



**Guidelines for
Generally Accepted Water Management Practices
for the
Public Water Supply Sector**

Developed By:

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Foreword

Background and Purpose

Act No. 35 of the Public Acts of 2006, effective date February 28, 2006, requires that within 12 months after the effective date of the act, each water user's sector must begin designing guidelines for generally accepted water management practices or environmentally sound and economically feasible water conservation measures within that sector. Within 24 months after the effective date of the act, the Department of Environmental Quality (DEQ) is to review and report to the legislature on whether or not there are reasonably detailed criteria for assisting a facility in determining whether water is being used in an efficient manner. The act allows for established statewide professional associations representing a sector to adopt such guidelines as a means of showing compliance with the provisions of the act.

The sector specific guidelines are intended to be utilized by the DEQ as part of the permitting process authorized under Public Acts 33 through 37 of 2006 for certain large quantity water withdrawals. For the public water supply sector, these withdrawals include:

- New or increased withdrawals of more than 5 mgd for withdrawals from a Great Lake or one of the connecting channels.
- New or increased withdrawals of more than 2 mgd for withdrawals from other than a Great Lake or one of the connecting channels.

The Michigan Section of the American Water Works Association (MI-AWWA), as the primary professional association representing all public water supplies in the State of Michigan, has developed these guidelines for the public water supply sector to comply with the requirements of Act No. 35 of the Public Acts of 2006.

In support of these guidelines, MI-AWWA has adopted the following position statement:

POSITION ON WATER USE EFFICIENCY, RESOURCE SUSTAINABILITY, AND CONSERVATION MANAGEMENT¹

The Michigan Section of the American Water Works Association (MI-AWWA) supports measures that protect the Great Lakes waters from harmful and unlawful diversions out of the Basin, and from waste and exploitation of the resource. MI-AWWA further supports the development of a sustainable approach to water resource management and a goal of water use efficiency by incorporating management strategies at the discretion of each water supplier for its particular circumstance.

Because each water system is unique, MI-AWWA urges flexibility of management choices. Each system must be aware of its own operation, and make logical, well considered decisions to improve efficient use of the resource.

MI-AWWA advocates water use efficiency and conservation planning as a resource management practice that incorporates analysis of costs and uses of water, specification of water-saving solutions, installation of water-saving measures, and verification of savings to maximize the cost effective use of the water resource.

Prior to the implementation of any water use efficiency or conservation management programs, a water supplier must evaluate all program measures with respect to compliance with federal, state, and local codes, cost effectiveness, aesthetics, functionality, performance, safety, and security to determine the practical and economic feasibility of such measures.

MI-AWWA encourages the use of the American Water Works Association “Water Conservation Programs – A Planning Manual” (M52) by water suppliers planning water use efficiency and conservation management programs. This Manual provides comprehensive water efficiency and conservation guidelines including cost/benefit analysis methodologies, as well as being a nationally recognized authoritative source book.

An abundant, renewable, and safe water supply is an economic advantage Michigan currently enjoys in attracting and retaining business and industry, as well as economically providing for the public health and welfare of the State’s communities. Improving the efficient use of water will continue to provide for the public health and welfare of the State’s communities and citizens.

¹ Adopted by the Michigan Section American Water Works Association Board of Trustees on January 18, 2008.

The Michigan Section endorses the American Water Works Association Water Use Efficiency policy, a copy of which is reproduced below.

POLICY

Adopted by the Board of Directors Jan. 27, 1991, revised Jan. 31, 1993, and June 15, 1997, and reaffirmed Jan. 20, 2002.

The American Water Works Association (AWWA) strongly encourages water utilities to adopt policies and procedures that result in the efficient use of water, in their operations and by the public, through a balanced approach combining demand management and phased source development.

To this end, AWWA supports the following water conservation principles and practices:

1. Efficient utilization of sources of supply;
2. Appropriate facility rehabilitation or replacement;
3. Leak detection and repair;
4. Accurate monitoring of consumption and billing based on metered usage;
5. Full cost pricing;
6. Establishment of water-use-efficiency standards for new plumbing fixtures and appliances and the encouragement of conversion of existing high-water-use plumbing fixtures to more efficient designs;
7. Encouragement of the use of efficient irrigation systems and landscape materials;
8. Development and use of educational materials on water conservation;
9. Public information programs promoting efficient practices and water conservation by all customers;
10. Integrated resource planning;
11. Water reuse for appropriate uses; and
12. Continued research on efficient water use practices.



MICHIGAN SECTION – AMERICAN WATER WORKS ASSOCIATION (MI-AWWA)

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WATER USE EFFICIENCY AND CONSERVATION MANAGEMENT STRATEGIES

The Michigan Section encourages the use of the American Water Works Association “Water Conservation Programs – A Planning Manual” (M52) by public water suppliers planning water use efficiency and conservation management strategies. This Manual provides comprehensive water efficiency and conservation guidelines including cost/benefit analysis methodologies, as well as being a nationally recognized authoritative source book.

The Michigan Section further encourages water suppliers planning to implement such strategies to carefully research other water efficiency and conservation sources in order to comprehensively determine the most appropriate program components that will meet the local need. A listing of such references and resources are included at the end of this program.

There are a number of strategies that can be employed for system optimization. These strategies provide the public water supplier a menu of tools, opportunities, and suggestions from which they can select and implement only those they feel are complimentary to their own set of circumstances.

STRATEGIES UNDER CONTROL OF THE UTILITY

1) Metering

Water use metering is an essential element of efficiency and conservation management, and is necessary in order to conduct a system audit. Metering is a requirement for loss control, accounting and rate making, verification of water and cost savings, and the evaluation of the effectiveness of efficiency and conservation measures.

Metering should be provided at all important water production processes and delivery locations including at the supply source, at critical in-plant control points, at wholesale delivery points, and at service connections.

2) Meter Calibration and Replacement Programs

Water meters tend to deteriorate with age which results in inaccurate readings. Often times meters are damaged or don't record water use at all. Inaccurate readings result in inaccurate information about water usage which impacts system audits and leak detection efforts.

The public water supplier should implement a program to test all system meters at regular intervals. The water supplier should also ascertain that meters are appropriately sized as oversize meters for a customer's use tend to under record use.

In addition to a meter testing program, a water supplier may schedule a meter replacement program, especially for older meters in the system. Larger meters in the system and wholesale customer meters should be calibrated on a regular basis, as well as tested for accuracy at scheduled intervals.

3) System Audits

All public water suppliers need to develop a system of water use accounting in an effort to identify water loss. Water loss includes water that is metered, but not billed, and unmetered water.

Metered, but not billed, water may include in-plant uses such as backwashing filters. Unmetered water may include: (a) utility purposes such as hydrant flushing or testing, (b) public uses such as firefighting, and (c) losses such as leaks, theft, failed meters, and reading or billing errors.

A system audit is necessary in order for the water supplier to develop plans to reduce or eliminate water loss.

4) Leak Detection and Repair Programs

A significant amount of water loss not only is a waste of water system funds for treating and pumping, but also a waste of the resource. Systems experiencing substantial water loss should evaluate and implement a leak detection and repair program.

Leak detection equipment and methods are available to detect leaks in water lines, valves, services, and other system components. Consultants specializing in leak detection may be engaged to assist the water system in this effort.

The water supplier may also implement a water loss prevention program. Such a program may include pipe inspections, preventative maintenance, pipeline cleaning,

and replacement of components. The water system may also evaluate measures to reduce water usage for in-plant or system maintenance procedures.

5) Full Cost Pricing

Public water suppliers should utilize cost-of-service accounting and rate-setting methods in accordance with generally accepted accounting practices. The analysis of system costs and the determination of effective rates and charges are important efficiency and conservation strategies because they detail the true value of water and provide the information about that value, by the rates and charges, to the community leaders and the customer.

The water supplier should regularly analyze cost and usage information to determine the impact on system demand and revenue by such factors as: seasonal effects, growth, conservation measures, changes in customer class, and contractual relationships. The required Reliability Study should be carefully analyzed to understand and anticipate changes in flow patterns, maximum day demands, peaking factors, and other relevant trends that may impact long term cost analysis and rate determinations.

The water supplier should also evaluate the effect that increased rates and charges will have on water usage and system revenue. System managers and financial analysts must anticipate the responsiveness of customer usage to a change in price. Increases in the rate and charge structure should allow for usage reduction for a period of time in order to fully recover system costs.

6) Water Use Restrictions

Restrictions on water use are primarily utilized to control irrigation demand when a water system approaches its capacity, or during emergencies or in drought conditions. Since irrigation is a main component of system maximum daily demand, reduction of water use not only conserves chemical and electrical use, but may avoid or delay expensive infrastructure improvements. Such restrictions, therefore, may be a very effective and necessary water use efficiency and conservation strategy.

A public water supplier may propose to use non-emergency restrictions as an efficiency and conservation measure, although such a proposal may be unpopular and difficult to enforce. By use of the Public Education Strategy a water supplier should demonstrate to the community that such measures may save money, avoid system capital expenditures, and allow for watering lawns and gardens while maintaining customers' rights and quality of service.

A public water supplier must have a restriction and regulation program in place to manage the water supply during an emergency or in drought conditions. Such a program should include different levels of restriction depending on the severity of the situation. Typical restrictions may include Level 1 – Odd/Even irrigation, Level 2 – Odd/Even irrigation during certain hours, Level 3 – a ban on all irrigation, and Level 4 –

a ban on all irrigation and all non-essential water use. The water supplier must include the restriction program as part of the community's water use ordinance and verify that the ordinance provides for enforcement and penalties. Frequent public notification and information is an essential activity during an emergency situation.

7) Conservation Pricing

A public water supplier may promote conservation by proposing that the system rates and charges be structured to reflect the seasonal variation of water use or the cost of water production and distribution during peak periods. Such a measure, however, may be controversial, and the supplier must recognize the additional work required for accounting, auditing, rate making, and billing. Most importantly, however, is the determination and verification that such pricing is reflective of the true cost of service and not in any way construed as inequitable or an inappropriate revenue plan. It must also be an accurate component of a Full Cost Pricing Strategy.

EDUCATION STRATEGIES

8) Public Information Initiatives

Providing water use efficiency and conservation information to the public is essential in gaining public support for a water supplier's program.

- The customer should understand the water bill. The water bill should clearly identify usage, rates, charges, and other pertinent water use information.
- The water bill can provide an opportunity to include information about home water conservation measures.
- The water bill should provide contacts and phone numbers to allow customers to report leaks and waste, or to make suggestions or propose incentives.

9) Public Education Initiatives

The water supplier can utilize a variety of methods to educate the public about water efficiency and conservation strategies.

- School programs. Involvement with the school system provides the water supplier an opportunity to educate and interact with students in a variety of water supply, efficiency, and conservation issues.
- Community programs. Water suppliers should pursue opportunities to disseminate water efficiency and conservation information in the community through speaking possibilities, a booth at community events, or printed and video material presentations.
- Workshop programs. Water suppliers can schedule meetings with various sectors of the community (planning commission members, irrigation companies, garden clubs, etc.) to present water efficiency and conservation information.

- Workgroups/Committees. Local or regional units of government can organize a workgroup or advisory committee comprised of representatives of various community sectors, to assist the water supplier in disseminating water efficiency and conservation information.

STRATEGIES PROMOTED OR INFLUENCED BY THE UTILITY

10) Irrigation System Efficiency Programs

Although the public water supplier may not have jurisdiction over private irrigation systems, by use of the Public Information and Education strategy, the supplier can promote efficiency and conservation measures. The public water supplier can include with the water bill, irrigation and lawn and garden water conservation suggestions to the customer. The supplier can also meet with the irrigation and lawn maintenance sector to encourage that water-saving and efficiency methods be understood and utilized in promoting their business.

The water supplier should educate customers about and promote water efficient irrigation systems that include low-flow sprinkler heads, effective system design/installation/and maintenance, efficient irrigation schedules, and attention to the system's operation.

11) Water Efficient Landscaping

By use of the Public Information and Education strategy, the public water supplier should promote efficiency-oriented landscaping measures. Reduction of landscape water usage can be an effective conservation measure that should include reduction of turf and irrigated areas, efficiently designed and maintained irrigation systems, and the use of native and low-water use plantings, including xeriscapes.

The public water supplier should encourage various community sectors such as landscapers, nurseries, planning commissioners, public officials, and residential and non-residential owners of large properties to integrate water use efficiency and conservation measures into the planning, design, and maintenance of parks, building grounds, golf courses, and common areas.

12) Water Efficient Fixtures and Appliances

Water efficient toilets, urinals, showerheads, faucets, dishwashers, and washing machines are generally specified by the Building Code and are not under the jurisdiction of the public water supplier. The water supplier, however, must understand the impact that use of these fixtures and appliances will have on water use, the system audit, and long term accounting and rate setting.

Federal law requires that toilets manufactured after January 1, 1997 must use no more than 1.6 gallons per flush and urinals must use no more than 1.0 gallons per flush. The

1992 Act also required that showerheads and faucets must meet a 2.5 gallon per minute limit. Recently manufacturers have been promoting low water use wash machines and dishwashers.

The public water supplier should routinely meet with the community's Building Department, architects, and developers renovating existing buildings to evaluate the installation of such water efficient fixtures and appliances. The water supplier can encourage community leaders and building officials to promote a fixture retrofit program that could include residential, commercial, industrial, and public building. The water supplier, in conjunction with the Building Department or a community outreach agency, could implement a program of rebates or other incentives to encourage the replacement of older fixtures.

13) Efficiency Based Boiler and Steam Systems, Cooling Equipment and Towers, and High Water Using Processes.

Specifications for water use for heating, cooling, and process equipment in industrial, commercial, institutional, and public buildings is generally not under the jurisdiction of the public water supplier. The supplier, however, should understand the water demand of these customers and its impact on water efficiency and conservation measures. Typically these customers are supportive of efficiency measures as reduced water use is a budget benefit.

The public water supplier should meet with the building system managers to discuss water use efficiency and conservation measures including metering, fixture retrofit, landscaping and irrigation, and understanding in-building measures that may affect the suppliers system audit, accounting, and rate making.

STRATEGIES FOR PROMOTING NEW TECHNOLOGY, MITIGATION, ALTERNATIVE ENERGY, ETC.

14) Water Reuse and Recycling

Water reuse and recycling may, in certain circumstances, become an effective water efficiency and conservation measure. Obviously, federal, state, and local codes and permit requirements must be carefully reviewed before considering such measures. As efficiency and conservation technology improves, making reuse and recycle operationally and financially feasible, new or revised regulations may be necessary to govern such use.

Typically water reuse and recycling measures are defined as the use of waste or non-potable water instead of treated drinking water in any of the following manners:

- On-site reuse or recycle that reuses minimally treated or filtered water for repetitive purposes, such as at a recycle car wash.
- Treated wastewater that is redistributed for specific uses such as irrigation.

- Gray water is wastewater from certain uses that is filtered to remove solids and reused for specific purposes such as toilet flushing.
- Catchment systems collect water from rainfall, wells, or surface sources, store it, and use it for irrigation or building sanitary systems.

The public water supplier should stay informed as to the feasibility of this strategy and be in a position to evaluate and promote such use as proposals may be considered.

15) Land Use Planning

The public water supplier should be an advocate for long term community and regional planning principles that include water use efficiency and conservation measures. By use of the Public Information and Education strategy, presentations at planning commission meetings, and by demonstrating the cost and water savings of various efficiency strategies, the water supplier can influence land use and development guidelines that may include the appropriate water use efficiency and conservation measures that best fit the community or regional need.

16) Additional Opportunities

The public water supplier should interact with other agencies in supporting goals of efficiency and sustainability strategies for other water resource and energy sectors including: watershed management, storm water management, source water protection, biosolids utilization, solar/wind/geothermal energy systems, or other resource protection measures. The water supplier's involvement in the development of vision, principles, and objectives to guide efficiency and conservation in these sectors will enhance efficiency efforts for selected water supply strategies or mitigate limited opportunity to fully implement other programs.

Reducing water use requirements through efficiency and conservation strategies is a core element of sustainable resource management. By reducing water use requirements by the incorporation of such strategies, as determined by each public water supplier to meet the appropriate local need, a water system may reduce impacts on the entire system infrastructure including reductions in source water pumping, water treatment facilities and associated energy and chemical usage, and wastewater treatment ultimately resulting in reducing the need for development of costly future infrastructure.

The Michigan Section supports research and the development of technology, methods, equipment, and initiatives that may enhance water use efficiency and conservation strategies. It is intended that this Program provide a guide for public water suppliers in their consideration of appropriate water use efficiency and conservation measures that will benefit their community water system's goals.

RESOURCES

Water Conservation Programs – A Planning Manual (Manual of Water Supply Practices M52); American Water Works Association, Denver, Colorado, 2006 (AWWA Bookstore No. 30052).

Water Audits and Leak Detection (Manual of Water Supply Practices M36); American Water Works Association, Denver, Colorado, 1999 (AWWA Bookstore No. 30036).

Water Loss Control Manual; American Water Works Association, Denver, Colorado, 2002 (AWWA Bookstore No. 20511).

Web-based Resources – Refer to the MI-AWWA website (<http://www.mi-water.org/waterefficiency.html>) for resources including:

- <http://epa.gov/watersense/> - US EPA *WaterSense* website.
- <http://www.awwa.org/waterwiser/> - AWWA *WaterWiser* water efficiency clearinghouse.
- http://www.michigan.gov/deq/0,1607,7-135-3585_4127_11417-64902--_00.html – Michigan DEQ Energy Efficiency (E2) and Water Conservation resources.

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