

PARE PROJECT NO. 09009.00

REPORT

CITY OF WOONSOCKET
WATER SUPPLY SYSTEM MANAGEMENT PLAN
5-YEAR UPDATE
WOONSOCKET, RHODE ISLAND

EXECUTIVE SUMMARY

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EXECUTIVE SUMMARY

Purpose

The purpose of this Water Supply System Management Plan (WSSMP) is to comply with the Rhode Island State Law (RIGL 46-15). Further, the Woonsocket Water Division (WWD) intends that the plan serve as a planning tool, both through the process of its preparation, and in its documentation of existing plans such as the Capital Improvement Program (CIP) and Infrastructure Rehabilitation Plan (IRP).

Pare Corporation (PARE) prepared the previous WSSMP which was submitted in March 2003. PARE has updated this document as required in accordance with State of Rhode Island and Providence Plantations Water Resources Board Rules and Procedures for Water Supply System Management Planning.

Goals Statement

The WWD's mission includes four goals:

- To provide high quality drinking water that protects public health and complies with all applicable standards.
- To produce adequate water supply in the most economically feasible and environmentally sound manner.
- To serve those areas in Woonsocket and adjacent communities that have contaminated private, wells, or are otherwise in need of water supply.
- To efficiently manage and protect its active and supplemental water resources.

Existing System and Practices

The Woonsocket water system is a regulated public utility under Rhode Island General Law 39-1-1 and is under the jurisdiction of the Rhode Island Public Utilities Commission. The Woonsocket water system is owned by the City, and operated by the Department of Public Works' WWD. The City Council and City Administration provide oversight and the Director of Public Works provides administrative supervision.

The Water Division Transmission/Distribution Supervisor oversees the metering and distribution system operations and maintenance. The accounting section provides billing and WWD accounting functions.

The City of Woonsocket's three water supply reservoirs are Reservoir No. 1, Reservoir No. 3, and Harris Pond. The raw water transmission mains consist of a 30-inch gravity main from the mixing chamber located at Reservoir No. 1 connecting with the 24-inch raw water line at the treatment plant, and an 18-inch pressure main from Harris Pond to the mixing chamber at Reservoir No. 1. The Woonsocket Water Department completed the Crookfall Brook pipeline project in 1997, which includes a 24-inch gravity pipeline from Reservoir No. 3 to Reservoir No. 1 and the installation of a raw water-mixing chamber at Reservoir No. 1. The 18-inch pressure main has also been connected to the mixing chamber. The mixing chamber has the ability to meter and record raw water from each source and allows the Woonsocket



Water Department to proportionally blend the raw water.

Treatment Facilities

The Charles Hamman Water Treatment Plant (WTP), built in 1962, is located on Manville Road, on the bank of the Blackstone River in Woonsocket, Rhode Island. Modifications to the sedimentation-filtration units enable the plant to treat up to 13.25 mgd with the ability to expand to 15 mgd. However, the plant is currently limited to pumping 11.25 mgd. Average daily flow at the plant is 3.72 mgd (including in-plant uses such as washwater); maximum daily flow is measured at 5.42 mgd.

In October 2004, CDM completed a Water Treatment Plant Evaluation for the WWD (see Appendix D). The purpose of the report was to conduct an evaluation of a new water treatment plant for the WWD. The existing water treatment plant is in need of rehabilitation and ultimately replacement. Based on the findings of the evaluation, CDM recommended that the City construct a new water treatment plant. This report also recommended two potential locations for the proposed plant and the City is currently evaluating both locations.

The City issued a Request for Qualifications (RFQ) on December 14, 2009 for the Design, Build, and Operation of a new Water Treatment Plant. Two multidisciplinary teams submitted on the request, United Water and Veolia Water. The City is in the process of an in depth review on both team's submittals and intends to move forward with the project. Since the issue of the RFQ, the City is exploring the possibility of constructing a 30-inch transmission main to convey water from the Pawtucket treatment plant. If this project is feasible, the construction will proceed. Once the transmission main is completed the City will build a new treatment plant at the existing site or at an alternate site.

Storage Facilities

There are nine distribution storage facilities in the Woonsocket system, with five servicing the low service area and four servicing the high service areas. Table 1-1 lists these facilities.

Four booster pump station facilities in the Woonsocket system supply the high service areas. High service booster stations include the:

- Mount St. Charles (Logee Street) booster station (two pumps, each with a capacity 2,000 gpm) located on Washington Street and built in 2008, which serves the Mount St. Charles No. 5 storage tank;
- Diamond Hill Road booster station (two pumps, each with capacity 615 gpm) – future upgrades planned as part of the Cumberland Water Department Interconnection;
- Rhodes Avenue booster station (two pumps, each with capacity of 450 gpm); and
- Highland Industrial Park booster station (capacity 800 gpm) –future upgrades planned as part of the Cumberland Water Department Interconnection.

Each of these facilities has redundant pumps and motors, lead-lag pumping, and emergency generators.

The WWD service area includes virtually all of the city of Woonsocket and sections of North Smithfield and Cumberland, Rhode Island, and Blackstone and Bellingham, Massachusetts.



TABLE 1-1

Storage Facilities

Storage Tank	Type	Total Volume (MG)	Usable Volume (MG)	Service	Overflow Elevation
Cobble Hill	Reservoir	1.00	0.43	low	393.00
Mount St. Charles 1	Reservoir	0.44	0.22	low	393.69
Mount St. Charles 2 - Logee Street	Reservoir	2.95	2.95	low	393.00
Mount St. Charles 3	Reservoir	1.02	0.51	low	393.69
Mount St. Charles 4	Reservoir	1.62	0.60	low	393.00
Mount St. Charles 5	Fluted Column	0.75	0.20	high	504.00
Highland Industrial Park	Reservoir	1.81	0.37	high	513.00
Rhodes Avenue	Elevated	0.75	0.15	high	504.00
Diamond Hill	Reservoir	0.75	0.42	high	509.50
Clearwell No. 1	Reservoir	0.50	0.50	Treatment Plant	
Clearwell No. 2	Reservoir	0.50	0.50	Treatment Plant	
	Total:	12.09	6.85		

Services

In total, the system has about 9,267 services (calendar year 2008), divided as follows:

<u>Community</u>	<u>No. of Services</u>
Woonsocket	8,638
N. Smithfield	586
Cumberland	17
Blackstone	20
Bellingham	6

Transmission Mains

Two major transmission mains exit the water treatment facility, a 20-inch main and a 30-inch main. A 16-inch main connects to both of these and runs east, crossing the Blackstone River just behind the plant for service in the east part of the City.

Overall, the distribution system includes about 130 miles of pipe, of which an estimated 75 percent is cast iron and 25 percent is ductile iron. There is a small amount (50 feet) of asbestos cement (AC) pipe. The system also includes about 1,550 hydrants.

Meters

Master meters at the WTP include the raw water Venturi meter (replaced in 1991-92), the washwater tank Venturi meter (replaced in 1991-92), and finished water meters on the 20-inch and 30-inch mains to the distribution system. Flows measured by the two finished water meters are recorded and totalized.

Erickson Engineering calibrates the WTP master meters and pump station meters annually.

Individual source withdrawals are metered and recorded at the mixing chamber located at Reservoir No. 1. Venturi meters with totalizers have been installed on the pipes from Reservoir No. 1, Reservoir No. 3, and Harris Pond Reservoir.

System master meters include meters at several of the booster pump stations. The Rhodes Avenue and Diamond Hill pump stations have meters with flow totalizers. The Highland Industrial Park and Mount Saint Charles pump stations have digital flow meters with flow totalizers. All system master meters are tested once per year under a contract with Erickson Engineering.

With the exception of a few municipal buildings, all services are metered. WWD began use of Neptune T-10 ARB meters in 1986. About 99 percent of the meters 1-inch or less are ARB type meters. The meter reading and billing functions were computerized in 1991.

All meters (e.g., residential, commercial, industrial, and schools) are read quarterly. Meter reading occurs in February, May, August, and November.



Interconnections

WWD is basically a self-contained system, because there are no adjacent communities with sufficient transmission and/or supply to serve Woonsocket. The WWD restored its interconnection with the Lincoln Water Commission in order to provide some flow to WWD in an emergency. WWD is currently in the process of developing an interconnection with the Cumberland Water Department (CWD) and working in conjunction with the Water Resources Board.

A 6-inch line extends service through North Smithfield to a pump station in Lincoln for an interconnection with the Lincoln Water Commission. The pump station has been retrofitted and reconfigured for transmission of water from Woonsocket to Lincoln (pumping required) or from Lincoln to Woonsocket (gravity). Capacity of flow in either direction is limited to 1.0 mgd due to transmission main size. (Source: WWD)

The WWD is currently working with the CWD on a new interconnection, which will entail an interconnection at Mendon Road/Highland Park, an interconnection at the industrial park, upgrades to both the Diamond Hill Road and the Highland Industrial Park Booster Stations, and a new water main connecting the Diamond Hill and Highland Industrial Park tanks.

System Management

WWD conducts leak detection surveys on approximately 33% of the distribution system each year and repairs all identified leaks. WWD has purchased leak detection equipment and performs in-house leak detection surveys of the Woonsocket system.

The WWD continues to conduct infrastructure rehabilitation on an as-needed basis and as recommended in the Infrastructure Rehabilitation Plan (CDM, 2007) in accordance with the Clean Water Infrastructure Act. WWD has replaced approximately 400, 4-inch hydrants and non-traffic model hydrants. Among the infrastructure projects identified in the 2007 Infrastructure Rehabilitation Plan are the replacement of distribution and transmission lines, the cleaning and cement mortar lining of transmission lines, upgrades/replacement of existing pump stations, a hydrant flushing program, rehabilitation of existing dams and the design of a new water treatment facility. The WWD expects to have completed all the items identified in the Infrastructure Rehabilitation Plan for the 5-year planning period (2007-2012).

Since 1987, WWD has replaced about 4,200 meters, or about half of the system's service meters, to upgrade to new ARB meters. All residential services have been replaced with ARB meters. After 1994, WWD had replaced approximately 5 percent of the system meters per year. In 2004 the WWD completed the replacement of all meters 2 inches or less in size with remote radio read meters and the replacement of selected larger meters with smaller meters with remote radio read meters. WWD replaces commercial/industrial meters on a 10-year basis. When meters are replaced, WWD has customarily required installation of backflow preventors (on non-residential 2-inch and larger meters). Additionally, the WWD evaluates the possibility of downsizing the meter.

WWD is working towards a more formal and thorough preventive maintenance program. The WWD maintains the minimum amount of staff members necessary to perform the required maintenance while striving to be a cost conscious department. These staff members perform routine maintenance on hydrants and gates valves, as well as a main flushing program. Currently, dead ends are flushed approximately twice per year, and hydrants approximately once per year.



The WWD developed a hydrant flushing program of all of its hydrants in 2008 and plans to implement it once funding is available.

In 1998 the WWD, began one of the largest tank replacement programs within the state of Rhode Island resulting in construction of five new storage tanks. The WWD constructed the following tanks:

- Logee Tank – Completed in 2003,
- Mt. Saint Charles 4 – Completed in 2004,
- Rhodes Avenue Tank – Completed in 2005,
- Cobble Hill Tank – Completed in 2006,
- Mt. Saint Charles Tank 5 – Completed in 2009.

The WWD has developed a comprehensive Emergency Response Plan (ERP), in part to comply with Rhode Island Water Resource Board's regulations. The ERP includes a discussion of the local, state, and federal resources available to WWD in an emergency, and the applicable communication systems, and identifies organization charts and response action flow charts for each of 13 specific emergency situations. The ERP follows the incident commands system, a procedure developed to address command and control of resources during emergency situations, as described in the *Guidelines for Water Emergency Response Plan for the State of Rhode Island* and the AWWA Manual.

Supply and Demand Management

Currently, the average day demand is about 3.73 mgd (2008). The maximum day demand during 2008 is 5.42 mgd, which occurred during the month of June, according to distribution data. The average day demand is projected to be 3.79 mgd in 2030.

The safe yield of the water supply system based on the drought of record is 6.9 mgd; yield based on a critical dry period with a one percent chance of occurrence is 7.5 mgd; and yield based on a critical dry period with a five percent chance of occurrence is 8.0 mgd.

The WWD is able to meet the average daily demand of 3.72 mgd with the existing sources of supply. The WWD will be also able to meet the 2030 projected demand with the existing sources of supply.

The following table provides a summary of the safe yield and yield results for the WWD system.

	Safe Yield and Yield Results		
	Reservoir No. 1 & 3	Harris Pond	Total
1960's Drought-of-Record (safe yield)	2.5	4.4	6.9
Critical Dry Period with a 1% Chance of Occurrence (yield)	3.1	4.4	7.5
Critical Dry Period with a 5% Chance of Occurrence (yield)	3.5	4.5	8



SWDA Compliance

The 1996 amendments to the SDWA and subsequent rules and regulations have considerably changed the treatment, monitoring and reporting required of water suppliers. The WWD system meets these requirements by providing filtration and disinfection of all surface water sources through the Charles G. Hamman Water Treatment Plant.

Financial Management

The WWD is one of several operating divisions within the City of Woonsocket's Public Works Department. The WWD is a separate, self-supporting entity, which is operated as an Enterprise Fund. It records its revenue and expense transactions and prepares its financial reports on an accrual basis in accordance with Generally Accepted Accounting Principles as prescribed by the Governmental Accounting Standards Board. The WWD's Superintendent monitors its fiscal strength by reviewing monthly reports of its actual to budgeted expenses, and with periodic reviews of the WWD's cash position by the City's Financial Directors Office.

The following table summarizes the City's actual financial performance for the past three fiscal years on an accrual basis. The WWD's fiscal year is from July 1 to June 30.

HISTORIC EXPENSES

Revenue	Fiscal Year 2008	Fiscal Year 2007	Fiscal Year 2006
Annual Water Rate Revenue	\$7,820,309	\$6,359,001	\$6,352,205
General Facility Charge Revenue			
Special Assessment Fund			
Capital Fund			
Reserve Fund Revenue			
Other Earned Revenue	\$220,918	\$273,373	\$769,172
Other Unearned Revenue	\$168,150	\$213,406	\$209,326
Totals	\$8,209,377	\$6,845,780	\$7,330,703

Expenses	Fiscal Year 2008	Fiscal Year 2007	Fiscal Year 2006
Annual Water System Indebtedness			
Debt of Service Bonds	\$1,789,476	\$1,809,671	\$1,544,232
Operation and Maintenance Expenses	\$4,997,759	\$4,381,084	\$4,307,173
Other Expenses, Administrative and General	\$1,291,921	\$1,418,233	\$1,240,653
Totals	\$8,079,156	\$7,608,988	\$7,092,058



Actions and Implementations

In November 2007 the WWD prepared a Water Distribution System Evaluation, which also contained an Infrastructure Rehabilitation Plan and Capital Improvement Projects. This evaluation provided an assessment of remaining components needing rehabilitation or replacement since 1999. This evaluation also detailed the need for a new water treatment plant. As previously noted, the WWD completed a Water Treatment Plant Evaluation in 2004. Through this evaluation the WWD issued a Request for Qualifications (RFQ) on December 14, 2009 for the Design, Build, and Operation of a new Water Treatment Plant. Since the issue of the RFQ, the City is exploring the possibility of constructing a 30-inch transmission main to convey water from the Pawtucket treatment plant. The WWD is currently developing an additional interconnection with the Cumberland Water Department (CWD) which will aid and serve both water systems.

