PARE PROJECT NO. 19029.00

EXECUTIVE SUMMARY

# CITY OF WOONSOCKET

# WATER SUPPLY SYSTEM MANAGEMENT PLAN

# 5-YEAR UPDATE

# WOONSOCKET, RHODE ISLAND

Prepared For:

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Woonsocket, Rhode Island

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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) has prepared this 2019 update to the WSSMP, which is an update to the last WSSMP submitted by the WWD in August 2013. 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 has five major goals conveyed through this WSSMP:

- 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.
- To conform to the overall goals for water suppliers established in State Guide Plan Element No. 721 – Rhode Island Water 2030.

This WSSMP has been prepared in recognition of these goals as well as the applicable goals stipulated in the State Guide Plan. Infrastructure goals and objectives outlined in *Land Use 2025* are reflected in the operation of the WWD system and were taken into account in the preparation of this plan. These goals and objectives are as follows:

- Land Use Goal 4: First class supporting infrastructure that protects the public's health, safety and welfare, fosters economic well-being, preserves and enhances environmental quality, and reinforces the distinction between urban and rural areas.

- Land Use Objective 4A: Maintain fully functional water and sewer systems; focus development to maximize the investment and capacity of these community assets.

- Land Use Objective 4B: Protect drinking water supply resources.

- Land Use Objective 4C: Utilize infrastructure to avoid or mitigate significant negative environmental impacts from development.

- Land Use Objective 4D: Locate new infrastructure in appropriate areas.

Goals and objectives specific to public water suppliers are also outlined in State Guide Plan 721, *Rhode Island Water 2030*, and are summarized below. The vision of *Rhode Island Water 2030* is "to ensure safe, reliable, ample water supplies to meet the State's short and long-range needs while preserving the physical, biological, and chemical integrity of the water resources of the State."

**Integrated Management and Planning Goals**

IPP-1: Integrate water resources and supply planning for water systems across intergovernmental and regional jurisdictions.

IPP-2: Ensure the adequate technical, managerial, and financial capacity of water systems.

IPP-3: Manage and plan for water systems that support sustainable, compact land use and concentrate development within the urban service boundary and or growth centers.

**Water Resource Management Goals**

WRM-1: Manage and plan for the sustainable water use and development of the water resources of the State.

WRM-2: Protect and preserve the health and ecological functions of the water resources of the State.

WRM-3: Ensure a reasonable supply of quality drinking water for the State.

WRM-4: Ensure the protection of public health, safety and welfare and essential drinking water resources during water supply emergencies.

**System Description**

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 of Woonsocket (City) and operated by the WWD under the Department of Public Works. The City Council and City Administration provide oversight and the Director of Public Works provides administrative supervision.

The WWD Superintendent is Mr. Marc Viggiani. This role oversees the metering and distribution system operations and maintenance. The City has contracted with Suez to operate water treatment functions. The accounting section provides billing and WWD accounting functions. Other City Departments provide additional functions, such as purchasing, procurement, etc.

The WWD service area includes virtually all of the City of Woonsocket and sections of North Smithfield and Cumberland, Rhode Island, as well as small sections of Blackstone and Bellingham, Massachusetts. The WWD sells wholesale water to the Cumberland Water District and North Smithfield Water District in addition to retail customers the WWD has in both of these communities.

***Supply Sources***

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 a mixing chamber located at Reservoir No. 1 connecting with the 24-inch raw water line at the Charles Hamman Water Treatment Plant (WTP), and an 18-inch pressure main from Harris Pond to the mixing chamber at Reservoir No. 1. 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 prior to it entering the treatment plant.

***Treatment Facilities***

The Charles Hamman WTP, built in 1962, is located on Manville Road, on the bank of the Blackstone River in Woonsocket, Rhode Island. Past 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 wash water); maximum daily flow is measured at 5.42 mgd.

In October 2004, CDM Smith (CDM) completed a Water Treatment Plant Evaluation for the WWD. The existing water treatment plant was determined to require rehabilitation and ultimately replacement. Based on the findings of the evaluation, CDM recommended that the City construct a new water treatment plant to replace the existing Charles Hamman WTP.

The City issued a Request for Qualifications (RFQ) on December 14, 2009 for the Design, Build, and Operation (DBO) of a new water treatment plant. Two multidisciplinary teams submitted on the request, United Water and Veolia Water, but the project was not awarded at that time. The City later issued a new RFP on August 5, 2015 for the DBO of the new water treatment plant. Three multidisciplinary teams submitted on the RFP, with proposals received and opened on February 17, 2016. After a thorough review by the City, the DBO team of Suez/AECOM/Nickerson was determined to have provided the best value for the City and they were awarded the contract for a total price of $56,752,800 which was approved and endorsed by the Woonsocket City Council.

The new treatment plant will be sited on property recently acquired by the City in the Bernon Heights area of Woonsocket. Construction of the new treatment plant is on-going and is expected to be complete by 2020. The new treatment plant is being designed for 7.5 MGD, with possibility for future expansion to 10.5 MGD. These flow capacities are more in line with the available supply from the City's three supply reservoirs. Transmission main upgrades and a new raw water pump station to convey water from the existing Charles Hamman WTP to the new treatment plant are also planned as part of this project.

***Storage Facilities***

There are nine storage tanks in the system. There are four tanks at the Mount St. Charles tank farm and another nearby tank on Logee Street, identified as the Mount St. Charles Tank Nos. 1 through 5, as well as the Cobble Hill Tank, Diamond Hill Tank, Rhodes Avenue Tank, and Highland Industrial Park Tank. Additionally, the WTP has a storage tank for washwater and two clearwells. Five of the tanks provide storage for the low-service area, while the remaining four provide storage for the high-service area.

***Pump Stations***

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 a capacity 1,000 gpm) – upgraded in 2017.

- Rhodes Avenue booster station (two pumps, each with capacity of 450 gpm); and

- Highland Industrial Park booster station (two pumps, each with a capacity 1,000 gpm) – upgraded in 2017.

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

***Transmission Mains and Distribution System***

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. New 30-inch raw water and finished water transmission mains are proposed as part of the Water Treatment Plant DBO project. The treatment plant is anticipated to be complete in 2020.

Overall, the distribution system includes about 130 miles of pipe, of which an estimated 74 percent is cast iron and 26 percent is ductile iron. There is a small amount (approximately 4,200 feet) of asbestos cement (AC) pipe. The system also includes about 1,570 hydrants.

***Service Area***

The WWD service population was estimated using US Census data from 2010 and population projections made by the Rhode Island Division of Planning, for 2018. All of Woonsocket is served (41,603 people); thus, the total population for the City of Woonsocket was used. For North Smithfield, a base number was developed as the number of services multiplied by the number of persons per household and adjusted by adding the known number of residents in three large multifamily facilities that each have a single service connection (1,854 people). For Cumberland, Bellingham, and Blackstone the number of services were multiplied by the number of persons per household. WWD residential service connections in these communities are almost completely single-family. Table 2 tabulates the results of the analysis. The total estimated service population for WWD is approximately 43,569. Note that this service population is based on residential customers only, consistent with Rhode Island Water Resource Board's guidance manual. WWD also serves Woonsocket's businesses and industries that draw employees from the greater Woonsocket area.

**TABLE 2**
**CURRENT SERVICE POPULATION**

| Community | 2018 Population (1) | Percent Served | 2018 Service Connections (2) | Persons/Household (1) | Estimated Population Served |
|---|---|---|---|---|---|
| Woonsocket | 41,603 | 100% | | | 41,603 |
| North Smithfield | 12,485 | 15% | 604 | 2.64 | 1,854* |
| Cumberland | 34,997 | 0.12% | 17 | 2.53 | 43 |
| Blackstone | 9,326 | 0.57% | 20 | 2.66 | 53 |
| Bellingham | 17,182 | 0.09% | 6 | 2.66 | 16 |
| **Total:** | | | | | **43,569** |

Sources:
(1) RI Statewide Planning, 2018 (translated from 2015 value) and 2010 Census
(2) Obtained from WWD

*Calculate North Smithfield's population by known service connections = 604 x 2.6 = 1,570
plus known multi-family facilities:

Lantern Apartments – 60 residents
St. Antoine Hospice Nursing Home – 137 full-time residents
Gatewood Apartments – 87 residents
Subtotal – 284
Total North Smithfield – 1,854

***Services***

In total, the system has about 9,702 services (calendar year 2018). Over 90% of these service connections are in Woonsocket, and roughly another 604 services are in North Smithfield. A relatively small number of services are located in Cumberland and in the towns of Blackstone and Bellingham in Massachusetts. The WWD categorizes customers as residential, commercial/industrial, and governmental. The approximate breakdown in services, by type, is as follows:

- Residential: 8,175
- Commercial/ Industrial: 1,450
- Governmental: 77
- Total: 9,702

The number of services in each of these communities is estimated as follows:

- Woonsocket: 9,055
- North Smithfield: 604
- Cumberland: 17
- Blackstone: 20
- Bellingham: 6

***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 St. 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. About 90 percent of the meters are 1-inch or less and about 99% have radio-frequency encoders for automatic meter reading. 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.

The City owns all residential meters and most commercial meters. Residential meters are tested upon complaint and repaired accordingly. Any meters not functioning at the time of reading are also repaired promptly.

***Interconnections***

The WWD has interconnections with water systems in the Towns of Lincoln, Cumberland, and North Smithfield. Interconnections with Cumberland and North Smithfield provide these two systems with additional water supply to meet demands while a separate interconnection with Cumberland allows supply to the WWD. The interconnection with Lincoln is a two-way interconnection and flow can be distributed to either water system. Additionally, all of the interconnections have capability to provide some flow in emergency situations. The City will review current interconnection agreements with each neighboring water system and recommend formalizing and updating such agreements.

*Lincoln Water Commission*

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 0.3 mgd due to transmission main size.

*Cumberland Water Department*

Two transmission mains with a capacity of 2 MGD each exist along Park East Drive and Mendon Road for interconnections with the Cumberland Water District (CWD). The interconnection on Park East Drive is owned by the CWD and provides both supply and emergency flow to Cumberland by gravity. The interconnection on Mendon Road is owned by the WWD and provides emergency flow to Woonsocket by gravity.

In 2015, Cumberland Emergency Interconnection Contract No. 1 was constructed to alleviate supply and water pressure issues arising around west Cumberland near Woonsocket during high demand conditions.

In 2017, Woonsocket Emergency Interconnection Contract No. 2 was constructed to alleviate concerns if the existing WTP fails during construction of the new water treatment facilities. WWD constructed this interconnection with Cumberland on Mendon Road and plans to use it in times of emergency.

*North Smithfield*

A 10-inch transmission main exists along Rhodes Avenue with the North Smithfield Water Department (NSWD). The interconnection is owned by the NSWD and provides supply flow to North Smithfield by gravity.

*Blackstone and Bellingham*

The WWD does not have any current plans to supply additional water to systems in the Towns of Blackstone or Bellingham nor are there any ongoing discussions between Woonsocket and Blackstone or Bellingham at this time.

**Water Quality Component**

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. The new treatment plant will also comply with SDWA regulations.

The Source Water Assessment Plan for the WWD was updated as part of this 2019 WSSMP Update. The risk rating for the City's three supply sources have not changed since the last SWAP update, prepared as part of the 2013 WSSMP.

**Supply Management**

Currently, the average day demand is about 3.97 mgd (2018); based on consumption alone (i.e. not including, non-account water), the system average day demand is 3.077 mgd. The maximum day demand during 2018 is 5.25 mgd, according to distribution data. The average day demand is projected to be 4.60 mgd in 2040.

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 current and projected future demands with the existing sources of supply.

**Demand Management**

The WWD is in compliance with the *Rules and Procedures Governing the Water Use and Efficiency Act for Major Public Water Suppliers* (Act), enacted in 2011. Per capita average day residential water use is estimated to be 3.077 mgd, or 37.97 gpcd, meeting the State's requirement of 65 gpcd. Also, the WWD targets 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. Estimated leakage in the system is approximately 7%.

**System Management**

The WWD continues to conduct infrastructure rehabilitation on an as-needed basis and as recommended in its Infrastructure Rehabilitation Plan (CDM, 2017) in accordance with the Clean Water Infrastructure Act. This includes replacement of hydrants, distribution pipes, cleaning and lining of transmission mains, and upgrades to storage tanks and pump stations. The WWD expects to complete all the items identified in the Infrastructure Rehabilitation Plan for the 5-year planning period (2017-2022).

The WWD plans on performing a comprehensive meter replacement program, beginning in 2020, as the current meters were installed in 2004 and are reaching the end of their useful life. All meters 2-inches and below in size shall be replaced with new meters with Radio encoders. The WWD is also proposing to implement a fixed network advanced meter infrastructure (AMI) system. This will allow meter reading to be performed on-demand and at a greater frequency to more effectively identify leaks, theft, and water use spikes. This system will also allow for major users to be billed monthly, rather than quarterly. Monthly billing will provide a financial benefit for both the major users and the WWD, allowing the WWD to have a more frequent inflow of revenue and major users to have smaller bill statements.

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 gate 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 is currently performing unidirectional flushing as part of their preventative maintenance program. WWD has a routine tank inspection program and all tanks were inspected as of June 2018. A major tank improvement program was performed between 1998 and 2009, resulting in the rehabilitation and replacement of most of the storage tanks in the system.

**Emergency Management**

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.

The WWD became a member of the Rhode Island Water and Wastewater Agency Response Network (RIWARN) in June 2015. RIWARN is available to all public and private water and wastewater system providers operating in the State of Rhode Island. Participation in the program is voluntary, and there is no fee required to participate in the program. Utilities that sign the standard RIWARN agreement can share resources with any of the other twenty-one current system providers that have signed the standard agreement and are part of the RIWARN network. During an emergency, the agreement provides a framework and defines processes and procedures for member utilities to share and receive mutual aid and assistance. Additionally, the agreement has provisions for reimbursement, worker's compensation, insurance, and liability.

**Drought Management**

The WWD has policies to monitor drought and impose a series of restrictions and actions to control demand as drought conditions warrant. The five phases of drought consistent with the Drought Watch/Warning System of the National Weather Service, are:

- Normal;
- Advisory;
- Watch;
- Warning; and
- Emergency.

Drought conditions are evaluated on a regional basis across the State and are assigned based on conditions represented by major hydrologic indices, including precipitation, groundwater levels, stream flow, and the Palmer Drought Index. The Rhode Island Water Resources Board and Drought Steering Committee evaluate the major hydrologic indices and adjust drought levels both state-wide and on a regional basis, accordingly. The WWD coordinates with the RIWRB and Drought Steerting Committee on drought conditions and enacting the appropriate response actions.

**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 WWD'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.

**WWD Total Revenue & Expenses (2016-2018)**

| | 2018 | 2017 | 2016 |
|---|---|---|---|
| **Total Revenues** | $8,048,318.00 | $8,186,937.00 | $8,747,659.00 |
| **Total Expenses** | $5,919,284.00 | $6,991,663.00 | $6,217,668.00 |
| **Total Income (Loss)** | $2,129,034.00 | $1,195,274.00 | $2,529,991.00 |

The WWD uses a flat rate billing system with a uniform charge for all water use, both residential and commercial. The RIPUC approved the Current water rates that went into effect on May 31, 2019 and replaces the tariff from October 2012. The WWD rates are adequate to fund system operations, maintain a capital improvement fund, and service debt.

**Implementation Plan**

In June 2018, 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 from the earlier capital improvement projects plan that WWD has to puruse in the upcoming 5-year and 20-year planning periods.

Table 3 provides a schedule of the WWD's 20-year capital improvement program, including anticipated timeframe, estimated costs, and potential sources of funding. This schedule was developed based on the City's recently updated 2018 Infrastructure Rehabilitation Plan (IRP).

**TABLE 3**

**IMPLEMENTATION SCHEDULE**

| Project | 5 Year Period | | | | Total | Funding Source |
|---|---|---|---|---|---|---|
| | 1 to 5 | 6 to 10 | 11 to 15 | 16 to 20 | | |
| Infrastructure Rehabilitation Plan Update | | $200,000 | | $200,000 | $400,000 | User Rates |
| Preliminary Design Evaluations | $130,000 | | | | $130,000 | User Rates |
| Meter Replacement and AMI System | $4,000,000 | | | | $4,000,000 | User Rates |
| New Water Treatment Plant | $56,752,800 | | | | $56,752,800 | Bonds /SRF |
| Distribution Pipes (Fire Protection) | $7,300,000 | $6,744,500 | | | $14,044,500 | User Rates |
| Distribution Pipes (IRP) | | | $31,459,800 | $7,600,000 | $39,059,800 | Bonds and User Rates |
| Transmission Mains | | $2,044,500 | $842,000 | | $2,886,500 | User Rates |
| Totals | $68,182,800 | $8,989,000 | $32,301,800 | $7,800,000 | $117,273,600 | |

**Coordination**

The WWD serves customers in the Towns of North Smithfield, Cumberland, Blackstone, and Bellingham in addition to Woonsocket. As such, the current comprehensive plans for Woonsocket, North Smithfield, and Cumberland were reviewed while updating this WSSMP. The City intends for this WSSMP to be consistent with the goals and policies of these comprehensive plans. Also, this WSSMP has been provided to the municipal planners in these communities for their review and concurrence with respect to their comprehensive plans.

Although the WWD also provides service to the Towns of Blackstone and Bellingham, the equivalent comprehensive plans for both towns were not evaluated although a Master Plan for Bellingham was reviewed since Harris Pond and its watershed is primarily located within this community. The WWD does not intend to expand service in either of these areas. Development and growth factors for both of these towns will not influence service and demand for WWD given the small number of services that will remain constant into the future. However, the WWD will continue to coordinate with the Town Blackstone on matters of watershed protection around Harris Pond.

The Comprehensive Plan for North Smithfield states that the Town acknowledges deficiencies in meeting the demands of its current users through the current structure of its fragmented water supply system. In order to meet the needs of future development, the Town has recommended the consolidation of its systems into one North Smithfield system. However, proper analysis, scheduling, and budgeting through a capital improvement program must be conducted beforehand. The WWD will need to evaluate the feasibility and impacts of any such system consolidation as the WWD has retail customers in North Smithfield and also sells water to the Town on a wholesale basis for their water supply system. At this time, system consolidation is not planned or anticipated in the near future.

The WWD currently has interconnections with the Towns of Lincoln, Cumberland, and North Smithfield. These interconnections are used to supply additional water to the other water systems to meet daily demands, as well as to be used in the event of emergency. The WWD will coordinate with each of these Towns and evaluate the feasibility of updating and formalizing existing interconnection supply agreements.