PORTSMOUTH ON-SITE WASTEWATER MANAGEMENT PLAN

FINAL DRAFT

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PORTSMOUTH PLANNING DEPARTMENT

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1.0 INTRODUCTION – PLAN OVERVIEW

1.1 Goal

The Goal of this document is to present an On-Site Wastewater Management Plan (OWMP) for the Town of Portsmouth, RI (hereinafter, "Town"). This Plan provides a set of strategies and implementation items to ensure the proper management, inspection, use and maintenance of on-site wastewater treatment systems. The Town recognizes that poorly managed on-site systems are prone to failure with age, out-moded design, overuse, poor soil conditions, or improper installation, repair or maintenance and that failing on-site systems jeopardize the health, safety and welfare of the community. The Town also recognizes that a properly developed and implemented OWMP can mitigate these circumstances and provide an efficient, environmentally safe and cost-effective alternative to municipal sewers.

This Plan is not intended to create an independent framework for enforcing State laws and regulations concerning the siting, design, permitting, or construction site inspection of on-site wastewater treatment systems. Those responsibilities rest and remain with the Rhode Island Department of Environmental Management (RIDEM).

1.2 Purpose

The Purpose of this OWMP is to:

- Address recommendations in the 2005 Sakonnet River – Portsmouth Park and The Cove – Island Park TMDL, which was written to address pathogen impairments to the Sakonnet River and the Cove, to establish "a comprehensive Town-wide wastewater management strategy."

- Act in accordance with the Portsmouth Comprehensive Community Plan which states "[It is the goal of the Town of Portsmouth] to minimize pollution by ensuring existing septic systems are properly maintained and to ensure that new septic systems are properly set back from environmentally sensitive resources and properly maintained."

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- Establish a program which ensures that all on-site wastewater treatment systems in the Town of Portsmouth are properly operated, regularly inspected, routinely maintained and promptly repaired or replaced when necessary.

- Facilitate the timely upgrading of aging on-site treatment systems to modern pathogen removal technologies.

- Abide by the provisions of a signed agreement dated November, 2014 between the Rhode Island Department of Environmental Management (RIDEM) and the Town of Portsmouth regarding the resolution of an appeal of a Notice of Violation issued by the Department.

- Qualify the Town for the State's Community Septic System Loan Program (CSSLP) in order for its citizens to take advantage of low-cost loans to assist in the repair and replacement of failed on-site systems.

In addition, the Town also identifies the following rationale for why it is beneficial to develop an OWMP:

- The federal, State of Rhode Island (hereinafter, "State") and local regulatory landscape enables on-site wastewater management strategies as effective tools for reducing the risks to the public health associated with the contamination of state and local surface and groundwater.

- The Town believes it is a high priority to work cooperatively towards restoring the designated uses of the State's SA classified waters in the Town for the benefit of all of the citizens of Rhode Island and that the phased removal of all cesspools is a crucial step in restoring those designated uses.

- The Town will continue to rely on on-site wastewater treatment in the future and is committed to working cooperatively with the State and its agencies to manage the collective population of on-site treatment systems in Portsmouth.

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- On-site wastewater treatment technology has improved in recent decades and has been shown to provide safe and effective wastewater treatment under even the most difficult siting conditions.

- On-Site Wastewater Management Plans are used effectively elsewhere in the State of Rhode Island and provide Portsmouth with useful models. As of September, 2011, eighteen towns have RIDEM-approved OWMPs with four others working on draft plans. Most of the rest of Rhode Island's communities are served by sewers and not in need of local plans to manage on-site systems.

- A Wastewater Management District (which is set forth as part of this Plan) with its on-site system inspection program will speed up the identification of failed systems and facilitate the process of repairing and replacing those systems.

1.3 Plan Highlights

Highlights of this OWMP include:

- A map of the management area (the entire Town of Portsmouth).

- A recognition and endorsement of RIDEM's approval of advanced technology, which is noted to achieve pathogen reduction, as an effective measure in pollution source reduction.

- A requirement for regular septic system inspection including a schedule of enforcement for non-compliance, as described in a proposed revision to the Town's existing Wastewater Management District Ordinance.

- A program for the phased removal of all cesspools throughout the Town of Portsmouth.

- A summary of the "alternatives" analysis and decision-matrix that resulted in the selection of the continued long-term reliance on on-site wastewater treatment in all areas of the Town of Portsmouth.

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- A local supplemental financial assistance program established to assist Portsmouth's citizens in bearing the costs of upgrading their OWTSs over and above funding available from the State's CCSLP program.

- A program of guidance and technical assistance to provide advice to homeowners regarding on-site wastewater treatment system options.

- A program to consider pump-out subsidies to assist homeowners Town-wide with the timely pump-out of their septic systems if they adhere to the pump-out schedule established for their OWTS by the inspection program.

- A program of public education addressing the proper operation and maintenance of OWTSs, the proper disposal of household hazardous wastes and water conservation strategies, among other relevant issues regarding OWTS health and efficiency.

- A program of continued monitoring to document water quality improvements as cesspools are removed and failed on-site systems are identified and replaced. This program includes continued illicit discharge detection and elimination in order to keep storm drains free of wastewater inputs.

1.4 RIDEM OWMP Criteria

RIDEM has established minimum criteria for OWMPs for those communities desirous of being approved for CCSLP Program eligibility. Generally, each plan must contain:

1) A description of the Management Area.

2) A description of the community assistance program for homeowners in the Management Area.

3) The methods used to encourage regular OWTS maintenance in the Management Area.

4) A Financial Analysis.

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5) A description of program administration and implementation, including the method and location of septage disposal.

2.0 DESCRIPTION OF THE MANAGEMENT AREA

The Management Area subject to this On-Site Wastewater Management Plan includes the entire Town of Portsmouth. This chapter presents a summary of current conditions in the Management Area, a discussion of the causes and impacts of OWTS failure, a review of past engineering and planning studies conducted in the Management Area and a cataloging of various RIDEM-approved advanced wastewater treatment technologies and their benefits in pathogen reduction in wastewater.

2.1 General Description of the Management Area

The Town of Portsmouth encompasses 23.2 square miles spread over several islands within Narragansett Bay including the northern portion of Aquidneck Island, all of Prudence Island and Hog Island, and several smaller uninhabited islands. See Map I.

Portsmouth's terrain on Aquidneck Island (where the majority of Portsmouth's population resides) is hilly, with a ridge line running north and south for the entire length of the Town. This drainage divide is generally east of the center of the island resulting in eastern slopes which tend to be steeper than the western slopes. Surface runoff from the eastern slopes drains into the Sakonnet River with surface runoff from the western slopes draining into the East Passage of Narragansett Bay, both via a network of natural drainage features and municipal storm drains. The extreme north end of Portsmouth on Aquidneck Island is characterized by sandy low-lying terrain.

See Appendix III for a complete description of the Management Area including both the natural environment and demographic characteristics.

2.1.1 Previous Studies –Berger, Lombardo, Woodard & Curran

On-site wastewater treatment in the Town of Portsmouth has been studied in great detail and wastewater management plans have been produced dating as far back as 1981 with work done by Metcalf and Eddy. For purposes of this Plan the three most recent studies are

summarized and critiqued below. None of these three recent plans have been adopted by the Town of Portsmouth or approved by RIDEM.

The Berger Plan – In 2001 the Town retained Louis Berger Group, Inc. ("Berger") to produce a Wastewater Facilities Plan Update (2002) for the neighborhoods of Island Park, Portsmouth Park and the Hummock in the Town of Portsmouth. Through a decision-matrix type analysis, Berger considered six different alternatives for wastewater treatment in these neighborhoods, which included conventional sewers as well as upgrading individual OWTSs. Berger's selected alternative was "Alternative 5: Upgrade Individual On-Site Wastewater treatment and Disposal Systems," as explained in the Summary of its plan.

> "Alternative 5 is to upgrade existing failing ISDSs [OWTSs] with on-site systems that are better designed to handle the constraints found within the study area. Section [X.X] outlines required treatment standards for each of the three areas needed to meet the project goals. The systems best suited for Island Park and the Hummocks include those listed as highly suitable for the following site constraints: pathogen sensitive, nitrogen sensitive, shallow depth to groundwater, rapidly permeable soils and size restricted lots. These systems include the recirculating sand filter, Advantex textile filter, and the FAST system. The RUCK system is also highly suitable under the above listed constraints, but is impractical for installing at an existing house. The systems best suited for Portsmouth Park are those listed as highly suitable for the following constraints: pathogen sensitive, slowly permeable soils, shallow depth to bedrock and size restricted lots. The systems most suitable for Portsmouth Park include: the single pass sand filter, the Puraflo Peat Biofilter, the recirculating sand filter, the Advantex textile filter, and the FAST system. For implementation of Alternative 5, the Town would have to establish a Wastewater Management District and implement a mandatory ISDS [OWTS] Inspection Program. The ISDS [OWTS] inspections could be performed by Town employees or qualified inspectors approved by the Town. The cost of the inspections would likely be borne by the homeowners directly. Based on the results of the inspection, all failed systems would have to be replaced with a system that achieves a higher treatment standard than a typical conventional ISDS [OWTS], such as those described above. The requirements for replacing/upgrading systems would likely be phased in over 5 to 7 years depending on the results of the inspections."[1]

[1] Louis Berger Group, Inc. October, 2002. *Draft Wastewater Facilities Plan Update – Island Park, Portsmouth Park and The Hummock*. Pages EXE-2 – EXE-3.

The 2003 Lombardo On-Site Wastewater Management Plan – Lombardo Associates, Inc. ("Lombardo") was hired in 2003 by the Town of Portsmouth to produce a plan to manage the population of OWTSs in Town. The stated scope of work for the Plan was to:

- Prepare a Community Profile for the Town, describing existing conditions with regard to wastewater management;
- Define a short list of technology options suitable for OWTSs in Town;
- Develop public education materials covering septic systems;
- Develop a program framework for the Community Septic System Loan Program (CCSLP) participation;
- Conduct a review of wastewater management options;
- Develop a draft On-Site Wastewater Management Plan (OWMP).

Lombardo devoted the bulk of their work to the fifth bullet point above, a desktop needs analysis, and produced an On-Site Wastewater Management Plan that recommended sewers were needed for the neighborhoods of Portsmouth Park, Island Park and Common Fence Point and concluded that a number of small densely populated areas of the rest of Portsmouth need off-site cluster (community) wastewater solutions as well.

To arrive at this recommendation, Lombardo scored each parcel of land in Town for lot size, percolation rate and depth-to-groundwater and assigned a rating of "severe, high, moderate, or low" in determining a parcels ability to support an on-site system or a need for an off-site solution (i.e. sewers). Due to budget constraints, the needs analysis did not, however, use lot-by-lot data in the scoring. Depth-to-groundwater and percolation rates for each lot were interpolated from recorded data gathered on less than 10% of the parcels in Town and it was further assumed by the study that lots of < 5000 sq. ft. (nearly 90% of the lots in some neighborhoods) could not support an on-site system. In seeming to discount its own work, the Lombardo document states, "because of the complicated nature of septic system design, using a threshold parcel size as an indicator of suitability for septic systems is useful only for very generalized analysis, and can be misleading if used for lot-by-lot analysis or other more detailed approaches."[2] This single critical assumption and the recommendations that resulted from it formed the basis for nearly all wastewater management planning efforts in Portsmouth since. Indeed, the 2009 Woodard & Curran Wastewater Facilities Plan noted below performed an analysis of Lombardo's

[2] Lombardo Associates, Inc. August, 2003. *On-Site Wastewater Management Plan for Portsmouth, Rhode Island*. Page 37.

recommended clusters in other parts of Town but took Lombardo's sewer recommendation for Island Park and Portsmouth Park as a given starting point with no further scrutiny.

It should be noted from the above that the assumption used in the 2003 Lombardo Plan that all parcels of <5000 sq. ft. cannot support an on-site treatment system is contrary to Berger who embraces the fact that on-site systems can effectively treat wastewater on-site, provided that the appropriate technology is used. The conclusions, policies, recommendations and implementation strategies of this Draft OWMP are based largely on the conclusions and recommendations of the 2002 Berger Plan.

The Woodard & Curran (W&C) Wastewater Facilities Plan (2009) – In 2005, the Town retained W & C to do cost estimates for the installation of conventional sewers under three different scenarios, 1) the neighborhoods of Island Park and Portsmouth Park alone, 2) the addition of Common Fence Point and other neighborhoods, and finally 3) the addition of the entire West side of Portsmouth. This work was intended to build on Lombardo which had recommended sewers for Island Park, Portsmouth Park, Common Fence Point and the Hummocks but provided no cost estimates. Over time the W & C contract was expanded to become a full Wastewater Facilities Plan intended to be in compliance with the RIDEM Facilities Plan Checklist and including an "alternatives" analysis which considered:

- "No Action" Alternative
- Optimum Operation of Existing [On-site] Facilities Alternative
- Regional Solutions Alternative
- "Build" Alternative

The selected alternative in the 2009 W & C Wastewater Facilities Plan was a "build" alternative including sewers for the neighborhoods of Island Park, Portsmouth Park, Common Fence Point, The Hummocks and several other neighborhoods across the rest of Town as well as the entire West Side of Portsmouth. In addition several clusters throughout Town that were impractical for tie-in were designated as requiring individual Wastewater Management Districts with shared community septic systems. The Portsmouth Town Council received the final draft of the W & C Plan in August, 2009.

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2.2 Identification of the Number, Type and Location of OWTSs

The Town of Portsmouth relies almost exclusively upon individual on-site wastewater treatment systems for wastewater disposal. There is no public sewer system anywhere in Town. There are however, several multi-user community wastewater treatment systems in Town serving large facilities and/or subdivisions, and the Newport sewer system has an extension serving a portion of the naval housing complex near Melville on the west side of Town.

There is no readily available count of the number of individual OWTS in Town. A useful surrogate for this count is the number of individual or multi-family housing units in Town, which is available from the Tax Assessors records. As of 2011, assuming each housing unit has an OWTS; there are approximately **6,391** OWTSs town-wide. Of those, 540 are on Prudence Island and Hog Island and 855 are in the neighborhoods of Island Park and Portsmouth Park (including Valhalla). See Map II. This Plan details a comprehensive Town-wide strategy to manage all **6,391** systems.

Developing approximate numbers for the types of OWTSs throughout the Management Area is necessary in order to determine future wastewater management needs. For determining the system types of the 6,391 OWTSs town-wide, this analysis referred to housing age from the Tax Assessors records and made the assumption that OWTSs installed before 1968 (44+ years old) are likely a cesspool, a substandard system or an older conventional system. It follows then that any OWTS installed after 1968 is a RIDEM-approved conventional or A/E system. Examination of the Tax Assessor records revealed that of **6,391** systems, **2997** systems (46.9%) were installed prior to 1968 and are therefore likely to be cesspools, substandard systems or older conventional systems. The remaining **3393** post-1968 installed systems are assumed to be conventional or A/E systems.

To disaggregate the above totals, for just the Island Park and Portsmouth Park (including Valhalla) neighborhoods, the Tax Assessor's database indicates that of the approximately **855** OWTSs in those neighborhoods, **685** (80.1%) were installed before 1968 and are therefore likely to be cesspools, substandard system, or older conventional systems.

Many pre-1968 systems have, of course, been repaired or replaced since they were installed. As part of his 2003 work, Lombardo examined the RIDEM database and determined that the average annual repair and/or replacement rate for the decade

between 1992 and 2001 was 1.0%. Applying this 1.0% rate over the 44 year period between 1968 and the present (64 repairs/replacements x 44 years = 2816 repairs/replacements for the period) and assuming for planning purposes that half of all system repairs/replacements were for pre-1968 installations, the following totals of types of systems can be calculated:

For the Entire Town

- Total number of systems = **6391**
- Un-repaired/replaced pre-1968 systems assumed to be cesspools, substandard systems or older conventional systems = **1589** (24.8%)
- Systems assumed to be conventional septic systems or repaired/replaced pre-1968 systems = **4802** (75.2%).

For the Island Park and Portsmouth Park (including Valhalla) Neighborhoods

- Total number of systems = **855**
- Un-repaired/replaced pre-1968 systems assumed to be cesspools, substandard systems or older conventional systems = **496** (58.1%)
- Systems assumed to be conventional septic systems or repaired/replaced pre-1968 systems = **359** (41.9%).

For the remainder of Portsmouth minus the above Neighborhoods

- Total number of systems = **5536**
- Un-repaired/replaced pre-1968 systems assumed to be cesspools, substandard systems or older conventional systems = **1093** (19.8%)
- Systems assumed to be conventional septic systems or repaired/replaced pre-1968 systems = **4443** (80.2%).

Please see Section 2.4.3 for a discussion of failure rates and Section 3.2.1 for system-replacement cost comparisons.

2.3 Impacts of Failed Systems on Surface and Groundwater

Failed or poorly functioning on-site wastewater treatment systems, including cesspools, are known to discharge pollutants such as pathogens and excessive nutrients into their

surrounding environment, the chief impact being on water quality. In the case of Portsmouth, as in some other communities in Rhode Island, these pollutants find their way as contaminated groundwater and surface water runoff into the municipal storm drain system and then into the marine environment and the waters of the State, interfering with the State's designated uses of those waters. It is important and necessary to ensure that these on-site systems are properly designed, installed and maintained so as to not release pollutants into the surrounding environment.

2.3.1 Drinking Water Quality

Drinking water for most of Portsmouth is provided by the Portsmouth Water and Fire District from City of Newport Department of Utilities surface water reservoirs in Portsmouth, Tiverton and Little Compton. Water is treated at the City of Newport owned facility on West Main Road and distributed to most of Portsmouth on Aquidneck Island. The portions of Portsmouth not supplied in this way are supplied directly by the City of Newport, with the raw water source and treatment facility being the same as above. Prudence and Hog Islands are serviced by a total of eight community wells. There are no municipal drinking water wells and few private individual drinking water wells in the remainder of Town.

With this drinking water infrastructure in place, there is little threat to drinking water quality from failed on-site treatment systems in Portsmouth. The drinking water reservoirs in Portsmouth are well protected by a Watershed Protection Overlay District provided for in the Portsmouth Zoning Ordinance and RIDEM has strict siting requirements for the separation between OWTSs and the few drinking water wells that do exist in Town.

2.3.2 The Sakonnet River & The Cove TMDL

The Sakonnet River and The Cove are State waters with a water quality classification of SA, indicating that they are designated for shellfish harvesting for direct human consumption as well as primary and secondary recreational uses. However, portions of these water bodies adjacent to the neighborhoods of Portsmouth Park and Island Park have appeared on past Rhode Island Section 303(d) list of impaired waters. These waters have been recently re-categorized from Category 5 (impaired or threatened for one or more designated uses by a pollutant(s), and requires a TMDL) to Category 4A (impaired or

threatened for one or more designated uses by a pollutant(s), but does not require development of a TMDL), not because monitoring data indicates water quality standards for the impairment are now being met, but because a TMDL addressing the water quality impairment and recommending pollution control activities has been completed and approved by EPA. The waters in question do not support the designated use of SA waters, specifically, the harvesting of shellfish for direct human consumption. The pollutant of concern is fecal coliform, a parameter used by the State as an indicator of human pathogens. The source is identified by the RIDEM Shellfish Program as "fecal inputs to the storm sewers from non-point sources associated with high-density housing and the existence of old, malfunctioning and undersized septic systems."[3] Based on monitoring data from RIDEM's Shellfish Program, these waters have been closed to shellfishing since 1985 due to the potential public health risk associated with discharges of contaminated groundwater both directly into the water bodies and indirectly through Town and State-owned storm water outfalls. In addition to the shellfish closure, RI Department of Health has issued a swimming advisory relative to these two shoreline areas, citing the same potential public health risks. The recent re-categorization indicates the waters of The Cove fully support primary and secondary contact recreation (swimming)

As required by the Clean Water Act, Section 303(d) and federal regulation 40CFR 130.7(c)(1), in 2005 RIDEM developed and published a total maximum daily load (TMDL) for these water bodies with the goal of reducing pollutant loading to improve water quality such that State standards are met for the water body's designated uses. Typically, a waste load allocation is calculated by specifying the amount of pollutants that can be released into a water body and still meet water quality standards. This 2005 TMDL is quite different, however. "This TMDL differs from the typical TMDL in that the identified water quality impairment is not based on ambient water quality violations but on the presence of a threat to public health in the form of direct and indirect discharges of untreated or inadequately treated wastewater."[4]

The TMDL states these discharges are a violation of the State's water quality regulations and OWTS regulations with the responsibility for correcting these violations resting both with the individual property owner, who is responsible for the proper disposal of wastewater, and the owners of the storm drains in question, namely the Town and in some

[3] RIDEM (Rhode Island Department of Environmental Management), Office of Water Resources. March, 2005. *Final – Total Maximum Daily Load – The Sakonnet River (Portsmouth Park)/The Cove (Island Park)*. Page12.

[4] Ibid., Page 35.

cases RIDOT, both of which are responsible for the detection and elimination of contaminated flows. The TMDL continues by recommending that the Town develop a "comprehensive community-wide strategy…which documents the commitment by the responsible parties to implement enforceable wastewater and storm water management alternatives to eliminate all untreated and inadequately treated wastewater discharges in the most timely manner possible."[5]

The TMDL concludes:

> "If the recommended alternative involves the continued use of [OWTS], the town should establish a wastewater management district. Though potentially less costly than a community-wide wastewater collection and treatment system, a site by site approach to dealing with septic system failures in these areas has many challenges to overcome. Contaminated seeps and polluted groundwater infiltrating into storm drains are difficult to trace back to the source and the responsible property owners.
>
> Notwithstanding, a large number of lots would undoubtedly be identified as having severe limitations for septic systems. Small lot sizes, poor soils, high groundwater and the proximity to water bodies are all conditions that present serious limitations for many of these properties. Successful implementation of a solution that relies upon the continued use of [OWTS] entails adoption of a local ordinance creating a wastewater management district which includes at a minimum: mandatory functional inspections as described in Septic System Check-up (to be performed in the Spring at high groundwater level), identification of any failed systems, and mandatory repair and/or replacement of cesspools and any failed systems. The program should include a schedule of enforcement and means to implement it. It is essential that the town commit sufficient personnel resources to successfully administer the management district (including technical assistance to homeowners) and a program of homeowner financial assistance (e.g. Community Septic System Loan Program (CSSLP) available through the Clean Water Finance Agency).
>
> Should contaminated discharges continue to be evident following implementation of these actions, additional control measures will be required, as appropriate. Until such time as a comprehensive community-wide wastewater management approach has been implemented, RIDEM's Office of Compliance and Inspection will continue

[5] Ibid., Page 38.

to address individual complaints and notice of failures as allowed for under current statute and policy."[6]

2.4 Analysis of the Causes of OWTS Failure

Ground and surface waters are important natural and recreational resources that are vital to the economic, environmental, and public health of the Town of Portsmouth. Many OWTSs in Portsmouth may be at risk of failure due to age, outmoded design, overuse, and improper installation, repair, and maintenance. Site factors such as poor soils or a shallow water table can increase risk of OWTS failure as well. The following sections discuss causes of OWTS failure, detail the calculation of failure rates throughout the management area and discuss the use of advanced treatment systems in reducing on-site septic system failure.

2.4.1 Lot Size, Residential Density and Land Use

Small lot sizes, particularly in combination with factors such as poorly drained soil and high groundwater, predispose OWTS to treatment failure. The average lot size town-wide in Portsmouth is 0.53 acres but drops dramatically to 0.19 acres (8140 sq. ft.) in the neighborhoods of Island Park and Portsmouth Park. Generally speaking, smaller lots (e.g., < 0.5 acre) exhibit significant challenges for siting OWTSs. While there is no RIDEM-required minimum lot size, RIDEM has established regulatory setback requirements from property lines, water mains, subsurface drains, foundation wall and the like to be applied to permit applications for all septic system installations. These setback regulations are established to give the on-site treatment system room to function properly. RIDEM, at their discretion, may vary these requirements. With regard to permitted system repairs, Section 17.7.2 of RIDEM Rules states, "If necessary, certain requirements under these rules may be relaxed at the discretion of the Director, provided that such modifications are consistent with the protection of public health and the environment."[8]

As discussed in Appendix III, many neighborhoods in the Town of Portsmouth developed as summer cottage communities on small lots and have now evolved into high-density residential year-round use. Use of many area homes has significantly expanded, but the

[6] Ibid., Page 39.
[8] RIDEM (Rhode Island Department of Environmental Management). July, 2012. *Rules and Regulations Establishing Minimum Standards Relating to Location, Design, Construction, and Maintenance of On-Site Wastewater Treatment Systems.* Page 33.

OWTSs serving these homes may not have been upgraded. Cesspools are common and even holding tank installations as system repairs do exist.

Given the small size of lots (sometimes 3,000 square feet or less) in the north end of Town and elsewhere, many properties lack the space needed for OWTSs to meet setbacks from wells, property lines and other lot features. Substandard systems, small lot size, and use of systems beyond their intended capacity predispose OWTSs in these neighborhoods to failure. In some cases (e.g., influent flows beyond design intent), failures may manifest as surface backups; but in other cases (e.g., inadequate setbacks in fast soils), treatment failures may occur, which manifest as contaminated groundwater entering the storm drains and then discharging into the State's waters.

In recognition of the above constraints to proper wastewater treatment and consistent with their authority to do so, RIDEM has issued supplementary *"Design Guidance for OWTS Repairs – Island Park and Portsmouth Park Neighborhoods, Portsmouth,"* effective July, 2013 and amended as of April, 2014. In addition to the minimum requirements in RIDEM's OWTS Rules and Regulations, additional testing, design and submittal requirements will be necessary for construction approval for OWTSs on lots located within these neighborhoods. Further restrictive setback requirements from coastal features and storm drains are a significant element of this design guidance as well. RIDEM reserves the authority to make further revisions to these design requirements as needed.

2.4.2 Soils in the Management Area

Soil characteristics can be grouped by hydrologic group to be helpful in planning land use and engineering projects that are likely to be affected by water. This grouping is used to estimate characteristics such as storm water runoff and infiltration/absorption rates in septic design. The four hydrologic soil groups are:

Group A – Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist chiefly of deep, well-drained to excessively drained sands or gravels. These soils have a high rate of water transmission. Approximately 5% of Portsmouth is covered by Group A soils, mainly in the north end neighborhoods of Island Park and Common Fence Point.

Group B - Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that

have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission. These soils occur in approximately 2% of Portsmouth.

Group C - Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission. This is by far the most prevalent soil group in Portsmouth at 76% coverage.

Group D - Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a clay pan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission. Approximately 6% of Portsmouth is covered by Group D soils, significantly in the neighborhood of Portsmouth Park.

The remaining 11% of Portsmouth is covered by unbuildable soils such as beaches and rock outcroppings.

2.4.3 System Failure and Failure Rates

An on-site wastewater management plan must address OWTS failures and replacements. Recent recorded failures and replacement rates as well as the age of existing septic systems can be used to forecast future system replacement requirements on a Town-wide basis.

As part of the context for management, the terms OWTS failure, alteration, repair, and replacement should be defined and understood. The definitions used by RIDEM and within this OWMP are:

Failure[9] - Any sewage disposal system that does not adequately treat and disperse wastewater so as to create a public or private nuisance or threat to public health or environmental quality, as evidenced by, but not limited to, one or more of the following conditions:

1. Failure to accept wastewater into the building sewer;

[9] Ibid., Pages 5-6.

2. Discharge of wastewater to a basement; subsurface drain; storm water collection, conveyance, or treatment device; or watercourse unless expressly permitted by the Department;

3. Wastewater rising to the surface of the ground over or near any part of OWTS or seeping from the absorption area at any change in grade, bank or road cut;

4. The invert of the inlet or the invert of the outlet for a septic tank, distribution box, or pump tank is submerged;

5. The liquid depth in a cesspool is less than six (6) inches from the inlet pipe invert;

6. Pumping of the cesspool or septic tank is required more than two (2) times per year;

7. OWTS is shown to have contaminated a drinking water well or watercourse;

8. If a septic tank, pump tank, distribution box, or cesspool is pumped and groundwater seeps into it; or

9. Any deterioration, damage, or malfunction relating to any OWTS that would preclude adequate treatment and dispersal of wastewater.

10. Excessive solids are evident in the distribution box or distribution lines.

Functional or Hydraulic failures occurs when the OWTS system physically stops working – this is manifested as surface breakout, sewage backing up into the house, and other readily apparent indications.

Treatment failures occur when the system is not functioning as designed. For purposes of this Plan, performance failure means the system is failing in the treatment of bacteria, which may be achieved by percolating wastewater through unsaturated soil or other pathogen treatment.

OWTS Repair: Repairs can be anything from a full system replacement to relatively minor maintenance or equipment repair activities. Repairs can include replacement of a septic tank, distribution box, pump, broken pipe, etc. Removal and replacement of a cesspool with

a conventional or advanced treatment system (or a holding tank) is considered an OWTS repair.

OWTS Alteration: Alterations are categorized as changes made to an OWTS system due to modification of a structure that reaches a certain threshold. For example, adding a bedroom onto a residence may require an OWTS alteration to provide increased leachfield capacity. OWTS alterations are user discretionary activities initiated by voluntary modifications to a structure.

Knowing the annual OWTS failure rate for a community is a useful statistic for wastewater management either in comparison with other communities and their management strategies or within a community (or neighborhood) over time to gauge the average life of septic systems in the study area. This annual failure rate can provide guidance for allocating appropriate loan assistance funding levels and similar management activities. This metric was used as a key factor in evaluating wastewater treatment alternatives in Section 3.0 of this Plan.

Lombardo calculated an average annual septic system failure rate of 1.0% Town-wide.[10] This OWMP considers this 1% rate too low to be realistic as by inference it suggests an average septic system life of 100 years. Prior to 1968 many of if not most systems installed were cesspools or metal tank systems and the failure rate for these systems is not comparable to that of current conventional designs. Moreover, even as much as 70 years of useful life does not fit well with common experience. It is certainly possible to "baby" a system to increase life expectancy, but conservatively, 30-40 years is more appropriate. Using a conservative system life of 40 years, a failure rate of **2.5%** per year for Portsmouth can be inferred and is used for determining future needs in this OWMP. Going forward the Town can expect approximately **160** OWTS repairs/replacements per year (6391 x .025) for the foreseeable future. (Note: the 2007 Cesspool Act will likely skew this number considerably for 2014 and beyond, but for the 7-year planning period of this OWMP, this number will suffice.

Section 2.2 (above) states there are approximately **6,391** individual on-site treatment systems in Portsmouth, **2997** of which were installed prior to 1968 and therefore likely to be cesspools, substandard systems or older conventional systems with the remaining **3393**

[10] Lombardo Associates, Inc. August, 2003. *On-Site Wastewater Management Plan for Portsmouth, Rhode Island*. Page 44.

OWTSs assumed to be conventional or A/E systems. For this OWMP, these numbers were further refined by applying Lombardo's 1% repair/replacement rate for the 44-year period between 1968 and the present and making the assumption that half of all repair/replacements were for pre-1968 OWTSs.

- Total number of OWTSs = **6391**
- Un-repaired/replaced pre-1968 OWTSs assumed to be cesspools, substandard systems or older conventional systems = **1589** (24.8%)
- OWTSs assumed to be conventional septic systems or repaired/replaced pre-1968 systems = **4802** (75.2%). (6391 minus 1589)

For planning purposes, this OWMP assumes that **75%** of the **160** expected OWTS repairs/replacements will be for un-repaired/replaced pre-1968 OWTSs assumed to be cesspools, substandard systems or older conventional systems, and further assumes these OWTSs will likely require upgrading to RIDEM-approved A/E systems. Therefore, for planning purposes, it is expected that **120** OWTSs per year town-wide will require full system upgrades to A/E OWTSs and **40** per year will require much less costly minor repairs to RIDEM-permitted conventional OWTSs as the Town's inspection system works its way through the population of septic systems in Portsmouth over the coming years.

The above discussion of septic failure rates is based on the natural aging of systems and the discovery of system failure as a result of the inspection program detailed in Section 4.4 of this OWMP. This plan however calls for the phased removal of cesspools in the Town of Portsmouth, specifically all cesspools within fifty (50) feet of a town or state storm drain shall be replaced by January 1, 2020 and all other cesspools by the end of 2025. Rough estimates of the number of cesspools within 50 feet of a storm drain is somewhat problematic as full storm drain mapping outside of the neighborhoods of Island Park and Portsmouth Park has not been completed. Outfall locations and the geographic coordinates of all surface features (manholes and catch basin) have been recorded but the "what-connects-to-what" mapping remains undone, except in selected locations.

Not so with the Island Park and Portsmouth Park neighborhoods. Extensive mapping has been completed and the location of every surface feature as well as subsurface piping is known and has been mapped. Planning Department research indicates there are approximately 310 parcels within fifty (50) feet of a component of a town or state owned storm drain system. If the percentage of cesspools in the total population (58.1%) for these

neighborhoods calculated in Section 2.2 of this plan is applied to this number, it is estimated that approximately 180 cesspools (within 50 ft of a storm drain) will be required to be replaced by the end of 2020. It is estimated that roughly half of these are already subject to the State-enforced Cesspool Phase Act, which leaves approximately 90 cesspools that must be removed by Town Ordinance by 2020 in the two neighborhoods.

2.4.4 Alternative Technologies

The use of conventional OWTSs may be limited by shallow depth to groundwater, setbacks from environmental sensitive resources, and certain soil conditions. A/E Alternative and experimental (A/E) technologies, however, can work in a wide variety of settings with significant hydrologic and environmental constraints. This section discusses the application of A/E OWTSs to challenging settings. Specifically, it discusses:

- National Guidance on A/E OWTSs.
- Rhode Island's recognition of A/E OWTSs.
- Demonstration projects conducted in the Portsmouth Park and Island Park areas.

2.4.4.1 National Guidance on A/E Onsite Wastewater Treatment

In 2002, EPA published the *Onsite Wastewater Treatment Systems Manual,* as a supplement to the 1980 *Design Manual: Onsite Wastewater Treatment and Disposal Systems*:

This update was…developed to provide supplemental and new information … to explore and discuss recent developments in treatment technologies, system design, and long-term system management. (EPA, 2002, p. ix)

The manual discusses "removing barriers that preclude widespread acceptance of onsite treatment technologies." For example it provides 13 technology fact sheets, which discuss a variety of A/E OWTSs.

This 2002 EPA manual, which is a central guidance document for use of onsite wastewater, advocates a comprehensive watershed approach using performance standards in place of prescriptive design standards:

> Over the past 20 years the OWTS industry has developed many new treatment technologies that can achieve high performance levels on sites with size, soil, ground water, and landscape limitations that might preclude installing conventional systems. New technologies and improvements to existing technologies are based on defining the performance requirements of the system characterizing wastewater flow and pollutant loads, evaluating site conditions, defining performance and design boundaries, and selecting a system design that addresses the factors. (EPA, 2002, p. xv)

The 2002 *Onsite Wastewater Treatment Systems Manual* can be found at:
http://www.epa.gov/owm/septic/pubs/septic_2002_osdm_all.pdf

2.4.4.2 Rhode Island's Recognition of A/E OWTSs

RIDEM has developed a program that specifically recognizes A/E OWTSs, which is entitled *Alternative/Experimental Onsite Wastewater Treatment Systems (OWTS) Technology Program* (A/E Program). This document is available at:
http://www.dem.ri.gov/programs/benviron/water/permits/isds/pdfs/ialist.pdf

The A/E Program discusses two treatment systems that may specifically be used to reduce pathogens, the single-pass sand filter and the Puraflow peat biofilter.

2.4.4.3 Rhode Island's Recognition of Zero Discharge Systems

Rule 28 of RIDEM's OWTS Rules prohibits zero discharge systems (holding tanks) for new building construction or for alterations of a structure. The Department does however allow holding tanks as a repair alternative under some environmental or operating conditions where failure of an existing system or cesspool must be addressed, provided the system is "designed, installed and operated with extraordinary care and diligence."

RIDEM has issued *Design Guidance for OWTS Repairs – Island Park and Portsmouth Park Neighborhoods, Portsmouth*, effective, July, 2013, wherein zero discharge systems (holding tanks) shall be required within 25 feet of any coastal feature or storm drain. This requirement applies only to these neighborhoods and will have a significant impact on those subject to the 2007 Cesspool Phase-out Act.

2.4.4.4 Rhode Island Demonstration Projects

The University of Rhode Island's New England Onsite Wastewater Training Center has partnered with USEPA, RIDEM, CRMC, and several municipalities, as well as a number of private sector entities and private individuals, to demonstrate the use of A/E OWTSs. One objective of these studies was to document the effectiveness of A/E OWTSs on sites with significant environmental constraints. One of the municipalities involved in these demonstrations was the Town of Portsmouth. Several of the demonstration systems were cited in the areas of Portsmouth Park and Island Park. Three studies have been provided as the Appendix IV to this Plan:

- "Utilizing Advanced Treatment Technologies to Remediated Failed On-site Systems on Marginal Sites Located in Sensitive Coastal Environments."

- "Performance Evaluation of Innovative Treatment Technologies Used to Remediate Failed Septic Systems."

- "A Blueprint for Community Wastewater Management."

3.0 ALTERNATIVES & FINANCIAL ANALYSIS

Using data compiled and recommendations made by various consultants and engineers as described in Section 2.1.1, the Town evaluated three alternatives in planning for the management of the treatment of wastewater town-wide. The conclusion reached through this evaluation process was that the Town of Portsmouth intends to continue to rely on on-site wastewater treatment and will put in place management practices to ensure the timely upgrade of on-site systems, including the removal of all cesspools, as needed. The following discussion presents the factors that were considered in arriving at this decision.

3.1 Alternatives and Selection Criteria

The Plan evaluated three alternatives:

1) The continued use of on-site treatment systems town-wide, including a mix of RIDEM-approved advanced pathogen removal and conventional treatment / disposal systems.

2) The installation of shared community septic systems for a finite number of homes in several undetermined locations in the neighborhoods of Island Park and Portsmouth Park (including Valhalla) along with the continued use of OWTSs elsewhere in those neighborhoods and the remainder of Town.

3) The installation of conventional sewers in the neighborhoods of Island Park and Portsmouth Park (including Valhalla) along with the continued use of OWTSs elsewhere in Town.

A "no-action" alternative was considered unacceptable and contrary to the Town's Comprehensive Plan with respect to providing for quality of life, the protection of the public health and addressing the continued degradation of the natural environment. The Town is committed to responding to these community planning goals in a responsible manner and developed the above three alternatives to consider as future courses of action.

At the other end of the spectrum, The Town did not consider the construction of sewers for the entire Town as an alternative because there is no demonstrated need for sewers Town-wide and because the high costs of such an undertaking would be prohibitive.

The basis for including Alternatives 2 and 3 in this evaluation is the assumption that there are many parcels in the neighborhoods of Island Park and Portsmouth Park (including Valhalla) that simply cannot accommodate an OWTS due primarily to lot size and therefore need an off-site solution. RIDEM does in fact work with homeowners by relaxing certain requirements in repair/replacement permitting to put the best systems possible on developed lots so it is difficult to know, for planning purposes, just which lots are "too small" to accommodate an OWTS. Much work has been done to determine the number of such lots and their relative proximity to one another, but without clear technical guidelines as to which lots are in fact "too small" for any type of system, it is difficult to make planning decisions to address what is likely to be a situation of widely scattered need. This geographic situation does not lend itself well to designing shared community systems. This OWMP acknowledges additional cooperative work needs to be done between the Town and RIDEM for this alternative to be seriously evaluated against the other two and therefore only considers for evaluation Alternatives 1 and 3 (on-site treatment and installation of sewers, respectively) in this OWMP.

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Evaluation criteria for the above alternatives included:

- infrastructure costs
- operations & maintenance costs
- the Town's responsibility
- land space requirements
- the impact of development pressure
- funding options
- the expected water quality improvements

Data supporting each of the evaluation criteria came from previous studies as described in Section 2.1.1. All costs estimates should be considered order-of-magnitude opinions suitable for planning purposes only and not for construction estimates or other detailed considerations.

In considering each of the alternatives, the Town was mindful of the successful use of the continued reliance on on-site treatment systems in communities elsewhere in the State as well as the legislative and regulatory landscape that enables the management of on-site treatment systems to be an effective tool for reducing risks to the public health. Please see Appendix I for an inventory of Federal, State and local regulations regarding on-site wastewater treatment and associated issues and a list of Rhode Island communities with RIDEM-approved on-site wastewater management plans.

The planning period for this analysis is seven (7) years. This coincides with the January 1, 2020 deadline established by the Rhode Island Cesspool Act of 2007 before which the Town must commit to installing sewers to enable homeowners in those neighborhoods where sewers are to be installed to take advantage of an extension to the requirement that they replace all cesspools by January 1, 2014, if they are subject to the Act. It is also consistent with the recent agreement between the Town and RIDEM for the removal of all cesspools throughout the Town. All cost estimates and implementation schedules are developed to fit this seven (7) year time period.

3.1.1 Alternative 1 - Continued Use of On-Site Wastewater Treatment Systems

As previously stated in Section 2.0 of this Plan, all parcels in the Town, with a few exceptions, are serviced by on-site treatment systems. Due to age, system maintenance

practices and other factors, many if not most of these OWTSs will have to undergo repairs or outright replacement in the coming decades.

Conventional OWTSs are expected to be the most prevalent type of on-site treatment system long into the future. With proper siting, installation and maintenance most of these systems can be expected to function properly for several decades. The inspection program detailed in this Plan will establish a suggested maintenance schedule for these conventional systems and the management program for these conventional systems is expected to be a relatively small part of the overall management program. As failed conventional systems are revealed over time by the inspection program and other means, some may be required by RIDEM to be upgraded to advanced pathogen reduction technology, but for the most part the Town expects conventional systems to be repaired as conventional systems or replaced with conventional systems if needed.

Cesspools and other types of substandard systems are another matter. Continued reliance on on-site treatment, which this OWMP promotes, will almost certainly require a strong reliance on RIDEM-approved advanced pathogen removal systems particularly in areas of Town with small lot sizes, poor soils and/or close proximity to coastal features or to storm drains. At the very least, RIDEM will require homeowners to replace all cesspools and failed systems having these constraints with advanced systems, particularly in keeping with their new design guidelines issued for the neighborhoods of Island Park and Portsmouth Park.

No management plan for the continued use of on-site wastewater treatment, particularly on lots with the constraints discussed above, can expect long term success with the continued use of cesspools. This plan recognizes there is a disproportionately number of cesspools in some neighborhoods and their replacement is, in some cases, likely to be disruptive and expensive. However, their continued use all but guarantees the failure of this management plan as an alternative to the installation of sewers. This plan mandates the phased removal of all cesspools throughout the Town of Portsmouth.

RIDEM has approved a number of advanced pathogen removal technologies to be used for on-site wastewater treatment and disposal. These include both treatment and disposal technologies. The approval of these technologies is based on RIDEM procedures and regulations updated in 2012. One such disposal technology, the bottomless sand filter (BSF), has been used extensively in recent system upgrades around Portsmouth and is seen on many parcels throughout Town. Other disposal technologies, such as the pressurized

shallow narrow drainfield (PSND) may also be applicable on challenging sites. Appropriateness of these technologies is of course the responsibility of RIDEM and would need to be assessed by that agency on a case-by-case basis.

The University of Rhode Island—Onsite Wastewater Training (URI-OWT) Center has developed a system for the selection of A/EA/E technology to address site constraints and protect sensitive areas such as wellheads, estuaries and marine environments. In the vicinity of these sensitive resources, URI-OWT recommends systems such as recirculating sand filters, Advantex, RUCK, and FAST as treatment components and PSND and BSF for drainfields.

Using assumptions and calculations in Section 2.2 and 2.4.3 (above) it is expected that **120** OWTSs per year will require full system upgrades to A/E OWTSs and **40** per year will require much less costly minor repairs to RIDEM-permitted conventional OWTSs as the Town's inspection system works its way through the population of septic systems in Portsmouth and compiles accurate inspection records of each OWTS over the coming years.

3.1.2 Alternative 2 – Shared Community Wastewater Systems

This alternative was set aside from further evaluation in this OWMP pending additional cooperative work between the Town and RIDEM to make it possible for consideration.

3.1.3 Alternative 3 – Conventional Sewering

As summarized in Section 2.1.1 above, in September, 2005, Woodard & Curran developed preliminary cost estimates for the installation of a conventional sewer system to service all parcels, both developed and undeveloped in the neighborhoods of Island Park and Portsmouth Park (including Valhalla). W & C's cost estimates expanded in scope over time to consider several larger geographic areas and scenarios, but W & C still maintained a cost estimate for the installation of sewers for just the parcels in these neighborhoods. This included a single treatment plant proposed at several possible locations within the area and treated effluent discharge into the Sakonnet River near the new Sakonnet River Bridge. The order-of-magnitude cost estimates presented in this Plan for Alternate 3 come from the 2009 W & C study and are not adjusted to net present value.

855 systems in Island Park and Portsmouth Park (including Valhalla) would be replaced by a conventional sewer system leaving **5,536** systems in the remainder of Town to be served by OWTSs.

3.2 Discussion of Selection Criteria

The following sections describe in greater detail the criteria used to arrive at the selection of the preferred of the two alternatives presented above. Selection Criteria include:

- Infrastructure Costs
- Operations and Maintenance Costs
- Town Responsibility
- Land Requirements
- Development Pressure and Community Character
- Funding Options
- Expected Water Quality Improvements

3.2.1 Infrastructure Costs

Assumptions:

- All costs are computed over the seven (7) year planning period.
- Advanced pathogen removal treatment system replacement cost - $22,500
- Conventional OWTS repairs - $5,000
- Failure rate for OWTSs town-wide – 2.5% per year
- All costs for individual on-site treatment systems will be borne by the homeowner.

Order-of-magnitude infrastructure costs over the seven (7) year planning period for each alternative are:

Alternative 1 – The continued reliance on on-site treatment systems Town-wide with applicable failure rates and system replacement costs applied. Using assumptions and calculations in Section 2.2 and 2.4.3 (above) it is expected that **120** OWTSs per year will require full system upgrades to A/E OWTSs and **40** per year will require much less costly minor repairs to RIDEM-permitted conventional OWTSs. These infrastructure costs are borne entirely by the homeowner.

120 OWTSs replaced with A/E OWTSs per year @ $22,500 = $2,700,000
40 conventional OWTSs undergoing minor repairs @ $5,000 = $200,000
Total = $2,900,000

Total over the 7-year planning period = $20,300,000

Alternative 3 - The installation of a conventional sewer system to service the Island Park and Portsmouth Park (including Valhalla) neighborhoods (855 users) with the continued reliance on OWTSs in the remainder of Town. Costs for the conventional sewer system installation come from the 2009 Woodard & Curran Wastewater Facilities Plan. Whether the conventional sewer system installation costs are borne by the Town, by the users or some combination of both has yet to be determined. Individual OWTS replacement costs in the remainder of Town are to be borne by the homeowner.

OWTS repair/replacement costs for remainder of Town per year - **$2,511,980**
Installation of a conventional sewer system - **$43,313,000**

Total over the 7-year planning period = $60,896,860

3.2.2 Operations and Maintenance Costs

Assumptions:

- All costs are computed over the seven (7) year planning period.
- O & M annual costs for a conventional OWTS - $450 (Lombardo)
- O & M annual costs for advanced OWTSs - $565 (Lombardo)
- Town-wide 80% conventional OWTS / 20% advanced systems

Order-of-magnitude infrastructure costs over the seven (7) year planning period for each alternative are:

Alternative 1 – The continued reliance on on-site treatment systems Town-wide with O & M costs are borne entirely by the homeowner.

5113 conventional OWTSs – O & M @ $450 per year = $2,300,850
1278 advanced OWTSs – O & M @ $565 per year = $722,070

Total = $3,022,920

Total over the 7-year planning period = $21,160,440

<u>Alternative 3</u> - The installation of a conventional sewer system to service the Island Park and Portsmouth Park (including Valhalla) neighborhoods (855 users) with the continued reliance on OWTSs in the remainder of Town. O & M costs for the conventional sewer system installation come from the 2009 Woodard & Curran Wastewater Facilities Plan. Whether the conventional sewer system O & M costs are borne by the Town, by the users or some combination of both has yet to be determined. Individual OWTS replacement costs in the remainder of Town are to be borne by the homeowner.

OWTS O & M for remainder of Town per year -	**$2,617,848**
O & M cost for treatment facility and collection system per year -	**$754,832**
O & M costs for individual tie-ins @$ 300 per year -	**<u>$256,500</u>**
Total =	**$3,629,180**

Total over the 7-year planning period = $25,404,260

3.2.3 Town Responsibility

Ownership and responsibility for operating and maintaining a wastewater treatment facility to service the neighborhoods of Island Park and Portsmouth Park (including Valhalla) would rest with the Town of Portsmouth.

Ownership of individual on-site systems is currently decentralized. That is, responsibility for upgrade and operations and maintenance of on-site treatment systems rests with the individual property owner. In order to support its citizens in this ownership scheme, the Town assumes responsibility for effective implementation of this On-site Wastewater Management Plan to manage the population of OWTSs, including the establishment of tracking and reminder procedures for system inspection, technical and financial assistance to the homeowner, educations programs to increase awareness of proper on-site septic system management and enforcement of a town-wide cesspool removal and replacement program.

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3.2.4 Land Requirements

Alternative 3, the installation of conventional sewers, will require either the use of Town-owned property or the acquisition of land by the Town in close proximity to the service area, or both. While treatment technologies continue to require less land than in the past, Woodard & Curran found there are few parcels in the area, Town-owned or otherwise, that lend themselves well to the building of treatment facilities. On the other hand, the continued reliance on OWTSs for wastewater treatment will require no land acquisition for public use.

3.2.5 Development Pressure and Community Character

While it can be reasonably assumed that the continued use of existing OWTSs (Alternative 1) will not add significantly to development pressures in the Island Park and Portsmouth Park (including Valhalla), the same cannot be said for the installation of conventional sewers. Simplified wastewater disposal for the development of vacant lots and the ability to add additional bedrooms to existing homes becomes far less problematic with sewers and would be expected to occur in valuable waterfront areas Town-wide. This increase in residential density would likely result in an increase in impervious surface thereby adding to potentially contaminated surface runoff, offsetting or at least moderating any gains in pathogen removal achieved by the installation of sewers.

3.2.6 Funding Options

Towns typically fund conventional sewers through either locally issued general obligation bonds backed by the full faith and credit of the Town or through the State Revolving Fund or likely a combination of both. The installation of a conventional sewer system could potentially qualify for an Interceptor Bond Fund grant (50% matching grant up to $500,000), but the bulk of the funding would have to come from Town indebtedness.

The CCSLP was put in place by the State in 1996. CSSLP targets assisting individual property owners in repairing and replacing aging OWTSs by allowing towns to access 2% loans for residents. Towns act as a go-between for the State and homeowners and are responsible in the case of default by the homeowner. Loans are typically administered by Rhode Island Housing to reduce administrative burdens on both the homeowner and the Town. Loans in the range of $15K-$20K are typically available.

To make the continued reliance on OWTSs a more fiscally viable option for homeowners, this Plan acknowledges the limited resources of the CCSLP and the magnitude of the need and proposes establishing a local supplemental funding mechanism wherein individual homeowners can borrow directly from the Town or make borrowing arrangements with a local bank backstopped by the Town. In either case, the homeowner would be subject to a lien on the property by the Town in case of homeowner default (see Section 6.1.3).

3.2.7 Expected Water Quality Improvement

Alternatives 1 and 3 evaluated in this OWMP address pathogen source reduction and will reduce the threat of wastewater contamination to nearby water resources. See Section 4.6 for a discussion of the follow-up monitoring program established to directly measure the effectiveness of this OWMP in improvements to water quality and the restoratiuon of designated uses to the state's waters as a result of improved on-site wastewater treatment in Portsmouth

3.2.8 The Selected Alternative

Alternative 1, the continued use of on-site wastewater treatment systems, is the selected alternative of this OWMP for the following reasons:

- Infrastructure Costs – Over the planning period of this OWMP, costs for the installations of sewers are roughly three times the continued use of on-site systems and it is the Town's desire that infrastructure cost for wastewater treatment remain with the homeowner.
- Operations & Maintenance Costs – It is the Town's desire that operations and maintenance costs of wastewater treatment remain with the homeowner.
- Town Responsibility – The ownership and responsibility for the operation and maintenance of a wastewater collection and treatment facility is beyond the limited resources of the Town. Conversely, the establishment of a Wastewater Management District and the management of the continued use of on-site treatment is well within the Town's technical, administrative and legal capacity.
- Land Requirements – The continued use of on-site treatment systems will require no land acquisition by the Town.

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- Development Pressure – The continued use of on-site systems will limit development pressure, a desirable outcome for the Town when compared to the changes the installation of sewers would likely bring to our neighborhoods.
- Funding options – The Town desires the costs of wastewater treatment remain with the homeowner rather than with the municipality.
- Water Quality Improvements – The Town believes an effective and efficient Wastewater Management District along with continued water quality monitoring will result in significant water quality improvement and is the more cost-effective of the two alternatives.

4.0 METHODS USED TO ENSURE OR ENCOURAGE REGULAR OWTS MAINTENANCE IN THE MANAGEMENT AREA

4.1 Introduction

The stated goal of the Portsmouth Comprehensive Community Plan with regard to OWTSs is "To minimize pollution by ensuring that existing septic systems are properly maintained and to ensure that new septic systems are properly set back from environmentally sensitive resources and properly maintained."[11] Policies set forth in the Plan to accomplish that goal include studying the feasibility of a Wastewater Management District, adopting "policies and programs which will keep septic systems operational and non-polluting," and to "retain On-Lot Systems where they are viable in the long run."

This Section describes the current management methods used by the Town and management program enhancements to be implemented as part of this Plan.

4.2 Wastewater Management District Ordinance (WWMD)

Many municipalities that develop an on-site wastewater management strategy also establish a Wastewater Management District by ordinance to provide a framework for the efficient inspection and maintenance of on-site treatment systems as well as education programs, financial assistance to homeowners, and other administrative functions to enable the program to work.

[11] Town of Portsmouth, Rhode Island. September, 1992, revised July, 2002. *Comprehensive Community Plan*. Page 99.

The State of Rhode Island developed and passed enabling legislation for WWMDs in 1987 under chapter 45-24.5 of the *Rhode Island General Laws*. See Appendix V.

The Town of Portsmouth has had a Wastewater Management District Ordinance in place since October 2010. This Ordinance includes many of the features outlined in the enabling legislation detailed above. This Ordinance has yet to be fully implemented and will in fact have to be amended at a future date upon RIDEM approval of this OWMP to bring the Ordinance into alignment with the plans and policies included herein.

4.3 The Wastewater Manager

See Section 7.2.1 for a discussion of the powers, duties and responsibilities of the Wastewater Manager.

4.4 OWTS Inspection & System Maintenance Tracking Program

An efficient on-site treatment system inspection program assesses the condition of OWTS to determine a) the overall condition of the system, b) when and at what frequency subsequent inspections should be performed, c) the date of the next inspection, d) the need for system repair or replacement and e) where appropriate, whether the system conforms to RIDEM Design Guidance. Records of all inspections will be kept by the Town and failed systems in need of repair or replacement will be reported to RIDEM. This information will be used to complete a Town-wide inventory of the type and condition of all septic systems and to track and remind homeowners of their inspection schedule.

Inspections will be performed at the homeowner's expense by qualified State- approved septic inspectors on a schedule determined by the Town. It is the goals of this Plan to have all OWTSs in the neighborhoods of Island Park and Portsmouth Park inspected by January 1, 2017 and all other septic systems in the remainder to town by the end of 2022. In order to maintain this schedule approximately 800 inspections Town-wide will have to be performed each year for the next eight years. The Wastewater Manager and the Town Planning Department will determine the geographic phasing of the inspection program with the neighborhoods of Island Park and Portsmouth Park (including Valhalla) expected to be completed by the end of 2016. All inspection data will be collected by the inspector using RIDEM-approved forms provided by the Town with data entered electronically into a

Town-maintained database by the inspectors directly. The homeowner will receive a copy of the inspection form for his/her records. The Wastewater Manager shall summarize and submit the results or all inspections in the neighborhoods of Island Park and Portsmouth Park to RIDEM no later than July 1, 2017.

This Plan proposes a Wastewater Management District Ordinance that will require two types of inspections as described in the *Septic System Checkup: the Rhode Island Handbook for Inspection*:

The First Maintenance (Baseline) Inspection - This type of inspection is conducted in order to obtain baseline information, to determine a subsequent inspection schedule, to identify failed system for RIDEM enforcement action and to identify systems in Portsmouth Park and Island Park that do not conform to RIDEM Design Guidelines. This baseline inspection includes some additional data gathering and determining the location of system components not usually necessary for subsequent inspections. The property owner will provide the inspector with any available pertinent information, including but not limited to, the use, age, location, maintenance history and design of the OWTS. As groundwater seeping back into a pumped out cesspool or cracked septic tank is considered an indicator of system failure (see Section 2.4.3), all cesspools and septic tanks shall be pumped as part of this baseline inspection to better evaluate the condition of the system.

The Routine Maintenance Inspection – These less rigorous inspections will be conducted after the First Maintenance (Baseline) Inspection and may occur between septic tank pump-outs. This Plan recommends routine inspections take place at a frequency of no less than every two (2) years for all cesspool or substandard OWTSs that have not been determined to be failed, no less than every five (5) years for all other A/E or conventional OWTSs, and annually for all Zero Discharge systems, unless it is determined by the inspector at the baseline inspection that routine inspection should take place more frequently based on the procedures for setting inspection frequency in *Septic System Checkup*. Routine Maintenance Inspections for any given OWTS should be conducted in accordance with the procedures described in *Septic System Checkup*.

Notification of the homeowner of a scheduled First Maintenance Inspection as well as subsequent Routine Maintenance Inspections will be given in writing. Upon notification, the homeowner must have his/her OWTS inspected within a given period of time, usually 45-60 days, and must provide proof to the Town of having done so. It will be considered a

violation of the Wastewater Management District Ordinance and fines may be assessed if this proof of inspection is not supplied to the Town. After a system has been inspected the owner will receive a copy of the inspection form along with notification of any recommended maintenance requirements, the time frame for subsequent routine inspections and a recommended future pump-out schedule. An important feature of the Town-maintained tracking and record-keeping system is that a reminder notice to the owner as the date for the next Routine Maintenance Inspection approaches will be automatically produced. All inspection forms used by the qualified inspectors will be standard forms from the *Septic System Checkup: the Rhode Island Handbook for Inspection* modified slightly to facilitate direct entry into the electronic database.

The homeowner assumes all responsibility for hiring a qualified inspector to conduct all inspections and a septic hauler to pump out the system at inspection if necessary.

If an inspection reveals a failed on-site treatment system, the inspector will immediately notify the Town and the homeowner. In the event of a reported failed system, The Wastewater Manager will forward a copy of the inspection report to the Rhode Island Department of Environmental Management. Notification to RIDEM by the Town of a failed on-site system does not replace or preclude the obligation of the homeowner to notify RIDEM and apply for system repair or replacement. RIDEM will be responsible for taking enforcement action against property owners with failed septic systems.

In addition to the obvious advantages of gathering a complete database on the condition of all on-site treatment systems in Town and establishing a routine inspection schedule for each one, the Town regards the twin features of the inspection program, (1) systematically locating failed systems and (2) ensuring that they are turned over to RIDEM for remediation, as the key wastewater management strategy of this Plan.

4.5 Technical Assistance

At the owner's request, and in order to facilitate the repair application to RIDEM, the Town will meet with the owner to provide technical and administrative assistance regarding OWTS repairs. Such assistance shall be designed to help the owner through the application process, to understand technical issues and appropriate system choices and to solve the problem in a fair and expeditious manner. This assistance provided by the Town at no cost does not preclude the owner's responsibility to hire needed professional assistance. It is

envisioned that the Wastewater Manager (see Section 7.2.1) will have sufficient training and qualifications to perform these duties.

4.6 Follow-Up Monitoring

As described in Section 2.3 above, pollutants from failed or poorly functioning OWTSs often find their way as contaminated groundwater and surface water runoff into the municipal storm drain system and then into the marine environment and the waters of the State, interfering with the State's designated uses of those waters. The Town's storm water management efforts and particularly its illicit discharge detection and elimination activities have documented this process through its periodic outfall discharge sampling program in keeping with the requirements for holding a General Permit under the Phase II storm water program.

In an effort to evaluate the efficacy of storm water management strategies and illicit discharge detection efforts as set forth in the Town's Storm Water Management Plan and the success of on-site wastewater management strategies set forth in this OWMP, the Town will conduct an annual outfall discharge sampling program for all of the 23 town and state owned outfalls discharging into the impaired waters of the southern half of The Cove and the Sakonnet River north of Morningside lane (See Map III). It is expected that over time as OWTSs are replaced and upgraded, groundwater contamination will be reduced, resulting in less contaminated inflow into the storm drain system, in turn resulting in less contaminated discharge from the town-owned outfalls.

The goals of this outfall discharge sampling program are to; (1) assess the effectiveness of the implementation of this plan in improving on-site wastewater treatment in Portsmouth Park and Island Park, (2) act as a starting point for and in support of the illicit discharge detection efforts detailed in Section 4.7 below, and (3) to abide by the provisions of a signed agreement dated November, 2014 between the Rhode Island Department of Environmental Management (RIDEM) and the Town of Portsmouth regarding the resolution of an appeal of a Notice of Violation issued by the Department.

4.6.1 Monitoring Plan and Schedule

Schedule - Annual Dry-weather sampling (>72 hours after a rain event) of all 23 outfalls will take place in March during the high groundwater period and in October during the low

groundwater period. In addition, a wet weather sample will be taken during or soon after a rain event in July of each year, subject to weather conditions. Past outfall sampling programs have shown that most, if not all of these 23 outfalls have no discharge more than 72 hours after a rain event. Outfalls showing no discharge will be visited several times before recording that no discharge exists during the scheduled sampling period.

Sample Sites - Samples will be taken at 23 outfalls, 18 owned and maintained by the town of Portsmouth and five owned and maintained by RIDOT. In the case of the town-owned outfalls, samples will be taken directly from the outfall at its final discharge point. In the case of the State-owned outfalls (all five are along Park Avenue in Island Park), samples will be taken in the manhole or catch basin where the town system connects to the state pipes. This is typically along the north side of Park Avenue with the state owned pipes running under Park Avenue to discharge onto the beach to the south of the seawall. In the past, sampling of the state outfalls along Park Avenue has been problematic as often the discharge pipes are either buried or within stagnant pools on the beach. Testing along the north side of Park Avenue will lead to better and more consistent results.

Testing Criteria - If the outfall is discharging, samples will be tested for fecal coliform bacteria, surfactants and ammonia, the last two being indicators designed to identify the source of any high bacteria counts. These testing criteria are designed to feed into the illicit discharge detection efforts described in Section 4.7 below. In addition, observations for odors, sheen, coloration, sedimentation and scouring, evidence of vegetation and/or algae growth will be noted.

Reporting – All data will be recorded in such a way that year-to-year analysis will be possible and will be kept as part of the Wastewater Managers records. The results of each sampling session will be sent to RIDEM within sixty (60) days of the sampling dates and an annual compilation of the year's three sampling sessions will be sent to RIDEM at the end of each calendar year.

4.7 Illicit Discharge Detection and Elimination

As a logical follow-on to the outfall sampling program detailed above in Section 4.6 and in order to abide by the provisions of a signed agreement dated November, 2014 between the Rhode Island Department of Environmental Management (RIDEM) and the Town of Portsmouth regarding the resolution of an appeal of a Notice of Violation issued by the

Department, the Town will undertake a renewal of its successful illicit discharge detection and Elimination (IDDE) program for the neighborhoods of Portsmouth Park and Island Park. A great deal of IDDE work has been completed in these two neighborhoods, but this plan recommends taking a fresh approach and essentially "starting from scratch." That said, at a minimum, the investigation portion of this illicit discharge detection program in these neighborhoods will be completed by January 1, 2017.

Goal – The goal of this IDDE program is to isolate the specific source of any detected illicit discharge from the Town-owned storm drains in these two neighborhoods. The pathogen of concern is fecal coliform bacteria, an indicator of human-caused wastewater contamination.

Methodology –Successful illicit discharge detection requires a two-pronged approach, knowing where to sample in order to isolate the geographic source and knowing what to test for in the sample in order to determine the type of discharge.

The simplest, most cost-effective method of isolating a contamination source is an approach called "bracketing" whereby samples are taken at each node in the system network upstream from the discharge point. Sampling at these strategic locations allows entire upstream pipe networks to be ruled out as a source with relatively little effort or cost. Where sampling does indicate a pollution source, it is a relatively simple matter to continue sampling upstream in that direction until the pollution is no longer evident. The neighborhoods of Island Park and Portsmouth Park are relatively small with well-mapped storm drain systems making for less complexity in this approach. Sampling for illicit discharge purposes should only be performed during dry weather conditions, the assumption being that all the storm water from the last rain event has left the system, leaving only non-storm water inputs.

Recognizing that not all bacterial contamination is from human sources, each sample will be tested for three parameters, fecal coliform, ammonia and surfactants. This "likely source" analysis is based on a diagram……adopted in part from Illicit Discharge Detection and Elimination Manual: A Guidance Manual for Program Development and Technical Assessments (Pitt, 2004). The diagram (See Appendix VII) provides for characterization of discharges based on the presence of surfactants, ammonia and bacteria at varying levels. Characterizations of discharge include:

- Natural groundwater of surface water
- Animal source of bacteria (non-human)
- Non-animal source of bacteria (non-human)
- Grey water
- Diluted black water – sanitary waste
- Industrial Discharge

The reasoning behind this type of analysis is that moderately high levels of bacteria without the occurrence of ammonia and surfactants indicate a non-human source of bacteria. Bacteria from a non-human source indicate no illicit connection and thereby no further investigation is needed. Basically, elevated bacteria indicates the need for further investigation, elevated surfactants indicate a human source (i.e., soaps, etc) and elevated ammonia indicates a mammal (including human) or bird source. A sample with high readings of all three test parameters indicates a human source , a target for further investigation.

Schedule – The above described sampling program will be set in motion if any of the dry weather samples from the outfall discharge program detailed above tests for fecal coliform bacteria in numbers >200 mpl/100ml or if any catch basin clean-outs (all 2300+ catch basins in the Town of Portsmouth are inspected and cleaned annually) show signs of odor, sheen, solids, or any other signs of contamination.

Enforcement – If a specific source of fecal coliform contamination, that is, a direct connection to a storm drain pipe or catch basin is isolated and confirmed through on-site testing; The Town will enforce its removal through the legal provisions set forth in the Town's Storm Water Discharge Control Ordinance (2008-04-28).

If investigation can get no more specific than a general area of the source of contamination, for example, somewhere between two catch basins but camera inspection reveals no direct connection, it must be assumed contaminated groundwater is entering the storm water system at that location. A search of records will be made to coordinate past and future septic system inspections in the immediate vicinity to identify suspected failed or failing systems. Dye testing of immediate systems will be employed as necessary. If an on-site septic system is deemed to be failed by inspection or by dye evidence that it contaminating the groundwater entering the storm drain system, RIDEM will be notified to undertake enforcement measures as necessary on the failed system.

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5.0 METHOD OF SEPTAGE DISPOSAL

Portsmouth has no wastewater treatment facility of its own. All septage pumped by the various service providers operating in Portsmouth is transported to the Newport treatment facility or to sites off-island. Anticipated flows may increase in the short term as pumping associated with the inspection program get in sync with individual homeowner's pumping schedules but is expected to level off and only increase with long-term land development. There are no known capacity problems at any of the known septage disposal sites being used by service providers operating in Portsmouth.

6.0 COMMUNITY ASSISTANCE PLAN COMPONENTS

The following Sections detail the financial assistance and public education components of this OWMP as well as the methods the Town will use to advertise the availability of these program components.

6.1 Financial Assistance Program for OWTS Repair

The Town anticipates that the State's Community Septic System Loan Program (CSSLP) will be a core component of its onsite wastewater management financing strategy but it also recognizes that additional sources of grant and loan money may be available to help system owners finance some of the costs of bringing on-site treatment systems up to acceptable standards. The Town of Portsmouth intends to identify any and all available funding sources as an essential component of plan implementation.

6.1.1 Community Development Block Grants (CDBG)

Past CDBG funding requests by the Town of Portsmouth have included requests for funds to help low-income homeowners in the repair and replacement of septic systems. This was discontinued some time back in favor of other more pressing project priorities. The Town intends to resume this past practice for the 2015 CDBG funding request. Each year, the Town Finance Department develops a list of projects which is sent to the Planning Board

for comment and ultimately to the Town Council for prioritization in advance to submittal to HUD (through Church Community Housing). Funds are limited, projects compete with each other for priority and CDBG funds would only be available for septic improvements to those living in the census tracts that meet low-moderate income standards.

6.1.2 Community Septic System Loan Program (CCSLP)

The Rhode Island Clean Water Finance Agency (RICWFA), in cooperation with RIDEM, has developed the Community Septic System Loan Program (CSSLP), a revolving loan fund designed to provide financial assistance to local municipality's in initiating programs to upgrade and repair individual on-site wastewater treatment systems in their communities. In order for homeowners to take advantage of CCSLP loans, the municipality must have a RIDEM-approved On-Site Wastewater Management Plan in place. Funds are loaned to the municipality through a negotiated agreement with RICWFA and are subsequently loaned by the Town to individual homeowners at a 2% interest rate. The size of RICWFA loan amounts to the municipality are based on a projection of the estimated need for on-site system repair or replacement as identified in its on-site management plan. See Section 2.0 herein. A critical component of this negotiated agreement with RICWFA is that the Town must provide a dedicated source of loan security in the event of homeowner loan default or non-payment. Minimum lending criteria are set by RICWFA, but for the most part, lending criteria to the homeowner are established by the Town to best fit the needs of its citizens. It is expected that in Portsmouth's first year of eligibility for this program (once this Plan is approved by RIDEM), approximately $500,000 will be made available to the Town for low-costs to its citizens from the CCSLP program. This amount may go up in $500K increments in subsequent years depending on the demonstrated need and efficacy of the program.

Rhode Island Housing and Mortgage Financing Corporation (RIHousing) is the loan servicer on the subsequent homeowner loans, eliminating administrative burden to the community. RIHousing processes and closes the loans in accordance with guidelines and lending criteria set by the Town. If applications meet the lending criteria, RIHousing will go ahead and process the loan, if not, RIHousing will present the application to the municipality for final review. When septic upgrade or replacement work is completed and RIHousing is in receipt of a Certificate of Conformance from RIDEM, funds are disbursed in a lump sum to the homeowner and/or the licensed septic installer.

Additional features of this loan program include:

1. Maximum homeowner loan amounts and other terms of the loan are set by the municipality.

2. The State places no income restrictions on OWTS owners for the use of CCSLP funds.

2. The municipality is obligated to repay only the outstanding principal balance in the event of a homeowner default.

3. When a system is considered substandard or failed and the repair or replacement also involves home improvements that increase design flow, the loan amount shall be limited to that required to repair or replace a system suitable for the home in its pre-improved form.

4. Subject to the negotiated agreement with RICWF, municipalities may individualize CSSLP with features such as means testing, hardship exemptions, technical assistance or supplemental grants and loans.

6.1.2.1 Portsmouth Eligibility Criteria for CCSLP Financing

The Management Area subject to this Plan encompasses the entire Town of Portsmouth. Any homeowner with a substandard or failed OWTS that meets all State & local lending criteria may qualify for the 2% loan funds. For determination of eligibility, this Plan relies upon RIDEM's definition of "substandard" and "failed" as:

Substandard - *Any OWTS that does not meet the current RIDEM standards for design and installation. This includes, but is not necessarily limited to, standards for design flow, vertical and horizontal setbacks, and treatment components.* Cesspools are not a RIDEM-approved method of wastewater disposal and all existing cesspools are considered to be substandard systems.

Failed – *See Section 2.4.3.*

In addition to meeting the above criteria, the following will be considered by the Town when determining loan eligibility:

1. System design is an eligible expense.

2. Replacing a septic tank, even when no drain field repairs are necessary, is considered a legitimate expense of CSSLP funds.

3. Upgrading to A/E technology is eligible for loan funds and will enjoy high priority eligibility.

4. Unless otherwise authorized the Town and RICWFA, maximum loan amounts for a single family shall be $20,000. Multifamily units will be evaluated on a case-by-case basis.

5. Generally speaking, loans will be made available on a first-come-first-served basis. If loan funds become limited, the Town will consider hardship situations and emergency repairs when determining loan amounts and priority.

6.1.2.2 Application Procedure

The following list outlines the general procedure for loan making to CSSLP applicants:

1. A system owner wishing to access the funds must obtain a letter from the Town stating that the system is eligible.

2. The system owner hires the appropriate professional to design the system repair and then submits the application to RIDEM for design approval.

3. Once RIDEM permit approval has been received, the system owner applies for a CSSLP loan through RIHousing.

4. Following loan approval, RIHousing issues a two-party check to the contractor and system owner.

5. The system owner begins repayment of the loan within one month after the check is received.

6.1.3 Local Financial Assistance

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This Plan recognizes that the standard for advanced pathogen reduction technology that RIDEM will likely require for many OWTS repairs or replacements will result in higher costs to the homeowner. With RIDEM approval of this plan, the Town will be eligible for participation in the CCSLP program, a process that may take some time. With this in mind, the Town has funded and instituted a Portsmouth Septic Loan Program to bridge the gap for homeowners in current need of financial assistance. Once CCSLP participation is assured, it may not be necessary to continue this locally-funded loan program, but the program is currently in place and will remain so until it is no longer needed.

6.1.4 Pump-out Subsidies

This OWMP recognizes that an accelerated pump-out schedule will likely be the outcome of the First Maintenance (Baseline) Inspection for many homeowners and calls for a program wherein the Town will subsidize half the cost of septic system pump-outs for all homeowners (means testing of this subsidy remains under discussion) that demonstrate strict adherence to the schedule established for their OWTS by the inspection program. Funds for this subsidy program may come from a Wastewater Management District fee accessed to all property owners. These funds will not be needed until 2015-16 when the pump-out schedules determined from the first Baseline inspections begin to take effect. This program is of course subject to adoption by the Town Council.

6.1.5 Public Subsidies for Risers & Effluent Filters

This OWMP recognizes the benefit of access risers and effluent filters on all on-site systems as an effective way to locate the system, facilitate the inspection and pumping of the septic tank and increase the longevity of OWTSs. This Plan suggests the Town participate in either a bulk purchase program wherein these septic system add-ons are purchased by the Town and sold to home-owners at half price or the Town subsidizes half the cost of the homeowner purchasing these important items themselves (means testing of this subsidy remains under discussion). Installation cost would be borne by the homeowner. Funds for this program may come from a Wastewater Management District fee assessed to all property owners. This program is of course subject to adoption by the Town Council.

6.2 Public Outreach & Education

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Public outreach and education is an essential component of an On-Site Wastewater Management Plan and can mean the difference between the long-term success and failure of the Plan. This section describes past and current educational efforts, proposes future educational program requirements and suggests potential ideas to incorporate into a successful public education strategy.

6.2.1 Past and Current Educational Efforts

Past and current educational efforts have centered around Fact Sheets and other materials to be found on the Town's website. See Appendix VI for a sample of available materials.
See these links for more information:

http://www.portsmouthri.com/townplanner/wastewaterinfo/index.php
http://www.portsmouthri.com/townplanner/stormwaterdaily/index.php
http://www.uri.edu/ce/wq/OWT/Factsheets/index.htm

6.2.2 Future Educational Efforts

A public education program will be developed, approved and implemented by the Town to inform on-site treatment system owners about the goals and community benefits of proper on-site system management. The program at a minimum will include printed and other materials on the topics of:

- The proper operation and maintenance of OWTSs.
- The proper disposal of hazardous waste, including household hazardous waste.
- Water conservation and the development of a water conservation program.
- Special considerations for cesspool owners.
- Protection of critical environmental resources.
- Use of alternative and innovative OWTSs and related technology.
- Participation in the CCSLP and other funding assistance programs.

Potential ideas to be incorporated into the educational program may include:

- Training workshops for septic system inspectors and homeowners;

- Hosting a science fair category in local schools related to wastewater treatment;
- Revise the science curriculum in the local schools to include information about on-site wastewater disposal;
- Channel 18 public service announcements and other programming;
- Hosting neighborhood meetings on the subject of on-site wastewater treatment;
- Establish citizen-led periodic beach inspections;

6.2.3 On-Site Demonstration Projects for Enhanced Treatment

This OWMP recommends the Town reach out to homeowners with existing advanced pathogen removal treatment systems (such as bottomless sand filters) and establish a program where other homeowners faced with an OWTS upgrade can tour the property on a limited basis and learn about the siting requirements and maintenance program for such systems. It is suggested that these tours be guided by a qualified on-site septic engineer and the Town intends to seek out sources of grant money to help with any costs associated with this tour program.

6.3 Methods Used to Advertise the Assistance Program

Portsmouth anticipates using the following methods to advertise financial assistance for on-site treatment system upgrades and repairs:

Town and other web sites - Portsmouth currently maintains a website where municipal documents, programs, and items of interest are discussed. As the Town continues to revise its draft On-Site Wastewater Management Plan, it will post information to its website. This may include planning documents, fact sheets, program descriptions, applications, pertinent web links, and other materials. At a minimum, the web site will provide information regarding eligibility criteria and how to apply for CSSLP when the Plan is approved.

Fact sheets and advertisements - The Town anticipates developing a similar fact sheet that will describe CSSLP and other features of the Town wastewater management program.

Public Meeting – The Town anticipates holding on-going meetings not only at the neighborhood or community-wide level, but intends to periodically put the assistance program on the Town Council agenda for discussion. This is expected to be particularly

effective as many of Portsmouth's citizens who cannot attend Town Council meetings watch the meeting on public access television.

7.0 PROGRAM RESPONSIBILITIES AND ADMINISTRATION

7.1 Program Responsibilities

In the management of the population of on-site treatment systems in Portsmouth, this Plan divides responsibilities among four key parties—service providers, individual OWTS owners, the Town itself and RIDEM. Responsibilities are as follows:

OWTS Owners - System owners are responsible for scheduling regular inspection, OWTS maintenance and adhering to a recommended pump-out schedule. Cost of inspection and maintenance services as well as system repair or replacement is borne by the OWTS owner although technical and financial assistance may be available through the Town.

Service Providers - Approved service providers perform general inspection and maintenance services on a scheduled basis. They are required to report inspection results and maintenance activities to the Town, the system owner and in certain circumstances, to RIDEM. All septic system inspectors will be RIDEM-approved.

The Town - The Town is responsible for collecting program data and ensuring program implementation and effectiveness. This involves computer tracking of inspection and maintenance information, certification of service providers, environmental monitoring, enforcement of local zoning and wastewater management district policy, enforcement of town-wide cesspool replacement requirements, where appropriate, and facilitating coordination between the individual on-site system owner and RIDEM. The Town also provides additional services and assistance such as procurement of bulk purchases of OWTS add-ons (see Section 6.1.5), financial assistance and technical assistance.

As previously stated, the Town signed an agreement dated November, 2014 with the Rhode Island Department of Environmental Management (RIDEM) regarding the resolution of an appeal of a Notice of Violation issued by the Department. The Town shall submit a report documenting the status if implementation of this agreement as well as the general implementation of this OWMP by no later than June 30, 2020.

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RIDEM – RIDEM is responsible for the permitting and minimum standards of the location, design, and construction of all OWTSs, the inspection and certification of the installation of all such systems, the regulation and enforcement of the repair and/or replacement of all failed systems and the implementation of additional rules and regulations such as the 2007 Rhode Island Cesspool Act. RIDEM is also responsible for review and approval of this OWMP which will allow the Town access to CSSLP.

7.2 Program Administration

Overall implementation of this On-site Wastewater Management Plan will be the responsibility of the Town Planning Department, with the administration of the Wastewater Management Program as detailed in the Portsmouth Wastewater Management District Ordinance being the responsibility of the Wastewater Manager. Both the Town Planning Department and the Wastewater Manager report directly to and are subject to direction from the Town Administrator.

7.2.1 Wastewater Manager

The Wastewater Manager will be responsible for all day-to-day administration of the Wastewater Management District and the provisions of the Wastewater Management District Ordinance. The Wastewater Manager will serve as the enforcement officer pursuant to the authority granted under the ordinance and will report directly to the Town Administrator.

This multi-faceted position involves not only administrative duties and electronic record keeping but public relations and educational duties as well. The Wastewater Manager may be called on to perform septic inspections under special circumstances and will be responsible for technical assistance to homeowners in navigating through the complexities of septic system maintenance, interfacing with RIDEM in system permitting, and giving general advice on septic design, particularly to homeowners with small lots. As such, the Wastewater Manager will have a demonstrated competency in the areas of soil science, OWTS functioning, inspection and repair procedures, including a general knowledge of innovative and alternative technology, and shall have attended and passed the courses

accredited through the University of Rhode Island Onsite Wastewater Training (URI's INSP 100 and 200 courses) or an equivalent training program both for conventional and innovative systems.

The Wastewater Manager will be responsible for:

- The conduct of day-to-day operations of the Wastewater Management District including the maintenance of all electronic records and inspection schedules as well as communication with the general public on matters associated with on-site wastewater treatment.

- The education of the general public and individual private OWTS owners on the proper operation of on-site treatment systems including the selection of potential replacement systems or components as needed.

- The routine and on-going notification to OWTS owners of actions to be taken under the ordinance, including administration of required on-site system inspections, pump-out schedules and ordinance compliance enforcement as needed.

- The administration and supervision of Town-approved service providers and septic system inspectors including the assurance of quality control in system inspections and the monitoring of the professional conduct in all of their dealings with on-site system owners.

- Enforcement of Town requirements for the town-wide removal and replacement of cesspools, as jurisdiction applies.

- All program administration including the compilation of monthly reports to the Town Administrator detailing the status of the inspection program, enforcement activities, number and status of system repairs/replacements and all other pertinent information.

7.2.2 Town Planning Department

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The Town Planning Department is responsible for overall implementation of this Plan, particularly in assuring that the implementation schedule is adhered to in as timely a manner as possible. The Department will also be responsible for assisting the Wastewater Manager in developing the schedule and geographic prioritizing of the First Maintenance (Baseline) Inspection program and in the development and conducting of all educational programs and materials for the general public. In addition, the Town Planning Department will be responsible for communication and coordination with RIDEM in obtaining State approval of this OWMP as well as on-going reporting of its implementation as needed. Finally, the Town Planning Department will be responsible for communication and coordination with the Town Council and the Town Administrator in the local amending and adoption of this OWMP, assisting the new Wastewater Manager in getting the on-site management program up and running smoothly and assisting in on-going reporting to the Town Administrator and Town Council of progress in the programs implementation.

7.2.3 Town Finance Department

The Town Finance Department will be responsible for management of the enterprise fund set up to receive fines for enforcement of the Wastewater Management District Ordinance, administration of all subsidy programs associated with this plan, all administration of general obligation bonds or other funding instruments as well as coordination with RIHousing in the administration of the CCSLP program for funding assistance to homeowners.

8.0 IMPLEMENTATION PLAN

This Section discusses program costs, sources of funding and provides a draft implementation schedule.

8.1 Program Costs

Program costs for this On-site Wastewater Management Plan can be divided into 4 separate categories:

- One-time costs to get the program up and running in the first year;
- Annual costs for the Wastewater Manager (full-time staff person), Postage, and Educational Materials;
- Annual costs to fund the two subsidy programs;

- Costs to establish a local financial assistance program.

8.1.1 One-Time Costs

These costs include desk and other office setup including computer & printer, auto folder and stuffing equipment, software purchases, and tracking software setup. One-time costs also include the administrative costs of the adoption of this OWMP by the Town and its approval by RIDEM.
Total first year one-time costs: **$13,000**

8.1.2 Annual WWMD Costs

These annual costs include employment costs for the full-time Wastewater Manager, postage and printing for notification correspondence, mileage and costs of the production of educational materials for the program.
Total Annual WWMD Costs: **$89,940**

8.1.3 Subsidy Program Costs

Note – these subsidy programs are subject to Town Council approval and these cost estimates will certainly change subject to how the Town Council wishes to configure the programs.

A) Pump-out Subsidy Program – As a starting point, this Plan assumes a current average pump-out schedule for all systems in the Town of Portsmouth of every four years. Thus, one-quarter of all systems will be pumped out any given year. Given approximately 6,390 systems Town-wide, this Plan assumes a total of 1600 pump-outs per year. Using a figure of $175 per pump-out, total costs are then approximately $304,000 per year. This OWMP suggests the Town subsidizing half of these costs. Funding for this program will not be needed until at least 2015-2016 as the first pump-outs per a determined schedule will not take place before then.
Total Annual Pump-out Subsidy Program Costs: **$152,000**

B) Effluent Filter / Septic Tank Riser Subsidy Program – As a starting point, this Plan assumes that of the approximately 2917 conventional septic system owners Town-wide,

10% of those, or 290 will take advantage of the Town subsidizing the purchase of these important septic tank improvements. At approximately $300 per system This Plan suggests the Town subsidize half of the cost to the homeowner.
Total Annual Effluent Filter / Septic Tank Riser Subsidy Program Costs: **$43,500**

8.1.4 Local Financial Assistance Program

While any local financial assistance program established by the Town will be available to all homeowners with failed OWTSs Town-wide, this Plan uses the immediate need of those who are subject to the 2007 Rhode Island Cesspool Act as a starting point to determine the amount of funds that might prove useful in establishing such a program. This financial assistance program is conceived as a revolving fund program, so it may be that establishing the fund at levels to service those subject to the Act will be sufficient seed money to get the program started.

The following are order-of-magnitude estimates for a potential financial assistance program to help homeowners comply with the 2007 Rhode Island Cesspool Act. The Act states that all cesspools within 200 feet of a shoreline feature must be replaced by January 1, 2014. There is a five-year extension available for those households earning <80% of the household median income for the area. The cost of complying with this Act is to be borne by individual homeowners.

RIDEM has sent letters to 471 properties they believe are affected by the Cesspool Act in the Town of Portsmouth. There is a response procedure wherein homeowners have an opportunity to demonstrate the Act does not apply to their property. This Plan assumes 25% will be successful in demonstrating they are not subject to the Act. This leaves approximately 350 properties Town-wide that will need to replace their cesspools by January 1, 2014 per State law.

Estimated Septic System Replacement Costs:

Advanced Treatment Systems - $20K to $25K (average $22,500)
Conventional Systems - $10K - $15K (average $12,500)

Estimate: 70% will require Advanced Treatment Systems – 245 A.T. systems
30% will require Conventional Systems – 105 Conventional systems

Total Estimated Replacement Costs:

245 replacement systems @ $22,500 = **$5,512,000**

105 replacement systems @ $12,500 = **$1,312,000**

$6,824,000 – Total replacement costs

Estimates for borrowing needs of homeowners subject to the Act

Those requiring Advance Treatment Systems (245 systems)

Assume 50% of homeowners will want to borrow the total cost of system replacement

123 systems @ $22,500 per system = $2,767,500

Assume 40% of homeowners will want to borrow half of the cost of system replacement

98 systems @ $ 11,250 per system = $1,102,500

Assume 10% of homeowners will not need or want to borrow from the fund

Those requiring Conventional Treatment Systems (105 systems)

Assume 30% of homeowners will want to borrow the total cost of system replacement

32 systems @ $12,500 per system = $400,000

Assume 50% of homeowners will want to borrow half of the cost of system replacement

53 systems @ $6,250 per system = $331,250

Assume 20% of homeowners will not need or want to borrow from the fund

Total estimated Loan Fund necessary to help Portsmouth homeowners comply with the State 2007 Cesspool Phase-out Act before January 1, 2014 = **$4,601,250**

There is a five-year extension available for those households earning <80% of the household median income for the area so all of these funds may not be needed immediately, but for the purposes of this Plan, the opportunity for an extension is set aside and it is assumed the Town will need the entire amounts of funds the first year.

As previously stated, when this OWMP is approved by RIDEM and the Town becomes eligible for CCSLP funds, a locally-funded septic loan program may not be needed.

8.2 Sources of Funding

This Plan calls for program costs for this OWMP to be divided into 4 separate categories:

- One-time costs to get the program up and running in the first year;
- Annual costs for the Wastewater Manager (full-time staff person), Postage, and Educational Materials;
- Annual costs to fund the two subsidy programs;
- Costs to establish a local financial assistance program.

This Plan calls for funding sources for these four different categories to come from 3 different sources.

- Funding for the one-time costs to get the program up and running and Annual costs for the Wastewater Manager, Postage and Educational Materials is to come from the General Fund and budgeted for in the general budget process.
- Funding for the Annual costs of the two subsidy programs could come from an annual Wastewater Management District fee accessed to all homeowners as part of their property tax bill. This WWMD fee is estimated to be $30 for the first year of the program.
- Funding for the local financial assistance program is to come from a general obligation bond.

8.3 Implementation Schedule

Tentative implementation schedule pending approval of Draft OWMP by RIDEM:

December, 2014 – Submittal of draft OWMP and Wastewater Management District Ordinance for RIDEM approval.

Jan-Feb, 2015 - Town Council approval of draft OWMP and Wastewater Management District Ordinance.

Jan-Feb, 2015 – Advertise for and fill position of Wastewater Manager.

March, 2015 – Begin OWTS inspection program in Portsmouth Park and Island Park.

March, 2015 – Begin Outfall Monitoring Program with follow-on illicit discharge detection as needed.

March, 2015 – Apply for CCSLP Eligibility.

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10.0 GLOSSARY OF TERMS[12]

"Alternative Technology" means any OWTS technology for which design parameters are not specified in these Rules, but has been demonstrated through field testing, calculations and other engineering evaluations to comply with performance standards consistent with these Rules, and for which a certification from DEM has been issued.

"Cesspool" means any buried chamber, including, but not limited to, any perforated metal tank, perforated concrete vault or covered hollow or excavation, which receives discharges of wastewater from a building sewer for the purpose of collecting solids and discharging liquids to the surrounding soil.

"Effluent" means sewage, water or other liquid, partially or completely treated or in its natural state, flowing out of any component of an OWTS, flowing over the ground's surface or beneath the ground in groundwater.

"Effluent Filter" means a filter installed on the outlet side of a septic tank that traps solids to prevent them from carrying over to the distribution box and soil absorption system.

"Failed OWTS" means any OWTS that does not adequately treat and disperse wastewater so as to create a public or private nuisance or threat to public health or environmental quality, as evidenced by, but not limited to, one or more of the following conditions:

[12] All definitions are word-for-word from either the RIDEM *OWTS Rules & Regulations*, the RIDEM *Septic System Handbook* or the Portsmouth *Wastewater Management District Ordinance (2013-02-11A).*

(1) Failure to accept wastewater into the building sewer;
(2) Discharge of wastewater to a basement; subsurface drain; stormwater collection, conveyance, or treatment device; or watercourse unless expressly permitted by the Department;
(3) Wastewater rising to the surface of the ground over or near any part of OWTS or seeping from the absorption area at any change in grade, bank or road cut;
(4) The top of the inlet or the top of the outlet for a septic tank, distribution box, or pump tank is submerged;
(5) The liquid depth in a cesspool is less than six (6) inches from the inlet pipe invert;
(6) Pumping of the cesspool or septic tank is required more than two (2) times per year;
(7) OWTS is shown to have contaminated a drinking water well or watercourse;
(8) If a septic tank, pump tank, distribution box, or cesspool is pumped and groundwater seeps into it;
(9) Any deterioration, damage, or malfunction relating to any OWTS that would preclude adequate treatment and dispersal of wastewater; or
(10) Excessive solids are evident in the distribution box or distribution lines.

"Groundwater Table" means the upper surface of the zone of saturation in an unconfined aquifer; includes a perched groundwater table.

"Holding Tank" means a closed watertight structure used to contain wastewater prior to being removed from the premises. A holding tank does not discharge wastewater to the surface of the ground or to the subsurface.

"Leachfield" means a group of one (1) or more dispersal chambers or trenches designed for the final treatment and dispersal of wastewater into the underlying soil. The leachfield shall be held to mean the horizontal and vertical lines circumscribing the outermost edges including the area between the chambers or trenches and the depth to the bottom of stone.

"Maintenance" means the regular cleaning of any concrete chamber, cesspool, septic tank, building sewer, distribution lines or any other component of an OWTS for the purpose of removing accumulated liquid, scum or sludge. The term, "maintenance," shall also be held to include regularly required servicing or replacement of any related mechanical, electrical, or other component equipment.

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"Owner" means any person who holds legal title to any real property; or has possession or control of any real property through any agent, executor, executrix, administrator, administratrix, trustee or guardian of the estate of a holder of a legal title. Each such person is bound to comply with the provisions of this ordinance.

"Onsite Wastewater Treatment System (OWTS)" means any system of piping, tanks, dispersal areas, alternative toilets or other facilities designed to function as a unit to convey, store, treat or disperse wastewater by means other than discharge into a public wastewater system.

"**OWTS Inspections"** means one of two types of OWTS inspections undertaken to gather baseline information, assess maintenance needs and to determine the condition of an OWTS, and if applicable, the cause of septic system failure or malfunction.

1. ***"First Maintenance Inspection"*** means the initial inspection performed on an OWTS and system site, and to assess whether any repairs and/or replacement are necessary. The septic tank and/or other components of the system are pumped as part of this inspection to facilitate the evaluation of the current condition of the OWTS. First maintenance inspections involve the location of OWTS components and more detailed data gathering that are not usually necessary for subsequent routine inspections.

2. ***"Routine Maintenance Inspections"*** means an inspection performed at a period of time after the first maintenance inspection of an OWTS and system site to determine the need and frequency for pumping, establish future inspections schedules and to assess whether any repairs and/or replacement are necessary.

"Pathogen" means an agent that causes disease, especially a living microorganism such as a bacterium, virus, or fungus. OWTSs are designed to remove pathogens from wastewater so as not to contaminate the surrounding environment.

"Repair" means any work performed on an OWTS in order to mend or renovate a specific defect or deficiency after the failure, injury, deterioration or partial destruction of a previously existing OWTS or component thereof as permitted by RIDEM. A repair shall include any upgrade or modification of an OWTS (e.g., replacement of cesspool). A repair

shall not include any work performed on an existing OWTS that increases the flow capacity of the system.

"Riser" means a cylinder, typically made of concrete or fiberglass, which allows easy access to the manhole or inspection ports of a septic system component.

"Septage" means any solid, liquid or semi-solid removed from septic tanks, cesspools, privies, wastewater holding tanks or other similar onsite wastewater treatment systems.

"Septic System" means a device that receives wastewater from a building sewer and typically discharges it to the soil on site.

> **"Alternative System"** means a septic system with components that are intended to deal with special site conditions (e.g., nitrogen-reduction systems, shallow trench soil absorption systems, sand filters).
>
> **"Conventional System"** means a septic system that includes a building sewer, septic tank and soil absorption system. Conventional systems may have substandard components.
>
> **"Substandard System"** means a septic system that does not meet the current minimum standards of the ISDS Regulations. Substandard systems include, but are not limited, to cesspools, systems with an undersized tanks and systems with metal tanks.

"Septic Tank" means a watertight receptacle which receives the discharge of wastewater from a building sewer, and is designed and constructed to permit the deposition of settled solids, the digestion of the matter deposited, and the discharge of the liquid portion into the next treatment component or distribution box.

"System Inspector" means a person on a DEM-approved list with the minimum qualifications of holding a Class I, II, or III Designers License or being a Registered System Inspector with the New England Onsite Wastewater Training Center.

"Wastewater" means human or animal excremental liquid or substance, putrescible animal or vegetable matter or garbage and filth, including, but not limited to, water

discharged from toilets, bath tubs, showers, laundry tubs, washing machines, sinks, and dishwashers. Both blackwater and graywater are considered wastewater under these Rules.

"**Wastewater Manager"** or his/her designee shall mean the Town employee or contractor whose duty it is to supervise the day-to-day administration of the Wastewater Management District and the provisions of this ordinance. The Wastewater Manager or his/her/its designee shall serve as the enforcement officer pursuant to the authority granted under this ordinance and any regulations adopted pursuant to this ordinance. The Wastewater Manager shall report directly to the Town Administrator and be subject to direction and management by the Town Administrator.

"Wastewater Management Program" means a program that either encourages or compels proper septic system maintenance within the boundaries of a municipality or other geographic region (i.e., wastewater management district). A wastewater management program may either work through a voluntary or an enforceable approach. Wastewater management programs may be involved in public education, technical assistance, financial assistance, maintenance record tracking as well as other activities associated with area-wide management of septic systems.

11.0 MAPS

Map I – Map of the entire Town of Portsmouth.

Map II – Map of neighborhoods of Island Park and Portsmouth Park (including Valhalla).

Map III – Map showing all 23 State and Town-owned outfalls discharging into impaired waters in Portsmouth.

12.0 APPENDICES (under separate cover)

Appendix I – Federal, State and Municipal Programs Related to OWTSs – prepared by Fuss & O'Neill

Appendix II – Summary of Rhode Island Municipal On-Site Wastewater Programs - 2011

Appendix III – General Description of the Portsmouth OWMP Management Area

Appendix IV – A. Performance Evaluation of Innovative Treatment Technologies Used to Remediate Failed Septic Systems – Loomis, George W, et all. 2001.

B. Utilizing Advanced Treatment Technologies to Remediate Failed On-Site Systems on Marginal Sites Located in Sensitive Coastal Environments – Loomis, George W. et al. 1998.

C. A Blueprint for Community Wastewater Management – EPA National Community Decentralized Wastewater Treatment Demonstration Project . URI Cooperative Extension, 2007.

Appendix V – State of Rhode Island General Laws – Chapter 45-24.5 Wastewater Management Districts. Short title, "Rhode Island Septic System Maintenance Act of 1987."

Appendix VI – A sample of OWTS educational materials available from Portsmouth's town website.

Appendix VII – Likely Source analysis flow chart.

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