

SECTION 8.00: EXECUTIVE SUMMARY

This Executive Summary of the District's Water Supply System Management Plan is intended to highlight the important elements of the plan. For additional detail and supporting information the reader is referred to the plan and the appendixes.

SECTION 8.01: GOALS STATEMENT

A. General

1. The District has developed Water Supply System Management Goals that are intended to:
 - a. Promote the effective and efficient conservation, development, utilization, and protection of the available water supply for Aquidneck Island and for the District.
 - b. Ensure an adequate quantity of water for the current and future customer base of the District.
 - c. Ensure adequate quality of water in conformance with the Rhode Island Department of Health and Safe Drinking Water Act standards.
 - d. Ensure adequate water volume and pressure for fire protection throughout the District.

SECTION 8.02: WATER SUPPLY SYSTEM DESCRIPTION

A. Organizational and Legal Structure

1. The Portsmouth Water and Fire District is a quasi-municipal, governmental agency created in 1952 by act of the Rhode Island General Assembly.
2. The District was created to obtain and maintain for the District a supply of water for the extinguishing of fire, and for distribution to the inhabitants of the district, for domestic use and for other purposes. The District encompasses all of Portsmouth on Aquidneck Island, exclusive of the Redwood Farms, Bay View, Raytheon and Melville areas.
3. The Portsmouth Water and Fire District is not affiliated legally or administratively with the Town of Portsmouth government, although the District and the town work cooperatively to best serve their common constituents. The District is governed by a seven-member Administrative Board, which is elected by the registered voters within the District. The District holds an annual election of officers on the second Wednesday in June. The Board meets on the first Tuesday of every month at 7:00 PM at the District's main office.

B. System Overview

1. The District's system is separated into two distinct but interconnected service areas designated as the low service area (north end) and the high service area (south end). The customer base is almost equally divided between the two service areas with the low service area containing 49.8% and the high service area containing 50.2% of the customers. The low service area experienced 44.5% of the 2010 system demand while the high service area experienced 55.5% of the system demand.
2. Both the high service area and low service area are supplied with water from Newport Water via the LV-WTP.
3. Water from Stone Bridge is supplied to the low-service area during emergency situations.

4. Water can be moved from the low service area to the high service area via the Turkey Hill Pump Station.
5. Water can be moved from the high service area to the low service area via the Quaker Hill Flow Control Valve (FCV) Station.

C. Supply Sources

1. The District does not own or operate any water supply sources. The District purchases all of its water from the City of Newport, Newport Water Department (Newport Water) and the Stone Bridge Fire District (Stone Bridge) in Tiverton.
2. The water purchased from the Newport Water Department comes from the Lawton Valley Reservoir, St. Mary Pond and Sisson Pond in Portsmouth, Watson Reservoir in Little Compton and Nonquit Pond in Tiverton. This water is treated by the Newport Water LV-WTP in Portsmouth.
 - a. The water quality at purchase currently meets the requirements of the federal Safe Drinking Water Act and the Rhode Island Department of Health (DOH). However, the water supplied by Newport Water contains high levels of Total Trihalomethanes (TTHMs), a regulated disinfection by-product (DBP), which periodically exceed the maximum contaminant level of 80.0 parts per billion (ppb) at purchase. Furthermore, the potential for the formation of additional TTHMs as the water travels through the District's distribution system is high due to the levels of organic matter and chlorine in the treated water.
 - b. Newport Water is in the process of designing a replacement water treatment plant to be located at Lawton Valley. The plant will be constructed using a design-build approach with an independent engineering firm acting as the Newport Water agent. The new plant is expected to address the existing DBP compliance problem, as well as meet the requirements of Stage 2 – DBP rules, which take effect in 2013, for the three Aquidneck Island water suppliers. The replacement plant is scheduled to be online by the end of 2014.
 - c. The District does not perform any additional treatment to the water purchased from Newport Water.
3. The water purchased from the Stone Bridge Fire District comes from Stafford Pond in Tiverton. This water is treated at the Stone Bridge Fire District Water Treatment Plant.
 - a. The water quality at purchase currently meets the requirements of the federal Safe Drinking Water Act and the Rhode Island Department of Health (DOH).
 - b. The District adds fluoride to the water purchased from Stone Bridge. The District also has the ability to add chlorine to the water purchased from Stone Bridge, as necessary. However, due to TTHM issues, chlorine would be added only for emergency bacteriological control.

D. Infrastructure Components

1. Treatment Facilities

In 1996, the District constructed and placed on-line the Tiverton Treatment Station on top of the existing Tiverton Meter Pit on Riverside Drive in Tiverton. The purpose of the facility is to treat the supply from Stone Bridge with fluoride and chlorine. The new treatment facilities and the existing meter pit are now collectively referred to as the Tiverton Treatment Station.

2. Storage Facilities

- a. The District has four (4) water storage tanks, two in each service area.
- b. The Quaker Hill Large Tank (2.0 MG) and Quaker Hill Small Tank (0.5 MG) are located within 140 feet of each other behind the District's main office on East Main Road in the high service area.
- c. The Large Butts Hill Tank (2.4 MG) and Small Butts Hill Tank (0.5 MG) are located 521 feet apart at opposite ends of Fort Butts off Fort Street in the low service area.

3. Pump Stations

- a. The District has one primary pump station and one booster pump station.
 - 1) The Union Street Pump Station, the primary station, pumps water from Newport Water to the District's high and low service areas and the four water storage tanks.
 - 2) The Turkey Hill Pump Station, the booster station, pumps water from the low service area to the high service area on an as needed basis.

4. Transmission Facilities

- a. The District has four transmission pipelines.
 - 1) Transmission line T-1 is a 16-inch suction pipeline that transits water from Newport Water's 4.0 million gallon underground storage reservoir at their LV-WTP to the District's Union Street Pump Station. T-1 is also connected to the Newport Water 2.0 million-gallon standpipe with a normally closed valve. This connection is used for emergency situations and allows the District to draw water from Newport Water's 2.0-MG standpipe by bypassing Newport Water's 4.0-MG underground reservoir.
 - 2) Transmission line T-2 is a 10-inch subaqueous pipeline under the Sakonnet River that transits water from the Stone Bridge system by pressure to the District's distribution system.
 - 3) Transmission line T-3 is a 12-inch main in Union Street that transmits water from the Union Street Pump Station into the distribution system to the east on Union Street.
 - 4) Transmission line T-4 is a 12-inch main in Union Street and West Main Road that transmits water from the Union Street Pump Station into the distribution system to the west on Union Street and to the north on West Main Road.
- b. There District has one Flow Control Valve.
 - 1) The Quaker Hill Flow Control Valve Station is located on the 10-inch distribution main in East Main Road at the separation between the high and low service areas. The FCV Station allows water to be moved from the high service area to service the low service area while at the same time reducing the pressure to match the pressure gradient of the low service area.
- c. The District has two Pressure Reducing Valves.
 - 1) The Tiverton Treatment Station contains a PRV to regulate the supply pressure and flow from Stone Bridge.

- 2) The Turkey Hill Pressure Reducing Valve Station is on West Main Road south of the Turkey Hill Pump Station. This valve allows water to be moved from the high service area to the low service area.

5. Interconnections

a. General

The District has four interconnections with its two suppliers. There is one interconnection with Stone Bridge and three interconnections with Newport Water. Two of the interconnections with Newport Water are for emergency use, with the Mitchell Lane emergency connection available for flow to either supplier. The Stone Bridge connection is presently used as an emergency connection primarily to supply the District, however, the District can and has back-fed part of the Stone Bridge system through this connection.

b. Newport Water

1) Contract

a) Effective Dates

The contract for the purchase of water became effective on May 6, 1983 and expired on December 31, 1995. Although the contract is expired, the Newport Water Department and the District continue to operate under the expired contract with the exception of rates, which are set by the Rhode Island Public Utilities Commission.

b) Contractual Amounts

Newport agrees to supply the District with 450 million gallons per year. The maximum day supply available per the contract is 2.25 million gallons. The contract requires a yearly minimum purchase amount of 191,000 gallons and a daily minimum purchase amount of 500,000 gallons.

c) Rates

The price of water effective July 2009 is \$2.573 per thousand gallons.

For water purchased at the emergency connection on Mitchell's Lane, the price to either party is set at \$0.20 per thousand gallons over and above the prevailing wholesale rate to the District at the time of use.

2) Restrictions

- a) The consent of the Newport Water Department is required to resell water outside the limits of the District.

- b) Should the City of Newport impose restrictions on water use on its customers the District must likewise impose such restrictions on its customers.

- c) The District agrees not to assess property taxes to the Newport Water Department on any property within the District and owned by the NWD for the purpose of water supply.

- d) The District agrees not to aid, assist or council any third party in any PUC hearing.

c. Stone Bridge Fire District

1) Contract

a) Effective Dates:

The water supply contract with Stone Bridge expired on July 1, 2007.

b) Rates

The price of water is negotiated between Stone Bridge and the District. The water rate is 15% over and above the prevailing wholesale rate charged to the District by Newport Water. The current rate is \$2.959 per thousand gallons. This rate is also the rate charged to Stone Bridge when the District backfeeds Stone Bridge in an emergency.

6. Service Area

- a. The District's service area is established in its enabling legislation. In essence, the District's boundaries include all of Portsmouth on Aquidneck Island with the exception of most of the area in the southwest corner of Portsmouth bounded by Middletown, West Main Road and the northern boundary of the Melville Campgrounds. This area outside the District's boundaries, which specifically includes Redwood Farms, Bay View Apartments and Condominiums, Raytheon, and the Melville marina area, is serviced by the Newport Water distribution system. The Raytheon Corporation is supplied by its own service line connected to the Newport Water 16-inch transmission main at the LV-WTP. The Navy Base and Melville Navy Housing are supplied with Newport Water by Naval Station Newport.
- b. It is not likely that the District's service area will extend beyond the current legislated boundaries since all surrounding areas are serviced by other public water systems. The entire Town of Portsmouth is serviced by the Portsmouth Water and Fire District, the Newport Water Department, the Naval Station Newport or the Prudence Island Water Company. The entire Town of Middletown, although not completely serviced by public water, is within the Newport Water Department franchise area. Although there are large tracts of undeveloped land, most roads within the entire District are serviced with water mains. The undeveloped land is mostly farmland and is predominantly located off Middle Road, East Main Road and Wapping Road.
- c. The current District population served and eligible to be served is 16,116 and 16,194, respectively.

7. Meters

- a. The District has three supply points that are metered by master meters. These include the Stone Bridge supply at the Tiverton Treatment Station, the Newport supply at the LV-WTP meter pit, and the emergency connection between the District and Newport Water at Mitchell Lane.
- b. The District has five customers that are classified as major users because they use more than three million gallons per year (WRB definition).
- c. Current Meter Programs
 - 1) Meter Reading
 - a) The mechanical, master meters are manually read on a weekly basis. The SCADA system venturi meters are continuously recorded more than once per

minute. The total water used each day, as recorded by the SCADA system, is calculated and reviewed on a daily basis to monitor usage and detect major changes in demand or leakage.

b) Customer meters are classified into three groups and are read as follows:

Yearly - Meters are read twice each year, in the spring and the fall, and are billed once per year in the spring. The majority of the District's customers are classified as yearly customers.

Yearly, Read Quarterly - Meters are read on a quarterly basis on July 1, October 1, January 1, and April 1, but billed once per year in the spring. There are 55 yearly, read quarterly customers. These customers typically do not use a large amount of water; however, they have larger meters with the potential for large water use.

Quarterly - Meters are read and billed on a quarterly basis on July 1, October 1, January 1, and April 1. There are 50 quarterly customers. These customers tend to have larger meters and higher water demand compared to other users. These customers are billed on a quarterly basis for cash flow reasons due to the large usage.

2) Testing and Calibration

a) Master Meters

Master meters are routinely tested on a six-month basis in October and April and are calibrated or repaired as necessary.

b) Customer Meters

The useful life of the small meters is approximately twenty-one years as determined through meter testing.

From FY-98 through FY-07, the District embarked on a Meter Replacement Program (MRP) to replace residential meters with an age greater than 21 years. During this period approximately 4,000 meters were replaced.

3) Meter Type

All of the District's year-round meters are equipped with Neptune ARB (Automatic Reading and Billing) registers or ABB Scancoder registers with remote receptacles.

4) Meter Reading Equipment

The District uses the handheld Logicon Versa Term and Versa Probe to conduct its meter reading programs. The Versa Probe is capable of reading the ARB pin type remote receptacle and the touch pad remotes of most meter manufacturers.

The meter reading information is downloaded to an office computer through the Versa Link hardware. The meter reading data is analyzed and then transferred to the District's billing software.

The District is in the process of issuing a Request for Proposals for an Advanced Metering Infrastructure (AMI) system, which will allow all meters to be read by radio, by early FY-13.

8. Water Use Data

a. System-wide and Per Capita Use

The District's historic maximum day demand (MDD), estimated peak hour demand (PHD), and average day demand (ADD) based on a billing year basis in MGD, as well as the maximum day peaking factor, for the last five years is as follows:

	2010	2009	2008	2007	2006
MDD	2.193	2.580	2.532	2.025	2.488
PHD	0.155	0.183	0.179	0.143	0.176
ADD	1.134	1.249	1.289	1.164	1.280
Peaking Factor	1.93	2.07	1.96	1.74	1.94

9. Water Conservation

a. Monitoring Daily Purchases

The District reads its master meters and calculates the system daily demand each workday. The demand data is routinely reviewed by the General Manager and Operations Manager to ensure that the system demand is consistent with past usage and expected use. This data is reported to the Administrative Board at the monthly meetings.

This monitoring program ensures that any major changes in consumption will be identified and appropriate action taken in a prompt manner.

b. Leak Detection Program

Since 1996, the District has conducted a comprehensive leak detection program every year using vendors that specialize in this work. The District has performed a leak survey of its entire system each year since 2002.

Primarily through the leak detection program, the District has been generally able to maintain unaccounted-for water at 10% or less.

c. School Education Program

The General Manager conducts a water conservation seminar each year for all of the third and seventh grade classes in the Portsmouth schools during National Drinking Water Week in May. This education program began in May of 1989 and will continue as part of a long-term priority for public education.

d. General Public Education Program

The District provides its customers with water conservation literature each May with the annual water bill. The pamphlets, along with other relevant handouts, including the most recent Consumer Confidence Report, are prominently displayed in the main lobby at the District's office for customers to take home.

Similar to the School Education Program, the General Public Education Program is intended to foster a change in water use habits. By providing the water conservation literature with the water bill, the customer is more likely to read it because of their concern about the ever-increasing price of water.

e. Residential Retrofit Program

In 1997, the District implemented a residential retrofit program to offer retrofit kits within a ten year period to all of the residential properties constructed prior to the 1990 plumbing code changes.

The kits contained two faucet aerators, one toilet bag, one showerhead and two dye tablets along with instructions. Additional shower heads and dye tablets were ordered and stocked in the main office. An additional showerhead was offered free to any customer that requested one for a second shower. The additional dye tablets are provided to customers with suspected leaks.

The District has 5044 residential customers that were connected to the system before 1990. All of these customers have been directly targeted with an offer for a retrofit kit. A total of 1,752 customers have received a retrofit either from direct targeting or requesting one at the bill paying counter at the District's office, which represents 34.7% of all customers tied-in to the water system prior to 1990. A total of 3,151 customers, or 48.9% of the customer base, have either requested a retrofit kit or connected to the system after the 1990 plumbing code change that required low use flow fixtures.

It appears that the overall average savings from the Residential Retrofit Program is approximately ten percent of total residential consumption.

f. Peak Water Use Reduction Program

In 1988 the District developed a Peak Water Usage Reduction Program. The purpose of the program is to reduce the peak water usage by the non-agricultural customers during periods of high seasonal demand. The program consists of alternate days for outside water usage. Customers that have an odd-numbered address will be requested to restrict their outside water usage to odd-numbered days. Customers that have an even-numbered address will be requested to restrict their outside usage to even-numbered days. Empirical data suggests that the reduction is on the order of 5% to 10% of peak demand. The Administrative Board's policy is to implement the plan only when the system demand increases to a level that warrants outside use restrictions.

g. Agricultural and Industrial Use

The Administrative Board has met several times with the agricultural customers to stress the need for water conservation. This is possible because there are a limited number of agricultural users that depend heavily on the District during periods of dry weather. The Board has also solicited their cooperation in using water during the District's off-peak hours. The District also corresponded with the agricultural users to request voluntary water conservation during the drought of 2002.

h. Rate Structure

The District has a four-tier, increasing block rate structure, which has been in effect since 1992. The increasing block rate structure, with significant increases between blocks, is intended to provide an incentive for the customer to conserve water. The rates are adjusted by the Board annually, as necessary, as part of the budget process.

i. Significant System Deficiencies and Needed Improvements Based on a review of the system description there are no apparent significant system deficiencies.

- j. Future planned improvements include:
 - 1) An Advanced Metering Infrastructure system will be purchased and installed to facilitate quarterly billing.
 - 2) A new Microsoft Windows-based water billing software with advanced billing capabilities will be purchased and installed to facilitate quarterly billing.

SECTION 8.03: WATER QUALITY PROTECTION COMPONENT

- A. The District purchases all of its water from the Newport Water Department and the Stone Bridge Fire District. The District does not own any sources of water or any watershed protection properties, and therefore does not have a Water Quality Protection Plan.
- B. The Newport Water Department and the Stone Bridge Fire District have Water Quality Protection Components in their respective Water Supply System Management Plans, which provide details of water quality protection for the water supplied to the District. The reader is referred to these plans for further information.
- C. The Department of Health completed Source Water Assessments in the fall of 2010 for the watersheds providing drinking water to the District. Copies of the Drinking Water Assessment Results for Aquidneck Island and Tiverton and Little Compton are included in Appendix B, Section 6, for reference.
- D. While the District does not have any legal authority to implement or enforce watershed protection in Portsmouth, the District has undertaken a number of initiatives to assist the Newport Water Department, which owns the reservoirs in Portsmouth, and the Town of Portsmouth with source protection in the town.
 - 1. The District notified Newport Water and the Town of Portsmouth that Newport's water quality protection plan fairly and adequately addresses the need and methods for water quality protection and is supported by the District. The Newport Water Quality Protection Plan was subsequently included in the Portsmouth Comprehensive Community Plan (PCCP) by reference.
 - 2. The District has offered to work with the Portsmouth town planner concerning implementation of the regulatory recommendations and the Public Works Department regarding best management practices. At the request of the town, the District participated in a review of the town's subdivision regulations prior to revision for conformance with the PCCP and the Water Quality Protection Plan.
 - 3. The District successfully encouraged Regine Enterprises, developer of a large condominium site adjacent to St. Mary Pond, to install an engineered storm water retainage basin as recommended by Newport Water.
 - 4. The District has supported the recommendations of the PCCP regarding watershed protection districts and other remedial water quality protection measures and has a continuing offer to provide technical assistance to the town to help achieve these recommendations. To that end, at the request of the town, the District reviewed and made recommendations on the draft regulations for the watershed overlay district.
 - 5. The District participated in the URI, Coastal Resources Center workshop series for Aquidneck Island, "Integrating Economic Growth and Environmental Health" in May of 1995. This program was designed for volunteer board and commission members to help them develop the knowledge and skills necessary to make decisions which balance

economic development and environmental concerns. The District participated in this program along with Newport Water in the session on Managing Water Resources. The presentation focused on the drinking water supply and its importance for future growth on the island and best management practices for protecting the quality of island water resources.

- E. The District has also served on the Stafford Pond Steering Committee. The steering committee worked with the Department of Environmental management to improve the quality of water in Stafford pond, which is the water source used by the Stone Bridge Fire District.

SECTION 8.04: MAPPING

A. Map #1 Water District System Map

1. The General Water Map of the Portsmouth Water and Fire District provided in Appendix C depicts the legal service boundaries of the District, present service area, major transmission lines; treatment and storage facilities, pumping stations, interconnections with the Newport Water Department and the Stone Bridge Fire District; locations of master meters; and the delineation of the high and low pressure zones.
2. The General Water Map (scale 1" = 1,000') was derived from United States Geologic Survey (USGS) topographic maps and Portsmouth Tax Assessor maps.
3. The General Water Map is prepared in AutoCAD and development of the map in ArcGIS is in progress.

B. Map #2 Source Water Map

1. The District does not own or operate any surface or groundwater supplies; therefore this map is not included in the plan.
2. Refer to the WSSMPs for the Newport Water Department and the Stone Bridge Fire District for Source Water Maps.

SECTION 8.05: SUPPLY MANAGEMENT

A. Anticipated Future Demands

1. Population Changes

The estimated population to be served by the District in the years 2015 (5 year planning period) and 2030 (20 year planning period) was determined by using the Statewide Planning population estimates with adjustments for the households located outside the District and for households in the District with wells.

It is estimated that the future population served by the District will be approximately 16,634 and 18,043 in the years 2015 and 2030, respectively.

The Portsmouth Planning Department in 2008 estimated a potential build-out population in Portsmouth of 26,000, which would result in an approximate District build-out population of 22,500.

2. Economic Development and Land Use Predictions

The PCCP recommends the encouragement of light industry particularly since Portsmouth does not have a public sewerage system. Consistent with the PCCP, and based on discussions with the Town Planner, it is assumed that most future economic

growth will consist of customers with domestic water needs and moderate processing water needs.

The PCCP recommends maintaining the agricultural industry close to its current level to maintain the rural charm and open space of Portsmouth. To this end, the District will continue to provide water to the agricultural community based on historical volumes.

The PCCP recommends a balanced growth approach to population growth and development in Portsmouth. The plan recommends several measures, some already implemented, for consideration by the town to achieve this balanced growth. While local growth control measures can clearly impact the build-out population and water demand of the District, they will not, if implemented, have a measurable affect on the projected 2015 and 2030 population and water demand.

3. Future Expansion

The District does not presently supply any wholesale customers and does not anticipate that it will be in a position to do so in the future. In addition, there does not appear to be any potential for any system expansion from future mergers with other water systems.

4. Legal Obligations to Provide Water

The District does not sell water on a wholesale basis, except to backfeed Stone Bridge or Newport Water during an emergency. The District is presently supplying water at retail water rates on a temporary, emergency basis to the Navy Melville Area North, although the Navy is a wholesale customer of Newport Water. The contract to supply water to the Navy expired in March of 2008.

5. Projected Future Water Demand

a. General

The 2010 base and future residential demand projections are based on the highest annual per capita consumption experienced by the District since 2003, which was fiscal year 2006, and the projected population for each year. The 2010 base non-residential projections, in general, are based on the 2006 consumption for each SIC category, with minor modifications as necessary for any aberrations. Future non-residential projections are generally assumed to increase proportionally with the change in population, with the exception of agricultural demand, which is held constant using the most recent high agricultural year of 2009.

b. Residential

In fiscal year 2006, the District experienced its highest consumption rate per capita since 2003. The District has used the 2006 demand for its estimate of future demand for this plan.

c. Commercial

The commercial demand, other than agricultural, tends to be more dependent on the strength of the economy. The PCCP stresses the need to maintain commercial employment and commercial services consistent with their ratio to the population at the end of the 1980's. Since most commerce is reliant on people to stay in business, it appears reasonable to tie commercial demand projections to population growth.

The commercial demand for the various SIC categories was analyzed for the period 2000 to 2010 and the 2006 demand was used for each category.

d. Industrial

The District's industrial demand has steadily decreased over the last two decades.

The PCCP has placed a priority on industrial and commercial development, with an emphasis on light industry that has minimal impact on the environment. This translates into industry with moderate water use or where recycling of process water is practiced.

The District will use the 2006 demand for the industrial demand for the 2010 base year. It is assumed that the base demand will increase over time proportional to the predicted change in population.

e. Governmental

The District will use the 2006 demand for the governmental demand for the 2010 base year. It is assumed that the base demand will increase over time proportional to the predicted change in population.

f. Institutional

The District will use the 2006 demand for the institutional demand for the 2010 base year. It is assumed that the base demand will increase over time proportional to the predicted change in population.

g. Peaking Factors

The District has a documented maximum day peaking factor ranging between 1.63 and 2.07 times the average day demand, including non-account water, for the period 2006 to 2010. The base peaking factor for 2015 and 2030 is estimated to be 1.93. The documented peaking factor for 2010 is 1.93. The District's peaking factor has increased over time as new customers with conservation fixtures connected to the system and existing customers were provided retrofit kits and/or changed out their toilets and showerheads due to age. While in-house use is affected by these conservation measures, the outdoor use which contributes to the maximum day demand is unaffected, thereby increasing the peaking factor.

h. Summary

The average day demand and maximum day demand by user category and the peaking factors for the base year and the years 2015 and 2030 are shown on Worksheet #27 in Appendix A. A summary of the projected demand follows:

	2010 Base	2015 5-Year	2030 20-Year
Average Day Demand (MGD)	1.311	1.370	1.486
Maximum Day Demand (MGD)	2.557	2.645	2.867

6. Major Users

Two of the District's five major users are mobile home parks, which were offered retrofit kits in 1997. One of the major users is a private golf course that uses water strictly for irrigation. The golf course is under the Aquidneck Island Land Trust umbrella of properties protected from development. One large user, Portsmouth Abbey School, is an institutional user, with a multi-building campus, including student dormitories. The

District has offered technical assistance to Portsmouth Abbey in the past. Portsmouth Abbey, in particular, has made several efforts to reduce water demand through retrofitting.

It is estimated that the base demand for the major users will not increase over time.

Due to limitations in the availability of commercial and industrial zoned land and the lack of sewers, it is not anticipated that there will be any additional major users in the future.

7. Fire Fighting

The water used for public fire fighting and training in the District is nominal and averages less than 100,000 gallons per year. It is assumed that the base demand will increase over time proportional to the predicted change in population.

8. Non-account Water

While all reasonable efforts will be made to minimize unmetered water and to control leakage, water systems by nature will leak. The District has assumed a rate for non-account water of 12.0% each year through the year 2030 for its demand projections. Unaccounted-for water is assumed to be 10% each year.

9. Non-potable Water Use

There does not appear to be any large scale potential for the use of non-potable water within the District that would greatly influence future water demand. Other than the reservoirs owned by the Newport Water Department, there are no significant standing bodies of fresh water for non-potable use. In addition, the geology of Aquidneck Island, as documented in the WSA-RI report, cannot support large well water supplies. Many of the agricultural customers are utilizing non-potable water where it is available. In the water audit conducted by Cataudella Associates, only three of the eight larger agricultural users relied solely on the District's supply.

B. Available Water

1. General

The District purchases all of its water supply from other water suppliers; therefore the available water is defined by contract and/or the suppliers' ability to deliver water as may be prescribed by their WSSMP.

2. Newport Water Supply

a. Available Water by Contract

- 1) The District's contract with the City of Newport to purchase 1.233 million gallons per day on an average day basis and 2.250 million gallons per day on a maximum day basis expired on December 31, 1995. The District and Newport Water continue to operate under the conditions of the expired contract, with the exception of water rates, which are determined by the Rhode Island Public Utilities Commission. In addition, in 1999, the District began to purchase all of its water from Newport Water with their concurrence. Prior to that time, the District purchased approximately one-half of its water from Stone Bridge.
- 2) There have been several efforts since 1992 to obtain a long-term, forty-year contract renewal, which included a negotiated agreement in 1997 that was not ratified by the City of Newport. The District will continue to pursue a long-term agreement with Newport Water to include additional water availability to supply

all of the District's future needs. Newport Water appears to be interested in a long-term contract with the District to support the funding of the debt service for the water treatment plant improvements. It is expected that a contract will be in place by 2012.

b. Available Water for Planning Purposes

- 1) The Newport Water WSSMP indicates water projections for the District as follows:

	2015	2030
Average Day Demand (MGD)	1.480	1.670
Maximum Day Demand (MGD)	2.664	3.006

- 2) Newport Water indicates that it has the water availability to meet its 2015 and 2030 demand projections, which includes the District's demand.

3. Stone Bridge Water Supply

a. Available Water by Contract

- 1) The District's contract with the Stone Bridge Fire District expired on July 1, 2007.
- 2) The contract states that Stone Bridge Water has a primary obligation to supply water to the Stone Bridge District and that nothing contained in the contract shall interfere with that primary obligation.
- 3) The District has not purchased water from Stone Bridge on a regular basis since May of 1999. Stone Bridge does not appear to have the ability to be a long term supplier to the District.

b. Available Water by Ability to Deliver

Stone Bridge has indicated in writing that it has the ability to deliver approximately 0.300 MGD to the District during peak demand conditions. This amount appears reasonable, albeit somewhat conservative, based on the fact that Stone Bridge was historically able to supply the District with 0.750 MGD on maximum day in 1998 and prior years. This historical amount must be reduced by demand from the addition of a power plant to the Stone Bridge system in 2000, which uses 0.210 MGD on maximum day, and by demand from additional growth since 1999. The current excess availability appears to be on the order of 0.500 MGD.

c. Available Water for Planning Purposes

- 1) For planning purposes, the District will use the Stone Bridge stipulated excess capacity of 0.300 MGD for the current amount of water availability and for the five-year plan. For future water availability for the 2030 planning periods, the District will use 0.200 MGD, assuming that the excess capacity will gradually be committed to new growth in Tiverton.
- 2) Stafford Pond, the water source for Stone Bridge, has a reported safe yield of 2.500 MGD, for which the water rights are owned by the City of Fall River. Stone Bridge has an agreement with the City of Fall River to withdraw up to 1.900 MGD on any day. The Stone Bridge treatment plant can treat

approximately 1.350 MGD. If the Stone Bridge Plant is expanded, there is potential for an additional 0.550 MGD of water availability.

4. Water Availability from Future Wells

- a. In 1999, the District completed the Phase I Report for the *Identification of Favorable Zones for Groundwater Development* prepared by HydroSource Associates, Inc. of Ashland, New Hampshire. The report identified nine favorable zones for locating fractured bedrock groundwater wells. In essence, the report concludes that it is possible to obtain 0.500 MGD with further effort of siting and drilling four to six test wells in four to six favorable zones and, subsequently, developing three or four production wells.
- b. The District has HydroSource under contract for Phase II of the study to develop the test wells. This phase of the project is presently on hold.

5. Available Water/Demand Comparisons

- a. The available supply based on the increased availability from Newport Water, appears to be sufficient to meet the District's projected average day and maximum day demand for the 2015 and 2030 planning periods.
- b. The available supply from Newport Water alone as documented in their 2000 WSSMP appears to be sufficient to meet the District's projected average daily demand for the 2015 and 2030 planning periods. The Stone Bridge excess capacity and the future fractured bedrock wells, when used to supplement the Newport supply, ensure that the District can meet its maximum day demand at its established peaking factors and also provide a margin of safety for the average day demand.
- c. In any event, the District will continue to monitor the availability of water from both Stone Bridge and Newport Water, and continue to negotiate with Newport Water for long term guaranteed supplies by contract to meet future average day and maximum day demands.
- d. A summary of the comparison of existing demand and available water for the base year 2010 and the 2015 and 2030 planning periods follows:

Condition	2010 Base Year		2015 5 Year Projection		2030 20 Year Projection	
	AVG Day	MAX Day	AVG Day	MAX Day	AVG Day	MAX Day
Ground Water Capacity Future Fractured Bedrock Wells	0.000	0.000	0.500	0.500	0.500	0.500
Surface Water (Operational Safe Yield)	0.000	0.000	0.000	0.000	0.000	0.000
Water Purchased from Newport Water Department	1.230	2.250	1.480	2.664	1.670	3.006
Water Purchased from Stone Bridge Fire District	0.300	0.300	0.300	0.300	0.200	0.100
Total Available Water	1.530	2.550	2.280	3.464	2.370	3.606
Daily Demand	1.311	2.557	1.370	2.672	1.486	2.897

C. Alternative Supply

As part of its Master Plan developed in 1988 the District has investigated the feasibility of a number of alternative sources of water. A summary of these investigations follows.

1. Stone Bridge Supply and Expansion

All information presently available to the District indicates that Stone Bridge is not able to supply the District with the amounts of water historically supplied nor provide a reliable, long-term supply to the District. There are several underlying reasons for this assessment:

- a. A limited safe yield of Stafford Pond
- b. The limited production capacity of Stone Bridge's water treatment plant
- c. The hydraulic limitations of their system
- d. The addition of the power plant as a Stone Bridge customer
- e. The recent and expected growth in water demand in Tiverton

Stone Bridge has the right to take 1,900 MGD from Stafford Pond; however, the capacity of the treatment plant is approximately 1,350 MGD. While the potential for expansion of the Stone Bridge Plant does exist, an analysis of Stone Bridge's current supply commitments and the potential customer base in Tiverton indicates that there will be little, if any, additional, long-term water available for Portsmouth.

If the plant were expanded to treat the full volume available from the pond, Stone Bridge may be able to supply Portsmouth with 0.750 MGD on a long-term basis beyond the year 2030. However, it does not appear likely that Stone Bridge will take the necessary steps to undertake such a massive and costly expansion.

2. Fall River Water Supply

The City of Fall River presently has the largest water supply of any potential supplier of the Portsmouth Water and Fire District. On three occasions since 1987, the most recent being 2010, the Administrative Board contacted the Fall River Water Department to explore the possibility of Fall River becoming a supplier. For the first time in sixteen years, the political climate and water availability may be right to fully explore the potential for Fall River to supply the District with water on the order of 1,000 MGD on maximum day.

3. Local Surface Water Supplies

A prefeasibility study for the development of surface water supplies by the District in the Town of Portsmouth was completed in July of 1988. The study included the review of five watersheds for the potential development of a surface water reservoir. Based on the prefeasibility study the Board decided to perform a feasibility study for the Barker Brook Watershed and to include further review of the potential for utilizing the town owned Melville ponds either separately or in conjunction with Barker Brook. Also, the feasibility of developing the Lawton Brook and Glen ravine as a source of water was also investigated.

The findings on the feasibility study for Barker Brook and Melville Ponds watersheds were not encouraging. The study indicated that the ratio of cost to available yield

exceeds what is justifiable. In addition, there are several issues which would have to be addressed which could stall or stop development of a reservoir. These issues include wetlands inundation, archaeological and historical impacts and the potential impact on the Portsmouth Abbey's athletic facility and individual sewage disposal system. Furthermore, the reservoir and watershed area has since been developed into the Carnegie Abbey Golf Course, essentially precluding any water supply development potential.

The findings on the Melville Ponds Watershed indicate that the ponds are not desirable for development as a public water supply and will not likely be approved by the Rhode Island Department of Health. The primary concerns leading to this conclusion are the active underground fuel oil tanks within the Melville Ponds watershed and up gradient from the lower pond, the abandoned Navy/Town landfill which recently appeared on the EPA's list of potential hazardous waste sites or CERCLIS (Comprehensive Environmental Response and Comprehensive Liability Information System) list and a documented incident of oil leakage into the lower pond which appears to have originated from an abandoned oil sludge pit adjacent to the pond.

Similar to the Melville Ponds analysis, the Lawton Brook was eliminated as a potential water source because of the adjacent U.S. Navy NETC Tank Farm.

The Glen watershed feasibility study indicates the potential for a 0.500 MGD reservoir. The cost of the dam alone for this project was estimated to be \$17 million (1988 dollars). While feasible, this project does not appear practical because of the high cost. In addition, this site presents difficult environmental and historical concerns as well.

4. Local Municipal Wells

A prefeasibility study for the development of municipal wells by the District in the Town of Portsmouth was completed in 1988. The study included the review of existing geological data and information on existing wells. The study concluded that "the probability of developing a reliable municipal well of any significant magnitude in the Town of Portsmouth is quite low. Based on this prefeasibility study, it does not appear that municipal wells are a viable alternative for increasing the available water supply to the District. Further study or field testing for ground water development is, therefore, not recommended." Data in the WSA-RI by A.D. Little supports this conclusion.

5. Connection to Scituate Reservoir System

According to the Rhode Island Water Resources Board and the Providence Water Supply Board, the Scituate Reservoir is near or has reached its safe yield. This is also confirmed in WSA-RI report. In order for the District or Aquidneck Island to receive water from the Providence Water Supply Board (PWSB) through the Bristol County Water Authority (BCWA), the Big River Reservoir must be constructed or the Scituate Reservoir must be supplemented from an additional water source. In addition, in order to service Aquidneck Island, after completion of the BCWA pipeline, a fifteen mile long, thirty to thirty-six inch pipeline must be constructed from Barrington to Lawton Valley in Portsmouth and a three mile long, forty-two inch pipeline must be constructed in Providence. The 1991 cost for this project was estimated to be approximately \$43 million. In order to service just Portsmouth the pipeline could terminate at Bristol Ferry. For this project the estimated 1991 cost was \$35 million.

The United States Environmental Protection Agency vetoed construction of the Big River reservoir in March of 1990, citing the loss of wetlands and insufficient study of alternatives as the reasons for the veto.

The WSA-RI report recommends a number of other Big River supply augmentation options which would have significantly less environmental impact. These options include ground water development, seasonal flood skimming with smaller reservoirs or impoundments or with transfer to the Scituate Reservoir and moderate sized reservoirs downsized from previous proposals with yields estimated to range from 4.5 to 25 million gallons per day. In addition, the report suggests that raising the level of the Scituate Dam by a limited amount could increase the safe yield of the Scituate Reservoir by 7 to 16 million gallons per day.

Each of the above options will, however, take many years of study and implementation. Furthermore, each option has its own set of social and environmental impacts which must be mitigated to the satisfaction of the public, environmental community and regulatory agencies.

In any event, the BCWA pipeline has been reduced in size to supply only Bristol County on a regular basis and East Providence in emergency situations. Notwithstanding the potential availability of water, it appears that the BCWA pipeline will not have the capacity to supply the District or Aquidneck Island.

Augmentation of the District's present supply via the PWSB does not appear to be a realistic or likely possibility.

D. Supply Augmentation Studies

1. Fractured Bedrock Groundwater Study

- a. In 1999, the District completed the first of three phases to evaluate the potential for fractured bedrock groundwater development in the District. The Phase I Report for the *Identification of Favorable Zones for Groundwater Development* was prepared by HydroSource Associates, Inc. of Ashland, New Hampshire. The report identified nine favorable zones for locating fractured bedrock groundwater wells. In essence, the report concludes that it is possible to obtain 0.500 MGD with further effort of siting and drilling four to six test wells in four to six favorable zones and, subsequently, developing three or four production wells.

The District has HydroSource under contract to conduct Phase II of the study and has funding in place for test well drilling. This phase of the project is presently on hold.

- b. The purpose of Phase II is to locate and develop new groundwater sources from fractured bedrock. The first phase of work resulted in the delineation of several "favorable zones" in the District (a favorable zone being a limited area offering potential, based on the combination of several criteria, for the development of groundwater sources in fractured bedrock). The second phase includes the design and implementation of geophysical surveys, test well site selections and test well drilling. If Phase II is successful, Phase III would entail the development of production wells.

Phase II will identify the potential capacity of each production well, establish water quality parameters, identify any water rights issues or competing uses, and establish a schedule for construction. Phase II will also identify the cost to bring the production wells on-line.

SECTION 8.06: DEMAND MANAGEMENT

A. Residential Retrofit Program (RRP) Plan

The goal of the District's RRP is to offer retrofit kits to all of the residential properties that were constructed prior to the 1990 plumbing code change or who have not upgraded fixtures to comply with the 1990 code. The RRP began in the spring of 1997. The goal of offering kits to all residential customers was completed in 2005.

The retrofit kits have a standard number of devices including one shower massage showerhead, three faucet aerators, two toilet bags and two dye test tablets. Detailed instructions and a letter from the District are also provided.

In addition, since the program started, any customer with a house built prior to 1990 has had the ability to sign-up for a retrofit kit at the business office. A retrofit kit is prominently displayed on the front counter where customers pay their bills with a sign to solicit interest.

Since the inception of the program, no customer has called requesting names of plumbers that can install their kits. Nevertheless, the District has arranged for one or more local plumbers to install retrofit kits at the request of customers for a fixed price. The District and the supply house will provide toll free telephone assistance to customers regarding questions regarding the installation of the devices. The District does not make site visits or install devices.

The District will annually issue a news release to the local newspapers to publicize the objectives and accomplishments of the retrofit program and the availability of water efficiency devices at the District office at no cost to the customer.

B. Public Education And Information

The District will continue to implement its existing public education and information programs and procedures which were described previously. Additional public education measures will be implemented consistent with the goals and findings of the Water Supply System Management Plan as warranted.

C. Major Users Technical Assistance Program (MUTAP)

1. Previous Assistance

All of the District's major users except Newport National Golf Course and the Navy were included in a technical assistance program as part of a 1991 water audit.

2. Future Assistance

The District will continue to provide technical assistance to major uses as warranted and as requested.

3. Non-Potable Water

a. The District has adopted a policy similar to that of Newport Water to prohibit the use of the District's water for once-through cooling. The policy states that commercial type air conditioning and refrigeration equipment must be cooled by means other than once-through cooling water.

b. The District will encourage the use of non-potable water, where available, for future industrial, commercial and agricultural users. Non-potable water may be available from the underground coal mines in the vicinity of the former Weyerhaeuser site off

Bristol Ferry Road. Any future industrial, commercial or agricultural users in this area may be able to economically tap into this source.

- c. Dual water distribution systems do not appear to be feasible for the District. There is no large, untapped fresh water source available. The farmers are the likely users of non-potable water and they are spread throughout the town. In addition, the cost of installing a town wide system in the rocky geology of Aquidneck Island would be cost prohibitive and disruptive.

D. Appropriate Fees, Rates And Charges

1. The District's current schedule of fees, rates and charges were developed by the Board to promote water conservation and to ensure that the cost of any special services provided by the District are paid for by the party requiring the services.
2. Rate structure alternatives that the Board may consider in the future include seasonal rates or seasonal rates with increasing blocks. Seasonal rates could be used to emphasize and encourage water conservation during the summer peak demand season to reduce maximum day demand. Seasonal rates may also serve to more fairly distribute the cost of water to those customers that cause the greatest peak demand.

E. Peak Usage Reduction Plan

The District will continue to directly notify the customers on a yearly basis with their water bill about the peak usage reduction program described earlier in this plan.

SECTION 8.07: SYSTEM MANAGEMENT

A. Statement of Objectives

The District has established system management goals to ensure a safe and reliable drinking water supply for its customers. The goals are:

1. Ensure complete and accurate measurement, within AWWA standards, of all water purchases, water sales and non-account use.
2. Ensure that all known leaks in the District's system, customers' servicelines, and/or plumbing are promptly repaired.
3. Ensure that unaccounted for water remains at or below 10%.
4. Ensure that non-account water remains at or below 12.5%.
5. Ensure that the water system infrastructure is maintained in accordance with AWWA standards with an emphasis on preventative maintenance and maintaining design capacity.
6. Ensure that the District's maintenance equipment is properly maintained in accordance with manufacturer's recommendations and replaced as necessary.
7. Maintain water quality in accordance with the Safe Drinking Water Act through the following actions:
 - a. Communication with wholesale suppliers on water quality issues.
 - b. Sound operating procedures.
 - c. Sufficient and proper sampling.
 - d. Responding to and monitoring customer complaints.

8. Pursue looping of water mains to improve water quality, distribution system hydraulics and system redundancy, where feasible.

B. Meter Installation, Maintenance and Replacement (MIMR) Plan

1. The goals of the MIMR Plan are:

- a. Ensure that all services continue to be metered and that remote receptacles are installed wherever possible.
- b. Ensure that meters are inspected when abnormally low meter readings are encountered during the spring and fall meter reading periods.
- c. Ensure that unmetered water use by the District is documented for water audit purposes.

2. Meter Maintenance, Testing and Replacement Schedules

- a. Master Meters at Interconnections will continue to be tested in October and April and calibrated as necessary.
- b. Major Users Meters and Large Meters will be tested and calibrated consistent with AWWA standard practices.

- c. Small Meters

- 1) The District's test results from the 1991 water audit conducted by Cataudella Associates, Inc. for small meters indicates that the acceptable life of a small meter is twenty-one (21) years before it fails to meet AWWA standards. The test results also indicate that the meters supplied with water from Newport Water fail to meet AWWA standards earlier than the meters supplied with water from Stone Bridge. This appears to be a result of the Newport water supply being harder than the Stone Bridge supply.

Small meters will be replaced when they have completed 21-years of service.

In addition, any meter that requires repair, relocation testing or other routine maintenance work during the normal course of business will be replaced if it has reached seventy-five (75%) percent of its useful life, or sixteen (16) years of age. Also, any meter that is found to have a malfunctioning 14-wire, remote receptacle, will be replaced regardless of age as they are obsolete.

From FY-98 through FY-07, the District embarked on a Meter Replacement Program (MRP) to replace residential meters with an age greater than 21 years. During this period approximately 4,000 meters were replaced. Since FY-08, the District has replaced approximately 130 meters per year in an effort to keep the age of meters to 21 years old or less.

C. Leak Detection and Repair (LDR) Plan

1. The District has developed the following goals for its leak detection and repair plan:

- a. Continue to conduct a semi-annual water audit to determine the amount of non-account water and unaccounted for water.
- b. Continue to conduct annual leak detection with in-house staff of known problem areas, as necessary.

- c. Continue to conduct leak detection with in-house staff of all new water mains prior to releasing the one year warranty bond.
- d. Maintain unaccounted for water at or below 10% and non-account water at or below 12.5% through comprehensive leak detection surveys:
 Since 1996, the District has conducted a comprehensive leak detection program every year using vendors that specialize in this work. Since 2002, the program has covered the entire system.
- e. Encourage the reporting of unknown origins of surface water.
- f. Continue to provide bill stuffers to customers indicating the importance and ease of checking for internal plumbing leakage.

D. Preventative Maintenance (PM) Program

1. Preventative Maintenance Goals

The goals for the District's preventative maintenance program are:

- a. Maintain an inventory of all system components.
- b. Maintain written maintenance procedures, checklists, and records for all system components, maintenance equipment and vehicles.
- c. Compile written procedures and checklists into a system maintenance manual.
- d. Gradually computerize preventive maintenance schedules and records utilizing infrastructure maintenance software.

2. Current Program

- a. The District's current preventative maintenance program consists of periodic inspection, testing, maintenance and replacement of key components of the transmission and distribution system as outlined herein.
- b. Preventative maintenance is recorded manually through file folders and inventory cards except for hydrant maintenance which is computerized.
- c. The program relies on maintenance procedure memoranda, manufacturer's written recommendations, maintenance personnel experience and outside contractors for specialty work.
- d. The maintenance work is scheduled and tracked manually on a master calendar each year. Maintenance work orders are issued to perform routine maintenance and corrective maintenance as necessary.

3. Record Keeping

The District will gradually computerize its preventative maintenance program as staff time permits. Computerization will include preventative maintenance procedures, checklists, scheduling and record keeping utilizing infrastructure maintenance software.

4. Schedule and Cost

- a. The development of Preventative Maintenance Procedures and Checklists is on-going with in-house staff.
- b. Investigations into available computer software for infrastructure maintenance will begin in the spring of FY-12. Computer software packages for water utilities of the

District's size range in cost from \$5,000 to \$50,000 depending on the level of sophistication desired. An estimated cost of \$25,000 has been assumed for budgeting purposes.

5. Emergency Maintenance

- a. System alarms are active and routinely tested.
- b. There are regularly scheduled on-call personnel with a written contact procedure.
- c. The District has two contractors that are on-call by written contract for routine and emergency maintenance work.
- d. The District also has written procedures for the following emergency maintenance situations:
 - 1) Activating the Newport emergency connection on Mitchell Lane
 - 2) Backfeeding water to the Stone Bridge Fire District
 - 3) Chlorinating water main repairs
 - 4) Hurricane Procedure

6. Spare Parts Inventory

- a. The Operations Manager is responsible to order, record and track water works hardware for routine work and emergency repairs. The inventory is tracked by software. The inventory is also visually inspected on a periodic basis by the operations manager and annually by the auditors.
- b. The District stocks the proper water works hardware to repair any type of water main break on any type and size of pipe within the District's system. The District's inventory also includes spare gaskets and gasket stock. The District has a gasket hole punch kit for making its own gaskets.
- c. The District also stocks miscellaneous repair kits and hardware for the hydrants and specialty valves.
- d. A list of the critical spare parts along with the name, address and phone number of both the manufacturer and distributor of each is also maintained.

E. Water System Expansion

1. One of the District's most important aspects of preventative maintenance is its policies and technical specifications for new construction. The Board strongly supports the use of proper materials, installation techniques and detailed inspection to prevent unnecessary system failures in the future. The District has detailed, up to date material and installation specifications for new water services and water main extensions.
2. The District requires that all new water services and water mains be inspected by the District during construction. All new water mains are pressure tested in accordance with AWWA standards prior to being activated. A leak detection survey of new mains is conducted by in-house staff after one year and prior to releasing the developer's water main bond.

F. Water System Looping

1. The District regularly pursues looping of water mains to improve water quality, distribution system hydraulics and system redundancy, where feasible and will continue to do so.
2. Where feasible, looping is accomplished by requiring that water main extensions for new subdivisions be looped to existing water mains.

SECTION 8.08: EMERGENCY MANAGEMENT

A. Facilities and Assets Evaluation

1. The District has performed a vulnerability analysis on its water system components and ranked the relative importance of each component based on goal-specific criteria using a pair-wise comparison technique.
2. A threat assessment was conducted on the most critical facilities for the types of emergencies that the District is exposed to and that are the most likely to impact the District's facilities and its ability to meet its goals.

B. Component Hardening

The District has evaluated its facilities to determine what additional improvements are necessary to reduce the risk of failure due to the identified emergency situations. The identified improvements have been made.

C. Emergency Management Plan

1. The emergency management plan identifies:
 - a. The capacity of critical facilities and the District's ability to deliver and store water under various emergency conditions.
 - b. The system water demand during emergency situations, including reduced demand during water restrictions and water rationing.
 - c. The emergency demand management options including emergency connections, priority water service customers and interruptible customers.
 - d. Demand reduction measures including voluntary and mandatory water use restrictions and water rationing.
 - e. Critical demand indicators, which are used to trigger a management review of the available water supply and system demand and the initiation of appropriate water use restrictions and public notification.
 - f. The procedures for notifying critical personnel and public officials during emergencies.
 - g. The procedure for recovering from an emergency.
 - h. Critical vulnerabilities and recommended actions to mitigate them.

SECTION 8.09: DROUGHT MANAGEMENT

F. Drought Management Goals:

1. The District herein incorporates the goals, policies and strategies of Rhode Island State Guide Plan Element 724, Rhode Island Drought Management Plan:
 - a. Minimize the effects of drought on public health and safety, economic activity, and environmental resources.
 - b. Preserve the water supply of Aquidneck Island
 - c. Reduce the District's vulnerability to periods of low precipitation (or long-term drought)

G. Providing Water Under Drought Circumstances:

1. Primary Water Supplier

- a. The District's primary water supplier is the Newport Water Department, which owns and operates all of the reservoirs and treatment plants supplying water to Aquidneck Island. The District will rely on Newport Water for its water supply during drought conditions and will supplement that supply with water from the Stone Bridge Fire District, as necessary.

2. Emergency Water Supplier

- a. The District's emergency water supplier is the Stone Bridge Fire District. Historically, dry weather has often affected the Stone Bridge Stafford Pond water supply differently than the Newport Water reservoirs. During some drought conditions, Stone Bridge Water may be able to provide varying amounts of water to Portsmouth Water to ease the draw on Newport Water's stressed reservoirs.

3. Obtaining Water Under Drought Conditions:

a. Newport Water Normal Hydraulic Conditions:

- 1) Provided that Newport Water has both treatment plants operational during the drought conditions, the District would obtain its water in the normal manner utilizing its Union Street Pump Station to pump from the Newport Water 4.0 million gallon storage reservoir. Depending on water availability, the District may be restricted to using one pump at the Union Street Pump Station.

b. Newport Water with Reduced Water Level in 4.0 Million Gallon Storage Reservoir:

- 1) In the event that the water level in the Newport Water 4.0 million gallon storage reservoir is low due to limited water availability, the District would be required to activate the emergency connection at the Lawton Valley Water Treatment Plant (LV-WTP) to draw water from the Newport Water Medium Service area, which is normally supplied by the LV-WTP.

c. Newport Water Lawton Valley Water Treatment Plant (LV-WTP) Out of Service

- 1) In the event that the LV-WTP is out of service the District would be required to:
 - a) Activate the emergency connection at the Lawton Valley Treatment Plant to draw water from the Newport Water Medium Service area, which would be supplied by the Station One Water Treatment Plant, and

b) Activate the Stone Bridge Fire District emergency connection.

c) Activate the Mitchell's Lane emergency connection.

H. Management of the System in Preparation for and during Drought

1. The District will respond promptly and effectively to drought conditions as determined by:
 - a. The Newport Water Department
 - 1) Newport Water is responsible for monitoring the raw water supply for drought conditions and implementing use restrictions in response to drought on Aquidneck Island.
 - 2) The expired contract with Newport Water requires that should Newport Water impose restrictions on water use on its customers the District shall likewise impose such restrictions on its customers. The District has and will continue to abide by this requirement.
 - b. The Rhode Island Water Resources Board
 - 1) The Rhode Island Water Resources Board is responsible for coordination of the drought management process and implementation of the drought management plan.
 - 2) The District has and will continue to respond to drought management requests and directives from the Water Resources Board.
2. Throughout all phases of the drought, the District is responsible for:
 - a. Creating public drought awareness within the District.
 - b. Establishing water use restrictions for the District and communicating any restrictions to the District's customers.
 - c. Otherwise assisting Newport Water, as requested.
3. Upon notice of a Drought Watch by the Water Resources Board, the District will monitor the water availability situation with Newport Water and Stone Bridge Water. The District will implement water use restrictions as it determines may be warranted or as required by Newport Water.
4. Drought Warning:
 - a. The District will review with the other water suppliers the potential and need for the District to draw water from Stone Bridge Water on an emergency basis during the drought conditions. The District will draw water from Stone Bridge Water as agreed to by the suppliers to assist in lessening the impact of the drought on Newport Water's reservoirs. The District will implement water use restrictions as it determines may be warranted or as required by Newport Water.
5. Drought Emergency:
 - a. The District will implement water use restrictions as it determines may be warranted or as required by Newport Water or the State of Rhode Island.

I. Drought Indices and Demand Reduction Actions

1. The following water demand reduction actions are intended to reduce water demand to a level consistent with the drought conditions. The responses are progressively more

stringent and are intended to achieve an increasing level of reduced water usage by the general customer base with increasing drought severity.

a. Drought Advisory:

1) Voluntary Water Restrictions

- a) Voluntary odd/even outside water use restrictions, excluding agricultural customers
- b) Voluntary odd/even outside water use restrictions and request for voluntary water conservation by agricultural customers

b. Drought Watch:

1) Voluntary Water Restrictions

- a) Voluntary outside water use restrictions

2) Mandatory Water Restrictions

- a) Mandatory odd/even outside water use restrictions, excluding gardening and agricultural customers.

c. Drought Warning:

1) Mandatory Water Restrictions

- a) Mandatory restrictions on all outside water use, excluding gardening use and agricultural customers.
- b) Mandatory restrictions on all outside water use, including gardening use and agricultural customers.

d. Drought Emergency:

1) Mandatory Water Restrictions

- a) Water use restricted to only essential needs for all customers. Mandatory restrictions on all outside water use, including gardening use and agricultural customers.
 - (1) Prohibit serving water to customers in restaurants.
 - (2) Avoid toilet flushing for liquid waste.
 - (3) Reduce shower and bathtub use whenever possible.
 - (4) Utilize sanitary facilities of friends and relatives outside the drought area.

J. Demand Reduction Goals for Each Stage of Drought.

1. The following demand reduction goals have been developed based on system experience and are intended to represent meaningful and practical water conservation efforts and results for the various stages of drought.

a. Drought Advisory:

- 1) With the above described voluntary odd/even outside water use restrictions the demand reduction is estimated to be four (4%) percent of average day demand.

b. Drought Watch:

- 1) With the above described voluntary outside water use restrictions and mandatory odd/even outside water use restrictions, excluding agricultural customers, the demand reduction is estimated to be eight (8%) percent of average day demand.

c. Drought Warning:

- 1) With the above described mandatory outside use restrictions on all outside water use, the demand reduction is estimated to be twelve (12%) percent of average day demand.

d. Drought Emergency:

- 1) With the above described water use restricted limiting water use to only essential needs for all customers, the demand reduction is estimated to be fifteen (15%) percent of average day demand (refer to Emergency Management Section 8.08)

SECTION 8.10: IMPLEMENTATION SCHEDULE, RESPONSIBLE ENTITIES, AND PROJECTED COSTS

A. General

1. An implementation schedule has been developed for the recommendations identified in the plan and is shown below:

IMPLEMENTATION SCHEDULE					
NO.	WSSMP SECTION	WORK ITEM	COMPLETE BY	COST	RESPONSIBLE PERSON
1	8.02 & 8.07	Advanced Metering Infrastructure (AMI)	FY-13	\$1.8 Million	Project Engineer
2	8.02 & 8.07	Water Billing Software	FY-13	\$40,000	General Manager
3	8.05	Retrofit Kit News Release	Annual	\$0	Office Manager
4	8.05	District Logo	FY-13	\$2,500	General Manager
5	8.04	GIS Mapping of Record Drawings	FY-14	\$20,000	Project Engineer
6	8.07	Computerize Infrastructure Maintenance Program	FY-15	\$25,000	Project Engineer
7	8.08	Replacement of Union Street Pump Station	FY-14	\$1.0 Million	General Manager

2. The purpose of the schedule is to identify actions necessary to implement the recommendations in a timely fashion and to identify individuals responsible for taking those actions.

B. Funding

The prioritized projects will be funded from operating income derived through routine budgeting and rate setting.

SECTION 8.11: FINANCIAL MANAGEMENT

A. General Guideline Information

1. The District's water rates will need to increase as the quantity of water sold decreases.
2. The District's water rates will need to increase as the wholesale cost of water increases.
3. As a quasi-municipal agency, the District is financially self-supporting and must maintain rates and charges based on the cost of providing water service and special services, including public and private fire protection for the community.
4. Annual revenue and cash reserves must be sufficient to cover all fixed operating costs and variable operating costs subject to fluctuation in water sales due to weather. Since the District is quasi-municipal, there are no expenses for intergovernmental services.
5. Revenue and cash reserves must be sufficient to fund all capital costs and annual debt service. The prioritized projects will be funded from operating income derived through routine budgeting and rate setting.

B. Current Financial Management Practices

1. General Information and Practices

- a. The District derives its revenue through water charges, service charges, tax charges and rental income. An annual audit is conducted and an audit report is prepared by an independent Certified Public Account in accordance with Generally Accepted Government Auditing Standards.
- b. The District is not regulated by the Public Utilities Commission. The Administrative Board annually adjusts the water rates, service charges and tax rate, as necessary to ensure an adequate revenue stream to fund operations, debt service and capital improvements for the next fiscal year. The District's water rates and charges are calculated based on cost of service.
- c. By charter, the Administrative Board by majority vote has the power to issue bonds or obtain commercial loans by majority vote of the Board. The Administrative Board's power to tax allows the District to issue tax exempt general obligation bonds. Tax supported bonds provide a more favorable interest rate than revenue bonds supported by variable water sales.

C. Future Revenue Sources

1. The District will continue to derive its revenue for system operations, system maintenance, capital projects and to implement system improvements and programs identified in the WSSMP from six (6) sources:
 - a. Water Usage Charges
 - b. Service Charges
 - c. Property Taxes
 - d. Lease with Cell Phone Companies

- e. Grants and Loans
 - f. General Obligation and Revenue Bonds, as necessary.
2. The District will secure bank loans, bank leases and loans from the Rhode Island Clean Water Finance Agency and issue general obligation bonds and revenue bonds, as necessary, to fund large capital projects.
 3. The District's operating and capital budget for FY-11 is \$3.1 million. It is anticipated that the budget will increase at a rate of approximately eight (8%) percent per year over the next three years based on:
 - a. Increase in the wholesale cost of water purchased from the Newport Water.
 - b. Capital improvements and increases in debt service for capital improvements.
 - c. Inflationary increases.
- D. Assessment of Rates
1. Water rates and charges will be established in advance of each fiscal year based on the approved fiscal year operating and capital budget, which will include prioritized action items from the WSSMP as described herein.
 2. Water rates will continue to be established by considering the following factors:
 - a. Recovery of all operating capital and debt service costs.
 - b. Emergency and drought period surcharges.
 - c. Seasonal price structures.
 - d. The effect of fees, rates and charges on the use of water.
 - e. The effect of maintaining non-account water consistent with or below stated goals.
 - f. The costs of preparing, maintaining and implementing water supply system management programs.

SECTION 8.12: COORDINATION

A. Coordination with Town of Portsmouth

1. Comprehensive Community Plan

- a. The Town of Portsmouth consulted with the Portsmouth Water and Fire District in preparing its Water Supply Section of the PCCP. Likewise, the District consulted with the Town of Portsmouth when preparing the WSSMP. The objectives and implementation of the Water Supply element of the PCCP are addressed in the District's WSSMP, although the element will need to be updated to reflect the latest developments on the District's water supply situation when the PCCP is next updated.
- b. The District has addressed all of the objectives of the Water Supply element of the PCCP, which include:
 - 1) Provide an adequate water supply for the present and projected residential population of the Town.
 - 2) Provide an adequate water supply to meet the agricultural needs of the Town and endeavor to provide this water under conditions and pricing structure that encourage farmers to continue farming.

- 3) Provide an adequate water supply for current and planned industrial and commercial developments that are required to provide desired employment and tax base.
 - 4) Promote water conservation through such means as education, pricing structure, and building code regulations.
 - 5) Promote water supply management through such means as system monitoring, leak detection and 100% metering.
- c. As identified in the Portsmouth Comprehensive Community Plan (PCCP), the Town of Portsmouth and the District have a shared obligation to ensure there will be a balance between the availability of water and the potential demand for water. To this end, the District and Town will coordinate their long-term planning for water availability and land use within the District.
- d. Emergencies
- As a quasi-municipal agency with legislated authority over water supply, the District will take the lead in addressing water supply emergencies within the District with backup assistance from the town, as indicated in the Emergency Management section of the WSSMP. The District is included in the Town of Portsmouth Emergency Response Plan as the contact and authority for water supply issues in the District during natural disasters and other emergencies.

B. Coordination with Other Water Suppliers

1. Interconnections

a. Newport Water

Discussions with Newport Water indicate that as the Newport System expands in Middletown, there is potential for an additional emergency connection between Newport Water and the District on Jepson Lane. Negotiations for this connection will proceed at the appropriate time.

b. Stone Bridge Fire District

The District and the Stone Bridge Fire District maintain open communications on matters of mutual interest and have a written agreement on each providing the other with emergency water supply as needed.

2. Mutual Aid

- a. The District is a member of the Rhode Island Water/Wastewater Agency Response Network (RIWARN), a mutual aid and assistance program for members to coordinate response activities and share resources during emergencies.
- b. The District has historically shared waterworks hardware and equipment with Stone Bridge, Newport Water and the Bristol County Water Authority during routine and emergency situations. Hardware is typically provided at no cost and returned in kind as soon as possible. Equipment is loaned on an as needed basis with or without personnel, depending on the equipment and need.

C. Coordination with Wastewater Treatment Facilities

There are no wastewater treatment facilities to coordinate with as the customers of the District rely solely on individual sewerage disposal systems.