

NORTH KINGSTOWN WATER SUPPLY SYSTEM MANAGEMENT PLAN EXECUTIVE SUMMARY

Introduction and Background

This Water Supply System Management Plan Five Year Update has been prepared as required under the Rhode Island General Laws 46-15.3, as amended and titled "The Water Supply System Management Planning Act" (Act). The legislative authority to effectuate the goals and policies of this Act has been conferred to the RIWRB. To this end, the RIWRB has promulgated the Rules and Regulations for Water Supply System Management Planning, October 1998, as amended to implement the provisions of this Act.

Under this regulation, the Town of North Kingstown – North Kingstown Department of Water Supply (NKWD), as a water purveyor supplying over 50 million gallons of water per year, is responsible for the preparation and adoption of a WSSMP. It also requires that the Town update this WSSMP periodically, as significant changes warrant, and every five years, or as otherwise stipulated in the Regulations.

Water Supply System Management Plans are prepared in order to provide the proper framework to promote the effective and efficient conservation, development, utilization and protection of the natural water resources of the State as utilized by the water purveyor. Further, the overall goals shall be consistent with the State Guide Plan Element 721, *Water 2030*. The purpose of this WSSMP is to outline the objectives of the Water Supply System Management Planning process for the Town of North Kingstown Water Supply System, and to serve as a guide to employ the proper decision making processes toward meeting that goal.

The WSSMP contains a description of the water system and includes the policies and procedures related to the general operation and management. The Emergency Management section relates to the vulnerability assessment of the water system for use

in emergency planning. It shall be incumbent upon the NKWD to implement the recommendations and procedures outlined in this WSSMP in order to comply with the overall requirements of the Act.

Water System Description

The Town of North Kingstown Water Supply Department, which is wholly owned by the Town of North Kingstown, was established by legislation of the General Assembly of the State of Rhode Island circa the late 1930s. The majority of the water system infrastructure was installed in the 1940s and **1950s**. Since that time, the system has expanded to meet the needs of the Town's growing population. It is presently operated as a self-supporting enterprise fund where all operations are financed from revenues derived from various user fees.

Water Supply Sources, Pumping Stations and Water Storage Tanks

The primary source of raw water supply for the North Kingstown water system is groundwater. Water is pumped directly into the distribution system for consumption, or serves to provide storage capacity in the storage facilities. The water supply, at present, consists of 11 water supply wells and pumping stations that serve the Saunderstown High, Slocum High and Low service areas. The Water Department installed a new gravel packed well (Well #11) and received new source approval from the RI Department of Health in April 2005. This well helps to meet peak demands associated with development that has occurred within the Town over the past ten (20) years and provide system flexibility and redundancy. In addition to the proposed new well, a satellite well (well #5a) was constructed to replace existing well #5. The new satellite well went into service in the summer of 2005. It is anticipated that Well #10, which has been out of service since 2013, will be reactivated (a new well developed to replace it) in 2022.

The NKWD does not own or operate any water treatment facilities. Historically, source water has been treated with caustic for pH adjustment and a corrosion inhibitor is added for lead and copper control. As a result of acute violations of the Total Coliform Rule in 2001, 2002, and 2003 a disinfection pilot study, was initiated in the low service area of

the distribution system (wells #1, 2, 6, 9, & 10) in the summer of 2005. The purpose of the pilot study was to evaluate the effectiveness of using sodium hypochlorite to control bacterial regrowth in the distribution system. All chemical treatments take place at each well station facility.

Water Distribution

The transmission and distribution system consists of approximately 177 miles of water main, constructed mainly in the 1940s and 1950s. The majority of the system consists of asbestos cement (AC) pipeline ranging in size from 6 to 16 inches. New and replacement mains consist of polyvinyl chloride (PVC) and cement-lined ductile iron pipe.

The service area is typically operated as three (3) independent systems, operating at different hydraulic grades. The service areas are isolated by several gate valves, which remain in the “closed” position and a pressure reducing valve (PRV). The North Kingstown Water System owns three (3) booster pumping stations in addition to the eleven (11) well pumping stations. Only two of these booster pumping stations are operational. In the event of an emergency, water could be supplied to the high service system from the low service by boosting the hydraulic grade through one of these facilities and opening a gate valve. If the shortfall occurred in the Low Service Area, water could be supplied from the high service area by opening one of the gate valves that isolate the pressure zones. Sharing water between the pressure zones is complicated to some extent by the Low Service Area disinfection. The NKWD has recently constructed a PRV/Booster pumping facility that will allow us to share water between pressure zones without compromising disinfectant residuals in the Low Service Area.

The Slocum service zone is controlled by the overflow elevation of the Slocum elevated water storage tank, with an overflow elevation of 348 feet mean sea level (MSL) and a total storage capacity of 500,000 gallons, and the Saunderstown service zone is controlled by the overflow elevation of the Saunderstown Standpipe (overflow elevation is 298 feet MSL) and a total storage capacity of 528,000 gallons. It should be noted that prior to 1996 the Slocum tank overflow elevation was equal to 298 feet MSL. In order to increase

domestic service pressures in the vicinity, the original standpipe was replaced with an elevated storage tank that afforded an additional fifty (50) feet of storage height and an additional pressure zone was subsequently created.

Water storage in the low service zone is provided by three (3) facilities. The Bow Hunters Water Storage Tank (overflow = 215 feet MSL), North End Standpipe (overflow = 210 feet MSL), and the Wickford Elevated Tank (overflow = 210 feet MSL) each provide regional storage capacity within the low service area. Total low service area storage capacity is 4,375,000 gallons.

Interconnections

The NKWD maintains five interconnections to neighboring water purveyors. They include the Town of Narragansett Water System (wholesale connection), and emergency connections to Warwick Water, the Quonset Development Corporation (Quonset Point Industrial Park), the Kent County Water Authority (KCWA) and an emergency-only interconnection, which requires the deployment of a temporary line on the Jamestown/Verrazano Bridge, with the Jamestown Water District. North Kingstown and Jamestown negotiated an emergency interconnection agreement. The two towns' staff are coordinating to fulfill completion of Department of Health-directed sampling to assess corrosivity of the North Kingstown water that would be transmitted to Jamestown.

Legal Agreements

North Kingstown has approved written agreements with the Kent County Water Authority and the City of Warwick for use of the interconnections to supply water during emergencies. North Kingstown has also entered into written agreements with the Town of Jamestown periodically for emergency water supply. An attempt to enter into a new agreement with the Town of Narragansett failed to gain the support of the North Kingstown Town Council. The Water Department is unaware of any former agreement with the Quonset Development Corporation. The Water Department will commit to

initiating discussion with all interconnected communities and the North Kingstown Town Council about the establishment of updated legal agreements.

Metering and Non Account Water

The source and distribution system is 100% metered. Master meters located at each individual well/pump station meter 100% of the water produced from the North Kingstown well field supply system. Every domestic service connection within the North Kingstown Water System is metered at the point of sale, thus providing 100% distribution metering. In recent years the NKWD has made the changeover to automatic reading and billing (ARB) remote distribution metering, and more recently to radio read meters, with the intent of recovering operating and capital costs of system operations, reducing unaccounted-for water volumes and collecting more accurate water use data. Additionally, all master meters at the well stations will be re-calibrated in the current fiscal year.

Shortly after the introduction of a disinfectant to the low service area, an increase in non-account water was evident. This was due, largely, to a scouring of biofilm in the individual service lines which allowed historic pinhole leaks to lose water at an accelerated rate. The department aggressively repaired leaks as they became evident and additionally undertook a leak detection survey by an outside contractor. Stabilization in the low service area through the action of our corrosion inhibitor additive has occurred and non-account water, which peaked in 2006 declined.

Recently, non-account water percentages have been increasing. An investigation indicated that master meters at the 11 well stations were not accurately measuring production. All master meters were recalibrated in Spring 2021.

The Department will continue to implement programs to improve the efficiency of water use and measurement.

Population Served

The service population is comprised mainly of residential, commercial, and government customers of which there are approximately 9,972 metered accounts. The total current service population has been estimated at approximately 26,212 people. The remaining residents not served by the public water system are served via private individual wells. Average day demand based on pumping data for the past five (5) years is approximately 2.6 million gallons with a maximum day demand of approximately 6.239 million gallons (July 2017).

The Town of North Kingstown has grown steadily over the past twenty (20) years. It has become evident that the more recent large lot subdivision developments use a significantly greater amount of water during the summer months than older smaller lot developments. New subdivision development in the southwest region of Town and the related prevalence of in-ground lawn and landscape irrigation systems has been the major contributors to seasonal high water demands.

This reality, that water usage in this largely residential community which is driven primarily by lawn size and the preponderance of in ground irrigation systems has caused us to rethink the format of our Major Users Technical Assistance Program (MUTAP). Rather than base this important demand management component around the traditional concepts of modification of commercial & industrial water usage, NKWD has decided to focus its MUTAP on the high usage irrigation accounts as well. Details of the program are included within the body of this WSSMP.

Demand Management

Pursuant to R.I. General Laws 46-15-8, as well as 46-15.3-5.1, 46-15.7-3, 46-15.8-5 the Water Resources Board has promulgated the Water Use and Efficiency Rule for Major Public Water Suppliers. The rule establishes targets and methods for efficient water use and requires that each major supplier prepare a Water Efficiency and Demand Management Strategy (DMS) to achieve the identified targets. Water use efficiency targets are to be reached through the application of required methods identified in section

4.1 of the rule and through the application of selected optional methods listed in section 4.2 and/or any other methods as appropriate.

The Water Department is very cognizant of the fact that the maximum day demand is encroaching on the available safe yield of its sources. A demand management program including revisions to the water service area, twice a week lawn irrigation restrictions and customer education programs have been implemented. Recent concerns regarding the Hunt River and the impact of water withdrawal on the availability of streamflow have resulted in a more focused effort to reduce seasonal demand increases and wasteful use of water. North Kingstown continues to employ proper system management procedures aimed at increasing the overall operating efficiency of its water supply distribution system with the underlying theme of water conservation.

Available Water and Safe Yield

North Kingstown's total pumping capacity in the Hunt, Annaquatucket, Pettaquamscutt Aquifer System is approximately 8.9 MGD but in reality the flow would be less given that individual well yield is less when other wells nearby are pumping at the same time. Previous Water Supply Management Plans used available water estimates published in the USGS water supply papers. These plans failed to acknowledge that the USGS reports did acknowledge the streamflow implications of pumping at these levels during dry periods or under drought conditions.

The recent estimates developed by the Water Resources Board applying the RIDEM developed Streamflow Depletion Methodology indicate that the low flow allowable depletion in the Hunt, Annaquatucket, Pettaquamscutt Aquifer System is approximately 4.8 MGD. The fact that seasonal high water demand associated with North Kingstown's current customer base occasionally exceeds 4.8 MG, demonstrates the need for continued management of our current supply sources and the need to look for sustainable future sources of water supply.

Anticipated Future Demands

In 2012 the North Kingstown Town Council approved an amendment to the North Kingstown Comprehensive Plan that included revisions to the North Kingstown Water Service Area. This revision is meant to aid in meeting the goals of the Water Use Efficiency Act, to support state and local efforts to direct growth to appropriate areas, and to promote protection of outlying land areas, which in North Kingstown includes our sensitive groundwater protection zones. As part of this effort, the Horsley Witten Group (HW) was tasked with preparing a buildout analysis of the revised Water Service Area. Looking at a 20-year horizon, HW developed estimates for the number of potential residential units and commercial and industrial acres that could be served and estimated the demand in gallons per day under the revised Water Service Area Map based on existing zoning designations. The analysis also took into consideration parcels outside of the revised Water Service Area that have frontage on existing water mains. The results of their analysis estimated an average day increase of 1.7 MG and a peak day increase of close to 4 MG¹.

Rate Structure and Financial Management

The North Kingstown Town Council did adopt a Water Rate schedule that includes inclining block rates for all water customers and a “fourth tier” for residential customers to discourage excessively high water use. The rate schedule includes a base rate set at the average cost of producing and distributing water. There was consensus among the Town Council members that all or a portion of the funds generated by the fourth tier could be used to finance education and incentive programs.

Recently, the fixed costs (flat fee) were adjusted to more truly reflect costs associated with metering and billing; the infrastructure replacement fee was increased to a number based upon the costs identified in the CWIRP. The actual per gallon rate was not increased.

¹ Multiplier used for peak based on 2005 water pumping data

Emergency Management

The Emergency Management section of the Plan establishes the responsibilities and authority within the NKWD for responding to most probable emergencies and outlines specific tasks for carrying out functional and constructive solutions based on a review of the potential emergencies and risks. The procedures are consistent with the goals of the State Emergency Water Supply System Management Plan. It is also intended that this document provide guidance to ensure that the primary aspects of recovery from an emergency are addressed in an organized manner to aid in an efficient response and in maintaining drinking water quality and quantity. This Emergency Management section was updated in the spring of 2020 to operate as a “stand alone” document capable of being utilized in all emergency situations. This was done in conjunction with the federally mandated vulnerability assessment. In addition to updating contact information, which included adding websites and email address, an epidemic/pandemic section was added.

Water quality protection has always been of the highest priority to the North Kingstown Water Department, and in spite of the continuing source water protection assessment which indicates that the water supply has a low susceptibility for contamination, it is understood that any supply can become contaminated. Ongoing diligent protection efforts are critical to continue to protect this critical asset.