Cranston, Rhode Island

Onsite Wastewater Management Plan

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TABLE OF CONTENTS

Page

EXECUTIVE SUMMARY ES-1

1.0 INTRODUCTION 1-1
1.1 The Case for Onsite System Management 1-1
1.2 Plan Overview 1-3

2.0 THE BASICS OF ONSITE WASTEWATER TREATMENT AND DISPOSAL 2-1
2.1 Typical Components in an Onsite Wastewater Treatment System 2-1
2.2 Onsite System Treatment Performance 2-1
2.3 Failing and Substandard Systems 2-2
2.4 Patterns of Development and Implications for the Environment 2-3

3.0 EXISTING CONDITIONS 3-1
3.1 Land Use, Zoning, and Demographics 3-1
3.2 Soils and Geology 3-1
3.3 Fresh Surface Water and Water Quality 3-1
3.4 Groundwater and Drinking Water Supplies 3-2
3.5 Current Wastewater Infrastructure 3-2

4.0 STATE POLICY 4-1
4.1 RIDEM Regulations 4-1
4.2 Rhode Island Cesspool Act of 2007 4-2

5.0 OWTS WASTEWATER MANAGEMENT APPROACHES 5-0
5.1 System Inventory/Tracking and Public Education and Outreach 5-0
5.2 Special Design Standards 5-0
5.3 Wastewater Management Districts 5-0
5.4 Financial Assistance 5-2
5.5 Management Approaches Used by Other Rhode Island Municipalities 5-3

6.0 RECOMMENDATIONS AND NEXT STEPS 6-1
6.1 Education and Outreach 6-1
6.2 CSSLP 6-1
6.3 Methods of Advertising 6-4

7.0 PROGRAM RESPONSIBILITIES AND ADMINISTRATION 7-1

8.0 METHOD OF SEPTAGE DISPOSAL 8-1

9.0 IMPLEMENTATION 9-1
9.1 Anticipated Project Costs 9-1
9.2 Implementation Schedule 9-1

LIST OF TABLES

Table 2-1. Typical Use of OWTSs

Table 3-1. Soil Survey of Rhode Island Topographical Descriptions

Table 3-2. Soil Development Classifications for Cranston

Table 3-3. List of Impaired Waterbodies 2018-2020

Table 3-4. Summary of OWTS System Permit Data (1990-April 2021)

Table 4-1. 2018 RIDEM OWTS Regulations Minimum Setbacks for Leachfields to Physical and Environmental Features

Table 5-1. Summary of Rhode Island Municipal Onsite Wastewater Standards and Programs

Table 6-1. Estimated Cost of Repair per OWTS Failure

Table 6-2. Cost of Expected Repair Activity per Year for the Duration of the CSSLP Loan

Table 9-1. Onsite Wastewater Management Program Development Cost

Table 9-2. Onsite Wastewater Management Program Development Schedule

LIST OF FIGURES

Figure 1. Cranston OWMP Management Area

Figure 2. Cranston Soil Characterization

Figure 3. OWTS Failure Locations

Figure 4. OWTS Failure Locations and Environmentally Sensitive Features

Figure 5. Currently Sewered Areas and Areas Proposed to be Sewered

EXECUTIVE SUMMARY

If we assume, like Rhode Island as a whole, that one-third of Cranston's approximately 6,150 onsite wastewater treatment systems (e.g., septic systems and cesspools) are substandard, then we could estimate that approximately 1,045 or other substandard onsite wastewater systems likely exist in the City and are probably at least 50 years old, since 1968 was the last year that a cesspool could be legally installed. Systems of this age are past their life expectancy and are, therefore, prone to failure. A failed onsite wastewater treatment system presents health and environmental risk not to mention an inconvenience and unexpected expense.

The primary purpose of the Cranston Onsite Wastewater Management Plan is to enable the City to qualify for a line of credit under Rhode Island's Community Septic System Loan Program (CSSLP), which will allow homeowners with failed and substandard onsite wastewater treatment systems to use their homes as collateral to access low-interest loans and upgrade their systems. The CSSLP has been in existence for over 20 years and over 20 Rhode Island communities currently participate in it.

The Cranston Onsite Wastewater Management Plan also describes the basics of onsite wastewater treatment and disposal, how the standards apply to existing conditions in the City, regulatory and management issues, and plan implementation.

1.0 INTRODUCTION

The City of Cranston, Rhode Island (the City) has gathered information about both current and future environmental and public health issues related to onsite wastewater treatment and disposal. Encompassing approximately 30 square miles, the City is located in the east-central portion of Rhode Island. As of the 2020 decennial census, Cranston has a population of 82,935 (population density of approximately 2,925/square mile). From 2010 to 2020 the City's population growth was approximately 3.2%. 2020 census data indicates that there are a total of 34,482 housing units within the City. Interstate 295 bisects the City, with the majority of residents living in Eastern Cranston.

The eastern portion of the City is generally served by public sewer; however, there are isolated parcels where properties are served by septic systems. The western portion of the City is primarily served by septic systems. The Assessor's records show there are over 32,000 parcels in Cranston with 5,503 parcels without buildings and 26,497 parcels with buildings. Of those 26,497 developed parcels, 22,241 records are on the "Sewer Roll," meaning that 4,256 parcels with buildings are not connected to sewers.[1]

The Cranston Onsite Wastewater Management Plan (Cranston OWMP) provides information about how onsite systems work, how to improve system performance in sensitive environments, why maintenance of the systems is important, and what options a community or group of communities has for managing onsite systems. Western Cranston (see Figure 1) is considered the management area for this OWMP. The City Council resolution provided in Appendix A demonstrates the City of Cranston has formally decided to participate in development and submittal of this plan.

1.1 The Case for Onsite System Management

In their 1997 Response to Congress, the United States Environmental Protection Agency (US EPA) concluded that "adequately managed decentralized wastewater systems are a cost-effective and long-term option for meeting public health and water quality goals, particularly in less densely populated areas." To support onsite system management programs at the local and state levels, the US EPA released guidelines that are structured to reflect an increasing need for more comprehensive management as the sensitivity of the environment or the degree of technological complexity increases (US EPA, 2003). Local or state regulators can use these voluntary guidelines as a basis for their onsite system management programs to reduce the public health and water quality concerns associated with these systems.

Domestic sewage contains high concentrations of total suspended solids (TSS), 5-Day biochemical oxygen demand (BOD_5), pathogens, ammonium nitrogen, total nitrogen, and total phosphorus, as well as varying amounts of heavy metals, organic compounds, pharmaceuticals, and other potentially hazardous materials. A properly installed and operated onsite system can treat many of the constituents present in residential wastewater. Standard and properly installed onsite systems that protect public health may not, however, protect drinking water supplies, recreational waters, or aquatic habitats from the nutrient loading those onsite systems can add to local waters.

Improperly designed or constructed systems—for example, where the disposal field is too close to groundwater—can adversely affect groundwater through the release of pathogens, nutrients, and other contaminants. Cesspools are no longer allowed in Rhode Island for new construction because they do not provide adequate treatment. Notwithstanding, some cesspools still exist, particularly on

[1] The number of parcels with buildings not on the sewer (i.e. with individual septic), is from the 2010 Comprehensive Plan.

older lots. Cesspools lack treatment design and are generally undersized for modern wastewater needs. Even when onsite systems are properly designed, located, and operated, they can have public health and ecological effects on groundwater and surface waters. Where very coarse soils exist, pathogens and nitrate can more easily wash through the soils into groundwater.

Cranston is primarily within the watersheds of the Pawtuxet River, Providence River, and Seekonk River. A small area of the northwestern corner of Cranston is in the Scituate Reservoir Watershed and, therefore, contributes runoff to the Providence Water supply.

With the exception of a few private wells, Cranston is predominantly served by Providence Water. Drilled wells are usually sealed into solid bedrock and tap into groundwater reservoirs far below the surface. Thus, drilled bedrock wells are often somewhat protected from the potential effects of onsite systems. Shallow wells and springs use shallower groundwater sources and may not be adequately protected from sources of surface contamination, including pollutants from substandard or failing onsite systems.

Presently, approximately 6,150 developed properties within Cranston rely on onsite systems for wastewater disposal.[2] Since 1982, 670 of these onsite systems were repaired or upgraded due to system failure. Localized clusters of system failures, particularly in areas with small lots or older development may have the potential to affect local groundwater or surface water quality, although data documenting these effects generally do not exist.

In addition to the effects of onsite systems on local drinking water supplies, an overabundance of nutrients from human sources getting into surface waters can lead to the excessive growth of algae and other nuisance aquatic plants—a process known as cultural eutrophication. Freshwater lakes and ponds can be particularly affected by phosphorus from onsite system effluent. Coastal embayments with shellfisheries can also be negatively affected by high nutrient loads and can be closed to production because of high pathogen counts in the waters. Since Cranston's surface waters all eventually discharge to the Narragansett Bay (the Bay), improperly functioning onsite systems in the City can contribute to the cumulative effect of high nutrient and pathogen loadings in the Bay.

To ensure the safe disposal of wastewater from onsite systems, the Rhode Island Department of Environmental Management (RIDEM) enacted regulations governing the installation and repair of septic systems; however, under normal circumstances, these rules cannot be applied to systems that were installed before the regulations, and the rules do not provide for the maintenance of onsite systems after they are constructed. Thus, using only the State rules to govern onsite wastewater disposal, communities are not able to ensure that onsite systems remain a viable infrastructure for protecting drinking water and surface water quality.

Local governments can implement onsite wastewater management programs (OWM programs) to address existing problems resulting from onsite wastewater disposal, or as proactive measures to protect drinking water and other sensitive resources where problems are not yet documented. Several Rhode Island towns, including Charlestown, Narragansett, South Kingstown, Block Island, North Kingstown, and Tiverton, established protective septic system siting requirements beyond those required by State regulations and implemented OWM programs to protect water quality and other natural resources in their communities. RIDEM and the RI Coastal Resources Management Council (CRMC) revised the freshwater wetlands rules to implement amendments to state law that were aimed

[2] The number of OWTS cited here (6,150) is based on the number of parcels with buildings not served by sewer plus the additional parcel potential in western Cranston (2002 OSWMP; 2010 Comprehensive Plan).

at strengthening wetlands protection, providing clarity and predictability, and streamlining the permitting process for development and other activities conducted in proximity to freshwater wetlands. These rule changes address the siting of OWTS and were implemented in 2018.

1.2 Plan Overview

The purpose of this plan is to:

- Provide the City and the public with a summary of onsite wastewater issues.
- Provide a substantive means of dealing with the City's onsite wastewater issues in an environmentally responsible way.
- Enable the City to qualify for a line of credit under CSSLP.

The following sections describe the basics of onsite wastewater treatment and disposal, how the standards apply to existing conditions in the City, regulatory and management issues, and plan implementation.

2.0 THE BASICS OF ONSITE WASTEWATER TREATMENT AND DISPOSAL

Decentralized water supply and wastewater treatment and disposal technology choices can have a significant effect on protecting water supplies and surface waters, meeting development density goals, and preserving traditional New England-village land use patterns. Onsite and clustered systems can be protective of public health, drinking water supplies, and the quality of water resources if they are properly planned, installed, operated, and maintained. When they are managed properly, these systems can also protect property values, preserve tax bases, result in lifecycle cost savings, and further Rhode Island's ultimate goals for thoughtful development and land use. Current state regulations, recent technology improvements (including management system technologies for smaller systems), and new management models give communities more options for meeting public health, environmental, and land use planning goals. The following sections explain how septic systems function, what land characteristics and soil conditions are needed for proper treatment performance, and what types of effects systems can have on the environment.

2.1 Typical Components in an Onsite Wastewater Treatment System

A typical OWTS includes two major components—a septic tank and a disposal field. The septic tank is a watertight structure that allows solids to settle to the bottom. Scum, grease, and oils rise to the top of the tank, and are kept from leaving the tank by baffles. Relatively clear effluent leaves the septic tank. Newer tanks include access risers to the ground surface for easy access and maintenance and an effluent filter at the tank outlet that keeps solids from leaving the tank and clogging the disposal field. The septic tank provides primary treatment of the sewage and is a vitally important part of the entire system. Older tanks may leak and may eventually collapse. The baffles in older tanks may also deteriorate, allowing scum, oils, or solids to escape into the disposal field.

The disposal field is designed to maintain unsaturated soil conditions below the disposal field and provides both physical and biochemical treatment of wastewater effluent. As the effluent moves through the soil, solids and microbes are physically filtered out of the wastewater. Treatment processes that occur in the unsaturated soils between the disposal field and groundwater, impervious soils, and bedrock significantly reduce pathogen levels, provide some adsorption, and may transform forms of nitrogen compounds.

2.2 Onsite System Treatment Performance

Much of the treatment in the disposal field occurs at the interface between the media (typically stone) and the undisturbed soil, where a chemical and biological layer known as a biomat forms. A biomat is often less permeable than the surrounding soils, and system design standards take into account the long-term acceptance rate of the biomat.

Soil can provide treatment of effluent through a series of physical, chemical, and biological processes. However, some of the nutrients (such as nitrate) are capable of moving through the soil into the groundwater (and surface waters). Nitrogen can undergo several transformations in and below the disposal field. Nitrification, the conversion of ammonium nitrogen to nitrite and then nitrate by bacteria is the predominant transformation. However, if there is inadequate separation to seasonal groundwater, this conversion may not occur.

Although traditional onsite septic systems can treat many of the constituents present in residential wastewater, OWTSs can still have public health effects and ecological effects. Other wastewater constituents that can cause problems in drinking water and surface waters include the following:

- Toxic organic compounds in household chemicals can be persistent in groundwater and cause damage to surface water ecosystems and human health.

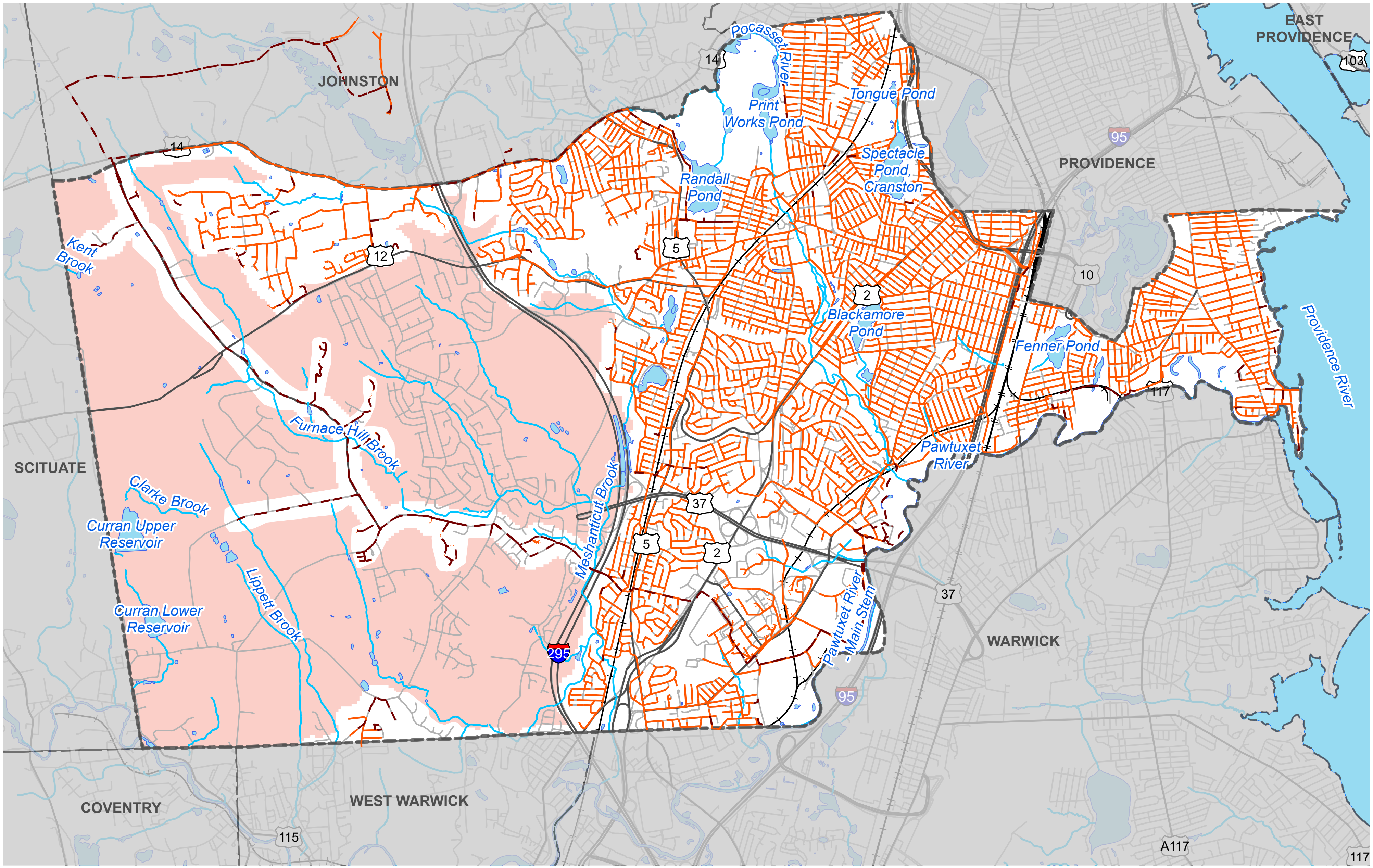


FIGURE 1
CITY OF CRANSTON, RI
WASTEWATER MANAGEMENT PLAN

ONSITE WASTEWATER MANAGEMENT AREA

- Sewer Gravity Mains
- Sewer Pressurized Mains
- Roads
- Major Roads
- Railroad
- Town Boundary
- Mangement Area
- Water Bodies
- Rivers and Streams

5,000 0 5,000
Scale In Feet

N

- Dissolved inorganic compounds like chloride and sulfide can cause taste and odor problems in drinking water.
- Pharmaceuticals can be persistent in groundwater and recent studies are evaluating their potential effect on drinking water and surface waters.

2.3 Failing and Substandard Systems

Failing or substandard septic systems that pollute water resources are considered a category of nonpoint source (NPS) pollution. This type of wastewater pollution is considered to be a significant contributor to water quality contamination both regionally and nationally.

Cesspools and Other Substandard Systems

Systems installed prior to the advent of permitting (circa 1968), were built without the benefit of today's regulatory requirements. These older systems may still "function" in the sense that sewage is not backing up into the plumbing or surfacing in the yard, but they do not always function properly in terms of treating the wastewater before it reaches groundwater or surface water. Many of these older systems are cesspools.

Cesspools are disposal systems without septic tanks, where raw sewage enters a single perforated or bottomless tank and leaches out through holes in the sides and bottom. Cesspools typically do not provide enough interface with the soil to properly treat wastewater. This type of system does not provide adequate treatment and is not allowed in Rhode Island for new construction, although cesspools may still serve some older residences.

There are likely about 1,000 cesspools and other substandard systems in Cranston. This estimate is based on using median value of two different approaches to determining the number of substandard systems.

- According to the Rhode Island Cesspool Act of 2007 (RIGL 23-19.15-2; see Section 4.2), as of 2013 there are approximately 25,000 cesspools in Rhode Island meaning that approximately 17% of Rhode Island's roughly 150,000 OWTS are cesspools. If we extrapolate this estimate to Cranston and assume that 17% of Cranston's approximately 6,150 OWTS are substandard systems, then we could estimate that approximately 1,045 cesspools likely exist in the City.
- When we use City assessor records of building data and OWTS permit data collected by RIDEM,[3] we estimate that approximately 980 substandard systems likely exist in the City.[4, 5]

Failing Systems

Modern septic systems, even those that are sited and installed properly, can still fail if they are not maintained. Conditions that can cause the soil to provide poor treatment primarily involve hydraulic or organic overloading of the disposal field. This overloading is most commonly caused by failure to maintain the septic tank.

[3] The state of Rhode Island has run the OWTS permitting program since 1968. Records were collected originally in hard copy, until an electronic data system was installed. Current, records are available in the electronic database from 1992 to present. The searchable records are used as a representative sample.
[4] The number of repaired OWTS (640) is based on RIDEM permit records from 1992-2021 classified RPR.
[5] Town assessor data on residences built since 1970 was searched to find residences on streets outside of sewered areas shown within the 2017 Comprehensive Plan. This search resulted in 1,457 records, 224 of which are partially sewered streets. Another 365 are known to have permitted OWTS (according to the Town Wastewater Facilities Plan Amendment in 2010). Assuming 50% of residences on partially sewered streets (1/2 of 224) have OWTS, this estimate is 980 (1,457 minus 112 minus 365).

Section 3.7 of this plan discusses City specific data pertaining to failing systems from 1992 to the present.

2.4 Patterns of Development and Implications for the Environment

Preserving compact village development patterns while also protecting public health and water quality by improving OWTSs is a delicate balance. Both in villages and in more rural areas, the use of OWTSs for wastewater disposal creates important concerns regarding nutrient and bacterial loadings, particularly near or over important water resources, aquifers, and recreational waters. The most common environmental and public health effects attributed to OWTSs are effects from the pathogens and nutrients that can be present in wastewater effluent.

Potential effects on surface waters that are used for swimming and other forms of recreation are typically monitored, and swimming areas can be closed if indicator pathogens, such as *Enterococcus* or *E. coli*, are reported in high numbers; however, it is widely recognized that these bacteria indicate only the potential presence of other water-borne pathogens; thus, the presence of indicator bacteria does not exclude other sources of pathogens or necessarily mean that nearby OWTSs are performing improperly. In recent years, new methods for monitoring pathogens near recreation areas have been developed. Microbial source typing, for instance, attempts to identify the type of animal that was the source for a certain bacterium.

As previously identified, an overabundance of nutrients from human sources in surface waters can lead to cultural eutrophication. Freshwater lakes and ponds can be affected by phosphorus from septic system effluent. Coastal embayments with shellfisheries can also be negatively affected by high nutrient loads and can be closed to production because of pathogens in the waters. Since Cranston's surface waters all eventually discharge to Narragansett Bay, they can contribute to the cumulative effect of high nutrient and pathogen amounts.

Table 2-1 (below) adapted from USEPA's 2002 Onsite Wastewater Treatment Systems Manual, lists the types of land and soil characteristics (along with other design factors) used in evaluating existing and future OWTS locations.

Table 2-1. Typical Use of OWTSs

Design Issue	Common Use or Application	Applications to Avoid
Type of wastewater service	Domestic and commercial (residential, mobile home parks, schools, restaurants, etc.,)	Facilities with non-sanitary and/or industrial wastewaters. Local codes may contain additional restrictions.
Daily flow	<20 population equivalents unless a management entity exists	>20 population equivalents without a management program. Local codes may contain specific or special conditions (e.g., USEPA or state Underground Injection Control Program Class V rule)
Minimum pretreatment	Septic tank	Discharge of raw wastewater to disposal field, cesspool, etc.
Lot orientation	Loading along contour(s) must not exceed the allowable loading rate	Any site where hydraulic loads from the system will exceed allowable contour loading rates

Table 2-1. Typical Use of OWTSs

Design Issue	Common Use or Application	Applications to Avoid
Landscape position	Ridge lines, hilltops, shoulder/side slopes	Depressions, foot slopes, concave slopes, floodplains
Topography	Planar, mildly undulating slopes of ≤20% grade	Complex Slopes of >30%
Soil texture	Sands to clay loams	Very fine sands, heavy clays, expandable clays
Soil structure	Granular, blocky	Platy, prismatic, or massive
Drainage	Moderately drained or well-drained	Extremely well-drained, somewhat poor or very poorly drained
Depth to groundwater	>5 feet	<2 feet. Check local codes for specific requirements

Note:
Source: Table 4-2 "Characteristics of Typical SWIS Applications," https://www.epa.gov/sites/production/files/2015-06/documents/2004_07_07_septics_septic_2002_osdm_all.pdf.

3.0 EXISTING CONDITIONS

An essential part of building an OWMP is an understanding of the local environment (e.g., soils and hydrogeology); sensitive resources (e.g., public and private drinking water supplies), regulatory conditions (e.g., municipal planning and zoning regulations); and current wastewater management infrastructure. The following sections of this plan describe the key characteristics in the City that influence the locations and performance of septic systems.

3.1 Land Use, Zoning, and Demographics

The City of Cranston encompasses a total area of 28.6 square miles, with boundaries formed by the town of Johnston to the north, the City of Providence to the north and east, the municipalities of Warwick and West Warwick to the south, and Scituate and Coventry to the west. Providence River also forms part of the eastern border of Cranston.

As of the 2020 decennial census, Cranston has a population of 82,935 (population density of approximately 2,925/square mile). From 2010 to 2020 the City's population growth was approximately 3.2%. Census data from 2020 indicates that there are a total of 34,482 housing units within the City.

3.2 Soils and Geology

Soils vary based on parent geologic materials, slope, hydrology, human disturbance, and other factors. For this assessment, we are primarily concerned with soil properties that determine suitability for siting of OWTSs. These properties include depth to seasonal high groundwater, depth to bedrock, soil texture and structure, and slope. State regulations require four feet from the ground surface to seasonal high groundwater table, or a vertical separation of three feet from the bottom of the system. A five-foot separation is required from the bottom of the system to impervious soils or bedrock.

Based on the data from Rhode Island GIS (RIGIS), 24% percent of the land in Cranston is categorized as having severe constraints for development. Soils considered as having moderate constraints to development account for 27% of the City, while 21% of the City has slight constraints. Approximately 28% of the City has soils considered to have unknown constraints to development, and need further site investigations to determine the level of development constraints. Figure 2 shows the location of restrictive soils across the management area.

Table 3-2. Soil Development Classifications for Cranston

Development Constraint	Percentage of Land
Soils have severe constraints	24%
Soils have moderate constraints	27%
Soils have slight constraints	21%
Unknown	28%

Source: Rhode Island GIS

3.3 Surface Water and Water Quality

The City of Cranston has several prominent fresh and estuarine surface waterbodies. Named waters include:

- Blackamore Pond
- Clarke Brook

- Dyer Pond
- Fenner Pond
- Furnace Hill Brook and Tributaries
- J.L. Curran Reservoir (Fiskeville Reservoir)
- Lippet Brook and Tributaries
- Meshanticut Brook and Tributaries
- Meshanticut Pond
- Pawtuxet River Main Stem
- Pawtuxet River North Branch
- Pocasset River and Tributaries
- Print Works Pond
- Providence River
- Randall Pond
- Spectacle Pond
- Stone Pond
- Tongue Pond

In addition to these major waterbodies, the City has abundant small ponds, brooks and streams that form a network that extends beyond the boundaries of the City.

There are several waterbodies in City that either already have a TMDL or are required to have one in the future. Table 3-1, below, provides a list of waterbodies in Cranston that are included in RIDEMs Impaired Waters List 2018 - 2020.

Table 3-1. List of Impaired Waterbodies 2018-2020[a]

Waterbody	Impairment	TMDL Status and Schedule
Blackamore Pond	Phosphorus (Total)	TMDL (2024)
Fenner Pond	Phosphorous (Total)	TMDL (2024)
Meshanticut Brook and Tributaries	Enterococcus	TMDL Approved
Pawtuxet River North Branch	Mercury in Fish Tissue	TMDL (2026)
Pawtuxet River Main Stem	Phosphorous (Total)	TMDL (2023)
	Mercury in fish tissue	TMDL (2028)
	Enterococcus	TMDL (2020)
	Nonnative Plants	No TMDL Required
Pocasset River and Tributaries	Benthic-Macroinvertebrate Bioassessments	TMDL (2026)
	Chloride	TMDL (2026)
	Copper	TMDL (2026)
	Nonnative Plants	No TMDL Required
	Enterococcus	TMDL (2020)
Print Works Pond	Total Suspended Solids	TMDL (2026)
	Chloride	TMDL (2026)
	Lead	TMDL (2026)
	Fecal Coliform	TMDL (2024)
Providence River	Dissolved Oxygen	TMDL (2023)
	Nitrogen (Total)	TMDL (2023)
	Fecal Coliform	TMDL (2025)

Table 3-1. List of Impaired Waterbodies 2018-2020[a]		
Waterbody	Impairment	TMDL Status and Schedule
Spectacle Pond	Chlorophyll-a	TMDL Approved
	Dissolved Oxygen	TMDL Approved
	Phosphorus (Total)	TMDL Approved

Notes:

a. Source: State of Rhode Island 2021 Impaired Waters Report
b. Listed as scheduled for 2020 although the scheduled timeframe has passed.

3.4 Groundwater and Drinking Water Supplies

Groundwater is found in fractured rock and saturated soil formations, where water is stored in spaces within the rock or soil. Aquifers occur where these formations can yield substantial amounts of water. Unconfined aquifers occur where unsaturated porous materials overlie the saturated formations. These aquifers can be extremely complex, and their yields can vary greatly. Unconfined aquifers are also susceptible to pollution from septic systems and other sources since contaminants can move relatively quickly in saturated materials.

Even when properly designed, located and operated, septic systems can affect groundwater through the discharge of nitrate, phosphorus and pathogens. Where very coarse soils exist, pathogens and nitrate can more easily wash through the soils into groundwater. Substandard systems, where the disposal field is below or too close to the seasonal high groundwater table, can affect groundwater through incomplete soil-based treatment that allows pathogens, nitrate, and other contaminants to enter the groundwater. Maintaining minimum setbacks and construction requirements typically provides protection from contamination. Higher levels of wastewater treatment can be required as additional protection from nutrients or pathogens.

Cranston is mainly within the Pawtuxet River watershed which includes the Pawtuxet River, the North Branch of the Pawtuxet River, the Pocassett River, and the Scituate Reservoir. A small corner in the northeast part of the City is located in the Woonasquatucket River and Moshassuck River watersheds. Cranston’s principal waterbodies are primarily rivers which are tidally influenced near the coast, and inland ponds. These are all vulnerable to impacts associated with sea level rise and coastal storm surge, nonpoint source pollution, eutrophication, sedimentation, and invasive species. Cranston’s drinking water is managed by Providence Water. The main source of water is from the Scituate Reservoir which is the terminal reservoir in a network of six interconnected reservoirs: the Scituate Reservoir, Regulating Reservoir, Barden Reservoir, Ponaganset Reservoir, Westconnaug Reservoir, and Moswansicut Reservoir.

3.5 Current Wastewater Infrastructure

This section discusses the extent of sewer system infrastructure and the extent of OWTSs in Cranston.

Use of Onsite Wastewater Treatment Systems

Septic system records compiled by the RIDEM, Office of Water Resources were reviewed for this project to identify the number of known disposal systems and failures over roughly the past 10 - 30 years. An electronic search was conducted for repair applications submitted to the RIDEM for the

City from 1992 through 2021.[6] Repair applications were chosen for review because they typically represent septic system failures and upgrade of cesspools. Cesspool upgrades commonly occur due to their failure. Failures may occur for a variety of reasons that include unfavorable soil conditions, high groundwater, ledge close to surface, improper maintenance, faulty construction, improper sizing, and increase in use above design capacity. System repair records help to establish the frequency of failures within a particular area and give an indication of the frequency of problems. The approximate locations of OWTS failures are shown in Figure 3. Figure 4 then shows these locations relative to environmentally sensitive areas and areas with environmental constraints. OWTS failure rate in Cranston is summarized in Table 3-2.

[6] Permit and repair records are available in the RIDEM electronic database from 1992 to present. The searchable records are used here as a representative sample.

Table 3-2. Summary of OWTS Repairs and Enforcement Actions from 1992 to April 2021		
Total OWTS	OWTS Repairs and Unresolved Enforcement Actions	Percent of OWTS Repaired or with Unresolved Enforcement Actions
6,150[1]	670[2]	11

Notes:

1. Total OWTS of 6,150 is estimated based on the 4,256 built parcels without sewer plus 1,894 potential additional parcels in Western Cranston (Cranston 2010 CCP)
2. This is the total number of repairs including upgrades to innovative and alternative systems, conventional systems, and upgrade of substandard system replacements.

Several factors were reviewed in order to map areas of apparent failure risk to onsite systems in the City. Some of these issues were discussed in previous sections, and thus will be briefly summarized in the following sections:

1. Septic system failure/repair rates
2. Soil suitability for onsite disposal systems
3. Surface and groundwater quality
4. Density of housing (lot sizes)
5. Depth of groundwater
6. Age of septic systems

According to RIDEM septic system records unresolved enforcement actions and repair applications total 670 between 1992 and April 2021. This represents about 11% of the total number of OWTSs in the City (assuming 6,150 developed parcels without sewer each have one OWTS). This equates to a failure rate of approximately 23 systems (or 0.37 percent)[7] per year.

An additional number of OWTSs must be upgraded by regulation when the property is sold. At the rate of 85 homes sold per year,[8] and with 11% of homes in Cranston having substandard systems, that will likely result in approximately 9 additional systems needing upgrade each year. Thus, the total number of OWTS needing replacement each year may be estimated at 32.

OWTS failures occur throughout Cranston, however, there are some areas in the City where clusters of known OWTS repairs and enforcement issues are present. These areas are reflected in Figure 4 and could pose wastewater disposal problems in the future.

Sewer System Extent and Expansion

The City of Cranston owns a municipal wastewater system that is operated by Veolia Water. It treats an average of 10.0 million gallons of wastewater per day, serving approximately 73,200 customers in Cranston. The WWTF shares the site with an incinerator capable of processing 66 dry tons of sludge per day.

Much of the service area of the wastewater system is located in the eastern section of the City. The developed parcels in the City that do not have sewer service discharge their wastewater to OWTS. Figure 5 provides a map of currently sewered areas in City as well as proposed areas for expansion.

[7] Based on 670 failures over 352 months (i.e., from January 1992 to April 2021) and 6,150 total OWTSs.
[8] Redfin.com Cranston, RI Housing Market Trends.

According to the Cranston Facilities Plan, the only existing sewer infrastructure in place that makes sewer expansion growth in western Cranston feasible at this time would be via connection to the Rhode Island State Energy (RISE) return line.

The City's comprehensive plan update states that future development in western Cranston will require individual OWTS unless development projects can connect to the pressurized sewer line (RISE). The current City policy is generally not to extend sewer service to western Cranston; therefore, it is assumed that the western Cranston population that is sewered will likely not increase significantly while this policy is in place. That said, since the RISE line is a variable pressure force main the City policy is dependent on an ongoing sewer model, which is maintained by the City. There are certain locations on the RISE line where the pressures preclude sewer connections; however, the City is currently allowing most requested connections to the system with a small area near Wilbur Avenue being excluded. Essentially, capacity and pressure drives decision making.

4.0 STATE POLICY

To ensure the safe disposal of wastewater, RIDEM enacted regulations governing the installation and repair of septic systems. Several towns in Rhode Island have also enacted standards that go beyond rules promulgated by the State to protect groundwater and other natural resources. This section summarizes Rhode Island's state regulations for septic systems and provides information about local wastewater management programs already established in some other Rhode Island towns. We have also provided it as a description of the *Rhode Island Cesspool Act of 2007*.

4.1 RIDEM Regulations

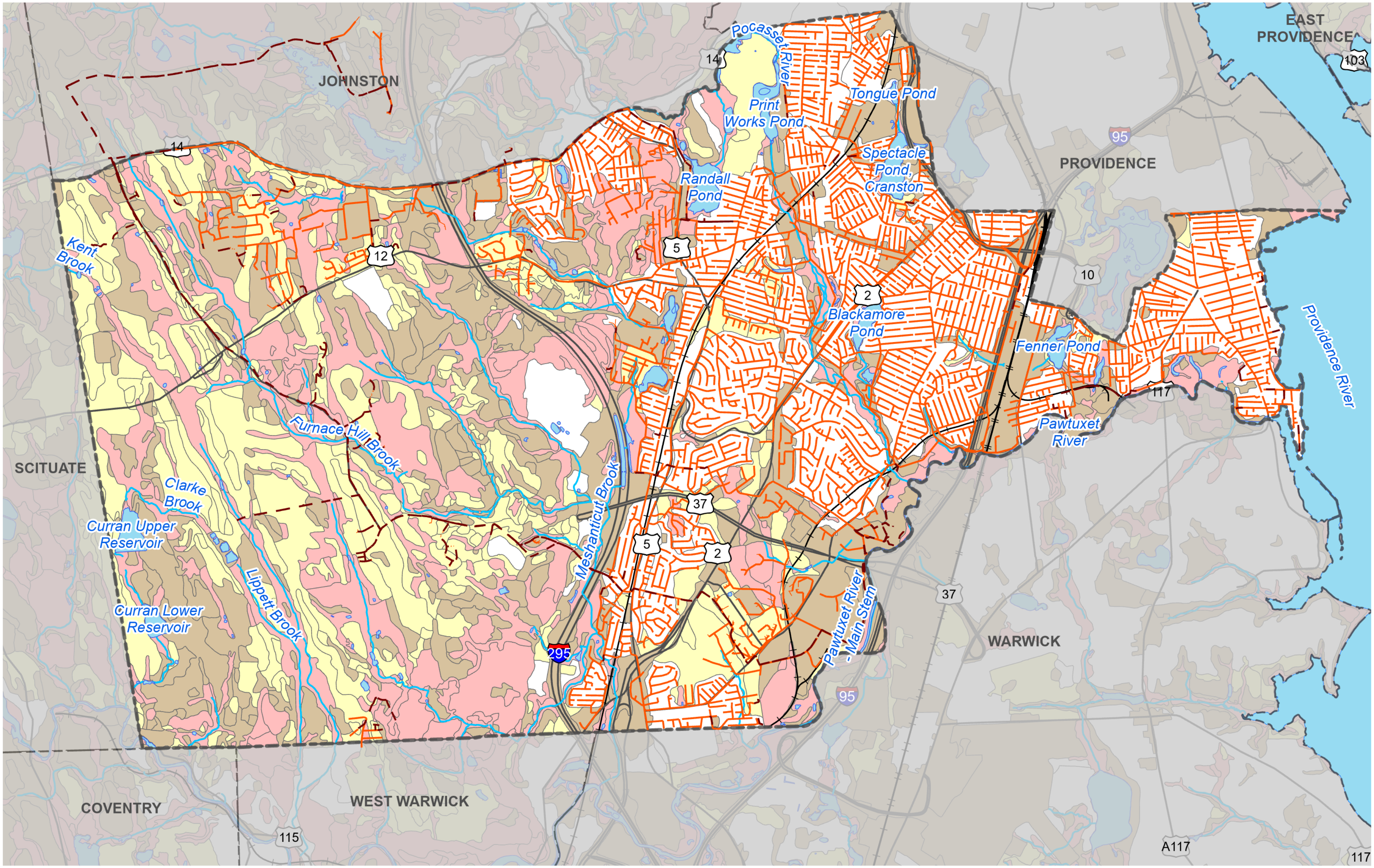
In 2018, the RIDEM published the latest set of regulations (*Rules Establishing Minimum Standards Relating to Location, Design, Construction and Maintenance of Onsite Wastewater Treatment Systems*), referred to below as the 2018 RIDEM OWTS Regulations, concerning the use of septic systems. The regulations state that "No person shall install, construct, alter, or repair or cause to be installed, constructed, altered, or repaired any OWTS without first obtaining the Director's written approval of the plans and specifications for such work and without adhering to each and every term of the approval." The Rules were amended in July 2022 to be consistent with the recently adopted "Rules and Regulations Governing the Administration and Enforcement of the Freshwater Wetlands Act" (Freshwater Wetlands Rules) (250-RICR-150-15-3), which went into effect July 1, 2022.

The horizontal and vertical distances between the leaching field of the septic system and important physical and environmental features, as specified in the regulations, are summarized in Table 4-1. Additional distances are provided in the 2018 RIDEM OWTS Regulations, amended in 2022. The amendment does not impact the minimum setbacks included below.

Table 4-1. 2018 RIDEM OWTS Regulations Minimum Setbacks for Leachfields to Physical and Environmental Features

Physical or Environmental Feature	Minimum Horizontal Setbacks (ft) for Leachfields
Seasonally High Groundwater	3 (vertical)
Private Drinking Water Wells	150[1]
Public Drinking Water Wells	200[2]
Property Lines	10
Water Supply Lines	25
Foundations	25[3]
Flowing Water and Open Bodies of Water	75[4]

Notes:
1. This distance assumes an OWTS design flow of 1,000- <2,000 gallons per day.
2. Assumes an OWTS design flow of 1,000-<2,000 galls per day and also assumes the well is drilled or driven.
3. May be varied under certain conditions.
4. Assumes an OWTS design flow of <5,000 gallons per day.



Town Boundary
Water Bodies
Rivers and Streams
Major Roads
Railroad
Sewer Gravity Mains
Sewer Pressurized Mains
Slightly Restrictive Soils
Moderately Restrictive Soils
Severely Restrictive Soils
No Characterization

FIGURE 2
CITY OF CRANSTON, RI
WASTEWATER MANAGEMENT PLAN

SOIL CHARACTERIZATION

5,000 0 5,000

Scale In Feet

N

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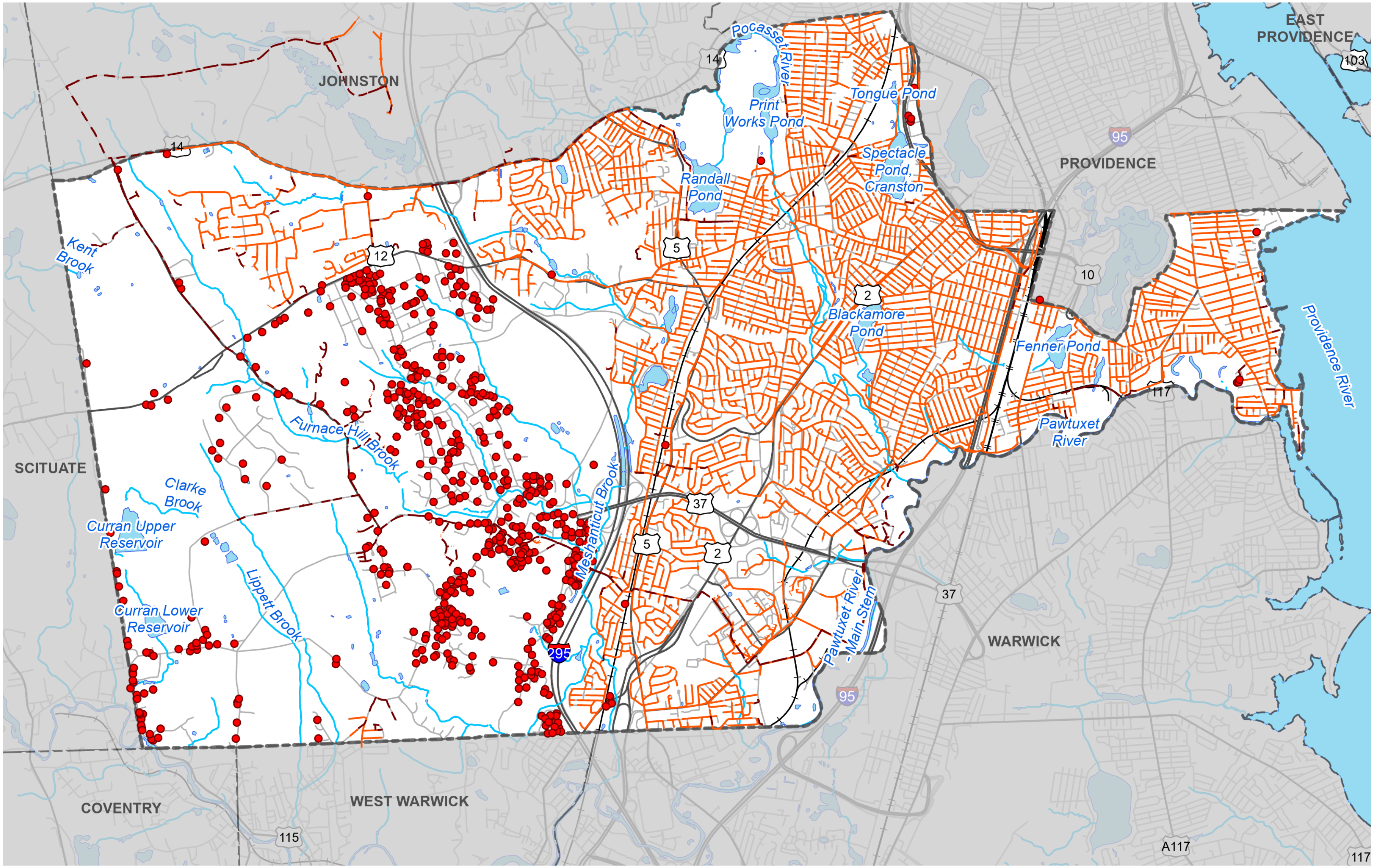

Failure Locations
Town Boundary
Water Bodies
Rivers and Streams
Roads
Major Roads
Railroad
Sewer Gravity Mains
Sewer Pressurized Mains

FIGURE 3
CITY OF CRANSTON, RI
WASTEWATER MANAGEMENT PLAN

OWTS FAILURE LOCATIONS

5,000 0 5,000
Scale In Feet

N

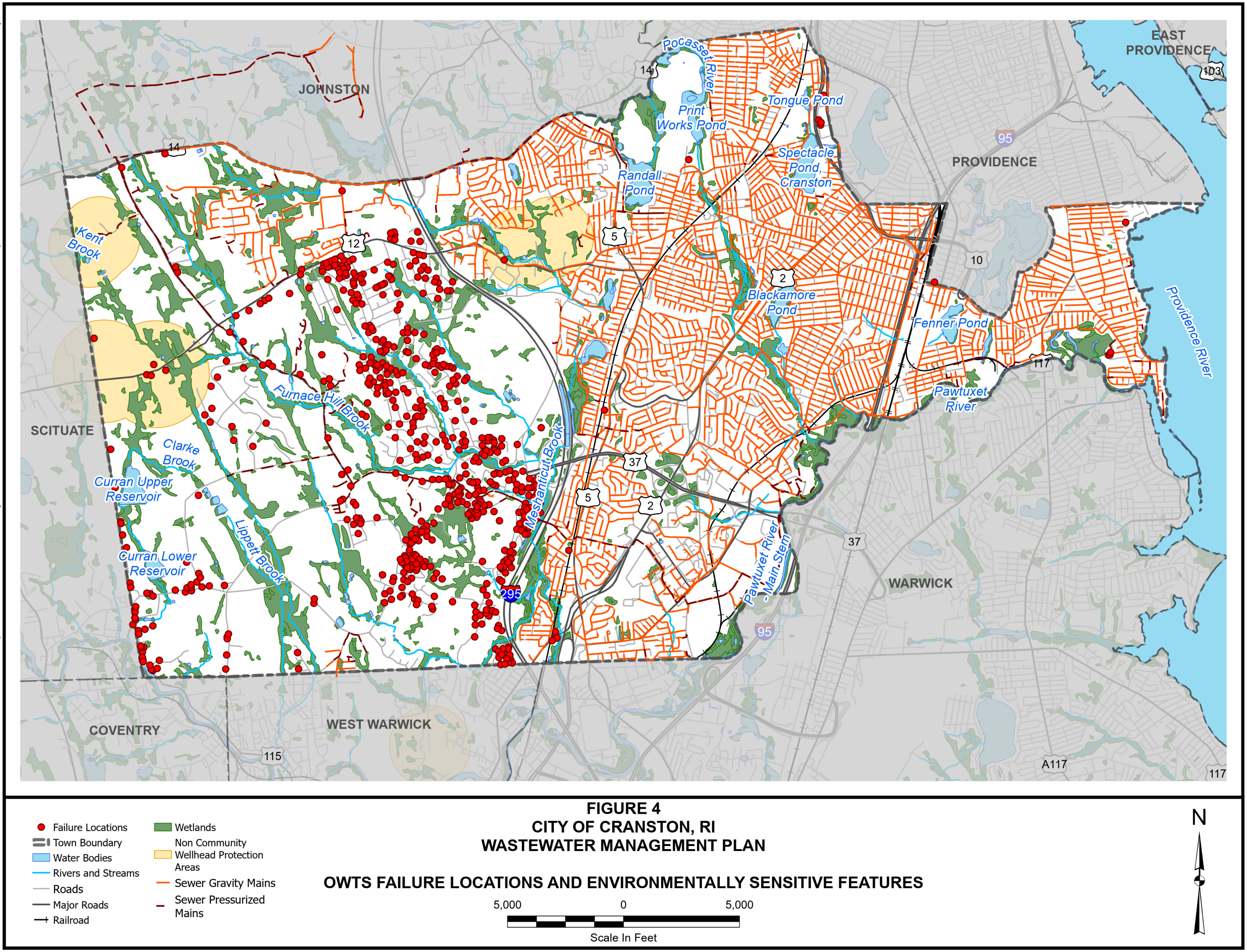

FIGURE 4
CITY OF CRANSTON, RI
WASTEWATER MANAGEMENT PLAN

OWTS FAILURE LOCATIONS AND ENVIRONMENTALLY SENSITIVE FEATURES

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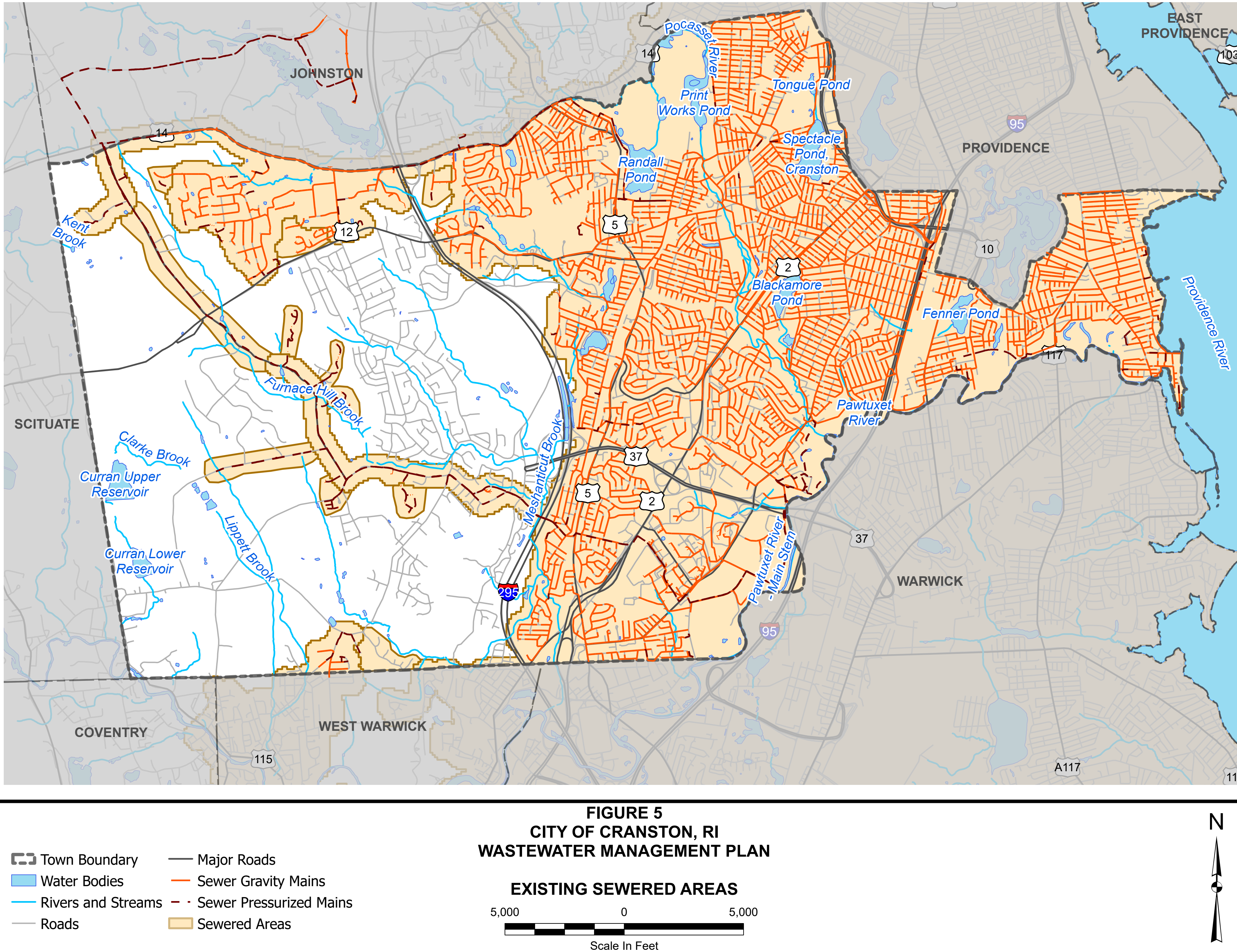

FIGURE 5
CITY OF CRANSTON, RI
WASTEWATER MANAGEMENT PLAN

EXISTING SEWERED AREAS

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Variances to these minimum setbacks are allowed under specific conditions. Alternative distances and specific conditions under which variances apply are provided in the 2018 RIDEM OWTS Regulations.

Licensing Requirements for OWTS Design and Construction

A state license, issued by RIDEM, is required for professionals who design new systems or repairs or alterations for existing systems. A Class I designer's license authorizes the design of repair of a residential septic system or component with flows less than or equal to 900 gallons per day. A Class II license authorizes the design of repairs and alterations of residential systems with flows less than 2,000 gallons per day and commercial systems with flows less than 900 gallons per day. A Class II license also authorizes the design of new systems provided there are no variances to the requirements for depth to groundwater, depth to an impervious layer, or setbacks established for critical resource areas. Class III licenses authorize the design of any septic system. Class I licenses can be either a registered Professional Land Surveyor or hold an OWTS Installers license while Class II licenses require registration as a Professional Land Surveyor or a Professional Engineer. Class III licenses can only be obtained by a Professional Engineer licensed by the State of Rhode Island.

A suitably licensed contractor must install septic systems. However, a licensed designer is responsible for witnessing and inspecting the installation and is responsible for issuing a Certificate of Construction. The Certificate of Construction certifies that the installation was completed in accordance with the approved application, plans, and specifications, and must be submitted to RIDEM.

Upgrading Dwellings with OWTSs

Because sewage flows can change significantly when building renovations are proposed or when there is a change in use, a determination of existing disposal system suitability must be rendered by RIDEM. RIDEM approval must be obtained before a City building permit is issued. A building renovation includes any addition, replacement, demolition and reconstruction, or modification of a structure on a subject property, which meets one or more of the following:

- Results in any increase in wastewater flow into the OWTS, which for residential structures is equivalent to the addition of one (1) or more bedrooms.
- Involves demolition or replastering or replacement of interior wallboard, interior walls, ceilings, flooring, windows, plumbing fixtures, electrical wiring or kitchen cabinetry, which in total affects over 50% or more of the living area of the existing structure.
- Involves adding an additional floor level or portion of floor level of living space to the structure.
- Increases the footprint of the living space of the structure.

4.2 Rhode Island Cesspool Act of 2007

In 2007, the State passed the *Rhode Island Cesspool Act of 2007* (see Appendix B), amended in 2015. Under this legislation, any cesspool in Rhode Island located within 200 feet of tidal coastline, 200 feet of public wells, and within 200 feet of drinking water reservoirs must be inspected and replaced with an OWTS meeting regulatory standards.

As described on RIDEM's webpage titled "OWTS Cesspool Phaseout"[9] there are a number of scenarios and timelines under which a cesspool must be replaced outside of the aforementioned 200-foot zones:

[9] http://www.dem.ri.gov/programs/water/owts/regulations-reports/cess-phaseout.php

1. If a property is subject to sale or transfer, the cesspool must be removed from service within one year of the closing date.
2. If a cesspool is failed, the cesspool must be replaced within one year of the failure, or less if an imminent threat to public health is identified.
3. If a cesspool serves as non-residential facility servicing more than 20 people per day, or any multifamily dwelling, the cesspool must be replaced as required under current DEM and EPA regulations.
4. If a cesspool is located within one of three areas described below, the cesspool must be replaced immediately:

   - Within 200 feet of the inland edge of all shoreline features bordering tidal water areas.
   - Within 200 feet of any public wells.
   - Within 200 feet of a water body with an intake for drinking water supply.

   Within the three 200-foot zones identified above:

   - All cesspools will have to be inspected within a four-year period, completed by January 1, 2012.
   - All cesspools found to be failed will need to be replaced within 1 year.
   - All cesspools found in already-sewered areas will need to be hooked-up to the sewer within one year of the sale of the associated property.

The deadline for replacing cesspools located within these 200-foot zones was January 1, 2014 and all remaining cesspools in these areas are in violation of the Cesspool Act.

As discussed in RIDEM's "Frequently Asked Questions – Cesspool and the Rhode Island Cesspool Act of 2007" (hereinafter Cesspool Phaseout FAQ), there are several topics addressed in detail to provide a more thorough review of the requirements:

> A failed cesspool is one that meets any of the criteria below. Note that a cesspool can appear to function in a manner that disposes of the waste and still be considered a "failed cesspool" under the criteria below. In other words, a backup of sewage or leakage onto the ground surface are not the only criterion for failure.
>
> - Cesspool fails to accept sewage, as evidenced by sewage backing up onto the ground surface or into the building it serves.
> - The liquid level in the cesspool is less than six inches from the bottom of the pipe (i.e., building sewer) that drains into it.
> - The cesspool has to be pumped more than two times per year.
> - The cesspool has been shown to have contaminated a drinking water well, stream or wetland.
> - The bottom of the cesspool is below the groundwater table at any time of year, resulting in direct connection between the waste in the cesspool and the groundwater.

5.0 OWTS WASTEWATER MANAGEMENT APPROACHES

Several management approaches are available to communities that wish to develop onsite wastewater management plans. These are briefly described below.

5.1 System Inventory/Tracking and Public Education and Outreach

Under this approach, the City develops an active educational program to inform homeowners about proper septic system care, inspections, and maintenance. The program may publicize and provide details of the CSSLP through a combination of local newspaper advertisements, local radio announcements, community cable television channels, and posted public notices. Pamphlets describing septic systems, operation and maintenance techniques, and adverse effects related to failing systems should be made available to all septic system owners/users. This effort should encourage property owners to be more proactive as they address concerns related to substandard or failing systems.

Data collection efforts under this approach include developing and maintaining a database. This database can be used for inventorying specific permit and system component information, following up on permit conditions, tracking maintenance contracts on advanced systems, collecting and tracking septic tank pumpout information, and tracking septic system failures. If system inspections or pumpouts are encouraged or required, the database can be used to generate notices for inspections and to track follow-up maintenance activities.

The City may also encourage residents to perform voluntary inspections of their septic systems (e.g., at a recommended rate of once every three to five years).

5.2 Special Design Standards

Historically, cities and towns have had the ability to adopt special design standards in their zoning regulations or code of ordinances such as cesspool elimination, increased treatment performance standards, or increased setbacks from surface waters. These design standards could include nutrient reduction in systems near sensitive environments, particularly where dense development may contribute to eutrophication or contamination of drinking water supplies.

5.3 Wastewater Management Districts

Many problems associated with septic systems are the result of substandard designs, construction, or poor maintenance practices. To overcome these problems, a regulatory framework can be developed at the local level to oversee septic system approvals, installations, and maintenance practices. Enabling legislation that was passed in the 1987 Rhode Island General Assembly Session allows municipalities to establish their own Wastewater Management Districts (WWMDs).

The purpose of WWMDs is to mitigate or prevent contamination of state waters from malfunctioning septic systems through the implementation of local inspection and maintenance programs. Among other things, WWMDs allow a municipality to:

- Access private property, when necessary, for the periodic inspection and/or maintenance of onsite systems.
- Raise funds for the administration, operation, and services of the WWMD by assessing property owners for taxes or annual fees and issuing bonds.

- Establish the necessary administrative, financial, technical, enforcement, and legal structure to implement and conduct wastewater management programs and hire the necessary personnel to support the structure.
- Receive grants or loans and establish a revolving fund to make grants and low interest loans available to property owners for the improvement, rehabilitation, or replacement of failed septic systems.
- Levy fines for noncompliance. Such fines shall be no greater than $500 per violation. Each day of continuing noncompliance shall constitute a separate and distinct violation.

Community Required Maintenance Inspections

Under this approach, the management entity requires homeowners to provide periodic inspection and maintenance if needed on their septic systems but does not provide the service directly. One-way municipalities encourage compliance is to have a notice sent to system owners every three to five years to remind them to have their systems inspected or pumped out. A return receipt attached to the notice can be sent back to the City by the inspector or pumping contractor once the inspection is complete. This approach requires establishment of local legislation requiring periodic maintenance by property owners. The management entity should also have the authority to randomly inspect systems to ensure their proper operation.

Setting an Inspection Schedule

In 2000, RIDEM published *Septic System Checkup: The Rhode Island Handbook for Inspection* (Riordan, 2000) (see *Appendix C*). This handbook provides a state-approved method for inspection of conventional septic systems. For conventional systems, inspections are recommended on a three-to-five-year basis, depending on system use, and can generally be completed by a service provider in few minutes. Inspections are recommended as the basis for determining pumpout need, which helps avoid the unnecessary expense of overkill maintenance. Inspection-based programs also provide protection from system failure as they ensure that the system is functioning properly and that minor repair needs do not become aggravated.

An inspection-based program is essential for innovative and alternative (I&A) systems, which generally include mechanical and electrical parts that are more likely to experience malfunction. I&A systems should be inspected annually. The University of Rhode Island's New England Onsite Wastewater Training URI-OWT Center has developed training and certification programs for service providers. These training programs include both conventional and I&A systems. A number of Rhode Island municipalities maintain lists of approved service providers and use satisfactory completion of the URI-OWT programs as the basis for service-provider registration.

Community Operated Maintenance Program

This approach may be financed through user fees assessed to individual property owners, and the management entity assumes responsibility for pumping systems on a regular schedule and providing periodic inspections. The management entity provides services either directly or through contracted private firms. Local legislation would be necessary to require participation in the program. Bonds can be issued to cover capital expenditures, should the City decide to provide pumpout or inspection services directly. Since the management entity assumes responsibility for OWTS pumping schedules and periodic OWTS inspection under this alternative, proper system maintenance and operation is relatively certain. This has environmental and public health benefits, as groundwater and surface water resources are more likely to be protected from contamination associated with OWTS failures. This type of program would serve to eliminate the “flush and forget” attitude that is sometimes taken by the public toward system maintenance.

However, this alternative also has several negative aspects. Operating costs, in the form of additional personnel required to implement and administer the program, are high and the management entity assumes significant amounts of liability. Difficult local legislation requiring owner participation may also be necessary.

Community Owned OWTSs

Under this approach, the City takes ownership of all septic systems within the management district and is responsible for their installation and operation. To finance this program, a user charge is assessed to each property owner included within the management district. A substantial amount of new local legislation would be required to allow the management entity to purchase equipment, assess fees on system owners, and to receive federal or state grants and loans. This alternative also requires significant capital expenditures for vehicles, computers, office equipment, and field equipment. Additional personnel, ranging from administrators to inspectors, would be needed to staff the program. The tremendous liabilities, the negative economic effects on private firms that design and install septic systems, and the high costs associated with this alternative do not support its feasibility.

5.4 Financial Assistance

Financial Assistance for Repair and Replacement

The costs to install, alter, or repair an OWTS to meet RIDEM standards can be substantial. A complete conventional system replacement for a three-bedroom home can cost between $10,000 and more than $18,000 depending on site constraints, while the cost of an innovative system can range from $20,000 to more than $32,000.[10]

These costs present a significant expense for most homeowners and may form the basis for objections to community based OWTS inspection and maintenance programs. Homeowners are often wary that inspection requirements create a gateway to potentially unaffordable upgrade requirements. Financial assistance can help to defray upgrade costs and may help to soften concerns.

Recently, the range of projects eligible for funding through the State Revolving Fund (SRF) has been expanded to incorporate nonpoint source pollution projects, including the repair and replacement of failing residential septic systems. The Rhode Island Infrastructure Bank (RIIB) Agency has formulated a loan program known as the CSSLP. Under this program, every community in the State will be able to use the SRF—not just those served by municipal wastewater facilities. Funding for up to one million dollars annually will be provided through this program. A copy of the regulations for the CSSLP is included in Appendix D.

By law, the RIIB or SRF cannot make loans to private individuals; therefore, the loan program allows loans to be provided to septic system owners through Cities and Towns. Rhode Island Housing (RIHousing) services the loan. RIHousing accepts homeowner loan applications, examines their ability to repay; issues payments to vendors for the work done; and collects

[10] Approximated in 2020 dollars based on empirical data.

repayments over the life of the loans. The community acts as the primary borrower, and a loan agreement will be in place for the principal portion of outstanding homeowner loans. The community must provide a pledge for repayment of the total amount of the community's line of credit through a dedicated source of revenue or a general obligation pledge.

Specifics of the CSSLP include:

Community Involvement

- The community must prepare an OWMP describing the specifics of the community's septic system management program. The plan identifies areas that the City wishes to be covered by the septic system management program and estimates a dollar cost for the remediation of septic systems. The RIIB caps its CSSLP loans to communities at $300,000. However, communities may borrow additional $300,000 increments once the original loan is depleted below $50,000.
- RIDEM will approve the OWMP and issue a Certificate of Approval, thus making the septic system management program eligible for financing.

Homeowner Involvement

- Owners of one to four family properties will be eligible for participation in the loan program. Communities are free to decide whether the property must be the owner occupied in order to be eligible for assistance. There is a maximum loan amount of $30,000[11] that can be obtained and there are no income restrictions for eligibility.
- Recently, RIIB has begun to require that borrowers retain a designer and obtain an OWTS permit prior to obligating loan monies. This encourages immediate use of loans and reduces the potential for underutilized loans to tie up the City's borrowing line (e.g., while permits are obtained). To further encourage the immediate use of loans, the City will establish a one-year limit on the homeowner's borrowing line following loan approval. However, the cost of design and permitting can be rolled into the loan upon its approval.
- Loan financing is interest free, with borrowers subject to a $300 loan origination fee and a 1% annual servicing fee on the outstanding loan balance.

RIHousing Involvement

- RIHousing will collect repayments from homeowners and make the debt service payment to the SRF on behalf of the community.

5.5 Management Approaches Used by Other Rhode Island Municipalities

Rhode Island municipalities enjoy significant state support for development of onsite wastewater management programs. In addition to CSSLP funding, the state has also offered grant funding for the development of municipal wastewater management programs as well as technical assistance in the form of several guidance documents. Two of these documents were developed to describe the onsite wastewater management implementation efforts of Rhode Island municipalities. They are:

- Rhode Island Municipal Septic System Standards and Programs (Riordan, 2001).
- Summary of Rhode Island Municipal Onsite Wastewater Programs (RIDEM, 2014).

[11] Towns may waive or adjust the maximum loan amount at their discretion.

Both documents are included in Appendix E of this report. A tabular summary of management approaches used by each municipality, adapted from the two aforementioned reports has been provided in Table 5-1 below.

Table 5-1. Summary of Rhode Island Municipal Onsite Wastewater Standards and Programs

Municipality	Management (Inspection/Maintenance) Requirements	Required Use of Innovative and Alternative Technologies	Repair Replacement Programs
Bristol	Yes	No	Yes (CSSLP)
Burrillville	No	No	No
Charlestown	Yes	Yes	Yes (CSSLP)
Coventry	Yes	No	Yes (CDBG & CSSLP)
Cranston	No	No	No
Cumberland	No	No	No
East Greenwich	No	No	No
Exeter	Yes	No	No
Foster	Yes	Yes	No
Glocester	Yes	Yes	Yes (CSSLP)
Hopkinton	Yes	Yes	Yes (CSSLP)
Jamestown	Yes	Yes	Yes (CSSLP)
Johnston	Yes	No	Yes (CSSLP)
Little Compton	No	No	No
Middletown	No	No	No
Narragansett	Yes	Based on staff recommendation	Yes (CSSLP)
New Shoreham	Yes	Yes	Yes (CSSLP)
North Kingstown	Yes	Yes	Yes (CSSLP)
North Smithfield	No	No	No

Table 5-1. Summary of Rhode Island Municipal Onsite Wastewater Standards and Programs			
Municipality	Management (Inspection/Maintenance) Requirements	Required Use of Innovative and Alternative Technologies	Repair Replacement Programs
Portsmouth	Yes	Yes	Yes (CDBG &CSSLP)
Richmond	Yes	No	Yes (CSSLP)
Scituate	Yes	No	Yes (CSSLP)
Smithfield	Yes	Yes	Yes (CSSLP)
South Kingstown	Yes	May be required through negotiation	Yes (CSSLP)
Tiverton	Yes	No	Yes (CSSLP)
Warren	Yes	No	Yes (CSSLP)
Warwick	No	No	No
West Greenwich	No	No	No
Westerly	Yes	No	Yes (CSSLP)

Notes:

1. CDBG means Community Development Block Grant funds have been programmed for septic system repair/replacement.
2. WRIHRP refers to the Western Rhode Island Home Repair Program.

Several communities in Rhode Island, including Charlestown, Narragansett, South Kingstown, and Jamestown have established more restrictive septic system siting requirements than those required by RIDEM and have implemented OWM programs. As they provide good local examples of OWM programs, we have provided summaries of them below. It should be noted that as previously mentioned, current RIDEM regulatory requirements may be amended, which would limit the ability of cities and towns to adopt regulatory requirements in excess of those established by RIDEM in the future.

Charlestown

Charlestown's subdivision regulations and zoning and ordinance establish standards for septic system siting and installation that include policies for protection of sensitive resources. The subdivision regulations require an evaluation of sewage disposal factors such as soils, slopes, and proximity to water bodies and wetlands. The zoning ordinance establishes setbacks for septic systems from water bodies and wetlands of:

- 100 feet from a coastal wetland
- 200 feet from a 10-foot-wide flowing body of water
- 100 feet from flowing bodies of water less than 10-feet wide
- 100 feet from intermittent streams

- 100 feet from floodplains

Charlestown also has a wastewater management ordinance that mandates regular septic system pump-outs based on inspections. The Town sends a mailing to 1/3 of its residents each year requiring that the septic system be inspected. Residents that respond favorably have their systems inspected by one of three qualified firms whose services are retained by the Town. The property owner pays for the inspection. Significant points of the program are listed below.

- Septic system inspections occur at a minimum frequency of once every three years, or more frequently as determined by the WWMD.
- Pump-outs are based on inspection results but occur no less than once every six years.
- All OWTS owners are sent written notifications of regularly scheduled inspections.
- The WWMD maintains a record of each septic system inspected.
- If system requires pumping, the owner has 30 days to show proof that it was done.

If system is failed, owner has 60 days to submit a repair/replacement application.

Narragansett

In its zoning ordinance, Narragansett requires special use permits for septic systems located within 200 feet of all coastal features. Under the Town's utility code, owners must pump their septic systems at least every four years and septic tanks must be accessible at all times. In the coastal overlay district, the town may require the use of innovative/alternative septic systems for systems sited within 200 feet of a coastal feature. Requirements for nitrogen reduction are based on staff recommendations.

South Kingstown

Special use permits are required in South Kingstown for septic systems located:

- Within 200 feet of flowing bodies of water 10 feet or more in width
- Within 100 feet of flowing bodies of water less than 10 feet in width
- Within 150 feet of floodplains
- Within 50 feet of a bog, marsh, swamp, or pond
- Within 150 feet of other freshwater wetlands.

The Town's zoning ordinance also establishes setbacks, performance standards, and requirements for enhanced treatment. Portions of South Kingstown are served by a municipal sewer system. A Wastewater Management District that includes all unsewered areas has been established. The key points of the management program are:

- A Program Administrator supervises activities, serves as enforcement officer, and has authority to levy fines and orders maintenance of septic systems based on inspection results.
- Implementation will occur over a seven-year period starting with the Green Hill Pond watershed, then other coastal ponds, then the groundwater protection overlay

district, and finally the remainder of town.

- The program will create a town-wide inventory based on inspection results.
- The septic system owner is responsible for hiring septage haulers or maintenance contractors.
- If inspections reveal an immediate need to pump, a pumpout must be performed within five days.

Jamestown

Jamestown, like South Kingstown, is partially sewered. However, in Jamestown's program, the wastewater management area covers the entire Town. Highlights of Jamestown's wastewater management program include:

- Administered through the Department of Public Works (DPW).
- Powers include:
  - Contract with septage haulers, installers, and inspectors as needed
  - Order maintenance of systems based on inspection results
  - Allow entry onto private property for inspection, pumping, and repair.
- Maintenance requirements are based on inspection results
- Inspection results are being used to complete a town wide inventory
- DPW maintains a list of approved inspectors
- DPW sends a notice to system owners telling them that an inspection is required, and inspections must be scheduled within 45 days of notice.
- If inspection reveals an immediate need to pump, owners have five days to present evidence that it was done.
- Inspections are mandatory.
- Stringent design standards were established for high groundwater areas.

6.0 RECOMMENDATIONS AND NEXT STEPS

Cranston recognizes the importance of enhanced wastewater management in high-risk areas such as areas with high groundwater, shallow bedrock, and small lots served by private wells. Based on the information collected to date and presented in this plan, it is recommended that the City implement a voluntary education and outreach effort as part of a CSSLP loan program.

6.1 Education and Outreach

The education and outreach goals are to provide information to property owners on the basic components of septic systems, how septic systems can affect water resources, and about system usage and maintenance requirements and the CSSLP program. The City plans to do the following:

- City and other web sites—Cranston currently maintains a robust website, which currently provides extensive data and resources. The City will add relevant information regarding its OWMP to the website under the Department of Public Works page. This will include planning documents, fact sheets, program descriptions, applications, pertinent web links, and other materials. The City may also consider a web-based computer tracking system for maintenance activities contingent on the availability of funding. At a minimum, the web site will provide information regarding eligibility criteria and how to apply for CSSLP.
- Public meetings—City will hold a public meeting to discuss the development of its OWMP.
- Fact sheets and advertisements—The City will prepare a community-specific fact sheet for distribution to residents. An example fact sheet is provided in Appendix F.

6.2 CSSLP

The City is interested in applying for and receiving funding for a residential loan program through the CSSLP. This program is described in Section 5.4 of this OWMP. Following is additional information on establishing the loan criteria.

General Eligibility

The City intends that any residential failed or substandard OWTS in the City that meets the CSSLP eligibility criteria for the state would qualify for the loan funds. For determination of eligibility, this plan relies upon RIDEM's definition of "failed" and "substandard."

Currently, RIDEM defines a "failed" system as:

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.
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 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.
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.

“Substandard” refers to 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.

Additional Eligibility Issues and Features

The property owner loan program is based on a projected number of failures and includes a process for establishing criteria for approving loans. These criteria can include prioritizing areas of environmental concern, prioritizing areas where older systems including cesspools are known, and other criteria developed by the community. Suggested eligibility criteria include:

1. Loans are for all single-family and multi-family homes up to four dwelling units in size. No institutions, condominiums, or commercial businesses are to be covered. All state and local approvals and procedures must be in place prior to any acceptance of applications. No loans will be granted for properties with a sewer tie-in requirement.
2. If a system is failed, but the repair also calls for an increase in the number of bedrooms, the loan amount shall be limited to that required to repair or replace a system suitable for the original number of bedrooms.
3. Replacing a septic tank, even when no drain field repairs are necessary, is considered a legitimate expense of CSSLP funds.
4. I & A systems may be required in areas where site conditions warrant, such as a wetland buffer, high water table soils, small lots, and lots with inadequate separation distance from a well, etc. Upgrading to I&A technology is eligible for loan funds.
5. In order to qualify for the loan fund, the owner must submit three bids. The construction portion of the loan shall be limited to the low bid plus 10 percent. Engineering and permitting costs are also legitimate loan expenses.
6. The maximum loan amount is to be $30,000.
7. When the available pool of money is $50,000 or less, hardship situations and emergency repairs will be given priority.

Expected Activity of the Cranston Loan Program

We determined the expected activity of the loan program is based on a projected number of failures. For the City’s total of 6,150 onsite systems, an average failure and replacement rate of 32 per year yields 320 systems over roughly 10 years.

Table 6-1 on the following page summarizes anticipated costs of repair per OWTS failure.

Table 6-1. Estimated Cost of Repair per OWTS Failure	
Type of Repair	Estimated Cost
Replace Leach Field	$6,700
Replace Septic Tank	$5,600
Full System Replacement	$12,350

Notes: 1. Costs estimated from RIDOT Standard Unit Prices and Local Contractor Price Quotes from 2020.

Assuming an inflation rate of 2.5% per year, it is anticipated that over a 10-year period, the duration of the CSSLP loan, the City would need approximately $4,538,000 for system repairs. Table 6-2 below shows the cost of expected repair activity on an annual basis.

Table 6-2. Cost of Expected Repair Activity per Year for the Duration of the CSSLP Loan			
Year	Cost per System[1]	Total Cost	Cumulative Total Cost
Year 1	$12,659	$405,088	$405,088
Year 2	$12,975	$415,215	$820,303
Year 3	$13,300	$425,596	$1,245,899
Year 4	$13,632	$436,235	$1,682,134
Year 5	$13,973	$447,141	$2,129,276
Year 6	$14,322	$458,320	$2,587,595
Year 7	$14,681	$469,778	$3,057,373
Year 8	$15,048	$481,522	$3,538,896
Year 9	$15,424	$493,560	$4,032,456
Year 10	$15,809	$505,899	$4,538,356

Notes: 1. Cost per system includes an inflation rate of 2.5% per year and assumes that Year 1 begins in 2023 and, in order to be conservative on total cost, that each system will require full replacement.

The expected level of activity does not account for substandard system replacement (i.e., cases where homeowners chose to replace antiquated systems that have not failed hydraulically). Based on conversations with RIIB, we found that Towns and Cities that actively pursue wastewater management through mandatory inspection (e.g., Charlestown, North Kingstown, South Kingstown) experience high levels of borrowing activity (e.g., $300,000/year or more). Towns and Cities that institute voluntary programs (e.g., Tiverton, Johnston) experience relatively low levels of borrowing activity (e.g., $300,000/5 years). Therefore, Cranston plans to borrow $300,000 as a starting point, which is anticipated to cover most of the first year of repair activity.

Application Procedure

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

1. A system owner wishing to access the funds must obtain three bids for review by the Environmental Program Manager.
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. Loan funds must be expended by the homeowner within one year of loan approval.

6.3 Methods of Advertising

Cranston anticipates using the following methods to advertise financial assistance for OWTS upgrades and repairs:

- City and other web sites—Cranston currently maintains a website where municipal documents, programs, and items of interest are discussed. As the City continues to develop a wastewater management program, 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.
- Public meetings—Cranston has planned one public meeting to discuss its OWMP at a date to be determined.
- Fact sheets and advertisements-The City will prepare a fact sheet for distribution to residents.

7.0 PROGRAM RESPONSIBILITIES AND ADMINISTRATION

The City's Environmental Program Manager will be responsible for overall implementation of the program. The finance department will be the responsible party to facilitate the loan agreements with RIIB as well as alternative financing etc. Cranston anticipates day-to-day loan administration activities with RIHousing through the Finance Director.

8.0 METHOD OF SEPTAGE DISPOSAL

Sewage collection service areas remain largely within the developed portions of the City. Service areas include the entire City east of I-295 and a small portion west of I-295 between Plainfield Pike on the north and Scituate Avenue on the south. Sewage is not collected in the public system in most of western Cranston, where onsite wastewater treatment systems (OWTS) are used instead. Sewage flows largely by gravity to the sewage treatment plant. The plant discharges into the Pawtuxet River, as do two other treatment plants located in other municipalities. The City has a contract with Veolia Water to maintain and operate the sewage treatment plant. The plant has excess capacity of approximately 4 million gallons a day (MGD). While actual flow is approximately 10 MGD, some components of the plant reportedly could support a capacity of 20 MGD.

Reports from Cranston WPCF indicate that they are able to receive 250,000 gallons a day of septage and are not expecting any issues with reaching maximum capacity of septage they can receive. The City has approximately 6,150 systems with a typical septic-tank and pumpout volume of 1,000 gallons per pumpout. Assuming an average pumpout rate of one pumpout per system every four years, the total volume of septage transported to the WPCF is approximately 4,212 gallons per calendar day.[12] Therefore, the City has a per-day unused septage receiving capacity of approximately 245,000 gallons.

Septic haulers conducting work in Cranston generally transport septage to the Cranston WPCF. If we assume 32 new or updated systems per year and that all system replacements add 1,000 gallons to the pumpout demand every four years, we estimate an increase demand of approximately 10,000 gallons of septage pumping per year in the first year or approximately 22 gallons per day.[13] Increased demand over 10 years will, therefore, be approximately 220 gallons per day, which is well within the available daily volume.

[12] Determined by the following calculation: (6,150 systems * 1,000 gallons)/(365 days * 4 years) = ~ 4,212 gallons/day
[13] Determined by the following calculation: (32 systems * 1,000 gallons)/(365 days * 4 years) = ~ 22 gallons/day

9.0 IMPLEMENTATION

The following steps are to be taken to implement this onsite management plan:

1. Obtain SRF loan and establish Cranston in the CSSLP.
2. Advertise acceptance into the CSSLP program to City residents via items outlined in Section 6.3
3. Add information to the City's website that specifically addresses OWTSs.
4. Consider tracking OWTS systems and maintenance and pumping in GIS.
5. Mail OWTS brochures to residents of the City with the tax bill.
6. Consider establishing wastewater management districts through the necessary regulations and ordinances.
7. Revisit the OWMP and consider updating the plan.

9.1 Anticipated Project Costs

Table 9.1 provides a suggested order-of-magnitude budget for onsite wastewater management program development.

Table 9.1 Onsite Wastewater Management Program Development Cost

Program Item	Order-of-Magnitude Costs
Obtain SRF loan and establish Cranston in the CSSLP	$5,000
Advertise acceptance into the CSSLP program to City residents	Costs covered in other steps of implementation
Add information to the City's website that specifically addresses OWTSs	$5,000
Make guidance brochures available to the public at the Public Library and City offices	$3,000 - $5,000
Consider tracking OWTS systems and maintenance and pumping in GIS	$2,000 - $10,000
Mail OWTS brochures to residents of the City with the tax bill	$2,000 - $4,000
Total	$17,000 - $29,000

9.2 Implementation Schedule

Table 9.2 provides a suggested schedule of next steps.

Table 9.2 Onsite Wastewater Management Program Development Schedule

Program Item	Number Month/Year
Obtain SRF loan and establish Cranston in the CSSLP	Month 6

Advertise acceptance into the CSSLP program to City residents	Month 8
Add information to the City's website that specifically addresses OWTSs	Month 8
Make guidance brochures available to the public at the Public Library and City offices	Month 8
Consider tracking OWTS systems and maintenance and pumping in GIS	Year 3
Mail OWTS brochures to residents of the City with the tax bill	Year 1

APPENDIX A

City Council Resolution

CITY OF CRANSTON

RESOLUTION OF THE CITY COUNCIL

TO PARTICIPATE IN THE RI INFRASTRUCTURE BANK'S COMMUNITY SEPTIC SYSTEM LOAN PROGRAM

No. 2023-23

Passed:
June 26, 2023

Jessica M. Marino, Council President

Resolved, that

WHEREAS, the City of Cranston wishes to participate in the RI Infrastructure Bank's Community Septic System Loan Program (CSSLP) in order to assist property owners in Cranston who are required to repair or replace failing septic systems and cesspools; and

WHEREAS, such approval is a prerequisite for participation in the CSSLP

NOW, THEREFORE, BE IT RESOLVED THAT, the Honorable Cranston City Council authorizes Administration and the Finance Director to execute any and all documents necessary to participate in the Rhode Island Infrastructure Bank's Community Septic System Loan Program including the request for a non-restoring line of credit in the amount of $500,000 to be allocated.

The following criteria shall be applied to all CSSLP loans in the City of Cranston administered by Rhode Island Housing:

1. The maximum amount of each loan shall be $30,000
2. The loans shall be interest free, however borrowers shall pay a one-time origination fee of $300 and a 1% annual servicing charge on the outstanding balance.
3. The term shall be up to a maximum of ten (10) years.
4. Residential properties with up to 4 units shall be eligible.
5. There shall be no income limits for program participants.
6. A property owner must first acquire an approved RIDEM Onsite Wastewater Treatment System Permit to be eligible for funding.
7. Funding is released to the homeowner when RI Housing receives RIDEM Certificate of Conformance after the work is complete.

Sponsored by: Jessica M. Marino, Council President
Referred to Finance Committee June 5, 2023

APPENDIX B

Rhode Island Cesspool Act of 2007

CHAPTER 23-19.15
The Rhode Island Cesspool Act of 2007

Index Of Sections

- **§ 23-19.15-1. Short title.**
- **§ 23-19.15-2. Legislative findings.**
- **§ 23-19.15-3. Declaration of purpose.**
- **§ 23-19.15-4. Definitions.**
- **§ 23-19.15-5. Inspection requirements for cesspools located in close proximity to tidal waters and public drinking supplies.**
- **§ 23-19.15-6. Cesspool removal and replacement.**
- **§ 23-19.15-7. Waiver.**
- **§ 23-19.15-8. Exemption.**
- **§ 23-19.15-9. Notice to remove and replace cesspools.**
- **§ 23-19.15-10. Regulations.**
- **§ 23-19.15-11. Severability and construction.**
- **§ 23-19.15-12. Cesspool removal and replacement requirements at property transfer.**

TITLE 23
Health and Safety

CHAPTER 23-19.15
The Rhode Island Cesspool Act of 2007
SECTION 23-19.15-1

§ 23-19.15-1. Short title.

This chapter shall be known and may be cited as the "Rhode Island Cesspool Act of 2007."

History of Section.
(P.L. 2007, ch. 136, § 1; P.L. 2007, ch. 233, § 1.)

§ 23-19.15-2. Legislative findings.

The general assembly hereby recognizes and declares that:

(1) There exists a need to abate pollution and threats to public health caused by cesspools.

(2) It is estimated that there are more than twenty-five thousand (25,000) cesspools within the state as of 2013.

(3) Cesspools are a substandard and inadequate means of sewage disposal.

(4) Cesspools contribute directly to groundwater and surface water contamination and environmental impacts will be exacerbated by increased precipitation, storm frequency, and sea level rise.

(5) Wastewater disposed from cesspools contains bacteria, viruses, ammonium, and other pollutants, and may also include phosphates, chlorides, grease, and chemicals used to clean cesspools.

(6) Wastewater disposed from cesspools violates drinking water health standards for certain contaminants.

(7) Wastewater disposed from cesspools can pose significant health threats to people who come into contact with, or consume, contaminated surface waters or groundwaters.

(8) Appropriate treatment of sewage disposed into the ground is essential to the protection of public health and the environment, particularly in relation to Narragansett Bay and the rest of the state's coastal region, and public drinking water resources.

(9) Replacement of cesspools with onsite wastewater treatment systems (OWTS) technology reduces risks to public health and the environment.

(10) In sewered areas, sewer tie-ins offer a readily available, environmentally preferable means of mitigating problems and threats caused by cesspools.

(11) A fund exists to assist homeowners with the costs of removing cesspools and inadequate septic systems and replacing them with an approved OWTS if the community in which the homeowner resides has created a wastewater management district in accordance with chapter 24.5 of title 45.

History of Section.
(P.L. 2007, ch. 136, § 1; P.L. 2007, ch. 233, § 1; P.L. 2015, ch. 163, § 1; P.L. 2015, ch. 185, § 1.)

§ 23-19.15-3. Declaration of purpose.

The purpose of this chapter is to phase out use of cesspools beginning with those located in close proximity to tidal water areas and public drinking water supplies. Additionally, this chapter provides for the connection of properties served by cesspools to available sewer lines and requires the identification and replacement of cesspools on all properties throughout the state that are subject to sale or transfer.

History of Section.
(P.L. 2007, ch. 136, § 1; P.L. 2007, ch. 233, § 1; P.L. 2015, ch. 163, § 1; P.L. 2015, ch. 185, § 1.)

§ 23-19.15-4. Definitions.

For the purposes of this chapter the following terms shall mean:

(1) "Cesspool" means any buried chamber other than an onsite wastewater treatment system (OWTS), including, but not limited to, any metal tank, perforated concrete vault, or covered hollow or excavation, that receives discharges of sanitary sewage from a building for the purpose of collecting solids and discharging liquids to the surrounding soil.

(2) "Department" means the department of environmental management as established in chapter 17.1 of title 42.

(3) "Director" means the director of the department of environmental management or his or her designee.

(4) "Failed cesspool" means a cesspool where one or more of the following conditions exist: (i) The cesspool fails to accept or dispose of sewage, as evidenced by sewage at the ground surface above or adjacent to the cesspool, or in the building served; (ii) The liquid depth in a cesspool is less than six (6) inches from the inlet pipe invert; (iii) Pumping is required more than two (2) times a year; (iv) The cesspool is shown to have contaminated a drinking water well or watercourse; or (v) There is shown to be direct contact between the bottom of the cesspool and the groundwater table.

(5) "Onsite wastewater treatment system" or "OWTS" means any system of piping, tanks, disposal areas, alternative toilets, or other facilities designed to function as a unit to convey, store, treat, and/or dispose of sanitary sewage, by means other than discharge into a public sewer system. A cesspool is not an OWTS.

(6) "System inspector" means a person who is registered as an inspector and capable of properly assessing the condition of an OWTS.

(7) "Transfer" means a transfer of real property except between the following relationships:

(i) Between current spouses;

(ii) Between parents and their children;

(iii) Between full siblings; or

(iv) Where the grantor transfers the real property to be held in a revocable or irrevocable trust, where at least one of the designated beneficiaries is of the first degree of relationship to the grantor.

(8) "Wastewater" means human or animal excremental liquid or substance, putrescible animal or vegetable garbage or filth, including, but not limited to, waste discharged from toilets, bath tubs, showers, laundry tubs, washing machines, sinks, and dishwashers.

History of Section.
(P.L. 2007, ch. 136, § 1; P.L. 2007, ch. 233, § 1; P.L. 2015, ch. 163, § 1; P.L. 2015, ch. 185, § 1.)

§ 23-19.15-5. Inspection requirements for cesspools located in close proximity to tidal waters and public drinking supplies.

(a) Unless exempted under § 23-19.15-8(a), the owner of property served by a cesspool in the following areas shall cause an inspection to be performed on said cesspool by a system inspector in accordance with a schedule established by the department, but no later than January 1, 2012:

(1) Which cesspool is within two hundred feet (200') of the inland edge of a shoreline feature bordering a tidal water area [corresponding to the jurisdiction of the RI coastal resources management council];

(2) Which cesspool is within two hundred feet (200') of a public drinking water well; and

(3) Which cesspool is within two hundred feet (200') of a surface drinking water supply, specifically the impoundment from which water is drawn via the intake.

The inspection shall be conducted by a system inspector as defined herein and reported in accordance with procedures required by the department, and the results shall be recorded on forms prescribed by the department.

(b) Pursuant to § 5-20.8-13, every contract for the purchase and sale of real estate that is, or may be, served by a private cesspool shall provide that potential purchasers be permitted a ten-day (10) period, unless the parties mutually agree upon a different period of time, to conduct an inspection of the property's on-site sewage system in accordance with procedures required by the department in subsection (a) of this section before becoming obligated under the contract to purchase.

History of Section.
(P.L. 2007, ch. 136, § 1; P.L. 2007, ch. 233, § 1; P.L. 2008, ch. 475, § 61; P.L. 2015, ch. 163, § 1; P.L. 2015, ch. 185, § 1.)

§ 23-19.15-6. Cesspool removal and replacement.

(a) Any cesspool located in close proximity to tidal water areas and public drinking water supplies and required to be abandoned pursuant to this chapter shall be replaced with an approved OWTS, or the building served by the cesspool shall be connected to a public sewer, prior to the applicable deadlines contained in subsection (b) of this section.

(b) Cesspools found to be located within the areas identified in § 23-19.15-5(a) shall cease to be used for sewage disposal and shall be properly abandoned in accordance with the following schedule:

(1) *Tier 1.* Any cesspool deemed by the department or a system inspector to be failed in accordance with this chapter shall be properly abandoned within one year of discovery unless an immediate public health hazard is identified, in which case the director may require a shorter period of time.

(2) *Tier 2.* Any cesspool located on a property that has a sewer stub enabling connection to a public sewer shall be properly abandoned, and the building served by the cesspool shall be connected into the sewer system of such premises with such sewer and fill up and destroy any cesspool, privy vault, drain, or other arrangement on such land for the reception of sewage, excluding any Rhode Island department of environmental management OWTS-approved system, prior to January 1, 2014.

(3) *Tier 3.* Any cesspool within two hundred feet (200') of a public drinking water well, or within two hundred feet (200') of the inland edge of a shoreline feature bordering a tidal water area [corresponding to the jurisdiction of the RI Coastal Resources Management Council], or within two hundred feet (200) of a surface drinking water supply [specifically, the impoundment from which water is drawn via the intake], shall be properly abandoned by January 1, 2014.

History of Section.
(P.L. 2007, ch. 136, § 1; P.L. 2007, ch. 233, § 1; P.L. 2011, ch. 285, § 1; P.L. 2011, ch. 380, § 1; P.L. 2015, ch. 163, § 1; P.L. 2015, ch. 185, § 1.)

§ 23-19.15-7. Waiver.

The director may grant a waiver, to the extent necessary, from applicable provisions listed in § 23-19.15-6(b) provided the homeowner demonstrates undue hardship, defined as having an annual income of less than or equal to eighty percent (80%) of the appropriate household size area median income determined by the federal Housing and Urban Development standards for the community within which the cesspool is located, and the cesspool is not a failed system as defined herein. No waiver shall exceed five (5) years from the dates specified in § 23-19.15-6(b). Any waiver granted shall expire upon transfer or sale of the land or easement upon which the cesspool is located.

History of Section.
(P.L. 2007, ch. 136, § 1; P.L. 2007, ch. 233, § 1; P.L. 2011, ch. 285, § 1; P.L. 2011, ch. 380, § 1; P.L. 2015, ch. 163, § 1; P.L. 2015, ch. 185, § 1.)

§ 23-19.15-8. Exemption.

(a) The provisions of §§ 23-19.15-5, 23-19.15-6(a) and 23-19.15-12(a) shall not apply to any cesspool located in an area of a community covered by municipal, on-site wastewater management ordinance that requires the risk-based phase out of cesspools on an alternative schedule that meets the purposes of this act.

(b) The provisions of §§ 23-19.15-6(b)(2) and 23-19.15-12 shall not apply to any cesspool located on a property that is properly designated to be sewered no later than six (6) years after the applicable deadlines provided in § 23-19.15-6(b)(3) provided: (1) The sewering project is identified in the city, town, or sewer district's wastewater facilities plan as approved by DEM prior to January 1, 2013; (2) The municipality, acting through its city or town council, states in writing to the director of the department of environmental management by January 1, 2013, that the municipality will complete construction of the sewering project on or before January 1, 2020; and (3) The property owner certifies, in writing, that the dwelling/building will be connected to the sewer system within six (6) months of receipt of the notification to connect to the sewer system and that no increase in the design sewage flow or number of bedrooms in the building will occur until the connection is made.

(c) In addition to subdivision (b)(2) of this section, the municipality must demonstrate by December 31, 2014, that it has bond authorization or some other dedicated financial surety for expansion of sewers to the area of the building served by the cesspool. If the municipality fails to demonstrate such surety, this exemption shall terminate and the cesspool shall be replaced by June 30, 2015.

History of Section.
(P.L. 2007, ch. 136, § 1; P.L. 2007, ch. 233, § 1; P.L. 2008, ch. 475, § 61; P.L. 2011, ch. 285, § 1; P.L. 2011, ch. 380, § 1; P.L. 2015, ch. 163, § 1; P.L. 2015, ch. 185, § 1.)

§ 23-19.15-9. Notice to remove and replace cesspools.

(a) The owner of any cesspool who or that has not complied with the requirements pursuant to this chapter shall be in violation of this chapter and subject to enforcement action by the department in accordance with chapters 17.1 and 17.6 of title 42.

(b) Notwithstanding the above provisions, the director may require the abandonment and replacement of any cesspool with an approved OWTS prior to the dates specified in § 23-19.15-6(b) if the cesspool is a large capacity cesspool as defined pursuant to applicable federal regulations governing underground injection control (UIC) facilities.

History of Section.
(P.L. 2007, ch. 136, § 1; P.L. 2007, ch. 233, § 1; P.L. 2008, ch. 475, § 61; P.L. 2015, ch. 163, § 1; P.L. 2015, ch. 185, § 1.)

§ 23-19.15-10. Regulations.

The department shall promulgate rules and regulations as may be necessary to implement and carry out the provisions of this chapter.

History of Section.
(P.L. 2007, ch. 136, § 1; P.L. 2007, ch. 233, § 1.)

§ 23-19.15-11. Severability and construction.

The provisions of this chapter shall be severable, and if any court declares any phrase, clause, sentence, or provision of this chapter to be invalid, or its applicability to any government, agency, person, or circumstance is declared invalid, the remainder of the chapter and its relevant applicability shall not be affected. The provisions of this chapter shall be liberally construed to give effect to the purposes thereof.

History of Section.
(P.L. 2007, ch. 136, § 1; P.L. 2007, ch. 233, § 1.)

§ 23-19.15-12. Cesspool removal and replacement requirements at property transfer.

(a) Any cesspool found to be serving a building or use subject to sale or transfer shall be removed and replaced with an OWTS or the building served by the cesspool shall be connected to a public sewer system within twelve (12) months of the date of sale or transfer.

(b) Should the manner of wastewater disposal be unknown, an inspection shall be conducted to determine if a cesspool is present on the property. This inspection shall be done by a system inspector prior to the time of sale or transfer.

(c) Pursuant to § 5-20.8-13, every contract for the purchase and sale of real estate that is or may be served by a private cesspool shall provide that potential purchasers be permitted a ten-day (10) period, unless the parties mutually agree upon a different period of time, to conduct an inspection of the property's onsite sewage system in accordance with procedures required by the department in § 23-19.15-5(a), before becoming obligated under the contract to purchase.

History of Section.
(P.L. 2015, ch. 163, § 2; P.L. 2015, ch. 185, § 2.)

APPENDIX C

Septic System Checkup: The Rhode Island Handbook for Inspection

Septic System Checkup: The Rhode Island Handbook for Inspection

By
M. James Riordan

Layout design and drawings by
Anne Sherman Jett

Funded by DEM using a grant from
the U.S. Environmental Protection Agency
Clean Water Act, section 319

"You can observe a lot by watching."

Yogi Berra, 1968

TABLE OF CONTENTS

PREFACE 1

ACKNOWLEDGMENTS 3

CHAPTER 1 Inspecting Operating Septic Systems: An Overview 5
- 1.1 Types of Inspections 6
  - 1.1.1 Maintenance inspections 6
  - 1.1.2 Functional inspections 8
- 1.2 Types of Septic Systems and How Their Workings 13
  - 1.2.1 Cesspools 13
  - 1.2.2 Conventional septic systems 15

CHAPTER 2 Gathering Records and Data for Inspections 19
- 2.1 Acquiring Records from DEM 20
  - 2.1.1 System conformance and construction 20
  - 2.1.2 Determining system history (optional) 21
  - 2.1.3 Acquiring the most recent system drawings 22
- 2.2 Acquiring Information from Community Officials 22
- 2.3 Interviewing System Owners 23

CHAPTER 3 In-Home Plumbing Evaluation 25
- 3.1 Wastewater Routing 25
- 3.2 Estimating Water Use 26
  - 3.2.1 Estimating water use with a water meter 26
  - 3.2.2 Estimating water use in unmetered homes 28
  - 3.2.3 Reducing excessive water use 29

3.3 Leak Diagnosis and Repair 30
3.3.1 Measuring flow rate 30
3.3.2 Toilets 31
3.3.3 Faucets 33
3.3.4 Water treatment appliances 34
3.4 Retrofitting Household Fixtures with Water Conservation Devices 36

CHAPTER 4 Techniques for Accessing Septic System Components 37
4.1 Locating Septic Tanks and Cesspools 37
4.2 Locating Distribution Boxes and Soil Absorption Systems 39
4.3 Opening and Closing Component Accesses 40
4.3.1 Accesses at grade 40
4.3.2 Buried accesses 41
4.4 Suggested Retrofits for Conventional Septic Systems 42
4.4.1 Risers to grade 43
4.4.2 Effluent filters and gas baffles 44

CHAPTER 5 Evaluation and Maintenance Procedures for Septic System Components 45
5.1 Inspecting and Maintaining Septic Tanks 45
5.1.1 Examining the external condition of septic tanks 45
5.1.2 Determining when conventional tanks need pumping 45
5.1.3 Cleaning sludge and scum measuring devices 48
5.1.4 Pumping need for metal tanks 49
5.1.5 Pumping septic systems automatically as part of the first maintenance inspection 49
5.1.6 Procedures for multicompartment tanks or septic tanks in series 49
5.1.7 Procedures for cleaning effluent filters 50
5.1.8 Pumping procedures for septic tanks 51
5.1.9 Determining septic tank volume (optional) 53
5.1.10 Septic system additives 54
5.2 Procedures for Maintaining Distribution Boxes if an Inspection Port is Present 55
5.3 Maintenance Inspection for Cesspools 55
5.3.1 Inspection prior to pumping 56
5.3.2 Pump the cesspool regardless of solids depth 56

5.3.3 Cesspools with overflow pipes and other outlets 56
5.4 Observation of Site Conditions 57
5.5 Flow Trial for Identifying Gross Loss of Hydraulic Capacity 59
5.5.1 Limitation of the flow trial 59
5.5.2 Calculating the flow trial volume 61
5.5.3 Flow trial procedures 61
5.6 Dye Tracing for Confirming Treatment Bypasses 63
5.6.1 Identifying suspected treatment bypasses 63
5.6.2 Checking catch basins for bypasses 64
5.6.3 Investigating suspected bypasses 67
5.6.4 Preparation of dye-tracing solution 68

CHAPTER 6 Scheduling Maintenance Inspections 71
6.1 Conventional Systems Serving Single-Family Homes 71
6.1.1 Conventional systems serving 1-2 persons per bedroom 71
6.1.2 Conventional systems serving 1 person per bedroom or less 72
6.1.3 Effect of garbage grinders on maintenance 72
6.2 Nonconventional Systems Serving Single-Family Homes 73
6.2.1 Cesspools and other substandard systems 73
6.2.2 Alternative systems 73
6.3 Special Consideration for Systems Serving Rental Properties 74
6.4 Suggested Policy for Scheduling Inspections in Community Programs 74
6.5 Evaluation of Inspection Schedules 76

GLOSSARY OF TERMS 79

BIBLIOGRAPHY 87

SEPTIC SYSTEM MAINTENANCE POLICY FORUM AND SUBCOMMITTEES 95

PREFACE

How should septic systems[1] be maintained? How can one determine if a given septic system is working when purchasing a home? *Septic System Checkup* answers these questions by providing state-recommended standards for evaluating and maintaining septic systems that serve residences in Rhode Island. The handbook includes complete instructions for gathering septic system records, locating components, diagnosing minor in-home plumbing problems, conducting flow trials, dye tracing, and maintenance scheduling. It describes two types of inspections: (1) a maintenance inspection to determine the need for pumping and minor repairs; and (2) a functional inspection for use during property transfer.

Septic System Checkup is for everyone with an interest in ensuring septic system function. Home inspectors should use it to determine if a system is adequate to serve the needs of a prospective buyer. Homebuyers will find it useful in learning how septic systems should be evaluated. Maintenance professionals should use *Septic System Checkup* to determine the need for routine maintenance as well as repair. Community officials will find the handbook helpful in developing septic system maintenance programs. And do-it-yourselfers can use the handbook for instruction on how to conduct their own routine inspections.

1. This handbook applies to conventional septic system components and cesspools. Those readers interested in inspection and maintenance of innovative and alternative components should refer to the specific system's permit stipulations and manufacturer instructions.

ACKNOWLEDGEMENTS

Septic System Checkup: The Rhode Island Handbook for Inspection and *Inspection Report Forms* were authored by M. James Riordan, Principal Environmental Scientist of the Office of Water Resources, Department of Environmental Management. Mr. Riordan also oversaw all aspects of their development.

During development, Mr. Riordan was supervised--and generously mentored--by Russ Chateauneuf, Division Chief of the Office of Water Resources, Sue Kiernan, Deputy Division Chief of the Office of Water Resources and Scott Millar, Supervising Environmental Scientist of the Office of Strategic Planning and Policy (who originated the concept of a septic system inspection handbook for Rhode Island).

Layout, design and graphic artwork for the handbook and report forms were all done by Anne Jett. Ms. Jett also devoted countless hours as one of the *Septic System Checkup's* primary reviewers and editors. Without her assistance, *Septic System Checkup* would have remained unmanifest.

Development of *Septic System Checkup* occurred in cooperation with Rhode Island's Septic System Maintenance Policy Forum. The policy forum is a roundtable group that comprises approximately 100 representatives from federal, state and local government, as well as private associations, businesses and general public. The policy forum operates on a consensus-based approach. The meetings are open to all interested parties. It has met seventeen times since its inception in 1995. The cooperative spirit of the policy forum and dedication of all its participants has been no less than critical to successful development of *Septic System Checkup*. A list of the attendants of the policy forum can be found in "Septic System Maintenance Policy Forum and Subcommittees" at the rear of the handbook.

Several individuals provided particularly significant time and effort towards the development of the procedures of *Septic System Checkup* as well as the science behind septic system inspections in general. They include Bob Schmidt and Peter O'Rourke of the Rhode Island Department of Environmental Management; George Loomis and David Dow of the University of Rhode Island; and Joe Frisella of Frisella Engineering, Dave Burnham of the Rhode Island Independent Contractors and Paul Brunetti of Griggs and Browne. *Septic System Checkup* would not have been possible without the benefit of their knowledge and generosity of time.

Many others have also contributed to *Septic System Checkup* by reviewing the document, discussing issues with the author and providing emotional support (here especially, Jody-Kay Riordan, the author's wife). To all of you--both named and unnamed--thank you for broadening the author's field of view.

"If I have seen farther than others, it is because I was standing on the shoulders of giants." (Albert Einstein)

CHAPTER 1
Inspecting Operating Septic Systems: An Overview

Approximately 150,000 Rhode Island households, or one third of the state's population, use some form of septic system for sewage disposal. Rhode Island's septic systems discharge some seven billion gallons of wastewater into the ground each year.

When used properly, septic systems function very well. If mismanaged, however, these systems will fail, creating conditions that may threaten human health and the environment. Untreated effluent from malfunctioning septic systems may reveal itself by sight and smell, when a system backs up, or it may quietly percolate through the soil into the groundwater and adjacent waterbodies.

Failed systems have been associated with many serious problems. Outbreaks of diseases, such as hepatitis, dysentery, and gastroenteritis, may result from unmitigated wastewater pathogens. Untreated effluent can accelerate the eutrophication process of nearby waterbodies, lowering oxygen levels and suffocating aquatic life. From an economic point of view, septic system repair bills can be staggering. Yet, many of us live with and use septic systems, giving little or no thought for their existence…until they fail.

Inspection and maintenance is the key to ensuring that septic systems function properly. Nevertheless, few systems receive routine inspection and maintenance and those that do may receive inadequate care as inspectors have historically been without standardized procedures.

This handbook is about septic system inspections. It provides guidelines for performing inspections. It also provides answers to a number of important questions regarding the operation and maintenance of septic systems. For example, what is the most convenient and least expensive maintenance method for ensuring that a septic system functions properly? How can prospective homebuyers make certain that a home purchase will include an adequate system? What is the minimum inspection regime necessary to determine if a septic system is working?

1.1 Types of Inspections

This handbook addresses the two types of inspections that are typically performed by properly trained wastewater professionals: maintenance inspections and functional inspections. The maintenance inspection is used to determine the need for pumping and to ensure proper function; the functional inspection is used primarily during property transfers and builds on the maintenance inspection.

1.1.1 Maintenance inspections

The maintenance inspection is used to determine the need for pumping and to identify minor problems before they become serious health and environmental hazards or cost prohibitive to repair. There are two maintenance inspection subtypes: a first maintenance inspection and a routine maintenance inspection. The first maintenance inspection consists of procedures that are designed to help an inspector locate the system components; the routine maintenance inspection assumes that the components have already been located. The following is an outline of first maintenance and routine inspection procedures (see also Tables 1.1 and 1.2).

First maintenance inspection

Gather Records and Data (chapter 2):

1. Interview user/homeowner (section 2.3).
2. Obtain most recent system drawings (section 2.1.3).

Locate the System Components (chapter 4):

1. Locate and gain access to the septic tank/cesspool (section 4.1).
2. Locate the soil absorption system (section 4.2).

3. Identify any potential retrofits (section 4.4).

Evaluate and Maintain the System Components (chapter 5):

1. Inspect and maintain the septic tank/cesspool (section 5.1).
2. Inspect the distribution box, if handhole is present (section 5.2).
3. Observe overall site conditions (section 5.4).

Establish an Inspection Schedule (chapter 6)

Report findings to the homeowner and, where required by municipal ordinance, a local official (*Septic System Checkup: Inspection Report Forms*)

Routine maintenance inspection

Locate the System Components (chapter 4):

1. Locate and gain access to the septic tank/cesspool (section 4.1).
2. Locate the soil absorption system (section 4.2).
3. Identify any potential retrofits (section 4.4).

Evaluate and Maintain the System Components (chapter 5):

1. Inspect and maintain the septic tank/cesspool (section 5.1).
2. Inspect the distribution box, if handhole is present (section 5.2).
3. Observe overall site conditions (section 5.4).

Establish an Inspection Schedule (chapter 6)

Report findings to the homeowner and, where required by municipal ordinance, a local official (*Septic System Checkup: Inspection Report Forms*)

In some instances, a maintenance service provider may perform an in-home plumbing evaluation, flow trial and dye tracing. However, these procedures should only be performed when a system problem is suspected and should not be done as a routine part of maintenance inspections.

1.1.2 Functional inspections

The functional inspection is used to determine whether a system is adequate to serve the wastewater disposal needs of the household. The functional inspection is especially intended for use during a property transfer as a means to protect the consumer and identify systems in need of upgrade or repair. It may involve, as appropriate, any of the procedures described in this handbook. The following is an outline of functional inspection procedures (see also Tables 1.1 and 1.2).

Gather Records and Data[2] (chapter 2):

1. Determine system conformance (section 2.1.1).
2. Determine the history of the system (section 2.1.2).
3. Acquire the most recent system drawings (section 2.1.3).
4. Acquire information about the system from community officials (as necessary) (section 2.2).
5. Interview the system user/owner (section 2.3).

Evaluate the In-Home Plumbing (chapter 3):

1. Estimate water use (section 3.2).
2. Conduct a leak diagnostics and repair evaluation (section 3.3).
3. Retrofit household fixtures with water conservation devices (section 3.4).

Locate the System Components (chapter 4):

1. Locate and access the septic tank/cesspool (section 4.1).
2. Locate the soil absorption system (section 4.2).
3. Identify any potential retrofits (section 4.4).

Evaluate and Maintain the System Components (chapter 5):

1. Inspect and maintain the septic tank/cesspool (section 5.1).
2. Inspect the distribution box, if handhole is present (section 5.2).
3. Observe overall site conditions (section 5.4).
4. Conduct a flow trial (section 5.5).
5. Conduct dye tracing (section 5.6).

2. Septic system permit records for functional inspections are typically obtained by homeowners and provided to home inspectors. Some home inspectors may provide record research services for a fee (see chapter 2).

Establish an Inspection Schedule (chapter 6)

Report findings to the homeowner, the potential homebuyer, where required by municipal ordinance, a local official, using maintenance and functional inspection reports (*Septic System Checkup: Inspection Report Forms*)

Many of the inspection procedures, described herein, require special equipment, information, and reference materials: Table 1.1, "Inspection Procedures and Necessary Information, Materials and Equipment," lists the equipment and materials necessary for each procedure. Table 1.2, "Types of Inspection and Necessary Information, Materials and Equipment," lists the items required to perform first maintenance, routine maintenance and functional inspections.

Table 1.1 Inspection Procedures and Necessary Information, Materials and Equipment

Procedure Type	Procedure	Items Required
Record and data gathering	Acquiring records from DEM and acquiring information from community officials	•Name of owner •Address of system •Plat and lot of property
	Interviewing homeowners	•System records •Interview information sheet
In-home plumbing evaluation	Estimating water use	•Recent water bills (see section 2.1) •Flashlight •Calculator (optional)
	Leak diagnosis and repair	•Calculator (optional) •Chalk, crayon or tape •Watch or stopwatch •Plumbing replacement parts and tools •Large and small metered collection cups •Clean cloth for wiping fixtures •Water conservation devices and tools as necessary •Pressure and flow meters
Accessing system components	Septic tanks and cesspools	•System drawings (see section 2.1) •Shovel or spade •Metal prod •Electrician's snake •Wrench to open building sewer •Metal detector or other pipe locator (optional)
	Distribution box	•Access to septic tank and associated tools
Evaluation and maintenance procedures	Septic tank (once accessed)	•Sludge measuring device •Scum measuring device •Latex gloves •Rag for cleaning sludge and scum off measuring devices •Bleach and water solution

Procedure Type	Procedure	Items Required
Evaluation and maintenance procedures (continued)	Septic tank (once accessed)	•Pumptruck and pumping equipment •Flashlight for viewing interior •Mirror on pole •Eye protection •Septage spoon
	Cesspool (once accessed)	•Pumpout equipment •Electrician's snake •Flashlight for viewing interior •Angled mirror on pole
	Observation of site conditions	•System drawings
	Flow trial (once the tank is located and inspected)	•Calculator •Garden hose or other water source •Flow meter or other flow measuring equipment
	Dye tracing (once tank is located and inspected)	•Dye tracing solution · dye · protective clothing · latex gloves · 1½ gallon pitcher · measuring spoons · stir stick · funnel · storage bottles · carrying cases · paper towels •Checking for bypasses · municipal permission to access basins · 6 traffic cones · manhole cover hook · rope · flashlight · broom · crow bar •Investigating bypasses · garden hose · watch
Scheduling inspections		•System records (see section 2.1) •Calculator •Most recent inspection report
Reporting findings		•Appropriate report form •Educational materials

Table 1.2 Types of Inspection and Necessary Information, Materials and Equipment

Routine Maintenance	First Maintenance	Functional Inspection
	All items from "Routine Maintenance" and...	*All items from "Routine Maintenance" and "First Maintenance" and...*
•Most recent inspection report	•Name of owner	•Interview information sheet
•Shovel or spade	•Address of system	•Recent water bill (see section 2.1 "Acquiring Records from DEM")
•Metal probe	•System drawings (see section 2.1 "Acquiring records from DEM")	•Food coloring for identifying toilet leaks
•Electrician's snake	•Calculator (optional)	•Chalk, crayon or tape
•Wrench to open building sewer		•Watch or stopwatch
•Metal detector or other pipe locator (optional)		•Plumbing replacement parts and tools
•Sludge and scum measuring device		•Clean, dry cloth for wiping fixtures
•Pumping equipment		•Large and small metered collection cups
•Flashlight		•Water conservation devices and tools as necessary
•Mirror on pole		•Pressure and flow meters
•Appropriate report form		•Garden hose or other water source
•Educational materials		•Dye tracing solution
•Latex gloves		•Municipal permission to access basins
•Rag for cleaning sludge and scum measuring device		•Rope
•Bleach and water solution		•6 traffic cones
		•Broom
		•Manhole cover hook
		•Crow bar
		•Metered (measuring) cup

1.2 Types of Septic Systems and Their Workings

Septic systems come in many forms and state-of-the-art technology is constantly evolving. The vast majority of systems in Rhode Island, however, fall into one of two basic categories: cesspools and conventional systems.

1.2.1 Cesspools

What exactly is a cesspool? Typically, a cesspool is a rock-walled, covered hole that receives wastewater from a home and allows it to drain into the surrounding soil. More sophisticated designs incorporate open-bottom concrete vaults with grated sidewalls and may discharge to a seepage pit or drainfield (refer to Figure 1.1). DEM's *Rules and Regulations Establishing Minimum Standards Relating to Location, Design, Construction and Maintenance of Individual Sewage Disposal Systems* (hereafter referred to as the ISDS Regulations) define "cesspool" as follows:

> The term "cesspool" shall be held to mean any buried chamber, including but not limited to, any metal tank, perforated concrete vault or covered hollow or excavation, which receives discharges of sanitary sewage from building sewer for the purpose of collecting solids and discharging liquids to the surrounding soil. Cesspools are not an approved method of sewage disposal under these Regulations and all existing cesspools are considered to be substandard. (SD 1.00)

Approximately 70,000 Rhode Island homes use cesspools for wastewater disposal. Irrespective of their wide distribution, cesspools provide inadequate wastewater disposal service for many users. Because of this inadequacy, households that rely on cesspools and employ modern appliances, such as garbage grinders, dishwashers and washing machines, tend to have system overflows or backups.

Cesspools also compromise public health and environmental quality. Cesspools allow wastewater to flow to ground- and surface-water resources without providing adequate treatment. This means that disease-causing bacteria and viruses, which are commonly found in raw wastewater, go unchecked. When wastewater pathogens pass freely into the natural environment, they threaten fishing grounds, bathing beaches and drinking water supplies.

DEM strongly encourages owners of cesspools to upgrade their systems; however, the department also recognizes that not every owner has the immediate financial means to replace a septic system. Therefore, this handbook recommends procedures for cesspool maintenance that should be used when cesspools are not obviously failing or causing nuisance. Inspectors and owners should be aware, however, that even cesspools maintained according to handbook procedures provide, at best, marginal treatment and should be considered for upgrade as soon as practicable. Additionally, a failed cesspool is not considered repairable and should be replaced with a conventional septic system in accordance with regulatory standards.

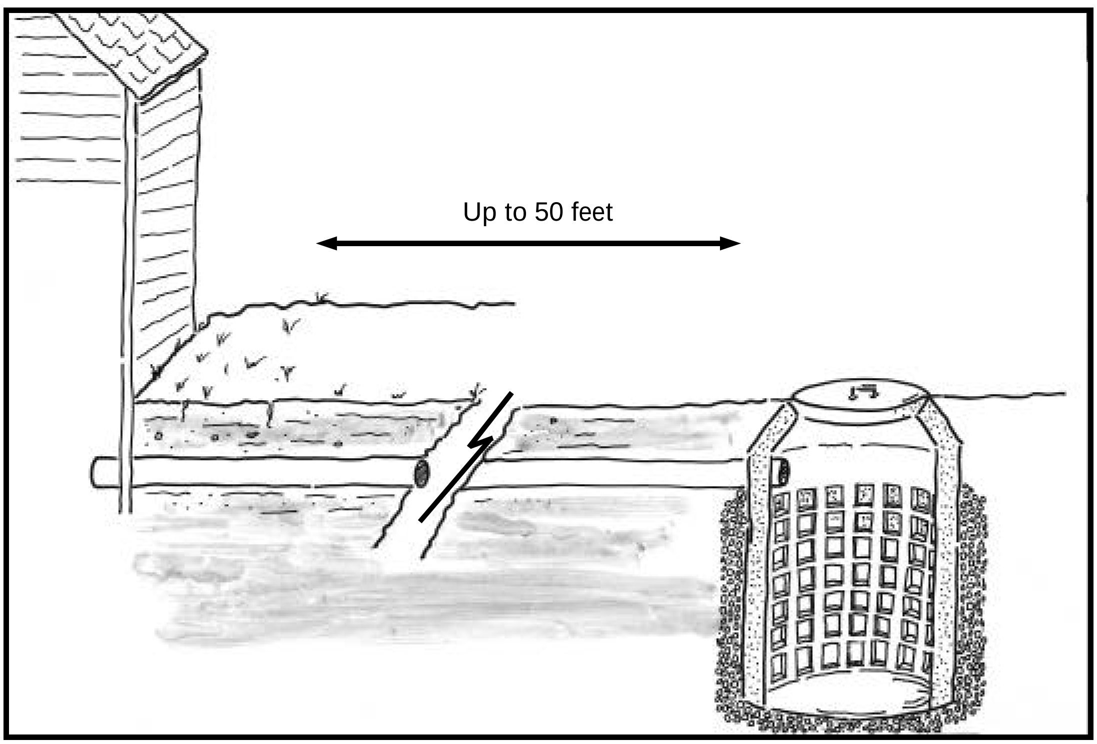


Figure 1.1 Cut away of a typical cesspool with a concrete vault. Wastewater flows by gravity from the building sewer to the cesspool, which may be located up to 50 feet from the foundation.

1.2.2 Conventional septic systems

A well-designed and maintained septic system provides an excellent means for sewage disposal. Once considered only a short-term option, experts now recognize that the conventional septic system can be long-lived and cost effective. In fact, in many suburban and rural areas, conventional septic systems are preferred over sewers.

In Rhode Island, a conventional septic system includes three basic components: building sewer, septic tank, and soil absorption system. The following sections describe the general workings of each.

Building sewer

Houses with conventional plumbing discharge all wastewater through a single pipe, called the building sewer or soil pipe, which delivers wastewater by gravity to some part of a sewage disposal system, typically the septic tank.

Septic tank

Modern septic tanks are generally rectangular boxes that are constructed of either concrete or fiberglass (refer to Figure 1.3a). Older tanks may be round (i.e., cylindrical) and built of substandard material, such as steel, which may corrode over time. Modern tank sizes typically range from 1000 - 1500 gallons, depending on the number of bedrooms served. Some older tanks may be as small as 500 gallons.

A septic tank is used to hold wastewater while the wastewater's solid and liquid constituents separate. The heavier material in the wastewater, called sludge, sinks to the bottom of the tank where it slowly decomposes. The floatable material (e.g., grease and oil), which is refered to as scum, rises to the surface and becomes trapped between devices at the tank's inlet and outlet, either baffles or sanitary tees. When wastewater enters the tank, it pushes relatively clean septage out of the tank from the "clear zone," which is the settling area between the scum and sludge layers, out of the tank .

Typically, solids accumulate in septic tanks faster than they decompose. This accumulation of solids reduces the clear zone of the tank. If the clear zone becomes too small, the incoming wastewater will displace the wastewater before solids and liquids have properly separated. Wastewater with unsettled solids will clog a soil absorption system. Thus, tanks need to be pumped to maintain an appropriate clear zone. Failure to pump in a timely manner will cause the soil absorption system to fail.

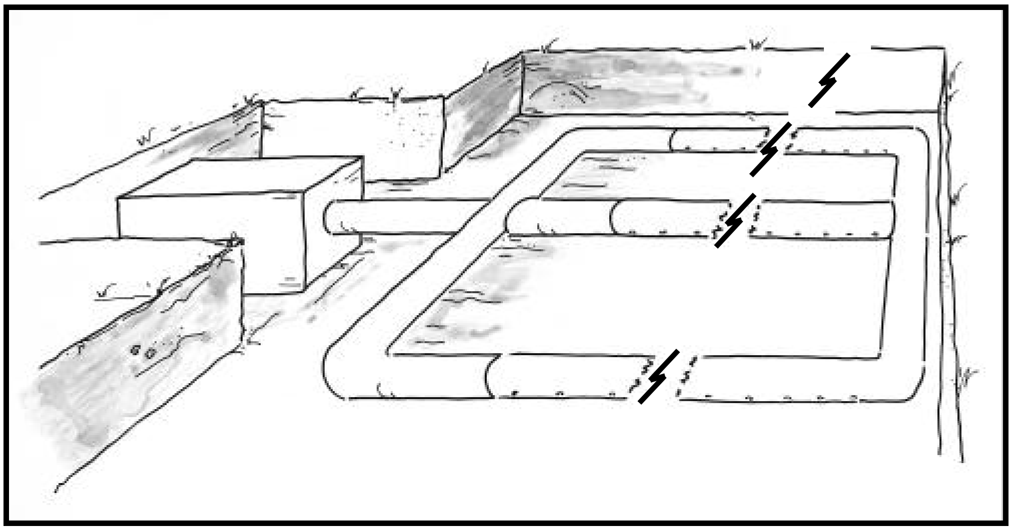


Figure 1.2a Soil absorption bed system

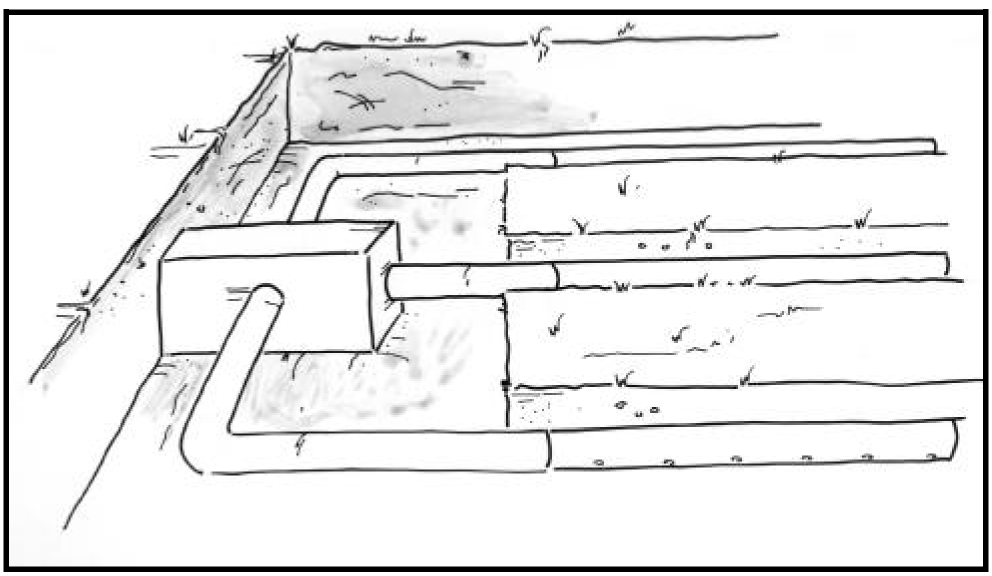


Figure 1.2b Soil absorption trench system

Soil absorption system

When effluent leaves the septic tank, it flows to the soil absorption system. If the septic tank of a conventional system is maintained in accordance with the procedures of this handbook, the soil absorption system should function properly for many, many years, perhaps in perpetuity. Three basic types of soil absorption systems are commonly used in Rhode Island: seepage pits, disposal beds and disposal trenches.

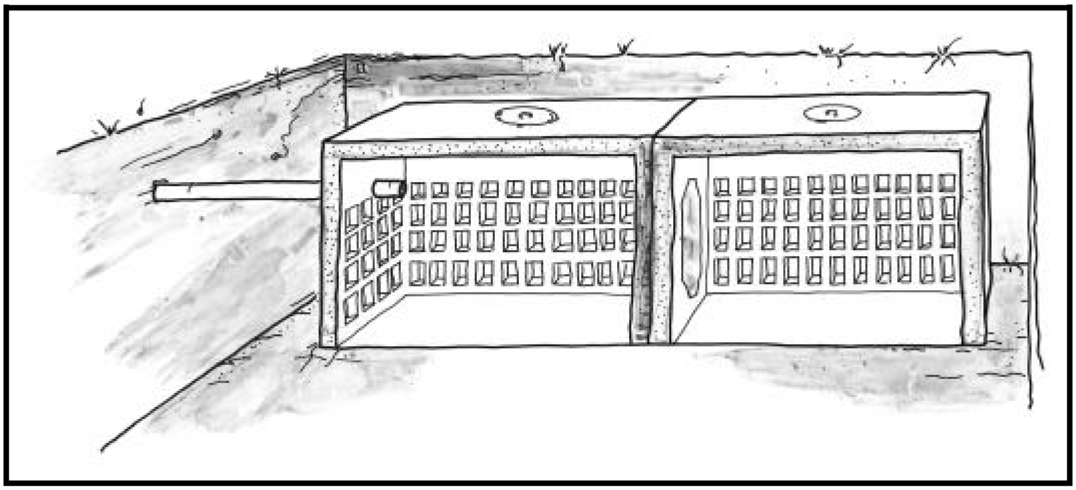
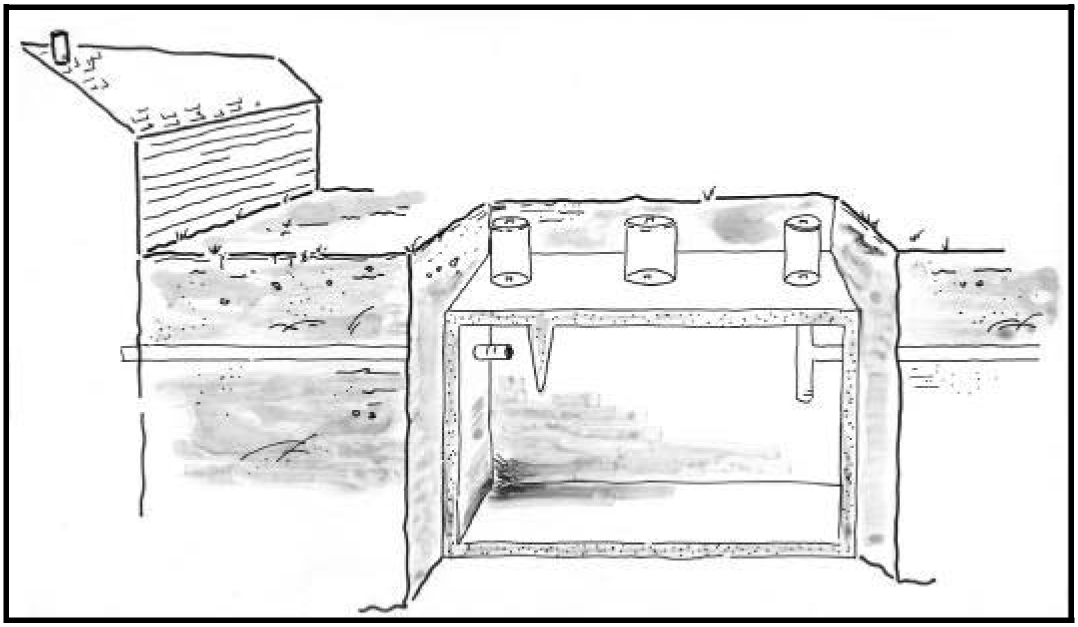


Figure 1.2c Cut-away view of soil absorption two galley-style seepage pits in series

Seepage pits (see Figure 1.2c)—sometimes referred to as flow diffusers or galleys—employ bottomless concrete structures with grated sides. The design of a seepage pit is similar to that of a cesspool; however, a seepage pit, by regulatory definition, is always downline from a septic tank.[3]

Disposal beds and disposal trenches are generically referred to as drainfields, but are in fact different. A disposal bed system is a shallow rectangular excavation that is partially backfilled with stone, lined with a network of perforated distribution pipe, and then filled to grade with earth. A disposal trench system consists of two or more parallel ditches that are partially filled with stone, each lined with singular perforated pipe, covered with a porous liner and then filled to grade with earth. Both system types typically utilize a distribution box (i.e., D-box, see Figure 1.3b). The D-box follows the septic tank, splitting the flow into approximately equal amounts, which it channels to the drainfield lines.

3. When a cesspool system has two chambers, the second is usually referred to as a seepage pit.



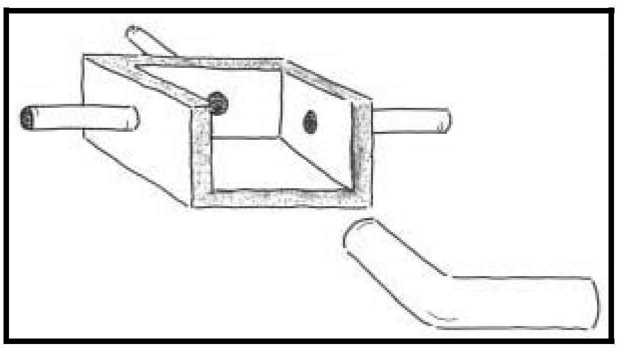


Figure 1.3a Cut-away view of a conventional 1000-gallon septic tank. Wastewater flows by gravity from the building sewer to the septic tank, followed by the distribution box and then to the soil absorption system.

Figure 1.3b Exploded diagram of a conventional distribution box.

CHAPTER 2
Gathering Records and Data for Inspections

Determining the adequacy of a septic system requires knowledge about its design, use and maintenance. Such information may be obtained by reviewing its application, use and maintenance records and by talking with the system's users.

Inspectors should make certain to have written records available at the time of inspection. Table 2.1, "Obtaining Septic System Application, Use and Maintenance Records," lists types of records and where they can be obtained. These records are necessary to ensure system conformance. The records will also provide valuable time savings when attempting to locate buried components . Usually, records are gathered by the homeowner and provided to an inspector; however, this does not preclude inspectors from gathering records as a service to homeowners.

Table 2.1 Obtaining Septic System Application, Use and Maintenance Records

Type of information	Name of record	Availability
Application[a]	Applications for new system, alteration & repair Certification of conformance Certification of construction	DEM Homeowner Building official System designer
Use[a]	Septage pumping records Water bill	Homeowner or tenant Inspector/pumper (pumping records only)
Maintenance	Maintenance inspection report	Homeowner Wastewater management official

Note: a. Some information regarding application and use may have been recorded in functional inspection and first maintenance inspection reports. However, such information should be checked against the original source, whenever possible, to avoid repeating any data-gathering errors.

The following sections describe how inspectors and homeowners may obtain information from DEM and community officials. It also discusses how inspectors should interview homeowners and other system users, such as renters.

2.1 Acquiring Records from DEM

Application records demonstrate that a system is properly permitted. Most systems installed after April 6, 1968 will have application records. Homeowners and inspectors may obtain copies of these records from DEM, which generally has the most comprehensive and up-to-date records.

Whenever possible, an inspector should review records with the homeowner to make sure they are complete. If a homeowner notes any discrepancy, the inspector should request documentation. Homeowners should follow up with local officials and DEM regarding any discrepancies that are found.

DEM keeps records at 235 Promenade Street, Providence in the Office of Water Resources. DEM's Office of Technical and Customer Assistance is available to help the general public in obtaining permits. DEM's telephone number is in the Blue Pages of the telephone directory. To obtain optimum assistance, customers may wish to call DEM before visiting the office in person. With respect to DEM records, a functional inspection should include a review of the following:

1. System conformance and construction certificates, and optionally, a functional inspection may include records of system history such as violations or applications for repair or alteration.
2. Most recent as-built plans.

2.1.1 System conformance and construction

A functional inspection should include a determination of whether a system is conformed and constructed in accordance with regulations. All conformed systems are recorded in a reference set, entitled *Conformed ISDS Applications*. Conformance records show that a system was constructed and installed in accordance with the regulations that were in force at the time of the application approval. *Conformed ISDS Applications* lists eight fields of information for each system:

1. Year of application.[4]
2. City/Town of system location.
3. Application number.
4. Microfilm number.
5. Street of system location.
6. Plat number.
7. Lot number.
8. Applicant name.

The reference indexes septic systems by town of location, and either street of location or application number.

In January 1992, DEM computerized its septic system records. Reference numbers since then have two parts that are separated by a hyphen. The first four digits include a two digit number for the year (e.g., "92" for applications in 1992) and two digits representing town number in an alphabetized listing (e.g. "30" for Scituate). The second part is a number of 1-4 digits representing order of receipt (e.g., "99" for the ninety-ninth ISDS application received by DEM in a given year). Thus, the application number for the system just described would be: 9230-99. Applications prior to 1992 were assigned reference numbers using other systems.

2.1.2 Determining system history (optional)

Though determining system history is not necessary for either functional or maintenance inspections, homeowners and potential homebuyers may wish to find out whether a system has a good history of regulatory compliance. The records of new construction, alteration or repair are bound in logbooks cataloged by year, town and application number. These records are available through DEM's Office of Technical and Customer Assistance.

4. An application, with proper renewals and transfers, may be valid for years after it has been approved. Thus a system may be built in one year, but have an application for another year.

DEM also keeps records of violations in a log entitled *EE. RIDEM ISDS Status Report*. The report is indexed by year, town, and street address. It dates back to 1982. Records of violations are available by request at the DEM Office of Technical and Customer Assistance, 235 Promenade Street, Providence.

2.1.3 Acquiring the most recent system drawings

To access system components, inspectors will need to know where system components are located. System drawings generally give reliable information. Using the techniques described in "Determining system history" (section 2.1.2), find the most recent permit application number for the system. Find the microfilm number in *Conformed ISDS Applications*. To obtain a hard copy of the application, contact DEM's Office of Technical and Customer Assistance.

2.2 Acquiring Information from Community Officials

Local officials may keep permit or maintenance records. Generally, building officials or wastewater officials provide appropriate points of contact.

Building officials keep records of all building permits. Before a town issues a certificate of occupancy, state law requires the town to confirm the existence of an up-to-date certificate of conformance for the septic system.

Towns with wastewater management programs may keep records of inspection and maintenance. To acquire such information, call the appropriate official as listed in the Blue Pages of the telephone directory. For questions about who to contact, call the town hall. DEM's Office of Water Resources is currently developing a reference text that also provides this information.

2.3 Interviewing System Owners

The functioning of a septic system is dynamic and complex. Sometimes observations during an inspection have more than one possible interpretation. Interviewing a system's owner and users may help to interpret inspection results. Figure 2.1 lists important information an inspector may wish to obtain from the homeowner or system users.

HOMEOWNER/OCCUPANT RECORDS & DATA, as available

Information collected pursuant to this section is to be provided voluntarily and at the discretion of the property owner. The property owner is solely responsible for record and data accuracy and completeness. The inspector assumes no responsibility for the accuracy of information provided by the property.

Indicate whether the following information was made available during the inspection. Attach copies of available records. If the property owner states that any of the following services were not provided—or in the case of application records that the system was installed prior to regulations (April 1968) — indicate not applicable (N/A). If the property owner states that partial records were provided, indicate "partial."

Source of Records & Data

Records and data were given to the inspector by:

_______ Property owner _______ Realtor ________ Other _____________________________

Application Records

Yes	No	N/A	
☐	☐	☐	Applications for septic system (inclusive of new systems, alteration, repairs). Indicate the number of each: ______ New system ______ Alteration ______ Repairs
☐	☐	☐	Certificate of Construction
☐	☐	☐	Certificate of Conformance

Use Records

Yes	No	N/A	Partial	
☐	☐	☐	☐	Last two septage pumping bills
☐	☐	☐	☐	Water bills for the last 12-24 months

Maintenance Records

Yes	No	N/A	Partial	
☐	☐	☐	☐	Maintenance inspection reports

Resident Data

During the last 12 months, the inspected residence housed _____ year-round occupants

Plat Number ______ Lot Number ______

Figure 2.1 Important homeowner records and information as required for the functional inspection, see *Septic System Checkup: Inspection Report Form.*

Begin the interview by carefully reviewing all pertinent written information. Some written records may be out of date or contain inaccuracies. An interview may help to verify data on written reports.

Interviews are best done in person. When interviewing be sure to maintain a courteous and professional demeanor. Make the person being interviewed feel comfortable. This will help to optimize the quality of the interview. Interviews also provide an excellent opportunity to educate the user about how to care for their septic system. Inspectors may wish to leave educational materials with system users. Educational materials are available from DEM, the University of Rhode Island's Onsite Wastewater Training Center, and from some municipalities.

CHAPTER 3
In-Home Plumbing Evaluation

Faulty or outdated plumbing may add significantly to the wastewater load on a septic system. Overloaded systems tend to fail and as a result may generate expensive repair bills. Also, faulty plumbing adds to overall water use and may result in expensive water bills.

Inspectors performing functional inspections should carefully check all plumbing, water fixtures and water-using devices for malfunctions.[5] Maintenance inspections, however, will not usually include in-home plumbing evaluation.

3.1 Wastewater Routing

For the purposes of this handbook, wastewater routing refers to the manner in which gray and black water outlets exit from a building. Unless otherwise allowed by a DEM-approved permit, all wastewater should route through the building sewer to the septic system. Inspectors should visually check to make certain that *only one* wastewater pipe exits the basement and, in particular, that the washing machine outflow goes to the septic tank. Homeowners may illegally route these out a window or to a storm drain.

If a gray water discharge to a dry well is approved by the department and it has not been altered since its permit approval, then it is usually an acceptable discharge.[6] Nevertheless, having a permit approval does not ensure that a dry well functions properly. Homeowners should keep in mind that most inspectors *do not* assume responsibility for dry wells and therefore do not include them as part of a functional

5. While checking for faulty plumbing, an inspector may also wish to take the opportunity to locate the building sewer to help find the septic tank.
6. Black water discharges to dry wells are prohibited by regulation.

inspection. Currently, there is no procedure to ensure the proper functioning of a dry well.

Sump pumps and foundation drains should not be routed to the septic system. Water volumes generated by these devices will quickly overload a system and cause backups or other hydraulic failures. Instead, these devices should outlet to the ground surface or a dry well.

3.2 Estimating Water Use

Inspectors should analyze water use as part of the functional inspection. High water use contributes to septic system failure in two major ways: (a) high water flows tend to stress the absorptive capacity of soils; and (b) overly large flows are likely to carry over solids from the septic tank and thereby clog the soil absorption system. Inspectors should use the following method to diagnose water-use problems when a water meter is present.

3.2.1 Estimating water use with a water meter

1. Obtain water bills from the last 12-24 months including records of previous meter readings. Inspectors should obtain water bills from the homeowner (refer to section 2.3).
2. Locate the water meter by following any water line back to the main water supply line inlet. The meter may be in the basement or outside the house. Water meters generally have protective flap covers that lift open.
3. Read the meter. Water meters come in three types as shown in Figure 3.1. Use the Equation 3.1 to approximate water use per capita per day. Inspectors should also ask residents about their outdoor water-use habits (refer to section 2.3 for information on conducting interviews). Typical outdoor water use (e.g., lawn and garden) adds approximately 25 percent to water consumption. Inspectors should subtract outdoor water use from total water use before making the calculation in Step 3. Table 3.1 shows some general ranges for

Equation 3.1 Water Use Per Capita Per Day

$$W = (R_2 - R_1)/D \cdot O$$

Where:

- W = water use per capita per day
- R_2 = most recent water meter reading
- R_1 = oldest water meter reading
- D = number of days elapsed between the water meter readings
- O = average occupancy of the residence between readings (R_1, R_2)

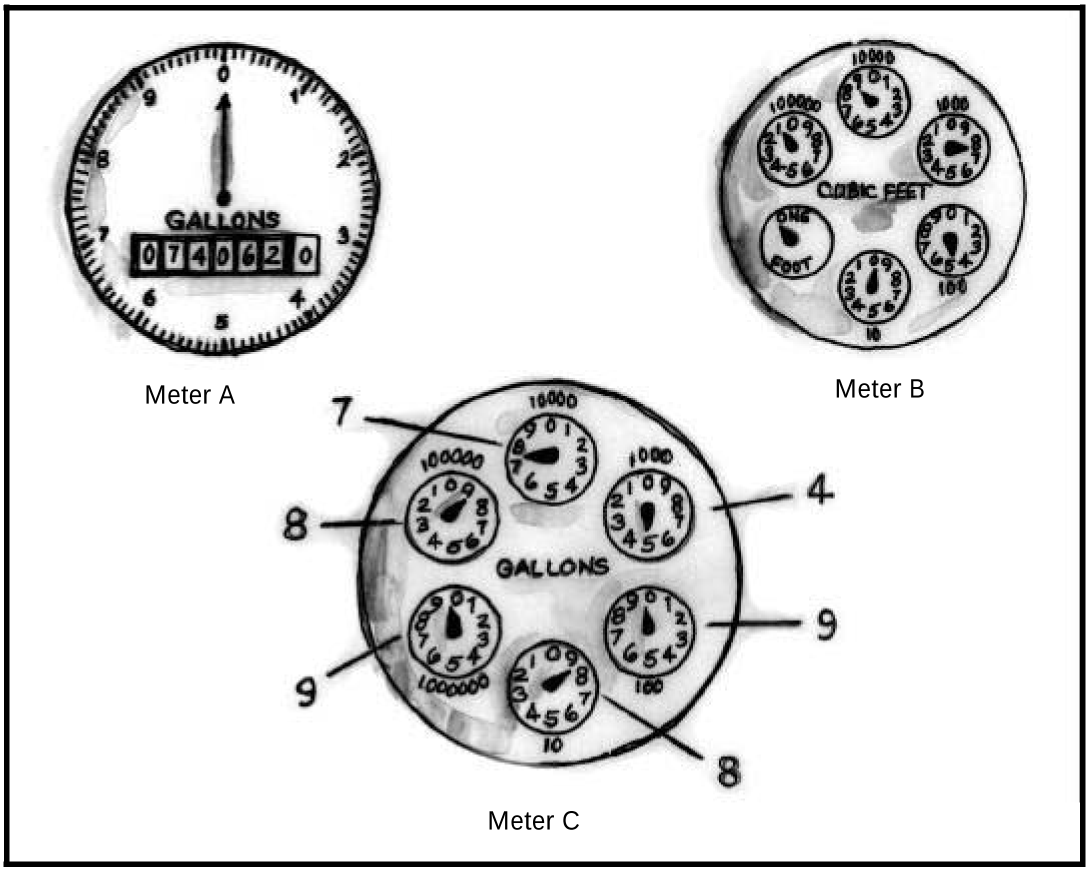


Figure 3.1 Water meters — Meter A reads 74,062.0 gallons, Meter B reads 187,499 cubic feet and Meter C reads 9,875,890 gallons.

Table 3.1 Typical Residential Outdoor Water Use

Type of use	Percentage of outdoor water use	Percentage of total water use
Lawn and garden	75-100	25-30
Swimming pool	0-12.5	0-5
Car washing	0-12.5	0-5

Note: Adapted from *Evaluating Urban Water Conservation Programs* (Planning and Management Consultants, 1993).

outdoor water use as a percentage of total usage.

4. Check the meter for units of measure.[7] It should read in either gallons or cubic feet--sometimes hundreds of gallons or cubic feet. Usage, as calculated in Step 3 for a home that is occupied throughout the day, should not exceed 75 gallons or 10 cubic feet per person per day. Water use in homes where occupants are absent for long periods during the day should be less--no more than 50 gallons per person per day.

Water consumption above these levels suggests leakage and may compromise system function. If excessive water use is found, inspectors should follow up with leak diagnosis as described in section 3.3.

3.2.2 Estimating water use in unmetered homes

Many homes on private wells do not have water meters. When a water meter is unavailable, water use cannot be measured directly. Inspectors may rely on home occupancy to identify potential overloads. Septic system permits are granted for use by up to two year-round occupants per bedroom. Occupancy in excess of two occupants per bedroom may damage the system. To calculate occupancy per bedroom, refer to Equation 3.2. Inspectors should note excess occupancy.

7. Cubic foot = 7.48 gallons

Equation 3.2 Household Occupancy Per Bedroom

$$O_B = O_T/B$$

Where:

O_B = Occupancy per bedroom
O_T = Year-round occupancy, averaged over 12 months
B = Number of rooms in a house, which are of at least 100 square feet in floor area and which have at least one window and closeable passageway (i.e., doorway (see also Rule SD 1.00 of the ISDS Regulations)

Because excess water use may be generated by faulty plumbing, all fixtures and appliances in an unmetered home should be inspected carefully. Refer to section 3.3, "Leak Diagnosis and Repair."

In homes where there are water-use problems and no water meters, owners may wish to consider installing sewer-water meters. These meters apprise both the homeowner and septic system inspector of exactly how much water flows to the septic system over a period of time. Meters can help to find out if plumbing leaks or improperly routed water-using devices are adding to the hydraulic load in the septic system, and whether the home occupants are using more water than the system can handle.

3.2.3 Reducing excessive water use

In most cases where water use is above the acceptable range (approximately 50 to 75 gallons per person per day--see section 3.2., "Estimating Water Use"), it is because of leaky or out-of-date (i.e., high volume) water fixtures. Water-use problems can often be fixed by retrofitting a fixture with a water conservation device or by troubleshooting and repairing leaks. Sometimes, however, water-use problems may be best fixed by replacing a faulty fixture. Table 3.2, entitled "Intervention for Excess Water Use," lists typical remedies for residential water-use problems.

Table 3.2 Intervention for Excess Water Use

Fixture	Intervention	Repair person	Comment
Toilet	Retrofit	Homeowner Plumber	Retrofit devices are inexpensive, but work well only if carefully selected, installed and adjusted. Refer to section 3.4, "Retrofitting Household Fixtures with Water Conservation Devices."
	Leak repair	Homeowner Plumber	A leaky toilet can waste well over 100 gallons of water per day (see section 3.3.2, "Toilets").
	Replacement	Plumber	Toilets with a 1.6 gallon flush are required for replacement by code.
Faucets	Retrofit	Homeowner Plumber	Not recommended for faucets with intentionally high flows. Refer to section 3.4, "Retrofitting Household Fixtures with Water Conservation Devices."
	Leak repair	Homeowner Plumber	Due to the many types of fixtures, leak repair may require a plumber's service.
Showerheads	Retrofit	Homeowner Plumber	Retrofit devices are inexpensive, but work well only if properly selected, installed and adjusted. Refer to section 3.4, "Retrofitting Household Fixtures with Water Conservation Devices."
	Leak repair	Homeowner Plumber	Depending on the location of the leak, this may require the services of a plumber.
Water treatment appliance	Leak repair	Homeowner Plumber	A leaky water treatment appliance can waste hundreds of gallons of water per day. Refer to section 3.3.4, "Water treatment Appliances."

3.3 Leak Diagnosis and Repair

The following sections discuss step-by-step procedures for identifying and repairing leaky plumbing fixtures.

3.3.1 Measuring flow rate

Flow rates may be determined by measuring volume of flow over a period of time and substituting the measurements for variables in the flow rate equation. Inspectors should use Equation 3.3 when calculating the rate of flow from leaks.

Equation 3.3 Flow Rate

$$R = V/T$$

Where:

R = Flow rate
V = Volume of water accumulated
T = Time elapsed during accumulation of flow

3.3.2 Toilets

A leaky toilet may easily contribute a hundred gallons of water per day to the wastewater flow (see Table 3.3, "Flows from a Leaky Toilet"). Leaky toilets have also been found to cause septic system failure.

The following procedures may be used to determine if a toilet is leaking:

1. Sometimes leaks can be heard. Flush the toilet, wait for it to complete its refill cycle and then listen for flowing water. If no sound is detected, use either Procedure 2 or 3 to identify silent leaks.
2. Add a small amount of food coloring (as it will not stain) to the toilet cistern (i.e., tank or reservoir). Wait fifteen minutes. If the toilet is leaking, dye will appear in the toilet bowl.
3. Shut off the in-flow to the cistern and mark the level of water in it with crayon, chalk or tape. Wait a period of time--thirty minutes or so--and recheck the water level. If it has dropped, then the toilet is leaking. For a seeping (i.e., slight) leak, water level in a 3-5 gallon cistern may drop about an inch in 30

Table 3.3 Flows from a Leaky Toilet[a]

Leak type	Approximate water loss (gallons per day)
Seeping	30+
Open (stuck valve)[b]	6000

Notes: a. Adapted from *How Much is Enough* (Judd, 1993).
b. Assumes 4 GPM flow (i.e., as from an open valve).

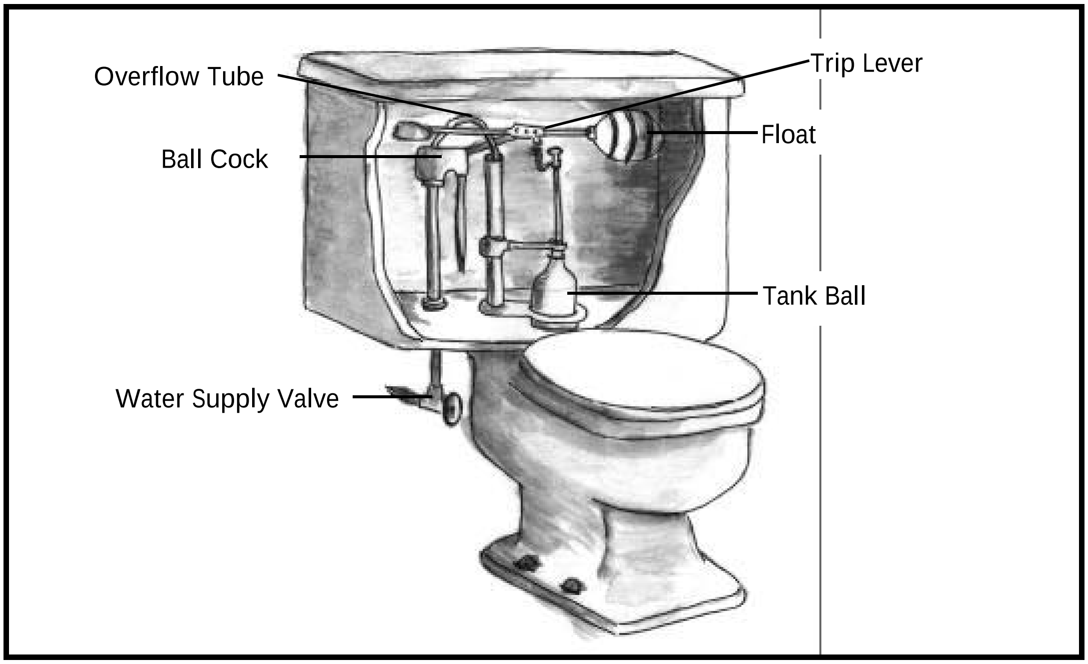


Figure 3.2 Diagram of a toilet

minutes. This represents a loss of approximately a half gallon or 24 gallons per day (see Table 3.3).

Toilet leaks are generally easy to fix. The following steps for fixing toilet leaks have been adapted from the text *Onsite Wastewater Disposal* (Perkins, 1989).

1. Check the water level in the cistern to make sure that water is not continuously running down the overflow tube. If it is, turn the adjustment screw to lower the float. If there is no adjustment screw, carefully bend the float arm.
2. If water flows in the cistern when the float is fully elevated, replace the shut off valve.
3. Inspect the overflow pipe below the water level. Replace it if there are any pitholes.
4. Check the plunger (tank ball) at the bottom of the cistern to see if it seals

properly. Remove any debris and replace any worn parts.

5. If the plunger does not drop exactly into the opening in the cistern bottom, adjust the vertical rod and/or the loops through which it passes to allow it to drop freely.
6. Make sure that the chain on the plunger rod is not twisted or caught.

3.3.3 Faucets

A water faucet that drips just a couple drops per second may add many gallons to the daily wastewater load (see Table 3.4). Often a leak can be fixed by changing a washer. If a faucet is leaking, the washer should be changed.

Sometimes leaks are not apparent. To check a fixture that is suspected of leaking, use the following procedure:

1. Open the fixture and allow water to flow for approximately 2-3 seconds.
2. Firmly close the fixture, but do not over tighten. The fixture should be closed as it would be after normal use.
3. Dry the fixture completely with a clean cloth, especially around the spout, control valves, and any plumbing joints. Watch carefully for 10 seconds to see if droplets form in the dried areas. If droplets form, recheck to be sure the control valves are firmly closed and dry the fixture again. Watch for another 10 seconds. If droplets continue to form on any part of the faucet or spout, this indicates a leak. Inspectors can use Procedures 4 and 5 to measure the rate of leakage; however, these are optional.

Table 3.4 Comparison of Leaks and Flows from a Typical Faucet [a]

Flow	Water loss (gallons per day)
Slow drip (approximately 1 drop per second)	36
Heavy leak	180
Fully open valve [b]	3600

Notes: a. Adapted from *How Much is Enough* (Judd, 1993).
b. Water loss rates assume a flow of 2.5 gallons per minute when a faucet is fully open.

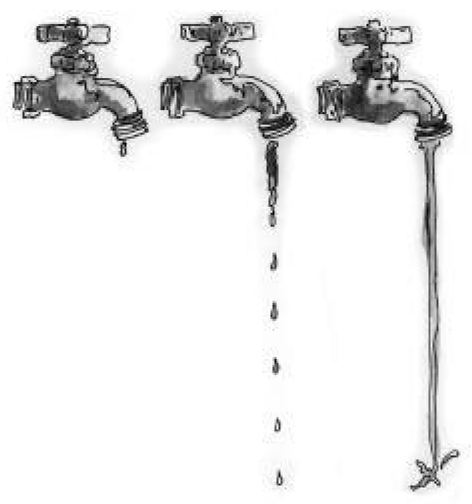


Figure 3.3 A slow steady leak (i.e., one drop per second) from a faucet may create a water loss of 36 gallons per day. A heavy leak may lose 180 gallons per day. A fully open faucet flowing at 2.5 gallons per minute will pour out 3600 gallons per day.

4. Place a dry metered cup or other collection device under the tap. Note the time and allow it to collect for at least fifteen minutes.

5. After fifteen minutes or so, recheck the collection cup. The flow rate of the leak can be calculated using the equation described in section 3.3.1, "Measuring flow rate."

3.3.4 Water treatment appliances

Water treatment appliances include softeners and purification systems. Water softeners remove minerals from domestic water. Water purifiers use filters to remove pathogens and low-level toxins from domestic water.

Most water treatment appliances backflush routinely. The backflush leaves the system via a small-diameter hose. The hose typically directs flow to one of three outlets: (a) the septic system via the washing machine outlet; (b) a sump pump outlet; or (c) an auxiliary soil absorption system (i.e., dry well) that is separate from the septic system.

Water treatment appliances backflush at a very high flow rate. Sometimes the backflush valve of a softener or purifier may stick open or leak. Such a leak may waste several hundred gallons of water per day. If a leaky softener or purifier is routed to the septic system, the system may become overloaded and back up. When softeners and purifiers are present, the following procedures should be used to locate the backflush outlet and check for leakage.

Finding water treatment backflush outlets:

1. Ask the residents. If the residents are unable to assist, proceed to Steps 2-4.
2. Some water treatment appliances are installed under the kitchen sink. Check there first.
3. Often, softeners and purifiers are designed to treat all the water coming into the house and thus intercept the main water supply line. If not found under the sink, locate a softener or purifier by following any water supply line (e.g., a cold water line from a sink) back to the incoming main.
4. Softeners and purifiers usually have four lines: (a) an incoming line--the main supply line coming into the house; (b) an outgoing line--the continuation of the supply main that delivers water to the house after it is treated by the appliance; (c) a bypass line--a line with a valve that will allow water to bypass the treatment appliance; and (d) a backflush line--usually a small, clear or black rubber hose that is approximately 10 feet long, though sometimes more, which directs backflush out of the appliance.
5. Follow the backflush line to its outlet. If the backflush line terminates in the building sewer or in another line that feeds to the septic system, it should be checked carefully for leaks. See the next procedure, "Identifying water treatment appliance leaks."

Identifying water treatment appliance leaks:

1. Locate the backflush line. See the previous procedure, "Finding water treatment backflush outlets." A backflush line will generally make a loose, unfastened connection to its outlet. Open the outlet and--being careful to avoid spillage--move the line from the outlet to a metered container (approximately 1 gallon). Observe the water treatment appliance and confirm that it is not performing a routine backflush. Generally, water treatment appliances use a timer to control backflushes. Backflushes typically occur late at night, so as not to conflict with normal water usage.
2. Backflush from a stuck valve usually flows out of a water treatment appliance under pressure and may squirt from the line. If water flows lightly and does not clearly indicate a leak, place the line in the container for 5 minutes and observe whether water flows continually. A very small amount of water may

be residual from a previous flush cycle.

3. In some cases, inspectors may desire to calculate the flow rate. Refer to section 3.3.1, "Measuring flow rate."

3.4 Retrofitting Household Fixtures with Water Conservation Devices

Excessive household water use may result from old, high-flow fixtures. Installing conservation devices is typically quick, inexpensive, and will reduce the wastewater load on a septic system. Retrofitting should, however, be undertaken thoughtfully, to avoid inappropriate remedies. Anyone who installs a conservation device should make sure of the following:

1. The new device fits the use of the fixture. Most homeowners will remove devices that are too restrictive and may damage the associated fixture in the process.
2. Water savings justify the cost of the device.
3. The new device complies with code (refer to Rhode Island State Building Code, Plumbing Code Regulation SBC-3, Article 15, Water Supply and Distribution, as amended).
4. The homeowner and/or potential homeowner are happy with the look and operation of the new device.
5. The simplest installation possible is used. Inspectors should be mindful of their skill limitations. Some installations may require a licensed plumber.
6. The retrofits are recommended after measuring flows and water pressure. Water pressure below 60 pounds per square inch requires specially designed devices. Use an in-line pressure meter to determine pressure.

   Installing conservation devices in a toilet may seem simple, but can be tricky. Inspectors should be certain to use only properly designed and manufactured devices. Makeshift retrofits can damage toilets. Never use a brick or piece of concrete as a water displacement device. Both of these materials disintegrate and may gum up plumbing mechanisms over time.

CHAPTER 4
Techniques for Accessing Septic System Components

When a system receives its first maintenance or functional inspection, the location of system components may be unknown. The following techniques are simple methods to help an inspector find the exact location of the septic tank or cesspool and to approximate the location of the distribution box and soil absorption system. Refer to chapter 5, "Evaluation and Maintenance Procedures for Septic System Components," for information on how to inspect and maintain these components.

4.1 Locating Septic Tanks and Cesspools

Several procedures may be used to locate a septic tank or cesspool. They are presented here with the least invasive procedures listed first. In general, a septic tank will be located 5-15 feet from the foundation of the house and a cesspool will be located up to 50 feet from the foundation. Keep in mind, locating a septic tank or cesspool is as much an art as it is a science. Refer to section 4.3 for instructions on how to open septic system components.

1. Check for a past maintenance inspection or functional inspection report. The homeowner and the inspector who wrote the report should have a copy. Municipalities with septic system maintenance programs may also keep reports.
2. If no written records exist, ask the homeowner. The homeowner may know approximately or even exactly where the septic tank or cesspool is located.
3. Look for inspection ports at ground level. Tanks installed after 1990 should

have ports to grade. Also, many cesspools have manholes to grade. Tanks installed prior to 1990 should have accesses that are no more than 1 foot below grade.

4. Acquire a copy of the as-built design plans. The plans should accurately show the location of all system components. DEM keeps plans and other septic system permit information for most systems built after April 1968 (refer to section 2.1.3, "Acquiring the most recent system drawings"). Homeowners or local building inspectors may also have copies.

5. Look for indirect evidence of the building sewer pipe location. The sewer pipe usually exits the basement directly below the sewer vent pipe. Also, most building sewer lines will exit the basement from the area beneath the bathroom. If no access to the house is permitted, look for a bathroom window, which is typically a small window, to help determine the approximate vicinity of the pipe.

   After determining the general location of the sewer line, precisely locate the tank using a steel probe. Most tanks are made of steel-reinforced concrete, so a metal detector may also be used. Attempt to locate buried cesspools in the same manner; however, as many cesspools have no metal parts, probing with a rod may be necessary. Be careful; probes may puncture orangeberg pipes.

6. If other procedures do not work, and if the inspector is given access to the basement, the building sewer can be used to help locate the tank.

   Open the building sewer cleanout closest to where it exits the basement and insert a snake. (An electrician's snake works best.) The inlet baffle, tee or the furthest wall of the tank or cesspool should stop the snake as it is inserted. The length of snake inserted approximates the distance to the tank or cesspool from the building sewer access. A building sewer typically runs in a straight line to the cesspool or septic tank. Inspectors should note, however, that some building sewers bend or corner, offsetting the location of the tank or cesspool from the outlet in the basement.

   Alternatively, a float with a remote sensing device may be used to locate a septic tank. Refer to the manufacturer's instructions for proper use.

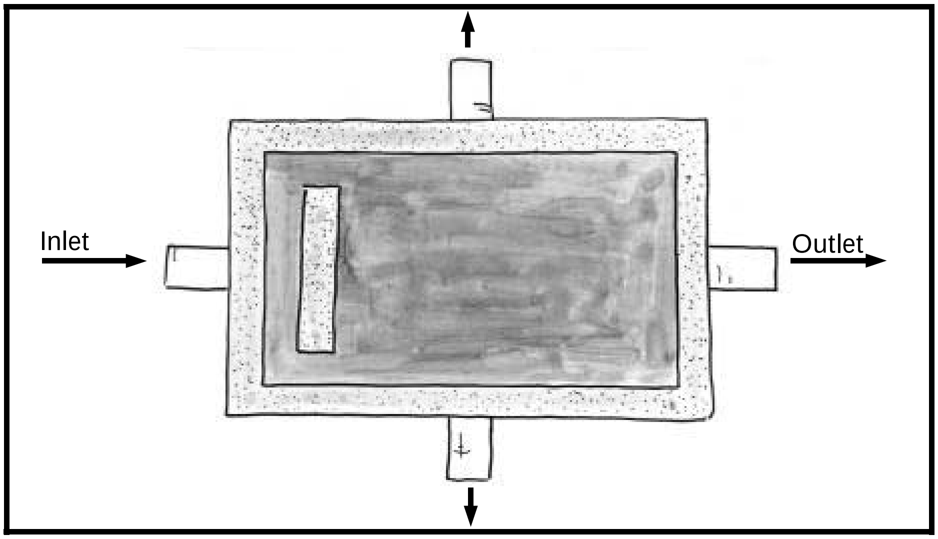


Figure 4.1 Top view of a distribution box

4.2 Locating Distribution Boxes and Soil Absorption Systems

The following techniques may be used to approximate locations for both the distribution box and soil absorption system.

1. Refer to past inspection reports. Ask the homeowner for copies. If there is a wastewater management program in town, inspection reports may also be available through the program. Refer to section 2.2 for procedures on acquiring information from community officials.
2. System components of conventional systems are constructed in accordance with as-built plans. Obtain the plans prior to the site visit and use the plans as a tool for locating components. See section 2.1.3, "Acquiring the most recent system drawings."
3. If system drawings and past inspection reports are unavailable, observe the direction of the outlet pipe of the septic tank to determine the general location of the distribution box and soil absorption system. Occasionally, the distribution box will have an inspection port (i.e., handhole) at the ground

level, providing direct access and evidence of location. Refer to section 4.3 for instructions on how to open septic system components.

4.3 Opening and Closing Component Accesses

In some cases, a component will have an access at grade. In others, the access is buried. A system component, once located, still needs to be opened. After the inspection is completed, it will also need to be closed. It is important to complete these procedures carefully and with minimal disturbance to any landscaping.

4.3.1 Accesses at grade

Sometimes, a septic system component is accessible via a riser. See Figure 4.2a, "Top view of septic tank risers at grade level." Risers are vertical tubes with tight-fitting fiberglass or concrete covers at, slightly above, or just below the ground surface. Open a fiberglass cover by unfastening the lid and lifting it off. If the lid is locked, ask the homeowner to open it. Concrete covers do not usually lock or latch.

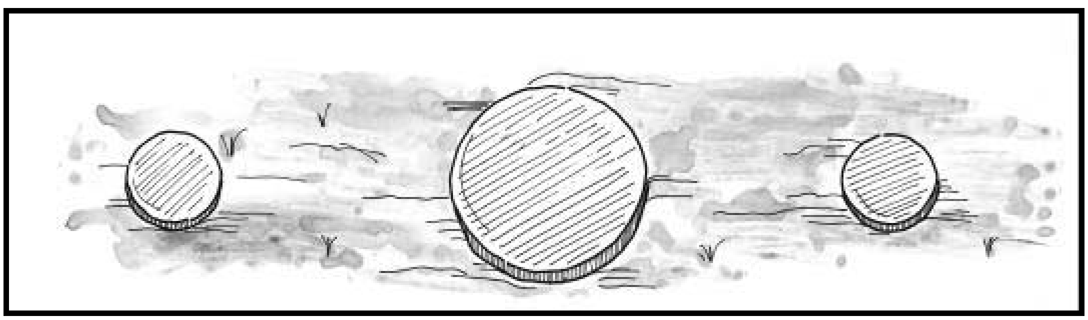


Figure 4.2a Top view of septic tank risers at grade level.

Close the access in the reverse manner to which it was opened. Be certain to replace any locks.

4.3.2 Buried accesses

Use the following procedures to open a buried access:

1. Locate the system component (refer to sections 4.1 and 4.2).
2. Approximate the location of the inspection ports or central manhole based on the anticipated component size. See Figure 4.1, "Top view of a distribution box" and Figure 4.2b, "Top view of a typical unearthed septic tank."
3. Use a spade to carefully cut and remove sections of sod. After removing the ground cover, dig as necessary to uncover the tank inspection ports. Pre-1990 code did not require that septic tanks have an access at grade. Post-1990 code requires accesses at grade.

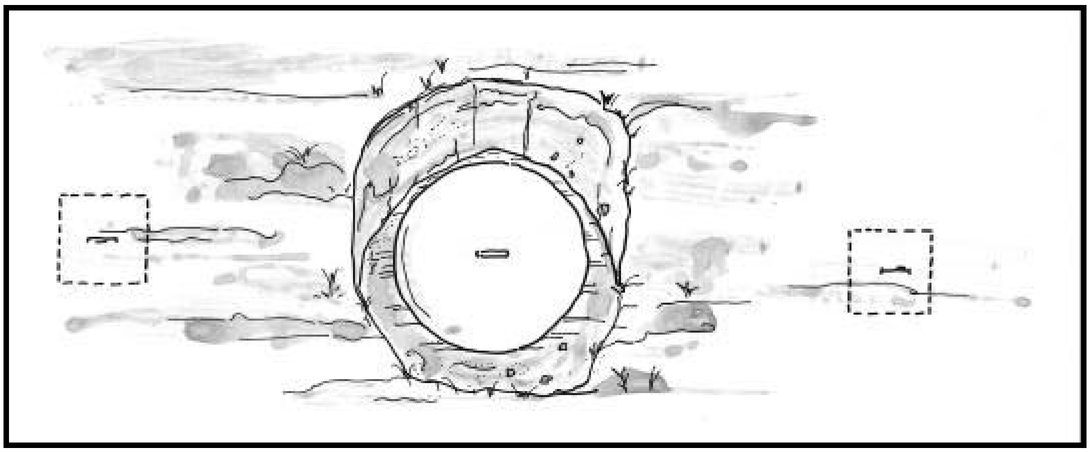


Figure 4.2b Top view of a typical unearthed septic tank main access (manhole). (Current regulations require a manhole and two inspection ports. DEM is revising the regulations to require two 20-inch manholes at the influent and effluent ends of the tank and no center manhole.)

Use the following procedures to close a buried access:

1. Be sure all port and manhole locations are correctly indicated on the current inspection report and the reports for first maintenance inspection, functional inspection and certificate of construction, as available. All component accesses should be located using swing-tie measurements. The term swing-tie

refers to two or more measurements made from the corners of a building foundation that intersect only at the point to be located. The length of each swing-tie from the intersection to the foundation corner is recorded to make finding the septic system easy.

2. Be sure port and manhole gaskets and seals are properly in place and intact before closing.

3. Rebury the access. Carefully replace the sod and tamp it down to ground level.

4.4 Suggested Retrofits for Conventional Septic Systems

The following retrofits are recommended to make inspections easier and to improve the longevity of the system. Inspectors should recommend these retrofits to system owners at the time of inspection.

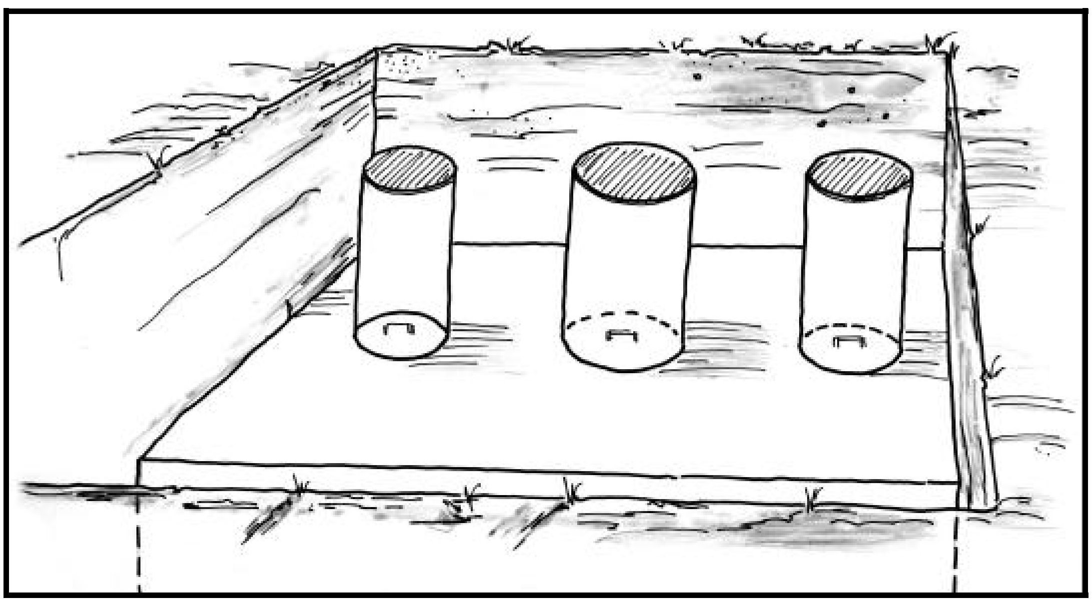


Figure 4.3a Proper installation of fiberglass risers.

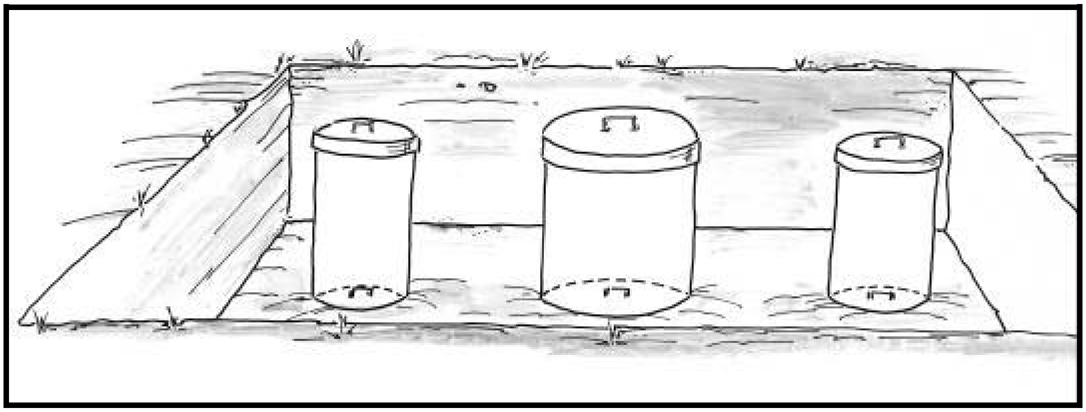


Figure 4.3b Proper installation of concrete well ring risers on the main access (manhole). Main access (manhole) cover remains on the tank; well rings are capped with a concrete cover that overlaps the outside of the rings to prevent leakage.

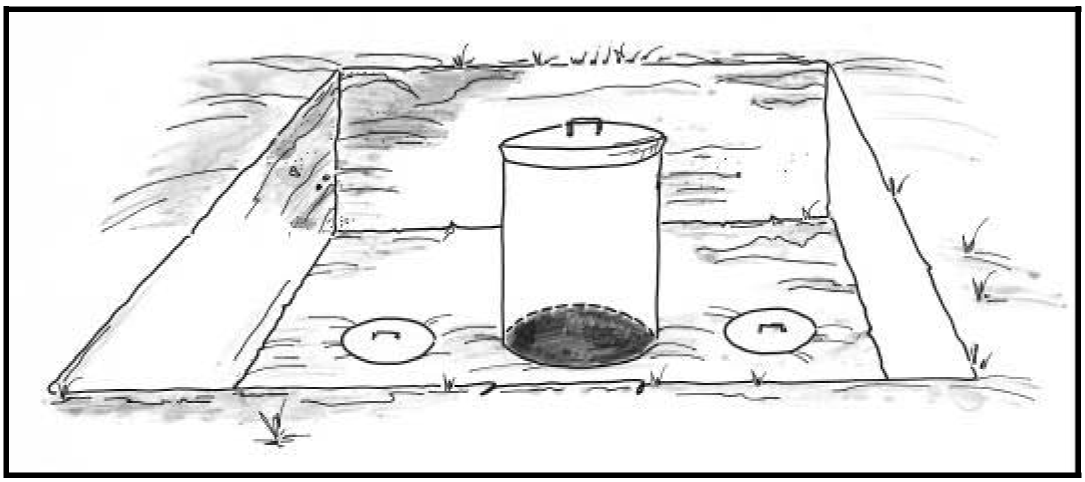


Figure 4.3c Improper installation of well ring risers with the septic tank main access (manhole) cover moved to the top of the well ring. This provides a poor fit, which may result in leakage as well as chipping of the concrete.

4.4.1 Risers to grade

Septic tank risers allow easy access to the septic tank, inspection port and manhole. Without risers, a tank must be unearthed during every inspection and pumpout. With risers, little or no digging is necessary.

System owners may also wish to install distribution box (D-box) risers. D-box risers allow inspectors to see if any solids are being carried over into the D-box. Solids carryover contributes to leachfield failure. D-box risers also allow easy access to the laterals of the soil absorption system, which may clog occasionally and require cleaning.

Risers come in two varieties: fiberglass risers and concrete well rings. Installers should make certain to use a riser with an interior dimension that is larger than access hole or manhole cover. Never use a tank's access cover as the lid for a riser. See Figures 4.3a, 4.3b and 4.3c. A tank cover will not seal a riser properly. Over time, an improper cover will damage a riser and allow stormwater to leak into the septic tank.

4.4.2 Effluent filters and gas baffles

Effluent filters attach at the outlet of a septic tank. Filters provide an easy and inexpensive means of capturing particulates to prevent them from carrying over to and clogging the soil absorption system. Properly sized filters only need cleaning at routine maintenance intervals (i.e., every 5 years or so). Refer to section 5.1.7, "Procedures for cleaning effluent filters," for more information. Gas baffles (refer to Figure 4.4) attach to the effluent sanitary tee of the septic tank and deflect gas bubbles, which may otherwise carry solids through the effluent outlet. Effluent filters and gas baffles are simple and inexpensive ways to protect and extend the life of soil absorption systems.

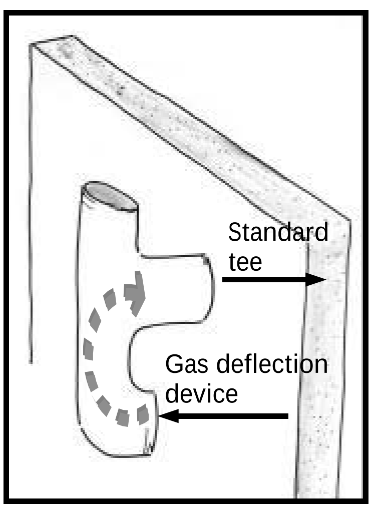


Figure 4.4 A gas baffle typically employs a standard sanitary tee fitted with a gas deflection device.

CHAPTER 5
Evaluation and Maintenance Procedures for Septic System Components

5.1 Inspecting and Maintaining Septic Tanks

This part of the inspection requires, at a minimum, access to one inspection port of the septic tank, preferably the effluent port (i.e., port at the outflowing side of the septic tank). If a pumpout is needed, the septic tank manhole must also be accessible. Locate and access the septic tank as described in sections 4.1 and 4.3. Inspectors should be aware that some septic tanks are built with two large access ports, instead of two small inspection ports with a large manhole or center hole. Two-port tanks should be inspected from the effluent port and may be pumped from either port.

5.1.1 Examining the external condition of septic tanks

Look for cracks or other signs of leakage on top of the tank and especially around the manhole and inspection ports. Leaks in the septic tank prevent proper wastewater treatment. Septic tank failures may contribute to soil absorption system failures. Any damage to the manhole or port should be repaired, but usually does not require a permit.

5.1.2 Determining when conventional tanks need pumping

Septic tanks must be pumped regularly to ensure proper functioning. If the septic system is not pumped in a timely manner, solids will bypass the effluent tee or baffle and clog the soil absorption system. Unabated, this will eventually result in hydraulic failure (e.g., plumbing backup and wastewater breakout).

Septic tanks are usually sized to allow a little more than half their volume for accumulation of solids. The remaining volume of a tank , which is called the "clear zone," provides a quiescent area for holding wastewater while the solids settle out from liquids. Standard septic tanks have a flow depth of 48 inches. A standard septic tank, which is inspected routinely, in accordance with chapter 6 of this handbook, can store 16 inches of solids (i.e., scum and sludge combined) before pumping should be considered. Pumping should also be considered when sludge depth in a tank exceeds 13 inches or the scum depth exceeds 5 inches.

A combined solids accumulation of 16-34 inches, during a routine maintenance inspection, indicates a need to pump the tank. If accumulation is over 26 inches, evaluate the inspection schedule. Combined solids accumulation greater than 34 inches indicates a high potential for solids carryover and the need for more in-depth analysis by a licensed designer. Such an analysis should include a flow trial and recommendations to improve system operation. Refer to Table 5.1a for more information.

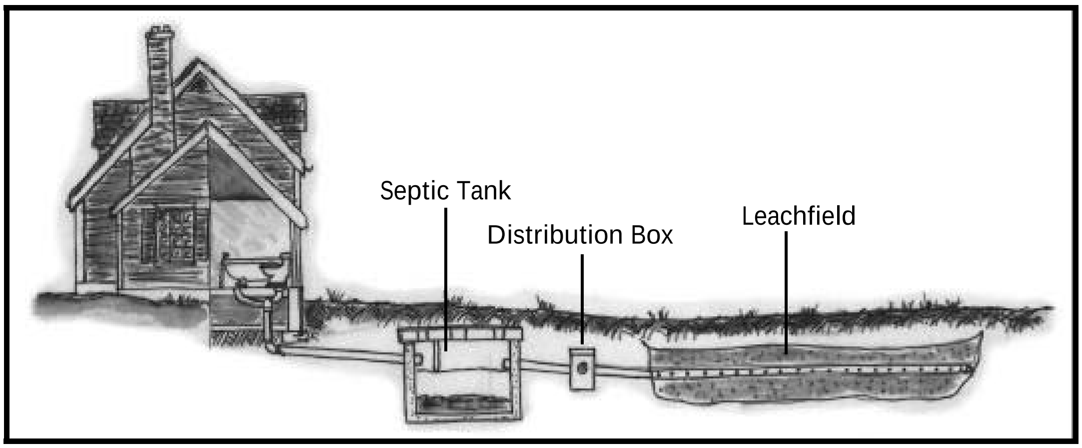


Figure 5.1 Diagram of a conventional septic system

Generally speaking, sludge accumulates at 3-4 times the rate of scum. However, relative accumulation rates may vary over a wide range, depending on such factors as the presence of a garbage disposal (see section 6.1.3 for more information on the

Table 5.1a Pumpout Guidelines for Conventional Septic Systems Serving Residential Properties

Solids 48 inch depth tank Depth Criteria	Nonstandard depth tank	Recommended Action
Combined solids < 16 inches	Combined solids < 1/3 flow depth	Pump at owner's discretion. Consider setting a new Maintenance Inspection Schedule (see section 6.5 "Evaluation of Inspection Schedules."
Combined solids = 16 - 34 inches[b]	Combined solids = 1/3 - 3/4 flow depth[b]	Pump the tank and re-inspect as per section 6.5 "Evaluation of Inspection Schedules."
Either: Combined solids > 34 inches, Sludge > 26 inches, or Scum > 11 inches	Either: Combined solids > 3/4 flow depth, Sludge > 1/2 flow depth, or Scum 1/5 flow depth	Pump the tank and consider a system analysis by a licensed designer. A new inspection schedule, which accounts for system capacity and use, should be set by the licensed designer.

Note: a. Based on T. Bounds (1987) anticipated accumulation rates.
b. Refer to Table 5.1b to determine if relative accumulation rates of scum and sludge are within acceptable ranges. Accumulation of more than 26 inches (1/2 flow depth) of combined solids indicates a need for more frequent maintenance.

Table 5.1b Combined Solids Depths and Range of Sludge Depths at Pumpout for Maximum Septic Tank Efficiency

Combined Solids (inches)	Acceptable Range of Sludge Depth (inches)[a]	Combined Solids (inches)	Acceptable Range of Sludge Depth (inches)[a]
16	11-13	26	18-20
17	11-13	27	18-21
18	12-14	28	19-22
19	13-15	29	20-24
20	14-16	30	20-24
21	14-16	31	21-24
22	14-17	32	22-25
23	16-18	33	22-26
24	16-19	34	23-26
25	16-20		

Note: a. Acceptable sludge-depth range equals approximately 66-80% of combined solids. Ranges have been rounded conservatively to whole inch numbers (i.e., top-end ranges are rounded down; bottom-end ranges are rounded up).

impact of garbage grinders), cooking habits and clothes-washing habits. For a septic tank of any flow depth to operate efficiently, scum depth should make up about 20-33% of solids depth, while sludge depth should make up 66-80% of solids depth. Table 5.1b, "Combined Solids Depths and Range of Sludge Depths at Pumpout for Maximum Septic Tank Efficiency," lists relative depths of sludge for combined solids measurements to ensure proper and efficient operation of conventional septic systems.

The following procedures should be used to measure solids depths and determine if a tank needs to be pumped:

1. Locate and open the septic tank inspection port. If two ports are accessible, open the port on the effluent side. Refer to sections 4.1 and 4.3 for more information.
2. Put on latex gloves and measure the depth of the scum and sludge layers with appropriate scum and sludge measuring device(s) and record the results. There are several devices that may be used to make scum and sludge layer measurements. Refer to manufacturer instructions for information on proper use. URI's On-Site Wastewater Training Center can be contacted for information on manufacturers and vendors of such equipment.
3. Consider Tables 5.1a and 5.1b to determine the need for pumping and other appropriate actions.

5.1.3 Cleaning sludge and scum measuring devices

The following procedures should be used for cleaning sludge and scum measuring devices:

With a garden hose

If a garden hose is available, hose down each measuring device into the septic tank and wipe each device clean with a rag that has been thoroughly wetted with a bleach and water solution. (Use 1 tablespoon of bleach to a gallon of water. Because chlorine is volatile, a batch of bleach solution is good for approximately two days.) Let the sun dry the devices as the weather allows and store for transport in a sheath, case or other container.

Without a garden hose

If no garden hose is available, wipe each measuring device down with the rag and bleach solution as directed for cleaning "With a garden hose." Let the sun dry the devices and store for transport as above.

5.1.4 Pumping need for metal tanks

Some older septic systems may use metal septic tanks. Metal septic tanks tend to rust, causing a loss of structural integrity. Occasionally, this may result in a collapse or cave-in. Internal rusting may cause baffles and sanitary tees to break apart or drop off. Because they are prone to failure, metal septic tanks should be pumped out as part of every inspection and then inspected carefully for structural problems. Metal tanks should be replaced with tanks that are up to code as soon as possible

5.1.5 Pumping septic systems automatically as part of the first maintenance inspection

In many cases, the first maintenance inspection will mark the first time that a system receives thorough and proper maintenance. For this reason, it is a good idea to have tanks pumped initially, regardless of solids levels, in order to fully inspect the tank.

5.1.6 Procedures for multicompartment tanks or septic tanks in series

Some septic systems may have multicompartment tanks (Figure 5.2) or two septic tanks in series. Septic tanks in series are not always visually apparent. To determine if more than one tank is in use, refer to the application information (see Table 2.1), which should include a drawing of the complete system. Multicompartment tanks may also be identified by referring to the application information, but are usually evident at inspection.

Maintenance for multicompartment tanks and tanks in series is similar to that for single-compartment and single-tank systems. Simply replicate the inspection procedures on all tanks and compartments and pump out as needed per Table 5.1a.

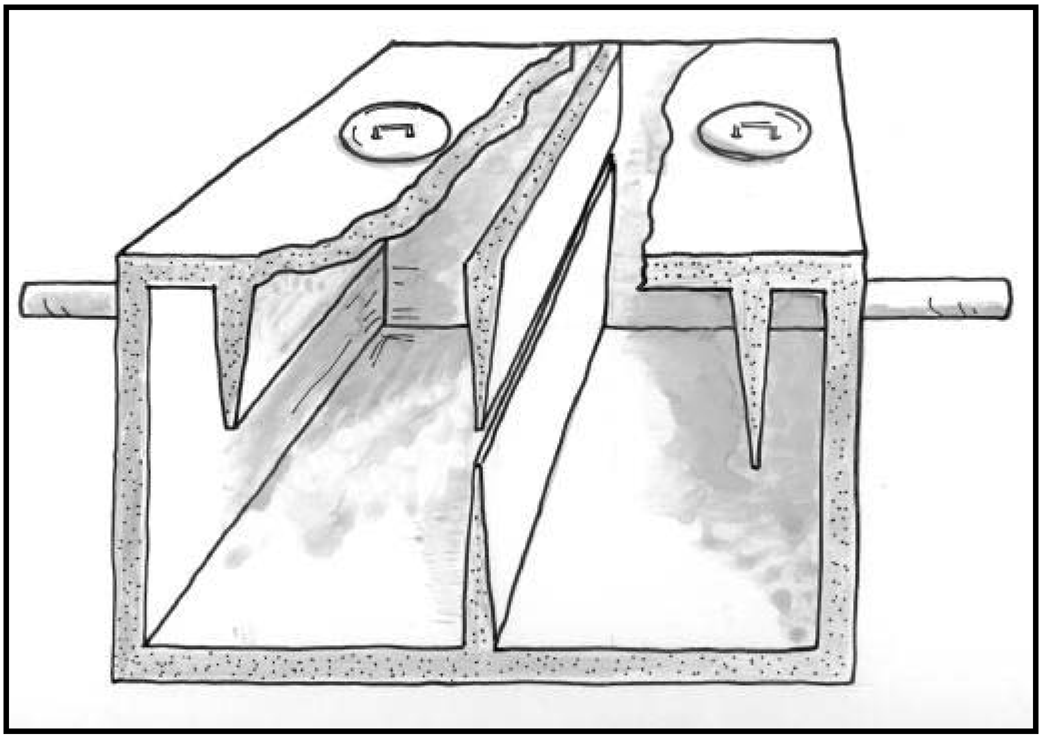


Figure 5.2 Cut-away view of a multicompartment septic tank

5.1.7 Procedures for cleaning effluent filters

Effluent filters protect soil absorption systems from clogging by removing particulates from the waste stream. Properly designed effluent filters will self-clean between routine maintenance inspections. Particles in the waste stream get caught in the filter during high-flow conditions. Most then drop to the bottom of the tank as flows subside. Septic tank bacteria eat away and dislodge the remaining particles, keeping the filter clear enough to pass wastewater.

Effluent filters should be inspected and cleaned as part of each maintenance inspection (i.e., at 3-5 year intervals). To clean a filter, put on latex gloves and remove the filter cartridge from its housing. Tap the filter against the inside of the inspection port or hose it off into the tank. The filter does not need to be cleaned spotlessly. In fact, the bio-mass that accumulates naturally on the filter helps to prevent solids carryover. After cleaning, replace the filter and continue with the inspection.

5.1.8 Pumping procedures for septic tanks

Septic tanks need pumping only when the solids buildup in the tank begins to exceed storage capacity or when a complete internal inspection is to be done. To determine if maintenance pumping is needed, refer to section 5.1.2, "Determining when conventional tanks need pumping." If the tank requires pumping, do so using the following procedures:

1. Before pumping, note the liquid level of the tank in relation to the tank's outlet pipes. Consider Table 5.2 for troubleshooting flow-level problems in the septic tank and record the tank's condition on the inspection report.
2. If not already accessed, open the appropriate access port--usually the large central access on the septic tank--using the procedure described in section 4.3, "Opening and Closing Component Accesses." Only pump out the tank from the manhole. Pumping from inspection ports may damage tees and baffles. Also, the inspection ports do not allow pumping access to all areas of the tank.[8]
3. As the tank is pumped, watch for backflow from the tank outlet. Backflow indicates a soil absorption system backup. Notify the owner and record the occurrence on the inspection report.
4. Pump the tank completely. Use a septage spoon to loosen the sludge in the corners of the tank. There is no need to seed the tank by leaving septage in it. Conversely, there is no need to scrub or powerwash the tank's walls.
5. Once the tank is pumped, look at it to visually check the integrity of the

8. Some tanks are designed with large (20 inch) access ports and no center hole (e.g., Connecticut-style tanks). These tanks can accommodate pumpout from either port.

Table 5.2 Troubleshooting for Flow Problems Based on Liquid Level in a Septic Tank

Observation	Condition and Cause
Liquid level is approximately 2 inches below the inlet and even with the outlet bottom. There is no apparent wastewater flow in the tank.	Tank is installed properly and at rest with no indication of backup based on liquid level.
Liquid level is below the inlet and elevated less than 2 inches above the bottom of the outlet. Free flow of wastewater from inlet to outlet is apparent.	Tank is installed properly and is currently in use with no indication of backup based on liquid level.
Regardless of observed wastewater flowage in septic tank, liquid level is at or above inlet bottom or elevated by 2 inches or more above the outlet bottom.	Tank is probably installed properly, but elevated wastewater levels indicate probable backup in the system down-flow of the the tank. The inspector should perform a flow trial.
Regardless of observed wastewater flowage in the septic tank, the liquid level is at or below the outlet and the inlet is submerged.	Tank is installed up gradient or installed backwards (i.e., with the inlet in the outlet's position). Up-gradient tanks may appear to slope up towards the outlet end. Tanks installed backwards may have tees and baffles in reverse positions. Either condition should be corrected by a licensed installer.
Regardless of observed flowage in tank, liquid level is more than 2 inches below the inlet and the outlet appears and no more than 2 inches above the outlet bottom.	Tank is sloped down gradient. Depending on the severity of the slope, the tank may actually appear to slope downward toward the outlet. If the slope is minimal, no repair is necessary. Consider evaluation by a licensed installer.
Regardless of observed flowage in tank, liquid level is below inlet and outlet.	Tank may be leaking and may have structural problems. Pump the system and have a licensed installer make repairs as necessary.

sanitary tees, baffles and overall structure. Under current regulations, tanks should have an inlet tee or baffle and an outlet tee. Use a mirror on a pole and flashlight, as necessary, to look around corners and see in darkened areas. Inspection of baffles and tees can visually be done without a mirror from the inspection ports. Look for groundwater seepage through cracks or holes in the tank. Listen for trickling sounds that may indicate either backflow from the soil absorption system or groundwater seepage through a crack in the tank. Most tank in Rhode Island have a lateral midseam that may be susceptible to leakage. Tanks manufactured using a monolithic poring have a seam around the top and are susceptible to leakage there. Leakage may also occur at inlets and outlets. If there appears to be any damage, notify the owner and record the observation on the inspection report. Carefully inspect the influent side of the inlet baffle. Sometimes, baffles may trap a plug of scum or floatables that could create a plumbing backup.

5.1.9 Determining septic tank volume (optional)

Occasionally, inspectors may wish to determine the volume of a septic tank. The following procedures may be used to approximately measure volumes of rectangular and round (i.e., cylindrical) tanks.

1. Use a tape measure to determine the outer top-side dimensions of the septic tank in inches. Measure the diameter, if the tank is round. Measure the length and width if the tank is rectangular.
2. Use a sludge-measuring device to determine the flow depth of the tank in inches (i.e., the distance from the internal bottom or floor of the tank to the bottom of the tank's outlet pipe).
3. The following tables may be used to determine the volume of most tanks.

Table 5.3a Typical Rectangular Tank Volumes, Styles and Approximate Dimensions

Volume	Style	Dimensions outside length × outside width × flow depth in inches
1,000	Single compartment	102 × 58 × 48
1,000	Lowboy	126 × 68 × 40
1,250	Single compartment	126 × 60 × 48
1,500	Single compartment	126 × 68 × 48

Table 5.3b Approximate Flow Depths and Diameters for Typical Round-Tank Volumes

Diameter (inches)	Volume (gallons) and Flow Depth (inches)			
	500	600	750	900
60	41	49	61	74
72		34	43	51
84			31	38

If the tank's dimensions are atypical and the volume cannot be determined with the previous tables, use Equation 5.1 or 5.2 to approximate volumes.

Equation 5.1 Volume of Rectangular Tanks

$$V = D \times L \times W \times 0.00439 \text{ gallons/cubic inch}$$

Where:

V = Volume
D = Flow Depth
L = Length
W = Width
0.00439 gallons/cubic inch = Conversion factor (cubic inches to gallons)

Equation 5.2 Volume of Round Tanks

$$V = D \times Pi \times r^2 \times 0.00439 \text{ gallons/cubic inch}$$

Where:

V = Volume
D = Flow Depth
r = Radius (r = d/2)
d = Diameter
Pi = 3.14
0.00439 gallons/cubic inch = Conversion factor (cubic inches to gallons)

5.1.10 Septic system additives

A number of companies market products (e.g., enzymes and baking soda) under the claim that routine addition to the toilet or septic tank will improve septic system function and restore flow to "slow plumbing." Most experts consider these product claims to be unsubstantiated. Consumers should be aware that wastewater flow problems, which originate in a septic system, are symptomatic of major system failure. Without the proper attention of a wastewater professional, such problems will usually get worse and more expensive to repair. Relying on additives to fix septic system problems is ill-advised at best.

Some septic system service companies offer acid and organic chemical treatments as a remedy for septic system backups or even as preventative maintenance. Use of such solvents is extremely dangerous. They are caustic, typically poisonous and may contaminate nearby water supplies (e.g., private wells). Use of such solvents is also a violation of Rhode Island's ISDS Regulations. The only exception is hydrogen peroxide, which may sometimes be used in conjunction with a system enlargement to rehabilitate a failing system.

Septic system owners should note that backups are often the result of wastewater overload. Beyond danger and regulatory infraction, a solvent cannot increase the long-term capacity of a septic system. Septic systems that are undersized will need to be enlarged in order to function properly.

5.2 Procedures for Maintaining Distribution Boxes if an Inspection Port is Present

Occasionally, a distribution box may have a handhole at grade. If present, open the port and check the distribution box. There should be no solid material or standing water above the outlets in the box. If standing water is present, it may indicate a backup in the soil absorption system. If solids are present, it indicates solids carryover and the likelihood of an impending failure. If either condition is present, notify the owner and record it on the inspection report.

5.3 Maintenance Inspection for Cesspools

It is estimated that 20-30 percent of existing cesspools in Rhode Island are hydraulically failed (i.e., backing up into the building sewer or onto the surface of the ground). Cesspools need more frequent maintenance than conventional septic systems as they are typically of smaller design capacity, more prone to failure and therefore, less protective of public health and the environment. At first sign of failure, cesspools, like other substandard systems, should be upgraded.

If a cesspool has not failed and is not being immediately upgraded, then it should be maintained using the procedures that follow. Nevertheless, system owners should be reminded of the potential pitfalls of these substandard systems.

5.3.1 Inspection prior to pumping

1. As with a septic tank, inspect the cesspool for cracked covers. Cracked covers should be replaced as soon as possible.
2. Inspect for backup into or above the inlet pipe. If septage is found above the inlet, the system has reached the end of its useful life and should be upgraded to regulatory standard as soon as possible.

5.3.2 Pump the cesspool regardless of solids depth

1. As with a septic tank, pump a cesspool completely. No additional maintenance is necessary.
2. After the system is pumped, observe the inside. If water is rising from the bottom or seeping through the sidewalls, so as to create standing water, the cesspool is likely to be installed in the groundwater and should be upgraded. If the system has apparent structural problems, the system is failed and should be upgraded as soon as possible.

5.3.3 Cesspools with overflow pipes and other outlets

Some cesspools may have one or more overflow pipes or other outlets.[9] Outlets may outfall into a secondary soil absorption system (e.g., seepage pits, leaching trenches, etc.), waterbody, catch basin, or onto the surface of the ground.

Because an outlet may direct wastewater to the ground surface, an inspector should attempt to locate the outlet's terminus using the procedures of section 5.6.1, "Identifying suspected treatment bypasses." If a suspected treatment bypass is

9. Cesspool overflows and outlets are generally illegal unless they direct flow to a secondary soil absorption system.

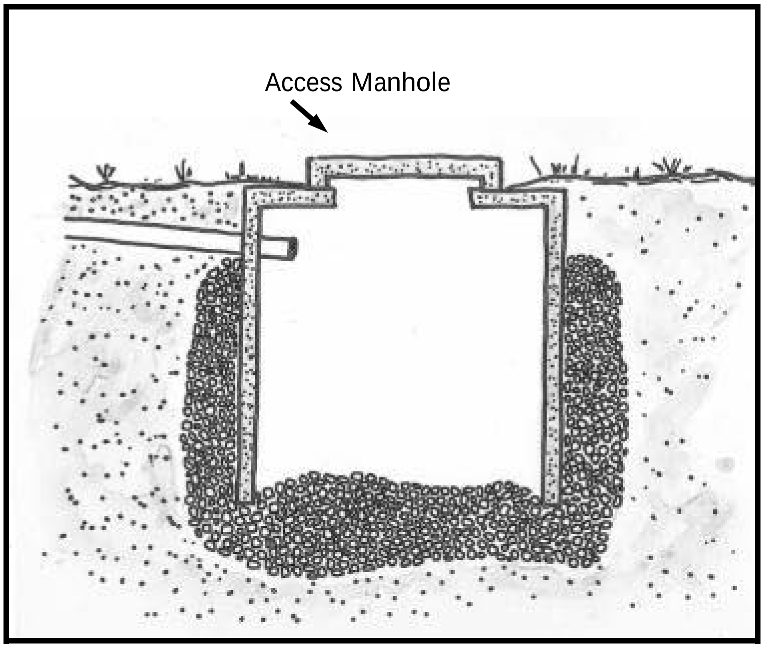


Figure 5.3 Diagram of a cesspool

identified, the inspector should notify the system owner and indicate the bypass on the inspection report.

If no bypass is observed, the inspector should assume that the overflow pipe leads to a secondary soil absorption system. Attempt to locate the absorption system, applying the principles used for locating the cesspool (see section 4.1).

If a secondary soil absorption system, which could need maintenance, is found, access, inspect and clean it as per sections 5.3.1-2.

5.4 Observation of Site Conditions

This portion of the inspection requires general knowledge of the location of certain components. These are the cesspool or septic tank and soil absorption system. Location of components can be determined by referring to the results of a first maintenance inspection, functional inspection or conformed system drawings.

Location may also be determined at the site by the inspector (refer to chapter 4, "Techniques for Accessing Septic System Components"). Once components are located, inspectors should do the following:

1. Look for any trees, large shrubs or other plants with extensive root systems growing over or within 10 feet of any system components. If any such plants are present, the owner may wish to have them removed. Owners may wish to leave ornamental and other such plants in place. However, inspectors should inform owners that large roots may crack, offset or otherwise intrude and damage components (Figure 5.4).

2. Look for any indication (e.g., tire tracks and other imprints) that heavy machinery or heavy objects (e.g., cars, above-ground pools, etc.) are or have been over any system components. If any heavy objects or indication of heavy objects are present, the owner should remove objects and discontinue the placement of such objects over the system components. Heavy objects may crush or offset system components.

3. Look for any indication that stormwater (e.g., roof runoff or outflow from foundation drains such as sump pumps) is flowing into or over any septic system components. If this condition is present, the owner should take steps to redirect the flows. Runoff that is diverted to the area of the soil absorption system may flood it and interfere with proper wastewater treatment or cause backup. Runoff diverted over other system components adds to wear and tear. Runoff may also infiltrate components,

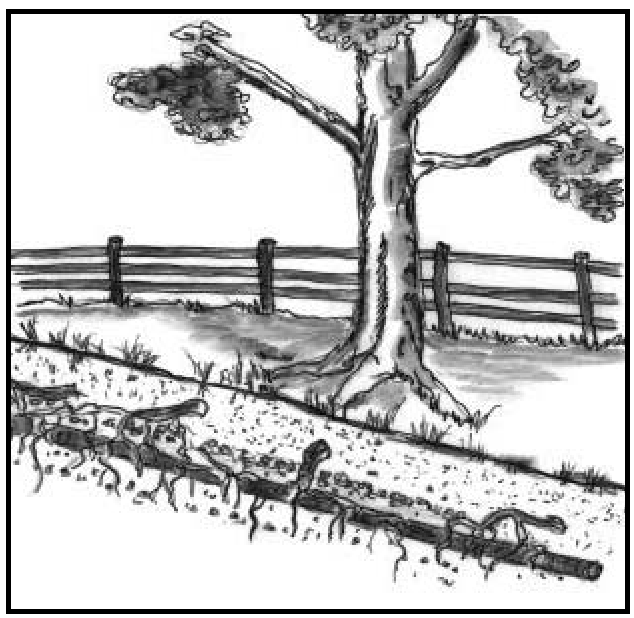


Figure 5.4 Root systems of large plants may intrude into a septic system when proper setbacks (i.e., 10 feet) are not observed.

eventually flooding the soil absorption system.

4. Look for physical evidence of system malfunction, such as cave-in or exposed components. If present, the owner should be instructed to have the malfunction fixed by a repair professional.
5. Look for impermeable surfaces, such as driveways or patios, within 10 feet of components. Impermeable surfaces block the natural movement of air and moisture in soil, inhibiting biological activity and hindering wastewater treatment. The owner should have any such surfaces removed.
6. Look for any observable signs of system malfunctioning, such as septic odors, ponding, or other signs of wastewater outbreak, patches of lush green grass (in conjunction with other signs of failure and giving consideration to seasonal growth patterns), burnt-out grass or ground staining. Symptoms, such as the aforementioned, indicate a major system failure and should receive the immediate attention of a repair professional.

5.5 Flow Trial for Identifying Gross Loss of Hydraulic Capacity

Hydraulic capacity--the potential for a soil absorption system to accept wastewater--varies as a result of changes in effective absorption area, wastewater flow, waste strength and biological activity in the soil. When overly stressed by excessive flows or waste strengths, a system may lose hydraulic capacity. In the most severe cases, this may result in a complete failure (i.e., a wastewater backup into the house or onto the ground surface). The functioning of a soil absorption system may also be impaired as a result of cave-ins, crushed pipes or objects stuck in lines. The flow trial is a means for identifying blockages or significant reduction of hydraulic capacity.

5.5.1 Limitations of the flow trial

The flow trial is one of a suite of techniques that may be used to assess a septic system during a functional inspection. It is not a be-all-and-end-all test, nor is it accurate under all conditions. The results of a flow trial should always be interpreted within the context of the entire inspection. If a system is showing signs of failure, certain flow-trial procedures may actually aggravate the problem (see "Situations when a flow trial performed at the septic tank outlet is recommended …," which follows). Under such circumstances, if a flow trial cannot be done at the outlet, do not perform a flow trial. If there is an obvious cave-in over the soil absorption system, the system clearly needs a major repair and no flow trial is necessary.

Situations when a flow trial may give unreliable results

1. During the last 12 months, the home was unoccupied for a continuous period of one month or more.
2. The system has had a recent hydrogen peroxide treatment (usually evidenced by chemical scouring or a bleached-out appearance on concrete components). Inspectors should be mindful that use of hydrogen peroxide generally indicates an attempt to fix a major system failure, which will be likely to recur.

Situations when a flow trial performed <u>at the septic tank outlet</u> is recommended as other methods may contribute to a failure (refer to section 5.5.3, "Flow trial procedures," for more information on various methods to load a system with the flow trial volume)

1. Overaccumulation of solids: (a) depth of combined solids is greater than 34 inches; (b) depth of scum is greater than 11 inches; or (c) depth of sludge is greater than 26 inches.
2. Evidence of structural damage to the system: (a) broken tee or baffle; (b) cracked tank; (c) evidence of a heavy object placed over the soil absorption system; or (d) one component or more has been exposed as a result of soil erosion.
3. Inspector has not measured the depth of solids and the system has not been pumped in over 3 years. An adequately sized, conventional system, which has been pumped in the last 3 years, is unlikely to have an overaccumulation of solids; however, inspectors may wish to measure solids for added certainty.

5.5.2 Calculating the flow trial volume

Normal wastewater flows vary over the course of a day, peaking during the morning and evening hours when people are most likely to use the kitchen, bathroom and laundry facilities. The greatest flow that may enter a system during an hour of time is called the peak one-hour flow. As it is typically the most stressful condition experienced by a system, the peak one-hour flow is also the condition that the flow trial is designed to approximate (i.e., peak one-hour flow = flow trial volume).

An examination of the literature indicates that peak one-hour flow can be estimated as 12 times the average hourly flow or half the daily flow. Systems in Rhode Island are designed based on the daily flow (i.e., design flow = daily flow), which can be calculated as 150 gallons per bedroom per day.[10] Therefore, flow trial volumes can be calculated as half the design flow or as the number of bedrooms times 75 gallons. Table 5.4 indicates flow trial volumes for homes relative to number of bedrooms and design-flow volumes.

Table 5.4 Minimum Flow Trial Volumes Relative to Number of Bedrooms and Design Flow

Number of Bedrooms	Design Flow (Gallons/Day)	Flow Trial Volume (Gallons)
2	300	150
3	450	225
4	600	300
5	750	375
6	900	450

5.5.3 Flow trial procedures

The following are procedures for a flow trial. Inspectors should keep in mind that a flow trial requires a large volume of water, which creates a good condition for dye tracing. If both a dye tracing and flow trial are to be done, an inspector should perform them together to avoid waste (to determine if dye tracing is necessary refer to section 5.6, "Dye Tracing for Confirming Treatment Bypasses").

10. The design flow should also be indicated on the certificate of construction.

1. Ask occupants to refrain from using any plumbing fixtures (e.g., sinks, toilets, spigots, etc.) during the flow trial.

2. Consider the condition of the septic tank (refer to section 5.1.1, "Examining the external condition of septic tanks" and to section 5.5.1, "Limitations of the flow trial"). If there is evidence of backflow from the soil absorption system, evidence of solids carryover or other situations of concern, do not flow trial the system at the inlet or by using in-home water fixtures. Instead, consider doing a flow trial by running water through a garden hose that has been inserted into the tank outlet. If the inspector opts not to do the flow trial at the outlet, then the tank should be pumped and the inspector should refer the system owner to a repair professional.

   In general, if a system has been pumped in the last three years, then it can be assumed that there will be no solids carryover during a flow trial. If no pumpout record is available, the inspector should measure the depth of both the scum and sludge layers. (Refer also to Item 1 of "Situations when a flow trial performed at the septic tank outlet is recommended..."). If the system appears to be in working order, the flow trial volume may be added via either the inlet or the outlet of the septic tank.

3. The flow trial volume (refer to section 5.5.2, "Calculating the flow trial volume") may be added at a rate of between 5 and 10 gallons per minute. This may be done by placing a garden hose at the inlet inspection port of the tank or by opening water taps in the house.

   If the house has a water meter, then the meter may be used to measure flow (refer to section 3.2, "Estimating Water Use"). (Be sure to note the volume unit of flow on the meter--a cubic foot is approximately 7.48 gallons.) If a household water meter is not present, an in-line flow meter may be used on a garden hose to measure flow rate. If no metering device is available, flow rate from a garden hose may be estimated by opening the tap fully and timing the fill up of a 5 gallon bucket (refer to section 3.3.1, "Measuring flow rate," for more details).

   If dye tracing is being performed on the system, dye should be added to the outlet of the septic tank during this step (refer to section 5.6, "Dye Tracing for Confirming Treatment Bypasses").

4. Measure and record the time it takes to add the flow-trial volume as determined in Step 2. If water begins to back up (i.e., rises more than two inches above the outlet bottom), record the time it took for this to occur. Inspectors should note that when first adding flow to the soil absorption system, a small rise in water level (1 or 2 inches) will occur in the septic tank. This is not a backup.

5. Calculate the volume of flow accepted by the soil absorption system (refer to section 3.3.1, "Measuring flow rate," for more details). Record the results on the inspection report form. If the system did not accept the full flow-trial volume, refer the owner to a repair professional.

5.6 Dye Tracing for Confirming Treatment Bypasses[11]

Soil absorption systems use the soil to treat wastewater and remove pathogens, (i.e., disease-causing organisms and viruses) from wastewater. When wastewater bypasses soil treatment, wastes and pathogens are not adequately removed and remain in unhealthful concentrations. For example, treatment may be bypassed by an overflow pipe that routes flow out of a septic system component, preventing it from reaching the soil absorption system. Bypasses are illegal under Rhode Island law and should be eliminated when they are confirmed.

Bypasses may take complex and broken paths, making them difficult to trace visually or even by use of a snake. Dye tracing overcomes this problem, as dye will resurface and flow wherever wastewater does (i.e., up to the ground surface, into a waterbody or stormwater system). Inspectors should use the following procedures when dye tracing.

5.6.1 Identifying suspected treatment bypasses

Most bypasses are installed to drain undersized or failed cesspools or drain gray-water appliances (e.g., washing machines). Bypasses in conventional septic systems

11. Procedures are based on *Identification of Sewage Contamination Sources: A Field Handbook* (RIDEM, in draft).

are rare, but not entirely unheard of. Therefore, check all systems thoroughly.

The following procedures may be used to find potential bypasses, but require a large volume of water to be effective. Therefore, the dye tracing and flow trials should be performed together. If a flow trial is not being performed because of solids-carryover concerns, do not perform dye tracing either (refer to section 5.5).

1. Ask the residents if they know of any wastewater bypasses or overflow pipes.
2. Walk the property boundary and note any catch basins within view, pipes emerging from the ground or retaining walls as well as waterbodies that border the property. Also, walk throughout the whole property and note any waterbodies and groundwater upwellings. Inspectors should note both visible outlets and wet areas where outlets are likely to discharge.

   Check the interiors of cesspools and septic tanks using a mirror and flashlight if necessary. A bypass is most likely installed at or just above the flow line, therefore, pumping the tank is not required for inspection purposes.
3. If any potential bypasses are observed, note their locations and any signs of flowage (i.e., actual flow or evidence of flow, such as laundry lint, algal growth, or erosion patterns on the ground). If any catch basins are found, they should be checked for bypass lines (refer to section 5.6.2, "Checking catch basins for bypasses").
4. If no potential bypasses are visible and the residents report no bypasses, dye tracing is not necessary. Proceed with the remainder of the inspection. If a suspected bypass is identified, proceed to section 5.6.3, "Investigating suspected bypasses."

5.6.2 Checking catch basins for bypasses

Safety precautions for observing and opening catch basins

1. Opening and working near catch basins must be undertaken carefully in order to avoid risk to both the inspector and unwary onlookers. Removal of a catch basin grate or manhole cover is heavy work and somewhat dangerous.

Removing a catch basin cover should only be done by a trained drainlayer or municipal employee.

2. Never enter a catch basin without following appropriate Occupational Safety and Health Administration precautions (refer to OSHA 1910.146 Permit Required Confined Space Rule). Never leave an open catch basin unattended (i.e. out of view) as water in the basin may present a drowning hazard.

3. Catch basins are usually owned by a municipality. Notify and obtain permission from local officials--both at the police and public works departments--prior to accessing a catch basin.

   Ask for assistance in following safety procedures as these may change from one municipality to another.

4. Oncoming traffic can be dangerous. Do not attempt to open or look inside catch basins where posted speeds exceed 25 miles per hour.

5. Do not attempt to open or look inside covers, located more than five feet laterally from the curb edge to the furthest point on the cover.

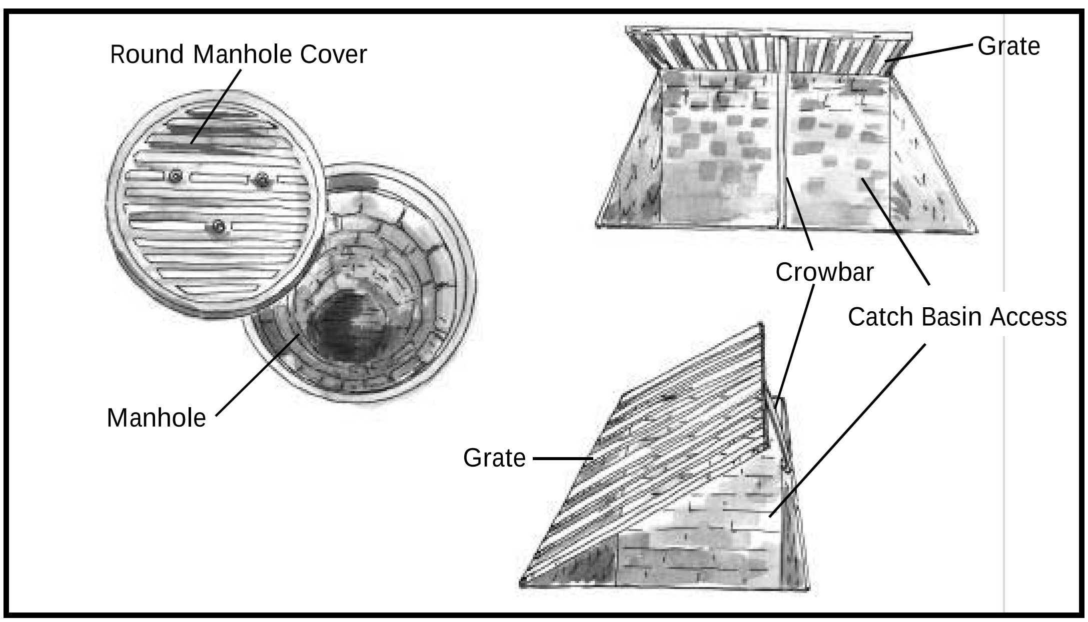


Figure 5.5 Opened storm drain grates.

6. Catch basins should not be opened or observed during inclement weather or when driving conditions are otherwise poor.

7. To limit traffic hazards, park a vehicle, with the hazard lights flashing, approximately 10 feet up-traffic of the catch basin being accessed. Place three traffic cones up-traffic of the parked vehicle. Place three additional cones at five-foot intervals around the cover in a triangular formation.

Determining the need to open catch basins (refer to "Safety precautions for observing and opening catch basins," listed above)

If the cover is a grate, dye may be observable without opening the grate. Attempt to look inside the access hole using a flashlight. If a suspected bypass, bottom of the basin or water in the basin can be viewed clearly, then the tracing dye will also be visible and opening the basin is not necessary.

Opening and closing catch basins (refer to "Safety precautions for observing and opening catch basins," listed above)

1. Sweep debris and sand from the general area of the catch basin to prevent it from falling into the cover seating when the basin is opened. This makes resetting the cover easier.

2. If pivoted diagonally, a rectangular grate may fall into its access hole. Before attempting to open a rectangular grate, secure a rope to it and then to something that can support its weight if it falls (e.g., your vehicle bumper, if it is sturdy enough). Circular covers cannot fall into their access holes and do not need to be secured.

3. Wedge a crowbar into any notch around the edge of the cover and pry the cover with the crowbar until it is raised an inch or so above its seating. Insert a manhole cover hook and use it to grab the cover. Circular covers may be swung along side the catch basin access hole. Rectangular covers should propped up on one side of their seating using the crowbar as a prop (see Figure 5.5).

4. Check the inside of the catch basin for bypass lines. A bypass line is typically a 2-inch diameter pipe. However, the minimum standard pipe size for a

stormwater drain is 12 inches; therefore, an inspector should be suspicious of any pipes less than 12 inches in diameter. If no suspected bypass is found, close the catch basin (refer to Step 6) and proceed with the inspection as appropriate.

5. If a suspected bypass is identified, proceed with dye tracing (refer to section 5.6.3, "Investigating suspected bypasses"). Be certain to replace any removed catch basin covers at the end of the dye-tracing procedure.

6. Before closing a catch basin, sweep its cover seating to remove sand or other obstructions. Replace the cover, being certain that the cover resets tightly.

5.6.3 Investigating suspected bypasses

Use the following procedures to determine if a suspected bypass is actually diverting flows and interrupting septic system treatment. Only use this procedure after suspected bypasses have been identified (refer to section 5.6.1, "Identifying suspected treatment bypasses").

1. After following the steps of "Identifying suspected treatment bypasses," add one quart of dye solution (refer to section 5.6.4, “Preparation of dye-tracing solution").

2. Dye testing is typically done in conjunction with a flow trial. Proceed with a flow trial (refer to section 5.5, "Flow Trial for Identifying Gross Loss of Hydraulic Capacity"). Look through the outlet inspection port to make certain that dye is moving into the outlet pipe. If the dye appears to be pooling or if the flow trial is being done at the septic tank outlet, use a garden hose to wash it through.

3. Once the flow trial is in process and water is being added to the septic system, begin observation of the suspected bypasses by checking them every 10 minutes for dyed water. If no dye is apparent by the end of the flow test, a bypass is not present. If dye is present, it indicates a bypass. Record the occurrence in the inspector’s report, noting the location and general description of the bypass and recommend that the owner seeks the advice of a repair professional.

5.6.4 Preparation of dye-tracing solution

Fluorescein dye, which is used for the dye-tracing procedures, may be purchased in powder or liquid concentrates. Liquid concentrates are generally easier to work with than powder. The dye powder can be messy to handle. It may permanently stain clothing, carpets and other textiles. Dye powder may be blown about by very light air movement.

If powder is being used, an inspector should prepare dye solution before visiting the inspection site. The following is a procedure for making a dye tracing solution from powdered dye, which was adapted from *Identification of Sewage Contamination Sources: A Field Handbook* (RIDEM, in draft).

Equipment

1. Utility sink with a nearby counter or other clear work surface.
2. Lab smock or other covering to protect clothing from dye stains.
3. Latex gloves to prevent staining of hands.
4. A 1½ gallon pitcher for mixing and pouring the solution.
5. Measuring spoons: teaspoon and tablespoon.
6. Stir stick or long-handled mixing spoon.
7. Funnel.
8. 4 clearly labeled,[12] quart-sized, plastic bottles with screw-on tops (to prevent poisoning do not use drink containers) for storing and dispensing the dye solution.
9. Waterproof carrying case (such as a smaller cooler) to transport the bottles of dye solution.
10. Paper towels for cleanup.

12. Inspectors should clearly label bottles as follows: **"Caution - flourescien dye solution, not for human consumption"** to ensure that it is not confused with a beverage.

Materials per 1 gallon batch

1. 2 teaspoons of fluorescein yellow dye powder. Yellow dye is recommended as it is easy to see in the field.

2. 1 gallon and 1 tablespoon of water (tap water is acceptable).

Preparation steps

1. Put on the smock and gloves and arrange all materials and equipment at the utility sink. In the sink, place the mixing pitcher and 4 storage bottles. On the nearby work surface, spread out 1 or 2 paper towels with the opened dye powder container and measuring spoon on top. Place the carrying case, funnel, and stir stick nearby so it will be ready for use.

2. Holding the dye powder container over the sink, measure 2 teaspoons of dye powder carefully into the mixing pitcher. Put the dye powder back on the paper towel and re-cover it.

3. Add 1 tablespoon of water--in a few driblets--to the dye in the mixing pitcher. Mix the powder and water with the stir stick so that the powder becomes wetted and pasty. If the powder is not completely wetted, it will not mix in when the larger volume of water is added, but instead will float like unsweetened cocoa powder in cold milk. Add the gallon of water and mix thoroughly.

4. Place the funnel into the neck of a storage container. With one hand, grasp the neck of the bottle and funnel together, giving them support. Use the other hand to pour off dye solution from the pitcher and fill the storage bottle. Fill each of the remaining bottles in the same manner.

5. Cap the storage bottles tightly and wipe off any dye residue with paper towels. Discard the used towels and place the bottles in the carrying case. Carefully fold up and discard the paper towels on the counter. Use additional paper towels to wipe up any spilled dye from the sink and counter area.

CHAPTER 6

Scheduling Maintenance Inspections

6.1 Conventional Systems Serving Single-Family Homes

All septic systems require regular maintenance, which should include inspection and pumping if necessary. Because pumpouts are the most regularly required type of maintenance for conventional systems, maintenance schedules may generally be based on the anticipated need for pumping. In some cases, however, systems may go for long periods without needing pumpout. Such systems should still be inspected at least once every 5 years to ensure that other types of maintenance and repair are not needed.

6.1.1 Conventional systems serving 1-2 persons per bedroom

When scheduling inspection based on the anticipated need for pumping, inspectors should consider two factors: tank volume and household occupancy. Table 6.1, "Longest Recommended Inspection Frequency in Years for Single-Family Residences on Conventional Systems," may be used to determine the maximum recommended interval between maintenance inspections. Table 6.1 also accounts for the 5-year inspection limit. As mentioned above, systems should be inspected at least once every 5 years to ensure proper function. To calculate number of persons per bedroom refer to Equation 3.2 in section 3.2.2.

Table 6.1 Longest Recommended Inspection Frequency in Years for Single-Family Residences on Conventional Systems

Tank Size (gallons)	Household Occupancy (number of people)			
	1-4	4-6	6-8	10 or more
1000	5	3	Undersized Tanks	
1250	5	4	3	
1500	5	5	4	3

Notes: a. Inspections frequencies are based on worst-case scenarios for solids accumulation as determined by the US Public Health Service study (1954) and T. Bounds study (1987); as well as the 5-year anticipated need for preventative maintenance.
b. Inspection frequencies are based on a household wastewater disposal rate of 150 gallons per bedroom per day.
c. "Undersized Tanks" means that based on ISDS Regulations, the tank size is substandard for the number of people indicated.

6.1.2 Conventional systems serving 1 person per bedroom or less

The inspection frequencies listed in Table 6.1 allow for fairly high household occupancy. Households that can document stable occupancy of 1 person per bedroom or less can extend their inspection frequencies to the maximum of 5 years. To calculate number of persons per bedroom refer to Equation 3.2 in section 3.2.2.

6.1.3 Effect of garbage grinders on maintenance

Garbage grinders can be compatible with well-designed conventional septic systems; however, they are known to increase scum layer accumulation rates by approximately 20 percent (Bounds, 1987). Certain food wastes tend to biodegrade slowly. For example, egg shells and coffee grounds break down at a very slow rate. Disposal of such wastes via a septic system will necessitate more frequent maintenance.

For a septic system with a garbage grinder, an owner should consider that maintenance pumpouts will probably be needed 1-2 years earlier than for the same system without a garbage grinder. Effluent filters are recommended for any system with a garbage grinder to prevent solids from carrying over to the soil absorption system (refer to section 4.4.2, “Effluent filters and gas baffles.”) Garbage grinders are not recommended for use with substandard systems.

6.2 Nonconventional Systems Serving Single-Family Homes

6.2.1 Cesspools and other substandard systems

All substandard systems, including cesspools, systems with metal tanks and systems with undersized tanks, should be inspected[13] on a 1-3 year basis. Because cesspools are set deep into the ground, they are susceptible to groundwater infiltration. Cesspools should be inspected during the rainy season (i.e., early spring) if possible. The scheduling frequency should be based on the sensitivity and proximity of local natural resources as well as local conditions that predispose systems to failure. In particular, communities may wish to consider proximity to water resources (e.g., coastal resources, surface water supplies and wellheads), local soil type, local depth to groundwater, depth to restrictive layers (e.g., bedrock), lot size and household occupancy.

6.2.2 Alternative systems

A wide variety of alternative technologies are available for wastewater treatment. Rhode Island has formed a technical review committee to determine what forms of alternative treatment technology will be allowable in the state. These various alternative treatment technologies and their specific maintenance requirements are not described in this document. However, the companies that manufacture these systems are required by the state to make operation and maintenance information

13. Inspections for cesspools and substandard systems should always include pumping the system (see section 5.3, “Maintenance Inspection for Cesspools”).

available to homeowners. Owners and inspectors should also refer to requirements for maintenance included as part of their permits.

6.3 Special Consideration for Systems Serving Rental Properties

Though not always the case, some renters tend to be less attentive to septic systems than are owners. In addition, rental properties are frequently occupied by more people per bedroom than single-family houses. Septic systems serving rental units with year-round occupancy should be inspected on a 1-3 year schedule. Septic systems serving summer rental units or other temporary rental units should be inspected every year.

Different tenants are likely to have different water-use habitats. For this reason, property owners should consider having their systems inspected within 6 months to a year after a change in tenancy.

Owners should consider doing regular water-use surveys to monitor for system leaks and level of water usage. Chapter 3 of this handbook describes how to detect leaks in various household water-using devices. For more information, readers may contact the American Water Works Association. *How Much is Enough? Controlling Water Demand in Apartment Buildings* (Judd, 1993) is one publication that describes leak diagnosis for household plumbing.

6.4 Suggested Policy for Scheduling Inspections in Community Programs

Communities adopting wastewater management programs may wish to simplify the inspection scheduling process. The following six statements could be used to frame such a policy. Table 6.2, "Policy for Inspection Frequency Based on Household Type and System Type," summarizes these policies.

14. A standard tank is one that meets current DEM ISDS regulatory standards by size and construction.

Table 6.2 Policy for Inspection Frequency Based on Household Type and System Type

Household Type	System Type	Inspection Frequency
Water use of 75 gals./bedroom or less (i.e., 1 occupant per bedroom or less)	Conventional (standard tank)[a]	5 years
Single family	Conventional	5 years
Single family 3 or more bedrooms	Conventional (large tank)[b] Conventional (standard tank)	4 years 3 years
Rental or seasonal property	Any system	1-3 years (determined on a case-by-case basis)
Any household	Substandard (i.e., cesspool, metal tank, undersized tank, excessive occupancy, etc.) Innovative or alternative	1-3 years (determined on a case-by-case basis) Based on type of technology

Notes:
a. A standard tank is a tank that meets current RIDEM ISDS regulatory standards for size and construction.
b. A large tank is a septic tank that is larger than required by ISDS Regulations.

(a) All conventional systems with standard tanks,[14] serving a residence with low occupancy (1 person per bedroom or less), should be inspected on a 5-year schedule. Refer to Equation 3.2 in section 3.2.2 to calculate occupancy per bedroom.

(b) All conventional systems with at least 1000 gallon tanks, serving 1-2 bedroom homes, should be inspected on a 5-year schedule.

(c) All conventional systems with tanks that are larger than required by regulation and serving a residence with up to 2 persons per bedroom should be inspected on a 4-5 year schedule.[15] Refer to Equation 3.2 in section 3.2.2 to calculate occupancy per bedroom.

(d) All conventional systems with standard tanks, serving 3-bedroom or larger homes with up to 2 persons per bedroom, should be inspected on a 3-year schedule. Refer to Equation 3.2 in section 3.2.2 to calculate occupancy per bedroom.

15. Large tanks are fairly rare and communities may wish to drop this provision.
16. Undersized tanks are tanks that do not meet DEM's current volumetric standards.

(e) All substandard systems, including cesspools, systems with metal tanks and systems with undersized tanks,[16] and systems serving households with occupancy of more than 2 persons per bedroom, should be inspected on a 1-3 year schedule to be determined by the community on a case-by-case basis. Refer to Equation 3.2 in section 3.2.2 to calculate occupancy per bedroom.

(f) All systems serving rental properties should be inspected on a 1-3 year schedule as determined by the community.

(g) All systems using alternative wastewater disposal mechanisms should be scheduled for inspection based on the type of technology and DEM permit requirements.

Table 6.3 Adjusted Inspection Intervals for Conventional Systems Serving Single Family Residences Based on Combined Solids Accumulation Since the Last Pumpout [a, b]

Combined Solids Accumulation		System Pumped 3 Years Ago	System Pumped 4 Years Ago	System Pumped 5 Years Ago
48-inch tank	**nonstandard depth tank**			
30-34 inches	3/5-3/4 of depth flow	System Analysis Required [c]		3 years
26-30 inches	1/2-3/5 of flow depth		3 years	4 years
20-26 inches	2/5-1/2 of depth flow	3 years	4 years	5 years
16-20 inches	1/3-2/5 of depth flow	4 years	5 years	5 years
< 16 inches	< 1/3 of depth flow	5 years	5 years	5 years

Notes:
a. Recommended inspection intervals are based on worst-case scenario for rate of solids accumulation, (Bounds, 1987).
b. Inspection intervals are valid for systems where scum makes up 20-33% of combined solids and sludge makes up 66-80% of combined solids (see also Table 5.1b). Other systems should be assessed by a design professional and are likely to need more frequent inspections.
c. "System Analysis Required" means that combined solids accumulation will necessitate maintenance every 2 years or less. Such systems may need upgrades (e.g., larger tank).

6.5 Evaluation of Inspection Schedules

Occasionally a system's inspection schedule may need adjustment. Whenever a home changes ownership or occupancy, changes to an inspection schedule should be considered in accordance with Table 6.3. Other conditions that necessitate an inspection schedule evaluation include evidence of system failure and greater or lesser than anticipated accumulation of solids in the septic tank.

If a system has no more than 26 inches of scum and sludge combined and the system requires only routine maintenance (i.e., pumpout), then the time between inspections may be increased as per Table 6.3. However, inspection intervals should never exceed 5 years and an inspector should only recommend lengthening an inspection interval if the system is also being pumped.

From time to time, an inspector may observe a system that has an overaccumulation of solids. If a system has an overaccumulation of solids (greater than 26 inches of combined solids), but no signs of failure, then use Table 6.3 to recommend a more appropriate inspection frequency.

Setting inspection frequencies after a system has failed is beyond the scope of this handbook. If a system has failed, it should be referred to a repair professional.

GLOSSARY OF TERMS

Alternative (Innovative) System: See "Septic System."

Angled Mirror on a Pole: A pole of approximately 6 feet in length with a mirror attached to one end at a 45 degree angle. The device is used to see the interior parts of a septic tank, which are not otherwise visible from the manhole or inspection ports.

Application: See "System Records."

As-Built Plans: See "System Drawing."

Baffle: A downward extension from the ceiling of the septic tank that spans the sides, but leaves area underneath itself for wastewater flow. Baffles are typically designed to trap scum in the top portion of the septic tank.

Bedroom: Any room in a residential structure that is more than 100 square feet in floor area and has at least one window and a closeable passageway (i.e, doorway). Refer also to SD 1.00 of the ISDS Regulations for more detail.

Black water: Refers to sanitary sewage that is, in some substantial part, made up of human or animal excrement.

Building Sewer: A pipe beginning outside a building wall and extending to a septic system component (e.g., septic tank or cesspool).

Bypass: A pipe or other conveyance that allows sewage to short-circuit normal treatment. In a cesspool a bypass may also be referred to as an overflow pipe.

Bypasses are typically installed to prevent septage from backing up into the building sewer.

Certificate of Conformance: See "System Records."

Cesspool: A buried chamber that receives sanitary sewage from a building sewer for the purpose of collecting solids and discharging liquids to the surrounding soil.
An overflow cesspool refers to a secondary cesspool intended to collect overflow from a primary cesspool. Cesspools in a series refers to two or more cesspools linked together, consecutively.

Clear Zone: The relatively clear liquid layer between scum layer and sludge layer in a septic tank. In a properly functioning tank, effluent is taken from the clear zone as it is relatively free of solids.

Combined Solids: The combined thickness of the scum layer and sludge layer. In a typical septic tank, which has 48-inch liquid depth, combined solids accumulation should not exceed 26 inches as measured at the effluent inspection port.

Conventional Septic System: See "Septic System."

Design Plans: See "System Drawings."

Distribution Box (D-box): A watertight compartment that receives septic tank effluent and distributes it in approximately equal amounts to two or more pipe lines of a soil absorption system.

Effluent Filter: 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.

Gray Water: Wastewater that is discharged from a structure, but does not contain human or animal excrement or discharges from water closets. For example, gray water sources include sink water and washing machine discharge.

Handhole: A small access or inspection port (approximately 6-inch diameter) that allows access to a septic system component.

Inspection Report: See “System Records.”

ISDS Regulations: The most recently adopted *Rules and Regulations Establishing Minimum Standards Relating to Location, Design, Construction and Maintenance of Individual Sewage Disposal Systems*.

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

Scum Layer: Scum is the wastewater constituent that is lighter than water and therefore tends to float. The scum layer is that portion of wastewater that accumulates in the top portion of a septic tank.

Scum Layer Measuring Device: A device for measuring the thickness of scum that accumulates in the upper part of a septic tank.

Septage Pumping Records: See “System Records.”

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

> Alternative System: 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: A septic system that includes a building sewer, septic tank and soil absorption system. Conventional systems may have substandard components.
>
> Substandard System: 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 System Inspections: For the purposes of this handbook, septic system inspections refer to inspections done for maintenance or for property transfers.

First Maintenance Inspection: The first inspection for maintenance purposes that is done on a septic system. First maintenance inspections involve some record and data gathering and locating of components that is usually not necessary for routine maintenance inspections.

Functional inspection: Inspection of a septic system that typically includes investigation of permit records, in-home plumbing evaluation, and evaluation of septic system components including flow trial and dye tracing, as appropriate. Functional inspections are primarily done at property transfers.

Routine Maintenance Inspection: An inspection of the septic tank or cesspool and the system site to determine the need for pumping and repairs. Routine maintenance inspections are typically done every 1-5 years.

Septic Tank: A receptacle that receives wastewater from a building sewer, segregates scum and sludge via settling, and discharges clarified effluent to a distribution box or soil absorption system.

48-Inch Tank: A septic tank with a liquid depth of 48 inches. 48 inch tanks are the industry standard.

Large Tank: A septic tank that has more liquid volume than required by the ISDS Regulations. Large tanks require less frequent maintenance than standard and undersized tanks.

Metal Tank: A septic tank that is constructed of metal, typically steel. Metal tanks are substandard and tend to rust out over the course of years.

Multicompartment Tank: A septic tank with two or more consecutively linked chambers. Multicompartment tanks generally improve the settling process and produce cleaner effluent than noncompartmentalized tanks.

Nonstandard-Depth Tank (e.g., lowboy or ledge tank): A septic tank that does not have a liquid depth of 48 inches.

Septic Tanks in Series: Two or more septic tanks linked together consecutively. Septic tanks in series, like multicompartmental tanks, generally produce a cleaner effluent than singular tanks.

Sludge Layer: Sludge is wastewater material that is heavier than water and therefore sinks. The sludge layer is that portion of wastewater that accumulates at the bottom of a septic tank.

Sludge Layer Measuring Device: A device for determining the depth of sludge that has accumulated in the bottom of a septic tank.

Soil Absorption System: A component of a septic system that allows wastewater to leach into the soil for the purpose of treatment. Soil absorption systems include, but are not limited to, seepage pits (i.e., galleys), disposal beds, disposal trenches and cesspools.

Substandard System: See "Septic System."

System Drawings: A schematic for a septic system that includes components and their locations.

As-Built Drawings: System drawings that precisely and accurately indicate the installation of a completed septic system.

Design Plans: System drawings that indicate specifications for the proposed installation of a septic system.

System Records: Written forms that indicate the design, use and maintenance of a septic system.

Applications: Plans and specifications for installing, constructing, altering or repairing a septic system. There are three types of septic system application: Application for a New System, Application for Alteration, and Application for Repair. (See ISDS Regulations for more information.)

Certificate of Conformance: A form issued by DEM, which indicates that an installed system conforms with the ISDS Regulations. A municipality may not issue a certificate of occupancy without a certificate of conformance. Buildings may not be occupied or sold until a certificate of occupancy is issued. (See ISDS Regulations for more information.)

Certificate of Construction: A form filled out by an installer and approved by DEM, which indicates that a septic system was installed in accordance with permit plans as approved by DEM. Installers who encounter unanticipated conditions during construction, which prevent installation as per the permit plans, must file a revised application for DEM approval. Installers should leave a copy of the certificate in the home near the building sewer. (See the ISDS Regulations for more information.)

Inspection Reports: One of four reports prepared pursuant to this handbook: Functional Inspection Report, First Maintenance Inspection Report, Routine Maintenance Report, and Maintenance Report Supplement.

Septage Pumping Records: A bill or official record (e.g., an inspection report) that indicates that a septic system was pumped on a particular date.

Tees (Sanitary): A T-shaped pipe that is installed in a septic tank, typically on the effluent end, so as to prevent scum from flowing out of the tank.

Undersized Tanks: See "Septic System, Substandard System."

Wastewater: For the purposes of this handbook, wastewater refers to gray or black water discharge from toilets, laundry tubs, washing machines, sinks, and dishwashers, as well as the contents of septic systems.

Wastewater Management Program: 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 areawide management of septic systems.

Wastewater Management Official: A person who is charged with some aspect of operating a wastewater management program.

Water Treatment Appliance: A device that filters or softens the water supply to a building. Water treatment appliances, as referred to in this handbook, have backflush cycles.

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SEPTIC SYSTEM MAINTENANCE POLICY FORUM AND SUBCOMMITTEES

Septic System Maintenance Policy Forum

Sue Adamowicz; Rhode Island Department of Environmental Management
Rob Adler; US Environmental Protection Agency
Andy Alcusky; Beta Engineering
Linda Allen; Pete Fenner, Inc.
Martin Anderson; Fuss & O'Neill
Bob Ballou; Rhode Island Department of Environmental Management
Bill Bivona; Narragansett Conservation Commission
Jim Boyd; Coastal Resources Management Commission
Jeff Brownell; Save the Bay
Paul Brunetti; Griggs and Browne
Dave Burnham; Rhode Island Independent Contractors
Russ Chateauneuf; Rhode Island Department of Environmental Management
Clarkson Collins; Narragansett Community Development Department
Nicole Cromwell; Save the Bay
Kevin Cute; Coastal Resources Management Commission
Betsy Dake; Rhode Island Department of Environmental Management
Chris Deacutis; Rhode Island Department of Environmental Management
Steve DeNoyelle; Rhode Island Department of Mental Health, Retardation and Hospitals Facilities and Maintenance
Tom DePatie; Charlestown Wastewater Management Commission
Brenda Dillmann; Planning Consultant
Oscar L. Doucett; Fidelity Inspection Service
David Dow; University of Rhode Island
Laura Ernst; Coastal Resources Management Commission

William Freeman; Superior Home Inspection
Joe Frisella; Frisella Engineering
Wenly Ferguson; Save the Bay
John Gagnon; Second Opinion Home Inspection
Darlene Gardner; Superior Septic Service
Dan Geagan; Warwick Planning Department
Bob Gilstein; Portsmouth Planning Department
Alicia Good; Rhode Island Department of Environmental Management
Tom Groves; New England Interstate Water Pollution Control Commission
Christopher Hamblett; Save the Bay
Tom Hansen; Fuss & O'Neill
Robin Hedges; Rhode Island Clean Water Finance Agency
Nancy Hess; Charlestown Planning Department
Eric Izzi; New England Interstate Water Pollution Control Commission
Philip Johnson; New Shoreham Sewer Commission
Lorraine Joubert; University of Rhode Island
Janet Keller; Rhode Island Department of Environmental Management
Sue Kiernan; Rhode Island Department of Environmental Management
Kevin Klein; Brown University
Jennifer Langheld; Rhode Island Department of Environmental Management
Elizabeth Leach; Rhode Island Clean Water Finance Agency
Kathleen Leddy; Rhode Island Department of Administration
Susan Licardi; North Kingstown Water Department
George Loomis; University of Rhode Island
Don Lucas; Town of Old Saybrook, Connecticut
Jay Manning; Rhode Island Department of Environmental Management
Eugenia Marks; Audubon Society of Rhode Island
David McCurdy; Atlantic States Rural Water and Wastewater Association
Galen McGovern; Rhode Island Department of Environmental Management
Bob Mendoza; US Environmental Protection Agency
Ted Mercier; Home Check
Joe Migliore; Rhode Island Department of Environmental Management
Laura Miguel; Coastal Resources Management Commission
Scott Millar; Rhode Island Department of Environmental Management
Chris Miller; University of Rhode Island
Dave Monk; Salt Ponds Coalition

Brian Moore; Rhode Island Department of Environmental Management
Tom Mulhern; Rhode Island Realtors Association
Mickie Musselman; Rhode Island Department of Environmental Management
Carlene Newman; Rhode Island Department of Environmental Management
Ray Nickerson; South Kingstown Planning Department
Craig Onorato; Warwick Sewer Authority
Peter O'Rourke; Rhode Island Department of Environmental Management
Ernie Panciera; Rhode Island Department of Environmental Management
Meg Parulis; Town of Old Saybrook, CT
Dick Pastore; RP Engineering
Roger Pease; Charlestown Wastewater Management Commission
Tony Perri; John Perri and Sons
Jesse Perry; Ocean State Home Inspection
Margret Pilaro; Warwick Planning Department
Margherita Pryor; US Environmental Protection Agency
Richard Ribb; Rhode Island Department of Environmental Management
Steve Richtarik; Beta Engineering
M. James Riordan; Rhode Island Department of Environmental Management
Deb Robson; Rhode Island Department of Environmental Management
Bob Schmidt; Rhode Island Department of Environmental Management
Robert Scott; Atlantic States Rural Water and Wastewater Association
Frank Sheppard; University of Massachusetts
Anthony Simeone; Rhode Island Clean Water Finance Agency
John Slivey; Rhode Island Cesspool Cleaners
Gregory Snow; Beta Engineering
Sally Spadaro; Governor's Policy Office
Jonathan Stevens; Warwick Planning Department
JoAnne Sulak; US Environmental Protection Agency
Beth Tetreault; Glocester Wastewater Management Commission
Warren Towne; Rhode Island Department of Environmental Management
Suzanne Vetromile; Narrow River Preservation Association
Dennis Vinaheirto; Warwick Sewer Authority
Alison Walsh; US Environmental Protection Agency
Jeff Willis; Coastal Resources Management Commission
Mike Young; Burrillville Cesspool

Issues related to septic system maintenance and inspection can be complex and occasionally controversial. The policy forum created subcommittees as issues arose that required special consideration. Subcommittee meetings were open to all interested parties and were attended as follows:

Flow Testing Subcommittee

David Dow; University of Rhode Island
Joe Frisella; Frisella Engineering
Scott Millar; Rhode Island Department of Environmental Management
Brian Moore; Rhode Island Department of Environmental Management
Peter O'Rourke; Rhode Island Department of Environmental Management
M. James Riordan; Rhode Island Department of Environmental Management
Dennis Vinaheirto; Warwick Sewer Authority

Inspection Subcommittee

Dave Burnham; Rhode Island Independent Contractors
Nicole Cromwell; Save the Bay
Tom DePatie; Charlestown Wastewater Management Commission
David Dow; University of Rhode Island
Joe Frisella; Frisella Engineering
Dan Geagan; Warwick Planning Department
Phil Johnson; Town of New Shoreham
George Loomis; University of Rhode Island
Eugenia Marks; Audubon Society of Rhode Island
Scott Millar; Rhode Island Department of Environmental Management
Brian Moore; Rhode Island Department of Environmental Management
Craig Onorato; Warwick Sewer Authority
Margaret Pilaro; Warwick Department of Planning
M. James Riordan; Rhode Island Department of Environmental Management
Bob Schmidt; Rhode Island Department of Environmental Management
Gregory Snow; Beta Engineering
Alison Walsh; Save the Bay

Field-Testing Subcommittee

Paul Brunetti; Griggs & Browne
David Burnham; Rhode Island Independent Contractors
David Dow; University of Rhode Island
Joe Frisella; Frisella Engineering
Gary Fullerton; University of Rhode Island
Darlene Gardner; Superior Septic System Service
Rick Gardner, Jr.; Superior Septic System Service
George Loomis; University of Rhode Island
Sue Licardi; North Kingstown Water Department
M. James Riordan; Rhode Island Department of Environmental Management
Adam Sykes; University of Rhode Island

Home Inspector and Pumper Workgroup

Paul Brunetti; Griggs & Browne
Russ Chateauneuf; Rhode Island Department of Environmental Management
William Freeman; Superior Home Inspection
John Gagnon; Second Opinion Home Inspections
Darlene Gardner; Superior Septic Service
Rick Gardner; Superior Septic Service
Ted Mercier; House Check
Tony Perri; John Perri & Sons
Jesse Perry; Ocean State Home Inspections
M. James Riordan; Rhode Island Department of Environmental Management
John Slivey; Rhode Island Cesspool Cleaners
Mike Young; Burrillville Cesspool

Rhode Island Recommended

SEPTIC SYSTEM FUNCTIONAL INSPECTION REPORT[1]

as described in

Septic System Checkup: The Rhode Island Handbook for Inspection

Inspection Date:____________________

CLIENT INFORMATION

Client's Name ____ Phone # ______________

Inspection Street Address & Town ____

____

INSPECTOR INFORMATION

Inspector's Name ____

Company ____ Phone # ______________

Street Address & Town ____

____

IMPORTANT NOTICE

This inspection report indicates the present condition of the system based on state-recommended inspection procedures, *but is in no way* a guarantee or warranty of future performance. The inspection report excludes and does not intend to cover components that are concealed or are otherwise not observable. Dry wells are not included in this inspection.

HOMEOWNER/OCCUPANT RECORDS & DATA, As Available (chapter 2)[2]

Information collected pursuant to this section is to be provided voluntarily and at the discretion of the property owner. The property owner is solely responsible for record and data accuracy and completeness. The inspector assumes no responsibility for the accuracy of information provided by the property owner.

Indicate whether the following information was made available during the inspection. Attach copies of available records. If the property owner states that any of the following services were not provided—or in the case of application records that the system was installed prior to regulations (1968) — indicate not applicable (N/A). If the property owner states that partial records were provided, indicate "partial."

Source of Records & Data

Records and data were given to the inspector by:

_______ Property owner _______ Realtor ________ Other __________________________

Application Records

Yes	No	N/A	
☐	☐	☐	Applications for septic system (inclusive of new systems, alteration, repairs). Indicate the number of each: ______ New system ______ Alteration ______ Repairs
☐	☐	☐	Certificate of construction
☐	☐	☐	Certificate of conformance

Use Records

Yes	No	N/A	Partial	
☐	☐	☐	☐	Last two septage pumping bills
☐	☐	☐	☐	Water bills for the last 12-24 months

Maintenance Records

Yes	No	N/A	Partial	
☐	☐	☐	☐	Maintenance inspection reports

Resident Data

During the last 12 months, the inspected residence housed _____ year-round occupants

Plat Number ______ Lot Number ______

1. The Functional Inspection Report is primarily intended for inspection as part of a property transfer or sale.
2. Chapter and section numbers refer to *Septic System Checkup: The Rhode Island Handbook for Inspection.*

IN-HOME PLUMBING EVALUATION (chapter 3)

Information reported in this section may in part be based on homeowner records and data. The inspector assumes no responsibility for inaccurate records or data.

Wastewater Routing (section 3.1)

Yes	No	Inconclusive	
☐	☐	☐	All grey and black water plumbing is routed to the ISDS. Comments: ____ ____

Occupancy/Water Use (section 3.2)

Yes	No	Inconclusive	
☐	☐	☐	Water records and owner data show water use is over 75 gallons per person per day (GPD), indicating high usage or potential plumbing problems. ____ gallons were used by ____ occupants during ____ months.
☐	☐	☐	Current occupancy is estimated to be over 2 occupants per bedroom, which may be stressful to the system. Owner data indicates there were ____ live-in occupants during previous ____ months. Based on in-home observations, there are ____ bedrooms.
☐	☐	☐	A garbage disposal is routed to the septic system and may place an added burden on it (section 6.1.3).

Leak Diagnosis (section 3.3)

The following fixtures were found and inspected (indicate #):___ toilets ___ bathtub faucets ___ basin faucets ___ showerheads

Yes	No	Inconclusive	
☐	☐	☐	A water treatment appliance backflushes to the septic system.
☐	☐	☐	There is evidence of plumbing leakage from: toilet, basin faucet, bathtub faucet, showerhead or water treatment appliance. (Circle one or more of the aforementioned.) Indicate floor and room: ___________

SYSTEM COMPONENT EVALUATION (chapters 1 and 5)

Type of septic system (section 1.2): ☐ Single Cesspool ☐ Conventional septic tank system ☐ Other _________________________

Type of tank, if present (section 1.2.2): ☐ Concrete ☐ Metal ☐ Other _________________________

Indicate if any of the following components or accessories are present:
___ ISDS effluent pump ___ D-box handhole ___ Effluent filter ___ In-door lift pump ___ Other _________________________

Access to the system (diagram below or attach existing drawings): ☐ At grade ☐ Below grade

a. Outline approximate shape of the house, indicate front (F) and back (B).
b. Use swing-tie measurements to indicate the manhole (main access) of the septic tank, if buried.
c. Sketch in septic tank and other components as well as important surface features that may help to locate parts of the system.

Cesspools, *before pumpout and dye tracing* (section 5.3)

Yes	No	Not Observable	
☐	☐	☐	There is evidence of structural damage (section 5.3.1 and 5.3.2).
☐	☐	☐	There may be an overflow, second cesspool, soil absorption system, or other outlet from the cesspool. Dye tracing is recommended (section 5.3.3).
☐	☐	☐	There is standing water in the cesspool above the invert (section 5.3.1).

Septic Tank, *before pumpout, flow trial and dye tracing* (section 5.1)

Yes No Not Observable

☐ ☐ ☐ There is evidence of structural damage to the baffles, tees or superstructure of the tank (circle one or more)(section 5.1.8).

☐ ☐ Based on visual observations, sewage or septage may bypass the soil absorption system via a pipe or other conveyance. If a flow trial is being done, dye tracing should also be done (section 5.6.1).

☐ ☐ Flowage was seen or heard coming from the inlet even though all known water-use appliances/fixtures in the home are off. This condition may indicate in-home plumbing leakage (section 5.1.8). See also "In-Home Plumbing Evaluation" (chapter 3).

☐ ☐ Scum and sludge layer thickness measurements were taken. Scum is ___ ins. and sludge is ___ ins. Indicate the appropriate "Recommended Action" in the Pumpout Guidelines table which follows (section 5.1.2).

Pumpout Guidelines for Conventional Systems (Table 5.1a)

Depth Criteria: Solids 48 inch depth tank	Nonstandard depth tank	Recommended Action
Combined solids < 16 inches	Combined solids < 1/3 flow depth	Pump at owners discretion. Consider setting a new Maintenance Inspection Schedule (see section 6.5 "Evaluation of Inspection Schedules."
Combined solids = 16 - 34 inches	Combined solids = 1/3 - 3/4 flow depth	Pump the tank and re-inspect as per section 6.5 "Evaluation of Inspection Schedules."
Either: Combined solids > 34 inches, Sludge > 26 inches, or Scum > 11 inches	Either: Combined solids > 3/4 flow depth, Sludge > 1/2 flow depth, or Scum 1/5 flow depth	Pump the tank and consider a system analysis by a licensed designer. A new inspection schedule, which accounts for system capacity and use, should be set by the licensed designer.

SITE OBSERVATIONS (section 5.4)

Yes No Inconclusive

☐ ☐ ☐ Impermeable surface such as concrete, asphalt, or brick is located approximately over the soil absorption system.

☐ ☐ ☐ There are one or more of the following signs of system malfunction present:
- ___ Septic odors
- ___ Ponding or wastewater breakout
- ___ Burnt out grass or ground staining over the soil absorption system (only indicate if one or more other signs are present).
- ___ Patches of lush green grass over the soil absorption system (only indicate if one or other signs are present).

☐ ☐ ☐ Trees, large shrubs or other plants with extensive root systems were observed in the vicinity (10 feet as per Rule 11.06(2) of the ISDS Regulations) of the soil absorption system.

☐ ☐ ☐ Heavy objects (e.g. cars or pools); or evidence from such objects (e.g. tracks and impressions) are in the vicinity (i.e. directly over) of the soil absorption system.

☐ ☐ ☐ Stormwater, sump pumps, foundation drains or roof runoff is diverted to flow into the septic system.

☐ ☐ ☐ An apparent cave-in or exposed component was identified. A flow trial is not recommended.

FLOW TRIAL AND DYE TRACING (section 5.5 and 5.6)

Flow trial (75 gals/bdrm. @ 5 - 10 gpm with less than 2 inch rise in septic tank fluid level (section 5.5))
Indicate one of the following:

___ Preliminary evaluation indicates that a flow trial should be performed at the septic tank outlet for any of the following reasons (indicate one or more; section 5.5.1):
  ___ Excessive depth of septic tank solids ___ Structural damage ___ No solids depths measured and no pumpout in over three years

___ Flow trial shows the system accepted ___ gals. over ___ mins. (flow trial volumes are approximates), which is:
  ___ At least 75 gals/bdrm. ___ Is less than 75 gals/bdrm.

___ Flow trial results were inconclusive for the following reasons (section 5.6.1): ____
____

Dye tracing, when indicated (section 5.6)
Indicate one of the following:

___ Dye tracing was not done, as no potential system bypasses were identified (sections 5.6.1 and 5.6.2).

___ Potential bypass(es) was/were identified but no dye tracing was performed for the following reasons (sections 5.6.1 and 5.5.1): ____________
____

___ Dye tracing was performed as ___ potential system bypasses had been identified. Dye tracing results were as follows:
  ___ No bypasses were confirmed.
  ___ ___ bypasses were confirmed originating from inside the home and ___ bypasses were confirmed that originate outside the home.

  Describe where bypasses originate and terminate: ____
  ____

RESULTS & RECOMMENDATIONS

Results:
Inspection revealed (indicate one or more of the following):

___ System functions properly.
___ System is substandard or has substandard components. (Note reason(s) for indicating this on comment line below. Substandard systems may include, but are not limited to, cesspools, metal tanks, round tanks, undersized systems, and improper setbacks.)
___ Structural damage to the system (such as cracks in the septic tank or a soil absorption system cave-in).
___ Excessive wastewater backup in the soil absorption system.
___ Plumbing leaks or wastewater routing problems in the home.
___ Need for system maintenance.
___ Due to the condition of the system or lack of information, the inspection results are inconclusive.

Comments: ____
____
____

The system was last inspected or pumped on _______ (indicate date or N/A if there is no knowledge of previous maintenance) based on:
___ Pumping bill ___ Inspection report ___ Other ___________________________

Recommendations:
Indicate one or more of the following:

___ Further evaluation by a repair professional is recommended.
___ System upgrade should be considered.
___ Evaluation by a plumber is recommended.
___ Pumping and completion of the inspection is recommended.

Indicate one of the following (chapter 6)

___ Based on this inspection, the recommended maintenance interval is ___ (years) and should occur on ________________________ (date).
___ The system should receive further evaluation before a next inspection is scheduled.

Standard Inspection Schedules for Single-Family Residences on Conventional Systems (section 6.1.1)

Tank Size (gallons)	Household Occupancy			
	1-4	4-6	6-8	10 →
1000	5	3	**Undersized Tanks**	
1250	5	4	3	
1500	5	5	4	3

Please note: Substandard systems such as cesspools and systems with metal or undersized tanks should be on 1-3 year schedules, as should rental and seasonal properties. Innovative and alternative system should be scheduled based on DEM requirements.

Adjusted Inspection Schedules for Conventional Systems (section 6.5)

Combined Solids Accumulation **48 inch tank**	**nonstandard depth tank**	**System Pumped 3 Years Ago**	**System Pumped 4 Years Ago**	**System Pumped 5 Years Ago**
30"- 34"	3/5- 3/4 of flow depth	**System Analysis Required**		3 years
26"- 30"	1/2- 3/5 of flow depth		3 years	4 years
21"- 26"	2/5- 1/2 of flow depth	3 years	4 years	5 years
16"- 21"	1/3- 2/5 of flow depth	4 years	5 years	5 years
< 16"	< 1/3 of flow depth	5 years	5 years	5 years

INSPECTOR SIGNATURE

____

Inspector's Name (printed or typed)

____

Inspector's Signature

Rhode Island Recommended

SEPTIC SYSTEM
FIRST MAINTENANCE INSPECTION REPORT[1]

as described in
Septic System Checkup:
The Rhode Island Handbook for Inspection

Inspection Date:______________________

CLIENT INFORMATION

Client's Name ____ Phone # ______________

Inspection Street Address & Town ____

____

INSPECTOR INFORMATION

Inspector's Name ____

Company ____ Phone # ______________

Street Address & Town ____

____

IMPORTANT NOTICE

This inspection report indicates the present condition of the system based on state-recommended inspection procedures, *but is in no way* a guarantee or warranty of future performance. The inspection report excludes and does not intend to cover components that are concealed or are otherwise not observable. Dry wells are not included in this inspection.

HOMEOWNER/OCCUPANT RECORDS & DATA, As Available (see chapter 2)[2]

Information collected pursuant to this section is to be provided voluntarily and at the discretion of the property owner. The property owner is solely responsible for record and data accuracy and completeness. The inspector assumes no responsibility for the accuracy of information provided by the property owner.

Indicate whether the following information was made available during the inspection. Attach copies of available records. If the property owner states that any of the following services were not provided—or in the case of application records that the system was installed prior to regulations (1968) — indicate not applicable (N/A). If the property owner states that partial records were provided, indicate "partial."

Application Records

Yes	No	N/A	
☐	☐	☐	Applications for septic system (inclusive of new systems, alteration, repairs). Indicate the number of each: ______ New system ______ Alteration ______ Repair
☐	☐	☐	Certificate of construction
☐	☐	☐	Certificate of conformance

Maintenance and Inspection Records

Yes	No	N/A	Partial	
☐	☐	☐	☐	Last septage pumping bill
☐	☐	☐	☐	Last maintenance or home inspection report

1. The Home Inspection Report is primarily intended for inspection as part of a property transfer or sale. For information on reports for use during other inspection circumstances, refer to *Septic System Checkup: The Rhode Island Handbook for Inspection.*
2. Chapter and Section numbers refer to *Septic System Checkup*.

SYSTEM COMPONENT EVALUATION (chapters 1 and 5)

Type of septic system (section 1.2): ☐ Single Cesspool ☐ Conventional septic tank system ☐ Other ______________________

Type of tank, if present (section 1.2.2): ☐ Concrete ☐ Metal ☐ Other ________________________

Indicate if any of the following components or accessories are present:
___ ISDS effluent pump ___ D-box handhole ___ Effluent filter ___ In-door lift pump ___ Other ________________________

Access to the system (diagram below or attach existing drawings): ☐ At grade ☐ Below grade

a. Outline approximate shape of the house, indicate front (F) and back (B).
b. Use swing-tie measurements to indicate the manhole (main access) of the septic tank, if buried.
c. Sketch in septic tank and other components as well as important surface features that may help to locate parts of the system.

Cesspools, *before pumpout* (section 5.3)

Yes	No	Not Observable	
☐	☐	☐	There is evidence of structural damage (section 5.3.1 and 5.3.2).
☐	☐	☐	There may be an overflow, second cesspool, soil absorption system, or other outlet from the cesspool. Dye tracing is recommended (section 5.3.3).
☐	☐	☐	There is standing water in the cesspool above the invert (section 5.3.1).

Septic Tank, *before pumpout* (section 5.1)

Yes	No	Not Observable	
☐	☐	☐	There is evidence of structural damage to the baffles, tees or superstructure of the tank (circle one or more) (section 5.1.8).
☐	☐	☐	Based on visual observations, sewage or septage may bypass the soil absorption system via a pipe or other conveyance. If a flow trial is being done, dye tracing should also be done (section 5.6.1).
☐	☐	☐	Flowage was seen or heard coming from the inlet even though all known water-use appliances/fixtures in the home are off. This condition may indicate in-home plumbing leakage (section 5.1.8). Performing an in-home evaluation should be considered (chapter 3).
☐	☐	☐	Scum and sludge layer thickness measurements were taken. Scum is ___ ins. and sludge is ___ ins. Indicate the appropriate "Recommended Action" in the Pumpout Guidelines table which follows (section 5.1.2).

Pumpout Guidelines for Conventional Systems (Table 5.1a)

Solids Depth Criteria: 48 inch depth tank	Solids Depth Criteria: Nonstandard depth tank	Recommended Action
Combined solids < 16 inches	Combined solids < 1/3 flow depth	Pump at owners discretion. Consider setting a new Maintenance Inspection Schedule (see section 6.5 "Evaluation of Inspection Schedules."
Combined solids = 16 - 34 inches	Combined solids = 1/3 - 3/4 flow depth	Pump the tank and re-inspect as per section 6.5 "Evaluation of Inspection Schedules."
Either: Combined solids > 34 inches, Sludge > 26 inches, or Scum > 11 inches	Either: Combined solids > 3/4 flow depth, Sludge > 1/2 flow depth, or Scum 1/5 flow depth	Pump the tank and consider a system analysis by a licensed designer. A new inspection schedule, which accounts for system capacity and use, should be set by the licensed designer.

SITE OBSERVATIONS (section 5.4)

Yes	No	Inconclusive	
☐	☐	☐	Impermeable surface such as concrete, asphalt, or brick is located approximately over the soil absorption system.
☐	☐	☐	There are one or more of the following signs of system malfunction present: ___ Septic odors ___ Ponding or wastewater breakout ___ Burnt out grass or ground staining over the soil absorption system (only indicate if one or more other signs are present). ___ Patches of lush green grass over the soil absorption system (only indicate if one or other signs are present).
☐	☐	☐	Trees, large shrubs or other plants with extensive root systems were observed in the vicinity (10 feet as per Rule 11.06(2) of the ISDS Regulations) of the soil absorption system.
☐	☐	☐	Heavy objects (e.g. cars or pools); or evidence from such objects (e.g. tracks and impressions) are in the vicinity (i.e. directly over) of the soil absorption system.
☐	☐	☐	Stormwater, sump pumps, foundation drains or roof runoff is diverted to flow into the septic system.
☐	☐	☐	An apparent cave-in or exposed component was identified. A flow trial is not recommended.

RESULTS & RECOMMENDATIONS

Results:
Inspection revealed (indicate one or more of the following):

___ System fuctions properly.
___ System is ubstandard or has substandard components. (Note reason(s) for indicating this on comment line below. Substandard systems may include, but are not limited to, cesspools, metal tanks, round tanks, undersized systems, and improper setbacks.)
___ Structuraldamage to the system (such as cracks in the septic tank or a soil absorption system cave-in).
___ Excesive wastewater backup in the soil absorption system.
___ Need for system maintenance.
___ Due to th condition of the system or lack of information, the inspection results are inconclusive.

Comments: ____

____

____

The system was last inspected or pumped on _______ (indicate date or N/A if there is no knowledge of previous maintenance) based on:
___ Pumping bill ___ Inspection report ___ Other __________________________

Recommendations:
Indicate one or more of the following:

___ Further evaluation by a repair professional is recommended.
___ System upgrade should be considered.
___ Evaluation by a plumber is recommended.
___ Pumping and completion of the inspection is recommended.

Indicate one of the following:

___ Based on this inspection, the recommended maintenance interval is ___ (years) and should occur on ________ (date) (sections 6.1. and 6.5).
___ The system should receive further evaluation before a next inspection is scheduled.

Standard Inspection Schedules for Single-FamilyResidences on Conventional Systems (section 6.1.1)

Tank Size	Household Occupancy			
	1-4	4-6	6-8	10 →
1000	5	3	**Undersized Tanks**	
1250	5	4	3	
1500	5	5	4	3

Please note: Substandard systems, such as cesspools and systems with metal or undersized tanks, should be on 1-3 year schedules, as should rental and seasonal properties. Innovative and alternative system should be scheduled based on DEM requirements.

Adjusted Inspection Schedules for Conventional Systems (section 6.5)

Combined Solids Accumulation **48 inch tank**	**nonstandard depth tank**	**System Pumped 3 Years Ago**	**System Pumped 4 Years Ago**	**System Pumped 5 Years Ago**
30”- 34”	3/5- 3/4 of flow depth	**System Analysis Required**		3 years
26”- 30”	1/2- 3/5 of flow depth		3 years	4 years
21”- 26”	2/5- 1/2 of flow depth	3 years	4 years	5 years
16”- 21”	1/3- 2/5 of flow depth	4 years	5 years	5 years
<16”	< 1/3 of flow depth	5 years	5 years	5 years

INSPECTOR SIGNATURE

____
Inspector’s Name (printed or typed)

____
Inspector’s Signature

Rhode Island Recommended

SEPTIC SYSTEM
ROUTINE MAINTENANCE INSPECTION REPORT[1]

as described in
Septic System Checkup:
The Rhode Island Handbook for Inspection

Inspection Date:____________________

CLIENT INFORMATION

Client's Name ____ Phone # ______________

Inspection Street Address & Town ____

____

INSPECTOR INFORMATION

Inspector's Name ____

Company ____ Phone # ______________

Street Address & Town ____

____

IMPORTANT NOTICE

This inspection report indicates the present condition of the system based on state-recommended inspection procedures, *but is in no way* a guarantee or warranty of future performance. The inspection report excludes and does not intend to cover components that are concealed or are otherwise not observable. Dry wells are not included in this inspection.

HOMEOWNER/OCCUPANT RECORDS & DATA, As Available (see chapter 2)[2]

Information collected pursuant to this section is to be provided voluntarily and at the discretion of the property owner. The property owner is solely responsible for record and data accuracy and completeness. The inspector assumes no responsibility for the accuracy of information provided by the property owner.

Indicate whether the following information was made available during the inspection. Attach copies of available records. If the property owner states that any of the following services were not provided—or in the case of application records that the system was installed prior to regulations (1968) — indicate not applicable (N/A). If the property owner states that partial records were provided, indicate "partial."

Maintenance and Inspection Records

Yes	No	N/A	Partial	
☐	☐	☐	☐	Last septage pumping bills
☐	☐	☐	☐	Last maintenance or home inspection report

SYSTEM COMPONENT EVALUATION

Cesspools, *before pumpout*:

Yes	No	Not Observable	
☐	☐	☐	There is evidence of structural damage (section 5.3.1 and 5.3.2).
☐	☐		There may be an overflow, second cesspool, soil absorption system, or other outlet from the cesspool. Dye tracing is recommended (section 5.3.3).
☐	☐		There is standing water in the cesspool above the invert (section 5.3.1).

1. The Routine Maintenance Inspection Report is intended for use during a routine maintenance inspection. For information on reports for use during other inspection circumstances, refer to *Septic System Checkup: The Rhode Island Handbook for Inspection.*
2. Chapter and Section numbers refer to *Septic System Checkup*.

Septic Tank, *before pumpout*

Yes	No	Not Observable	
☐	☐	☐	There is evidence of structural damage to the baffles, tees or superstructure of the tank (circle one or more). A flow trial is not recommended (section 5.1.1 and 5.1.8).
☐	☐		Based on visual observations, sewage or septage may bypass the soil absorption system via a pipe or other conveyance. If a flow trial is being done, dye tracing should also be done (section 5.6.1).
☐	☐		Flowage was seen or heard coming from the inlet even though all known water-use appliances/fixtures in the home are off. This condition may indicate in-home plumbing leakage (section 5.1.8).
☐	☐		Scum and sludge layer thickness measurements were taken. Scum is ___ ins . and sludge is ___ ins. Indicate the appropriate "Recommended Action" in the Pumpout Guidelines table which follows (section 5.1.2).

Pumpout Guidelines for Conventional Systems (Table 5.1a)

Depth Criteria Solids 48 inch depth tank	Nonstandard depth tank	Recommended Action
Combined solids < 16 inches	Combined solids < 1/3 flow depth	Pump at owners discretion. Consider setting a new Maintenance Inspection Schedule (see section 6.5 "Evaluation of Inspection Schedules."
Combined solids = 16 - 34 inches	Combined solids = 1/3 - 3/4 flow depth	Pump the tank and re-inspect as per section 6.5 "Evaluation of Inspection Schedules."
Either: Combined solids > 34 inches, Sludge > 26 inches, or Scum > 11 inches	Either: Combined solids > 3/4 flow depth, Sludge > 1/2 flow depth, or Scum 1/5 flow depth	Pump the tank and consider a system analysis by a licensed designer. A new inspection schedule, which accounts for system capacity and use, should be set by the licensed designer.

SITE OBSERVATIONS (section 5.4)

Yes	No	Not Observable	
☐	☐	☐	Impermeable surface such as concrete, asphalt or brick is located approximately over the soil absorption system.
☐	☐	☐	There are one or more of the following signs of system malfunction present: ___ Septic odors ___ Ponding or wastewater breakout ___ Burnt out grass or ground staining over the soil absorption system (only indicate if one or more other signs are present). ___ Patches of lush green grass over the soil absorption system (only indicate if one or other signs are present).
☐	☐	☐	Trees, large shrubs or other plants with extensive root systems were observed in the vicinity (10 feet as per Rule 11.06(2) of the ISDS Regulations) of the soil absorption system.
☐	☐	☐	Heavy objects (e.g. cars or pools); or evidence from such objects (e.g. tracks and impressions) are in the vicinity (i.e. directly over) of the soil absorption system.
☐	☐	☐	Stormwater, sump pumps, foundation drains or roof runoff is diverted to flow into the septic system.
☐	☐	☐	An apparent cave-in or exposed component was identified. A flow trial is not recommended.

RESULTS & RECOMMENDATIONS

Results:

Inspection revealed (indicate one or more of the following):

___ System functions properly.
___ Structural damage to the system (such as cracks in the septic tank or a soil absorption system cave-in).
___ Excessive wastewater backup in the soil absorption system is indicated.
___ Need for system maintenance.
___ Due to the condition of the system or lack of information the inspection results are inconclusive.

Comments: ____
____
____

The system was last inspected or pumped on _______ (indicate date or N/A if there is no knowledge of previous maintenance) based on:
___ Pumping bill ___ Inspection report ___ Other __________________________

Recommendations

Indicate one or more of the following:

___ Further evaluation by a licensed designer is recommended.
___ System upgrade should be considered.
___ Evaluation by a plumber is recommended.
___ Pumping and completion of the inspection is recommended.

Indicate one of the following

___ Based on this inspection, the recommended maintenance interval is ___ (years) and should occur on _____________ (date).
___ The system should receive further evaluation before a next inspection is scheduled.

Standard Inspection Schedules for Single-Family Residences on Conventional Systems (section 6.1)

Tank Size (gallons)	**Household Occupancy**			
	1-4	4-6	6-8	10 →
1000	5	3	**Undersized Tanks**	
1250	5	4	3	
1500	5	5	4	3

Please note: Substandard systems such as cesspools and systems with metal or undersized tanks should be on 1-3 year schedules, as should rental and seasonal properties. Innovative and alternative system should be scheduled based on DEM requirements. To change schedules for systems with nonstandard-depth tank consult handbook.

Adjusted Inspection Schedules for Conventional Systems (section 6.5)

Combined Solids Accumulation **48 inch tank**	**nonstandard depth tank**	**System Pumped 3 Years Ago**	**System Pumped 4 Years Ago**	**System Pumped 5 Years Ago**
30”- 34”	3/5-3/4 of flow depth	**System Analysis Required**		3 years
26”- 30”	1/2-3/5 of flow depth		3 years	4 years
2”- 26”	2/5-1/2 of flow depth	3 years	4 years	5 years
16”- 21”	1/3-2/5 of flow depth	4 years	5 years	5 years
< 16”	< 1/3 of flow depth	5 years	5 years	5 years

INSPECTOR SIGNATURE

____
Inspector’s Name (printed or typed)

____
Inspector’s Signature

Rhode Island Recommended
SEPTIC SYSTEM MAINTENANCE INSPECTION REPORT SUPPLEMENTS[1]
as described in *Septic System Checkup: The Rhode Island Handbook for Inspection*

Inspection Date:______________________

CLIENT INFORMATION

Client's Name ____ Phone # ____________________

Inspection Street Address & Town ____

____

INSPECTOR INFORMATION

Inspector's Name ____

Company ____ Phone # _____________________

Street Address & Town ____

____

FLOW TRIAL AND DYE TRACING (sections 5.5 and 5.6)

Flow trial: 75 gals/bdrm. @ 5 - 10 gpm with less than 2 inch rise in septic tank fluid level (section 5.5)[2]

Indicate one of the following:

___ Preliminary evaluation indicates that a flow trial should be performed at the septic tank outlet for any of the following reasons (indicate one or more; section 5.5.1):

___ Excessive depth of septic tank solids ___ Structural damage ___ No solids depths measured & no pumpout in over three years

___ Flow trial shows the system accepted ___ gals. over ____ mins. (flow trial volumes are approximates), which is:

___ At least 75 gals/bdrm. ___ Is less than 75 gals/bdrm.

___ Flow trial results were inconclusive for the following reasons (section 5.5.1): ____

____

Dye tracing , when indicated (section 5.6)

Indicate one of the following

___ Dye tracing was not done, as no potential system bypasses were identified (sections 5.6.1 and 5.6.2).

___ Potential bypass(es) was/were identified but no dye tracing was performed for the following reasons (sections 5.6.1. and 5.5.1):

___ Dye tracing was performed as ___ potential system bypasses had been identified. Dye tracing results were as follows:

___ No bypasses were confirmed.

___ Bypasses were confirmed.

___ bypasses were confirmed originating from inside the home and

___ bypasses were confirmed that originate outside the home.

Describe where bypasses originate and terminate: ____

____

INSPECTOR SIGNATURE

____
Inspector's Name (printed or typed)

____
Inspector's Signature

1. The Home Inspection Report is primarily intended for inspection as part of a property transfer or sale. For information on reports for use during other inspection circumstances, refer to *Septic System Checkup: The Rhode Island Handbook for Inspection.*
2. Chapter and Section numbers refer to *Septic System Checkup*.

APPENDIX D

Community Septic System Loan Policies and Procedures

830-RICR-10-15-3

TITLE 830 - INFRASTRUCTURE BANK

CHAPTER 10 - PROGRAMS

SUBCHAPTER 15 - SEPTIC AND SEWER

PART 3 - Community Septic System Loan Policies and Procedures

3.1 Purpose:

These Loan Policies and Procedures of Rhode Island Infrastructure Bank (the "Bank") have been established to govern the lending activities between the Bank and local governmental units in the state of Rhode Island in connection with the Community Septic System Loan Program ("CSSLP") under and pursuant to the State Water Pollution Control Revolving Funds, 33 U.S.C. §§ 1381 to 1388 and R.I. Gen. Laws Chapter 46-12.2 as amended.

3.2 Definitions:

Except as otherwise defined herein, the words and phrases used within these Loan Policies and Procedures have the same meaning as the words and phrases have in R.I. Gen. Laws Chapter 46-12.2 as amended.

3.3 Financial Assistance:

A. These Loan Policies and Procedures govern the provision of financial assistance to local governmental units to administer a program of septic system repair and cesspool closure in their community. The CSSLP is a source of funds to provide subsequent loans to property owners for the repair or replacement of failed or failing septic systems or substandard systems and cesspool closures within areas identified in the local government unit's On-site Wastewater Management Plan.

B. The Bank and the local governmental unit will establish a relationship to be evidenced by a loan agreement to provide financing for repair or replacement of failed, failing or substandard systems in that community. Rhode Island Housing and Mortgage Financing Corporation (RI Housing), or any other entity as selected by the Bank, or its successor, will be the loan servicer (the "Servicer") on the subsequent property owners loans. The Servicer will:

1. accept applications from property owners;

2. coordinate payments to septic system installers/cesspool closure contractors/property owners;

3. collect repayments from property owners;

4. credit the property owner repayments to the principal repayment obligation of the local governmental unit; and

5. make monthly reports to both the Bank and the local governmental unit.

3.4 Loan Application:

A. Requests for financing under the Community Septic System Loan Program should be submitted in writing by the chief executive officer or other authorized officer of the local governmental unit to the Executive Director of the Bank. The written request shall include:

1. A projection of the estimated need for repair or replacement of failed or failing system or cesspool as contemplated by the Community's program and identified in the On-site Wastewater Management Plan prepared by the local governmental unit.

2. Indication of approval of the local governmental unit program for on-site septic system repair or replacement or cesspool closure as outlined in its On-site Wastewater Management Plan by the Department of Environmental Management (DEM).

3. A description of the dedicated source of loan security in the event of property owner loan default or non-payment, i.e., pledge of general revenues from property taxes of cities and towns, property liens, or other source available to the local governmental unit and deemed appropriate by the Bank.

4. A description of the overall operation of the local governmental unit, including but not limited to the most recent annual report or audited financials, with an emphasis on

    a. legal structure;

    b. management;

    c. sources of revenues;

    d. operating expenses;

    e. operating surpluses or deficits;

f. actual results versus budget; and

g. sources of financial liquidity.

(1) The most recent annual report or audited financials may be submitted in satisfaction of all or any part of this item.

5. Legal authority or authorities to borrow from the Community Septic System Loan Program.

6. Other information reasonably requested by the Bank.

3.5 Loan Approval Process:

Subject to availability of Bank funds and to prioritization by DEM of programs as outlined in the communities' On-site Wastewater Management Plans, loan applications will be considered for approval by the Bank for any eligible local governmental unit. The local governmental unit will provide a general obligation pledge, note in fully marketable form, or other obligation deemed appropriate by the Bank to ensure repayment of the CSSLP loan. A credit review of the local governmental unit and report by the Executive Director will be taken into consideration by the Bank.

3.6 Terms and Conditions:

A. The property owner repayment stream will be credited towards the community's repayment obligation of the CSSLP loan.

B. Rate - The CSSLP loan to the local governmental unit from the Bank will be at a rate of zero percent (0%).The subsequent loans to property owners will carry an interest rate of zero percent (0%) and service fees equivalent to 1% of the outstanding balance of the property owners loan to be distributed as follows:

1. Servicer 0.5% Property Owner Loan Service Fee

2. Bank 0.5% Community Loan Service Fee

3. 1.0% Total CSSLP Fees

a. In addition to the service fees set forth above, the property owner shall also pay a loan origination fee (Loan Origination Fee) at the time of closing to the Servicer in the amount of three hundred dollars ($300.00).

b. (CSSLP loan rates and fees are subject to periodic changes as per § 3.10 of this Part.)

C. Community Fees - The local governmental unit will be responsible for its own out of pocket closing costs, i.e. borrower's counsel fees and financial advisor fees.

D. Amortization - The loan repayments from the property owners will provide the repayments to the Bank. As the primary borrower, the local government unit is responsible for any shortfall or default in the repayments from the property owners. Amortization on the local governmental unit's loan will begin on the first day of the quarter after the loan closing and on a quarterly basis thereafter. The Servicer will collect payments from the property owners and make payments to the Bank on behalf of the local governmental unit.

E. Prepayments - The loan may be prepaid by the borrower at any time but may be subject to a prepayment penalty based on the cost of reinvesting the prepayment, the cost of prepaying outstanding bonds of the Bank, or any other negative financial impact to the Bank.

F. Security - Loans will have a pledge of

1. general revenues; and/or

2. may be secured by any other assets and upon such other terms and conditions as the Bank deems appropriate to protect the interests of the other participants in the loan programs of the Bank; bondholders; other creditors of the Bank; bondholders; or the finances of the Bank.

a. The obligations of the Borrower may be subject to and dependent upon appropriations being made by the Borrower for such purposes.

G. Loan Advances - The local governmental unit will indicate in written form an estimate of its yearly requirement for septic system or substandard system repairs or cesspool closures. As loans to property owners are originated, the Bank will advance the necessary amount for disbursement for approved project costs. RI Housing will act as paying agent on behalf of the local governmental unit for payments to contractors/property owners for approved project costs.

H. Community Specific Criteria for Property Owners Loans - The community may apply specific property owner loan criteria such as; number of estimates needed from licensed septic system installers or cesspool closure contractors; maximum number of housing units per structure allowed access to CSSLP; owner-non-owner-occupied borrowers; whether inhabitants of areas planned for sewer extension are eligible; and other such specific requirements. The community may not raise or lower the current property owner CSSLP fee of 1% but may combine the CSSLP with other sources of money so as to provide a greater dollar amount available for loans or to provide a greater economic incentive for property owners to repair or replace the failed systems. Any additional criteria applied by the local governmental unit cannot negate or otherwise overrule any federal and state laws and regulations which apply to the CSSLP.

I. Ineligible Project Costs - Eligibility shall be subject to any restrictions mandated by the EPA.

J. On-site Wastewater Management Plan/Certificate of Approval - Prior to entering into a loan agreement the Borrower must have a Certificate of Approval ("CA") from the RIDEM for the Borrower's On-site Wastewater Management Plan.

3.7 Reporting Requirements:

A. Local governmental units will be required to provide information to the Bank during the life of the loan, including but not limited to:

1. A record of the number and type of repaired or replaced septic systems and cesspool closures funded by this program.

2. A copy of its Annual Audited Financial Statements in accordance with Generally Accepted Government Accounting Standards annually within nine months days of end of fiscal year.

3. Copies of reports submitted to RIDEM, the Environmental Protection Agency (EPA) and any other regulatory agency relating to the septic systems or cesspools financed by the Bank or the operation thereof, simultaneously with each submission.

4. Other information or reports as and when the Bank may reasonably require.

3.8 Loan Documents:

The terms and conditions of each loan will be evidenced by an agreement outlining the specific terms and conditions of the loan and such agreement will be accompanied by an opinion of counsel, as required by the Bank enabling act.

3.9 Compliance with State and Federal Law:

Recipients (the Borrower) of loans must comply with all applicable state, Federal, Bank and municipal laws, ordinances, rules and/or regulations.

3.10 Modifications:

Where deemed appropriate by the Bank, waiver or variation of any provisions herein may be made or additional requirements may be added.

3.11 Severability

If any provision of these rules and regulations or the application thereof to any local government unit, person, or corporation is held invalid by a court of competent jurisdiction, the remainder of the rules and regulations shall not be affected thereby. The invalidity of any section or sections or parts of any section or sections shall not affect the validity of the remainder of these rules and regulations.

830-RICR-10-15-3

TITLE 830 - INFRASTRUCTURE BANK

CHAPTER 10 - PROGRAMS

SUBCHAPTER 15 - SEPTIC AND SEWER

PART 3 - Community Septic System Loan Policies and Procedures (830-RICR-10-15-3)

Type of Filing: Amendment
Effective Date: 06/01/2018

Editorial Note: This Part was filed with the Department of State prior to the launch of the Rhode Island Code of Regulations. As a result, this digital copy is presented solely as a reference tool. To obtain a certified copy of this Part, contact the Administrative Records Office at (401) 222-2473.

APPENDIX E

Summary of Rhode Island Municipal Onsite Wastewater Programs

RHODE ISLAND DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF WATER RESOURCES

Summary of Rhode Island Municipal Onsite Wastewater Programs

September 30, 2014

The R.I. Department of Environmental Management (DEM) has established minimum standards for onsite wastewater treatment systems throughout the state- *Rules Establishing Minimum Standards Relating to Location, Design, Construction and Maintenance of Onsite Wastewater Treatment Systems*. The rules are available online at: http://www.dem.ri.gov/pubs/regs/regs/water/owts14.pdf. DEM also encourages municipalities to establish local programs to meet the onsite wastewater needs of each community. Cities and towns have authority under state law to establish local management programs to encourage or require septic system maintenance. Most of these programs have been created with the assistance of State Bond funds or Federal Nonpoint Source funds distributed through DEM grants (with the exception of New Shoreham, where an EPA grant was used). Towns use these funds to develop an onsite wastewater management plan (OWMP) designed to meet local needs. An OWMP describes the elements of the municipal management program for septic systems. Program elements may include, for example, passing an ordinance requiring system inspections, enhancing homeowner education, or specifying more stringent treatment requirements in environmentally sensitive areas. Once approved by DEM, an OWMP makes a town eligible to apply to the Community Septic System Loan Program (CSSLP). CSSLP has been the primary incentive for towns to develop an OWMP. CSSLP funds come from the State Revolving Fund and are administered by Rhode Island Housing. Money is used by participating towns to provide low-interest loans to homeowners to cover the costs associated with septic system repairs and upgrades.

This document provides a brief summary of local onsite wastewater management in Rhode Island. Eighteen towns have an approved OWMP; fourteen participate in the CSSLP. The following cities and towns are primarily served by sewers and have not initiated local efforts to manage septic systems: Barrington, Central Falls, East Providence, Lincoln, Newport, North Providence, Pawtucket, Providence, West Warwick, and Woonsocket.

Bristol: Much of the Town of Bristol is served by municipal sewers, but some onsite systems are in use. Bristol has an approved OWMP and is participating in the CSSLP. The plan calls for voluntary system inspections and homeowner education.

Burrillville: Burrillville does not have an active municipal onsite wastewater management program at this time.

Charlestown: Charlestown has an approved OWMP and has a robust municipal onsite wastewater management program in place. The town charter includes a dedicated staff person to run the onsite wastewater program. The town has a wastewater management ordinance requiring periodic inspection of onsite systems. The town also maintains a web-based septic system inventory and tracking program, and is in the midst of a town-wide cesspool phase-out program. Charlestown also participates in the CSSLP.

Coventry: Coventry has an approved OWMP and participates in the CSSLP. The approved OWMP proposes phased implementation of a management program based on improving homeowner awareness, creating a septic system inventory, and promoting voluntary system inspections. The management program focuses on making financial assistance available to repair or replace failed systems and cesspools.

Cranston: The City of Cranston is primarily served by sewers and does not have an active municipal onsite wastewater management program at this time.

Cumberland: Cumberland does not have an active municipal onsite wastewater management program at this time.

East Greenwich: East Greenwich has a municipal sewer system for the area east of Route 2, serving approximately two-thirds of the town's population. The rest of the town is served by onsite systems. The town does not have an approved OWMP.

Exeter: Exeter has an approved OWMP. The plan calls for education and outreach efforts to encourage homeowners to properly maintain septic systems and recommends voluntary system inspections.

Foster: Foster has an approved OWMP. The plan utilizes education and outreach efforts to encourage voluntary system inspections. The town also utilizes a web-based inventory program.

Glocester: Glocester has an approved OWMP and has implemented a limited municipal onsite wastewater management program. The town participates in the CSSLP. The management program encourages voluntary system inspections. The town also requires local review and a special-use permit for proposed onsite systems located within 150 feet of a waterbody.

Hopkinton: Hopkinton has an approved OWMP. The plan calls for education and outreach efforts to encourage homeowners to properly maintain septic systems and recommends voluntary system inspections.

Jamestown: Jamestown has an approved OWMP and has a municipal onsite wastewater management program in place. The town participates in the CSSLP. Jamestown has an onsite wastewater management ordinance requiring septic system inspections at regular intervals. The town also has a High Groundwater Overlay Zone specifying additional septic system siting and treatment requirements. Jamestown uses a web-based inventory and tracking program to monitor septic system maintenance and track performance.

Johnston: Johnston has an approved OWMP and is participating in the CSSLP. The plan utilizes education and outreach efforts to encourage voluntary system inspections.

Little Compton: Little Compton does not have an active municipal onsite wastewater management program at this time.

Middletown: Middletown does not have an active municipal onsite wastewater management program at this time.

Narragansett: Narragansett has an approved OWMP and participates in the CSSLP. The town does not have an onsite wastewater management ordinance, but the zoning ordinance sets more stringent standards than the state regulations for septic system siting. The town utilities ordinance requires septic system pumping at least every 4 years, with records submitted to the town.

New Shoreham: The Town of New Shoreham has an approved OWMP and has a municipal onsite wastewater management program in place. The town has an onsite wastewater management ordinance requiring system inspections and maintenance. A town-wide cesspool phase-out program is ongoing. New Shoreham's zoning ordinance specifies treatment standards based on location and soil conditions. The town also participates in the CSSLP.

North Kingstown: The Town of North Kingstown has an approved OWMP and has a municipal onsite wastewater management program in place. The town has an onsite wastewater management ordinance requiring septic system inspection and maintenance at regular intervals. The town participates in the CSSLP with loan funds administered by the Water Department.

North Smithfield: North Smithfield currently has no formal municipal onsite wastewater management program. Basic outreach materials for septic system operations and maintenance are available on the Town's web site.

Portsmouth: Portsmouth does not currently have a DEM-approved municipal onsite wastewater management plan. The town is currently developing a program for enhanced management of onsite systems.

Richmond: Richmond has an approved OWMP. The plan calls for education and outreach efforts to encourage homeowners to properly maintain septic systems and recommends voluntary system inspections.

Scituate: Scituate has an approved OWMP. The plan utilizes education and outreach efforts to encourage voluntary system inspections. The town also utilizes a web-based inventory program. The town participates in the CSSLP.

Smithfield: Smithfield does not have an active municipal onsite wastewater management program at this time.

South Kingstown: South Kingstown has an approved OWMP and has an onsite wastewater management program in place. The town has a wastewater management ordinance requiring inspection of onsite systems. A town-wide cesspool phase-out is nearly complete with all required deadlines having passed. Cesspools discovered via the inspection program had to be upgraded within 5 years of discovery. Cesspools were also required to be upgraded within 12 months of the sale of a property. The South Kingstown zoning ordinance contains more stringent setbacks from natural features than the state requirements. South Kingstown uses a web-base inventory and tracking program and participates in the CSSLP.

Tiverton: Tiverton has an approved OWMP and an onsite wastewater management program, including a management ordinance. The town participates in the CSSLP. The ordinance requires septic system inspection and maintenance and mandates the installation of access risers and effluent filters when systems are repaired or upgraded. Tiverton is in the process of implementing a limited cesspool phase-out program. The Town has focused initially on the Stafford Pond watershed and has nearly completed upgrades in this area. Coastal areas in Tiverton are still subject to the R.I. Cesspool Act of 2007 because the Town program specifies later deadlines than the State program.

Warren: Although much of the Town of Warren is served by sewers, the Touisset Neck section of town is not. The Town has an approved OWMP for the un-sewered areas of town. The plan proposes an aggressive monitoring and oversight program with a web-based inventory and tracking system. Warren participates in the CSSLP.

Warwick: Much of Warwick is sewered, but a significant number of onsite systems remain. The city is in the process of implementing a mandatory sewer tie-in program. Lots with access to municipal sewers will be required to abandon their onsite system and connect to the sewer line upon sale of the property. The city is considering the development of a management program for those areas where sewer service will not be extended.

West Greenwich: The Town of West Greenwich does not have an active municipal onsite wastewater management program at this time.

Westerly: The Town of Westerly has a municipal sewer system serving the downtown area, corresponding to approximately half the town's population. The rest of the town is served by onsite systems. Westerly has an approved OWMP which calls for creation of a wastewater management district for areas not currently served by sewers and where the Wastewater Facilities Plan indicates sewer extensions are not planned. Within this district, the Town will create a homeowner education and outreach program and create a computerized inventory containing results of voluntary inspections. The town participates in the CSSLP.

APPENDIX F

Example CSSLP Fact Sheet

rihousing
Invest. Build. Believe.

Portsmouth Community Septic Loan Program

Offered by RIHousing in partnership with the Rhode Island Infrastructure Bank, the State Department of Environmental Management and the Town of Portsmouth.

The program goal is to safeguard public health, and protect and improve ground and surface water resources, by ensuring the proper functioning and maintenance of all septic systems in Portsmouth. The program makes low interest rate mortgages available to Portsmouth residents.

Loan Terms: ☐ 10 Years

PLEASE ATTACH THE FOLLOWING ITEMS TO YOUR APPLICATION

- ☐ a copy of 2 most recent pay stub(s) for each applicant
- ☐ a copy of each applicant's most recent signed tax return, along with last two years of W-2s *(Note: one tax return is acceptable in the case of joint returns)*
- ☐ a copy of the property deed with exhibit A
- ☐ a copy of most recent mortgage statement, real estate tax bill and homeowner's insurance
- ☐ a copy of social security and/or pension award letters *(or recent bank statement verifying receipt of social security and/or pension funds)*
- ☐ If self-employed or commissioned, provide copies of your completed federal tax returns from the last two years with all schedules attached

LOAN TERMS

- Loan term to 10 years
- 1% Fixed Rate
- Loan amounts to $25,000
- No income restrictions
- 45% debt-to-income ratio
- Owner-occupied and non-owner-occupied one- to four-family residential properties qualify

PROGRAM REQUIREMENTS

- All work must be completed by a Rhode Island-licensed installer
- Must have no current bankruptcies
- No current state or federal tax liens on the property
- DEM Certificate of Conformance required prior to disbursement

FEES

There is a $300.00 loan origination fee to be paid to the borrower at closing

Note: funds are available on a first-come, first-served basis. These funds are not intended for the purpose of refinancing an already completed septic system project.

CONTACT US

Call us today at 401-457-1127 with questions or complete and mail this application to:

RIHousing
44 Washington Street
Providence, RI 02903-1721
Attn: Community Lending