This Water Supply System Management Plan (WSSMP) has been prepared as required under 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 Rhode Island Water Resources Board (RIWRB). To this end, the RIWRB has promulgated the Rules and Regulations for Water Supply System Management Planning (490 RICR-00-00-2) and the Water Use and Efficiency Rule for Major Public Water Suppliers (490 RICR-00-00-1).

The Jamestown Water District (JWD), as a water purveyor supplying over 50 million gallons (MG) of water a year, is responsible for updating its WSSMP every 5 years. This WSSMP update has been prepared to be consistent with the goals of the Rules as well as the strategies and goals articulated in the RIWRB's 2012 Strategic Plan and the RIWRB's Water Use and Efficiency Rule for Major Water Suppliers. It is also consistent with the goals of State Guide Plan Element No. 721 – RI Water 2030 and the goals stipulated in the Comprehensive Plan for the Town of Jamestown.

Background

The JWD was established by legislation of the General Assembly of the State of Rhode Island in March 1969. The original system, privately developed and owned, dated back to 1890. The source of supply was derived from two surface water storage impoundments, the North and South Ponds, constructed in 1901 and 1909, respectively. North Pond was expanded to increase overall capacity in the early 1900s. The JWD, to this day, continues to derive its primary source of supply from North Pond.

A conventional water treatment plant was originally installed in 1920 and upgraded periodically over time. By the 1950s, the system served approximately 2,000 year-round residents and up to 4,000 seasonal residents. A distribution system and storage tank was in place to serve the southern portion of the island south of Rhode Island Route 138. In 1991, the Town constructed a new pretreatment facility and main treatment plant. The Town has since constructed a new treatment plant to replace the prior facility, which was put into service in 2010.

The main service area for the public water supply is the Village area of Jamestown. The urban district is the area which has historically served as the commercial and residential focus for the island. Public services and facilities have traditionally been located in the Village area. Water service is also supplied to the rural water district, the area to the south of the Village area. Water service connections in the rural water district area are subject to the approval of the Town's Board of Water and Sewer Commissioners and must be consistent with the Comprehensive Community Plan.

Water System Description

The JWD supply and distribution system is classified by the Rhode Island Department of Health as a "Community" Public Water Supply System. As such, the system is required to conform to applicable rules and regulations of the Rhode Island Department of Health (RIDOH) and the Federal Safe Drinking Water Act (SDWA). The water system currently maintains full compliance with the stipulations of these rules and regulations.

The existing JWD system was developed primarily from the original water supply system that originated in the 1890's. Improvements to the infrastructure have been implemented over the years to maintain and upgrade the system to keep pace with increasingly stringent water quality regulations. The water quality has consistently been rated as good to excellent with occasional exceedances of secondary water quality standards for color and turbidity from the surface water supply of the reservoirs.

The water supply consists of two reservoirs that capture surface water runoff and two supply wells. The North Pond reservoir has a watershed of approximately 192 acres and a water body of 25.4 acres with a net usable water volume of 60 million gallons (70 million gallons total storage). The South Pond reservoir has a watershed of approximately 449 acres and a water body of 4.67 acres with a net useable volume of 8 million gallons (10 million gallons total storage). The two reservoirs are interconnected and deliver water to the treatment facility through a 10-inch PVC main. The total maximum safe day yield for North Pond is 194,000 gallons per day (gpd) and it is 89,000 gpd for South Pond. Two supply wells, JR-1 (installed 1996) and JR-3 (installed 2004), are each rated for 50,000 gpd though only one can be used at a given time. The JWD also maintains a non-permanent emergency interconnection (6-inch flexible water line) with the Town of North Kingstown water system across the Jamestown Verrazano Bridge. The interconnection has the capability of supplying the JWD with up to 200,000 gallons daily but is only used for emergencies. It has not been used since 2002.

The system employs a pretreatment facility located at South Pond. This facility pretreats between 180,000 to 350,000 gpd. Pretreatment consists of pH adjustment, chlorine dioxide (ClO_2) bleaching for odor, color, and taste, and flow monitoring. The main water treatment plant is a new facility that was constructed in 2010, replacing a facility that had been in service since 1991. The new facility was designed to treat up to 500,000 gpd, including raw water from South Pond. It also produces higher-quality finished water and reduces backwash water discharges to Great Creek.

Raw water enters into the clearwell of the 1991 treatment plant before passing through a screener and then into a chemical mixing tank where it undergoes pH adjustment and coagulant addition. Flow then splits into parallel treatment trains consisting of coagulation basins and membrane filtration basins. Finished water is pumped to the system's two storage tanks by a pump station with two 350 gpm pumps.

The transmission and distribution system consists of upwards of 20.5 miles of asbestos cement, cast iron, and polyvinyl chloride (PVC) pipeline, the majority of PVC piping is less than 20 years in age and ranges in size from 6 inches to 12 inches. New and replacement main sections consist predominantly of PVC pipe. The service area is operated as a single pressure zone that is controlled by the overflow elevation (204.0 feet MSL) of two (2) one-million-gallon storage standpipes. The original standpipe was constructed in 1974 and a second standpipe was constructed in 2007. These tanks establish the hydraulic grade and maintain system pressure in the range of 30 to 60 psi. The tanks are located alongside one another, and the useable storage capacity of each tank is estimated at 0.7 million gallons but there is a transfer pump station between the two tanks which effectively increases the usable storage of the two-tank system.

The source and distribution system is 100% metered. The water department staff is responsible for the daily operation and maintenance of the water system that also includes metering and billing of customers. The JWD is operated as an "Enterprise Fund Agency" within the municipal corporation of the Town of Jamestown. The Town has established enterprise funds for operations that are organized to be self-supporting through user charges. It is the intent that all costs of providing the services to the general public on a continuing basis be financed or recovered fully through user charges.

The service population is comprised of residential, commercial, and government customers of which there are approximately 1,548 metered accounts as of 2022. Of the 1,548 metered accounts, there are 1,420 residential accounts, 96 commercial accounts, and 32 governmental accounts. The residential service population is approximately 3,323 of the roughly 5,538 residents in Town. The residential service population was estimated using recent US Census Data that suggests there are approximately 2.34 people per household throughout Jamestown. The remaining residents not serviced by the public water system are served via private individual wells. Current average day demand (ADD), based on measured water withdrawals from the JWD's supply sources in 2022, is approximately 168,000 gallons per day. Total water withdrawals were 61.17 million gallons in 2022, primarily from North Pond with supplemental withdrawals from well JR-1. On this basis, the maximum day demand (MDD) is estimated to be 335,000 gallons per day using an assumed MDD to ADD multiplier of 2.0.

Actual metered water use in the system was estimated to be 53.90 million gallons in 2022, representing an ADD of 0.148 MGD. The vast majority of total water use, approximately 47.81 million gallons or 89%, was residential water use. Per capita residential water use for 2022 was estimated at approximately 39.4 gallons per capita per day (gpcd) on average, which is less than the last WSSMP 5-year update (41.3 gpcd).

Water Quality Protection Component

Water quality protection is an important aspect to the JWD as the source of supply continues to be affected by growth, potential pollution sources, and increases in demand. The Source Water Assessment Plan (SWAP) for Jamestown was reviewed and updated as part of this WSSMP Update and has been included as Volume II of the WSSMP.

The Town currently employs zoning ordinances, site plan reviews, and has made numerous land purchases within the watershed and wellhead protection area. It has also created conservation easements for parcels within the wellhead protection area and an overlay district has been established for the Center Island Watershed. The Town also instituted a wastewater management ordinance which specifically addresses onsite wastewater treatment systems (OWTS) in the Jamestown Shores area. The intent of this ordinance is to increase inspection and maintenance requirements on existing OWTS to help protect water resources in order to reduce potential future pressures to extend water service to this area of Town. The Town does not believe the extension of water service to Jamestown Shores is feasible based on the current available supply.

Anticipated Future Demands

JWD projected the anticipated future demand of the water system through service area population data as a result of a build-out analysis based on recent and projected land use data. Tables 3~~1, 2~~ and 4~~3~~ outline the results. JWD also compared the current bedroom data to provide the most conservative worst-case scenario with the existing town dwellings in place. The population in Jamestown is expected to rise gradually but modestly over time, and it is anticipated that the population changes in the JWD service area will generally mirror population changes throughout the Town. Also, future estimates of population for 5-year and 20-year planning periods were made using available US Census data and projections made by the RI Division of Planning and outlined in Tables 1 and 2. These population projections, as well as their anticipated impacts on future demand, are summarized in the following tables.

Table 1
CURRENT AND PROJECTED WATER CONSUMPTION RATES –
INCLUDES ~~NOMINAL~~ CENSUS POPULATION GROWTH ONLY

Year	Total Population in Jamestown	Population Projected in Service Area	Metered/Projected Water Usage				Average Day Demand*
			Residential	Commercial**	Government	Total	
2022	5,538	3,323	47.81 MG	4.21 MG	1.87 MG	53.89 MG	0.148 MGD
2027	5,597	3,382	48.66 MG	~~4.43~~5.05 MG	1.87 MG	~~54.96~~55.58 MG	0.~~151~~152 MGD
2042	5,679	3,464	49.84 MG	~~5.09~~7.58 MG	1.87 MG	~~56.79~~59.29 MG	0.~~156~~162 MGD

* Based on consumption alone (i.e. non-account water not included)
** Commercial projections based on ~~2023~~2024 Build-Out Analysis Data

Residential water use for the 5-year period was projected based on a service area population of 3,382 people and an average per capita residential water use of 39.4 gpcd equivalent to the average per capita residential water use for 2022. Only modest population growth is expected over this timeframe and residential water use is anticipated to remain relatively consistent. Similarly, residential water use for the 20-year planning period was projected based on a service area population of 3,464 and 39.4 gpcd. This assumes that efficient residential water use continues to be a priority in Jamestown.

Water use by the ~~commercial and~~ government sectors in Jamestown has declined over time, and relatively little ~~commercial and~~ governmental development is expected in the JWD service area or in Jamestown as a whole. Governmental water usage for the 5-year and 20-year planning periods were projected to be equivalent to the fiscal year 2022 governmental usage of 1.87 MG. As part of the ~~2023~~2024 build-out analysis, the current commercial vacant land use for new development is almost at capacity and not much commercial growth is expected from vacant land use. There is potential commercial growth for existing commercial non-vacant lots that could be sub-divided into new lots that would increase system demand ~~slightly~~ overtime. The commercial zone growth from non-vacant commercial lots is expected to be for residential usage with two (2) condos per lot. However, this growth would ~~be minimal and~~ not expected to occur all at once. As a result, commercial water usage for the 5-year and 20-year planning periods were projected to increase by ~~one (1~~five (5) new commercial ~~connection~~connections each year. In 2042, the potential commercial growth would be close to capacity based on the development of non-vacant lots. Commercial non-vacant lot build-out development would be at capacity in ~~2050~~2053 if ~~one (1~~five (5) new commercial connection is established each year from 2022.

The JWD has traditionally used a maximum day to average day peaking factor of 2.0 to estimate maximum day demand (MDD) in the system. Table 2 shows the current ADD and MDD as well as projections for the 5-year and 20-year planning periods, based on consumption.

Table 2
CURRENT AND PROJECTED AVERAGE DAY & MAXIMUM DAILY DEMANDS ON ~~NOMINAL~~ CENSUS POPULATION GROWTH ONLY

YEAR	AVERAGE DAY DEMAND*	MAXIMUM DAY DEMAND**
2022	0.148 MGD	0.296 MGD
2027	0.~~151~~152 MGD	0.~~302~~304 MGD
2042	0.~~156~~162 MGD	0.~~321~~324 MGD

* Based on consumption alone (i.e., non-account water excluded)
** Estimated using MDD to ADD ratio of 2.0

Projected estimates for water produced have been made assuming ~~15~~11.88% non-account water, consistent with State goals. Therefore, the ADD and MDD based on water production are estimated to be 0.16~~871~~ MGD and 0.3~~642~~ MGD, respectively.~~,~~ F~~f~~or the 5-year planning period.~~,~~ ~~Similarly,~~ the ADD and MDD are estimated to be 0.17~~15~~ MGD and 0.3~~4250~~ MGD, respectively.~~,~~ Similarly, the ADD and MDD are estimated to be 0.175 MGD and 0.350 MGD for the 20-year planning period. It is noted that non-account water currently is below 15% (11.88%) but it has met the State's goal of 15% in the past. This is mostly attributed to the process water requirements for the operation of the water treatment plants.

In January 2023, Rhode Island General Law 45-24, as amended and titled, "An Act Relating to Towns and Cities – Zoning Ordinances", allows the owner to build an accessory dwelling unit (ADU) on any lot with a total area of 20,000 square feet or more for which the primary use is residential and where the proposed ADU is located within the existing footprint of the primary structure or existing secondary attached or detached structure and does not expand the footprint of the structure. The legislation was passed to address the projected shortage of housing by making it easier to build ADUs.

In ~~2023~~2024, the Town of Jamestown conducted an updated build-out analysis to reflect the current residential and commercial land use within the Town to forecast the potential new dwelling units and its impact on the existing water system. The potential new dwelling units were calculated using the current residential and commercial minimum lot zoning requirements on the developable vacant and non-vacant lots, and ADUs on residential vacant and non-vacant properties with lot sizes equal to or greater than 20,000 square-feet.

Table 3 contains the 5-year (2027) and 20-year (2042) future water use projections in the JWD water system ~~as noted above in Table 1 with the inclusion of the~~ estimating the~~ed~~ residential and commercial population growth from potential current developable vacant and non-vacant lots, and ADUs. For this analysis, the governmental water usage remained the same as in Table 1 since it's not anticipated that there will be much growth in these areas in the coming years. The commercial water projections as explained above and noted in Table 1 will be used in Table 3.

ADUs in Table 3 are estimated based on 12 new dwelling units constructed each year with half of the dwelling units being one-bedroom and the other half of the dwelling units being two-bedroom. Each year estimates that the Jamestown population will grow by 36 people (two people per bedroom) with the construction of ADUs alone. Table 3 also estimates that each year 4.0 vacant lots and 5.5 sub-dividable lots are used for new home construction with includes condominiums.

Each year estimates that the Jamestown population will grow by 22 people (2.34 persons per household) with the development of vacant and non-vacant developable sub-dividable properties. In total, each year there is an estimated population growth of 58 people in Jamestown.

Table 3
CURRENT AND PROJECTED WATER CONSUMPTION RATES
INCLUDES ~~NOMIMAL~~ POPULATION GROWTH BASED ON ~~AND~~ BUILD-OUT ANALYSIS DATA**

Year	Total Population in Jamestown***	Population Projected in Service Area With ~~2023~~2024 Build-Out Analysis	Metered/Projected Water Usage				Average Day Demand*
			Residential	Commercial	Government	Total	
2022	5,538	3,323	47.81 MG	4.21 MG	1.87 MG	53.89 MG	0.148 MGD
2027	6,023~~5,829~~	3,614	~~56.19~~51.99 MG	~~4.43~~5.05 MG	1.87 MG	~~62.49~~58.91 MG	0.~~171~~1614 MGD
2042	7,479~~6,646~~	4,~~431~~488	~~79.69~~64.57 MG	~~5.09~~7.58 MG	1.87 MG	~~86.65~~74.02 MG	0.~~237~~2038 MGD

* Based on consumption alone (i.e., non-account water not included) with residential population increase from ~~2023~~2024 Build-Out Analysis)
** Based on residential and commercial projections from ~~2023~~2024 Build-Out Analysis Data
*** Assumed growth at the same rate as the water district

Table 4
CURRENT AND PROJECTED AVERAGE DAY & MAXIMUM DAILY DEMANDS
BASED ON
~~NOMINAL POPULATION GROWTH AND~~ BUILD-OUT ANALYSIS DATA

YEAR	AVERAGE DAY DEMAND*	MAXIMUM DAY DEMAND**
2022	0.148 MGD	0.296 MGD
2027	0.~~171~~1614 MGD	0.~~342~~3228 MGD
2042	0.~~237~~2038 MGD	0.~~474~~4016 MGD

* Based on consumption alone (i.e., non-account water excluded)
** Estimated using MDD to ADD ratio of 2.0

Projected Future Demand Based on Bedroom Data Only

JWD also compared the current bedroom count in the water district to get a sense of what the future water demand would be if every bedroom currently in the water district was occupied. Currently, there are 4,271 total bedrooms in the water district and with two people per bedroom at 39.4 gpcd (estimated above), the future water demand could be as high as 337,000 gpd. This value represents the MDD that is currently experienced within the system at times and provides the most

conservative worst-case scenario. The MDD is reached normally at the height of the summer season when there are a lot of seasonal visitors to the Town. ~~This scenario suggests that the addition of houses in the future would need to be evaluated since this would increase the overall MDD.~~

Available Water

The primary supply for the JWD is surface water from North Pond, supplemented with water from South Pond. Supplemental water from South Pond can be transferred to North Pond but only when water is flowing over the dam at South Pond. The capacity and safe yield of North and South Ponds, based on the most recent safe yield analysis performed in 2000, is as follows:

Reservoir	Area	Usable Capacity	Safe Yield
North Pond	25.4 Acres	60 MG	194,000 gallons/day*
South Pond	4.67 Acres	8 MG	89,000 gallons/day

South Pond has not been used for a number of years due to water quality concerns. The new treatment plant was designed with the ability to treat water from South Pond but the treatment process is inefficient due to the amount of sludge generated. *Currently, JWD is using the safe yield for North Pond of 185,000 gpd as a result of the RIDEM analysis and Drought of Record. South Pond is not available during dry periods and is only used to transfer water to North Pond when water is flowing over the South Pond dam.

The JWD also has two supply wells, JR-1 and JR-3, which each has a 50-gpm pumping capacity and safe yield of 50,000 gallons per day. Only one well is used at a given time, typically JR-1. Water from JR-1 is pumped only when the water treatment plant is in operation. As a result and based on plant data, flow from JR-1 varies between the range of 24,000 and 48,000 gallons per day. Flow from JR-1 varies throughout the year between this range and is at maximum pumping capacity during summer months. Currently, supply well JR-3 is not being used due to water quality concerns.

The current and projected future MDD, as well as the ADD during the peak summer season, exceed the safe yield of North Pond and often exceeds the combined safe yield of North Pond and JR-1. The JWD has taken a number of actions to manage demand, which is reflected by the decreases in water use when compared to previous versions of this WSSMP. However, it is imperative that the JWD continue to promote efficient water use, monitor land use and development within the service area, reduce leakage, improve their understanding and accounting of non-account water, and implement other demand management strategies to reduce pressures on the supply sources currently available to the JWD.

Demand Management

The *Rules and Procedures Governing the Water Use and Efficiency Act for Major Public Water Suppliers*, adopted May 16, 2011, established efficient water use targets for major public water suppliers, which includes the JWD. The JWD's 2012 Demand Management Strategy, and this update of the WSSMP, showed that the JWD is in general compliance with the residential average per capita water use goal of 65 gpcd, which was most recently estimated at 39.4 gpcd for 2022.

The JWD estimates non-billed water from various uses, such as firefighting, system flushing, and use at the treatment plant meets the metering and billing requirements stipulated in the Act, which includes quarterly billing for the entire system and the use of radio-read meters. The JWD encourages the use of water-efficient appliances and provides educational materials to the customer

base.

The 2012 Demand Management Strategy estimated average leakage in the distribution system to be approximately 8.6% of system-wide water use, meeting the State's goal of 10%. However, recent estimates of leakage as reported in this WSSMP are lower, estimated at about 1.6% for 2022 based on 1.0 MG of estimated leakage. This change in estimated leakage suggests that there may be other sources of non-account water that are not being adequately accounted for and estimated. The JWD will continue to assess leakage rates and will review their accounting of non-billed water as a whole.

System Management

The major goals of system management include the following:

- Maintaining non-account water use to below 15% of total system demand, in accordance with State Guide Plan Element 721;
- Reducing leakage to below 10% of system demand;
- Establishing a preventive maintenance program; and
- Maintaining compliance with the applicable requirements of the *Rules and Procedures Governing the Water Use and Efficiency Act for Major Public Water Suppliers*.

The JWD shall continue to employ proper system management procedures including programs for meter management (source and distribution), leak detection and repair, implementation of their preventive maintenance plan, infrastructure rehabilitation, and a billing rate schedule which promotes efficient and non-wasteful water use. It is intended that the financial management of the system will be one in which normal operation, maintenance, and rehabilitation will be funded through operating revenue from the customer base. Where possible, the JWD shall seek alternate funding sources such as State and Federal grants, for major improvement projects.

Emergency Management

The Emergency Response Section of this WSSMP was reviewed and modified accordingly as part of this WSSMP Update. The Emergency Response section generally establishes the following:

- Responsibilities and authority within the JWD for responding to most probable emergencies;
- Most probable causes for emergencies and their potential impacts to the system;
- System components that are vulnerable to damage or incapacitation based on the most likely causes for emergency; and
- Specific tasks for carrying out functional and constructive solutions based on a review of the potential emergencies and the associated system risks.

The procedures outlined are believed to be consistent with the goals of the State Emergency Water Supply System Management Plan. In addition to emergency response, it is also intended that this section of the WSSMP 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.

Drought Management

The JWD recognizes the Drought Watch/Warning System of the National Weather Service, as follows:

1. Normal;
2. Advisory;
3. Watch;
4. Warning; and
5. Emergency

The Water Resources Board administers these phases with aid from the Drought Steering Committee. The JWD takes a variety of demand and supply management actions based on the various stages of drought. The JWD also monitors the water levels in their own supply sources and takes a series of actions in the distribution system based on these measurements, as follows:

Step 1 — Capacity to -6" below capacity
No restrictions

Step 2 — -6" to -1' below capacity
Public notification – voluntary conservation.

Step 3 — -1' to -2' below capacity
Restrict outside water use to odd/even days for residential use.

Step 4 — -2' to -3' below capacity
Reduce water pressure 5 psi.
Continue public notification for voluntary conservation.

Step 5 — -3' to -3.5' below capacity
Reduce pressure 5 psi.
Establish a residential ban on car washing and lawn watering.
Restrict swimming pool filling.

Step 6 — -3.5' to -5' below capacity
Ban outside water use entirely.

Step 7 — -5' to -6' below capacity
Reduce pressure 5 psi.
Restrict water use at marinas to potable water use only.
Begin commercial carwash and other non-essential commercial use restrictions.

Step 8 — -6' to -7' below capacity
Restrict all non-essential water use.

Step 9 — -7' to -8' below capacity
Reduce pressure 5 psi.
Continue restrictions on all non-essential water use.

Implementation and Financial Management

The JWD has undertaken two projects in an effort to increase supply, which is the most significant challenge facing the JWD system. One of these projects was a pumping system that recirculates treatment plant backwash water as opposed to dumping it to Great Creek. It is anticipated to be completed soon and is estimated to save the JWD approximately 6.05 million gallons annually once

completed. A second project, which is currently in the preliminary evaluation stage, would include modifications to a stormwater pump station operated by the Rhode Island Bridge and Turnpike Authority (RIBTA) on North Road and Route 138 that may allow for recharge of the watershed to North Pond.

The JWD is operated as an Enterprise Fund, with annual operating revenue of approximately $1.4 Million and annual expenses typically around $1.1 Million. The remaining revenue is used for debt service. The JWD bills residential and commercial customers quarterly. Current rates, which went into effect in June 2022, are as follows:

Table 5
WATER RATES - MINIMUM IN ADVANCE CHARGES
Source: Jamestown Water Department

Meter Size	Quarterly Billing Rates	Seasonal Billing Rates	Miscellaneous Charges
5/8”	$89.82	$340.84	Turn-on/off $30.00
3/4"	$134.80	$511.59	Install/Remove $100.00
1”	$167.42	$635.36	Early Install/Remove $50.00
1-1/2”	$206.22	$781.78	Sprinkler Charge/unit $0.18
2”	$268.63	$1,019.50	Frozen Meter Charge $125.00
3”	$495.25	$1,879.56	Special Reading $20.00
4”	$745.46	$2,828.23	Call Out $150.00
			Lien Discharge Recording Fee $49.00

Table 6
CURRENT EXCESS WATER RATES
Source: Jamestown Water Department

Gallon Tier Structure		Rate per 1,000 Gallons
0	5,000	$0.00
5,001	9,999	$7.98
10,000	14,999	$8.58
15,000	19,999	$10.87
20,000	49,999	$15.13
50,000	99,999	$18.56
100,000	199,999	$23.76
200,000	999,999,999	$30.24

Table 7
EXCESS SEASONAL WATER RATES
Source: Jamestown Water Department

Minimum	Maximum	Rate per 1,000 Gallons
0	20,000	$0.00
20,001	49,999	$15.13
50,000	99,999	$18.56
100,000	199,999	$23.76
200,000	999,999,999	$30.24

Coordination

The 2015 Jamestown Comprehensive Plan, which was adopted by the Jamestown Planning Commission and Jamestown Town Council on June 18, 2014, was reviewed while updating this WSSMP and it is the intent that this WSSMP be consistent with the goals and policies of the Town's Comprehensive Plan.

The Preamble to the Comprehensive Plan identifies that the driving theme of the plan is to maintain the town's rural character. The Comprehensive Plan also indicates that the "Center Island Watershed should continue to be protected. Development should not exceed on-island natural supplies of water. Conservation of existing water supplies should continue to be emphasized, as well as finding new methods to supplement the existing yield." The Comprehensive Plan lays out a number of goals and recommended actions in order to protect the quality and quantity of the potable water resources on the Island. The JWD acknowledges and supports these goals and recommended actions.

The JWD has a non-permanent emergency interconnection with the Town of North Kingstown and maintains a close working relationship with the Town with regard to the maintenance of the emergency interconnection. The JWD also coordinates with the local fire department to track water usage for firefighting and training exercises. The JWD estimates that approximately 100,000 gallons of water is used annually by the fire department.

Municipal wastewater collection and treatment, in addition to water supply, is provided by the water and sewer division of the town's Department of Public Works. The Jamestown Town Council sits as the Board of Water and Sewer Commissioners. Joint billing is not currently in place but may be a future consideration in Jamestown.

SECTION 1.0
GOALS STATEMENT

The overall goal of this 5-year update to the Water Supply System Management Plan (WSSMP) for the Town of Jamestown Water Department (JWD) is to provide a document that complies with the provisions of the Water Supply System Management Act. Ultimately, it provides a comprehensive analysis of past years in order to establish the water system's needs in the future. Appendix A includes the worksheets that accompany this WSSMP, current and projected data applicable to the system.

This document is intended to comply with the provisions of the latest edition of the Rules and Procedures for Water Supply System Management Planning (490 RICR-00-00-2) and the Water Use and Efficiency Rule for Major Public Water Suppliers (490 RICR-00-00-1). These rules were promulgated in accordance with Chapter 42-35 pursuant to Chapter 46-15.3 of the Rhode Island General Laws, as amended.

1.1 General JWD Goals and Objectives

The JWD's primary objective is to operate a water system for the benefit of and to meet the legitimate needs of, the customers in its service area. In accordance with that objective, the JWD's specific goals are to:

1. Protect the integrity of the watershed, by preventing potential pollutants from entering the water distribution system.
2. Maintain or increase the available water supply to meet existing and future demand.
3. Promote the efficient use of water through:

    a. Conservation and efficient operation of the system in accordance with industry and State standards; and
    b. Effective metering and public information programs that encourage water conservation.

4. Plan for future development such that the water supply system is not extended beyond its capacity, in order to provide safe, clean drinking water.
5. Maintain and upgrade the distribution network to decrease the volume of unaccounted water.
6. Investigate alternatives to increase the safe daily yield of the water system.
7. Regulate expansion of municipal water service.
8. Comply with all applicable laws and regulations.
9. Conform to the overall goals for water suppliers established in State Guide Plan Element No. 721 – Rhode Island Water 2030.

1.2 State Guide Plan Element 721 - Rhode Island Water 2030

Goals and objectives specific to public water suppliers are outlined in State Guide Plan Element 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."

The goals of this WSSMP are consistent with those of Rhode Island Water 2030, as follows:

Integrated Management and Planning Goals

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

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

IMP-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.

1.3 RIWRB Strategic Plan

The Rhode Island Water Resources Board (WRB) established a Strategic Plan in 2012 to articulate a strategy of achieving its primary duty, which is to "…regulate the proper development, protection, conservation and use of the water resources of the State". These actions form the WRB's four primary goals for managing the water resources of the State. The JWD shares these goals and operates the water system with those in mind. This WSSMP is intended to be consistent with these objectives.

SECTION 2.0
WATER SUPPLY SYSTEM DESCRIPTION

Background

The Town of Jamestown Water Department was established by legislation of the General Assembly of the State of Rhode Island in March of 1969 to provide for a public water supply to the Town of Jamestown. However, the water system on the island dates to 1890. It was owned and operated by the Newport Water Works Corporation until 1940 when ownership was passed to the Jamestown Water Company. Before 1969, ownership of the water system was by private entities. Legislation establishing the public water supply in Jamestown is provided in Appendix B.

Source of supply, dating to the original development of the system, has been from surface waters impounded in two reservoirs, Carr Pond (North Pond) and Watson's Pond (South Pond), which were constructed in 1901 and 1909, respectively. Storage capacity was increased at Carr Pond, the main supply source, in 1927 by raising the embankment height.

A water treatment plant was installed circa 1920 which included the conventional processes of coagulation, flocculation, sedimentation, and filtration. Subsequently, in the 1950s, the treatment process was expanded to include the addition of chlorine, chlorine dioxide, aluminum sulfate (alum), and lime.

By 1950, it was estimated that the system served approximately 2,000 year-round residents and up to 4,000 variant summer residents in the southern portion of the Town, south of Route 138. The distribution system consisted of upwards of 12.5 miles of pipeline ranging in size from 4 to 12 inches and was constructed predominantly of cast iron (unlined) and cement pipe. At that time the system had one storage tank, constructed in 1914 with a capacity of 360,000 gallons. Pressures in the system ranged from 30 – 60 psi. It has been reported that average daily demand ranged from 0.10 to 0.33 million gallons per day (MGD), with a maximum day demand of 0.586 MGD.

A water treatment and filtration plant with automated controls was constructed in 1991. Treatment processes at this plant included upflow clarafloculator filtration package units, pH adjustment, disinfection, and corrosion control. This treatment plant has since been replaced with a new, state-of-the-art membrane filtration plant that was put into service in 2010. There is also a pre-treatment facility at South Pond, capable of pre-treating between 180,000 and 350,000 gallons of raw water per day with pH adjustment and chlorine dioxide (ClO_2) bleaching for odor, color, and taste. Treated water is pumped from the treatment plant to two 1.0 MG standpipes for distribution into the system.

2.1 Organization and Legal Structure

The Town of Jamestown owns, operates, and maintains a water distribution system that serves approximately 3,323 customers in town. The Town operates under the Council-Administrator form of government. The Town Council, which sits as the Board of Water and Sewer Commissioners (Board), is the governing body of the Town's water supply. The Board creates and administers public water policies through the Town Administrator and Public Works Director who is the head of the Water Department. The Public Works Department, Town Engineer, and Water Division personnel are responsible for the full implementation and operation of the public water supply. Figure 2.1, provided on the following page, is the organization chart for the Town's Water Division.

Replace this page with Figure 2-1

The Water Division, under the direction of the Public Works Director, is responsible for the maintenance and operation of all physical facilities related to water supply, treatment, and delivery. The Water Division has three full-time employees. In addition to the Public Works Director, there is one other staff member at the managerial level. The Treatment Plant Operator must meet state certification requirements. The water system is designated by the State of Rhode Island Department of Health as #1858419.

2.2 System Description

The system consists of two surface reservoirs, a treatment plant put into service in 2010, a pretreatment facility at South Pond, two bedrock supply wells, one pumping station, two water storage facilities, and the distribution piping network. Distribution piping consists of approximately 20.5 miles of mostly 6- and 8-inch water main. The current system was largely developed and expanded over time from the original system of the 1890s.

The main service area for the public water supply is the Village area of Jamestown. This area has historically served as the commercial and residential center of the Island and public services and facilities have traditionally been confined to this part of Town. Water service connections in this area are subject to the approval of the Town's Board of Water and Sewer Commissioners and must be consistent with the Comprehensive Community Plan.

2.3 Supply Sources

2.3.1 Surface Water Supply

Jamestown's surface water resources consist of two surface reservoirs, located within a single watershed. Nearly 99% of the water is surface runoff, with a minimal portion coming from underground springs. Total land area comprising the watershed is 640 acres. The watershed is located in the central portion of Conanicut Island. Land use in the watershed is primarily low-density residential. The following is a breakdown of the surface water sources, including safe yield estimated from a Safe Yield Analysis performed by Fay Spofford & Thorndike in 2000. Supplemental water from South Pond can be transferred to North Pond but only when water is flowing over the dam at South Pond.

Reservoir	Area	Usable Capacity	Safe Yield
North Pond	25.4 Acres	60 MG	194,000 gallons/day*
South Pond	4.67 Acres	8 MG	89,000 gallons/day

South Pond has not been used for a number of years due to water quality concerns. The new treatment plant was designed with the ability to treat water from South Pond but the treatment process is inefficient due to the amount of sludge generated. *Currently, JWD is using the safe yield for North Pond of 185,000 gpd as a result of the RIDEM analysis and Drought of Record. South Pond is not available during dry periods and is only used to transfer water to North Pond when water is flowing over the South Pond dam.

North Pond, also known as Carr Pond, is located near the intersection of North Road and Route 138 and has a watershed area of 192 acres. Its total capacity is 70 million gallons (MG) with a net usable volume of 60 MG. South Pond, referred to as Watson Pond, is located just north of Great Creek on the western side of North Road. It receives excess spillover from North Pond plus runoff

from an additional 449 acres of watershed area. Its usable capacity is approximately 8 MG and a total capacity of 10 MG.

Water quality in North Pond has historically been better than South Pond and is used as the primary supply to the system.

There are currently no requirements from any state agencies imposing minimum downstream discharge release from either of the two surface water supplies. No such future requirements are envisioned at this time.

2.3.2 Groundwater Resources

The subterranean composition of Conanicut Island is bedrock and glacial till. In an effort to augment Jamestown's water supply, two deep bedrock wells (JR-1 and JR-3) were drilled to the south of North Pond with capacities ranging from 45,000 to 55,000 gallons per day (gpd). Water from JR-1 and JR-3 is pumped directly into the transmission main between North Pond and South Pond at rates up to 50 gpm. Both JR-1 and JR-3 are limited, per the Rhode Island Department of Environmental Management and the Rhode Island Department of Health, to a 48-hour operating cycle, which alternates both wells. A detailed description of each facility is provided in Worksheet No. 2.

2.4 Infrastructure Components

2.4.1 Water Treatment

Raw water from North Pond flows through a 7,500-foot long, 10-inch PVC pipe to the pumping/pretreatment station located at South Pond (Reference Map 1). The pump station can pump from either the North Pond pipe or directly from South Pond, depending on the level in the reservoirs. At this stage, the water supply receives primary treatment in the form of chlorine dioxide to kill bacteria and microorganisms at a pre-treatment facility before it is pumped to the primary water treatment facility. Worksheet No. 5 provides additional information relative to the raw water pump station.

A new, state-of-the-art treatment facility was constructed and put into service in May 2010 on the site of the pre-existing treatment facility on North Road. The prior treatment facility last underwent significant renovation and upgrades in 1991, but the new treatment plant was constructed with higher treatment capacity (500,000 gallons per day), improved finished water quality, and to lower backwash water requiring discharge to Great Creek.

The raw water wetwell of the 1991 treatment facility remains in use. Raw water enters this wetwell where it passes through a basket screener before flowing into a chemical mixing tank for pH adjustment (potassium hydroxide) and coagulant (alum) addition. Flow splits to parallel treatment trains consisting of coagulation basins and membrane filtration basins. Treated water is stored in an underground clearwell original to the 1991 treatment facility, and then is pumped from a transmission pump station located on North Road. The storage capacity of the clearwell is 38,000 gallons. Additional information on the treatment facilities in use in the system is provided on Worksheet No. 3. Figure 2.2, provided on the following page, is a flow diagram of the processes at the new treatment plant.

2.4.2 Storage Facilities

The system contains two 1.0 MG steel standpipes located on Howland Avenue. The original tank (South Tank) was constructed in 1974 ~~and was last repainted in 1998.~~. . It was most recently inspected in ~~2012~~2019 and is typically inspected every five years. The other standpipe (North Tank) was constructed in 2007 to provide supply redundancy to help correct fire flow deficiencies and increase emergency storage, while also providing more flexibility for tank maintenance. It was most recently inspected in 2013. The exteriors of both tanks were repainted in 2023.

Both tanks have a 41-foot diameter, height to overflow of 101 feet, and usable capacity of 700,000 gallons. The system operates as a single pressure zone set by the elevation in the two standpipes.

The JWD installed a transfer pumping station between the two tanks to take advantage of the water stored in the bottom of each standpipe that would otherwise not be considered usable storage. Additional information is provided on Worksheet No. 4.

Replace this page with Figure 2.2

2.4.3 Pumping Station

The JWD has one finished water booster pump station, located on North Road. The pump station has two, 350 gpm pumps that are used to fill the two standpipes on Howland Avenue.

2.4.4 Transmission Mains

Including connections from the reservoirs to the treatment plant, there are five distribution lines in Jamestown that are categorized as transmission mains. They are listed on Worksheet No. 6 in Appendix A and are summarized below:

North Pond to South Pond - 7,500-foot, 10" PVC water main constructed in 1980 that is in good condition.

South Pond to Treatment Plant - 2,600-foot, 10" asbestos cement (AC) water main constructed in 1975 that is in good condition.

Weeden Lane - 2,250-foot, 10" PVC water main constructed in 1980 that is in good condition.

East Shore Road - 3,000-foot, 10" PVC water main constructed in 1991 that is in good condition.

Howland Avenue – This line was replaced in 2005 with a 12-inch DI pipe and the 2,500-foot section is in excellent condition. This transmission main connects the standpipes to the distribution system.

2.4.5 Distribution System

The JWD water distribution system consists of approximately 21 miles of water main. Distribution mains are a combination of cast iron (CI), polyvinyl chloride (PVC), cement-lined ductile iron (DI), and asbestos cement (AC) pipe. Distribution pipe sizes are either 6-inch or 8-inch in diameter. The majority of these pipelines are less than 25 years in age. New and replacement mains consist predominantly of PVC pipe.

Generally speaking, the majority of the distribution piping is in good condition. Still, the JWD has replaced over 8,000 linear feet of pipe in the distribution system since 2005. Recent water main replacement projects the JWD has completed include the following:

- Racquet Road: Installed 1,500 feet of 6” water main to eliminate a 2” water service line to multiple homes.
- Hull Cove Farm Road: Replacement of 1,400 feet 4” water main with new 6” PVC water main.
- Replaced 300 linear feet of 6” CI water main on Conanicus Avenue at East Ferry with 8” PVC water pipe.
- 2023 completion of design, permitting, and bid documents for two distribution replacement projects that have received funding:
    - To replace 3,000 linear feet of 6” CI water main with 12” DI water pipe within Narragansett Avenue.
    - To replace 3,000 linear feet of 6” CI transmission main in North Road between the water treatment plant and the village water district with a 12” DI water pipe.

These pipe replacement projects are part of an overall distribution system upgrade program the JWD is implementing to correct fire flow deficiencies and address transmission deficiencies while also replacing aging components. The program consists of pipe replacement and pipe cleaning and lining. The timeline is over an approximate 20-year period.

2.5 Interconnections

JWD is currently waiting for approval from the RIDOH on a permanent emergency interconnection with North Kingstown. The connection would be a 6-inch flexible water line that runs from a hydrant on Tashtassuck Road in Jamestown to a hydrant on Lorelei Drive in North Kingstown. The flexible water line consists of three, 2,500 linear-foot trailer-mounted hose reels, which can be installed by driving the trailer from the Jamestown hydrant across the Jamestown Verrazano Bridge to the North Kingstown hydrant. Purchase of water via the interconnection is limited strictly to emergency and can be made available by contacting the Director of Water Supply for the Town of North Kingstown. The system operates by gravity since the hydraulic grade of the North Kingstown water system is greater than that of the Jamestown Water System.

The cross-connection to the North Kingstown water system has the capacity to supply water at the rate of approximately 150 gpm (0.216 MGD). However, the North Kingstown – Jamestown Water Agreement (Appendix C) mandates that no more than 200,000 gpd may be purchased, at the sole discretion of the Director of North Kingstown's Department of Water Supply. However, this quantity alone is sufficient to meet Jamestown's demands during months of low water consumption as well as under emergency conditions. Worksheet No. 7 provides additional information relative to this interconnection.

The most recent use of the interconnection occurred in 2002 when Jamestown utilized approximately 0.91 MG from North Kingstown. In January 1994, the Water Division operated solely on the North Kingstown connection while repairs were enacted to their storage tank and other system components. From the first day of operation, this connection has been an operational success, and has helped to alleviate the burden on North Pond. The Water Department has annually renewed its agreement to purchase water from North Kingstown. It is expected that this agreement will continue as long as the connection remains active.

2.6 Service Area

2.6.1 Geographic Area

Jamestown is confined to Conanicut Island, located at the mouth of Narragansett Bay. Access to the island occurs either by the Jamestown Bridge, which connects Jamestown's western shore to the Town of North Kingstown, or by the Newport Bridge, which provides access to and from the City of Newport, which is also located on an island in Narragansett Bay.

The service area is located entirely within the Town of Jamestown and is confined predominantly to the Village and Beavertail sections of the town. The Water Regulations adopted by the Board of Water and Sewer Commissioners define the district as follows:

"Urban Water and Sewer District" shall refer to all the land in the Town of Jamestown bounded to the north by a line running east along the north property line of Plat 8, Lot 30 from the West Passage of Narragansett Bay extended to Arnold Avenue and continuing east on Arnold Avenue to North Road, then north on North Road to Whittier Road, then east on Whittier Road to Prudence Lane, then south on Prudence Land to Bryer Avenue, then east on Bryer Avenue to Calvert Place, then north on Calvert Place to Mount Hope Avenue, then east on Mount Hope Avenue to Bayview Drive, then north on Bayview Drive to property line of Plat 8, Lot 645 to the East Passage of Narragansett Bay and bounded to the south by the water shut-off at the Mackerel Cove Beach House running east along Hamilton Avenue right-of-way and along the northern edge of Plat 9, Lots 827 and 324, extended east to the East Passage of the Narragansett Bay, and further defined as that land which is encompassed within the area shown and designated as the Urban District on the Urban and Rural Water and Sewer District Map. All references to roadway boundaries are defined as the centerline of the roadway.

Figure 2.3 shows the boundaries of the Urban Water and Sewer District. Extensions of water service have been made beyond this District. These additions include service to the Beavertail area (Rural Water District), and water line extension to the Dumplings Area. No future extensions of water service are planned at this time.

Replace page with Figure 2.3

Areas outside the Water District, where water lines are currently located, are eligible for connection. Any water service connection in this area outside of the District is subject to the approval of the Town's Board of Water and Sewer Commissioners and must be consistent with the Comprehensive Community Plan. Section 13 discusses Jamestown's Comprehensive Plan as it pertains to the Water District.

2.6.2 Present and Historic Water Services

There currently are 1,420 residential services in the system. Additionally, there are 96 commercial and 32 governmental service connections in the system. There are no industrial water users in Jamestown. The sewage treatment plant is a governmental customer and four marinas that operate in Jamestown are treated as commercial customers. There is no true industrial type of establishment in Jamestown.

2.6.3 Population Served

The total population of Jamestown was estimated to be 5,538 in the 2022 U.S. Census, an increase from 5,405 people in 2010. Recent US Census Data suggests that there are approximately 2.34 people per household throughout Jamestown. The current population in the JWD water system service area is estimated to be 3,323.

2.6.4 Population Distribution and Future Land Use

The JWD service area is comprised of an Urban Water and Sewer District which comprises the "Village" part of Town and a Rural Water District that encompasses Rural Residential area in the southern part of Town, including the Beavertail section of Jamestown. A considerable portion of Jamestown's population resides outside of the water system service area., ~~as demonstrated in Section 2.6.3 above.~~

A large percentage of this resides in the Jamestown Shores area, which has relatively dense development but is not currently served with water or sewer. Jamestown Shores is along the west side of the island, primary north of Route 138. The remaining population resides in rural areas in the far north and northeast parts of Jamestown.

Urban Water District

Under the Urban and Rural Water District Regulations adopted in 1986, the Town has specific guidelines for new connections to the water system. Service connections for use other than one or two-family homes require approval of the Board of Water and Sewer Commissioners. Applicants must show to the satisfaction of the Board that the request for service:

1) is consistent with the Comprehensive Community Plan;
2) will not impair available resources of the Urban Water District;
3) will not reduce the level of fire protection; and
4) will not reduce the quality or quantity of water provided to existing users.

Property owners whose land is within the district or which has frontage on a district boundary road may request a water service connection. Because of the relatively small supply capacity of the system, no expansion of the Urban Water District is planned or anticipated at this time. Extension of water service within the Urban Water District is typically only granted when it provides a greater benefit, such as bringing fire protection to an area that currently does not have it.

Jamestown Shores Neighborhood

From time to time, the issue of water service to the Jamestown Shores area is raised. This area was subdivided in the 1940s into very small lots, and most are less than a quarter acre in size. The area is zoned R-40, which requires 40,000 square-foot lots but many of the lots do not meet this and are developed in accordance with the original subdivision. Over time, the area has transitioned from small seasonal homes to larger, year-round homes. There is currently no public water service available in the area, and each lot has its own private well and onsite wastewater treatment system (OWTS). This factor, coupled with poor soil conditions, creates the potential for groundwater quality concerns. Figure 2.4 depicts Jamestown Shores and other areas of Town.

Should water quality issues become evident in Jamestown Shores, measures may be needed to provide potable water to the area. This scenario would exact a severe financial and service burden on the Water Department. New transmission lines, pump stations, and a standpipe would be required. Also, it is unlikely that existing supply sources would be sufficient and questionable that sufficient raw water could be found on the island to meet this increased demand.

At this time there are no indications that groundwater quality has deteriorated to any significant degree that would suggest expansion of the water service area is warranted. Also, the Jamestown Comprehensive Plan indicates that extension of services to this area of Jamestown is not currently being considered. Therefore, it is imperative that the Town of Jamestown makes every reasonable effort to ensure that water quality in the Jamestown Shores area is maintained. Steps that the Town has considered and begun to implement in order to minimize health risks associated with this area include:

- Monitoring RIDEM's granting of OWTS permits in the area;
- Require maintenance of existing septic systems;
- Create a soils overlay district and prohibit OWTS where severe limitations exist;
- Strictly enforce local regulations on OWTS setbacks from wetlands; and
- Encourage property owners to consider alternative OWTS technology where appropriate.

2.7 Source and Distribution Metering

The JWD meters 100% of the water distributed to its customers. Water use is metered and billed on a quarterly basis.

The interconnection with North Kingstown is metered at both ends of the pipeline when in use, which allows leakage to be immediately detected and repaired. There also is one master meter in the system, located at the new treatment plant and described further on Worksheet No. 8. There are no major users in the system. Therefore, Worksheets Nos. 9 and 10 are not applicable to the JWD.

Replace with Figure 2.4

2.8 System Production Data

The JWD obtains its water supply primarily from North Pond with relatively little from well JR-1. South Pond and well JR-3 are typically not used under normal conditions but are also available supply sources and are protected and maintained as such. For 2022, water withdrawn from North Pond was 53.60 MG and 7.57 MG from Well JR-1 for a total of 61.17 MG. The JWD does not typically buy water from, or sell water to, other water systems at wholesale. JWD recently discovered a reporting error with the computation of the total production flow data in the system. Flow data is metered at the water treatment plant and includes flows from both the North Pond and well JR-1 production sources. JWD was also reporting the metered flow from well JR-1 separately and as a result was double counting the flow from well JR-1 in the annual reporting spreadsheets. JWD has corrected this going forward for future annual production flow reporting.

Total water production for 2022, based on withdrawals from available sources, was 61.17 MG. This is less than the water use over the last five years with the exception of 2021 (71.10 MG). Another exception to this was a relatively high withdrawal rate in 2010, which is attributed to the startup and testing of the new water treatment facility. In comparison, water withdrawn from all sources from 2017 to 2021 was reported to be 68.20 MG on average.

2.9 System Water Use

2.9.1 System-Wide and Per Capita Water Use

Worksheet No. 15 presents the Average Day Demand (ADD) based on water withdrawn from JWD's sources (North Pond and Well JR-1). The ADD for 2022 was 0.168 MGD and per capita ADD was 50.4 gallons per person per day, each based on water withdrawn from the JWD's sources and not metered water use. The per-capita ADD estimates are based on an approximate service area population of 3,323 for each month of the year. It is acknowledged that part of the JWD's service population is seasonal but accurate estimates of how the population varies throughout the year are not currently available. With that said, water use increases in the summer and the ADD for July and August 2022 was approximately 0.~~220~~245 MGD.

Worksheet No. 15 also presents the Maximum Day Demand (MDD) based on water withdrawn from JWD's sources (North Pond and Well JR-1). The MDD for 2022 is estimated to be 0.336 MG using a multiplier of 2.0 applied to the ADD, which is an assumption that has traditionally been used by the JWD. Peak hour demand data is not available.

2.9.2 Water Use by Category

Table 4.2 provides water use by category (residential, commercial, and government) based on quarterly meter readings for Fiscal Year 2022. The majority of water use was residential, approximately 47.81 MG or 89% of the 53.90 MG total used for the year. Commercial and governmental water use was approximately 7.8% and 3.5% of total water use in 2022, respectively.

Worksheet No.15 shows the 5-year and 20-year ADD and MDD water withdrawn values that will increase from the 2022 values based on the increased service area population outlined in the ~~2023~~2024 build-out analysis. These values are currently lower than the current 0.233 MGD source total water available for ADD but not MDD. For future service area population growth, it is important that JWD finds additional sources of water. The non-billed and non-metered flows are presented in Worksheet No. 11. The combined non-billed and non-metered flow for 2022 was estimated to be 7.27 MG. Worksheet No. 12 and Table 4.4 depicts the 5-year and 20-year projected

metered flows for the JWD system based on the recent ~~2023~~2024 build-out analysis. Table 4.2 shows the current metered flows based on the 2022 JWD annual report flow data as well as the service area population growth projection that is based on current US Census data and RI Division of Statewide Planning population growth data.

2.9.3 Major Users

The regulations define major users as any user who consumes in excess of 3 million gallons per year. There are no major water users in Jamestown. Worksheets Nos. 9, 10 and 13 are not applicable for this WSSMP.

Legal Obligations to Provide Water

The Town of Jamestown is obligated to supply drinking water to properties located within the Urban Water District. The Town has recently adopted regulations regarding future connections to municipal water and sewer. Jamestown has no obligations to provide specific quantities of water to any private or public water users or any other water systems.

2.9.4 Non-Account Water Use

Non-account water use consists of the difference between the volume of water metered at the point of supply, and that recorded at all points of sale. This non-account water typically consists of water consumed for both authorized and unauthorized uses. Authorized uses include firefighting, water main/storm drain flushing, sewer/street cleaning, landscaping in public areas, etc. It also includes water that is metered but not billed, and therefore is not reflected in the recorded volumes of water sold. Unauthorized uses may include system leaks, malfunctioning meters, meter pit bypasses, and water theft.

Table 2.1 summarizes non-account water use accounted for in the system for the most recent year, and Worksheet No. 11 provides non-account water for 2022 and the 5-year and 20-year projections (2027 and 2042, respectively). For now, the 5-year and 20-year non-account projections were assumed to be the same as Fiscal Year 2022. Non-account water that was accounted for was estimated to be approximately 7.27 MG in 2022.

Table 2.1
TYPICAL ANNUAL NON-ACCOUNT WATER USE (MG)

Firefighting	0.1
Main Flushing/System Maintenance	0.1
Storm Drain Flushing,/Sewer/Street Cleaning/Landscaping	0.015
Leakage	1.0
Process Water at Treatment Plants	6.05
Total	7.27

Fire Protection

Fire protection for Jamestown is offered by a volunteer fire department located on Narragansett Avenue. Water use at the fire station is metered. Response to fire emergencies requires personnel to utilize whatever water source is most readily available. Water used for firefighting is drawn from equipment tanks, hydrants, Narragansett Bay and freshwater ponds.

Average non-account water use by the fire department is approximately 100,000 gallons annually. This is used for drills, annual training, and distinguishing small fires.

Leakage

Total non-account water was estimated to be approximately 7.27 MG in 2022, which represents 11.88% of the total water withdrawn from North Pond and Well JR-1. For 2022, leakage was estimated to be 1.0 MG, or approximately 1.6% of total water use in the system.

Over the past several years, significant effort has been made to reduce water lost resulting from leakage in the distribution system. The JWD routinely checks areas where leaks have been detected in the past. Rusty water complaints are also investigated and water mains are checked. The JWD has their own leak detection equipment that they routinely use; however, leaks are often discovered quickly as the geological composition of the island results in water rising to the ground surface.

Many of the older distribution lines most at risk for leaks in Jamestown have been replaced in recent years. The reduction in non-account water since the early 2000s is attributed in part to a vigorous leak detection program as well as transmission main upgrades performed by the JWD.

Quantifiable Water Uses at the Treatment Plant

Water quality testing and plant processing volumes are necessary uses of finished water needed to ensure a continuous supply of high-quality drinking water for JWD customers. In the past, water drawn for finished-quality testing had been taken from a fixture located at the former treatment plant which ran constantly at the rate of 5 gpm (2.63 MG per year). The rationale of the JWD personnel for running the water at all times was to ensure continuous flushing so that water tests would accurately reflect water quality in the transmission main. This is not the current practice at the new treatment plant and water use for water quality testing has been reduced.

The production of potable water from the surface reservoir requires that a certain volume of water be used for processing. A relatively high volume is used at the plant due to the high level of organic matter in raw water, and the treatment plant requires an average of 1.5 MG of finished, metered water for processing each year. The primary use of this water is for cleaning equipment.

2.10 Water System Deficiencies

~~The JWD operates with few limiting deficiencies. As previous parts of this section discussed, major system improvements have been completed since the last WSSMP that have improved overall supply, system redundancy, and distribution capability. These include construction of a new treatment plant, increasing storage by construction of a second 1.0 MG storage tank, cleaning and painting of the existing 1.0 MG storage tank, and installation of a transfer pump station between the two tanks to increase useable storage volume.~~

~~Additional upgrades~~The primary deficiency in the JWD system is the lack of supply. Otherwise, the system has been well maintained.

Upgrades to the system that have been completed in recent years and underway include the following:

Reservoirs

- Completed improvements to the 850-foot earthen dam at North Pond with the installation of a toe drain along the entire length.
- Filled and re-graded the face of the entire earthen dam to improve the slope and stability of the structure.
- Replaced compressed air with a high-volume blower for the diffused aeration system within the reservoir that was used to improve raw water quality.
- Design and permitting drawings are complete for the reconstruction of the South Pond earthen dam project. The project is funded, and the construction schedule will be determined in the future.

Well JR-1

- Installed new PLC and controls for the wellhead.
- Replaced well pump and constructed well house over the well standpipe for protection.
- Installed 700 linear feet of well piping beneath grade from the wellhead to the transmission main connection to protect the line from freezing so that the well can be used year-round.

South Pond Transfer Pump

- Reconstructed the pump skid and installed new pumps to transfer water from South Pond to North Pond to increase the available supply at the reservoir.

South Pond Pretreatment Building

- Installed 2,500 linear feet of underground fiber between the water treatment plant and the South Pond pretreatment building to add it to the SCADA system.
- Installed a new PLC to integrate the chlorine dioxide system into the SCADA system for the entire treatment plant.
- Installed a backup generator.
- Shingled the water treatment building.

Water Treatment Building

- 2023 upgraded all mechanical and electrical controls for the treatment facility for the new generation of equipment installed in 2009 with the original construction of the facility and no longer supported by the manufacturer for replacement parts.
- 2023 upgraded SCADA system to a new version of the software.
- 2023 replaced membrane filters that were original to the water treatment plant construction in 2009.
- 2023 recoated steel membrane filter tanks during filter upgrade. Tanks were stripped to clean steel and coated.
- Installed new wiring between the raw water pump system and finished water high lift pump system to new equipment in the motor control center (MCC) in the treatment facility. The existing pumps were connected to the former treatment building MCC that was more than 30 years old and below flood elevation.
- Rebuilt raw water pump system with new piping and slide rails.

Water Storage Tanks

- 2023 Painting Project: There are two (2) 1-million-gallon storage tanks, one constructed in 1974 and the second in 2006. The 2006 storage tank will be cleaned and overcoated. The older storage tank will be stripped to bare steel and coated. During the painting project, improvements to the vent and overflow pipe will be completed.

- Upgraded the diffused air system at the storage tanks from compressed air to a blower pump system. The diffused air protects the storage tanks from freezing during winter conditions.

The most noteworthy deficiency in the JWD system is the gap between available supply and current and anticipated future demands. The JWD has been active at promoting water efficiency and establishing billing rates that encourage conservation in efforts to manage demand. Also, construction of a new treatment plant in 2010 with capacity of up to 500,000 gpd and the ability to treat raw water from South Pond were significant measures in managing supply. However, South Pond remains an unreliable source due to raw water quality and the treatment challenges and inefficiencies it creates.

One measure the JWD is currently taking is to reclaim approximately 6.05 million gallons of backwash water they waste from the treatment plant each year. Backwash water cannot be directed to the headworks of the treatment plant per the original design intent since attempts to do this during plant startup nearly damaged the membrane treatment units. Instead, backwash water is conveyed to two settling tanks for clarification before being discharged into Great Creek. The JWD is working with Harbor Controls for installation of a pumping system that will pump this clarified water to the plant headworks instead of discharging it. This represents a major component of non-account water that the JWD may be able to reclaim for use in the distribution system.

The JWD also plans to evaluate potential recharge of the North Pond watershed through modifying pumping at a stormwater pump station the Rhode Island Turnpike and Bridge Authority operates along Route 138. This pump station may also intercept groundwater that is then pumped out to the Bay, lowering groundwater in the watershed and potentially reducing the available water in the ponds and supply wells.

Lastly, JWD is currently evaluating the development of an existing well near the water treatment plant to supplement the raw water supply.

SECTION 3.0
WATER QUALITY PROTECTION COMPONENT

3.1 Source Water Assessment Plan

In April 2003, the University of Rhode Island Cooperative Extension, in cooperation with the Rhode Island Department of Health Source Water Assessment Program, completed a Source Water Assessment Plan (SWAP) and Wastewater Needs Analysis for the JWD. The SWAP was updated as part of the last WSSMP Update and has been updated again for this WSSMP Update. Refer to Volume II of this WSSMP. The findings of the 2022 SWAP Update determined that there was no change in the final risk rating for the Carr (North) Pond Reservoir and Watson (South) Pond Reservoir.

Figure 3.1 depicts the current land use within the source water protection area. Figure 3.2 depicts mapped sites with known contaminants based on data available from RIGIS, which shows that there are no such sites located within the source water protection areas.

3.2 Potential Impacts of Sea Level Rise

The JWD acknowledges the risks associated with the potential impacts of sea level rise on critical infrastructure, including within the water system. The treatment plant is within the 100-year floodplain and portions of the treatment plant site are located within the velocity zone. The JWD has begun evaluating and implementing modifications to minimize the potential risks associated with flooding at the treatment plant, such as elevating certain critical infrastructure components above the estimated flood elevation.

Replace this page with Figure 3-1

Replace this page with Figure 3-2

SECTION 4.0
ANTICIPATED FUTURE DEMANDS

The intent of this section is to project the future water demands expected of the JWD system for the 5-year and 20-year planning periods. To best project future water use several factors must be considered, including changes in population density, commercial water use and development, economic development, changes in service area, land use, water quality, and conservation measures.

4.1 Population and Economic Development

The RI Department of Administration, Division of Planning publishes population projections for each Rhode Island municipality at five-year intervals. These projections were made using 2010 US Census data, which estimated the population in Jamestown in 2022 to be 5,538. The projected population in Jamestown for the period of 2020 to 2040 is summarized in Table 4.1 below.

Table 4.1
POPULATION PROJECTIONS (2020 – 2040)

YEAR	POPULATION	ANNUAL % CHANGE
2020	5,484	--
2025	5,570	1.57%
2030	5,638	1.22%
2035	5,674	0.64%
2040	5,674	--

These projections show only modest population growth and are dramatically different than those previously developed by the RI Division of Planning based on past population trends and US Census data. The population trends projected for Jamestown are similar to population trends for many other communities in Rhode Island.

~~In 2010, the Town of Jamestown conducted a build-out analysis. The build-out analysis was used to determine maximum potential future population that the Town can accommodate under existing local regulations. At that time, it was estimated that the largest potential population for Jamestown is 7,084 persons, an increase of 1,679 (32%) over the 2010 population. This build-out analysis estimated that an additional 273 dwelling units could potentially be connected to the Town water system.~~

~~There were approximately 1,365 residential service connections in 2016 serving approximately 3,184 people, compared to 1,420 services in 2022 serving an estimated 3,323 residents. Based on the 2010 build-out analysis, 273 additional dwelling units could potentially be connected to the water system. At an average of 2.29 persons/household, as suggested by the US 2010 Census data, the number of potential water service customers is 3,919 at full build-out. This is not expected to fully occur during the 5-year and 20-year planning periods and only modest population growth is anticipated in the water service area and the Town as a whole.~~

In ~~2023~~2024, the Town of Jamestown conducted an updated build-out analysis to reflect the current residential and commercial land use within the Town to forecast the potential new dwelling units and its impact on the existing water system. The potential new dwelling units were calculated using the current developable vacant and non-vacant lots, and ADUs on properties with lot sizes equal to or greater than 20,000 square-feet. ~~-~~This build-out analysis estimated an additional ~~938 dwelling~~

~~units~~1,208 residential and 156 commercial connections could potentially be connected to the Town water system over time. ~~As noted above for 2010, T~~the full build-out of the ~~2023~~2024 projected growth is not anticipated to occur fully during the 5-year and 20-year planning periods. See discussion below in Section 4.3 and Table 4.4 for the breakdown of the ~~2023~~2024 municipal residential water system build-out analysis. It is important to note that no water main extensions or system expansion has been proposed in over 20 years, and none is anticipated at this time.

4.2 Projected Future Demands Based on Census Data

Future demand projections were made using the RI Statewide Planning population projections and the methodology described above. Previous versions of this WSSMP also projected demand for a full build-out scenario; however, current Census population projections represent only modest growth in Jamestown's population over time as compared to past projections that anticipated growth at a much faster rate. The Census population projected in Jamestown in 20 years (i.e., 2042) is far less than the population at full build-out (based on the 2024 Buildout Analysis). The ~~, and~~ current Census projections predict that population will plateau in 2035. However, b~~B~~ased on the ~~2023~~2024 B~~b~~uild-O~~o~~ut A~~a~~nalysis, the projected population growth far exceeds the RI Statewide Planning projected growth. See information below.

Table 4.2 contains the 5-year (2027) and 20-year (2042) future water use projections in the JWD water system based on 2022 US Census and RI Division of Statewide Planning data. It is assumed that all of the anticipated population growth in the Town of Jamestown will be within the water district, which is conservative.

Table 4.2
CURRENT AND PROJECTED WATER CONSUMPTION RATES –
INCLUDES ~~NOMINAL~~ CENSUS POPULATION GROWTH ONLY **

Year	Total Population in Jamestown	Population Projected in Service Area	Metered/Projected Water Usage				Average Day Demand*
			Residential	Commercial**	Government	Total	
2022	5,538	3,323	47.81 MG	4.21 MG	1.87 MG	53.89 MG	0.148 MGD
2027	5,597	3,382	48.66 MG	~~4.43~~5.05 MG	1.87 MG	~~54.96~~55.58 MG	0.~~151~~152 MGD
2042	5,679	3,464	49.84 MG	~~5.09~~7.58 MG	1.87 MG	~~56.79~~59.29 MG	0.~~156~~162 MGD

* Based on consumption alone (i.e. non-account water not included)
** Commercial projections based on ~~2023~~2024 Build-Out Analysis Data

Residential water use for the 5-year period was projected based on a service area population of 3,382 people and an average per capita residential water use of 39.4 gpcd equivalent to the average per capita residential water use for 2022. Only modest population growth based on Census data is expected over this timeframe and residential water use is anticipated to remain relatively consistent. Similarly, residential water use for the 20-year planning period was projected based on a service area population of 3,464 and 39.4 gpcd. This assumes that efficient residential water use continues to be a priority in Jamestown.

Water use by the ~~commercial and~~ government sectors in Jamestown has declined over time, and relatively little ~~commercial and~~ governmental development is expected in the JWD service area or in Jamestown as a whole. Governmental water usage for the 5-year and 20-year planning periods were projected to be equivalent to the fiscal year 2022 governmental usage of 1.87 MG. As part of the ~~2023~~2024 build-out analysis, the current commercial vacant land use for new development is almost at capacity and not much commercial growth is expected from vacant land use. There is potential commercial growth for existing commercial non-vacant lots that could be sub-divided into new lots that would increase system demand ~~slightly~~ overtime. The commercial zone growth from non-vacant commercial lots is expected to be for residential usage with two (2) condos per lot. However, this growth would ~~be minimal and~~ not be expected to occur all at once. ~~-~~ As a result, commercial water usage for the 5-year and 20-year planning periods were projected to increase by ~~one (1~~five (5) new commercial ~~connection~~connections each year. In 2042, the potential commercial growth would be close to capacity based on the development of non-vacant lots. Commercial non-vacant lot build-out development would be at capacity in ~~2050~~2053 if ~~one (1~~five (5) new commercial ~~connection is~~connections are established each year from 2022.

The JWD has traditionally used a maximum day to average day peaking factor of 2.0 to estimate maximum day demand (MDD) in the system. Table 4.3 shows the current ADD and MDD as well as projections for the 5-year and 20-year planning periods, based on consumption.

Table 4.3
CURRENT AND PROJECTED AVERAGE DAY & MAXIMUM DAILY DEMANDS ON ~~NOMINAL~~ CENSUS POPULATION GROWTH ONLY

YEAR	AVERAGE DAY DEMAND*	MAXIMUM DAY DEMAND**
2022	0.148 MGD	0.296 MGD
2027	0.~~151~~152 MGD	0.~~302~~304 MGD
2042	0.~~156~~162 MGD	0.~~321~~324 MGD

* Based on consumption alone (i.e., non-account water excluded)
** Estimated using MDD to ADD ratio of 2.0

Projected estimates for water produced have been made assuming 11.88% non-account water, consistent with State goals. Therefore, the ADD and MDD for 2022 based on water production are estimated to be 0.168 MGD and 0.336 MGD, respectively. For the 5-year planning period ~~-~~, the ADD and MDD ~~water production~~ are estimated to be 0.17~~182~~ MGD and 0.34~~264~~ MGD, respectively. Similarly, the ADD and MDD are estimated to be 0.175~~223~~ MGD and 0.350~~446~~ MGD for the 20-year planning period. JWD is currently seeking other alternatives for additional source water production. See Worksheet Nos. 12 and 15.

It is noted that non-account water currently is below 15% (11.88%) ~~but~~ and ~~it~~ has met the State's goal of 15% ~~in the past~~. This is mostly attributed to the process water requirements for the operation of the water treatment plants. This estimate is presented on Worksheet No. 11. Worksheet No. 11 underscores the importance of JWD obtaining a better understanding of, and altogether lowering, non-account water in the system. One significant step toward this goal is reclaiming the majority of backwash water that currently is discharged to Great Creek, as discussed in Section 2.10 of this WSSMP.

4.3 Projected Future Demands Based on ~~2023~~2024 Build-Out Analysis

In January 2023, Rhode Island General Law 45-24, as amended and titled, "An Act Relating to Towns and Cities – Zoning Ordinances", allows the owner to build an accessory dwelling unit (ADU) on any lot with a total area of 20,000 square feet or more for which the primary use is residential and where the proposed ADU is located within the existing footprint of the primary structure or existing secondary attached or detached structure and does not expand the footprint of the structure. The legislation was passed to address the projected shortage of housing by making it easier to build ADUs.

In ~~2023~~2024, the Town of Jamestown conducted an updated build-out analysis to reflect the current residential and commercial land use within the Town to forecast the potential new dwelling units and its impact on the existing water system. The potential new dwelling units were calculated using the current residential and commercial minimum lot zoning requirements on the developable vacant and non-vacant lots, and ADUs on residential vacant and non-vacant properties with lot sizes equal to or greater than 20,000 square-feet.

Table 4.4 contains the 5-year (2027) and 20-year (2042) future water use projections in the JWD water system ~~as noted above in Table 4.2 with the inclusion of the~~ estimat~~inged~~ residential and commercial population growth from potential current developable vacant and non-vacant lots, and ADUs. For this analysis, the governmental water usage remained the same as in Table 4.2 since it's not anticipated that there will be much growth in these areas in the coming years. The commercial water projections as explained above and noted in Table 4.2 will be used in Table 4.4.

ADUs in Table 4.4 are estimated based on 12 new dwelling units constructed each year with half of the dwelling units being one-bedroom and the other half of the dwelling units being two-bedroom. Each year estimates that the Jamestown population will grow by 36 people (two people per bedroom) with the construction of ADUs alone. Table 4.4 also estimates that each year 4.0 vacant lots and 5.5 sub-dividable lots are used for new home construction with includes condominiums. Each year estimates that the Jamestown population will grow by 22 people (2.34 persons per household) with the development of vacant and non-vacant developable sub-dividable properties. In total, each year there is an estimated population growth of 58 people in Jamestown. This information is also presented on Worksheet No. 12.

Table 4.4
CURRENT AND PROJECTED WATER CONSUMPTION RATES
INCLUDES ~~NOMIMAL~~ POPULATION GROWTH BASED ON ~~AND~~ BUILD-OUT ANALYSIS DATA**

Year	Total Population in Jamestown***	Population Projected in Service Area With ~~2023~~2024 Build-Out Analysis	Metered/Projected Water Usage				Average Day Demand*
			Residential	Commercial	Government	Total	
2022	5,538	3,323	47.81 MG	4.21 MG	1.87 MG	53.89 MG	0.148 MGD
2027	6,023~~5,829~~	3,614	~~56.19~~51.99 MG	~~4.43~~5.05 MG	1.87 MG	~~62.49~~58.77 MG	0.~~171~~161 MGD
2042	7,479~~6,646~~	4,~~431~~488	~~79.69~~64.57 MG	~~5.09~~7.58 MG	1.87 MG	~~86.65~~74.02 MG	0.~~237~~203 MGD

* Based on consumption alone (i.e., non-account water not included) with residential population increase from ~~2023~~2024 Build-Out Analysis)
** Based on residential and commercial projections from ~~2023~~2024 Build-Out Analysis Data
*** Assumed growth at the same rate as the water district

Table 4.5
CURRENT AND PROJECTED AVERAGE DAY & MAXIMUM DAILY DEMANDS
BASED ON
~~NOMINAL POPULATION GROWTH AND~~ BUILD-OUT ANALYSIS DATA

YEAR	AVERAGE DAY DEMAND*	MAXIMUM DAY DEMAND**
2022	0.148 MGD	0.296 MGD
2027	0.~~171~~1614 MGD	0.~~342~~3228 MGD
2042	0.~~237~~2038 MGD	0.~~474~~4016 MGD

* Based on consumption alone (i.e., non-account water excluded)
** Estimated using MDD to ADD ratio of 2.0

4.4 Projected Future Demand Based on Bedroom Data Only

JWD also compared the current bedroom count in the water district to get a sense of what the future water demand would be if every bedroom currently in the water district was occupied. Currently, there are 4,271 total bedrooms in the water district and with two people per bedroom at 39.4 gpcd (estimated above), the future water demand could be as high as 337,000 gpd. This value represents the MDD that is currently experienced within the system at times and provides the most conservative worst-case scenario. The MDD is reached normally at the height of the summer

season when there are a lot of seasonal visitors to the Town. ~~This scenario suggests that the addition of houses in the future would need to be evaluated since this would increase the overall MDD.~~

4.5 Category & Subcategory and Major Users Future Demand

Future residential and commercial water demands are summarized on Worksheet No. 12 and in Table 4.~~2~~4. There are no major users in the system, nor are any current users expected to increase demand to rates that would qualify them as a major user (i.e., demands in excess of 3 million gallons annually). The JWD is not aware of any potential major user currently in planning.

4.6 Legal Obligations to Provide Water

The JWD does not have any wholesale customers, major users, or any other legal obligations to provide water.

4.7 Service Area Extension

4.7.1 Urban Water District

Under the Urban and Rural Water District Regulations adopted in 1986, the Town has specific guidelines for new connections to the water system. Service connections for use other than one or two-family homes require approval of the Board of Water and Sewer Commissioners. Applicants must show to the satisfaction of the Board that the request for service:

1) is consistent with the Comprehensive Community Plan;
2) will not impair available resources of the urban water district;
3) will not reduce the level of fire protection; and
4) will not reduce the quality or quantity of water provided to existing users.

Property owners whose land is within the district or which has frontage on a district boundary road may request a water service connection. Because of the relatively small supply capacity of the system, no expansion of the urban water district is planned or anticipated at this time.

4.7.2 Jamestown Shores Neighborhood

From time to time, the issue of water service to the Jamestown Shores area is raised. This area in the northern half of the island houses 40% of the Town's overall population. There is currently no public water service available in the area.

The Shores area was subdivided in the 1940s into very small lots. Most lots are less than a quarter acre. Each home must have a well and onsite sewage disposal system on the property. This factor, coupled with poor soil conditions, creates the potential for groundwater contamination.

If water quality problems become evident in Jamestown Shores, measures may be needed to provide potable water to the area. This scenario would exact a severe financial and service burden on the Water Department. New transmission lines, pump stations, and possibly other system improvements would be required. There are no plans for serving this area now or in the immediate future, but it is doubtful whether sufficient raw water could be found on the island to meet this demand should it become necessary.

It is therefore imperative that the Town of Jamestown makes every reasonable effort to ensure that water quality in the Jamestown Shores area is maintained. Steps that the Town has taken and should continue in an effort to minimize health risks associated with this area include:

- Monitoring RIDEM's granting of OWTS permits in the area;
- Require maintenance of existing septic systems;
- Create a soils overlay district and have limitations on impervious surface coverage based on soils suitability;
- Strictly enforce RIDEM regulations on OWTS setbacks from wetlands;
- Encourage RIDEM to consider alternative OWTS technology where appropriate.
- Purchase of lots for preservation; and
- RIDEM limits bedrooms based on OWTS capacity based on soils suitability.

SECTION 5.0
AVAILABLE WATER

5.1 General

North Pond is the primary water supply for the Jamestown system. The JWD supplements the reservoir with water withdrawn from their supply well, JR-1, during peak demand times of year. Well withdrawals typically make up a very small amount of the water withdrawn from the JWD's sources.

Analysis of the safe yield of the North Pond Reservoir system was conducted previously by staff of the Rhode Island Department of Environmental Management, Division of Water Supply Management. The purpose of the study was to determine the ability of the existing system to meet the water supply needs of the existing customer base. The full report was provided in the last WSSMP, while this chapter presents the major findings of the study. Also presented are the findings of a more recent study, completed in 2000 by Fay, Spofford and Thorndike, Inc. (FS&T).

In times of drought, the JWD has also utilized South Pond for its water supply. A study of the safe yield of the watershed was conducted by Richard Hazen in 1983. This report will be referred to for supporting data on the probable safe yield of South Pond, though the reservoir has not been used for some time.

5.2 Physical Characteristics of the Reservoirs

Jamestown's reservoirs were constructed in the 19th century by the creation of earth dams in two natural drainage swales. The spillways have been modernized to concrete structures permitting outflow above a certain water level. There is no provision for flashboards at either spillway. Elevation of North Pond, when full is 37 feet above mean sea level, 27 feet above South Pond.

Both reservoirs are shallow, and as such are subject to high rates of evaporation during the hottest months. South Pond, being of small capacity with a fairly large drainage area, is very responsive to rainfall, especially when the ground is saturated. Public Works officials have observed the water level in South Pond rise a foot overnight. Because of the physical and water quality limitations of South Pond, it is not considered a reliable source of supply but remains an active source that can potentially be used in the future should some of its water quality limitations be suitably addressed.

5.3 Safe Yield of Surface Waters

5.3.1 FS&T Safe Yield Analysis, October 2000

FS&T completed a safe yield study of North and South Ponds in October 2000 on behalf of the JWD. The Safe Yield Analysis Report (text only) is included in Appendix D. This represents the most recent safe yield analysis performed on the JWD's supply sources.

FS&T created a computer model to simulate the Town's water supply system and compute the safe yield. The model incorporated historic hydrologic and hydraulic factors (i.e., precipitation, direct runoff, evaporation, demand withdrawal rates) as well as current operational factors in its mass balance approach. The results of this analysis are presented in Table 5.1. A second safe yield analysis was then conducted whereby the transfer of water from South Pond to North Pond was simulated. These results are presented in Table 5.2.

Table 5.1
SAFE YIELD (gpd)

Average Surface Water Inflow Factor	North Pond	South Pond	Total
0.40	175,000	86,000	261,000
0.45	**194,000***	**89,000**	**283,000**
0.50	213,000	92,000	305,000

* Currently, JWD is using the safe yield for North Pond of 185,000 gpd as a result of the RIDEM analysis and Drought of Record (See below). South Pond is not available during dry periods and is only used to transfer water to North Pond when water is flowing over the South Pond dam.

Table 5.2
SAFE YIELD WITH TRANSFER PUMPING (gpd)

Average Surface Water Inflow Factor	North Pond	South Pond	Total
0.40	304,000	80,000	384,000
0.45	**321,000**	**83,000**	**404,000**
0.50	333,000	55,000	421,000

A transfer pumping system between South Pond and North Pond is in place but is not typically used due to the water quality issues in South Pond. Also, the transfer pumping system can only pump water from South Pond to North Pond when there is water flowing over the South Pond dam.

5.3.2 Previous Analyses

RIDEM chose a method of computer mass balance of reservoir inflows and outflows using the U.S. Army Corps of Engineers Hydrologic Engineering Center program HEC-5: Simulation of Flood Control and Conservation Systems.

The Hazen study used stream flow records of mainland rivers. Additionally, the study used storage yield curves recorded in NEWWA reports from 1969. Studies of the 27 square-mile Abbott Run watershed and the 93 square-mile Scituate watershed during the record-breaking drought of the mid 1960s were used to determine the expected yield of a reservoir in the region. The NEWWA procedure takes into account the drainage area; the percentage of drainage area covered by the reservoir; the rainfall and probable loss by evaporation; the stream flow; and the storage required to assure the desired supply. Data are computed on the basis of drainage areas, with safe yield and storage required stated per square-mile.

North Pond

Applying the HEC-5 methodology, the following are the results of the safe yield analysis for different drought scenarios:

Table 5.3
NORTH POND SAFE YIELD

Drought Analysis	Safe Yield (GPD)
1% change of occurrence (100% reliability)	175,000
5% change of occurrence (95% reliability)	210,000
Drought of Record (99% reliability)	185,000

South Pond

Although South Pond is a small reservoir, it receives runoff from 70 percent of the watershed, or 0.7 square-miles. Total runoff is 700,000 gpd, but the characteristics of the drainage area are significantly different from the North Pond drainage area. A vast wetland encompasses much of the watershed above South Pond. This increases evaporation and transpiration and reduces the quantity of runoff, especially during dry weather.

South Pond was drawn daily for five months in early 1981. Pumping averaged 180,000 gpd, with a maximum one-day yield of 364,000 gallons. Hazen's estimate of the safe yield of the reservoir is as follows:

Table 5.4
SOUTH POND SAFE YIELD

Drought Analysis	Safe Yield (GPD)
2% change of occurrence (98% reliability)	100,000

Like the FS&T Evaluation, the results of this study suggest that partial use of South Pond would substantially increase available water to the system.

Because South Pond is served by more than two thirds of the drainage area of the watershed, its storage capacity is the primary limiting factor in its utility to the water supply. The other deficiency of South Pond is water quality. Below North Pond, runoff passes slowly through a large wetland on the way to South Pond. This "percolating" process causes the water in South Pond to have high quantities of organic matter, iron, acid, and other contaminants. This results in discoloration and unpleasant tastes and odors.

Drought Duration

The drought of the 1960s is generally considered the drought of record in this region. However, at the time of the drought, the population of Jamestown was around 2,500, half of the current population. No records exist as to the extent of the drought in Jamestown, but anecdotal information suggests that the Town's water system did not experience an inability to provide sufficient water to customers.

During the summer of 1993, a short-term drought occurred. From late-July through September, Jamestown received very little rainfall. As the summer season progressed, evaporation combined with diminished inflow and high demand to create a crisis situation for the water supply system. South Pond, normally reserved for supplemental supply, was already at the bottom of the reserve storage zone though no water had been drawn from it. The Town instituted an outdoor watering ban in August, and conservation was greatly encouraged.

Efforts to reduce water consumption were not sufficient to stabilize the level of the reservoirs. By late summer North Pond held only a 20-day supply of water. The National Guard was notified, and began delivering water by truck from North Kingstown. This practice continued until November 15 of that year.

When winter rains began to recharge South Pond, it was used to supply the water system, allowing North Pond to recharge without use. It was found that when water is drawn from South Pond, the rate of flow through the upstream wetland increases. This unfortunately does not result in improved water quality.

In the final analysis, the National Guard delivered 7.5 million gallons to the Jamestown water supply. It was estimated at the end of the deliveries that the North Pond volume was 6.7 million gallons. Jamestown would almost certainly have run out of water had not the National Guard helped supplement the supply.

The Town has prepared a plan to avoid having a situation like the 1993 water deficiency in the future. The plan is described in the augmentation study section as well as in Section 10 – Drought Management of this WSSMP.

Water Withdrawals

There are no withdrawals from Jamestown Brook.

5.4 Limitations to Water Use

The new water treatment plant has a design capacity of 0.5 MGD, more than the safe yield of the supply sources and above current and future estimates of the MDD. The only limitation to drawing water is the water quality of South Pond. Even when the reservoir is full, water quality at South Pond is much lower than North Pond. While the new treatment plant was designed to treat water from South Pond, sludge generation when using raw water from South Pond makes the treatment plant inefficient. Therefore, supply from South Pond is not typically used.

5.5 Available Water/Demand Comparisons

Although the two reservoirs appear to have a combined safe daily yield of 283,000 gallons, the actual available water is less due to the poor water quality of South Pond, as noted above. In the past, North Pond has been used almost exclusively for supply, providing the Town with a safe daily yield of 185,000 gallons (based on the RIDEM analysis and the Drought of Record). Also, it is doubtful whether South Pond could truly provide 100,000 gpd, due to the water quality problems described above. The ADD exceeds the safe yield of North Pond during the warmer months each year, and the JWD supplements supply with withdrawals from Well JR-1 (~50,000 gpd) in periods of higher water use. Based on plant data, flow from JR-1 varies between the range of 24,000 and 48,000 gallons per day. Flow from JR-1 varies throughout the year between this range and is at maximum pumping capacity during summer months. The JWD has implemented a number of water conservation strategies and continue to impose outdoor water use restrictions in an attempt to control water use peaks during the summer months. The total daily yield from North Pond and Well JR-1 is ~~235~~233,000 gallons.

5.6 Alternative Supply

The JWD maintains alternative supply sources in addition to North Pond and the two active supply wells, JR-1 and JR-3. While South Pond is considered an active supply source and is maintained as such, it effectively acts as an alternate surface water supply as withdrawals are infrequent due to raw water quality.

It was the JWD's intent with construction of the new treatment plant in 2011 to increase treatment capacity to 500,000 gpd while also having the capability to treat water from South Pond. In practice; however, the treatment process is inefficient and a high volume of sludge is generated when raw water from South Pond is used, makings withdrawals from South Pond impractical.

Over the years, the JWD explored development of additional supply wells around wells JR-1 and JR-3. However, these other wells are currently not being used as supply due to concerns over groundwater depletion.

The JWD has a non-permanent emergency interconnection with North Kingstown, consisting of truck-mounted flexible piping that can be connected to hydrants on either side of the Jamestown Verrazano Bridge. This interconnection is not intended for permanent use, and development of a permanent interconnection is not immediately feasible and would be extremely costly due to Jamestown's isolated nature as an island in Narragansett Bay, over a mile from the nearest mainland.

5.7 Supply Augmentation Study

Since 1993 the Town has investigated various alternatives to source augmentation to meet the ever-increasing demand requirement of drinking water. The following summarizes the actions taken in an effort to augment supply.

5.7.1 Water Supply Committee Report (1995)

In response to the drought of 1993, the Town established a Water Supply Committee. The committee was comprised of a variety of professionals with expertise in drinking water issues. Over a two-year period, the committee developed and evaluated a number of alternatives to increase the supply of public water. The committee completed its report in 1995.

A copy of the Water Supply Committee report was provided in the previous WSSMP. Below is a brief description of the primary alternatives considered by the committee, as presented in this report. The committee was only charged with evaluating supply augmentation. Water conservation has been considered separately by the Conservation Commission and JWD staff.

1. *Expand North Reservoir* – This alternative included diversion of Carr Creek and improvements to the impoundment dam. Carr Creek watershed has an area of 0.11 square-miles, which could yield over 100,000 gpd. Also, it was estimated that raising the spillway and dam at North Pond by 12 inches would result in an increase in storage capacity of 8 MG. This volume represented a 35-day supply of water, based on 1992 consumption. It would represent a 40-day supply based on current ADD.

Both the Carr Creek diversion and dam improvements involve significant permitting and engineering studies. The committee recommended no action on this alternative at that time, and this alternative has not been revisited since.

2. *Development of South Pond* – South Pond could be utilized if water quality were improved sufficiently to make the water treatable. Methods of reducing the effects of organic material in the watershed were discussed, but this possibility was dismissed as impractical and requiring extensive further study.

Initial results indicate the same portion of South Pond water may be returned to North Pond through transfer pumping or mixed at the treatment plant, but this alternative required further evaluation. Since then, the new treatment plant was designed to treat water from South Pond but the increased sludge generation would make treatment too inefficient for long term use.

3. *Bedrock Drilling* – This approach involves drilling a series of wells to tap water trapped in bedrock fissures. Significant background study has been done to determine the most effective well locations. The water would be pumped directly into the distribution system if quality is high enough, or it could be pumped to the treatment plant.

The JWD has done extensive well exploration over the years. Well JR-3 is a result of these efforts and has been in service since 2000.

4. *Water Conservation* – Developing methods of reducing per capita consumption were recommended as part of the report. The Conservation Commission has recommended specific steps for water conservation. These affect residential and commercial consumers, as well as treatment plant operations.

Among the most significant recommendations in the report are: (1) an education program to raise public awareness on methods of water conservation, and (2) "change-out" and retrofit programs to encourage/require users to utilize water-conserving fixtures, toilets, and washing machines. The results of these programs are discussed elsewhere in this WSSMP. ~~JWD is currently proposing to potentially develop an existing well near the water treatment plant.~~

Results

The Town opted to pursue Alternatives #3 and #4, which were met with success. Well JR-1 has been in service since 2000. Estimated yields from the wells JR-1 and JR-3 are 50,000 gpd, each. They are only used at times of year with high demand. Water conservation measures have also been proven successful and the JWD will continue to pursue water conservation in the system. For instance, the ADD presented in the 1993 report was 248,000 gpd and was a similar rate in the 2000 Safe Yield Analysis performed by FS&T, referenced earlier. Future ADD estimates were projected to increase, but they have decreased and the ADD currently averages 200,000 gpd for a typical year. The JWD has realized a lot of success through water conservation practices.

5.7.2 Water Treatment Feasibility Study – 1999

In September 1998, the Town of Jamestown contracted Fay, Spofford & Thorndike, Inc. to evaluate alternative sources of water supply and the feasibility of associated water treatment requirements. A Water Treatment Feasibility Study was prepared in April 1999. The Executive Summary from the Report was provided in the previous WSSMP. Below is a brief description of the alternatives that were considered in the report.

The report concluded that North Pond is not able to meet the ADD based on its estimated safe yield, and recommended that the Town explore one of two tracks for increasing supply. One of the options presented in this report was to

"establish a permanent connection with North Kingstown at an estimated life cycle cost of about $3.2 million pending discussions with North Kingstown officials and a more detailed cost evaluation. This has the advantages of providing adequate water supply and being more reliable in terms of water quality. The major disadvantages are cost and the Town becomes dependent upon an outside community for its water supply."

The Town has since developed a non-permanent emergency interconnection (6-inch flexible water line) between hydrants with the Town of North Kingstown and the Town of Jamestown, but a permanent connection has not been implemented as JWD is currently waiting for approval from RIDOH.

The second recommended track was to develop additional supply in Jamestown. Since 1995 the Town had done extensive well exploration and development. These efforts resulted in installation of Well JR-3 with an estimated safe yield of 50,000 gpd, like that of Well JR-1 though both wells are never used at the same time.

Utilizing Narragansett Bay as a water supply source had also been reviewed. High-pressure reverse Osmosis (RO) is the membrane-separation technique typically utilized to reduce the total dissolved solids (TDS) in the seawater from 34,000 mg/l to less than 500 mg/l for drinking water. This was a very costly option, estimated at close to $6 million for construction of a desalination plant. Costs associated with desalination have increased since completion of this report and this alternative has not been seriously explored in recent years.

5.7.3 Limnological Baseline Study

In 1999, the Town retained Ecosystem Consulting Service, Inc. to conduct a limnological baseline study of the surface water sources based on recommendations from FS&T's 1998 report summarized above. The intent of this study was to quantify the quality of water from the two reservoirs, identify reservoir management techniques, and investigate ways to increase available water supply for the Town. The end result was to assist in identifying cost effective, reasonable approaches to increasing water availability for the Town.

On December 16, 1999, FS&T issued a final/supplemental limnological baseline study for the North and South Ponds in addition to the above. This report identified specific alternatives which could be implemented to increase the overall yield from the surface water supplies while maintaining a reasonable water quality, given the raw water quality limitations of South Pond.

Both reports were provided in the previous WSSMP. Several recommendations for increasing the available water supply were presented, which are summarized as follows:

- Increase Safe Yield from North Pond

    - Intercepting and treating water from the South Pond watershed adjacent to the North Pond watershed north of Route 138 and east of wells JR1 and JR3, and diverting this water to North Pond.
    - Increasing the North Pond Reservoir level by 10-14 inches by the addition of flashboards during early summer.

- Improve Water Quality from North Pond

- By the addition of stormwater detention basins to treat water entering North Pond from the watershed area west of North Main Street. The DPQ was already developed design plans for the installation of these basins to address this issue.
- The addition of a hypolimnetic aeration and depth selective supply withdrawal system.

- Improve South Pond Water Quality

  - Correcting the "leakage-overflow" to the west from South Pond.
  - Increasing the storage volume in South Pond through a shallow reservoir expansion to the west from the dam.
  - Installing a hydrologic discharge control assembly at the South Pond spillway.
  - Installing a depth-selective supply withdrawal structure at South Pond.

The total cost of these recommendations was estimated at $95,000. It was also recommended that a safe yield study of North and South Ponds be conducted to verify the proper transfer rate between the two ponds and to determine the impact of increasing the North Pond reservoir level. This was conducted in 2000 and was discussed earlier in this section.

SECTION 6.0
SUPPLY MANAGEMENT

6.1 Water Quality Protection

The Town of Jamestown recognizes the critical nature of protecting the public water supply. Because Conanicut Island lacks a municipal quality aquifer, protecting the surface reservoirs is very important. The Town has taken a number of measures to ensure long-term protection of the reservoirs and watershed.

The remainder of this section contains measures undertaken by the Town of Jamestown to ensure the protection of Jamestown Brook Watershed. It is intended, that upon completion of this section, the reader will understand the level of commitment that Jamestown has demonstrated towards the protection of its most valuable resource.

Zoning

There are no industrial uses within the public supply watershed. All 760 acres of the Watershed are in the RR-200 zoning district with a minimum lot requirement of 200,000 square-feet (4.6 acres), however, the land is predominantly open space. As such, there are no known point sources of pollution within the watershed.

In order to further protect the watershed, the Zoning Ordinance prohibits location of any onsite wastewater treatment system (OWTS) within 150 feet of a bog, floodplain, pond, marsh, or swamp.

The Zoning Ordinance also contains a lot merger provision for identical ownership of small parcels.

Site Plan Review

Over 85% of the watershed has been permanently protected from development. Property that remains in private ownership has little potential for development. A site plan review process is used to ensure that future development within the watershed does not adversely affect water quality. A development plan is required for any construction in the district that is zoned RR-200. The plan must include a topographic map, a soils map, and a discussion of water quality impacts. Topics covered should be as follows:

1. Erosion control during construction;
2. Disposal of storm water runoff; release rates, drainage system, detention/ retention basins;
3. Sewage disposal methods and impacts on the environment;
4. Area of impervious surface, measures for groundwater infiltration; and
5. Disclosure of any toxic substance to be stored on site.

The standards for review of the development plan are as follows:

1. Rhode Island Erosion and Sediment Control Handbook
2. Area of disturbance must be at least 300' from reservoir or any tributary
3. Minimize impervious surface
4. Permanent vegetation cover in unpaved areas
5. Construction must minimize area of disturbance and time of exposure
6. Detention and retention basins for no net increase in runoff

Underground Storage Tanks

New underground storage tanks are prohibited in all districts.

Subdivision Regulations

Any subdivision of land in Jamestown must include a soil erosion control plan that must conform to Eastern RI Soil Conservation District.

Wastewater Management

The Town of Jamestown passed an ordinance in 2001 geared toward improving maintenance and inspections of OWTS on the Island. The program consists of routine inspections, issuing maintenance reminders, a web-based database, system siting and installation requirements, and the designation of a High Groundwater Table District. The Town performed an initial round of inspections in 2003 and began a routine inspection program in 2006. Systems are inspected every three or five years based on system size and the results recorded on the web-based database. The Town can authorize pump-out of a system at the property owner's expense if they deem the system to be at risk of impending failure. Several dozen systems have been repaired or replaced as a result of this inspection program.

Conanicut Island Land Trust (CILT)

CILT remains active in identifying priority properties and wetland areas and taking appropriate protection measures. This includes properties within the watershed of North and South Ponds.

In addition to the land trust, the Town of Jamestown will continue an aggressive acquisition of fee simple and development rights to all properties located within the Jamestown Brook watershed. This is in accordance with the Jamestown Comprehensive Community Plan.

Copper Sulfate Application

Because of the relatively shallow basin of both reservoirs, periodic applications of copper sulfate are made~~.~~ to control algae. The Water Department monitors water quality testing and maintains a copper reading of 1 ppm in North Pond. In most years, this requires 3 to 5 treatments per summer. Treatments are made by hand from a small boat at the rate of 300 lbs. per month from May through August.

South Pond is rarely treated because it is seldom used as a water supply source. Also, the turnover of water in South Pond is fairly rapid, limiting the effects of copper sulfate treatment.

Wellhead Protection Area (WHPA)

In September 1997, the Atlantic States Rural Water Association completed a Wellhead Protection Plan for the Community of Jamestown (Reference Appendix E). This Plan contains the following: a delineation of the WHPA, an inventory of potential contamination sources, priority ranking of potential contamination sources, a wellhead protection management plan, a groundwater quality analysis of Community Well JR-1, and proposed management strategies. The delineated area is depicted on Figure 6.1. Land in the WHPA comprises approximately 280 acres.

This WHPP has not been updated; however, an update to the Source Water Assessment Plan (SWAP) was performed and is provided as Volume II of this WSSMP.

Replace this page with Figure 6.1

Analysis of Safe Drinking Water Act (SDWA) Requirements

Jamestown contracts with the Rhode Island Department of Health to perform periodic water quality testing procedures. Tests are performed weekly and quarterly. The beneficial effect of this arrangement is two-fold: (1) RIDOH has the best technical knowledge of the types of testing required for public water supplies, and (2) there is no transfer of information required since reports are filed with RIDOH.

Jamestown's public water does not exceed action levels for any contaminants. In fact, water quality is excellent from a health standpoint. The only complaints logged regarding public water have to do with color and taste. Because of the amount of organic matter both in the reservoirs and in the intervening wetland, raw water entering the system is tea-colored and bitter tasting. During most periods, treatment reduces these elements to undetectable levels.

Treatment Procedures

Raw water is pumped from either North Pond or South Pond to the treatment plant. Pre-chlorination is done at the South Pond pump station, so that it is effective during the transportation time to the treatment plant. The first treatment processes at the plant are screening, pH adjustment, and coagulation. Flow splits and is treated in parallel membrane filtration basins than receives disinfection and corrosion control additives. Procedures to remove volatile organic compounds (VOCs) and trihalomethanes (THMs) have not been necessary, as Jamestown's water is below the threshold for treatment.

Surface Water Treatment Rule

Raw water receives pretreatment from a chemical feed system located in a building at South Pond that feeds Chlorine Dioxide directly into the main to treat the raw water prior to it entering the treatment facility at North Road. Chlorine dioxide is highly soluble in water and is effective at disinfection and improving color, odor, and taste. The pretreatment facility was constructed in 1991 and has been in full operation since that time. Water flows through a screen at the head of the plant to remove large particulate matter prior to water entering the treatment system.

Lead and Copper Rule

The JWD has been, and currently is, below compliance levels for lead and copper. The ~~2021~~2022 Consumer Confidence Report (provided as Appendix F) summarizes lead and copper results for calendar year ~~2014~~2021.

Inorganic and Synthetic Chemicals

The JWD has been within or below compliance levels for inorganic and synthetic compounds in raw water sources and the distribution system.

Radionuclides in Drinking Water

The JWD has been within or below compliance levels for radionuclides in the water system.

Phase VIa: Disinfectants and Disinfection By-Products

The Stage 1 Disinfectants and Disinfection By-Products (D/DBP) regulation was promulgated on December 16, 1998. The D/DBP Rule (Stage 1) included MCLs for four trihalomethanes (0.080 mg/l), five most common Haloacetic Acids (0.060 mg/l), Bromate (0.010 mg/l) and Chlorite (1.0

mg/l). Maximum Residual Disinfectant Level Goals (MRDLG) of 4.0, 4.0 and 0.8 mg/l have been set for Chlorine, Chloramines and Chlorine Dioxide, respectively.

The Stage 2 Disinfectants and Disinfection By-Products (D/DBP) regulation was promulgated on January 4, 2006. The intent of the rule is to reduce potential cancer and reproductive and developmental health risks from disinfection byproducts (DBPs) in drinking water. The rule applies to community and nontransient noncommunity water systems that add and/or deliver treated water with a primary or residual disinfectant other than ultraviolet light serving less than 10,000. The rule requires systems to meet MCLs at a local running annual average at each compliance monitoring location for two groups of DBPs, Total Trihalomethanes (TTHM) and five Haloacetic Acids (HAA5). The running annual average TTHM concentration is below 80 parts per billion and the running annual average HAA5 concentration is below 60 parts per billion. The JWD is in compliance with the disinfection byproduct rule.

Groundwater Rule

The Groundwater Rule, referenced in the previous WSSMP for the JWD, went into effect in 2006, as anticipated. However, this rule does not apply to the JWD because they combine groundwater supply with surface water withdrawn from North Pond.

SECTION 7.0
DEMAND MANAGEMENT

7.1 General

Demand Management consists of conservation measures which achieve long-term water savings by providing incentives and technical assistance to the customer base as a means of improving efficiency of water use and reducing waste. Such water conservation measures, whereby suppliers and/or local water utilities work to influence water consumption, is the most fundamental approach to water conservation since the ability to conserve water lies primarily with the water user. Consequently, the success of these measures is highly dependent upon consumer participation and cooperation.

The JWD actively promotes a water conservation program by checking meter accuracy and addressing issues such as waste, detection of water leakage, promotion of conservation measures, and peak usage reduction.

7.2 Demand Management Strategy (2012)

The *Rules and Procedures Governing the Water Use and Efficiency Act for Major Public Water Suppliers* (Act) was enacted in 2011 to establish efficient water use targets for all major water suppliers in Rhode Island. The Act also required that major suppliers complete a demand management strategy (DMS), documenting how they would meet each of the specified goals.

7.2.1 Goals

The demand management goals required of major water suppliers identified in the Act includes:

1. Residential average annual water use of 65 gallons per capita per day (gpcd);
2. Efficient outdoor water use;
3. Efficient indoor water use;
4. A full accounting of non-billed water;
5. Leakage of no more than 10%; and
6. Accurate metering and billing.

In addition, the Act established required methodologies that must be employed in an effort to meet these goals, including:

- Initiating a program to accomplish 100% metering of all water delivered by December 31, 2012, as specified in R.I. General Laws §46-15.3-22(b).
- Initiating a program for the maintenance and replacement of meters by December 31, 2012, as specified in R.I. General Laws §46-15.3-22(b).
- Initiating a program for installing radio frequency reading systems by December 31, 2012, as specified in R.I. General Laws §46-15.3-22(b).
- Recording metered usage and bill quarterly or more frequently by December 31, 2013, as specified in R.I. General Laws §46-15.3-22(c).
- Educating customers in regards to efficient water use.
- Establishing rate structures that are adequate to fund all water supply costs, are equitable, sensitive to economic impacts, and encourage efficient water use, per R.I. General Laws §39-15.1-3 or §45-39.1.5 as applicable.
- Implementing leak detection programs in accordance with AWWA standards and initiating a system-wide leak detection program if leakage is more than 10% of the water purchased.

Other optional methods for meeting the efficient water use targets are also discussed in Part 4.0 of the Act. These include billing structures that encourage efficient water use, methods for reducing non-agricultural water use, efficient indoor water use strategies, and methods of improving water use efficiency by major users.

The JWD completed its Demand Management Strategy in 2012, which served as an addendum to Section 7 of their WSSMP. The following sections provide an update to the 2012 Demand Management Strategy.

7.2.2 Residential Average Annual Per-Capita Water Use

The residential average annual per capita water use in the JWD system was estimated to be approximately between 38.1 and 44.5 gpcd for the period from 2016 to 2022. These averages were based on total metered residential water use and a residential population of approximately 3,256 people in the service area. More recently, metered residential water use was 47.81 million gallons in 2022, which represents 39.4 gpcd based on an estimated 3,323 residents in the system.

Water use in the JWD system is impacted by seasonal changes in population to a greater degree than other water systems in Rhode Island. It is difficult to accurately compute the year-round population in the system, and it is acknowledged that seasonal population fluctuations have some level of impact on per capita water use estimates. However, the JWD has very little multi-family housing, which is often accounted for in the commercial customer base in other systems. Therefore, the JWD has a high degree of confidence that actual residential water use continues to meet the State's goal of 65 gpcd.

~~JWD also compared the current bedroom count in the water district to get a sense of what the future water demand would be if every bedroom currently in the water district was occupied. Currently, there are 4,271 total bedrooms in the water district and with two people per bedroom at 39.4 gpcd (estimated above), the future water demand could be as high as 337,000 gpd. This value represents the MDD that is currently experienced within the system at times and provides the most conservative worst-case scenario. The MDD is reached normally at the height of the summer season when there are a lot of seasonal visitors to the Town. This scenario suggests that the addition of houses in the future would need to be evaluated since this would increase the overall MDD.~~

7.2.3 Efficient Water Use

The JWD has implemented programs to improve the efficiency of indoor and outdoor water use by its customers. Plumbing fixtures and appliances used in any new construction project must meet the JWD's water efficiency standards in order to be permitted for connection to the JWD system. The building code mandates that all new construction in Jamestown must be fitted with water conservation fixtures, including 1.5 gallons/flush toilet, sink faucet which takes 7.5 seconds to fill a quart container, and a shower head which takes 6.5 seconds to fill a quart container.

For existing homes, any replacement dishwasher, clothes washer, or other appliance using water must also meet these water efficiency standards. The JWD requires customers to file a permit with the JWD to ensure compliance with the water efficient standards. These standards are published in the JWD's Rules and Regulations, which are available on the Town's website (http://www.jamestownri.gov/Home/ShowDocument?id=1465).

The JWD established a Residential Retrofit Program (RRP) in the mid-1990s, offering complimentary retrofit kits to interested homeowners to assist them in conserving water. The kits are still available at the Town Offices and contain a low-flow showerhead, faucet flow-restrictors,

a water displacement bag for toilets, and leak detection tablets. Efficient plumbing fixtures are now a requirement for all homes connected to the JWD system, and a quarterly surcharge is charged to any homeowner that fails to meet these requirements. Additionally, the JWD enacted a regulation in 1999 requiring that all clothes washers meet the Town's water efficiency standards by May 2014.

An outdoor water use ban has historically been imposed each year from June 1st to August 31st. Additionally, water use bans are put into effect when the water level at North Pond, the JWD's primary supply, falls more than 42 inches below the spillway elevation. Also, connection of lawn irrigation systems in the JWD supply system is strictly prohibited without prior approval. Violators are called in front of the Board of Water and Sewer Commissioners and may be fined for failing to comply with the JWD's outdoor water use restrictions. These mandatory restrictions in outdoor water use are significant at maintaining relatively low per capita water use, as the vast majority of the service area is residential development of low to medium density.

A public information program promoting water efficiency is run through the Planning Department. The department periodically sends out press releases on the need to reduce water consumption and potential methods for implementing conservation practices. Brochures are made available to educate residents on voluntary conservation methods.

7.2.4 Full Accounting of Non-Billed Water

Non-billed water is defined as the difference between the amount of water withdrawn from the system's supply sources and the amount of water sold to the customer base. Typically between 70 million and 85 million gallons of water have been withdrawn from the JWD's supply reservoirs each year, while between 50 million and 65 million gallons of water are sold to customers based on meter readings. In 2022, approximately 61.17 million gallons was withdrawn from supply while metered water use was 53.90 million gallons.

Sources of non-billed water that the JWD accounts for in a typical year, and the estimated volumes of water associated with each are as follows:

- Fire Department Allowance: Typically 100,000 gallons annually;
- Hydrant Flushing: 100,000 gallons annually;
- Storm Drain Flushing: Typically 5,000 gallons annually;
- Sewer and Street Cleaning: Typically 10,000 gallons annually; and
- Process Water at Treatment Plants: Six (6) to twelve (12) million gallons annually, under normal operation. For 2022, the process water used at the treatment plants was 6.05 MG.

The remaining volume of non-billed water is unaccounted, of which the majority is attributed to leakage (1.0 million gallons annually in 2020 to 2022). Water theft, meter inaccuracy, and other miscellaneous withdrawals are believed to be relatively minor and likely represent a small portion of the total unaccounted water volume.

7.2.5 Leakage

The JWD reviewed the amount of water withdrawn from supply sources and compared it to the water sold and accounted for quantities of unbilled water to estimate leakage from 2009 – 2012 in the 2012 Demand Management Strategy. With the exception of 2010, which appeared to represent an outlier, leakage ranged from approximately 5% to 11% and averaged 8.6% annually. This met the State's goal for leakage of 10%. However, leakage in 2016 was estimated to be over 17%. This is a significant increase, and it is questionable whether this is a true reflection of leakage and it likely represents other non-billed water that has not been adequately quantified. Between 2020 and

2022, leakage has remained around 1.6%. This significant reduction in leakage as compared to previous years is the result of an on-going effort to monitor and repair problem areas when detected in the distribution system. The JWD routinely checks areas where leaks have been detected in the past. The JWD will continue to review their accounting of non-billed water and will monitor leakage in the system.

7.2.6 Metering and Billing

RI General Laws §46-15.3-22(b) required that a program for the installation of radio frequency read devices be initiated by December 31, 2012. It also required that major water suppliers initiate a program to accomplish 100% metering by December 31, 2012, in addition to establishing a meter maintenance and replacement program. RI General Laws §46-15.3-22(c) requires that meter reading and billing be performed at least quarterly by December 31, 2013.

The JWD is currently in compliance with these requirements. Between 1996 and 2000, each of the approximate 1,400 meters in the system were replaced with ARB style remote meters, and all new meters include radio-frequency readers. The system is entirely metered, and all customers are billed at least quarterly. Joint water and sewer bills are sent out each quarter to residential customers and monthly to commercial customers.

The JWD uses a rate structure that encourages water conservation while adequately funding system operations. A flat rate, based on meter size, is charged for the first 5,000 gallons of water used each quarter. The rates for water used beyond the first 5,000 gallons increase under an inclining block rate schedule. This is in addition to the surcharge billed to customers in violation of the JWD's strict water efficiency requirements.

7.3 Residential Retrofit Program (RRP) Plan

In response to the drought of 1993, the Town investigated the potential water savings created by a Residential Retrofit Program (RRP). The study culminated with a presentation by the RIDEM, Division of Water Supply Management to the Board of Water and Sewer Commissioners showing how much water would be saved by various retrofit measures.

As of May 17, 1999 the RRP is mandatory. The "Rules and Regulations of the Board of Water and Sewer Commissioners" mandated that within 5 years of adoption of these rules, all toilets, showerheads, and faucets in any property connected to the municipal water system, shall meet or exceed low-flow standards set by the Board. It was also required that all washers meet Energy Star efficiency requirements by 2014. In the event of a deed transfer, the above standards must be met prior to any sale.

The customer base is generally in compliance with these requirements. Residential retrofit kits are still available but are not typically sought after as most homes and businesses comply with the Board's efficiency requirements.

7.4 Major Users Technical Assistance Program

There are no major water users in Jamestown. Restaurants and overnight guesthouses are the largest water users. They are requested to use water efficiently and make reasonable efforts to conserve water.

SECTION 8.0
SYSTEM MANAGEMENT

8.1 Statement of Objectives

Water conservation practices involving system management initiatives are directed at improving the efficiency of, and reducing waste in, the production and distribution of water within a supply system. Such practices are necessary to ensure that the physical components of the water system are properly operated and maintained. Goals of system management include the following:

- Maintaining non-account water use to below 15% of the total system demand, in accordance with State Guide Plan Element 721;
- Maintaining leakage below 10% of system demand;
- Establishing a preventive maintenance program; and,
- Maintaining compliance with applicable requirements of the Rules and Procedures Governing the Water Use and Efficiency Act for Major Public Water Suppliers.

In order to maintain the long-term viability of the public water supply system, fiscal planning must be done to provide sufficient funding for necessary improvements and repairs. Proper management of the system requires that the JWD continuously monitor the condition of equipment and facilities, develop funding mechanisms for future capital expenditures, and respond to regulatory changes with regard to water quality and treatment methods.

The objectives of managing the Jamestown public water supply system are as follows:

- To maintain water treatment equipment to provide consistent, high quality drinking water to the customer base;
- To minimize water losses between the treatment plant and water customers;
- To plan for capital improvements to the water treatment system to maintain efficient plant operation;
- To plan for capital expenditures necessary to meet water quality standards set forth in the Safe Drinking Water Act;
- To meet the operating costs of the water treatment and distribution system;
- To keep costs borne by customers at the minimum level necessary to accomplish the above objectives.

8.2 Meter Installation, Maintenance, and Replacement (MIMR) Plan

The JWD is in compliance with RI General Law §46-15.3-22(b). All residential and commercial water services on the public water supply system are metered, and all meters are equipped with radio-frequency automatic meter reading (AMR) units.

The JWD continues its program of meter testing and replacement. The American Water Works Association publication, Water Meters – Selection, Installation, Testing and Maintenance offers standards for meter performance and maintenance which the JWD uses as a guide. Ranges of meter accuracy should be in line with the latest revisions of the AWWA standards (6700 Series) and the State Plumbing Code. Where an AWWA standard for a meter is not available, the Water Department shall demonstrate that the meter is capable of measuring not less than 95% and not more than 105% of the water that passes through the meter. Information on individual water meters is maintained at the Water Department office, and file cards are used to record data relative to meter

performance, repairs, and accuracy of metering at the time the meter was installed. Also, all meter testing information is documented and maintained at the Water Department offices.

Because of the relatively high cost of repairing water meters, most meters will be replaced rather than repaired if they do not perform to AWWA meter standards. New meters are more efficient in their ability to accurately measure water consumed and meters generally "slow down" over time, resulting in an underestimation of water consumption. Generally speaking, residential and small commercial meters have a useful life of approximately 15 years. Most of the meters in the system were installed around 2000, and the JWD ~~will begin to~~should plan for their replacement.

Master meters located at the treatment plant wetwell and finished water pump station will be tested and calibrated annually and repaired or replaced as necessary.

8.3 Leak Detection and Repair (LDR) Plan

The Water Department possesses an electronic detection device used to locate leaks in water lines. This device is used to determine the exact location of a leak prior to ground excavation. Leakage is monitored by the JWD to ensure that it meets the State's goal of no more than 10% of total water in the system. While leakage fluctuates from year to year, the JWD has generally complied with this. Also, the JWD has performed several system improvements over the last 15 years, including replacement of over 2.5 miles of aging pipe prone to breaks and leakage since 2005, which has contributed to relatively low leakage.

Conanicut Island is composed primarily of bedrock with relatively little overburden soil. Because of this, water leaks usually saturate the soil layer and rise to the ground surface where they are often visually identified and reported to the JWD by local officials or residents. Public awareness of the importance of water conservation on the island is such that virtually any leak is reported quickly and by multiple parties. All known leaks receive priority treatment for repair and repairs are made as soon as possible.

8.4 Preventive Maintenance (PM) Plan

The PM Plan is organized around a magnetic yearly calendar board system. All major pieces of equipment are charted and moved on a monthly basis on the calendar board. The maintenance functions are summarized on individual clips and placed on the board at the appropriate month. After the maintenance function is completed, the clip is advanced to the month of the next scheduled maintenance task. Each completed task is recorded on a file card system.

Hydrant flushing and valve exercising is accomplished in the spring/early summer. Each hydrant is flushed clear and appropriate valves are exercised to direct flow to individual hydrants. The schedule is published in the *Jamestown Press* with the usual customer warnings as to laundry staining.

Maintenance Schedule
The following is a list of the major pieces of equipment that are regularly serviced and maintained:

Component	# of Items
Chlorine Dioxide Generator	1
Flow Recorder - South Pond	1
Influent Pumps	3
Zenon Membrane Filter	2
Metering Pumps	12
Backwash Pumps	2
Effluent Pumps	2
Generator	1

Spare parts are maintained as required to replace normal wear parts, along with preventive maintenance kits from the manufacturers. Spare valves, pipe, repair clamps, bends, reducers, etc. are kept in stock for every known size and type of material in the distribution system.

Spare Parts Inventory
Spare parts are stored at the water plant for all essential equipment. A list of equipment vendors is kept on file at the water plant, so that they can be notified immediately if emergency service is needed on any equipment.

SECTION 9.0
EMERGENCY MANAGEMENT

9.1 Emergency Management Planning

As a sole source water provider, Jamestown guards its watershed. Being situated on an island, the JWD has no quick and reasonable alternative water sources in case of emergencies. As a result, the JWD uses the following Emergency Management procedures to deal with a variety of potential emergency situations.

9.2 Known and Potential Risks to Water Supply System

Many of the potential water emergency scenarios would have similar impacts on critical system components. Critical system components include the treatment plant, supply sources, pump station, two standpipes, and transmission mains. These components were described in Section 2 of this WSSMP.

Table 9.1 describes the potential impact emergencies might have on various system components.

Table 9.1
POTENTIAL SYSTEM IMPACTS UNDER VARIOUS EMERGENCY CONDITIONS

IMPACT	Interrupt Supply	Loss of Treatment Plant	Loss of Standpipe	Loss of Pump Station	System Contamination	Prolonged Power Loss
Hurricane	•	•	•	•	•	•
Drought	•					
Earthquake	•	•	•	•	•	•
Hazardous Material Spill	•				•	
Plane Crash		•	•	•	•	•
Vandalism	•	•	•	•	•	•

9.2.1 Hurricane

Because of Jamestown's location at the mouth of Narragansett Bay, a hurricane or major storm could cause significant damage to the water system. Current FEMA flood maps show that the storm surge from a severe hurricane could inundate South Pond, the raw water pump station, and the Treatment Plant. This scenario would incapacitate the production system, forcing residents to rely solely on standpipe storage for potable water. Hurricanes could also present power outages. A long-duration power outage could have a significant impact on the treatment plant and pump station.

The Town has a Hurricane Preparedness Plan. The plan describes the duties of all local officials in dealing with a hurricane. The plan requires an annual bench top drill be performed in the middle of summer in preparation for the hurricane season. Hazardous material training drills are scheduled quarterly. Employees are certified at the Technician Level for handling chlorine gas. A copy of the plan can be found in Appendix G.

Scenario – Hurricane

Potential Conditions:
1. South Pond contaminated with seawater.
2. South Pond pump station, treatment plant flooded.
3. Long-duration power outage at the treatment plant and pump station, prohibiting transmission of water to system.
4. Clearwell and standpipe storage are not damaged.
5. Finished water storage filled to capacity.

Remaining System Capacity:
1. The useable storage in each standpipe is 0.7 million gallons, or 1.4 MG collectively.

Response:

- Limit water consumption to 2 gpd per person to meet only basic needs. This would be accomplished by rationing water from central locations in Town, by authorities, to each homeowner in the water district upon presentation of proper identification.

9.2.2 Drought or Seasonal Water Storage

Jamestown Water Department (JWD) relies on two surface reservoirs for its water supply. The reservoirs are fed almost entirely by precipitation runoff. As a result, the system is vulnerable to the effects of periodic drought conditions. The public water system is also currently drawing a greater volume than the safe daily yield of North Pond, the primary supply source at certain times of year. This causes great fluctuations in the amount of usable stored water in the reservoir from year to year.

A worst-case scenario would be an interruption in the water supply to some or all customers. In this scenario, potable water would be rationed to residents at the rate of 2 gallons per person daily. In order to be prepared for firefighting a minimum of 0.6 MG will be retained in the standpipe. This volume is sufficient for 3 hours of firefighting, which should be able to extinguish most residential fires and provide ample time to request assistance from adjacent communities.

Scenario – Drought

Potential Conditions:
1. Partial or complete loss of water supply due to insufficient storage in reservoirs.
2. Maintain standpipe at maximum capacity.

Remaining System Capacity:
1. Treatment plant capacity will depend on the severity of conditions.
2. Connection to emergency supply in North Kingstown may be restricted, depending on the regional impact of drought conditions.

Response:

- Invoke mandatory conservation requirements detailed above.

See Section 10 of this WSSMP for more details on Drought Management.

9.2.3 Earthquake

Earthquakes are rare in Rhode Island relative to other parts of the country. They do, however, occur from time to time. Up to this time, earthquakes in the area have been very mild. Some scientists have theorized that the Northeast United States could be prone to an earthquake sometime within the next fifty years.

A severe earthquake could totally incapacitate the water treatment and delivery systems. It can result in structural damage and/or prolonged power outages. In these cases, the Town would activate its primary control center. The Public Works Director is responsible for initial assessment of the situation, and shall notify the Town Administrator and confer on proper response. The Rhode Island Department of Transportation shall be notified, and public information on the situation disseminated via the emergency broadcast system.

JWD personnel shall inspect all critical components including: pump shafts, pumps, treatment equipment, mains, and the standpipe. A damage report shall be made to the Public Works Director, who shall notify the Town Administrator and Board of Water and Sewer Commissioners.

If the system is damaged, the Public Works Director shall immediately investigate alternative means of supply. The RI Department of Health shall be notified immediately and appraised of the situation. Component vendors and/or distributors shall be contacted as soon as possible to begin repairs. If there is no apparent damage to the system, water quality shall be monitored and appropriate action taken to ensure that water in the system meets quality standards.

Scenario – Earthquake

Potential Conditions:

1. Major structural damage to treatment plant, pump station, and standpipes possible.
2. Damage to water transmission line from North Pond.
3. Water main breaks in distribution system.
4. Integrity of reservoir dams compromised.
5. Standpipe damaged.

Remaining System Capacity:

1. Treatment plant capacity will depend on the severity of emergency conditions.

Response:

- Invoke mandatory conservation requirements detailed above.
- Inspect all critical components. Determine if any level of normal service can be maintained.
- Inspect dams. If potential for breach exists, evacuate watershed below North Pond and monitor condition.
- Damage to standpipe will require that emergency supply of potable water be secured. Make sources available at central locations at rate of 2 gpd per person to meet only basic needs.
- Immediately begin repair procedures, beginning with major components and transmission lines.

9.2.4 Hazardous Material Spill

Potential for a hazardous material spill includes a release of treatment plant chemicals or an unrelated spill off-site within the Jamestown Watershed. The latter could be caused by a vehicle or airplane crash, fire, or explosion. Either type of incident could result in contamination of finished or raw water.

The most likely cause is a vehicular accident on Route 138, a limited-access highway that bisects the watershed. The highway drainage system is designed to capture all stormwater runoff and transport it to one of two detention ponds. In order to cause an emergency condition to the watershed, an accident would have to occur outside the containment area of the highway.

A hazardous material spill could have numerous effects. First, the raw water quality of the reservoirs could be compromised. A second impact might be restricted access to or use of water system components. There would also be impacts to public water customers and the environment. Possible effects of a hazardous material spill on the JWD's water customers could range from a lack of available water to consumption of contaminated water.

In preparing to deal with a hazardous materials incident, the JWD requires comprehensive training of personnel. Emergency preparedness training includes an orientation seminar. Personnel are given an overview of the entire system and facilities, and the Emergency Preparedness Plan is presented and discussed. Employees are detailed on every aspect of their anticipated involvement to respond to an emergency situation.

Supervisors are required to undergo more rigorous training. All supervisors receive cross-training in systems operations so that they are able to operate all system components. Lower-level supervisors are trained to make management decisions in the event of an emergency.

All JWD personnel go through a 40-hour OSHA Hazardous Material Response Training course and are required to attend periodic AWWA seminars in water quality management. Supervisors are required to attend an additional 8-hour OSHA training. Personnel also attend AWWA backflow prevention courses and quality/microbiology seminars regularly. To further prepare for an emergency, the JWD engages in mock emergency exercises. A tabletop exercise is conducted at least annually to keep all personnel and elected and appointed town officials up to date on their emergency duties.

In the event that a hazardous spill should occur, several agencies should be notified, many specific to this type of emergency. These are as follows:

RI Department of Environmental Management (DEM)	(401) 222-4700
RI DEM After Hours Emergencies	(401) 222-3070
US EPA Region 1	(617) 918-1111 or (888) 372-7341
National Response Center	(800) 424-8802
RI Department of Health	(401) 222-5960
Clean Harbors Field Services	(401) 228-2435

The Fire Department shall be dispatched immediately to the site and will utilize the spill containment kits in the event of a spill. The kits are stored at the Fire Station and near Route 138 within the watershed. The Public Works Director shall assess the situation to determine the degree of the spill and the appropriate response.

9.2.5 Civil Unrest

Civil unrest could result in a work stoppage impacting operation of the water treatment plant or general system maintenance. This situation could result in a loss of union personnel, in which case the JWD would suspend non-essential operations.

If the Public Works Director and Town Administration fear that security could be a concern, a police detail and/or National Guard personnel would be dispatched to the treatment plant. Regular drive-by surveillance would be done at the reservoirs, standpipe, hydrants, and other exposed equipment of the distribution system.

The JWD will consider hiring private contractors to run the treatment plant in the event of a work stoppage. In this situation, outside personnel may require police escorts to the work site.

9.2.6 Vandalism

Because of the size of the watershed area and the distribution of various components, it is impossible to defend against vandalism of the entire system.

Because of the small size of the water system, a release of water from a hydrant would be detected within minutes. A broken hydrant, however, could allow enough water to escape to lower the standpipe elevation, which would cause a decrease in water pressure and storage. This would be a temporary situation that would not result in damage to the system. JWD personnel indicate that the most probable cause of system damage from a hydrant release would result from shutting off the hydrant too quickly. This situation creates a pressure "hammer" which can cause damage to weak pipes.

Vandalism associated with hazardous material being introduced into the system would be handled as detailed in section 9.2.4 above.

Scenario – Vandalism

Potential Conditions:
1. Damage to treatment plant.
2. Contamination of reservoir.

Remaining System Capacity:
1. Incapacitation of treatment plant would result in zero production.
2. Contamination of reservoir would require utilization of emergency supply in North Kingstown.

Response:

- Dispatch personnel to site to assess situation.
- In the event of contamination, notify agencies listed in hazardous spill section.
- Contact North Kingstown Water Department for emergency supply.

9.2.7 Other Extraordinary Emergencies

1. Fire – The Treatment Plant is brick and masonry construction. All electrical systems are enclosed in steel panels. The Plant's electrical contractor, Jack's Electric, would be called in for fire damage to electrical systems.
2. North Pond Contamination, Hazardous Material Spill – the intake from North Pond would immediately be closed. Chemical containment kits, which are stored in the watershed and at the Fire Department, would be placed as needed. Clean Harbors, Inc. would be dispatched by the Police Department. The Treatment Plant would begin taking water from South Pond with RIDOH approval.

The above emergencies constitute the greatest threats to continuous service of the public water system. An emergency generator is maintained at the water treatment plant to provide power for all necessary functions. Should a pollution event occur, the Town would be forced to seek water from an outside source.

9.3 Problem Identification/Assessment

Identifying the emergency situation and assessing its impacts on the system is a critical first step needed to determine which system components are impacted and what general and specific responses are required. The following is a procedure for assessing the water system emergency before response actions are taken.

1. Determine whether the emergency reduces the quantity and/or quality of potable water in the system.
2. Assess the extent of the emergency and assign the severity of the water quantity or water quality type of emergency.
3. Determine the cause of the emergency so that appropriate specific responses can be selected.
4. Identify critical system components impacted, or those that are vulnerable to impacts, from the emergency conditions.

9.4 General Responses

In instances where the water quality or available quantity has been reduced, general response actions should be taken to mitigate the potential consequences from reduced water quantity or quality. The following general responses are appropriate for most types of emergencies typically facing water systems:

1. Notify RIDOH of impending public health emergency condition.
2. Notify RI Emergency Management Agency to coordinate state resources, possibly including RI National Guard, local fire and police departments, local emergency maintenance agencies, and other agencies as applicable.
3. Implement emergency notification procedures through the Statewide Emergency Broadcast System to instruct water system customers of the emergency water event.
4. Restrict water usage as required based on the severity of the emergency.
5. Notify North Kingstown Water Department if activation of the emergency interconnection is considered.
6. If deemed necessary, utilize state resources to implement potable water distribution in affected areas for the expected duration of the water emergency condition.
7. Identify critical components impacted by the emergency and implement specific response actions.

8. Flush and disinfect system components impacted upon resolution of emergency, as appropriate.
9. Prepare a situation report and submit to RIDOH within 10 days of the resolution of emergency condition.

9.5 Specific Response Actions

Response actions likely required for a number of types of emergencies are summarized in Section 9.2. Response actions specific to the various types of critical infrastructure in the JWD system are summarized in this section.

9.5.1 Treatment Plant

The JWD relies on one treatment facility to treat source water from their supply reservoirs and wells.

Treatment Plant Damaged and Out of Service

Severe structural damage or a contamination event at the treatment plant is possible during certain types of emergencies which might remove it entirely from service and cut off supply of treated water to the distribution system. In this event, notification procedures outlined in Section 9.6 shall be implemented and an emergency response team mobilized to the damaged facility to assess the damage. Necessary repairs shall be made by water department staff or outside contractors, as required, to reinstate operation of the treatment plant as expeditiously as possible. The JWD shall also coordinate with the North Kingstown Water Department to activate the emergency interconnection, if warranted.

Failure of a Piece of Equipment

Although the treatment plant is equipped with redundant equipment and multiple treatment trains, failure of a piece of equipment can restrict production capabilities to the point where a short-term emergency condition may ensue. Upon such an occurrence, a precautionary restricted water use condition shall be considered and implemented, if warranted. This shall be coordinated with the RIDOH, Division of Drinking Water Quality, in addition to other state and local emergency management authorities. Damaged or failed equipment shall be isolated and a response team shall assess the situation and determine the repairs necessary to return it to service. Repairs shall be made by JWD staff or outside contractors, as deemed appropriate based on the degree of equipment failure.

9.5.2 Pump Station

The pump station pumps finished water from the treatment plant to the two standpipes, which supply the distribution system.

Pump Station Damaged and Out of Service

Severe structural damage to the pump station is possible during certain types of emergencies which might entirely cut out supply to the two standpipes and the distribution system. In this event, notification procedures outlined in Section 9.6 shall be implemented and an emergency response team mobilized to the damaged facility to assess the damage. Necessary repairs shall be made by water department staff or outside contractors, as required, to reinstate operation of the pump station as expeditiously as possible.

Failure of a Piece of Equipment within the Pump Station During Operation

Although the pump station is equipped with two pumps, and thus capable of absorbing the short-term loss of a single pump, an emergency situation involving the failure of electrical and mechanical systems, or even both pumps, is possible. The pump station is integral to the system by supplying the two standpipes with finished water from the treatment plant.

Upon such an occurrence, a precautionary restricted water use condition shall be immediately implemented for the affected area and coordinated with the RIDOH, Division of Drinking Water Quality, in addition to other state and local emergency management authorities. Care shall be taken to monitor drawdown of the two standpipes. The failed pump(s) shall then be isolated and an emergency response team shall assess the situation and determine the repairs necessary to return the failed pumps to service.

9.5.3 Storage Tanks

The two standpipes in the JWD system provide for flexibility in water supply operation and facility storage is utilized for normal operation during system peak demand periods. Storage also assists in providing for system-wide fire flow demands.

Loss of a storage tank could result from an emergency event causing structural damage to the facility or contamination of stored water within the tank, requiring it to be removed from service for decontamination. Emergency events in which both standpipes are impacted are obviously more critical than if one of the standpipes is compromised, since they generally serve a similar function.

Tank Damaged and Out of Service

Upon severe structural damage and collapse of the tank, the facility shall be bypassed and taken off-line. In addition, the local Fire Departments shall be notified of the loss of this storage, and any remaining water shall be drained. System demand shall be monitored during periods of peak demand while the storage tank is out of service. Once the damaged tank is isolated, an emergency response team shall assess the situation and determine the repairs necessary to return the damaged tank to service.

Tank Contaminated and Out of Service

Should the tank become contaminated in any way, bacteriologically or otherwise, the facility shall be bypassed and taken off line. In addition, the local Fire Departments shall be notified of the loss of this storage.

Once the contaminated facility is isolated, an emergency response team shall assess the situation and determine the necessary mitigating action. Recommended procedures for adequate decontamination shall then be implemented and coordinated with the RIDOH, Division of Drinking Water Quality, and other state and local emergency channels. This will involve disinfection, draining of the tank, sampling, testing and refilling upon acceptance.

It should be noted, that under these conditions, portions or in fact all of the distribution system should be placed in a precautionary restricted water use condition. Aside from moving to effect repairs to the tank, action should be undertaken to impose service restrictions on water usage until normal system storage can be reinstituted.

9.6 Notification Procedures

Quick and effective communication is an important factor in responding to an emergency situation. If a condition is found to exist which threatens water quality or supply quantities, the following agencies and key personnel should be notified.

1. Local Management and Emergency Personnel:

    a. Public Works Director (401) 423-7225
    b. Town Administrator (401) 423-7220
    c. Jamestown Emergency Management Director
    d. Jamestown Police Department (401) 423-1212
    e. Jamestown Fire Department (401) 423-7277
    f. Other Town Personnel, as appropriate

2. State and Other Local Officials:

    a. North Kingstown Water Department, Director (401) 268-1521
    b. RI Department of Health, Office of Drinking Water Quality (401) 222-6867
    c. RI Department of Environmental Management (401) 222-4700
    d. RI Emergency Management Agency (401) 946-9996

3. Media and Public:

    a. Providence Journal (401) 277-7623
    b. Newport Daily News (866) 758-3408
    c. Jamestown Press (401) 423-3200
    d. WPRI CBS 12 (401) 438-3310
    e. WLNE ABC 6 News (401) 453-8000
    f. WJAR NBC 10 (401) 455-9100
    g. WPRO (401) 438-9776
    h. WHJJ (866) 920-9455
    i. Emergency Broadcast System through RIEMA

4. Other Utilities:

    a. Rhode Island Energy - Gas (800) 870-1664
    b. Rhode Island Energy – Gas Emergencies (800) 640-1595
    c. Rhode Island Energy – Electric (855) 743-1101
    d. Verizon (800) 837-4966

9.7 Recovery and Reverse Triggers

Regardless of the emergency condition, the system will generally be returned to normal operation at some point. The following general provisions should be implemented to return to the system to normal operation:

1. Identify that the emergency situation no longer exists;
2. Obtain approval, as necessary, from the appropriate authority to restore normal operation;

3. Perform testing on the restored facility and restore partial operation while monitoring operating conditions;
4. Confirm operation appears normal and perform additional testing before placing component into full, normal operation.

9.8 Preventative Measures

An important aspect of emergency response is system preparedness. To adequately respond to an emergency/disaster event affecting the system, knowledge of the system and the proper response action, as well as adequate resources, must be available. The preparedness of the system relates to ensuring that knowledge of the proper response actions is thoroughly ingrained within the SWSB's personnel and that the resources needed for the implementation of response actions are available under all reasonably expected circumstances. The aspects of system preparedness fall into three basic components: Training, Resource Coordination, and Plan Updates. The basic requirements of these components are as described in the following section.

9.8.1 Training

Appropriate personnel must be properly trained and organized in order to ensure an efficient and effective response to emergency conditions. All appropriate new personnel are to be given an orientation training session, which should include the following:

- A general description of the water system and its facilities.
- A brief overview of this Emergency Response Plan; and
- A detailed description of the employee's anticipated involvement in emergency response (i.e. location of emergency control centers; who and where to report in case of emergency; etc.).

Employees acting in a supervisory or management role in the water system operation, and who are expected to be utilized as a resource during an emergency response, are to be thoroughly trained in all aspects of the JWD's emergency response procedures. This training will include the following:

- A thorough review of this section of the WSSMP. Each operating management/supervisory person will have their own copy (or access to a central copy) for immediate use during a water system emergency.
- All water system management personnel will be cross-trained in system operations outside their own areas of expertise (i.e., meter readers trained in transmission/distribution operations, etc.) for emergency response in other areas, as required.
- Lower-level management personnel should be trained in management decision-making procedures in the event of an emergency response where senior management personnel cannot be present.

The main goals of management training are to make management personnel thoroughly aware of emergency preparedness and to ensure that an adequate response does not rely upon a single decision maker who may not be available during an emergency event.

Specialized training should be consistent with the anticipated risks that are applicable to the water system. With the exception of training for emergency operational situations the primary risks to the water system would be in contamination of the distribution system due to backflows or cross connections. Appropriate personnel should be provided with the following training:

- OSHA 40-hour training for hazardous material response
- OSHA 8-hour supervisor training for hazardous material response (for supervisory personnel)
- AWWA Seminar for Emergency Planning for water quality management.
- NEWWA/AWWA Cross-Connection Control and Backflow Prevention courses.
- AWWA Water Quality/Microbiology Seminar (for water quality monitoring personnel).
- FEMA Emergency Management Institute Courses:
    - IS 100 – Introduction to Incident Command System (ICS 100)
    - IS 200 – Incident Command System (ICS) for Single Resources and Initial Accident Incidents
    - IS 700 – National Incident Management System (NIMS): An Introduction

In addition to these specialized training seminars listed, water system management should ensure that system operations personnel maintain an active and ongoing program of skills training through local trade associations, such as the New England Water Works Association.

9.8.2 Mock Emergency Exercises

Mock training exercises should be performed to ensure that emergency personnel are able to respond adequately to identified problems and ensure that equipment and resources are adequate prior to an actual event. By utilizing mock exercises as part of the overall training program, and as a part of the periodic review and revision activity, individuals will obtain firsthand experience with the response plan. Mock exercises can also indicate necessary areas of improvement for the plan. There are three specific types of mock exercises:

- **Tabletop Exercise:** This activity is designed to identify problems based upon the emergency response procedures. Elected or appointed personnel with emergency management responsibilities (primarily the command group) are gathered together to act out various simulated emergency situations. The exercise scenarios should test the performance of duties, tasks, or operations in a manner similar to the way they would be performed in a real emergency. Modifications to the emergency response procedures usually occur in response to this activity.
- **Functional Exercise:** This activity is designed to test or evaluate the capability of personnel to respond to individual or multiple functions. This type of exercise is more complex than a tabletop exercise in that activities are under time constraints and involve an extensive evaluation/critique at the end of the exercise. An example of a functional exercise would be an activity designed to test and evaluate the centralized emergency operations capability and timely response of one or more units of government under a given scenario. Functional exercises should be conducted from the emergency operations center and should accurately simulate the use of outside agencies and resources.

- **Full Scale Exercise:** This activity should evaluate the operational capability of emergency management systems in an interactive manner over a substantial period of time. It involves the simulated testing of a major portion of the basic elements existing within emergency operation response plans. This type of exercise includes mobilization of personnel and resources and the actual movement of emergency workers, equipment, and resources required to demonstrate emergency coordination and resource capability. The emergency operations center should be activated and field command posts may be set up. Extensive use of outside agencies should be considered to better simulate an actual disruptive event.

9.9 Emergency Sources

The Town of Jamestown currently has an agreement with the Town of North Kingstown to purchase water in the case of a water emergency. The connection has the capacity to transport water at the rate of 150 gpm, but is limited by the current contract of 200,000 gallons per day. The Town has maintained a written agreement with North Kingstown from September 15, 1993 to present. A copy of the most recent agreement can be found in Appendix C.

An emergency connection to the Newport water system is also feasible, but would require significant expense in installing a pipeline over the Newport Bridge or under the East Passage of Narragansett Bay. A connection to Newport is not currently a serious consideration.

The RI Emergency Management Agency is the contact for the RI National Guard. The National Guard is able to provide water via tank truck in the most severe cases of supply or distribution problems. The JWD monitors the reservoir levels daily throughout the year.

SECTION 10.0
DROUGHT MANAGEMENT

10.1 General

A drought event is not immediate but occurs over a period of time. State Guide Plan Element 724 defines five phases of drought consistent with the Drought Watch/Warning System of the National Weather Service, which are:

1. Normal;
2. Advisory;
3. Watch;
4. Warning; and
5. Emergency.

The Water Resources Board administers these phases with aid from the Drought Steering Committee. 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 JWD system is within Rhode Island's Eastern Drought Region.

10.2 System Operation in Drought Conditions

The summer drought of 1993 caused the JWD to set specific guidelines for graduated conservation measures from May to November which are still in use today. The following are the steps activated by the level of the reservoir as measured from full capacity:

Step 1 — Capacity to -6" below capacity
No restrictions

Step 2 — -6" to -1'below capacity
Public notification – voluntary conservation.

Step 3 — -1' to -2'below capacity
Restrict outside water use to odd/even days for residential use.

Step 4 — -2' to -3' below capacity
Reduce water pressure 5 psi.
Continue public notification for voluntary conservation.

Step 5 — -3' to -3.5' below capacity
Reduce pressure 5 psi.
Establish a residential ban on car washing and lawn watering.
Restrict swimming pool filling.

Step 6 — -3.5' to -5' below capacity
Ban outside water use entirely.

Step 7 -5' to -6' below capacity
Reduce pressure 5 psi.
Restrict water use at marinas to potable water use only.
Begin commercial carwash and other non-essential commercial use restrictions.

Step 8 -6' to -7' below capacity
Restrict all non-essential water use.

Step 9 -7' to -8' below capacity
Reduce pressure 5 psi.
Continue restrictions on all non-essential water use.

There is no formal procedure for restricting water use beyond Step 9. In 1993, the drought reached Step 7. Water conservation resulted in a reduction in use of 20%. If a situation arises which requires further restriction of water use, all commercial and industrial users will be restricted.

10.3 Agreements with Other Water Systems

The JWD currently has a non-permanent emergency interconnection with the Town of North Kingstown as detailed in Section 2.5. The emergency interconnection, nine step drought management program, and experience of the 1993 drought provide security and insurance to aid the JWD with emergency situations such as drought and encourages a proactive approach at responding to drought.

11.0 PLAN IMPLEMENTATION

General

The purpose of this WSSMP is to outline the goals of the water supply system management planning process for the Jamestown Water Supply Board System, and to serve as a guide for the Board's decision-making procedures. The purpose of this section is to catalog actions necessary for the implementation of the WSSMP's recommendations in a timely fashion. The implementation section will therefore serve to link those recommendations resulting from comprehensive study, to policy and financial decisions required for actual improvement of the water supply system.

A primary objective of the JWD is to maximize the sustainable use of their current water supplies, which is of heightened concern given the lack of alternative supply on the Island.

The JWD is also exploring a potential opportunity for a watershed recharge project that might benefit water supplies. Currently, a stormwater pump station operated by the Rhode Island Bridge and Turnpike Authority (RIBTA) on North Road pumps stormwater from portions of Route 138 and North Road ultimately to the Bay. However, it may be possible to redirect this discharge to a location that recharges the watershed to North Pond. Pare has assisted the JWD with developing conceptual alternatives for redirecting the discharge from this pump station. At this time, the JWD is pursuing preliminary discussions with the RIBTA to further discuss the feasibility of these modifications.

The JWD is currently pursuing modifications at the treatment plant to include a pumping system that recirculates treatment plant backwash water to the head of the plant, as opposed to discharging it to Great Creek which is the current practice. It is anticipated to be completed soon and is estimated to save the JWD approximately 6.05 million gallons annually once completed. Other projects the JWD envisions completing in upcoming years are related to the continued maintenance of the system. The JWD anticipates performing routine leak detection surveys, water main replacement projects in Narragansett Avenue, and repainting of their original standpipe.

12.0 FINANCIAL MANAGEMENT

12.1 General

The JWD is operated as an enterprise fund, and is self-supporting. Revenues generated from water rates are used to meet the fixed, capital, operating, and administrative expenses of the water system. The Board of Water and Sewer Commissioners set water rates, and the utility is not regulated by the Rhode Island Public Utilities Commission (PUC).

Debt service for capital improvements is generally paid from annual revenues. The JWD is currently paying the debt service on a $6.2 Million Clean Water SRF loan issued in 2007, set to reach maturity in 2027, as well as two other small bonds.

12.2 Current Financial Management Practices

Table 12-1 summarizes the revenue and expenses for the Jamestown Water Department for Fiscal Years 2020, 2021, and 2022.

Table 12.1: Jamestown Water Total Revenue & Expenses (2020-2022)

	2020	2021	2022
Total Revenue	$1,218,968	$1,343,859	$1,396,314
Total Expenses	$1,080,257	$1,092,892	$1,104,677
Total Income (Loss)	$138,711	$250,967	$291,637

An independent accounting firm audits financial records annually. A summary of the budgetary and actual revenues and expenses, as well as the long-term debt status, for Fiscal Years 2020, 2021, and 2022 is presented in Appendix H. A review of revenues and expenses for the last three years can also be found in Worksheet No. 16.

12.3 Future Revenue Sources

The Water Department will continue to seek the most cost-effective means of financing future capital expenditures. It is anticipated that future revenues will be derived from water rates in most instances, though loans and grants may be pursued for large-scale capital improvements. The JWD does not anticipate performing any large capital improvement projects in the water system at this time, but routine maintenance of existing components will likely be required.

There are a variety of options for financing capital improvements to the water system in the event borrowing is required. These are listed below:

- *Town General Obligation Bonds*
- *Water System Revenue Bonds*
- *RI Clean Water Protection Financing Agency Loans*
- *RI Water Resources Board Loans*
- *Farmer's Home Administration Loans*
- *Other state and federal loan programs*

One option to using the above financing methods is forming a reserve fund from water rates that can be used to finance improvements without incurring debt.

Section 11.0 of this Plan discussed programs that will be implemented by the JWD in the coming years. For the current and succeeding years, the cost of these programs will be covered by revenues generated from water rates.

12.4 Assessment of Rates

Bills for residential and commercial customers are issued quarterly. Tables 121, 12.2, and provide the current rate structure for public water use, effective as of June 2022:

Table 12.2
WATER RATES - MINIMUM IN ADVANCE CHARGES
Source: Jamestown Water Department

Meter Size	Quarterly Billing Rates	Seasonal Billing Rates	Miscellaneous Charges
5/8”	$89.82	$340.84	Turn-on/off $30.00
3/4"	$134.80	$511.59	Install/Remove $100.00
1”	$167.42	$635.36	Early Install/Remove $50.00
1-1/2”	$206.22	$781.78	Sprinkler Charge/unit $0.18
2”	$268.63	$1,019.50	Frozen Meter Charge $125.00
3”	$495.25	$1,879.56	Special Reading $20.00
4”	$745.46	$2,828.23	Call Out $150.00
			Lien Discharge Recording Fee $49.00

Table 12.3
CURRENT EXCESS WATER RATES
Source: Jamestown Water Department

Gallon Tier Structure		Rate per 1,000 Gallons
0	5,000	$0.00
5,001	9,999	$7.98
10,000	14,999	$8.58
15,000	19,999	$10.87
20,000	49,999	$15.13
50,000	99,999	$18.56
100,000	199,999	$23.76
200,000	999,999,999	$30.24

Table 12.4
EXCESS SEASONAL WATER RATES
Source: Jamestown Water Department

Minimum	Maximum	Rate per 1,000 Gallons
0	20,000	$0.00
20,001	49,999	$15.13
50,000	99,999	$18.56
100,000	199,999	$23.76
200,000	999,999,999	$30.24

The JWD charges a flat fee for each service based on meter size, as shown in Table 12.1, and uses an inclining block rate structure for water use consumption in excess of 5,000 gallons each quarter, as shown in Table 12.2. Table 12.3 depicts the excess seasonal water rates. Water rates are evaluated and adjusted each year relative to the anticipated expenditures and overall water system budget. The current quarterly billing water rates represent a 15% increase from the rates presented in the previous 2015 WSSMP, determined following an evaluation performed by a consultant hired by the Town.

12.5 Billing

Charges for water and sewer service are currently coordinated into a joint bill, mailed quarterly. This method of billing reduces the volume of mail and saves time in the Water Department. While not all customers purchase both services, there have been no issues with this billing method to date.

Funding Requirements

It is important that the JWD establish a reserve fund to prepare for major capital improvements as detailed in Section 11.0. The establishment of a reserve fund will help offset the costs of major capital improvements. A portion of profits and interest within the JWD could be used to develop such a reserve fund.

SECTION 13.0
COORDINATION

13.1 Consistency with Jamestown Comprehensive Plan

The 2015 Jamestown Comprehensive Plan, which was adopted by the Jamestown Planning Commission and Jamestown Town Council on June 18, 2014, was reviewed while updating this WSSMP. This WSSMP is intended to be consistent with the goals and policies of the Comprehensive Plan, and a copy of the WSSMP has been provided to the Jamestown Planning Department for their review. A letter (refer to Appendix I) has been requested from the Jamestown Planning Department confirming consistency between the Comprehensive Plan and this WSSMP.

The Preamble to the Comprehensive Plan identifies that the driving theme of the plan is to promote the protection of the town's rural character. The Comprehensive Plan also indicates that the "Center Island Watershed should continue to be protected. Development should not exceed on-island natural supplies of water. Conservation of existing water supplies should continue to be emphasized, as well as finding new methods to supplement the existing yield."

13.1.1 Land Use

Land within the Center Island Watershed, the watershed to North and South Ponds, is approximately 17% developed and 73% of it is permanently protected. The area is established as a Watershed Conservation District, protected by a RR-200 zoning district and Open Space I District. Land zoned RR-200 limits development to single-family housing on 200,000 square-foot lots. The Open Space I District was established to protect public properties within the Watershed Conservation District. One of the action items identified in the Comprehensive Plan is to "continue to aggressively purchase all vacant properties within the Center Island Watershed" in an effort toward maintaining and improving the Town's public and private water supplies.

The Land Use section of the Comprehensive Plan identifies the challenges associated with the Jamestown Shores area. The area is currently zoned R-40, requiring 40,000 square-foot lots but most lots are much smaller than this, dating back to the original subdivision of 7,200 square-foot lots. Originally, Jamestown Shores was an area of seasonal homes but infill development and expansion of homes into year-round residences has occurred over time.

The Comprehensive Plan reaffirms that the Town does not intend on extending water service to the Jamestown Shores area and identifies that current supply would not be sufficient to sustain service to this area. One significant step that the Town has taken to protect groundwater quality used by individual wells in this area is the creation of an On-Site Wastewater Management Ordinance which requires that all OWTS be inspected and maintained on an established schedule. The Town also created a High Groundwater Table and Impervious Layer Overlay District that encompasses Jamestown Shores, which "regulates impervious coverage on lots as well as storm-water attenuation for new development." Future considerations may include extending public sewer to the Jamestown Shores area to remove the need for OWTS.

The Comprehensive Plan identifies that future land use in Town is becoming more predictable as Jamestown approaches full build-out – less than 15% of the Jamestown remains undeveloped. The Plan recognizes that the most significant issue regarding land use is potable water. It states that:

> *"Significant improvements to the public water system, the Town's Wastewater Management Program, and its active land acquisition program have contributed to increasing the public water supply system capacity and protecting the private well-water quality. The Town Council and the Board of Water and Sewer Commissioners should continue to study the future water needs of Jamestown. Jamestown's growth rate should be managed to insure that the Town's water capacity is able to adequately supply future population growth."*

13.1.2 Population

The Population component of the Comprehensive Plan indicates that the estimated population in 2000 was 5,622 residents but the population in 2010 decreased to 5,405, according to 2010 U.S. Census estimates. This was a decrease of 217 residents and represents the first instance of declining population after several decades of steady population growth in Jamestown. The JWD estimates that the population currently served by the water system is approximately 3,323 residents.

Population projections made by the RI Division of Planning were most recently revised in 2013 and estimate that the Town's population will increase at a relatively slow rate in upcoming years, reaching 5,674 residents in 2040. Population projections previously made in 2004 estimated that the population in Jamestown would reach 7,064 residents by 2030. This disparity between past and more recent population growth projections is common in many other parts of Rhode Island and generally the State as a whole.

13.1.3 Natural and Cultural Resources

The Comprehensive Plan identifies several goals that of critical importance to the water system. Specifically, the preamble to the Comprehensive Plan it identifies that "the Center Island Watershed should continue to be protected" and that "development should not exceed on-island natural supplies of water." It also states that "conservation of existing water supplies should continue to be emphasized, as well as finding new methods to supplement the existing yield."

The Comprehensive Plan identifies a number of actions that should be implemented to achieve the plan's policies of maintaining and improving the quantity and quality of public and private drinking water supplies. These actions are as follows:

Policy: Maintain and improve the quality of Jamestown's public and private water supplies.

Actions:
1. Continue to aggressively purchase all vacant properties within the Center Island Watershed.
2. Continue to update the Emergency Response Plan contained in the Water Supply Management Plan.
3. Continue to identify potential point and non-point pollution sources.
4. Reduce pollution on public land and educate private landowners of possible sources of pollution.
5. Continue to detect leaks and groundwater intrusion in public sewer pipes.

6. Implement the recommendations of Ann Veeger's 1997 University of Rhode Island study.
7. Conduct studies modeling the Veeger study and adopt an Ordinance that requires retrofitting of cesspools.
8. Review for amendment Section 308 of the Jamestown Zoning Ordinance to protect development from impacting groundwater resources and other natural resources.
9. Investigate using best management practices and development plan review for management of the drinking water watershed.

Policy: Protect the quantity of Jamestown's freshwater resources within the public drinking water watershed and private well areas.

Actions:
1. Continue to enforce the 1999 Water Conservation Regulations adopted by Board of Water and Sewer Commissioners and develop stricter penalties for violation and excessive high use rates.
2. Investigation options to expand the quantity of public drinking water supply system (e.g. desalination, South Pond, increased storage and off-Island sources).
3. Develop monitoring program that measures effect of pumping Town wells on surrounding wells in the vicinity.
4. Investigate a reporting and information dissemination system that detects low water levels and salt water intrusion problems in private wells and recommend conservation measures.

13.2 Coordination with Other Water Suppliers

The JWD has a non-permanent emergency interconnection with the Town of North Kingstown, as referenced earlier in this WSSMP. The JWD maintains a close working relationship with the Town of North Kingstown with regard to the maintenance of the emergency interconnection.

13.3 Coordination with Wastewater Collection Systems

Municipal wastewater collection and treatment, in addition to water supply, is provided by the water and sewer division of the town's Department of Public Works. The Jamestown Town Council sits as the Board of Water and Sewer Commissioners. Joint billing is not currently in place but may be a future consideration in Jamestown.

13.4 Coordination with Local Fire Departments

The Jamestown Fire Department is the sole provider of fire protection service to the town. The JWD coordinates with the fire department to track water usage for fire-fighting and training exercises. The JWD estimates that approximately 100,000 gallons of water is used annually by the fire department.