Guide to Water Conservation and Reuse

Village of Nyack

November 2015

SPONSORED BY

NYSERDA

PREPARED BY

vhb Engineering, Surveying and Landscape Architecture, P.C.

An Independent Contractor to NYSERDA

Notice

This report was prepared by VHB Engineering, Surveying and Landscape Architecture, P.C. in the course of performing work contracted for and sponsored by the New York State Energy Research and Development Authority (hereafter NYSERDA). The opinions expressed in this report do not necessarily reflect those of NYSERDA or the State of New York, and reference to any specific product, service, process, or method does not constitute an implied or expressed recommendation or endorsement of it. Further, NYSERDA, the State of New York, and the contractor make no warranties or representations, expressed or implied, as to the fitness for particular purpose or merchantability of any product, apparatus, or service, or the usefulness, completeness, or accuracy of any processes, methods, or other information contained, described, disclosed, or referred to in this report. NYSERDA, the State of New York, and the contractor make no representation that the use of any product, apparatus, process, method, or other information will not infringe privately owned rights and will assume no liability for any loss, injury, or damage resulting from, or occurring in connection with, the use of information contained, described, disclosed, or referred to in this report.

Table of Contents

Overview of Climate Smart Communities Program **1**

Introduction **2**

Step 1: Conduct a Baseline Assessment of Water Resources and Community Water Demand **3**

Key Metrics in Annual Water Quality Reports 3
Forecasting Community Water Demand 4
Analyze the Baseline Assessment 5
Case Study: Baseline Assessment for the Village of Nyack 5

Step 2: Maximize Watershed Recharge **8**

Step 3: Improve Water Supply and Distribution Infrastructure **10**

Water Treatment Plant Upgrades through the NYSERDA Flex Tech Program 10
Best Practices for Improving Distribution Infrastructure 10
Implement Green Infrastructure to Manage Stormwater 11
Water Infrastructure Improvements and Capital Improvement Plan (CIP) 11

Step 4: Reduce Water Demand **13**

Assess Rate Structure 13
Upgrade Plumbing Policies 13
Low-Flow Water Fixtures 13
Greywater Use 14
Adopt a Water Conservation Ordinance for Residential and Commercial Outdoor Use 15

Step 5: Engage and Educate the Public **17**

Join the EPA WaterSense Program 18
WaterSense Promotional Partner Agreement Eligibility 18
The EPA WaterSense Calculator 18

Conclusion **20**

Additional Water Conservation Resources 21

Town of New Paltz 22
Town of North Salem 22
The City of White Plains 22

Appendix A: NYSDEC Water Demand Forecast Sheets A-1

Appendix B: CIP Priority Criteria B-1

Appendix C: City of Yonkers Green Building Ordinance C-1

Appendix D: Sustainable Jersey Model Water Conservation Ordinance D-1

Appendix E: EPA WaterSense Promotional Partners Agreement E-1

List of Figures

Figure 1: Village of Nyack Annual Water Quality Report Metrics 6

Figure 2: Average Maximum Day Production 7

Figure 3: EPA WaterSense Program Website 17

Figure 4: EPA WaterSense Program Calculator 19

List of Tables

Table 1: Required and Recommended Water Conserving Fixtures 14

Overview of Climate Smart Communities Program

The Climate Smart Communities (CSC) program is a New York State initiative to help local governments that have adopted the CSC Pledge to reduce greenhouse gas (GHG) emissions, save taxpayers money, and prepare for the effects of climate change. The Village of Nyack (Nyack) has been a CSC since 2013 and has completed significant actions under the *CSC Pledge Element 2: Set Goals, Inventory Emissions, Plan for Climate Action*. In year three of the CSC Regional Coordinator Pilot Program, a representative from Nyack met with the Mid-Hudson CSC Regional Coordinator, VHB Engineering, Surveying and Landscape Architecture P.C. (VHB), to request guidance on the development of a water conservation and reuse program. The guidance provided in this document will help local governments address *CSC Pledge Element 7: Enhance Community Resilience and Prepare for the Effects of Climate Change and it aligns with the CSC Certification Action 7.23: Implement a Water Conservation Program*. Although this guide focuses on Nyack as an example, any local government in New York State can refer to this guide when developing a local water conservation and reuse program.

Introduction

Water scarcity, aging infrastructure, environmental pressure, and rising water rates are some of the factors changing water management practices today. Developing a water conservation and reuse program will help local governments proactively plan to meet existing and growing water demands; communities are likely to face more frequent heat waves, rising saltwater tables, and reduced streamflow, which impacts water quality, economic activity, and habitat. According to the Rockland County Task Force on Water Resources Management, 4.4 million to 7.0 million gallons per day of the water supply could become available if local governments implement improvements to water distribution facilities and help to reduce customer demand.[1] Implementing a water conservation program can help local governments achieve multiple goals, including:

- Increase efficiency for both energy and water;
- Reduce demand on water sources;
- Reduce energy consumption (and associated costs);
- Reduce cost associated with finding new, and more expensive, water sources;
- Reduce the costs associated with water treatment, allowing water treatment facilities to serve a growing population without being stressed; and
- Increase ability to handle emergencies, including periods of drought.

This guide outlines five steps and supporting tools to help local governments develop community-scale water conservation and reuse strategies. To ensure the success of a water conservation and reuse program, the local government should engage its local water departments and utilities, as well as the community's residents and businesses in conservation and reuse efforts. This guide addresses water conservation strategies for both water supply and demand, while highlighting best practices for developing baseline assessments; maximizing watershed recharge; improving water supply and distribution infrastructure; managing water demand; and engaging the public.

[1] Rockland County Press Release. *Independent Report: Millions of gallons of water available to Rockland County: Rockland Task Force files major water study with state.*

Step 1: Conduct a Baseline Assessment of Water Resources and Community Water Demand

The goal of a baseline water assessment is to evaluate the adequacy and reliability of freshwater resources based on the rate of community consumption. A comprehensive baseline assessment will help local governments better understand existing water resources, current uses and inefficiencies, and projected water demand.[2]

A local government should identify a project coordinator and establish a taskforce to assist with the development and implementation of a water conservation and reuse program. To create an appropriate water conservation plan for the community, the taskforce should consist of key stakeholders, which include: local government officials or staff; a local water department or utility; and community or regional stakeholders who share water resources.

For more information on the development of a taskforce, refer to the *CSC Certification Manual Action 1.3 or 1.4: Create an External or Internal Green Team Focused on Climate Change Mitigation and Adaptation*.

New York State requires local governments to report on water quality annually, which includes key baseline metrics, such as the number of gallons treated, withdrawn, billed, and unbilled, among others. Local governments can leverage metrics from the annual water quality report to inform a baseline assessment. Below is a list of key metrics, with descriptions, that are included in most annual water quality reports in New York State.

Key Metrics in Annual Water Quality Reports[3]

- Raw water withdraw refers to the number of gallons withdrawn from the environment.
- Water delivered refers to gallons withdrawn from the local water system including unaccounted water.

[2] Rockland County Press Release. *Independent Report: Millions of gallons of water available to Rockland County: Rockland Task Force files major water study with state.*

[3] EPA WaterSense Program. *Understanding Your Water Bill.* http://www3.epa.gov/watersense/our_water/understanding_your_bill.html. Accessed October 10, 2015.

- Maintenance Water is used for the flushing program which is required for all water departments and utilities by the Department of Health to maintain high water quality.
- Water billed or accounted for includes water paid for by legal water connections.
- Unaccounted water includes water pipe leakages, illicit connections, hydrant flow tests, Fire Department training, fires, emergency flushing of sewer mains during fuel spills, and main breaks.
- Average Day (Production) is the average amount of water distributed daily in the designated year.
- Maximum Day (Production) is the maximum gallons delivered in the designated year.

Local governments can assess existing water conservation methods to supplement annual water report data with other plans and permits within the local government. Community plans such as hazard mitigation plans, climate action plans, and sustainability plans are also places that address water conservation initiatives. If water resources are not owned and operated by a local government, it would be helpful to research and review water- related plans developed in neighboring communities.

Forecasting Community Water Demand

A water demand forecast predicts future water needs for customer sectors, including residential, commercial, and industrial use.[4] Developing a water demand forecast will help local governments prepare for future supply challenges and plan for resource- efficient strategies to meet growing demands. It is useful to refer to population growth projections and proposed land developments in a community's comprehensive plan to estimate impacts on future water demand, as well as considering projected climate changes that could impact supply.

A water demand forecast can be completed using various data collections methods. A per capita forecast is based on future population projections, and is most useful when the majority of the customer base is from one sector. The water supplier or the taskforce should complete this estimate to assess future need. A simple disaggregated forecast is a complex process that yields accurate projection of future water demand for specific sectors including residential and non-residential. These sectors can be broken down even further to increase the accuracy of the water demand forecast. The most intensive water demand forecast requires advanced modeling using statistical techniques to complete a forecast demand. Statistical tools and models are used to assess demographic factors including population, climate, season, and employment. All water forecasting demand methods discussed

[4] Oregon Water Resources Department. http://www.oregon.gov/owrd/docs/wmcp_guidebook.pdf. Accessed October 10, 2015.

will provide local governments the foundation to address future water demand (*Appendix A, NYSDEC Water Demand Forecast Worksheets*).[5]

Analyze the Baseline Assessment

The community taskforce should collectively review existing plans, report data, and water-related information to evaluate adequacy of existing water resources, and establish a baseline for a water conservation and reuse program. The preservation of water resources often results in other benefits that may be revealed during the baseline assessment. Identifying co-benefits can help to justify the development of water conservation and reuse programs. For example, conserving water is the least expensive way to save on water costs; lakes and scenic rivers attract tourists and support economic development; and streamflow supports water quality and species habitat.

Case Study: Baseline Assessment for the Village of Nyack

The Village of Nyack would like to lead by example through the development of a water conservation and reuse program. The Hacken River, which begins at the Lake DeForest Reservoir is the water source supplying Nyack. The Lake Deforest Reservoir is located in the Town of Clarkstown and has the capacity of five billion gallons of water.[6] The location of the DeForest Reservoir requires Nyack to coordinate with Clarkstown for future conservation efforts.

The Village of Nyack addresses current and future water conservation initiatives in their annual water report,[5] sustainable action plan,[7] and green infrastructure report.[8] In the annual water report, Nyack addresses system improvements and water conservation initiatives in 2014 including:

- Installing new pumps to increase energy efficiency;
- Upgrading water valves on hydrants to reduce water wasted during tests/flushing;
- Conducting an annual leak survey of water systems to identify opportunities for improvement;
- Replacing aged water mains; and
- Repairing leaks throughout distribution systems.

In the *Sustainable Nyack Action Plan 2015-2016*, Nyack has committed to completing a GHG inventory of all municipal buildings, including all water

[5] NYSDEC. *Potential Reuses of Greywater and Reclaimed Wastewater in New York State*. http://www.dec.ny.gov/docs/water_pdf/waterresue.pdf. Accessed November 10, 2015.

[6] Village of Nyack. *The Village of Nyack Water Department: Annual Drinking Water Quality Report for 2014*.

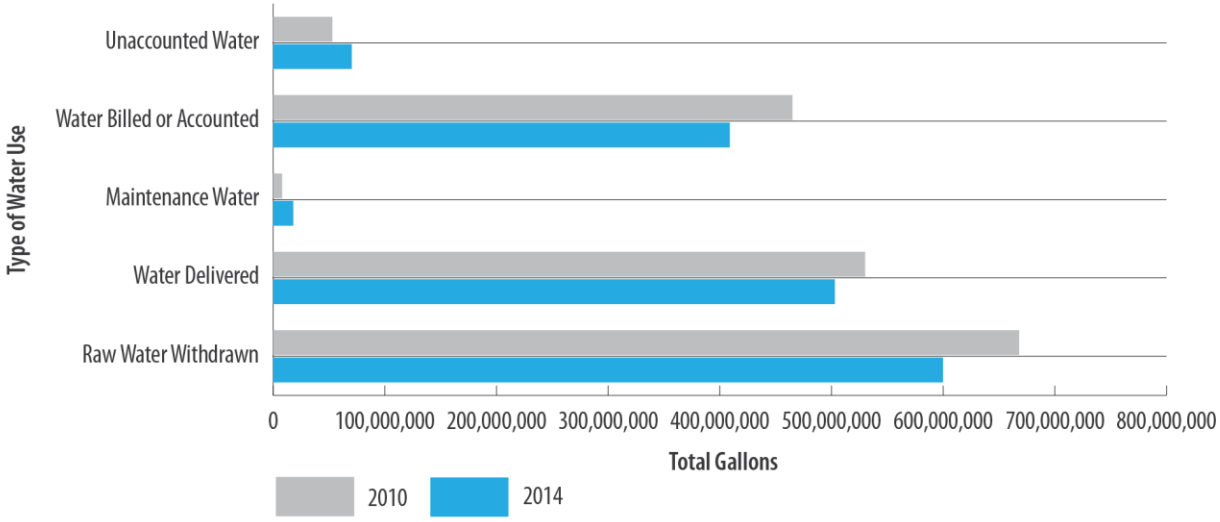
[7] Village of Nyack. *Sustainability Action Plan 2015-2016. http://nyack-ny.gov/dev/wp-content/uploads/Sustainable-Nyack-Action-Plan-2015-2016.pdf*. Accessed November 19, 2015.

[8] Village of Nyack. *Nyack Green Infrastructure Report*. http://nyack-ny.gov/dev/wp-content/uploads/filebase/committees/green-infrastructure/Roundtable-Report-FINAL7-1.pdf. Accessed November 19, 2015.

department buildings. To reduce GHG emissions, Nyack has committed to reducing the energy use of the water plant and holding tank by installing solar panels. In the *Nyack Green Infrastructure Report*, Nyack has introduced low impact development to improve and protect the Hudson River Estuary Watershed.

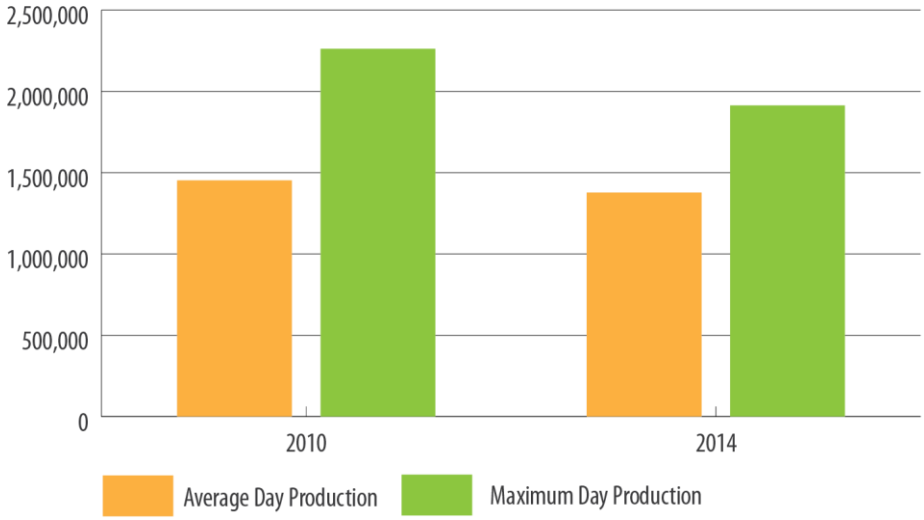
The Village of Nyack can compare key metrics from the 2010 annual water quality report and the 2014 annual water quality report to assess water use over time. Compared to 2010 data, there is a decrease in the amount of raw water withdrawn, total amount of water delivered between, and total amount of water billed or accounted for in 2014 (Figure 1). These decreases show that less water was used in 2014 than 2010. Additionally, there was a decrease in the average daily production and maximum daily production in 2014, compared to 2010 (Figure 2). However, there was an increase in the total amount of unaccounted water in 2014, compared to 2010. This indicates that water distribution system improvements would further improve water conservation efforts.

Figure 1: Village of Nyack Annual Water Quality Report Metrics



Sources: The Village of Nyack Water Department: Annual Drinking Water Quality Report for 2014.
The Village of Nyack Water Department: Annual Drinking Water Quality Report for 2010.

Figure 2: Average and Maximum Day Production



Sources: The Village of Nyack Water Department: Annual Drinking Water Quality Report for 2014.
The Village of Nyack Water Department: Annual Drinking Water Quality Report for 2010.

Nyack has already established a strong foundation for its water conservation program through existing initiatives and comprehensive community plans. The steps described below identify additional ways to expand and improve upon existing initiatives.

Step 2: Maximize Watershed Recharge

Maintaining local forests, wetlands, and other areas that infiltrate water is a cost-effective way for local governments to maximize watershed recharge. A healthy watershed also contributes to local ecosystem resiliency and helps to mitigate potential climate change effects. Understanding common watershed impacts will help local governments effectively manage freshwater supply and mitigate impacts to natural resources.

Watershed capacity and resources are often impacted by sediment build up, high evaporation rates during extreme heat waves, reductions in buffer zones, and the introduction of non-native plant species that are more water intensive than native plants.[9] Watershed capacity is also impacted by impervious surfaces,[10] which are caused by land development and/or pavement. Impervious surfaces reduce the amount of water infiltrating into the surface or ground water system and have many associated negative impacts to natural hydrology, including: impacts to groundwater supply; flooding and accelerated erosion during storm events; reduced surface water quality; and aquatic habitat loss.[11]

Refer to the CSC manual CSC Pledge Element 7: Enhance Community Resilience and Prepare for the Effects of Climate Change. This step aligns with the CSC Certification Action 7.10: Create or Update a Watershed Assessment to Identify Flooding and Water Quality Priorities and CSC Certification Action 7.17: Conserve Wetlands and Forests to Manage Storm Water, Recharge Groundwater, and Mitigate Flooding.

Local governments should review ordinances and regulations governing watershed management practices and land use surrounding water bodies. Expanding and

[9] Oregon Water Resources Department. *Water Management and Conservation Plans.* http://www.oregon.gov/owrd/docs/wmcp_guidebook.pdf. Accessed October 10, 2015.

[10] Impervious surfaces are any type of surface that water cannot penetrate. Some common examples include conventional roadways, sidewalks, buildings, and driveways.

[11] University of New Hampshire Estuaries Project. 2007. *The Impacts of Impervious Surfaces on Water Resources.* http://www.prep.unh.edu/resources/pdf/theimpactsof-nhep-04.pdf. Accessed November 11, 2015.

strengthening current watershed management best practices will allow for greater protection of the community's water resources. Of particular importance are buffer zones, which are floodplains and wetlands located between water bodies and human land uses. Aquatic buffers serve as natural boundaries between development and water bodies and help to protect water quality by filtering pollutants and sediment runoff. Benefits also include flood control and temperature control, among others.[12]

The reduction of impervious surfaces will help local governments protect water resources and ensure adequate water supply for future needs. Local governments should consider ways to reduce impervious surface area within their watershed, particularly in areas that feed local water supply. Low impact development[13] is an effective way to reduce impervious surface area and maximize watershed recharge by mimicking natural hydrology.

Local governments can enhance vegetation along permanent and intermittent streams, wetlands, and other water bodies to protect water bodies and enhance buffer zones. Local governments can also encourage the use of native vegetation throughout the community to reduce or eliminate the need for irrigation, which minimizes source water draw-down. The use of native vegetation also benefits surrounding wildlife by improving habitat.

Nyack has already taken steps to improve watershed management practices in the *Nyack Green Infrastructure Report* including a review of existing codes to encourage low impact development and an initiative to conserve natural resources within the Hudson River Estuary Watershed.

[12] U.S. Environmental Protection Agency. *Aquatic Buffers.* http://water.epa.gov/polwaste/nps/buffers.cfm. Accessed November 11, 2015.

[13] Low impact development is an approach to land development and stormwater management that mimics natural hydrology. Low impact development principles include recreating natural landscape features and minimizing impervious surfaces. For more information: http://water.epa.gov/polwaste/green/.

Step 3: Improve Water Supply and Distribution Infrastructure

Impaired water supplier distribution systems waste water through pipe leakage, which also wastes energy. Improving distribution networks will help local governments reduce the potable water lost, which is identified as "unaccounted water" in the annual water quality reports. Local governments can integrate the benefits of distribution facility improvements in a capital improvement program and utilize the NYSERDA FlexTech program as guidance for these projects.

Water Treatment Plant Upgrades through the NYSERDA Flex Tech Program

NYSERDA offers local governments its FlexTech program, for community initiatives that address energy savings or process improvements. Local governments could utilize this funding to upgrade water distribution facilities, enhance water distribution efficiency, and improve energy efficiency. Visit the NYSERDA website to learn more about how to work with a NYSERDA FlexTech consultant (http://www.nyserda.ny.gov/All-Programs/Programs/FlexTech-Program).

Best Practices for Improving Distribution Infrastructure

Local governments can use the following practices to repair and improve distribution infrastructure. Between 2010 and 2014, Nyack implemented distribution system improvements that have resulted in water savings. Resulting from these improvements, metrics within the annual water report decreased from 2010 to 2014 including the total amount of water withdraw, water delivered, and water billed and accounted (Figure 1). The following best practices will help local governments, like Nyack, reduce water use and provide a baseline for infrastructure upgrades.

A local government can complete a water audit to quantify all water entering and leaving the distribution system. A water audit will provide a baseline to assess leakage and unauthorized water connections. Communities can install a metering system to measure all types of connections including wells, surface water diversion, and connections between water distribution pipes. Meters can also be implemented individually on homes, residential buildings, commercial facilities, and industrial

facilities to measure water delivery. Meter testing and maintenance programs are needed with the addition of a full metering program to maintain accurate data. Communities can also install a system leak detection program to monitor water distribution system leaks by using an estimate of the system leak and comparing it to all metered diversions.[14]

Implement Green Infrastructure to Manage Stormwater

Local governments can take advantage of green infrastructure practices to help manage stormwater, improve water quality, and reduce the volume of water treated by a water treatment plant. Reducing stress on water treatment facilities can result in energy savings. Nyack has identified the implementation of green infrastructure practices to maximize watershed recharge and plans to promote the use of these practices among its constituents. Nyack also plans to explore future options and funding for green infrastructure at shared public spaces throughout the community.

Local governments can identify green infrastructure best practices to promote and implement throughout the community. Some of these practices include:

- Green roofs;
- Trees and tree boxes;
- Pervious pavement;
- Rain gardens; and
- Reforestation.

Water Infrastructure Improvements and Capital Improvement Plan (CIP)

In order to allocate funds for these projects, local governments can integrate green infrastructure initiatives to facilitate watershed recharge in a Capital Improvement Plan (CIP). System repairs to reduce leakages and energy costs, can be a costly endeavor for most local governments. It is essential to highlight the benefits when submitting annual budget proposals or updating CIPs. Some communities have established priority criteria and checklists to evaluate water infrastructure projects and capture sustainability benefits (*Appendix B, CIP Priority Criteria*).[15] In order to provide metrics for green infrastructure practices and highlight benefits for a CIP, there are calculators available to help evaluate potential projects and in *Step 5: Educate and Engage the Community*. The National Resource Defense Council (NRDC) Green Infrastructure Calculator and the Water-Energy Sustainability Tool (WESTweb)

[14] Oregon Water Resources Department. *Water Management and Conservation Plans*. http://www.oregon.gov/owrd/docs/wmcp_guidebook.pdf. Accessed October 10, 2015.

[15] Santa Clara Valley Water District. *Five –Year Capital Improvement Program*. http://www.valleywater.org/cip.aspx. Accessed October 23, 2015.

are tools used to calculate the benefits of large-scale and small-scale proposed water infrastructure improvements and green infrastructure practices.

The NRDC Green Infrastructure Calculator[16] can be used to calculate the benefits of rainwater harvesting, rain gardens, native landscaping (xeriscaping), tree planting, porous pavement, bio-swales, green roofs, greenways, wetlands, green alleys, streets, and parking lots. This calculator can aid in the assessment and implementation of green infrastructure practices.

Another helpful tool, WESTweb,[17] determines the life-cycle energy and environmental effects of water system infrastructure, especially piping, structures and process equipment. WESTweb provides results for energy consumption, GHG emissions, and other environmental impacts. These tools address water conservation improvements to water supply infrastructure, but water-saving measures can also be implemented on the user demand side.

[16] NRDC. *Benefits Calculator*. http://www.freshcoast740.com/calculate. Accessed October 10, 2015.

[17] WESTWeb: *Water Energy Sustainability tool*. http://west.berkeley.edu/. Accessed November 2, 2015.

Step 4: Reduce Water Demand

Assess Rate Structure[18]

The price of water directly affects customer use by reflecting the cost of treatment and water delivery. Appropriately reflecting all water costs in pricing will encourage more efficient use of water resources. An adjusted rate structure can help water suppliers reduce their total maximum demand, which reduces energy costs during peak demand times by encouraging less water use. Implementing or adjusting a rate structure is complex, and may need additional expertise to accurately determine water price and to encourage efficient water use by all customers.

The Village of Nyack uses a uniform rate structure, which allows for a constant per unit price of all metered units of water. Nyack's water billing rate is $2.63, which is lower compared to the neighboring Rockland County water rates of $3.35.[19] Nyack could address community rate structure in order to more accurately reflect associated costs of delivering water to the community.

Upgrade Plumbing Policies

Low-Flow Water Fixtures

To further address water demand, local governments can amend existing plumbing codes to promote efficient water use.

Integration of low-flow water fixtures[20] within the local plumbing code will require builders to utilize this technology and reduce residential and commercial water use. New York State follows the federal standards[21] for water saving plumbing fixtures and no longer requires testing and certification of such fixtures. Local governments can take the state's guidance one step further by implementing higher restrictions on maximum flow and water consumption by requiring the same flow rates required for the Environmental Protection Agency (EPA) WaterSense label. The City of Yonkers, for example, has incorporated water conserving fixtures as a mandatory

[18] Oregon Water Resources Department. *Water Management and Conservation Plans.* http://www.oregon.gov/owrd/docs/wmcp_guidebook.pdf. Accessed October 10, 2015.

[19] Center for Research, Regional Education and Outreach. *Water Conservation and Long-Term Water Supply Planning in the Hudson Valley a Rockland County Case Study.* http://www.newpaltz.edu/media/the-benjamin-center/brief_7_rockland_water.pdf. Accessed November 6, 2015.

[20] Low-flow water fixtures saves plumbing appliance water use by moderate water flow. For more information: http://greenmanual.rutgers.edu/newcommercial/strategies/lowflowfixtures.pdf.

[21] EPA. *National Efficiency Standards and Specification for Residential and Commercial Water-Using Fixtures and Appliances.* http://www3.epa.gov/watersense/docs/matrix508.pdf. Accessed November 13, 2015.

requirement in its Green Buildings Ordinance (*Appendix C, City of Yonkers Green Buildings Ordinance*).[22]

Table 1: Required and Recommended Water Conserving Fixtures

Fixture	Code Requirement (Maximum Flush or Flow Rate)	Recommended Water Conservation Level (Maximum Flush or Flow Rate)	Conservation Difference between Baseline and Recommended Water Conservation Level
Toilet	1.68 gpf	1.28 gpf	20%
Urinal	1.0 gpf	0.50 gpf	50%
Public lavatory faucet	0.5 gpm at 60 psi	0.40 gpm	20%
Private lavatory faucet	2.2 gpm at 60 psi	1.50 gpm	32%
Kitchen faucet	2.2 gpm at 60 psi	1.75 pgm	20%

Source: USGBC LEED Reference Guide for Building Design and Construction

Note: gpm=gallons per minute
gpf=gallons per flush
psi=pounds per square inch

Greywater Use

To further address water demand, local governments can integrate greywater use within local plumbing code. New York State encourages the reuse of wastewater for non-drinking water purposes such as landscape irrigation, wetland maintenance, and other residential and industrial uses. Greywater includes all untreated wastewater from bathtubs, showers, washing machines, dishwashers, and sinks, but does not include discharges from toilets, urinals, and all industrial sources. This wastewater reuse, or greywater[23] reuse, can be applied in buildings with specialized plumbing systems.[24] Local governments can integrate the use of greywater by adopting or upgrading plumbing policies that encourage greywater use. (See Additional Water Conservation Resources Section below).

NYSDEC does not provide direct guidance to local governments on the use of greywater through plumbing codes. Greywater use is currently limited to landscaping practices and individual residences. Plumbing codes throughout the state unintentionally discourage the use of greywater by requiring all water to follow the same procedure. Changes in plumbing codes should be altered to encourage the use of greywater in toilets, dishwashers, and washing machines. Benefits of altering New York State plumbing codes include less water entering the sewer system and a decrease in the use of potable water for non-drinking purposes.

[22] City of Yonkers. *City of Yonkers Green Development Workbook*. http://www.cityofyonkers.com/home/showdocument?id=10836. Accessed October 23, 2015.

[23] NYSDEC also refers to greywater as "gray water" and "wastewater reuse." This water conservation strategy will use "greywater."

[24] NYSDEC. *Potential Reuses of Greywater and Reclaimed Wastewater in New York State*. http://www.dec.ny.gov/docs/water_pdf/waterresue.pdf. Accessed November 10, 2015.

How to Collect, Store, and Use Greywater[25]

Individuals can collect, store, and use greywater through different methods depending on the scale of water use.

- Bucketing is a method used for small amounts of greywater generated from the shower, bath, and/or laundry for use in the garden or lawn.
- Greywater diversion systems can be installed by a plumber to redirect water from the shower, bath, and/or laundry for use in the garden or lawn.
- Greywater treatment systems can be installed by a plumber to treat greywater for solids, pollutants, and microorganisms. This treated greywater can be used in toilets, gardens, and washing machines.

Adopt a Water Conservation Ordinance for Residential and Commercial Outdoor Use[26]

A local government can adopt a water conservation ordinance to address residential and commercial landscaping practices. These regulations will reduce the amount of water used outdoors, provide time periods for watering, and encourage best practices to comply with a water conservation ordinance for outdoor water use (See example ordinance in *Appendix D, Sustainable Jersey Model Water Conservation Ordinance*). [27] Local governments can encourage rainwater harvesting and irrigation conservation methods such as the SMART irrigation systems.

SMART irrigation systems use weather or site-specific data to control irrigation with an area. This type of irrigation system provides water use regulation that can be applied to residential and commercial sites. SMART irrigation systems can be programed by the user to comply with the local water conservation ordinance. Local governments can partner with companies providing this technology to incentivize its use throughout the community (Appendix D, Sustainable Jersey Model Water Conservation Ordinance[28]).

Rain barrels are a low-cost rainwater harvesting method used to collect and store rainwater runoff from impervious surfaces, such as home roofs. Rain barrels prevent water from transporting fertilizer, pesticides, and other contaminants into the local storm drain system. Rainwater harvesting can help reduce flooding and decrease water demand for landscaping purposes. Local governments can incentivize the use

[25] Greywater Action. *About Greywater Use*. http://greywateraction.org/contentabout-greywater-reuse/. Accessed November 10, 2015.

[26] It should be noted that NYSDEC requires a water conservation program to acquire a water withdraw permit. Assessing the water conservation program provided to the state for the withdraw permit as a starting point may also provide the foundation for a local government water conservation and reuse program.

[27] Sustainable Jersey. *Outdoor Landscape Water Conservation Model Ordinance Description*. http://www.sustainablejersey.com/fileadmin/media/Actions_and_Certification/Actions/NaturalResources/WaterConservationModelOrdinance.doc. Accessed November 10, 2015.

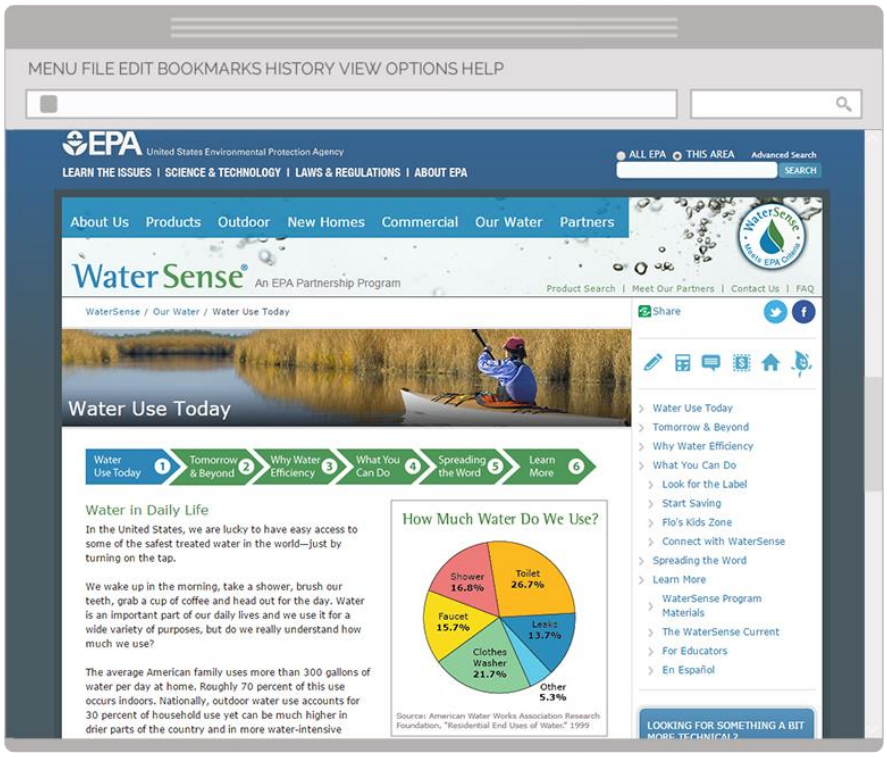
[28] Sustainable Jersey. *Outdoor Landscape Water Conservation Model Ordinance Description*. http://www.sustainablejersey.com/fileadmin/media/Actions_and_Certification/Actions/NaturalResources/WaterConservationModelOrdinance.doc. Accessed November 10, 2015.

of rain barrels by partnering with local companies to provide residents a discount. A rain barrel program could be implemented to engage the community in rainwater harvesting and provide an opportunity to educate the public on water conserving irrigation practices.

Step 5: Engage and Educate the Public

Updating policies, codes, and ordinances related to water conservation and reuse can provide a path to educate community members about the importance and benefits of water stewardship. The public needs to be informed about new policies and code updates in order to effectively implement water conservation and reuse strategies. Local governments can raise awareness by updating the local government website, holding community meetings, distributing a water supplier newsletter, collecting feedback about water conservation initiatives, and providing promotional materials for community distribution.

Figure 3: EPA WaterSense Program Website



Join the EPA WaterSense Program

The EPA WaterSense program aids in public education and promotes general water conservation efforts. The EPA WaterSense program's mission is to use water resources more efficiently to preserve them for future generations. The program promotes water-efficient products and services to offer people a simple way to use less water. The program was established in 2006 and has saved an estimated 287 billion gallons of water and $5 billion in water and energy bills.[29] Benefits of joining the EPA WaterSense program include:

- Support to local water departments and their water conservation initiatives;
- Information and promotional materials on water fixtures with WaterSense Labeling for residential, commercial, and industrial use;
- WaterSense marketing materials for use by local governments; and
- No membership fee!

The EPA WaterSense calculator can be used to analyze water savings and compare them to a series of other measurements. This tools converts gallons saved into measureable metrics (Figure 3). This provides a baseline to understand how gallons saved correlates to aspects of everyday life.

WaterSense Promotional Partner Agreement Eligibility

To participate in the WaterSense Program, local governments can become a promotional partner.[30] With this partnership, local governments are required to submit an annual report to EPA and plan one water conservation event annually (*Appendix E, EPA WaterSense Promotional Partners Agreement*).[31]

The EPA WaterSense Calculator

The EPA WasterSense Calculator[32] compares water savings from efficient appliances to other metrics, such as GHG emissions. This resource is available online to all users, not just those involved in the EPA WaterSense Program. This helps users understand the many benefits of conserving water by applying saved gallons of water to tangible metrics. There are additional programs similar to the EPA WaterSense program that local governments could join to promote their water conservation efforts.

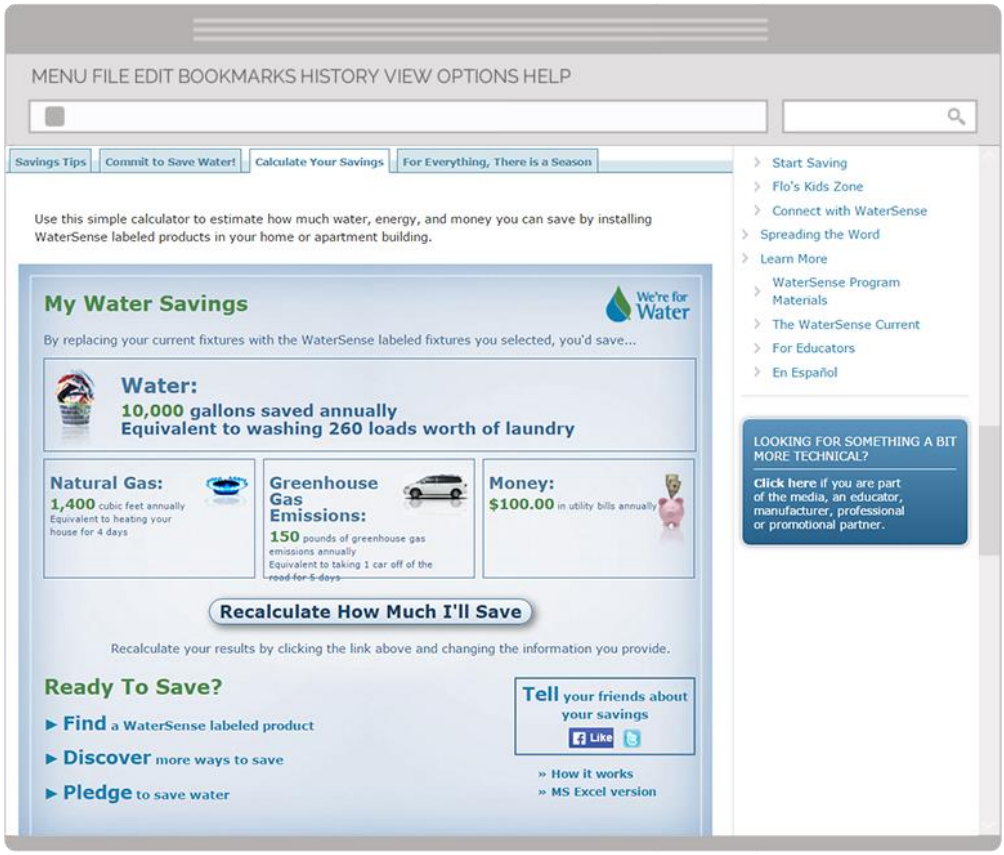
[29] EPA. *WaterSense: An EPA Partnership Program*. http://www3.epa.gov/watersense/. Accessed October 21, 2015.

[30] WaterSense does not provide financial incentives for local governments to use or promote WaterSense products. Discounts are not awarded to residents or commercial entities unless incentives are provided/financed by a local government outside of the WaterSense program. All parties benefit from the energy and water savings generated from using more efficient fixtures.

[31] EPA. *WaterSense Eligibility*. http://www3.epa.gov/watersense/partners/eligible.html. Accessed October 21, 2015.

[32] EPA. 2012. *EPA WaterSense Calculator*. http://www3.epa.gov/watersense/our_water/start_saving.html#tabs-3. Accessed October 8, 2015.

Figure 4: EPA WaterSense Calculator



Conclusion

This guide identified a number of ways for local governments to establish a water conservation program and improve upon existing water conservation initiatives. Adopting a water conservation and reuse program engages local governments, community members, and large water users in a collective effort to reduce water use. Implementing the steps outlined in this guide is a proactive approach towards integrating water conservation efforts community-wide. The guidance provided in this document will help local governments address CSC Pledge Element 7: Enhance Community Resilience and Prepare for the Effects of Climate Change and it aligns with the CSC Certification Action 7.23: Implement a Water Conservation Program. Although this guide focuses on Nyack as an example, any local government in New York State can refer to this guide when developing a local water conservation and reuse program.

Additional Water Conservation Resources

- NYSDEC Water Demand Worksheets:

  http://www.dec.ny.gov/docs/water_pdf/waterconsman.pdf

- WaterSense Calculator:

  http://www3.epa.gov/watersense/our_water/start_saving.html#tabs-3

- Grace Communications Foundation Water Footprint Calculator:

  http://www.watercalculator.org

- NRDC Water Benefits Calculator: http://www.freshcoast740.com/calculate

- EPA WaterSense Promotional Partners Agreement:

  http://www3.epa.gov/watersense/partners/partnership_agreement.html

- Example Water Conservation Code: http://www.sustainablejersey.com/actions-certification/actions/?type=1336777436&tx_sjcert_action%5BactionObject%5D=72&tx_sjcert_action%5Baction%5D=getPDF&tx_sjcert_action%5Bcontroller%5D=Action&cHash=1a357be169b1e8b8c53dc887c958620c

- Example Rain Barrel Purchasing Program:

  http://www.sustainablebelmont.net/?page_id=148

- Example from the New York City Plumbing Code:

  http://www.nyc.gov/html/dep/pdf/conservation/water-demand-management-plan-single-page.pdf

Town of New Paltz

The Town of New Paltz Town Board revised the construction code to require residential buildings to use U.S. Environmental Protection Agency WaterSense standards for water conservation when installing new plumbing fixtures. Please visit their webpage for more information: http://www.townofnewpaltz.org

Town of North Salem

Approximately 20 percent of the Town of North Salem has smart water meters installed for households within the sewer district. The meters use a remote/antenna system, called Master Meter, which allows for water usage information to be collected quickly and efficiently. Anomalies can be quickly identified and Town staff can alert homeowners to excessive usage that may be indicative of a problem (e.g., burst pipe, leaking fixtures, etc.). Please visit their webpage for more information: http://www.northsalemny.org

The City of White Plains

The City of White Plains adopted a zero percent Runoff Policy in January 2008. White Plains was the first community in Westchester County to install Flexi-Pave Tree Grates in many of the tree wells in the downtown area. The porous material made of recycled tires allows water to filter through while protecting the tree roots. Automated Meter Interface (AMI) water meters were installed in the first quarter of 2014. AMI eliminates the need for in-person meter readings which saves the City on labor and fuel costs while making it easier for the City to identify possible leaks or unusual water activity. Please visit their webpage for more information: http://www.cityofwhiteplains.com

Appendix A: NYSDEC Water Demand Forecast Sheets

C. Water Demand Forecast

Developing a water demand analysis and forecast is the next step in gathering information for a water conservation plan. The conventional forecast approach is inadequate under most conditions, because it relies on population and per capita demand projections which merely carry historic trends into the future. Where the design, size and timing of additional facilities depends on forecasted demand, errors can lead to construction of inadequate facilities and excessive economic and environmental cost.[17] Even if population assumptions prove correct, errors will result if the forecast ignores changes in the mix of household types, housing size, water price, changes in the local economy or if existing conservation efforts are ignored.

A more detailed, disaggregated water demand forecast is an important prerequisite for estimating the effectiveness of water conservation measures.[18] Disaggregation refers to separation by major water use sectors. Because different water use sectors respond at different rates to individual conservation measures, sectoral disaggregation is the only way to evaluate the effectiveness of a conservation measure to the entire water system. The disaggregation can vary from a general breakdown (for example, residential, commercial, industrial, public and unaccounted-for water) to very detailed breakdowns within more general user categories. The greater the number of sectors in the disaggregation, the more flexible, detailed and accurate the forecast will be. Disaggregation should also include dimensions of water use. Dimensions refer to water flow rates corresponding to a specific time condition. Common dimensions important in water supply planning and demand projections are average daily flow, winter seasonal daily flow (this represents indoor use), summer seasonal use (used to determine outdoor use), and peak daily use.[19] Dimensional disaggregation is important when determining reduction factors for conservation methods on different use dimensions. For example, one method might impact only residential outdoor water use, which is determined by the difference between summer and winter average use in the residential sector.

Some water utilities, especially those with pending facility expansions, might wish to hire outside consultants to perform detailed disaggregated demand analyses. Table 4 lists some data types and information sources for demand studies.[20] A simple disaggregation facilitated by the water supply audit, can be accomplished internally with less detailed information, and will considerably assist the preparation of a conservation plan.

Table 4: Information Sources for Water Demand Studies

A: Historic Data.

1. Water use data (municipal and industrial)
   - Water Utility
2. Population data
   - DEC Substate Water Management Strategies
   - County or regional planning agency
   - U.S. Census of Population
3. Number of households or dwelling units
   - County or regional planning agency
   - U.S. Census of Population, Housing
4. Number of connections
   - Water utility
5. Climatic data
   - National Weather Service
   - State University Department of Atmospheric Sciences, Meteorology or Climatology
   - Utility records
6. Water and Wastewater rate structures
   - Utilities
7. Other economic variables
   - County or regional planning agencies
   - U.S. Census of Population, Housing, Business, Manufacturers
8. Existing water resource policies
   - State plumbing code
   - Local government
   - Utility
9. Manufacturing employment, output, processes
   - Local or regional economic development agency
   - Regional office, N Y State Department of Labor
   - U.S. Census of Manufacturers
   - U.S. Bureau of Labor Statistics
   - Individual firms

B: Projected Data

10. Population, Household size, Number of households, etc.
    - DEC Substate Water Management Strategies
    - Local or regional economic development agency
11. Economic variables
    - County or regional planning agency
    - Regional office, N Y State Department of Labor
12. Manufacturing employment
    - County or regional planning agency
    - Local economic development agency
    - Individual firms

Source: NYSDEC. *Potential Reuses of Greywater and Reclaimed Wastewater in New York State*. http://www.dec.ny.gov/docs/water_pdf/waterresue.pdf.

Water Demand Worksheets

If your utility has recently completed a disaggregated water demand analysis, that analysis should be used. Likewise, if major capital expansions are being considered, a detailed disaggregated water demand analysis should be undertaken. At the very least, however, in order to determine the approximate demand reductions from various conservation approaches, the following sequence of worksheets (Worksheets 7 through 10) should be completed.

Worksheet 7: Historic Water Demand

Name of water supplier: _____

Address: _____

Contact person: _____ Title: _____ Phone: _____

Use at least two years of records, including the most recent complete year of record. Information from the Water Audit Work Sheet can be used where applicable. A previous year of record should, if possible, be a census year, such as 1980. Additional years of record will help improve demand forecasts.

Include average daily demands in MGD for base year and chosen historic years for each category. Years should be evenly spaced: e.g.., every 3 years, every 5 years, etc. If demand breakdowns are not possible, include as detailed breakdown as is possible, and note combined categories in "notes."

For each entered year of record, "MGD" is the average millions of gallons per day in that user category for the given season. Winter use is usage from November through April. Summer use is usage from May through October. "GPSD" is the average number of gallons per service connection per day in that user category for the given season. The percent columns should indicate the percent of total services or water use for the entire water system.

BASE YEAR: _____ TOTAL POPULATION SERVED: _____

USER CATEGORY	No. services	%	WINTER MGD	WINTER GPSD	WINTER %	SUMMER MGD	SUMMER GPSD	SUMMER %
Residential								
Single family								
2-4 family								
Apartment								
TOTAL Residential								
Commercial								
Industrial								
Metered public								
TOTAL Authorized Unmetered								
Unaccounted-for water								
TOTAL WATER USE		100%			100%			100%

NOTES _____

Source: NYSDEC. *Potential Reuses of Greywater and Reclaimed Wastewater in New York State*. http://www.dec.ny.gov/docs/water_pdf/waterresue.pdf.

Worksheet 7: Historic Water Demand (Continued)

FIRST PREVIOUS YEAR:_____ TOTAL POPULATION SERVED:_____

USER CATEGORY	No. services	%	WINTER MGD	WINTER GPSD	WINTER %	SUMMER MGD	SUMMER GPSD	SUMMER %
Residential								
Single family								
2-4 family								
Apartment								
TOTAL Residential								
Commercial								
Industrial								
Metered public								
TOTAL Authorized Unmetered								
Unaccounted-for water								
TOTAL WATER USE		100%			100%			100%

NOTES _____

SECOND PREVIOUS YEAR:_____ TOTAL POPULATION SERVED:_____

USER CATEGORY	No. services	%	WINTER MGD	WINTER GPSD	WINTER %	SUMMER MGD	SUMMER GPSD	SUMMER %
Residential								
Single family								
2-4 family								
Apartment								
TOTAL Residential								
Commercial								
Industrial								
Metered public								
TOTAL Authorized Unmetered								
Unaccounted-for water								
TOTAL WATER USE		100%			100%			100%

NOTES _____

Source: NYSDEC. *Potential Reuses of Greywater and Reclaimed Wastewater in New York State*. http://www.dec.ny.gov/docs/water_pdf/waterresue.pdf.

Worksheet 7: Historic Water Demand (Continued)

THIRD PREVIOUS YEAR:_____ TOTAL POPULATION SERVED:_____

USER CATEGORY	No. services	%	WINTER MGD	WINTER GPSD	WINTER %	SUMMER MGD	SUMMER GPSD	SUMMER %
Residential								
Single family	____	____	____	____	____	____	____	____
2-4 family	____	____	____	____	____	____	____	____
Apartment	____	____	____	____	____	____	____	____
TOTAL Residential	____	____	____	____	____	____	____	____
Commercial	____	____	____	____	____	____	____	____
Industrial	____	____	____	____	____	____	____	____
Metered public	____	____	____	____	____	____	____	____
TOTAL Authorized Unmetered			____		____	____		____
Unaccounted-for water			____		____	____		____
TOTAL WATER USE	____	100%	____	____	100%	____	____	100%

NOTES _____

FOURTH PREVIOUS YEAR:_____ TOTAL POPULATION SERVED:_____

USER CATEGORY	No. services	%	WINTER MGD	WINTER GPSD	WINTER %	SUMMER MGD	SUMMER GPSD	SUMMER %
Residential								
Single family	____	____	____	____	____	____	____	____
2-4 family	____	____	____	____	____	____	____	____
Apartment	____	____	____	____	____	____	____	____
TOTAL Residential	____	____	____	____	____	____	____	____
Commercial	____	____	____	____	____	____	____	____
Industrial	____	____	____	____	____	____	____	____
Metered public	____	____	____	____	____	____	____	____
TOTAL Authorized Unmetered			____		____	____		____
Unaccounted-for water			____		____	____		____
TOTAL WATER USE	____	100%	____	____	100%	____	____	100%

NOTES _____

Source: NYSDEC. *Potential Reuses of Greywater and Reclaimed Wastewater in New York State*. http://www.dec.ny.gov/docs/water_pdf/waterresue.pdf.

Worksheet 8: Percentage Trends in Water Demand

Using the data from Worksheet 7, compute the percent change between historic years in each demand category.

CATEGORY	PERCENT CHANGE BETWEEN YEARS: 4th Previous and 3rd Previous	3rd Previous and 2nd Previous	2nd Previous and 1st Previous	1st Previous and Base Year
Service Population	____	____	____	____
Residential				
Single family				
# Services	____	____	____	____
Winter use (gpsd)	____	____	____	____
Summer use (gpsd)	____	____	____	____
2-4 family				
# Services	____	____	____	____
Winter use (gpsd)	____	____	____	____
Summer use (gpsd)	____	____	____	____
Apartment				
# Services	____	____	____	____
Winter use (gpsd)	____	____	____	____
Summer use (gpsd)	____	____	____	____
TOTAL Residential				
# Services	____	____	____	____
Winter use (gpsd)	____	____	____	____
Summer use (gpsd)	____	____	____	____
Commercial				
# Services	____	____	____	____
Winter use (gpsd)	____	____	____	____
Summer use (gpsd)	____	____	____	____
Industrial				
# Services	____	____	____	____
Winter use (gpsd)	____	____	____	____
Summer use (gpsd)	____	____	____	____
Metered public				
# Services	____	____	____	____
Winter use (gpsd)	____	____	____	____
Summer use (gpsd)	____	____	____	____
TOTAL Authorized Unmetered				
Winter use (MGD)	____	____	____	____
Summer use (MGD)	____	____	____	____
Unaccounted-for water				
Winter use (MGD)	____	____	____	____
Summer use (MGD)	____	____	____	____
TOTAL WATER USE				
# Services	____	____	____	____
Winter use (MGD)	____	____	____	____
Summer use (MGD)	____	____	____	____

Source: NYSDEC. *Potential Reuses of Greywater and Reclaimed Wastewater in New York State*. http://www.dec.ny.gov/docs/water_pdf/waterresue.pdf.

Worksheet 9: Projection Year Percent Change

For projection years, use the trend in percentage change or other information to estimate demand figures. For instance, if the trend for a particular category indicates increasing use, but at a declining percentage of increase, use a continually declining percent of increase in the future. Judgement may indicate a leveling of the trend or a counter trend due to some new circumstance.

From Year:	Base Year	_____	_____
To Year	_____	_____	_____
Service Population	_____	_____	_____
Residential			
Single family # Services	_____	_____	_____
Winter use (gpsd)	_____	_____	_____
Summer use (gpsd)	_____	_____	_____
2-4 family			
# Services	_____	_____	_____
Winter use (gpsd)	_____	_____	_____
Summer use (gpsd)	_____	_____	_____
Apartment			
# Services	_____	_____	_____
Winter use (gpsd)	_____	_____	_____
Summer use (gpsd)	_____	_____	_____
TOTAL Residential			
# Services	_____	_____	_____
Winter use (gpsd	_____	_____	_____
Summer use (gpsd)	_____	_____	_____
Commercial			
# Services	_____	_____	_____
Winter use (gpsd)	_____	_____	_____
Summer use (gpsd)	_____	_____	_____
Industrial			
# Services	_____	_____	_____
Winter use (gpsd)	_____	_____	_____
Summer use (gpsd)	_____	_____	_____
Metered public			
# Services	_____	_____	_____
Winter use (gpsd)	_____	_____	_____
Summer use (gpsd)	_____	_____	_____
TOTAL Authorized Unmetered			
Winter use (MGD)	_____	_____	_____
Summer use (MGD)	_____	_____	_____
Unaccounted-for water			
Winter use (MGD)	_____	_____	_____
Summer use (MGD)	_____	_____	_____

Source: NYSDEC. *Potential Reuses of Greywater and Reclaimed Wastewater in New York State*. http://www.dec.ny.gov/docs/water_pdf/waterresue.pdf.

Worksheet 10: Future Year Projections of Water Demand

Except for unmetered and unaccounted-for use, projected water use should be based on projections of number of connections and usage per connection rather than on total water use. For residential categories, look also at projected population figures from the Substate Water Management Strategy for your area and consider how future population is likely to be allocated to various housing categories. For unmetered and unaccounted-for use, volume projections can be made. However, if the water supply audit provides for further usage breakdowns, projected use can be similarly broken down.

Use this worksheet to convert projected percent changes into "MGD" (the average millions of gallons per day in a user category for a given season) and "gpsd" (the average number of gallons per service connection per day in a user category for a given season).

YEAR	_____	_____	_____
Service Population	_____	_____	_____
Residential			
Single family			
# Services	_____	_____	_____
Winter use (gpsd),(MGD)	___.___	___.___	___.___
Summer use (gpsd),(MGD)	___.___	___.___	___.___
2-4 family			
# Services	_____	_____	_____
Winter use (gpsd),(MGD)	___.___	___.___	___.___
Summer use (gpsd),(MGD)	___.___	___.___	___.___
Apartment			
# Services	_____	_____	_____
Winter use (gpsd),(MGD)	___.___	___.___	___.___
Summer use (gpsd),(MGD)	___.___	___.___	___.___
TOTAL Residential			
# Services	_____	_____	_____
Winter use (gpsd),(MGD)	___.___	___.___	___.___
Summer use (gpsd),(MGD)	___.___	___.___	___.___
Commercial			
# Services	_____	_____	_____
Winter use (gpsd),(MGD)	___.___	___.___	___.___
Summer use (gpsd),(MGD)	___.___	___.___	___.___
Industrial			
# Services	_____	_____	_____
Winter use (gpsd),(MGD)	___.___	___.___	___.___
Summer use (gpsd),(MGD)	___.___	___.___	___.___
Metered public			
# Services	_____	_____	_____
Winter use (gpsd),(MGD)	___.___	___.___	___.___
Summer use (gpsd),(MGD)	___.___	___.___	___.___
Tot Authorized Unmetered			
Winter use (MGD)	_____	_____	_____
Summer use (MGD)	_____	_____	_____
Unaccounted-for water			
Winter use (MGD)	_____	_____	_____
Summer use (MGD)	_____	_____	_____
TOTAL WATER USE			
# Services	_____	_____	_____
Winter use (MGD)	_____	_____	_____
Summer use (MGD)	_____	_____	_____

Source: NYSDEC. *Potential Reuses of Greywater and Reclaimed Wastewater in New York State*. http://www.dec.ny.gov/docs/water_pdf/waterresue.pdf.

Appendix B: CIP Priority Criteria

WATER SUPPLY CAPITAL PROJECTS

Priority Ranking Criteria

PRIORITY SCORE = 0

Project Name Here

RAW SCORE = 0

PRIMARY OBJECTIVE (75%)

Water Supply (E 2) Impact = ; Probability = 0.00

A ☐ Project maintains existing water utility infrastructure or is required to meet the current and future water supply demand, comply with water quality standards or meet other regulatory requirements. **(H+, H-, M+, M-, L)**

B ☐ Project increases operation flexibility, improves maintenance capabilities, adds efficiency, or improves post-disaster reliability of water utility infrastructure [Example: improving the systematic reliability of water utility infrastructure to continually perform during and after a devastating event; improving the systematic flexibility of water utility infrastructure to utilize various source water; or add redundancy so infrastructure can be taken off-line for maintenance]. **(H, M, L)**

C ☐ Timing of when project is needed to meet water supply demands, water quality standards, or other regulations. **(I = Immediately (0-3 yrs.); S = Short-term (3-5 yrs.); L = Long-term (5+ yrs.))**

COMMUNITY ENGAGEMENT (7.5%)

Social Factor - Check if applicable 0.00

☐ Promotes Emergency Recovery

Positive Interaction (E 4) - Check all that apply

☐ With the Community ☐ With other agencies

ENVIRONMENTAL SUSTAINABILITY (7.5%)

Water Quality (E 3.2) - Check if applicable 0.00

☐ Promotes drinking water quality

Natural Resources Sustainability (E 3.2) - Check all that apply

☐ Promotes water use efficiency ☐ Promotes energy efficiency or incorporates energy efficient features

☐ Promotes stream management

COST RECOVERY (10%)

Lifecycle costs are minimized - Check One 0.00

☐ Annual cost savings of more than $250,000

☐ Annual cost savings of $50,000 to $250,000

☐ Annual cost savings of less than $50,000 (reference ½ PY)

Funding Available from Other Agencies - Check One

☐ Over 50% of project costs available from other agencies

☐ 26% to 50% of project costs available from other agencies

☐ Up to 25% of project costs available from other agencies

Source: Santa Clara Valley Water District. *Five –Year Capital Improvement Program*. http://www.valleywater.org/cip.aspx.

FLOOD PROTECTION PROJECTS

Priority Ranking Criteria

PRIORITY SCORE = 0

Project Name Here

RAW SCORE = 0

PRIMARY OBJECTIVE (60%)

Flood Protection (E 3) Impact = ; Probability = 0.00

- ☐ Project restores existing watershed infrastructure to its intended level of flood protection.
- ☐ Project improves watershed infrastructure to achieve the committed level of flood protection.
- ☐ Project improves watershed infrastructure to provide flood protection beyond the level of commitment.

COMMUNITY ENGAGEMENT (10%)

Positive Interaction (E 4) - Check all that apply 0.00

- ☐ With the Community
- ☐ With other agencies

Good Neighbor (E 4) - Check all that apply

- ☐ Graffiti removal or Prevention Features
- ☐ Trash removal features (vortex weirs)
- ☐ Improves aesthetics of project location

ENVIRONMENTAL SUSTAINABLITY (15%)

Ecological Function (E 3.1, 4.1) - Check all that apply 0.00

- ☐ Fish Barrier Removal / Structural improvement to fish habitat
- ☐ Upland Habitat Protection/Preservation
- ☐ Riparian Habitat (planting, setback or protect in place)
- ☐ Wetland Habitat Protection/Preservation
- ☐ SRA Plantings or Improved water temperature
- ☐ Hardscape Reduction
- ☐ Habitat Connectivity

Physical Stream Function (E 3.2) - Check all that apply

- ☐ Holistic Watershed Approach
- ☐ Erosion Control (Sediment Source Reduction)
- ☐ Geomorphic Design Elements
- ☐ Floodplain Connectivity

Water Quality and Supply (E 3.2) - Check all that apply

- ☐ Storm Water Treatment
- ☐ Provides opportunity for recharge
- ☐ TMDL Improvements

Trails & Open Space (E4.2, E4.3) - Check all that apply

- ☐ Trail friendly features
- ☐ Open Space Protection / Preservation
- ☐ Provides/Improves Bicycle Commute Route

COST RECOVERY (15%)

Funding Available from Other Agencies - Check One 0.00

- ☐ Over 50% of project costs available from other agencies
- ☐ 26% to 50% of project costs available from other agencies
- ☐ Up to 25% of project costs available from other agencies

Source: Santa Clara Valley Water District. *Five –Year Capital Improvement Program*. http://www.valleywater.org/cip.aspx.

WATER RESOURCES STEWARDSHIP PROJECTS

Priority Ranking Criteria

PRIORITY SCORE = 0

Projecct Name

RAW SCORE = 0

PRIMARY OBJECTIVE (55%)

Stewardship Projects Impact = ; Probability = 0.00

A ☐ Project restores a previously constructed environmental enhancement so that it can continue to provide the benefits for which it was created. or Project meets a permit condition/ requirement.

B ☐ Project creates Stewardship features to achieve stewardship commitments.

C ☐ Stewardship activities beyond the current commitment.

COMMUNITY ENGAGEMENT (15%)

Positive Interaction (E 4) - Check all that apply 0.00

☐ With the Community

☐ With other agencies

Good Neighbor (E 4) - Check all that apply

☐ Graffiti removal or Prevention Features

☐ Trash removal features (vortex weirs)

☐ Improves aesthetics of project location

Education Element

☐ Promotes water conservation

☐ Promotes stream stewardship

☐ Promotes flood protection

☐ Promotes Bay protection

ENVIRONMENTAL SUSTAINABLITY (15%)

Ecological Function (E 3.2) - Check all that apply 0.00

☐ Fish Barrier Removal / Structural or nonstructural improvement to fish habitat

☐ Riparian Habitat (planting, setback or protect in place)

☐ SRA Plantings or Improved water temperature

☐ Upland Habitat Protection/Preservation

☐ Wetland Habitat Protection/Preservation

☐ Hardscape Reduction

Physical Stream Function (E 3.2) - Check all that apply

☐ Holistic Watershed Approach

☐ Geomorphologic Design Elements

☐ Erosion Control or Sediment Source Reduction

Water Quality (E 3.2) - Check all that apply

☐ Storm Water Treatment (pervious pavement, green roofs, etc.)

☐ TMDL Improvements

☐ Hazardous Material Removal (Asbestos, Lead, Hydrocarbons, etc.)

Trails & Open Space (E3.3) - Check all that apply

☐ Trail friendly features

☐ Provides/Improves Bicycle Commute Route

☐ Open Space Protection / Preservation

☐ Climate change elements

COST RECOVERY (15%)

Funding Available from Other Agencies - Check One 0.00

☐ Over 50% of project costs available from other agencies

☐ 26% to 50% of project costs available from other agencies

☐ Up to 25% of project costs available from other agencies

Source: Santa Clara Valley Water District. *Five –Year Capital Improvement Program*. http://www.valleywater.org/cip.aspx.

BUILDINGS & GROUNDS PROJECTS

Priority Ranking Criteria

PRIORITY SCORE = 0

Project Name RAW SCORE = 0

PRIMARY OBJECTIVE (60%)	**Buildings and Grounds (EL 3.4)** Impact = ; Probability =	0.00
	A ☐ Project maintains or replaces existing building infrastructure to provide continuous housing of existing functions and/or to comply with employer safety standards.	
	B ☐ Project enhances building infrastructure to address treatment of staff issues.	
	C ☐ Project positions the District to meet projected future space needs.	
COMMUNITY ENGAGEMENT (10%)	**Positive Interaction (E 4)** - Check all that apply	0.00
	☐ With the Community ☐ With other agencies	
	Good Neighbor (E 4) - Check all that apply	
	☐ Graffiti removal or Prevention Features	
	☐ Trash removal features (vortex weirs)	
	☐ Improves esthetics of project location	
ENVIRONMENTAL SUSTAINABILITY (15%)	**Natural Resources Sustainability (E 3.2)** - Check all that apply	0.00
	☐ Air Quality & Visibility Improvement ☐ Recycled Water, rain water or gray water utilized	
	☐ Energy Efficient Features (Lighting, HVAC, maximize daylight use, etc.) ☐ Construction Site Waste Management	
	☐ Recycle/Re-use Solid Waste	
	☐ Renewable Energy Use ☐ Reduce Solid Waste Production	
	☐ Water Efficient Features: Plumbing fixtures, Landscaping, etc. ☐ Use of Recycled or Alternative Building Materials	
	Trails & Open Space (E3.3) - Check all that apply	
	☐ Trail friendly features ☐ Open Space Protection / Preservation	
	☐ Provides/Improves Bicycle Commute Route	
COST RECOVERY (15%)	**Funding Available from Other Agencies (Grants & Cost-share) - Check One**	0.00
	☐ Over 50% of project costs available from other agencies	
	☐ 26% to 50% of project costs available from other agencies	
	☐ Up to 25% of project costs available from other agencies	

INFORMATION TECHNOLOGY PROJECTS

Priority Ranking Criteria

PRIORITY SCORE = 0

Project Name SCORE = 0

PRIMARY OBJECTIVE (90%)	**Information Technology (EL 7.5)** Impact = ; Probability =	0.00
	A ☐ Project maintains existing mission critical software systems and/or IT infrastructure to improve reliability for business continuity. **(H+, H-, M+, M-, L)**	
	B ☐ Project enhances mission critical software systems and/or IT infrastructure to improve user functionality. **(H, M, L)**	
	C ☐ Project enhances mission critical software systems and/or IT infrastructure to meet projected future needs. **(H, M, L)**	
	D ☐ Ties into IT master Plan finding and/or recommendations (10 pts.)	
COST RECOVERY (10%)	**Funding Available from Other Agencies** - Check One	0.00
	☐ Over 50% of project costs available from other agencies	
	☐ 26% to 50% of project costs available from other agencies	
	☐ Up to 25% of project costs available from other agencies	

Source: Santa Clara Valley Water District. *Five –Year Capital Improvement Program*. http://www.valleywater.org/cip.aspx.

Appendix C: City of Yonkers Green Building Ordinance

4.1

Mandatory

Water-conserving Fixtures

All Projects

Rationale

Water conservation translates into direct utility savings for residents, tenants and building owners and lowers infrastructure costs associated with stormwater management and water treatment facilities.

Recommendations

- Certain existing fixtures, such as bathroom faucets, can be retrofitted with an aerator to reduce water flow to the requisite level.
- Dual-flush toilets typically have an average flow rate calculated and provided by the manufacturer. However, if this information is not available, use a 2:1 ratio to determine the average flow rate.

  For example, with a dual-flush toilet that has a 0.8 low-volume flush to a 1.6 high-volume flush, the calculation would be:

  $$\frac{0.8}{1.6} \times \frac{2}{1} / 3 = 1.067 \text{ average gpf}$$

- For projects using bathtubs rather than showers, the tub faucet is exempt from this measure.
- Consider conducting a WaterSense water pressure test at the street level, given that a project's water pressure and the distance between the source of water and the fixture(s) may allow a fixture to release more or less water than its rating indicates.

Requirements

Install water-conserving fixtures with the following specifications:

- Toilets — 1.28 gpf (gallons per flush) or less, including dual-flush toilets and pressure-assisted toilets (Note that there are both dual-flush and single-flush models of 1.28 gpf toilets available.)
- Urinals — 0.5 gpf or less
- Showerheads — 2.0 gpm (gallons per minute) or less
- Kitchen faucets — 2.0 gpm or less
- Bathroom faucets — 1.5 gpm or less

Resources

- Not all high-efficiency toilets operate equally well, and poor design can lead to ineffective flushing and the need for multiple flushes. The EPA's WaterSense program certifies toilets that achieve both water efficiency and operational effectiveness. The WaterSense label identifies high-efficiency products that have

Source: *City of Yonkers Green Development Workbook*. http://www.cityofyonkers.com/home/showdocument?id=10836

been verified for performance. WaterSense currently has a specification for high-efficiency toilets and bathroom faucets, and specification for showerheads is under development. Information is available at: www.epa.gov/owm/water-efficiency

- Maximum Performance (MaP™) Testing California Urban Water Conservation Council: http://www.cuwcc.org/Resources/ProductInformation/ToiletFixtures/MaximumPerformance%28MaP%29TestingUniformNorthAmericanRequirements%28UNAR%29.aspx
  The MaP™ testing project was initiated in 2003 to test toilet models' performance. This testing protocol simulates real-world use to help consumers identify high-efficiency toilets that not only save water but also work well. The current MaP testing report provides performance information on 470 toilet models. This site provides access to the complete listings of the tested toilets.

4.2

Optional – 10 points max

Advanced Water-Conserving Appliances and Fixtures

All Projects

Rationale

Water conservation translates into direct utility savings for residents, tenants and building owners and lowers infrastructure costs associated with stormwater management and water treatment facilities.

Recommendations

- Certain existing fixtures, such as bathroom faucets, can be retrofitted with an aerator to reduce water flow to the requisite level.
- Dual-flush toilets typically have an average flow rate calculated and provided by the manufacturer. However, if this information is not available, use a 2:1 ratio to determine the average flow rate.

$$\frac{\text{low flow volume rate}}{\text{high flow volume rate}} \times \frac{2}{1} \;/\; 3 = \text{average flow rate}$$

For example, with a dual-flush toilet that has a 0.8 low-volume flush to a 1.6 high-volume flush, the calculation would be:

$$\frac{0.8}{1.6} \times \frac{2}{1} \;/\; 3 = 1.067 \text{ average gpf}$$

- For projects using bathtubs rather than showers, the tub faucet is exempt from this measure.

Source: *City of Yonkers Green Development Workbook*. http://www.cityofyonkers.com/home/showdocument?id=10836

- Consider conducting a WaterSense water pressure test at the street level, given that a project's water pressure and the distance between the source of water and the fixture(s) may allow a fixture to release more or less water than its rating indicates.

Requirements
Install water-conserving fixtures with the following specifications. Inclusion of each type of fixture is worth the following optional points:

- **Option 1** *[4 points]*: All toilets — 1.2 gpf (gallons per flush) or less
- **Option 2** *[3 points]*: All showerheads —1.5 gpm (gallons per minute) or less
- **Option 3** *[3 points]*: All faucets for kitchens and bathrooms
  - Kitchen faucets — 1.5 gpm or less
  - Bathroom faucets — 0.5 gpm or less

Substantial and Moderate Rehab projects can replace or retrofit all fixtures to meet the flow rates above to achieve these optional points.

Resources

- Not all high-efficiency toilets operate equally well, and poor design can lead to ineffective flushing and the need for multiple flushes. The EPA's WaterSense program certifies toilets that achieve both water efficiency and operational effectiveness. The WaterSense label identifies high-efficiency products that have been verified for performance. WaterSense currently has a specification for high-efficiency toilets and bathroom faucets, and specification for showerheads is under development. Information is available at: www.epa.gov/owm/water-efficiency
- Maximum Performance (MaP™) Testing California Urban Water Conservation Council: http://www.cuwcc.org/Resources/ProductInformation/ToiletFixtures/MaximumPerformance%28MaP%29TestingUniformNorthAmericanRequirements%28UNAR%29.aspx
  The MaP™ testing project was initiated in 2003 to test toilet models' performance. This testing protocol simulates real-world use to help consumers identify high-efficiency toilets that not only save water but also work well. The current MaP testing report provides performance information on 470 toilet models. This site provides access to the complete listings of the tested toilets.

4.3

Optional – 5 points max

Water Reuse

All Projects

Rationale
Rainwater and greywater reuse strategies reduce the need for municipal water supplies and sewage treatment.

Source: *City of Yonkers Green Development Workbook*. http://www.cityofyonkers.com/home/showdocument?id=10836

Appendix D: Sustainable Jersey Model Water Conservation Ordinance

Outdoor Landscape Water Conservation Model Ordinance Description

This model ordinance is intended to help municipalities curtail water waste associated with excessive seasonal outdoor water usage, which can lead to an unnecessary reduction in reservoir storage, ground water levels, and stream flows. In addition, over-watering actually inhibits the health of the landscape and drought-tolerance of turf. This ordinance seeks to extend available supplies through short-term drought periods and avoid recurrent drought warnings/water emergencies necessitated by demand-driven water shortages.

This ordinance includes a two day per week watering schedule. Odd/even watering schedules are **not** recommended as water use has been shown to increase because property owners tend to over-water on days when watering is permitted. Therefore ordinances with odd/even schedules will not be eligible for credit in Sustainable Jersey. Municipalities should consider enforceability when determining how to establish the most appropriate watering schedule for their communities. An example of an effective structure would be to allow watering on the same days as garbage/recycling collection (if your community has a 2 day per week garbage collection schedule) or the same days as garbage/recycling collection and a weekend day (if your community only has a 1 day per week collection schedule). In addition, this ordinance contains morning and late afternoon/early evening irrigation periods to capitalize on low evapotranspiration (ET) rates and specifies a watering duration limit of 30 minutes per area to reduce over-watering. This stipulation varies for those that have automatic irrigation systems with rotary irrigation heads, SMART irrigation systems, or a qualified irrigation manager.

Regardless of the type of schedule structure implemented, it should be understood that irrigation in New Jersey is intended to be supplemental to natural rainfall and that following periods of rain, lawns and landscapes may not need any additional watering.

Finally, this ordinance recommends extending the reach of the State rain sensor law by requiring that all automatic irrigation systems are equipped with operational rain sensors regardless of the year of installation. The current State law (NJSA 52:27D-123.13) requires systems installed after September 8, 2000, to be equipped with an operational rain sensor. Municipalities should consider monitoring this requirement through a combination of routine monitoring and inspections, including Time of Sale and Certificate of Occupancy inspections.

Source: Sustainable Jersey. *Outdoor Landscape Water Conservation Model Ordinance Description*. http://www.sustainablejersey.com/fileadmin/media/Actions_and_Certification/Actions/NaturalResources/WaterConservationModelOrdinance.doc.

<MUNICIPALITY>
ORDINANCE NO. _____

AN ORDINANCE OF THE <MUNICIPALITY> IN <COUNTY> COUNTY, AMENDING THE CODE OF THE <MUNICIPALITY>, BY ADDING A SECTION ENTITLED X-XX, OUTDOOR LANDSCAPE WATER CONSERVATION GUIDELINES.

WHEREAS, the water supplies within the <MUNICIPALITY> should be protected to afford the greatest beneficial use to <MUNICIPALITY> citizens and businesses, which depend on adequate water supplies for their livelihood, health, welfare, and economic production; and

WHEREAS, the water resources associated with the <MUNICIPALITY> have been threatened in the past due to drought conditions; and

WHEREAS, there exists a need to ensure water is available for uses essential to the health, welfare and safety of the <MUNICIPALITY> and for averting or lessening the impact of any water shortage; and

WHEREAS, taking steps to ensure clean, wholesome, and adequate water supplies is a high priority in protecting the health, safety, and welfare of <MUNICIPALITY> citizens;

WHEREAS, pursuant to N.J.S.A. 40:48-2, the <MUNICIPALITY> has the power to adopt ordinances necessary and proper for the protection of persons and property, and the preservation of the public health, safety and welfare;

BE IT ORDAINED by the <MUNICIPALITY> Committee of the <MUNICIPALITY> in <COUNTY> County as follows:

Section x-xx. The Code of the <MUNICIPALITY> in <COUNTY> County (year) shall be amended by the addition of Section x-xx, entitled, "Outdoor Landscape Water Conservation Ordinance", to read as follows:

I. Water Use Restrictions

Restrictions on outdoor landscape water use apply to all users in <MUNICIPALITY> at all times regardless of source of supply (e.g. public water supplies, well or ground water, lakes, streams, or ponds) unless expressly exempt

Source: Sustainable Jersey. *Outdoor Landscape Water Conservation Model Ordinance Description*. http://www.sustainablejersey.com/fileadmin/media/Actions_and_Certification/Actions/NaturalResources/WaterConservationModelOrdinance.doc.

in *V. Exemptions.* Such water use shall conform to the following Outdoor Landscape Water Use Restrictions:

A. Lawn watering with a hose or hose-end sprinkler
   1. May only be done two days per week *(Choose one of the 2 examples below or develop another structure better suited for the individual municipality)*
      a. *Example 1*- Properties may only water 2 days per week. Properties with even number addresses may only water on Mondays and Thursday, properties with odd number addresses may only water on Tuesday and Fridays.
      b. *Example 2*- Properties may only water 2 days a week to coincide with trash pickup days;
   2. Watering shall only be conducted between the hours of 6:00 a.m. and 9:00 a.m. or between 5:00 p.m. and 8:00 p.m.;
   3. The watering of any single area shall not exceed thirty minutes per day;
   4. Flowers and shrubs may be watered as needed with a hand-held hose equipped with an automatic shut-off nozzle;
   5. No hose or hose-end watering shall be permitted when it is raining.

B. Irrigating lawns and landscapes with automatic irrigation systems equipped with a conventional irrigation controller (this includes all systems that do not have a "SMART" controller as defined in section I.C)
   1. May only be done two days per week *(Choose one of the 2 examples below or develop another structure better suited to individual municipalities)*
      a. *Example 1* – Properties may only irrigate 2 days per week. Properties with even number addresses may only irrigate on Mondays and Thursdays, properties with odd number addresses may only irrigate on Tuesdays and Fridays.
      b. *Example 2* – Properties may only irrigate 2 days a week to coincide with trash pickup days;
   2. Irrigation shall only be conducted between the hours of 12:00 midnight and 10:00 a.m.
   3. Operation of any irrigation zone equipped with spray (mist) heads shall not exceed 15 minutes per zone. Operation of any irrigation zone equipped with rotary sprinkler heads shall not exceed 50 minutes per zone.

Source: Sustainable Jersey. *Outdoor Landscape Water Conservation Model Ordinance Description*. http://www.sustainablejersey.com/fileadmin/media/Actions_and_Certification/Actions/NaturalResources/WaterConservationModelOrdinance.doc.

C. Irrigation with systems equipped with a SMART controller
   1. To qualify for this provision, the SMART controller must have met the minimum requirements of IA-SWAT protocol testing. Lists of climate-based and sensor based controllers that have successfully completed the protocol testing can be found at http://www.irrigation.org/SWAT/Industry/ia-tested.asp
   2. The property owner must register the SMART controller with the municipality
      a. The municipality will issue a yard placard which the owner must display signifying that the property is irrigated with a SMART controller
   3. The SMART controller must be programmed by an EPA WaterSense Partner who holds a New Jersey Landscape Irrigation Contractor Certificate pursuant to NJSA 45:5AA-3.
      a. The SMART controller must be programmed to irrigate between the hours of 12:00 midnight and 10:00 am;
      b. Proper sprinkler head data and accurate soil/plant/irrigation information must be entered;
      c. The SMART controller programming data shall be posted at the controller;
      d. The WaterSense Partner must make a minimum of two site visits after the initial programming to adjust and fine tune the irrigation schedule.

D. Irrigation systems programmed and monitored by an irrigation manager
   1. The property owner must designate a qualified person who will be the irrigation manager and register that person with the municipality with defining qualifications.
      a. The municipality will issue a yard placard which the owner must display signifying that the property is irrigated by an irrigation manager.
   2. The irrigation manager must be an EPA WaterSense Partner or show evidence of successfully completing one of the approved courses listed below:
      a. Rutgers University Continuing Education Course, *Irrigation Systems: Scheduling*
      b. Irrigation Association's online course, *Landscape Irrigation Scheduling.*
      c. A comparable course offered by a recognized continuing education facility or professional association.

Source: Sustainable Jersey. *Outdoor Landscape Water Conservation Model Ordinance Description*. http://www.sustainablejersey.com/fileadmin/media/Actions_and_Certification/Actions/NaturalResources/WaterConservationModelOrdinance.doc.

3. A property specific irrigation program shall be developed by the irrigation manager based on plant variety, soil type, exposure, slope, precipitation rate, and irrigation efficiency.
4. Weekly adjustments shall be made to the irrigation schedule based on current evapotranspiration (ET) rates or weather conditions.
5. If it is found that an irrigation manager does not follow any of the terms prescribed in this ordinance, they may be disqualified from acting as a properties irrigation manager.

E. All automatic irrigation systems:
1. Shall be equipped with an operational automatic rain sensor device, which disables the system when a predetermined amount of rainfall has occurred. Each rain sensor device shall be capable of and programmed to interrupt the automatic irrigation cycle when ¼ inch of rain has fallen.
2. Any work performed on a system as a result of any inspection made by the homeowner or a professional must be in compliance with the Landscape Irrigation Contractor Certification Act of 1991 (NJSA 45:5AA-3).
3. Flowers and shrubs irrigated with drip or micro irrigation may be watered as needed.

F. All new irrigation systems must comply with the following:
1. The system must be installed by an EPA WaterSense Partner who holds a New Jersey Landscape Irrigation Contractor Certificate pursuant to NJSA 45:5AA-3.
2. New Jersey Irrigation Best Management Design Practices are listed below. More information on these practices can be found in the Outdoor Landscape Water Conservation Model Ordinance Best Practices Guide located on the <MUNICIPALITY> web site:
    a. designing a system that insures sufficient operating pressure at the sprinkler head;
    b. dividing irrigated areas into hydro-zones of turf and plants with similar water requirements;
    c. creating zoning systems according to exposure;
    d. considering the soil type so the sprinkler irrigation precipitation rate is compatible with the soil infiltration rate or dividing the zone runtimes into multiple short cycles;
    e. providing separate control of sloped areas;
    f. preventing sprinkler heads from overthrowing onto driveways, roads, and sidewalks;
    g. providing for separate irrigation for parkway strips between curbs and sidewalks that minimizes overthrow onto walks, pavement, and other impervious surfaces;

Source: Sustainable Jersey. *Outdoor Landscape Water Conservation Model Ordinance Description*. http://www.sustainablejersey.com/fileadmin/media/Actions_and_Certification/Actions/NaturalResources/WaterConservationModelOrdinance.doc.

h. using pressure regulating technology as necessary to ensure sprinkler heads operate within the manufacturer's recommended range. The pressure regulation may be:
   i. a pressure regulation device at the point of connection;
   ii. pressure regulation at each remote control valve;
   iii. pressure regulation at the sprinkler head;
   iv. a combination of the above.
i. irrigating all flowers and shrubs with drip and/or micro-irrigation;
j. including check valves in low sprinkler heads to prevent low-point drainage;
k. having a pressure regulating device and wye strainer on each drip/micro control valve.

3. System must have a SMART controller capable of estimating or measuring depletion of available plant soil moisture and operating the irrigation system only to replenish the water as needed while minimizing excess water use.
   a. The SMART controller must have undergone SWAT testing and be listed on the Irrigation Association website www.swatirrigation.org *(This section may be replaced by a WaterSense labeling requirement once the EPA releases the labeling of SMART controllers anticipated in 2011).*
   b. The SMART controller must be programmed by an EPA WaterSense Partner who holds a New Jersey Landscape Irrigation Contractor Certificate pursuant to NJSA 45:5AA-3.
      i. Proper sprinkler head data and accurate soil/plant/irrigation information must be entered;
      ii. The SMART controller programming data shall be posted at the controller;
      iii. The WaterSense partner must make a minimum of two site visits after the initial programming to adjust and fine tune the irrigation schedule.

H. Upon the Declaration of Water Emergency by the <MUNICIPAL GOVERNING BODY>additional restrictions may be imposed and shall supersede the restrictions in this ordinance.

I. State of New Jersey requirements shall supersede those identified in this Section when more stringent than those identified in this ordinance.

Source: Sustainable Jersey. *Outdoor Landscape Water Conservation Model Ordinance Description*. http://www.sustainablejersey.com/fileadmin/media/Actions_and_Certification/Actions/NaturalResources/WaterConservationModelOrdinance.doc.

II. Violations

A. Violations include knowingly or recklessly watering or irrigating or permitting irrigation of lawn or landscape on owned, leased, or managed property that results in the following:

1. Watering during any form of precipitation;
2. Water leaking from any irrigation equipment;
3. Water puddling on landscape or impervious surfaces;
4. Water run-off from irrigated property;
5. Irrigating on days not permitted in this ordinance;
6. Irrigating at hours not permitted in this ordinance.

B. Violators of these guidelines and requirements are subject to fines and penalties described in *IV. Penalties.*

C. All water users in <MUNICIPALITY> are responsible for preventing the above violations. Specific information with regard to identifying and preventing such violations can be found in the Outdoor Landscape Water Conservation Model Ordinance's Best Management Practices for Irrigating Landscapes located on the <MUNICIPALITY> web site.

III. Enforcement of Water Conservation Guidelines

The water use restrictions and automatic rain sensor requirement imposed pursuant to this section shall be enforced by the local authorized official. Whenever a local authorized official shall find a violation of the water use restrictions, regardless of the source of the water (public supply or private source), such authorized official shall issue a written warning and explain the penalties for a second and third offense, as provided in subsection IV. The local authorized official shall keep such records as may be reasonable and necessary for the purpose of determining the persons and businesses who have been warned upon a first offense. The local authorized official is hereby empowered to write summons for the violation of the water use restrictions imposed pursuant to this section.

IV. Penalties

After a warning for a first offense in accordance with subsection III above, any person or business that thereafter violates the water use restrictions imposed

Source: Sustainable Jersey. *Outdoor Landscape Water Conservation Model Ordinance Description*. http://www.sustainablejersey.com/fileadmin/media/Actions_and_Certification/Actions/NaturalResources/WaterConservationModelOrdinance.doc.

pursuant to this section shall be subject to the penalty provisions stated at _____.

V. Exemptions

Restrictions in Section x-xx above do not apply to the following:

A. Outdoor water use from rain water harvesting, gray water, or reclaimed water are exempt from the provisions of the ordinance. Use of gray or reclaimed water must have an approved NJPDES permit issued through the NJDEP.
B. Outdoor water use for commercial farms producing harvestable crops, commercial nurseries, sod farms and golf courses are exempt from the provisions of the ordinance.
C. Outdoor irrigation necessary for one day only where treatment with an application of chemicals require immediate watering to preserve an existing landscape or to establish a new landscape.
D. Outdoor irrigation necessary for the establishment of newly sodded lawns or landscaping within the first 21 consecutive days of planting.
E. Visually supervised operation of an irrigation system by a person in compliance with the New Jersey Landscape Irrigation Contractor Certification Act of 1991 (NJSA 45:5AA-1) and at the minimum rate necessary in order to check system condition and effectiveness.

Source: Sustainable Jersey. *Outdoor Landscape Water Conservation Model Ordinance Description*. http://www.sustainablejersey.com/fileadmin/media/Actions_and_Certification/Actions/NaturalResources/WaterConservationModelOrdinance.doc.

Appendix E: EPA WaterSense Promotional Partners Agreement

EPA WaterSense

OMB Control Number 2040-0272

Partnership Agreement: Promotional Partners

Section I: EPA WaterSense® Program Goals

EPA's WaterSense program aims to use water resources more efficiently to preserve them for future generations and to reduce water and wastewater infrastructure costs by reducing unnecessary water consumption. Through this program, EPA provides reliable information on high-performing, water-efficient products and practices, raises awareness about the importance of water efficiency, ensures water-efficient product performance, helps consumers identify products and services that use less water, promotes innovation in product development, and supports state and local water-efficiency efforts.

Section II: Partnership Pledge

As an EPA WaterSense promotional partner, my organization shares EPA's goals as outlined above and is proud to commit to the following activities to further these goals:

1. Educate consumers, residents, businesses, and institutions located in the United States and Canada on the value of water efficiency, the importance of saving water, and the meaning of the WaterSense label. Where feasible, undertake activities and events to achieve mutual WaterSense goals.
2. As appropriate, encourage eligible constituents, members, or affiliates to participate as partners in EPA's WaterSense program.
3. **For utilities and governments:** On an annual basis, provide data to EPA on promotional activities and incentive programs to assist in determining the impact of the program in promoting labeled products.
4. **For applicable trade associations:** If asked, provide aggregate data to EPA on market share of WaterSense labeled products and programs in relevant industry. Compile data submitted by members who are also WaterSense partners into a summary report to assist EPA in evaluating market trends and the success of the WaterSense program, without disclosing any proprietary information from members.
5. Adhere to all policies and procedures contained in the Program Guidelines.
6. Feature the WaterSense promotional label and partner logo on website and in other promotional materials.
7. Adhere to WaterSense program mark guidelines and ensure that authorized representatives, such as advertising agencies, distributors, and subcontractors, also comply. Help EPA maintain program integrity by alerting EPA to possible misuse(s) of the WaterSense program marks.
8. Grant EPA's WaterSense program permission to include partner's name on a list of participating partners on the WaterSense website, program materials, and announcements. Partners understand that from time to time, EPA will be interested in profiling partner accomplishments in case studies and articles. If selected for such promotion, partners will have the opportunity to provide input and review the final print or Web document before EPA releases it to the public. Further, the partner understands that EPA might refer media contacts interested in publicizing water efficiency to partners for information about products and accomplishments.

Section III: EPA WaterSense Program's Commitments to Partners

1. Develop national specifications for water-efficient new homes, products, and programs through an open, public process.
2. Increase awareness of the WaterSense brand by distributing key messages on the benefits of labeled products and programs, and the importance of water efficiency.
3. Provide current EPA WaterSense program news, information, and reference documents (via the program website, WaterSense Helpline, email, or other means), including a listing of labeled products and programs on the website.
4. Provide WaterSense partners with public recognition for their involvement in the program and role in protecting the environment through online listing of partners, special awards, publications, and other efforts.
5. Respond swiftly to partner requests for information or clarification on EPA WaterSense program policies.
6. Provide materials, templates, and program marks for promotional use, consistent with the WaterSense Program Guidelines.
7. Review pre-press promotional items, draft websites, packaging, or other materials that use the WaterSense marks upon request.

EPA Form Number 6100-06

Source: EPA. *WaterSense Eligibility*. http://www3.epa.gov/watersense/partners/eligible.html.

Section IV: General Terms and Disclaimers

1. The partner will not construe, claim, or imply that its participation in the EPA WaterSense program constitutes federal government (EPA) approval, acceptance, or endorsement of anything other than the partner's commitment to the program.
2. Nothing in this agreement, in and of itself, obligates the EPA to expend appropriations or to enter into any contract, assistance agreement, interagency agreement, or incur other financial obligations that would be inconsistent with Agency budget priorities. The partner agrees not to submit a claim for compensation for services rendered to EPA or any federal agency in connection with any activities it carries out in furtherance of this agreement.
3. The partner and the EPA WaterSense program will assume good faith as a general principle for resolving conflict and will seek to resolve all matters informally, so as to preserve maximum public confidence in the program.
4. No building, facility, or structure will be WaterSense labeled as a result of this agreement. If additional WaterSense partner categories become available, affected organizations will be asked to reapply for partnership in the new category.
5. Failure to comply with any of the terms of this partnership agreement can result in its termination and cessation of access to the benefits of the program, including use of the program marks.
6. The EPA WaterSense program will actively pursue resolution of noncompliance related to the use of the program marks.
7. Both parties concur that this agreement is wholly voluntary and may be terminated by either party at any time, and for any reason, with no penalty. Termination will begin effective immediately upon written notice to or from the EPA WaterSense program. Upon termination of this agreement, partners agree to remove program marks in a timely manner, consistent with the WaterSense program mark guidelines.

EPA Form Number 6100-06

Source: EPA. *WaterSense Eligibility*. http://www3.epa.gov/watersense/partners/eligible.html.