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6.0 WATER DEMAND MANAGEMENT¹

The Local and Regional Water Supply Planning Regulation (9 VAC 25-780-110) requires the Plan to address conservation as part of the overall water demand management in accordance with practices for more efficient water use, water conservation measures through reduction of water use, and practices to reduce water loss. Water conservation as part of overall water demand management is described in the following sections.

6.1 Practices for More Efficient Use²

As required by 9 VAC 25-780-110, the Northern Virginia Plan includes information that describes practices for more efficient use of water that are used within the region. The types and measures described may include, but are not limited to, the adoption and enforcement of the Virginia Uniform Statewide Building Code (VUSBC) sections that limit maximum flow of water closets, urinals and appliances; use of low-water use landscaping; and increases in irrigation efficiency. This section describes practices for more efficient water use in the Northern Virginia region.

6.1.1 Virginia Uniform Statewide Building Codes

The VUSBC is a state regulation promulgated by the Virginia Board of Housing and Community Development (Board). The Board is appointed by the Governor of Virginia for the purpose of establishing minimum regulations to govern the construction and maintenance of buildings and structures. The provisions of the VUSBC are based on nationally recognized building and fire codes published by the International Code Council, Inc. The 2003 editions of the International Codes are incorporated by reference into the VUSBC.

The VUSBC requires 1.6 gallon-per-flush toilets and limits the maximum allowable flow rates for showerheads and faucets to 1.5 gallons-per-minute. The codes are generally enforced in the region by the County Building Official through plan reviews and routine inspections.

¹ 9 VAC 25-780-110.

² 9 VAC 25-780-110.A.1.

Section 104.1 of the VUSBC includes provisions for small localities to enter into an agreement with another governing body to enforce the code.

6.1.1.1. Arlington County

Arlington County adopted the VUSBC around 1995. The County generally enforces the VUSBC through their Building Inspection Division, which was in place prior to the VUSBC.

6.1.1.2. Fairfax County

Fairfax County adopted the VUSBC in 1993. The County generally enforces the VUSBC through County Code Chapters 61 and 65, which reference VUSBC updates, and residential and building permits.

6.1.1.3. Loudoun County

Loudoun County adopted the VUSBC in 1987 (Codified ordinances of Loudoun County Part 14 – Building and Housing Code, Chapter 1410 - VUSBC. This ordinance was first adopted in 1987 and was last amended in 2009. VUSBC are generally enforced by the Department of Building and Development through the Building Official. Loudoun County provides building inspections for the towns of Leesburg and Purcellville.

6.1.1.4. Prince William County

Prince William County adopted the 2006 VUSBC on May 1, 2008. VUSBC are generally enforced by the County Building Official.

6.1.1.5. City of Alexandria

The City of Alexandria adopted the most recent version of VUSBC in 2010(Section 8-1-2, Ordinance No. 4659, Section 1). VUSBC is generally enforced by the Department of Code Administration per the City Ordinance Section 8-1-2.

6.1.1.6. City of Fairfax

The City of Fairfax has adopted the VUSBC; however, the year the VUSBC were adopted is unknown.

6.1.1.7. City of Falls Church

The City of Falls Church adopted the VUSBC in 1986. The City generally enforces the VUSBC through the City's Building Official, who reviews and approves all building permits. City Ordinance No. 1164, allows the Building Official to enforce VUSBC.

6.1.1.8. City of Manassas

The City of Manassas adopted the VUSBC; however, the date the VUSBC was first adopted by the City is unknown. The City adopted the 2009 VUSBC, effective March 1, 2011, on February 24, 2011.

6.1.1.9. City of Manassas Park

The City of Manassas Park adopted the VUSBC; however, the date the VUSBC was first adopted by the City is unknown.

6.1.1.10. Town of Clifton

Prince William County provides building inspections and enforces the VUSBC for Town of Clifton.

6.1.1.11. Town of Dumfries

Prince William County provides building inspections and enforces the VUSBC for Town of Dumfries.

6.1.1.12. Town of Hamilton

Loudoun County provides building inspections and enforces the VUSBC for Town of Hamilton.

6.1.1.13. Town of Haymarket

Prince William County provides building inspections and enforces the VUSBC for Town of Haymarket.

6.1.1.14. Town of Herndon

The Town of Herndon Building Inspection Staff enforces the VUSBC for the Town.

6.1.1.15. Town of Leesburg

Loudoun County provides building inspections and enforces the VUSBC for Town of Leesburg.

6.1.1.16. Town of Lovettsville

Loudoun County provides building inspections and enforces the VUSBC for Town of Lovettsville.

6.1.1.17. Town of Middleburg

Loudoun County provides building inspections and enforces the VUSBC for Town of Middleburg.

6.1.1.18. Town of Occoquan

Prince William County provides building inspections and enforces the VUSBC for Town of Occoquan.

6.1.1.19. Town of Purcellville

Loudoun County provides building inspections and enforces the VUSBC for Town of Purcellville.

6.1.1.20. Town of Quantico

Prince William County provides building inspections and enforces the VUSBC for Town of Quantico.

6.1.1.21. Town of Round Hill

Loudoun County provides building inspections and enforces the VUSBC for Town of Round Hill.

6.1.1.22. Town of Vienna

Fairfax County provides building inspections and enforces the VUSBC for Town of Purcellville.

6.1.2 Ordinances Governing Water Efficient Landscaping

6.1.2.1. Arlington County

Arlington County has not adopted ordinances or developed and implemented a master landscape plan for water efficient landscaping.

6.1.2.2. Fairfax County

Fairfax County has not adopted ordinances or developed and implemented a master landscape plan for water efficient landscaping. However, the Wise Water Use Landscaping and Watering Guide is available to customers. This guide provides information on planning and design, soil improvement, practical turf management, efficient irrigation, mulching, low-water use plants, and maintenance to promote water efficient landscaping.

6.1.2.3. Loudoun County³

Loudoun Water notes the greatest opportunities for water savings in their service area come from watering lawns, which has been calculated at 65 percent of total use at worst case and, have seen evidence of overwatering as high as 60 percent. As a result, Loudoun Water provides tips and tools on their website and request that customers follow a two-day per week watering schedule:

- ODD Addresses water Wednesdays and Saturday;
- EVEN Addresses water Thursday and Sunday; and
- Commercial/Multi-family properties water on Tuesday and Friday.

This schedule provides the following benefits: distributes water use evenly over a week's time and allows storage tanks to refill on Mondays after a weekend of heavy water use.

In addition, Loudoun Water provides customers a guide to water wise landscaping, landscaping that minimizes the need for watering, by request or by downloading a copy on their website.

6.1.2.4. Prince William County⁴

The PWCSA requests that customers adhere to the following proposed watering schedule:

- ODD addresses water on Sunday, Tuesday, and Friday;
- EVEN addresses water on Monday, Thursday, and Saturday; and
- Businesses water on Tuesday, Thursday, and Saturday.

This schedule provides the following benefits: helps maintain adequate water pressure; avoids purchase of additional water capacity, which may lead to future rate increases; and reduces system-wide peak water demand by approximately 50 percent. In addition, the PWCSA requests customers avoid watering lawns and landscaping between peak demand hours of 3 a.m. and 7 a.m.

³ <http://www.loudounwater.org/Residential-Customers/Conservation/>

⁴ http://www.pwcsa.org/index.php?option=com_content&view=article&id=153:help-your-neighbors-and-yourself&catid=4:service-authority-news&Itemid=11

This information is provided on the PWCSA website in addition to the Wise Water Use Landscaping and Watering Guide. Additionally, the Prince William County Service Authority has implemented educational programs in an effort to educate Service Authority customers on smart water use. The campaign presents information and how to instructions on seasonal conservation topics via the following: the website, monthly billing inserts, quarterly newsletter and through grade school and citizen presentations.

6.1.2.5. City of Alexandria

The City of Alexandria does not have a local ordinance specifically addressing wastewater water use; however, City Ordinance Sec. 5-6-4 through Sec. 5-6-10, Code 1963, Sec. 40-1 allows mandatory water restrictions during times of water supply emergencies, enforceable with a Class Five Civil Violation Charge.

City Ordinance Sec. 8-1-18 states that all car washes must be equipped with a water recycling system approved by the City Building Official. The requirement for a water recycling system also applies to any water-connected device or appliance requiring a continuous flow of five gallons per minute or more..

6.1.2.1. City of Fairfax⁵

The City of Fairfax website recommends customers follow even/odd water schedule where customers with even addresses water outdoors only on even days and odd addresses water outdoors only on odd days. This rule helps reduce the demand for water from customers in any one day by 10 to 25 percent. It also minimizes peaks in demand when the rivers are low and it helps in extending the life of the available water in the reservoirs. The City also recommends watering in the morning or late in the evening.

In addition, the City's website provides information on creating a water wise landscape and discusses Xeriscaping, which refers to use of drought-tolerant plants, trees, and shrubs in landscaping.

6.1.2.2. City of Falls Church

The City of Falls Church has not adopted ordinances or developed and implemented a master landscape plan for water efficient landscaping.

⁵ <http://fairfaxva.gov/Utilities/WiseWaterUse.asp>

6.1.2.3. City of Manassas

The City of Manassas has not adopted ordinances or developed and implemented a master landscape plan for water efficient landscaping.

6.1.2.4. City of Manassas Park

The City of Manassas Park has not adopted ordinances or developed and implemented a master landscape plan for water efficient landscaping.

6.1.2.5. Town of Clifton

The Town of Clifton has not adopted ordinances or developed and implemented a master landscape plan for water efficient landscaping.

6.1.2.6. Town of Dumfries

The Town of Dumfries has not adopted ordinances or developed and implemented a master landscape plan for water efficient landscaping. The Town is served by the PWCSA and the guidance offered by the PWCSA applies to the Town.

6.1.2.7. Town of Hamilton

The Town of Hamilton has not adopted ordinances or developed and implemented a master landscape plan for water efficient landscaping.

6.1.2.8. Town of Haymarket

The Town of Haymarket has not adopted ordinances or developed and implemented a master landscape plan for water efficient landscaping. The Town is served by the PWCSA and the guidance offered by the PWCSA applies to the Town.

6.1.2.9. Town of Herndon⁶

The Water Wise Landscaping and Watering Guide is available on the Town of Herndon's website.

6.1.2.10. Town of Leesburg

The Town of Leesburg is a partner in the National "Water Use It Wisely" campaign and provides a link on their website.

6.1.2.11. Town of Lovettsville

The Town of Lovettsville has not adopted ordinances or developed and implemented a master landscape plan for water efficient landscaping.

⁶ http://www.herndon-va.gov/Content/Town_Services/Water_and_Sewer/Water_Conservation_Tips/default.aspx?cnlid=3026

6.1.2.12. Town of Middleburg

The Town of Middleburg has not adopted ordinances or developed and implemented a master landscape plan for water efficient landscaping.

6.1.2.13. Town of Occoquan

The Town of Occoquan has not adopted ordinances or developed and implemented a master landscape plan for water efficient landscaping. The Town is served by the PWCSA and the guidance offered by the PWCSA applies to the Town.

6.1.2.14. Town of Purcellville

The Town of Purcellville has not adopted ordinances or developed and implemented a master landscape plan for water efficient landscaping.

6.1.2.15. Town of Quantico

The Town of Quantico has not adopted ordinances or developed and implemented a master landscape plan for water efficient landscaping.

6.1.2.16. Town of Round Hill

The Town of Round Hill has not adopted ordinances or developed and implemented a master landscape plan for water efficient landscaping.

6.1.2.17. Town of Vienna

The Town of Vienna has not adopted ordinances or developed and implemented a master landscape plan for water efficient landscaping.

6.1.3 Local Ordinances Regarding Wasteful Water Use

6.1.3.1. Arlington County

Arlington County does not have a local ordinance specifically addressing wasteful water use; however, County Ordinance No. 02-05 allows the County Administrator to restrict water use for various reasons including water shortages, water main breaks, or power outages. This ordinance is not enforced as a water conservation measure unless an emergency situation exists.

Through the Water and Sewer regulations, which are not part of the County Code by ordinance, certain wasteful water use practices are prohibited such as car washes without re-circulating systems.

6.1.3.2. Fairfax County

Fairfax County has not adopted a local ordinance regarding wasteful water use. However, Fairfax Water requires customers to repair leaking pipes and fixtures to reduce water loss.

6.1.3.3. Loudoun County

Loudoun County has not adopted a local ordinance regarding wasteful water use.

6.1.3.4. Prince William County

Prince William County has not adopted a local ordinance regarding wasteful water use. However, the PWCSA rate structure Peak I and Peak II rates penalize excessive use of water financially. In addition, the County's drought ordinance includes a provision for water use violators in times of emergency and states those that violate the emergency water restriction at any of the three stages of curtailment can face a misdemeanor and or suspension of water service for not abiding by the restrictions of the ordinance.

6.1.3.5. City of Alexandria

The City of Alexandria has a local ordinance (City Ordinance Sec. 5-6-1, Code 1963, Sec. 40-1) that specifically addresses wasteful water use during times of emergencies, enforceable with a fine ranging from \$10-\$50.

City Ordinance Sec. 8-1-18 states that all car washes must be equipped with a water recycling system approved by the City Building Official. The requirement for a water recycling system also applies to any water-connected device or appliance requiring a continuous flow of five gallons per minute or more.

6.1.3.6. City of Fairfax

The City of Fairfax has not adopted a local ordinance regarding wasteful water use.

6.1.3.7. City of Falls Church

The City of Falls Church has not adopted a local ordinance regarding wasteful water use.

6.1.3.8. City of Manassas

The City of Manassas has not adopted a local ordinance regarding wasteful water use.

6.1.3.9. City of Manassas Park

The City of Manassas Park has not adopted a local ordinance regarding wasteful water use.

6.1.3.10. Town of Clifton

The Town of Clifton has not adopted a local ordinance regarding wasteful water use.

6.1.3.11. Town of Dumfries

The Town of Dumfries has not adopted a local ordinance regarding wasteful water use. However, the PWCSA rate structure Peak I and Peak II rates penalize excessive use of water financially.

6.1.3.12. Town of Hamilton

The Town of Hamilton has not adopted a local ordinance regarding wasteful water use.

6.1.3.13. Town of Haymarket

The Town of Haymarket has not adopted a local ordinance regarding wasteful water use. However, the PWCSA rate structure Peak I and Peak II rates penalize excessive use of water financially.

6.1.3.14. Town of Herndon

The Town of Herndon revised Section 74-397 related to restrictions on use of water during shortages. The ordinance revision will address concerns related to wasteful water use during shortages.

6.1.3.15. Town of Leesburg

The Town of Leesburg has not adopted a local ordinance regarding wasteful water use; however, Section 34-23 of the Town Code prohibits excessive use of water. In addition, the rates are structured to increase as the water usage increases, consequently penalizing wasteful use of water.

6.1.3.16. Town of Lovettsville

The Town of Lovettsville has not adopted a local ordinance regarding wasteful water use.

6.1.3.17. Town of Middleburg

The Town of Middleburg has not adopted a local ordinance regarding wasteful water use.

6.1.3.18. Town of Occoquan

The Town of Occoquan has not adopted a local ordinance regarding wasteful water use. However, the PWCSA rate structure Peak I and Peak II rates penalize excessive use of water financially.

6.1.3.19. Town of Purcellville

The Town of Purcellville does not have an ordinance specific to wasteful water use; however, Section 82-130 (a) of Town Code states “it shall be unlawful to forego repair of water leaks identified by town personnel on the consumer side of the water system, including but not limited to, fire sprinkler systems. The penalty for foregoing repairs will be denial or discontinuation of water service.” The Town of Purcellville has a tiered rate system which discourages excessive irrigation and charges sewer fees on all water used on all residential and commercial accounts. The Town also employs a mandatory recycling requirement for commercial car washes.

6.1.3.20. Town of Quantico

The Town of Quantico has not adopted a local ordinance regarding wasteful water use.

6.1.3.21. Town of Round Hill

The Town of Round Hill has not adopted a local ordinance regarding wasteful water use.

6.1.3.22. Town of Vienna

The Town of Vienna has not adopted a local ordinance regarding wasteful water use.

6.1.4 Governmental Practices to Increase Irrigation Efficiency

6.1.4.1. Arlington County

Arlington County implements a flat rate water and sewer billing structure, which discourages excessive irrigation by charging sewer fees on all water used at a typical residential or commercial account. Citizens may opt for a “water only” account; however, they must pay for a new service (\$3200-\$4800) and any plumbing necessary to connect such service.

6.1.4.2. Fairfax County

Fairfax County does not require irrigation meters; however, customers can request a sub-meter through the water purveyor.

6.1.4.3. Loudoun County⁷

Loudoun Water website provides guidelines for installation of an irrigation system and provides tips to increase irrigation efficiency from the Irrigation Association.

⁷ <http://www.loudounwater.org/Residential-Customers/Conservation/>

6.1.4.4. Prince William County

Prince William County does not require irrigation meters; however, customers can request a sub-meter through PWCSA.

The PWCSA requests that customers adhere to the following proposed watering schedule:

- ODD addresses water on Sunday, Tuesday, and Friday;
- EVEN addresses water on Monday, Thursday, and Saturday; and
- Businesses water on Tuesday, Thursday, and Saturday.

This schedule provides the following benefits: helps maintain adequate water pressure; avoids purchase of additional water capacity, which may lead to future rate increases; and reduces system-wide peak water demand by approximately 50 percent. In addition, the PWCSA requests customers avoid watering lawns and landscaping between peak demand hours of 3 a.m. and 7 a.m.

This information is provided on the PWCSA website in addition to the Wise Water Use Landscaping and Watering Guide.

Additionally, the Prince William County Service Authority has implemented educational programs in an effort to educate Service Authority customers on smart water use. The campaign presents information and how to instructions on seasonal conservation topics via the following: the website, monthly billing inserts, quarterly newsletter and through grade school and citizen presentations.

Also, the PWCSA rate structure Peak I and Peak II rates penalize excessive use of water financially.

6.1.4.5. City of Alexandria

The City of Alexandria does not implement or enforce practices to increase irrigation efficiency for residents and businesses. The City uses a remote control irrigation system to monitor and operate irrigations of City-owned individual sites, such as parks. The system utilizes a weather station to accurately respond to water needs based on actual weather events.

The Alexandria Sanitation Authority (ASA) allows businesses to install exemption meters for potable water uses that do not enter the sanitary sewer system, including irrigation. The water used through these meters are not billed sewer charges. Residents cannot install irrigation meters, but ASA bills for sewer charges based on the winter usage, so as during the summer, lawn watering, car washing, etc., won't show up on their bill because it is based on the months that generally do not have these activities.

6.1.4.6. City of Fairfax

The City of Fairfax does not implement or enforce practices to increase irrigation efficiency.

6.1.4.7. City of Falls Church

The City of Falls Church does not implement or enforce practices to increase irrigation efficiency.

6.1.4.8. City of Manassas

The City of Manassas does not implement or enforce practices to increase irrigation efficiency.

6.1.4.9. City of Manassas Park

Information for the City of Manassas Park regarding implementation or enforcement practices to increase irrigation efficiency was not available at the time of this report.

6.1.4.10. Town of Clifton

The Town of Clifton does not implement or enforce practices to increase irrigation efficiency.

6.1.4.11. Town of Dumfries

The Town of Dumfries is served by the PWCSA. Information on implementation or enforcement practices to increase irrigation efficiency for the PWCSA is discussed in Section 6.1.4.4 above.

6.1.4.12. Town of Hamilton

Information for the Town of Hamilton regarding implementation or enforcement practices to increase irrigation efficiency was not available at the time of this report.

6.1.4.13. Town of Haymarket

The Town of Haymarket is served by the PWCSA. Information on implementation or enforcement practices to increase irrigation efficiency for the PWCSA is discussed in Section 6.1.4.4 above.

6.1.4.14. Town of Herndon⁸

The Water Wise Landscaping and Watering Guide is available on the Town of Herndon's website.

6.1.4.15. Town of Leesburg

The Town of Leesburg does not offer sewer credits. Sewer fees are applied to all water used, which is metered.

6.1.4.16. Town of Lovettsville

The Town of Lovettsville does not implement or enforce practices to increase irrigation efficiency.

6.1.4.17. Town of Middleburg

The Town of Middleburg does not implement or enforce practices to increase irrigation efficiency.

6.1.4.18. Town of Occoquan

The Town of Occoquan is served by the PWCSA. Information on implementation or enforcement practices to increase irrigation efficiency for the PWCSA is discussed in Section 6.1.4.4 above.

6.1.4.19. Town of Purcellville

The Town of Purcellville implements a tiered water billing system where water rates increase with increased water use.

6.1.4.20. Town of Quantico

Information for the Town of Quantico regarding implementation or enforcement practices to increase irrigation efficiency was not available at the time of this report.

6.1.4.21. Town of Round Hill

Information for the Town of Round Hill regarding implementation or enforcement practices to increase irrigation efficiency was not available at the time of this report.

⁸ http://www.herndon-va.gov/Content/Town_Services/Water_and_Sewer/Water_Conservation_Tips/default.aspx?cnlid=3026

6.1.4.22. Town of Vienna

The Town of Vienna meters all water service connections discouraging excessive irrigation.

6.1.5 Water Use Efficiency Measures Implemented by Water Suppliers

6.1.5.1. Arlington County

The Arlington County water system is divided into multiple zones which allows the County to regulate pressures between approximately 40 psi and 80 psi, which are typical static pressures for water systems in the USA, in accordance with VDH regulations and American Water Works Association (AWWA) guidelines. Homes and businesses in areas where pressures exceed the 40 to 80 psi range are required by code to have pressure reducing valves.

6.1.5.2. Fairfax County

Fairfax Water maintains several pressure zones to ensure efficient delivery of water to all parts of the distribution system, consistent with VDH regulations. Fairfax Water has six primary pressure zones and in excess of 30 sub zones. The pressure in the system is generally maintained between 35 psi and 80 psi. Pressure reducing valves are used to manage higher pressures and several pumping stations are available to boost pressure when it is low. Fairfax Water also has an active energy management program that has included evaluating the wire to water efficiency of pumps, valve operations, and maintenance practices at several of their facilities. Increased water use efficiency occurs indirectly by implementing changes to valve and pumping operations that are practiced to reduce energy consumption.

6.1.5.3. Loudoun County

Loudoun Water maintains five pressure zones within the distribution system to maintain efficient delivery of water to all sections of their service area and to stay consistent with VDH regulations. The pressure within the system is maintained between 40 psi and 120 psi as this is based primarily on elevation. Pressure reducing valves are used within the system to manage high pressures while five pumping (booster) station are available to boost pressure when considered low.

6.1.5.4. Prince William County

The PWCSA operates its water distribution systems on several pressure zones to provide water pressure consistent with VDH Regulations. PWCSA has six pressure zones in its eastern system and four pressure zones in its western system. The PWCSA utilizes water booster pump stations and pressure reducing valves to control pressure entering each zone. All but one of these zones is serviced by elevated water storage tanks to maintain pressure and provide equalization supply within the zone during daily operations to optimize pump operation. PWCSA utilizes a system-wide SCADA system to control tank and pump operations within the various pressure zones.

The well pumps in the community water systems operated by the PWCSA and supplied by groundwater are controlled by SCADA from the storage tanks within those systems, The Bull Run Mountain Lower System operates with several pressure zones controlled by Pressure Reducing Valves.

The Dale City water distribution system operated by the VAWC utilizes three pressure zones with ground storage and elevated storage and booster pumping facilities to maintain the desired pressure within each zone.

6.1.5.5. City of Alexandria

The City of Alexandria is served by Virginia American Water and does not operate their community water system; therefore, this section does not apply to the City.

6.1.5.6. City of Fairfax

The City of Fairfax does not maintain different pressure zones and there is no management of pressure within the system. The pressure within the distribution system ranges from 20 psi to 80 psi.

6.1.5.7. City of Falls Church

The City's first pump station after receiving water from the WTP is operated to maintain a constant discharge pressure. During seasonal variations the discharge pressure is varied. The pressure is lowered in late fall due to reduced demand and when the demand increases in the spring the discharge pressure is raised.

6.1.5.8. City of Manassas

The City of Manassas manages water pressure at the WTP and maintains one pressure zone.

6.1.5.9. City of Manassas Park

Information for the City of Manassas Park regarding implementation of water use efficiency measures such as management of water system pressure was not available at the time of this report.

6.1.5.10. Town of Clifton

The Town of Clifton does not own or operate a community water system; therefore, this section does not apply to the Town.

6.1.5.11. Town of Dumfries

The Town of Dumfries is served by the PWCSA and does not own or operate their community water system; therefore, this section does not apply to the Town.

6.1.5.12. Town of Hamilton

Information for the Town of Hamilton regarding implementation of water use efficiency measures such as management of water system pressure was not available at the time of this report.

6.1.5.13. Town of Haymarket

The Town of Haymarket is served by the PWCSA and does not own or operate their community water system; therefore, this section does not apply to the Town.

6.1.5.14. Town of Herndon

The Town of Herndon maintains a supervisory control and data acquisition (SCADA) system, which monitors the water system pressure and water tanks pressure. The Town utilizes altitude valves in all elevated water tanks, which are controlled by the SCADA system and used in two methods. Method 1 - the tank pressure is lower than water system pressure: the altitude valves open allowing the water to fill the tanks up to the maximum level. Method 2 - during the peak use: when the water system pressure is lower than tank pressure the altitude valves open allowing water to flow into the water system.

The Town of Herndon purchases water from Fairfax Water through Fairfax Water pumping stations and three connection vaults. The Town and Fairfax Water utilize water pressure devices at all the three connections vaults, maintaining an adequate pressure for the Town water system. The Town and Fairfax Water are planning to upgrade the vaults pressure monitoring to the SCADA system.

6.1.5.15. Town of Leesburg

Water distribution and pressure for the Town of Leesburg's water system is managed by operators at the Town WTP via pumps, pipes, water storage tanks, and a supervisory control and data acquisition (SCADA) system.

6.1.5.16. Town of Lovettsville

Water distribution and pressure for the Town of Lovettsville's water system is managed by Loudoun Water operators at the Town WTP by water pumps and storage. Water pressure is maintained in a range of 30 psi to 50 psi.

6.1.5.17. Town of Middleburg

Water distribution and pressure for the Town of Middleburg is managed by Loudoun Water operators via water pumps and storage. Water pressure is maintained in a range of 30 psi to 50 psi.

6.1.5.18. Town of Occoquan

The Town of Occoquan is served by the PWCSA and does not own or operate their community water system; therefore, this section does not apply to the Town.

6.1.5.19. Town of Purcellville

The Town of Purcellville utilizes altitude valves in elevated water tanks which open when the water level in tank is low and needs to be refilled and closes when the water level in the tank is nearly full to prevent overflows.

6.1.5.20. Town of Quantico

Information for the Town of Quantico regarding implementation of water use efficiency measures such as management of water system pressure was not available at the time of this report.

6.1.5.21. Town of Round Hill

Information for the Town of Round Hill regarding implementation of water use efficiency measures such as management of water system pressure was not available at the time of this report.

6.1.5.22. Town of Vienna

The Town of Vienna has two pressure zones and will be implementing a SCADA system in 2011.

6.1.6 Water Suppliers and Irrigation Professionals who are WaterSense Partners

6.1.6.1. Arlington County

Arlington County's DES recently became a WaterSense partner and will implement practices consistent with the program's guidelines.

6.1.6.2. Fairfax County

Fairfax Water is not a WaterSense partner. However, KT Irrigation, LLC, an irrigation system installation and maintenance professional located in Chantilly, Virginia is a WaterSense partner.

6.1.6.3. Loudoun County⁹

Loudoun Water is a member is a WaterSense partner.

6.1.6.4. Prince William County

Prince William County is not a WaterSense partner.

6.1.6.5. City of Alexandria

The City of Alexandria is a WaterSense partner. There are no landscape irrigation professionals within Alexandria that are WaterSense partners, but there are several located in the Northern Virginia region that serve residents and businesses in the Alexandria.

6.1.6.6. City of Fairfax

The City of Fairfax is not a WaterSense partner.

⁹ <http://www.loudounwater.org/Residential-Customers/Conservation/>

6.1.6.7. City of Falls Church

The City of Falls Church is not a WaterSense partner and is not aware of any landscape irrigation professional in the City that are WaterSense partners.

6.1.6.8. City of Manassas

The City of Manassas is not a WaterSense partner.

6.1.6.9. City of Manassas Park

The City of Manassas Park is not a WaterSense partner.

6.1.6.10. Town of Clifton

The Town of Clifton does not own or operate a community water system; therefore, this section does not apply to the Town. There are no known irrigation professionals in the Town of Clifton.

6.1.6.11. Town of Dumfries

The Town of Dumfries is not a WaterSense partner.

6.1.6.12. Town of Hamilton

The Town of Hamilton is not a WaterSense partner.

6.1.6.13. Town of Haymarket

The Town of Haymarket is not a WaterSense partner.

6.1.6.14. Town of Herndon

The Town of Herndon is not a WaterSense partner.

6.1.6.15. Town of Leesburg

The Town of Leesburg is not a WaterSense partner; however, the Town will consider becoming a partner if deemed beneficial.

6.1.6.16. Town of Lovettsville

The Town of Lovettsville is not a WaterSense partner.

6.1.6.17. Town of Middleburg

The Town of Middleburg is not a WaterSense partner.

6.1.6.18. Town of Occoquan

The Town of Occoquan is not a WaterSense partner.

6.1.6.19. Town of Purcellville

The Town of Purcellville is a WaterSense partner. In addition, the following companies are WaterSense partners located in the Town of Purcellville: KT Irrigation, Smith Turf & Irrigation, Kovach Design Solutions, and Bio Green, Inc.

6.1.6.20. Town of Quantico

The Town of Quantico is not a WaterSense partner.

6.1.6.21. Town of Round Hill

The Town of Round Hill is not a WaterSense partner.

6.1.6.22. Town of Vienna

The Town of Vienna is not a WaterSense partner.

6.2 Water Conservation Measures ¹⁰

As required by 9 VAC 25-780-110, the Northern Virginia Plan includes information describing the water conservation measures used within the planning area to conserve water through the reduction of use. The types of measures to be described may include, but are not limited to, technical, educational, and financial programs. This section describes water conservation measures through reduction of use in the Northern Virginia region.

6.2.1 Water Conservation Ordinances

6.2.1.1. Arlington County

Arlington County has adopted ordinances to address water conservation practices through reduction of use; however, no additional info on those practices was provided.

6.2.1.2. Fairfax County

Fairfax County has not adopted ordinances to address water conservation practices through reduction of use. However, Fairfax County addresses water conservation measures in their Comprehensive Plan and LEED initiatives, public education, and operating procedures as discussed below.

¹⁰ 9 VAC 25-780-110.A.2.

6.2.1.3. Loudoun County

Loudoun County has not adopted ordinances to address water conservation practices through reduction of use; however the “WiseWater Use” program is emphasized through customer education and the Loudoun Water website..

6.2.1.4. Prince William County

Prince William County has not adopted ordinances to address water conservation practices through reduction of use.

6.2.1.5. City of Alexandria

The City of Alexandria has not adopted ordinances to address water conservation practices through reduction of use.

6.2.1.6. City of Fairfax

The City of Fairfax has not adopted ordinances to address water conservation practices through reduction of use.

6.2.1.7. City of Falls Church

The City of Falls Church has not adopted ordinances to address water conservation practices through reduction of use.

6.2.1.8. City of Manassas

The City of Manassas has not adopted ordinances to address water conservation practices through reduction of use.

6.2.1.9. City of Manassas Park

The City of Manassas Park has not adopted ordinances to address water conservation practices through reduction of use.

6.2.1.10. Town of Clifton

The Town of Clifton has not adopted ordinances to address water conservation practices through reduction of use.

6.2.1.11. Town of Dumfries

The Town of Dumfries has not adopted ordinances to address water conservation practices through reduction of use.

6.2.1.12. Town of Hamilton

The Town of Hamilton has not adopted ordinances to address water conservation practices through reduction of use.

6.2.1.13. Town of Haymarket

The Town of Haymarket has not adopted ordinances to address water conservation practices through reduction of use.

6.2.1.14. Town of Herndon

The Town of Herndon revised Section 74-397 related to restrictions on water use during shortages. The ordinance revision will address concerns related to water conservation.

6.2.1.15. Town of Leesburg

The Town of Leesburg Ordinance No. 2008-0-08 addresses water conservation practices through reduction of use.

6.2.1.16. Town of Lovettsville

The Town of Lovettsville has not adopted ordinances to address water conservation practices through reduction of use; however, the Town does initiate water conservation during periods of drought or excessive water use.

6.2.1.17. Town of Middleburg

The Town of Middleburg has not adopted ordinances to address water conservation practices through reduction of use.

6.2.1.18. Town of Occoquan

The Town of Occoquan has not adopted ordinances to address water conservation practices through reduction of use.

6.2.1.19. Town of Purcellville

The Town's Lawn Establishment Ordinance prohibits the use of Town drinking water for establishing new lawns. The Town's tiered rate structure encourages water conservation. High water users pay a higher rate for drinking water and sewer. The Town also offers rebates for clothes washers, toilets, and rain barrels and provides low-flow showerheads and faucet aerators free to Town residents.

6.2.1.20. Town of Quantico

The Town of Quantico has not adopted ordinances to address water conservation practices through reduction of use.

6.2.1.21. Town of Round Hill

The Town of Round Hill has not adopted ordinances to address water conservation practices through reduction of use.

6.2.1.22. Town of Vienna

The Town of Vienna has not adopted ordinances to address water conservation practices through reduction of use.

6.2.2 Standard Operating Procedures and Reduction in Use

6.2.2.1. Arlington County

The Arlington County water system has not adjusted their standard operating procedures to improve water conservation.

6.2.2.2. Fairfax County

Water reuse is practiced at Fairfax Water's Corbalis WTF, the largest WTF in Virginia, which produces the majority of finished water for Fairfax Water. The water used for reuse is generally filter backwash, which is decanted and the clear water is returned to the head of the plant. Filter backwash is conducted based on continual plant performance monitoring data. It is done to ensure that treatment process is able to meet water quality criteria and standards. Approximately 4-5 MGD (about 5%) of finished water is produced from recycled water.

6.2.2.3. Loudoun County

Loudoun Water built the Broad Run Water Reclamation Facility (BRWRF), a state-of-the-art facility that treats wastewater for the protection of the regions drinking water and the Chesapeake Bay. The BRWRF is an 11 MGD water reclamation facility located in Ashburn, Virginia. The facility is subject to state regulations, the Dulles Watershed Regulation, that requires stringent standards due to the fact that it is upstream of a drinking water supply in the Potomac River, and Chesapeake Bay regulations.

6.2.2.4. Prince William County

Wastewater flows collected in the public sanitary sewer system in western Prince William County are conveyed to the Upper Occoquan Sewage Authority's Water Reclamation Facility in Centreville, Virginia where it undergoes advanced wastewater treatment processes and is discharged into Bull Run. Bull Run flow into the Occoquan Reservoir, the supply source for the Fairfax Water Griffith Water Treatment Plant, thereby becoming a recycled water resource.

The PWCSA offers advice on irrigation scheduling to reduce the impact of landscape irrigation on the public water system. The PWCSA water rates encourage reduction in use by its peak use.

6.2.2.5. City of Alexandria

The City of Alexandria is served by Virginia American Water and does not operate their community water system; therefore, this section does not apply to the City.

6.2.2.6. City of Fairfax

The City of Fairfax has not adjusted their standard operating procedures to improve water conservation.

6.2.2.7. City of Falls Church

The City of Falls Church has not adjusted their standard operating procedures to improve water conservation.

6.2.2.8. City of Manassas

The City of Manassas has not adjusted their standard operating procedures to improve water conservation; however, the City promotes water conservation on the City's website, pamphlets, and articles in their newsletter.

6.2.2.9. City of Manassas Park

Information was not available at the time of this report for the City of Manassas Park regarding standard operating procedures to improve water conservation.

6.2.2.10. Town of Clifton

The Town of Clifton does not own or operate a community water system; therefore, this section does not apply to the Town.

6.2.2.11. Town of Dumfries

The Town of Dumfries is served by the PWCSA and does not own or operate their community water system; therefore, this section does not apply to the Town.

6.2.2.12. Town of Hamilton

Information was not available at the time of this report for the Town of Hamilton regarding standard operating procedures to improve water conservation.

6.2.2.13. Town of Haymarket

The Town of Haymarket is served by the PWCSA and does not own or operate their community water system; therefore, this section does not apply to the Town.

6.2.2.14. Town of Herndon

The Town of Herndon performed several program to improve water conservation such as: Annual preventive maintenance program for the entire water system and the Cast-Iron water main replacement program. The Herndon Water Conservation and Operations Plan is provided in Appendix E.

6.2.2.15. Town of Leesburg

The Town of Leesburg has adjusted their standard operating procedures to improve water conservation through treatment and recycling of filter back wash wastewater.

6.2.2.16. Town of Lovettsville

The Town of Lovettsville has not adjusted their standard operating procedures to improve water conservation.

6.2.2.17. Town of Middleburg

The Town of Middleburg has not adjusted their standard operating procedures to improve water conservation.

6.2.2.18. Town of Occoquan

The Town of Occoquan is served by the PWCSA and does not own or operate their community water system; therefore, this section does not apply to the Town.

6.2.2.19. Town of Purcellville

The Town of Purcellville has adjusted their standard operating procedures to improve water conservation by reducing the frequency of filter back wash and shortening time lengths by adding a polymer that enables this to happen.

6.2.2.20. Town of Quantico

Information was not available at the time of this report for the Town of Quantico regarding standard operating procedures to improve water conservation.

6.2.2.21. Town of Round Hill

Information was not available at the time of this report for the Town of Round Hill regarding standard operating procedures to improve water conservation.

6.2.2.22. Town of Vienna

The Town of Vienna has not altered their standard operating procedures to improve water conservation.

6.2.3 Installation of Low-Flow Fixtures

6.2.3.1. Arlington County

The majority of the County's facilities have low-flow fixtures installed and LID techniques are used in all new construction. Cisterns for feeding toilets, no-flow urinals, and detention used for irrigation are all examples being used.

6.2.3.2. Fairfax County

The majority of the Fairfax Water facilities are equipped with low-flow fixtures, including faucets, showers, urinals, and flushing valves. In addition, low-flow and/or no-flow fixtures are installed in all new construction and remodeling in local government facilities in accordance with VUSBC requirements.

The Fairfax County Park Authority has installed low-flow showerheads at the RECenters and campgrounds and automatic faucet control devices in restrooms. In addition, many restrooms at Resource Management sites have the motion activated use fixtures. Low-flow and/or no-flow fixtures are installed in all new construction and remodeling in local government facilities in accordance with VUSBC requirements.

6.2.3.3. Loudoun County

Low-flow and/or no-flow fixtures are installed in all new construction and remodeling in local government facilities in accordance with VUSBC requirements.

6.2.3.4. Prince William County

Low-flow and/or no-flow fixtures are installed in all new construction and remodeling in local government facilities in accordance with VUSBC requirements.

6.2.3.5. City of Alexandria

Low-flow and/or no-flow fixtures are installed in all new construction and remodeling in local government facilities in accordance with VUSBC requirements.

6.2.3.6. City of Fairfax

Information on installation of low-flow and/or no-flow fixtures in the City of Fairfax's facilities was not available at the time of this report.

6.2.3.7. City of Falls Church

The City of Falls Church has not installed low-flow and/or no-flow fixtures in their facilities.

6.2.3.8. City of Manassas

Low-flow and/or no-flow fixtures are installed in all new construction and remodeling in local government facilities in accordance with VUSBC requirements.

6.2.3.9. City of Manassas Park

Low-flow and/or no-flow fixtures are installed in all new construction and remodeling in local government facilities in accordance with VUSBC requirements.

6.2.3.10. Town of Clifton

The Town of Clifton does not own or operate a community water system; therefore, this section does not apply to the Town.

6.2.3.11. Town of Dumfries

Low-flow and/or no-flow fixtures are installed in all new construction and remodeling in local government facilities in accordance with VUSBC requirements.

6.2.3.12. Town of Hamilton

Information on installation of low-flow and/or no-flow fixtures in the facilities for the Town of Hamilton was not available at the time of this report.

6.2.3.13. Town of Haymarket

Low-flow and/or no-flow fixtures are installed in all new construction and remodeling in local government facilities in accordance with VUSBC requirements.

6.2.3.14. Town of Herndon

Low-flow and/or no-flow fixtures are installed in all new construction and remodeling in local government facilities in accordance with VUSBC requirements.

6.2.3.15. Town of Leesburg

The Town of Leesburg installs low-flow and/or no-flow fixtures and water saving devices in all new construction.

6.2.3.16. Town of Lovettsville

Low-flow and/or no-flow fixtures are installed in all new construction and remodeling in local government facilities in accordance with VUSBC requirements.

6.2.3.17. Town of Middleburg

Low-flow and/or no-flow fixtures are installed in all new construction and remodeling in local government facilities in accordance with VUSBC requirements.

6.2.3.18. Town of Occoquan

Low-flow and/or no-flow fixtures are installed in all new construction and remodeling in local government facilities in accordance with VUSBC requirements.

6.2.3.19. Town of Purcellville

The Town of Purcellville has installed low-flow faucet aerators and shower heads in the Town Office, Water Treatment Plant, Wastewater Treatment Plant, and the Maintenance Facility. The Town also worked with Loudoun County Public Schools to install low-flow faucet aerators and showerheads in all five public schools located within the Town.

6.2.3.20. Town of Quantico

Information on installation of low-flow and/or no-flow fixtures in the facilities for the Town of Quantico was not available at the time of this report.

6.2.3.21. Town of Round Hill

Information on installation of low-flow and/or no-flow fixtures in the facilities for the Town of Round Hill was not available at the time of this report.

6.2.3.22. Town of Vienna

Low-flow and/or no-flow fixtures are installed in all new construction and remodeling in local government facilities in accordance with VUSBC requirements.

6.2.4 Water Conservation Plans

6.2.4.1. Arlington County

Arlington County has not developed or implemented a water conservation plan.

6.2.4.2. Fairfax County

Fairfax Water is part of the Metropolitan Washington Council of Governments (WMCOG) Water Use It Wisely Campaign. The Wise Water Use logo is on the Fairfax Water website homepage and it links to MWCOG Wise Water Use page. Program materials include Regional Media Campaign, 100 water saving device tips, and Wise Water Use Landscaping and Watering Guide. The Regional Media Campaign consists of regional print and radio spots designed to provide information and tips about wise water use. The media campaign includes outreach materials and a mascot to promote wise water use at community and sporting events. The campaign and additional resources and materials are featured on the MWCOG water supply webpage.

Fairfax Water participates in the MWCOG Community Engagement Network made up of public affairs staff from all the regional water and wastewater utilities. Each year this group develops a Community Engagement Campaign using the Wise Water Use messages. Each utility contributes funding to support the campaign. The group hired a consultant last year – Water Words That Work. The focus is electronic outreach.

Fairfax water encourages its customers to use water wisely, through presentations, the Fairfax Water website, a display at the annual Celebrate Fairfax fair and numerous other publications. At the request of civic organizations or other groups, Fairfax Water conducts presentations on a variety of water-related topics. For example, Fairfax Water provided guidance on water-wise yard practices to local gardening clubs. Fairfax Water's webpage and each issue of From the Tap, a publication distributed quarterly with all water bills, contain information on conserving water both indoors and outdoors. Fairfax Water's Celebrate Fairfax fair display highlights wise water use concepts. For example, during 2000 the display featured a garden composed of plants appropriate for the region that minimize excess water use. Fairfax Water also publishes two brochures on wise water use, including 25 ways to save water and Water Wise Gardening.

Fairfax Water also has a brochure available to promote its water supply stakeholder outreach grant program and an online e-book is available on Fairfax Water's website to teach children about watersheds and why we need to protect them.¹¹ Several other resources are also available at the website for parents, teachers and children on water resources, water conservation and water use.

Fairfax Water is also involved in outreach to schools and community groups. Fairfax Water routinely responds to requests from local schools and community groups to make presentations on water-related topics. As part of the education program, Fairfax Water distributes materials developed by American Water Works Association including My Book About Water and How to Use it Wisely and Let's Learn About Saving Water Inside and Out. These books are aimed at educating elementary school children on wise water use, ways to conserve water, and understanding the importance of protecting drinking water resources.

6.2.4.3. Loudoun County¹²

Loudoun Water requests that customers follow a two-day per week watering schedule to conserve water:

- ODD Addresses water Wednesdays and Saturday;
- EVEN Addresses water Thursday and Sunday; and
- Commercial/Multi-family properties water on Tuesday and Friday.

This schedule provides the following benefits: distributes water use evenly over a week's time and allows storage tanks to refill on Mondays after a weekend of heavy water use.

In addition, Loudoun Water provides many links and documents on ways to conserve water.

¹¹www.fairfaxwater.org/education/watershed/index.html

¹²<http://www.loudounwater.org/default.aspx>

6.2.4.4. Prince William County¹³

The PWCSA requests that customers adhere to the following proposed watering schedule:

- ODD addresses water on Sunday, Tuesday, and Friday;
- EVEN addresses water on Monday, Thursday, and Saturday; and
- Businesses water on Tuesday, Thursday, and Saturday.

This schedule provides the following benefits: helps maintain adequate water pressure; avoids purchase of additional water capacity, which may lead to future rate increases; and reduces system-wide peak water demand by approximately 50 percent. In addition, the PWCSA requests customers avoid watering lawns and landscaping between peak demand hours of 3 a.m. and 7 a.m.

This information is provided on the PWCSA website in addition to the Wise Water Use Landscaping and Watering Guide. Additionally, the Prince William County Service Authority has implemented educational programs in an effort to educate Service Authority customers on smart water use. The campaign presents information and how to instructions on seasonal conservation topics via the following: the website, monthly billing inserts, quarterly newsletter and through grade school and citizen presentations.

6.2.4.5. City of Alexandria¹⁴

The City of Alexandria provides water conservation tips on their website. Outreach about water conservation and use reduction is provided to schools, homeowners associations and other organizations.

Alexandria is a partner of the Northern Virginia Rain Barrel program which holds “Build Your Own Rain Barrel” workshops and sells pre-made rain barrels.

¹³ http://www.pwcsa.org/index.php?option=com_content&view=article&id=153:help-your-neighbors-and-yourself&catid=4:service-authority-news&Itemid=11

¹⁴ <http://alexandriava.gov/tes/oeq/info/default.aspx?id=23402>

6.2.4.6. City of Fairfax¹⁵

As part of an effort coordinated by the Metropolitan Washington Council of Governments, the City of Fairfax is participating in the Wise Water Campaign in order to advise customers of ways they can help preserve the region's water resources, protect the environment, and reduce water bills. In addition, the City of Fairfax website provides water conservation information for customers.

6.2.4.7. City of Falls Church

As part of an effort coordinated by the Metropolitan Washington Council of Governments, the City of Falls Church is participating in the Wise Water Campaign in order to advise customers of ways they can help preserve the region's water resources, protect the environment, and reduce water bills. City of Manassas¹⁶

The City of Manassas provides water conservation tips on their website.

6.2.4.8. City of Manassas Park

The City of Manassas Park has not developed or implemented a water conservation plan.

6.2.4.9. Town of Clifton

The Town of Clifton has not developed or implemented a water conservation plan.

6.2.4.10. Town of Dumfries

The Town of Dumfries is served by the PWCSA. The PWCSA recommends customers adhere to a proposed watering schedule to conserve water, as discussed in Section 6.2.4.4 above.

6.2.4.11. Town of Hamilton

Information on development or implementation of a water conservation plan in the Town of Hamilton was unavailable at the time of this report.

6.2.4.12. Town of Haymarket

The Town of Haymarket is served by the PWCSA. The PWCSA recommends customers adhere to a proposed watering schedule to conserve water, as discussed in Section 6.2.4.4 above.

¹⁵ <http://fairfaxva.gov/Utilities/WiseWaterUse.asp>

¹⁶ <http://www.manassascity.org/index.aspx?NID=89>

6.2.4.13. Town of Herndon

The Town of Herndon has not developed or implemented a water conservation plan.

6.2.4.14. Town of Leesburg

The Town of Leesburg has developed and implements a water conservation plan for emergencies only.

6.2.4.15. Town of Lovettsville

The Town of Lovettsville has not developed or implemented a water conservation plan; however, the Town will implement voluntary water restrictions during periods of drought or high water usage.

6.2.4.16. Town of Middleburg

The Town of Middleburg has not developed or implemented a water conservation plan; however, the Town has adopted an ordinance with procedures to restrict water use if warranted by drought, etc.

6.2.4.17. Town of Occoquan

The Town of Occoquan is served by the PWCSA. The PWCSA recommends customers adhere to a proposed watering schedule to conserve water, as discussed in Section 6.2.4.4 above.

6.2.4.18. Town of Purcellville

The Town of Purcellville developed a Water Conservation Plan in March 2008. The Water Conservation Plan recommended and the Town implemented the following water conservation measures: distribute retrofit kits containing a low-flow showerhead, faucet aerators, and toilet leak-detection dye tablets; distribute kitchen spray rinse valves to commercial kitchens; provide clothes washer rebates; provide toilet rebates; and increase public education.

6.2.4.19. Town of Quantico

The Town of Quantico has not developed or implemented a water conservation plan.

6.2.4.20. Town of Round Hill

Information on development or implementation of a water conservation plan in the Town of Round Hill was unavailable at the time of this report.

6.2.4.21. Town of Vienna¹⁷

The Town of Vienna’s website includes “25 Things You Can Do To Prevent Water Waste,” including how to check for leaks, installing water saving fixtures, and using appliances only for full loads.

6.2.5 Use of SRF Funds

6.2.5.1. Arlington County

Arlington County recently completed upgrades to their Water Pollution Control Plant, which included some new facilities, and CWSR funds were used for this project.

6.2.5.2. Fairfax County

Fairfax County has not used CWSR or DWSR funds to upgrade or retrofit facility fixtures, build new facilities, or purchase efficient landscape irrigation equipment for publicly owned facilities.

6.2.5.3. Loudoun County

Loudoun County has not used CWSR or DWSR funds to upgrade or retrofit facility fixtures, build new facilities, or purchase efficient landscape irrigation equipment for publicly owned facilities.

6.2.5.4. Prince William County

Prince William County has not used CWSR or DWSR funds to upgrade or retrofit facility fixtures, build new facilities, or purchase efficient landscape irrigation equipment for publicly owned facilities.

6.2.5.5. City of Alexandria

The City of Alexandria has not used CWSR or DWSR funds to upgrade or retrofit facility fixtures, build new facilities, or purchase efficient landscape irrigation equipment for publicly owned facilities.

6.2.5.6. City of Fairfax

The City of Fairfax has not used CWSR or DWSR funds to upgrade or retrofit facility fixtures, build new facilities, or purchase efficient landscape irrigation equipment for publicly owned facilities.

¹⁷ http://www.viennava.gov/Town_Departments/Toilet%20Leaks.pdf

6.2.5.7. City of Falls Church

The City of Falls Church has not used CWSR or DWSR funds to upgrade or retrofit facility fixtures, build new facilities, or purchase efficient landscape irrigation equipment for publicly owned facilities.

6.2.5.8. City of Manassas

The City of Manassas has not used CWSR or DWSR funds to upgrade or retrofit facility fixtures, build new facilities, or purchase efficient landscape irrigation equipment for publicly owned facilities.

6.2.5.9. City of Manassas Park

The City of Manassas Park has not used CWSR or DWSR funds to upgrade or retrofit facility fixtures, build new facilities, or purchase efficient landscape irrigation equipment for publicly owned facilities.

6.2.5.10. Town of Clifton

The Town of Clifton does not own or operate a community water system; therefore, this section does not apply to the Town.

6.2.5.11. Town of Dumfries

The Town of Dumfries is served by the PWCSA and does not own or operate their community water system; therefore, this section does not apply to the Town.

6.2.5.12. Town of Hamilton

The Town of Hamilton has not used CWSR or DWSR funds to upgrade or retrofit facility fixtures, build new facilities, or purchase efficient landscape irrigation equipment for publicly owned facilities.

6.2.5.13. Town of Haymarket

The Town of Haymarket is served by the PWCSA and does not own or operate their community water system; therefore, this section does not apply to the Town.

6.2.5.14. Town of Herndon

The Town of Herndon has not used CWSR or DWSR funds to upgrade or retrofit facility fixtures, build new facilities, or purchase efficient landscape irrigation equipment for publicly owned facilities.

6.2.5.15. Town of Leesburg

The Town of Leesburg has not used CWSR or DWSR funds to upgrade or retrofit facility fixtures, build new facilities, or purchase efficient landscape irrigation equipment for publicly owned facilities.

6.2.5.16. Town of Lovettsville

The Town of Lovettsville has not used CWSR or DWSR funds to upgrade or retrofit facility fixtures, build new facilities, or purchase efficient landscape irrigation equipment for publicly owned facilities.

6.2.5.17. Town of Middleburg

The Town of Middleburg has not used CWSR or DWSR funds to upgrade or retrofit facility fixtures, build new facilities, or purchase efficient landscape irrigation equipment for publicly owned facilities.

6.2.5.18. Town of Occoquan

The Town of Occoquan is served by the PWCSA and does not own or operate their community water system; therefore, this section does not apply to the Town.

6.2.5.19. Town of Purcellville

The Town of Purcellville has not used CWSR or DWSR funds to upgrade or retrofit facility fixtures, build new facilities, or purchase efficient landscape irrigation equipment for publicly owned facilities.

6.2.5.20. Town of Quantico

The Town of Quantico has not used CWSR or DWSR funds to upgrade or retrofit facility fixtures, build new facilities, or purchase efficient landscape irrigation equipment for publicly owned facilities.

6.2.5.21. Town of Round Hill

The Town of Round Hill has not used CWSR or DWSR funds to upgrade or retrofit facility fixtures, build new facilities, or purchase efficient landscape irrigation equipment for publicly owned facilities.

6.2.5.22. Town of Vienna

The Town of Vienna has not used CWSR or DWSR funds to upgrade or retrofit facility fixtures, build new facilities, or purchase efficient landscape irrigation equipment for publicly owned facilities.

6.2.6 Reclaimed Water

6.2.6.1. Arlington County

Arlington County does not have a dual pipe or parallel distribution system to distribute reclaimed water to users for non-potable water use purposes.

6.2.6.2. Fairfax County

Fairfax County is in the process of constructing a reclaimed water system. The initial customers are located in the Lorton area of the County, including the Covanta facility, the Laurel Hill Golf Course and the Ball Fields at Norman Cole Plant site. The reclaimed water will be used for cooling purposes at Covanta's incinerators, and irrigation purposes at the Laurel Hill golf course and the Ball Fields at the Norman Cole Plant site. The Covanta incinerator is for an industrial use and is estimated to supply about 1-1.5 MGD. An agreement for supplemental use of reclaimed water for irrigation purposes at the Laurel Hill golf Club golf course was finalized in November 2010. This agreement will allow for parallel construction of an effluent irrigation feed from the Norman Cole WWTP to the Laurel Hill Golf Club. The system should be in use during calendar year 2011. The use is approved for non-potable irrigation use.

It is important to note that since 1978, the Upper Occoquan Sewage Authority (UOSA) has been discharging non-potable reclaimed water into a stream above the Occoquan Reservoir, one of Fairfax Water's two major water supply sources. This was one of the first indirect potable reuse projects in the United States. Today, the Occoquan system remains one of the largest water reuse projects in the country, with much of the UOSA wastewater service area being provided potable water by Fairfax Water. In this manner, water is reclaimed for subsequent reuse into Fairfax Water's source water supply. Diversion of the UOSA reclaimed water to another distribution network would reduce the availability of this water to Fairfax Water's water supply Reservoir.

6.2.6.3. Loudoun County¹⁸

The majority of waste water in Loudoun County (approximately 13.8 MGD) is treated by the D.C. Water and Sewer Authority (DCWASA) at their Blue Plains Treatment Plant. In 2008, Loudoun Water began collecting more wastewater than they could send to the Blue Plains facility, due to growth. In anticipation of this, Loudoun Water built the Broad Run Water Reclamation Facility (BRWRF), a state-of-the-art facility that treats wastewater for the protection of the regions drinking water and the Chesapeake Bay.

The BRWRF is an 11 MGD water reclamation facility located in Ashburn, Virginia. The facility is subject to state regulations, the Dulles Watershed Regulation, that requires stringent standards due to the fact that it is upstream of a drinking water supply in the Potomac River, and Chesapeake Bay regulations.

The first water reuse project involves installation of 3,900 feet of 16-inch purple pipe for a water reuse main to serve a private office building and the “One Loudoun” World Trade Center development on the Loudoun County Parkway near Route 7. The second project involves installation of 4,920 feet of purple pipe to the National Rural Utilities Cooperative Finance Corporation located along Route 28. Both customers expressed interest in receiving reclaimed water for irrigation, cooling towers, and other non-potable uses, in order to meet Leadership in Environmental and Energy Design (LEED) criteria.

6.2.6.4. Prince William County¹⁹

The H.L. Mooney Water Reclamation Facility located in Woodbridge, Virginia treats wastewater from the eastern portion of the County. The PWCSA is currently working on an upgrade and expansion of the facility. The first phase of the planned expansion will significantly lower the amount of nitrogen released from the facility.

Wastewater flows collected in the public sanitary sewer system in western Prince William County are conveyed to the Upper Occoquan Sewage Authority’s Water Reclamation Facility in Centreville, Virginia where it undergoes advanced wastewater treatment processes and is discharged into Bull Run. Bull Run flow into the Occoquan

¹⁸ <http://www.loudounwater.org/Residential-Customers/Water-Reclamation/>

¹⁹ http://www.pwcsa.org/index.php?option=com_content&view=category&layout=blog&id=1&Itemid=2

Reservoir, the supply source for the Fairfax Water Griffith Water Treatment Plant, thereby becoming a recycled water resource.

Prince William County does not have a dual pipe or parallel distribution system to distribute reclaimed water to users for non-potable water use purposes at this time.

Wastewater flows collected in the public sewer system in the Dale City area of the County served by the VAWC are conveyed to Water Reclamation Facilities operated by the Dale Service Corporation.

6.2.6.5. City of Alexandria

The T.C. Williams High School, which was recently renovated, includes a 450,000 gallon underground cistern which collects and stores rainwater for toilet flushing, air conditioning operations, and irrigation. In addition, the City requires all commercial car wash facilities to be equipped with a water recycling system.

The City of Alexandria has completed a study that evaluated both existing and future potential reclaimed water demand along two corridors. The largest demand was located at the Covanta facility, with an average daily demand ranging from 0.4 to 0.8 MGD. A preliminary cost analysis was included as part of the study, which indicated that the life-cycle costs of constructing and operating a reclaimed water system cost more per gallon than Covanta continuing to purchase potable water from Virginia American Water. Therefore, the City is not pursuing to move forward with this project at this time.

6.2.6.6. City of Fairfax

The City of Alexandria does not have a dual pipe or parallel distribution system to distribute reclaimed water to users for non-potable water use purposes.

6.2.6.7. City of Falls Church

The City of Falls Church does not have a dual pipe or parallel distribution system to distribute reclaimed water to users for non-potable water use purposes.

6.2.6.8. City of Manassas

The City of Manassas does not have a dual pipe or parallel distribution system to distribute reclaimed water to users for non-potable water use purposes.

6.2.6.9. City of Manassas Park

The City of Manassas Park does not have a dual pipe or parallel distribution system to distribute reclaimed water to users for non-potable water use purposes

6.2.6.10. Town of Clifton

The Town of Clifton does not own or operate a community water system; therefore, this section does not apply to the Town.

6.2.6.11. Town of Dumfries

The Town of Dumfries is served by the PWCSA and does not own or operate their community water system; therefore, this section does not apply to the Town. Information for the PWCSA is discussed in Section 6.2.7.4 above.

6.2.6.12. Town of Hamilton

The Town of Hamilton does not have a dual pipe or parallel distribution system to distribute reclaimed water to users for non-potable water use purposes.

6.2.6.13. Town of Haymarket

The Town of Haymarket is served by the PWCSA and does not own or operate their community water system; therefore, this section does not apply to the Town. Information for the PWCSA is discussed in Section 6.2.7.4 above.

6.2.6.14. Town of Herndon

The Town of Herndon does not have a dual pipe or parallel distribution system to distribute reclaimed water to users for non-potable water use purposes

6.2.6.15. Town of Leesburg

The Town of Leesburg does not currently have a dual pipe or parallel distribution system to distribute reclaimed water to users for non-potable water use purposes. However, the Town is currently working with a proposed green energy power plant which would result in the re-use of over 80% of Town's WWTP effluent. It is unclear at this time whether the project will materialize. If this project does not materialize, the Town plans to pursue other options for the beneficial use of WWTP effluent. The Town uses reclaimed water for process water at the WWTP.

6.2.6.16. Town of Lovettsville

The Town of Lovettsville does not have a dual pipe or parallel distribution system to distribute reclaimed water to users for non-potable water use purposes.

6.2.6.17. Town of Middleburg

The Town of Middleburg does not have a dual pipe or parallel distribution system to distribute reclaimed water to users for non-potable water use purposes.

6.2.6.18. Town of Occoquan

The Town of Occoquan is served by the PWCSA and does not own or operate their community water system; therefore, this section does not apply to the Town. Information for the PWCSA is discussed in Section 6.2.7.4 above.

6.2.6.19. Town of Purcellville

The Town of Purcellville does not have a dual pipe or parallel distribution system to distribute reclaimed water to users for non-potable water use purposes.

6.2.6.20. Town of Quantico

The Town of Quantico does not have a dual pipe or parallel distribution system to distribute reclaimed water to users for non-potable water use purposes.

6.2.6.21. Town of Round Hill

The Town of Round Hill does not have a dual pipe or parallel distribution system to distribute reclaimed water to users for non-potable water use purposes.

6.2.6.22. Town of Vienna

The Town of Vienna does not have a dual pipe or parallel distribution system to distribute reclaimed water to users for non-potable water use purposes

6.2.7 Yard Taps

6.2.7.1. Arlington County

Arlington County does not offer “yard taps” to customers.

6.2.7.2. Fairfax County

Fairfax County does not offer “yard taps” to customers.

6.2.7.3. Loudoun County

Loudoun County does not offer “yard taps” to customers.

6.2.7.4. Prince William County

Prince William County does not offer “yard taps” to customers.

6.2.7.5. City of Alexandria

The City of Alexandria is served by Virginia American Water and does not operate their community water system; therefore, this section does not apply to the City.

6.2.7.6. City of Fairfax

The City of Fairfax does not offer “yard taps” to customers.

6.2.7.7. City of Falls Church

The City of Falls Church does not offer “yard taps” to customers.

6.2.7.8. City of Manassas

The City of Manassas does not offer “yard taps” to customers.

6.2.7.9. City of Manassas Park

The City of Manassas Park does not offer “yard taps” to customers.

6.2.7.10. Town of Clifton

The Town of Clifton does not own or operate a community water system; therefore, this section does not apply to the Town.

6.2.7.11. Town of Dumfries

The Town of Dumfries is served by the PWCSA and does not own or operate their community water system; therefore, this section does not apply to the Town.

6.2.7.12. Town of Hamilton

The Town of Hamilton does not offer “yard taps” to customers.

6.2.7.13. Town of Haymarket

The Town of Haymarket is served by the PWCSA and does not own or operate their community water system; therefore, this section does not apply to the Town.

6.2.7.14. Town of Herndon

The Town of Herndon does not offer “yard taps” to customers.

6.2.7.15. Town of Leesburg

The Town of Leesburg does not offer “yard taps” to customers.

6.2.7.16. Town of Lovettsville

The Town of Lovettsville does not offer “yard taps” to customers.

6.2.7.17. Town of Middleburg

The Town of Middleburg does not offer “yard taps” to customers.

6.2.7.18. Town of Occoquan

The Town of Occoquan is served by the PWCSA and does not own or operate their community water system; therefore, this section does not apply to the Town.

6.2.7.19. Town of Purcellville

The Town of Purcellville does not offer “yard taps” to customers.

6.2.7.20. Town of Quantico

The Town of Quantico does not offer “yard taps” to customers.

6.2.7.21. Town of Round Hill

The Town of Round Hill does not offer “yard taps” to customers.

6.2.7.22. Town of Vienna

The Town of Vienna does not offer “yard taps” to customers.

6.2.8 Public Education to Address Water Conservation

6.2.8.1. Arlington County²⁰

Arlington County has several education programs to encourage water conservation among residents and businesses. The county offers educational workshops on water conservation and sustainable landscaping and has distributed over 5,000 water conservation kits in recent years. The County sponsors a regional rain barrel program and through this program has distributed approximately 600 rain barrels to county residents. County Staff have developed tools for property managers to track utility usage and better communication to residents of multi-family properties about conservation. County developed the Arlington Green Games program in 2011, which is a friend competition between local businesses to achieve certain conservation goals.

²⁰ www.arlingtonenvironment.org/barrel.php and www.arlingtongreengames.com

The Arlington County Department of Public Works is a regional partner in the Water Use It Wisely campaign designed to encourage wise water use and stewardship through easy actions and behaviors.

6.2.8.2. Fairfax County

Fairfax County implements several educational programs that address water conservation. These programs include the Stewardship Program, Water Supply Stakeholder Outreach Program, outreach to schools and community groups, Public Facilities Manual, and quarterly newsletter From the Tap.

Stewardship Program

The Fairfax County Park Authority (FCPA) educates the staff and public in publication with the County “Stewardship” series brochure titled “Water.” The FCPA has also developed a public education brochure titled “Rain Garden, Design and Construction.” Additionally, the FCPA has produced articles in their “Resources” publication regarding water conservation and quality. The Resource Management Division of the FCPA offers many classes and events regarding water conservation and quality. These discuss watersheds and proper use and methods to conserve water.

Water Supply Stakeholder Outreach Program

Each year Fairfax Water provides grants to qualified non-profit organizations that undertake water supply education or watershed protection projects. The Boat People SOS project in 2006 is an example. This project aimed at educating the Vietnamese community living in Fairfax County on the importance of water conservation.

Outreach to Schools and Community Groups

Fairfax Water routinely responds to requests from local schools and community groups to make presentations on water-related topics. As part of the educational program, Fairfax Water distributes materials developed by the American Water Works Association (AWWA) including My Book About Water, How to Use It Wisely and Let’s Learn About Saving Water Inside and Out. These books are aimed at educating elementary school children on wise water use, ways to conserve water, and understanding the importance of protecting drinking water sources.

Public Facilities Manual

The Environmental Site Review Division of Fairfax County has incorporated into the Public Facilities Manual, Low Impact Development techniques such as rain gardens, vegetated swales, and infiltration trenches.

Water Savings Tips

Fairfax Water provides water savings tips to its retail customers in the quarterly newsletter From the Tap. The water savings tips, discussing household and outdoor water use, are provided to customers in each quarter throughout the year. The tips are part of Fairfax Water's participation in the Wise Water Use Campaign. These tips and a link to the "Water Use It Wisely" program are available on the Fairfax Water webpage

6.2.8.3. Loudoun County

Loudoun County provides information on water conservation, including groundwater conservation frequently asked questions, water conservation tips, and 25 simple ways to conserve water, on the County's website²¹. Loudoun Water is a regional partner in the Water Use It Wisely campaign designed to encourage wise water use and stewardship through easy actions and behaviors. In addition, Loudoun water provides water conservation information on their website as well as a link to calculate customer water use.

6.2.8.4. Prince William County

The PWCSA is a regional partner in the Water Use It Wisely campaign designed to encourage wise water use and stewardship through easy actions and behaviors.

Additionally, the Prince William County Service Authority has implemented educational programs in an effort to educate Service Authority customers on smart water use. The campaign presents information and how to instructions on seasonal conservation topics via the following: the website, monthly billing inserts, quarterly newsletter and through grade school and citizen presentations.

²¹ <http://www.loudoun.gov/Default.aspx?tabid=1131>

6.2.8.5. City of Alexandria²²

The City of Alexandria has developed and implemented the following public education programs that address water conservation:

- The Office of Environmental Quality website provides water conservation tips for residents.
- Outreach about water conservation and use reduction is provided to schools, homeowners associations and other organizations.
- Alexandria is a partner of the Northern Virginia Rain Barrel program which holds “Build Your Own Rain Barrel” workshops and sells pre-made rain barrels.
- Green Building Policy and Green Building Resource Center promotes water conservation and reuse through conservation landscaping, rain barrels, and water reuse through the development and redevelopment process.

Virginia American Water periodically inserts educational literature with customer bills that discuss water conservation measures.

6.2.8.6. City of Fairfax²³

As part of an effort coordinated by the Metropolitan Washington Council of Governments, the City of Fairfax is participating in the Wise Water Campaign in order to advise customers of ways they can help preserve the region’s water resources, protect the environment, and reduce water bills. In addition, the City of Fairfax website provides water conservation information for customers.

6.2.8.7. City of Falls Church

The City of Falls Church is a regional partner in the Water Use It Wisely campaign designed to encourage wise water use and stewardship through easy actions and behaviors.

6.2.8.8. City of Manassas²⁴

The City of Manassas publishes a newsletter with current information on water, sewer, electric, and telecommunications utilities. This newsletter is available on their website. In addition, the City of Manassas’ website provides water conservation tips on their website.

²² <http://alexandriava.gov/tes/oeq/info/default.aspx?id=23402>

²³ <http://fairfaxva.gov/Utilities/WiseWaterUse.asp>

²⁴ <http://www.manassascity.org/index.aspx?NID=256>

6.2.8.9. City of Manassas Park

Information on development or implementation of public education programs to address water conservation for the City of Manassas Park was unavailable at the time of this report.

6.2.8.10. Town of Clifton

The Town of Clifton has not developed or implemented public education programs to address water conservation.

6.2.8.11. Town of Dumfries

The Town of Dumfries is served by the PWCSA and does not own or operate their community water system. The PWCSA is a regional partner in the Water Use It Wisely campaign designed to encourage wise water use and stewardship through easy actions and behaviors.

6.2.8.12. Town of Hamilton

Information on development or implementation of public education programs to address water conservation for the Town of Hamilton was unavailable at the time of this report.

6.2.8.13. Town of Haymarket

The Town of Haymarket is served by the PWCSA and does not own or operate their community water system. The PWCSA is a regional partner in the Water Use It Wisely campaign designed to encourage wise water use and stewardship through easy actions and behaviors.

6.2.8.14. Town of Herndon²⁵

The Town of Herndon provides water conservation tips on their website. In addition, the Water Wise Landscaping and Watering Guide is available to customers.

6.2.8.15. Town of Leesburg

The Town of Leesburg provides public education information on their website, attends Homeowners Association (HOA) meetings and school shows, and participates in the annual Leesburg Flower and Garden show.

²⁵ http://www.herndon-va.gov/Content/Town_Services/Water_and_Sewer/Water_Conservation_Tips/default.aspx?cnlid=3026

In addition, the Town of Leesburg is a regional partner in the Water Use It Wisely campaign designed to encourage wise water use and stewardship through easy actions and behaviors.

6.2.8.16. Town of Lovettsville

The Town of Lovettsville customers receive water conservation information through periodic customer publications and the Town Clerk's office. They also have access to the Loudoun Water website detailing water conservation/ education practices.

6.2.8.17. Town of Middleburg

The Town of Middleburg customers have access to the Loudoun Water website detailing water conservation/education practices.

6.2.8.18. Town of Occoquan

The Town of Occoquan is served by the PWCSA and does not own or operate their community water system. The PWCSA is a regional partner in the Water Use It Wisely campaign designed to encourage wise water use and stewardship through easy actions and behaviors.

6.2.8.19. Town of Purcellville

Letters and brochures on water conservation have been provided to water users by mail, at environmental festivals, on the Town's website, and in the Town Office lobby.

In addition, the Town of Purcellville is a regional partner in the Water Use It Wisely campaign designed to encourage wise water use and stewardship through easy actions and behaviors.

6.2.8.20. Town of Quantico

Information on development or implementation of public education programs to address water conservation for the Town of Quantico was unavailable at the time of this report.

6.2.8.21. Town of Round Hill

Information on development or implementation of public education programs to address water conservation for the Town of Round Hill was unavailable at the time of this report.

6.2.8.22. Town of Vienna²⁶

The Town of Vienna’s website includes “25 Things You Can Do To Prevent Water Waste,” including how to check for leaks, installing water saving fixtures, and using appliances only for full loads.

6.2.9 Funding Incentives

6.2.9.1. Arlington County

Arlington County does not offer incentive programs to customers to retrofit or replace older fixtures and appliances to reduce water use or offer rebates, tax breaks or vouchers to encourage customers to reduce water use.

6.2.9.2. Fairfax County

Fairfax Water does not offer incentive programs to customers to retrofit or replace older fixtures and appliances to reduce water use.

6.2.9.3. Loudoun County

Loudoun County does not offer incentive programs to customers to retrofit or replace older fixtures and appliances to reduce water use.

6.2.9.4. Prince William County

The PWCSA offers a courtesy billing adjustment for unusually high water consumption due to leaks that have been repaired in a timely manner and an adjustment of sewer consumption charges relating to filling a pool. Retrofitting and/or replacement of older fixtures and appliances to reduce water use are accomplished by provisions of the VUSBC. The PWCSA does not offer incentive programs to customers to retrofit or replace older fixtures and appliances to reduce water use.

6.2.9.5. City of Alexandria

The City of Alexandria does not offer incentive programs to customers to retrofit or replace older fixtures and appliances to reduce water use.

6.2.9.6. City of Fairfax

The City of Fairfax does not offer incentive programs to customers to retrofit or replace older fixtures and appliances to reduce water use.

²⁶ http://www.viennava.gov/Town_Departments/Toilet%20Leaks.pdf

6.2.9.7. City of Falls Church

The City of Falls Church does not offer incentive programs to customers to retrofit or replace older fixtures and appliances to reduce water use or offer rebates, tax breaks or vouchers to encourage customers to reduce water use.

6.2.9.8. City of Manassas²⁷

The City of Manassas is replacing water meters for approximately 450 residents in the Point of Wood East/Lakeside neighborhood, and for 50 commercial businesses in the Mathis Avenue area. This program is called the Load Management Program. The first 100 homeowners to participate in the program will be eligible for a free home energy audit. In addition, participants will receive a one time \$50.00 credit on their utility bill and a \$2.00 monthly credit for water heaters by having a load management device installed.

6.2.9.9. City of Manassas Park

Information for the City of Manassas Park and the PWCSA regarding customer programs to retrofit or replace older fixtures and appliances to reduce water use was not available at the time of this report.

6.2.9.10. Town of Clifton

The Town of Clifton does not offer incentive programs to customers to retrofit or replace older fixtures and appliances to reduce water use or offer rebates, tax breaks or vouchers to encourage customers to reduce water use.

6.2.9.11. Town of Dumfries

The Town of Dumfries is served by the PWCSA and does not own or operate their public community water system. The PWCSA offers a courtesy billing adjustment for unusually high water consumption due to leaks that have been repaired in a timely manner and an adjustment of sewer consumption charges relating to filling a pool.

Retrofitting and/or replacement of older fixtures and appliances to reduce water use is accomplished by provisions of the VUSBC.

²⁷ <http://www.manassascity.org/index.aspx?NID=990>

6.2.9.12. Town of Hamilton

Information for the Town of Hamilton regarding customer programs to retrofit or replace older fixtures and appliances to reduce water use was not available at the time of this report.

6.2.9.13. Town of Haymarket

The Town of Haymarket is served by the PWCSA and does not own or operate their public community water system. The PWCSA offers a courtesy billing adjustment for unusually high water consumption due to leaks that have been repaired in a timely manner and an adjustment of sewer consumption charges relating to filling a pool.

Retrofitting and/or replacement of older fixtures and appliances to reduce water use is accomplished by provisions of the VUSBC.

6.2.9.14. Town of Herndon

Information for the Town of Herndon regarding customer programs to retrofit or replace older fixtures and appliances to reduce water use was not available at the time of this report.

6.2.9.15. Town of Leesburg

The Town of Leesburg does not offer direct incentive programs to customers to retrofit or replace older fixtures and appliances to reduce water use or offer rebates, tax breaks or vouchers to encourage customers to reduce water use. However, the tiered rate structure, where the rate increases as the water use increases, does provide an indirect incentive.

6.2.9.16. Town of Lovettsville

The Town of Lovettsville does not offer incentive programs to customers to retrofit or replace older fixtures or appliances to reduce water use.

6.2.9.17. Town of Middleburg

The Town of Middleburg does not offer incentive programs to customers to retrofit or replace older fixtures or appliances to reduce water use.

6.2.9.18. Town of Occoquan

The Town of Occoquan is served by the PWCSA and does not own or operate their public community water system. The PWCSA offers a courtesy billing adjustment for

unusually high water consumption due to leaks that have been repaired in a timely manner and an adjustment of sewer consumption charges relating to filling a pool.

Retrofitting and/or replacement of older fixtures and appliances to reduce water use is accomplished by provisions of the VUSBC.

6.2.9.19. Town of Purcellville

The Town of Purcellville provides rebates to customers for low-flow clothes washers, toilets, and rain barrels.

6.2.9.20. Town of Quantico

Information for the Town of Quantico regarding customer programs to retrofit or replace older fixtures and appliances to reduce water use was not available at the time of this report.

6.2.9.21. Town of Round Hill

Information for the Town of Round Hill regarding customer programs to retrofit or replace older fixtures and appliances to reduce water use was not available at the time of this report.

6.2.9.22. Town of Vienna

The Town of Vienna does not provide customer programs to retrofit or replace older fixtures and appliances to reduce water use.

6.2.10 Water Conservation Rate Structure

6.2.10.1. Arlington County

Arlington County implements a flat rate structure along with zero exclusion for sewer in summer months.

6.2.10.2. Fairfax County

Fairfax Water's retail customers have a strong incentive to reduce consumption through Fairfax Water's Commodity and Additional Peak Use Charges. Fairfax Water's Additional Peak Use Charge is based on the costs of constructing facilities required to meet peak capacity demands above the system summer to winter quarter peak ratio. Only those customers who require the additional peak capacity each year are subject to the Additional Peak Use Charge during the two summer quarters of peak demand. In

addition, those customers who use less water will benefit from lower commodity charges. Peak Use Charge is implemented for all consumption by customers in the June through November billing periods when their usage is in excess of great than 5,000 gallons above the consumption of the preceding winter quarter billing period or 1.3 times the consumption of the preceding winter quarter billing period. The winter quarter billing period is defined as any quarterly billing period based on meter readings obtained or estimated in the months of February through April.

Fairfax Water’s rate structure also rewards facilities that incorporate water efficiency in design and construction. Connection charges have been adopted by Fairfax Water in order to assess new customers with the cost of providing plant expansion associated with meeting their needs. The largest of these connection charges is the Availability Charge. The Availability Charge reflects the costs of water supply, treatment, and transmission facilities to be utilized by future customers. The Availability Charge for commercial and industrial accounts is based on the requested meter size. Because of this rate structure, there is an inherent incentive for developers to properly size the meter based on the specific demand calculations. Smaller peak water demands from these connection allow smaller meters and thus, a lower Availability Charge.

6.2.10.3. Loudoun County²⁸

Loudoun water implements a water conservation rate structure that encourages reduction of water use by increasing water rates with increasing water usage. Tables 6-1 and 6-2 summarize water rates for residential and commercial customers, respectively.

Table 6-1: Loudoun Water Residential Rate Structure

Residential	Thousand Gallons	Rate	Explanation
Tier 1	0-25	\$1.90	Usage at this tier is less than home’s allocation, so customer pays less than cost to deliver.
Tier 2	26-50	\$5.51	Usage at this tier is in line with home’s allocation, so customer pays cost to deliver.
Tier 3	Over 50	\$7.12	Usage at this tier is more than home’s allocation, so customer pays more to help offset costs incurred as a result of usage.

²⁸ <http://www.loudounwater.org/About/Rates-and-Billing/>

Table 6-2: Loudoun Water Commercial Rate Structure

Residential	Rate	Explanation
Tier 1	\$2.51	Consumption range for multifamily and commercial accounts based on the reserved capacity purchased at the time availability charges are paid.
Tier 2	\$4.32	Consumption in excess of the reserved capacity purchased.
Other Uses	5.31	Includes, but not limited to, fire hydrant special use, construction water, and irrigation/submeters

6.2.10.4. Prince William County²⁹

PWCSA customers are charged for water consumption based on metered water usage. This charge covers the cost of purchased water as well as cost of operation and maintenance of water lines, pumping stations, and water storage tanks. The base water rate for residential (\$3.05 on 9/1/2010) and commercial (\$3.30 on 9/1/2010) is a flat rate per 1,000 gallons used. However, residential and multi-family residential connections are subject to peak use charges, which promote conservation and are set to recover the costs of constructing facilities required to meet peak capacity demands. Only those customers whose water usage patterns reach peak capacity demands on the water system are subject to the peak use charge. Peak use charges are in effect from May 1st through October 31st and are billed at a rate per 1,000 gallons and are added to the metered water usage charge. Based on dry weather conditions, the General Manager may extend the period during which peak use charges are applied.

The Peak Use I Charge applies to monthly water consumption exceeding the greater of: (1) 7,000 gallons; (2) 2,000 gallons above the preceding Winter Average Consumption; or (3) 1.3 times the preceding Winter Average Consumption.

The Peak Use II Charge applies to monthly water consumption exceeding the greater of: (1) 3.0 times the preceding Winter Average Consumption or (2) 21,000 gallons.

6.2.10.5. City of Alexandria

The City of Alexandria is served by Virginia American Water and does not operate their community water system; therefore, this section does not apply to the City.

²⁹http://www.pwcsa.org/documents/rates%20and%20fees/Schedule%20of%20Water%20and%20Sewer_Financial.pdf

6.2.10.6. City of Fairfax³⁰

The City of Fairfax implements a water conservation rate structure that encourages reduction of water use by increasing water rates with increasing water usage. For residential customers, the rate is \$20.79 for the first 5,000 gallons and an additional \$3.96 cents for each addition 1,000 gallons of water. For commercial customers, the rate is \$24.34 for the first 5,000 gallons of water and an additional \$3.96 for each additional 1,000 gallons of water.

6.2.10.7. City of Falls Church

The City of Falls Church has a peak use rate in which customers are charged a higher rate if their June through November consumption is 6,000 gallons above or 1.1 times more than the preceding winter quarter.

6.2.10.8. City of Manassas³¹

The City of Manassas does not implement a water conservation rate structure that encourages reduction of water use by increasing water rates with increasing water usage. The City's water rates decrease per 1,000 gallons after the first 25,000 gallons of water.

6.2.10.9. City of Manassas Park

Information regarding the City of Manassas Park's³¹ rate structure was not available at the time of this report.

6.2.10.10. Town of Clifton

The Town of Clifton does not own or operate a community water system; therefore, this section does not apply to the Town.

6.2.10.11. Town of Dumfries

The Town of Dumfries is served by the PWCSA and does not own or operate their community water system; therefore, this section does not apply to the Town.

6.2.10.12. Town of Hamilton³²

The Town of Hamilton implements a rate structure that encourages reduction of water use by increasing water rates with increasing water usage. Table 6-3 presents the Town's rate structure.

³⁰<http://fairfaxva.gov/Utilities/WaterSewerServiceRates.asp>

³¹<http://www.manassascity.org/index.aspx?NID=804>

³²http://www.herndon-va.gov/Content/Town_Services/Water_and_Sewer/FAQ/default.aspx?cnlid=2975

Table 6-3: Town of Hamilton Rate Structure

Gallons Used	In Town Residents Rate per 1,000 gallons	Out of Town Residents Rate per 1,000 gallons	In Town Apartment Rate per 1,000 gallons	Out of Town Apartment Rate per 1,000 gallons	Out of Town Commercial Rater per 1,000 gallons
0-8,000 gallons	\$4.75	\$6.50	\$6.10	\$8.50	\$6.15
Over 8,000 gallons	\$11.50	\$11.50	\$11.50	\$11.50	\$11.50

In addition, the Town applies a water surcharge of \$19.00.

6.2.10.13. Town of Haymarket

The Town of Haymarket is served by the PWCSA and does not own or operate their community water system; therefore, this section does not apply to the Town.

6.2.10.14. Town of Herndon³³

Peak water use rates are implemented in the Town of Herndon. The peak water use period consumption is defined as any consumption for a quarterly billing period reflected in bills issued during the months of June through November. The peak use rate is charged if consumption exceeds 3,000 gallons above, or one tenth times, the consumption of the preceding winter quarter period. The winter quarter billing period consumption is defined as any consumption for quarterly billing period reflected in bills issued during the months of February through April. The charge for peak water use is an additional \$3.50 per 1,000 gallons. In addition, a peak charge for sewer is applied at \$1.70 per 1,000 gallons.

6.2.10.15. Town of Leesburg

The Town of Leesburg implements a rate structure that encourages reduction of water use by increasing water rates with increasing water usage by applying a peak use charge.

6.2.10.16. Town of Lovettsville³⁴

The Town of Lovettsville implements a rate structure that encourages reduction of water use by increasing water rates with increasing water usage. Table 6-4 presents the Town’s rate structure.

³³ http://www.herndon-va.gov/Content/Town_Services/Water_and_Sewer/FAQ/default.aspx?cnlid=2975

³⁴ <http://www.town.hamilton.va.us/general-information/water-and-sewer-rates>

Table 6-4: Town of Lovettsville Rate Structure

Gallons Used	Rate
First 6,000 gallons	\$91.50
Each additional 1,000 gallons over first 6,000	\$6.10

6.2.10.17. Town of Middleburg

The Town of Middleburg implements a one-tier rate structure but is considering implementing a tiered structure to encourage water conservation.

6.2.10.18. Town of Occoquan

The Town of Occoquan is served by the PWCSA and does not own or operate their community water system; therefore, this section does not apply to the Town.

6.2.10.19. Town of Purcellville

The Town of Purcellville implements a rate structure that encourages reduction of water use by increasing water rates with increasing water usage. Table 6-5 presents the Town's rate structure. The Town also uses a service fee that increases with the size of the meter.

Table 6-5: Town of Purcellville Rate Structure

Gallons Used	Price per 1,000 gallons
First 5,000 gallons	\$5.65
5,001-10,000	\$7.53
10,001-15,000	\$9.41
15,001-20,000	\$11.30
20,001-100,000	\$13.18
100,001-200,000	\$14.18
200,001-500,000	\$15.18
Over 500,000	\$23.18

6.2.10.20. Town of Quantico

Information regarding the Town of Quantico's rate structure was not available at the time of this report.

6.2.10.21. Town of Round Hill

The Town of Round Hill charges a minimum charge per bill of \$14.74 for In-Town customers and \$22.11 for other customers. This minimum charge applies only if usage is less than 2,000 gallons per billing period.

6.2.10.22. Town of Vienna³⁵

An excessive use rate is applied if usage exceeds a customer’s average by 6,000 gallons or 30%, whichever is lower. The excessive use rate is \$.2.15 per 1,000 gallons over the average consumption and is applied from June 1st through November 30th.

6.3 Water Loss Reduction Practices³⁶

As required by 9 VAC 25-780-110, the Northern Virginia Plan includes information that describes practices to address water loss in the maintenance of water systems to reduce unaccounted for water loss. The types of items to be described may include, but are not limited to, leak detection and repair and old distribution line replacement. This section describes practices to reduce water loss in the Northern Virginia region.

6.3.1 Meters and Conservation Pricing

Table 6-6 summarizes source and service connection meters and how frequently the meters are read for each entity in the NVRC region.

Table 6-6: Summary of Connection Meters

Entity	Type of Meter		Meter Read Frequency
	Source	Service	
Arlington County	X	X	monthly, quarterly
Fairfax Water	X	X	quarterly
Loudoun County		X	quarterly
Prince William County		X	PWCSA: monthly VAWCo: quarterly
City of Alexandria	X		maintained by Fairfax Water
City of Fairfax		X	Monthly – commercial Quarterly – residential
City of Falls Church		X	automatic, monthly, quarterly
City of Manassas	X	X	Monthly
City of Manassas Park	Unknown	Unknown	Unknown
Town of Clifton	Not Applicable	Not Applicable	Not Applicable
Town of Dumfries		X	PWCSA: monthly
Town of Hamilton		X	Bi-monthly
Town of Haymarket		X	PWCSA: monthly

³⁵ 9 VAC 25-780-110.A.3.

³⁶ http://www.viennava.gov/Town_Services/water_sewer.htm#info

Entity	Type of Meter		Meter Read Frequency
Town of Herndon		X	Quarterly
Town of Leesburg	X	X	Automatic/quarterly
Town of Lovettsville		X	quarterly
Town of Middleburg		X	quarterly
Town of Occoquan		X	PWCSA: monthly
Town of Purcellville	X	X	automatic
Town of Quantico	Unknown	Unknown	Unknown
Town of Round Hill		X	Bi-monthly
Town of Vienna		X	Quarterly

Arlington County implements a drive-by AMR which will still be read quarterly for residential and monthly for commercial accounts. Source meters are read daily at our wholes sale provider. We strive for a 10 year cycle for water meter replacements. Most meter types are no longer cost effective to maintain so it's becoming a replacement strategy. We test meters on request, but do not regularly test meters anymore since disposing when removed from the system.

Fairfax water has an active ongoing program of calibrating service water meters. In addition, Fairfax Water has a program to change-out meters across the entire system, about once every 10 years. Source meters are electronic flow monitoring devices. Fairfax Water has an active program of calibrating these devices as required.

All residential meters in the City of Falls Church have been replaced in the last 3 years. The customer service department tracks the replacement on meters. They also receive customer calls that would require the testing or replacement of a meter.

The Town of Leesburg meters are tested annually and serviced as necessary. Most meters (<2-inch) are replaced every 10 years. Daily AMR monitoring points are malfunctioning meters and are attended immediately. Each address has a meter and the meter # is in the billing system.

A Town of Purcellville technician keeps inventory of meters and a supply of replacements. Testing is conducted when leak is apparent or when customer requests. Maintenance is done periodically and the last change out of meters was in 2007.

6.3.2 Policies that Require Water Users to Repair Leaks

6.3.2.1. Arlington County

Arlington County has not adopted ordinances or have policies in place that require water users to repair leaking fixtures, appliances, or plumbing.

6.3.2.2. Fairfax County

Fairfax County has not adopted ordinances or have policies in place that require water users to repair leaking fixtures, appliances, or plumbing; however, Fairfax Water requires customers to repair leaking fixtures, appliances, or plumbing at the customers expense.

6.3.2.3. Loudoun County

Loudoun Water has established guidelines and policies through their Rates, Rules and Regulations, effective July 1, 2011. Rule No. 29 – Water Leaks describes actions taken when a leak is discovered. Customers shall notify Loudoun Water in the event of a water leak. Loudoun Water is responsible for maintaining the public water main and water service connection and maintenance of building service pipe or water piping is the responsibility of the property owner. Loudoun Water will determine whether the leak is in the public water main or service connection. If the leak is in either the public main or service connection, Loudoun Water will repair the leak without cost to the customer. If a leak is found to not be responsibility of Loudoun Water, the customer will be notified and will be required to have the leak repaired by a registered plumber at the customer's expense.

6.3.2.4. Prince William County³⁷

The PWCSA website notes that the PWCSA is responsible for leaks on the street side of the water meter and leaks from the connection to the water meter to the home, as well as leaks inside the home are the responsibility of the customer. The PWCSA website also provides information on how to check for leaks and the procedures to follow when a leak identified.

Prince William County Service Authority's' metering infrastructure is comprised of approximately 83,000 meters, which are read on a monthly basis using a mixture of

³⁷ http://www.pwcsa.org/index.php?option=com_content&view=article&id=37:leak-detection&catid=10:service-authority-tips&Itemid=29

reading technologies. Currently the Authority has approximately 80% radio read meters, 19% touch read and less than 1% manual read meters. Meter replacements are determined by reviewing the age and accumulated consumption of meters, in accordance with AWWA standards, which may cause meters to register lower than actual. In addition, the billing department monitors and the field services department investigates meters with significant decreases in monthly consumption that may indicate that a repair or replacement is necessary. In addition the Authority has a large meter testing and calibration program which tests and calibrates large meters on a rotational basis in accordance with AWWA standards and, if necessary, the field services department rebuilds or exchanges these meters to ensure they are accurately capturing all water consumed.

Unauthorized Use The act of diverting or wasting public water, tampering with a metering device, damaging or intentionally destroying water facilities is unlawful per Virginia Code Section 18.2-162,163. The Prince William County Service Authority charges an Unauthorized Use Charge of \$250.00

VAWC maintains water mains within the Dale City area of Prince William County.

6.3.2.5. City of Alexandria

The City of Alexandria is served by Virginia American Water and does not operate their community water system; therefore, this section does not apply to the City.

6.3.2.6. City of Fairfax³⁸

The City of Fairfax website notes that customers are responsible for internal plumbing from the water meter into the structure. When problems occur which are suspected to be originating from the system, city maintenance should be notified.

6.3.2.7. City of Falls Church

The City of Falls Church has not adopted ordinances or have policies in place that require water users to repair leaking fixtures, appliances, or plumbing.

6.3.2.8. City of Manassas

The City of Manassas has not adopted ordinances or have policies in place that require water users to repair leaking fixtures, appliances, or plumbing.

³⁸ <http://fairfaxva.gov/Utilities/MaintenanceResponsibility.asp>

6.3.2.9. City of Manassas Park

The City of Manassas has not adopted ordinances or have policies in place that require water users to repair leaking fixtures, appliances, or plumbing.

6.3.2.10. Town of Clifton

The Town of Clifton does not own or operate a community water system; therefore, this section does not apply to the Town.

6.3.2.11. Town of Dumfries

The Town of Dumfries is served by the PWCSA and does not own or operate their community water system; therefore, this section does not apply to the Town.

6.3.2.12. Town of Hamilton

Information on ordinances or policies that may be in place requiring water users to repair leaking fixtures, appliances, or plumbing for the Town of Hamilton was not available at the time of this report.

6.3.2.13. Town of Haymarket

The Town of Haymarket is served by the PWCSA and does not own or operate their community water system; therefore, this section does not apply to the Town.

6.3.2.14. Town of Herndon

The Town of Herndon Building Inspection staff enforce the VUSBC for the Town to require repair of leaks. Additionally, the Town implemented an ordinance in the Town Code – Article III. Water, Division 2, Section 74-309, which addresses the responsibilities of the Town and customers to maintain water service lines and leak repair.

6.3.2.15. Town of Leesburg

The Town of Leesburg does not issue credits for water lost due to leaks except within first 10 days of discovering the leak in order to encourage customers to repair leak promptly. Also, the sewage charge is 100% of the water used, which is another incentive to locate and repair leak quickly.

6.3.2.16. Town of Lovettsville

The Town of Lovettsville has not adopted ordinances nor have policies in place that require water users to repair leaking fixtures, appliances, or plumbing.

6.3.2.17. Town of Middleburg

The Town of Middleburg has not adopted ordinances nor have policies in place that require water users to repair leaking fixtures, appliances, or plumbing.

6.3.2.18. Town of Occoquan

The Town of Occoquan is served by the PWCSA and does not own or operate their community water system; therefore, this section does not apply to the Town.

6.3.2.19. Town of Purcellville

The Town of Purcellville Code Section 82-130 (a) states “it is unlawful to forego repair of water leaks identified by town personnel on the customer side of the system, including but not limited to fire sprinkler systems. The penalty for foregoing repairs will be denial or discontinuation of water service.”

6.3.2.20. Town of Quantico

Information on ordinances or policies that may be in place requiring water users to repair leaking fixtures, appliances, or plumbing for the Town of Quantico was not available at the time of this report.

6.3.2.21. Town of Round Hill³⁹

Article III – Water Taps, Service Connections, and Meters of the Town’s Water Ordinance states that customers are responsible for repairs on the customer-side.

6.3.2.22. Town of Vienna

The Town of Vienna does not require repair of leaks on private property but will shut off water service to vacant or abandoned homes.

6.3.3 Operating Strategies for Leak Detection and Water Audits

6.3.3.1. Arlington County

Arlington County performs an audit on billings and water usage annually. The County has also performed system specific leak detection and found no systematic problems. The County is currently using M-LOG devices to passively listen for leaks in select areas of their water system.

³⁹ <http://www.roundhillva.org/Default.asp?Page=264>

6.3.3.2. Fairfax County

Fairfax Water uses 105 mobile leak detectors attached to hydrants or placed within valve boxes to proactively identify leaks in their water system. Listening devices are used to complete a preliminary survey of an area. If a leak is detected using the listening devices, correlators are used to pinpoint the leaks for repairs. This leak detection equipment aids in identification of small leaks that if not addressed, may result in large main breaks. In addition to minimizing costly main break repairs and disruption of service, leak detection equipment reduces unaccounted for water. The unaccounted for water at Fairfax Water for the past five years has averaged 5.46%, about half of the AWWA Leak Detection and Accountability Committee recommended benchmark of 10%.

6.3.3.3. Loudoun County

Loudoun Water performs an annual audit on water usage. Unaccounted for water averages approximately 8% to 9% annually. Loudoun Water also employs a leak detection service contracted annually to detect leaks in their most problematic, older areas of the service area. Also, the leak detection service scans approximately 200 to 300 miles of water main per year of the approximately 1000 miles water system. Leak detectors are also employed to pin point leaks for repair.

6.3.3.4. Prince William County

PWCSA monitors water loss on a monthly basis. Strategies used by PWCSA to minimize water loss include surveying at least 15% of the water system annually for subsurface leaks, aggressive oversight of hydrant meter customers, and routine replacement of water meters. At the time of this report, annual water loss for PWCSA is below 6%.

Leak Detection

- The Authority has customer/SA responsibilities regarding who is responsible for leaks in the main versus service line similar to Loudoun Water (See Customer Handbook).
- The Authority also offers leak adjustments to customers

- The Authority has approx 10,000 smart meters with leak detection capabilities. Should water use meet certain criteria, the Authority will send customers a letter outlining the usage information and that such a pattern may indicate a potential leak.
- Authority field personnel respond to identified or reported leaks in the system such as emergency water main breaks or routine customer inquiries regarding leaks.
- The Authority's water loss is between 4 – 6%.

6.3.3.5. City of Alexandria

The City of Alexandria is served by Virginia American Water and does not operate their community water system; therefore, this section does not apply to the City. Virginia American Water monitors data loggers set throughout the system, which record flow and pressure data used to detect water loss.

6.3.3.6. City of Fairfax

The City of Fairfax performs an informal audit of water usage using plant production and billing records.

The City of Fairfax recently implemented a leak detection program using technology offered by Pure Technologies. The program consisted of P-wave technology and a Smartball technology. The P-wave was electromagnetic and assessed the condition of the City's 24-inch transmission pipe. The Smartball used audio technology to identify leaks. Only three major leaks were identified and will be addressed through repair and monitoring. Overall, the condition of the pipeline is very good. It should be noted the entire length of the pipeline was not evaluated with both technologies. An audio leak detection program was completed on 200 miles of distribution lines and indicated very few leaks in the system, which have been addressed.

6.3.3.7. City of Falls Church

The City of Falls Church does not implement operating strategies for leak detection or complete regular water audits to reduce water loss.

6.3.3.8. City of Manassas

The City of Manassas conducts monthly inspections to identify potential leaks.

6.3.3.9. City of Manassas Park

Information regarding implementation of operating strategies for leak detection or completion of regular water audits to reduce water loss was not available at the time of this report for the City of Manassas Park.

6.3.3.10. Town of Clifton

The Town of Clifton does not own or operate a community water system; therefore, this section does not apply to the Town.

6.3.3.11. Town of Dumfries

The Town of Dumfries is served by the PWCSA and does not own or operate their community water system; therefore, this section does not apply to the Town.

6.3.3.12. Town of Hamilton

Information regarding implementation of operating strategies for leak detection or completion of regular water audits to reduce water loss was not available at the time of this report for the Town of Hamilton.

6.3.3.13. Town of Haymarket

The Town of Haymarket is served by the PWCSA and does not own or operate their community water system; therefore, this section does not apply to the Town.

6.3.3.14. Town of Herndon

The Town's Leak Detection Program includes the following: perform an annual leak detection survey for the entire water distribution system and water main repair; perform a leak detection survey for the new development before bond release and final approval; and perform leak detection survey for emergency water leak. The leak detection surveys are conducted annually by a private leak detection contractor. The Town repairs leaks accordingly and reports water losses are currently down to 14% of purchased water. A copy of the Herndon Water Conservation and Operations Plan is included in Appendix E.

6.3.3.15. Town of Leesburg

The Town of Leesburg compares production data from the WTP with all metered water usage and corrective actions are taken if necessary. Also, the distribution system is routinely checked for leaks and frequent water audits are conducted.

6.3.3.16. Town of Lovettsville

Leak detection and water main repair services are provided by Loudoun Water to include all equipment and labor required. Leak detection devices, owned and operated by Loudoun Water are used for detection and repair.

6.3.3.17. Town of Middleburg

Leak detection and water main repair services are provided by Loudoun Water to include all equipment and labor required. Leak detection devices, owned and operated by Loudoun Water are used for detection and repair. In addition, the Virginia Rural Water Association completed a leak detection study in 2011.

6.3.3.18. Town of Occoquan

The Town of Occoquan is served by the PWCSA and does not own or operate their community water system; therefore, this section does not apply to the Town.

6.3.3.19. Town of Purcellville

The Town of Purcellville conducts water audits periodically by comparing water sold against water produced to identify potential water loss. In addition, technicians monitor water use and when abnormally large uses appear, meters are checked for potential leaks.

6.3.3.20. Town of Quantico

Information regarding implementation of operating strategies for leak detection or completion of regular water audits to reduce water loss was not available at the time of this report for the Town of Quantico.

6.3.3.21. Town of Round Hill

Information regarding implementation of operating strategies for leak detection or completion of regular water audits to reduce water loss was not available at the time of this report for the Town of Round Hill.

6.3.3.22. Town of Vienna

The Town of Vienna recently purchased leak detection equipment and is training staff and implementing a leak detection program.

6.3.4 Unauthorized Connections

6.3.4.1. Arlington County

Staff and citizens in Arlington County report suspicious connections, which results in confiscating equipment and/or discussions with the contractor(s). The County has a hydrant permit process that allows limited use of hydrants by select contractors with a permit and fee for use.

6.3.4.2. Fairfax County

Fairfax County reports suspected unauthorized usage to Fairfax Water. It is Fairfax Water's policy to deal promptly with unauthorized connections. Upon detection of unauthorized conveyance equipment attached to the system, it is promptly disengaged and a tamper fee of \$250 is imposed. On becoming aware of unauthorized use of fire hydrants, it is Fairfax Water's policy to inform the local authorities of the unlawful usage of County property and the unauthorized user may be penalized under law.

6.3.4.3. Loudoun County⁴⁰

Under Loudoun Water's Rates, Rules and Regulations, effective July 1, 2011, Rule No. 2 (c) – General states that “No person shall turn the water on or off at any street valve, corporation stop, curb stop, or other street connection, or disconnect or remove any meter without the consent of Loudoun Water. Penalties provided by law for any such unauthorized action will be rigidly enforced.”

6.3.4.4. Prince William County⁴¹

Any person who either tampers with the meter assigned to a property or who installs any type of device at the connection other than the assigned meter will be subject to an unauthorized use charge of \$250.

⁴⁰ <http://www.loudounwater.org/About/Rates-and-Billing/>

⁴¹ http://www.pwcsa.org/documents/rates%20and%20fees/Schedule%20of%20Water%20and%20Sewer_Final.pdf

6.3.4.5. City of Alexandria

The City of Alexandria does not have practices or policies in place to track unauthorized connections.

6.3.4.6. City of Fairfax

The City of Fairfax does not have a formal program to track unauthorized connections; however, the City utilizes their fleet to monitor throughout the City for unauthorized usage. Other departments within the City also assist in monitoring effects.

6.3.4.7. City of Falls Church

The City of Falls Church does not have practices or policies in place to track unauthorized connections.

6.3.4.8. City of Manassas

Information on practices or policies in the City of Manassas to track unauthorized connections was not available at the time of this report.

6.3.4.9. City of Manassas Park

Information on practices or policies in the City of Manassas Park to track unauthorized connections was not available at the time of this report.

6.3.4.10. Town of Clifton

The Town of Clifton does not own or operate a community water system; therefore, this section does not apply to the Town.

6.3.4.11. Town of Dumfries

The Town of Dumfries is served by the PWCSA and does not own or operate their community water system; therefore, this section does not apply to the Town. Information on PWCSA policies on unauthorized connections is discussed in Section 6.3.4.4 above.

6.3.4.12. Town of Hamilton

Information on practices or policies in the Town of Hamilton to track unauthorized connections was not available at the time of this report.

6.3.4.13. Town of Haymarket

The Town of Haymarket is served by the PWCSA and does not own or operate their community water system; therefore, this section does not apply to the Town. Information on PWCSA policies on unauthorized connections is discussed in Section 6.3.4.4 above.

6.3.4.14. Town of Herndon

The Town of Herndon performs several programs to track unauthorized connections such as: 1) control and inspection of water usage for water delivered from a fire hydrant or from other approved temporary connections (Town Code Article III, Division 2, Sec. 74-301-304); 2) control and inspection of service for construction purposes (Town Code Article III, Division 2, Sec. 74-305); 3) control and inspection of water meter tampering (Town Code Article III, Division 2, Sec. 74-309); 4) control and inspection of connections to the public water system (Town Code Article III, Division 3, Section 74-356); and 5) control and inspection of irrigation systems connected to the public water system (Town Code Article III, Division 3, Sec. 74-358a). In addition, the Town is performing a Cross-Connection Program where the building inspection staff identify fixtures that have been connected without authorization and enforces disconnection.

6.3.4.15. Town of Leesburg

The Town of Leesburg tracks unauthorized connections by word of mouth, police, residents, and through water audits. In addition, every new connection must be submitted for review and approval including fees.

6.3.4.16. Town of Lovettsville

The Town of Lovettsville does not have practices or policies in place to track unauthorized connections other than word of mouth.

6.3.4.17. Town of Middleburg

The Town of Middleburg does not have practices or policies in place to track unauthorized connections other than word of mouth.

6.3.4.18. Town of Occoquan

The Town of Occoquan is served by the PWCSA and does not own or operate their community water system; therefore, this section does not apply to the Town. Information on PWCSA policies on unauthorized connections is discussed in Section 6.3.4.4 above.

6.3.4.19. Town of Purcellville

If a customer reports a withdrawal from a Town hydrant by an unauthorized person and the police apprehend the suspect, the customer reporting the unauthorized use receives a \$50 credit.

6.3.4.20. Town of Quantico

Information on practices or policies in the Town of Quantico to track unauthorized connections was not available at the time of this report.

6.3.4.1. Town of Round Hill⁴²

Article X – Water Theft of the Town’s Water Ordinance outlines actions taken for unauthorized water use.

6.3.4.2. Town of Vienna

The Town of Vienna implements a cleaning and lining program and water main replacement program. Water main breaks repairs are completed quickly by Town staff.

6.3.5 Repair and Maintenance of the Systems

6.3.5.1. Arlington County

Arlington County attempts to fix leaks and water line breaks in a timely manner. The County prioritizes problematic mains highly susceptible to breaks for replacement through the County CIP process.

6.3.5.2. Fairfax County

Fairfax Water attempts to repair broken water mains and restore water service within six hours. For service connections, Fairfax Water attempts to repair and restore water service within four hours. Proactive response helps reduce water loss. Fairfax Water has an active valve exercising program and a proactive leak detection system with the objective to cover the entire system once every five years. It is Fairfax Water’s goal to flush each hydrant annually. The amount of water lost during flushing is also estimated and accounted for. Hydrant flushing is essential to making sure that the valves in the hydrants are in working condition and water will be available through the hydrants when required.

6.3.5.3. Loudoun County⁴³

Loudoun Water conducts annual water main flushing in the spring to ensure high standards of water quality and proper operation of valves and fire hydrants. Water main/hydrant flushing cleans out sediment and other particulates, which accumulate

⁴² <http://www.roundhillva.org/Default.asp?Page=264>

⁴³ <http://www.loudounwater.org/Residential-Customers/Hydrant-Flushing/>

normally in water mains. Loudoun Water also tests and performs routine maintenance on valves and fire hydrants during the flushing operation. Water main repair is typically performed within an 8-hour period.

6.3.5.4. Prince William County⁴⁴

The PWCSA completes annual flushing of their water system through fire hydrants starting in the spring. Annual system flushing cleans out sediment and other particulates, which accumulate normally in water mains. Annual system flushing also provides an opportunity for the PWCSA to test the nearly 10,000 fire hydrants, ensuring that they are well-maintained and fully functioning.

PWCSA has an active valve exercising program designed to exercise all valves in an eight year cycle.

The leak detection program covers the water system every five years with some areas being assessed more frequently due to their leak history.

PWCSA monitors water loss on a monthly basis. Strategies used by PWCSA to minimize water loss include surveying at least 15% of the water system annually for subsurface leaks, aggressive oversight of hydrant meter customers, and routine replacement of water meters. At the time of this report, annual water loss for PWCSA is below 6%.

Leak Detection

- The Authority has customer/SA responsibilities regarding who is responsible for leaks in the main versus service line similar to Loudoun Water (See Customer Handbook).
- The Authority also offers leak adjustments to customers
- The Authority has approximately 10,000 smart meters with leak detection capabilities. Should water use meet certain criteria, the Authority will send customers a letter outlining the usage information and that such a pattern may indicate a potential leak.

⁴⁴ http://www.pwcsa.org/index.php?option=com_content&view=article&id=91:service-authority-begins-annual-spring-cleaning-of-distribution-system&catid=4:service-authrORITY-news&Itemid=11

- Authority field personnel respond to identified or reported leaks in the system such as emergency water main breaks or routine customer inquiries regarding leaks.

The Authority's water loss is between 4 – 6%.

6.3.5.5. City of Alexandria

The City of Alexandria is served by Virginia American Water and does not operate their community water system; therefore, this section does not apply to the City. Virginia American Water bases its main replacement program on historical leaks or break reports. Repairs are promptly made upon report of the leak or break within the system.

6.3.5.6. City of Fairfax⁴⁵

As part of the City of Fairfax Water Service Maintenance Program, the Utilities Department flushes the water mains through fire hydrants during March and April between 9:30 p.m. and 5:00 a.m. on weekdays.

6.3.5.7. City of Falls Church

The City of Falls Church has a leak detection program in which a contractor will listen for and identify the location of leaks. The noted leaks are then repaired by the City maintenance crews as part of the regular maintenance schedule. The City has an annual hydrant flushing program where every hydrant is flushed each year. During this flushing each hydrant is inspected and needed repairs are noted and completed by the City maintenance crews as part of the regular maintenance schedule.

6.3.5.8. City of Manassas⁴⁶

The City of Manassas maintains infrastructure through routine flushing, valve exercising, leak detection, pipe replacement, and repairs. The City of Manassas flushes water lines and hydrants bi-annually.

6.3.5.9. City of Manassas Park

Information on the repair and maintenance of the water system for the City of Manassas Park was unavailable at the time of this report.

⁴⁵ <http://fairfaxva.gov/Utilities/Utilities.asp>

⁴⁶ <http://www.manassascity.org/index.aspx?NID=85>

6.3.5.10. Town of Clifton

The Town of Clifton does not own or operate a community water system; therefore, this section does not apply to the Town.

6.3.5.11. Town of Dumfries

The Town of Dumfries is served by the PWCSA and does not own or operate their community water system; therefore, this section does not apply to the Town.

6.3.5.12. Town of Hamilton

Information on the repair and maintenance of the water system for the Town of Hamilton was unavailable at the time of this report.

6.3.5.13. Town of Haymarket

The Town of Haymarket is served by the PWCSA and does not own or operate their community water system; therefore, this section does not apply to the Town.

6.3.5.14. Town of Herndon

The Town of Herndon has a preventive maintenance program for water and sewer, which includes fire hydrant maintenance, replacement, and flushing; water valve and water meter replacement; and altitude valve maintenance as required.

6.3.5.15. Town of Leesburg

The Town of Leesburg implements preventive and corrective maintenance programs, in consolidation with other improvement projects in the Town (e.g., streets, drainage, trails, etc.). The distribution system is routinely surveyed for leaks and frequent water audits are conducted. The Town has a very vigorous program for unaccounted for water, leak detection, and repair.

6.3.5.16. Town of Lovettsville

The Town of Lovettsville contracts Loudoun Water to operate the water system and Loudoun Water performs corrective and preventative maintenance according to Loudoun Water's accepted practices.

6.3.5.17. Town of Middleburg

The Town of Middleburg contracts Loudoun Water to operate the water system and Loudoun Water performs corrective and preventative maintenance according to Loudoun Water's accepted practices.

6.3.5.18. Town of Occoquan

The Town of Occoquan is served by the PWCSA and does not own or operate their community water system; therefore, this section does not apply to the Town.

6.3.5.19. Town of Purcellville

The Town of Purcellville incorporates replacement of old water lines and/or water lines that have a history of breaks into their Capital Improvement Plan each year.

6.3.5.20. Town of Quantico

Information on the repair and maintenance of the water system for the Town of Quantico was unavailable at the time of this report.

6.3.5.21. Town of Round Hill

Information on the repair and maintenance of the water system for the Town of Round Hill was unavailable at the time of this report.

6.3.5.22. Town of Vienna

Any unauthorized connections discovered by the Town of Vienna are immediately terminated. The Town offers Construction Water and Hydrant Meters as a way to discourage unauthorized connections.

6.3.6 Capital Improvement Plans

6.3.6.1. Arlington County

Arlington County includes upgrades of existing water mains, meters, and valves as part of their CIP process.

6.3.6.2. Fairfax County

Fairfax Water's CIP is transmitted annually to Fairfax County. It includes projects to replace/repair water mains at risk of failure. Water mains defined for replacement are typically prone to breaks which can result in water loss. An evaluation of Fairfax Water's distribution main rehabilitation and replacement program was conducted as part of the 2008 Master Plan Update. The study recommended conducting a system-wide risk analysis that prioritizes water main replacement based on pipe condition and consequence of failure. An emphasis was placed on initiating a proactive financial planning strategy to support the replacement program. Fairfax Water responded by increasing its 2011 10-

year CIP funding for the Distribution System Sustainability (DSS) program to \$123,044,000. Twenty four projects have been identified for the DSS program in 2010. The CIP also addresses improving the collection of main break related data to better estimate pipe service life and alternate rehabilitation and replacement techniques that could save money compared to open cut pipe replacement.

6.3.6.3. Loudoun County⁴⁷

Loudoun Water has many projects and studies underway as part of their CIP process. The CIP provides the design and construction of new infrastructure to upgrade and maintain their water and wastewater systems. Improvements are made annually to meet the extra demands and maintenance associated with a growing service area. Loudoun Water typically plans at least ten years in advance for CIP improvements so that sufficient time is allotted for design and construction.

6.3.6.4. Prince William County⁴⁸

The PWCSA utilizes a CIP program to identify and schedule funding of major repairs, replacement or new construction of water infrastructure to include pumping facilities, storage facilities, and transmission and distribution mains (to include lines, fire hydrants, valves and other appurtenances), to extend the life, improve the capacity and capabilities of these facilities and reduce water loss and improve energy efficiencies. The current PWCSA Capital Improvements Program Document may be viewed on the PWCSA Website, <http://www.pwcsa.org>.

Likewise, the VAWC has a CIP program for its water facilities in the Dale City area of Prince William County.

6.3.6.5. City of Alexandria

The City of Alexandria CIP includes dedicated funds to upgrade plumbing components in the City's public buildings.

⁴⁷ <http://www.loudounwater.org/Residential-Customers/Current-Projects/>

⁴⁸ <http://www.pwcgov.org/default.aspx?topic=040059000700004536>

6.3.6.6. City of Fairfax⁴⁹

The City of Fairfax's Water Utility CIP is a five-year planning document separated into three functional areas: Impoundment and Treatment, Water Storage, and Distribution System. The Impoundment and Treatment section is composed of two reservoirs with related dams and the Water Treatment Plan. The Water Treatment Plant is aging and will be upgraded and refurbished by replacing the raw and high service pumping equipment and motors and new chemical storage. Under the Water Storage plan, the utility will replace two altitude valves to better control water levels in the three storage tanks located within the City. The Distribution System section includes repairs of pipelines, valves, and hydrants.

6.3.6.7. City of Falls Church

The City of Falls Church has a dedicated CIP project fund to replace old and failing cast iron pipes.

6.3.6.8. City of Manassas⁵⁰

The City of Manassas has dedicated CIP funds to upgrade existing facility infrastructure.

6.3.6.9. City of Manassas Park

Information on CIP funds for the City of Manassas Park was unavailable at the time of this report.

6.3.6.10. Town of Clifton

The Town of Clifton does not own or operate a community water system; therefore, this section does not apply to the Town.

6.3.6.11. Town of Dumfries

The Town of Dumfries is served by the PWCSA and does not own or operate their community water system; therefore, this section does not apply to the Town.

6.3.6.12. Town of Hamilton

Information on CIP funds for the Town of Hamilton was unavailable at the time of this report.

⁴⁹ <http://fairfaxva.gov/Utilities/CapitalImprovementPlan.asp>

⁵⁰ <http://www.manassascity.org/index.aspx?NID=85>

6.3.6.13. Town of Haymarket

The Town of Haymarket is served by the PWCSA and does not own or operate their community water system; therefore, this section does not apply to the Town.

6.3.6.14. Town of Herndon⁵¹

The Town of Herndon includes a General Water Maintenance and Replacement fund in their CIP. This program provides for major component replacement. This program provides for major component replacement. The Town's water and sewer division prepared cost estimates for the FY2008-2024 CIP which included cast iron and plastic water main replacement through 2024.

In addition, a concept study and design of an automated water meter reading system was commissioned in 2001. The objectives of the study were to identify the cost/benefit of automating the commercial meter reading function; evaluate the cost/benefit of automating the residential meter reading functions, including phase-in of automation over ten years; and if supported by the results, develop an RFP for an automated meter reading system. This project is being developed within the parameters of the Automated Water and Sewer Management System and SCADA for the Town. Based on preliminary information, funds have been reserved to cover the cost to implement the utility billing software enhancements and automate all existing commercial water meters.

6.3.6.15. Town of Leesburg

The Town of Leesburg adopted a master plan, which is periodically updated. Water demand and hydraulic modeling are kept up to date as new developments take place. CIP projects are then implemented based on water demand and age of the infrastructure.

6.3.6.16. Town of Lovettsville

The Town of Lovettsville has dedicated funds to upgrade/replace existing facility infrastructure.

6.3.6.17. Town of Middleburg

The Town of Middleburg does not have dedicated funds to upgrade/replace existing facility infrastructure; however the Town will be preparing a CIP in the near future to include funds for upgrades, etc.

⁵¹ [http://www.herndon-va.gov/Content/Zoning/Comprehensive Planning/Capital Improvement Program/default.aspx?cnlid=604](http://www.herndon-va.gov/Content/Zoning/Comprehensive%20Planning/Capital%20Improvement%20Program/default.aspx?cnlid=604)

6.3.6.18. Town of Occoquan

The Town of Occoquan is served by the PWCSA and does not own or operate their community water system; therefore, this section does not apply to the Town.

6.3.6.19. Town of Purcellville

The Town of Purcellville has 16 projects in the current (April 2011) CIP for water projects, four of which are directed at reducing water loss and include: Water Distribution System Evaluation and Implementation, which will identify repairs to be completed (pg 210); A Street Water Line Loop, which will allow more users to remain online while repairs are made in a certain area (pg 212); Vulnerability Assessment, which will identify areas prone to attract terrorist (pg 214); and Water Line Replacement on Route 690, which will replace 50 plus year old water line with a new and larger water line (pg 234). The page numbers refer to pages in the Town's Fiscal Year 2010-2011 Fiscal Plan and Capital Improvement Program for Fiscal Year 2011-2015.

6.3.6.20. Town of Quantico

Information on CIP funds for the Town of Quantico was unavailable at the time of this report.

6.3.6.21. Town of Round Hill

Information on CIP funds for the Town of Round Hill was unavailable at the time of this report.

6.3.6.22. Town of Vienna

The Town of Vienna includes upgrades of existing water mains, meters, and valves as part of their CIP process.

6.3.7 Educational Programs to Reduce Customer-Side Water Loss

6.3.7.1. Arlington County

Arlington County offers leak detection tablets to residents upon request and also hand out leak detection tablets at public events such as the County Fair.

6.3.7.2. Fairfax County

Fairfax Water provides leak detection tablets to customers upon request. The tablets are also made available to customers if their meter readings are observed to be unusually

high. Fairfax water also does courtesy notification to customers if a leak is observed on the service lateral during leak detection operations carried out by Fairfax Water, under their leak detection program. Fairfax Water's website also contains detailed step by step information on how to determine if there are leaks on the customer side.

6.3.7.3. Loudoun County⁵²

Loudoun Water provides information on their website for customers to aid them in identifying leaks and making repairs to reduce customer-side water loss. In addition, Loudoun Water previously provided their quarterly newsletter (NewsLeak) with customer water bills. The newsletter features news and information about water and sewer service pertinent to the season. However, beginning in April 2010 at the request of hundreds of customers, the quarterly newsletter is now electronic which has resulted in more than \$10,000 annual savings and is the first step toward paperless billing. Customers can sign up via email on the Loudoun Water website.

6.3.7.4. Prince William County⁵³

The PWCSA provides information on their website for customers to aid them in identifying leaks and making repairs to reduce customer-side water loss.

6.3.7.5. City of Alexandria

The City of Alexandria is served by Virginia American Water and does not operate their community water system; therefore, this section does not apply to the City. Virginia American Water does provide periodic inserts about water leakage with the water and sewer bills and provides information based on customer inquiry.

6.3.7.6. City of Fairfax

The City of Fairfax has not developed or implemented education programs to reduce customer-side water loss.

6.3.7.7. City of Falls Church

The City of Falls Church has not developed or implemented educational programs to reduce customer-side water loss.

⁵² <http://www.loudounwater.org/Residential-Customers/Plumbing-and-Pipes/>
<http://www.loudounwater.org/About/NewsLeak/>

⁵³ http://www.pwcsa.org/index.php?option=com_content&view=category&layout=blog&id=10&Itemid=29

6.3.7.8. City of Manassas⁵⁴

The City of Manassas provides information for customers to check for underground water and toilet leaks.

6.3.7.9. City of Manassas Park

Information on educational programs to reduce water loss for the City of Manassas Park was unavailable at the time of this report.

6.3.7.10. Town of Clifton

The Town of Clifton does not own or operate a community water system; therefore, this section does not apply to the Town.

6.3.7.11. Town of Dumfries

The Town of Dumfries is served by the PWCSA and does not own or operate their community water system; therefore, this section does not apply to the Town.

6.3.7.12. Town of Hamilton

Information on educational programs to reduce water loss for the Town of Hamilton was unavailable at the time of this report.

6.3.7.13. Town of Haymarket

The Town of Haymarket is served by the PWCSA and does not own or operate their community water system; therefore, this section does not apply to the Town.

6.3.7.14. Town of Herndon

The Town of Herndon has not developed or implemented educational programs to reduce customer-side water loss.

6.3.7.15. Town of Leesburg

The Town of Leesburg works with customers if the water usage by the customer does not tract with the historical pattern, or based on concerns by the customer.

6.3.7.16. Town of Lovettsville

The Town of Lovettsville has not developed or implemented educational programs to reduce customer-side water loss; however the customers have access to Loudoun Water programs to address customer-side water loss.

⁵⁴ <http://www.manassascity.org/FAQ.aspx?QID=169>

6.3.7.17. Town of Middleburg

The Town of Middleburg recently developed a publication to educate customers regarding the possible reasons for high water use and ways to identify potential water leaks and reduce water use. This publication is available on the Town’s website as well as hard copy at the Town Office. In addition, customers have access to Loudoun Water programs to address customer-side water loss.

6.3.7.18. Town of Occoquan

The Town of Occoquan is served by the PWCSA and does not own or operate their community water system; therefore, this section does not apply to the Town.

6.3.7.19. Town of Purcellville

The Town of Purcellville makes educational brochures both printed and online available to customers and provides leak detection tablets to residents upon request.

6.3.7.20. Town of Quantico

Information on educational programs to reduce water loss for the Town of Quantico was unavailable at the time of this report.

6.3.7.21. Town of Round Hill

Information on educational programs to reduce water loss for the Town of Round Hill was unavailable at the time of this report.

6.3.7.22. Town of Vienna⁵⁵

The Town of Vienna’s website includes “25 Things You Can Do To Prevent Water Waste,” which includes information on how to check for leaks.

⁵⁵ http://www.viennava.gov/Town_Departments/Toilet%20Leaks.pdf