billing agency.

3. Late Payment Penalty. Bills not paid within 25 days of the billing date shall be considered delinquent. A late penalty of five percent (5%) of the amount due shall be added to each delinquent bill.

All applications for service restoration and the payment of all delinquent amounts must be made at City Hall.

1.05 LIEN FOR NONPAYMENT

The owner of the premises served and any lessee or tenant thereof shall be jointly and severally liable for water service charges to the premises. Water service charges remaining unpaid and delinquent shall constitute a lien upon the premises served and shall be certified by the Clerk to the County Treasurer for collection in the same manner as property taxes.

(Code of Iowa, Sec. 384.84)

1.06 LIEN EXEMPTION.

The lien for nonpayment shall not apply to a residential rental property where water service is separately metered and the rates or charges for the water service are paid directly to the City by the tenant, if the landlord gives written notice to the City that the property is residential rental property and that the tenant is liable for the rates or charges. The City may require a deposit not exceeding the usual cost of ninety (90) days of water service to be paid to the City. When the tenant moves from the rental property, the City shall refund the deposit if the water charges are paid in full. A change in the ownership of the residential property shall require written notice of such change to be given to the City within ten (10) business days of the completion of the change of ownership. The lien exemption does not apply to delinquent charges for repairs to a water service.

(Code of Iowa, Sec. 384.84)

1.07 REPEALER CLAUSE.

All ordinances or parts of ordinances in conflict herewith are hereby repealed.

1.08 SEVERABILITY CLAUSE.

If any section, provision, or part of this ordinance shall be adjudged invalid or unconstitutional, such adjudication shall not affect the validity if the ordinance as a whole or any section, provision or part thereof not adjudged invalid or unconstitutional.

1.09 EFFECTIVE DATE.

This ordinance shall be effective from and after the final passage, approval and publication as provided by law.

PASSED AND APPROVED this ____ day of _____, 2013.

_____
,Mayor

ATTEST:

_____
, City Clerk